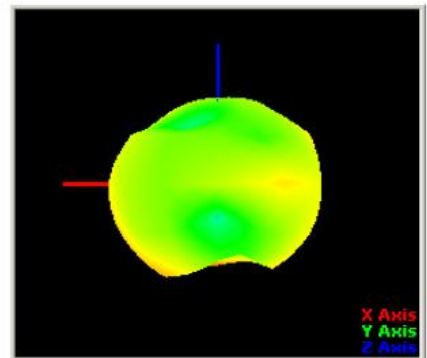
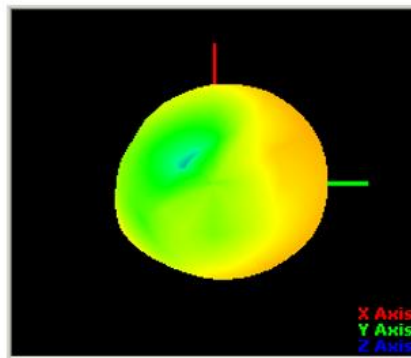
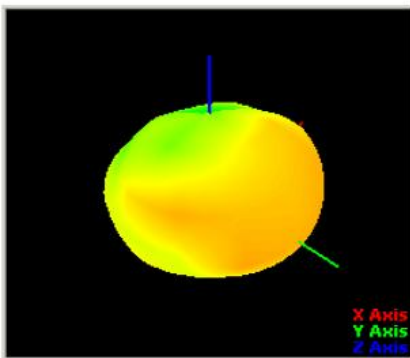


2.2.3 BT-antenna efficiency and gain

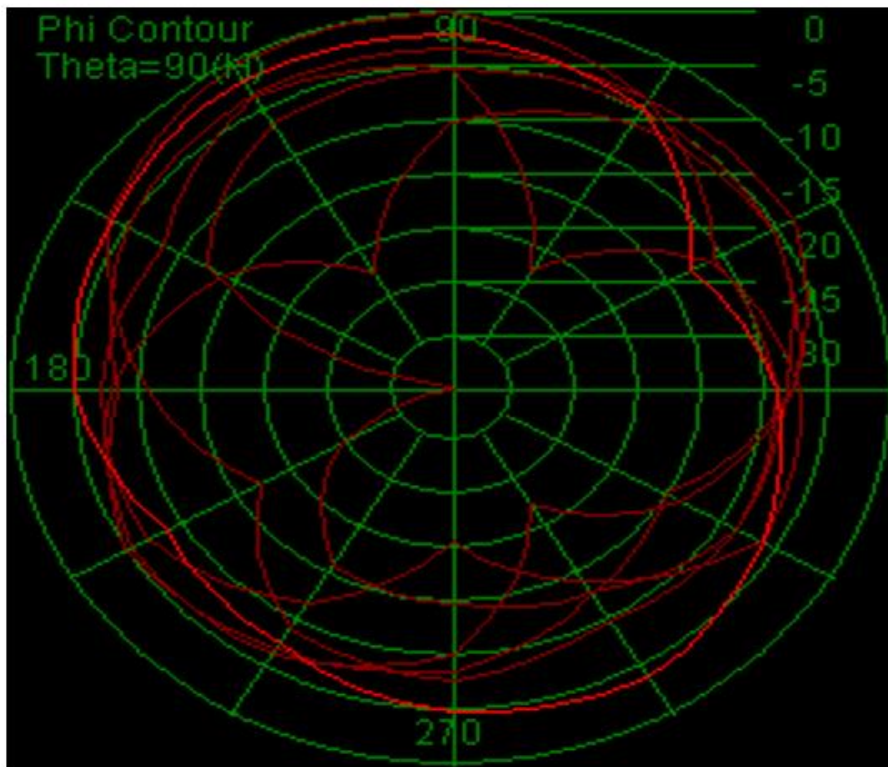
Passive Test For 2400MHz~2500MHz				
Freq	Effi	Effi	Gain	
(MHz)	(%)	(dB)	(dBi)	
2400	51.8%	-2.86	1.75	
2410	52.6%	-2.79	1.88	
2420	53.8%	-2.69	1.91	
2430	54.1%	-2.67	2.24	
2440	54.6%	-2.63	2.37	
2450	55.8%	-2.53	2.45	
2460	54.7%	-2.62	2.32	
2470	53.2%	-2.74	2.16	
2480	52.4%	-2.81	1.87	
2490	52.8%	-2.77	1.93	
2500	51.9%	-2.85	1.83	



2.2.4 Radiation Pattern For BT Antenna (2450MHz) , Peak Gain: 2.45dbi



2.2.5 Antenna passive parameters-BT direction diagram

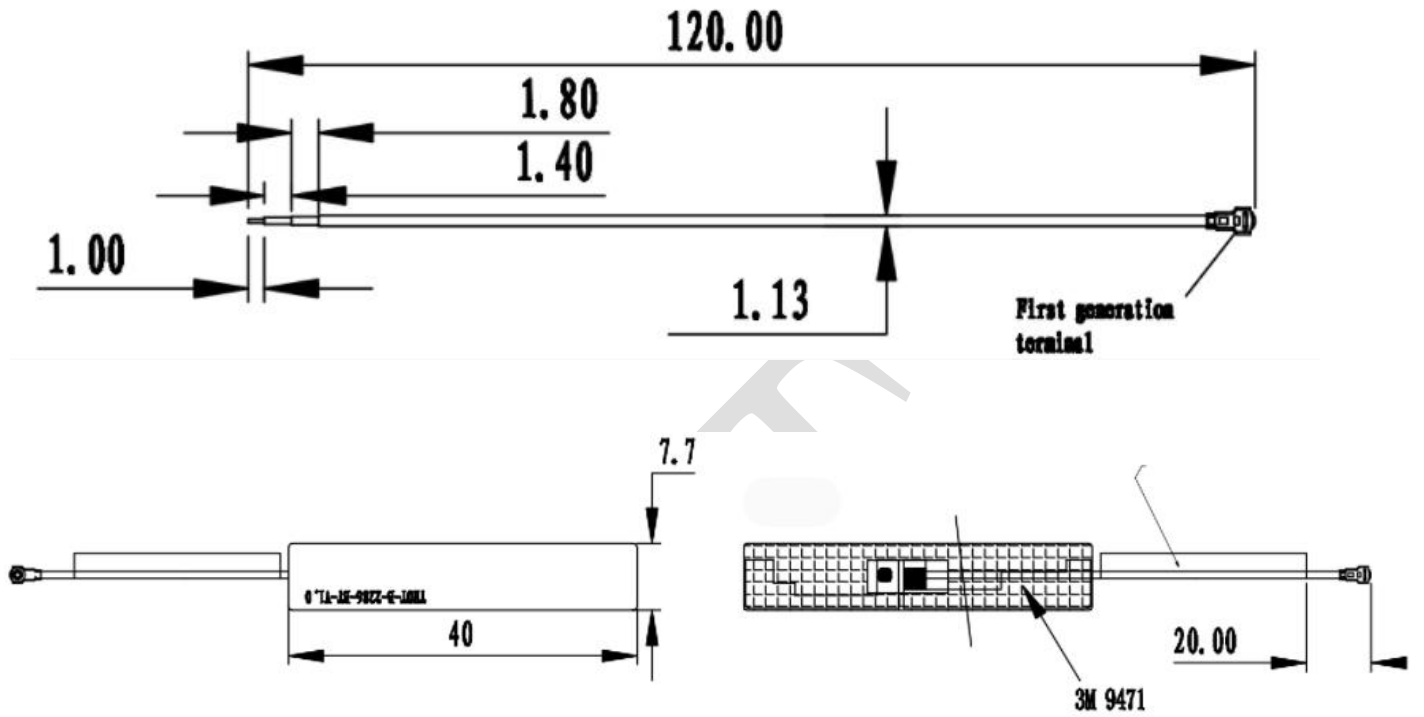


MIN= -6.93

2.2.6 Active parameters of BT antenna

Test	BT		
Result	1	39	78
TRP (dBm)	7.20	6.71	6.85
TIS (dBm)	-89.04	-89.25	-89.14

2.4 Antenna design-Dipole



2.5 active parameters of BT antenna (0 channel)

Bluetooth, Channel 0, TRP														
		0	30	60	90	120	150	180	210	240	270	300	330	360
H+V Total (30° Step)	0	-4.33	-4.33	-4.07	-4.07	2.13	2.13	--	--	--	--	--	--	--
	30	-4.33	-4.33	-4.07	-4.07	2.13	2.13	4.98	4.98	2.01	2.01	-4.86	-4.86	--
	60	-3.94	-1.78	0.46	5.62	10.30	11.65	11.43	11.86	11.90	9.02	3.38	1.23	--
	90	-3.32	-1.65	-2.73	7.97	12.05	10.16	10.08	12.07	12.76	12.38	7.22	0.25	--
	120	-3.01	-3.91	0.36	9.13	11.98	11.53	12.39	12.09	12.41	12.03	7.04	-3.83	--
	150	-0.03	-0.03	2.13	2.13	11.16	11.16	11.60	11.60	10.84	10.84	4.55	4.55	--
	180	-0.03	-0.03	2.13	2.13	11.16	11.16	--	--	--	--	--	--	--
H (30° Step)	0	-7.69	-7.69	-7.65	-7.65	-0.14	-0.14	--	--	--	--	--	--	--
	30	-7.69	-7.69	-7.65	-7.65	-0.14	-0.14	4.47	4.47	1.15	1.15	-5.10	-5.10	--
	60	-8.56	-3.28	-14.27	4.11	10.23	11.30	10.39	11.41	11.72	8.71	2.56	0.21	--
	90	-4.97	-5.70	-3.78	7.76	13.01	9.33	9.03	11.88	12.69	12.27	7.10	-0.71	--
	120	-3.40	-4.99	-0.21	8.98	12.66	9.83	11.09	12.77	12.38	11.90	6.62	-5.60	--
	150	-0.06	-0.06	1.95	1.95	10.53	10.53	9.84	9.84	10.60	10.60	2.18	2.18	--
	180	-0.06	-0.06	1.95	1.95	10.53	10.53	--	--	--	--	--	--	--
V (30° Step)	0	-7.02	-7.02	-6.57	-6.57	-1.78	-1.78	--	--	--	--	--	--	--
	30	-7.02	-7.02	-6.57	-6.57	-1.78	-1.78	-4.59	-4.59	-5.43	-5.43	-17.61	-17.61	--
	60	-5.78	-7.14	0.31	0.31	-7.80	0.58	4.73	1.79	-2.13	-2.56	-4.25	-5.56	--
	90	-8.33	-3.82	-9.39	-5.19	-7.19	2.54	3.38	-1.53	-5.38	-3.77	-8.51	-6.77	--
	120	-13.71	-10.50	-8.76	-5.61	1.56	6.62	6.52	1.58	-7.70	-2.39	-3.27	-8.57	--
	150	-21.95	-21.95	-11.70	-11.70	2.46	2.46	6.83	6.83	-1.93	-1.93	0.80	0.80	--
	180	-21.95	-21.95	-11.70	-11.70	2.46	2.46	--	--	--	--	--	--	--

Bluetooth, Channel 0, TIS														
		0	30	60	90	120	150	180	210	240	270	300	330	360
H+V Total (30° Step)	0	-80.59	-80.59	-80.85	-80.85	-87.05	-87.05	--	--	--	--	--	--	--
	30	-80.59	-80.59	-80.85	-80.85	-87.05	-87.05	-89.90	-89.90	-86.93	-86.93	-80.06	-80.06	--
	60	-80.98	-83.14	-85.38	-90.54	-95.22	-96.57	-96.35	-93.78	-96.82	-93.94	-88.30	-86.15	--
	90	-81.60	-83.27	-82.19	-92.89	-91.97	-93.08	-95.00	-94.99	-93.68	-93.30	-92.14	-85.17	--
	120	-81.91	-81.01	-85.28	-90.05	-91.90	-93.45	-94.31	-94.01	-94.33	-93.95	-91.96	-81.09	--
	150	-84.89	-84.89	-87.05	-87.05	-91.08	-92.08	-93.52	-93.52	-93.76	-92.76	-89.47	-89.47	--
	180	-84.89	-84.89	-87.05	-87.05	-90.08	-90.08	--	--	--	--	--	--	--
H (30° Step)	0	-77.23	-77.23	-77.27	-77.27	-84.78	-84.78	--	--	--	--	--	--	--
	30	-77.23	-77.23	-77.27	-77.27	-84.78	-84.78	-89.39	-89.39	-86.07	-86.07	-79.82	-79.82	--
	60	-76.36	-81.64	-70.65	-89.03	-92.15	-93.22	-92.31	-96.33	-92.64	-93.63	-87.48	-85.13	--
	90	-79.95	-79.22	-81.14	-92.68	-94.93	-94.25	-93.95	-96.80	-91.61	-92.19	-92.02	-84.21	--
	120	-81.52	-79.93	-84.71	-93.90	-91.58	-94.75	-92.01	-92.69	-93.30	-92.82	-91.54	-79.32	--
	150	-84.86	-84.86	-86.87	-86.87	-91.45	-93.45	-92.76	-92.76	-91.52	-93.52	-87.10	-87.10	--
	180	-84.86	-84.86	-86.87	-86.87	-93.45	-91.45	--	--	--	--	--	--	--
V (30° Step)	0	-77.90	-77.90	-78.35	-78.35	-83.14	-83.14	--	--	--	--	--	--	--
	30	-77.90	-77.90	-78.35	-78.35	-83.14	-83.14	-80.33	-80.33	-79.49	-79.49	-67.31	-67.31	--
	60	-79.14	-77.78	-85.23	-85.23	-77.12	-85.50	-89.65	-86.71	-82.79	-82.36	-80.67	-79.36	--
	90	-76.59	-81.10	-75.53	-79.73	-77.73	-87.46	-88.30	-83.39	-79.54	-81.15	-76.41	-78.15	--
	120	-71.21	-74.42	-76.16	-79.31	-86.48	-91.54	-91.44	-86.50	-77.22	-82.53	-81.65	-76.35	--
	150	-62.97	-62.97	-73.22	-73.22	-87.38	-87.38	-91.75	-91.75	-82.99	-82.99	-85.72	-85.72	--
	180	-62.97	-62.97	-73.22	-73.22	-87.38	-87.38	--	--	--	--	--	--	--

2.6 active parameters of BT antenna (39 channel)

Bluetooth, Channel 39, TRP

		0	30	60	90	120	150	180	210	240	270	300	330	360
H+V Total (30° Step)	0	-6.13	-6.13	-4.79	-4.79	2.54	2.54	--	--	--	--	--	--	--
	30	-6.13	-6.13	-4.79	-4.79	2.54	2.54	5.75	5.75	3.77	3.77	-4.64	-4.64	--
	60	-6.73	-0.78	-1.31	4.19	9.51	10.42	10.42	11.69	11.54	8.23	2.65	-1.07	--
	90	-5.41	-1.97	-3.39	6.26	10.59	8.12	11.09	13.61	11.98	11.65	6.55	-3.48	--
	120	-4.69	-5.37	-1.78	7.86	12.22	10.10	11.43	12.06	11.62	12.31	5.24	-7.73	--
	150	-2.79	-2.79	0.59	0.59	10.32	10.32	10.22	10.22	10.97	10.97	4.22	4.22	--
	180	-2.79	-2.79	0.59	0.59	10.32	10.32	--	--	--	--	--	--	--
H (30° Step)	0	-7.86	-7.86	-16.84	-16.84	0.91	0.91	--	--	--	--	--	--	--
	30	-7.86	-7.86	-16.84	-16.84	0.91	0.91	5.52	5.52	3.09	3.09	-6.65	-6.65	--
	60	-14.39	-2.73	-11.61	2.32	9.49	10.01	9.16	11.34	11.45	8.05	1.73	-2.16	--
	90	-6.76	-4.58	-4.99	6.03	10.57	6.49	11.54	11.51	11.85	11.46	6.45	-4.64	--
	120	-5.73	-5.41	-2.16	7.75	11.79	7.54	11.32	11.96	11.60	12.16	4.81	-8.59	--
	150	-3.01	-3.01	-0.29	-0.29	9.16	9.16	8.68	8.68	10.74	10.74	1.82	1.82	--
	180	-3.01	-3.01	-0.29	-0.29	9.16	9.16	--	--	--	--	--	--	--
V (30° Step)	0	-10.96	-10.96	-5.07	-5.07	-2.50	-2.50	--	--	--	--	--	--	--
	30	-10.96	-10.96	-5.07	-5.07	-2.50	-2.50	-7.03	-7.03	-4.61	-4.61	-8.94	-8.94	--
	60	-7.55	-5.19	-1.73	-0.38	-14.87	-0.07	4.42	0.64	-5.24	-5.68	-4.55	-7.60	--
	90	-11.13	-5.43	-8.50	-6.52	-12.66	3.08	2.81	-2.83	-2.23	-1.99	-9.80	-9.78	--
	120	-11.39	-26.30	-12.59	-8.33	1.97	6.58	5.95	-2.56	-10.66	-2.41	-5.06	-15.20	--
	150	-15.81	-15.81	-6.80	-6.80	4.02	4.02	4.97	4.97	-1.91	-1.91	0.49	0.49	--
	180	-15.81	-15.81	-6.80	-6.80	4.02	4.02	--	--	--	--	--	--	--

Bluetooth, Channel 39, TIS

		0	30	60	90	120	150	180	210	240	270	300	330	360
H+V Total (30° Step)	0	-79.98	-79.98	-81.32	-81.32	-88.65	-88.65	--	--	--	--	--	--	--
	30	-79.98	-79.98	-81.32	-81.32	-88.65	-88.65	-91.86	-91.86	-89.88	-89.88	-81.47	-81.47	--
	60	-79.38	-85.33	-84.80	-90.30	-91.62	-93.53	-92.53	-92.80	-92.65	-91.34	-88.76	-85.04	--
	90	-80.70	-84.14	-82.72	-92.37	-91.70	-91.23	-92.20	-91.72	-92.09	-92.76	-92.66	-82.63	--
	120	-81.42	-80.74	-84.33	-93.97	-91.33	-92.21	-93.54	-92.17	-92.73	-91.42	-91.35	-78.38	--
	150	-83.32	-83.32	-86.70	-86.70	-91.43	-92.43	-92.33	-91.33	-92.08	-92.08	-90.33	-90.33	--
	180	-83.32	-83.32	-86.70	-86.70	-91.43	-91.43	--	--	--	--	--	--	--
H (30° Step)	0	-78.25	-78.25	-69.27	-69.27	-87.02	-87.02	--	--	--	--	--	--	--
	30	-78.25	-78.25	-69.27	-69.27	-87.02	-87.02	-91.63	-91.63	-89.20	-89.20	-79.46	-79.46	--
	60	-71.72	-83.38	-74.50	-88.43	-93.60	-91.12	-92.27	-91.45	-91.56	-92.16	-87.84	-83.95	--
	90	-79.35	-81.53	-81.12	-92.14	-92.68	-92.60	-92.65	-92.62	-91.96	-91.57	-92.56	-81.47	--
	120	-80.38	-80.70	-83.95	-93.86	-91.90	-93.65	-97.43	-93.07	-91.71	-92.27	-90.92	-77.52	--
	150	-83.10	-83.10	-85.82	-85.82	-95.27	-95.27	-94.79	-91.79	-92.85	-91.85	-87.93	-87.93	--
	180	-83.10	-83.10	-85.82	-85.82	-95.27	-95.27	--	--	--	--	--	--	--
V (30° Step)	0	-75.15	-75.15	-81.04	-81.04	-83.61	-83.61	--	--	--	--	--	--	--
	30	-75.15	-75.15	-81.04	-81.04	-83.61	-83.61	-79.08	-79.08	-81.50	-81.50	-77.17	-77.17	--
	60	-78.56	-80.92	-84.38	-85.73	-71.24	-86.04	-90.53	-86.75	-80.87	-80.43	-81.56	-78.51	--
	90	-74.98	-80.68	-77.61	-79.59	-73.45	-89.19	-88.92	-83.28	-83.88	-84.12	-76.31	-76.33	--
	120	-74.72	-59.81	-73.52	-77.78	-88.08	-92.69	-92.06	-83.55	-75.45	-83.70	-81.05	-70.91	--
	150	-70.30	-70.30	-79.31	-79.31	-90.13	-90.13	-91.08	-91.08	-84.20	-84.20	-86.60	-86.60	--
	180	-70.30	-70.30	-79.31	-79.31	-90.13	-90.13	--	--	--	--	--	--	--

2.7 Active parameters of BT antenna (78 channel)

Bluetooth, Channel 78, TRP

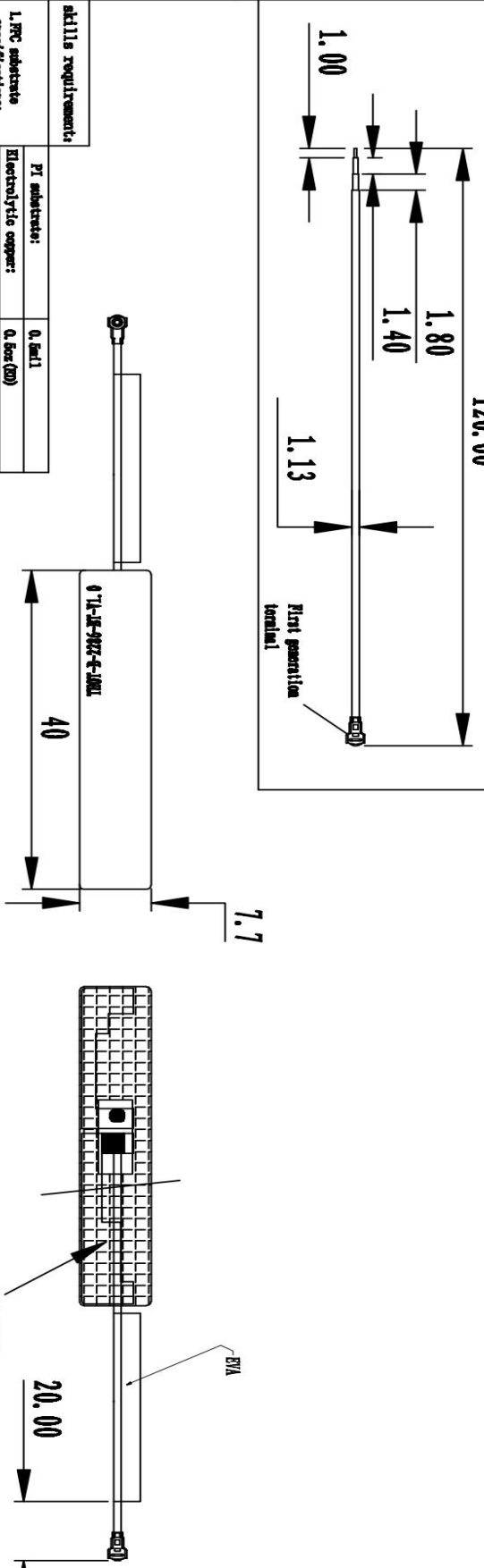
		0	30	60	90	120	150	180	210	240	270	300	330	360
H+V Total (30° Step)	0	-10.60	-10.60	-4.76	-4.76	1.60	1.60	--	--	--	--	--	--	--
	30	-10.60	-10.60	-4.76	-4.76	1.60	1.60	4.31	4.31	2.43	2.43	-5.43	-5.43	--
	60	-8.10	-2.12	-3.36	2.59	7.06	8.66	8.47	10.07	10.13	6.99	1.62	-4.01	--
	90	-11.03	-4.71	-3.01	3.97	8.17	6.75	11.77	13.11	12.24	10.30	4.40	-6.85	--
	120	-9.34	-7.44	-5.73	5.78	10.08	9.29	12.26	11.59	12.50	10.72	3.75	-5.05	--
	150	-4.18	-4.18	-3.67	-3.67	7.72	7.72	8.23	8.23	9.42	9.42	2.89	2.89	--
	180	-4.18	-4.18	-3.67	-3.67	7.72	7.72	--	--	--	--	--	--	--
H (30° Step)	0	-10.67	-10.67	-13.90	-13.90	-0.24	-0.24	--	--	--	--	--	--	--
	30	-10.67	-10.67	-13.90	-13.90	-0.24	-0.24	4.12	4.12	1.82	1.82	-11.98	-11.98	--
	60	-14.61	-4.29	-8.11	0.76	7.03	8.20	7.27	9.72	10.09	6.81	0.81	-5.46	--
	90	-15.33	-6.74	-3.85	3.61	8.09	5.22	11.33	13.06	12.09	9.94	4.19	-7.30	--
	120	-11.95	-7.46	-5.79	5.69	9.47	6.87	11.58	13.55	12.49	10.53	3.55	-5.45	--
	150	-4.65	-4.65	-4.37	-4.37	6.40	6.40	6.36	6.36	9.18	9.18	-0.86	-0.86	--
	180	-4.65	-4.65	-4.37	-4.37	6.40	6.40	--	--	--	--	--	--	--
V (30° Step)	0	-28.73	-28.73	-5.33	-5.33	-3.01	-3.01	--	--	--	--	--	--	--
	30	-28.73	-28.73	-5.33	-5.33	-3.01	-3.01	-9.46	-9.46	-6.37	-6.37	-6.52	-6.52	--
	60	-9.20	-6.17	-5.13	-2.05	-15.23	-1.35	2.29	-1.08	-10.09	-6.89	-6.10	-9.49	--
	90	-13.05	-8.98	-10.55	-7.08	-8.98	1.49	1.62	-6.43	-2.43	-0.67	-8.96	-16.89	--
	120	-12.80	-30.24	-24.28	-10.99	1.23	5.60	3.90	-6.63	-12.36	-2.88	-9.78	-15.65	--
	150	-14.05	-14.05	-11.96	-11.96	1.90	1.90	3.68	3.68	-3.26	-3.26	0.52	0.52	--
	180	-14.05	-14.05	-11.96	-11.96	1.90	1.90	--	--	--	--	--	--	--

Bluetooth, Channel 78, TIS

		0	30	60	90	120	150	180	210	240	270	300	330	360
H+V Total (30° Step)	0	-75.46	-75.46	-81.30	-81.30	-87.66	-87.66	--	--	--	--	--	--	--
	30	-75.46	-75.46	-81.30	-81.30	-87.66	-87.66	-90.37	-90.37	-88.49	-88.49	-80.63	-80.63	--
	60	-77.96	-83.94	-82.70	-88.65	-93.12	-91.72	-91.53	-92.13	-91.19	-93.05	-87.68	-82.05	--
	90	-75.03	-81.35	-83.05	-90.03	-94.23	-92.81	-92.83	-93.17	-92.30	-96.36	-90.46	-79.21	--
	120	-76.72	-78.62	-80.33	-91.84	-92.14	-92.35	-91.32	-93.65	-91.56	-91.78	-89.81	-81.01	--
	150	-81.88	-81.88	-82.39	-82.39	-93.78	-93.78	-91.29	-91.29	-91.48	-91.48	-88.95	-88.95	--
	180	-81.88	-81.88	-82.39	-82.39	-93.78	-93.78	--	--	--	--	--	--	--
H (30° Step)	0	-75.39	-75.39	-72.16	-72.16	-85.82	-85.82	--	--	--	--	--	--	--
	30	-75.39	-75.39	-72.16	-72.16	-85.82	-85.82	-90.18	-90.18	-87.88	-87.88	-74.08	-74.08	--
	60	-71.45	-81.77	-77.95	-86.82	-91.09	-91.26	-93.33	-92.78	-92.15	-92.87	-86.87	-80.60	--
	90	-70.73	-79.32	-82.21	-89.67	-91.15	-91.28	-92.39	-92.12	-91.15	-92.00	-90.25	-78.76	--
	120	-74.11	-78.60	-80.27	-91.75	-92.53	-92.93	-91.64	-92.61	-91.55	-92.59	-89.61	-80.61	--
	150	-81.41	-81.41	-81.69	-81.69	-92.46	-92.46	-92.42	-92.42	-91.24	-91.24	-85.20	-85.20	--
	180	-81.41	-81.41	-81.69	-81.69	-92.46	-92.46	--	--	--	--	--	--	--
V (30° Step)	0	-57.33	-57.33	-80.73	-80.73	-83.05	-83.05	--	--	--	--	--	--	--
	30	-57.33	-57.33	-80.73	-80.73	-83.05	-83.05	-76.60	-76.60	-79.69	-79.69	-79.54	-79.54	--
	60	-76.86	-79.89	-80.93	-84.01	-70.83	-84.71	-88.35	-84.98	-75.97	-79.17	-79.96	-76.57	--
	90	-73.01	-77.08	-75.51	-78.98	-77.08	-87.55	-87.68	-79.63	-83.63	-85.39	-77.10	-69.17	--
	120	-73.26	-55.82	-61.78	-75.07	-87.29	-91.66	-89.96	-79.43	-73.70	-83.18	-76.28	-70.41	--
	150	-72.01	-72.01	-74.10	-74.10	-87.96	-87.96	-89.74	-89.74	-82.80	-82.80	-86.58	-86.58	--
	180	-72.01	-72.01	-74.10	-74.10	-87.96	-87.96	--	--	--	--	--	--	--

3. structural drawings

1	2	3	4	5	6	7	8
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Technical Specifications:

1. PCB substrate specifications:	PC substrate: 0.6mm1
Electrolytic copper:	0.06 (20)
Double-sided tape:	3M-9471US
2. Electroplating specifications:	Nickel plating: 30um
Gold plating: 0.0125um	
3. Surface ink requirements:	Surface ink color: Matt black
Printing font color:	Bright black
Printing font height:	According to drawings
4. Reliability requirements:	1. Reliability test: salt spray test\rubber friction test\alcohol resistance test\100 grid test. 2. The front ink, the surface of the ink is required to be folded in half without cracking, scratching, etc.
5. Tolerance requirements:	1. Shape tolerance ±0.10; 2. Copper foil circuit tolerance ±0.05; 3. The position of the copper foil to the shape is ±0.15; 4. Hole-to-hole position tolerance ±0.10; hole-to-shape position tolerance ±0.15; 5. The size tolerance of gold finger is ±0.20. 6. For other unmarked dimensions, refer to 2D drawings.
6. Key control size:	The dimensions marked with numbers are regarded as important dimensions, and the others refer to 2D drawings
7. Environmental requirements:	Parts meet ROHS2.0/RE/Reach/CE environmental protection requirements
8. Packaging requirements:	Packed in PE bags, the quantity of each bag is 100PCS, there is a mark on the outside of the bag

Material and Quality Control:

0.10	±0.10	○	0.02	Model	S-2286	DATE	2023030313
10.20	±0.12	◎	0.03	Name	RF antennas	Design	JTB
20.40	±0.15	┘	0.02	Part NO	289048-1A	Revise	JTB
40.50	±0.20	∇	0.04	Special quality	Electrolytic copper (not to use)	Revise	CHJ
		∇	0.02	Sold within tolerance			
		∇	0.02	Agreement			

Shenzhen Yu Sheng Communication Equipment Co., Ltd.

Double-sided printing black oil

1	2	3	4	5	6	7	8
DATE	Modify the content	Version	Revise	批准	设计	审核	确认