

EM02-BK3296 Antenna Test Report



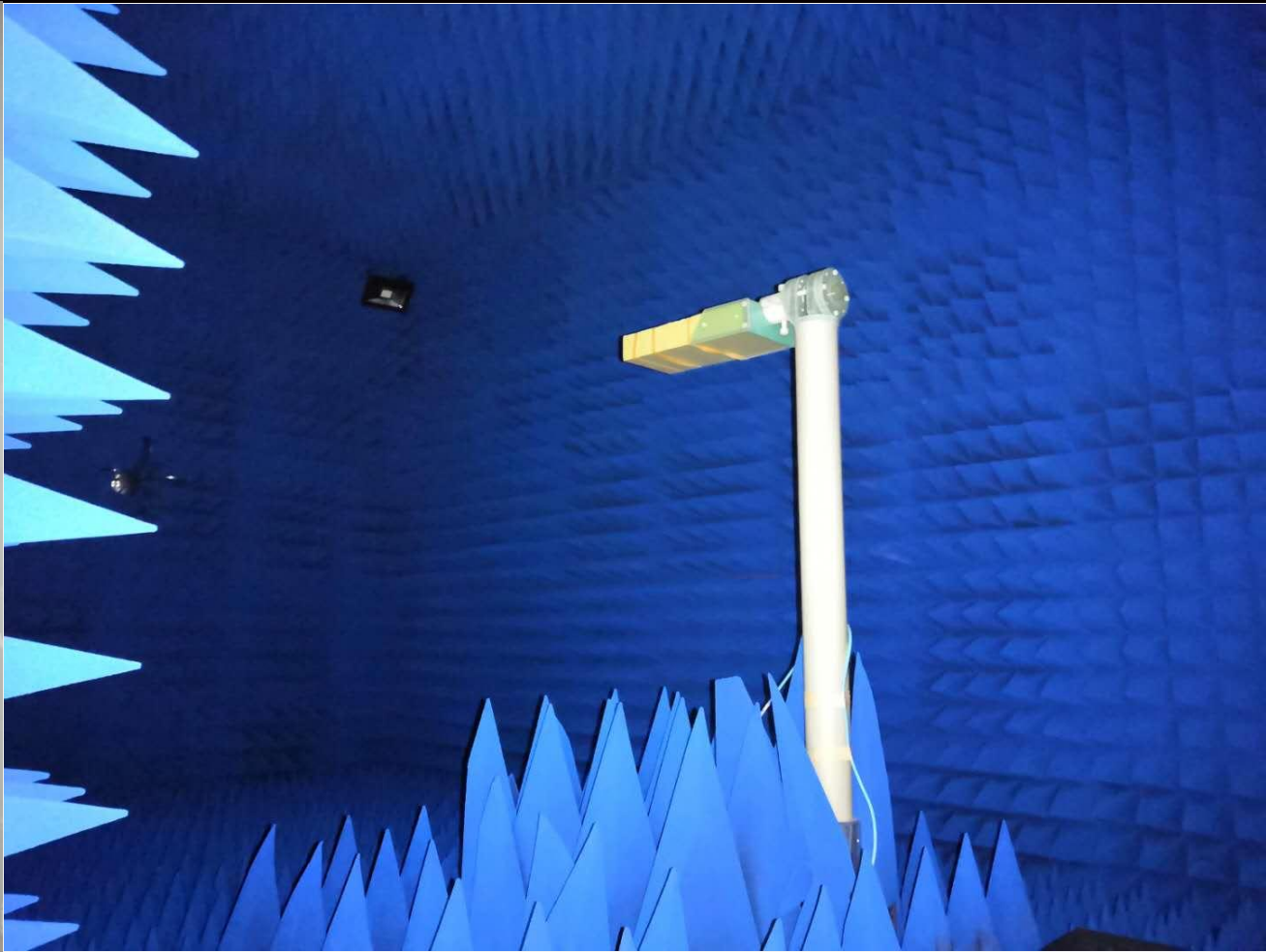
Date: April 1st, 2025



Customer		Item Name	EM02-BK3296
Frequency Band	2400MHZ-2500MHZ BT	Antenna Engineering:	Kangzhongzhu
Date	April 1st, 2025		

1.Test Tools

Instrument	Agilent Technologies E5071B & R&S CMW500
Darkroom	Atenlab M3
Antenna Engineering	Kangzhongzhu
Temperature	25℃
Humidity	65% (RH)





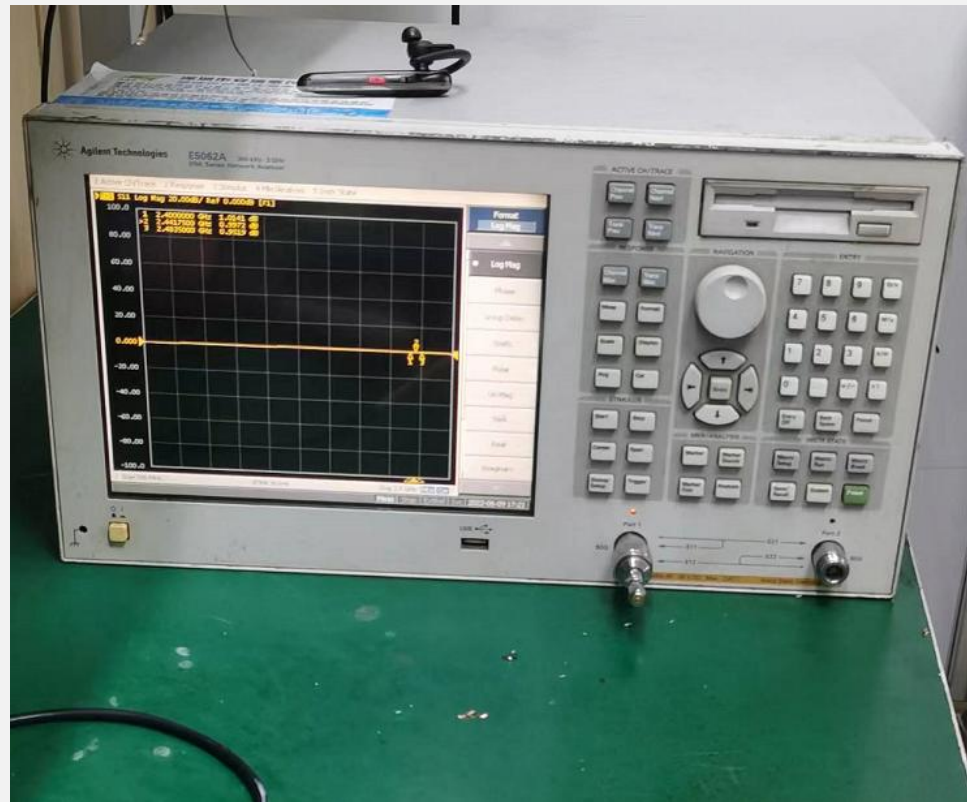
- Test setup
- Antenna Solution
- S Parameter --- Return Loss、 Isolation
- Efficiency and Peak Gain
- Radiation Patterns
- Test Result---TRP and TIS
- Summary

1. Test system description---S Parameter

1.1. Test Setup

1.1.1 VNA Test Setup

S parameter measurements (S_{11}) were performed using an Keysight 5062A&E5071B Network Analyzer and previously described tests fixtures. The isolation between antennas is also tested. The testing was performed with apparatus in free space.



1. Test system description--- Anechoic Chamber Test Setup

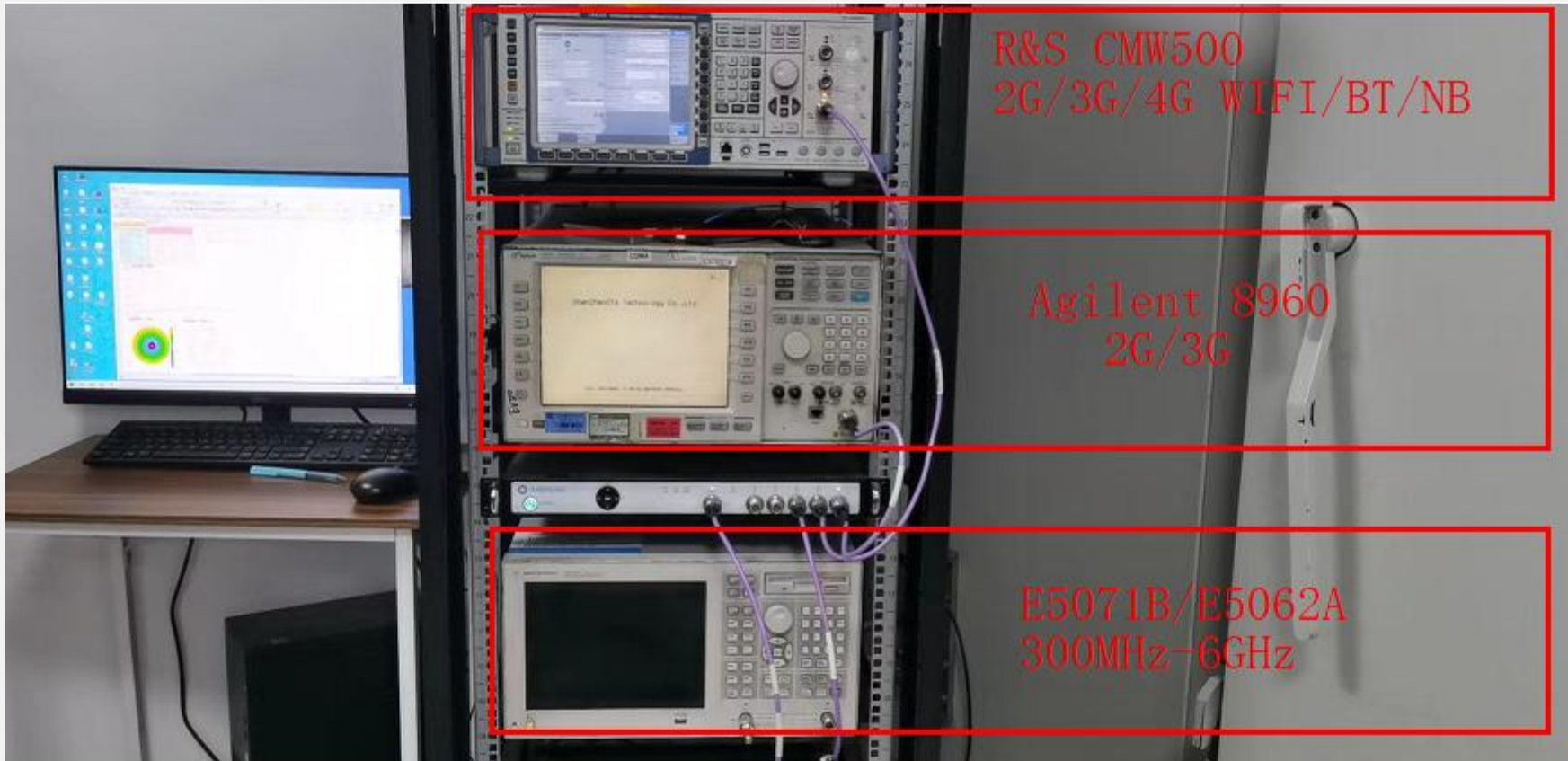
1.1.1 Anechoic Chamber Test Setup

The gain of the antenna was measured in the anechoic chamber(ETS-3D). The chamber provides less than -30 dB reflectivity from 400 MHz through 6 GHz. The chamber size is: 7m*4m*3m. The measurement results are calibrated using a leaky wave horn standard. We can measure the antenna gain and efficiency accurately.



1. Test system description--- Test Instruments

1.1.3 Instruments



2. Antenna Solution

2.1 Antenna Location Pictures for passive



3. Test Result---Return Loss and Efficiency

S11 (for EM02-BK3296 Bluetooth) :

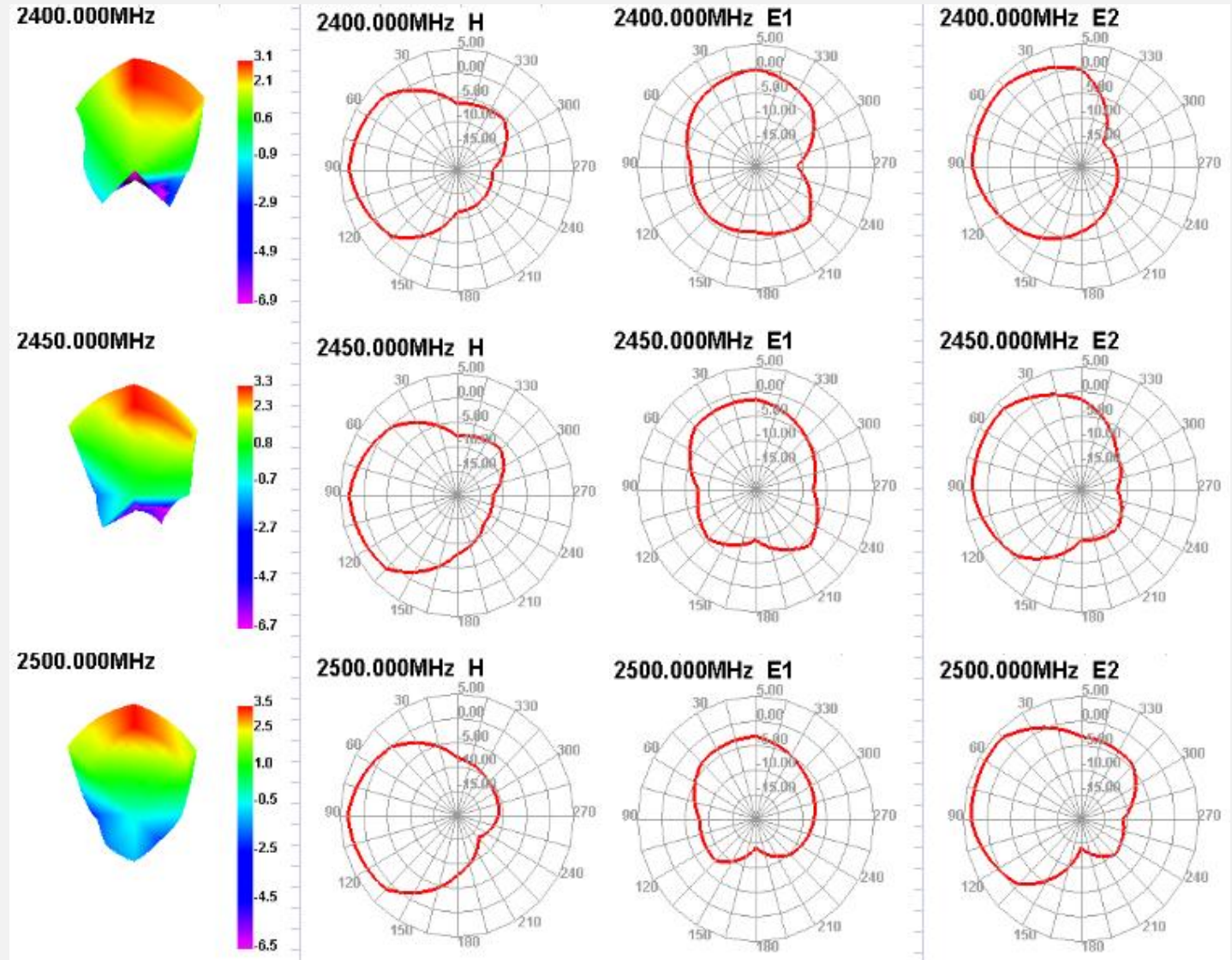


4.Test Result---Gain and Efficiency

Data (for EM02-BK3296 Bluetooth) :

3D radiation patterns:

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)
2400	54.69	-2.62	3.11	0.96
2410	48.05	-3.18	2.59	0.44
2420	51.47	-2.88	2.92	0.77
2430	53.44	-2.72	3.07	0.92
2440	47.58	-3.23	2.56	0.41
2450	55.93	-2.52	3.25	1.1
2460	51.56	-2.88	2.93	0.78
2470	53.02	-2.76	3.17	1.02
2480	57.55	-2.4	3.65	1.5
2490	46.01	-3.37	2.79	0.64
2500	53.3	-2.73	3.5	1.35



5.Test Result---TRP and TIS

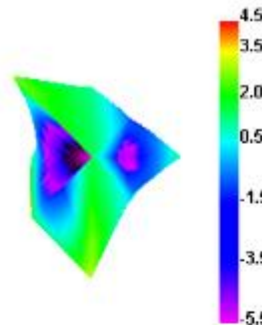
3D radiation patterns:

Data (for EM02-BK3296 Bluetooth) :

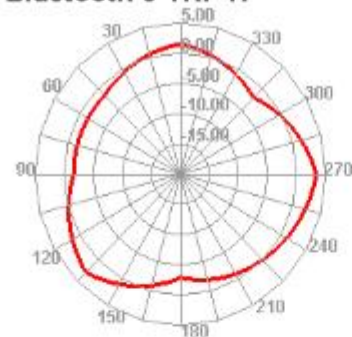
Test Result	Bluetooth TRP		
	0	39	78
Frequency (MHz)	2402	2441	2480
TRP(dBm)	0.57	2.92	4.55
NHPRP(dBm) 45	-2.68	-0.09	1.82
MAX(dBm)	4.54	7.22	9.02
EIRP peak	4.54	7.22	9.02
Min(dBm)	-5.03	-3.04	-0.69

Test Result	Bluetooth TIS		
	0	39	78
Frequency (MHz)	2402	2441	2480
TIS(dBm)	-87.86	-88.24	-88.65
NHPIS(dBm) 45	-84.6	-85.23	-85.92
RSSIave	1.43	2.6	4.62
MaxPosRSSI	3.34	4.85	6.62
MaxPosSens	-89.77	-90.49	-90.65
MAX(dBm)	5.4	6.9	9.09
EIS peak	5.4	6.9	9.09
Min(dBm)	-4.17	-3.36	-0.62

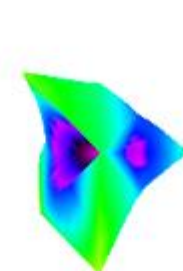
Bluetooth 0 TRP



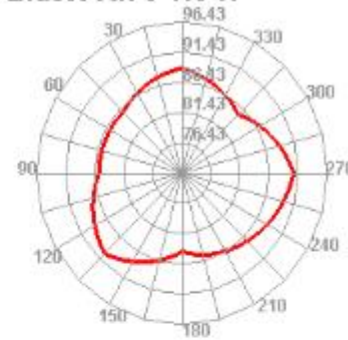
Bluetooth 0 TRP H



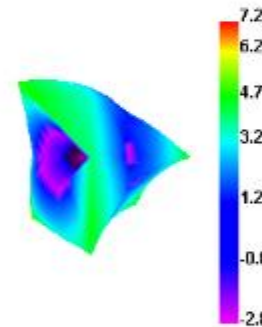
Bluetooth 0 TIS



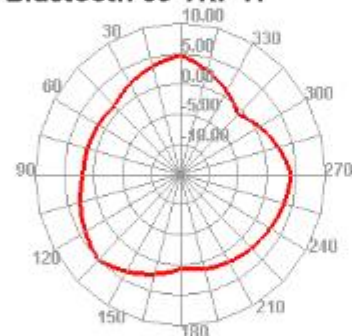
Bluetooth 0 TIS H



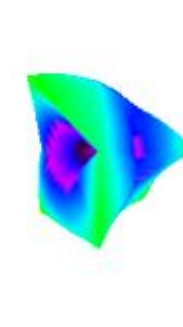
Bluetooth 39 TRP



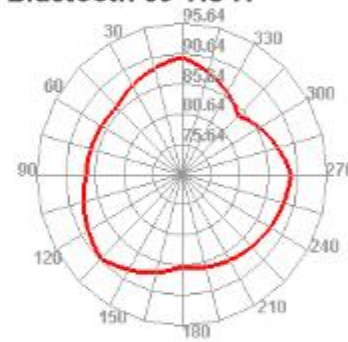
Bluetooth 39 TRP H



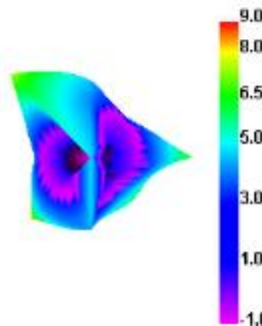
Bluetooth 39 TIS



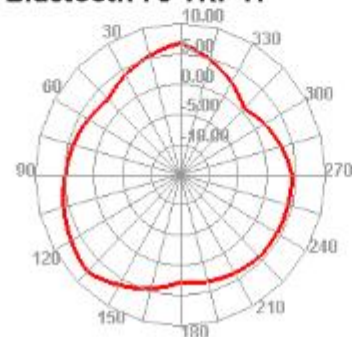
Bluetooth 39 TIS H



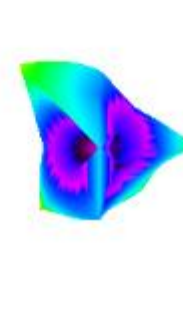
Bluetooth 78 TRP



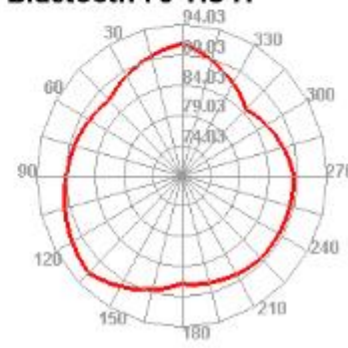
Bluetooth 78 TRP H



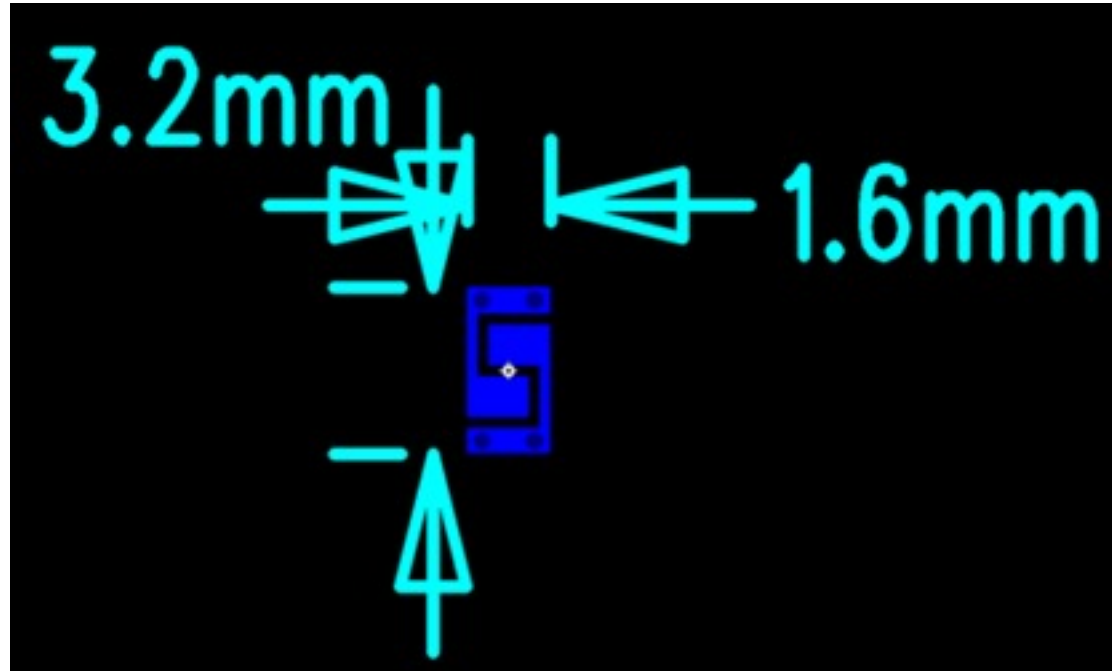
Bluetooth 78 TIS



Bluetooth 78 TIS H



Antenna size



An aerial photograph of the New York City skyline, featuring prominent skyscrapers like the Chrysler Building and the Empire State Building. The image is partially covered by a large, semi-transparent yellow geometric shape that cuts across the frame from the top left to the bottom right. The text 'Thank you for watching!' is positioned on the right side of the image, overlaid on the white background.

Thank you for
watching!