

# Düşük Bütçe ile 10GHz (3 cm bandı) Çalışmaları



Suat Alper Seyhan, TA2SUA 2021

# Giriş

- Düşük Maliyet
- Kendin Yap
- Egzotik
- Öğretici

# 3 cm Bandi



## IARU Region 1 SHF band plan

Effective December 2020 (VGC Novi Sad)

edited by ON4AVJ(02/12//2020)

10 - 10,500 GHz	10000,000 - 10150,000	none	MGM	
	10150,000 - 10250,000	none	all modes	
	10250,000 - 10350,000	none	MGM	
	10350,000 - 10368,000	none	all modes	
	10368,000 - 10368,800	2700	all modes	10.3682 Narrow band center of activity 10368.750-10368.800 Local Beacon
	10368,800 -10368,990			Beacons only
	10369,000 - 10370,000	2700	all modes	
	10370,000 - 10450,000		all modes	
	10450,000 - 10500,000		all modes	10.450-10.452 Narrow band modes in countries where 10.368-10.370 is not available AMATEUR SATELLITE SERVICE

# 3 cm Bandı

Amatör Radyo Band Planı

Band (MHz)	Dalga Boyu	Frekans Bandı	Tahsis Durumu	Frekans Bandlarına İlişkin Açıklama	Verici Çıkış Gücü	Verici PEP Gücü	İzin Verilen Belge Sınıfı	İzin Verilen Emisyon Tipi	
0,136	2200 m	135.7-137.8 kHz	S		1 W	5 W	A ve B	A1A, A1B	
1,8	160 m	1810–1840 kHz 1840–1850 kHz	P S	11	9 W	30 W	A	A1A, J3E	
3,5	80 m	3500–3610 kHz 3610–3800 kHz	P S	2 9	75 W	75 W		A1A A1B A2A A3C F1A F2B F2A H3E J2A J2B J3C, J3E, R3E	
7	40 m	7000–7200 kHz	P	2, 14		100 W			
10	30 m	10100–10150 kHz	S	2, 4, 5					
14	20 m	14000–14250 kHz 14250–14350 kHz	P P	2, 3 3		400 W			
18	17 m	18068–18168 kHz	S	1, 3					
21	15 m	21000–21150 kHz 21151–21450 kHz	P P	2, 3 3					
24	12 m	24890–24990 kHz	S	1, 2, 3					
30	10 m	28000–29700 kHz	P	2, 3, 6, 10, 14					A1A A1B A2A, A2B A3C A3F C3F F1A F1B F2A F2B F3E, F3F G3E H3E J2A J2B J2C J3E J3F R3E
50	6 m	50–52 MHz	S	1, 10, 15					
144–146	2 m	144–146 MHz	P	2, 3, 7, 8, 10, 13, 16	75 W	400 W	A-B-C		
		430.200–430.700 MHz	S						
		431.550–431.825 MHz	S						
430–440	70 cm	432.000–432.975 MHz	S	3, 7, 8, 10, 16					
		433.400–433.575 MHz	S						
		435.000–437.975 MHz	S						
		439.150–439.425 MHz	S						
1300	23 cm	1240–1300 MHz	S	3, 7, 8, 10					
5700	6 cm	5650–5670 MHz 5820–5850 MHz	S S	3, 12					
10000	3 cm	10450–10452 MHz	S	3			A-B		
24000	12 mm	24000–24050 MHz	P	3, 12					
47000	6 mm	47000–47200 MHz	P	3, 12					
75000	4 mm	75500–76000 MHz	P	3					
142000	2 mm	134000-136000 MHz 136000-142000 MHz	P S	3					

# Avrupa'dan Örnek Çalışmalar / Bazı Öncüler



IK1WVQ

<http://ik1wvq.blogspot.com/>



F6HCC

<http://f6hcc.free.fr/10ghz.htm>



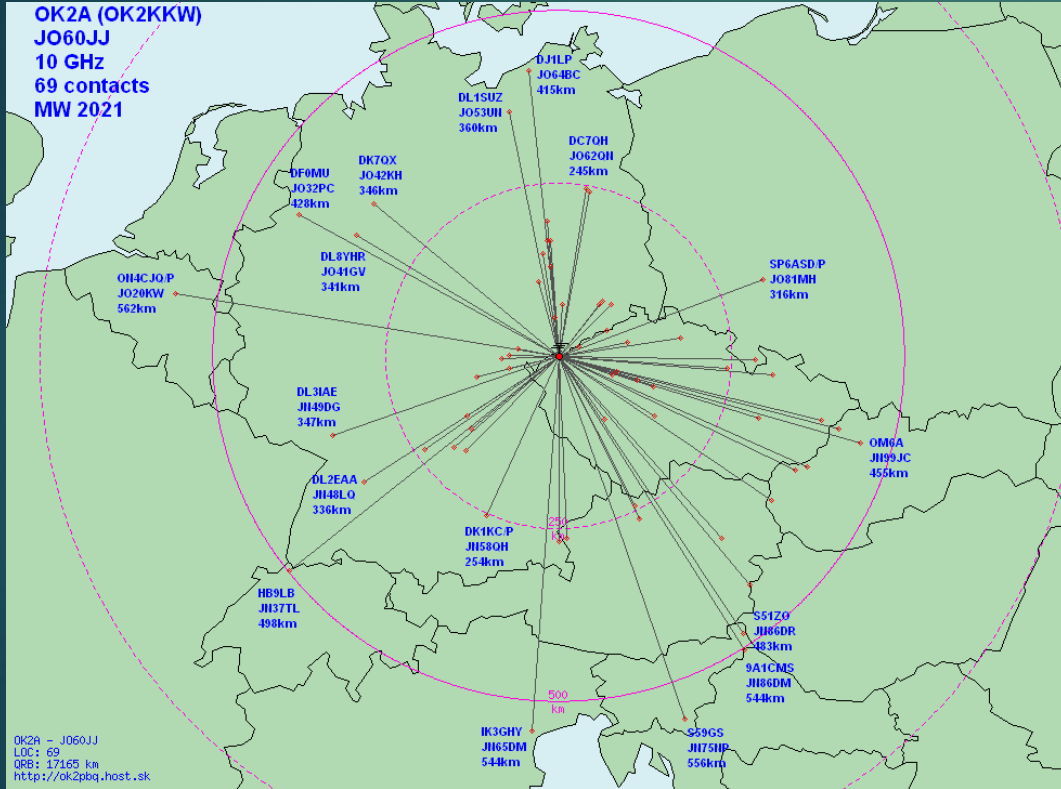


Team #1: Giuseppe IK8XFR –  
Nino IZ8WLZ - Giacomo (Jack) on  
S. Giovanni a Piro JN70RB

Team #2: Giuseppe IZ8WGU -  
Domenico IZ8BAD - Gianluca  
IZ8YWC - Antonio IK8TGH on  
Solano Sup. JM78VF

<https://youtu.be/cmtURuuoMf0>

# 10ghz çalışmaları/Contestler



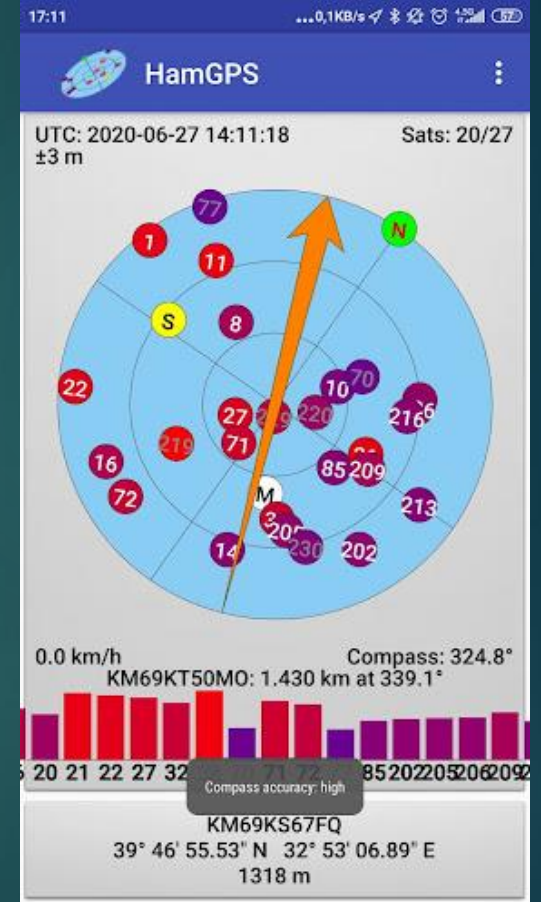
<http://www.ok2kkw.com/00003016/mw021/mw2021.htm>



<https://ghz-europe.com/10-ghz-qso-with-a-reflection-from-mont-blanc-2/>



# Biz neler yaptık



İlk denemeler



# Biz neler yaptık



İkinci Deneme



# Biz neler yaptık



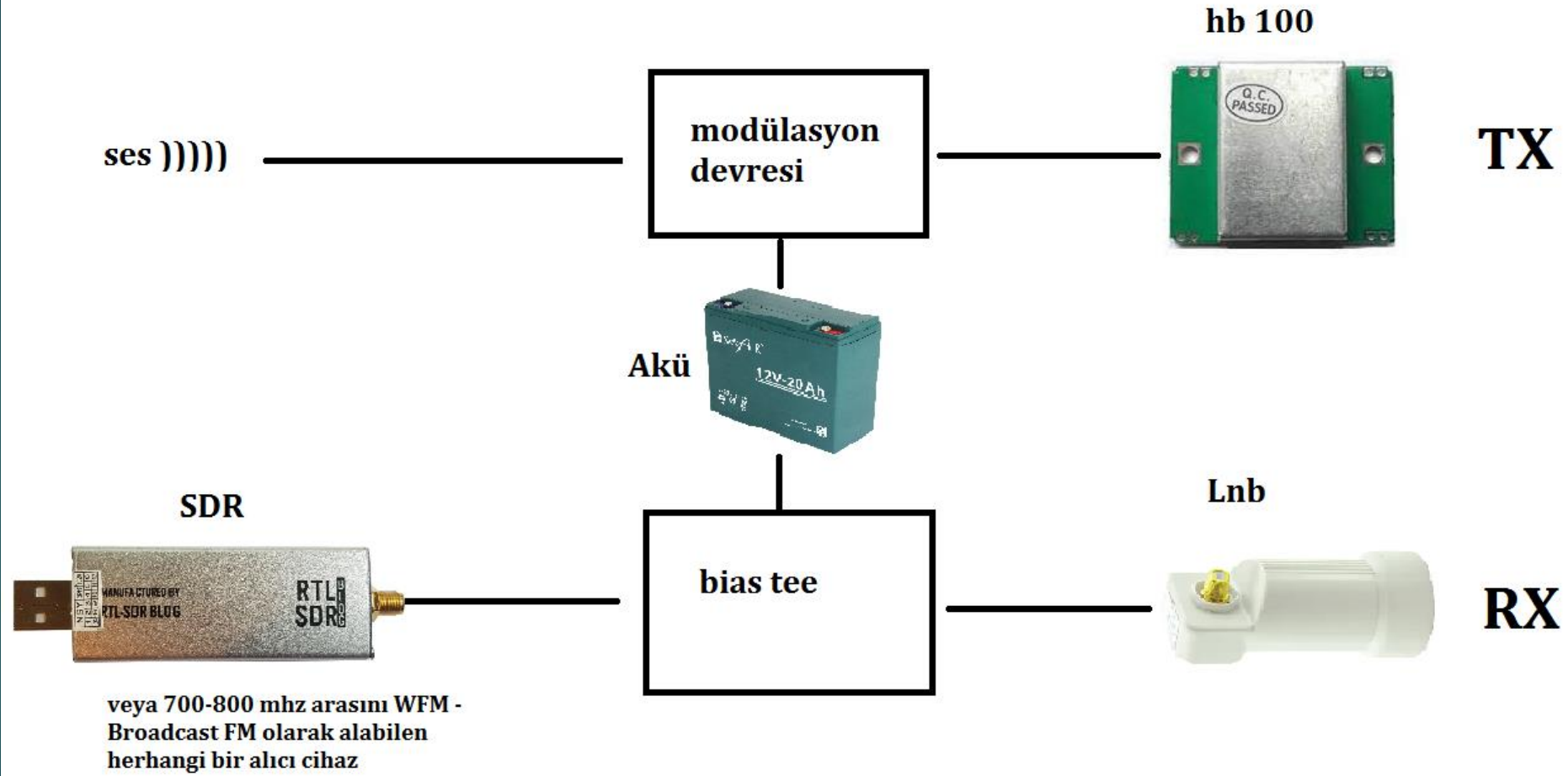
Üçüncü deneme

# Biz neler yaptık

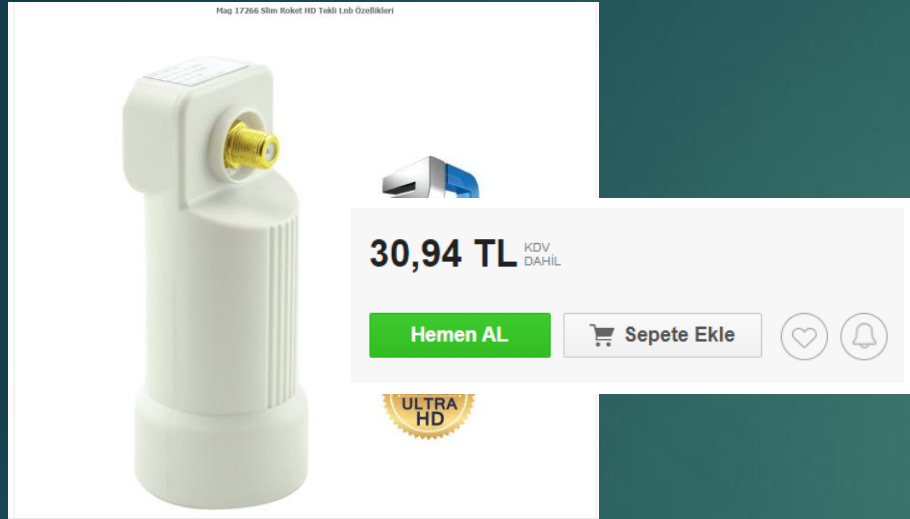
Normalde bu sayfada TA2NC TA2SUA 10 GHZ QSO videosu bulunmaktadır.  
Zaten youtube videosunda kaydı bulunduğundan dosya boyutu açısından sunumdan çıkarılmıştır.



# Nasıl?



# Rx Detaylar - LNB



## Teknik Özellikleri:

- Input : 10,7 ~ 12,75 Ghz
- Output : 950 ~ 2150 Ghz
- L.O. Low Band : 9,75 Ghz
- L.O. High Band : 10,6 Ghz
- Noise : 0,1 dB
- Conversion Gain : 65 dB
- Tek Çıkışlı
- Philips Chip
- PLL
- Model : 17266

**AliExpress** **RTLSDRBlog Store** **+ Takip**  
98.8% olumlu geribildirim 2309 Takip Edenler

Mağaza Ev Ürünler ▼ Satış Ürünleri Zirvedeki Satış Geri bildirim

QO-100 Bullseye TCXO LNB - Ultra kararlı LNB QO-100 ve Ku Band uydu

★★★★★ 4.9 ~ 80 Yorum 179 siparişler

**TRY 277.50**

Miktar:   %15 indirim (5 parçalar ve üzeri için geçerli) 168 parçalar mevcut

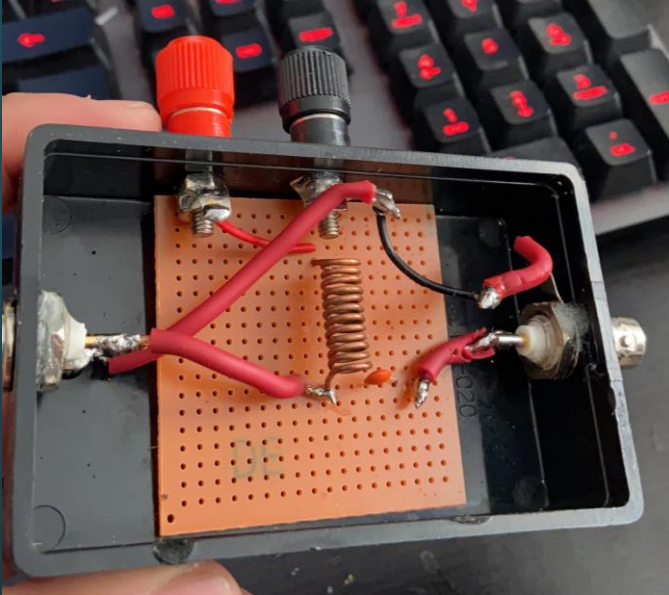
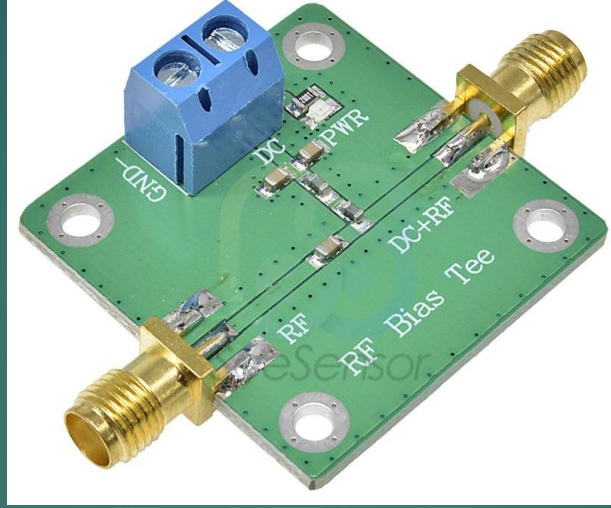
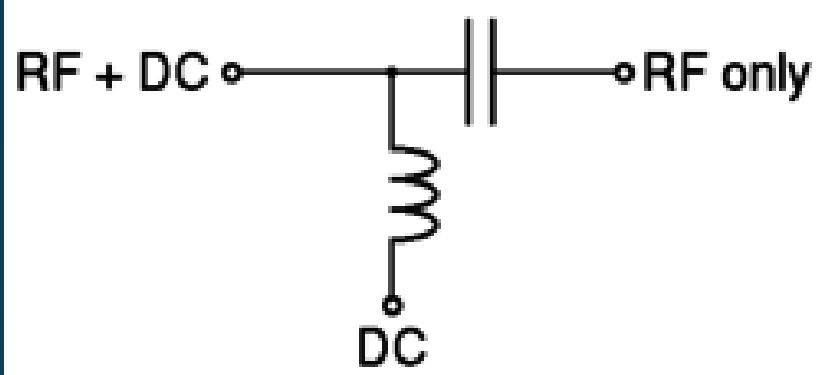
**Ücretsiz Gönderi**  
AliExpress Standard Shipping ile Turkey teslimatı ▼  
Tahmini Teslimat 11 Kas tarihinde 📅

🛡️ **75 Günlük Alıcı Koruma Programı**  
Para iadesi garantisi

**RTLSDRBlog Store**

10 khz hassasiyet, SMA çıkış

# Rx Detaylar – Bias Tee



100 pf mercimek kondansatör  
4mm matkap ucu üstüne sarılmış 12 tur 1mm bakır tel

11.5 - 14V dikey polarizasyon, 16 - 19V yatay polarizasyon



# Rx Detaylar – Alıcı

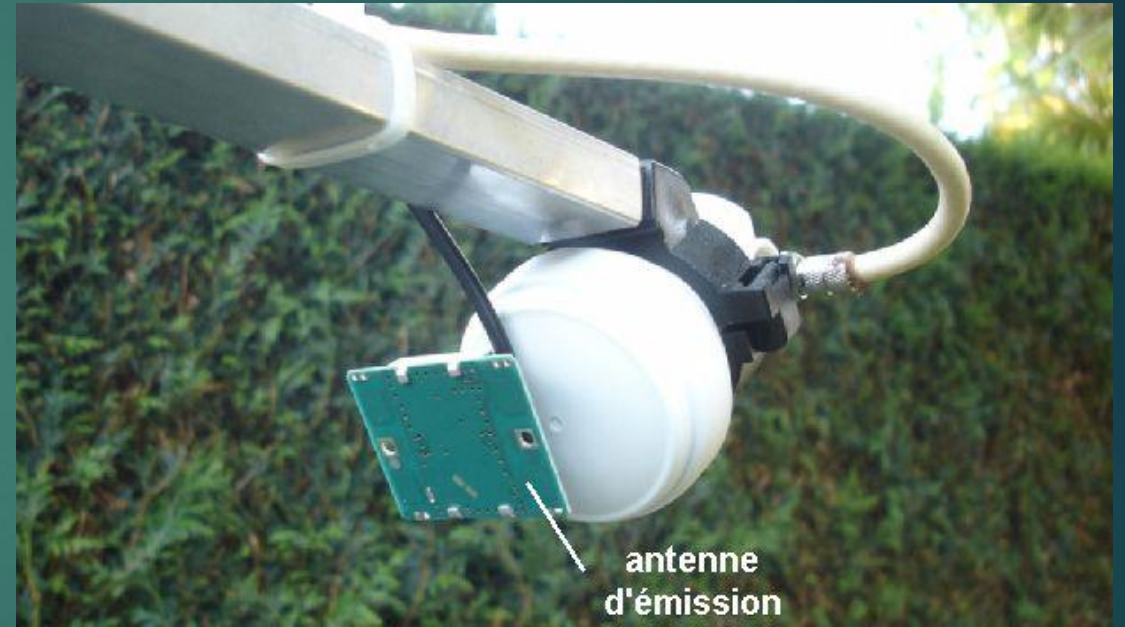
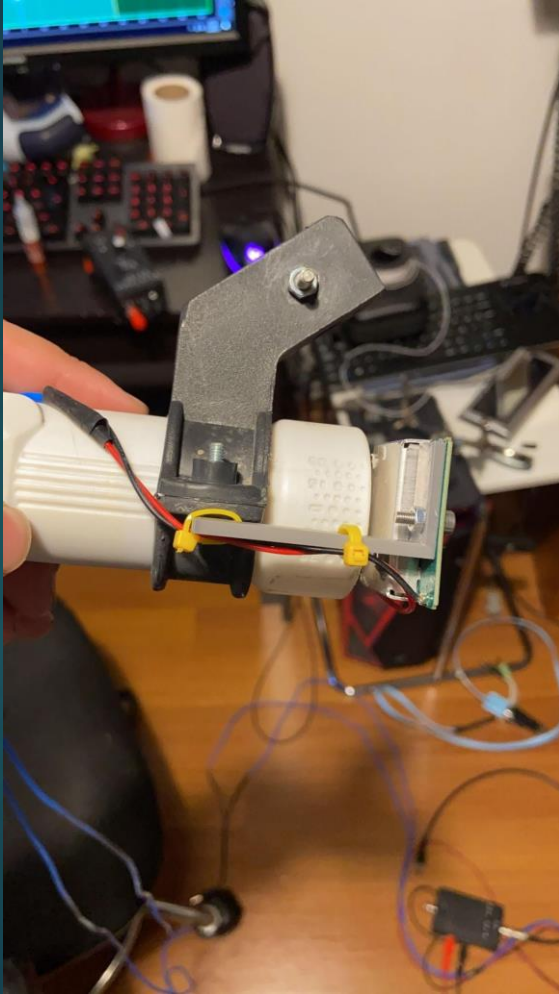


$10.450 - 9750 = 700 \text{ MHz}$

WFM – Broadcast FM 150khz+ genişlik

Rf kazancını ayarlayabilme veya ATT

# Rx Detaylar – LNB (Çanak yerleşimi)



# Tx Detaylar – HB100



## HB100 Mikrodalga Doppler Radar

Ürün Kodu : 15995  
Marka / Menşei : Robotistan  
★★★★★ : Yorumlar (2)  
Stok Adedi : 100+

Fiyat : 32,71 TL + KDV  
KDV Dahil Fiyat : **38,60 TL**

Adet:

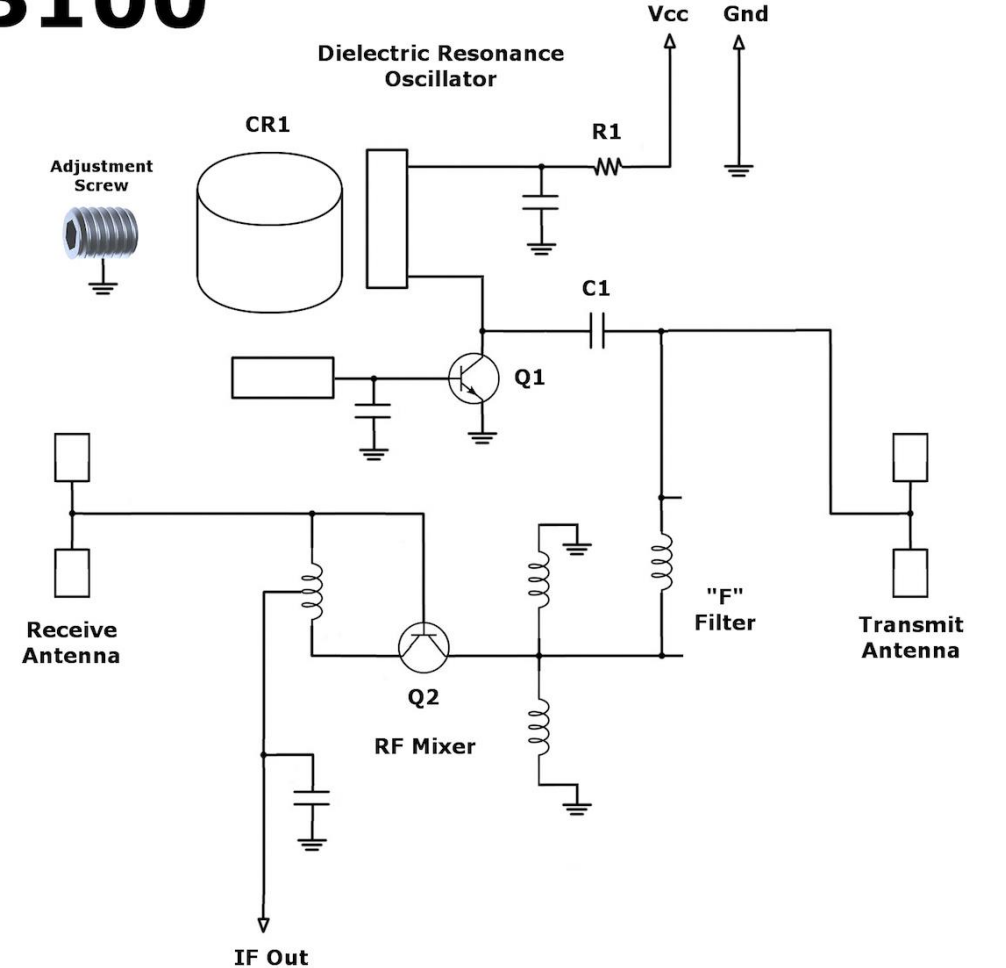
- 1 +

1 saat 34 dak  
içerisinde sipa  
verirsen  
**BUGÜN KARGO**

Toplu alımlarda indirim fırsatları için tıklayın!

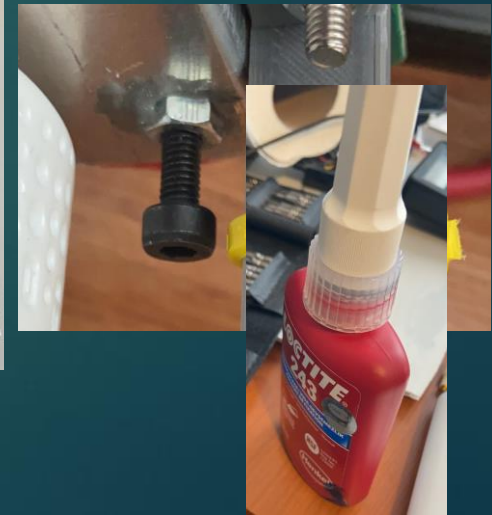
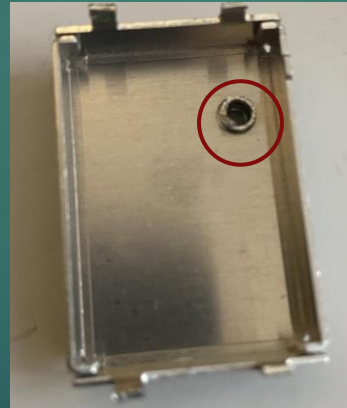
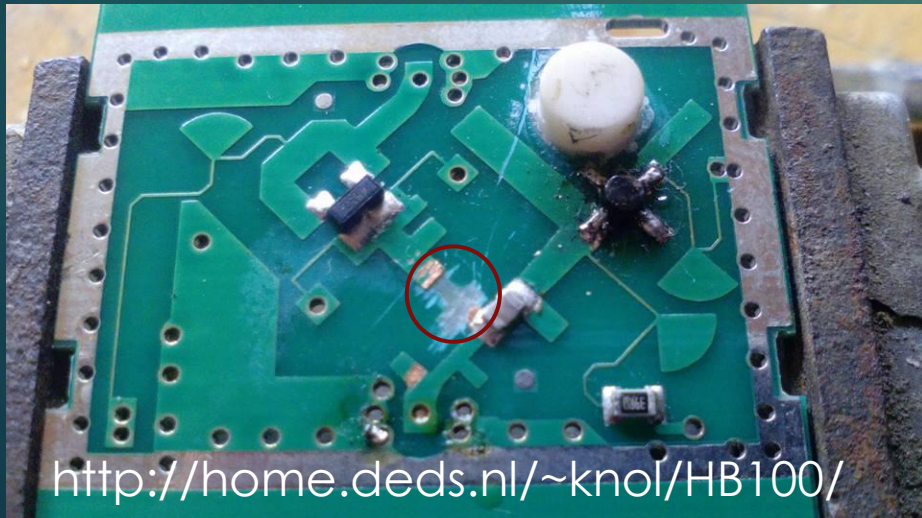
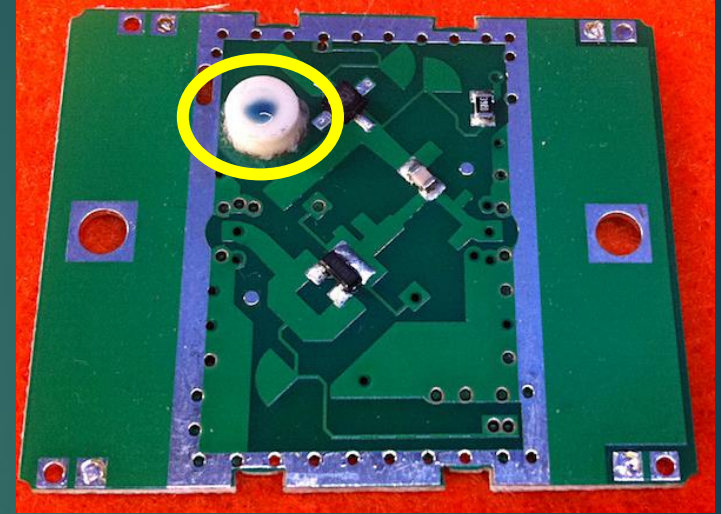
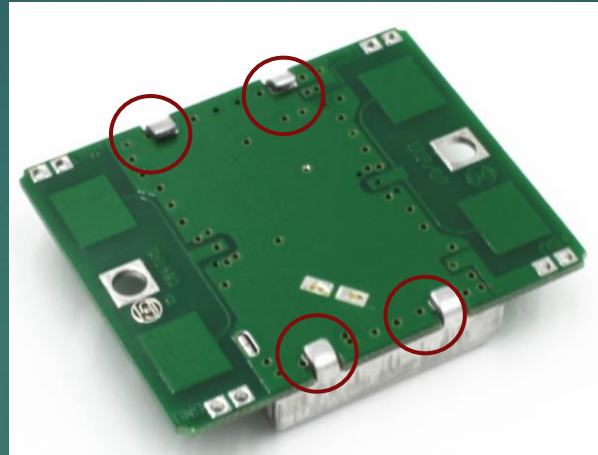
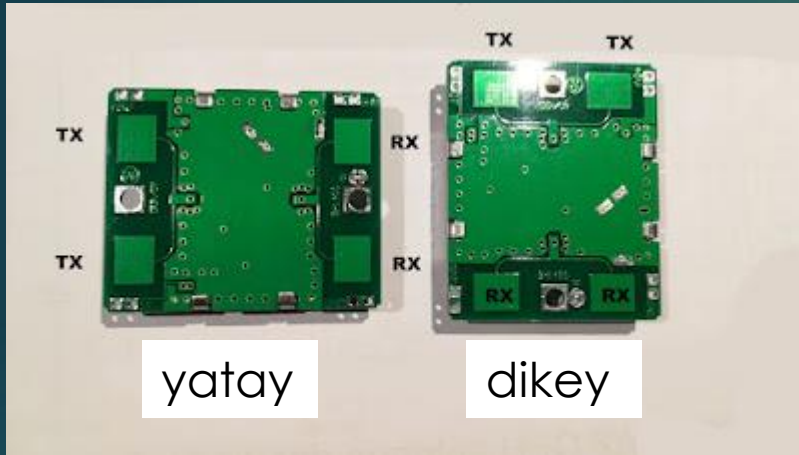
 **SEPETE EKLE**

## HB100





# Tx Detaylar – HB100



# Tx Detaylar – Modölatör





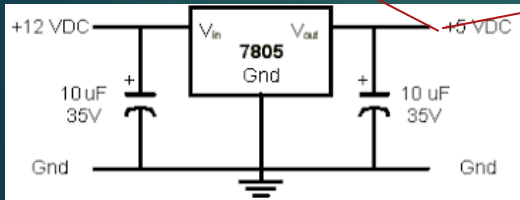
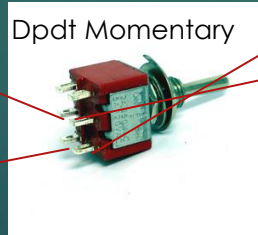
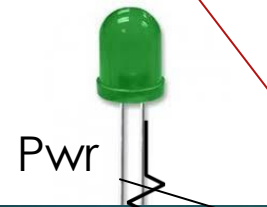
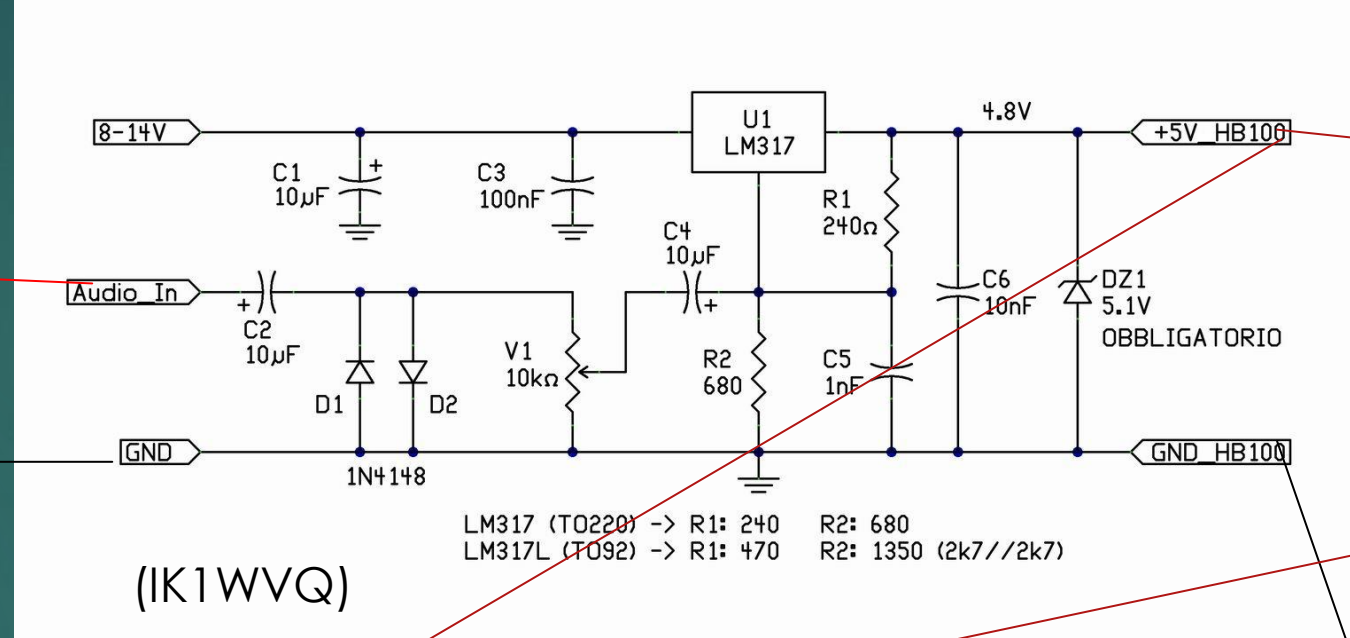
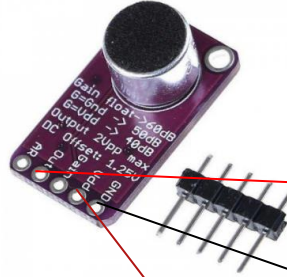
# Tx Detaylar – Modölatör

## MAX9814 Mikrofon Modülü

Satış Fiyatı  
**33,04 TL**  
(KDV DAHİL)

Kategori : MODÜL KARTLAR  
Stok Kodu : MAX9814  
Fiyat : 28,00 TL + KDV  
3,08 TL den başlayan taksitlerle!

Favorilerime Ekle Tavsiye Et

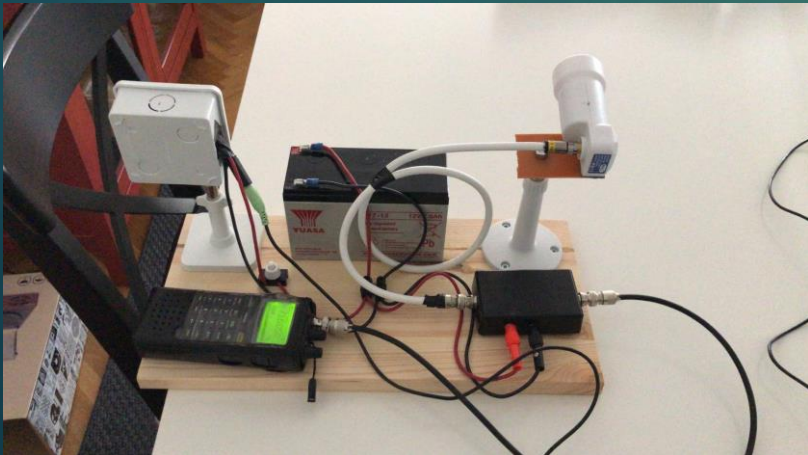




# Maliyet

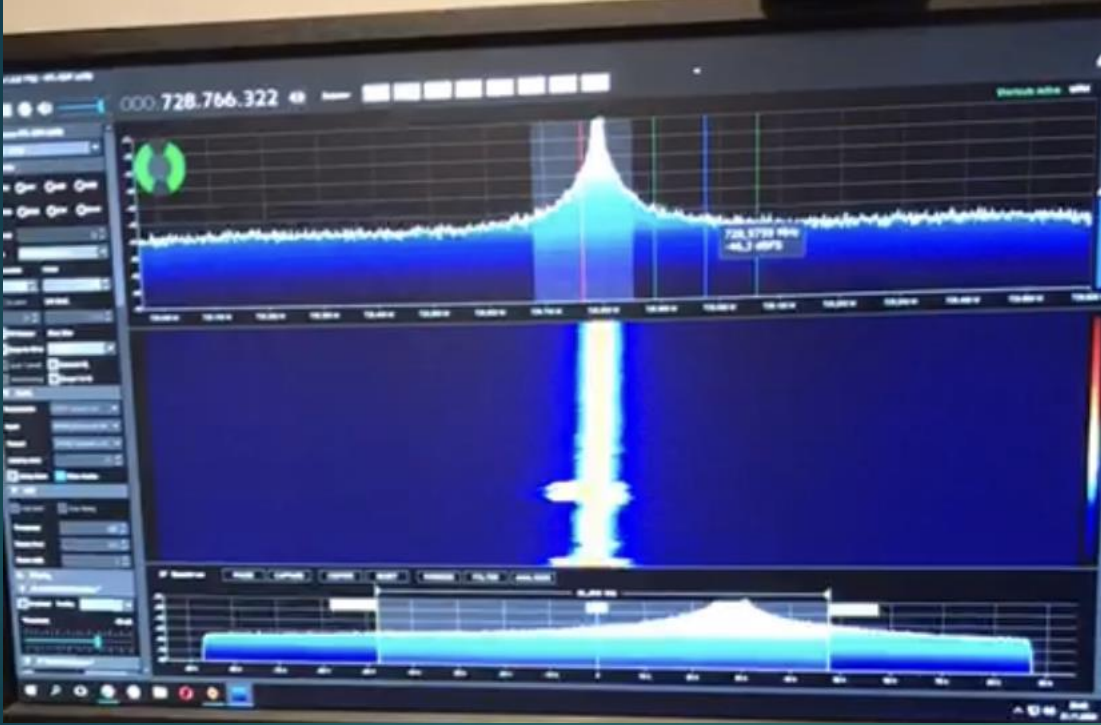
Malzeme	Fiyat	
Mag Rocket PLL LNB	31	
Bias Tee	15	
HB100	39	
Modülatör	70	
Kablo-konnektör sarf	45	
<b>Toplam</b>	<b>200,00 ₺</b>	
<b>Opsiyonel Malzeme</b>		
ikinci el Çanak Anten	60	
Hoparlör Ayağı-Tripod	120	
Akü	130	
RTL SDR	150	

# Antenler / Antensiz?





# Uygulama Detayları – Doğru Frekansı bulmak



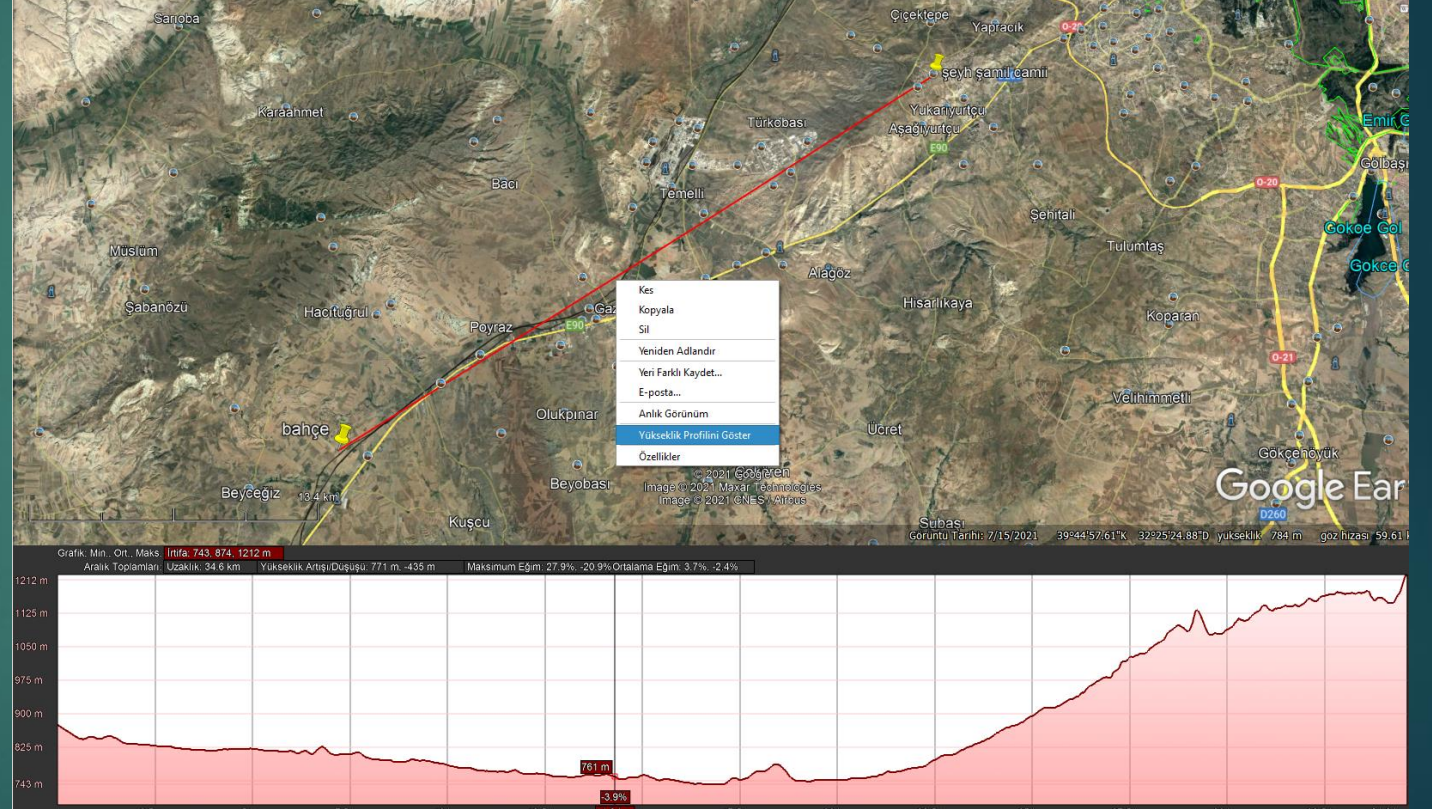
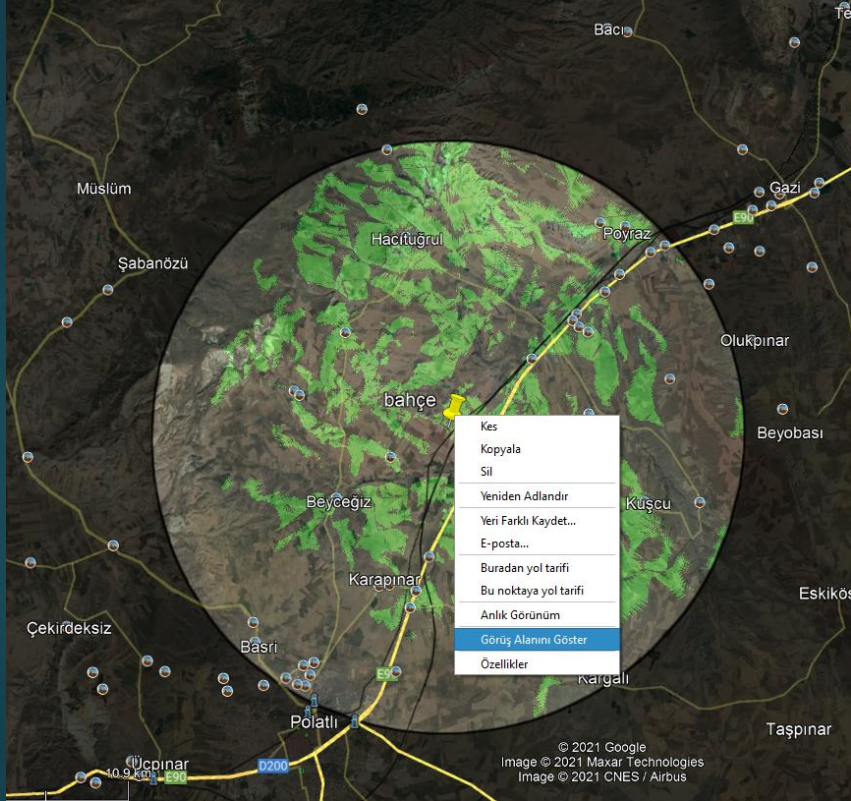
Bias Tee ile alıcı bağlantısını sökün, hatta bias tee alıcıdan en az yarım metre uzakta olsun olası frekansları gezin bulduğunuz en güçlü sinyal «gerçek» çıkış frekansınızdır

Sonra vidayı yavaşça ilerleterek 10.450 mhz e gelmeye çalışın

İki istasyon arasında en az ~1 mhz fark olsun

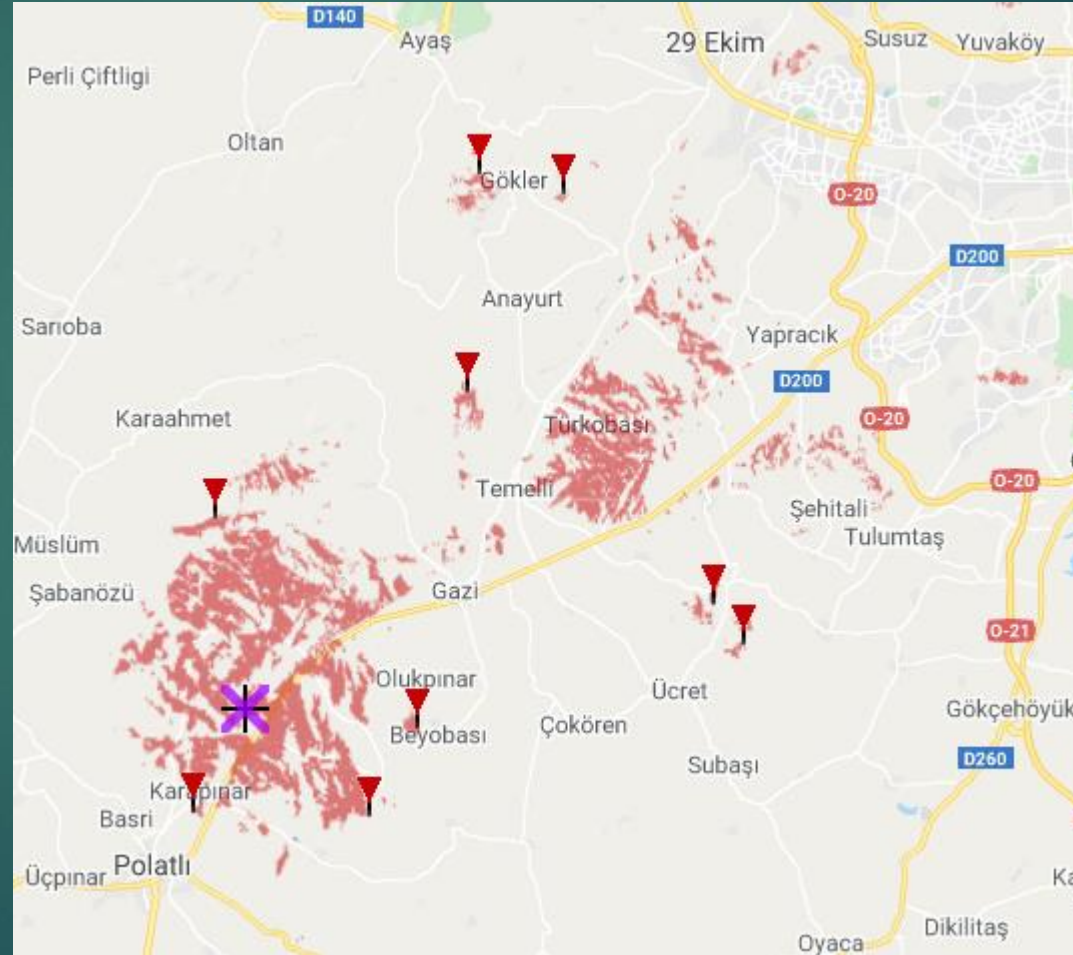


# Uygulama Detayları – LOS – Uygun Alan Bulmak



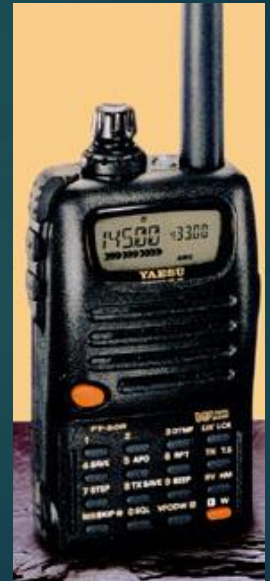
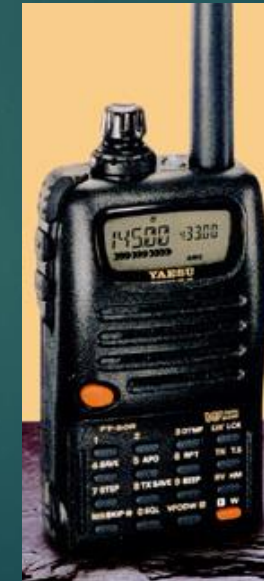
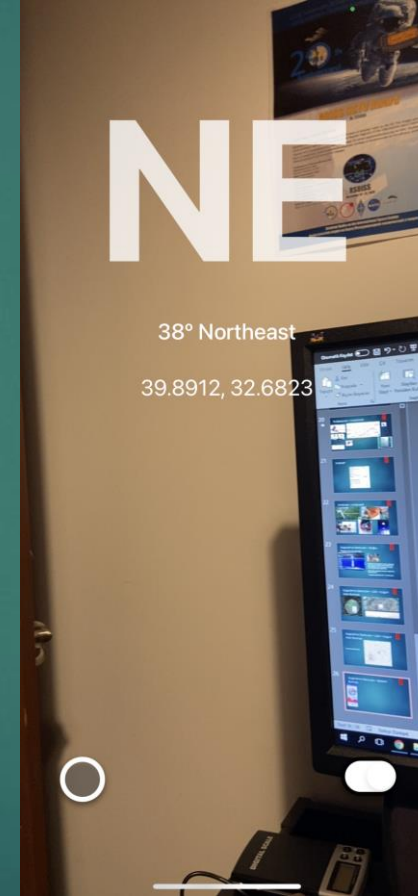
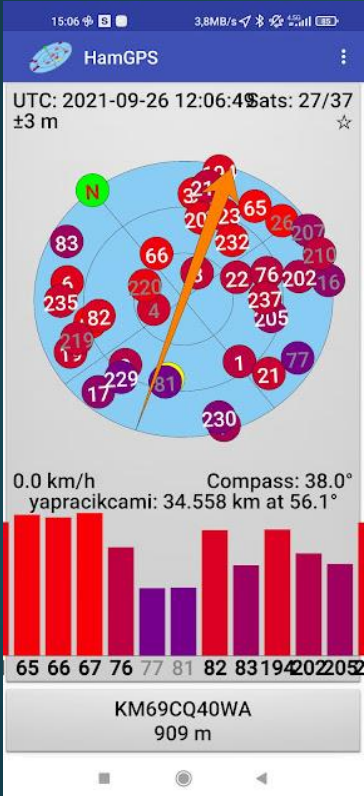
# Uygulama Detayları – LOS – Uygun Alan Bulmak

[www.heywhatsthat.com](http://www.heywhatsthat.com)



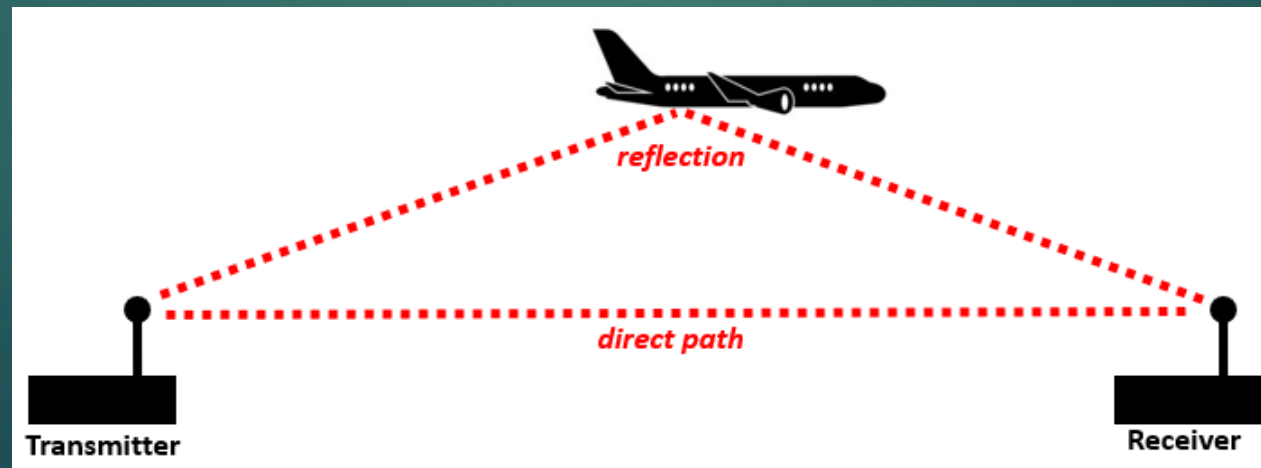
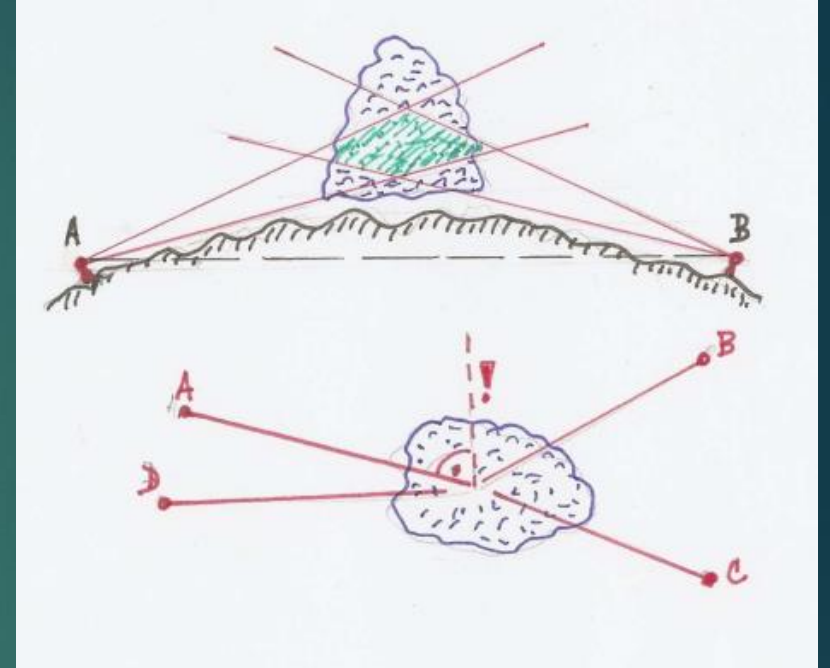
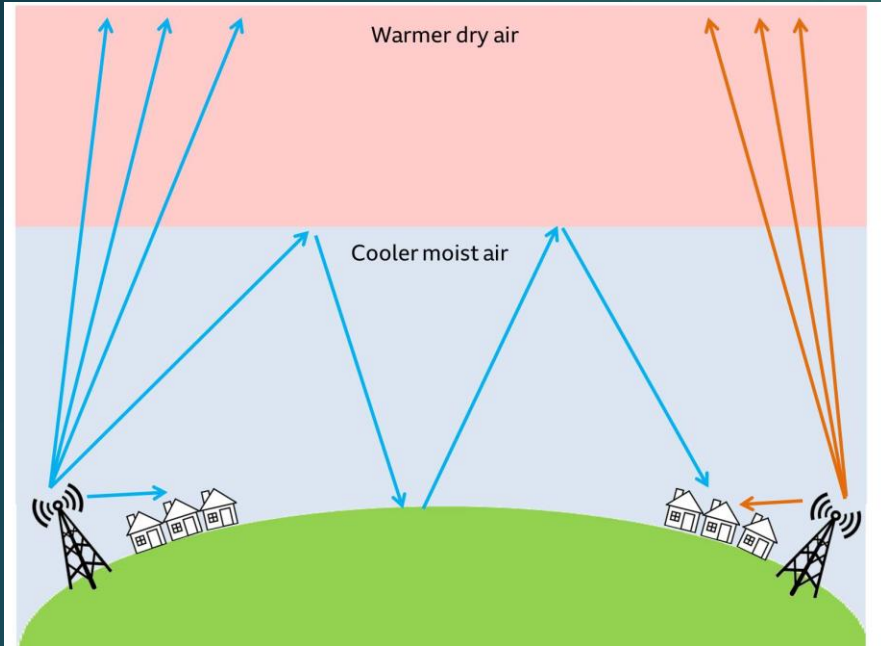


# Uygulama Detayları – Birbirini Bulmak





# Propagasyon





SABIRLA DİNLEDİĞİNİZ İÇİN TEŞEKKÜRLER ☺