

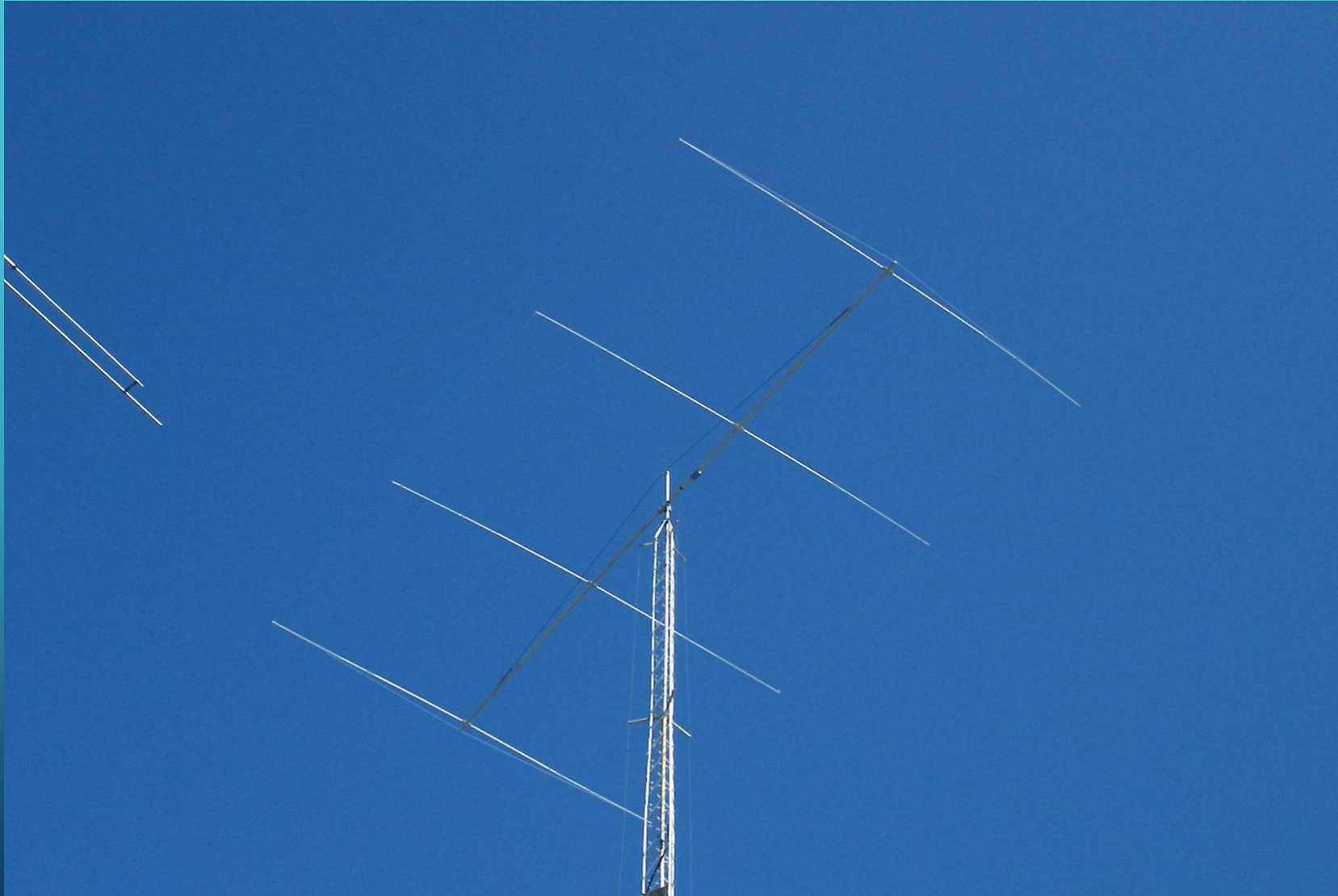


HORIZONTAL WALLER FLAG ANTENNA (HWF) TOP-BEAM SYSTEMS WF300

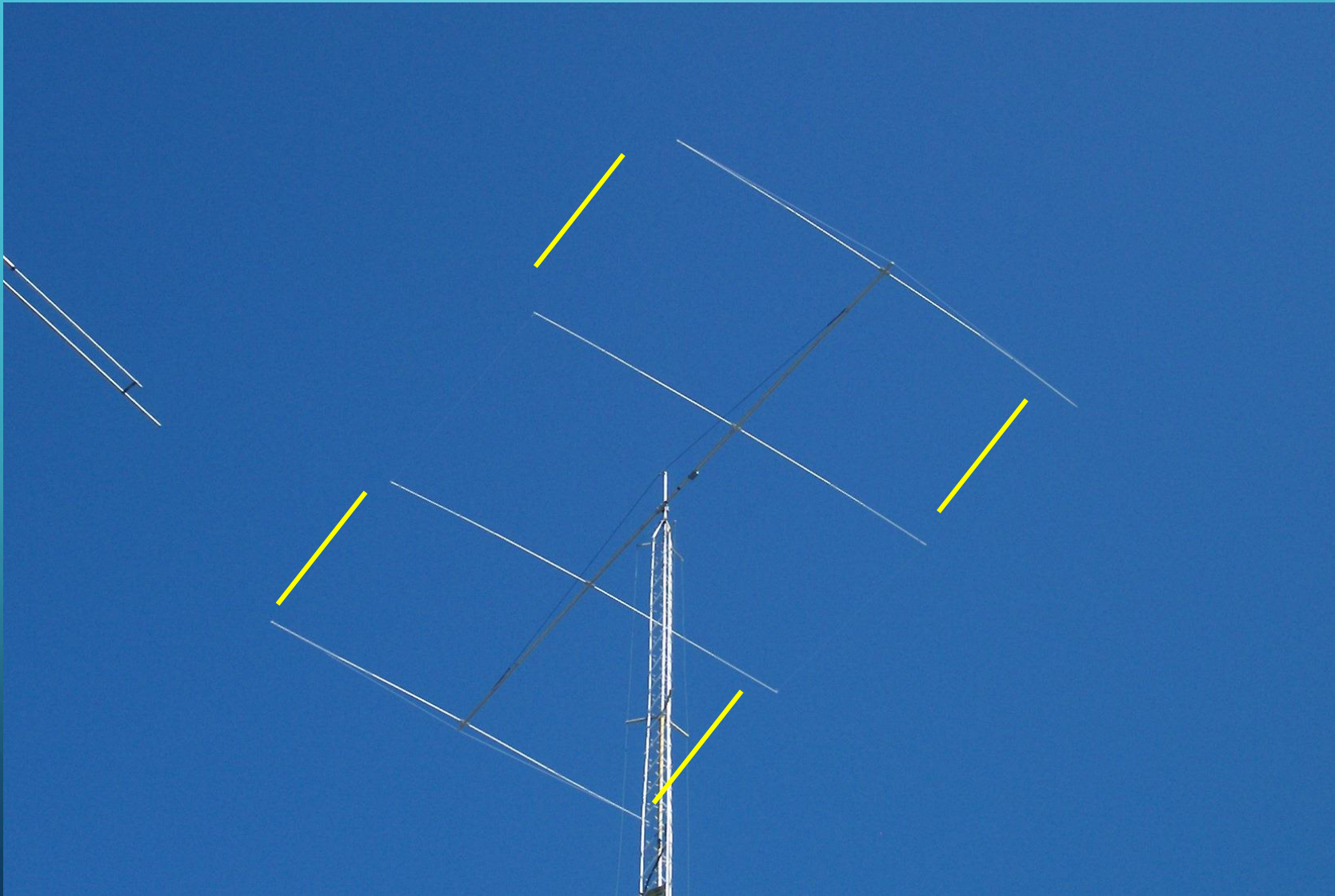
JA2IVK/AA2IU 鈴木英樹

2019 Tokyo Top Band Meeting

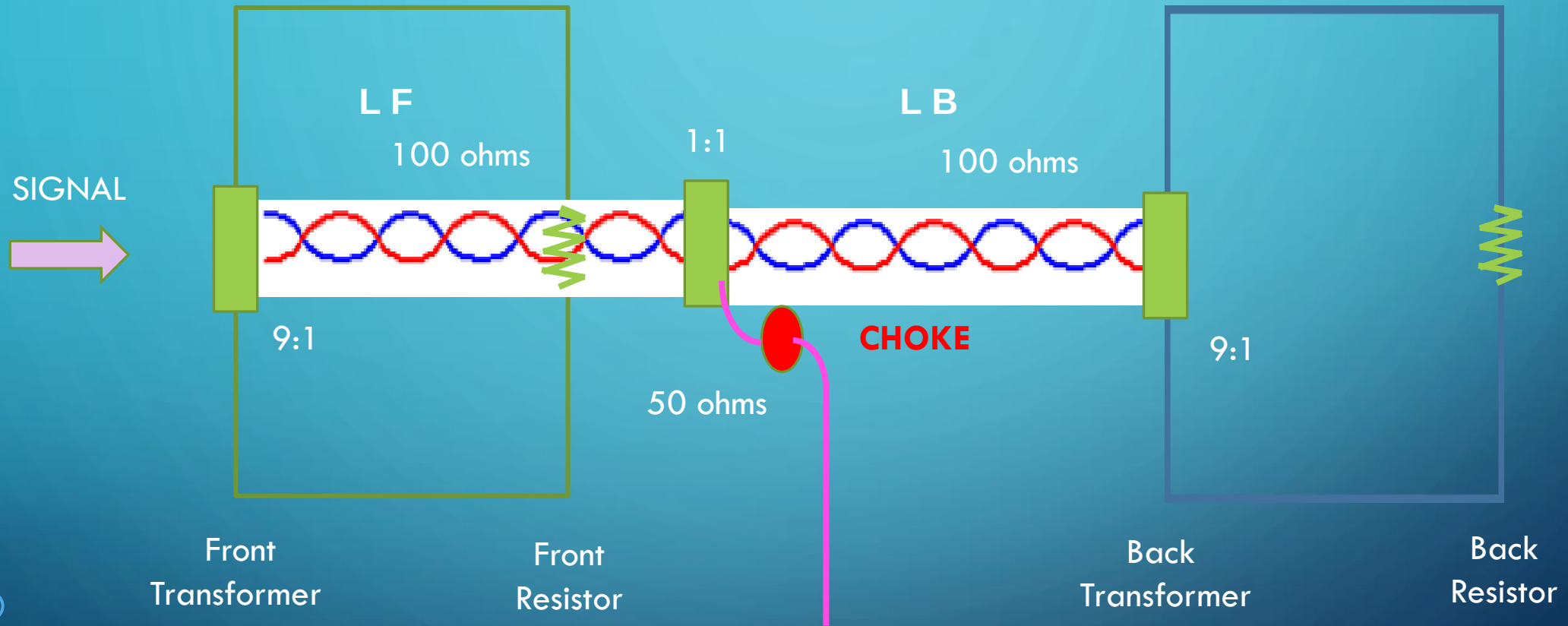
TOP BEAM (N4IS) HORIZONTAL WALLER FLAG (HWF)



N4IS HORIZONTAL WALLER FLAG (HWF)



HORIZONTAL WALLER FLAG STRUCTURE



TWO TYPE OF TOP BEAM HWF

TOP BEAM



WF200 6 x 2.4m 7.2m boom

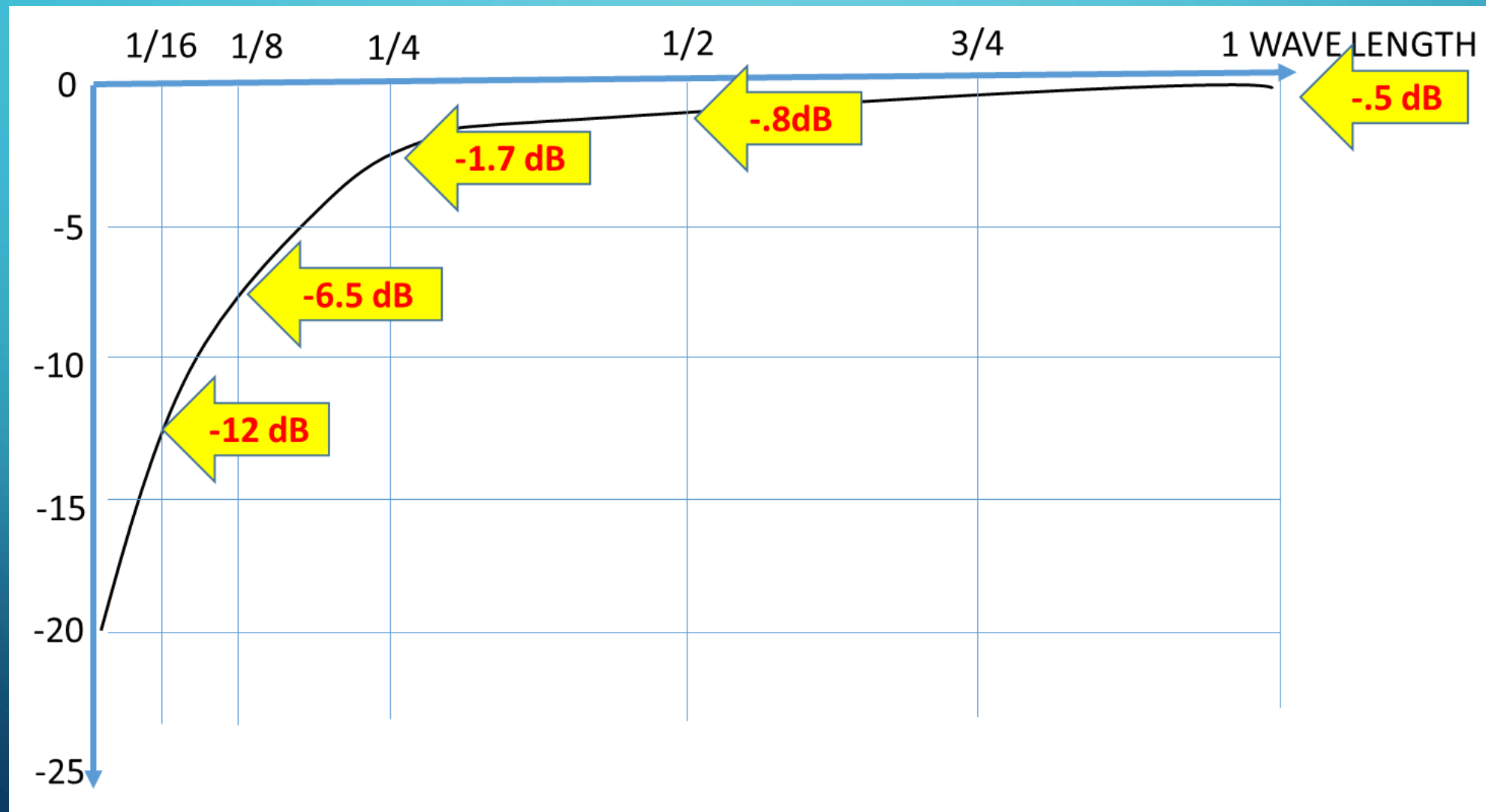


WF300 6.3 x 4.2m 12m boom

WF200 VS WF300

	WF200	WF300
バンド	80(160)-30m	160-30m
推奨高さ	>27m	>27m
ブーム長	7.2m	12m
ループ大きさ	6mx2.4m	7.8mx3.6m
重量	19.1Kg	23.6Kg
受風面積	0.37m ²	0.74m ²
RDF(Relative Directivity Factor)	11.5dB	11.5dB

HWF GAIN CHANGE WITH HEIGHT ABOVE GROUND

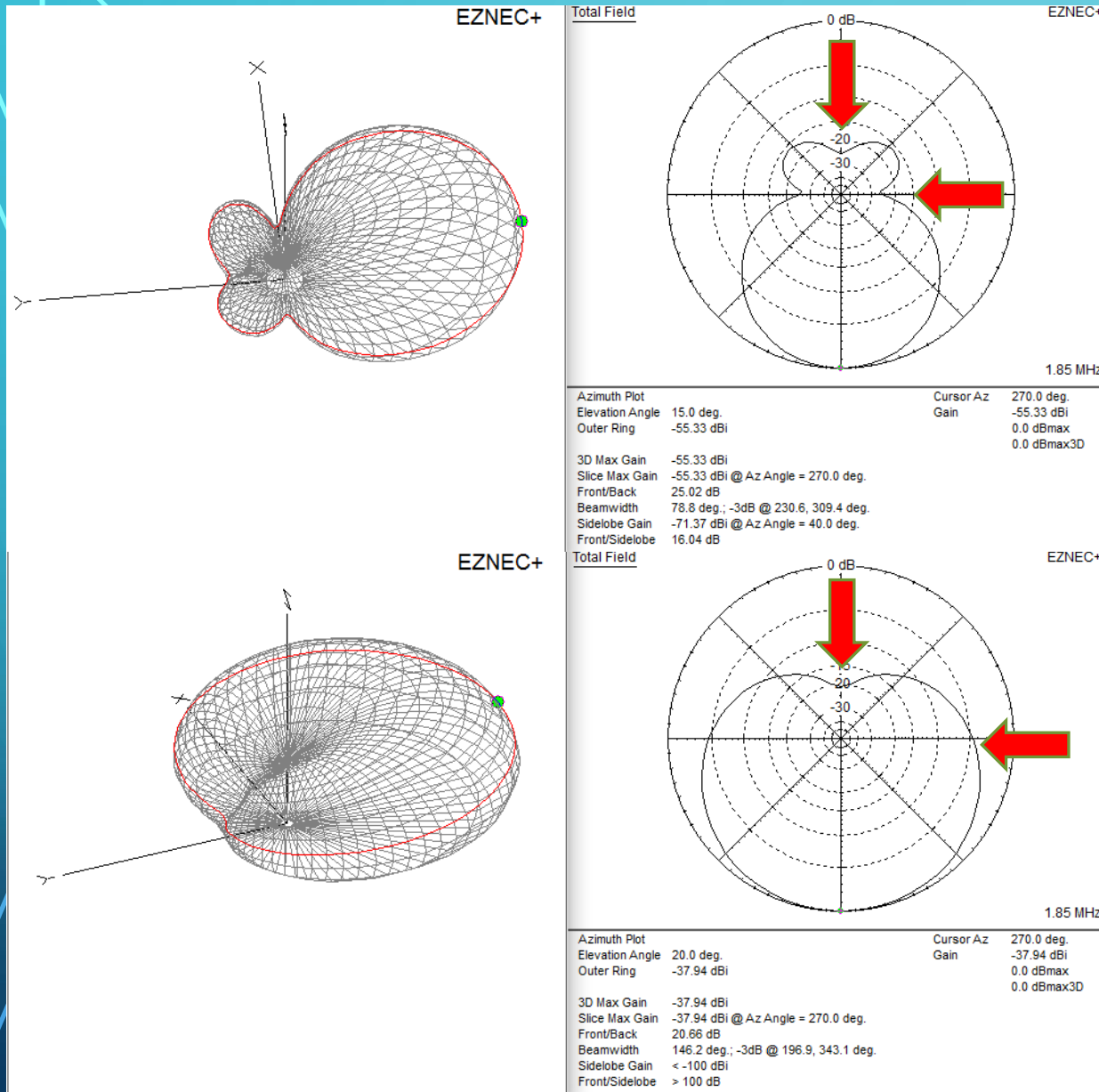


HWF with 180 degree phase

Gain = -55.33 dBi
Front back = - 25 dB
Front side = -27 dB

HWF with 0 degree phase

Gain = - 37.94 dBi
Front back = - 20.6 dB
Front side = - 5 dB



POLARIZATION FILTER OF HWF

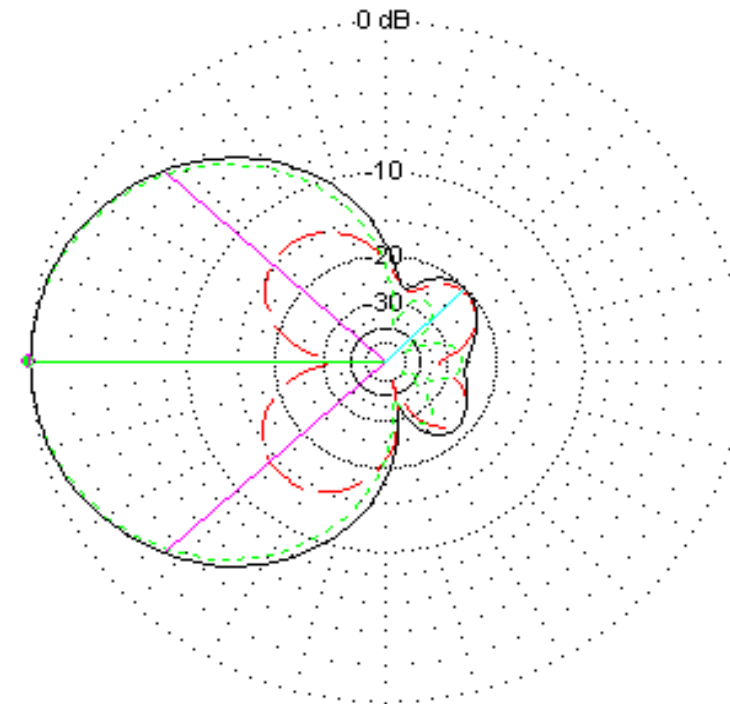


**MAN MADE
NOISE
REJECTION**

^ Total Field

Horizontal Pol

Vertical Pol



EZNEC+

1.83 MHz

Azimuth Plot

Elevation Angle 38.0 deg.

Outer Ring -50.47 dBi

3D Max Gain -50.47 dBi

Slice Max Gain -50.47 dBi @ Az Angle = 180.0 deg.

Front/Back 25.31 dB

Beamwidth 84.1 deg.; -3dB @ 138.0, 222.1 deg.

Sidelobe Gain -70.61 dBi @ Az Angle = 44.0 deg.

Front/Sidelobe 20.14 dB

Cursor Az 180.0 deg.

Gain -50.47 dBi

0.0 dBmax

0.0 dBmax3D

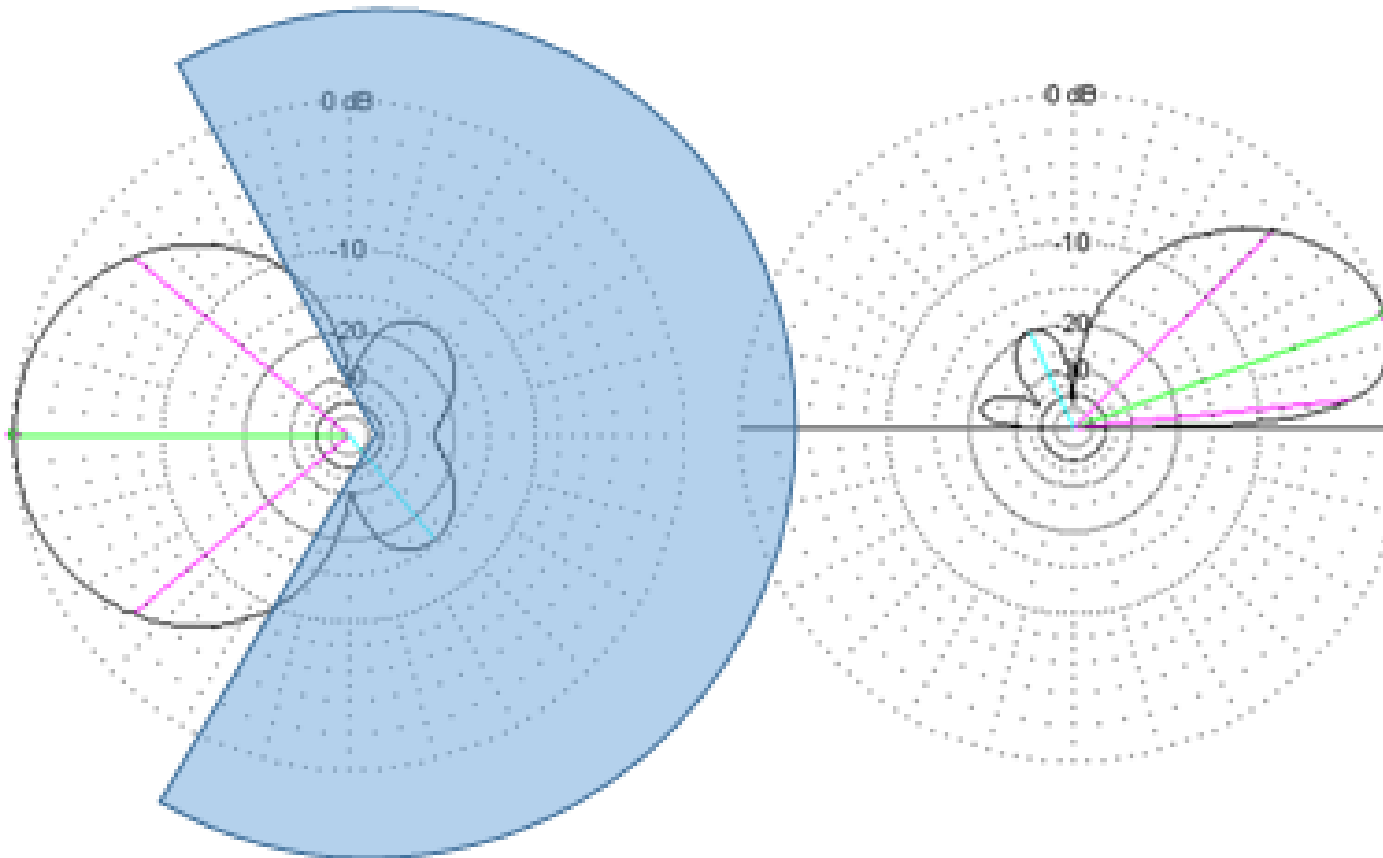
VERTICAL WALLER FRAG (VWF)



低くても設置可能

VERTICAL SURFACE DIRECTIVITY OF VWF

VWF Vertical Waller Flag 11.5 to 12 db RDF



打上角: 20°

水平方向にゲイン
⇒人工ノイズを拾う

垂直偏波に感度
⇒送信アンテナ、タワー
の影響を受ける

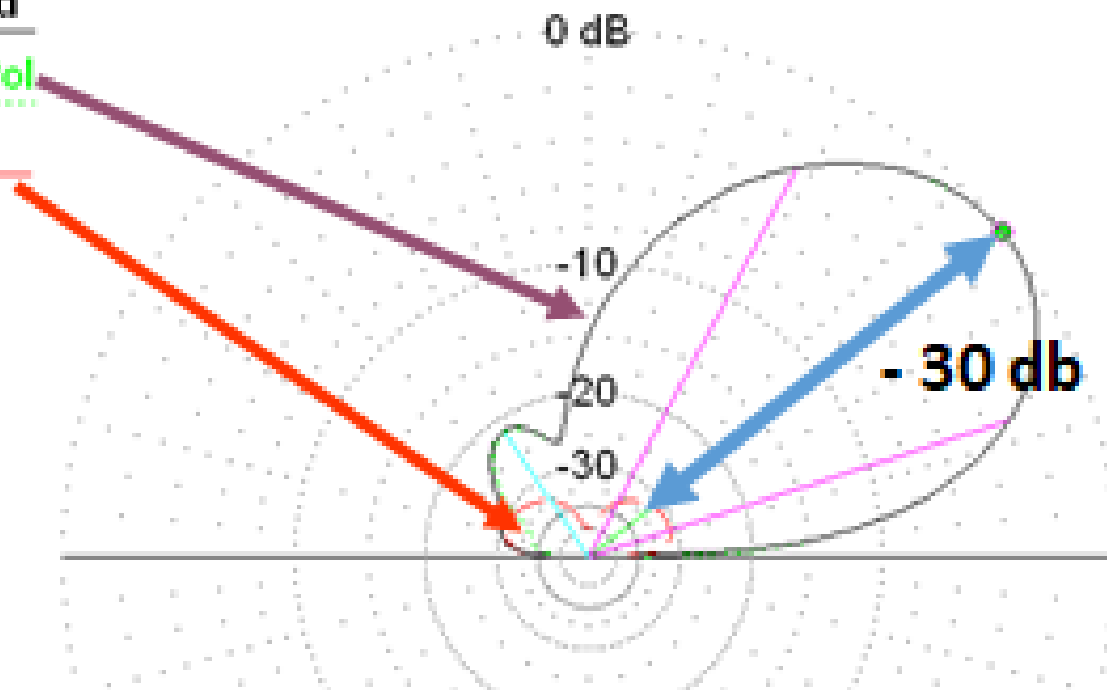
VERTICAL SURFACE DIRECTIVITY OF HWF

FOURTH STEP >> Polarization filter HWF 11.5 to 12 dB RDF

* Total Field

Horizontal Pol

Vertical Pol



1. The HWF attenuate vertical polarized signal > -30 dB

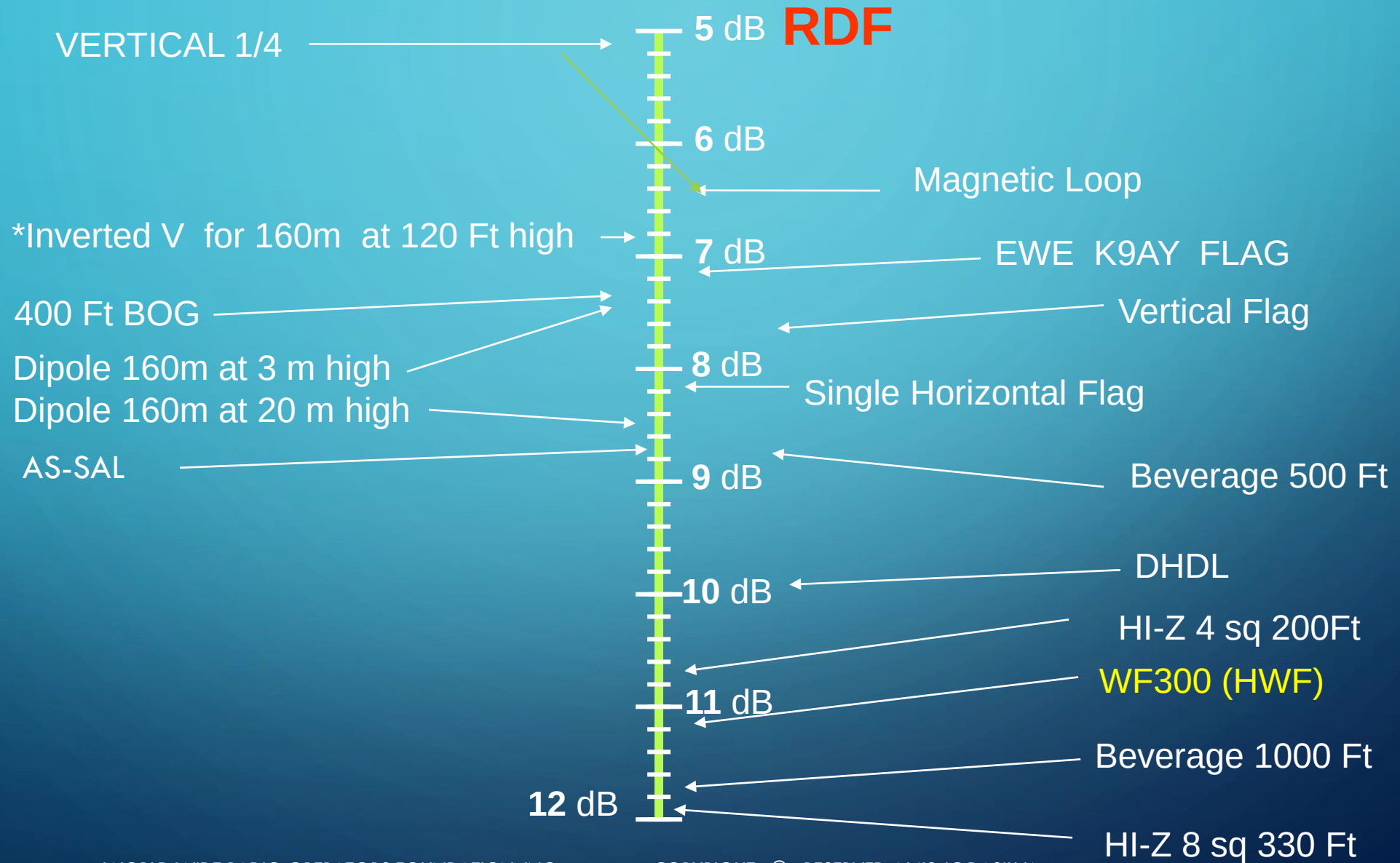
打上角: 40°

水平方向はローゲイン
 $\Rightarrow$ 人工ノイズを拾い難い

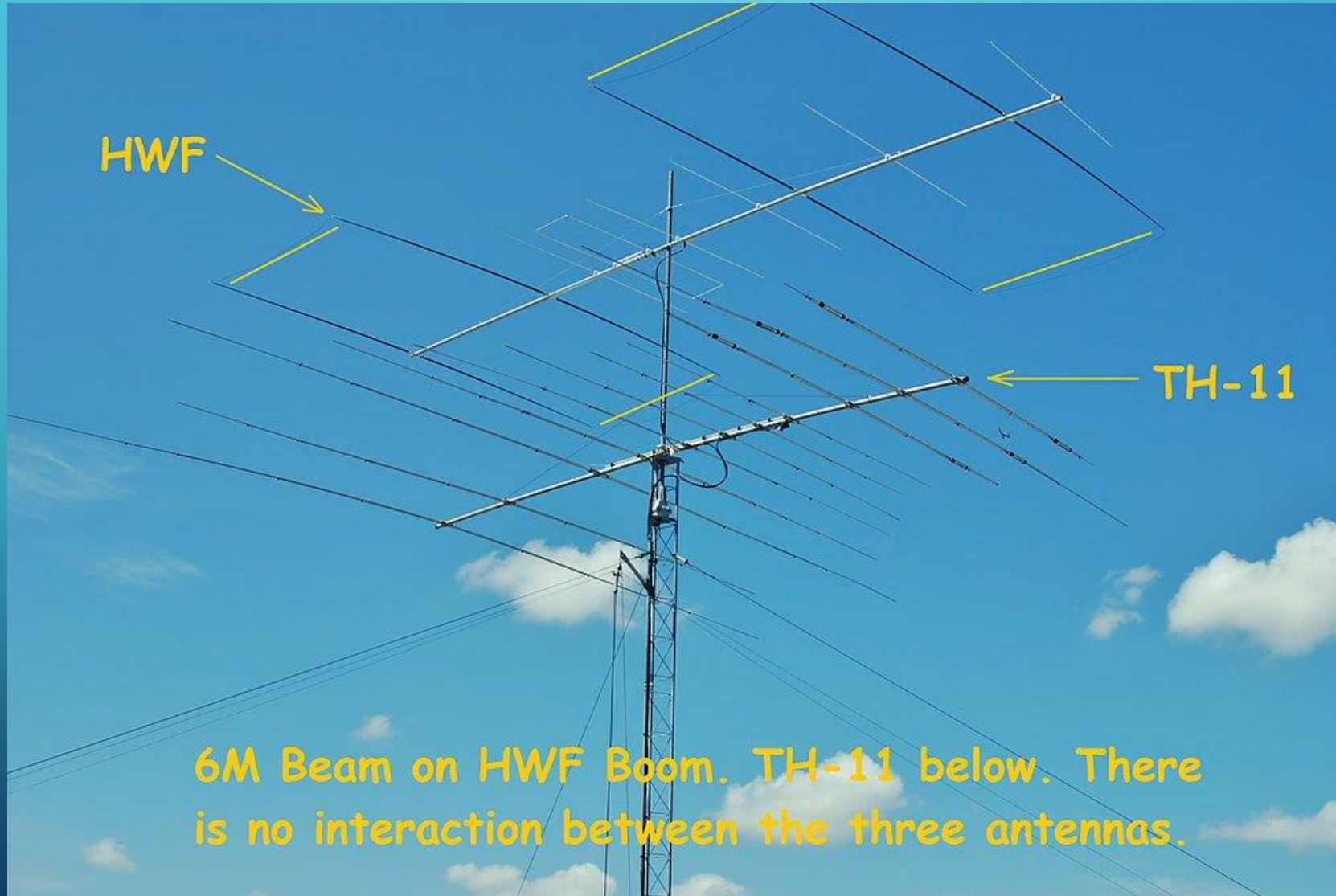
偏波フィルター (-30 dB)
 $\Rightarrow$ 送信アンテナ、タワー
の影響が少ない

DX電波の入射角度
 $10 \sim 30^\circ$ にて
 $\Rightarrow$ 良好な S/N

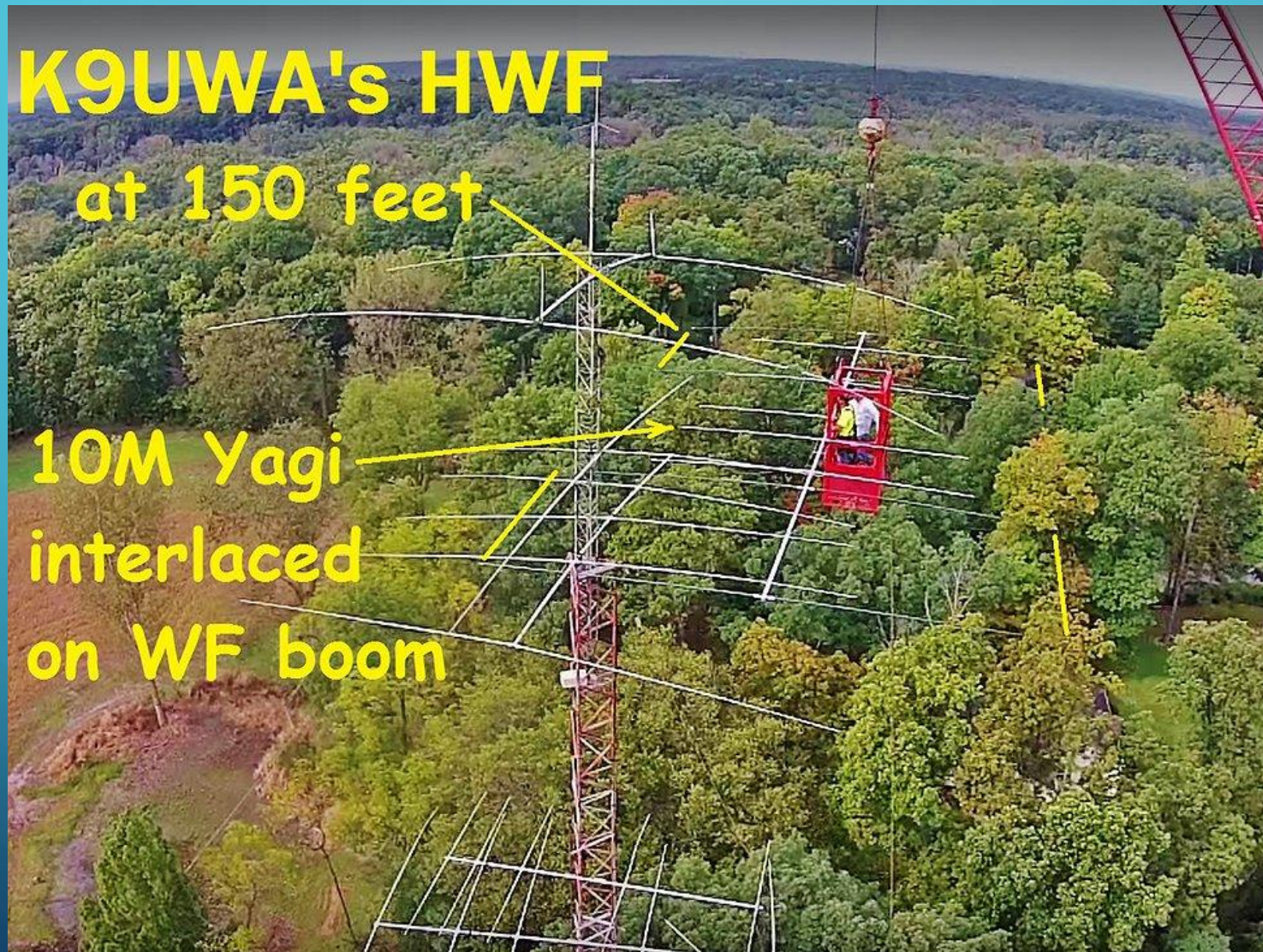
RDF(RELATIVE DIRECTIVITY FACTOR) ANTENNA COMPARISON FOR 160M



HWF PICTURE



HWF PICTURE K9UWA



WF300 ON VERTICAL ANTENNA



**Folded Unipole
Vertical Antenna
N4IS**

from N4IS on QRZ.com

WF300 SHIPPING CARTON, INSIDE CARTON



WF300 BOOM



WF300 ELEMENT CONNECTION



WF300 MAST CRAMP



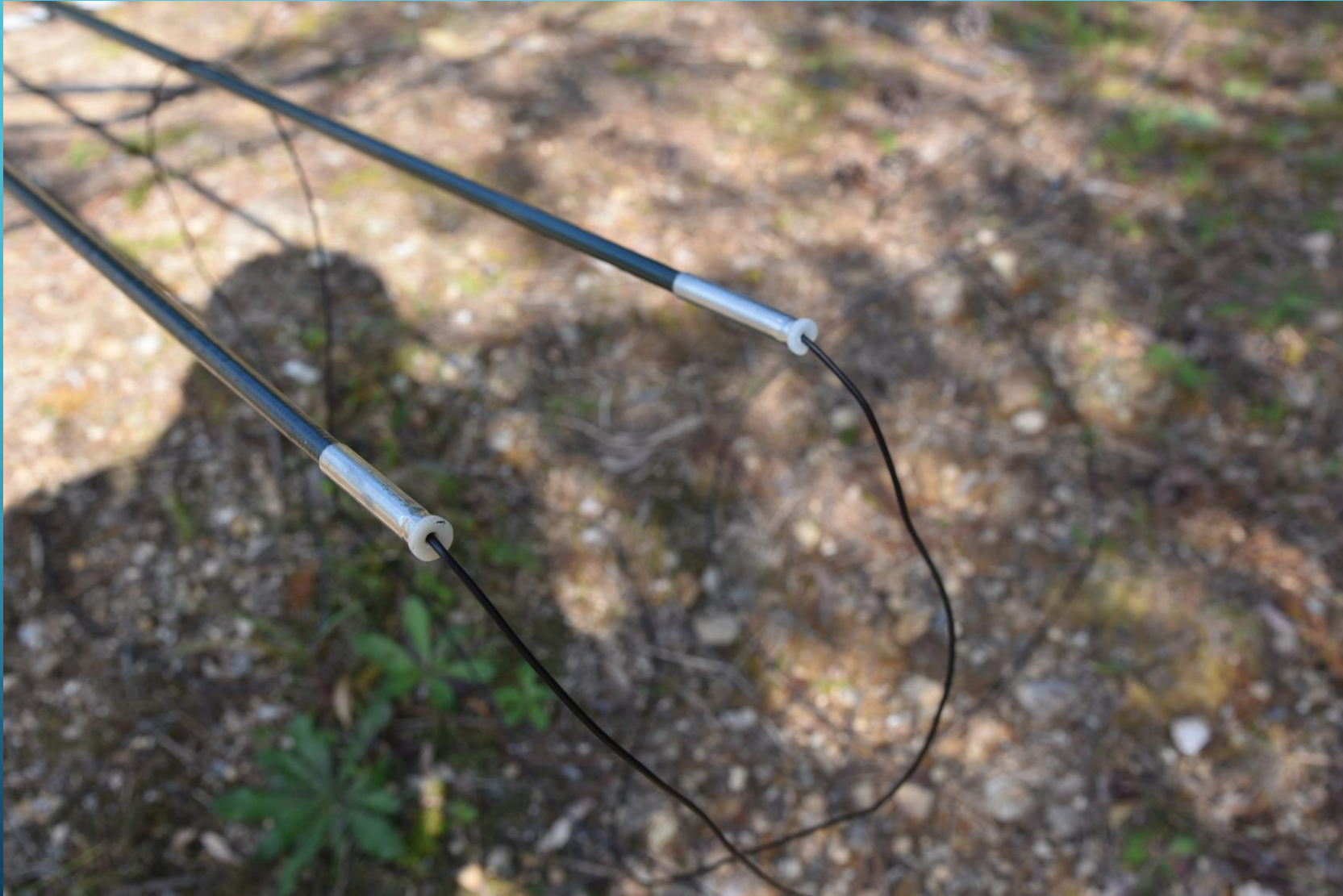
WF300 FEED POINT



WF300 ELEMENTS



WF300 ELEMENT WIRE



WF300 BASE OF ELEMENT



WF300 CONSTRUCTION



WF300 CONSTRUCTION



WF300 CONSTRUCTION



PREAMPLIFIER FILTER INTERLOCK UNIT



WF300 receiving systems

Preamplifier Filter Interlock Unit



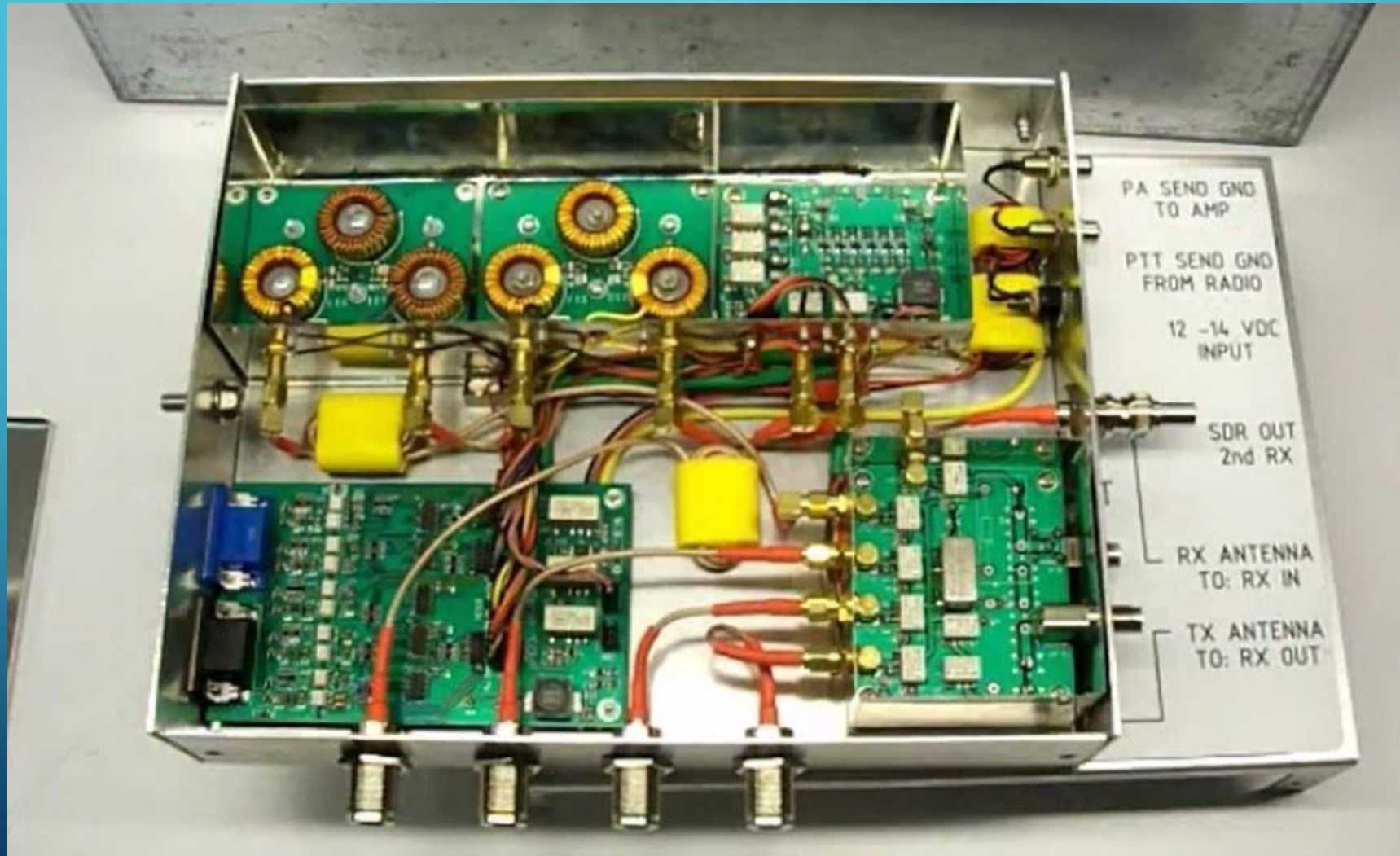
Control Unit

3 RX antennas input

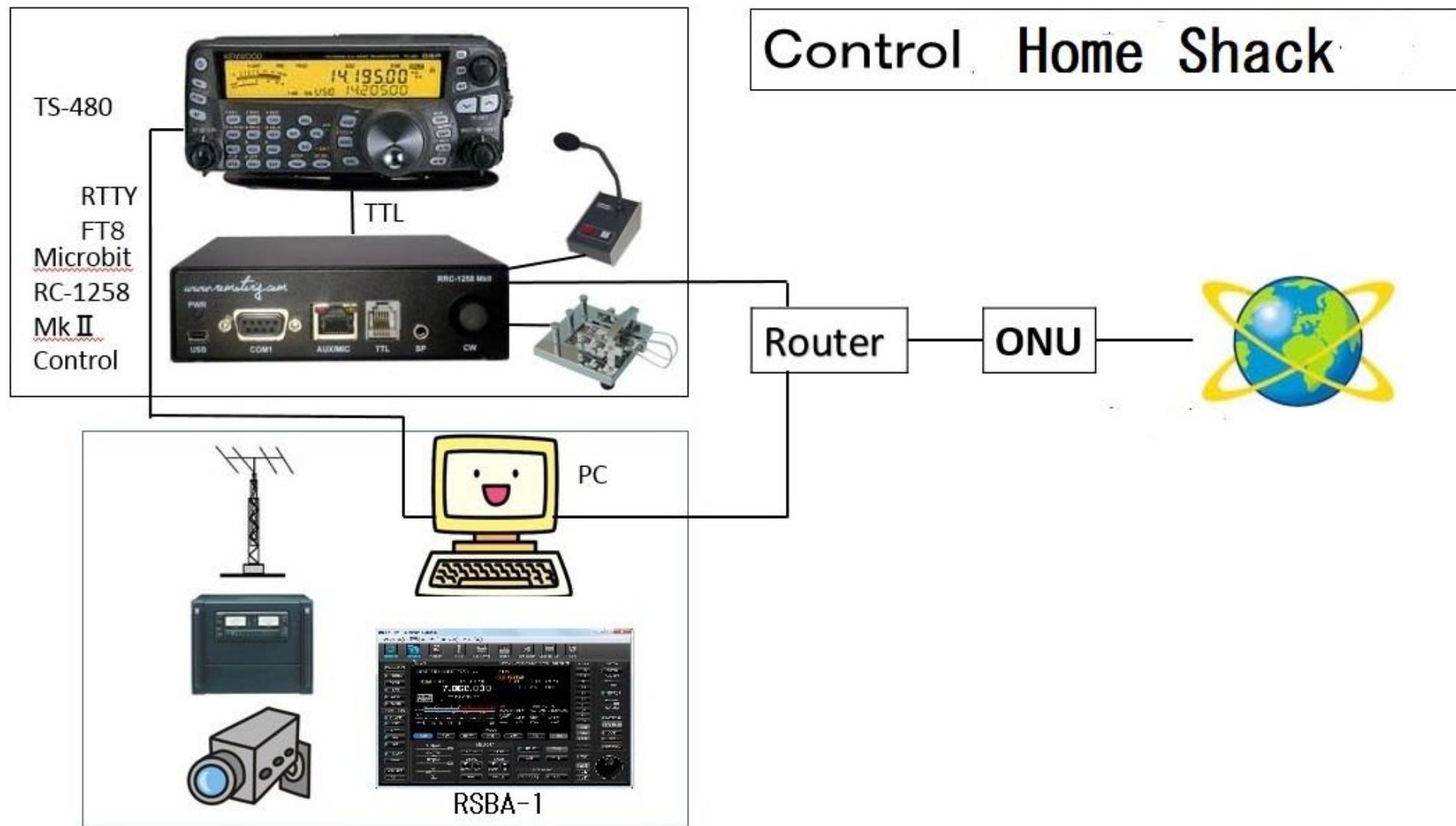
Computer remote control

Output for 2 receivers

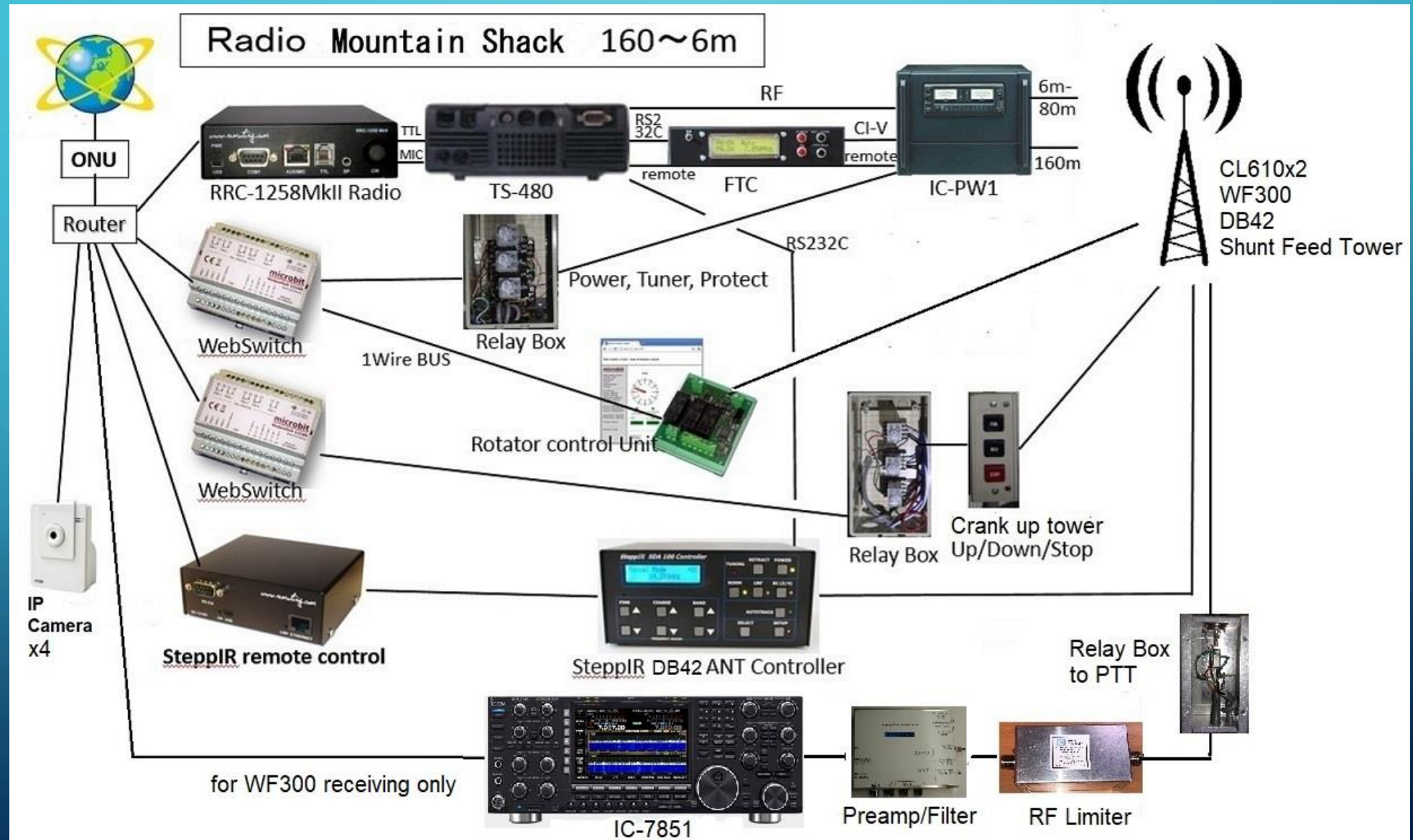
INSIDE OF PFIU



REMOTE CONTROL (HOME SHACK) JA2IVK



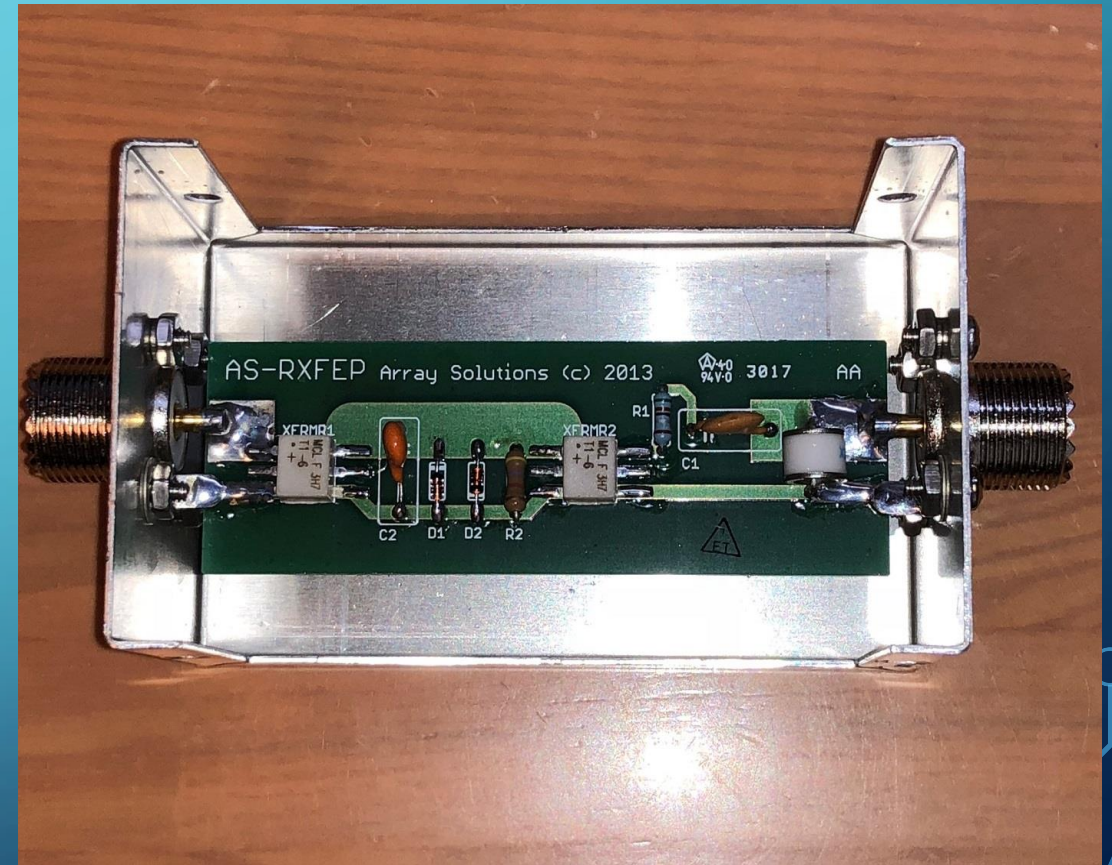
REMOTE CONTROL (MOUNTAIN SHACK) JA2IVK



RECEIVER FRONT END PROTECTOR



**ARRAY
SOLUTIONS**
Receiver Front End Protector
RF Limiter/Arrestor
Model AS-RXFEP
1 to 150MHz
Insertion Loss .3 dB typical
VSWR 1.1:1
www.arrayolutions.com
1(214)954-7140
RADIO ANTENNA



ARRAY SOLUTIONS AS-RXFEP

MY CURRENT ANTENNA JA2IVK



6m 10ele Stack
WF300
SteppIR DB42
160m Shunt Feed Tower

MY ANTENNA SYSTEM JA2IVK VIDEO



160M QSL OBTAINED BY WF300 JA2IVK



CONCLUSIONS

- Vertical Waller Flag: 素晴らしいがノイジー(市街地のノイズは地表から)
送信アンテナとの共存が難しい(ビームパターン劣化)
- Horizontal Waller Flag: ローノイズ、ノイズの多い市街地で特に有効
WF300 垂直送信アンテナとの共存が可能(偏波フィルター)
他の水平アンテナとの共存が可能(エレメントキャンセレーション)
- WF300はビバレージに迫る受信性能
250m長ビバレージ $\geq$ WF300>160m長ビバレージ>>タワーシャントバーチカル
- WF300はノイズの多い市街地で敷地が狭い日本向きの受信アンテナ

Special thanks to N4IS Jose

REFERENCE

TOP-BEAM SYSTEMS

<https://top-beam.com/>

K7TJR Comparison Chart of Rx antennas

<https://www.k7tjr.com/rx1comparison.htm>

W8JI Low Noise Receiving Antennas and Arrays

<https://www.w8ji.com/receiving.htm>

W8WWV The RDF Metric

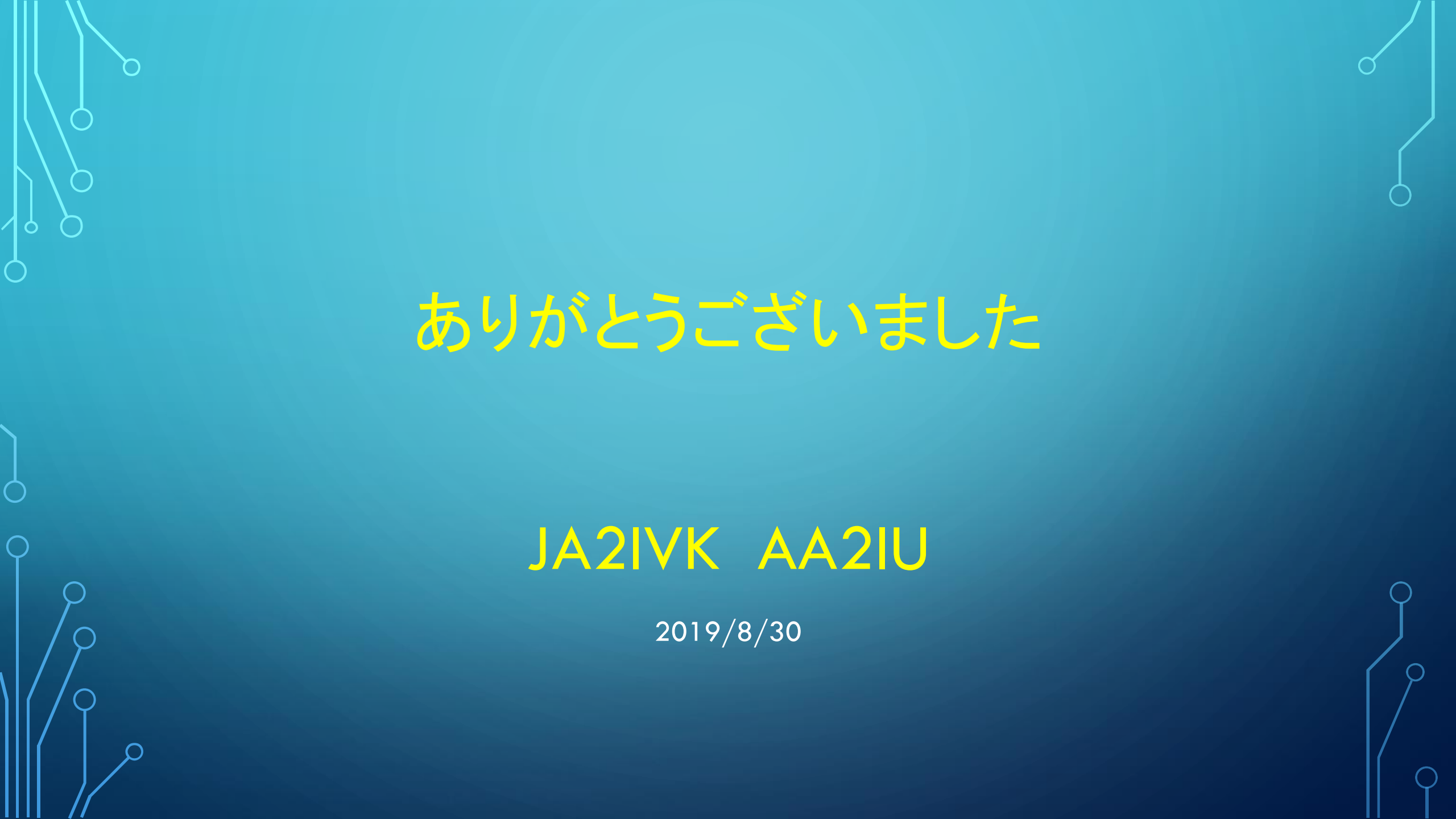
<http://www.seed-solutions.com/gregordy/Amateur%20Radio/Experimentation/RDFMetric.htm>

ARRAY SOLUTIONS (Receiver Front End Protector)

<https://www.arrayolutions.com/as-rxfep?search=as-rxfep>

MICROBIT

<http://www.remoterig.com/wp/>

The background is a blue gradient. In the corners, there are white line art illustrations of circuit boards or neural networks, with lines connecting to small circles.

ありがとうございました

JA2IVK AA2IU

2019/8/30