TECHNICAL
DOCUMENTATION

DTV Utah - Farnsworth Peak

BROADCAST

759 25063 | UHF antenna inside GRP radome
10/29/2018

KATHREIN

KATHREIN SE
Anton-Kathrein-Straße 1-3
83022 Rosenheim, Germany
Phone +49 8031 184-0
Fax +49 8031 184-495
www.kathrein.com | broadcast@kathrein.de

Description

1. Antenna system

The antenna system consists of two sub-systems: System 1 (top system), system 2 (bottom system). Both decompose into 8 bays, which 3 panels per bay. Each panel, in turn, exhibits two connectors (EIA 7/8" flange) to feed a crossed dipole system. By feeding both parts in phase, with 180° or 90°, the polarization can be altered from vertical, to horizontal or circular. Any phases in between create elliptical polarization (general polarization ellipse).
For horizontal polarization a phase in between of 180° is necessary.
For getting a 70% horizontal polarization and 30% vertical polarization a phase in between of 114° is necessary.

The characteristic impedance of internal cabling is 50Ω. However, the main splitter inputs are designed to match a 8 3/16" EIA 75 Ω feed system. For operation with the existing 6 1/8" EIA 50 Ω rigid line feed system, a transition from 8 3/16" 75 Ω to 6 1/8" 50 Ω is provided.

Both systems stand a maximum power of 90 kW at main feeder input.

2. Altered headings

The azimuth headings are altered to 37°, 155°, 270°.

3. Elevation pattern modification in autumn 2018

The original in the beginning of 2018 planned elevation patterns have been revised in October 2018, in order to strengthen the field strength in the first and second null. For that additional rigid line spacers will be added to the existing new system. The new cable phases and rigid line lengthes can be found in this handbook.

General Specifications

constructional features	see figure sheet 109
frequency range	470 - 608 MHz
design frequency	587 MHz
operating channels (US)	CH 30 / 34 / 35 / 36
possible signal modulations	ATSC 1.0, ATSC 3.0
polarization	default: horizontal switchable to elliptical H70/V30 for configuration see manual "Polarization configuration 2018-09-17.pdf"
impedance in harness impedance at main splitter input	50Ω unbalanced 75Ω unbalanced
gain * reference to λ/2 dipole (at main splitter input)	14.3 / 14.4 / 14.3 / 14.5 dBd (horiz. component) see sheet 105.1 "ERP Gain Calculations" for details
VSWR (at main splitter input)	VSWR ≤ 1.2 (over complete band) VSWR ≤ 1.15 (in channels)
horizontal radiation pattern	see figure sheet 101
vertical radiation pattern	see figure sheet 102
absolute maximum power at feeder input (at main splitter input)	90 kW
voltage resistance for ATSC 1.0 @ 13 dB Crest factor (envelope model)*	Yes, up to max. power 90 kW.
voltage resistance for ATSC 3.0 @ 16dB Crest factor (envelope model)*	Yes, up to max. power 90 kW.

General Specifications

construcitonal features	see figure sheet 109
frequency range	470 - 608 MHz
design frequency	521 MHz
operating channels (US)	CH 17 / 19 / 23 / 27
possible signal modulations	ATSC 1.0, ATSC 3.0
polarization	default: horizontal switchable to elliptical H70/V30 for configuration see manual "Polarization configuration 2018-09-17.pdf"
impedance in harness impedance at main splitter input	50Ω unbalanced 75Ω unbalanced
gain * reference to λ/2 dipole (at main splitter input)	13.4 / 13.5 / 13.5 / 14.1 dBd (horiz. component) see sheet 105.1 "ERP Gain Calculations" for details
VSWR (at main splitter input)	VSWR ≤ 1.2 (over complete band) VSWR ≤ 1.15 (in channels)
horizontal radiation pattern	see figure sheet 101
vertical radiation pattern	see figure sheet 102
absolute maximum power at feeder input (at main splitter input)	90 kW
voltage resistance for ATSC 1.0 @ 13 dB Crest factor (envelope model)*	Yes, up to max. power 90 kW.
voltage resistance for ATSC 3.0 @ 16dB Crest factor (envelope model)*	Yes, up to max. power 90 kW.

ERP Gain Calculation

operating channels (US)	17	19	23	27	30	34	35	36	
midband frequency	**491**	**503**	**527**	**551**	**569**	**593**	**599**	**605**	**MHz**
horizontal directivity (horiz. pol.)	2.8	2.8	2.9	2.0	2.8	2.9	2.8	3.0	dB
vertical directivity (horiz. pol.)	11.4	11.5	11.7	11.9	12.0	12.0	12.0	12.0	dBd
harness attenuation	0.45	0.45	0.46	0.47	0.48	0.49	0.49	0.49	dB
system gain (at main splitter input)	**13.7**	**13.8**	**14.1**	**13.4**	**14.3**	**14.4**	**14.3**	**14.5**	**dBd**
attenuation rigid line (6 1/8") (254 ft, 6 1/8" 50 Ω)	0.29	0.30	0.30	0.31	0.31	0.32	0.32	0.33	dB
attenuation rigid line (8 3/16") (254 ft, 8 3/16" 75 Ω)	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.21	dB
system gain bottom (6 1/8")	**13.4**	**13.5**	**13.8**	**13.1**	**14.0**	**14.1**	**14.0**	**14.1**	**dBd**
(at input feeder cable)	22.0	22.6	24.2	20.4	25.2	25.5	25.2	25.9	lin.
system gain bottom (8 3/16")	**13.5**	**13.7**	**13.9**	**13.2**	**14.1**	**14.2**	**14.1**	**14.3**	**dBd**
(at input feeder cable)	22.5	23.2	24.8	20.9	25.8	26.2	25.9	26.7	lin.
Assigned repack ERP	188	114	398	133	389	423	157	200	**kW**
required TPO (6 1/8") (at input feeder cable)	**8.5**	**5.0**	**16.5**	**6.5**	**15.5**	**16.6**	**6.2**	**7.7**	**kW**
total TPO (6 1/8")			36.6				46.0		kW
required TPO (8 3/16") (at input feeder cable)	**8.3**	**4.9**	**16.1**	**6.4**	**15.1**	**16.2**	**6.1**	**7.5**	**kW**
total TPO (8 3/16")			35.7				44.8		kW

reserve channels

Remarks:
The upper system exhibits greater cable lengths than the lower system due to the fact that both main splitters are mounted in the bottom of cylinder. Therefore the harness losses are slightly higher than at the lower system.
The vertical component is neglected.

KATHREIN	Date: 29.10.2018	DTV Utah, Salt Lake City	Type No.: 759 25063
	Sign / Name BSR / Ge	Gain values Antenna system 1 (upper half)	Sheet No.: 105.1

ERP Gain Calculation

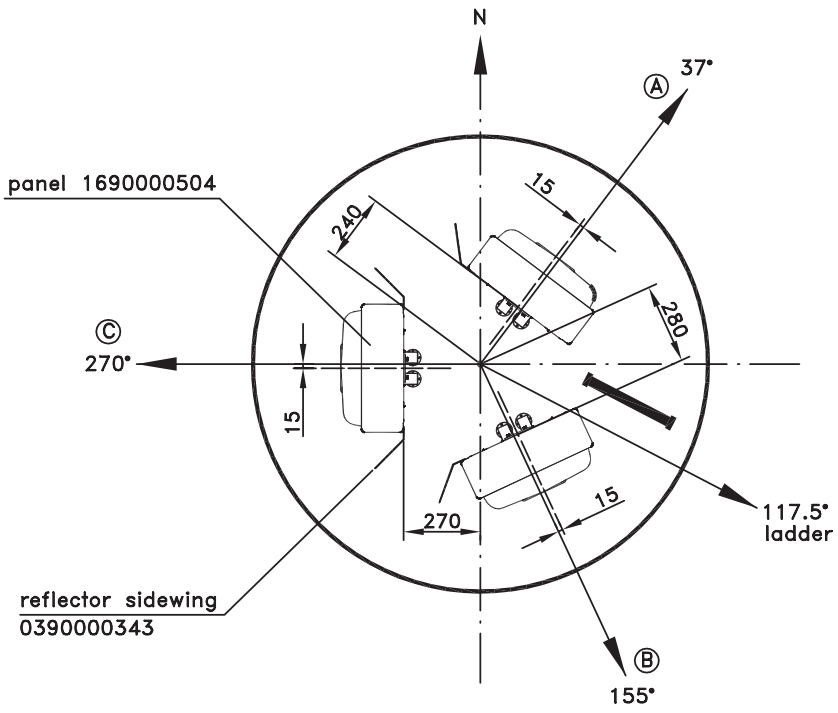
operating channels (US)	17	19	23	27	30	34	35	36	
midband frequency	**491**	**503**	**527**	**551**	**569**	**593**	**599**	**605**	**MHz**
horizontal directivity (horiz. pol.)	2.5	2.5	2.3	2.7	2.8	3.2	3.1	3.2	dB
vertical directivity (horiz. pol.)	11.2	11.3	11.5	11.7	11.7	11.7	11.7	11.7	dBd
harness attenuation	0.30	0.31	0.31	0.32	0.32	0.33	0.33	0.33	dB
system gain (at main splitter input)	**13.4**	**13.5**	**13.5**	**14.1**	**14.2**	**14.6**	**14.5**	**14.5**	**dBd**
attenuation rigid line (6 1/8") (254 ft, 6 1/8" 50 Ω)	0.29	0.30	0.30	0.31	0.31	0.32	0.32	0.33	dB
attenuation rigid line (8 3/16") (254 ft, 8 3/16" 75 Ω)	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.21	dB
system gain bottom (6 1/8")	**13.1**	**13.2**	**13.2**	**13.8**	**13.9**	**14.3**	**14.2**	**14.2**	**dBd**
(at input feeder cable)	20.3	20.7	21.0	23.9	24.4	26.8	26.1	26.2	lin.
system gain bottom (8 3/16")	**13.2**	**13.3**	**13.3**	**13.9**	**14.0**	**14.4**	**14.3**	**14.3**	**dBd**
(at input feeder cable)	20.7	21.2	21.5	24.5	25.1	27.5	26.8	27.0	lin.
Assigned repack ERP	188	114	398	133	389	423	157	200	**kW**
required TPO (6 1/8") (at input feeder cable)	**9.3**	**5.5**	**19.0**	**5.6**	**15.9**	**15.8**	**6.0**	**7.6**	**kW**
total TPO (6 1/8")		39.3				45.4			kW
required TPO (8 3/16") (at input feeder cable)	**9.1**	**5.4**	**18.5**	**5.4**	**15.5**	**15.4**	**5.9**	**7.4**	**kW**
total TPO (8 3/16")		38.3				44.2			kW

reserve channels

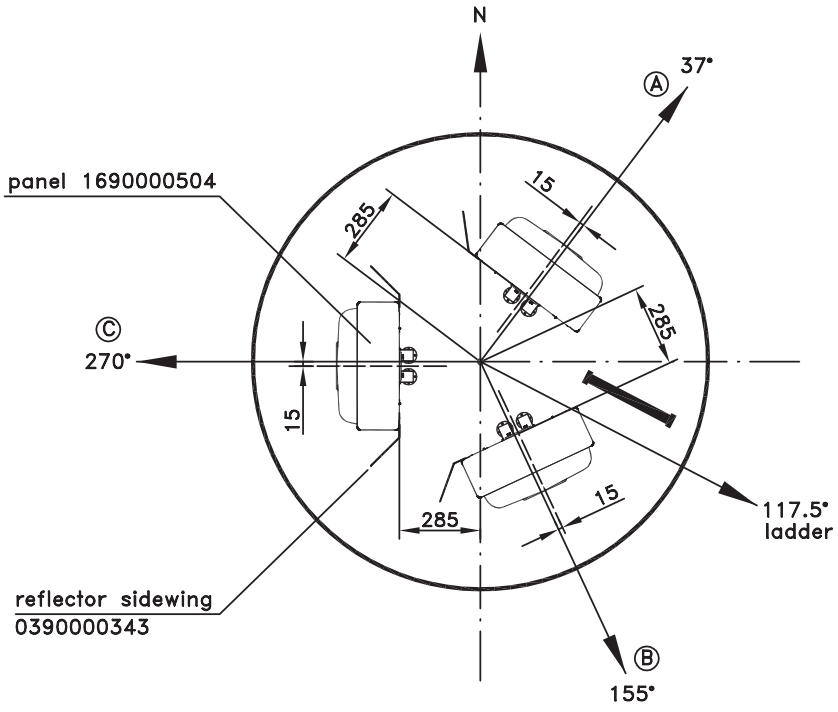
Remarks:
The vertical component is neglected.

KATHREIN	Date: 29.10.2018	DTV Utah, Salt Lake City	Type No.: 759 25063
	Sign / Name BSR / Ge	Gain values Antenna system 2 (lower half)	Sheet No.: 105.2

Antenna System 1
(bay no. 9 – 16)

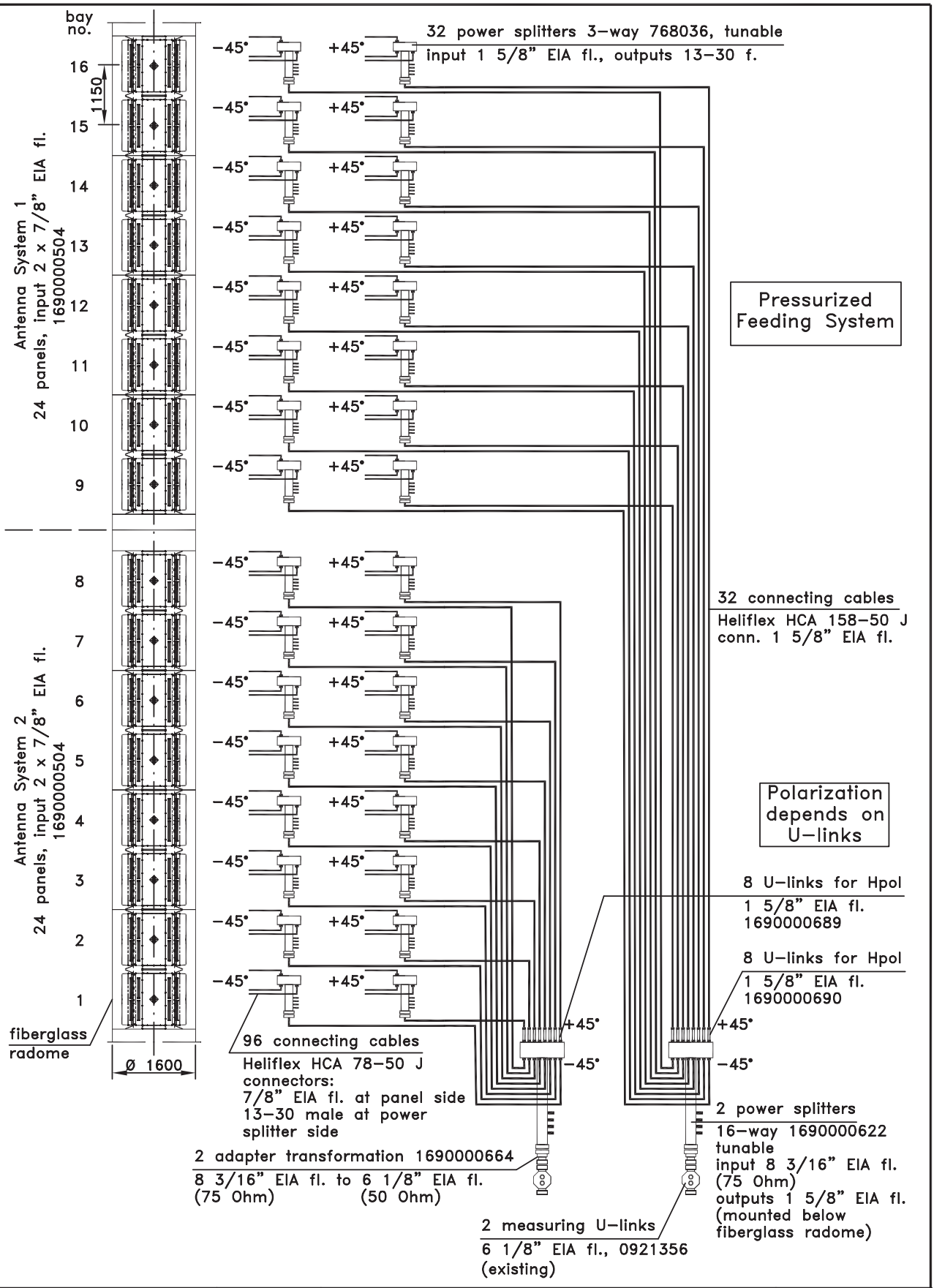


Antenna System 2
(bay no. 1 – 8)



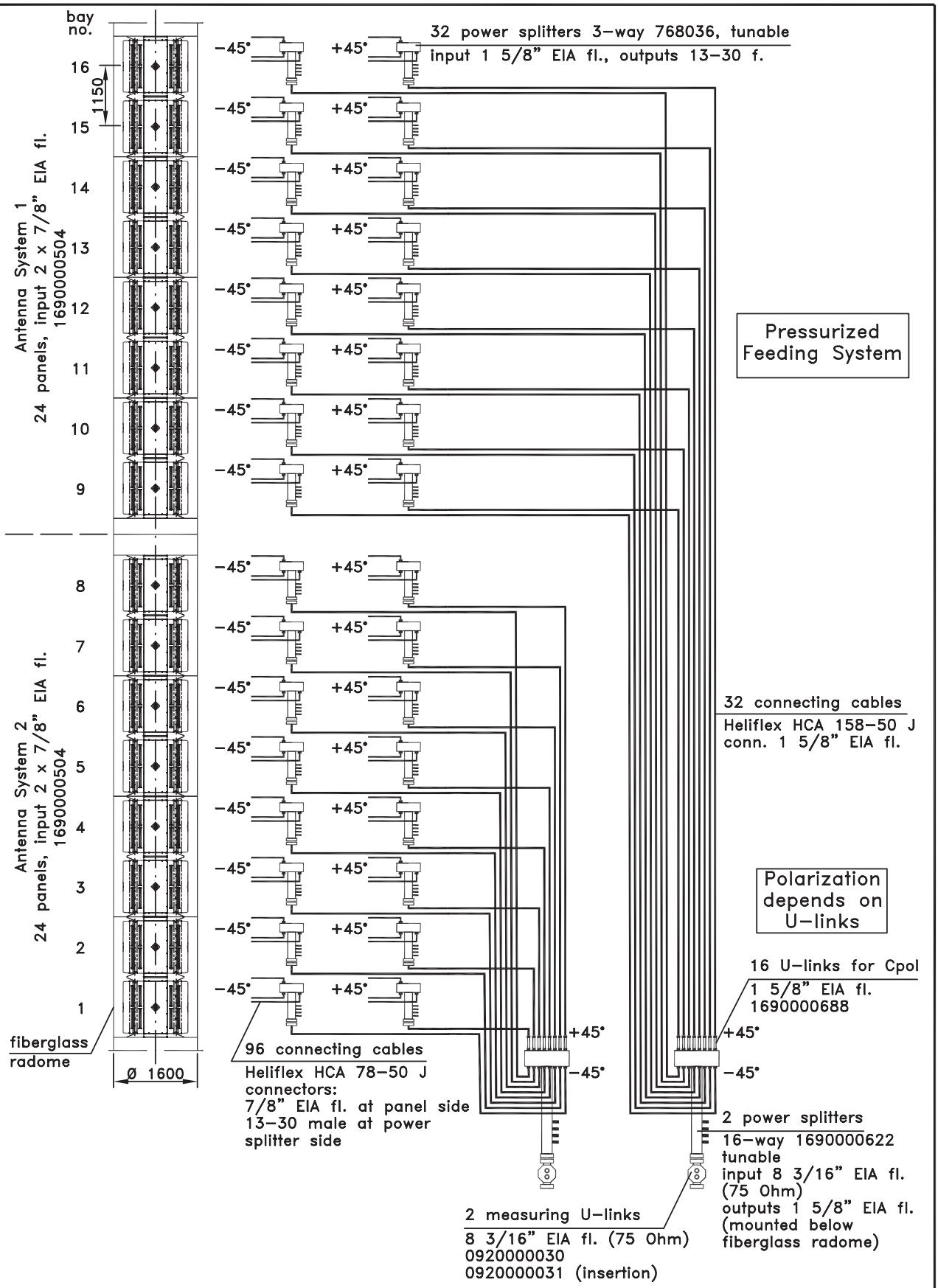
KATHREIN	Day	DTV Utah Antenna Top View SALT LAKE CITY	Type No.
	27.03.2018		75925063
	Name		
	BSR–Ge		Sheet: 109.Top

75925063_109_Top.dwg



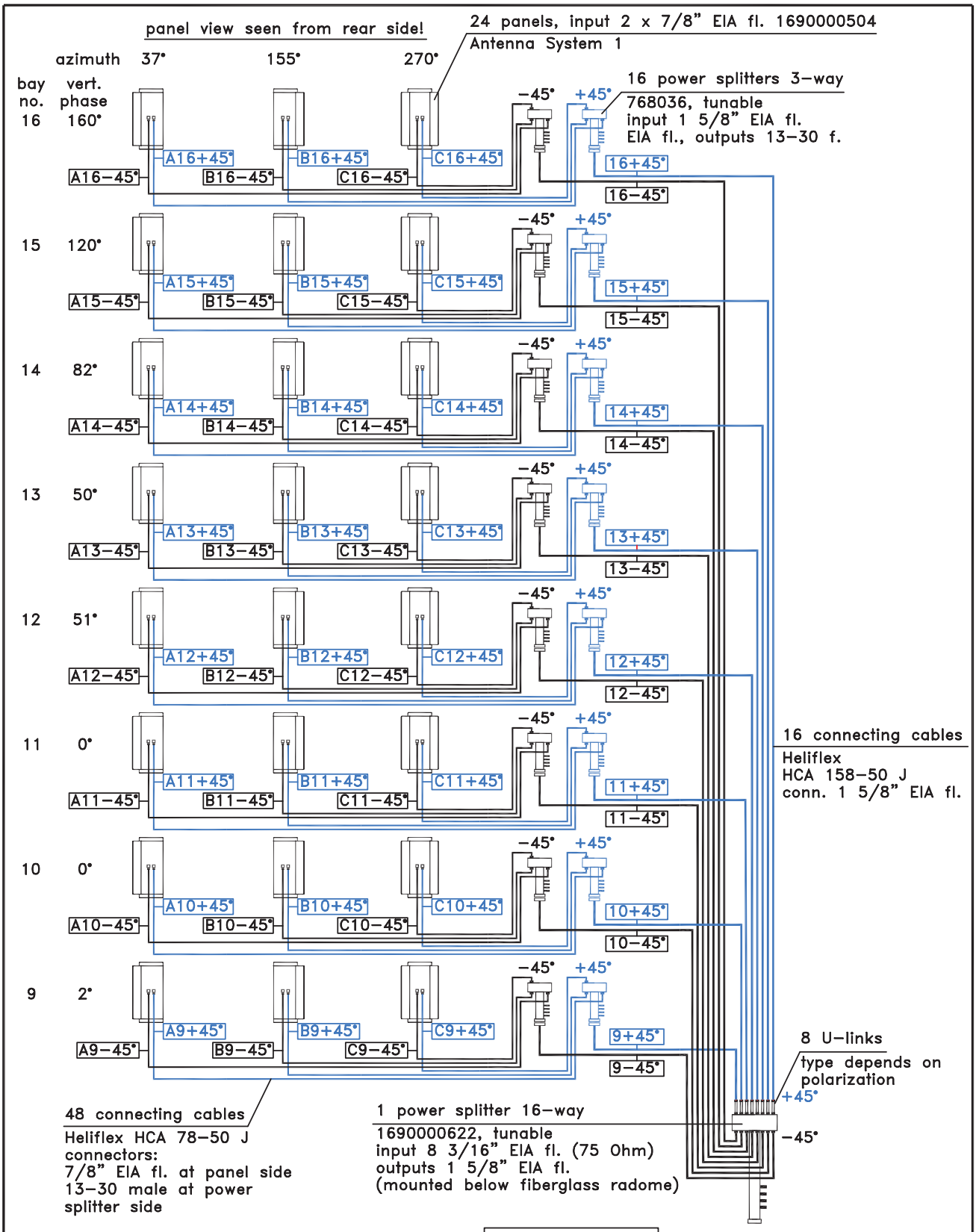
KATHREIN	Day 27.03.2018 Name BSR-Ge	DTV Utah Antenna Hpol Configuration SALT LAKE CITY	Type No. 75925063 Sheet: 109.H

75925063_109_Hpol.dwg



KATHREIN	Day	DTV Utah Antenna Epol (H:70/V:30) Configuration SALT LAKE CITY	Type No.
	27.03.2018		75925063
	Name		
	BSR-Ge		Sheet: 109.E

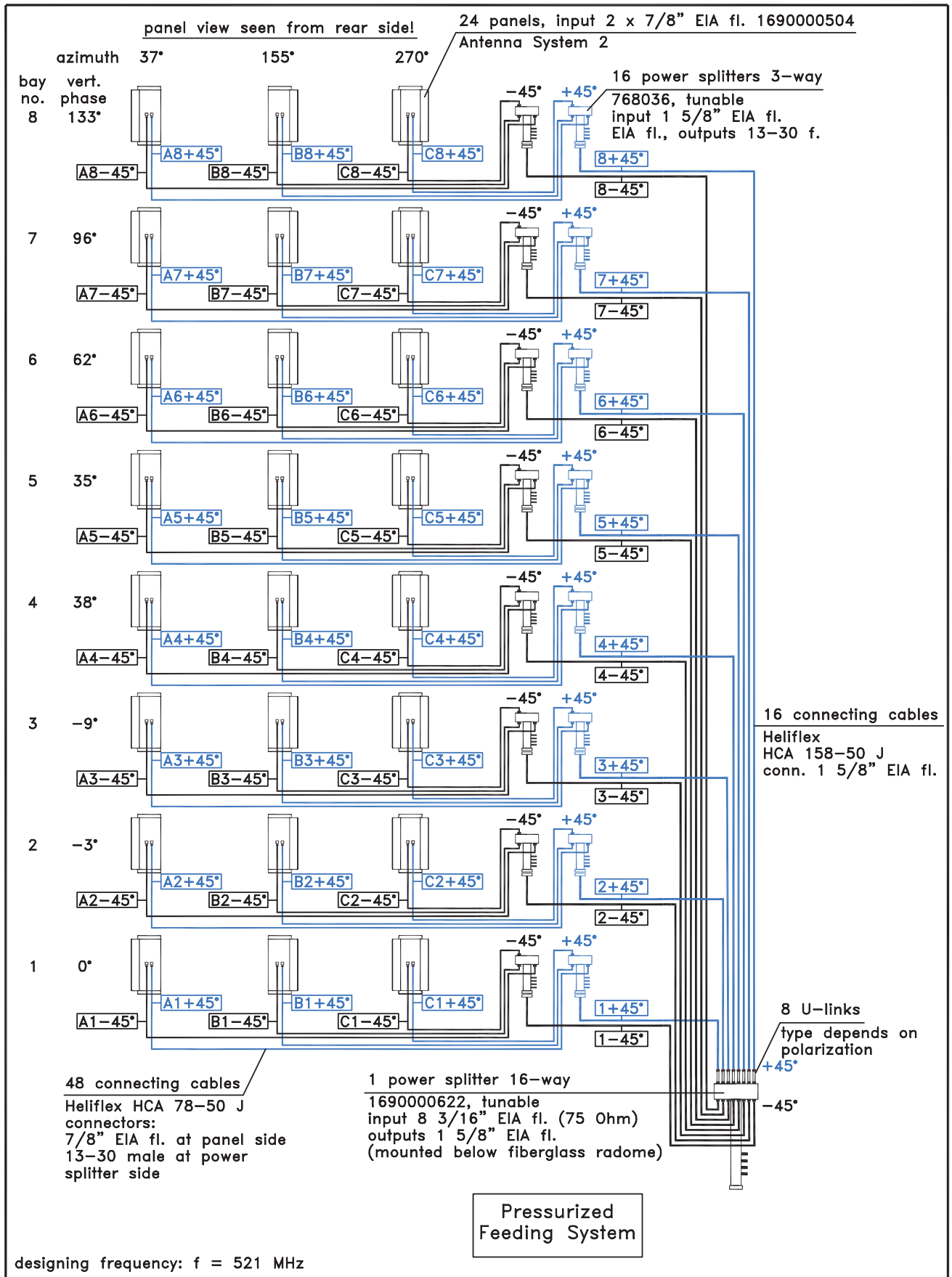
75925063_109_Epol.dwg



designing frequency: f = 587 MHz

KATHREIN	Day 27.03.2018 Name BSR-Ge	Cabling for 75925063 DTV Utah Antenna Antenna System 1 SALT LAKE CITY	Type No. k1970000446-b Sheet: 115.1

75925063_115-1_System_1.dwg



designing frequency: f = 521 MHz

KATHREIN	Day 27.03.2018 Name BSR−Ge	Cabling for 75925063 DTV Utah Antenna Antenna System 2 SALT LAKE CITY	Type No. k1970000446−b Sheet: 115.2

75925063_115−2_System_2.dwg

qty.	cable no.	length [mm]	rel. phase [°]	-	-	cable type	connectors
1 ea.	A16 -45° - A9 -45°	1 600	0	-	-	Heliflex HCA 78-50 J (914525)	at panel side: 7/8" EIA fl. (0921959) at power splitter side: 13-30 male (0921896) **ALL CONNECTORS DRILLED! "GASS PASS"**
1 ea.	A16 +45° - A9 +45°	1 600	0	-	-		
1 ea.	B16 -45° - B9 -45°	1 600	0	-	-		
1 ea.	B16 +45° - B9 +45°	1 600	0	-	-		
1 ea.	C16 -45° - C9 -45°	1 600	0	-	-		
1 ea.	C16 +45° - C9 +45°	1 600	0	-	-		

qty.	cable no.	length [mm]	rel. phase [°]	U-link phase [°]	vert. phase [°]	cable type	connectors
1	16 -45°	23 962	160	0	160	Heliflex HCA 158-50 J (914526)	1 5/8" EIA fl. (0921163) **ALL CONNECTORS DRILLED! "GAS PASS"**
1	15 -45°	24 016	120	0	120		
1	14 -45°	24 067	82	0	82		
1	13 -45°	24 110	50	0	50		
1	12 -45°	24 109	51	0	51		
1	11 -45°	24 178	0	0	0		
1	10 -45°	24 178	0	0	0		
1	9 -45°	24 175	2	0	2		
1	16 +45°	23 780	295	135	160		
1	15 +45°	23 834	255	135	120		
1	14 +45°	23 885	217	135	82		
1	13 +45°	23 928	185	135	50		
1	12 +45°	23 927	186	135	51		
1	11 +45°	23 996	135	135	0		
1	10 +45°	23 996	135	135	0		
1	9 +45°	23 993	137	135	2		

designing frequency: f = 587 MHz

Attention: The shown configuration has been modified in November 2018 with additional rigid lines.

Please mind: See "Modification VRP (11/2018)" cable plan "K1970002179-a" for details. Gerl, 10/29/2018

The system is **designed for pressurization** by means of a dehydrator.
Please make sure that the sealing screws of 3-way power splitters (supplied) are applied on the ventilation tube of the power splitters.

KATHREIN	Day 27.03.2018 Name BSR-Ge	Cabling for 75925063 DTV Utah Antenna Antenna System 1 SALT LAKE CITY	Type No. K1970000446-b Sheet 115.1a

qty.	cable no.	measured rel. phase[°]	U-link phase[°]	relative target phase[°]	Spacer length [mm]	Spacer Type no.
1	16 -45°	151.2	0	221	21	1690002017 L=21
1	15 -45°	109.6	0	159	51	1690002000 L=51
1	14 -45°	86.0	0	115	80	1690002000 L=80
1	13 -45°	53.2	0	103	50	1690002000 L=50
1	12 -45°	39.1	0	57	96	1690002000 L=96
1	11 -45°	10.6	0	58	54	1690002000 L=54
1	10 -45°	0.0	0	17	96	1690002000 L=96
1	9 -45°	6.3	0	56	50	1690002000 L=50
1	16 +45°	269.3	135	356	0	---
1	15 +45°	242.8	135	294	48	1690002000 L=48
1	14 +45°	213.2	135	250	69	1690002000 L=69
1	13 +45°	172.3	135	238	28	1690002017 L=28
1	12 +45°	176.2	135	192	98	1690002000 L=98
1	11 +45°	136.7	135	193	41	1690002017 L=41
1	10 +45°	135.7	135	152	98	1690002000 L=98
1	9 +45°	123.4	135	191	25	75210081

Design frequency: f=587 MHz

Please mind:
Spacers should be mounted at the main splitter outputs.

KATHREIN	Day	75925063 Modification VRP (11/2018) DTV Utah Antenna System 1 SALT LAKE CITY	Type No.
	25.10.2018		K1970002179-a
	Name		
	BSR-Ge		Sheet 115.1b

qty.	cable no.	length [mm]	rel. phase [°]	-	-	cable type	connectors
1 ea.	A8 -45° - A1 -45°	1 600	0	-	-	Heliflex HCA 78-50 J (914525)	at panel side: 7/8" EIA fl. (0921959) at power splitter side: 13-30 male (0921896) **ALL CONNECTORS DRILLED! "GASS PASS"**
1 ea.	A8 +45° - A1 +45°	1 600	0	-	-		
1 ea.	B8 -45° - B1 -45°	1 600	0	-	-		
1 ea.	B8 +45° - B1 +45°	1 600	0	-	-		
1 ea.	C8 -45° - C1 -45°	1 600	0	-	-		
1 ea.	C8 +45° - C1 +45°	1 600	0	-	-		

qty.	cable no.	length [mm]	rel. phase [°]	U-link phase [°]	vert. phase [°]	cable type	connectors
1	8 -45°	13 942	133	0	133	Heliflex HCA 158-50 J (914526)	1 5/8" EIA fl. (0921163) **ALL CONNECTORS DRILLED! "GAS PASS"**
1	7 -45°	13 999	96	0	96		
1	6 -45°	14 050	62	0	62		
1	5 -45°	14 091	35	0	35		
1	4 -45°	14 087	38	0	38		
1	3 -45°	14 158	-9	0	-9		
1	2 -45°	14 149	-3	0	-3		
1	1 -45°	14 145	0	0	0		
1	8 +45°	13 780	240	107	133		
1	7 +45°	13 836	203	107	96		
1	6 +45°	13 888	169	107	62		
1	5 +45°	13 929	142	107	35		
1	4 +45°	13 924	145	107	38		
1	3 +45°	13 996	98	107	-9		
1	2 +45°	13 987	104	107	-3		
1	1 +45°	13 982	107	107	0		

designing frequency: f = 521 MHz

Attention: The shown configuration has been modified in November 2018 with additional rigid lines.

Please mind: See "Modification VRP (11/2018)" cable plan "K1970002179-a" for details. Gerl, 10/29/2018

The system is **designed for pressurization** by means of a dehydrator.
Please make sure that the sealing screws of 3-way power splitters (supplied) are applied on the ventilation tube of the power splitters.

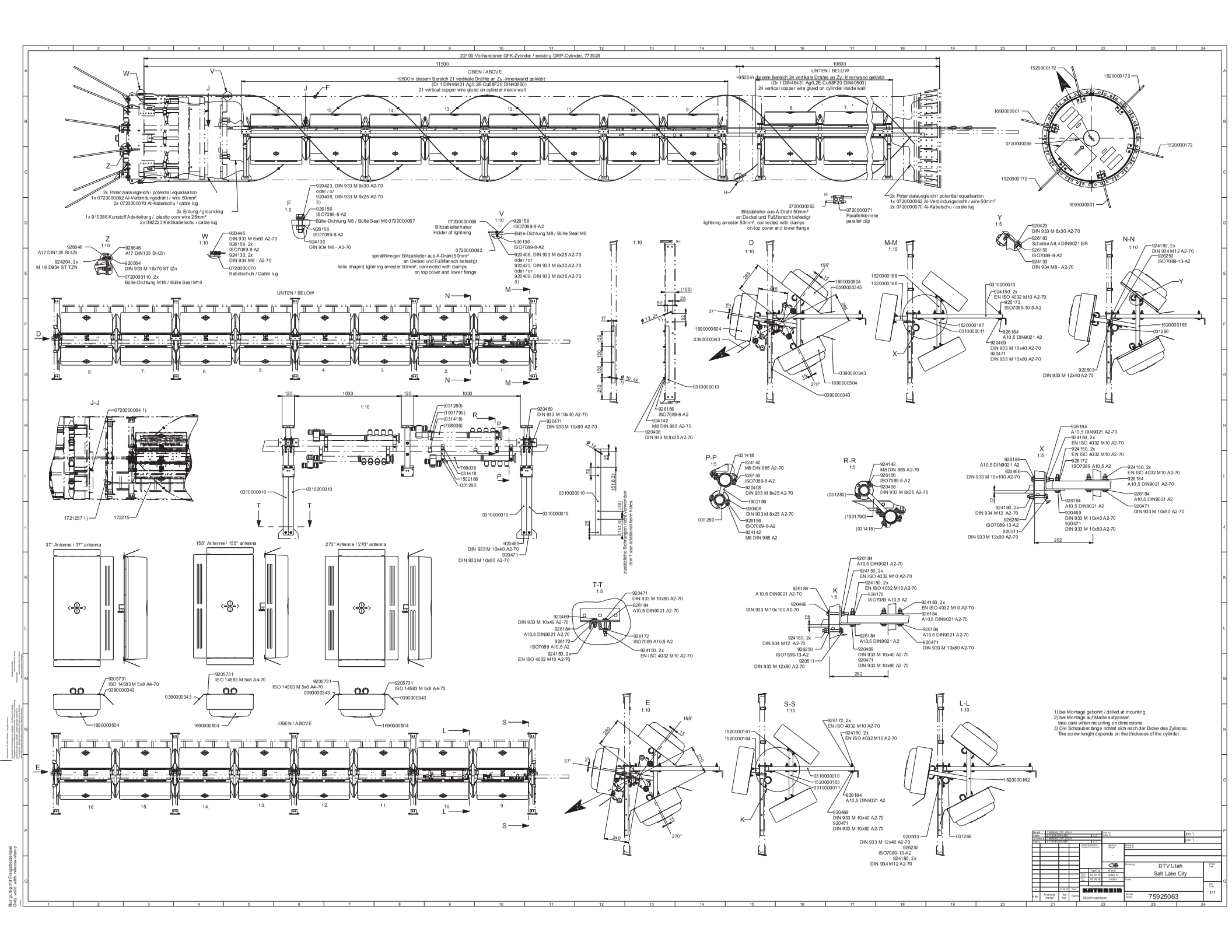
KATHREIN	Day	Cabling for 75925063 DTV Utah Antenna Antenna System 2 SALT LAKE CITY	Type No. K1970000446-b
	27.03.2018		
	Name		
	BSR-Ge		Sheet 115.2a

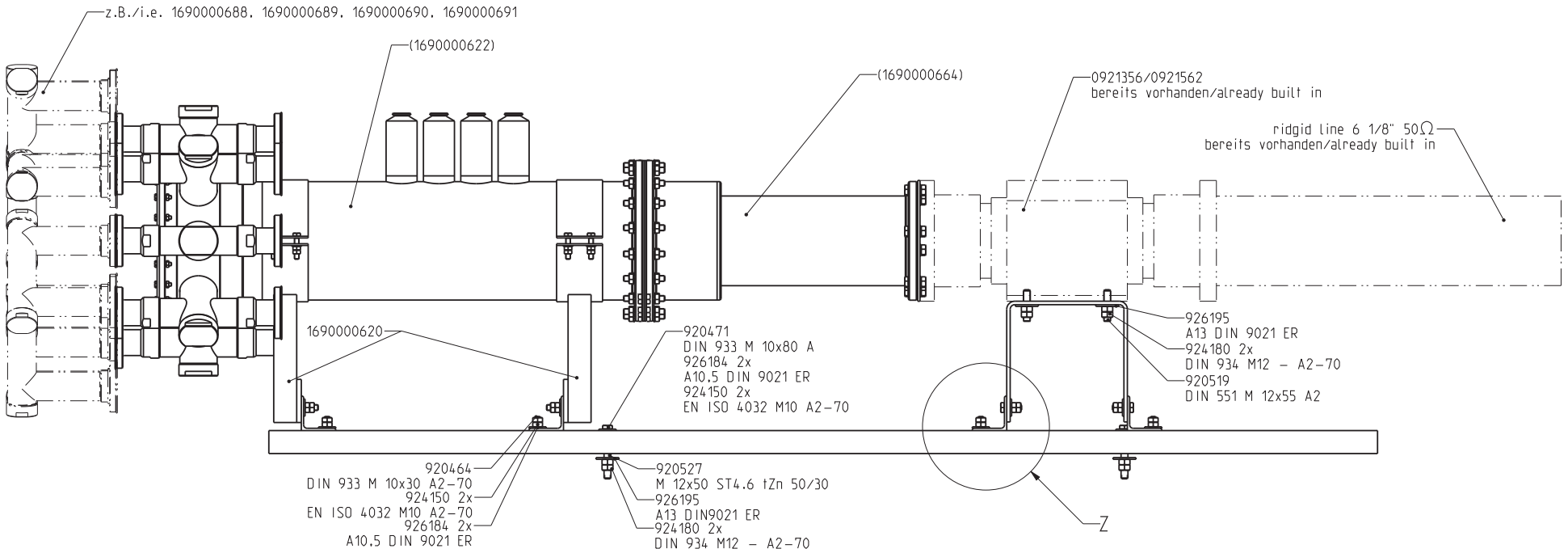
qty.	cable no.	measured rel. phase[°]	U-link phase[°]	relative target phase[°]	Spacer length [mm]	Spacer Type no.
1	8-45°	127.6	0	204	0	---
1	7-45°	98.9	0	142	51	1690002000 L=51
1	6-45°	65.4	0	101	63	1690002000 L=63
1	5-45°	36.3	0	94	28	1690002017 L=28
1	4-45°	28.2	0	47	90	1690002000 L=90
1	3-45°	0.0	0	49	41	1690002017 L=41
1	2-45°	26.9	0	13	142	1690002000 L=142
1	1-45°	9.1	0	55	45	75210083
1	8+45°	240.6	107	311	0	---
1	7+45°	203.3	107	249	45	75210083
1	6+45°	169.2	107	208	58	1690002000 L=58
1	5+45°	146.1	107	201	32	1690002017 L=32
1	4+45°	147.7	107	154	110	1690002000 L=110
1	3+45°	103.2	107	156	35	75210082
1	2+45°	107.6	107	120	100	1690002000 L=100
1	1+45°	115.1	107	162	45	75210083

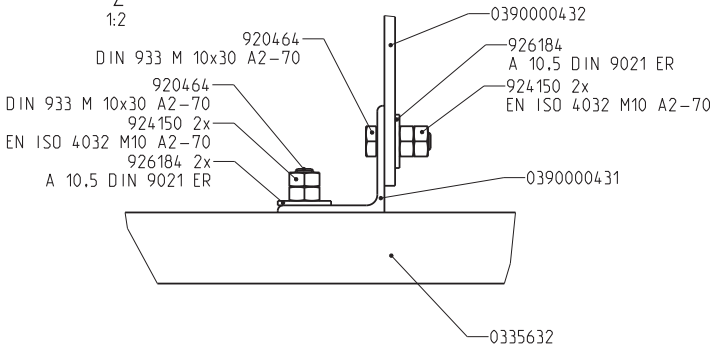
Design frequency: f=521 MHz

Please mind:
Spacers should be mounted at the main splitter outputs.

KATHREIN	Day	75925063 Modification VRP (11/2018) DTV Utah Antenna System 2 SALT LAKE CITY	Type No.
	25.10.2018		K1970002179-a
	Name		
	BSR-Ge		Sheet 115.2b


22100 Vorhandener GFK-Zylinder / existing GRP-Cylinder, 773928
11500
10600
OBEN / ABOVE
~9500 in diesem Bereich 21 vertikale Drähte an Zy.-Innenwand geklebt
(Dr 1 DIN46431 Ag0,2E-Cu58F20 DIN40500)
21 vertical copper wire glued on cylinder inside wall
UNTEN / BELOW
~9500 in diesem Bereich 24 vertikale Drähte an Zy.-Innenwand geklebt
(Dr 1 DIN46431 Ag0,2E-Cu58F20 DIN40500)
24 vertical copper wire glued on cylinder inside wall
2x Potenzialausgleich / potential equalisation
1x 0720000062 Al-Verbindungsdraht / wire 50mm²
2x 0720000070 Al-Kabelschu / cable lug
2x Erdung / grounding
1x 910386 Kunstoff Adereitung / plastic core wire 25mm²
2x 092223 Kertkabelschu / cable lug
0720000062
Blitzableiter aus A-Draht 50mm²
an Deckel und Fußflansch befestigt
lightning arrester 50mm², connected with clamps
on top cover and lower flange
0720000071
Parallelklemme
parallel clip
0720000096
Blitzableiterhalter
Holder of lightning
0720000062
spiralförmiger Blitzableiter aus A-Draht 50mm²
an Deckel und Fußflansch befestigt
helix shaped lightning arrester 50mm², connected with clamps
on top cover and lower flange
zusätzliche Bohrungen nicht verwenden
don't use additional bore holes
1) bei Montage gebohrt / drilled at mounting
2) bei Montage auf Maße aufpassen
take care when mounting on dimensions
3) Die Schraubenlänge richtet sich nach der Dicke des Zylindes.
The screw length depends on the thickness of the cylinder.
DTV Utah
Salt Lake City
75925063
1/1





Sonderverpackung / special packaging

Modell	1690000814_VERTEILER_GES			Oberfl.-Nr./ Surface No.		[mm²]	
Status	21-RELEASED	b.3					
Zeichnung	1690000814_VERTEILER_GES					[mm²]	
Status	21-RELEASED	b.3					
				Allgemeintoleranz General Tolerances	Gewicht lgl weight 117000	Material-Nr./ Material No.	
						Benennung	Befestigung Phase 1 Hauptverteiler Utah
					Tag/Day	Name	Maßstab Scale 1:5
				Bearb. Engin.	21.02.18	Estermann	
				Gepr. Check.	21.02.18	Petrut	Name fixing phase 1 main splitter Utah
b	100803	09.03.18	Esterm.	KATHREIN			Blatt Sheet 1/1
a		21.02.18	Esterm.	83022 Rosenheim		Nummer/ Number	1690000814
Index	Änderung Change	Tag Day	Name				

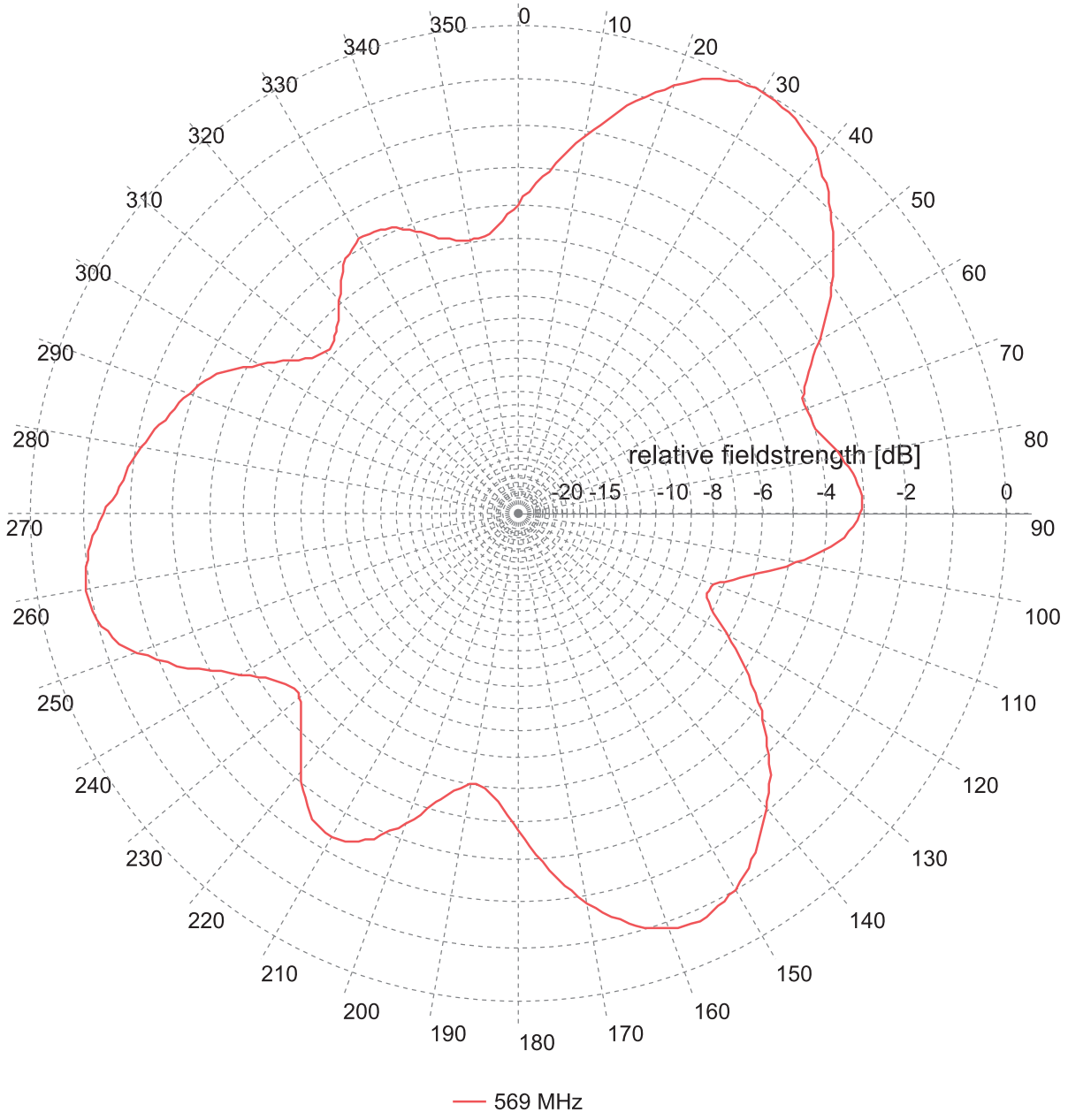
Nur gültig mit Freigabestempel
Only valid with release-stamp
printed

RELEASED 13.03.2018

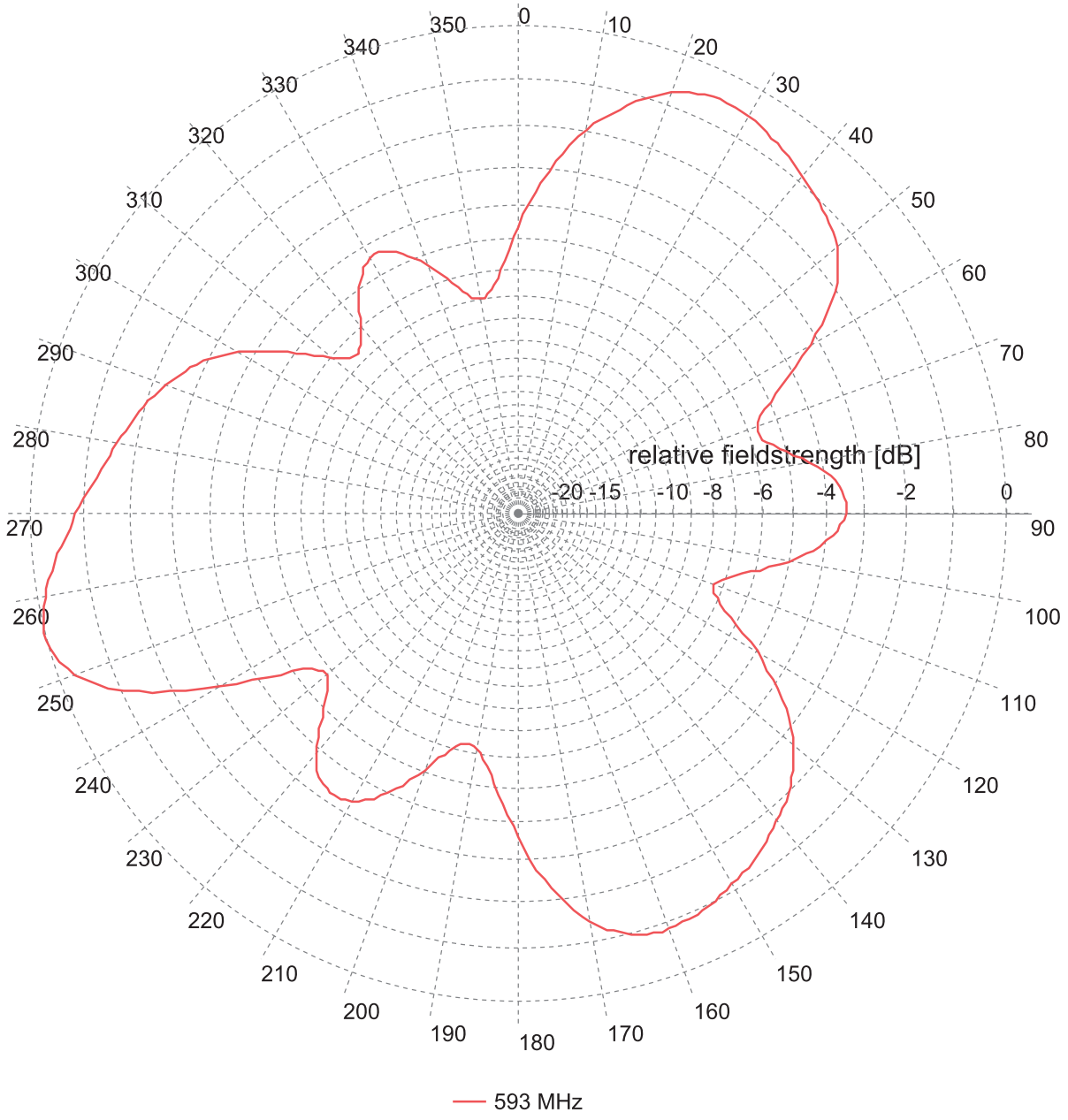
KATHREIN

Patterns

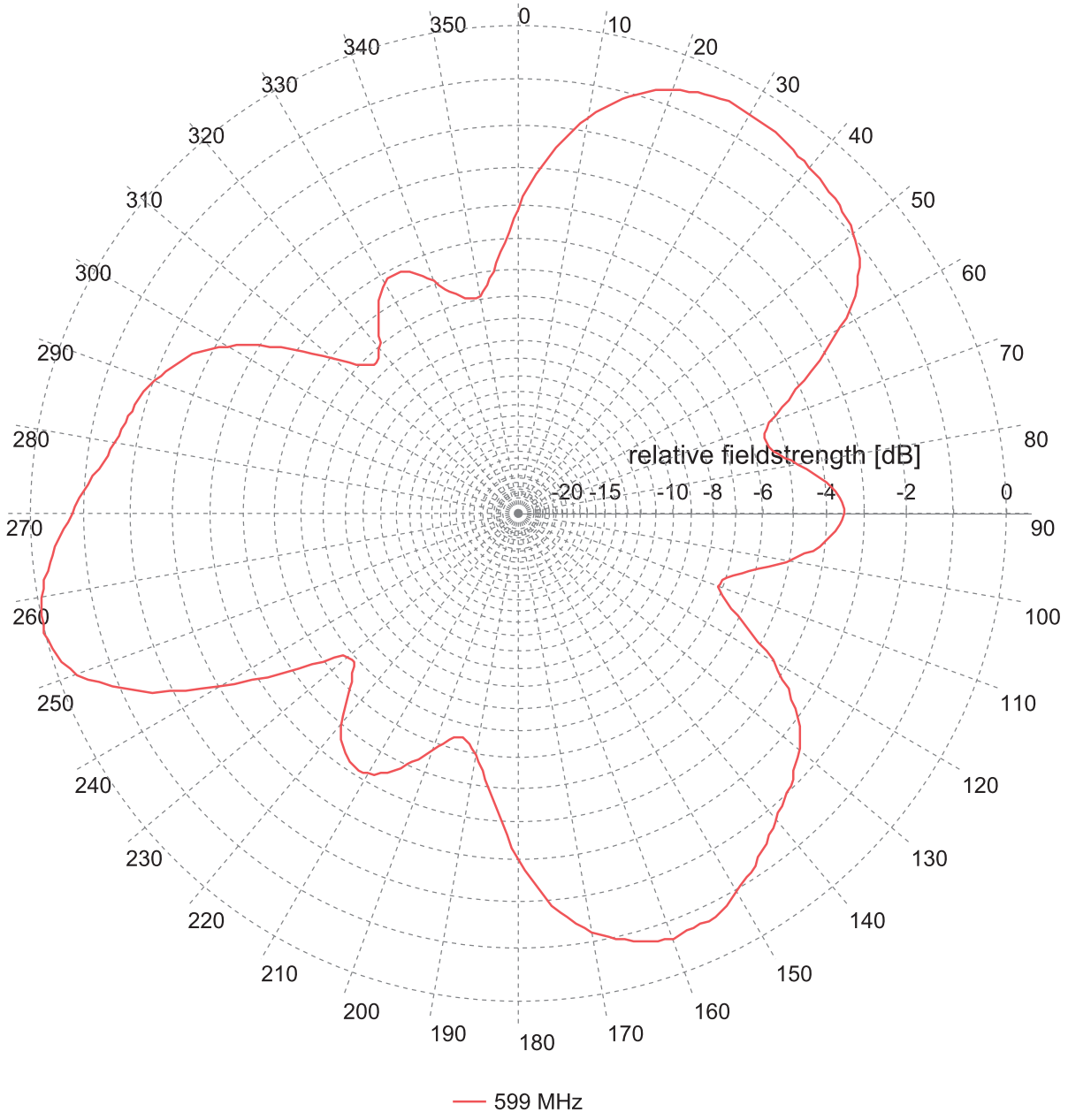
Antenna system 1 (upper half)
Main channels



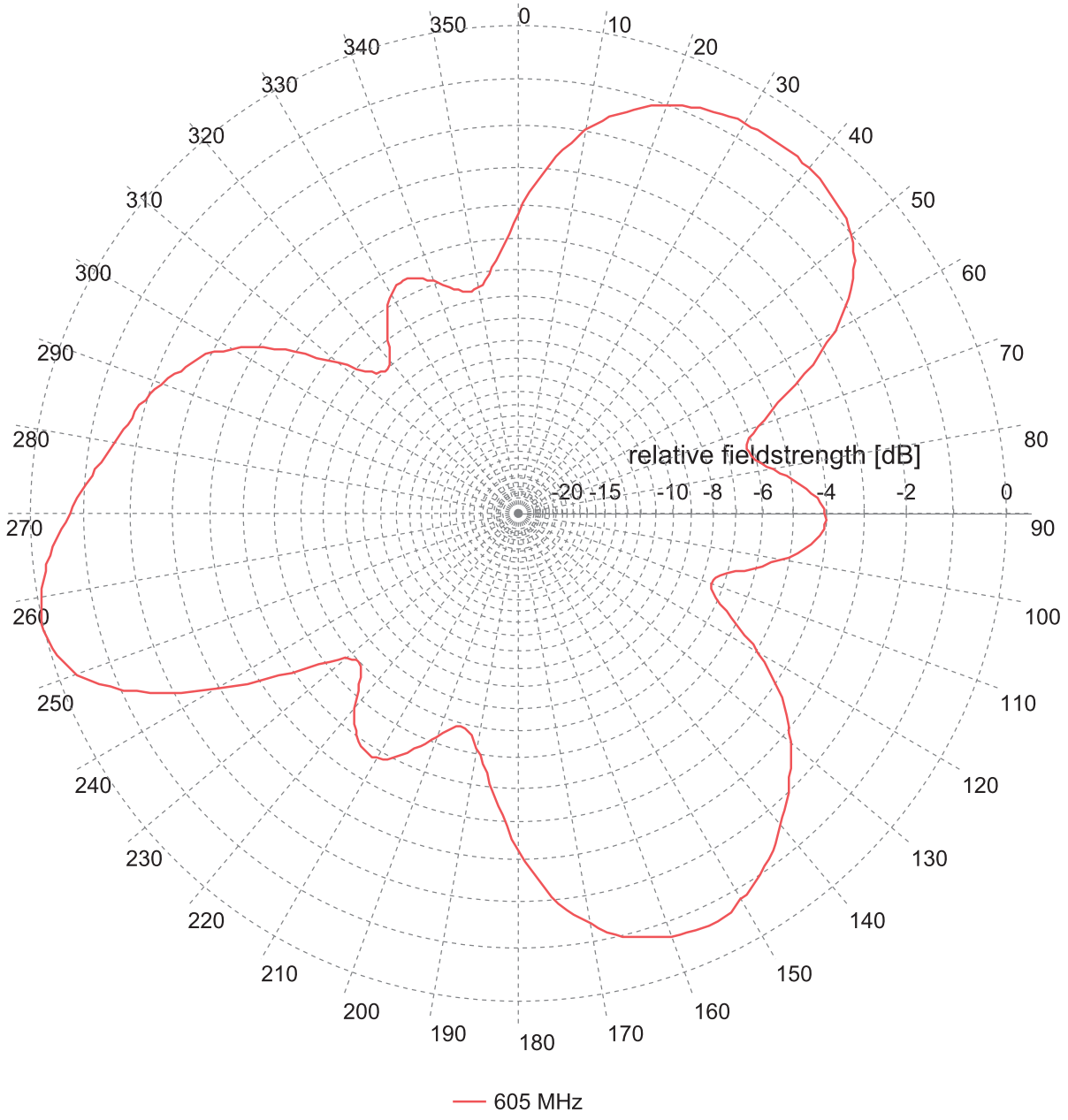
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ122	0.0	0.0	0.0	0.0	0.0	100.0



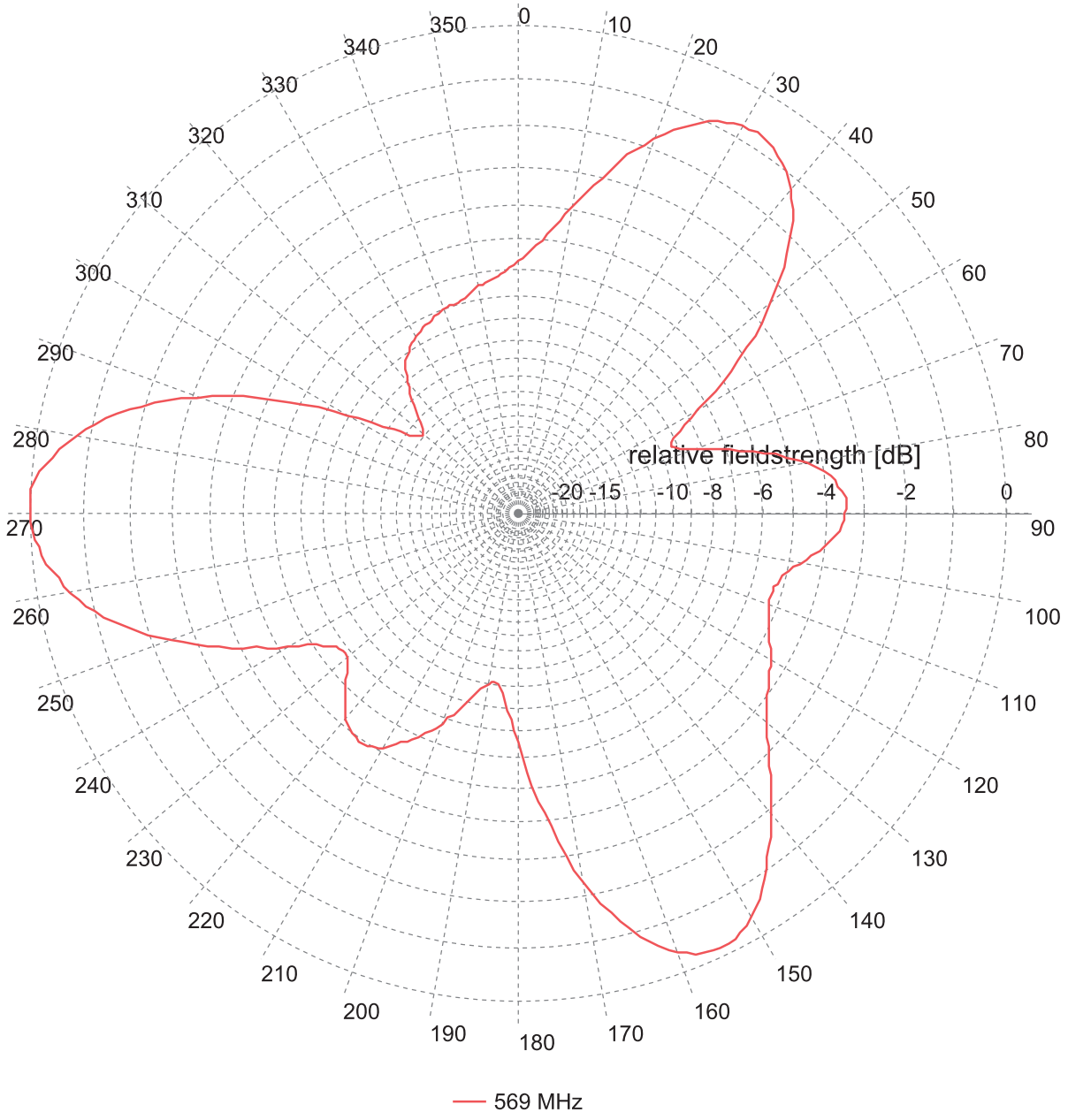
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ122	0.0	0.0	0.0	0.0	0.0	100.0



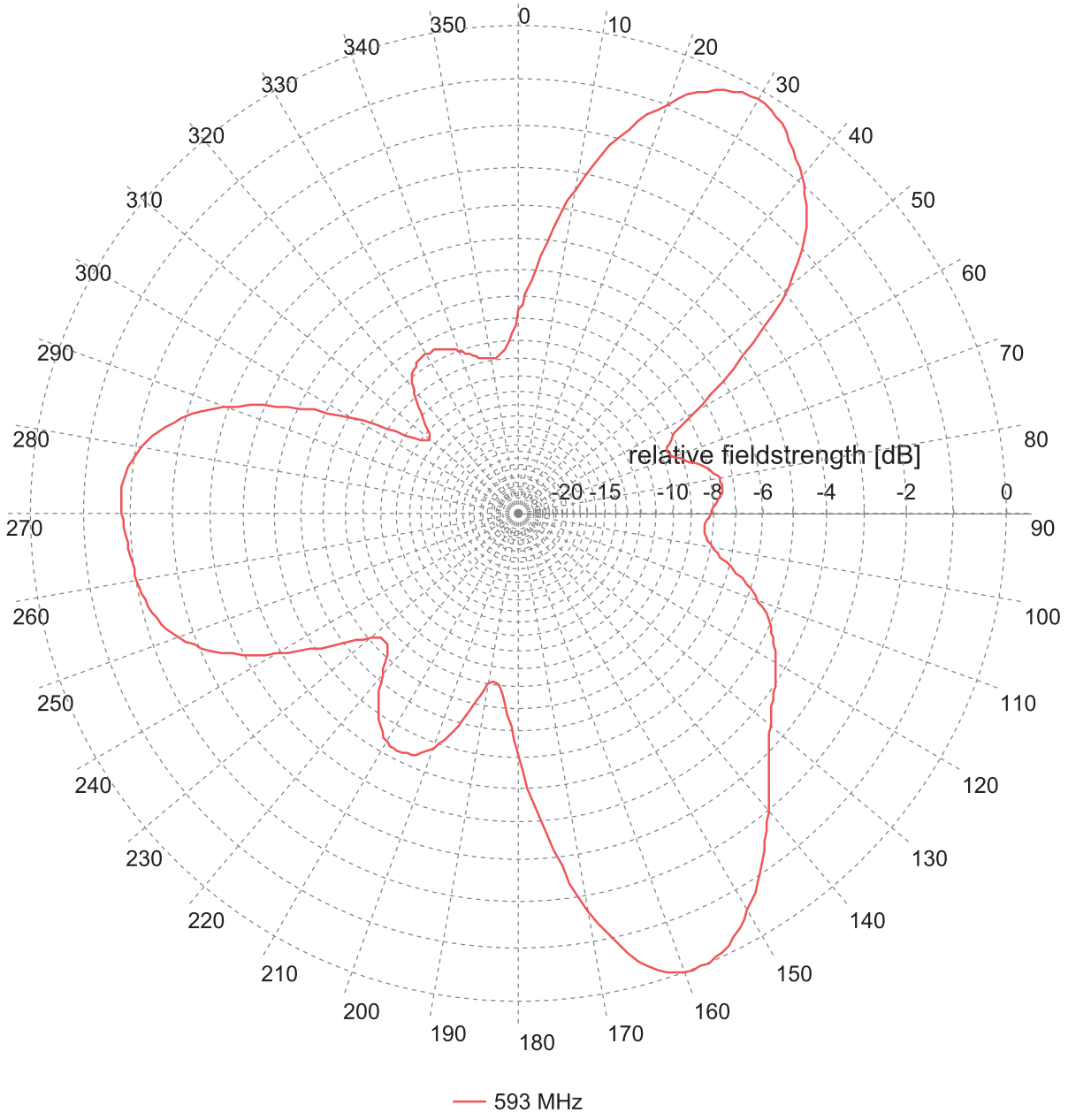
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ122	0.0	0.0	0.0	0.0	0.0	100.0



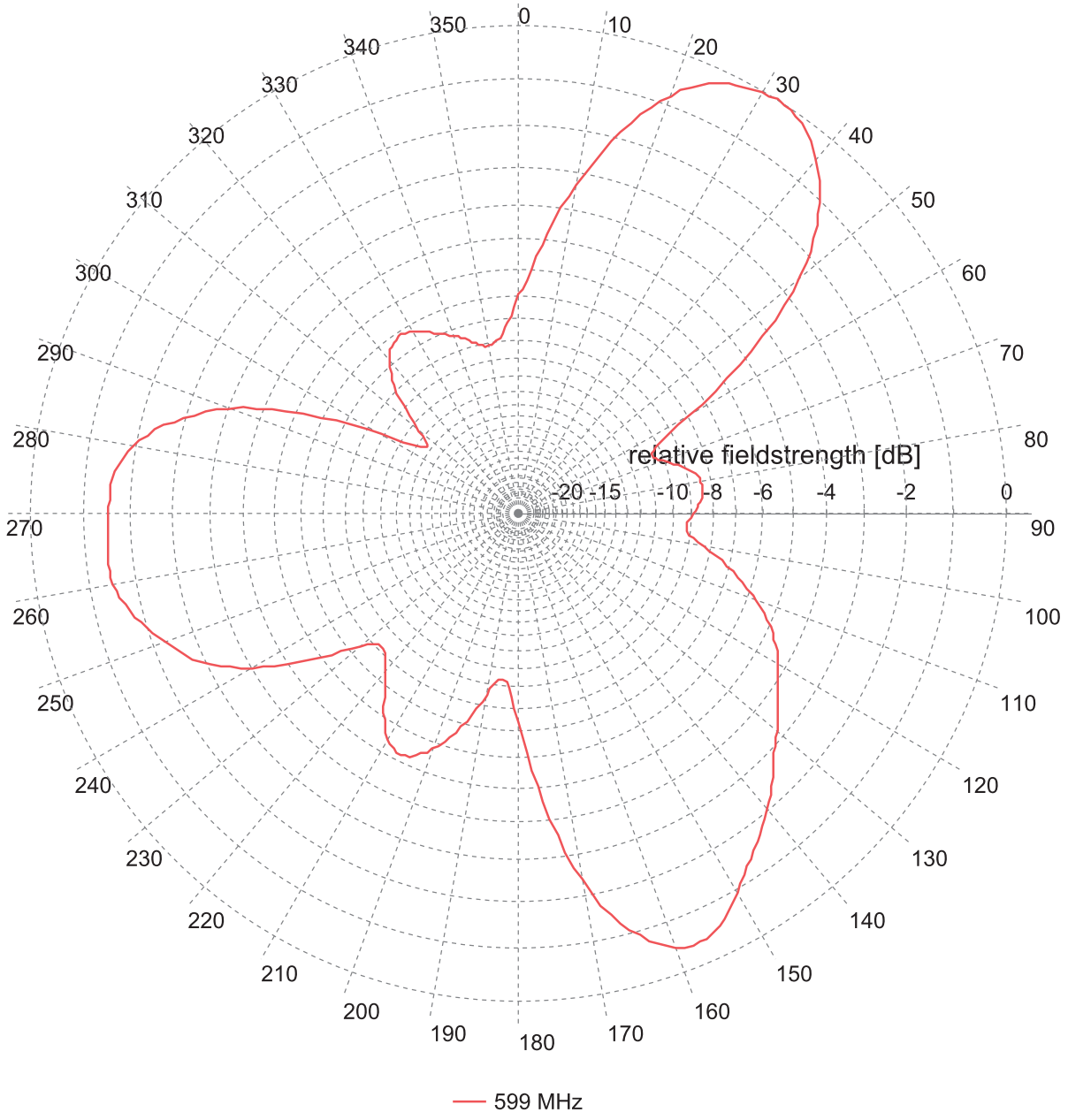
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ122	0.0	0.0	0.0	0.0	0.0	100.0



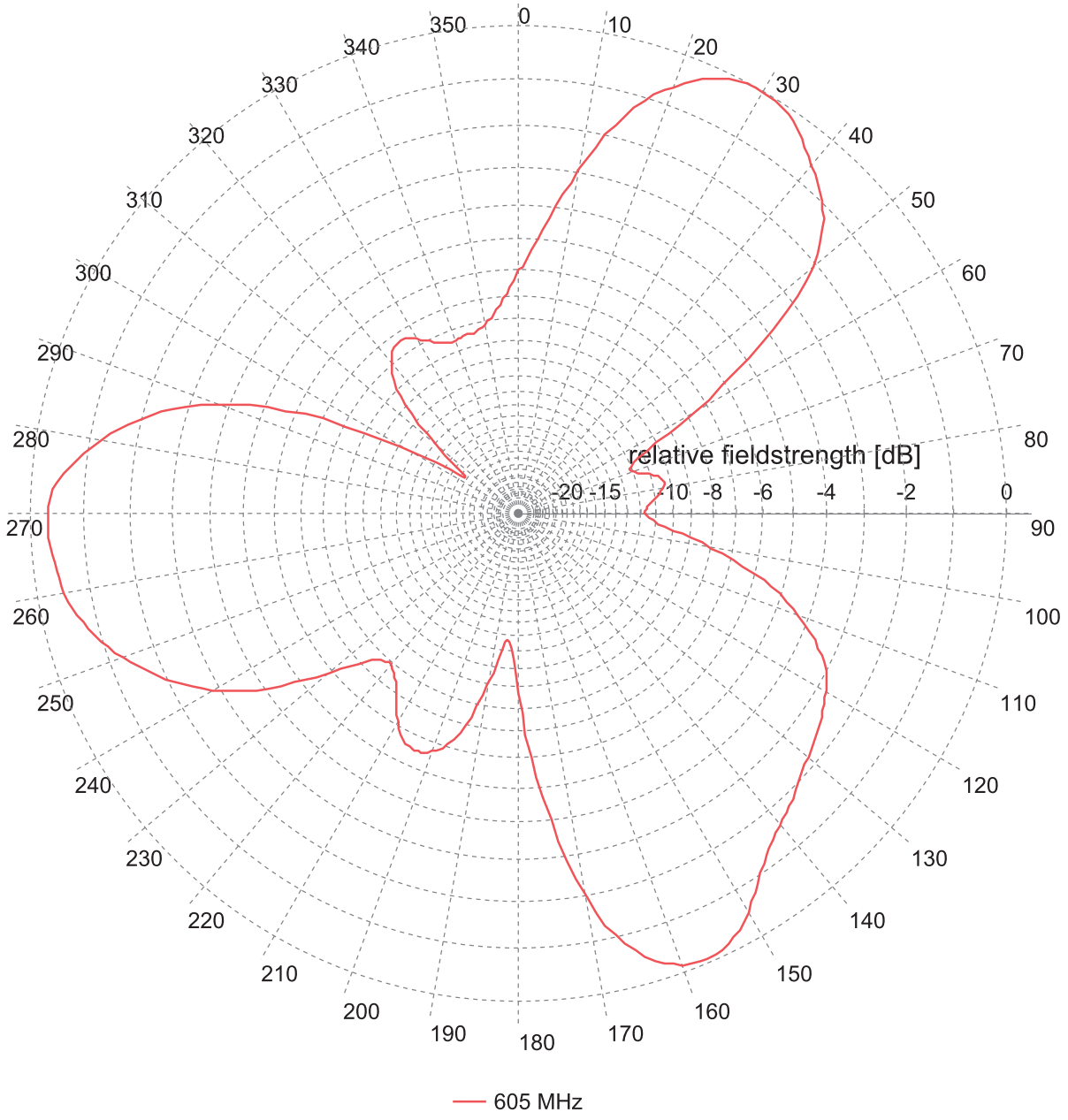
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ122	0.0	0.0	0.0	0.0	0.0	100.0



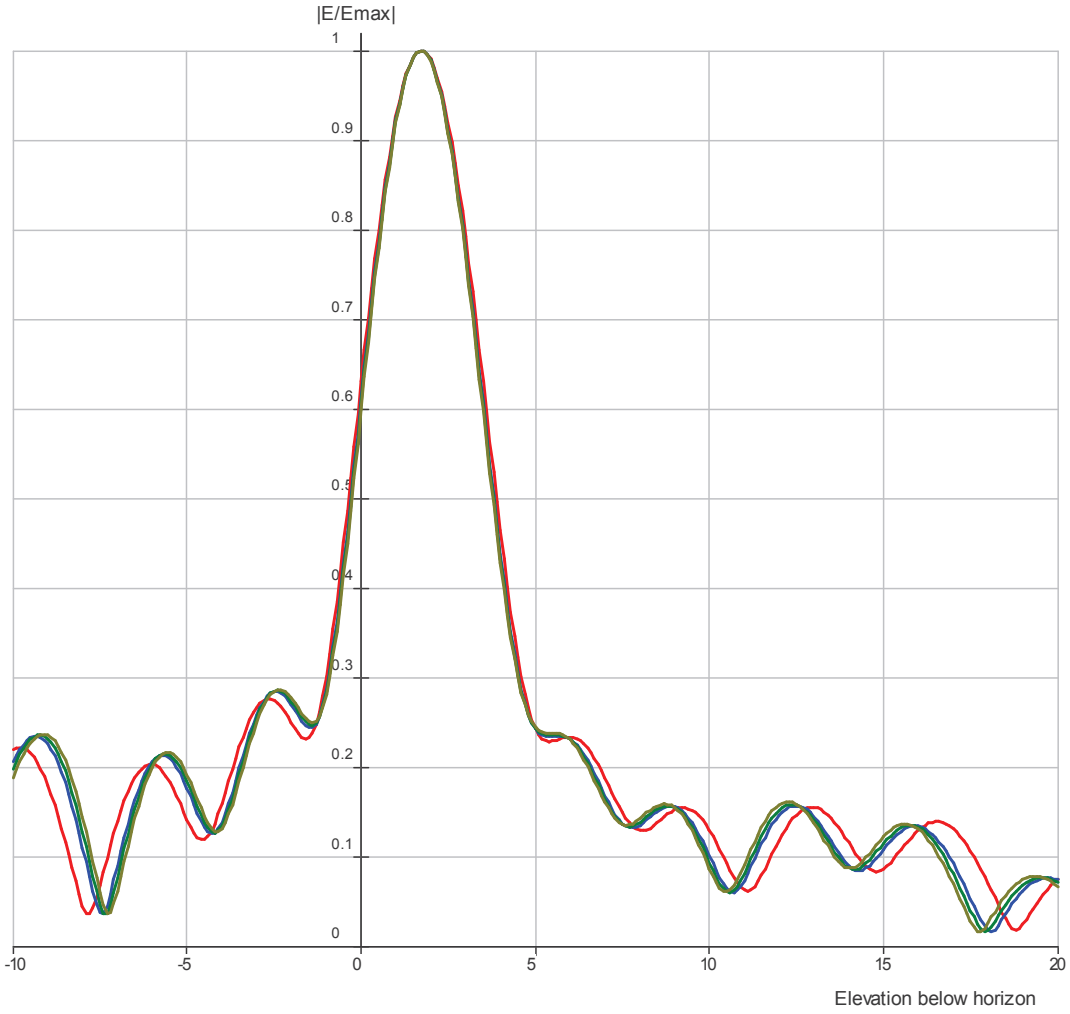
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ122	0.0	0.0	0.0	0.0	0.0	100.0



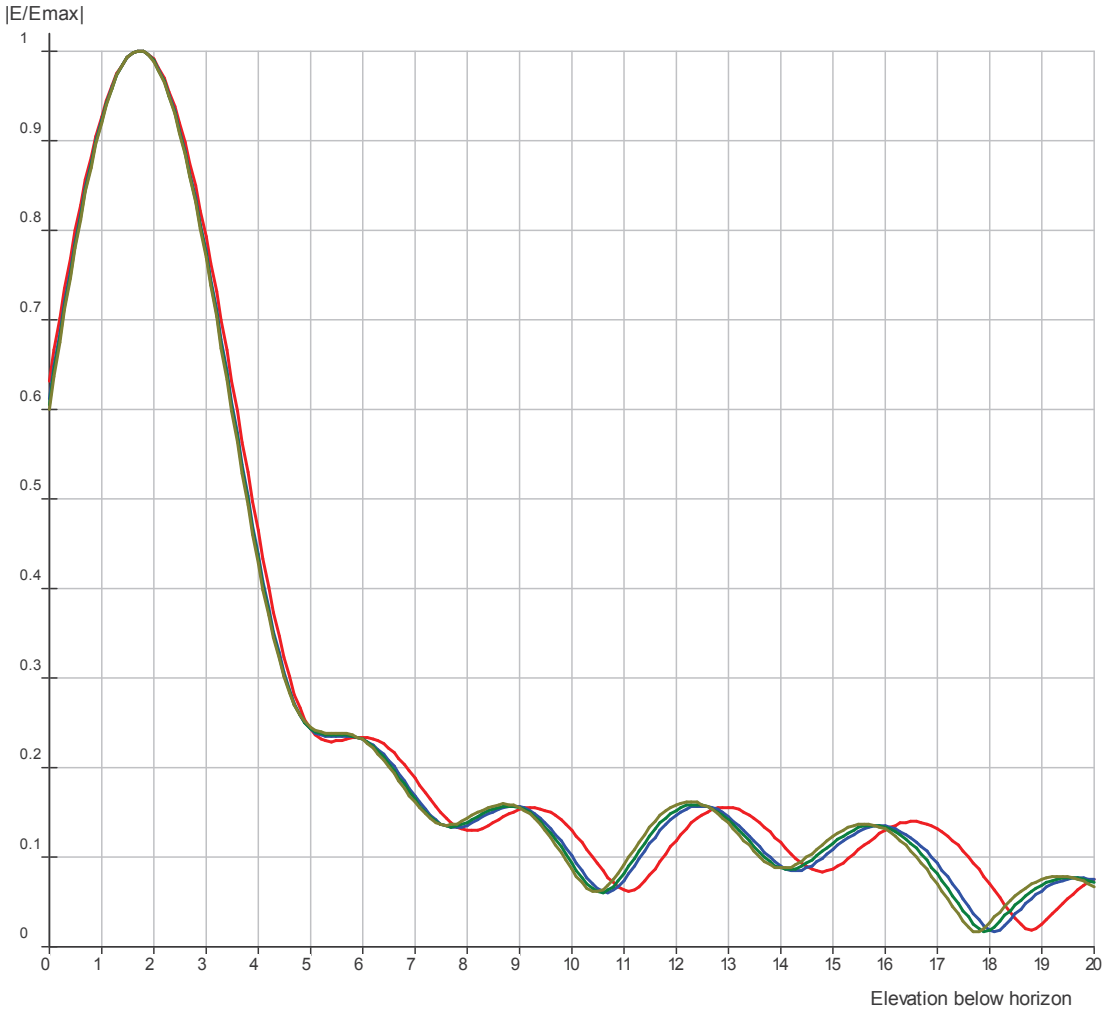
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ122	0.0	0.0	0.0	0.0	0.0	100.0



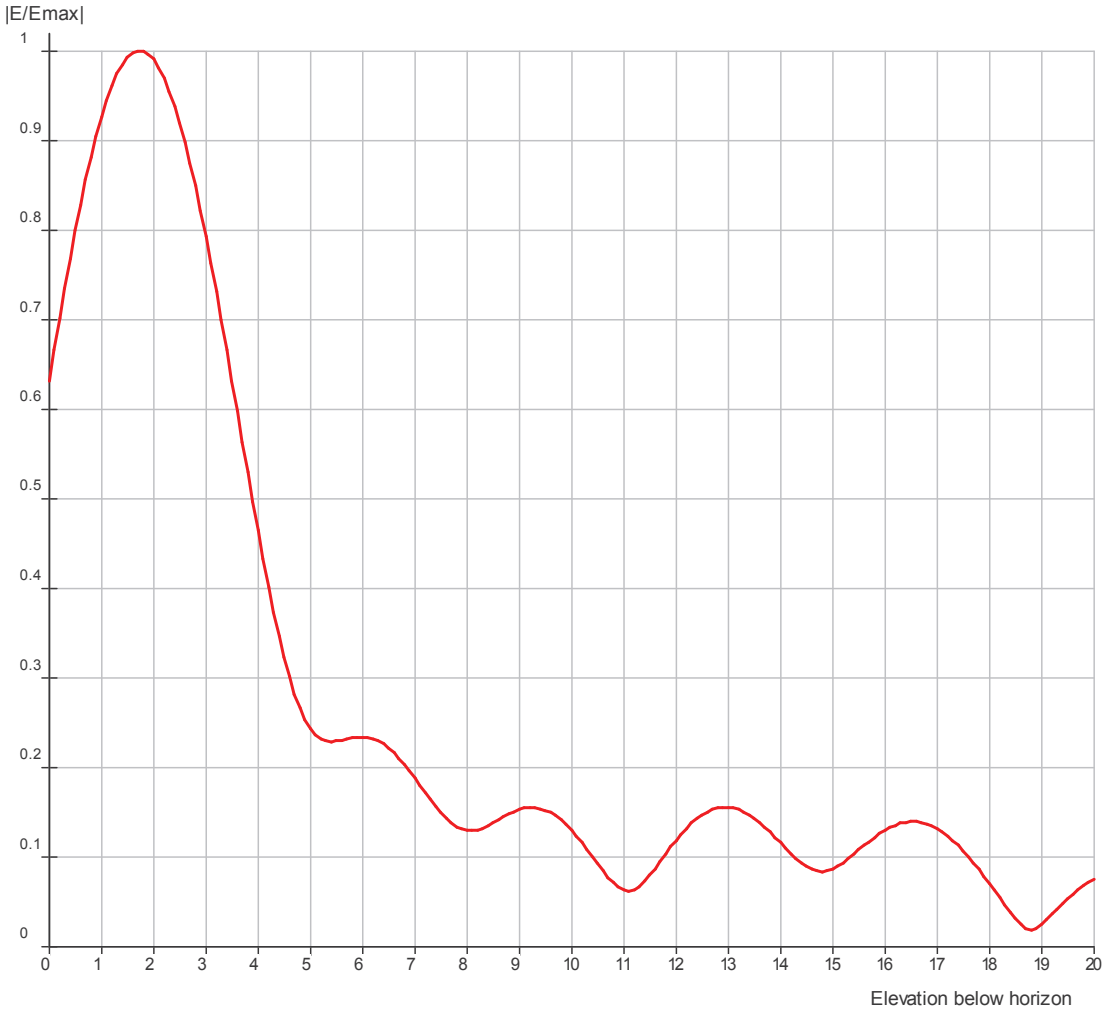
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ122	0.0	0.0	0.0	0.0	0.0	100.0



Frequency (MHz):	569	593	599	605
Azimuth:	270°	270°	270°	270°

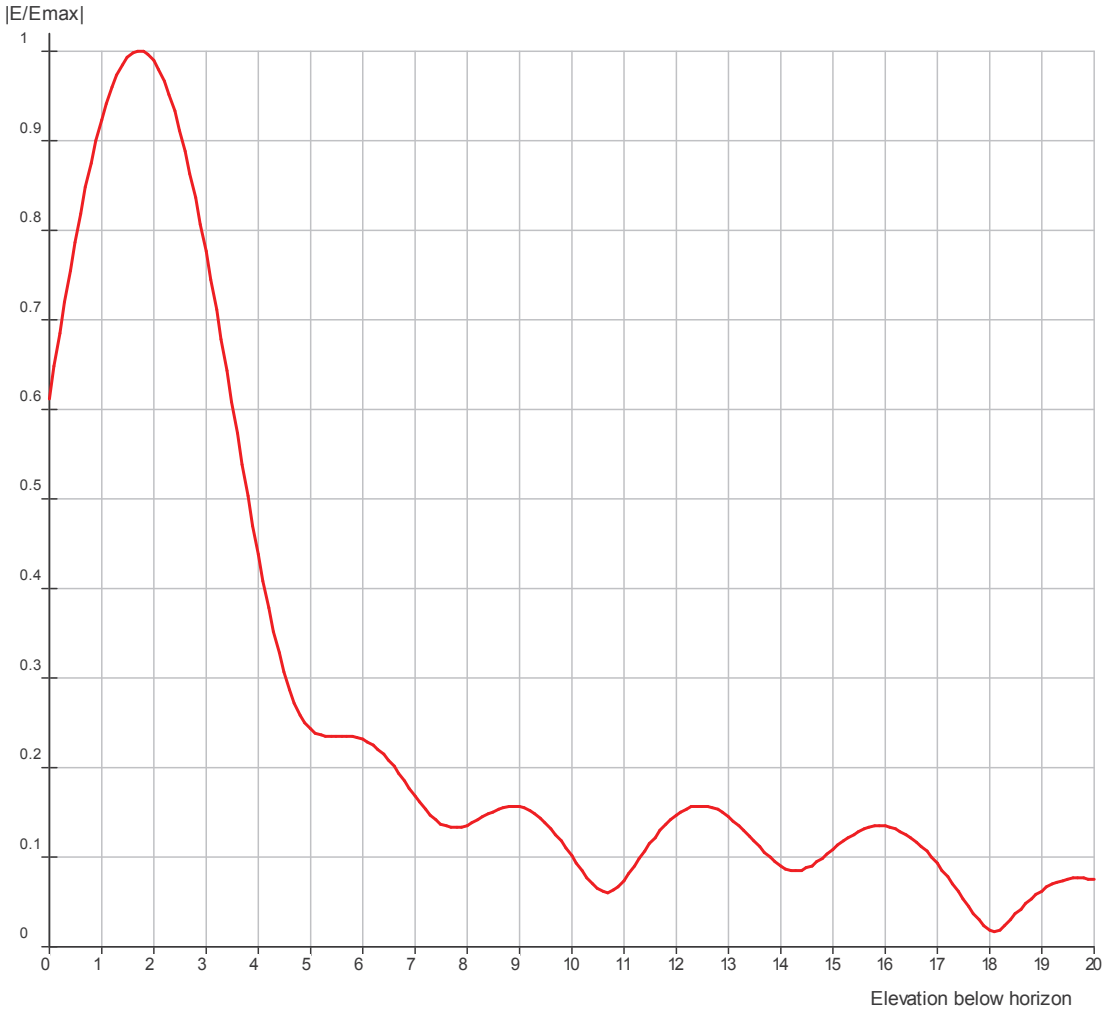


Frequency (MHz):	569	593	599	605
Azimuth:	270°	270°	270°	270°



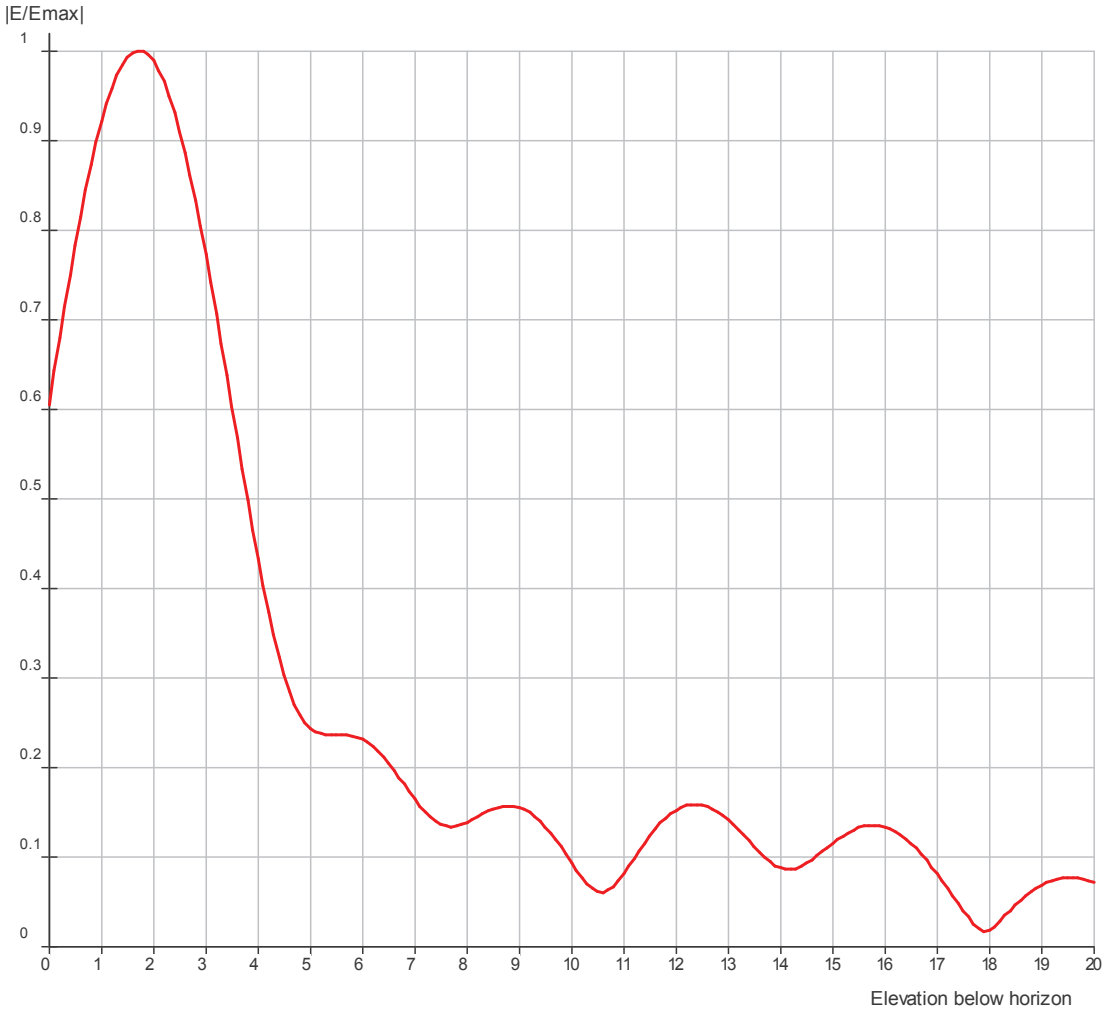
Frequency (MHz): 569

Azimuth: 270°



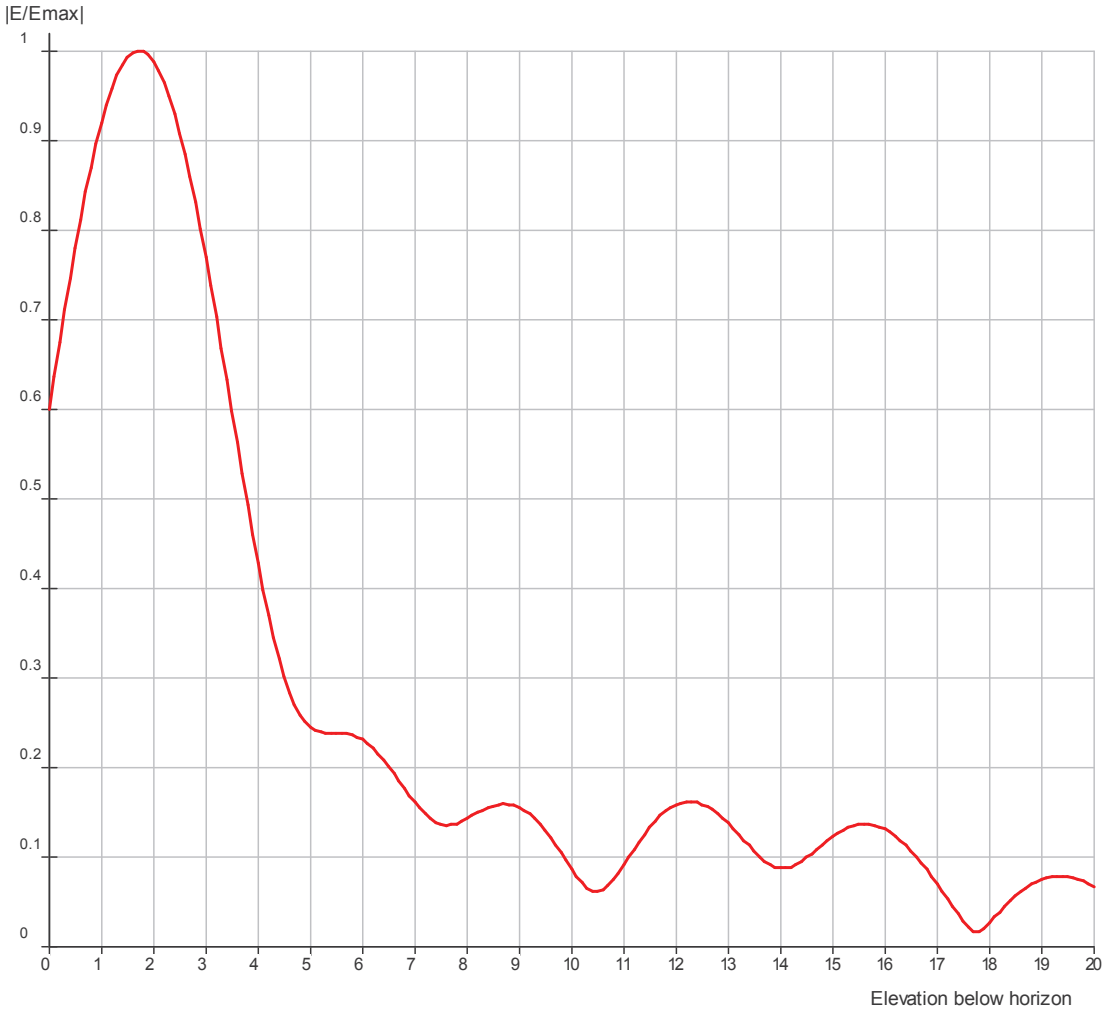
Frequency (MHz): 593

Azimuth: 270°



Frequency (MHz): 599

Azimuth: 270°



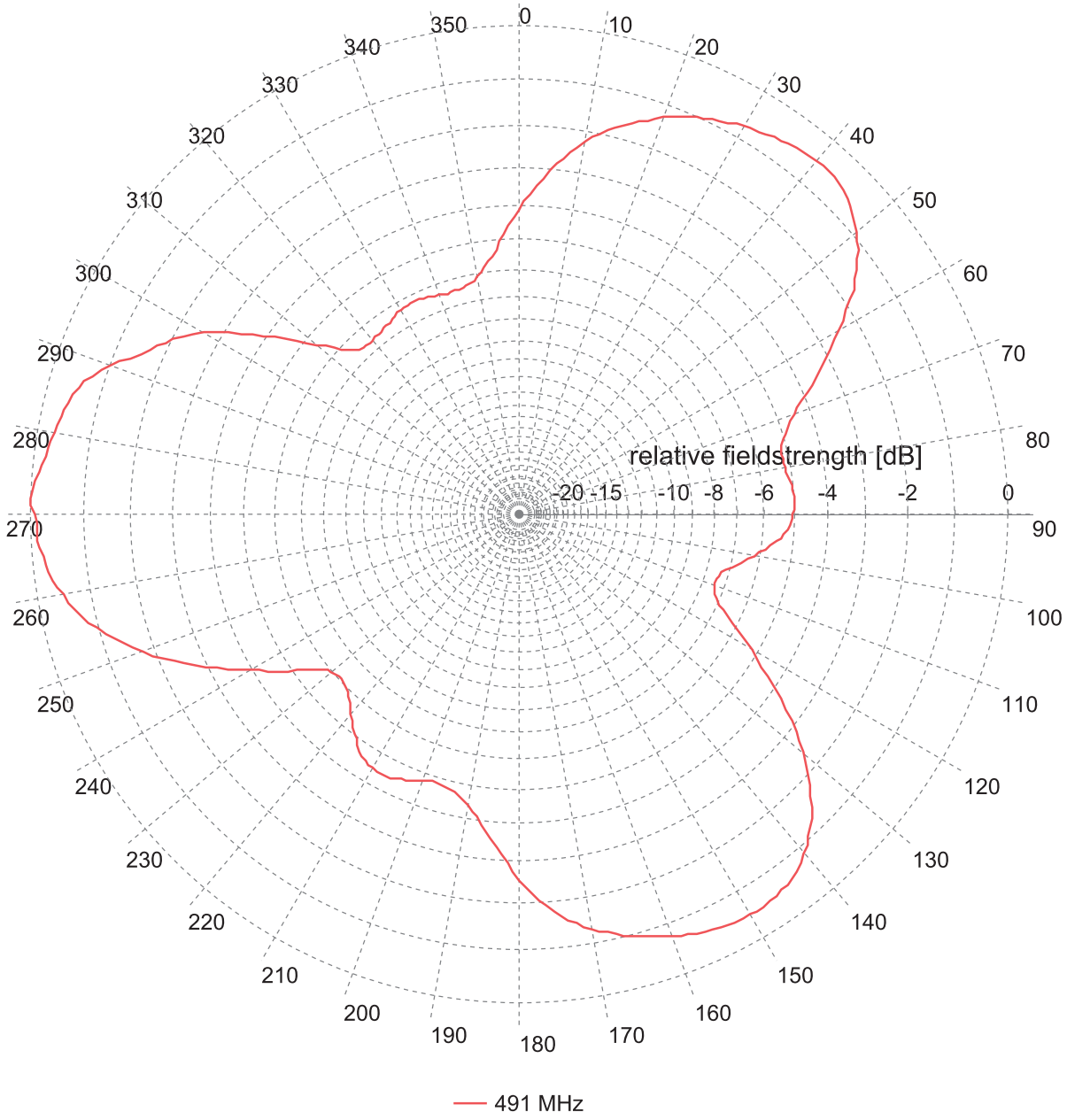
Frequency (MHz): 605

Azimuth: 270°

KATHREIN

Patterns

Antenna system 1 (upper half)
Reserve channels

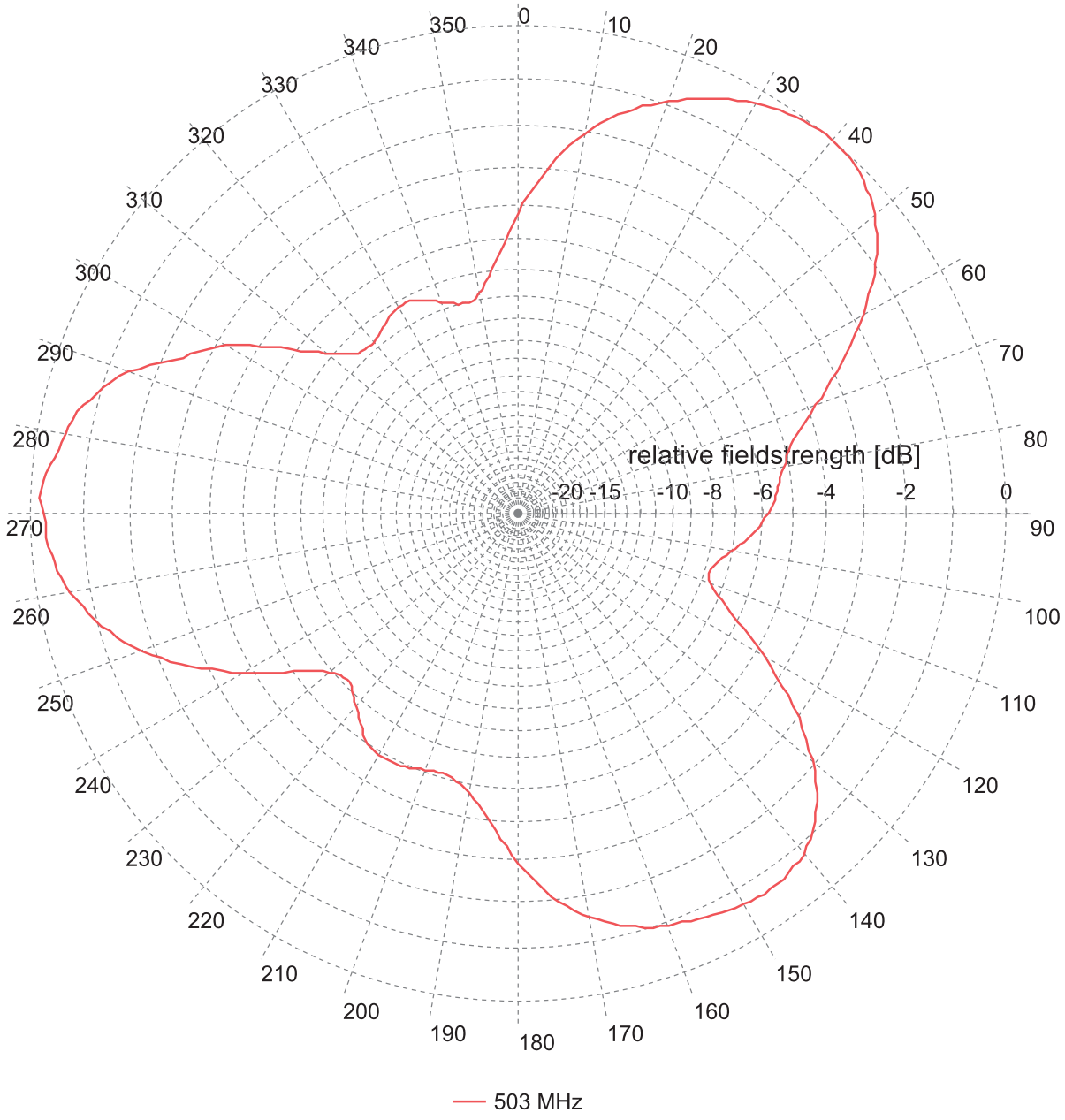


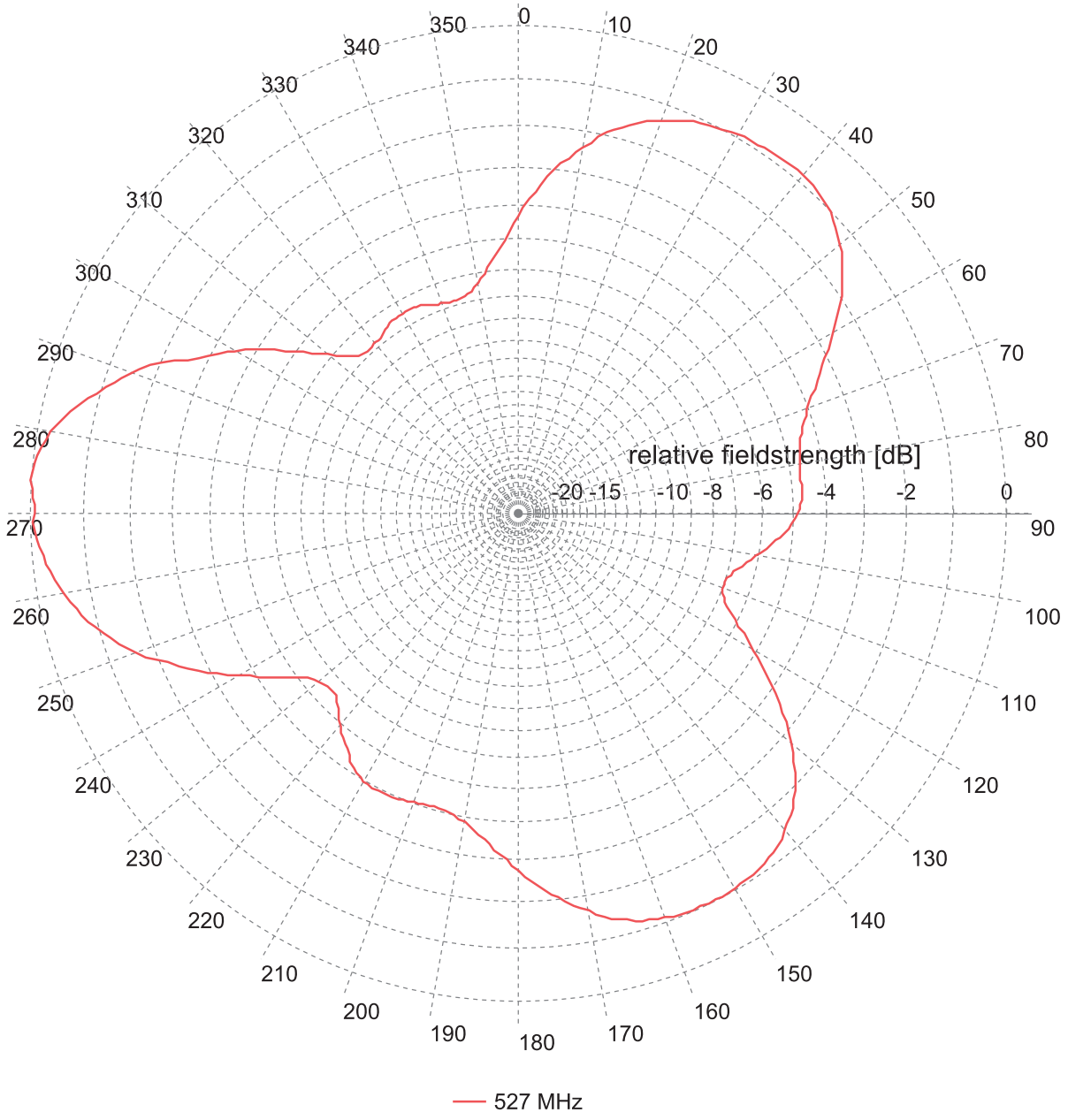
KATHREIN

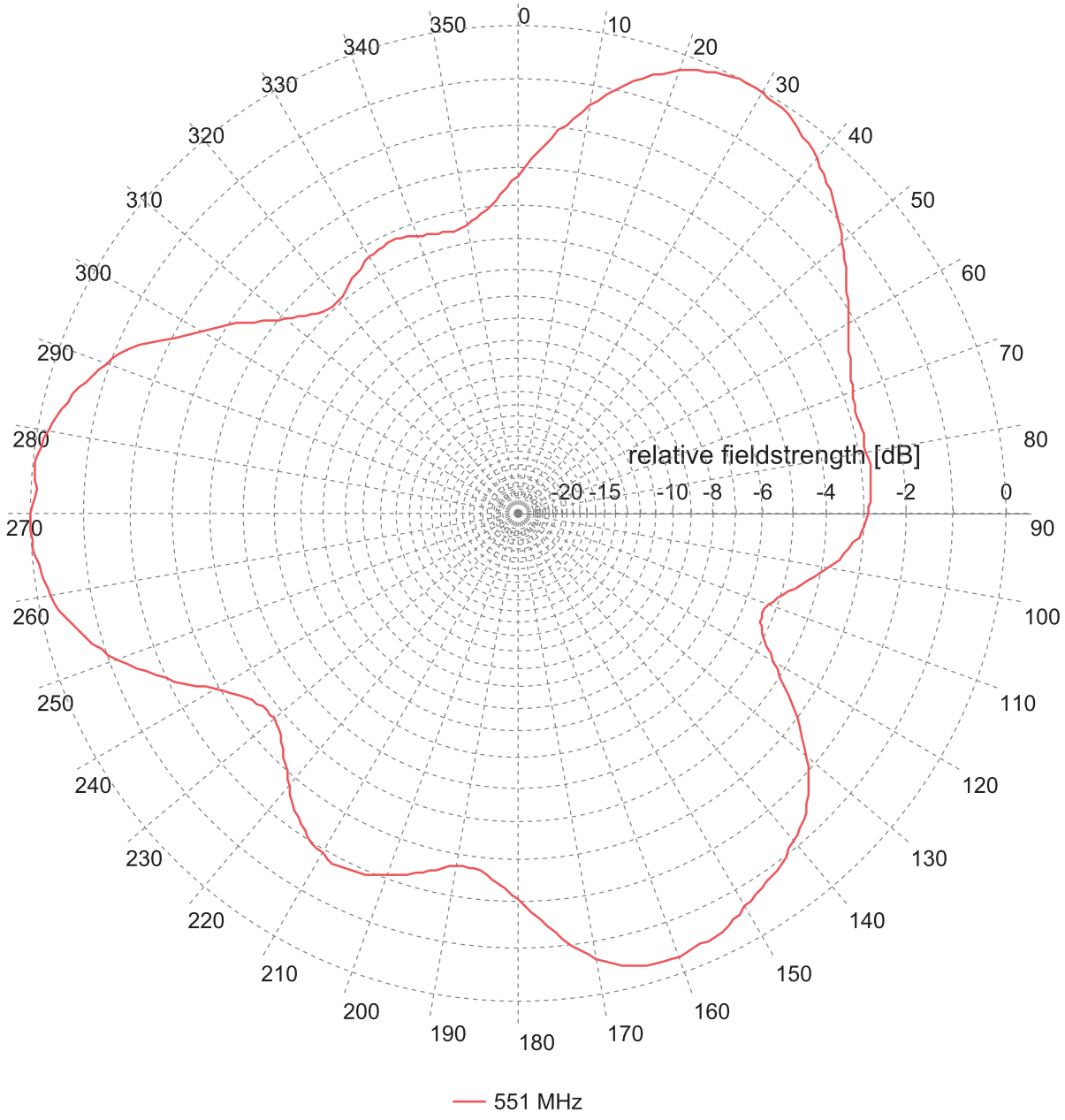
Horizontal Radiation Pattern

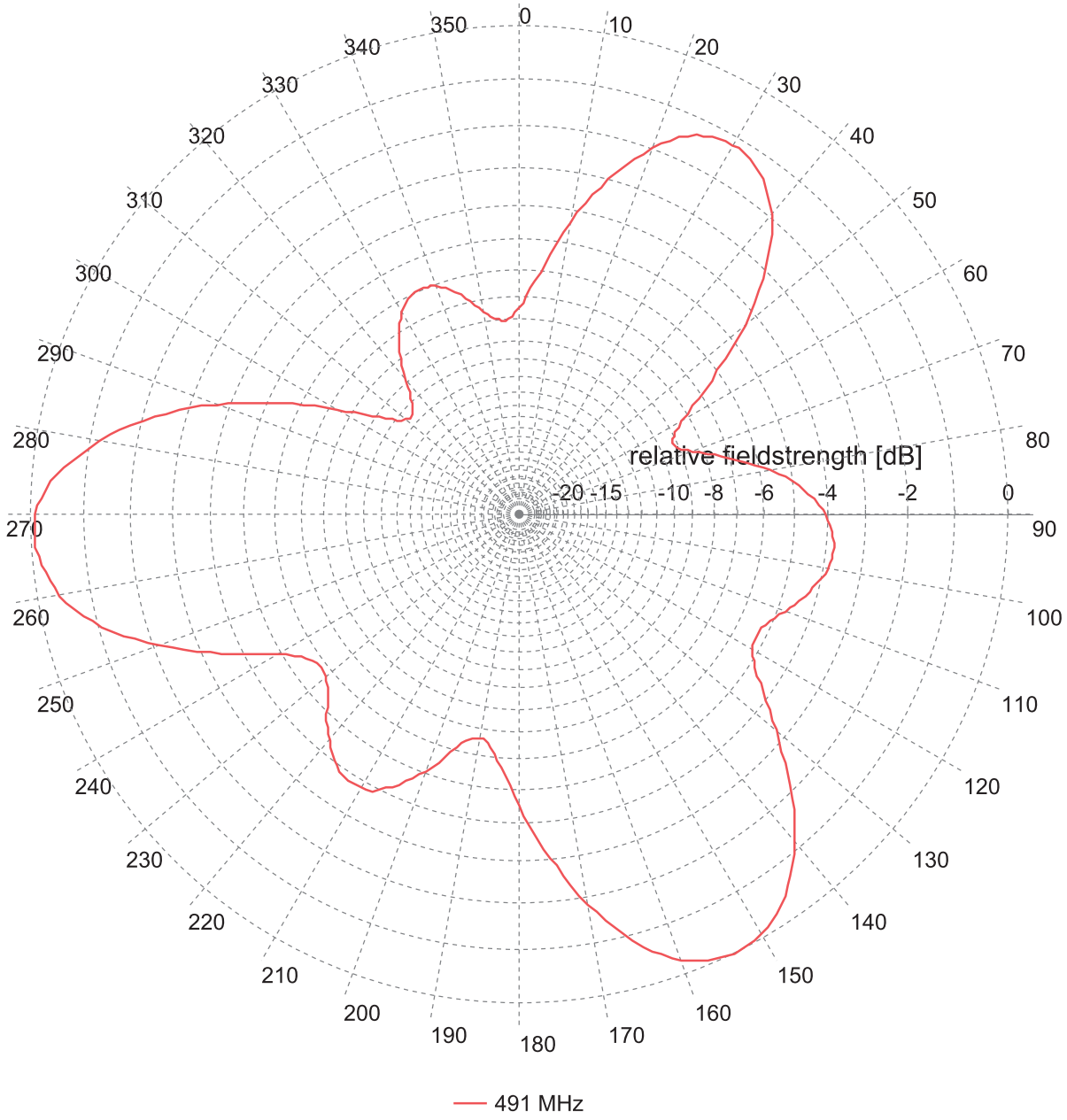
Antenna System 1 (Upper Half) - H-Polarized

Gerl/BSR, 09.05.2018 14:47


0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
503 MHz


0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
527 MHz


0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
551 MHz

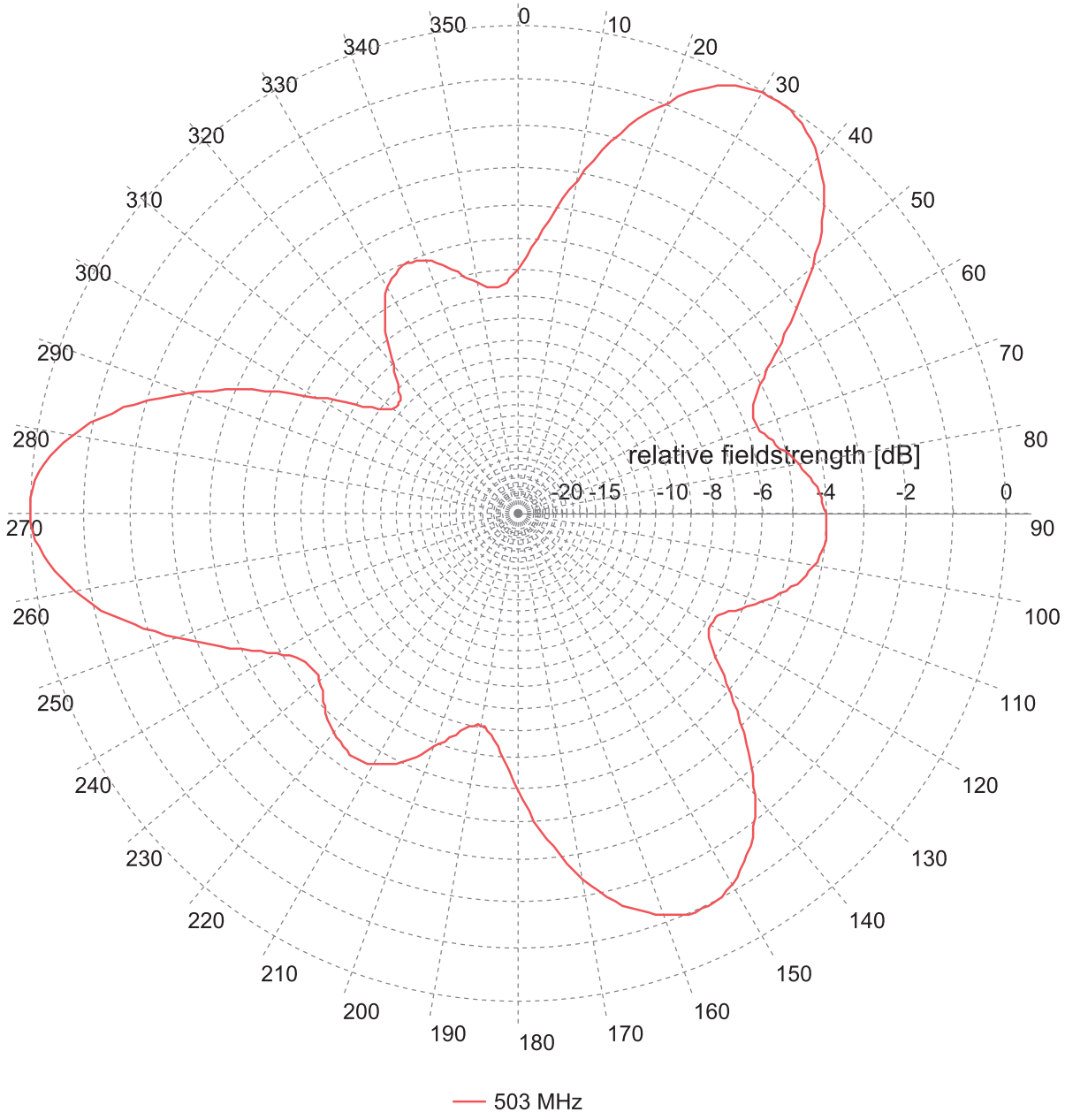


KATHREIN

Horizontal Radiation Pattern

Antenna System 1 (Upper Half) - V-Polarized

Gerl/BSR, 09.05.2018 14:55

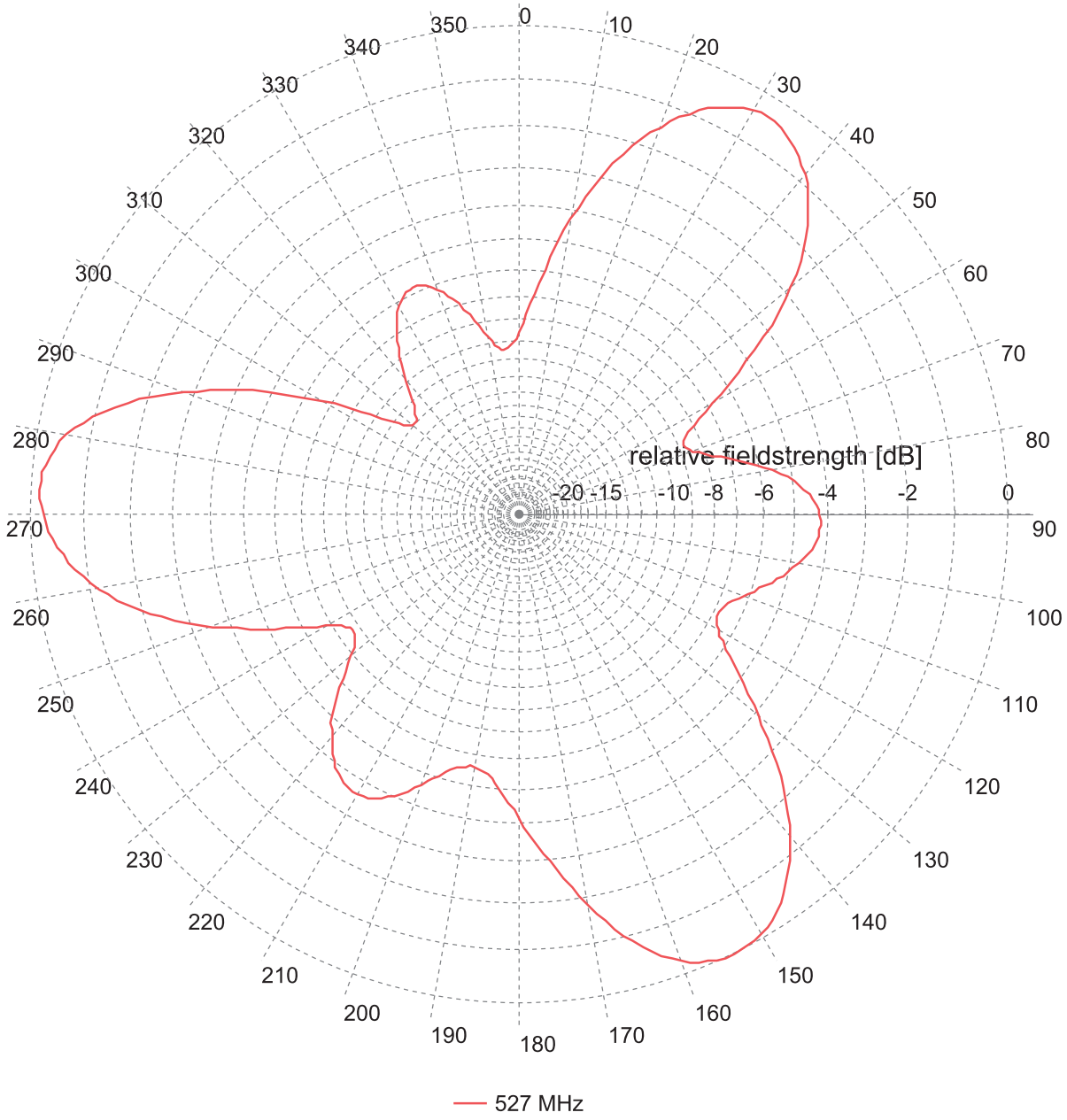


KATHREIN

Horizontal Radiation Pattern

Antenna System 1 (Upper Half) - V-Polarized

Gerl/BSR, 09.05.2018 14:56

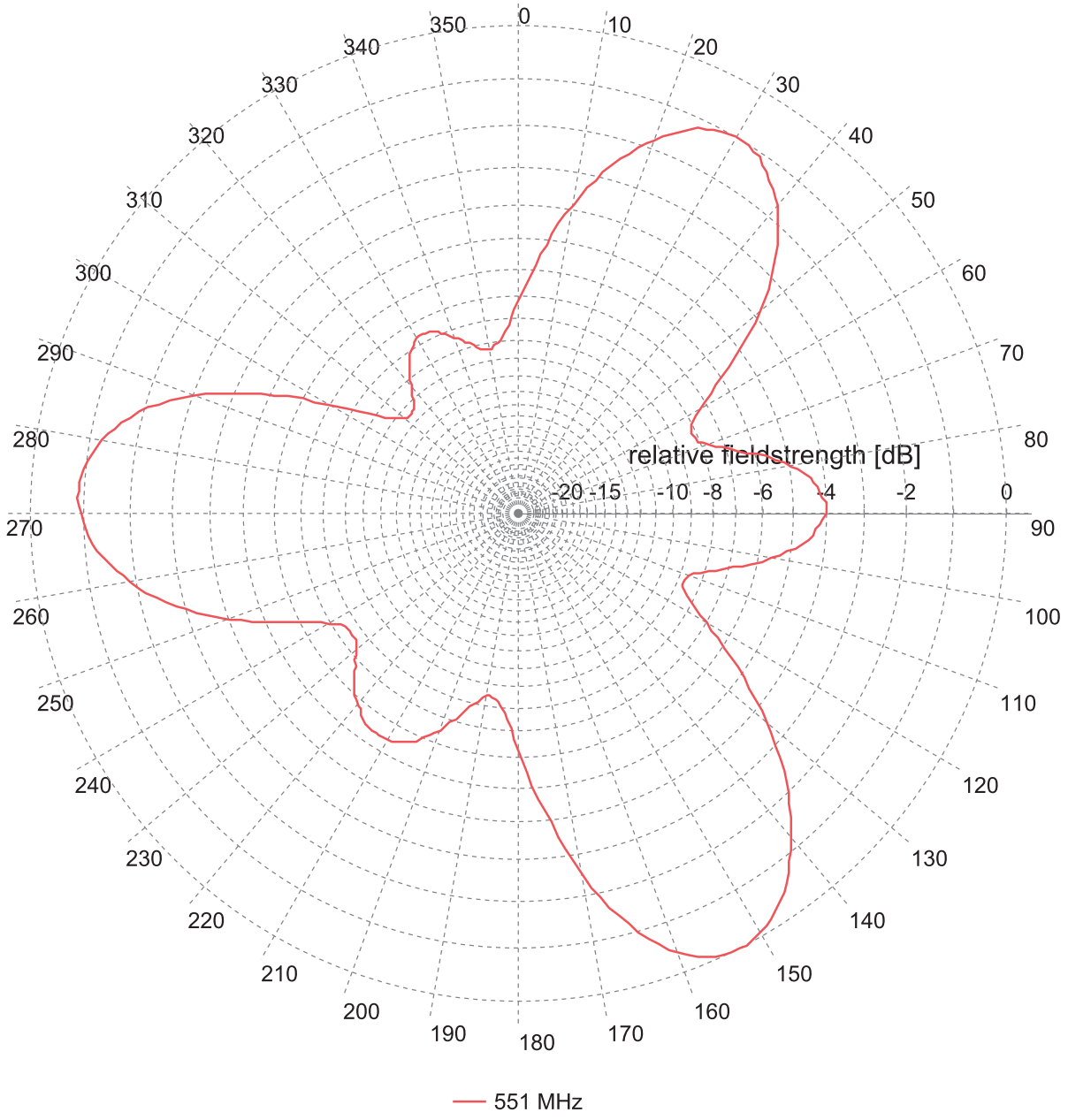


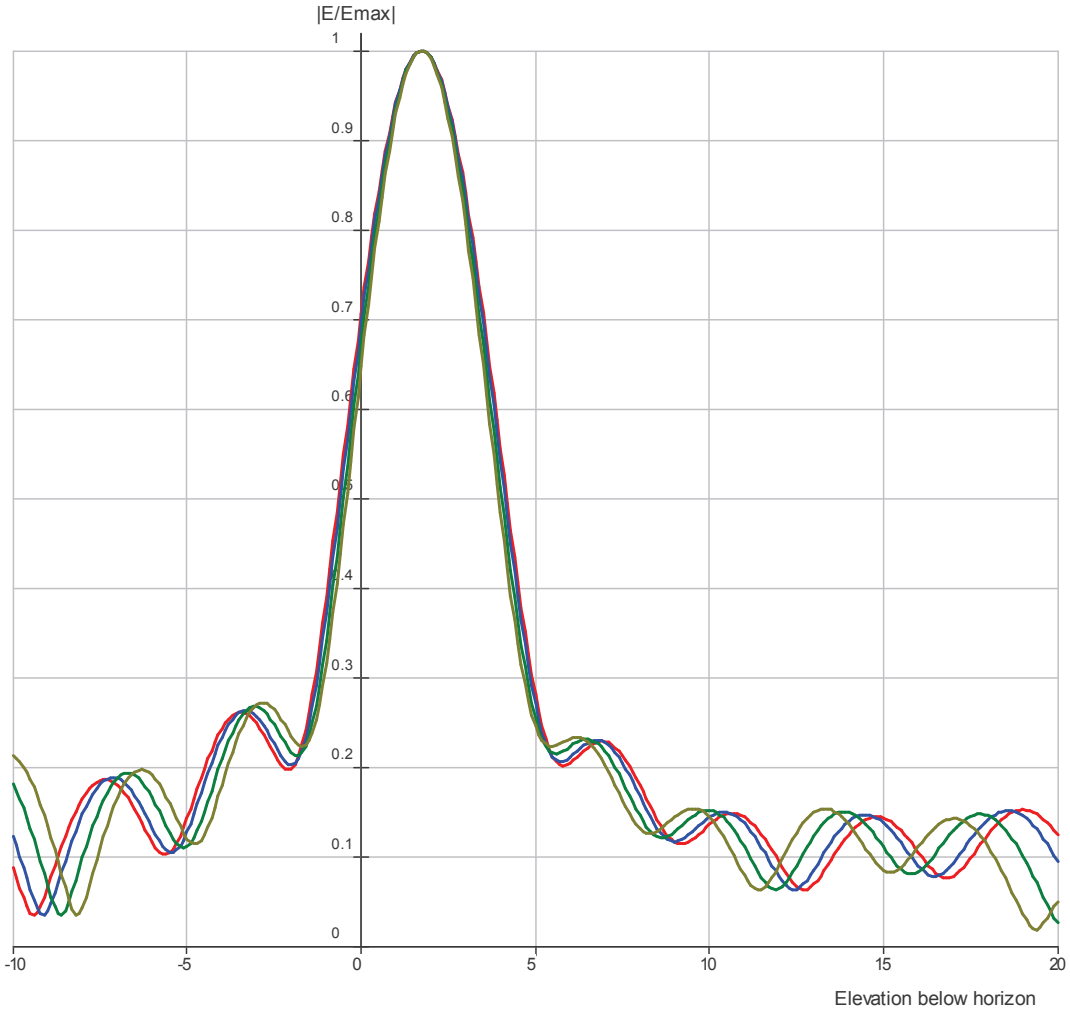
KATHREIN

Horizontal Radiation Pattern

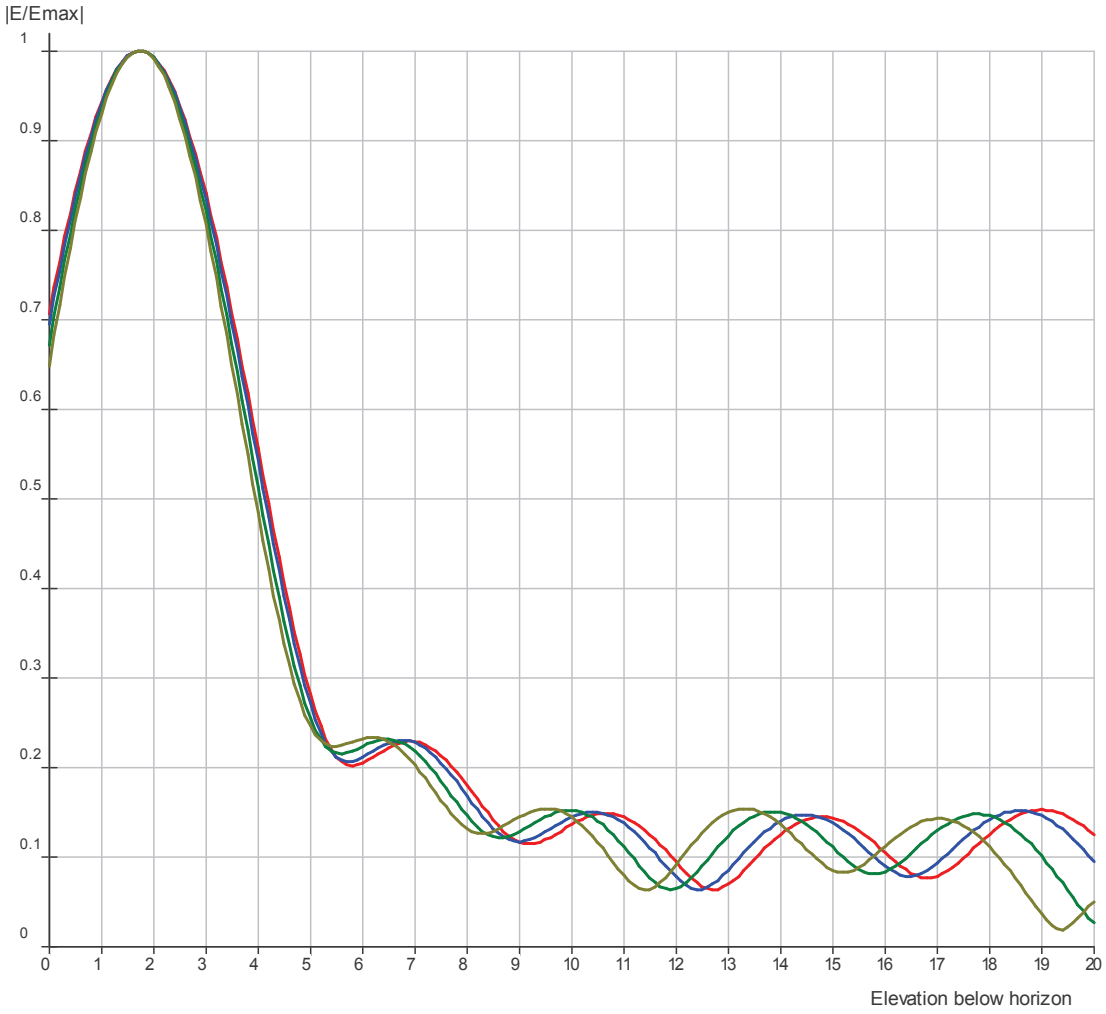
Antenna System 1 (Upper Half) - V-Polarized

Gerl/BSR, 09.05.2018 14:57

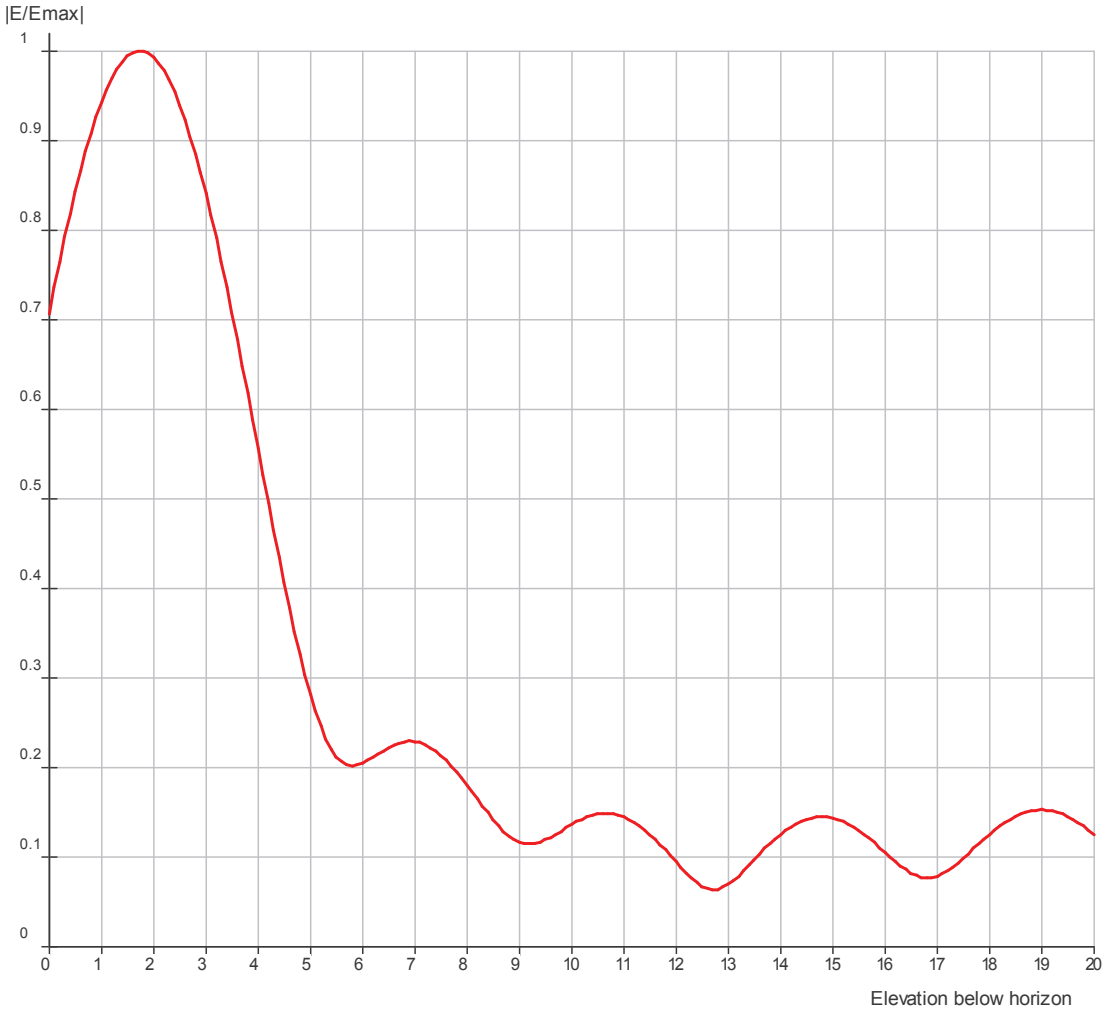

0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
551 MHz



Frequency (MHz):	491	503	527	551
Azimuth:	270°	270°	270°	270°

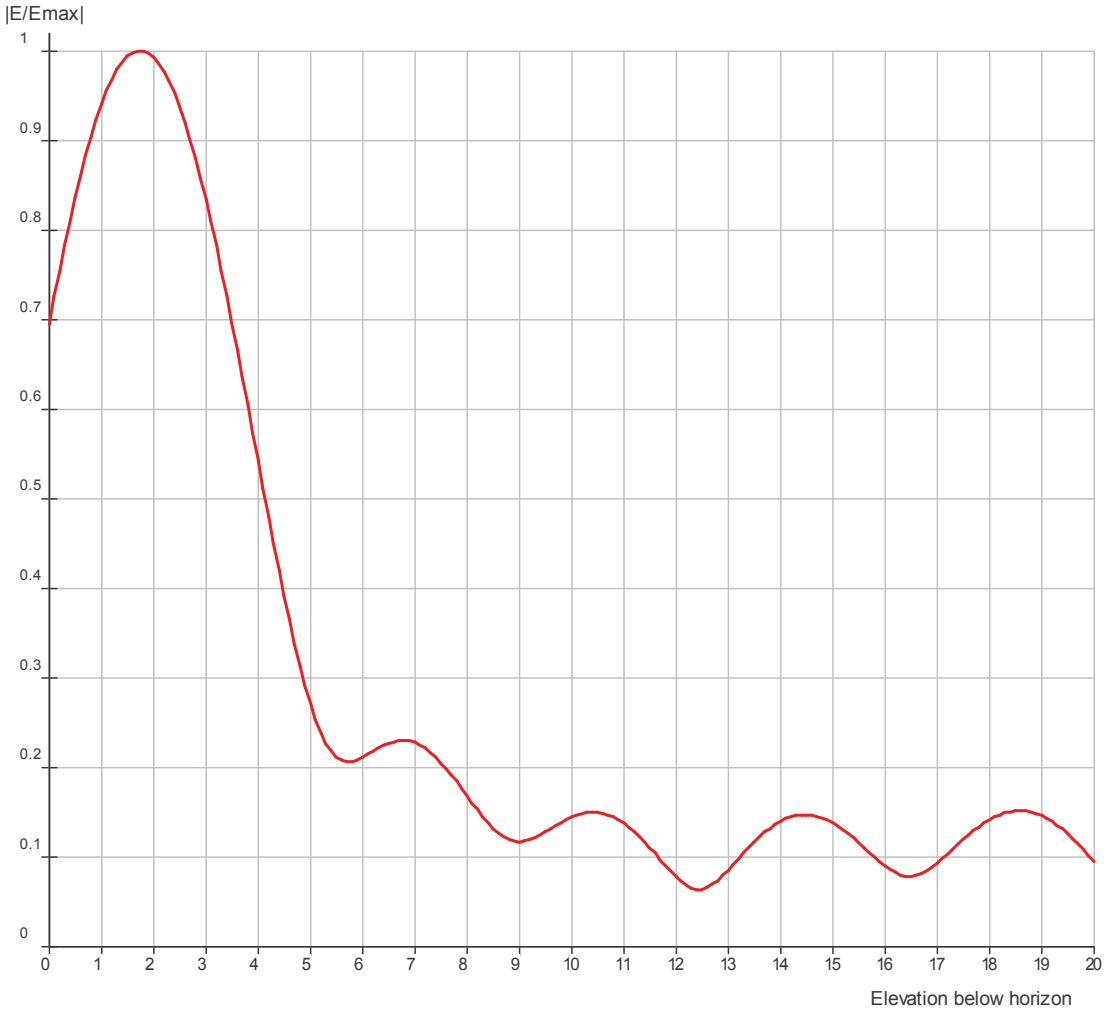


Frequency (MHz):	491	503	527	551
Azimuth:	270°	270°	270°	270°



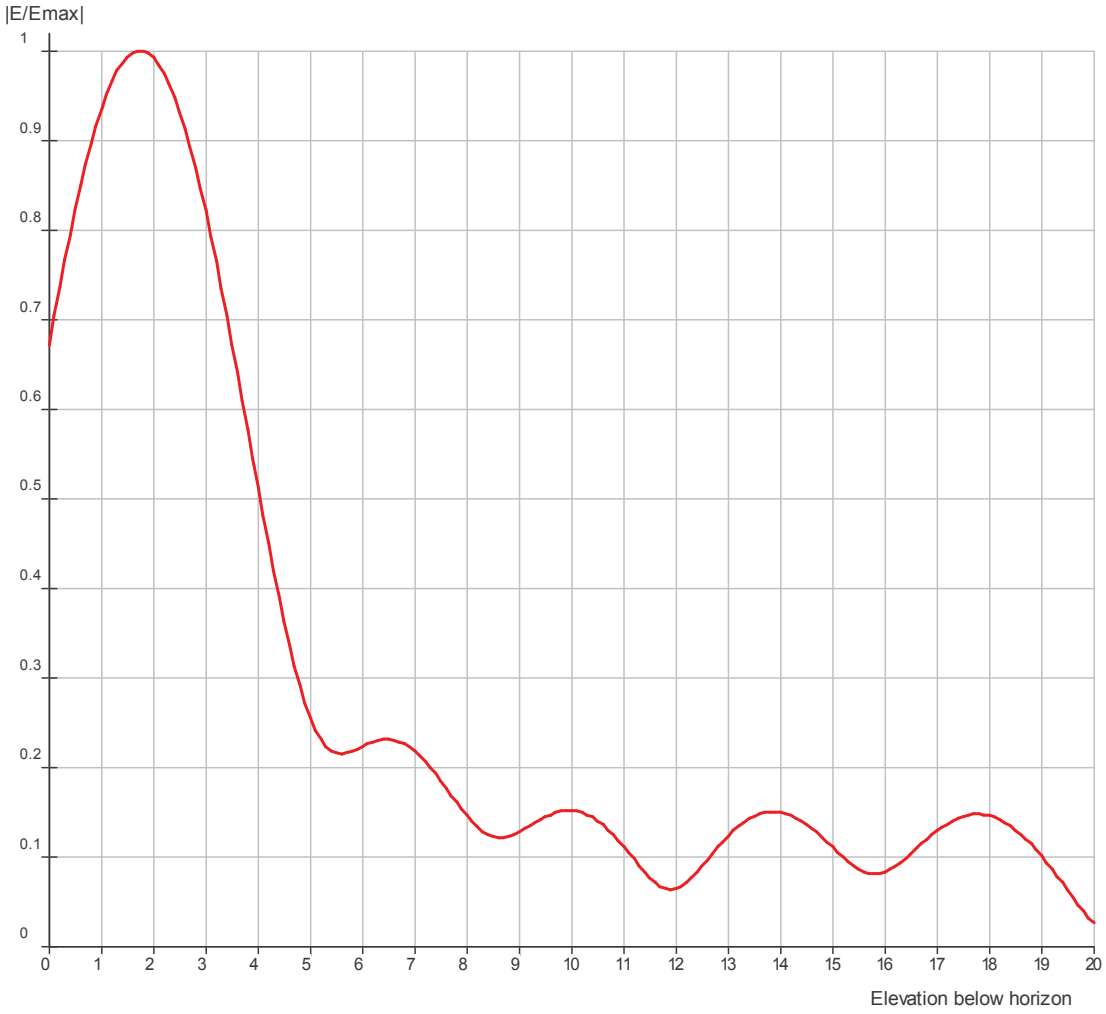
Frequency (MHz): 491

Azimuth: 270°



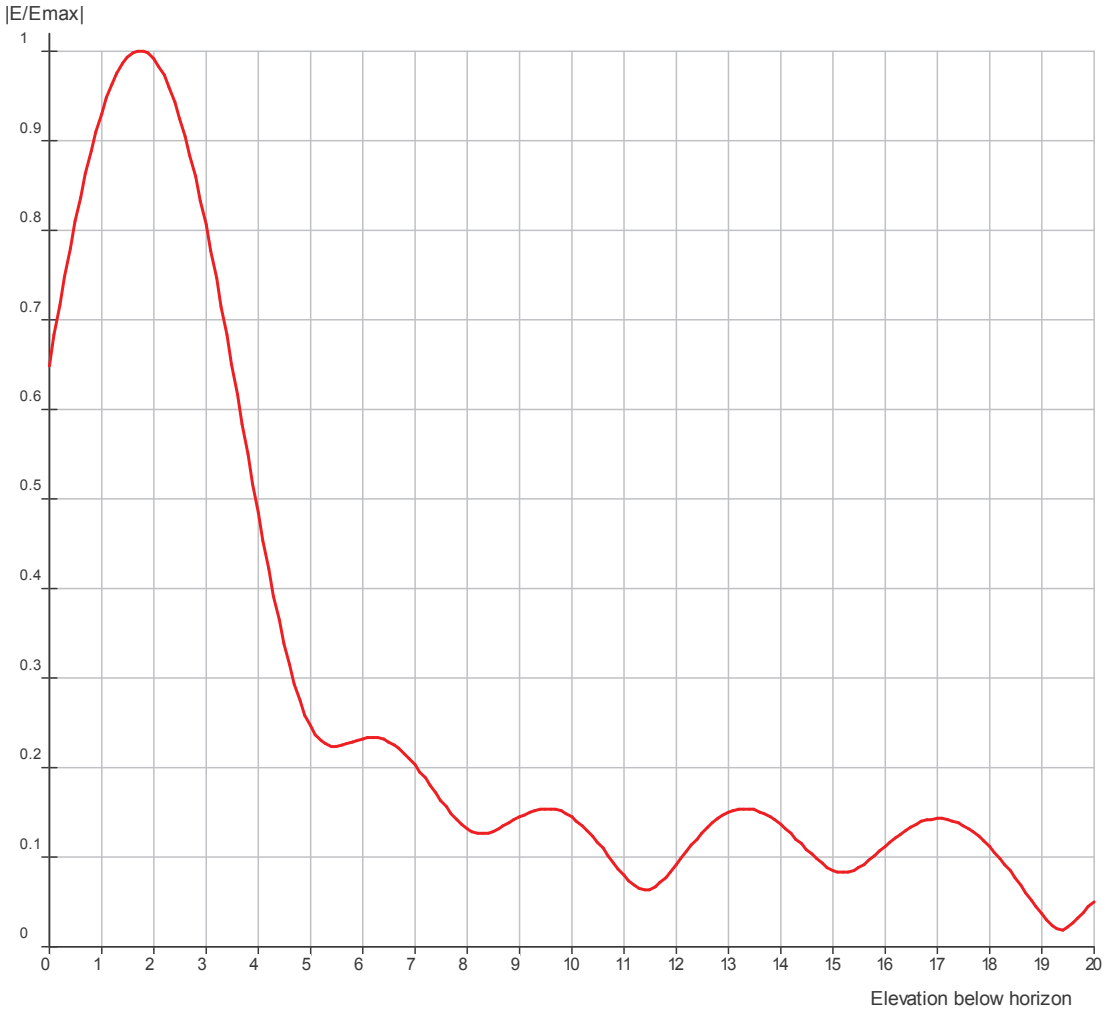
Frequency (MHz): 503

Azimuth: 270°



Frequency (MHz): 527

Azimuth: 270°



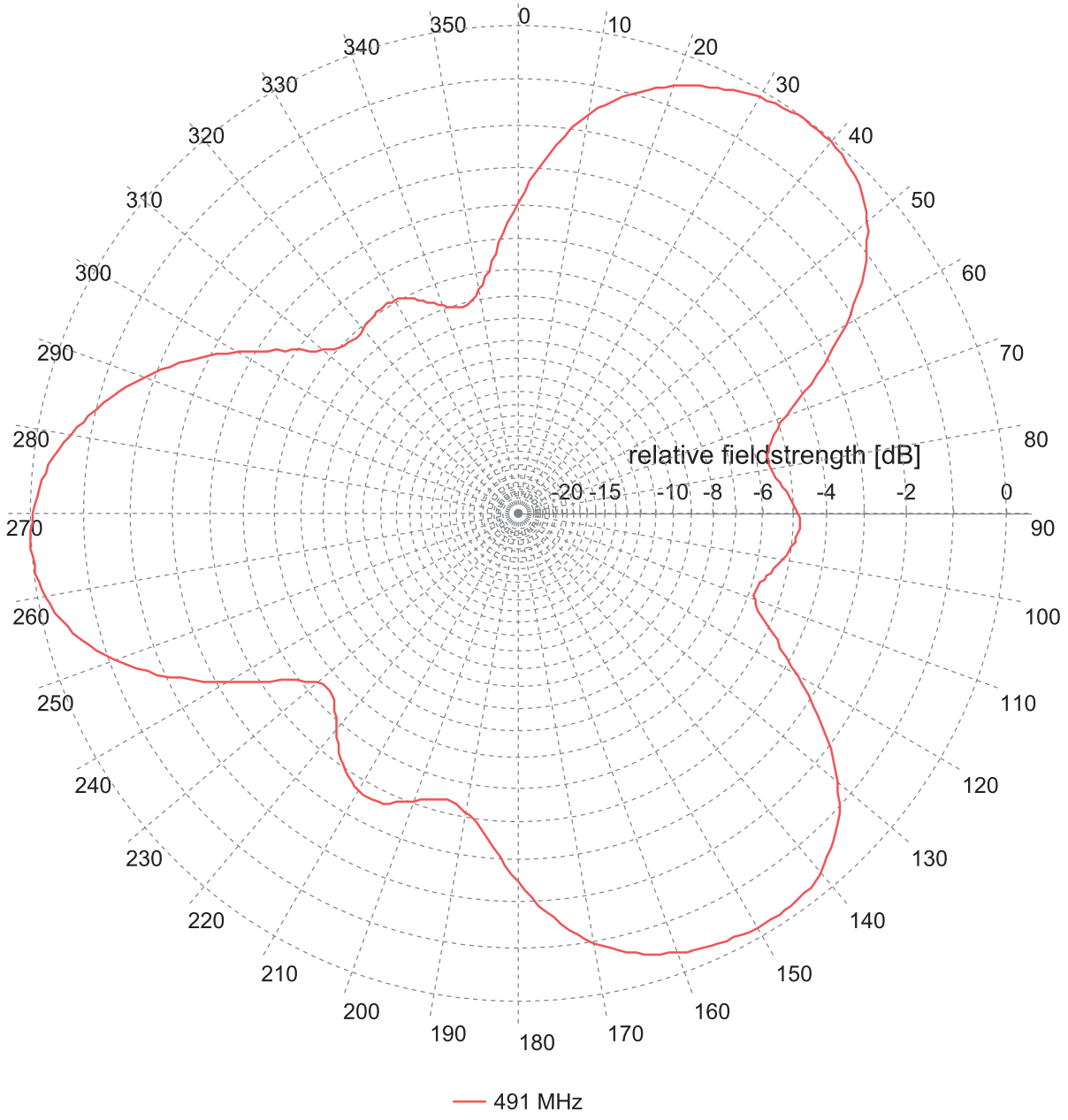
Frequency (MHz): 551

Azimuth: 270°

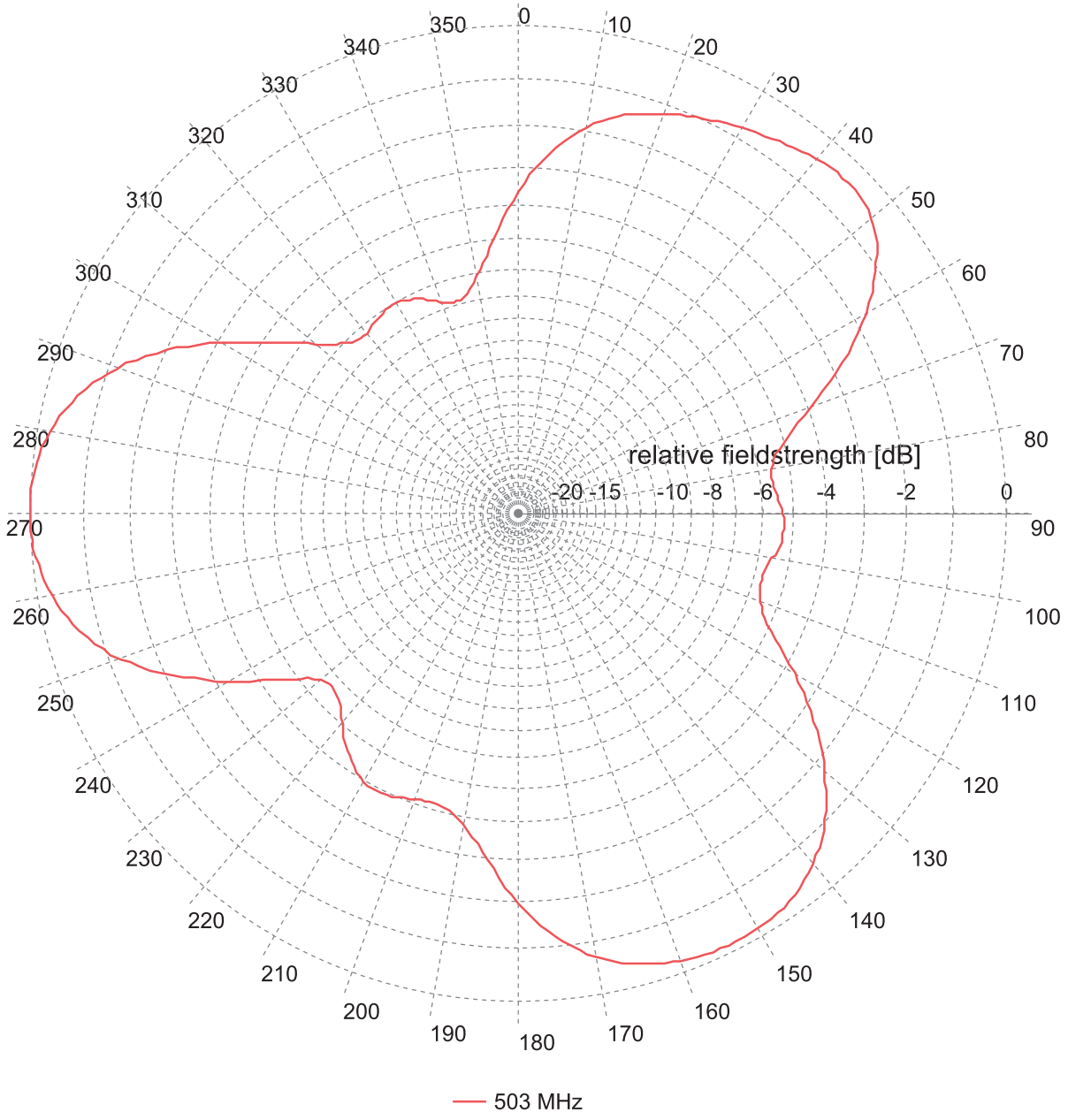
KATHREIN

Patterns

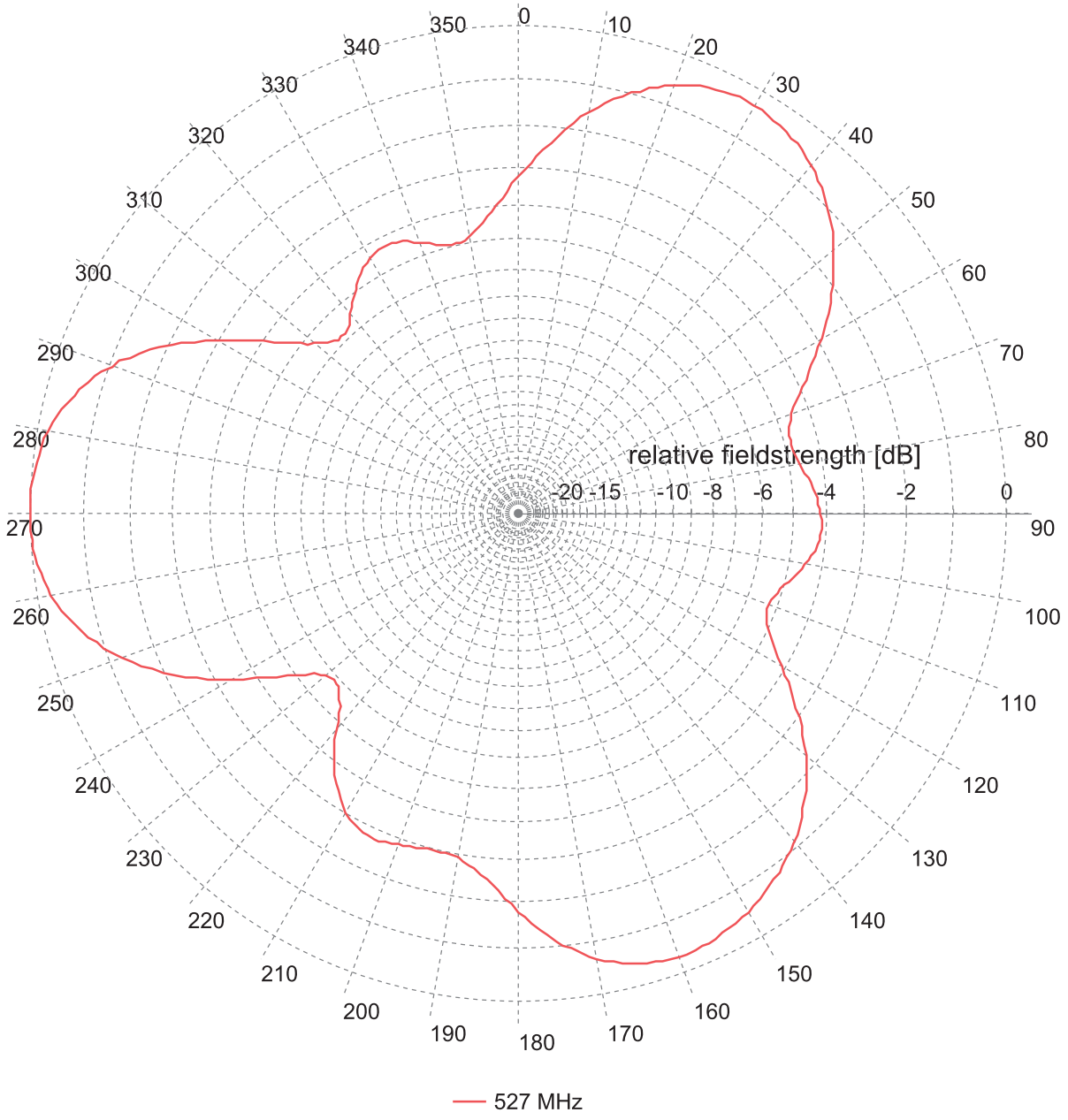
Antenna system 2 (lower half)
Main channels



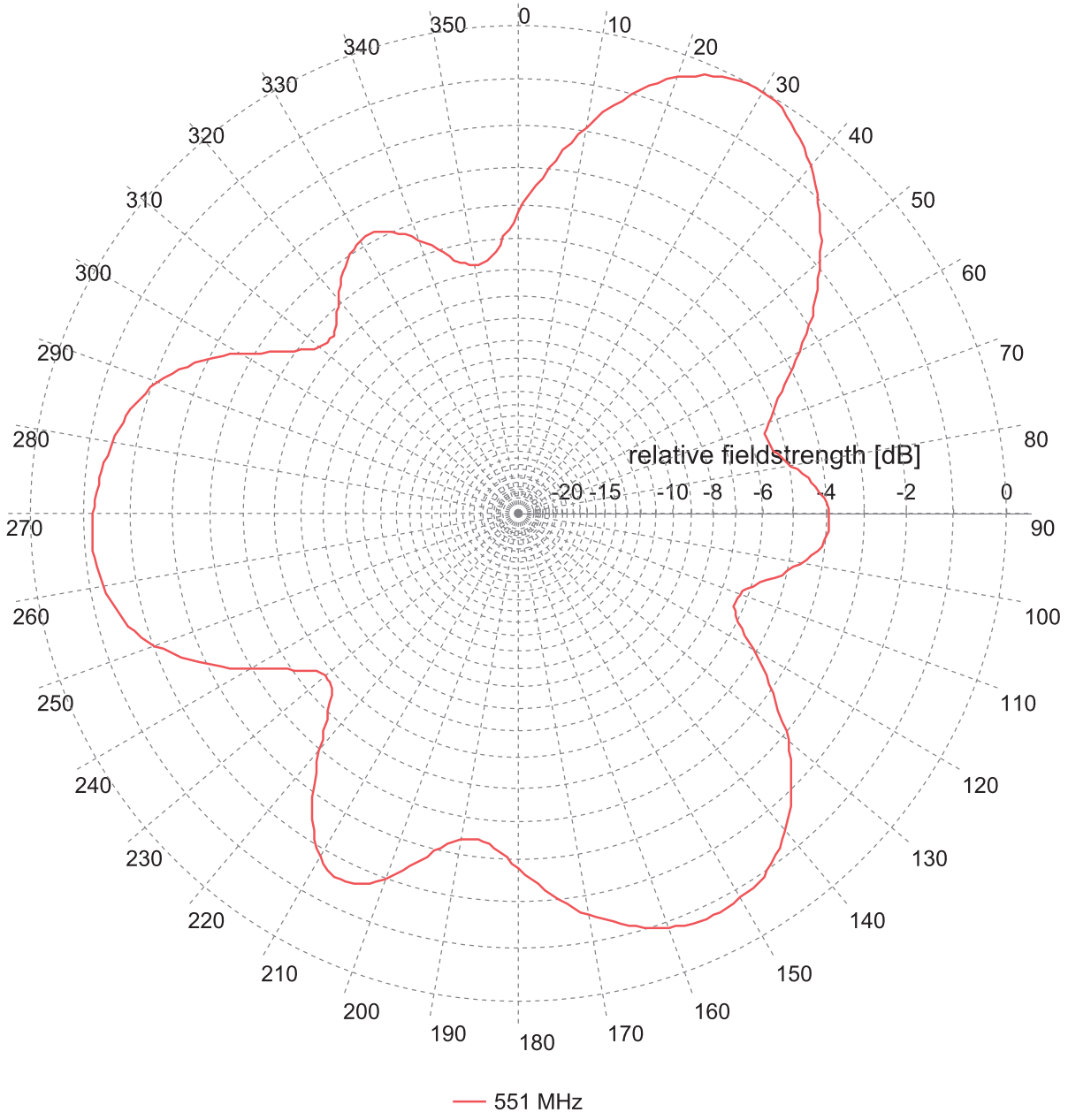
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ98	0.0	0.0	0.0	0.0	0.0	100.0



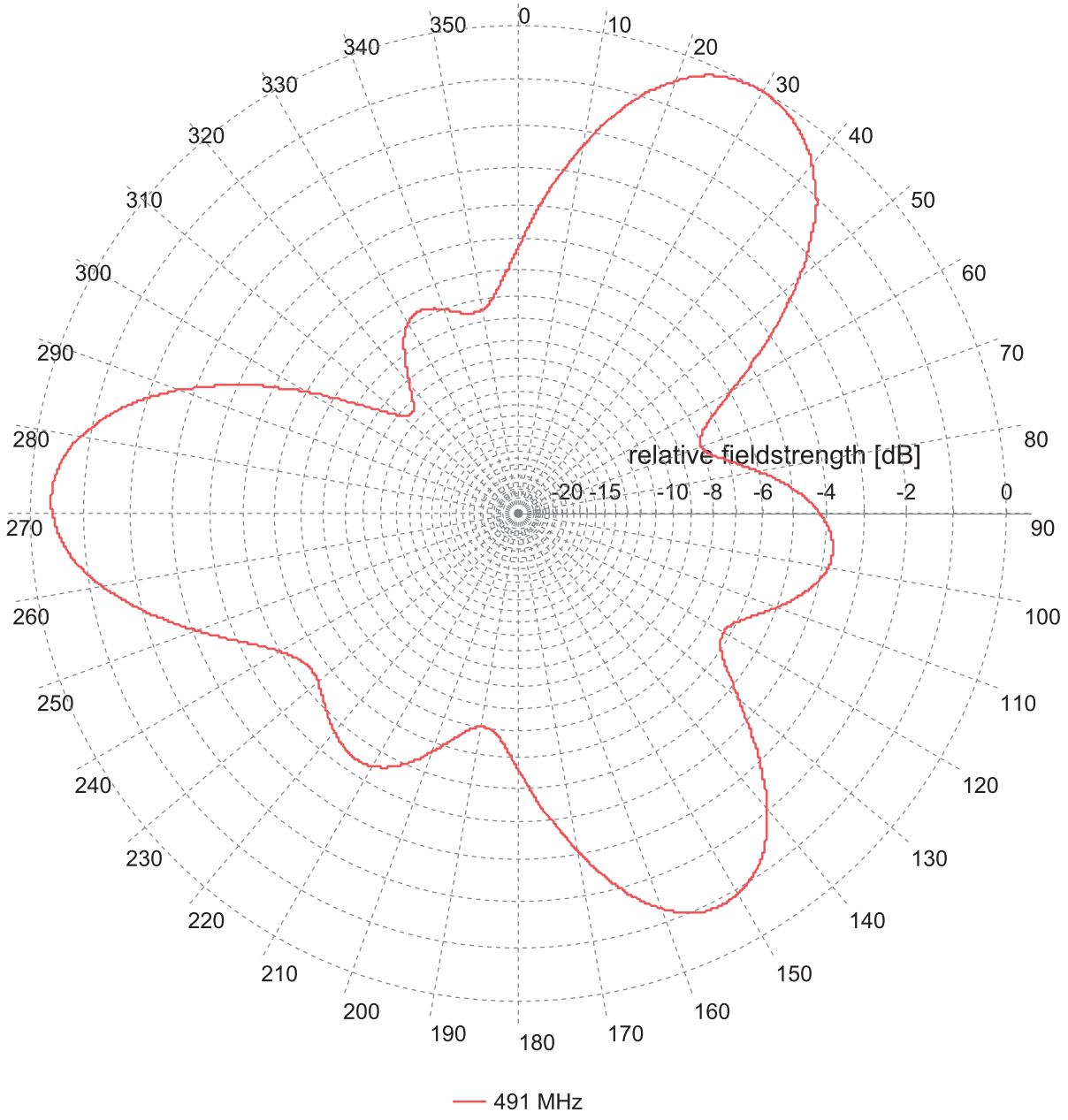
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ98	0.0	0.0	0.0	0.0	0.0	100.0



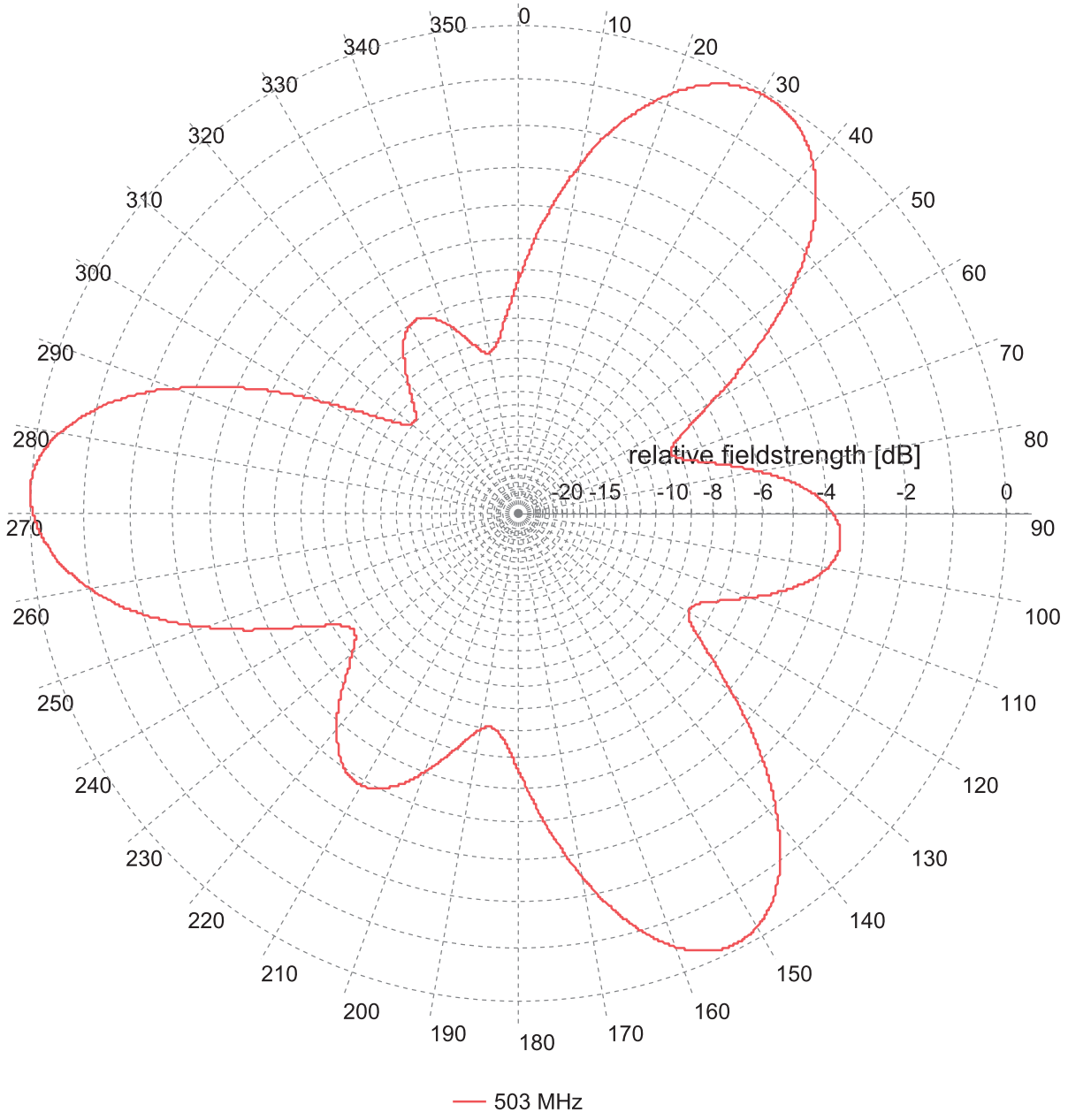
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ98	0.0	0.0	0.0	0.0	0.0	100.0



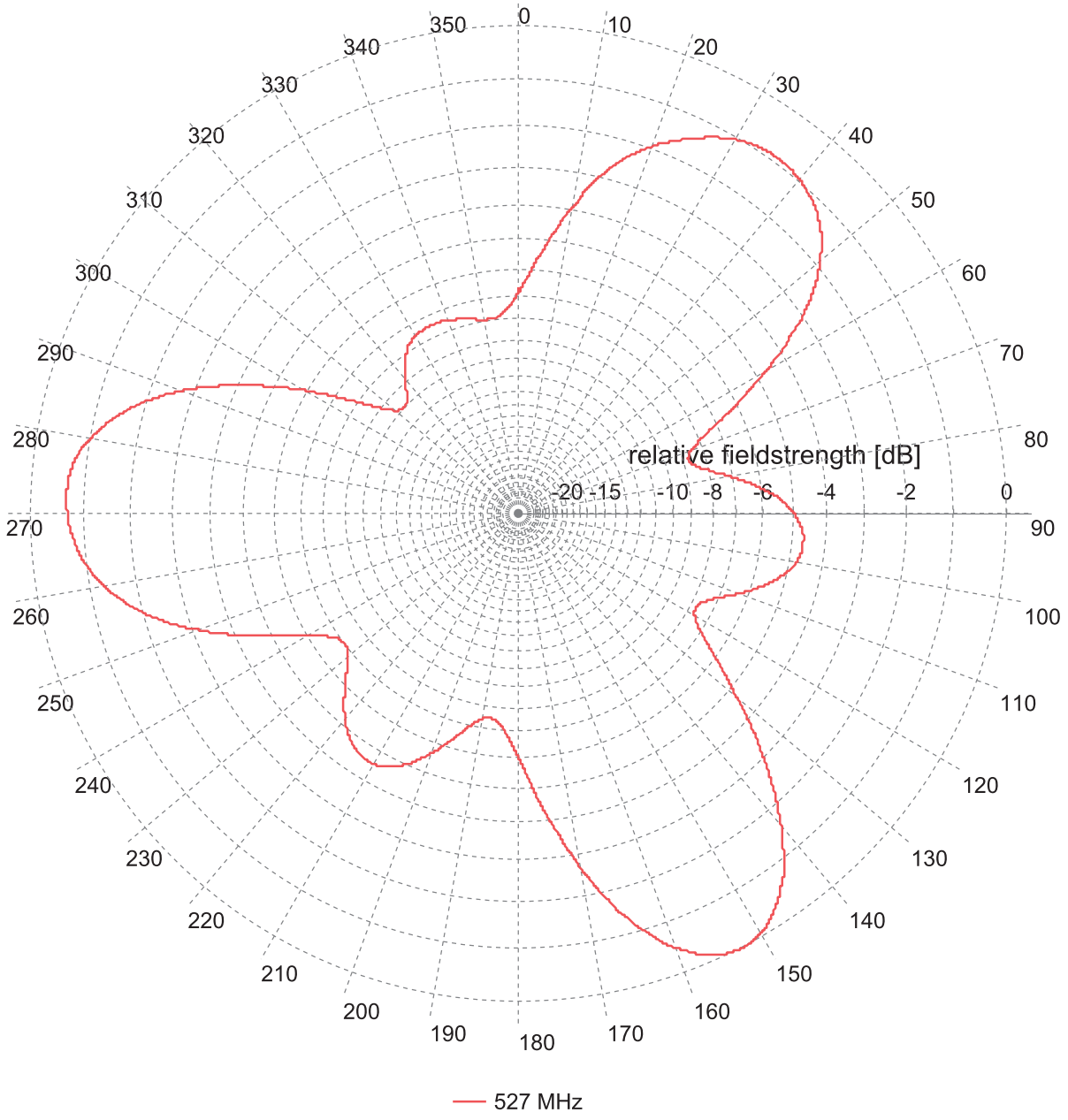
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HHZ98	0.0	0.0	0.0	0.0	0.0	100.0



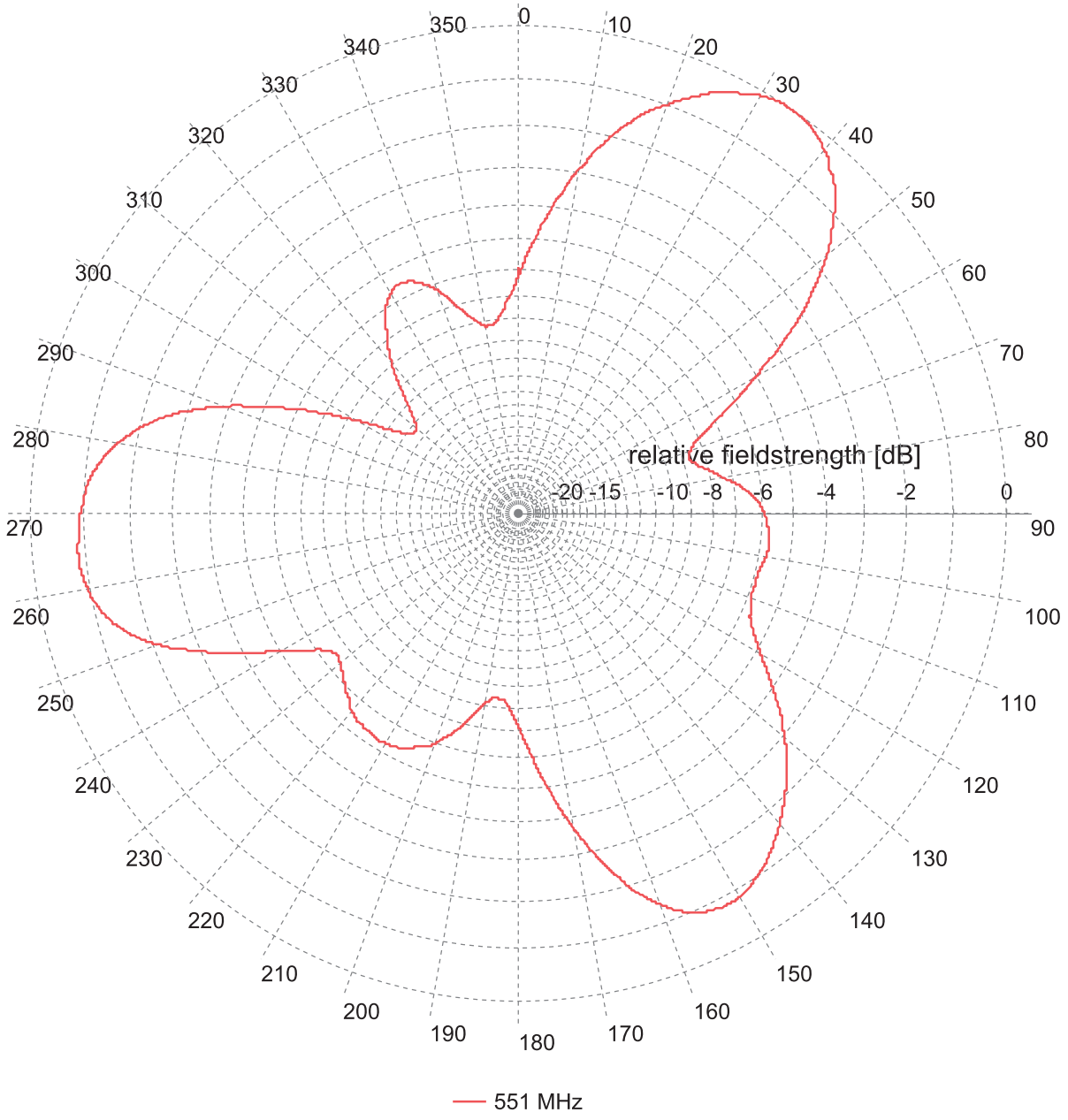
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ98	0.0	0.0	0.0	0.0	0.0	100.0



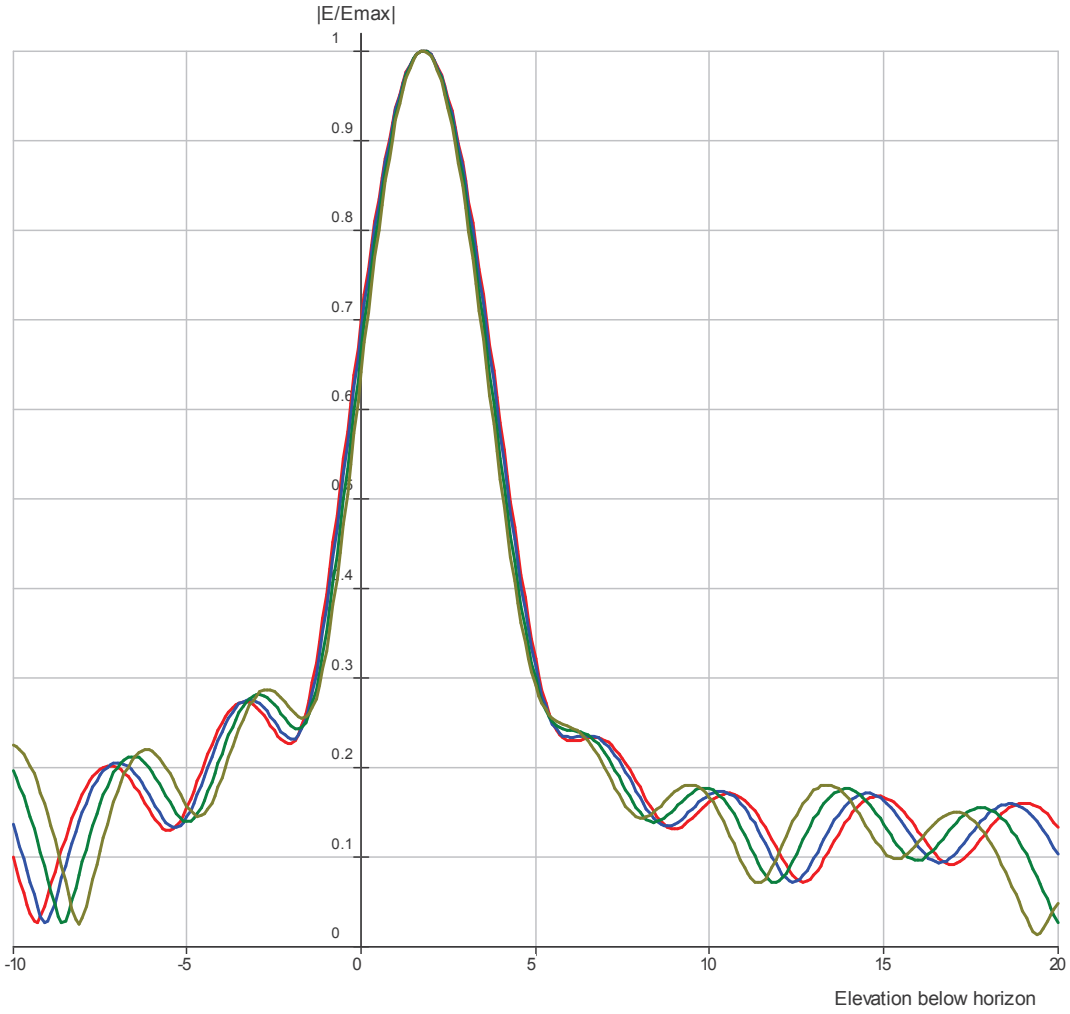
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ98	0.0	0.0	0.0	0.0	0.0	100.0



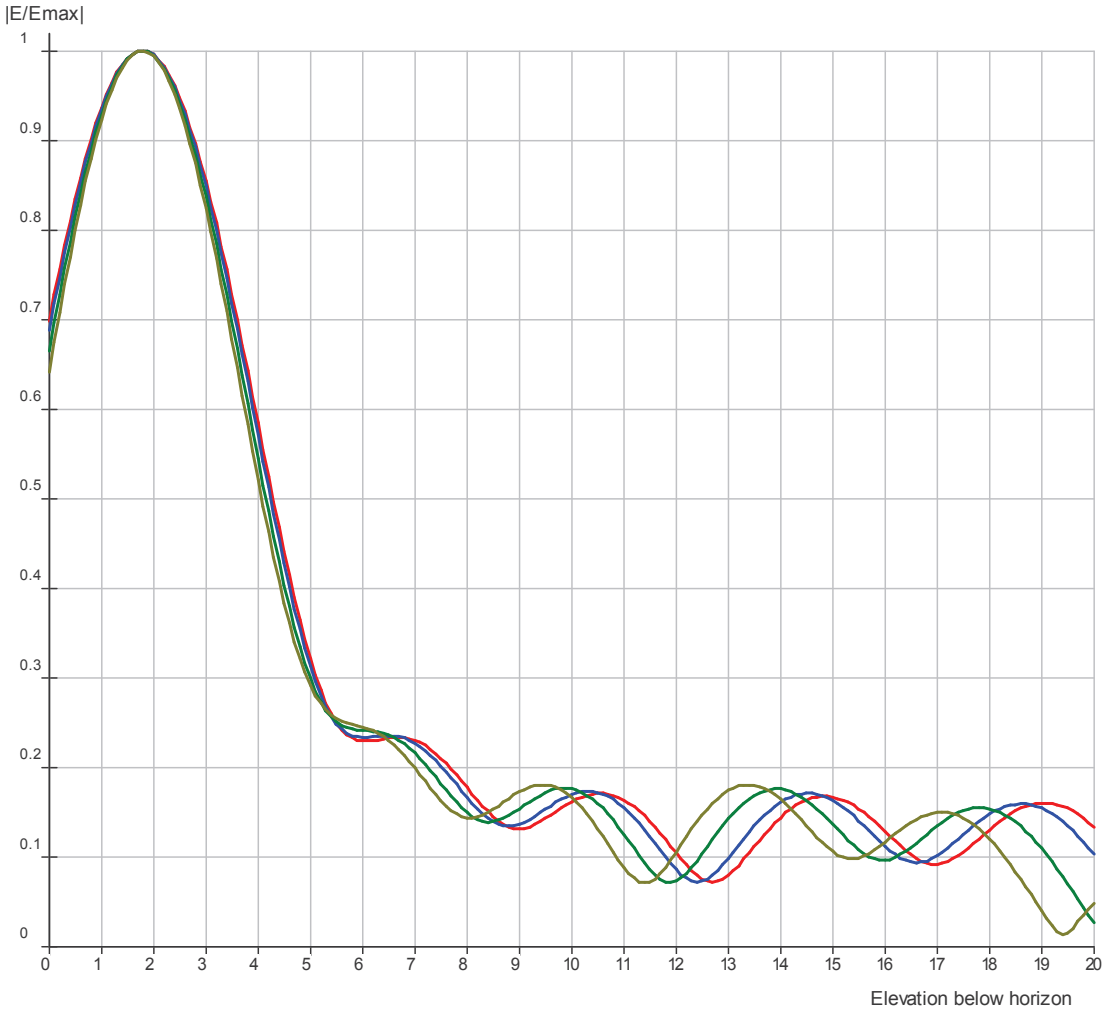
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ98	0.0	0.0	0.0	0.0	0.0	100.0



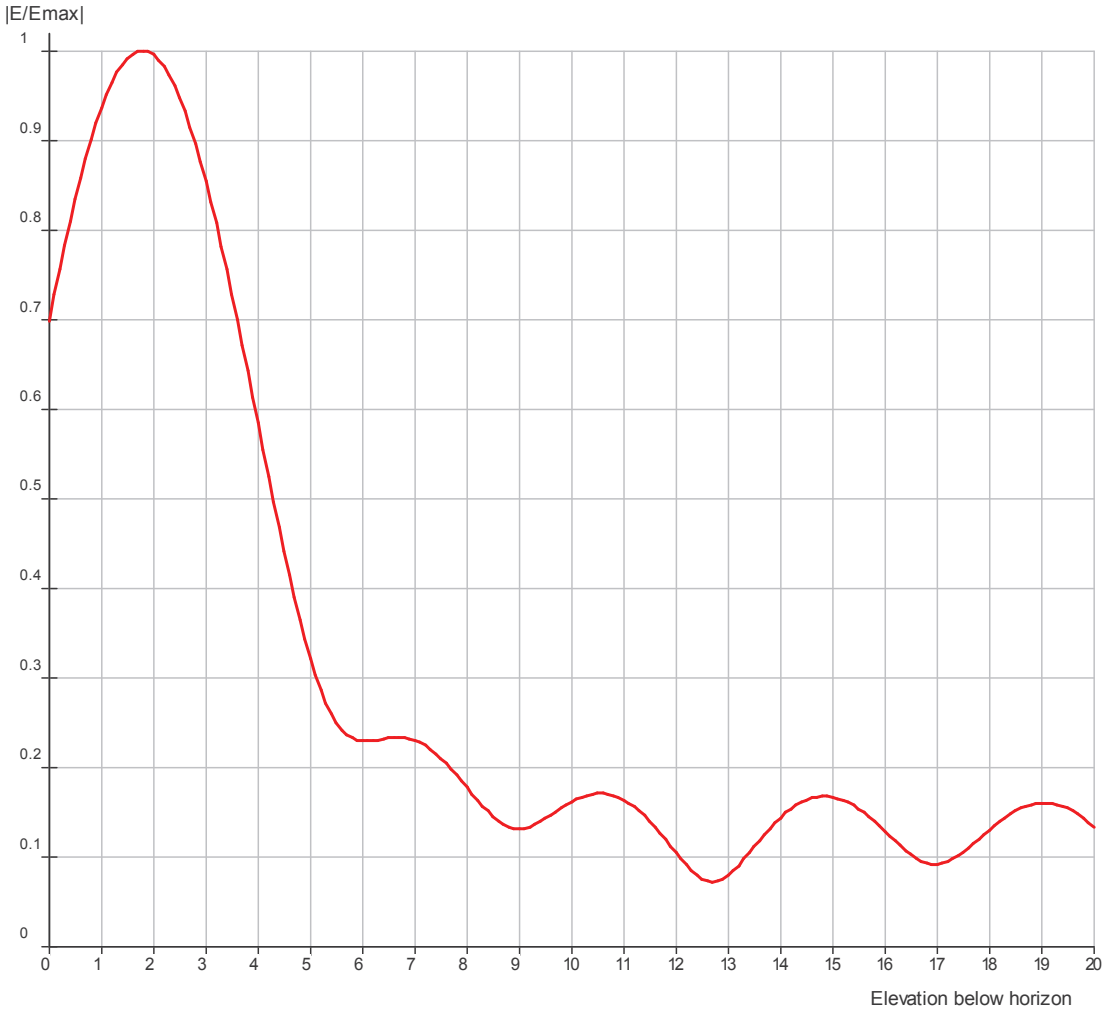
Antenna type	Azimuth [deg]	Dist [mm]	Offset [mm]	Fix-Ph [deg]	Cab-Ph [deg]	Power [%]
HVZ98	0.0	0.0	0.0	0.0	0.0	100.0



Frequency (MHz):	491	503	527	551
Azimuth:	270°	270°	270°	270°

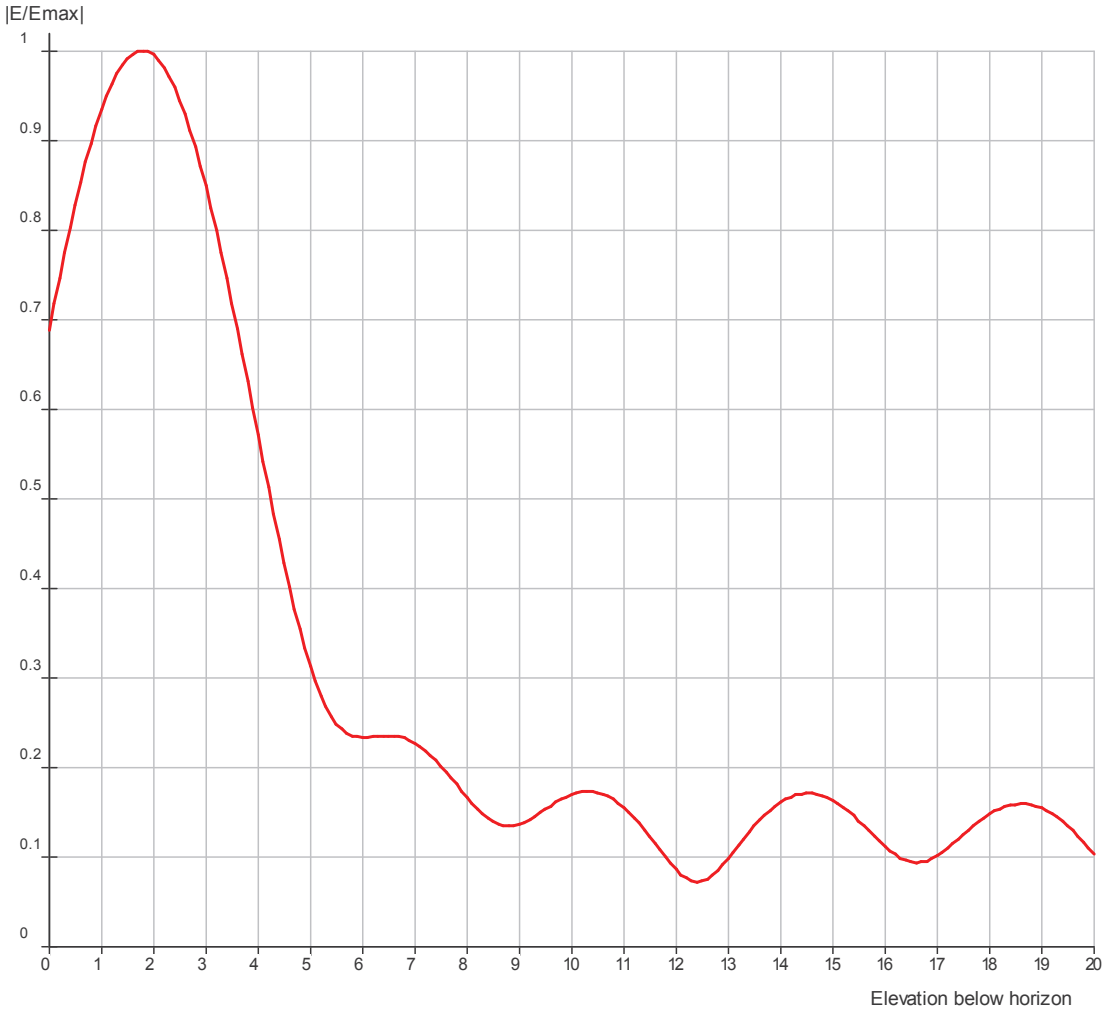


Frequency (MHz):	491	503	527	551
Azimuth:	270°	270°	270°	270°



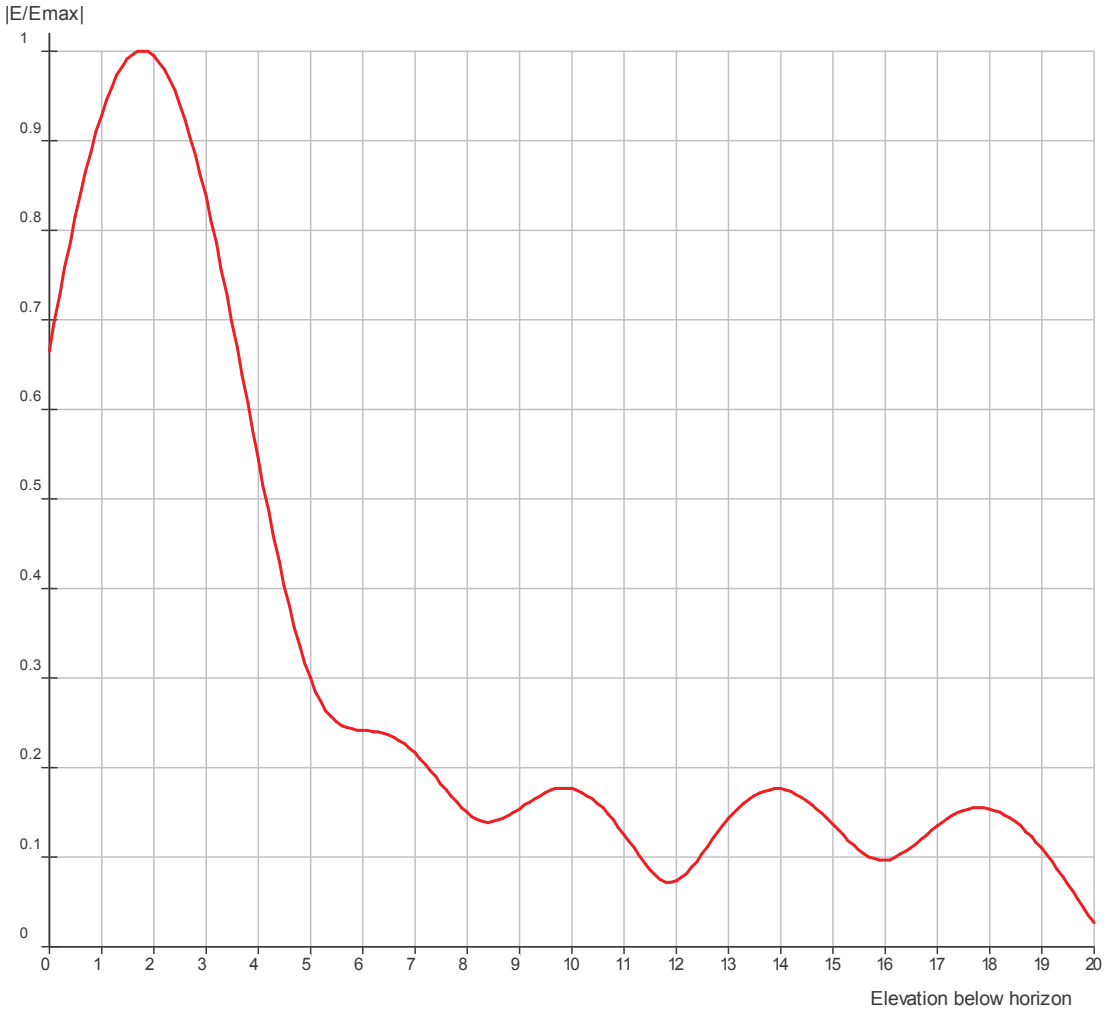
Frequency (MHz): 491

Azimuth: 270°



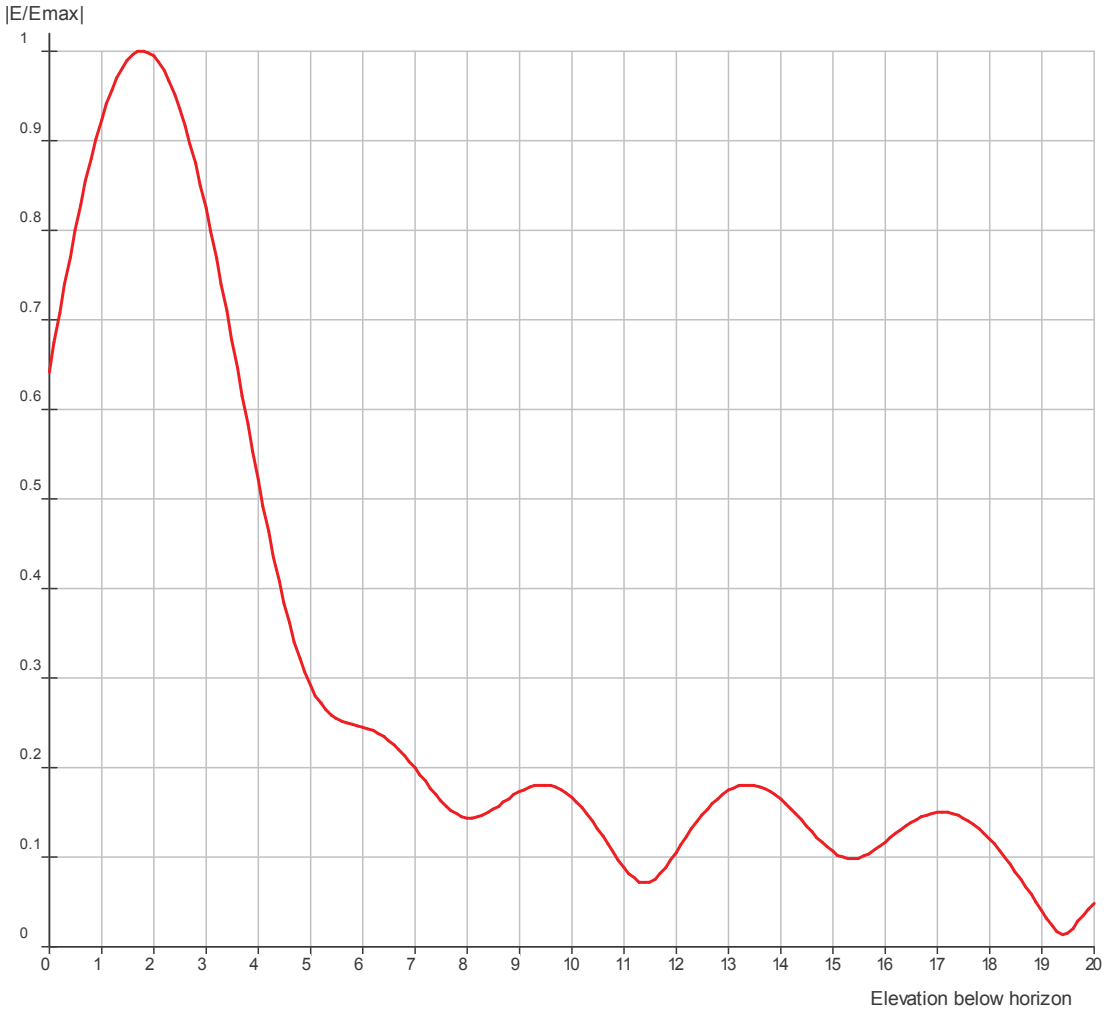
Frequency (MHz): 503

Azimuth: 270°



Frequency (MHz): 527

Azimuth: 270°



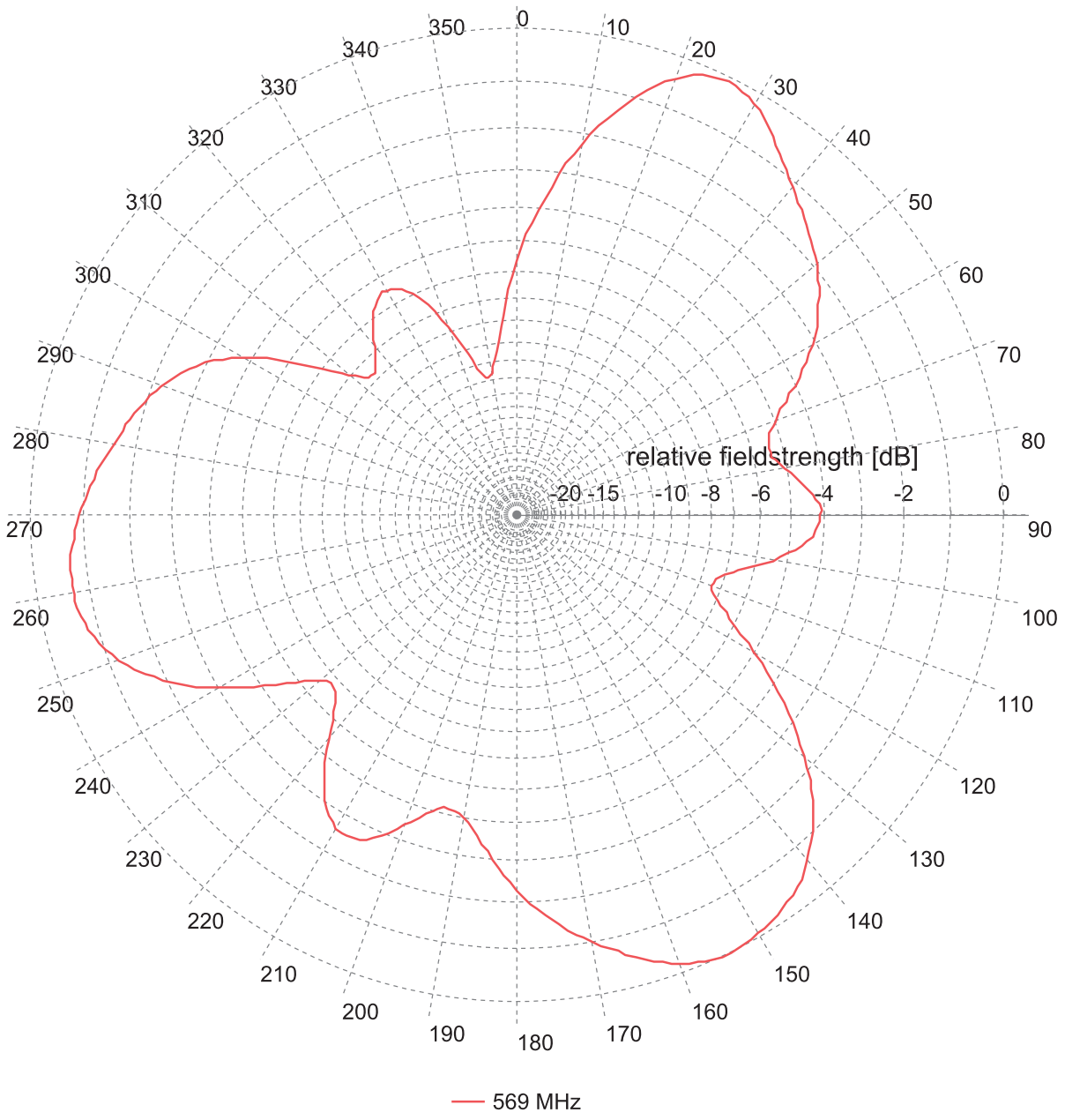
Frequency (MHz): 551

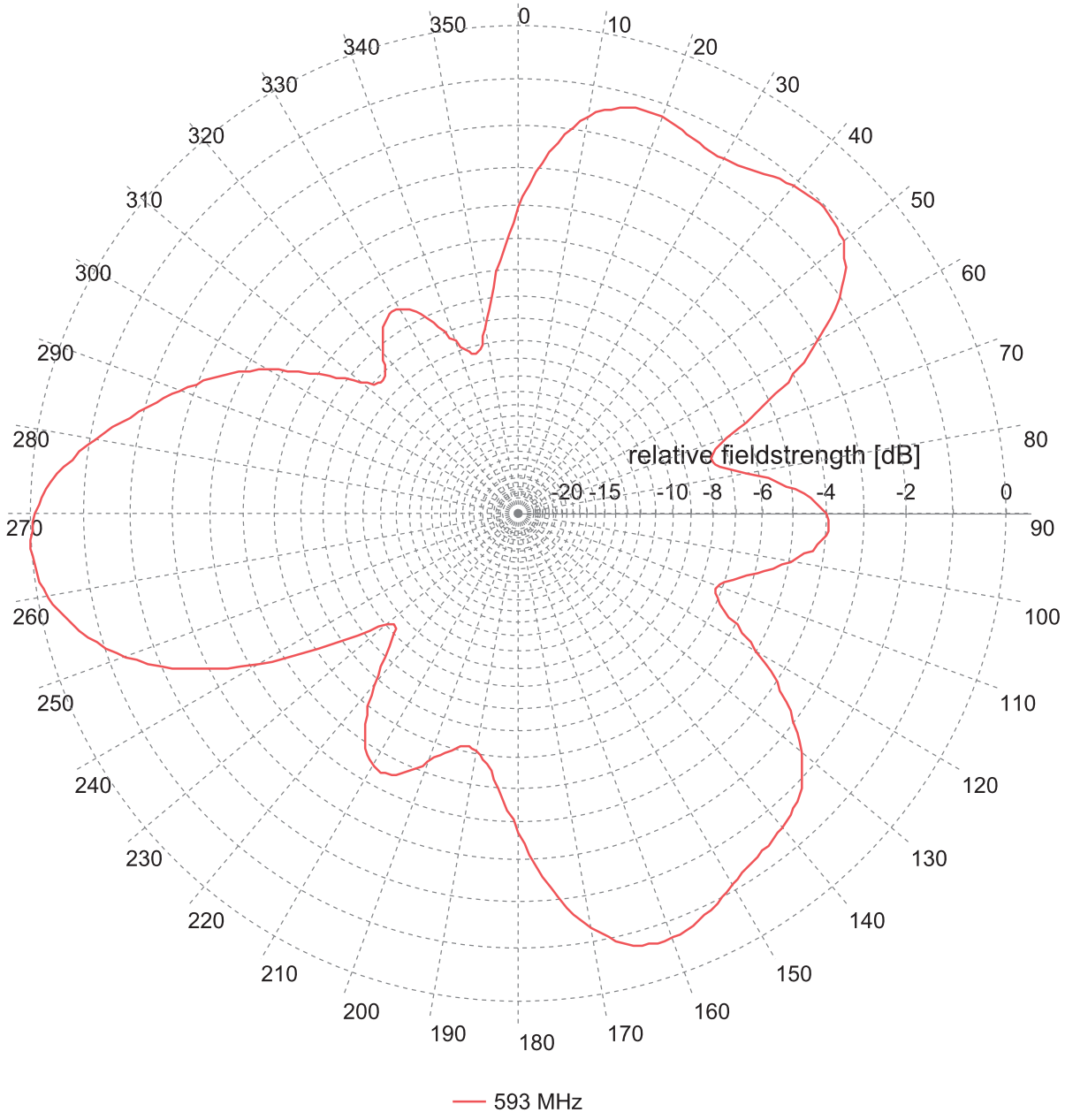
Azimuth: 270°

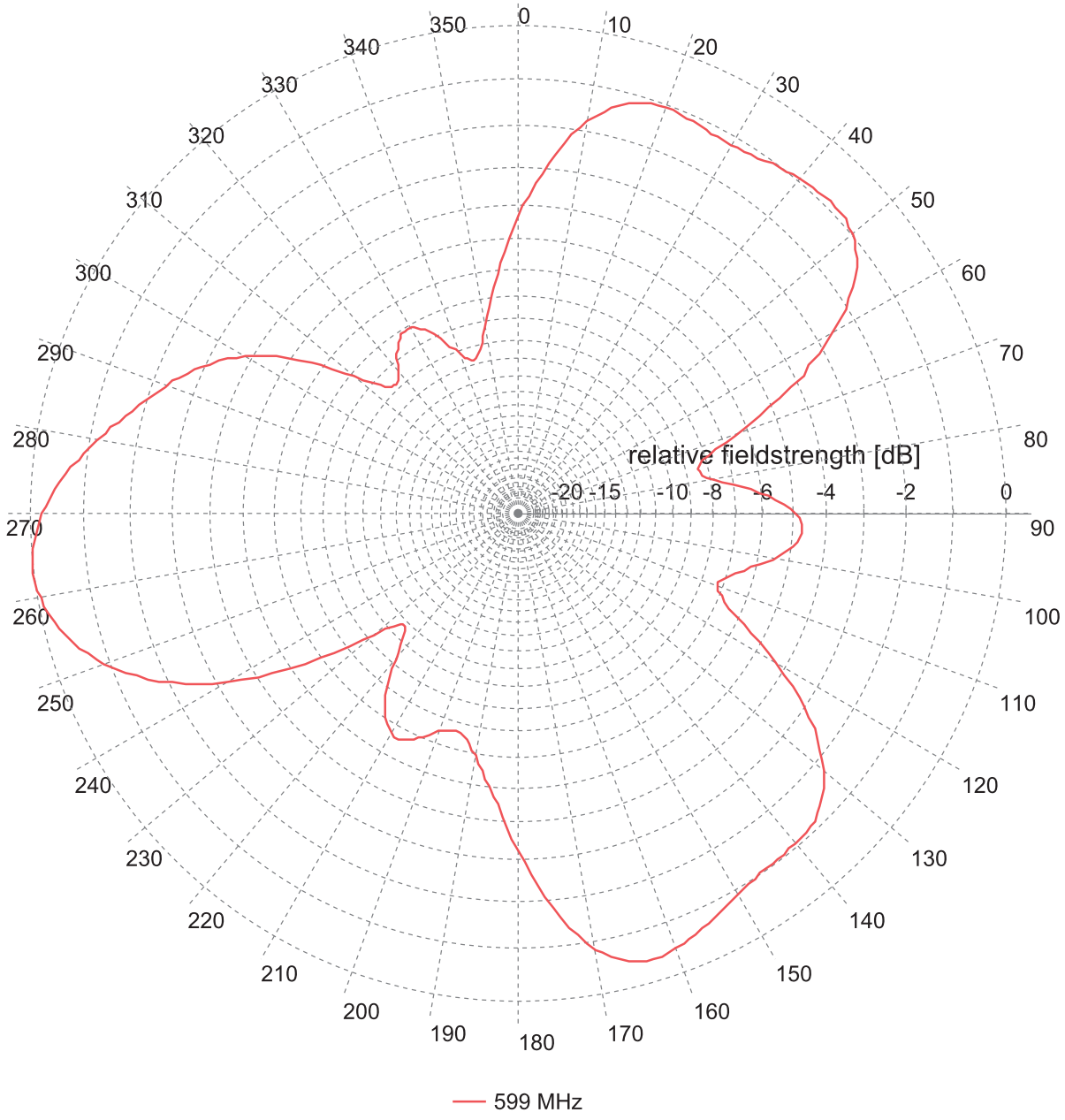
KATHREIN

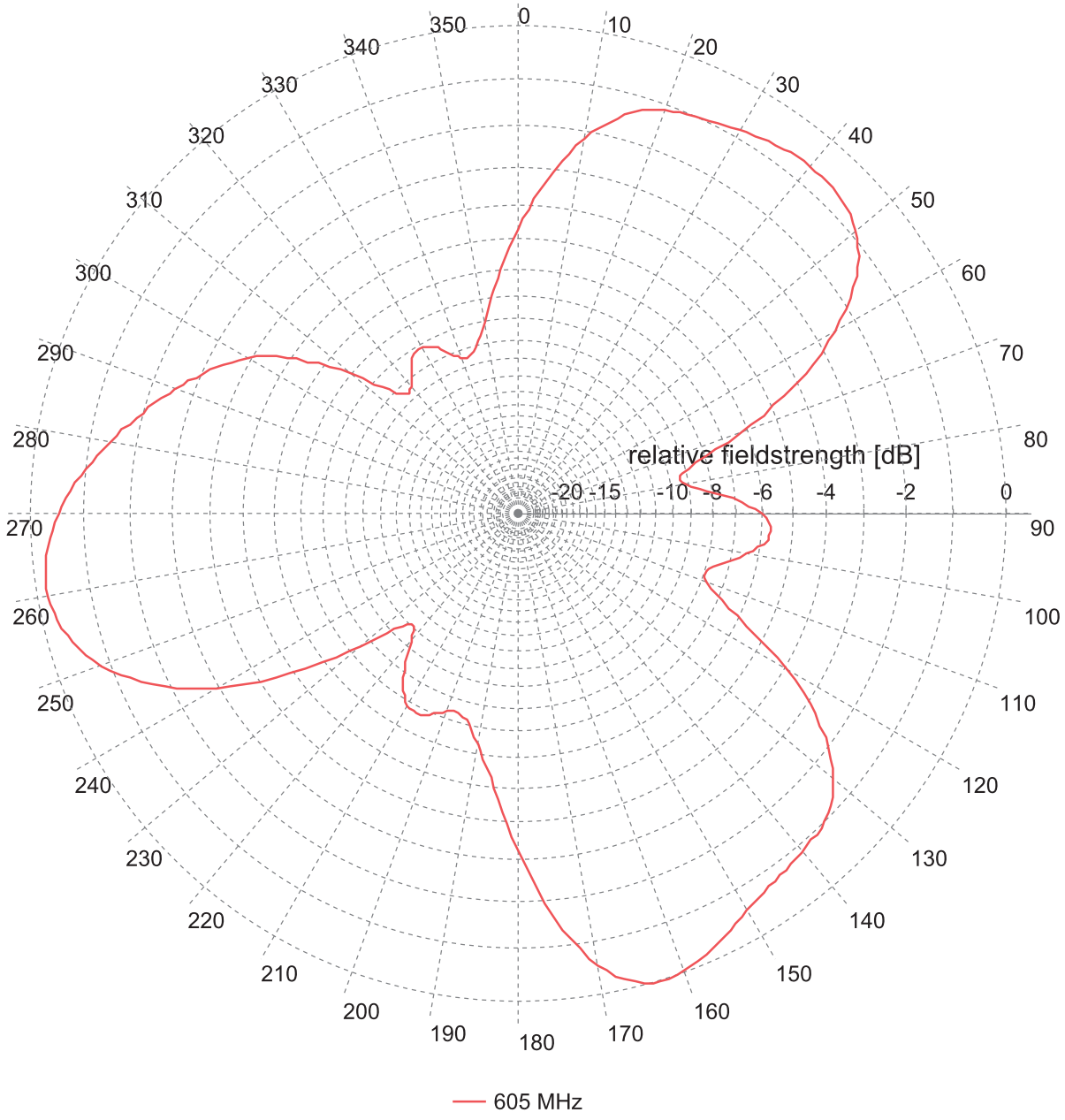
Patterns

Antenna system 2 (lower half)
Reserve channels


0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
569 MHz


0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
593 MHz


0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
599 MHz

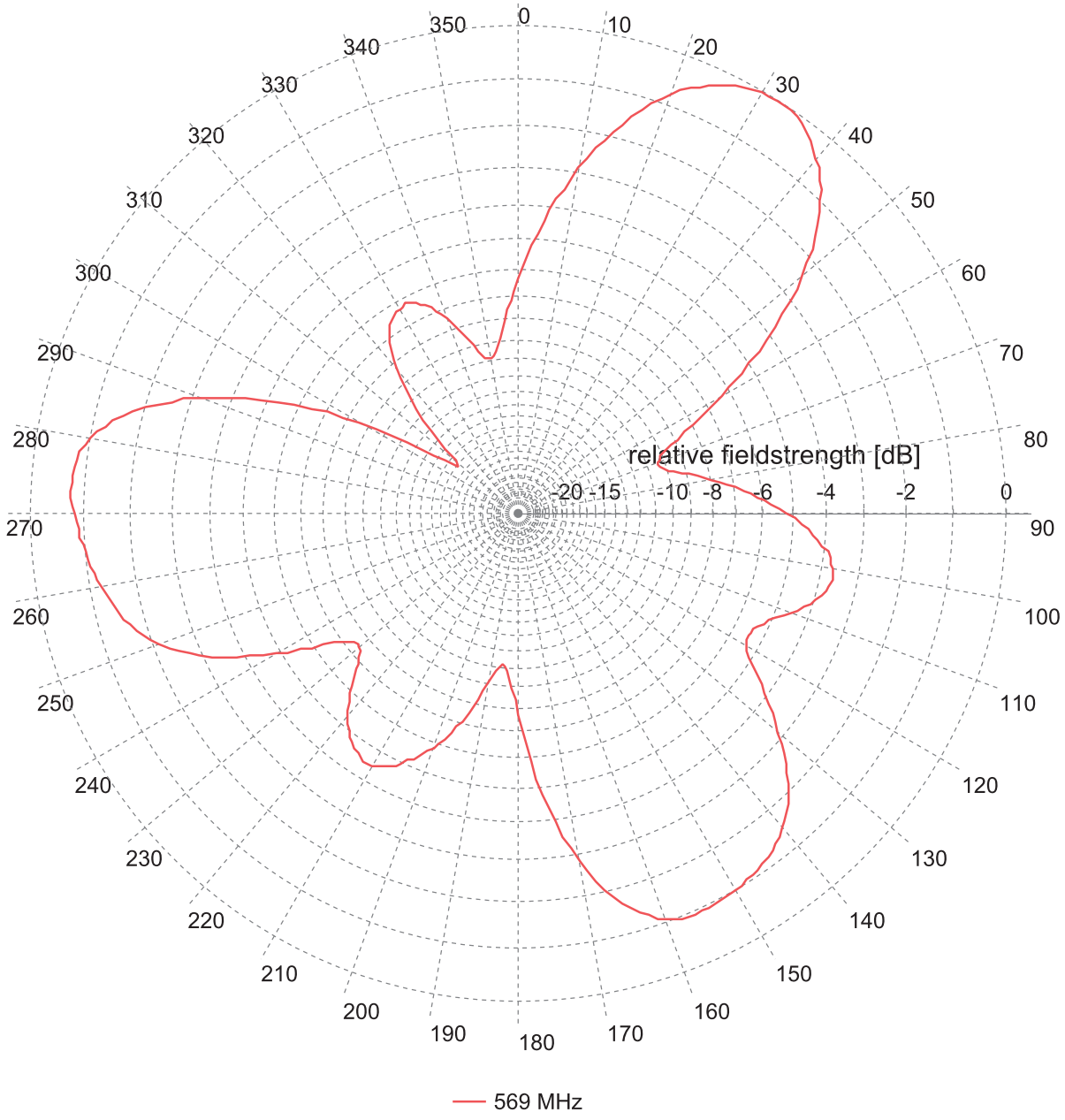


KATHREIN

Horizontal Radiation Pattern

Antenna System 2 (Lower Half) - H-Polarized

Gerl/BSR, 09.05.2018 13:52

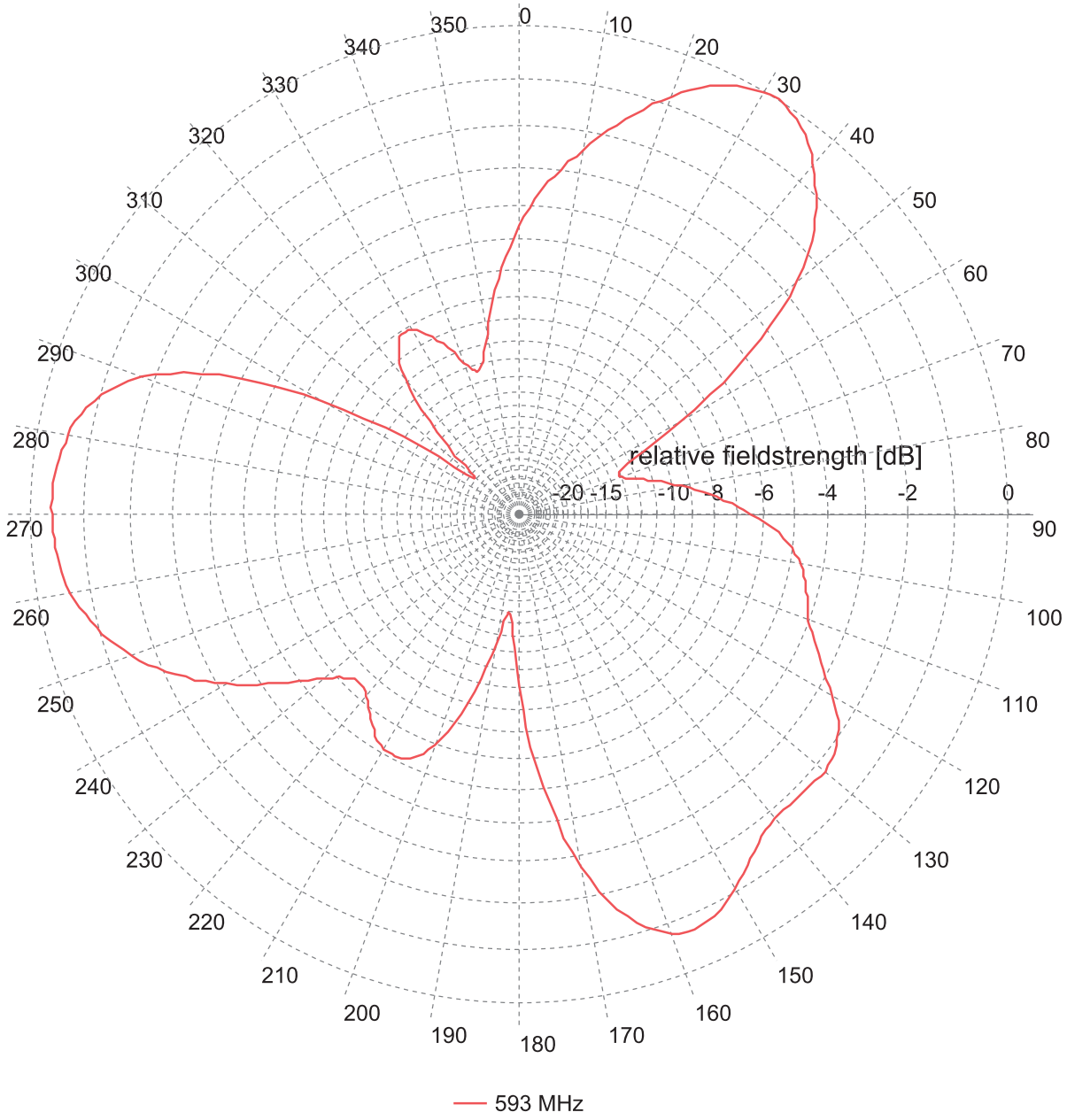


KATHREIN

Horizontal Radiation Pattern

Antenna System 2 (Lower Half) - V-Polarized

Gerl/BSR, 09.05.2018 14:32

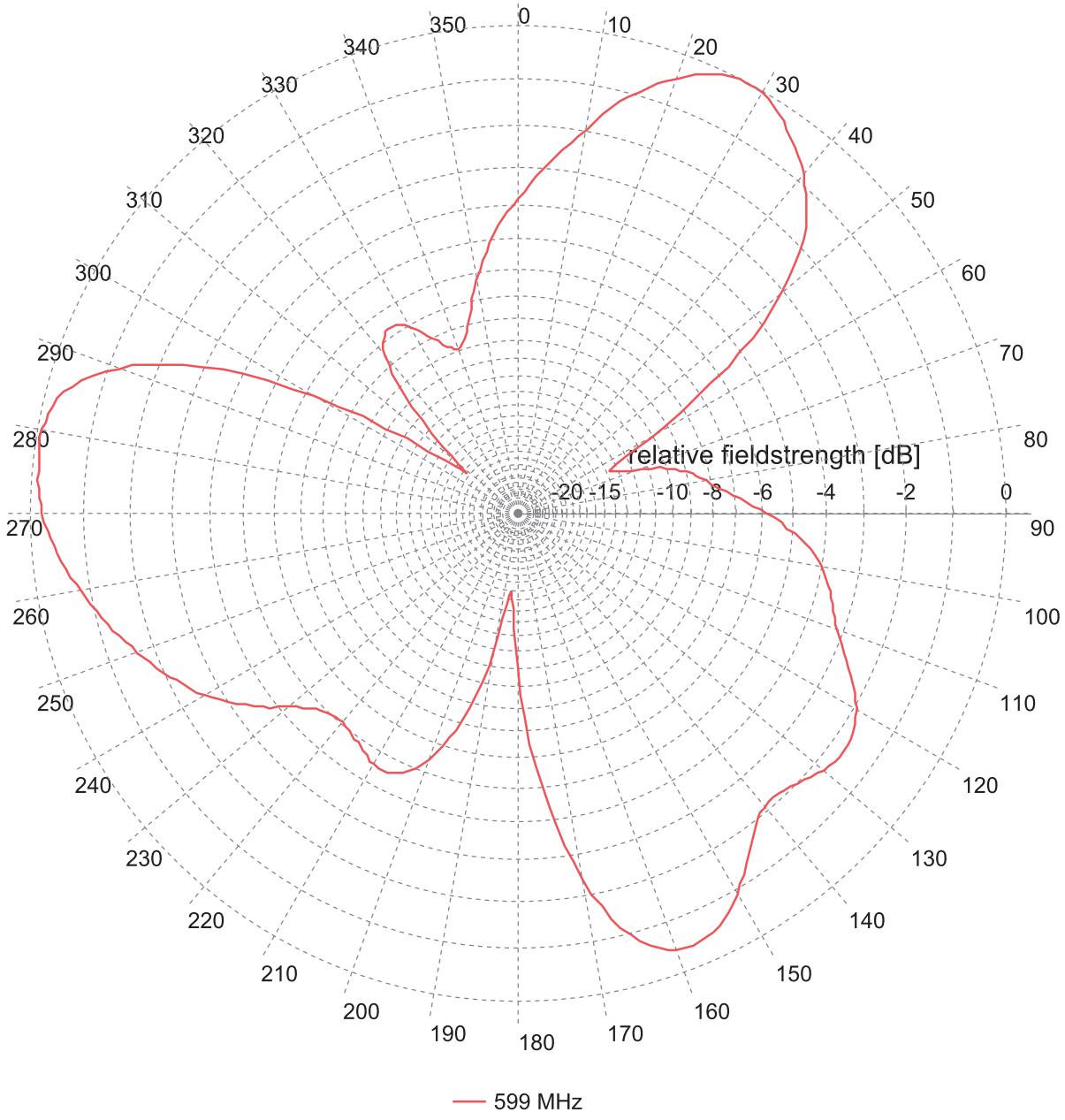


KATHREIN

Horizontal Radiation Pattern

Antenna System 2 (Lower Half) - V-Polarized

Gerl/BSR, 09.05.2018 14:31

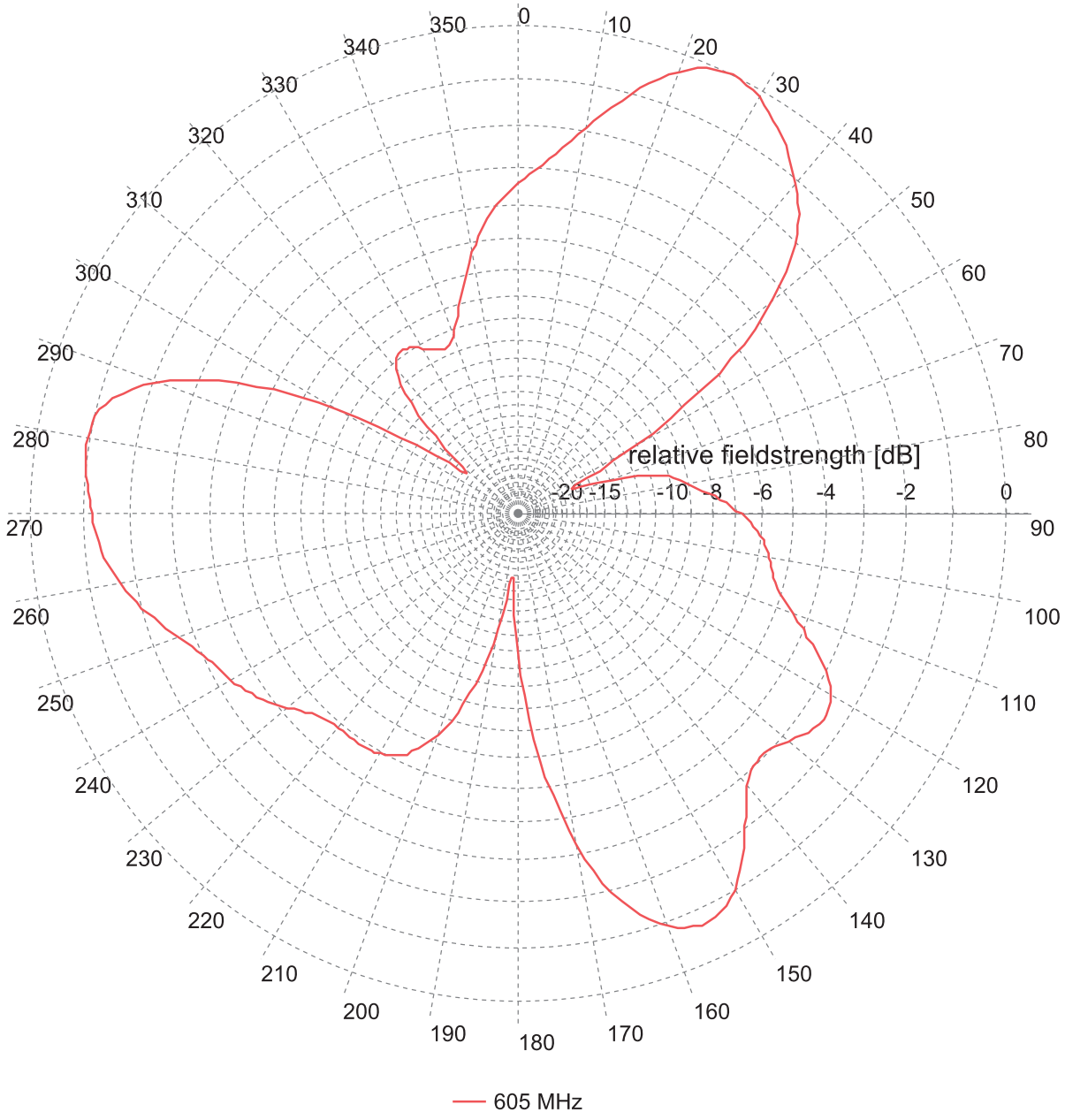


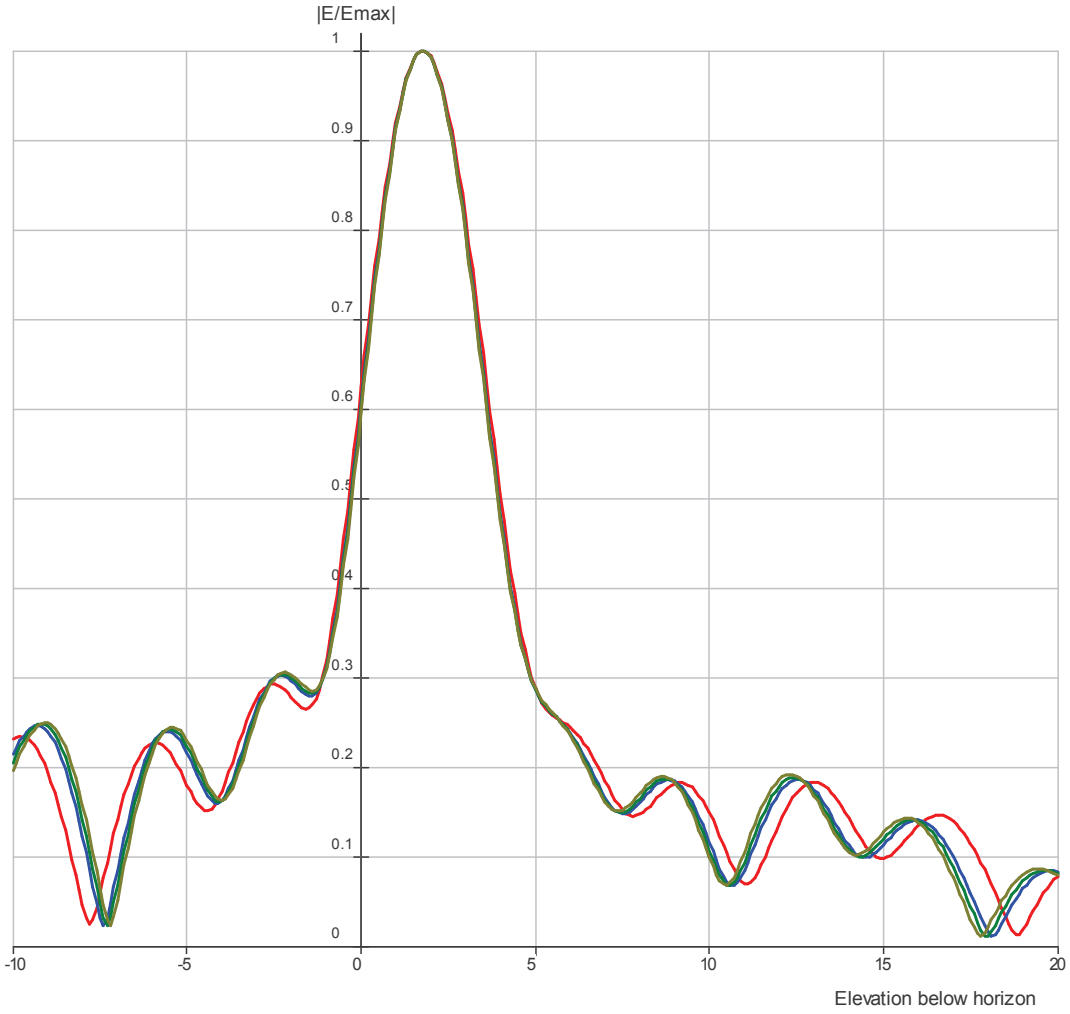
KATHREIN

Horizontal Radiation Pattern

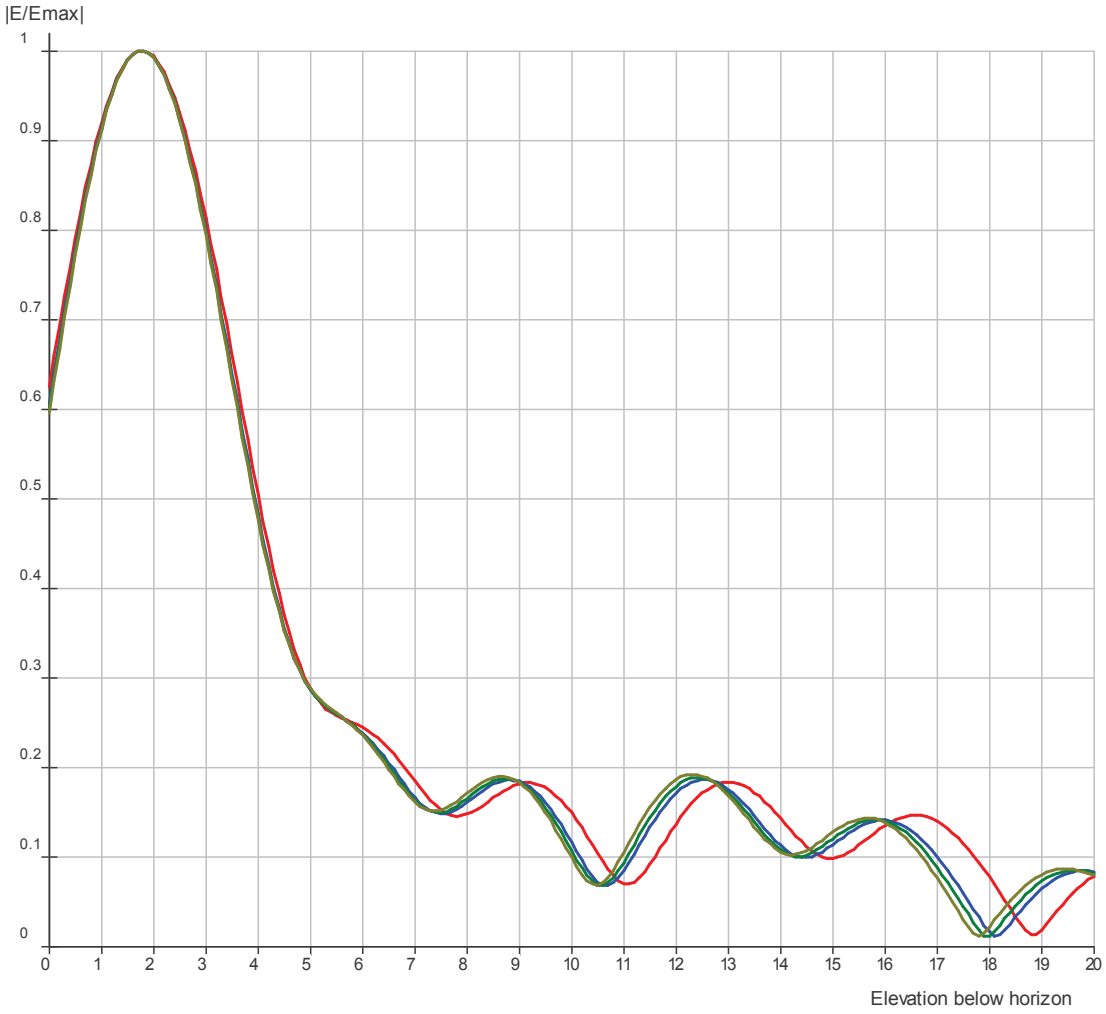
Antenna System 2 (Lower Half) - V-Polarized

Gerl/BSR, 09.05.2018 14:32

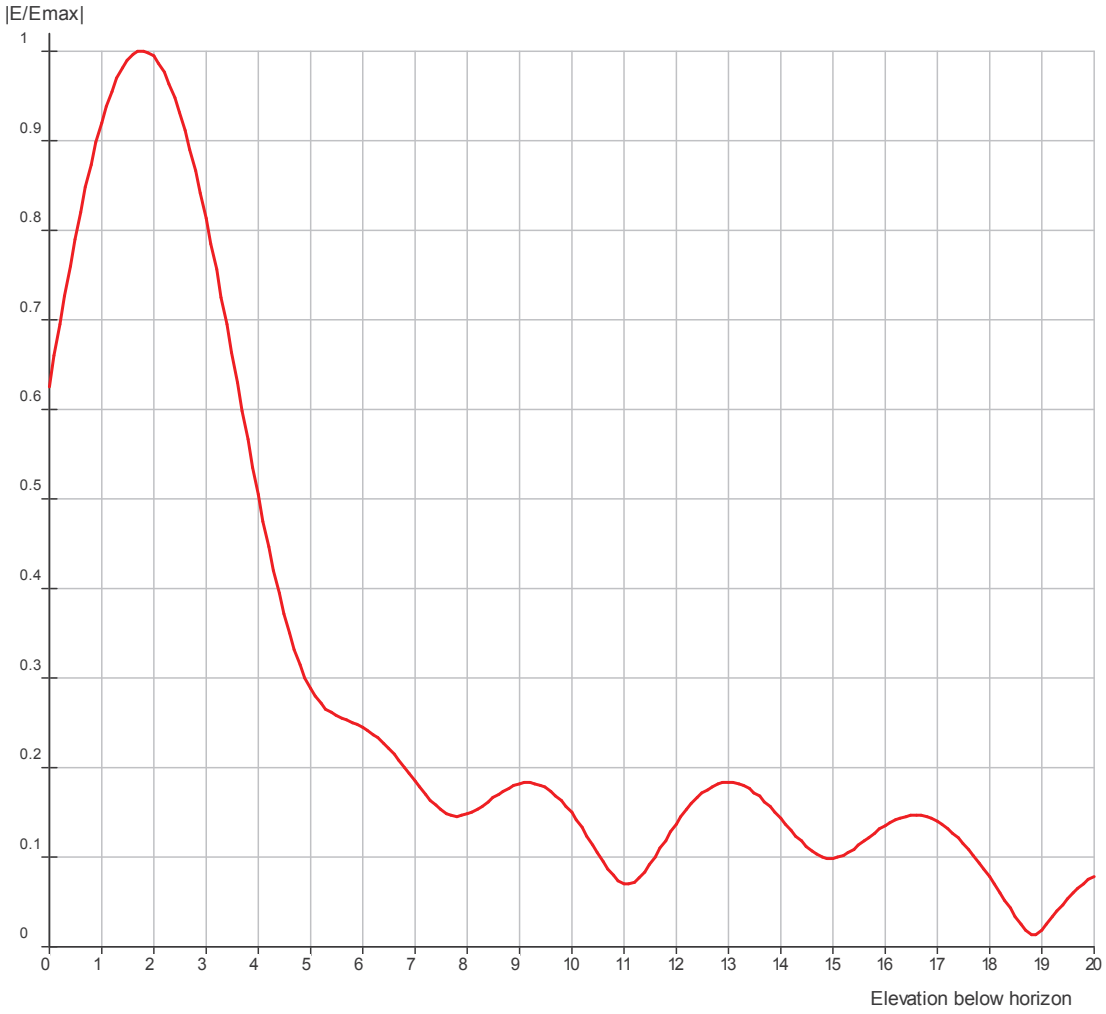

0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350
relative fieldstrength [dB]
-20 -15 -10 -8 -6 -4 -2 0
605 MHz



Frequency (MHz):	569	593	599	605
Azimuth:	270°	270°	270°	270°

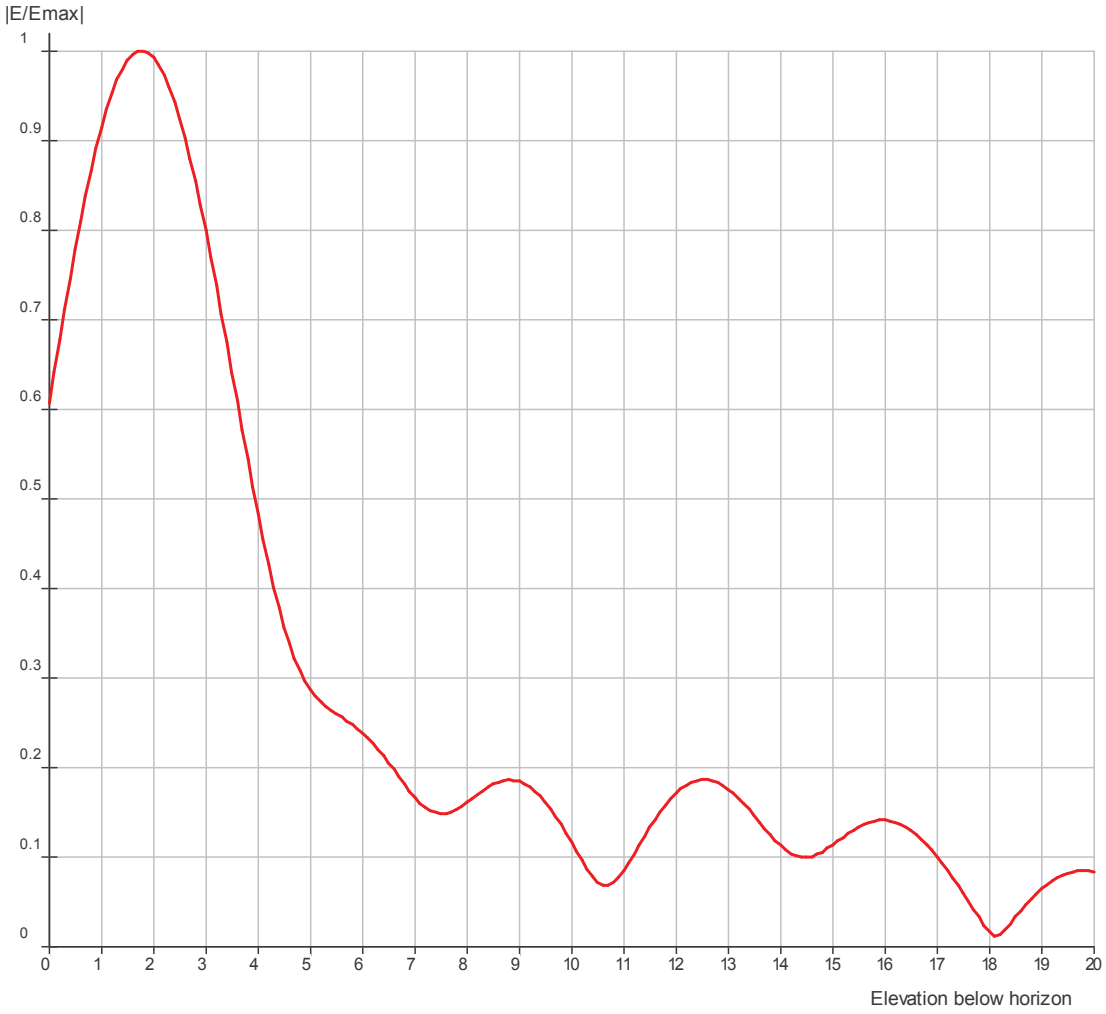


Frequency (MHz):	569	593	599	605
Azimuth:	270°	270°	270°	270°



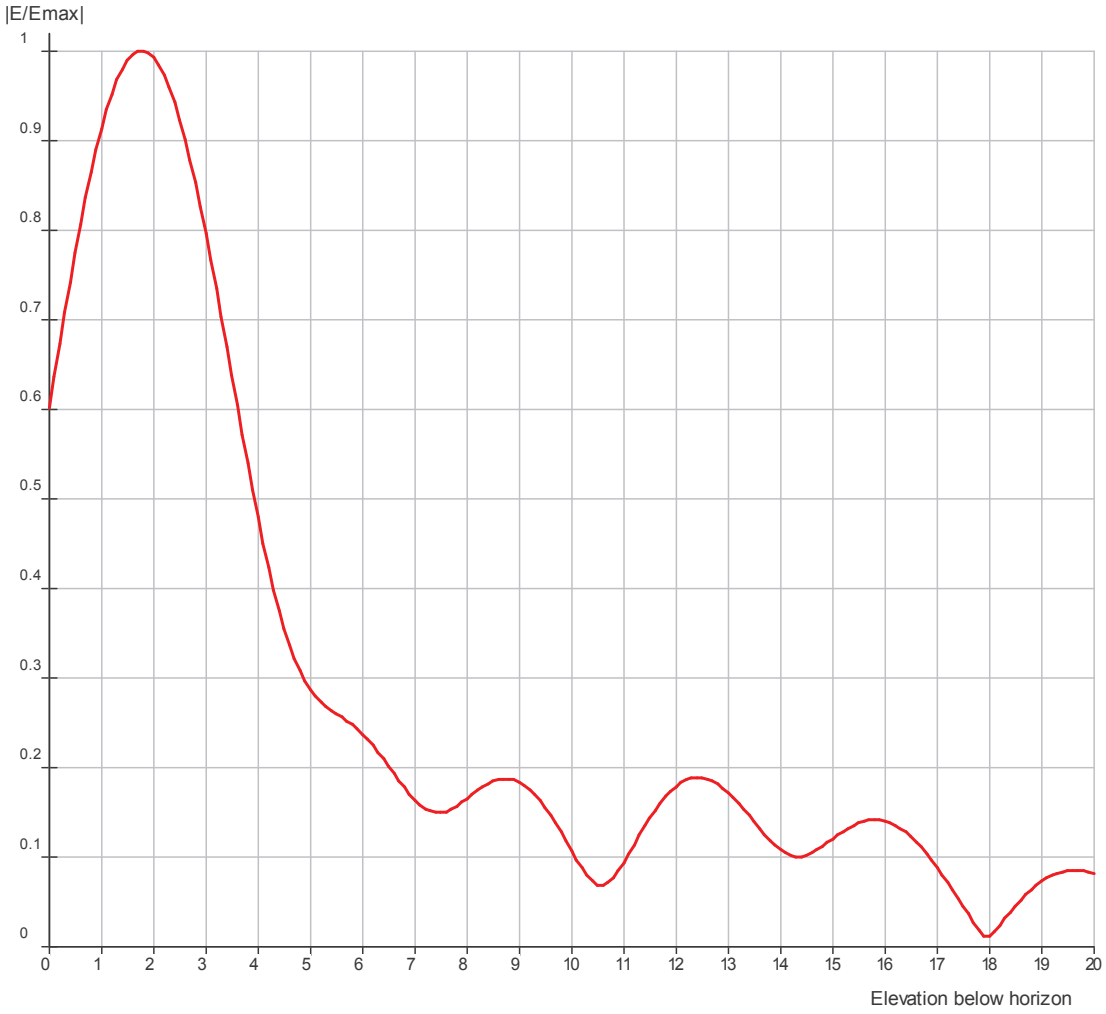
Frequency (MHz): 569

Azimuth: 270°



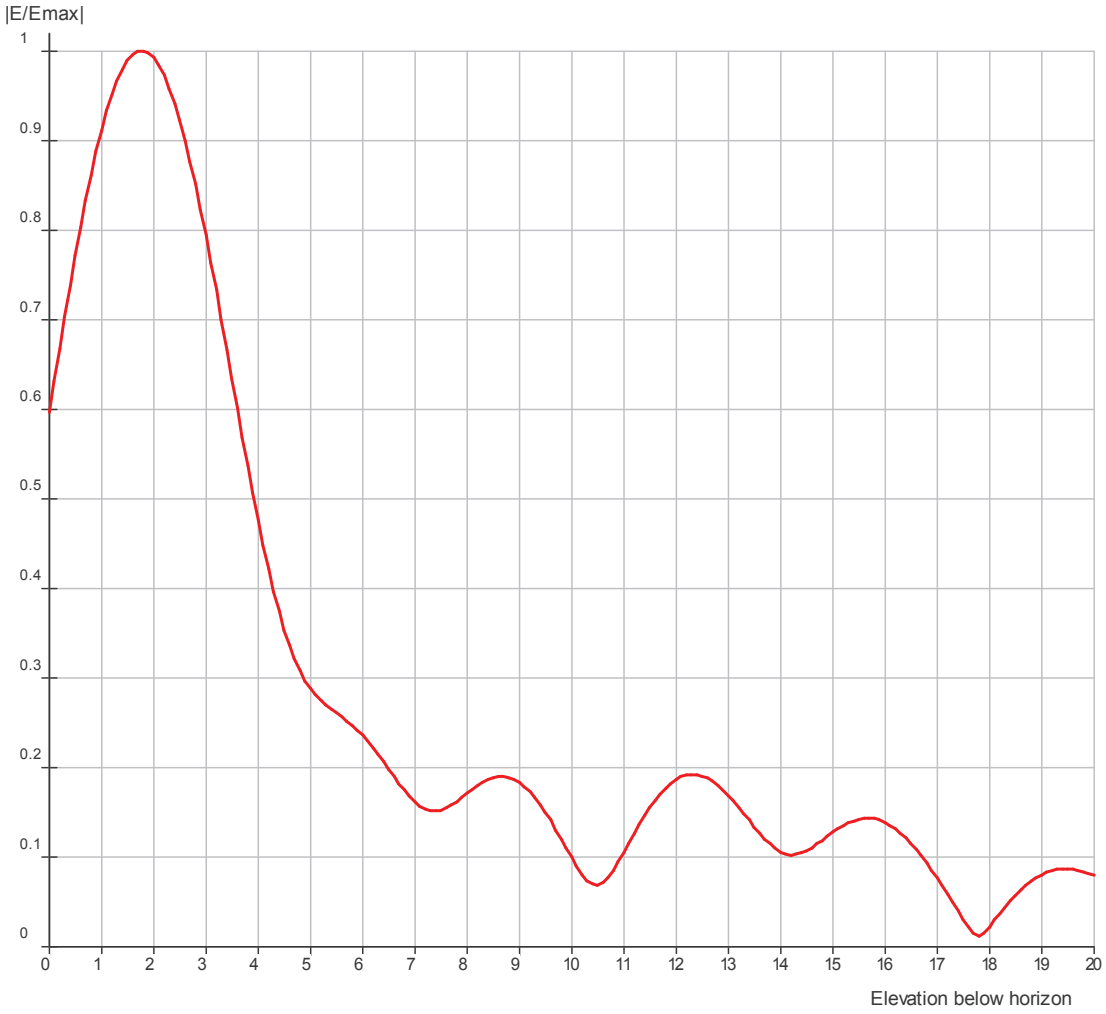
Frequency (MHz): 593

Azimuth: 270°



Frequency (MHz): 599

Azimuth: 270°



Frequency (MHz): 605

Azimuth: 270°