Internal Report IASF Bologna 506/2008

WCAM PROTOTYPE FEED HORN WITH APERTURE GROOVES (WCAM-PROT01-a)

F.Villa[1] and V.Martorelli[1]

[1] *IASF– Bologna, Italy*

Feb 2008

Internal Report IASF Bologna 506/2008

WCAM PROTOTYPE FEED HORN WITH APERTURE GROOVES (WCAM-PROT01-a)

F.Villa[1] and V.Martorelli[1]

[1]*INAF / IASF – Bologna, Italy*

Summary — The horn design WCAM-PROT01 has been revised to take into account manufacturing constraints. The design has been modified at the aperture plane by including a set of two corrugations. Here the expected performances of this prototype are reported. A comparison between different solution is appointed

1 Introduction

Although the WCAM-prot01 horn design has been accepted for platelet prototype manufacturing, a modification of the aperture plate has been required from manufacturing point of view. In the original design [3] the corrugation step is 1.0 mm that impose the use of a plate with the same thick also a the aperture of the horn. Mechanically, this was a problem both in terms of the overall strength of the structure and of the screws need to be used to package together the plates. It has proposed a solution using at the aperture a 3mm plate. Hereafter the solution adopted and performances are reported.

2 Design

A first attempt was simply the use of a corrugation 3mm wide at the aperture as sketched in Figure 2 This design reflected in a degradation of electromagnetic performances since the mode of propagation at the aperture is not longer a pure hybrid mode due to the 1λ smooth walled circular waveguide section. This can be seen in figure figure 1, both panels reporting the field vectors at the aperture of the original horn and the wcam-prot01-la horn respectively. the field of this design (bottom panel) is similar to the filed of the TE11 mode.

The resulting patterns shown a degradation of the cross polar performances and a degradation of sidelobes, as seen at 100GHz on figure 3.

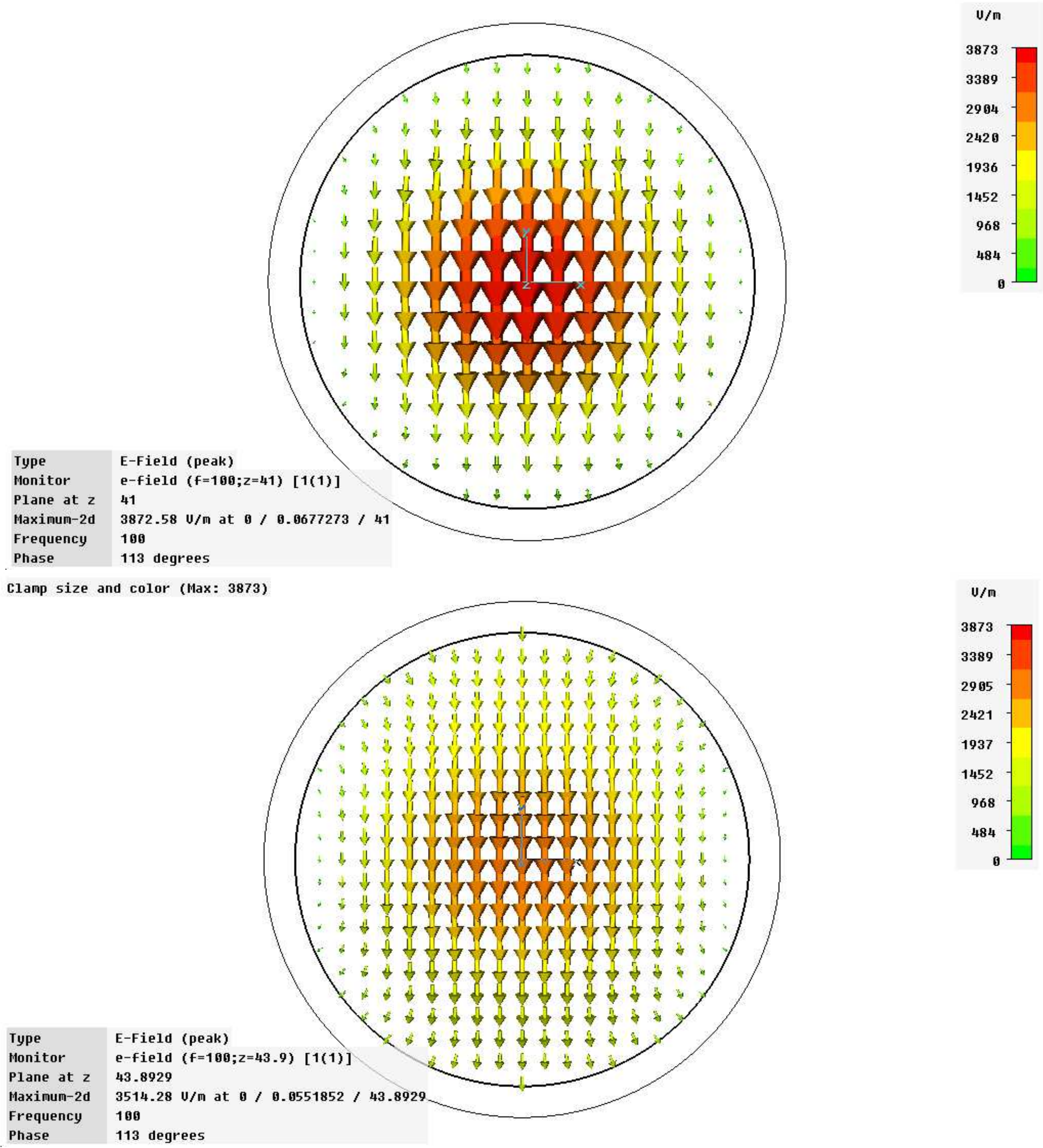


Figure 1: Vector filed on the horn aperture of both designs. Upper panel is referred to the original design. Bottom panel is referred to the 'LA' design.

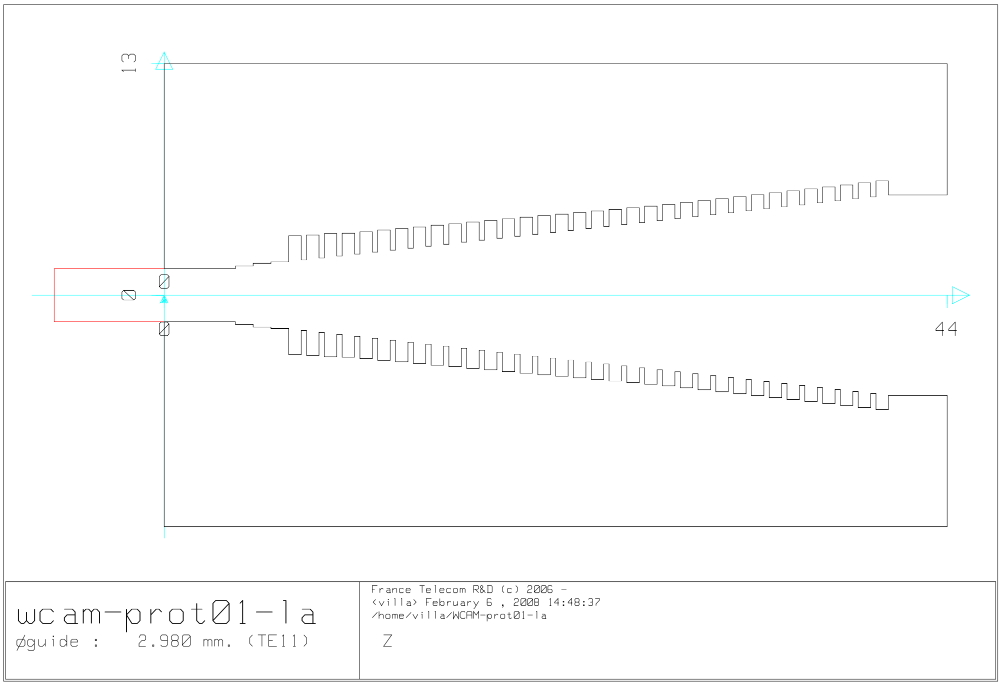


Figure 2: Sketch of the design WCAM-prot01-la

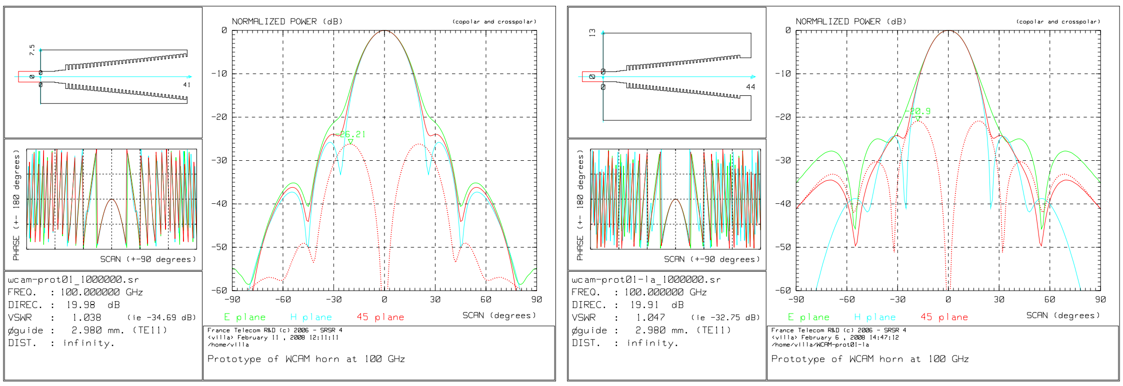


Figure 3: 100GHz radiation patterns of the original design (left) and of the modified 'LA' design.

The electromagnetic performances have been preserved by using corrugations also at the aperture plane to reduce cross talk and sidelobes. The aperture grooves act as a quarter–wave trap [1], being their dept at 0.79 mm, very close to $\frac{\lambda}{4}$ at 100 GHz. The sketch of this design is shown in Figure 4.

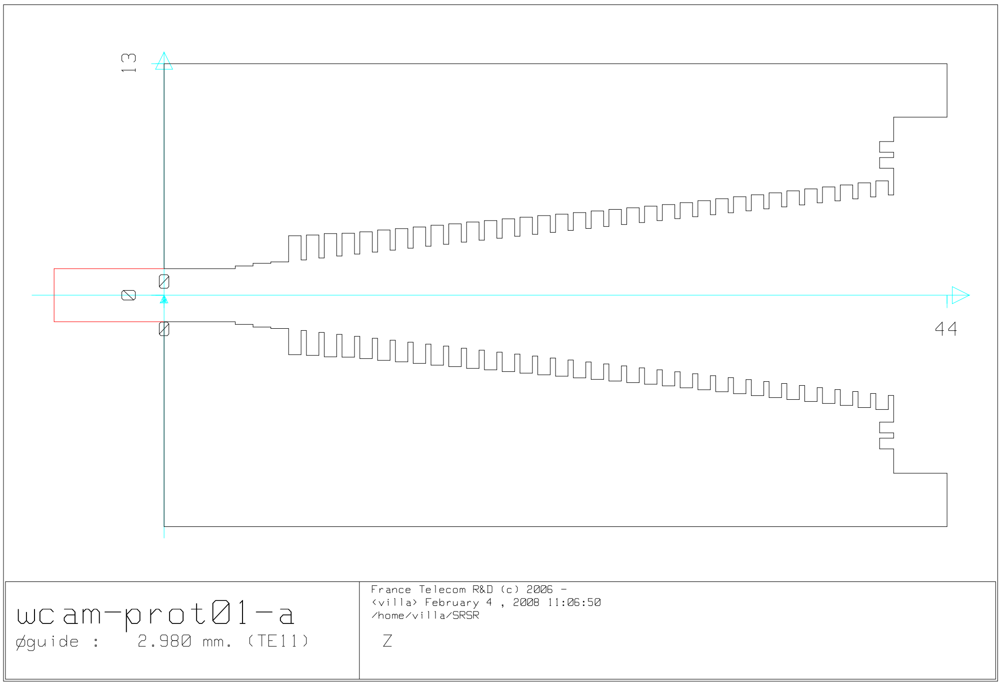


Figure 4: Sketch of the design WCAM-prot01-a.

3 Electromagnetic Performances

The electromagnetic characteristics of this horn design have been studied with SRSR-D[1] software package.

The table 3 reports the values of the the return loss $rl = 10 \cdot \log_{10} |\rho|^2$ in dB, the Voltage Standing Wave Ratio, $VSWR = \frac{1-\rho}{1+\rho}$, the maximum Directivity, $D = 10 \cdot \log_{10} \frac{4\pi}{P(0,0)}$ in isotropic dB level (dBi), and the maximum cross-polar level in dB referred to the 45 degrees plane. The figure 5 reports the graphical behavior of such parameters as carried out by SRSR-D. Moreover the figure reports also the plot of the full width at different pattern levels: -3dB, -10dB, and -20dB.

Figures 6, 7, 8, 9, and 10 report the radiation patterns (E–plane, H–plane, and 45 degrees plane including cross–polar radiation) at 90GHz, 95GHz, 100GHz, 105GHz, and 110GHz respectively.

[1]SRSR-D is a Francetelecom software.
`http://www.orange.com/en_EN/innovation/software_licensing/Software/P01285.html`.

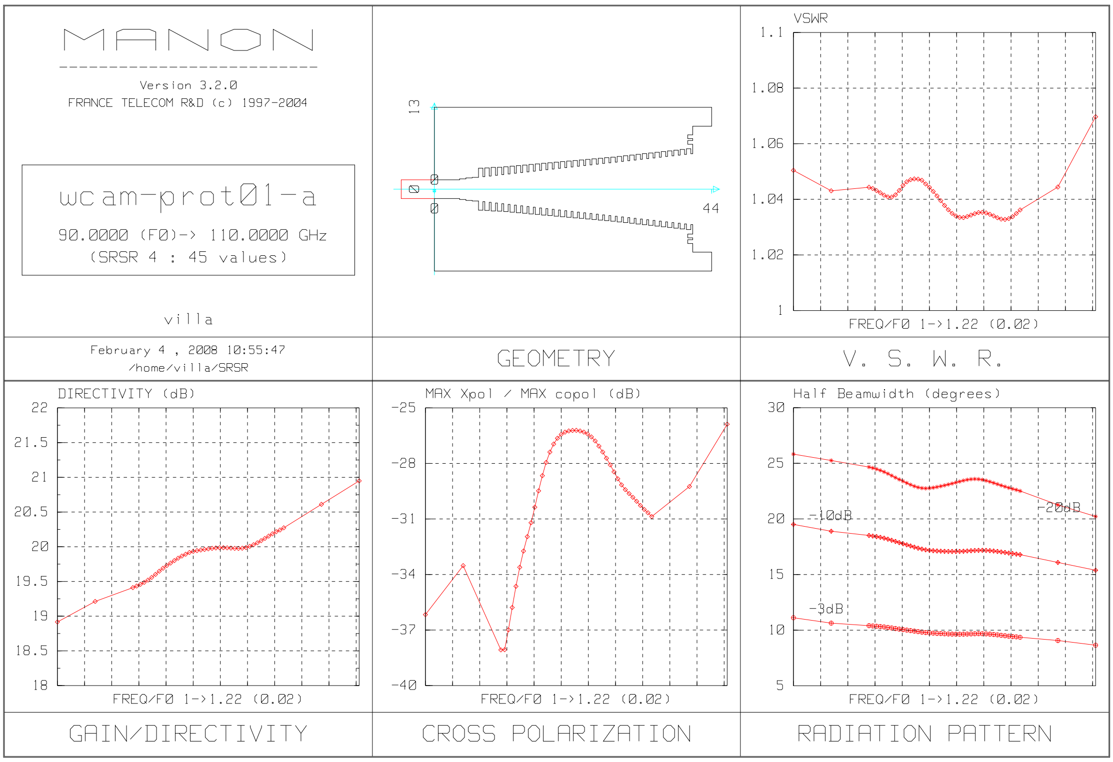


Figure 5: Sketch of the WCAM horn design. Here the main dimensions are displayed in mm.

Table 1: Electromagnetic Performances of WCAM-prot-01-a design.

	Matching		Pattern	
Frequency	Return Loss	VSWR	Directivity	X–pol
GHz	dB	–	dBi	dB
90.00	-32.18	1.050	18.92	-36.17
92.50	-33.52	1.043	19.21	-33.52
95.00	-33.27	1.044	19.41	-38.07
95.25	-33.37	1.044	19.43	-38.06
95.50	-33.51	1.043	19.46	-36.99
95.75	-33.67	1.042	19.49	-35.78
96.00	-33.84	1.041	19.52	-34.65
96.25	-33.97	1.041	19.56	-33.61
96.50	-33.98	1.041	19.60	-32.73
96.75	-33.82	1.042	19.65	-31.96
97.00	-33.50	1.043	19.69	-31.20
97.25	-33.16	1.045	19.73	-30.36
97.50	-32.91	1.046	19.76	-29.48
97.75	-32.77	1.047	19.80	-28.66
98.00	-32.72	1.047	19.83	-27.95
98.25	-32.73	1.047	19.87	-27.39
98.50	-32.81	1.047	19.89	-26.95
98.75	-33.05	1.046	19.92	-26.64
99.00	-33.28	1.044	19.93	-26.43
99.25	-33.57	1.043	19.94	-26.31
99.50	-33.90	1.041	19.95	-26.25
99.75	-34.26	1.040	19.96	-26.22
100.00	-34.63	1.038	19.97	-26.21
100.25	-34.99	1.036	19.98	-26.25
100.50	-35.31	1.035	19.98	-26.31
100.75	-35.53	1.034	19.99	-26.41
101.00	-35.66	1.034	19.99	-26.57
101.25	-35.68	1.033	19.98	-26.79
101.50	-35.59	1.034	19.98	-27.07
101.75	-35.46	1.034	19.98	-27.38
102.00	-35.33	1.035	19.98	-27.72
102.25	-35.23	1.035	19.98	-28.08
102.50	-35.21	1.035	19.99	-28.46
102.75	-35.26	1.035	20.01	-28.83
103.00	-35.39	1.035	20.03	-29.16
103.25	-35.53	1.034	20.06	-29.42
103.50	-35.70	1.033	20.09	-29.63
103.75	-35.82	1.033	20.12	-29.83
104.00	-35.86	1.033	20.15	-30.04
104.25	-35.78	1.033	20.19	-30.27
104.50	-35.60	1.034	20.22	-30.49
104.75	-35.32	1.035	20.24	-30.66
105.00	-35.01	1.036	20.27	-30.87
107.50	-33.26	1.044	20.61	-29.25
110.00	-29.46	1.070	20.95	-25.88

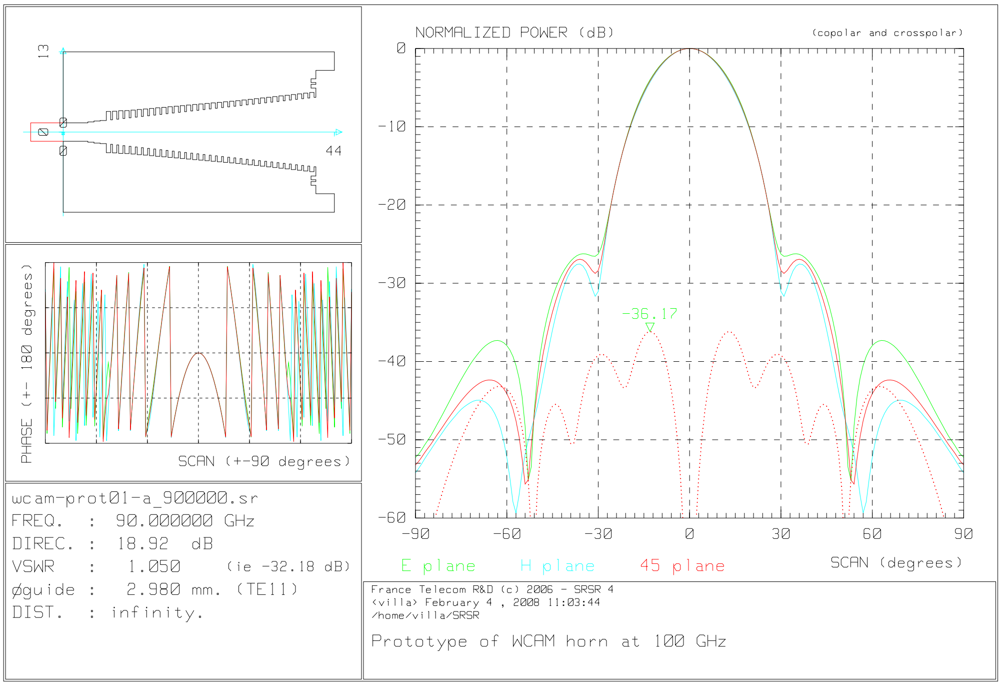


Figure 6: Radiation Pattern at 90 GHz

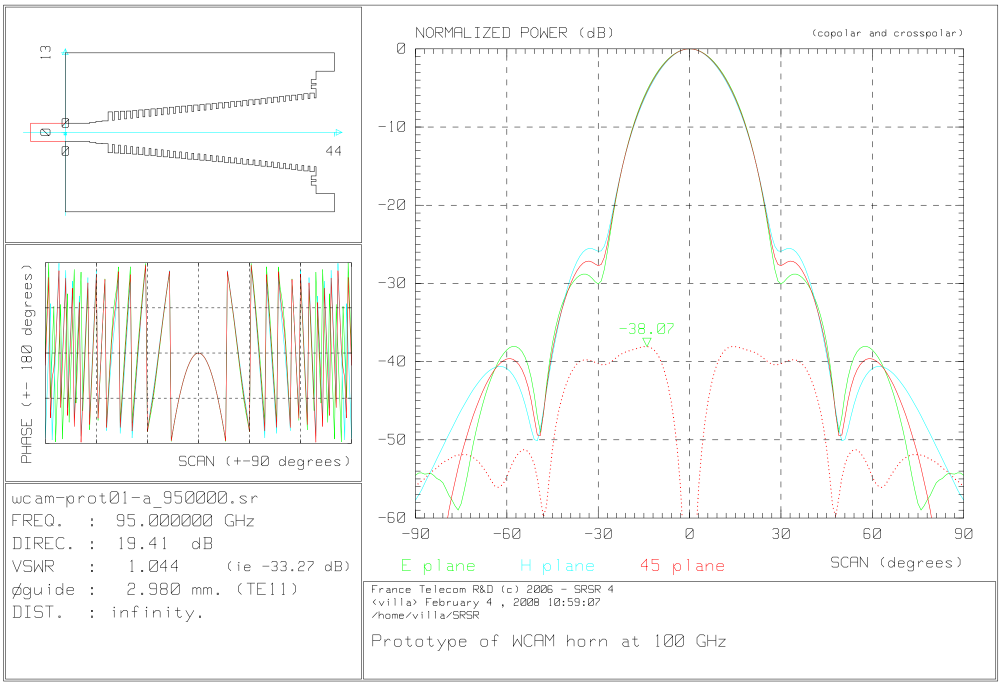


Figure 7: Radiation Pattern at 95 GHz

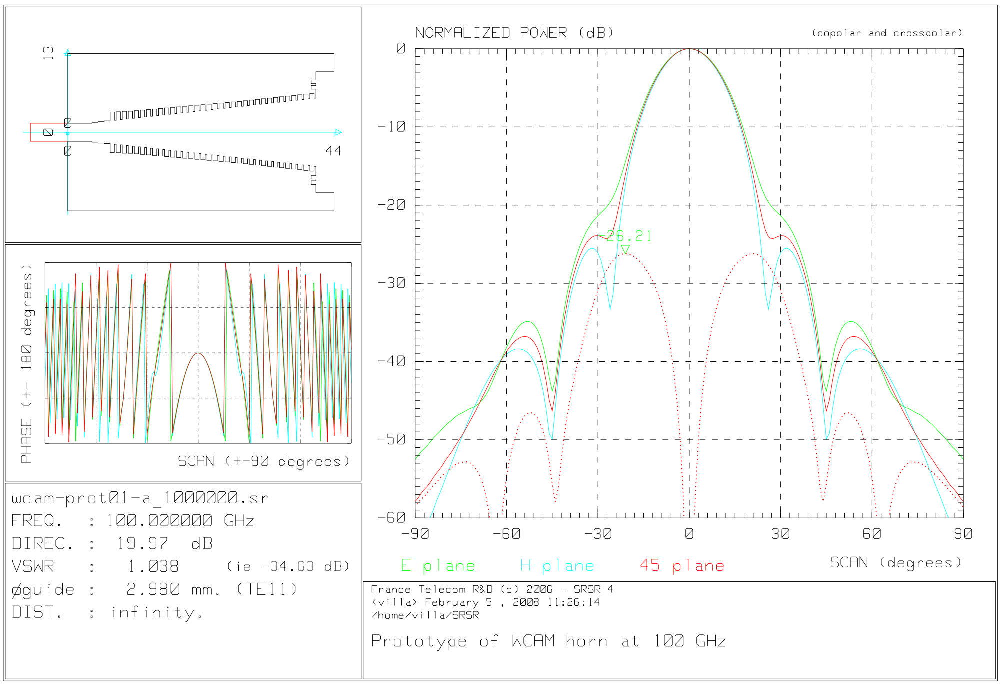


Figure 8: Radiation Pattern at 100 GHz

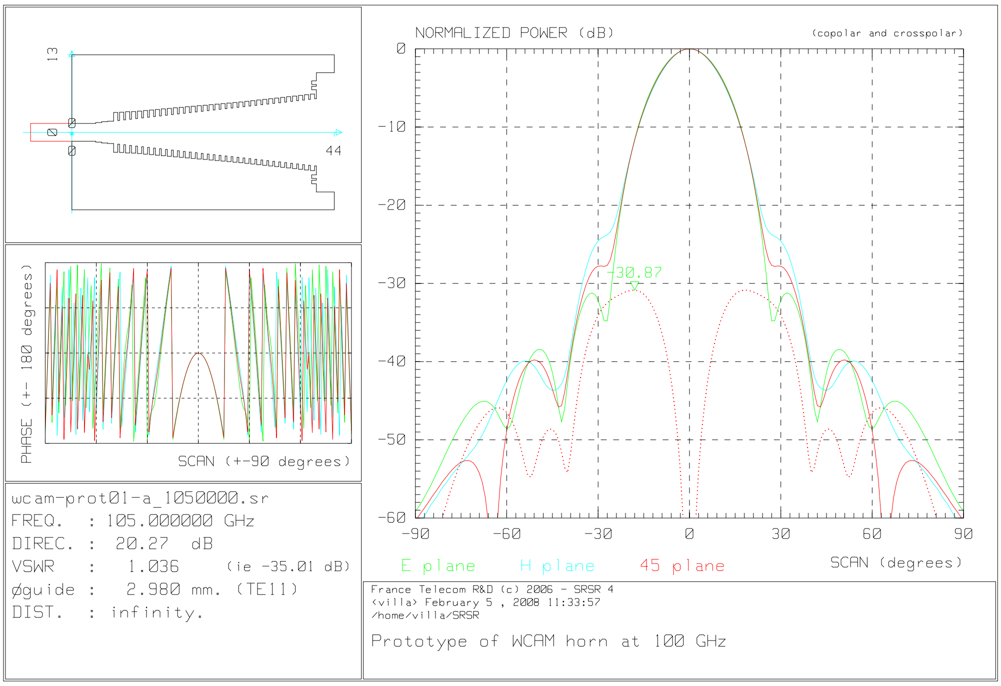


Figure 9: Radiation Pattern at 105 GHz

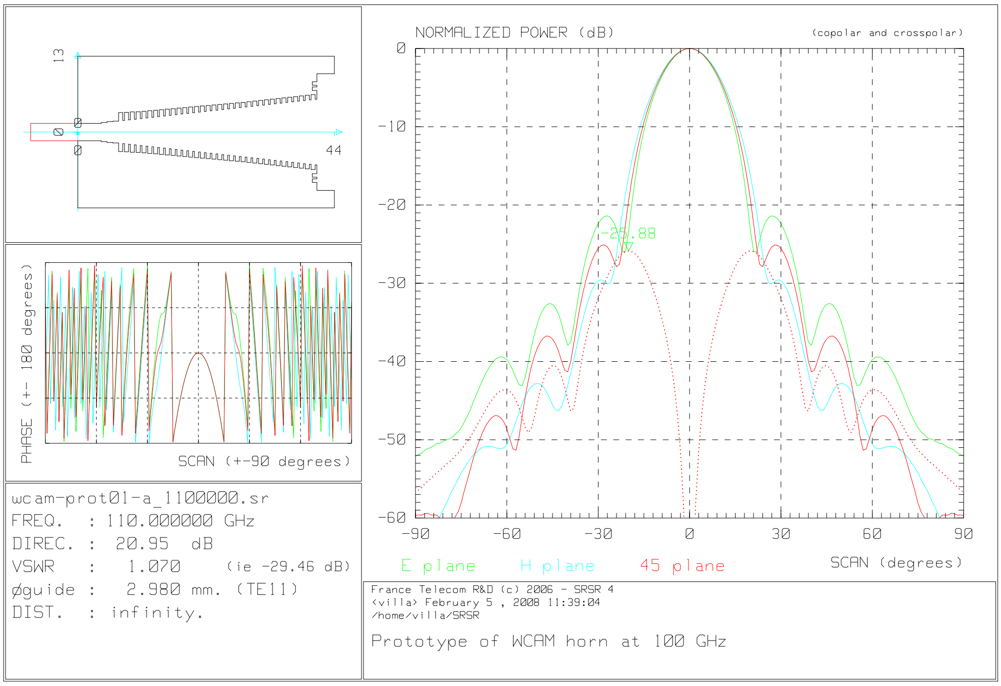


Figure 10: Radiation Pattern at 110 GHz

4 Conlcusions

The design with corrugation at the aperture (wcam-prot01-a) represents a solution to accommodate manufacturing constraint, maintaining the electromagnetic performances close to the original design. The Table 4 reports the main electromagnetic parameters for the two design reported in this report. Figures 11, 12, and 13 report the pattern differences at 100 GHz between the design wcam-prot01-la and wcam-prot01-a.

Table 2: Comparison between the WCAM-prot01-a and WCAM-prot01-la designs.

	Directivity (dBi)		Return Loss (dB)		Cross Polar Max (dB)	
Frequency GHz	A	LA	A	LA	A	LA
90.0	18.92	19.13	-32.3	-30.7	-36.17	-25.20
95.0	19.41	19.50	-33.3	-34.9	-38.07	-27.86
100.0	19.97	19.91	-34.6	-32.7	-26.21	-20.90
105.0	20.27	20.43	-35.0	-34.9	-30.87	-30.59
110.0	20.95	21.03	-29.5	-29.9	-25.88	-26.04

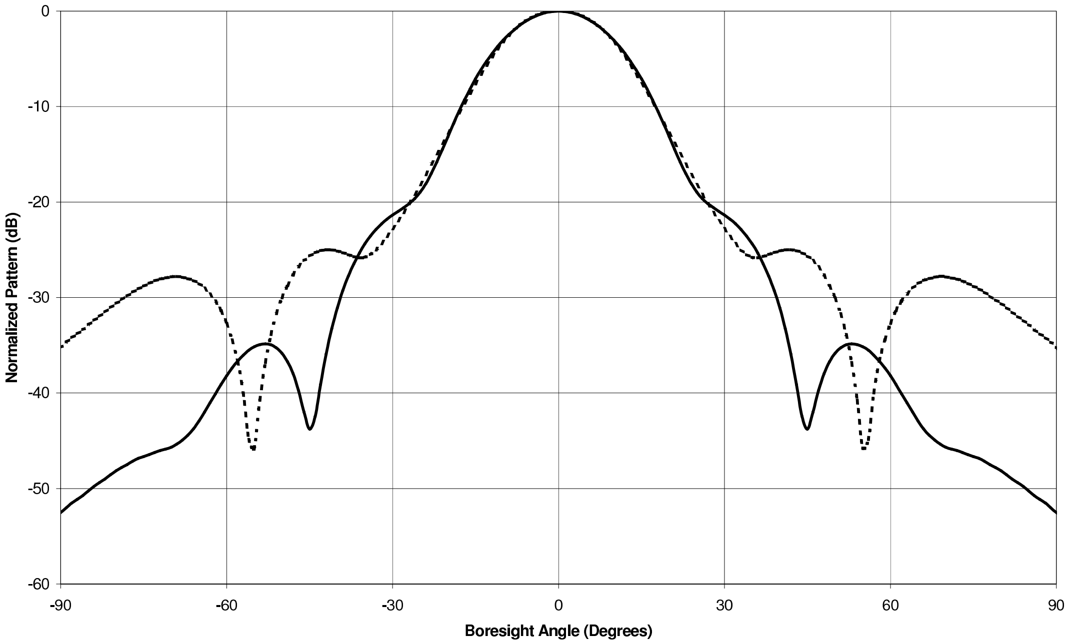


Figure 11: WCAM-prot01-a (solid black) and WCAM-prot01-al (dashed black) E-plane patterns at 100GHz

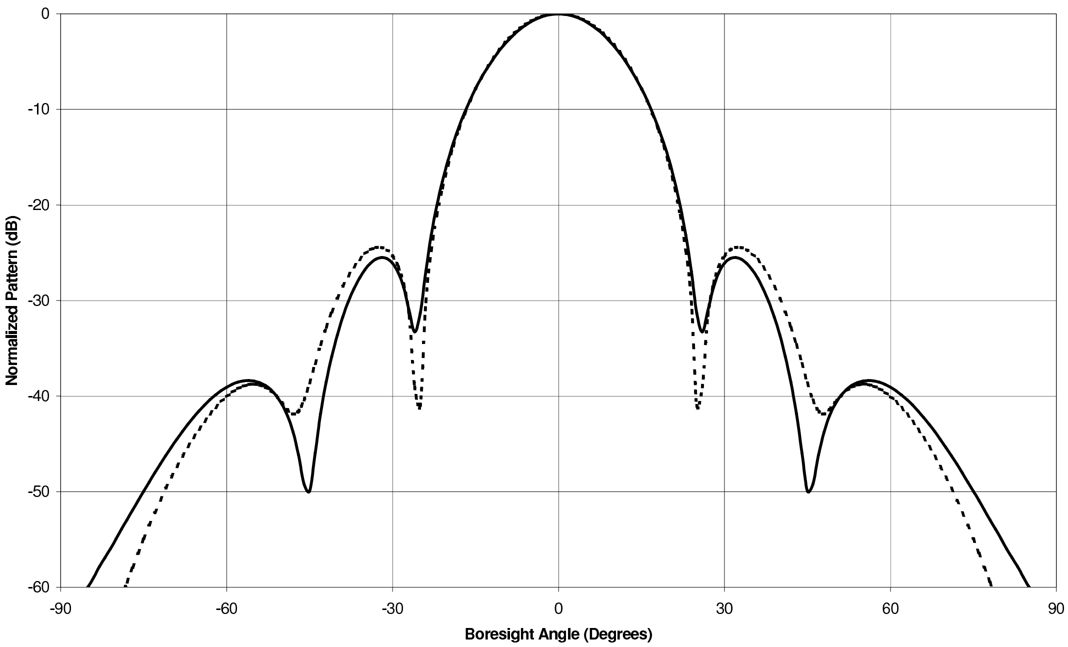


Figure 12: WCAM-prot01-a (solid black) and WCAM-prot01-al (dashed black) H-plane patterns at 100GHz

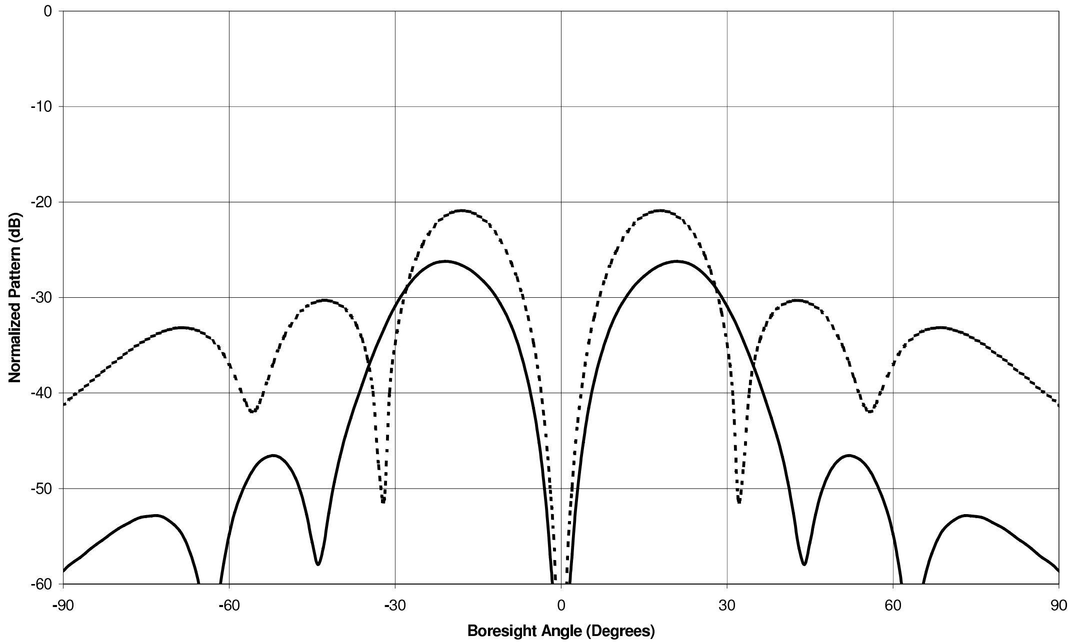


Figure 13: WCAM-prot01-a (solid black) and WCAM-prot01-al (dashed black) X-pol patterns at 100GHz

It has been decided to proceed with the manufacturing of wcam-prot01-a design as reported in [2] The mechanical design of the array 2x2 is reported in Figure 14 and 15 and described in

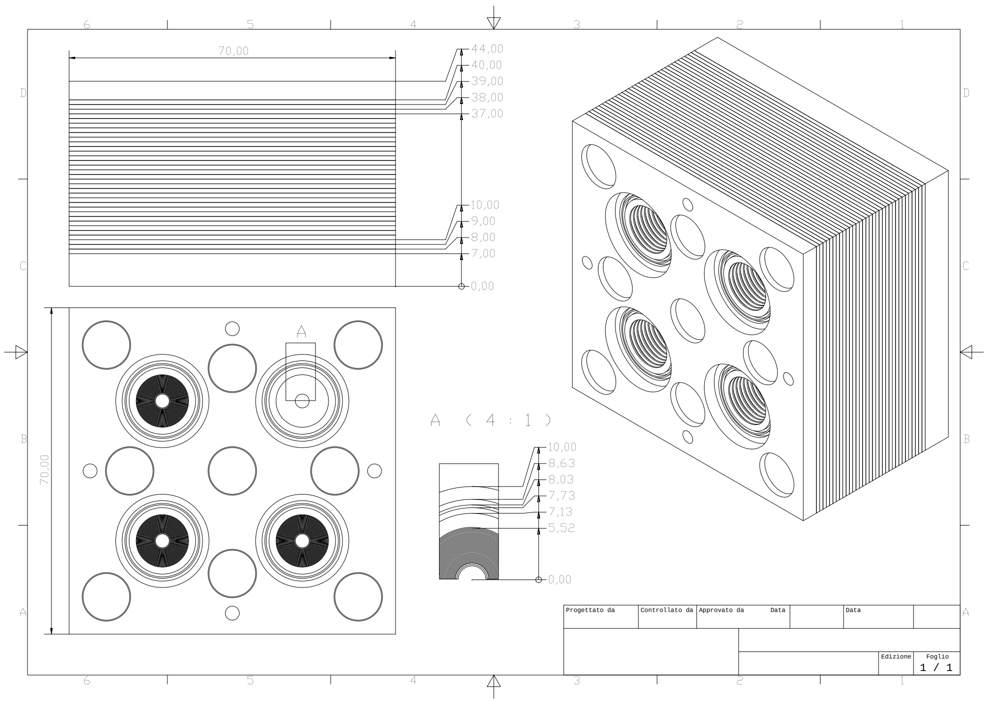


Figure 14: Sketch of the WCAM platelet horn array prototype at W-band. Here the main dimensions are displayed (in mm). A detailed view of the corrugation at the aperture is also shown.

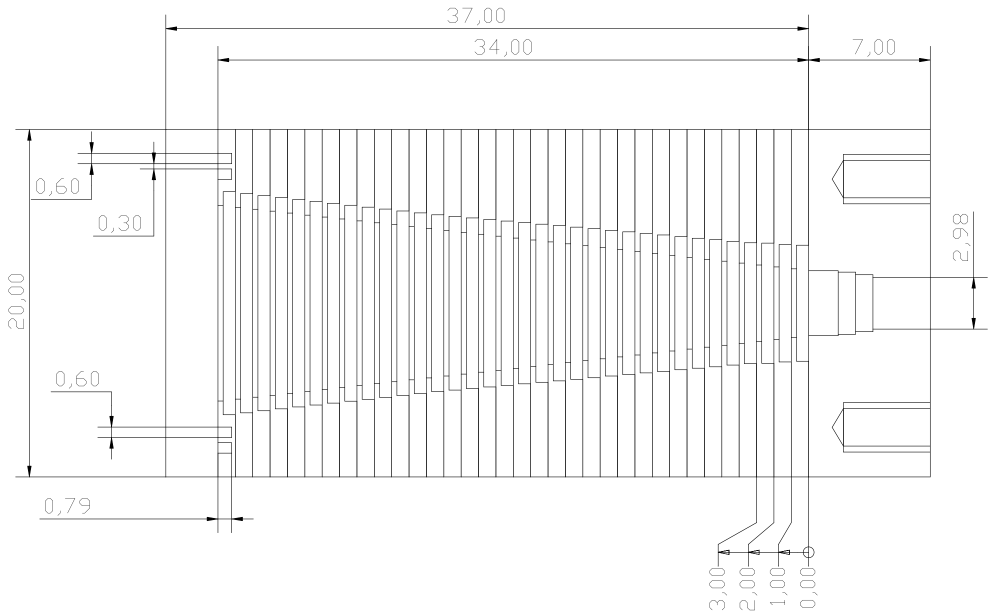


Figure 15: Sketch of the WCAM horn design. Here the main dimensions are displayed in mm.

References

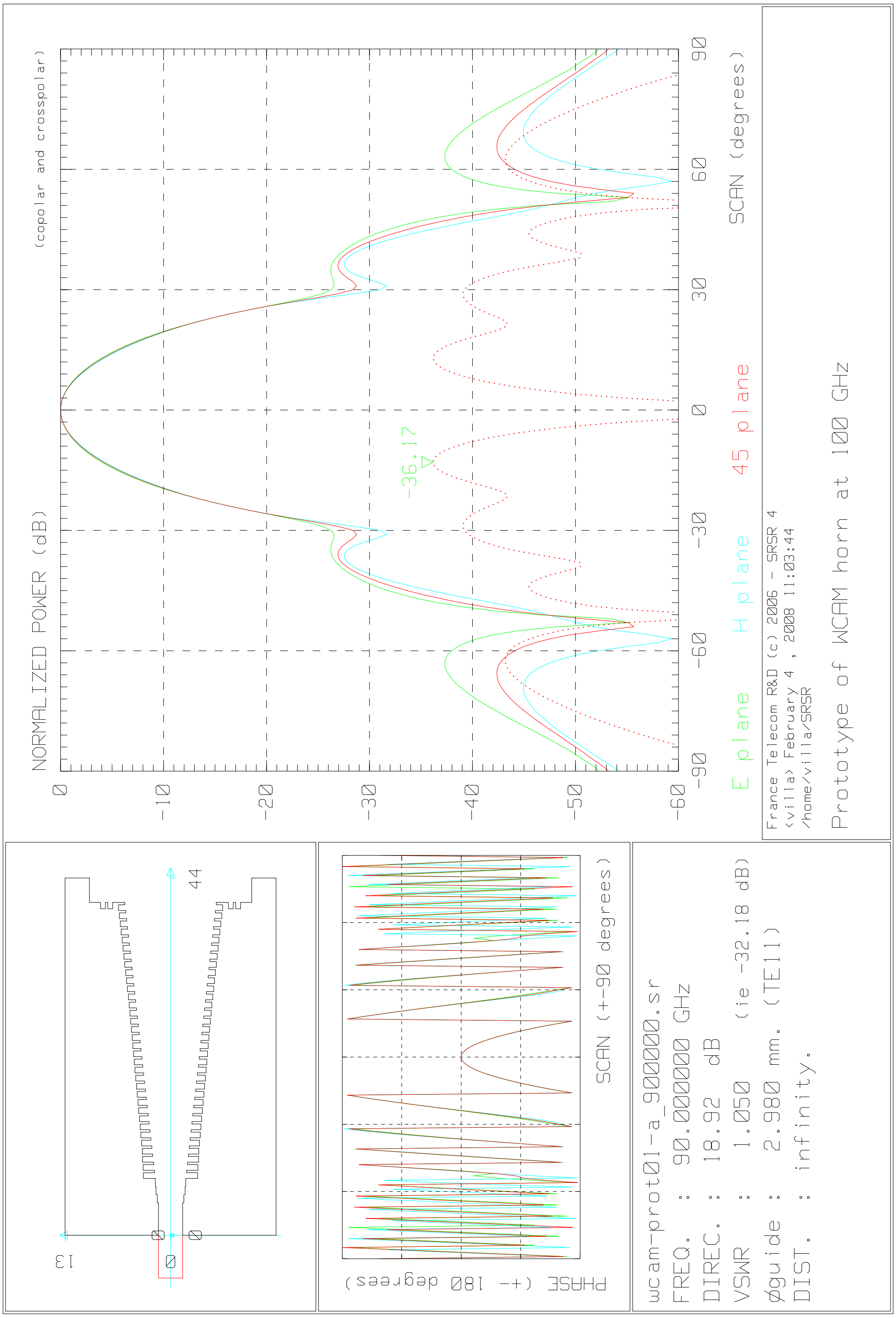
[1] A.D. Olver, P.J.B. Clarricoats, A.A. Kishk, and L. Shafai. *Microwave Horns and Feeds.*

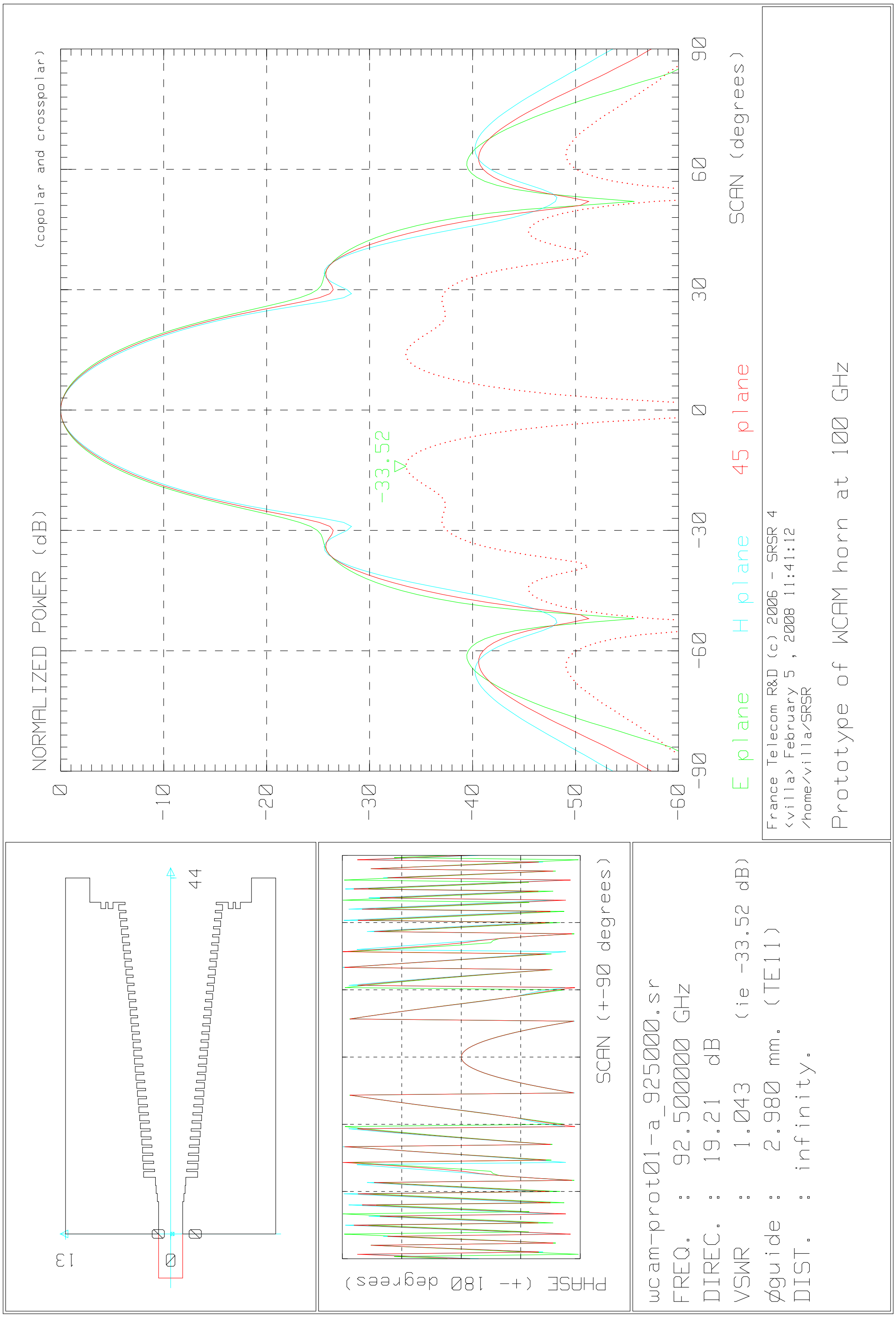
[2] A. De Rosa and F. Cavaliere. Wcam prototype feed horn mechanical design (wcam-prot01). Technical Report 486, IASF Bologna, 2007.

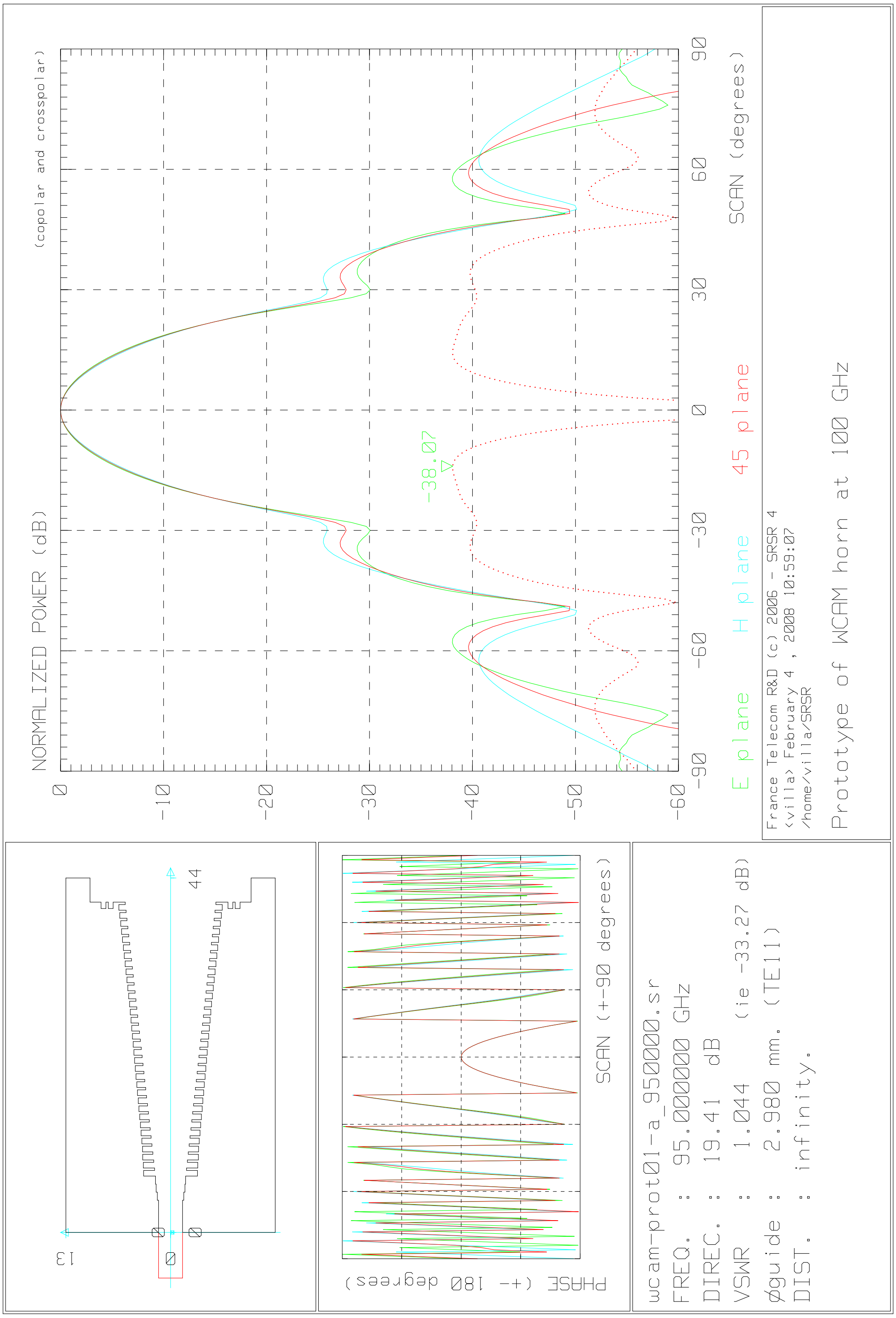
[3] F. Villa and V. Martorelli. Wcam prototype feed horn design (wcam-prot01). Technical Report 463, IASF Bologna, 2007.

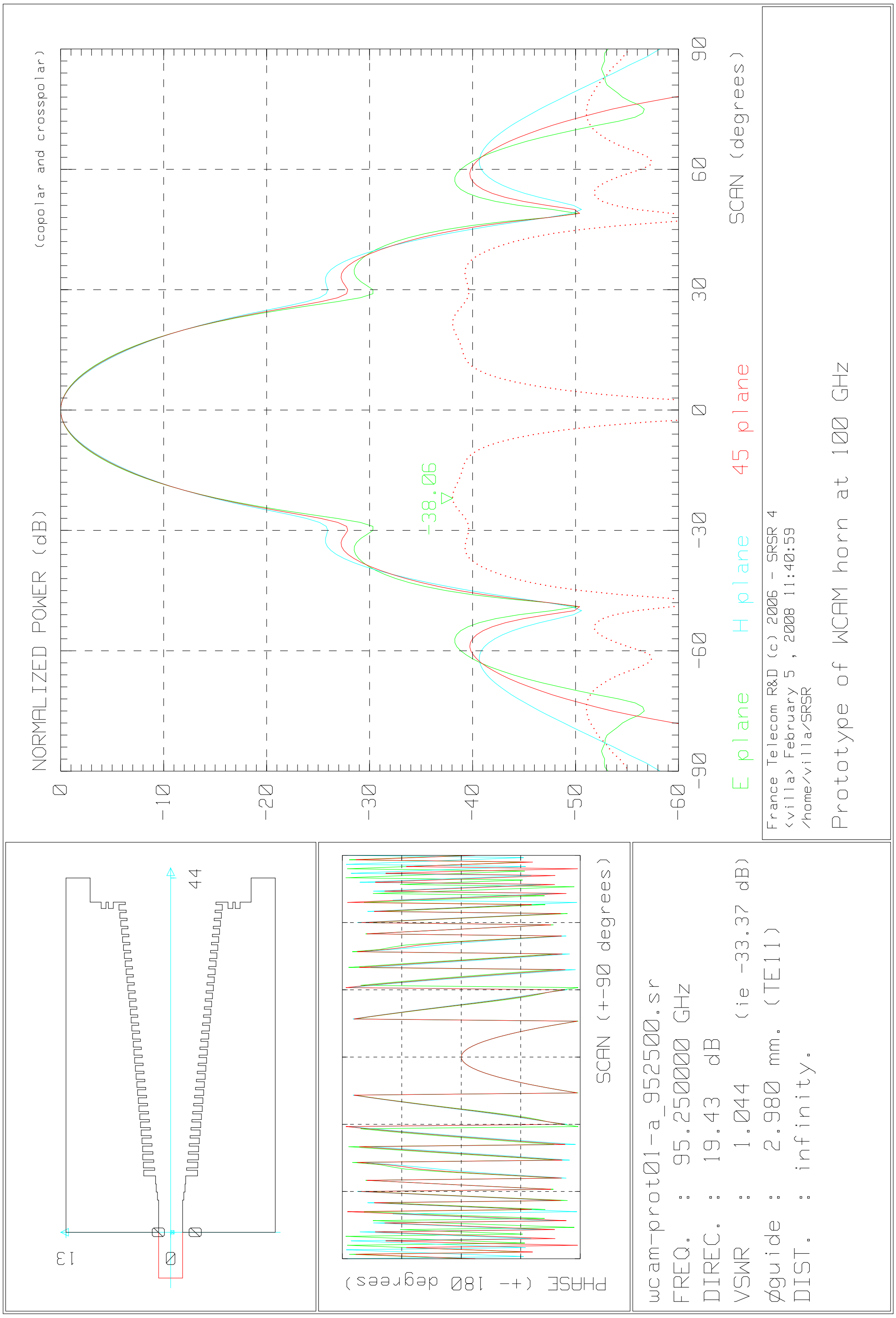
5 APPENDIX: Pattern Plots

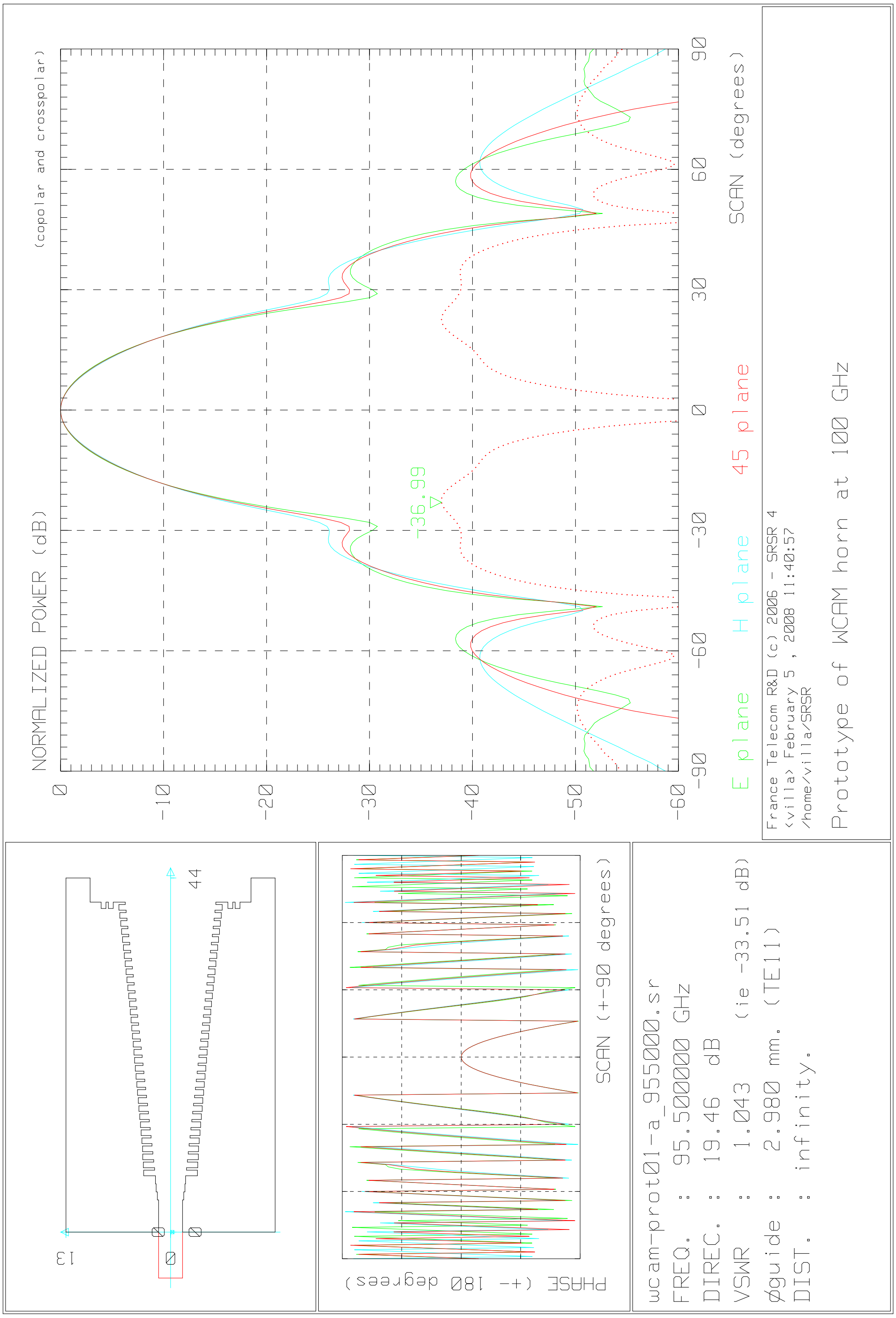
For completeness, in this appendix the pattern plots are reported at frequencies listed in table 3. The reference frequency for pattern is written in each table.

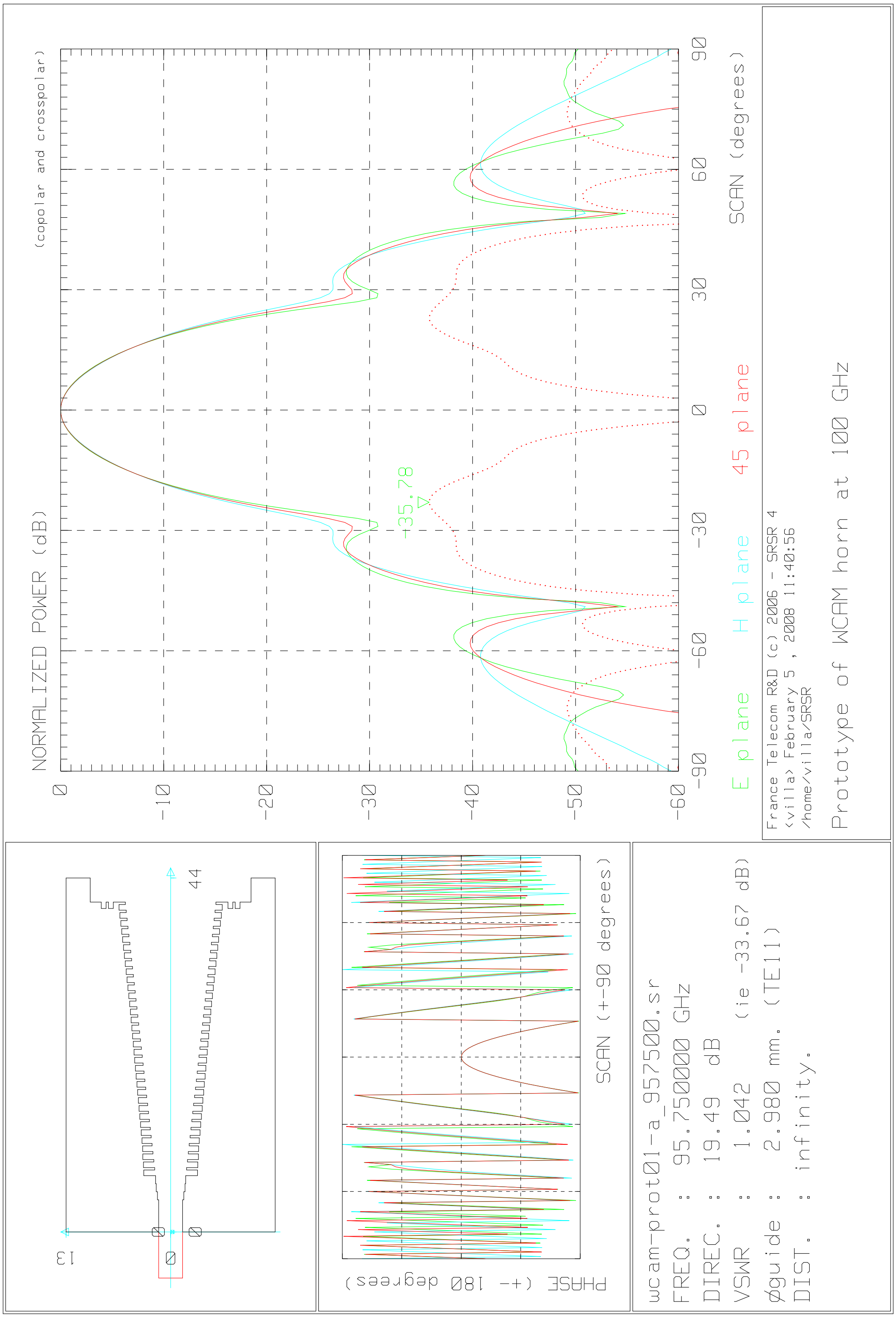

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-36.17
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 4 , 2008 11:03:44
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_900000.sr
FREQ. : 90.000000 GHz
DIREC. : 18.92 dB
VSWR : 1.050 (ie -32.18 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

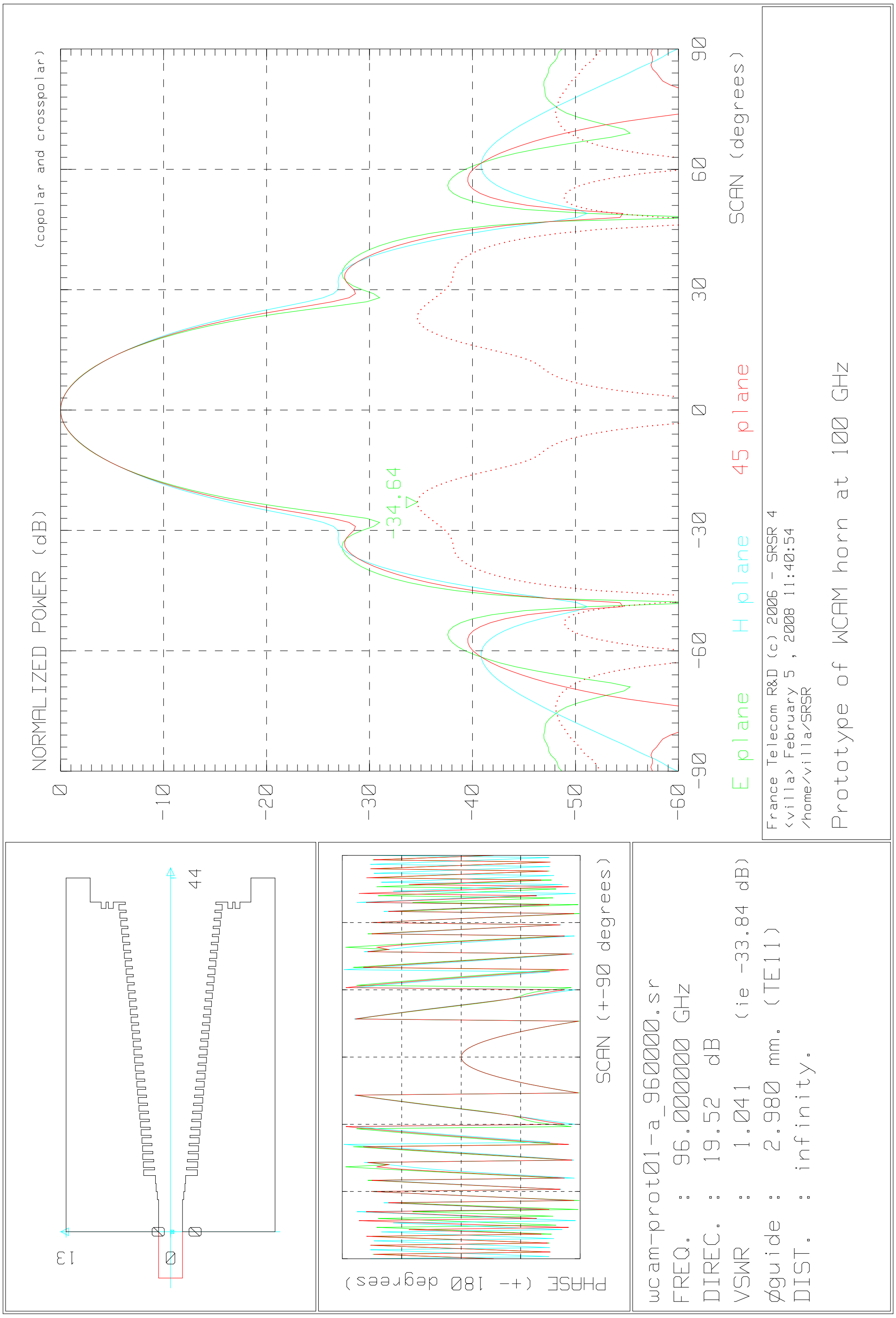

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-33.52
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:41:12
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_925000.sr
FREQ. : 92.500000 GHz
DIREC. : 19.21 dB
VSWR : 1.043 (ie -33.52 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

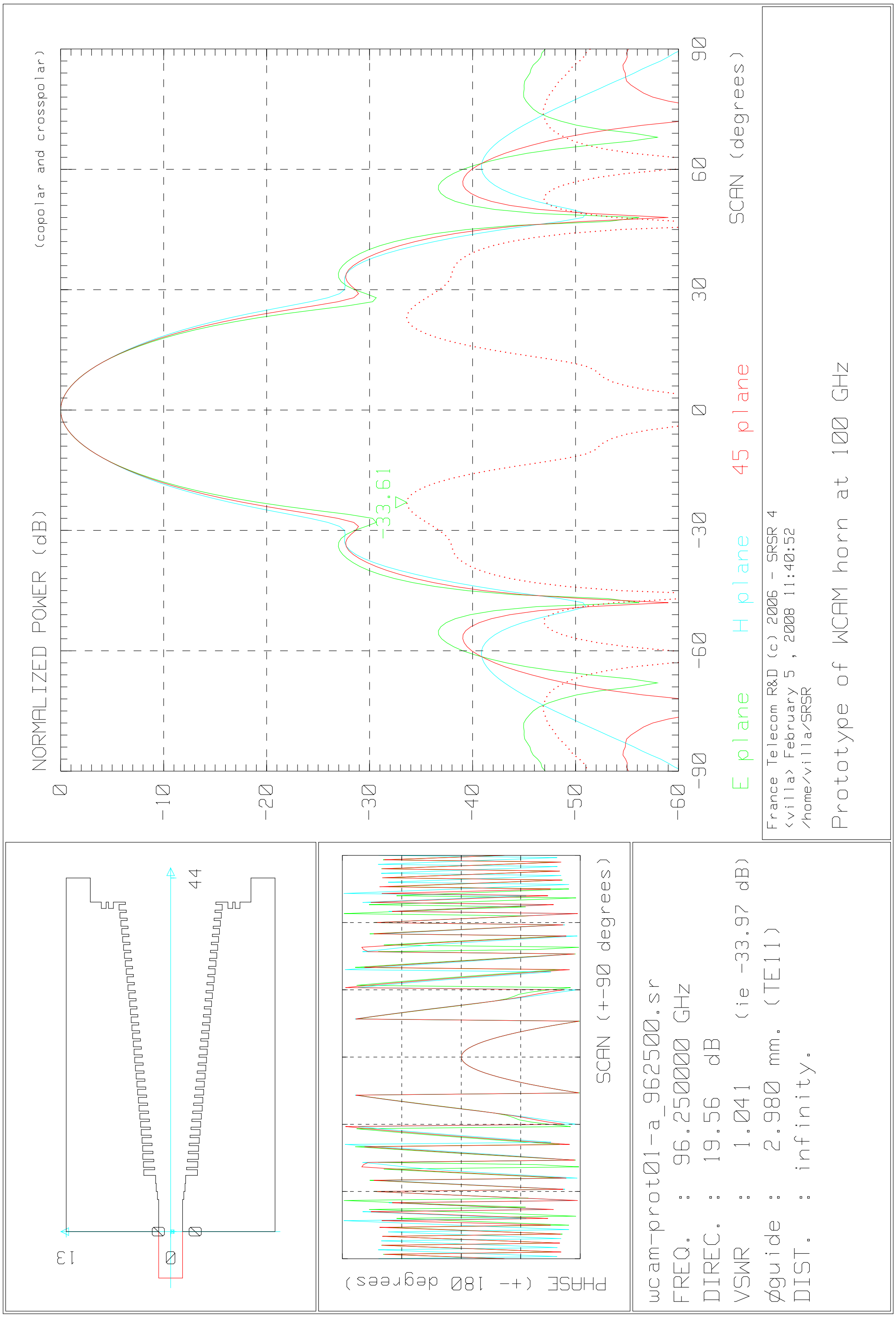

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-38.07
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 4 , 2008 10:59:07
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_950000.sr
FREQ. : 95.000000 GHz
DIREC. : 19.41 dB
VSWR : 1.044 (ie -33.27 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

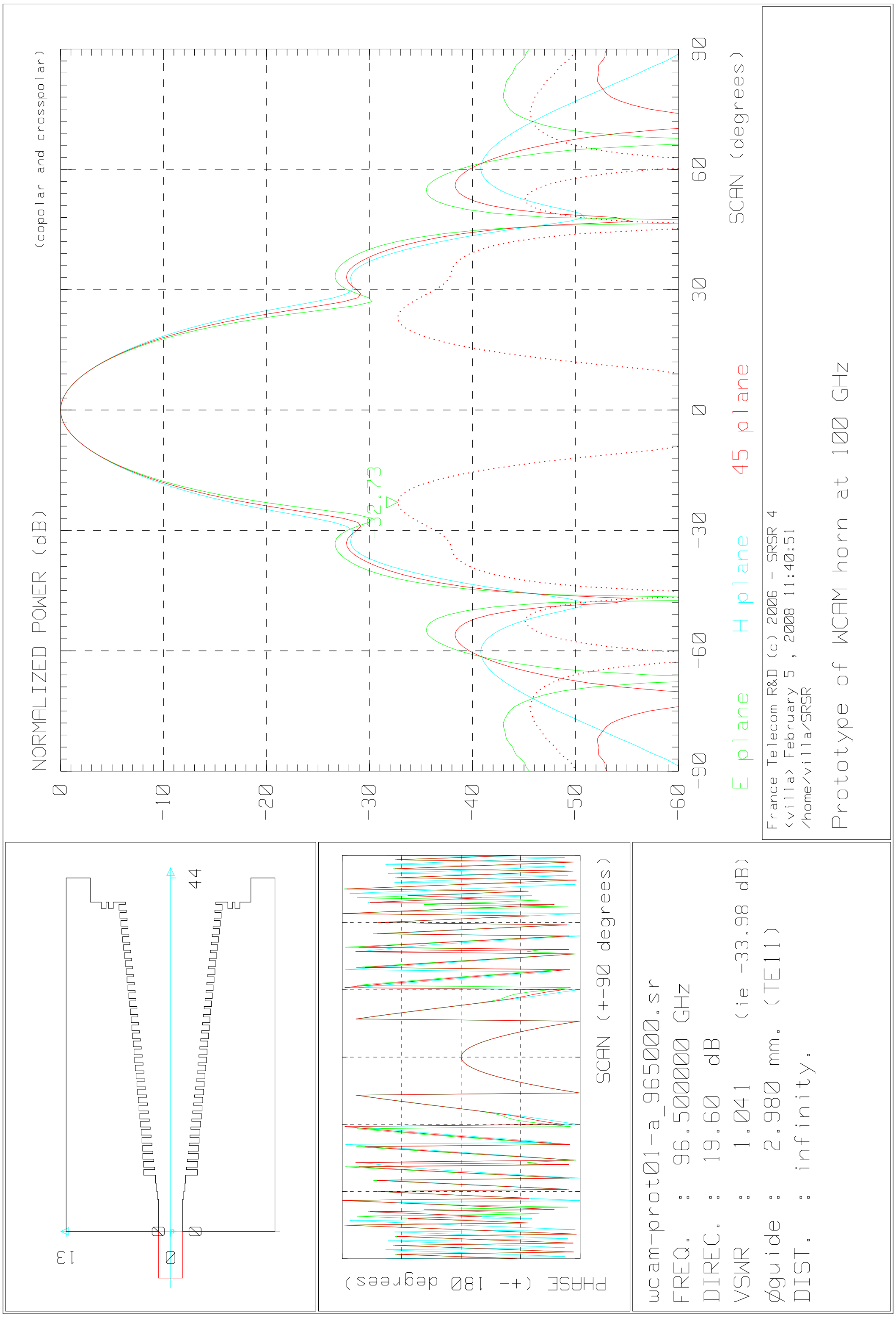

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-38.06
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:59
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_952500.sr
FREQ. : 95.250000 GHz
DIREC. : 19.43 dB
VSWR : 1.044 (ie -33.37 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

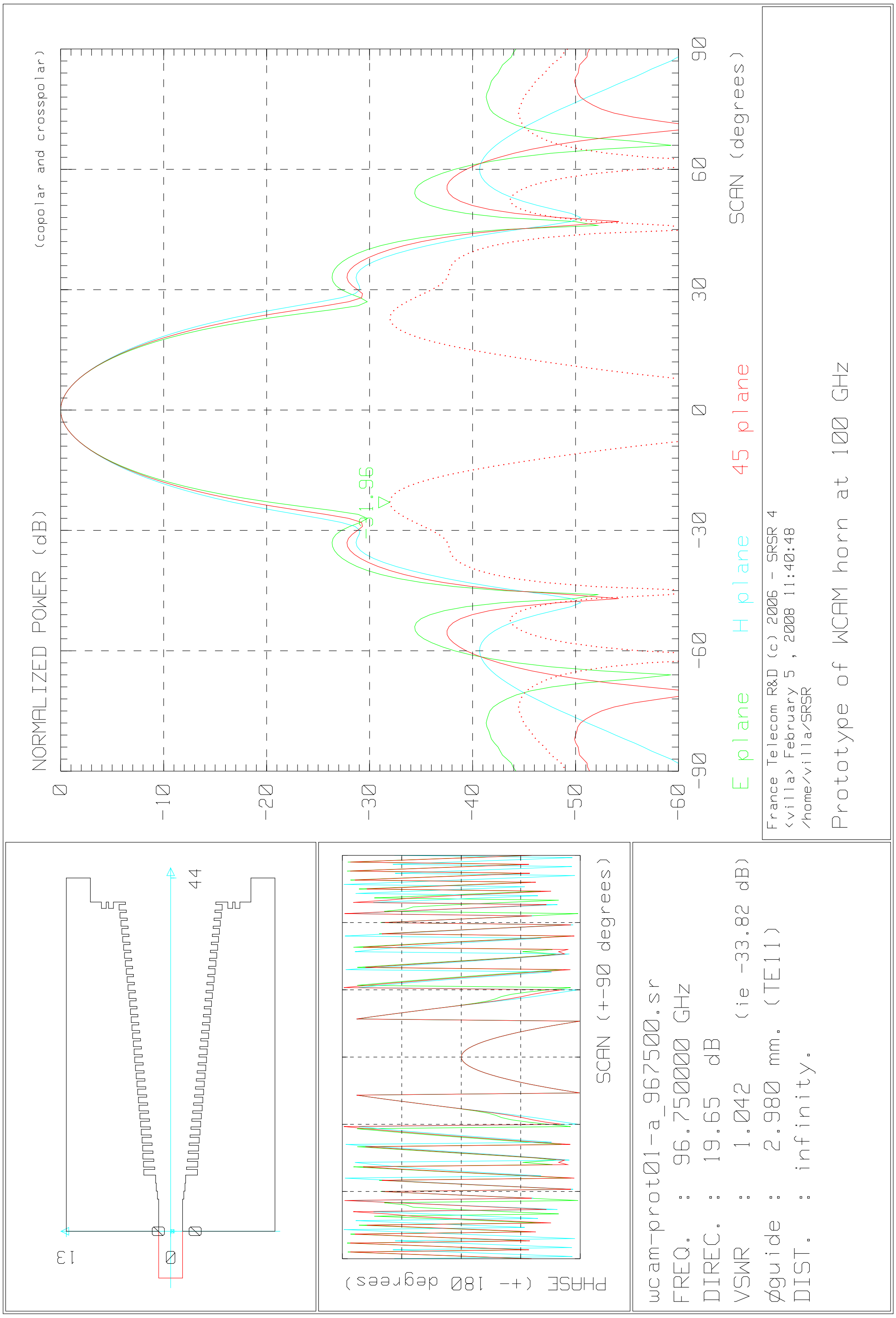

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-36.99
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:57
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_955000.sr
FREQ. : 95.500000 GHz
DIREC. : 19.46 dB
VSWR : 1.043 (ie -33.51 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.
13
44

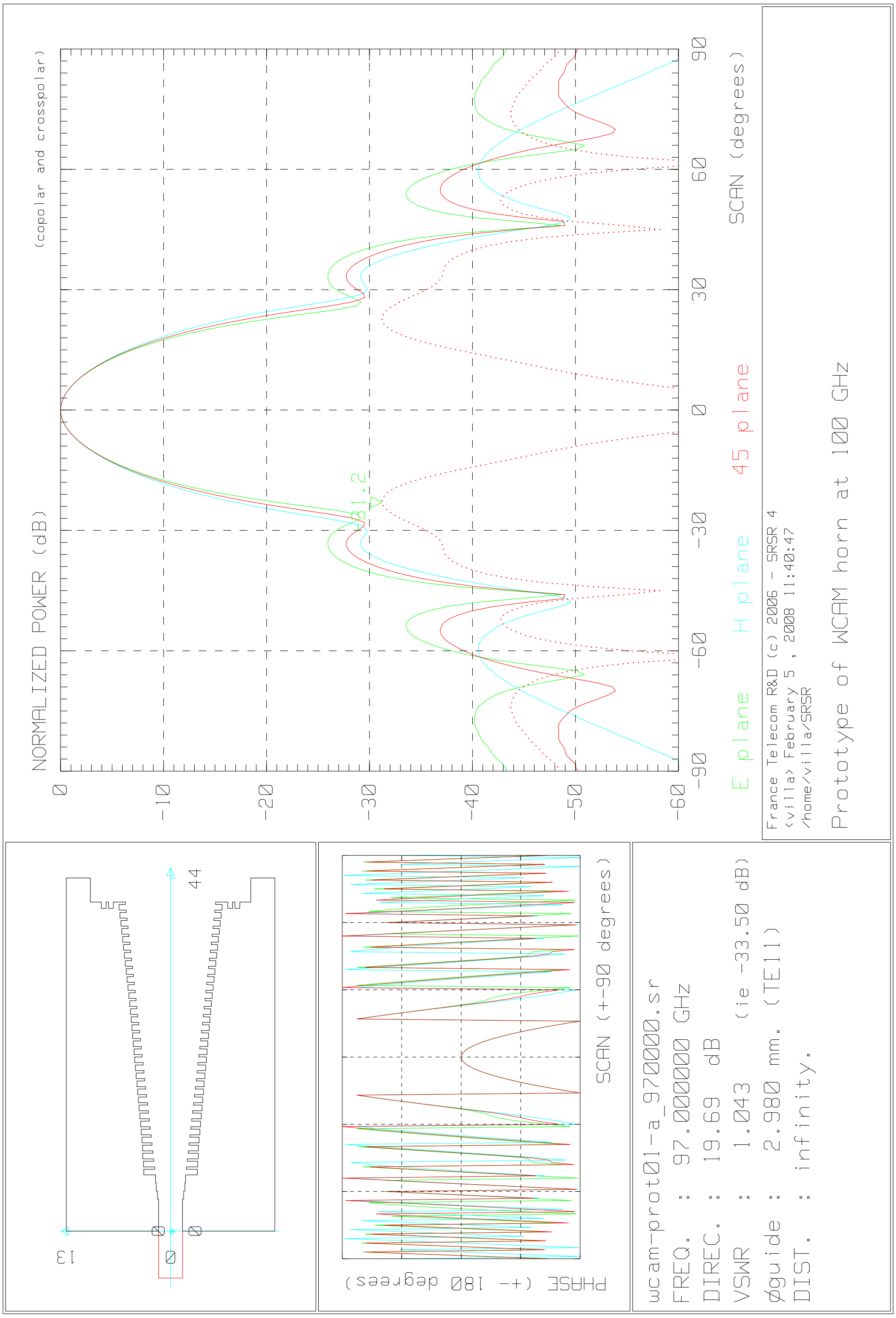

NORMALIZED POWER (dB)
(copolar and crosspolar)
-35.78
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:56
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_957500.sr
FREQ. : 95.750000 GHz
DIREC. : 19.49 dB
VSWR : 1.042 (ie -33.67 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

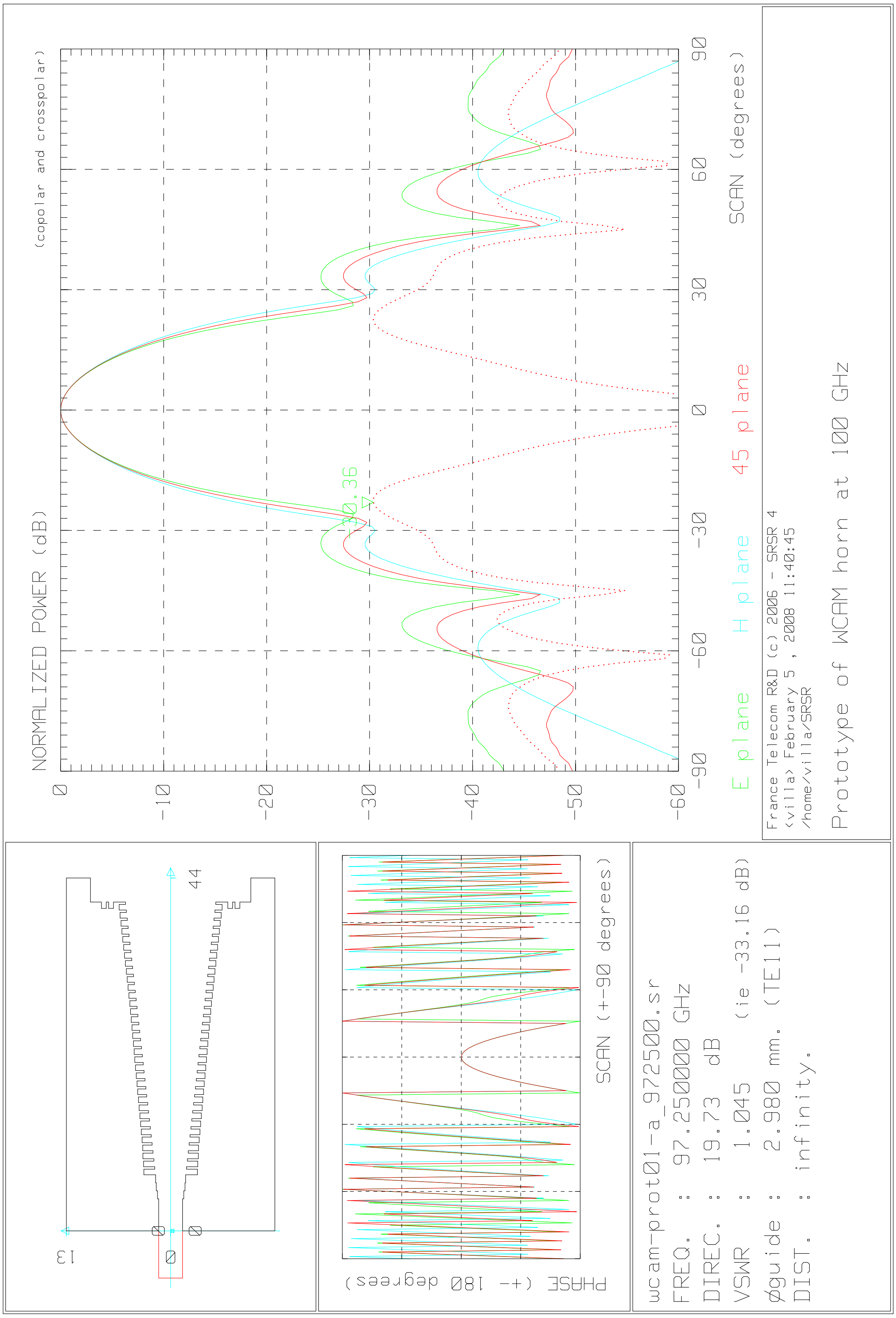

NORMALIZED POWER (dB)
(copolar and crosspolar)
-34.64
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:54
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_96000.sr
FREQ. : 96.000000 GHz
DIREC. : 19.52 dB
VSWR : 1.041 (ie -33.84 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

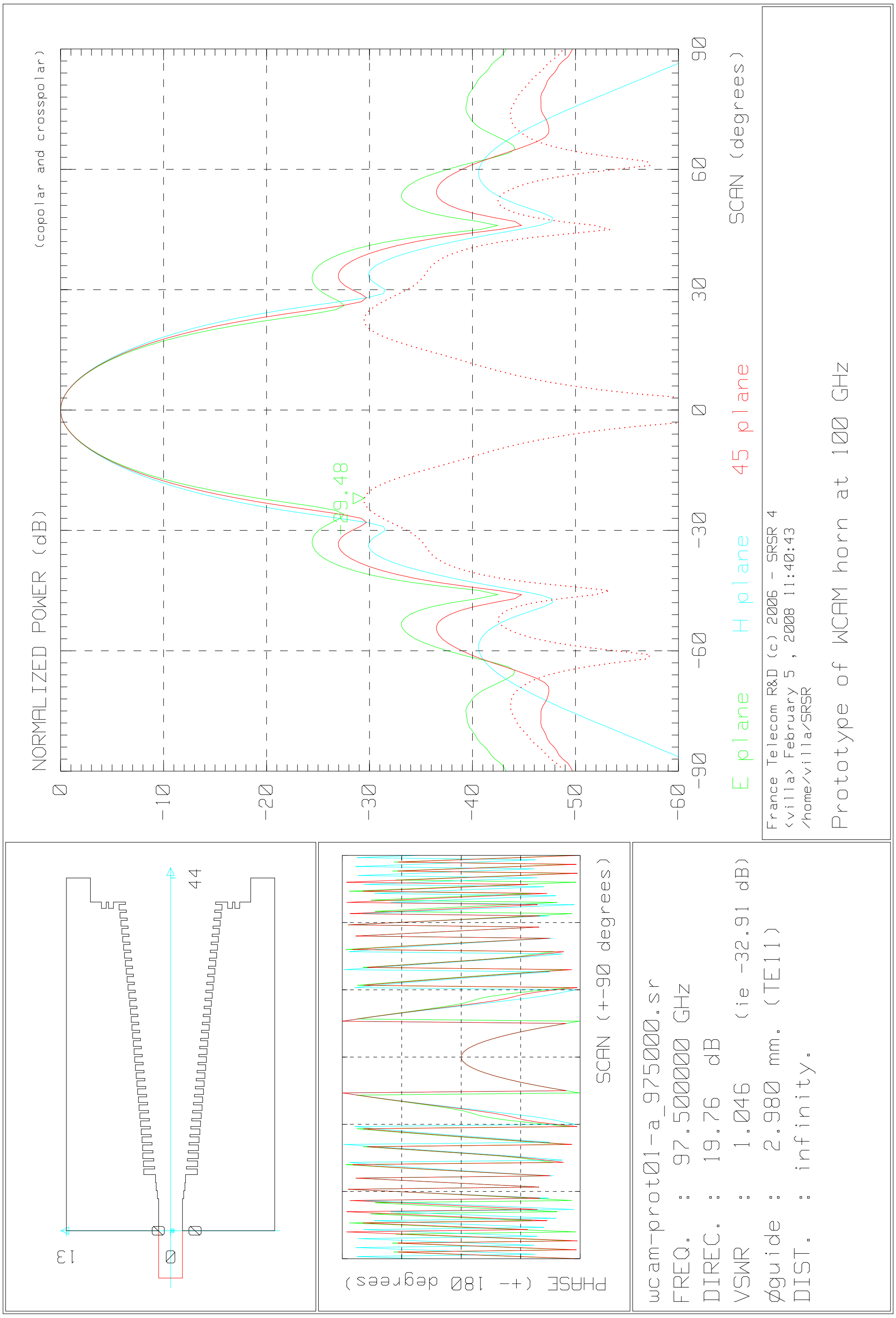

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-33.61
E plane H plane 45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:52
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_962500.sr
FREQ. : 96.250000 GHz
DIREC. : 19.56 dB
VSWR : 1.041 (ie -33.97 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

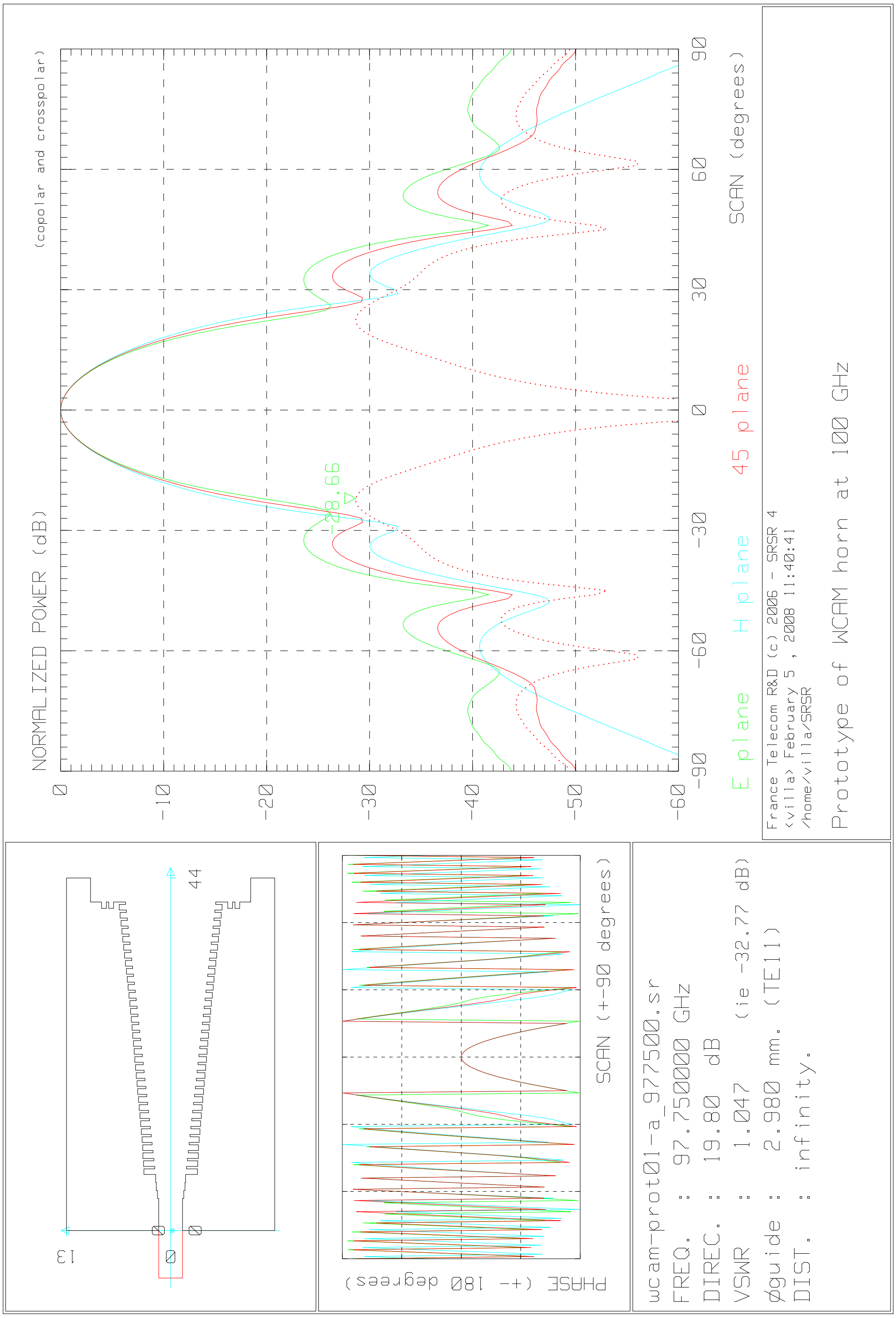

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-32.73
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:51
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
SCAN (+-90 degrees)
PHASE (+- 180 degrees)
wcam-prot01-a_965000.sr
FREQ. : 96.500000 GHz
DIREC. : 19.60 dB
VSWR : 1.041 (ie -33.98 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

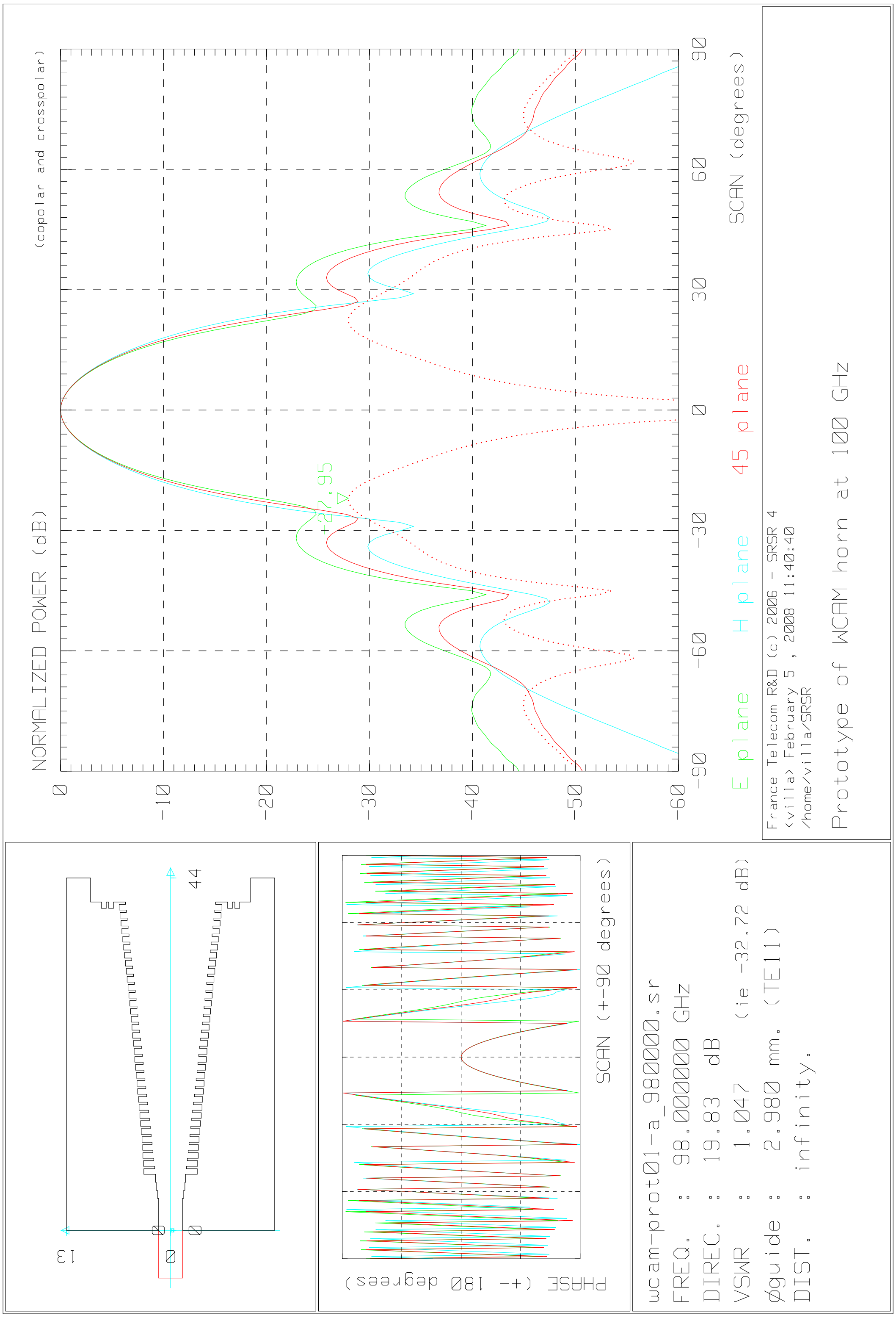

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane H plane 45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:48
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_967500.sr
FREQ. : 96.750000 GHz
DIREC. : 19.65 dB
VSWR : 1.042 (ie -33.82 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

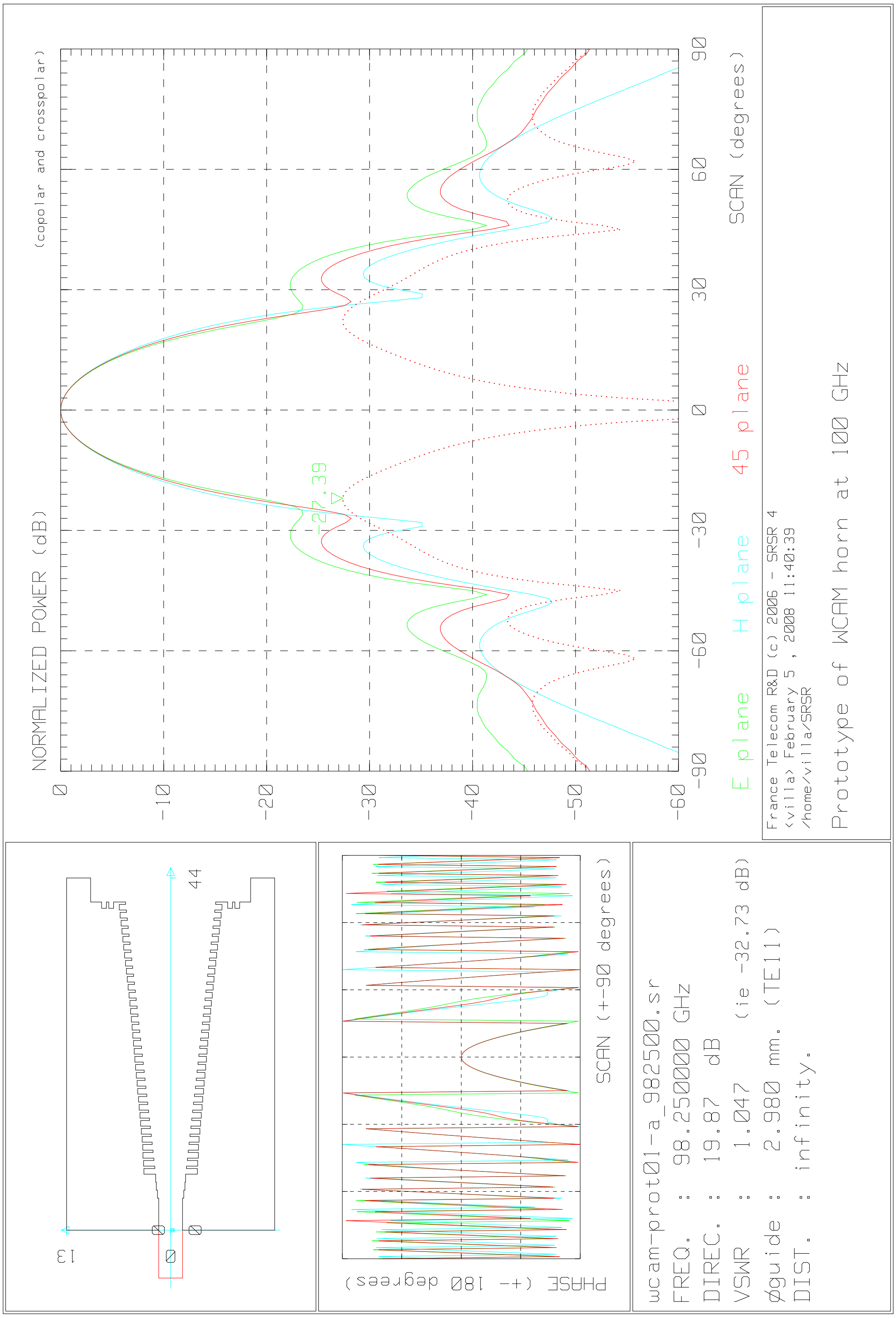

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:47
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_970000.sr
FREQ. : 97.000000 GHz
DIREC. : 19.69 dB
VSWR : 1.043 (ie -33.50 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

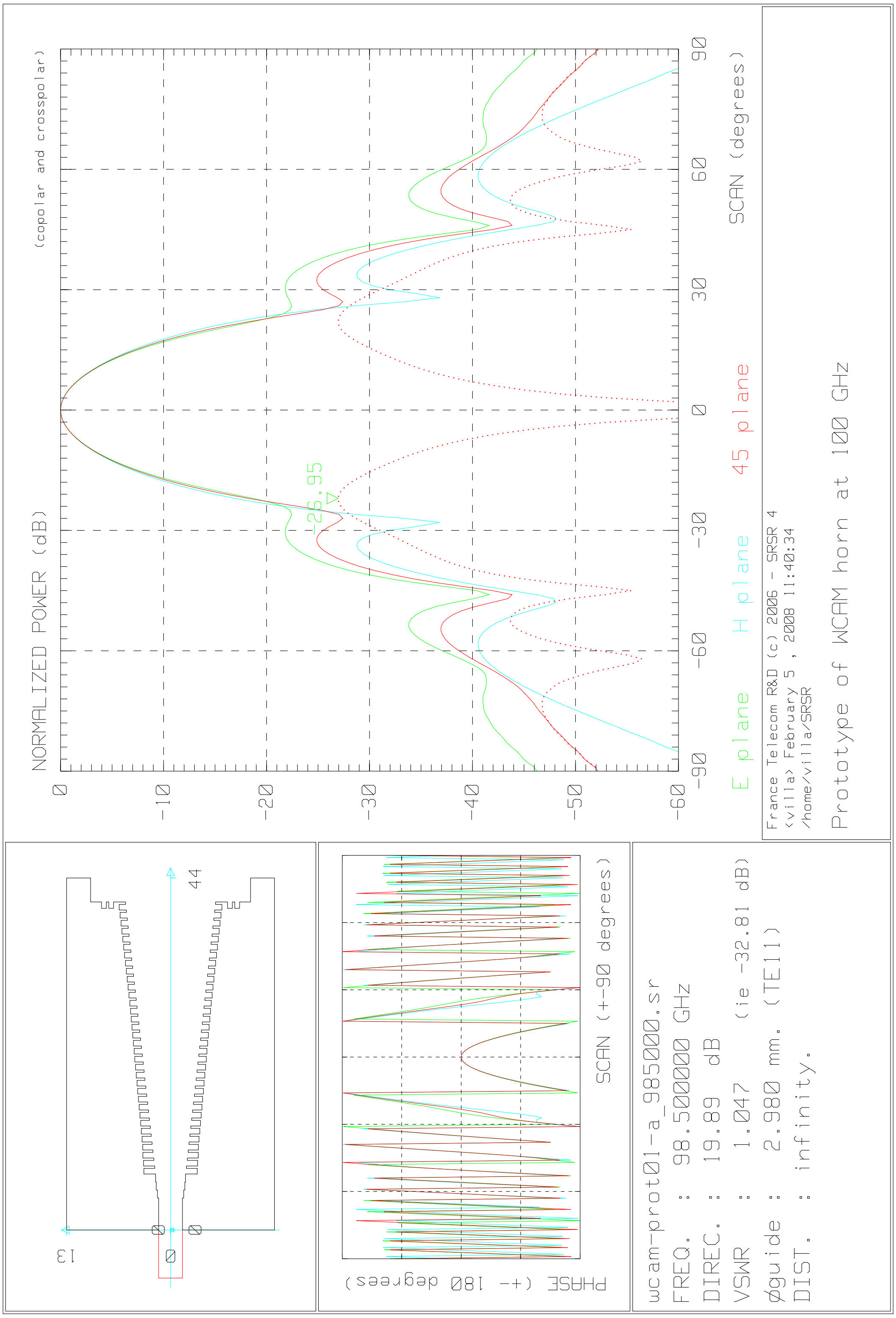

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:45
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_972500.sr
FREQ. : 97.250000 GHz
DIREC. : 19.73 dB
VSWR : 1.045 (ie -33.16 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

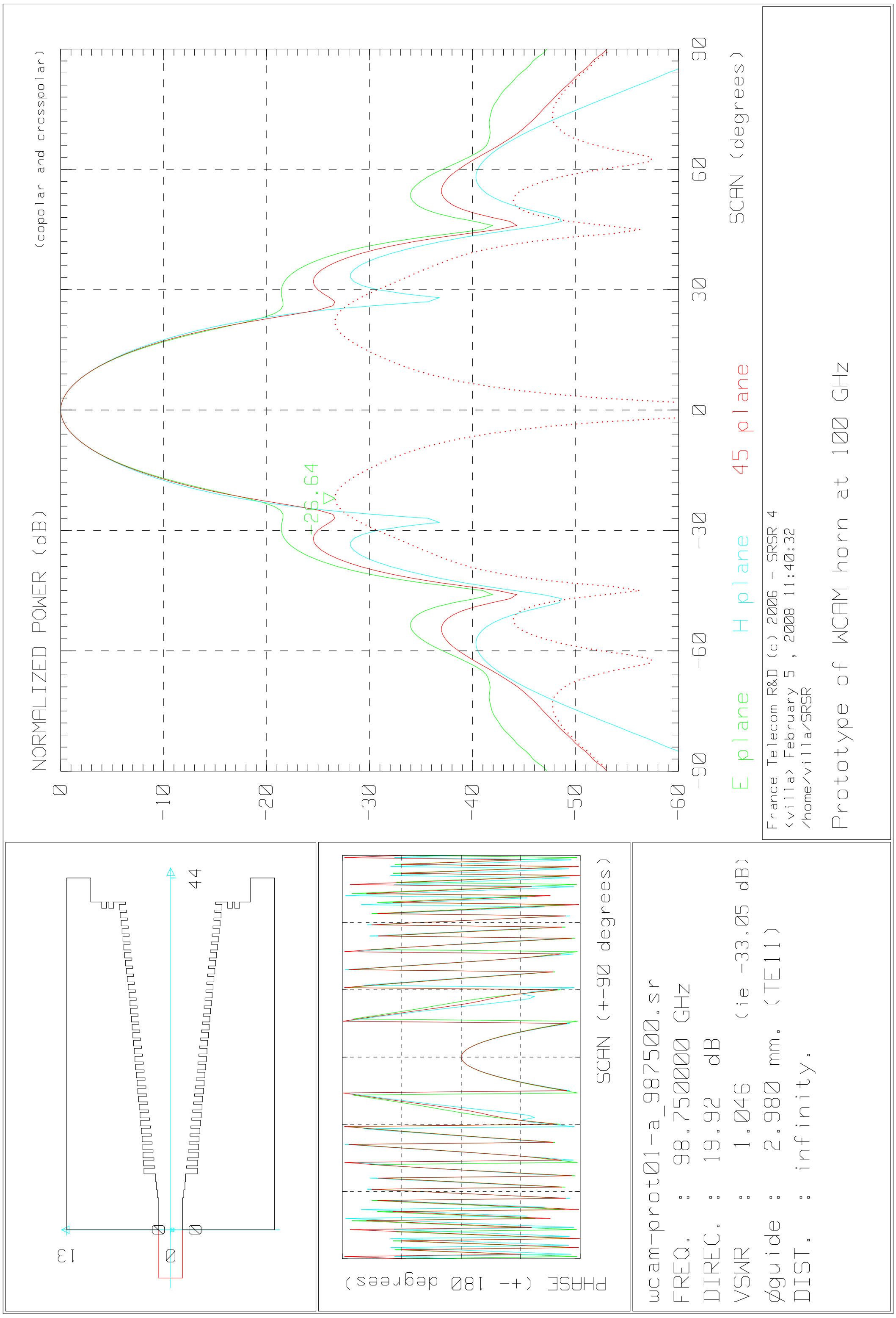

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-29.48
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:43
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_975000.sr
FREQ. : 97.500000 GHz
DIREC. : 19.76 dB
VSWR : 1.046 (ie -32.91 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

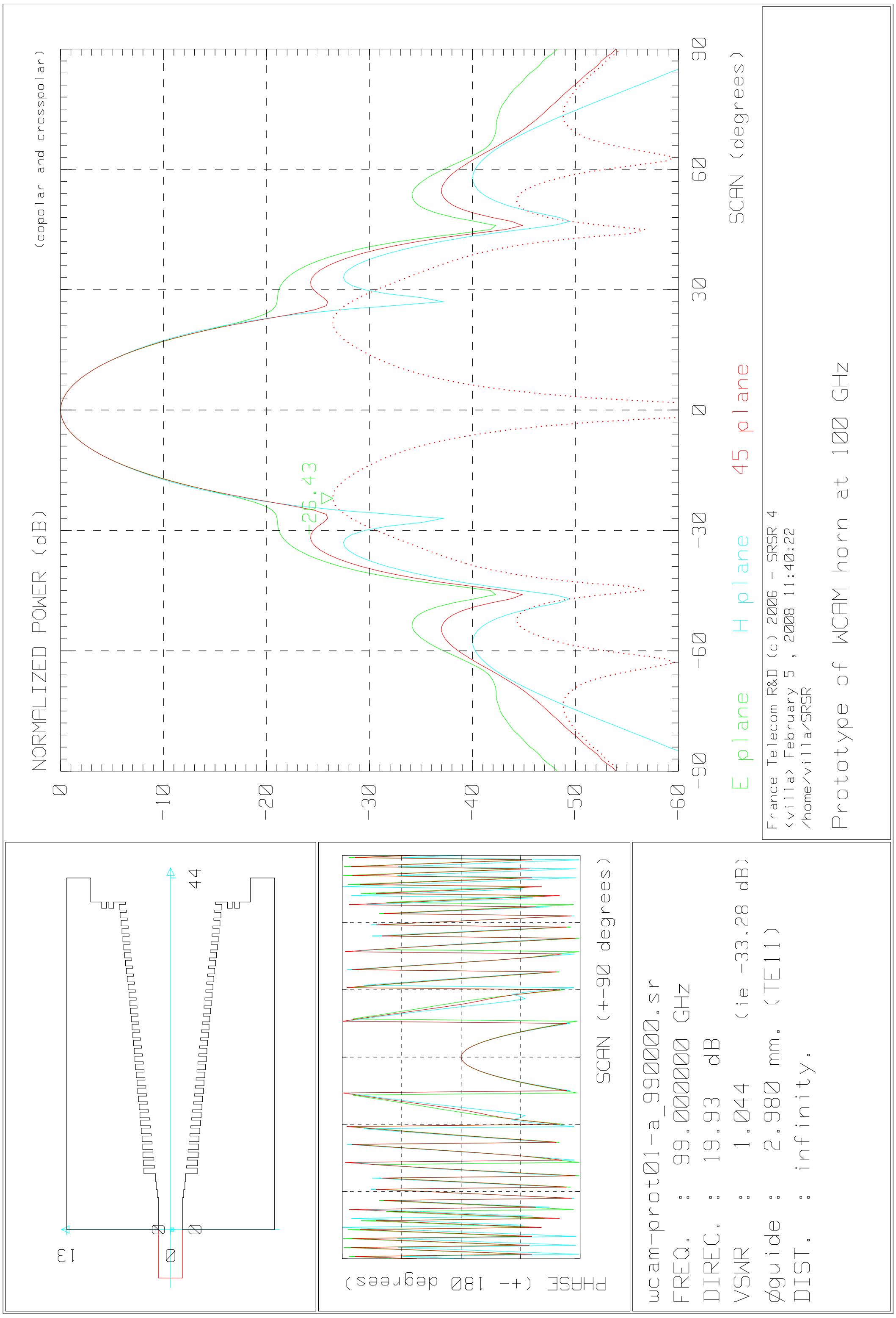

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:41
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_977500.sr
FREQ. : 97.750000 GHz
DIREC. : 19.80 dB
VSWR : 1.047 (ie -32.77 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

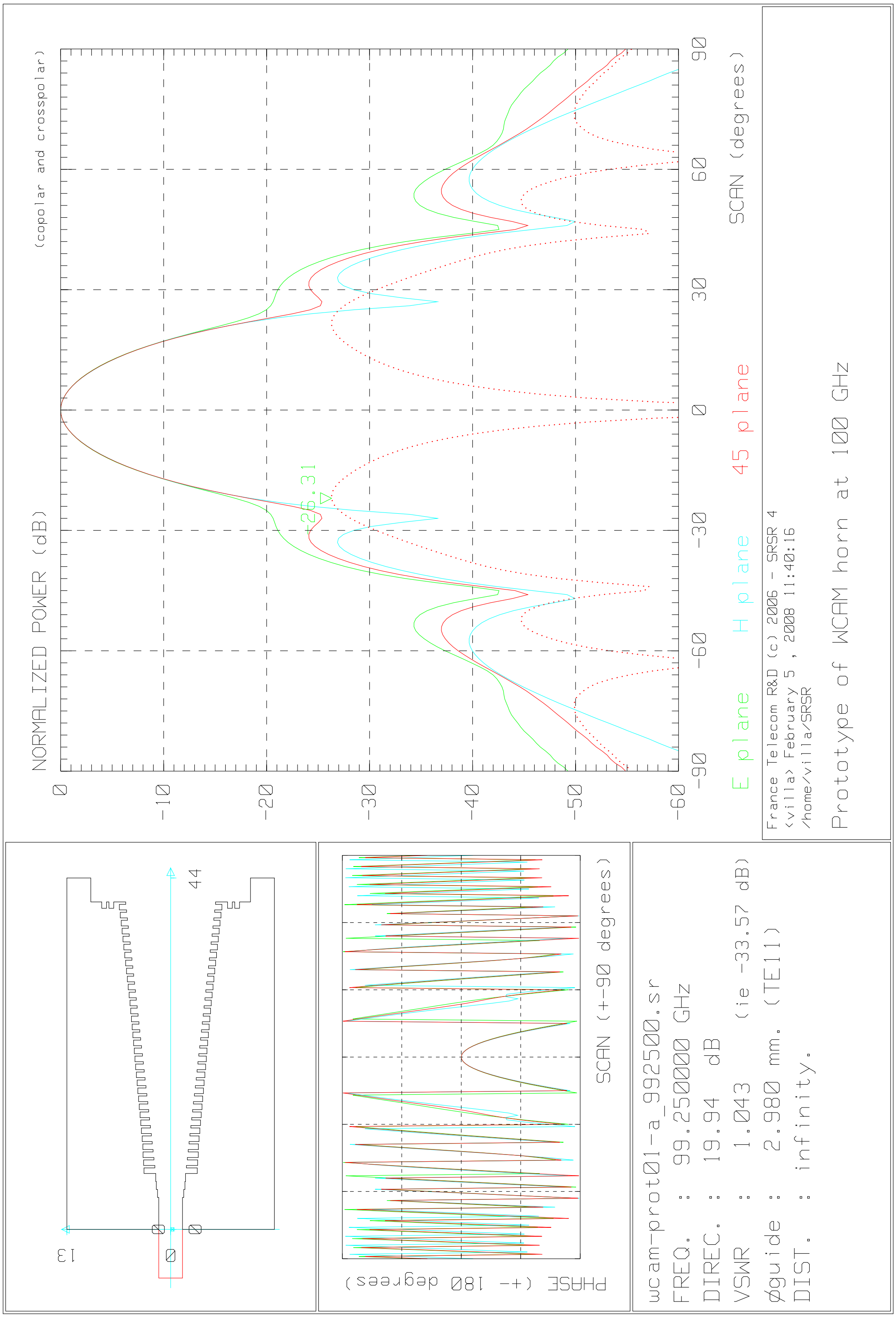

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-27.95
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:40
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_980000.sr
FREQ. : 98.000000 GHz
DIREC. : 19.83 dB
VSWR : 1.047 (ie -32.72 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

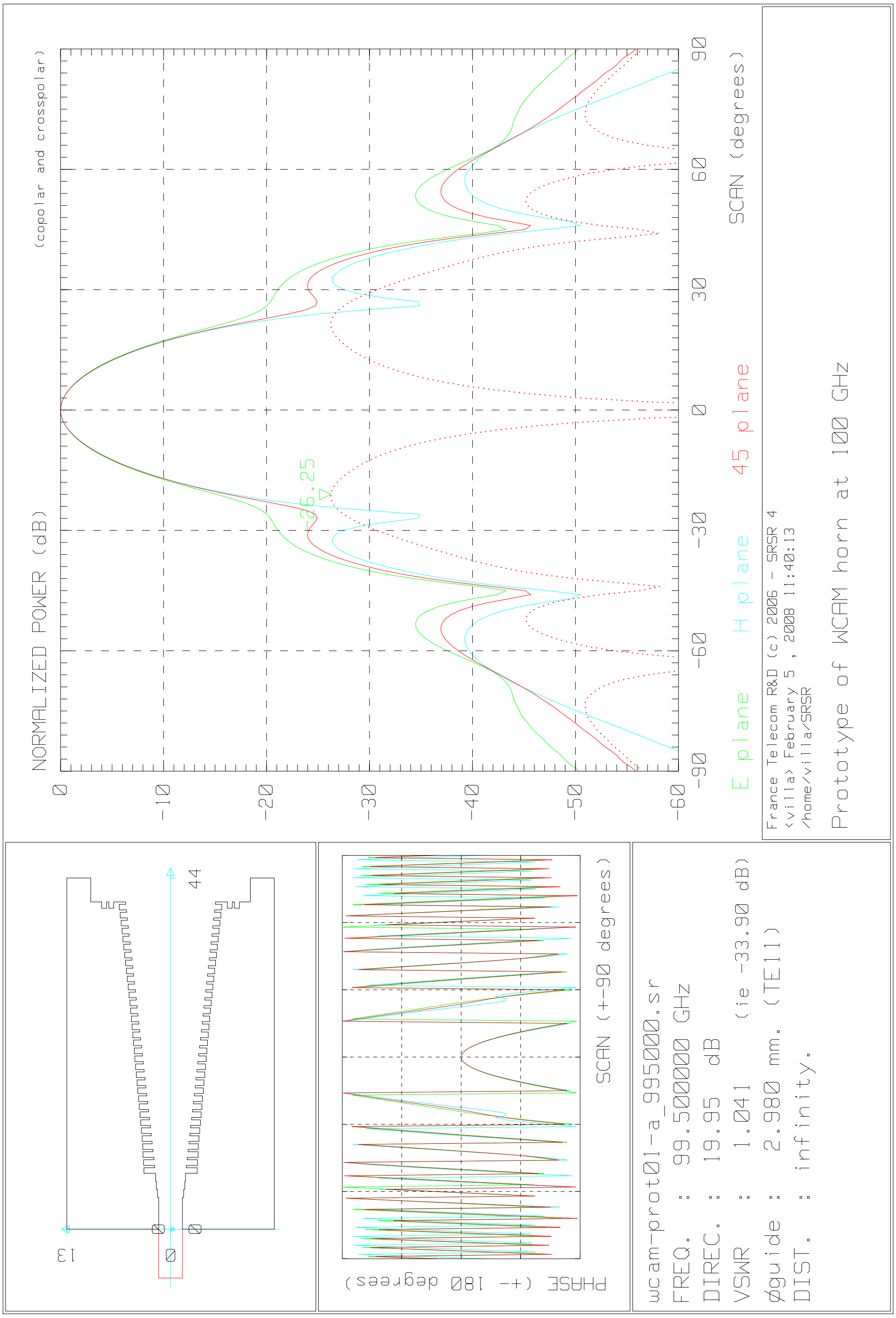

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-27.39
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:39
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_982500.sr
FREQ. : 98.250000 GHz
DIREC. : 19.87 dB
VSWR : 1.047 (ie -32.73 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

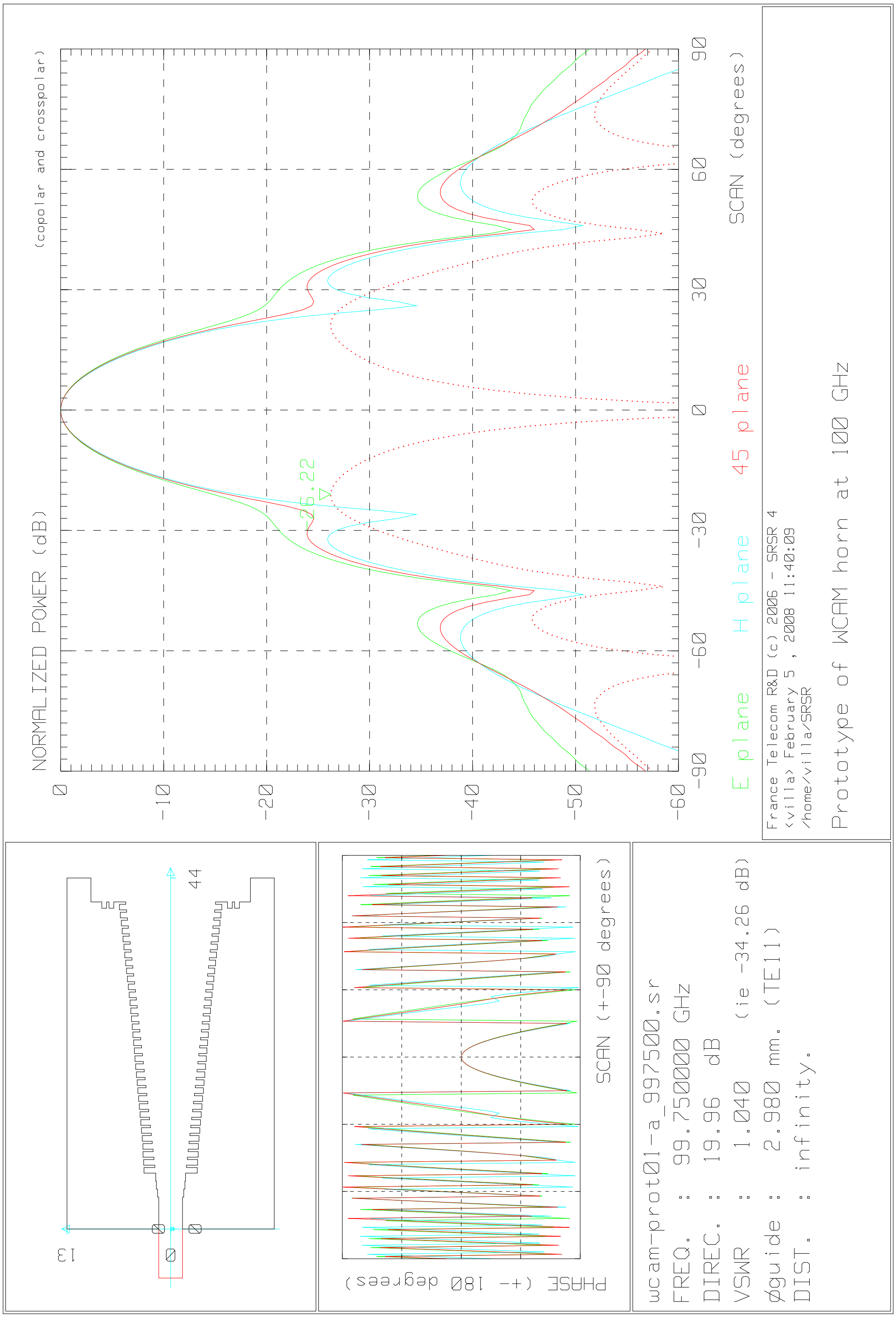

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-26.95
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:34
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_985000.sr
FREQ. : 98.500000 GHz
DIREC. : 19.89 dB
VSWR : 1.047 (ie -32.81 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

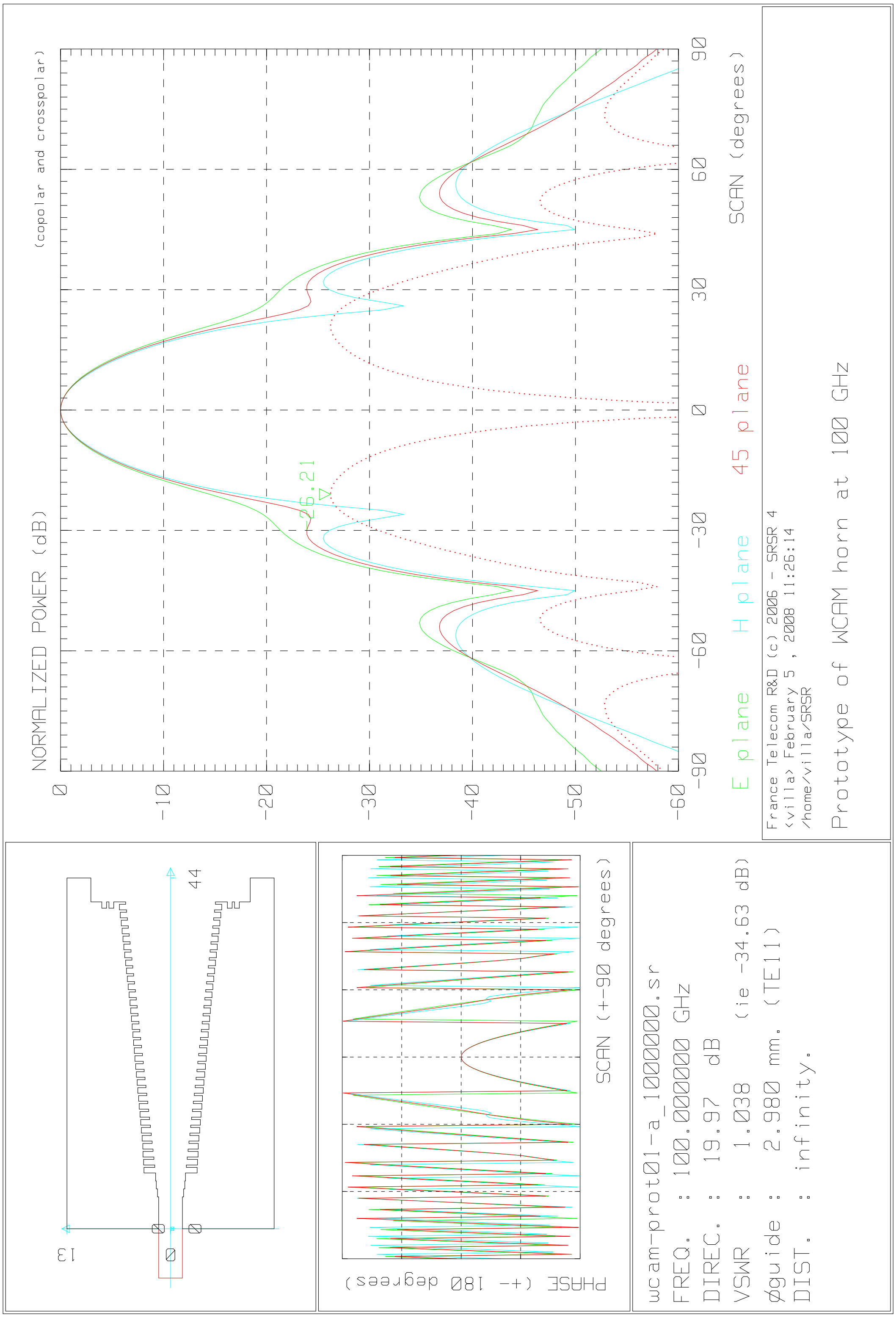

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-26.54
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:32
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_987500.sr
FREQ. : 98.750000 GHz
DIREC. : 19.92 dB
VSWR : 1.046 (ie -33.05 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

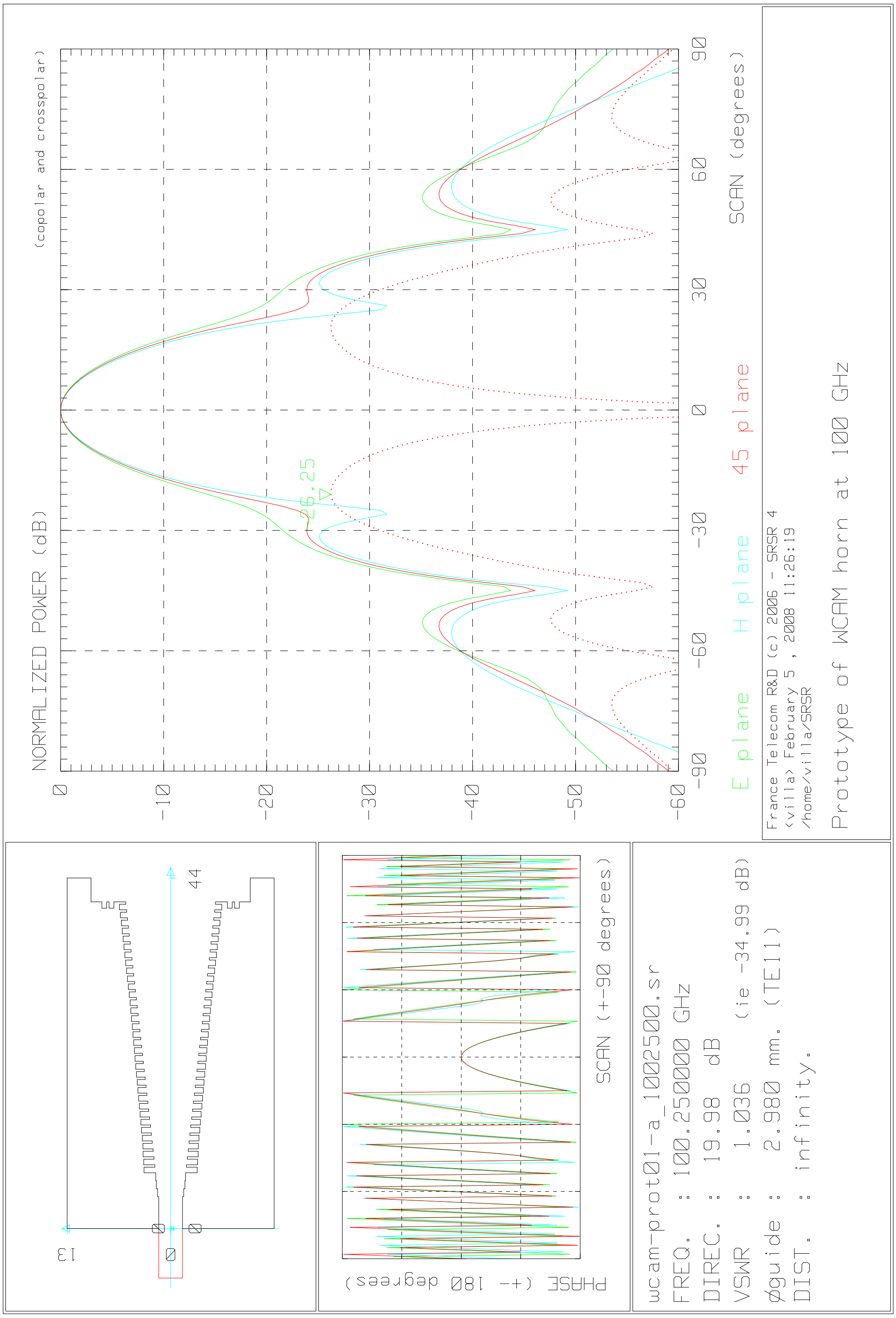

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-26.43
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:22
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_99000.sr
FREQ. : 99.000000 GHz
DIREC. : 19.93 dB
VSWR : 1.044 (ie -33.28 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

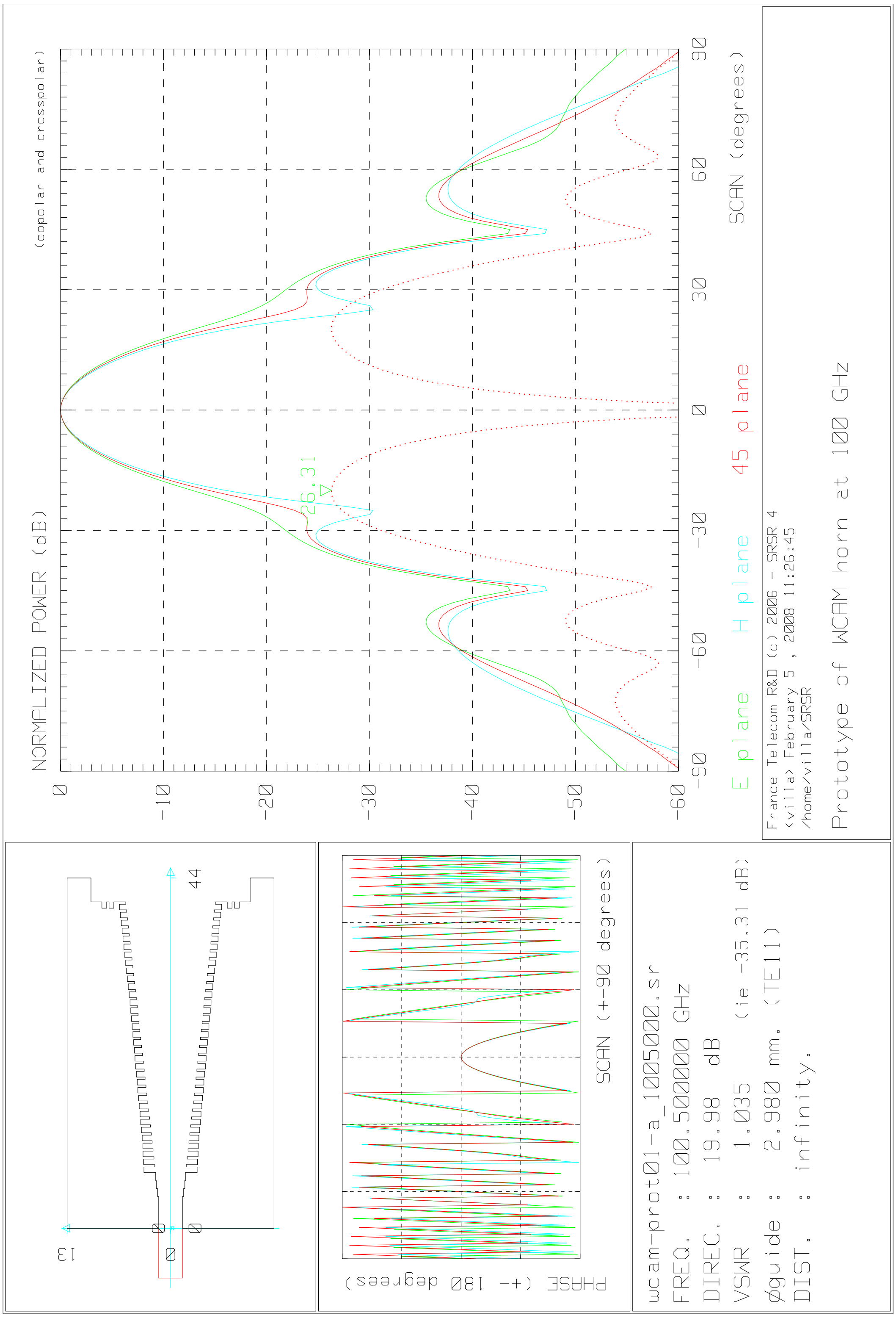

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:16
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_992500.sr
FREQ. : 99.250000 GHz
DIREC. : 19.94 dB
VSWR : 1.043 (ie -33.57 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

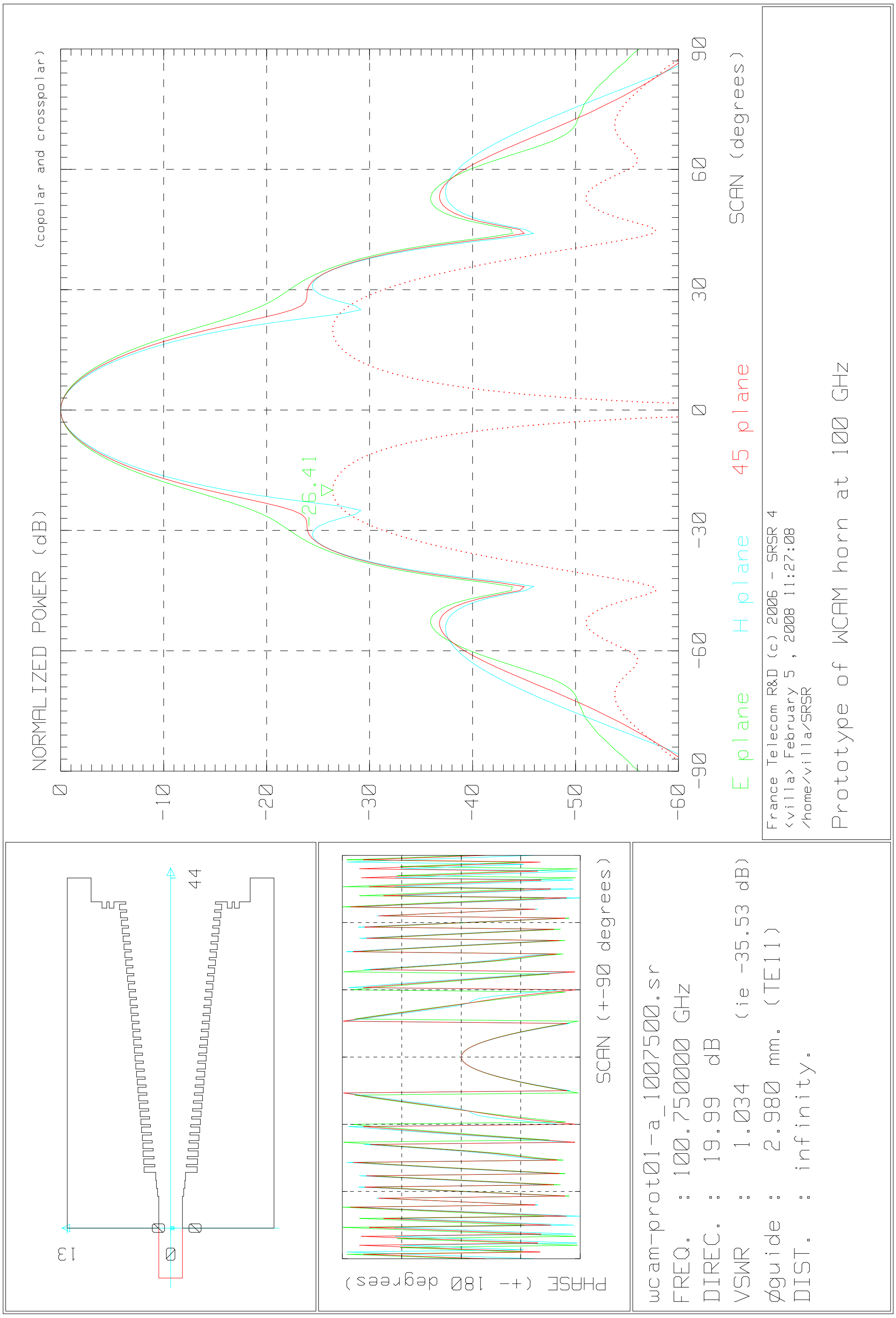

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-26.25
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:13
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_995000.sr
FREQ. : 99.500000 GHz
DIREC. : 19.95 dB
VSWR : 1.041 (ie -33.90 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

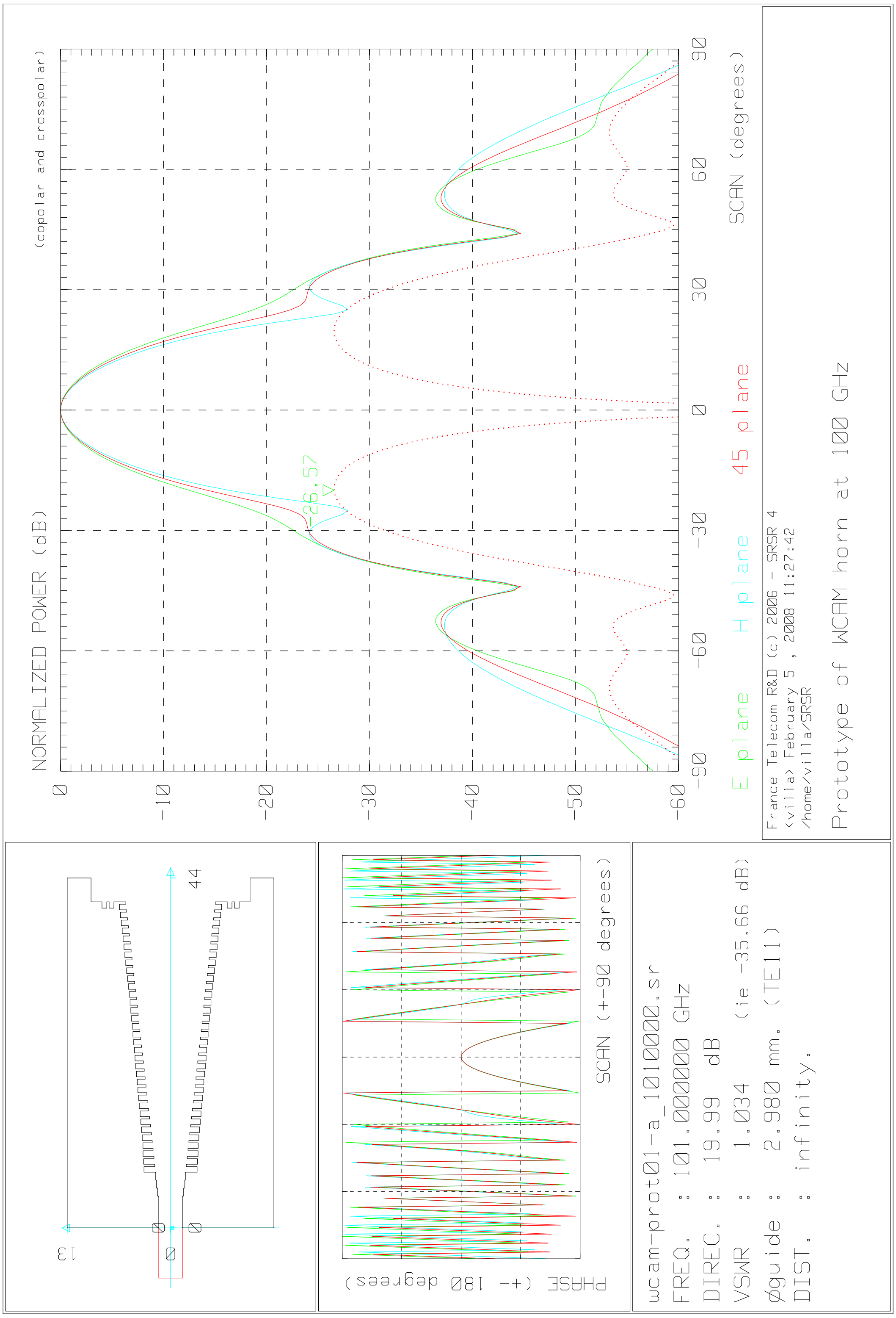

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:40:09
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_997500.sr
FREQ. : 99.750000 GHz
DIREC. : 19.96 dB
VSWR : 1.040 (ie -34.26 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

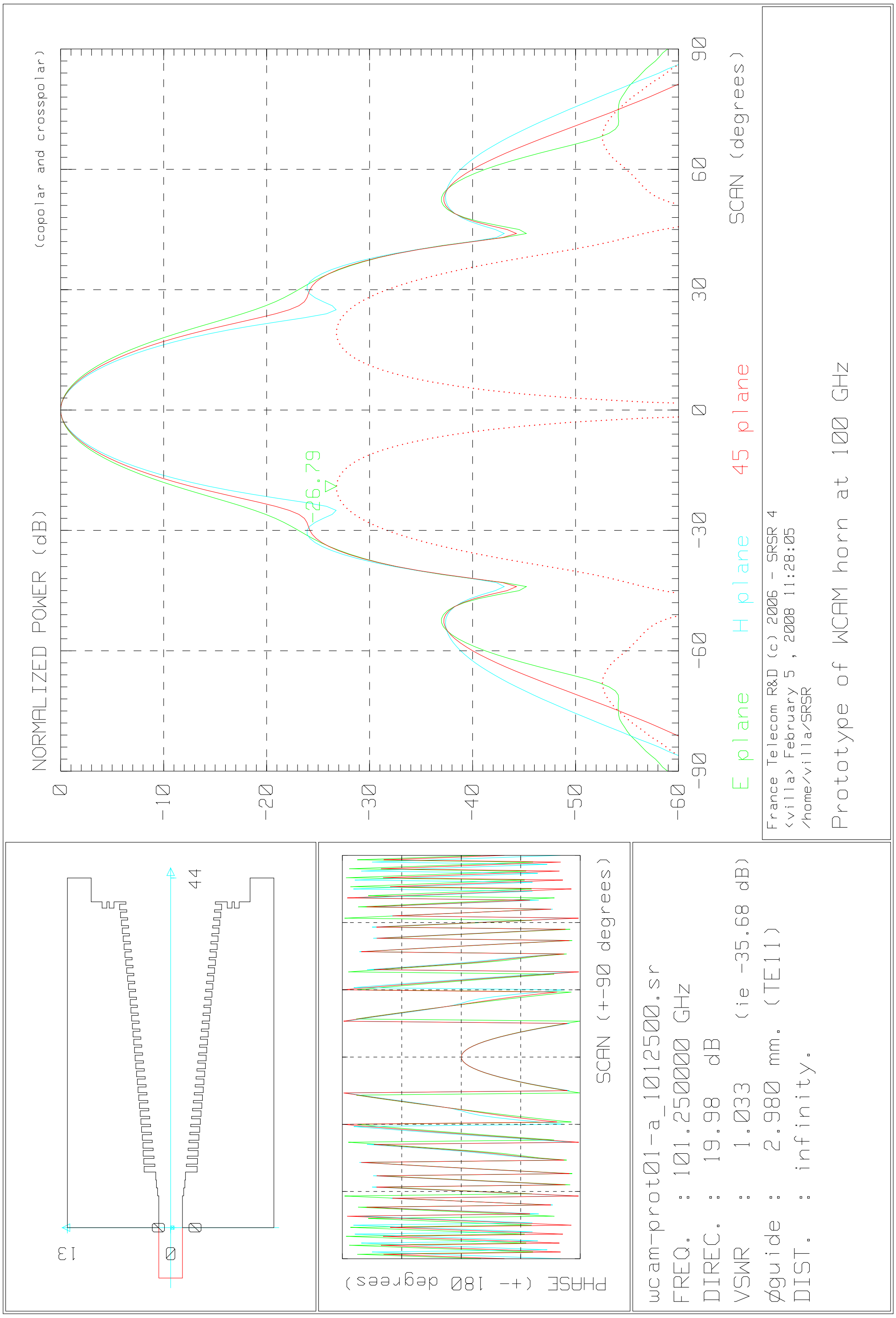

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane H plane 45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:26:14
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1000000.sr
FREQ. : 100.000000 GHz
DIREC. : 19.97 dB
VSWR : 1.038 (ie -34.63 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

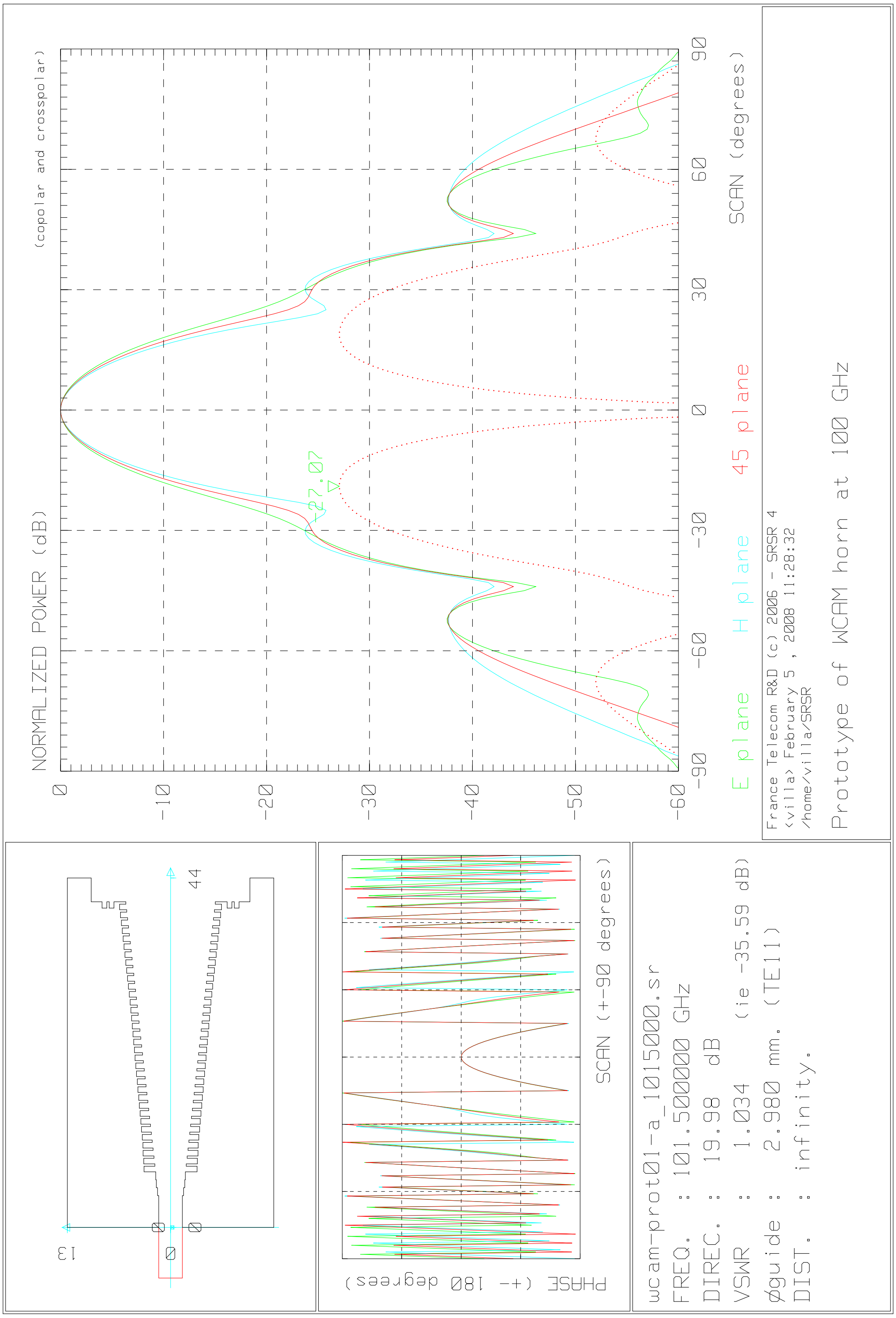

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
26.25
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:26:19
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1002500.sr
FREQ. : 100.250000 GHz
DIREC. : 19.98 dB
VSWR : 1.036 (ie -34.99 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

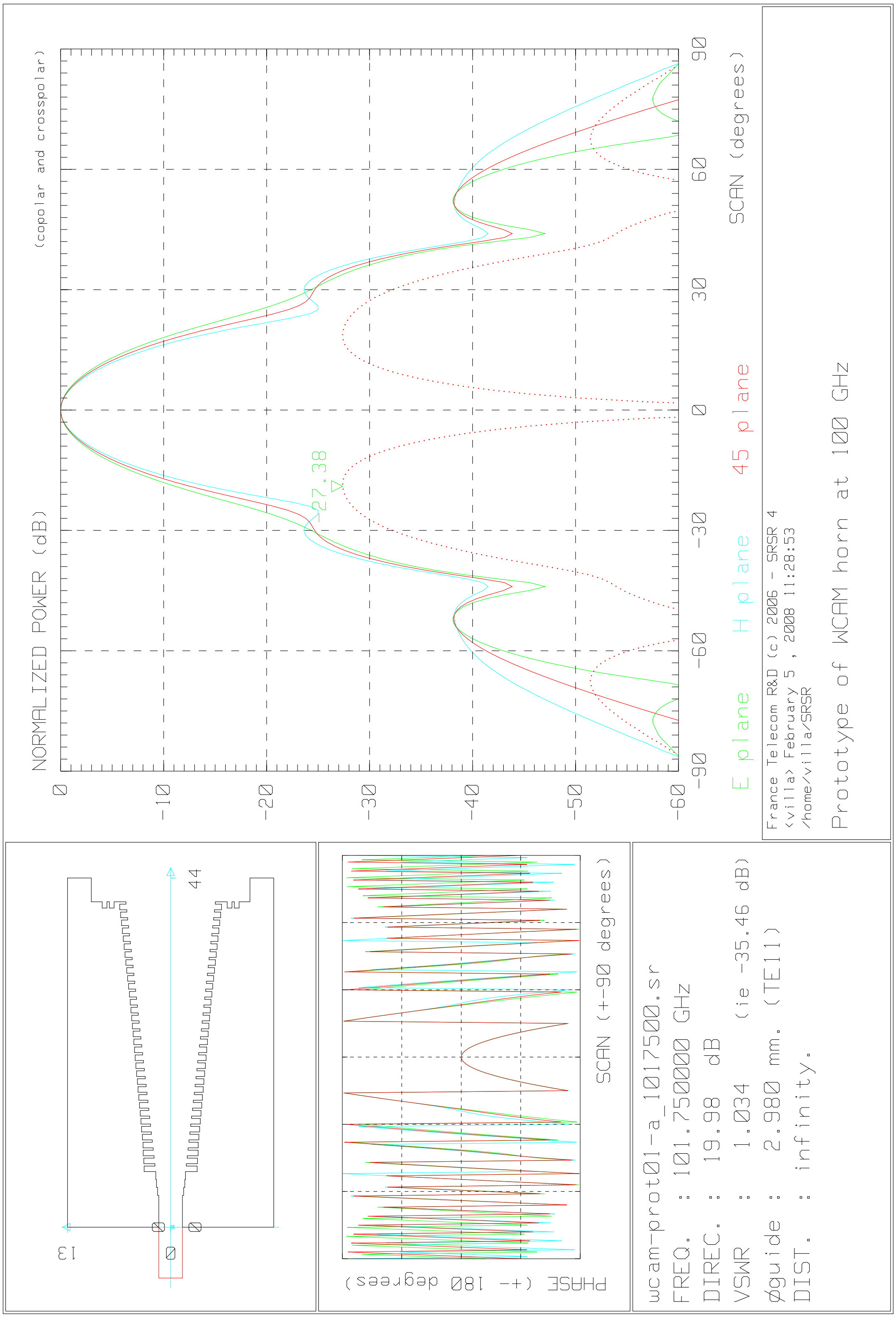

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:26:45
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1005000.sr
FREQ. : 100.500000 GHz
DIREC. : 19.98 dB
VSWR : 1.035 (ie -35.31 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

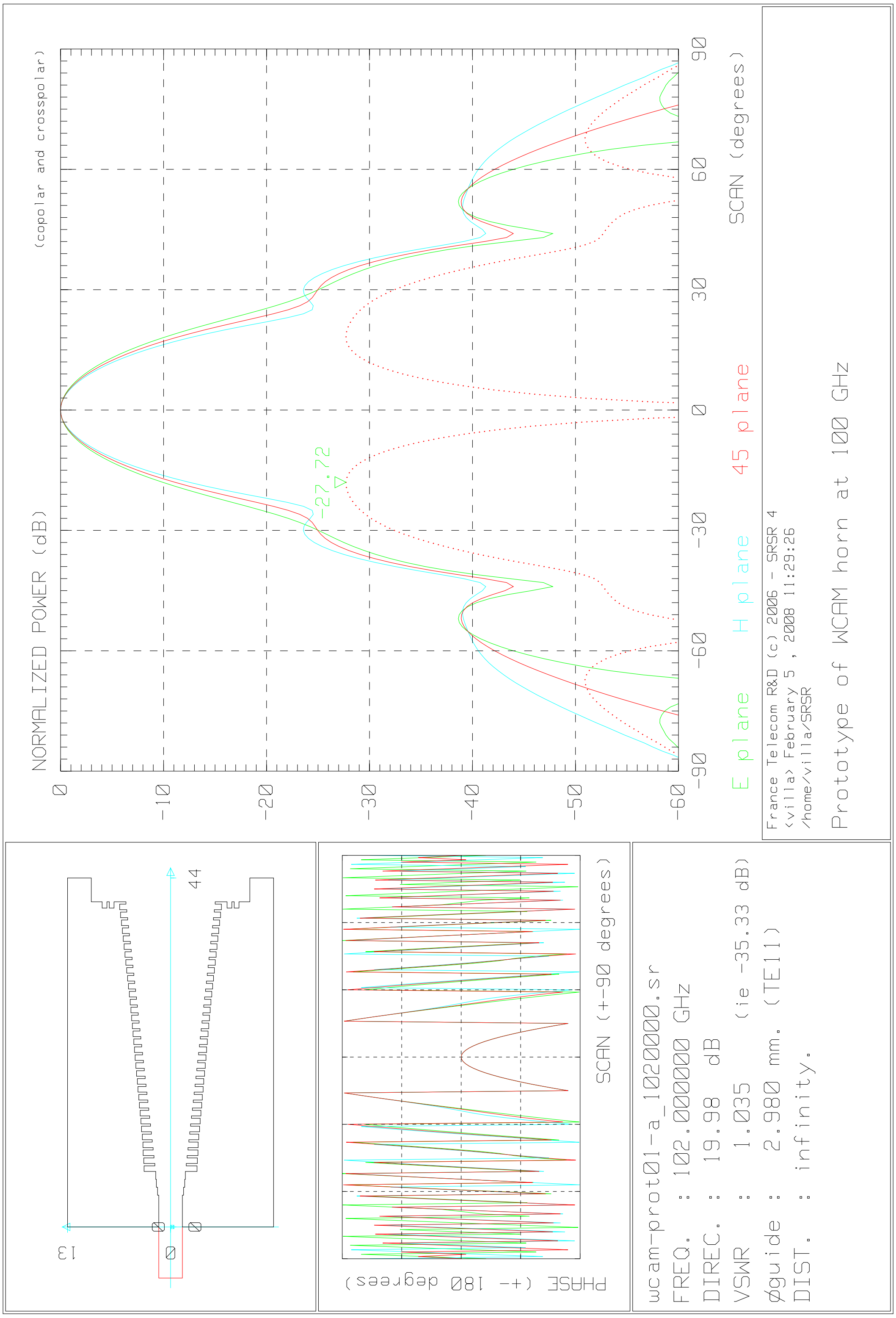

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
26.41
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:27:08
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1007500.sr
FREQ. : 100.750000 GHz
DIREC. : 19.99 dB
VSWR : 1.034 (ie -35.53 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

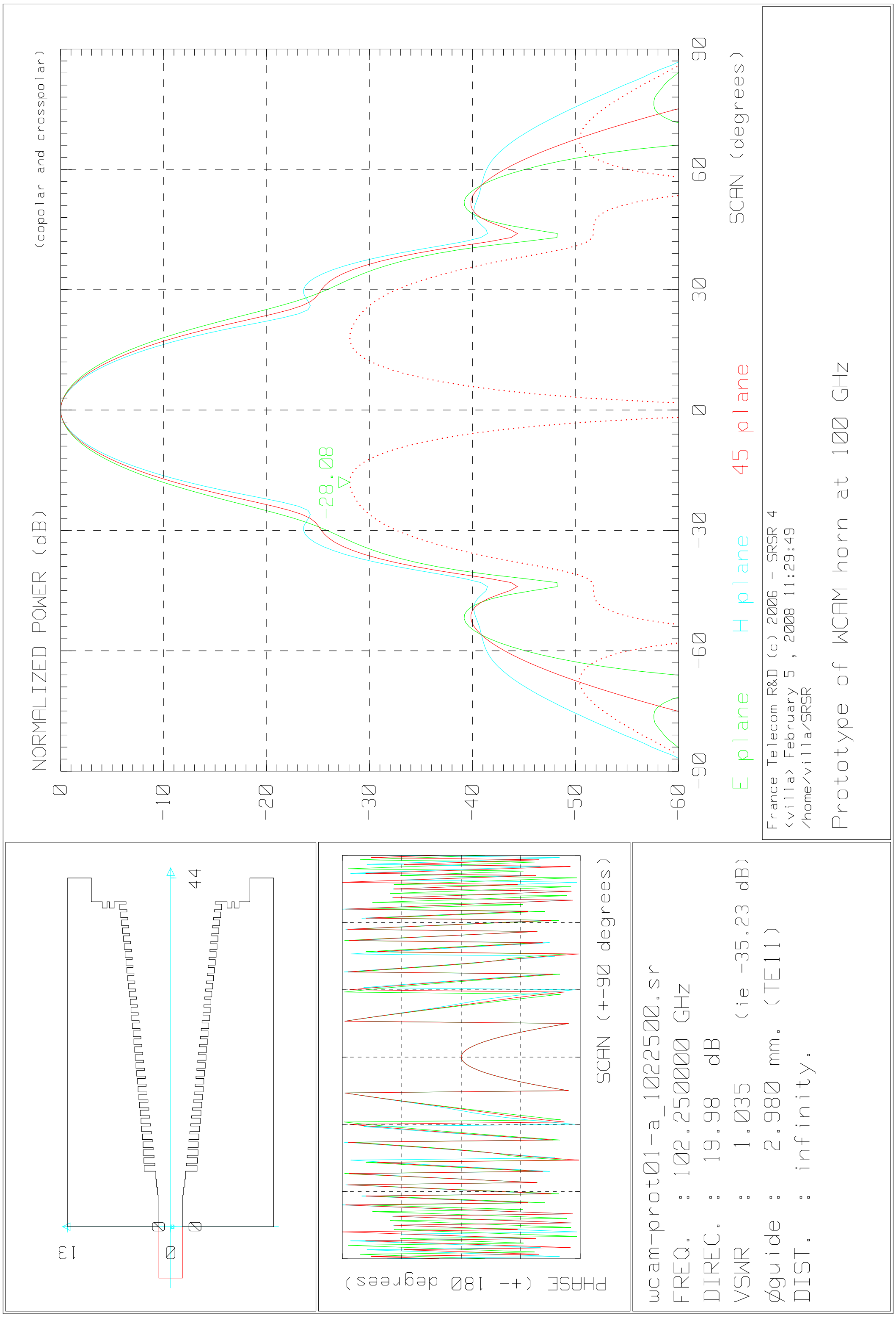

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-26.57
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:27:42
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_101000.sr
FREQ. : 101.000000 GHz
DIREC. : 19.99 dB
VSWR : 1.034 (ie -35.66 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

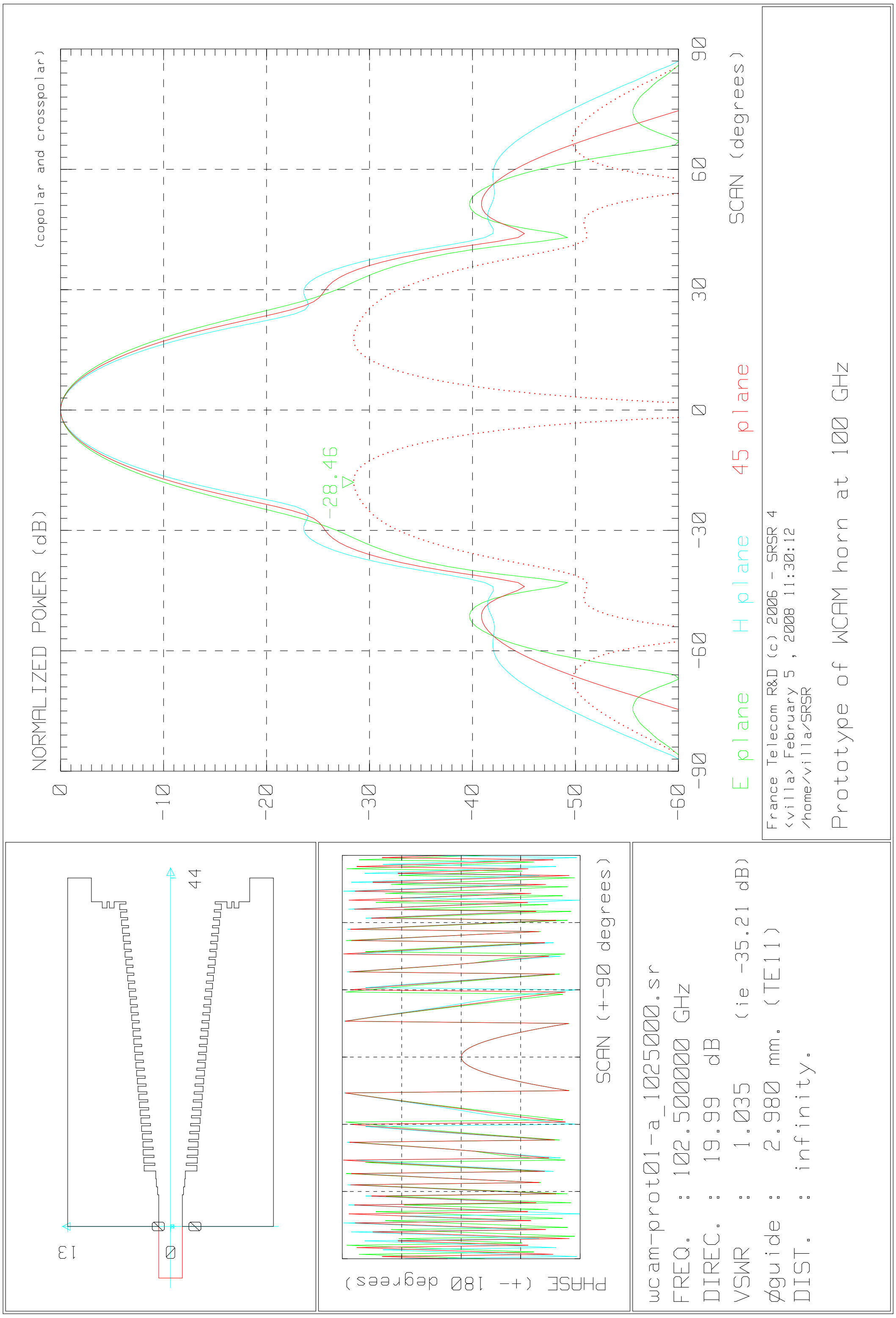

NORMALIZED POWER (dB)
(copolar and crosspolar)
-26.79
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:28:05
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1012500.sr
FREQ. : 101.250000 GHz
DIREC. : 19.98 dB
VSWR : 1.033 (ie -35.68 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

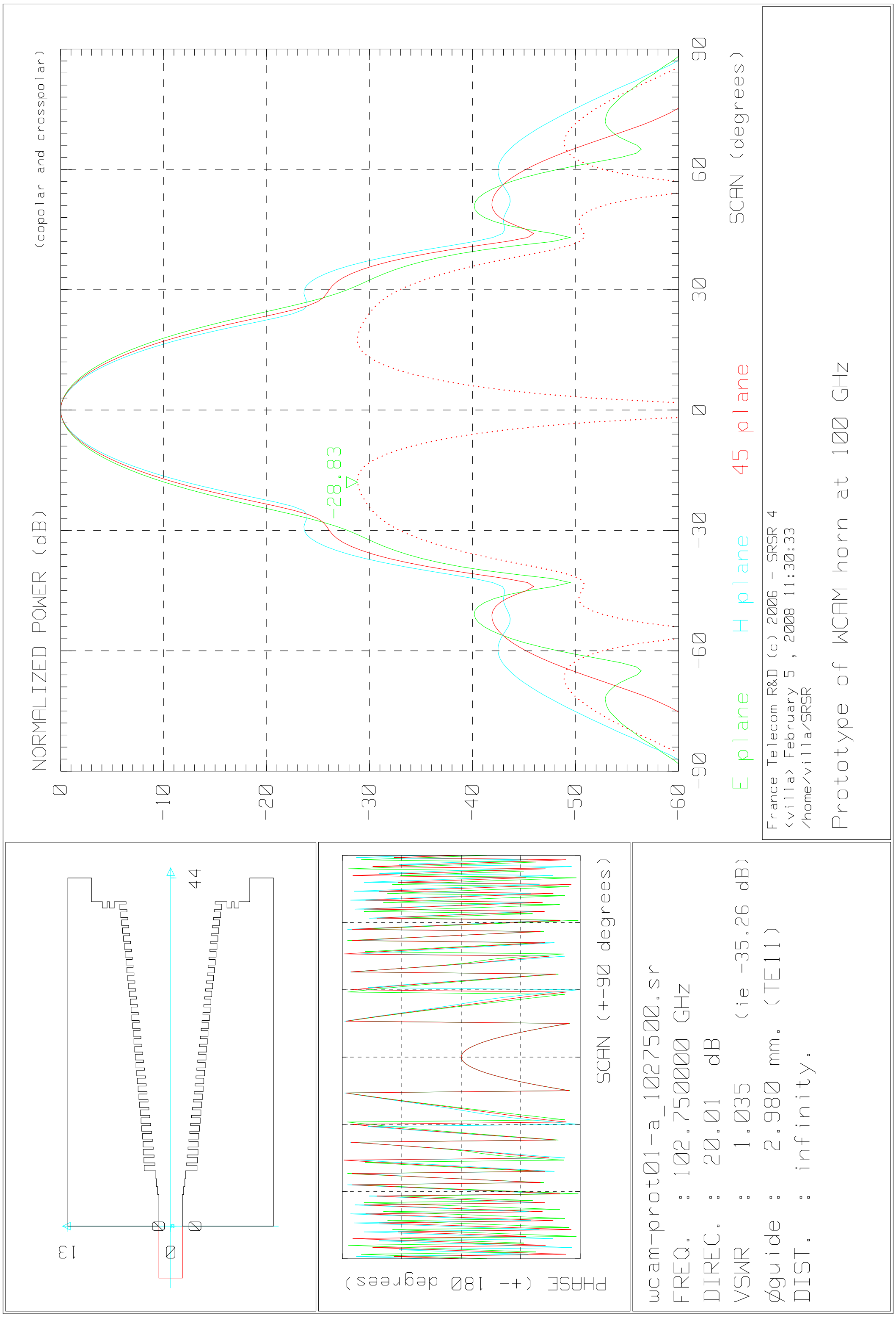

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-27.07
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:28:32
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1015000.sr
FREQ. : 101.500000 GHz
DIREC. : 19.98 dB
VSWR : 1.034 (ie -35.59 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

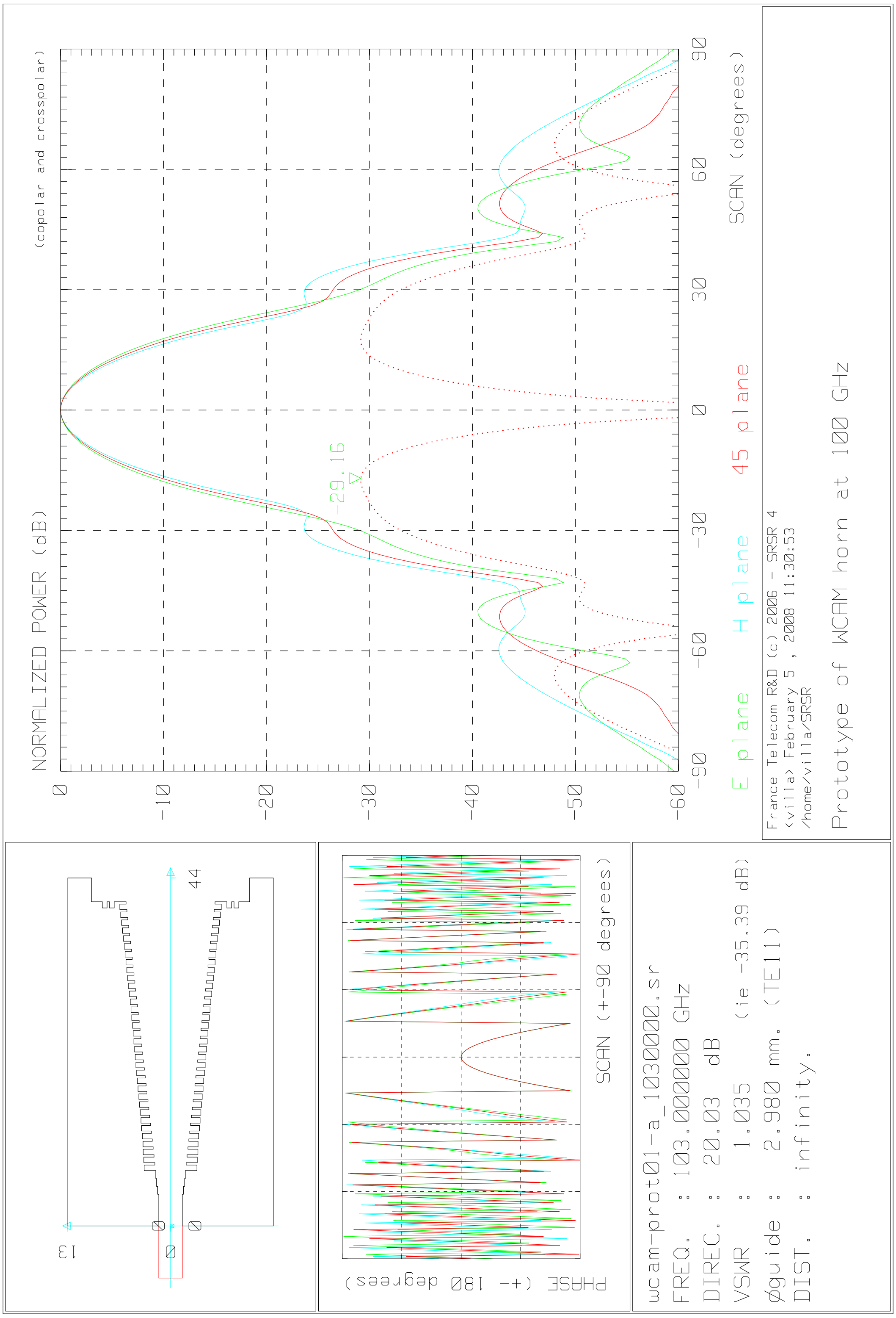

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
E plane
H plane
45 plane
-27.38
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:28:53
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1017500.sr
FREQ. : 101.750000 GHz
DIREC. : 19.98 dB
VSWR : 1.034 (ie -35.46 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.


NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-27.72
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:29:26
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1020000.sr
FREQ. : 102.000000 GHz
DIREC. : 19.98 dB
VSWR : 1.035 (ie -35.33 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

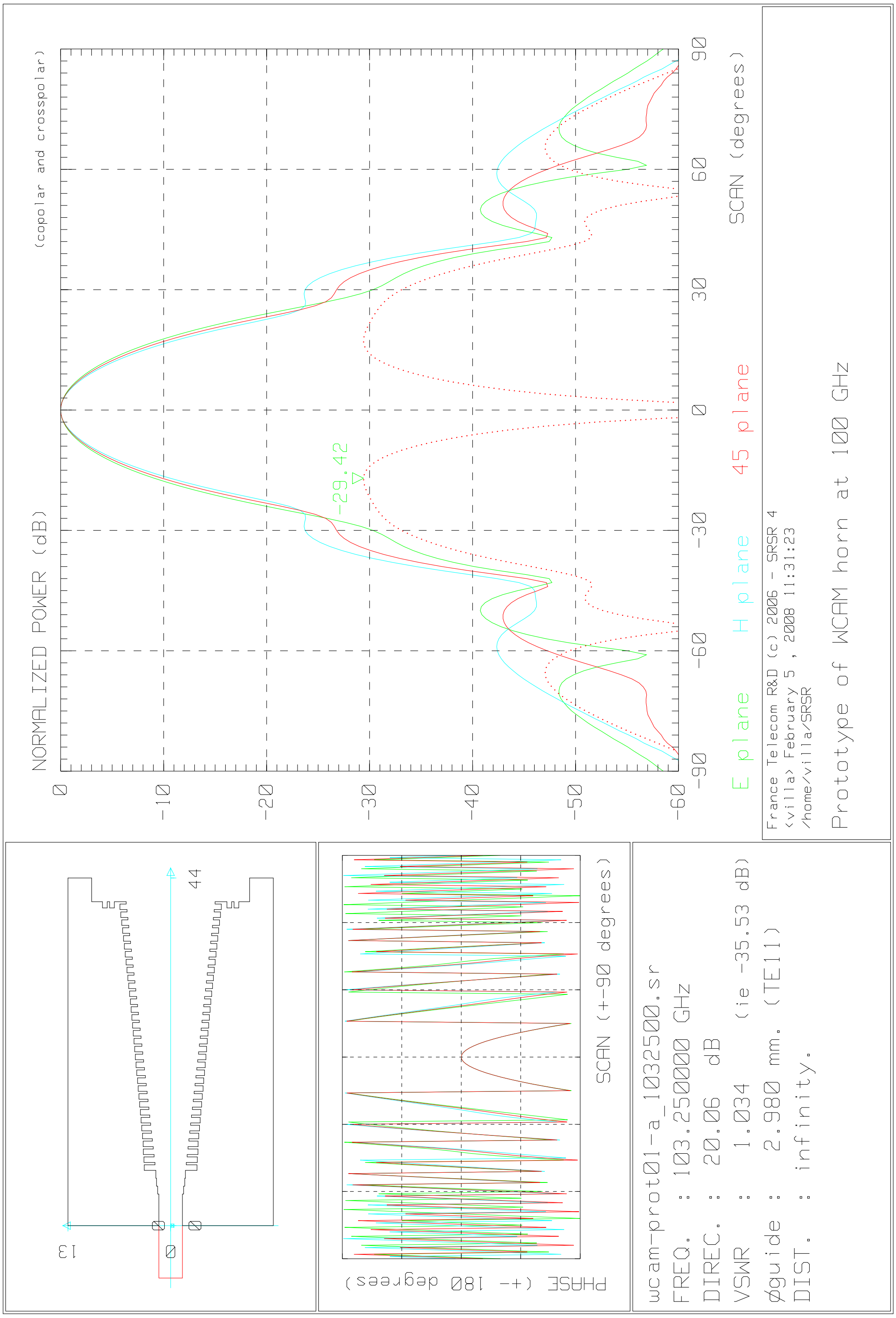

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-28.08
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:29:49
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1022500.sr
FREQ. : 102.250000 GHz
DIREC. : 19.98 dB
VSWR : 1.035 (ie -35.23 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

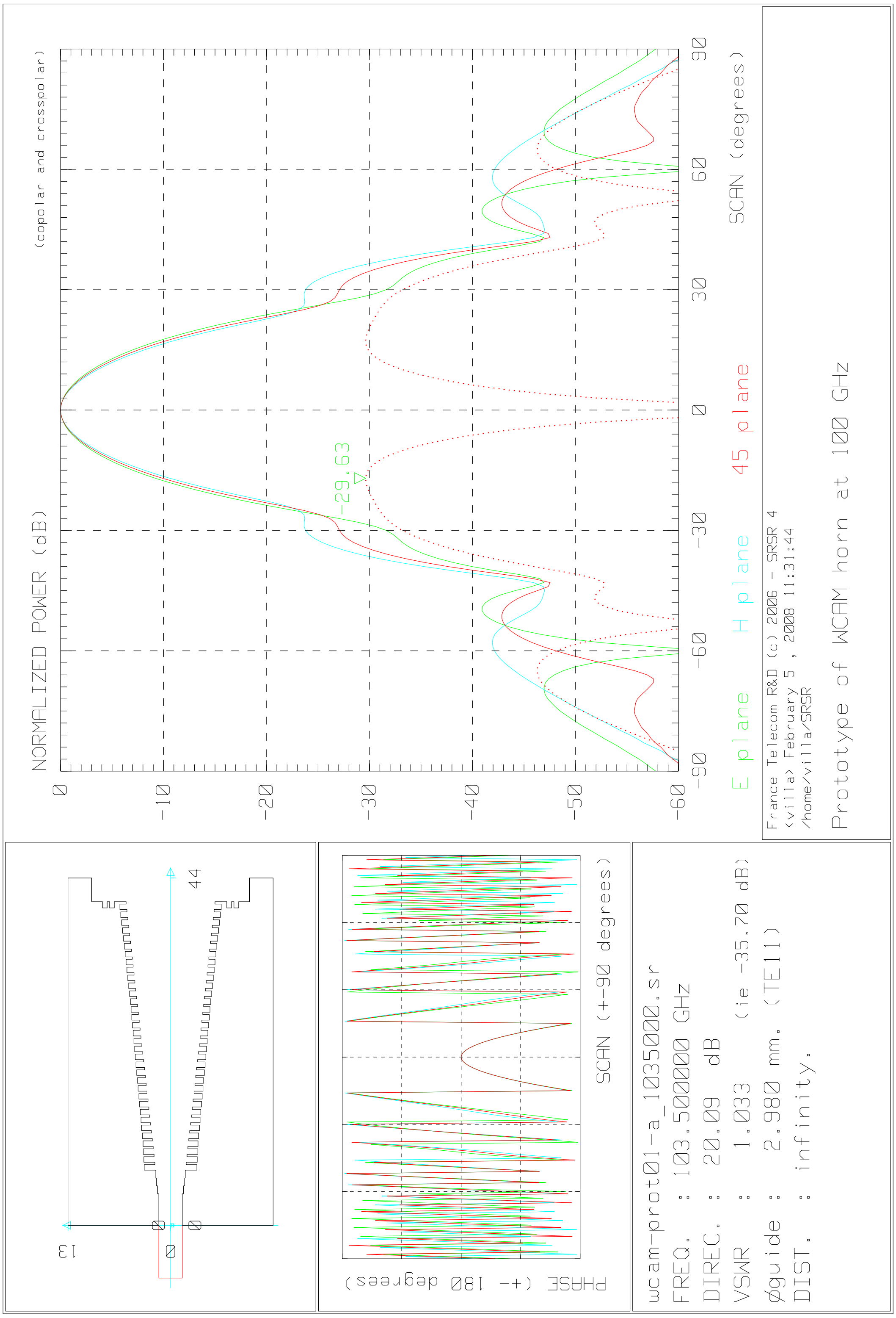

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-28.46
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:30:12
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1025000.sr
FREQ. : 102.500000 GHz
DIREC. : 19.99 dB
VSWR : 1.035 (ie -35.21 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

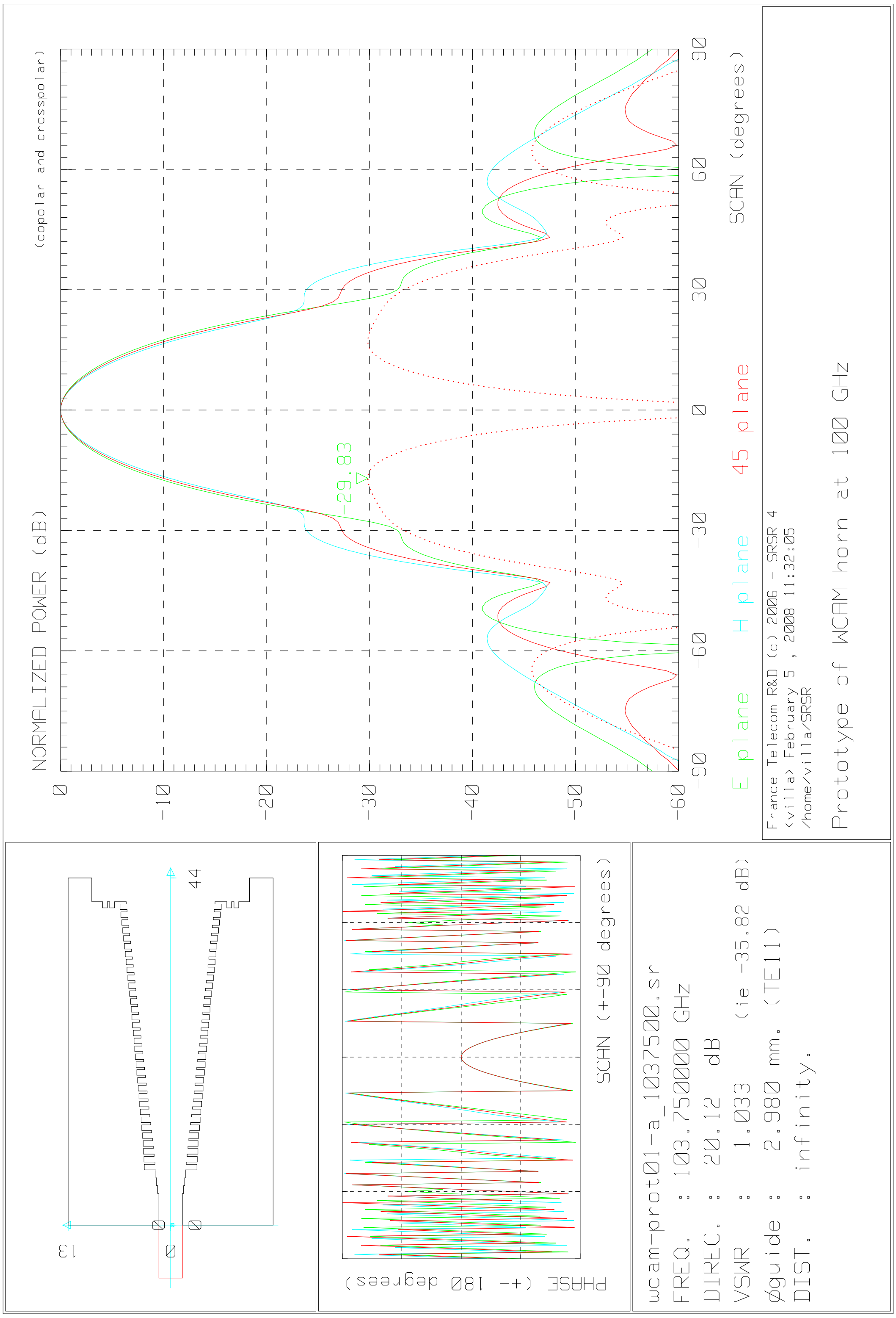

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-28.83
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:30:33
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1027500.sr
FREQ. : 102.750000 GHz
DIREC. : 20.01 dB
VSWR : 1.035 (ie -35.26 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

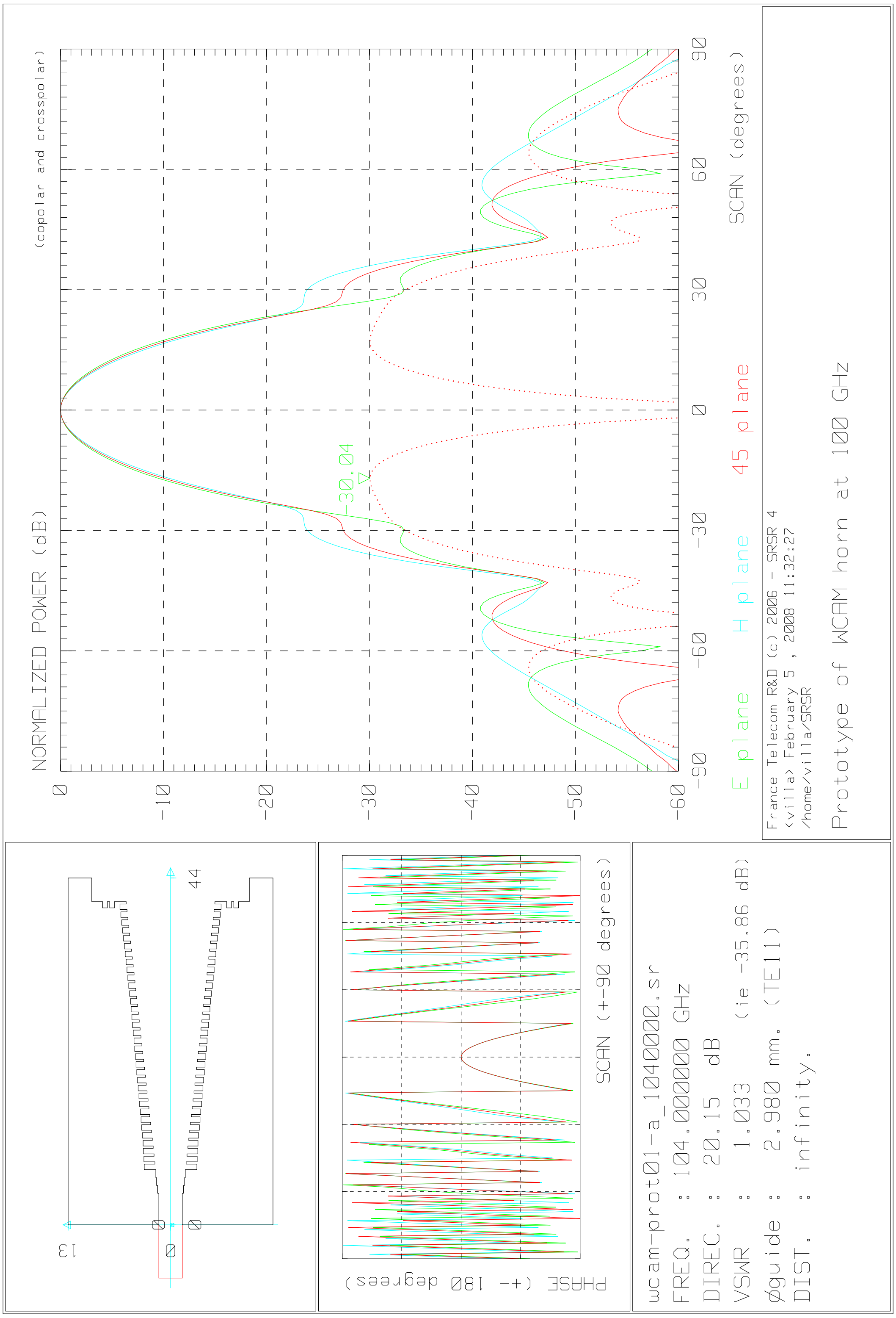


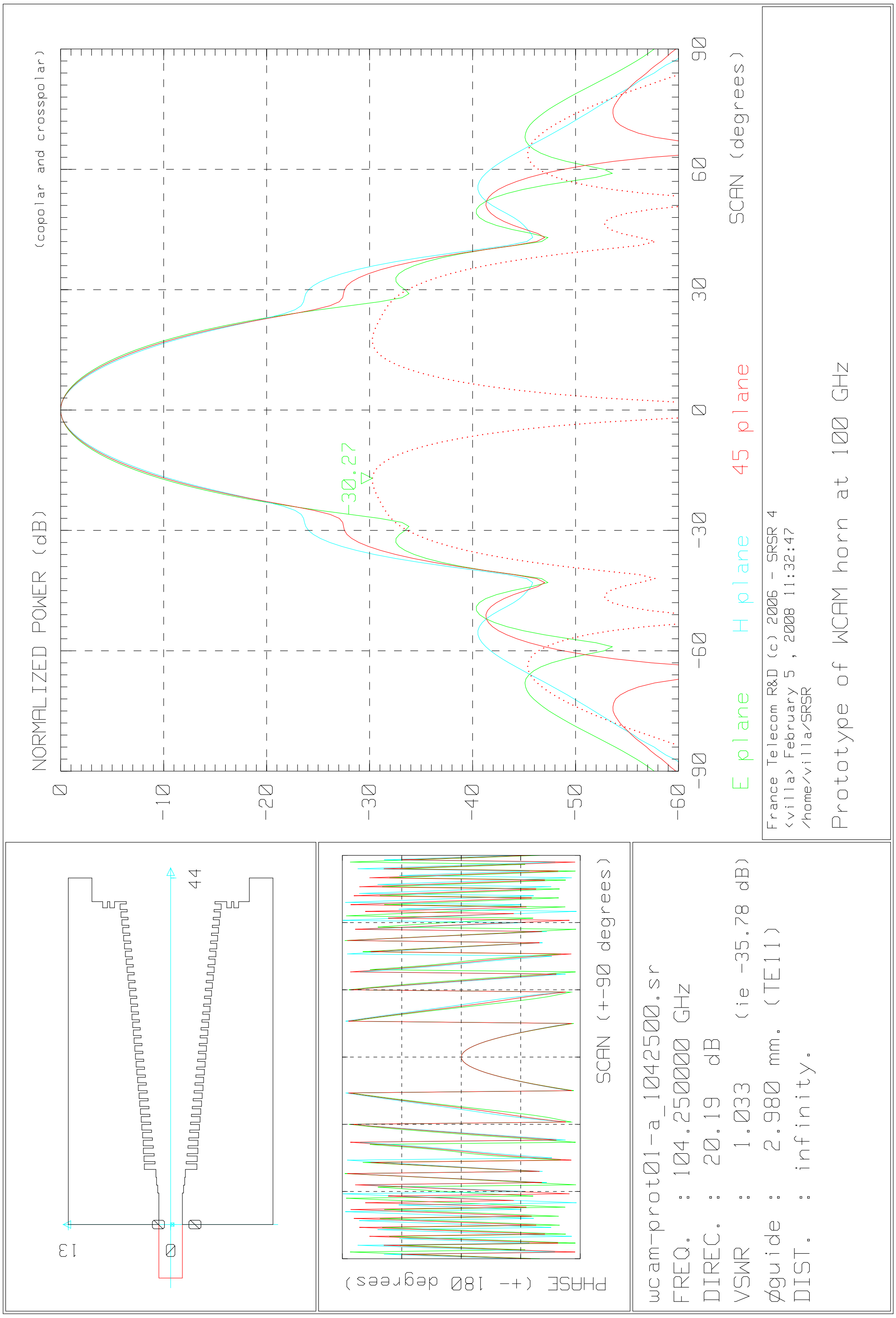
NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-29.16
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:30:53
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1030000.sr
FREQ. : 103.000000 GHz
DIREC. : 20.03 dB
VSWR : 1.035 (ie -35.39 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

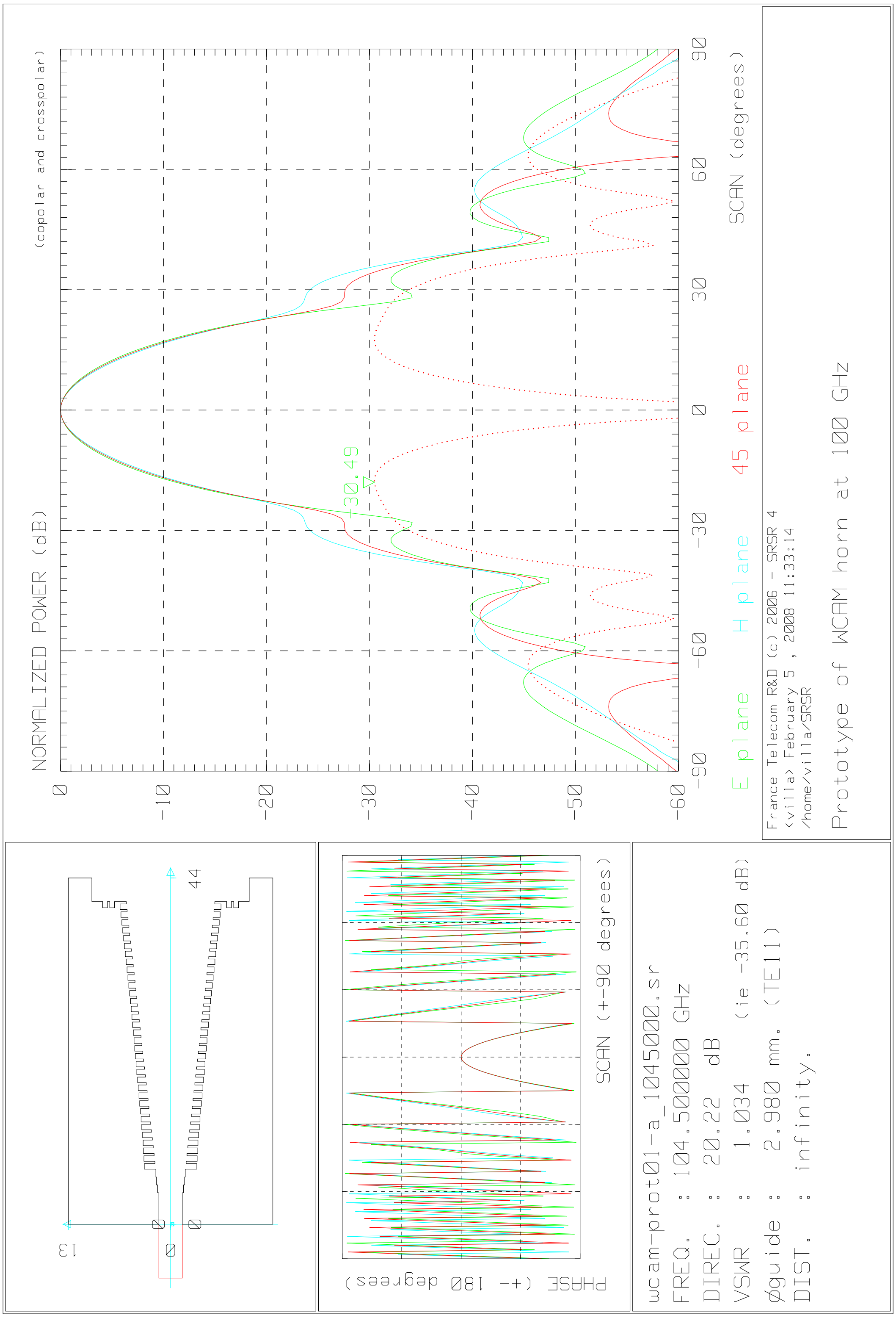


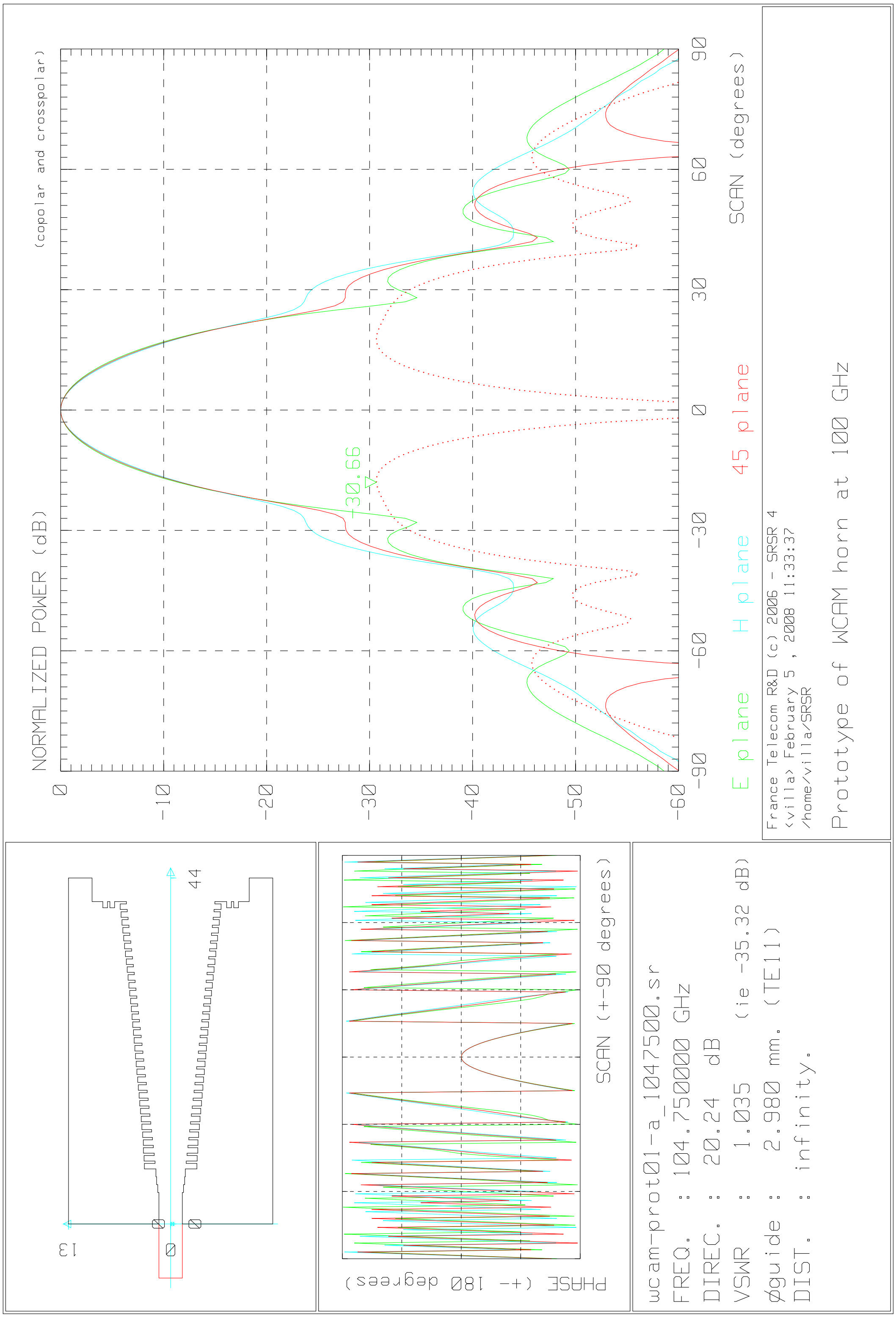

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-29.63
E plane H plane 45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:31:44
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1035000.sr
FREQ. : 103.500000 GHz
DIREC. : 20.09 dB
VSWR : 1.033 (ie -35.70 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

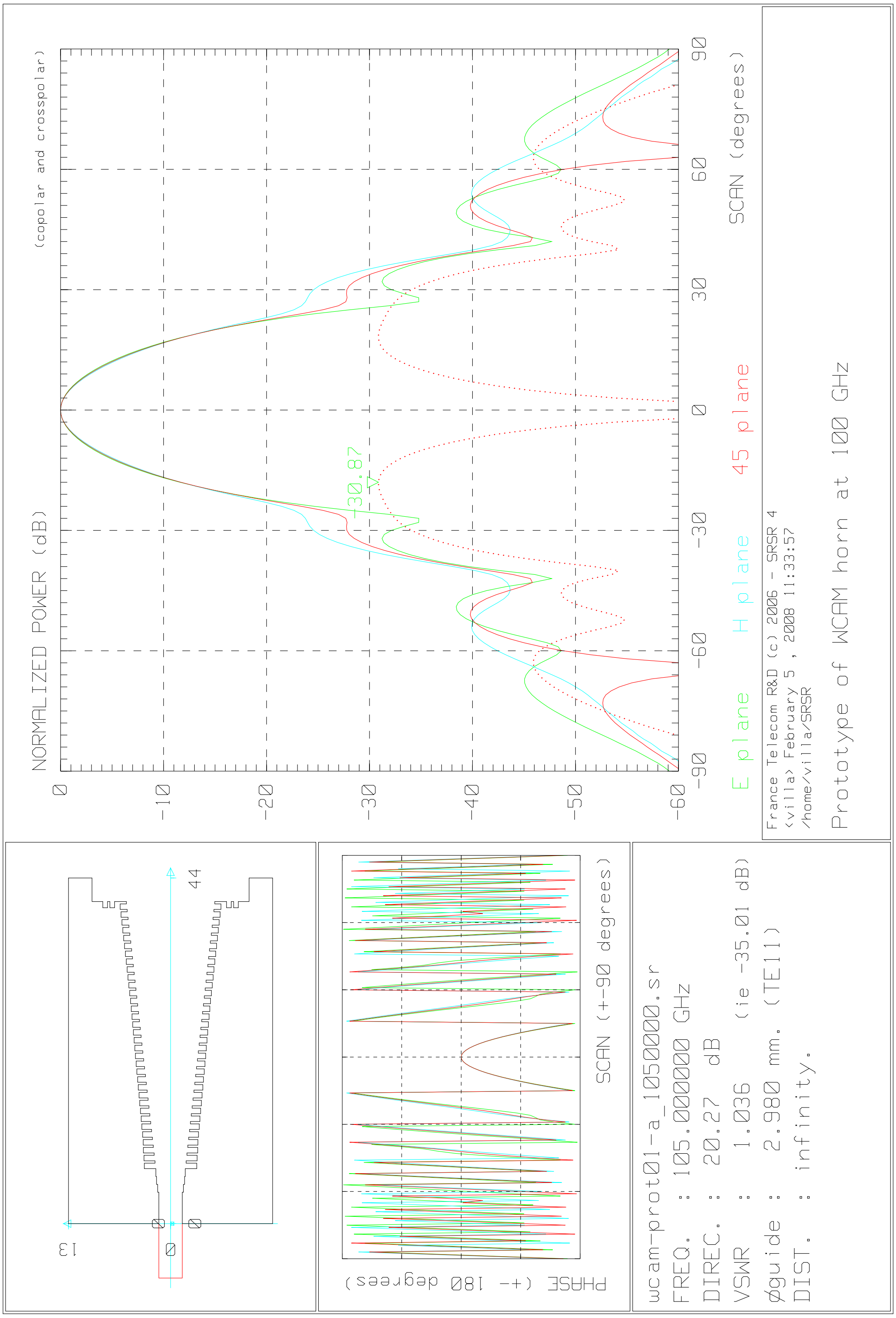

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-29.83
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:32:05
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1037500.sr
FREQ. : 103.750000 GHz
DIREC. : 20.12 dB
VSWR : 1.033 (ie -35.82 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

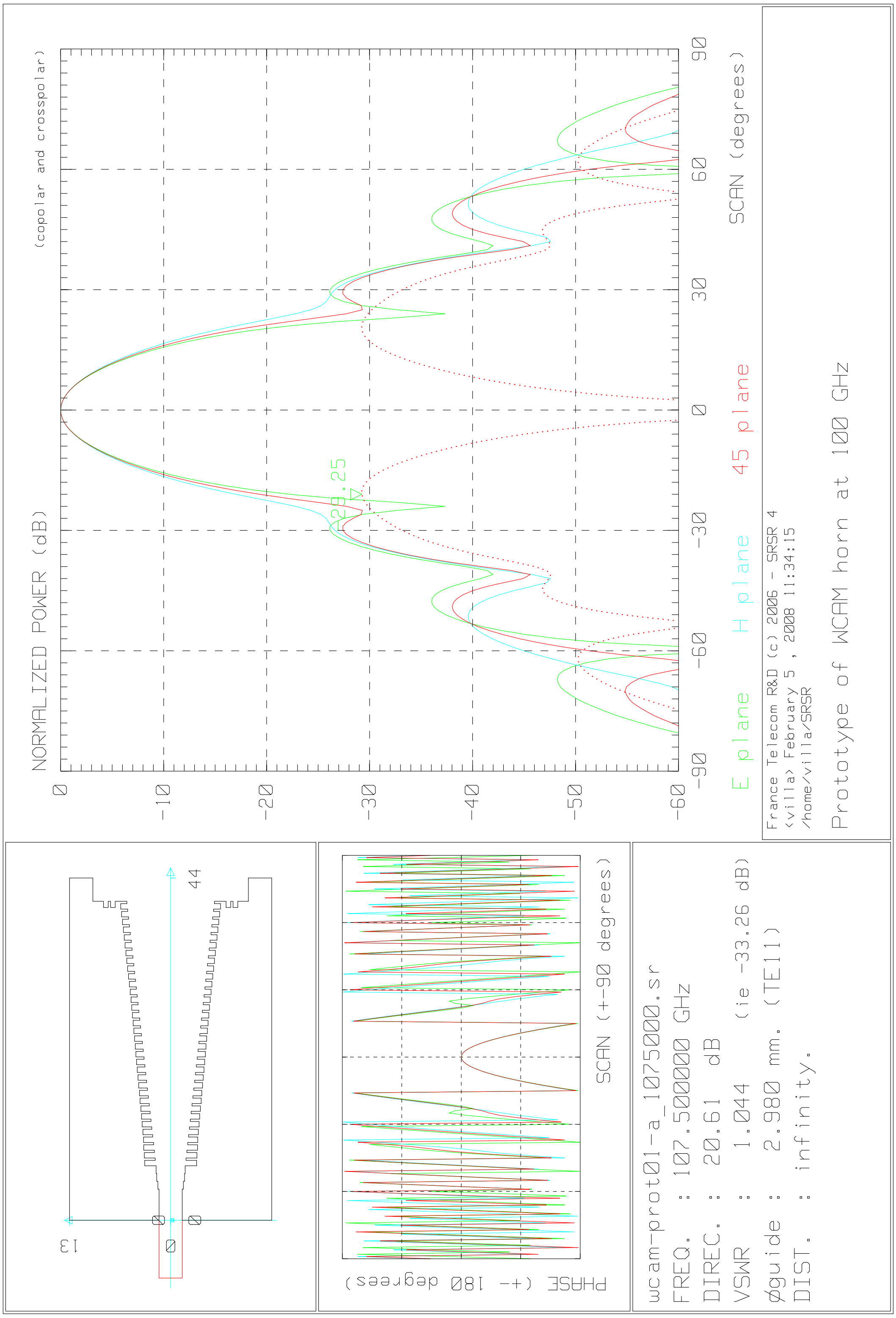

NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-30.04
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:32:27
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_104000.sr
FREQ. : 104.000000 GHz
DIREC. : 20.15 dB
VSWR : 1.033 (ie -35.86 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.

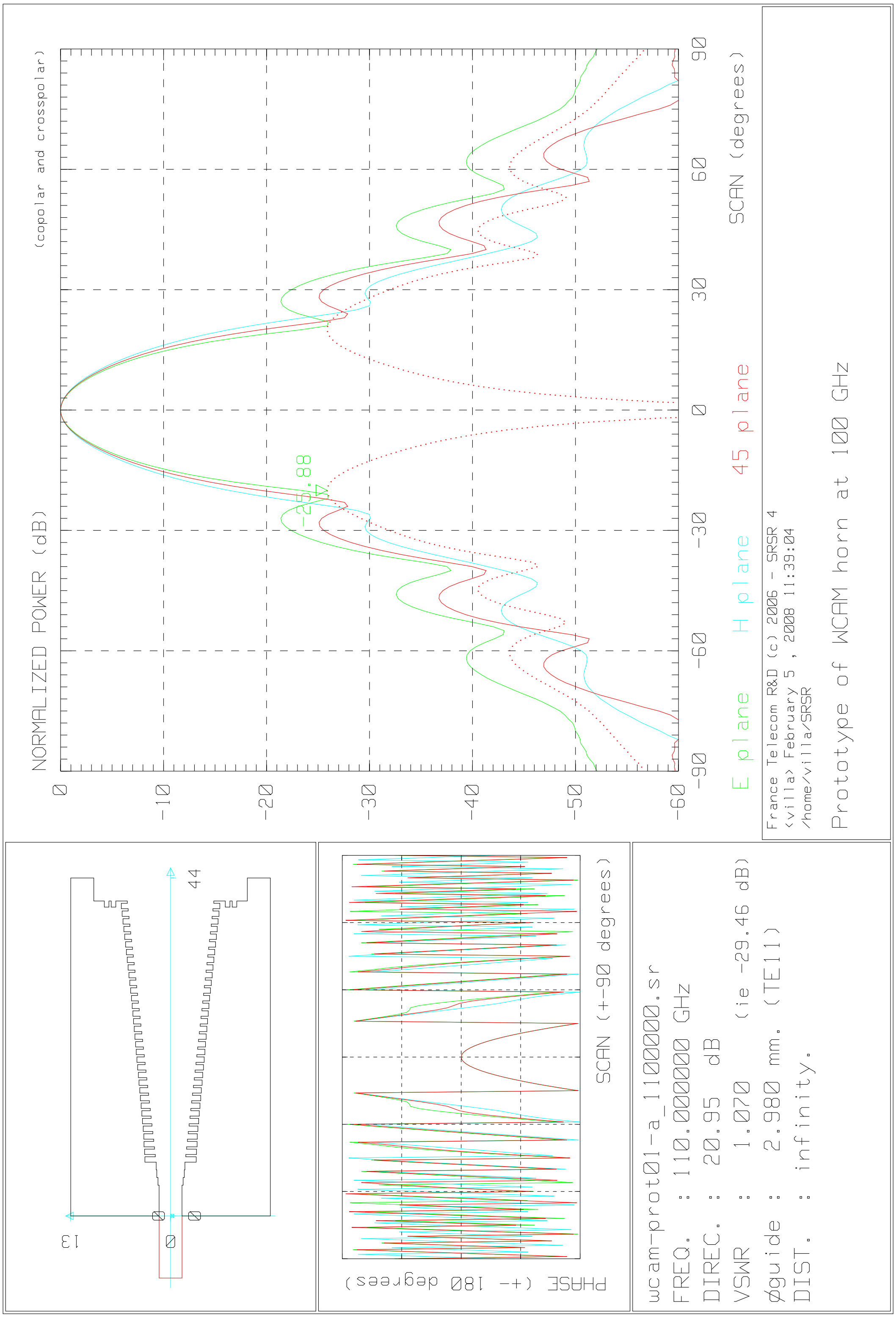

NORMALIZED POWER (dB)
(copolar and crosspolar)
-30.27
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:32:47
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1042500.sr
FREQ. : 104.250000 GHz
DIREC. : 20.19 dB
VSWR : 1.033 (ie -35.78 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.


NORMALIZED POWER (dB)
(copolar and crosspolar)
-30.49
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:33:14
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1045000.sr
FREQ. : 104.500000 GHz
DIREC. : 20.22 dB
VSWR : 1.034 (ie -35.60 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.


NORMALIZED POWER (dB)
(copolar and crosspolar)
-30.66
SCAN (degrees)
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:33:37
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1047500.sr
FREQ. : 104.750000 GHz
DIREC. : 20.24 dB
VSWR : 1.035 (ie -35.32 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.


NORMALIZED POWER (dB)
(copolar and crosspolar)
0
-10
-20
-30
-40
-50
-60
-90
-60
-30
0
30
60
90
SCAN (degrees)
-30.87
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:33:57
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
44
13
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_105000.sr
FREQ. : 105.000000 GHz
DIREC. : 20.27 dB
VSWR : 1.036 (ie -35.01 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.


NORMALIZED POWER (dB)
(copolar and crosspolar)
SCAN (degrees)
-29.25
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:34:15
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_1075000.sr
FREQ. : 107.500000 GHz
DIREC. : 20.61 dB
VSWR : 1.044 (ie -33.26 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.


(copolar and crosspolar)
NORMALIZED POWER (dB)
SCAN (degrees)
-25.88
E plane
H plane
45 plane
France Telecom R&D (c) 2006 - SRSR 4
<villa> February 5 , 2008 11:39:04
/home/villa/SRSR
Prototype of WCAM horn at 100 GHz
PHASE (+- 180 degrees)
SCAN (+-90 degrees)
wcam-prot01-a_110000.sr
FREQ. : 110.000000 GHz
DIREC. : 20.95 dB
VSWR : 1.070 (ie -29.46 dB)
øguide : 2.980 mm. (TE11)
DIST. : infinity.