ANTENNA SPECIFICATION		DATE	2005-10-07	Rev.	IR
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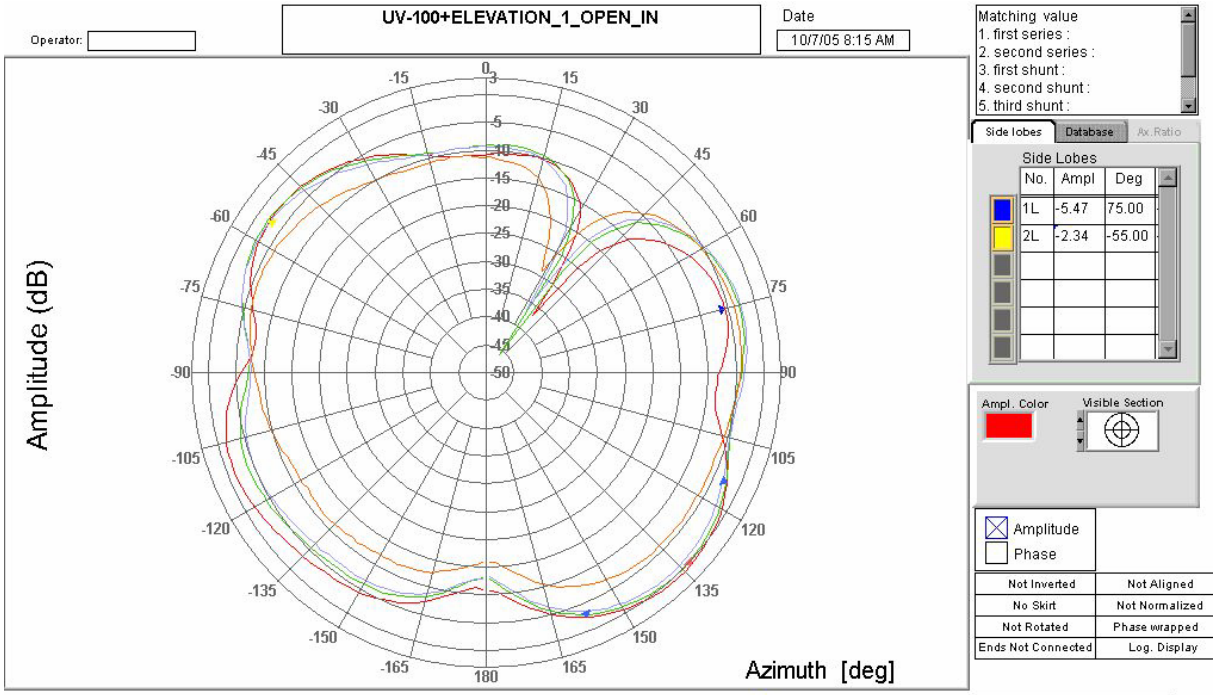
US-PCS ELEVATION-1, OPEN IN



File Name	Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]		Avg.	Dir.	Gain	Norm.	Phase
100_elevation_1_open_in-CAL.s	1850.000 M	0.00	CH1			0.61	133.00	P	42.86	3.00	P				-4.49	0.00	0.00	-51.76	
100_elevation_1_open_in-CAL.s	1910.000 M	0.00	CH1			0.01	137.00	P	45.08	3.00	P				-4.73	0.00	0.00	-52.69	
100_elevation_1_open_in-CAL.s	1930.000 M	0.00	CH1			-0.81	137.00	P	47.47	3.00	P				-5.16	0.00	0.00	-53.12	
100_elevation_1_open_in-CAL.s	1990.000 M	0.00	CH1			-3.77	81.00	P	95.52	3.00	P				-8.06	0.00	0.00	-51.40	

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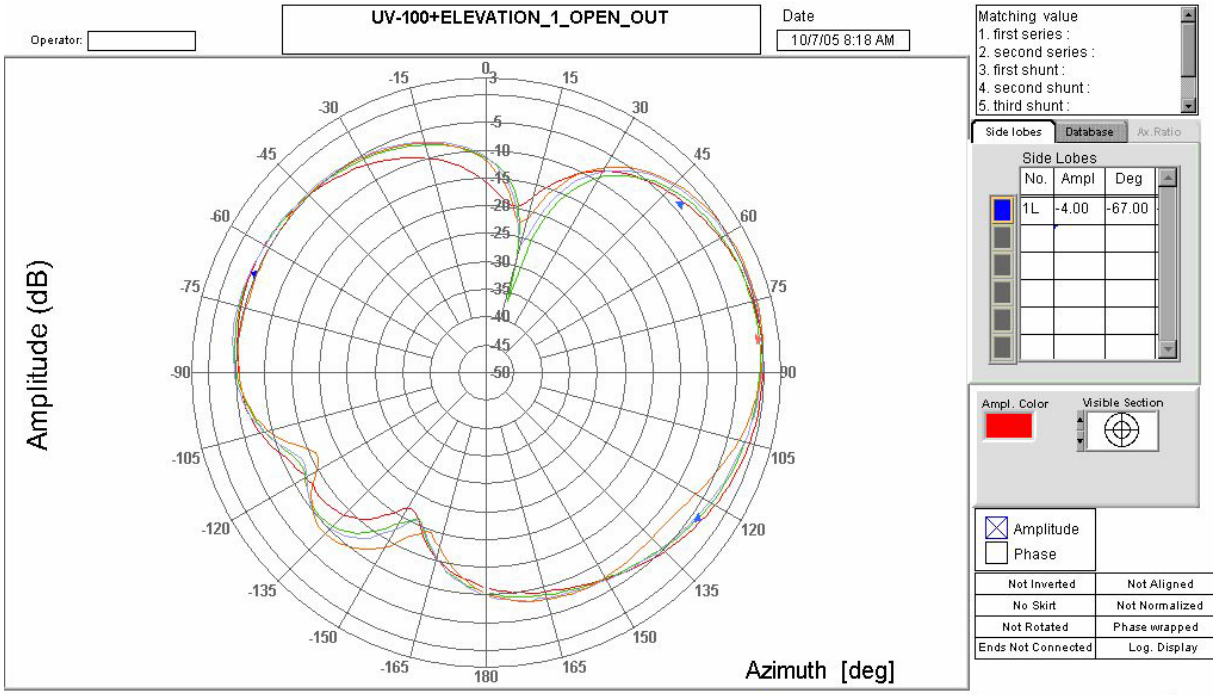
US-PCS ELEVATION-1, OPEN OUT



File Name	Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]	Avg.	Dir.	Gain	Norm.	Phase
00_elevation_1_open_out-CAL	1850.000 M	0.00	CH1			-0.07	83.00	P	75.43	3.00	P			-5.17	0.00	0.00	-51.76	
00_elevation_1_open_out-CAL	1910.000 M	0.00	CH1			-0.37	75.00	P	77.32	3.00	P			-5.21	0.00	0.00	-52.69	
00_elevation_1_open_out-CAL	1930.000 M	0.00	CH1			0.24	73.00	P	71.01	3.00	P			-4.82	0.00	0.00	-53.12	
00_elevation_1_open_out-CAL	1990.000 M	0.00	CH1			0.41	71.00	P	61.08	3.00	P			-5.18	0.00	0.00	-51.40	

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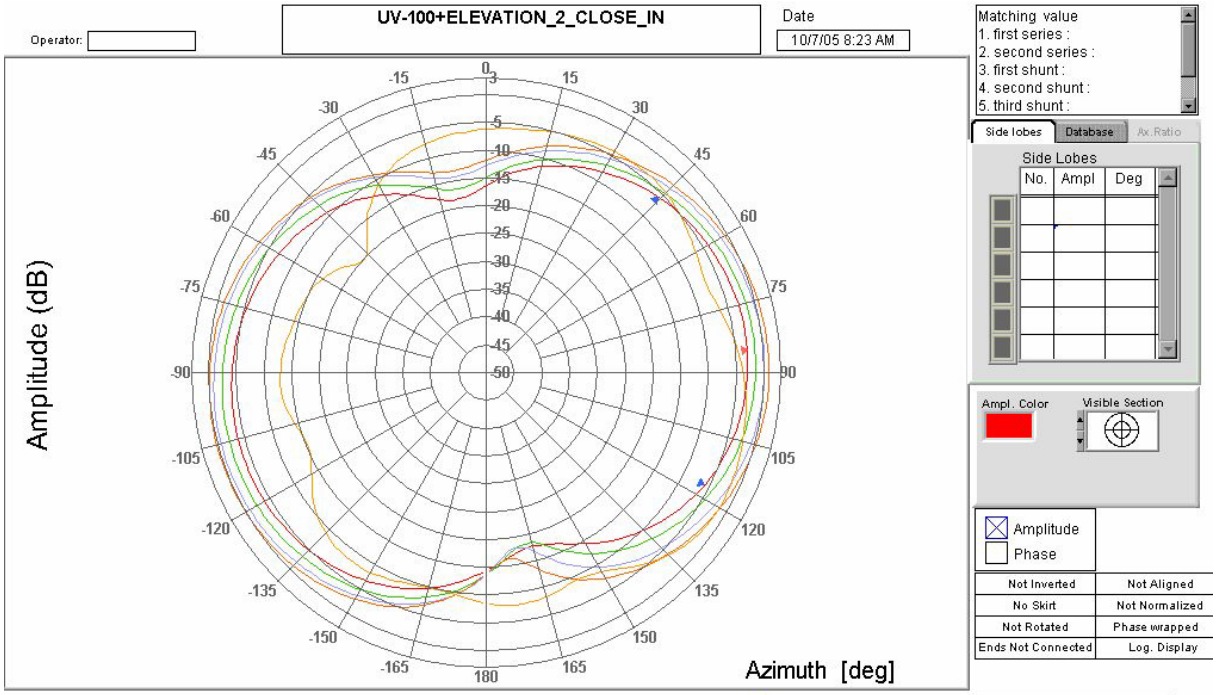
CELLULAR / GPS ELEVATION-2, CLOSE IN



File Name			Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]		Avg.	Dir.	Gain	Norm.	Phase
100_elevation_2_close_in-CAL.			824.000 M	0.00	CH1			-2.84	85.00	P	72.90	3.00	P				-6.59	0.00	0.00	-42.57	
100_elevation_2_close_in-CAL.			849.000 M	0.00	CH1			-1.46	83.00	P	74.67	3.00	P				-5.01	0.00	0.00	-42.42	
100_elevation_2_close_in-CAL.			869.000 M	0.00	CH1			0.10	85.00	P	75.77	3.00	P				-3.46	0.00	0.00	-42.72	
100_elevation_2_close_in-CAL.			894.000 M	0.00	CH1			0.95	87.00	P	77.89	3.00	P				-2.59	0.00	0.00	-43.71	
100_elevation_2_close_in-CAL.			1575.000 M	0.00	CH1			-1.46	119.00	P	52.54	3.00	P				-6.65	0.00	0.00	-49.61	

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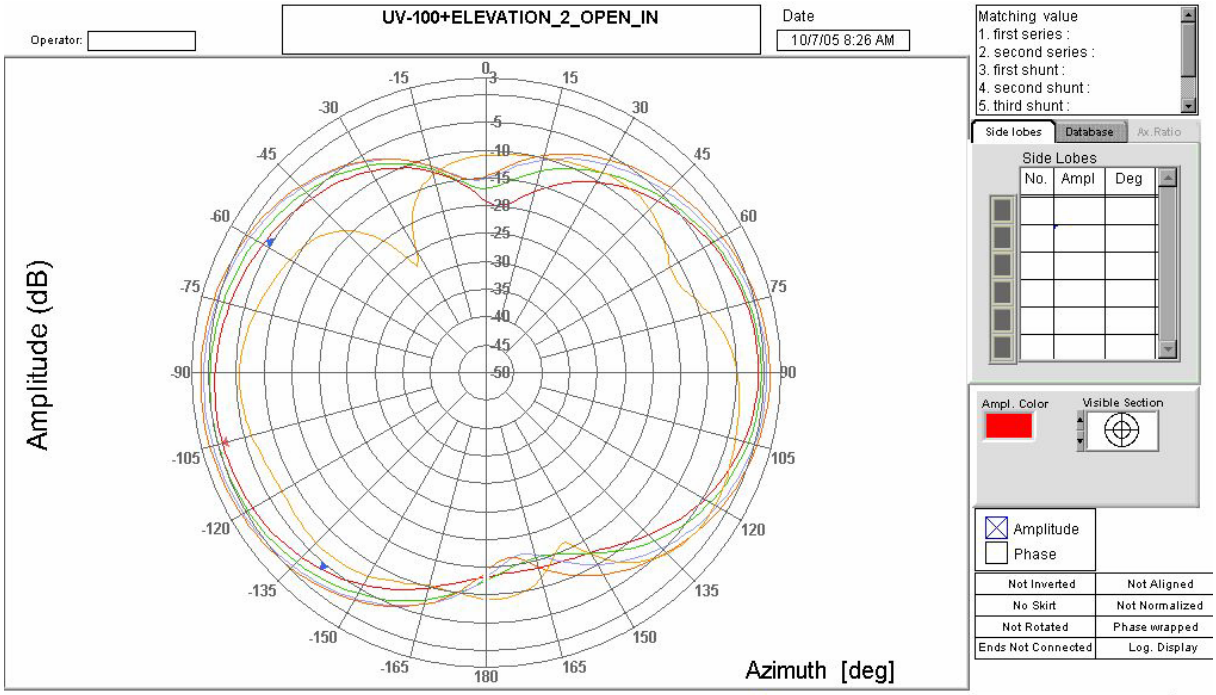
CELLULAR / GPS ELEVATION-2, OPEN IN



File Name	Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]	Avg.	Dir.	Gain	Norm.	Phase
100_elevation_2_open_in-CAL.s	824.000 M	0.00	CH1			-0.83	-105.00	P	80.92	3.00	P			-4.64	0.00	0.00	-42.57	
100_elevation_2_open_in-CAL.s	849.000 M	0.00	CH1			-0.09	-107.00	P	92.46	3.00	P			-3.66	0.00	0.00	-42.42	
100_elevation_2_open_in-CAL.s	869.000 M	0.00	CH1			0.98	-103.00	P	92.73	3.00	P			-2.56	0.00	0.00	-42.72	
100_elevation_2_open_in-CAL.s	894.000 M	0.00	CH1			1.48	-101.00	P	91.90	3.00	P			-1.98	0.00	0.00	-43.71	
100_elevation_2_open_in-CAL.s	1575.000 M	0.00	CH1			-2.32	123.00	P	51.99	3.00	P			-7.53	0.00	0.00	-49.61	

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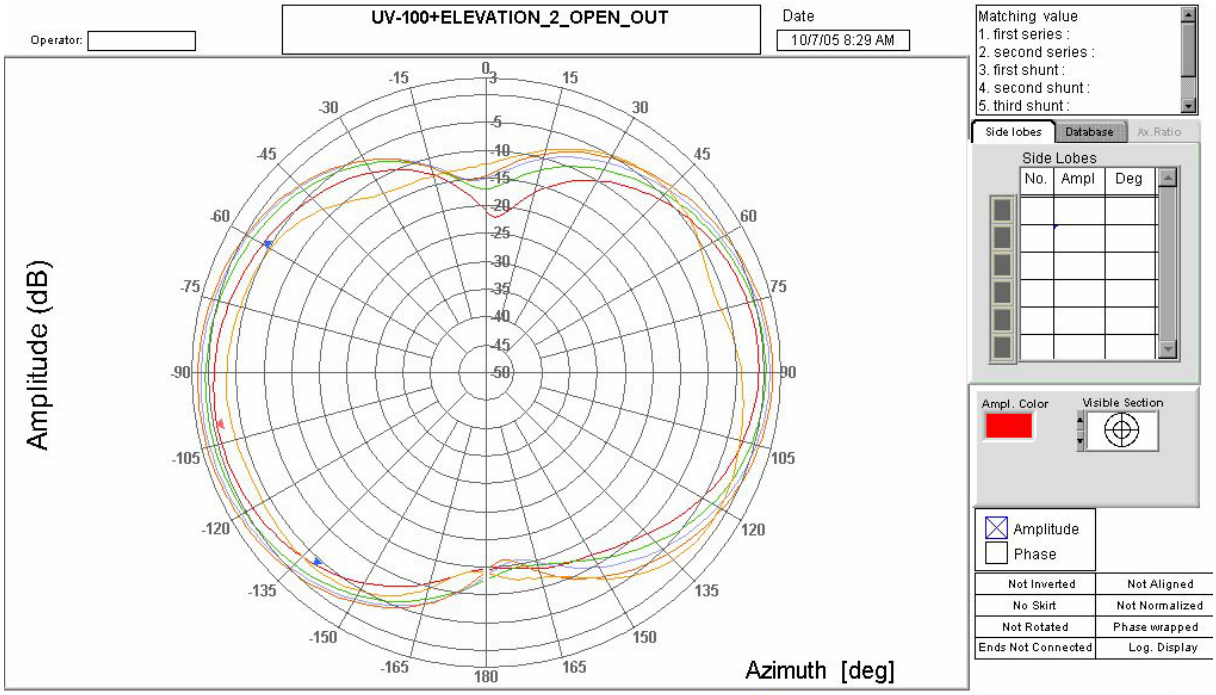
CELLULAR / GPS ELEVATION-2, OPEN OUT



File Name			Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]		Avg.	Dir.	Gain	Norm.	Phase
00_elevation_2_open_out-CAL			824.000 M	0.00	CH1			-0.71	-101.00	P	78.75	3.00	P				-4.61	0.00	0.00	-42.57	
00_elevation_2_open_out-CAL			849.000 M	0.00	CH1			0.74	-101.00	P	88.77	3.00	P				-2.97	0.00	0.00	-42.42	
00_elevation_2_open_out-CAL			869.000 M	0.00	CH1			1.53	-101.00	P	89.46	3.00	P				-2.12	0.00	0.00	-42.72	
00_elevation_2_open_out-CAL			894.000 M	0.00	CH1			2.02	-103.00	P	88.98	3.00	P				-1.55	0.00	0.00	-43.71	
00_elevation_2_open_out-CAL			1575.000 M	0.00	CH1			-1.29	123.00	P	54.06	3.00	P				-5.20	0.00	0.00	-49.61	

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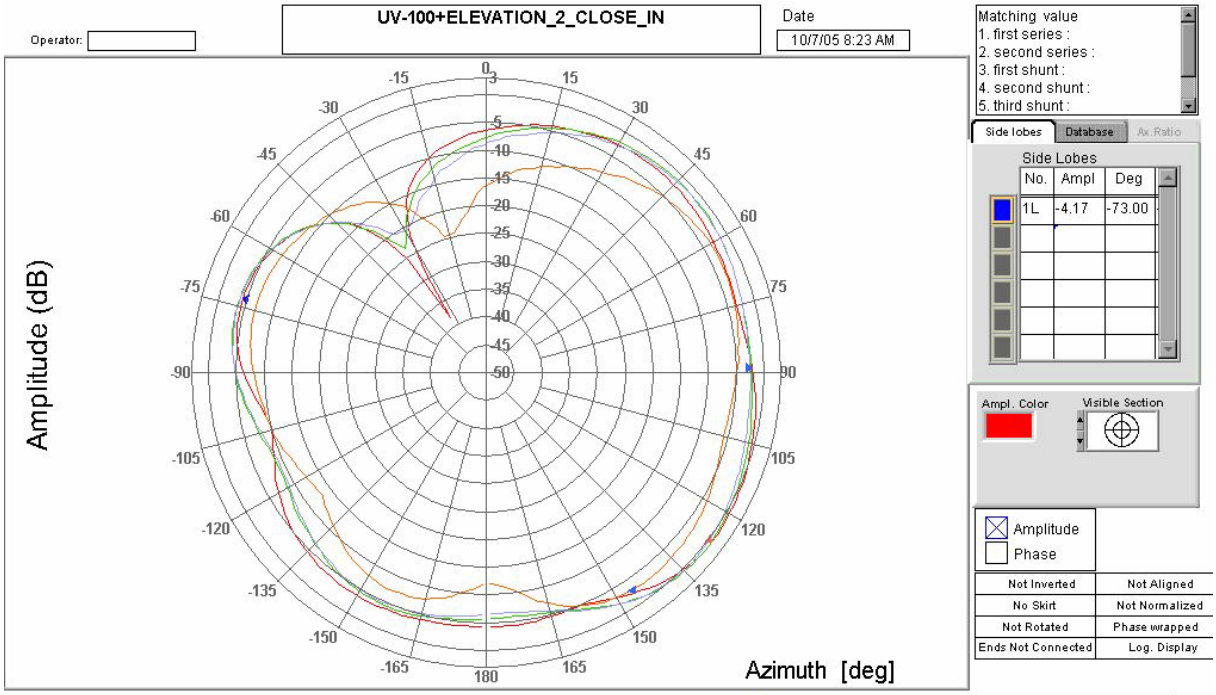
US-PCS ELEVATION-2, CLOSE IN



File Name	Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]	Avg.	Dir.	Gain	Norm.	Phase
100_elevation_2_close_in-CAL.	1850.000 M	0.00	CH1			0.80	127.00	P	56.94	3.00	P			-3.72	0.00	0.00	-51.76	
100_elevation_2_close_in-CAL.	1910.000 M	0.00	CH1			0.71	131.00	P	62.07	3.00	P			-3.64	0.00	0.00	-52.69	
100_elevation_2_close_in-CAL.	1930.000 M	0.00	CH1			0.42	131.00	P	68.41	3.00	P			-3.96	0.00	0.00	-53.12	
100_elevation_2_close_in-CAL.	1990.000 M	0.00	CH1			-2.71	141.00	P	56.03	3.00	P			-6.90	0.00	0.00	-51.40	

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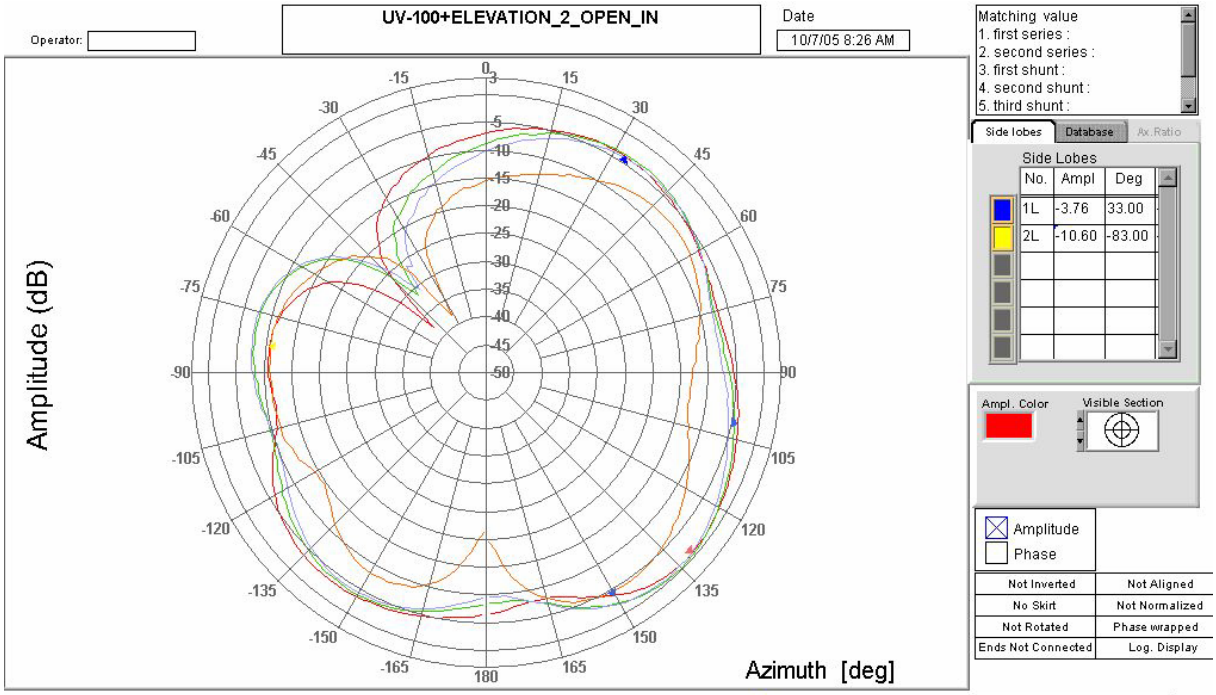
US-PCS ELEVATION-2, OPEN IN



File Name	Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]		Avg.	Dir.	Gain	Norm.	Phase
100_elevation_2_open_in-CAL.s	1850.000 M	0.00	CH1			-0.73	131.00	P	48.62	3.00	P				-5.49	0.00	0.00	-51.76	
100_elevation_2_open_in-CAL.s	1910.000 M	0.00	CH1			-0.30	135.00	P	45.26	3.00	P				-5.55	0.00	0.00	-52.69	
100_elevation_2_open_in-CAL.s	1930.000 M	0.00	CH1			-0.63	137.00	P	44.04	3.00	P				-5.99	0.00	0.00	-53.12	
100_elevation_2_open_in-CAL.s	1990.000 M	0.00	CH1			-4.40	147.00	P	39.53	3.00	P				-10.16	0.00	0.00	-51.40	

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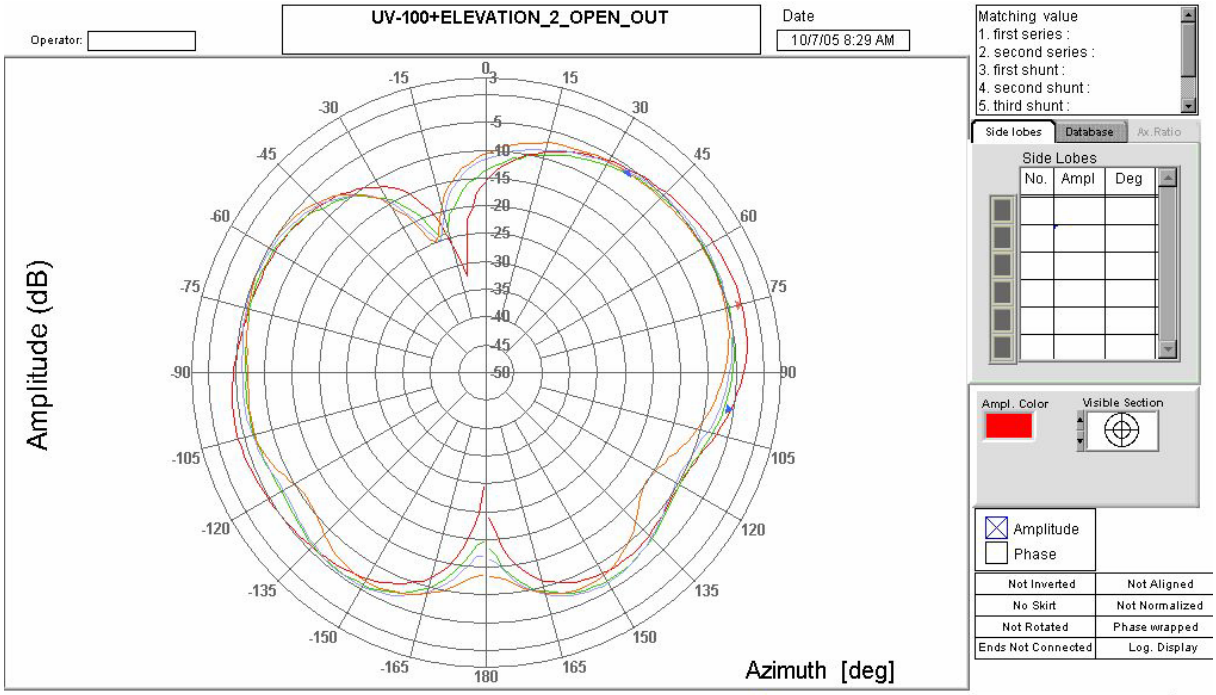
US-PCS ELEVATION-2, OPEN OUT



File Name	Freq. MHz		Ch.	Beam	Switch	Beam Peak [dB] Value	[deg]		Beam Width [deg] Value	At dB		Null Depth [dB] Value	[deg]	Avg.	Dir.	Gain	Norm.	Phase
00_elevation_2_open_out-CAL	1850.000 M	0.00	CH1			-2.36	75.00	P	63.17	3.00	P			-6.52	0.00	0.00	-51.76	
00_elevation_2_open_out-CAL	1910.000 M	0.00	CH1			-4.71	67.00	P	80.17	3.00	P			-7.46	0.00	0.00	-52.69	
00_elevation_2_open_out-CAL	1930.000 M	0.00	CH1			-4.43	63.00	P	77.35	3.00	P			-7.21	0.00	0.00	-53.12	
00_elevation_2_open_out-CAL	1990.000 M	0.00	CH1			-4.86	-63.00	P	70.39	3.00	P			-7.86	0.00	0.00	-51.40	

3.3 Antenna Gain

Antenna gain shall be measured in decibels relative to a standard horn reference antenna (unit : dBi)

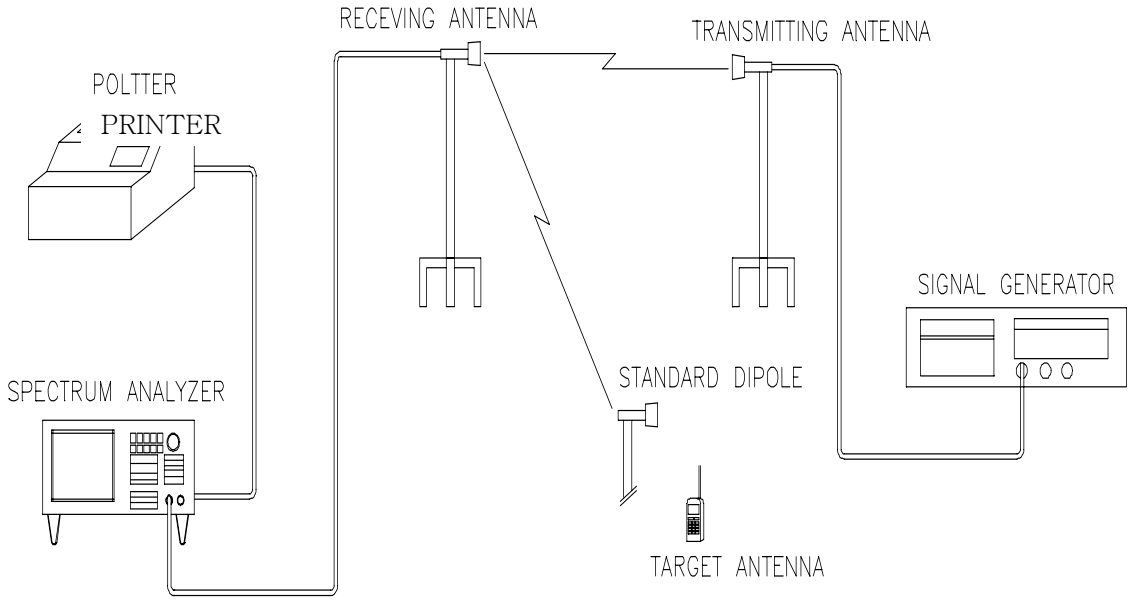


Figure. 2 Antenna Gain Measurement System

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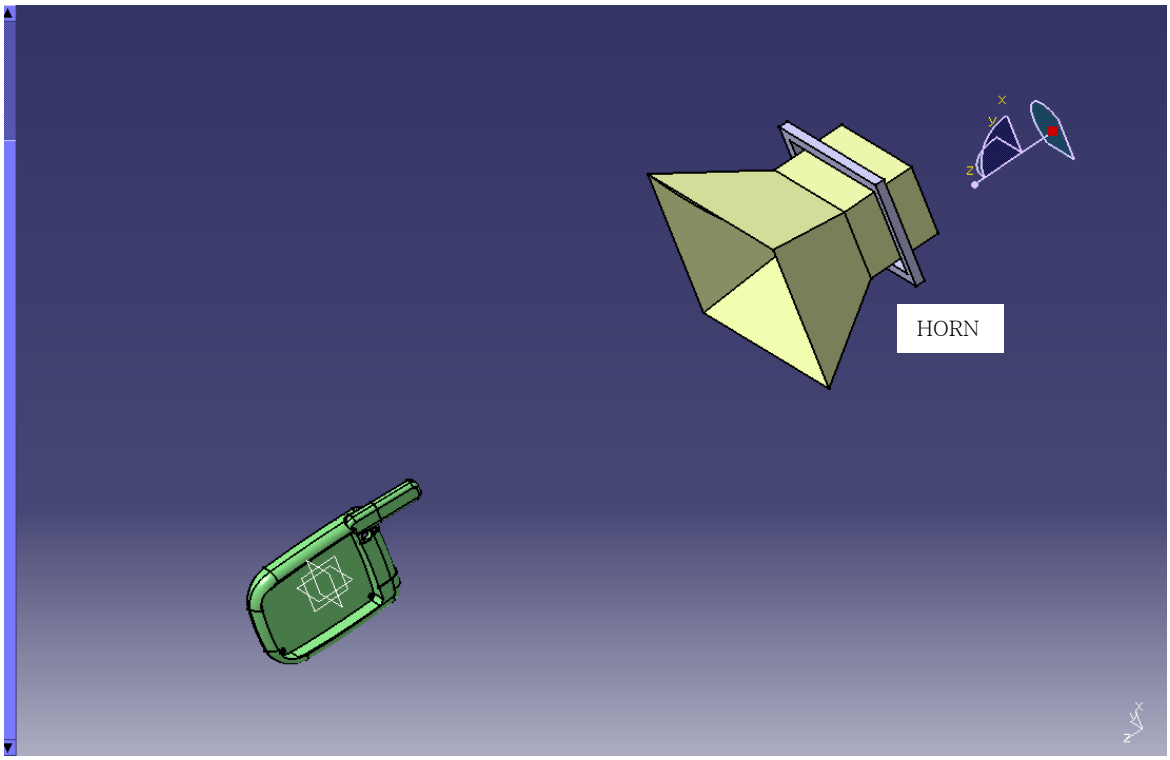
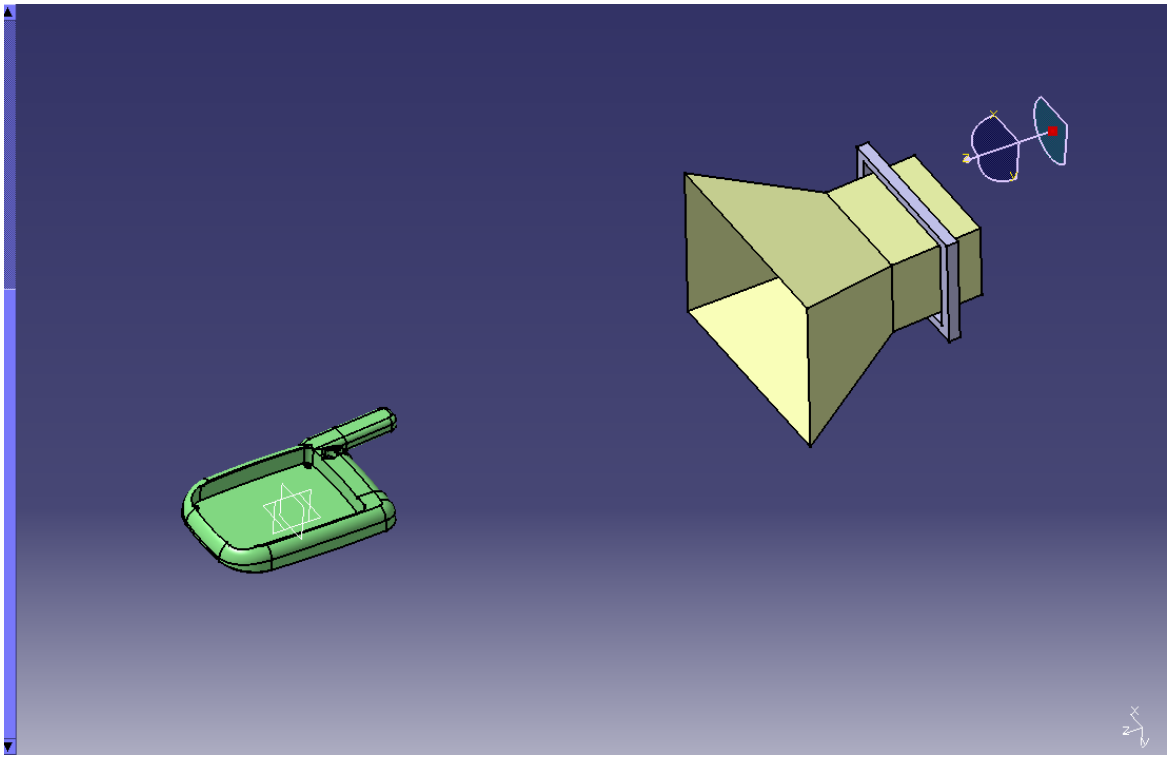
ELEVATION-1 MEASUREMENT



ELEVATION-2 MEASUREMENT



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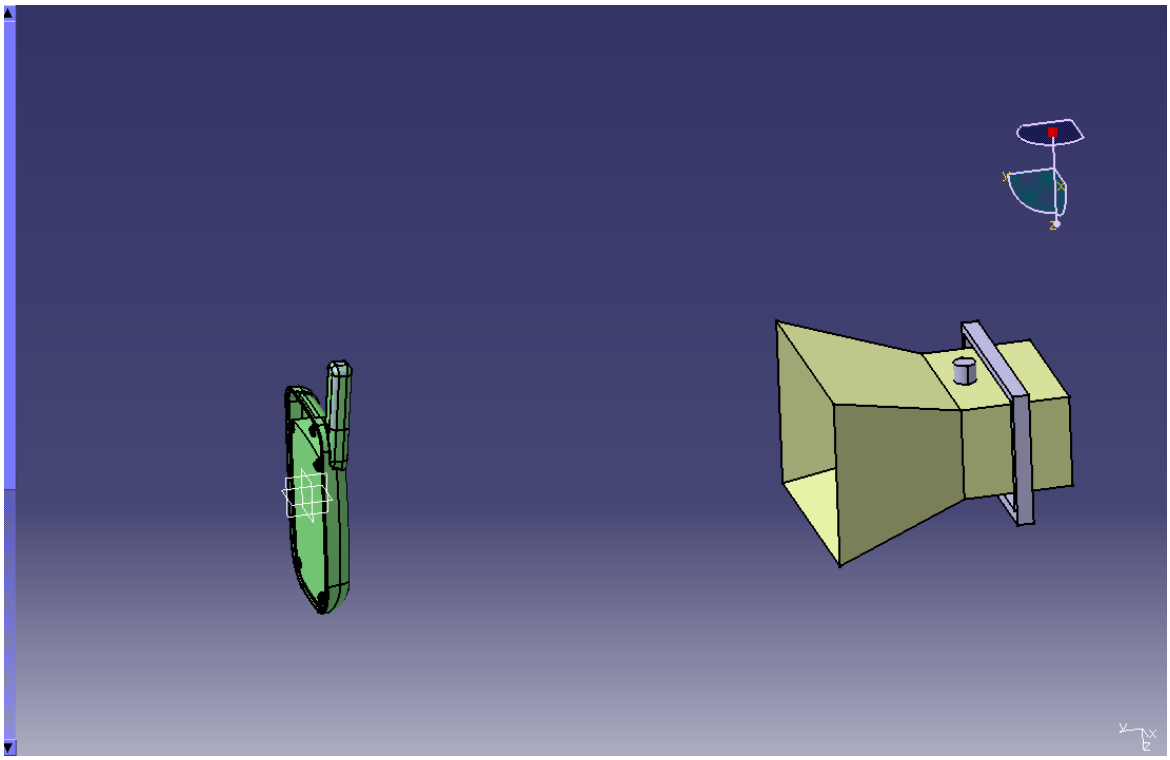
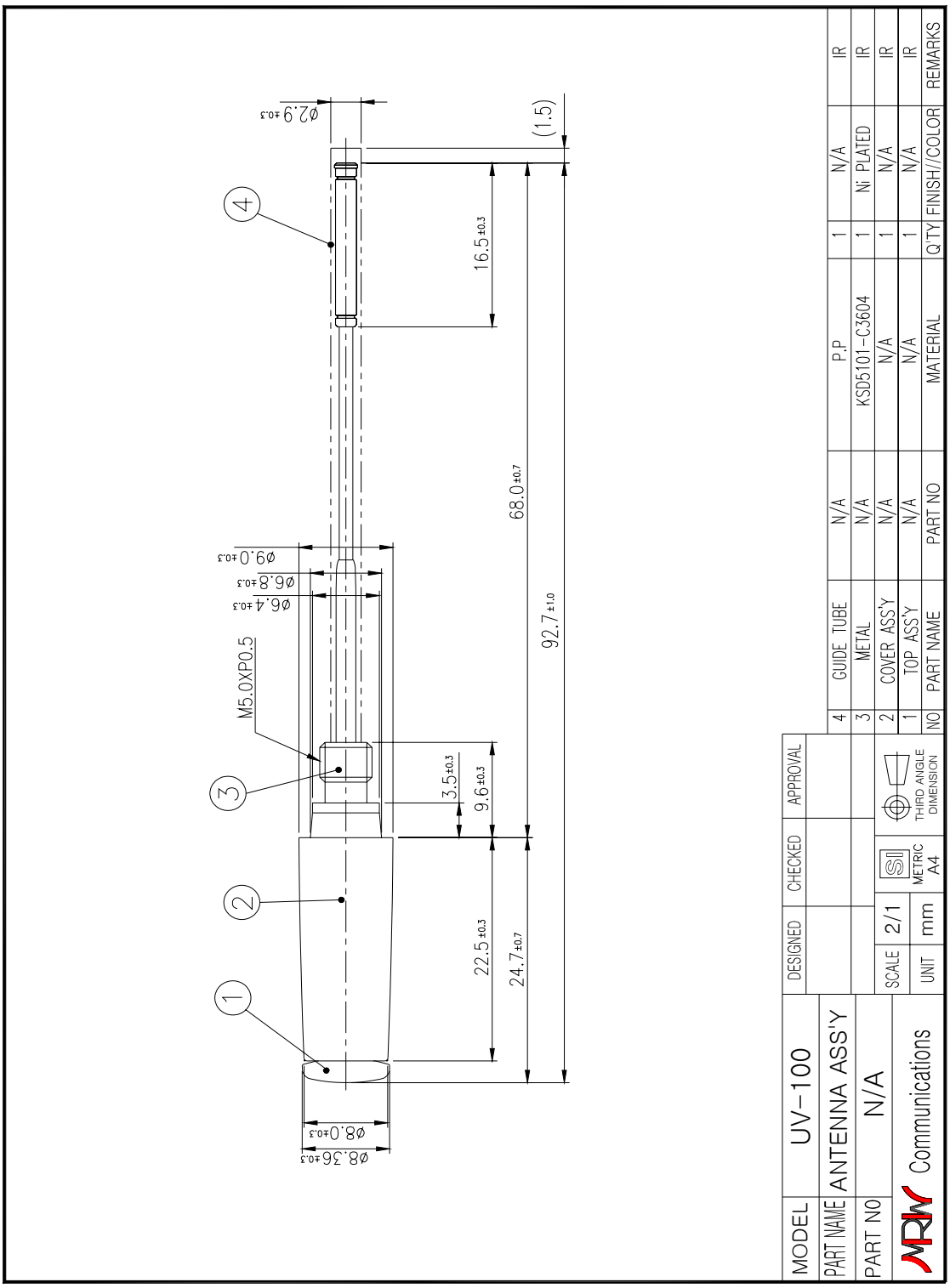
AZIMUTH MEASUREMENT



ANTENNA SPECIFICATION		DATE	2005-10-07	Rev.	IR
MODEL	**UV-100**	TYPE	Retractable	PAGE	31 / 37

4. Mechanical Specification

4.1 **Dimension (**Refer to the drawing**)**



4.2 **Bending Test**

There shall not be any visible damage and shall met electrical specification after 400 times bending at 90° form side to side.

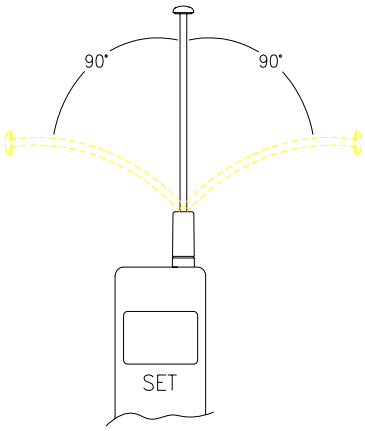


Figure. 3 Bending Test

4.3 Extraction / Retraction Test

When the whip of antenna is pulled up for extraction in retracted position, the force should be 100 ~ 400gf and when the whip of antenna is pushed down for retraction, he release force of stopper shall be 100 ~ 400gf.

4.4 **Drop Test**

The handset installed with antenna is dropped from 1.5m onto the concrete bottom for 3 times.

There shall not be any major visible damage and the antenna shall perform normally as defined in this specification after the test.

4.5 Pull Test

The antenna is assembled in the test equipment and pulling force with 7kgf is applied to the antenna for 10 seconds.

No visual deterioration shall occur and the antenna shall satisfy the electrical demands after the test.

4.6 Torque Test

The antenna is assembled to the test equipment. After applying the torque force with 3kgf in clockwise direction between fitting and plastic, no visual deterioration shall occur, the antenna shall satisfy the electrical demands after the test.

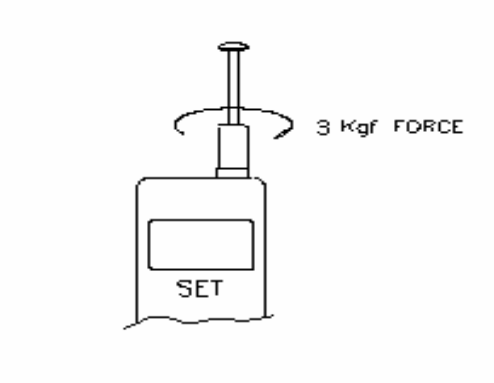


Figure 4. Torque Test

4.7 **Cycle Test**

The antenna is fully extended / retracted (1 cycle) with 10,000 times and the extraction / retraction force is measured every 2,000 cycles.

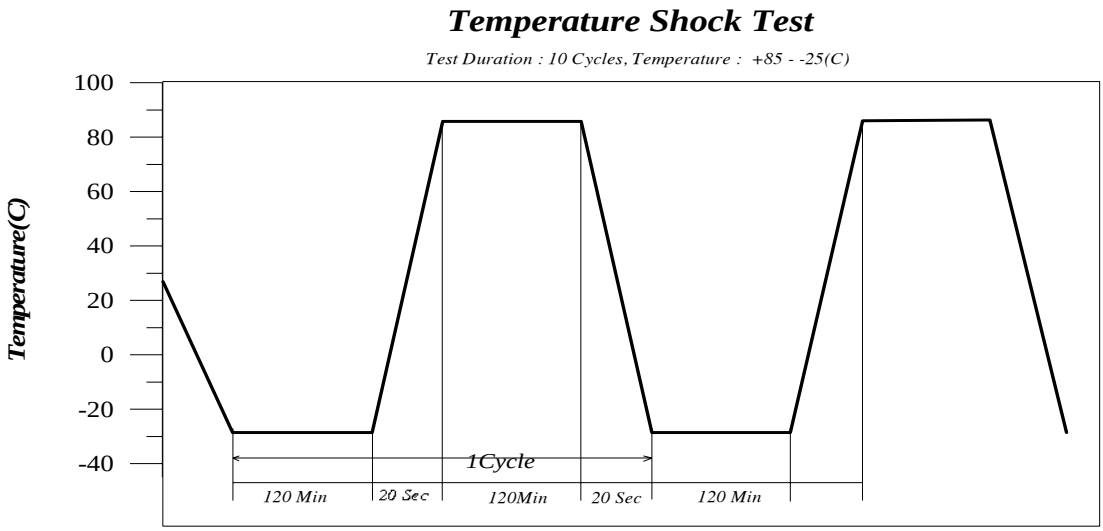
The extraction/retraction force of antenna shall keeps 50 ~ 400gf.

No visual deterioration shall occur and the antenna shall satisfy the electrical demands after the test.

5. Environmental Specification

5.1 Thermal Shock

The antenna shall withstand 10 repeated cycles of 120 minutes at -25ºC and 120 minutes at +85ºC with a maximum transition time between temperature extremes of 20 seconds. The antenna shall satisfy the electrical specification after the test. The antenna shall have no deterioration after the test.



5.2 Temperature Cycling

The antenna is placed in the temperature chamber with -40 for 3 hours and measured after taking out of chamber.

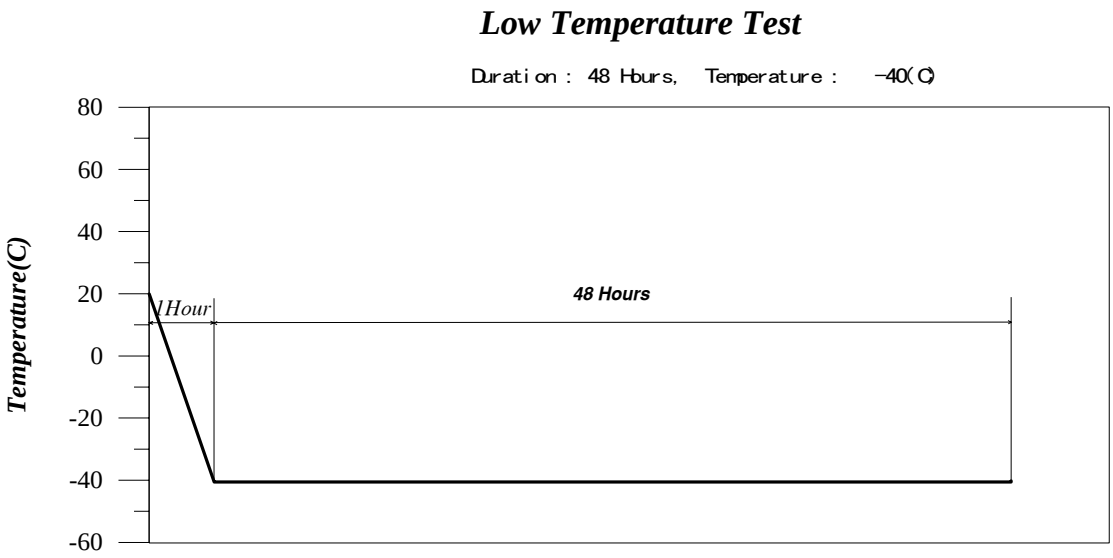
After that, the antenna is again placed in the temperature chamber with +70ºC for 3 hours and measured after taking out of chamber.

The antenna shall not be any visible damage and it shall meet electrical spec.

5.3 Low Temperature Test

The antenna is placed in the temperature chamber with -40ºC for 48 hours and measured after taking out of chamber.

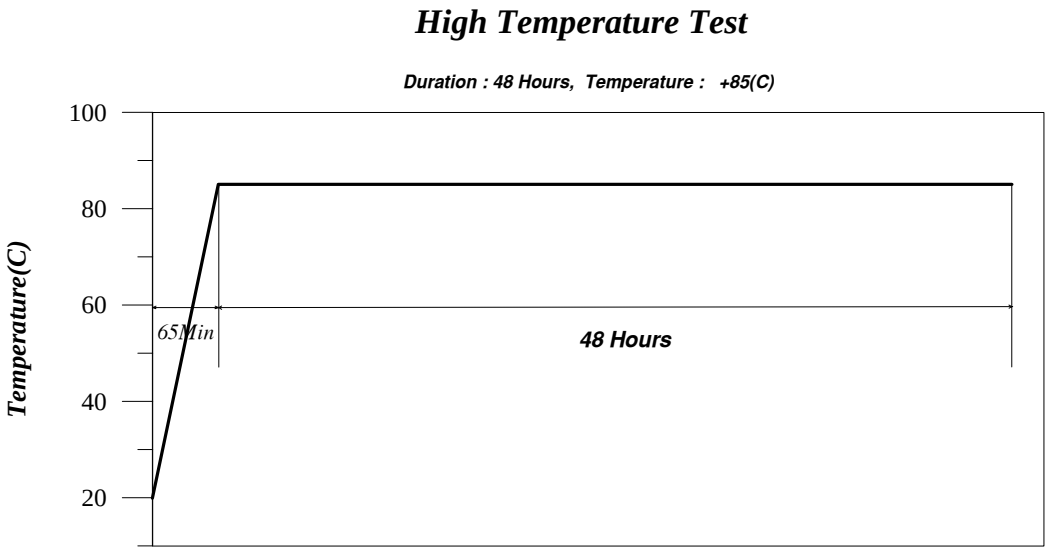
The antenna shall not be any visible damage and it shall meet electrical spec.



5.4 High Temperature Test

The antenna is placed in the temperature chamber and test it under below condition and measured it after taking out of chamber.

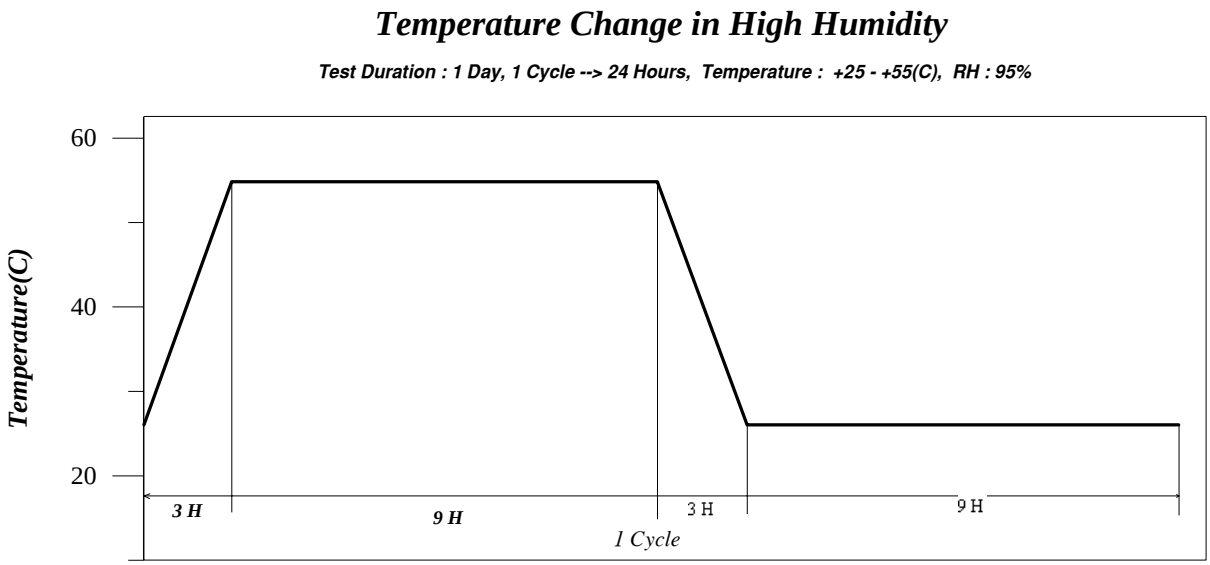
The antenna shall not be any visible damage and it shall meet electrical spec.



5.5 Humidity Test

The antenna is placed in the temperature chamber and test it under below condition and measured it after taking out of chamber.

The antenna shall not be any visible damage and it shall meet electrical spec.



5.6 Salt Spray Test

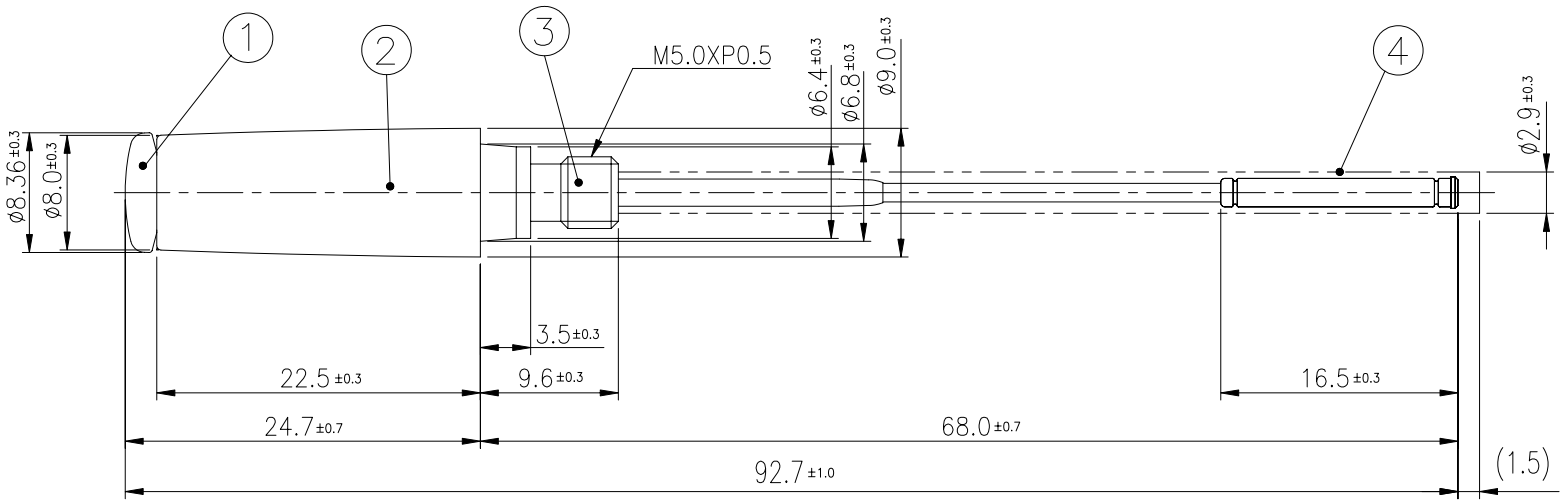
The antenna shall be exposed for 48 hours at +35ºC to a 5% Sodium Chloride fog and have no appearance or function changes after the test.

Appendix A. Reference of TestMethods

		Test Items	Reference
Mechanical	MRWS-Ma	Drop Test	IEC 68-2-31
	MRWS-Mb	Insertion/Extraction Test	-
	MRWS-Mc	Pulling Test	-
	MRWS-Md	Bending Test	-
	MRWS-Me	Torsion Test	-
	MRWS-Mf	Helix Breaking Test	-
	MRWS-Mg	Endurance Test	-
Enviromental	MRWES-Na	Temperature Shock Test	IEC 68-2-14
	MRWES-Nb	Temperature Cyclng Test	IEC 68-2-14
	MRWES-Ab	Low Temperature Test	IEC 68-2-1
	MRWES-Bb	Hot Temperature Test	IEC 68-2-2
	MRWES-D	Humidity Test	IEC 68-2-30
	MRWES-Fc	Sinusoidal Vibration Test	IEC 68-2-6

. MRWS-M : MRW Mechanical Standard

. MRWES- : MRW Environmental Standard



MODEL	UV-100
PART NAME	ANTENNA ASS'Y
PART NO	N/A

DESIGNED	CHECKED	APPROVAL

SCALE	2/1
UNIT	mm

SI METRIC A4

THIRD ANGLE DIMENSION

MRW Communications

NO	PART NAME	PART NO	MATERIAL	Q'TY	FINISH//COLOR	REMARKS
4	GUIDE TUBE	N/A	P.P	1	N/A	IR
3	METAL	N/A	KSD5101-C3604	1	Ni PLATED	IR
2	COVER ASS'Y	N/A	N/A	1	N/A	IR
1	TOP ASS'Y	N/A	N/A	1	N/A	IR