


AUT report for SDR operation of Kamstrup helix antenna
As per "35-Part-15-Antenna-Updates-TCB_Oct_2022.pdf"

Tested by	kamstrup a/s				
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Device under test					
Antenna type	Helix				
Reference	30261216				
Use	The antenna is used with Kamstrup meters KWM2220 and KWM3220 both approved under FCC id OUY-KWMX220.				
Test results		Frequency	902 MHz	915 MHz	928 MHz
		Peak Gain	-2 dBi	-2 dBi	-3 dBi
		Total efficiency	-4 dB	-5 dB	-5 dB
		Directivity	2 dBi	2 dBi	2 dBi
Test conditions					
Temperature	20 oC - 22 oC / 68 oF - 72 oF				
Date	2022.06.30				
Test by	Kamstrup				
Report					
Date	2024.02.20				
Report by	Kamstrup				

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1 Equipment under test

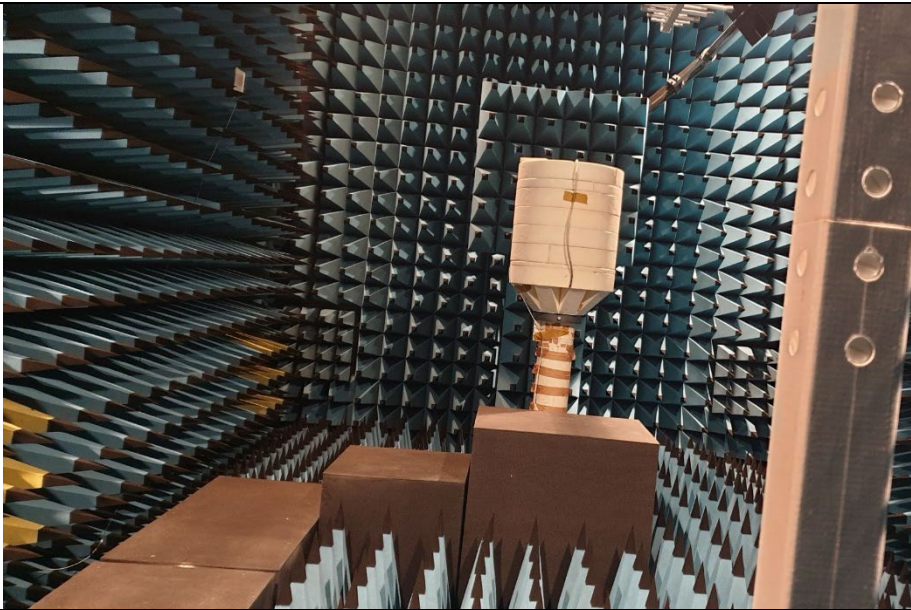
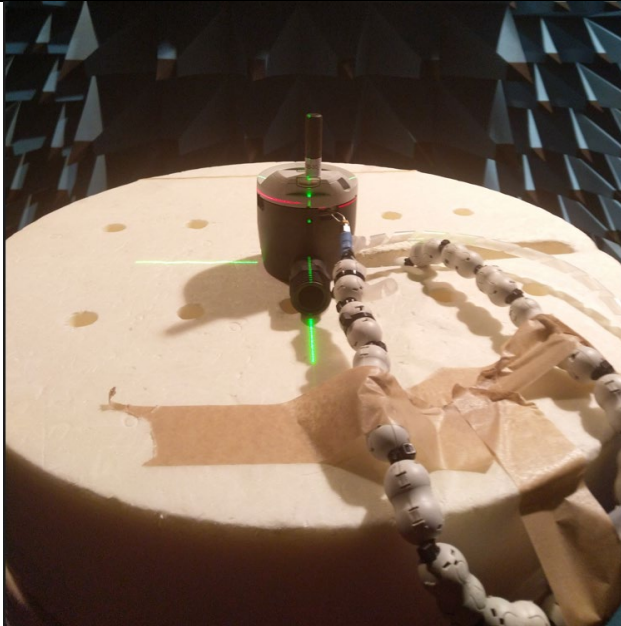
Description	Proprietary helix antenna designed specifically for Kamstrup KWM series water meters
Electric specification	
Frequency range:	902 - 928 MHz
Impedance:	50 Ohm
VSWR:	3:1
Gain:	0 dBi
Radiation	Omnidirectional
Polarization	Linear
Mechanical specification	
Connector	Proprietary
Material	
Helix	Metal
Dielectric	Poly Carbonate
Temperature	
Operational	-20 °C - 55 °C / 32 °F - 131°F
Storage	-20 °C - 55 °C / 68°F - 131°F
Design	
Antenna information used for conformity with limits	<p>Spurious emission measurements were performed with the antenna mounted on the DUT in reports G0M-2311-2314-TFC090PMR and G0M-2311-2314-TFC247DT.</p> <p>The maximal in-band gain is used for calculations of exposure in reports G0M-2311-2314-TFC091MP and G0M-2311-2314-TIC091MP</p>

2 Support Equipment

Housing	KWM 2220 meter shell
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3 Test setup

Method	Full 3D antenna measurements in the anechoic chamber
Chamber certification	Shielding Efficiency: EN 50147-1
Site/equipment information:	
Test Chamber	Antenna Chamber AC and Pre-Compliance EMC Chamber M-CDC, AlbatrossProjects 003-008-017/14E

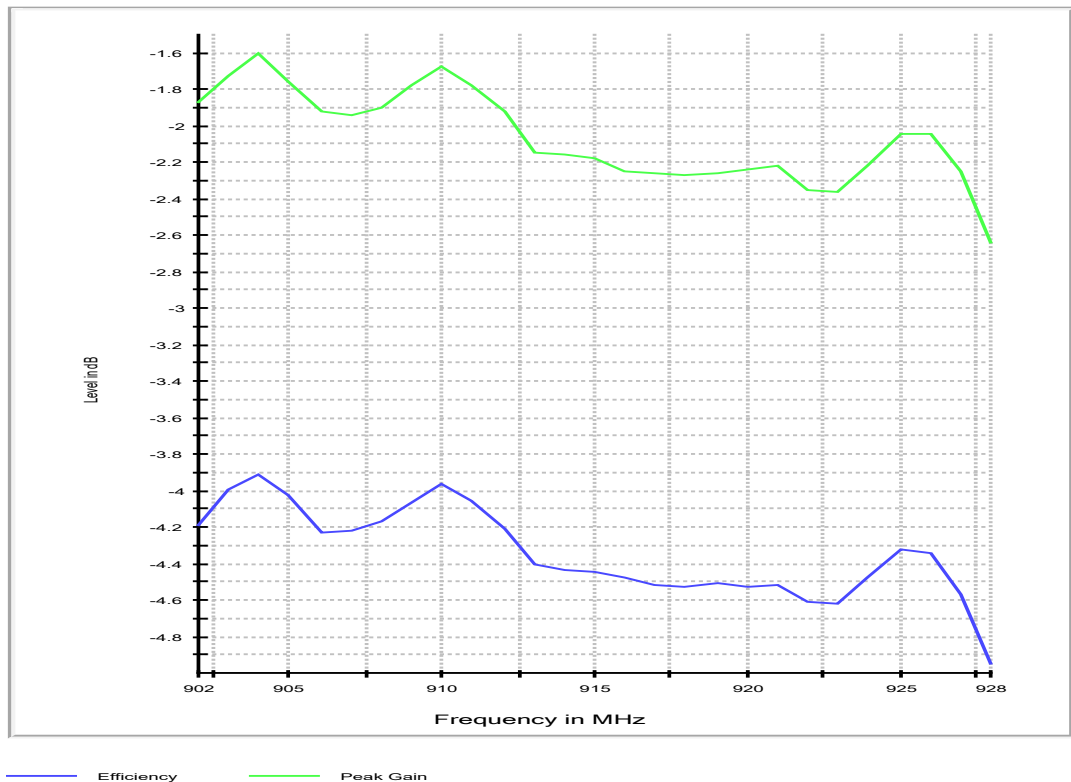
Test Equipment	
Network analyzer	Rohde & Schwarz, ZVL6
Antenna	The Howland Company, QR-3A
Theta Axis Boom	Maturo
Phi Axis Turntable	Maturo
Antenna/equipment calibration status:	
ZVL6:	Calibrated 2021-08-26, by Rohde & Schwarz Certificate number 1700-00950-039
Antenna	Verified on 2021-08-24 by Kamstrup technical personnel
Boom	Verified on 2021-08-24 by Kamstrup technical personnel
Turntable	Verified on 2021-08-24 by Kamstrup technical personnel
Full system	Verified on 2021-08-24 by Kamstrup technical personnel
Test software	AMS32 antenna test suit from Rohde & Schwarz
Test setup	
Anechoic chamber	
Antenna Placement	
Additional equipment	The antenna was mounted on a KWM meter, where the signal to the antenna was fed through a coaxial cable.

4 Results

4.1 Source of antenna gain information

The antenna efficiency and peak gain was measured across the supported frequency band, while gain was characterized with 3D measurements performed with the system and methods described in section above.

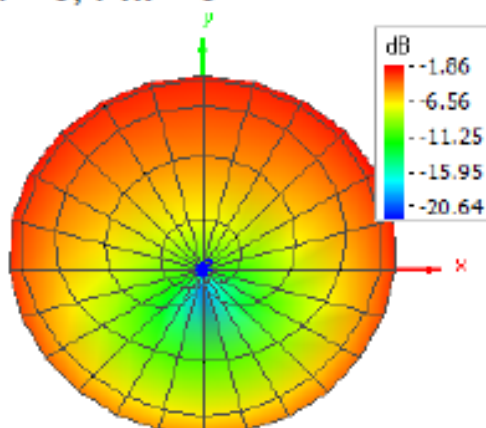
4.2 Peak gain and efficiency across the tested band



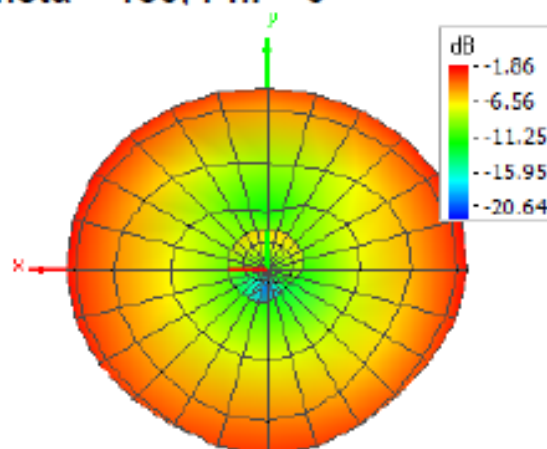
4.3 Peak gain, polarization, θ , ϕ and radiation plots for max gain plane

4.3.1 Radiation plots at 902 MHz

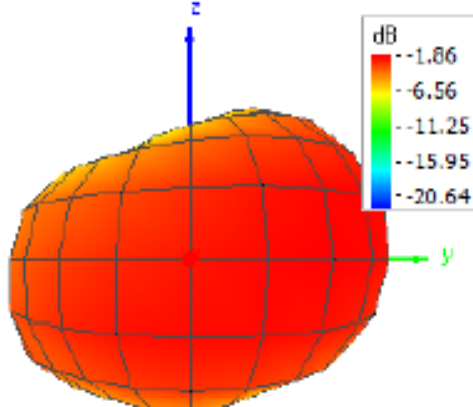
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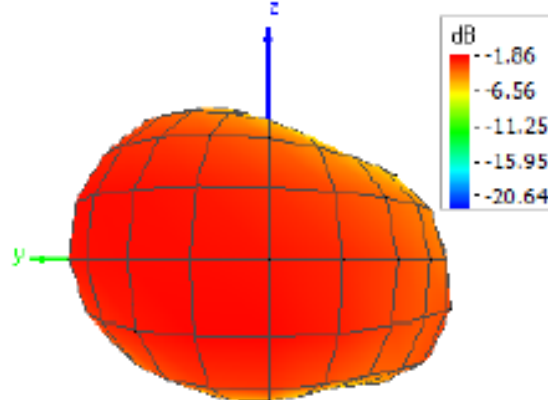
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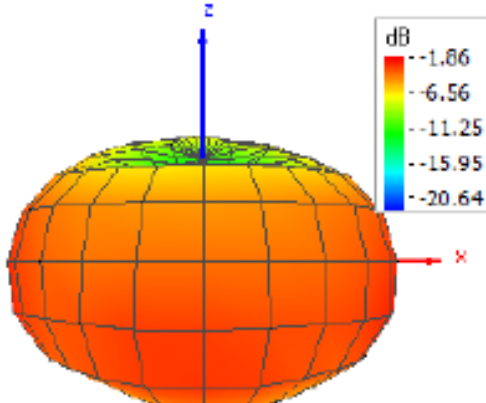
Theta = 90, Phi = 0



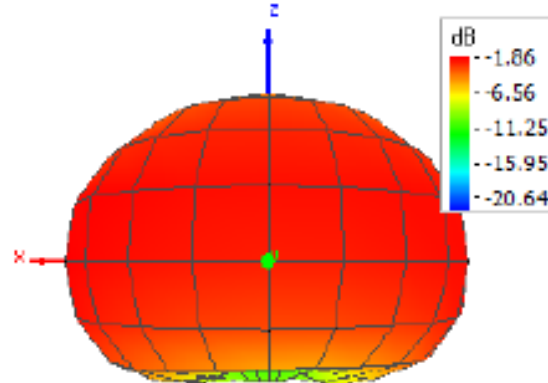
Theta = 90, Phi = 180



Theta = 90, Phi = 270

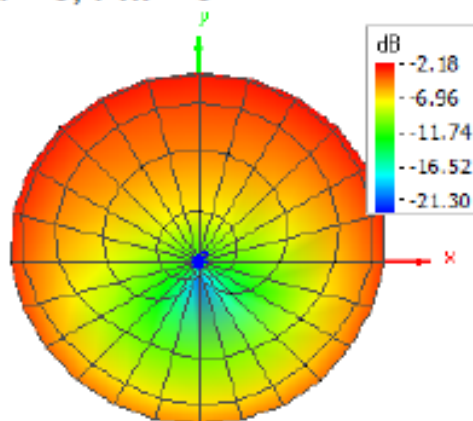


Theta = 90, Phi = 90

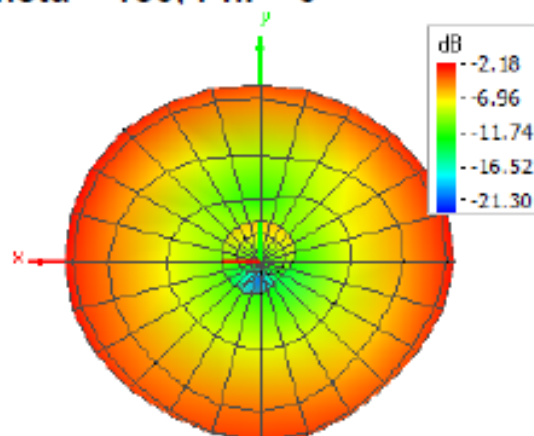


4.3.2 Radiation plots at 915 MHz

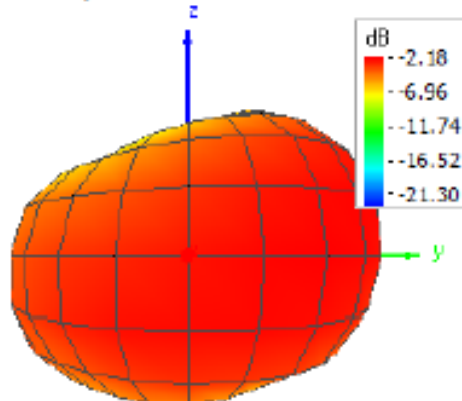
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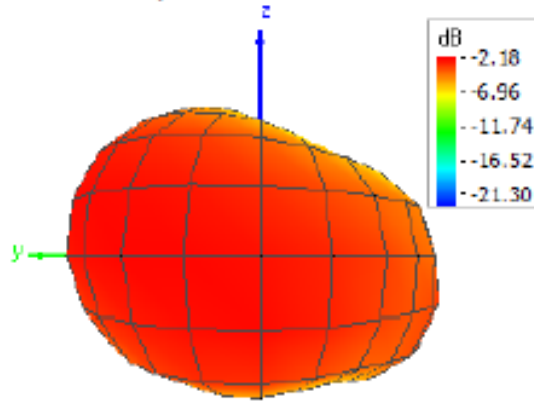
Theta = 180, Phi = 0



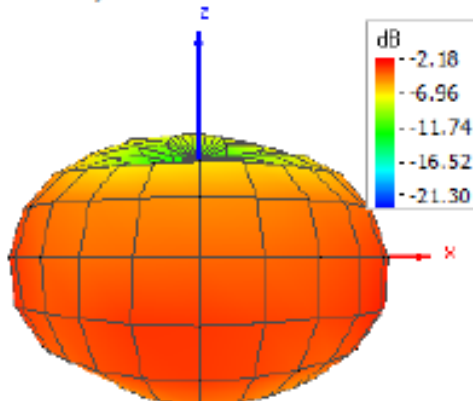
Theta = 90, Phi = 0



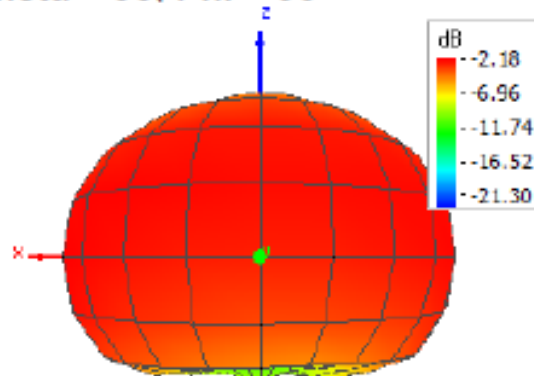
Theta = 90, Phi = 180



Theta = 90, Phi = 270

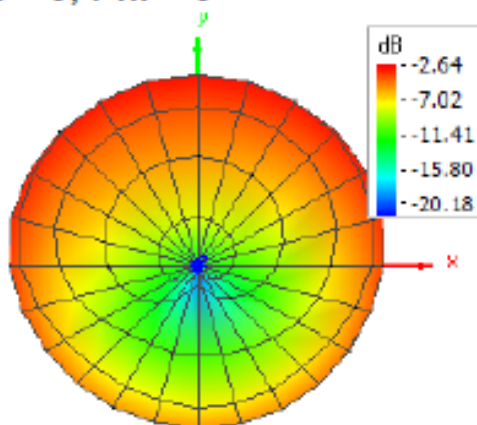


Theta = 90, Phi = 90

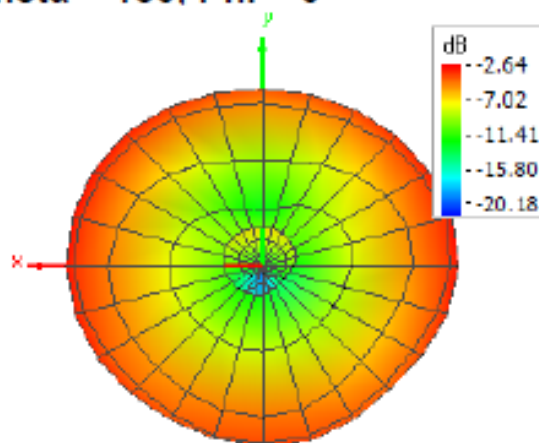


4.3.3 Radiation plots at 928 MHz

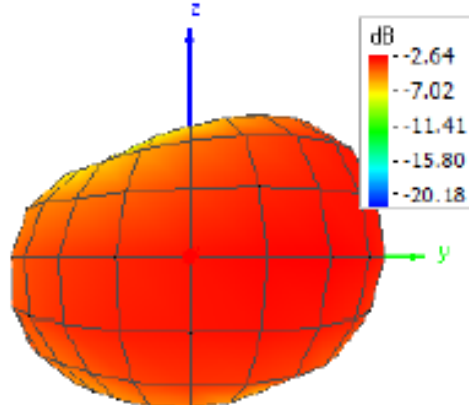
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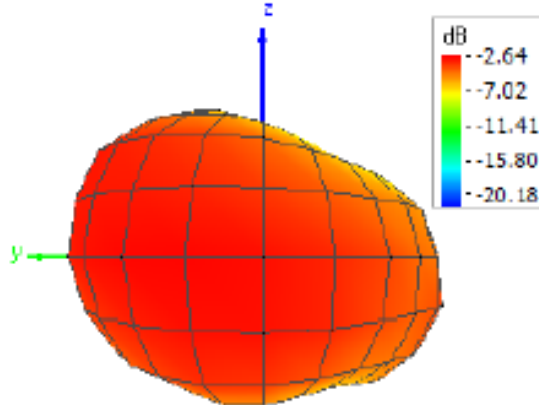
Theta = 180, Phi = 0



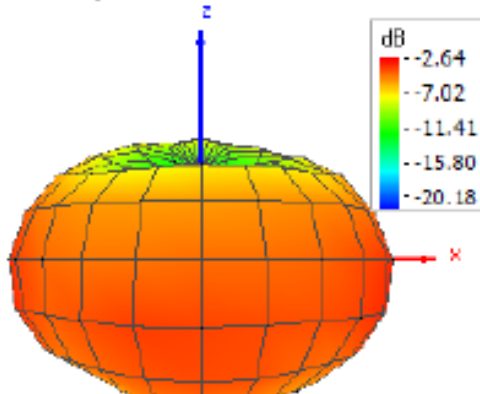
Theta = 90, Phi = 0



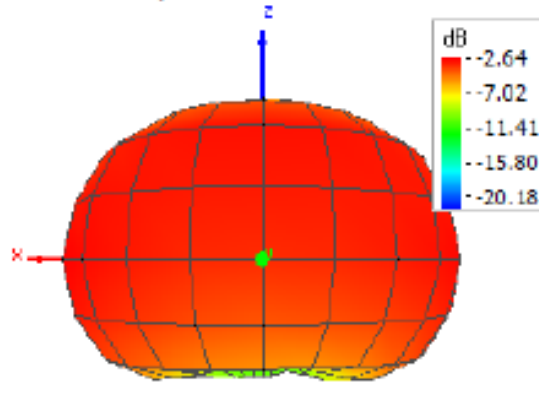
Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 90, Phi = 90



5 Signature

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