

GSM & GPS Rugged 'Puck' Antenna IP67

Features

- 4G GSM & GPS Antenna
- World-Wide Use
- Rugged M12 Screw Fix connector
- 3m RG174u-DS Low Loss
- SMA (M) Connector
- Operates -30 to +80degC

GPS

- 1575.42MHz
- Bandwidth 10MHz
- Active LNA gain: 30dB typ
- Noise Figure 1.5max
- SMA Male Connector
- Operates from 2.7—5.5V, 28mA

GSM

- 4G Antenna 824 - 960MHz 1710 - 2170MHz 2.6 - 2.7GHz
- Active gain: +2dBi
- VSWR < 2.0
- Omni directional
- Impedance 50ohm



Applications

- Automotive Applications
- Covert Applications
- Machine to Machine
- Secure Rugged Applications

Description

A Rugged antenna with high performance for worldwide use. This antenna provides 4G GSM Antenna with 2dBi gain. Housed in a rugged low profile UV resistant IP67 housing, this antenna is compact and resistant to Vandalism.

Ordering Information

Part Number	Description	Cable Length	Connector
ANT-GSMGPSPUKS	Puck Antenna	3metres	SMA (M)



Mechanical Data



GSM & GPS Rugged 'Puck' Antenna IP67

Test VSWR



DS GSMGPSPUKS-4

www.rfsolutions.co.uk

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Measured Performance GPS Horizontal Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Cala = 22.0425 dBi. Max far-field (plobal) = -16.72397 dB, Max far-field (plot) = -16.72397 dB. Mormalization: Reference, Network offset = 0.000 dB Heak at : -22.0001 deg, Vpak at: 0.000 deg

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBIZ000 V4.0.124, Filename:C:\Documents and Setting=\NBIXDesktop\2 Measurement date/time: 5/9/2013 1:25:47 BM, Filetype: NSI-97 Far-field Cut Analysis -3. db beam width: 15.03 deg -6. db beam width: 15.03 deg -6. db beam width: 15.03 deg Left Sidelobe: -4.03 db at -131.732 deg Kipht Sidelobe: -4.03 db at -131.844 deg Far-field display setup Aizurt (deg]mool deg. Center = 0.000 deg, #pts = 101 starte -180.00001 deg. Stop = 180.00001 deg. Pets = 2.000 deg

- g Elevation (deg) Center = 0.000 deg, #pts = 1

ted beam (s) 1 of 1 Frequency Azimuth Elevation Pol 1.57542 GHz Azimuth Elevation Single-pol

Measured Performance at 824MHz Horizontal Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -0.40917 dB1 = -0.40917 dB1 = -42.40851 dB, Max far-field (plot) = Normalizations. Reference, Network offset = 0.000 dB Hpeak at: -92.000 deg, Vpeak at: 0.000 deg Flot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:lOcuments and Settings/NBI2Desktop/2 Mesourcement (ator/time: 5:9/2013 11:26:45 AM, Filetype: NSI-97 Far-field Cut Amalysis Aug value: -6.461 db -3. db Deam width: 53.91 deg -10. db Deam width: 57.17 db deg Fight Sidobles: -3.64 db at 141.700 deg Far-field display setup Atiauth (db0]0001 deg, Center = 0.000 deg, #sts = 181 Span = 360,0001 deg, Stop = 180.00001 deg, Delta = 2.000 deg

deg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Prequency Azimuth Elevation Pol 1 0.824 GHz Azimuth Elevation Single-pol





Measured Performance at 850MHz Horizontal Plane



Far-field asplitude, Eprincipal: Linear, Twu = 0.000 deg Gaim = -3.01227 dBi Max far-field (global) = -45.07613 dB, Max far-field (glob) = -45.07614 dB Mormalization: Reference, Network offset = 0.000 dB Hpeak at: -98.0001 deg, Vpeak at: 0.000 deg Flot constraing on

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:Uocuments and Settings/NBI1Desktop/2 Measureament date/fine: 5/9/2013 11:26:45 AM, Filetype: NBI-97 Far-field CU: Analyms: 52.61 deg -3. dB beam width: 52.63 deg -6. dB beam width: 52.53 deg Laft Sidelobe: Mor Found Right Sidelobe: -4.82 dB at 71.397 deg Far-field display setup Atisuth (deg)0001 deg, Center = 0.000 deg, #pts = 181 State = 180.00001 deg, Stop = 180.00001 deg, Delta = 2.000 deg

deg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam (s) 1 of 12 Beam Prequency Arimuth Elevation Pol 2 0.850 GHz Arimuth Elevation Single-pol

Measured Performance at 900MHz Horizontal Plane



Far-field applitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -11905 dBi = -6,1905 dBi = -6,7500 dB, Max far-field (plot) = -40,7500 dB, Max far-field (plot) = Normalization: Reference, Network offset = 0.000 dB Heak at: 67,9999 deg, Vpeak at: 0.000 deg Flot centering: on

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:lDocuments and Settings/NBI2Desktop/2 Measuresense tast/fine: 5/9/2013 11:26:45 AM, Filetype: NBI-97 Far-field Cut Analyses -3. dB beam width: 63.53 deg -6. dB beam width: 63.64 deg Left Bidelobe: -1.60 dB at.77.400 deg Left Bidelobe: -4.61 dB at.77.909 deg Far-field display setup Atimuth (deg)001 deg, Center = 0.000 deg, Apts = 181 Spam = 350,0001 deg, Stop = 180,00001 deg, Delta = 2.000 deg East-180.00001 deg, Stop = 180,00001 deg, Delta = 2.000

Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Frequency Azimuth Elevation Pol 3 0.900 GHz Azimuth Elevation Single-pol





Measured Performance at 960MHz Horizontal Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -2.61629 dB1 -45.264 dB (global) = -45.24596 dB, Max far-field (plot) = -45.264 dB Normalization: Reference, Metwork offset = 0.000 dB Heak at: 75,9999 deg, Vpak at: 0.000 deg Flot centering: On

Measurement date/time: 5//2011 11:26:45 AM, Filetype: N31-97 Far-field Ctranspirs: Any value: -10.544 dd -6. db beam width: 54.18 deg -0. db beam width: 54.18 deg -10. db beam width: 54.18 deg Haph fildeds; Not Found Far-field display neture Assauch (egg)______ NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20

- files dept. Span = 360.00001 deg, Center = 0.000 deg, #pts = 181 Start= -180.00001 deg, Stop = 180.00001 deg, Delta = 2.000
- deg Elevation (deg) Center = 0.000 deg, #pts = 1
- Selected beam(s) 1 of 12 Beam Frequency Azimuth Elevation Pol 4 0.960 GHz Azimuth Elevation Single-pol

Measured Performance at 1710MHz Horizontal Plane



Far-field applitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -4.4023 dBL = -4.4023 dBL -49.5909 dB (both = -49.59509 dB, Max far-field (plot) = -49.59509 dB (both = -49.6900 dB) Normalization: Reference, Network offset = 0.000 dB Hpeak at: -2.0001 deg, Vpeak at: 0.000 deg

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 2000 V40.124, Filenametc:Nocuments and Settings/NBINesktop/2 wareamet.data/clime: 5/9/2013 11:26:45 AM, Filetype: N3I-97 -field Out Analysis: -data beam width: 62.52 deg -d. dB beam width: 62.52 deg -d. dB beam width: 64.30 deg Right Sidologt: -0.82 db et 135.743 deg -field display setup -field display setup Span 566.0001 deg, Stope 180.00001 deg, Delta = 2.000

Elevation (deg) Center = 0.000 deg, #pts = 1

ted beam(s) 1 of 12 Frequency Azimuth Elevation Pol 1.710 GHz Azimuth Elevation Single-pol





Measured Performance at 1800MHz Horizontal Plane



Ear-field applitude, Brincipal: Linear, Tau = 0.000 deg Gala = -2.18060 dBi Max far-field (global) = +9.70062 dB, Max far-field (plot) = -49.70062 dB. Mormalization: Reference, Network offset = 0.000 dB Hysek at: 7.9999 deg, Ypeak at: 0.000 deg Elot centerlay: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBIZ000 V4.0.124, Filename:C:UOCCUMENTS and SetLings/NBI/Dewktop/20 Meanurement cate/rims: 5/7/2013 11:26:45 34, Filetype: NBI-97 Filed Cut AmbyPair -3, db heam vidth: 63.96 deg -0, db heam vidth: 103.72 deg -10, dB heam vidth: 103.72 deg -10, db heam vidth: 103.72 deg Hipht Siddenber: -17.22 dat 83.464 deg Far-field display setup Asiauth (deg) start-103.00001 deg, Setter = 0.000 deg, #pts = 101 start-103.00001 deg, stop = 100.0001 deg, Helta = 2.000 deg

deg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Prequency Azimuth Elevation Pol 6 1.800 GHz Azimuth Elevation Single-pol

Measured Performance at 1900MHz Horizontal Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gaia = -2.20900 dBi Max far-field (global) = -49.24694 dB. Max far-field (plot) = -49.24694 dB Mormalization: Reference, Network offset = 0.000 dB Hpeak att 11.9999 day, Vpeak att 0.000 deg Flot constraints (on

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:lOccuments and dettings/NBI/Desktop/2 Measurgement date/Lime:5/9/2013 11:26:45 AM, Filetype: NBI-97 Far-field Cut Analysis -3, dB beam width: 121,91 dog -6, dB beam width: 121,91 dog Left Sidelobe: -9,64 GB at -137,743 deg Right Sidelobe: -9,64 GB at -137,743 deg Right Sidelobe: -9,64 GB at -137,743 deg Right Sidelobe: -9,81 dB at -137,654 deg Far-field display setup Aisuch (dog)0001 deg, Center = 0.000 deg, #pts = 101 Spam = 360,0001 deg, Center = 0.000 deg, Peta = 2.000 Tater -200.0001 deg, stop = 100.00001 deg, Peta = 2.000

ieg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam (s) 1 of 12 Beam Frequency Arianth Elevation Fol 7 1.900 GHz Arianth Elevation Single-pol





Measured Performance at 2100MHz Horizontal Plane



Ear-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -1,74913 dBi Max far-field (global) = -49.07503 dB, Max far-field (glot) = -49.07544 dB Normalization: Reference, Network offset = 0.000 dB Heeak at: -10.0001 deg, Ypeak at: 0.000 deg Elot construing 'on

SI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:Uocuments and SetLings/NBI2008 V4.0.124, Filename:C:Uocuments and SetLings/NBI2008 Filed Out Analysis: Far-field Out Analysis: -3. db beam width: 16.130 deg -6. db beam width: 10.131 deg Left Sidelobe: -3.65 db at -3.441 deg Left Sidelobe: -3.65 db at -3.441 deg Eart-field display setup Far-field display setup Falst Side(S0, mool deg, Center = 0.000 deg, Spts = 181 Statt - 180,00001 deg, Stop = 180.00001 deg, Delta = 2.000 deg

Elevation (deg) Center = 0.000 deg, #pts = 1

elected beam (s) 1 of 12 am Frequency Arimuth Elevation Pol 2.100 GHz Azimuth Elevation Single-pol

Measured Performance at 2170MHz Horizontal Plane



Far-field asplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = 2.32166 dBi Max Tar-field (global) = -49.4977 dB, Max far-field (plot) = -49.4977 dB Morsalization: Befrence, Network offset = 0.000 dB Mpauk at = -141000 deg Mpauk at: 0.000 deg Plot contering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:Documents and Settings/NBI/DesKtop/2 Measurement date/Lime: 5/9/2013 11:26:45 AM, Filetype: NBI-97 Field Cut Ambyme: 5,473 db -3. db beam visth: 54.18 deg -6. db beam visth: 54.18 deg -18. db beam visth: 180.73 deg Hight Sidelobe: -10.83 db at 89.520 deg Far-field display setup Aisaut (deg) mool deg. Center = 0.000 deg, #pts = 101 Beat= -100,00001 deg. Stop = 180.00001 deg. Pets = 2.000 deg_

- deg Elevation (deg) Center = 0.000 deg, #pts = 1

- Selected beam(s) 1 of 12 Beam Frequency Azimuth Elevation Pol 9 2.170 GHz Azimuth Elevation Single-pol





Measured Performance at 2400MHz Horizontal Pane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -5,40718 dBi Max far-field (globa) = -54,41491 dB, Max far-field (plot) = -54,41493 dB Mormalization: Reference, Network offset = 0.000 dB Hpeak at: 13,9999 deg, Vpeak at: 0.000 deg Flot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 312000 V4.0.124, Filename:Ci\Documents and Settings\NBI\Desktop\2 seuresent data(rime: 5/9/2013 11:26:45 AM, Filetype: NBI-97 Ary Value:-10.300 dB -3. dB beam width: 37.29 deg -5. dB beam width: 37.29 deg -6. dB beam width: 37.29 deg Inft Sidelobe: -3.66 dB at -37.151 deg Fight Sidelobe: -2.86 dB at -37.151 deg Ariseth degDool 45.925 deg trifield display setup Ariseth degDool 45.925 deg trifield splay setup State: -180.00001 deg, enter = 0.000 deg, #pts = 181 state: - 180.00001 deg, stop = 180.00001 deg, Delta = 2.000 95 deg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Frequency Azimuth Elevation Pol 10 2.400 GHz Azimuth Elevation Single-pol

Measured Performance at 2500MHz Horizontal Plane



Far-field applitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -4.16371 dBi Max Tar-field (global) = -54.2997 dB, Max far-field (plot) = -54.29971 dB Normalization: Reference, Network offset = 0.000 dB Hpeak at: 7.99999 deg, Vpeak at: 0.000 deg Thot centering: Cn

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBIZ000 V4.0.124, Filename:C:\Ocuments and fetling:\NBILDesktopl2 Measurement date/time: 5/9/2013 11:26:45 AM, Filetype: NJI-9T Far-field Cut Analyzis -0. dB beam width: 54.22 deg -0. dB beam width: 54.22 deg -0. dB beam width: 54.22 deg Left Sidelobe: -0.12 dB at 71.397 deg Fight Sidelobe: -0.12 dB at 71.397 deg Far-field display setup Anama, 060,00001 deg, Center = 0.000 deg, #ptm = 181 State - 180,00001 deg, Stop = 180.00001 deg, Petm = 2.000 deg

deg Elevation (deg) Center = 0.000 deg, #pts = 1

- Selected beam (s) 1 of 12 Beam Frequency Azimuth Elevation Pol 11 2.500 GHz Azimuth Elevation Single-pol 11





Measured Performance at 2600MHz Horizontal Plane



Measured Performance GPS Vertical Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gaim = -0.0556 ddi Max far-field (global) = -50.37335 db, Max far-field (plot) = -50.37337 db Normalization: Beference, Network offset = 0.000 dB Hoad at: =70.00001 deg, Vpeak at: 0.000 deg Flot centering: Cn

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI200 V4.0.124, Filename:C:Uocuments and SettingsINBTLOesktopl2 Measurement date/time: 5/9/2013 11:26:45 AM, Filetype: NBI-97 Far-field Out Analyzes -3. db beam width: 30.60 deg -6. db beam width: 30.68 deg Left Sinkelose: -1.82 dB at -3.056 deg Hight Sinkelose: -0.40 dB at -3.058 deg Far-field display setup Aziauth (degloog) deg, Center = 0.000 deg, Spts = 181 Start - 185.00001 deg, Center = 0.000 deg, Bets = 181 Start - 185.00001 deg, Center = 0.000 deg, Bets = 181 Start - 185.00001 deg, Stop = 186.00001 deg, Betta = 2.000 deg

Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Frequency Azimuth Elevation Pol 12 2.600 GHz Azimuth Elevation Single-pol



Ear-field applitude, Dyrincipal: Linear, Tau = 0.000 deg Gain = $26,72\,\mathrm{E2}^{-1}$ db: Max far-field (plobal) = -8.03331 db, Max far-field (plot) = -8.03322 dB Normalization: Beference. Network offset = 0.000 dB Hyeak at: -8.0001 deg, Vpeak at: 0.000 deg Elot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBID00 V4.0.124, Filemane:C:UOCUMENTS and SetLingTVBI/UGBNCO/2 Nearureaset data/fine: 5/0/2013 1:20:00 FW, Filetype: HSI-97 Far-field Gut Analysis; -3. db beam width: 135.15 dog -3. db beam width: 135.15 dog -10. db beam width: 224.30 deg Left Sidelobe: 10.02 dd at 177.009 deg Far-field display setup Aspan = 360.0001 deg, Conter = 0.000 deg, %pts = 101 Statt = 100.0001 deg, Gtop = 100.0001 deg, Delta = 2.000 deg

deg Elevation (deg) Center = 0.000 deg, fpts = 1

Selected beam(s) 1 of 1 Decam Frequency Azimuth Elevation Fol 1 1.57542 GHz Azimuth Elevation Single-pol





Measured Performance at 824MHz Vertical Plane



Ear-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -3.49476 dBi Max far-field (global) = -46.4941 dB, Max far-field (plot) = -46.49412 dB, Normalization: Reference, Network offset = 0.000 dB Reak at: -166.000 deg Plot centering: on

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBIZ000 V4.0.124, Filename:C:lDocuments and Settings/NBIZ0esktop/2 Measureament date/fine: 5/9/2013 1:01:59 FM, Filetype: NBI-97 Far-field CU: Analyses -3. db beam width: Not Found -6. db beam width: Not Found Left Sidelobe: Not Found Left Sidelobe: -3.92 dd at -43.240 deg Far-field display setup Aisuath (deg) mool deg. Center = 0.000 deg. #pts = 181 state - 180.00001 deg. Stop = 180.00001 deg. Pelta = 2.000 deg

- deg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Frequency Arimuth Elevation Pol 1 0.824 GHz Azimuth Elevation Single-pol

Measured Performance at 850MHz VerticalPlane



Far-field asplitude, Eprincipal: Linear, Tau = 0.000 deg Gaim = -6.74011 dBi Max far-field (globa) = -47.99697 dB, Max far-field (plot) = -47.99697 dB, Max far-field (plot) = Normalisation: Reference, Network offset = 0.000 dB Rpeak at: -166.000 deg Vpeak at: 0.000 deg Flot centering: Cn

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20

- SI2000 V4.0.124, Filename:C:Nocuments and Settings/NBILDesktop/2 sarcfield cut Analysis: Aug value: 11.130 df -3. db beam width: Not Found -5. db beam width: Not Found Fight Sidelobe: Not Found Right Sidelobe: -2.54 db at -37.207 deg arcfield display setup Aspan = 060.0001 deg, Etop = 100.0001 deg, Epts = 101 State = 100.0001 deg, Etop = 100.0001 deg, Delta = 2.000 Sg.

Elevation (deg) Center = 0.000 deg, #pts = 1

- Selected beam(s) 1 of 12 Beam Frequency Arimuth Elevation Pol 2 0.850 GHz Azimuth Elevation Single-pol





Measured Performance at 900MHz Vertical Plane



Measured Performance at 960MHz Vertical Plane



Far-field applitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -4.05416 dBi Max far-field (global) = -47.48303 dB, Max far-field (plot) = -47.48303 dB Mornalization: Beference, Network offset = 0.000 dB Mpask at: 23.99999 deg, Vpeak at: 0.000 deg Flot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20

Elevation (deg) Center = 0.000 deg, #pts = 1

MarLoud V=0.1144, Filemamas:r:tucouments and settings.Nailuesktopic Measurement date/time: 5/2013 1:10:59 PM, Filetype: NSI-97 Far-field Cut Analysis: Avg value: -9.200 df -3. d8 Deam vidth: 80.40 df -3. d8 Deam vidth: 80.55 df -10. d8 Deam vidth: 80.55 df -10. d8 Deam vidth: 80.75 df Ieft Sidelobe: -8.34 dB at -89.497 df Right Sidelobe: -9.30 dB at 79.441 dfg Far-field display stup Argan -300.00001 dfg, Center = 0.000 dfg, \$pts = 181 start: -180.00001 dfg, Stop = 180.00001 dfg, Delta = 2.000 dfg______ deg Elevation (deg) Center = 0.000 deg, #pts = 1

lected beam(s) 1 of 12 am Prequency Azimuth Elevation Pol 0.960 GHz Azimuth Elevation Single-pol





Measured Performance at 1710MHz Vertical Plane



Par-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -10.82067 dBi Max far-field (global) = -56.01326 dB, Max far-field (plot) = -56.01326 dB, Max far-field (plot) Mormalization: Beference, Network offset = 0.000 dB Ngeak at: -22.00001 deg. Vpeak at: 0.000 deg Flot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20

- NBICUDU V4.0.124, Filename:C: Ubccuments and Settings/NBILDesktop/J Measurement date/Line: 5/2/2013 1:10:59 PM, Filetype: NBI-97 Far-Field Cut Analysis: Avg value: -17.657 ds -3. dB beam vidth: 55.60 deg -3. dB beam vidth: 57.81 deg Left Sidelobe: -4.18 dB at -152.690 deg Hight Sidelobe: -4.18 dB at -152.690 deg Hight Sidelobe: -4.18 dB at -63.63 deg Far-Field display setup Alamuth (bg) 00001 deg, Center = 0.000 deg, #pts = 101 Btatt= -180.00001 deg, Stop = 180.00001 deg, Delta = 2.000 deg_
- Elevation (deg) Center = 0.000 deg, #pts = 1
- Selected beam (s) 1 of 12 Beam Frequency Azimuth Elevation Pol 5 1.710 GHz Azimuth Elevation Single-pol

Measured Performance at 1800MHz Vertical Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -0.6537 dBi Max far-field (global) = -55.30741 dB, Max far-field (plot) = -55.30742 dB Normalization: Deference, Network offset = 0.000 dB Ngoak at: 27.99999 deg, Vpeak at: 0.000 deg Flot constelling: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NJI2000 V4.0.124, Filename:C:\Documents and Settings\N21Desktop\2 Masurement take/time: 5/9/2013 1:10:59 FM, Filetype: NSI-97 Far-field Cut Analysis: Avg value: -13.889 dB -3. dB beam vidth: 121.04 deg -10. dB beam vidth: 121.04 deg -10. dB beam vidth: 121.04 deg -10. dB beam vidth: 124.62 deg Right Sidelobe: -4.62 dB at 71.397 deg Far-field display setup Azimuth (deg) Span = 360.00001 deg, Center = 0.000 deg, #pts = 181 Statt- 180.00001 deg, top = 180.00001 deg, Delta = 2.000 deg

Elevation (deg) Center = 0.000 deg, #pts = 1

- ected beam(s) 1 of 12 m Frequency Azimuth Elevation Fol 1.800 GHz Azimuth Elevation Single-pol





Measured Performance at 1900MHz Vertical Plane



Far-field asplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = -2.92520 dBi Max far-field (global) = -49.96224 dB, Max far-field (plot) = -49.96225 dB Normalization: Reference, Metwork offset = 0.000 dB Plot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBI2000 V4.0.124, Filename:C:\Documents and SetLings\NBI\Desktopl2 Measurement fact/time: 9/9/2013 1:10:59 PM, Filetype: NBI-97 Far-field Cut Analymis: Avg value: -9.368 dB -3. dB beam vidth: 80.63 deg -6. dB beam vidth: 82.21 deg -7. dB beam vidth: 123.21 deg -7. dB beam

- Elevation (deg) Center = 0.000 deg, #pts = 1
- Selected beam (s) 1 of 12 Beam Frequency Arimuth Elevation Pol 7 1.900 GHz Azimuth Elevation Single-pol

Measured Performance at 2100MHz Vertical Plane



Far-field asplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = 0.29072 dBi Max far-field (globa)] = -47.02798 dB, Max far-field (plot) = -47.02798 dB Moralization: Beference, Network offset = 0.000 dB Npeak at: -22.00081 deg, Vpeak at: 0.000 deg Plot centering: on

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 BI2000 V4.0.124, Filename:C:Nbouments and SettingstNBTLDesktopl2 Mary Settingst Settingst SettingstNBTLDesktopl2 ar-field Cut Analysis: -3. dB beam width: 44.62 deg -5. dB beam width: 13.54 deg -6. dB beam width: 13.54 deg -1.64 to Settingst Settingst Settingst Left Sidelohe: -5.72 dB at 79.542 deg Arifield display setup Arimuth (dg) Old deg, Center 0.000 deg, Spts = 101 Spar 360.0001 deg, Stop = 180.00001 deg, Pets = 2.000 % Tart -180.00001 deg, Stop = 180.00001 deg, Pets = 2.000

eg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam (s) 1 of 12 Beam Prequency Ariauth Elevation Pol 8 2.100 GHz Aziauth Elevation Single-pol





Measured Performance at 2170MHz Vertical Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gaim = -1.0464 dBi Max far-field (global) = -48.57895 dB, Max far-field (plot) = -40.57895 dB Moralization: Reference, Network offset = 0.000 dB Hpeak at: -20.0001 deg, Vpeak at: 0.000 deg Elot centering: On

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NBIZ000 V4.0.124, Filename:C:\Documents and Settings\NBI\Desktopl2 Measurement take/time: 5//2013 1:10:59 PM, Filetype: NBI-97 Far-field Cut Analysis: -3. dB beam width: 17.19 deg -6. dB beam width: 17.19 deg -10.01 Elbeam width: 17.19 deg -10.0

deg Elevation (deg) Center = 0.000 deg, #pts = 1

Selected beam(s) 1 of 12 Beam Frequency Arimuth Elevation Pol 9 2.170 GHz Arimuth Elevation Single-pol

Measured Performance at 2400MHz Vertical Plane



Far-field applitude, Eprincipal: Linear, Tau = 0.000 deg Gain = 2.7025 dBi Max far-field (global) = -51.7139 dB, Max far-field (plot) = -51.7139 dB, Max far-field (plot) = -51.7139 dB, Max far-field (plot) = 1-51.7139 dB, Max far-field (plot

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20

NBI2000 V4.0.124, Filename:C: Uncounsents and Settings/NBI1Desktop/2 Measurement date/times: 0/Y0/2013 1:10:59 PM, Filetype: NBI-97 Far-field Cut Analysis: Avg value: -0.107 d8 -5. d8 Deam vidth: 72.94 deg -5. d8 Deam vidth: 70.74 deg -6. d8 Deam vidth: 70.74 deg -7. d8 Deam vidth: 70.74 deg -7. d8 Deam vidth: 70.74 deg -7. d8 Deam vidth: 70.74 deg Heft Sidelobe: -4.66 d8 at 23.184 deg Far-field display stup Arimath (deg) 0001 deg, Center = 0.000 deg, #pts = 181 statt= -180.00001 deg, Stop = 180.00001 deg, Delta = 2.000 deg deg Elevation (deg) Center = 0.000 deg, #pts = 1

- Selected beam (5) 1 of 12 Beam Prequency Azimuth Elevation Pol 10 2.400 GHz Azimuth Elevation Single-pol





Measured Performance at 2500MHz Vertical Plane



Measured Performance at 2600Hz Vertical Plane



Far-field amplitude, Eprincipal: Linear, Tau = 0.000 deg Gain = 2.33806 dig (global) = -47.97873 dB, Max far-field (global) = -47.97873 dB, Max far-field (plot) = -47.97873 dB, Max far-field (plot) = Normalization: Beference, Network offset = 0.000 dB Hpeak at: -28.0001 deg, Vpeak at: 0.000 deg Elot centering: On

Far-field applitude, Eprincipal: Linear, Tau = 0.000 deg Gain = 0.45901 dBi Max far-field (global) = -49.67690 dB, Max far-field (plot) = -49.67699 dB Mormalization: Reference, Network offset = 0.000 dB Hpeak at: -20.00001 deg, Vpeak at: 0.000 deg Flot centering on

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20

NBI2000 V4.0.124, Filename:C:\Documents and Settings\NBI\Desktop\2 Measurement taker/time: 5/20/2013 1:0:59 FM, Filetype: NBI-97 Far-field Cut Analysis: -3. dB beam width: 63.09 deg -6. dB beam width: 84.22 deg -1.04 dB beam width: 10.12 ug -1.04 dB beam width: 10.22.607 deg Right Sidelobe: -10.56 dB at 71.397 deg Far-field display setup Aliawit (deg) Span = .560.0001 deg, Center = 0.000 deg, %pts = 101 State-100.0001 deg, Stop = 100.0001 deg, belta = 2.000

deg Elevation (deg) Center = 0.000 deg, #pts = 1

 Selected beam (s) 1 of 12

 Beam
 Frequency
 Azimuth
 Elevation
 Pol

 11
 2.500 GHz
 Azimuth
 Elevation
 Single-pol

NSI2000 V4.0.124, Filename:C:\Documents and Settings\NSI\Desktop\20 NSIZ000 V4.0.124, Filename:C:\Occuments and Settings\NSIXDesktop\2 Measurement take/time: 5/07/2013 1:10:59 PM, Filetype: NSI-97 Far-field Cut Analysis: -3, dB beam vidth: 60.09 deg -6, dB beam vidth: 60.26 deg Far-field display setup A:auth (deg) Far-field display setup A:auth (deg) Par isld display setup A:auth (deg) Dest - 180.00001 deg, Stop = 180.00001 deg, Mpts = 181 Dest = -180.00001 deg, Stop = 180.00001 deg, Delta = 2.000 deg

deg Elevation (deg) Center = 0.000 deg, #pts = 1

 Selected beam (s)
 1
 of
 12

 Beam
 Frequency
 Azimuth
 Elevation
 Pol

 12
 2.600
 GHz
 Azimuth
 Elevation
 Single-pol



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