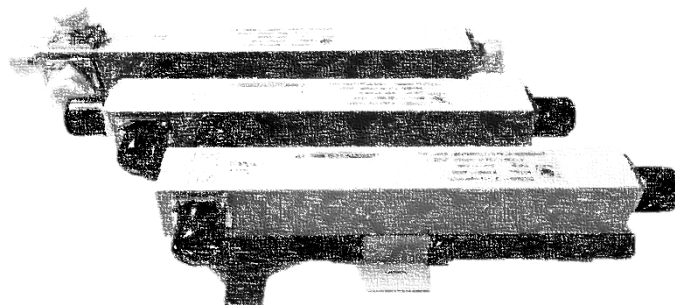




PRODUCT'S CATALOGUE

By ThaiTelCom Co.,Ltd



SALES PERSON: MR.PANUWAT NGAMSIRIKUL
MOBILE: 085-484-3330
TEL: 02-641-4450 FAX: 02-641-4451

PRODUCT LIST



No	Equipment	Description	Model	APPROVED BY			
				AIS	DTAC	TMV	TOT
1	2way splitter	800-2700MHz, 2-way, Connector-N, 300 W (indoor & outdoor)	WHS0827-2PNO	✓	o	✓	
2	3way splitter	800-2700MHz, 3-way, Connector-N, 300 W (indoor & outdoor)	WHS0827-3PNO	✓	o	✓	
3	4way splitter	800-2700MHz, 4-way, Connector-N, 300 W (indoor & outdoor)	WHS0827-4PNO	✓	o	✓	
4	6dB taper	700-2700MHz, Tap-6dB,Connector-N, 200 W (indoor & outdoor)	WHCOU800-2700-6P		o	✓	
5	7dB taper	700-2700MHz, Tap-7dB,Connector-N, 200 W (indoor & outdoor)	WHCOU800-2700-7P	✓	o	✓	
6	8dB taper	700-2700MHz, Tap-8dB,Connector-N, 200 W (indoor & outdoor)	WHCOU800-2700-8P		o	✓	
7	10dB taper	700-2700MHz, Tap-10dB,Connector-N, 200 W (indoor & outdoor)	WHCOU800-2700-10P	✓	o	✓	
8	15dB taper	700-2700MHz, Tap-15dB,Connector-N, 200 W (indoor & outdoor)	WHCOU800-2700-15P	✓	o	✓	
9	3dB Hybrid coupler (Din-fm)	3dB Hybrid Coupler, Din-type For 800-2700MHz	WHDSCB800/2700-3dBP	✓	o	✓	
10	3dB Hybrid coupler (N-fm)	3dB Hybrid Coupler, N-type For 800-2700MHz	WHDSCB800/2700-3dBP-N	✓	o	✓	
11	6dB Hybrid coupler 4in-4out (Din-fm) {MCM}	6dB Hybrid Coupler with 4-input and 4-output, DIN-type For 800-2700MHz	LHHT-0016K-N-A	✓	o	✓	
12	Diplexer0	Dual-Band Combiner, Din-type, 806-960 & 1710-1880 / 1920-2170MHz	WHFC900/1800-2100-A3P	✓	o	✓	
13	Diplexer1	Dual-Band Combiner, Din-type, 800-960 / 1710-2170MHz	WHFC800/900-1700/2200-A3P	✓	o	✓	
14	Diplexer2	Dual-Band Combiner, Din-type, 1710-1880 / 1920-2170MHz	WHFC1800-2100-A4P		o	✓	
15	Diplexer3 (Din-fm)	Dual-Band Combiner, Din-type, 800-2170 / 2400-2700MHz	LTELH-0071A	✓	o	✓	
16	Diplexer3 (N-fm)	Dual-Band Combiner, N-type, 800-2170 / 2400-2700MHz	LTELH-0071B	✓	o	✓	
17	Diplexer4	Dual-Band Combiner, Din-type, 1710-2170 / 2400-2700MHz	LTELH-0070A		o	✓	
18	Triplexer	Triplexer 800-960/1710-1880/1920-2170	SGQLH-0111D-O-A	✓	o	✓	
19	POI (11 input ports)	11 input ports, 4 output ports; 2xWCDMA850 1xGSM900 1x WCDMA900 3x GSM1800 4x WCDMA2100	LHPOI-0069A-N-A	✓	✓	✓	✓
20	Low-PIM Load 100W	Low PIM Load 100W	WHLD-100P-DF-1	✓	o	✓	
21	Indoor Omni Antenna, High Gain	Gain: 800-960MHz - 5 dBi, 1710-2170MHz - 6dBi	WHQ-800/2170-5	✓	o	✓	
22	Indoor Omni Antenna, Normal Gain	Gain: 800-960MHz - 2.5 dBi, 1710-2170MHz - 3.5dBi	WHQ-800/2170-3M	✓	o	✓	
23	LTE MIMO Indoor Antenna	Gain: Port1 800-960MHz - 3 dBi, 1710-2170MHz - 5dBi; Port2 1710-2170MHz - 4 dBi	WHQ-1710/2170-C2	✓	o	✓	
24	Fullband MIMO Antenna	Gain: 800-960MHz - 3 dBi, 1710-2170MHz - 4dBi	LHTX-0204A-I-N-A	✓	o	✓	
25	3dB Low-PIM Attenuator	Low PIM Attenuator, 3dB	LHSJQ-0120B-3dB-1727-O-A	✓	o		
26	10dB Low-PIM Attenuator	Low PIM Attenuator, 10dB	LHSJQ-0120B-10dB-1727-O-A	✓	o		
27	N-Right Angle Adaptor	N-Male to N-Female Angle Adaptor	N-JKW	✓	o	✓	
28	Connector NM for Feeder 7/8"	Connector NM for Feeder 7/8"	CCNM78	✓	o	✓	
29	Connector NF for Feeder 7/8"	Connector NF for Feeder 7/8"	CCNF78	✓	o	✓	
30	Connector NM for Feeder 1/2"	Connector NM for Feeder 1/2"	CCNM12	✓	o	✓	
31	Jumper Nm-Nm 1 meter (1/2" Superflex)	Jumper Nm-Nm 1 meter (1/2" Superflex)	NMNM12S-1m	✓	o		

✓ : Got approval

o : Need to confirm with operator

Low-PIM Power Splitters**800-2700MHz, 2 Way, 3 Way, 4 Way****Product Description**

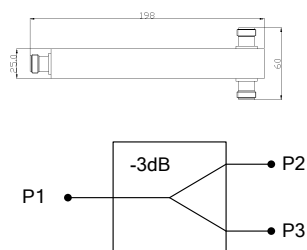
The Series of Low-PIM Power splitters are designed for providing low PIM and low insertion loss solution for the multi standards or multi operators in DAS systems.
Provide 2 Way, 3 Way, 4 Way type.

**Features**

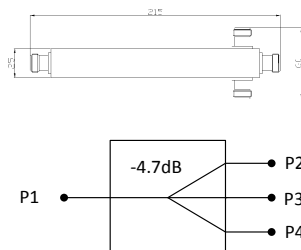
- ➔ Wide frequency band: 800 to 2700MHz.
- ➔ High power capacity and isolation
- ➔ Low insertion loss
- ➔ Extremely low PIM
- ➔ High ingress protection: support indoor and outdoor applications

Specifications

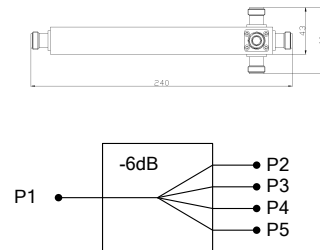
Frequency range	800-2700MHz		
Product number	WHS0827-2PNO	WHS0827-3PNO	WHS0827-4PNO
Configuration	1:2	1:3	1:4
Distribution loss	3.0dB	4.7dB	6.0dB
Insertion loss (Exclude Distribution Loss)	≤0.2dB	≤0.2dB	≤0.2dB
Weight	≤0.35 Kg	≤0.38 Kg	≤0.45 Kg
Dimension	198 x 60 x 25 mm	215 x 60x 25 mm	240 x 60 x 43 mm
Inter-modulation	≤-150dBc (with 2 x 43dBm)		
Power capacity	Average: ≤300W, Peak: ≤1500W		
Return Loss	≥ 19		
Impedance	50 Ohms		
Operating temperature	-25°C to +70°C		
Relative humidity	0~95%		
Ingress protection	IP65		
Connector	N-Female		

Sketch Diagram

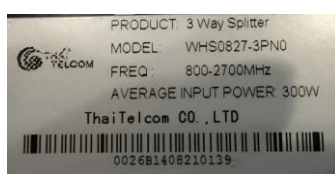
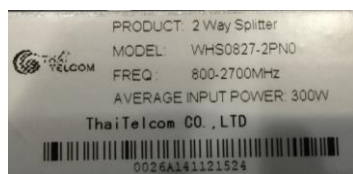
WHS0827-2PNO



WHS0827-3PNO



WHS0827-4PNO



Product Description

The wide frequency range allows use with multiband antennas and leaky cable systems and in wireless base stations. With minimal solder joints and an air dielectric, the dissipative loss has been minimized and reliability enhanced. These Directional Couplers may also be used as Unequal Dividers or Tappers, which are usually specified by the power ratio between outputs.



Features

- ➔ Wider Bandwidth
- ➔ Low Insertion Loss
- ➔ Low PIM
- ➔ Small Volume, Light Weight
- ➔ Higher Power Capacity
- ➔ Application for outdoor and indoor use

Electrical Specification

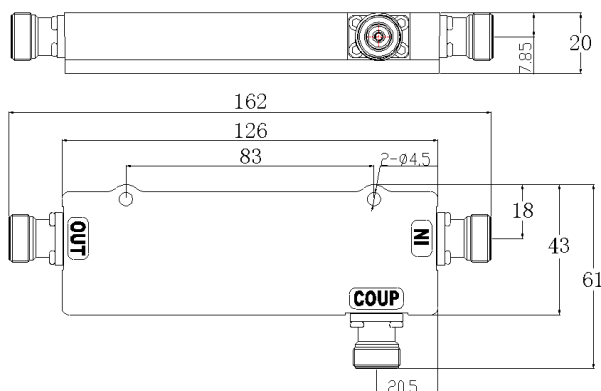
Product Model	WHCOU800-2700-6P	WHCOU800-2700-7P	WHCOU800-2700-10P	WHCOU800-2700-15P
Frequency Range	800-2700MHz			
Output ratio	6.2:1.2	7.0:1.0	10.4:0.4	15.1:0.1
Insertion Loss (max)	0.3 dB	0.3 dB	0.3 dB	0.3 dB
Impedence	50ohm			
VSWR	≤1.25			
Passive Intermediations	≤-150 dBc @2-tone x 43dBm			
Average input power	≤200 Watt (continuous)			

Physical Specification

Connector type	N female
Dimensions(LxWxH)	162x61x20mm
Net Weight	≤300g

Environmental Specification

Operating Temperature	-25°C to +75°C
Relative Humidity	0~95%
Enclosure protection	IP67

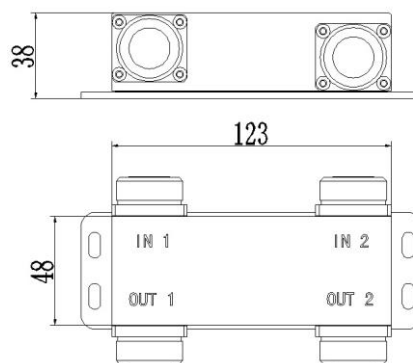


Tolerance: $\pm 0.5\text{mm}$

3-dB Hybrid Combiner (DIN-type)



- Cellular Base Station signals combination
- Wider frequency range
- Low PIM
- Low insert loss
- High isolation
- For indoor or outdoor applications



Technical Specifications:

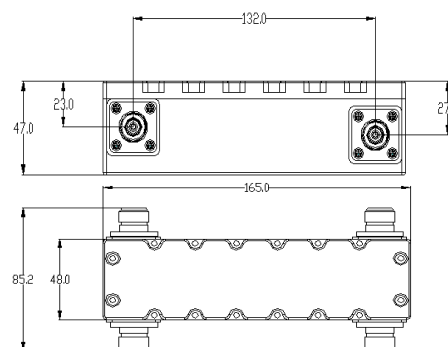
Product Type	WHDSCB800/2700-3dB
Working Frequency Range	800 - 2700 MHz
Insert Loss	3±0.4 dB
In-band Ripple	≤0.5dB
Isolation	≥20 dB
VSWR	≤1.25
Impedance	50Ω
Inter-modulation Products	≤-150 dBc (with 2 x 43dBm)
Input Power	500 W Per Port
Average Power (Continues)	500 W Per Port
Connectors	7-16 Female
Working Temperature	-40 +60 °C
Relative Humidity	0 - 95 %
Weight	≤1.0 Kg
Dimensions (L x W x H)	165 x 82.5 x 47 mm
	Indoor Or Outdoor (IP 65)

Product Pictures :



3-dB Hybrid Combiner (N-type)

- Wider frequency range
- Low PIM
- Low insert loss
- High isolation
- For indoor or outdoor applications

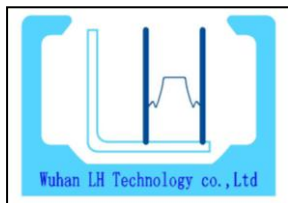


Technical Specifications:

Product Type	WHDSCB800/2700-3dB-P-N
Working Frequency Range	800 - 2700 MHz
Insert Loss	3±0.4 dB
In-band Ripple	≤0.5 dB
Isolation	≥20 dB
VSWR	≤1.25
Impedance	50Ω
Inter-modulation Products	≤-150 dBc (with 2 x 43dBm)
Input Power	300 W Per Port
Average Power (Continues)	300 W Per Port
Connectors	N Female
Working Temperature	-40 +60 °C
Relative Humidity	0 - 95 %
Weight	≤1.0 Kg
Dimensions (L x W x H)	165 x 82.5 x 47 mm
Applications	Indoor Or Outdoor (IP65)

Product Pictures :



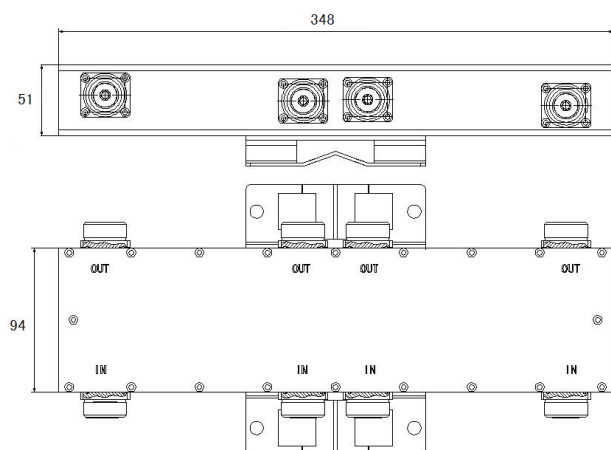


4Way In and 4 Way Out Wideband Hybrid Coupler

LHHT-0016K-N-A

- high reliability
- high power handling
- low PIM

Electrical Specifications			
Frequency range		696–2700MHz	
Output power separation		6.0 dB	
Insertion loss		≤ 0.15dB	
In-band ripple (dB)	696–750 MHz	750–2650 MHz	2650–2700 MHz
	±0.5 dB	±0.4 dB	±0.5 dB
Isolation		≥ 25 dB	
Impedance		50 Ohm	
VSWR		≤ 1.20: 1	
IM3@2×20W		< -155 dBc	
Average input power		500 W	
Connectors		7–16 Female	
Mechanical Specifications			
Dimensions (w x h x d)		348×94×51mm	
Weight		< 4.0 kg	
Maximum Environmental Ratings			
Enclosure protection		IP 54	
Temperature range		-10 °C – +65 °C	
Relative humidity		0 – 95 %	

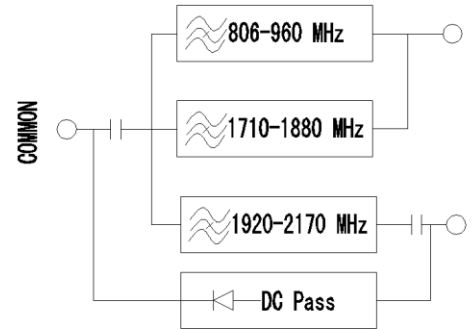


Dual-band Combiner (900/1800 –2100)

WHFC900/1800-2100-A3P



- High reliability High power
- Handling Low PIM High rejection
- Built-in lightning protection
- Wall or mast mounting
- Environment ip67
- Low Loss



Electrical Specifications

Pass band

Port 1 806-960 MHz/1710-1880 MHz

Port 2 1920-2170 MHz

Pass band Insertion loss
<0.25 dB (806-960 MHz)
<0.4 dB (1710-1880 MHz)
<0.4 dB (1920-2170 MHz)

Input return loss ≥ 20 dB

Power handling 200w CW/Avg,1kw Peak

Impedance in/out 50 Ω

Port to port rejection > 47dB

DC Pass

Port 2 to COMMON 3A / AISG Signal(2.176 MHz) per AISG 2.0

Inter modulation(IM3) < -150 dBc (3rd order; with 2 x 20 W)

Connectors 7-16 female (long neck)

Mechanical Specifications

Dimensions (L x W x H) 210x 160x 49 mm

Weight < 3.0 kg

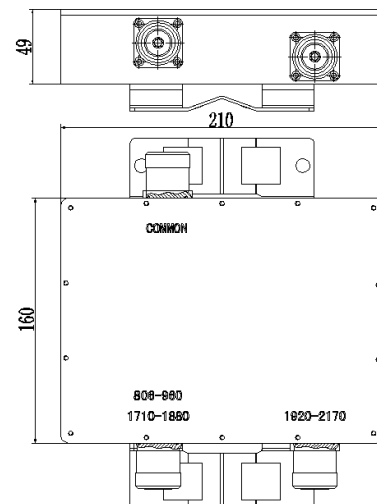
Maximum Environmental Ratings

Temperature range - 10 ... +70 °C

MTBF 100,000 hours min

Application Indoor or outdoor (IP 67)

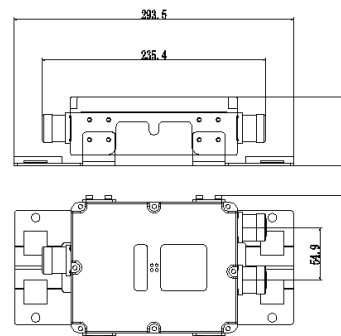
Lightning protection 3 kA, 10/350 μ s pulse



Dual-band Combiner (800-900 and 1800-2100)



- Cellular Base Station signals combination
- Low PIM
- Low insert loss
- High rejection
- For indoor and outdoor applications



Technical Specifications:

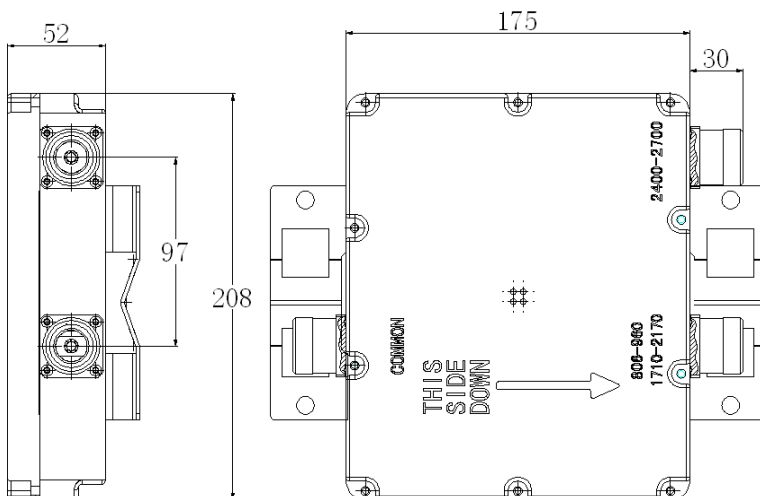
Parameters	Indicator	
Model	WHFC800/900-1710/2200-A3P	
Working Frequency Range (MHz)	806~960	1710 - 2170
Insert Loss (dB)	≤0.2	≤0.3
In band ripple (dB)	≤0.2	
Isolation (dB)	≥50dB@1710~2170MHz	≥50dB@806~950MHz
Input return loss (dB)	≥20	
Impedance (Ω)	50	
Inter-modulation Distortion (dBc)	≤-150dBc (+43dBm*2)	
DC By Pass	Block	Pass
DC Pass Current	3A	
Power Capacity (W)	250 W Average Per Port, 3 KW Peak	
Reference Dimensions(L*W*H) (mm)	294 x 152x 73	
Connection Model	7-16 DIN Female	
Working Temperature (°C)	-40~+65	
Application	Indoor Or Outdoor (IP 67)	
Lightning protection	8/20μs,20kA; 10/350 μs pulse,3 kA Port ANT)	
MTBF	10 Million Hours	
Safety	EN60 950	
Environmental	ETS 300 019	
Relative Humidity (%)	0~95	
Weight (Kg)	<4.5	

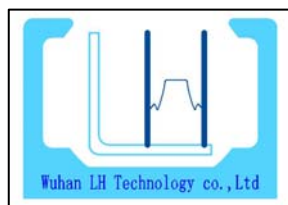
Product Pictures :



LTELH-0071A
Technical Data

Type No.	LTELH-0071A	
	Port1	Port2
Pass band	806-960 and 1710-2170 MHz	2400-2700 MHz
Insertion loss	≤ 0.25 dB (800, 900) and ≤ 0.5 dB (1800, 2100)	≤ 0.5 dB
In Band Ripple	<0.3 dB	
Return loss	> 20 dB	
Isolation between systems	≥ 50 dB	
Power capacity per input port	250W average 3kw peak	
Impedance in/out	50 Ω	
Inter modulation products	< -150 dBc (2-tone x 20W)	
DC pass	Pass	Block
DC+AISG	5A+2.176 MHz(options*)	
Temperature range	-40 – 65 °C	
Connectors	7-16 female (long neck)	
Sealing	IP67	
MTBF	10 million hours	
Safety	EN60 950	
Lightning protection	3 kA, 10/350 μs pulse	
Humidity	Relative 0 – 95 %	
Weight	3.5 kg	
Material	aluminum	
Dimensions (w x h x d)	Single Unit: 175 x 208x 52 mm	





ThaiTelCom-LHT WiFi Combiner

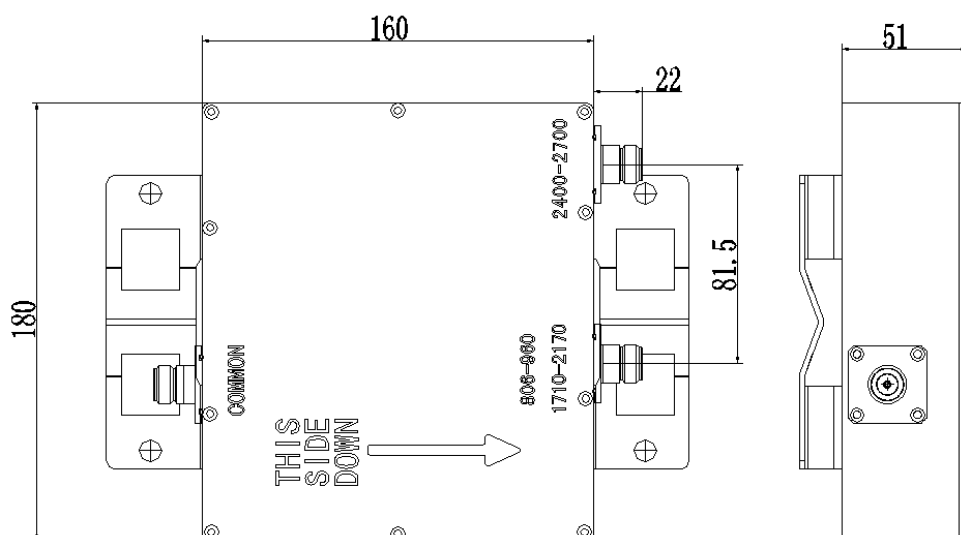


LTELH-0071B



Technical Data

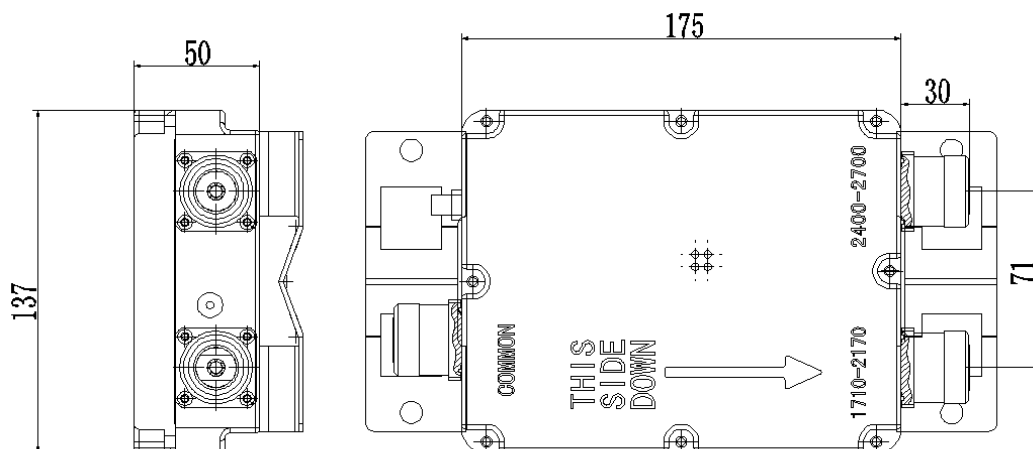
Type No.	LTELH-0071B	
	Port1	Port2
Pass band	806-960 or 1710-2170 MHz	2400-2700 MHz
Insertion loss	≤ 0.25 dB (800, 900) and ≤ 0.5 dB (1800, 2100)	≤ 0.5 dB
In Band Ripple	< 0.3 dB	
Return loss	> 20 dB	
Isolation between systems	≥ 50 dB	
Power capacity per port	250W average 3kw peak	
Impedance in/out	50 Ω	
Inter modulation products	< -150 dBc (2-tone x 20W)	
DC pass	Pass	Block
DC+AISG	5A+2.176 MHz(options*)	
Temperature range	$-40 - 65$ $^{\circ}\text{C}$	
Connectors	N female (long neck)	
Sealing	IP54	
MTBF	10 million hours	
Safety	EN60 950	
Lightning protection	3 kA, 10/350 μs pulse	
Humidity	Relative 0 – 95 %	
Weight	< 4.2 kg	
Material	Aluminum	
Dimensions (w x h x d)	Single Unit: 160 x 180 x 51 mm	



LTELH-0070A

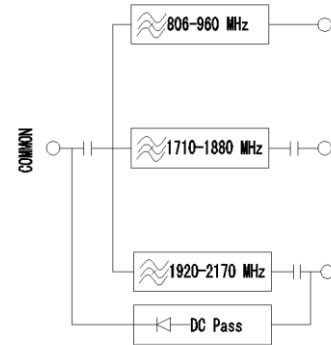
Technical Data

Type No.	LTELH-0070A	
	Port1	Port2
Pass band	1710-2170 MHz	2400-2700 MHz
Insertion loss	≤ 0.35 dB	≤ 0.5 dB
In Band Ripple	< 0.3 dB	
Return loss	> 20 dB	
Isolation between systems	≥ 50 dB	
Power capacity	250W average 3kw peak	
Impedance in/out	50 Ω	
Inter modulation products	< -150 dBc (2-tone x 20W)	
DC pass	Block	Pass
DC+AISG	5A+2.176 MHz(options*)	
Temperature range	$-40 - 60$ °C	
Connectors	7-16 female (long neck)	
Sealing	IP67	
MTBF	10 million hours	
Safety	EN60 950	
Lightning protection	3 kA, 10/350 μ s pulse	
Humidity	Relative 0 – 95 %	
Weight	2.2 kg	
Material	Aluminum	
Dimensions (w x h x d)	Single Unit: 175 x 137x 50 mm	



SGQLH-0111D-O-A

- High reliability High power
- Handling Low PIM High rejection
- Built-in lightning protection
- Wall or mast mounting
- Environment IP66
- Low Loss

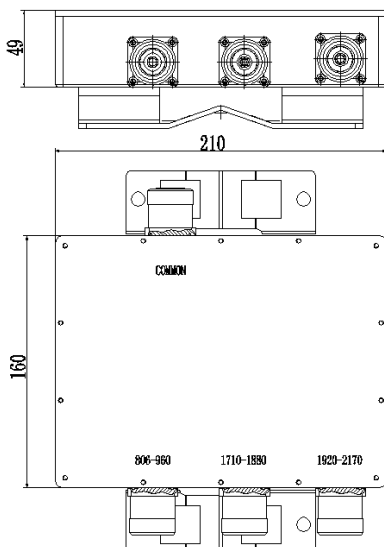


Electrical Specifications

Pass band	
800/900	806-960 MHz
1800	1710-1880 MHz
2100	1920-2170 MHz
Pass band Insertion loss	<0.2 dB (806-960MHz) <0.35 dB(1710-1880/1920-2170MHz)
Input return loss	≥20 dB
Power handling	200w CW/Avg,1kw Peak
Impedance in/out	50 Ω
Port to port rejection	> 50dB
DC Pass(2170 Port to COMMON)	3A / AISG Signal(2.176 MHz) per AISG 2.0
Inter modulation(IM3)	< -150 dBc (3rd order; with 2 x 20 W)
Connectors	7-16 female (long neck)

Mechanical Specifications

Dimensions (L x W x H)	210x 160x 49 mm
Weight	< 3.0 kg
Maximum Environmental Ratings	
Temperature range	- 10 ... +60 °C
MTBF	100,000 hours min
Application	Indoor or outdoor (IP 66)
Lightning protection	3 kA, 10/350 μs pulse





ThaiTelCom-LHT

MULTIBAND COMBINER (POI)

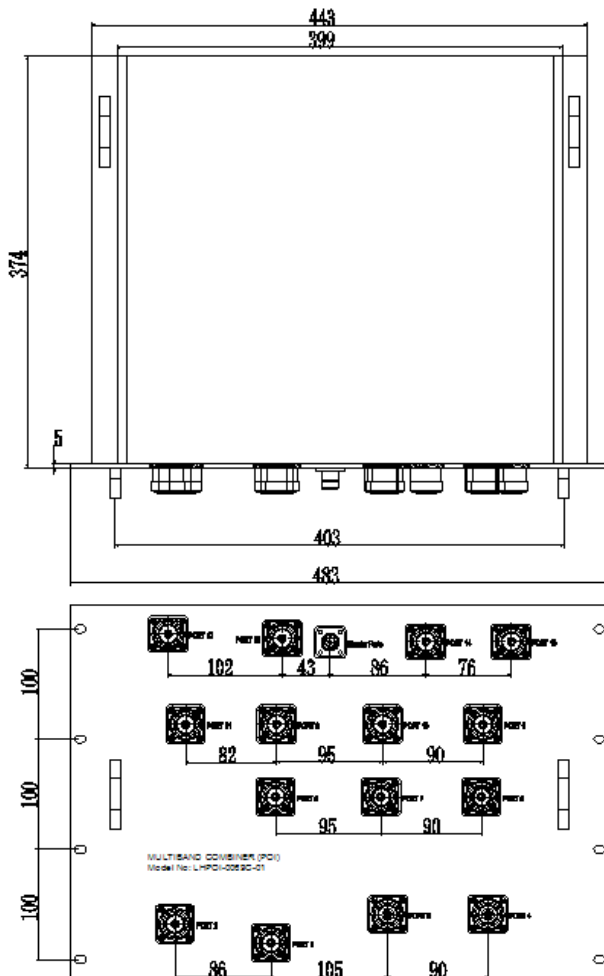
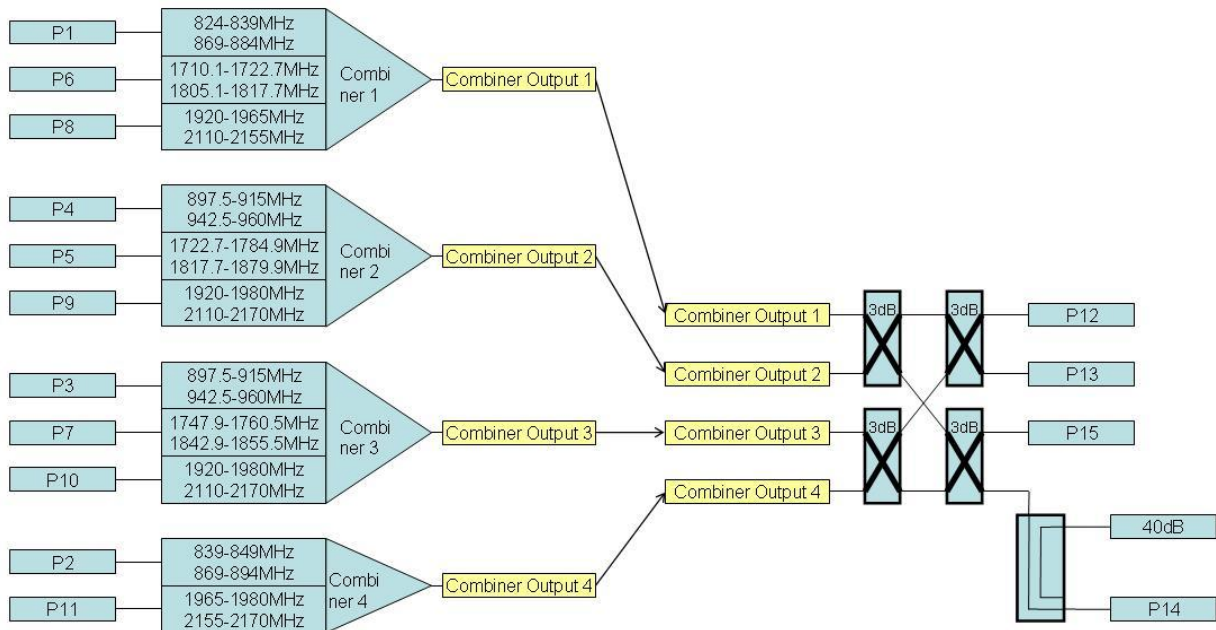


LHPOI-0069A-N-A

Technical Data

Type No.	LHPOI-0069A-N-A
Frequency range	
Port1 TRUEMOVE850 (MHz)	824-839 MHz/869-884 MHz
Port2 DTAC850 (MHz)	839-849 MHz/884-894 MHz
Port3 AIS WCDMA900 (MHz)	897.5-915MHz/942.5-960MHz
Port4 AIS GSM900 (MHz)	897.5-915MHz/942.5-960MHz
Port5 DTAC1800 (MHz)	1722.7-1747.9, 1760.5-1784.9/1817.7-1842.9, 1855.5-1879.9MHz
Port6 TRUEMOVE1800 (MHz)	1710.1-1722.7/1805.1-1817.7 MHz
Port7 DPC1800 (MHz)	1747.9-1760.5/1842.9-1855.5MHz
Port8 DTAC2100 (MHz)	1920-1935/ 2110-2125 MHz
Port9 TMV2100 (MHz)	1935-1950/ 2125-2140 MHz
Port10 AIS2100 (MHz)	1950-1965/ 2140-2155 MHz
Port11 TOT2100 (MHz)	1965-1980/ 2155-2170 MHz
Cross Band Isolation (dB)	
P1↔P3,P4 P2↔P3,P4 P3↔P1,P2 P4↔P1,P2	≥90
Other port	≥50
Same Band Isolation (dB)	≥20
Insertion loss(dB)	
P1,P2,P3,P4	≤ 8.8
P5,P6,P7,P9,P9,P10,P11	≤ 7.8
Impedance (Ohm)	50
Return loss (dB)	≥18.5
Intermodulation@2-tone x 20W (dBc)	≤ -150
Average input power per port (Watt)	≥20
Connector type	7/16DIN (female)
Monitor Ports	N-Female 40±2dB (in-coupling)
Enclosure protection	IP54 or better than
Operating temperature (oC)	-10 – 60
Relative humidity (%)	0 – 95
Size	Width 19 inch (483 mm), Height 8 U (350mm)

MULTIBAND COMBINER (POI)

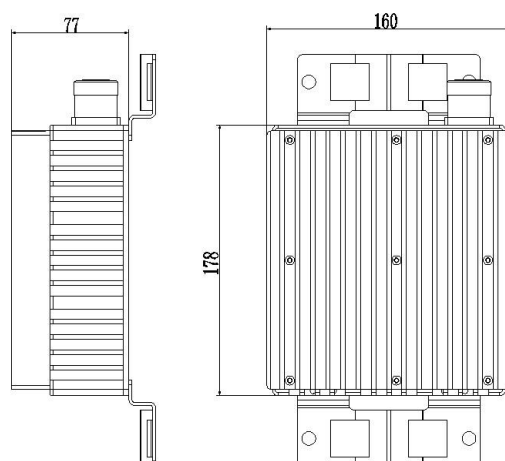


Product Description Features

- ➔ Wide frequency band: 500-3000MHz
- ➔ Extremely low PIM
- ➔ High power capacity
- ➔ Wall or pole mounting

Specifications

Frequency range	500-3000MHz
Product Type	WHLD-100P-DF-1
Power Capacity (Per Port)	Average: $\leq 100W$ Peak: $\leq 500W$
RF Connector	D-Female
Weight excl package	$\leq 5.0Kg$
Dimension	280 x 180 x 94 mm
Ingress Protection	IP65
Applications	Indoor and outdoor
Inter-modulation	≤ -153 dBc (with 2 x 43dBm)
VSRW(Return Loss)	≤ 1.25 (-19.1 dB)
Impedence	50 Ohms
Operating Temperature	-25°C to +70°C
Relative Humidity	0~95%

Sketch Diagram and Out View

Indoor Omni Antenna (800-2700MHz, 5dBi/7dBi)**Product Description**

This Omni antenna is specifically designed for Multi band in building system of LTE, GSM, DCS, CDMA, UMTS, 3G, WiFi, WLAN services. The antenna is constructed from lightweight materials, suitable for ceiling mounting. The off-white Radome blends easily into most indoor environments.

Features

- ➔ LTE ready and wide frequency band: including CDMA800, GSM900, DCS1800, UMTS2100, CDMA1900, LTE2600, WiFi
- ➔ Input power 50Watt maximum
- ➔ Low VSWR/return loss
- ➔ Aesthetically designed, compact and light weight
- ➔ Off-white (ABS) Radome
- ➔ Extend a Low Loss pig tail cable

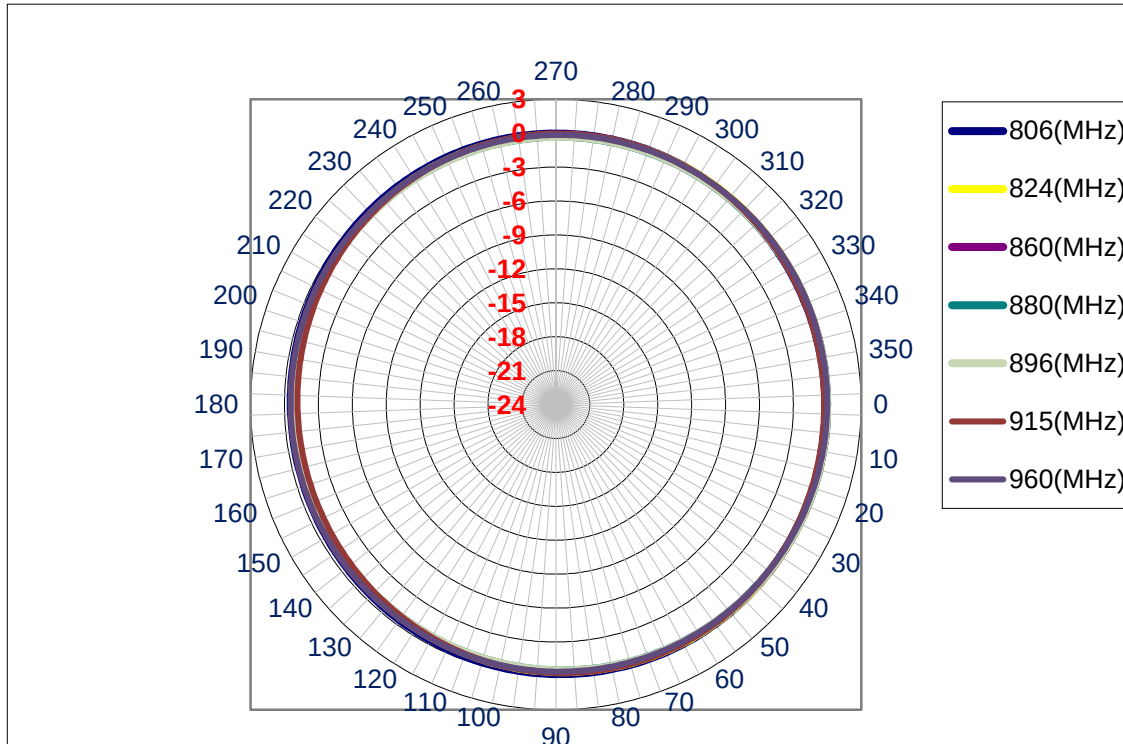
Specifications

Product Type	WHQ-800/2170-5		
Frequency range	800-960 MHz	1710-2170 MHz	2300-2700MHz
VSWR	≤1.5	≤1.5	≤1.5
Gain	5 dBi	6 dBi	7 dBi
Polarization	Vertical		
Weight excl package	≤0.4 Kg		
Antenna Dimension(D×H)	Ø204mm × 115mm		
Plate size	Ø380mm		
Inter-modulation	≤-140 dBc (with 2 x 5W)		
Power Capacity (Per Port)	50W max		
Impedence	50 Ohms		
Radome Material	ABS		
Radome Color	White		
Operating Temperature	-30 to +60		
Relative Humidity	0~95%		
RF Connector	N-Female		

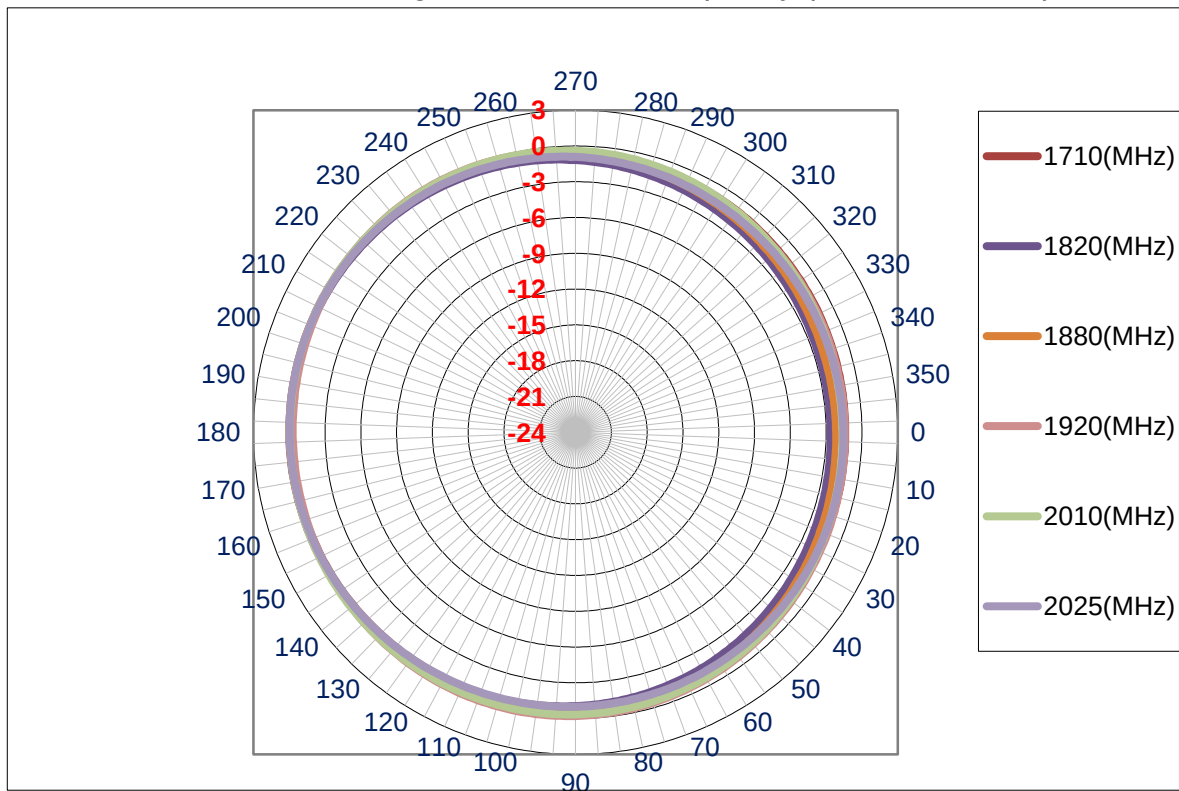


Indoor Omni Antenna (800-2700MHz, 5dBi/7dBi)**Radiation Pattern**

Horizontal Beam is 0-360 degree for low-frequency (800-960 MHz)

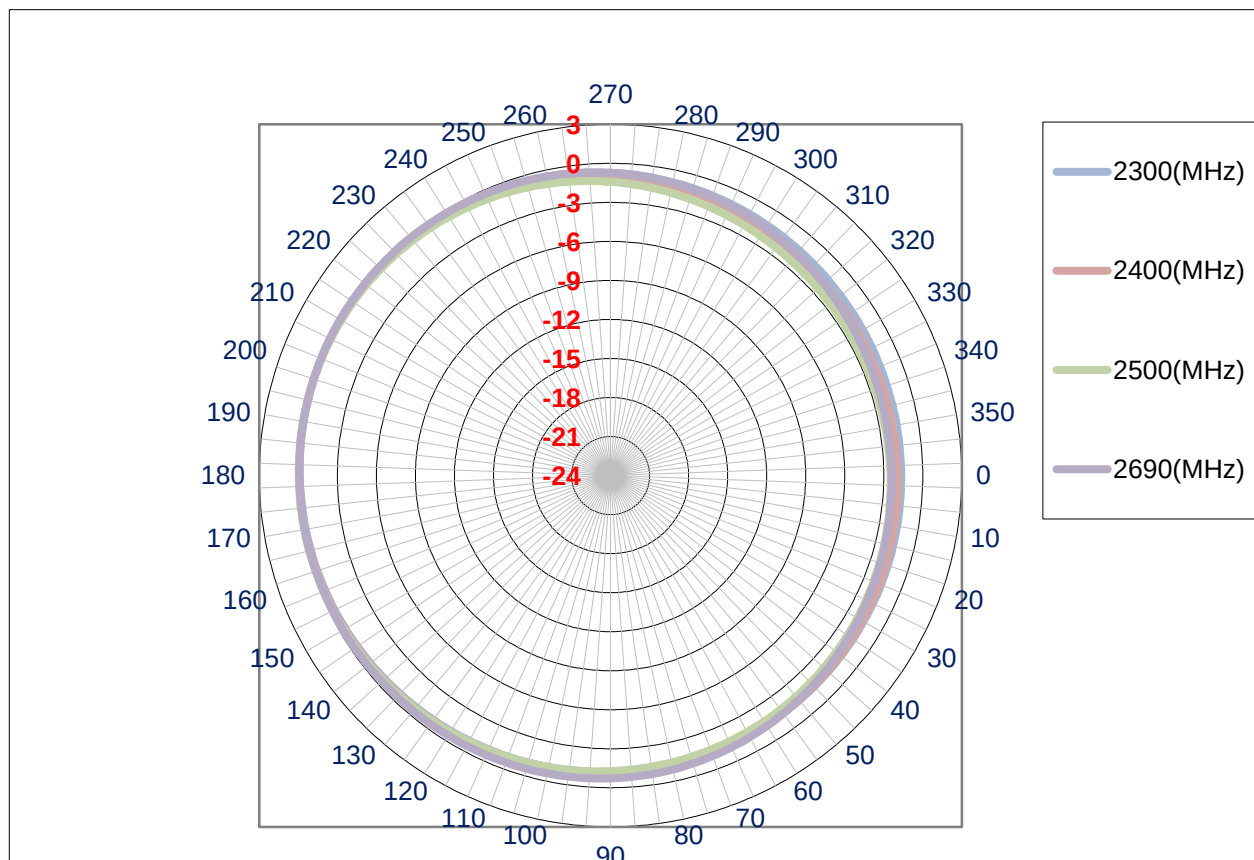


Horizontal Beam is 0-360 degree for medium-frequency (1710-2170 MHz)

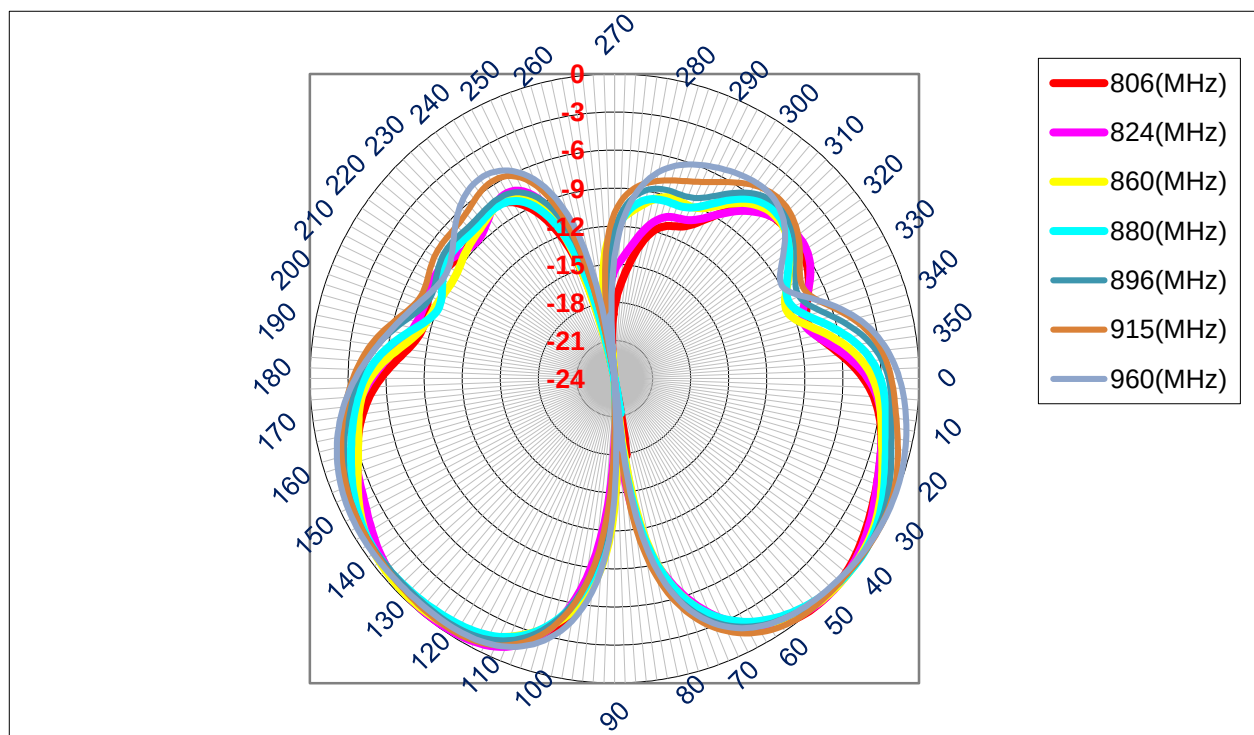


Indoor Omni Antenna (800-2700MHz, 5dBi/7dBi)

Horizontal Beam is 0-360 degree for high-frequency (2300-2700 MHz)

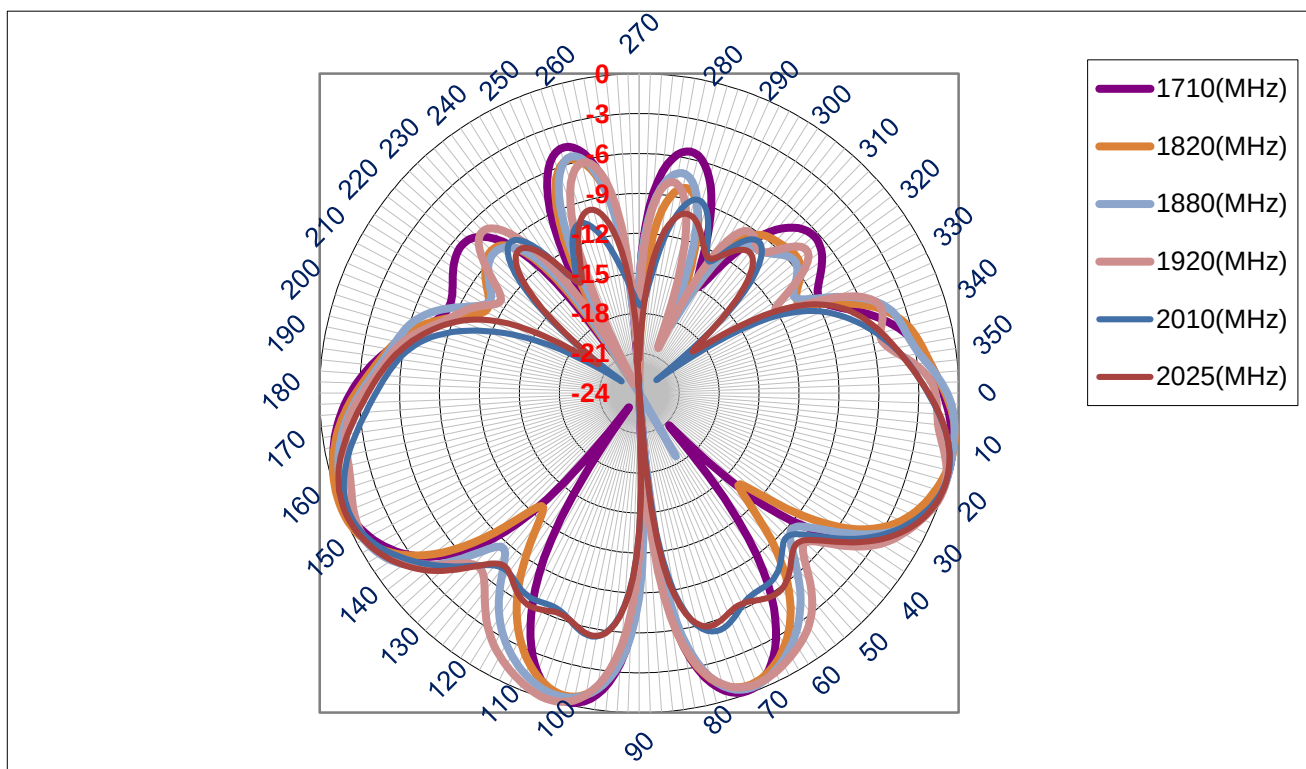


Vertical Beam is 0-70 degree for low-frequency (800-960 MHz)

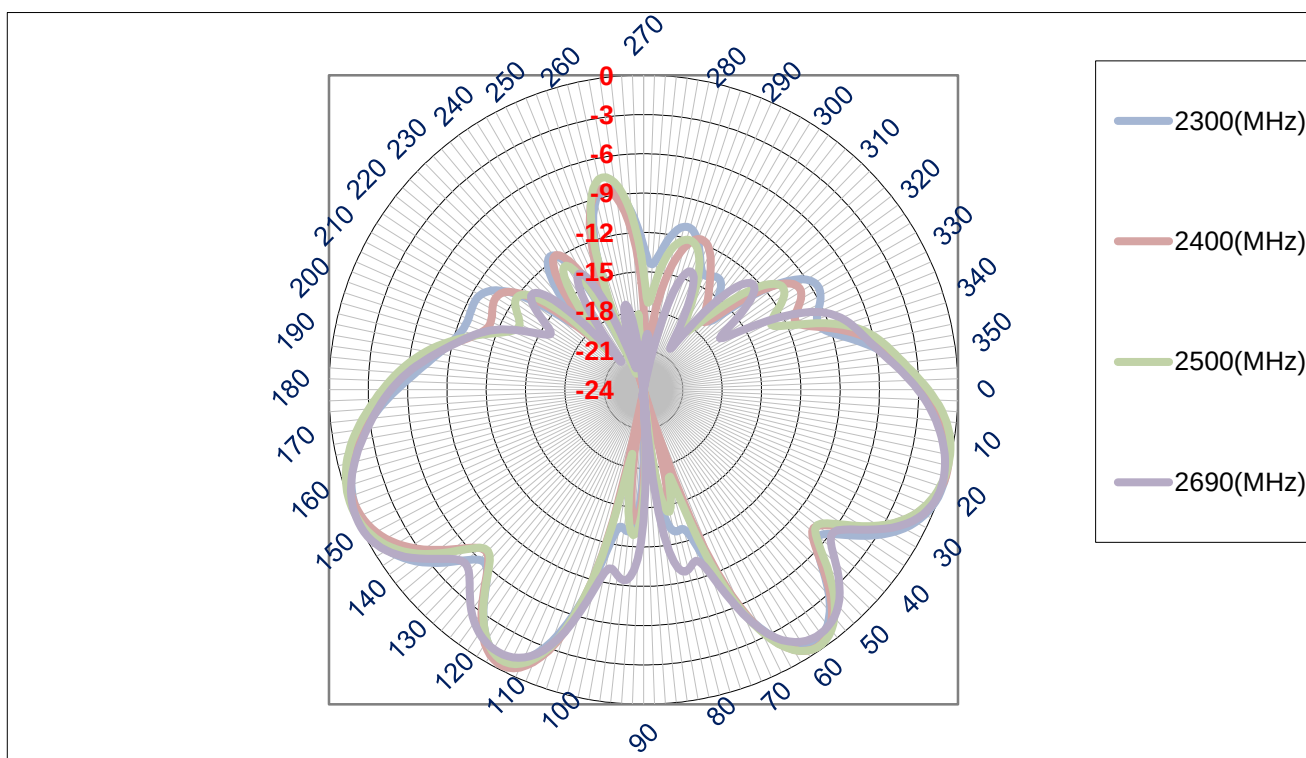


Indoor Omni Antenna (800-2700MHz, 5dBi/7dBi)

Vertical Beam is 0-35 degree for medium-frequency (1710-2170 MHz)

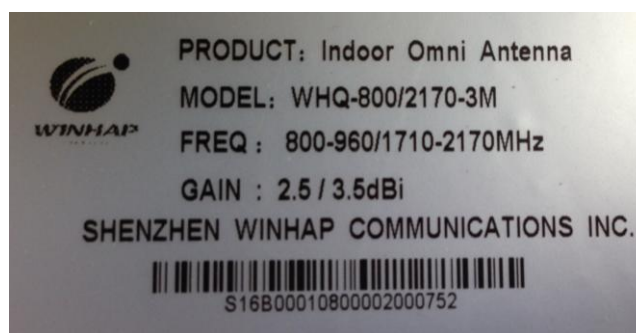


Vertical Beam is 0-35 degree for high-frequency (2300-2700 MHz)



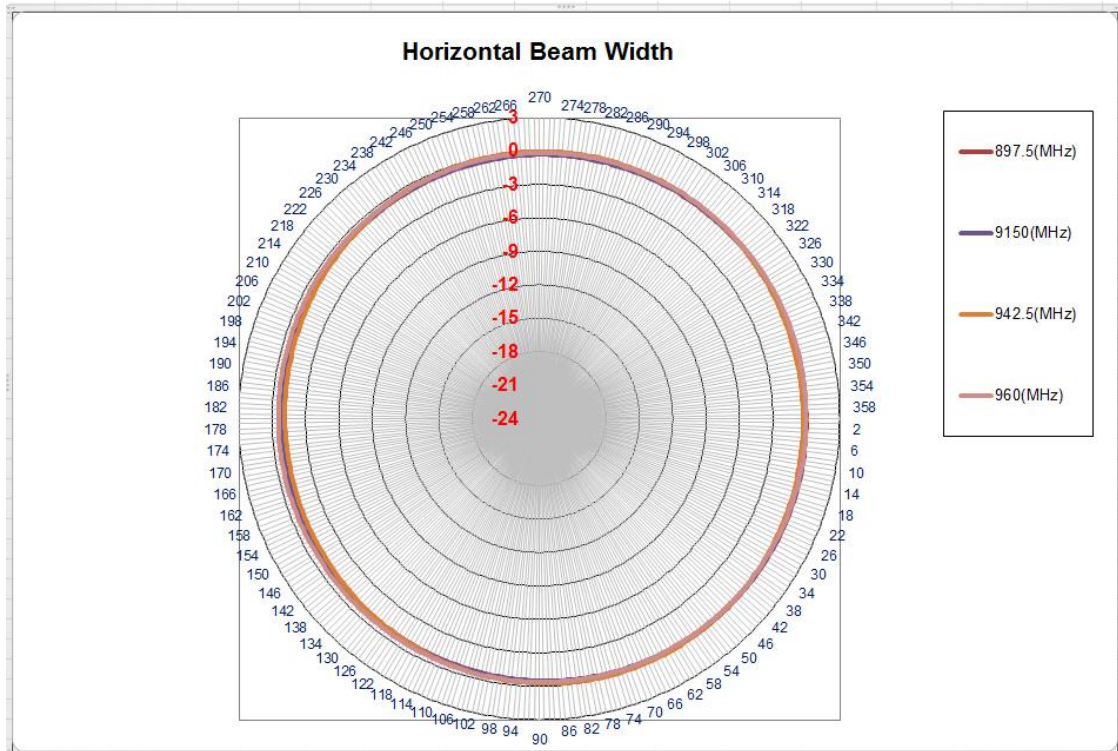
Specifications

Product Type	WHQ-800/2170-3M	
Frequency range (MHz)	800-960	1710-2700
Gain (dBi)	2.5	3.5
VSWR	≤1.5	≤1.6
Polarization	Vertical	
Inter-modulation(dBc)	≤-140 (with 2 x 2.5W)	
Power Capacity(W)	50	
Impedence(Ohms)	50	
RF Connector	N-Female	
Dimension(D×H)(mm)	204*115	
Weight excl package(Kg)	0.3	
Radome Material	ABS	
Radome Color	White	
Operating Temperature(°)	-30 to +60	
Relative Humidity (%)	0~95%	

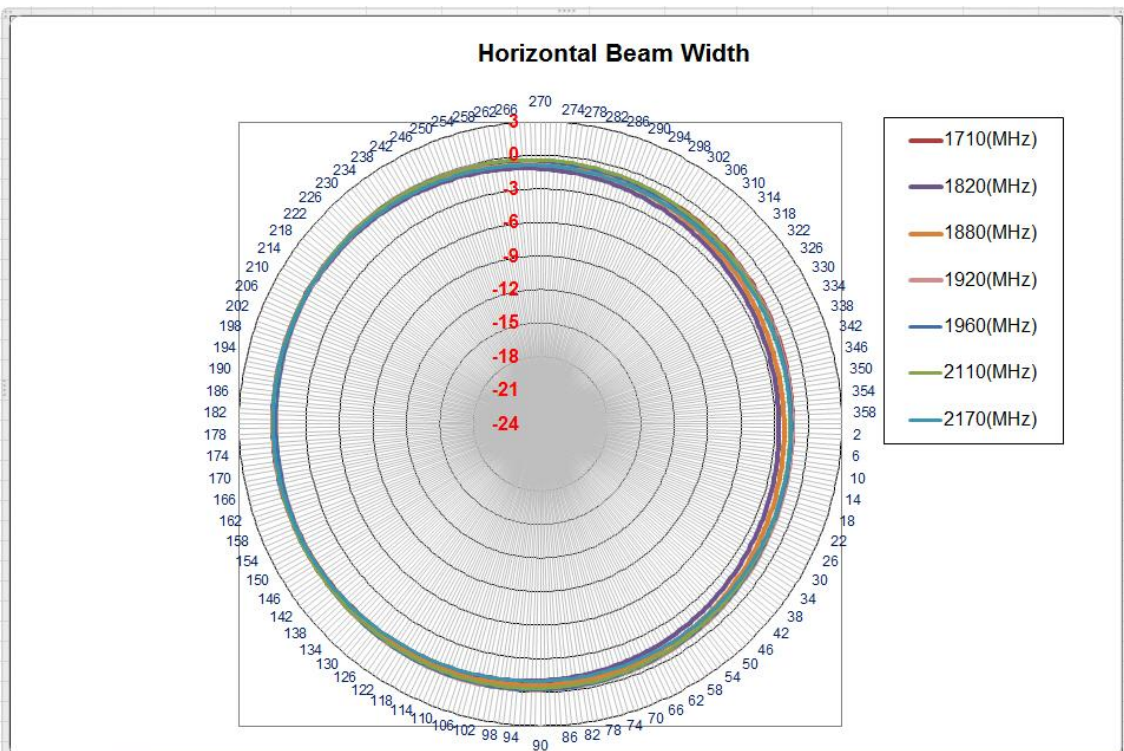


Radiation Pattern

Horizontal Beam is 0-360 degree for low-frequency (800-960 MHz)

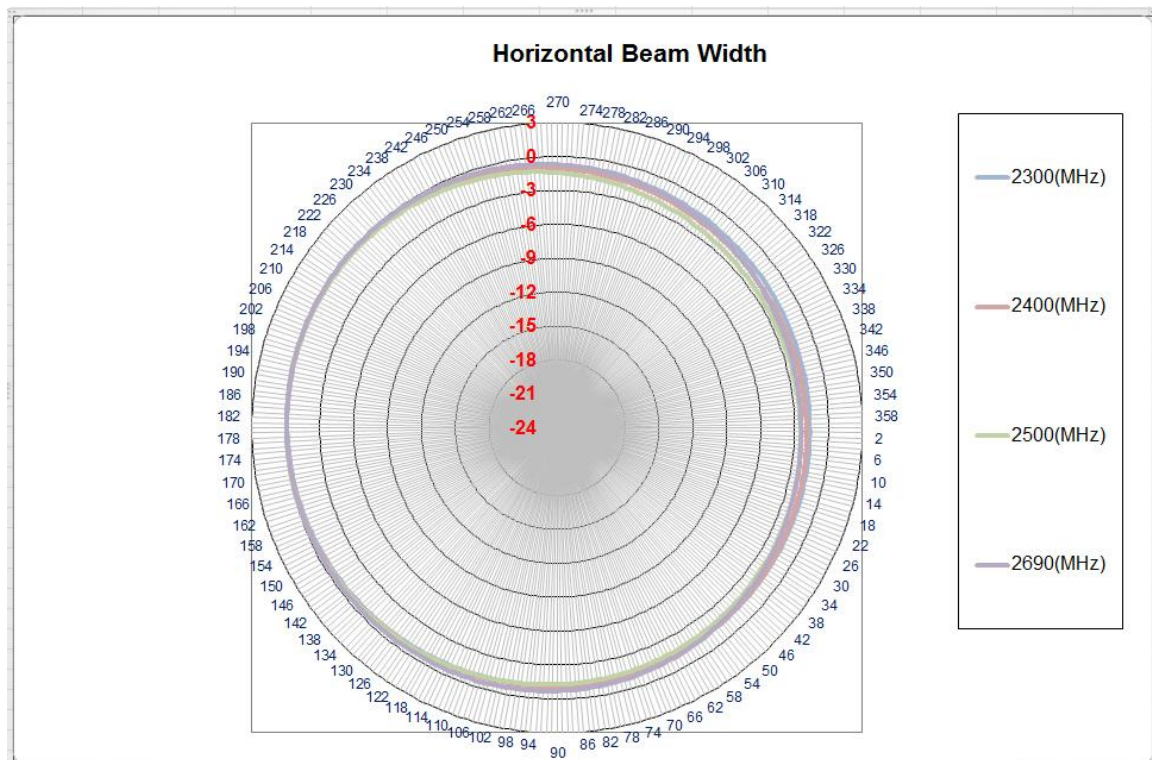


Horizontal Beam is 0-360 degree for medium-frequency (1710-2170 MHz)

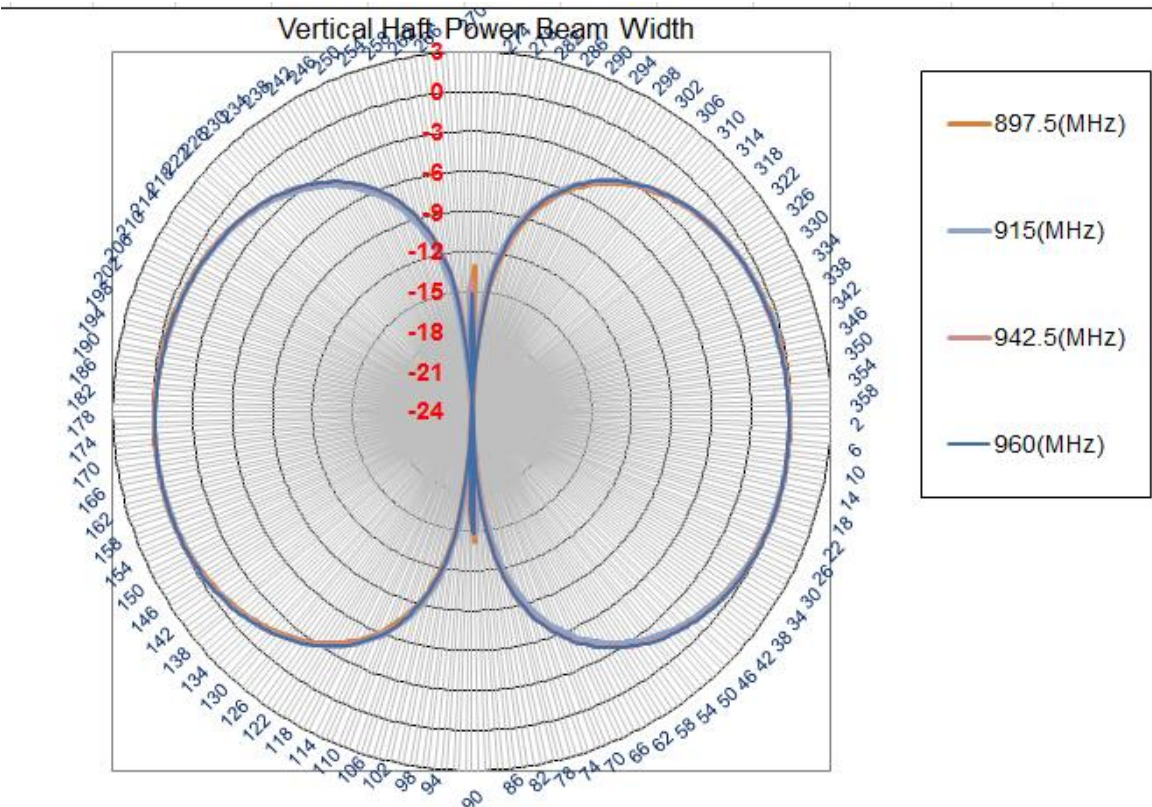


Indoor Omni antenna 800-2700MHz, 2.5dBi/3.5dBi

Horizontal Beam is 0-360 degree for high-frequency (2300-2700 MHz)

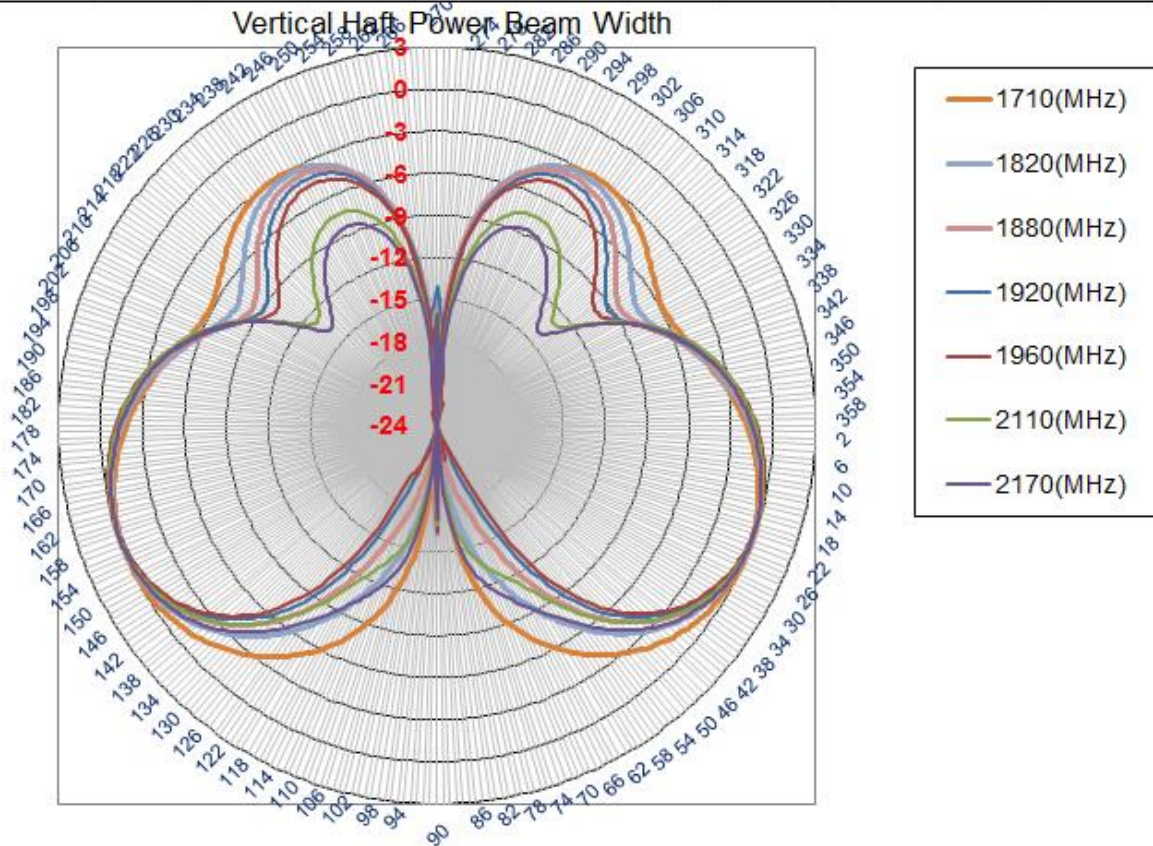


Vertical Beam is 300-60 degree for low-frequency (800-960 MHz)

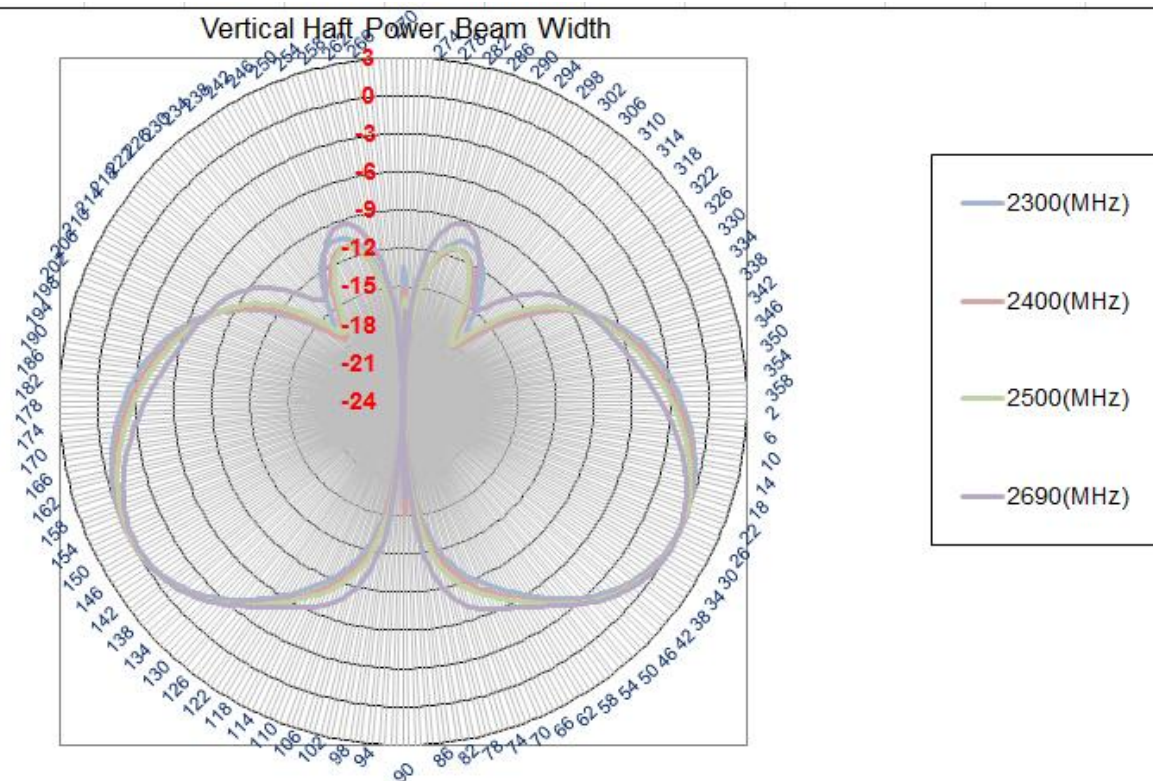


Indoor Omni antenna 800-2700MHz, 2.5dBi/3.5dBi

Vertical Beam is 350-50 degree for medium-frequency (1710-2170 MHz)



Vertical Beam is 350-50 degree for high-frequency (2300-2700 MHz)



LTE MIMO Omni Indoor Antenna
800-2700MHz

Product Description

This LTE MIMO Omni antenna is specifically designed for Multiband inbuilding system of LTE700, GSM, DCS, CDMA, UMTS, 3G, Wi-Fi, LTE2600, WLAN services.

The antenna provide 2 port for support LTE 2×2 MIMO.

The antenna is constructed from lightweight materials, suitable for ceiling mounting. The off-white Radome blends easily into most indoor environments.

- ➔ LTE ready and wide frequency band: including CDMA800, GSM900, DCS1800, UMTS2100, CDMA1900, LTE700, LTE2600,WiFi
- ➔ Input power 50 Watt maximum
- ➔ Low VSWR/Return loss
- ➔ Aesthetically designed, compact and light weight
- ➔ Off-white (ABS) Radome
- ➔ Extend a Low Loss pig tail cable

Specifications

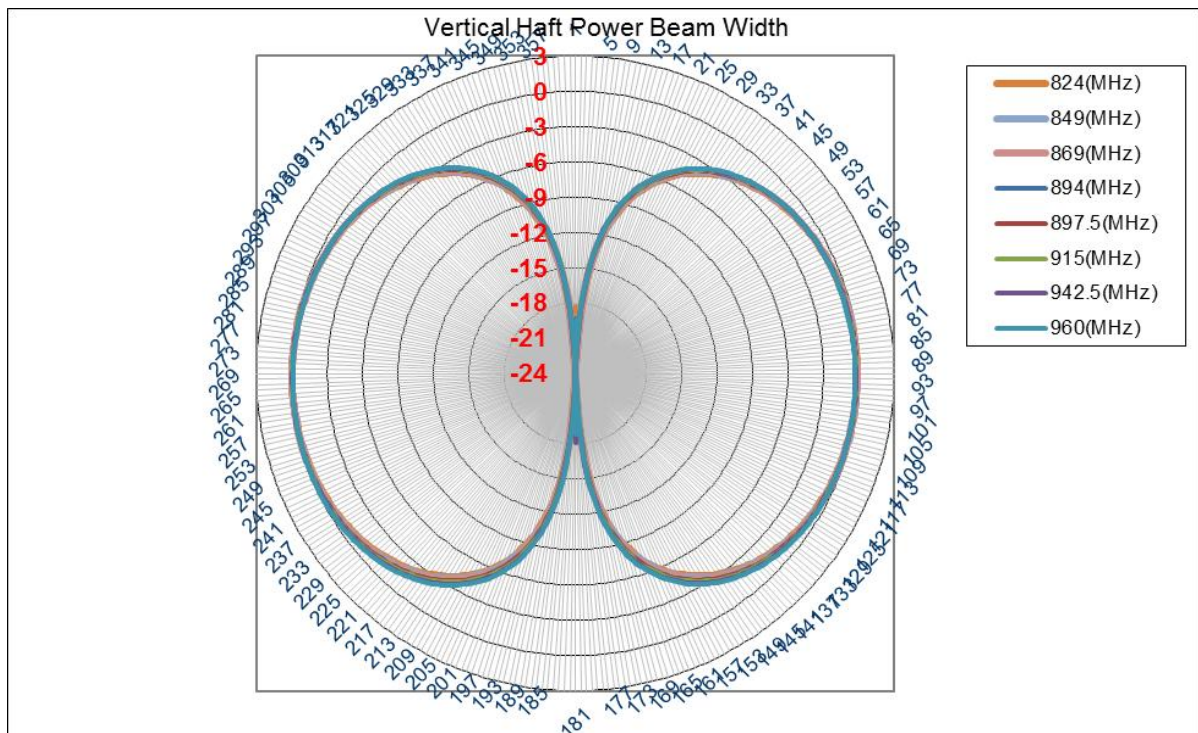
Product number	WHQ-1710/2170-C2		
Frequency range	Port1	Port2	
	800-960 MHz	1710-2700MHz	1710-2700MHZ
VSWR	≤ 1.5	≤ 1.6	≤ 1.6
Gain	$3 \pm 0.5\text{dBi}$	$4 \pm 1\text{dBi}$	$4 \pm 0.5\text{dBi}$
Polarization	Vertical		Horizontal
Horizontal 3dB Beamwidth	360°		360°
Vertical 3dB Beamwidth	120°	60°	60°
Isolation between Ports	$\geq 30\text{ dB}$		
PIM at 2 x 2 W	$\leq -140\text{ dBc}$		
Weight	$\leq 0.5\text{Kg}$		
mension(D×H)	Ø220mm×106mm		
Power capacity	50 W max		
Impedance	50 Ohms		
Radome material	ABS		
Radome color	White		
Operating temperature	-30°C to $+60^{\circ}\text{C}$		
Relative humidity	0~95%		
Connector	N-Female		



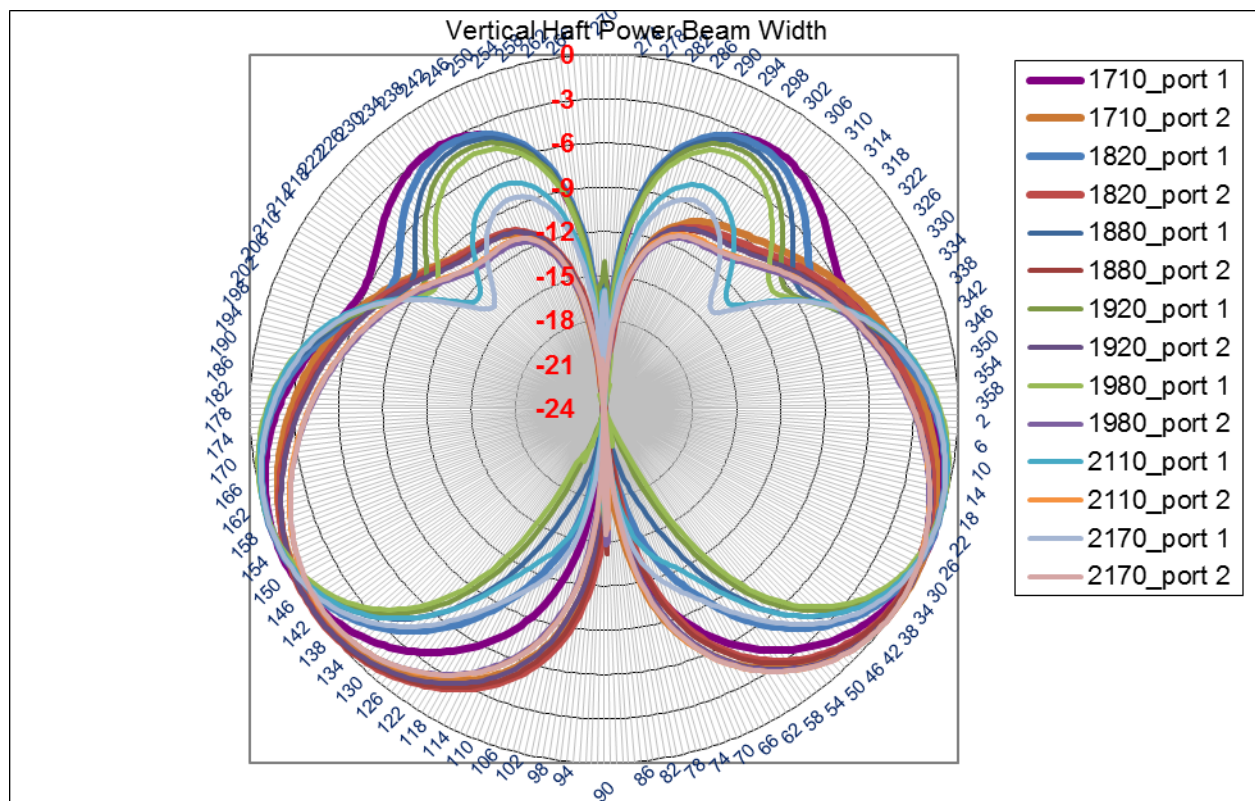


Radiation Pattern

Vertical Low frequency

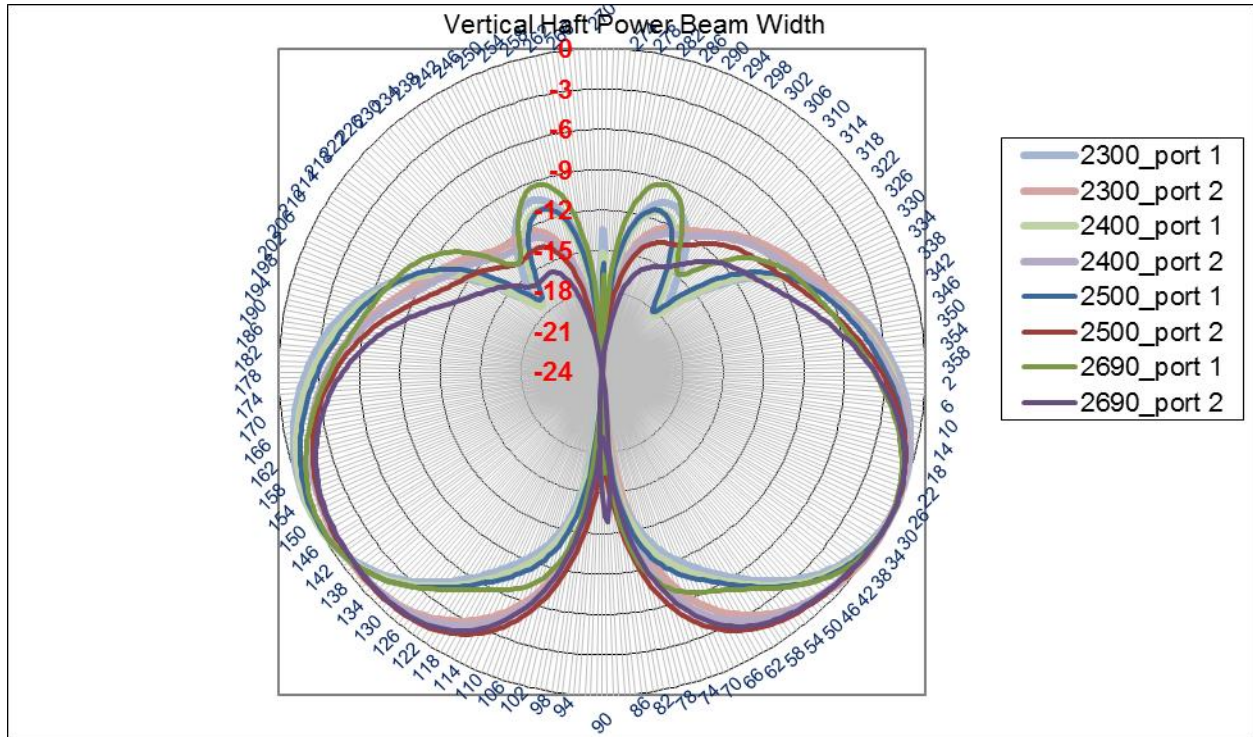


Vertical Medium frequency

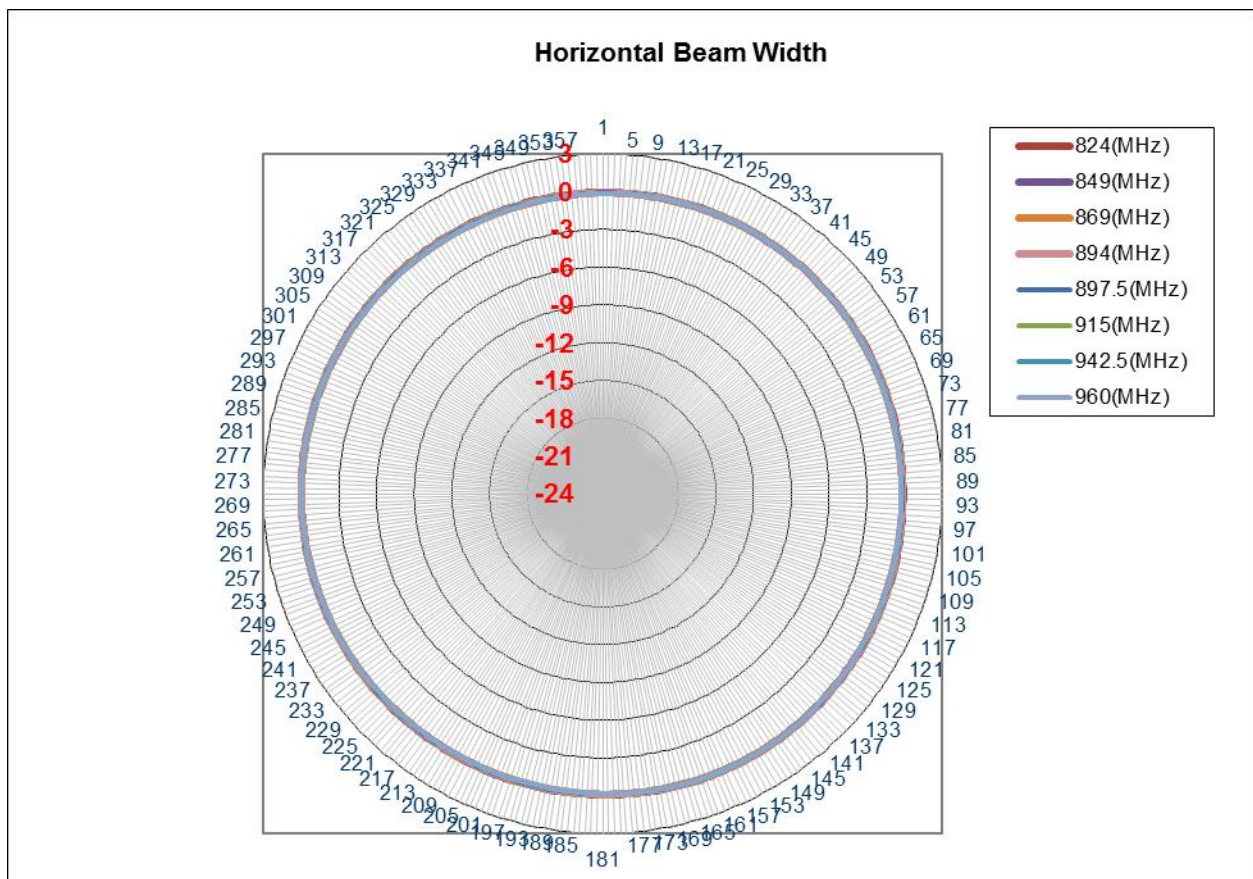




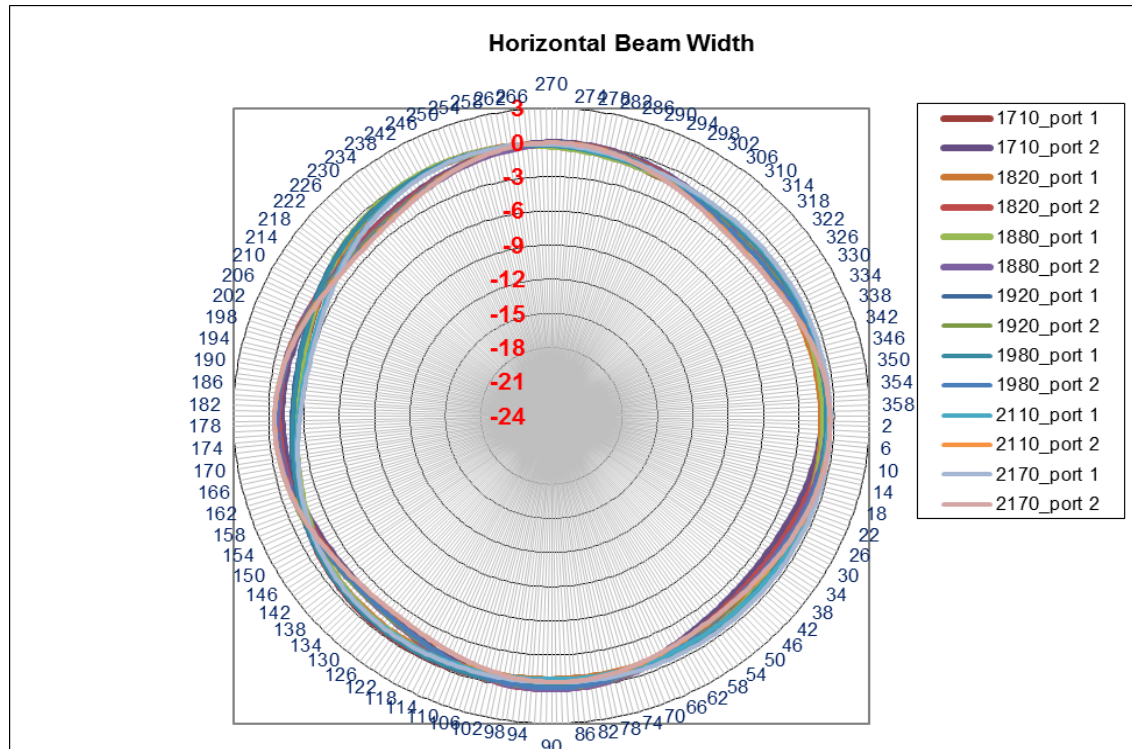
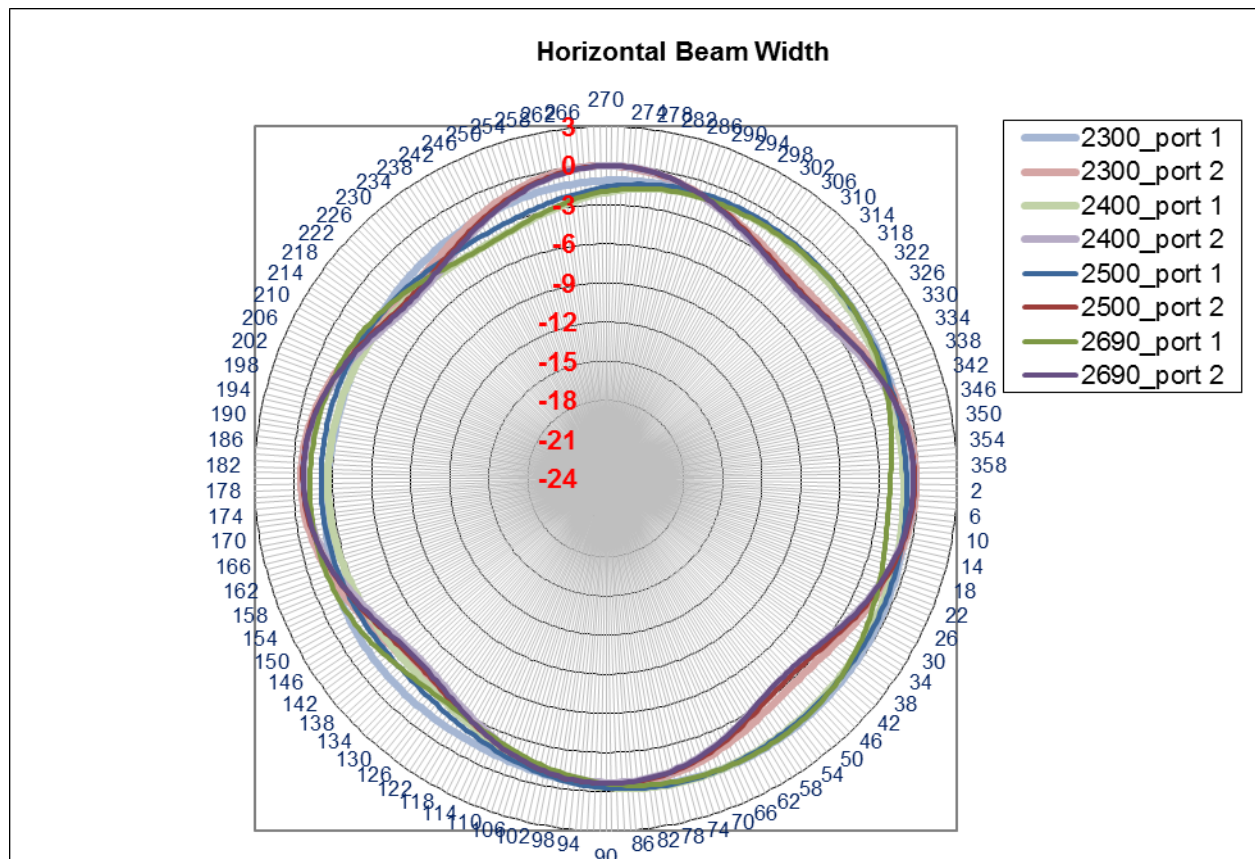
Vertical High frequency



Horizontal Low frequency



LTE MIMO Omni Indoor Antenna
800-2700MHz

WINHAP
Horizontal Medium frequency

Horizontal High frequency


Fullband MIMO Antenna

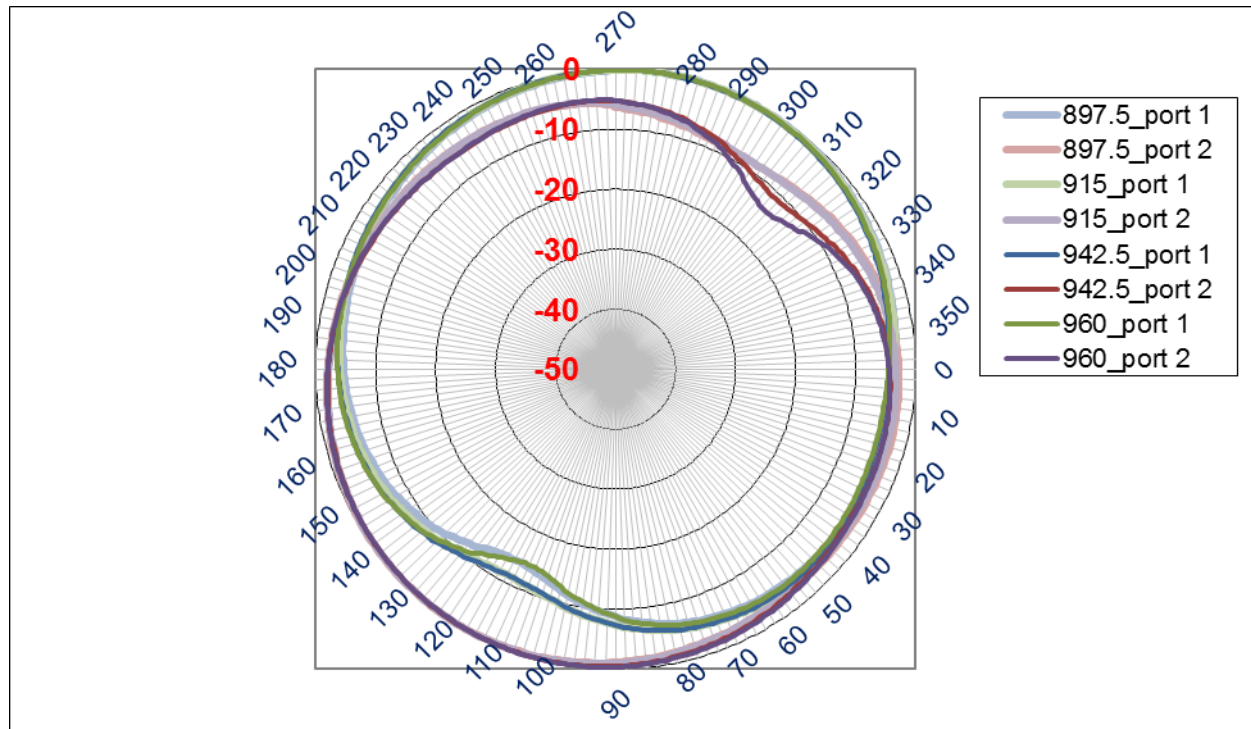
LHTX-0204A-I-N-A

Electrical Specifications		PORT 1		PORT 2	
Frequency Band (MHz)	800-960	1710-2700	800-960	1710-2700	
Inter-Port Isolation	>= -20 dB	>= -25 dB	>= -20 dB	>= -25 dB	
Input	2x N-Type (Female)				
Horizontal Beam-width	Omni (360°)				
Impedance in/out	50 Ω				
VSWR	<1.5 : 1	<1.5 : 1	<1.5 : 1	<1.5 : 1	
Gain	3 ± 0.5dBi	4 ± 0.5dBi	3 ± 0.5dBi	4 ± 0.5dBi	
Input Power	50 W				
PIM @ 2 x 33 dBm	< -150 dBc				
Mechanical Specifications					
Dimensions					
Diameter	204 mm				
Height	66 mm				
Weight	< 0.5 kg				
Maximum Environmental Ratings					
Temperature range	- 30 ... +60 °C				
Relative humidity	0~95%				
Environmental Conditions	Indoor				

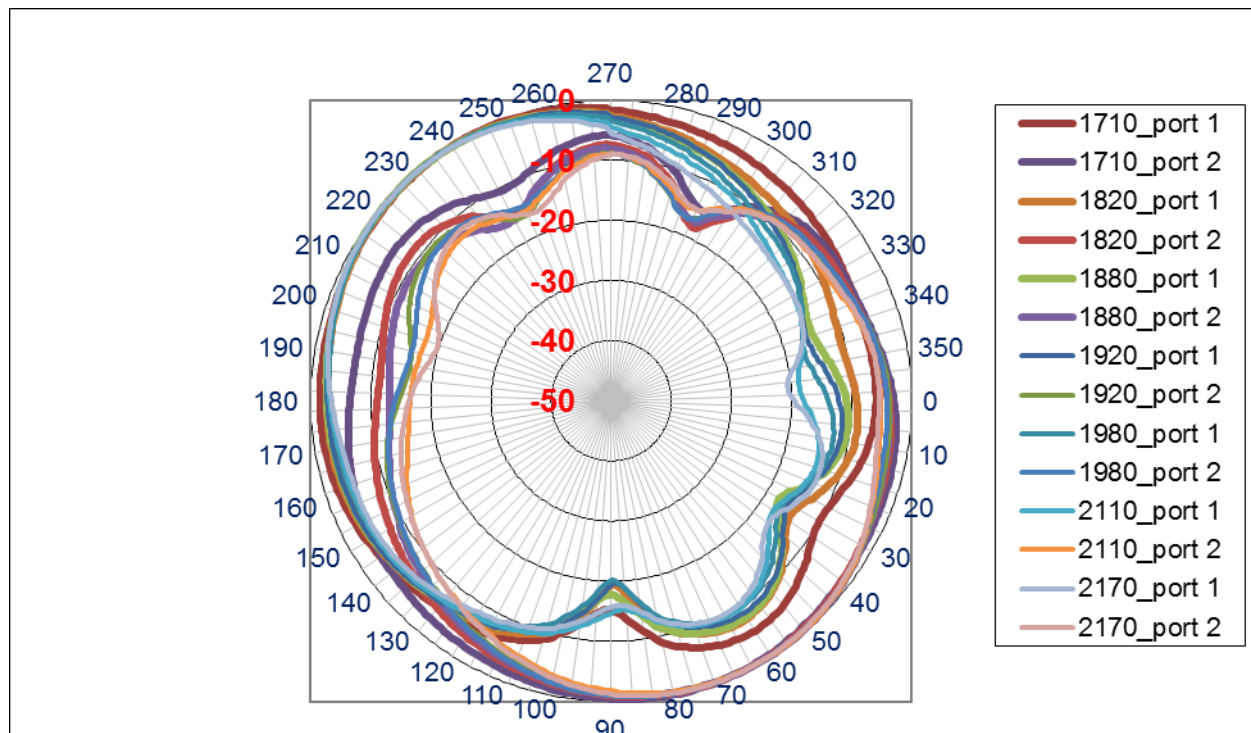


Radiation Pattern

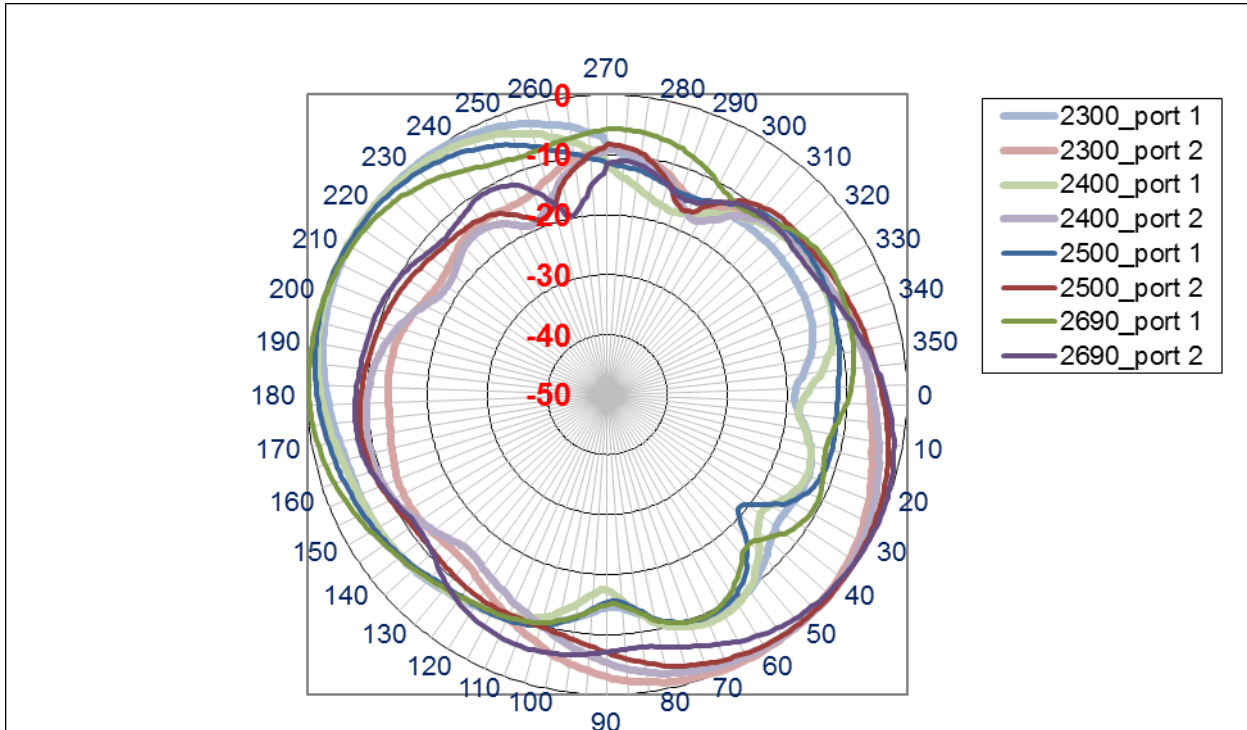
Horizontal Beam is 0-360 degree for low-frequency (800-960 MHz)



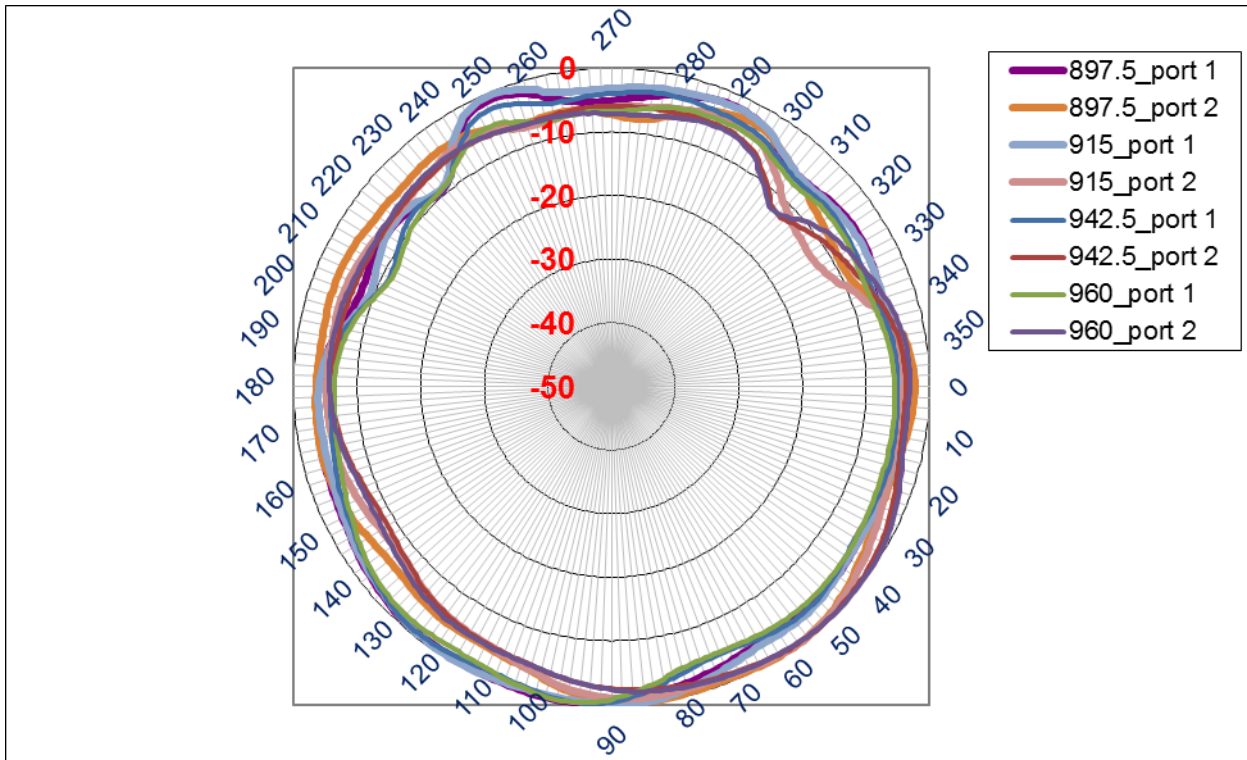
Horizontal Beam is 0-360 degree for medium-frequency (1710-2170 MHz)



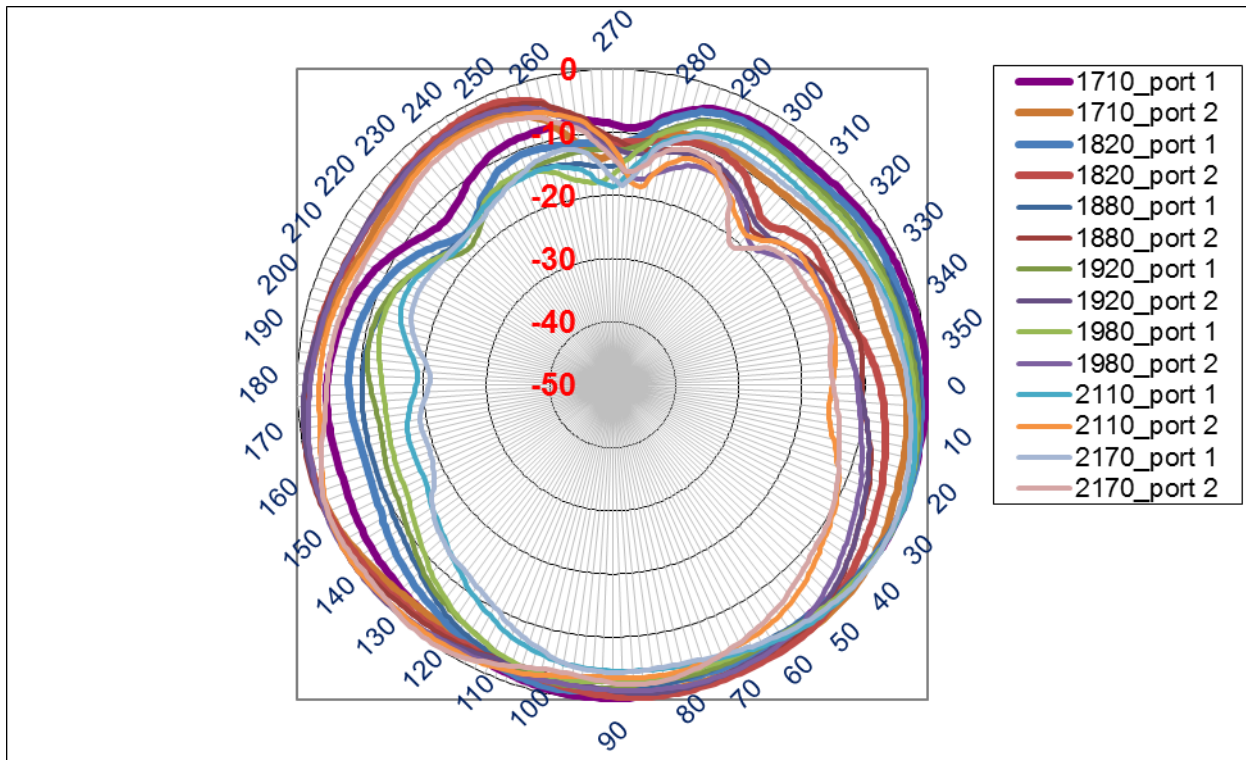
Horizontal Beam is 0-360 degree for high-frequency (2300-2700 MHz)



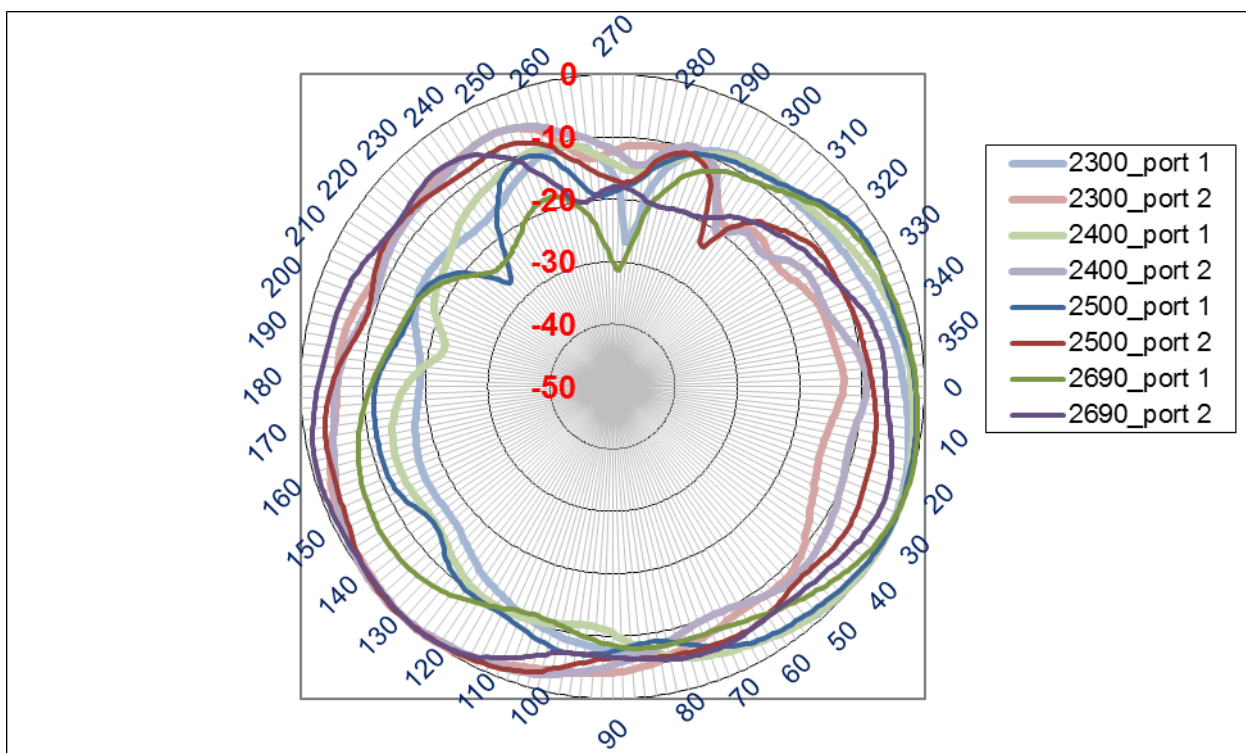
Vertical Beam is 0-360 degree for low-frequency (800-960 MHz)



Vertical Beam is 0-180 degree for medium-frequency (1710-2170 MHz)



Vertical Beam is 0-180 degree for high-frequency (2300-2700 MHz)

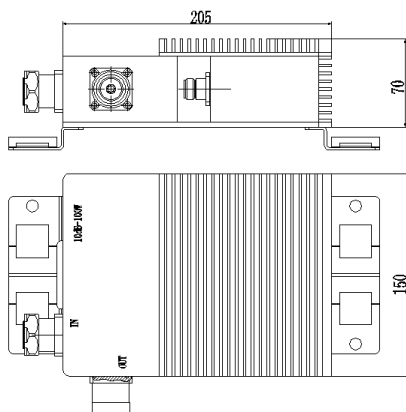
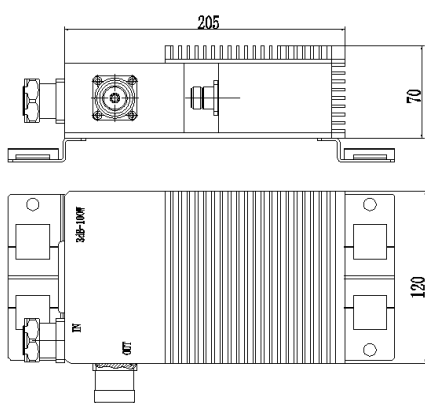


LHSJQ-0120B-3dB-1727-O-A Low PIM Attenuator, 3dB

LHSJQ-0120B-10dB-1727-O-A Low PIM Attenuator, 10dB

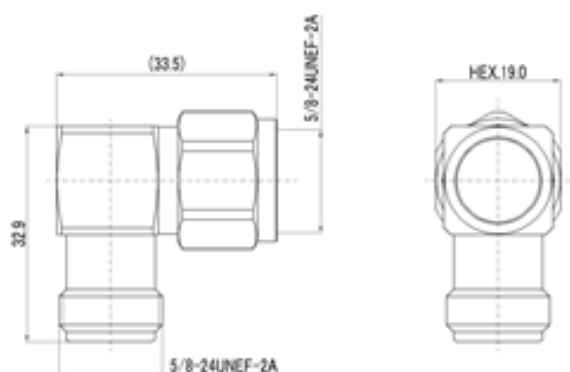
Technical Data

Type No.	LHSJQ-0120B-3dB-1727-O-A	LHSJQ-0120B-10dB-1727-O-A
Pass band	1710-2700 MHz	
Attenuation (dB)	3.0 dB	10.0 dB
Attenuation accuracy (dB)	<0.2 dB	
Return Loss (dB)	≥19 dB	
Power Handling	100W Average	
Impedance in/out	50Ω	
Inter modulation(IM3)	< -150 dBc (3rd order; with 2 x 20 W)	
Connectors	IN: 7/16 male OUT: 7/16 female	
Temperature range	0... +70 °C	
Environmental Protection	Outdoor IP65	
Humidity	Relative 5-95%	
Dimensions (w x d x h)	205 x 120 x 70 mm	205 x 150 x 70 mm



N-Right angle adaptor

General Specification	
Conform to the standard	IEC 169-16
Interface	N male to female
Part Number	N-JKW
Electrical Specification	
Impedance	50Ω
Operating Frequency	DC-11GHz
Insertion Loss	≤ 0.15 dB
VSWR(800MHz-2700MHz)	<1.12
Passive inter-modulation 3rd	<-150dBc (@2*20w)
Withstand voltage	>2500V
Insulation resistance	>5000MΩ
Inner Contact Resistance	<1.5mΩ
Outer Contact Resistance	<1mΩ
Mechanical Specification	
Interface Durability	>500 cycles
Center contact captivation	>28N
Torque resistance	>30Nm
Tensile resistance	>300N
Materials &Plating	
Inner Conductor	Phosphor bronze, silver plated
Outer Conductor	Brass, Tri-alloys plated
Gaskets	Silicone rubber
Insulator	PTFE
Environmental Specification	
Vibration Test Method	IEC 68, Part 2-6
Operating temperature	-40℃ ~ +125℃
Corrosion	IEC 68, part 2-1, test Ka,96hrs



ThaiTelCom N-Straight Connector for 7/8" feeder

		TYPE NO.	CCNM78
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N Male Type Connector for 7/8" Feeder Cable



Electrical Characteristics	
Impedance, Ω	50
Frequency Range, GHz	2.5
3rd Order IMD, dBc	≤ -155
RF Operating Voltage, Vrms	≤ 707
DC Test Voltage, V	2000
Inner Contact Resistance, m Ω	≤ 2.00
Outer Contact Resistance, m Ω	≤ 0.30
Insulation Resistance, M Ω	≥ 10000
Average Power, W	600@ 900MHz
Peak Power, kW	≤ 10
VSWR	≤ 1.15
Insert Loss, dB	≤ 0.08
Mechanical Characteristics	
Durability	500
Connector Retention Tensile Force, N	1334
Connector Retention Torque, N-M	8.13
Environmental	
Operating Temperature, $^{\circ}\text{C}$	-40~+85
Storage Temperature, $^{\circ}\text{C}$	-55~+85
Moisture Resistance Test Method	MIL-STD-202F
Mechanical Shock Test Method	MIL-STD-202F
Thermal Shock Test Method	MIL-STD-202F
Vibration Test Method	IEC 60068-2-6
Corrosion Test Method	MIL-STD-1344A
Waterproof	IP68
Materials	
Housing	Brass plating with Tri-Alloy
Center conductor	Brass/Phosphor bronze plating with Silver
Insulator	PTFE
Other Metal Parts	Brass plating with Ni
Regulatory Compliance/Certifications	
RoHS 2011/65/EU	Compliant by Exemption

ThaiTelCom N-Straight Connector for 7/8" feeder

		TYPE NO.	CCNF78
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N Female Type Connector for 7/8" Feeder Cable



Electrical Characteristics	
Impedance, Ω	50
Frequency Range, GHz	2.5
3rd Order IMD, dBc	≤ -155
RF Operating Voltage, Vrms	≤ 707
DC Test Voltage, V	2000
Inner Contact Resistance, m Ω	≤ 2.00
Outer Contact Resistance, m Ω	≤ 0.30
Insulation Resistance, M Ω	≥ 10000
Average Power, W	600@ 900MHz
Peak Power, kW	≤ 10
VSWR	≤ 1.15
Insert Loss, dB	≤ 0.08
Mechanical Characteristics	
Durability	500
Connector Retention Tensile Force, N	1334
Connector Retention Torque, N-M	8.13
Environmental	
Operating Temperature, $^{\circ}\text{C}$	-40~+85
Storage Temperature, $^{\circ}\text{C}$	-55~+85
Moisture Resistance Test Method	MIL-STD-202F
Mechanical Shock Test Method	MIL-STD-202F
Thermal Shock Test Method	MIL-STD-202F
Vibration Test Method	IEC 60068-2-6
Corrosion Test Method	MIL-STD-1344A
Waterproof	IP68
Materials	
Housing	Brass plating with Tri-Alloy
Center conductor	Brass/Phosphor bronze plating with Silver
Insulator	PTFE
Other Metal Parts	Brass plating with Ni
Regulatory Compliance/Certifications	
RoHS 2011/65/EU	Compliant by Exemption

ThaiTelCom N-Straight Connector for 1/2" feeder

		TYPE NO.	CCNM12
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N Male Type Connector for 1/2" Feeder Cable



Electrical Characteristics	
Impedance, Ω	50
Frequency Range, GHz	2.5
3rd Order IMD, dBc	≤ -155
RF Operating Voltage, Vrms	≤ 707
DC Test Voltage, V	1500
Inner Contact Resistance, m Ω	≤ 1.50
Outer Contact Resistance, m Ω	≤ 1.00
Insulation Resistance, M Ω	≥ 10000
Average Power, W	600@ 900MHz
Peak Power, kW	≤ 10.00
VSWR	≤ 1.15
Insert Loss, dB	≤ 0.08
Mechanical Characteristics	
Durability	500
Connector Retention Tensile Force, N	890
Connector Retention Torque, N·m	5.42
Environmental	
Operating Temperature, $^{\circ}\text{C}$	-40~+85
Storage Temperature, $^{\circ}\text{C}$	-65~+125
Moisture Resistance Test Method	MIL-STD-202F
Mechanical Shock Test Method	MIL-STD-202F
Thermal Shock Test Method	MIL-STD-202
Vibration Test Method	MIL-STD-202F
Corrosion Test Method	MIL-STD-1344A
Waterproof	IP68
Materials	
Housing	Brass plating with Tri-Alloy
Insulator	PTFE
Center Conductor	Phosphor bronze plating with Silver
Other Metal Parts	Brass
Regulatory Compliance/Certifications	
RoHS 2011/65/EU	Compliant by Exemption

ThaiTelCom N-Straight Connector for 1/2" feeder

		TYPE NO.	CCNF12
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N Female Type Connector for 1/2" Feeder Cable

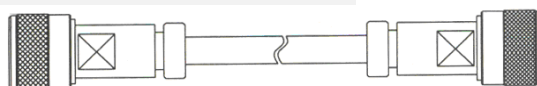


Electrical Characteristics	
Impedance, Ω	50
Frequency Range, GHz	2.5
3rd Order IMD, dBc	≤ -155
RF Operating Voltage, Vrms	≤ 707
DC Test Voltage, V	1500
Inner Contact Resistance, m Ω	≤ 1.50
Outer Contact Resistance, m Ω	≤ 1.00
Insulation Resistance, M Ω	≥ 10000
Average Power, W	600@ 900MHz
Peak Power, kW	≤ 10.00
VSWR	≤ 1.15
Insert Loss, dB	≤ 0.08
Mechanical Characteristics	
Durability	500
Connector Retention Tensile Force, N	890
Connector Retention Torque, N·m	5.42
Environmental	
Operating Temperature, $^{\circ}\text{C}$	-40~+85
Storage Temperature, $^{\circ}\text{C}$	-65~+125
Moisture Resistance Test Method	MIL-STD-202F
Mechanical Shock Test Method	MIL-STD-202F
Thermal Shock Test Method	MIL-STD-202
Vibration Test Method	MIL-STD-202F
Corrosion Test Method	MIL-STD-1344A
Waterproof	IP68
Materials	
Housing	Brass plating with Tri-Alloy
Insulator	PTFE
Center Conductor	Phosphor bronze plating with Silver
Other Metal Parts	Brass
Regulatory Compliance/Certifications	
RoHS 2011/65/EU	Compliant by Exemption

ThaiTelCom N-Straight to N-Straight 1/2" Super-Flexible Jumper			
PRODUCT	Jumper cable	Model	NMNM12S-xm
DATE OF ISSUE	Feb. 25, 2014		

RF50 12S Jumper cable

Graphics



NMNM

General Specification

Type NO.	NMNM 12S
Body Style	Straight
Cable Family	RF50 12S
Interface Connector A	N Male
Interface Connector B	N Male

Length		1m	2m	3m	5m
Electrical properties					
Insertion Loss (dB)	960MHz	0.15	0.26	0.36	0.54
	1880MHz	0.20	0.36	0.52	0.80
	2200MHz	0.26	0.42	0.58	/
	2690MHz	0.30	0.51	0.72	/
VSWR	800-1000 MHz				1.06
	1700-2200 MHz				1.08
	2200-2400 MHz				1.08
	2400-3000 MHz				1.13
PIM, dBc @ 2-tone×20W					≤-150
Insulation resistance ,MΩ .km					≥10000

Environmental properties

□	High Temperature(85±2°C , 2h)	No abnormality
□	Low Temperature(-40±2°C , 2h)	No abnormality
□	Humid Heat (40±2°C , 90 ~ 95% , 48h)	No abnormality&corrosion