佳邦科技股份有限公司
INPAQ TECHNOLOGY CO., LTD.

客戶名稱
CUSTOMER : **Garmin**

Document No.: ENS000063520
Approval Sheet Rev.: A0
Spec. Rev. : A3

承　認　書
APPROVAL SHEET

產品品名/Product Model No. : VGAP-CLA-AS-A1

客戶料號/Customer No. :

專案名稱/Project Name:

發行日期/ Issue Date : 2026/9/8

承認日期/ Approved Date :

Approved by customer: (signing or stamping here)

製造商地址：苗栗縣竹南鎮公義里11鄰科義街11號

INPAQ WEB

F

I-FM-19-03

VGAP-CLA-AS-A1 Specification

1. Features and Application

(1) This product is manufactured in ISO/TS16949 certified production factory.
(2) This product is qualified according to AEC-Q200.
(3) This product is for WiFi, Zigbee, Bluetooth, 802.11 b/g/n, 2400 MHz…

2. Explanation of Part Number

VGAP	-	C	LA	-	A	S	-	A1
		(1)	(2)		(3)	(4)		(5)

(1) Product Type: Chip Antenna
(2) Center Frequency/Band Code: 2400 MHz
(3) Size Code: 5.0*3.6 mm (Length * Width)
(4) Special Code: RoHS Compliant
(5) Design Revision Code: Rev.1

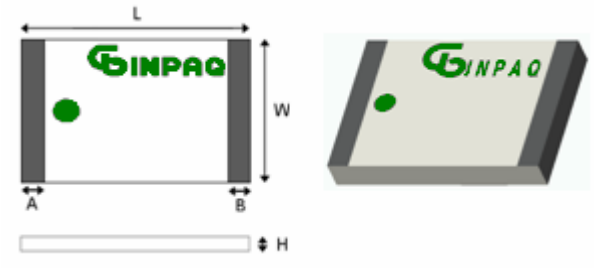
3. Electrical Specification

Item	Specification
Frequency Band	2400 ~ 2500 MHz
VSWR	Less than 2.5
Polarization	Linear
*Peak Gain	3.2 dBi Typ.
*Peak Efficiency	81 % Typ.
Impedance	50 ohm Typ.

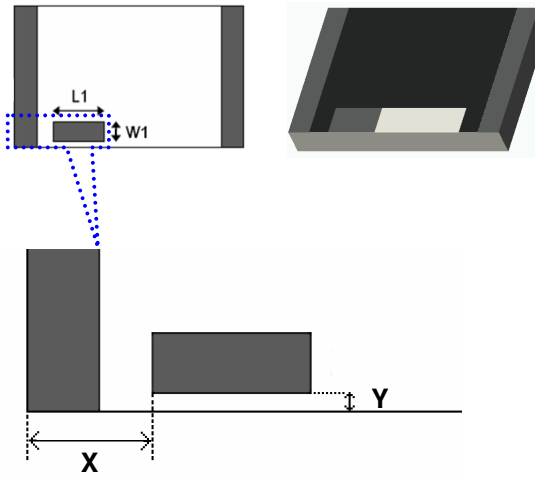
* Test condition: Test board size 80*40 mm
Matching circuit may be required

4. Physical Dimension

Top view



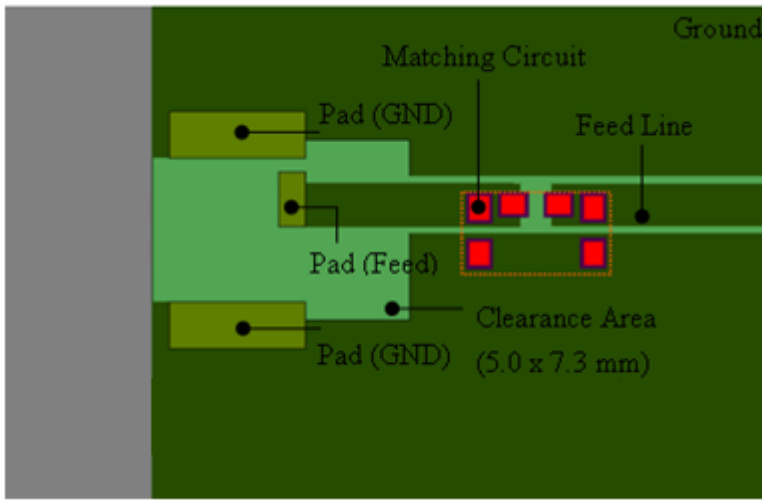
Bottom view

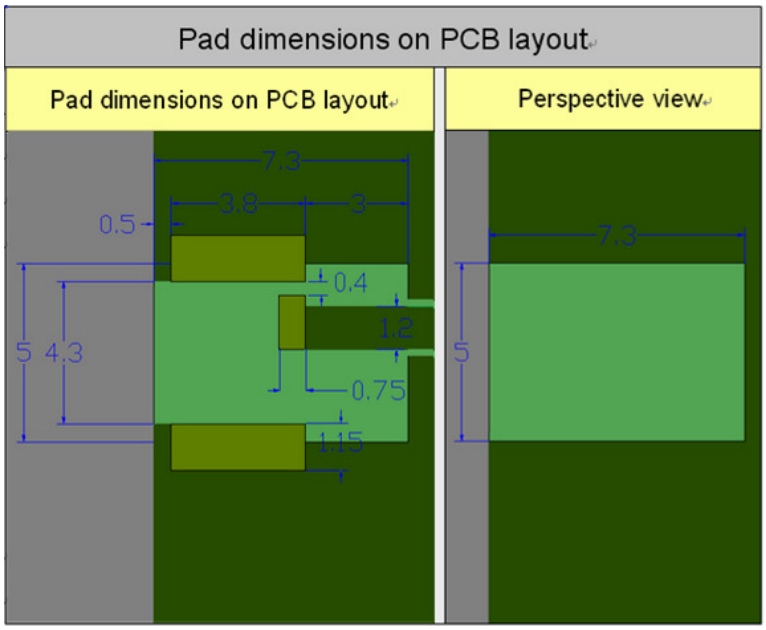


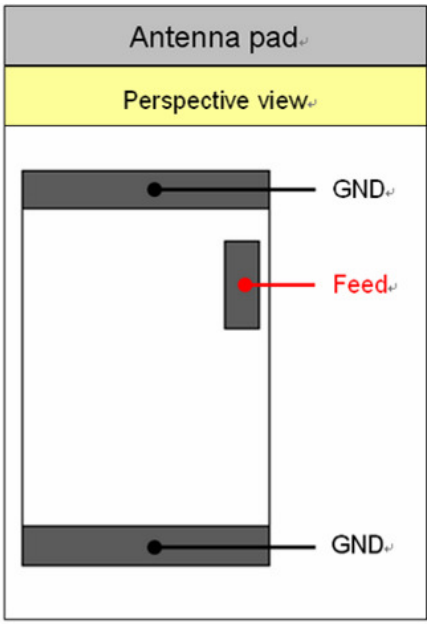
Chip Antenna	L	W	A	B	L1	W1	H	X	Y
VGAP-CLA-AS-A1	5.2±0.3	3.7±0.3	0.45±0.25	0.45±0.25	1.1±0.20	0.55±0.20	0.70±0.15	0.85±0.25	0.12±0.06

5. Recommend PCB Layout

Layout







(Unit: mm)

PCB pad dimensions

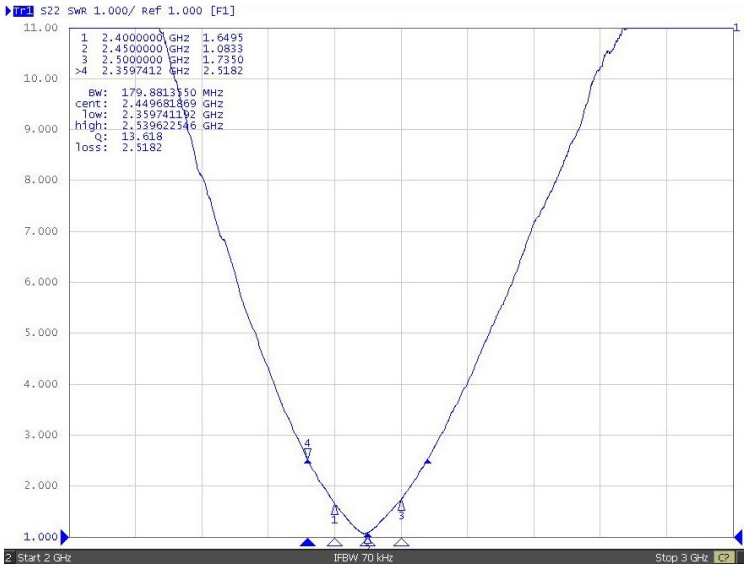
Terminal name	Terminal Dimensions
Pad (Feed)	1.65 X 0.75
Pad (GND)	3.8 X 1.15
Pad (GND)	3.8 X 1.15

Antenna pad dimensions

Terminal name	Terminal Dimensions
Feed	1.1 X 0.55
GND	3.7 X 0.45
GND	3.7 X 0.45

6. Electrical Characteristics

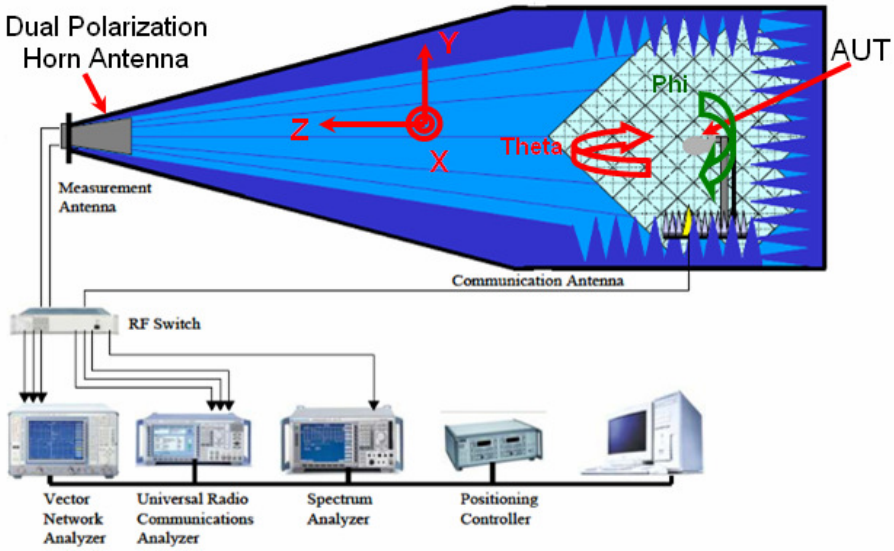
VSWR



Mark	Frequency	VSWR
1	2400 MHz	1.6
2	2450 MHz	1.1
3	2500 MHz	1.7

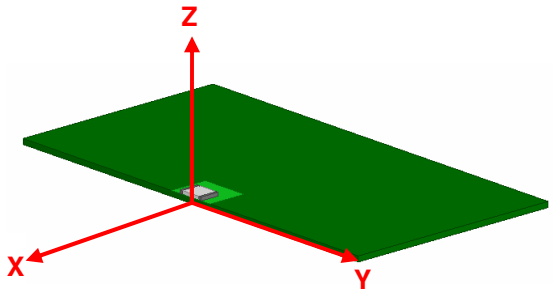
Radiation Pattern

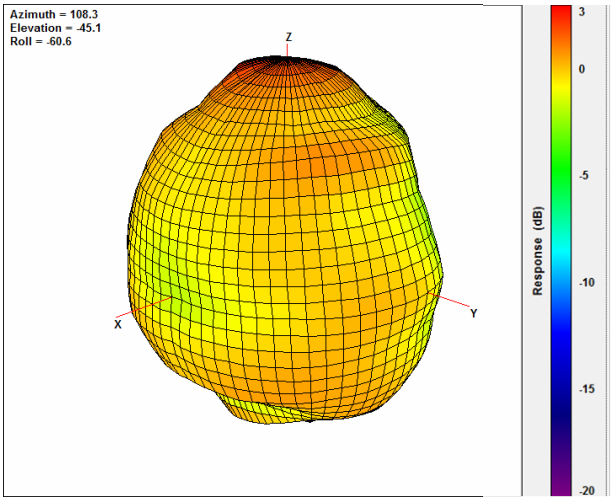
The Gain pattern is measured in INPAQ's FAR-field chamber. DUT is placed on the table of rotator, a standard horn antenna and Vector Network Analyzer is used to collect data.

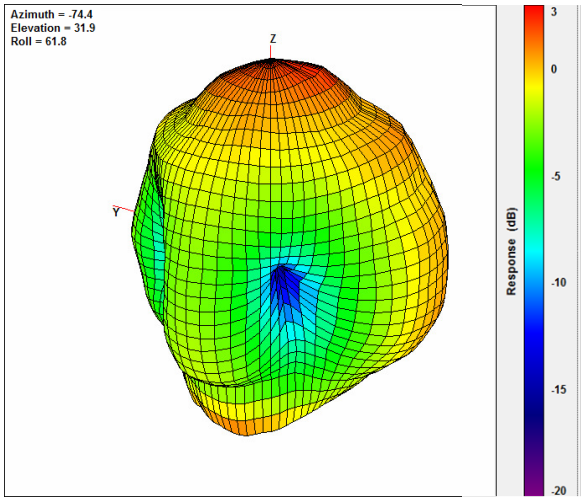


3D Chamber Definition

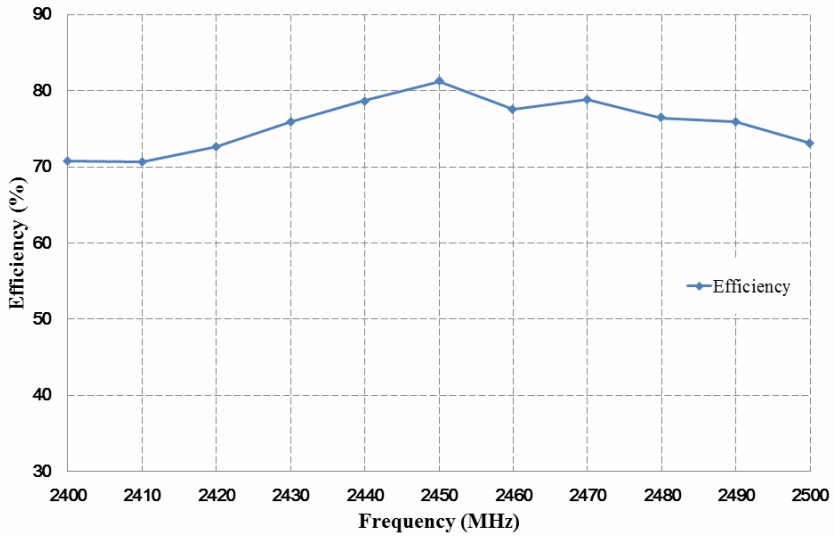
3D Gain Pattern (2450 MHz)







Efficiency



Frequency	Efficiency (%)
2400 MHz	70.7
2450 MHz	81.2
2500 MHz	73.1

UNLESS OTHER SPECIFIED TOLERANCES ON : X=± X.X=± X.XX= ANGLES=± HOLEDIA=±		INPAQ TECHNOLOGY CO., LTD.
SCALE : -----	UNIT : mm	THIS DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF INPAQ TECHNOLOGY CO.,LTD.AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION
DRAWN BY: 林豪建 Stan	CHECKED BY: 吳柏青	
DESIGNED BY: 林豪建 Stan	APPROVED BY: 黃月碧	
TITLE : VGAP-CLA-AS-A1 Specification	DOCUMENT NO. ENS000063520	SPEC REV. A3

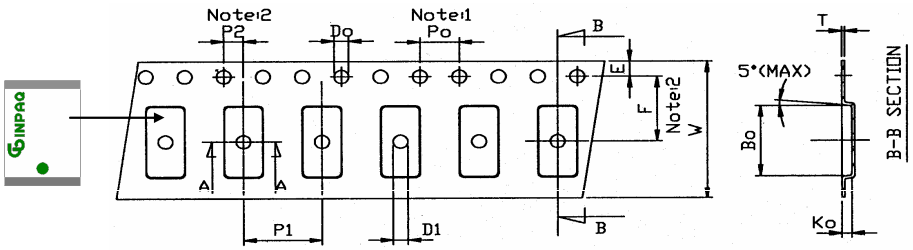
7. Taping Package and Label Marking

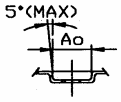
(1) Quantity/Reel：2000pcs/Reel

(2) Carrier tape dimensions

(Unit: mm)

Symbol	Spec.
Po	4.00±0.1
P1	8.00±0.1
P2	2.00±0.05
Do	1.55±0.05
D1	1.50(MIN)
E	1.75±0.1
F	5.50±0.05
10Po	40.00±0.2
W	12.00±0.1
T	0.25±0.05





A0 = 4.10±0.10 mm

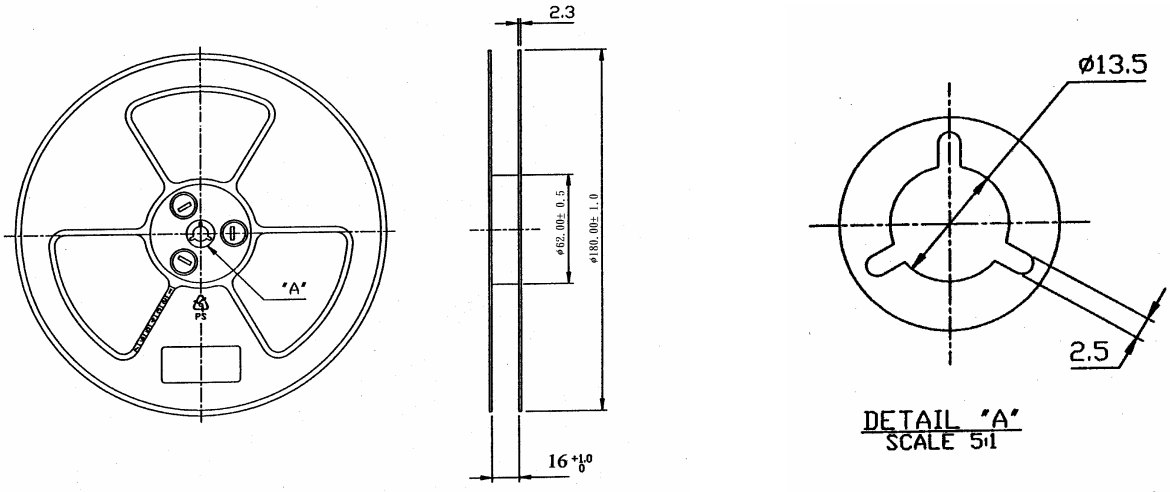
B0 = 5.60±0.10 mm

K0 = 1.02±0.10 mm

Notice:

1. 10 Sprocket hole pitch cumulative tolerance is ±0.1mm
2. Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
3. Ao & Bo measured on a place 0.3mm above the bottom of the pocket to top surface of the carrier.
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
5. Carrier camber shall be not than 1mm per 100mm through a length of 250mm.

(3) Taping reel dimensions



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DESIGNED BY: 林豪建 Stan	APPROVED BY: 黃月碧		
TITLE：VGAP-CLA-AS-A1 Specification		DOCUMENT NO. ENS000063520	SPEC REV. A3

8. Environmental Characteristics

This product is qualified according to AEC-Q200.

(1) Reliability Test

Item	Condition	Specification
Thermal shock	1. 30±3 minutes at -40℃±5℃, 2. Convert to +105℃ (5 minutes) 3. 30±3 minutes at +105℃±5℃, 4. Convert to -40℃ (5 minutes) 5. Total 100 continuous cycles	No damage
Humidity resistance	1. Humidity: 85% R.H. 2. Temperature: 85±5℃ 3. Time: 1000 hours.	No damage
High temperature resistance	1. Temperature: 150℃±5℃ 2. Time: 1000 hours.	No damage
Low temperature resistance	1. Temperature: -40℃±5℃ 2. Time: 1000 hours.	No damage
Soldering heat resistance	1. Solder bath temperature: 260±5℃ 2. Bathing time: 10±1 seconds	No damage
Solderability	The dipped surface of the terminal shall be at least 95% covered with solder after dipped in solder bath of 245±5℃ for 3±1 seconds.	No damage

(2) Storage condition

(a) At warehouse：

The temperature should be within 0 ~ 30℃ and humidity should be less than 60% RH.

The product should be used within 1 year from the time of delivery.

(b) On board：

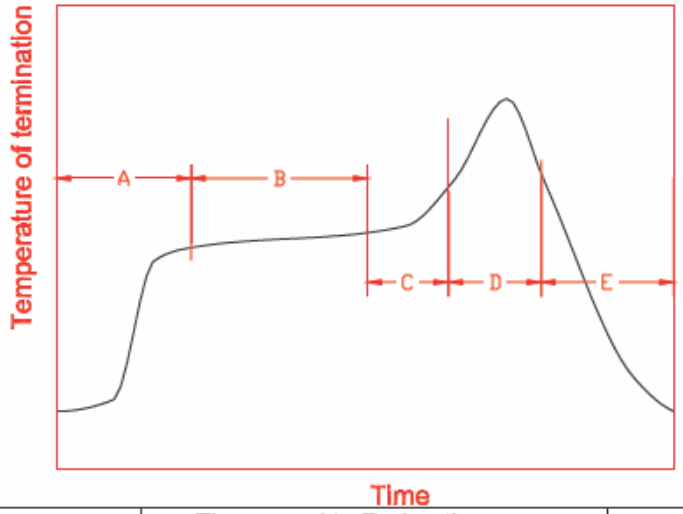
The temperature should be within -40 ~ 85℃ and humidity should be less than 85% RH.

(3) Operating temperature range

Operating temperature range：-40 ~ +105℃.

9. Recommended reflow soldering

Reference: J-STD-020C



A	1st rising temperature	The normal to Preheating temperature	30s to 60s
B	Preheating	140℃ to 160℃	60s to 120s
C	2nd rising temperature	Preheating to 200℃	20s to 40s
D	Main heating	if 220℃	50s～60s
		if 230℃	40s～50s
		if 240℃	30s～40s
		if 250℃	20s～40s
		if 260℃	20s～40s
E	Regular cooling	200℃ to 100℃	1℃/s ～ 4℃/s

(1) Soldering gun procedure

Note the follows, in case of using solder gun for replacement.

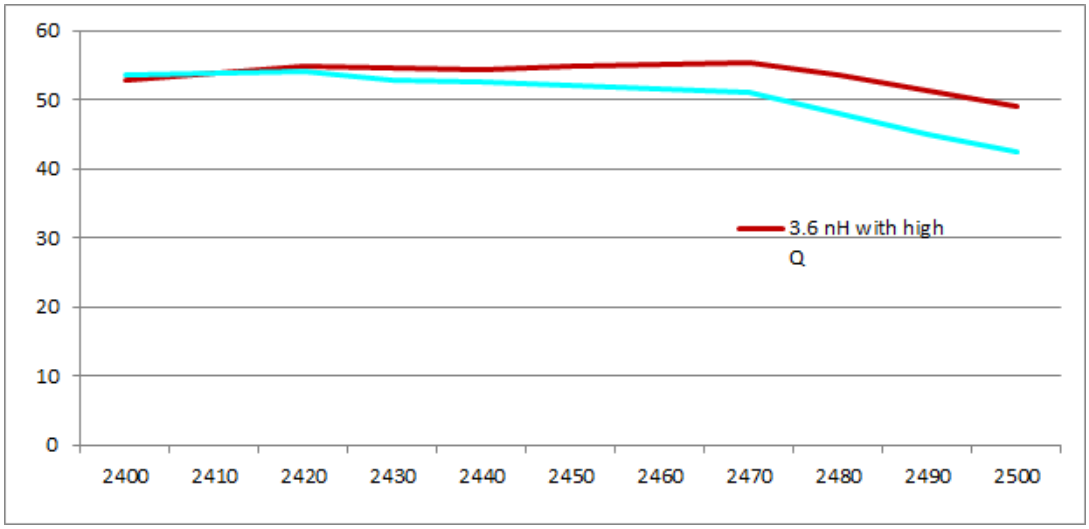
(a) The tip temperature must be less than 350°C for the period within 3 seconds by using soldering gun under 30 W.

(b) The soldering gun tip shall not touch this product directly.

(2) Soldering volume

Note that excess of soldering volume will easily get crack the body of this product.

10. IMWW Peak Gain: 1.46 dBi Typ.

condition	Frequency(MHz)	2300	2310	2320	2330	2340	2350	2360	2370	2380
3.6 nH with high Q	Directivity(dBi)	4.85	4.76	4.59	4.57	4.65	4.61	4.53	4.39	4.2
	Average Gain(dBi)	-5.69	-5.44	-5.15	-5.02	-4.66	-4.42	-4.25	-3.97	-3.73
	Efficiency(%)	26.96	28.6	30.52	31.47	34.18	36.14	37.59	40.08	42.37
	Peak Gain(dBi)	-0.84	-0.68	-0.56	-0.45	-0.01	0.19	0.28	0.42	0.47
3.6 nH with low Q	Directivity(dBi)	4.32	4.49	4.57	4.57	4.58	4.51	4.45	4.47	4.41
	Average Gain(dBi)	-4.69	-4.32	-3.9	-3.7	-3.47	-3.2	-2.98	-2.77	-2.79
	Efficiency(%)	34	36.96	40.77	42.69	45.02	47.86	50.39	52.85	52.62
	Peak Gain(dBi)	-0.37	0.17	0.68	0.87	1.11	1.31	1.47	1.7	1.62

2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
3.99	3.83	3.75	3.65	3.59	3.67	3.65	3.85	4.02	4.1	4.09	3.9
-3.43	-2.77	-2.69	-2.61	-2.63	-2.64	-2.6	-2.58	-2.56	-2.7	-2.9	-3.09
45.42	52.83	53.84	54.83	54.63	54.48	55	55.25	55.47	53.66	51.31	49.14
0.56	1.06	1.06	1.04	0.97	1.03	1.05	1.27	1.46	1.4	1.19	0.81
4.31	4.21	4.12	4.01	3.88	3.77	3.65	3.58	3.84	4.09	4.23	4.21
-2.82	-2.7	-2.69	-2.67	-2.76	-2.8	-2.83	-2.88	-2.93	-3.19	-3.46	-3.71
52.22	53.7	53.81	54.03	52.96	52.48	52.14	51.47	50.97	48.01	45.07	42.57
1.49	1.51	1.43	1.34	1.12	0.97	0.82	0.7	0.91	0.9	0.77	0.51