

## Regulatory WLAN Antenna Information

### Greenland - Hitachi

<b>Platform</b>	Greenland
Platform Owner	
Brand Name	XPS
Model Name	M2010
ODM	Compal
Target Launch Date	6/19/2006 (Currently Shipping)
<b>Antenna</b>	
Brand Name	Hitachi
Part Number	<input checked="" type="checkbox"/> Tx1 Antenna: <i>HMT02-DL01-AS(WH) (panel) and HMT02-DL01-MS(W) (hinge)</i>
	<input checked="" type="checkbox"/> Tx2 Antenna: <i>HMT02-DL01-AS(K) (panel) and HMT02-DL01-MS(K) (hinge)</i>
	<input checked="" type="checkbox"/> Tx3 (or Rx3) Antenna: <i>HMT02-DL01-AS(WH) (panel) and HMT02-DL01-MS(H) (hinge)</i>
<b>Module</b>	
With WLAN Module	<input type="checkbox"/> WM3B2200BG
(Check Box)	<input type="checkbox"/> WM3B2915ABG
	<input checked="" type="checkbox"/> WM3945ABG
	<input checked="" type="checkbox"/> 4965AGN

## Antenna Sample / Antenna Data Requirements for worldwide regulatory approval

Section	Description of Required OEM / ODM Antenna Information	US / IC	EU	Japan	Taiwan	S.Korea
1A	Part Number for Antenna only	Required	Required	Required	Required	Required
1B	Antenna Manufacturer Name	Required	Required	Required	Required	Required
1C	Description of Antenna Type	Required	N/A	N/A	N/A	N/A
1D	Part number of Antenna Assembly / cable impedance, length & diameter.	Required	Desired	Desired	Desired	Desired
1E	Tx1, Tx2 & Tx3 antenna (Peak Gain W/ cable loss) *	Required	Required	Required	Required	Required
	1E OR 1F, 1G, 1H					
1F	Tx1, Tx2 & Tx3 antenna (Peak Gain only) *	Required	Required	Required	Required	Required
1G	VSWR of cable including connector	Required	Required	Required	Required	Required
1H	Tx1, Tx2 & Tx3 antenna (Cable loss W/ connector) *	Required	Required	Required	Required	Required
2	Dimensioned Photographs and Drawings of Tx1, Tx2, and Tx3 (or Rx3) antennas	Required	Required	Required	Required	Required
3	Radiation patterns of antennas loaded in the host platform.	Required	Desired	Required	N/A	Required
4	Platform model name / number - correlated to antenna manufacturer and antenna part number	Required	Required	Desired	Required	Desired
5	Photograph(s) or Drawings showing location of antennas in platform. (S. Korea requires photographs of antennas for approval submission). Taiwan requires pictures of each antenna type shown in the system.	Required	Required	Desired	Required (Photos)	Required (Photos)
6	Mech. drawings / photos with dimensions of antenna locations and distance from end-user (For evaluation of SAR testing requirement).	Required	N/A	N/A	N/A	N/A
7	Photograph(s) or Drawings showing the location of all antennas (WLAN, other) and distance between those transmitting antennas. Information will be used to evaluate whether co-location testing is required.	Required	N/A	N/A	N/A	N/A
8	Local representative contact information for LMA/ PARS process.	Required	N/A	N/A	N/A	N/A

**NOTE:**

(\*) if 3<sup>rd</sup> antenna is Rx only (e.g. receive only for 4965AGN) then peak gain and cable loss not required

# Antenna Information

## Section 1. Antenna Assembly Specifications

### Antenna Assembly Summary:

1A Antenna Part Number	1B Manufacture	1C Antenna Type	1D Cable Assembly Part Number and Information	1E *Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G VSWR	1H Cable Loss (dB)
(P/N: <i>HMT02-DL01-A S(WH) (panel) and HMT02-DL01-M S(W) (hinge)</i> ) Main Antenna	Hitachi	Monopole	Vendor: Hitachi Cable length: 270 + 644 mm OD: φ 1.37 mm Radio Connector Type: Micro Coaxial Connector Mid-Line Connector Type: Molex SSMCX Color: White	2412-2462MHz 3.00 dBi (peak)	2412-2462MHz 5.30 dBi (peak)	2412-2462MHz 2.0 max	2412-2462MHz 2.3 dB
				4900-5350MHz 0.90 dBi (peak)	4900-5350MHz 4.80 dBi (peak)	4900-5350MHz 2.0 max	4900-5350MHz 3.9 dB
				5470-5875MHz -0.30 dBi (peak)	5470-5875MHz 3.60 dBi (peak)	5470-5875MHz 2.0 max	5470-5875MHz 3.9 dB
				5470-5875MHz -0.30 dBi (peak)	5470-5875MHz 3.60 dBi (peak)	5470-5875MHz 2.0 max	5470-5875MHz 3.9 dB
(P/N: <i>HMT02-DL01-A S(K) (panel) and HMT02-DL01-M S(K) (hinge)</i> ) Auxiliary antenna	Hitachi	Monopole	Vendor: Hitachi Cable length: 300 + 644 mm OD: φ 1.37 mm Radio Connector Type: Micro Coaxial Connector Mid-Line Connector Type: Molex SSMCX Color: Black	2412-2462MHz 2.30 dBi (peak)	2412-2462MHz 4.70 dBi (peak)	2412-2462MHz 2.0 max	2412-2462MHz 2.4 dB
				4900-5350MHz 2.10 dBi (peak)	4900-5350MHz 6.10 dBi (peak)	4900-5350MHz 2.0 max	4900-5350MHz 4.0 dB
				5470-5875MHz 1.20 dBi (peak)	5470-5875MHz 5.20 dBi (peak)	5470-5875MHz 2.0 max	5470-5875MHz 4.0 dB
				5470-5875MHz 1.20 dBi (peak)	5470-5875MHz 5.20 dBi (peak)	5470-5875MHz 2.0 max	5470-5875MHz 4.0 dB
(P/N: <i>HMT02-DL01-A S(WH) (panel) and HMT02-DL01-M S(H) (hinge)</i> ) MIMO antenna	Hitachi	Monopole	Vendor: Hitachi Cable length: 380 + 603 mm OD: φ 1.37 mm Radio Connector Type: Micro Coaxial Connector Mid-Line Connector Type: Molex SSMCX Color: Gray	2412-2462MHz 0.0 dBi (peak) *	2412-2462MHz 2.50 dBi (peak) *	2412-2462MHz 2.0 max *	2412-2462MHz 2.5 dB *
				4900-5350MHz 1.50 dBi (peak) *	4900-5350MHz 5.70 dBi (peak) *	4900-5350MHz 2.0 max *	4900-5350MHz 4.2 dB *
				5470-5875MHz 1.70 dBi (peak) *	5470-5875MHz 5.90 dBi (peak) *	5470-5875MHz 2.0 max *	5470-5875MHz 4.2 dB *
				5470-5875MHz 1.70 dBi (peak) *	5470-5875MHz 5.90 dBi (peak) *	5470-5875MHz 2.0 max *	5470-5875MHz 4.2 dB *

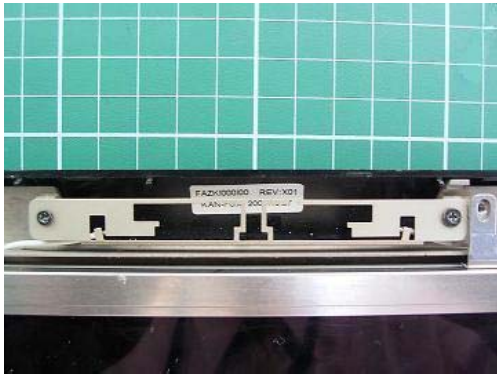
### NOTE:

(\* ) If Rx3 only (3<sup>rd</sup> antenna receives only, e.g. for 4965AGN) then the information marked with \* is not required

### Antenna Peak Gain Table:

Frequency (MHz)	Tx1 antenna		Tx2 Antenna		Tx3 (or Rx3) Antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2412	3.00	1.80	1.90	1.40	-1.10	-1.90
2437	2.30	2.20	2.30	2.00	-0.10	-1.10
2462	1.10	0.80	1.80	1.80	0.00	-2.10
4900	-1.80	0.20	-3.50	1.00	-2.50	1.20
5150	0.90	0.00	-1.50	2.10	-0.80	1.50
5350	-0.70	-0.60	-1.40	1.10	-0.01	1.50
5470	-0.40	-1.00	-2.20	0.50	-0.80	1.20
5725	-0.90	-0.80	-1.70	1.20	-1.70	1.70
5875	-0.30	-0.40	-1.90	-0.50	-1.60	-0.40

- **Antenna Peak Gain required being test in system basis.**
- **1E frame contend absolutely peak antenna gain include H/V**
- **If Rx3 only (3<sup>rd</sup> antenna receives only, e.g. for 4965AGN) then the information is not required for Rx3.**



(a) Main & MIMO Antenna



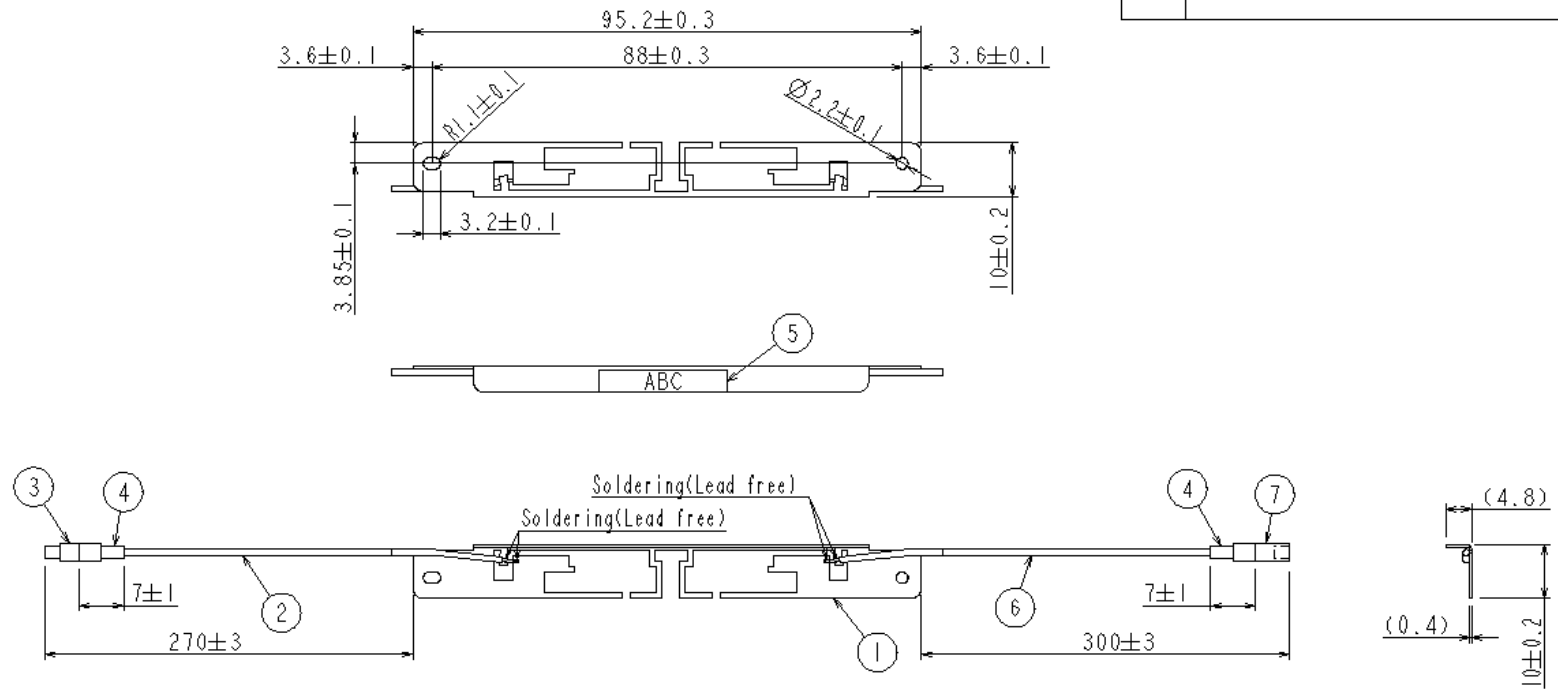
(b) Aux Antenna

Picture of Antenna installed in the notebook



Picture of Antenna

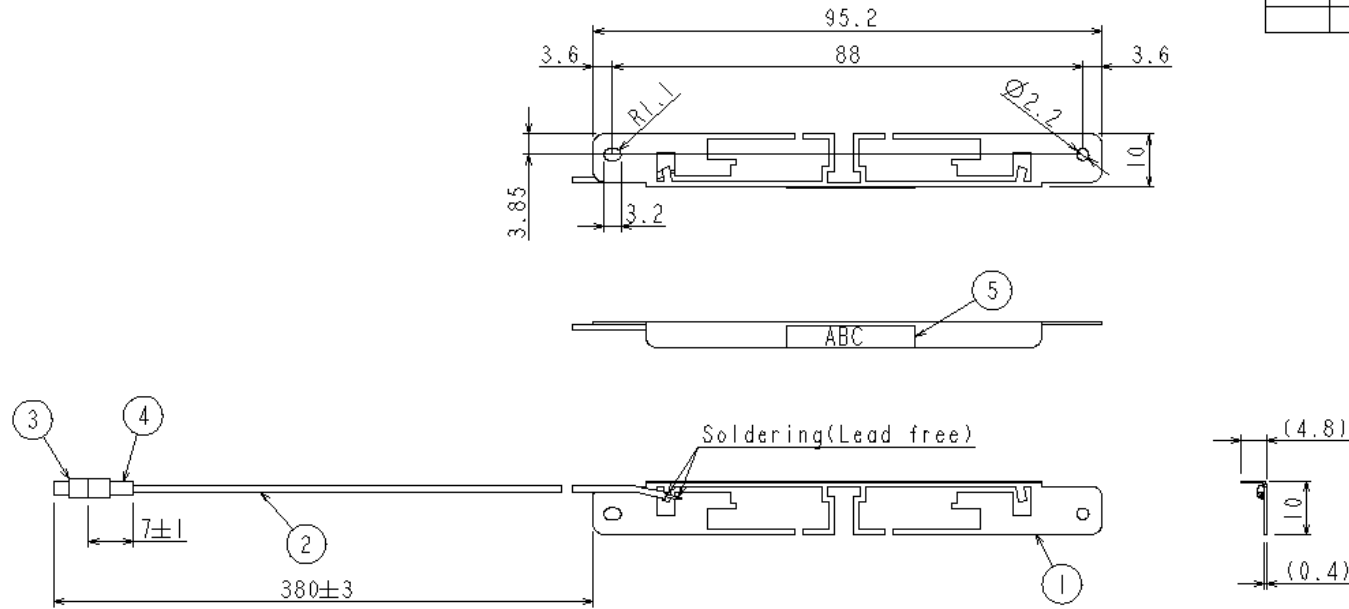
MARK	REVISION	DATE	NAME	CHKD.



No.	Description
①	Metal Plate Antenna(HMT02-L rev1)
②	Coaxial Cable(Ø1.37,White)
③	SSMCX PLUG
④	Heat Shrinkable tube SUMITUBE F34
⑤	Lable
⑥	Coaxial Cable(Ø1.37,Gray)
⑦	SSMCX JACK

DWN.	06.02.22	TITLE
CHKD.	REGD. PROJ.	HMT02-DL01-AS(WH)
APPD.	④	
SCALE.	N.T.S	EH3855144
<b>Hitachi Cable, Ltd.</b> <b>Hitaka Works</b>		

MARK	REVISION	DATE	NAME	CHKD.



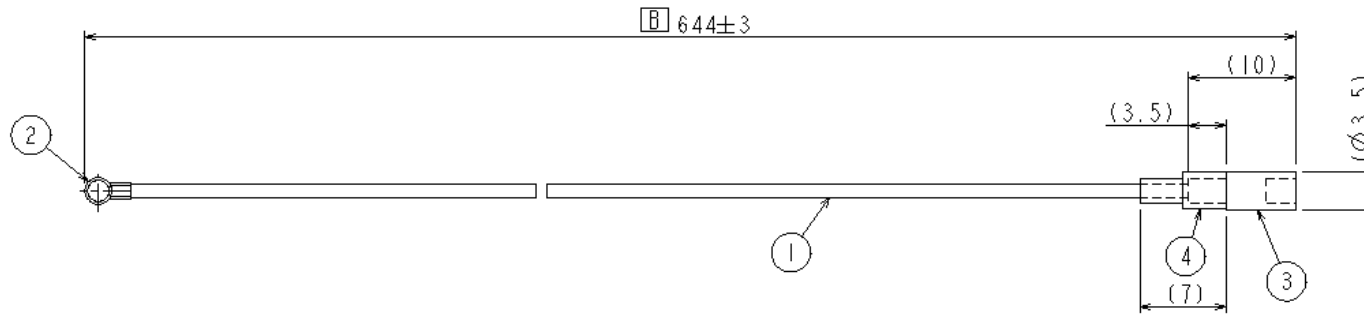
No.	Description
①	Metal Plate Antenna(HMT02-R)
②	Coaxial Cable(∅1.37,Black)
③	SSMCX PLUG
④	Heat Shrinkable tube SUMITUBE F34
⑤	Label

TOLERANCES OF DIMENSIONS		
Dimension	Tolerance	
- 6	±0.1	
6 - 30	±0.2	
30 -	±0.3	

DWN.	K.ENDO	05.10.20	TITLE
CHKD.	Y.YAMAMOTO	REGD. PROJ.	HMT02-DL01-AS(K)
APPD.	K.TSUKAMOTO		
SCALE	N.T.S		
<b>Hitachi Cable, Ltd.</b> <b>Hitaka Works</b>			EH3854764

EH3854767

MARK	REVISION	DATE	NAME	CHKD.
	First drawig(05.10.20/K.ENDO/S.TAKABA/K.TSUKAMOTO)			
A	Cable length changed.	05.12.16	K.ENDO	S.TAKABA
B	Cable length changed.	06.02.22		



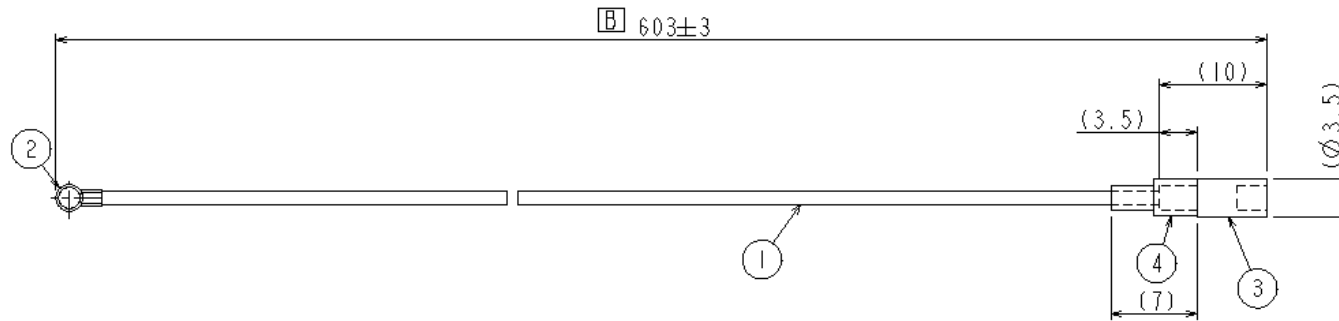
No.	Description
①	Coaxial Cable( $\phi 1.37$ ,White)
②	mPCI connector Hirose U.FL-LP088
③	MMCX JACK
④	Heat Shrinkable tube SUMITUBE F34

Customer P/N		TITLE	
DWN.	06.02.22	REGD.	PROJ.
CHKD.			
APPD.			HMT02-DL01-MS(W)
SCALE.	N.T.S		
<b>Hitachi Cable, Ltd.</b> <b>Hitaka Works</b>		EH3854767	



EH3854766

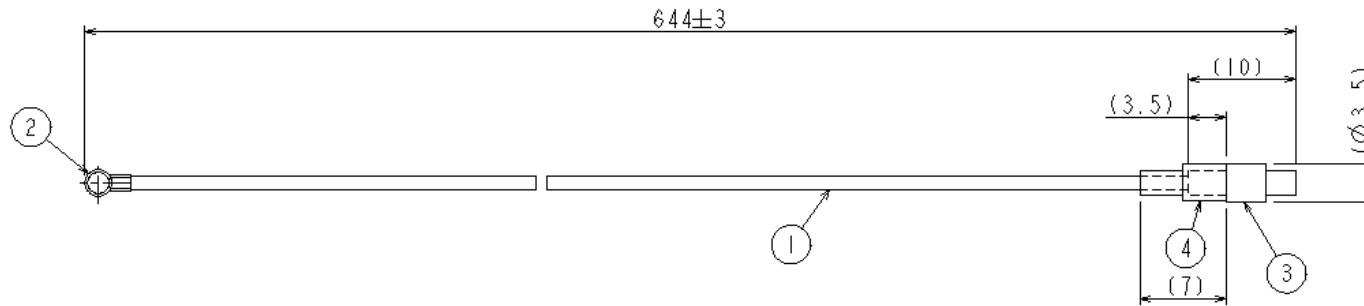
MARK	REVISION	DATE	NAME	CHKD.
	First drawig(05.10.20/K.ENDO/S.TAKABA/K.TSUKAMOTO)			
A	Cable length changed.	05.12.16	K.ENDO	S.TAKABA
B	Cable length changed.	06.02.22		



No.	Description
①	Coaxial Cable(∅1.37,Black)
②	mPCI connector Hirose U.FL-LP088
③	MMCX JACK
④	Heat Shrinkable tube SUMITUBE F34

Customer P/N		TITLE	
DWN.	06.02.22	REGD.	PROJ.
CHKD.			
APPD.			HMT02-DL01-MS(K)
SCALE.	N.T.S		
<b>Hitachi Cable, Ltd.</b> <b>Hitaka Works</b>		EH3854766	

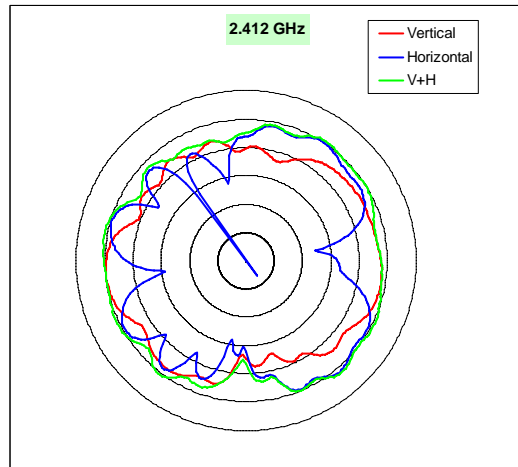
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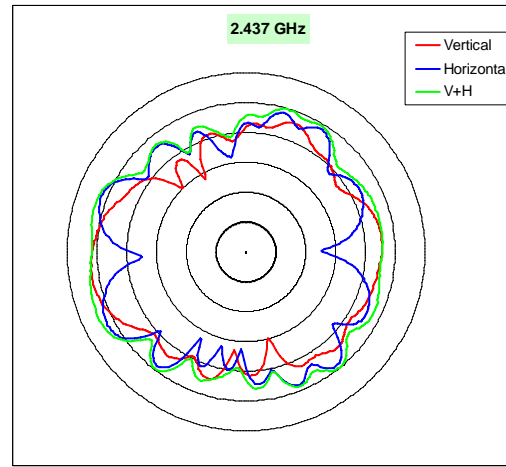
No.	Description
①	Coaxial Cable(∅1.37,Gray)
②	mPCI connector Hirose U.FL-LP088
③	MMCX PLUG
④	Heat Shrinkable tube SUMITUBE F34

Customer P/N			
DWN.		06.02.22	TITLE
CHKD.		REGD. PROJ.	HMT02-DL01-MS(H)
APPD.			
SCALE.	N.T.S		
<b>Hitachi Cable, Ltd.</b> <b>Hitaka Works</b>		EH3855145	

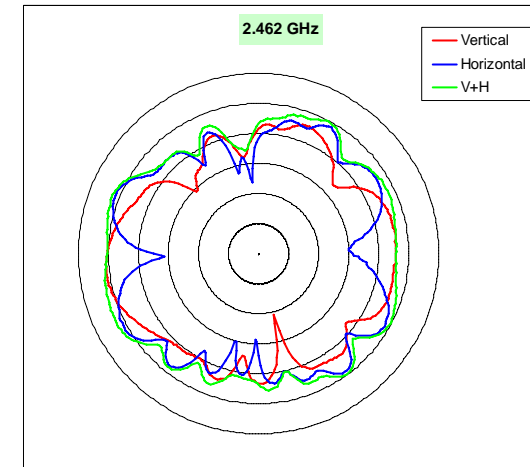
# Main Antenna (1)



Frequency (MHz)	2412
Vertical Peak Gain (dBi)	1.8
Horizontal Peak Gain (dBi)	3.0
V + H Peak Gain (dBi)	4.6

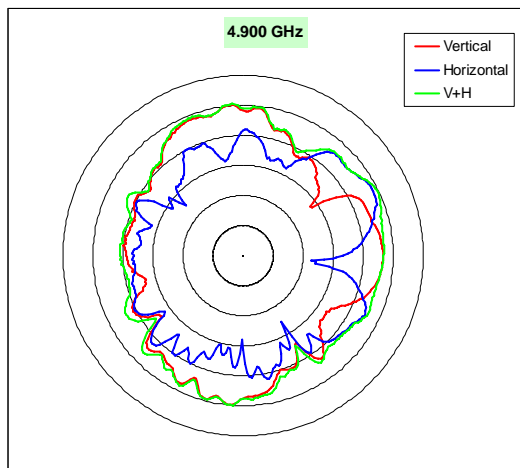


Frequency (MHz)	2437
Vertical Peak Gain (dBi)	2.2
Horizontal Peak Gain (dBi)	2.3
V + H Peak Gain (dBi)	4.0

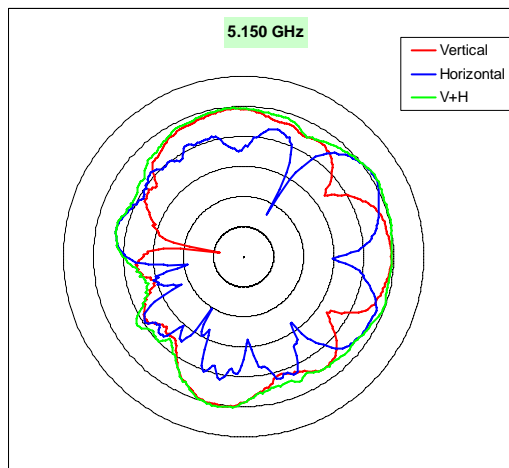


Frequency (MHz)	2462
Vertical Peak Gain (dBi)	0.8
Horizontal Peak Gain (dBi)	1.1
V + H Peak Gain (dBi)	2.5

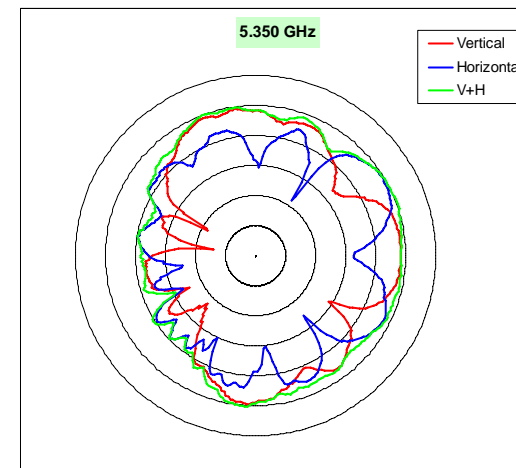
# Main Antenna (2)



Frequency (MHz)	4900
Vertical Peak Gain (dBi)	0.2
Horizontal Peak Gain (dBi)	-1.8
V + H Peak Gain (dBi)	0.4

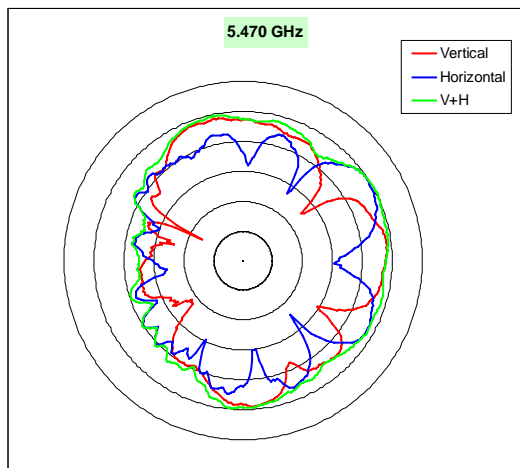


Frequency (MHz)	5150
Vertical Peak Gain (dBi)	0
Horizontal Peak Gain (dBi)	0.9
V + H Peak Gain (dBi)	1.2

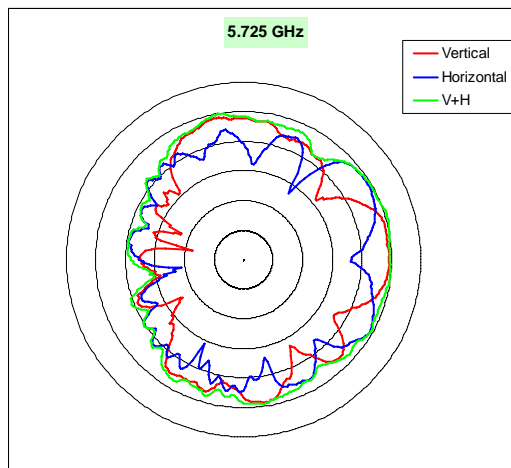


Frequency (MHz)	5350
Vertical Peak Gain (dBi)	-0.6
Horizontal Peak Gain (dBi)	-0.7
V + H Peak Gain (dBi)	0.2

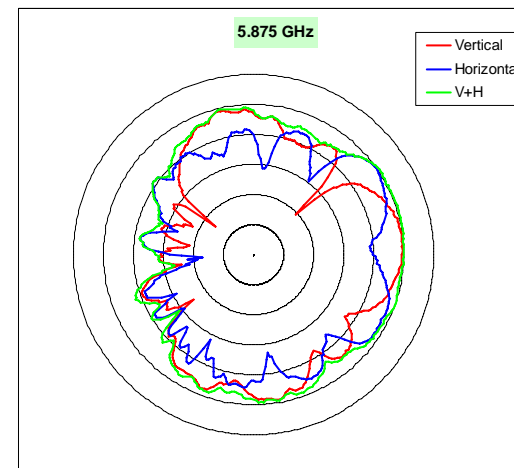
# Main Antenna (3)



Frequency (MHz)	5470
Vertical Peak Gain (dBi)	-1.0
Horizontal Peak Gain (dBi)	-0.4
V + H Peak Gain (dBi)	0.3

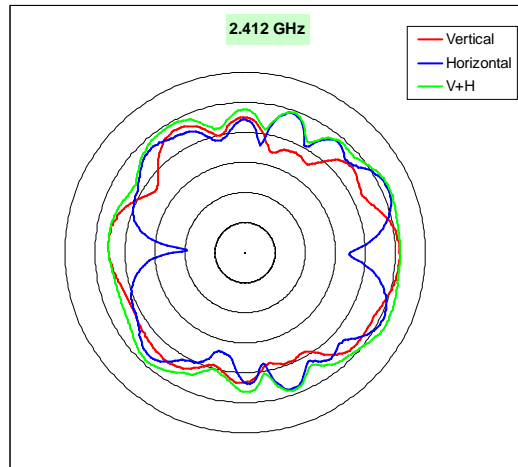


Frequency (MHz)	5725
Vertical Peak Gain (dBi)	-0.8
Horizontal Peak Gain (dBi)	-0.9
V + H Peak Gain (dBi)	0.6

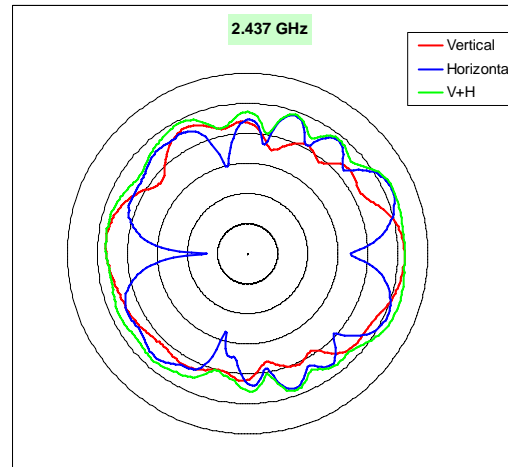


Frequency (MHz)	5875
Vertical Peak Gain (dBi)	-0.4
Horizontal Peak Gain (dBi)	-0.3
V + H Peak Gain (dBi)	0.4

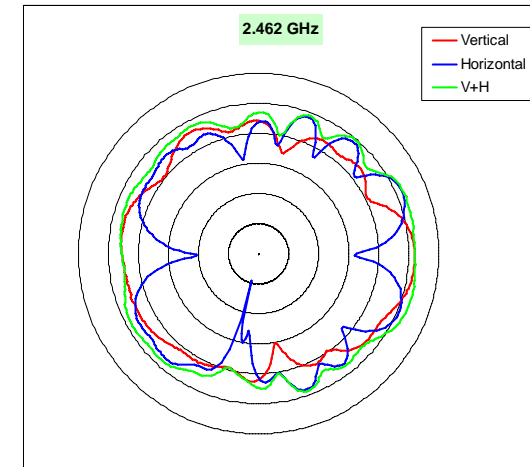
# Aux Antenna (1)



Frequency (MHz)	2412
Vertical Peak Gain (dBi)	1.4
Horizontal Peak Gain (dBi)	1.9
V + H Peak Gain (dBi)	2.6

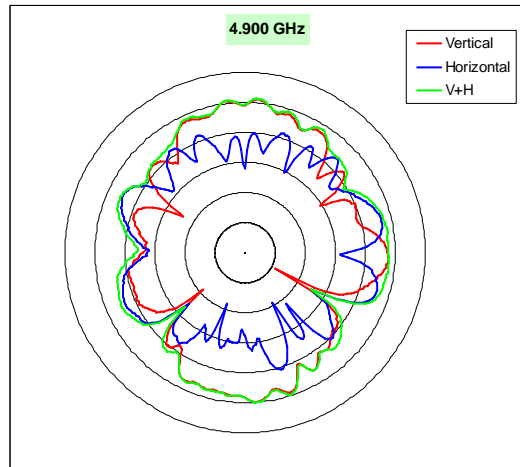


Frequency (MHz)	2437
Vertical Peak Gain (dBi)	2.0
Horizontal Peak Gain (dBi)	2.3
V + H Peak Gain (dBi)	3.0

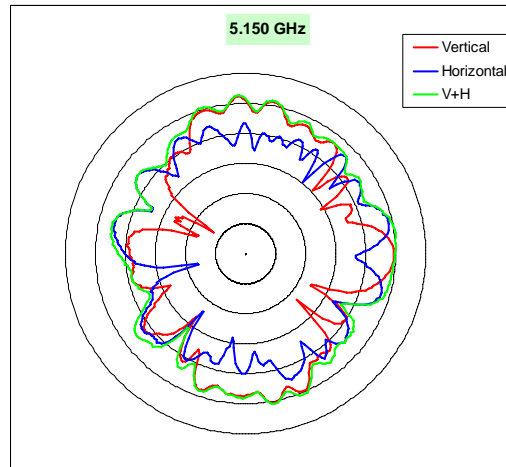


Frequency (MHz)	2462
Vertical Peak Gain (dBi)	1.8
Horizontal Peak Gain (dBi)	1.8
V + H Peak Gain (dBi)	2.8

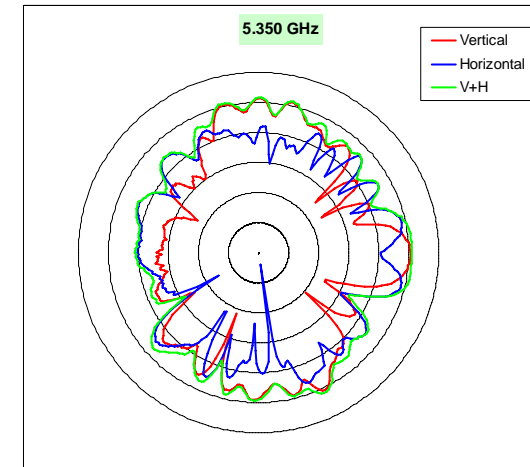
# Aux Antenna (2)



Frequency (MHz)	4900
Vertical Peak Gain (dBi)	1.0
Horizontal Peak Gain (dBi)	-3.5
V + H Peak Gain (dBi)	1.3

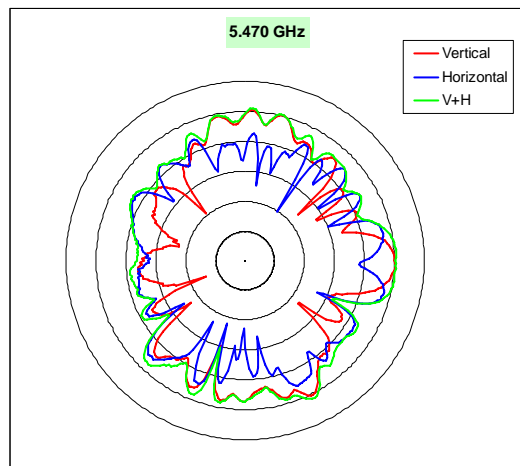


Frequency (MHz)	5150
Vertical Peak Gain (dBi)	2.1
Horizontal Peak Gain (dBi)	-1.5
V + H Peak Gain (dBi)	2.5

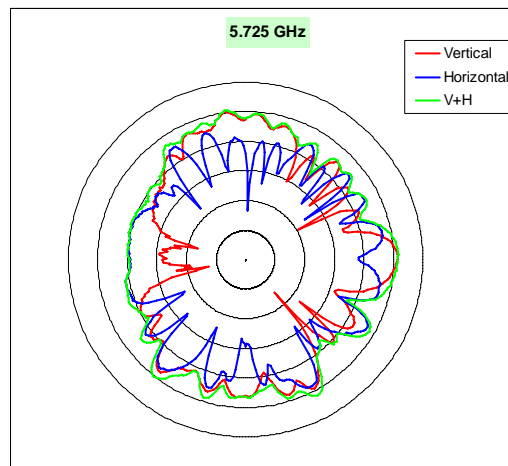


Frequency (MHz)	5350
Vertical Peak Gain (dBi)	1.1
Horizontal Peak Gain (dBi)	-1.4
V + H Peak Gain (dBi)	1.5

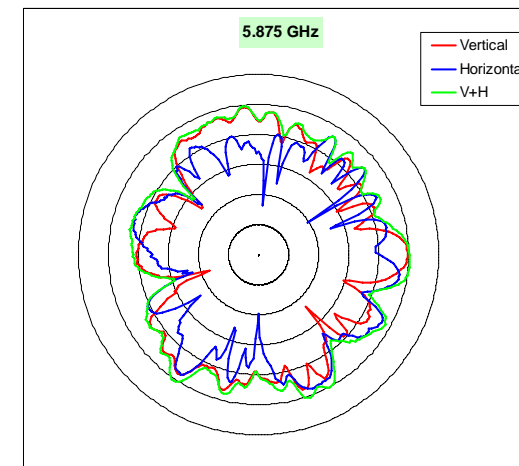
# Aux Antenna (3)



Frequency (MHz)	5470
Vertical Peak Gain (dBi)	0.5
Horizontal Peak Gain (dBi)	-2.2
V + H Peak Gain (dBi)	1.5



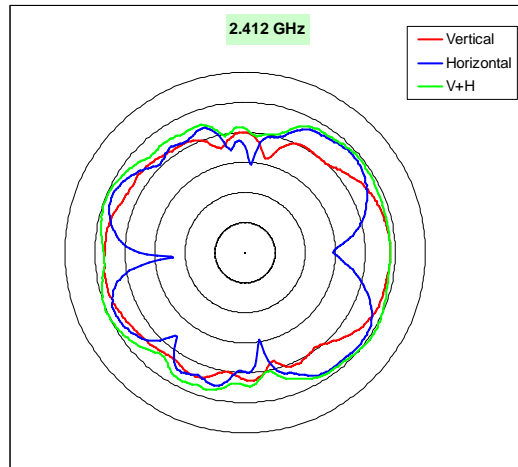
Frequency (MHz)	5725
Vertical Peak Gain (dBi)	1.2
Horizontal Peak Gain (dBi)	-1.7
V + H Peak Gain (dBi)	1.8



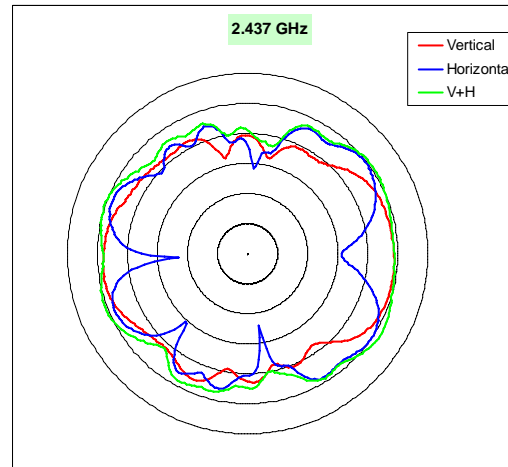
Frequency (MHz)	5875
Vertical Peak Gain (dBi)	-0.5
Horizontal Peak Gain (dBi)	-1.9
V + H Peak Gain (dBi)	0.6



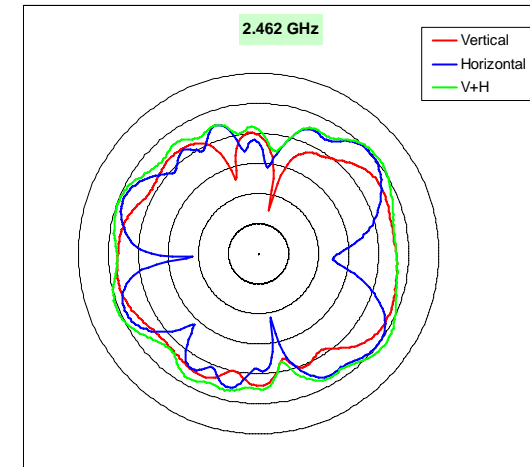
# MIMO Antenna (1)



Frequency (MHz)	2412
Vertical Peak Gain (dBi)	-1.9
Horizontal Peak Gain (dBi)	-1.1
V + H Peak Gain (dBi)	0.4

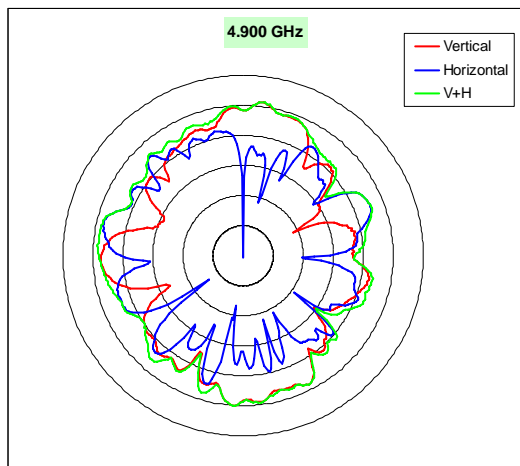


Frequency (MHz)	2437
Vertical Peak Gain (dBi)	-1.1
Horizontal Peak Gain (dBi)	-0.1
V + H Peak Gain (dBi)	1.7

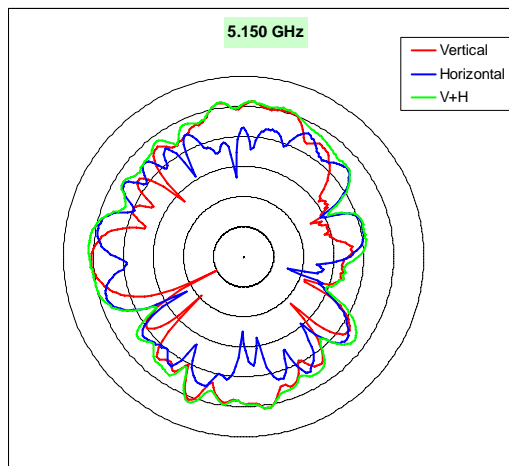


Frequency (MHz)	2462
Vertical Peak Gain (dBi)	-2.1
Horizontal Peak Gain (dBi)	0
V + H Peak Gain (dBi)	1.6

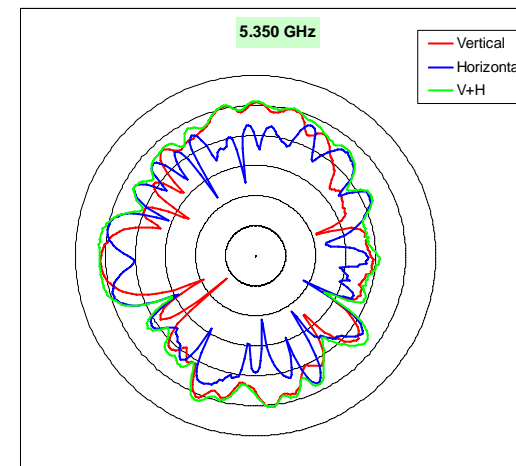
# MIMO Antenna (2)



Frequency (MHz)	4900
Vertical Peak Gain (dBi)	1.2
Horizontal Peak Gain (dBi)	-2.5
V + H Peak Gain (dBi)	1.3

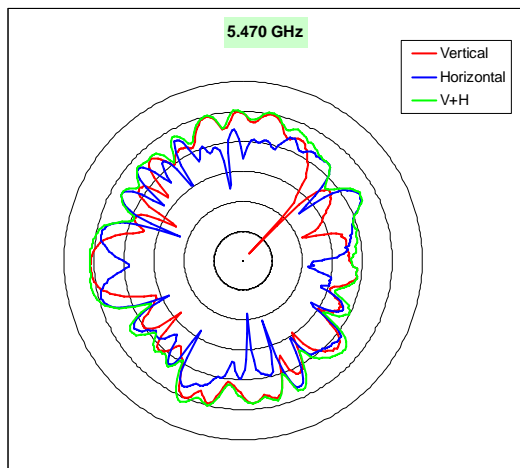


Frequency (MHz)	5150
Vertical Peak Gain (dBi)	1.5
Horizontal Peak Gain (dBi)	-0.8
V + H Peak Gain (dBi)	1.7

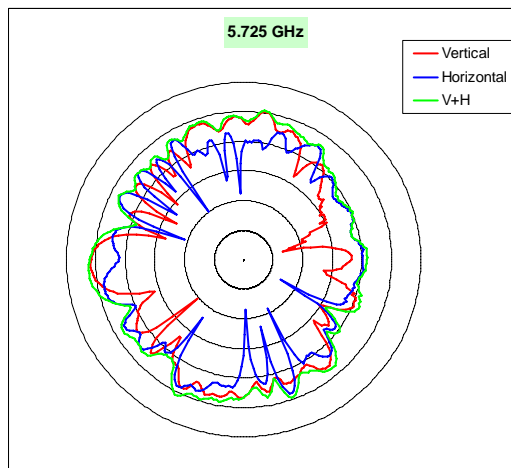


Frequency (MHz)	5350
Vertical Peak Gain (dBi)	1.5
Horizontal Peak Gain (dBi)	-0.1
V + H Peak Gain (dBi)	2.0

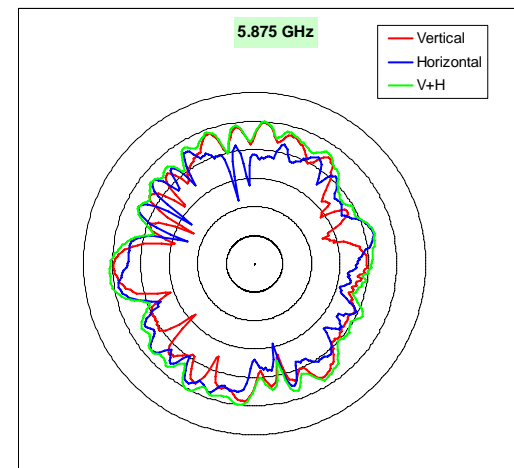
# MIMO Antenna (3)



Frequency (MHz)	5470
Vertical Peak Gain (dBi)	1.2
Horizontal Peak Gain (dBi)	-0.8
V + H Peak Gain (dBi)	1.6



Frequency (MHz)	5725
Vertical Peak Gain (dBi)	1.7
Horizontal Peak Gain (dBi)	-1.7
V + H Peak Gain (dBi)	2.3



Frequency (MHz)	5875
Vertical Peak Gain (dBi)	-0.4
Horizontal Peak Gain (dBi)	-1.6
V + H Peak Gain (dBi)	1.1