

AP.35A.07.0054A

Specification

Part No.	AP.35A.07.0054A
Product Name	35mm One Stage GPS Active Patch Antenna Module with back-end Saw Filter
Feature	35mm*35mm*5.5mm (Ground Plane) 54mm Ø1.13 I-PEX MHFI (U.FL) 15dB LNA ROHS Compliant

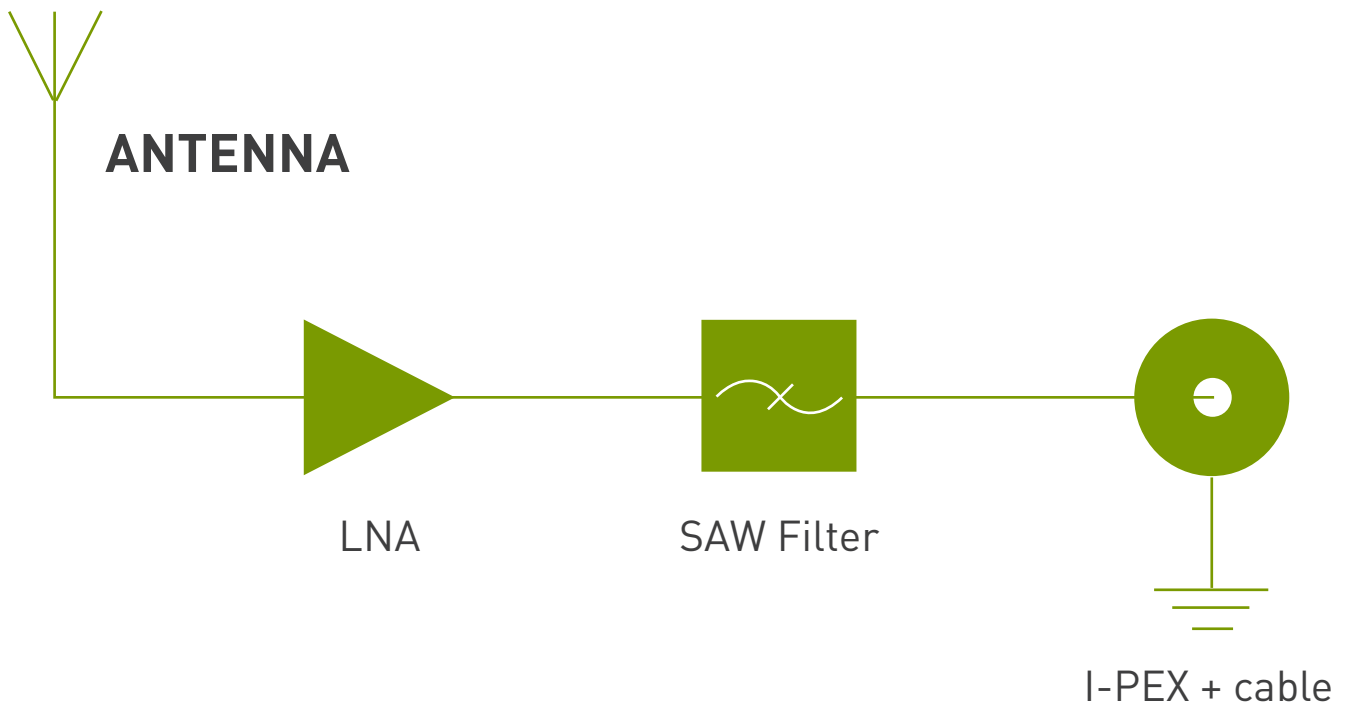
1. Introduction

The AP.35A has been designed for embedded (inside device) integration with GPS receiver modules, the AP.35A combines a 35*35*3.5mm advanced low profile ceramic patch antenna with a one stage LNA and ultra thin coaxial cable.

The Ground Plane size of 35*35mm combined with the larger size GPS Patch, gives this solution a performance increase in gain of 1~2dB. It also helps shields the patch antenna from noise and increases performance at low elevations. Taoglas active antenna modules utilise

XtremeGain™ technology for the highest sensitivity in the industry.

This antenna system consists of two functional blocks, the LNA portion and the patch antenna. The AP.35A has a back-end SAW filter.



2. Specification

2.1 Patch Antenna

Parameter	Specification
Frequency	1575.42 ± 1.023MHz
Gain @ Zenith	+2.5 dBic Typ. @ Zenith (35mm GP)
Polarization	RHCP
Axial Ratio	3.0dB max. @ Zenith
Patch Dimension	35*35*3.5mm

2.2 LNA

Parameter	Specification
Frequency	1575.42 ± 1.023MHz
Outer Band Attenuation	F0=1575.42MHz F0±30MHz 5dB min. F0±50MHz 23dB min. F0±100MHz 28dB min.
Output Impedance	50Ω
Output VSWR	2.0 Max
Pout at 1dB Gain	Typ. -2dBm
Compression point	Min. -6dBm

LNA Gain, Power Consumption and Noise Figure

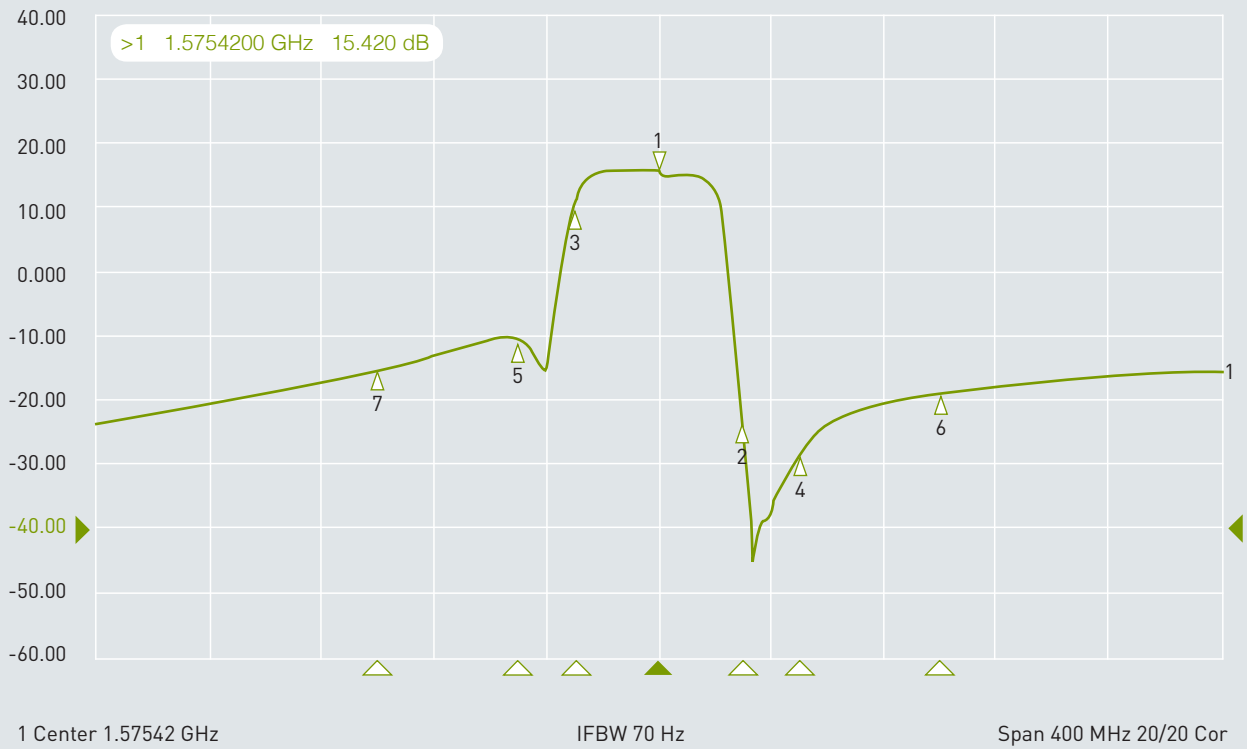
Voltage	LNA Gain (Typ)	Power Consumption(mA) Typ	Noise Figure Typ
Min. 1.8V	14dB	3mA	1.5dB
Typ. 3.0V	15dB	3mA	1.5dB
Max. 5.5V	15dB	3mA	1.5dB

2.3 Cable & Connector

Parameter	Specification
RF Cable	Coaxial Cable Ø1.13 ± 0.1mm, length 54 ± 2.0mm
Connector	IPEX MHFI (U.FL)

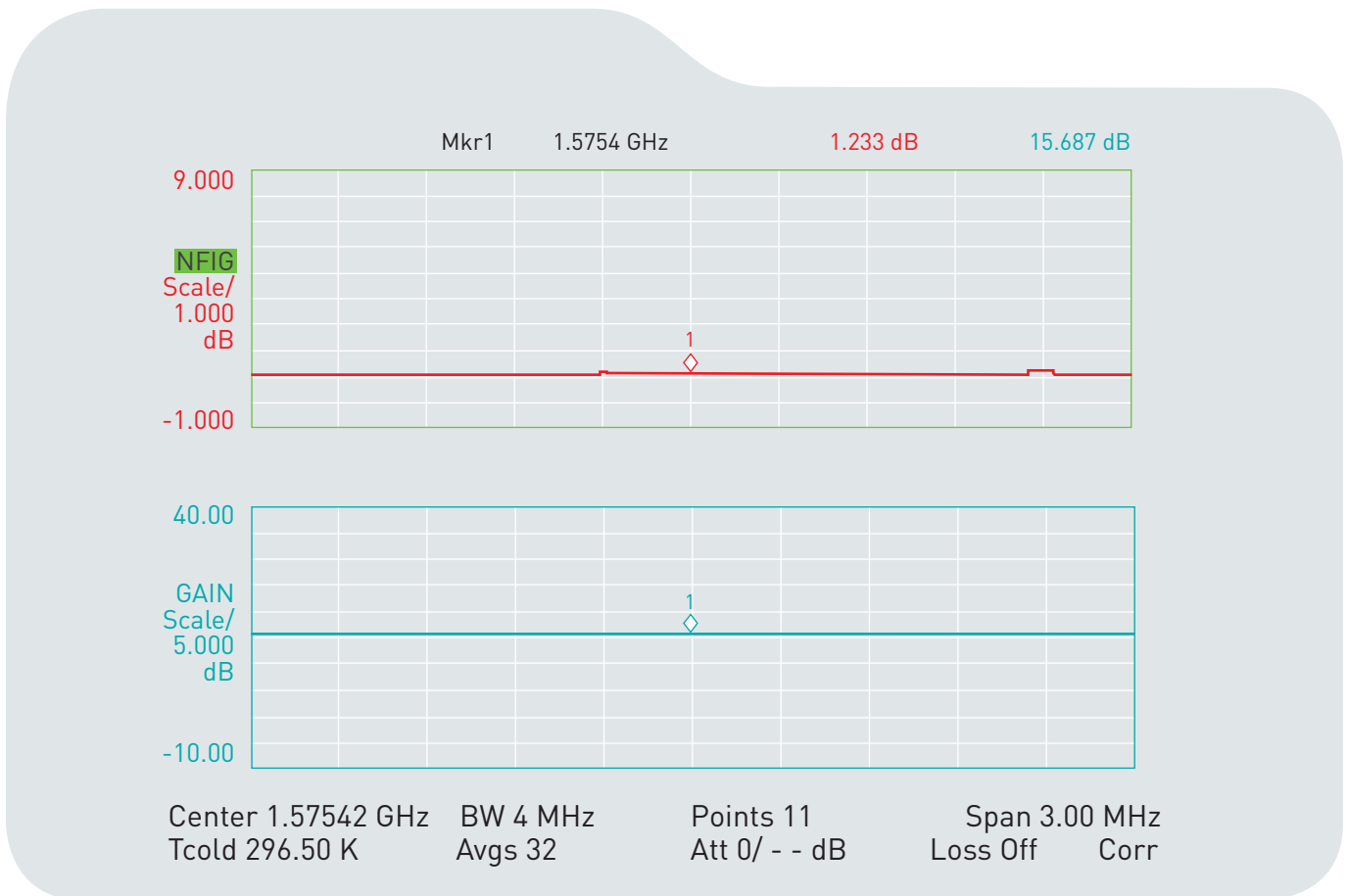
3. LNA Gain and Out Band Rejection @3.0V

Tr1 S21 Log Mag 10.00dB/ Ref -40.00dB (F2)



Cg1	Tr1	S21	>1	1.5754200 GHz	15.420	dB
Cg1	Tr1	S21	2	1.6054200 GHz	-22.977	dB
Cg1	Tr1	S21	3	1.5454200 GHz	10.190	dB
Cg1	Tr1	S21	4	1.6254200 GHz	-27.934	dB
Cg1	Tr1	S21	5	1.5254200 GHz	-10.395	dB
Cg1	Tr1	S21	6	1.6754200 GHz	-19.083	dB
Cg1	Tr1	S21	7	1.4754200 GHz	-15.386	dB

4. LNA Noise Figure @3.0V

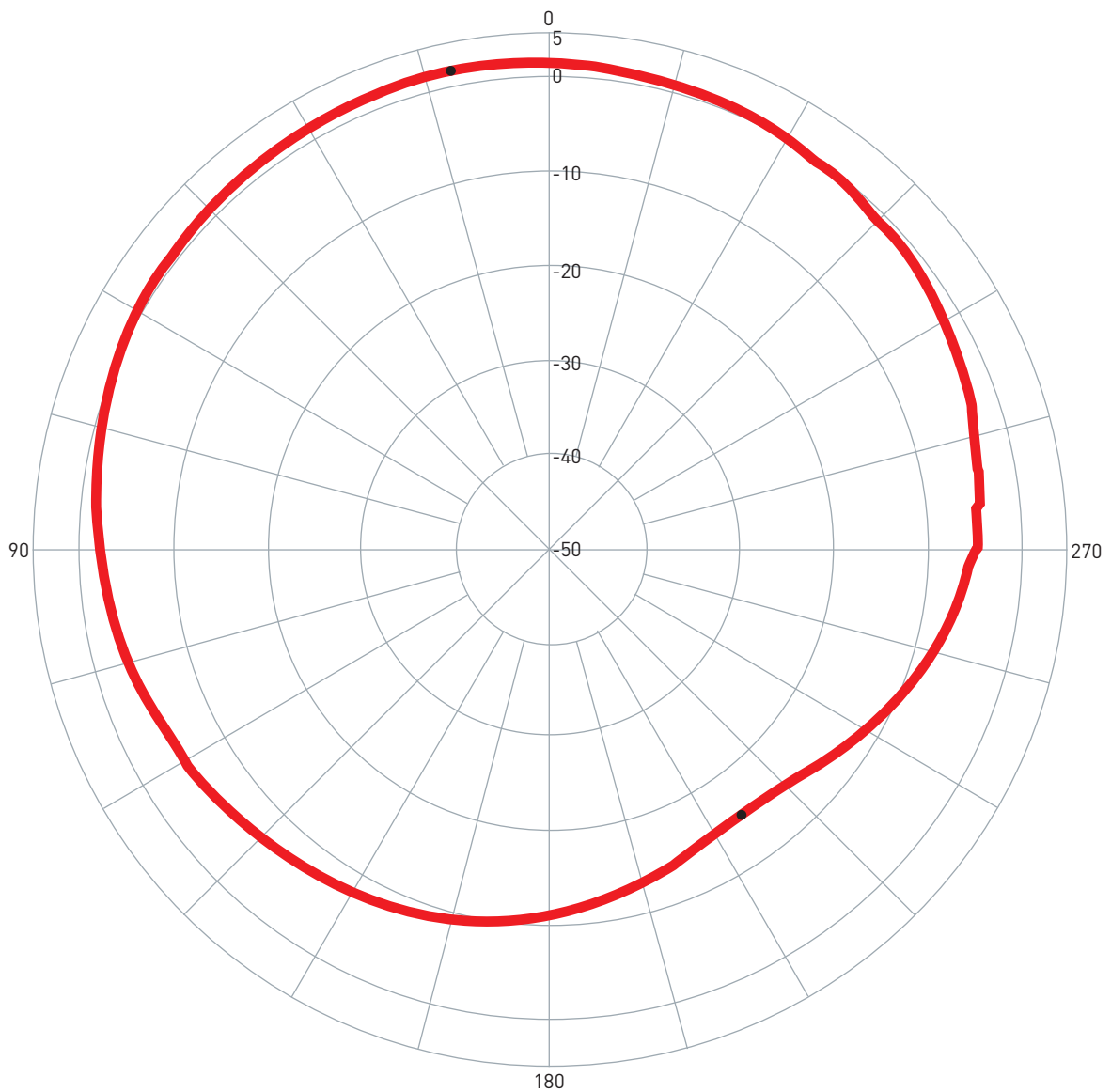


5. Total Specification (through Antenna, LNA, Cable and Connector)

Parameter	Specification
Frequency	1575.42 ± 1.023MHz
Gain	At 3V: 17.5 ± 3dBic @ 90°
Output Impedance	50Ω
Polarization	RHCP
Output VSWR	Max 2.0
Operation Temperature	-40°C to + 85°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	40% to 95%
Input Voltage	Min. 1.8V, Typ. 3.0V, Max. 5V
Antenna	35*35*5.5mm

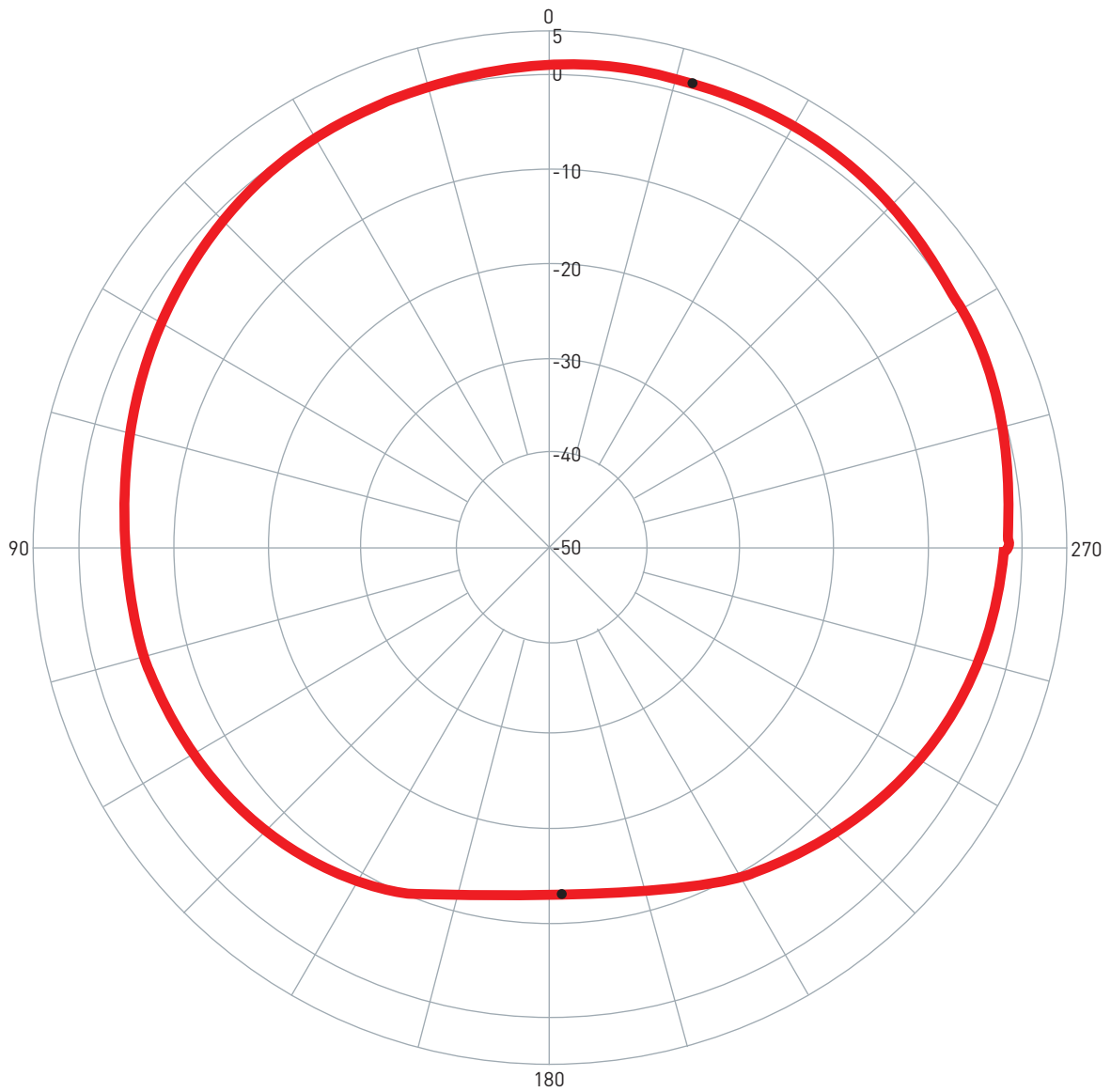
6. Radiation Patterns

6.1 XZ Plane Radiation



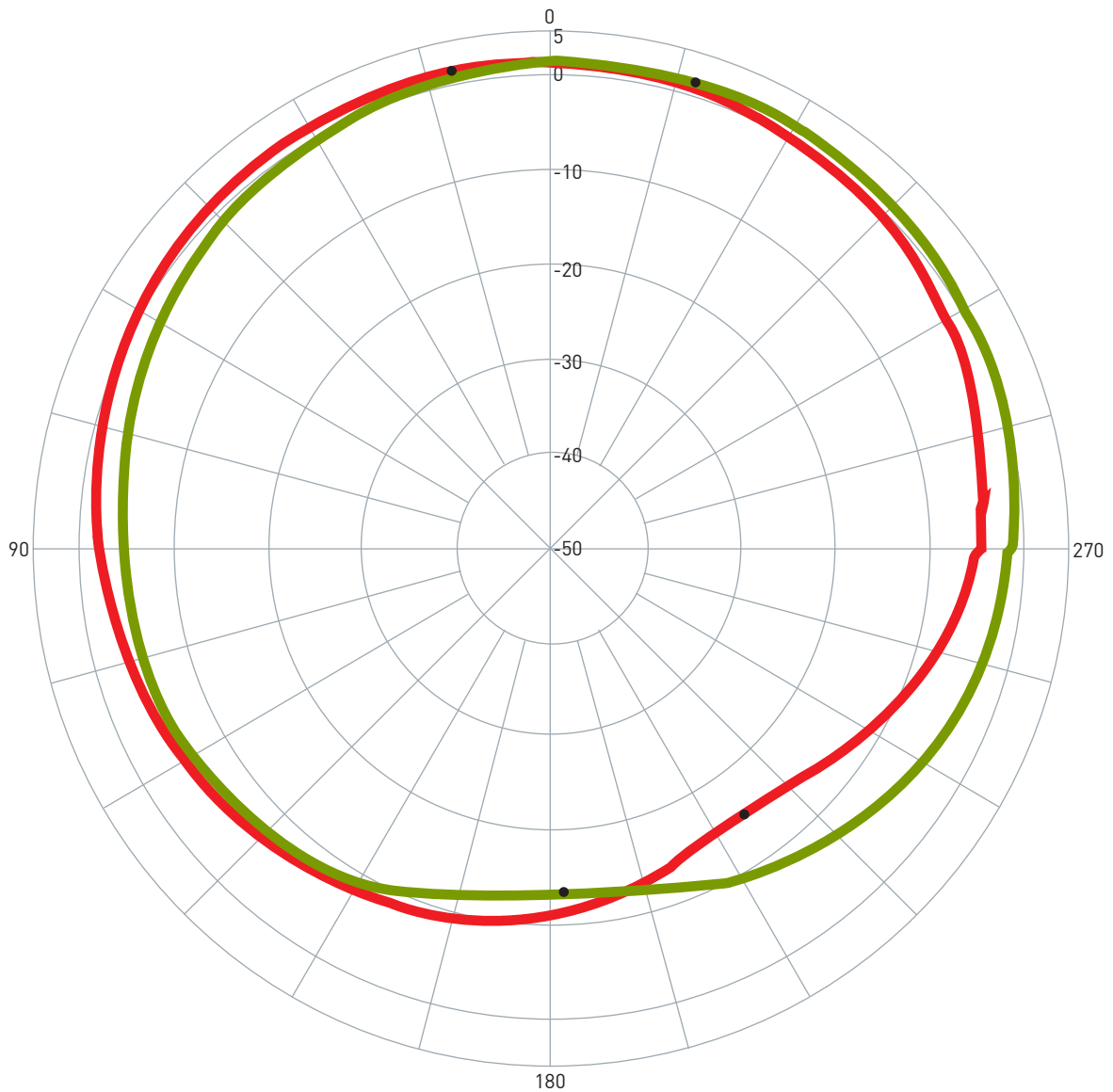
Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.	Date
1	AP.35A.07.0054A	XZ	1575.42	1.65 / 11.56	-15.22 / 215.70	-2.22	RHCP	2010/1/14

6.2 YZ Plane Radiation



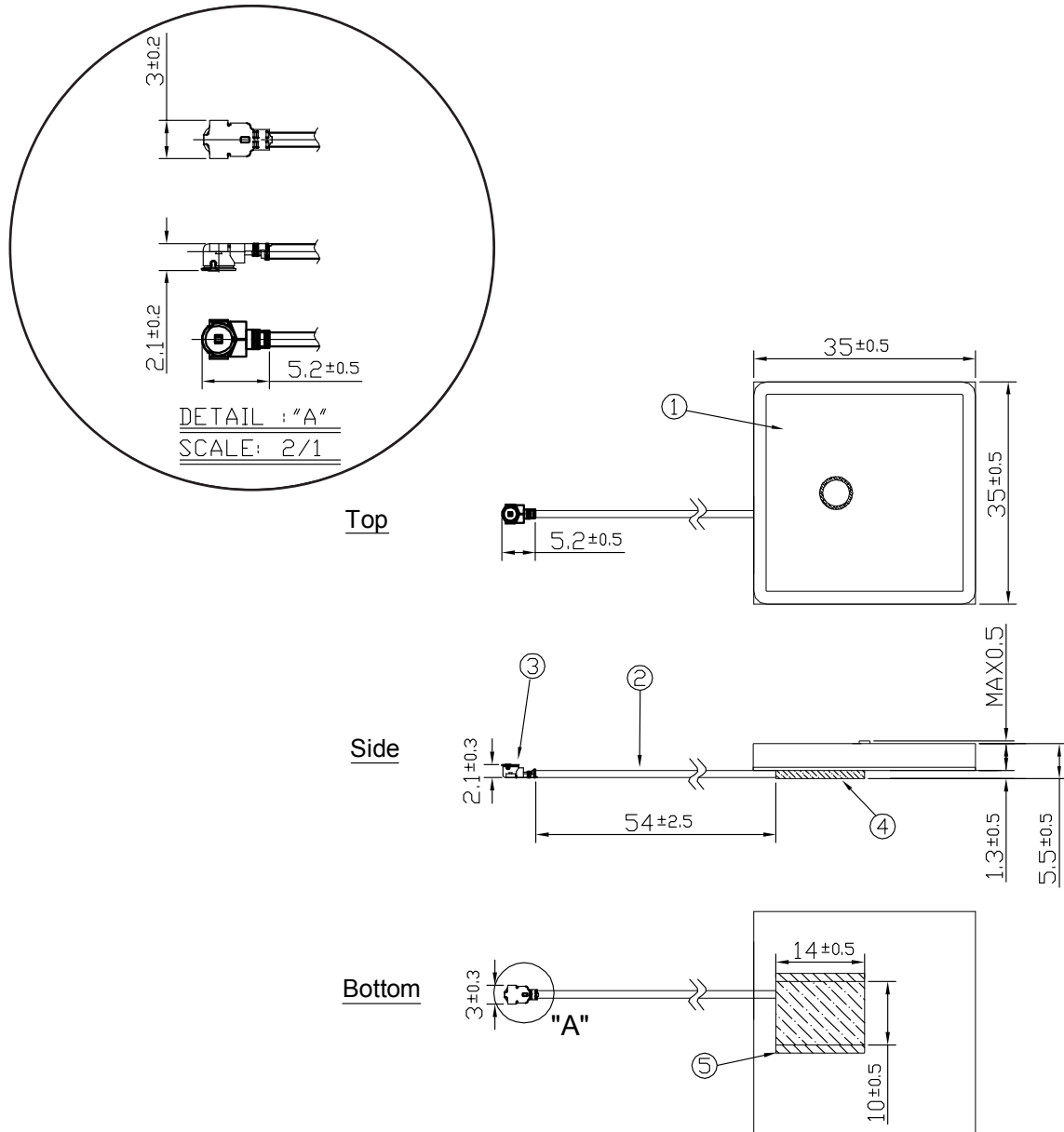
Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.	Date
1	AP.35A.07.0054A	YZ	1575.42	1.62 / 343.00	-13.37 / 182.00	-2.08	RHCP	2010/1/14

6.3 XY Plane Radiation





Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.	Date
1	AP.35A.07.0054A	XZ	1575.42	1.65 / 11.56	-15.22 / 215.70	-2.22	RHCP	2010/1/14
2	AP.35A.07.0054A	YZ	1575.42	1.62 / 343.00	-13.37 / 182.00	-2.08	RHCP	2010/1/14

7. Technical Drawing

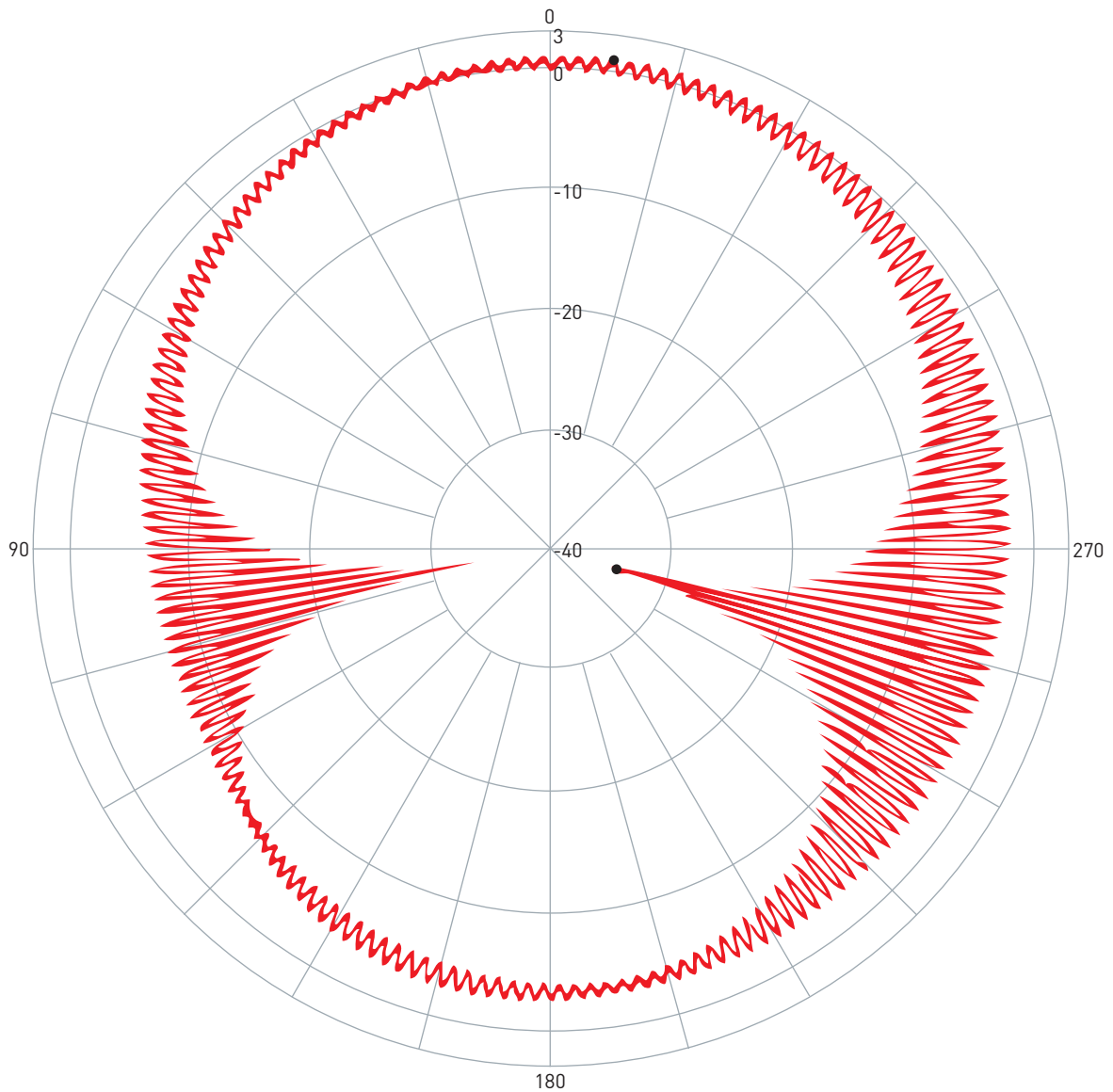


Name	P/N	Material	Finish	QTY
1 AP.35A Patch(35*35*4mm)	AP.35A	Ceramic	Clear	1
2 1.13 Coaxial Cable	OD.113.CM	FEP	Gray	1
3 IPEX MHF1 Connector	IPEX.MHF1.113	Brass	Gold	1
4 Shielding Case		Tin (SPTE)	Tin Plated	1
5 AP.35A PCB		FR4 0.5t	Green	1

NOTE:

- Soldered area 
- Shielding case area 
- All material must be RoHS compliant.
- The connector orientation has a fixed position to the antenna as per drawing.

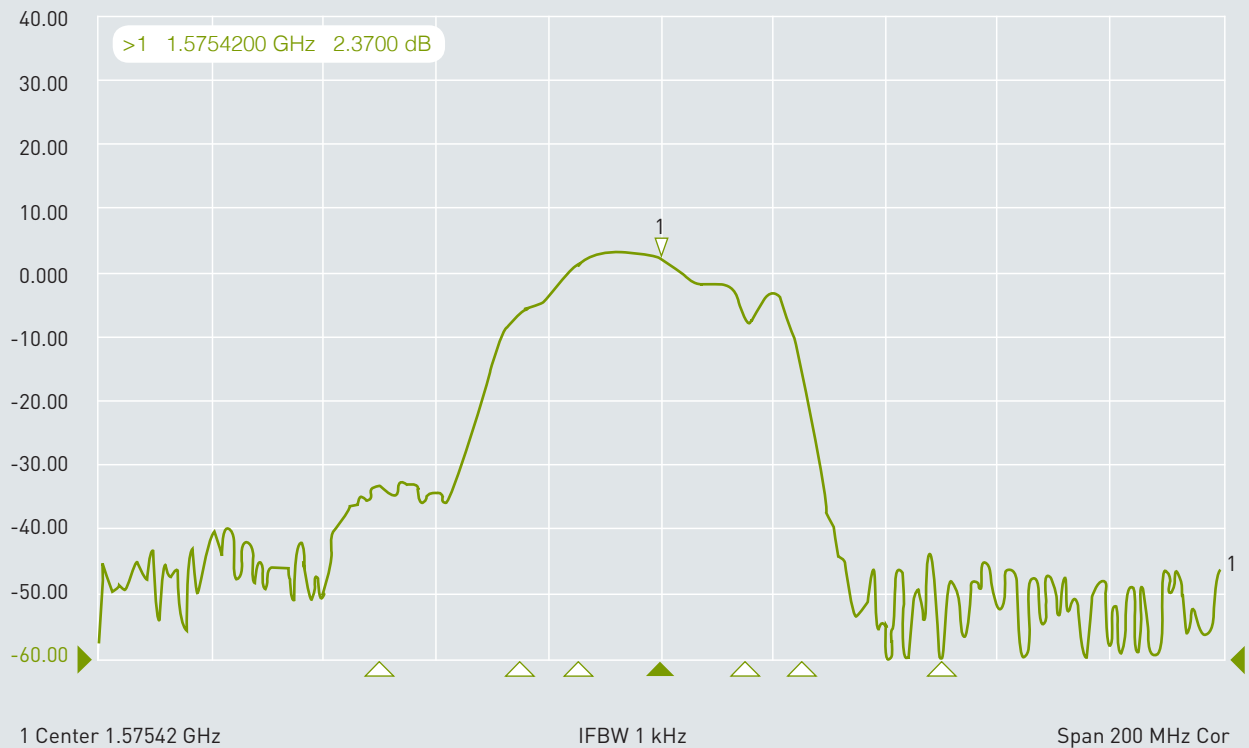
8. Axial Ratio



Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.	Date
1	AP.35A.07.0054A	Axial Ratio	1582.42	0.88 / 352.00	-34.25 / 253.70	-3.05	CP	2009/10/7

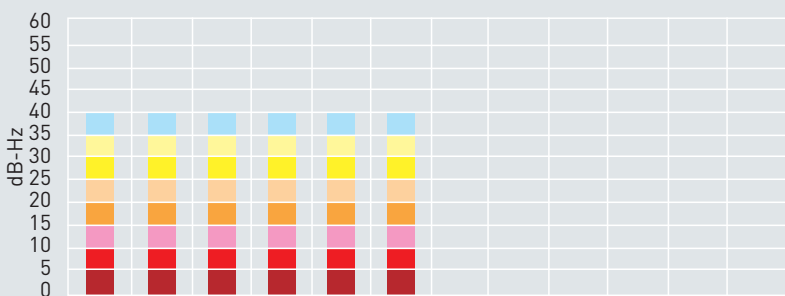
9. Reliability Test (Room temperature +25°C)

▶ Tr1 S21 Log Mag 10.00dB/ Ref -60.00dB (F2)



Cg1 Tr1 S21 >1 1.5754200 GHz 2.3700 dB

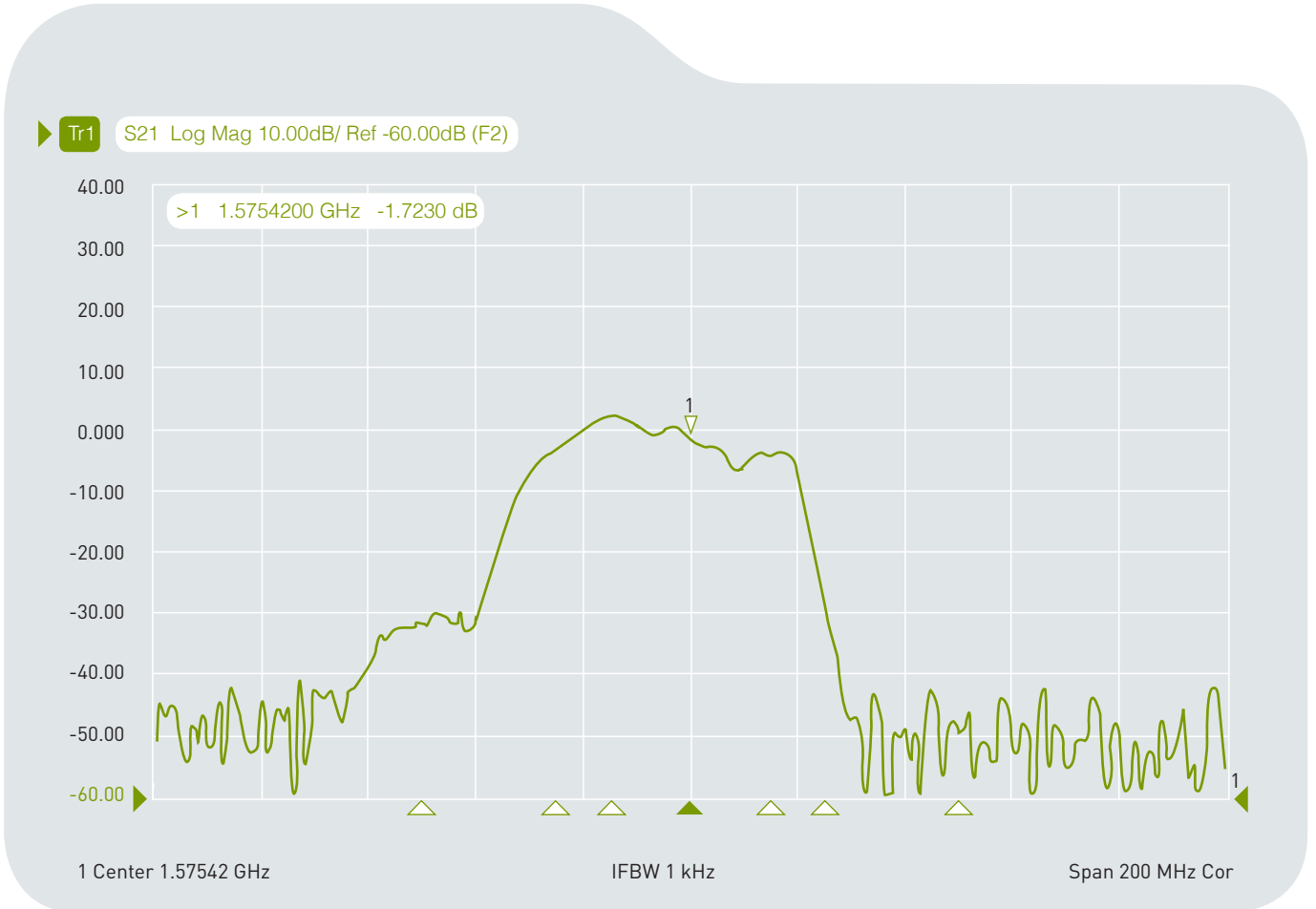
9. S21 Radiation Gain at +25°C



C/N at
+25°C

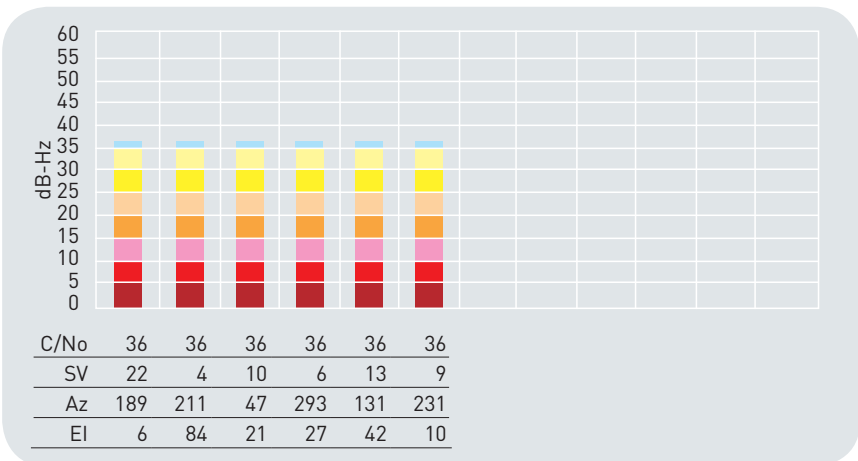
C/No	40	40	40	40	40	40
SV	22	9	4	13	10	6
Az	189	231	215	132	46	293
EI	6	9	84	41	21	27

9.1 Reliability Test (Room temperature +85°C)



Cg1 Tr1 S21 >1 1.5754200 GHz -1.7230 dB

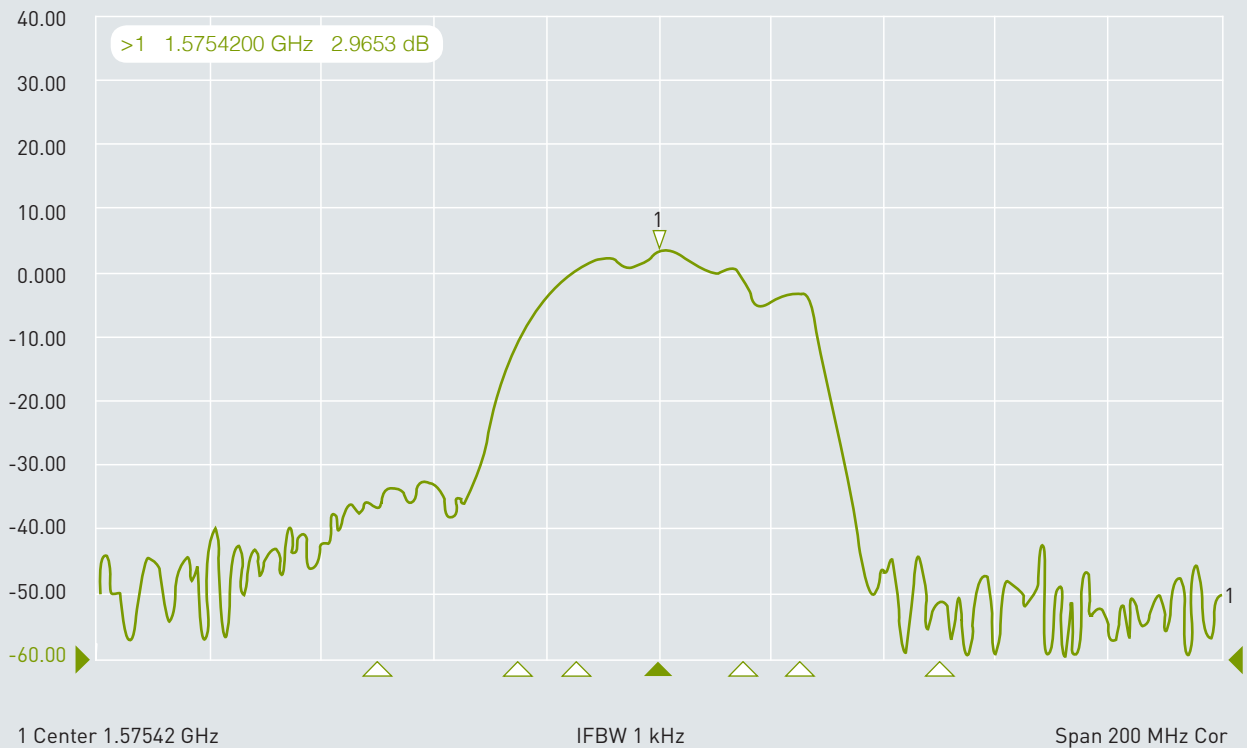
9.1 S21 Radiation Gain at +85°C



C/N at
+85°C

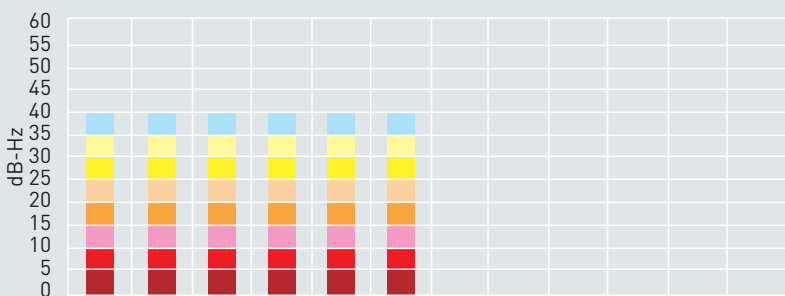
9.2 Reliability Test (Low temperature -40°C)

Tr1 S21 Log Mag 10.00dB/ Ref -60.00dB (F2)



Cg1 Tr1 S21 >1 1.5754200 GHz 2.9653 dB

9.2 S21 Radiation Gain at -40°C



C/N at
-40°C

C/No	40	40	40	40	40	40
SV	10	6	9	13	4	22
Az	47	293	231	132	211	189
EI	21	27	10	42	84	6

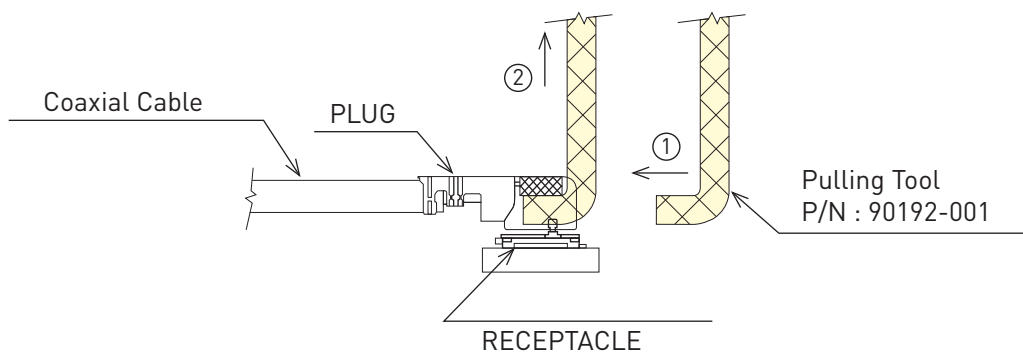
10. Plugs Usage Precautions

10.1 Mating / unmating

(1) To disconnect connectors, insert the end portion of I-PEX under the connector flanges and pull off vertically, in the direction of the connector mating axis.

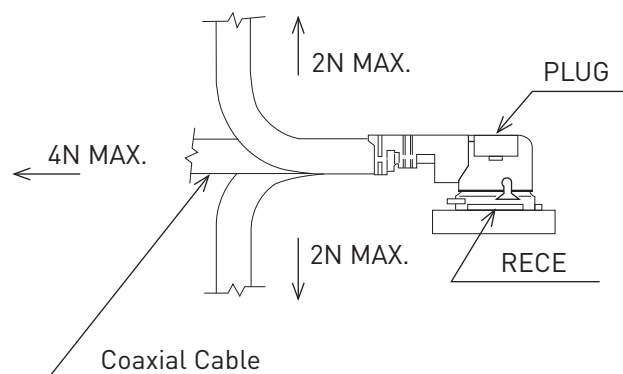
(2) To mate the connectors, the mating axes of both connectors must be aligned and the connectors can be mated. The "click" will confirm fully mated connection.

Do not attempt to insert on an extreme angle.



10.2 Pull forces on the cable after connectors are mated

After the connectors are mated, do not apply a load to the cable in excess of the values indicated in the diagram below.



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