Users' Guide

For

Tower Mounted Amplifier

(Model No. TMA1900P)

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1. General Description

Mounted close the Macro site antenna, it improves the radio uplink performance and ensures a balanced link budget. VisionLink offers a wide range of TMAs for most cellular standards and all VisionLink TMAs are specified and verified to ensure optimum and problem-free performance in systems.

VisionLink TMA has been designed for installing on the base station and amplifying RX signal to base station. It improves received signal sensitivity and extends the base station's coverage. Also it minimize loss of transmitting signal and maximize the effectiveness for Tower Mounted Amplifier by optimizing power handling.

Benefits

- Significantly reduced dropped call rate
- Larger site coverage area
- Enhanced in-door coverage

Operator benefits from the above include:

- Increased traffic/billing and boosted customer satisfaction
- Larger areas to establish site location during network cell planning

2. Feature

Top Panel

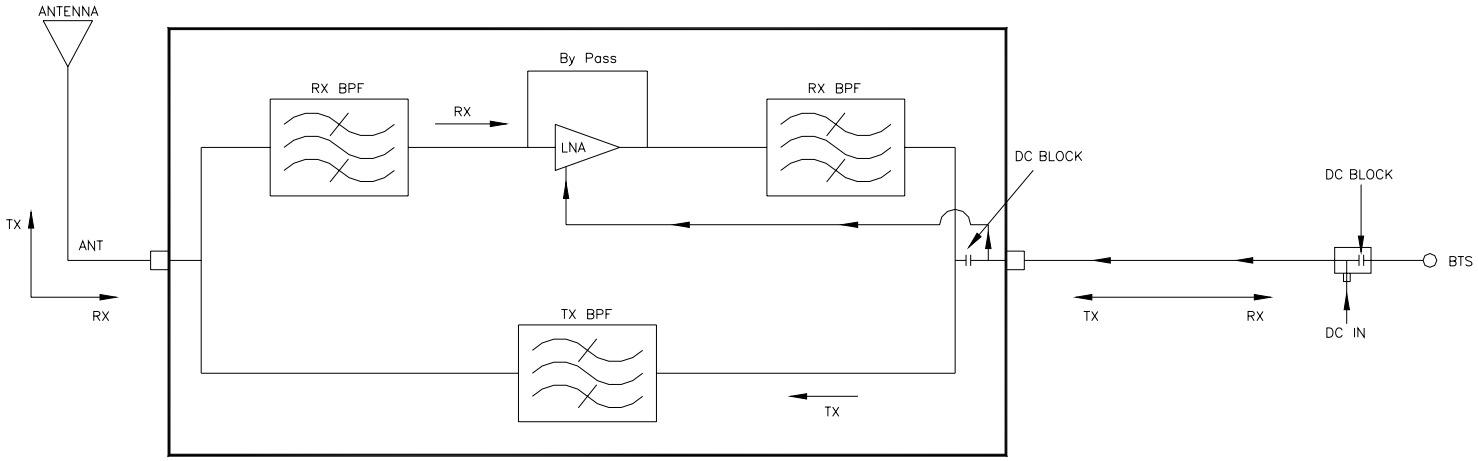
Left Panel

Front Panel

Right Panel

Bottom Panel

3. Block Diagram



4. Specification

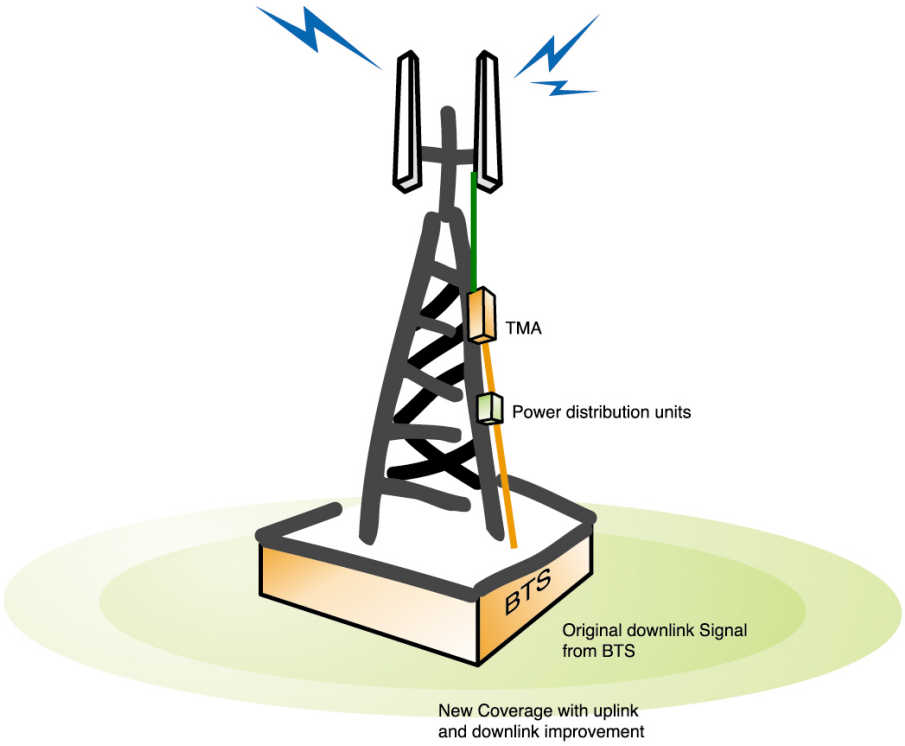
3-1. Electrical Properties

Parameter	Specification		Comments
Frequency Range	**TX**	**RX**	
	1930 ~ 1990 MHz	**1850 ~ 1910MHz**	
Insertion Loss	0.6 dB Max	-	Typical
Gain	-	12 dB ± 1.0 dB	Typical
Gain Drift Over Temperature	-	1.5 dB Max	
Noise Figure	-	1.8 dB Max	Typical
Input 3rd Order Intercept Point	-	+12 dBm Min	
Intermodulation	-117 dBm Max	-	
Return Loss (Input)	20.0 dB Min		
Return Loss (Output)	20.0 dB Min		
Max Tx Input Power	54dBm		
Impedance	50Ω		

3-2. **Physical Properties**

Parameter	Specification	Comments
Operating Temp.	-35°C ~ + 55°C	
Operating Humidity	5 ~ 95%	
Dimension(WxDxH (inch))	9.724 x 8.504 x 3.465	Without Connector
Connector	7/16 Female	
Sealing	IP 659	
Mounting	Pole or Wall	
MTBF	900,000 hours	
Finish	DIC-201	
Weight (Kg)	4.5 ㎏	

4. Installation Procedure



Step 1. Take out the connector cap (DIN 7/16 Male)

Step 2. Please make sure any defectiveness of the case. If it has any, you may contact the representatives.

Step 3. Place the TMA tightly using 4 units of volts and nuts (M4)

Step 4. Using power cable, you should make sure of being grounded for TMA.

Step 5. Connect RF cable to antenna port of TMA which comes from antenna of base station

Step 6. Connect RF cable to BTS port which comes from base station.

5. Test Procedure

5-1-1. Test equipment(Gain / Return Loss / Gain Flatness)

Test equipment	Model	Spec.	Remark
Network Analyzer	8753ES	~ 3 GHz	
Cal. Kit	HP85032B	N-Type	For Calibration

5-1-2. Test equipment (Noise Figure)

Test equipment	Model	Spec.	Remark
Noise Figure Meter	8913A	~ 3 GHz	

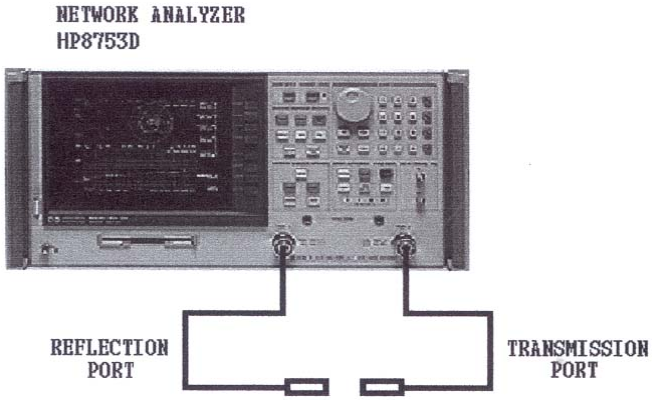
5-1-3. Test equipment (Spectrum Analyzer)

Test equipment	Model	Spec.	Remark
Spectrum Analyzer	E4445A	~ 26.5 GHz	
Signal Generator	E4438C	~ 3 GHz	

5-2. Measurement Method

5-2-1 Calibration Method(Gain / Return Loss / Gain Flatness)

5-2-1-1. Connection diagram



5-2-1-2. Calibration procedure

Step 1. Turn on the power.

Step 2. Set the power as 0dBm on the Menu.

Step 3. Select RX : Center 1880.0 SPAN 200 ㎒, TX : Center 1960.0 SPAN 200 ㎒

Step 4. Select CAL and then select N50Ω from Cal Kit.

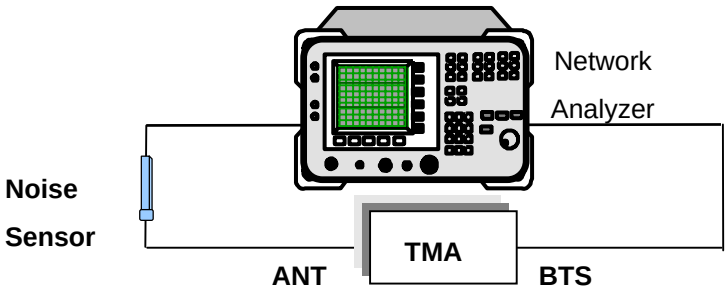
Step 5. Calibrate with connecting Open, Short, Load on S11/S22 Calibration Reflection Test Port and Transmission Test Port

Step 6. Calibrate with connecting S21 Calibration : Transmission Test Port and Reflection Test Port

Step 7. Confirm of the all calibrations.

5-2-2 Calibration Method (Noise Figure)

5-2-2-1 Connection diagram



Equipments

1. 1set of Noise Figure Meter or similar equipment
2. 1set of Noise Sensor
3. Cable Set

5-2-2-2 Calibration procedures

Step 1. Turn on the power

Step 2. Connect noise source between input port and source of noise figure meter.

Step 3. Set the frequency, gain, and noise figure as Specification says so.

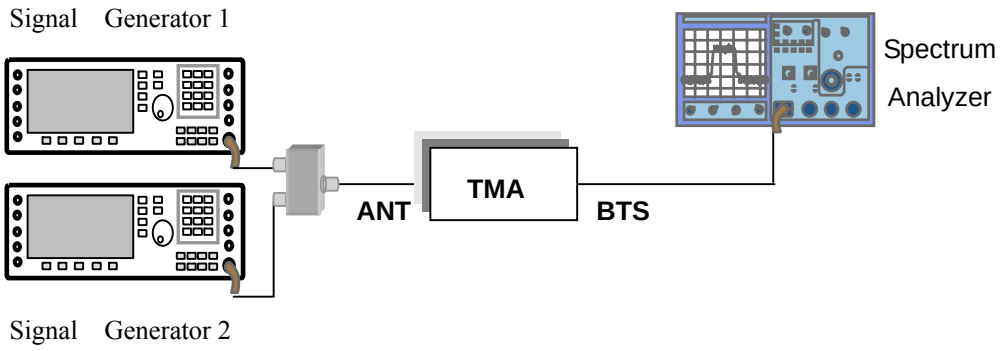
: Frequency (Start 1850 ㎒, Stop 1910 ㎒, Step Size 0.5 ㎒)

Step 4. Cal after the set up.

Step 5. Confirm the all calibration

5-2-3 Calibration Method (Spectrum Analyzer)

5-2-3-1 Connection diagram



Equipments

1. 1 set of Spectrum Analyzer
2. 2 sets of CW Signal Generator
3. Cable Set

5-5-2-2 Calibration procedures

Step 1. Turn on the power.

Step 2. Measure cable loss between Power Divider (2Way) and Spectrum Analyzer. And set the offset value.

Step 3. Set the gain of AMP as 12dB

Step 4. Set the output power of F1 and F2 as –20dBm from 2sets of signal generator

	Input frequency		Input Power	Remark
	Signal Generator 1	2 Ch. ± 900KHz	-20dBm	
	Signal Generator 2	2 Ch. ±1700KHz		

Step 5. Confirm the all calibration

5-3. Measurement

5-3-1. Measurement Parameters

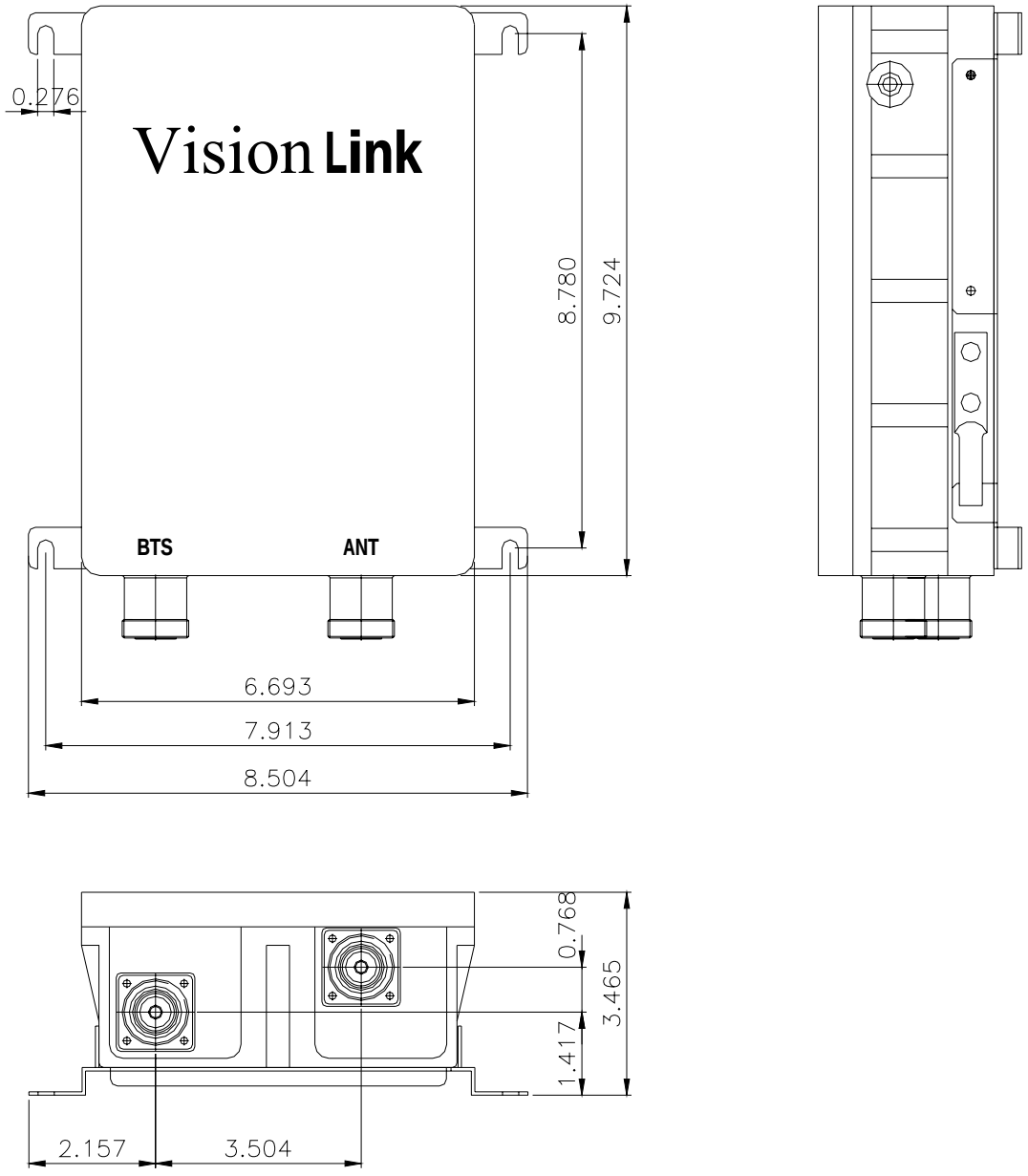
- Tx Path

Lists	Test Methods	Standards	Remark
Return Loss (Input)S11	1. Connect BTS port to RF port of test equipment and connect ANT port to TRN port. 2. Measure return loss with marking on the frequency range.	20.0 dB Min.	Center: 1960.0 MHz SPAN: 200 MHz M1 : 1930.0 MHz M2 : 1990.0 MHz
Return Loss (Output)S22	1. Connect BTS port to RF port of test equipment and connect ANT port to TRN port. 2. Measure return loss with marking on the frequency range.	20.0 dB Min.	Center: 1960.0 MHz SPAN: 200 MHz M1 : 1930.0 MHz M2 : 1990.0 MHz
Insertion Loss	1. Connect BTS port to RF port of test equipment and connect ANT port to TRN port. 2. Measure S21 with marking on the frequency range.	0.6 dB Max.	Center: 1960.0 MHz SPAN: 200 MHz M1 : 1930.0 MHz M2 : 1990.0 MHz

- Rx Path

Lists	Test Methods	Standards	Remark
Return Loss (Input)S11	1. Connect ANT port of filter on the REF port of test equipment and connect BTS port of Bias-T on the TRN Port. 2. Measure return loss with marking on the frequency range. Bias – T VDC 24V	20.0 dB Min.	Center: 1880.0 MHz SPAN: 200.0 MHz M1 :1850.0 MHz M2 :1910.0 MHz
Return Loss (Output)S22	1. Connect ANT port of filter on the REF port of test equipment and connect BTS port of Bias-T on the TRN Port. 2. Measure return loss with marking on the frequency range. Bias – T VDC 24V	20.0 dB Min.	Center: 1880.0 MHz SPAN: 200.0 MHz M1 :1850.0 MHz M2 :1910.0 MHz
Gain	1. Connect ANT port of filter on the REF port of test equipment and connect BTS port of Bias-T on the TRN Port. 2. Measure return loss with marking on the frequency range. Bias – T VDC 24V	12.0 dB.	Center: 1880.0 MHz SPAN: 200.0 MHz M1 :1850.0 MHz M2 :1910.0 MHz
Noise Figure	1. Connect ANT port of filter on the REF port of test equipment and connect BTS port of Bias-T on the TRN Port. 2. Measure return loss with marking on the frequency range. Bias – T VDC 24V	1.8 dB Max.	Center: 1880.0 MHz SPAN: 200.0 MHz M1 :1850.0 MHz M2 :1910.0 MHz
Input 3rd Order Intercept Point	1. Set the gain of TMA-LNA as 12dB 2. Set the output power as –20dBm from signal generator 3. Measure with spectrum analyzer after insert the signal to TMA using combiner. Bias – T VDC 24V *IP3 Calculation OUTPUT IP3 = IMD/2 + Output Power $_{\text{One Tone}}$	+12 dBm Min	

6. Drawing


0.276
Vision Link
8.780
9.724
BTS
ANT
6.693
7.913
8.504
0.768
3.465
1.417
2.157
3.504