

Multi-hub 7in1 Antenna

1 Antenna description

LTE/5G_1 Antenna: 600-960MHz, 1.4-1.55GHz, 1.71-2.69GHz, 3.3-4.2GHz, 4.4-5GHz

LTE/5G_2 Antenna: 600-960MHz, 1.4-1.55GHz, 1.71-2.69GHz, 3.3-4.2GHz, 4.4-5GHz

LTE/5G_MIMO1 Antenna: 1.4-1.55GHz 1.71-2.69GHz, 3.3-4.2GHz, 4.4-5GHz

LTE/5G_MIMO2 Antenna: 1.4-1.55GHz 1.71-2.69GHz, 3.3-4.2GHz, 4.4-5GHz

WIFI_1 Antenna: 2400-2500MHz, 5150-5185MHz, 5925-7125MHz

WIFI_2 Antenna: 2400-2500MHz, 5150-5185MHz, 5925-7125MHz

GNSS Antenna: 1561-1602MHz

1.1 Part number

Part Number: 2178531000

1.2 Antenna Polarization

LTE/5G_1 Antenna: linear

LTE/5G_2 Antenna: linear

LTE/5G_MIMO1 Antenna: linear

LTE/5G_MIMO2 Antenna: linear

WIFI_1 Antenna: linear

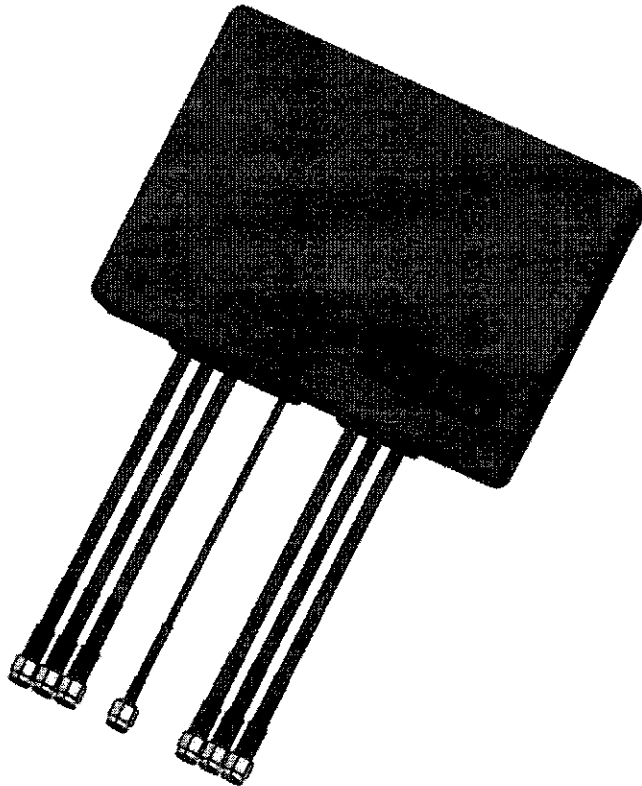
WIFI_2 Antenna: linear

GNSS Antenna: RHCP

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1.3 Antenna picture



Pic1. 3D Antenna

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2 Electrical Performance

2.1 Measurement Set-up

2.1.1 VSWR and return loss

VSWR measurements (S11) were performed using an Agilent ENA series Network Analyzer and the previous described test fixture. Coaxial chokes were used to mitigate surface currents on the outside of the cable. The test was performed in free space.

2.1.2 Efficiency, Gain

The gain of the antenna was measured in MOLEX's 3D anechoic chamber in Shanghai, China. The chamber is ETS system capable of doing tests from 400MHz to 8GHz. Coaxial chokes on the feed cable were used to mitigate surface currents during passive tests. The measurement results are calibrated using dipole standards.

2.2 Reference measurement data

2.2.1 Antenna Return Loss

LTE/5G Antenna

Frequency (MHz)		600-960MHz	1400-1550MHz	1710-2690MHz	3300-4200MHz	4400-5000MHz
LTE/5G_1	Return Loss (dB)	<-3	<-5	<-6	<-7	<-6
LTE/5G_2	Return Loss (dB)	<-3	<-5	<-5	<-6	<-5

LTE/5G_MIMO Antenna

Frequency (MHz)		1400-1550MHz	1710-2690MHz	3300-4200MHz	4400-5000MHz
LTE/5G_MIMO1	Return Loss (dB)	<-7	<-9	<-8	<-8
LTE/5G_MIMO2	Return Loss (dB)	<-10	<-9	<-7	<-5

WIFI Antenna

Frequency (MHz)		2400-2500MHz	5150-5850MHz	5925-7125MHz
WIFI_1	Return Loss (dB)	<-10	<-10	<-7
WIFI_2	Return Loss (dB)	<-8	<-8	<-8

GNSS Antenna

Frequency (MHz)		1561MHz	1575MHz	1602MHz
GNSS	Return Loss (dB)	<-10	<-8	<-10

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2.2.2 Antenna Efficiency in Free Space

LTE/5G Antenna

Frequency (MHz)		600-960MHz	1400-1550MHz	1710-2690MHz	3300-4200MHz	4400-5000MHz
LTE/5G_1	Average Efficiency (%)	>50	>55	>60	>55	>60
LTE/5G_2	Average Efficiency (%)	>50	>50	>50	>55	>50

LTE/5G MIMO Antenna

Frequency (MHz)		1400-1550MHz	1710-2690MHz	3300-4200MHz	4400-5000MHz
LTE/5G_MIMO1	Average Efficiency (%)	>60	>60	>60	>55
LTE/5G_MIMO2	Average Efficiency (%)	>60	>60	>60	>55

WiFi Antenna

Frequency (MHz)		2400-2500MHz	5150-5850MHz	5925-7125MHz
WiFi_1	Average Efficiency (%)	>60	>55	>55
WiFi_2	Average Efficiency (%)	>60	>55	>50

GNSS Antenna

Frequency (MHz)		1561±2MHz	1575±5MHz	1602±5MHz
GNSS	Average Efficiency (%)	>55	>40	>45

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2.2.3 Antenna Gain in Free Space

LTE/5G Antenna

Frequency (MHz)		600-960MHz	1400-1550MHz	1710-2690MHz	3300-4200MHz	4400-5000MHz
LTE/5G_1	Peak Gain (dBi)	2.1	2.7	3.8	4.1	4
LTE/5G_2	Peak Gain (dBi)	3.5	2.8	3.4	4.7	2.8

LTE/5G MIMO Antenna

Frequency (MHz)		1400-1550MHz	1710-2690MHz	3300-4200MHz	4400-5000MHz
LTE/5G_MIMO1	Peak Gain (dBi)	3.9	4.6	6.1	5.7
LTE/5G_MIMO2	Peak Gain (dBi)	5.8	5.6	5.9	5.2

WIFI Antenna

Frequency (MHz)		2400-2500MHz	5150-5850MHz	5925-7125MHz
WIFI_1	Peak Gain (dBi)	3.8	3.3	3.6
WIFI_2	Peak Gain (dBi)	2.6	3.6	2.9

GNSS Antenna

Frequency (MHz)		1561±2MHz	1575±5MHz	1602±5MHz
GNSS	Peak Gain (dBi)	3.9	2.2	1.7

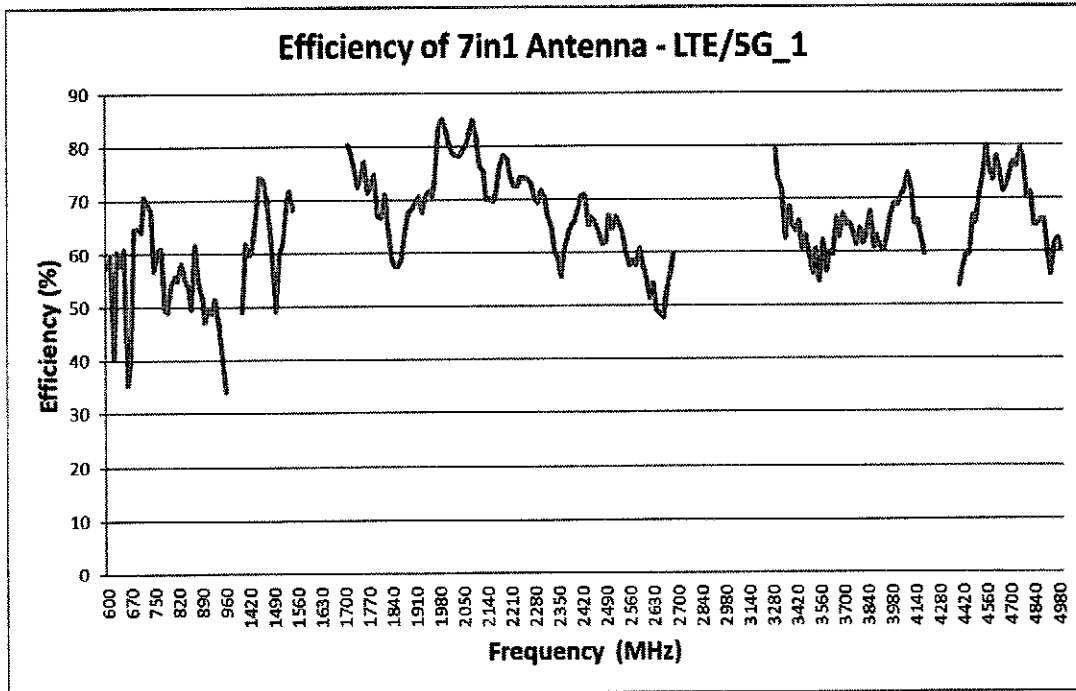
2.2.4 GNSS LNA

DESCRIPTION	EQUIPMENT	REQUIREMENT		
Frequency Range	VNA E5071C	1561MHz	1575MHz	1602MHz
DC Voltage	DC Supplier	3.0-5.0V		
Gain	VNA E5071C	28±3dB		
VSWR	VNA E5071C	≤2.0		
Noise Figure	VNA E5071C	≤3dB		
DC Current	DC Supplier	10±3mA (at 3.0V)		

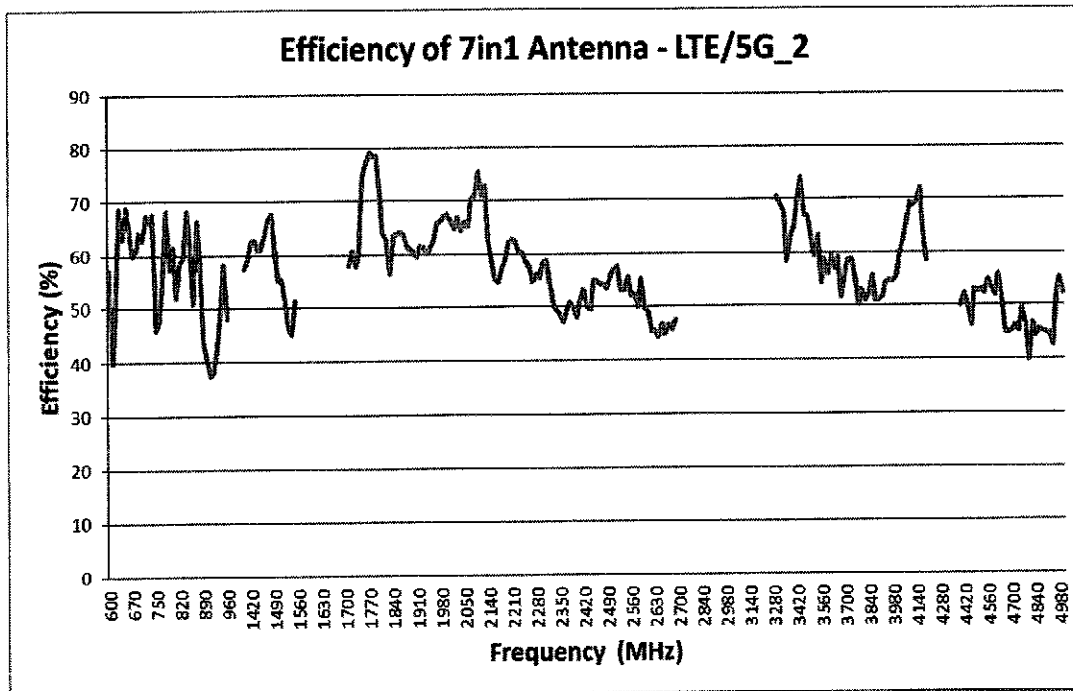
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3.2 Efficiency



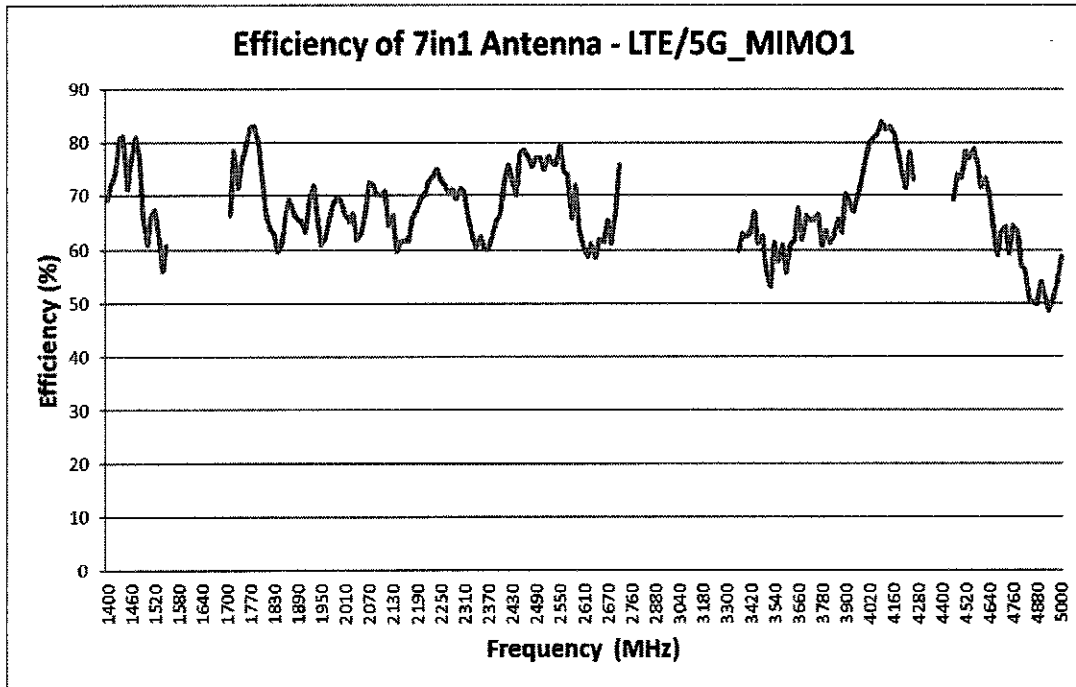
Pic24. Efficiency of LTE/5G_1 Antenna



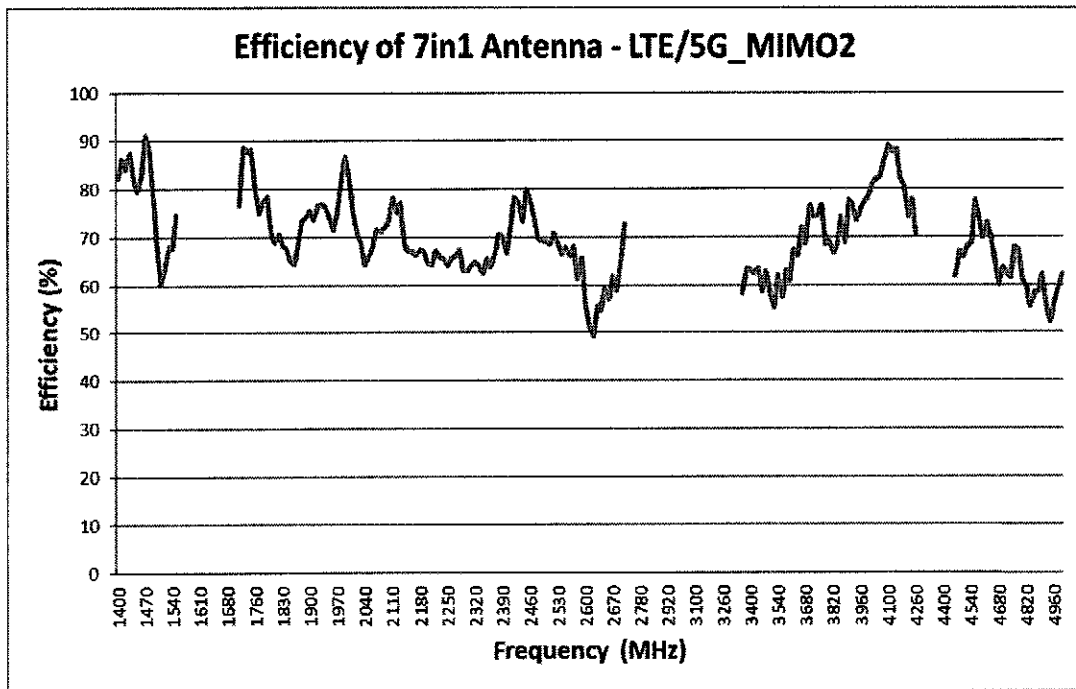
Pic25. Efficiency of LTE/5G_2 Antenna

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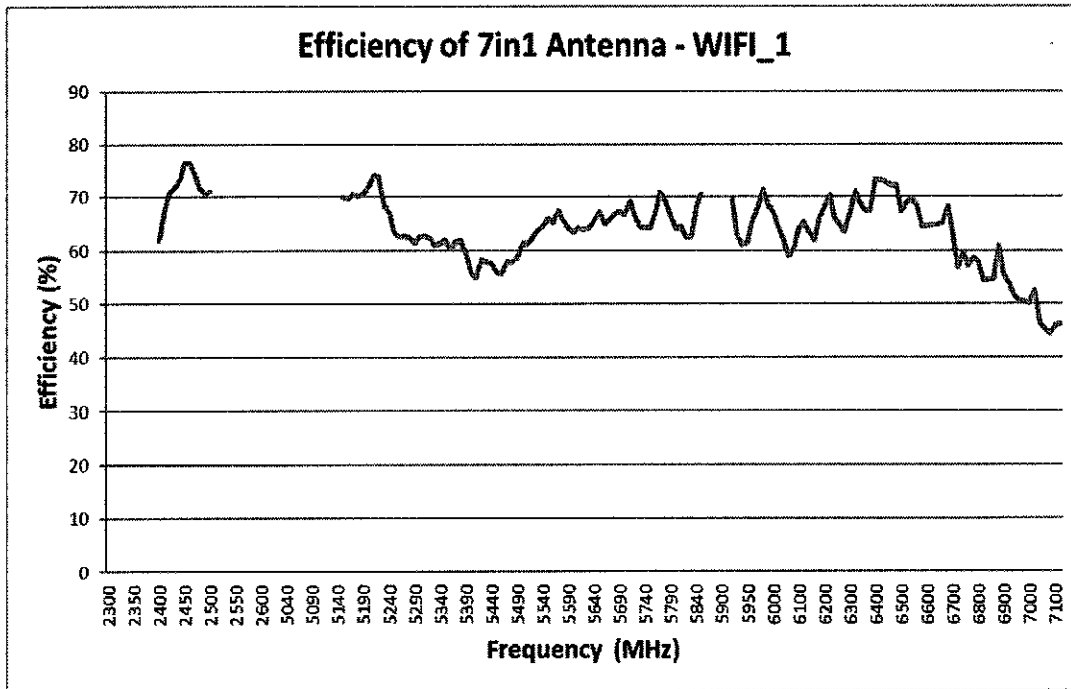
Pic26. Efficiency of LTE/5G_MIMO1 Antenna



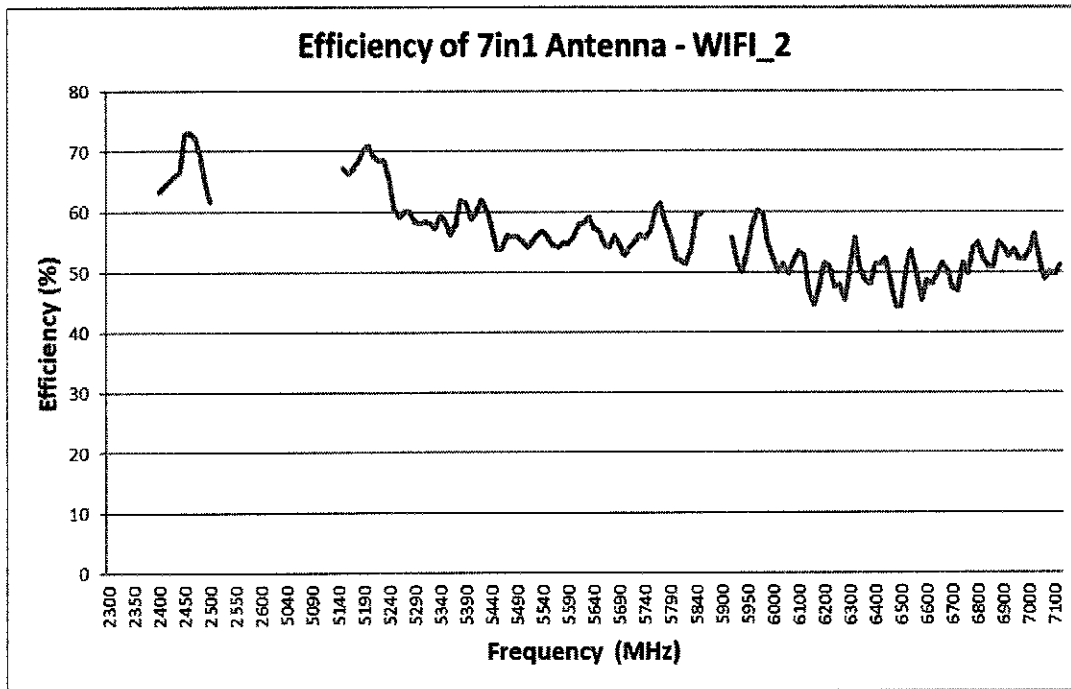
Pic27. Efficiency of LTE/5G_MIMO2 Antenna

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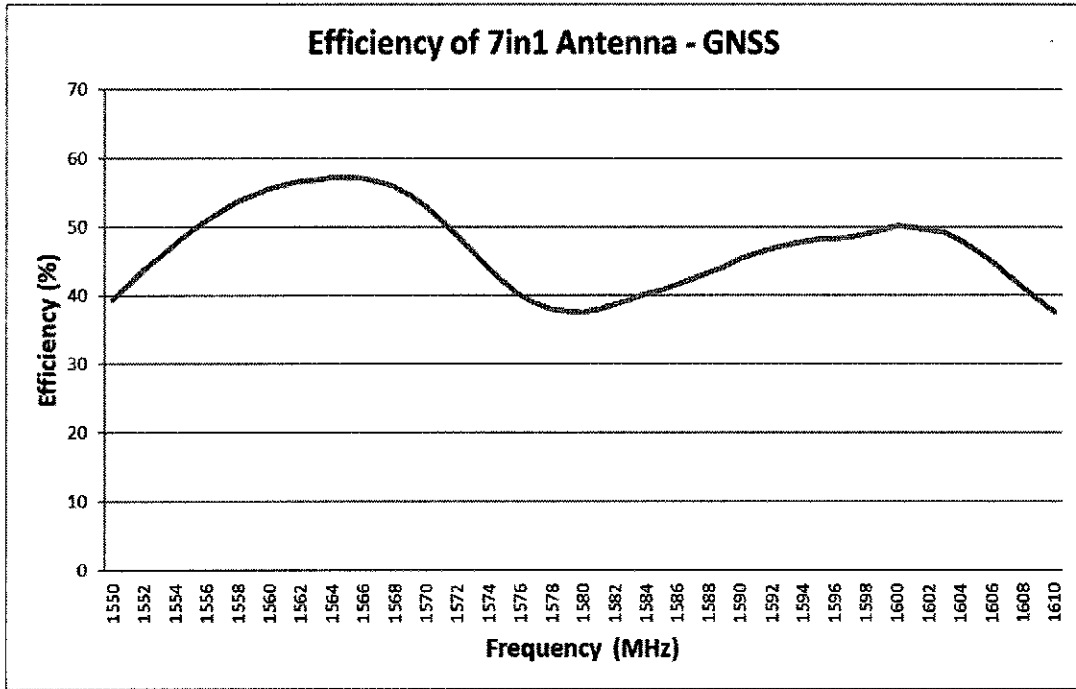
Pic28. Efficiency of WIFI_1 Antenna



Pic29. Efficiency of WIFI_2 Antenna

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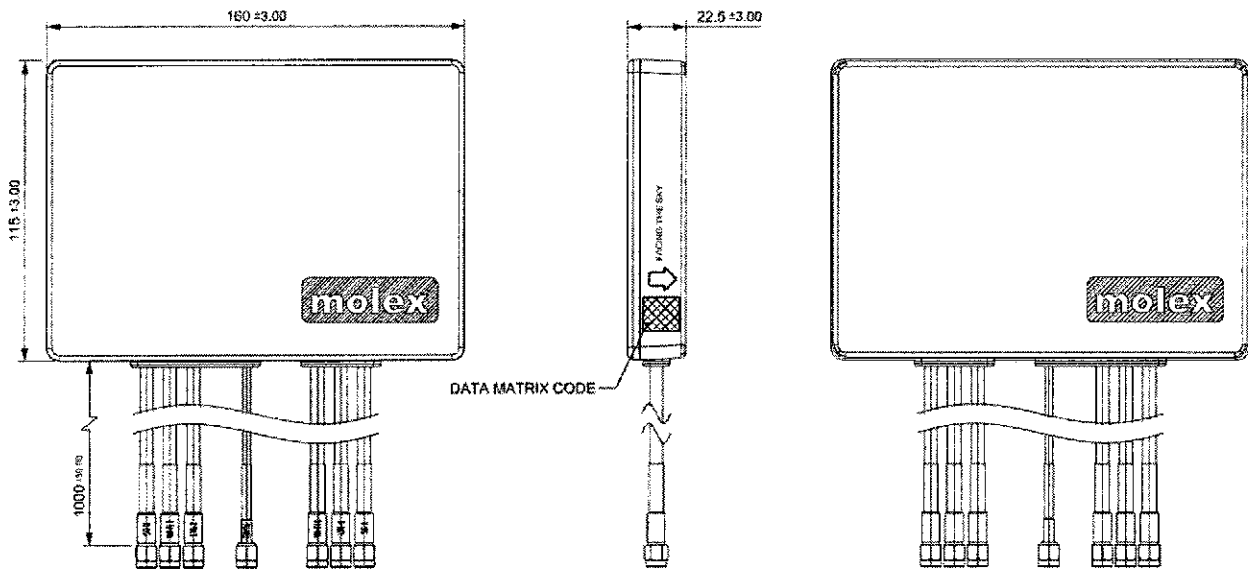


Pic30. Efficiency of GNSS Antenna

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4 Drawing



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