

Antenna for Unmanned System

LTE / GNSS / Sub6G / MIMO

Antenna Div.

2021.9.25

AMO
A M O T E C H

Applications

- Unmanned autonomous delivery robot
- Unmanned delivery drone
- Smart Agricultural machine(Tractor)
- Smart Construction machinery(Excavator, Dump truck)
- Unmanned lawnmower robot



Antenna Solution (External)

RTK LTE Antenna

Mount : Screw
P/N. ACA556022-S0-A1

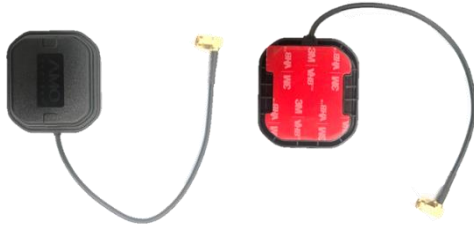


Low Profile
 (60x55x22mm)

High Performance
on metal plate

- ✓ There are Dia. 4.5mm x 2ea hole in housing.
- ✓ Please use the screw 2ea to fix it.

Mount : Adhesive tape
P/N. ACA556022-S0-A2



Frequency : 699~960MHz, 1427~3800MHz

Band :

- B1/B2/B3/B4/B5/B7/B8/B10
- B11/B12/B13/B14/B17/B18/B19
- B20/B21/B22/B24/B25/B26/B28/B29
- B33/B34/B35/B36/B37/B38/B39
- B40/B41/B42/B43/B44/B66/B67/B68/B69/B70

Waterproof : IP67



GNSS Multi-band Antenna



Patent

Small size
 (60x55x22mm)

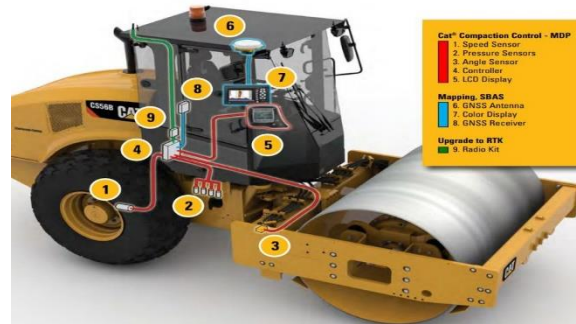
- ✓ There are Dia. 4.5mm x 2ea hole in housing.
- ✓ Please use the screw 2ea to fix it.

P/N. AGA556022-S0 Series

Band :

- ✓ GNSS L1/L2/E5b : AGA556022-S0-A14
- ✓ GNSS L1/L5/E5b : AGA5560SS-S0-A17
- ✓ GNSS L1/L2/L5 : AGA5560SS-S0-A19
- ✓ GNSS L1/L2/L6 : AGA5560SS-S0-A16
- ✓ GNSS L1/L2/E5b/RTK L Band
 AGA5560SS-S0-TBD

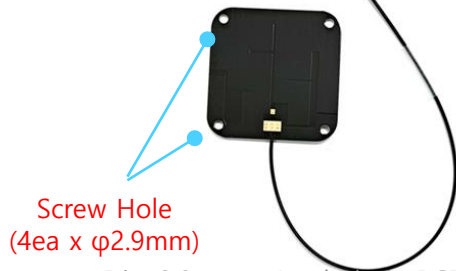
Waterproof : IP67



Antenna Solution (Embedded)

RTK LTE Antenna

Mount : Screw
P/N. AMMAL030U200



- ✓ There are Dia. 2.9mm x 4ea hole in PCB.
- ✓ Please use the screw 4ea to fix it.

Frequency : 699~960MHz, 1427~3800MHz

Band :

B1/B2/B3/B4/B5/B7/B8/B10

B11/B12/B13/B14/B17/B18/B19

B20/B21/B22/B24/B25/B26/B28/B29

B33/B34/B35/B36/B37/B38/B39

B40/B41/B42/B43/B44/B66/B67/B68/B69/B70



GNSS Multi-band Antenna



- ✓ There are Dia. 2.9mm x 4ea hole in PCB.
- ✓ Please use the screw 4ea to fix it.

P/N. AGA424214 Series
(43x43x16mm)

Band :

- ✓ GNSS L1/L2/E5b : AGA424214-S0-A1
- ✓ GNSS L1/L5 : AGA424214-S0-A2
- ✓ GNSS L1/L2/L5 : AGA424214-S0-A8
- ✓ GNSS L1/L2/L6 : AGA424214-S0-A9
- ✓ GNSS L1/L2/E5b/Inmarsat : AGA424214-S0-A7

P/N. AGA424208 Series
(43x43x11mm, Slim type)

Band :

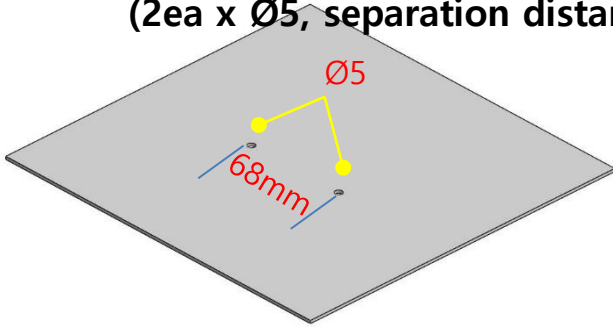
- ✓ GNSS L1/L2/E5b : AGA424208-S0-A1
- ✓ GNSS L1/L5 : AGA424208-S0-A2



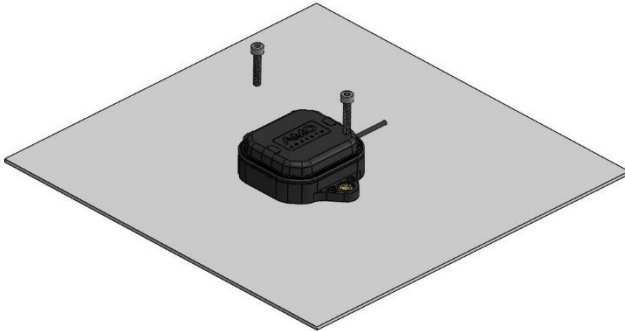
*The distance between antenna and GND plane is not less than 6mm

RTK LTE/GNSS Application note

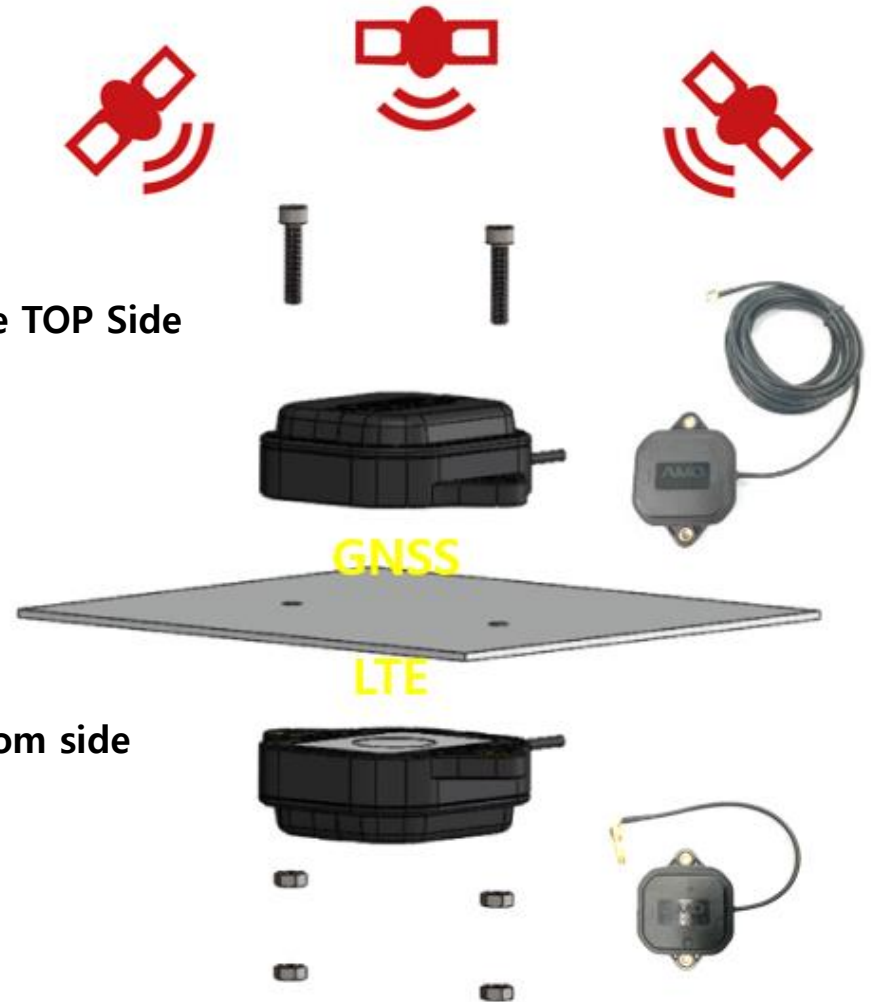
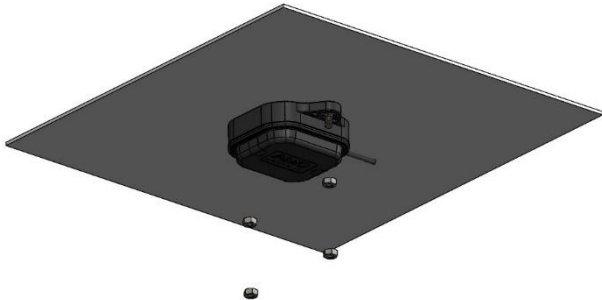
- Step. 1 Create 2ea screw holes to fix external antenna on the plate (2ea x $\text{Ø}5$, separation distance 68mm)



- Step. 2 Attach the **GNSS external antenna** on the TOP Side

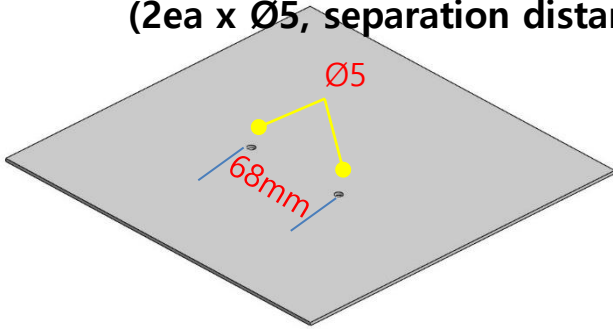


- Step. 3 And, attach the **LTE antenna** on the bottom side

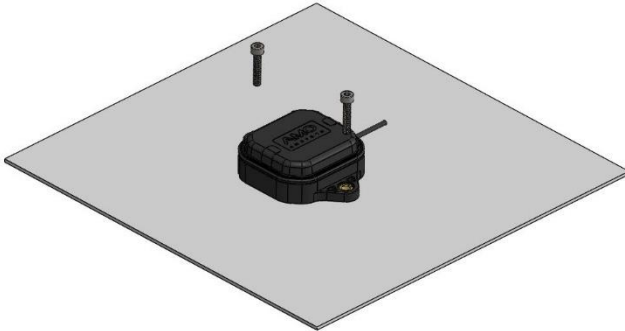


LTE MIMO Antenna Guide

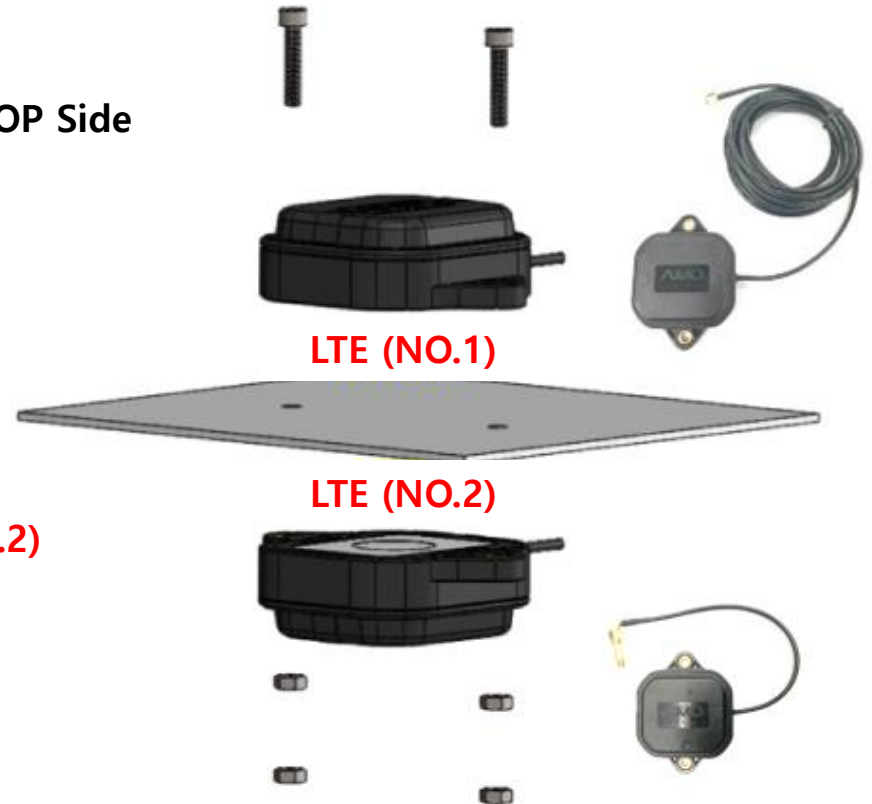
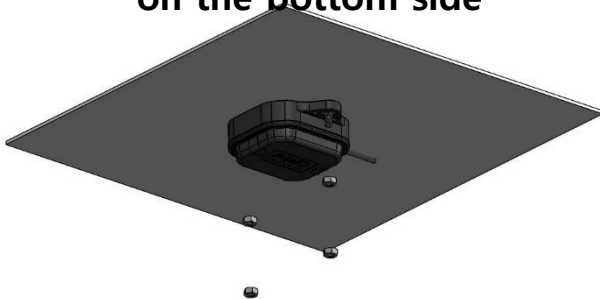
- Step. 1 Create 2ea screw holes to fix external antenna on the plate (2ea x $\text{Ø}5$, separation distance 68mm)



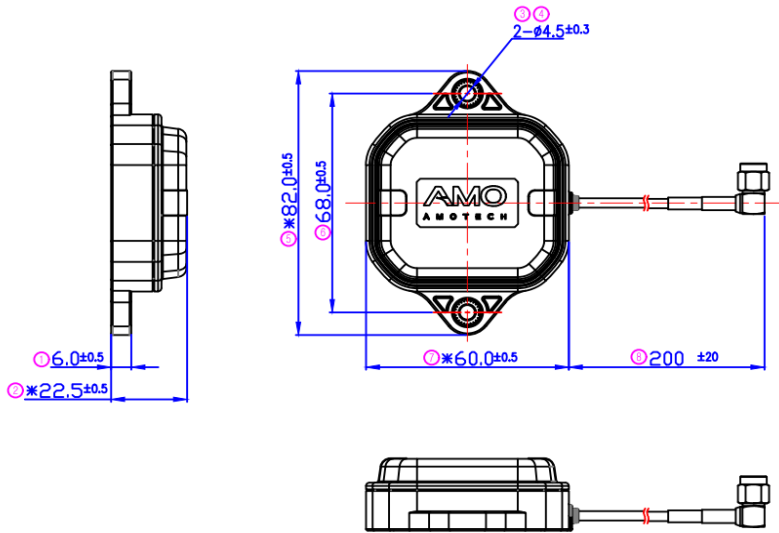
- Step. 2 Attach the **LTE antenna(NO.1)** on the TOP Side



- Step. 3 And, attach the other **LTE antenna(NO.2)** on the bottom side

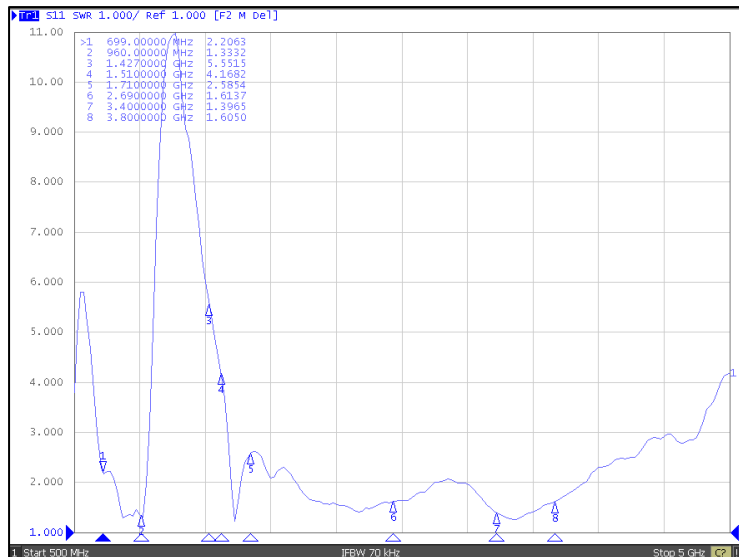


LTE / Sub6G External Antenna



- P/N. ACA556022-S0-A1
- 80x60x22.52mm
- 699~5000MHz
- RG174 200mm/ SMA(RA,M)

VSWR



ITEM	LTE12	LTE17	LTE20	LTE5	LTE8	LTE11
Frequency [MHz]	699~716 729~746	704~716 734~746	791~821 832~862	824~849 869~894	880~915 925~960	1427.9~1447.9 1475.9~1495.9
Peak Gain[dBi]	4.88	4.11	4.10	4.07	4.32	1.22
Eff.[%] @Avg.	65	67	53	54	67	45
ITEM	LTE21	LTE3	LTE2	LTE1	LTE4	LTE23
Frequency [MHz]	1447.9~1462.9 1495.9~1510.9	1710~1785 1805~1880	1850~1910 1930~1990	1920~1980 2110~2170	1710~1755 2110~2155	2000~2020 2180~2200
Peak Gain[dBi]	1.57	3.98	3.78	3.84	3.86	4.30
Eff.[%] @Avg.	48	62	71	76	69	79
ITEM	LTE40	LTE7	LTE42	LTE43	N77	N79
Frequency [MHz]	2300~2400	2500~2570 2620~2690	3400~3600	3600~3800	3300~4200	4400~5000
Peak Gain[dBi]	3.82	4.17	5.00	5.00	4.65	3.41
Eff.[%] @Avg.	70	70	74	70	64	49

2 in 1 RTK GNSS/LTE Antenna(External)



- P/N. ACGA1028425-S0-A1
- Dimension : 102x84x25mm (Main Body 80x80x25mm)
- LTE : 699~5,000MHz
- GNSS L1/L2/E5b(L1,G1,B1,L2,E5b)
- Waterproof : IP67
- SMA (RA,M) / I.5D 200mm














- P/N. ACGA1028425-S0-A2
- Dimension : 102x84x25mm (Main Body 80x80x25mm)
- LTE : 699~5,000MHz
- GNSS L1/L5/E5b (L1,G1,B1,L5,E5b)
- Waterproof : IP67
- SMA (RA,M) / I.5D 200mm

2 in 1 LTE(Sub6G) 2X2 MIMO Antenna(External)


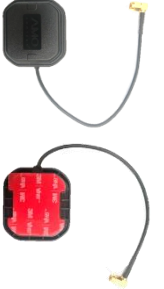

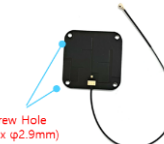


- P/N. ACA1028425-S0-A1
- Dimension : 102x84x25mm (Main Body 80x80x25mm)
- LTE : 699~3800MHz
- Waterproof : IP67
- SMA (RA,M) / I.5D 200mm

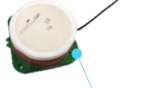




Cable & Connector Guide

Cable	Connector		Temp.	Remark
Dia.1.13mm Coaxial Cable (Color Black)	U.FL		-40~85°C	Need to change the Bushing for waterproof.
	MHF with lock		-40~85°C	
	SMA(Male/ST)		-40~85°C	
	SMA(Male/RA)		-40~85°C	
RG174 (Dia.2.9mm) (Color Black)	SMA(Male/ST)		-40~85°C	MP
	SMA(Male/RA)		-40~85°C	
	SMB(Female/ST)		-40~85°C	
	MCX(Male/ST)		-40~85°C	
	MCX(Male/RA)		-40~85°C	
	FAKRA Female RA		-40~85°C	
1.5D (Dia.2.9mm) (Color Black)	FAKRA Female RA		-40~105°C	Need to change the Bushing for waterproof.
	SMA(Male/ST)		-40~105°C	
	SMA(Male/RA)		-40~105°C	


Standard Product List (LTE/Sub6G)

Application	External/ Embedded	Product picture	AMOTECH Part	Only main body t[g] (Without cable & connector)	weight Including cable[g]	Cable Connector	Dimension [mm]	Remark
LTE+Sub6G 699~3800M	External (Mount Screw)		ACA556022-S0-A1	32g	40g	SMA (M,RA) RG174 L=200mm	60x55x22mm	Low profile On metal ground
LTE+Sub6G 699~3800M	External (Mount adhesive tape)		ACA556022-S0-A2	30g	38g	SMA (M,RA) RG174 L=355mm	60x55x22mm	Low profile On metal ground
LTE+Sub6G 699~3800M	External (Mount adhesive tape)		ACAD6623-S0-A1	-	-	Fakra D-FM RG178, 355.6mm	Dia.66.5-22.5 mm	Screw Type, Low profile On metal ground
LTE+Sub6G 699~3800M	Embedded (Mount Screw)		AMMAL030U200	-	4.7g	U.FL Dia.1.13mm L=200mm	43x43x1.0mm	Between antenna and ground plane : Min. 6mm



Standard Product List(GNSS Multi band)

Application	External/Embedded	Product picture	AMOTECH Part	Only main body t[g] (Without cable & connector)	weight including cable[g]	Cable Connector	Dimension [mm]	Remark
GNSS L1/L2/E5b Multi band	Embedded	<p>Slim / Lightweight</p>  <p>Screw Hole (4ea x φ2.9mm)</p>	AGA424208-S0-A1	39g	40g	U.FL Dia.1.13mm L=100mm	43x43x11mm	Lightweight (Drone)
GNSS L1/L2/E5b Multi band	Embedded	 <p>Screw Hole (4ea x φ2.9mm)</p>	AGA424214-S0-A1	74g	75g	U.FL Dia.1.13mm L=100mm	43x43x16mm	High Performance
GNSS L1/L2/E5b Multi band	External		AGA556022-S0-A30 (424208 사용)	62.5g	70g	SMA (M,RA) RG174 L=200mm	60x55x22mm	Lightweight
GNSS L1/L2/E5b Multi band	External		AGA556022-S0-A23 (424214 사용)	97.5g	103g	SMA (M,RA) RG174 L=200mm	60x55x22mm	High Performance
GNSS L1/L2/E5b Multi band	External		AGA556022-S0-A14 (424214 사용)	97.5g	170g	SMA (M,ST) RG174 L=5,000mm	60x55x22mm	High Performance

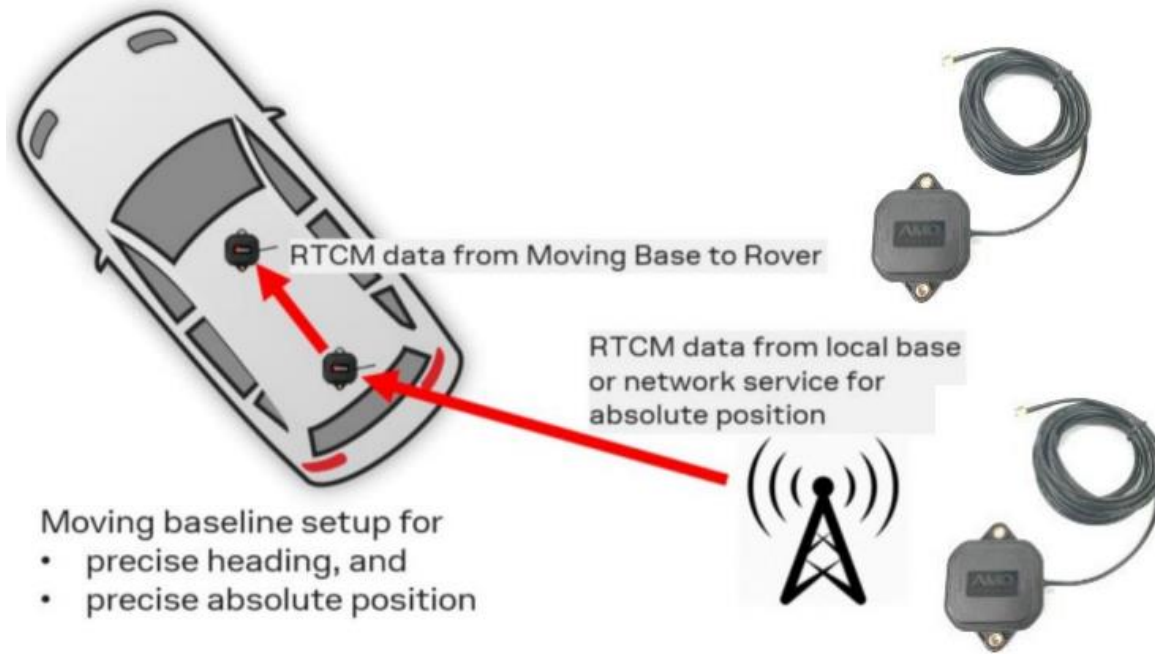
Standard Product List(GNSS Multi band, Embedded)

Type	Part Number	Size (mm)	Frequency (MHz)	LNA gain (dB)	NF (dB)	Current (mA)	Cable(mm) / Connector
 Embedded	AGA424208-S0-A1 (ASPA-A36A)	D.42-11T	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ=1.13, L=100 / ECT 818000089 (U.FL compatible)
	AGA424208-S0-A2 (AGGA42K42-34-L1L5-D150)		L1/L5	Typ. 28	Typ. 2.8/4.5	Typ. 15 @ 5V	Φ=1.13, L=100 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A1 (ASPA-A28A)	D.42-16T	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ=1.13, L=100 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A3 (ASPA-A28A)		L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ=1.13, L=41 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A4 (ASPA-A28A)		L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	RG174 Φ2.8 mm L=200 mm / Fakra-C (F,RA)
	AGA424214-S0-A6 (ASPA-A28A)		L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ=1.13, L=60 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A2 (ASPA-A65A)		L1/L5	Typ. 28	Typ. 2.8/4.5	Typ. 15 @ 5V	Φ=1.13, L=100 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A8 (ASPA-A68A)		L1/L2/L5	Typ. 28	Typ. 1.4	Typ. 15 @ 5V	Φ=1.13, L=100 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A9 (AGGA42K42-48-L1L2L6-JRC1)		L1/L2/L6	Typ. 28	Typ.2.5	Typ. 15 @ 5V	Φ=1.13, L=100 / ECT 818000089 (U.FL compatible)
	AGA424214-S0-A11 (AGGA42K42-48-INL1L2-ZIP1)		L1/L2/E5b/ Inmarsat(L)	Typ. 28	Typ.2.5	Typ. 15 @ 5V	RG174 Φ2.8 mm L=200 mm / SMA (M,ST)

Standard Product List(GNSS Multi band, External)

Type	Part No.	Size (mm)	Frequency (MHz)	LNA gain (dB)	NF (dB)	Current (mA)	Cable(mm)_RG174 / Connector
 External	AGA556022-S0-A14	55x60x22.5 (Dia.42-4T/8T)	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ2.8, L=5,000 / SMA ST(M)
	AGA556022-S0-A30 Lightweight	55x60x22.5 (Dia.42-3T/4T)	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ2.8, L=200 / SMA RA (M) WO Magnetic
	AGA556022-S0-A23	55x60x22.5 (Dia.42-4T/8T)	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ2.8, L=200 / SMA RA WO Magnetic
	AGA556022-S0-A22	55x60x22.5 (Dia.42-4T/8T)	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	Φ2.8, L=1200 / SMA ST WO Magnetic
	AGA556022-S0-A17	55x60x22.5 (Dia.42-4T/8T)	L1/L5	Typ. 28	Typ. 2.8/4.5	Typ. 15 @ 5V	Φ2.8, L=5,000 / SMA ST(M)
	AGA556022-S0-A16	55x60x22.5 (Dia.42-4T/8T)	L1/L2/L6	Typ. 28	Typ.2.5	Typ. 15 @ 5V	Φ2.8, L=5,000 / SMA ST(M)
	AGA556022-S0-A19	55x60x22.5 (Dia.42-4T/8T)	L1/L2/L5	Typ. 28	Typ. 1.4	Typ. 15 @ 5V	Φ2.8, L=5,000 / SMA ST(M)
 AGAD6623-S0-A1 (Roof mount)	Dia.66.5-23.5 (Dia.42-4T/8T)	L1/L2/E5b	Typ. 28	Typ. 3.0	Typ. 15 @ 5V	TNC(FM) / SMA(FM)	

Use Case in Unmanned ground vehicle : Unmanned Taxi



“M” Unmanned Robot Taxi

- 2 GNSS L1/L5 Stacked Patch
- Dimension : 500x500mm
- ➔ ***Dia.42-4T/8T Stacked patch X 2 EA***

High-precision positioning measurement system

Customer Questions

*What is the positioning precision?
Can you satisfy the "30cm" positioning precision?*

We can measure the positioning accuracy of our antenna by using the ublox ZED F9P demo board.



**Ublox ZED F9P
Demo Board (EVK)**

