



AOS (Antenna Optimisation Service)

Customer: HardandSoftwerk

Project:

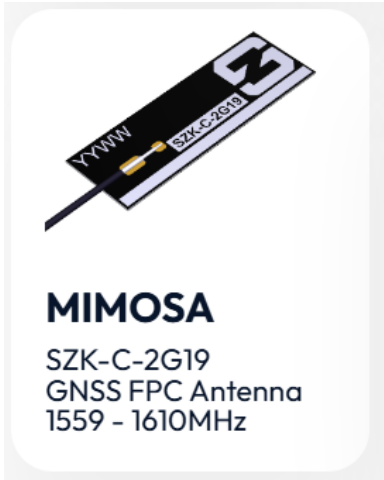
Report: SZ25-013-R01

31 MAR 2025



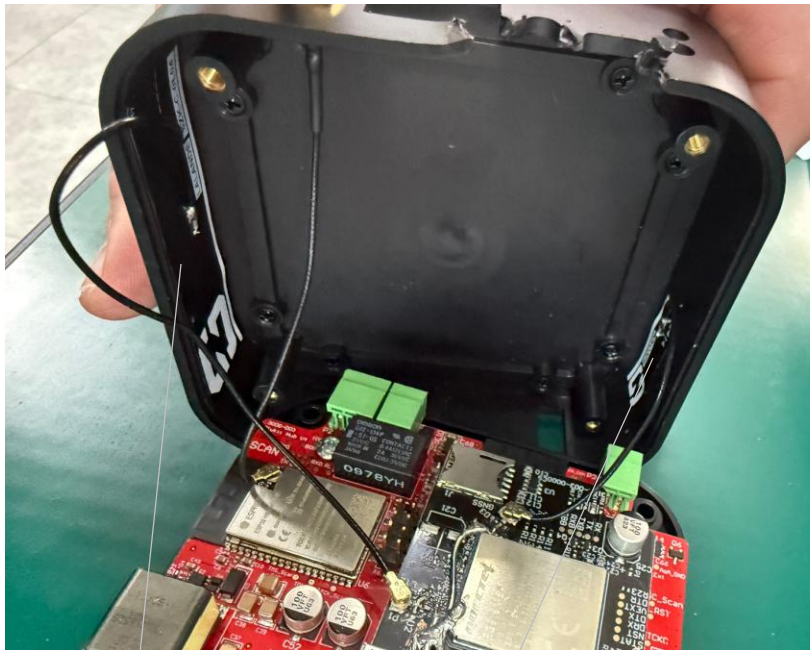
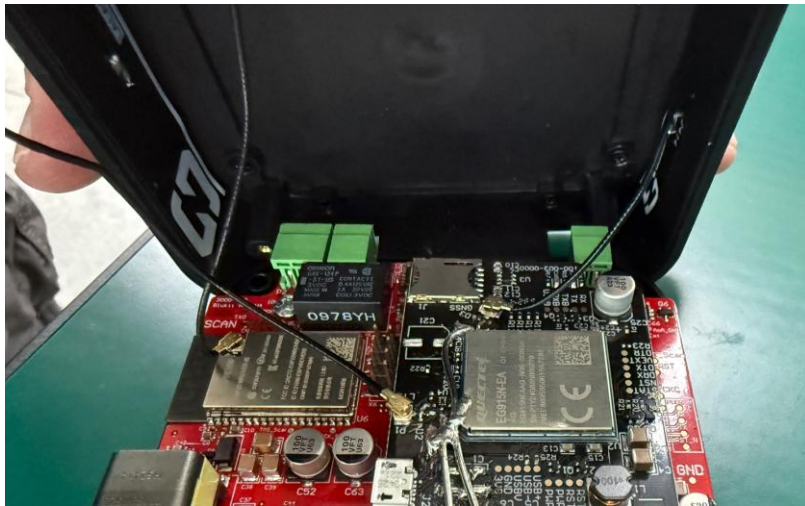
- The customer supplied a unit to tune the two FPC's.
- It was found that the PETRA2 FPC was not optimal. It was therefore decided to continue the tuning/testing with LALANDE FPC antenna.

Antenna Requirements		
Application	LTE	GNSS
Frequency Range (MHz)	698-960; 1710-2200; 2500-2690	1559-1609
Synzen Solution used	LALANDE (SZK-C-0L04-150-01)	MIMOSA (SZK-C-2G19-100-01)





- The PCBA was assembled as shown within the enclosure.
- Each FPC was placed as shown.
- The antenna was optimised for free space.



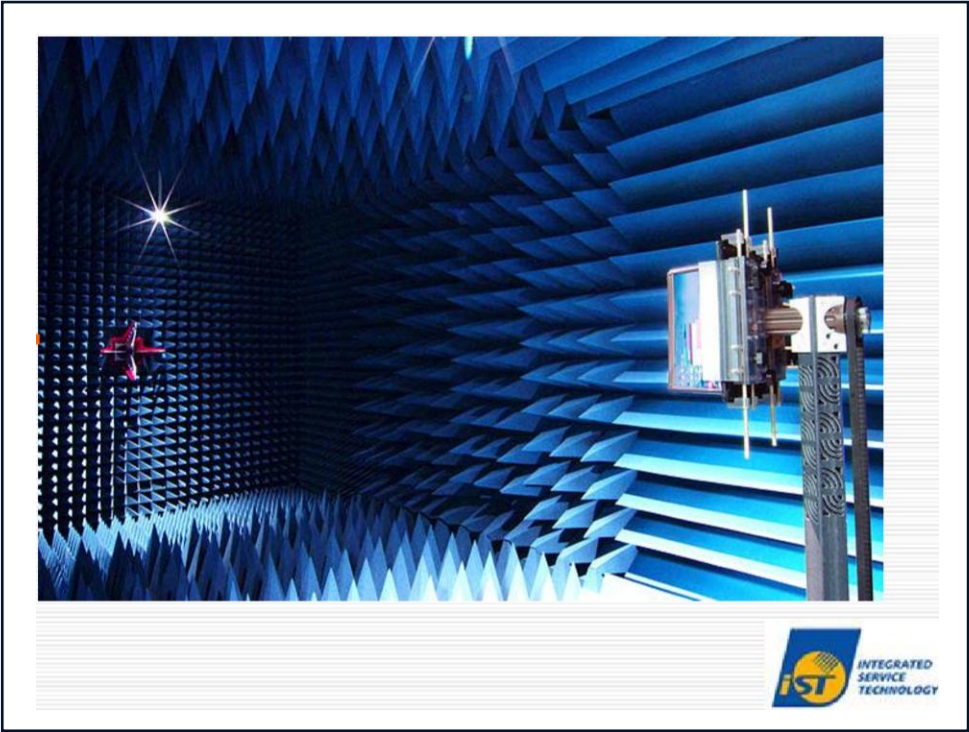
LALANDE

MIMOSA





Equipment	Model/Type	Calibration due date
Network Analyser	Rhode&Schwarz ZNB-8	01/2026
Calibration Kit	Rhode&Schwarz ZV-Z132	01/2026
Chamber	AMS-8500	CTIA Approved IST



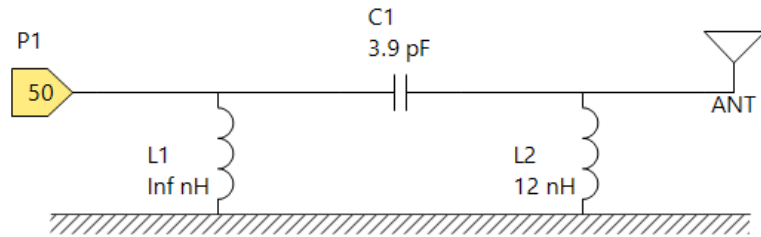


LTE			
Frequency Range (MHz)	698-960	1710-2200	2500-2690
Peak Efficiency (%)	32.7	51.1	38.4
Avg Efficiency (%)	26.3	30.5	32.5
Peak Gain (dBi)	-0.52	1.49	-0.45

GNSS	
Frequency Range (MHz)	1559-1609
Peak Efficiency (%)	28.3
Avg Efficiency (%)	23.8
Peak Gain (dBi)	-1.82

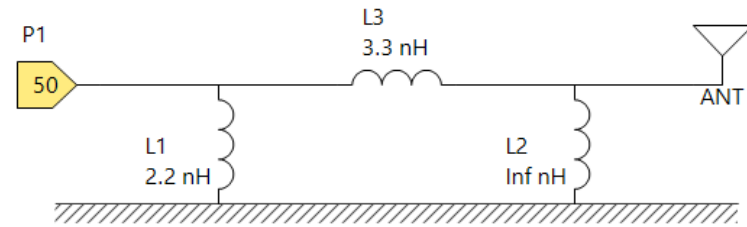


LTE

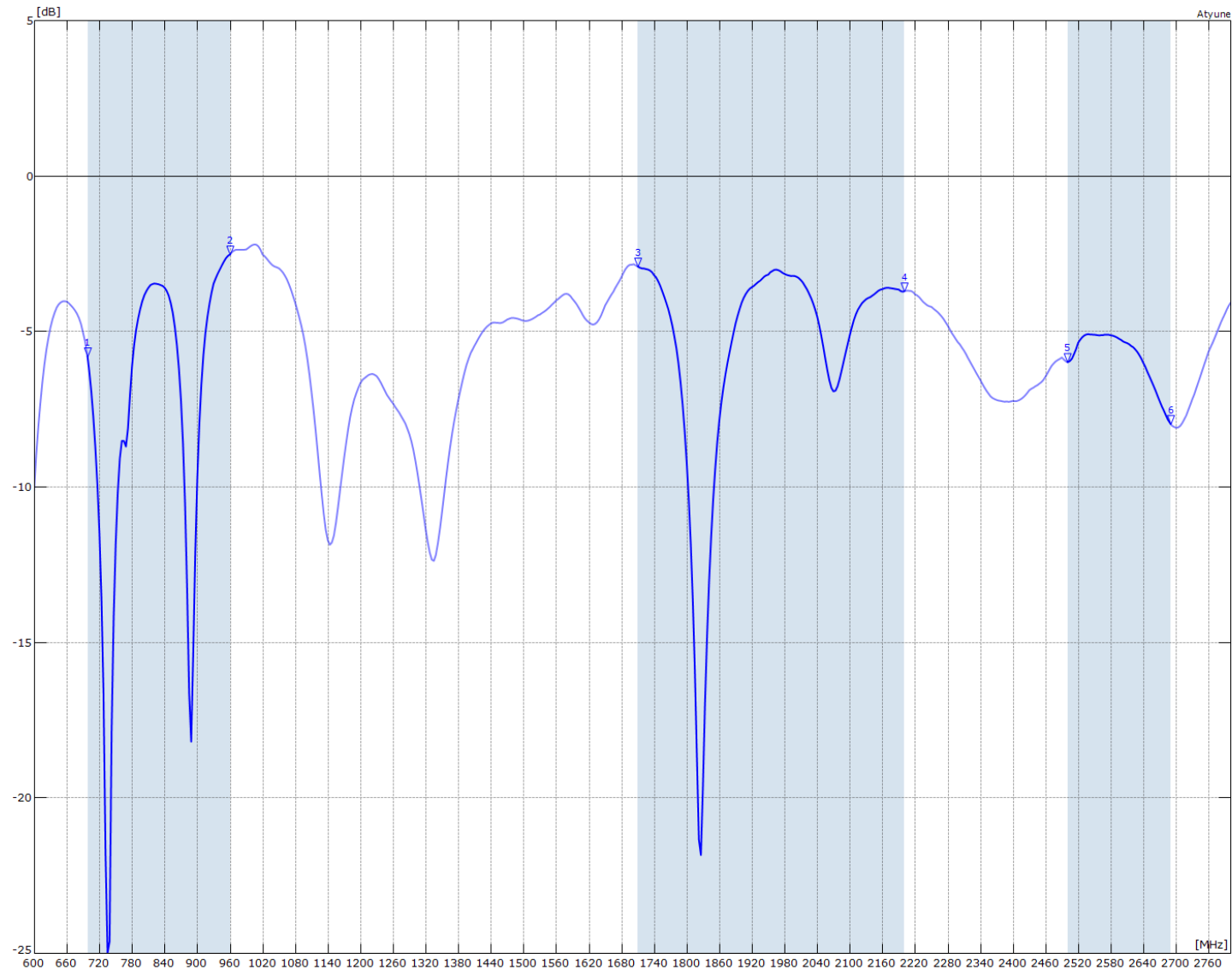


Designator	Type	Value	Size	MPN
L1	DNP	-	0402	Not fitted
C1	Capacitor	3.9pF	0402	GJM1555C1H3R9WB01D
C2	Inductor	12nH	0402	LQG15HS12NH02D

GNSS

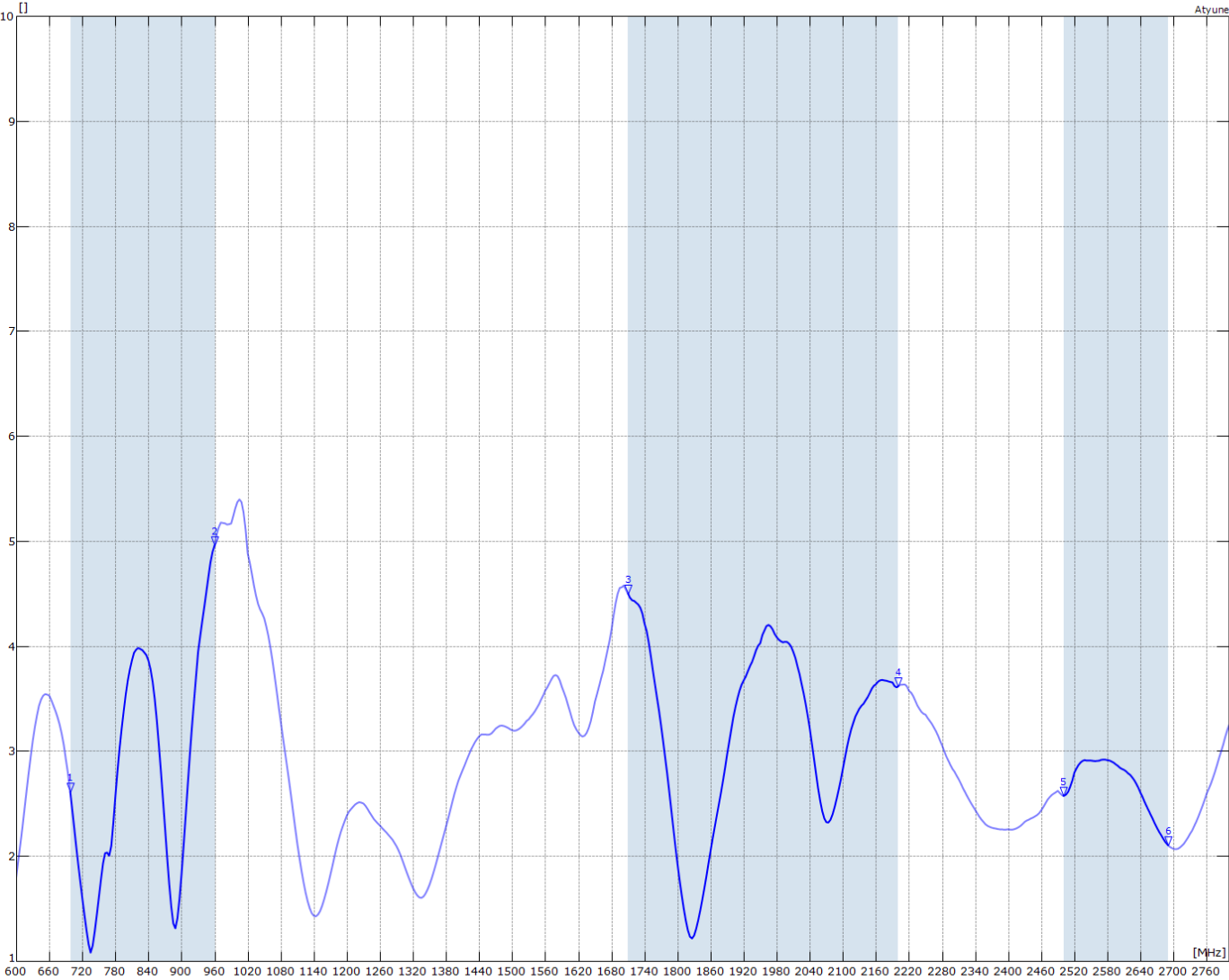


Designator	Type	Value	Size	MPN
L1	Inductor	2.2nH	0402	LQG15HS2N2C02D
L3	Inductor	3.3nH	0402	LQG15HS3N3C02D
L2	DNP	-	0402	Not Fitted



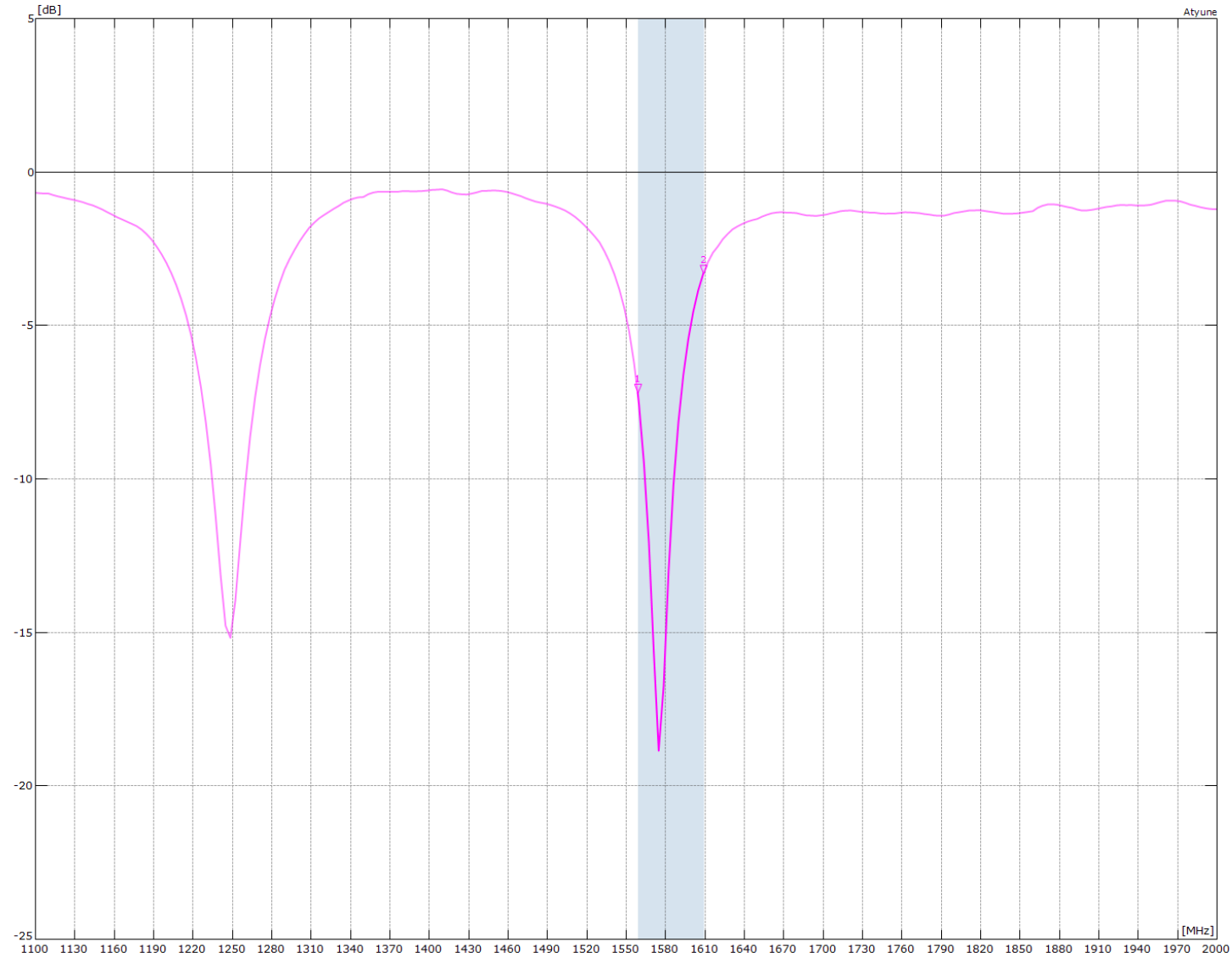
MARKERS:	MHz	dB	MHz	dB	MHz	dB
LALANDE+matched.s1p - S11						
	1: 698	-5.80	3: 1710	-2.92	5: 2500	-5.99
	2: 960	-2.54	4: 2200	-3.72	6: 2690	-7.98

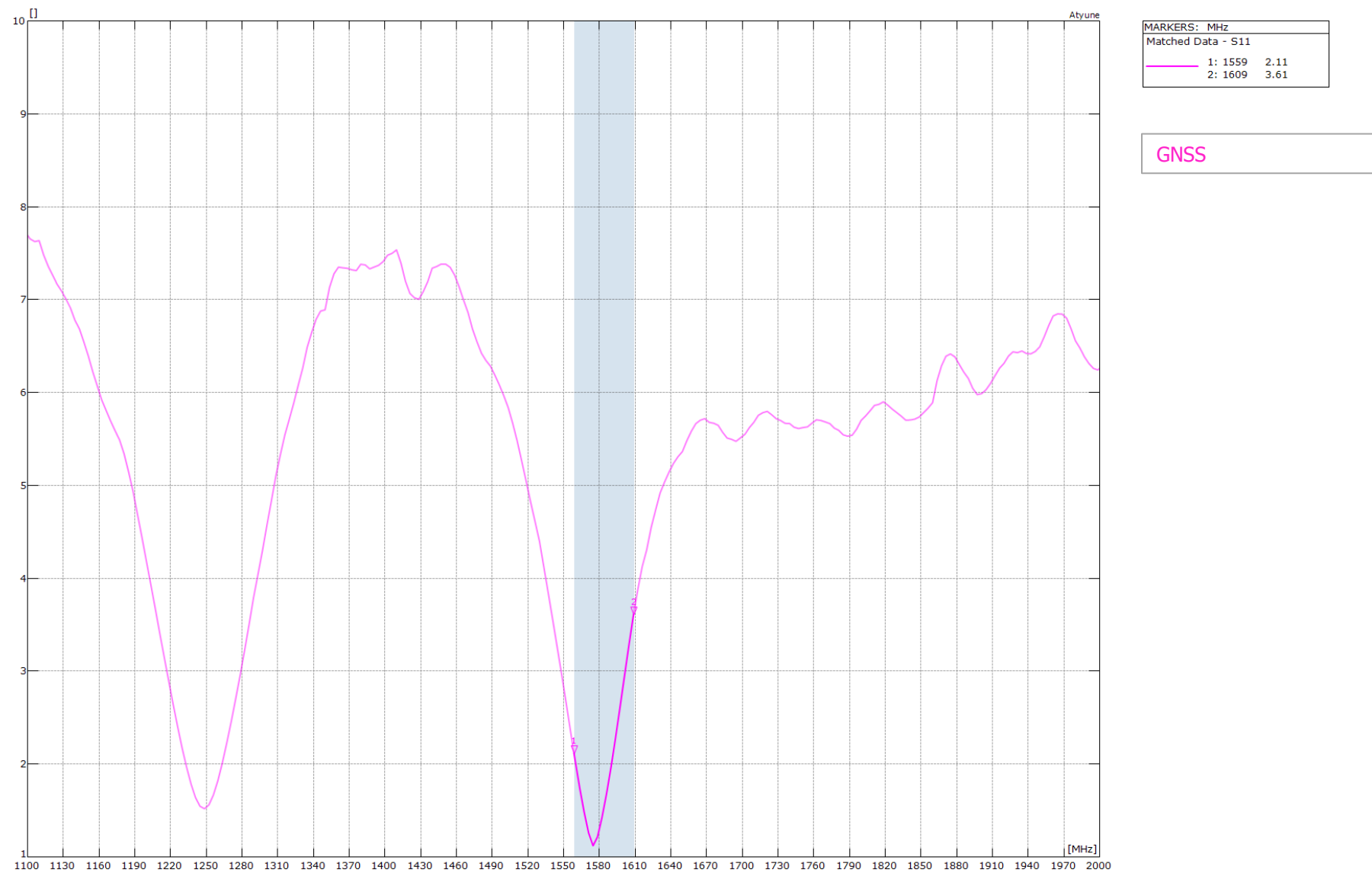
LTE



MARKERS: MHz		MHz		MHz		
Matched Data - S11						
	1: 698	2.61	3: 1710	4.50	5: 2500	2.57
	2: 960	4.96	4: 2200	3.62	6: 2690	2.10

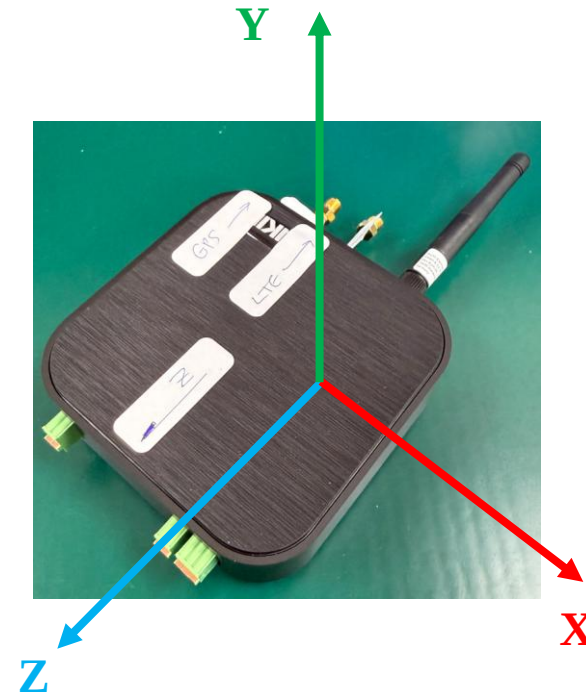
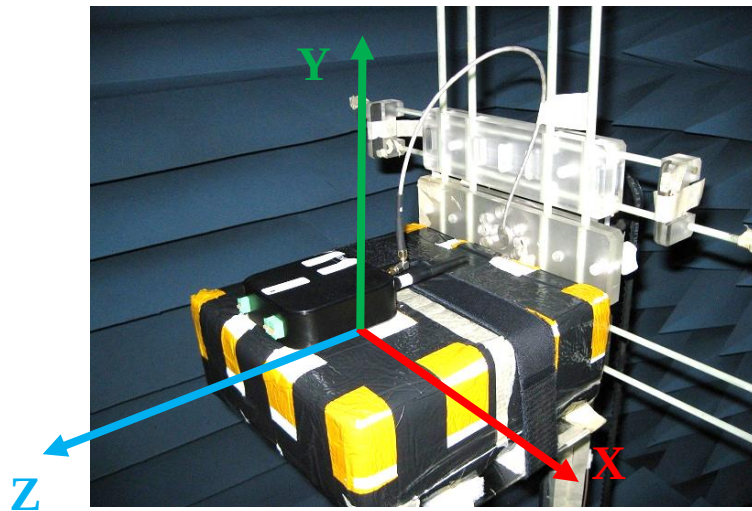
LTE

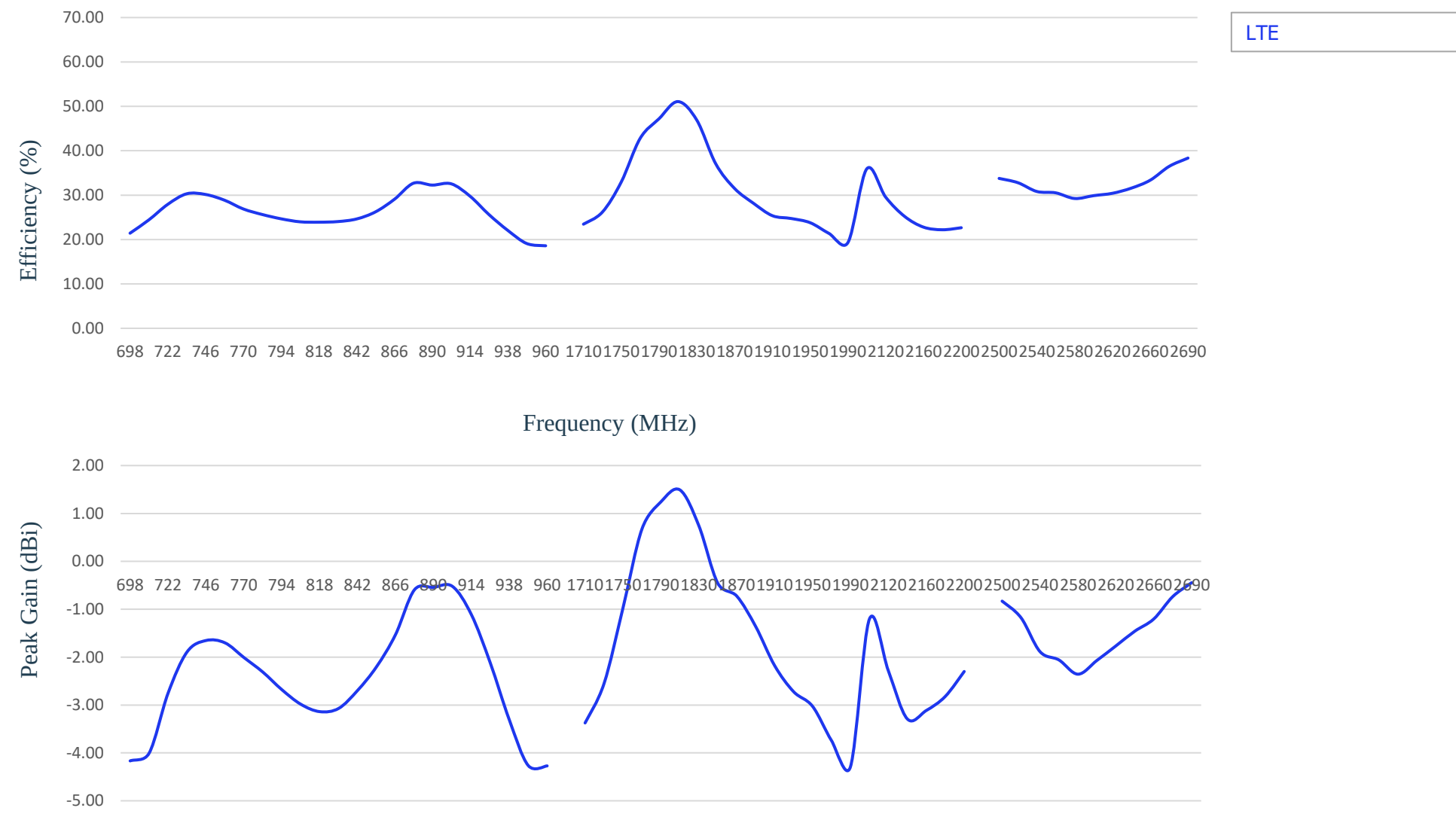


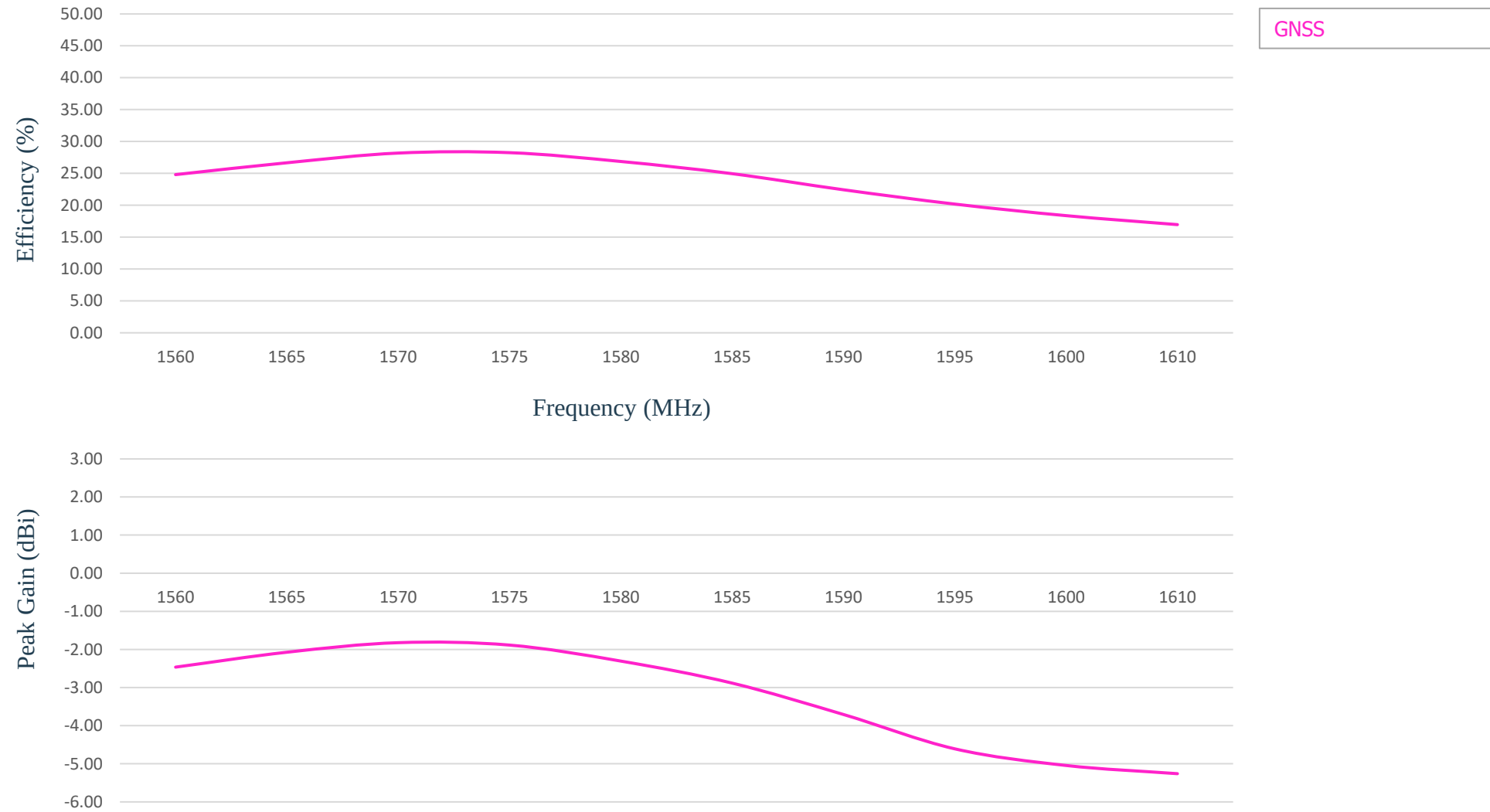


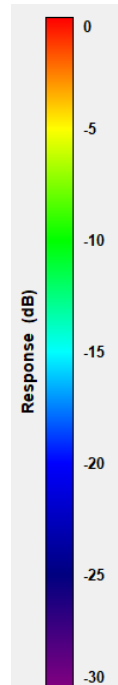
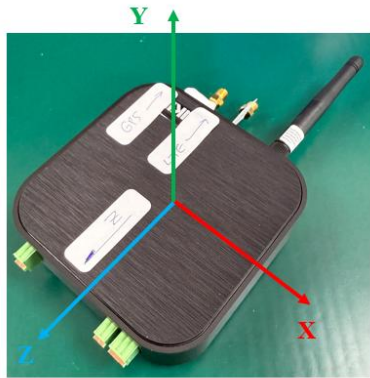


- The device was placed in the chamber as shown. The antenna under test used the required RF choke to prevent cable radiation which can give false high performance and incorrect radiation pattern data.





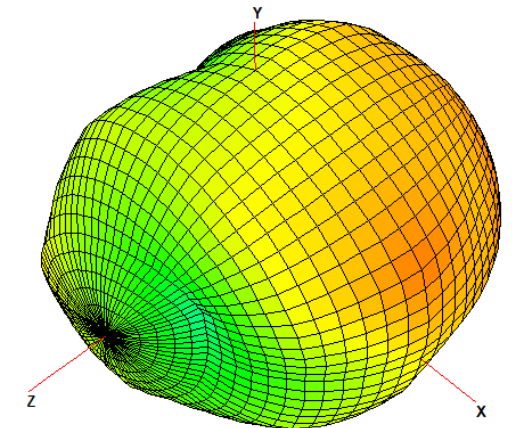
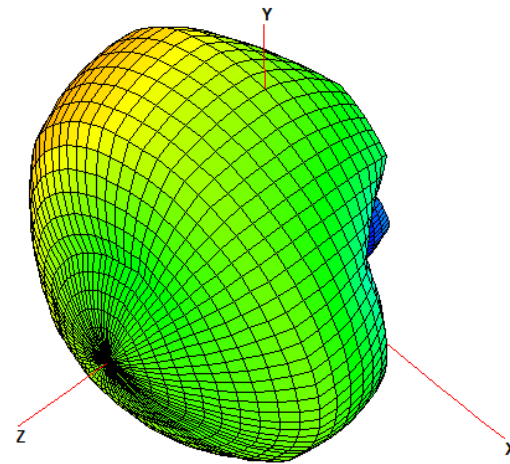


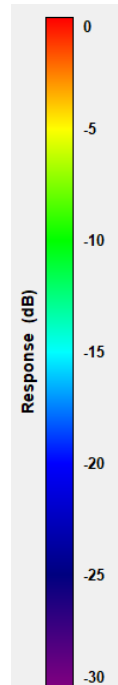
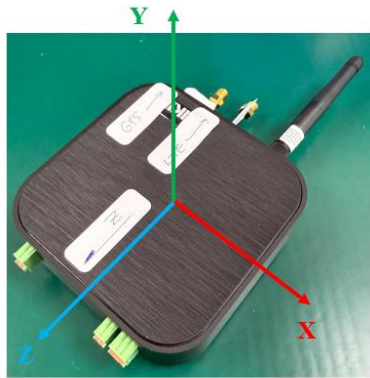


LTE

Pattern at 880MHz

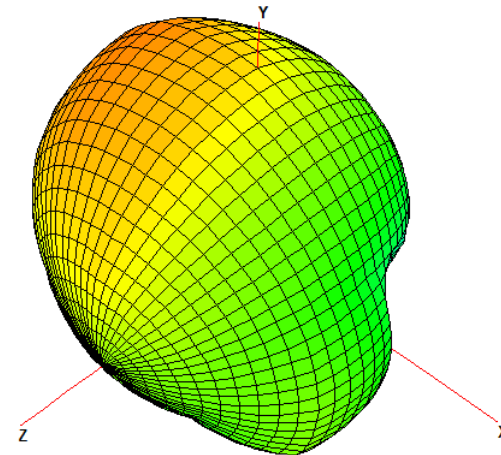
Pattern at 1880MHz





GNSS

Pattern at 1575MHz





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