Outpost [DVT]

Antenna test report

Manufacturer: Axon Enterprise Inc, 17800 N 85th St, Scottsdale, AZ 85255

Measured at: 2025.08.25 – 2025.11.05

Measurements done by: Dmytro Vasylenko, Radio Frequency Engineer
Ihor Kvachenok, Radio Frequency Engineer

SQUAD Ukraine, 2025

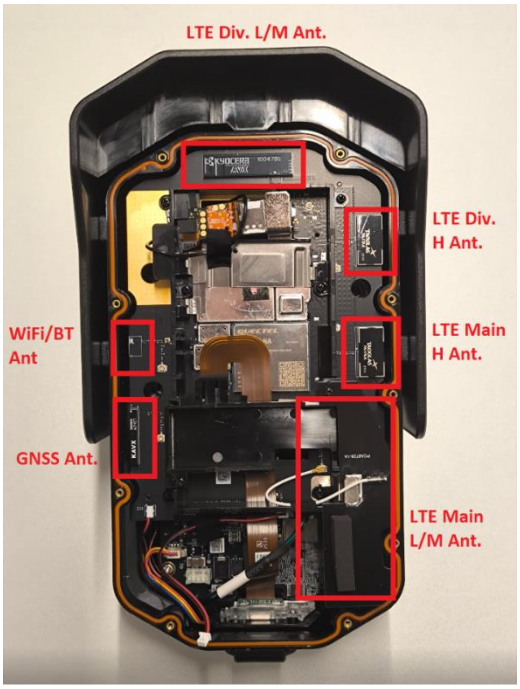
Measurement Information:

i. Devices was tested in a passive mode;
ii. Measurement carried out with batteries installed;
iii. For matching circuits Murata GJM03; GJM15 MLCC and LQP03TN; LQG15HS Chip Inductors are used;
iv. Measurement procedure
– TOSM calibration of VNA is carried out
– the Murata switch connector are unsoldering from the main board
– fixture compensation for prepared pigtails is carried out
– pigtails are soldered in place of Murata switch connectors
– during measurements, the pigtails of inactive antennas are loaded with 50 Ohm terminators.
v. For LTE TX/RX Main LB+MB antenna measurements done in active mode, peak gain and efficiency calculated from TRP and EIRP respectively
Peak Gain [dBi] = Peak EIRP - conducted power
Efficiency [dB] = TRP - conducted power

Measurement Equipment List:

– Rohde&Schwarz ZNLE6 VNA (Cal Kit ZV-Z135) [Cal. Date 2023.11.07]
– ETS-Lindgren AMS-8041 [OTA calibralion 2025.08.10]
– Agilent E5071C [Cal. Date 2024.04.23]
– Rohde&Schwarz CMW500
– EMQuest EMQ-100 Data Acquisition and Analysis Software

Antennas definition:



- LTE TX/RX Main LB+MB (B2, B4, B5, B12, B13, B14, B25, B26, B66)
- LTE TX/RX Main HB (B7, B30)
- LTE RX Diversity LB (B5, B12, B13, B14, B26)
- LTE RX Diversity MB+HB (B2, B4, B7, B25, B30, B66)
- GNSS, L1 band
- Dual band 2.4GHz & 5GHz Wi-Fi/BT/BLE

Passive maximum antenna peak gain summary table:

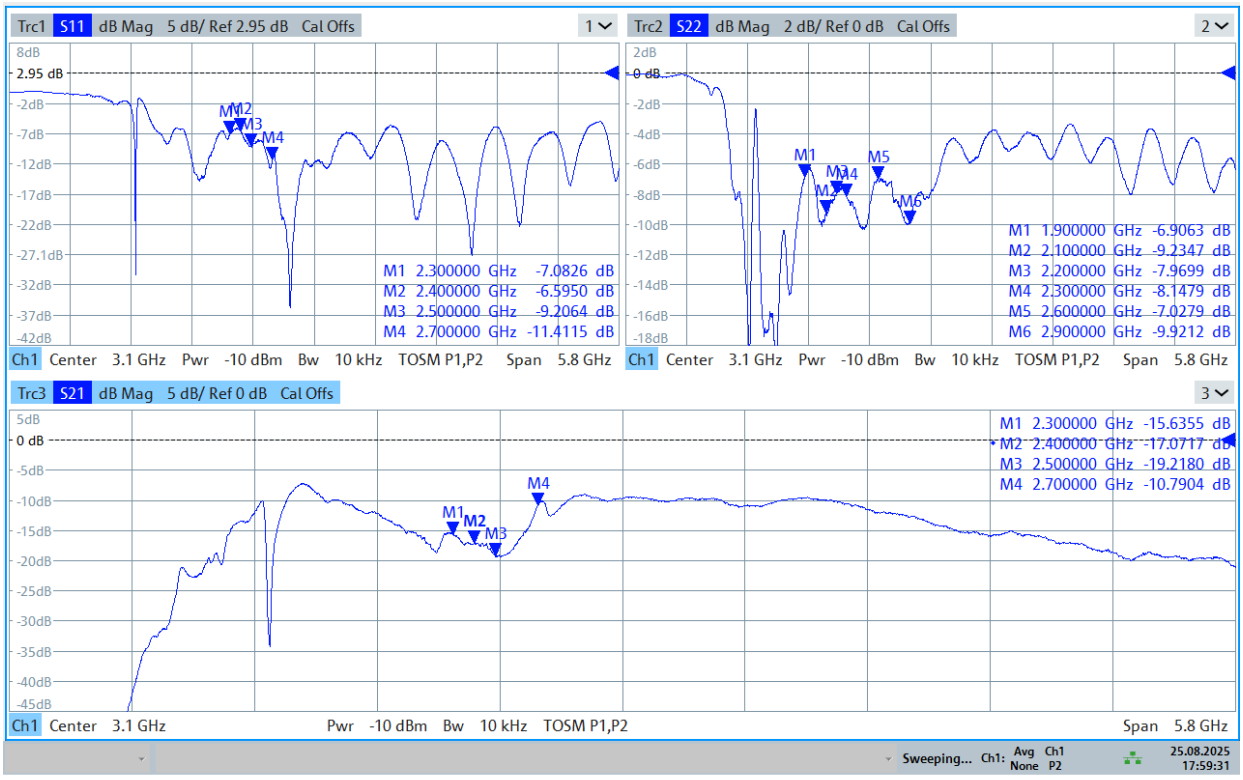
Band	Frequency, MHz	LTE TX/RX Main LB+MB	LTE TX/RX Main HB	Wi-Fi/BT/BLE
		Gain, dBi	Gain, dBi	Gain, dBi
Uplink (TX)				
B5	824 – 849	2.6		
B12	699 – 716	0.1		
B13	777 – 787	1.3		
B14	788 – 798	1.5		
B26	815 – 848	2.6		
B2	1850 – 1910	3.3		
B4	1710 – 1755	2.5		
B25	1850 – 1915	3.3		
B66	1710 – 1780	2.7		
B7	2500 – 2570		2.8	
B30	2305 – 2315		2.7	
1-11	2401 – 4273			4.2
36-48	5150 – 5250			3.3
52-64	5250 – 5350			3.3
100-144	5470 – 5725			3
149-165	5725 – 5850			2.9

Passive antennas radiation efficiency results summary table:

Band	Frequency, MHz	LTE TX/RX Main LB+MB	LTE RX Diversity LB	LTE TX/RX Main HB	LTE RX Diversity MB+HB	Wi-Fi/ BT/BLE	GNSS
		Efficiency, dB	Efficiency, dB	Efficiency, dB	Efficiency, dB	Efficiency, dB	Efficiency, dB
Downlink (RX)							
B5	869 – 894	-2.8	-6.8				
B12	729 – 746	-2.7	-2.7				
B13	746 – 756	-2.8	-3.3				
B14	758 – 768	-2.9	-3.9				
B26	859 – 894	-2.6	-6.8				
B2	1930 – 1990	-2.8			-4.3		
B4	2110 – 2155	-3.2			-3.1		
B25	1930 – 1995	-2.8			-3		
B66	2110 – 2200	-3.2			-3.1		
B7	2620 – 2690			-2.7	-4		
B30	2350 – 2360			-3.3	-2.4		
GNSS L1	1575						-5.6
Uplink (TX)							
B5	824 – 849	-2.9					
B12	699 – 716	-2.6					
B13	777 – 787	-3					
B14	788 – 798	-2.9					
B26	815 – 848	-2.5					
B2	1850 – 1910	-2.6					
B4	1710 – 1755	-3.1					
B25	1850 – 1915	-2.9					
B66	1710 – 1780	-3.1					
B7	2500 – 2570			-2.9			
B30	2305 – 2315			-3.6			
1 – 11	2401 – 2473					-3.5	
36 – 48	5150 – 5250					-3.7	
52 – 64	5250 – 5350					-3.3	
100 – 144	5470 – 5725					-3.4	
149 – 165	5725 – 5850					-3.6	

LTE TX/RX Main (HB) & LTE RX Diversity (MB+HB)

Port 1 (S11) related to **LTE TX/RX Main (HB)** and Port 2 (S22) related to **ANT3 LTE RX Diversity (MB+HB)**. Observed wide resonants with RL better than -6.9dB. Decided to go as is without optimization and fine tuning.



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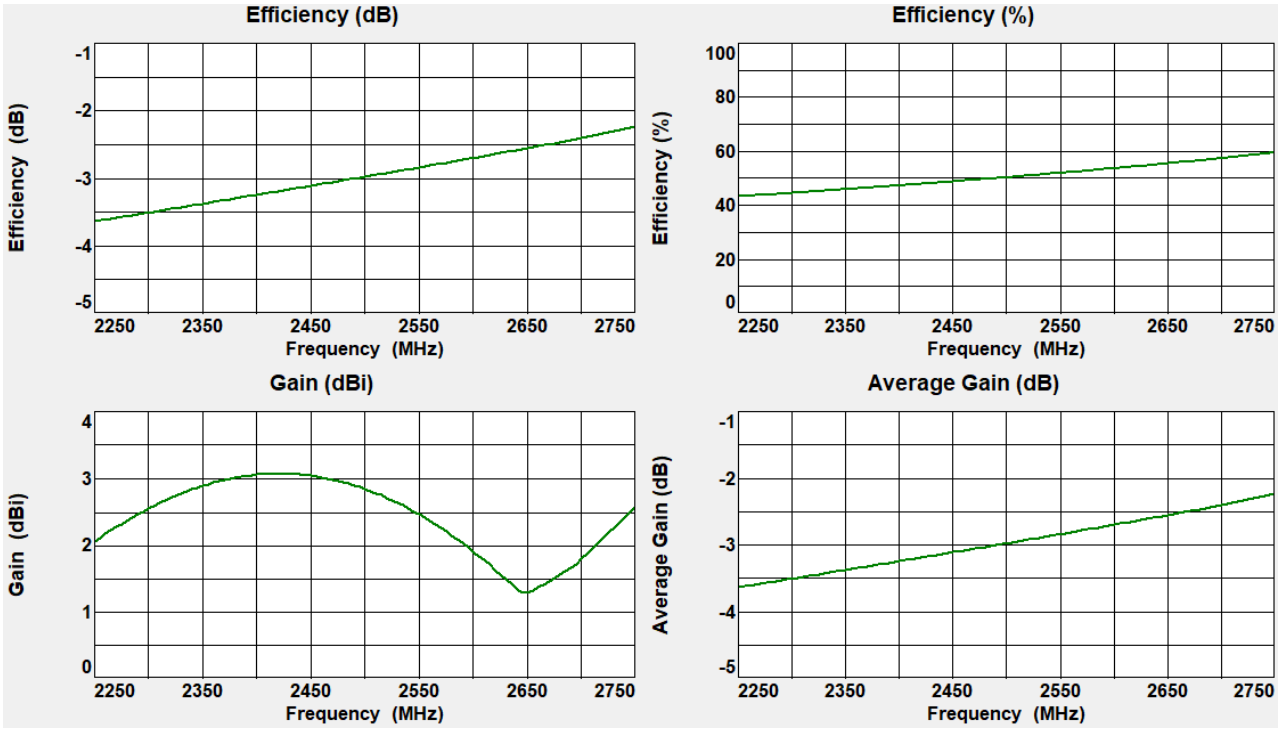
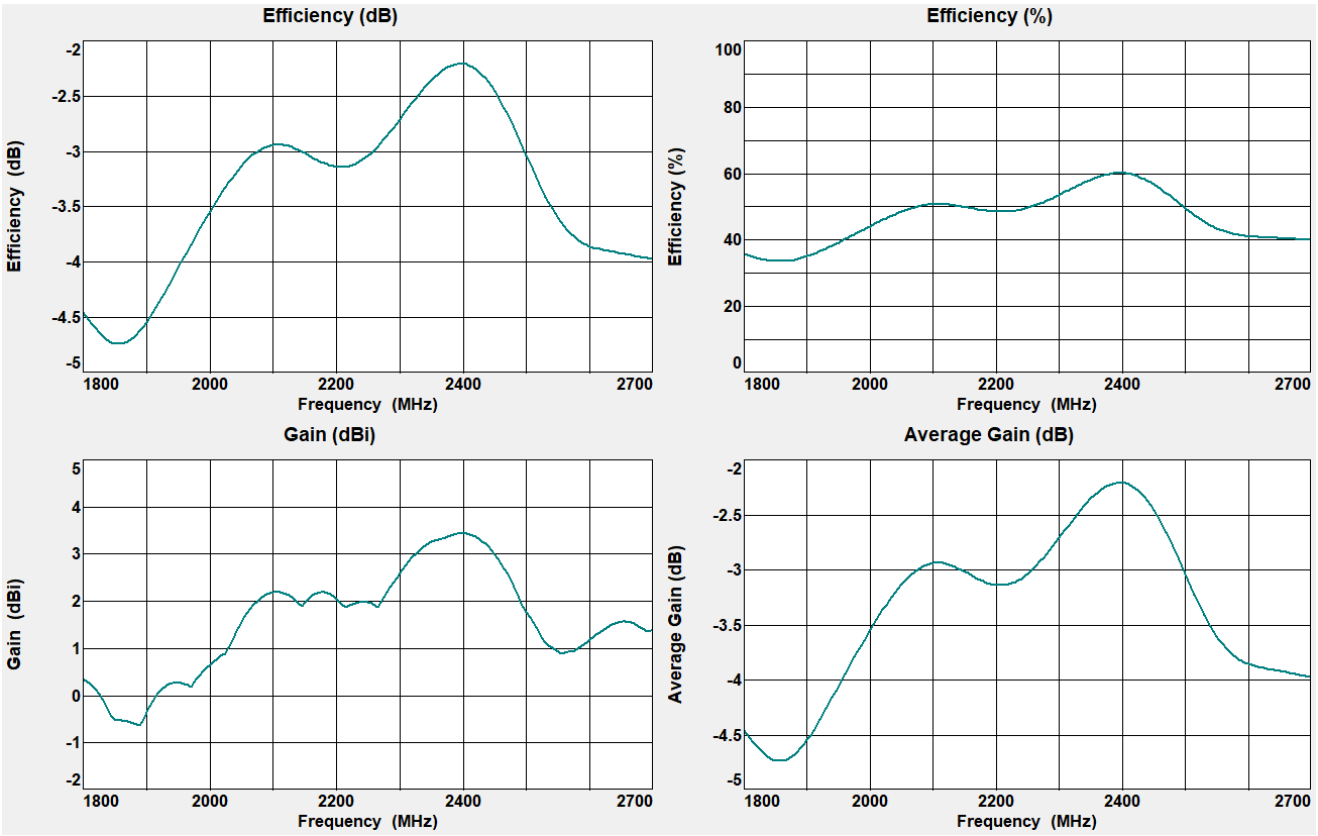
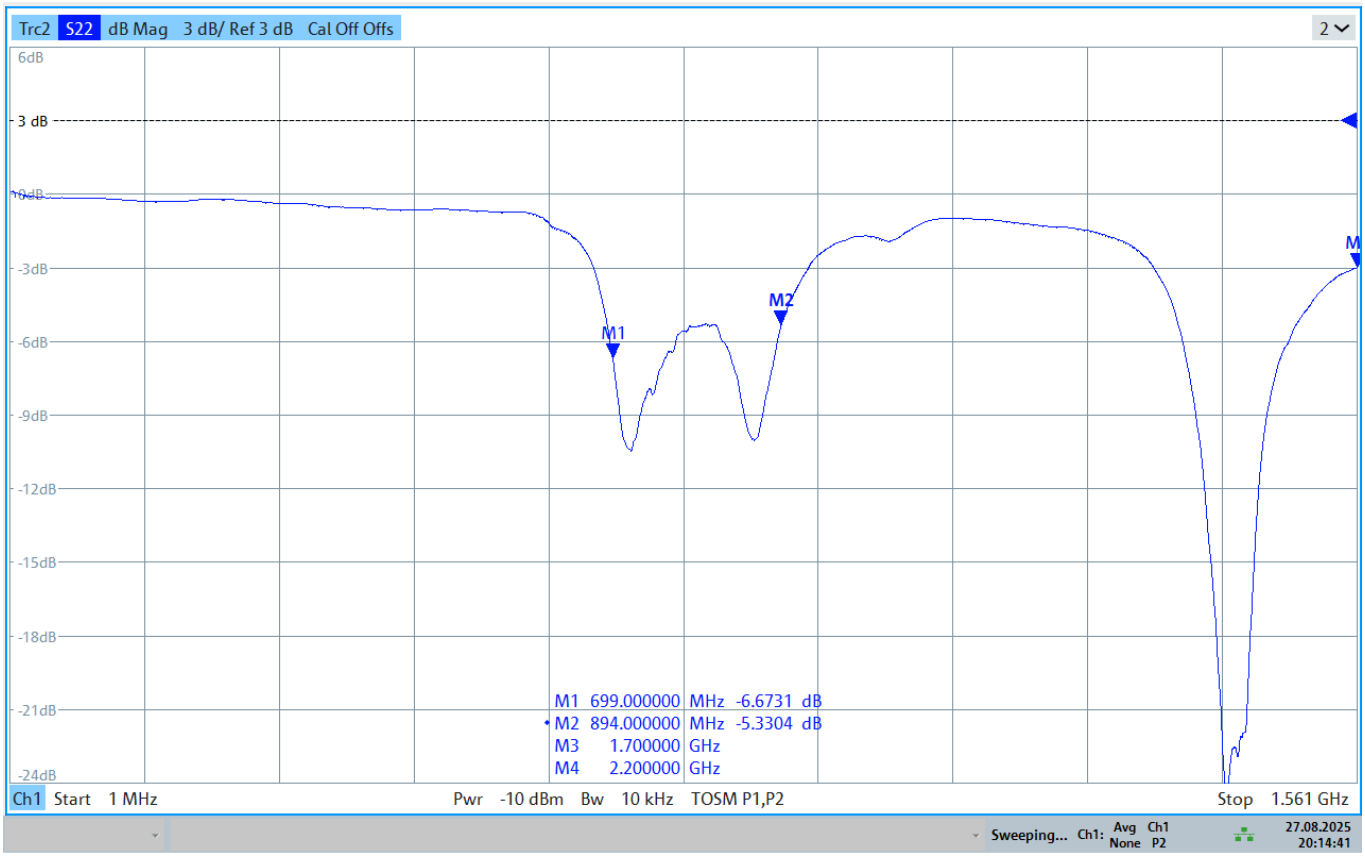
LTE TX/RX Main (HB) performance shows batter than 40% of efficiency (-4dB).



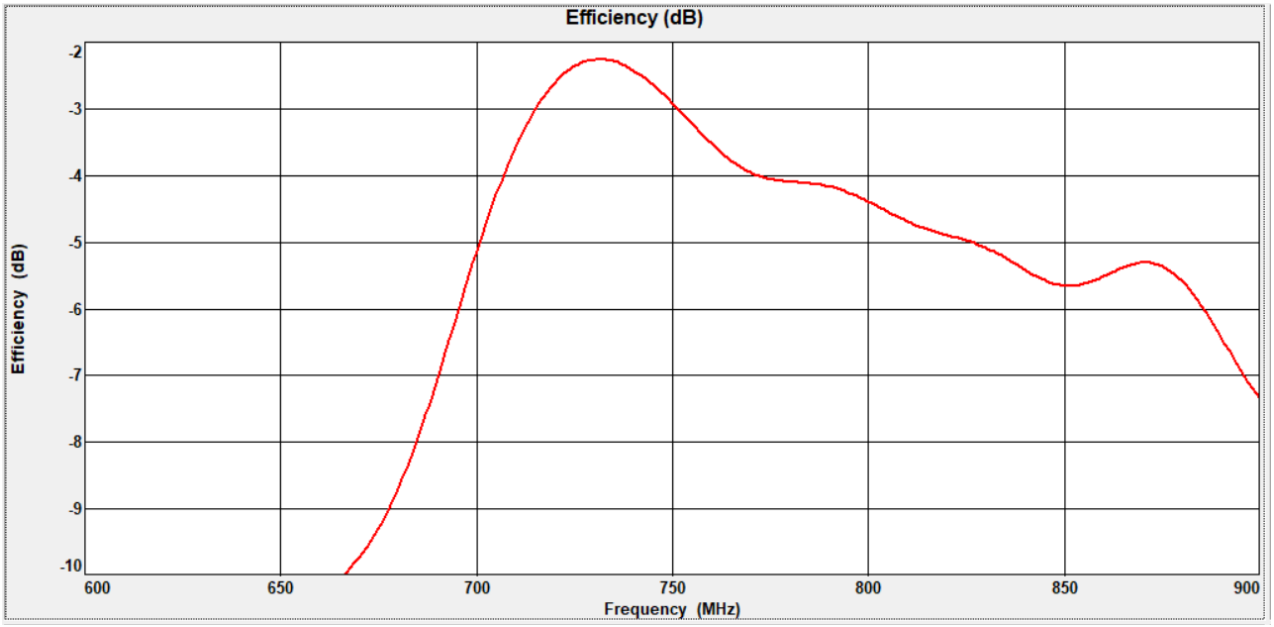
LTE RX Diversity (MB+HB) performance shows batter than 35% of efficiency (-4.5dB).

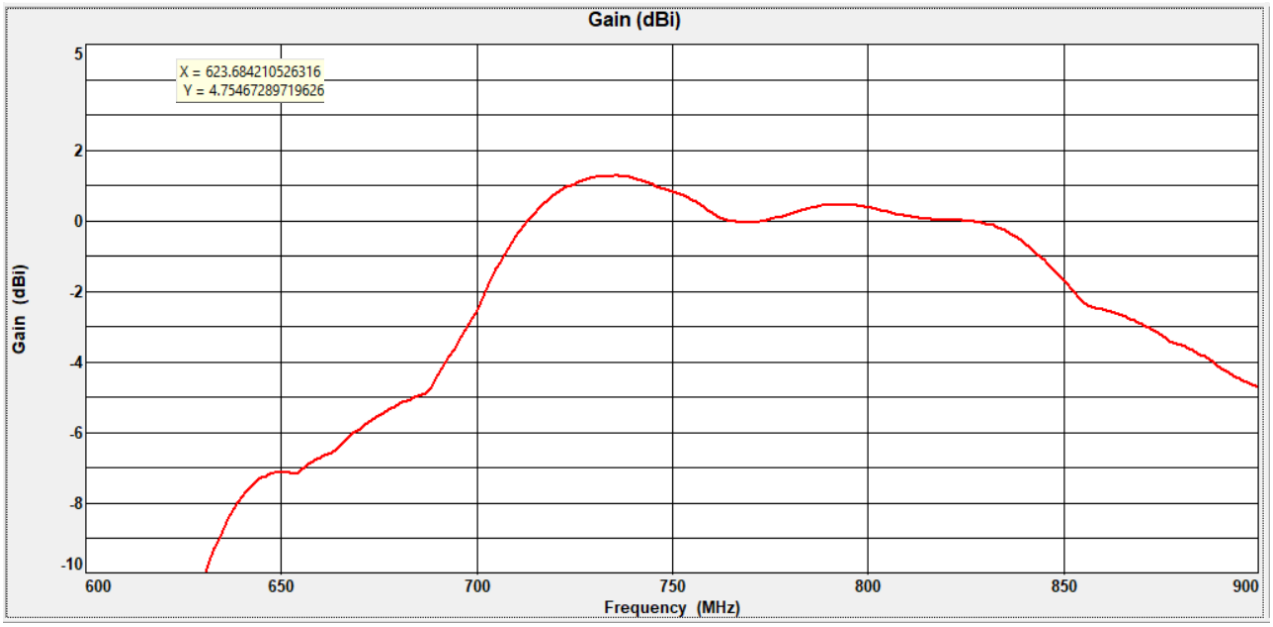


LTE RX (Diversity LB) Return Losses shows vide resonant with no worse than -5.3dB. Test has been performed with Sub-1GHz antenna preloaded to 50 Ohm resistor.



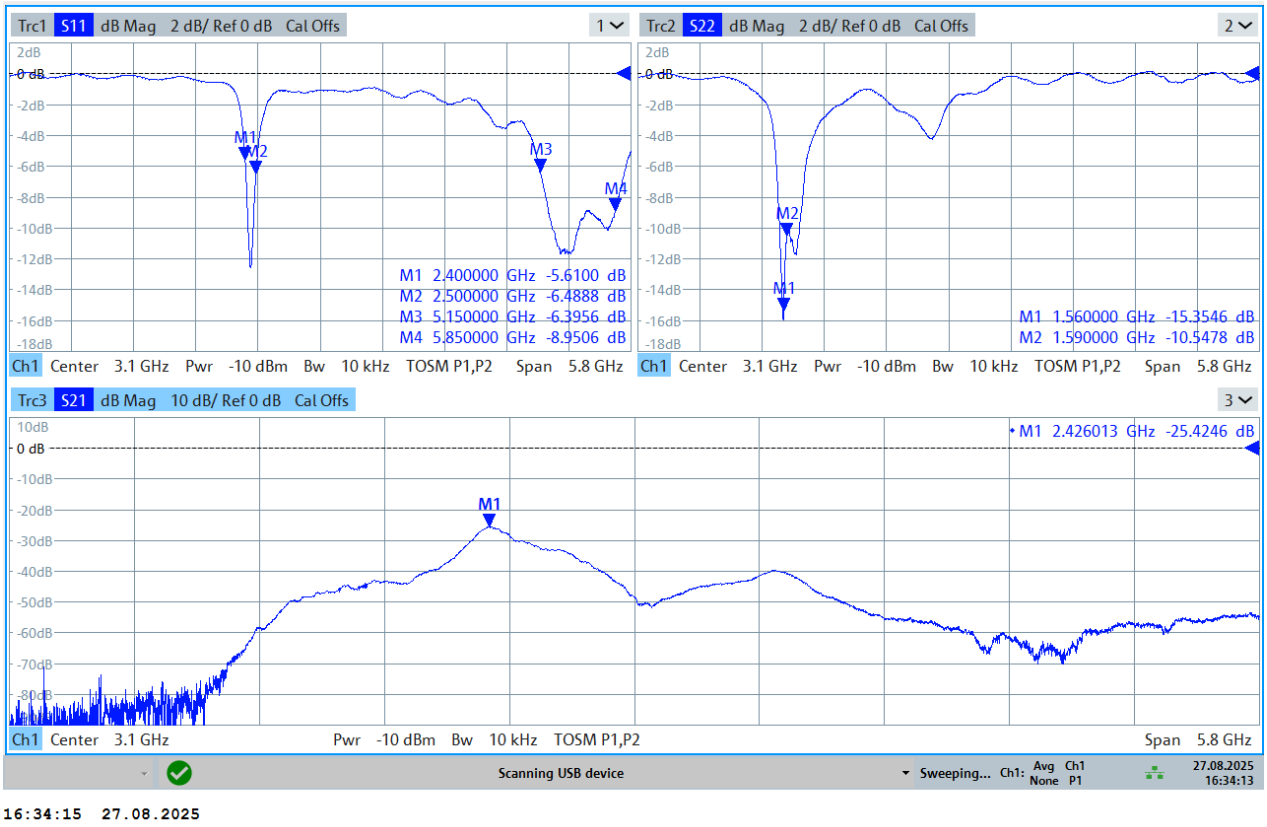
ANT2 performance shows efficiency better than -5dB over required frequency band.





Dual band 2.4GHz & 5GHz Wi-Fi/BT/BLE & ANT4 GNSS L1 (1575.42MHz)

Obtained fine-tuned resonants for both antennas. For **Wi-Fi/BT/BLE** antenna (Port 1, S11) on both bands RL better that -5.6dB and looks acceptable for further evaluation point of view. **GNSS** became better with wide resonant better than -10dB.



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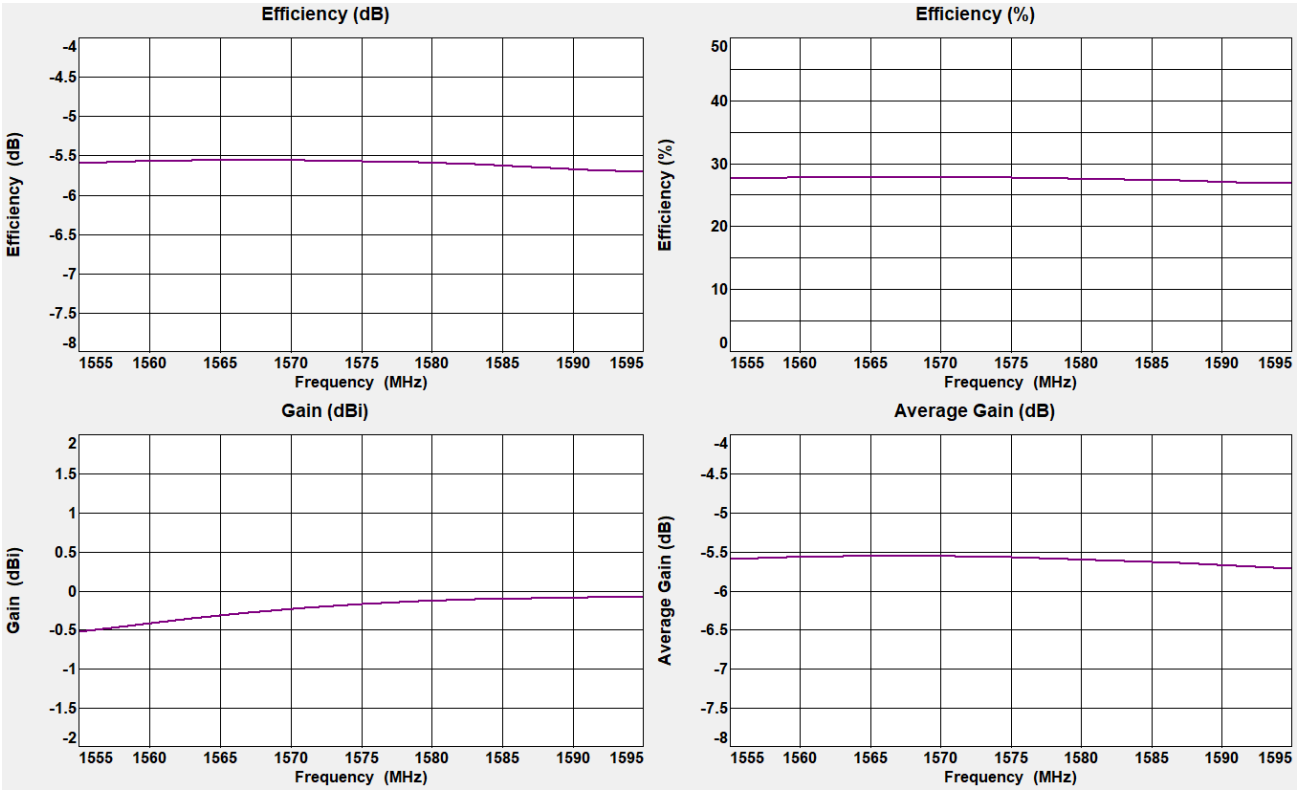
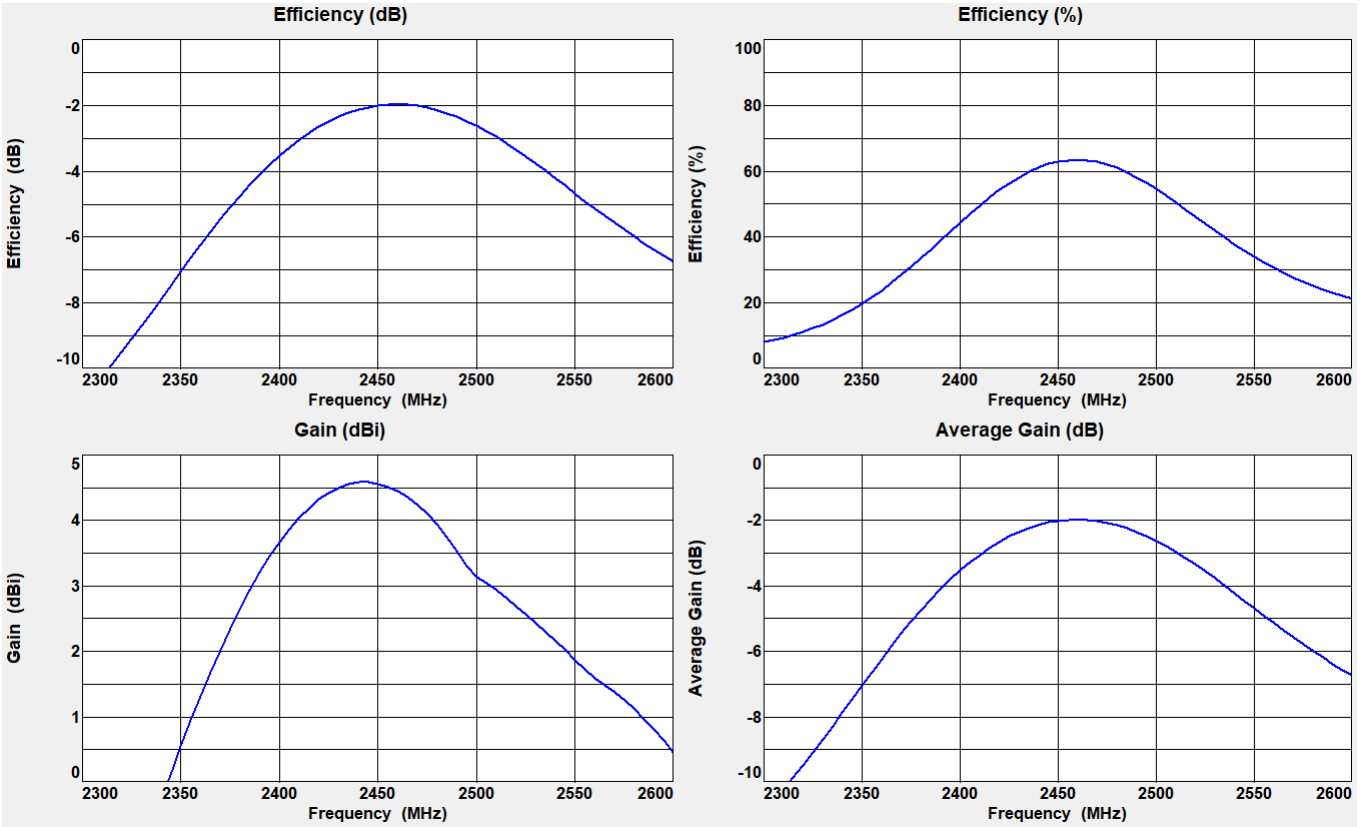
GNSS performance shows more that 25% of efficiency (better than -6dB).



Wi-Fi/BT/BLE 2.4GHz band performance shows more than 40% of efficiency (better than -4dB).



Wi-Fi/BT/BLE 5GHz band performance shows more than 45% of efficiency (better than -3.5dB).