



SUCCESSFUL VALIDATION

With FORMOSAT-8A & FORMOSAT-5

HyperSDR

Satellite Ground Station Modem



One platform. Every mission. The ultimate all-in-one satellite modem

YTTEK HyperSDR is an all-in-one SDR satellite ground station modem, integrating modulation, signal analysis, PCIe high-speed data transfer, and massive data storage in a single platform. Proven in space missions, it delivers up to 15 GHz frequency coverage and 2.25 Gbps throughput per channel for demanding space applications.

International satellite standards compliant

HyperSDR fully supports CCSDS 131.0-B-4, CCSDS 131.2-B-1, and the ETSI EN 302 307-1 DVB-S2 waveform for satellite broadcast, enabling compatibility with international satellite communication infrastructures while reducing integration overhead and accelerating ground station deployment.

15 GHz wideband coverage with X & Ku band support

By leveraging highly integrated Software-Defined Radio (SDR) technology, HyperSDR combines RF front-end and baseband modem functionalities into a single, unified unit. It supports a broad frequency range from 10 MHz to 15 GHz, covering X and Ku bands without extra up/down converters.

Applications

Satellite communication

Key features

- Fully CCSDS and DVB-S2 compliant
- Proven success in real-world space missions
- Ultra-wide frequency support up to 15 GHz
- Ultra-fast 2.25 Gbps throughput per channel
- 500 Msps RF recording for in-depth analysis
- SDR flexibility to adapt to future requirement changes



HyperSDR decodes FORMOSAT-8A — live, from orbit.

TASA deployed YTTEK’s HyperSDR as the mission’s high-speed X-band receiver.

0.7_M

Color image resolution decoded

600_{Mbps}

Downlink data rate
4× FORMOSAT-5

2.25_{Gbps}

Per-channel data throughput

2_{TB+}

Total data processed

Proven performance across major X-band missions

Trusted by Taiwan Space Agency (TASA), HyperSDR successfully received and decoded signals from TASA’s FORMOSAT-8A and FORMOSAT-5, as well as processed signals from NASA’s Landsat-8 and Landsat-9. Its field-proven performance makes it the reliable choice for mission-critical satellite communications.

Agency	TASA		NASA	
Satellite	FORMOSAT-8A	FORMOSAT-5	Landsat-8	Landsat-9
ID	666666	42920	39084	49260
Data rate (bps)	600 M	150 M	440.825 M	440.825 M

RF recorder for testing & validation

Featuring a 500 Msps RF recorder with up to 30 minutes of recording time, HyperSDR enables detailed signal evaluation, post-processing, and long-duration high-speed data analysis. This makes it an indispensable tool for ground station testing and satellite validation.

Highly flexible, SDR architecture

Built on a true SDR architecture, HyperSDR delivers 10 MHz to 15 GHz frequency agility and enables waveform and protocol upgrades through software without replacing core hardware. Powered by FPGA and Linux, it provides programmable capabilities for seamless integration.



Mission log

Date	April 27, 2026
Target	Alibag, India
Status	Real-time high resolution image decoding

Successful high-data-rate image decoding

Delivering 2.25 Gbps of per-channel processing throughput, HyperSDR successfully decoded FORMOSAT-8A's 600 Mbps downlink data rate to reconstruct 0.7-meter-resolution color imagery of Alibag, India—validating its mission-proven performance in orbit.

Why choose HyperSDR?

Mission-proven

TASA-validated with successful NASA signal reception.

All-in-one

One platform with native X- and Ku-band support.

High-throughput

Delivers up to 2.25 Gbps throughput per channel.

Specifications

RF parameters

Frequency range	10 MHz – 15 GHz
Bandwidth	400 MHz
No. of RF chains	2
TX output power	–50 to +10 dBm
RX receive power	–50 to +5 dBm
Modulations	BPSK, QPSK, OQPSK, 8PSK, 16APSK, 16QAM, 32APSK, 64APSK
Max baud rate	375 Msps per channel
Max throughput	2.25 Gbps per channel
Pulse shaping filter	SRRC, user-defined
NRZ type	NRZ-L, NRZ-M, NRZ-S, DNRZ

RF recorder

Down-convert to baseband I/Q raw data and recording to SSD

Max sample rate	10 MHz – 491.52 Msps
Max recording duration	30 mins @ 491.52 Msps (Varies by sample rate and SSD capacity)
SSD storage	4 TB NVMe SSD
NRZ type	NRZ-L, NRZ-M, NRZ-S, DNRZ

Frequency reference

Ports	1 INPUT / 1 OUTPUT
Frequency	10 MHz sine
Impedance	50 Ω

CCSDS 131.0-B-4

Modulation & channel coding combination

Uncoded	Without channel coding
Convolutional Code Only (CCSDS 131.0-B-4, Chapter.3)	Code rates: 1/2, 2/3, 3/4, 5/6, 7/8
Reed-Solomon Code Only (CCSDS 131.0-B-4, Chapter.4)	Interleave depths: I=1,2,3,4,5,8 Virtual bits: q=0-15 for (255,232), q=0-15 for (255,239)
Concatenated CC and RS (CCSDS 131.0-B-4, Chapter.5)	Any parameter combination of CC only and RS only
Turbo Code (CCSDS 131.0-B-4, Chapter.6)	Code rates: 1/3, 1/4, 1/6 Information block sizes: k=1784, 3568, 7136, 8920 Total 16 possible cases of combination of code rate and information block size
LDPC for TF (CCSDS 131.0-B-4, Chapter.7)	Basic LDPC code rate: 7136/8160 AR4JA LDPC code rate: 1/2, 2/3, 4/5 AR4JA LDPC code information block size: 1024, 4096, 16384 - Total 10 possible cases - One basic LDPC - Nine AR4JA LDPC combination of code rate and information block size
LDPC for SMTF (CCSDS 131.0-B-4, Chapter.8)	Basic LDPC code rate: 7136/8160 AR4JA LDPC code rate: 1/2, 2/3, 4/5 AR4JA LDPC code information block size: 1024, 4096, 16384 - Total 10 possible cases - One basic LDPC - Nine AR4JA LDPC combination of code rate and information block size

CCSDS 131.2-B-1

Modulation & channel coding combination

Standard	CCSDS 131.2-B-1
Modulation (S2)	QPSK, 8PSK, 16APSK, 32APSK, 64APSK
Channel code	SCCC
FRAME and Coding rate	Support all ACM
Pilot symbols	On / Off
Scrambling	PL scrambler, gold code n = 0 - 133440
Roll-off (S2)	User-defined
Pulse shaping	SRRC, user-defined

DVB-S2

Modulation & channel coding combination

Standard	ETSI EN 302 307-1 (DVB-S2)
Modulation (S2)	QPSK, 8PSK, 16APSK, 32APSK
Inner code	LDPC (64 800 / 16 200 bits)
Outer code	BCH (error floor suppression)
FECFRAME	Normal = 64 800 bits, Short = 16 200 bits
Code rates (S2)	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Pilot symbols	On / Off, 36-symbol pilot blocks
Scrambling	PL scrambler, gold code n = 0 - 262141
Roll-off (S2)	User-defined
Pulse shaping	SRRC, user-defined



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