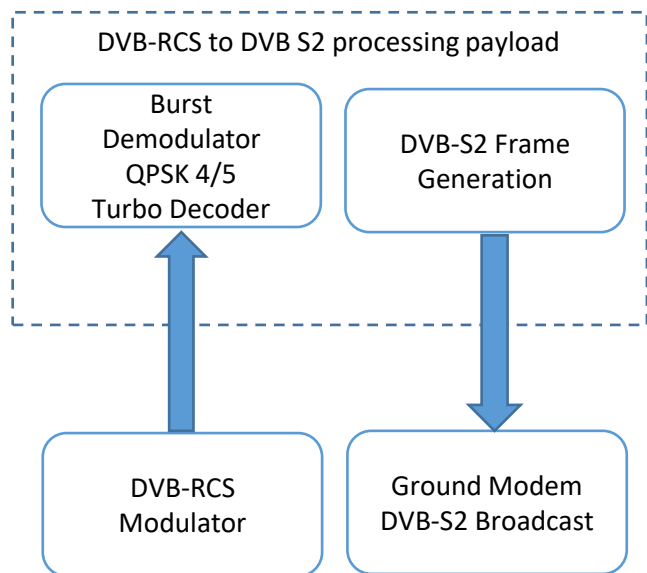


End to end Verification model and major IPs of DVB-RCS to DVB-S2 Onboard Processing Systems

Space Applications Centre of Indian Space Research Organisation, ISRO has designed and developed a single channel reconfigurable DVB-RCS to DVB-S2 processing system. The uplink DVB-RCS is transmitted using MPEG-2TS packets. These packets are transmitted using QPSK modulation in burst mode. The data rate is 8.192 Mbps with ETSI complaint 4/5 turbo encoder. The length of MPEG-2TS packet is 1504 bits, which include 16-bit UW (47 hex) along with 1496 bits data.

In the diagram, DVB-RCS terminal communicates to DVB-S2 hub via SAC developed onboard DVB-RCS to DVB-S2 processing (ODDP) IP. These packets are transmitted using QPSK modulation in burst mode. The (On-Board DVB-RCS to DVB-S2 Processor) regenerative payload is aimed to provide broadcast of digital multimedia programs through onboard digital processor. The basic concept is to provide access to individual broadcasters and service provider's direct access to the users. This payload can receive video, audio and data uplink signals from several different geographic locations on the Digital Video Broadcasting - Return Channel Satellite (DVB-RCS) standard and multiplex the min to a single Digital Video Broadcasting by Satellite (DVB-S2) standard downlink signal.



Regional and local broadcasters can therefore benefit from easy and direct satellite access into millions of homes. It may be useful for service providers, corporates, universities, multimedia content providers, broadcasters and telecom operators. The various IPs are developed in due course of DVB-RCS to DVB-S2 onboard processing payload development. These IPs can be used in any DVB-RCS and DVB-S2 based application development.

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System Configuration (Uplink)

Specification	Values
Bandwidth	36 MHz Dynamic B.W. allocation 1.5 k.Rs (k = 1, 2, 4, 8 and 16)
IF freq.	950-1450 MHz
Framing	MPEG-2 TS /Generic stream
Access Mode	MF-TDMA
User/ Provider Terminal	DVB-RCS Standard
Signal Error Correction	Turbo Code- Rates (4/5)
Modulation	QPSK, $\alpha = 0.35$

Applications

Any DVB-RCS and DVB-S2 based application development

Deliverables

- Complete protocol Software simulation of DVB-RCS to DVB S2 On-Board Conversion.
- List of Hardware IP, which are used to develop for DVB-RCS to DVB S2 On-Board Conversion.
 - ETSI based (DVB RCS) TURBO Encoder and Decoder
 - DVB S2 based 1/2 LDPC Encoder
 - DVB-S2 based Frame Formatter and DVB S2 based physical layer Scrambler
 - All DVB S2 based Modulation Scheme
 - 2x clock based RRC filter
 - Turbo coded 4/5 QPSK burst modulator

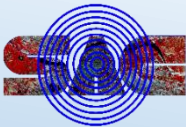
System Configuration (Downlink)

Specification	Values
IF Freq.	950-2150 MHz (L band)
Access Mode	TDM
DVB-S2 Standard	Yes
Data Rate (Max)	50 Mbps –rate 1/2 28.125 Mbps – rate 8/9 27.78 Mbps– rate 9/10
Coding	LDPC Inner Coding rates QPSK (1/2), 8PSK(9/10), 16APSK(8/9) BCH Outer Coding Bit Interleaving With data frame length normal (64800)
Modulation Scheme	QPSK, 8PSK, 16APSK $\alpha = 0.20$ CCM, VCM, ACM (on above three MODCOD)
Type of Services	Broadcast – QPSK with 1/2 coding DSNG (IP based) -- 8 PSK with 9/10 coding Unicast Interactive IP service (ACM mode)-16 APSK with 8/9 Coding

Technology Transfer

SAC/ISRO offers to transfer this technology of the **DVB-RCS** developed by SAC to industries in India with adequate experience and facilities. Enterprises interested in obtaining knowhow may register and submit their proposal to IN-SPACe, Ahmedabad at www.inspace.gov.in

For more details, Contact:
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