DCP COMMAND LINK

RF LINK

SPECIFICATIONS

V0.1

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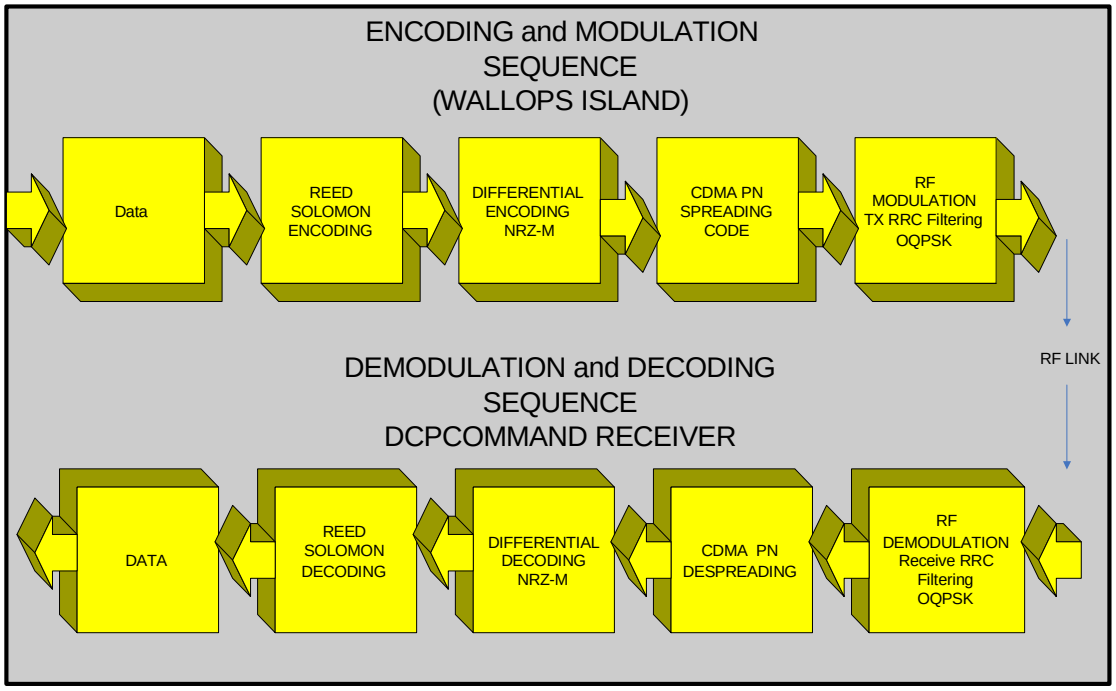
SUMMARY

This document defines the system RF details for the DCP Command proposed link for the GOES satellites. All details of encoding and modulation are provided.

DCP-COMMAND BLOCK DIAGRAM



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SYSTEM OVERALL SPECIFICATIONS

The specifications for the National Oceanic and Atmospheric (NOAA) Data Collection Platform Interrogate (DCPCOMMAND) service are recommended below. These specifications are for a Direct Sequence Spread Spectrum CDMA link:

	DESCRIPTION	SPECIFICATION
1	Downlink Frequency Band	468.799 MHz to 468.847 MHz
2	Available Modulation 3dB Bandwidth	48.0 KHz
3	Downlink Center Frequency	468.823 MHz +/- TBD
4	(DS-SS) Direct Sequence Spread Spectrum Modulation	Offset QPSK
5	User Channel Multiplexing	CDMA
6	Encoding Inner Layer	Reed Solomon (223/255) I=2 interleaved code blocks.
7	Encoding Outer Layer	Differential Encoding NRZ-M
8	Net Link Data Rate with R/S Overhead	342.7 bps
9	Throughput	299.7 bps
10	RF Symbol Rate	171.3 bps
11	Frame Rate	12.00 Seconds
12	Chip Rate	21.75933 KHz
13	Occupied Bandwidth	43.51867 KHz
14	PN Code Length	127
15	Processing Gain	21.04 dB
16	Transmit Filter	RRC (alpha = 1.0)
17	CDMA PN code sequences **	
	GOES East I	B6 24 89 C7 85 0E 65 F3 6E 69 E7 AA B8 1B 61 12
	GOES East Q	07 EA 31 8B 90 67 4C 17 04 76 3A 17 AE 44 71 20
	GOES West A	86 71 2D 60 14 A6 1A 85 9A 30 9B EA 75 95 14 D0
	GOES West B	67 41 78 C4 B3 37 B2 FA EC C4 C2 96 35 58 9A A4
18	Error Handling	Retries & acknowledgements

** The representation below is a 16 x 8 byte representation. The LSB, or right most character has been stuffed with '0' and will be stripped or disregarded during implementation.

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DATA RATE

The selected data rate meeting all of the criteria ranging from old satellites to new satellites to bandwidth to antenna and finally to performance yields a data rate of 300 bps.

Parameter	Choice
Data Rate	299.6654 BPS (342.6667BPS with RS overhead)

Due to the Reed Solomon encoder, the necessary overhead associated with the (255,223) code will simply be the following: 299.6654 * 255 / 223. This yields a physical data rate of exactly 342.66667 Hz (we specify this figure precisely, not the 'user rate').

Parameter	Choice
Data Rate with Overhead	342.66667 Hz

Finally, with the physical modulation of OQPSK, the symbol rate will be ½ that due to the efficiencies of QPSK.

Parameter	Choice
Symbol Rate	171.3333 Hz

CHIP RATE

The chip rate of the system is simply the multiplication of PN code length, 127, and the Symbol rate.

Parameter	Choice
Chip Rate	21759.333 Hz

OCCUPIED BANDWIDTH

The occupied bandwidth of this system will be the chip rate multiplied by (1+alpha) where alpha is the filter rolloff. In this application, alpha 1.

Parameter	Choice
Occupied Bandwidth	43518.666 Hz

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RF DOWNLINK POWER

The following chart represents the RF power that the satellites may provide. Note that this may change and values should be confirmed from a NESDIS representative.

Satellite EIRP	RF Power Level	Bandwidth (3 dB)
GOES I/M	44.8 dBm	48 KHz
GOES NOP	47.0 dBm (48.75 est) *	48 KHz
GOES R	TBD	TBD

* this value may be adjusted lower by NOAA over a 10 dB range in 1 dB steps.

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