Iteration	Operation(10)	Operation(2)	Result(2)	Result(10) Signed	Result(10) Unsigned	Cin	Cout	OV	
1	0 + 5	00000000+00000101	00000101	5	5	0	0	0	
2	5 + 5	00000101+00000101	00001010	10	10	0	0	0	
3	10 + 5	00001010+00000101	00001111	15	15	0	0	0	
4	15 + 5	00001111+00000101	00010100	20	20	0	0	0	
5	20 + 5	00010100+00000101	00011001	25	25	0	0	0	
6	25 + 5	00011001+00000101	00011110	30	30	0	0	0	
7	30 + 5	00011110+00000101	00100011	35	35	0	0	0	
8	35 + 5	00100011+00000101	00101000	40	40	0	0	0	
9	40 + 5	00101000+00000101	00101101	45	45	0	0	0	
10	45 + 5	00101101+00000101	00110010	50	50	0	0	0	
11	50 + 5	00110010+00000101	00110111	55	55	0	0	0	
12	55 + 5	00110111+00000101	00111100	60	60	0	0	0	
13	60 + 5	00111100+00000101	01000001	65	65	0	0	0	
14	65 + 5	01000001+00000101	01000110	70	70	0	0	0	
15	70 + 5	01000110+00000101	01001011	75	75	0	0	0	
16	75 + 5	01001011+00000101	01010000	80	80	0	0	0	
17	80 + 5	01010000+00000101	01010101	85	85	0	0	0	
18	85 + 5	01010101+00000101	01011010	90	90	0	0	0	
19	90 + 5	01011010+00000101	01011111	95	95	0	0	0	
20	95 + 5	01011111+00000101	01100100	100	100	0	0	0	
21	100 + 5	01100100+00000101	01101001	105	105	0	0	0	
22	105 + 5	01101001+00000101	01101110	110	110	0	0	0	
23	110 + 5	01101110+00000101	01110011	115	115	0	0	0	
24	115 + 5	01110011+00000101	01111000	120	120	0	0	0	
25	120 + 5	01111000+00000101	01111101	125	125	0	0	0	
26	125 + 5	01111101+00000101	10000010	-126	130	1	0	1	OV=1 in this iteration only
27	130 + 5	10000010+00000101	10000111	-121	135	0	0	0	-126 + 5 does not result in an overflow
28	135 + 5	10000111+00000101	10001100	-116	140	0	0	0	-121 + 5 does not result in an overflow
29	140 + 5	10001100+00000101	10010001	-111	145	0	0	0	
30	145 + 5	10010001+00000101	10010110	-106	150	0	0	0	
31	150 + 5	10010110+00000101	10011011	-101	155	0	0	0	
32	155 + 5	10011011+00000101	10100000	-96	160	0	0	0	
33	160 + 5	10100000+00000101	10100101	-91	165	0	0	0	
34	165 + 5	10100101+00000101	10101010	-86	170	0	0	0	

35	170 + 5	10101010+00000101	10101111	-81	175	0	0	0	
36	175 + 5	10101111+00000101	10110100	-76	180	0	0	0	
37	180 + 5	10110100+00000101	10111001	-71	185	0	0	0	
38	185 + 5	10111001+00000101	10111110	-66	190	0	0	0	
39	190 + 5	10111110+00000101	11000011	-61	195	0	0	0	
40	195 + 5	11000011+00000101	11001000	-56	200	0	0	0	
41	200 + 5	11001000+00000101	11001101	-51	205	0	0	0	
42	205 + 5	11001101+00000101	11010010	-46	210	0	0	0	
43	210 + 5	11010010+00000101	11010111	-41	215	0	0	0	
44	215 + 5	11010111+00000101	11011100	-36	220	0	0	0	
45	220 + 5	11011100+00000101	11100001	-31	225	0	0	0	
46	225 + 5	11100001+00000101	11100110	-26	230	0	0	0	
47	230 + 5	11100110+00000101	11101011	-21	235	0	0	0	
48	235 + 5	11101011+00000101	11110000	-16	240	0	0	0	
49	240 + 5	11110000+00000101	11110101	-11	245	0	0	0	
50	245 + 5	11110101+00000101	11111010	-6	250	0	0	0	-11 + 5 does not result in an overflow

At the termination of this loop, OV=0.
Clearly 5*50 != -6, so why is OV=0?
The OV bit is only set to one if the result of an addition exceeds 127(dec). The only place this happens is in iteration 26.
Every other iteration is completely valid to the chip.