

Working Paper SC209-WP03-14 for SC 209 Meeting #3

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Subject: Status of document cross reference work

1. Draft DO 181D version 0.4 has been parsed and indexed with each "shall" marked and numbered and a table of all shall produced. Examples extracted from the products are:

DO 181Dv0.4 –

1.1.1 Airworthiness

The design and manufacture of the equipment shall provide for installation that does not impair the airworthiness of the aircraft.

1.1.2 General Performance

The equipment shall perform its intended function as defined by the manufacturer, and its proper use shall not create a hazard to users of the National Airspace System (NAS).

1.1.3 Federal Communications Commission Rules

The equipment shall comply with all applicable rules of the Federal Communications Commission.

1.1.4 Fire Protection

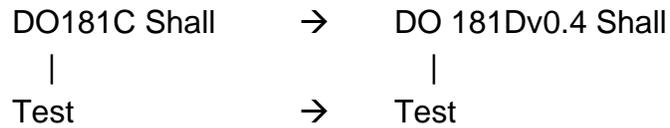
Except for small parts (such as knobs, fasteners, seals, grommets and small electrical parts) that would not contribute significantly to the propagation of a fire, all materials used shall be self-extinguishing.

Index –

Index	Style	Section	SectionTitle	Text	Page	Bookmark
1	Heading 3	2.1.1	Airworthiness	The design and manufacture of the equipment shall <<shall0001>> provide for installation that does not impair the airworthiness of the aircraft.	11	shall0001
2	Heading 3	2.1.2	General Performance	The equipment shall <<shall0002>> perform its intended function as defined by the manufacturer, and its proper use shall not create a hazard to users of the National Airspace System (NAS).	11	shall0002
3	Heading 3	2.1.2	General Performance	The equipment shall <<shall0002>> perform its intended function as defined by the manufacturer, and its proper use shall <<shall0003>> not create a hazard to users of the National Airspace System (NAS).	11	shall0003
4	Heading 3	2.1.3	Federal Communications Commission Rules	The equipment shall <<shall0004>> comply with all applicable rules of the Federal Communications Commission.	11	shall0004
5	Heading 3	2.1.4	Fire Protection	Except for small parts (such as knobs, fasteners, seals, grommets and small electrical parts) that would not contribute significantly to the propagation of a fire, all materials used shall <<shall0005>> be self-	11	shall0005

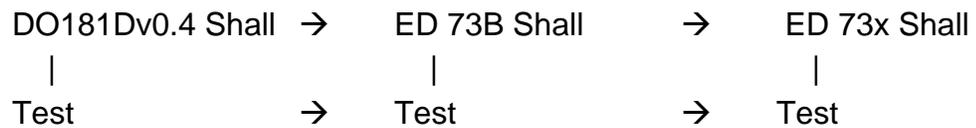
				extinguishing.		
Index	Style	Section	SectionTitle	Text	Page	Bookmark

2. Work started on mapping the DO 181Dv0.4 to DO 181C is underway. The approach is:



Future versions of 181 are expected to be in a format comparable to v0.4 so that linking between v0.4 and future versions should be straight forward.

Linking to ED 73B is as follows:



3. Examples of mapping reports for review relationships between DO 181C and ED 73B.

4. Cross Reference - Different

49	Different	DO note corresponds to second half of the ED statement. ED makes it a standard and DO keeps it a note.				
DO	SHALL0037	Page: 22	37	ED	SHALL0110	Page: 39 110
2.2.3.3	Unwanted Output Power			3.3.4	Residual Power Output	
Note 2: If the transponder is used in conjunction with TCAS equipment, the RF power in the inactive state at 1090 MHz at the terminals of the Mode S transponder antenna shall not exceed -70 dBm.		When the transponder transmitter is in the inactive state, the RF output power at 1 090 ±3 MHz, at the terminals of the antenna shall<<SHALL#0109>> not exceed -50 dBm, except in transponders intended for use with ACAS where it shall not exceed -70 dBm.				
53	Different	DO standard is embedded in the Mode S standard in ED				
DO	SHALL0039	Page: 22	39	ED	SHALL0114	Page: 39 114
2.2.3.4.1	ATCRBS Reply Rate Capability			3.4.2	Reply Rate Capability - Mode S	
The transponder shall be able to continuously generate at least 500 ATCRBS 15-pulse replies per second.		The total reply rate over each time interval specified below, shall be the sum of the individual Mode A/C replies at an average rate of 500 per second and the Mode S reply rate over that interval.				
51	Different	Specifics are different but generally the same. DO being revised				
DO	SHALL0040	Page: 22	40	ED	SHALL0112	Page: 39 112
2.2.3.4.1	ATCRBS Reply Rate Capability			3.4.1	Reply Rate Capability - Mode A/C	
If intended for installation in aircraft that operate at altitudes above 15,000 feet, the transponder shall be capable of a peak reply rate of 1,200 ATCRBS 15-pulse replies for a duration of 100 milliseconds.		CLASS 1 equipment shall be capable of at least 1200 Mode A/C replies per second for a 15-pulse coded reply (including 2 framing pulses, 12 information pulses and the SPI pulse).				
52	Different	ED more specific . DO being revised				
DO	SHALL0041	Page: 22	41	ED	SHALL0113	Page: 39 113
2.2.3.4.1	ATCRBS Reply Rate Capability			3.4.1	Reply Rate Capability - Mode A/C	
If intended for installation in aircraft that operate at altitudes not exceeding 15,000 feet, the transponder shall be capable of a peak reply rate of 1,000 ATCRBS 15-pulse replies for a duration of 100milliseconds.		CLASS 2 equipment shall be capable of at least 1 000Mode A/C replies per second for a 15-pulse coded reply (including2 framing pulses, 12 information pulses and the SPI pulse).				

57	Different	DO refers to Level 5 transponder and ED does not address the Level 5 transponder			
DO	SHALL0044	Page: 23	44	ED	SHALL0116 Page: 39 116
	2.2.3.4.2	Mode S Reply Rate Capability		3.4.2	Reply Rate Capability - Mode S
	c.	A transponder equipped with the enhanced data link protocols (2.2.17.5) shall be able to transmit as long replies:			A transponder equipped for long Mode S reply formats shall be able to transmit as long replies,
		At least 24 of the 50 Mode S replies in any 1-second interval.		(1)	at least 16 of the 50 Mode S replies in any one second interval;
		At least 9 of 18 Mode S replies in a 100-millisecond interval.		(2)	at least 6 of the 18 Mode S replies in a 100 millisecond interval;
		At least 6 of 8 Mode S replies in a 25 millisecond interval.		(3)	at least 4 of the 8 Mode S replies in a 25 millisecond interval;
		At least 2 of 4 Mode S replies in a 1.6 millisecond interval.		(4)	at least 2 of the 4 Mode S replies in a 1.6 millisecond interval.
58	Different	This statement is not in the ED document.			
DO	SHALL0045	Page: 23	45	ED	YYY Page: 976
	2.2.3.4.2	Mode S Reply Rate Capability			None
		All of the above reply rates shall be in addition to any squitter transmissions that the transponder is required to make.			Blank Field linked to D0 181C standardss that do not correspond to ED 73B standards.
66	Different	DO explicit that SPI only if IDENT switch is activated.			
DO	SHALL0052	Page: 23	52	ED	SHALL0122 Page: 40 122
	2.2.4.1.3	ATCRBS-SPI		3.5.3	Mode A/C Special Position Identification (SPI) Pulse
		The SPI pulse shall be transmitted only if the IDENT switch is first activated.		c.	Upon activation of the IDENT switch, the SPI pulse shall be transmitted when replying to Mode A interrogations for a period of 18±1.0 seconds.
67	Different	DO explicit and ED implies not with Mode C . Experience from APS 64 was that the SPI on Mode C prevented tracking by TCAS/ACAS			
DO	SHALL0053	Page: 23	53	ED	SHALL0122 Page: 40 122
	2.2.4.1.3	ATCRBS-SPI		3.5.3	Mode A/C Special Position Identification (SPI) Pulse
		The SPI pulse shall not be transmitted when replying to Mode C interrogations.			

341 Different Standard not found in ED

DO SHALL0073 **Page:** 25 73 **ED** YYY **Page:** 976
 2.2.4.2.3 Mode S Reply Pulse Shape None

The spectrum of a reply shall not exceed the following bounds:

Blank Field linked to D0 181C standardss that do not correspond to ED 73B standards.

Frequency Difference Response (MHz From Carrier Peak)	Maximum Relative (dB Down From Peak)
> 1.3 and < 7	3
> 7 and < 23	20
> 23 and < 78	40
> 78	60

130 Different ED specifies a condition implied in DO

DO SHALL0113 **Page:** 28 113 **ED** SHALL0192 **Page:** 49 192
 2.2.7.1.1 Echo Suppression Desensitization 3.10.1 Echo Suppression

Upon receipt of any pulse more than 0.7 microsecond in duration (desensitization pulse), the transponder shall be desensitized temporarily for all received signals by raising the receiver threshold.

Single pulses of less than 0.7 μs in duration need not cause a specified desensitisation, but in any case they shall not cause a desensitisation of amplitude or duration greater than permitted in paragraphs 3.10.1 a. and 3.10.2.

236 Different ED included refernces to squitter and it is not explicit in the DO document

DO SHALL0127 **Page:** 29 127 **ED** SHALL0209 **Page:** 52 209
 2.2.7.3.2 Mode S Reply Rate Limiting 3.11 REPLY RATE LIMITING

If a reply rate limiting device is provided for Mode S replies, it shall permit at least the reply rates required in subparagraph 2.2.3.4.2.

If a reply rate limiting device is provided for Mode S replies, it shall permit at least the reply rates specified in paragraph 3.4 and shall not prevent acquisition squitter transmission as per 3.20.2.6 and extended squitter as per 3.21.2.6 nor the transmission of a DF=16 (3.21.1.4).

5. Cross Reference - Similar

<p>10 Similar Restatement DO SHALL0001 Page: 16 2.1.1 Airworthiness The design and manufacture of the equipment shall provide for installation that does not impair the airworthiness of the aircraft.</p>	1	<p>ED SHALL0013 Page: 24 2.1 AIRWORTHINESS The equipment shall not, under normal or fault conditions, impair the airworthiness of the aircraft in which it is installed.</p>	13
<p>11 Similar Restatement DO SHALL0004 Page: 17 2.1.3 Federal Communications Commission Rules The equipment shall comply with all applicable rules of the Federal Communications Commission.</p>	4	<p>ED SHALL0014 Page: 24 2.2 INTERNATIONAL TELECOMMUNICATIONS UNION The equipment shall comply with the relevant International Telecommunications Union Radio Regulations.</p>	14
<p>15 Similar precedes a list DO SHALL0008 Page: 17 2.1.7 Flight Crew Control Functions The following functions shall be provided.</p>	8	<p>ED SHALL0018 Page: 24 2.5 CONTROL AND INDICATION FUNCTIONS The following Control and Indication functions shall be provided:</p>	18
<p>32 Similar ED mentions design DO SHALL0018 Page: 18 2.1.9 Effects of Tests Unless otherwise provided, the application of the specified tests shall produce no subsequently discernible condition detrimental to the continued performance of the equipment.</p>	18	<p>ED SHALL0091 Page: 35 2.8 EFFECTS OF TESTS Unless otherwise stated, the design of the equipment shall be such that, during and after the application of the specified tests, no condition exists which would be detrimental to the subsequent performance of the equipment.</p>	91
<p>34 Similar Close DO SHALL0027 Page: 21 2.2.2.3 Bandwidth The standard ATRCBS interrogation signal required to trigger the transponder below 1005 MHz and above 1055 MHz shall be at least 60 dB stronger than that required to trigger the transponder at 1030 MHz with the same reply efficiency.</p>	27	<p>ED SHALL0099 Page: 37 3.2.3 Bandwidth The level of an interrogation signal needed to trigger the transponder at frequencies below 1 005 MHz and above 1 055 MHz shall be at least 60 dB above the level needed to trigger the transponder at 1 030 MHz with the same reply efficiency.</p>	99

<p>37 Similar</p> <p>DO SHALL0028 Page: 21</p> <p>2.2.2.4 Sensitivity and Dynamic Range</p> <p>The MTL for ATRBS and ATRBS/Mode S All-Call interrogations shall be -73 dBm ±4 dB.</p>	<p>Same intent . Need to clarify at the box or antenna. Should be at the antenna. Test conditions should be at 1 dB higher?</p> <p>38</p> <p>28</p> <p>3.2.4 Sensitivity and Dynamic Range</p> <p>The Minimum Triggering Level (MTL) for Mode A/C and Mode A/C/S All-Call interrogations, having equal amplitude P1 and P3 pulses and P2 not detected shall be -73 dBm, ±4 dB.</p>	<p>ED SHALL0100 Page: 100</p>
<p>339 Similar</p> <p>DO SHALL0035 Page: 22</p> <p>2.2.3.2 RF Peak Output Power</p> <p>The RF peak output power of each pulse of each reply at the terminals of the antenna shall be:</p> <p>a. minimum RF peak power for equipment intended for installation in aircraft that operate at altitudes not exceeding 15,000 feet and that have a normal cruising speed less than 175 knots: 18.5 dBW (70 W).</p> <p>b. minimum RF peak power for equipment intended for installation in aircraft that have a normal cruising speed in excess of 175 knots: 21.0 dBW (125 W).</p> <p>c. minimum RF peak power for equipment intended for installation in aircraft that operate at altitudes above 15,000 feet: 21.0 dBW (125 W).</p> <p>d. maximum RF peak power for all equipment: 27.0 dBW (500 W).</p>	<p>Presentation quite different but results similar</p> <p>35</p> <p>3.3.3 RF Peak Output Power</p> <p>The RF peak output power of each pulse of each reply at the terminals of the antenna shall be as follows.</p> <p>a. CLASS 1 Equipment Minimum RF peak power: 21.0 dBW (125 W). Maximum RF peak power: 27.0 dBW (500 W).</p> <p>b. CLASS 2 Equipment Minimum RF peak power: 18.5 dBW (70W). Maximum RF peak power: 27.0 dBW (500 W).</p>	<p>ED SHALL0108 Page: 38</p> <p>108</p>
<p>48 Similar</p> <p>DO SHALL0036 Page: 22</p> <p>2.2.3.3 Unwanted Output Power</p> <p>When the transponder transmitter is in the inactive state, the RF output power at 1090 ±3 MHz at the terminals of the antenna shall not exceed -50 dBm.</p>	<p>DO 181 corresponds to first half of the ED statement. The second half is in the DO note 2 with <<SHALL0037>></p> <p>109</p> <p>36</p> <p>3.3.4 Residual Power Output</p> <p>When the transponder transmitter is in the inactive state, the RF output power at 1 090 ±3 MHz, at the terminals of the antenna shall not exceed -50 dBm, except in transponders intended for use with ACAS where it shall not exceed -70 dBm.</p>	<p>ED SHALL0109 Page: 39</p>

<p>50 Similar ED separates squitter transmissions out of the reply rate DO SHALL0038 Page: 22 38 2.2.3.4 Reply Rate Capability The total reply rate over each time interval specified below shall be the sum of the individual ATCRBS and Mode S reply rates over this interval.</p>	<p>ED SHALL0111 Page: 39 111 3.4 REPLY RATECAPABILITY All the reply rates mentioned in this section shall be in addition to any squitter transmissions that the transponder is required to make.</p>
<p>59 Similar ED statement in parentheses is parenthetical but provides additional information. The DO note is added information. 39 DO SHALL0046 Page: 23 46 2.2.3.5 Mode S ELM Peak Reply Rate At least once every second, a transponder equipped for ELM downlink operation shall have the capability of transmitting, in a 25-millisecond interval, 25 percent more segments than have been announced in the initialization Note: Transponders may exist which are capable of transmitting less than the maximum allowable number of Comm-D segments in one burst. The requirement for 25 percent surplus transmitting capacity is derived from the possible need for reinterrogation.</p>	<p>ED SHALL0117Page: 117 3.4.3 Mode SELM Peak Reply Rate A transponder equipped for ELM downlink operations shall have the capability of transmitting, at least once every one second, in a 25 millisecond interval, 25% more segments than have been announced in the initialisation (i.e. at least 20 long replies for transponders capable of handling the maximum of 16 segments). NOTE 1: The specification for 25% surplus transmitting capacity is derived from the possible need for re-transmission.</p>
<p>60 Similar ED is the note that is the same as the DO note. DO SHALL0046 Page: 23 46 2.2.3.5 Mode S ELM Peak Reply Rate At least once every second, a transponder equipped for ELM downlink operation shall have the capability of transmitting, in a 25-millisecond interval, 25 percent more segments than have been announced in the initialization Note: Transponders may exist which are capable of transmitting less than the maximum allowable number of Comm-D segments in one burst. The requirement for 25 percent surplus transmitting capacity is derived from the possible need for reinterrogation.</p>	<p>ED SHALL0118 Page: 40 118 3.4.3 Mode SELM Peak Reply Rate NOTE 2: Transponders may exist which have a declared capability of transmitting less than the maximum number of Comm D segments in one burst. These shall also have a surplus transmitting capacity of 25%.</p>

86 Similar ED explicit on bounds, DO not
DO SHALL0071 **Page:** 25 71 **ED** SHALL0143 **Page:** 43 143

2.2.4.2.3 Mode S Reply Pulse Shape

The pulse rise time shall not exceed 0.1 microsecond.

3.6.4 Mode S Reply Pulse Shape

b. All Mode S reply pulses shall have the following characteristics.

Duration: See paragraph 3.6.2 c.

Rise time: Between 0.05 and 0.1 μs.

Decay time: Between 0.05 and 0.2 μs.

87 Similar ED explicit on bounds, DO not
DO SHALL0072 **Page:** 25 72 **ED** SHALL0143 **Page:** 43 143

2.2.4.2.3 Mode S Reply Pulse Shape

The pulse decay time shall not exceed 0.2 microsecond.

3.6.4 Mode S Reply Pulse Shape

92 Similar ED mentions no lock-out condition
DO SHALL0080 **Page:** 25 80 **ED** SHALL0161 **Page:** 44 161

2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call

The transponder shall react to side lobe interrogations as follows:

3.8.2 Side Lobe Suppression, Mode A/C, Mode A/C-Only All-Call, and Mode A/C/S All-Call

Assuming no lock-out condition is in effect, the transponder shall react to side lobe interrogations as follows.

344 Similar SHALL 0162 and 0163 are the same - 2 shalls. DO mentions 1% and all combinations. ED mentions 10% and all linked by "and." **ED** SHALL0162 **Page:** 44 162

DO SHALL0081 **Page:** 25 81
 2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call

Conditions Under Which the Transponder SHALL Be Suppressed The transponder shall reply to no more than one percent of the interrogations under all combinations of the following conditions:
 (1) when the pulse interval between P1 and P2 is varied over the range from 1.85 to 2.15 microseconds,
 (2) when the RF input signal level of P1 is varied from 3 dB above MTL to -21 dBm,
 (3) when the level of P2 equals or exceeds the level of P1.

3.8.2 Side Lobe Suppression, Mode A/C, Mode A/C-Only All-Call, and Mode A/C/S All-Call

Conditions Under Which the Transponder SHALL Be Suppressed

The transponder shall< reply to no more than 10% of the interrogations if

(1) the pulse interval between P1 and P2 is varied over the range from 1.85 to 2.15 μs, and

(2) the RF input signal level of P1 is varied from MTL+3dB to 21 dBm, and

(3) the level of P2 equals or exceeds the level of P1.

95 Similar ED explicit on or's linking the conditions
DO SHALL0083 **Page:** 26 83 **ED** SHALL0164 **Page:** 46 164

2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call

3.8.2 Side Lobe Suppression, Mode A/C, Mode A/C-Only All-Call, and Mode A/C/S All-Call

b. Conditions Under Which the Transponder SHALL NOT Be Suppressed The transponder shall reply to at least 90 percent of the interrogations over the input signal level range of 3 dB above MTL to -21dBm, when:

Conditions Under Which the Transponder SHALL NOT Be Suppressed

The transponder shall< reply to at least 90% of the interrogations over the input signal level range of from MTL+3dB to 21 dBm, if

- (1) the level of P1 exceeds the level of P2 by 9 dB or more,
- (2)no pulse is received at the position 2.0 ±0.7 microseconds following P1,
- (3)the duration of P2 is less than 0.3 microsecond.

- (1) the level of P1 exceeds the level of P2 by 9 dB or more, or
- (2) no pulse is received at the position 2.0 ±0.7 μs, following P1, or
- (3) the duration of P2 is less than 0.3 μs.

348 Similar
DO SHALL0085 **Page:** 26 85

2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call

ED SHALL0166 **Page:** 46 166

3.8.2 Side Lobe Suppression, Mode A/C, Mode A/C-Only All-Call, and Mode A/C/S All-Call

c. Conditions Under Which Transponder SHALL NOT Reply but May Initiate Suppression The transponder shall not reply with more than 10 percent reply ratio over the RF input level range from MTL to MTL +3 dB, if the amplitude of P2 equals or is greater than the amplitude of P1. Under the same conditions, the transponder may or may not initiate suppression.

Conditions Under Which The Transponder SHALL NOT Reply, But May Initiate Suppression.

- (1) The transponder shall< not reply with more than a 10% reply rate over the RF input level range from MTL to MTL+3dB, if the amplitude of P2 equals or is greater than the amplitude of P1.
- (2) Under the same conditions, the transponder may or may not initiate suppression.

353 Similar Standards are in different locations
DO SHALL0089 **Page:** 26 89

ED SHALL0156 **Page:** 44 156

3.8.1 General

2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call

(3) The side lobe suppression period shall be capable of being reinitiated within two microseconds after the end of any suppression period.

The side lobe suppression period shall be capable of being re-initiated within 2 μs after the end of any suppression period.

354	Similar	Standards are in different locations				
DO	SHALL0090	Page: 26	90	ED	SHALL0157	Page: 44 157
	2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call			3.8.1 General		

(4) The receiver sensitivity for ATCRBS signals shall beat MTL not later than one microsecond after the end of the suppression period.

The receiver sensitivity for Mode A/C signals shall be at MTL not later than one microsecond after the end of the suppression period.

355	Similar	Standards are in different locations				
DO	SHALL0091	Page: 26	91	ED	SHALL0158	Page: 44 158
	2.2.5.1 Side Lobe Suppression, ATCRBS, ATCRBS-Only All-Call, and ATCRBS/Mode S All-Call			3.8.1 General		

(5) The two-pulse side lobe suppression pair shall initiate suppression in a Mode S transponder regardless of the position of the pulse pair in a group of pulses, provided the transponder is not already suppressed or in a transaction cycle (2.2.16.2.2 k.).

The two-pulse side lobe suppression pair shall initiate suppression in a Mode S transponder regardless of the position of the pulse pair in a group of pulses, provided that the transponder is not already suppressed or in a transaction cycle.

106	Similar					
DO	SHALL0094	Page: 26	94	ED	SHALL0171	Page: 46 171
	2.2.6 Pulse Decoder Characteristics			3.9.1 General		
	Applicable "valid" interrogations shall result in at least 90 percent replies, and interrogations which are not valid shall result in less than 10 percent replies.			Valid interrogations shall result in at least 90% replies.		

107	Similar					
DO	SHALL0094	Page: 26	94	ED	SHALL0172	Page: 46 172
	2.2.6 Pulse Decoder Characteristics			3.9.1 General		
	Applicable "valid" interrogations shall result in at least 90 percent replies, and interrogations which are not valid shall result in less than 10 percent replies.			Interrogations which are not valid shall result in less than 10% replies.		

108	Similar					
DO	SHALL0095	Page: 26	95	ED	SHALL0171	Page: 46 171
	2.2.6 Pulse Decoder Characteristics			3.9.1 General		
	Applicable "valid" interrogations shall<<SHALL#0094>> result in at least 90 percent replies, and interrogations which are not valid shall result in less than 10 percent replies.			Valid interrogations shall result in at least 90% replies.		

<p>109 Similar DO SHALL0095 Page: 26 2.2.6 Pulse Decoder Characteristics Applicable "valid" interrogations shall<<SHALL#0094>> result in at least 90 percent replies, and interrogations which are not valid shall result in less than 10 percent replies.</p>	<p>95 ED SHALL0172 Page: 46 172 3.9.1 General Interrogations which are not valid shall result in less than 10% replies.</p>
<p>124 Similar DO SHALL0109 Page: 27 109 2.2.6.4 Sync Phase Reversal Position Tolerance If the transponder determines the sync phase reversal from P2, the sync phase reversal shall be accepted if it is received within the interval from 2.7 to 2.8 microseconds following the leading edge of P2.</p>	<p>186 ED SHALL0186 Page: 49 186 3.9.5 Sync Phase Reversal Position Tolerance b. Mode A/C Only All Call interrogations If the equipment receives a valid Mode A/C interrogation at any signal level from MTL+1dB to 21 dBm, followed by any pulse in the P4 position with its trailing edge less than 3.3 µs after P3, (1) the sync phase reversal shall be accepted if it is received within the interval between 2.7 and 2.8 µs following the leading edge of P2,</p>
<p>149 Similar The subject titles and the referenced sub paragraphs are not the same. DO SHALL0115 Page: 28 115 2.2.7.1.2 Narrow Pulse Performance Single pulses less than 0.7 microsecond in duration are not required to cause a specified desensitization, but if they occur shall not cause a desensitization of amplitude or duration greater than that permitted in subparagraphs 2.2.7.1.1 and 2.2.7.2.</p>	<p>192 ED SHALL0192 Page: 49 192 3.10.1 Echo Suppression Single pulses of less than 0.7 µs in duration need not cause a specified desensitisation, but in any case they shall not cause a desensitisation of amplitude or duration greater than permitted in paragraphs 3.10.1 a. and 3.10.2.</p>
<p>235 Similar May be the same. The DO adds the words "without regard to the number of pules in each reply/" DO SHALL0125 Page: 29 125 2.2.7.3.1 ATCRBS Reply Rate Limiting The limit shall be capable of being adjusted between 500 continuous ATCRBS Mode A and Mode C replies per second and the maximum continuous rate of which the transponder is capable, or 2000 replies per second, whichever is less, without regard to the number of pulses in each reply.</p>	<p>207 ED SHALL0207 Page: 51 207 3.11 REPLY RATE LIMITING Without regard to the number of pulses in each reply, the limit control shall permit adjustment to any value between 500 continuous Mode A/C replies per second and a. 2 000 continuous replies per second, or b. the maximum continuous reply rate capability, if less than 2 000 replies per second.</p>

247 Similar Re-wording may not be identical

DO SHALL0128 **Page:** 29 128 **ED** SHALL0213 **Page:** 52 213

2.2.8.1 Response in the Presence of Low Level Asynchronous Interference

3.12.3 Low Level Asynchronous Interference

For all received signals levels between -65 and -21 dBm, given an interrogation that requires a reply according to paragraph 2.2.15 and if no lockout condition is in effect, the transponder shall reply correctly with at least 95 percent reply ratio in the presence of asynchronous interference.

In the presence of asynchronous interference, the transponder shall reply correctly to at least 95% reply of valid Mode S interrogations with received signal levels between -65 and -21 dBm, provided that no lockout condition is in effect.

244 Similar Some subtle differences. The ED is seems more specific in the response. The notes are also quite different **ED SHALL0212 Page: 52 212**
DO SHALL0136 Page: 30 136

2.2.8.5 Simultaneous Interrogation of Mode A and Mode C

3.12.2 Simultaneous Interrogations of Mode A and Mode C

If a transponder receives two valid ATCRBS pulse patterns simultaneously, it shall:

If a transponder recognises two valid pulse patterns simultaneously, it shall

a. Enter the ATCRBS suppression state if one of the received pulse patterns is a P1- P2 suppression pair.

a. enter the Mode A/C suppression state if one of the received pulse patterns is a P1 P2 suppression pair;

b. Generate a valid Mode C reply if the two received pulse patterns are Mode A and Mode C interrogations.

b. and if one of the received pulse patterns is not a P1-P2 suppression pair, then generate a valid Mode C altitude reply if either of the two received pulse patterns is a Mode C interrogation.

Note: Simultaneous receipt of two interrogation pulse patterns can occur wherever there are two or more interrogators transmitting in the same airspace. For example, a single pulse from an interfering interrogator received 8 or 21 microseconds before the second pulse of a P1-P2 pair can cause the transponder to simultaneously recognize an ATCRBS interrogation and an ATCRBS suppression. When this occurs, the Mode S transponder should enter the ATCRBS suppression state. It will thereby be enabled to receive the remainder as a possible interrogation waveform following the P1-P2 pair. A single interference pulse received 8 microseconds before the P3 pulse of a Mode C interrogation (or 21 microseconds before the P3 pulse of a Mode A interrogation) can cause the transponder to simultaneously recognize both interrogation patterns. When this occurs, a Mode C reply is preferred because a missing Mode A reply usually causes less degradation of beacon tracking.

NOTE 1: In a transponder equipped for diversity antenna operation, diversity channel selection takes place before all other processes.

NOTE 2: Simultaneous receipt of two interrogation pulse patterns can occur whenever there are two or more interrogators transmitting in the same airspace. For example, a single pulse from an interfering interrogator received 8 or 21 μs before the second pulse of a P1 P2 pair can cause the transponder to simultaneously recognise a Mode A/C interrogation and a Mode A/C suppression.

NOTE 3: A single interference pulse received 8 μs before the P3 pulse of a Mode C interrogation (or 21 μs before the P3 pulse of a Mode A interrogation) can cause the transponder to simultaneously recognise both interrogation patterns. When this occurs, a Mode C reply is preferred because a missing Mode A reply usually causes less degradation of transponder tracking.

<p>250 Similar May be identical. The ED add "during the test period" to item (2). DO SHALL0139 Page: 30 2.2.10.1 Self Test</p> <p>a. The device that radiates test interrogation signals or prevents transponder reply to proper interrogation during the test period shall be limited to intermittent use is no longer than that required to determine the transponder status.</p>	<p>139</p>	<p>ED SHALL0228 Page: 54 3.14.1 Self Test</p> <p>a. A self test system that: (1) radiates test interrogation signals, or, (2) prevents the transponder replying to valid interrogations during the test period, shall be limited to intermittent use for a duration which is no longer than that needed to determine the transponder status.</p>	<p>228</p>
<p>776 Similar DO SHALL0160 Page: 32 2.2.12.2 Received Signal Delay Tolerance</p> <p>If an interrogation is received at either antenna 0.125 microsecond or less in advance of reception at the other antenna, the interrogations shall be considered simultaneous and the reply antenna selection criteria shall be applied.</p>	<p>160</p>	<p>ED SHALL0254 Page: 57 3.16.4 Received Signal Delay Threshold</p> <p>If an interrogation is received at either antenna 0.125 μs or less in advance of reception at the other antenna, the selection shall be made on the basis of received signal strength.</p>	<p>254</p>
<p>777 Similar DO SHALL0161 Page: 32 2.2.12.2 Received Signal Delay Tolerance</p> <p>If an interrogation is received at either antenna 0.125 microsecond or less in advance of reception at the other antenna, the interrogations shall<<SHALL#0160>> be considered simultaneous and the reply antenna selection criteria shall be applied.</p>	<p>161</p>	<p>ED SHALL0254 Page: 57 3.16.4 Received Signal Delay Threshold</p>	<p>254</p>