



Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION SPECTRUM

IEC 61993-2, CLAUSE 15.1.3

25 kHz Channel Mode

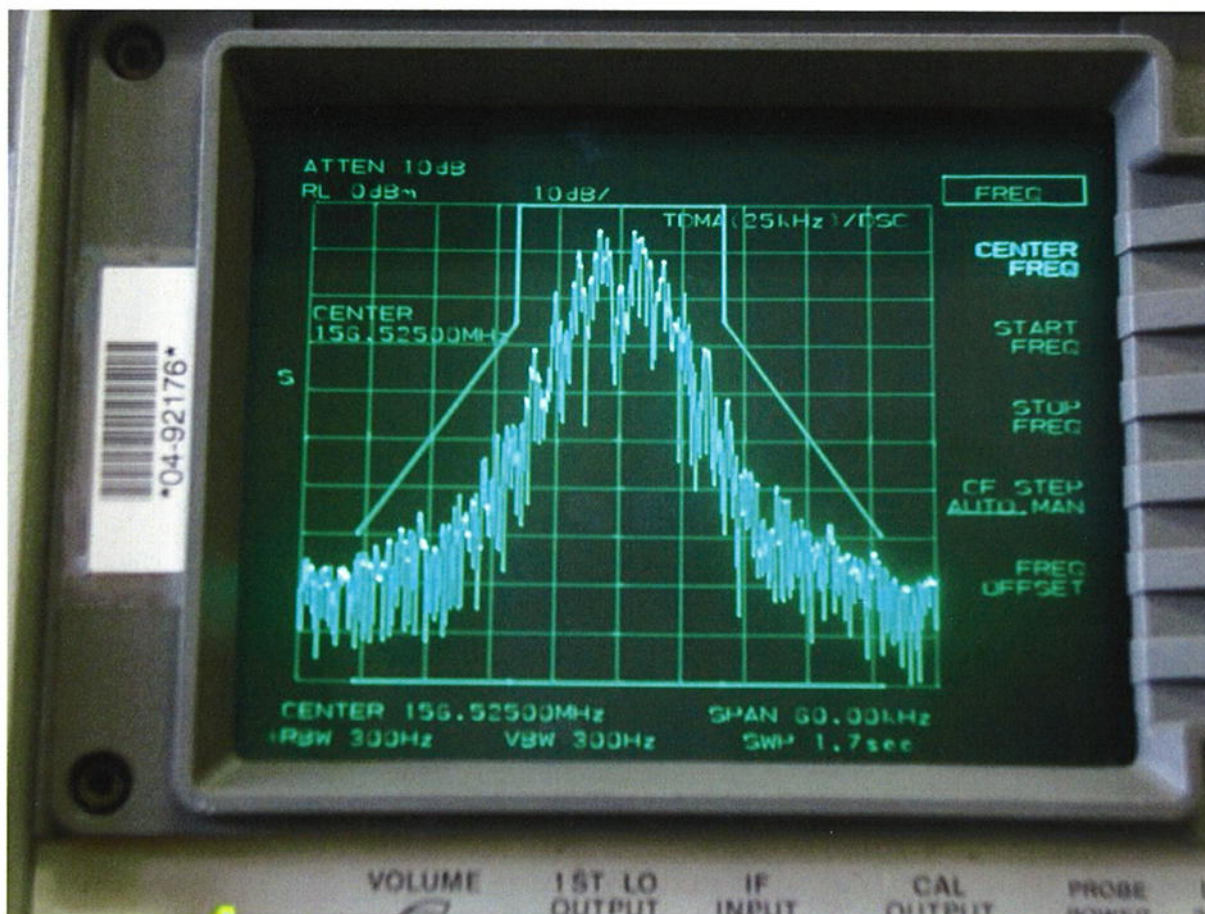


Figure x. Modulation Spectrum, EUT in 25 kHz mode (DSC), operating frequency 156.525 MHz, modulation: standard test signal No. 1



Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION SPECTRUM

IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

See plots on following pages.

Required results

The modulation spectrum shall be within the mask shown on each of the plots.

Remarks

The EUT satisfied the requirements of this test.

Software used: 71

TEST EQUIPMENT USED:
12, 26, 28, 65, 85

.....

Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION SPECTRUM

IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

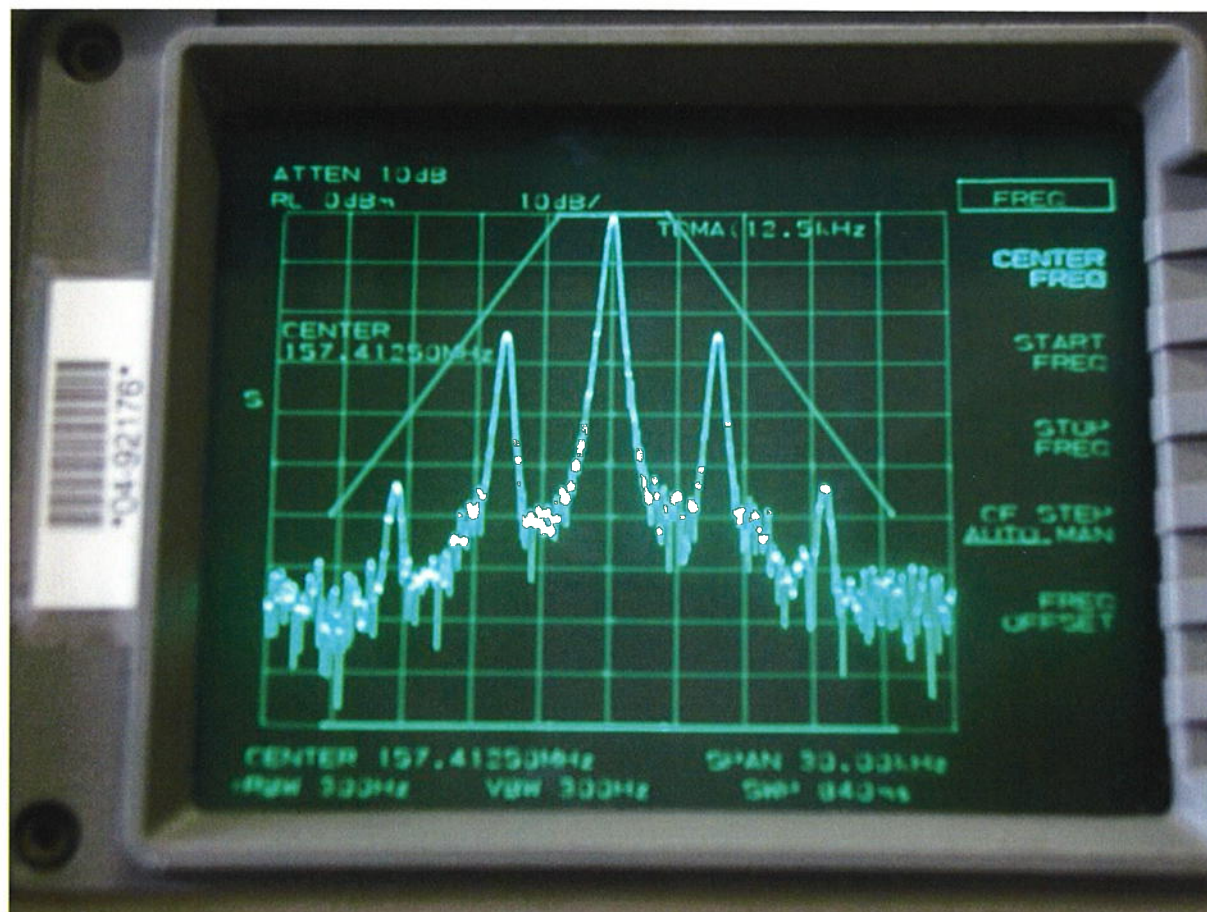


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 157.4125 MHz, modulation: dot pattern 10101010

Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION SPECTRUM

IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

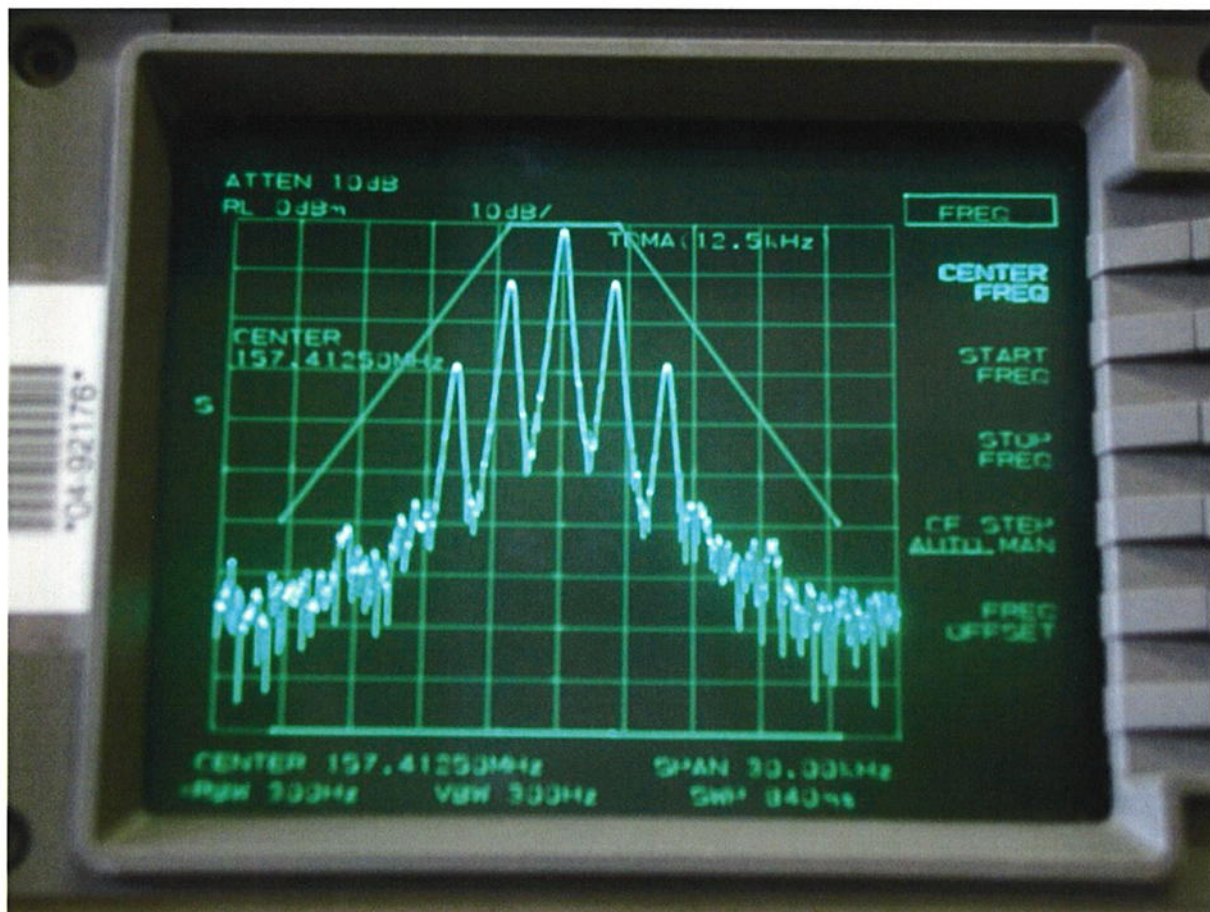


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 157.4125 MHz, modulation: dot pattern 11001100

Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION SPECTRUM

IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

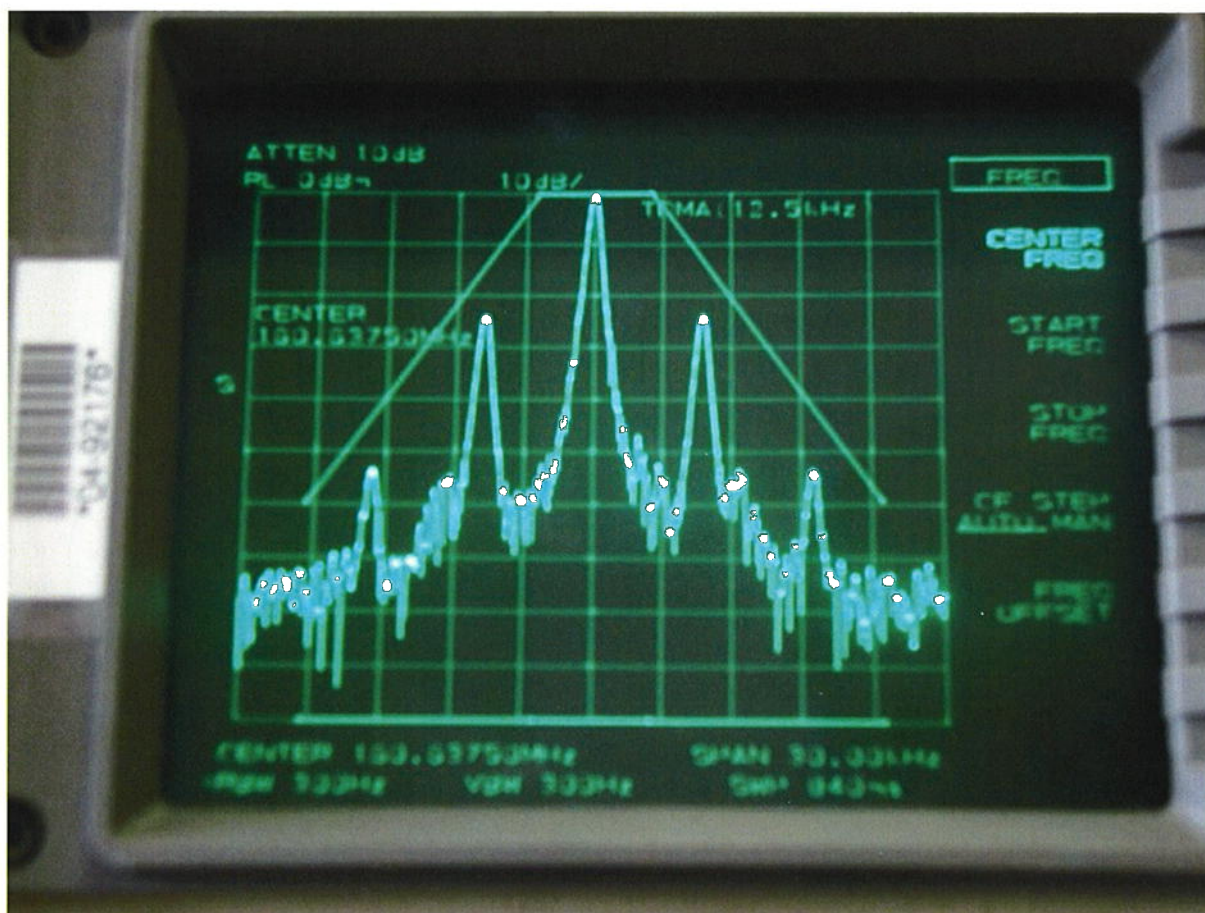


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 160.6375 MHz, modulation: dot pattern 10101010



Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION SPECTRUM

IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

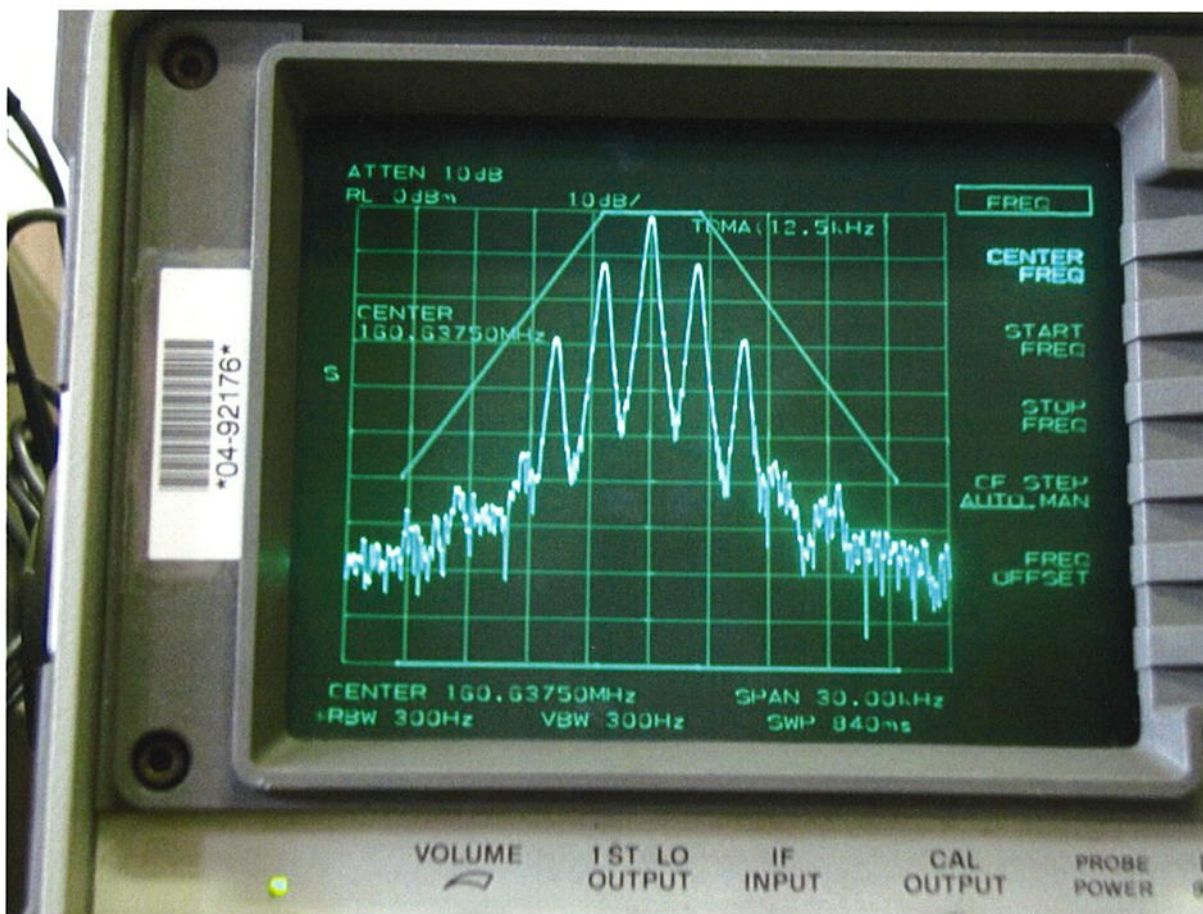


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 160.6375 MHz, modulation: dot pattern 11001100



Ambient temperature +24.5 °C Relative humidity 58 %

TRANSMITTER ATTACK TIME

IEC 61993-2, CLAUSE 15.1.5
Extreme supply IEC 61993-2, CLAUSE 10.2.2

Operating Frequency 162.025 MHz

TEST CONDITIONS		TDMA Transmitter Attack Time		
		Attack time (ms)	Power level deviation (dB)	Frequency error after 1 ms (±kHz)
T _{nom} (+25°C)	AC 220 V, 60 Hz	0.7	+0.75	+0.2
T _{min} (-15/-25°C)*	AC 220 V, 60 Hz	0.8	+0.1	-0.15
T _{max} (+55°C)	AC 220 V, 60 Hz	0.7	+0.75	+0.2
Measurement uncertainty		±5%		

*The NTE-182 and NQD-4382 were at -25°C, all other units at -15°C for this test.

Required results

The Transmitter Attack Time shall not exceed 1 ms and the transient power level shall not exceed ± 1.5 dB of its final value at any time. The carrier frequency shall not exceed ± 1 kHz of its required value after 1 ms.

Remarks

The EUT satisfied the requirements of this test.

Software used: 71

TEST EQUIPMENT USED:
2, 3, 9, 10, 16, 23, 28, 65, 85

.....



Ambient temperature +24.5 °C Relative humidity 58 %

TRANSMITTER ATTACK TIME

IEC 61993-2, CLAUSE 15.1.5
Extreme supply IEC 61993-2, CLAUSE 10.2.2

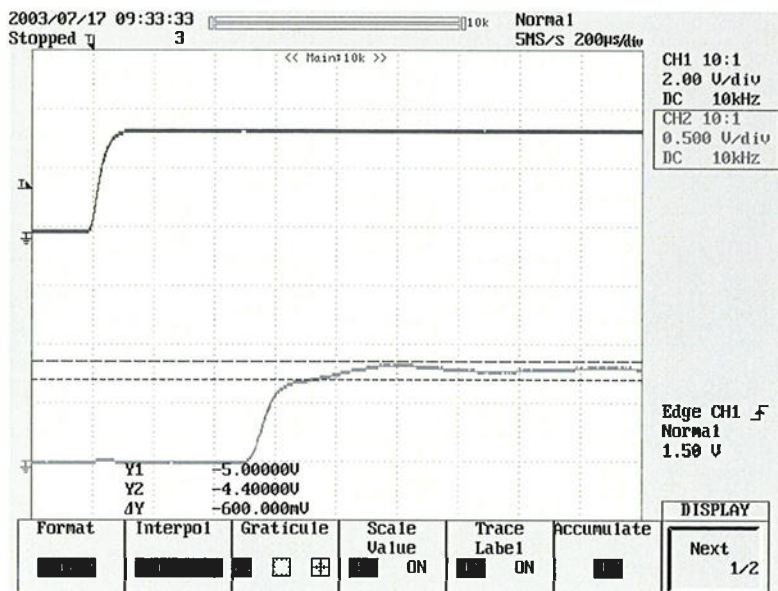


Figure x. Transmitter attack time at normal temperature.



Ambient temperature +25.7°C Relative humidity 66%

TRANSMITTER ATTACK TIME

IEC 61993-2, CLAUSE 15.1.5
Extreme supply IEC 61993-2, CLAUSE 10.2.2

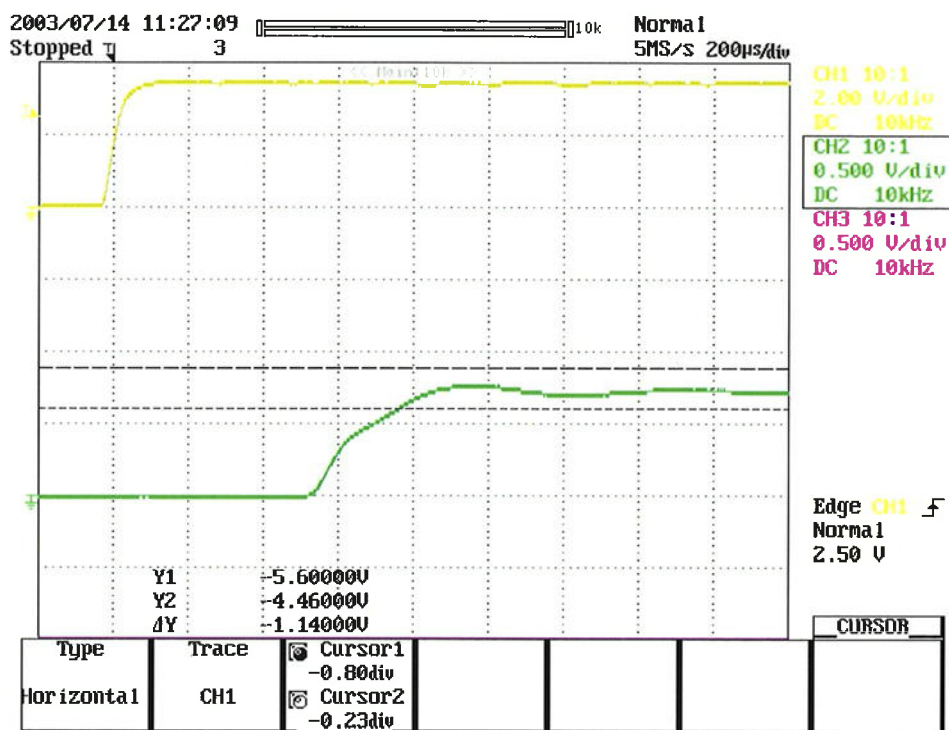


Figure x. Transmitter attack time at -25°C.



Ambient temperature +25.7°C Relative humidity 79%

TRANSMITTER ATTACK TIME

IEC 61993-2, CLAUSE 15.1.5
Extreme supply IEC 61993-2, CLAUSE 10.2.2

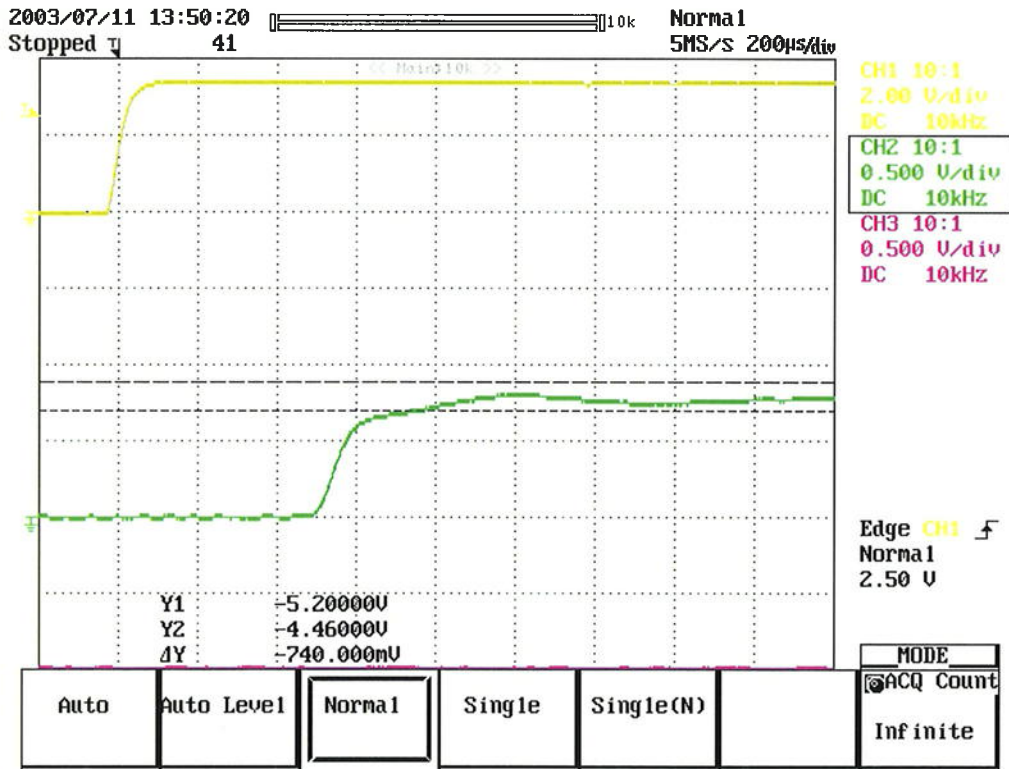


Figure x. Transmitter attack time at +55°C.



Ambient temperature +24.5 °C Relative humidity 58 %

TRANSMITTER RELEASE TIME

IEC 61993-2, CLAUSE 15.1.6
Extreme supply IEC 61993-2, CLAUSE 10.2.2

Operating Frequency 162.025 MHz

TEST CONDITIONS		TDMA Transmitter Release Time (ms)
T _{nom} (+25°C)	AC 220 V, 60 HZ	0.24
T _{min} (-15/-25°C)*	AC 220 V, 60 HZ	0.22
T _{max} (+55°C)	AC 220 V, 60 HZ	0.18
Measurement uncertainty		±5%

* The NTE-182 and NQD-4382 were at -25°C, all other units at -15°C for this test.

Required results:

The Transmitter Release Time shall not exceed 1 ms.

Remarks

The EUT satisfied the requirements of this test.

Software used: 71

TEST EQUIPMENT USED:

2, 3, 8, 23, 27, 28, 65, 85

.....



Ambient temperature +24.5 °C Relative humidity 58 %

TRANSMITTER RELEASE TIME

IEC 61993-2, CLAUSE 15.1.6
Extreme supply IEC 61993-2, CLAUSE 10.2.2

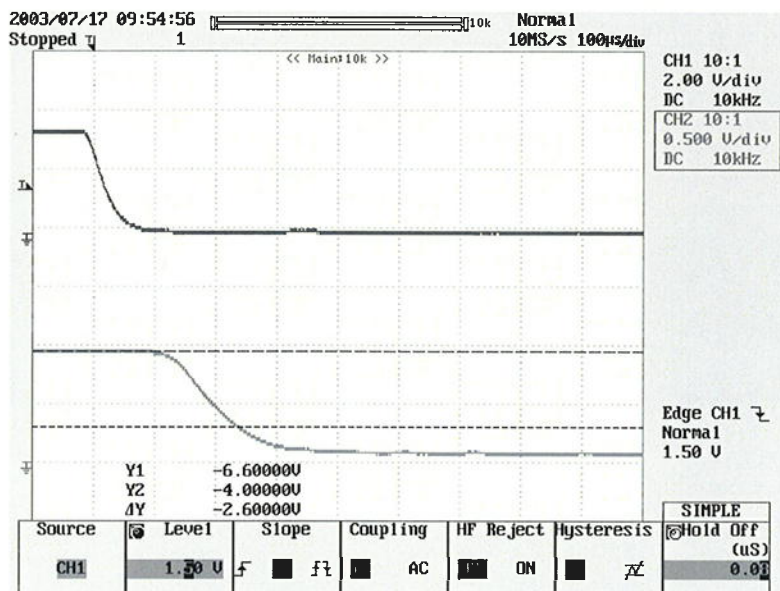


Figure x. Transmitter release time at normal temperature.



Ambient temperature +25.7°C Relative humidity 66%

TRANSMITTER RELEASE TIME

IEC 61993-2, CLAUSE 15.1.6
Extreme supply IEC 61993-2, CLAUSE 10.2.2

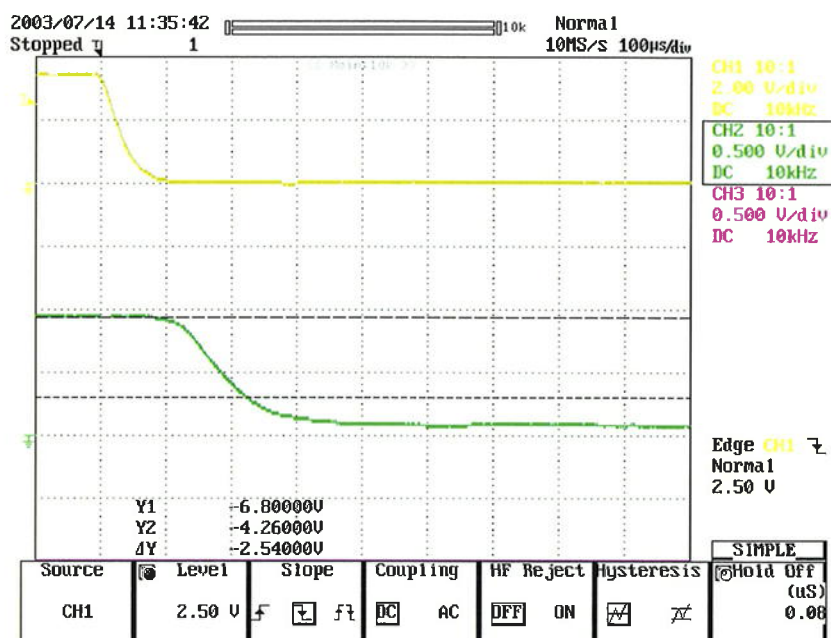


Figure x. Transmitter release time at -25°C.



Ambient temperature +20°C Relative humidity 49%

TRANSMITTER RELEASE TIME

IEC 61993-2, CLAUSE 15.1.6
Extreme supply IEC 61993-2, CLAUSE 10.2.2

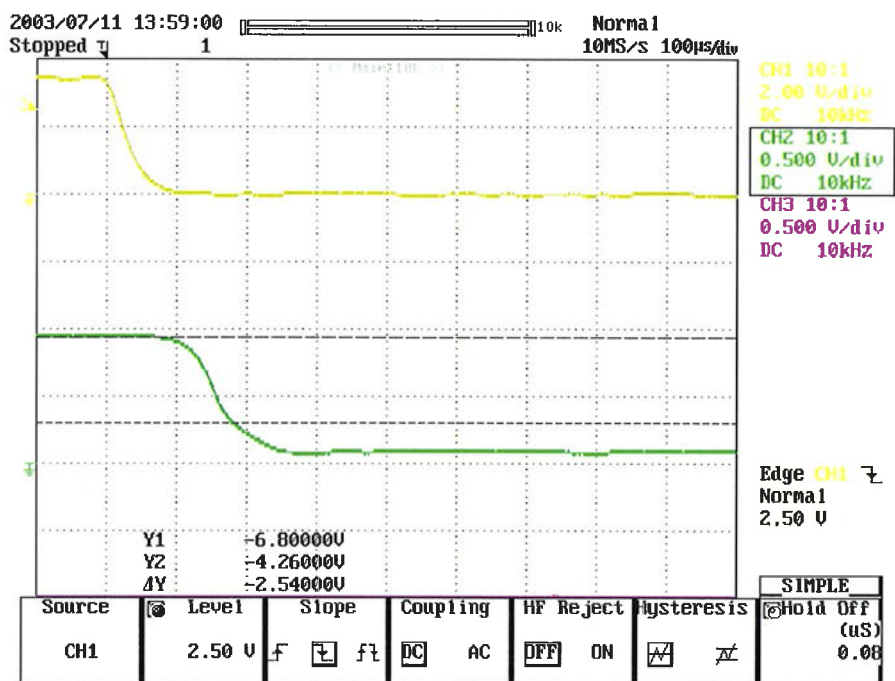


Figure x. Transmitter release time at +55°C.



Ambient temperature +24.5 °C Relative humidity 58 %

FREQUENCY ERROR OF THE DSC SIGNAL

IEC 61993-2, CLAUSE 15.2.1
Extreme supply IEC 61993-2, CLAUSE 10.2.2

TEST CONDITIONS		Frequency Error (Hz)	
		Mark (Y)	Space (B)
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	-1.7	0
T _{min} (-15/-25°C)*	V _{min} (220 V, 60 Hz)	-2	0
T _{max} (+55°C)	V _{max} (220 V, 60 Hz)	-1.5	0
Measurement uncertainty (Hz)		±0.15	

* The NTE-182 and NQD-4382 were at -25°C, all other units at -15°C for this test.

Required results

The B and Y state frequencies for both normal and extreme conditions shall be within ±1%.

Remarks

The EUT satisfied the requirements of this test.

Software used: 71

TEST EQUIPMENT USED:

2, 3, 8, 28, 65,85

.....



Ambient temperature +24.5 °C Relative humidity 58 %

MODULATION RATE

IEC 61993-2, CLAUSE 15.2.2

TEST CONDITIONS		Baud Rate (bits/s)
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	1199.995
Measurement uncertainty (Hz)		±0.0013

Required results:

The Modulation rate shall be 1200 bits per second ±30 ppm. (1199.964 to 1200.036)

Remarks

The EUT satisfied the requirements of this test.

Software used: 71

TEST EQUIPMENT USED:

6, 14, 28, 65

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER SENSITIVITY

IEC 61993-2, CLAUSE 15.3.1
Extreme supply IEC 61993-2, CLAUSE 10.2.2

25 kHz operation

TEST CONDITIONS		Sensitivity (dBm)	
		156.025 MHz	162.025 MHz
T _{nom} (+25°C)	AC 220 V, 60 Hz	Ch A: -113	Ch A: -113
		Ch B: -113	Ch B: -112
T _{min} (-15/-25°C)*	AC 220 V, 60 Hz	Ch A: -113	Ch A: -112
		Ch B: -115	Ch B: -114
T _{max} (+55°C)	AC 220 V, 60 Hz	Ch A: -109	Ch A: -109
		Ch B: -109	Ch B: -109
Measurement uncertainty (dB)		±1.1	

*

Required results

The sensitivity shall be -107dBm under normal conditions and -101dBm under extreme conditions when operating on a 25 kHz channel with a PER of 20%.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

2, 3, 20, 28, 65, 85

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER SENSITIVITY

IEC 61993-2, CLAUSE 15.3.2
Extreme supply IEC 61993-2, CLAUSE 10.2.2

12.5 kHz operation

TEST CONDITIONS		Sensitivity (dBm)	
		157.4125 MHz	160.6375 MHz
T _{nom} (+25°C)	AC 220 V, 60 Hz	Ch A: -105	Ch A: -105
		Ch B: -106	Ch B: -105
T _{min} (-15/-25°C)*	AC 220 V, 60 Hz	Ch A: -106	Ch A: -106
		Ch B: -107	Ch B: -107
T _{max} (+55°C)	AC 220 V, 60 Hz	Ch A: -101	Ch A: -101
		Ch B: -101	Ch B: -101
Measurement uncertainty (dB)		±1.1	

*

Required results:

The sensitivity shall be -98 dBm under normal conditions and -92 dBm under extreme conditions when operating on a 12.5 kHz channel with a PER of 20%.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

2, 3, 20, 28, 65, 85

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER ERROR BEHAVIOUR AT HIGH INPUT LEVELS

IEC 61993-2, CLAUSE 15.3.3

25 kHz operation

TEST CONDITIONS		Messages received	
		156.025 MHz	162.025 MHz
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	-77 dBm I/P	-77 dBm I/P
		Ch A: 1000	Ch A: 1000
		Ch B: 1000	Ch B: 1000
		-7 dBm I/P	-7 dBm I/P
		Ch A: 1000	Ch A: 1000
		Ch B: 1000	Ch B: 1000

Required results

Out of 1000 sent messages, the number of messages not correctly received (lost or corrupted) at -7 dBm shall not differ by more than 10 from that recorded at -77 dBm.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:
20, 28, 65

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Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER CO-CHANNEL REJECTION RATIO

IEC 61993-2, CLAUSE 15.3.4

TEST CONDITIONS	Rejection Ratio (dB)		
T_{nom} (+25°C) V_{nom} (220 V, 60 Hz) 25kHz operation.	SG(A)156.025	SG(A)156.025	SG(A)156.025
	SG(B) FM	SG(B) FM	SG(B) FM
	156.025	156.022	156.028
	Ch A: -9.5	Ch A: -8.0	Ch A: -8.5
	Ch B: -9.5	Ch B: -7.5	Ch B: -9.0
	SG(A)162.025	SG(A)162.025	SG(A)162.025
	SG(B) FM	SG(B) FM	SG(B) FM
	162.025	162.022	162.028
Ch A: -9.5	Ch A: -8.0	Ch A: -9.0	
Ch B: -9.0	Ch B: -8.5	Ch B: -8.5	
SG(A)156.025	SG(A)156.025	SG(A)156.025	
SG(B) GMSK	SG(B) GMSK	SG(B) GMSK	
156.025	156.022	156.028	
Ch A: -6.0	Ch A: -8.5	Ch A: -10.0	
Ch B: -6.0	Ch B: -9.0	Ch B: -9.0	
SG(A)162.025	SG(A)162.025	SG(A)162.025	
SG(B) GMSK	SG(B) GMSK	SG(B) GMSK	
162.025	162.022	162.028	
Ch A: -5.0	Ch A: -5.5	Ch A: -8.0	
Ch B: -5.0	Ch B: -6.5	Ch B: -7.0	
Measurement uncertainty (dB)	±1.7		

Required results

The value of the co-channel rejection ratio, expressed in dB, at the signal displacements given in the method of measurement, shall be between -10 dB and 0 dB. Any positive value is also acceptable.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

16, 20, 21, 24, 25, 28, 65

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER CO-CHANNEL REJECTION RATIO

IEC 61993-2, CLAUSE 15.3.5

TEST CONDITIONS	Rejection Ratio (dB)		
T _{nom} (+25°C) V _{nom} (220 V, 60 Hz) 12.5kHz operation.	SG(A)157.4125	SG(A)157.4125	SG(A)157.4125
	SG(B) FM 157.4125	SG(B) FM 157.411	SG(B) FM 157.414
	Ch A: -14.5 Ch B: -15.0	Ch A: -14.0 Ch B: -15.0	Ch A: -16.0 Ch B: -16.0
	SG(A)160.6375	SG(A)160.6375	SG(A)160.6375
	SG(B) FM 160.6375	SG(B) FM 160.636	SG(B) FM 160.639
	Ch A: -14.5 Ch B: -15.0	Ch A: -14.0 Ch B: -15.5	Ch A: -16.0 Ch B: -16.0
	SG(A)157.4125	SG(A)157.4125	SG(A)157.4125
	SG(B) GMSK 157.4125	SG(B) GMSK 157.411	SG(B) GMSK 157.414
	Ch A: -6.0 Ch B: -6.0	Ch A: -14.5 Ch B: -16.0	Ch A: -16.5 Ch B: -16.0
	SG(A)160.6375	SG(A)160.6375	SG(A)160.6375
SG(B) GMSK 160.6375	SG(B) GMSK 160.636	SG(B) GMSK 160.639	
Ch A: -6.0 Ch B: -6.5	Ch A: -14.5 Ch B: -16.0	Ch A: -16.5 Ch B: -16.5	
Measurement uncertainty (dB)	±1.7		

Required results

The value of the co-channel rejection ratio, expressed in dB, at the signal displacements given in the method of measurement, shall be between -18 dB and 0 dB. Any positive value is also acceptable.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

16, 20, 21, 24, 25, 28, 65

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER ADJACENT CHANNEL SELECTIVITY

IEC 61993-2, CLAUSE 15.3.6

25 kHz operation on 156.025 MHz

TEST CONDITIONS		Adjacent Channel Selectivity (dB)	
		156.025	156.025
SG (A) Frequency (MHz)		156.025	156.025
SG (B) Frequency (MHz)		156.050	156.000
T _{nom} (+25°C)	AC 220 V, 60 Hz	Ch A: 78.0	Ch A: 78.0
		Ch B: 79.0	Ch B: 79.0
T _{min} (-25°C)	AC 220 V, 60 Hz	Ch A: 80.0	Ch A: 80.0
		Ch B: 82.0	Ch B: 82.0
T _{max} (+55°C)	AC 220 V, 60 Hz	Ch A: 77.0	Ch A: 78.0
		Ch B: 78.0	Ch B: 79.0
Measurement uncertainty (dB)		±1.7	

Required results

The adjacent channel selectivity shall not be less than 70 dB under normal test conditions and 60 dB under extreme test conditions.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:
 2, 3, 16, 20, 24, 25, 28, 65



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER ADJACENT CHANNEL SELECTIVITY

IEC 61993-2, CLAUSE 15.3.6

25 kHz operation on 162.025 MHz

TEST CONDITIONS		Adjacent Channel Selectivity (dB)	
		162.025	162.025
SG (A) Frequency (MHz)		162.025	162.025
SG (B) Frequency (MHz)		162.050	162.000
T _{nom} (+25°C)	AC 220V, 60 Hz	Ch A: 78.0	Ch A: 78.0
		Ch B: 79.0	Ch B: 80.0
T _{min} (-15/-25°C)*	AC 220V, 60 Hz	Ch A: 81.0	Ch A: 80.0
		Ch B: 83.0	Ch B: 83.0
T _{max} (+55°C)	AC 220V, 60 Hz	Ch A: 77.0	Ch A: 78.0
		Ch B: 78.0	Ch B: 79.0
Measurement uncertainty (dB)		±1.7	

*

Required results

The adjacent channel selectivity shall not be less than 70 dB under normal test conditions and 60 dB under extreme test conditions.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

2, 3, 16, 20, 24, 25, 28, 65

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER ADJACENT CHANNEL SELECTIVITY

IEC 61993-2, CLAUSE 15.3.7

12.5 kHz operation on 157.4125 MHz

TEST CONDITIONS		Adjacent Channel Selectivity (dB)	
		157.4125	157.4125
SG (A) Frequency (MHz)		157.425	157.400
SG (B) Frequency (MHz)			
T _{nom} (+25°C)	AC 220 V, 60 Hz	Ch A: 59.0	Ch A: 59.0
		Ch B: 59.0	Ch B: 61.0
T _{min} (-15/-25°C)*	AC 220 V, 60 Hz	Ch A: 61.0	Ch A: 56.0
		Ch B: 56.0	Ch B: 62.0
T _{max} (+55°C)	AC 220 V, 60 Hz	Ch A: 57.0	Ch A: 59.0
		Ch B: 56.0	Ch B: 61.0
Measurement uncertainty (dB)		±1.7	

* The NTE-182 and the NQD-4382 were at -25°C, all other units at -15°C.

Required results:

The adjacent channel selectivity shall not be less than 50 dB under normal test conditions and extreme test conditions.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

2, 3, 16, 20, 24, 25, 28, 65



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER ADJACENT CHANNEL SELECTIVITY

IEC 61993-2, CLAUSE 15.3.7

12.5 kHz operation on 160.6375 MHz

TEST CONDITIONS		Adjacent Channel Selectivity (dB)	
		160.6375	160.6375
SG (A) Frequency (MHz)		160.650	160.625
SG (B) Frequency (MHz)			
T _{nom} (+25°C)	AC 220, 60 Hz	Ch A: 59.0	Ch A: 59.0
		Ch B: 58.0	Ch B: 61.0
T _{min} (-15/-25°C)*	AC 220, 60 Hz	Ch A: 61.0	Ch A: 56.0
		Ch B: 56.0	Ch B: 63.0
T _{max} (+55°C)	AC 220, 60 Hz	Ch A: 57.0	Ch A: 59.0
		Ch B: 56.0	Ch B: 61.0
Measurement uncertainty (dB)		±1.7	

* The NTE-182 and the NQD-4382 were at -25°C, all other units at -15°C.

Required results:

The adjacent channel selectivity shall not be less than 50 dB under normal test conditions and extreme test conditions.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

2, 3, 16, 20, 24, 25, 28, 65

.....



Ambient temperature +25.7 °C Relative humidity 64 %

TDMA RECEIVER SPURIOUS RESPONSE REJECTION

IEC 61993-2, CLAUSE 15.3.8

Test Conditions	TDMA Receiver Spurious Response Rejection (dB)			
T_{nom} (+25°C) V_{nom} (220 V, 60 Hz)	SG_A:156.025MHz SG_B:50.75MHz IF1	SG_A:156.025MHz SG_B:0.45MHz IF2	SG_A:156.025MHz SG_B:257.525MHz RF+2*IF1	SG_A:156.025MHz SG_B:155.125MHz RF-2*IF2
	Ch_A	Ch_A	Ch_A	Ch_A
	>80.0	>80.0	>80.0	79.0
	SG_A:162.025MHz SG_B:50.75MHz IF1	SG_A:162.025MHz SG_B:0.45MHz IF2	SG_A:162.025MHz SG_B:263.525MHz RF+2*IF1	SG_A:162.025MHz SG_B:161.125MHz RF-2*IF2
	Ch_A	Ch_A	Ch_A	Ch_A
	>80.0	>80.0	>80.0	79.0
SG_A:156.025MHz SG_B:38.85MHz IF1	SG_A:156.025MHz SG_B:0.45MHz IF2	SG_A:156.025MHz SG_B:233.725MHz RF+2*IF1	SG_A:156.025MHz SG_B:156.925MHz RF+2*IF2	
Ch_B	Ch_B	Ch_B	Ch_B	
79.0	>80.0	>80.0	73.5	
SG_A:162.025MHz SG_B:38.85MHz IF1	SG_A:162.025MHz SG_B:0.45MHz IF2	SG_A:162.025MHz SG_B:239.725MHz RF+2*IF1	SG_A:162.025MHz SG_B:162.925MHz RF+2*IF2	
Ch_B	Ch_B	Ch_B	Ch_B	
76.0	>80.0	>80.0	73.0	
Measurement Uncertainty (dB)	±1.7			

Required results:

At any frequency separated from the nominal frequency of the receiver by two channels or more, the spurious response rejection shall not be less than 70 dB.

(continued)



Ambient temperature +25.7 °C Relative humidity 64 %

TDMA RECEIVER SPURIOUS RESPONSE REJECTION

IEC 61993-2, CLAUSE 15.3.8

Test Conditions	TDMA Receiver Spurious Response Rejection (dB)			
T _{nom} (+25°C) V _{nom} (220 V, 60 Hz)	SG_A:156.025MHz SG_B:362.8MHz 2*LO1-IF1	SG_A:156.025MHz SG_B:464.3MHz 2*LO1+IF1	SG_A:156.025MHz SG_B:101.05MHz 2*IF1-IF2	SG_A:156.025MHz SG_B:101.95MHz 2*LO2-IF2
	Ch_A >80.0	Ch_A >80.0	Ch_A >80.0	Ch_A >80.0
	SG_A:162.025MHz SG_B:374.8MHz 2*LO1-IF1	SG_A:162.025MHz SG_B:476.3MHz 2*LO1+IF1	SG_A:162.025MHz SG_B:101.05MHz 2*IF1-IF2	SG_A:162.025MHz SG_B:101.95MHz 2*LO2-IF2
	Ch_A >80.0	Ch_A >80.0	Ch_A >80.0	Ch_A >80.0
	SG_A:156.025MHz SG_B:350.9MHz 2*LO1-IF1	SG_A:156.025MHz SG_B:428.6MHz 2*LO1+IF1	SG_A:156.025MHz SG_B:77.25MHz 2*IF1-IF2	SG_A:156.025MHz SG_B:76.35MHz 2*LO2-IF2
	Ch_B >80.0	Ch_B >80.0	Ch_B >80.0	Ch_B >80.0
	SG_A:162.025MHz SG_B:362.9MHz 2*LO1-IF1	SG_A:162.025MHz SG_B:440.6MHz 2*LO1+IF1	SG_A:162.025MHz SG_B:77.25MHz 2*IF1-IF2	SG_A:162.025MHz SG_B:76.35MHz 2*LO2-IF2
	Ch_B >80.0	Ch_B >80.0	Ch_B >80.0	Ch_B >80.0
Measurement Uncertainty (dB)	±1.7			

Required results:

At any frequency separated from the nominal frequency of the receiver by two channels or more, the spurious response rejection shall not be less than 70 dB.

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

16, 20, 24, 25, 28, 65

.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER
INTERMODULATION RESPONSE REJECTION AND BLOCKING

IEC 61993-2, CLAUSE 15.3.9

25 kHz operation

TEST CONDITIONS		Test Result (% Error)	
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	Test #1	Test #2
		SG(A): 156.025	SG(A): 162.025
		SG(B): 156.525	SG(B): 161.525
		SG(C): 157.025	SG(C): 161.025
		SG(D): 161.750	SG(D): 156.300
		Ch A: 1.1	Ch A: 0 (zero)
		CH: B: 1.5	CH: B: 16.4

Required results

The packet error rate, with the outputs of signal generators B, C and D switched on, shall be 20% or less.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:
13, 16, 17, 20, 22, 24, 25, 28, 65
.....



Ambient temperature +25.7 °C Relative humidity 53 %

TDMA RECEIVER
TRANSMIT TO RECEIVE SWITCHING TIME

IEC 61993-2, CLAUSE
15.3.10

25 kHz operation

TEST CONDITIONS		Test Result (% PER)			
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	156.025 MHz	156.025 MHz	162.025 MHz	162.025 MHz
		Pat. 10101010	Pat.11001100	Pat. 10101010	Pat. 11001100
		Ch A: 0.49	Ch A: 0.5	Ch A: 0.6	Ch A: 0.5
		Ch: B: 0.4	Ch: B: 1.1	Ch: B: 0.5	Ch: B: 0.8
Measurement uncertainty (dB)		±1.7			

Required results

The sensitivity shall be -107 dBm with a PER of no greater than 20% under normal test conditions.

Remarks

The EUT satisfied the requirements of this test.

Software used: 74

TEST EQUIPMENT USED:

14, 20, 28, 65, 85

.....



Ambient temperature +25.7 °C Relative humidity 64 %

DSC RECEIVER MAXIMUM SENSITIVITY

IEC 61993-2, CLAUSE 15.4.1

Operation on 156.525 MHz

TEST CONDITIONS		Maximum Sensitivity (dBm)		
		156.5235 MHz	156.525 MHz	156.5265 MHz
T _{nom} (+20°C)	AC 220V, 60 Hz	-113.0	-112.5	-110.0
T _{min} (-15/-25°C)*	AC 220V, 60 Hz	-116.0	-114.0	-113.0
T _{max} (+55°C)	AC 220V, 60 Hz	-109.5	-107.5	-105.5
Measurement uncertainty (dB)		±1.7		

* The NTE-182 and the NQD-4382 were at -25°C, all other units at -15°C.

Required results

The Maximum Sensitivity shall be less than -107 dBm under normal test conditions and -101 dBm under extreme test conditions. The test shall be repeated at the nominal carrier frequency (156.525 MHz) ±1.5 kHz.
The bit error rate (BER) shall not exceed 10⁻².

Remarks

The EUT satisfied the requirements of this test.

Software used: 70,72

TEST EQUIPMENT USED:
2, 3, 8, 19, 28, 61, 64, 65, 69

.....



Ambient temperature +25.7°C Relative humidity 64%

DSC RECEIVER ERROR BEHAVIOUR AT HIGH INPUT LEVELS

IEC 61993-2, CLAUSE 15.4.2

Normal supply conditions.

Operation on 156.525 MHz

TEST CONDITIONS		Bit Error Rate
$T_{nom}(+25^{\circ}\text{C})$	$V_{nom}(220\text{ V}, 60\text{ Hz})$	0 (no errors)
Measurement uncertainty (dB)		± 1.7

Required results

The Bit Error Rate shall not exceed 10^{-2} .

Remarks

The EUT satisfied the requirements of this test.

Software used: 70, 73

TEST EQUIPMENT USED:

19, 28, 61, 64, 65, 69

.....



Ambient temperature +25.7 °C Relative humidity 64 %

DSC RECEIVER CO-CHANNEL REJECTION RATIO

IEC 61993-2, CLAUSE 15.4.3

Operation on 156.525 MHz

TEST CONDITIONS		Rejection Ratio (dB)		
		SG(A) 156.525 MHz	SG(A) 156.525 MHz	SG(A) 156.525 MHz
		SG(B) 156.522 MHz	SG(B) 156.525 MHz	SG(B) 156.528 MHz
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	-3.5	-3.5	-3.5
Measurement uncertainty (dB)		±1.7		

Required results

The value of the co-channel rejection ratio, expressed in dB, at the signal displacements given in the method of measurement, shall be between -10 dB and 0 dB. The BER shall not exceed 10⁻².

Remarks

The EUT satisfied the requirements of this test.

Software used: 70, 73

TEST EQUIPMENT USED:
 16, 19, 24, 25, 28, 61, 64, 65, 69



Ambient temperature +25.7 °C Relative humidity 64 %

DSC RECEIVER ADJACENT CHANNEL SELECTIVITY

IEC 61993-2, CLAUSE 15.4.4
Extreme supply IEC 61993-2, CLAUSE 10.2.2

Operation on 156.525 MHz

TEST CONDITIONS		Adjacent Channel Selectivity (dB)	
		SG (A)156.525 MHz SG (B)156.500 MHz	SG (A)156.525 MHz SG (B)156.550 MHz
T _{nom} (+25°C)	AC 220 V, 60 Hz	78.5	79
T _{min} (-15/-25°C)*	AC 220 V, 60 Hz	77	79
T _{max} (+55°C)	AC 220 V, 60 Hz	76	76
Measurement uncertainty (dB)		±1.7	

* The NTE-182 and the NQD-4382 were at -25°C, all other units at -15°C.

Required results

The Adjacent Channel Selectivity for different channel separations shall be no less than 70 dB under normal test conditions and 60 dB under extreme test conditions.

Remarks

The EUT satisfied the requirements of this test.

Software used: 70, 73

TEST EQUIPMENT USED:
2, 3, 16, 19, 24, 25, 28, 61, 64, 65, 69



Ambient temperature + 24.8 °C Relative humidity 55 %

DSC RECEIVER SPURIOUS RESPONSE REJECTION

IEC 61993-2, CLAUSE 15.4.5

EUT operating on 156.525 MHz

TEST CONDITIONS	Unwanted Frequency (MHz)	Spurious Response Rejection ratio (dB)
$T_{nom} +25^{\circ}C$, $V_{nom} 220 V, 60 Hz$ $f_{unwanted} = 100 kHz$ to 2 GHz in 10 kHz steps.	161.065	80.1
	172.795	78.8

Required results:

At any frequency separated from the nominal frequency of the receiver by two channels or more, the spurious response rejection ratio shall not be less than 70dB.

There were no other responses between 100 kHz and 2 GHz.

The EUT satisfied the requirements of this test.

Software used: 70, 72, 73

TEST EQUIPMENT USED:
16, 19, 24, 25, 28, 61, 64, 65, 69, 83
.....



Ambient temperature +25.7 °C Relative humidity 64 %

DSC RECEIVER INTERMODULATION RESPONSE REJECTION

IEC 61993-2, CLAUSE 15.4.6

Normal supply.

Operation on 156.525 MHz

TEST CONDITIONS		Intermodulation Response Rejection Ratio (dB)	
		SG (A)156.525 MHz SG (B)156.575 MHz SG(C) 156.625 MHz	SG (A)156.525 MHz SG (B)156.475 MHz SG(C) 156.425 MHz
T _{nom} (+25°C)	V _{nom} (220 V, 60 Hz)	69.5	69.5
Measurement uncertainty (dB)		±1.7	

Required results

The intermodulation response rejection ratio shall not be less than 65 dB.
The BER shall not exceed 10⁻².

Remarks

The EUT satisfied the requirements of this test.

Software used: 70, 73

TEST EQUIPMENT USED:
16, 19, 22, 25, 28, 61, 64, 65, 69

.....