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Report On

Radio Approval Testing of the
SRT Marine Technology Ltd Cobalt: Class B AIS Unit
In accordance with IEC 62287-1

Document 75912008 Report 03 Issue 1 March 2011

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REPORT ON

Radio Approval Testing of the
SRT Marine Technology Ltd Cobalt: Class B AIS Unit
In accordance with IEC 62287-1

Document 75912008 Report 03 Issue 1

March 2011

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08 March 2011

Product Service

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SECTION 1

REPORT SUMMARY

Radio Approval Testing of the
SRT Marine Technology Ltd Cobalt: Class B AIS Unit
In accordance with IEC 62287-1

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Radio Approval Testing of the SRT Marine Technology Ltd Cobalt: Class B AIS Unit to the requirements of IEC 62287-1.

Objective	To perform Radio Approval Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	SRT Marine Technology Ltd
Model Number(s)	011-0014
Serial Number(s)	10
Number of Samples Tested	One
Test Specification/Issue/Date	IEC 62287-1 Edition 2: 2010
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	R001715 02 December 2010
Start of Test	20 December 2010
Finish of Test	25 January 2011
Name of Engineer(s)	M Russell B Airs G Lawler

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with IEC 62287-1 is shown below.

Section	Spec Clause	Test Description	Result	Comments
2.1	11.1.1	TDMA Transmitter – Frequency Error	Pass	
2.2	11.1.2	TDMA Transmitter – Carrier Power	Pass	
2.3	11.1.3	TDMA Transmitter – Transmission Spectrum	Pass	
2.4	11.1.4	TDMA Transmitter – Modulation Accuracy	Pass	
2.5	11.1.5	TDMA Transmitter – Transmitter Output Power Vs Time Function	Pass	
2.6	11.2.1	TDMA Receiver - Receiver Sensitivity	Pass	
2.7	11.2.2	TDMA Receiver – Error Behaviour At High Input Levels	Pass	
2.8	11.2.3	TDMA Receiver – Co Channel Rejection	Pass	
2.9	11.2.4	TDMA Receiver – Adjacent Channel Selectivity	Pass	
2.10	11.2.5	TDMA Receiver – Spurious Response Rejection	Pass	
2.11	11.2.6	TDMA Receiver – Intermodulation Response Rejection	Pass	
2.12	11.2.7	TDMA Receiver – Blocking Or Desensitisation	Pass	
2.13	11.3.1	TDMA Receiver – Conducted Spurious Emissions From Receiver	Pass	
2.14	11.3.2	TDMA Receiver – Conducted Spurious Emissions From Transmitter	Pass	
2.15	C.4.2	DSC Receiver – Maximum Sensitivity	Pass	
2.16	C.4.3	DSC Receiver – Error Behaviour at High Input Levels	Pass	
2.17	C.4.4	DSC Receiver – Co Channel Rejection	Pass	
2.18	C.4.5	DSC Receiver – Adjacent Channel Selectivity	Pass	
2.19	C.4.6	DSC Receiver – Spurious Response Rejection	Pass	
2.20	C.4.7	DSC Receiver – Intermodulation Response Rejection	Pass	
2.21	C.4.8	DSC Receiver – Blocking Or Desensitisation	Pass	

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	COBALT
Part Number	011-0014
Technical Description (Please provide a brief description of the intended use of the equipment)	Marine AIS CSTDMA Class B Transceiver to IEC62287-1

TYPE OF EQUIPMENT		
☐	Base Station	(Equipment fitted with an antenna socket for use with an external antenna, and intended for use in a fixed location).
☒	Mobile Station	(Mobile equipment fitted with an antenna socket, for use with an external antenna, normally used in a vehicle or as a transportable station).
☐	Hand Portable	(fitted with an antenna socket)
☐	Hand Portable	(without an external antenna socket integral antenna equipment, but fitted with a permanent internal or a temporary internal 50 ohm R.F. connector which allows access to the transmitter output and the receiver input)
☐	Other	

TYPE OF EQUIPMENT					
Base Station	☐	Mobile Station	☒	Hand Portable	☐
☐ Transmitter			☐ Simplex		
☐ Receiver			☒ Duplex		
☒ Transceiver			☐ Communal Site use (70dB limit)		

TRANSMITTER TECHNICAL CHARACTERISTICS		
FREQUENCY CHARACTERISTICS		
Transmitter channel switching frequency range:	156.025 to 162.025	MHz (MHz Range)
Transmitter frequency alignment range:	156.0 to 162.0	MHz (MHz Range)

TRANSMITTER POWER CHARACTERSITICS								
Is transmitter intended for :								
Continuous duty						☐	Yes	☒ No
Intermittent duty only						☒	Yes	☐ No
If intermittent duty state DUTY CYCLE								
Transmitter ON	0.0267	Seconds		Transmitter OFF	30	Seconds		
Is transmitter output power variable?						☒	Yes	☐ No
If yes								
RF output power (watts)	2	Maximum			2	Minimum		
Is the RF power								
continuously variable						☐	Yes	☒ No
Or								
stepped						☐	Yes	☒ No
If stepped							dB per step	

TRANSMITTER - MODULATION			
Amplitude	☐	Other	☐
Frequency	☐	Details :	
Phase	☒		
Can the transmitter be operated without modulation (See Note 1)		☒ Yes	☐ No

RECEIVER TECHNICAL CHARACTERISTICS		
Intermediate Frequencies		
☒ 1st ☒ 2nd ☐ 3rd		
Is local oscillator injection frequency higher or lower than the receiver nominal frequency?		
☐ Higher ☒ Lower		
RECEIVER CHANNEL SWITCHING FREQUENCY RANGE	156.025 to 156.025	MHz (MHz Range)
RECEIVER FREQUENCY ALIGNMENT RANGE	156.0 to 162.0	MHz (MHz Range)

RECEIVER AUDIO (AF) CHARACTERISTICS				
MAXIMUM RATED AUDIO (AF) FREQUENCY OUTPUT POWER				
Into Loudspeaker	N/A	Watts		
Into Line	N/A	Watts		
Into Earpiece	N/A	Watts		
Balanced			☐ Yes	☐ No
Unbalanced			☐ Yes	☐ No
Does connection carry DC voltage?			☐ Yes	☐ No
If Yes, please state value:	N/A			
Normal Audio load impedance:				
At Loudspeaker	N/A	Ohms		
At Line	N/A	Ohms		
At Earpiece	N/A	Ohms		
At audio accessory connection or facility socket (if fitted):				
Output	N/A	Watts		
Impedance	N/A	Ohms		
Max input level at audio accessory socket:				
Output	N/A	mV		
Impedance	N/A	Ohms		

TRANSMITTER AND RECEIVER CHARACTERISTICS			
Channel Separation:	25	kHz	
State the maximum number of channels over which the equipment can operate			240

EXTREME TEMPERATURE RANGE over which equipment is to be type tested
☐ -25°C to +55°C
☒ -15°C to +55°C
☐ -10°C to +55°C

POWER SOURCE			
☐	AC mains		State voltage
	AC supply frequency	(Hz)	
	VAC		
	Max Current		
	Hz		
☐	Single phase		☐ Three phase
And / Or			
☒	External DC supply		
	Nominal voltage	12V V	Max Current 1A A
	Extreme upper voltage	31.2 V	
	Extreme lower voltage	10.8 V	
Battery			
☐	Nickel Cadmium		☐ Lead acid (Vehicle regulated)
☐	Alkaline		☐ Leclanche
☐	Lithium		☐ Other Details :
	Volts nominal.		
End point voltage as quoted by equipment manufacturer			V

AUTOMATIC EQUIPMENT SWITCH OFF	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
☐ Applies	V cut-off voltage
☒ Does not apply	

ALIGNMENT RANGE			
The definition of the alignment range AR1 and AR2 are given in Sub Clauses 3.1.2 and 3.1.3 of the Standard. The applicant should ensure that the sample equipment(s) submitted are operational on the appropriate channel(s) as given in Sub Clauses 3.1.5 through to 3.1.11 and tick the appropriate box.			
	3.1.5	One sample single channel equipment of category AR1	☐
Or	3.1.6	Three samples of single channel equipments of category AR2	☐
Or	3.1.7	One sample two channel equipment of category AR1	☐
Or	3.1.8	Three samples of two channel equipment of category AR2	☐
Or	3.1.9	One sample multichannel equipment of category AR1	☐
Or	3.1.10	Three samples of multichannel equipment of category AR2	☐
Or	3.1.11	One sample of multichannel equipment of category AR2 where the switching range equals the alignment range	☐

CHANNEL IDENTIFICATION			
Each equipment, whether one or more submitted for tests shall carry clear identification (such as a serial number), together with the frequencies associated with the channel identification displayed on the equipment.			
Equipment Identification eg Serial Number	Channel Number	Transmit Nominal Freq MHz	Receive Nominal Freq MHz
10	AIS 1 and AIS	161.975MHz and 162.025MHz	161.975MHz and 162.025MHz
11	AIS 1 and AIS	161.975MHz and 162.025MHz	161.975MHz and 162.025MHz
12	AIS1 and AIS2	161.975MHz and 162.025MHz	161.975MHz and 162.025MHz

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

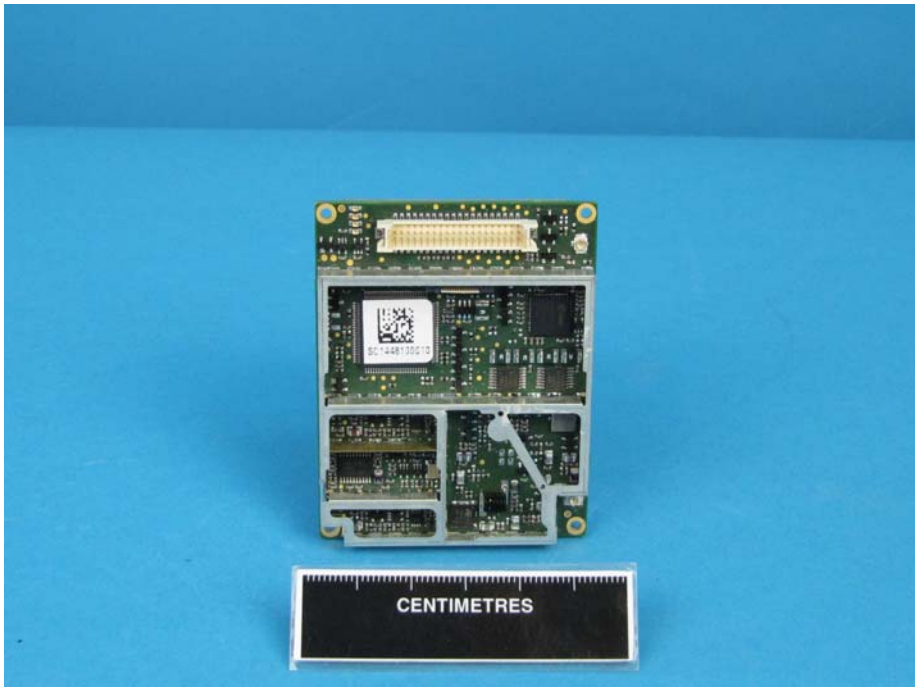
Signature:  Name: Nathan Emery

Position held: Test & Quality Manager Date: 15th February 2011

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine Technology Ltd Cobalt: Class B AIS Unit as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test

1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

The table below details modifications made to the EUT during the test programme. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable
1	Rx1 Tuning Range Extended (C261 Fitted)	Nathan Emery	06 January 2011

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SECTION 2

TEST DETAILS

Radio Approval Testing of the
SRT Marine Technology Ltd Cobalt: Class B AIS Unit
In accordance with IEC 62287-1

2.1 TDMA TRANSMITTER – FREQUENCY ERROR

2.1.1 Specification Reference

IEC 62287-1, Clause 11.1.1

2.1.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.1.3 Date of Test and Modification State

20 December 2010- Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Environmental Conditions

Ambient Temperature	20.2°C
Relative Humidity	22.2%

2.1.6 Test Results

12 V DC Supply

Transmitted unmodulated

Test Conditions		Frequency Error (kHz)			
		Lowest Operating Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		TX1	TX2	TX1	TX2
T_{nom}(+20.2°C)	V_{nom}(12.00V)	0	0	0	0
T_{max}(+55°C)	V_{max}(31.20V)	0	0	0.3205	0
T_{min}(-15°C)	V_{min}(10.80V)	0.3205	0	0.3205	0
Measurement uncertainty (Hz)		±9.25			

Limit Clause 11.1.1.3

The frequency error shall not exceed ±0.5 kHz under normal and ±1 kHz under extreme test conditions.

2.2 TDMA TRANSMITTER – CARRIER POWER

2.2.1 Specification Reference

IEC 62287-1, Clause 11.1.2

2.2.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.2.3 Date of Test and Modification State

20 December 2010 - Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Environmental Conditions

Ambient Temperature	20.6°C
Relative Humidity	23.5%

2.2.6 Test Results

12V DC Supply

Test Signal Number 4

Test Conditions		Carrier Power (dBm)			
		Lowest Operating Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		TX1	TX2	TX1	TX2
T_{nom}(+20.6°C)	V_{nom}(12.00V)	33.70	33.72	33.20	33.26
T_{max}(+55°C)	V_{max}(31.20V)	33.21	33.29	32.47	32.63
T_{min}(-15°C)	V_{min}(10.80V)	32.87	32.91	32.44	32.49
Measurement uncertainty (dB)		±0.70			

Limit Clause 11.1.2.3

At all test frequencies, the carrier power shall be 33 dBm ±1.5 dBm under normal test conditions.

At all test frequencies the carrier power shall be 33 dBm ±3 dBm under extreme test conditions.

2.3 TDMA TRANSMITTER – TRANSMISSION SPECTRUM

2.3.1 Specification Reference

IEC 62287-1, Clause 11.1.3

2.3.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.3.3 Date of Test and Modification State

20 December 2010 - Modification State 0

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Environmental Conditions

Ambient Temperature	21.6°C
Relative Humidity	26.2%

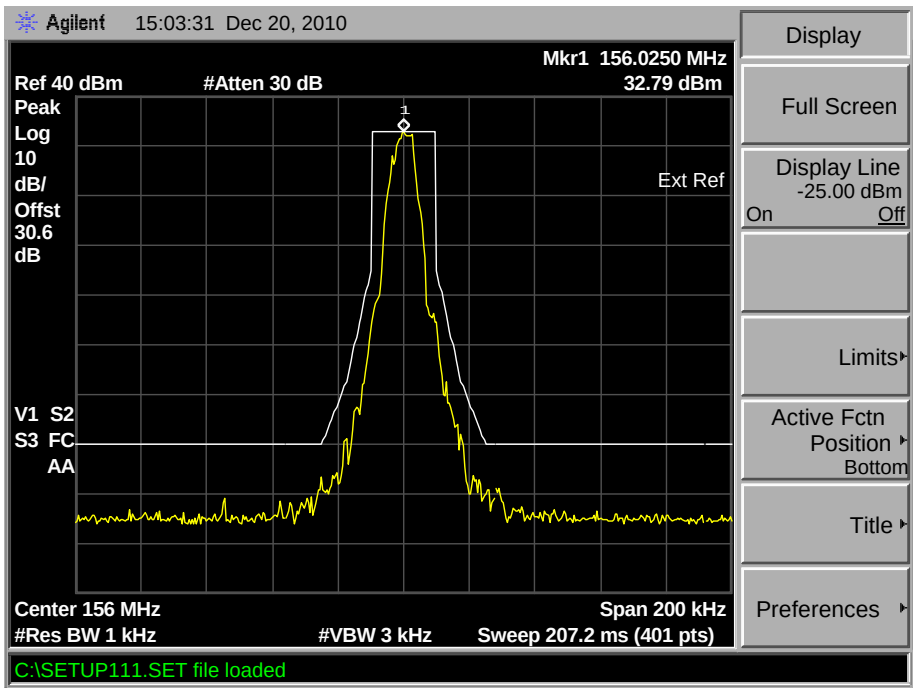
2.3.6 Test Results

12V DC Supply

Test Signal Number 4

156.025 MHz

Tx1



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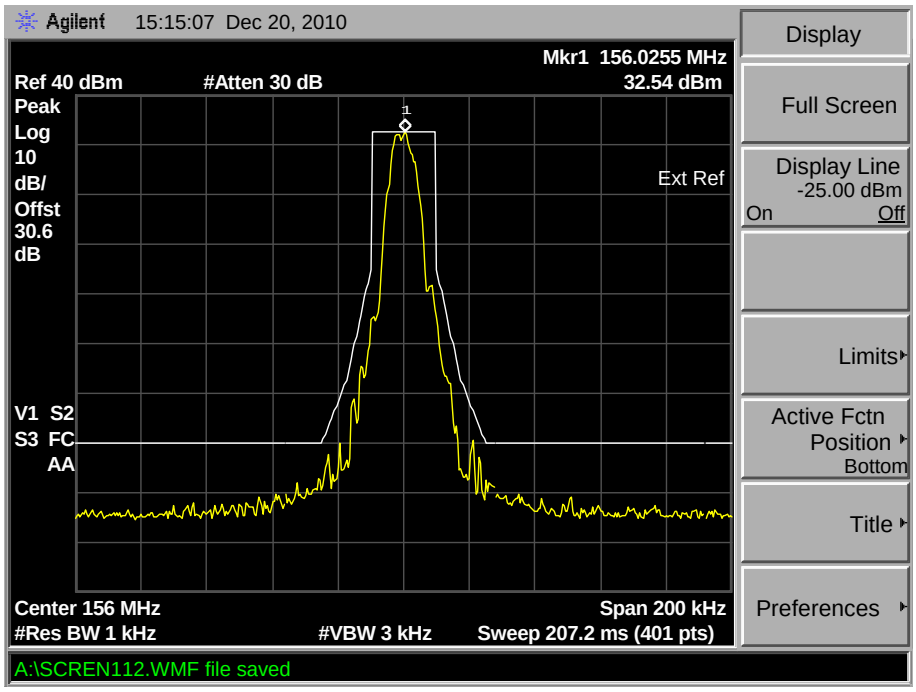
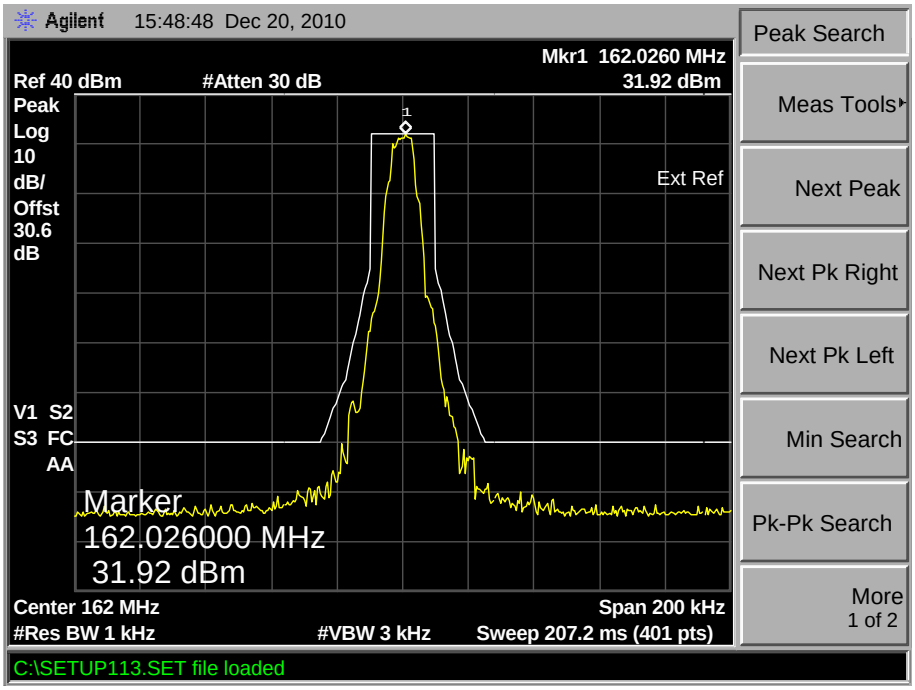


162.025 MHz

Tx1



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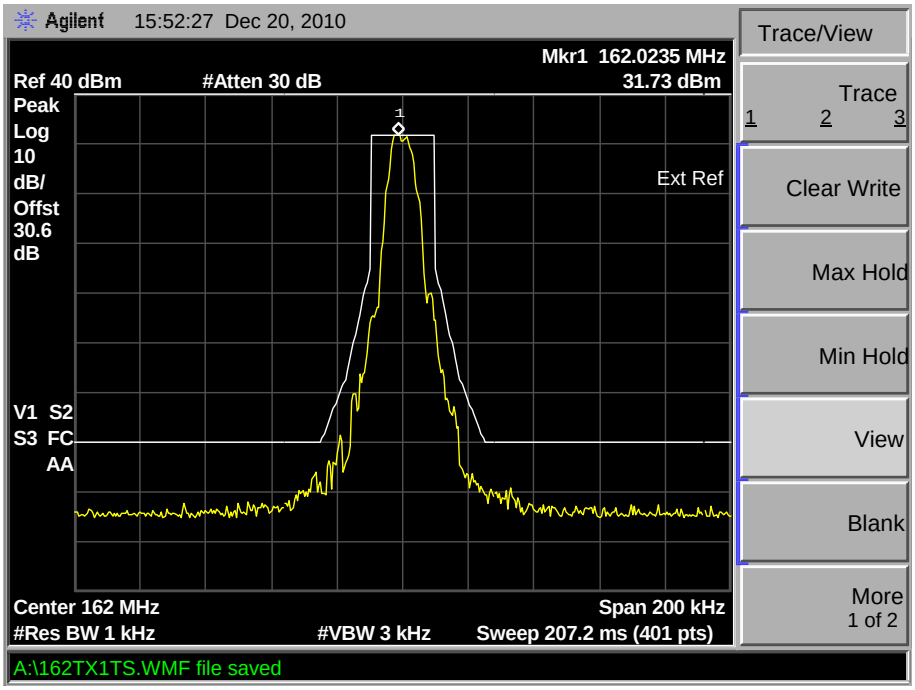


Limit Clause 11.1.3.3

The spectrum for slotted transmission shall be within the emission mask as follows:

• in the region between the carrier and ±10 kHz removed from the carrier, the modulation and transient sidebands shall be below 0 dBc

• at ±10 kHz removed from the carrier, the modulation and transient sidebands shall be below –25 dBc

• at ±25 kHz to ±62,5 kHz removed from the carrier, the modulation and transient sidebands shall be below the lower value of –60 dBc or –30 dBm

• in the region between ±10 kHz and ±25 kHz removed from the carrier, the modulation and transient sidebands shall be below a line specified between these two points.

2.4 TDMA TRANSMITTER – MODULATION ACCURACY

2.4.1 Specification Reference

IEC 62287-1, Clause 11.1.4

2.4.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.4.3 Date of Test and Modification State

27 January 2011 - Modification State 1

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	17%

2.4.6 Test Results

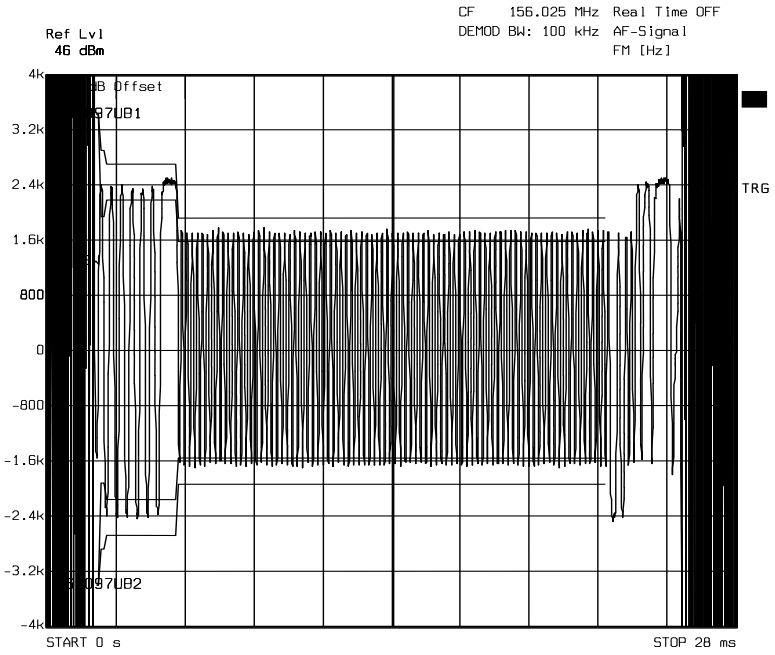
12V DC Supply

156.025 MHz

Test Signal Number 2

Ambient Temperature

Tx1



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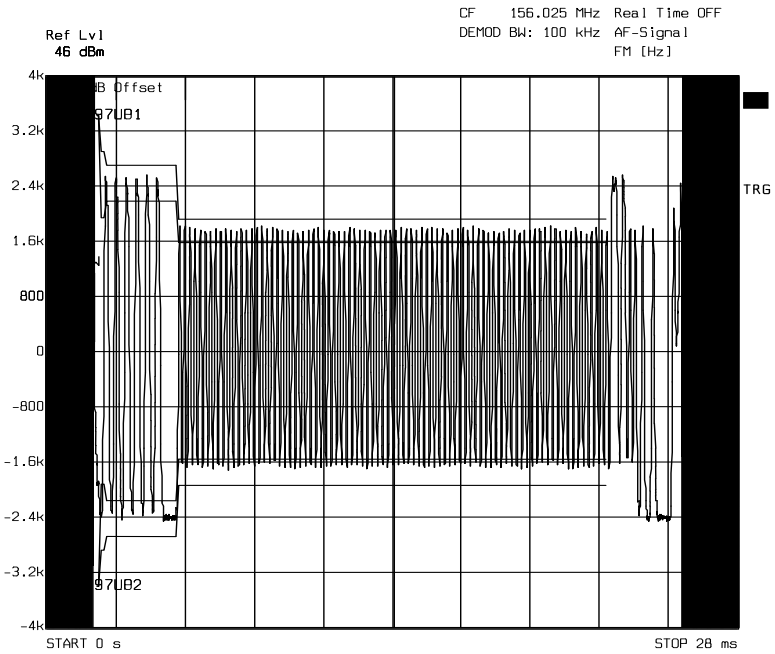

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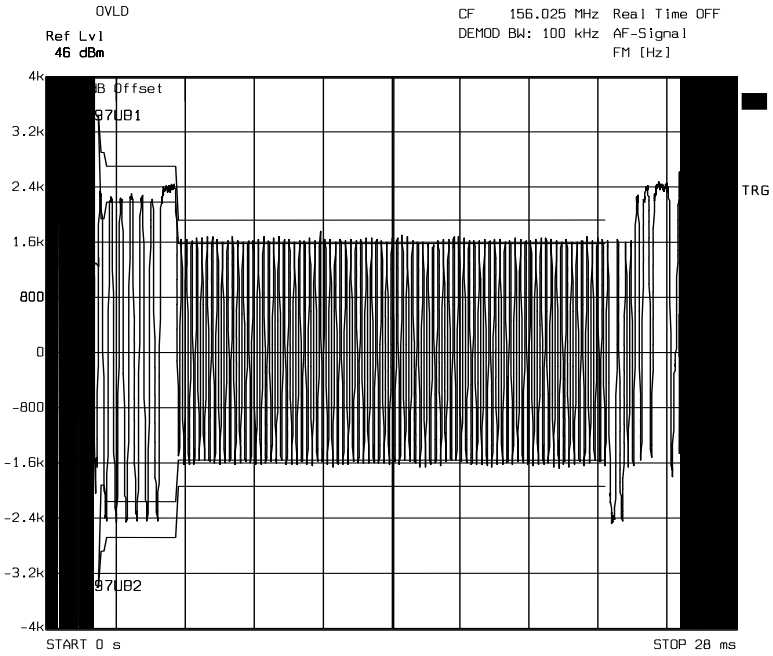
Low Temperature

Tx1



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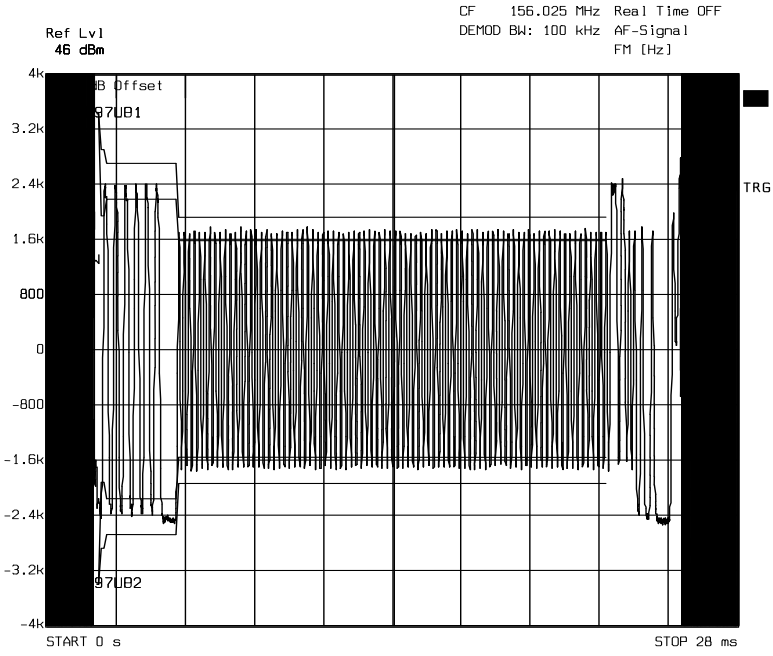
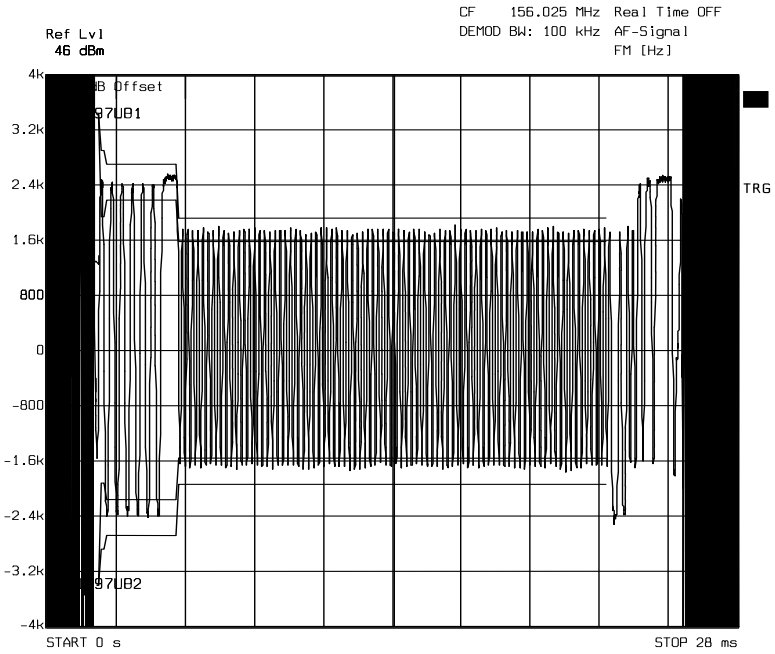


High Temperature

Tx1



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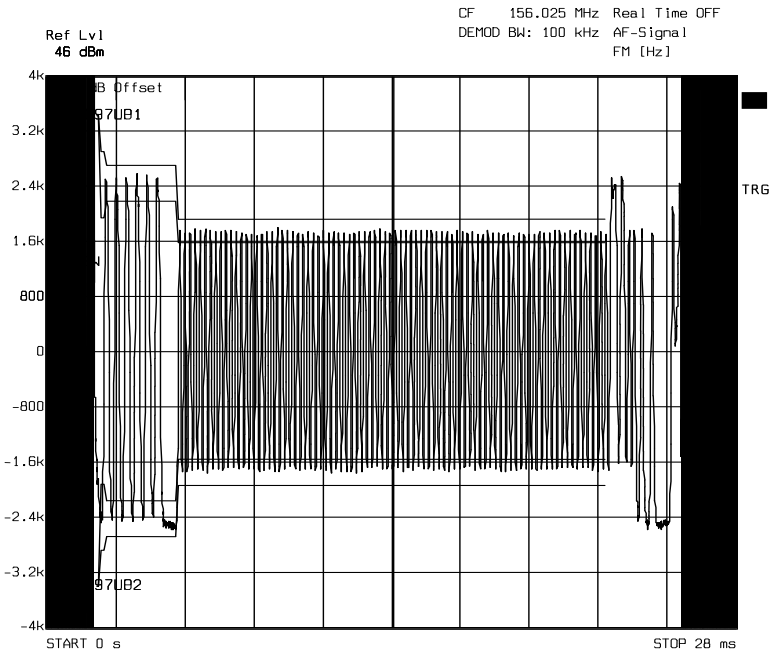

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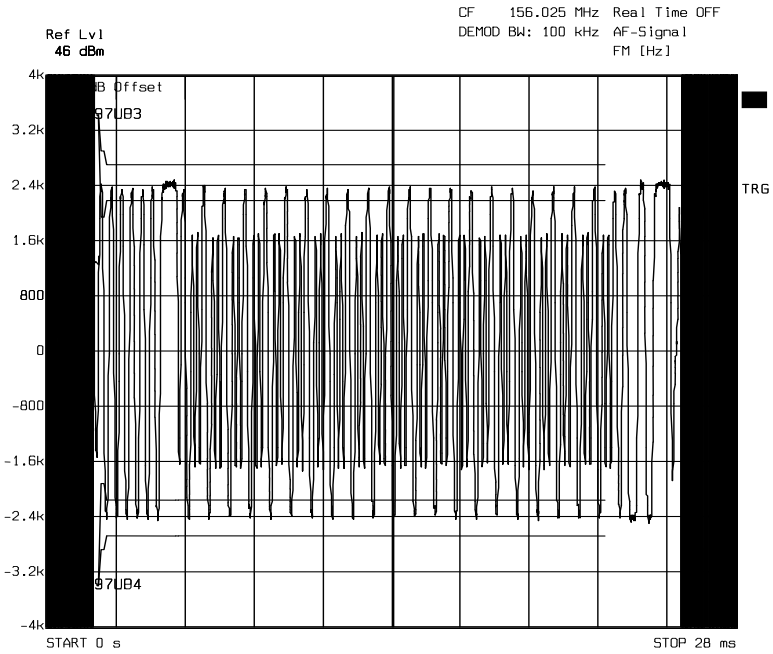
Test Signal Number 3

Ambient Temperature

Tx1



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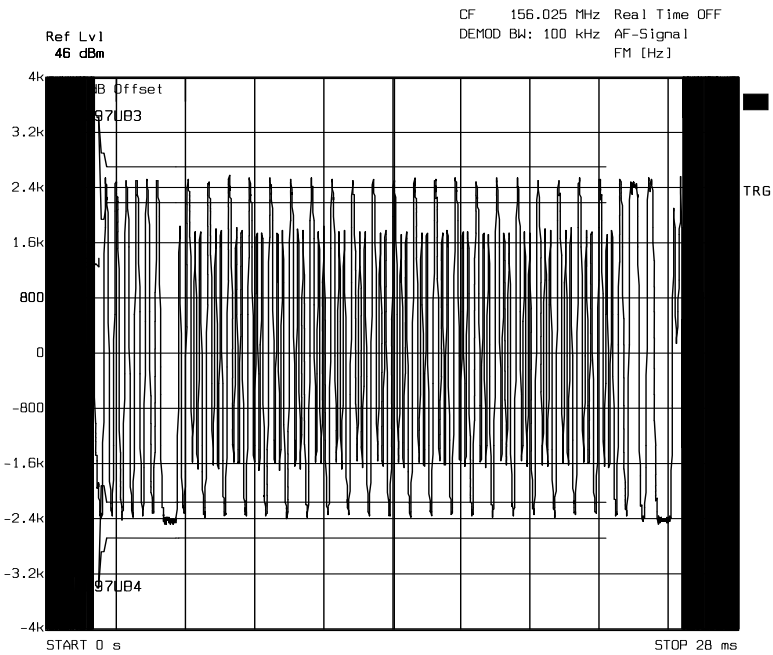

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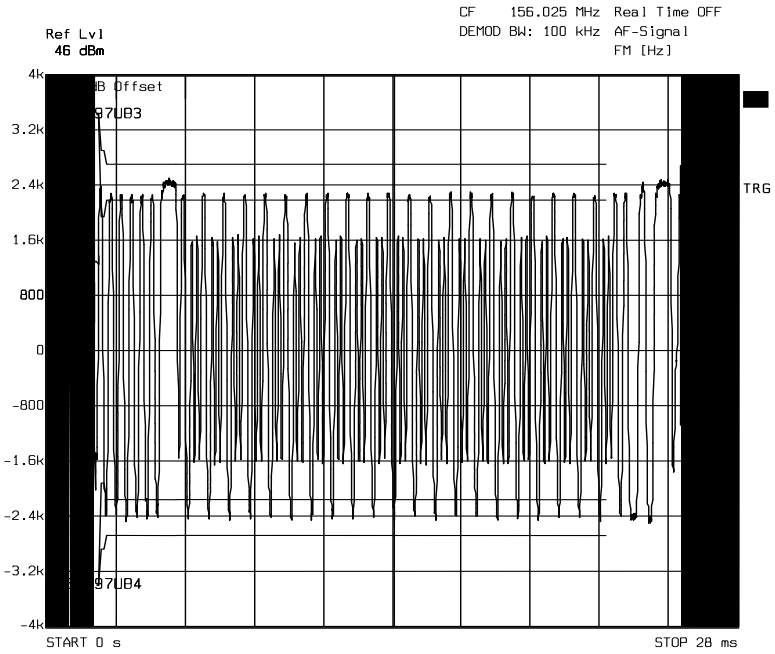
Low Temperature

Tx1



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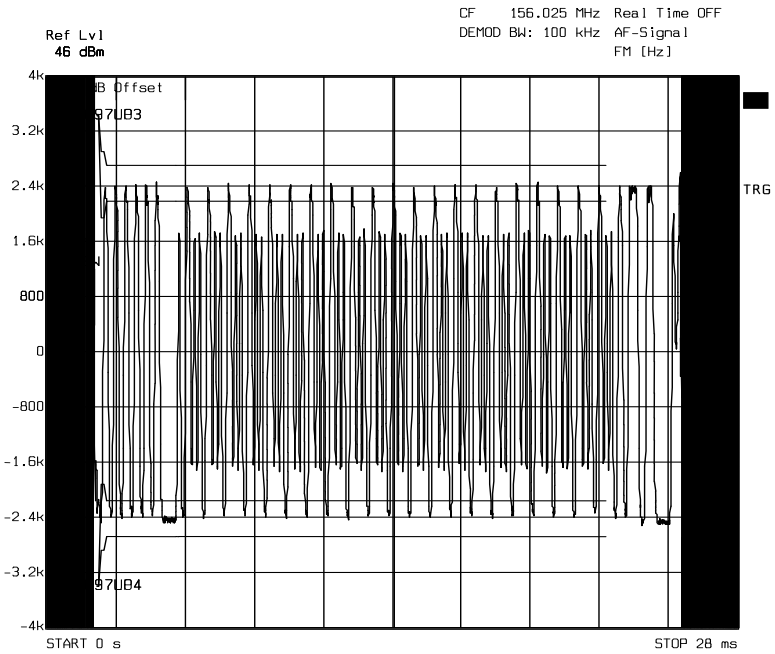

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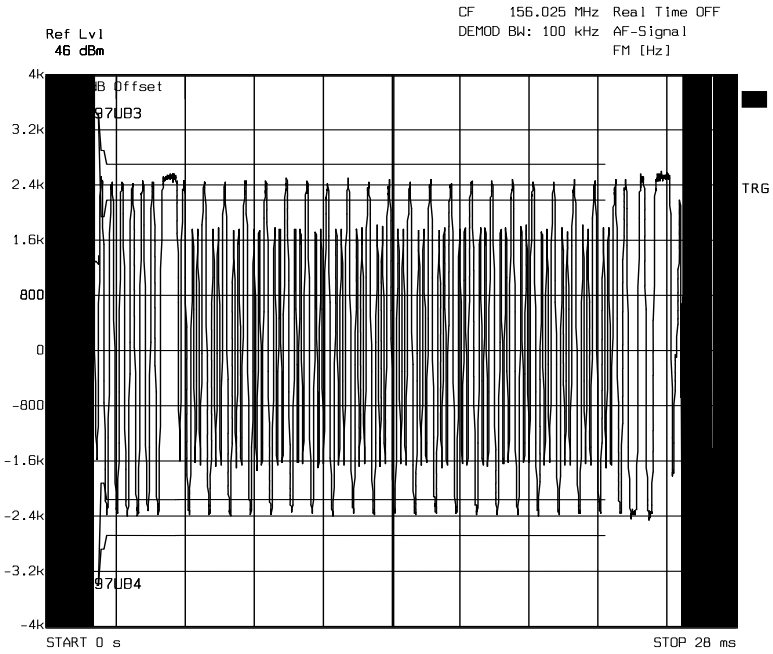
High Temperature

Tx1



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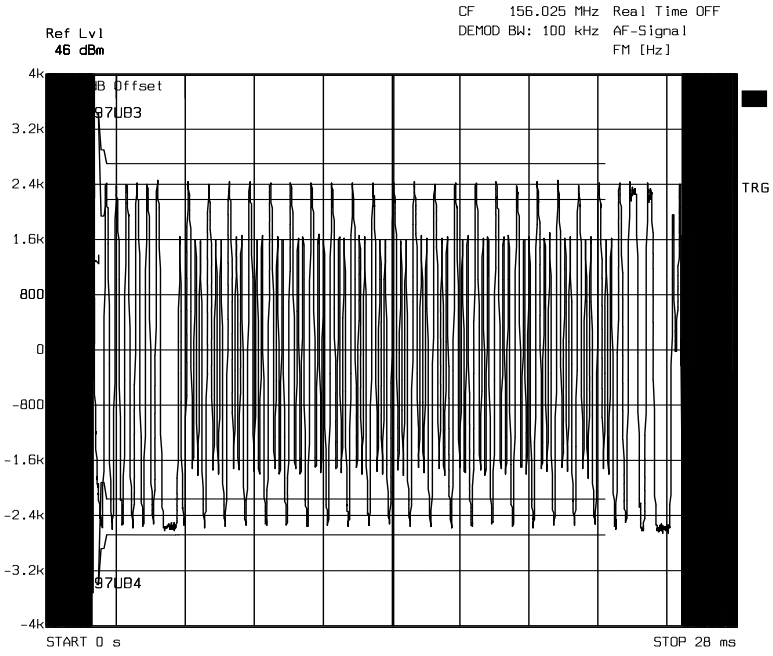
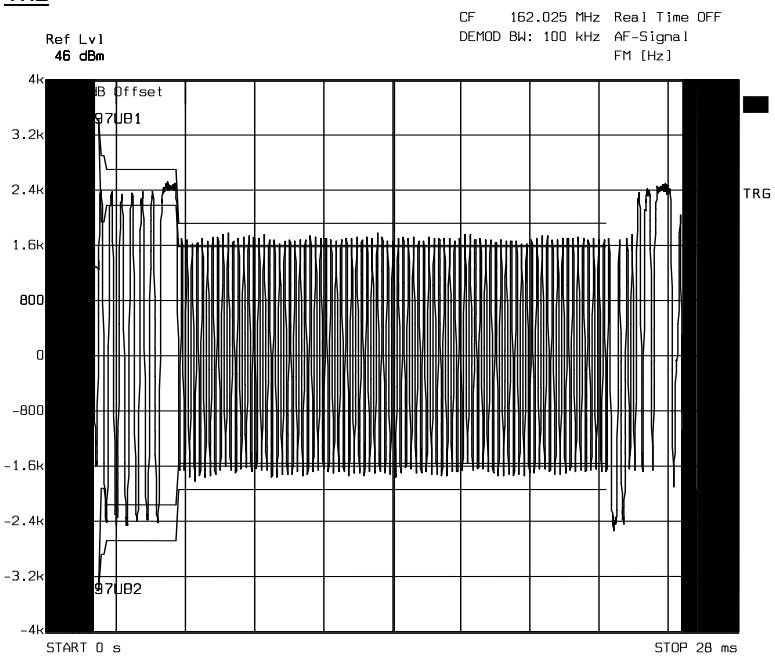


162.025 MHz

Test Signal Number 2

Ambient

Tx1



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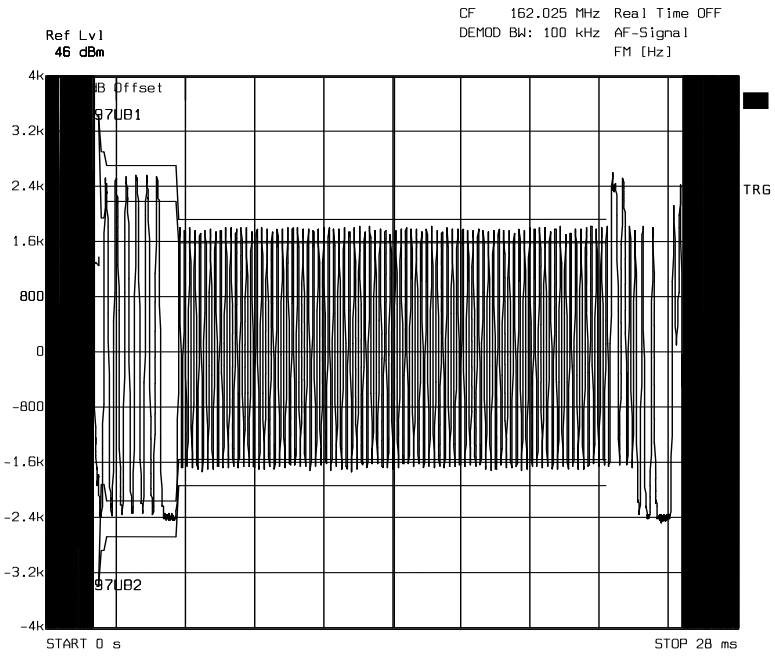

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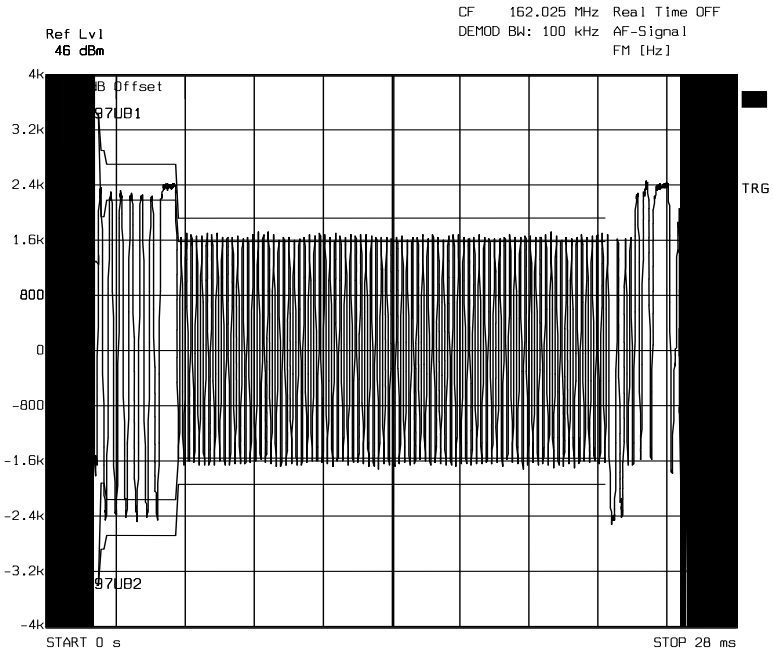
Low Temperature

Tx1



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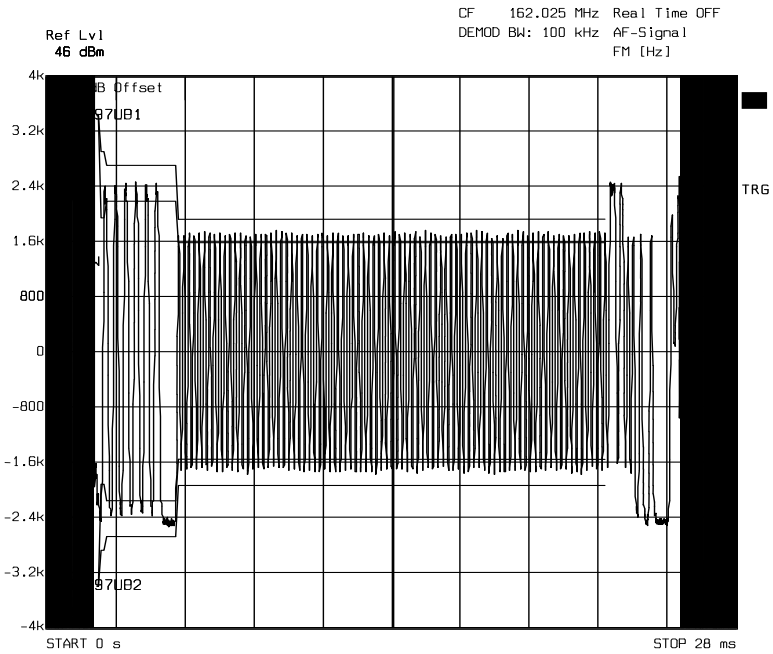

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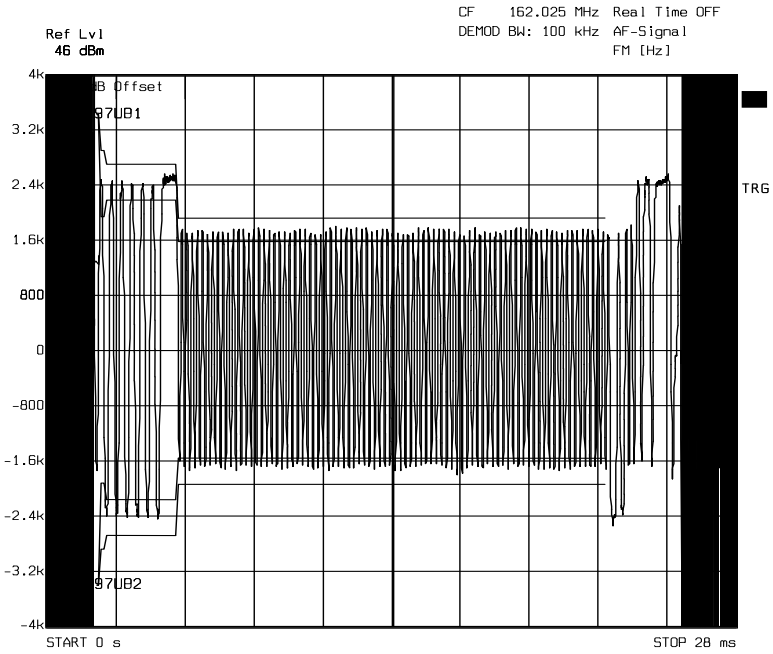
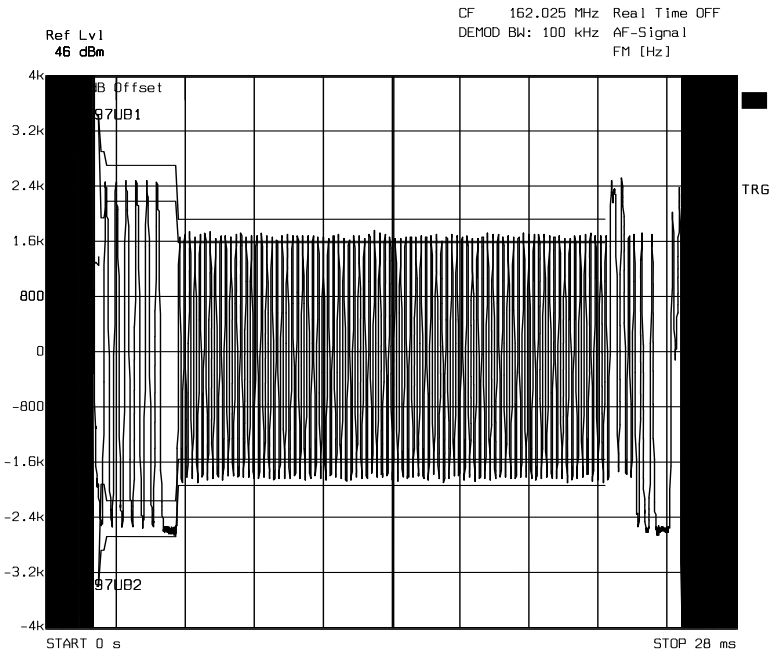
High Temperature

Tx1



Date: 27.JAN.2011 12:50:52

Tx2

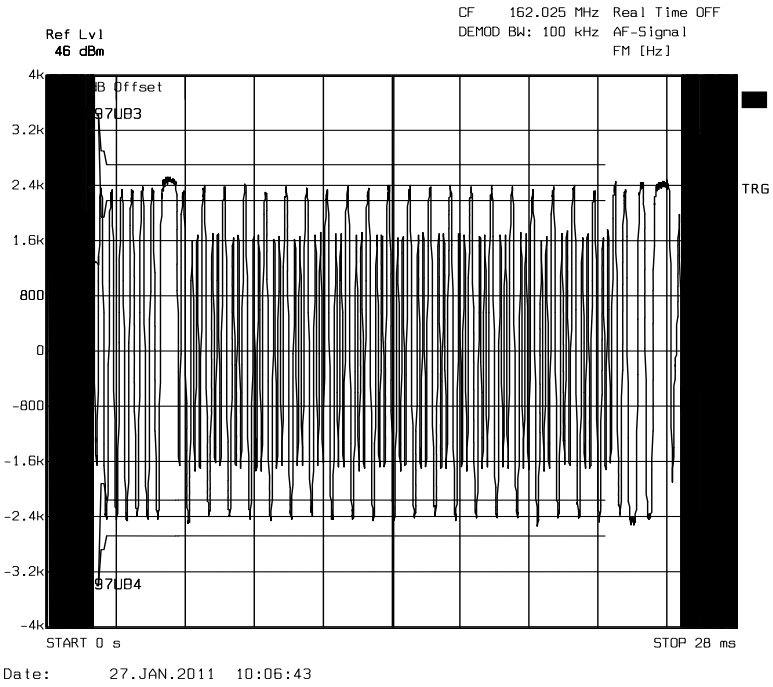


Date: 27.JAN.2011 12:53:17

Test Signal Number 3

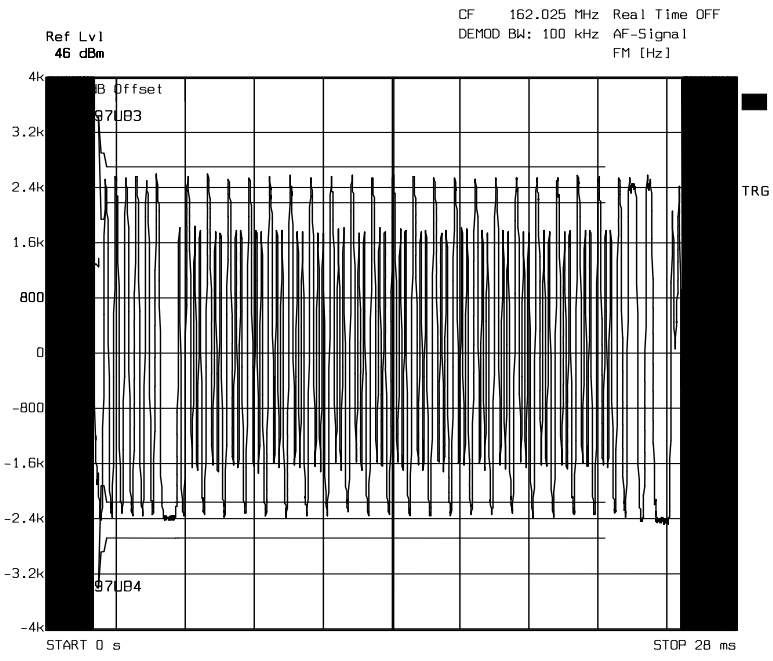
Ambient

Tx1



Date: 27.JAN.2011 10:06:43

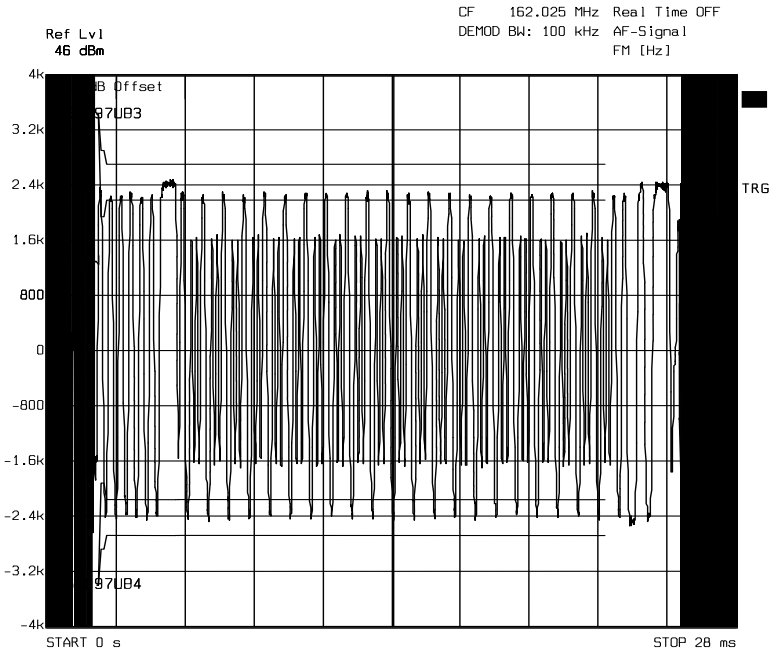
Tx2



Date: 27.JAN.2011 10:10:48

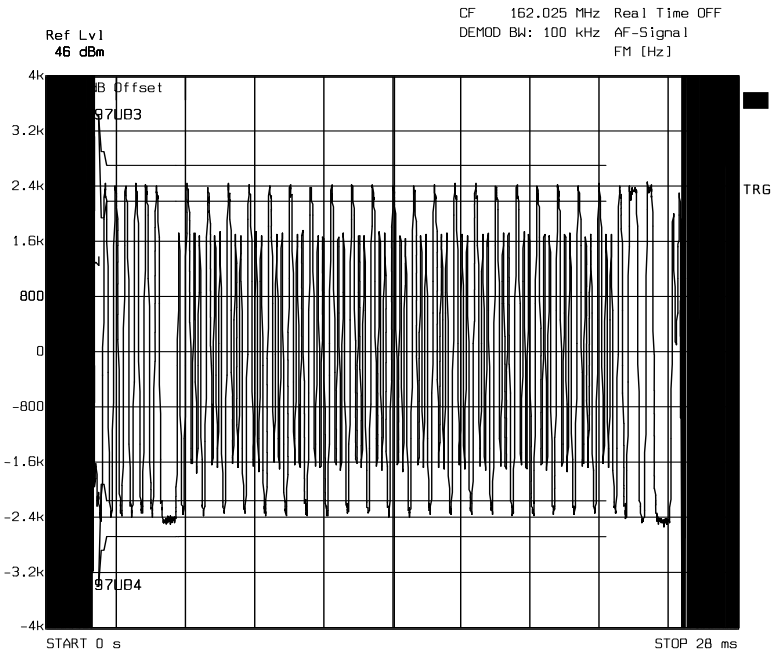
Low Temperature

Tx1



Date: 27.JAN.2011 15:42:35

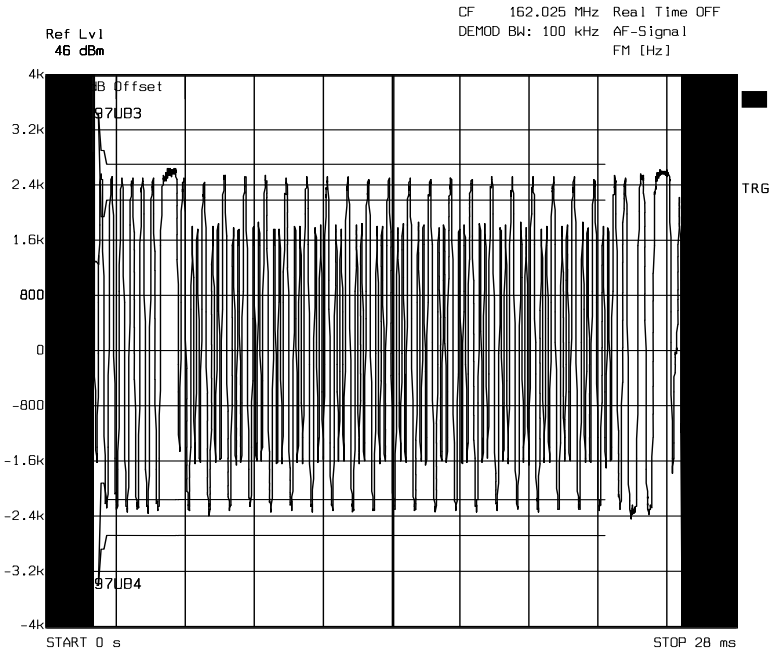
Tx2



Date: 27.JAN.2011 15:45:03

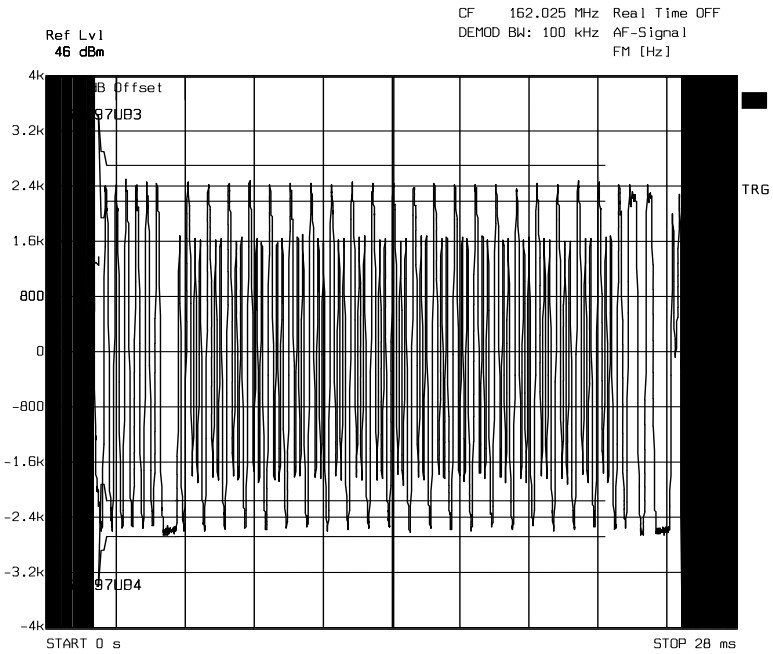
High Temperature

Tx1



Date: 27.JAN.2011 13:02:28

Tx2



Date: 27.JAN.2011 13:04:38

Limit Clause 11.1.4.3

Measurement Period from centre of each bit	Test Signal 2		Test Signal 3	
	Normal	Extreme	Normal	Extreme
Bit 0 to bit 1	< 3400 Hz			
Bit 2 to bit 3	2400 ± 480 Hz			
Bit 4 to bit 31	2400 ± 240 Hz	2400 ± 480 Hz	2400 ± 240 Hz	2400 ± 480 Hz
Bit 32 to bit 199	1740 ± 175 Hz	1740 ± 350 Hz	2400 ± 240 Hz	2400 ± 480 Hz

2.5 TDMA TRANSMITTER – TRANSMITTER OUTPUT POWER VS TIME FUNCTION

2.5.1 Specification Reference

IEC 62287-1, Clause 11.1.5

2.5.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.5.3 Date of Test and Modification State

06 January 2011 - Modification State 0

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Environmental Conditions

Ambient Temperature	22°C
Relative Humidity	30%

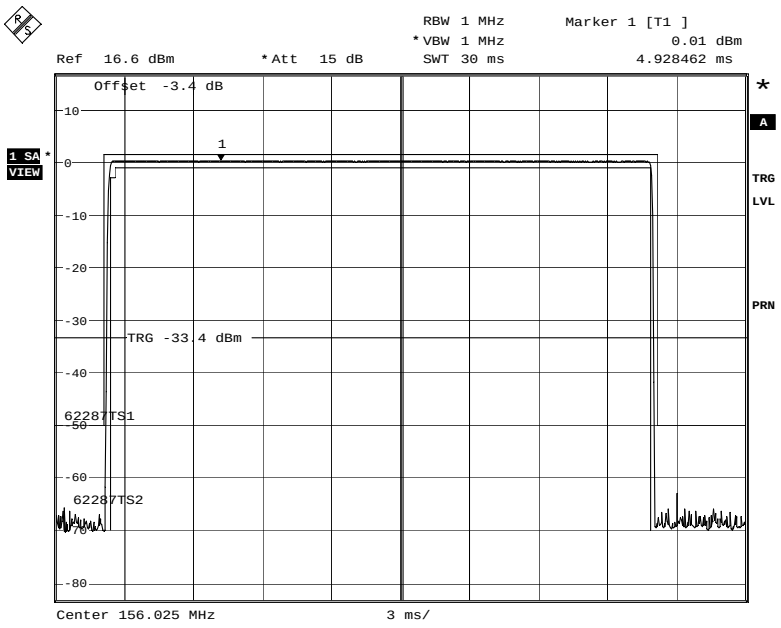
2.5.6 Test Results

12 V DC Supply

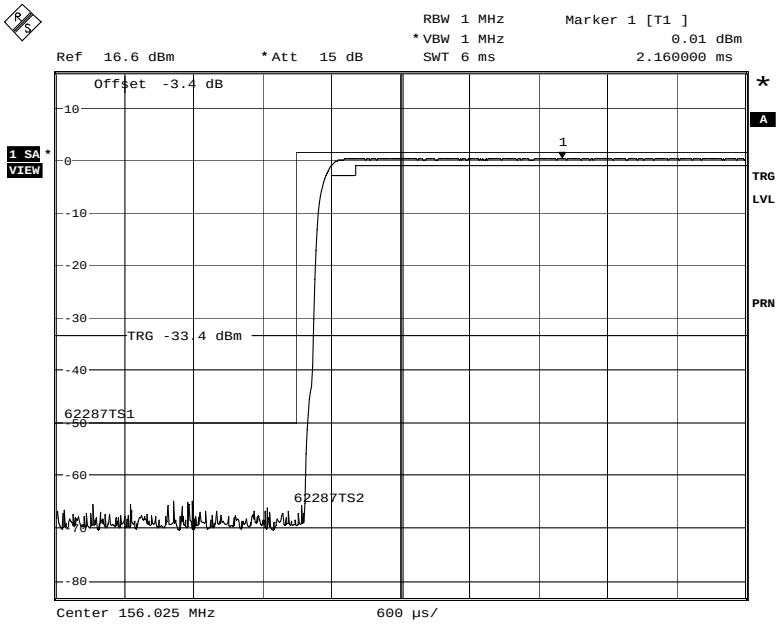
Test Signal Number 2

156.025 MHz

Tx1

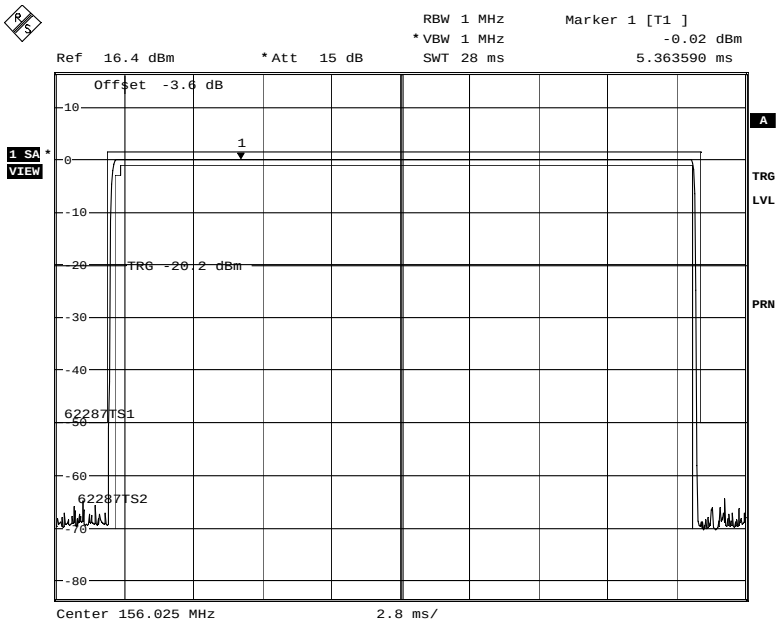


Date: 5.JAN.2011 17:51:46

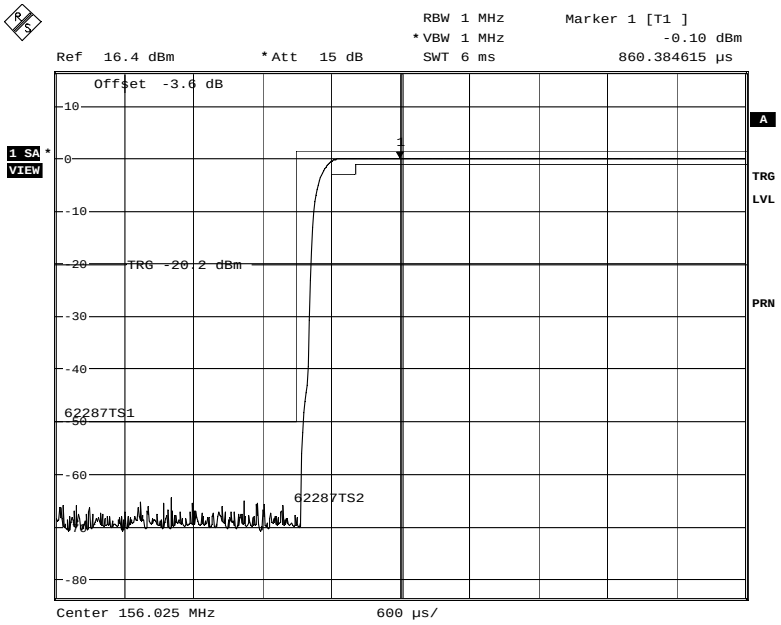


Date: 5.JAN.2011 18:01:52

Tx2



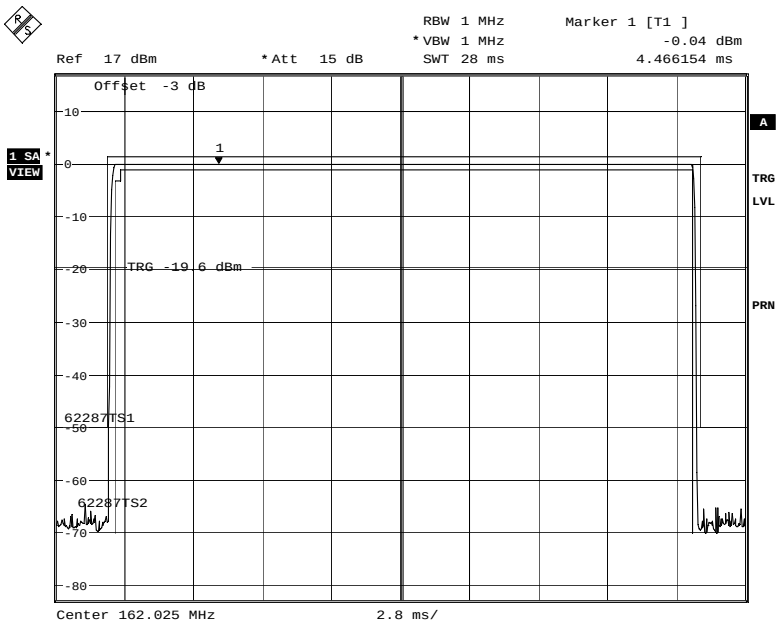
Date: 6.JAN.2011 14:52:53



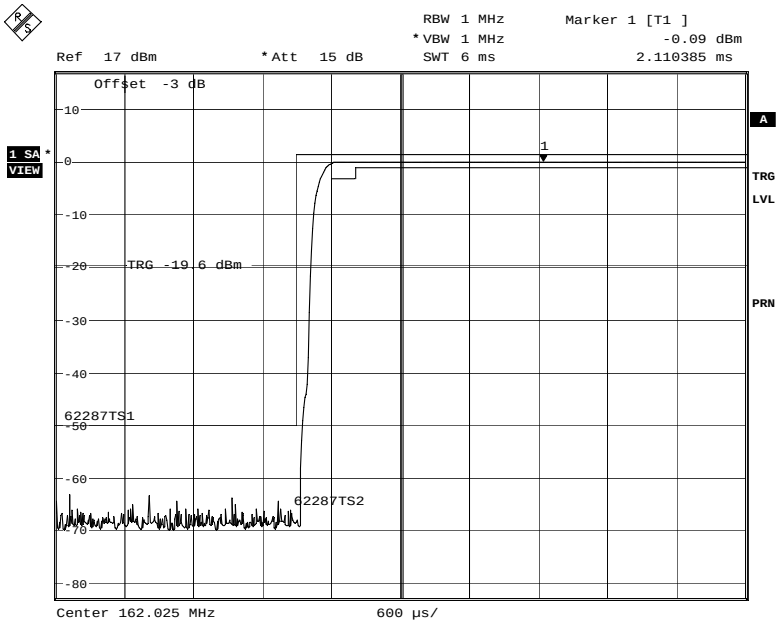
Date: 6.JAN.2011 15:17:08

162.025 MHz

Tx1

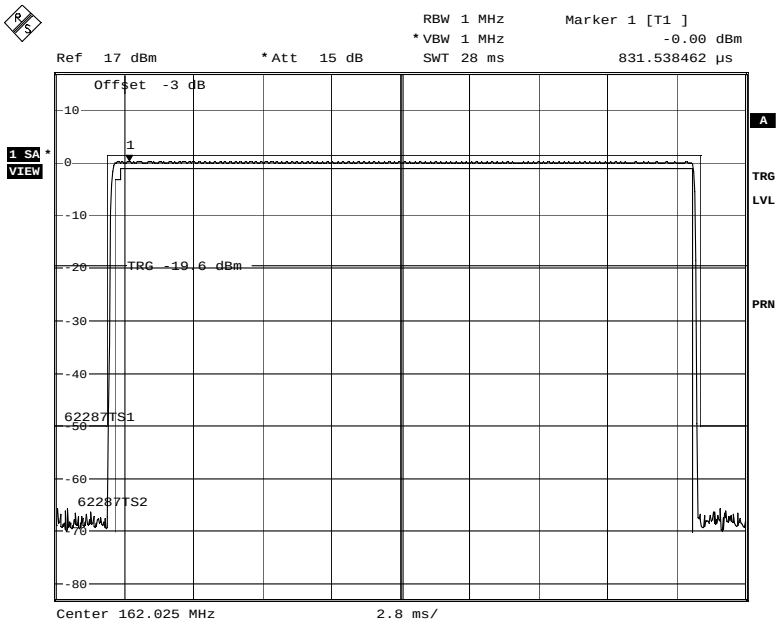


Date: 6.JAN.2011 11:01:22

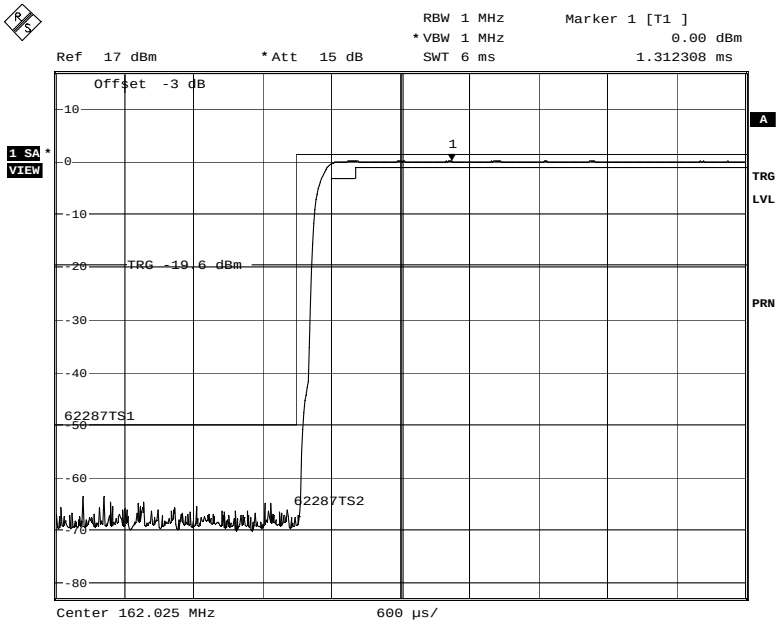


Date: 6.JAN.2011 11:29:47

Tx2



Date: 6.JAN.2011 15:26:07



Date: 6.JAN.2011 15:47:38

Limit Clause 11.1.4.3

The transmitter power shall remain within the mask shown in fig 3 and associated timings given in Table 6.

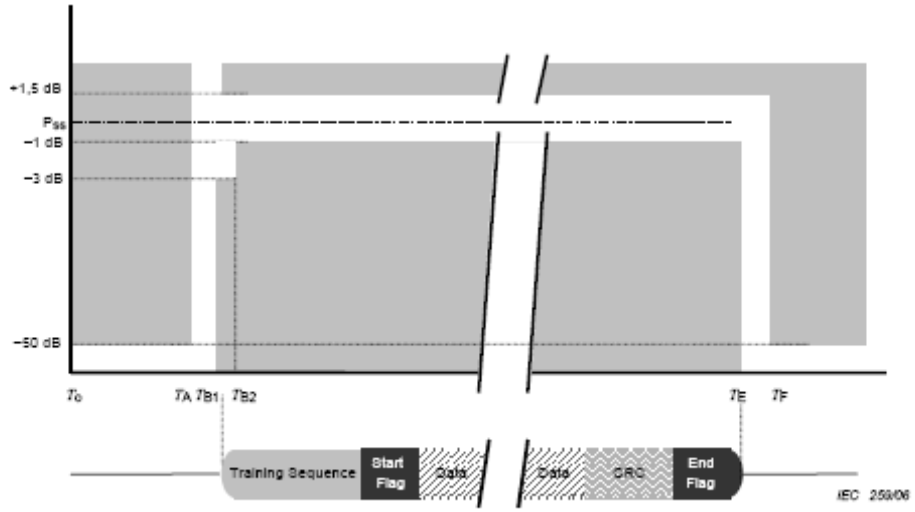


Figure 3 – Power versus time mask

Reference		Bits	Time (ms)	Definition
T_0		0	0	Start of candidate transmission time period
T_A		20	2.083	Power shall not exceed -50 dB of P_{ss}
T_B	T_{B1}	23	2.396	Power shall reach within +1.5 dB or -3 dB of P_{ss}
	T_{B2}	24	2.604	Power shall reach within +1.5 dB or -1 dB of P_{ss}
T_E (plus 1 stuffing bit)		248	25.833	Power shall still remain within +1.5 dB or -1 dB of P_{ss}
T_F (plus 1 stuffing bit)		251	26.146	Power shall reach -50 dB of P_{ss} and stay below this

2.6 TDMA RECEIVER – RECEIVER SENSITIVITY

2.6.1 Specification Reference

IEC 62287-1, Clause 11.2.1

2.6.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.6.3 Date of Test and Modification State

23 December 2010 - Modification State 0

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Environmental Conditions

Ambient Temperature	20.5°C
Relative Humidity	20.1%

2.6.6 Test Results

12 V DC Supply

Test Signal 5

Test Conditions		PER (%)			
		Lowest Transmit Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(+20.5°C)	V_{nom}(12.0V)	5%	0.5%	3%	0.5%
T_{max}(+55°C)	V_{max}(31.2V)	0.5%	0.5%	0.5%	0.5%
T_{min}(-15°C)	V_{min}(10.8V)	18%	0.5%	3.0%	0.5%
Measurement uncertainty (dB)		± 1.407			

Test Conditions		PER (%)			
		Lowest Transmit Frequency + 500 Hz		AIS 2 + 500 Hz	
		156.0255 MHz		162.0255 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(+20.5°C)	V_{nom}(12.0V)	0.5%	0.5%	0.5%	0.5%
Measurement uncertainty (dB)		± 1.407			

Test Conditions		PER (%)			
		Lowest Transmit Frequency - 500 Hz		AIS 2 - 500 Hz	
		156.0245 MHz		162.0245 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(+20.5°C)	V_{nom}(12.0V)	0.5%	0.5%	0.5%	0.5%
Measurement uncertainty (dB)		± 1.407			

Limit Clause 11.2.1.3

The PER shall not exceed 20 %.

2.7 TDMA RECEIVER – ERROR BEHAVIOUR AT HIGH INPUT LEVELS

2.7.1 Specification Reference

IEC 62287-1, Clause 11.2.2

2.7.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.7.3 Date of Test and Modification State

22 December 2010 - Modification State 0

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Environmental Conditions

Ambient Temperature	21.0°C
Relative Humidity	23.4%

2.7.6 Test Results

12 V DC Supply

Test Signal 5

Test Conditions		Input Level (dBm)	PER (%)			
			Lowest Transmit Frequency		AIS 2	
			156.025 MHz		162.025 MHz	
			RX1	RX2	RX1	RX2
T_{nom}(+21.0°C)	V_{nom}(12.0V)	-77	0.5%	0.5%	0.5%	0.5%
		-7	0.5%	0.5%	0.5%	0.5%
Measurement uncertainty (dB)			± 1.622			

Limit Clause 11.2.2.3

The PER shall not exceed 2 % at an input level of -77 dBm and 10% at an input level of -7dBm.

2.8 TDMA RECEIVER – CO CHANNEL REJECTION

2.8.1 Specification Reference

IEC 62287-1, Clause 11.2.3

2.8.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.8.3 Date of Test and Modification State

07 January 2011 - Modification State 1

2.8.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	41%

2.8.6 Test Results

12 V DC Supply

Wanted: Test Signal Number 5

Unwanted: Test Signal Number 4

Test Conditions		PER (%)			
		Lowest Transmit Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(+23°C) V_{nom}(12V)	Wanted Frequency	1.0	0.5	3.0	0.5
	Wanted Frequency + 1 kHz	4.0	0.5	6.5	1.0
	Wanted Frequency - 1 kHz	4.0	1.5	3.5	0.5
Measurement uncertainty (dB)		± 3.229			

Limit Clause 11.2.3.3

The PER shall not exceed 20 %.

2.9 TDMA RECEIVER – ADJACENT CHANNEL SELECTIVITY

2.9.1 Specification Reference

IEC 62287-1, Clause 11.2.4

2.9.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.9.3 Date of Test and Modification State

07 January 2011 - Modification State 1

2.9.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.5 Environmental Conditions

Ambient Temperature	22°C
Relative Humidity	26%

2.9.6 Test Results

12V DC Supply

Wanted: Test Signal Number 5

Test Conditions		PER (%)			
		Lowest Transmit Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(+22°C)	Wanted Frequency + 25 kHz	2.0	0.5	1.5	2.0
V_{nom}(12V)	Wanted Frequency - 25 kHz	3.0	1.5	2.0	2.0
Measurement uncertainty (dB)		± 3.229			

Limit Clause 11.2.4.3

The PER shall not exceed 20 %.

2.10 TDMA RECEIVER – SPURIOUS RESPONSE REJECTION

2.10.1 Specification Reference

IEC 62287-1, Clause 11.2.5

2.10.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.10.3 Date of Test and Modification State

25 January 2011 - Modification State 1

2.10.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.10.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	29%

2.10.6 Test Results

12 V DC Supply

Wanted: Test Signal Number 5

Spurious Responses (MHz)	Ratio (dB)	
	Lowest Transmit Frequency	AIS 2
	156.025 MHz	162.025 MHz
Measurement uncertainty (dB)	± 3.62	

No spurious responses were found yielding a BER> 20%

Limit Clause 11.2.5.6

At any frequency separated from the nominal frequency of the receiver by two channels or more, the spurious responses shall not result in a PER of greater than 20 %.

2.11 TDMA RECEIVER – INTERMODULATION RESPONSE REJECTION

2.11.1 Specification Reference

IEC 62287-1, Clause 11.2.6

2.11.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.11.3 Date of Test and Modification State

23 December 2010 - Modification State 0

2.11.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.11.5 Environmental Conditions

Ambient Temperature	20.3°C
Relative Humidity	20.0%

2.11.6 Test Results

12 V DC Supply

Wanted: Test Signal Number 5

Test Conditions		PER (%)			
		Lowest Transmit Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(20.3°C) V_{nom}(12V)	Test 1	-	-	8.0	2.0
	Test 2	-	-	5.5	2.5
	Test 3	11.0	1.5	-	-
	Test 4	5.5	0.5	-	-
Measurement uncertainty (dB)		± 3.229			

Limit Clause 11.2.6.3

The PER shall not exceed 20 %.

2.12 TDMA RECEIVER – BLOCKING OR DESENSITISATION

2.12.1 Specification Reference

IEC 62287-1, Clause 11.2.7

2.12.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.12.3 Date of Test and Modification State

23 December 2010 - Modification State 0

2.12.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.12.5 Environmental Conditions

Ambient Temperature	19.5°C
Relative Humidity	20.5%

2.12.6 Test Results

Test Signal 5

Test Conditions		PER (%)			
		Lowest Transmit Frequency		AIS 2	
		156.025 MHz		162.025 MHz	
		RX1	RX2	RX1	RX2
T_{nom}(19.5°C) V_{nom}(12V)	-10 MHz	0.5	0.5	0.5	0.5
	-5 MHz	0.5	0.5	0.5	0.5
	-2 MHz	0.5	0.5	0.5	0.5
	-1 MHz	0.5	0.5	0.5	0.5
	-0.5 MHz	0.5	0.5	0.5	0.5
	+0.5 MHz	0.5	0.5	0.5	0.5
	+1 MHz	0.5	0.5	0.5	0.5
	+2 MHz	0.5	0.5	0.5	0.5
	+4.975 MHz	0.5	0.5	-	-
	+5 MHz	-	-	0.5	0.5
	+10 MHz	0.5	0.5	0.5	0.5
Measurement uncertainty (dB)		± 3.229			

Limit Clause 11.2.7.3
The maximum packet error rate shall not exceed 20 %.

2.13 TDMA RECEIVER – CONDUCTED SPURIOUS EMISSIONS FROM RECEIVER

2.13.1 Specification Reference

IEC 62287-1, Clause 11.3.1

2.13.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.13.3 Date of Test and Modification State

21 December 2010 - Modification State 0

2.13.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.13.5 Environmental Conditions

Ambient Temperature	21.1°C
Relative Humidity	26.4%

2.13.6 Test Results

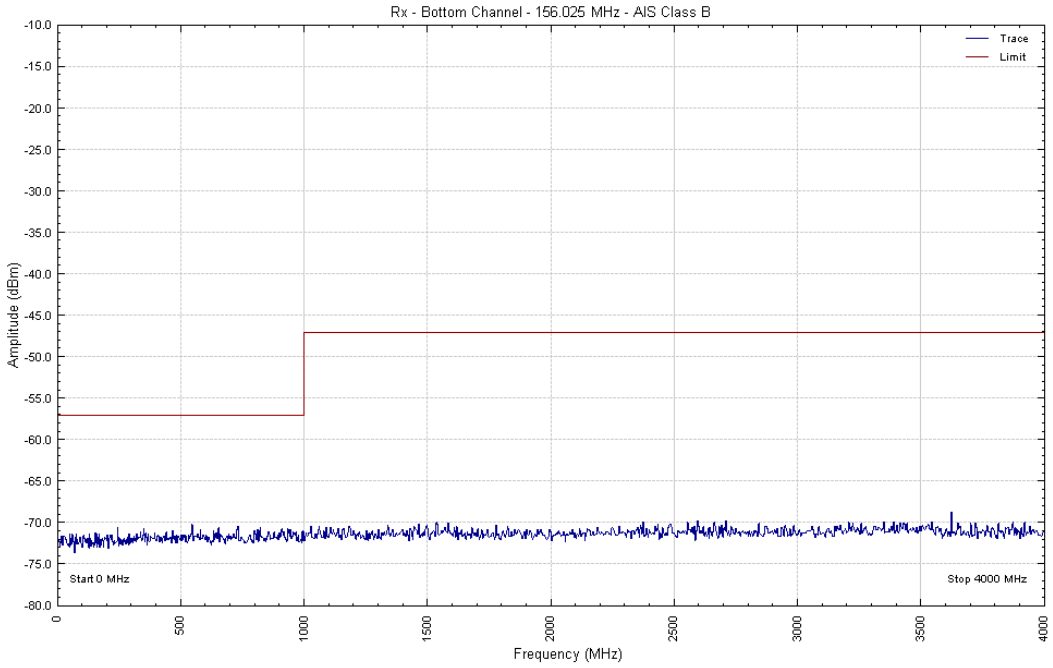
12 V DC Supply

Frequency of Spurious Emissions (MHz)	Spurious Emissions Level (dBm)			
	Lowest Transmit Frequency		AIS 2	
	156.025 MHz		162.025 MHz	
	RX1	RX2	RX1	RX2
Measurement uncertainty (dB)	± 3.454			

No emissions were detected within 6dB of the limit.

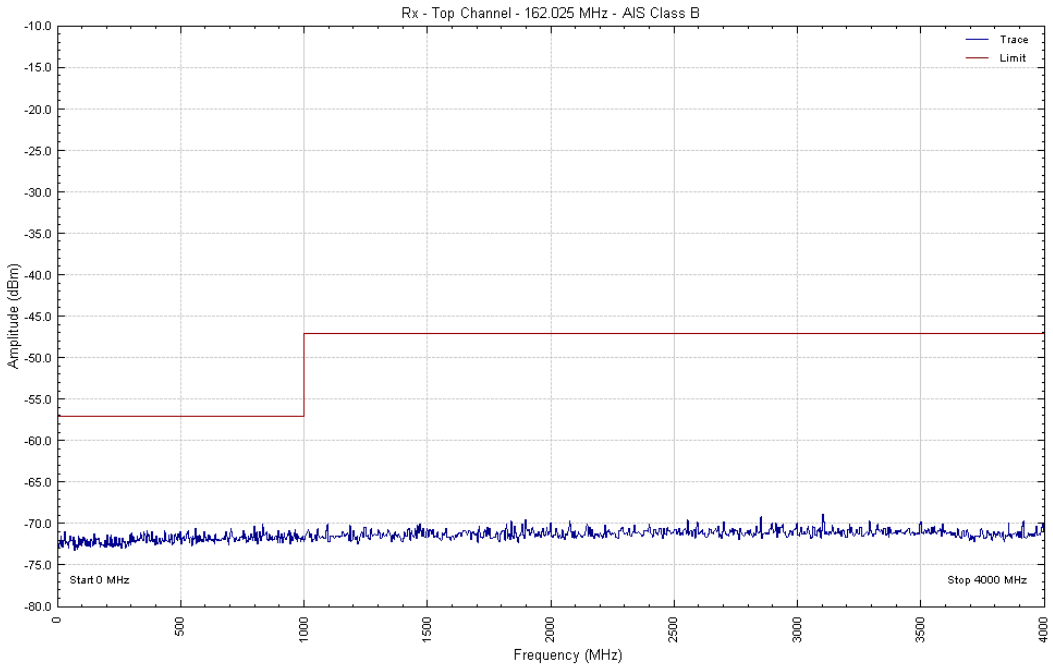
156.025 MHz

RX1



162.025 MHz

RX1



Limit Clause 11.3.1.3

The power of any spurious emission in the specified range at the antenna terminal shall not exceed –57 dBm (2 nW) in the frequency range 9 kHz to 1 GHz and –47 dBm (20 nW) in the frequency range 1 GHz to 4 GHz.

2.14 TDMA RECEIVER – CONDUCTED SPURIOUS EMISSIONS FROM TRANSMITTER

2.14.1 Specification Reference

IEC 62287-1, Clause 11.3.2

2.14.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.14.3 Date of Test and Modification State

21 December 2010 - Modification State 0

2.14.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.14.5 Environmental Conditions

Ambient Temperature	21.1°C
Relative Humidity	26.4%

2.14.6 Test Results

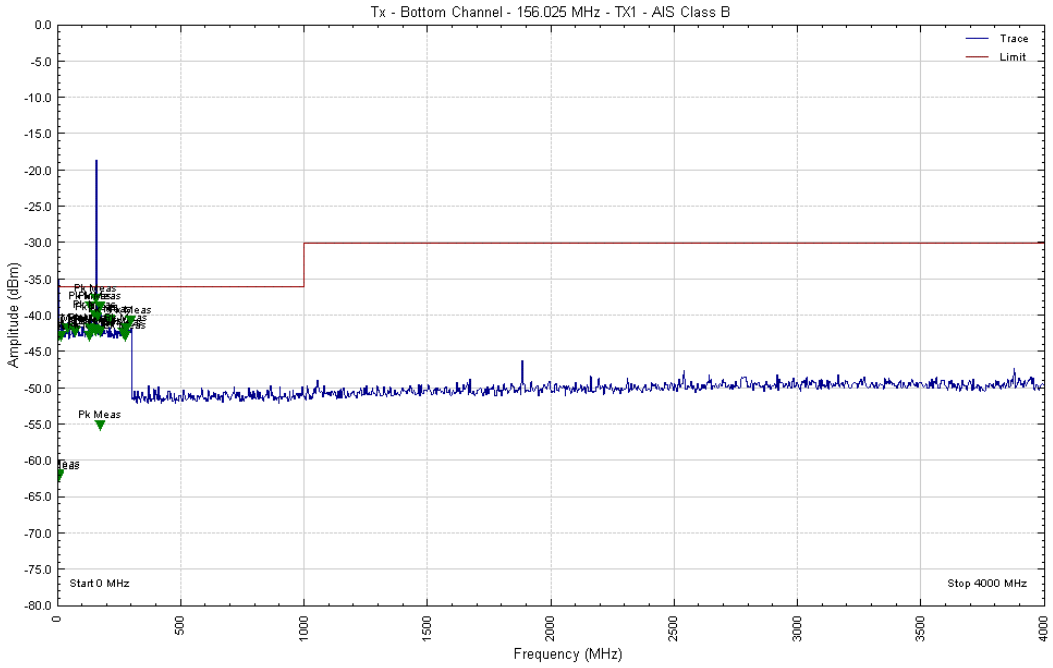
12 V DC Supply

Unmodulated

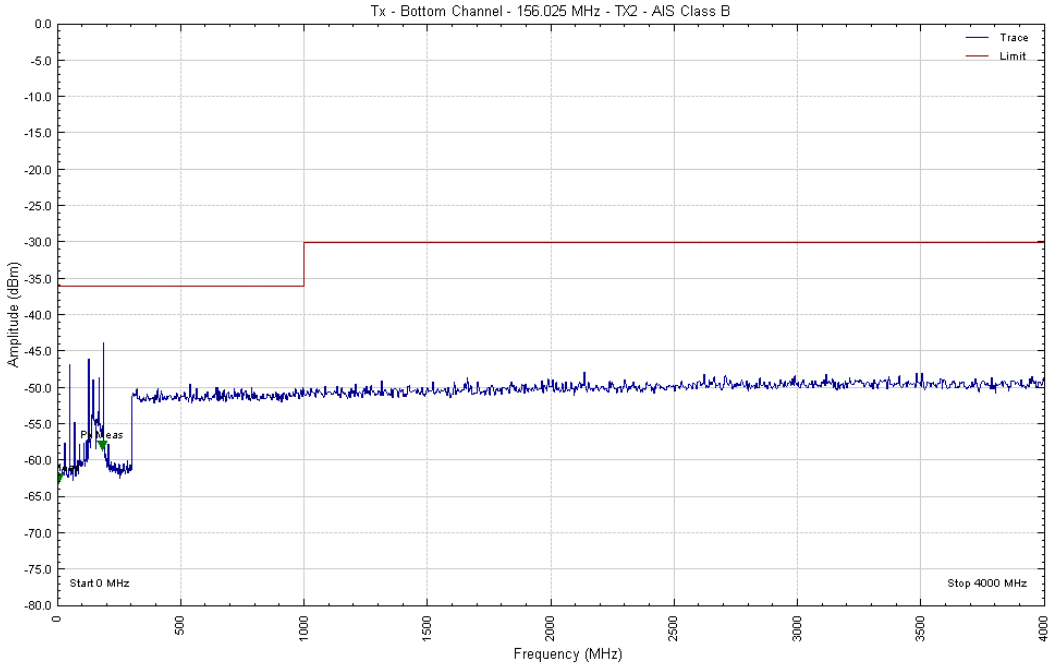
Frequency of Spurious Emissions (MHz)	Spurious Emissions Level (dBm)			
	Lowest Transmit Frequency		AIS 2	
	156.025 MHz		162.025 MHz	
	TX1	TX2	TX1	TX2
181.673	-	-	-	-45.68
113.572	-	-	-	-37.12
132.759	-	-	-	-39.67
29.261	-	-	-	-42.39
106.954	-	-	-	-45.67
Measurement uncertainty (dB)	± 3.454			

156.025 MHz

TX1

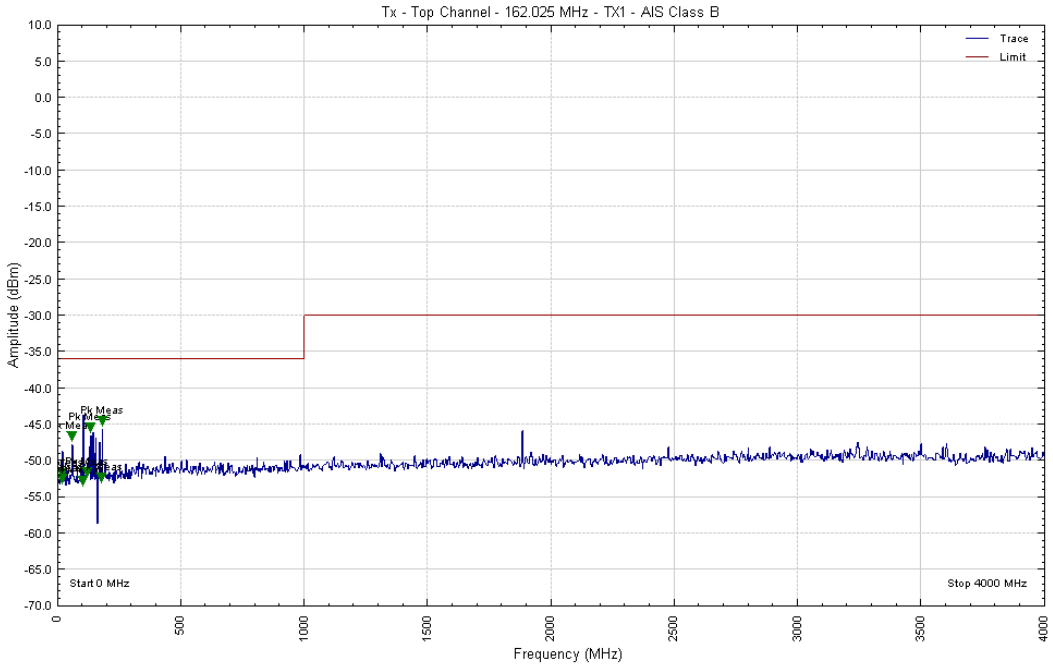


TX2

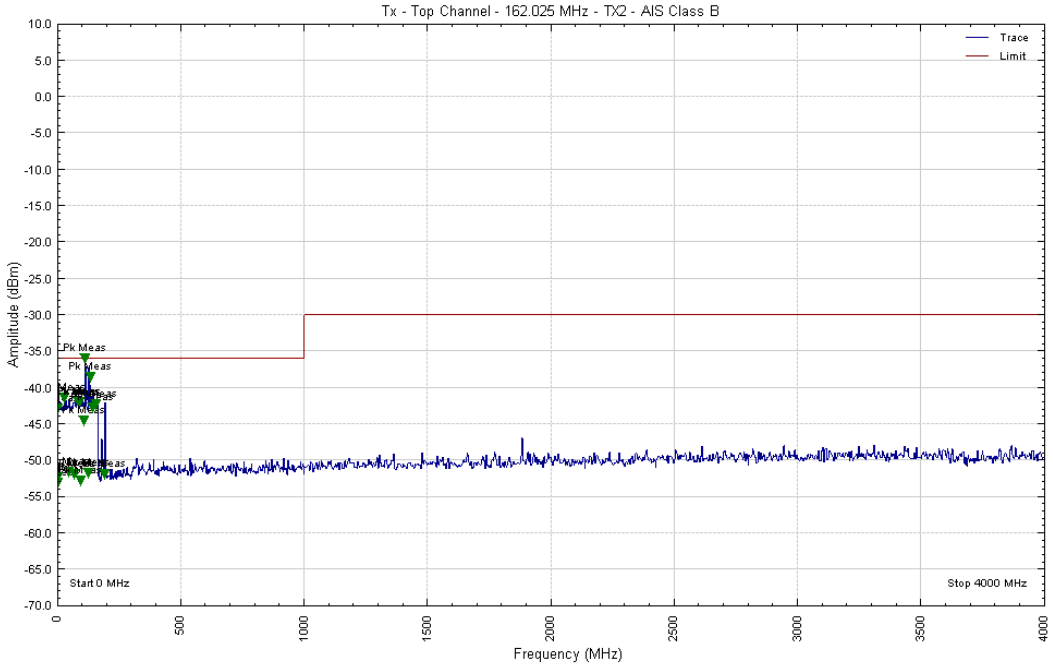


162.025 MHz

TX1



TX2



Limit Clause 11.3.2.3

The power of any spurious emission on any discrete frequency shall not exceed 0.25 mW (–36 dBm) in the frequency range 9 kHz to 1 GHz and 1 mW (–30 dBm) in the frequency range 1 GHz to 4 GHz.

2.15 DSC RECEIVER – MAXIMUM SENSITIVITY

2.15.1 Specification Reference

IEC 62287-1, Clause C.4.2

2.15.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.15.3 Date of Test and Modification State

10 January 2011 - Modification State 1

2.15.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.15.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	30%

2.15.6 Test Results

12 V DC Supply

Test Signal 1

Test Conditions		BER (%)		
		156.5265 MHz	156.525 MHz	156.5235 MHz
T_{nom}(+23.0°C)	V_{nom}(12.0V)	0	0	7
T_{max}(+55°C)	V_{max}(31.2V)	0	0	0
T_{min}(-15°C)	V_{min}(10.8V)	10	0	9
Measurement uncertainty (dB)		± 1.407		

To achieve the results above, a level of -107dBm was used under normal conditions and -101dBm at extreme conditions.

Limit Clause C.4.2.3

Ensure that the maximum usable sensitivity does not exceed –107 dBm under normal test conditions, and –101 dBm under extreme test conditions.

2.16 DSC RECEIVER – ERROR BEHAVIOUR AT HIGH INPUT LEVELS

2.16.1 Specification Reference

IEC 62287-1, Clause C.4.3

2.16.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.16.3 Date of Test and Modification State

10 January 2011 - Modification State 1

2.16.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.16.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	30%

2.16.6 Test Results

12 V DC Supply

Test Signal 1

Test Conditions		Input Level (dBm)	BER (%)
			156.525 MHz
T_{nom}(+23°C)	V_{nom}(12V)	-7	0
Measurement uncertainty (dB)			± 1.622

Limit Clause C.4.3.3

The BER shall not exceed 10^{-2}.

2.17 DSC RECEIVER – CO CHANNEL REJECTION

2.17.1 Specification Reference

IEC 62287-1, Clause C.4.4

2.17.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.17.3 Date of Test and Modification State

10 January 2011 - Modification State 1

2.17.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.17.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	30%

2.17.6 Test Results

12 V DC Supply

Test Signal 1

Test Conditions		BER (%)		
		156.522 MHz	156.525 MHz	156.528 MHz
T_{nom}(+23°C)	V_{nom}(12V)	0	0	0
Measurement uncertainty (dB)		± 3.229		

Limit Clause C.4.4.3

The BER shall not exceed 10^{-2}.

2.18 DSC RECEIVER – ADJACENT CHANNEL SELECTIVITY

2.18.1 Specification Reference

IEC 62287-1, Clause C.4.5

2.18.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.18.3 Date of Test and Modification State

11 January 2011 - Modification State 1

2.18.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.18.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	30%

2.18.6 Test Results

12 V DC Supply

Test Signal 1

Test Conditions		BER (%)		
		156.500 MHz	156.525 MHz	156.550 MHz
T_{nom}(+23°C)	V_{nom}(12.0V)	0	-	0
T_{max}(+55°C)	V_{max}(31.2V)	0	-	0
T_{min}(-15°C)	V_{min}(10.8V)	0	-	8
Measurement uncertainty (dB)		± 3.229		

A ratio of 70dB was set at normal conditions and a 60dB ratio at extreme conditions to acheive the BER results above.

Limit Clause C.4.5.3

The adjacent channel selectivity for a BER not exceeding 10^{-2} shall be not less than 70 dB under normal test conditions and not less than 60 dB under extreme test conditions.

2.19 DSC RECEIVER – SPURIOUS RESPONSE REJECTION

2.19.1 Specification Reference

IEC 62287-1, Clause C.4.6

2.19.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.19.3 Date of Test and Modification State

25 January 2011 - Modification State 1

2.19.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.19.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	29%

2.19.6 Test Results

12 V DC Supply

Test Signal 1

Spurious Responses (MHz)	Ratio (dB)
Measurement uncertainty (dB)	± 3.62

No spurious responses were found yielding a BER greater than 10^{-2}.

Limit Clause C.4.6.3

The BER shall not exceed 10^{-2}.

2.20 DSC RECEIVER – INTERMODULATION RESPONSE REJECTION

2.20.1 Specification Reference

IEC 62287-1, Clause C.4.7

2.20.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.20.3 Date of Test and Modification State

11 January 2011 - Modification State 1

2.20.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.20.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	30%

2.20.6 Test Results

12 V DC Supply

Test Signal 1

Test Conditions		Unwanted Offsets	BER (%)
			156.525 MHz
T_{nom}(+23°C)	V_{nom}(12V)	+50 kHz / +100 kHz	0
		-50 kHz / -100 kHz	0
Measurement uncertainty (dB)		± 3.229	

Limit Clause C.4.7.3

The BER shall not exceed 10^{-2} (for an intermodulation response rejection ratio of 65 dB).

2.21 DSC RECEIVER – BLOCKING OR DESENSITISATION

2.21.1 Specification Reference

IEC 62287-1, Clause C.4.8

2.21.2 Equipment Under Test

Cobalt: Class B AIS Unit, S/N: 10

2.21.3 Date of Test and Modification State

11 January 2011 - Modification State 1

2.21.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.21.5 Environmental Conditions

Ambient Temperature	23°C
Relative Humidity	30%

2.21.6 Test Results

12V DC Supply

Test Signal 1

Test Conditions		Unwanted Offsets	BER (%)
			156.525 Hz
T_{nom}(+23°C)	V_{nom}(12V)	-10 MHz	0
		-5 MHz	0
		-2 MHz	0
		-1 MHz	0
		-0.5 MHz	0
		+0.5 MHz	0
		+1 MHz	0
		+2 MHz	0
		+5 MHz	0
		+10 MHz	0
Measurement uncertainty (dB)			± 3.229

Limit Clause C4.8.3

The BER shall not exceed 10^{-2}.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – TDMA Transmitter - Frequency Error					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	75 Mk3	455	12	5-Jan-2012
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	1-Dec-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Thermocouple Thermometer	Fluke	51	3172	12	12-Jul-2011
Attenuator (30dB, 150W)	Narda	769-30	3369	12	24-May-2011
Section 2.2 – TDMA Transmitter – Carrier Power					
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	75 Mk3	455	12	5-Jan-2012
Attenuator (10dB)	Weinschel	47-10-34	481	12	26-Mar-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
1GHz Digital Oscilloscope	Lecroy	9370M	612	12	19-Oct-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	1-Dec-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Thermocouple Thermometer	Fluke	51	3172	12	12-Jul-2011
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
Power Divider	Weinschel	1506A	3345	12	29-Apr-2011
Attenuator (10dB, 150W)	Narda	769-10	3368	12	24-May-2011
Attenuator (30dB, 150W)	Narda	769-30	3369	12	24-May-2011
Logic Level Shifter	Andy Blagg	0V to 10V to TTL Interface	3584	-	O/P Mon

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.3 – TDMA Transmitter - Transmission Spectrum					
Power Meter	Hewlett Packard	436A	94	12	11-Oct-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	75 Mk3	455	12	5-Jan-2012
Attenuator (10dB)	Weinschel	47-10-34	481	12	26-Mar-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
1GHz Digital Oscilloscope	Lecroy	9370M	612	12	19-Oct-2011
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Power Sensor	Hewlett Packard	8481A	1338	12	18-Dec-2010
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
Power Divider	Weinschel	1506A	3345	12	29-Apr-2011
Attenuator (10dB, 150W)	Narda	769-10	3368	12	24-May-2011
Attenuator (30dB, 150W)	Narda	769-30	3369	12	24-May-2011
Logic Level Shifter	Andy Blagg	0V to 10V to TTL Interface	3584	-	O/P Mon
Section 2.4 – TDMA Transmitter - Modulation Accuracy					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	1-Dec-2011
Thermocouple Thermometer	Fluke	51	3172	12	12-Jul-2011
Spectrum Analyser	Rohde & Schwarz	FSEA30	S/N: 841557/009	12	19-Aug-2011
Section 2.5 – TDMA Transmitter – Transmitter Output Power vs Time Function					
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	75 Mk3	455	12	5-Jan-2012
Cystal Detector (Pos O/P)	ASL (TUV)	RAB1	479	-	TU
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
Power Divider	Weinschel	1506A	3345	12	29-Apr-2011
Attenuator (10dB, 150W)	Narda	769-10	3368	12	24-May-2011
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Feb-2012
Logic Level Shifter	Andy Blagg	0V to 10V to TTL Interface	3584	-	O/P Mon
Section 2.6 – TDMA Receiver – Receiver Sensitivity					
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.7 – TDMA Receiver – Error Behaviour at High input Levels					
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.8 – TDMA Receiver - Co Channel Rejection					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	17-Dec-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.9 – TDMA Receiver - Adjacent Channel Selectivity					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	17-Dec-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.10 – TDMA Receiver - Spurious Response Rejection					
Signal Generator	Rohde & Schwarz	SMG	42	12	1-Sep-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Power Divider	Weinschel	1506A	3345	12	29-Apr-2011
Tunable Notch Filter	Wainwright	WRCD 130.0/170.0-0.05/50-5EEK	3412	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.11 – TDMA Receiver - Intermodulation Response Rejection					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Power Divider	Weinschel	1506A	604	12	18-Mar-2011
Broadband Resistive Power Divider	Weinschel	1506A	605	12	8-Sep-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.12 – TDMA Receiver – Blocking or Desensitisation					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Power Divider	Weinschel	1506A	604	12	18-Mar-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.13 and 2.14 – TDMA Receiver - Conducted Spurious Emissions from Receiver and Transmitter					
Rejection Network (100MHz-400MHz)	Electrometrics	3012	102	-	TU
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	75 Mk3	455	12	5-Jan-2012
Attenuator (10dB)	Weinschel	47-10-34	481	12	26-Mar-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
1GHz Digital Oscilloscope	Lecroy	9370M	612	12	19-Oct-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
High Pass Filter	Mini-Circuits	NHP-300	1640	12	12-Aug-2011
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	12-Nov-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
Power Divider	Weinschel	1506A	3345	12	29-Apr-2011
Attenuator (20dB, 150W)	Narda	769-20	3367	12	24-May-2011
Attenuator (10dB, 150W)	Narda	769-10	3368	12	24-May-2011
Logic Level Shifter	Andy Blagg	0V to 10V to TTL Interface	3584	-	O/P Mon
Section 2.15 – DSC Receiver - Maximum Sensitivity					
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Thermocouple Thermometer	Fluke	51	3172	12	12-Jul-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.16 – DSC Receiver - Error behaviour at High Input Levels					
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.17 – DSC Receiver - Co Channel Rejection					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	17-Dec-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.18 – DSC Receiver - Adjacent Channel Selectivity					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	17-Dec-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Thermocouple Thermometer	Fluke	51	3172	12	12-Jul-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.19 – DSC Receiver - Spurious Response Rejection					
Power Supply Unit	Farnell	LT-30-2	41	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Power Divider	Weinschel	1506A	3345	12	29-Apr-2011
Tunable Notch Filter	Wainwright	WRCD 130.0/170.0-0.05/50-5EEK	3412	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.20 – DSC Receiver - Intermodulation Response Rejection					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programable power supply	Thurlby	T-1000	418	-	TU
Broadband Resistive Power Divider	Weinschel	1506A	605	12	8-Sep-2011
Power Splitter	Weinschel	1506A	606	12	17-Dec-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU
Section 2.21 – DSC Receiver – Blocking or Desensitisation					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	25-Jun-2011
Signal Generator	Rohde & Schwarz	SMY 01	118	12	28-Jun-2011
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Dual programmable power supply	Thurlby	T-1000	418	-	TU
Power Splitter	Weinschel	1506A	606	12	17-Dec-2011
Multimeter	Fluke	79 Series III	611	12	22-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	9-Mar-2011
Hygrometer	Rotronic	I-1000	2891	12	27-Apr-2011
Programmable Modulation Waveform Generator	Sine Qua Non	PMG1	3291	-	TU

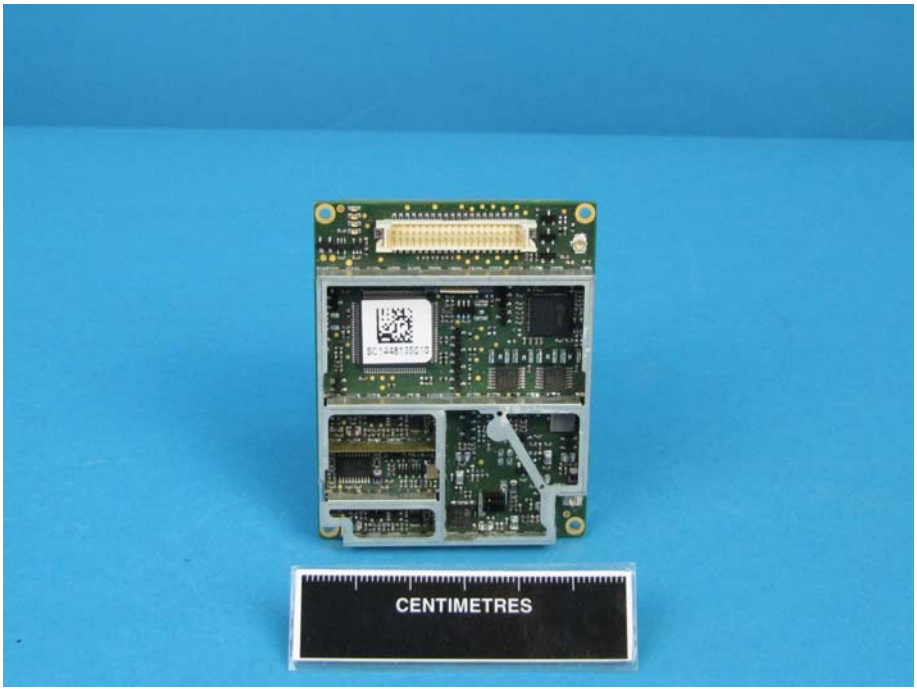
TU – Traceability Unscheduled
OP MON – Output Monitored with Calibrated Equipment

SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Front View



Front View with Cover Removed

Rear View

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).