

No. 200673R1

Equipment:	Trimble ACU
Type / model:	571 225 500
Manufacturer:	TRIMBLE AB
Tested by request of:	TRIMBLE AB

The equipment complies with the requirements of the following standards:

FCC, Part 15, Subpart B (2001)
FCC, Part 15.247, Subpart C (2001)

Date of issue: September 13, 2002

Tested by:

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By: 
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1. CLIENT INFORMATION

The EUT has been tested by request of

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2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment:	Trimble ACU
Type/Model:	571 225 500
Serial Number	-
Brand name:	Trimble
Manufacturer:	Trimble AB
Rating:	12 V DC (7 ... 18 V DC)
Rating RF output power:	Power class 2
Operating temperature range:	-20 to +55 °C
Frequency range:	2400 – 2483,5 MHz

2.2 Additional hardware information about the EUT

The EUT consists of the following units:

Unit	Type and version	Serial number
Trimble ACU	571 225 500	-

2.3 Additional software information about the EUT

During the tests the EUT supported the following software:

Software	Version	Comment
Survey Controller	10.50	Application software
Trimble Test	1.0	To control the Test Mode

2.4 Peripheral equipment

Peripheral equipment is defined as equipment needed for correct operation of the EUT, but not included as a part of the testing and evaluation of the EUT.

Equipment	Manufacturer / Type	Serial number
AC/DC Power Adapter	FW7207/12 Input: 100-240 V, 47-63 Hz, 400mA; Output: 12 V DC, 1,25 A	-
Bluetooth starter kit	Ericsson AB / ROK 101 008/21 P3G	106002538 8001001 01W06 S61
Laptop PC	IBM / 2645-450	55250AY

The EUT was tested using the following cables:

Cable	Type	Length
System cable	Trimble AB / 571 202 216	1,0 m
Serial cable	Standard	1,5 m

3. TEST SPECIFICATIONS

3.1 Standards

FCC (2001): Subpart B – Unintentional radiators and Subpart C – Intentional Radiators; §15.247 for frequency hopping systems operating in the 2400 – 2483.5 MHz and 5725 – 5850 MHz; §15.205 for restricted bands; §15.107 for conducted limits; §15.109 and §15.209 for radiated limits.

3.2 Additions, deviations and exclusions from standards and accreditation

No additions, deviations or exclusions have been made from standards and accreditation.

3.3 Mode of operation during the test

Measurement set-ups for the test of conducted disturbance voltage in the frequency range 0,45-30 MHz and out-of-band spurious emissions test are described in Sections 12.4 and 13.4 respectively. During the other tests the EUT was connected to the spectrum analyzer FSIQ 40 (SEMCO No. 9192) by the cable Sucoflex 104 (SEMCO No. 5186). Spectrum analyzer and the EUT settings are specified in the corresponding sections. The frequencies and hopping mode of the EUT were controlled through the radio link with Bluetooth Ericsson starter kit (see Section 2.4) supporting the software EBDK, version 2.0.1.5.

3.4 Operating environment

Temperature: 23 °C
Relative Humidity: 55 %

4. TEST SUMMARY

The results in this report apply only to the sample tested:

	Test	Result	Note
15.247(b)	Peak output power	Pass	
15.247(a)	TX Output Spectrum – 20 dB Bandwidth	Pass	
15.247(a)	Carrier frequency separation	Pass	
15.247(a)	Number of hopping frequencies (channels)	Pass	
15.247(a)	Time of occupancy (dwell time)	Pass	
15.247(c)	Band edge compliance	Pass	
15.247 (d)	Power spectral density	Pass	
15.107 (a)	Conducted disturbance voltage in the frequency range 0,45 - 30 MHz	Pass	
15.109 (a)	Out of band spurious emissions, radiated	Pass	
15.247(c)	Out of band spurious emissions, radiated	Pass	

5. PEAK OUTPUT POWER

5.1 Test protocol

Date of test: August 28, 2002

The EUT was set to the TX mode and hopping off.

Spectrum analyzer settings:

Span: 10 MHz

RBW: 3 MHz

VBW: 3 MHz

Sweep time: 1 s

Detector: Peak

Trace: Max Hold

Test conditions	Output power (dBm)			
	$F_{\min} = 2402 \text{ MHz}$	$F_{\text{mid}} = 2441 \text{ MHz}$	$F_{\max} = 2480 \text{ MHz}$	Limit (dBm)
$V_{\text{nom}} = 12 \text{ V}$	- 1,7	- 2,3	- 3,2	30

Measurement plots are given in Appendix I.

6. TX OUTPUT SPECTRUM – 20 dB BANDWIDTH

6.1 Test protocol

Date of test: August 27, 2002

The EUT was set to the TX mode and hopping off.

Spectrum analyzer settings:

Span: 1,5 MHz

RBW: 30 kHz

VBW: 30 kHz

Sweep time: 5 ms

Detector: Peak

Trace: Max Hold

Test conditions	20 dB bandwidth (kHz)			
	$F_{\min} = 2402 \text{ MHz}$	$F_{\text{mid}} = 2441 \text{ MHz}$	$F_{\max} = 2480 \text{ MHz}$	Limit (kHz)
$V_{\text{nom}} = 12 \text{ V}$	743	854	953	<1000

Measurement plots are given in Appendix I.

7. CARRIER FREQUENCY SEPARATION

7.1 Test protocol

Date of test: August 27, 2002

The EUT was set to the TX mode and hopping on.

Spectrum analyzer settings:

Span: 4 MHz

RBW: 100 kHz

VBW: 100 kHz

Sweep time: 5 ms

Detector: Peak

Trace: Max Hold

Test conditions	Frequency separation (kHz)			
	$F_{\min} = 2402 \text{ MHz}$	$F_{\text{mid}} = 2441 \text{ MHz}$	$F_{\max} = 2480 \text{ MHz}$	Limit (kHz)
$V_{\text{nom}} = 12 \text{ V}$	1006	994	998	> 953

Measurement plots are given in Appendix I.

8. NUMBER OF HOPPING CHANNELS

8.1 Test protocol

Date of test: August 27, 2002

The EUT was set to the TX mode and hopping on.

Spectrum analyzer settings:

Span: 85 MHz

RBW: 100 kHz

VBW: 100 kHz

Sweep time: 21,5 ms

Detector: Peak

Trace: Max Hold

Test conditions	Frequency range	
	No. of channels	Limit (No. of channels)
$V_{nom} = 12 \text{ V}$	79	> 75

Measurement plots are given in Appendix I.

9. BAND EDGE COMPLIANCE

9.1 Test protocol

Date of test: August 28, 2002

The EUT was set to TX mode and hopping off.

Spectrum analyzer settings:

Span: 5-9 MHz
 RBW: 100 kHz
 VBW: 100 kHz
 Sweep time: 5 ms
 Detector: Peak
 Trace: Max Hold

Test conditions	Band edge compliance		
	$F_{\min} = 2400 \text{ MHz}$	$F_{\max} = 2483,5 \text{ MHz}$	Limit (dBc)
$V_{\text{nom}} = 12 \text{ V}$	-44,5 dBc	-43,6 dBc	< -20

Measurement plots are given in Appendix I.

10. TIME OF OCCUPANCY (DWEELL TIME)

10.1 Test protocol

Date of test: August 28, 2002

The EUT was set to the TX mode and hopping on.

Spectrum analyzer settings:

Determination of transmitting time T

Span: 0 Hz
 RBW: 1 MHz
 VBW: 1 MHz
 Sweep time: 1,05 ms
 Single sweep
 Detector: Peak
 Trace: Clear/Write
 Trigger: Video

Determination of the number of times n the channel occurred in 30 s

RBW: 100 kHz
 VBW: 100 kHz
 Sweep time: 10 s

Time for the channel to be active in 30 s: $S = T * n$

Limit: < 0,4 s

Test conditions	Test parameters	Time of occupancy (dwell time)		
		$F_{\min} = 2402 \text{ MHz}$	$F_{\text{mid}} = 2441 \text{ MHz}$	$F_{\max} = 2480 \text{ MHz}$
$V_{\text{nom}} = 12 \text{ V}$	$T (\mu\text{s})$	465,0	456,6	456,6
	n	$100*3=300$	$101*3=303$	$97*3=291$
	$S (\text{s})$	0,14	0,14	0,13

Measurement plots are given in Appendix I.

11. POWER SPECTRAL DENSITY

11.1 Test protocol

Date of test: August 28, 2002

The EUT was set to the TX mode, hopping on and maximum data rate.

Spectrum analyzer settings:

Span: 1 MHz

RBW: 3 kHz

VBW: 10 kHz

Sweep time: 280 ms

Detector: Peak

Trace: Max Hold

Test conditions	Power spectral density (dBm)			
	$F_{\min} = 2402 \text{ MHz}$	$F_{\text{mid}} = 2441 \text{ MHz}$	$F_{\max} = 2480 \text{ MHz}$	Limit (dBm)
$V_{\text{nom}} = 12 \text{ V}$	-9,7	-12,5	-14,3	< 8

Measurement plots are given in Appendix I.