



Trade Association for  
Content Delivery

## **Cable Type RG6-CAI-SDU**

## **CAI Certification Specification**

**Ref: CAI-013-C / RG6-CAI-SDU / 12-2016**

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## INDEX

<b>1</b>	<b>GENERAL.....</b>	<b>3</b>
<b>2</b>	<b>MECHANICAL SPECIFICATION.....</b>	<b>3</b>
<b>3</b>	<b>CABLE MEASURING .....</b>	<b>3</b>
<b>4</b>	<b>TESTING (ELECTRICAL) .....</b>	<b>3</b>
4.1	CONDUCTOR RESISTANCE .....	3
4.2	REGULARITY OF IMPEDANCE .....	4
4.3	LONGITUDINAL LOSS (ATTENUATION).....	4
4.4	RETURN LOSS.....	4
4.5	CAPACITANCE.....	4
4.6	RELATIVE PROPAGATION VELOCITY.....	5
4.7	CHARACTERISTIC IMPEDANCE.....	5
4.8	STATIC BEND TEST.....	5
4.9	MULTIPLE BENDING TEST.....	5
4.10	SCREENING ATTENUATION .....	6
4.11	FLEXING TEST.....	6
4.12	CRUSH RESISTANCE.....	6

**CERTIFICATION SUMMARY: CAI-013-C / RG6-CAI-SDU / 11-2012**  
**Cable Type RG6-CAI-SDU..... APPENDIX**

## 1 General

This specification defines the pass/fail criteria for the testing of cable type RG6-CAI-SDU, and references the relevant sections of BS EN 50117-1: 1997 where appropriate. The methods of BS EN 50117-6:1997 are used as appropriate.

All details, where applicable, will be recorded on CAI-010-C: Cable Testing Result Sheet. When a cable fails any section, the details of the failure will be fully recorded.

High quality connectors are to be used to test the cable as required throughout this procedure, referencing the correct method of connection in the VHF/UHF Handbook.

## 2 Mechanical Specification

The mechanical specifications for the cable as follows:

Inner Conductor	: To be copper plated steel
Diameter of Inner Conductor	: Steel 1.0 +/- 0.02 mm
	: Copper plate 0.01 mm +/- 5%
Outer Braid	: No contact between dissimilar metals
Outer Tape	: Aluminium Mylar tape
External Diameter of Sheath	: 6.7 +/- 0.3 mm
Bending Radius	: 40 mm
Flexing Radius	: 75 mm

## 3 Cable Measuring

Physically measure and cut 100 m (+/- 25 cm), 30 m (+/- 6 cm) and 3 m (+/- 3 cm) from the cable to be tested using a tape measure, when required. Once measured, put onto reels as necessary for the tests to be carried out.

## 4 Testing (Electrical)

**Carry out the following test with 100 m of cable on the drum**

### 4.1 Conductor Resistance

(Reference BS EN 50117-1: 1997 Section 11.1)

Calculate the DC resistance of each core of the cable under test, at 20°C, of both the inner and outer conductors.

Utilising BS EN 50117-1 1997 Section 11, determine the DC resistance of the inner and outer conductors and convert the reading to  $\Omega/\text{km}$ .

Express the result to the standard temperature of 20°C using BS EN 50117-1: 1997 Section 11.1.5 equation (7).

The DC resistance of the inner conductor should be <105 Ω/km.

The DC resistance of the outer conductor should be <63.5 Ω/km.

## 4.2 Regularity of Impedance

(Reference BS EN 50117-1: 1997 Section 11.9)

Using a TDR, enter the velocity ratio of the cable under test as specified by the manufacturer into the TDR, and observe the cable regularity of impedance.

Regularity of Impedance should be <1% throughout the test specimen.

## 4.3 Longitudinal Loss (Attenuation)

(Reference BS EN 50117-1: 1997 Section 11.8)

The attenuation of the cable under test should meet the following:

5 MHz	:	<2.0 dB/100 m
50 MHz	:	<4.9 dB/100 m
100 MHz	:	<6.9 dB/100 m
200 MHz	:	<9.7 dB/100 m
460 MHz	:	<14.8 dB/100 m
860 MHz	:	<20.2 dB/100 m
1000 MHz	:	<21.8 dB/100 m
1750 MHz	:	<28.8 dB/100 m
2150 MHz	:	<32.0 dB/100 m

## 4.4 Return Loss

(Reference BS EN 50117-1: 1997 Section 11.6)

The return loss of the cable under test should meet the following:

5 - 30 MHz	:	>23 dB
30 - 470 MHz	:	>23 dB
470 - 862 MHz	:	>20 dB
862 - 2150 MHz	:	>18 dB

In each frequency band, 3 peak return loss values up to 4 dB lower than the stated specified limit are permissible.

**Carry out the following tests with 30 m of cable cut from the drum**

## 4.5 Capacitance

Measure the capacitance of the cable under test using a capacitance meter and convert the reading to give pF/m.

#### 4.6 Relative Propagation Velocity

(Reference BS EN 50117-1: 1997 Section 11.7)

Calculate the required values using BS EN 50117-1: 1997 Section 11.7.4 equation (15) & (17).

Express the final value using BS EN 50117-1: 1997 Section 11.7.5 equation (18).

#### 4.7 Characteristic Impedance

(Reference BS EN 50117-1: 1997 Section 11.5)

Using the values obtained in section 4.6 above, and capacitance value obtained in section 4.5 above. Apply the values using BS EN 50117-1: 1997 Section 11.5.1.2 equation (9) to calculate the impedance of the cable under test.

The Characteristic Impedance should be  $75 \Omega \pm 3 \Omega$ .

**Carry out the following tests using new cable from the drum**

#### 4.8 Static Bend Test

(Reference BS EN 50117-1: 1997 Section 10.2.4)

Using a 20 m (minimum) piece of the cable under test, wrap a section  $180^\circ$  around a 80 mm diameter mandrel - ensuring the cable touches all the required parts of the mandrel.

Using a TDR, ensure that the regularity of impedance is  $<1\%$ .

After testing, there should be no cracks, or breaks in the dielectric, metallic elements or sheath.

#### 4.9 Multiple Bending Test

(Reference BS EN 50117-1: 1997 Section 10.2.1)

Using a 10 m (minimum) piece of the cable under test, bend a section  $90^\circ$  around the 80 mm diameter mandrel, then straighten and bend again 3 times. Wind the same section of cable 3 turns around the same mandrel. Ensure the cable touches all the required parts of the mandrel for these tests.

Using a TDR, ensure that the regularity of impedance is  $<1\%$ .

After testing, there should be no cracks, or breaks in the dielectric, metallic elements or sheath.

**Carry out the following test using a new 3 m section of cable**

#### **4.10 Screening Attenuation**

(Reference BS EN 50117-1: 1997 Section 11.10)

Using the formula specified in BS EN 50117-1: 1997 Section 11.10.6 equation (31), the result +6 dB of the cable under test should meet the following attenuation levels:

5 - 30 MHz	:	>75 dB
30 - 300 MHz	:	>75 dB
300 - 470 MHz	:	>75 dB
470 - 1000 MHz	:	>65 dB
1000 - 2150 MHz	:	>65 dB

**Carry out the following tests using 15 m section of new cable**

#### **4.11 Flexing Test**

(Reference BS EN 50117-1: 1997 Section 10.2.2)

Mark the middle 10 m (minimum) of the cable under test as the test area, and pull the cable through the 150 mm diameter pulleys backwards and forwards 5 times, with a force of 10 to 20 N, at a rate of not less than 1 m/minute.

Using a TDR, ensure that the regularity of impedance is <1%.

Re-check the screening attenuation on a 3 m length of the 10 m of cable tested using the set up in section 4.10, and the formula specified in BS EN 50117-1: 1997 Section 11.10.6 equation (31), the result +6 dB of the cable under test should meet the following attenuation levels:

5 - 30 MHz	:	>75 dB
30 - 300 MHz	:	>75 dB
300 - 470 MHz	:	>75 dB
470 - 1000 MHz	:	>65 dB
1000 - 2150 MHz	:	>65 dB

After testing, there should be no cracks, or breaks in the dielectric, metallic elements or sheath.

#### **4.12 Crush Resistance**

(Reference BS EN 50117-1: 1997 Section 10.4)

Using a TDR and a torque wrench set to 13.6 Nm, ensure the cable has no lateral movement and apply a crush load to the cable for 2 minutes.

Ensure that the regularity of impedance is <1% and record any magnitude variations.

## Certification Summary: CAI-013-C / RG6-CAI-SDU / 11-2012 Cable Type RG6-CAI-SDU

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**Standard** : BS EN50117-1: 1997

*Coaxial Cables used in cabled distribution networks*

**Sections** : 10.2.1, 10.2.2, 10.2.4, 10.4, 11.1, 11.5, 11.6, 11.7, 11.8, 11.9, 11.10

### **MECHANICAL SPECIFICATION**

Inner Conductor	:	To be copper plated steel
Diameter of Inner Conductor	:	Steel 1.0 +/- 0.02 mm
	:	Copper plate 0.01 mm +/- 5%
Outer Braid	:	No contact between dissimilar metals
Outer Tape	:	Aluminium Mylar tape
External Diameter of Sheath	:	6.7 +/- 0.3 mm
Bending Radius	:	40 mm
Flexing Radius	:	75 mm

### **ELECTRICAL SPECIFICATION**

Nominal Impedance	:	75 $\Omega$ +/- 3 $\Omega$
DC Resistance (20°C)	:	Inner <105 $\Omega$ /km
	:	Outer <63.5 $\Omega$ /km

#### **Attenuation:**

5 MHz	:	<2.0 dB/100 m
50 MHz	:	<4.9 dB/100 m
100 MHz	:	<6.9 dB/100 m
200 MHz	:	<9.7 dB/100 m
460 MHz	:	<14.8 dB/100 m
860 MHz	:	<20.2 dB/100 m
1000 MHz	:	<21.8 dB/100 m
1750 MHz	:	<28.8 dB/100 m
2150 MHz	:	<32.0 dB/100 m

#### **Return Loss:**

5 - 30 MHz	:	>23 dB
30 - 470 MHz	:	>23 dB
470 - 862 MHz	:	>20 dB
862 - 2150 MHz	:	>18 dB

**Screening Attenuation:**

5 - 30 MHz	:	>75 dB
30 - 300 MHz	:	>75 dB
300 - 470 MHz	:	>75 dB
470 - 1000 MHz	:	>65 dB
1000 - 2150 MHz	:	>65 dB

**Screening Attenuation following Flexing Test:**

5 - 30 MHz	:	>75 dB
30 - 300 MHz	:	>75 dB
300 - 470 MHz	:	>75 dB
470 - 1000 MHz	:	>65 dB
1000 - 2150 MHz	:	>65 dB

**Flexing:**

Maintain minimum impedance regularity <1%, and screening performance.

**Static Bend Test:**

Maintain minimum impedance regularity <1%

**Crush Resistance:**

Maintain impedance regularity <1%