SRI LANKA STANDARD 1070 : 1995

UDC 621 . 397.13 : 621 : 396.67

SPECIFICATION FOR TELEVISION RECEIVING ANTENNAE FOR DOMESTIC USE

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR TELEVISION RECEIVING ANTENNAE FOR DOMESTIC USE

SLS 1070 : 1995

Gr. 7

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

SRI LANKA STANDARD
SPECIFICATION FOR TELEVISION RECEIVING ANTENNAE FOR DOMESTIC USE

FOREWORD

This standard was approved by the Sectoral Committee on Electronic Engineering Standards and was authorized for adoption as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1995-08-24.

This standard specifies the essential requirements for television receiving antennae for domestic use. The limits of performance requirements prescribed in this standard have been so chosen as to ensure quality of the antenna and the same time ensure sufficient freedom in their design.

All values given in this specification are in SI units.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test, shall be rounded off in accordance with SLS 102. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

In the preparation of this standard, the assistance derived from the IS 9793 : 1983 : Television Receiving Aerials for domestic use, Part II : Specification for requirements, is gratefully acknowledged.

1 SCOPE

This standard lays down essential requirements for Yagi television receiving antenna for reception of VHF/UHF television transmissions for domestic applications.

2 REFERENCES

IEC 68 Environmental testing.

IEC 68-2-6 Test Fc and guidance - Vibration (Sinusodial).

IEC 68-2-10 Test J and guidance - Mould growth.

IEC 68-2-11 Test Ka - Salt mist test.

SLS 580 Basic Environmental testing procedures.
Part 1 General and guidance.
Part 2.1 Cold test.
Part 2.2 Heat test.
Part 2.3 Damp heat test.

SLS 1008 Aerials for the reception of sound and television broadcasting in the frequency range 30 MHz to 1 GHz.
Part 1 Electrical and mechanical characteristics.
Part 2 Method of measurement of electrical performance parameters.
Part 3 Method of measurement of mechanical properties, vibration and environmental test.
Part 4 Guide for the preparation of aerial performance specification, Detailed Specification sheet format.

3 DEFINITIONS

For the purpose of this standard the terms and definitions given in SLS 1008 : Part 1 shall apply, in addition to the following;

3.1 **front to back ratio** : Ratio of the electric field strengths produced at the same distance from the antenna but in forward and backward directions.

4 PERFORMANCE REQUIREMENTS

The performance requirements for television receiving antennae shall be in accordance 4.1 to 4.10 as given herein.

Incase, the connecting wire is made from a material different from that of the antenna, a proper connector shall be used in between to avoid the formation of bimetallic cell.

4.1 Nominal impedance

Nominal impedance shall be,

a) 300 ohms balanced; or
b) 75 ohms unbalanced.

Compliance shall be checked by the test given in Clause 3.6 of SLS 1008 : Part 2 : 1993.

NOTE
If the nominal impedance of the antenna is significantly different it should be stated.

4.2 Gain bandwidth

Gain bandwidth shall be as in Table 1.

TABLE 1 - Antenna gain variation for different bands.

Antenna type (1)	Bandwidth MHz (2)	Band (3)	Frequency range MHz (4)	Max.gain variation dB (5)
Single channel	7	VHF	47 - 68	± 2
Multi channel	___	VHF	47 - 68	± 2 (see note)
Single channel	7	VHF	174 - 230	± 1.5
Multi channel	___	VHF	174 - 230	± 2 (see note)
Multi channel	___	UHF	470 - 606	± 1.5
Multi channel		UHF	606 - 862	± 1.5

NOTE
It is suggested that the gain variation over any single channel should not exceed ± 1.5 dB.

Compliance shall be checked by the test given in Clause 3.2 of SLS 1008 : Part 2 : 1993.

4.3 Directivity protection bandwidth

Minimum requirements shall be in accordance with Fig 1 when tested as specified in Clause 3.4 of SLS 1008 : Part 2 : 1993.

4.4 Impedance bandwidth

For variation of ± 20 percent of the nominal impedance value, the bandwidth shall cover the channels, specified by the transmitting authority.

4.5 Cross polarization protection bandwidth

The level of Cross-polar radiation in any azimuth direction should be at least 20 dB below the copolar radiation in the direction of the main lobe, when tested in accordance with Clause 3.5 of SLS 1008 : Part 2 : 1993. Lower cross-polar radiation, i.e. better cross polarization protection, should be achievable except with a simple antenna.

4.6 Beam width

Beam width shall be in accordance with Fig. 1.

4.7 Voltage standing wave ratio (VSWR)

Voltage standing wave ratio shall be calculated in accordance with Clause 3.18 of SLS 1008 : Part 1 : 1993, and the calculated VSWR shall comply with the relevant value, in Table 2.

TABLE 2 - VSWR for different bands

Antenna type (1)	Magnitude of Max reflection coefficient (2)	Maximum VSWR (3)	Return loss ratio dB (4)
Single channel VHF 47 - 68 MHz	0.5	3	6.0
Multi channel VHF 47 - 68 MHz	0.5	3	6.0
Single channel VHF 174 - 230 MHz	0.43	2.5	7.3
Multi Channel VHF/UHF	0.43	2.5	7.3

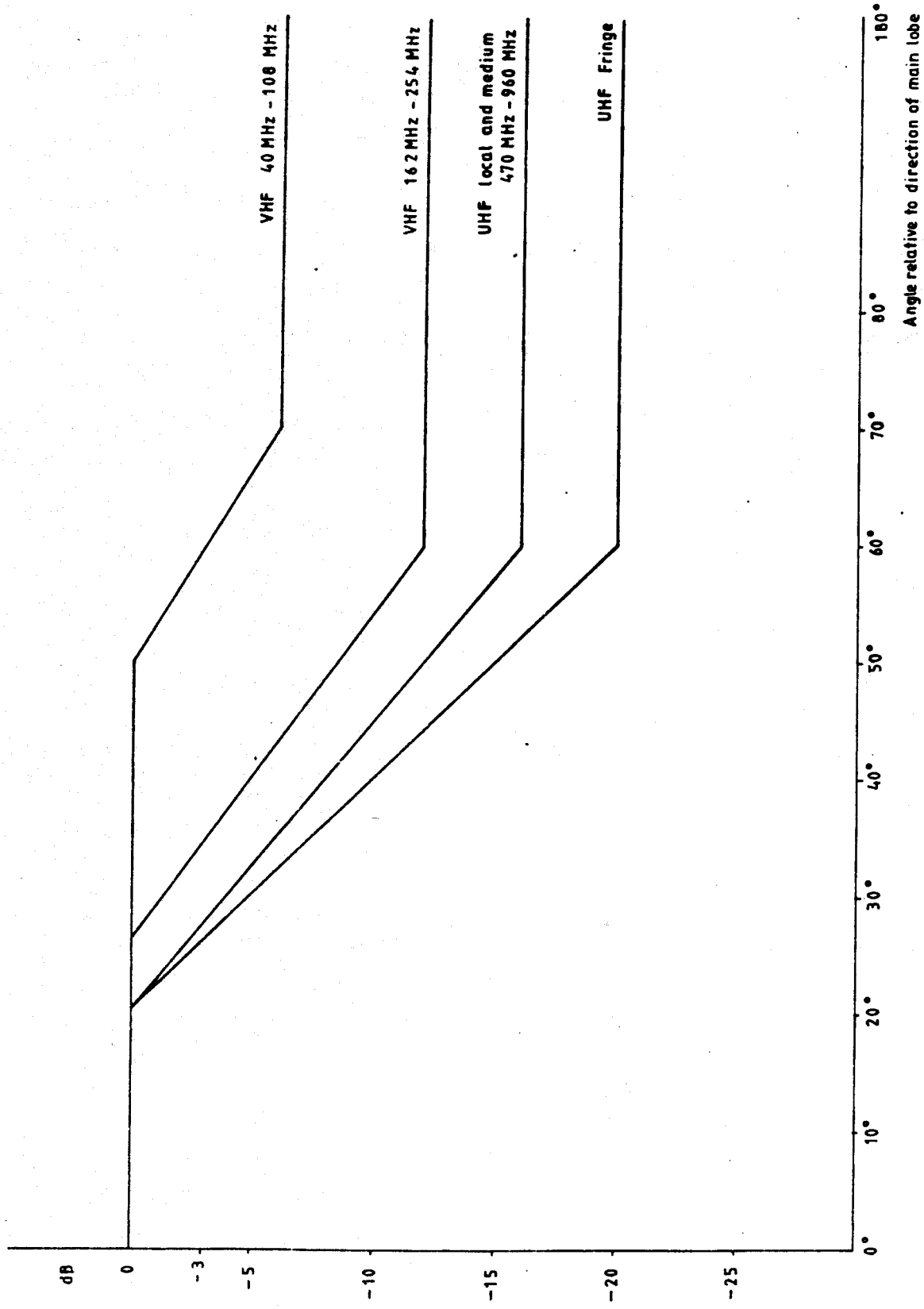

FIGURE 1 - Antenna directivity protection

4.8 Antenna Gain

Aerial gain shall be in accordance with Table 3. Compliance shall be checked by the test given in Clause 3.2 of SLS 1008 Part 2 : 1993.

Commercially available standard antennae shall be used for gain measurement.

TABLE 3 - Minimum gain over a single channel

Band (1)	Channels (2)	Antenna Type (3)	Gain (minimum) over single channel dB (4)
I	2 - 4	Medium gain	2
		High gain	4
III	5 - 12	Medium gain	5
		High gain	8
IV	21 - 37	Medium gain	8
		High gain	11
V	38 - 69	Medium gain	9
		High gain	12

4.9 Wind load

The receiving antenna shall be able to withstand a wind load of 49 m/s.

Compliance shall be checked by calculation in accordance with Appendix A.

4.10 Ability to withstand environmental conditions

The antenna shall be able to withstand the environmental Severities listed in Table 4. The method of test also shall be in accordance with Table 4.

TABLE 4 - Severity and Method of test

Test (1)	Severity (2)	Method of test Specified in (3)
Cold	10 °C, 4 h	SLS 580-2-1 : 1983
Dry heat	70 °C, 16 h	SLS 580-2-2 : 1983
Damp heat	10 days	SLS 580-2-2 : 1983
Salt mist	-------	IEC 68-2-11 : 1981
Mould growth	28 days	IEC 68-2-10 : 1988
Vibration	1 Hz to 10 Hz,6 h	IEC 86-2-6 : 1982

4.11 Connection

Proper electrical contact shall be made between the ends of the dipole and the terminal box. Compliance shall be checked by inspection.

4.12 Robustness of terminal device :

The terminal device of the antenna shall be able to withstand the direct axial and bending stresses likely to be applied during antenna installation or in service.

Compliance shall be checked by the test specified in Clause 5 of SLS 1008 Part 3 : 1993.

5 SPECIFICATION SHEET

5.1 The manufacturer shall provide a specification sheet with each antenna to ensure uniformity, and conformity. The following properties shall be given in the specification sheet.

5.1.1 *Resistive Load (The nominal value of the characteristic impedance of the antenna).*
5.1.2 *Gain Bandwidth.*
5.1.3 *Mass (assembled).*
5.1.4 *Operating bandwidth and channels.*
5.1.5 *Gain.*
5.1.6 *Wind load.*
5.1.7 *Total length and number of elements.*
5.1.8 *Front to back ratio.*

5.2 The following properties may be given in the specification sheet.

5.2.1 *Directivity protection bandwidth.*
5.2.2 *Impedance bandwidth.*
5.2.3 *Cross-polarization bandwidth.*
5.2.4 *Directivity protection.*
5.2.5 *Cross-polarization protection.*
5.2.6 *Beamwidth.*
5.2.7 *Reflection coefficient (or VSWR or RLR).*
5.2.8 *Dimensions.*

6 MARKING AND PACKAGING

6.1 The following information shall be marked on the antenna and the package;

a) Band/Channel,
b) Impedance, and
c) Gain.

This information shall be printed on a junction box at the feed point.

NOTE
Attention is drawn to certification facilities offered by SLSI. See the inside back cover of this standard.

7 TESTS

The methods of test shall be in accordance with SLS 1008 : Part 2 : 1993 and SLS 1008 : Part 3 : 1993.

Type tests, Routine Tests and Acceptance tests shall be in accordance with the Appendix B.

APPENDIX A

WIND LOAD

A.1 Wind Loading Zones.

The wind loading zone is found from the Fig. 2.

A.2 Wind Speed.

The wind speeds for different zones to be used for calculation of wind pressures are given in Table 7.

TABLE 7 - Wind speed and the constant "k" for different zone

Zone (1)	wind speed in m/s (2)	constant "k" (3)
1	49.0	0.56
2	42.5	0.57
3	33.5	0.59

A.3 Dynamic pressure.

The dynamic pressure of the wind shall be determined as follows:

$$p = kV^2s$$

where

p = Dynamic pressure of the wind (N/m^2);

V_s = Design wind speed (m/sec.); and

K = A constant, in accordance with Table 7.

A.4 Wind Load.

Wind Load shall be checked by the test given in Clause 3.1 of SLS 1008 : Part 3 : 1993.

NOTE

The contents given in this Appendix have been extracted from the Manual for the Design of Buildings for High Winds in Sri Lanka, published by Ministry of Local Government, Housing and Construction.

SRI LANKA
WIND LOADING ZONES

(Extracted from the manual for the design of buildings for high winds in Sri Lanka)

Scale 1 : 2000 000

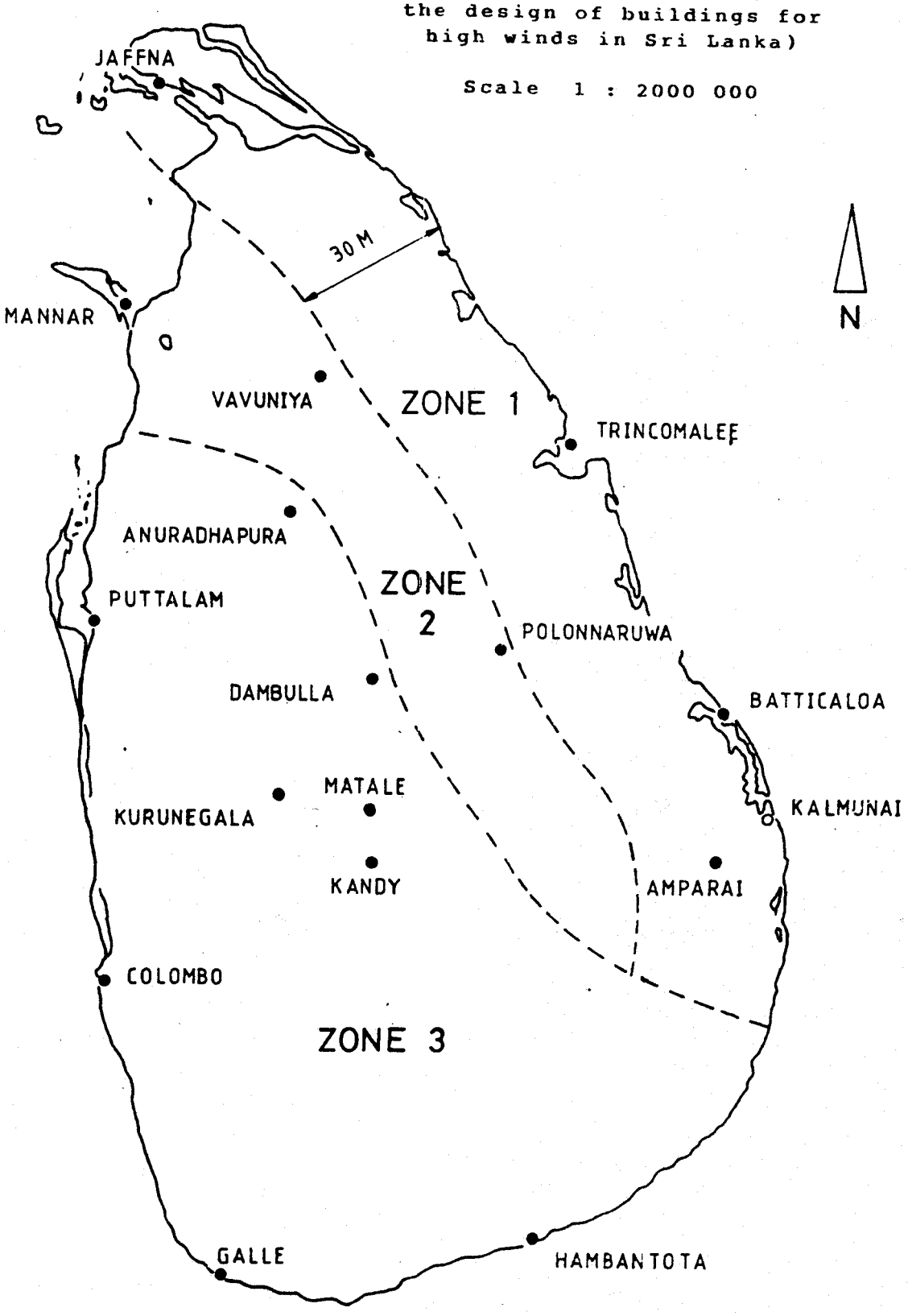

FIGURE 2

APPENDIX B

CLASSIFICATION OF TESTS

B.1 TYPE TEST

The following tests shall constitute the type tests:

a) Dimensions,
b) Bandwidth,
c) Gain,
d) Nominal impedance,
e) VSWR,
f) Directivity Protection,
g) Cross polarization protection,
h) Wind load, and
i) Environmental tests.

B.1.1 *Number of samples.*

For type tests three samples shall be selected preferably at random, from a regular production lot.

B.1.2 *Criteria of acceptance.*

There shall be no single failure in any of the type tests.

B.2 Routine Tests.

The routine test shall constitute dimensions only and shall be carried on each antenna.

B.3 Acceptance Tests.

The following shall constitute the acceptance tests.

a) Dimensions,
b) VSWR,
c) Impedance,
d) Gain, and
e) Bandwidth.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

Printed at SLSI (Printing Unit)

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.