

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

K.97

(02/2014)

SERIES K: PROTECTION AGAINST INTERFERENCE

Lightning protection of distributed base stations

Recommendation ITU-T K.97



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Summary

Recommendation ITU-T K.97 deals with lightning protection of a distributed base station (DBS) on the tower site. A DBS is a new type of radio base station which consists of a remote radio unit (RRU) located on the tower, and a base band unit (BBU) inside the shelter at the bottom of the tower. Lightning protection of DBS is not fully covered by Recommendation ITU-T K.56.

The main objective of this Recommendation is the lightning protection of RRU and rectifier interfaces with direct current (DC) power cable, and bonding of the DBS.

Protection of these interfaces is achieved by installing a protection module. Possible protection schemes for such installations are also described.

This Recommendation indicates when these protection modules should be used, and provides indication of their withstand current. The surge protective device (SPD) needed on the feeder cable is also indicated.

Bonding configurations of the protection module and of the optical fibre cable are also illustrated.

Appendix I shows an example of an isolated protection solution.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T K.97	2014-02-13	5	11.1002/1000/12130

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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Recommendation ITU-T K.97

Lightning protection of distributed base stations

1 Scope

This Recommendation addresses distributed base stations (DBSs) composed of a shelter or an outdoor cabinet to house equipment, and a nearby tower for antennas and equipment. The tower will prevent lightning from hitting the shelter or outdoor cabinet. The purpose of this Recommendation is to give criteria for the definition of procedures that will protect DBSs against lightning discharges.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T K.27] Recommendation ITU-T K.27 (1996), *Bonding configurations and earthing inside a telecommunication building*.
- [ITU-T K.39] Recommendation ITU-T K.39 (1996), *Risk assessment of damages to telecommunication sites due to lightning discharges*.
- [ITU-T K.40] Recommendation ITU-T K.40 (1996), *Protection against LEMP in telecommunications centres*.
- [ITU-T K.56] Recommendation ITU-T K.56 (2010), *Protection of radio base stations against lightning discharges*.
- [ITU-T K.85] Recommendation ITU-T K.85 (2011), *Requirements for the mitigation of lightning effects on home networks installed in customer premises*.
- [IEC 62305-2] IEC 62305-2 ed2.0 (2010), *Protection against lightning – Part 2: Risk management*.

3 Definitions

3.1 Terms defined elsewhere

The definitions contained in the referenced documents apply to this Recommendation.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 base band unit (BBU): The base band module of a radio base station (RBS) which can be installed separated from the remote radio unit (RRU).

NOTE – Optical fibre is commonly used to connect the base band unit (BBU) to the remote radio unit (RRU).

3.2.2 cable tray: Rigid structural system used to securely fasten or support cables.

3.2.3 distributed base station (DBS): One kind of radio base station (RBS), where the remote radio unit (RRU) and the base band unit (BBU) can be installed separated.

3.2.4 radio base station (RBS): Installation intended to provide access to the telecommunication system by means of radio waves.

3.2.5 remote radio unit (RRU): The radio frequency module of a radio base station (RBS) which can be installed separated from the base band unit (BBU).

NOTE 1 – Optical fibre is commonly used to connect the base band unit (BBU) to the remote radio unit (RRU).

NOTE 2 – The radio frequency module is also called remote radio head (RRH).

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AC	Alternating Current
BBU	Base Band Unit
DBS	Distributed Base Station
GDT	Gas Discharge Tube
MEB	Main Earthing Bar
MET	Main Earth Terminal
MOV	Metal-Oxide Varistor
LPL	Lightning Protection Level
LPZ	Lightning Protective Zone
ODF	Optical fibre Distribution Frame
RBS	Radio Base Station
RRH	Remote Radio Head
RRU	Remote Radio Unit
RTN	Return
SPC	Surge Protective Component
SPD	Surge Protective Device

5 Reference configuration

Figure 1 shows the reference configuration considered in this Recommendation. In this figure, three lightning protective zones (LPZs), as described in [ITU-T K.40], can be seen.

In Figure 1, RRU is installed very close to the antenna and is, in general, connected to the antenna by a coaxial feeder cable and to BBU by an optical fibre cable.

RRU is powered from the rectifier by a shielded or unshielded direct current (DC) power cable.

Both optical fibre and DC power cables run along the tower and enter the shelter.