A B f D C B M H C N S G B

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***Ab t act* I t , t t -**

. D . R . BS (MS) . D SINR, BS, (MBRP), (MIRP). A

[3], [26], [25], [31]. O BS MS . C . W BS MS H N . A . O BS . A . A BS

-SINR [26], [27]. U [22] [24] H N -SINR BS . I [30], H N MBRP . I [1] [3], H N MIRP

I -BS -SINR . W SINR . . F MBRP MIRP -BS -SINR . W H N H N . W SINR 1, H N -SINR MIRP -BS MBRP . F . F . W

II. System Model

: BS , BS .

A. BS Layout

H N K L . BS P $\mathbb{R}^2$ $\lambda_{ok}, \lambda_{cl}$ k l $k = 1, \ldots, K$ $l = 1, \ldots, L$. MS BS BS . W MS BS . S BS , MS .

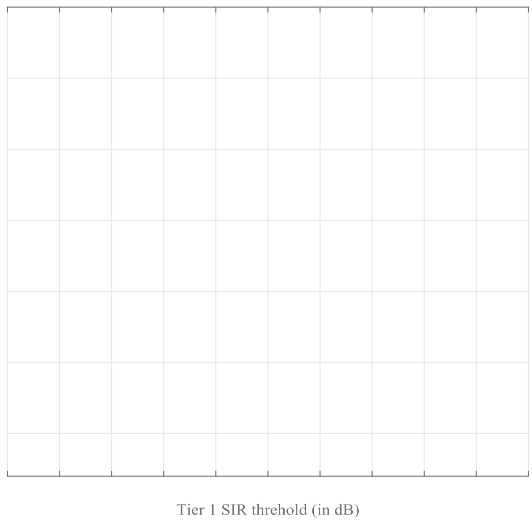
B. Radio Environment and Downlink SINR

BS . A ( ) . SINR MS i BS k BS BS η,

$$\mathrm{SINR}_{ki} = \frac{P_{ok}\Psi_{oki}R_{oki}^{-\varepsilon_{ok}}}{I_o - P_{ok}\Psi_{oki}R_{oki}^{-\varepsilon_{ok}} + I_c + \eta}, \tag{1}$$

‘o’ ‘c’ , $I_o = \sum_{m=1}^{K}\sum_{n=1}^{\infty} P_{om}\Psi_{omn}R_{omn}^{-\varepsilon_{om}}$ BS ; $\{P_{om}, \Psi_{omn}, \varepsilon_{om}, R_{omn}\}_{m=1,\, n=1}^{m=K,\, n=\infty}$, , MS n BS m ; $I_c = \sum_{l=1}^{L}\sum_{n=1}^{\infty} P_{cl}\Psi_{cln}R_{cln}^{-\varepsilon_{cl}}$ omn

( ) B R_{ol1} $_{l=1}^{K}$


Tier 1 SIR threhold (in dB)

f C ’ [32], $^{-s\eta}$ -

$_{k=1,\cdots,K} \gamma_k M_k \leq u$ $\gamma_k P_{ok} \Psi_{okl} R$

(*a*)

$$I_o + I_c + \eta < \sum_{i=1,\cdots,K} \gamma_i M_i =$$

$$\frac{1}{\kappa} \times \sum_{i=1,\cdots,K} \gamma_i M_i + \eta < I_o + I_c + \eta < \sum_{i=1,\cdots,K} \gamma_i M_i$$

$$I_o + I_c + \eta < \sum_{i=1,\cdots,K} \gamma_i M_i$$

$$I_o + I_c + \eta \le \frac{\sum_{i=1,\cdots,K} \gamma_i M_i}{\kappa} + \eta,$$

, (*b*) ... (*c*) ... (27), ... x ... ω ... (4). ... (5),

B. Proof for Lemma 1

G ... BS ... k ... R ... [2, ... 2], $R = (P_{ok}\Psi_{ok})^{-1} R^{\varepsilon_{ok}}$ ... BS ... BS ... 1-D P ... BS ... $\lambda_{ok}(r)$, ... $\mathbb{E}\left[\Psi_{ok}^{\frac{2}{\varepsilon_{ok}}}\right] < \infty$, ... $k = 1, 2, \cdots, K$. S ... $R = (P_c\Psi_c)^{-1} R^{\varepsilon_c}$ ... BS ... 1-D P ... BS ... $\lambda(r)$, ... $\mathbb{E}\left[\Psi_c^{\frac{2}{\varepsilon_c}}\right] < \infty$. ... M ... [32, P ... 18] ... M ... [32, P ... 55] ... P ... F ... BS ... BS ... 1-D ... P ... R's ... S ... [32, P ... 16] ... P ... P ... $\lambda(r) = \sum_{k=1}^{K} \lambda_{ok}(r)$, $r \ge 0$.

I ... BS ... 2-D ... H N ... BS ... 2- ... 1-D (... -), ... SINR ... F ... MIRP BS ... H N ... BS ... (MS) ... 2- ... A ... SINR ... R' ... R' ... (10).

C. Proof for Lemma 2

H N SINR ... MIRP ... F ... $m = 1, \cdots, K, c$ (...), ... $\left(\sum_{l=1}^{\infty} P_{om}\Psi_{om,l}\right)^{-\frac{1}{\varepsilon}} R_{om,l}$ ... $\{R_{m,l}\}_{l=1}^{\infty}$ ... R' ... N ... $\{R_{m,l}^{-\varepsilon}\}_{l=1}^{\infty}$ ... m ... BS ... F ... BS' ... (T) ... $\{R_{m,1}^{-\varepsilon}\}_{m=1}^{K}$ ... SINR ... U ... [19, C ... 3] ...