

HAPS FS

Technology on the Interference and Sharing Study from HAPS to FS

(B.J. Ku)
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(J.M. Park)
(D.S. Ahn)

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가
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2005 4 20 28
HAPS

ITU-R WP9B

HAPS (FS) 가
FS RRS FWA

I. (ITU)

HAPS
IMT-2000
Ka V
3GHz
가

ITU-R HAPS
JWP4-9S, WP9B WP8F
WP9B HAPS

2005 4 ITU-R
WP9B HAPS

HAPS FS
FS 가
FS RRS FWA

1.
ITU-R WP9B
HAPS
ITU-R WP9B draft

DG-HAPS 가 ,
가 ,

- DG-HAPS: HAPS
FS 가
- 27.5~28.35GHz HAPS FWA
가()
- 3GHz HAPS RRS
가()

(1)
Q.212-2/9 HAPS

(2)
()
- 2003 WP9B Annex 5(Annex 5 of Doc. 9B/219)
- ITU-R F.1609[1] "27.5~28.35GHz HAPS 31.0~31.3GHz HAPS (FWA) 가 " (DRR)

9B/116 ()
- HAPS 가 FWA 가
HAPS 가 FWA
FWA 가 Annex 3

- 2004 WP9B Annex 7(Annex 7 to Doc. 9B/83)
- 3GHz HAPS 가
9B/122 () (DNR) RRS 가
- HAPS RRS가
- , HAPS RRS 가



2.

(1)

- ITU-R F.1609
 (DRR) 2003
 (PDRR) (Annex 3 4), 31GHz
 , 27GHz

(Annex 3 가) WP9B Plenary
 DRR . 2005

11 SG9 RR .
 가

(DNR) DG 9B Dr.
 Hashimoto 가

6GHz .
 WP9B 1 FS

(FDP)
 ITU-R F.1108¹⁾

FS
 가 () F.1107²⁾

FWS
 RRS 가 .

(revision 1 to docu-
 ment 9B/TEMP/60)가 WP9B 2

(DNR) . 2005

11 SG9 .

1) "Determination of the criteria to protect fixed service receivers from the emission of space stations operating in non-geostationary orbits in shared frequency bands", FS

2) "Probabilistic analysis for calculating interference into the fixed service from satellites occupying the geostationary orbit", ITU-R F.1108 FS

(2)

()

- ITU-R F.1609 "27.5~
 28.35GHz 31.0~31.3GHz
 9B/TEMP/59 HAPS FWA 9B/116
 [2] 가 " DRR (Japan)
 - Annex 3 가 PDRR
 DRR .

- DNR ITU-R F.[HAPS-RRS]:
 3GHz HAPS

9B/TEMP/60 가 가 9B/122
 (Rev.1) - 가 ()
 [3] 가,
 (F.1108 F.1107
) PDNR

DNR .

가

HAPS-FS

가 .
 3GHz HAPS-FWS

가 [3] 27.5~28.35
 GHz HAPS-FWA 가 [2]

, , ,

1. 3GHz HAPS-FWS

가

가.

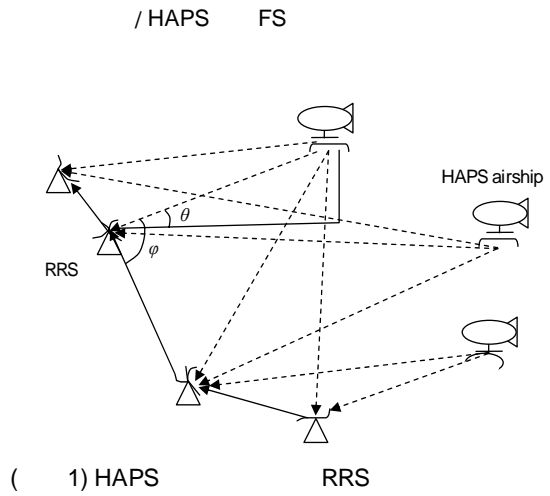
WP9B RF , ,

, HAPS HAPS

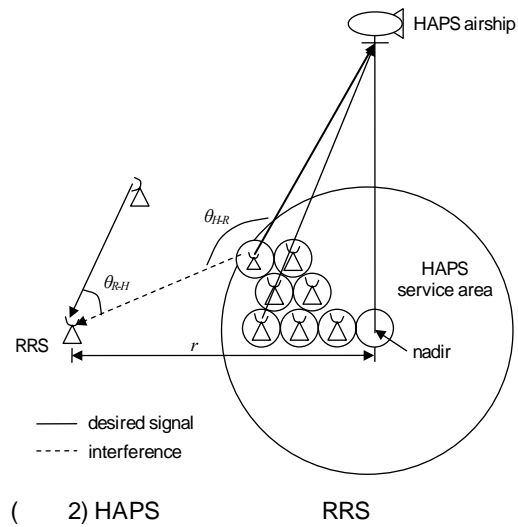
, WRC-2000 3GHz

HAPS 가
 (734), WRC-2003

734(WRC-03) , HAPS
 HAPS ()
 734(WRC-03)
 HAPS 가 3GHz
 가
 , HAPS



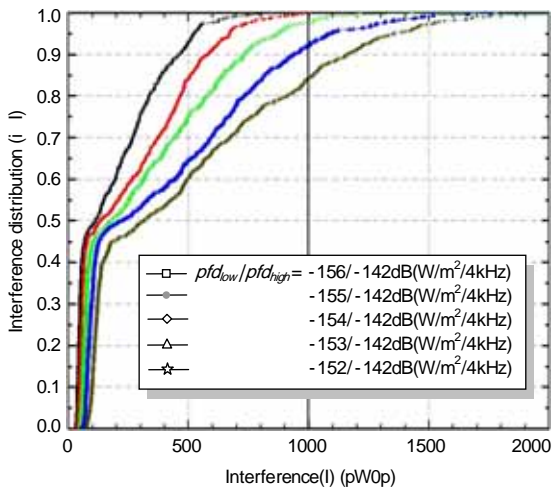
HAPS
 HAPS
 (DNR)
 HAPS
 HAPS
 HAPS
 DNR
 HAPS
 , HAPS pfd,
 HAPS nadir
 HAPS nadir



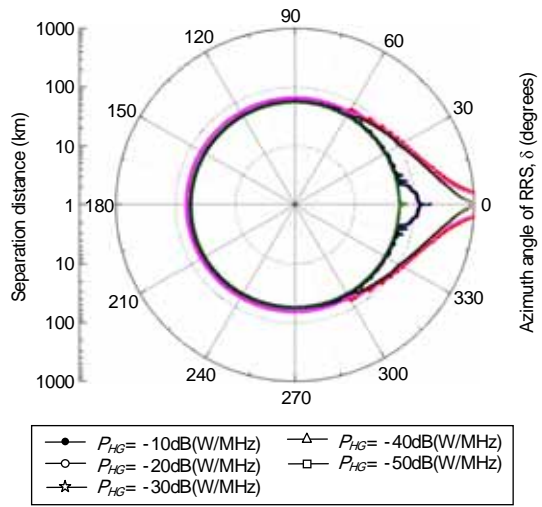
(1)
 (RRS)
 RRS
 pfd RRS
 RRS가

HAPS
 RRS
 RRS
 HAPS
 RRS가 ((
 3)) ((4))
 가
 [4]
 ITU-R F.1108 F.1107

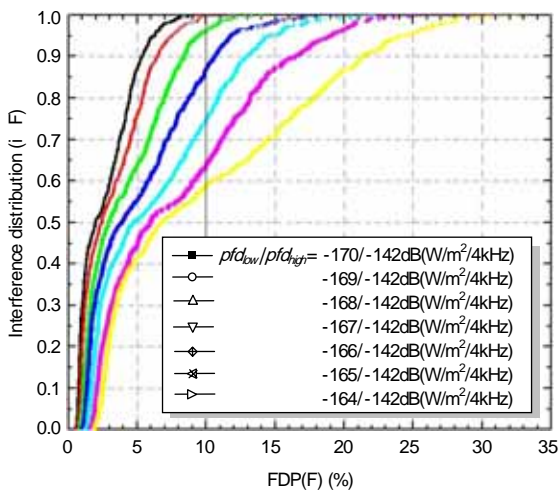
(2) HAPS RRS pfd



(3) HAPS RRS



(5) HAPS Nadir RRS



(4) HAPS RRS

0), 가 ,
 HAPS
 (180) 60km 가
 ((5)).

2. 27.5~28.35GHz HAPS-FWA 가

가.
 ITU-R F.1609[1] 27.5~28.35
 GHz 31.0~31.3GHz HAPS FWA
 가 ,
 가 FWA 가
 HAPS

pfd 가 ,
 HAPS RRS 가 FWA HAPS , FWA
 HAPS 가
 HAPS RRS가
 HAPS RRS 가
 HAPS RRS가 가
 HAPS (. 2003 4 WP9B

/ HAPS FS

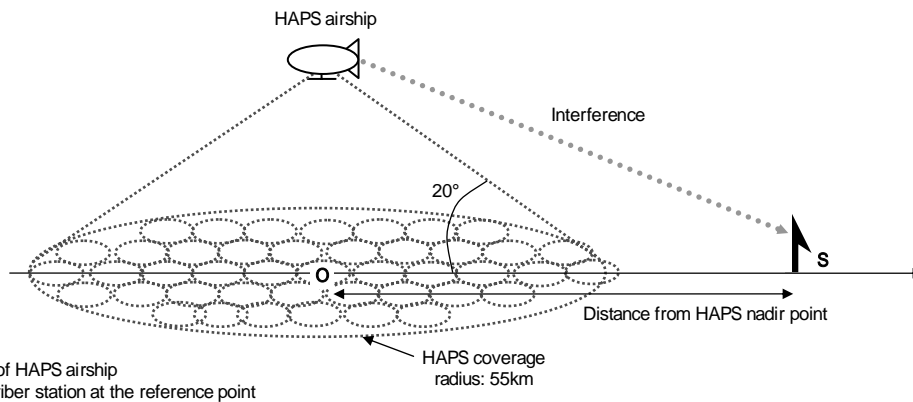
. FWA 가

PDR (Annex 5 to Doc.9B/219), FWA 가 가
 27.5~28.35GHz , 가 가
 DRR . FWA

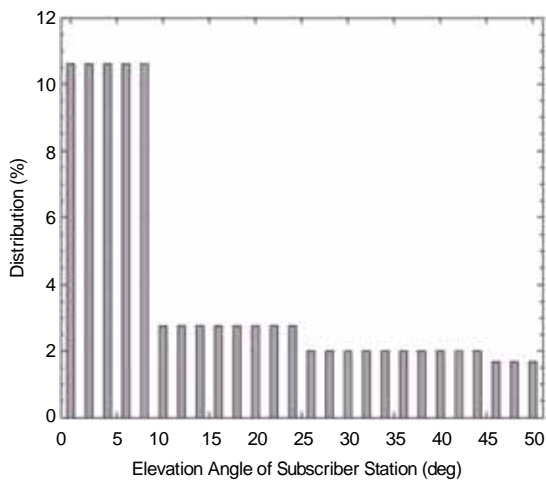
HAPS 가 HAPS nadir 가

27.5~28.35GHz HAPS FWA 가 ,

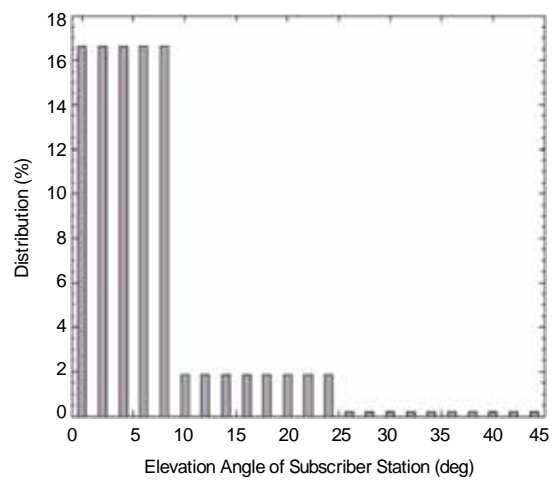
가 가 (subscriber (6) HAPS FWA [2].
 DRR . FWA 가 HAPS FWA ITU-R F.1609
 station) HAPS
 FWA (base station)



(6) HAPS Nadir RRS



(a)



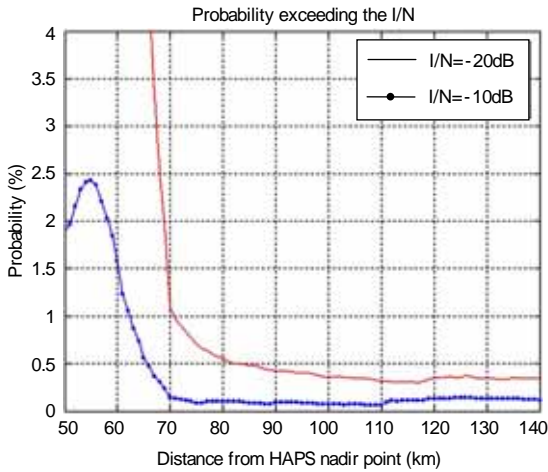
(b)

(7) FWA 가

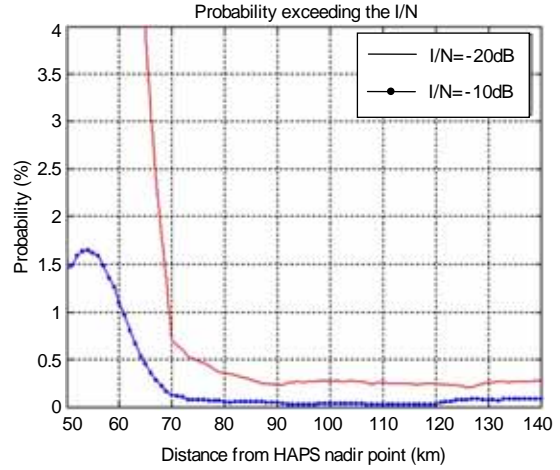
(Annex 1 Section 2.1)[1]

- HAPS : HAPS
ITU-R F.1569 .
- FWA 가 : 가 ITU-R
F.1609 Appendix 2 . ,
(7) 가 [2].
- FWA : ITU-R
F.1609 Appendix 2 .

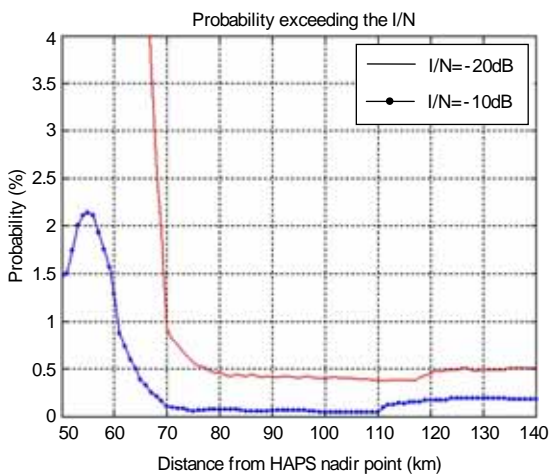
FWA 가 HAPS nadir
I/N . (8) (9)
FWA 가 (7)
가 I/N=-20 -10dB
[2].
FWA 가 HAPS 70km
I/N
((8) (9)). FWA



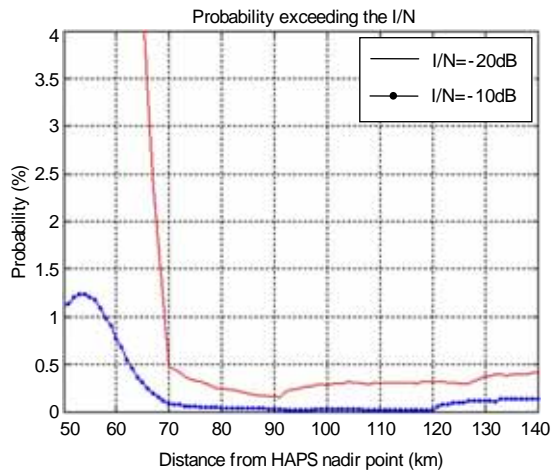
(a) Antenna Gain=36dB
(8) FWA 가 I/N



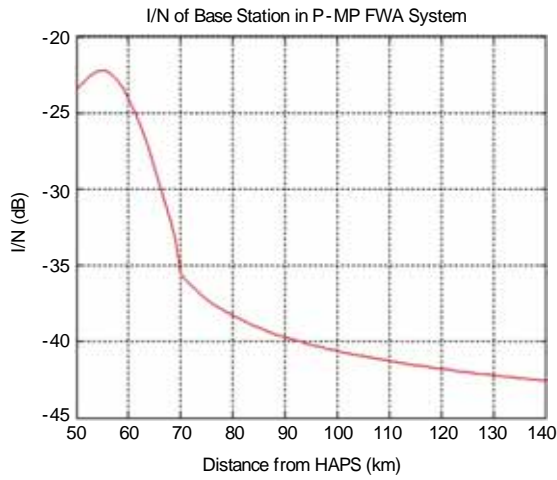
(b) Antenna Gain=42dB
(USA Model of EL Distribution)



(a) Antenna Gain=36dB
(9) FWA 가 I/N



(b) Antenna Gain=42dB
(Japan Model of EL Distribution)



(10) FWA I/N

I/N FWA HAPS

가

((10)) [2].

- DG Draft Group
- DNR Draft New Recommendation
- DRR Draft Revision of Recommendation
- FDP Fractional Degradation in Performance
- FS Fixed Service
- FWA Fixed Wireless Access
- FWS Fixed Wireless System
- HAPS High Altitude Platform Station
- I/N Interference to Noise power Ratio
- ITU International Telecommunication Union
- JWP Joint Working Party
- NR New Recommendation
- (P)DRR (Preliminary) Draft Revision Recommendation
- (P)DNR (Preliminary) Draft New Recommendation
- PFD Power Flux Density
- RR Revision of Recommendation
- RRS Radio Relay System
- WP Working Party

2005 4 ITU-R
WP9B HAPS

HAPS FS
DNR

“3GHz (HAPS) (FS) 가 (DNR)” ITU-R WP9B가 SG9

NR 가 ITU-R

가 734

가 가

“27.5~28.35GHz 31.0~31.3GHz HAPS FS FWA 가 (DRR)” ITU-R WP9B가 SG9 RR

[1] Recommendation ITU-R F.1609, Interference evaluation from fixed service systems using high altitude platform stations(HAPS) to fixed wireless access(FWA) systems in the bands 27.5-28.35GHz and 31.0-31.3GHz, ITU, 2003.

[2] ITU-R WP9B Doc. 9B/TEMP/59-E, Methodology for interference evaluation using a stochastic approach from a high altitude platform station to stations of the fixed wireless access systems in the 27.5-28.35GHz band, 2005.

[3] ITU-R WP9B Doc. 9B/TEMP/60-E, Methodology to evaluate interference from fixed service system using high altitude platform stations to fixed wireless system in the bands above 3GHz, 2005.

[4] , , “HAPS (RRS) 가 ,” ETRI , 18 4 , 2003. 8., pp.65-73.