EXERCISE 1

- Downlink
- Interference from Digital (wide) to Digital(narrow)
- Wanted
  - THAICOM-AK2 (78.5^{o}E)
    - Group ID : 96604135
    - Emission : 22K0G7W
- Interfering
  - INTERSPUTNIK-75E-Q(75^{o}E)
    - Group ID : 105625699
    - Emission : 32M2G7W

Exercise 1 **Interference from Digital wide to Digital narrow**

Wanted: THAICOM-AK2 (78.5E) **Longitudinal Tolerance** 0.1

Interfering: INTERSPUTNIK-75E-Q (75E) **Longitudinal Tolerance** 0.1

DOWNLINK

	Wanted	
Beam	TK1	
Group ID	96604135	
Emission	22K0G7W	
Wanted E/S long	106.86	
Wanted E/S Lat	18.85	
Topocentric angle	3.73	
Wanted E/s sidelobe pattern	A-25log()	A=29
Frequency (MHZ)	12585	

	Interfering
Beam	002
Group ID	105625699
Emission	32M2G7W

	Wanted
Ps	
Gs	
ES relative to wanted beam peak	-4
FSL	-205.82
Ges	
BW(Hz)	
Tes	

	Interfering
Ps	
Gs	
ES relative to interfering beam peak	-1.58
FSL	-205.87
Wanted Ges()	
BW(Hz)	

Carrier	-209.82	
Noise	#NUM!	
C/N	#NUM!	
C/I basic	-2.37	
adj factor	#DIV/0!	
C/I adj	#DIV/0!	
C/I req'd	#NUM!	C/N+12.2
Margin	#DIV/0!	
to add 1.87	#DIV/0!	Sect B3 ROP Attachment2 para5

Interference	-207.45

Exercise 1	**Interference from Digital wide to Digital narrow**		
Wanted:	THAICOM-AK2 (78.5E)	**Longitudinal Tolerance**	0.1
Interfering:	INTERSPUTNIK-75E-Q (75E)	**Longitudinal Tolerance**	0.1

DOWNLINK

	Wanted	
Beam	TK1	
Group ID	96604135	
Emission	22K0G7W	**Slide 10**
Wanted E/S long	106.86	
Wanted E/S Lat	18.85	
Topocentric angle	3.73	
Wanted E/s sidelobe pattern	A-25log()	A=29
Frequency (MHZ)	12585	

	Interfering	
Beam	002	
Group ID	105625699	
Emission	32M2G7W	**Slide 11**

	Wanted	
Ps	-14.9	**Slide 5**
Gs	38.9	**Slide 5**
ES relative to wanted beam peak	-4	
FSL	-205.82	
Ges	41.5	**Slide 5**
BW(Hz)	22000	**Slide 5**
Tes	200	**Slide 5**

	Interfering	
Ps	14.9	**Slide 6**
Gs	37	**Slide 6**
ES relative to interfering beam peak	-1.58	
FSL	-205.87	
Wanted Ges()	14.707279	**Slide 5**
BW(Hz)	32200000	**Slide 6**

Carrier	-144.32
Noise	-162.17
C/N	17.85
C/I basic	-3.48

Interference	-140.8427

Beam	TK1
Group ID	96604135
Emission	22K0G7W
Wanted E/S long	106.86
Wanted E/S Lat	18.85
Topocentric angle	3.73
Wanted E/s sidelobe pattern	A-25log()
Frequency (MHZ)	12585

Slide 10

A=29

Beam	002
Group ID	105625699
Emission	32M2G7W

Slide 11

	Wanted	
Ps	-14.9	Slide 5
Gs	38.9	Slide 5
ES relative to wanted beam peak	-4	
FSL	-205.82	
Ges	41.5	Slide 5
BW(Hz)	22000	Slide 5
Tes	200	Slide 5

	Interfering	
Ps	14.9	Slide 6
Gs	37	Slide 6
ES relative to interfering beam peak	-1.58	
FSL	-205.87	
Wanted Ges()	14.707279	Slide 5
BW(Hz)	32200000	Slide 6

Carrier	-144.32	
Noise	-162.17	
C/N	17.85	
C/I basic	-3.48	
adj factor	-31.65	Slide7 8
C/I adj	28.18	
C/I req'd	30.05	C/N+12.2
Margin	-1.87	
to add 1.87	0.00	Sect B3 ROP Attachment2 para5

Interference	-140.8427

Solution

Wanted

THAICOM-AK2 (96500002)

B1a/BR17 Beam designation	B1b Steerable	B2 Emi-Rcp	B3a1 Max. co-polar gain	B3d Pointing accuracy
TK1		E	38.9	0.08

BR7a/BR7b Group id.	BR1 Date of receipt	C2c RR No. 4.4
96604135	08.01.1996	

A2a Date of bringing into use	A2b Period of valid.	A3a Op. agency	A3b Adm. resp.	BR16 Value of type C8b
17.12.1993	35	1	A	

BR62 Expiry date for bringing into use	BR63 Confirmed date of bringing into use	BR64 Date of receipt of 1st Res49
06.08.2000	17.12.1993	

BR14 Special Section:

C4a Class of station	C3a Assigned freq. band	C6b Polarization angle
EC	54000	

C4b Nature of service	C6a Polarization type
CP	

C8d1 Max. tot. peak pwr.	C8d2 Contiguous bandwidth

C11a1 Service area no.	C11a2 Service area	C11a3 Service area diagram
1		1

A5/A6 Coordinations/Agreements							
RR1060	O		G	TON	URS	USA	USA/IT

C2a1 Assigned frequency

12.5949	GHz	12.6575	GHz	12.7201	GHz						

A13 Ref. to Special Sections	C7a Design. of emission	C8a1/C8b1 Max. peak pwr	C8a2/C8b2 Max. pwr dens.	C8c1 Min. peak pwr	C8c2 Attch.	C8c3 Min. pwr dens.	C8c4 Attch.	C8e1 C/N ratio	C8e2 Attch.
AR11/A/727 AR11/C/2196 AP30/A/127	1 22K0G7W--	-14.9	-58.3						

C10b1 Assoc. earth station id.	C10b2 Type	C10c1 Geographical coord.	C10c2 Ctry	C10d1/C10d2 Cls. / Nat.	C10d3 Max. iso. gain	C10d4 Bmwdth	C10d6 Noise temp.	C10d7 Ant. diameter	C10d9 Ant. dim. (DGSO)
TYPICAL K2(6/1.2)	T			1 TC CP	41.5	1.45	200		

C10d5a Co-polar antenna pattern

C10b1 Assoc. earth station id.	Co-polar ref. pattern	Coef. A	Coef. B	Coef. C	Coef. D	Phi1	Co-polar rad. diag.
TYPICAL K2(6/1.2)	A-25*LOG(FI)	29					

Findings	2D Date of protection	13A Conformity with RR	13B1 Provision	13B2 Remarks	13B3 Date of Review
	08.01.1996	A- A- --			

13C Remarks:

Form

INTERSPUTNIK-75E-Q (105500291)

B1a/BR17 Beam designation: 002 | *B1b* Steerable: | *B2* Emi-Rcp: E | *B3a1* Max. co-polar gain: 37 | *B3d* Pointing accuracy: 0.1

BR7a/BR7b Group id.: 105625699 | *BR1* Date of receipt: 19.08.2005 | *C2c* RR No. 4.4:

A2a Date of bringing into use: 01.09.2005 | *A2b* Period of valid.: 40 | *A3a* Op. agency: 2 | *A3b* Adm. resp.: A | *BR16* Value of type C8b:

BR62 Expiry date for bringing into use: 07.09.2005 | *BR63* Confirmed date of bringing into use: 01.09.2005 | *BR64* Date of receipt of 1st Res49:

BR14 Special Section:

C4a Class of station: EC | *C3a* Assigned freq. band: 36000

C4b Nature of service: CP | *C6a* Polarization type: M | *C6b* Polarization angle:

C8d1 Max. tot. peak pwr.: 18 | *C8d2* Contiguous bandwidth: 36000

C11a1 Service area no.: 1 | *C11a2* Service area: | *C11a3* Service area diagram: 2

A5/A6 Coordinations/Agreements				
	9.7	O		BRU CHN F/EUT G INS LAO RUS SNG THA TUR UAE USA VTN
	AP30#7.1	O		
	N/9.7	O		TON

C2a1 Assigned frequency

12.525	GHz	12.565	GHz	12.605	GHz	12.645	GHz	12.685	GHz						
12.545	GHz	12.585	GHz	12.625	GHz	12.665	GHz	12.705	GHz						

A13 Ref. to Special Sections		*C7a* Design. of emission	*C8a1/C8b1* Max. peak pwr	*C8a2/C8b2* Max. pwr dens.	*C8c1* Min. peak pwr	*C8c2* Attch.	*C8c3* Min. pwr dens.	*C8c4* Attch.	*C8e1* C/N ratio	*C8e2* Attch.
API/A/428	1	36M0F8W--	5.9	-60.1	0.9		-65.1		16.6	
CR/C/144	2	32M2G7W--	14.9	-60.1	7.9		-67.1		23.1	
	3	45K0G1X--	-16.6	-63.1	-23.6		-70.1		20.2	

C10b1 Assoc. earth station id.	*C10b2* Type	*C10c1* Geographical coord.		*C10c2* Ctry	*C10d1/C10d2* Cls. / Nat.		*C10d3* Max. iso. gain	*C10d4* Bmwdth	*C10d6* Noise temp.	*C10d7* Ant. diameter	*C10d9* Ant. dim. (DGSO)
TYPICAL-4,5	T				1	TC CP	53.3	0.36	200		

	C10d5a Co-polar antenna pattern						
C10b1 Assoc. earth station id.	Co-polar ref. pattern	Coef. A	Coef. B	Coef. C	Coef. D	Phi1	Co-polar rad. diag.
TYPICAL-4,5	REC-580						

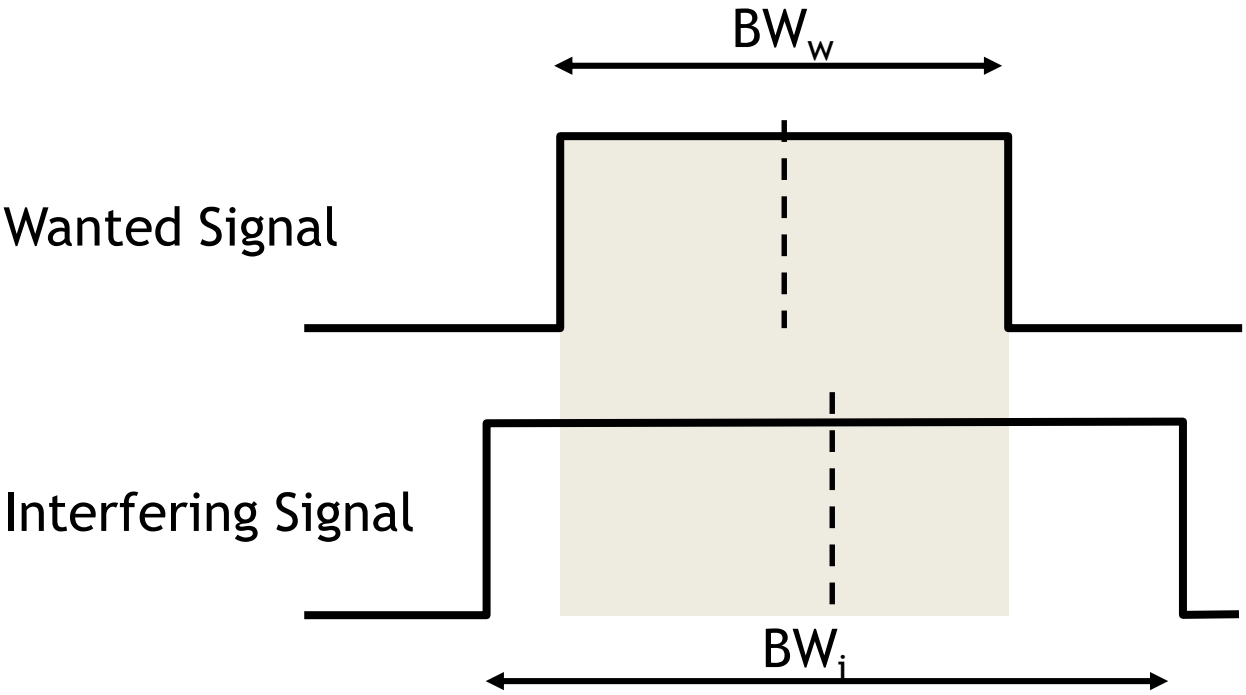
Findings | *2D* Date of protection: 19.08.2005 | *13A* Conformity with RR: A- A- -- | *13B1* Provision: | *13B2* Remarks: | *13B3* Date of Review:

13C Remarks:

Form

Get Adjustment Factor

Method 1:



BW: Necessary Bandwidth (Hz)

$$I_a = 10\log_{10}(BW_{overlap} / BW_i)$$

$$= 10\log_{10}(BW_w / BW_i)$$

$$< 0 = \text{Improvement!}$$

Form2

$$\text{Adj factor} = 10\log_{10}(22000 / 32000000) = -31.63$$

Form2

Exercise 1	**Interference from Digital wide to Digital narrow**		
Wanted:	THAICOM-AK2 (78.5E)	**Longitudinal Tolerance**	0.1
Interfering:	INTERSPUTNIK-75E-Q (75E)	**Longitudinal Tolerance**	0.1

DOWNLINK

	Wanted	
Beam	TK1	
Group ID	96604135	
Emission	22K0G7W	
Wanted E/S long	106.86	
Wanted E/S Lat	18.85	
Topocentric angle	3.73	
Wanted E/s sidelobe pattern	A-25log()	A=29
Frequency (MHZ)	12585	

	Interfering
Beam	002
Group ID	105625699
Emission	32M2G7W

	Wanted
Ps	-14.9
Gs	38.9
ES relative to wanted beam peak	-4
FSL	-205.82
Ges	41.5
BW(Hz)	22000
Tes	200

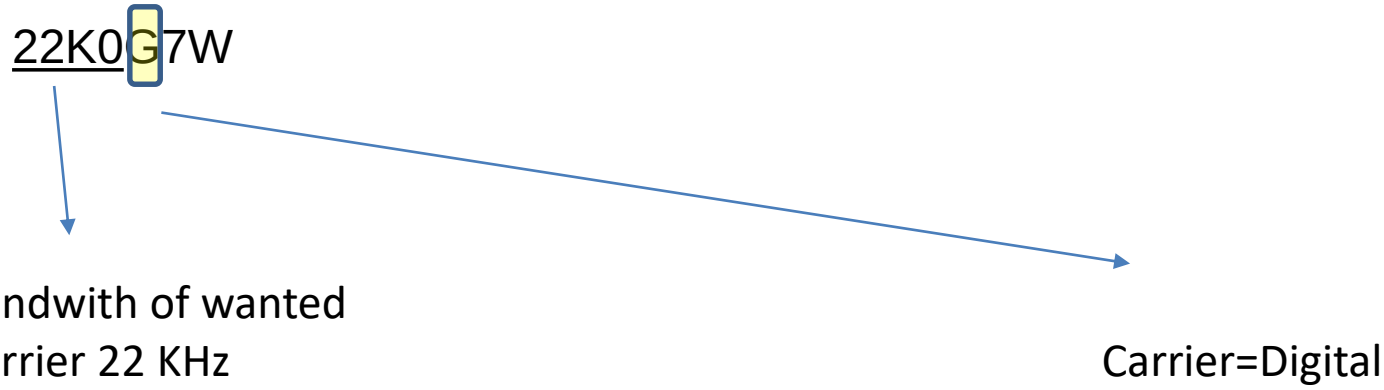
	Interfering
Ps	14.9
Gs	37
ES relative to interfering beam peak	-1.58
FSL	-205.87
Wanted Ges()	14.71
BW(Hz)	32200000

Carrier	-144.32	
Noise	-162.17	
C/N	17.85	
C/I basic	-3.48	
adj factor	-31.65	
C/I adj	28.17	
C/I req'd	30.05	C/N+12.2
Margin	-1.87	
to add 1.87	0.00	Sect B3 ROP Attachment2 para5

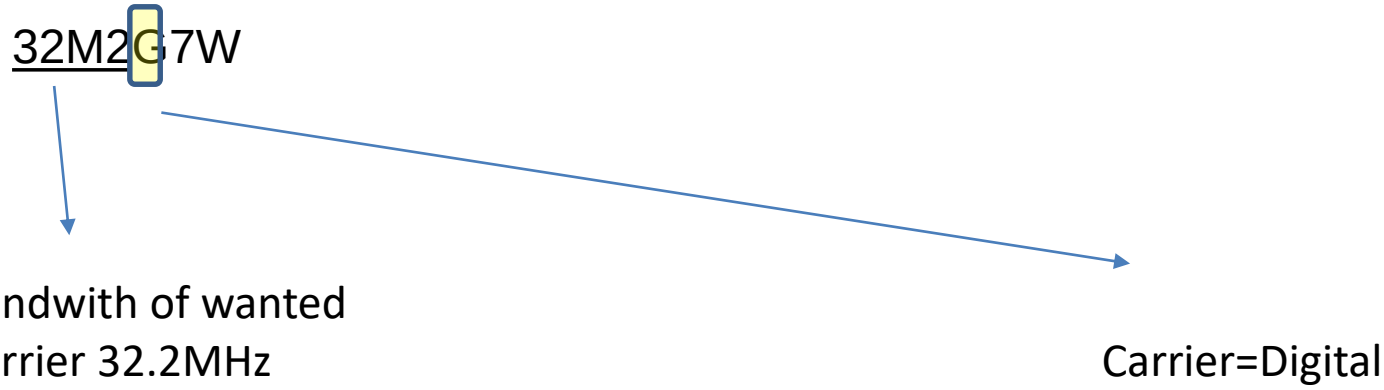
Interference	-140.84

Adj factor= $10\log_{10}(22000 / 32000000)$=-31.63

Form2



Form


32M2G7W
Bandwith of wanted
Carrier 32.2MHz
Carrier=Digital

Form