

Written by P. J. Park

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Subject : USHR-781921-5B

MSCL Calculation

Model Name: USHR-781921-5B

ACE TECHNOLOGIES

Date	Dec 4, 2014	Sheet No.	2/8	Version No.
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Revised date	Description	Remarks
	1st Version	1.0

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Booster Uplink Gain limit

1. UL max gain

max UL gain < - 34dB – RSSI + MSCL

[“FCC 20.21 (i) technical requirement,(C) Booster gain limit”p78]

2. RSSI value

RSSI = DL output power – DL gain

3. MSCL value

Distance between service antenna and mobile phone was assumed 1 meter.

CCIR model was applied to coupling loss calculation.

$L_{fs} = 32.45 + 20\log_{10}(d_{km}) + 20\log_{10}(f_{MHz})$ [free space path loss model : CCIR]

Band	Min Frequency(MHz)	Lfs	Remark
Band 12	698MHz	29.4(29dB)	
Band 13	778MHz	30.3(30dB)	
Band 5	824MHz	30.1(30dB)	
Band 4	1710MHz	37.2(37dB)	
Band 2	1850MHz	37.7(37dB)	

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4. UL gain

■ Band 12

DL input input(RSSI) [dBm]	DL Gain[dB]	MSCL(dB)	UL Gain[dB]	UL Atten Value[dB]	DL-UL Gain[dB]	Remark
-40	42	29(dB)	30	30	12	Shutdown
-41	43		31	29	12	
-42	44		32	28	12	
-43	45		33	27	12	
-44	46		34	26	12	
-45	47		35	25	12	
-46	48		36	24	12	
-47	49		37	23	12	
-48	50		38	22	12	
-49	51		39	21	12	
-50	52		40	20	12	
-51	53		41	19	12	
-52	54		42	18	12	
-53	55		43	17	12	
-54	56		44	16	12	
-55	57		45	15	12	
-56	58		46	14	12	
-57	59		47	13	12	
-58	60		48	12	12	
-59	60		49	11	11	
-60	60		50	10	10	
-61	60		51	9	9	
-62	60		52	8	8	
-63	60		53	7	7	
-64	60		54	6	6	
-65	60		55	5	5	
-66	60		56	4	4	
-67	60		57	3	3	
-68	60		58	2	2	
-69	60		59	1	1	
-70	60		60	0		

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■ Band 13

DL input input(RSSI) [dBm]	DL Gain[dB]	MSCL(dB)	UL Gain[dB]	UL Atten Value[dB]	DL-UL Gain[dB]	Remark
-40	42	30dB	31	30	11	Shutdown
-41	43		32	29	11	
-42	44		33	28	11	
-43	45		34	27	11	
-44	46		35	26	11	
-45	47		36	25	11	
-46	48		37	24	11	
-47	49		38	23	11	
-48	50		39	22	11	
-49	51		40	21	11	
-50	52		41	20	11	
-51	53		42	19	11	
-52	54		43	18	11	
-53	55		44	17	11	
-54	56		45	16	11	
-55	57		46	15	11	
-56	58		47	14	11	
-57	59		48	13	11	
-58	60		49	12	11	
-59	60		50	11	10	
-60	60		51	10	9	
-61	60		52	9	8	
-62	60		53	8	7	
-63	60		54	7	6	
-64	60		55	6	5	
-65	60		56	5	4	
-66	60		57	4	3	
-67	60		58	3	2	
-68	60		59	2	1	
-69	60		60	1		
-70	60		61	0		
-71	60		61	0		

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■ Band 5

DL input input(RSSI) [dBm]	DL Gain[dB]	MSCL(dB)	UL Gain[dB]	UL Atten Value[dB]	DL-UL Gain[dB]	Remark
-40	42	30dB	31	30	11	Shutdown
-41	43		32	29	11	
-42	44		33	28	11	
-43	45		34	27	11	
-44	46		35	26	11	
-45	47		36	25	11	
-46	48		37	24	11	
-47	49		38	23	11	
-48	50		39	22	11	
-49	51		40	21	11	
-50	52		41	20	11	
-51	53		42	19	11	
-52	54		43	18	11	
-53	55		44	17	11	
-54	56		45	16	11	
-55	57		46	15	11	
-56	58		47	14	11	
-57	59		48	13	11	
-58	60		49	12	11	
-59	61		50	11	11	
-60	62		51	10	11	
-61	62		52	9	10	
-62	62		53	8	9	
-63	62		54	7	8	
-64	62		55	6	7	
-65	62		56	5	6	
-66	62		57	4	5	
-67	62		58	3	4	
-68	62		59	2	3	
-69	62		60	1	2	
-70	62		61	0	1	
-71	62		61	0	1	

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■ Band 4

DL input input(RSSI) [dBm]	DL Gain[dB]	MSCL(dB)	UL Gain[dB]	UL Atten Value[dB]	DL-UL Gain[dB]	Remark
-40	42	37dB	38	30	4	Shutdown
-41	43		39	29	4	
-42	44		40	28	4	
-43	45		41	27	4	
-44	46		42	26	4	
-45	47		43	25	4	
-46	48		44	24	4	
-47	49		45	23	4	
-48	50		46	22	4	
-49	51		47	21	4	
-50	52		48	20	4	
-51	53		49	19	4	
-52	54		50	18	4	
-53	55		51	17	4	
-54	56		52	16	4	
-55	57		53	15	4	
-56	58		54	14	4	
-57	59		55	13	4	
-58	60		56	12	4	
-59	61		57	11	4	
-60	62		58	10	4	
-61	63		59	9	4	
-62	64		60	8	4	
-63	65		61	7	4	
-64	66		62	6	4	
-65	67		63	5	4	
-66	68		64	4	4	
-67	69		65	3	4	
-68	70		66	2	4	
-69	70		67	1	3	
-70	70		68	0	2	
-71	70		68	0	1	

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■ Band 2

DL input input(RSSI) [dBm]	DL Gain[dB]	MSCL(dB)	UL Gain[dB]	UL Atten Value[dB]	DL-UL Gain[dB]	Remark
-40	42	37dB	38	30	4	Shutdown
-41	43		39	29	4	
-42	44		40	28	4	
-43	45		41	27	4	
-44	46		42	26	4	
-45	47		43	25	4	
-46	48		44	24	4	
-47	49		45	23	4	
-48	50		46	22	4	
-49	51		47	21	4	
-50	52		48	20	4	
-51	53		49	19	4	
-52	54		50	18	4	
-53	55		51	17	4	
-54	56		52	16	4	
-55	57		53	15	4	
-56	58		54	14	4	
-57	59		55	13	4	
-58	60		56	12	4	
-59	61		57	11	4	
-60	62		58	10	4	
-61	63		59	9	4	
-62	64		60	8	4	
-63	65		61	7	4	
-64	66		62	6	4	
-65	67		63	5	4	
-66	68		64	4	4	
-67	69		65	3	4	
-68	69		66	2	3	
-69	69		67	1	2	
-70	69		68	0	1	
-71	69		68	0	1	