

Appendix D: Test Results of Radiated Spurious Emissions_PCB

Antenna

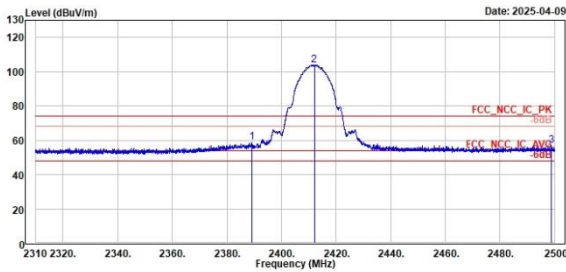
PIC32WM-BW1002UC, ANT 13, Main Source
Band Edges, 2.31GHz ~ 2.9GHz

802.11b

Low Channel (Horizontal) Peak



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

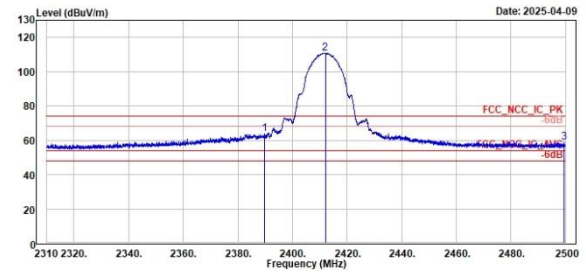


	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	Level Factor	Line	Limit	cm	deg			
1	2389.14	58.63	20.43	38.20	74.00	-15.37	104	299 Peak	Horizontal	
2 *	2412.00	103.93	65.57	38.36	74.00	29.93	104	299 Peak	Horizontal	
3	2498.91	56.81	18.19	38.62	74.00	-17.19	104	299 Peak	Horizontal	

Low Channel (Vertical) Peak



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec. 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



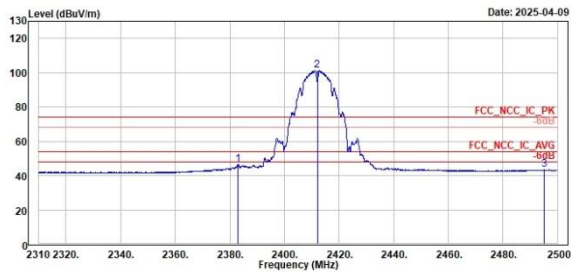
	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	Level Factor	Line	Limit	cm	deg			
1	2389.71	63.57	25.36	38.21	74.00	-10.43	126	292 Peak	Vertical	
2 *	2412.00	110.94	72.58	38.36	74.00	36.94	126	292 Peak	Vertical	
3	2499.38	58.64	20.02	38.62	74.00	-15.36	126	292 Peak	Vertical	

802.11b

Low Channel (Horizontal) Average



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

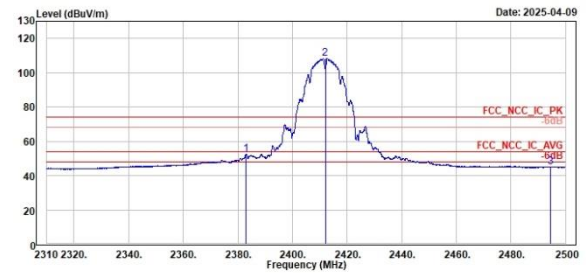


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	2382.87	46.51	8.37	38.14	54.00	-7.49	104	299	Average	Horizontal		
2 *	2412.00	101.43	63.87	38.36	54.00	47.43	104	299	Average	Horizontal		
3	2495.25	43.32	4.71	38.61	54.00	-10.68	104	299	Average	Horizontal		

Low Channel (Vertical) Average



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	2383.06	52.47	14.33	38.14	54.00	-1.53	126	292	Average	Vertical		
2 *	2412.00	100.45	78.09	38.36	54.00	54.45	126	292	Average	Vertical		
3	2494.63	45.19	6.58	38.61	54.00	-8.81	126	292	Average	Vertical		

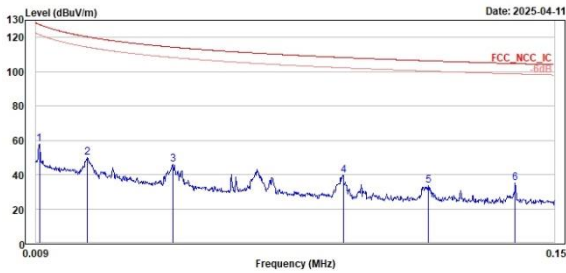
Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

802.11b

Low Channel(Open) 9kHz~150kHz



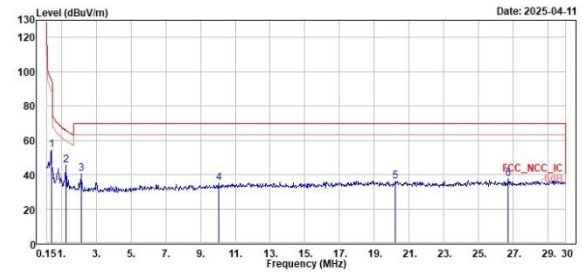
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01	57.69	39.58	18.11	127.60	-69.91	100	230	Peak	Open	
2	0.02	50.00	30.33	19.67	120.32	-70.32	100	200	Peak	Open	
3	0.05	46.07	27.05	19.02	114.30	-68.23	100	197	Peak	Open	
4	0.09	39.68	21.66	18.02	108.26	-68.58	100	192	Peak	Open	
5	0.12	33.57	15.45	18.12	106.33	-72.76	100	179	Peak	Open	
6	0.14	34.88	16.61	18.27	104.72	-69.84	100	194	Peak	Open	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.42	54.56	35.09	18.67	95.17	-40.61	100	188	Peak	Open	
2	1.28	45.35	26.55	18.80	65.43	-20.08	100	188	Peak	Open	
3	2.15	40.46	21.60	18.86	69.50	-29.04	100	188	Peak	Open	
4	10.03	35.05	13.72	21.33	69.50	-34.45	100	326	Peak	Open	
5	20.21	36.31	13.49	22.82	69.50	-33.19	100	125	Peak	Open	
6	26.72	37.53	14.57	22.96	69.50	-31.97	100	292	Peak	Open	

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

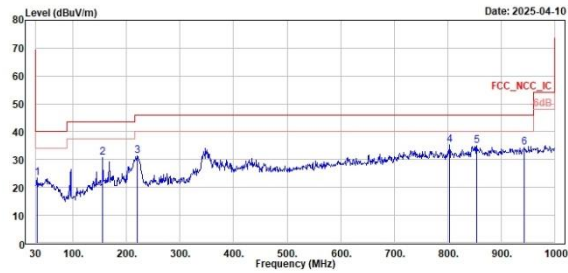
802.11b

Low Channel (Horizontal)

Low Channel (Vertical)



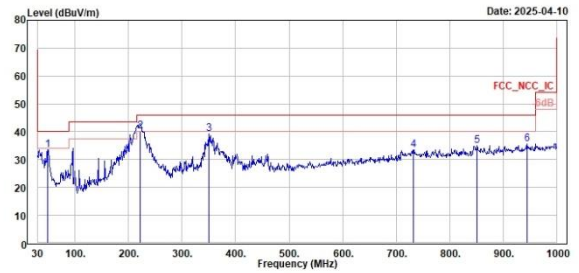
TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	32.91	23.32	30.96	-7.64	40.00	-16.68	100	360 Peak	Horizontal	
2	155.13	30.62	36.42	-5.80	43.50	-12.88	100	259 Peak	Horizontal	
3	220.12	31.46	39.67	-8.21	46.00	-14.54	100	161 Peak	Horizontal	
4	804.06	35.22	31.46	3.76	46.00	-10.78	100	219 Peak	Horizontal	
5	854.50	34.92	30.63	4.29	46.00	-11.08	100	292 Peak	Horizontal	
6	943.74	34.41	28.74	5.67	46.00	-11.59	100	95 Peak	Horizontal	



TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	48.43	33.59	39.36	-5.77	40.00	-6.41	100	16 Peak	Vertical	
2	221.09	40.24	48.40	-8.16	46.00	-5.76	100	176 QP	Vertical	
3	350.10	39.18	43.52	-4.34	46.00	-6.82	100	174 Peak	Vertical	
4	732.28	33.56	30.77	2.79	46.00	-12.44	200	360 Peak	Vertical	
5	851.59	34.93	30.71	4.22	46.00	-11.07	142	360 Peak	Vertical	
6	944.71	35.67	29.98	5.69	46.00	-10.33	200	152 Peak	Vertical	

Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

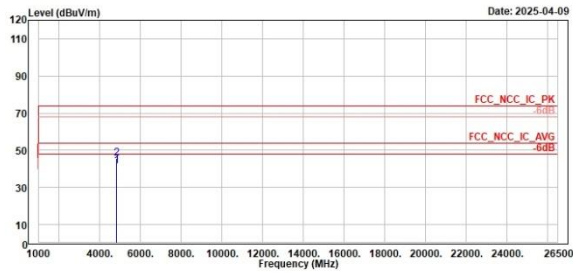
802.11b

Low Channel (Horizontal)

Low Channel (Vertical)



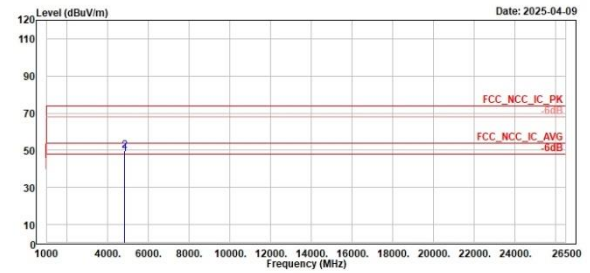
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4824.00	41.72	58.78	-9.06	54.00	-12.28	184	298	Average	Horizontal	
2	4824.00	45.68	54.66	-9.06	74.00	-28.40	184	298	Peak	Horizontal	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	4824.00	47.99	57.05	-9.06	54.00	-6.01	180	295	Average	Vertical	
2	4824.00	49.98	58.96	-9.06	74.00	-24.10	180	295	Peak	Vertical	

PIC32WM-BW1002UC, ANT 14, Main Source
Band Edges, 2.31GHz ~ 2.9GHz

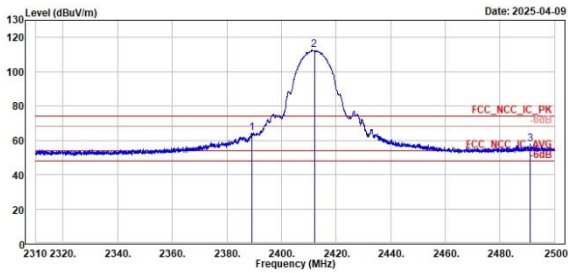
802.11b

Low Channel (Horizontal) Peak

Low Channel (Vertical) Peak



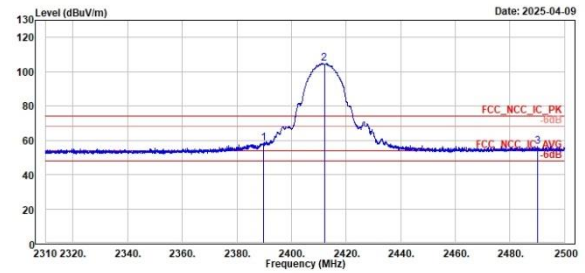
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2389.04	64.40	26.20	38.20	74.00	-9.60	286	18 Peak	Horizontal	
2 *	2412.00	112.60	74.24	38.36	74.00	38.60	286	18 Peak	Horizontal	
3	2491.02	57.90	19.29	38.61	74.00	-16.10	286	18 Peak	Horizontal	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



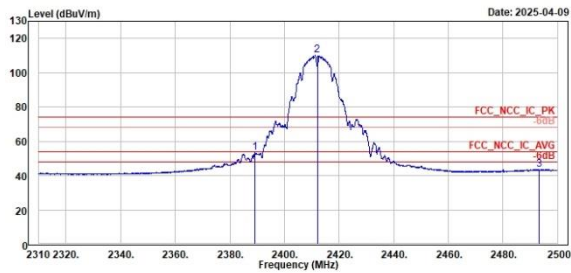
	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2389.00	58.22	28.01	38.21	74.00	-15.78	394	293 Peak	Vertical	
2 *	2412.00	104.00	66.54	38.36	74.00	30.90	394	293 Peak	Vertical	
3	2490.22	56.39	17.78	38.61	74.00	-17.61	394	293 Peak	Vertical	

802.11b

Low Channel (Horizontal) Average



TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

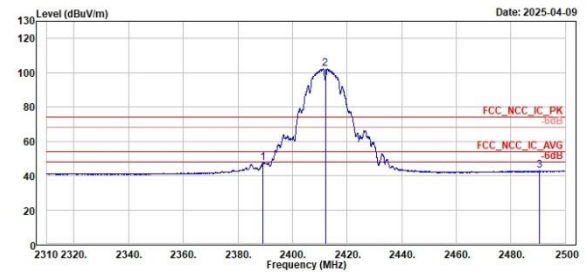


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2389.23	53.22	15.02	38.20	54.00	-0.78	286	18	Average	Horizontal		
2 *	2412.00	110.03	71.67	38.36	54.00	56.03	286	18	Average	Horizontal		
3	2493.11	43.51	4.90	38.61	54.00	-10.49	286	18	Average	Horizontal		

Low Channel (Vertical) Average



TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	2389.23	47.42	9.22	38.20	54.00	-6.58	394	293	Average	Vertical		
2 *	2412.00	102.36	64.00	38.36	54.00	48.36	394	293	Average	Vertical		
3	2490.36	42.85	4.24	38.61	54.00	-11.15	394	293	Average	Vertical		

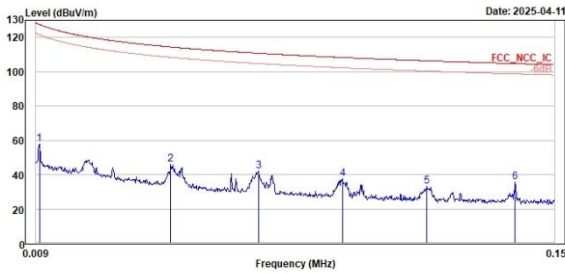
Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

802.11b

Low Channel(Open) 9kHz~150kHz



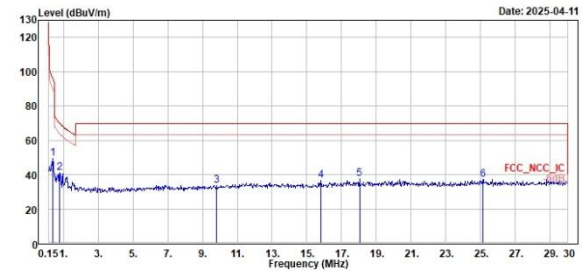
TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.01	57.76	39.65	18.11	127.60	-69.84	100	236 Peak	Open	
2	0.05	45.79	26.77	19.02	114.40	-68.61	100	193 Peak	Open	
3	0.07	42.16	23.67	18.49	110.76	-68.60	100	198 Peak	Open	
4	0.09	37.44	19.42	18.02	108.29	-70.85	100	212 Peak	Open	
5	0.12	33.35	15.23	18.12	106.36	-73.01	100	198 Peak	Open	
6	0.14	35.47	17.20	18.27	104.72	-69.25	100	174 Peak	Open	



TÜV Rheinland Taiwan Ltd.
No. 458-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	0.39	49.63	30.99	18.64	95.81	-46.18	100	217 Peak	Open	
2	0.78	41.27	22.35	18.92	69.80	-28.53	100	158 Peak	Open	
3	9.79	33.80	12.58	21.22	69.50	-35.70	100	185 Peak	Open	
4	15.82	36.62	14.77	21.85	69.50	-32.88	100	164 Peak	Open	
5	18.03	37.64	15.01	22.63	69.50	-31.86	100	201 Peak	Open	
6	25.13	37.11	13.87	23.24	69.50	-32.39	100	182 Peak	Open	

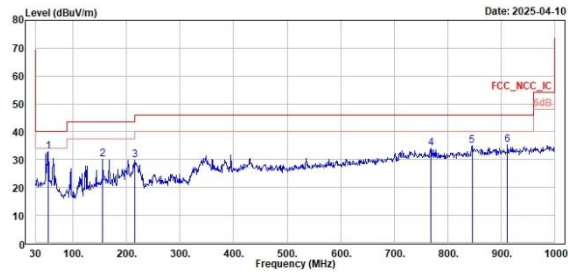
Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

802.11b

Low Channel (Horizontal)



TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322

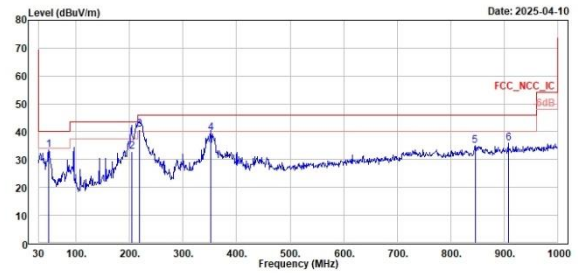


	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	53.28	32.93	38.63	-5.70	40.00	-7.07	100	25 Peak	Horizontal	
2	155.13	30.11	35.91	-5.80	43.50	-13.39	100	241 Peak	Horizontal	
3	215.27	29.91	38.21	-8.30	43.50	-13.59	100	187 Peak	Horizontal	
4	768.17	34.04	30.40	3.64	46.00	-11.96	100	116 Peak	Horizontal	
5	845.77	35.08	30.99	4.09	46.00	-10.92	100	311 Peak	Horizontal	
6	911.73	35.37	30.07	5.30	46.00	-10.63	100	0 Peak	Horizontal	

Low Channel (Vertical)



TÜV Rheinland Taiwan Ltd.
No. 438-18, Sec 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel: +886-2172-1000 Fax: +886-2172-1322



	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	48.43	33.57	39.34	-5.77	40.00	-6.43	100	112 Peak	Vertical	
2	203.63	32.93	41.10	-8.17	43.50	-10.57	100	262 QP	Vertical	
3	218.18	40.85	49.11	-8.26	46.00	-5.15	100	241 QP	Vertical	
4	351.07	39.53	43.85	-4.32	46.00	-6.47	100	216 Peak	Vertical	
5	845.77	34.94	30.85	4.09	46.00	-11.06	200	269 Peak	Vertical	
6	907.85	35.94	30.71	5.23	46.00	-10.06	100	294 Peak	Vertical	

	Freq	Level	Rad Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	4824.00	51.93	60.99	-9.06	54.00	-2.07	100	292	Average	Vertical	
2	4824.00	52.51	61.57	-9.06	74.00	-21.49	100	292	Peak	Vertical	