

## LIST OF FIGURES

2.1	MCRBS block diagram. (Source: D. A. Sujiansyah, Ultra Wide Band Vivaldi Antenna for Mobile Cognitive Radio Base Station in Disaster Recovery Wireless Networks, 2018) . . . . .	7
2.2	The MCRBS search several telecommunication devices in disaster area and scattered around the MCRBS. . . . .	8
2.3	Geometry of biconical antenna. (Source: Constantine A Balanis, Antena Theory: Analysis and Design, 2nd Edition, 2005) . . . . .	9
2.4	Biconical antenna geometry and radiated spherical waves. (Source: Constantine A Balanis, Antena Theory: Analysis and Design, 2nd Edition, 2005) . . . . .	9
2.5	Electric and magnetic fields, and associated voltages and currents, for a biconical antenna. (Source: Constantine A Balanis, Antena Theory: Analysis and Design, 2nd Edition, 2005) . . . . .	10
2.6	Biconical antenna with light design. . . . .	11
3.1	Flow diagram of biconical antenna design for MCRBS. . . . .	14
3.2	Design of $N$ connector for MCRBS antenna. . . . .	16
3.3	The type of SB antenna. . . . .	17
3.4	Optimization procedure of the antenna bandwidth. . . . .	18
3.5	Comparison $R_L$ value of the type of SB, ICAB, and OCAB antenna. . . . .	19
3.6	The type of ICAB antenna. . . . .	20
3.7	The type of OCAB antenna. . . . .	20
3.8	Angle of the cone antenna and $R_L$ . . . . .	21
3.9	Length the cone antenna and $R_L$ . . . . .	22
3.12	The final design of antenna for MCRBS. . . . .	22
3.10	Semi-spherical ring and $R_L$ . . . . .	23
3.13	Return loss of the proposed antenna. . . . .	23
3.11	Semi-spherical sheet and $R_L$ . . . . .	24
4.1	The realize of OCAB antenna. . . . .	26
4.2	Comparison $R_L$ value of the proposed antenna has been simulated and realize antenna result. . . . .	27

4.4	The radiation pattern of antenna at frequency of 0.8 GHz in the azimuth plane. . . . .	27
4.3	Far-field scheme test for measure the realize antenna. . . . .	28
4.5	The radiation pattern of antenna at frequency of 0.8 GHz in the elevation plane. . . . .	28
4.6	The radiation pattern of antenna at frequency of 0.9 GHz in the azimuth plane. . . . .	29
4.7	The radiation pattern of antenna at frequency of 0.9 GHz in the elevation plane. . . . .	29
4.8	The radiation pattern of antenna at frequency of 1.8 GHz in the azimuth plane. . . . .	30
4.9	The radiation pattern of antenna at frequency of 1.8 GHz in the elevation plane. . . . .	30
4.10	The radiation pattern of antenna at frequency of 1.9 GHz in the azimuth plane. . . . .	31
4.11	The radiation pattern of antenna at frequency of 1.9 GHz in the elevation plane. . . . .	31
4.12	The radiation pattern of antenna at frequency of 2.1 GHz in the azimuth plane. . . . .	32
4.13	The radiation pattern of antenna at frequency of 2.1 GHz in the elevation plane. . . . .	32
4.14	The radiation pattern of antenna at frequency of 2.3 GHz in the azimuth plane. . . . .	33
4.15	The radiation pattern of antenna at frequency of 2.3 GHz in the elevation plane. . . . .	33
4.16	The radiation pattern of antenna at frequency of 3.3 GHz in the azimuth plane. . . . .	34
4.17	The radiation pattern of antenna at frequency of 3.3 GHz in the elevation plane. . . . .	34
4.18	GNU Radio configuration for the real-field experiment of MCRBS antenna. . . . .	38
4.19	The real-field experiment for scenario 1. . . . .	39
4.20	The real-field experiment for scenario 2. . . . .	40
4.21	The real-field experiment for scenario 3. . . . .	41
4.22	FER performances obtained from the real-field experiment. . . . .	42
4.23	BER performances obtained from the real-field experiment. . . . .	43
4.24	Anemometer for measure the speed of wind. . . . .	44

4.25 Robust to wind test for vivaldi antenna. . . . .	44
4.26 Robust to wind test for OCAB antenna. . . . .	45