EmittanceQualityof Terrestrial Digital Multimedia Broadcasting (TDMB)

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***Abstract*— Television terrestrial broadcasting technology, even fix or mobile have a rapid development along with the development of digital technology. Many countries decided to move from analog TV broadcasting to digital TV broadcasting. Sultan Agung Islamic University (UNISSULA), one of the private university in Central Java had begun to develop the Terrestrial Digital Multimedia Broadcasting (TDMB), as a research to support the migration from analog TV broadcasting to digital TV broadcasting. Because of that goal, must be observed the range of the scope by testing the TDMB Transmitter in UNISSULA. The tool of the test is drive test measurements by Purposive Random Sampling on the three research area, there are, the main road in Semarang, eastern part of the transmitter, Southern part of the transmitter. The Measurement is limited to strength and quality signal.**

Keywords—Digital Television, Test Drive, TDMB, Strength and Quality Signal

I. INTRODUCTION

Digital Audio Broadcasting (DAB) introduced since the mid-1990s, known as Eureka-147[1]. Digital multimedia broadcasting (DMB) is one of the emerging applications of the Eureka-147 DAB system. The Digital Audio Broadcasting (DAB) system was announced as an official transmission specification of terrestrial Digital Multimedia Broadcasting (T-DMB) system based on Eureka-147 standard in Korea. T-DMB system provides mobile multimedia broadcasting services including moving pictures as well as CD quality digital audio services in the VHF band [2].DMB in Korea focused on broadcasting moving pictures and reception system on a fairly difficult terrain, where many places surrounded by tall buildings, as well as passing vehicles moving at high speed[3]. Digital Technology Development gave a great contribution in broadcasting, telecommunication, and information technology[4].One of that development is television digital, which offer a good quality of receiver, clear sound, and bright picture. The output could be enjoyed either by handphone (HP) or personal digital Assistant (PDA), Computer, and fix or mobile TV. Nowdays, the developmentof a three-dimensional audio-visual(3D AV) service systembased on the terrestrial digital multimedia broadcasting (TDMB)system is much more feasiblethan before with the fast advancement of hardware technologies,especially 3D flat panel display [5]. In December 2005, Korea launched TerrestrialDMB (T-DMB) services for the first time in the world, makingmultimedia broadcasting services available in the mobileenvironment. In addition to high-quality digital radio (audio)and television (video), diverse data services, such as Trafficand Travel Information, BIFS, and Visual Radio, arecurrently being serviced [6].

Digital technology for television has many advantages compared by analog technology. To know the strong and quality of the TDMB, software DMB Analyzer was very helpful. It's use Software DABAir II Plus (Figure 1) that is hadinterfaced which content complete analysis supporting features like Antenna Loss Receive Level and Signal Quality.

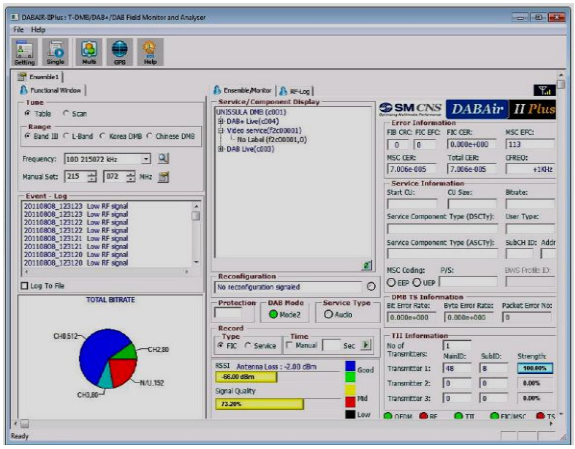


Fig. 1. DMB Analyzer: SoftwareDABAir II Plus

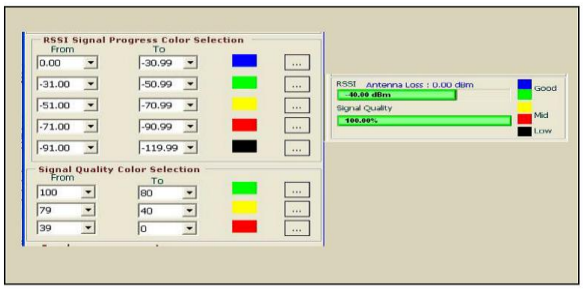


Fig. 2. Signal Parameter of DMB

The colourparameters were set in the quality signal measurement. It used to know the signal quality as shown in Figure 2. Blue colour indicates "the best" performance of signal quality, represents the level of acceptance range 0dBm until -30,99dBm. Green colour represents the level of acceptance range -31 dBm until –50,99 dBm, yellow colour represents the level of acceptance range -51 dBm until -70,99 dBm, red colour represents the level of acceptance range -71 dBm until -90,99 dBm, and black colourrepresent the level of acceptance range -91 dBm until -119,99 dBm.

II. DATA COLLECTION

The data are the result of measurements with Drive Test System. Drive Test System is the process to check and measure RF signal of the circuit and to optimalize the signal and then observed to transmit power and receive power, level of access failure. The Drive Test System observed from the receiver side (MS) use software AnalyserDABAir II Plus.

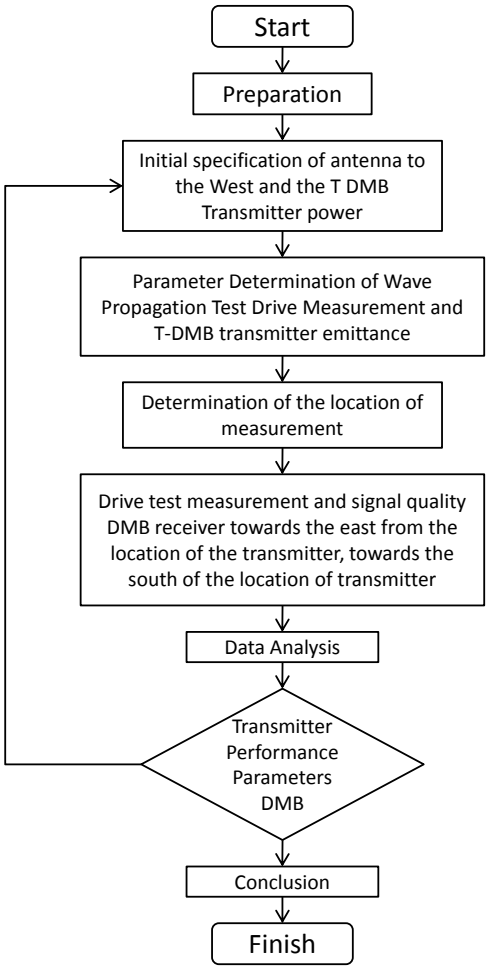


Fig. 3. ExperimentFramework

Besidesmeasure, the signal quality from a transmitter, it also measures the signal quality from the receiver DMB.

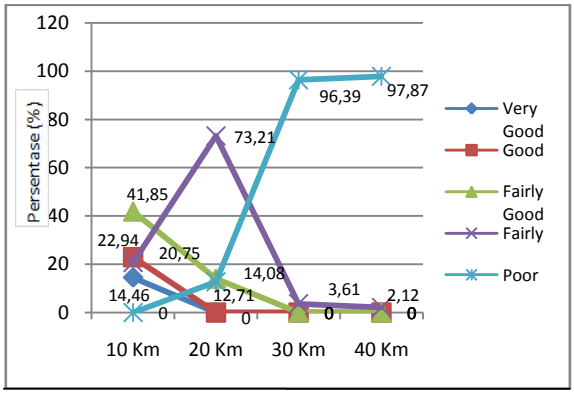
Figure 3 describes the flowchart of the research method. Begin with the Preparation Phase, determination the direction of the antenna specifications, to know the wave propagation measurements and TDMB power transmitter, and then analyzing the data.

III. DMB EMITTANCE

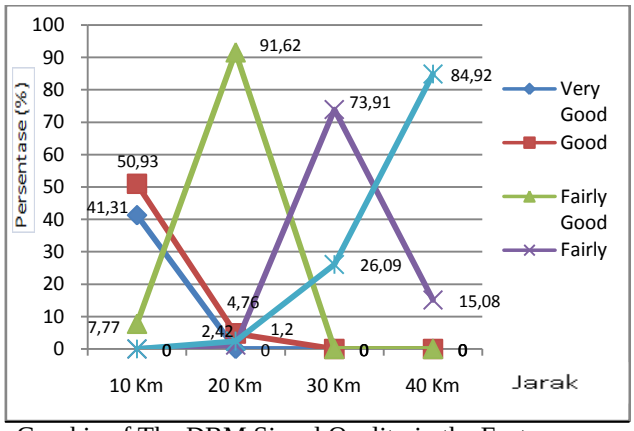
A. East of The Transmitter Result

Drive test done with emittance parameter 1000 Watt on the Band Frequency III/ Block 10 D east of the transmitter. The path corresponding to Figure 4. The result of drive test measurement in the east of transmitter could be seen in Figure 5 dan 6. The result show that receiver signal quality "very good" (signal quality parameter 80% - 100%) contain in the radius 10 Km as much as 41,31%. The result show that receiver signal quality "good" (signal quality parameter 50% - 79%) contain in the radius 10 Km as much as 50,93% and radius 20 Km asa much as 4,76%. Receiver can't receive the signal in radius 30 Km. Further to the east the signal become less powerfull.

Fig. 4. The Result of theMain roaddrive testin the east of the Transmitter



Graphic of the DBM Signal power in the Eastern area.



Graphic of The DBM Signal Quality in the Eastern area.

B. *Result of the Main Road in Semarang.*

The area includes, Tanjung Mas – Srondol Street, Srondol – Jatingaleh street, Jatingaleh – Krapyak street, Kelud Raya Street, and Papandayan street. The range of signal quality is -31,00 until -50.99 dBm, 12.74 % in a "very good" category, 69,16 % in a "good" category. The quality of the received signal between 42,67 % until 100 %.

C. *Measurement Result From the South of The Transmitter*

The area includes South Semarang, Ungaran, Bawen, and Salatiga. The signal quality in the south area looks better than east area. The result could be seen in Figure 7, Figure 8, and Figure 9.

Fig. 5. The Result of the Main roaddrive testin the Southern Area

The distribution of strong signal quality signal could be seen in Table 1 and Table 2 below.

TABEL1.DMB SIGNAL STRONG LEVEL IN AREAS SOUTH

Signal Strong (dBm)	Receiver Signal Quality	Number of Grid	Percentage (%)
0.00 s/d -30.99	Very Good	375	4.6
-31.00 s/d -50.99	Good	2196	27.20
-51.00 s/d -70.99	Fairly Good	2025	25.08
-71.00 s/d -90.99	Fairly	2199	27.24
-91.00 s/d -119.99	Poor	1277	15.82

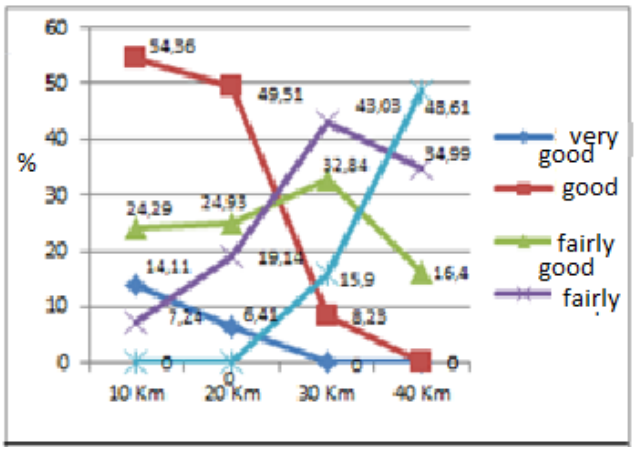


Fig. 6. DBM Signal Strong in South Region

TABEL 2. DBM SIGNAL QUALITY IN SOUTH REGION

Signal Quality (%)	Quality Signal Receive	Number of Grid	Percentage (%)
100 s/d 80	Very Good	824	10.21
79 s/d 50	Good	2457	30.44
49 s/d 21	Fairly Good	1253	15.52
20 s/d 10	Fairly	2029	25.14
9 s/d 0	Poor	1509	18.69

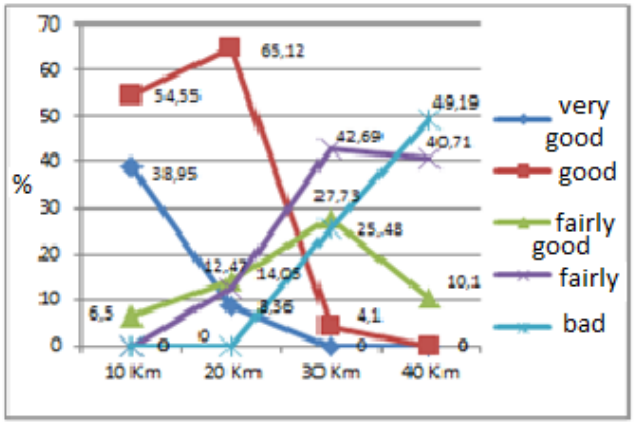


Fig. 7. DMB Signal Quality in Southern Region

The result show that receiver signal quality "very good" (signal quality parameter 80% - 100%) contain in the radius 10 Km as much as 14,11% and radius 20 Km as much as 6,41%. The result show that receiver signal quality "good" (signal quality parameter 50% - 79%) contain in the radius 10 Km as much as 54,36% , radius 20 Km as much as 49,51%, and radius 30 Km as much as 8,23%. Receiver can't receive the signal in radius 40 Km.

IV. Conclusion

Coverage area of the DMB transmitter to the east of the transmitter only reach until less than 30 km, the south area reach until 40 km, and the area of the main road principally could be covered by DMB transmitter depend on the areaof the main road.

Quality and quantity of the signalin the east and south of the transmitter and the area of the main road approximately 50% are in a good category.

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