

Analysis of Television Signal Boosters Using Digital Television Boosters and Antenna

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ABSTRACT

A digital antenna is a device used to capture digital signals. Digital television broadcasts are capable of transmitting better reception quality image signals on the television screen than analog broadcasts. Using an antenna without a booster causes less than optimal reception for several stations that are quite far from the receiving antenna. The television antenna booster functions as an amplifier for signal losses received from the antenna via coaxial cable. The signal that enters the antenna through the cable is a very weak RF signal. The booster itself works as an RF signal amplifier and also acts as a frequency selector used by the television receiver (VHF or UHF). This research aims to analyze the comparison of the performance of two antenna boosters, namely the TOYOSAKI Booster and MATRIX Booster, using digital antennas, namely the TOYOSAKI, MATTRIX and TAFFWARE antennas, to find a comparison of which antenna and booster are the best. This research uses the SINPO method, namely a number code to assess signal strength, interference, atmospheric noise, propagation conditions, and general impression of reception. Ratings are made with numbers ranging from 5 (very good) to 1 (very bad). The research results show that the quality of the images produced by the TOYOSAKI and MATRIX antennas is better using the MATRIX Booster than using the TOYOSAKI Booster. Meanwhile, for the TAFFWARE antenna, it is better to use a TOYOSAKI Booster than to use a MATRIX.

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1. INTRODUCTION

As time goes by, technological developments and the increasing human need for information mean that all media and communication service providers are increasingly competing to improve the quality of their services. [1] This applies to the world of television which is increasingly developing in providing information and entertainment for the wider community. One example of technology that is currently developing is digital television, which is a tool for capturing image broadcasts.[2]

This digital television broadcasting system is capable of transmitting image signals with sharper and clearer reception quality on the TV screen compared to analog broadcasts due to the digital modulation process and more complex signal processing. In an analog television broadcasting system, one frequency channel is used to distribute one television broadcast program. Meanwhile, in the DVB-T2 digital broadcasting system, one frequency channel is capable of carrying 4-8 broadcast programs Standard Definition (SDTV). This means that there is inefficiency in the use of the radio spectrum in the analog system. On the other hand, in digital systems there is optimization of frequency channel utilization.[1]

The use of a booster as an antenna amplifier plays an important role in determining the quality of the image received, so that the received signal can provide good image results. The choice of booster type varies greatly on the market, so using a booster that is not of good quality can cause the image quality received on the television to not produce satisfactory results.[3]

Based on the pattern spread on television transmitting stations in West Kalimantan, especially Pontianak, efforts are needed to improve the quality of reception using Digital Television antennas. In this research the author will compare the signal reception quality of digital television antennas and boosters using the SINPO method. So in this research the author will design "Analysis of Television Signal Boosters Using Boosters and Digital TV Antennas" in Pontianak" and is expected to obtain recommendations for digital television antennas and boosters that have better broadcast quality in the Pontianak area.

2. LITERATURE REVIEW

2.1 Previous Research

There are several previous studies or similar research that have previously been used as material for preparing this thesis.

Research conducted by Sandyono Sninambela. The 2018 thesis for Electrical Engineering Students at Tanjungpura University, Pontianak, entitled "Analysis of the Receiver Power of an Omnidirectional Yagi Antenna for Observing Television Broadcasts Using Two Booster Comparisons" which states that this research is about an antenna without a booster, the receiver is less than optimal for several stations that are quite far away. For some stations that are far enough away for some receivers. The aim is to compare two television antenna boosters, namely the SUNNYCO booster and the TAYOSAKI booster using an omnidirectional yagi antenna.[3]

Research conducted by Matripagelardo. Tanjungpura University Electrical Engineering Student's 2022 thesis entitled "Identification of Digital Antenna Signal Reception for Television Using the SINPO Method" which states that this research describes the identification of image quality, sound and digital television broadcast signals, using the SINPO method.[1]

2.2 Digital Television

Digital transmission, on the other hand, reduces the signal content. Digital signals can be propagated a limited distance before attenuation compromises data integrity. Repeaters (reapters) are used to cover longer distances. A Reapter receives a digital signal, recovers the pattern of ones and zeros, and transmits a new signal, then the attenuation is resolved. The digital television broadcasting system has sources (audio and video as output from processes carried out in the studio) which are encoded into digital data that conforms to these standards which were previously used as television broadcast programs. [4]

in digital technology, it can transmit as many as 6 to 8 transmission channels at once with different programs. Digital technology is efficient in using the frequency spectrum. One digital television provider uses a fairly large amount of spectrum, so it's not just 1 (one) carrier channel, but more. The organizer functions as a network operator, which transmits programs from other television stations terrestrially into a service package similar to the current subscription cable television operation. The design and implementation of digital TV broadcast systems is (primarily) aimed at improving image quality. Digital TV allows the transmission of images with high accuracy and resolution. [5], [6]

The digital TV system is capable of producing clear, stable image reception, and without shadow effects or double images, even though the receiver is moving at high speed. Digital TV systems do not recognize unclear images, double images (ghosts), and other poor image quality, because in digital techniques they only recognize "0" or "1". Good pictures or none at all. [6]

2.3 Television Antenna Booster Theory

A television booster is a signal amplifier for signal losses received from the antenna via a coaxial cable that is too long. The signal that enters the antenna through the cable is a very weak RF signal. The booster itself works as an RF signal amplifier and also acts as a frequency selector used by the television receiver (VHF or UHF). Because of this, boosters for television usually have 2 outputs, namely VHF and UHF, but it really depends on the type of antenna we use, whether the antenna is specifically for UHF or for VHF. Adding a booster to the antenna can provide a high gain value of up to 20 db. [3], [7]

The TV antenna booster functions to strengthen the signal received by the TV antenna. The TV antenna booster is very useful for TV users who are far from the TV transmitter, especially in remote rural areas.[8]

2.4 Antenna Theory

An antenna is a component designed to transmit and receive waves electromagnetic. Antenna as a transmitting device is a transducer. Electromagnetism, which is used to convert guided waves in cable transmission lines, into waves that propagate in free space and as a receiver (receiving antenna) converts free space waves into guided waves.[9], [10]

2.5 Coaxial Cable

Cable coaxial is one of the transmission media on computer networks in the form of network cables with high transmission capabilities, so it is more commonly used on television channels than on computer networks.[11]

2.6 Radio Broadcast Reception Quality Antenna Theory (SINPO)

SINPO is a numeric code to assess signal strength, interference, noise from the atmosphere, propagation conditions and overall reception impression. Ratings are made with numbers ranging from 1 (very bad) to 5 (very good). In assessing SINPO parameters, each letter represents a certain factor, show Table 1. [12]

Table 1. SINPO Acceptance Quality

Code	What is measured/assessed	Job Description	The best value	Worst Value
S	Signal (Signal Strength)	Listen and assess the strength and weakness of the signals received	5	1
I	Interferensi (disturbance)	Listen and assess whether there is interference from other transmitters	5	1
N	Noise	Listen and assess whether there is noise interference on the radio when receiving broadcasts	5	1
P	Propagasi (Sound Interference)	Listen and assess how the received signal propagates, whether there is fading interference (signal instability due to weather, or long distances)	5	1
O	Overall (Admission Results)	Listen and assess the overall reception results, including Signal, Interference, Noise and Propagation from the measured radio broadcast	5	1

3. RESEARCH METHODOLOGY

This research was conducted at the Telecommunications Lab, Faculty of Engineering, Tanjungpura University, Pontianak. This research was conducted in June 2023.

3.1. Tools and material

3.2.1 Television

Television is a term that comes from Greek. Which comes from the words tele (far) and also visi (image). In simple terms, television is an object whose function is to present visual displays in the form of images and sound. And broadcast from long distances.[13]



Figure 1. AQUA 55 Inch Android TV 4K UHD LE55AQT6600UG

The following are the specifications of the television use:

- Input / Output : - HDMI : 3
- USB Input : 2
- Power Consumption : - 150 Watt
- Screen Size : - 55 Inch
- Others : - System of Digital TV : DVB-T+C+T2+S2
- Operate System : Android 9.0
- SMART AI - AI Smart voice by google assistant
- SMART AI - Android devices IoT Hub
- Mobile remote app
- Bluetooth
- 4K HDR
- Produkt Dimension : - 1239 x 62 x 715 mm
- Tipe Layar : - LED SMART TV
- Screen Resolution : - 3840 x 2160

3.2.2 Toyosaki Antennas

The Toyosaki antenna is a device used to capture or reach digital signals. By using a digital antenna, broadcast quality can produce a clearer display and clearer sound. This antenna is designed for the Indonesian television frequency (UHF) which can capture all analog and digital broadcasts (DVB).



Figure 2. Antena Tayosaki AIO-220

The following are the specifications of the television use:

- Typo Antena : - AIO 220
- Frequensy : 470 MHz -860 MHz
- Gain : 22 dB
- Output Gain Max : 95 Db
- Power Comsumption : 3 w
- Voltage Input : 220 v
- Dimension : 13x7 cm

3.2.3 Matrix Antennas

The Matrix HD 302 Digital Tv Antenna is a device used to capture or reach digital signals. By using a digital antenna, broadcast quality can produce a clearer display and clearer sound, which is the right choice for enjoying high quality digital TV broadcasts. This antenna can be used both indoors and outdoors, this antenna is also equipped with 2 TV ports.



Figure 3. Antena Matrix HD-302

The following are the specifications of the television use:

- Type Antena : HD-302
- Frequency : 470-810 Mhz
- Gain : 30dBi
- Impedance : 75Ω
- Standing Waveratio : 220 AC/ 50 – 60 Hz

3.2.4 Taffware Antennas

The Taffware antenna is an antenna that is identical to a small and thin antenna. But a display like this is not inferior to the others. The quality of this digital antenna is very trustworthy, because this antenna can produce excellent TV resolution, namely 4K which can catch TV broadcasts up to 50 miles away.[14]



Figure 4. Antena Taffware TFL – D139

The following are the specifications of the television use:

- Antena type : - TFL-139
- Frequency : - VHF(172-240 Mhz)
- UHF(470-860 Mhz)
- LNA Gain : - 25 dB
- Dimensions : - Antenna: 21 x 12 cm
- Cable Length: 2.86 meter (286 cm)
- Wireless Transmission Power : - 50 Mil/80 km (with Amplifier)/35 Mil/56 km (no Amplifer)

3.2.5 Toyosaki Boosters

The TOYOSAKI booster functions as a signal amplifier from the TV antenna so that the image obtained on television is clearer and better. The use of a booster as a TV signal amplifier is to maximize the signal received from television stations which are quite far from the television antenna.[15]



Figure 5. Toyosaki Boosters

The following are the specifications of the television use:

- Impendansi : 75 Ω
- Input Voltage : AC220V/50Hz
- Output : 5VDC/100Ma
- Power : 3 watt

3.2.6 Matrix Boosters



Figure 6. Booster Matrix

The following are the specifications of the television use:

- Antena Type : HD-302
- Impedance : AC220/50Hz
- Output : DC5V/100mA

3.3 Flowchart

The steps in antenna research using a booster can be seen in the flowchart of this research:

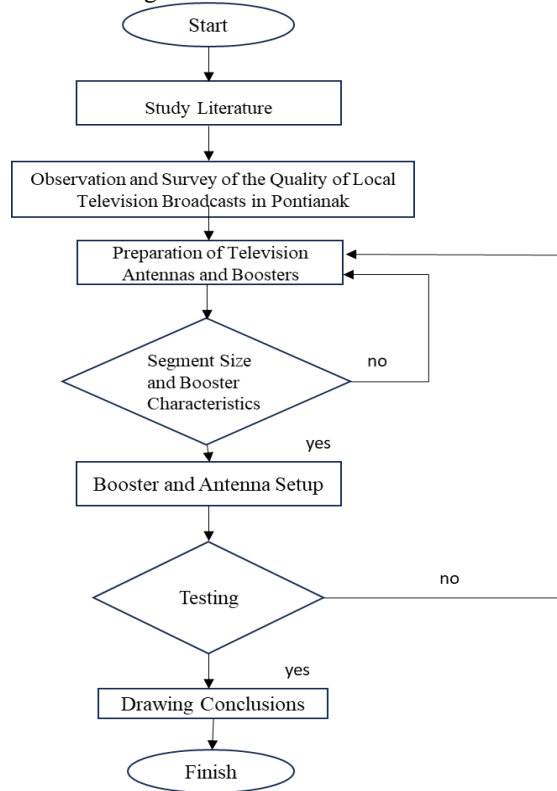


Figure 7. Reasearch Flowchart

Based on Figure 7 research flowchart, there are stages carried out in this research. with take and collect basic theories and supporting theories regarding the quality of digital antenna signal reception for television using the SINPO method and also from various sources such as books, theses, journals, articles and theories from internet network sites, followed by observations and surveys of local broadcast quality in Pontianak, then prepare the antenna and booster that will be used as well as, measure the segments and find out the characteristics of the booster, if it is not suitable then prepare the antenna and booster again and if it is suitable, continue by preparing the antenna and booster that will be used and immediately carry out testing by displaying the results on the display screen output on the television, after testing, comparison results are obtained and conclusions.

4. RESULTS AND DISCUSSION

After 3 days of collecting observation data on television channels in the Pontianak area with three antennas, namely the MATRIX, TAFFWARE and TOYOSAKI antennas using two boosters, namely the MATRIX booster and the TOYOSAKI booster, we obtained:

4.1 First Day Of Observation

Table 2 of Observation Results of Digital Television SINPO Parameters June 21 2023:

Table 2. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5

M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

Table 3. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

In Tables 2 and 3, when using a MATRIX antenna with a Matrix and Toyosaki signal amplifier, the image quality of digital television broadcasts is of good quality. This is due to the absence of interference from other transmitters, its absence noise and good propagation channels or no interference fading.

Table 4. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	3	5	5	3	4
TVRI Kalimantan Barat	3	5	5	3	4
TVRI World	4	5	5	4	4
TVRI Sport	4	5	5	4	5
RTV	4	5	5	4	5
NET TV	4	5	5	4	5
M2TV	3	5	5	3	4
RCTI	3	5	5	3	4

Table 5. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5

In Tables 4 and 5, when using the TAFFWARE Antenna with a Matrix signal amplifier, it is better than the Toyosaki signal amplifier. This can be seen from the image quality that is obtained when using the Toyosaki booster. On TVRI National, TVRI West Kalimantan, M2TV and RCTI channels there is propagation or interference fading (unstable signal due to weather and distance influencing) the television broadcast.

Table 6. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5

Table 7. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	2	5	5	2	4
SCTV	2	5	5	2	4
Moji	2	5	5	2	4

Mentari TV	2	5	5	2	4
Metro TV	2	5	5	2	4
Kompas TV	2	5	5	2	4

In Tables 6 and 7, when using a Toyosaki antenna with a Toyosaki signal amplifier, it is better than a Matrix signal amplifier. Toyosaki can be said to be better than Matrix because the Toyosaki booster gets all digital television channels even though there is propagation on Indosiar, Moji, Mentari, Metro and Kompas channels. And on the Matrix booster, you can't find channels on Indosiar, Moji, Mentari, Metro and Kompas television broadcasts.

4.2 Second day of observation

Table of Observation Results of Digital Television SINPO Parameters June 22 2023

Table 8. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

Table 9. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5

Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

In Tables 8 and 9 using a MATRIX antenna using Booster Matrix and Toyosaki, the image quality of digital television broadcasts is of good quality. Because there is no interference from other transmitters, there is no noise and no propagation or interference fading.

Table 10. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	2	5	5	2	4
TVRI Kalimantan Barat	2	5	5	2	4
TVRI World	2	5	5	2	4
TVRI Sport	2	5	5	2	4
RTV	4	5	5	4	5
NET TV	4	5	5	4	5
M2TV	4	5	5	4	5
RCTI	4	5	5	4	5

Table 11. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	2	5	5	2	4
TVRI Kalimantan Barat	2	5	5	2	4
TVRI World	2	5	5	2	4
TVRI Sport	2	5	5	2	4
RTV	3	5	5	3	4
NET TV	3	5	5	3	4
M2TV	3	5	5	3	4
RCTI	3	5	5	3	4

In Tables 10 and 11 using the TAFFWARE antenna with Booster Matrix and Toyosaki, the image quality produced by the Toyosaki booster and Matrix booster has the same propagation or fading interference and on the same channels as TVRI National, TVRI Kalbar, TVRI World, TVRI Sport only. The remaining propagation on RTV, NET, M2TV and RCTI channels is overall good.

Table 12. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

Table 13. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5
ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

In Tables 12 and 13, using the TOYOSAKI antenna with Booster Matrix and Toyosaki, the image quality of digital television broadcasts is of good quality. This is due to the absence of interference from other transmitters noise and the absence of propagation or interference fading

4.3 Third Day Of Observation

Table of Observation Results of Digital Television SINPO Parameters June 23 2023:

Table 14. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
Indosiar	5	5	5	5	5
SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

Table 15. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
Indosiar	5	5	5	5	5

SCTV	5	5	5	5	5
Moji	5	5	5	5	5
Mentari TV	5	5	5	5	5
Metro TV	5	5	5	5	5
Kompas TV	5	5	5	5	5

In Tables 14 and 15, using a MATRIX antenna with Booster Matrix and Toyosaki, the image quality of digital television broadcasts is of good quality. Because there is no interference from other transmitters, there is no noise and no propagation or fading interference.

Table 16. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	2	5	5	2	4
TVRI Kalimantan Barat	2	5	5	2	4
TVRI World	3	5	5	3	4
TVRI Sport	3	5	5	3	4
RTV	3	5	5	3	4
NET TV	2	5	5	2	4
M2TV	2	5	5	2	4
RCTI	2	5	5	2	4

Table 17. Booster TOYOSAKI

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	3	5	5	3	4
TVRI Kalimantan Barat	3	5	5	3	4
TVRI World	3	5	5	3	4
TVRI Sport	3	5	5	3	4
RTV	3	5	5	3	4
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5

In Tables 16 and 17 using the TAFFWARE antenna with Booster Matrix and Toyosaki, the image quality produced by the Matrix booster is better than the image quality produced by the Toyosaki booster. The broadcast quality that is obtained by both of them has the same propagation or interference fading. However, it can be seen from the quality of the images obtained that the quality of the booster matrix is better than the Toyosaki booster.

Table 18. Booster Matrix

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	5	5	5	5	5
TRANS 7	5	5	5	5	5
CNN	5	5	5	5	5
CNBC	5	5	5	5	5
Tv ONE	5	5	5	5	5

ANTV	5	5	5	5	5
MNCTV	5	5	5	5	5
GTV	5	5	5	5	5
Inews	5	5	5	5	5

Table 19. Booster Toyosaki

Channel	Parameter SINPO				
	S	I	N	P	O
TVRI Nasional	5	5	5	5	5
TVRI Kalimantan Barat	5	5	5	5	5
TVRI World	5	5	5	5	5
TVRI Sport	5	5	5	5	5
RTV	5	5	5	5	5
NET TV	5	5	5	5	5
M2TV	5	5	5	5	5
RCTI	5	5	5	5	5
TRANS TV	2	5	5	2	4
TRANS 7	2	5	5	2	4
CNN	2	5	5	2	4
CNBC	2	5	5	2	4
Tv ONE	2	5	5	2	4
ANTV	2	5	5	2	4
MNCTV	2	5	5	2	4
GTV	2	5	5	2	4
Inews	2	5	5	2	4

In Tables 18 and 19 using a Toyosaki antenna using a Booster Matrix is better than using a Toyosaki Booster. When using the Toyosaki Booster on TRANS TV, TRANS 7, CNN, CNBC, Tv ONE, ANTV, MNCTV, GTV and Inews channels, the quality obtained is not good. And when using the MATRIX Booster the quality is good because there is no interference from other transmitters, no noise and no propagation or interference fading.

4.4 Overall Analysis

From the overall test results of the tool as seen After 3 days of collecting observation data on television channels in the Pontianak area with three antennas, namely the MATRIX, TAFFWARE and TOYOSAKI antennas using two boosters, namely the MATRIX booster and the TOYOSAKI booster, with observation data taken in the form of image quality based on SINPO. it can be seen in each measurement results table that the image quality results using MATRIX antennas, MATRIX and TOYOSAKI boosters get good quality results. A television antenna booster is an amplifier for the incoming signal from the antenna via a long coaxial cable. A television antenna booster can strengthen the input signal from the antenna which makes the image quality of television broadcasts even better. So to produce better image quality, you can use both MATRIX and TOYOSAKI boosters.

And each measurement results table shows that the image quality results using the TAFFWARE Antenna, TOYOSAKI booster have better quality when compared to the image quality produced using the MATRIX booster. As previously explained, a television antenna booster is an amplifier for the incoming signal from the antenna via a long coaxial cable. A television antenna booster can strengthen the input signal from the antenna which makes the image quality of television broadcasts even better. So to produce better image quality you have to use a TOYOSAKI booster. From the results of the observation table above as a whole it can be seen that by using the TOYOSAKI booster on the RTV, NET, M2TV and RCTI channels it can be captured with very good quality, but with the MATRIX booster the quality that can be captured is weak, it can be seen that by using the MATRIX booster on the channel TVRI National, TVRI Kalbar, TVRI WORLD, TVRI Sport can be caught with weak quality. Changes in overall image quality conditions resulting from TOYOSAKI boosters and MATRIX boosters can be caused by many factors, especially natural factors, for example humidity, weather, wind, sun, or tall buildings or structures, the location of television broadcast stations which are quite far away also affect the quality of the images obtained. Many things affect signal quality in the transmission process.

And in each measurement results table shows that the image quality results using the TOYOSAKI Antenna, the MATRIX booster have better quality when compared to the image quality produced using the TOYOSAKI booster. As previously explained, a television antenna booster is an amplifier for the incoming signal from the antenna via a long coaxial cable. A television antenna booster can strengthen the input signal from the antenna which makes the image quality of television broadcasts even better. So to produce better image quality you have to use a MATRIX booster. Changes in overall image quality conditions resulting from TOYOSAKI boosters and MATRIX boosters can be caused by many factors. Many things affect the quality of

the signal in the transmission process, especially natural factors, for example humidity, weather, wind, sun, or tall buildings or structures, the location of television broadcast stations which are quite far away also affect the quality of the images obtained.

5. CONCLUSION

Based on field tests and analysis results on the antenna and booster, it can be concluded that poor broadcast reception quality occurs due to interference from other transmitters, noise and poor propagation channels or fading interference, namely signal instability because it is influenced by the NLOS (indoor observation) propagation channel). The influence of weather and also the location of television broadcast stations which are quite far away result in high signal attenuation which affects the quality of the resulting image. The closer the distance between the transmitter and receiver, the greater the chance of getting good signal quality. This is especially true if there are no physical obstacles or other interference that can block the signal path. The greater the distance between the television transmitter and television receiver, the greater the possibility of the signal weakening. This may cause the loss of some channels or produce a blurry image. then a description of the image quality results from the antenna using the SINPO approach as a reference for the resulting image quality. So, it can be concluded from the results of comparing the signal reception quality of digital television antennas and boosters using the SINPO method, where these results obtain recommendations for digital television antennas and boosters that have better broadcast quality in the Pontianak area. that is The reception quality produced by the TOYOSAKI and MATRIX antennas is better using the MATRIX Booster. while for the TAFFWARE antenna it is better to use the TOYOSAKI Booster. results this is expected to obtain recommendations for digital television antennas and boosters that have better broadcast quality in the Pontianak area.

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