

# DS1610 "KingStone" Broadband Network Monitoring System

### Key Benefits

- Proactively monitor the broadband network in order to detect problems before it affects customers
- 24/7 monitoring system with alarms and notifications which informs the user immediately when an impairment is detected
- Reduce OPEX by analyzing multiple return and forward paths simultaneously
- Real-time monitoring of the entire network from a PC



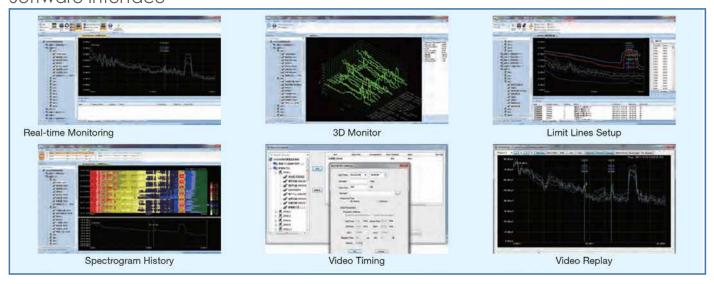
The Kingstone monitoring system offers real-time simultaneous signal monitoring and analysis on multiple return and forward paths of HFC networks. The DS1610 system is capable of capturing any transient noise and ingress noise and includes alarm setting, data storage, data analysis, data comparison in 3D and video recording, simplifying the installation, maintenance and troubleshooting of HFC networks. The user is also able to log in through any PC, enabling remote monitoring of the plant.

## System Configuration

	Standard Configuration	
DS1610		Housing with built-in Local Management Software
	DS1610 Server Software	
		DS1610 Client Management Software

Optional Modules		
DS1610-1D	Return Path Monitor Card	
DS1615	RF FSK Modulator	
DS8831H	Spectrum Analyzer	

#### Software Interface





#### 1. Return Path Monitoring Solution

The return path signal transmits from cable modem finally to CMTS via splitter, reverse amplifier, fiber network and reverse receiver. DS1610 monitoring system with DS1610-1D card could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

| Cloud and | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

| Cloud and | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

| Cloud and | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

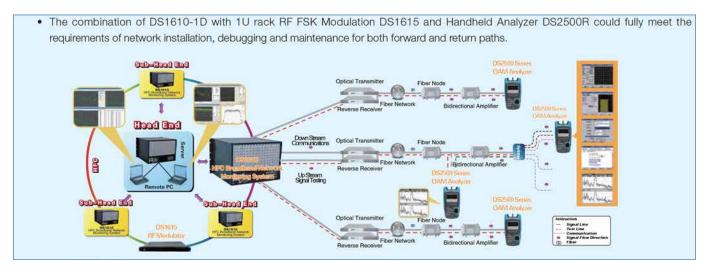
| Cloud and | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

| Cloud and | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

| Cloud and | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the errors.

| Cloud and | Could an error | Could monitor the real-time signal before it enters the CMTS and help capture the injected noises and troubleshoot the error | Could an erro

#### 2. Return & Forward Path Debugging and Troubleshooting Solution





# Specifications

Range	DS1610-1D8/16/24/32				
Span         0 ~ 86 MHz           Sweep Time         ≤1 ms(Full Span)           RBW         30 kHz ~ 300 kHz 1-3 Step           VBW         30 kHz ~ 300 kHz 1-3 Step           Amplitude           Level           Max. Safe Input         +110 dB <sub>M</sub> V 25 V DC           Displayed Average Noise Level         ≤18 dB <sub>M</sub> V 5 MHz ~ 65 MHz(No Input Signal, OdB Attenuation, 300 kHz RBW, 30 kHz VBW, Sampling Demodulation)           Attenuator         Attenuator           Range         0 dB ~ 30 dB           Step         1 dB           Spurious Responses         Second Harmonic           <-55 dBc for +80 dB <sub>M</sub> V Signal at input mixer         Second Harmonic           0-55 dBc for two +80 dB <sub>M</sub> V Signals at input mixer with ≥1 MHz Separation, Amplifier Off         Display           Logarithm Scale         0.1 ~ 0.9 dBidiv at 0.1 dB Steps 1 ~ 40 dB div at 1 dB Step         Second Harmonic           Logarithm Scale         0.1 ~ 0.9 dBidiv at 0.1 dB Steps 1 ~ 40 dB div at 1 dB Step         Second Harmonic           Logarithm Scale         0.1 ~ 0.9 dBidiv at 0.1 dB Steps 1 ~ 40 dB div at 1 dB Step         Second Harmonic           Logarithm Scale         0.1 ~ 0.9 dBidiv at 0.1 dB Steps 1 ~ 40 dB div at 1 dB Step         Second Harmonic           Scale Unit         dBm, dBmW, dB, W         Second Harmonic					
Sweep Time	Range	0.5 MHz ~ 86 MHz			
NEW 30 kHz 1-3 Step  ***Step 1-10 dBy V 2 5 V DC  ***Step 1-10 dBy V 3 MHz V 5 W, Sampling Demodulation, 300 kHz RBW, 30 kHz V 5 W, Sampling Demodulation, 300 kHz V 5 W, Sampling	Span	0 ~ 86 MHz			
New   Amplitude   Level   September   Amplitude   September   September   Amplitude   September   S	Sweep Time	≤1 ms (Full Span)			
Amplitude           Level           Max. Safe Input         +110 dB <sub>1</sub> W 25 V DC           Displayed Average Noise Level         ≤18 dB <sub>2</sub> W, 5 MHz ~ 65 MHz/No Input Signal, 0dB Attenuation, 300 kHz RBW, 30 kHz VBW, Sampling Demodulation)           Attenuator         Attenuator           Step         1 dB           Spurious Responses         Second Harmonic           Second Harmonic         <55 dBc for +80 dB <sub>2</sub> W Signal at input mixer           Third Order Intermodulation         <55 dBc for two +80 dB <sub>2</sub> W Signals at input mixer with ≥1 MHz Separation, Amplifier Off           Display         Linear Scale           Linear Scale         0 1 ~ 0.9 dB/div at 0.1 dB Step: 1 ~ 40 dB/div at 1 dB Step           Linear Scale         8 Divisions           Scale Unit         dBm, dBmv, dBy W           Trace Detector         MAX, MIN, Average           Reference Level         0 dBy W + 140 dBy W           Level Accuracy         Typical ≤±1.5 dB@+20 °C           Others           Working Temperature         0 °C ~ +40 °C           Storage Temperature         10 °C ~ +50 °C           Structure         10 Rack           Power Supply         AC 220 V / 50 Hz           RF Frequency         87 MHz ~ 120 MHz           Output         85 dBuV ~ 110 dBuV, 1 dB Step	RBW	30 kHz ~ 300 kHz 1-3 Step			
Level           Max. Safe Input         ±110 dBµV 25 V DC           218 dBµV, 5 MHz ~ 65 MHz[No Input Signal, OdB Attenuation, 300 kHz RBW, 30 kHz VBW, Sampling Demodulation)           Attenuator           Range         0 dB ~ 30 dB           Step         1 dB           Suprious Responses           Second Harmonic         <55 dBc for +80 dBµV Signal at input mixer	VBW	30 kHz ~ 300 kHz 1-3 Step			
Max. Safe Input         +110 dBμV 25 V DC           Displayed Average Noise Level         ≤18 dBμV, 5 MHz ~ 65 MHz(No Input Signal, 0dB Attenuation, 300 kHz RBW, 300 kHz VBW, Sampling Demodulation)           Attenuator         Range         0 dB ~ 30 dB           Step         1 dB           Spurious Responses         Second Harmonic         <.55 dBc for +80 dBμV Signal at input mixer	Amplitude	Amplitude			
Sila dBµV, S MHz ~ 65 MHz/(No Input Signal, 0dB Attenuation, 300 kHz NBW, 30 kHz NBW, Sampling Demodulation)   Attenuator					
300 kHz RBW, 30 kHz VBW, Sampling Demodulation	Max. Safe Input	+110 dB <sub>µ</sub> V 25 V DC			
Range         0 dB ~ 30 dB           Step         1 dB           Spurious Responses           Second Harmonic         < 55 dBc for +80 dBµV Signal at input mixer	Displayed Average Noise Level	≤18 dBµV, 5 MHz ~ 65 MHz(No Input Signal, 0dB Attenuation, 300 kHz RBW, 30 kHz VBW, Sampling Demodulation)			
Step 1 dB  Spurious Responses  Second Harmonic < .55 dBc for +80 dBµV Signal at input mixer Third Order Intermodulation < .55 dBc for two +80 dBµV Signals at input mixer with ≥1MHz Separation, Amplifier Off  Display  Logarithm Scale 0.1 ~ 0.9 dB/div at 0.1 dB Step: 1 ~ 40 dB/div at 1 dB Step  Linear Scale 8 Divisions  Scale Unit dBm, dBmV, dBµV  Trace Detector MAX, MIN, Average Reference Level 0dBµV ~ +140 dBµV  Level Accuracy Typical ≤±1.5 dB@+20 °C  Others  Working Temperature 0° C ~ +40 °C  Storage Temperature 10° C ~ +50 °C  Storage Temperature 10 Rack  Power Supply AC 220 V / 50 Hz  RF Frequency 87 MHz ~ 120 MHz  Output 85 dBuV ~ 110 dBuV, 1 dB Step  Modulation Type FSK (±67 kHz)  Data Baud Rate 38.4 kbps	Attenuator				
Spurious Responses  Second Harmonic	Range	0 dB ~ 30 dB			
Second Harmonic  - 55 dBc for +80 dBµV Signal at input mixer  Third Order Intermodulation  - 55 dBc for two +80 dBµV Signals at input mixer with ≥1MHz Separation, Amplifier Off  Display  Logarithm Scale  - 0.1 ~ 0.9 dB/div at 0.1 dB Step: 1 ~ 40 dB/div at 1 dB Step  Linear Scale  - 8 Divisions  Scale Unit  - dBm, dBmV, dBµV  Trace Detector  - MAX, MIN, Average  Reference Level  - 0 dBµV ~ +140 dBµV  Level Accuracy  - Typical ≤±1.5 dB@+20 °C  Others  Working Temperature  - 0 °C ~ +40 °C  Storage Temperature  - 10 °C ~ +50 °C  - DS1615  Structure  - 1U Rack  Power Supply  - AC 220 V / 50 Hz  - RF Frequency  - B7 MHz ~ 120 MHz  Output  - B5 dBuV ~ 110 dBuV, 1 dB Step  Modulation Type  - SK (±67 kHz)  Data Baud Rate  - 38.4 kbps	Step	1 dB			
Third Order Intermodulation  <-55 dBc for two +80 dBμV Signals at input mixer with ≥1MHz Separation, Amplifier Off Display Logarithm Scale Universe of the separation	Spurious Responses				
Display         Logarithm Scale       0.1 ~ 0.9 dB/div at 0.1 dB Step: 1 ~ 40 dB/div at 1 dB Step         Linear Scale       8 Divisions         Scale Unit       dBm, dBmV, dBµV         Trace Detector       MAX, MIN, Average         Reference Level       0 dBµV ~ +140 dBµV         Level Accuracy       Typical ≤ ± 1.5 dB@+20 °C         Others         Working Temperature       0 °C ~ +40 °C         Stroage Temperature       -10 °C ~ +50 °C         DS1615         Structure       1U Rack         Power Supply       AC 220 V / 50 Hz         RF Frequency       87 MHz ~ 120 MHz         Output       85 dBuV ~ 110 dBuV, 1 dB Step         Modulation Type       FSK (±67 kHz)         Data Baud Rate       38.4 kbps	Second Harmonic	<-55 dBc for +80 dBµV Signal at input mixer			
Logarithm Scale0.1 ~ 0.9 dB/div at 0.1 dB Step: 1 ~ 40 dB/div at 1 dB StepLinear Scale8 DivisionsScale UnitdBm, dBmV, dBμVTrace DetectorMAX, MIN, AverageReference Level0 dBμV ~ +140 dBμVLevel AccuracyTypical ≤±1.5 dB@+20 °COthersWorking Temperature0 °C ~ +40 °CStorage Temperature10 °C ~ +50 °CDS1615Structure1U RackPower SupplyAC 220 V / 50 HzRF Frequency87 MHz ~ 120 MHzOutput85 dBuV ~ 110 dBuV, 1 dB StepModulation TypeFSK (±67 kHz)Data Baud Rate38.4 kbps	Third Order Intermodulation	<-55 dBc for two +80 dBµV Signals at input mixer with ≥1MHz Separation, Amplifier Off			
Linear Scale 8 Divisions  Scale Unit dBm, dBmV, dBµV  Trace Detector MAX, MIN, Average  Reference Level 0 dBµV ~ +140 dBµV  Level Accuracy Typical ≤ ± 1.5 dB@+20 °C  Others  Working Temperature 0 °C ~ +40 °C  Storage Temperature -10 °C ~ +50 °C  DS1615  Structure 1U Rack  Power Supply AC 220 V / 50 Hz  RF Frequency 87 MHz ~ 120 MHz  Output 85 dBuV ~ 110 dBuV, 1 dB Step  Modulation Type FSK (± 67 kHz)  Data Baud Rate 388	Display				
Scale Unit         dBm, dBmV, dBµV           Trace Detector         MAX, MIN, Average           Reference Level         0 dBµV ~ +140 dBµV           Level Accuracy         Typical ≤±1.5 dB@+20 °C           Others           Working Temperature           0 °C ~ +40 °C           Storage Temperature         -10 °C ~ +50 °C           DS1615           Structure         1U Rack           Power Supply         AC 220 V / 50 Hz           RF Frequency         87 MHz ~ 120 MHz           Output         85 dBuV ~ 110 dBuV, 1 dB Step           Modulation Type         FSK (±67 kHz)           Data Baud Rate         38.4 kbps	Logarithm Scale	0.1 ~ 0.9 dB/div at 0.1 dB Step: 1 ~ 40 dB/div at 1 dB Step			
Trace Detector $MAX$ , $MIN$ , Average $MAX$ , $MIN$ ,	Linear Scale	8 Divisions			
Reference Level       0 dBµV ~ +140 dBµV         Level Accuracy       Typical ≤±1.5 dB@+20 °C         Others         Working Temperature       0 °C ~ +40 °C         Strage Temperature       -10 °C ~ +50 °C         DS1615         Structure       1U Rack         Power Supply       AC 220 V / 50 Hz         RF Frequency       87 MHz ~ 120 MHz         Output       85 dBuV ~ 110 dBuV, 1 dB Step         Modulation Type       FSK (±67 kHz)         Data Baud Rate       38.4 kbps	Scale Unit	dBm, dBmV, dBµV			
Level Accuracy Typical $\leq \pm 1.5 \text{ dB@} + 20 ^{\circ}\text{C}$ Others  Working Temperature $0 ^{\circ}\text{C} \times + 40 ^{\circ}\text{C}$ Storage Temperature $-10 ^{\circ}\text{C} \times + 50 ^{\circ}\text{C}$ Structure DS1615  Structure 1U Rack  Power Supply AC 220 V / 50 Hz  RF Frequency 87 MHz $\sim 120 ^{\circ}\text{MHz}$ Output 85 dBuV $\sim 110 ^{\circ}\text{dBuV}$ , 1 dB Step  Modulation Type FSK ( $\pm 67 ^{\circ}\text{kHz}$ )  Data Baud Rate 38.4 kbps	Trace Detector	MAX, MIN, Average			
OthersWorking Temperature0 °C ~ +40 °CStorage Temperature-10 °C ~ +50 °CDS1615Structure1U RackPower SupplyAC 220 V / 50 HzRF Frequency87 MHz ~ 120 MHzOutput85 dBuV ~ 110 dBuV, 1 dB StepModulation TypeFSK (±67 kHz)Data Baud Rate38.4 kbps	Reference Level	$0 \text{ dB}\mu\text{V} \sim +140 \text{ dB}\mu\text{V}$			
Working Temperature 0 °C ~ +40 °C  Storage Temperature -10 °C ~ +50 °C  DS 1615  Structure 1U Rack  Power Supply AC 220 V / 50 Hz  RF Frequency 87 MHz ~ 120 MHz  Output 85 dBuV ~ 110 dBuV, 1 dB Step  Modulation Type FSK (±67 kHz)  Data Baud Rate 38.4 kbps	Level Accuracy	Typical ≤±1.5 dB@+20 °C			
Storage Temperature -10 °C ~ +50 °C  DS1615  Structure 1U Rack Power Supply AC 220 V / 50 Hz  RF Frequency 87 MHz ~ 120 MHz  Output 85 dBuV ~ 110 dBuV, 1 dB Step  Modulation Type FSK (±67 kHz) Data Baud Rate 38.4 kbps	Others				
DS1615           Structure         1U Rack           Power Supply         AC 220 V / 50 Hz           RF Frequency         87 MHz ~ 120 MHz           Output         85 dBuV ~ 110 dBuV, 1 dB Step           Modulation Type         FSK (±67 kHz)           Data Baud Rate         38.4 kbps	Working Temperature	0 °C ~ +40 °C			
Structure         1U Rack           Power Supply         AC 220 V / 50 Hz           RF Frequency         87 MHz ~ 120 MHz           Output         85 dBuV ~ 110 dBuV, 1 dB Step           Modulation Type         FSK (±67 kHz)           Data Baud Rate         38.4 kbps	Storage Temperature	-10 °C ~ +50 °C			
Power Supply         AC 220 V / 50 Hz           RF Frequency         87 MHz ~ 120 MHz           Output         85 dBuV ~ 110 dBuV, 1 dB Step           Modulation Type         FSK (±67 kHz)           Data Baud Rate         38.4 kbps		D\$1615			
RF Frequency       87 MHz ~ 120 MHz         Output       85 dBuV ~ 110 dBuV, 1 dB Step         Modulation Type       FSK (±67 kHz)         Data Baud Rate       38.4 kbps	Structure	1U Rack			
Output         85 dBuV ~ 110 dBuV, 1 dB Step           Modulation Type         FSK (±67 kHz)           Data Baud Rate         38.4 kbps	Power Supply	AC 220 V / 50 Hz			
Modulation Type FSK (±67 kHz)  Data Baud Rate 38.4 kbps	RF Frequency	87 MHz ~ 120 MHz			
Data Baud Rate 38.4 kbps	Output	85 dBuV ~ 110 dBuV, 1 dB Step			
	Modulation Type	FSK (±67 kHz)			
Post to connect DC1/10 DC222	Data Baud Rate	38.4 kbps			
roit to connect D51010 R5232	Port to connect DS1610	RS232			

©2014 Deviser Instruments Incorporated. 780 Montague Expressway, Suite 606, San Jose, CA 95131. All rights reserved. Specifications subject to change without notice. All product and company names are trademarks of their respective corporations. Deviser Instruments manufacturing facilities are ISO 9001 certified. Do not reproduce, redistribute, or repost without written permission from Deviser Instruments.TC702 140921