

4. After installation has completed, a shortcut in user desktop will appear, and new installer windows appears in order to install USB drivers. Follow the installer stepby-step process

ia -			×
Installation Complete		w	M.
Click "Close" to exit			
	Canoel	Frevious	Close



- 5. Connect Ethernet or USB cable between computer and Signal Booster, keeping the Signal Booster powered off. New USB device will be detected
- 6.
- 7. Turn on the Signal Booster



BE SURE THAT "TO MOBILE" AND "TO BASE" PORTS ARE PROPERLY LOADED EITHER WITH 50 OHMS DUMMY LOADS, OR RADIATING SYSTEM.





	WESTELL
Control Software	
Version 1.0.38.0	

8. Execute the Westell Control Software. Next window will appear:

User interface controls:

- Scan Devices Button: refresh the available COM ports and identify Westell devices
- Connection Button: connect / disconnect software from Signal Booster
- List of available devices: below two buttons, is placed a dropdown list that shows all available COM ports. Available COM ports not related to Westell Signal Boosters will be shown with its number and "Unknown device" label. COM ports related to Westell Signal Boosters will show a device description.
- Embedded Web browser: graphical area where configuration and monitoring parameters will be shown.
- File menu: contains menus to save Signal Booster configuration to a file and load configuration from file to Signal Booster.

NOTE: if Westell Signal Booster is not turned on, related COM port will appear as "Unknown device"

8. Click "Scan Devices"





Now, the Westell Digital Signal Booster is shown in the list of available devices, and connection button is enabled.

NOTE: Westell Signal Booster could not appear in list, if COM port number is higher than COM16, depending on Windows version. COM port number can be forced to arbitrary number (below COM16) through Device Administrator. In order to change COM number, click "Properties" pop-up menu.

Click "Advanced Options"

Change COM port number

9. Click "Connect". Westell Control Software window will be automatically maximized, and web browser will show the configuration screen. Application screens are described in the next section due to these application screens and web pages (in webserver remote mode) are the same.



10. Once Signal Booster is configured, user can disconnect software using connection button, now labelled "Disconnect". Initial window will be shown.

If Signal Booster is disconnected or turned off, while Westell Control Software is connected to device, software will go back to initial window. Moreover, if some communication problem occurs while device is monitored, the software will go back to initial state as well.





vices I	Disconnect	Refresh									
al Booster											
							2.2				
TELL				D.	IGITA	IL BI	DA				
	-										
Status			PLINK					DOWNLIN			
Tag		INPUT	ou	FPUT	_		INPUT		OUTPUT		
IP		Squelch					Squelch				
& Time		Threshold -100 dBm	Cashie Con	-			Threshold -80	dBm Ena	ble ON		
ter Info		Main Gain 80 dB	Rower	-26.7	Ren		Main Gain 80	dB Pov	ver Calle	20.4 dBm	
ter Tool		Power Limit 18 dBm	PA Status				Power Limit 36	dBm Comm. Er	ror T.	AGC Fail	
		Overload UL					Overload DL	03	WK 15	C POWER LOW	
	-	II Filters Same BW					All Filters Same BW				_
motion			Linked UL/DL	VES V	C.	usich Mada	Not Linked X	RESET			
hanges			Frequencies	1120	- Dq	Seich House		and the second s			
Settings			Temperature	32.1	°C R>	Power Low	н	W Fail			
			Show filte	rs (1-16) 🗸							
			Show filte	rs (17-32) 🗌							
	FILTER		UPLINK FILTER	ING				DOWNLINK F	LTERING		
ersion	Nr. On	Fr. (MHz) BW (KHz) G (dB)	Power IN dBm D	et Power OUT	dBm AGC	dB	Fr. (MHz) BW (KHz) G (dB)	Power IN dBm	Det Power OUT	dBm A	GC dB
	1 🖌	380.000000 90K 💌 🛛 0	-117.0	-	-37.0	0.0	390.000000 90K 🔽 0	-115.3		-35.2 📖	0.0
8.05-28]		381.000000 90K 💌 🛛 0	-117.3	-	-37.3	0.0	391.000000 90K V 0	-114.4	-	-34.4	0.0
8.05-28] W: 6.03] W: 1C]	~ •		-117.5	-	-37.5	0.0	392.000000 90K V 0	-59.6	-	20.4	0.0
8.05-28] W: 6.03] W: 1C] B: 4.2.0] 5.01.02]	3 🗸	382.000000 90K 💙 0			37.0	0.0	393.000000 90K V 0	-115.8	-	-35.8	0.0
8.05-28] W: 6.03] W: 1C] B: 4.2.0] 5.01.02] 5030309]	3 🗹 4 🗸	382.000000 90K ✓ 0 383.000000 90K ✓ 0	-117.0	100000	07.0						
8.05-28] W: 6.03] W: 1C] B: 4.2.0] 5.01.02] 5030309]	3 🗹 4 🗹 5 🗸	382.000000 90K ✓ 0 383.000000 90K ✓ 0 384.000000 90K ✓ 0	-117.0	=	-35.7	0.0	394.000000 90K V 0	-116.3	-	-36.3	0.0
8.05-28] W: 6.03] W: 1C] B: 4.2.0] 5.01.02] 6030309] ©2018	3 9 4 9 5 9	382.000000 90K ⊻ 0 383.000000 90K ⊻ 0 384.000000 90K ⊻ 0 385.000000 90K ⊻ 0	-117.0	Ξ	-35.7	0.0	394.000000 ₽0K ▼ 0	-116.3	=	-36.3	0.0

Initial window for narrow-band filters version



Initial window for adjustable bandwidth filters version



_ WESTELL.COM

July 2018; Doc No. UHF Signal Booster UM RA Page 54 of 95



devices .	Disconnect	Refresh									
ignal Booster											
WEBTELL				DIGITA	L BDA						0
Content	-	INPUT				INPUT		HILYNG OUT	PUT		
Fag JP Spectrum Ate & Time Filter Info Filter Tool	P O All Filter	Squelch 🗹 Threshold -100 dBm Main Gain 80 dB ower Limit 24 dBm verload UL Same BW 🗹	Enable ON Power -12 PA Status	25.9 dBm	A	Squelch Threshold Main Gain Power Limit Overload DL Il Filters Same BW	-80 dBm 80 dB 37 dBm C	Enable ON Power omm. Error VSWR	-125.9 AG Tx Power	dBm C Fail r Low	
iguration		Linked UL/ Frequenci Temperatur	oL YES ♥	Squeich Mode Not	Linked 🗸	RESET HW Fail	32 Nar 8 Adju	rrow filters 🗹 stable filters 🗔			
d Settings			Show filters (1-10 Show filters (17-3	2)			000				
Version	FILTER		Show filters (1-16 Show filters (17-3 UPLINK FILTERING	22)			DO	ILINK FILTERING			
Version W: 14.12-04	FILTER Nr. On Fr. ()	на) – ВW (КНа) G (dB) Ро	Show filters (1-16 Show filters (17-3 UPLINK FILTERING	OUT dBm AGC	de P	r. (MHz) BW (KHz) G	DOWN	ILINK FILTERING	OUT dBm	AGC	dB
Version W: 14:8-94 [SWI 6-03] [SWI 6-03] [HWI 6-03]	FILTER Nr. On Fr. () 1 380.0	M2) BW (KH2) G (dB) Po 0000 POK V	Show filters (1-14 Show filters (17-3 UPLINK FILTERING wer IN dBm Det Power -117.0	OUT dBm AGC	de P	r. (MH2) BW (KH2) G 0.000000 POK V	DOWN (dB) Power IN	dam Det Power	OUT dBm -35.2	AGC	68 0.0
Version (Settings Version (SW 6.03 [SW 6.0	FILTER Nr. On Fr. () 1 1 380.0 2 1 381.0	Hz) BW (KHz) G (dB) Po 0000 POK V 0 0000 POK V 0	Show filters (1-14 Show filters (17-3 UPLINK FILTERING wer IN dBm Det Power -117.0 -117.3	- 37.3	de P 0,0 39 0,0 39	r. (MHz) BW (KHz) G 0.000000 BOX V	DOWN (dB) Power IN 0	HINK FILTERING dBm Det Power 1 -115.2	OUT dBm -35.2 -34.4	AGC	dB 0.0 0.0
Version (Swi 6.03 (WEB: 4.3.0) (WEB: 4.3.0) (SWi 6.33 (SWi 6.33) (SWi 6.33) (SWi 6.33) (SWi 6.33)	FILTER Nr. On Fr. (I 1 380.0 2 3 3 31.0 3 3 31.0	H2) BW (KH2) G (dB) Po 0000 90K V 0 0000 90K V 0 0000 90K V 0	Show filters (1-14 Show filters (17-3 UPLINK FILTERING wer IN dBm Det Power -117.0 -117.3 -117.5	OUT dBm AGC -37.0 -37.3 -37.5	dē P 0,0 39 0,0 39 0,0 39	- (MHz) BW (KHz) G 0.000000 POK V 1.000000 POK V 2.000000 POK V	DOWN i (dB) Power IN 0 0 0 0 0 0 0 0 0 0 0 0 0	HINK FILTERING d dBm Det Power -115.2 -114.4 -59.6	OUT dBm -35.2 -34.4 20.4	AGC	88 0.0 0.0 0.0
Version W. 14, 19-94 [SW: 6-93 [SW: 6-93] [SW: 6	Filtrer Nr. On Fr. (1 1 √ 380.0 2 √ 381.0 3 √ 382.0 4 √ 383.0	H2) BW (KH2) G (dB) Po 0000 90K V 0 0000 90K V 0 0000 90K V 0 0000 90K V 0	Show filters (1-14 Show filters (12-3 UPLINK FILTERING wer IN dBm Det Power -117.0 -117.3 -117.5 -117.0	- OUT dBm AGC - 37.0 - 37.3 - 37.5 - 37.0	dē P 0,0 39 0,0 39 0,0 39 0,0 39	r. (MH2) BW (KH2) G 0.000000 BOX W 1.000000 BOX W 2.000000 BOX W 3.000000 BOX W	DOWN 5 (dB) Power IN 0 0	4 dBm Det Power -115.2 -114.4 -59.6 -115.8	OUT dBm -35.2 -34.4 20.4 -35.8	AGC	88 0.0 0.0 0.0 0.0
Version w: 14.16-04 [5W: 4-3-0] [W: 14-3-0] [W: 14-3-0] [SN: 12] [SN: 12] (SN: 12] (SN	FILTER Nr. On Fr. (1) 1 √ 380.0 2 √ 381.0 3 √ 382.0 4 √ 380.0 5 √ 384.0	H2) BW (KH2) G (dB) Po 0000 90K V 0 0000 90K V 0 0000 90K V 0 0000 90K V 0 0000 90K V 0	Show filters (1-11 Show filters (1-7 UPLINK FILTERING over IN dBm Det Power - 117.0 - 117.3 - 117.5 - 117.0 - 115.7	OUT dBm AGC -37.0 -37.3 -37.5 -37.6 -37.6 -35.7	dē F 1 0,0 39 1 0,0 39 1 0,0 39 1 0,0 39 1 0,0 39 1 0,0 39	r. (MH2) BW (KH2) G 0.000000 90K W 1.000000 90K W 2.000000 90K W 3.000000 90K W	DOW/ 5 (dB) Power I/ 0 0 0	4 dBm Det Power -115.2 -114.4 -59.6 -115.8 -116.3	OUT dBm -35.2 -34.4 20.4 -35.8 -36.3	AGC	dB 0.0 0.0 0.0 0.0 0.0

Initial window for dual firmware version

10 Remote Web Server option

10.1 IP Connection

Westell Signal Boosters use an Ethernet module and 3G Router to give TCP/IP connectivity (webserver and SNMP Agent). In local mode, user can connect directly a computer to the Ethernet module using the inside Ethernet cable.

In order to access to web browser, default IP addresses of Ethernet module are detailed in the next table:

IP Address	192.168.1.10	IP Address
Network submask	255.255.255.0	Network submask
Gateway	192.168.1.2	Gateway





Computer network adapter configuration needs to be set to same network submask and gateway. IP address can take any value in this IP range (192.168.1.11, for instance). These addresses can be changed by user.

10.2 Web pages description

Once the Ethernet module is properly configured, user can connect to the Signal Booster, writing IP address in URL toolbar of any web browser available in its computer. Default URL is http://192.168.1.10.

First screen to appear is Authentication. Default login and password are:

Login	admin	Login
Password	admin	Password

Password can be changed by user, using menu described in next sections.

NOTE: in order to restore password, push the button placed close to USB Connector during 5 seconds.



After authentication, web browser will load the main page of Westell Signal Booster showing RF configuration and monitoring parameters.





		DIG	ITAL B	BDA				
-	U.	PLINK	-		DOW	NLINK)		_
	Squelch Threshold -100 dBr Main Gain 80 dB	Enable ON -30.0 dBm		Squelch Threshold Main Gain Power Limit	-80 dBm 80 dB	Enable ON Power	20.0 dBm	
	Overload UL All Filters Same BW	PA Status		Overload DL All Filters Same BW		VSWR To	AGC Fail Power Low	
FUTE	Overload UL All Filters Same BW	Linked UL/DL YES Y Frequencies YES Y Temperature 35.5 Show filters (1-16) # # # Show filters (17-32)	Squeich PC Rx Pawe	Overload DL All Filters Same BW Mode Not Linked V	RESET HW Fail		AGC Fall Power Low	
FILTES Nr. On	Overload UL All Filters Same BW	Linked UL/DL YES Y Frequencies YES Y Temperature 35.5 Show filters (1-16) # # Show filters (17-32) UPLINK FILTERING Power IN dBm Det Power OUT dBm	Squeich PC Rx Pawe	Overload DL All Filters Same BW Mode Not Linked V r Low	RESET HW Fail DOWN (dB) Power IN	VSWR Ty	AGC Fail Power Low	dB
FILTER Nr. On 1 V	Overload UL All Filters Same BW Fc (MHz) BW (KHz) G (dB) 382.006250 BOX V G	Linked UL/DL YES Y Frequencies YES Y Temperature 35.5 Show filters (1-16) # # # Show filters (1-732) UPLINK FILTERING Power IN dBm Det Power OUT dBm -117.437.4	Squelch PC Rx Pawe P P AGC dB 0.0	Overload DL All Filters Same BW Mode Not Linked V r Low	RESET HW Fail DOWN (d8) Power IN	VSWR To LINK FILTERING dfm Det Bower OUT -113.9	AGC Fail Power Low dBm AGC -33.9	d8 0.0
FILTER No. On 1 ¥ 2 ¥	Overload UL All Filters Same BW Fc. (MHz) BW (KHz) G (dB) 582.006250 90K V 0 382.100000 PDK V 0	PA Status Linked UL/DL YES Y Frequencies YES Y Temperature 35.5 Show filters (1-16) Ø Ø Ø Show filters (17-32) UPLINK FILTERING Pavver IN dem Dat Power DUT dem -117.437.4	Squelch I PC Rx Pawe P P AGC dB 0.0 0.0	Overload DL All Filters Same BW Mode Not Linked ▼ r Low Fc. (MHz) BW (KHz) G BW (KHz) G 392.006250 BOK ▼ 392.100000 BOK ▼	RESET HW Fail DOWN (d8) Power IN 0	VSWR To NUNK FILTERING dBm Det Power DUT -113.9	AGC Fail Power Low dam AGC -33.9	d8 0.0 0.0
FILTEF Nr. On 1 4 2 4 3 4	Overload UL All Filters Same BW Fc. (MHz) BW (KHz) G (dB) B2.006250 00K ▼ 0 B21.00000 00K ▼ 0 B2.199750 00K ▼ 0	PA Status Linked UL/DL YES T Frequencies YES T Show filters (1-16) 7 7 7 Show filters (1-732) UPLINK FILTERING Power IN dBm Dat Power OUT dBm 117.437.4 -117.737.7	Squetch PC Rx Pave AGC dB 0.0 0.0 0.0	Overload DL All Filters Same BW Mode Not Linked ▼ r Low Fr. (MHz) BW (KHz) G 392.06255 90K ▼ 392.100000 992.193750 90K ▼	RESET HW Fail DOWN (dB) Power IN 0 0	USWR To USWR To UINK FILTERING dBm Det Power DUT -113.9 -115.3 -114.8	AGC Fail Power Low dBm AGC -33.9 -35.3 -34.8	dB 0.0 0.0 0.0
FILTEF Nr. on 1 & 3 & 4 &	Dverload UL All Filters Same BW Fe. (MHz) BW (KHz) S (d8) B82.005250 90K V 0 B82.100000 90K V 0 B82.100000 90K V 0 B82.00000 90K V 0 B82.100000 90K V 0 B82.00000 90K V 0	PA Status Linked UL/DL Frequencies YES * Temperature 35.5 Show filters (11-6) * Show filters (17-32) * UPLINK FILTERING * Payar IN dBm -117.7 -37.4 -117.7 -37.7 -117.7 -37.7 -117.7 -37.7 -117.0 -37.0	Squetch PC Rx Pave AGC dB 0.0 0.0 0.0 0.0	Overload DL All Filters Same BW Hode Not Linked ▼ Fc. (MHz) BW (KHz) G 392.006255 90K. ▼ 392.100000 90K. ▼ 392.100000 90K. ▼ 392.000000 90K. ▼	RESET HW Fail (dB) Power 10 0 0	USWR D3	AGC Fail Power Low dBm AGC -33.9 -35.3 -34.8 20.0	de 0.0 0.0 0.0 0.0 0.0

At left side of webpage, configuration menus are shown:

Content

- Status: whole RF configuration and monitoring parameters are shown. These parameters are described in the next section.
- Tag: user can set a tag to ease Signal Booster identification. For modifying the TAG, write a new value in text field and click over Apply Changes link







• IP: At this page, Signal Booster IP address, network submask, gateway address and IP addresses of SNMP Managers are shown. User can set addresses of two SNMP Managers (IP where SNMP agent will send TRAP information). To modify, click over Apply Changes link after writing new values on text fields.

WESTELL						
Content Status Tag Spectrum	IP SETTING	5				
Date & Time Filter Info	IP ADDRESS	192	168	. 1	. 10	
Filter Tool	NET MASK	255	255	. 255	. 0	
	GATEWAY	192	168	. 1	. 2	
	SNMP Manager 1	192 .	168	. 1	. 15	
	SNMP Manager 2	192 .	168	. 1	. 15	
Configuration Apply Changes Reload Settings	MODEM IP A	DDR	ESS			,
	Modem-router IP	0	.] 0	. 0	. 0	

In case the Signal Booster had been fit with an internal modem-router, its own IP address settings would be fixed and the modem's address would be shown in the greyed boxes.

• Spectrum: this page shows estimation for input and output spectrum in either DL or UL, whatever is selected by the user. Estimation for output spectrum takes into account RF input levels, and gain, bandwidth filters and squelch options programmed by the user, and it can be a useful tool for users to know how the undesired signals are rejected by the channel selective Signal Booster.

The user can change start and stop frequency modifying text fields placed at the page bottom. Minimum span is 200KHz and maximum span is the band covered by the Signal Booster. In case the same frequency is set for both start and stop, then zero-span is set. For user convenience, a zero-span checkbox is available that makes that operation with one click, and chooses the start frequency setting as the measurement frequency. That also disables the stop frequency setting and changes it according to start frequency. And finally, measurements can be averaged up to 32 times.







• Date and Time: page to modify real time clock. When the Signal Booster is not powered, this clock runs with a voltage supply provided by a 3V lithium battery, button type of 20mm (CR2032) with 220mA·h. This suffices for at least half year. When the Signal Booster is powered, no current is drained from the battery. So, actual battery life will depend on Signal Booster usage. For battery replacement, please locate battery holder between USB and Ethernet connectors on main board. Battery positive side is UP, i.e. on holder clip.

WEBTEL	
Content Status Tg IP Spectrum Date & Time Filter Info Filter Tool	SUPERVISION SYSTEM TIME Current Time: Tue, 27 Feb 2018 12:47:38
Configuration Apply Changes Reload Settings	YEAR 2018 MONTH 2 DAY 27 HOUR 12 MINUTES 47 SECONDS 38

Date and time setting





After clicking on "Apply Changes" link, next message will appear, warning the user that system needs to be rebooted.



• Filter Info: following this link, a new window appears with detailed information of frequency and delay response of all available filter bandwidths (1dB, 3dB and 10dB bandwidths and delay at center frequency)



• Filter tool: assistant to easily configure signal booster filters with minimum delay response (all filters set to 90KHz bandwidth). It is especially useful if carriers are grouped in "frequency packets" where it is not possible to configure an independent filter for each one. With this tool filtering parameters are automatically set from a desired frequency carriers list. This tool executes in a pop-up window as the image below and is described in next sections:





<i>@</i>		
	Carrier Frequency List	
	Enter downlink frequencies in MHZ separated by spaces	
	^	
	✓	
	Compute Configuration Proposal	

The desired carrier frequencies of the downlink band, are to be typed in the text area of this window expressed in MHz. The tool will try to enable as many filters of 90KHz bandwidth as necessary for all carriers, using a fine gain of 0dB by default. This is trivial when carrier frequencies are sufficiently separated apart. For instance:

Signal Booster	Reiresa	
		×
WEBTELL		1
	Carrier Frequency List	
Content	Enter downlink frequencies in MHz separated by spaces	
Status	392 393 394	
Tag		
Spectrum		
Date & Time		4 dBm
Filter Tool	Compute Configuration Proposal	AGC Fail
		wer Low
	Filter Proposal	
and the second se	Filter Bandwdith: 90 KHz	
nfiguration ply Changes	Single filter 1: 392 MHz	
ad Settings	Single filter 3: 394 MHz	
ETI		
Version		Pm 400 48
FW: 28.05-28] 1	Apply Proposal	4.0 0.0
[SW: 6.03] [HW: 1C] 2		4.4 0.0
[WEB: 4.2.0] HTTP: 5.01.02]		0.4 0.0
SN: 16030309]		5.9 0.0
©2018 5		16.3 0.0
N/		





The button "Compute Configuration Proposal" shows the computed filter frequencies in another text area and, if accepted, the button "Apply Proposal" would actually perform the configuration change.

However, for carrier frequencies that come in packets, the filter frequencies should not be set too close because the overall response would be distorted. Depending upon signal modulation, that response distortion might not have any consequence. But in the case that distortion cannot be tolerated, consider that the minimum frequency separation between two filters to avoid this problem is 1.25 times the semi-sum of their bandwidths. For instance, two filters width bandwidths 90KHz and 30KHz respectively, must be separated apart by $1.25 \cdot (90 + 30) / 2 = 75$ KHz.

Nevertheless, there are certain conditions under which filters can be set closer to make up a single filter with wider bandwidth:

- The frequency separation must be 93.75 KHz.
- o All of them must have the same bandwidth setting of 90 KHz.
- All of them must have the same fine gain setting.

The Filter Info window shows the frequency response of the combination of up to five filters:







Now, consider for instance a case with the following downlink carrier frequencies: 392.0, 392.05, 392.1, 392.15, 392.2, 393.0 and 394.0 MHz. This is when the Filter Tool comes in handy. It will automatically choose the filters required to cover the range between 392.0 MHz and 392.2 MHz. As shown in next picture, it would set three filters with frequencies 392.00625 MHz, 392.1 MHz and 392.19375 MHz for the four carriers in the packet, and two more filters for the two separated carriers.





		- 0
e <u>A</u> bout		
Scan devices Disconnect	Refresh	
OM3 - Signal Booster		×
		12:37:14
WATERS THE	Carrier Frequency List	
All and a second se	Enter downlink frequencies in MHz separated by spaces	
Status	392 392.05 392.1 392.15 392.2 393 394	
Tag		
IP Spectrum		
Date & Time		
Filter Tool	Compute Configuration Proposal	5 dBm AGC Fail
		wer Low
	Filter Proposal	
A CONTRACTOR OF	Filter Bandwdith: 90 KHz	
Configuration	Group filter 1: 392.00625 392.1 392.19375 MHz	
Reload Settings	Single filter 1: 393 MHz Single filter 2: 394 MHz	
V		
FIL		
Version Nr.		Bm AGC dB
[FW: 28.05-28] 1	Apply Proposal	0.5 0.0
[SW: 6.03] [HW: 1C] 2		4.6 0.0
[HTTP: 5.01.02] 3		16.4 0.0
[SN: 16030309] 4		6.3 0.0
©2018		
WESTELL		

It is certainly possible to do this same operation manually, in the Filter Control Frame, although it would be less convenient. Should the user set filters without keeping these rules, the software would show a warning message, as in the following image:





Stan devices Disconnect Refresh COM3 - Signal Booster DIGITAL BDA Temperature 32,9 °C RX Power Low HW Fail Show filters (1-16) ✓ ✓ ✓ ✓ ✓ FILTER DOWNLINK FILTERING DOWNLINK FILTERING	12:5
COM3 - Signal Booster	12:
Content Temperature 32.9 °C Rx Power Low HW Fail Status Show filters (1-16) V V 0	12:
Content Temperature 32.9 % Rx Power Low HW Fail Status Show filters (1-16) ✓ ✓ ✓ Tag Show filters (17-32) Spectrum FILTER UPLINK FILTERING DOWNLINK FILTERING	
Content Show filters (1-16) V V V Status Show filters (1-32) Image: Content of the state o	
Status Show filters (17-32) Image: Control of the state of the sta	
IP Spectrum FILTER UPLINK FILTERING DOWNLINK FILTERING Date & Time	
Date & Time	
Filter Info Nr. On Fr. (MHz) BW (KHz) G (dB) Power IN dBm Det Power OUT dBm AGC dB Fr. (MHz) BW (KHz) G (dB) Power IN dBm Det Power OUT dBm	AGC dB
Filter Tool 1 2 391.00000 60K 2 0 -116.2 -36.2 0.0 391.00000 60K 2 0 -114.7 -34.7	0.0
2 2 381.096625 00K 🔍 0 -117.1 -37.1 0.0 391.096625 00K 🔍 0 -114.5 -34.5	0.0
3 🗹 382.000000 00K 🗹 0 🗰 -117.4 -37.4 0.0 392.00000 00K 🗹 0 = -59.7 🖌 20.3	0.0
4 🗹 383.000000 00K 🔍 0 -117.3 -37.3 0.0 393.00000 00K 🔍 0 -115.9 -35.9	0.0
Computation 5 2 384.00000 60K 2 0 -116.0 -36.0 0.0 394.00000 60K 2 0 -116.0 -36.0	0.0
Reload Settings 6 🗹 385.00000 90K 🗹 0 💶 -110.1 🔲 -30.1 💷 0.0 395.00000 90K 💟 0 💶 -116.3 -36.3	0.0
FILTER SETTINGS WARNINGS	
Version CONFLICTING FILTERS:	
[Pw: 28,05-28] Opinik Filter 1 connects with inter(s) 2 [sweared] Connects with inter(s) 2	
IMW, IC1	
RULES FOR SETTING FILTER FREQUENCIES	
As a general rule, the frequency difference between two filters must be equal or greater than 1.25 times the semi-sum of their bandwidths.	
ezona Examples. Consuler 2 medias with administration and 30 km2, and 30 km2 mediates and administration of the minimutum mediates and administration and administrat	
1) All of them must have the same bandwidth setting. 2) The bandwidth setting must be 90 KHz.	
3) All of them must have the same fine-gain setting.	

• Password (only via web connection): to modify webpage password, old password is required, and new password needs to be written two times. After clicking on "Apply Changes" link, new authentication screen appear, where user must write new password.

	×	
+ C 0	192.168.1.10	
Content Status Tag IP Spectrum Date & Time Filter Info Filter Info Filter Tool Password Somp	WEB PASSWORD CHANGE	

• SNMP (only via web connection): user can configure through webserver some SNMP parameters:





Content Status Tag P Spectrum Filter Info Filter Info Filter Sond Smp CALCONLY COMMUNITY READ-WRITE COMMUNITY WATCHDOG PERIOD (mins) ublic Private private Date & Time Filter Info Filter Sond Smp DELETE ALL TRAPS 1440 TRAP COMMUNITY TRAP PORT 1440 1440 Somp TRAP COMMUNITY TRAP REPETITION 1440 MANAGER ENABLE KEEP-ALIVE PERIOD (mins) 162 162	WEDTEL			
Tag READ-ONLY COMMUNITY public IP Spectrum READ-WRITE COMMUNITY private Spectrum WATCHDOG PERIOD (mins) 1440 Date & Time ETHERNET RESET Image: Community Filter Info Filter Tool Delete All TRAPS Password Smp Image: Community Image: Community TRAP COMMUNITY Trap trap TRAP COMMUNITY Trap 162 162 TRAP REPETITION 3 3 3 Apply Changes KEEP-ALIVE PERIOD (mins) 60 60	Content	SNMP COMMUNITI	ES	
IP READ-WRITE COMMUNITY private Spectrum WATCHDOG PERIOD (mins) 1440 Date & Time ETHERNET RESET Image: Community Filter Info Filter Tool Delete All TRAPS Image: Community Password Snmp Image: Community TRAP COMMUNITY Image: Community TRAP COMMUNITY trap trap trap TRAP REPETITION 3 3 Apply Changes KEEP-ALIVE PERIOD (mins) 60 60	Tag	READ-ONLY COMMUNITY	public	
Spectrum WATCHDOG PERIOD (mins) 1440 Date & Time ETHERNET RESET Image: Configuration Filter Tool Password Image: Configuration Apply Changes Reload Settings MANAGER ENABLE Image: Configuration Apply Changes KEEP-ALIVE PERIOD (mins) 60 60	IP	READ-WRITE COMMUNITY	private	
Filter Info ETHERNET RESET Filter Tool DELETE ALL TRAPS Password Image: Configuration Configuration Manages enable Apply Changes Manages enable Reload Settings KEEP-ALLVE PERIOD (mins)	Date & Time	WATCHDOG PERIOD (mins)	1440	
Filter Tool Password Snmp DELETE ALL TRAPS Configuration Apply Changes Reload Settings MANAGER I	Filter Info	ETHERNET RESET		
Password Snmp TRAP COMMUNITY TRAP PORT TRAP PORT TRAP REPETITION Apply Changes Reload Settings	Filter Tool	DELETE ALL TRAPS		
MANAGER 1 MANAGER 1 TRAP COMMUNITY trap trap trap TRAP PORT 162 162 162 TRAP REPETITION 3 Apply Changes MANAGER ENABLE KEEP-ALIVE PERIOD (mins) 60	Password			
TRAP COMMUNITY trap trap TRAP PORT 162 162 TRAP REPETITION 3 3 Apply Changes Reload Settings MANAGER ENABLE Image: Comparison of the second	Simp		MANAGER 1	MANAGER 2
Configuration TRAP PORT 162 162 Apply Changes Reload Settings MANAGER ENABLE Image: Configuration of the set				
Configuration 3 3 Apply Changes MANAGER ENABLE Image: Configuration Reload Settings KEEP-ALIVE PERIOD (mins) 60		TRAP COMMUNITY	trap	trap
Apply Changes Reload Settings		TRAP COMMUNITY TRAP PORT	trap 162	trap 162
Reload Settings KEEP-ALIVE PERIOD (mins) 60 60		TRAP COMMUNITY TRAP PORT TRAP REPETITION	trap 162 3	trap 162 3
	Configuration	TRAP COMMUNITY TRAP PORT TRAP REPETITION MANAGER ENABLE	trap 162 3	trap 162 3
	Configuration Apply Changes Reload Settings	TRAP COMMUNITY TRAP PORT TRAP REPETITION MANAGER ENABLE KEEP-ALIVE PERIOD (mins)	trap 162 3 €	trap 162 3 €0
	Configuration Apply Changes Reload Settings	TRAP COMMUNITY TRAP PORT TRAP REPETITION MANAGER ENABLE KEEP-ALIVE PERIOD (mins)	trap 162 3 60	trap 162 3 €0

- Read-only community and read-write community: set passwords for SNMP agent (typically "public" / "private")
- Watchdog Period: time in minutes without external IP access to the device (HTTP, SNMP or PING) after which the embedded Ethernet module will reboot just in case it were stuck. It does not affect RF functioning. Default value is 1440 minutes, i.e. one day.
- o Ethernet RESET: resets Ethernet module.
- Delete All Traps: clear all alarm conditions and sets trap counter to zero
- Trap community: set trap community for each connection to SNMP Manager
- Trap port: set UDP port for SNMP trap sending. Default standard port is 162. SNMP polling is done through standard port nr. 161.
- Trap repetition: set number of traps that SNMP agent will send every time that alarm conditions vary. Maximum number is five repetitions and the time lapse between them is 10 seconds.
- Manager Enable: enables each connection to SNMP Manager independently. If enabled, traps will be sent to manager IP address set in IP section.
- Keep-Alive period: Keep-Alive traps can be sent periodically with the purpose of letting the SNMP manager know that the agent is working. The time in minutes between these traps is the Keep-Alive period. Default period is 60 minutes. A setting o 0 disables sending these traps. These traps are not affected by the Trap Repetition mentioned before.
- Configuration
 - Apply Changes: as it is said above, this link is used to load changes to the Signal Booster, in configuration, tag, IP, password and date and time menus. After any configuration change, web page will show and icon that allows user to know if configuration has been successfully applied:









- Reload Settings: clicking this link, Signal Booster configuration data is refreshed.
- Version: shows hardware, firmware and software versions of Signal Booster and serial number.

11 RF parameters description

"Status" menu shows whole RF configuration and monitoring data that are distributed along the webpage.

The status window is divided in two main blocks: general control and filtering control. First, general control contains signal booster main configuration parameters, while second block is a list with variable number of rows (according to number of enabled filters) which contains detailed configuration and monitoring parameters of each filter. Maximum number of filters is 32 for narrow filters version and 8 for adjustable bandwidth version



General control frame for narrow-band version





	UPLINK		DOWNLINK	
INPUT	OUTPUT	INPUT	OUTPUT	
Squelch Threshold 95 dBm Main Gain 80 dB Power Limit 24 dBm Overload UL	Enable ON Power OFF dBm PA Status O	Squelch Threshold -60 dBm Main Gain 60 dB Power Limit 27 dBm Overload DL	Enable ON OFF dbm Power OFF dbm Comm. Error O AGC Fail O VSWR Tx Power Low O	
Uverioad UL Verioad UL Linked UL/DL YES Frequencies Squelch Mode Not Linked RESET Temperature 48.5 °C Rx Power Low HW Fail Show filters (1-8) Y				

General control frame for adjustable bandwidth version

U	PLINK		DOWNLINK	
INPUT	ОИТРИТ	INPUT	OUTPUT	
Squelch 🗸		Squelch 🗸		
Threshold -100 dBr		Threshold -80	dBm Enable ON	
Main Gain 80 dB	Enable ON	Main Gain 80	dB Power -125.9 dBm	
Power Limit 24 dBr	Power -125.9 dBm	Power Limit 37	dBm Comm. Error O AGC Fail O	
Overload UL 🛛 🔍		Overload DL 🔍	VSWR 🔍 Tx Power Low 🔾	
All Filters Same BW 🖌		All Filters Same BW 🗸		
Linked UL/DL YES Squelch Mode Not Linked V ASSET 32 Narrow filters				
Temperature 47.0 °C Rx Power Low HW Fail 8 Adjustable filters				
Show filters (1-16) 🗹 🔹 🔹 🔹 🔹 🔹 🔹 🔹 🔹 🔹				
	Show filters (17-32)			

General control frame for dual version

• General control frame. There are four sub-sections inside this frame:

UPLINK				
INPUT		ОUТРИТ		
Squelch				
Threshold	-100 dBn			
Main Gain	80 dB	Enable ON		
Power Limit	18 dBn	PA Status		
Overload UL	\odot			
All Filters Same BW				

 Main uplink control: RF main parameters regarding to uplink band are contained in this section: gain, output power limit, squelch threshold, squelch enable, PA enable control, RF output power indicator, and RF input overload, PA status and stability alarms. Next table describes information of this frame:

Uplink frame

Parameter	Description





	1
Main Gain	Set maximum gain of Signal Booster at UL band. Range can vary between models.
Power Limit	Set maximum output power of Signal Booster at UL band. System automatically will apply a correction to share this limit between the active channels. For instance, +18dBm band limit means +12dBm maximum output power per channels for 4 active channels. Range can vary between models depending on rated power.
Squelch Enable	Enabling this control, Signal Booster does not transmit in each channel if RF input power do not exceed the threshold level configured according to next row
Squelch Threshold	If squelch is enabled, input levels below this threshold are not transmitted.
PA Enable	This control enables / disables PA UL: Green button and label "ON" means that PA is enabled, red button and label "OFF" means that PA is disabled
RF Output Power	Shows instantaneous RF output power at UL band
Overload UL	This alarm indicates that Signal Booster is being overloaded at UL band, due to very high RF input level
PA Status	PA status alarm indication based on current consumption
All Filters Same BW	If enabled, any change of bandwidth filter of any enabled filter will be applied to all UL filters



• Main downlink control: parameters regarding to downlink band. They are almost equal to uplink band.





Downlink frame

Parameter	Description
Main Gain	Set maximum gain of Signal Booster at DL band. Range can vary between models.
Power Limit	Set maximum output power of Signal Booster at DL band. System automatically will apply a correction to share this limit between the active channels. For instance, +36dBm band limit means +30dBm maximum output power per channels for 4 active channels. Range can vary between models depending on rated power.
Squelch Enable	Enabling this control, Signal Booster does not transmit in each channel if RF input power do not exceed the threshold level configured according to next row.
Squelch Threshold	If squelch is enabled, input levels below this threshold are not transmitted.
PA Enable	This control enables / disables PA DL: Green button and label "ON" means that PA is enabled, red button and label "OFF" means that PA is disabled
RF output power	Shows instantaneous RF output power at DL band
Overload DL	This alarm indicates that Signal Booster is being overloaded at DL band, due to very high RF input level
Comm. Error	Indicates that communication with monitoring PA Board is lost. In this case, following three alarms will not be available
AGC Fail	This alarms appear if output power is higher than maximum output power (typical +37dBm) plus 3dB.
VSWR	Alarm appears if high reflected power is detected in "To mobile" connector
Tx Power Low	Indicates that measured output power at PA output is lower than expected according to RF input levels and configured gains





Linked UL/DL Frequencies	YES	Squelch Mode Not Linked 🗸	RESET	Simplex Mode
Temperature 📒	32.1 °C	Rx Power Low	HW Fail 🔍	
	Show filters (1-16)			
	Show filters (17-32	2)		
Linked UL/DL Frequencies	YES 🗸	Squelch Mode Not Linked 🗸	RESET	32 Narrow filters
Temperature	49.4 °C	Rx Power Low	HW Fail 🕓	8 Adjustable filters 🗹
	Show filters (1-8) 🗸 🗸 🗸 🖉 🗌 🗌	Center/Bandwid	th



o General control

Parameter	Description
Linked UL/DL frequencies	If 'Yes' then frequency setting in DL will also modify UL according to frequency band split preset in factory. If 'No' then filter frequencies can be set independently in UL and DL.
Squelch mode control	If this control is set to "Linked", DL channels without input signal (according to DL Squelch threshold) automatically squelch related UL channels
RESET	Reboots digital signal processor
Simplex Mode (only available in some narrow filters versions)	If enabled, signal booster works in simplex mode. This is, any DL signal detected in any DL enabled filter blocks all UL filters and any UL signal detected in any UL enabled filter blocks all DL filters
Temperature	Shows internal Signal Booster temperature
Rx Power Low	Alarm is active, if signal is not detected in any DL channel
Hardware fail alarm	Indicates critical malfunctioning in digital signal processor
Show filters	



Firmware selection (only for dual version)	User can change filtering mode in case of dual version signal booster
--	---

Simplex mode checkbox control is only visible in devices with such capability. It allows signal flow only in one direction, either uplink or downlink, at any given time. The chosen direction is made automatically based on signal detection which, in turn, depends on squelch. Therefore, turning on simplex mode automatically turns on squelch, both in uplink and downlink sections, and disables these controls for the user. Besides, it also sets squelch mode to "Not Linked" and disables this control, too. This is necessary since otherwise the lack of RF input signal in downlink would mute the uplink RF input, thus blocking all communication. The look of the general control frame in simplex mode is as in next image:



Filter control frame for narrow-band version

• Filtering control frame.





FILTER	UPLINK FILTERING	DOWNLINK FILTERING
Nr. On	Fr. (MHz) BW (KHz) G (dB) Power IN dBm Det Power OUT dBm AGC dB	Fr. (MHz) BW (KHz) G (dB) Power IN dBm Det Power OUT dBm AGC dB
1 🖌	380.000000 90K ▼ 0 ■ -117.0 ○ ■ -37.0 ■ 0.0	390.000000 90K ▼ 0 ■ -115.2 0 ■ -35.2 ■ 0.0
2 🖌	381.000000 POK V 0 -117.3 · -37.3 0.0	391.000000 90K V 0 -114.4 · -34.4 0.0
з 🖌	382.000000 POK V 0 -117.5 · -37.5 0.0	392.000000 POK V 0 -59.6 • 20.4 0.0
4 🖌	383.000000 90K ▼ 0 -117.0 · -37.0 0.0	393.000000 POK V 0 -115.8 · -35.8 0.0
5 🗸	384.000000 POK V 0 -115.7 · -35.7 0.0	394.000000 90K V 0 -116.3 · -36.3 0.0
6 🖌	385.000000 90K ▼ 0 -109.5 -29.5 0.0	395.000000 ₽0K ▼ 0 ■ -115.6 · ■ -35.6 ■ 0.0

Filter control frame for narrow-band version

FILTER	UPLINK FILTERING	DOWNLINK FILTERING
Nr. On	Fr. (MHz) BW (MHz) G (dB) Power IN dBm Det Power OUT dBm AGC dB	Fr. (MHz) BW (MHz) G (dB) Power IN dBm Det Power OUT dBm AGC dB
1 🗹	412.500 0.100 0 -108.2 0 -28.2 0.0	422.500 0.100 0 97.5 • 17.5 0.0
2 🖌	411.500 0.750 0 -102.7 • -22.7 0.0	421.500 0.750 0 -91.1 • -11.1 0.0
з 🗸	410.500 0.500 0 -103.9 -23.9 0.0	420.500 0.500 0 -92.4 • -12.4 0.0
4 🗹	414.100 1.000 0 -101.5 • -21.5 0.0	424.100 1.000 0 -89.5 • -9.5 0.0

Filter control frame for adjustable bandwidth version

• Filter control frame: shows configuration and monitoring information of all filters. The frame is divided in two: uplink and downlink. Data showed in each half is symmetric.

Parameter	Description
On	Allows to enable/disable each filter
Frequency	Configures center frequency of each filter
Bandwidth filter control for narrow-band version only	There are up to five available filters (depending on factory setup) to adjust the trade-off between rejection to undesired signals and delay
Fine gain control	Each channel gain can be fine adjusted
RF input power	Shows RF input level for each channel
Signal detection	With this indicator, system shows if signal is detected at input, according to squelch threshold. Moreover, with Squelch Mode = 'Linked', UL shows no signal if signal is not detected in the same DL channel even if UL signal exceed squelch threshold. Similarly, with simplex mode enabled, if one signal is detected at DL band, all UL filters will show "No signal"

Filter control frame



1.877.844.4274



RF output power	Shows estimation for RF output level for each channel, according to programmed gain and AGC control. Shows 'OFF' in the same cases that signal detection shows 'No signal'
AGC	Indicates gain reduction due to power limitation control.

In case of adjustable filter version, filter control frame is slightly different. According to entry mode button, frequency and bandwidth parameter configuration can be:

- o Center frequency (in 25KHz steps) and bandwidth filters (50KHz steps)
- Start and stop frequencies (in 25KHz steps)







12 Spectrum Analyzer

The spectrum analyzer feature of the Signal Booster is a useful tool for commissioning and troubleshooting. This section explains how to use it.



Spectrum analyzer settings

Input and output signals are scanned successively and can be shown or hidden independently:

Spectrum input/output selection



_ WESTELL.COM

July 2018; Doc No. UHF Signal Booster UM RA Page 75 of 95





Either uplink or downlink signal paths are chosen and average up to 32 can help to clean noise signals. Resolution bandwidth and sweep time are set automatically.

Spectrum UL / DL selection

When start and stop frequencies are set equal, then zero-span mode is activated to show evolution of signals with time, which may be of special interest with pulsed signals. The same thing can be achieved by setting the zero-span checkbox, with the convenience that start frequency change would also change stop frequency accordingly.



Spectrum zero-span mode

Resolution bandwidth becomes enabled in zero-span mode and sweep time is automatically set according to its setting, which is user selectable between 25.000Hz, 12.500Hz, 6.250Hz and 3.125Hz. Average setting will also impact sweep time in a similar way.







Zero span settings





13 SNMP Agent

Westell Signal Booster includes a SNMPv1 agent that allows user to supervise the device by means of 'SET' and 'GET' type commands and, asynchronous traps to notify alarm conditions can be sent. The device is intended to be monitored by a polling NMS but it can send traps to a NMS or Trap Receiver if enabled. Westell can provide a NMS system upon request.

The following sections will show the user configurable, relevant information that can be read via SNMP from the device. The tables will describe these values in order to explain how the information has to be read and interpreted.

MIB Description

The associated MIB document is WESTELL-BDA-SYSTEMv13-MIB.mib. The Westell MIB is divided into blocks. Each block describes the characteristics and values of a specific element but not all elements are implemented in this agent. Each MIB block is divided in two segments, named 1T and 2T. Segment 1T contains the information that is fixed & read only. Segment 2T has the information that can vary over time, regardless of it being read/only or read/write.

The following sections will show the user configurable, relevant information that can be read via SNMP from the device.

Manager

This is a table with 2 consecutive elements, one for each NMS. No checking is done of the validity of the information stored in the table, so extra care must be taken by the user.

Field Name	OID	Description	Туре
Man2TAddress[0]	1.3.6.1.4.1.26355.2.50.3.2.1.2. 0	First NMS Address	R/W
Man2TAddress[1]	1.3.6.1.4.1.26355.2.50.3.2.1.2. 1	Second NMS Address	R/W

SNMP Managers table





Man2TPort[0]	1.3.6.1.4.1.26355.2.50.3.2.1.3. 0	First NMS Port where to send traps	R/W
Man2TPort[1]	1.3.6.1.4.1.26355.2.50.3.2.1.3. 1	Second NMS Port where to send traps	R/W
Man2TEnable[0]	1.3.6.1.4.1.26355.2.50.3.2.1.5. 0	First NMS. 1= Enabled, 2=Disabled	R/W
Man2TEnable[1]	1.3.6.1.4.1.26355.2.50.3.2.1.5. 1	Second NMS. 1= Enabled, 2=Disabled.	R/W
Man2TAliveNotificationPeri od[0]	1.3.6.1.4.1.26355.2.50.3.2.1.6. 0	First NMS. If enabled in Man2TEnable, defined time between keep-alive traps.	R/W
Man2TAliveNotificationPeri od[1]	1.3.6.1.4.1.26355.2.50.3.2.1.6. 1	Second NMS. If enabled in Man2TEnable, defined time between keep-alive traps.	R/W

The following MIB tree representation shows this table:





SNMP Managers table



Tools	hde2						
Dashboard	DUAS	zcn bua.mana	ger				
Agents		DESCRIPTION	SETTINGS				
and a sublik	Index	id	Address	Port	Community	Enable	Alive Notification Peri
	0	manager1	172.18.21.19	162	🖋 trap	🖋 enable	€ 60
iodule audit da32ch	. 1	manager2	a 172 18 21 19		🖋 trap	🖋 enable	
bda	*						
≽ alarms							
🕨 manager							
network							

The following picture shows the same table as seen by the Westell NMS:

NMS: SNMP Managers table

Network

This is a table has just one element with two items. The first one is the device's IP address and it is read-only to avoid unwanted miss-configuration. This can only be changed by means of the embedded web server or locally, through USB, by means of the Westell Control Software. The second item is a "kind" of button intended for resetting the embedded Ethernet hardware interface.

SNMP Network table

Field Name	OID	Description	Туре
Net2Tlp[0]	1.3.6.1.4.1.26355.2.50.4.2.1.2. 0	IP address	R/O
Net2TResetNetwork[0]	1.3.6.1.4.1.26355.2.50.4.2.1.3. 0	Network reset: reads as <i>idle</i> (1), sets to <i>reset</i> (2)	R/W





The following MIB tree representation shows this table and following there is the NMS view:



SNMP Network table





Device

This is also a one element table, providing several informative fields, but only relevant and implemented one is the "Location" field, which allows to easily identify a device by a name provided by the user, usually related to the place where it is located.





SNMP Device table

Field Name	OID	Description	Туре
Dev2TPowerOn[0]	1.3.6.1.4.1.26355.2.50.5.2.1.2. 0	-	R/W
Dev2TLocation[0]	1.3.6.1.4.1.26355.2.50.5.2.1.3. 0	String with up to 30 characters	R/W
Dev2TConnectionStatus[0]	1.3.6.1.4.1.26355.2.50.5.2.1.4. 0	-	R/O
Dev2TMainPowerStatus[0]	1.3.6.1.4.1.26355.2.50.5.2.1.5. 0	-	R/O
Dev2TBatteryStatus[0]	1.3.6.1.4.1.26355.2.50.5.2.1.6. 0	-	R/O
Dev2TIsolationStatus[0]	1.3.6.1.4.1.26355.2.50.5.2.1.7. 0	-	R/O
Dev2TDoorStatus[0]	1.3.6.1.4.1.26355.2.50.5.2.1.8. 0	-	R/O

MIB tree view:





SNMP MIBs		Result Table	172.1	8.21.11 - d	ev2Table ×	
MIB Tree	^	PRotate	1	Refresh	Export	Poll
Modules Reducts					1	
hdaSariac		dev2TIndex		0		
6o390		dev2TPowerOn		on	199	
dbda001		dev2TLocation		MASTER FI	PLEX	
bdaSustem		dev2TConnectionS	tatus	connected	1	
E conformance		dev2TMainPowerS	tatus	line		
notification		dev2TBatteryStatu	JS	ok		
manager		dev2TIsolationStat	tus	ok		
in an ager		dev2TDoorStatus		dosed		
ev2TPowerOn ev2TConnectionStatus ev2TConnectionStatus ev2TCainPowerStatus ev2TEatteryStatus ev2TEsolationStatus ev2TEsolationStatus ev2TCoorStatus						
squelch attenuator agc amplifier dev2TLocation	~					
Image: Second	~					

SNMP Device table

The Westell NMS view shows this table under the tab named "info":

MU	120							i.	·• ¢\$• ē•
🗲 Tools	bda	32ch bda.info							
🚳 Dashboard		DESCRIPTION 🗄	STATUS			-		SETTINGS	
	Index	ld	Connection	Main Power	Battery	Isolation	Door	Location	Power On
	0	FiplexBDA32ch	connected	📀 line	Øok	🕑 ok	오 close	🖋 BDA FIPLEX	🖋 on
Module audit									•
da32ch	Ĩ								
📒 bda	×								

NMS: SNMP Device table

Additional information is shown by clicking on the link named "Description". This extra piece of information comes from the fixed table, Dev1Table. The most relevant items in this table are the following ones:





SNMP Device Group table

Field Name	OID	Description	Туре
Dev1TGroup[0]	1.3.6.1.4.1.26355.2.50.5.1.1.3. 0	das.info (conformance group)	R/O
Dev1TurlExtern[0]	1.3.6.1.4.1.26355.2.50.5.1.1.1 9.0	URL of embedded web server	R/O

Alarms

Alarms tables provide information regarding the status of key parts in the system. The fixed table *gralAlarm1Table* provides self-explanatory identifiers, *gralAlarm1Tld*, for each relevant subject. The second item in each element of this table is the *gralAlarm1TGroup*. When the device being monitored is a Remote unit, this item just takes the value '*das.alarms*'. However, since the Master unit carries information from all the devices in the whole DAS system, it provides a different value for each device to which the alarm is assigned to, be it the Master unit, any of the Remote units or any of the Expansion units. Therefore, the actual number of elements in this table for the Master unit, depends on how many devices compose the DAS system. The third item of each element, *gralAlarm1TDescription*, is left blank, since the first one suffices for that purpose.

SNMP	Alarm	Group	table

Field Name	OID	Description	Туре
GralAlarm1Tld[0]	1.3.6.1.4.1.26355.2.50.13.1.1. 2.0	Descriptive identifier string	R/O
GralAlarm1TGroup[0]	1.3.6.1.4.1.26355.2.50.13.1.1. 3.0	Conformance group for general alarms	R/O
GralAlarm1TDescription[0]	1.3.6.1.4.1.26355.2.50.13.1.1. 4.0	-	R/O





The alarm identifiers available are the following ones:

- *AlarmGeneralFail* Board malfunction that cannot be determined.
- *AlarmHwFail* Digital signal processor failure.
- AlarmRxLow No input signal is detected in the downlink direction in any of the activated filters. Aside from a faulty part, as the donor antenna or RF cable, this also might be caused be a problem with the base station or frequency configuration. Notice also that signal detection is dependent on squelch threshold setting. Because of that, this is considered a warning instead of an alarm.
- AlarmTempHigh High device temperature (over 85°C).
- *AlarmOverloadUplink* Excessive RF input signal in UL.
- AlarmOverloadDownlink Excessive RF input signal in DL.
- *AlarmTxLowDownlink* Detected RF output power much lower than expected. Since output power measurement is performed by the dedicated monitoring board, a fault in that board would make this item be set as *Unavailable* and *AlarmPAFaultDownlink* set to true.
- *AlarmTxHighDownlink* Excessive RF output power detected (3dB higher than rated). This is most likely due to bad gain settings, since AGC would limit output power otherwise.
- *AlarmPAFaultUplink* Uplink Power Amplifier failure. This alarm is available for certain amplifier types only, and for the rest an 'unavailable' status is set in the next table.
- *AlarmPAFaultDownlink* Downlink Power Amplifier failure. A communication failure with the dedicated monitoring board itself, throws this alarm, too.
- *AlarmVswr* RF mismatch of PA output is detected. Since VSWR measurement is performed by the dedicated monitoring board, a fault in that board would make this item be set as *Unavailable* and *AlarmPAFaultDownlink* set to true.





SNMP MIB	s		R	esult Table	172.	18.21.10 - gralAlarm1Table ×			
	Modules Products	^		Rotate	¢	Refresh 🔓 Export	Poll SNMP SET	Create Row Dele	te Row
	bdaSeries	1.00	-	gralAlarm 1T	Index	gralAlarm 1TId	gralAlarm 1TGroup	gralAlarm 1TDescription	Inde
	fip380		1	0		AlarmGeneralFail	bda,alarms		0
	dbda001		2	1		AlarmHwFail	bda.alarms		1
	bdaSystem		3	2		AlarmRxLow	bda.alarms		2
	the conformance		4	3		AlarmTempHigh	bda.alarms		3
			5	4		AlarmOverloadUplink	bda.alarms		4
	manager		6	5		AlarmOverloadDownlink	bda.alarms		5
	hetwork		7	6		AlarmTxLowDownlink	bda.alarms		6
			8	7		AlarmTxHighDownlink	bda.alarms		7
			9	8		AlarmPAFaultUplink	bda.alarms		8
	attenuator		10	9		AlarmPAFaultDownlink	bda.alarms		9
			11	10		AlarmVswr	bda.alarms		10
	gralAlarm gralAlarm gralAlarm in gralAla	~							
Name	gralAlarm 1Table								
OID	.1.3.6.1.4.1.26355.2.50.13.1	-1^{1}							
MTR		- 11		<					>
Syntax	SEQUENCE OF Gral Alarm 1TableEntry	-							
Access	not-accessible								
Status	current								
DefVal									
Indexes	gralAlarm1TIndex	~							
	The george contraction of the	-	_						_

SNMP Alarms Group table

On the other hand, the mutable table *gralAlarm2Table* provides the actual status of each alarm. This table has one element for each element in *gralAlarm1Table*. Each element has two items. The first one is a status identifier, *gralAlarm2TStatus*, be it 'ok', 'warning', 'fail' or 'unavailable'. The second item is a short description of the fault, mainly for human readability.

SNMP Alarm table 2

Field Name	OID	Description	Туре
GralAlarm2TStatus[0]	1.3.6.1.4.1.26355.2.50.13.2.1. 2.0	Status enumeration	R/O
GralAlarm2TEventDescriptio n[0]	1.3.6.1.4.1.26355.2.50.13.2.1. 3.0	Short descriptive string	R/O





The next picture is the MIB tree view of this table, and the Westell NMS provides a combined view of both tables and groups alarms:

Address: 172.18.21.10 v Advanced 0	ID: .1.	3.6.1.4.1.2635	5.2.50.13.2		~	Operations:	Get Next	~	Go 🕞
SNMP MIBs		esult Table	172.18.21.10 - g	ralAlarm2Table ×					
MIB Tree		PRotate	🕼 Refresh	Export Export	Poll	SNMP	SET	Create I	Row Delet
Modules Product	1 2 3 4 5 6 7 7 8 9 10 11	gralAlarm2TI 0 1 2 3 4 5 6 6 7 8 8 9 10	n gralAlarm2TS ok ok ok ok ok unavailable ok unavailable fail unavailable	GraiAlarmZTEventD HW GENERAL FAIL HW GENERAL FAIL HW FAIL - OK RX LOW DOWNLINK TEMPERATURE HIG RX OVERLOAD UPLI RX OVERLOAD UPLI RX OVERLOAD DOW TX LOW DOWNLINK TX HIGH DOWNLINK TX HIGH DOWNLINK ALAI ANTENNA VSWR HI	escription - OK (- OK H - OK INK - OK INK - OK VINLINK - (- UNAVA C - UNAVA C - UNAVA GH - UNA	OK AILABLE LABLE LABLE		Ind 0 1 2 3 4 5 6 6 7 7 8 9 10	ex Value

SNMP Alarms table

WEETELL	=			ia
¢ Tools	bda3	2ch bda.alarms		
B Dashboard				
🛢 Agents	and the second	DESCRIPTION ±	STATUS	
Data audit	Index	Id	Status	Status description
Module audit	0	AlarmGeneralFail	Øok	HW GENERAL FAIL - OK
bde32cb	1	AlarmHwFail	🕏 ok	HW FAIL - OK
bda	2	AlarmRxLow	📀 ok	RX LOW DOWNLINK - OK
boa	3	AlarmTempHigh	Øok	TEMPERATURE HIGH - OK
info	4	AlarmOverloadUplink	Øok	RX OVERLOAD UPLINK - OK
> manager	5	AlarmOverloadDownlink	🕑 ok	RX OVERLOAD DOWNLINK - OK
network	7	AlarmTxHighDownlink	Øok	TX HIGH DOWNLINK - OK
😃 dasusademo	v 8	AlarmPAFaultUplink	unavailable	PA UPLINK ALARIM - UNAVAILABLE
😃 master1	v 9	AlarmPAFaultDownlink	🛕 fail	PA DOWNLINK ALARM - FAIL
😃 master2	y 10	AlarmVswr	unavailable	ANTENNA VSWR HIGH - UNAVAILABLE
😃 remote1	~ 6	AlarmTxLowDownlink	🗇 unavailable	TX LOW DOWNLINK - UNAVAILABLE
remote2	*			

NMS: SNMP Alarms table





14 SNMP Traps

General Explanation

For any event that may set or clear an alarm in the *gralAlarm2Table*, there is a SNMP trap that may be sent by the embedded SNMP agent to the manager, if enabled. Therefore, the list of traps closely reassembles the entries in the alarms table. Furthermore, there is also a keepalive trap for letting the SNMP manager that the agent is working, in case that polling is not being done.

Each trap message has the following fields (except for the *keepAlive* trap, whose only object is the agent's IP address

- An identification number associated to the event being signaled.
- A severity indication number.
- A short string description for human readability.

The following list gathers all the available identifiers:

Source event	Description	ID
Keep-alive	System sends this trap periodically. Period is set with <i>Keep-Alive Period</i> setting of the trap manager. When this trap is thrown, the trap counter is not incremented. It is always in <i>cleared</i> state.	3
General Failure	This trap indicates that the board controller is not responding to the remote supervision system.	5
Hardware Failure	This trap indicates malfunction related the Digital Signal Processor.	6
Rx Input Low DL	Downlink input signal is not detected in any active filters.	10
Temperature	Internal repeater temperature exceeds +85°C.	11
Rx Overload UL	Uplink RF input level overload	20
Rx Overload DL	Downlink RF input level overload	21
Tx Low DL	Detected Downlink RF output power is lower than expected.	30

SNMP Trap descriptions and Enterprise Specific IDs





Source event	Description	ID
Tx High DL	Downlink RF output power too high	31
PA Fault UL	Alarm for the UL Power Amplifier if available.	40
PA Fault DL	Alarm for the DL Power Amplifier. It may be caused by communication error with PA monitoring module.	41
VSWR	Excessive DL output reflected power: antenna mismatch.	50

As it turns out from this list, there is a one-to-one relationship between events triggering traps and their notification identifiers. But the trap identifier does not tell whether the event was to trigger the alarm state or to cancel it. That is the purpose of the severity identification number in the trap message. The following table lists the severity numbers used:

SNMP Trap status binding

Severity	Description	StatusID	Trap status binding	Binding string
CRITICAL	System malfunction comes into effect	1	3	fail
WARNING	System warning comes into effect.	4	2	warning
CLEARED	System malfunction or warning is canceled.	5	1	ok
UNAVAILABLE	System state cannot be determined	6	99	unavailable

The character string attached to each trap message includes both a short event description plus a severity description such as "OK" or "FAIL". As an example, the following picture shows a snapshot of a trap receiver getting traps from a unit at address 172.18.21.10. The *time-stamp* shows time since system boot and SNMP Version is '1'. The severity is set to 'warning'.





	72.10.21.10 • Advanced [010.	. 1.3.0.1.4.1.20333.2.	30.13.2			operations. d	et ivext	CHA CO		
SNMP MIE	s	Result Table	Result Table Trap Receiver ×							
MIB Tree										
🖯] iso	.org.dod.internet.private.enterprises.	Operations	Tools							
e- Modules ⊖Products •bdaSeries		000								
		Description	Description Source Time				Severity			
	- (a) fip 380	Specific: 10; .iso.	.org.dod.internet.private.enterprises.	172.18.21.10	2018-02-28 19:09:55	28 19:09:55				
	dbda001	Coorifica 10a inc	are ded internet private enterprises	172 19 21 10	2018 02 28 10:00:44					
	bdaSystem	apecinic, 10, ilso.	org.dod.internet.privatetenterprises.	172.10.21.10	2010-02-20 19:09:44					
	contormance	Specific: 10; .iso.	.org.dod.internet.private.enterprises.	172, 18, 21, 10	2018-02-28 19:09:34					
	H notification									
	natural and the set of									
	device									
	in gewice									
	squeici									
	🖽 🤚 agc									
	amplifier									
🐵 🍊 generalInput										
	generalOutput									
	eneralOutput									
	ia - JogeneralOutput ia - JogeneralOutput if IterTaa ia - JogenalAlarm gralAlarm	A.T.								
	erralOutput filterTaa gralAlarm gralAlarm ITable	Source:	172.18.21.10 Tim	estamp: 10 minutes	: 19 seconds S	NMP Version:	L			
	B generalOutput B gen	Source: Enterprise:	172.18.21.10 Tim .iso.org.dod.internet.private.enterprises.	estamp: 10 minutes	: 19 seconds S	NMP Version:	Ĭ			
	b - generalOutput - filterTaa - graklarm ⊕ ∰ graklarm ITable - ∰ graklarm TableEntry = ∰ graklarm TableEntry	Source: Enterprise:	172.18.21.10 Tim iso.org.dod internet private enterprises.	estamp: 10 minutes	: 19 seconds S	NMP Version:	Ĩ.			
	generalOutput generalOutput generalOutput generalOutput generalOutput generalSum ITable generalSum ITable generalSum ITable generalSum ITableEntry generalSum ITableEntry generalSum ITableEntry generalSum ITableEntry generalSum ITableEntry generalSum ITableEntry	Source: Enterprise: Specific:	172.18.21.10 Tim .iso.org dod internet private.enterprises. 10	estamp: 10 minutes	: 19 seconds S	NMP Version:	1			
	b generalOUput c gralAam ⊕ gralAam ⊕ gralAam ⊕ gralAam ⊕ gralAam gralAam gralAam gralAam Tode gralAam Tode	Source: Enterprise: Specific: Generic:	172.18.21.10 Tim iso org dod internet private enterprises. 10 enterpriseSpecific	estamp: 10 minutes	: 19 seconds S	NMP Version:	ţ			
	b generalOutput b generalOutput generalized generalized general	Source: Enterprise: Specific: Generic: Variable Bin	172.18.21.10 Tim iso org.dod internet private enterprises. 10 enterpriseSpecific dinos:	estamp: 10 minutes	: 19 seconds S	NMP Version:	1			
	B generalOUtput B generalOUtput gralAlarm B gralAlarm Trable B gralAlarm Trable B gralAlarm Trable B gralAlarm Trable B gralAlarm ZTstatus B gralAlarm ZTstatus B gralAlarm ZTStatus	Source: Enterprise: Specific: Generic: Variable Bin	172.18.21.10 Tim .iso.org dod internet private enterprises. 10 enterpriseSpecific dings:	estamp: 10 minutes	: 19 seconds S	NMP Version:	1			
	b- generalOUput - filterTaa - gralAlarm - gradAlarm -	Source: Enterprise: Specific: Generic: Variable Bin Name:	172. 18.21.10 Tim iso org dod internet private enterprises. 10 enterpriseSpecific dings: iso org dod internet private enterprises	estamp: 10 minutes	: 19 seconds S	NMP Version:	ţ			
Nama	generalOutput general	Source: Enterprise: Specific: Generic: Variable Bin Name:	172.18.21.10 Tim .iso.org.dod internet private enterprises. 10 enterpriseSpecific dings: .iso.org.dod internet.private enterprises.	estamp: 10 minutes	: 19 seconds S	NMP Version:	1			
Name	b generalOUput generalOUput gralAlarm ⊕ gralAlarm ⊕ gralAlarm ⊕ gralAlarm gralAlarm2Table gralAlarm2Totex gralAlarm2Totex gralAlarm2Totex gralAlarm2Totex 13.6.14.1,26355.2.50,13.2	Source: Enterprise: Specific: Generic: Variable Bin Name: Value;	172.18.21.10 Tim iso org dod internet private enterprises. 10 enterpriseSpecific dings: iso org dod internet private enterprises. [Integer] warning (2)	estamp: 10 minutes	: 19 seconds S	NMP Version:	Ĺ			
Name OID MTR	generalOutput generalOutput gralAlarm ⊕ ∰ gralAlarm Trable ⊕ ∰ gralAlarm ZTableEntry gralAlarmZTableEntry gralAlarmZTable gralAlarmZTeventDescription gralAlarmZTable 1.3.6.1.4.1.26355.2.50.13.2 ref r.5.3 u=20100000000000000000000000000000000000	Source: Enterprise: Specific: Generic: Variable Bin Name: Value:	172.18.21.10 Tim iso.org.dod internet private enterprises. 10 enterpriseSpecific dings: iso.org.dod internet private enterprises. [Integer] warning (2)	estamp: 10 minutes	: 19 seconds S	NMP Version:	1			
Name OID MIB Suptav	B→ generalOUtput B→ figterTas gralAlarm B→ gralAlarm Table B→ gralAlarm Table B→ gralAlarm TableEntry B→ gralAlarm ZTableEntry gralAlarm ZTable 1.3.6.1.4.1.26355.2.50.13.2 rurst.couves151.cm 2.5rue SPOI EPIC FOR Callalarm TableEntry	Source: Enterprise: Specific: Generic: Variable Bin Name: Value: Name:	172.18.21.10 Tim .iso.org.dod internet private.enterprises. 10 enterpriseSpecific dings: .iso.org.dod internet private.enterprises. [Integer] warning (2) .iso.org.dod internet private.enterprises.	estamp: 10 minutes	: 19 seconds S	NMP Version:	1	4		
Name OID MIB Syntax Access	generalOUtput graklarm graklar	Source: Enterprise: Specific: Generic: Variable Bin Name: Value: Name: Value:	172. 18.21.10 Tim iso org dod internet private enterprises. 10 enterpriseSpecific dings: iso. org dod internet private enterprises. [Integer] warming (2) iso org dod internet private enterprises. [OctedString] RX LOW DOWNLINK.	estamp: 10 minutes	:19 seconds S	NMP Version:	ŀ			
Name OID MIB Syntax Access	GeneralOutput GeneralOutput GeneralOutput General GralAlam Trable GradAlam Trable	Source: Enterprise: Specific: Generic: Variable Bin Name: Value: Name: Value:	172.18.21.10 Tim iso org dod internet private enterprises 10 enterpriseSpecific dings: iso org dod internet private enterprises. [Integer] warning (2) iso org dod internet private enterprises. [OctetString] RX LOW DOWNLINK -	estamp: 10 minutes	: 19 seconds S	NMP Version:	1			
Name OID MIB Syntax Access Status	GeneralOUtput General	Source: Enterprise: Specific: Generic: Variable Bin Name: Value: Name: Value: Description:	172. 18. 21. 10 Tim iso org dod internet private enterprises. 10 enterpriseSpecific dings: . iso org dod internet private enterprises. [Integer] warning (2) . iso org dod internet private enterprises. [OctetString] RX LOW DOWNLINK -	estamp: 10 minutes	: 19 seconds S	NMP Version:	I.			
Name OID MIB Syntax Access Status DefVal Indexed	GeneralOutput GeneralOutput GeneralOutput GeneralOutput GeneralOutput GeneralAtion	Source: Enterprise: Specific: Generic: Variable Bin Name: Value: Name: Value: Description:	172.18.21.10 Tim iso.org.dod internet private enterprises 10 enterpriseSpecific dings: iso.org.dod internet private enterprises. [Integer] warning (2) iso.org.dod internet private enterprises. [OctetString] RX LOW DOWNLINK -	estamp: 10 minutes	:19 seconds S	NMP Version:	1			
Name OID MIB Syntax Access Status DefVal Indexes	generalOUtput generalOUtput generalOUtput generalOUtput generalOutput generalPote	Source: Enterprise: Specific: Generic: Variable Bin Name: Value: Name: Value: Description:	172.18.21.10 Tim iso org dod internet private enterprises. 10 enterpriseSpecific dings: iso org dod internet private enterprises. [Integer] warning (2) iso org dod internet private enterprises. [OctetString] RX LOW DOWNLINK -	estamp: 10 minutes	: 19 seconds S	NMP Version:	F			

SNMP Trap in trap receiver

Example trap capture





July 2018; Doc No. UHF Signal Booster UM RA Page 90 of 95



SNMP Trap capture

Trap data explained:

Enterprise: .1.3.6.1.4.1.26355 (Westell Inc.)

BDA System MIB: .1.3.6.1.4.1.26355.2.50 (applicable to BDA system)

Enterprise specific trap number: 10 (meaning '*Rx Input Low DL*' according to the table of trap identifiers).

Trap Bindings

1) gralAlarm2TStatus. Value: 2 (see table below)

2) gralAlarm2TEventDescription: Value: "RX LOW DOWNLINK - WARNING"

The first binding in the trap is the *gralAlarm2TStatus* of *gralAlarm2T* table in the MIB:

gralAlarm2TStatus OBJECT-TYPE SYNTAX INTEGER { ok(1), warning(2), fail(3), unavailable(99) } MAX-ACCESS read-write STATUS current DESCRIPTION "_" ::= { gralAlarm2TableEntry 2 }

and its equivalence to the trap severity is explained in the table shown in previous section.

The second binding is the string used to be human-readable. The only different type of trap is the keep-alive one, which as an example is shown in next picture:





4	Simple Network Management Protocol
	version: version-1 (0)
	community: trap
	4 data: trap (4)
	4 trap
	enterprise: 1 3 6 1 4.1.26355 (iso.3.6.1.4.1.26355)
	agent-addr: 172.18.21.10
	generic-trap: enterpriseSpecific (6)
	specific-trap: 3
	time-stamp. 170511
	<pre>4 war lable-bindings: 1 item</pre>
	4 1.3.6.1.4.1.26355.2.50.4.2.1.2.0: 172.18.21.10
	Object Name: 1.3.6.1.4.1.26355.2.50.4.2.1.2.0 (is.3.6.1.4.1.26355.2.50.4.2.1.2.0)
	Value (IpAddress): 172.18.21.10

SNMP Keep-alive trap capture

and its only binding is the net2TIp part of the net2Table in the MIB

```
net2TIp OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"-"

::= { net2TableEntry 2}
```

List of traps

The following table lists all bindings in each trap for convenience:

SNMP Trap list

Source event	Specific Trap ID	Bindings	Value
Keep-alive	3	1.3.6.1.4.1.26355.2.50.4.2.1.2.0	Ip Address
General Failure	5	1.3.6.1.4.1.26355.2.50.13.2.1.2.0	{1, 2, 3, 99}





Source event	Specific Trap ID	Bindings	Value
		1.3.6.1.4.1.26355.2.50.13.2.1.3.0	String
Hardware Failure	6	1.3.6.1.4.1.26355.2.50.13.2.1.2.1	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.1	String
Rx Input Low DL	10	1.3.6.1.4.1.26355.2.50.13.2.1.2.2	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.2	String
Temperature	11	1.3.6.1.4.1.26355.2.50.13.2.1.2.3	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.3	String
Rx Overload UL	20	1.3.6.1.4.1.26355.2.50.13.2.1.2.4	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.4	String
Rx Overload DL	21	1.3.6.1.4.1.26355.2.50.13.2.1.2.5	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.5	String
Tx Low DL	30	1.3.6.1.4.1.26355.2.50.13.2.1.2.6	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.6	String
Tx High DL	31	1.3.6.1.4.1.26355.2.50.13.2.1.2.7	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.7	String
PA Fault UL	40	1.3.6.1.4.1.26355.2.50.13.2.1.2.8	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.8	String
PA Fault DL	41	1.3.6.1.4.1.26355.2.50.13.2.1.2.9	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.9	String
VSWR	50	1.3.6.1.4.1.26355.2.50.13.2.1.2.10	{1, 2, 3, 99}
		1.3.6.1.4.1.26355.2.50.13.2.1.3.10	String





Appendix A Important Product Information

A.1 Registration Number

FCC - NVRPSA91080-UHF

A.2 UL This product is UL Listed.







Appendix B Acronyms and Abbreviations

Table B-1 contains the acronyms and abbreviations used in this manual, along with a definition for each one.

	Table B-1: Acronyms and Abbreviations		
AGC	Automatic Gain Control		
AMPS	Advanced Mobile Phone Service		
ARFCN	Absolute Radio Frequency Channel Number		
BCCH	Broadcast Control Channel (GSM broadcast channel time slot)		
BS	Base Station, BS antenna = towards the base station		
CDMA	Code Division Multiple Access		
DC	Direct Current		
DCS	Digital Communication System (same as PCN)		
DL	Downlink signal direction (from base station via Signal Booster / Master / Remote to mobile station)		
DPLX	Duplex filter		
EEPROM	Electrical Erasable Programmable Read Only Memory		
EGSM	Extended Global System for Mobile communication		
ETACS	Extended Total Access Communication System		
ETSI	European Telecommunications Standard Institute		
WCS	Westell Control Software		
GSM	Global System for Mobile communication		
HW	Hardware		
LED	Light Emitting Diode		
LNA	Low Noise Amplifier, uplink and downlink		
MS	Mobile Station, MS antenna = towards the mobile station		
OL	Overload		
OMS	Operation and Maintenance System		
ΡΑ	Power Amplifier		
PCN	Personal Communication Network (same as DCS)		
PCS	Personal Communication System		
pWOMS	Portable Westell Operation and Maintenance Software		
PS	Power Supply		
RF	Radio Frequency		
RSSI	Received Signal Strength Indication		
SW	Software		
UL	Uplink signal direction (from mobile station via Signal Booster / Master / Remote to base station)		
WEEE	Waste of Electric and Electronic Equipment		

