

Andrew Wireless Solutions

OneBase InSite™ Diagnostic Unit



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InSite Application

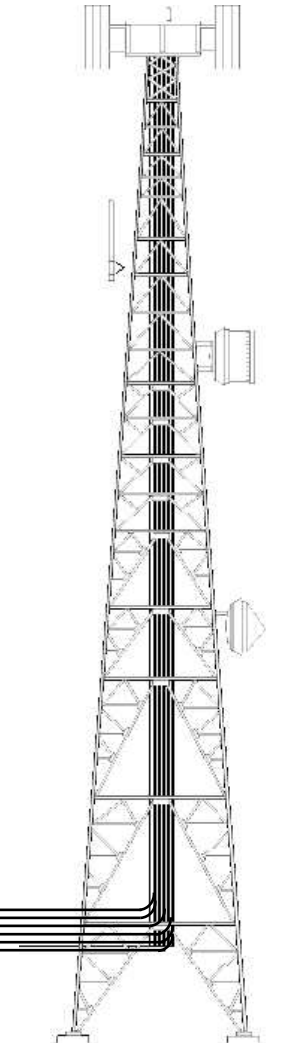
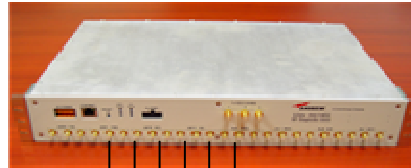
RF Measurement System capable of radio and antenna diagnostics:

- 2G, 2.5G, 3G RF signal analysis
- VSWR measurements
- spectrum analysis
- PIM measurements

BTS Cabinet(s)



InSite Unit



InSite Diagnostic Unit

- Contains the RF test functions and features required to perform a suite of RF tests related to antenna line performance
- Capable of performing a full range of signal analysis used in evaluating cell site interference situations as well as evaluating signal integrity from the host BTS.



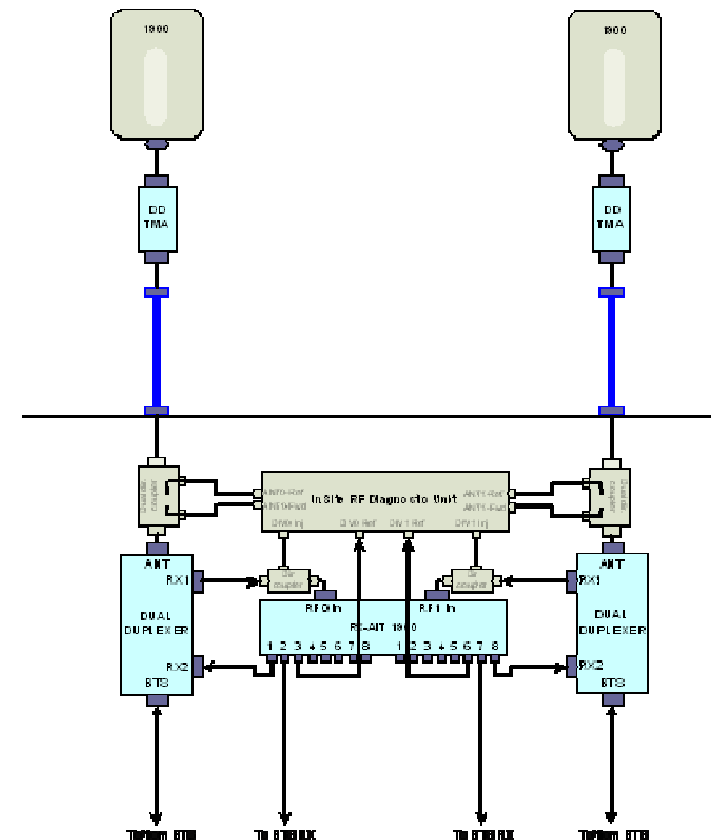
InSite Diagnostic Unit Features:

- TX-band FWD power & VSWR measurements
- RX-band antenna line functional test
- BTS signal analysis
- Spectrum analyzer feature
- RX band interference analysis
- Passive Intermodulation measurement
- Dual Band capable
- Alarm interface: dry relay contacts with Major, Minor and Critical severity levels
- Diagnostics available via IP interface
- Management interface: Internet browser, Telnet, SNMP alarm trap
- web server, GUI interface
- manual & automatic test scheduling
- event logging
- +27v, -48v compatible
- -40°C to + 50°C operation
- 16 lbs
- 17.5" (W) x 2.6" (H) x 14.3" (D)

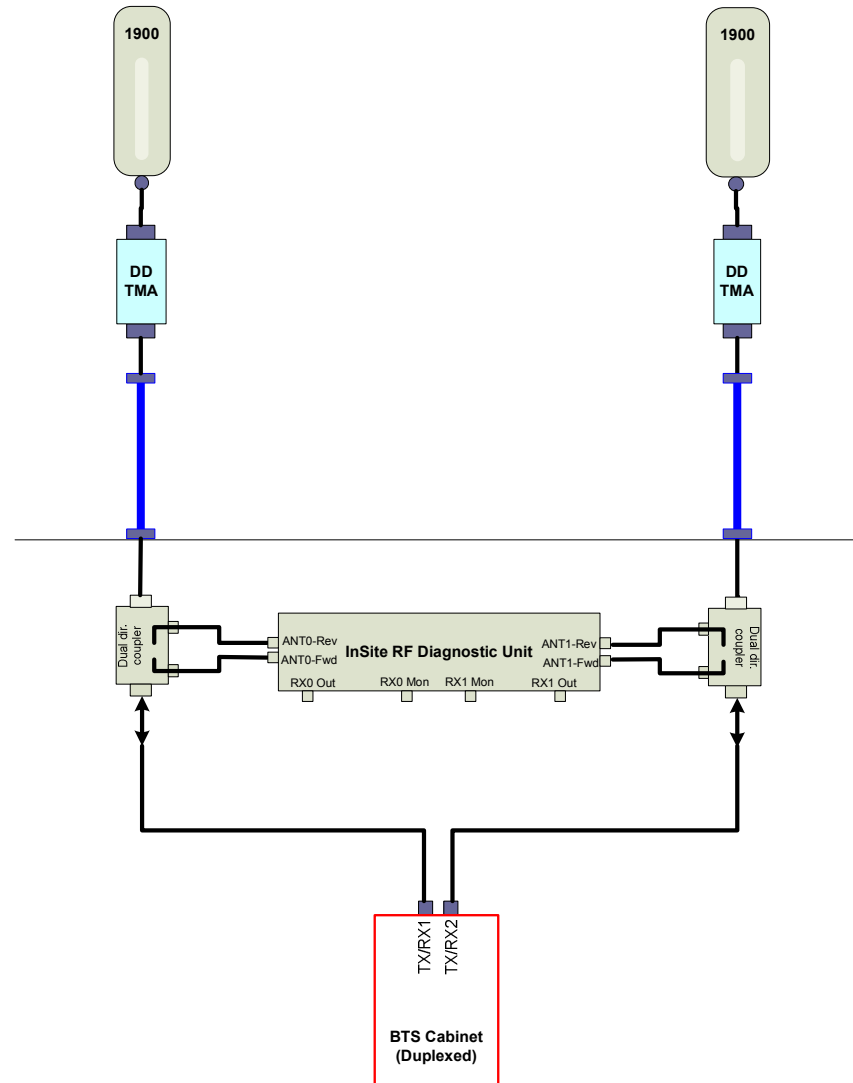
850/1900 InSite Diagnostic Unit Specifications

Parameter	Specification
Frequency Band	Dual-band, 850/1900 in a single unit. Other dual-band combinations possible.
Frequency Range	869-894 MHz downlink measurements 824-849 MHz uplink measurements 1930-1990 MHz downlink measurements 1850-1910 MHz uplink measurements
Antenna feedline monitor ports	12 total (6 Forward path, 6 Reverse path)
Receive Band monitor ports	6 total
Return loss all ports	16 dB, typical
Isolation, port-to-port	60 dB
Forward power monitor	True RMS, >20 dB dynamic range
VSWR measurement	>20 dB dynamic range with respect to output power
RX-band VSWR measurement	-30 dBm referenced to antenna feedline, 10 dB adjustment range
PIM test tones	2x, 0 dBm to +10 dBm/tone
Receiver sensitivity	9 dB noise figure, max
Receiver instantaneous dynamic range	>80 dB, single tone
Supported air interfaces	CDMA, EVDO, GSM/EDGE, WCDMA
RF interface connectors	QMA(F)
Power supply	+24v or -48v versions available
Power consumption	30w, maximum
Mechanical outline	1.5 RU, 17.5"(w) x 2.63"(h) x 14.3"(d); 19" EIA rack-mount module
Weight	16 lbs
Temperature range	-5°C to +50° C, operational

Application diagram



TX Signal analysis, power meter, TX VSWR application



Power On Screen

The screenshot displays the InSite web application interface within a Windows Internet Explorer browser window. The address bar shows the URL `http://192.168.247.1/bin/InSiteApp.html`. The application has a navigation menu with tabs for InSite, Measurement, Alarm, Configuration, and Maintenance. The Measurement Source section includes dropdown menus for Measurement (Tx Monitor), Frequency Band (Cellular), and Sector (α (Alpha)), along with radio buttons for Measurement Port (Tx ANT0, Tx ANT1, Rx0 MON, Rx1 MON). The Tx Monitor Measurement table is currently empty. The Measurement Control panel on the right includes a Run button, a Continue Mode checkbox, an Interval of 2 seconds, and source configuration details: Sector: α (Alpha), Input: Tx ANT0, and Band: Cellular.

Tx Monitor Measurement			
Power (dBm)	Reverse (dBm)	Return Loss (dB)	Alarm

Manual Measurement: Tx Pilot Power

The screenshot shows the InSite web application interface. At the top, there are navigation tabs: InSite, Measurement, Alarm, Configuration, and Maintenance. The 'Measurement Source' section includes a dropdown menu for 'CDMA2000 Pilot' and a table for 'Measurement Port' with columns for Tx ANT0, Tx ANT1, x0 MON, and Rx1 MON. Below this is the 'CDMA2000 Pilot Measurement' table, which displays the following data:

Channel	Frequency (MHz)	Pilot Power (dBm)	Carrier Power (dBm)	Reference (dBm)	Alarm	Status
384	881.52	38.27	45.71	37		successful
425	882.75	38.28	45.63	37		successful
466	883.98	38.33	45.61	37		successful
507	885.21	38.53	45.8	37		successful
548	886.44	38.19	45.69	37		successful
589	887.67	38.64	45.88	37		successful
630	888.9	38.26	45.48	37		successful

Below the table, the 'Measurement Time' is 04/24/2008 15:07:30. To the right of the table is the 'CDMA2000 Pilot Control' section, which includes a 'Run' button, a 'Continue Mode' checkbox, an 'Interval' of 2 seconds, and 'Source' settings: Sector: β (Beta), Input: Tx ANT0, and Band: Cellular. At the bottom of the interface, a status bar shows: Status Request: get meas.cdma2k.status Response: success: /tmp/meas_cdma2000_33563.xml

Setting Pilot Power Threshold

The screenshot shows the InSite web application interface within a Windows Internet Explorer browser window. The browser address bar displays `http://192.168.247.1/bin/InSiteApp.html`. The application has a navigation menu with tabs for InSite, Measurement, Alarm, Configuration, and Maintenance. The 'Measurement Source' section includes filters for Sector (all), Measurement Port (all), Frequency Band (Cellular), and Measurement Type (CDMA2000 Pilot). A dropdown menu for 'CDMA2000 Pilot' is open, showing options: Rx Return Loss, Tx Monitor, and CDMA2000 Pilot (selected). Below this is the 'CDMA2000 Pilot Configuration' section with 'Alarm' and 'Frequency' tabs. The 'Frequency' tab contains a table with the following data:

Parameter	Severity	Condition	Value (dB/dBm)	Value (dB/dBm)
relative to ref	major	not between	-4	4

The status bar at the bottom of the browser window shows 'Done', 'Internet', and '100%' zoom level.

Setting Return Loss Alarm Thresholds

The screenshot shows the InSite web application interface in a Windows Internet Explorer browser window. The address bar shows the URL `http://192.168.247.1/bin/InSiteApp.html`. The application has a navigation menu with tabs for InSite, Measurement, Alarm, Configuration, and Maintenance. The 'Alarm' tab is active.

Under the 'Alarm' tab, there is a 'Measurement Source' section with the following configuration:

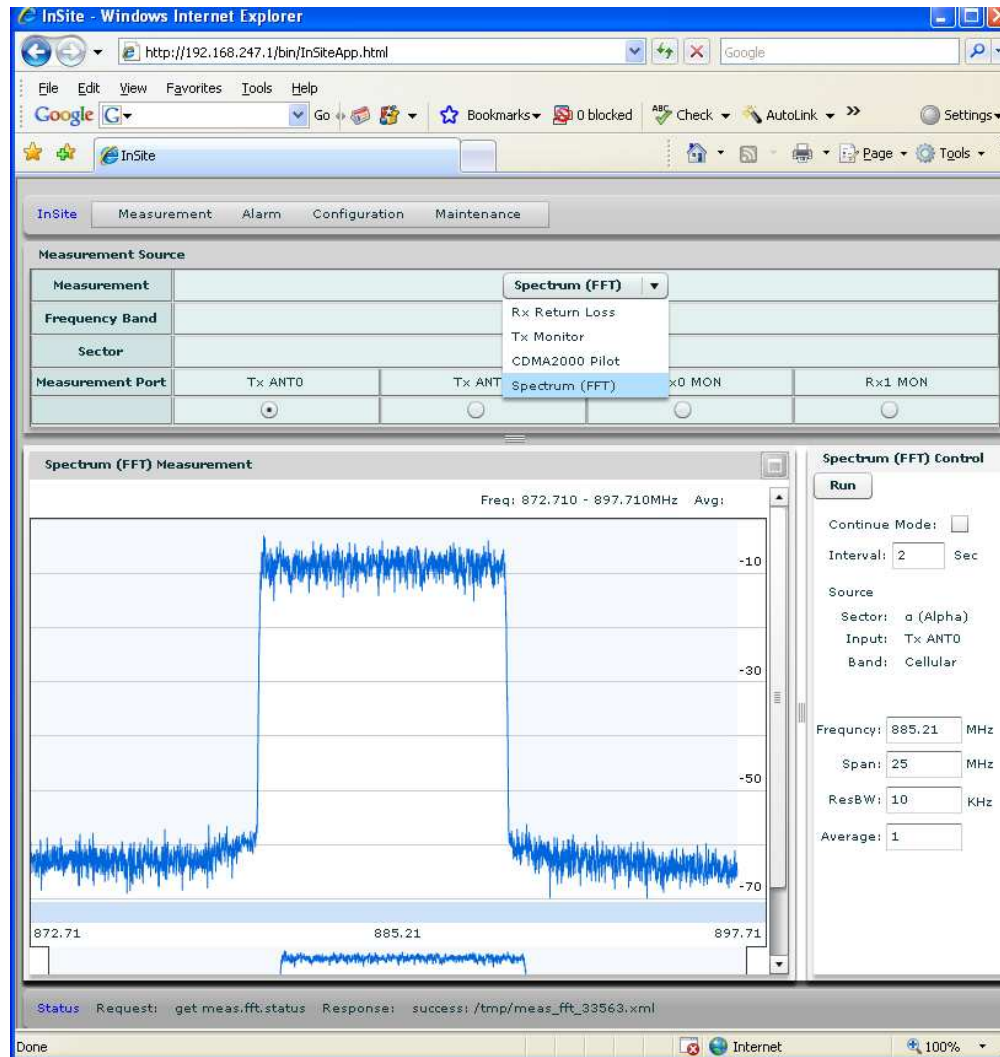
- Sector: all
- Measurement Port: all
- Frequency Band: Cellular
- Measurement Type: Tx Monitor (dropdown menu is open showing options: Rx Return Loss, Tx Monitor, CDMA2000 Pilot)

Below this is the 'Tx Monitor Configuration' section, which has two sub-tabs: 'Alarm' and 'Frequency'. The 'Alarm' sub-tab is active, displaying a table of alarm thresholds:

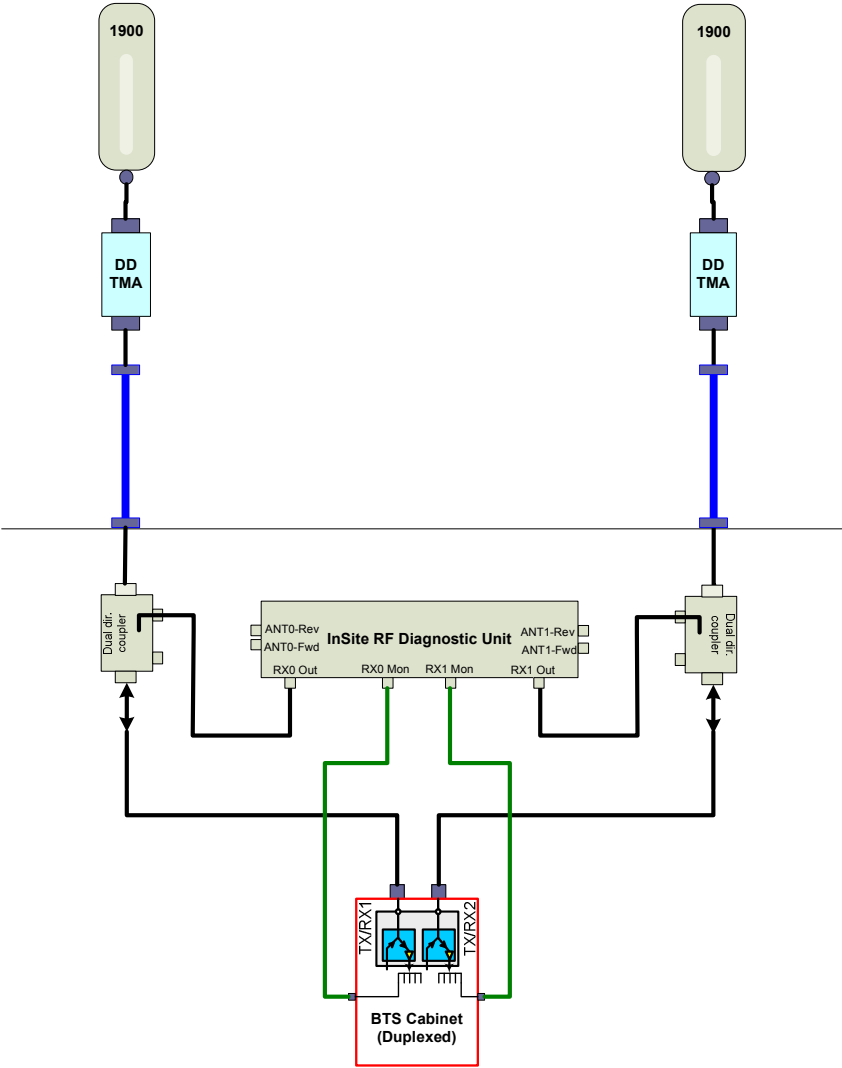
Parameter	Severity	Condition	Value (dB/dBm)	Value (dB/dBm)
return loss	minor	between	3	10
return loss	critical	less	3	

The status bar at the bottom of the browser window shows 'Done', 'Request: Response:', and 'Internet'.

Spectrum Analysis



RX Band VSWR, interference analysis



Manual Measurement: Rx Return Loss

The screenshot displays the InSite web application interface within a Windows Internet Explorer browser. The browser address bar shows the URL `http://192.168.247.1/bin/InSiteApp.html`. The application has a navigation menu with tabs for "InSite", "Measurement", "Alarm", "Configuration", and "Maintenance".

The "Measurement Source" section is active, showing a configuration table. A dropdown menu is open over the "Measurement" column, listing options: "Rx Return Loss", "Tx Monitor", "CDMA2000 Pilot", and "Spectrum (FFT)". The "Rx Return Loss" option is selected.

The "Rx Return Loss Measurement" table displays the following data:

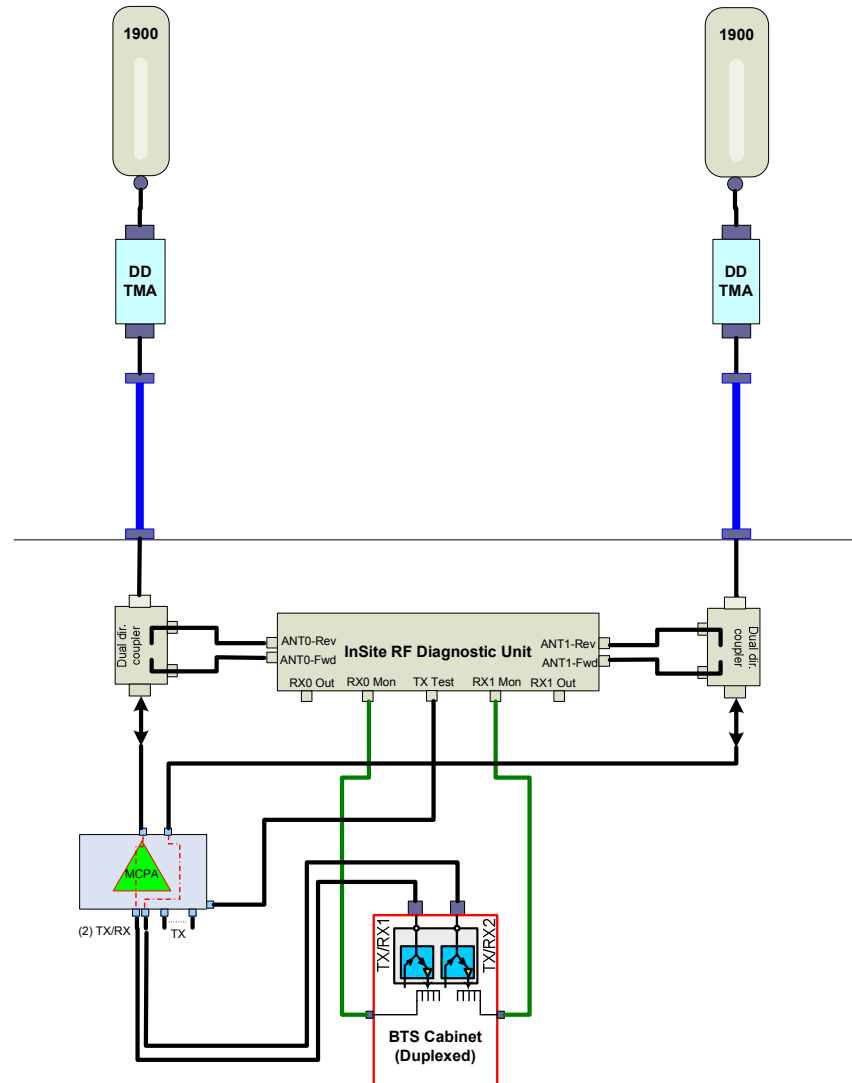
Channel	Frequency (MHz)	DIV	Return Loss (dB)	Alarm	Status
370	835.1		24.08		successful
830	848.9		30		successful

Below the table, the "Measurement Time" is recorded as 04/24/2008 15:10:13.

The "Rx Return Loss Control" panel on the right includes a "Run" button, a "Continue Mode" checkbox, an "Interval" of 2 seconds, and source configuration fields: "Sector: a (Alpha)", "Input: Rx1 MON", and "Band: Cellular".

The status bar at the bottom shows: `Status Request: get meas.rxmon.status Response: success: /tmp/meas_rxmon_33563.xml`

Passive Intermodulation (PIM) Test



Example – Measurement History

The screenshot displays the InSite web application interface. At the top, there is a navigation menu with options: InSite, Measurement, Alarm, Configuration, and Maintenance. Below this is the 'Log History Selection' section, which contains several filter dropdowns: Mode (all), Type (CDMA2000 Pilot), Port (Sector: all, Port: Rx Return Loss, Tx Monitor, CDMA2000 Pilot, Spectrum (FFT)), Alarm (Severity: all), and Category. The main content area is titled 'CDMA2000 Pilot Measurement Log' and contains a table with the following data:

Date	Time	Sector	ANT	DIV	Band	Channel	Frequenc (MHz)	Carrier Power (dBm)	Pilot Power (dBm)	Reference P (dBm)	alarm
04/24/20	08:33:05	alpha	TX	0	CELL	384	881.52	45.35	37.77	37.7	
04/24/20	08:33:46	alpha	TX	0	CELL	384	881.52	45.41	38.13	37.7	
04/24/20	08:34:13	alpha	TX	0	CELL	384	881.52	45.41	38.11	37.7	
04/24/20	08:34:32	beta	TX	0	CELL	384	881.52	44.92	37.66	37.7	
04/24/20	08:34:52	gamma	TX	0	CELL	384	881.52	44.59	37.15	37.7	
04/24/20	08:35:12	alpha	TX	0	CELL	425	882.75	45.31	38.02	37.7	
04/24/20	08:35:44	alpha	TX	0	CELL	384	881.52	45.4	38.11	37.7	
04/24/20	08:36:26	alpha	TX	0	CELL	384	881.52	45.43	38.18	37.7	
04/24/20	08:36:46	beta	TX	0	CELL	384	881.52	44.92	37.63	37.7	
04/24/20	08:37:05	gamma	TX	0	CELL	384	881.52	44.6	37.22	37.7	
04/24/20	08:37:25	alpha	TX	0	CELL	425	882.75	45.31	38.01	37.7	
04/24/20	08:37:44	beta	TX	0	CELL	425	882.75	44.61	37.16	37.7	
04/24/20	08:38:04	gamma	TX	0	CELL	425	882.75	44.42	37.09	37.7	
04/24/20	08:38:23	alpha	TX	0	CELL	466	883.98	45.22	37.97	37.7	
04/24/20	08:38:43	beta	TX	0	CELL	466	883.98	44.58	37.27	37.7	

At the bottom of the application, there is a status bar with 'Status Request: Response:' and a 'Done' indicator. The browser window title is 'InSite - Windows Internet Explorer' and the address bar shows 'http://192.168.247.1/bin/InSiteApp.html'.

Example – Alarm History (All Alarms)

The screenshot shows the InSite web application interface in a Windows Internet Explorer browser. The browser address bar displays `http://192.168.247.1/bin/InSiteApp.html`. The application has a navigation menu with tabs for "InSite", "Measurement", "Alarm", "Configuration", and "Maintenance". The "Alarm" tab is active, and a dropdown menu is open, showing "Current Alarm" and "Alarm History".

Below the navigation menu is the "Log History Selection" section, which includes several filter dropdowns: "Measurement" (set to "all"), "Type" (set to "all"), "Port" (set to "all"), "Sector" (set to "all"), "Severity" (set to "all"), and "Category" (set to "all").

The main content area displays the "Alarm History Log" as a table with the following columns: Date, Time, Category, Sector, ANT, DIV, Alarm Type, Item, alarm, and Action. The table contains 18 rows of data, all from the date 04/22/2008.

Date	Time	Category	Sector	ANT	DIV	Alarm Type	Item	alarm	Action
04/22/2008	09:42:31	site	alpha	RX	0	RXMON	835.1	minor	clear
04/22/2008	09:43:10	site	alpha	RX	0	RXMON	848.9	critical	set
04/22/2008	09:43:15	site	alpha	RX	0	RXMON	835.1	critical	set
04/22/2008	09:43:33	site	alpha	RX	0	RXMON	835.1	critical	clear
04/22/2008	09:43:36	site	alpha	RX	0	RXMON	848.9	critical	clear
04/22/2008	09:44:34	site	alpha	RX	0	RXMON	835.1	critical	set
04/22/2008	09:44:37	site	alpha	RX	0	RXMON	848.9	critical	set
04/22/2008	09:44:52	site	alpha	RX	0	RXMON	835.1	minor	set
04/22/2008	09:44:52	site	alpha	RX	0	RXMON	835.1	critical	clear
04/22/2008	09:44:55	site	alpha	RX	0	RXMON	848.9	minor	set
04/22/2008	09:44:55	site	alpha	RX	0	RXMON	848.9	critical	clear
04/22/2008	09:45:13	site	alpha	RX	0	RXMON	848.9	minor	clear
04/22/2008	09:46:03	site	alpha	RX	0	RXMON	835.1	minor	clear
04/22/2008	09:46:03	site	alpha	RX	0	RXMON	835.1	critical	set
04/22/2008	09:46:06	site	alpha	RX	0	RXMON	848.9	critical	set

At the bottom of the application, there is a status bar with fields for "Status", "Request:", and "Response:". The browser status bar at the very bottom shows "Done" and "Internet" with a 100% zoom level.

Example – Alarm History Filtered (Rx Return Loss)

The screenshot shows the InSite web application interface. At the top, there are navigation tabs for Measurement, Alarm, Configuration, and Maintenance. Below this is the 'Log History Selection' section with several filters: Mode (all), Type (Rx Return Loss), Port (Sector: all), Alarm (Severity: all), and Time Period. A dropdown menu for 'Type' is open, showing options: Rx Return Loss, Tx Monitor, CDMA2000 Pilot, Spectrum (FFT), and all. Below the filters is the 'Alarm History Log' table.

Date	Time	Category	Sector	ANT	DIV	Alarm Type	Item	alarm	Action
04/22/2008	09:41:33	site	alpha	RX	0	RXMON	848.9	critical	clear
04/22/2008	09:41:56	site	alpha	RX	0	RXMON	835.1	minor	clear
04/22/2008	09:41:59	site	alpha	RX	0	RXMON	848.9	minor	clear
04/22/2008	09:42:05	site	alpha	RX	0	RXMON	835.1	minor	set
04/22/2008	09:42:31	site	alpha	RX	0	RXMON	835.1	minor	clear
04/22/2008	09:43:10	site	alpha	RX	0	RXMON	848.9	critical	set
04/22/2008	09:43:15	site	alpha	RX	0	RXMON	835.1	critical	set
04/22/2008	09:43:33	site	alpha	RX	0	RXMON	835.1	critical	clear
04/22/2008	09:43:36	site	alpha	RX	0	RXMON	848.9	critical	clear
04/22/2008	09:44:34	site	alpha	RX	0	RXMON	835.1	critical	set
04/22/2008	09:44:37	site	alpha	RX	0	RXMON	848.9	critical	set
04/22/2008	09:44:52	site	alpha	RX	0	RXMON	835.1	minor	set
04/22/2008	09:44:52	site	alpha	RX	0	RXMON	835.1	critical	clear
04/22/2008	09:44:55	site	alpha	RX	0	RXMON	848.9	minor	set
04/22/2008	09:44:55	site	alpha	RX	0	RXMON	848.9	critical	clear

Example – Alarm History Filtered (Rx RL, Gamma)

Log History Selection

Measurement	Mode	all	Type	Rx Return Loss
Port	Sector	γ (Gamma)	Port	all
Alarm	Severity	α (Alpha) β (Beta) γ (Gamma) all	Category	all
Time Period				

Alarm History Log

Date	Time	Category	Sector	ANT	DIV	Alarm Type	Item	alarm	Action
04/22/2008	09:59:18	site	gamma	RX	0	RXMON	835.1	minor	set
04/22/2008	09:59:21	site	gamma	RX	0	RXMON	848.9	minor	set
04/22/2008	09:59:42	site	gamma	RX	0	RXMON	835.1	minor	clear
04/22/2008	09:59:45	site	gamma	RX	0	RXMON	848.9	minor	clear
04/22/2008	10:00:17	site	gamma	RX	0	RXMON	835.1	critical	set
04/22/2008	10:00:20	site	gamma	RX	0	RXMON	848.9	critical	set
04/22/2008	16:59:14	site	gamma	RX	1	RXMON	835.1	critical	set
04/22/2008	17:02:25	site	gamma	RX	1	RXMON	835.1	critical	clear
04/23/2008	09:20:48	site	gamma	RX	1	RXMON	835.1	minor	set
04/23/2008	10:20:47	site	gamma	RX	1	RXMON	835.1	minor	clear
04/23/2008	13:48:15	site	gamma	RX	1	RXMON	835.1	critical	set
04/23/2008	13:48:31	site	gamma	RX	1	RXMON	835.1	critical	clear
04/23/2008	14:07:46	site	gamma	RX	0	RXMON	835.1	critical	set
04/23/2008	14:08:15	site	gamma	RX	0	RXMON	835.1	critical	clear
04/23/2008	16:04:15	site	gamma	RX	0	RXMON	835.1	critical	set

Example – Alarm History Filtered (Rx RL, Gamma, Minor)

The screenshot shows the InSite application interface in a Windows Internet Explorer browser. The address bar displays the URL `http://192.168.247.1/bin/InSiteApp.html`. The application has a navigation menu with tabs for InSite, Measurement, Alarm, Configuration, and Maintenance. The 'Alarm' tab is active, and the 'Log History Selection' section is visible. The filters are set as follows:

- Measurement: Mode: all, Type: Rx Return Loss
- Port: Sector: γ (Gamma), Port: all
- Alarm: Severity: minor (selected in a dropdown menu), Category: all
- Time Period: (empty)

The 'Alarm History Log' table displays the following data:

Date	Time	Category	Sect	DIV	Alarm Type	Item	alarm	Action	
04/22/2008	09:59:18	site	gam	0	RXMON	835.1	minor	set	
04/22/2008	09:59:21	site	gamma	RX	0	RXMON	848.9	minor	set
04/22/2008	09:59:42	site	gamma	RX	0	RXMON	835.1	minor	clear
04/22/2008	09:59:45	site	gamma	RX	0	RXMON	848.9	minor	clear
04/23/2008	09:20:48	site	gamma	RX	1	RXMON	835.1	minor	set
04/23/2008	10:20:47	site	gamma	RX	1	RXMON	835.1	minor	clear

Example – Alarm History Filtered (Rx RL, Gamma, Minor, Div. Ant)

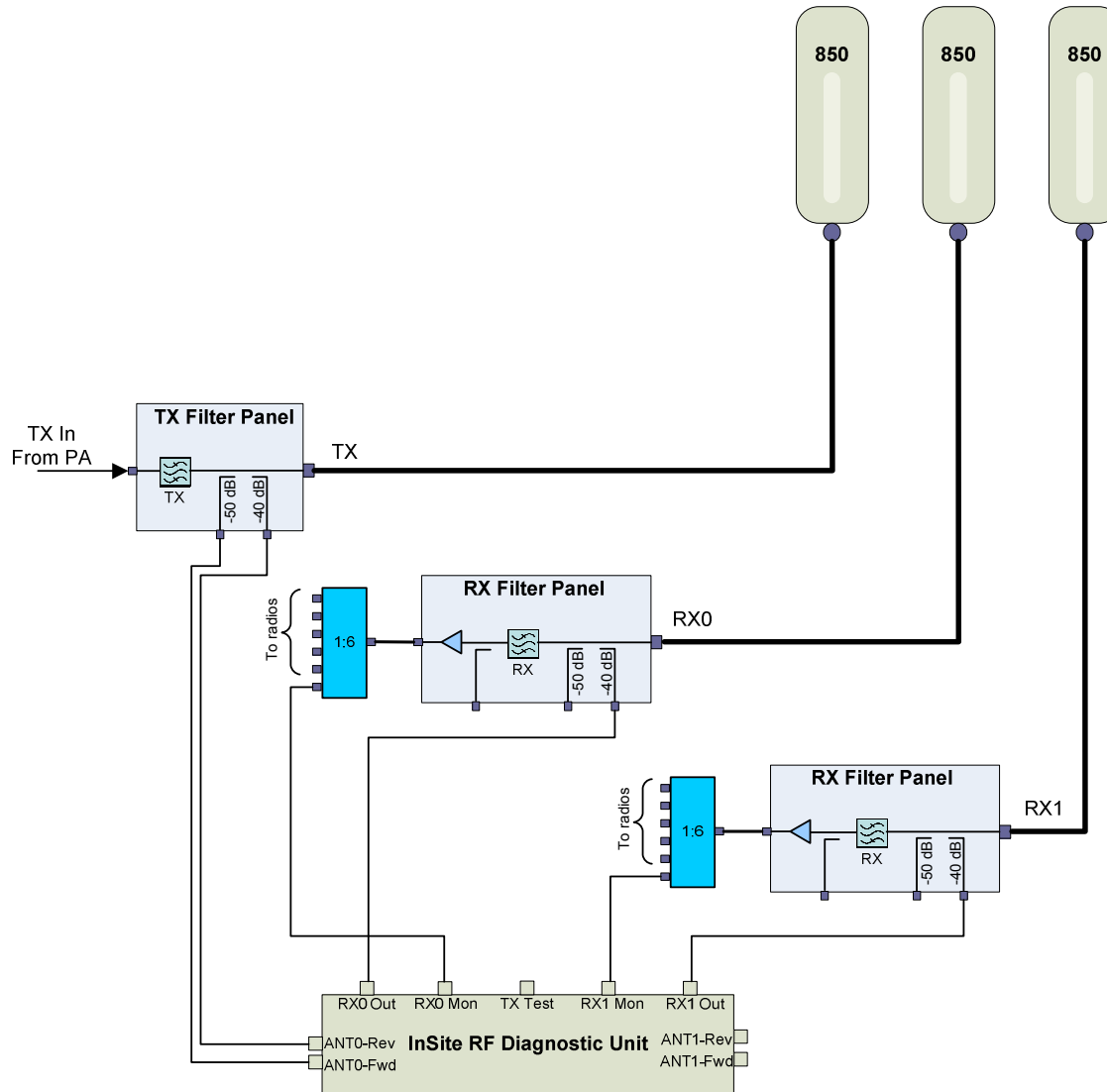
The screenshot shows the InSite web application interface. The 'Log History Selection' section is configured with the following filters:

- Measurement: Mode: all, Type: Rx Return Loss
- Port: Sector: γ (Gamma), Port: Rx1 MDN
- Alarm: Severity: minor, Category: Tx ANT0, Tx ANT1, Rx0 MON, Rx1 MON
- Time Period: (empty)

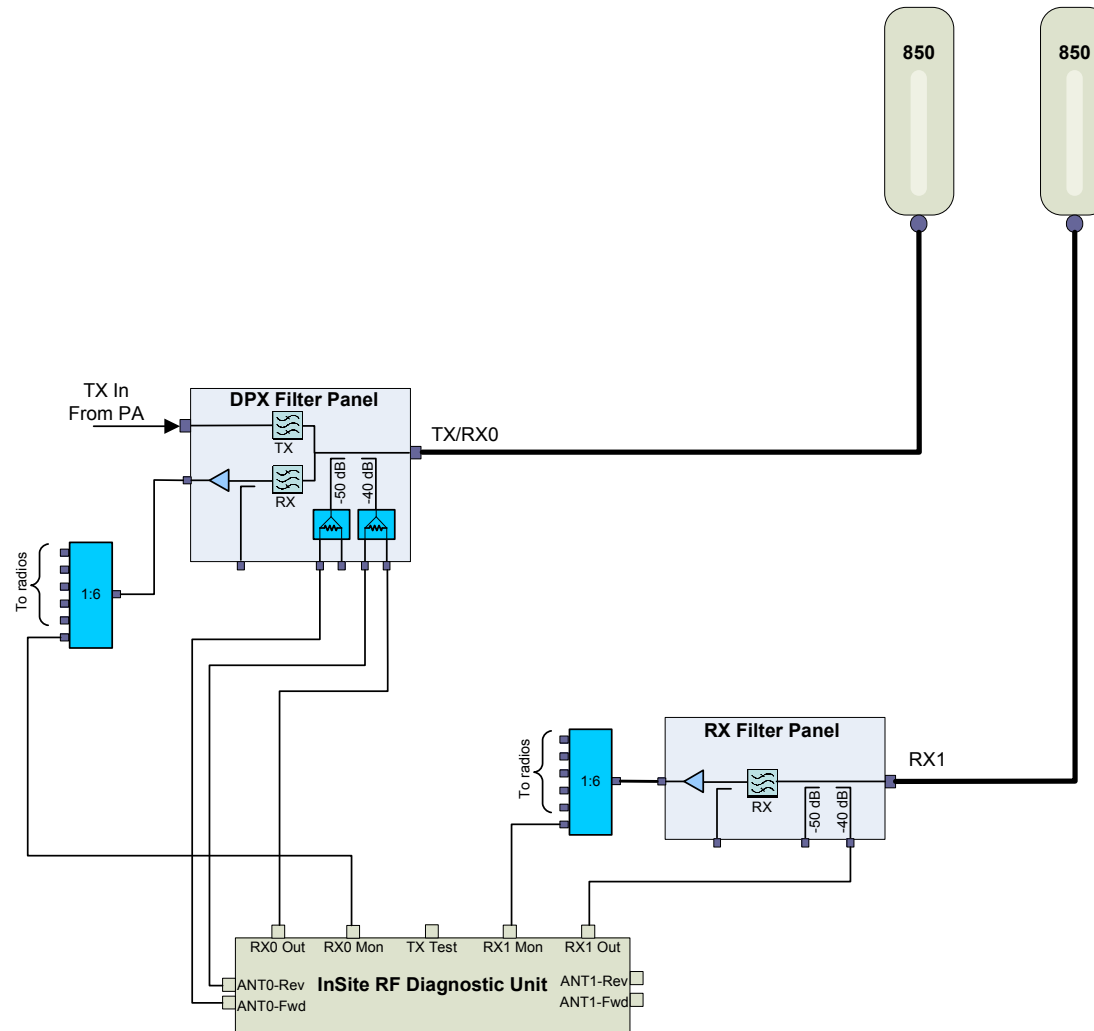
The 'Alarm History Log' table displays the following data:

Date	Time	Category	Sector	ANT	Div	Alarm type	Item	alarm	Action
04/23/2008	09:20:48	site	gamma	RX	1	RXMON	835.1	minor	set
04/23/2008	10:20:47	site	gamma	RX	1	RXMON	835.1	minor	clear

InSite integration with AIF – Simplex antennas



InSite integration with AIF – Duplex antennas



InSite Schedule

Current Trials:

- VZW NJ (Maintenance Engineering): Installed at end of April (AIF integration)
- VZW Northern California: AIF integration planned in mid-May

Schedule:

- Additional trial units available in late May
- Basic requirements for Verizon Maintenance Engineering include Tx/Rx Return Loss and Pilot Power measurements.
- Additional features for Q3/Q4 software release:
 - PIM Testing
 - Spectrum Analyzer Data extraction
 - Rx Interference Sweep and user defined threshold
 - Calibration Assist Feature (Network Analyzer capability for calibrated RF Sweeps)
 - SNMP Alarming
 - Integration with AI Remote
- Longer Term Goal
 - Integration with CommScope InSite Connect

