Purpose

This Change Log documents end-user visible changes to the communications system analyzer. It is not an exhaustive reference. Primarily major modifications and improvements easily distinguished by an analyzer operator are described.

Conventions

The Change Log is organized by system version, with the oldest entries appearing at the end of the document. The system version is a single version number that represents a unique combination of BIOS, FPGA, operating system, general software, and protocol support versions that are installed on the communications system analyzer.

Attributions

Change Log

3.8.0.0

a) New Features
   i) AutoTune automated test and alignment option for BK Technologies KNG-S radios
   ii) AutoTune option for Technisonic TDFM9000 series radios
   iii) Saved Cable Sweeps
   This powerful new feature gives users the power to run and store cable sweeps. In this way, the characteristics of test cables can be fully accounted for, greatly enhancing the accuracy of radio testing.
   iv) Avionics Ramp Test Option
   An industry first – avionics ramp test capability in an LMR service monitor! The radio shop that also has the need to test Avionics tests can now get an all-in one solution. The ramp test option includes:
   1) VOR (VHF Omnidirectional Range)
   2) ILS (Instrument Landing System) Glide Slope and Localizers

3) Marker Beacons
4) Selcal (Selective Calling System)
5) Morse Code Idents

b) Improvements

i) Support for mobile radios added to Hytera AutoTune option

ii) Multiple enhancements to Hytera portable AutoTune:

a) Add support for dual band radios

b) Add support for narrowband audio test

c) Add Tx Max Analog Deviation CDCSS and Tx CDCSS Deviation Tests

d) Renamed Rx SINAD test to Rx SNR

iii) Addition of support for NX-320/820 to Kenwood NX Series AutoTune

iv) PTC-ACSES improvements

Display "Lost Packet Error Rate"

v) PTC-ITCR Improvements

Extend power profile display range

vi) 10 kHz and 8.33 kHz IF BW filters added

vii) Motorola XTS/XTL AT

Recover radio subscriber IP address rather than use the default IP address.

viii) SNR meter: Correct display units

c) Versions

```
System:                          3.8.0.0

  DMR (MOTOTRBO)                   1.5.3.0
  Project 25                       2.5.3.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  TETRA TMO                        1.0.43.0
  TETRA BSM                        1.0.0.0
  TETRA BST1                       1.0.18.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ACSES                        1.0.0.0
  PTC-ITCR                         1.0.3.0
  AVIONICS                         1.0.1.0

  Application:                     3.8.0.0
  Dynamic Link Library:            1.3.1.0
  Signal Service Provider:         1.49.2.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.8.1.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.5.0
```

3.7.0.0

a) New Features

i) Analog SNR (Signal-to-Noise Ratio) Meter for AM/FM in analog mode. SNR measurements is available in Monitor and Generate modes. Informational message indicates that Deviation Average set to RMS Average when SNR Meter is selected.

ii) Add P25 Constellation plot to support C4FM simulcast transmitter synchronization.

iii) Support testing DMR radios configured for TDMA Direct Mode time slots.

iv) Hytera DMR AutoTune support for PD5xx and PD6xx single band radios.

v) Harris XL AutoTune supports XL-185P.

vi) Motorola APX AutoTune support for APX 1500 and APX 8500 High Power.

b) Improvements

i) RF Zone: Input Source soft key/indicator added with selections Auto, Input Level and Power Meter to provide a way to stop TDMA from auto-switching between them during unused slots.

ii) Display Zone: Power Profile (TDMA modes): Added marker mode "Delta dBm".

iii) Meter Zone: Voltmeter Units selection added for V, mV, or dBV.

iv) Improve support of testing DMR user devices configured for operation with a repeater

(1) BS_IDLE pattern corrected

(2) BS_BUSY pattern added

v) TETRA BST: Gen Port selection added.

vi) TETRA TMO: Added Paging Request function to the start of PLC TEST to support Sepura and Airbus radios.

vii) Hytera DMR AutoTune: Limits updated

viii) AutoTune

(1) Harris XL

(a) Renamed Harris XL-200 option display name to Harris XL

(b) Check firmware version before entering test mode to prevent soft-brick of radio.

(c) Set zone and channel for selected bands in TCXO Align/Test initialize and set frequency.

(2) BK KNG-P: Fixed radio communication issue.

(3) Motorola APX: Numerous report and limits improvements.

c) Versions

```
System:                          3.7.0.0

DMR (MOTOTRBO)                   1.5.3.0
Project 25                       2.5.3.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
TETRA TMO                        1.0.43.0
TETRA BSM                        1.0.0.0
TETRA BST1                       1.0.18.0
dPMR                             1.1.0.0
P25 II                           1.1.3.0
PTC-ITCR                         1.0.2.0
PTC-ACSES                        1.0.0.0

Application:                     3.7.0.0
Dynamic Link Library:            1.3.1.0
Signal Service Provider:         1.49.1.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.8.1.0
         - Comm                  1.6.2.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                6.1.4.0
```

3.6.2.0

a) New Features

i) BS Live Repeater Option(R8-DMR_RPTR). Simplifies testing with a DMR repeater in Digital mode. The option enables the R8000/R8100 to emulate a DMR radio, generating a wakeup burst, synchronizing with downlink, transmitting into repeater and receiving the slots repeated back to test equipment.

ii) Hytera Autotune (R8-AT_HYTERA) added. Optional automated test and alignment for Hytera DMR portables.

b) Improvements

i) DMR – New displays now included with DMR option (R8-DMR)

(1) Distribution Plot

(2) Eye Diagram

(3) Power Profile

ii) DMR – Ability to decode Call ID now standard with DMR option (R8-DMR)

iii) Autotune - Reordered APX 6000B test frequencies to align with Test Sequence specified in Motorola documentation.

iv) Autotune - Improved TX Power Characterization for APX radios

v) Enhancements to TETRA BST and TMO test options.
vi) DTMF – Reduced minimum tone duration to 40ms
vii) DTMF – Reduced minimum inter-digit delay to 20ms
viii) Added Adjustable Mod Out DC offset

c) Version s

```
System:                          3.6.2.0

  DMR (MOTOTRBO)                   1.5.2.0
  Project 25                       2.5.3.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  TETRA TMO                        1.0.43.0
  TETRA BSM                        1.0.0.0
  TETRA BST1                       1.0.15.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0
  PTC-ACSES                        1.0.0.0

  Application:                     3.6.2.0
  Dynamic Link Library:            1.3.1.0
  Signal Service Provider:         1.49.1.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.8.1.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.4.0
```

3.5.0.0

a) New Features
   i) Positive Train Control for the Advanced Civil Speed Enforcement System for GE MDS TD220MAX radios (R8-PTC_ACSES)

b) Improvements
   i) TETRA TMO Test Mode (R8-TETRA_TMO)
      (1) Added ability to decode DTMF in MS function
      (2) Added splash screen
   ii) TETRA Base Station/ T1 Mode
      (1) Added ability to decode MNC, MCC and BC C base station transmissions

(2) Added user-selectable settings based on OEM Base Station Model

(3) Improved base station synchronization

(4) In T1 mode, added the ability to synchronize even with no BNCH/T transmitted in synchronization downlink burst

iii) AutoTune

(1) Added analyzer serial number to test report header

(2) Added RF Level Offset and Cable Sweep settings to test report

(3) Improved performance of Motorola APX6000B/SRX2200B deviation balance test

(4) Multiple improvements to Harris XG-75 RSSI test

(5) XG-75 mobile test frequencies changed to align with those called out in Harris service manual

(6) Harris XL-200

(a) Added radio enabled bands to Test Report Info section

(b) Added hardware revision, DSP version, AES and DES versions and radio bands to Test Report Header Info section

(c) Modified test to ignore Enabled Bands in AutoTune that are not in actual list of Enabled Bands in the radio

c) Version s

```
System:                          3.5.0.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.3.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  TETRA TMO                        1.0.41.0
  TETRA BSM                        1.0.0.0
  TETRA BST1                       1.0.15.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.5.0.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.49.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.8.1.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.3.0
```

3.4.2.0

a) New Features
   i) Process Automation Toolkit (R8-PAT).
   ii) TETRA Base Station Test Mode (R8-TETRA_BSM) replaces TETRA BS Monitor with a full-screen display zone. In addition to the Monitor mode tests, it may also include a T1 Test option (R8-TETRA_BST1).
   iii) AutoTune: APX 8000 PA Bias 1 alignment added.

b) Improvements
   i) TETRA TMO Test Mode (R8-TETRA_TMO)
      (1) Added 100 MHz Band.
      (2) Export to CSV soft key message defined as "Exporting to...".
      (3) Added logging enable and export to USB drive.
      (4) Automatically turn RF Power to on after Duplex is selected.
   ii) AutoTune:
      (1) AutoTune: APX 8000 Deviation Balance improvements

c) Versions

```
System:                          3.4.2.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.3.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  TETRA TMO                        1.0.39.0
  TETRA BSM                        1.0.0.0
  TETRA BST1                       1.0.0.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.4.2.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.49.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.8.0.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.3.0
```

3.3.0.0

a) New Features
   i) TETRA Trunking Mode Operation (TMO) test mode with integrated full-screen display and horizontal soft key menu.

b) Improvements
   i) Software control of system fan speed: temperatures of various sensors in the system are monitored and fan speed is gradually raised. Below 32 C, the fan remains off. At 75 C, the fan will run at 100% speed. The fan will operate at 20% in an office environment, when no external RF power is applied to the RF In/Out port.
   ii) AutoTune:
      (1) R8-APX: Improve TX Current Limit & TX Control Voltage Limit alignments.
      (2) R8-APX8000: Update several limits to match manufacturer's specs.
   iii) Presets improvements
   iv) Screen capture:
      (1) SHIFT keys match the R8100 zone hot key.
      (2) SHIFT+1 screen capture filename changed from RFZone*.jpg to RF*.jpg for consistency with other zones.

c) Versions

```
System:                          3.3.0.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.3.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  TETRA TMO                        1.0.32.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.3.0.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.49.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.8.0.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.3.0
```

3.2.0.0

a) New Features
   i) AutoTune

(1) APX8000/8500 AutoTune option.

ii) TETRA Base Station Monitoring option.

b) Improvements

i) AutoTune:

(1) Voltage and SINAD measurements are now displayed for some Rx audio tests, eliminating the need to change screens.

(2) Output levels are now displayed for Noise Squelch Threshold and Sensitivity/SINAD tests, eliminating the need to change screens.

(3) Multiple reductions in APX radio test time, including the removal of radio reset following Deviation Balance test and alignments.

(4) Message log now written to disk rather than memory, allowing at least partial data retention in the event of reboot or crash

(5) Multiple improvements in memory utilization

(6) General AutoTune engine performance improvements

(7) Bug fixes

ii) Application Performance

Multiple improvements to improve processing execution time and memory allocation

iii) Remote Front Panel Improvements

(1) User Datagram Protocol ("UDP") support added to enable application to automatically detect analyzers connected to a local network

(2) Bug fixes

iv) NXDN

Added ability to send independent test patterns in Generate and Monitor mode

v) TETRA

Improvements to measurement presentation and display esthetics

vi) R8000 Settings, Options, display improvements

Multiple improvements to presentation of option list, including minor bug fixes

vii) Miscellaneous improvements, including improved vocoder compatibility and various esthetic enhancements.

c) Versions

```
System:                          3.2.0.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.3.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.2.0.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.48.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.7.0.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.3.0
```

3.1.0.0

a) New Features

i) AutoTune

(1) Support for Kenwood NX radios using USB programming cables.

ii) P25 Phase 1 Conventional:

(1) Independent selection of test patterns in Duplex mode. User can transmit a different pattern than is being used for received BER computations.

iii) Extended Generator Output Range:

(1) Support for option R8-GEN_EXT, which allows generation of output levels from +5dBm to -125dBm from the Generate Port.

iv) M&C:

(1) GET tag OPTIONS:enabled added to return a list of the text names of all options that are enabled on the unit.

(2) GET empty string values may not be returned rather than a Format failure response (9:)

(3) Instruments, Tracking Generator tag TRACK_GEN:Trace Request and TRACK_GEN:Trace added to get post-processed display trace data

b) Removed

i) AutoTune:

(1) Harris XL-200 Synthesizer Test removed per Harris direction

(2) Motorola APX Front End Filter Alignment for UHF2 band removed pending resolution of Motorola firmware issue.

c) Improvements

i) AutoTune:

(1) Log timestamps include milliseconds.

(2) Harris multi-band control white pixels on R8100 background removed.

(3) Motorola APX Mobile Power Detection Limits moved to APX limit files.

(4) Motorola APX Rx BER Test radio reset when entering BER Mode to prevent communications error.

(5) Miscellaneous user enhancements

ii) Meter Zone:

(1) SINAD/Distortion display resolution increased from .01 to .01dB

(2) RF Scan

(a) Improved functionality

(i) Duplex supported

(ii) Run RF scan modes changed from Stop/Start to Off, Single and Auto

(iii) Inactive state changed so it cannot go to Locked unless Auto mode is selected. Single mode forces rescan even when squelch is open.

(iv) Locked state changed on setting Single mode from staying Locked to Scanning. So rescan is forced when Start/Stop not changed and not squelched.

(v) Locked state changed on setting Off mode from staying Locked to going Inactive.

(b) Accuracy and display enhanced

(c) Speed significantly improved

(d) Reliability of signal acquisition improved:

(e) User Interface improved:

(i) Enabled in P25, NSCN, dPMR

(ii) Run Scan State indicator colors changed from setting to readout.

(3) Squelch: Now forced closed at wide sans unless knob is fully turned counterclockwise.

(4) Instruments
- (a) Tracking Generator timing optimized
- (b) R8100 Vertical Scale indicator colored as read-only (cyan on black) when R8-ESA is not enabled

(5) P25 Phase 1
- (a) P25 Phase 1 Trunking:
  - (i) P25 Trunking Bandplan Tables set to Defaults for Bandwidth
  - (ii) BS Mode Explicit VCRx and CCRx soft keys and display indicators linked
  - (iii) Widened channel # fields to show -#### without truncation. R8100 channel frequency fields widened to show last 2 digits without truncation.
  - (iv) R8000 – Band colored as a soft key setting (white on black).

(6) Automatic Attenuation Enhancements:
- (a) Defaults to On. Spec An Reference Levels changed from 30 to 0 dBm for the noise floor.
- (b) Settings, System Settings, Auto Attn Minimum attenuation added, default 0 dB is backward compatible.
- (c) Settings, System Settings, high and low threshold soft key labels clarified.
- (d) RF Zone, Attenuation setting indicator label background colored cyan when Auto Attn is active (like Cable Sweep and RF Level Offset).
- (e) Enable for Meter Zone RF Scan when not scanning (Disabled, Locked, Inactive)

(7) Settings, About, Contact Us:
- (a) Sales - phone added +1 and prompt 1.
- (b) Service - added tickets https://service.freedomcte.com w/ toll-free prompts.
- (c) Support - phone number changed from (612) 721-5889 to +1 (833) 903-7333 prompt 2 then 2.
- (d) Font size changed from 13 to 17 points.

(8) Remote Front Panel (R8-REMOTE):
- (a) Update rate improved.
- (b) After the M&C remote session is initiated, the Remote Front Panel controls are now locked. Pressing Esc hard key resets the M&C remote control to allow Remote Front Panel control.

(9) M&C:

(a) Unused response code 6 is now "ERROR – an error occurred," and is used when an unexpected internal error in M&C processing code occurs. Internal errors previously reported by either INVALID (7) or UNKNOWN (8) are now always reported as ERROR (6).
(b) SET & DO commands, Access=READ_ONLY, Option=disabled response from OPTION (5) to INVALID (7), because the option does not matter when the command is bad.
(c) SET & DO commands, unexpected error in hard key code reports ERROR (6) and subsequent code will run as much as possible rather than be skipped entirely.
(d) SET & DO commands with non-existent <owner:tag> response from INVALID (7) to UNKNOWN (8), for consistency for FCT-1110 8 "Tag is unknown".
(e) GO command, edit type<>SUBMENU response from OPTION (4) to INVALID (7), a defect fix.
(f) HELP command, unexpected error in processing code reports ERROR (6).

(10) Spanish Language:
(a) Miscellaneous minor changes, including correction of spelling errors.
(b) Translate Settings, System Settings, and Automatic Attenuation

d) Versions

```
System:                          3.1.0.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.1.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.1.0.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.47.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.7.0.0
           - Comm                  1.6.2.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.3.0
```

a) New Features
   (1) None

b) Improvements
   i) AutoTune
      (1) Improved test limits for APX 6000B and several Kenwood NX radio models with service PC boards (not original boards).

c) Notes
   i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.
   ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009
   iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009
   iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145
   v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.
   vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a ‘Reset Averaging’ soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          3.0.1.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.0.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.0.0.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.46.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.6.3.0
           - Comm                  1.6.1.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.2.0
```

3.0.0.0

a) New Features
   i) Windows Embedded Standard OS
   ii) LabVIEW 2015 compiler
   iii) Single Side Band (SSB) support, with option R8-SSB
   iv) Automatic Rx Attentuation
   v) dPMR updated to add Chinese PDR
   vi) Gen Out Output Level Extension feature added. This feature extends the Gen Out minimum output level from -95dBm to -125dBm
   vii) P25 I Trunking Explicit Mode
   viii) P25 I NAC/System ID Decoupling
   ix) Autotune
      (1) Harris XL-200P support
      (2) Motorola APX 6000B, SRX 2200B support

b) Improvements
   i) Fixed copyrights in various places
   ii) R8-Remote changed to serve R8000.html and improve series naming
   iii) R8100 RF Zone fixed Output Level from showing Output Level Units value (Volts or Watts) instead of dBm. #6721

iv) R8100 Display Zone reverted from greying out to hiding non-applicable indicators like R8000 and most other R8100 screens. #6712

v) R8100 Display Zone Bar Graphs Frequency Error < -100Hz readout fixed from dashed to number by resizing Frequency Error string by 25 pixels and changing the caption for the indicator to Left justified. #6878

vi) R8100 Settings, Options, System indicator alignment restored. #6877

vii) Fixed bug that would change the Audio Levels in Monitor Mode or Generate AM to the FM Gen Audio levels when Bandwidth or Tone C Frequency were updated. #6832

viii) AutoTune

(1) Fixed bug that crashed app after performing at least one test with a radio which use serial based communications (Kenwood NX series or Harris XG series) and then select another radio in the AutoTune Radio Make & Model list not included in the mentioned radios. #6845

(2) Correct Front End Gain & Attenuation calculation for MOTOTRBO Enhanced Portables. #6831

(3) Improve MOTOTRBO model number/product name association. #6563

(4) Update XTL/XTS Deviation Balance, Deviation Limit, and voice modulation test scripts to use +/- Peak / 2 deviation averaging, replacing Power-Weight Avg averaging. #4745

(5) Fixed bug where “Enter Operator ID” is still displayed in message bar after an Operator ID is entered. #6888

(6) Correct partial support for Kenwood NX-200G/210G/300G portables. #6367 #6889

(7) Correct Sensitivity, TX VOX analyzer voltmeter units from Vpk to Vrms. #6800

(8) Correct MOTOTRBO radio prompt background to white from yellow. #5924

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          3.0.0.0

  DMR (MOTOTRBO)                   1.4.0.0
  Project 25                       2.5.0.0
  NXDN                             2.0.0.0
  TETRA                            1.0.0.0
  dPMR                             1.1.0.0
  P25 II                           1.1.3.0
  PTC-ITCR                         1.0.2.0

  Application:                     3.0.0.0
  Dynamic Link Library:            1.3.0.0
  Signal Service Provider:         1.46.0.0
  Sound Device Interface:          1.0.2.0
  Firmware - Control:              1.6.3.0
           - Comm                  1.6.1.0
           - TX                    1.7.1.0
           - RX                    1.3.1.0
           - BIOS                  1.17.5.0 or 3.15.1.0
  Operating system:                6.1.2.0
```

2.3.4.0

a) New Features

i) P25 conventional vocoder, option R8-P25_VOC, added to send received audio to the speaker and Demod Out port in Monitor or Duplex mode.

ii) Cable Sweep feature added to System Settings menu. Two cable-specific attenuation values for 100 MHz and 1 GHz may be entered to linearly interpolate the cable loss at any given frequency. That loss is applied to the various measurements and levels as is done for the RF Level Offset. #6503

iii) Spec An Occupied Bandwidth (OBW) feature added to the Enhanced Spectrum Analyzer option (R8-ESA) in the full-screen Instrument display.

iv) AutoTune

(1) Relm BK KNG-Pxxx radio series support added.

(2) Harris XG-100M radio series support added.

(3) Harris P7300 radio model added. #6776

(4) Motorola APX Front End Filter alignment added. #6703

b) Improvements

i) NXDN Trunking Eye Diagram Display Mode Fade Away selection enabled. #6160

ii) P25 Trunking Eye Diagram Display Mode Fade Away selection enabled. #6160

iii) P25 Phase 2 RF Zone Input Level fixed. #6785

iv) P25 Phase 2 now stays in Duplex when entering the mode from Duplex, instead of reverting to Monitor. #6794

v) DMR now stays in Duplex when entering the mode from Duplex, instead of reverting to Monitor. #6794

vi) Spec An Detector type setting added to Display Zone, Instrument, and Dual Display screens. Setting values are Power, Peak (default), Sample, Mean, Valley. The detection was previously controlled automatically by using Peak for Span<=158kHz and Power for greater. Now the user may select the most appropriate type for the specific test scenario.

vii) M&C busy response times modified so that subsequent commands are not rejected by N/A response. #6859

viii) Fix no RF from Generate/Duplex after loading Monitor preset with an Audio Zone modulation mode enabled. #6850

ix) Fix blue operation mode navigation hard keys (Monitor, Generate, Duplex) which might not update the vertical soft key menu the first time pressed, in some contexts (e.g. DMR, PTC, an TETRA test mode zones). #6871

x) Filter Monitor/Center Frequency excess cursor key and spin knob events so changes are not buffered up causing RF to continue changing after the editor value stops changing. #3478

xi) Change key repeat rate to improve system responsiveness to long keypress events. #6869

xii) AutoTune:

(1) Test Report columns are dynamically resized to fit the widest content.

(2) Test grid may be scrolled to show hidden tests that are currently running. #6776

(3) Motorola APX models skip IP Address query if USB device ID is not present to prevent a long delay before the user is warned of radio communication issue if the radio programming cable is disconnected or the radio is powered off. #6702

(4) Correct issue which prevented Harris XG-75 models from performing Reference Oscillator Frequency alignment. #6844

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          2.3.4.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.4.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.1.2.0
PTC-ITCR                         1.0.2.0

Application:                     2.3.4.0
Dynamic Link Library:            1.3.0.0
Signal Service Provider:         1.45.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.3.0
         - Comm                  1.6.1.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.58.1
```

2.2.1.0

a) New Features
   i) N/A

b) Improvements
   i) Display Zone:
      (1) Fix R8100 blue zone selection border position by a few pixels.
   ii) P25 Trunking
      (1) The zone still shows that the default BS Mode is Implicit (a read-only indicator added in system version 2.2.0.0).
      (2) The Options screen, System field was widened to show "(R8-P25_EXP)". The option LED was added in system version 2.2.0.0, but the order-by part number was truncated.

c) Notes
   i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          2.2.1.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.3.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.1.0.0
PTC-ITCR                         1.0.2.0

Application:                     2.2.1.0
Dynamic Link Library:            1.3.0.0
Signal Service Provider:         1.44.1.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.2.0
         - Comm                  1.6.1.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.55.1
```

2.2.0.0

a) New Features
   i) P25 Phase 1 Conventional Test Pattern "Modified 1011 Hz" added to get a 0% BER when testing a live base station. #6736
   ~~ii) P25 Phase 1 Trunking NAC field added and settable independent of the System ID.~~
   ~~iii) P25 Phase 1 Trunking Explicit Mode Option (R8-P25_EXP) to transmit explicit channel frequencies to the subscriber rather than channel numbers.~~
   iv) P25 Phase 2 Duplex mode enabled with capability to synchronize with the base station RF for BER testing.
   v) Audio Zone Tone C added for Generate/Duplex FM/AM Off/Continuous, Frequency 0-99999.9 Hz, and Level per Bandwidth.
   vi) AutoTune
      (1) Motorola APX 1000 supported (minus Tx Power Out alignment). #6694
      (2) Motorola APX 4500 900 MHz support added. #6669
      (3) Motorola SRX 2200 support added. #6668

b) Improvements
   i) RF Zone
      (1) Generate Frequency cannot ignore last of many rapid changes. #6750
      (2) Output Level cannot ignore last of many rapid changes. #6750
   ii) Audio Zone
      (1) Renamed Audio Sum and Mod Sum to Sum [of Levels]. #6706
      (2) Renamed Microphone In to Microphone like soft key. #6706
      (3) Fixed Synth, Format PL, Freq indicator colors. #6706
      (4) Fixed indicator alignment. #6706
      (5) Rearranged screen indicators to match soft key order. #6706
      (6) Suppressed Gen AM% Sum zero decimals. #6706
      (7) Prevent multiple soft key reconfigurations during preset loads. #6706
      (8) Stopped display code from wasting CPU when Test Mode is not Standard. #6706
      (9) Tone A & B Frequency maximum increased by 0.1 Hz to 20 kHz. #6737
   iii) Display Zone

(1) Eye Diagram, Display Mode added to DPMR, NXDN, P25 Phase 2, PTC-ITCR, and M&C. #6160

iv) AutoTune

(1) Motorola APX Distortion test improved to use audio from radio module rather than from test script. Supports various audio levels needed by different RF bands. #6669

(2) Motorola APX reset if network interface isn't present. #6702

(3) Motorola APX UHF2 0 W fixed for Tx Power limits. #6720

(4) Motorola APX 900 MHz Tx Power Out test and alignment test limits fixed with CPS Transmit Power Levels values. #6735

v) R8000

(1) Soft key refreshing reduced to limit flashing when assigning or reconfiguring soft keys like R8100.

vi) R8100

(1) RF Zone Output Level indicator fixed for non-dBm units. #6721

(2) Voice Loopback On/Off indicator, progress, and message fixed (P25, NXDN, dPMR). #6707

(3) Phase 1 conventional Voice Frame Decode (Display Zone and Meter Zone) Frame number least significant digits shown and width increased. #6691, #6692

(4) GUI zone covers improved for Tracking Generator and Cable Fault. Zone Titles and selection borders show since their soft keys are still selectable. #4780

vii) Miscellaneous

(1) Meter Zone instrument covers fix when an instrument is running (e.g. Instrument, Tracking Generator, Test, Esc, Esc). #4780

(2) Fix horizontal soft key issues. Prevent reconfiguring from automatically closing and ignoring key presses except Escape. They are refreshed while open and not shown until initialized. #6726

(3) FPGA register corruption workarounds cleaned up, average parameter setting time improved though some may have increased. #3536

(4) Please Wait messages conformed to proper-case and no period.

(5) Screen shot file name for Shift+0 changed from R8000YYMMDD_HHMMSS.jpg to ScreenYYMMDD_HHMMSS.jpg. #6684

viii) M&C command *IDN? removed "R8000" from: "Freedom Communication Technologies, Inc. R8000 Communications System Analyzer Model:R8..." #6684

ix) The product boot splash screen no longer contains the term "R8000" to make the graphics more suitable to a variety of product lines. #6684

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

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xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a ‘Reset Averaging’ soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          2.2.0.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.3.0.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.1.0.0
PTC-ITCR                         1.0.2.0

Application:                     2.2.0.0
Dynamic Link Library:            1.3.0.0
Signal Service Provider:         1.44.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.2.0
         - Comm                  1.6.1.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.55.1
```

2.1.2.0

a) New Features

i) N/A

b) Improvements

i) Prevent a USB-attached DVSI vocoder from interfering with AutoTune radio communication.

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

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vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

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xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          2.1.2.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.2.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.0.1.0
PTC-ITCR                         1.0.2.0

Application:                     2.1.2.0
Dynamic Link Library:            1.3.0.0
Signal Service Provider:         1.43.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.2.0
         - Comm                  1.6.1.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.55.0
```

2.1.1.0

a) New Features
   i) AutoTune
      (1) Harris XG-75 series support
      (2) Kenwood NX-706, -806 models support. #6671

b) Improvements
   i) Improve PTC EVM and power magnitude measurements.
   ii) Correct forcing of user RF Power setting to On only when changing from Monitor mode. #3235
   iii) Add unit serial number to Settings > Options screen removed in 2.0.0.0. #6550
   iv) Improve serial number text display on Settings > Options screen so that trailing characters are displayed. #6589
   v) R8000:
      (1) Restore freedomcte.com URL fixes reverted by PTC merge for 2.0.0.0. #6699
   vi) R8100:
      (1) P25 View Frame History Latency in System Version 2.0. #6691
      (2) P25 Frame # Does Not Update Correctly In System Version 2.0. Assure all Frame # digits visible in Display and Meter zones. #6692
   vii) AutoTune
      (1) Motorola MOTOTRBO Enhanced Light models now use correct Rx BER test limit. #6612
      (2) Add missing test limits for Motorola MOTOTRBO Enhanced Entry Professional VHF models. #6629
      (3) Motorola MOTOTRBO Enhanced portables now show signed softpot values for Reference Frequency alignment, test. #6639
      (4) Correct issue where Motorola MOTOTRBO VHF Entry Professional portables do not generate enough power to begin Reference Frequency alignment. #6640
      (5) In R8100 AutoTune, improve truncated model number text. #6693
      (6) Correct AutoTune message log duplication. #6695
      (7) Update MOTOTRBO Front End Filter for both portables and mobiles to not perform either alignment or test if not supported by radio. #6698

(8) Motorola APX UHF2 portables now use correct Tx Power test limits. #6720

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a ‘Reset Averaging’ soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          2.1.1.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.2.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.0.1.0
PTC-ITCR                         1.0.2.0

Application:                     2.1.1.0
Dynamic Link Library:            1.3.0.0
Signal Service Provider:         1.43.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.2.0
         - Comm                  1.6.1.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.55.0
```

2.0.0.0

a) New Features
   i) Positive Train Control (PTC-ITCR) test mode
   ii) R8100 support (new platform)

b) Improvements
   i) Improve floating-point number editing. #3438, #3710
   ii) The Eye Diagram, Display Mode soft key is now accessible in Duplex mode. #6160
   iii) AutoTune
      (1) Correct Kenwood NX series radio communication initialization to support multiple baud rates. #6635
      (2) Add support for serviced Kenwood NX series models. #6587
   iv) Corrected a 1.19.2.0 mitigation of an issue [#3536] that triggered erroneous "SYSTEM| :(7001) HARDWARE FAILURE... Status=0" messages. This improvement avoids hiding actual fault conditions. #6643

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          2.0.0.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.2.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.0.1.0
PTC-ITCR                         1.0.0.0

Application:                     2.0.0.0
Dynamic Link Library:            1.3.0.0
Signal Service Provider:         1.43.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.2.0
         - Comm                  1.6.1.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.55.0
```

1.19.2.0

a) New Features

i) Add support for updated R8xxx product hardware.

b) Improvements

i) Update *IDN? M&C query company name to Freedom Communication Technologies, Inc. #6593

ii) Various system initialization changes improve system reliability. #4868, #4369, #4871, #4872, #4946, #4949

iii) Boot graphics are improved by removing a black border that appears at initial power up and by reducing graphical transitions that occur during startup. This change also help maintain consistency of appearance for the various R8xxx product revisions.

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.19.2.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.2.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.0.1.0

Application:                     1.19.2.0
Dynamic Link Library:            1.2.0.0
Signal Service Provider:         1.42.3.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.1.0
         - Comm                  1.6.0.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.5.0 or 3.15.1.0
Operating system:                3.1.55.0
```

1.19.0.0

a) New Features
   i) P25 Phase 2
   ii) AutoTune
      (1) Add Real-Time Clock (RTC) alignment for Kenwood NX series radios.
      (2) Add support for Kenwood NX-*G models.
      (3) Add support for APX 4000 two-knob models. #6456.
      (4) Add support for digital (P25/DMR) Tx tests. #4461, #4924, #4925
   iii) Add separate analog, digital measurement averaging functions. #6347

b) Improvements
   i) Improve Meter Zone Frequency Counter measurement accuracy. #6412, #6382
   ii) Display serial number on About, Options screen. #6550
   iii) Show frequency-related softkeys upon exiting trunking test modes. #6064
   iv) Replace General Dynamics branding with Freedom branding. #6481
   v) As of this release, R8000 products read and write files in a FREEDOM folder on USB media; the \GDSATCOM folder is no longer used. #6481
   vi) As of this release, R8000 update processing reads files from the USB media \FREEDOM\R8000 folder; the \GDSATCOM\R8000A folder is not used. #6481
   vii) Distribution Plot for P25 phase 1 improved.
   viii) Eye Diagram is now pre-configured for Display Mode Normal to avoid "Reconfiguring Eye Diagram... Please Wait" message 5025 and a multi-second delay before first use. #6442
   ix) Power Profile, Select View, Frame setting moved before Slot 1 to become the default view for TETRA and P25 II. The change ensures that a P25 II burst is seen regardless which logical channel or asymmetrical slot is active.
   x) P25 Phase 1 Conventional RX modulation type now configured for LSM and WCQPSK which horizontally stabilize their Eye Diagram. #6388
   xi) AutoTune
      (1) Correct RCMP protocol Rx BER Control Invalid_Parameter result when Disable 170 attempted. #6540

(2) Improved MOTOTRBO XPR portable TX Power Out alignment to correct ineffective softpot updates and test report power measurements not coinciding with the reported softpot values. #6363, #6364

(3) Update Kenwood NX portable test setup diagram radio to analyzer cable type. #6381

(4) Correct Kenwood NX Maximum Deviation NXDN alignment, test to use correct audio lowpass filter setting. #6050

(5) Updated all APX portable Tx Power Out UHF 2 test limits to more appropriate levels. #5915

(6) Update APX portable test setup diagrams to remove 3D image of RLN4460_ to make more room for setup diagram schematic. Add test to image to indicate RLN4460_ settings. Also add expected power supply voltage and current limit. #5367

(7) Update APX portable Reference Frequency Align test limits to match radio service manual limits. #6507

(8) Correct too narrow RF bandwidth filter for MOTOTRBO modulation balance alignment and test. #6493

(9) Add missing MOTOTRBO TX Power Out test limits. #6406

(10) Correct MOTOTRBO Digital Sensitivity (Tx BER) test missing modulation. #6496

(11) Improve APX power detector calibration for speed and accuracy. #6436, #6517

(12) Add missing APX 900MHz portable Tx Power Out test limits. #6070

(13) Correct defect where only APX 6000 and 7000 models were detected as portables, causing newer portable models to be treated as mobiles. #6505

(14) For APX portables, print frequency steps in message bar status during power detector calibration alignment. This additional information helps the user know how the power detector calibration is proceeding. #6055

(15) Enable prompt to switch antennas for APX High Power dual-band models. #6366

(16) Correct XTS 5000 TX Power UHF1 alignment failure. #6346

(17) Add Kenwood NX connected radio model number to the popup screen text displayed when a connected model is not a supported model. #6400

(18) Do not perform inconsistent Internal Voice Modulation test for XPR 7000 series portables. #6354

(19) Correct defect that prevented most MOTOTRBO mobiles from performing Front End Filter alignment. #6534

(20) Correct XPR 6580 IS (CSA) Tx Power High test limits to better align with radio capability. #6542

(21) Increase MOTOTRBO Modulation Balance test audio voltage adjustment attempts to better test radio performance. #6549

(22) Reduce test time for APX radios. #4740

(23) Correct scenario where Kenwood NX Rx Sensitivity test is prematurely preempted causing subsequent Rx Squelch test to fail. #6564

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To work around a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a ‘Reset Averaging’ soft key press. #4950

xv) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.19.0.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.2.1.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0
P25 II                           1.0.1.0

Application:                     1.19.0.0
Dynamic Link Library:            1.2.0.0
Signal Service Provider:         1.42.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.1.0
         - Comm                  1.6.0.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.4.0
Operating system:                3.1.34.0
```

1.18.0.0

a) New Features

i) AutoTune

(1) MOTOTRBO Enhanced, Enhanced Light radios supported.

(2) Motorola APX 2000/2500/4000/4500 models supported.

(3) Motorola APX, XTL High Power radios supported. #4434

(4) Kenwood NX series radios now accessible using USB to serial adapters with Prolific ICs.

ii) P25

(1) Symbol Rate Error measurement added to conventional (Monitor and Duplex) and trunking test zones.

(2) Add Constellation Plot to Display Zone.

(3) Distribution Plot enabled.

(4) LSM and WCQPSK modulation types added.

iii) P25 Trunking

(1) Distribution Plot enabled.

(2) LSM and WCQPSK modulation types added.

b) Improvements

i) Corrected DMR test mode defect which caused DMR Symbol Deviation, FSK Error, and BER to become intermittently large. #6079

ii) Autotune

(1) Retrieve and use actual IP Address for Motorola APX radios. #5079

(2) Improve Reference Frequency alignment accuracy for Motorola XTS, XTL and APX models. #4526

(3) Improve softpot range limit checking for Motorola XTL, XTS, APX, and MOTOTRBO radio alignments. #4654

(4) Improve Motorola MOTOTRBO TX Power Out alignment predictability. #5372

(5) Update Motorola APX Tx Power Out limits to support multiple frequency sub-bands. #4782

(6) Improve alignment performance for Motorola XTS, XTL, and APX Reference Frequency, Deviation Balance, and/or Deviation Limit alignments to prevent indefinite softpot adjustment in case something with the measurement goes wrong. #5482

(7) Improve Motorola MOTOTRBO test setup diagrams. #6052

(8) Separate Motorola APX Reference Frequency alignment, test limits to better conform to radio service manual specifications. #5182

(9) Correct potential poor Tx Power Out alignment performance on MOTOTRBO High Power mobiles. #6172

(10) Correct Motorola MOTOTRBO radio connection issue where radio may not enter test mode if Connect Plus channel selected. #5240

(11) improve portable APX UHF2 band radio Tx Power Out test limits from 5.3 - 5.5 W to a wider 5.0 - 5.6 W. This change better reflects the radio's practical power output performance. #5915

iii) Prevent Output Level default value from overriding a preset's Output Level value. #4512

iv) Eye Diagram RF Overload reaction flatline and warning message removed. #5234

v) P25 NAC and voice frame encoder field changes applied correctly after various configuration events. #5586

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) Beginning in the 1.17.0.0 release, the Settings, Calibration... softkey is hidden by default. The R8000 does not typically require a field calibration once it has left the factory. However, if instructed to do so by technical support, a field calibration may be performed. Specific instructions for performing a field calibration will be provided by technical support at the time such calibration is needed.

iii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iv) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

vi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

viii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

ix) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

x) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xi) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xii) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xiii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiv) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xvi) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xvii) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xviii) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.18.0.0

DMR (MOTOTRBO)                   1.4.0.0
Project 25                       2.1.0.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0

Application:                     1.18.0.0
Dynamic Link Library:            1.2.0.0
Signal Service Provider:         1.42.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.0.0
         - Comm                  1.6.0.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.4.0
Operating system:                3.1.34.0
```

1.17.1.0

a) New Features
   i) N/A

b) Improvements
   i) Autotune
      (1) Improve Kenwood NX series RX sensitivity test speed. #5994
      (2) Correction to perform RSSI alignment at NXDN Narrow bandwidth for NX-901 mobiles. #5950
      (3) Correct Kenwood NX series RX Squelch test to only perform test rather than alignment and test. #5966
      (4) Update APX portable External Voice Modulation test to use correct analyzer audio voltage and test limits. #5621
      (5) Log APP version, APX radio model number, serial number, and supported RF bands. #5910
      (6) Add missing Motorola XTS 1500 diagrams, test limits. #5981

c) Notes
   i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) Beginning in the 1.17.0.0 release, the Settings, Calibration... softkey was hidden by default. The R8000 does not typically require a field calibration once it has left the factory. However, if instructed to do so by technical support, a field calibration may be performed. Specific instructions for performing a field calibration will be provided by technical support at the time such calibration is needed.

iii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iv) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

vi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

viii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

ix) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

x) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xi) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xii) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xiii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiv) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xvi) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xvii) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xviii) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.17.1.0

DMR (MOTOTRBO)                   1.3.0.0
Project 25                       2.0.6.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0

Application:                     1.17.1.0
Dynamic Link Library:            1.2.0.0
Signal Service Provider:         1.41.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.0.0
         - Comm                  1.6.0.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.4.0
Operating system:                3.1.27.0
```

1.17.0.0

a) New Features
   i) AutoTune
      (1) Kenwood NX series radios now supported
      (2) Motorola XTS 1500 radios now supported
      (3) Export all AutoTune test reports or test logs with a single softkey press
   ii) dPMR test package option (R8-DPMR)
   iii) ± Peak / 2 deviation averaging option

b) Improvements
   i) Add workaround to prevent TX signal loss if audio zone parameters changed. #4071
   ii) Fix P25 encoder reset to defaults error #5041
   iii) Tracking Generator Find Peak and Find Valley are now on same menu page
   iv) Autotune
      (1) Correct RF bandwidth settings for APX Internal Voice Modulation and External Voice Modulation tests. #5621
      (2) Add missing Demo radio model test setup diagram. #5491
      (3) Correct Motorola MOTOTRBO Modulation Balance test issue which could cause indefinite loop under certain circumstances. #5108

(4) Correct APX mobile dual-band Power Detector Calibration issue where first band softpot alignment only applied if second band softpot changed. #5911

v) Tracking Generator

(1) Responsiveness significantly improved. #4311

(2) Dynamic range improved to add RBW [Wide, Medium, Narrow] settings. #4311

(3) M&C effect time reduced from 5 to 4 seconds. #4311

vi) Removed asterisk from momentary display over TETRA Constellation diagram at first entry after boot. #4927

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) Beginning in the 1.17.0.0 release, the Settings, Calibration... softkey is hidden by default. The R8000 does not typically require a field calibration once it has left the factory. However, if instructed to do so by technical support, a field calibration may be performed. Specific instructions for performing a field calibration will be provided by technical support at the time such calibration is needed.

iii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iv) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

vi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

viii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

ix) When the Display Zone configured for Oscilloscope displays a signal input to Meter In port, the display may remain when the input is disconnected, though it eventually updates after an unspecified amount of time. #4315

x) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xi) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

xii) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xiii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xiv) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xv) TETRA constellation display may momentarily show erroneous results after a ‘Reset Averaging’ soft key press. #4950

xvi) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xvii) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xviii) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.17.0.0

DMR (MOTOTRBO)                   1.3.0.0
Project 25                       2.0.6.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0
dPMR                             1.0.0.0

Application:                     1.17.0.0
Dynamic Link Library:            1.2.0.0
Signal Service Provider:         1.41.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.6.0.0
         - Comm                  1.6.0.0
         - TX                    1.7.1.0
         - RX                    1.3.1.0
         - BIOS                  1.17.4.0
Operating system:                3.1.27.0
```

1.16.0.0

a) New Features

i) DMR Duplex

b) Improvements

i) AutoTune

(1) Log the current RF Level Offset state and value to the AutoTune message log. Since the RF Level Offset affects power measurements, knowing its state and value are important when troubleshooting. #5297

(2) AutoTune: Remove TX Power VHF, UHF1, and UHF2 Mid power limits. Only 700/800 MHz band models use TX Power Mid power limits. #4763

(3) Compare measurements to 1 digit of precision for APX External Voice Modulation tests to reduce test failures. #4860

(4) Allow test limit values to range between +/-9999.999 to accommodate some higher band Reference Frequency test limits. #5370

(5) AutoTune: Correct Reference Frequency test limits. #5360

(6) Add support for Motorola XTS 2500/5000 900 MHz models and XTL 900 MHz models.#4919

(7) Options screen refreshed to better contain AutoTune options. Option(s) renamed to fit new screen width. Settings, About..., AutoTune screen obsoleted. #4962

(8) Add support for Motorola APX 7000XE models. The following APX models are known to be supported. Support is primarily a function of whether the model's model series value is recognized by the AutoTune software. #4969

(a) Portables: APX 7000, APX 7000XE, APX 6000, APX 6000XE, APX 6000Li, APX 5000

(b) Mobiles: APX 7500, APX 6500, APX 6500Li, APX 5500

(9) Correct several XTS TX Power Out alignment defects which could prevent some radios, especially VHF band models, from successfully aligning. #5264 #5265 #5266 #5267

ii) Correct RF Level Offset defect which prevented output level values beyond normal port limits. Output level values may now exceed port limits as long as the following inequality is satisfied: minimum port output level <= Output Level - RF level port offset value <= maximum port output level #5278

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

ix) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

x) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xi) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiii) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xiv) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xv) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xvi) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.16.0.0

DMR (MOTOTRBO)                   1.3.0.0
Project 25                       2.0.6.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0

Application:                     1.16.0.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.38.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.26.0
```

1.15.0.0

a) New Features

i) NXDN Trunking Type C support added.

ii) RF Level Offset. Apply an offset to input measurements and output signals to compensate for cable loss, attenuators, amplifiers, etc.

iii) Extended Tone A, Tone B frequencies. The Tone A and Tone B frequencies now support sub-Hz resolution (0.1 Hz).

iv) Extended DPL codes. All 512 possible DPL codes are now available for use.

v) AC Voltmeter dBr measurements. The AC Voltmeter can now display relative dB measurements (dBr), allowing normalization of a dB measured value to a reference input voltage.

vi) Spectrum Trace Math. Adds the ability to normalize the spectrum analyzer trace using several normalization effects. #4965

b) Improvements

i) AutoTune

(1) Correct XTS portables and MOTOTRBO portables TX Power Out alignment to report failed output power when the radio cannot achieve nominal output power. #4654

(2) Improve XTS portables and MOTOTRBO portables TX Power Out alignment to use a mid-range starting softpot if the programmed softpot is outside known good softpot range. #5223

(3) Correct the MOTOTRBO Sensitivity test that inappropriately disabled Fixed 1 kHz audio under some test conditions. #5131

(4) Print information message when test limits are saved or when default test limits are loaded. #5161

ii) P25 Trunking

(1) Show Display Zone Spec An frequency soft keys during BER Test; now includes Instrument Spectrum Analyzer, and Dual Display Spectrum Analyzer. #5221

(2) Prevent changing Monitor Frequency via Display Zone Center Marker and Center Peak by hiding the softkeys when in P25 Trunking test mode. #5221

(3) Rename fields from Control & Voice Chnl to Channel for consistency with the associated soft key. #5227

iii) Error handling improvements. #4690

iv) Standardize the appearance of Trigger settings. #4965

v) Standardize screen labels for Vertical Scale and Horizontal Scale. #5100

vi) Standardize the appearance of the Center, Start, and Stop frequency labels. #5098

vii) Standardize the resolution bandwidth screen labels. #4965

viii) Standardize the appearance of all marker displays. #4965

ix) Marker Mode Off clears highlight to prevent multiple highlights when the previous marker was not the first marker. #5089

x) Tracking Generator Display Mode, Average, Count is visible to improve user interface consistency. #5120

xi) Prevent the message bar message 'Requested Operating Mode Invalid in Current Test Mode' from appearing in P25 Trunking or NXDN Trunking mode after loading the factory configuration preset. #5215

xii) Correct PL and DPL internal decodes to function at some specific frequencies. #3603

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) When configuring the Analyzer's network interface settings, it is preferable to use DHCP IP Address assignment. Use of static IP Addressing is not consistently possible. To effectively assign the Analyzer a fixed IP address, the DHCP server is ideally configured to assign IP Addresses by MAC address. For more information on resolving network configuration issues, refer to the Troubleshooting section of the product user manual. #3320, #4009

iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

ix) When DHCP "On" is applied after configuration of a static IP address, the static address is not relinquished and the unit does not acquire a new address from DHCP. This gives a false impression that the static address was acquired from DHCP. Disable and re-enable of the network connection works around this condition. #4519

x) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

xi) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xii) APX AutoTune: In the event that the External Voice Modulation test fails, adjust the External Voice Modulation:Max test limit to 3.6 kHz. #4860

xiii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiv) TETRA constellation display may momentarily show erroneous results after a ‘Reset Averaging’ soft key press. #4950

xv) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xvi) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xvii) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.15.0.0

DMR (MOTOTRBO)                   1.2.0.0
Project 25                       2.0.6.0
NXDN                             2.0.0.0
TETRA                            1.0.0.0

Application:                     1.15.0.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.38.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.26.0
```

1.14.1.0

a) New Features

i) AutoTune for Motorola MOTOTRBO Core portable, mobile radios

ii) NXDN

(1) Radio Access Number (RAN) support

(2) Kenwood FSW+PN9 Pattern support

iii) DMR

(1) Symbol Deviation measurement added. #4976

b) Improvements

i) DMR FSK Error measurement improved. #4976

ii) NXDN

(1) Correct Generate Test Pattern after using Voice Loopback. #4961

(2) Correct 9600bps, 1031 Hz Tone pattern. It used VCH in the last frame but should have used FACCH instead. #4959

(3) Correct NXDN Generate 1097 Exception. #4947

(4) Clarified and reordered the two 511 test pattern names. #5049

iii) P25

(1) Correct generate test patterns corrupted under various scenarios, including voice loop and NAC editing. #4571

(2) AFC, Busy, and Idle test patterns replaced by Voice Frame Encoder procedures in the manual. #4571

(3) Conventional and Trunking, Test Pattern screen indicator displays the same name as the "1011 Hz Tone" soft key instead of "Standard Tone". #4936

(4) Generate mode NAC soft key hidden and screen indicator disable (grayed out) for non-voice-frame patterns. #4945

(5) Trunking, BER Test, Test Pattern changes update the screen indicator. #4628

(6) Rename P25 conventional and trunking test pattern from "Calibration" to "Calibration (Tone 5%)" to identify what it is based on. #5049

iv) Correct occasional exception which occurred when using digital test modes. #4703

v) Oscilloscope Set DC Offset corrected. #4606

vi) AutoTune

(1) Correct receive test (e.g., Distortion) occasional failures. #5027

(2) Improve XTS TX Power Out alignment time and to skip an alignment frequency if tune attempts fail. #5053

(3) Improve Toggle Test Selection softkey placement. #4896

(4) Initialize Span to 158 kHz prior to each AutoTune test sequence execution. Specifically set units to kHz. #4909, 4451

(5) Correct Test Report To Open selection issue where test report selection other than most recent test opened most recent test. #4601

vii) Hide Spectrum Analyzer soft keys in Generate mode. #4965

viii) Correct Output Level lag when Output Level changed rapidly via arrow/spin knob. #4688

ix) Corrected issue where non-Standard Test modes would have their Modulation Mode disabled when loaded from a Preset after start up. #4540

c) Notes

i) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

ii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iii) It is not presently possible to configure the Analyzer with a static IP address. Use of DHCP is required. For consistency through power cycles, a DHCP server should be configured to assign an IP Address to the Analyzer based on its MAC address. #3320, #4009

iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

v) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vi) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

vii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

viii) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

ix) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

x) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

xi) APX AutoTune: In the event that the External Voice Modulation test fails, adjust the External Voice Modulation:Max test limit to 3.6 kHz. #4860

xii) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

xiii) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xiv) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xv) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xvi) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.14.1.0

DMR (MOTOTRBO)                   1.2.0.0
Project 25                       2.0.6.0
NXDN                             1.2.0.0
TETRA                            1.0.0.0

Application:                     1.14.1.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.38.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.26.0
```

1.13.0.0

a) New Features
   i) TETRA protocol

b) Improvements
   i) Correct a wrong model number from displaying on the Settings > About… screen of recently manufactured units. #4880
   ii) Prevent a brief visual anomaly from occurring under various conditions. #4927
   iii) Dispense with reporting of an R8-LPN option to reduce confusion. The Low Phase Noise feature is implemented in hardware whereas other reported options are software features. #4905
   iv) Corruption of displayed parameters on the bottom line of the full-screen oscilloscope is corrected with this release. #4908
   v) The Output Level maximum range is corrected and a calibrated generation level is assured when the modulation type is AM and when certain instrument or test modes are exited. #4505, 4850

c) Notes
   i) Before performing a field calibration, place the product in the Standard FM (Analog) mode of operation. #4906

ii) For best results when using the Remote Front Panel (R8-Remote option), rotate the local Squelch knob fully counter-clockwise, enable Settings > Network Setup > Network Connection after a restart, and use dynamic IP addresses (DHCP On). Using the Generate or Duplex modes of the R8000 is not recommended while using the Remote Front Panel option.

iii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #3320, #3765, #4009

iv) It is not presently possible to configure the Analyzer with a static IP address. Use of DHCP is required. For consistency through power cycles, a DHCP server should be configured to assign an IP Address to the Analyzer based on its MAC address. #3320, #4009

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #3617, #4145

vi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

vii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus impacting certain measurements. #3956

viii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

ix) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

x) The P25 pattern generator may have degraded BER measurements if cycling through certain modes. To workaround, change the modulation state from Continuous to Off and back to Continuous. #4571

xi) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this, the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. #4595

xii) The receiver is presently calibrated only above 10 MHz. #4596

xiii) APX AutoTune: In the event that the External Voice Modulation test fails, adjust the External Voice Modulation:Max test limit to 3.6 kHz. #4860

xiv) TETRA constellation display may momentarily show erroneous results after a 'Reset Averaging' soft key press. #4950

xv) In generate mode, the TETRA modulation spectrum/constellation diagrams are disabled without any on-screen indication of this fact. #4951

xvi) In TETRA test mode, the RF Zone Freq Error measurement averaging is controlled by TETRA-specific averaging settings and the System Settings are not used. #4952

xvii) After removal of a valid TETRA DMO signal, the Input Level measurement continues to show the last reading until a valid signal is re-applied. This reading may also dynamically change as a result of alterations to input attenuation and other conditions such as temperature change. #4953

d) Versions

```
System:                          1.13.0.0

DMR (MOTOTRBO)                   1.1.11.0
Project 25                       2.0.2.0
NXDN                             1.0.0.0
TETRA                            1.0.0.0

Application:                     1.13.0.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.38.1.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.25.0
```

1.12.3.0

a) New Features
   i) DMR Power Profile
   ii) DMR Voice Loopback
   iii) Tracking Generator Normalization
   iv) FM Pre/De-emphasis
   v) Audio weighting filters (CCITT, C-Message)
   vi) AutoScript (beta)
   vii) P25
      (1) Add Copy NAC to Generator softkey to copy received NAC to P25 Generate mode NAC.
      (2) Add monitor NAC indicator in P25 zone.
   viii) RF Scan: Add Start, Stop soft keys to allow user manual control over when scanning begins and ends.
   ix) AutoTune for Motorola APX 6000/6500/7000/7500 radios
   x) AutoTune
      (1) Add support for XTL Series, APX Family Mobile USB radio programming cable HKN6184_ for front GCAI connector. #4494

b) Improvements
   i) AutoTune
      (1) Improved Motorola XTS TX Power Out alignment, test performance. #4646, #4791
      (2) Corrected Motorola XTL/XTS Deviation Balance indefinite loop issue on some radios. #4584
      (3) Improved performance of Motorola XTL/XTS Reference Frequency alignment, particularly for XTS VHF radios. #4526
      (4) Improved Deviation Balance algorithm and enabled averaging to deviation measurements to improve Deviation Balance, Deviation Limit test and alignment performance. #4745
      (5) Correct issue where wrong test report opened if system time was set prior to 01/01/2010. #4787
      (6) Correct issue where CPU starvation occurred after multiple AutoTune test sequences performed. #4849
      (7) Correct inescapable popup under certain conditions during Reference Frequency alignment. #4851
   ii) Added true RMS deviation averaging. #4222
   iii) P25

(1) P25 Trunking BER test pattern applies correctly. #4628

(2) Link Control Opcode (LCO) correctly displays selection of 3 – U2U_V_CH_USR. #4581

iv) DMR

(1) Corrected issue where DMR Monitor Input Level continued to report the last computed input level after the radio was dekeyed and synchronization lost. #4692

(2) Improved symbol synchronization algorithm. #4348

v) DPL generator output power conforms to TIA-603 requirement for <1% power above 300 Hz. #4559

vi) Prevent false positive error 6051 Unable to Generate Requested Power Level - Minimum Power Level Reached (in Monitor mode) when R8000 starts. #4723

vii) Default RF Attenuation is 40 dB. Default Reference Level is +30 dBm to place spectrum analyzer noise floor near bottom of display. #4736

viii) Changes to the RF Generate Port selection correctly re-calculates correct output level. #4610

ix) Correct possible error message seen when starting Tracking Generator. #4591

x) Corrected editor issue where certain entries (for example, backspace) were made, especially in P25 mode. #4579.

xi) Presets Delete Preset softkey presented correctly when presets are present/not present. #4575

xii) Oscilloscope correctly applies DC Offset setting. #4606

xiii) Test Mode Presets loaded at R8000 start up correctly display their zone softkey (for example, “DMR Zone…”). #4593

xiv) Correct memory read access exception occasionally observed in 1.11.x release which forced a R8000 reboot to restore normal operation. #4703

xv) Improved file handling to prevent corrupted or missing serial numbers. #4801

c) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

iii) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages.

iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

v) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vi) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

vii) It is not presently possible to configure the Analyzer with a static IP address. Use of DHCP is required. For consistency through power cycles, a DHCP server should be configured to assign an IP Address to the Analyzer based on its MAC address. #4009, #3320

viii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

ix) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

x) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

xi) P25 pattern generator may have degraded BER measurements if cycling through certain modes. To workaround, change the modulation state from Continuous to Off and back to Continuous. #4571

xii) P25 trunking mode may not correctly register XTL mobile radios, preventing completion of voice calls. #4560

xiii) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xiv) AutoTune: For APX portable radios, the External Voice Modulation test may fail. To workaround, adjust the External Voice Modulation:Max test limit to 3.6 kHz. #4860

d) Versions

```
System:                          1.12.3.0

DMR (MOTOTRBO)                   1.1.11.0
Project 25                       2.0.2.0
NXDN                             1.0.0.0

Application:                     1.12.2.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.38.1.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.25.0
```

1.11.2.0

a) Improvements

i) Fix R8000B RX & TX frequency error. A symptom was a Spec An power ripple (+/-0.8 dB). #4642

b) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

iii) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages.

iv) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Analyzer with a static IP address. Use of DHCP is required. For consistency through power cycles, a DHCP server should be configured to assign an IP Address to the Analyzer based on its MAC address. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

xii) AutoTune: On some XTS 2500 radios, Deviation Balance alignment softpot changes may not apply correctly causing alignment to hang. To workaround, adjust the Deviation Balance test limit to 3%. This issue will be addressed in a future release. #4584

xiii) P25 pattern generator may have degraded BER measurements if cycling through certain modes. To workaround, change the modulation state from Continuous to Off and back to Continuous. #4571

xiv) P25 trunking mode may not correctly register XTL mobile radios, preventing completion of voice calls. #4560

xv) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xvi) AutoTune: On XTS radios, TX Power Out alignment may hang during Mid or High power band. To workaround, use a battery eliminator and perform the alignment by itself after radio has been off at least 30 minutes. This issue will be addressed in a future release. #4646

xvii) DMR Monitor Input Level continues to report last computed input level after radio is unkeyed and synch is lost. To workaround, switch to Generate mode and then back to Monitor mode. #4692

c) Versions

```
System:                          1.11.2.0

DMR (MOTOTRBO)                   1.1.8.0
Project 25                       2.0.2.0
NXDN                             1.0.0.0

Application:                     1.11.0.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.37.2.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.20.0
```

1.11.1.0

a) Improvements

i) Fix DMR Monitor measurements susceptibility to corruption at analyzer start up. #4572

ii) Upgrade DMR Monitor SYNC pattern processing. #4623, #4624

iii) Correct DMR Monitor Constellation anomalies and improve DMR zone measurements. #4589

iv) Enhance DMR Monitor sub-system infrastructure. #4625

b) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

iii) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages.

iv) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vii) The R8-Remote option supports remote, unattended operation, but the network connection may not persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Analyzer with a static IP address. Use of DHCP is required. For consistency through power cycles, a DHCP server should be configured to assign an IP Address to the Analyzer based on its MAC address. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

xii) AutoTune: On some XTS 2500 radios, Deviation Balance alignment softpot changes may not apply correctly causing alignment to hang. To workaround, adjust the Deviation Balance test limit to 3%. This issue will be addressed in a future release. #4584

xiii) P25 pattern generator may have degraded BER measurements if cycling through certain modes. To workaround, change the modulation state from Continuous to Off and back to Continuous. #4571

xiv) P25 trunking mode may not correctly register XTL mobile radios, preventing completion of voice calls. #4560

xv) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xvi) AutoTune: On XTS radios, TX Power Out alignment may hang during Mid or High power band. To workaround, use a battery eliminator and perform the alignment by itself after radio has been off at least 30 minutes. This issue will be addressed in a future release. #4646

c) Versions

```
System:                          1.11.1.0

DMR (MOTOTRBO)                   1.1.8.0
Project 25                       2.0.2.0
NXDN                             1.0.0.0

Application:                     1.11.0.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.37.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.20.0
```

1.11.0.0

a) New Features

i) Meter Zone Duplex mode Decode Burst for General Sequence tones

ii) Import and export Preset files

iii) Tracking Generator Marker Type with Point Cross, Vertical bar, Horizontal bar, and cross bars types

b) Improvements

i) General Sequence decoder

ii) Correct issue where decoding stopped after initial decode. #4506

iii) Tracking Generator markers retain frequencies when graph reconfigured by either number of points or by a Span change. #4311

iv) Preset UI asks for delete confirmation before removing a Preset #4513 #3204

v) Corrected issue where external/internal PL/DPL decoders failed under certain conditions. #4458

vi) Redesigned Network Settings screen. #4519

vii) Corrected issue where non-Standard Test modes would have their Modulation Mode disabled when loaded from a Preset after start up. #4540

viii) AutoTune

(1) Corrected compatibility with Motorola XTS 5000 radios with firmware revisions up to and including R16.00.00. #4548

(2) Motorola XTS radios now calibrated, tested at all correct frequencies during applicable tests and alignments. #4527

(3) If only Motorola XTS option enabled, applicable test setup diagram is now correctly shown. #4510

(4) In Test Reports menu, irrelevant softkeys are hidden when no test logs are present. #4525

(5) Start softkey correctly updated if conditions for its display are met but then another radio is selected. #4516

(6) Deviation measurements now performed with more appropriate RF bandwidth settings. #4463 #4450

(7) Correct issue where Deviation Balance alignment could retry to infinity at a particular frequency if poor measurements were detected. #4553

(8) Analyzer state initialization performed before beginning any test or alignment. ##4553

(9) Correct issue where TX Power Out alignment, test could retry indefinitely under certain conditions. #4568

(10) Correct Motorola XTS TX Power Out alignment, test issue where for first points in a power band could be measured inaccurately. #4507

ix) Reduce frequency of false hardware failure messages when retuning tracking generator. #4479

x) Improve reset of Antenna and RF Gen Out port overload protection relays for port change and overload condition. #4389

xi) Corrected issue where output level was incorrect when switching Generate Port with the soft key in DUPLEX mode. #4505

xii) Corrected issue where audio levels were inappropriately ranged when modified through the M&C. #4504

c) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection. #4595

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz. #4596

iii) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages.

iv) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vii) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Analyzer with a static IP address. Use of DHCP is required. For consistency through power cycles, a DHCP server should be configured to assign an IP Address to the Analyzer based on its MAC address. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

xii) AutoTune: On some XTS 2500 radios, Deviation Balance alignment softpot changes may not apply correctly causing alignment to hang. To workaround, adjust the Deviation Balance test limit to 3%. This issue will be addressed in a future release. #4584

xiii) P25 pattern generator may have degraded BER measurements if cycling through certain modes. To workaround, change the modulation state from Continuous to Off and back to Continuous. #4571

xiv) P25 trunking mode may not correctly register XTL mobile radios, preventing completion of voice calls. #4560

xv) Meter Zone 2-Tone internal decoder may not decode Audio Zone A/B Sequence all the time. #4411

xvi) AutoTune: On XTS radios, TX Power Out alignment may hang during Mid or High power band. To workaround, use a battery eliminator and perform the alignment by itself after radio has been off at least 30 minutes. This issue will be addressed in a future release. #4646

xvii) DMR Monitor measurements are susceptible to corruption at analyzer start up. To workaround, save a DMR preset and then restart the analyzer. This issue will be addressed in the next release. #4572

d) Versions

```
System:                          1.11.0.0

DMR (MOTOTRBO)                   1.1.2.0
Project 25                       2.0.2.0
NXDN                             1.0.0.0

Application:                     1.11.0.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.37.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.5.0.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.20.0
```

1.10.1.0

a) New Features

i) AutoTune for Motorola XTL series, Motorola XTS 2500, and Motorola XTS 5000 radios

ii) Remote M&C interface

iii) DMR

(1) Test zone display of Source ID (Radio ID, Source Address)

b) Improvements

i) Reorganized Meter Zone

ii) PL Code editor changed to smoother list box interface.

iii) Corrected issue where Modulation data from the Mod Out BNC connector on the front panel is not useful in Monitor mode when the demodulation data is unavailable. #4271

iv) Corrected issue where METER Zone > Select Meter > General Sequence decoder tone codes may not match expected Tone Standard tone codes. #4402

v) Miscellaneous UI fixes. #4409

vi) Microphone now sampled correctly in Monitor mode. #4192

vii) Corrected DMR test mode issue where measurements could lag real-time and after continuous demodulation for over 20 minutes (e.g. over-the-air monitoring of a repeater), the DMR measurements and constellation became erroneous for about 200 seconds. #4005

viii) P25 Trunking

(1) Fixed the format of the identifier update (IDEN_UP) message.

(2) Fixed the signaling block (TSBK) on band change (UHF/VHF or 700/800 MHz).

(3) Fixed the sign of the TX Offset.

ix) Correct configuration initialization events triggering issue for RF On/Off event. #4476

x) Volume control knob response improved to use a logarithmic function for better perceived performance and higher amplification levels. #3443

xi) Modulation data from the Mod Out BNC connector on the front panel is now useful in Monitor mode when the demodulation data is unavailable. #4271

c) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz.

iii) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages.

iv) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vii) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Communications System Analyzer with a static IP address. Use of DHCP is required. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xi) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

xii) Settings, Network Setup… screen can place unapplied data into the settings fields. For example, if an out-of-range IP Address is entered and applied, the warning message persists even if a valid IP Address is entered and the change applied. To work around, ignore the warning message. When Apply Network Changes is pressed with a valid IP Address, previous warnings should be cleared. #4519

xiii) General Sequence decoding fails after the first decode. A decode test can still be performed by starting the burst before starting the decoder. #4506

xiv) AutoTune: After deleting a test log, the deleted log continues to appear in the log list until AutoTune is exited. #4525

xv) AutoTune: If only the Motorola XTS option is enabled, the Motorola XTL test setup diagram will display instead of the XTS test setup diagram. TO see the correct Motorola XTS test setup diagram, refer to the R8000 AutoTune User Guide. #4510

xvi) AutoTune: Motorola XTS radios are not calibrated at the highest frequency. This issue affects Reference Oscillator, TX Power Out, Deviation Balance, and Deviation Limit tests and alignments. #4527

xvii) RF On/Off must be pressed to output when the R8000 starts with a preset. #4487

xviii) PL decoder may fail to correctly decode PL tones. To work around, enable any one of General Sequence or 5/6 Tone decoders, then enable the PL decoder again. #4458

d) Versions

```
System:                          1.10.1.0

DMR (MOTOTRBO)                   1.1.2.0
Project 25                       2.0.2.0
NXDN                             1.0.0.0

Application:                     1.10.2.0
Dynamic Link Library:            1.1.0.0
Signal Service Provider:         1.36.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.4.5.0
         - Comm                  1.4.2.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.20.0
```

1.9.0.2

a) New Features
   i) N/A

b) Improvements
   i) A firmware change corrects an issue that prevents use of RX hardware temperature measurements to improve accuracy.

c) Notes
   i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.
   ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz.
   iii) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222
   iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.
   v) To avoid filling the message log, avoid use of the mic while in Monitor mode. #4192
   vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818
   vii) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Communications System Analyzer with a static IP address. Use of DHCP is required. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages. #3920

xi) Modulation data from the Mod Out BNC connector on the front panel is not useful in Monitor mode when the demodulation data is unavailable. Workarounds are to use Duplex mode instead or to ensure that squelch is open and the Spec An span is less than or equal to 158 kHz. #4271

xii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xiii) In DMR test mode, after continuous demodulation for over 20 minutes (e.g. over-the-air monitoring of a repeater), the DMR measurements and constellation become erroneous for about 200 seconds. Change the Burst setting to correct them. A delay may also be noticeable after the transmission. This is to be fixed in the next version. #4005

xiv) METER Zone > Select Meter > General Sequence decoder tone codes may not match expected Tone Standard tone codes. To correct, select ESC > AUDIO Zone > General Sequence Table > Select Tone Standard to indicate the desired Tone Standard to decode. Select ESC > ESC > METER Zone to view results. Decoded tone codes will now match selected Tone Standard. To decode to a different Tone Standard, repeat these steps. This issue will be corrected in the next release. #4402

xv) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834.

d) Versions

```
System:                          1.9.0.1

DMR (MOTOTRBO)                   1.1.0.0
Project 25                       2.0.0.0
NXDN                             1.0.0.0

Application:                     1.9.0.0
Dynamic Link Library:            1.0.3.0
Signal Service Provider:         1.36.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.4.1.0
         - Comm                  1.4.0.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.15.1
```

1.9.0.1

a) New Features
   i) N/A

b) Improvements
   i) A firmware change corrects an issue that resulted in periodic analyzer start up failures.

c) Notes
   i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.
   ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz.
   iii) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

v) To avoid filling the message log, avoid use of the mic while in Monitor mode. #4192

vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vii) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Communications System Analyzer with a static IP address. Use of DHCP is required. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages. #3920

xi) Modulation data from the Mod Out BNC connector on the front panel is not useful in Monitor mode when the demodulation data is unavailable. Workarounds are to use Duplex mode instead or to ensure that squelch is open and the Spec An span is less than or equal to 158 kHz. #4271

xii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xiii) In DMR test mode, after continuous demodulation for over 20 minutes (e.g. over-the-air monitoring of a repeater), the DMR measurements and constellation become erroneous for about 200 seconds. Change the Burst setting to correct them. A delay may also be noticeable after the transmission. This is to be fixed in the next version. #4005

xiv) METER Zone > Select Meter > General Sequence decoder tone codes may not match expected Tone Standard tone codes. To correct, select ESC > AUDIO Zone > General Sequence Table > Select Tone Standard to indicate the desired Tone Standard to decode. Select ESC > ESC > METER Zone to view results. Decoded tone codes will now match selected Tone Standard. To decode to a different Tone Standard, repeat these steps. This issue will be corrected in the next release. #4402

xv) The system infrequently fails to shut down properly, and requires a hard power down (initiated by holding the power button until the unit shuts down). When analyzer shut down fails, a small dialog is shown in the upper right hand corner of the screen. The dialog reads: "Resetting VI: Audio.VI". #3834

d) Versions

```
System:                          1.9.0.1

DMR (MOTOTRBO)                   1.1.0.0
Project 25                       2.0.0.0
NXDN                             1.0.0.0

Application:                     1.9.0.0
Dynamic Link Library:            1.0.3.0
Signal Service Provider:         1.36.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.4.3.0
         - Comm                  1.4.0.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.15.1
```

1.9.0.0

a) New Features

i) General Sequence encoder/decoder as a standard feature supporting up to 20 sequential audio tones.

ii) P25 Conventional Duplex operation and Voice Frame encode/decode including the network access code (NAC) field.

iii) P25 Trunking test capabilities (purchased option).

b) Improvements

i) Power meter calibration improved; requires factory calibration. #4343

ii) String editor expanded to allow entry of more than 16 characters. Use the left and right arrow keys to scroll the string editor window across strings greater than 16 characters long. #3988

iii) When capturing screenshots, the accompanying popup message appears only once per analyzer reboot. Corrected certain popup messages which mentioned that the ENTER key dismisses the popup; the Continue or Cancel soft keys are now used exclusively. #4255

iv) Display Zone > Deviation Average > RMS Average renamed to more appropriate Pwr-Weight Average. #4222

v) Meter Zone > Select Meter > DC Voltmeter > DC Range > Battery softkey removed. #4243

vi) Settings > Calibration > Restore Factory Defaults softkey removed along with associated onscreen text. #4344

vii) A status bar receive attenuation warning is now functional when the Analyzer is in Tracking Generator or Cable Fault modes. This warning normally indicates when the RF input is oversaturated, resulting in possible degradation of measurement accuracy. #4239

viii) Output Level now accurate when loaded from a Preset. #3475

ix) Audio generation settings now accurate when loaded from a Preset. #3475

x) Default Mod Scope trigger level now 0 kHz. #4135

xi) When loading a preset, some fields (for instance, Monitor and Generate Frequencies and Spectrum Analyzer Span) units now restored correctly. #3721

xii) The precision of number fields over 6 decimal places now restored appropriately from preset. #3725

xiii) Strange Output Level editor keypad entry behavior now corrected. #3711

xiv) The Audio Zone Generate mode A/B Sequence selection now changes the actual generated tone. #4316

xv) Demodulation disabled at Spans greater than 158 kHz now a yellow warning message for better visibility. The Display Zone > Demod at Marker function may be used to retrieve demodulated audio in this state. #4336

xvi) Field calibration frequency points updated providing better input level measurement and output level accuracy below 10 MHz. #4050, #4283

xvii) During field calibration, corrected possible indefinite hang at beginning of RF Input or during RF Output calibrations. #4256, #4257

xviii) Oscilloscope defaults for horizontal scale changed to 1 ms and for vertical scale to 1 V. #4345

xix) Monitor mode data timing stability corrected. Though the incidence is low, on some Analyzers, this issue caused the Spectrum Analyzer to occasionally freeze (stop updating). A reboot would be required to restore proper function. #4104, #3929

xx) Settings > Messages buffer underflow error message when Spectrum Analyzer span greater than 158 kHz because of enabled demodulation now corrected. #4271

c) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz.

iii) Display Zone > Bar Graphs > Deviation Average setting of Pwr-Weight Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

iv) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

v) To avoid filling the message log, avoid use of the mic while in Monitor mode. #4192

vi) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

vii) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

viii) It is not presently possible to configure the Communications System Analyzer with a static IP address. Use of DHCP is required. #4009, #3320

ix) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

x) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages. #3920

xi) Modulation data from the Mod Out BNC connector on the front panel is not useful in Monitor mode when the demodulation data is unavailable. Workarounds are to use Duplex mode instead or to ensure that squelch is open and the Spec An span is less than or equal to 158 kHz. #4271

xii) In DMR test mode, RF Zone broadband "switch" may toggle between Watt Meter and Input Level when monitoring a high-power radio transmission. The Input Level should be used rather than the Watt Meter, which can vary from the power in the used TDMA slot to 3 dB less due to the null TDMA slots. #4034

xiii) In DMR test mode, after continuous demodulation for over 20 minutes (e.g. over-the-air monitoring of a repeater), the DMR measurements and constellation become erroneous for about 200 seconds. Change the Burst setting to correct them. A delay may also be noticeable after the transmission. This is to be fixed in the next version. #4005

xiv) METER Zone > Select Meter > General Sequence decoder tone codes may not match expected Tone Standard tone codes. To correct, select ESC > AUDIO Zone > General Sequence Table > Select Tone Standard to indicate the desired Tone Standard to decode. Select ESC > ESC > METER Zone to view results. Decoded tone codes will now match selected Tone Standard. To decode to a different Tone Standard, repeat these steps. This issue will be corrected in the next release. #4402

d) Versions

```
System:                          1.9.0.0

DMR (MOTOTRBO)                   1.1.0.0
Project 25                       2.0.0.0
NXDN                             1.0.0.0

Application:                     1.9.0.0
Dynamic Link Library:            1.0.3.0
Signal Service Provider:         1.36.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.4.2.0
         - Comm                  1.4.0.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.15.1
```

1.8.0.0

a) New Features

i) Settings > Options > Enter Option Key supports more expedient option changes to systems in the field.

ii) Spectrum Analyzer Demodulation at the absolute Marker.

iii) Settings > System Settings > Pre-Amplifier Auto-Off supports disabling the Pre-Amp when the Power Meter is active or when broadband power is detected.

iv) Screen captures are saved to a USB drive by using the Shift key with the Zone Hot Keys.

v) Settings > About… > Versions now displays Main and RF PCBA versions.

vi) Added AM Power Meter switch support for Rev G RF hardware.

b) Improvements.

i) Message popup screens now use vertical soft keys instead of the ENTER and ESC buttons.

ii) Markers are improved through addition of variable speed movement and Find Peak frequency delta value updates.

iii) Settings > Messages improvements include uninterrupted manual scrolling and removal of duplicate message suppression (to fix associated sluggishness).

iv) Audio Zone high and low pass baseband filter defaults are now 300Hz and 3kHz and the Meter Zone automatic audio Decode filter settings are updated:

Format	Filter Settings (HP;LP)
PL	1Hz; 300Hz
DPL	1Hz; 3 kHz
DTMF	1Hz; 3 kHz
2-Tone	1Hz; 3 kHz
5/6 Tone	1Hz; 3 KHz

v) RF Input/Output calibration states are now saved correctly. Both are marked “Incomplete” when calibration begins, and each status is individually updated to “Complete” when processing finishes. Calibration data is saved when both processes attain a “Complete” state. If a power loss occurs prior to completion of both calibration processes, on system restart, both calibration states are assigned a status of “Incomplete”.

vi) Output level accuracy is improved for low frequencies (< 50 MHz) and for an un-modulated DMR carrier.

vii) Temperature compensation improvements result in better power measurement accuracy.

viii) The DC Volts meter automatically switches to 1 MegOhm impedance (like AC Volts) if DC Range is Auto or > 10V. To use an impedance of 600 Ohm, set both AC and DC Range to <= 10 V.

ix) The RF Zone Watt Meter and the Meter Zone Power Meter operate in non-Standard Test modes at larger deviations after using AM modulation in Standard Test Mode.

x) Mod In/Out port protection against changes from In to Out are improved by changing input voltage detection from > 0.5V to < -0.2 or > 0.2 V.

xi) RF Zone measurements are enabled, the speaker is un-muted, and message 5007 "Demodulation is disabled for Span values > 158 kHz" is now cleared when using Mod Scope after having used a wide span in the Spec An. Also, Demod Out and the speaker now work even if demodulation is not needed by the display (e.g. Oscilloscope).

xii) Squelch is now always based on the center frequency Input Level (and never on the broadband Watt Meter).

xiii) Mod Scope improvements include Trigger Mode "Single" operation, consistent update rate, and uniform decimation at large horizontal scales.

xiv) Data processing improvements are made for all non-Standard test modes (DMR, P25, NXDN), to reduce latency, increase Monitor and Generate continuity, produce robust operation of Voice Playback (renamed “Voice Loopback”), and to significantly improve various aspects of Analyzer operation when the R8-Remote option is installed or in use.

xv) Data processing improvements are made in all operational modes (especially Duplex) for both RF and analog ports. This results in better buffer maintenance, greater tolerance to heavy data processing (e.g. Dual Display), reduced interference due to rapid user input, and significant continuity improvements.

xvi) RF On/Off signal timing improves remove occasional artifacts in the RF signal.

xvii) Settings > About... shows a correct model number when the R8-NXDN option is enabled.

xviii) Messages that previously omitted descriptive text and showed only a numeric code now appear in the message log and on the status bar with the text included.

xix) Various dynamically generated error messages that did not display data needed to understand the message are now properly shown.

xx) Tone A and Tone B frequency labels now correctly label the value in Hz when the Frequency is edited.

xxi) Self-calibration improvements remove issues associated with starting the calibration when the Analyzer is in a non-standard mode (i.e. P25, NXDN, or DMR).

xxii) An improved Settings > Options… screen layout more clearly maps the Analyzer model number to its installed options.

c) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.

ii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz.

iii) Display Zone > Bar Graphs > Deviation Average setting of RMS Average actually displays the product of the root mean square and the square root of two. This is equivalent to the peak amplitude for a sine wave. To get the actual root mean square value for any type of wave, divide the value displayed by the square root of 2. This is necessary when comparing the value with a manufacturer's average RMS specification. #4222

iv) A status bar receive attenuation warning is non-functional when the Analyzer is in Tracking Generator or Cable Fault modes. This warning normally indicates when the RF input is oversaturated, resulting in possible degradation of measurement accuracy. #4239

v) To workaround a potential issue with the tracking generator where the generated power level can be 6 dB below the specified Output Level setting after generating an AM signal, select "FM" in Generate Mode before using the tracking generator. #4145, #3617.

vi) To avoid filling the message log, avoid use of the mic while in Monitor mode. #4192

vii) Certain popup messages mention that the ENTER key dismisses the popup, but the Continue or Cancel soft keys are used exclusively. #4255

viii) Though the incidence of this issue is low, on some Analyzers, the Spectrum Analyzer may occasionally freeze (stop updating). A reboot may be required to restore proper function. #4104, #3929

ix) When the R8-Remote option is installed on system version 1.6.1.0 or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up. #3818

x) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply. #4164, #3765, #3320

xi) It is not presently possible to configure the Communications System Analyzer with a static IP address. Use of DHCP is required. #4009, #3320

xii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements. #3956

xiii) For best results when using the Remote Front Panel (R8-Remote option): Open the local Squelch knob fully (CCW), enable Settings > Network Setup > Network Connection after a restart, use dynamic IP addresses (DHCP On), and avoid generation/modulation, and check buffer events with Settings > Messages. #3920

d) Versions

```
System:                          1.8.0.0

DMR (MOTOTRBO)                   1.1.0.0
Project 25                       1.0.3.0
NXDN™                            1.0.0.0

Application:                     1.8 0.0
Dynamic Link Library:            1.0.3.0
Signal Service Provider:         1.35.0.0
Sound Device Interface:          1.0.2.0
Firmware - Control:              1.4.1.0
         - Comm                  1.2.0.0
         - TX                    1.6.2.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.15.1
```

1.7.1.1

a) New Features

i) This release does not contain new features.

b) Improvements.

i) Removed an issue where the Spectrum Analyzer noise floor has too high of a baseline, and contains fluctuations over wide span, as observed on a limited number of hardware platforms.

c) Notes

i) When performing a self-calibration, be sure that the Analyzer is in the standard mode (i.e., not in P25, NXDN or DMR modes).

ii) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and switches back to the user-selected port when the Monitor Mode is re-selected. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.

iii) The receiver is presently calibrated only above 10 MHz. A factory re-calibration service will soon be available to users that have a requirement for calibrated receiver measurements below 10MHz.

iv) When generating an AM signal the actual output level is 6 dB below the setting entered by the operator. This will be fixed by a future software update. Until then, select "FM" in Generate Mode before using the tracking generator.

v) Tone A and Tone B frequency labels read kHz instead of Hz when the Frequency is edited.

vi) Some dynamically generated error messages in the Analyzer are not displayed correctly and do not show important information needed to interpret the message properly. For example, on the INSTRUMENT | Spec An page, when a span of greater than 158 MHz is selected, the system should display an error that identifies the 158 MHz maximum. This release, however, truncates the message so that the 158 MHz value is not visible.

vii) The NXDN™ option is not evident in the Model No. field on the SETTINGS | About... screen even though the option is functional and properly shown on the Settings | Options... screen.

viii) Certain system messages are displayed incorrectly. The issue is observable upon entry to the SETTINGS | Network Setup... screen when the network interface is disabled (the default at system boot). A system message occurs that contains a numeric code but does not display text needed to effectively describe why it was displayed.

ix) When a R8-Remote option is installed on system version 1.6.1.0, or newer, a normally hidden window may be seen minimizing toward the lower left corner of the display as the Analyzer powers up.

x) The R8-Remote option supports remote, unattended operation, but the network connection does not currently persist across a reboot. Until this issue is addressed, remote installations may limit exposure by operating the Analyzer on an uninterruptible power supply.

xi) It is not presently possible to configure the Communications System Analyzer with a static IP address. Use of DHCP is required.

xii) When using the R8-Remote option, the setting of the squelch control on the Analyzer may override the remote knob, thus hindering certain measurements.

xiii) When using the R8-Remote option, Duplex, Generate, and Mod Out (Monitor) do not work.

xiv) When a Communications System Analyzer has the R8-Remote option installed, meter and demodulation data is sometimes discontinuous. The issue may also exist on other Analyzers when Duplex Mode or Dual Scope is in use.

xv) On some Analyzers, the Spectrum Analyzer may occasionally freeze (stop updating). A reboot may be required to restore proper function.

d) Versions

```
System:                          1.7.1.1

DMR (MOTOTRBO)                   1.1.0.0
Project 25                       1.0.3.0
NXDN™                            1.0.0.0

Application:                     1.7 1.0
Dynamic Link Library:            1.0.3.0
Signal Service Provider:         1.34.2.0
Sound Device Interface:          1.0.1.0
Firmware - Control:              1.4.0.0
         - Comm                  1.2.0.0
         - TX                    1.6.0.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.15.1
```

1.7.1.0

a) New Features

i) Remote Front Panel option (R8-Remote) with updated manual.

ii) POCSAG radio paging protocol encoder as a standard feature.

iii) NXDN™ test capabilities (purchased option)

b) Improvements.
   i) Fixed an issue with P25 bit pattern which would allow a TX-only pattern when switched back to Monitor mode
   ii) Improved System>Messages.
      (1) Prevent the message log from hanging the unit when full (after 1000 messages).
      (2) Rename the soft keys in message log from "Clear" to “Acknowledge" and "Clear All" to "Delete All".
      (3) Various minor functional and aesthetic changes.
   iii) Fixed spectrum analyzer display freezing.
   iv) Added 12, 10, and 20 dB marks on the SINAD meter.
   v) RF Zone Copy Frequency to Generator (in Monitor mode) function button added.
   vi) RF Zone Copy Frequency to Monitor (in Generate mode) function button added.
   vii) Improved audio generator tone duration accuracy for:
      (1) DPL
      (2) DPL Invert
      (3) A/B Sequence
      (4) 5/6 Tone
      (5) Tone A
      (6) Tone B
      (7) DTMF encoders.
   viii) DMR (ETSI Digital Mobile Radio) Test Mode (formerly MOTOTRBO™)
      (1) Improved testing per Motorola recommendations for R01.06.01 of CPS/Tuner and radio firmware.
      (2) Generate silence test pattern with all-call destination and broadcast service option to test speaker noise without having to reprogram radio IDs.
      (3) Generate setting for the color code (0-15) eliminates the need to reprogram the radio color code before performing tests.
      (4) Generate Audio Test, Sensitivity Test calibration, and execution combined with modulation mode control (Off or Continuous). Consequentially, modulation mode can now be saved as a preset, and operational mode changes do not stop modulation.

(5) Generated test patterns are now reset when a pattern setting is changed so they begin transmission at the first frame of a super frame (burst A).

(6) Monitor and test base station or repeater transmissions.

(7) Monitor display of the slot power (input level) during digital operation when synchronization is locked but insufficient for tuning the high/low power level.

(8) Monitor display of frequency error during digital operation when synchronization is locked but insufficient for tuning the reference oscillator.

(9) Monitor display of the color code of a transmission when synchronization is locked, and added the ability to copy it to the Generate setting.

(10) Monitor display of Synchronizations counter, FSK Error, Magnitude Error, and Constellation meter is now automatic even during a BER test, without having to restart the Quality Test.

(11) Monitor display of FSK Error and Magnitude Error are affected by Settings, System Settings, Measurement Averaging and Averaging Samples.

(12) Monitor display of synchronization counter is now updated in real time.

(13) Monitor display of BER test pattern name (O.153).

(14) Automatic change from an unsupported operation or instrument test to a supported mode, and correct display on switch from Generate.

(15) Protocol version is not cleared when loading a preset.

(16) Spectrum Analyzer span is not reduced unnecessarily for Generate testing.

(17) Various user interface improvements: the test zone is more consistent with the rest of the user interface, including soft key names and unit labels; an indication is given when the Constellation meter is disabled for Generate testing; the test mode, option, and protocol are now named DMR since MOTOTRBO™ is fully compliant with European Telecommunications Standards Institute (ETSI) Digital Mobile Radio (DMR) Tier 2. The option name is now R8-DMR with backward compatible recognition of R8-TRBO. A Brand setting may be changed between MOTOTRBO™ and Other, for future use.

ix) Corrected PL encoder code M5 = 233.6 Hz. Previously it had been 223.6 Hz.

x) The POCSAG Alpha-numeric character set now includes a backslash '\' character.

xi) The POCSAG default baud rate has changed to 1200 bps from 512 bps. 1200 bps is more common in field use.

xii) Various critical system data files are now protected by a failure detection and recovery system.

xiii) System version 1.6.1.0 and later was extensively tested to determine the status of a long-standing issue related to catastrophic failure of the Analyzer when a surprise power-loss event occurred during system boot. The tests show that the Analyzer is no longer vulnerable to catastrophic failure when power is suddenly lost during startup. The improvement occurred prior to the introduction of system version 1.6.1.0, but the releases had not been tested specifically for this issue. This improvement does not remove the possibility of catastrophic failure when power is lost during a software upgrade operation.

c) Notes

i) RF Output Port accuracy is ±1dB when the Monitor Port is set to RF Input. If the Monitor Port is set to Antenna, RF Output Port accuracy is +3dB. To mitigate this problem the software automatically switches the Monitor Port to RF Input when the user selects Generate Mode and restores to the user selected port when the user selects Monitor Mode. This does not address operation in Duplex Mode. An upcoming enhancement will improve accuracy to +1dB irrespective of Monitor Port selection.

ii) The receiver is presently calibrated only above 10 MHz. Calibrated receiver measurements below 10MHz will soon be available via factory recalibration for users with this requirement.

iii) When generating an AM signal the actual output level is 6 dB below the setting entered by the operator. This will be fixed by a future software update. Until then, select "FM" in Generate Mode before using the tracking generator.

iv) When performing a self-calibration, be sure that the R8000 is in the standard mode (i.e., not in P25, NXDN or DMR modes).

v) Tone A and Tone B frequency labels read kHz instead of Hz when the Frequency is edited.

vi) Certain dynamically generated error messages in the R8000 application are not displayed correctly and do not show important information needed to interpret the message properly. For example, on the INSTRUMENT | Spec An page, when a span of greater than 158 MHz is selected, the system should display an error that identifies the 158 MHz maximum. This release, however, truncates the message so that the 158 MHz value is not visible.

vii) The NXDN™ option is not evident in the Model No. field on the SETTINGS | About... screen even though the option is functional and properly shown on the Settings | Options... screen.

viii) Certain settings messages are displayed incorrectly. The easiest way to observe the issue is to enter SETTINGS | Network Setup... when the network interface is disabled (the default at system boot). A numeric code is displayed without descriptive text.

ix) As of system version 1.6.1.0, when a Communication Systems Analyzer initializes after power up, a visible animation occurs as a hidden window that minimizes toward the lower left corner of the display when the Remote Front Panel option (R8-Remote) is installed.

d) Versions

```
System:                          1.7.1.0

DMR (MOTOTRBO)                   1.1.0.0
Project 25                       1.0.3.0
NXDN™                            1.0.0.0

Application:                     1.7 1.0
Dynamic Link Library:            1.0.3.0
Signal Service Provider:         1.34.2.0
Sound Device Interface:          1.0.1.0
Firmware - Control:              1.4.0.0
         - Comm                  1.3.0.0
         - TX                    1.6.0.0
         - RX                    1.2.0.0
         - BIOS                  1.17.4.0
Operating system:                3.1.15.1
```

1.6.1.0

a) New Features

i) P25 Conventional (C4FM) test capabilities (purchased option)

(1) Ability to Generate and Receive bit test patterns for V.52, 1011 Hz, and others.

(2) BER test measurement

(3) Symbol deviation and Modulation Fidelity measurements.

(4) An eye pattern diagram is now available in the Display Zone.

(5) Ability to test radio transmit and receive using the voice playback feature.

b) Improvements

c) Cable Fault Analyzer fixes to calibration routine and general user interface.

d) Improved measurement averaging for AC volt meter.

e) Notes

i) If a modulated AM signal is detected, Power Meter accuracy tolerance will automatically be changed for optimal precision. To get the typical power meter accuracy, use the meter with 0% AM modulation.

ii) As of system version 1.6.1.0, when a Communication Systems Analyzer initializes after power up, a visible animation occurs as a hidden window that minimizes toward the lower left corner of the display when the Remote Front Panel option (R8-Remote) is installed.

f) Versions

```
Application:                      1.6 1.0
Dynamic Link Library:             1.0.2.0
Signal Service Provider:          1.34.1.0
Sound Device Interface:           1.0.1.0
Firmware - Control:               1.4.0.0
         - Comm                   1.2.0.0
         - TX                     1.5.0.0
         - RX                     1.2.0.0
         - BIOS                   1.17.4.0
Operating system:                 3.1.15.1
MOTOTRBO™                         1.0.1.0
Project 25                        1.0.3.0
```

1.5.3.0

a) Improvements

b) In Generate mode, the RF Zone Output Level upper limits for AM have been changed from +5dBm to -1dBm (RF Gen Out) and -30dBm to -36dBm (RF In/Out) to accommodate peak power levels. The output level indicates the carrier power of the AM signal.

c) Increase user interface responsiveness and processing efficiency for overall operation of application version 1.3.2.0 when the Remote Front Panel (R8-Remote) option is enabled.

d) Power Meter improvements

e) Units in Watts instead of dBm.

f) Temperature characterization for better accuracy.

g) Update system
   (1) End-user feedback enhancements.

h) Versions

```
Application:                    1.4.1.0
Signal Service Provider:        1.34.1.0
Sound Device Interface:         1.0.1.0
Firmware - Control:             1.4.0.0
         - Comm                 1.2.0.0
         - TX                   1.5.0.0
         - RX                   1.2.0.0
         - BIOS                 1.17.4.0
Operating system:               3.1.15.1
Communications Protocols
         - MOTOTRBO™            1.0.1.0
         - Project 25           1.0.1.0
```

1.4.0.0
Pre-release; limited distribution.

a) New Features
   i) OEM brand support.
   ii) Boot splash screens no longer contain brand-specific markings.
   iii) Product background screen customization support added.

b) Improvements
   i) RF Input saturation detection. A warning message is now presented if the system detects an RF overload instructing the user to increase the attenuation. Measurements are dashed out under these conditions.
   ii) The “Squelch Open @” indicator improvements:
      (1) Accurate after startup without having to touch the squelch knob.
      (2) Accurate when moving the squelch knob quickly to the full clockwise or full counter-clockwise positions.
   iii) Allow user to set the tracking generator span to 1 Hz using the soft key editor.

iv) MOTOTRBO™ Professional Digital Two-Way Radio System, Test option version 1.0.1.0:

(1) Audio Test (1031 Hz tone) changed from Destination ID 61235 with no Service Options to All Call with Broadcast Service Option. Consequently, the destination ID of the radio no longer needs to be reprogrammed (though its color code must be 14). Incidentally, radios now report Source ID 00000000 rather than 16777016.

v) Update system to make software updates easier to perform.

(1) While preparing a USB drive to update a Communications System Analyzer, an error message is now shown if a problem occurs during the preparation process. Previously, the preparation could silently fail. This could lead to a number of different errors if the improperly prepared device was used to update the Communications System Analyzer.

(2) "Search for Updates" now discriminates between updates designed for the current system version and those that are not. The prior implementation could erroneously find an update for a different system version, and if such an update was found, the operator could elect to apply and process it (though the system was not modified).

(3) Update automation is improved by implementing an automatic reboot, instead of a shut down, when the operator chooses to apply an update.

(4) An "Upgrade in progress…" message is now shown during the apply process.

vi) The system BIOS is reconfigured to use a spread spectrum clock configuration to support CE certification.

c) Versions

```
Application:                    1.3.2.0
Signal Service Provider:        1.34.1.0
Sound Device Interface:         1.0.1.0
Firmware - Control:             1.4.0.0
         - Comm                 1.2.0.0
         - TX                   1.5.0.0
         - RX                   1.2.0.0
         - BIOS                 1.17.4.0
Operating system:               3.1.15.0
Communications Protocols
         - MOTOTRBO™            1.0.1.0
```

1.3.1.0

a) New Features
   i) Cable Fault Analyzer
   ii) RF Scan Meter
   iii) Measurement averaging for the following data: Deviation, Frequency Error, AC\DC Volts, Internal\External Distortion, and SINAD. Located on the Settings->System Settings menu.

b) Improvements
   i) Corrected issue in Tracking Generator that required Generate Mode to be selected first.
   ii) Improved squelch and added squelch open indicator shows at what level signals will break squelch. This is available on all spectrum analyzer and modulation scope screens (found in lower right corner just under vertical soft keys).
   iii) Added indication of recommended maximum input on oscilloscope instruments based on the horizontal scale selected due to aliasing at certain scales and levels.
   iv) Corrected issues with the Mod In/Out port selection.
   v) Corrected issue that reset Monitor Port to RF In\Out when changing operating modes.
   vi) Corrected RF In/Out LED operation.
   vii) Re-ordered the spectrum analyzer selections to group Center Marker, Find Peak, and Center Peak together for operational efficiency.

c) Versions

```
Application:                    1.3.0.0
Signal Service Provider:        1.34.0.0
Sound Device Interface:         1.0.1.0
Firmware - Control:             1.3.0.0
         - Comm                 1.1.0.0
         - TX                   1.4.0.0
         - RX                   1.1.0.0
         - BIOS                 1.17.3.0
Operating system:               3.1.14.0
Communications Protocols
         - MOTOTRBO™            1.0.0.0
```

1.2.0.0

a) New Features

b) Tracking Generator (for units equipped with R8-TG)
   i) Oscilloscope Display and Instrument selections

ii) Frequency Counter Meter

c) Improvements

i) Enabled MOD In/Out Port protection

ii) Enable audio capabilities when in the Modulation scopes regardless of Spectrum Analyzer Span.

d) Versions

```
Application:                    1.2.0.0
Signal Service Provider:        1.33.0.0
Sound Device Interface:         1.0.1.0
Firmware - Control:             1.3.0.0
         - Comm                 1.1.0.0
         - TX                   1.4.0.0
         - RX                   1.1.0.0
         - BIOS                 1.17.3.0
Operating system:               3.1.14.0
Communications Protocols
         - MOTOTRBO™            1.0.0.0
```

1.1.3.0
End user update to enable 3 GHz capability.

a) Improvements

i) Signal Service Provider reliability.

b) Versions

```
Application:                    1.1.3.0
Signal Service Provider:        1.32.1.1
Sound Device Interface:         1.0.1.0
Firmware - Control:             1.2.0.0
         - Comm                 1.0.0.0
         - TX                   1.4.0.0
         - RX                   1.0.0.0
         - BIOS                 1.17.3.0
Operating system:               3.1.14.0
Communications Protocols
         - MOTOTRBO™            1.0.0.0
```

1.1.2.0
Factory update to 3 GHz capability.

a) New Features

i) Initial factory support for the 3 GHz expanded operating range.

b) Versions

```
Application:                    1.1.2.0
Signal Service Provider:        1.32.1.0
Sound Device Interface:         1.0.1.0
Firmware - Control:             1.2.0.0
         - Comm                 1.0.0.0
         - TX                   1.4.0.0
         - RX                   1.0.0.0
         - BIOS                 1.17.3.0
Operating system:               3.1.14.0
Communications Protocols
         - MOTOTRBO™            0.9.0.0
```

1.1.0.1
Update system maintenance.

a) Versions

```
Application:                    1.1.0.0
Signal Service Provider:        1.32.0.0
Sound Device Interface:         1.0.0.0
Firmware - Control:             1.2.0.0
         - Comm                 1.0.0.0
         - TX                   1.4.0.0
         - RX                   1.0.0.0
         - BIOS                 1.17.3.0
Operating system:               3.1.14.0
Communications Protocols
         - MOTOTRBO™            0.9.0.0
```

1.1.0.0
The initial public release of the R8000 Communications System Analyzer.

a) Versions

```
Application:                    1.1.0.0
Signal Service Provider:        1.32.0.0
Sound Device Interface:         1.0.0.0
Firmware - Control:             1.2.0.0
         - Comm                 1.0.0.0
         - TX                   1.4.0.0
         - RX                   1.0.0.0
         - BIOS                 1.17.3.0
Operating system:               3.1.14.0
Communications Protocols
         - MOTOTRBO™            0.9.0.0
```

J – See ECO	DC	M.Mullins	2/20/20	0272
H – See ECO	DC	M. Mullins	10/1/19	0241
G- Release 3.7.0.0	DC	M. Mullins	9/30/19	0240
F – Release 3.6.2.0	DC	C. Cox	5/8/19	0227
E – Release 3.5.2.0	DC	C. Cox	12/10/18	0217
D – Release 3.4.2.0	DC	C. Cox	10/26/18	0213
C – Release 3.3.0.0	DC	M. Humphries	7/11/18	0200
B – Release 3.2.0.0	D. Bulgrien	M. Humphries	6/30/18	0199
A - Original Release 3.1.0.0	D. Bulgrien	E.Mick	3/01/18	0179
Rev. No - change	Requested By	Approved By	Date	ECO#