comsearch
A CommScope Company

iQ·link®

Key Features

v1.3

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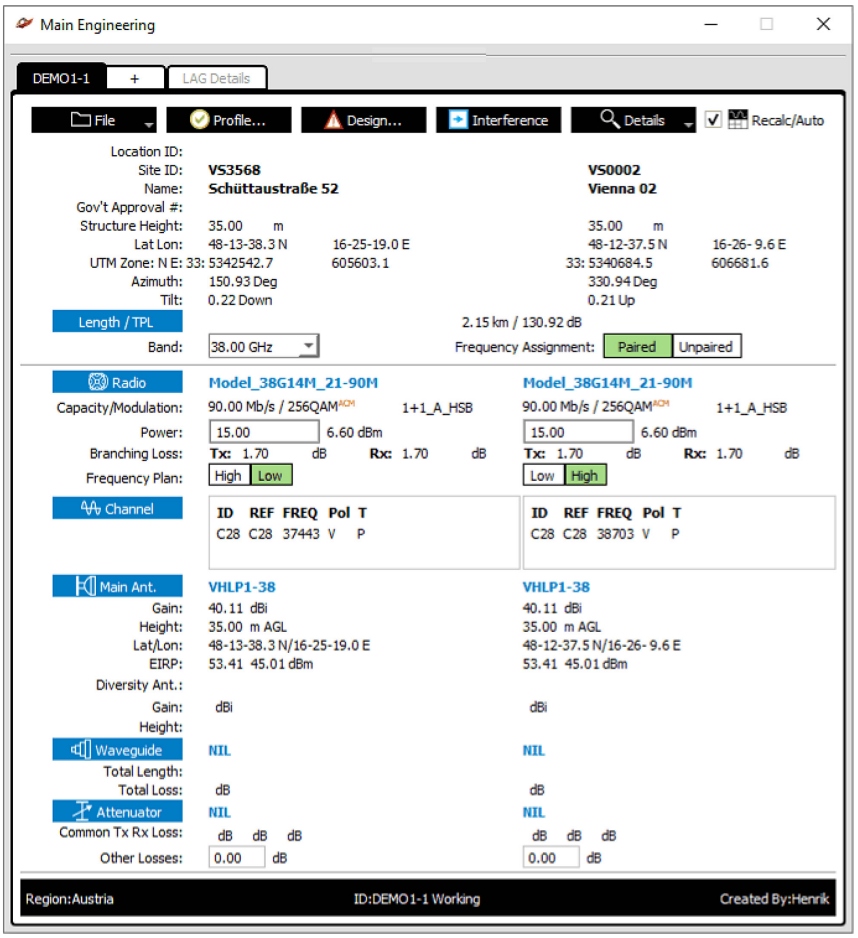
1. Quick Link Budget Design

iQ·link enables rapid creation of Point-to-Point (PtP) or Point-to-Multipoint (PMP) links.

Links may be saved as working designs (nominal), primary designs or confirmed (password protected, on-air) links.

This engineering window provides a one-page summary of all of the necessary microwave link elements, enabling the user to build the link and make changes without the need to sort through a clutter of multiple windows.



2. Radio State Analysis Graphics

The job of the microwave design engineer is becoming more and more challenging as modern IP radios become more complex with multiple modulations and power adjust features. Comsearch has developed an innovative graphical user interface to present the radio's options to the designer in the most intuitive way possible.

Not only will you get the most out of your radio and microwave link design, but you will avoid potentially very costly mistakes of a poor design. This feature makes it easier to deploy microwave backhaul in settings that require special attention—namely, small cells and links with the most sophisticated radios. Highlights include:

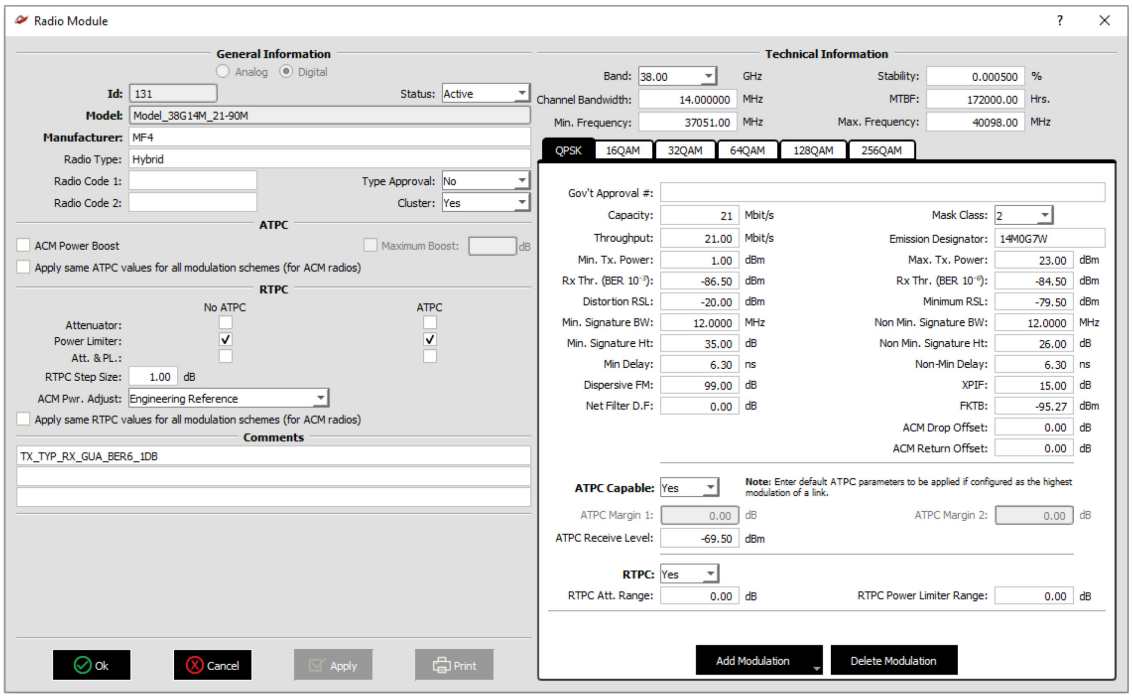
- The Maximum, Minimum and Configured Transmit power for each modulation is immediately visible.
- As radio power, attenuator, ATPC Rx targets are adjusted, the resulting RSL, Fade Margin and Availability of each modulation is updated in real time.

3. Comprehensive support for Adaptive Modulation (ADM) radios

The result of numerous discussions and meetings with major operators and equipment manufacturers, iQ·link offers the most comprehensive functionality to support the design of microwave links with adaptive modulation radios including:

- Simple and flexible import of numerous Adaptive Modulation radios through the use of a standardized spreadsheet format
- Highly customizable link designs with Voice/Data analysis (High Priority/Low Priority traffic)
- Option to report Outage/Unavailability statistics based on the specified Priority and Non-Priority traffic distribution
- Full Consideration of:
    - ADM Power Adjust
    - ADM Power Boost
    - Modulation Downshift offset
    - Modulation Upshift offset
- Full implementation of ADM with Automatic Transmit Power Control (ATPC)
- Availability and Performance calculations for all modulations

- Detailed interference analysis with the ability to automatically detect the worst-case modulation combination of interfering transmitter and victim receiver



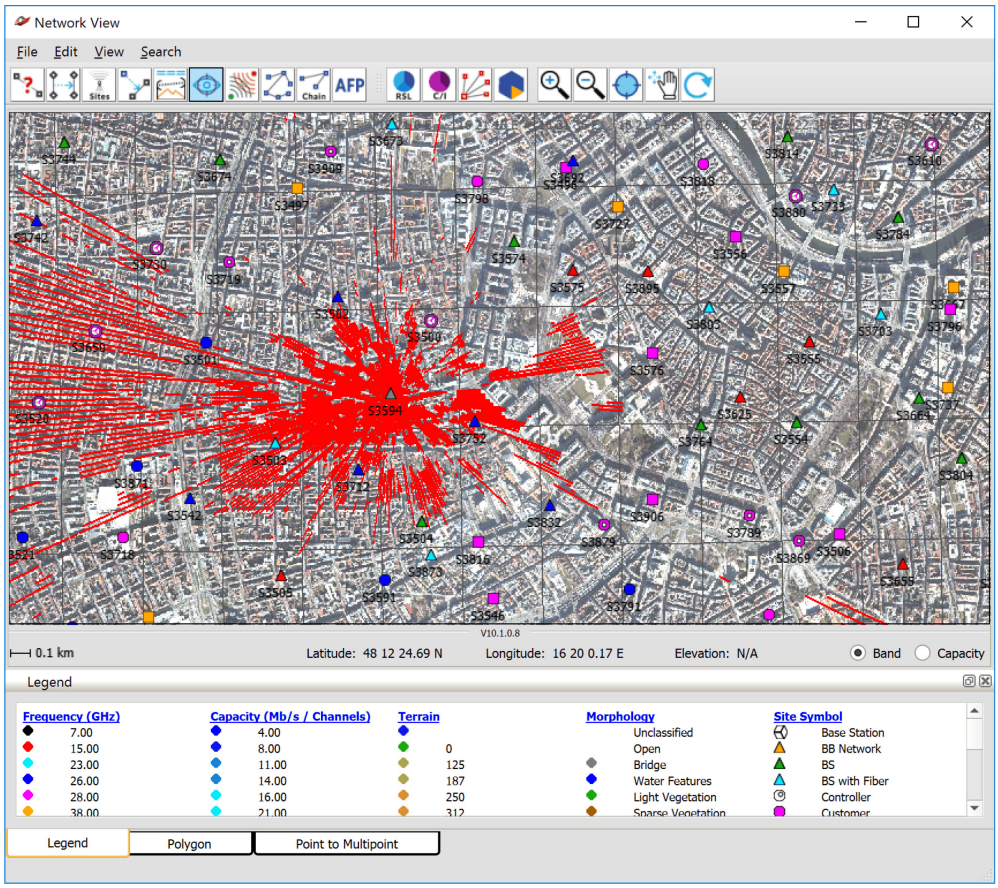
4. Comprehensive Network View & Live integration with Google Earth

Network View provides a multi-faceted interface that allows the user to graphically represent all or any part of the microwave network.

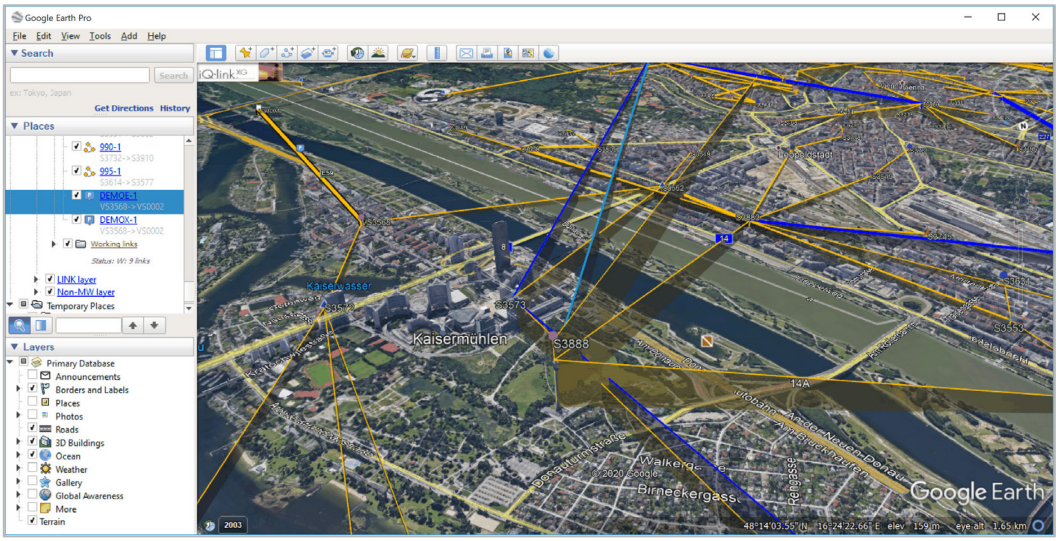
Links and sites can be displayed, as well as information regarding each component, including frequencies, capacities, channelization plans, high-low configuration, and other details of the system. The Network View module provides a rapid overview of the network architecture and allows the engineer to perform many rapid engineering assessments such as quick point-to-point link clearance analysis and global line-of-sight studies from a single site with overlap region definition from multiple sites.

Users have the ability to visualize environmental factors such as terrain, morphology, and clutter layers, as well as buildings, map, aerial imagery, vector data and other layers.

Several Engineering functions can be accomplished directly from this utility including quick and detailed link profiles, rapid Line of Sight (LOS) analysis and reporting, site creation, chain reliability calculations and Coverage and C/I analysis for PMP / Fixed Wireless Access systems.



Additionally, iQ·link offers a direct LIVE integration with Google Earth. As links are planned and saved in iQ·link, they automatically appear in Google Earth! Anyone in your organization – from engineers to the marketing department – can have a detailed view into the network:



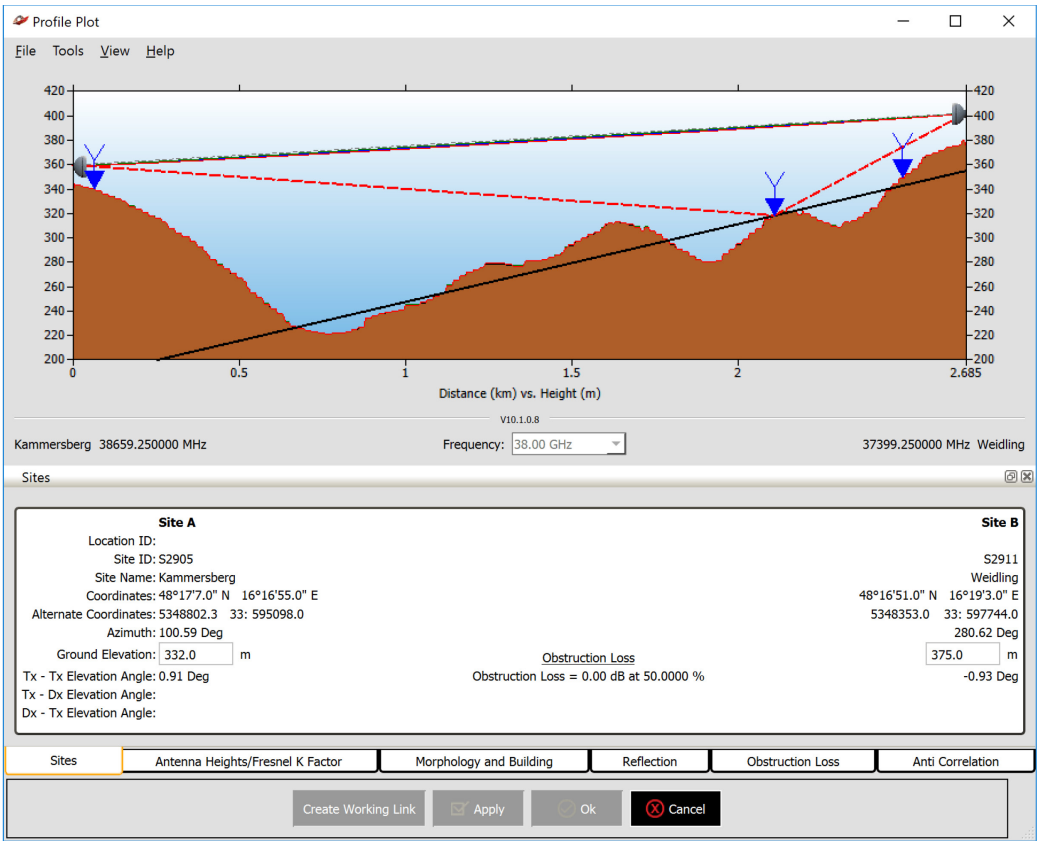
5. Detailed Path Profile Analysis

iQ·link's Profile Module generates a terrain profile between two sites to determine the line-of-sight (LOS) characteristics of the proposed link. The terrain profile can also incorporate clutter data such as buildings and vegetation.

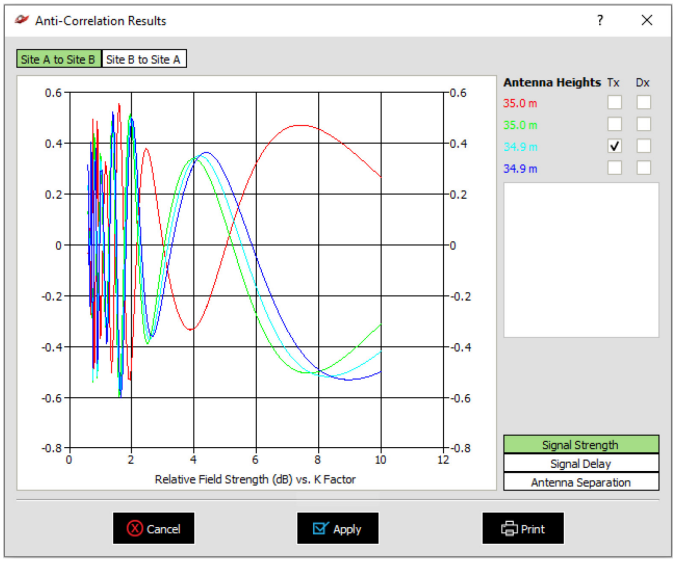
Digitized terrain profiling allows the microwave design engineer to accurately optimize antenna heights for proper path clearance, while avoiding potentially harmful reflections.

Results of the profile are shown both graphically and numerically for flat earth and up to three values of earth curvature (K-factor) and link clearance (Fresnel zone) criteria. The K-factors and Fresnel zone values are user-specified and can be easily changed as necessary.

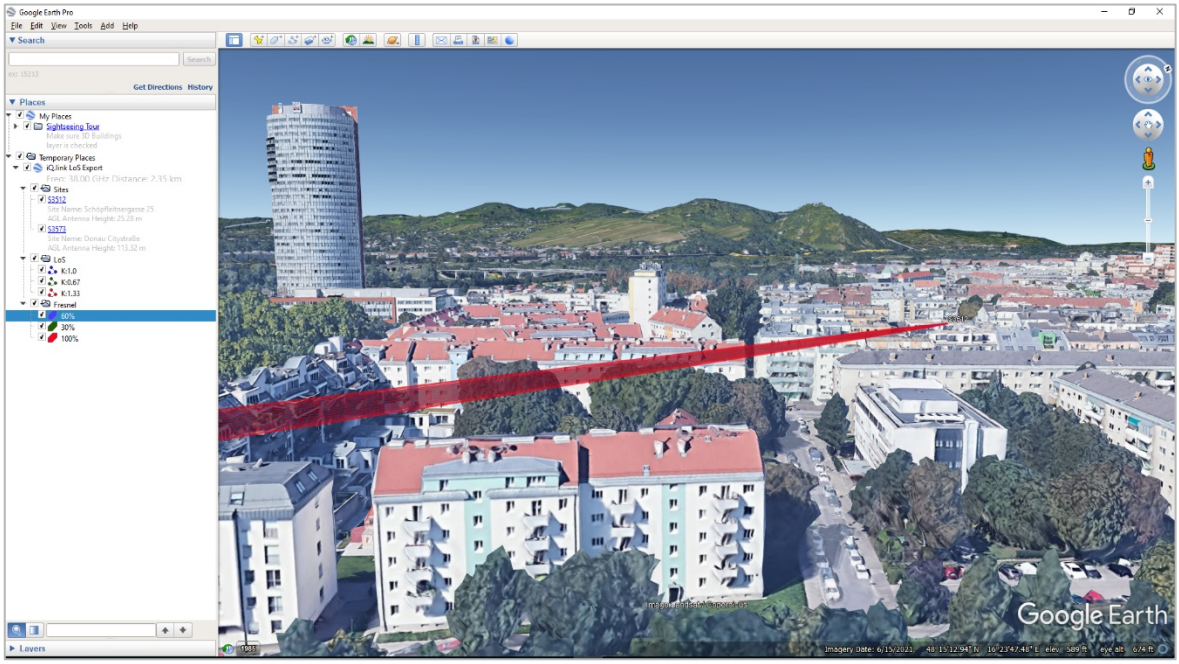
Morphology, user-definable clutter and even high-resolution building data can be incorporated into the path profile.

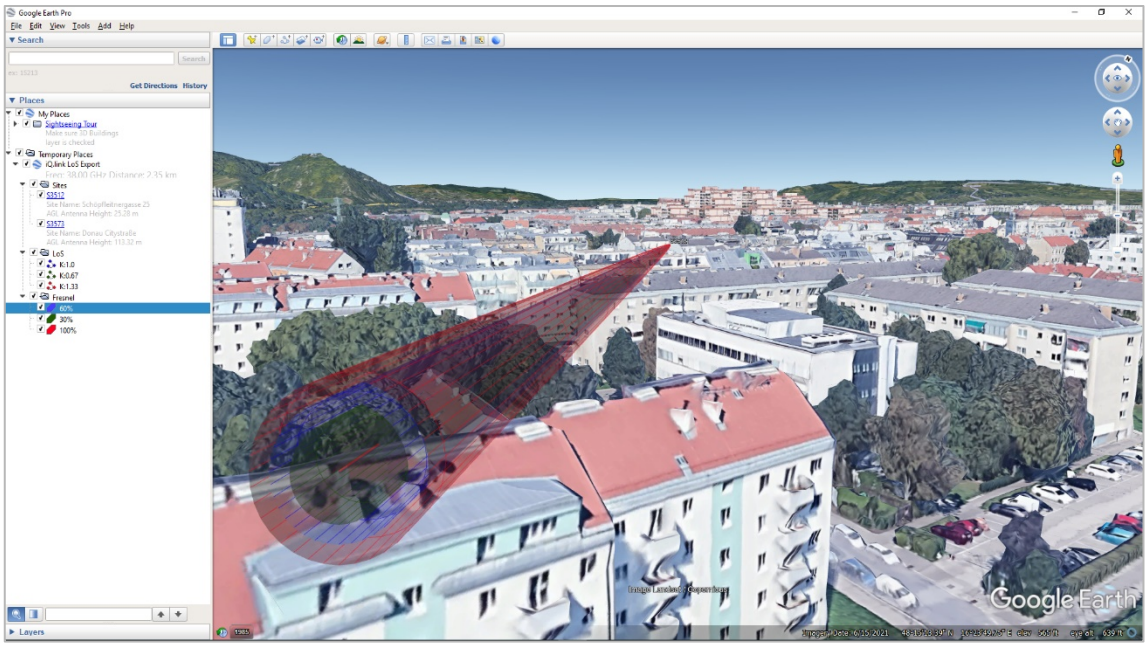


Anti-Correlation analysis provides the user with the ability to determine the ideal primary and diversity antenna spacing required in order to counter multipath propagation effects (based on ITU-R P.530).



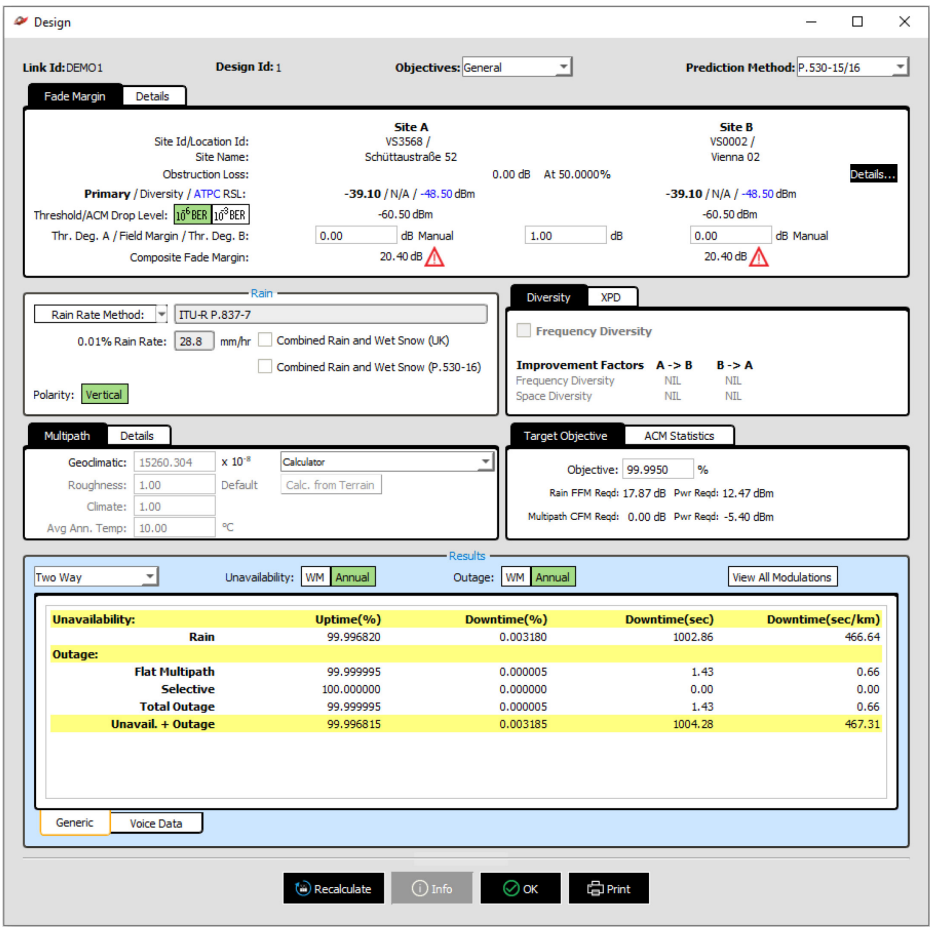
The Path Profile can be exported in Google Earth's KMZ format, showing the 3D Fresnel Zone with layers corresponding to the Fresnel Zone percentage, allowing for an accurate visualization of the effect of an obstruction in the path.





6. Availability and Performance Assessment

iQ·link performs link availability and performance calculations using industry standard propagation and objective models including Vigants, Glauner, ITU-R P.530 (revisions 6 through 17) ITU-T G.821 and G.826, Crane, ITU-R P.837-3, ITU-R P.837-1, ITU-R P.837-3, ITU-R P.837-5/6, ITU-R P.837-7:

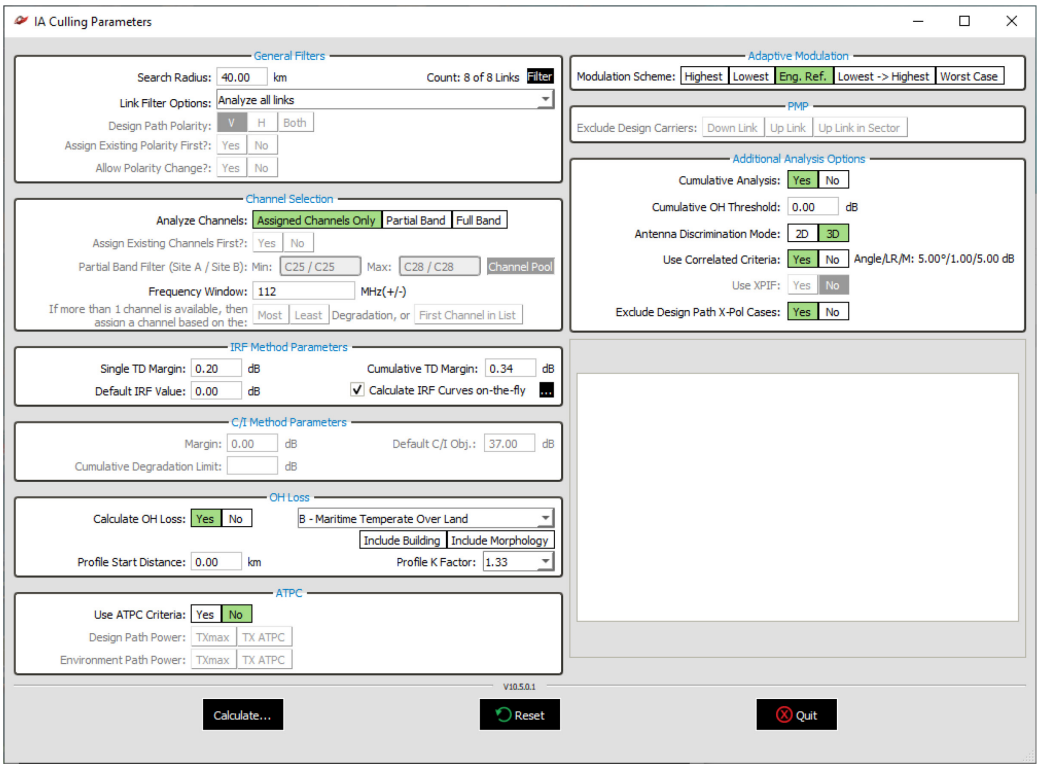


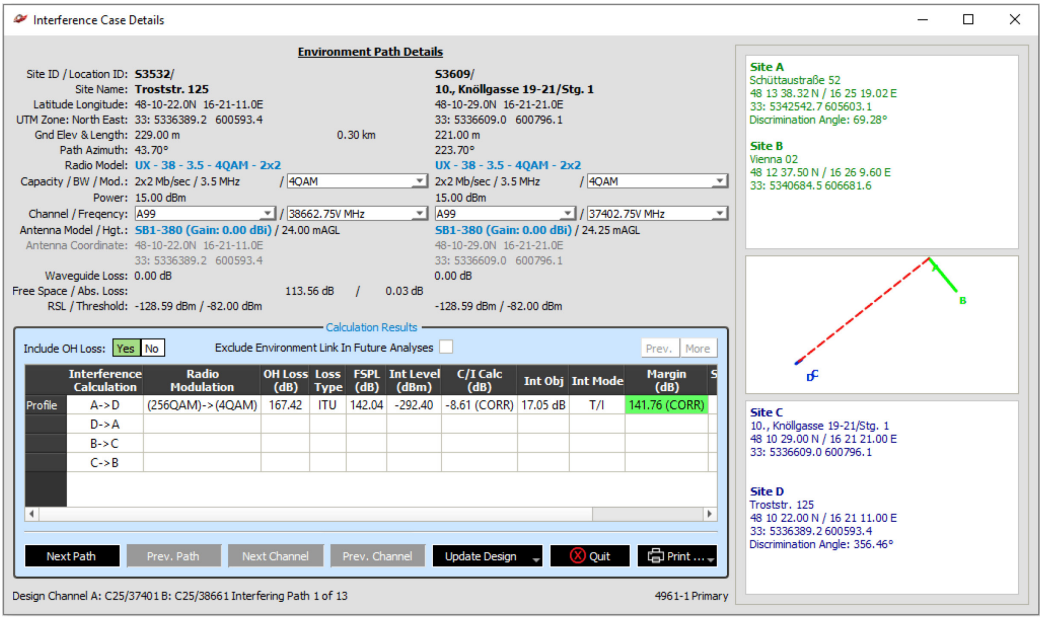
7. Interference Analysis

iQ·link's detailed, efficient interference analysis calculates the interference potential from a proposed new link against the database of all previously stored primary designs and confirmed links. Both Point-to-Point and Point-to-Multipoint systems are considered simultaneously.

A Cumulative interference analysis is offered in order to predict the amount of degradation caused by the cumulative interference of a maturing network.

Other options include the ability to utilize 3D antenna patterns when available, predict diffraction loss along interference paths due to obstacles and relax interference objectives due to correlated fading in bands where rain is the primary fading mechanism.

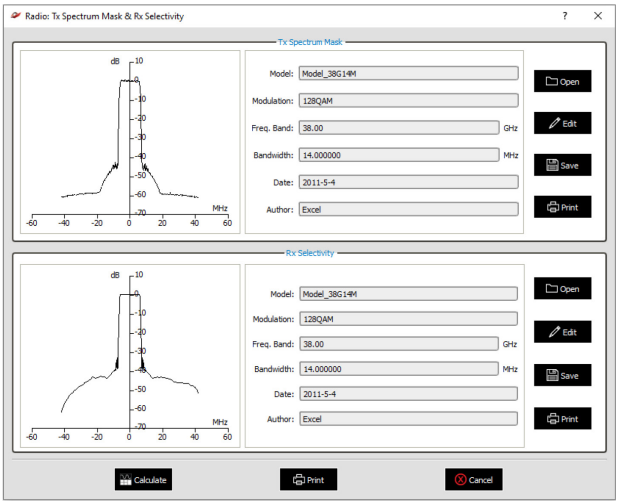




Tx Spectrum & Rx Selectivity

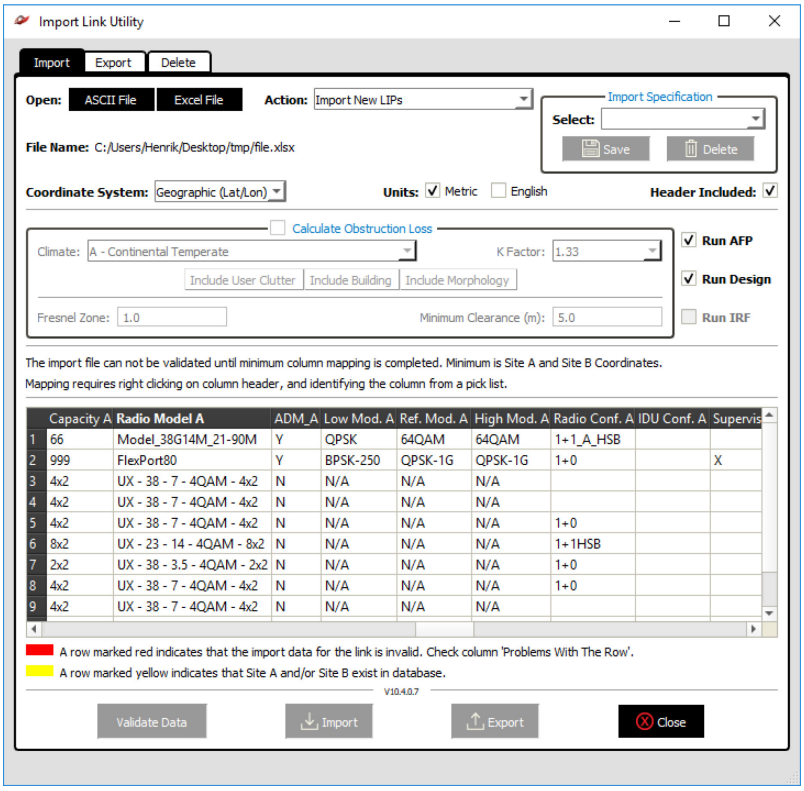
Detailed interference objectives between any combination of interfering and victim radios are quickly derived using Tx Spectrum masks and Rx selectivity curves provided by the manufacturer or ETSI defaults. The interference objective curves can be calculated on-the-fly, this results in a very fast interference analysis with no impact on performance or on the quality of the results.

Since the interference objectives matrix no longer needs to be precalculated and saved to the database, installation times for new radio models is greatly reduced. This is especially important in networks with a large number of radio models.



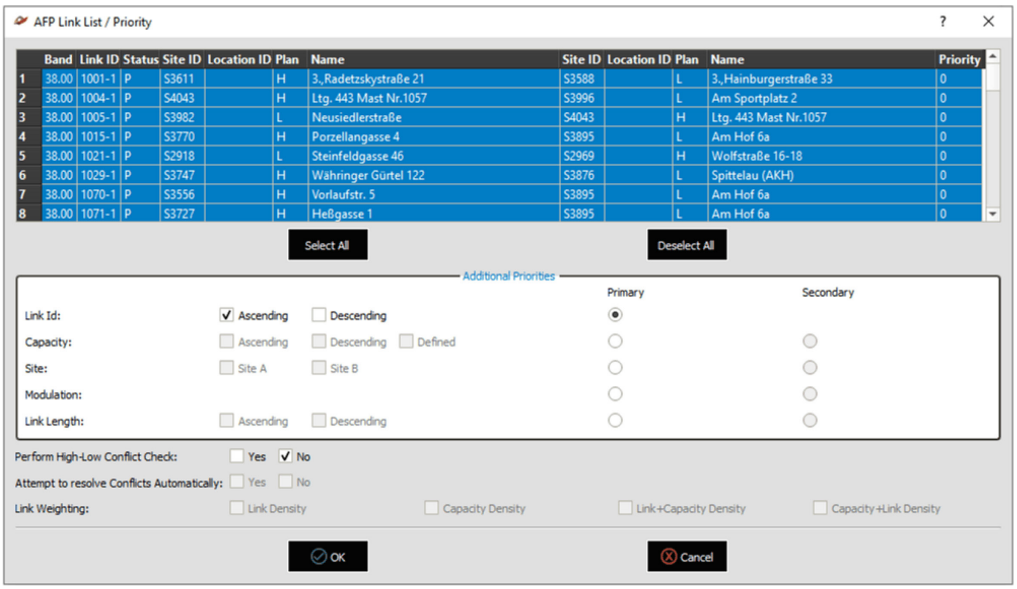
8. Bulk Link Design

iQ·link provides the user with the tools to perform Bulk Link designs, Obstruction Loss calculations, Interference Analysis, and Automatic Frequency Planning (AFP) by modifying the Link configuration in an Excel or delimited text template and then importing them into iQ·link. This streamlined design workflow can translate into great savings in both time and resources.



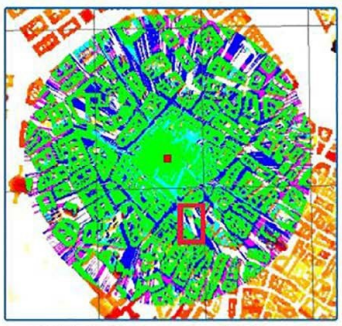
9. Automatic Frequency Planning (AFP)

iQ·link provides the user with the ability to perform automatic frequency planning. Detailed criteria can be set so that the final result meets your network design needs. In addition, this module incorporates a sophisticated high/low conflict resolving algorithm. Combined with the speed of iQ·link native calculation algorithm, this feature can significantly improve on design efficiency and time.

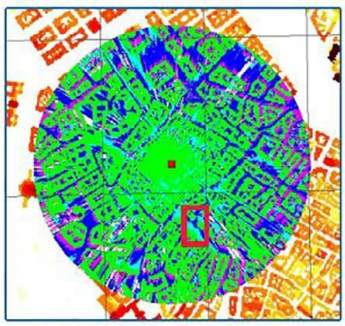


10. Near and Non-Line of Sight (nLOS) Propagation Model

Backhaul in a dense urban environment with small cells presents challenges that traditional Line of Sight (LOS) microwave cannot always address. RF studies have shown that non or near Line of Sight (nLOS) microwave can be a viable solution. Traditional microwave planning tools rely on obstruction loss algorithms from the ITU or NBS Technical Note 101. These were developed to handle a variety of terrain obstructions. However, they are not accurate for predicting losses when the signal is being obstructed by buildings and vegetation. Offered as an optional add-on to iQ·link, Comsearch has developed a unique and proprietary model that looks at the true obstruction environment along a path to better calculate losses. These models have been validated with a major radio vendor using existing network designs and integrated into iQ·link beginning with Version 9.5. Losses calculated by our nLOS model are not only highly accurate but are often significantly less than those predicted by traditional microwave obstruction loss models.



3.5 GHz RSL Plot using traditional ITU loss model



3.5 GHz RSL Plot using Comsearch nLOS model

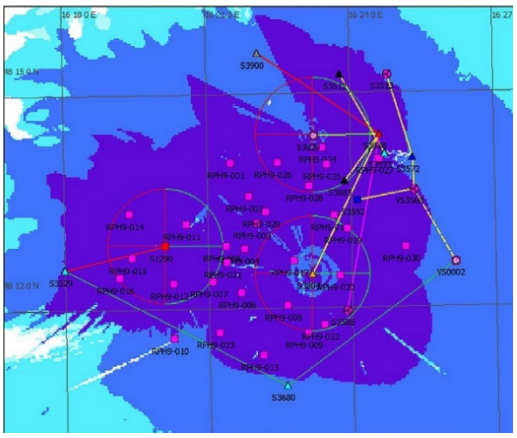
11. Point-to-Multipoint / Fixed Wireless Access Design Functionality

iQ·link supports the design of Hub-Subscriber links that are required to implement such networks as Fixed Wireless Access, Local Multipoint Distribution Service (LMDS), and other point-to-multipoint (PMP) applications.

The network view module offers a color-coded plot of receive signal level (RSL) and interference (C/I) which may be displayed for selected hub sites within the Network View. The user controls the color-coding scales. It is possible to visualize locations around hub facilities where acceptable coverage and interference-free operation are available.

Both omni-directional and sectorized antennas are supported with the ability to enter and utilize antenna pattern data in both the azimuth and elevation planes.

When combined with high-resolution terrain and building data, design and analysis of point-to-multipoint networks is fast and simple.



12. Utility Programs

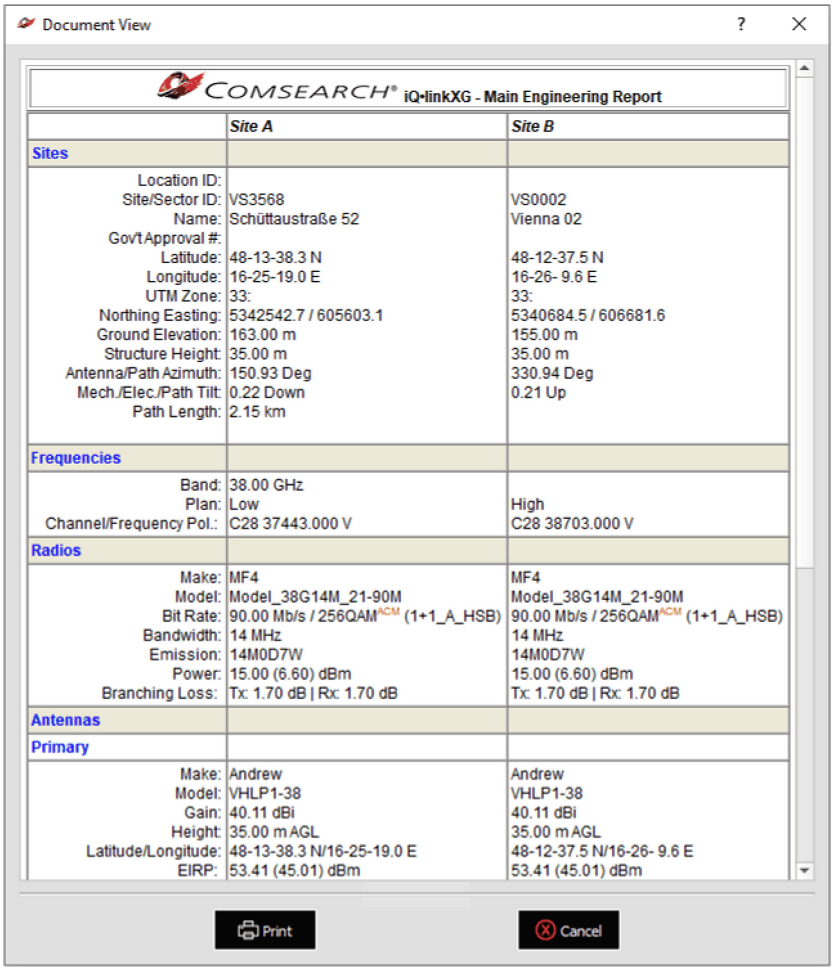
iQ·link comes with a several utility programs so that administrative tasks can be performed easily and with controlled access.

Utility features include:

- Coordinate conversion
- Find-point algorithm
- Import for Sites, Antennas, Radios, Links and Network and Pathloss files.
- System Administration
- Google Earth KML Export
- Bulk Selective and Radial Line of Sight Manager
- Bulk Reengineering of Links
- Bulk Export and Delete Links

13. Reports

iQ·link offers several reports, which are built on HTML templates and Database Views. They can be fully customized, including the addition of your own company logo. These reports can be saved in PDF, EXCEL or CSV formats.



	Site A	Site B
Sites		
Location ID:		
Site/Sector ID:	VS3568	VS0002
Name:	Schüttaustraße 52	Vienna 02
Gov't Approval #:		
Latitude:	48-13-38.3 N	48-12-37.5 N
Longitude:	16-25-19.0 E	16-26- 9.6 E
UTM Zone:	33:	33:
Northing Easting:	5342542.7 / 605603.1	5340684.5 / 606681.6
Ground Elevation:	163.00 m	155.00 m
Structure Height:	35.00 m	35.00 m
Antenna/Path Azimuth:	150.93 Deg	330.94 Deg
Mech./Elec./Path Tilt:	0.22 Down	0.21 Up
Path Length:	2.15 km	
Frequencies		
Band:	38.00 GHz	
Plan:	Low	High
Channel/Frequency Pol.:	C28 37443.000 V	C28 38703.000 V
Radios		
Make:	MF4	MF4
Model:	Model_38G14M_21-90M	Model_38G14M_21-90M
Bit Rate:	90.00 Mb/s / 256QAM^{ACM} (1+1_A_HSB)	90.00 Mb/s / 256QAM^{ACM} (1+1_A_HSB)
Bandwidth:	14 MHz	14 MHz
Emission:	14M0D7W	14M0D7W
Power:	15.00 (6.60) dBm	15.00 (6.60) dBm
Branching Loss:	Tx: 1.70 dB | Rx: 1.70 dB	Tx: 1.70 dB | Rx: 1.70 dB
Antennas		
Primary		
Make:	Andrew	Andrew
Model:	VHLP1-38	VHLP1-38
Gain:	40.11 dBi	40.11 dBi
Height:	35.00 m AGL	35.00 m AGL
Latitude/Longitude:	48-13-38.3 N/16-25-19.0 E	48-12-37.5 N/16-26- 9.6 E
EIRP:	53.41 (45.01) dBm	53.41 (45.01) dBm

14. Third Party Application Integration

iQ·link offers the option to integrate with third party applications for both unidirectional and bidirectional workflows. This allows iQ·link to update external applications and vice versa.