

January 8th, 2019

LINKPlanner Updates Webinar

Agenda

- Products Supported
- New Features in Q3/Q4 2018
- Simplified PMP Design Process
- Coming Soon in 2019
- Question and Answer

Products Supported in LINKPlanner

	Products	Bands
Sub-6GHz PTP	ePMP 1000 ePMP 2000 N500 PTP 450 PTP 450i PTP 670 PTP 700	2.4, 4.9 – 5.9 GHz 5.1 – 5.8 GHz 220, 406-470, 700, 900 MHz 900 MHz, 3.5, 3.6, 5.4, 5.8 GHz 3.5, 3.6, 4.9 – 5.8 GHz 4.8 – 5.9 GHz 4.7 – 5.8 GHz
Licensed PTP	PTP 800 PTP 810 PTP 820/820i	6-38 GHz
Point to Multipoint	ePMP 1000 ePMP 2000 N500 PMP 450 PMP 450i PTP 670/700 HCMP	2.4, 4.9 - 5.8 GHz 5.1 - 5.8 GHz 406-470, 700, 900 MHz 2.4, 3.5, 3.6, 5.4, 5.8 GHz 900 MHz, 3.5, 3.6, 4.9 – 5.8 GHz 4.7 – 5.9 GHz

LINKPlanner continues to support obsolete Cambium products

New Features in Q3/Q4 2018



New Features in Q3/Q4 2018 – PMP 450

- PMP 450 family
 - Added 3 GHz PMP 450m
 - Added UL Mu-MIMO
 - Increased PMP 450m EIRP levels for downlink beamforming
 - Added 5 GHz PMP/PTP 450b Mid and High Gain
 - Added support for min and max modulation modes

New Features in Q3/Q4 2018 – Unlicensed

- cnReach
 - Added 406-470 MHz bands to PMP
 - Added 700 MHz band to PMP
 - Added support for PMP T/R = Any and Unpaired
- PTP 650/670/700
 - Added CMM5 to PTP 650
 - Obsolete PTP 700 Lite parts and kits
- cnPilot in BOM Estimator
 - Added e700
 - Added e430H

New Features in Q3/Q4 2018 – Licensed

- PTP 820
 - Added PTP 820C HP
 - Added PTP 820G Unit Redundancy
 - Added 24 GHz in FCC and Canada
 - Added PTP 820G Single Ethernet MC-ABC
 - Updated PTP 820C and PTP 820S cable drops to use fiber for antenna heights above 90 m (295 ft)

New Features in 2018 – General

- PMP
 - Added user SM Transmit Power limit
 - Added ability to choose between subscriber site height or fixed height in Best Server Analysis
 - Added SM count when adding new SMs to an AP
- Added combined PTP and PMP Proposal Report
- Updated user defined antennas to support Vertical and Horizontal Polarization
- Replaced UGPS with cnPulse
- Changed support email address to linkplanner@cambiumnetworks.com

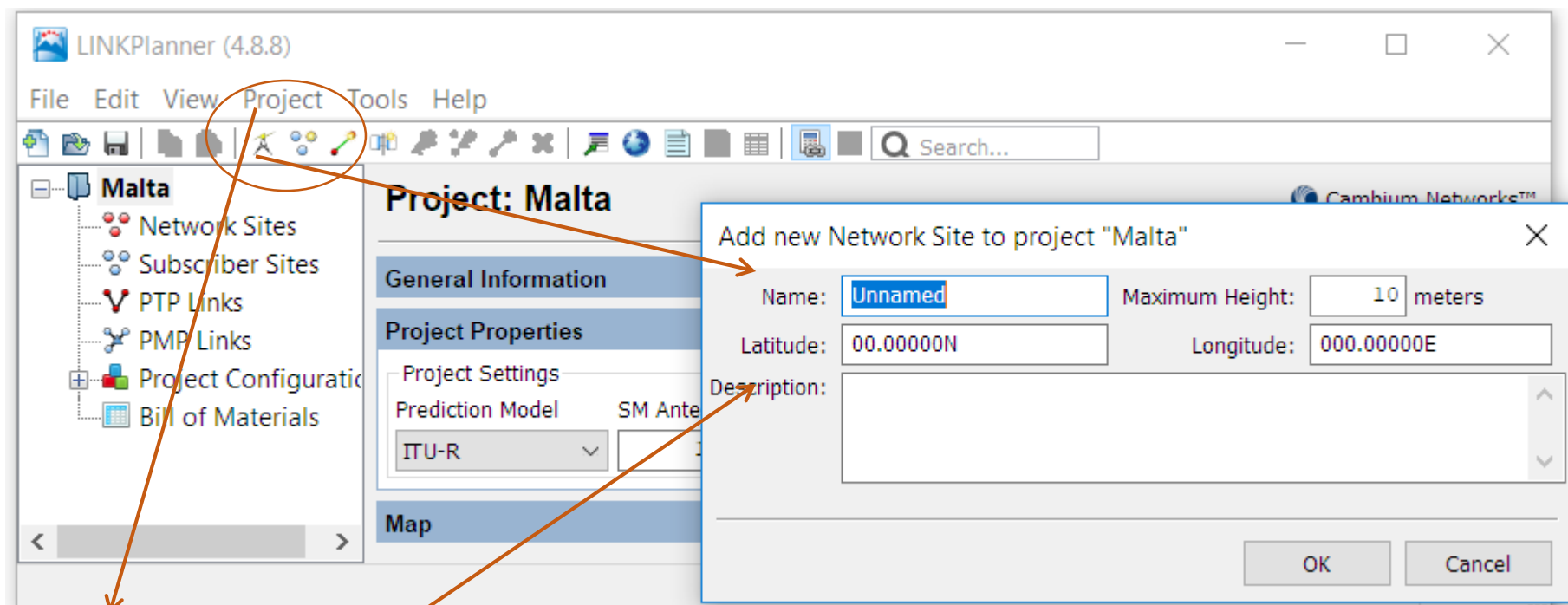


Simplified PMP Design Process

Simplified PMP Design Process

- Create a PMP Network in 5 easy steps
 1. Import Network and Subscriber Sites
 2. Set up PMP Equipment Templates
 3. Add New Hubs
 4. Run Best Server Analysis
 5. Add Channel Plans (optional)

Step 1 – Import Network/Subscriber Sites



The screenshot shows the LINKPlanner (4.8.8) application window. The 'Project' menu is open, and the 'New Network Site' option is selected. A dialog box titled 'Add new Network Site to project "Malta"' is displayed, showing the following fields:

- Name:
- Maximum Height: meters
- Latitude:
- Longitude:
- Description:

Buttons for 'OK' and 'Cancel' are at the bottom right of the dialog.

- New Network Site
- New Subscriber Site
- New PTP Link Ctrl-L
- New Hub
- New Access Point
- New Subscriber Module
- Delete Ctrl-D
- Get Profiles

- Enter Lat/Long directly
- Import from CSV or KML file
- Point/Click on Google Maps™
- PTP and PMP links can also be imported from CSV, which includes site location

Step 1 – Import Network/Subscriber Sites

LINKPlanner (4.8.8)

File Edit View Project Tools

Malta

- Network Sites
- Subscriber Sites
- PTP Links
- PMP Links
- Project Configuration
- Bill of Materials

Network Sites from KML/KMZ

Subscriber Sites from KML/KMZ

Network Sites from csv

Subscriber Sites from csv

PTP Links from csv

PMP Links from csv

PMP Links from SF csv

PTP Path (.ptpdat)

Path from Hydra (.pth)

Path from csv

Path from Pathloss

Select data delimiter and encoding

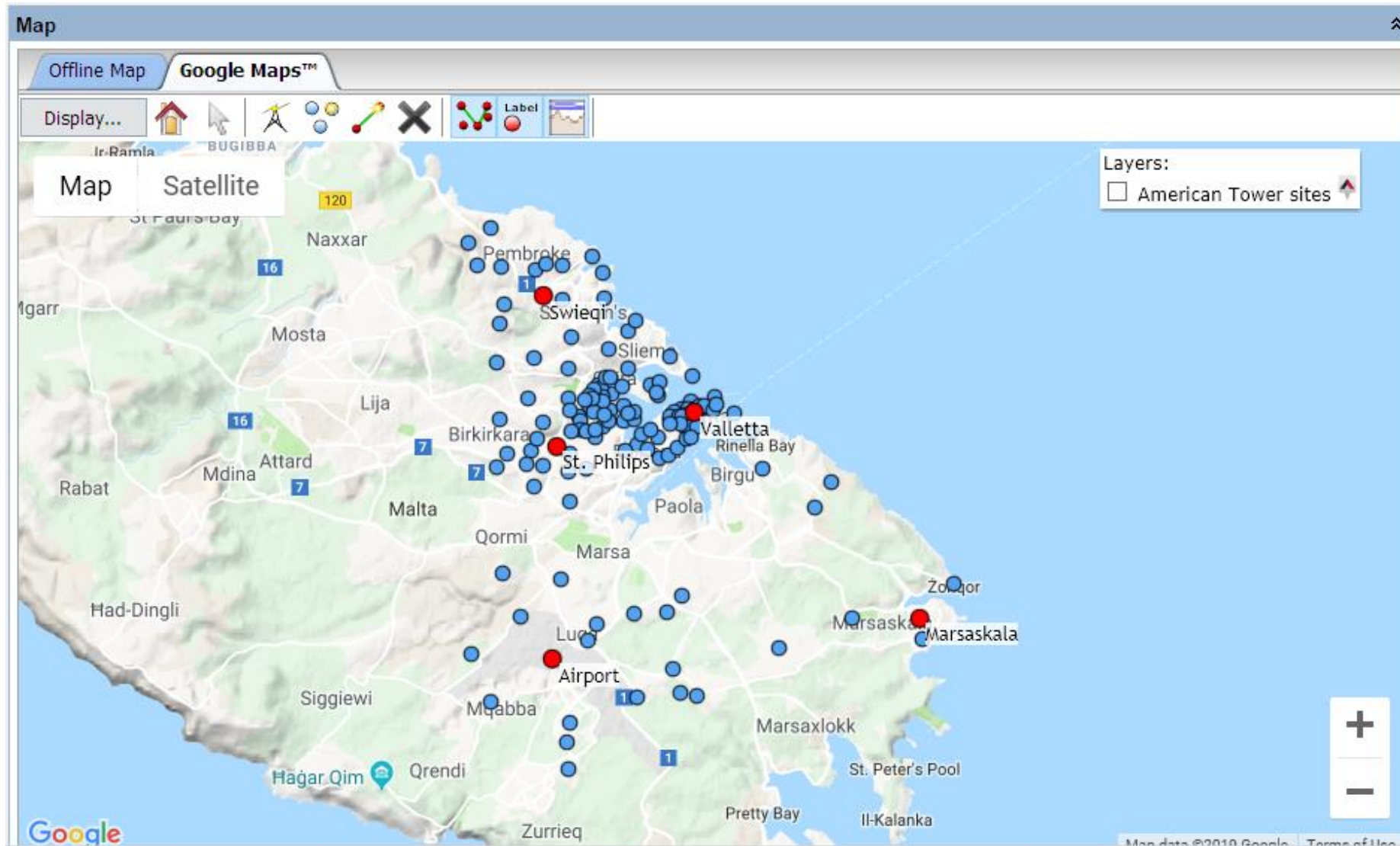
Select which columns should be imported

☒ Skip first row

	Name	Latitude	Longitude	Max. Height (m)	Description
HEAD	Name	Latitude	Longitude	Maximum Height (ft)	Description
1	Airport	35:51:13.4N	014:28:52.2E	33	
2	Marsaskala	35:51:40.8N	014:33:55.5E	33	
3	Rabat	35:52:51.5N	014:24:00.0E	33	
4	St. Julians	35:55:08.4N	014:29:24.7E	33	
5	St. Philips	35:53:35.9N	014:28:55.9E	33	
6	Swieqi	35:55:16.5N	014:28:44.8E	33	
7	Valletta	35:53:58.7N	014:30:49.4E	66	

< Back Next > Cancel

Step 1 – Sites Added



Step 2 – Set up PMP Equipment Templates

LINKPlanner (4.8.8)

File Edit View Project Tools Help

Malta

- Network Sites
- Subscriber Sites
- PTP Links
- PMP Links
- Project Configuration
 - PTP Antennas
 - Access Point Antennas
 - Subscriber Models
 - TDD Sync
 - Custom Fields
 - PTP Link Format
 - PMP Formatting
 - PTP Equipment
 - PMP Equipment**
 - Channel Plans
 - BOM Estimator
 - Best Server Analysis
- Bill of Materials

PMP Equipment Templates

New Template Edit Template Delete Template Set as Default

Name: PMP Equipment Template: PMP Equipment template

Equipment Template: PMP Equipment template

Template Details

Name: PMP 450m 5.8 GHz

Description:

Set as default ☒

Access Point Equipment

Region and Equipment Selection

Band	Product	Country	Sync Input	Encryption Variant	Operating Mode
5.8 GHz	PMP450m	Other	Generate Sync	AES	Mu-MIMO

PMP450m Configuration

Bandwidth	Color Code	Adjacent Channel Support	Range Units	SM Range	Frame Period	Max Registrations Allowed	Downlink Data	Contention Slots	Broadcast
20 MHz	0	Disabled	kilometers	4.0 km	2.5 ms	238	75 %	3	0

Max: 3 mi.

Antenna Configuration

Antenna Selection: Cambium Networks 90° PMP 450m Integrated Antenna (15.3dBi)

Modeled Beamwidth: 90 °

Power

EIRP: 40 dBm

SM Receive Target Level: -56 dBm

AP Interference? ☐ Default SM Interference? ☐

(Limit is 48 dBm)

Give the template a title

Enter the AP Parameters the same as on the AP Equipment page

Step 2 – Set up PMP Equipment Templates continued

Continue by setting up the SM Equipment

Subscriber Module Equipment

Region and Equipment Selection

Product
PMP 450b High Gain (Preliminary) ▼

PMP 450b High Gain (Preliminary) Configuration

Data Channels DL Maximum Mod Mode UL Maximum Mod Mode
1 ▼ x8 ▼ x8 ▼

Antenna Configuration

Antenna Selection
Cambium Networks 7° High Gain Integrated (22.4dBi)

Performance Summary

Performance to AP
Min Mod Mode Required : x1 (QPSK MIMO-A) ▼
Min Availability Required : 99.0000 %

Performance to SM
Min Mod Mode Required : x1 (QPSK MIMO-A) ▼
Min Availability Required : 99.0000 %

Bill of Materials for Access Point

New Extra ✕ Delete Extra

P D... Qty N...

This list is empty

Bill of Materials for Subscriber Module

New Extra ✕ Delete Extra

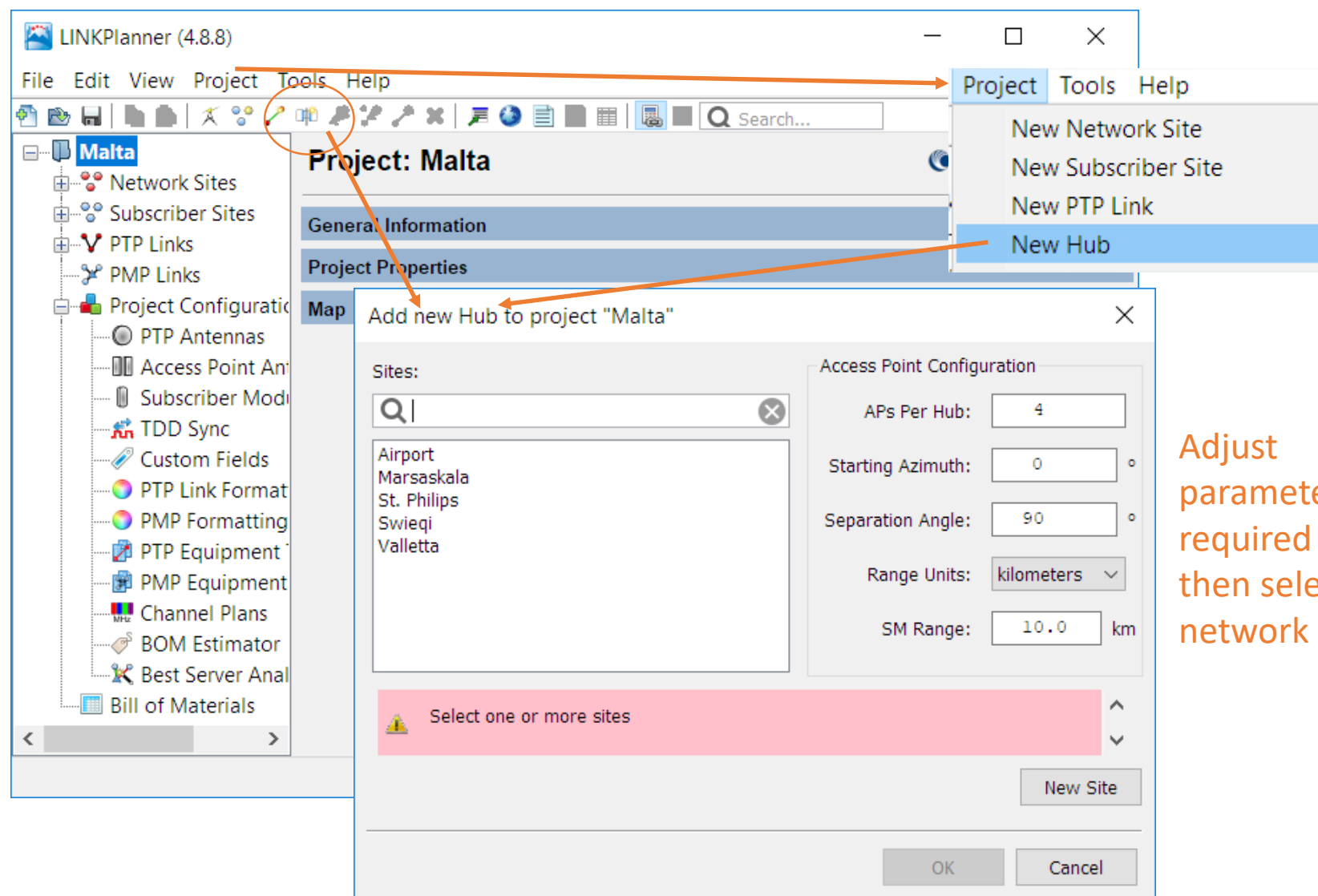
P D... Qty N...

This list is empty

Set a default subscriber product

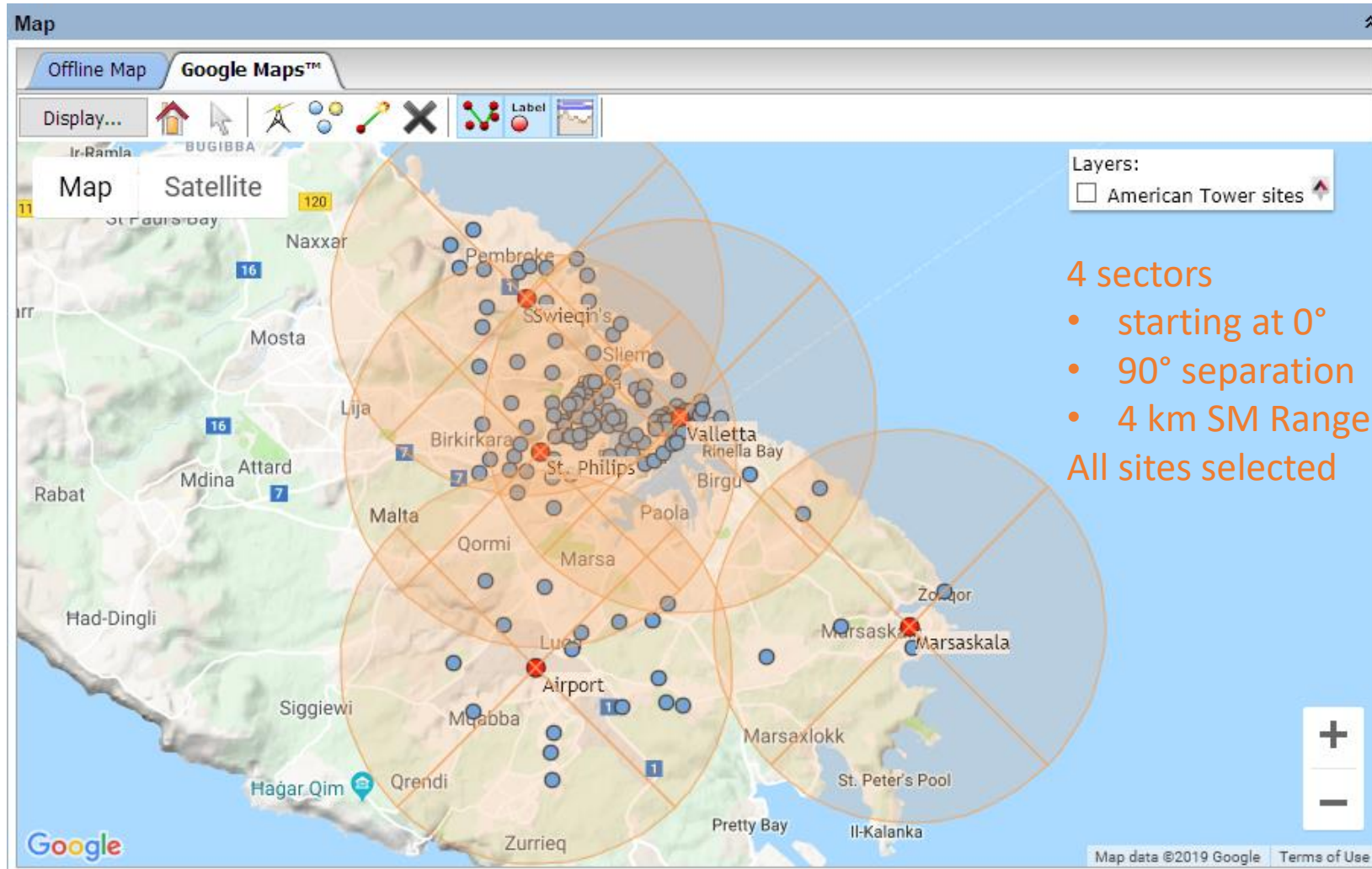
Update Performance parameters and add optional extras to the AP and SM if required

Step 3 – Add New Hubs



Adjust parameters as required and then select network sites

Step 3 – New Hubs Added



Step 4 – Run Best Server Analysis

LINKPlanner (4.8.8)

File Edit View Project Tools Help

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 - Bill of Materials

Best Server Analysis

PMP-450 Family

Target SM Mode: x1 (QPSK MIMO-A) Target SM Fade Margin: 0.0 dB Antenna Height: 10 meters

☒ Omit connected places? ☐ Use subscriber site height? **Go**

SM Product Preferences

Check the products that you wish to use. Use the arrows to sort the products in order of preference.

- ☐ PMP 450b High Gain
- ☐ PMP 450b Mid-gain
- ☐ PMP450
- ☐ PMP450d (retired)
- ☐ PMP450i
- ☐ PMP450i ATEX/HAZLOC

Results Summary

Subscriber places:	141
Connected places:	0
Able to connect:	0
Not meeting requirements (NMR):	0
Out of range (OOR):	0

Name	Height (m)	Selected AP	AP 1 - Name	AP 1 - SM Product	AP 1 - SM Fade Margin (dB)	AP 1 - SM Antenna Gain (dBi)	AP 2 - Name	AP 2 - SM Product	AP 2 - SM Fade Margin (dB)	AP 2 - SM Antenna Gain (dBi)	AP 3 - Name	AP 3 - SM Product	AP 3 - SM Fade Margin (dB)
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Best Server Analysis

PMP-450 Family

Target SM Mode: x2 (QPSK MIMO-B) Target SM Fade Margin: 3.0 dB Antenna Height: 7 meters

☒ Omit connected places? ☐ Use subscriber site height? **Go**

SM Product Preferences

Check the products that you wish to use. Use the arrows to sort the products in order of preference.

- ☒ PMP 450b Mid-gain
- ☒ PMP 450b High Gain
- ☐ PMP450
- ☐ PMP450d (retired)
- ☐ PMP450i
- ☐ PMP450i ATEX/HAZLOC

Set the Target SM Mode, SM Fade Margin, Antenna Height and SM product and then select "Go"

Step 4 – Best Server Analysis Results

Best Server Analysis

PMP-450 Family

Target SM Mode

x2 (QPSK MIMO-B)

Target SM Fade Margin

3.0

dB

Antenna Height

10

meters

☒ Omit connected places?
 ☒ Use subscriber site height?

Go

Create

Analysis complete

SM Product Preferences

Check the products that you wish to use.
Use the arrows to sort the products in order of preference.

☒ PMP 450b Mid-gain
 ☒ PMP 450b High Gain
 ☐ PMP450
 ☐ PMP450d (retired)
 ☐ PMP450i
 ☐ PMP450i ATEX/HAZLOC

Results Summary

Subscriber places:

141

Connected places:

0

Able to connect:

133

Not meeting requirements (NMR):

8

Out of range (OOR):

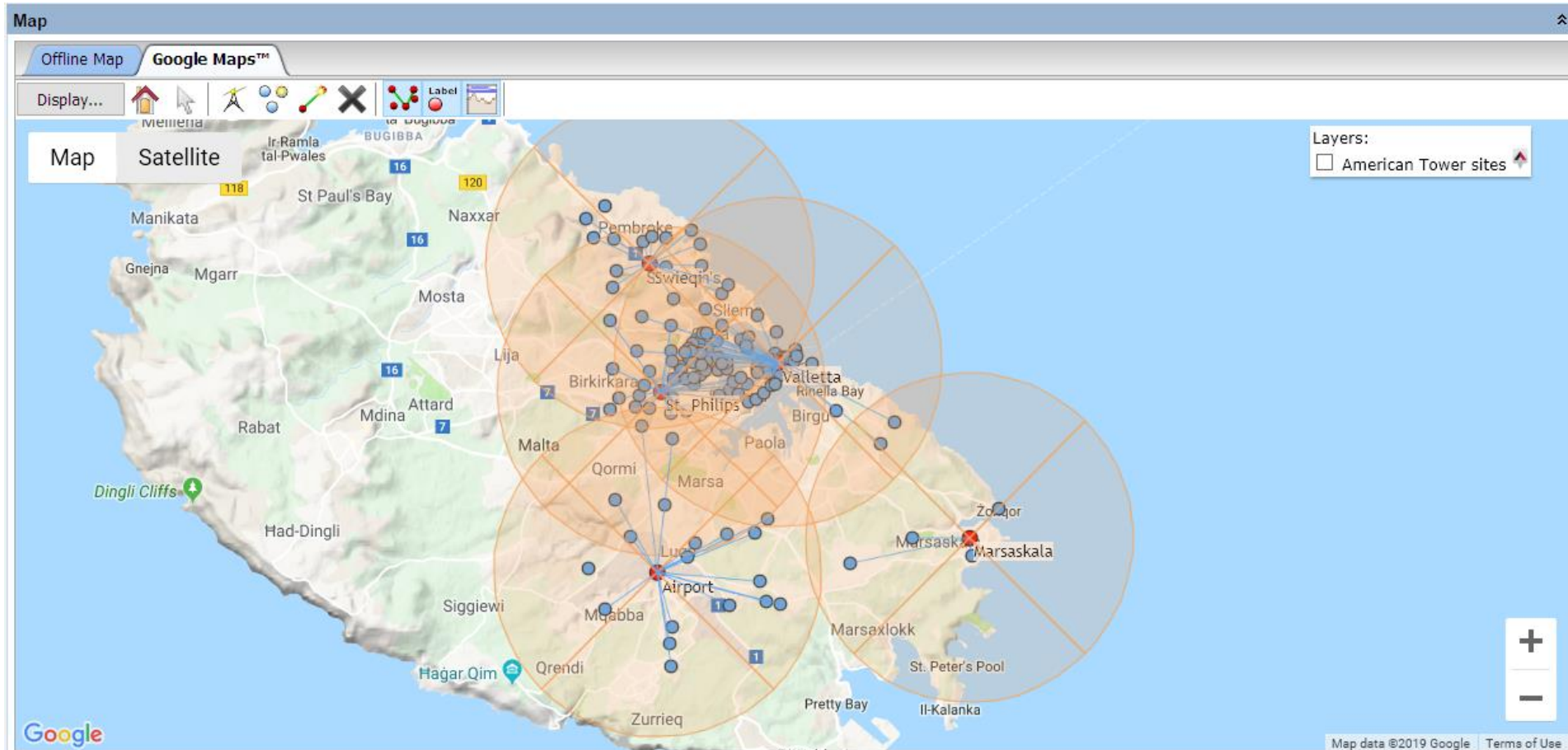
0

Name	Height (m)	Selected AP	AP 1 - Name	AP 1 - SM Product	AP 1 - SM Fade Margin (dB)	AP 1 - SM Antenna Gain (dBi)	AP 2 - Name	AP 2 - SM Product	AP 2 - SM Fade Margin (dB)	AP 2 - SM Antenna Gain (dBi)
North Street	10	AP 1	Valletta : 2	PMP 450b Mid-gain (Preliminary)	39.00	16.03				
Mandrigo	10	AP 1	Valletta : 4	PMP 450b Mid-gain (Preliminary)	36.11	16.03				
Marsamxett	10	AP 1	Valletta : 1	PMP 450b Mid-gain (Preliminary)	35.21	16.03	St. Philips : 2	PMP 450b Mid-gain (Preliminary)	22.13	16.03
Knights Hospitallers	10	AP 1	Valletta : 2	PMP 450b Mid-gain (Preliminary)	38.12	16.03				
Qasba	10	AP 1	Swieqi : 4	PMP 450b Mid-gain (Preliminary)	26.66	16.03				
Gang	10	AP 1	Valletta : 3	PMP 450b Mid-gain (Preliminary)	41.36	16.03				
Barrakka	10	AP 1	Valletta : 3	PMP 450b Mid-gain (Preliminary)	11.67	16.03				
Fort Manoei	10	AP 1	Valletta : 4	PMP 450b Mid-gain (Preliminary)	32.25	16.03	St. Philips : 2	PMP 450b Mid-gain (Preliminary)	23.40	16.03
Sprachcaffe	10	AP 1	Swieqi : 1	PMP 450b Mid-gain (Preliminary)	36.31	16.03				
Militar	10	AP 1	Swieqi : 4	PMP 450b Mid-gain (Preliminary)	21.51	16.03				
Triq Burma	10	AP 1	Swieqi : 1	PMP 450b Mid-gain (Preliminary)	32.43	16.03				
Corinthia	10	AP 1	Swieqi : 2	PMP 450b Mid-gain (Preliminary)	26.59	16.03	Valletta : 1	PMP 450b Mid-gain (Preliminary)	18.01	16.03
Arcisqof	10	AP 1	Valletta : 4	PMP 450b Mid-gain (Preliminary)	41.63	16.03				
Dragonara	10	AP 1	Swieqi : 2	PMP 450b High Gain (Preliminary)	6.01	22.41	Valletta : 1	PMP 450b Mid-gain (Preliminary)	6.06	16.03
Bellanti	10	AP 1	St. Philips : 1	PMP 450b Mid-gain (Preliminary)	27.22	16.03	Valletta : 4	PMP 450b Mid-gain (Preliminary)	25.37	16.03
Lascaris		NMR								
Geiza	10	AP 1	Swieqi : 2	PMP 450b Mid-gain (Preliminary)	39.86	16.03	Valletta : 4	PMP 450b Mid-gain (Preliminary)	16.84	16.03

Select Create to apply the results to the network

Recommend save the results to a spreadsheet and take note of all SMs which are listed as NMR or OOR

Step 4 – Best Server Network



PMP Network is now created but can be further optimized by adding a channel plan

Step 5 – Create Channel Plans

LINKPlanner (4.8.8)

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Channel Plans

PMP Channel Plans

New Channel Plan Delete Channel Plan Create Plans Increase Channels Decrease Channels Color...

Name	Band	Product	Country	T/R Spacing (MHz)	Bandwidth (MHz)	Raster (MHz)	Ch 1 (MHz)	Ch 2 (MHz)
Channel Plan 1	5.8 GHz	PMP450m	Other	Unpaired	20 MHz	2.5	5740.0	5770.0

PMP Channel Plans

New Channel Plan Delete Channel Plan Create Plans Increase Channels Decrease Channels Color...

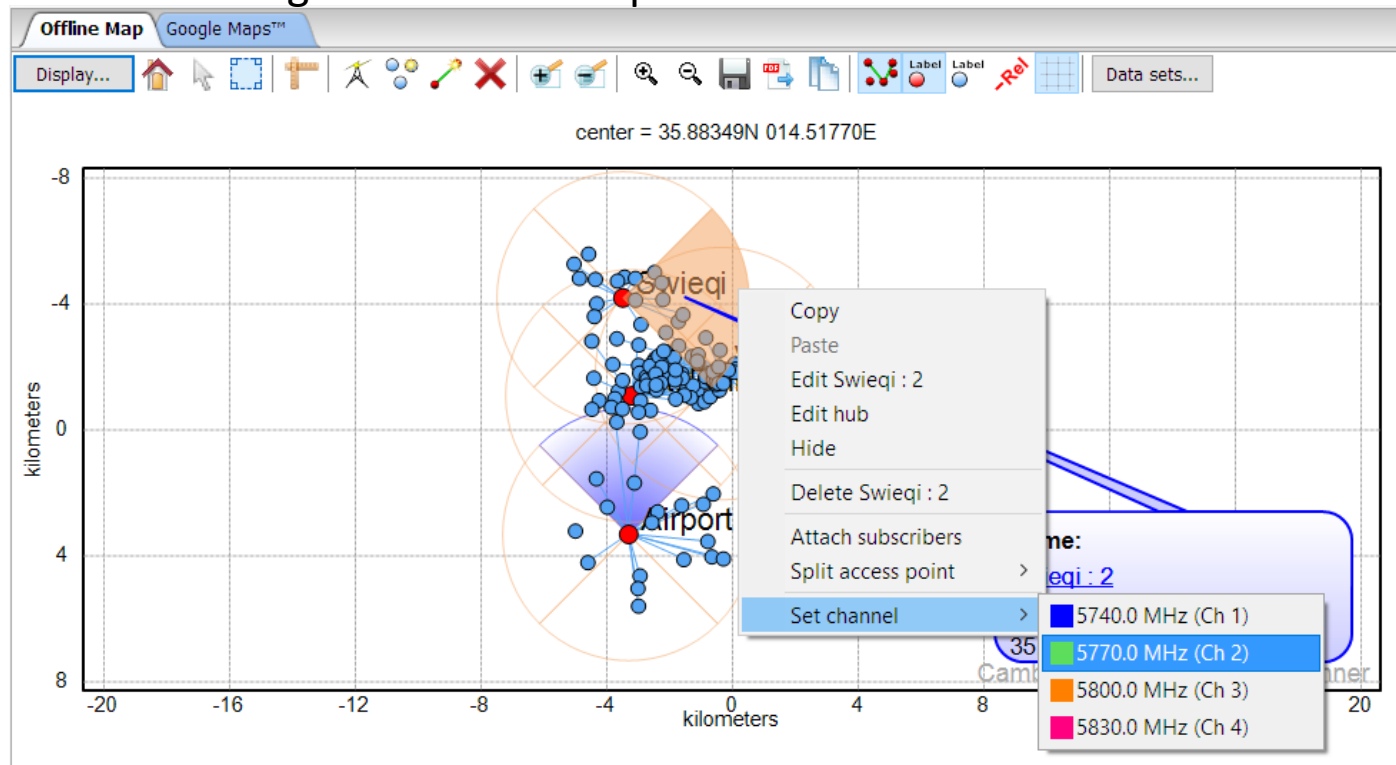
Name	Band	Product	Country	T/R Spacing (MHz)	Bandwidth (MHz)	Raster (MHz)	Ch 1 (MHz)	Ch 2 (MHz)	Ch 3 (MHz)	Ch 4 (MHz)
Channel Plan 1	5.8 GHz	PMP450m	Other	Unpaired	20 MHz	2.5	5740.0	5770.0	5800.0	5830.0

Use Increase Channels to add more columns

Use Color to change the color of each channel

Step 5 – Apply Channel Plans

Either through the Offline Map

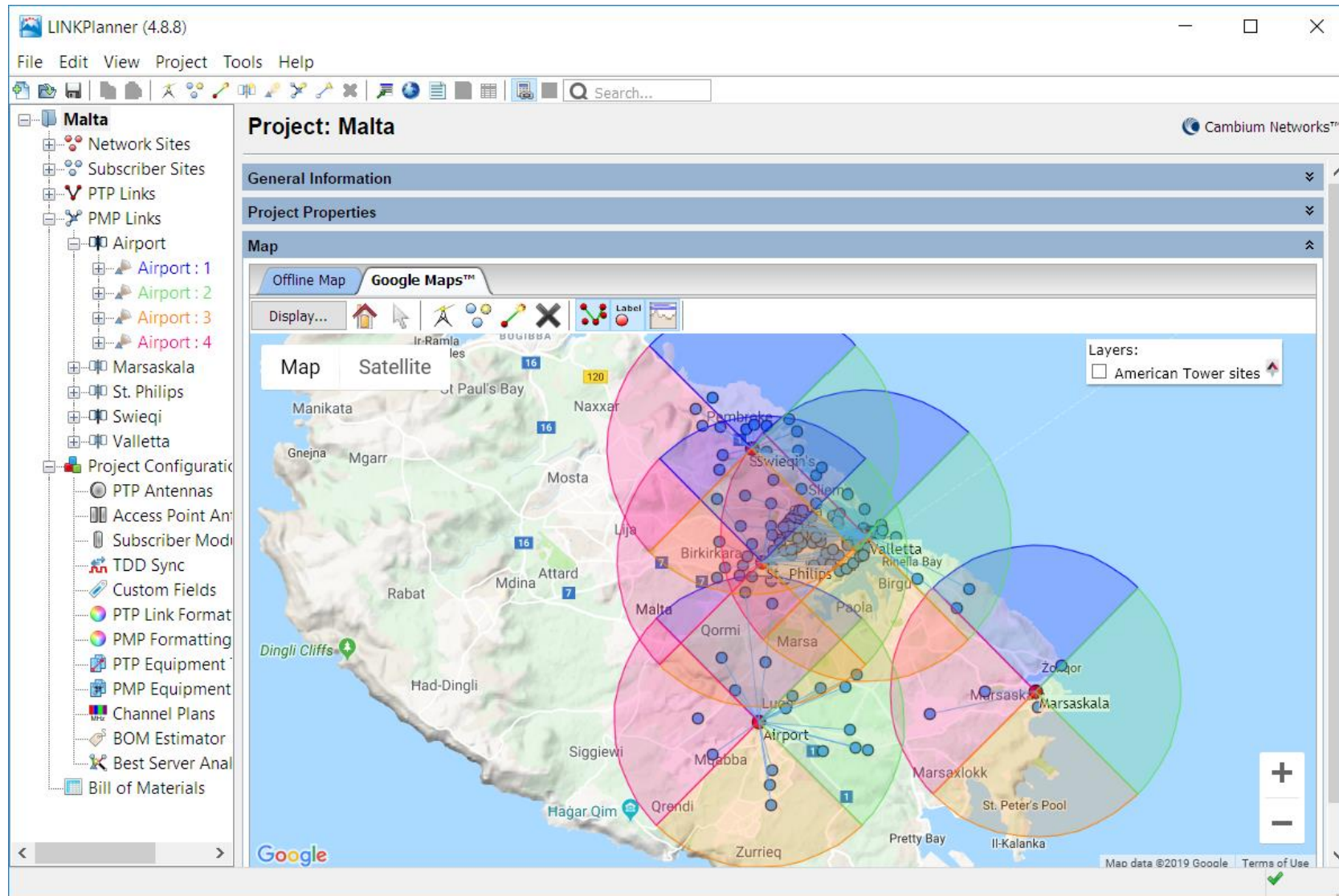


Or on the Access Point Equipment panel

Channel Selection

Channel Plan	Channel Plan Frequency
Channel Plan 1	5740.0 MHz (Ch 1)

PMP Design Complete!



Coming Soon in 2019



Coming Soon in 2019

- ePMP 3000 and Force 300-16
- cnRanger
- Interoperability between ePMP 1000/2000 and ePMP 3000

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Products

Network Planning

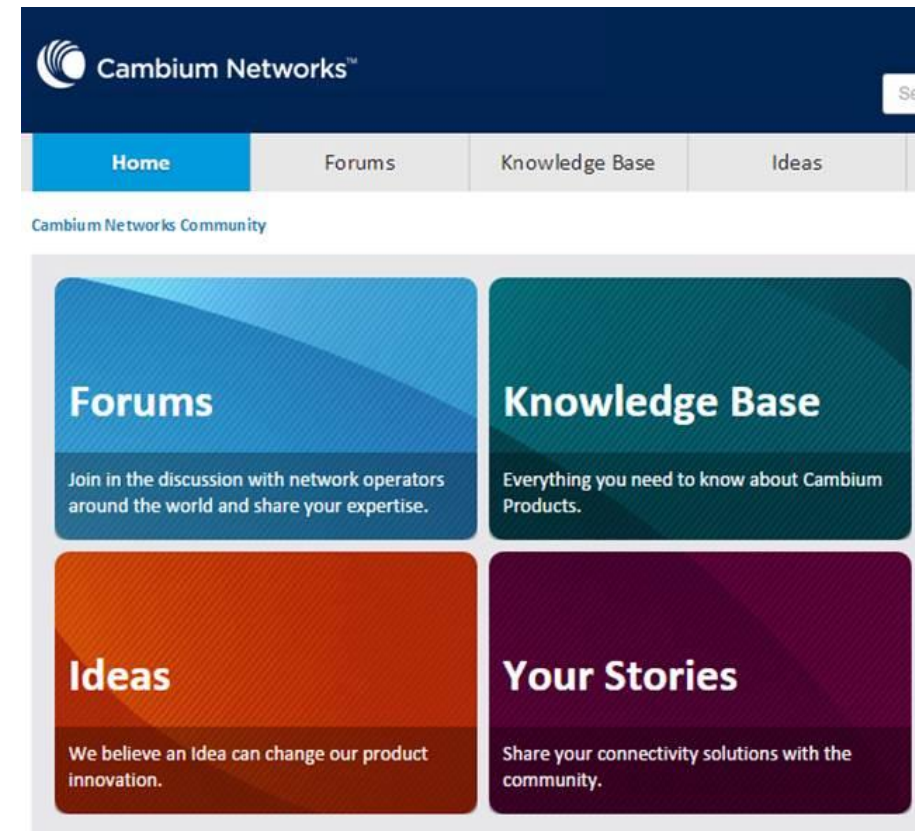
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detail documents

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