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www.puc.bz

#4 Princess Margaret Drive
2nd Floor, Marina Towers,
Belize City, Belize



Public Utilities Commission

Note for the guidance of Applicants for a Spectrum Authorization under the (Licensing Classification, Authorization and Fee Structure) Regulations, 2002 as amended from time to time.

1. Unless the Commission states otherwise, **two copies (one clearly marked CONFIDENTIAL INFORMATION which will be for PUC use only and one excluding confidential information for public scrutiny)** of the completed application form should be provided in addition to a completed soft copy submission to telecom@puc.bz. The application forms should be submitted in an envelope clearly marked "Application for Spectrum Authorization" addressed to:

The Public Utilities Commission
2nd Floor, Marina Towers
P.O. Box 300
Belize City, Belize
Central America

2. If any question is considered not applicable, please mark 'N/A' with further explanation if necessary.
3. The application fee for the License, and where appropriate, for the necessary Spectrum Authorization, must accompany an application in the form of a cheque made payable to the Public Utilities Commission in accordance with the Telecommunication (Licensing Classification, Authorization and Fee Structure) Regulations 2002 as amended from time to time.
4. Please note that the applicant is required to publish a notice of this application within **14 days** after the making of the application in accordance with the Telecommunication (Licensing Classification, Authorization and Fee Structure) Regulation 2002 as amended from time to time.
5. Failure to comply with any of these requirements may render the application liable to disqualification without refund of the application fee(s).

APPLICATION FOR SPECTRUM AUTHORIZATION

1. PART I – THE APPLICANT

(Please complete fully in type or block letters)

1.1 Contact Details

1.1.1 Name and business address of applicant

Belize Telemedia Limited
Esquivel Telecom Center
1 Saint Thomas Street
P.O. Box 603
Belize City
Belize

1.1.2 Designated contact person **Leonardo Calle, Chief Operations Officer, Belize Telemedia Limited**

1.1.3 Telephone Number **+501-610-3007**

1.1.4 Fax Number **N/A**

1.1.5 E-mail address (if available) **lcalle@livedigi.com**

1.2 Business Details

1.2.1 If the applicant is a company, partnership, or other body please give the name(s) and private address (es) of each of the current directors, company secretary, or partners:

1.2.2 Name under which applicant proposes to trade, and registered office address if different to above:

Belize Telemedia Limited
Esquivel Telecom Center
#1 Saint Thomas Street
Belize City
Belize

1.2.3 In the case of a company or other body corporate, please attach a copy of the company's Registration Certificate.

A copy of Belize Telemedia Limited's Certificate of Registration is produced at Annex 1 of this application.

1.2.4 Address in Belize for service of process or other notices (in case of overseas applicant)

N/A

1.3 History of the Applicant

1.3.1 Has the applicant ever applied for a Frequency Authorization or registration under any Act in Belize and been refused?

~~(YES)~~ ~~(NO)~~

1.3.2 Has the applicant ever been issued a Frequency Authorization under the Telecommunications Act?

~~(YES)~~ ~~(NO)~~

1.3.3 If the answer to question 1.3.2 is YES, has any such Frequency Authorization been revoked?

~~(YES)~~ ~~(NO)~~

1.3.4 Has any Affiliate of the applicant previously been granted a Frequency Authorization under the Telecommunications Act, which was revoked?

~~(YES)~~ ~~(NO)~~

1.3.5 Is the applicant the holder of a frequency authorization in any other country? If yes, please specify the country.

~~(YES)~~ ~~(NO)~~

1.3.6 Has the applicant or any Affiliate been refused a frequency authorization mentioned in question 1.3.5 above, or had a frequency authorization revoked?

~~(YES)~~ ~~(NO)~~

1.3.7 Has the applicant operated under or carried on business under any name other than in this application? (If Yes please attached company details)

~~(YES)~~ (NO)

2. **PART II – THE APPLICANT’S BUSINESS AND THE PROPOSED NETWORK AND/OR SERVICE(S)**

2.1 **The Applicant**

2.1.1 Please provide a diagrammatic representation of the applicant’s group structure, including the percentage of shares held. Please indicate which affiliates have, or intend to apply for, other telecommunications licenses or frequency authorizations.

2.1.2 Does the applicant have any shareholdings in any other licensed telecommunications provider or frequency authorization holder in the Belize or elsewhere?

(YES) ~~(NO)~~

Alternative Networks Limited (an Internet Networks Individual Licence Holder)

2.1.3 Has any member of the applicant’s managerial staff been bankrupt, or been a director of a company which has been insolvent?

~~(YES)~~ (NO)

If the answer is YES, please attach a certified copy of the discharge.

2.1.4 Has the applicant or any member of the applicant’s managerial staff ever been the defendant or respondent in any proceedings in any court in any jurisdiction involving dishonesty, fraud, theft or violence, or is the applicant or any member of the applicant’s managerial staff currently the subject of a charge or indictment under the law of any country for (contravention of any law or for) any conduct involving dishonesty, fraud, theft or violence?

~~(YES)~~ (NO)

2.2 Applicant's Current Activities

Please provide answers to the following questions in relation to (a) the applicant's activities in Belize; (b) the applicant's activities elsewhere in the Caribbean; and (c) the applicant's activities elsewhere in the world.

Networks

2.2.1 Please provide a summary of any radio-based infrastructure which the applicant currently has in place.

**Mobile Cellular GSM, UMTS, LTE FDD
Point-to-Point Microwave Backhaul Links
Point-to-MultiPoint Wireless Broadband Links**

2.2.2 If the applicant is using radio frequency spectrum, please provide details of any frequency authorizations held, including the number of frequency authorizations and the reference number of each frequency authorization.

The details of Frequency Authorizations held by Belize Telemedia Limited are produced at Annex 2 of this application.

Services

2.2.3 Please provide details of the services currently being provided by the applicant through its existing radio-based infrastructure.

- **Mobile Cellular GSM, UMTS, LTE FDD – Used to provide Mobile Cellular, SMS and Data Services to BTL customers via BTL's Product DigiCell.**
- **Point-to-Point Links – Used to provide wireless connectivity for backhaul Mobile Cellular & Data, Broadband.**
- **Point-to-MultiPoint Wireless Broadband Links – Used to provide wireless broadband services to BTL customers.**

Obligations

2.2.4 Please provide details of how the applicant currently complies with any other emissions of electromagnetic radiation from equipment of any description.

Equipment provided by reputable companies that adhere to ITU Standards. Equipment installed and operated according to manufacturer's recommendation and instructions.

2.3 Applicant's Proposed Activities

Radiocommunication Station

2.3.1 Is the frequency authorization for which the applicant is applying to be used in relation to a satellite earth station?

~~(YES)~~

(NO)

2.3.2 If the answer to question 2.3.1 is YES, please provide the following information:

- (a) A letter from the satellite provider, indicating its contact person and any assigned frequencies for the proposed service and the station to be communicated with.
- (b) A copy of the manufacturer's technical specification for the transmitter, receiver and antenna.
- (c) The following information in respect of the satellite earth station receiving characteristics:
 - (i) Make and model
 - (ii) Assigned frequencies (downlink)
 - (iii) Assigned frequency band
 - (iv) Date of bringing into use
 - (v) Location of station, including country and geographic coordinates
 - (vi) Class of emission
 - (vii) Antenna size, antenna gain and receive G/T
 - (viii) Horizontal elevation angle and min/max elevation angle
 - (ix) Azimuth
 - (x) Altitude
 - (xi) Polarization
 - (xii) Receive noise temperature
 - (xiii) Regular hours of operation
 - (xiv) Maintenance of system

- (d) The following information in respect of the satellite earth station transmitting characteristics:
- (i) Make and model
 - (ii) Assigned frequencies (uplink)
 - (iii) Assigned frequency band
 - (iv) Proposed date of bringing into use
 - (v) Transmitter power, including saturated transmitter power and maximum radiated power
 - (vi) Antenna gain
 - (vii) Polarization
 - (viii) Modulation (including FDM-FM, PCM/PSK, TV, and other)
 - (ix) Regular hours of operation
 - (x) Agreements with satellite provider
 - (xi) Operating satellite
 - (xii) Name of receiving earth station
 - (xiii) Location of receiving earth station.

2.3.3 Please provide a summary of the radio-based infrastructure that the applicant is planning to put in place within the next (three) years. In particular, please provide details of the proposed Radiocommunication Station, including:

Purpose of application (what is being applied for)?

The application's aim is for the PUC to grant the requisite frequency spectrum approval to upgrade the current Microwave Links between Belize City – Caye Caulker and Caye Caulker to San Pedro.

At present, BTL is operating a microwave link using Equipment Huawei RTN980L, configured in a 10+0 setup, providing a capacity of 4.7 Gbps; the frequencies to these links were assigned in the License Reference: PUC-BTL-20240618-01 with an Issue Date: June 18, 2024)

The proposed upgrade seeks to expand the current RTN980L configuration to a 16+0 setup and introduce a second microwave system Huawei RTN6900, configured in an 8+0 setup. These enhancements will result in aggregated microwave capacity of 11.712 Gbps across both links.

The Link RTN980L will have an expanded capacity of 7,520 Gbps, the RTN6900 will have a capacity of 4,192 Gbps, providing an aggregated capacity of 11,712 Gbps.

The additional capacity is required to ensure a high reliability of the Services to San Pedro and Caye Caulker. This upgrade will provide a robust alternative in the event of a failure of the Submarine Cable link between Bomba on the mainland and San Pedro.

This request aligns with BTL's strategic goal to enhance the reliability and scalability of BTL's telecommunications infrastructure, ensuring continued high-quality service for our customers in the areas of Belize City, Caye Caulker, and San Pedro.

- (a) Geographical location (GPS Coordinates), & Coverage Map

Link 1: BKP to Caye Caulker

**Belize City 17°30'40.56"N, 88°11'40.27"W to
Caye Caulker 17°44'34.49"N, 88° 1'31.82"W**

Link 2: Caye Caulker to San Pedro

**Caye Caulker 17°44'34.49"N, 88° 1'31.82"W to
San Pedro 17°55'19.67"N, 87°57'39.60"W**

- (b) Type of equipment and system (including manufacturer, model number, FCC Certificate & Current/Valid Type Approval).

Brand and Model of radio unit.

Type of equipment and system:

Currently BTL is using the Huawei OptiX RTN980L Radio Transmission System, which is already installed and configured for the existing Microwave Point-to-Point Links between Belize City (BKP) and Caye Caulker, as well as from Caye Caulker to San Pedro.

**Manufacturer: Huawei Technologies
Model number: RTN 980L
FCC Certificate: N/A ETSI Standard**

The RFU Model that will be used by BTL for the implementation of the expansion is XMC-LH.

The technical specification documentation for the equipment is produced in *Annex 6* of this Application.

Type of equipment and system: RTN 6900 Radio Transmission System
Manufacturer: Huawei Technologies
Model number: RTN 6900
FCC Certificate: N/A ETSI Standard

The technical specification documentation for the equipment is produced in *Annex 7* of this Application.

The RFU Model that will be used by BTL for the implementation is XMC-5D.

The technical specification documentation for the equipment is produced in *Annex 8* of this Application.

Note: Applicant must include, in soft copy, the vendor provided technical description documentation of the equipment and system.

- (c) Radio frequency and direction of frequency (whether link applied for is uni-directional or bi-directional, and relevant transmission details?)

Radio frequency and direction of frequency being requested are produced at *Annex 3* of this application.

Note: Request for Point-to-Point authorizations must conform to the 2020 Order: Belize Radio Frequency Channelization for Point-to-Point links. <https://www.puc.bz/2020-belize-radio-frequency-channelization-for-point-to-point-links/>

Applicant is required to identify the Lower and Upper edge frequencies applicable to requested range, transmitter location name and coordinates.

- (d) Transmission power level

Maximum of 31.5 dBm or 1.41 W

- (e) Preferred polarization of emissions (i.e. vertical, horizontal, co-channel dual polar)

XPIC

- (f) Preferred equipment carrier frequency range for channel assignment

ITU-R F.383-9 AND ITU-R F.384-11 as per Application Channelization defined by the ITU for the 6 GHz Frequency;

ITU-R F.385-10 as per Application Channelization defined by the ITU for the 7 GHz Frequency; and

ITU-R F.386-9 as per Application Channelization defined by the ITU for the 8 GHz Frequency.

Equipment tuning range: lower frequency to upper frequency

- (g) Is system intended to be duplicated? (If Yes, please Specify)

No

- (h) Type of antenna, including details of antenna height

Note: Applicant must include, in soft copy, the vendor provided technical specifications for the proposed antenna(s)

The Antennae for this Expansion are already installed, the intended expansion only expands mode RFU (ODU) to be connected to the installed antennas .

Link 1: BKP to Caye Caulker

Antenna Model: A6WD7WD24MB-3NX

Antenna Size: 2.4m

Antenna Height - BKP: 223ft & 154ft

Antenna Height - CCK: 85ft & 68ft

Link 2: Caye Caulker to San Pedro

Antenna Model: A6WD7WD24MB-3NX

Antenna Size: 2.4m

Antenna Height - CCK: 91ft & 68ft

Antenna Height - SPD: 108ft & 75ft

The technical specifications documentation for the Antenna are produced at *Annex 4* of this application.

- (i) Station ID (if applicable)

Link 1: BKP to Caye Caulker

Location A: BTL Kings Park, Belize City

Location B: Caye Caulker

Link 2: Caye Caulker to San Pedro

Location A: Caye Caulker

Location B: San Pedro

- (j) Address of location from where equipment is to be operated (if different from Radiocommunication Station's location).

N/A

- (k) Radio frequency feeder loss and hot-standby loss, rounded up to nearest dB. Any radio frequency feeder loss over 10 dB or hot-standby loss over 4 dB must be justified.

Radio frequency feeder loss: 1.5

The system is 16+0 (unprotected), therefore hot-standby loss is N/A.

- (l) Guaranteed maximum boresight gain relative to an isotropic radiator for any antenna specified rounded up to nearest dB.

Antenna Gain:

L6 & U6 is 42.7 dBi;

U7 & L8 is 43.9 dBi.

- (m) Path profile for the proposed point-to-point link(s).

Path Profile for the proposed Link is produced at *Annex 5* of this application.

- (n) Throughput capacity for the proposed link(s).

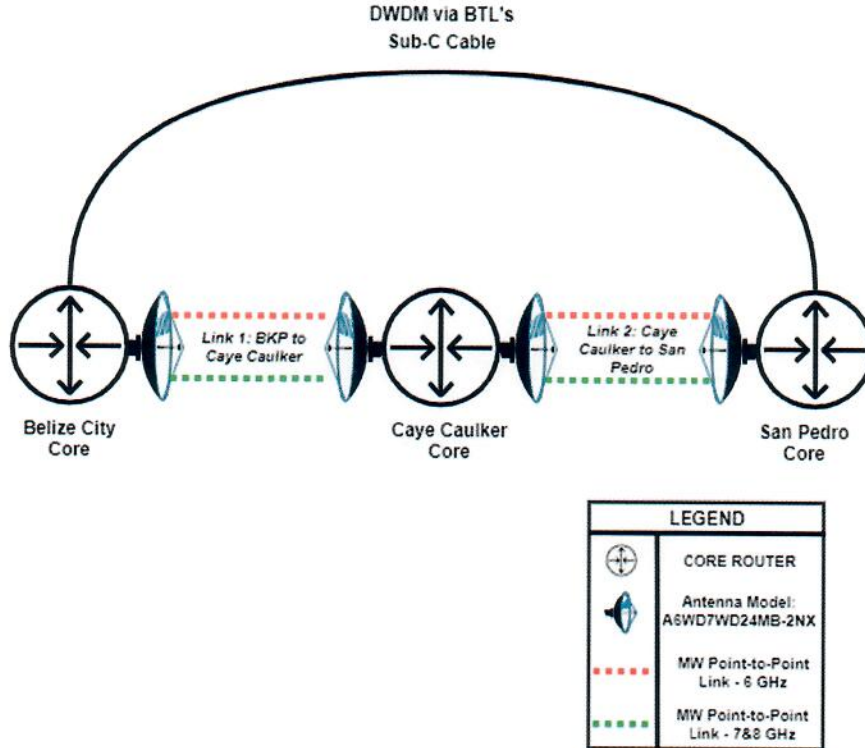
Throughput Capacity for the proposed Link is produced at *Annex 5* of this application.

Services

- 2.3.4 Please provide a description of the service, which the applicant proposes to provide using the frequency band for which it is applying. (Including an Architectural Diagram).

BTL provides the Services of Diginet , Digicell , DigiTel , and B2B Services for Customers in the Areas of San Pedro and Caye Caulker. These services need connectivity to Internet and the Core Nodes located in Belize City. The requested frequencies will provide such connectivity to Caye Caulker and San Pedro

Kindly see current and targeted architecture as requested.



The frequencies are needed to upgrade the capacity of the existing Microwave Point-to-Point Links from 4.7 Gbps to 11.72Gbps for both Link 1 (Belize City to Caye Caulker) and Link 2 (Caye Caulker to San Pedro).

The historic, current and forecasted requirement of capacity in the Link from San Pedro and Caye Caulker are presented in the below table. The current traffic is via Microwave and Submarine Cable

Traffic Source	Actuals				Forecast		
	Jan-24	Apr-24	Jul-24	Oct-24	Jan-25	Apr-25	Jul-25
Caye Caulker (Gbps)	3.2	2.5	3	2.8	3.1	3.1	3.2
San Pedro (Gbps)	8.7	9.2	13.7	14	15	15.8	16.6

Obligations

2.3.5 Please provide details of how the applicant proposes to comply with the obligations in the frequency authorization (and in the Frequency Authorization Regulations) in respect of harmful interference, and any other technical regulations in respect of emissions of electromagnetic radiation from equipment of any description.

- Electromagnetic Compatibility**
- Complies with ETSI EN 301 489-1.**
- Complies with ETSI EN 301 489-4.**
- Complies with ETSI EN 300 385.**
- Complies with ETSI EN 300 386.**

PART III

DECLARATION BY THE APPLICANT

Application is hereby made on behalf of **BELIZE TELEMEDIA LIMITED** for the issue of an Authorization to install, hold and use wireless sending and receiving apparatus – as detailed above – for the purposes stated.

In accordance with the Belize Telecommunications Act and any other Regulations thereunder, I accept responsibility for the installation, maintenance and operation of the system if approved.

I confirm that no change will be made in any of the foregoing without prior approval of The Public Utilities Commission.

Signature of applicant: _____ 

Name in Block Letters: Leonardo Calle
 Chief Operations Officer
 Belize Telemedia Limited

Date: October 8, 2024

THE APPLICANT/LICENSEE SHOULD BE AWARE THAT HE/SHE IS RESPONSIBLE IN LAW FOR THE RADIO SYSTEM AND ITS OPERATION REGARDLESS OF WHO SUPPLIES THE EQUIPMENT OR WHO OPERATES IT ON HIS/HER BEHALF

The completed Application Form and the appropriate fee should be submitted to: Office of the Chairman of Public Utilities Commission, P. O. Box 300, Belize City, Belize.

ANNEX 1 – Certificate of Registration



BELIZE COMPANIES & CORPORATE AFFAIRS REGISTRY

CERTIFICATE OF REGISTRATION

The Belize Companies & Corporate Affairs Registry HEREBY CERTIFIES, pursuant to the BELIZE COMPANIES ACT, 2022 all requirements in respect of registration have been complied with.

BELIZE TELEMEDIA LIMITED

Registration Number **000021455**

Former Registration Number **9497**

Private Company is this day registered in the Register.

Dated this
14 of September 2006
Certificate No. CERT-REG-23/33076



A handwritten signature in black ink, appearing to read "Santiago Sanchez".

Deputy Registrar
Belize Companies & Corporate
Affairs Registry

ANNEX 2 – Frequency Authorizations

Microwave Broadband FREQUENCY SPECTRUM REGISTER

MOBILE SPECTRUM REGISTER



BAND	NO	DESIGNATION / LOCATION	RF CHANNEL USE	Bandwidth (MHz)	Bandwidth (kHz)	Approval Date or Reference
700 MHz	1	LTE Band 12	1	10	10,000	PUC/TELECOM/DT/B2 (036) 2021
800 MHz	1	(AMPS Cellular) A' Band / GSM850		1.5	1500	PUC/TELECOM/DT/B2 (05) 2016 dated May 13, 2016
	2	B Band / GSM850		10	10000	
	3	extended B Band / GSM850		2.5	2500	PUC/DT/B2 (5) 2004 dated October 08 2004
		UMTS	1	5		
		GSM	45	9		
1900 MHz	1	GSM 1900 Band E (1885-1890)(1965-1970)		5	5000	OOT/BTL/3/01 (17) dated March 05, 2001
	2	GSM 1900 Band F (ARFCN 712 - 736)		5	5000	OOT/BTL/3/01 (17) dated March 05, 2001
	3	GSM 1900 Band C (ARFCN 737 - 810)		15	15000	OOT/BTL/3/01 (17) dated March 05, 2001
	4	GSM 1900 Band B (1870-1885)(1950-1965)		5	5000	(PUC/TELECOM/DT/B2 (14) 2016 dated Sep 16, 2016), (PUC/TELECOM/DT/B2 (036) 2021)
		GSM	2	0.4		
		UMTS	2	10		
		LTE	1	10		

NARROWBAND LMS FREQUENCY SPECTRUM REGISTER



BAND	NO	FREQUENCY	Location A Name	Location B Name	Bandwidth (MHz)	Comments
HF	1	3.600 Mhz	Emergency use - Countrywide	Emergency use - Countrywide	0.025	For use with NEMO
	2	7.200 Mhz	Emergency use - Countrywide	Emergency use - Countrywide	0.025	For use with NEMO
	3	7.250 Mhz	Emergency use - Countrywide	Emergency use - Countrywide	0.025	For use with NEMO
VHF	1	154.000 Mhz	Internal use - Countrywide (Emergency)	Internal use - Countrywide (Emergency)	0.025	Fixed
	2	152.550 Mhz	Internal use - Countrywide (Security)	Internal use - Countrywide (Security)	0.025	Fixed & Mobile
	3	153.875 Mhz	Internal use - Countrywide (Riggers)	Internal use - Countrywide (Riggers)	0.025	Fixed & Mobile
UHF	1	430.925 Mhz [Tx] 440.925 Mhz [Rx]	Belize City Kings Park	Gallon Jug	0.025	
	2	430.850 Mhz [Tx] 440.850 Mhz [Rx]	Gallon Jug	Chan Chich Lodge	0.025	

Microwave Broadband FREQUENCY SPECTRUM REGISTER 2024 - SEP 2024

BAND	NO	Location A Tx		Location A Rx		Location A Name	GPS Coordinates (Lat, Lon)	Location B Name	GPS Coordinates (Lat, Lon)	CHANNEL	Channel Size	BW Occupied	Comments	
		Centre	Band	Centre	Band									
6GHz	1	6256.540	L6	6004.500	L6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	29.65	59.30	Huawei	
	2	6286.190	L6	6034.150	L6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	29.65	59.30	Huawei	
	3	6315.840	L6	6063.800	L6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	29.65	59.30	Huawei	
	4	6345.490	L6	6093.450	L6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	29.65	59.30	Huawei	
	5	6375.140	L6	6123.100	L6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	29.65	59.30	Huawei	
	6	6404.790	L6	6152.750	L6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	29.65	59.30	Huawei	
	7	6670.000	U6	7010.000	U6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	30	60.00	60.00	Huawei
	8	6700.000	U6	7040.000	U6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	30	60.00	60.00	Huawei
	9	6730.000	U6	7070.000	U6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	30	60.00	60.00	Huawei
	10	6760.000	U6	7100.000	U6	Caye Caulker Exchange	17.742913, -88.025505	San Pedro Exchange	17.922133, -87.961000	1	30	60.00	60.00	Huawei
	11	6256.540	L6	6004.500	L6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	29.65	59.30	Huawei	
	12	6286.190	L6	6034.150	L6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	29.65	59.30	Huawei	
	13	6315.840	L6	6063.800	L6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	29.65	59.30	Huawei	
	14	6345.490	L6	6093.450	L6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	29.65	59.30	Huawei	
	15	6375.140	L6	6123.100	L6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	29.65	59.30	Huawei	
	16	6404.790	L6	6152.750	L6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	29.65	59.30	Huawei	
	17	6670.000	U6	7010.000	U6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	30	60.00	60.00	Huawei
	18	6700.000	U6	7040.000	U6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	30	60.00	60.00	Huawei
	19	6730.000	U6	7070.000	U6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	30	60.00	60.00	Huawei
	20	6760.000	U6	7100.000	U6	Belize City Kings Park	17.511267, -88.194519	Caye Caulker Exchange	17.742913, -88.025505	1	30	60.00	60.00	Huawei
7GHz	1	7331.000	L7	7170.000	L7	Orange Walk	18.066662, -88.564538	Blue Creek	17.896205, -88.900116	1	28	56.00	MNIM series Hybrid	
	2	7359.000	L7	7198.000	L7	Orange Walk	18.066662, -88.564538	August Pine Ridge	17.974363, -88.727566	1	28	56.00	MNIM series Hybrid	
	3	7415.000	L7	7254.000	L7	Orange Walk	18.066662, -88.564538	Yo Creek	18.091223, -88.636207	1	28	56.00	MNIM series Hybrid	
	4	7303.400	L7	7142.400	L7	Orange Walk	18.066662, -88.564538	Progreso	18.229396, -88.409811	1	28	56.00	MNIM series Hybrid	
	5	7327.500	L7	7166.500	L7	Corozal Exch	18.396635, -88.394583	Santanja	16.352831, -88.1496121	1	28	56.00	MNIM series Hybrid	
	6	7212.000	L7	7373.000	L7	Bermudian Landing	17.559681, -88.533581	Gallion Jug	17.559763, -89.044211	1	28	56.00	MNIM series Hybrid	
	7	7142.000	L7	7303.000	L7	Santa Cruz	16.7007741, -88.428575	Riversdale	16.691814, -88.312135	1	56	112.00	MNIM series Hybrid	
	8	7303.000	L7	7142.000	L7	Placencia	16.515034, -88.368022	Independence	16.5332975, -88.419771	1	56	112.00	MNIM series Hybrid	
	9	7411.500	L7	7250.500	L7	Punta Gorda Exch	16.095545, -88.811405	Barranco	16.001005, -88.920549	1	28	56.00	MNIM series Hybrid	
	10	7222.500	L7	7383.500	L7	Chunox	16.302416, -88.350798	Corozal Exch	16.396635, -88.394583	1	28	56.00	MNIM series Hybrid	
11GHz	1	10730.000	11	11250.000	11	Belize City Kings Park	17.511267, -88.194519	Caye Chapel	17.686313, -88.042345	1	56	112.00	Huawei	

ANNEX 3 – Radio Frequency and Direction of Frequency Being Requested

BELIZE CITY TO CAYE CAULKER

BELIZE CITY		CAYE CAULKER		Transmission Frequency				
Site A Coordinates		Site B Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U6	2	6475.000	6490.000	6505.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U6	3	6505.000	6520.000	6535.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U6	4	6535.000	6550.000	6565.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U6	5	6565.000	6580.000	6595.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U6	6	6595.000	6610.000	6625.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U6	7	6625.000	6640.000	6655.000

CAYE CAULKER		BELIZE CITY		Transmission Frequency				
Site B Coordinates		Site A Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U6	2	6815.000	6830.000	6845.000
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U6	3	6845.000	6860.000	6875.000
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U6	4	6875.000	6890.000	6905.000
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U6	5	6905.000	6920.000	6935.000
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U6	6	6935.000	6950.000	6965.000
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U6	7	6965.000	6980.000	6995.000

BELIZE CITY		CAYE CAULKER		Transmission Frequency				
Site A Coordinates		Site B Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U7	4	7508.500	7522.500	7536.500
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	U7	5	7536.500	7550.500	7564.500
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	L8	4	7817.000	7831.000	7845.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	L8	5	7845.000	7859.000	7873.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	L8	6	7873.000	7887.000	7901.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	L8	7	7901.000	7915.000	7929.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	L8	8	7929.000	7943.000	7957.000
17°30'40.56"N	88°11'40.27"W	17°44'34.49"N	88° 1'31.82"W	L8	9	7957.000	7971.000	7985.000

CAYE CAULKER		BELIZE CITY		Transmission Frequency				
Site B Coordinates		Site A Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U7	4	7669.500	7683.500	7697.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	U7	5	7697.500	7711.500	7725.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	L8	4	8100.500	8114.500	8128.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	L8	5	8128.500	8142.500	8156.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	L8	6	8156.500	8170.500	8184.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	L8	7	8184.500	8198.500	8212.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	L8	8	8212.500	8226.500	8240.500
17°44'34.49"N	88° 1'31.82"W	17°30'40.56"N	88°11'40.27"W	L8	9	8240.500	8254.500	8268.500

ANNEX 3 – Radio Frequency and Direction of Frequency Being Requested

CAYE CAULKER TO SAN PEDRO

CAYE CAULKER		SAN PEDRO		Transmission Frequency				
Site A Coordinates		Site B Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U6	2	6475.000	6490.000	6505.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U6	3	6505.000	6520.000	6535.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U6	4	6535.000	6550.000	6565.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U6	5	6565.000	6580.000	6595.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U6	6	6595.000	6610.000	6625.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U6	7	6625.000	6640.000	6655.000

SAN PEDRO		CAYE CAULKER		Transmission Frequency				
Site B Coordinates		Site A Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U6	2	6815.000	6830.000	6845.000
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U6	3	6845.000	6860.000	6875.000
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U6	4	6875.000	6890.000	6905.000
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U6	5	6905.000	6920.000	6935.000
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U6	6	6935.000	6950.000	6965.000
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U6	7	6965.000	6980.000	6995.000

CAYE CAULKER		SAN PEDRO		Transmission Frequency				
Site A Coordinates		Site B Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U7	4	7508.500	7522.500	7536.500
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	U7	5	7536.500	7550.500	7564.500
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	L8	4	7817.000	7831.000	7845.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	L8	5	7845.000	7859.000	7873.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	L8	6	7873.000	7887.000	7901.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	L8	7	7901.000	7915.000	7929.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	L8	8	7929.000	7943.000	7957.000
17°44'34.49"N	88° 1'31.82"W	17°55'19.67"N	87°57'39.60"W	L8	9	7957.000	7971.000	7985.000

SAN PEDRO		CAYE CAULKER		Transmission Frequency				
Site B Coordinates		Site A Coordinates		Band	Channel	Start	Central	End
Latitude	Longitude	Latitude	Longitude					
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U7	4	7669.500	7683.500	7697.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	U7	5	7697.500	7711.500	7725.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	L8	4	8100.500	8114.500	8128.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	L8	5	8128.500	8142.500	8156.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	L8	6	8156.500	8170.500	8184.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	L8	7	8184.500	8198.500	8212.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	L8	8	8212.500	8226.500	8240.500
17°55'19.67"N	87°57'39.60"W	17°44'34.49"N	88° 1'31.82"W	L8	9	8240.500	8254.500	8268.500



Product Specifications



Version	Date
V1.2	2023-07-25

A6WD7WD24MB-3NX

6WG&7WG, 2.4m, Multi-band, Dual Polarization,
Separate, Class3, Modular Antenna.

General Specifications

Product Type	Microwave antenna
Product Series	UHP-M Multi-band

Electrical Specifications

Model Number	Frequency (GHz)	Gain (dBi)			HPBW (°)	XPD (dB)	F/B Ratio (dB)	IPI (dB)	VSWR	ETSI Standard	Antenna Input*
		Low	Mid	High							
A6WD7WD24MB-3NX	5.925 ~ 7.125	41.1	41.9	42.7	1.3	30	68	35	1.3	Class 3	Huawei customized interface
	7.125 ~ 8.5	42.7	43.1	43.9	1.15	30	69	35	1.3	Class 3	

Note: Huawei customized interface. It can be only used with microwave electrical accessories customized for UHP-M multiband antenna (OMTXX-S-MB or MBF6W&7W-S-X).

Mechanical Specifications

Diameter (m)	2.4
Antenna Color (color charts)	Grey (RAL7035)
Reflector	One-piece reflector
Radome Color	White
Fine Azimuth Adjustment	±5°
Fine Elevation Adjustment	±5°
Diameter of mounting pipe (mm)	Φ114
Side Strut	2 (optional 2 pcs)
Installation	Separate Mount
Ice-load(mm)	25.4
Operational Temperature (°C)	-45 to +60

Product Specifications

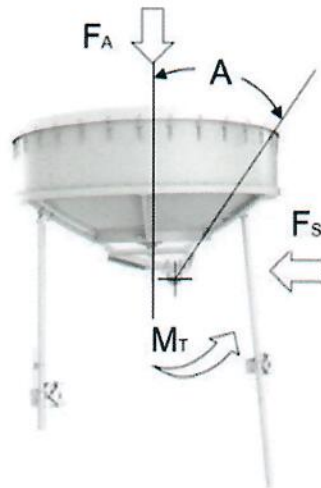


● Wind Forces At Wind Velocity Survival Rating

Wind Velocity Survival Rating, km/h	200
Wind Velocity Operational, km/h	125
Axial Force (N) *	12100
Side Force (N) *	7868
Twisting Moment (N-m) *	2410

Note: The diameter of the mounting pipe is 114 mm when testing. Axial Force/Side Force /Twisting Moment is at wind velocity survival rating.

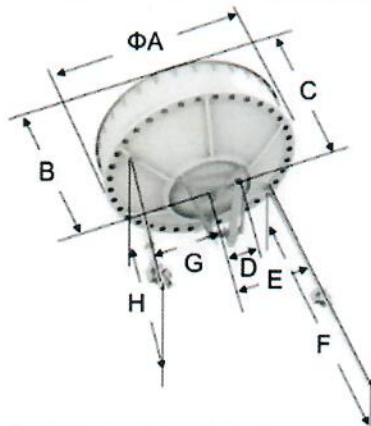
● Wind Forces At Wind Velocity Survival Rating Image



● Packed Dimensions

Gross Weight,Packed Antenna (kg)	298±15
Net Weight,Only Antenna (kg)	170±10
Single Side strut Weight (kg)	30±0.5
L × W× H (mm × mm × mm)	2690 × 1140 × 2550

● Antenna Dimensions



Dimensions in mm	
Antenna size,ft(m)	8(2.4)
A	2569
B	1230
C	1433
D	235
E	988
F	3050
G	966
H	2000

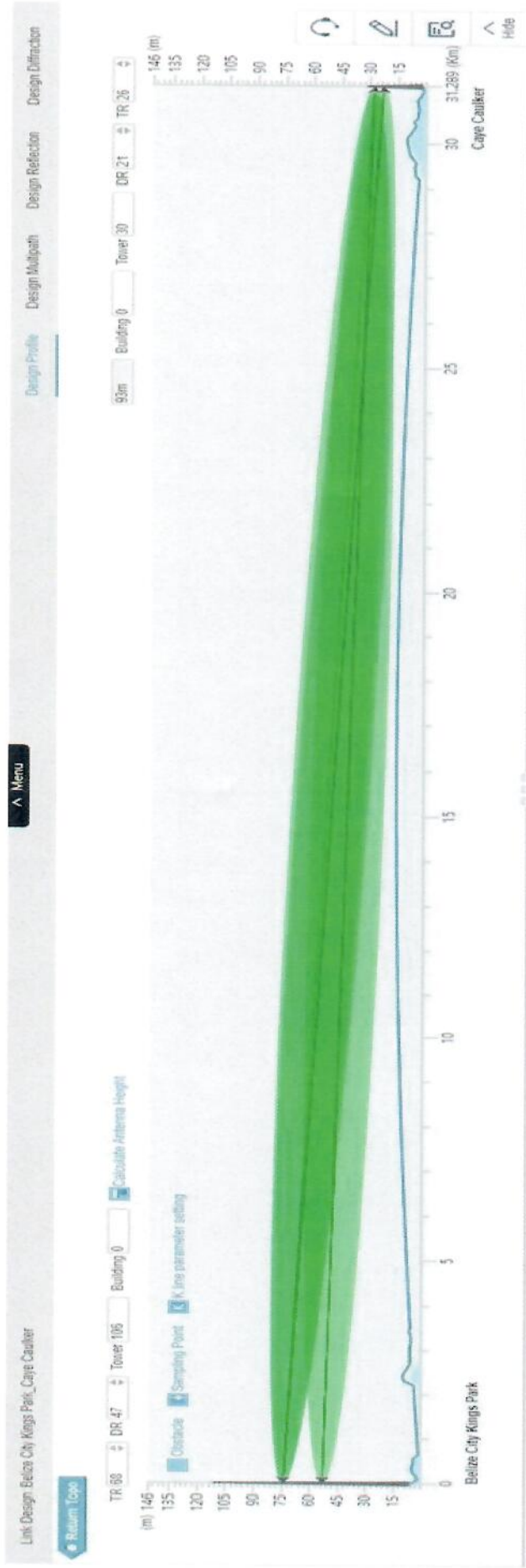
 **Note**

Gain	There may be an error in testing the gain in different test fields. The error should be less than 0.5dB.
Radiation Pattern Envelope Reference (RPE)	RPE of antenna is generated with the stated gain, so there will be a deviation of RPE when the gain is deviated. Theoretically, the pattern deviation dose not exceed 0.5dB.
Front-to-Back Ratio	Indicates the highest backward radiation, relative to the main lobe, in the range of $180^{\circ} \pm 40^{\circ}$. Production antennas do not exceed rated values by more than 2dB unless stated otherwise.
Half-power beamwidth (HPBW)	HPBW is a typical value that fluctuates with frequency.
Cross Polarization Discrimination (XPD)	The stated 30dB antenna XPD is tested in professional test field. Both antennas have 30dB XPD in a link, but the detected link XPD may fall back to the worst 24dB.

ANNEX 5 – Path Profile & Throughput Capacity

The link's design throughput capacity using the 6 GHz frequency spectrum is 7520 Mbps with 1024QAM modulation, while the 7 & 8 GHz frequency spectrum supports a design throughput of 4192 Mbps with 2048QAM modulation. The existing antenna, as shown in ANNEX 4, will be reused for this expansion.

Link 1: BKP to Caye Caulker Path Profile



Common: Path Multipath Equipment Antenna RF Loss Branching Other Loss Channel Report

Parameter	Belize City Kings Park	Caye Caulker	Help
Antenna S to D	<input type="checkbox"/>		
Antenna Model-TR	A6M07W024MB-30X	A6M07W024MB-30X	
Antenna Code-TR	A6M07W024MB-30X	A6M07W024MB-30X	
Antenna Gain(dBi)-TR	41.9	41.9	Range: 0-999999
Radome Loss(dB)-TR	0	0	Range: 0-1
Antenna Adapter Loss(dB)-TR	0	0	Range: 0-1
Antenna XFD(dB)-TR	30	30	Range: 0-999999
Antenna Model-DR	A6M07W024MB-30X	A6M07W024MB-30X	
Antenna Code-DR	A6M07W024MB-30X	A6M07W024MB-30X	
Antenna Gain(dBi)-DR	41.9	41.9	Range: 0-999999
Radome Loss(dB)-DR	0	0	Range: 0-1
Antenna Adapter Loss(dB)-DR	0	0	Range: 0-1

Annual Inavailability (%) = 99.999403 Thermal Fade Margin(dB) = 32.06 RX Signal(dBm) = -34.73

Link 1: BKP to Caye Caulker Throughput Capacity for the Link using the 6 GHz Frequency Spectrum

Modulation mode	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		TR-DR signal (dBm)		Flat fade margin - multipath (dB)		
1024QAM 7520.0Mbps	27.5	27.5	-53.8	-53.8	65.1	65.1	-33.98	-33.98	-33.58	-33.58	18.98	18.98	
512QAM 7024.0Mbps	29.5	29.5	-57.5	-57.5	67.1	67.1	-31.98	-31.98	-31.58	-31.58	24.82	24.82	
256QAM 6288.0Mbps	29.5	29.5	-61.0	-61.0	67.1	67.1	-31.98	-31.98	-31.58	-31.58	28.17	28.17	
128QAM 5392.0Mbps	31.5	31.5	-63.5	-63.5	69.1	69.1	-29.98	-29.98	-29.58	-29.58	32.01	32.01	
64QAM 4560.0Mbps	31.5	31.5	-66.0	-66.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	33.9	33.9	
32QAM 3792.0Mbps	31.5	31.5	-69.0	-69.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	35.31	35.31	
16QAM 3008.0Mbps	31.5	31.5	-72.0	-72.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	35.47	35.47	
16QAMS 2480.0Mbps	31.5	31.5	-74.0	-74.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	36.18	36.18	
QPSK 1488.0Mbps	31.5	31.5	-76.5	-76.5	69.1	69.1	-29.98	-29.98	-29.58	-29.58	36.23	36.23	
QPSKS 1232.0Mbps	31.5	31.5	-87.1	-87.1	69.1	69.1	-29.98	-29.98	-29.58	-29.58	38.11	38.11	
Modulation mode	Thermal fade margin (dB)		Worst month multipath (%)		Annual multipath (%)		Annual rain (%)		Total annual (%)	Time in mode (%)			
1024QAM 7520.0Mbps	19.81	19.81	99.879655	99.879655	99.953667	99.953667	99.998004	99.998004	99.905339	99.905339			
512QAM 7024.0Mbps	25.51	25.51	99.991838	99.991838	99.996857	99.996857	99.9993	99.9993	99.993016	0.087677			
256QAM 6288.0Mbps	29.01	29.01	99.998248	99.998248	99.999325	99.999325	99.999617	99.999617	99.998269	0.005253			
128QAM 5392.0Mbps	33.51	33.51	99.999699	99.999699	99.999884	99.999884	99.999824	99.999824	99.999593	0.001324			
64QAM 4560.0Mbps	36.01	36.01	99.999873	99.999873	99.999951	99.999951	99.999888	99.999888	99.999791	0.000198			
32QAM 3792.0Mbps	39.01	39.01	99.999934	99.999934	99.999974	99.999974	99.999936	99.999936	99.999885	0.000094			
16QAM 3008.0Mbps	42.01	42.01	99.999939	99.999939	99.999976	99.999976	99.999964	99.999964	99.999917	0.000032			
16QAMS 2480.0Mbps	44.01	44.01	99.999956	99.999956	99.999983	99.999983	99.99998	99.99998	99.999946	0.000029			
QPSK 1488.0Mbps	46.51	46.51	99.999957	99.999957	99.999983	99.999983	100.0	100.0	99.999967	0.000021			
QPSKS 1232.0Mbps	57.11	57.11	99.999982	99.999982	99.999993	99.999993	100.0	100.0	99.999986	0.000019			
Modulation mode	XPD threshold degradation - multipath(dB)			XPD threshold degradation - rain(dB)			SD Improvement Factor						
1024QAM 7520.0Mbps	0.83			0.83			1.19		1.19		2.91		2.91
512QAM 7024.0Mbps	0.68			0.68			0.95		0.95		11.41		11.41
256QAM 6288.0Mbps	0.84			0.84			0.88		0.88		24.84		24.84
128QAM 5392.0Mbps	1.5			1.5			0.86		0.86		62.46		62.46
64QAM 4560.0Mbps	2.11			2.11			0.83		0.83		99.4		99.4
32QAM 3792.0Mbps	3.69			3.69			0.99		0.99		134.34		134.34
16QAM 3008.0Mbps	6.54			6.54			1.4		1.4		134.66		134.66
16QAMS 2480.0Mbps	7.83			7.83			1.39		1.39		153.11		153.11
QPSK 1488.0Mbps	10.27			10.27			1.6		1.6		157.09		157.09
QPSKS 1232.0Mbps	19.0			19.0			1.63		1.63		200.0		200.0

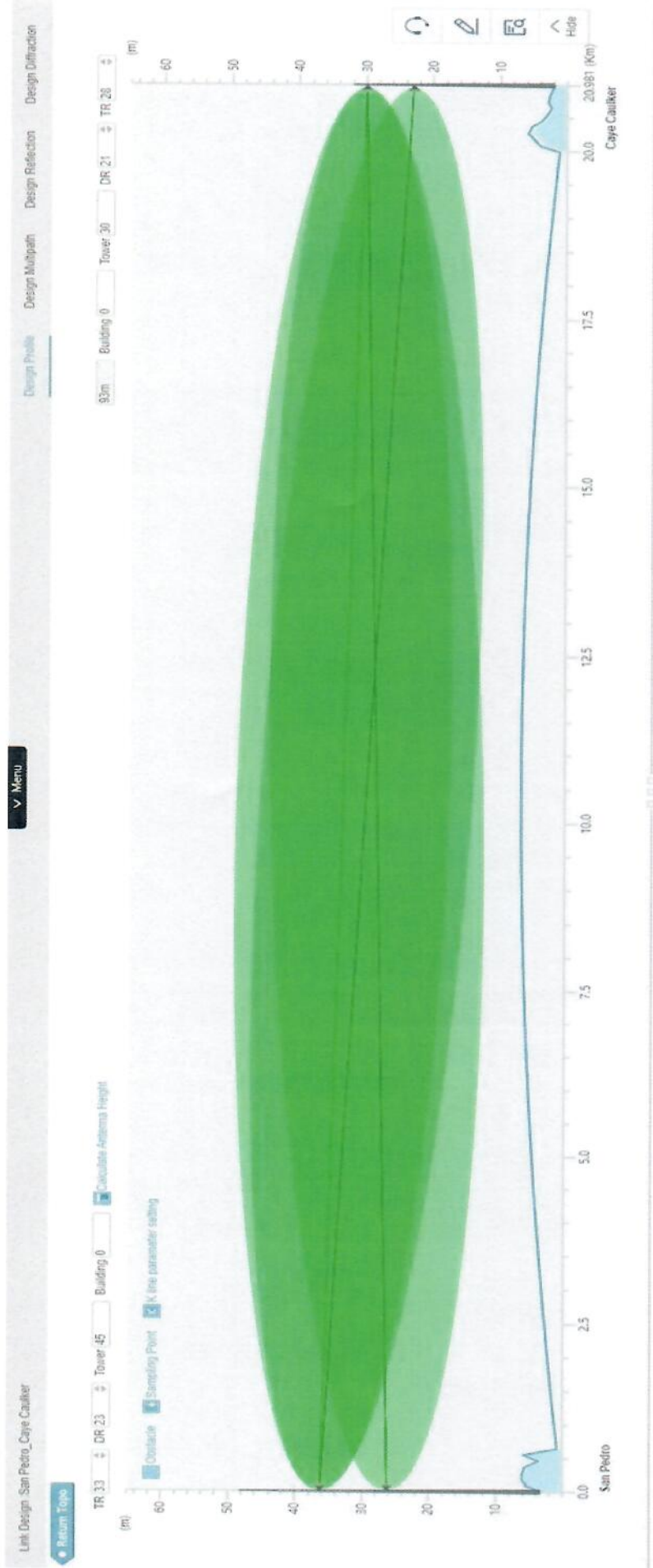
Link 1: BKP to Caye Caulker Throughput Capacity for the Link using the 7 & 8 GHz Frequency Spectrum

Modulation mode	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		TR-DR signal (dBm)		Flat fade margin - multipath (dB)	
2048QAM 4192.0Mbps	32.0	32.0	-53.3	-53.3	71.25	71.25	-30.75	-30.75	-30.75	-30.75	22.41	22.41
1024QAM 3856.0Mbps	32.0	32.0	-55.3	-55.3	71.25	71.25	-30.75	-30.75	-30.75	-30.75	24.38	24.38
512QAM 3488.0Mbps	32.5	32.5	-58.3	-58.3	71.75	71.75	-30.25	-30.25	-30.25	-30.25	27.72	27.72
256QAM 3080.0Mbps	33.0	33.0	-61.3	-61.3	72.25	72.25	-29.75	-29.75	-29.75	-29.75	30.94	30.94
128QAM 2704.0Mbps	34.0	34.0	-64.3	-64.3	73.25	73.25	-28.75	-28.75	-28.75	-28.75	34.43	34.43
64QAM 2280.0Mbps	34.0	34.0	-67.8	-67.8	73.25	73.25	-28.75	-28.75	-28.75	-28.75	36.67	36.67
32QAM 1904.0Mbps	34.5	34.5	-71.0	-71.0	73.75	73.75	-28.25	-28.25	-28.25	-28.25	38.43	38.43
16QAM 1504.0Mbps	35.0	35.0	-74.0	-74.0	74.25	74.25	-27.75	-27.75	-27.75	-27.75	38.62	38.62
16QAMS 1240.0Mbps	35.0	35.0	-75.0	-75.0	74.25	74.25	-27.75	-27.75	-27.75	-27.75	39.62	39.62
QPSK 752.0Mbps	35.0	35.0	-77.5	-77.5	74.25	74.25	-27.75	-27.75	-27.75	-27.75	39.51	39.51
QPSKS 616.0Mbps	35.0	35.0	-88.5	-88.5	74.25	74.25	-27.75	-27.75	-27.75	-27.75	41.4	41.4
Modulation mode	Thermal fade margin (dB)		Worst month multipath (%)		Annual multipath (%)		Annual rain (%)		Total annual (%)	Time in mode (%)		
2048QAM 4192.0Mbps	22.54	22.54	99.81376	99.81376	99.928297	99.928297	99.997789	99.997789	99.854385	99.854385		
1024QAM 3856.0Mbps	24.54	24.54	99.924913	99.924913	99.971091	99.971091	99.998329	99.998329	99.940512	0.086127		
512QAM 3488.0Mbps	28.04	28.04	99.983727	99.983727	99.993735	99.993735	99.998925	99.998925	99.986395	0.045883		
256QAM 3080.0Mbps	31.54	31.54	99.996244	99.996244	99.998554	99.998554	99.999291	99.999291	99.9964	0.010005		
128QAM 2704.0Mbps	35.54	35.54	99.999215	99.999215	99.999697	99.999697	99.99955	99.99955	99.998946	0.002546		
64QAM 2280.0Mbps	39.04	39.04	99.999719	99.999719	99.999891	99.999891	99.999687	99.999687	99.999471	0.000525		
32QAM 1904.0Mbps	42.74	42.74	99.999876	99.999876	99.999952	99.999952	99.999785	99.999785	99.99969	0.000219		
16QAM 1504.0Mbps	46.24	46.24	99.99988	99.99988	99.999954	99.999954	99.999845	99.999845	99.999753	0.000063		
16QAMS 1240.0Mbps	47.24	47.24	99.999929	99.999929	99.999972	99.999972	99.999862	99.999862	99.999808	0.000055		
QPSK 752.0Mbps	49.74	49.74	99.999927	99.999927	99.999971	99.999971	99.999891	99.999891	99.999835	0.000027		
QPSKS 616.0Mbps	60.74	60.74	99.999968	99.999968	99.999987	99.999987	99.999963	99.999963	99.999939	0.000104		
Modulation mode	XPD threshold degradation - multipath(dB)				XPD threshold degradation - rain(dB)				SD Improvement Factor			
2048QAM 4192.0Mbps	0.13				0.37				2.38			
1024QAM 3856.0Mbps	0.15				0.34				3.77			
512QAM 3488.0Mbps	0.32				0.43				8.24			
256QAM 3080.0Mbps	0.6				0.47				17.61			
128QAM 2704.0Mbps	1.11				0.46				40.19			
64QAM 2280.0Mbps	2.37				0.61				67.33			
32QAM 1904.0Mbps	4.31				0.71				100.6			
16QAM 1504.0Mbps	7.62				1.0				106.21			
16QAMS 1240.0Mbps	7.62				0.84				131.59			
QPSK 752.0Mbps	10.23				1.02				127.41			
QPSKS 616.0Mbps	19.34				1.04				199.61			

Link 2: Caye Caulker to San Pedro Path Profile

The link's design throughput capacity using the 6 GHz frequency spectrum is 7520 Mbps with 1024QAM modulation, while the 7 & 8 GHz frequency spectrum supports a design throughput of 4192 Mbps with 2048QAM modulation. The existing antenna, as shown in ANNEX 4, will be reused for this expansion.

Link 2: Caye Caulker to San Pedro Path Profile



Parameter	San Pedro	Caye Caulker	Help
Antenna S to D	<input type="checkbox"/>		
Antenna Model-TR	A6H07M024MB-3MX	A6H07M024MB-3MX	Q
Antenna Code-TR	A6H07M024MB-3MX	A6H07M024MB-3MX	
Antenna Gain(dBi)-TR	41.9	41.9	Range: 0-999999
Redline Loss(dB)-TR	0	0	Range: 0-1
Antenna Adapter Loss(dB)-TR	0	0	Range: 0-1
Antenna XFD(dB)-TR	30	30	Range: 0-999999
Antenna Model-DR	A6H07M024MB-3MX	A6H07M024MB-3MX	Q
Antenna Code-DR	A6H07M024MB-3MX	A6H07M024MB-3MX	
Antenna Gain(dBi)-DR	41.9	41.9	Range: 0-999999

Annual Availability(%)= 99.99999 Thermal Fade Margin(dB)= 35.52 RX Signal(dBm)= -31.17

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Link 2: Caye Caulker to San Pedro Throughput Capacity for the Link using the 6 GHz Frequency Spectrum

Modulation mode	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		TR-DR signal (dBm)		Flat fade margin - multipath (dB)	
1024QAM 7520.0Mbps	27.5	27.5	-53.8	-53.8	65.1	65.1	-33.98	-33.98	-33.58	-33.58	18.98	18.98
512QAM 7024.0Mbps	29.5	29.5	-57.5	-57.5	67.1	67.1	-31.98	-31.98	-31.58	-31.58	24.82	24.82
256QAM 6288.0Mbps	29.5	29.5	-61.0	-61.0	67.1	67.1	-31.98	-31.98	-31.58	-31.58	28.17	28.17
128QAM 5392.0Mbps	31.5	31.5	-63.5	-63.5	69.1	69.1	-29.98	-29.98	-29.58	-29.58	32.01	32.01
64QAM 4560.0Mbps	31.5	31.5	-66.0	-66.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	33.9	33.9
32QAM 3792.0Mbps	31.5	31.5	-69.0	-69.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	35.31	35.31
16QAM 3008.0Mbps	31.5	31.5	-72.0	-72.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	35.47	35.47
16QAMS 2480.0Mbps	31.5	31.5	-74.0	-74.0	69.1	69.1	-29.98	-29.98	-29.58	-29.58	36.18	36.18
QPSK 1488.0Mbps	31.5	31.5	-76.5	-76.5	69.1	69.1	-29.98	-29.98	-29.58	-29.58	36.23	36.23
QPSKS 1232.0Mbps	31.5	31.5	-87.1	-87.1	69.1	69.1	-29.98	-29.98	-29.58	-29.58	38.11	38.11
Modulation mode	Thermal fade margin (dB)		Worst month multipath (%)		Annual multipath (%)		Annual rain (%)		Total annual (%)	Time in mode (%)		
1024QAM 7520.0Mbps	19.81	19.81	99.879655	99.879655	99.953667	99.953667	99.998004	99.998004	99.905339	99.905339		
512QAM 7024.0Mbps	25.51	25.51	99.991838	99.991838	99.996857	99.996857	99.9993	99.9993	99.993016	0.087677		
256QAM 6288.0Mbps	29.01	29.01	99.998248	99.998248	99.999325	99.999325	99.999617	99.999617	99.998269	0.005253		
128QAM 5392.0Mbps	33.51	33.51	99.999699	99.999699	99.999884	99.999884	99.999824	99.999824	99.999593	0.001324		
64QAM 4560.0Mbps	36.01	36.01	99.999873	99.999873	99.999951	99.999951	99.999888	99.999888	99.999791	0.000198		
32QAM 3792.0Mbps	39.01	39.01	99.999934	99.999934	99.999974	99.999974	99.999936	99.999936	99.999885	0.000094		
16QAM 3008.0Mbps	42.01	42.01	99.999939	99.999939	99.999976	99.999976	99.999964	99.999964	99.999917	0.000032		
16QAMS 2480.0Mbps	44.01	44.01	99.999956	99.999956	99.999983	99.999983	99.99998	99.99998	99.999946	0.000029		
QPSK 1488.0Mbps	46.51	46.51	99.999957	99.999957	99.999983	99.999983	100.0	100.0	99.999967	0.000021		
QPSKS 1232.0Mbps	57.11	57.11	99.999982	99.999982	99.999993	99.999993	100.0	100.0	99.999986	0.000019		
Modulation mode	XPD threshold degradation - multipath(dB)		XPD threshold degradation - rain(dB)		SD Improvement Factor							
1024QAM 7520.0Mbps	0.83	0.83	1.19	1.19	2.91	2.91						
512QAM 7024.0Mbps	0.68	0.68	0.95	0.95	11.41	11.41						
256QAM 6288.0Mbps	0.84	0.84	0.88	0.88	24.84	24.84						
128QAM 5392.0Mbps	1.5	1.5	0.86	0.86	62.46	62.46						
64QAM 4560.0Mbps	2.11	2.11	0.83	0.83	99.4	99.4						
32QAM 3792.0Mbps	3.69	3.69	0.99	0.99	134.34	134.34						
16QAM 3008.0Mbps	6.54	6.54	1.4	1.4	134.66	134.66						
16QAMS 2480.0Mbps	7.83	7.83	1.39	1.39	153.11	153.11						
QPSK 1488.0Mbps	10.27	10.27	1.6	1.6	157.09	157.09						
QPSKS 1232.0Mbps	19.0	19.0	1.63	1.63	200.0	200.0						

Link 2: Caye Caulker to San Pedro Throughput Capacity for the Link using the 7 & 8 GHz Frequency Spectrum

Modulation mode	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		TR-DR signal (dBm)		Flat fade margin - multipath (dB)	
2048QAM 4192.0Mbps	30.0	30.0	-53.3	-53.3	69.25	69.25	-29.17	-29.17	-29.17	-29.17	23.89	23.89
1024QAM 3856.0Mbps	30.0	30.0	-55.3	-55.3	69.25	69.25	-29.17	-29.17	-29.17	-29.17	25.84	25.84
512QAM 3488.0Mbps	30.0	30.0	-58.3	-58.3	69.25	69.25	-29.17	-29.17	-29.17	-29.17	28.6	28.6
256QAM 3080.0Mbps	30.0	30.0	-61.3	-61.3	69.25	69.25	-29.17	-29.17	-29.17	-29.17	31.26	31.26
128QAM 2704.0Mbps	30.0	30.0	-64.3	-64.3	69.25	69.25	-29.17	-29.17	-29.17	-29.17	33.83	33.83
64QAM 2280.0Mbps	30.0	30.0	-67.8	-67.8	69.25	69.25	-29.17	-29.17	-29.17	-29.17	35.92	35.92
32QAM 1904.0Mbps	30.0	30.0	-71.0	-71.0	69.25	69.25	-29.17	-29.17	-29.17	-29.17	37.35	37.35
16QAM 1504.0Mbps	30.0	30.0	-74.0	-74.0	69.25	69.25	-29.17	-29.17	-29.17	-29.17	37.41	37.41
16QAMS 1240.0Mbps	30.0	30.0	-75.0	-75.0	69.25	69.25	-29.17	-29.17	-29.17	-29.17	38.41	38.41
QPSK 752.0Mbps	30.0	30.0	-77.5	-77.5	69.25	69.25	-29.17	-29.17	-29.17	-29.17	38.33	38.33
QPSKS 616.0Mbps	30.0	30.0	-88.5	-88.5	69.25	69.25	-29.17	-29.17	-29.17	-29.17	40.23	40.23
Modulation mode	Thermal fade margin (dB)		Worst month multipath (%)		Annual multipath (%)		Annual rain (%)		Total annual (%)	Time in mode (%)		
2048QAM 4192.0Mbps	24.12	24.12	99.982128	99.982128	99.993119	99.993119	99.998726	99.998726	99.984965	99.984965		
1024QAM 3856.0Mbps	26.12	26.12	99.992723	99.992723	99.997198	99.997198	99.999039	99.999039	99.993436	0.008471		
512QAM 3488.0Mbps	29.12	29.12	99.997953	99.997953	99.999211	99.999211	99.999346	99.999346	99.99777	0.004334		
256QAM 3080.0Mbps	32.12	32.12	99.999392	99.999392	99.999766	99.999766	99.999549	99.999549	99.999082	0.001312		
128QAM 2704.0Mbps	35.12	35.12	99.999812	99.999812	99.999927	99.999927	99.999686	99.999686	99.999542	0.00046		
64QAM 2280.0Mbps	38.62	38.62	99.999928	99.999928	99.999972	99.999972	99.999787	99.999787	99.999732	0.00019		
32QAM 1904.0Mbps	41.82	41.82	99.999963	99.999963	99.999985	99.999985	99.99985	99.99985	99.999822	0.00009		
16QAM 1504.0Mbps	44.82	44.82	99.999963	99.999963	99.999986	99.999986	99.99989	99.99989	99.999862	0.00004		
16QAMS 1240.0Mbps	45.82	45.82	99.999977	99.999977	99.999991	99.999991	99.999903	99.999903	99.999885	0.000023		
QPSK 752.0Mbps	48.32	48.32	99.999976	99.999976	99.999991	99.999991	99.999925	99.999925	99.999907	0.000022		
QPSKS 616.0Mbps	59.32	59.32	99.99999	99.99999	99.999996	99.999996	99.999978	99.999978	99.99997	0.000063		
Modulation mode	XPD threshold degradation - multipath(dB)			XPD threshold degradation - rain(dB)			SD Improvement Factor					
2048QAM 4192.0Mbps	0.23			0.41			7.03					
1024QAM 3856.0Mbps	0.27			0.38			11.08					
512QAM 3488.0Mbps	0.51			0.46			21.05					
256QAM 3080.0Mbps	0.86			0.48			39.11					
128QAM 2704.0Mbps	1.28			0.45			71.44					
64QAM 2280.0Mbps	2.69			0.6			115.54					
32QAM 1904.0Mbps	4.46			0.68			159.98					
16QAM 1504.0Mbps	7.4			0.95			163.71					
16QAMS 1240.0Mbps	7.4			0.8			200.0					
QPSK 752.0Mbps	9.99			0.97			198.36					
QPSKS 616.0Mbps	19.08			1.0			200.0					