



**Thai Cross-border Interference Joint
Industry Report
February 2018**

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Spectrum Findings Summary

Spectrum	OML Band	Myawaddy	Kawthoung	Tacheileik	Remark
900 Mhz	OMLUplink (890 ó 895 MHz)	Interfered	Interfered	Interfered	4 Mhz of out 5 Mhz OML WCDMA UPLINK is overlapping with Thai Operator 850Mhz WCDMA DOWNLINK (Myawaddy, Kawthoung, Tachileik).
	OMLDownlink (935 ó 940 MHz)	-	-	Interfered	Potential Downlink Co-existence with Thai Operators at other band 940 ó 960 Mhz
1800 Mhz	OMLUplink (1775 ó 1785 MHz)	-	-	-	OML Band: Clean at 1775 ó 1780 MHz
	OMLDownlink (1870 ó 1880 MHz)	-	-	-	OML Band: Clean at 1870 ó 1880 Mhz Note: Potential Downlink Co-existence with Thai Operators at other band 1815 ó 1860 Mhz
2100 Mhz	OMLUplink (1950 ó 1965 MHz)	-	-	-	OML Band: Clean at 1950 ó 1965 MHz
	OMLDownlink (2140 ó 2155 MHz)	Interfered	Interfered	Interfered	OML Band (2140 ó 2155 MHz): Co-existence with Thailand Downlink 2100 Mhz Operators (Myawaddy, Kawthoung, Tachileik)
700 Mhz	Uplink (All band)	Interfered	Interfered	Interfered	Having Medium interference on both Uplink and Downlink (suspected from TVsignal)
	Downlink (All band)	Interfered	Interfered	Interfered	Having Medium interference on both Uplink and Downlink (suspected from TVsignal)



Drive test Coverage Summary

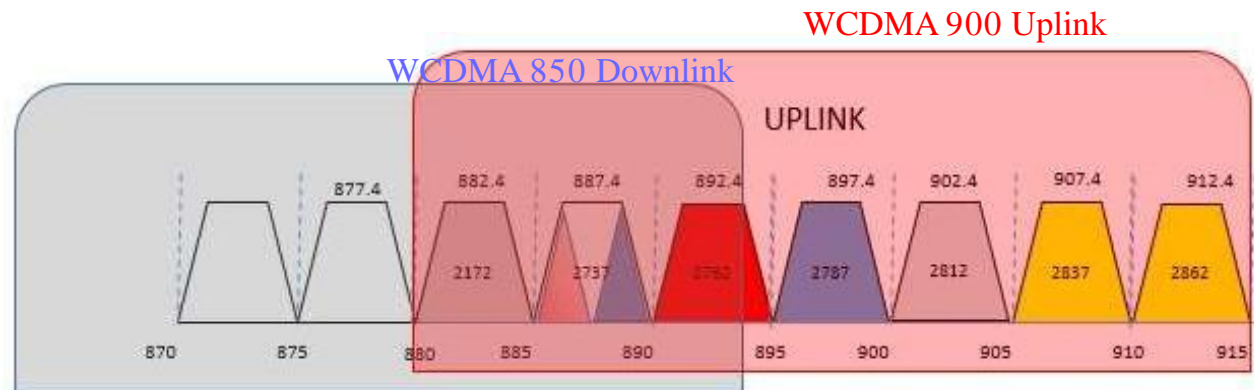
Band	Technology	Myawaddy		Kawthoung		Tacheileik	
900 MHz	GS M 900	AIS	Good	AIS	Good	AIS	Good
		DTAC	-	DTAC	-	DTAC	-
		TRUE M	Good	TRUE M	Good	TRUE M	Good
		OML	-	OML	-	OML	-
		TML	Good	TML	Good	TML	Good
	MPT	Good	MPT	Good	MPT	Good	
	UMT S 900	AIS	Good	AIS	Good	AIS	Good
		DTAC	-	DTAC	-	DTAC	-
		TRUE M	-	TRUE M	-	TRUE M	-
		OML	-	OML	-	OML	-
TML		-	TML	-	TML	-	
MPT	Good	MPT	Good	MPT	Good		
1800 MHz	GS M 1800	AIS	-	AIS	-	AIS	-
		DTAC	Good	DTAC	Good	DTAC	Good
		TRUE M	-	TRUE M	-	TRUE M	-
		OML	-	OML	-	OML	-
		TML	-	TML	-	TML	-
	MPT	-	MPT	-	MPT	-	
	LIE 1800	AIS	Good	AIS	Good	AIS	Good
		DTAC	Good	DTAC	Good	DTAC	Good
		TRUE M	-	TRUE M	Good	TRUE M	-
		OML	-	OML	-	OML	-
TML		Good	TML	-	TML	-	
MPT	Good	MPT	-	MPT	Good		
2100 MHz	UMT S 2100	AIS	Good	AIS	Good	AIS	Good
		DTAC	Good	DTAC	Good	DTAC	Good
		TRUE M	Good	TRUE M	-	TRUE M	Good
		OML	Good	OML	Good	OML	Good
		TML	Good	TML	Good	TML	Good
MPT	Good	MPT	Good	MPT	Good		

Note:
Drive test coverage done using each of operator simcards (both Foreign operators and local Myanmar operators). As well as PCtell drive test scanner

Technical Suggestion

1. Regulatory (PTD) to support country-to-country agreement regarding spectrum usage at Country Border area.
2. Each operators (both Local and Foreign operators) to perform Antenna Re-orientation, Antenna Down-tilt or BTS Power reduction of site sectors facing toward country border area.
3. Each operators to ensure No Signal Leakage across the country border area for following technologies at all respective Band
 - a. GSM (or 2G Technology) : Rx level < -105 dBm. (measured at the country border location)
 - b. WCDMA (or 3G Technology) : RSCP < -105 dBm (measured at the country border location)
 - c. LTE (or 4G Technology) : RSRP < -110 dBm (measured at the country border location)
4. Regulatory (PTD) to perform regular signal monitoring at country border area to ensure each operators (both local & Foreign operators) strictly follow the maximum signal leakage as mentioned at point 3.

900 MHz Uplink Scanning Result



OMLUMTS 900
Switched off during 900 MHz
Scanning

Note:

Interference detected on UPLINK 900 MHz Band (880 ó 894 MHz) due to co-existence of CAT (Thailand Operator) Downlink WCDMA 850 MHz

This Interference impacting OML UPLINK WCDMA U900. (890 ó 895 MHz). (4 out of 5 MHz OML Uplink is overlapping with CAT 850MHz WCDMA Downlink)

Wideband interference also detected at 2 locations :

1. Lat (20°27'0.15"N) & Lon (99°53'0.80"E): Extreme interference effecting to whole GSM band (880-915 MHz)
2. Lat (20°27'0.80"N) & Lon (99°54'0.10"E): High interference affecting to whole GSM band (880-915 MHz)



900 MHz Downlink Scanning Result

Band	UPLINK Spectrum Span	Myanmar Allocation	Area	Findings	Remark
900 Band					
	DL (940 ó 945 MHz)	TML	-	In Used	Currently in used by TML (typical GSM Signal)
	DL (945 ó 950 MHz)	Unknown 3	Complete City	Extreme Interference Signal Detected	Co-existence with Thailand Downlink WCDMA 900 Operator.
	DL (950 ó 955 MHz)	MPT	-	In Used	Currently in used by MPT (typical GSM & WCDMA Signal)
DL (955 ó 960 MHz)	MPT	-	In Used	Currently in used by MPT (typical GSM & WCDMA Signal)	

Note:

There are co-existence of Thailand operator WCDMA 900 Downlink at 945 ó 950 MHz

Wideband interference was detected at 4 locations

Lat (20°27'0.11"N) & Lon (99°53'0.39"E): Extreme interference effected to (925-940 MHz)

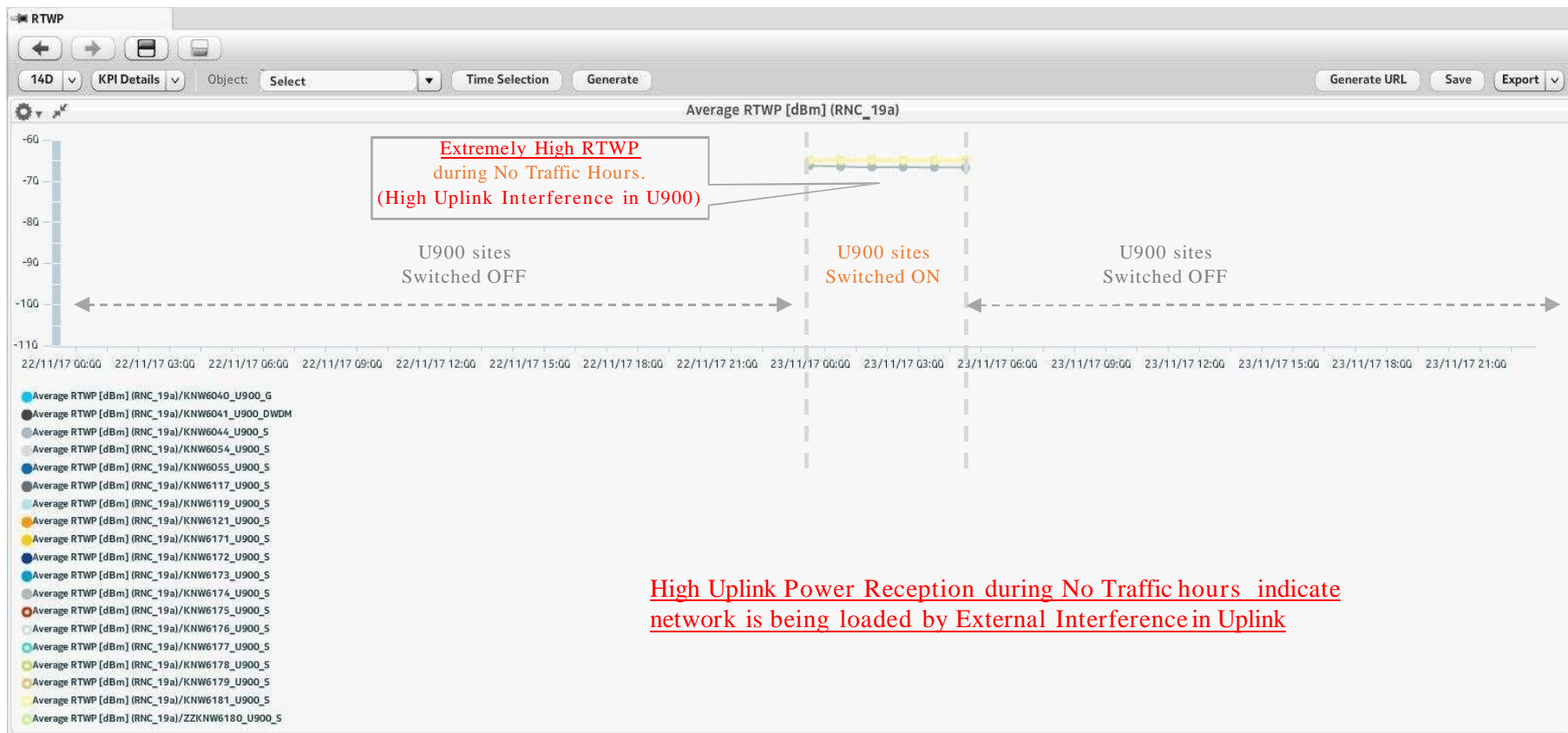
Lat (20°27'0.11"N) & Lon (99°53'0.38"E): High interference effected to whole GSM band (930-940 MHz)

Lat (20°27'0.08"N) & Lon (99°54'0.03"E): High interference effected to whole GSM band (930-940 MHz)

Lat (20°27'0.41"N) & Lon (99°54'0.56"E): High interference effected to whole GSM band (928-940 MHz)

Received Total Wideband Power (RTWP) Uplink Measurement

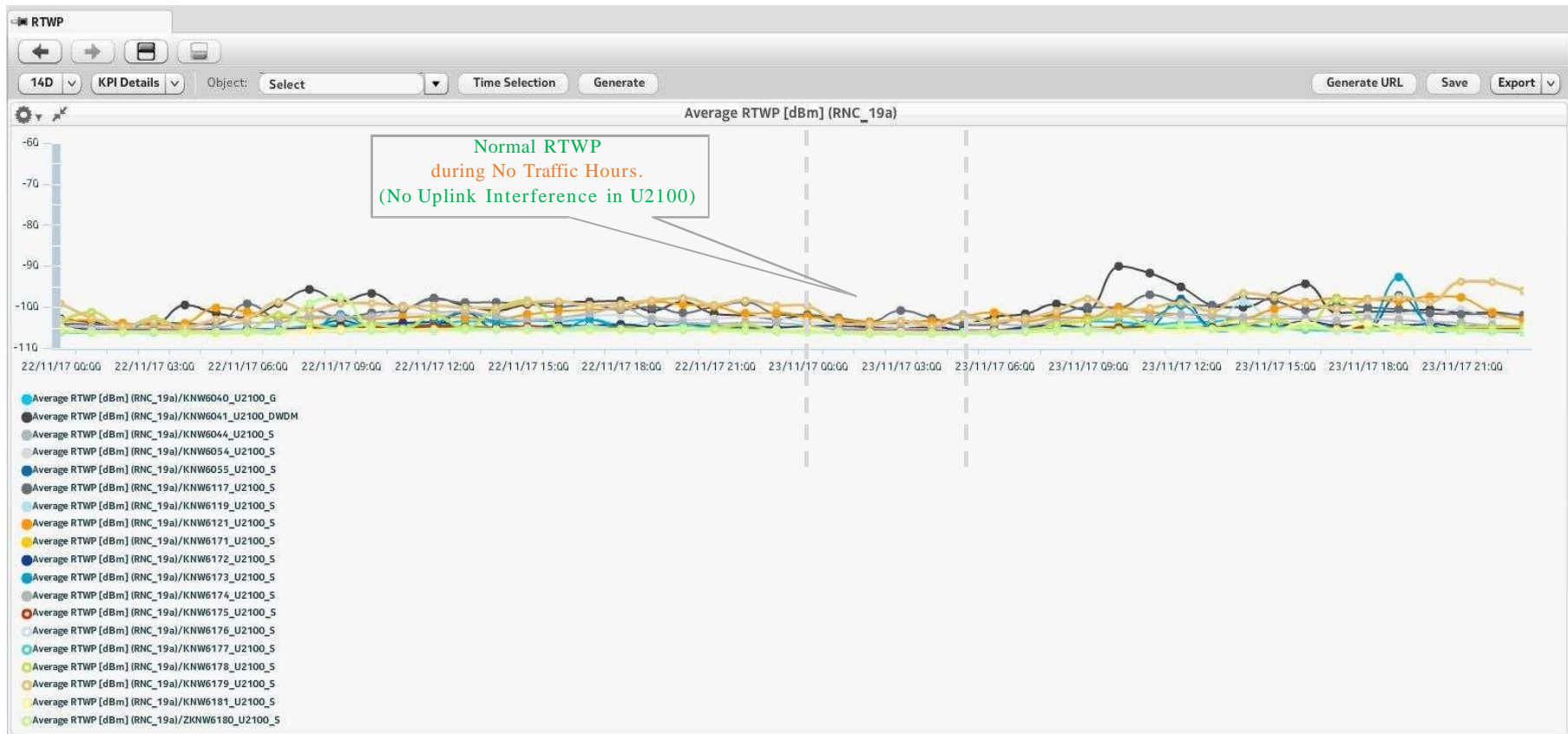
MYAWADDYCITY - UMTS 900MHz SITES at No Traffic Hour (00.00 ó 05.00AM)





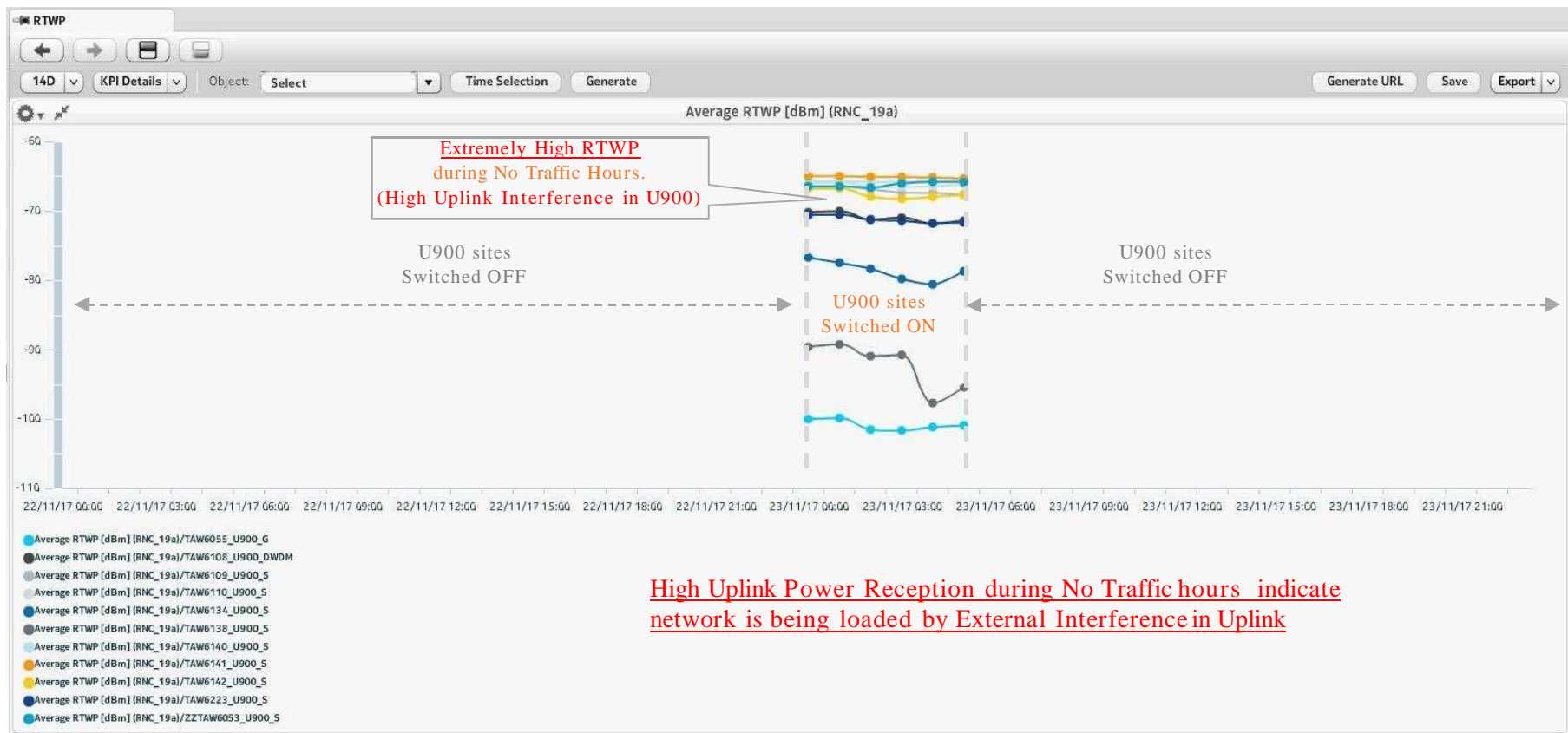
Received Total Wideband Power (RTWP) Uplink Measurement

MYAWADDYCITY - UMTS 2100MHz SITES at No Traffic Hour (00.00 ó 05.00AM)



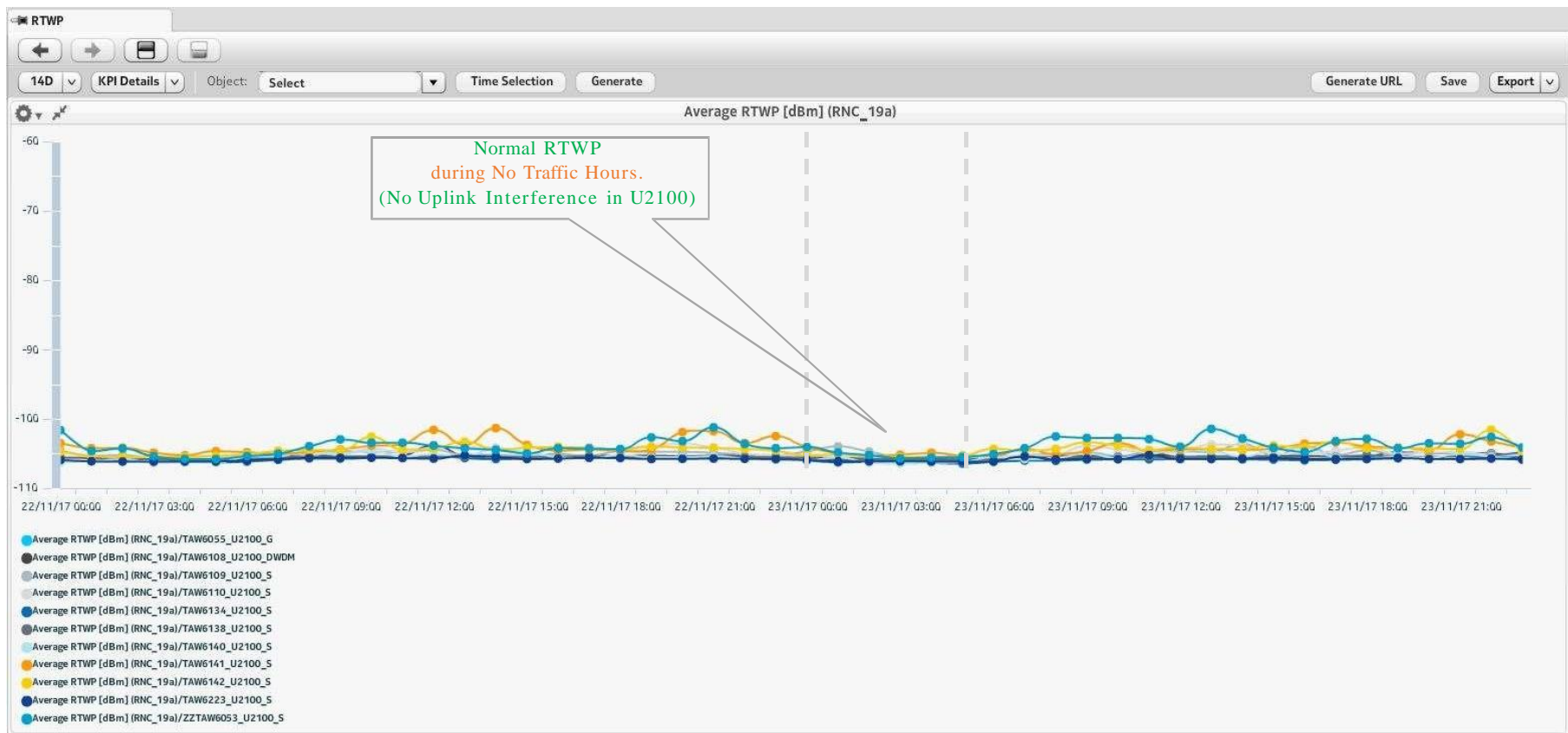
Received Total Wideband Power (RTWP) Uplink Measurement

KAWTHOUNG CITY- UMTS 900MHz SITES at No Traffic Hour (00.00 ó 05.00AM)



Received Total Wideband Power (RTWP) Uplink Measurement

KAWTHOUNG CITY - UMTS 2100MHz SITES at No Traffic Hour (00.00 ó 05.00AM)



All Thai Operators have excellent but illegal coverage inside Myanmar as verified at Myawaddy, Kawthoung and Tachileik towns



Spectrum	MPT Band	Myawaddy	Kawthoung	Tachileik	Remark
900 MHz	MPT Uplink (905 ó 915 MHz)	Interfered	Interfered	Interfered	<ol style="list-style-type: none"> Both MPT Uplink and Downlink bands overlap squarely with those of True Move. In addition to minimizing signal intrusion inside each other's territory, GSM Frequency Planning and UMTS PSC Planning need to be aligned between Thai and Myanmar operators.
	MPT Downlink (950 ó 960 MHz)	Interfered	Interfered	Interfered	
1800 MHz	MPT Uplink (1730 ó 1740 MHz)	Interfered	Interfered	Interfered	<ol style="list-style-type: none"> Both MPT Uplink and Downlink bands overlap squarely with those of AIS. Depending on the additional spectrum that may be allocated to MPT, overlapping may extend to those of True Move or DTAC. In addition to minimizing signal intrusion inside each other's territory, LTE PCI Planning need to be aligned between Thai and Myanmar operators.
	MPT Downlink (1825 ó 1835 MHz)	Interfered	Interfered	Interfered	
2100 MHz	MPT Uplink (1935 ó 1950 MHz)	Interfered	Interfered	Interfered	<ol style="list-style-type: none"> Both MPT Uplink and Downlink bands overlap squarely with those of True Move. In addition to minimizing signal intrusion inside each other's territory, UMTS PSC and LTE PCI Planning need to be aligned between Thai and Myanmar operators.
	MPT Downlink (2125 ó 2140 MHz)	Interfered	Interfered	Interfered	

Suggested Solution to Cross Border Interference Issue



- 1) Resolves Spectrum Interference
- 2) Codes Planning and Future Spectrum Planning Consideration

1) Spectrum Interference for TML



TML Spectrum			
900 MHz	UL	DL	Same Frequency Observe at Border
TML	895-900	940-945	AIS

TML Spectrum				
Network Type	Carrier	UARFCN- UPLINK	UARFCN-DOWNLINK	Same Frequency Observe at Border
U900 MHZ	1st carrier	2787	3012	AIS
U2100 MHZ	1st carrier	9837	10787	N/A
U2100 MHZ	2nd carrier	9862	10812	AIS
U2100	3rd carrier	9887	10837	N/A
L1800	1st carrier	19250	1250	True Move

2) Code Planning and Future Spectrum Planning Consideration



PSC Group	PSC used		Reserved 6 psc per group		Suggestion
	1	42	43	48	
1	1	42	43	48	Myanmar
2	49	90	91	96	Myanmar
3	97	138	139	144	Myanmar
4	145	186	187	192	Myanmar
5	193	234	235	240	Myanmar
6	241	282	283	288	Other Operators
7	289	330	331	336	Other Operators
8	337	378	379	384	Other Operators
9	385	426	427	432	Other Operators
10	433	474	475	480	Other Operators
Reserve for IBS	481	502	503	502	
Reserved for optimization spare	503	511			

PCI Group	Suggestion
Group 0 to 80	Myanmar
Group 81 to 160	Other Operators
Group 161 to 167	IBS or small cell

Note:

1. Requires central frequency of Thailand operator for PCI planning
2. The PSC/PCI and frequency planning represents as TML perspective only