	<b>100Watt Multi Operator Combiner</b> <b>Input : 12, 13, 15, 16 port</b> <b>Output : 4port + 4x(-30dB)</b>	<b>Code : PW-MOC-Series</b>		
		<b>Rev</b> 6	<b>Issued</b> 07/07/2011	<b>Page</b> 1/6

## Multi-Operator COMBINER (MOC)

### OVERVIEW :

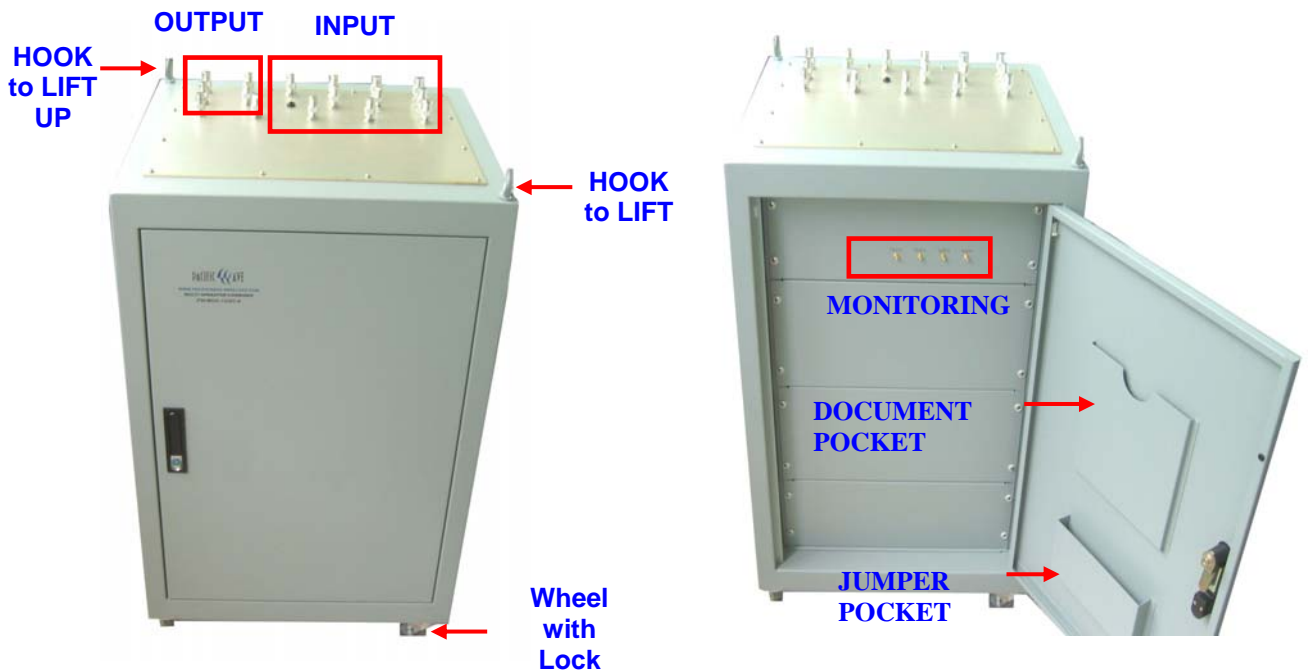
The rapid growth in the number of base station sites is highlighting the necessity for improvements in the way that network operators co-exist. This demand increase from time to time since this solution offers number of benefits:


- Effective in time and Installation as it easy and fast.
- Efficient in Investment as Few Cellular Providers utilize same network Infrastructure.
- Able to support Building Esthetical Aspect by reducing number of Indoor Antenna.

The potential for interference between operators is vast and requires appropriate on modern filtering and combining technologies. This problem was experienced and pioneered by Pacific Wave since 2002 with support of reliable contract manufacturer from few countries such as United Kingdom, Australia, Sweden, and China.

Combined Indoor Coverage become feasible by using a Multi Operator Combiner which has ability to handle each Signal with adequate Isolation (In-Band & Out-Band), good power handling ability and excellent IMD to generate a harmony Combination with less interference.


### PRODUCT PHOTO :



	<b>100Watt Multi Operator Combiner</b> <b>Input : 12, 13, 15, 16 port</b> <b>Output : 4port + 4x(-30dB)</b>	<b>Code : PW-MOC-Series</b>		
		<b>Rev</b> 6	<b>Issued</b> 07/07/2011	<b>Page</b> 2/6


## PRODUCT SPECIFICATION :

12input 4Output Combiner (ver A1)				
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)
<b>BTS I/O Port</b>	<b>GSM1800</b>	<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5
		<b>Indosat</b>	1717.5 - 1722.5 or 1750 - 1765	1812.5 - 1817.5 or 1845 - 1860
		<b>Telkomsel</b>	1722.5 - 1730 or 1745 - 1750 or 1765 - 1775	1817.5 - 1825 or 1840 - 1845 or 1860 - 1870
		<b>Natrindo</b>	1730 - 1745	1825 - 1840
		<b>HCPT</b>	1775 - 1785	1870 - 1880
	<b>CDMA800</b>	<b>Esia+Flexy</b>	825 - 835	870 - 880
		<b>Fren+StarOne</b>	835 - 845	880 - 890
	<b>UMTS 2100</b>	<b>HCPT</b>	1920 - 1930	2110 - 2120
		<b>Natrindo</b>	1930 - 1935	2120 - 2125
		<b>Telkomsel</b>	1935 - 1945	2125 - 2135
		<b>Indosat</b>	1950 - 1960	2140 - 2150
		<b>XL</b>	1960 - 1970	2150 - 2160
	<b>Isolation Between Same System</b>			≥ 23 dB
<b>Isolation Between System</b>			≥ 80-100dB	
<b>Max Input Power</b>			100W / port	
<b>Insertion Loss (DL)</b>			7 - 9 dB	
<b>Return Loss</b>			≥ 18dB	
<b>IM @ 43dBm *2 (channel)</b>			≥140 dBc	
<b>IM2 @ 43dBm *2 (channel)</b>			≥140 dBc	
<b>BTS ( I/P ) Ports</b>			12 Port	
<b>MS ( O/P ) Ports</b>			4 Port	
<b>Monitor Ports O/P Ports</b>			4 x -30Db (SMA Female)	
<b>Temperature Range</b>			0 to +60°C	
<b>RF Connectors I/O &amp; O/P Port</b>			Din-Female or N-Female	
<b>Dimension (mm) / Weight (kg)</b>			W60xL60xH105cm / 110 kg	

	<b>100Watt Multi Operator Combiner</b> <b>Input : 12, 13, 15, 16 port</b> <b>Output : 4port + 4x(-30dB)</b>	<b>Code : PW-MOC-Series</b>		
		<b>Rev</b> 6	<b>Issued</b> 07/07/2007	<b>Page</b> 3/6


## PRODUCT SPECIFICATION :

13input 4Output Combiner (ver B1)					
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)	
<b>BTS I/O Port</b>	<b>GSM1800</b>	<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5	
		<b>Indosat</b>	1717.5 - 1722.5 or 1750 - 1765	1812.5 - 1817.5 or 1845 - 1860	
		<b>Telkomsel</b>	1722.5 - 1730 or 1745 - 1750 or 1765 - 1775	1817.5 - 1825 or 1840 - 1845 or 1860 - 1870	
		<b>Natrindo/Axis</b>	1730 - 1745	1825 - 1840	
		<b>HCPT/Three</b>	1775 - 1785	1870 - 1880	
	<b>CDMA800</b>	<b>Esia+Flexy</b>	825 - 835	870 - 880	
		<b>Fren+StarOne</b>	835 - 845	880 - 890	
	<b>UMTS 2100</b>	<b>HCPT/Three</b>	1920 - 1930	2110 - 2120	
		<b>Natrindo/Axis</b>	1930 - 1935	2120 - 2125	
		<b>Telkomsel</b>	1935 - 1945	2125 - 2135	
		<b>Indosat</b>	1950 - 1960	2140 - 2150	
		<b>XL</b>	1960 - 1970	2150 - 2160	
	<b>CDMA-1900</b>	<b>WIN/Smart</b>	1900 - 1910	1980-1990	
	<b>Isolation Between Same System</b>			≥ 23 dB	
	<b>Isolation Between System</b>			≥ 80-100 dB	
<b>Max Input Power</b>			100W / port		
<b>Insertion Loss (DL)</b>			7.5 - 9dB		
<b>Return Loss</b>			≥ 18 dB		
<b>IM @ 43dBm *2 (channel)</b>			≥140 dBc		
<b>IM2 @ 43dBm *2 (channel)</b>			≥140 dBc		
<b>BTS ( I/P ) Ports</b>			13 Port		
<b>MS ( O/P ) Ports</b>			4 Port		
<b>Monitor Ports O/P Ports</b>			4 x -30dB (SMA Female)		
<b>Temperature Range</b>			0 to +60°C		
<b>RF Connectors I/O &amp; O/P Port</b>			Din-Female or N-Female		
<b>Dimension (mm) / Weight (kg)</b>			W60xL60xH105cm / 120 kg		

	<b>Multi Operator Combiner</b> <b>14Input 4Output Combiner</b> (Type A)	<b>Code : PW-MOC-14I-40-A</b>		
		<b>Rev</b> 2	<b>Issued</b> 07/07/2011	<b>Page</b> 1/1


**PRODUCT SPECIFICATION :**

14input 4Output Combiner (ver A1)					
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)	
<b>BTS I/O Port</b>	CDMA800	<b>Esia</b>	825 – 830	870 - 875	
		<b>Flexi</b>	830 – 835	875 – 880	
	GSM900	<b>Indosat</b>	890 - 900	935 - 945	
	GSM1800	<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5	
		<b>Indosat</b>	1717.5 – 1722.5 or 1750 - 1765	1812.5 - 1817.5 or 1845 - 1860	
		<b>Telkomsel</b>	1722.5 – 1730 or 1745 – 1750 or 1765 - 1775	1817.5 – 1825 or 1840 - 1845 or 1860 – 1870	
		<b>NTS (Lippo)</b>	1730 – 1745	1825 -1840	
		<b>Three (HCPT)</b>	1775 – 1785	1870 – 1880	
	UMTS2100	<b>Three (HCPT)</b>	1920 – 1930	2110 – 2120	
		<b>NTS (Lippo)</b>	1930 – 1935	2120 - 2125	
		<b>Telkomsel</b>	1935 – 1945	2125 – 2135	
		<b>Indosat</b>	1950 – 1960	2140 – 2150	
		<b>XL</b>	1960 – 1970	2150 - 2160	
	CDMA-1900	<b>SMART/WIN</b>	1900 – 1910	1980-1990	
	<b>Isolation Between Same System</b>			≥ 23 dB	
	<b>Isolation Between System</b>			≥ 80-100 dB	
<b>Max Input Power</b>			100W / port		
<b>Insertion Loss (DL)</b>			Max 9dB		
<b>Return Loss</b>			≥ 18 dB		
<b>IM @ 43dBm *2 (channel)</b>			≥ 140 dBc		
<b>IM2 @ 43dBm *2 (channel)</b>			≥ 140 dBc		
<b>BTS (INPUT) / MS (Output) Ports</b>			14 Port / 4 Port		
<b>Monitor Ports O/P Ports</b>			4 x -30dB (SMA Female)		
<b>Temperature Range</b>			0 to +60°C		
<b>RF Connectors I/O &amp; O/P Port</b>			N-Female		

	<b>100Watt Multi Operator Combiner</b> <b>Input : 12, 13, 15, 16 port</b> <b>Output : 4port + 4x(-30dB)</b>	<b>Code : PW-MOC-Series</b>		
		<b>Rev</b> 6	<b>Issued</b> 07/07/2011	<b>Page</b> 4/6


**Product Specification :**

14input 4Output Combiner (ver B1)				
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)
<b>BTS I/O Port</b>	<b>GSM1800</b>	<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5
		<b>Indosat</b>	1717.5 - 1722.5 or 1750 - 1765	1812.5 - 1817.5 or 1845 - 1860
		<b>Telkomsel</b>	1722.5 - 1730 or 1745 - 1750 or 1765 - 1775	1817.5 - 1825 or 1840 - 1845 or 1860 - 1870
		<b>Natrindo/Axis</b>	1730 - 1745	1825 - 1840
		<b>HCPT/Three</b>	1775 - 1785	1870 - 1880
	<b>CDMA800</b>	<b>Esia</b>	825 - 830	870 - 875
		<b>Flexy</b>	830 - 835	875 - 880
		<b>Fren</b>	835 - 840	880 - 885
		<b>StarOne</b>	840 - 845	885 - 890
	<b>UMTS 2100</b>	<b>HCPT/Three</b>	1920 - 1930	2110 - 2120
		<b>Natrindo/Axis</b>	1930 - 1935	2120 - 2125
		<b>Telkomsel</b>	1935 - 1945	2125 - 2135
		<b>Indosat</b>	1950 - 1960	2140 - 2150
		<b>XL</b>	1960 - 1970	2150 - 2160
	<b>Isolation Between Same System</b>			≥ 23 dB
<b>Isolation Between System</b>			≥ 80-100dB	
<b>Max Input Power</b>			100W / port	
<b>Insertion Loss (DL)</b>			7 - 9 dB	
<b>Return Loss</b>			≥ 18 dB	
<b>IM @ 43dBm *2 (channel)</b>			≥140 dBc	
<b>IM2 @ 43dBm *2 (channel)</b>			≥140 dBc	
<b>Number of Input/Output Ports</b>			14 Input / 4 Output	
<b>Monitor Ports O/P Ports</b>			4 x -30Db (SMA Female)	
<b>Temperature Range</b>			0 to +60°C	
<b>RF Connectors I/O &amp; O/P Port</b>			Din-Female or N-Female	
<b>Dimension (mm) / Weight (kg)</b>			W60xL60xH105cm / 115 kg	

	<b>Multi Operator Combiner</b> <b>15Input 4Output Combiner</b> (Type A)	<b>Code : PW-MOC-15I-40-A</b>		
		<b>Rev</b> 3	<b>Issued</b> 07/07/2011	<b>Page</b> 1/1


## PRODUCT SPECIFICATION :

15input 4Output Combiner (ver A1)				
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)
<b>BTS Input/Output Port</b>	<b>CDMA800</b>	<b>Esia</b>	825 – 830	870 – 875
		<b>Flexi</b>	830 – 835	875 – 880
		<b>Mobile8</b>	835 - 840	880 – 885
	<b>CDMA800+ GSM1800</b>	<b>Indosat</b>	840 – 845 and 1717.5 – 1722.5 or 1750 - 1765	885 – 890 and 181.5-1817.5 or 1845 - 1860
	<b>GSM1800</b>	<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5
		<b>Telkomsel</b>	1722.5 – 1730 or 1745 – 1750 or 1765 - 1775	1817.5 – 1825 or 1840 - 1845 or 1860 – 1870
		<b>NTS (Lippo)</b>	1730 – 1745	1825 -1840
		<b>Three (HCPT)</b>	1775 – 1785	1870 – 1880
	<b>UMTS2100</b>	<b>Three (HCPT)</b>	1920 – 1930	2110 – 2120
		<b>NTS (Lippo)</b>	1930 – 1935	2120 - 2125
		<b>Telkomsel</b>	1935 – 1945	2125 – 2135
		<b>Indosat</b>	1950 – 1960	2140 – 2150
		<b>XL</b>	1960 – 1970	2150 - 2160
	<b>CDMA-1900</b>	<b>SMART/WIN</b>	1900 – 1910	1980 - 1990
	<b>WIFI-2400</b>	<b>xxx</b>	2400-2500	2400-2500
	<b>Isolation Between Same System</b>			≥ 23 dB
<b>Isolation Between System</b>			≥ 80-100 dB	
<b>Max Input Power</b>			100W / port	
<b>Insertion Loss (DL)</b>			Max 9.5dB	
<b>Return Loss</b>			≥ 18 dB	
<b>IM @ 43dBm *2 (channel)</b>			≥ 140 dBc	
<b>IM2 @ 43dBm *2 (channel)</b>			≥ 140 dBc	
<b>BTS (INPUT) / MS (Output) Ports</b>			15 Port / 4 Port	
<b>Monitor Ports O/P Ports</b>			4 x -30dB (SMA Female)	
<b>Temperature Range</b>			0 to +60°C	
<b>RF Connectors I/O &amp; O/P Port</b>			N-Female	

	<b>100Watt Multi Operator Combiner</b> <b>Input : 12, 13, 15, 16 port</b> <b>Output : 4port + 4x(-30dB)</b>	<b>Code : PW-MOC-Series</b>		
		<b>Rev</b> 6	<b>Issued</b> 11/11/2011	<b>Page</b> 5/6

**Product Specification :**

15input 4Output Combiner (ver B1)				
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)
<b>BTS I/O Port</b>	<b>CDMA800</b>	<b>Esia</b>	825 – 830	870 - 875
		<b>Flexi</b>	830 – 835	875 – 880
		<b>Fren</b>	835 – 840	880 - 885
		<b>StarOne</b>	840 – 845	885 - 890
	<b>GSM1800</b>	<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5
		<b>Indosat</b>	1717.5 – 1722.5 or 1750 - 1765	1812.5 - 1817.5 or 1845 - 1860
		<b>Telkomsel</b>	1722.5 – 1730 or 1745 – 1750 or 1765 - 1775	1817.5 – 1825 or 1840 - 1845 or 1860 – 1870
		<b>NTS(Axis)</b>	1730 – 1745	1825 -1840
		<b>Three (HCPT)</b>	1775 – 1785	1870 – 1880
	<b>UMTS2100</b>	<b>Three (HCPT)</b>	1920 – 1930	2110 – 2120
		<b>NTS(Axis)</b>	1930 – 1935	2120 - 2125
		<b>Telkomsel</b>	1935 – 1945	2125 – 2135
		<b>Indosat</b>	1950 – 1960	2140 – 2150
		<b>XL</b>	1960 – 1970	2150 - 2160
	<b>CDMA-1900</b>	<b>SMART/WIN</b>	1900 – 1910	1980-1990
	<b>Isolation Between Same System</b>			≥ 23 dB
<b>Isolation Between System</b>			≥ 80-100 dB	
<b>Max Input Power</b>			100W / port	
<b>Insertion Loss (DL)</b>			≤ 9dB	
<b>Return Loss</b>			≥ 18 dB	
<b>IM @ 43dBm *2 (channel)</b>			≥ 140 dBc	
<b>IM2 @ 43dBm *2 (channel)</b>			≥ 140 dBc	
<b>BTS (INPUT) / MS (Output) Ports</b>			15 Port / 4 Port	
<b>Monitor Ports O/P Ports</b>			4 x -30dB (SMA Female)	
<b>Temperature Range</b>			0 to +60°C	
<b>RF Connectors I/O &amp; O/P Port</b>			Din-Female or N-Female	
<b>Dimension (mm) / Weight (kg)</b>			W60xL60xH105cm / 125 kg	

	<b>100Watt Multi Operator Combiner</b> <b>Input :12, 13, 15, 16 port</b> <b>Output : 4port + 4x(-30dB)</b>	<b>Code : PW-MOC-Series</b>		
		<b>Rev</b> 6	<b>Issued</b> 07/07/2011	<b>Page</b> 6/6

**PRODUCT SPECIFICATION :**

16input 4Output Combiner (ver A1)					
Frequency Range		Operator	UL Freq (MHz)	DL Freq (MHz)	
<b>BTS Input/Output Port</b>	CDMA800	<b>Esia</b>	825 – 830	870 – 875	
		<b>Flexi</b>	830 – 835	875 – 880	
		<b>Mobile8</b>	835 - 840	880 – 885	
	CDMA800+ GSM1800	<b>Indosat</b>	840 – 845 and 1717.5 – 1722.5 or 1750 - 1765	885 – 890 and 181.5-1817.5 or 1845 - 1860	
			<b>Excelcomindo</b>	1710 - 1717.5	1805 - 1812.5
	GSM1800	<b>Telkomsel</b>	1722.5 – 1730 or 1745 – 1750 or 1765 - 1775	1817.5 – 1825 or 1840 - 1845 or 1860 – 1870	
			<b>NTS (Lippo)</b>	1730 – 1745	1825 -1840
			<b>Three (HCPT)</b>	1775 – 1785	1870 – 1880
			<b>Three (HCPT)</b>	1920 – 1930	2110 – 2120
	UMTS2100	<b>NTS (Lippo)</b>	1930 – 1935	2120 - 2125	
			<b>Telkomsel</b>	1935 – 1945	2125 – 2135
			<b>Indosat</b>	1950 – 1960	2140 – 2150
			<b>XL</b>	1960 – 1970	2150 - 2160
			<b>SMART/WIN</b>	1900 – 1910	1980-1990
	CDMA-1900	<b>SMART/WIN</b>	1900 – 1910	1980-1990	
	WiFi	<b>2port</b>	2400-2500	2400-2500	
	<b>Isolation Between Same System</b>			≥ 23 dB	
	<b>Isolation Between System</b>			≥ 80-100 dB	
<b>Max Input Power</b>			100W / port		
<b>Insertion Loss (DL)</b>			Max 9dB		
<b>Return Loss</b>			≥ 18 dB		
<b>IM @ 43dBm *2 (channel)</b>			≥ 140 dBc		
<b>IM2 @ 43dBm *2 (channel)</b>			≥ 140 dBc		
<b>BTS (INPUT) / MS (Output) Ports</b>			16 Port / 4 Port		
<b>Monitor Ports O/P Ports</b>			4 x -30dB (SMA Female)		
<b>Temperature Range</b>			0 to +60°C		
<b>RF Connectors I/O &amp; O/P Port</b>			N-Female		