

# LTE-Advanced FDD/TDD DL CA

MT8820C

Radio Communication Analyzer

**MT8820C**  
**Radio Communication Analyzer**  
**Product Introduction**

*~ LTE-A DL CA Option Introduction ~*

**Version 3.00**  
**December 2014**

**ANRITSU CORPORATION**

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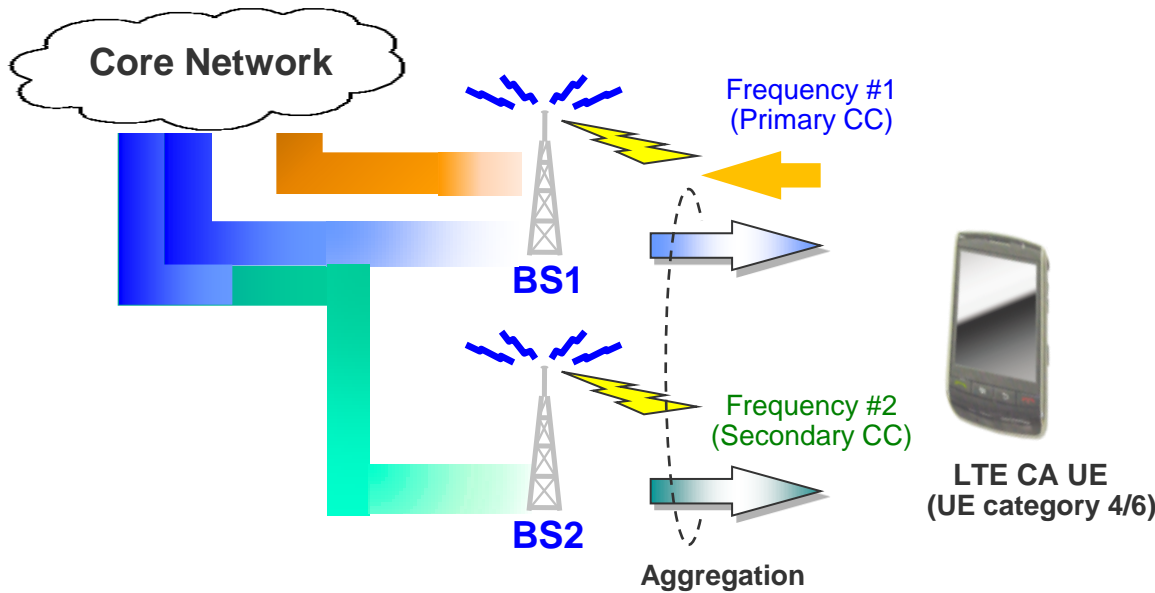
# ***LTE-Advanced FDD/TDD DL CA 2CCs Extensibility***

# What is LTE-Advanced FDD/TDD Carrier Aggregation?

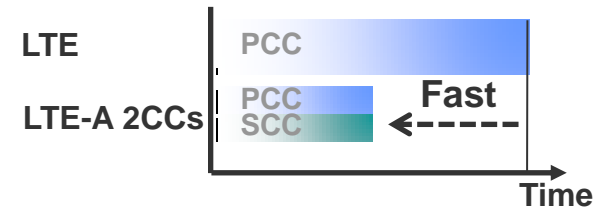
## What is LTE-Advanced FDD/TDD Carrier Aggregation?

The FDD and TDD methods are standardized by the LTE-Advanced specification. The FDD method divides the frequency band in use into separate frequencies for sending and for receiving, whereby both sending and receiving are performed simultaneously. The TDD method uses the same frequencies for both sending and receiving but sends and receives alternately at different, very-short, time instants.

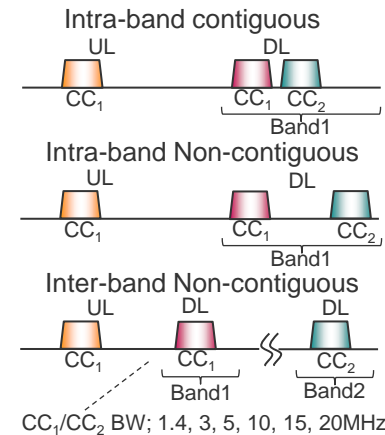
LTE-Advanced Carrier Aggregation is a virtualization technology for creating a wider bandwidth (range of electromagnetic frequencies) by combining multiple allocated frequency bands. In wireless communications systems, more data can be transferred at higher speeds as the frequency band becomes wider. In other words, if a communications carrier has a 20-MHz band and 10-MHz band, using this technology increases the peak and average data speeds for subscribers to the same data rate as when using a single 30-MHz wide bandwidth.



LTE-Advanced FDD Carrier Aggregation Image



### Data Download Time Image



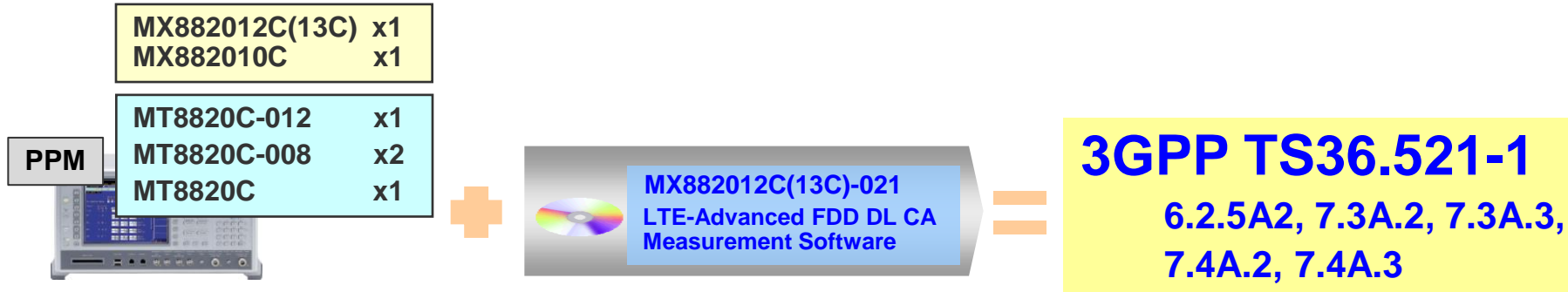
LTE-Advanced FDD Component Carrier Image

# LTE-Advanced FDD/TDD Carrier Aggregation Option

## LTE-A FDD(TDD) DL CA Option Features

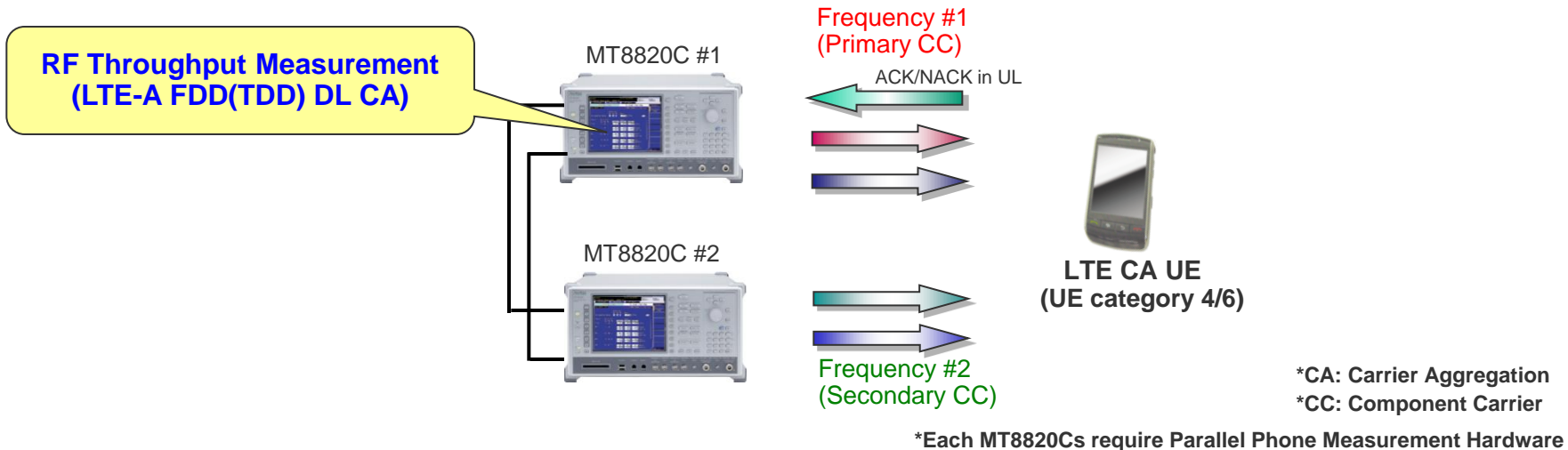
### LTE-A FDD(TDD) DL CA Extensibility

With addition of software license of this option, capable of measuring RF RX testing (3GPP TS36.521-1 6.2.5A.2 Configured UE transmitted Output Power for CA (inter-band DL CA without UL CA), 7.3A Reference sensitivity level for CA, 7.4A Max input level for CA )



## LTE-A FDD(TDD) DL CA plus MIMO RF Throughput Measurement (@physical layer)

With two MT8820Cs, capable of throughput testing of DL CA 2x2 MIMO PHY layer.



## 3GPP LTE-A FDD(TDD) CA Compliance Table (1/2)

3GPP TS36.521-1 V12.3.0(2014-09)

Test	3GPP TS36.521-1	Test Item	Non-Call Processing	Call Processing	MT8820C Measurement Items
Transmitter Test	<b>6</b>	<b>Transmitter characteristics</b>			
	6.2.2A.1	UE Maximum Output Power for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.2.3A.1	Maximum Power Reduction (MPR) for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.2.4A.1	Additional Maximum Power Reduction (A-MPR) for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.2.5A.1	Configured UE transmitted Output Power for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.2.5A.2	Configured UE transmitted Output Power for CA (inter-band DL CA without UL CA)	No	Yes	Power Measurement
	6.3.2A.1	Minimum Output Power for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.3.3A.1	UE Transmit OFF power for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.3.4A.1.1	General ON/OFF time mask for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.3.5A.1.1	Power Control Absolute power tolerance for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.3.5A.2.1	Power Control Relative power tolerance for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.3.5A.3.1	Aggregate power control tolerance for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.5.1A.1	Frequency error for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.5.2A.1.1	Error Vector Magnitude (EVM) for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.5.2A.2.1	Carrier leakage for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.5.2A.3.1	In-band emissions for non allocated RB for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.6.1A.1	Occupied bandwidth for CA (intra-band contiguous DL CA and UL CA)	No	No	
	6.7A.1	Transmit intermodulation for CA (intra-band contiguous DL CA and UL CA)	No	No	

\*Please refer to the latest information of MT8820C(LTE) Application Note

\*CA: Carrier Aggregation

# 3GPP LTE-A FDD CA Compliance Table (2/2)

3GPP TS36.521-1 V12.3.0(2014-09)

Test	3GPP TS36.521-1	Test Item	Non-Call Processing	Call Processing	MT8820C Measurement Items
Receiver Test	<b>7</b>	<b>Receiver characteristics</b>			
	7.3A.1	Reference sensitivity level for CA (intra-band contiguous DL CA and UL CA)	No	No	
	7.3A.2	Reference sensitivity level for CA(intra-band contiguous DL CA without UL CA)	No	Yes	Throughput
	7.3A.3	Reference sensitivity level for CA (inter-band DL CA without UL CA)	No	Yes	Throughput
	7.3A.4	Reference sensitivity level for CA (intra-band non-contiguous DL CA without UL CA)* <sup>1</sup>			
	7.4A.1	Maximum input level for CA (intra-band contiguous DL CA and UL CA)	No	No	
	7.4A.2	Maximum input level for CA (intra-band contiguous DL CA without UL CA)	No	Yes	Throughput
	7.4A.3	Maximum input level for CA (inter-band DL CA without UL CA)	No	Yes	Throughput
	7.5A.1	Adjacent Channel Selectivity (ACS) for CA (intra-band contiguous DL CA and UL CA)	No	No	
	7.5A.2	Adjacent Channel Selectivity (ACS) for CA (intra-band contiguous DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
	7.5A.3	Adjacent Channel Selectivity (ACS) for CA (inter-band DL CA without UL CA)* <sup>1</sup>			
	7.6.1A.1	In-band blocking for CA (intra-band contiguous DL CA and UL CA)	No	No	
	7.6.1A.2	In-band blocking for CA (intra-band contiguous DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
	7.6.1A.3	In-band blocking for CA (inter-band DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
	7.6.2A.1	Out-of-band blocking for CA (intra-band contiguous DL CA and UL CA)	No	No	
	7.6.2A.2	Out-of-band blocking for CA (intra-band contiguous DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
	7.6.2A.3	Out-of-band blocking for CA (inter-band DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
	7.6.3A.1	Narrow band blocking for CA (intra-band contiguous DL CA and UL CA)	No	No	
	7.6.3A.2	Narrow band blocking for CA (intra-band contiguous DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
	7.6.3A.3	Narrow band blocking for CA (inter-band DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput
7.7A.1	Spurious response for CA (intra-band contiguous DL CA and UL CA)	No	No		
7.7A.2	Spurious response for CA (intra-band contiguous DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput	
7.7A.3	Spurious response for CA (inter-band DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput	
7.8.1A.1	Wideband intermodulation for CA (intra-band contiguous DL CA and UL CA)	No	No		
7.8.1A.2	Wideband intermodulation for CA (intra-band contiguous DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput	
7.8.1A.3	Wideband intermodulation for CA (inter-band DL CA without UL CA)	No	part of Yes* <sup>2</sup>	Throughput	

\*1: 3GPP TS36.521-1 7.3A.4 and 7.5A.3 test description are not yet defined.

\*2: Requires external equipment (eg. signal generator) for interference signal, etc.

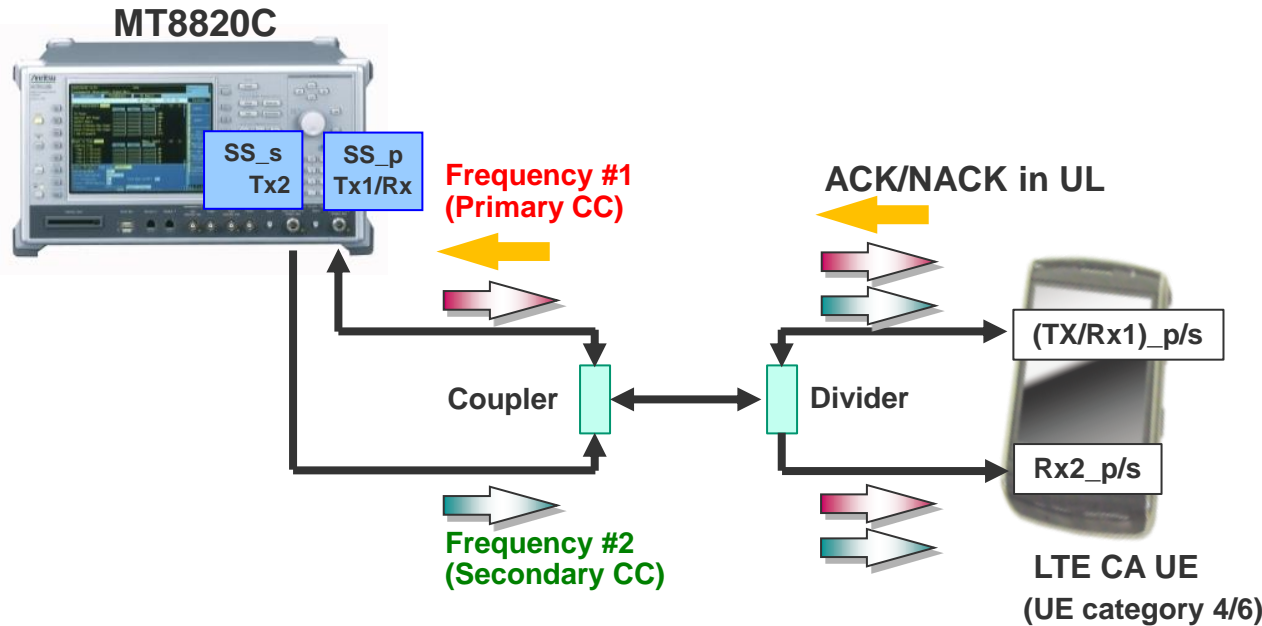
\*CA: Carrier Aggregation



# MT8820C configuration

## DL CA 2CCs (SISO) 1/2

- 6.2.5A.2 Configured UE transmitted Output Power for CA (inter-band DL CA without UL CA)
- 7.3A.2 Reference sensitivity level for CA (intra-band contiguous DL CA without UL CA)
- 7.3A.3 Reference sensitivity level for CA (inter-band DL CA without UL CA)
- 7.4A.2 Maximum input level for CA (intra-band contiguous DL CA without UL CA)
- 7.4A.3 Maximum input level for CA (inter-band DL CA without UL CA)

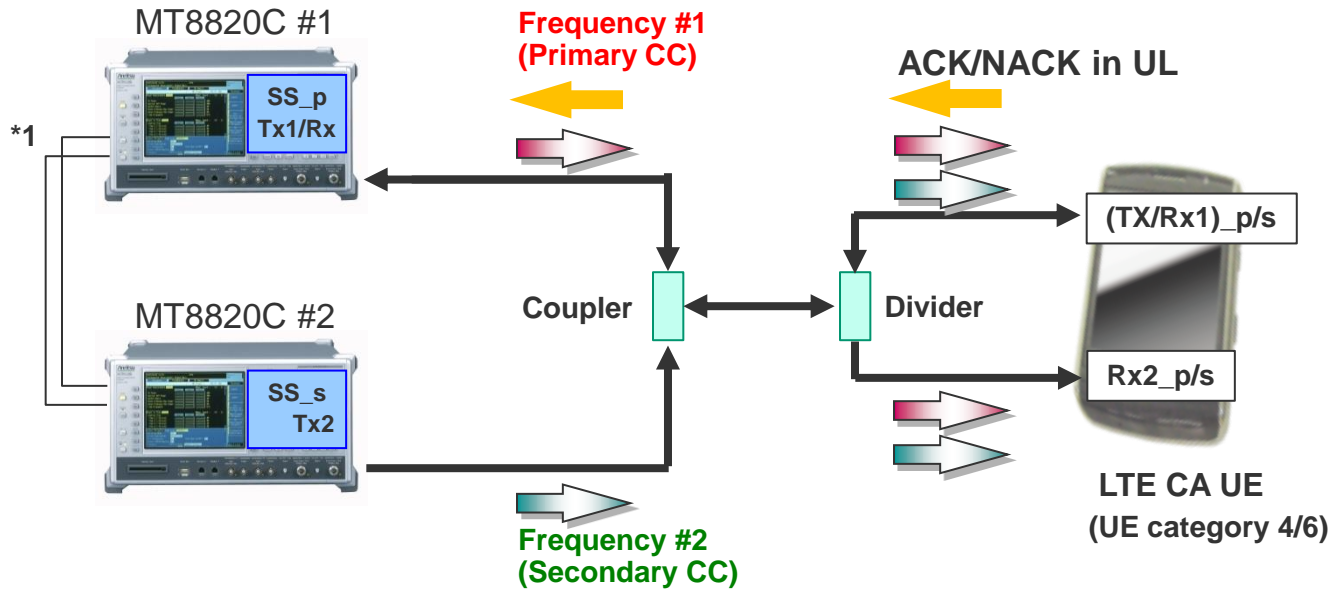


Example of DL CA (SISO) connection based on TS36.508 Figure A.32b

\*Requires MX882012C(13C)-021 LTE-A FDD(TDD) DL CA Meas. SW  
 \*LTE FDD: LTE ver.22.50(end of Jan., 2013) or later  
 LTE TDD: LTE ver.23.00(end of Jan., 2014) or later  
 \*Each MT8820Cs require Parallel Phone Measurement Hardware

# MT8820C configuration

## DL CA 2CCs (SISO) 2/2



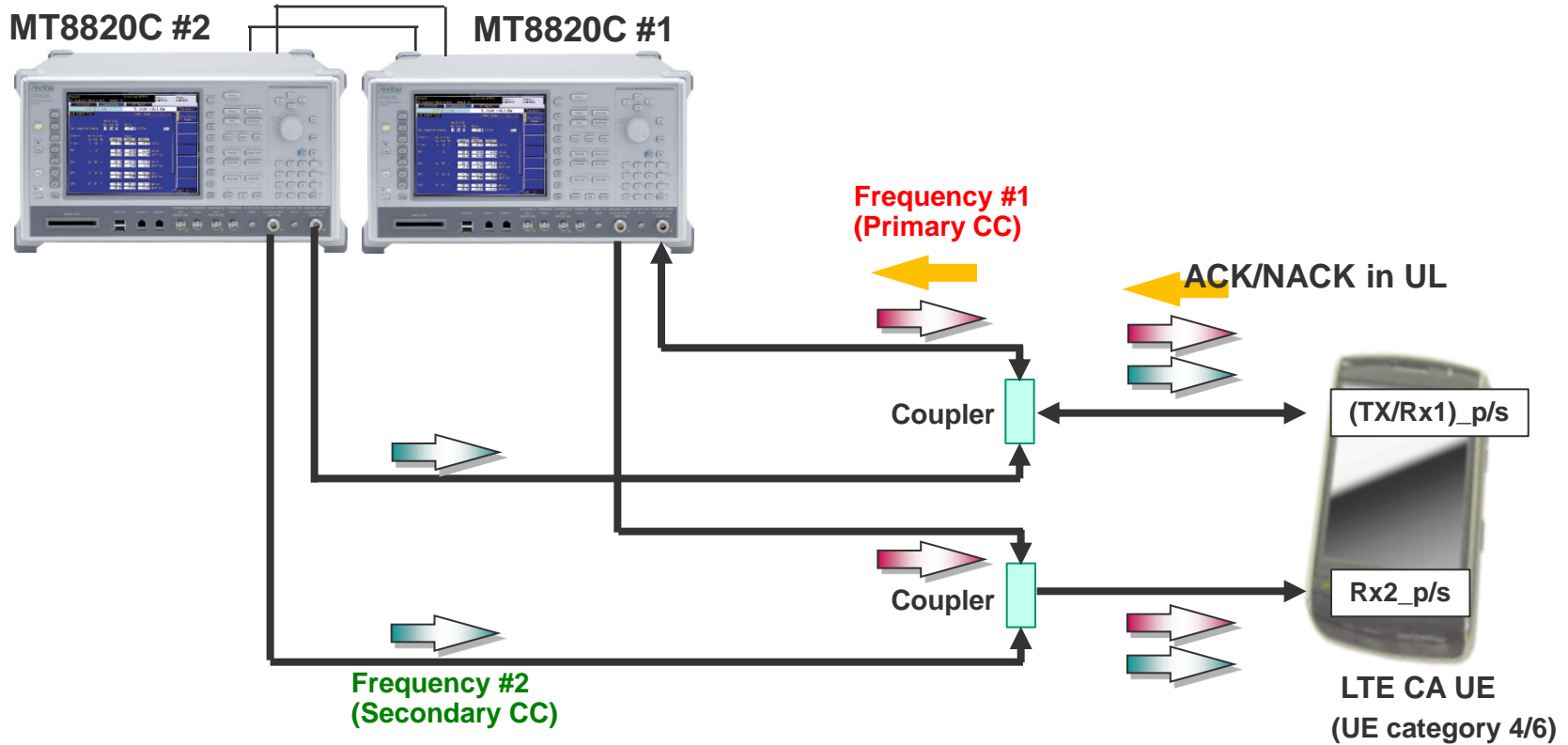
Example of DL CA (SISO)  
connection based on TS36.508  
Figure A.32b

\*1: Requires a Sync Cable ( J1249 CABLE) and a Ref Cable (BNC coaxial cable)

# LTE-A FDD(TDD) Carrier Aggregation plus DL MIMO - 1/2

## Carrier Aggregation plus DL MIMO

(PHY Throughput Measurement)



Example of DL CA (2x2 MIMO) connection

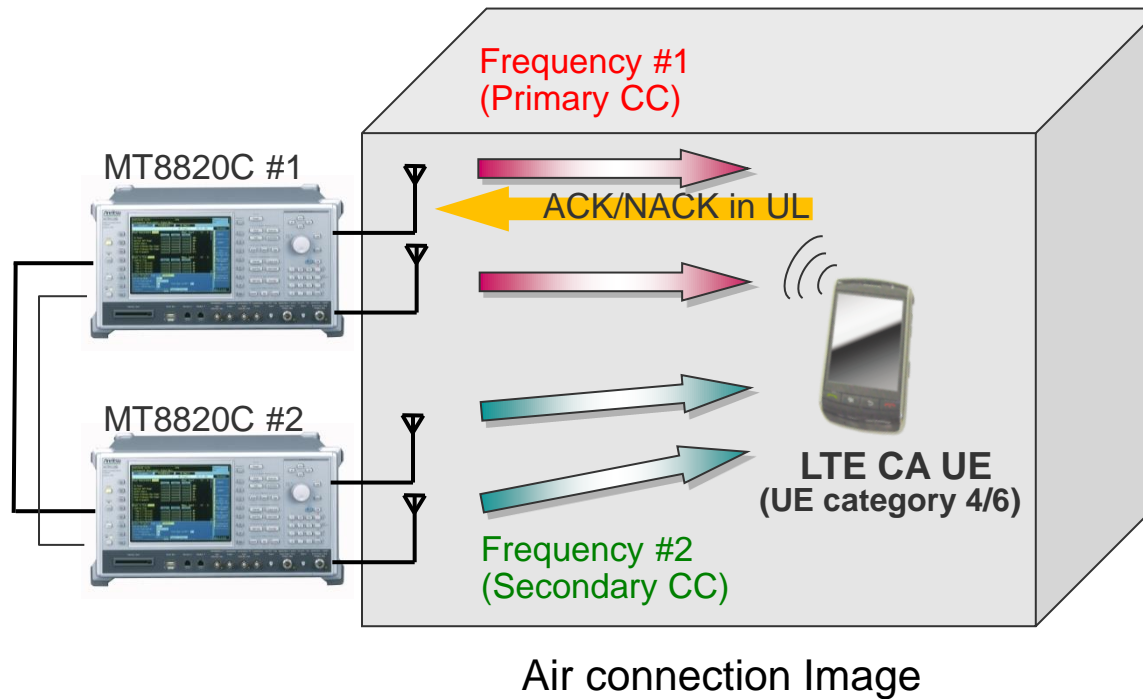
\*Each MT8820Cs require Parallel Phone Measurement Hardware

# LTE-A FDD(TDD) Carrier Aggregation plus DL MIMO - 2/2

## Carrier Aggregation plus DL MIMO

(PHY Throughput Measurement)

Throughput for a specified reference measurement channel (not IP throughput) is measured with two MT8820Cs. Each downlink carrier component consists of 2x2 MIMO (2 layers). Two MT8820Cs are synchronized with a synchronization signal.



\*Each MT8820Cs require Parallel Phone Measurement Hardware

# *LTE-Advanced FDD/TDD DL CA 3CCs Extensibility*

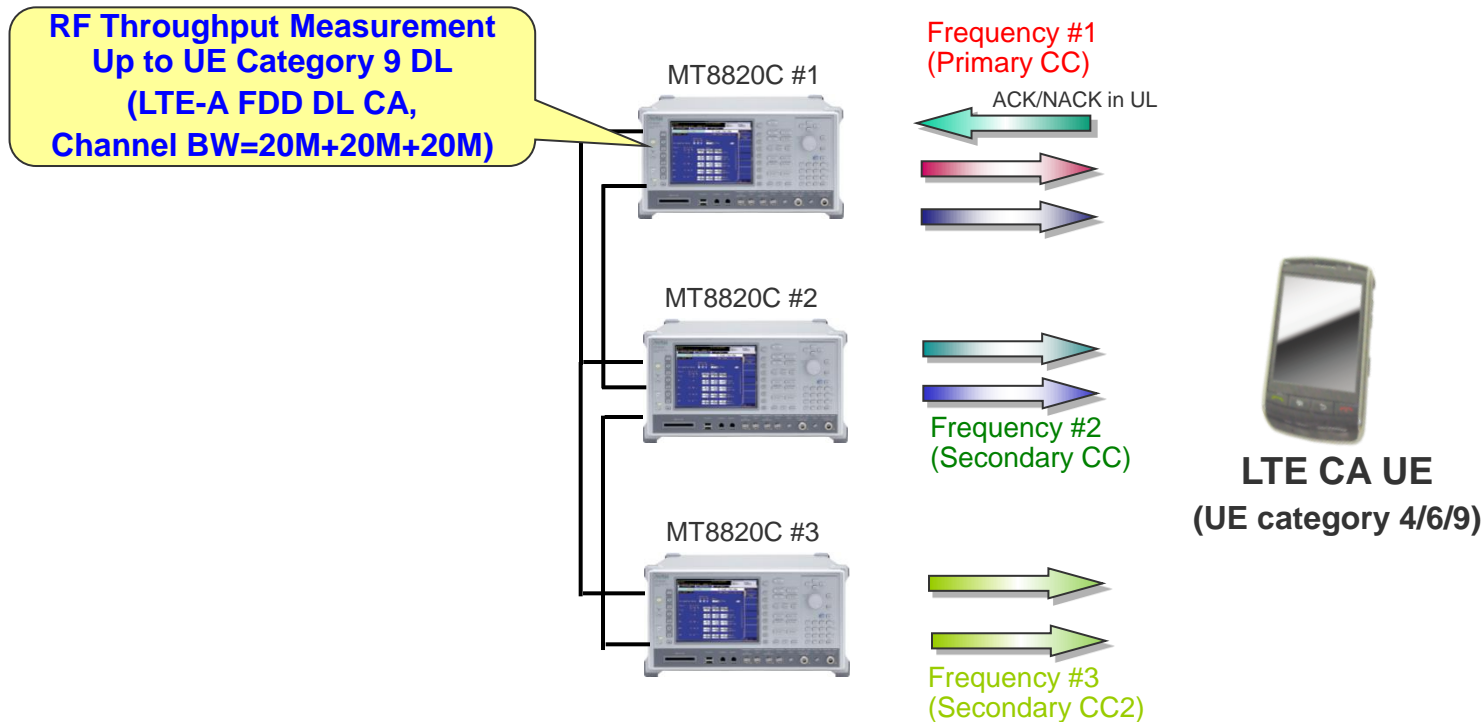
## LTE-A FDD/TDD DL CA 3CCs Option Features

### LTE-A FDD/TDD DL CA 3CCs Extensibility

With addition of software license of this option, capable of measuring RF RX testing (3GPP TS36.521-1 test description are not yet defined.)

### LTE-A FDD/TDD DL CA 3CCs plus MIMO RF Throughput Measurement (@physical layer)

With Three MT8820Cs, capable of throughput testing of DL CA 2x2 MIMO PHY layer (UE category 9, Channel Bandwidth = 20M +20M +20M and 3CCs)

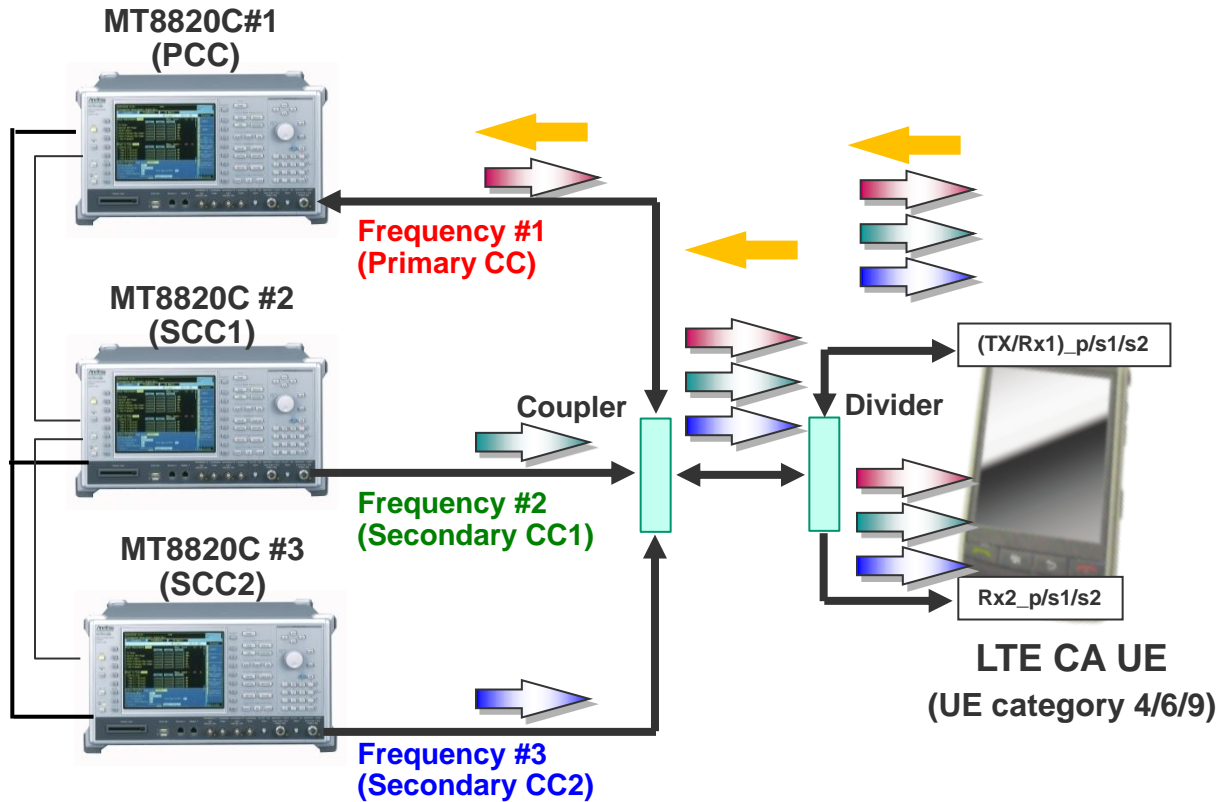


\*CA: Carrier Aggregation

\*CC: Component Carrier

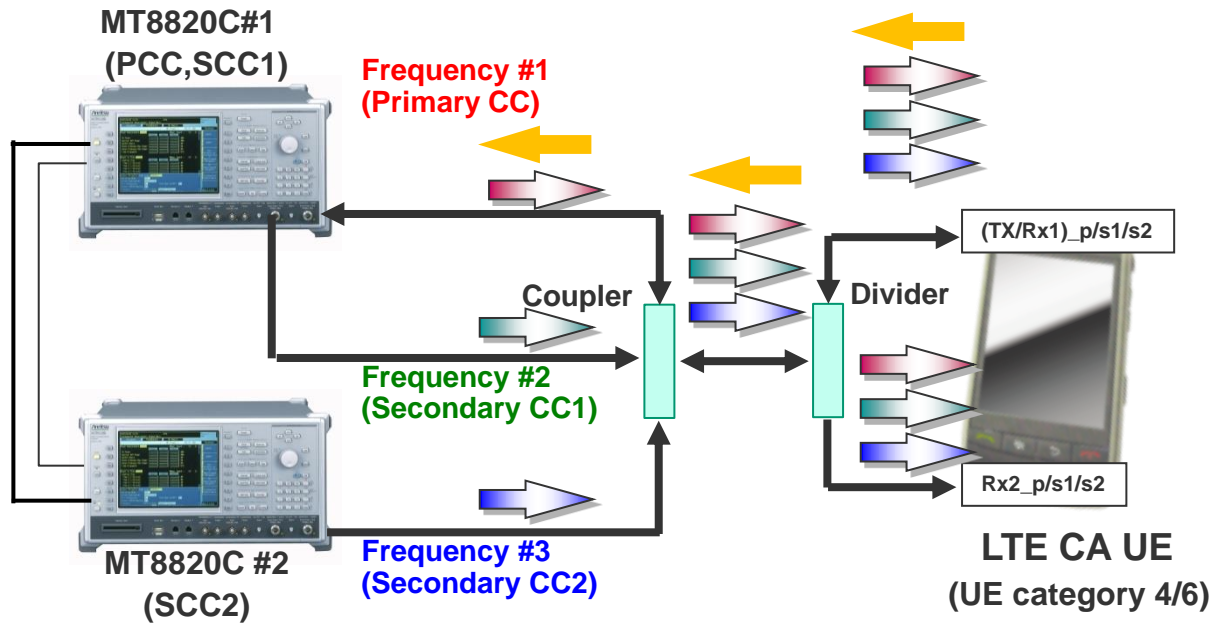
\*Each MT8820Cs require Parallel Phone Measurement Hardware

## MT8820C configuration DL CA 3CCs (SISO) 1/2



Coaxial Cable connection Image

## MT8820C configuration DL CA 3CCs (SISO) 2/2



Coaxial Cable connection Image

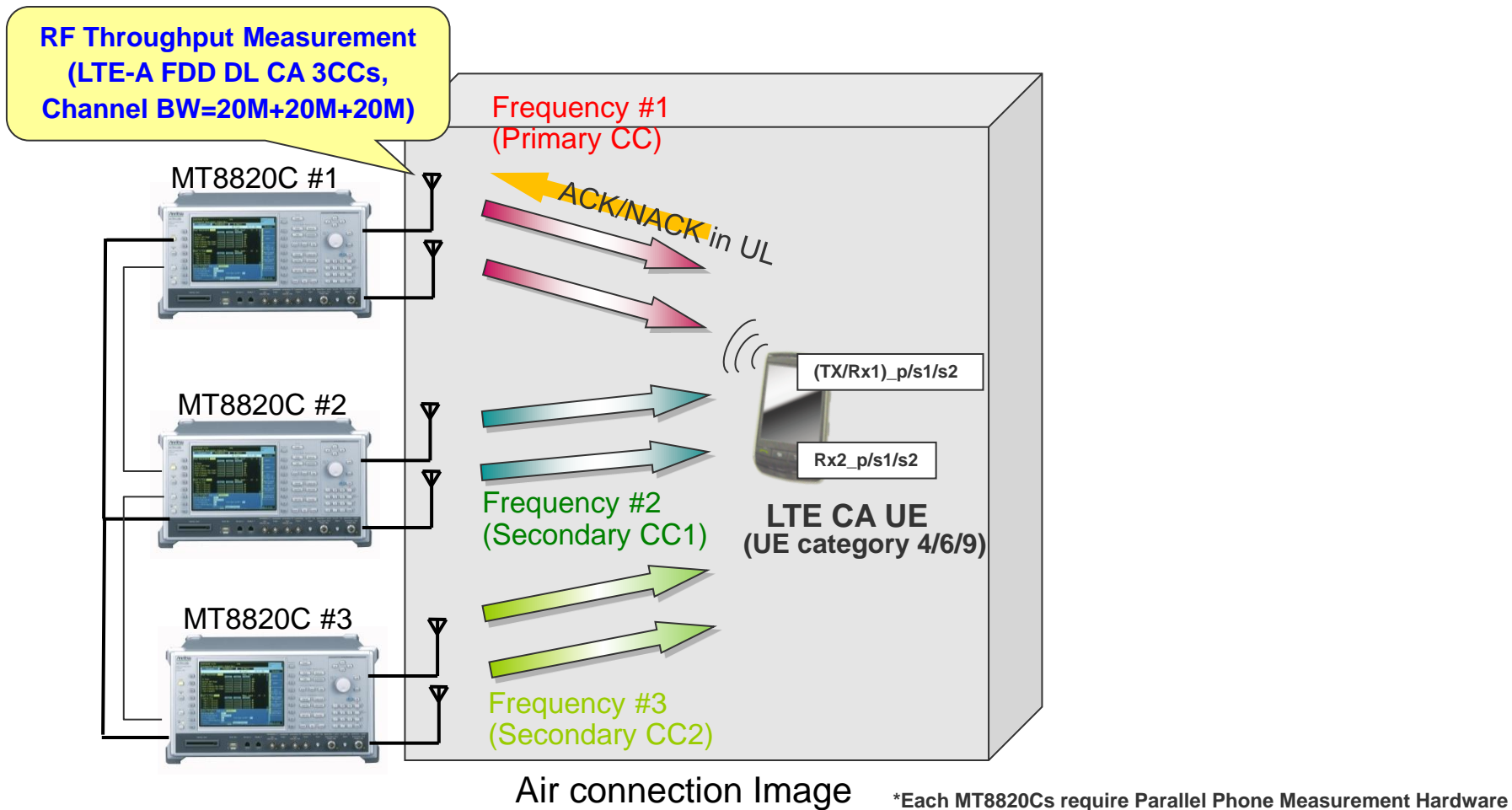
\*MT8820C #1 requires Parallel Phone Measurement Hardware



# LTE-A FDD Carrier Aggregation RF Throughput Test

## Carrier Aggregation 3CCs plus DL MIMO (PHY Throughput Measurement)

Throughput for a specified reference measurement channel (not IP throughput) is measured with three MT8820Cs. Each downlink carrier component consists of 2x2 MIMO (2 layers). Three MT8820Cs are synchronized with a synchronization signal.



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