



DXT Technology

arki Cluster[®]
ART, SCIENCE & HUMAN PROGRESS

Signaling Mode



CWI

Wireless 802.11x
Bluetooth



信令模式

Comprehensive Wireless Tester
WLAN / BT Signaling Tester
Arki Cluster Technology Co.,Ltd

2017 Feb



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- IOT 测试领域的新趋势
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 - OTT BOX / Smart TV Testing
 - Video Streaming Testing Solution
- 参考用户案例

信令模式

Signaling Mode



IOT 测试领域的新趋势



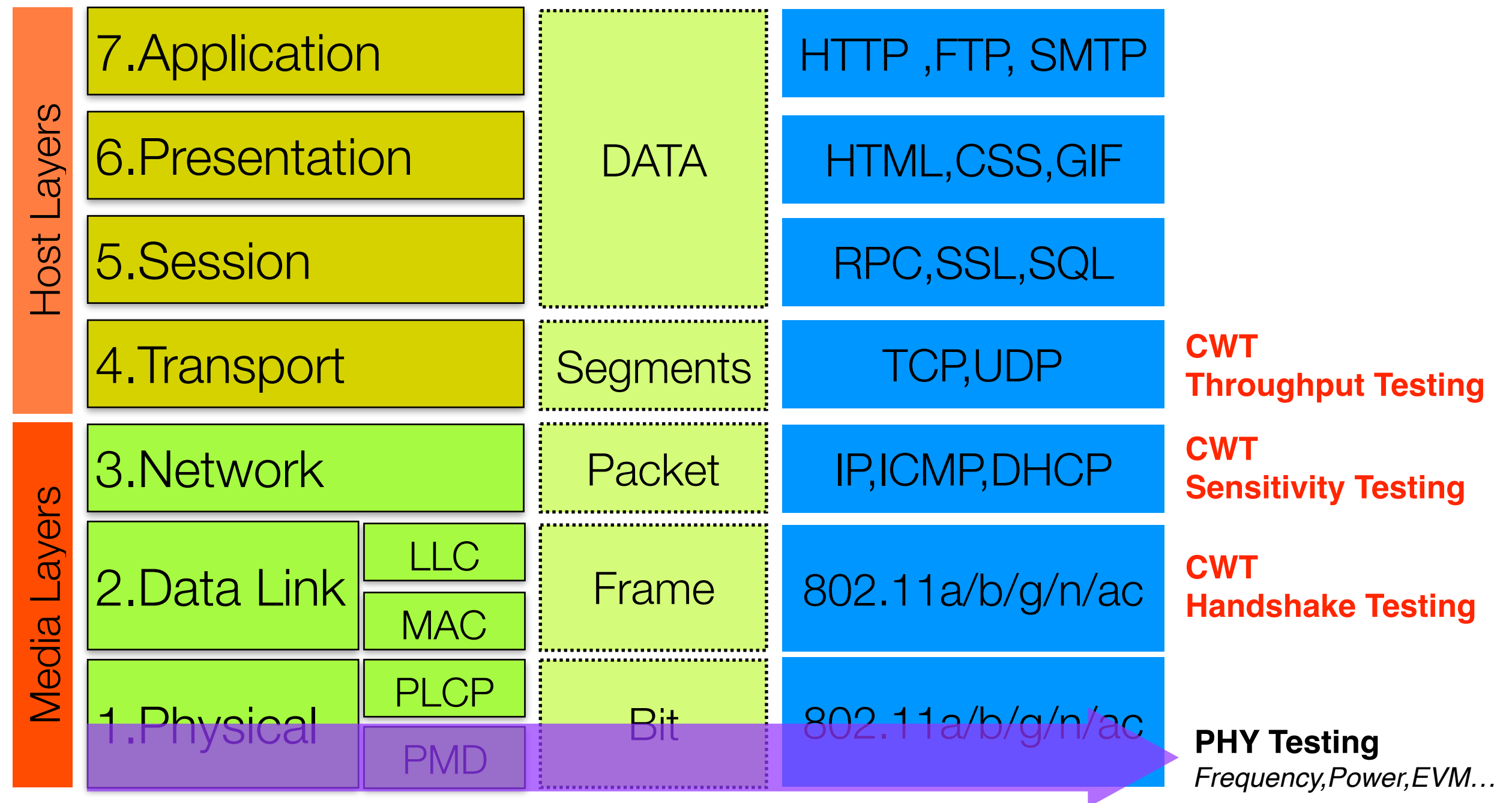
- **测试趋于用户体验式：**IOT产品测试更加关注客户实际的使用效果，测试也要更加趋于客户的实际体验。例如，能否快速连接，能否在实际使用场景下保持流畅度，这在测试指标上体现为灵敏度和吞吐量。
- **测试趋于企业定制化：**各个企业在IOT领域个性化的需求越来越明显，一刀切的标准化仪器不能很好的满足客户实际的测试需要。例如，蓝牙的BLE，很多产品在协议端的理解就无法统一，所以市面上通用仪表和被测件的建链都困难，更谈不上测试了。

• **IOT市场需要一台用户体验式测试的**可以支持定制化开发需要的仪表**-CWT**



- 芯片自校准技术显著降低了PCB测试对仪器仪表的依赖，用户体验式测试更多的集中在成品测试端

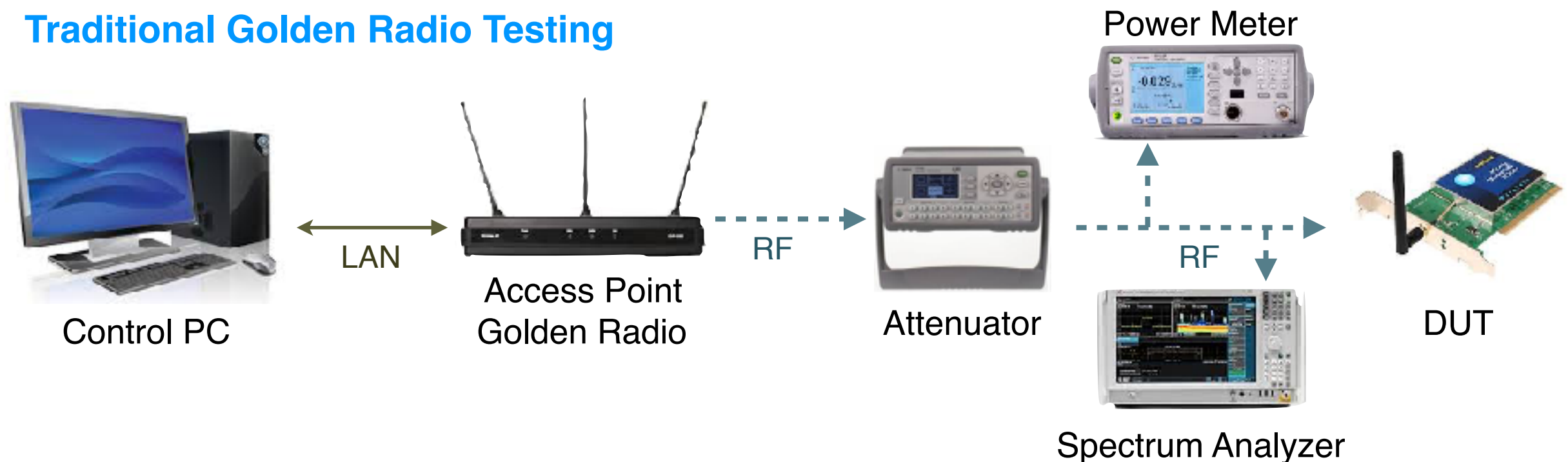
用户体验式测试关注的重点



Arki Cluster CWT is a system level testing.
PHY testing is a board (module) level testing

传统用户体验式测试的弊端

Traditional Golden Radio Testing



State of the art -> CWT Testing



CWT Tester



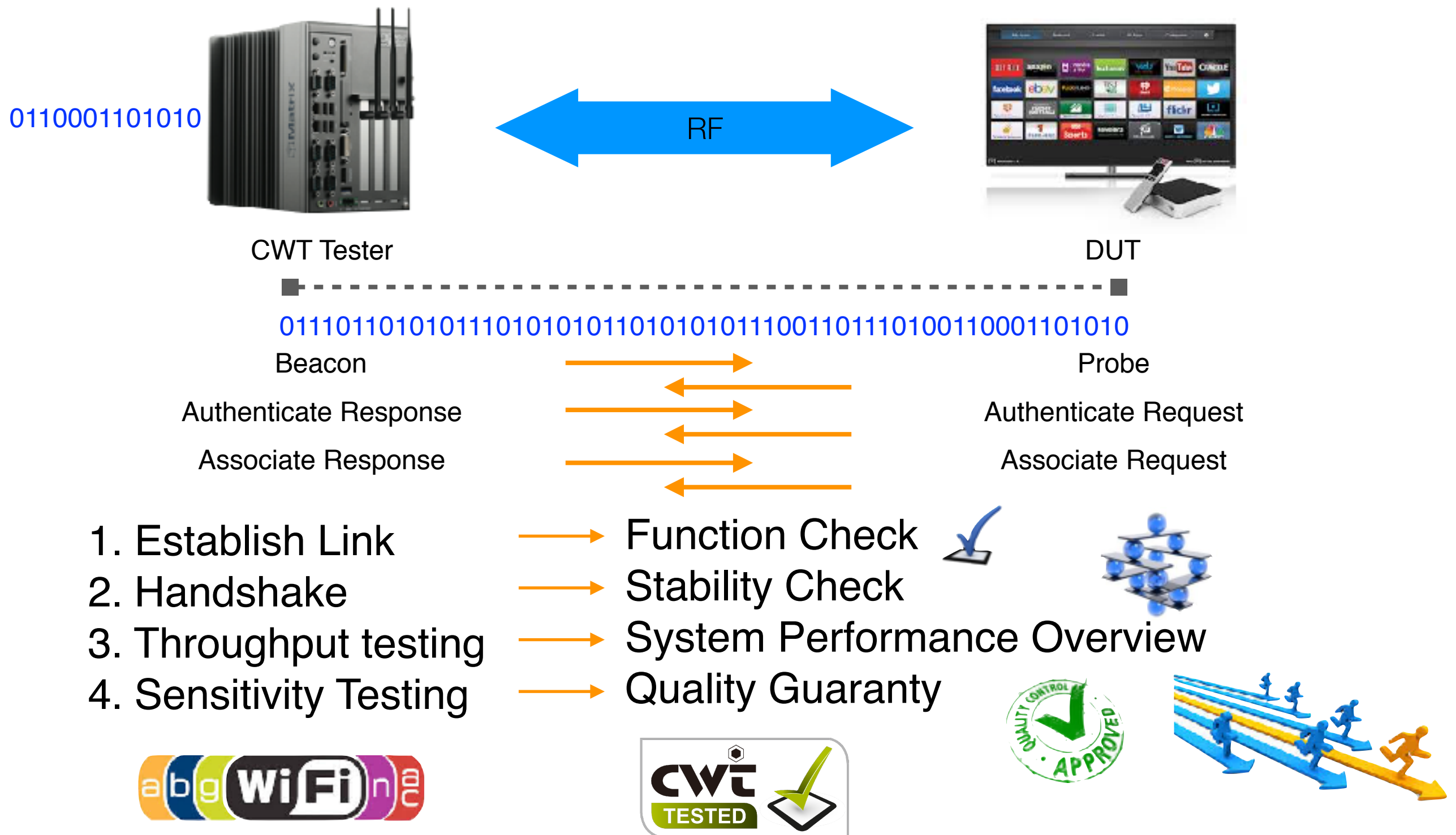
DUT

- 构建复杂
- 环境不确定因素影响大，不准确
- 固定，无法灵活配置
- 无法得到连续灵敏度指标

CWT 概览 - WLAN / BT Testing

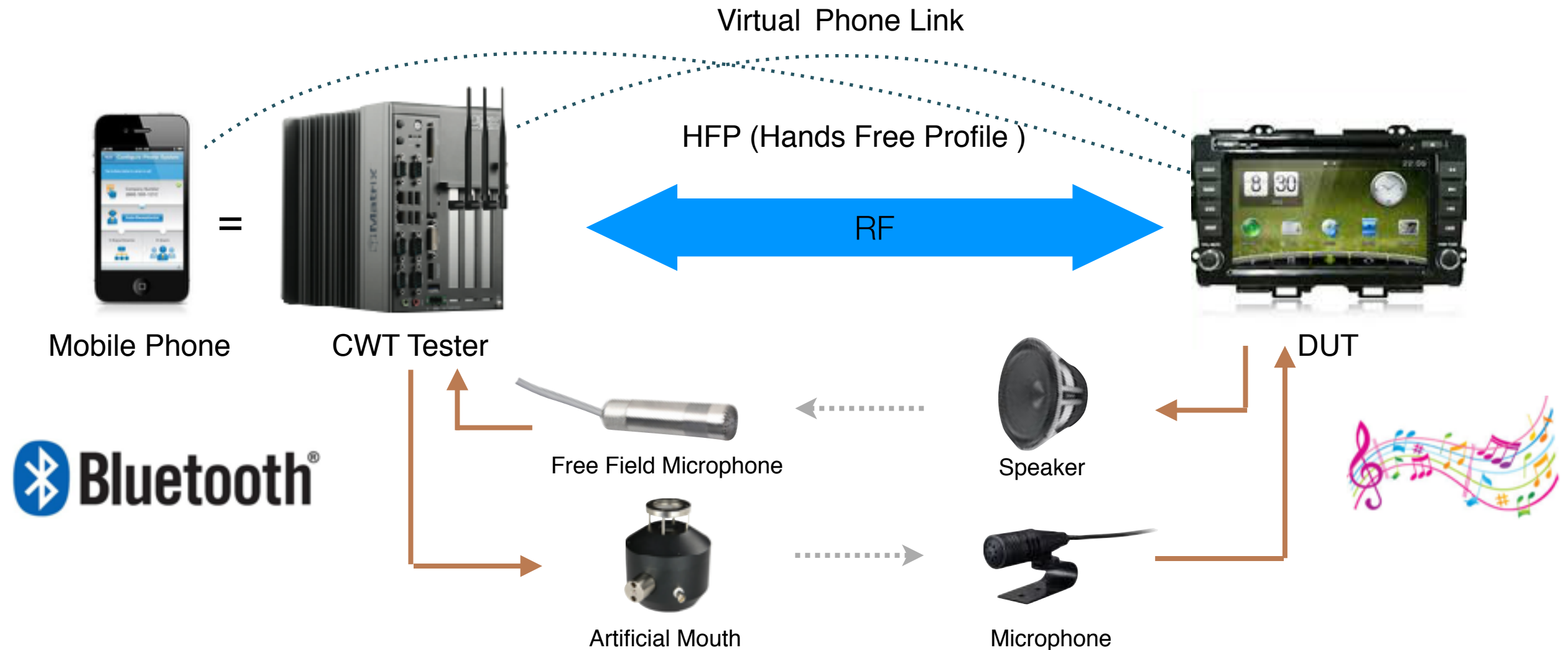


CWT WIFI Testing



CWT Bluetooth Testing

Car Infotainment System Scenario



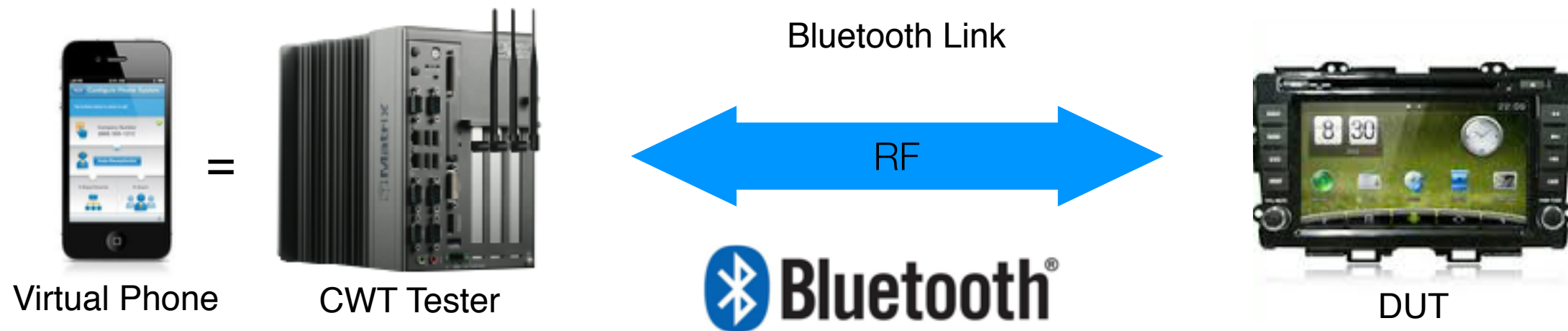
1. Bluetooth Paring
2. TX Power Measurement
3. Throughput testing
4. Sensitivity Testing
5. HFP Link (Virtual Phone Link)
6. Audio Check

Function Check
Stability Check
System Performance Overview
Virtual Phone BT link
Quality Guaranty



CWT Bluetooth Profile Support

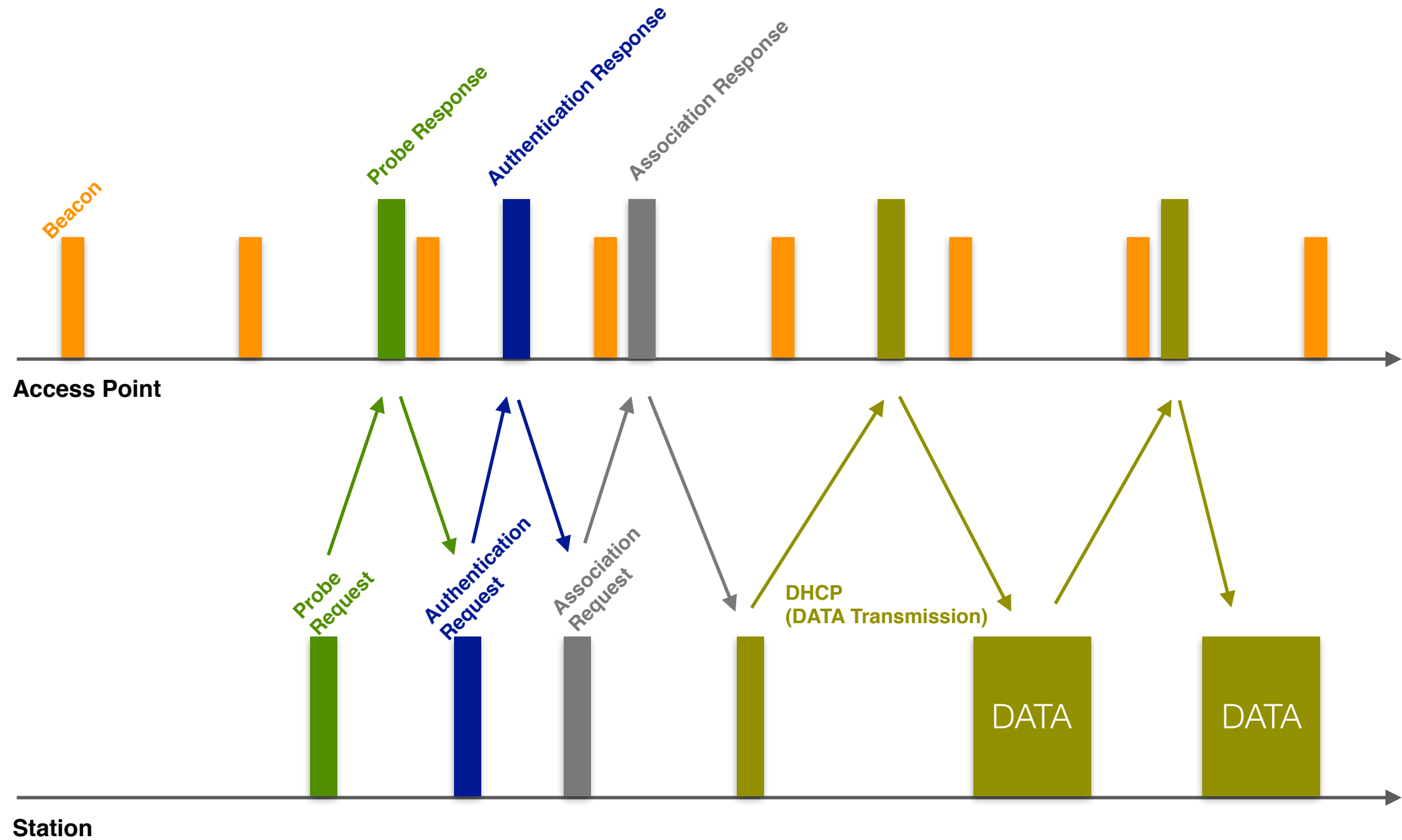
Car Infotainment System Scenario



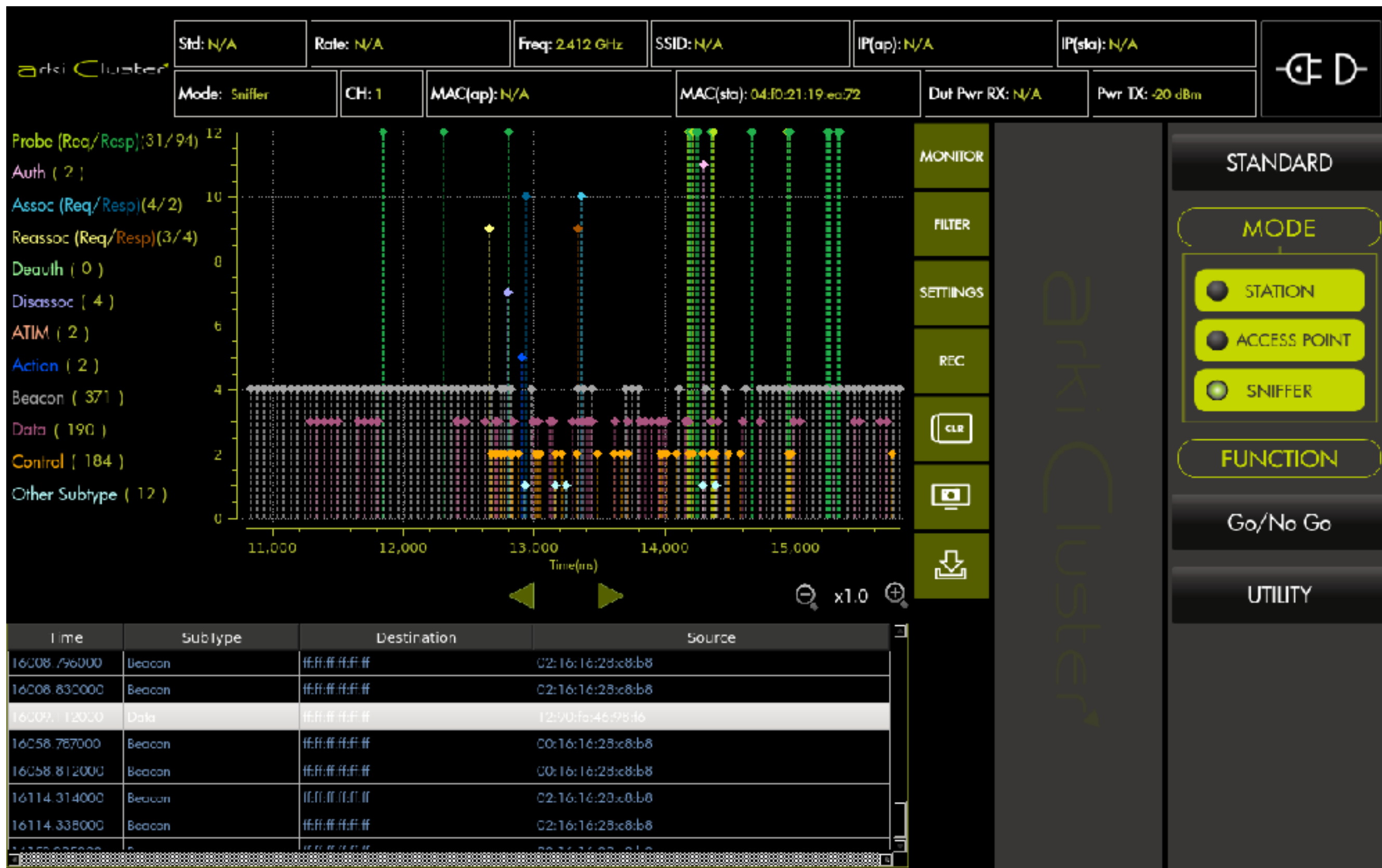
Application	Profile	Description
Hands Free	HFP	Hands Free Profile
Phone Book	PBAP	Phone Book Access Profile
Message	MAP	Message Access Profile
MUSIC	A2DP	Advanced Audio Distribution Profile
	AVRCP	Audio/Video Control Profile
Mobile Phone Control	SPP	Serial Port Profile
	HID	Human Interface Device



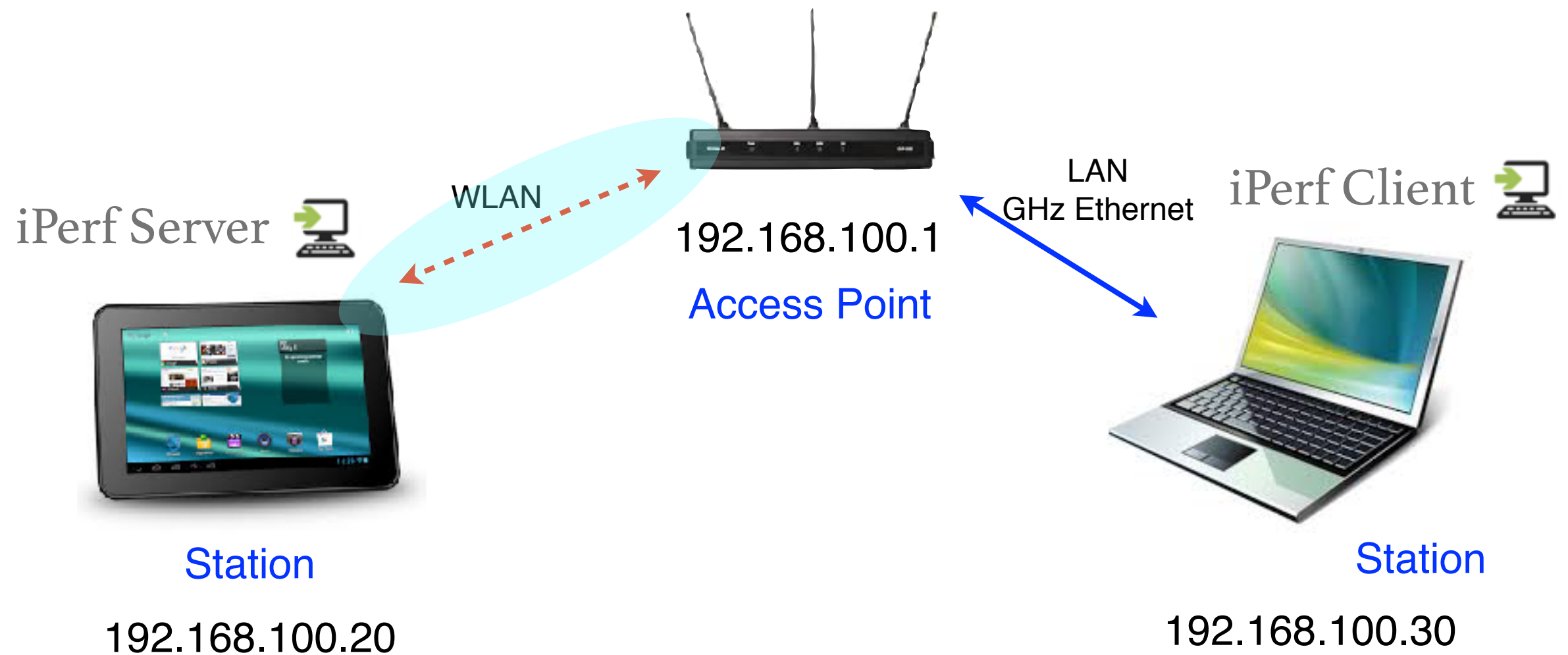
Handshake - Link Established



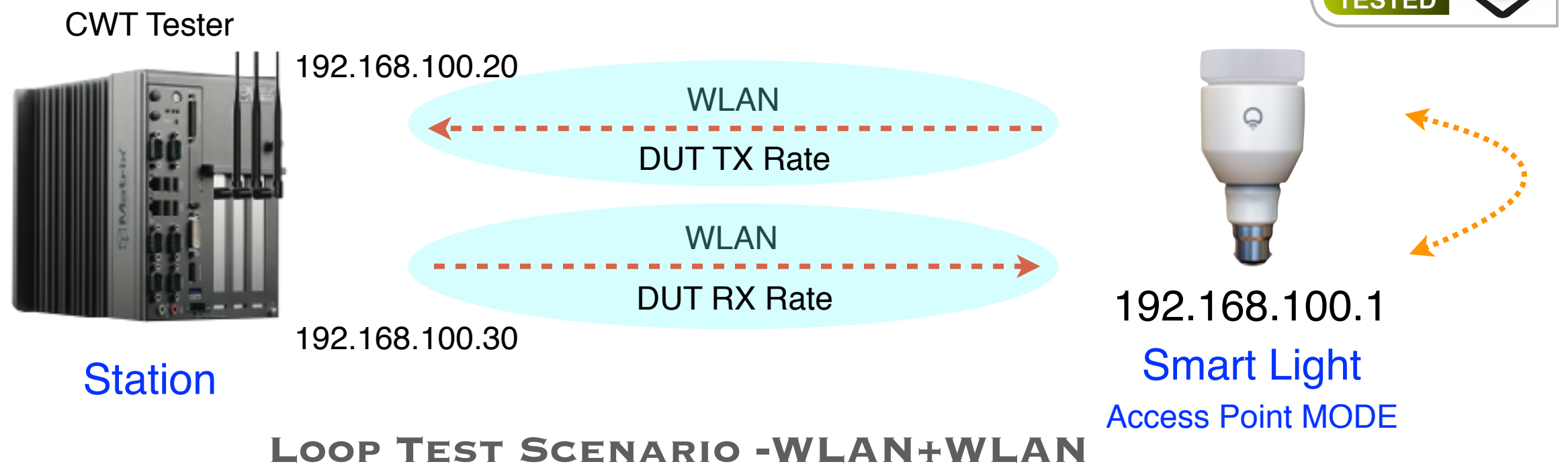
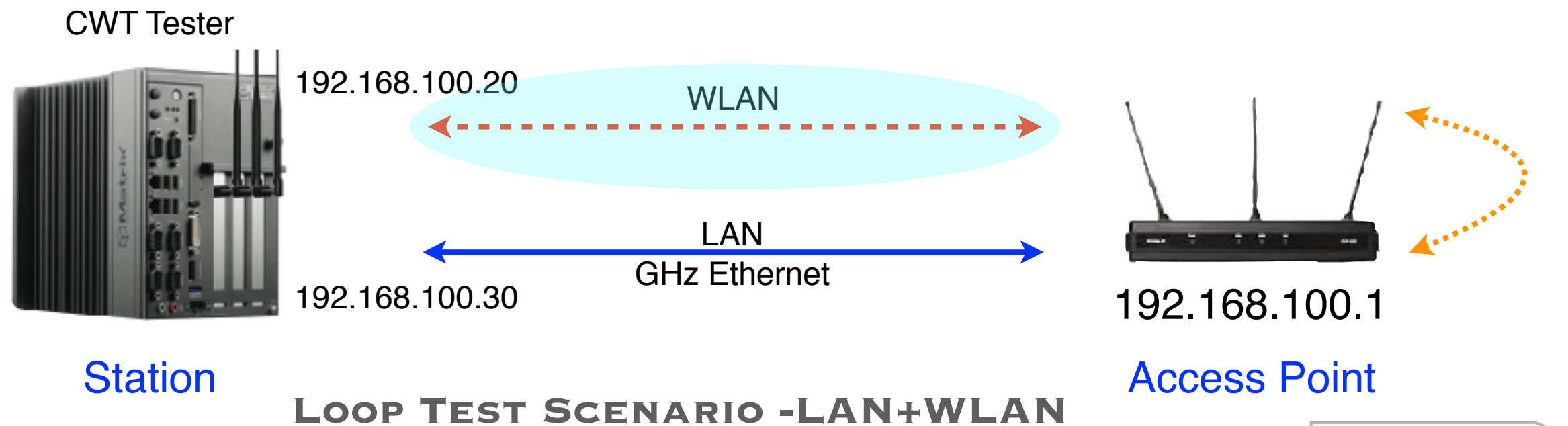
Analyzing the protocol stack



Throughput Architecture



CWT Throughput Architecture



OPTION : CWT LOOP Throughput HW required

Throughput Data Rate 802.11 spec

802.11a/g (20 MHz Bandwidth)			
Rate	Modulation	FEC Rate	Data Rate
1101 (13)	BPSK	1/2	6 Mbps
1111 (15)	BPSK	3/4	9 Mbps
0101 (5)	QPSK	1/2	12 Mbps
0111 (7)	QPSK	3/4	18 Mbps
1001 (9)	16QAM	1/2	24 Mbps
1011 (11)	16QAM	3/4	36 Mbps
0001 (1)	64QAM	2/3	48 Mbps
0011 (3)	64QAM	3/4	54 Mbps



CWT Tester



DUT

0111011010101110101010110101010111101010

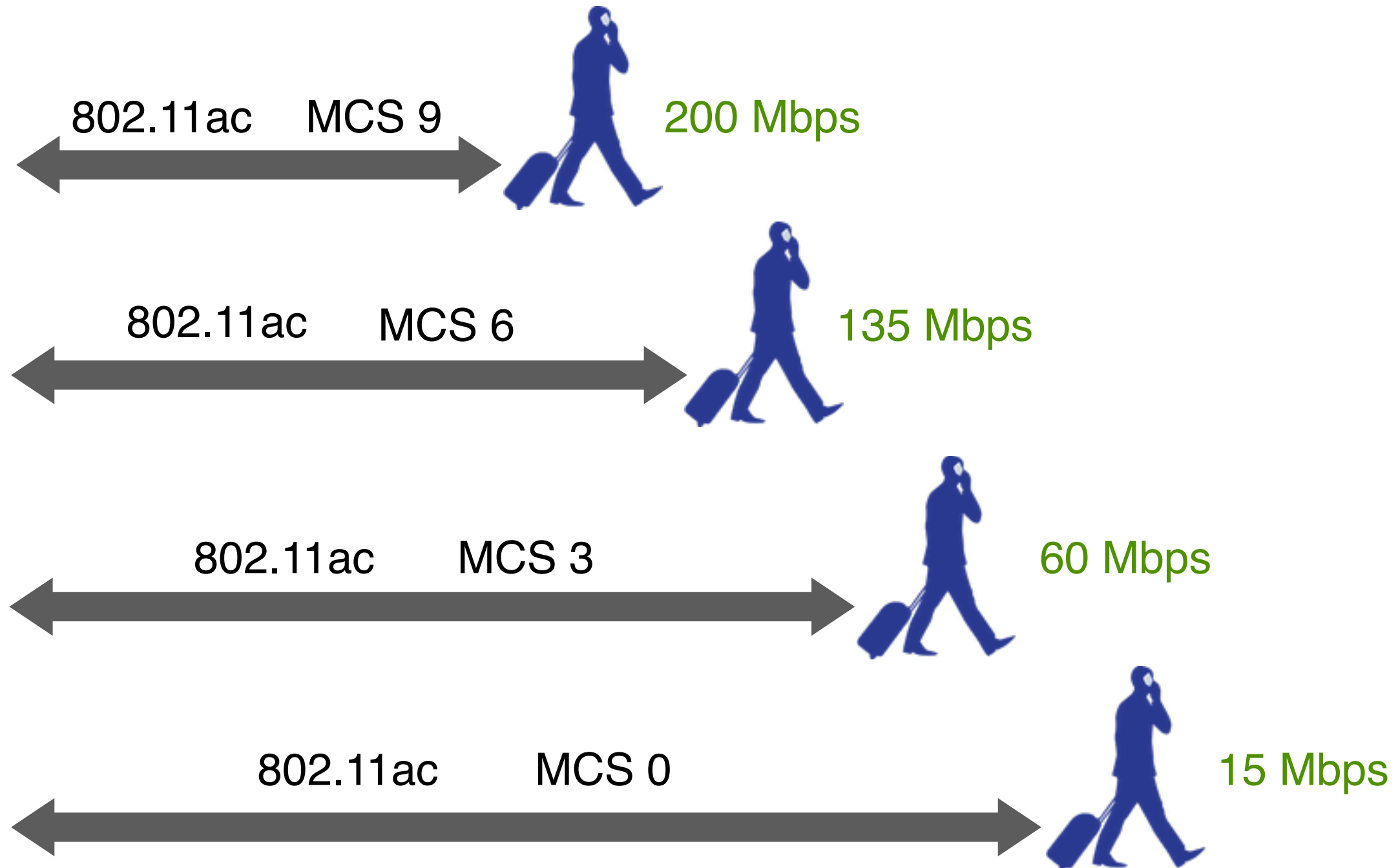
- Setting Different 802.11a/b/g Rate
- Setting Different 802.11n/ac MCS
- **Setting TX Power at AUTO MODE**

802.11n					802.11ac			
MCS	Modulation	FEC Rate	Data Rate (SISO: 1 Stream, Short Guard Interval)					
			20 MHz	40 MHz	20 MHz	40 MHz	80 MHz	160 MHz
0	BPSK	3/4	7.2 Mbps	15.0 Mbps	7.2 Mbps	15.0 Mbps	32.5 Mbps	65 Mbps
1	QPSK	1/2	14.4 Mbps	30.0 Mbps	14.4 Mbps	30.0 Mbps	65 Mbps	130 Mbps
2	QPSK	3/4	21.7 Mbps	45.0 Mbps	21.7 Mbps	45.0 Mbps	97.5 Mbps	195 Mbps
3	16QAM	1/2	28.9 Mbps	60.0 Mbps	28.9 Mbps	60.0 Mbps	130 Mbps	250 Mbps
4	16QAM	3/4	43.3 Mbps	90.0 Mbps	43.3 Mbps	90.0 Mbps	195 Mbps	390 Mbps
5	64QAM	2/3	57.8 Mbps	120.0 Mbps	57.8 Mbps	120.0 Mbps	260 Mbps	525 Mbps
6	64QAM	3/4	65.0 Mbps	135.0 Mbps	65.0 Mbps	135.0 Mbps	292.5 Mbps	585 Mbps
7	64QAM	5/6	72.2 Mbps	150.0 Mbps	72.2 Mbps	150.0 Mbps	325 Mbps	650 Mbps
8	256QAM	3/4			86.7 Mbps	180.0 Mbps	390 Mbps	780 Mbps
9	256QAM	5/6				200.0 Mbps	433.3 Mbps	866.7 Mbps

802.11 Datarate in Automode



Access Point



Throughput Testing

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Std: 802.11n

Freq: 2.462 GHz

SSID: kun

IP(ap): 192.168.1.1

IP(sta): 192.168.1.14

Power RX: --

Mode: Station

CH: 11

Rate: 1 Mbps

MAC(ap): 00:23:54:7a:4f:d0

MAC(sta): 04:f0:21:11:2b:ee

Power TX: 30 dBm

Wifi-Tester

Wifi-Tester

Station

Access Point

Sniffer

TX

PWR

CLR

Download

Folder

Iperf Command

iperf -c 192.168.1.17 -P 1 -i 1 -p 5001 -f a -t 10

Iperf Mode

Client

Server

Server address

192.168.1.17

Port

5001

Parallel Streams

1

Listen Port

1

Client Limit

Num Connections

0

Start Iperf

Compatibility Mode

Print Mss

Transmit

10

Bytes

Sec

Output Format

Adaptive Bits

Report Interval

1

sec

Test Mode

Dual

Trade

Test Port

1

TTL

0

Type of Service

None

Bind to Host

IPV6

TCP

Buffer Length

1

Bits

Window Size

1

Bits

Max Segment Size

1

Bits

TCP No Delay

UDP

UDP BandWidth

1

Bits

UDP Buffer Size

1

Bits

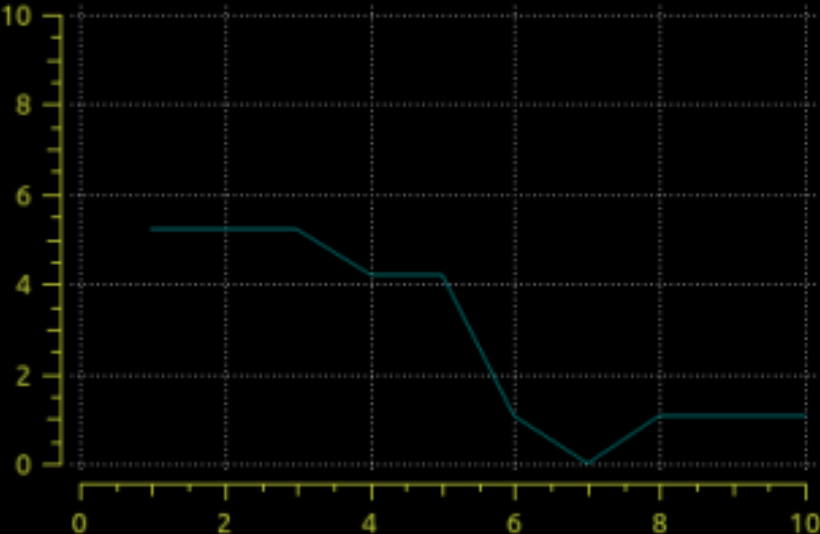
UDP Packet Size

1

Bits

Bandwidth Mbits/sec

Time(s)



Output

[3] 8.0- 9.0 sec 128 KBytes 1.05 Mbits/sec

[3] 9.0-10.0 sec 128 KBytes 1.05 Mbits/sec

[3] 0.0-11.5 sec 3.50 MBytes 2.55 Mbits/sec

STANDARD

FUNCTION

Mode

Config

Connect

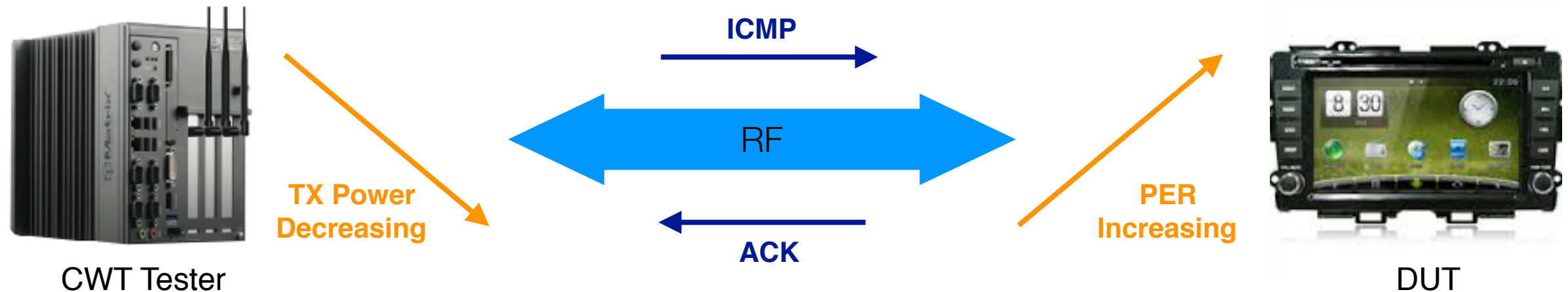
Protocol

Throughput

Sensitivity

UTILITY

Sensitivity Testing



01110110101011101010101101010101110011011100011010011010100110001101010

- CWT sends ICMP to DUT (Internet Control Message Protocol)
- DUT sends acknowledgment message (ACK) to CWT
- CWT sends ICMP at decreasing power (from -25dBm to -90dBm)
- CWT counts ACK to present PER in the testing

Measuring the PER is accepted as a reliable means of evaluating a receiver

Sensitivity Testing



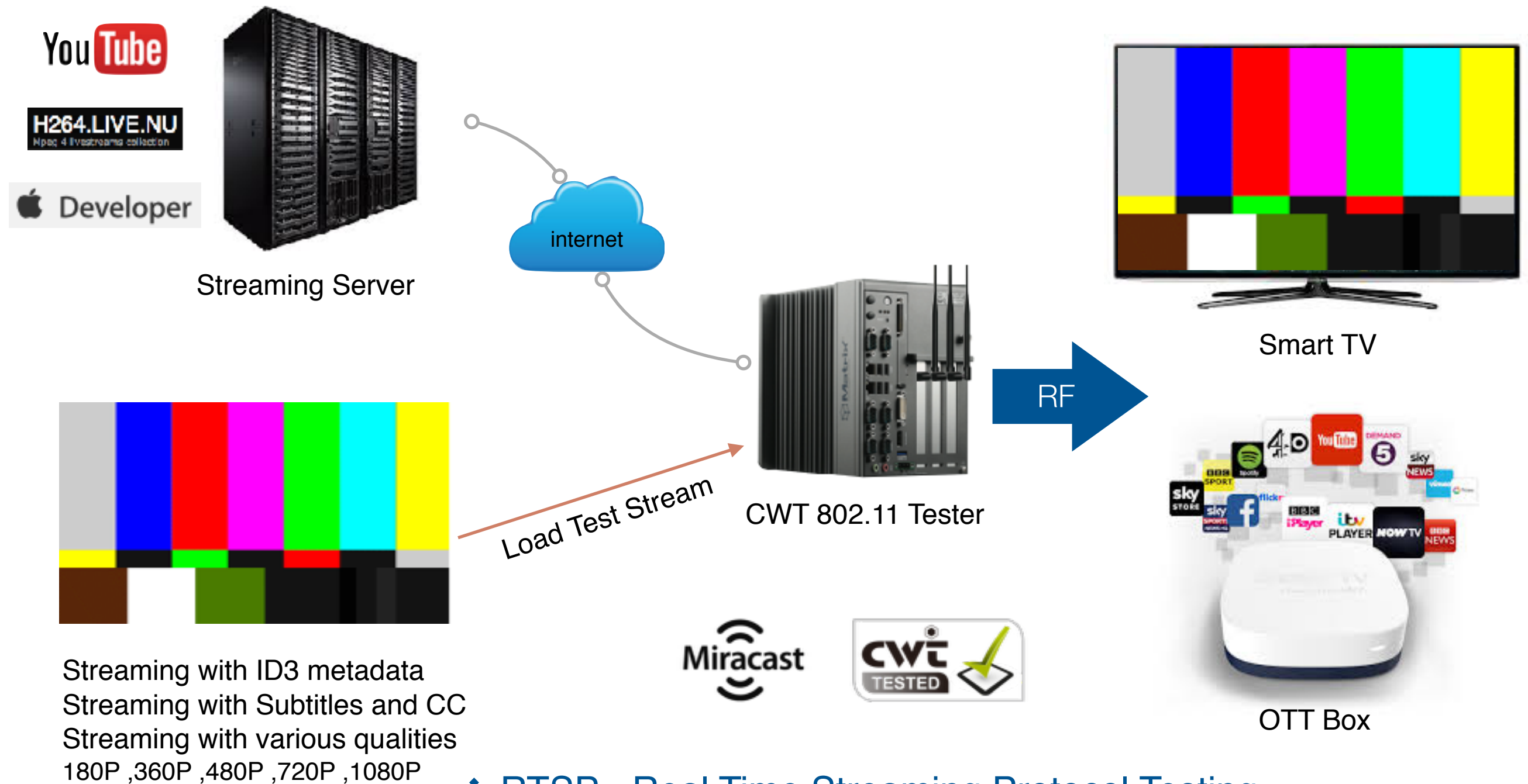


重点： 以上所有项目我们都可以支持客户定制化开发

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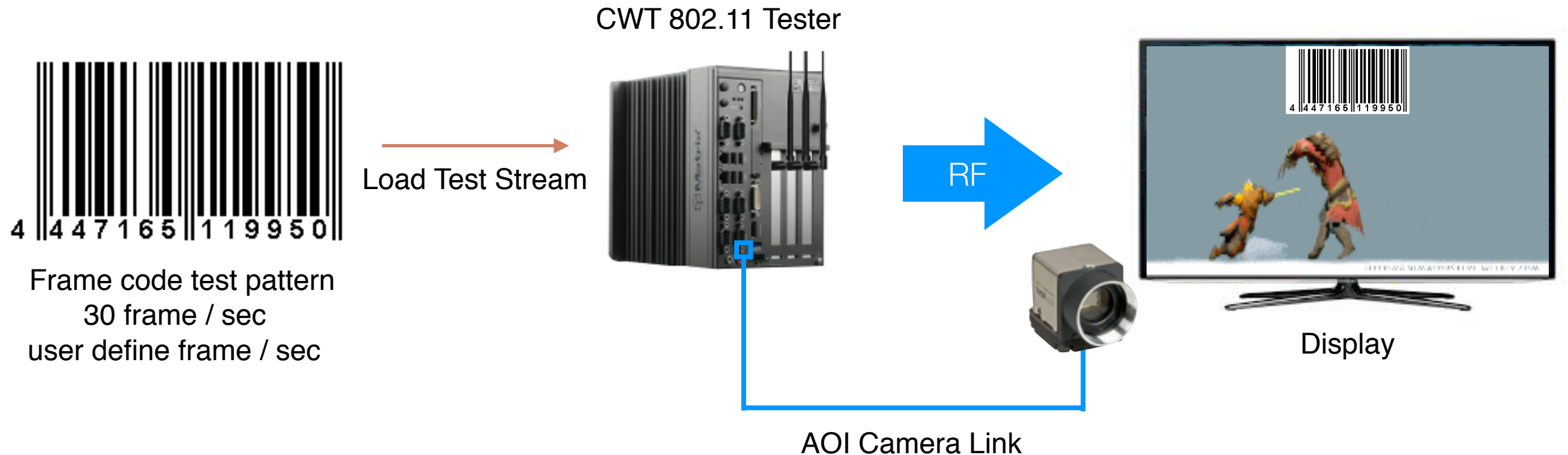


创新测试应用



- ❖ RTSP - Real Time Streaming Protocol Testing
- ❖ MPEG DASH Testing
- ❖ HLS - HTTP Live Streaming Testing

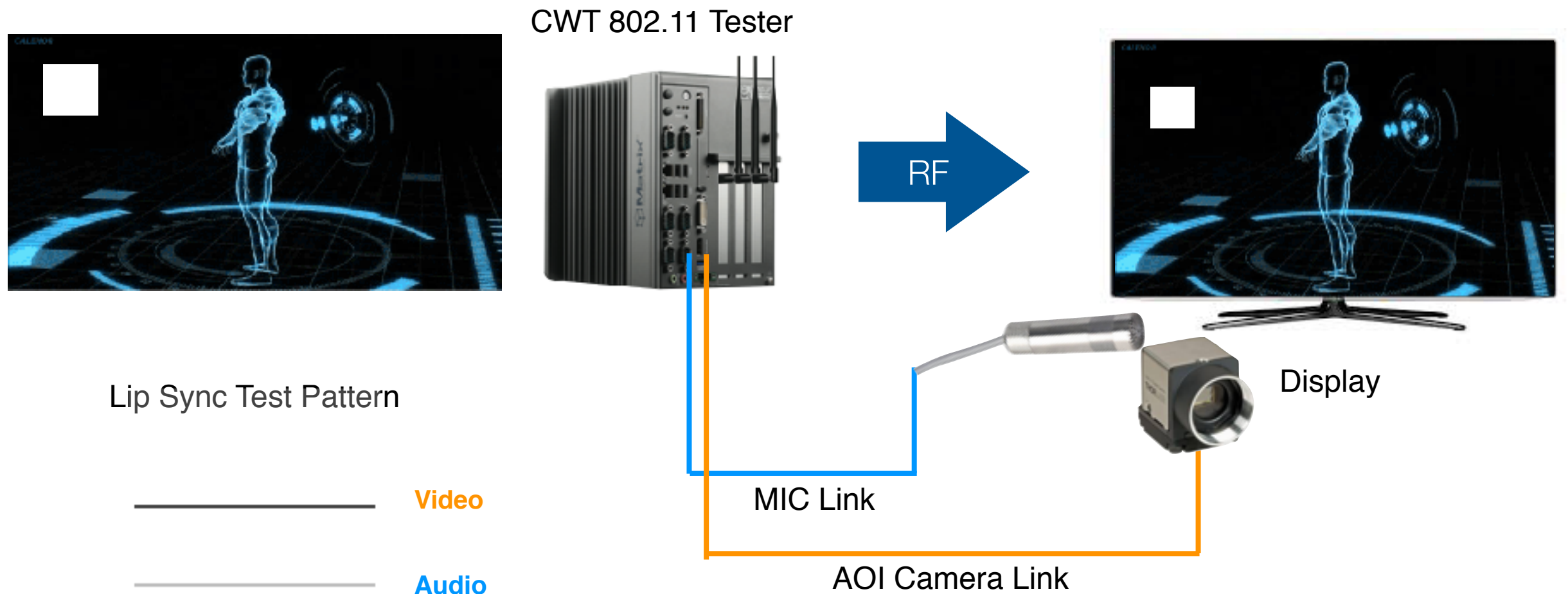
Wireless Video Streaming Test



- ❖ Barcode coding in the test video frame
- ❖ User define the coding rate
- ❖ Camera module auto detect the barcode
- ❖ Test video frame **delay** and **loss** in transmission



Lip-Sync Test



- ❖ Flash white block with 1KHz Audio Tone in every 1sec
- ❖ AOI Camera module detect the white block
- ❖ Test Microphone detect 1KHz Audio Tone
- ❖ Application Module calculate the audio & video delay time



参考用户案例



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Thank You

