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MSM™ 8937/WCN36x LA 1.0 Wireless Connectivity CS Release Test Report

Qualcomm Atheros, Inc.

80-Y8113-22 Rev. A

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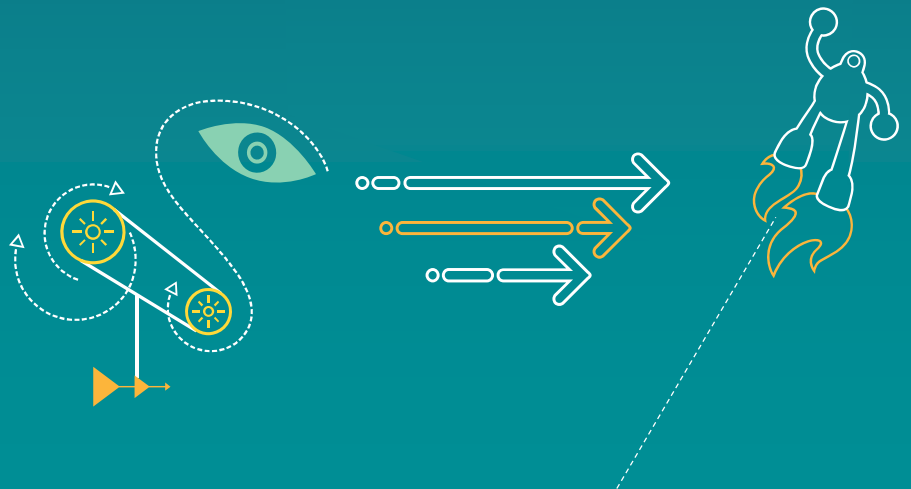

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Revision History

Revision	Date	Description
A	February 2016	Initial release

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Section 1

MSM8937 Overview and WCN Supported Configurations

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MSM8937 Overview and WCN Supported Configurations

Snapdragon 600/400	
Platform	MSM8937
Connectivity	WCN3680B (802.11ac) WCN3660B (DB) WCN3615 (SB)
Wi-Fi standards	802.11a/b/g/n/ ac 802.11a/b/g/n 802.11b/g/n
Wi-Fi streams	1x1
BT	BT3.x, BT4.2/LE
FM	FM Rx

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Android WCNSS platforms

MSM platform	Software package	PR version
MSM8937/8917	LA1.0	PR4.0

WCN36x0 Cards

Y9659-H6
Y8898-H300

Section 2

WLAN

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Section 2.1

WLAN Latency KPI

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WLAN Standalone Latencies KPI

Build: CNSS.PR.4.0-00167_LA.UM.5.1-12003-8x37.1-2

IRIS Card	Loading Time (Sec)	Unloading Time(secs)	Wifi on/off (secs)	Beacon Timeout(secs)	Connection time (WPA2 PSK Mode) (secs)	Connection from Saved Profile (WPA2 PSK Mode) (secs)
20-Y9659-H6	0.379	0.608	0.97	4.82	3.169	4.108667

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LFR/11r Roaming Latencies KPI

WLAN Roam Time	IRIS Card: Y9659-H6 Meta: MSM8937.LA.1.0-00235-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1		
Mode	Conditions	Channels	MSM8937.LA.1.0 (ms)
Open	Target is average over 10 iterations. No single iteration can be more than 1.5x of target	Ch 6 <-> Ch 36	86.3
PSK/PEAP		Ch 6 <-> Ch 36	119.3/438.5
OKC		Ch 6<-> Ch 36	119.5
11r (PSK/PEAP)		Ch 6 <-> Ch 36	93.6/97.8

Section 2.2

WLAN Throughput KPIs

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Section 2.2.1

STA/SAP/P2P KPIs WCN36x0 Y9659-H6

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MSM 8937 LA.1.0 STA KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	Security mode	AP: Dlink-DIR825 (SW:2.0) IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	802.11b	WPA2PSK	5.7
TCP/Rx	2.4	1	802.11b	WPA2PSK	6.5
TCP/Tx	2.4	6	802.11g	WPA2PSK	23
TCP/Rx	2.4	6	802.11g	WPA2PSK	28
TCP/Tx	5	36	802.11a	WPA2PSK	24
TCP/Rx	5	36	802.11a	WPA2PSK	28
TCP/Tx	2.4	6	802.11n/HT20	WPA2PSK	55
TCP/Rx	2.4	6	802.11n/HT20	WPA2PSK	60
TCP/Tx	5	36	802.11n/HT20	WPA2PSK	56
TCP/Rx	5	36	802.11n/HT20	WPA2PSK	62
TCP/Tx	5	161	802.11n/HT40	WPA2PSK	114
TCP/Rx	5	161	802.11n/HT40	WPA2PSK	130

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MSM 8937 LA.1.0 STA KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	AP: Netgear-R8000v2 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	802.11n/HT40	110
TCP/Rx	2.4	1	802.11n/HT40	126
TCP/Tx	2.4	1	802.11ac/VHT20	66
TCP/Rx	2.4	1	802.11ac/VHT20	64
TCP/Tx	2.4	1	802.11ac/VHT40	146
TCP/Rx	2.4	1	802.11ac/VHT40	154
TCP/Tx	5	36	802.11ac/VHT20	68
TCP/Rx	5	36	802.11ac/VHT20	73
TCP/Tx	5	44	802.11ac/VHT40	148
TCP/Rx	5	44	802.11ac/VHT40	160
TCP/Tx	5	36	802.11ac/VHT80	280
TCP/Rx	5	36	802.11ac/VHT80	332
TCP/Tx	5	149	802.11ac/VHT80	280
TCP/Rx	5	149	802.11ac/VHT80	334

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MSM 8937 LA.1.0 STA KPI - UDP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	Security mode	AP: Dlink-DIR825 (SW:2.0) IRIS Card: Y9659-H6 TPUT (Mbps)
UDP/Tx	2.4	1	802.11b	WPA2PSK	5.8
UDP/Rx	2.4	1	802.11b	WPA2PSK	6.5
UDP/Tx	2.4	6	802.11g	WPA2PSK	29
UDP/Rx	2.4	6	802.11g	WPA2PSK	36
UDP/Tx	5	36	802.11a	WPA2PSK	29
UDP/Rx	5	36	802.11a	WPA2PSK	36
UDP/Tx	2.4	6	802.11n/HT20	WPA2PSK	64
UDP/Rx	2.4	6	802.11n/HT20	WPA2PSK	65
UDP/Tx	5	36	802.11n/HT20	WPA2PSK	65
UDP/Rx	5	36	802.11n/HT20	WPA2PSK	66
UDP/Tx	5	161	802.11n/HT40	WPA2PSK	134
UDP/Rx	5	161	802.11n/HT40	WPA2PSK	135

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MSM 8937 LA.1.0 STA KPI - UDP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	AP: Netgear-R8000 IRIS Card: Y9659-H6 TPUT (Mbps)
UDP/Tx	2.4	1	802.11n/HT40	129
UDP/Rx	2.4	1	802.11n/HT40	130
UDP/Tx	2.4	1	802.11acV/HT20	73.5
UDP/Rx	2.4	1	802.11acV/HT20	69
UDP/Tx	2.4	1	802.11ac/VHT40	167
UDP/Rx	2.4	1	802.11ac/VHT40	162
UDP/Tx	5	36	802.11ac/VHT20	78
UDP/Rx	5	36	802.11ac/VHT20	75
UDP/Tx	5	44	802.11ac/VHT40	175
UDP/Rx	5	44	802.11ac/VHT40	173
UDP/Tx	5	36	802.11ac/VHT80	348
UDP/Rx	5	36	802.11ac/VHT80	349
UDP/Tx	5	149	802.11ac/VHT80	346
UDP/Rx	5	149	802.11ac/VHT80	350

Note: 2.4 GHz VHT20/VHT40 KPI are executed with QCA9992 AP

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MSM 8937 LA.1.0 SAP KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	Security mode	AP: SAP IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	6	802.11n/HT20	WPA2PSK	53
TCP/Rx	2.4	6	802.11n/HT20	WPA2PSK	53
TCP/Tx	2.4	1	802. 11n/HT40	WPA2PSK	113
TCP/Rx	2.4	1	802.11n/HT40	WPA2PSK	110
TCP/Tx	2.4	1	802.11n/VHT20	WPA2PSK	62
TCP/Rx	2.4	1	802.11n/VHT20	WPA2PSK	63
TCP/Tx	5	36	802.11n/HT20	WPA2PSK	55
TCP/Rx	5	36	802.11n/HT20	WPA2PSK	54
TCP/Tx	5	44	802.11n/HT40	WPA2PSK	117
TCP/Rx	5	44	802.11n/HT40	WPA2PSK	116
TCP/Tx	5	161	802.11ac/VHT20	WPA2PSK	66
TCP/Rx	5	161	802.11ac/VHT20	WPA2PSK	63
TCP/Tx	5	157	802.11ac/VHT40	WPA2PSK	152
TCP/Rx	5	157	802.11ac/VHT40	WPA2PSK	152
TCP/Tx	5	149	802.11ac/VHT80	WPA2PSK	280
TCP/Rx	5	149	802.11ac/VHT80	WPA2PSK	279

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MSM 8937 LA.1.0 SAP KPI - UDP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	Security mode	AP: SAP IRIS Card: Y9659-H6 TPUT (Mbps)
UDP/Tx	2.4	6	802.11n/HT20	WPA2PSK	63
UDP/Rx	2.4	6	802.11n/HT20	WPA2PSK	63
UDP/Tx	2.4	1	802.11n/HT40	WPA2PSK	130
UDP/Rx	2.4	1	802.11n/HT40	WPA2PSK	129
UDP/Tx	2.4	1	802.11ac/VHT20	WPA2PSK	74
UDP/Rx	2.4	1	802.11ac/VHT20	WPA2PSK	74
UDP/Tx	5	36	802.11n/HT20	WPA2PSK	65
UDP/Rx	5	36	802.11n/HT20	WPA2PSK	63
UDP/Tx	5	44	802.11n/HT40	WPA2PSK	133
UDP/Rx	5	44	802.11n/HT40	WPA2PSK	133
UDP/Tx	5	161	802.11ac/VHT20	WPA2PSK	78
UDP/Rx	5	161	802.11ac/VHT20	WPA2PSK	75
UDP/Tx	5	157	802.11ac/VHT40	WPA2PSK	175
UDP/Rx	5	157	802.11ac/VHT40	WPA2PSK	176
UDP/Tx	5	149	802.11ac/VHT80	WPA2PSK	300
UDP/Rx	5	149	802.11ac/VHT80	WPA2PSK	320

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MSM 8937 LA.1.0 P2PKPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	Security mode	AP: SAP IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	6	802.11n/HT20	WPA2PSK	51
TCP/Rx	2.4	6	802.11n/HT20	WPA2PSK	52
TCP/Tx	2.4	1	802.11ac/VHT20	WPA2PSK	63
TCP/Rx	2.4	1	802.11ac/VHT20	WPA2PSK	62
TCP/Tx	5	36	802.11n/HT20	WPA2PSK	54
TCP/Rx	5	36	802.11n/HT20	WPA2PSK	53
TCP/Tx	5	44	802.11n/HT40	WPA2PSK	114
TCP/Rx	5	44	802.11n/HT40	WPA2PSK	112
TCP/Tx	5	161	802.11ac/VHT20	WPA2PSK	63
TCP/Rx	5	161	802.11ac/VHT20	WPA2PSK	64
TCP/Tx	5	157	802.11ac/VHT40	WPA2PSK	148
TCP/Rx	5	157	802.11ac/VHT40	WPA2PSK	150
TCP/Tx	5	149	802.11ac/VHT80	WPA2PSK	281
TCP/Rx	5	149	802.11ac/VHT80	WPA2PSK	280

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MSM 8937 LA.1.0 P2PKPI - UDP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	AP Mode	Security mode	AP: SAP IRIS Card: Y9659-H6 TPUT (Mbps)
UDP/Tx	2.4	6	802.11n/HT20	WPA2PSK	58
UDP/Rx	2.4	6	802.11n/HT20	WPA2PSK	62
UDP/Tx	2.4	6	802.11ac/VHT20	WPA2PSK	69
UDP/Rx	2.4	6	802.11ac/VHT20	WPA2PSK	74
UDP/Tx	5	36	802.11n/HT20	WPA2PSK	59
UDP/Rx	5	36	802.11n/HT20	WPA2PSK	64
UDP/Tx	5	44	802.11n/HT40	WPA2PSK	129
UDP/Rx	5	44	802.11n/HT40	WPA2PSK	133
UDP/Tx	5	161	802.11ac/VHT20	WPA2PSK	70
UDP/Rx	5	161	802.11ac/VHT20	WPA2PSK	77
UDP/Tx	5	157	802.11ac/VHT40	WPA2PSK	170
UDP/Rx	5	157	802.11ac/VHT40	WPA2PSK	173
UDP/Tx	5	149	802.11ac/VHT80	WPA2PSK	318
UDP/Rx	5	149	802.11ac/VHT80	WPA2PSK	318

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Section 2.3

WLAN Concurrency KPIs

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Section 2.3.1

SCC-MCC KPIs

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MSM 8937 LA.1.0 MCC KPI

Meta:MSM8937.LA.1.0-00227-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-2
Apps:LA.UM.0.0.06.00.01.197.102 **Pronto:**CNSS.PR.4.0-00159-M8937BAAAANAAW-1

		Channel Width				Throughput in Mbps	
Concurrency	Band	WLAN	P2P	Protocol	P2P Mode	WLAN Rx	P2P Tx
MCC (STA+CLI)	2.4 GHz	HT20	HT20	TCP	CLI	15	12
MCC (STA+CLI)	2.4 GHz/5 GHz	HT20	HT40	TCP	CLI	18	41
MCC (STA+CLI)	5 GHz	HT20	HT40	TCP	CLI	14	24
MCC (STA+CLI)	5 GHz	HT40	HT40	TCP	CLI	26	24
MCC (STA+CLI)	2.4 GHz/5 GHz	HT20	VHT80	TCP	CLI	18	44
MCC (STA+Go)	2.4 GHz	HT20	HT20	TCP	GO	19	23
MCC (STA+Go)	2.4 GHz/5 GHz	HT20	HT40	TCP	GO	15	23
MCC (STA+Go)	5 GHz	HT20	HT40	TCP	GO	23	45
MCC (STA+Go)	5 GHz	HT40	HT40	TCP	GO	45	45
MCC (STA+Go)	2.4 GHz/5 GHz	HT20	VHT80	TCP	GO	15	24

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MSM 8937 LA.1.0 SCC KPI

Meta:MSM8937.LA.1.0-00227-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-2
Apps:LA.UM.0.0.06.00.01.197.102 **Pronto:**CNSS.PR.4.0-00159-M8937BAAAANAAW-1

		Channel Width				Throughput in Mbps	
Concurrency	Band	WLAN	P2P	Protocol	P2P Mode	WLAN Rx	P2P Tx
SCC (STA+CLI)	2.4 GHz	HT20	HT20	TCP	CLI	16	26
SCC (STA+CLI)	5 GHz	HT40	HT40	TCP	CLI	73	25
SCC (STA+CLI)	5 GHz	VHT80	VHT80	TCP	CLI	127	155
SCC (STA+Go)	2.4 GHz	HT20	HT20	TCP	GO	32	25
SCC (STA+Go)	5 GHz	HT40	HT40	TCP	GO	54	28
SCC (STA+Go)	5 GHz	VHT80	VHT80	TCP	GO	227	84

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Section 3

WLAN/BT Coexistence KPIs

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MSM 8937 LA.1.0 BTC - STA (11b)KPI – TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: linksys IRIS Card: Y9659-H6 TPUT (Mbps)
802.11b-TCP/Tx	2.4	1	Baseline	WPA2PSK	5.9
802.11b-TCP/Rx	2.4	1	Baseline	WPA2PSK	6.5
802.11b-TCP/Tx	2.4	1	A2DP	WPA2PSK	3.36
802.11b-TCP/Rx	2.4	1	A2DP	WPA2PSK	3.15
802.11b-TCP/Tx	2.4	1	HFP	WPA2PSK	1.8
802.11b-TCP/Rx	2.4	1	HFP	WPA2PSK	1.6
802.11b-TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	3.0
802.11b-TCP/Rx	2.4	1	OPP/Tx	WPA2PSK	2.1
802.11b-TCP/Tx	2.4	1	OPP/Rx	WPA2PSK	2.32
802.11b-TCP/Rx	2.4	1	OPP/Rx	WPA2PSK	2.38
802.11b-TCP/Tx	2.4	1	HID	WPA2PSK	4.12
802.11b-TCP/Rx	2.4	1	HID	WPA2PSK	3.76

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MSM 8937 LA.1.0 BTC - STA (11g)KPI – TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: linksys IRIS Card: Y9659-H6 Measured TPUT (Mbps)
802.11g-TCP/Tx	2.4	1	Baseline	WPA2PSK	22
802.11g-TCP/Rx	2.4	1	Baseline	WPA2PSK	26
802.11g-TCP/Tx	2.4	1	A2DP	WPA2PSK	12
802.11g-TCP/Rx	2.4	1	A2DP	WPA2PSK	13
802.11g-TCP/Tx	2.4	1	HFP	WPA2PSK	14.3
802.11g-TCP/Rx	2.4	1	HFP	WPA2PSK	12.6
802.11g-TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	9.10
802.11g-TCP/Rx	2.4	1	OPP/Tx	WPA2PSK	10.2
802.11g-TCP/Tx	2.4	1	OPP/Rx	WPA2PSK	9.18
802.11g-TCP/Rx	2.4	1	OPP/Rx	WPA2PSK	10.5
802.11g-TCP/Tx	2.4	1	HID	WPA2PSK	16.5
802.11g-TCP/Rx	2.4	1	HID	WPA2PSK	14.8

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MSM 8937 LA.1.0 BTC - STA (11a/an)KPI – TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: linksys IRIS Card: Y9659-H6 TPUT (Mbps)
802.11a-TCP/Tx	5	1	Baseline	WPA2PSK	23.5
802.11a-TCP/Rx	5	1	Baseline	WPA2PSK	26.8
802.11a-TCP/Tx	5	1	A2DP	WPA2PSK	23.6
802.11a-TCP/Rx	5	1	A2DP	WPA2PSK	26.9
802.11a-TCP/Tx	5	1	HFP	WPA2PSK	23.3
802.11a-TCP/Rx	5	1	HFP	WPA2PSK	26.1
802.11an-TCP/Tx	5/HT20	1	Baseline	WPA2PSK	54.5
802.11an-TCP/Rx	5/HT20	1	Baseline	WPA2PSK	51.4
802.11an-TCP/Tx	5/HT20	1	A2DP	WPA2PSK	54.7
802.11an-TCP/Rx	5/HT20	1	A2DP	WPA2PSK	52.1
802.11an-TCP/Tx	5/HT20	1	HFP	WPA2PSK	54.2
802.11an-TCP/Rx	5/HT20	1	HFP	WPA2PSK	52.3

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MSM 8937 LA.1.0 BTC - STA (11an/ac)KPI – TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: linksys IRIS Card: Y9659-H6 TPUT (Mbps)
802.11a-TCP/Tx	5/HT40	1	Baseline	WPA2PSK	93.5
802.11a-TCP/Rx	5/HT40	1	Baseline	WPA2PSK	95.2
802.11a-TCP/Tx	5/HT40	1	A2DP	WPA2PSK	93.6
802.11a-TCP/Rx	5/HT40	1	A2DP	WPA2PSK	95.2
802.11a-TCP/Tx	5/HT40	1	HFP	WPA2PSK	90.6
802.11a-TCP/Rx	5/HT40	1	HFP	WPA2PSK	92.1
802.11ac-TCP/Tx	5/HT80	1	Baseline	WPA2PSK	280
802.11ac-TCP/Rx	5/HT80	1	Baseline	WPA2PSK	300
802.11ac-TCP/Tx	5/HT80	1	A2DP	WPA2PSK	278
802.11ac-TCP/Rx	5/HT80	1	A2DP	WPA2PSK	296
802.11ac-TCP/Tx	5/HT80	1	HFP	WPA2PSK	275
802.11ac-TCP/Rx	5/HT80	1	HFP	WPA2PSK	295

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MSM 8937 LA.1.0 BTC - STA KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	56
TCP/Rx	2.4	1	Baseline	WPA2PSK	53
TCP/Tx	2.4	1	A2DP	WPA2PSK	23
TCP/Rx	2.4	1	A2DP	WPA2PSK	27
TCP/Tx	2.4	1	HFP	WPA2PSK	10.8
TCP/Rx	2.4	1	HFP	WPA2PSK	19
TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	20
TCP/Rx	2.4	1	OPP/Tx	WPA2PSK	19
TCP/Tx	2.4	1	OPP/Rx	WPA2PSK	19
TCP/Rx	2.4	1	OPP/Rx	WPA2PSK	18.7
TCP/Tx	2.4	1	HID	WPA2PSK	25
TCP/Rx	2.4	1	HID	WPA2PSK	33

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MSM 8937 LA.1.0 BTC - SAP KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	52
TCP/Rx	2.4	1	Baseline	WPA2PSK	52
TCP/Tx	2.4	1	A2DP	WPA2PSK	28
TCP/Rx	2.4	1	A2DP	WPA2PSK	24
TCP/Tx	2.4	1	HFP	WPA2PSK	74
TCP/Rx	2.4	1	HFP	WPA2PSK	74
TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	20
TCP/Rx	2.4	1	OPP/Tx	WPA2PSK	22
TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	19
TCP/Rx	2.4	1	OPP/Rx	WPA2PSK	21
TCP/Tx	2.4	1	HID	WPA2PSK	40
TCP/Rx	2.4	1	HID	WPA2PSK	41

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MSM 8937 LA.1.0 BTC - P2PGO KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	51
TCP/Rx	2.4	1	Baseline	WPA2PSK	52
TCP/Tx	2.4	1	A2DP	WPA2PSK	29
TCP/Rx	2.4	1	A2DP	WPA2PSK	28.9
TCP/Tx	2.4	1	HFP	WPA2PSK	18.9
TCP/Rx	2.4	1	HFP	WPA2PSK	13.6
TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	24.5
TCP/Rx	2.4	1	OPP/Tx	WPA2PSK	21.8
TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	24
TCP/Rx	2.4	1	OPP/Rx	WPA2PSK	22
TCP/Tx	2.4	1	HID	WPA2PSK	42
TCP/Rx	2.4	1	HID	WPA2PSK	41

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songpeng2@huaqin.com

MSM 8937 LA.1.0 BTC - P2PCLI KPI - TCP

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	52
TCP/Rx	2.4	1	Baseline	WPA2PSK	52
TCP/Tx	2.4	1	A2DP	WPA2PSK	29
TCP/Rx	2.4	1	A2DP	WPA2PSK	23
TCP/Tx	2.4	1	HFP	WPA2PSK	14.3
TCP/Rx	2.4	1	HFP	WPA2PSK	10.6
TCP/Tx	2.4	1	OPP/Tx	WPA2PSK	20.5
TCP/Rx	2.4	1	OPP/Tx	WPA2PSK	19
TCP/Tx	2.4	1	OPP/Rx	WPA2PSK	20
TCP/Rx	2.4	1	OPP/Rx	WPA2PSK	18
TCP/Tx	2.4	1	HID	WPA2PSK	36
TCP/Rx	2.4	1	HID	WPA2PSK	40

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MSM 8937 LA.1.0 BTC STA - BLE_KPI - TCP

Meta:MSM8937.LA.1.0-00227-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-2
Apps:LA.UM.0.0.06.00.01.197.102 **Pronto:**CNSS.PR.4.0-00159-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	56.9
TCP/Rx	2.4	1	Baseline	WPA2PSK	53.9
TCP/Tx	2.4	1	1BLE	WPA2PSK	54.5
TCP/Rx	2.4	1	1BLE	WPA2PSK	52.5
TCP/Tx	2.4	1	Esco-1BLE	WPA2PSK	11
TCP/Rx	2.4	1	Esco-1BLE	WPA2PSK	19
TCP/Tx	2.4	1	A2DP-1BLE	WPA2PSK	30
TCP/Rx	2.4	1	A2DP-1BLE	WPA2PSK	28.5
TCP/Tx	2.4	1	ESCO-3BLE	WPA2PSK	20
TCP/Rx	2.4	1	ESCO-3BLE	WPA2PSK	13
TCP/Tx	2.4	1	A2DP-3BLE	WPA2PSK	25.8
TCP/Rx	2.4	1	A2DP-3BLE	WPA2PSK	28.7
TCP/Tx	2.4	1	6BLE	WPA2PSK	45.6
TCP/Rx	2.4	1	6BLE	WPA2PSK	47.5

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MSM 8937 LA.1.0 BTC SAP - BLE_KPI - TCP

Meta:MSM8937.LA.1.0-00227-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-2
Apps:LA.UM.0.0.06.00.01.197.102 **Pronto:**CNSS.PR.4.0-00159-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	49
TCP/Rx	2.4	1	Baseline	WPA2PSK	50
TCP/Tx	2.4	1	1BLE	WPA2PSK	48.6
TCP/Rx	2.4	1	1BLE	WPA2PSK	48.5
TCP/Tx	2.4	1	Esco-1BLE	WPA2PSK	16
TCP/Rx	2.4	1	Esco-1BLE	WPA2PSK	20
TCP/Tx	2.4	1	A2DP-1BLE	WPA2PSK	18
TCP/Rx	2.4	1	A2DP-1BLE	WPA2PSK	25
TCP/Tx	2.4	1	ESCO-3BLE	WPA2PSK	15.5
TCP/Rx	2.4	1	ESCO-3BLE	WPA2PSK	20
TCP/Tx	2.4	1	A2DP-3BLE	WPA2PSK	25
TCP/Rx	2.4	1	A2DP-3BLE	WPA2PSK	26
TCP/Tx	2.4	1	6BLE	WPA2PSK	48
TCP/Rx	2.4	1	6BLE	WPA2PSK	45

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MSM 8937 LA.1.0 BTC P2P-CLI -BLE_KPI - TCP

Meta:MSM8937.LA.1.0-00227-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-2
Apps:LA.UM.0.0.06.00.01.197.102 **Pronto:**CNSS.PR.4.0-00159-M8937BAAAANAAW-1

Protocol/Direction	Band (GHz)	Frequency Channel	BT Mode	Security mode	AP: NetgearR6300 IRIS Card: Y9659-H6 TPUT (Mbps)
TCP/Tx	2.4	1	Baseline	WPA2PSK	52
TCP/Rx	2.4	1	Baseline	WPA2PSK	52
TCP/Tx	2.4	1	1BLE	WPA2PSK	50
TCP/Rx	2.4	1	1BLE	WPA2PSK	48
TCP/Tx	2.4	1	Esco-1BLE	WPA2PSK	10.8
TCP/Rx	2.4	1	Esco-1BLE	WPA2PSK	11
TCP/Tx	2.4	1	A2DP-1BLE	WPA2PSK	25
TCP/Rx	2.4	1	A2DP-1BLE	WPA2PSK	30.8
TCP/Tx	2.4	1	ESCO-3BLE	WPA2PSK	10.3
TCP/Rx	2.4	1	ESCO-3BLE	WPA2PSK	12
TCP/Tx	2.4	1	A2DP-3BLE	WPA2PSK	30
TCP/Rx	2.4	1	A2DP-3BLE	WPA2PSK	25
TCP/Tx	2.4	1	6BLE	WPA2PSK	48
TCP/Rx	2.4	1	6BLE	WPA2PSK	48

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Section 4

LTE Coexistence KPIs

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LTE-Coex Throughput Dashboard

LTE Band	WLAN Channel	WLAN Op Mode	Proto/Dir	SAP TPUT	E2E TPUT
LTE B#1(CAT4) UL Channel:18300	6	HT20	UDP DL	64.438	64.214
	6		UDP UL	64.545	48.872
	6		TCP DL	54.352	54.467
	6		TCP UL	54.015	47.995
	40	HT40	UDP DL	134.508	134.441
	40		UDP UL	134.8	48.74
	40		TCP DL	107.162	104.537
	40		TCP UL	113.866	47.442
LTE B#7(CAT4) UL Channel:21100	11	HT20	UDP DL	63.173	62.775
	11		UDP UL	64.383	49.323
	11		TCP DL	52.877	53.3
	11		TCP UL	53.184	48.318
	153	HT40	UDP DL	132	132.183
	153		UDP UL	129.967	49.287
	153		TCP DL	105.378	104.298
	153		TCP UL	109.293	48.383
LTE B#40(CAT4) UL Channel: 39150 ULDL Config:1	11	HT20	UDP DL	62.693	62.847
	11		UDP UL	64.393	19.055
	11		TCP DL	53.78	54.043
	11		TCP UL	53.364	18.62
	153	HT40	UDP DL	129.033	79.747
	153		UDP UL	133.7	19.18
	153		TCP DL	107.73	63.412
	153		TCP UL	105.99	18.396

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Section 5

WLAN Standalone RvR & Tput

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Section 5.1

STA-AP RVRs

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Section 5.1.1

8937 + IRIS Y9659-H6

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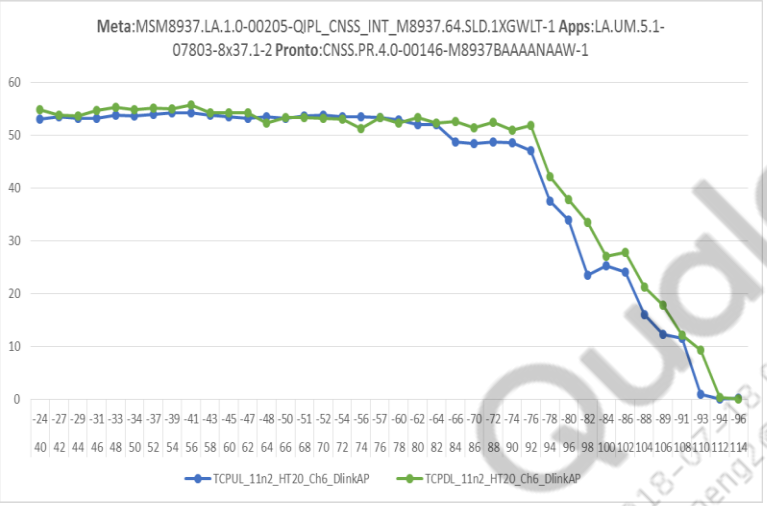

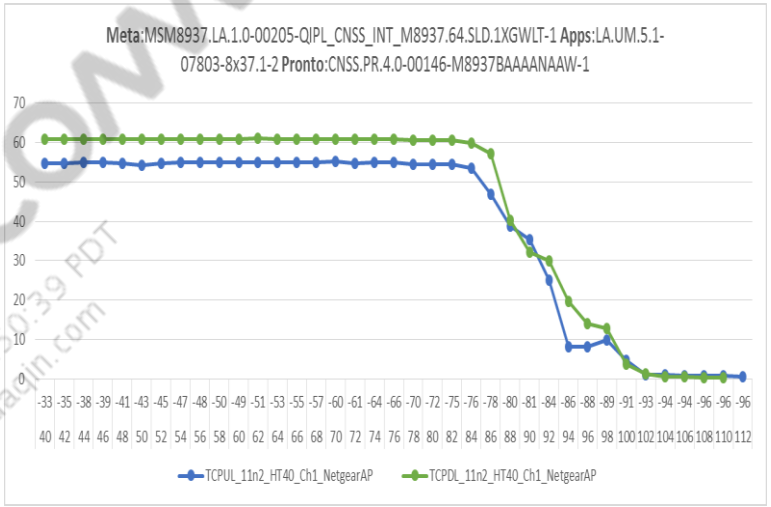

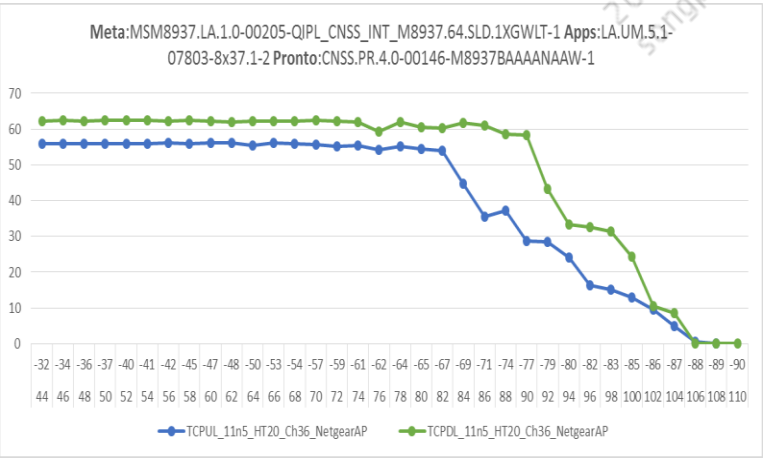

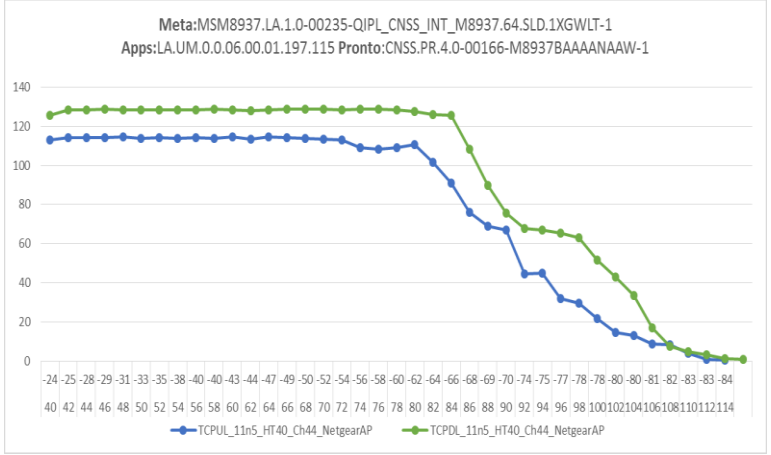

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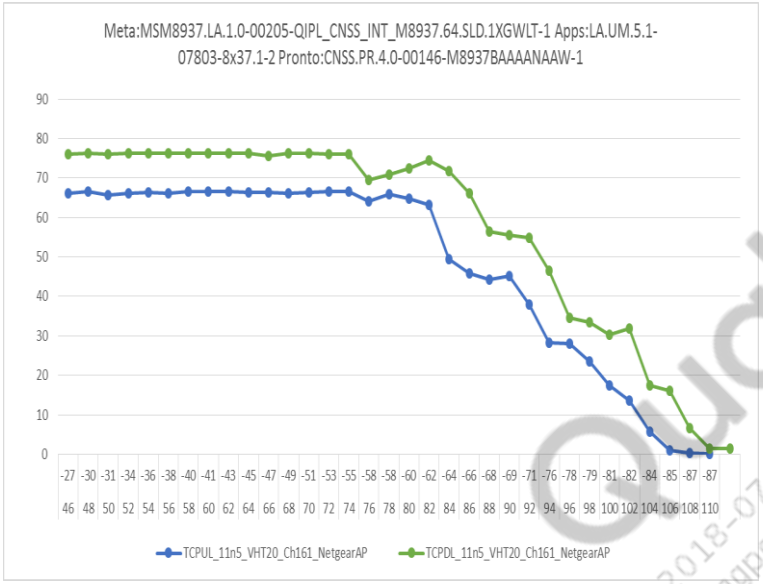

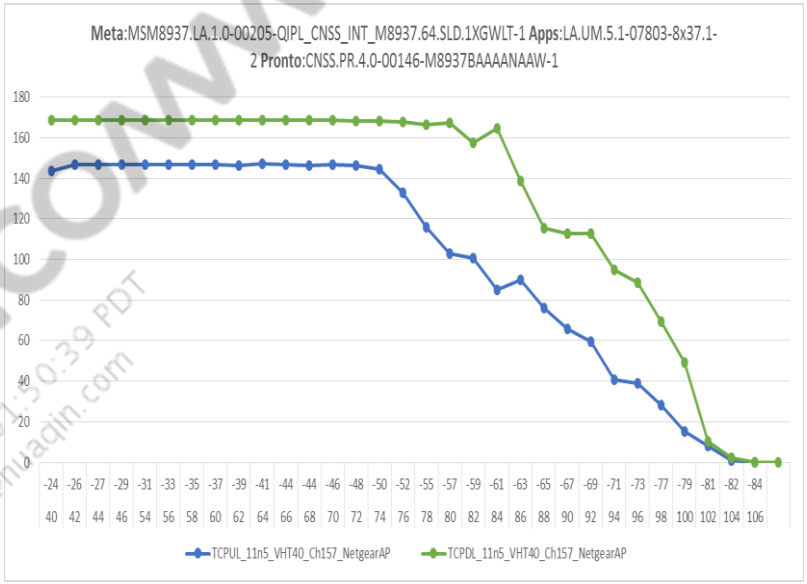

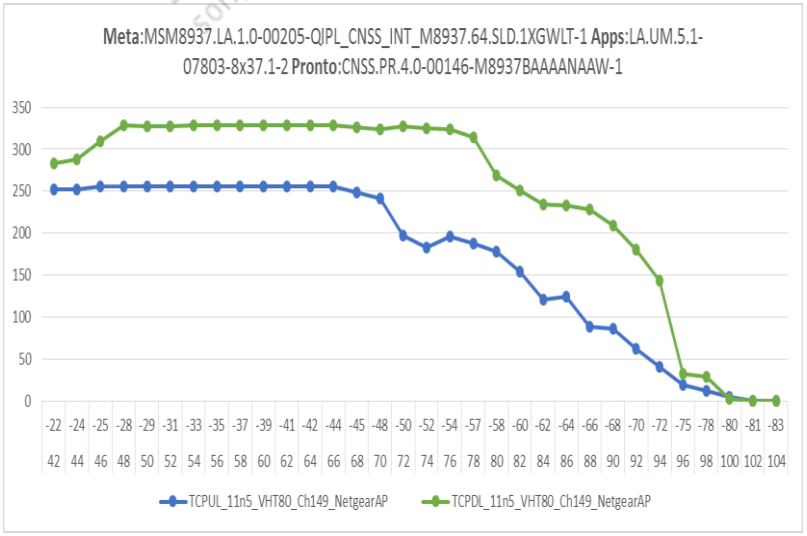

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Section 6

SAP RVRs 8937 + IRIS Y9659-H6

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2018-07-30 01:50:39 PDT
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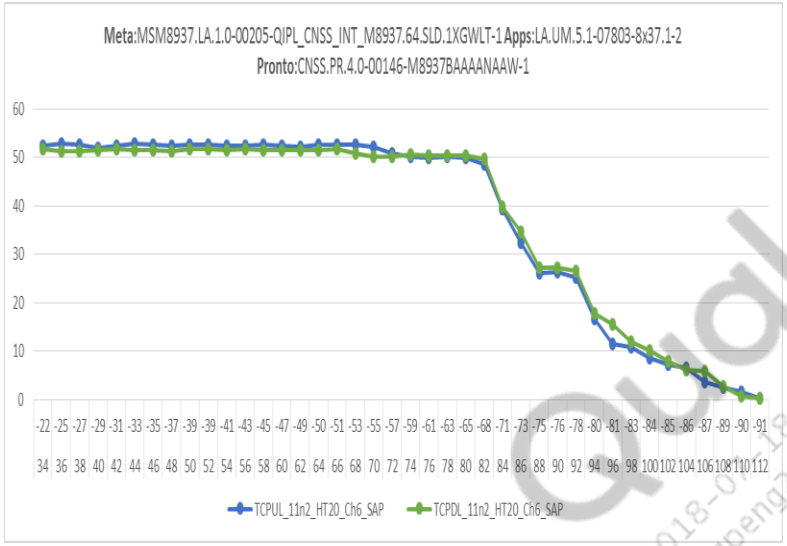

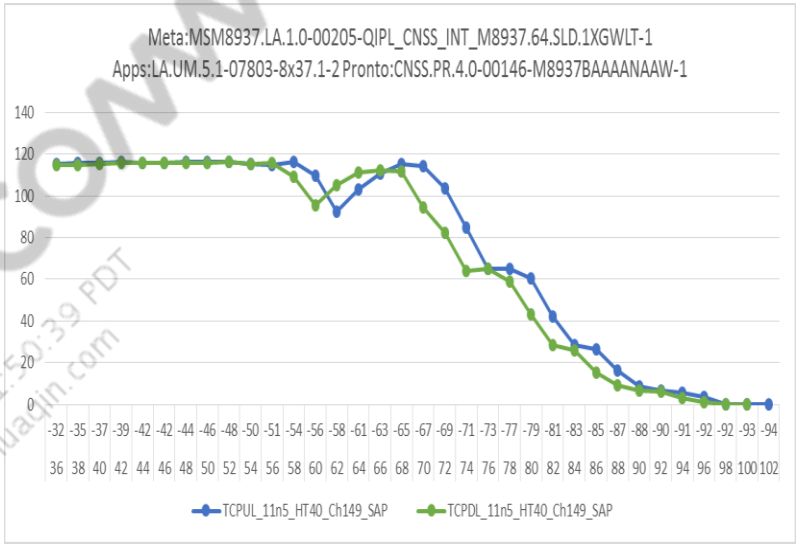

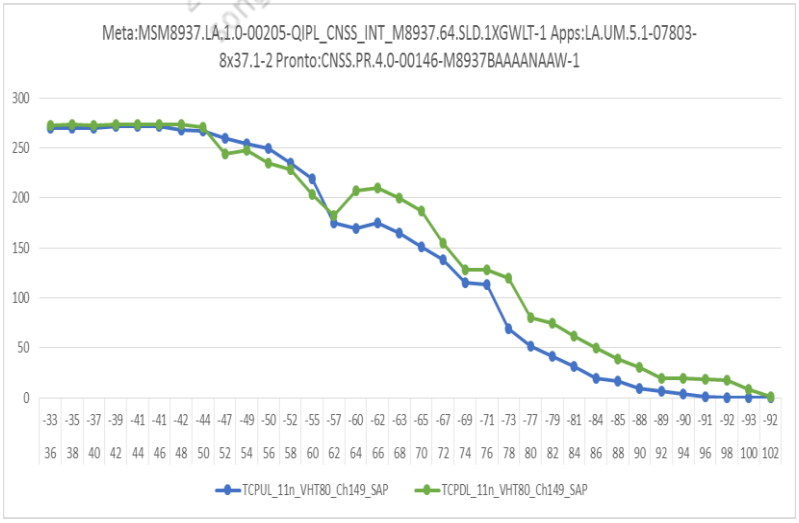

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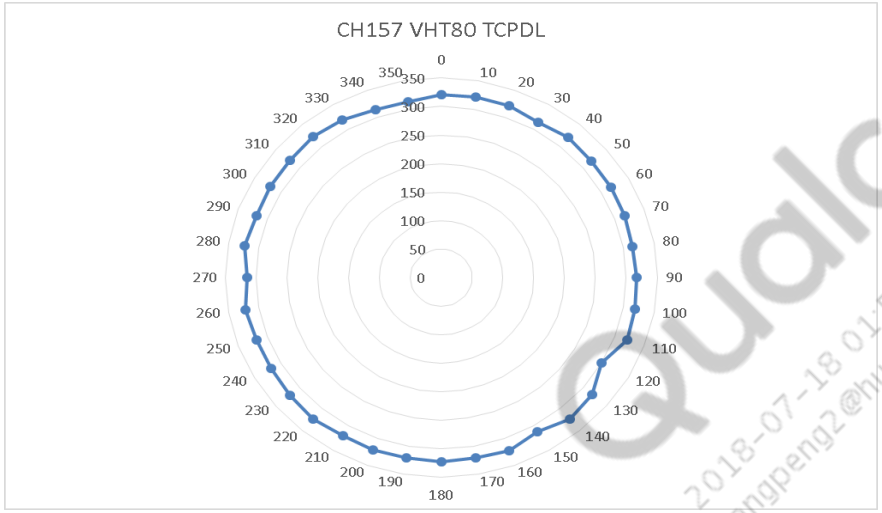
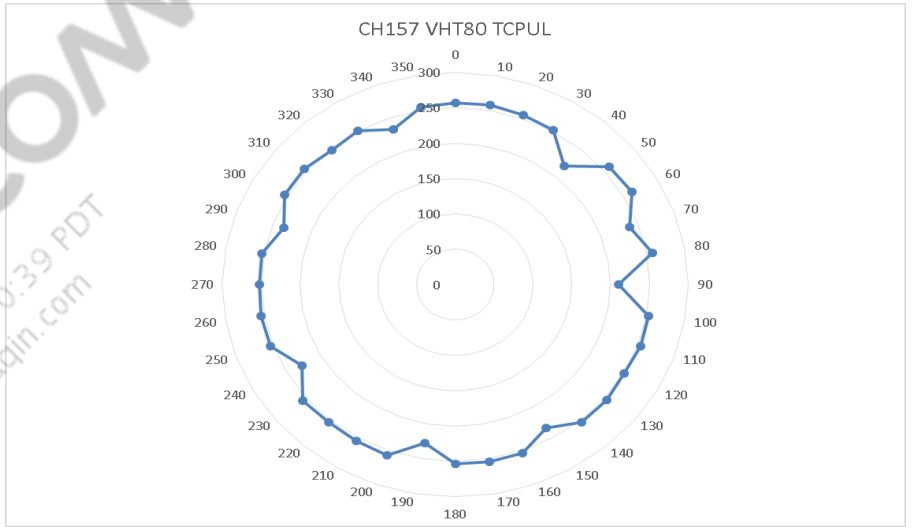
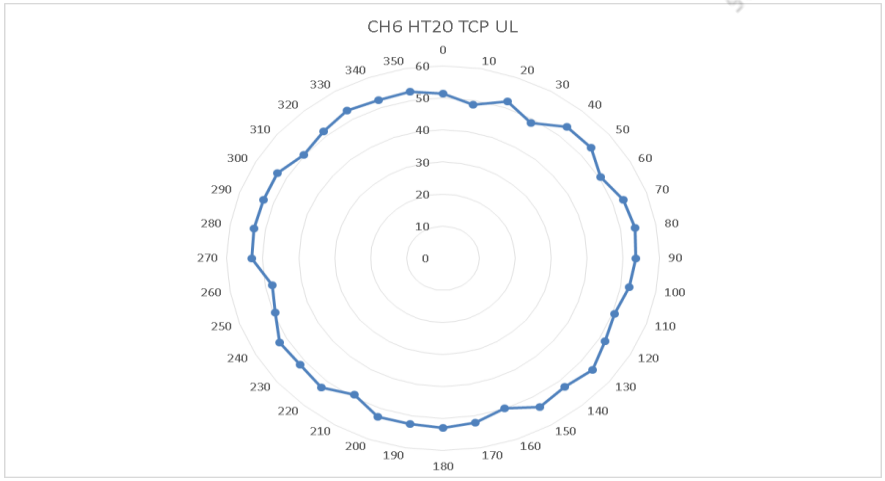
Section 7

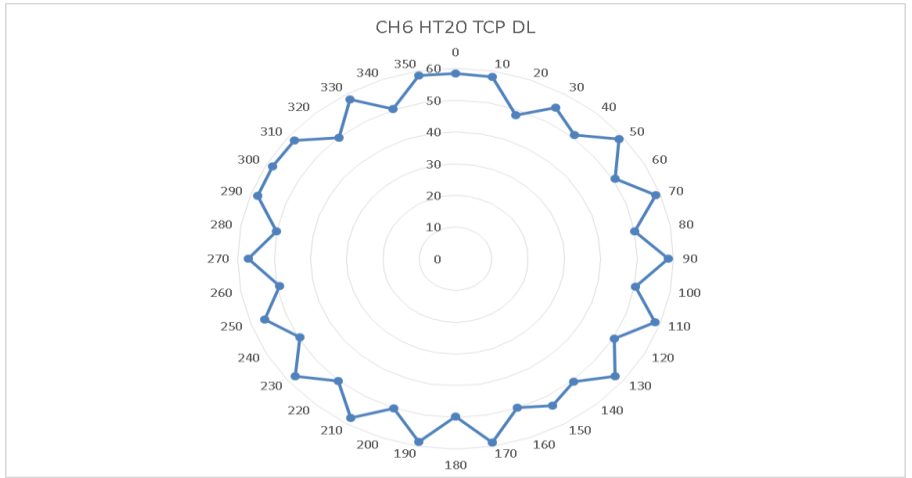
MSM8937.LA1.0 Turn Table KPI Results

Qualcomm
2018-07-1 50:39 PDT
songpeng2@huaqin.com









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2018-07-18 01:50:39 PDT
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Section 8

WLAN Stress and Stability (SnS)

Qualcomm
2018-07-[illegible] 01:50:39 PDT
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CNSS Stability update

SP Name	Meta Build ID	Host Build	FW Build ID
MSM8937.LA.1.0	MSM8937.LA.1.0-00254-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-2	LA.UM.5.1-13603-8x37.1-4	CNSS.PR.4.0-00173

# of devices: 25	Hours:1500	WCN MTBF: 71

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2018-07-18 01:50:39 PDT
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Section 9

WLAN Certification

Qualcomm
2018-07-18 01:50:39 PDT
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MSM8937.LA.1.0 – Internal Certification Coverage Status

Test Area	Coverage%	Pass %	FAIL %	IR/CR/Notes
STA Certified n	100%	100%	0%	
STA WMMPS	100%	100%	0%	
STA WPS2.0	100%	100%	0%	
STA VE	100%	94%	6%	5.8.1 test case failing, fix identified and would be available Post-CS
STA WMMAC	100%	100%	0%	
STA PMF	100%	100%	0%	
STA TDLS	92%	100%	0%	
STA Certified ac	100%	100%	0%	
STA HS2.0 – Rel2	100%	95%	5%	2 cases failing due to testbed issue, working with WFA 2 cases failing and fix identified. It would be part of Post-Cs build
STA HS2.0 – Rel1	100%	100%	0%	
SAP Certified n	100%	100%	0%	
SAP WPS2.0	100%	100%	0%	
SAP WMMPS	100%	100%	0%	
SAP PMF	100%	100%	0%	
SAP Certified ac	100%	100%	0%	
Wi-Fi Direct	100%	100%	0%	

Build: It is cumulative results and not on single build

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2018-07-18 01:50:39 PDT
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MSM8937.LA.1.0 – CS Version Details

Test Area	Sigma Version	Test Plan Version	sigma_dut Version
STA Certified n	9.0.0	2.6	Sigma-v1.10 Sigma-v1.10.11
STA WMM-PS	9.0.0	2.1.6	Sigma-v1.10.11
STA WPS2.0	Manual	2.0.15	Not Applicable
STA VE	9.0.0	1.1	Sigma-v1.10.11
STA WMMAC	9.0.0	1.0.6	Sigma-v1.10.11
STA PMF	9.0.0	1.1	Sigma-v1.10
STA TDLS	9.0.0	1.0.2	Sigma-v1.10
STA Certified ac	9.0.0	1.5	Sigma-v1.10 Sigma-v1.10.11
STA HS2.0-Rel1	9.0.0	1.0.6	Sigma-v1.10
STA HS2.0-Rel1	9.0.0	1.2	Sigma-v1.10

Test Area	Sigma Version	Test Plan Version	sigma_dut Version
SAP Certified n	9.0.0	2.6	Sigma-v1.10 Sigma-v1.10.11
SAP WPS2.0	Manual	2.0.15	Not Applicable
SAP WMMPS	9.0.0	2.1.6	Not Applicable
SAP PMF	9.0.0	1.1	Sigma-v1.10 Sigma-v1.10.11
SAP Certified ac	9.0.0	1.5	Sigma-v1.10 Sigma-v1.10.11
Wi-Fi Direct	9.0.0	1.2	Sigma-v1.10 Sigma-v1.10.11

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Section 10

LOS ARC OTA KPIs

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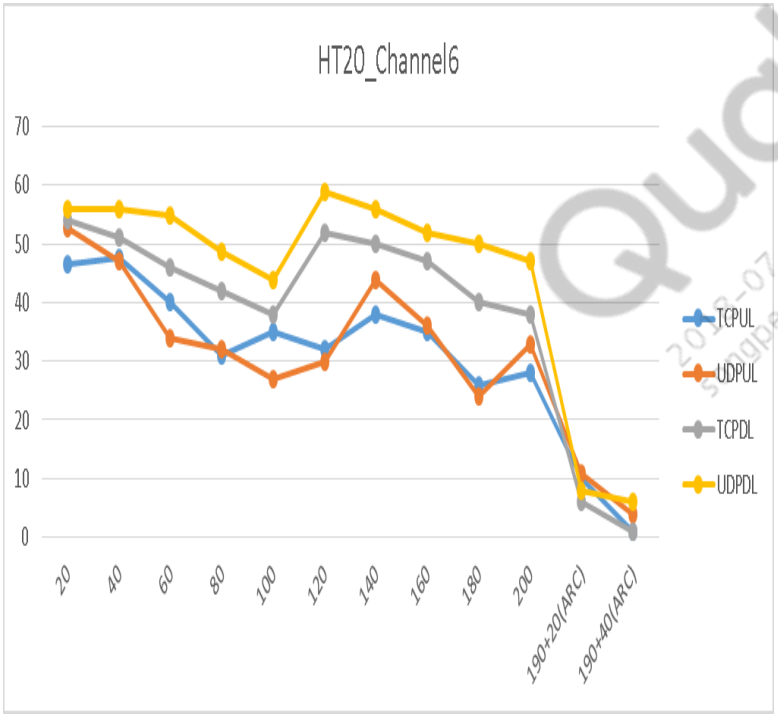
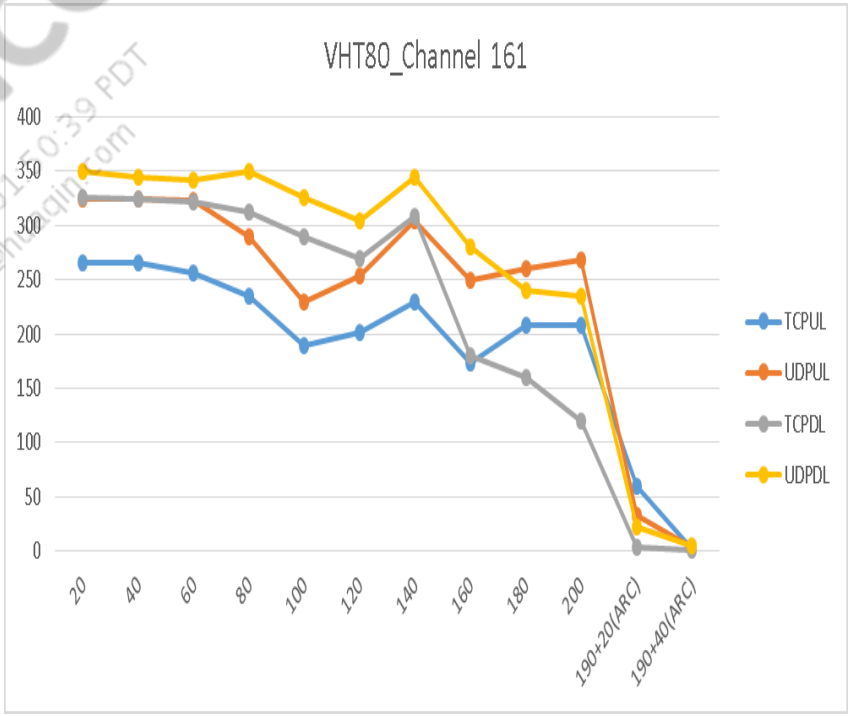
MSM 8937 LA.1.0 LOS ARC KPI

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1





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Section 11

MU-MIMO RVRs and KPIs

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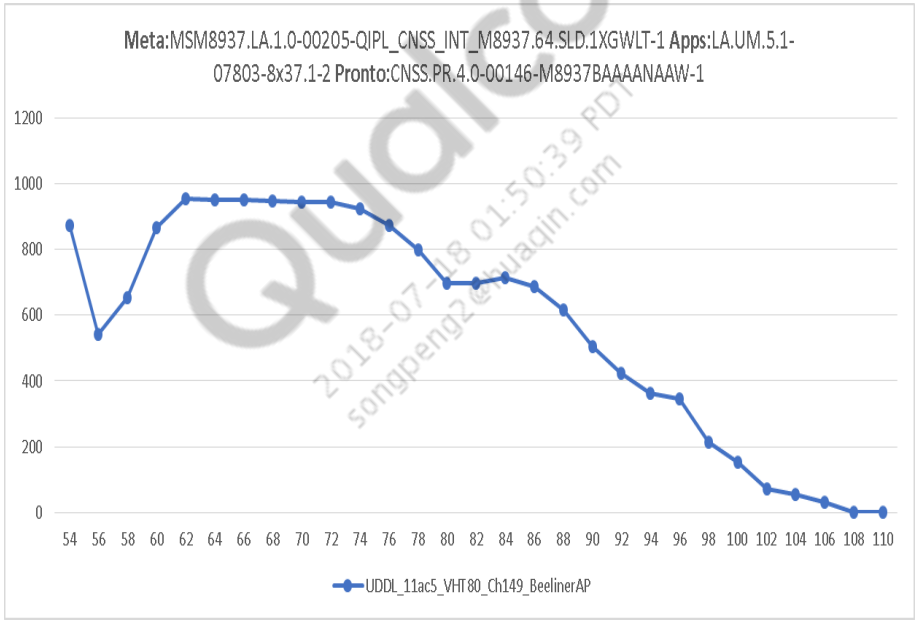
MSM 8937 LA.1.0 MU-MIMO RVR

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1



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MSM 8937 LA.1.0 MU-MIMO KPI

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

5GHz NTx=4	MU-MIMO Enabled						MU-MIMO Disabled					MU-Gain		
VHT80		*STA1*	*STA2*	*STA3*	*Total_E*	*Target*	*STA1*	*STA2*	*STA3*	*Total_D*	*Target*	*Total_E/ Total_D*	*External Target*	*Internal Target*
1SS + 1SS	UDP	326	327	-	653	610	186	189	-	375	360	1.74	1.7	1.5
	TCP	272	269	-	541	500	194	137	-	331	310	1.64	1.6	1.4
1SS + 1SS + 1SS	UDP	320	322	323	965	850	117	118	114	349	360	2.79	2.76	1.8
	TCP	222	226	220	668	660	101	101	109	311	300	2.15	2.2	1.6
VHT40		*STA1*	*STA2*	*STA3*	*Total_E*	*Target*	*STA1*	*STA2*	*STA3*	*Total_D*	*Target*	*Total_E/ Total_D*	*External Target*	*Internal Target*
1SS + 1SS	UDP	153	157	-	310	280	81	83	-	164	165	1.89	1.7	1.5
	TCP	140	141	-	281	230	82	68	-	150	140	1.87	1.6	1.4
1SS + 1SS + 1SS	UDP	147	151	151	449	390	54	54	55	163	165	2.75	2.4	1.8
	TCP	124	126	126	376	300	50	43	50	143	135	2.62	2.2	1.6
VHT20		*STA1*	*STA2*	*STA3*	*Total_E*	*Target*	*STA1*	*STA2*	*STA3*	*Total_D*	*Target*	*Total_E/ Total_D*	*External Target*	*Internal Target*
1SS + 1SS	UDP	58	60	-	118	110	35	36	-	71	65	1.66	1.7	1.5
	TCP	48	50	-	98	90	29	31	-	60	55	1.63	1.6	1.4
1SS + 1SS + 1SS	UDP	53	55	55	163	155	22	21	23	69	66	2.36	2.4	1.8
	TCP	42	41	38	121	120	15	22	21	58	55	2.09	2.2	1.6

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MSM 8937 LA.1.0 MU-MIMO KPI

Meta:MSM8937.LA.1.0-00205-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1 **Apps**:LA.UM.5.1-07803-8x37.1-2
Pronto:CNSS.PR.4.0-00146-M8937BAAAANAAW-1

2.4GHz NTx=4	**2.4G-MU-MIMO Enabled**						**2.4G-MU-MIMO Disabled**					**MU-Gain**
VHT40		*STA1*	*STA2*	*STA3*	*Total_E*	*Target*	*STA1*	*STA2*	*STA3*	*Total_D*	*Target*	*Total_E/Total_D*
1SS + 1SS	UDP	154	150	-	304	280	83	82	-	165	165	1.84
	TCP	136	142	-	278	230	76	71	-	147	140	1.89
1SS + 1SS + 1SS	UDP	132	132	132	396	390	57	58	51	166	165	2.39
	TCP	110	112	110	332	300	50	48	43	141	135	2.35
VHT20		*STA1*	*STA2*	*STA3*	*Total_E*	*Target*	*STA1*	*STA2*	*STA3*	*Total_D*	*Target*	*Total_E/Total_D*
1SS + 1SS	UDP	63	60	-	123	100	35	34	-	69	65	1.78
	TCP	54	55	-	109	85	32	32	-	64	55	1.7
1SS + 1SS + 1SS	UDP	56	56	55	167	140	23	23	23	69	65	2.42
	TCP	44	46	48	138	120	20	20	21	61	55	2.26

5GHz NTx=4	**MU-MIMO Enabled**						**MU-MIMO Disabled**					**MU-Gain**
VHT80		STA1	STA2	STA3	Total_E	Target	STA1	STA2	STA3	Total_D	Target	Total_E/Total_D
1SS + 1SS	UDP	280	282	-	562	458	170	198	-	368	275	1.52
	TCP	201	206	-	407	375	162	169	-	331	232	1.22
1SS + 1SS + 1SS	UDP	208	210	215	633	637	120	114	121	355	275	1.78
	TCP	164	172	161	497	495	101	102	118	321	225	1.54

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Section 12

HAL/PHY FTM Status

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2018-07-18 01:50:39 PDT
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HAL/PHY FTM Status

RF card: Y9659-H6
Build details:
META: MSM8937.LA.1.0-00208-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1
FW: CNSS.PR.4.0-00154-M8937BAAAANAAW-1
Host: LA.UM.5.1-08503-8x37.1-3

Area	Test count			Coverage #			Pass#			Coverage%	Pass%
	L1	L2	L1+L2	L1	L2	L1+L2	L1	L2	L1+L2	L1+L2	L1+L2
Channel tuning	4	8	12	4	8	12	4	8	12	100	100
RSSI	44	68	112	44	68	112	44	68	112	100	100
LO suppression	46	80	126	46	80	126	46	80	126	100	100
Pout accuracy	46	80	126	46	80	126	46	80	126	100	100
EVM	46	80	126	46	80	126	46	80	126	100	100
SEM	46	80	126	46	80	126	46	80	126	100	100
Max Rx sensitivity	46	80	126	46	80	126	46	80	126	100	100
Min Rx sensitivity	46	80	126	46	80	126	46	80	126	100	100

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Highlights:
- 880 TC passed out of 880
- No LO failures
- RSSI is accurate in all channels
- Frequency error is within tolerance levels for high powers
- SEM passes for all target powers.
- PER sweeps look clean
- CLPC pout accuracy looks good
- EVM passes for all target powers.
- Rx min sensitivity is passing the targets
- EVM passes for all target powers

Section 13

Bluetooth/FM

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Section 14

MSM8937.LA.1.0 BT KPI Data (30-Y9659-H6)

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2018-07-18 50:39 PDT
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MSM8937.LA.1.0 – BT RF

Test Area	Test Name	Modulation	MSM8937.LA.1.0 [Y9659-H6] Recorded Values
Transmitter Performance [Tx]	TX Output Power BR/EDR	GFSK	8.79 dBm
		DQPSK	6.86 dBm
		8PSK	6.86 dBm
	TX Output Power BLE	GFSK	0.9 dBm*
	TX PWR Control Step Size	GFSK	(Min.Setp) 5.6 dB / (Max.Step) 3.6 dB
		DQPSK	(Min.Setp) 5.6 dB / (Max.Setp) 3.6 dB
		8PSK	(Min.Setp) 5.6 dB / (Max.Setp) 3.6 dB
	TX PWR Control Range	GFSK	40.40
		DQPSK	40.83
		8PSK	40.83
	TX Initial Freq. Error	GFSK	25.0 kHz
		DQPSK	25.0 kHz
		8PSK	25.0 kHz
	TX DEVM RMS	DQPSK	0.05
		8PSK	0.05
	TX DEVM PEAK	DQPSK	0.11
		8PSK	0.1
Receiver Performance [Rx]	RX Sensitivity BR/EDR	GFSK	-91.3 dBm
		DQPSK	-95.4 dBm
		8PSK	-83.6 dBm
	RX Sensitivity BLE	GFSK	-95.3 dBm

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* -- results are within expected limits.

Data collected in shield room

MSM8937.LA.1.0 – BT Time KPIs

PL	MSM8937.LA.1.0
Y9659-H6	30-Y9659-H6
Build	CNSS.PR.4.0-00156 LA.UM.5.1-09103-8x37.1-1

KPIs	Recorded Value(sec)	Remote Device Used
BT ON -> OFF Time	0.703	NA
BT OFF -> ON Time	0.51	NA
BT ON -> OFF Time With 1 Headset Connected State	0.93	Motorola H19TXT
BT OFF -> ON Time With 1 Headset Connected State	0.47	Motorola H19TXT
BR EDR Scan Time[1st iteration]	15.27	NA
Scan Devices Based on the Proxmity	All devices found	NA
GAP - Pairing time with auto user confirmation with HFPOnly Headsets	1.6	NOKIA-BH10
GAP - Pairing time with auto user confirmation with HFP A2DP AVRCP Headsets	6.92	Motorola Roadster 2
HFP Reconnection time via out of range without audio connection	1.1	Sony SBH50
HFP Swap between 2 Headsets with audio connection(eSCO - 2ev3) present	1.7	Motorola Roadster 2 + BIG JAMBOX
SCO Connection Time	0.4	LG HBM-560
SCO Disconnection Time	0.07	LG HBM-560
eSCO Connection Time	0.3	Motorola Roadster 2
eSCO Disconnection Time	0.05	Motorola Roadster 2
OPP Profile - Only Connection Time (pairing time should not include)	0.68	BM3 4.0 Dongle
OPP Profile - Push vCARD Time(Size 185 KB)	1.98	BM3 4.0 Dongle

Data collected in shield room

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MSM8937.LA.1.0 – BT Time KPIs

PL	MSM8937.LA.1.0
IRIS Card	30-Y9659-H6
Build	CNSS.PR.4.0-00156 LA.UM.5.1-09103-8x37.1-1

KPIs	Recorded Value(sec)	Remote Device Used
OPP Profile - Disconnection Time	5.1	BM3 4.0 Dongle
FTP Profile - Connection Time	0.7	BM3 4.0 Dongle
FTP Profile - Root Folder Listing time in remote	0.4	BM3 4.0 Dongle
PBAP Profile - Connection Time (pairing time should not include)	0.76	BM3 4.0 Dongle
SAP Profile - Connection Time (pairing time should not include)	0.7	Mecapp
MAP Profile - Connection Time with instance 0 (pairing time should not include)	0.69	BM3 4.0 Dongle
HID Connection Time	1.8	Apple Mouse
HID Disconnection Time	0.15	Apple Mouse
HID Reconnection Time	1.22	Samsung Keyboard
PBAP Client Profile - Connection Time (pairing time should not include)	0.76	QCOM Solution
A2DP Sink Latency requirement	0.14	QCOM Solution

Data collected in shield room

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MSM8937.LA.1.0 – BT TPUT KPIs

PL	MSM8937.LA.1.0
IRIS Card	30-Y9659-H6
Build	CNSS.PR.4.0-00156 LA.UM.5.1-09103-8x37.1-1

Throughput	Recorded Value(Mbps)	Remote Device Used
OPP Client-obex over L2CAP	1.9	DUT(8937)-DUT(8937)
OPP Server-obex over L2CAP	1.86	DUT(8937)-DUT(8937)
OPP Client-obex over rfcomm	1.60	DUT(8937)-DUT(SAMSUNG Galaxy Note 5)
OPP Server-obex over rfcomm	1.52	DUT(8937)-DUT(SAMSUNG Galaxy Note 5)
FTP Server-Put over rfcomm	1.51	BM3 Solution
FTP Server-Get over rfcomm	1.52	BM3 Solution
PBAP download 1000 contacts	0.06	BM3 Solution
PANU-downlink	1.66	QCOM Solution
PANU-Uplink	1.93	QCOM Solution
NAP-downlink	1.64	QCOM Solution
NAP-uplink	1.98	QCOM Solution
eSCO+OPP Rx over L2CAP	0.4	BM3 + Motorola Roadster 2
eSCO+OPP Tx over L2CAP	0.27	BM3 + Motorola Roadster 2
eSCO+OPP Rx over rfcomm	0.3	Samsung Note 3 + Motorola Roadster 2
eSCO+OPP Tx over rfcomm	0.3	Samsung Note 3 + Motorola Roadster 2
PANU-downlink UDP Rx	1.6	QCOM Solution
PANU-Uplink UDP Tx	1.8	QCOM Solution
NAP-downlink UDP Rx	1.76	QCOM Solution
NAP-uplink UDP Tx	1.9	QCOM Solution
PBAP Client download 1000 contacts	0.12	QCOM Solution(8976)

Data collected in shield room

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MSM8937.LA.1.0 – BT Speech Quality

PL	MSM8937.LA.1.0
IRIS Card	30-Y9659-H6
Build	MSM8937.LA.1.0-00262-QIPL_CNSS_INT_M8937.64.SLD.1XGWLT-1

TECH	Vocoder	Rx		Tx	
		MSM8937	Benchmark	MSM8937	Benchmark
GSM	NB 12.2	3.807	3.9	3.958	3.9
	WB 12.65	3.43	3.57	3.56	Not available*
WCDMA	NB 12.2	3.85	3.9	3.927	3.9
	WB 12.65	3.44	3.2	3.50	Not available*

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Test Equipment : Spirent Nomad 4 Channel HD(2EV3)+ CMW 500
Test Environment : Screen room(Closed chamber)

MSM8937.LA.1.0 – FM KPIs

Test Case	Test case	Result DUT	Result DUT
		SINR_INTD	MPXDCC
Scan Time per band in Screen Room	Scan Time - US (sec)- 200KHz	4.57	11
	scan Time - EU (Sec)-100KHz	9.8	20.5
	Scan Time - Japan W (Sec)-50KHz	18	40.5
	Spur Channels		
		Available channels	
Search OTA	Commercial Search - Strong	6	7
	Commercial Search - Medium (1420A6)	5	5.75
	Commercial Search - Weak	NT	NT
		Average of all channels	
Audio Quality – WHS (OTA)	AQ - Strong	22.75	22.50
	AQ - Medium	12	10.75
	AQ - Weak	NT	NT
		Average of all channels	
Audio Quality – Spkr (OTA)	AQ - Strong	22.75	22.50
	AQ - Medium	12	10.75
	AQ - Weak	NT	NT
RDS	RDS acquisition Time [strong] (Sec)	1.65 Sec	

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Section 15

Bluetooth IOT

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IOT Device List

LE Devices	Name/Model
1	Tile
2	fit bit surge
3	hTC Fetch
4	SWR10
5	Smart Nudge
6	iBuffelo mouse
7	Parrot flower

HS/Spkr	Name/Model
1	PLT- BackBeat Pro
2	iBuffalo BSHSBE27
3	Connice iBlue5S
4	Jabra Sport Wireless Plus
5	Parrot Carkit
6	Kenwood Carkit [upto AVRCP 1.3]
7	Moto TK-30 [PBAP, PBAP, Legacy AVRCP]
8	XIAOMI BLUETOOTH 4.1
9	Roman R9020
10	Jabra Clear
11	SS Galaxy Gear Circle
12	LG HBS 730

HID	Name/Model
1	Sony Vaio mouse
2	Rapoo 6200

Phone	Name/Model
1	Nexus with M upgrade

Watch	Name/Model
1	LGE urbane
2	SS Gear Fit
3	microsoft fitness band

Following devices are covered in HFP regression testing:

- Motorola S11_Flex HD
- PLT M155
- Jabra Sport wireless+
- LG HBM 560
- Plantronics Backbeat
- PLT Legend
- Samsung HM 1700

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Section 16

Bluetooth Qualification

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Bluetooth Qualification

Qualification information

- Stack and profile:
  - https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=24526
- Controller:
  - https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=25620
- RF:
  - https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=23211 : WCN3615
  - https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=18867 : WCN3660/WCN3680

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2018-07-10 01:50:39 PDT
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Section 17

8937 LA 1.0 SP WLAN/BT/FM Power Dash Board

Qualcomm
2018-07-18 50:39 PDT
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MSM8937.LA.1.0 – WLAN Power DB (1 of 3)

PL		MSM8937.LA.1.0		
Meta Build		MSM8937.LA.1.0-00260-M8937.64.SLD.1XGWLT.INT-2		
Apps Build		LA.UM.5.1-13603-8x37.1-23		
Pronto build		CNSS.PR.4.0-00173-M8937BAAAANAAW-1		
Test Case	**Test Case ID**	**Baseline**	**Total @ Battery**	**Delta @ Battery**
		(mA)	**(mA)**	**(mA)**
Baseline – Airplane Mode (WLAN/BT OFF)	AIR1	2.28	2.28	0
Baseline after WLAN OFF(WLAN ON and OFF)	WLOFF	2.28	2.31	0.03
Standby (IMPS)	WLSTDBY	2.28	2.27	-0.01
DTIM1 @ 2.4GHz screen room	WLS1	2.28	4.18	1.9
WLAN BMPS DTIM3 @ 2.4GHz screen room	WLS3	2.28	2.98	0.7
WLAN BMPS DTIM5 @ 2.4GHz screen room	WLS5	2.28	2.62	0.34
WLAN BMPS DTIM1 @ 5GHz (SM enabled) screen room	WL1SR5G	2.28	3.85	1.57
WLAN BMPS DTIM3 @ 5GHz screen room	WL3SR5G	2.28	2.86	0.58
WLAN BMPS DTIM5 @ 5GHz with SM enabled screen room	WL5SR5G	2.28	2.67	0.39
Baseline - StaticDisplay with WLAN off	WOFFDIS	97.5	97.5	0
StaticDisplay with WLAN BMPS/DTIM1 @ 2.4 GHz	WIDLDIS	97.5	110.98	13.48

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MSM8937.LA.1.0 – WLAN Power DB (2 of 3)

Test Case	Test Case ID	Baseline (mA)	Total @ Battery (mA)	Delta @ Battery (mA)	Result1	Result2	Display adjusted 51.53mA deducted from total at batt
StaticDisplay with WLAN BMPS/DTIM1 @ 5 GHz with SM enabled	WIDIS5E	97.5	105.46	7.96			
Baseline - iPerf app invoked, WLAN off, Display on, USB disconnected	WLOFFDT	97.5	97.5	0			
TCP DL 20MHz BW @ 2.4GHz	WLTCPD2	97.5	281.27	183.77	48.34	3.8	229.74
TCP UL 20MHz BW @ 2.4GHz	WLTCPU2	97.5	352.66	255.16	49.61	5.14	301.13
UDP DL 20MHz BW @ 2.4GHz	WLUDPD2	97.5	258.47	160.97	51.6	3.12	206.94
UDP UL 20MHz BW @ 2.4GHz	WLUDPU2	97.5	361.75	264.25	62.27	4.24	310.22
TCP DL 20MHz BW @ 5GHz	WLTCPD5	97.5	301.97	204.47	53.17	3.85	250.44
TCP UL 20MHz BW @ 5GHz	WLTCPU5	97.5	402.44	304.94	46.78	6.52	350.91
UDP DL 20MHz BW @ 5GHz	WLUDPD5	97.5	280.96	183.46	59.27	3.1	229.43
UDP UL 20MHz BW @ 5GHz	WLUDPU5	97.5	416.32	318.82	57.32	5.56	364.79
TCP DL 40MHz BW @ 5GHz	WLT40D5	97.5	304.85	207.35	113.23	1.83	253.32
TCP UL 40MHz BW @ 5GHz	WLT40U5	97.5	400.7	303.2	94	3.23	349.17
UDP DL 40MHz BW @ 5GHz	WLU40D5	97.5	309.47	211.97	129.15	1.64	257.94
UDP UL 40MHz BW @ 5GHz	WLU40U5	97.5	409.73	312.23	101.34	3.08	358.2
PNO Scan	WLPNO	2.28	14.47	12.19			
SAP No connection	WLSAPS	2.28	71.35	69.07			
WL Ping		2.28	49.12	46.84			

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MSM8937.LA.1.0 – WLAN Power DB (3 of 3)

Test Case ID	Baseline	Total @ Battery	Delta @ Battery	Result1	Display adjusted 51.53mA deducted from total at batt
	(mA)	(mA)	(mA)		
WLU40U5	97.5	544.64	447.14	260	493.11
WLT80D5	97.5	429.42	331.92	260	377.89
WLU80D5	97.5	417.03	319.53	280	365.5
WLU80U5	97.5	592.44	494.94	303	540.91

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Section 17.1

Bluetooth/FM Power Consumption KPIs

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Power Consumption Test Setup

- Build used:
  - Meta: MSM8937.LA.1.0-00260-M8937.64.SLD.1XGWLT.INT-2
  - APPS: LA.UM.5.1-13603-8x37.1-23
  - Firmware build : CNSS.PR.4.0-00173-M8937BAAAANAAW-1
  - DUT used: RCM –
  - MCN: 10-NV927502S
  - WCN3680 card: Y9659 H6
  - RF card: WTR2955
  - MSM: 8937
- Other configurations used:
  - USB charging: Disabled
  - USB connected: No
  - Shield room setup: Shield room

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Bluetooth

Power consumption test result

Mode	Type	Test case ID	Baseline (mA)	Total @ battery (mA)	Delta @ battery (mA)
BT Low power /active cases	Baseline – Airplane Mode (WLAN/BT OFF)	AIR1	2.28	2.28	0
	BT OFF sleep Current	BTOFF	2.28	2.27	-0.01
	Page Scan T=1.28s	BTPS	2.28	3.17	0.89
	Page Scan + Inq Scan T=1.28/2.56s	BTPSIS	2.28	3.74	1.46
	Sniff + Page Scan (Moto HS850) T= 1.28/1.28s	BT2	2.28	3.25	0.97
	Sniff + Page Scan (Nokia BH 800) T=0.5/1.28s	BTSFPS2	2.28	3.94	1.66
	Sniff + Page Scan + Inq Scan T=1.28/1.28/2.56s	BTSFPSIS	2.28	3.81	1.53
	Page Scan from Sniff T=1.28s	PSFRSF	2.28	3.15	0.87
	No BT from Page Inq scan	NOBTFRPSIS	2.28	2.27	-0.01
	No BT from Sniff	NOBTFRSF	2.28	2.26	-0.02
	No BT from PageScan	NOBTFRPS	2.28	2.27	-0.01
	Baseline - BT OFF Vol=50%, wired headset, Au4	BTOFFMP3	23.61	23.61	0
	A2DP – EDR (Nokia BH 504) Vol = 50%, SBC 328kbps, EDR	BTMP3EDR	23.61	67.89	44.28
	Baseline - BT OFF Vol=50%, wired headset, Au14	BTOFFAAC	29.56	29.56	0
	A2DP – EDR (Nokia BH 504) Vol = 50%, SBC, 328kbps EDR	BTAACEDR	29.56	70.17	40.61
	OPP Server - RFCOMM - RX	BTOPPRRX	2.28	71.59	69.31
	OPP Client - RFCOMM - TX	BTOPPRTX	2.28	93.24	90.96

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FM

Power consumption BLE test result

Test case	Test case ID	configuration	Baseline	Total @ Battery	Delta @ Battery
			(mA)	(mA)	(mA)
BLE advertisement	BT page scan + LE advertising	1.28 s/1 s	4.24	4.66	0.42
	BT page scan + LE advertising	1.28 s/264 ms	4.24	5.85	1.61
	BT page scan + LE advertising	1.28 s/111 ms	4.24	8.14	3.9
Connection	LE connection BT on	49 ms	3.28	11.87	8.59
	LE connection BT on	500 ms	3.28	5	1.72
	LE connection BT on	1s	3.28	4.62	1.34
	LE connection BT on	1.28 s	3.28	4.3	1.02
Scan	Low Latency Mode	333ms	3.48	14.28	10.8
	Balanced Mode	1s	3.48	6.58	3.1

Test case	Test case ID	Baseline (mA)	Total @ Battery (mA)	Delta @ Battery (mA)
FM RX- audio over wired HS Vol=50%, wired headset	FMRXWHS	2.28	37.30	35.02
FM over Speaker Vol=50%, Speaker	FMRXSPK	2.46	37.60	35.14
FM Audio Mute Vol=50%, Audio Muted	FMRXMUT	2.46	37.28	34.82
FM OFF from FM Rx	FMRXOFF	2.46	2.26	-0.20

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Section 18

WLAN L Release and PR4.0 Features

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WCN - Android WLAN Software Roadmap Summary

PR version
802.11 a/b/g/n
802.11 ac
WiFi Direct (P2P) & WiFi Display
WPA/WPA2 Personal, Enterprise
WPS2.0, WMM, WMM-PS
WAPI
Passpoint Release 1
Voice Enterprise
CCXv4
SoftAP (32 clients)
RTT support (1-sided)
Offloads (ARP, PNO, MCBC)
LFR (FW-Assisted Roaming)
Bluetooth WLAN Coexistence (BTC)
LTE coexistence
Multi-channel concurrency
TDLS – Same Channel Only
Transmit BeamFormee
PMF (STA, SAP)
Switched Antenna Diversity
Google L feature support
2.4 GHz/HT40 support (STA, SAP)
MU-MIMO
TDLS off-channel
BTC enhancements (multiple BLEs)
Google M feature support (GSCAN, Link Layer Statistics, Debug framework)

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WCN - Android Bluetooth Firmware Roadmap Summary (1 of 2)

PR version
Bluetooth 4.0
Bluetooth 4.1
Bluetooth 4.2
Link Layer Topology
Low Duty Cycle Directed Advertising
Link Layer Ping
BR/EDR Secure Connections
Multiple Advertisers
BLE Filtering Updates
Privacy Mode / RPA
Advertisement / Scan Batching
Autonomous Channel Mapping
Energy API and computation
BLE Secure Connections
BLE Privacy 1.2
Optimized BLE Scans

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WCN - Android Bluetooth Host Software Roadmap Summary (2 of 2)

Android OS version
Bluetooth Specification BT4.2
FTP 1.1
HDP 1.0
HID 1.0 - Host
OPP 1.1
PAN 1.0
SAP 1.1
AVRCP 1.3
BLE GATT Client/Server
A2DP 1.2 – SRC/SNK
HFP 1.6 – AG/HS
MAP 1.0 - MSE/MCE
PBAP 1.0 – PSE/PCE
AVRCP 1.5 - Target
DUN 1.1
HID 1.0 - Client
HOGP 1.0

Android OS version
OPP 1.2
Dual-HFP
OBEX over L2CAP
AVRCP1.5 - Controller
BR/EDR Secure Connections *
Dual Mode Topology
BLE Peripheral Mode
Multi-HFP
HFP1.7
Dual A2DP Handoff
MAP 1.2 – MSE/MCE
Energy API and computation
BLE Secure Connections
BLE Privacy 1.2
BLE always on
Optimized BLE scans

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** Updated implementation for Android M*

Questions?

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Thank You

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