Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5510MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5510MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5550MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5550MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11ac 80MHz: 1 – 18GHz (5530MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11ac 80MHz: 1 – 18GHz (5530MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11ac 80MHz: 1 – 18GHz (5560MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11ac 80MHz: 1 – 18GHz (5560MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11a 20MHz: 1 – 18GHz (5700MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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Graphical Test Results 802.11a 20MHz: 1 – 18GHz (5700MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11a 20MHz: 1 – 18GHz (5680MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11a 20MHz: 1 – 18GHz (5680MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5670MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5670MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5710MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11n 40MHz: 1 – 18GHz (5710MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

Trace/Det 06:18:56 #Avg Type: RMS RBW 1.0 MHz PNO: Fast Trig: Free Run IFGain:High #Atten: 0 dB Select Trace 72.00 dBu Ref 86.99 dBµV **Clear Write** Trace Average Max Hold Start 1.000 GHz #Res BW 1.0 MHz Stop 18.000 GHz 42.6 ms (1601 pts) #VBW 1.0 MHz Sweep Min Hold 72.00 dBµV 60.39 dBµV 5.718 GHz 17.639 GHz N 1 f View/Blank Trace On More 1 of 3 STATUS r - EMiSoft Vasona: EMi Emission Softw BW #Avg Type: RMS RBW 1.0 MH Trig: Free Run #Atten: 0 dB PNO: Fast IFGain:High Ģ PPPPF Res BW 1.0 MHz Man Mkr1 5.718 GH: 75.51 dBµ\ uto Ref 86.99 dBuV Video BW 1.0 MHz Man uto VBW:3dB RBW Man Auto Span:3dB RBW 106 Mar Auto Start 1.000 GHz #Res BW 1.0 MHz Stop 18.000 GHz 42.6 ms (1601 pts) **RBW** Control #VBW 1.0 MHz Sweep Gaussian -3 dBl 5.718 GHz 17.639 GHz 75.51 dBµ\ 60.54 dBµ\ STATUS Title: 1 - 18GHz Test Results at 5710MHz (Peak)

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Graphical Test Results 802.11ac 80MHz: 1 – 18GHz (5720MHz – Average)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results 802.11ac 80MHz: 1 – 18GHz (5720MHz – Peak)

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results: 18 – 26GHz



Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

Graphical Test Results: 26 - 40GHz

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Radiated Receiver Spurious Measurements

Please note that for the 1-18GHz test results, the noise floor is close to the limit for the Average plots. Scans were performed with reduced RBW and VBW in order to verify that no significant emissions were hidden by the noise floor.

Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

Please note that the high emissions at 375MHz, 125MHz, and 625MHz are digital emissions. These will be covered in the EMC test report.



Test Results Table

Pre	escan Dat												
No	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1	374.956	39.6	1.8	15.1	56.5	Peak [Scan]	V	100	0	46.0	10.5	Fail	
2	624.731	32.4	2.4	19.4	54.2	Peak [Scan]	Н	200	0	46.0	8.2	Fail	
3	125.181	32.7	1.1	14.0	47.8	Peak [Scan]	V	100	0	43.5	4.3	Fail	
4	650.194	23.3	2.4	19.9	45.6	Peak [Scan]	V	100	0	46.0	4	Pass	
5	32.425	18.6	.5	19.3	38.4	Peak [Scan]	V	100	0	40.0	-1.6	Pass	
6	49.400	28.7	.6	8.1	37.3	Peak [Scan]	V	100	0	40.0	-2.7	Pass	
7	875.113	17.7	2.8	22.1	42.6	Peak [Scan]	Н	100	0	46.0	-3.4	Pass	
8	350.100	24.3	1.8	14.4	40.5	Peak [Scan]	V	200	0	46.0	-5.5	Pass	
9	99.113	27.0	.9	10.1	38.0	Peak [Scan]	Н	200	0	43.5	-5.5	Pass	
10	599.875	19.4	2.3	18.4	40.2	Peak [Scan]	V	100	0	46.0	-5.8	Pass	

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Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



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Appendix A: EUT Photos

EUT



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Power Supply



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Appendix B: Physical Test Arrangement Photos:

Title: Radiated Spurious Emissions Test Configuration 30M - 1000MHz



Title: Radiated Spurious Emissions Test Configuration 1G - 18GHz

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Title: Radiated Spurious Emissions Test Configuration 18 – 40GHz



Title: Conducted Test Setup

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Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
25659	MICRO-COAX/	Coaxial Cable, 84.0 in.		
20000	UFB311A-1-0840-504504	to 18GHz	13-Feb-15	13-Feb-16
21117	MICRO-COAX/	Coaxial Cable-18Ghz		
	UFB311A-0-2484-520520		25-Aug-14	25-Aug-15
49563	HUBER + SUHNER/ Sucoflex 106A	Coaxial Cable, 8m	25-Aug-14	25-Aug-15
5691	MITEQ/ NSP1800-25-S1	PREAMPLIFIER	29-Jan-15	29-Jan-16
4882	EMCO/ 3115	HORN ANTENNA	30-Jul-14	24-Jul-15
40507	CISCO/ Above 1CHz Site Cel	1GHz Cispr Site		
40597		Verification	28-May-14	28-May-15
47300	Keysight (Agilent/HP) / N9038A	EMI Receiver	13-Jan-15	13-Jan-16
		40GHz Cable K		
47285	HUBER + SUHNER / Sucoflex 102E	Connector	06 Jun 2014	06 Jun 2015
4883			Cal Not	Cal Not
+000	EMCO/ 3115	HORN ANTENNA	Required	Required
34075		Reference Spectrum	Cal Not	Cal Not
0.010	SCHAFFNER / RSG 2000	Generator, 1-18GHz	Required	Required
8166	Keysight (Agilent/HP) / 8491B Opt 010	ATTENUATOR	02 Feb 2015	02 Feb 2016
47294	FAIRVIEW MICROWAVE / ST6S-10	SMA Termination 6GHz	12-Aug-14	12-Aug-15
47293	FAIRVIEW MICROWAVE / ST6S-10	SMA Termination 6GHz	12-Aug-14	12-Aug-15
49504		SMA Female 50 Ohm		
	JFW / 50T-039 SMA-F	Termination	27-Mar-15	27-Mar-16
49503		SMA Female 50 Ohm		
+0000	JFW / 50T-039 SMA-F	Termination	27-Mar-15	27-Mar-16
		PRESET TORQUE		
20490		WRENCH 3.5 mm 12		
	Keysight (Agilent/HP) / 8710-1765	in/lbs	4-Feb-15	4-Feb-16
54230	Newport / iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	1-Feb-15	1-Feb-16
40503	Keysight (Agilent/HP) / E4440A	Spectrum Analyzer	6-Jun-14	6-Jun-15
54014		40GHz Cable K	07 14 45	07 14 40
40507	HUBER + SUHNER / SUCOTIEX 102E		∠/-Mar-15	27-Mar-16
49527	Keysight (Agilent/HP) / N8990K-A38	2x4 Switch Matrix	27-Mar-15	27-Mar-16

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		RF Cable 2.4mm - N		
54017	HUBER + SUHNER / Sucoflex 102	Type 18GHz	27-Mar-15	27-Mar-16
54040		RF Cable 2.4mm - N		
54018	HUBER + SUHNER / Sucoflex 102	Type 18GHz	27-Mar-15	27-Mar-16
54040		RF Cable 2.4mm - N		
54016	HUBER + SUHNER / Sucoflex 102	Type 18GHz	27-Mar-15	27-Mar-16
54045				
54015	HUBER + SUHNER / Sucoflex 102	Type 18GHz	27-Mar-15	27-Mar-16
22000		SPECTRUM		
33988	Keysight (Agilent/HP) / E4446A	ANALYZER, 44Ghz	9-Dec-14	9-Dec-15
30654		Combination Antenna,		
	Sunol Sciences / JB1	30MHz-2GHz	12-Dec-14	12-Dec-15
8448				
0440	CISCO/ NSA 5m Chamber	NSA 5m Chamber	7-Oct-14	7-Oct-15
27233		COMPARISON NOISE	Cal Not	Cal Not
21200	York / CNE V	EMITTER	Required	Required
		18-40GHz EMI Test		
41979		Head/Verification		
	Cisco / 1840	Fixture	9-Jul-14	9-Jul-15
20202		PSG ANALOG SIGNAL		
30392	Keysight (Agilent/HP) / E8257D	GENERATOR	19-Aug-14	19-Aug-15
10516				
49510	Keysight (Agilent/HP) / N9030A	PXA Signal Analyzer	12-Nov-14	12-Nov-15
54237		PRESET TORQUE		
54257	Pasternack / PE5011-1	WRENCH, 8 IN/LBS	04 Feb 2015	04 Feb 2016
37026			Cal Not	Cal Not
37230	JFW / 50CB-015	Control Box, GPIB	Required	Required

Software Used to Perform Testing:

EMIsoft Vasona, version 6.024

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Measurements were made in accordance with

- KDB Publication No. 789033 D01 General UNII Test Procedures Old Rules v01r04
- Measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.
- ANSI C63.4 2009
- ANSI C63.10 2009

Test procedures are summarized below

FCC Test Procedures 5GHz	EDCS # - 1445048

Appendix E: Test Assessment Plan

Compliance Test Plan (Excel) EDCS# 1237091 Target Power Tables EDCS# 1501962

Appendix F: Worst Case Justification

IW3702 is based upon the AIR-CAP3702P-A-K9. Test results for AIR-CAP3702P-A-K9 were reviewed. Worst case modes were selected by lowest margins. A representative sample of modulation types, bit-rates, and bandwidths were selected. The AIR-CAP3702P-A-K9 report can be found here EDCS# 1278295.

Appendix G: Scope of Accreditation

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at: http://www.a2la.org/scopepdf/1178-01.pdf

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Appendix H: Duty Cycle

		On-time	Total Time	Duty	Correction Factor
Mode	Data Rate	(ms)	(ms)	Cycle (%)	(dB)
NonHT20 Dual	6Mbps	1.438	1.448	99.3	0.03
NonHT20 BF Dual	6Mbps	1.437	1.447	99.3	0.03
VHT20 Quad	M0x3	0.494	0.505	97.8	0.10
VHT20 BF Quad	M0x3	0.493	0.505	97.6	0.11
NonHT40 Triple	6Mbps	1.438	1.447	99.4	0.03
HT40 Quad	M0x2	0.366	0.376	97.3	0.12
NonHT80 Quad	6Mbps	1.438	1.448	99.3	0.03
VHT80 Quad	M0x1	0.334	0.349	95.7	0.19
NonHT40 Triple	6Mbps	1.438	1.448	99.3	0.03
HT40 Triple	M0	0.669	0.679	98.5	0.07
HT40 BF Quad	M0x3	0.265	0.281	94.3	0.25
HT40 BF Quad	M0	0.669	0.679	98.5	0.07
NonHT20 Dual	6Mbps	1.438	1.447	99.4	0.03
NonHT20 BF Quad	6Mbps	1.438	1.447	99.4	0.03
VHT20 Triple	M0x2	0.705	0.717	98.3	0.07
VHT20 BF Triple	M0x3	0.494	0.506	97.6	0.11
NonHT20 BF Dual	6Mbps	1.437	1.447	99.3	0.03
VHT20 Triple	M0x2	0.706	0.719	98.2	0.08
VHT20 Quad	M0x3	0.493	0.505	97.6	0.11
VHT20 BF Triple	M0x3	0.493	0.506	97.4	0.11
VHT20 BF Quad	M0x3	0.494	0.507	97.4	0.11

Duty Cycle table and screen captures are shown below for power/psd modes.

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Duty Cycle, 5500 MHz, Non HT20, 6Mbps

🔆 Ag	jilent											Mar	ker
Ref 30 #Peak	∂dBm		*Atten	30 dB				M	kr3 1 4.!	.779 ms 53 dBm	Sele 1	ect 2	Marke <u>3</u>
Log 10 dB/ Offst	ipiaityr I		nin teologia <mark>Villin Pala</mark> i	<mark>jinan bi</mark>	in the second		nalisena Nileipityi	alla de la compositione Compositione de la compositione de la Compositione de la compositione de la					Norma
13.1 dB		•											Delta
#PAvg											(T Ref	De rack	l ta Pai i king Ref
Cente Res B	r 5.500 W 8 MH	000 (Z race	GHz Type	ŧ۷	'BW 8 № ×	1Hz Axis	Sм	eep 2	Sp ms (81 Amplit	an 0 Hz .92 pts) :ude	Span	Sp	an Pai Cente
1 2 3		(1) (1) (1)	Time Time Time		3 1 1	31.3 µs .769 ms .779 ms			-22.72 -13.06 4.53	dBm dBm dBm			Of
													More 1 of 2
Copyr	iaht 21	000-2	008 Aa	ilent T	echnol	naies							

Duty Cycle, 5500 MHz, Non HT20 Beam Forming, 6Mbps



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Duty Cycle, 5500 MHz, VHT20, M0.3



Duty Cycle, 5500 MHz, VHT20 Beam Forming, M0.3



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Duty Cycle, 5510 MHz, Non HT40, 6Mbps

Duty Cycle, 5510 MHz, VHT40, M0.2



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Duty Cycle, 5530 MHz, Non HT80, 6Mbps



Duty Cycle, 5530 MHz, VHT80, M0.1



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Duty Cycle, 5550 MHz, Non HT40, 6Mbps

Duty Cycle, 5550 MHz, HT40, M0



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Duty Cycle, 5550 MHz, VHT40, M0.3



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Duty Cycle, 5550 MHz, HT40 Beam Forming, M0



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🔆 Agilent					Marker
Ref 30 dBm #Peak	#Atten 30 dB		Mł	(r1 367.2µs −17.84 dBm	Select Marker <u>1</u> 2 3 4
Log 10 dB/ Offst		lander för som	an di kang ng k Ng kang ng kang	n a far an	Normal
13.1 dB	Ö				Delta
#PAvg					Delta Pair (Tracking Ref) Ref <u>∆</u>
Center 5.560 000 Res BW 8 MHz) GHz #V	VBW 8 MHz X Avis	Sweep 2	Span 0 Hz ms (8192 pts) Amplitude	Span Pair Span <u>Center</u>
1 (1) 2 (1) 3 (1)	Time Time Time	367.2 µs 1.805 ms 1.814 ms		-17.84 dBm -34.10 dBm -24.04 dBm	- Off
					More 1 of 2
Copyright 2000-	-2008 Agilent T	echnologies			

Duty Cycle, 5560 MHz, Non HT20, 6Mbps

Duty Cycle, 5560 MHz, Non HT20 Beam Forming, 6Mbps



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Duty Cycle, 5560 MHz, VHT20, M0.2



Duty Cycle MHz, VHT20 Beam Forming, M0.3

🔆 Aç	gilent											Mar	ker	
Ref 30 #Peak	0 dBm		*Atten	30 dB				M	kr2 6 -32.9	55.2µs 7dBm	Se 1	lect 2	Mar 3	ker 4
Log 10 dB/ Offst	non for <mark>Fri</mark> ndling	n an the National Constant	udhaadha <mark>Haanner</mark>	n an the second s		landele av N ¹ i Prijer i			ho ealaid <mark>P</mark> di <mark>a</mark> th	dalandar Militari			Nor	mal
13.1 dB													De	elta
#PAvg											(Ref	De Trac	lta F king f	Pair Ref) ≜
Cente	r 5.560	000 G	Hz						Spa	an 0 Hz		c.,		
Res B	W 8 MH	z		#V	BW 8 M	Ήz	Swee	ep 800	µs (81	92 pts)	Sna	່ ວt	an P	
Mark	ker T	race	Туре		Х	Axis			Amplit	ude	Jhai	·	001	ILCI
1 2 3		(1) (1) (1)	Time Time Time		1 6 6	.61.8 μs 55.2 μs 67.1 μs			-26.21 -32.97 -23.90	dBm dBm dBm				Off
													M (ore of 2
Copyr	ight 20	000-20	008 Ag	ilent T	echnol	ogies								

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🔆 Ag	ilent										M	arker
Ref 30) dBm		*Atten	30 dB				M	<r1 -19.9</r1 	431 µs 3 dBm	Sele	ct Marker
#Peak											<u> </u>	· · ·
10	all de liest d	di Albahan			- All approxiti			na ilia lai				
dB/	all a la b	يتاراط فأقتته أنا	l and i		alle Long				Maler In			Normal
Offst										— <mark>.</mark>		
13.1 dB			٥.							<u> </u>		Dalta
uD			ļ									Deita
												Delte Dela
										, 	(Tr	Delta Pair
# PAvg	<u> </u>										Ref	
Center	L 5.700	000 G	H7						Spi	an 0 Hz		
Res B	N 8 MH	Z		#V	BW 8 M	Ήz	SM	eep 2	ms (81	92 pts)	C	Span Pair
Mark	er T	race	Туре		Х	Axis			Amplit	ude	Span	Center
1 2		(1)	Time Time		1	431 μs 868 ms			-19.93	dBm dBm		
3		(1)	Time		1	.878 ms			5.29	dBm		Off
												More
												1 of 2

Duty Cycle, 5700 MHz, Non HT20 Beam Forming, 6Mbps

Duty Cycle, 5700 MHz, VHT20, M0.2

🔆 Agilent					Marker
Ref 30 dBm #Peak	#Atten	30 dB		Mkr3 8 –16.17	dBm Select Marker 1 2 <u>3</u> 4
Log 10 dB/ Offst	n <mark>dialahanananananananananananananananananan</mark>	and the board of the test densed and the board of the test densed	line transfording a bilant of the second (<mark> </mark>	<mark>n L_{enge}rin</mark> piloni	Normal
13.1 dB	↓ ↓ ◆				Delta
#PAvg					Delta Pair (Tracking Ref) Ref △
Center 5.700 Res BW 8 MH	0 000 GHz Iz	*VBW 8 M	1Hz Sm	Span Ieep 1 ms (8192	0 Hz Span Pair Pts) Span <u>Center</u>
Marker 1 2 3	race Type (1) Time (1) Time (1) Time	, X 1	(Hxis 117.7 µs 823 µs 836 µs	Hmplitud -27.72 dB -18.09 dB -16.17 dB	e m m Off
					More 1 of 2
Copyright 2	000-2008 Ag	ilent l'echnol	ogies		

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Duty Cycle, 5700 MHz, VHT20, M0.3



Duty Cycle, 5700 MHz, VHT20 Beam Forming, M0.3



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Duty Cycle, 5700 MHz, VHT20 Beam Forming, M0.3

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