9.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)





Page 151 of 245





Page 152 of 245 **UL CCS** FORM NO: CCSUP4701H 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

HARMONICS AND SPURIOUS EMISSIONS

Compliance Certification Services, Fremont Sm Chamber Test Engr: Tom Chen Date: 11/05/12 Project #: 12U14680 Company: Apple Test Target: FCC Class B Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Aver age Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp d B d B d B d B d B d B d B d B d B d B d B d B d B
Test Engr:Tom ChenDate:11/05/12Project #:12U14680Company:AppleTest Target:FCC Class BMode Oper:802.11n HT20 TX modefMeasurement Frequency Amp Distance to Antenna ReadPreamp Gain DCorrAverage Field Strength Limit Pastnet Correct to 3 meters Distance to Antenna Peak Field Strength @ 3 m Margin vs. Average Limit Margin vs. Average Limit CLAverage Field Strength @ 3 m Margin vs. Average Limit Margin vs. Average Limit CLfDist Distance to Antenna Read AF Antenna Factor CLPeak Peak Calculated Peak Field Strength B dBMargin vs. Average Limit Margin vs. Peak Limit Claculated Peak Field Strength B dBDet B dBPfDist Det B dBCorrFitr B dBCorr. B dBLimit Margin vs. Peak Limit B dBDet. P/A/QPPfDist B dBRead B dBD CorrFitr Corr. Corr.Limit Limit B dBDet. P/A/QPPfDist B dBD dBD dBD dBD dBD dBDDfDist B dB30.34.739.113.0-31.90.00.755.674.0-18.4VPfDisto DistanceDDDDDDDDDfDist Distance30.35.339.113.0-31.90.00.756.174.0-17.9HP
Date:11/05/12Project #:12U14680Company:AppleTest Target:FCC Class BMode Oper:802.11n HT20 TX modefMeasurement Frequency Amp Distance to Antenna ReadPreamp Gain DCorrAverage Field Strength Limit Poistance Correct to 3 meters Average Field Strength Limit ReadAnalyzer Reading AFAvg Average Field Strength @ 3 m HPFMargin vs. Average Limit Margin vs. Average Limit Margin vs. Peak Limit CLfDist Distance to Antenna ReadCLAmp Amerage Field Strength @ 3 m Margin vs. Peak Limit Claulated Peak Field Strength Margin vs. Peak Limit CLDet P/A/Q PfDist Read AFRead AF AffAF CLCLAmp Amp B dBD Corr B BHint B dB BMargin Ant. Pol. BDet. P/A/Q PfDist Read AffRead AF AffAF CLCLAmp Amp BD Corr BHint Amgin vs. Peak Limit BfDist Aff BRead AffAF CLCLAmp Amp BD CorrFitr Corr. Corr. Corr. Corr.Limit Margin Ant. Pol. BDet. P/A/Q P5180 MHzIn HT20ImImImoveImoveImoveImovefDist Albu V30.34.739.113.0-31.90.00.755.674.0-18.4VP15.5403.03.035.339.113.0-31.90.00.756.1
$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Company: Apple Test Target: FCC Class B Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Corr. Limit Margin Ant. Pol. Det. ? f Dist MBuV dB/m dB dB dB dB dB dB dB dB Margin Vs. Peak ? f Dist Read AF CL Amp DCorr Fitr Corr. Limit Margin Ant. Pol. Det. ? f MBuV dB/m dB
Test Target: FCC Class B 802.11n HT20 TX mode f Measurement Frequency Amp Dist Preamp Gain Distance to Antenna Read Average Field Strength Limit Distance Correct to 3 meters Average Field Strength Limit Peak Field Strength Limit AF Antenna Factor CL Peak Calculated Peak Field Strength CL Margin vs. Average Limit f Dist Read And Analyzer Reading AF AF Antenna Factor dBuV Peak Calculated Peak Field Strength GHz Margin vs. Peak Limit f Dist Cable Loss CL Amp dB D Corr dB Fit Corr. dB Limit Margin Ant. Pol. dB Det. V/H P/A/Q P 5180 MHz HT20 In In In In In In Pick In In <thi< th=""></thi<>
Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Dist Preamp Gain Distance to Antenna Average Field Strength Limit Read Analyzer Reading ArF Average Field Strength Margin vs. Average Limit AF Antenna Factor CL Peak Calculated Peak Field Strength Margin vs. Peak Limit f Dist Read AF CL Amp Amena Factor D Corr Peak Flir Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp Amb D Corr Flir Corr. Limit Margin Ant. Pol. Det. P f OBuV dB/m dB dB dB dB dB dB dB D P 5180 MHz 11n HT20 I I 3.0 34.7 39.1 13.0 -31.9 0.0 0.7 55.6 74.0 -18.4 V P I5.540 3.0 35.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -17.9 H P
fMeasurement Frequency Amp DistPreamp Gain Distance Correct to 3 metersAverage Field Strength Limit Peak Field Strength LimitReadAnalyzer Reading ArgAvg Average Field Strength @ 3 m Arerage Field Strength @ 3 m Margin vs. Average Limit Margin vs. Peak LimitMargin vs. Average Limit Margin vs. Peak LimitAF CLAntenna Factor CLPeak Calculated Peak Field Strength HPFMargin vs. Peak Limit Margin vs. Peak Limitf GHzDist (m)Read dB/mAF dB dBCLAmp dBD Corr dB dBFitr dB dBCorr. dB dB dBMargin Ant. Pol. dB dB dBDet. P/A/Q PP5180 MHzIn HT20Imode 15.540Imode 3.0Imode 34.7Imode 39.1Imode 13.0Imode 31.9Imode 0.0Imode 0.7Imode 55.6Imode 74.0Imode 18.4Imode VI5.5403.035.339.113.0-31.90.00.756.174.0-17.9Imode HImode
f Measurement Frequency Amp Dist Preamp Gain Average Field Strength Limit Dist Distance to Antenna Read Analyzer Reading Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor CL Cable Loss Peak Calculated Peak Field Strength Margin vs. Peak Limit f Dist Read AF CL Amp Amp D Corr Fitr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fitr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fitr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fitr Corr. Limit Margin vs. Peak Limit 5180 MHz 11n HT20 15.540 3.0 34.7 39.1 13.0 -31.9 0.0 0.7 55.6 74.0 -18.4 V P 15.540 3.0 35.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -
DistDistance to Antenna ReadD CorrDistance Correct to 3 meters Average Field Strength @ 3 mPeak Field Strength Limit Margin vs. Average Limit Margin vs. Peak LimitAFAntenna Factor CLPeakCalculated Peak Field Strength CLMargin vs. Average Limit Margin vs. Peak LimitfDist CHzReadAF MBWCLAmp ABD Corr ABFltr ABCorr.Limit Margin vs. Peak LimitfDist Margin vs. PeakRead AFAF
Read AF CLAnalyzer Reading AreaseAvg
AF CL Antenna Factor Cable Loss Peak HPF Calculated Peak Field Strength High Pass Filter Margin vs. Peak Limit f Dist GHz Read (m) AF dBuV AF dB CL Amp dB D Corr dB Filt dB Corr. dB Limit dB Margin vs. Peak Limit 5180 MHz In HT20 B dB dB dB dB dB Margin vs. Peak Limit 5180 MHz 11n HT20 C C Filt dB Corr. dB Limit dB Margin vs. Peak Limit 5180 MHz 11n HT20 C C Filt dB Corr. dB Limit dB Margin vs. Peak Limit 5180 MHz 11n HT20 C C Filt dB O.0 0.7 55.6 74.0 -18.4 V P 15.540 3.0 23.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -17.9 H P
CL Cable Loss HPF High Pass Filter f Dist Read AF CL Amp D Corr High Pass Filter GHz (m) dBuV dB/m dB dB D Corr Fltr Corr. Limit Margin Ant. Pol. Det. P/A/QP 5180 MHz 11n HT20 0 0.0 0.7 55.6 74.0 -18.4 V P 15.540 3.0 24.4 39.1 13.0 -31.9 0.0 0.7 45.2 54.0 -8.8 V A 15.540 3.0 35.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -17.9 H P
f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin Ant. Pol. Det. P/A/QP GHz (m) dBuV dB/m dB dB dB dB dB dBuV/m dBuV/m dB V/H P/A/QP 5180 MHz 11n HTzv -
f Dist Read AF CL Amp D Corr Fitr Corr. Limit Margin Ant. Pol. Det. P/A/Q P GHz (m) dBuV dB/m dB dB dB dB dB dB dB dB dB DCorr Fitr Corr. Limit Margin Ant. Pol. Det. P/A/Q P 5180 MHz 11n HT20
GHz (m) dBuV dB/m dB dB dB dB dB dB dB V/H P/A/Q P 5180 MHz 11n HT20
5180 MHz 11n H120 0 0.0 0.7 55.6 74.0 -18.4 V P 15.540 3.0 24.4 39.1 13.0 -31.9 0.0 0.7 55.6 74.0 -18.4 V P 15.540 3.0 24.4 39.1 13.0 -31.9 0.0 0.7 45.2 54.0 -8.8 V A 15.540 3.0 35.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -17.9 H P
15.540 3.0 34.7 39.1 13.0 -31.9 0.0 0.7 55.0 74.0 -18.4 V P 15.540 3.0 24.4 39.1 13.0 -31.9 0.0 0.7 45.2 54.0 -8.8 V A 15.540 3.0 35.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -17.9 H P
15.540 3.0 24.4 39.1 15.0 -51.9 0.0 0.7 45.2 54.0 -8.8 V A 15.540 3.0 35.3 39.1 13.0 -31.9 0.0 0.7 56.1 74.0 -17.9 H P
15.540 5.0 55.5 57.1 15.0 -51.7 0.0 0./ 50.1 /4.0 -1/.9 H P
15 540 3.0 24.3 30.1 13.0 11.0 0.0 0.7 45.2 54.0 9.9 H A
15.540 5.0 24.5 59.1 15.0 51.9 0.0 0.7 45.2 54.0 -0.0 H A
15.600 3.0 34.5 38.8 13.0 -31.9 0.0 0.7 55.1 74.0 -18.9 H P
15.600 3.0 24.3 38.8 13.0 -31.9 0.0 0.7 45.0 54.0 -9.0 H A
15.600 3.0 34.8 38.8 13.0 -31.9 0.0 0.7 55.5 74.0 -18.5 V P
15.600 3.0 24.3 38.8 13.0 -31.9 0.0 0.7 45.0 54.0 -9.0 V A
5240 MHz 11n HT20
15.720 3.0 35.2 38.4 13.1 -31.9 0.0 0.7 55.6 74.0 -18.4 H P
15.720 3.0 24.2 38.4 13.1 -31.9 0.0 0.7 44.5 54.0 -9.5 H A
15.720 3.0 34.4 38.4 13.1 -31.9 0.0 0.7 54.7 74.0 -19.3 V P
15.720 3.0 24.2 38.4 13.1 -31.9 0.0 0.7 44.5 54.0 -9.5 V A

Page 153 of 245

9.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW 1 CHANNEL)





Page 154 of 245





Page 155 of 245 UL CCS FORM NO: CCSUP4701H 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

RESTRICTED BANDEDGE (LOW 2 CHANNEL)





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roject: 12U14680			Mkr1 5.147 75 GH	z
ef 110 dBµV	#Atten≬dB		56.97 dBµ∖	Center Freq 5.07500000 GHz
og				Start Freq
B/				5.00000000 GHz
B				Stop Freq 5.15000000 GHz
4.0 Βμ∨				CF Step
PAvg	angeneration	an devide of the second	experience of the second second second	Auto Ma
1 V2 3 FC				Freq Offset 0.00000000 Hz
(f): Tun				Signal Track



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Page 157 of 245

HARMONICS AND SPURIOUS EMISSIONS

UIII DI IP II C	Measure ertification	ment Service	s. Frei	nont 5m	Chamb	er						
comprise of		Jernee	.,		- Chumb							
Test Engr:	Tom Ch	en										
Date:	11/06/12	1										
Project #:	12U146	80										
Company:	Apple											
Test Target:	FCC CI	ass B										
Mode Oper:	802.11n	HT40 T	Kmod	e								
f	Measurer	ment Free	quency	Amp	Preamp	Gain			Average	Field Stren	gth Limit	
Dist	Distance	to Anter	ina	DCorr	Distance	Correc	ct to 3 me	ters	Peak Fie	d Strength	Limit	
Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin			
AF	Antenna	Factor		Peak	Calculate	d Peak	Field Stre	ength	Margin	vs. Peak Lin	nit	
CL	Cable Lo	SS		HPF	High Pas	s Filter	1					
f Die	t Road	AF	CI	Imm	DCorr	El tr	Corr	Timit	Margin	Ant Pol	Det	Notes
CH7 (m)	dBnV	dB/m	dR	AR	dB	dR	dBuV/m	dBuVm	dB	V/H	P/A/OP	Notes
5100 H- HT40	, ubuv	ub/m	uD	uD	ub	db	aba v/m	abu v/m	ub	v/n	ringr	
15 570 3.0	351	38.0	13.0	-11 0	0.0	0.7	55.8	74.0	-18.2	н	P	
15.570 3.0	24.4	38.9	13.0	-31.9	0.0	0.7	45.2	54.0	-8.8	н	A	
5190MHz HT40												
15.570 3.0	35.0	38.9	13.0	-31.9	0.0	0.7	55.8	74.0	-18.2	V	Р	
15.570 3.0	24.4	38.9	13.0	-31.9	0.0	0.7	45.1	54.0	-8.9	V	A	
5230MHz HT40												
15.690 3.0	35.1	38.5	13.0	-31.9	0.0	0.7	55.5	74.0	-18.5	н	P	
15.690 3.0	24.4	38.5	13.0	-31.9	0.0	0.7	44.8	54.0	-9.2	H	A	
5230MHz H140	247	20 5	12.0	11.0	0.0	0.7	55.1	74.0	19.0	v	D	
15.690 3.0	24.7	38.5	13.0	-31.9	0.0	0.7	44.9	54.0	-18.9	v	A	
Dev 4127	24.4	50.5	15.0	-31.9	0.0	0./	44.0	24.0	-9.4		а	
Rev. 4.1.2.7 Note: No other	emissions	were de	tected	alove	the system	m noi:	se floor.					

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9.5. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH 1 CHANNEL)





Page 159 of 245

Draiaat: 101114000		Mk-1 5 257 70 CH-	
Ref 110 dBµV	#Atten≬dB	56.63 dBµ∀	Center Freq 5.40500000 GHz
Log 10 1B/			Start Freq 5.3500000 GHz
0150 0150 01			Stop Freq 5.46000000 GHz
'4.0 1Βμ∨ ≇PAvg	ted the product of th	Anter migrosporter and and a second	CF Step 11.0000000 MHz <u>Auto Ma</u>
51 V2 53 FC			Freq Offset 0.00000000 Hz
*(f): =Tun Swp			Signal Track
Start 5.350 00 GH	z #VBW 3 MH	Stop 5.460 00 GHz	



Page 160 of 245 UL CCS FORM NO: CCSUP4701H 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

RESTRICTED BANDEDGE (HIGH 2 CHANNEL)





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Page 161 of 245

oject: 121/14690		Mkr1 5 351 21 GHz	
ef 110 dBµV	#Atten I dB	62.82 dBµ∀	Center Freq
Peak a			0.4000000 011
3/			Start Freq 5.35000000 GHz
ffst 5.5 3			Stop Free
.0 3μ∨ ♦			CF Ste
PAvg	Herdensen mentalisted mentaliste	any matine between which are a served	11.0000000 MH: Auto M
1 M2 3 FC			Freq Offset 0.00000000 Hz
():			Signal Track
wp			
art 5.350 00 GHz	· · · · · · · · · · · · · · · · · · ·	Stop 5.460 00 GHz	



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HARMONICS AND SPURIOUS EMISSIONS

Test Engr: Date:		tification	Service	s, Fre	mont 5n	n Chamb	er							
Date:		Tom Ch	en											
Date.		11/05/12												
Project #		1211469	0											
Comparts:		Annle												
Test Targe	t-	FCCC	ss R											
Vode Ore		802 11-	TY mod	•										
vioue Ope		002.114	LX III OU	e										
	f	Measuren	ent Fre	uencv	Amp	Preamp	Gain			Average	Field Stren	gth Limit		
	Dist	Distance	to Anter	ina	DCorr	Distance	Corre	ct to 3 me	ters	Peak Field Strength Limit				
	Read	Analyzer	Reading	10000	Avg Average Field Strength @ 3 m					Margin vs. Average Limit				
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Stre	ngth	Margin V	s. Peak Lin	nit		
	CL	Cable Los	is		HPF	High Pas	s Filter		0.11					
			~											
ſ	Di st	Read	AF	CL	Amp	DCorr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes	
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP		
5260 MHz	lla													
15.780	3.0	34.5	38.2	13.1	-31.9	0.0	0.7	54.7	74.0	-19.3	V	P		
15.780	3.0	24.0	38.2	13.1	-31.9	0.0	0.7	44.2	54.0	-9.8	V	A		
15.780	3.0	34.3	38.2	13.1	-31.9	0.0	0.7	54.4	74.0	-19.6	H	P		
5300 MH-	3.0	24.0	38.2	13.1	-31.9	0.0	0.7	44.1	54.0	-9.9	н	A		
15.900	30	34.4	37.8	13.2	-11.8	0.0	07	54.2	74.0	-10.8	н	р		
15.900	3.0	24.1	37.8	13.2	-31.8	0.0	0.7	43.0	54.0	-10.1	н	A		
15.900	3.0	34.7	37.8	13.2	-31.8	0.0	0.7	54.5	74.0	-19.5	v	P		
15.900	3.0	24.1	37.8	13.2	-31.8	0.0	0.7	43.9	54.0	-10.1	V	A		
5320 MHz	11a													
15.960	3.0	34.6	37.8	13.2	-31.8	0.0	0.7	54.4	74.0	-19.6	V	P		
15.960	3.0	24.1	37.8	13.2	-31.8	0.0	0.7	43.9	54.0	-10.1	V	A		
15.960	3.0	34.6	37.8	13.2	-31.8	0.0	0.7	54.4	74.0	-19.6	H	P		
15.960	3.0	24.1	37.8	13.2	-31.8	0.0	0.7	43.9	54.0	-10.1	H	A		

Page 163 of 245

9.6. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH 1 CHANNEL)





Page 164 of 245

Project: 12U14680		Mkr1 5.353 0	8 GHz
tef 110 dBµ∨	#Atten≬dB	58.05	dBµ√ 5.40500000 GH
0 B/			Start Free 5.35000000 GH
5.5 IB			Stop Fre 5.46000000 GH
4.0 IBµ√ PAvg	address of the state	approximite description of the	CF Ste 11.0000000 MH <u>Auto M</u>
11 V2 13 FC			Freq Offset 0.00000000 Hz
(f): Tun Wp			Signal Traci
itart 5.350 00 GHz	#\/BW 3 M	Stop 5.460 0	0 GHz



Page 165 of 245 UL CCS FORM NO: CCSUP4701H 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

RESTRICTED BANDEDGE (HIGH 2 CHANNEL)





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Page 166 of 245

Regirent 13:29:3	9 OCI 24, 2012	RI	BVWAVg
Project: 12U14680 ≷ef 110 dB µ√ /Peak	#Atten≬dB	Mkr1 5.352 53 GHz 70.55 dBµ∨	Res B ¹ 1.0 MH Auto <u>M</u> 3
.og 0 IB/ Dffst 5.6			Video B ¹ 3.0 MH Auto <u>Ma</u> VBW/RE
IB ↓1			1.00000 <u>Auto Ma</u> Average 10
1 V2 3 FC	4.3499494949494949494444444444444444444	her en fan de	On <u>O</u> Avg/VBW Type Pwr (RMS) Auto <u>M</u> a
(f): Tun wp			Span/RBV
tart 5.350 00 GHz Res BW 1 MHz	#VBW 3 MH:	Stop 5.460 00 GHz z Sween 1 ms (1001 pts)	10 Auto Ma



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Page 167 of 245

HARMONICS AND SPURIOUS EMISSIONS

Tost En au	ce Cer	Measuren	Service	s. Fre	mont 5m	Chamb	er							
Test En an	ce cer	uncation	Service	3, 110	mont Sh	a chamo	c.							
Test Engr:		Tom Ch	en											
Date:		11/06/12												
Project #:		12U1468	0											
Company	:	Apple												
Test Targe	et:	FCC Cla	ss B											
Mode Ope	er:	802.11n	HI20 T	Xmod	e									
						_								
	t	Measuren	nent Free	quency	Amp	Preamp	Gain			Average Field Strength Limit				
	Dist	Distance	to Anter	nna	DCorr	Distance	Corre	ct to 3 me	ters	Peak Fie	ad Strength	Limit		
	Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin v	vs. Average	Limit		
	AF	Antenna	ractor		Peak	Calculate	d Peak	Field Str	ength	Margin v	vs. Peak Lin	mit		
	CL	Cable Los	SS		HPF	High Pas	s Filter	r.						
ſ	Dist	Read	AF	CL	Amp	DCorr	Eltr	Corr	Limit	Margin	Ant Pol	Det	Notes	
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/OP	roles	
5260 MHz	HT20			1				1						
15.780	3.0	34.9	38.2	13.1	-31.9	0.0	0.7	55.1	74.0	-18.9	н	P		
15.780	3.0	24.0	38.2	13.1	-31.9	0.0	0.7	44.2	54.0	-9.8	H	Ā		
15.780	3.0	34.1	38.2	13.1	-31.9	0.0	0.7	54.3	74.0	-19.7	V	P		
15.780	3.0	24.0	38.2	13.1	-31.9	0.0	0.7	44.2	54.0	-9.8	V	A		
5300 MHz	HT20													
15.900	3.0	34.4	37.8	13.2	-31.8	0.0	0.7	54.2	74.0	-19.8	H	P		
15.900	3.0	24.2	37.8	13.2	-31.8	0.0	0.7	44.0	54.0	-10.0	H	A		
15.900	3.0	34.0	37.8	13.2	-31.8	0.0	0.7	54.4	74.0	-19.0	V	P		
5320 MHz	3.0	24.2	37.8	13.2	-31.8	0.0	0./	44.0	54.0	-10.0	v	A		
15 960	3.0	35.1	37.6	13.2	-31.8	0.0	0.7	54.7	74.0	-10.3	н	Р		
15.960	3.0	24.3	37.6	13.2	-31.8	0.0	0.7	43.9	54.0	-10.1	н	Â		
15.960	3.0	34.8	37.6	13.2	-31.8	0.0	0.7	54.4	74.0	-19.6	V	P		
15.960	3.0	24.3	37.6	13.2	-31.8	0.0	0.7	44.0	54.0	-10.0	V	A		
Rev. 4.1.2.	.7									1.1.1.1.1				
Note: No	other e	missions	were de	tected	above	the system	m noi:	se floor.						

Page 168 of 245

9.7. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH 1 CHANNEL)





Page 169 of 245

Project: 121114680		Mkr1 5 350 11 GHz	
Ref 110 dBµV	#Atten I dB	56.45 dBµ∨	Center Freq
Peak			3.40000000 0112
10 1B/			Start Freq 5.35000000 GHz
Offst 5.4 IB			Stop Freq
4.0 Bu∀			CF Step
PAvg	an an a far the address of the second	100 Will advert the south the Brankley	11.0000000 MHz Auto Ma
S1 M2 S3 FC			Freq Offset 0.00000000 Hz
(f): Tun			Signal Track
3wp			
Start 5.350 00 GHz		Stop 5.460 00 GHz	



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Page 170 of 245

RESTRICTED BANDEDGE (HIGH 2 CHANNEL)





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Page 171 of 245

oject: 121/14690		Mkr1 5 351 21 GHz	
ef 110 dBµV	#Atten I dB	62.82 dBµ∀	Center Freq
Peak a			0.4000000 011
3/			Start Freq 5.35000000 GHz
ffst 5.5 3			Stop Free
.0 3μ∨ ♦			CF Ste
PAvg	Herdensen mentalisted mentaliste	any material and any and a second	11.0000000 MH: Auto M
1 M2 3 FC			Freq Offset 0.00000000 Hz
():			Signal Track
wp			
art 5.350 00 GHz	· · · · · · · · · · · · · · · · · · ·	Stop 5.460 00 GHz	



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Page 172 of 245

HARMONICS AND SPURIOUS EMISSIONS

mprinnee	ncy M Certi	leasuren	Service	s. Frei	nont 5n	Chamb	er						
	cera	incation	Service	5, 11 61	non on	Спашо	ei						
Test Engr:		Tom Che	en										
Date:		11/06/12											
Project #:	1	12U1468	0										
Company:		Apple											
Test Target:		FCC Cla	ss B										
Mode Oper:	3	802.11n	HT40 T	mod	e								
						_							
f		Measuren	ient Fred	uency	Amp	Preamp	Gain			Average	Field Stren	gth Limit	
Di	st	Distancet	to Anten	ina	DCorr	Distance	Correc	ct to 3 me	ters	Peak Fie	ad Strength	Limit	
Re	ad .	Analyzer	Reading		Avg	Average Field Strength @ 3 m				Margin v	vs. Average	Limit	
AF		Antennal	ractor		Peak	Calculate	d Peak	Field Stre	ength	Margin v	vs. Peak Lin	nit	
CL	- '	Cable Los	S		HPF	High Pas	s Filter						
f I	Dist	Read	AF	CL	Amp	DCorr	Fitr	Corr	Limit	Margin	Ant. Pol.	Det.	Notes
GHz (m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/OP	
5270MHz HT	40												
15.810	3.0	34.0	38.1	13.1	-31.9	0.0	0.7	54.1	74.0	-19.9	н	P	
15.810 3	3.0	24.1	38.1	13.1	-31.9	0.0	0.7	44.1	54.0	-9.9	H	A	
5270MHz HT	40												
15.810	3.0	34.4	38.1	13.1	-31.9	0.0	0.7	54.4	74.0	-19.6	V	P	
15.810	3.0	24.0	38.1	13.1	-31.9	0.0	0.7	44.1	54.0	-9.9	V	A	
5310MHz HT	40							-					
15.930	3.0	34.8	37.7	13.2	-31.8	0.0	0.7	54.6	74.0	-19.4	H	P	
15.930	3.0	24.3	37.7	13.2	-31.8	0.0	0.7	44.0	54.0	-10.0	н	A	
5 030	3.0	35.0	377	13.2	-11 8	0.0	0.7	54.8	74.0	-10.2	v	P	
15 930	3.0	24.3	37.7	13.2	-11.8	0.0	0.7	44.0	54.0	-10.0	v	A	
Rev 4127	0.0	24.0	07.17	10.2	0110	0.0	0.7	44.0	24.0	10.0			
Note: No oth	er en	115510115	were de	tected	atove	he syste	m n 015	se lloor.					

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9.8. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW 1 CHANNEL)





Page 174 of 245





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Page 176 of 245

Project: 12U14680	-	Mkr1 5,408 44 GHz	
Ref 110 dBµ∀ Peak □	#Atten I dB	59.88 dBµ∨	Center Freq 5.41000000 GHz
0			Start Freq 5.3500000 GHz
6.2 B			Stop Fred 5.47000000 GHz
4.0 Bμ√ PAvg that, where	Land and the second sec	an and and a sector of a later of the	CF Ste 12.0000000 MHz Auto M
11 V2 3 FC			Freq Offset 0.00000000 Hz
(f): Tun wp			Signal Track On <u>O</u>
tart 5.350 00 GHz Res BW 1 MHz	#VBW 3 MHz	Stop 5.470 00 GHz Sweep 1 ms (1001 pts)	



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AUTHORIZED BANDEDGE (HIGH 1 CHANNEL)

roject: 12U14680			Mł	ar1 5.727 5	GHz	
ef 110 dBµV Peak	#Atten≬dB			61.41 d	Bµ∨	Center Freq 5.77500000 GHz
og 0 B/						Start Freq 5.72500000 GHz
6.4 B						Stop Freq 5.82500000 GHz
8.2 Bµ√ ♦ PAvg	terply biraction between	hannan marin	hallar of fall southerna	instructure	Alantashi	CF Step 10.0000000 MHz Auto Ma
1 V2 3 FC						Freq Offset 0.00000000 Hz
(f): Tun wp						Signal Track On <u>Of</u>
tart 5.725 0 GHz			S1	top 5.825 0	GHz	



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Page 179 of 245

HARMONICS AND SPURIOUS EMISSIONS

Complian	ice Cer	tification	Service	s, Fre	mont 5n	n Chamb	er						
Test Engr		Tom Ch	en										
Date.		11/06/12											
Project #		1201468	:0										
Compary		Annie											
Test Tarm	et:	FCC Class B											
Mode Oper:		802.11a TX mode											
		002.114	LA III OUI										
	f	Measuren	nent Fre	quency	Amp	Preamp Gain			Average	Field Stren	gth Limit		
	Dist	Distance to Antenna DCo			DCorr	Distance Correct to 3 meters				Peak Fie	d Strength	Limit	
Read		Analyzer	Reading		Avg	Average Field Strength @ 3 m				Margin v	vs. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Sr	ength	Margin v	vs. Peak Lin	mit	
	CL	Cable Loss		HPF	High Pass Filter								
						In c							
1	Dist	Read	AF	CL	Amp	DCorr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	aB	aB	qB	d B	aBuV/m	aBuV/m	qB	V/H	P/A/QP	
5500 MHz	z 11a			10.5			0.5	-					
11.000	3.0	34.8	38.4	10.5	-33.6	0.0	0.7	50.8	74.0	-23.2	H	P	
11.000	3.0	24.5	38.4	10.5	-33.0	0.0	0.7	40.5	54.0	-13.5	N N	A D	
11.000	3.0	24.8	38.4	10.5	-33.0	0.0	0.7	40.8	54.0	-13.2	V	P A	
5580 MH2	z 11a	24.0	50.4	10.5	-33.0	0.0	0./	40.0		-13.2		-	
11.160	3.0	34.5	38.5	10.7	-33.4	0.0	0.7	51.0	74.0	-23.0	н	Р	
11.160	3.0	24.1	38.5	10.7	-33.4	0.0	0.7	40.7	54.0	-13.3	н	A	
11.160	3.0	37.0	38.5	10.7	-33.4	0.0	0.7	53.6	74.0	-20.4	V	P	
11.160	3.0	25.8	38.5	10.7	-33.4	0.0	0.7	42.3	54.0	-11.7	V	A	
5700 MHz	lla												
11.400	3.0	35.7	38.8	11.1	-33.2	0.0	0.7	53.1	74.0	-20.9	V	Р	
11.400	3.0	24.2	38.8	11.1	-33.2	0.0	0.7	41.6	54.0	-12.4	V	A	
11.400	3.0	33.9	38.8	11.1	-33.2	0.0	0.7	51.3	74.0	-22.7	H	P	
11.400	3.0	23.7	38.8	11.1	-33.2	0.0	0.7	41.1	54.0	-12.9	H	A	
11.400 11.400 Rev. 4.1.2 Note: No	3.0 3.0 .7 other e	33.9 23.7 missions	38.8 38.8 were de	11.1 11.1 tected	-33.2 -33.2 above	0.0 0.0 the system	0.7 0.7 m noi:	51.3 41.1 se floor.	74.0 54.0	-22.7 -12.9	H	P A	

Page 180 of 245

9.9. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

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Page 181 of 245





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Page 182 of 245

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Page 183 of 245





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Page 185 of 245

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Page 186 of 245
HARMONICS AND SPURIOUS EMISSIONS

Test Engr: Tom Chen Date: 11/06/12 Project #: 12/U14680 Company: Apple Test Target: FCC Class B Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Anp Preamp Gain Average Field Strength Limit Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fit Corr. Limit Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter D D D P S500 MHz HT20 I C Corr. Limit Margin vs. Peak Limit P 11.000 3.0 24.3 38.4 10.5 -33.6 0.0 0.7 <th< th=""><th>Complian</th><th>ice Cer</th><th>tification</th><th>Service</th><th>s, Fre</th><th>mont 5n</th><th>n Chamb</th><th>er</th><th></th><th></th><th></th><th></th><th></th><th></th></th<>	Complian	ice Cer	tification	Service	s, Fre	mont 5n	n Chamb	er						
Test Engr: Tom Chen Date: 11/06/12 Project #: 12U14680 Company: Apple Test Target: FCC Class B Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Arg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit Det. P/A/QP P 5500 MHz H20 Image Image Image Ant. Pol. Det. P 11.000 3.0 34.1 0.5 -33.6 0.0 0.7 50.2 74.0 -23.8 H P 11.000 3.0 24.3 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V P								22						
Date: 11/06/12 Project #: 12U14680 Company: Apple Test Target: FCC Class B Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Are age Field Strength @ 3 m Margin vs. Average Limit Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fit Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fit Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fit Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fit Corr. Limit Margin vs. Peak Limit <	Test Engr	:	Tom Ch	en										
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Date:		11/06/12											
	Project #:		12U1468	0										
Test Target: FCC Class B Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avgrage Field Strength @ 3 m Margin vs. Average Limit Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Filt Corr. Limit Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Calculated Peak Field Strength Det. P 11.000 3.0 34.1 38.4 10.5 -33.6 0.0 0.7 50.2 74.0 -23.8 H P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V	Company		Apple											
Mode Oper: 802.11n HT20 TX mode f Measurement Frequency Amp Dist Distance to Antenna Read Preamp Gain D Corr Average Field Strength Limit Distance Correct to 3 meters Read Average Field Strength Limit Margin vs. Average Limit CL AF Antenna Factor Calculated Peak Peak Field Strength Margin vs. Average Limit Margin vs. Average Limit f Dist Read Antenna Factor Peak Peak Calculated Peak Field Strength (Calculated Peak Field Strength) Margin vs. Average Limit f Dist Read MBuV AF CL Amp MB D Corr Fir Corr. Limit Margin vs. Average Limit f Dist Read AF CL Amp D Corr Fir Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fir Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fir Corr. Limit Margin vs. Margin vs. Peak f Distor BB	Test Targ	et:	FCC Class B											
f Measurement Frequency Anp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit Det. N 5500 MHz HT20 Image: Strength Image: Strength dB Image: Strength dB Image: Strength dB V/H P/A/Q P 11.000 3.0 34.1 38.4 10.5 -33.6 0.0 0.7 50.2 74.0 -23.8 H P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V P	Mode Op	er:	802.11n	HT20 D	X mod	e								
f Measurement Frequency Anp Dist Preamp Gain Average Field Strength Limit Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Average Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f OBUV dB dB dB dB dB MB dB														
Dist Distance to Antenna DCorr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Aver age Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Average Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit f Dist Read AF CL Am D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin vs. Peak Limit f Dist Read AF CL Amp D Corr Fltr Corr. Limit		f	Measurement Frequency Am			Amp	Preamp (Gain			Average Field Strength Limit			
Read AF CL Andlyzer Reading AF Calculated Peak HPF Average Field Strength (Calculated Peak Field Strength) High Pass Filter Margin vs. Average Limit Margin vs. Peak Limit f Dist CL Read BUV AF BUV CL Amp BBW D Corr BB Fltr Corr. Corr. Limit BBW/m Margin vs. Peak Limit Det. Peak f Dist GHz Read m AF BBW CL Amp BB D Corr BB Fltr Corr. Corr. Limit BBW/m Margin vs. Peak Limit 5500 MHz HT20 <td></td> <td>Dist</td> <td>Distance</td> <td>to Anter</td> <td>nna</td> <td>DCorr</td> <td colspan="4">Distance Correct to 3 meters</td> <td>Peak Fie</td> <td>d Strength</td> <td>Limit</td> <td></td>		Dist	Distance	to Anter	nna	DCorr	Distance Correct to 3 meters				Peak Fie	d Strength	Limit	
AF CL Antenna Factor Cable Loss Peak HPF Calculated Peak Field Strength High Pass Filter Margin vs. Peak Limit f Dist GHz Read (m) AF dBuV CL Amp dB D Corr dB Fit dB Corr. dB Limit dB Margin Ant. Pol. dB Det. V/H P/A/QP 5500 MHz HT20		Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin v	s. Average	Limit	
CL Cable Loss HPF High Pass Filter f Dist GHz Read (m) AF CL Amp dB D Corr dB High Pass Filter GHz (m) dBuV dB/m dB dB dB dB dB dB dB dB V/H P/A/QP P 5500 MHz HT20		AF	Antenna	Factor		Peak	Calculated Peak Field Strength				Margin vs. Peak Limit			
f Dist Read AF CL Amp D Corr Flir Corr. Limit Margin Ant. Pol. Det. P/A/QP GHz (m) dBuV dB/m dB dB dB dB dB dB dB dB dB/W/m dB V/H P/A/QP P/A/QP 5500 MHz HT20 BuV/m dB V/H P/A/QP 11.000 3.0 34.1 38.4 10.5 -33.6 0.0 0.7 50.2 74.0 -23.8 H P 11.000 3.0 24.3 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V P 11.000 3.0 34.4		CL	Cable Los	SS		HPF	High Pas	s Filter	r	10000000000				
I Dist Read AF CL Amp D Corr Flr Corr. Limit Margin Ant. Pol. Det. 2 GHz (m) dBuV dB/m dB dV/m dB V/H P/A/QP 5500 MHz HT20		The second			67		DC		6				P. (
GHZ (m) dBuV dB/m dB dB dB dB dB V/H P/A/Q P 5500 MHz HT20	ſ	Dist	Read	AF	CL	Amp	DCorr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
5500 MHz H120 - <	GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	PAQP	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5500 MH2	HT20		-	10.5		0.0		-					
11.000 3.0 24.3 38.4 10.5 -33.0 0.0 0.7 40.4 54.0 -13.0 H A 11.000 3.0 35.3 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.6 V P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 41.6 54.0 -12.4 V A 5580 MHz HT20	11.000	3.0	34.1	38.4	10.5	-33.6	0.0	0.7	50.2	74.0	-23.8	Н	Р	
11.000 3.0 35.3 36.4 10.5 -33.0 0.0 0.7 51.4 74.0 -22.0 V P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 51.4 74.0 -22.0 V P 11.000 3.0 25.5 38.4 10.5 -33.6 0.0 0.7 41.6 54.0 -12.4 V A 5580 MHz HT20	11.000	3.0	24.3	38.4	10.5	-33.0	0.0	0.7	40.4	54.0	-13.0	H	A	
X1.000 25.0 25.0 25.0 25.0 0.0 0.7 41.0 54.0 -12.4 V A 5580 MHz HT20	11.000	3.0	25.5	38.4	10.5	-33.0	0.0	0.7	41.6	54.0	-22.0	V	r A	
11.160 3.0 34.4 38.5 10.7 -33.4 0.0 0.7 50.9 74.0 -23.1 H P 11.160 3.0 24.0 38.5 10.7 -33.4 0.0 0.7 40.6 54.0 -13.4 H A 11.160 3.0 35.2 38.5 10.7 -33.4 0.0 0.7 51.8 74.0 -22.2 V P 11.160 3.0 25.4 38.5 10.7 -33.4 0.0 0.7 51.8 74.0 -22.2 V P 11.160 3.0 25.4 38.5 10.7 -33.4 0.0 0.7 42.0 54.0 -12.1 V A 5700 NHz HT20 54.0 -12.1 V A 5700 54.0 -12.1 V A	5580 MH	HT20	23.3	30.4	10.5	-33.0	0.0	0./	41.0	34.0	-12.4	•	A	
11.160 3.0 24.0 38.5 10.7 -33.4 0.0 0.7 40.6 54.0 -13.4 H A 11.160 3.0 24.0 38.5 10.7 -33.4 0.0 0.7 40.6 54.0 -13.4 H A 11.160 3.0 35.2 38.5 10.7 -33.4 0.0 0.7 51.8 74.0 -22.2 V P 11.160 3.0 25.4 38.5 10.7 -33.4 0.0 0.7 42.0 54.0 -12.1 V A 5700 NHz HT20 38.5 10.7 -33.4 0.0 0.7 42.0 54.0 -12.1 V A	11.160	3.0	34.4	38.5	10.7	-33.4	0.0	0.7	50.9	74.0	-23.1	н	Р	
11.160 3.0 35.2 38.5 10.7 -33.4 0.0 0.7 51.8 74.0 -22.2 V P 11.160 3.0 25.4 38.5 10.7 -33.4 0.0 0.7 51.8 74.0 -22.2 V P 11.160 3.0 25.4 38.5 10.7 -33.4 0.0 0.7 42.0 54.0 -12.1 V A 5700 NHz HT20	11.160	3.0	24.0	38.5	10.7	-33.4	0.0	0.7	40.6	54.0	-13.4	н	A	
11.160 3.0 25.4 38.5 10.7 -33.4 0.0 0.7 42.0 54.0 -12.1 V A	11.160	3.0	35.2	38.5	10.7	-33.4	0.0	0.7	51.8	74.0	-22.2	V	P	
5700 MHz HT20	11.160	3.0	25.4	38.5	10.7	-33.4	0.0	0.7	42.0	54.0	-12.1	V	A	
	5700 MHz	HT20												
11.400 3.0 34.0 38.8 11.1 -33.2 0.0 0.7 51.4 74.0 -22.6 H P	11.400	3.0	34.0	38.8	11.1	-33.2	0.0	0.7	51.4	74.0	-22.6	H	Р	
11.400 3.0 23.7 38.8 11.1 -33.2 0.0 0.7 41.1 54.0 -12.9 H A	11.400	3.0	23.7	38.8	11.1	-33.2	0.0	0.7	41.1	54.0	-12.9	H	A	
11.400 3.0 34.7 38.8 11.1 -33.2 0.0 0.7 52.1 74.0 -21.9 V P	11.400	3.0	34.7	38.8	11.1	-33.2	0.0	0.7	52.1	74.0	-21.9	V	P	
11.400 3.0 23.9 38.8 11.1 -33.2 0.0 0.7 41.3 54.0 -12.7 V A	11.400	3.0	23.9	38.8	11.1	-33.2	0.0	0.7	41.3	54.0	-12.7	V	A	

Page 187 of 245

9.10. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW 1 CHANNEL)





Page 188 of 245

roject: 12U14680		Mkr1 5.434 96 GHz	Contor From
ef 110 dBµV Peak	#Atten ø dB	56.87 dBµ∨	5.41000000 GHz
og 0 B/			Start Freq 5.3500000 GHz
5.2 B			Stop Free 5.47000000 GHz
J.0 Βμ√ ⊇Ανα		↓ ↓	CF Ste 12.000000 MH;
"" Phint hart	hadding many and intervention in an advantise of the sector of the secto	llowspectrated and an interval and a standard and a stand	Auto M
1 V2 3 FC			Freq Offset 0.00000000 Hz
f): Fun wp			Signal Tracl On <u>C</u>
tart 5.350 00 GHz	:	Stop 5.470 00 GHz	



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RESTRICTED & AUTHORIZED BANDEDGE (LOW 2 CHANNEL)



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Page 190 of 245

roject: 12U14680		Mkr1 5.434 96 GHz	Contor From
ef 110 dBµV Peak	#Atten Ø dB	56.87 dBµ∨	5.41000000 GHz
og 0 B/			Start Freq 5.3500000 GHz
5.2 B			Stop Free 5.47000000 GHz
J.0 Βμ√ ⊇Ανα		↓ ↓	CF Ste 12.000000 MH;
"" Phint hart	hadding many and intervention in an advantise of the sector of the secto	llowspectrated and an interval and a standard and a stand	Auto M
1 V2 3 FC			Freq Offset 0.00000000 Hz
f): Fun wp			Signal Tracl On <u>C</u>
tart 5.350 00 GHz	:	Stop 5.470 00 GHz	

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AUTHORIZED BANDEDGE (HIGH CHANNEL)

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Page 192 of 245

HARMONICS AND SPURIOUS EMISSIONS

Complian	ce Cer	inication	Service	s, frei	nont 5n	n Chamb	er						
Test Engr:		Tom Ch	en										
Date:		11/06/12											
Project #:		12U1468	0										
Company	:	Apple											
Test Targe	et:	FCC Cla	ISS B										
Mode Ope	er:	802.11n	HT40 D	X mod	e								
	f	Measuren	nent Free	quency	Amp	Preamp Gain			Average Field Strength Limit				
	Dist	Distance to Antenna DCorr			Distance Correct to 3 meters			Peak Fie	ld Strength	Limit			
	Read	Analyzer	Reading		Avg	Average	Field S	trength (a	3 m	Margin v	s. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Sr	ength	Margin v	s. Peak Lin	nit	
	CL	Cable Los	ss		HPF	High Pas	s Filter		0.00				
ſ	Dist	Read	AF	CL	Amp	DCorr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
5510MHz	HT40							1					
11.020	3.0	35.0	38.4	10.5	-33.6	0.0	0.7	51.0	74.0	-23.0	H	P	
11.020	3.0	24.3	38.4	10.5	-33.6	0.0	0.7	40.4	54.0	-13.6	H	A	
11.020	3.0	34.5	38.4	10.5	-33.6	0.0	0.7	50.6	74.0	-23.4	V	P	
11.020	3.0	24.3	38.4	10.5	-33.6	0.0	0.7	40.4	54.0	-13.6	V	A	
5550MHz	HT40		-	10.0		0.0							
11.100	3.0	35.2	38.5	10.6	-33.5	0.0	0.7	51.5	74.0	-22.5	H	P	
11.100	3.0	24.2	38.5	10.6	-33.5	0.0	0.7	40.0	54.0	-13.4	H	A	
11 100	3.0	24.3	38.5	10.0	-33.5	0.0	0.7	40.6	54.0	-13.4	v	Δ	
5670MHz	HT40		50.5	10.0	-33.3	0.0	0./	40.0	24.0	-13.4		-	
11.340	3.0	33.8	38.7	11.0	-33.2	0.0	0.7	51.0	74.0	-23.0	Н	P	
11.340	3.0	23.8	38.7	11.0	-33.2	0.0	0.7	41.0	54.0	-13.0	Н	A	
11.340	3.0	34.0	38.7	11.0	-33.2	0.0	0.7	51.1	74.0	-22.9	V	P	
11.340	3.0	23.7	38.7	11.0	-33.2	0.0	0.7	40.9	54.0	-13.1	V	A	
11.340 Rev. 4.1.2. Note: No	3.0 .7 other e	23.7	38.7	11.0	-33.2	0.0	0.7 n nois	40.9	54.0	-13.1	V	A	

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Page 193 of 245

9.11. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

Page 194 of 245

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

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Page 195 of 245

HORIZONTAL AND VERTICAL DATA

Project No:12U14680 Client Name:Apple Model / Device:A1469 Config / Other:EUT with support equiment Test By:Tom Chen

Horizontal 30 - 1000MHz

				25MHz-1GHz			CFR 47 Part		
Marker	Test	Meter		Chambr 3m	Antenna		15 Class B		
No.	Frequency	Reading	Detector	Amplified (dB)	T185 (dB)	dBuV/m	3m	Margin	Polarity
1	32.7138	41.61	РК	-27.5	19.2	33.31	40	-6.69	Horz
2	35.8153	44.09	РК	-27.4	16.9	33.59	40	-6.41	Horz
3	217.6419	51.04	РК	-25.7	10.6	35.94	46	-10.06	Horz
4	326.5614	48.28	QP	-25.3	13.8	36.78	46	-9.22	Horz
5	531.8645	48.34	PK	-25.8	18	40.54	46	-5.46	Horz
6	926.5328	44.17	PK	-23.9	22.3	42.57	46	-3.43	Horz

Vertical 30 - 1000MHz

				25MHz-1GHz			CFR 47 Part		
Marker	Test	Meter		Chambr 3m	Antenna		15 Class B		
No.	Frequency	Reading	Detector	Amplified (dB)	T185 (dB)	dBuV/m	3m	Margin	Polarity
7	32.605	41.11	QP	-27.5	19.3	32.91	40	-7.09	Vert
8	35.6874	42.96	QP	-27.4	17	32.56	40	-7.44	Vert
9	44.1507	53.22	PK	-27.4	10.8	36.62	40	-3.38	Vert
10	127.1163	49.04	PK	-26.5	13.9	36.44	43.5	-7.06	Vert
11	326.3889	50.29	PK	-25.3	13.8	38.79	46	-7.21	Vert
12	930.2158	23.25	QP	-23.8	22.4	21.85	46	-24.15	Vert

Page 196 of 245

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)			
	Quasi-peak	Average		
0.15-0.5	66 to 56	56 to 46		
0.5-5	56	46		
5-30	60	50		

Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

Page 197 of 245

RESULTS

<u>6 WORST EMISSIONS</u>

Project No:12U14680 Client Name:Apple Model/Device:A1469 Test Volt/Freq:120 VAC / 60Hz Test By:Tom Chen

Line-L1.15 - 30MHz

Test	Meter		T24 IL	LC Cables		CFR 47 Part 15 Class B		CFR 47 Part 15 Class B	
Frequency	Reading	Detector	(dB)	(dB)	dB(uVolts)	QP	Margin	Avg	Margin
0.159	51.79	PK	0.1	0	51.89	65.5	-13.61	-	-
0.159	39.33	Av	0.1	0	39.43	-	-	55.5	-16.07
3.8535	44.69	PK	0.1	0.1	44.89	56	-11.11	-	-
3.8535	29.82	Av	0.1	0.1	30.02	-	-	46	-15.98
18.1185	46.96	PK	0.2	0.2	47.36	60	-12.64	-	-
18.1185	31.87	Av	0.2	0.2	32.27	-	-	50	-17.73
Line-L2 .15	- 30MHz		T24 II	LC Cables		CER 47 Part		CFR 47 Part	
Test	Meter		L2.TXT	2&3.TXT		15 Class B		15 Class B	
Frequency	Reading	Detector	(dB)	(dB)	dB(uVolts)	QP	Margin	Avg	Margin
0.168	47.8	PK	0.1	0	47.9	65.1	-17.2	-	-
0.168	41.81	Av	0.1	0	41.91	-	-	55.1	-13.19
3.8355	41.28	PK	0.1	0.1	41.48	56	-14.52	-	-
3.8355	25.71	Av	0.1	0.1	25.91	-	-	46	-20.09
18.4605	45.65	PK	0.2	0.2	46.05	60	-13.95	-	-
			0.2						

Page 198 of 245

LINE 1 RESULTS

Page 199 of 245

LINE 2 RESULTS

Page 200 of 245

11. DYNAMIC FREQUENCY SELECTION

11.1. OVERVIEW

11.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) Channel Availability Check Time: ...

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

<u>FCC</u>

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Page 201 of 245

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode					
	Master	Client (without radar detection)	Client (with radar detection)			
Non-Occupancy Period	Yes	Not required	Yes			
DFS Detection Threshold	Yes	Not required	Yes			
Channel Availability Check Time	Yes	Not required	Not required			
Uniform Spreading	Yes	Not required	Not required			

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode					
	Master	Client	Client			
		(without DFS)	(with DFS)			
DFS Detection Threshold	Yes	Not required	Yes			
Channel Closing Transmission Time	Yes	Yes	Yes			
Channel Move Time	Yes	Yes	Yes			

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value				
	(see note)				
≥ 200 milliwatt	-64 dBm				
< 200 milliwatt	-62 dBm				
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna					
Note 2: Throughout these test procedures an additional 1 dB ha	as been added to the amplitude				
of the test transmission waveforms to account for variations in	measurement equipment. This				
will ensure that the test signal is at or above the detection three	hold level to trigger a DFS				
response.					

Page 202 of 245

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period

The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows:

For the Short pulse radar Test Signals this instant is the end of the *Burst*.

For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated.

For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

		1000 114101011110			
Radar	Pulse Width	PRI	Pulses	Minimum	Minimum
Туре	(Microseconds)	(Microseconds)		Percentage of	Trials
				Successful	
				Detection	
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (E	Padar Types 1 4)		80%	120	

Table 5 – Short Pulse Radar Test Waveforms

Aggregate (Radar Types T

Table 6 – Long Pulse Radar Test Signal

Radar	Bursts	Pulses	Pulse	Chirp	PRI	Minimum	Minimum
Waveform		per	Width	Width	(µsec)	Percentage	Trials
		Burst	(µsec)	(MHz)		of Successful	
						Detection	
5	8-20	1-3	50-100	5-20	1000-	80%	30
					2000		

Table 7 – Frequency Hopping Radar Test Signal

Radar	Pulse	PRI	Burst	Pulses	Hopping	Minimum	Minimum
Waveform	Width	(µsec)	Length	per	Rate	Percentage of	Trials
	(µsec)		(ms)	Нор	(kHz)	Successful	
				-		Detection	
6	1	333	300	9	.333	70%	30

Page 203 of 245

11.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM

Page 204 of 245

SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at runtime.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

Page 205 of 245

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST						
Description	Manufacturer	Model	Asset Number	Cal Due		
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/18/13		
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	11/17/12		

Page 206 of 245

11.1.3. SETUP OF EUT (CLIENT MODE)

RADIATED METHOD EUT TEST SETUP

SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description	Manufacturer	Model	Serial Number	FCC ID			
Wireless Access Point	Cisco	AIR-AP1252AG-A-	FTX130390D9	LDK102061			
(Master Device)		K9					
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH1049902N	DoC			
Notebook PC	Apple	MacBook Pro A1150	AOU257941	DoC			
(Controller/Server)							
AC Adapter	Delta Electronics	A1344	MV05104CNAL1A	DoC			

11.1.4. SETUP OF EUT (CLIENT-TO-CLIENT COMMUNICATIONS MODE)

RADIATED METHOD EUT TEST SETUP

SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description	Manufacturer	Model	Serial Number	FCC ID			
Wireless Access Point	Cisco	AIR-AP1252AG-A-	FTX130390D9	LDK102061			
(Master Device)		K9					
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH1049902N	DoC			
Notebook PC	Apple	MacBook Pro A1150	AOU257941	DoC			
(Controller/Server)							
AC Adapter (Controller PC)	Delta Electronics	A1344	MV05104CNAL1A	DoC			
Tablet PC (Peer Slave)	Apple	A1460	DLXJ908HF8LD	BCGA1460			
Video Display Monitor	Dell	U2410F	CN-0F525M-72872-	DoC			
			1B5-AGAL				

Page 208 of 245

11.1.5. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 22.87 dBm EIRP in the 5250-5350 MHz band and 22.78 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 3.16 dBi in the 5250-5350 MHz band and 2.34 dBi in the 5470-5725 MHz band.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is -64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses one transmitter/receiver chain connected to an antenna to perform radiated tests.

In the client mode, WLAN traffic is generated by streaming the video file TestFile.mp2 "6 ½ Magic Hours" from the Master to the Slave in full motion video mode using Safari web browser. In the Client-to-Client Communications mode, WLAN traffic is generated by streaming the video file TestFile.mp2 "6 ½ Magic Hours" from the Master, to the Slave, and mirror to the peer slave device in full motion video mode using Safari web browser.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths of 20 MHz and 40 MHz are implemented in standard client mode. Two nominal channel bandwidths of 20 MHz and 40 MHz are implemented in Client-to-Client Communications Mode.

The software installed in the EUT is IOS 5.2.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

Page 209 of 245

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102061. The minimum antenna gain for the Master Device is 3.5 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is -64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The software installed in the access point is 12.4(25d)JA1.

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Page 210 of 245

11.2. CLIENT MODE RESULTS FOR 20 MHz BANDWIDTH

11.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5500 MHz.

11.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM

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Page 211 of 245

TRAFFIC

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Page 212 of 245

11.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

```
Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
```

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.198	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	8.0	260

MOVE TIME

Page 214 of 245

CHANNEL CLOSING TIME

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Page 215 of 245

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.

Page 216 of 245

Only intermittent transmissions are observed during the IC aggregate monitoring period.

Page 217 of 245

11.3. CLIENT MODE RESULTS FOR 40 MHz BANDWIDTH

11.3.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5510 MHz.

11.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM

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Page 218 of 245

TRAFFIC

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11.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.3.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

```
Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
```

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.110	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	8.0	260

MOVE TIME

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CHANNEL CLOSING TIME

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Page 222 of 245
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



Page 223 of 245

Only intermittent transmissions are observed during the IC aggregate monitoring period.



Page 224 of 245

11.3.5. NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.

Agilent 12:54:	54 Nov 9, 2012			R	Т	Freq/Channel
40 dBm	#Atten 0 dB		Δ	Mkr1 1.8 -34.48	3 ks 3 dB	Center Free 5.51000000 GH
_1R						Start Free 5.51000000 GH
						Stop Fre 5.51000000 GH
					1	CF Sto 3.00000000 MH <u>Auto N</u>
S2 FS 4A						Freq Offse 0.00000000 H:
1						Signal Trac On <u>!</u>
er 5.510 000 (BW 3 MHz	GHz v	BW 3 MHz	Sweep	Spar 2 ks (8001 r	n 0 Hz î	

Page 225 of 245

11.4. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 20 MHz BANDWIDTH

11.4.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5500 MHz.

11.4.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



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Page 226 of 245

TRAFFIC

Aglient 14:09	:03 Nov 8, 2012			R	L	Freq/Channe
f -40 dBm eak	#Atten 0 dB			Mkr1 10 -81.41 (.81 s dBm	Center Fre 5.50000000 GH
g						Start Fre 5.50000000 G⊦
.5			1			Stop Fre 5.5000000 GH
.0 m Av	es ente llas persona en el pol	and define work for a large	վանձայիսերի	aller to And Anna Lee	ekeldelde	CF St 3.00000000 MH <u>Auto 1</u>
S2 FS AA						Freq Offse 0.00000000 H
: un						Signal Trac On
ptor 5 500 000	GHz			Spar	1 0 Hz Î	

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Page 227 of 245

11.4.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.4.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

```
Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
```

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.178	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	24.0	260

MOVE TIME



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Page 229 of 245

CHANNEL CLOSING TIME



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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



Page 231 of 245

Only intermittent transmissions are observed during the IC aggregate monitoring period.



Page 232 of 245

11.5. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 40 MHz BANDWIDTH

11.5.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5510 MHz.

11.5.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



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Page 233 of 245

TRAFFIC



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Page 234 of 245

11.5.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.5.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

```
Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)
```

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.192	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	28.0	260

MOVE TIME



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Page 236 of 245

CHANNEL CLOSING TIME



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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



Page 238 of 245

Only intermittent transmissions are observed during the IC aggregate monitoring period.



Page 239 of 245