

FCC CFR47 PART 15 SUBPART E

TEST REPORT

FOR

WIRELESS MESH ROUTER

MODEL NUMBER: MSR4K43N0, MSR4K43N3*

FCC ID: Q9DMSR4000DFS

REPORT NUMBER: 13U14957-1

ISSUE DATE: OCTOBER 24, 2013

Prepared for ARUBA NETWORKS 1344 CROSSMAN AVENUE SUNNYVALE, CA 94089, U.S.A.

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*Models differences are explained within the body of this report

NVLAP LAB CODE 200065-0

Revision History

Rev.	lssue Date	Revisions	Revised By
10/24/13		Initial Issue	F. Ibrahim

TABLE OF CONTENTS

1.	ΑΤΊ	ESTATION OF TEST RESULTS	. 7
2.	TES	T METHODOLOGY	. 8
3.	FAC	CILITIES AND ACCREDITATION	. 8
4.	CAL	IBRATION AND UNCERTAINTY	. 8
4	4.1.	MEASURING INSTRUMENT CALIBRATION	. 8
4	4.2.	SAMPLE CALCULATION	. 8
4	4.3.	MEASUREMENT UNCERTAINTY	. 9
5.	EQI	JIPMENT UNDER TEST	10
5	5.1.	DESCRIPTION OF EUT	.10
5	5.2.	DESCRIPTION OF MODEL(s) DIFFERENCES	.10
5	5.3.	MAXIMUM OUTPUT POWER	.10
5	5.4.	DESCRIPTION OF AVAILABLE ANTENNAS	.11
5	5.5.	SOFTWARE AND FIRMWARE	.11
5	5.6.	WORST-CASE CONFIGURATION AND MODE	.11
5	5.7.	DESCRIPTION OF TEST SETUP	.12
6.	TES	T AND MEASUREMENT EQUIPMENT	.14
6. 7.	TES ON	TAND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS	.14 .15
6. 7.	TES ON 7.1.	T AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS	. 14 . 15 . <i>15</i>
6. 7. 7	TES ON 7.1. 7.2.	T AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS MEASUREMENT METHOD FOR POWER AND PPSD	. 14 . 15 .15
6. 7. 7	TES ON 7.1. 7.2. 7.3.	T AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS MEASUREMENT METHOD FOR POWER AND PPSD MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz	. 14 . 15 .15 .15 .15
6. 7. 7 7	TES ON 7.1. 7.2. 7.3. 7.4.	T AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS. MEASUREMENT METHOD FOR POWER AND PPSD. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz DUTY CYCLE PLOTS	.14 .15 .15 .15 .15 .15
6. 7. 7 7 8.	TES ON 7.1. 7.2. 7.3. 7.4. AN1	TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS MEASUREMENT METHOD FOR POWER AND PPSD MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz DUTY CYCLE PLOTS	.14 .15 .15 .15 .15 .16 .18
6. 7. 7 7 7 7 7 7 8. 8.	TES ON 7.1. 7.2. 7.3. 7.4. 8.1. 8.1. 8.1. 8.1. 8.1.	ST AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS MEASUREMENT METHOD FOR POWER AND PPSD MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz DUTY CYCLE PLOTS FENNA PORT TEST RESULTS (Dipole Antenna, 9 dBi) 802.11a CDD 2TX MODE IN THE 5.3 GHz BAND 1 20 dB BANDWIDTH 2 26 dB BANDWIDTH 3 99% BANDWIDTH 4 OUTPUT POWER AND PPSD	.14 .15 .15 .15 .15 .15 .16 .18 .18 .18 .20 .24 .28
6. 7. 7 7 7 7 7 8. 8. 8. 8.	TES ON 7.1. 7.2. 7.3. 7.4. 8.1. 8.1. 8.1. 8.1. 8.1. 8.1. 8.1. 8	ST AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS. MEASUREMENT METHOD FOR POWER AND PPSD. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz. DUTY CYCLE PLOTS TENNA PORT TEST RESULTS (Dipole Antenna, 9 dBi) 802.11a CDD 2TX MODE IN THE 5.3 GHz BAND. 1 20 dB BANDWIDTH. 2 26 dB BANDWIDTH. 3 99% BANDWIDTH. 4 OUTPUT POWER AND PPSD. 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND . 1 20 dB BANDWIDTH. 2 26 dB BANDWIDTH. 3 99% BANDWIDTH. 4 OUTPUT POWER AND PPSD 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND . 1 20 dB BANDWIDTH. 2 26 dB BANDWIDTH. 3 99% BANDWIDTH. 4 OUTPUT POWER AND PPSD . 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND . 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND .	.14 .15 .15 .15 .15 .16 .18 .18 .18 .18 .18 .24 .28 .33 .35 .39 .43 .43
6. 7. 7 7 7 7 7 8. 8. 8. 8. 8.	TES ON 7.1. 7.2. 7.3. 7.4. 8.1. 8.1. 8.1. 8.1. 8.1. 8.1. 8.1. 8	ST AND MEASUREMENT EQUIPMENT TIME, DUTY CYCLE AND MEASUREMENT METHODS ON TIME AND DUTY CYCLE RESULTS MEASUREMENT METHOD FOR POWER AND PPSD MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz DUTY CYCLE PLOTS TENNA PORT TEST RESULTS (Dipole Antenna, 9 dBi) 802.11a CDD 2TX MODE IN THE 5.3 GHz BAND 1 20 dB BANDWIDTH 2 26 dB BANDWIDTH 3 99% BANDWIDTH 4 OUTPUT POWER AND PPSD 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND 1 20 dB BANDWIDTH 2 26 dB BANDWIDTH 3 99% BANDWIDTH 4 OUTPUT POWER AND PPSD 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND 1 20 dB BANDWIDTH 2 26 dB BANDWIDTH 3 99% BANDWIDTH 4 OUTPUT POWER AND PPSD 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND 1 20 dB BANDWIDTH 2 26 dB BANDWIDTH	.14 .15 .15 .15 .15 .16 .18 .18 .18 .18 .18 .18 .24 .23 .33 .35 .39 .43 .48 .48

Page 3 of 417

8.3.3. 8.3.4.	99% BANDWIDTH OUTPUT POWER AND PPSD	53
8.4. 802 8.4.1. 8.4.2. 8.4.3. 8.4.4. 8.4.5.	2.11a CDD 2TX MODE IN THE 5.6 GHz BAND 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD PEAK EXCURSION CONDUCTED WEATHER RADAR BAND EMISSIONS	
8.5. 802 8.5.1. 8.5.2. 8.5.3. 8.5.4. 8.5.5. 8.6. 802	2.11n HT20 STBC 2TX MODE IN THE 5.6 GHz BAND 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD PEAK EXCURSION CONDUCTED WEATHER RADAR BAND EMISSIONS 2.11n HT40 STBC 2TX MODE IN THE 5.6 GHz BAND	
8.6.1. 8.6.2. 8.6.3. 8.6.4. 8.6.5.	26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD PEAK EXCURSION CONDUCTED WEATHER RADAR BAND EMISSIONS	
9. ANTEN	NA PORT TEST RESULTS (Patch Antenna, 14 dBi)	114
9.1. 802 9.1.1. 9.1.2. 9.1.3. 9.1.4.	2.11a CDD 2TX MODE IN THE 5.3 GHz BAND 20 dB BANDWIDTH 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD	
9.2. 802 9.2.1. 9.2.2. 9.2.3. 9.2.4.	2.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND 20 dB BANDWIDTH 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD	
9.3. 802 9.3.1. 9.3.2. 9.3.3. 9.3.4.	2.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND 20 dB BANDWIDTH 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD	
9.4. 802 9.4.1. 9.4.2. 9.4.3. 9.4.4. 9.4.5.	2.11a CDD 2TX MODE IN THE 5.6 GHz BAND 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD PEAK EXCURSION CONDUCTED WEATHER RADAR BAND EMISSIONS	
9.5. 802 9.5.1. 9.5.2. 9.5.3. 9.5.4. 9.5.5.	2.11n HT20 STBC 2TX MODE IN THE 5.6 GHz BAND 26 dB BANDWIDTH 99% BANDWIDTH OUTPUT POWER AND PPSD PEAK EXCURSION CONDUCTED WEATHER RADAR BAND EMISSIONS Page 4 of 417	
UL VERIFICA	TION SERVICES INC.	FORM NO: CCSUP4701J

 9.6. 802.11n HT40 STBC 2TX MODE IN THE 5.6 GHz BAND 9.6.1. 26 dB BANDWIDTH	192 192 196 200 205 207
10. RADIATED TEST RESULTS	210
10.1. LIMITS AND PROCEDURE	210
10.2. DIPOLE ANTENNA 10.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND 10.2.2. TX ABOVE 1 GHz 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAN 10.2.3. TX ABOVE 1 GHz 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAN 10.2.4. TX ABOVE 1 GHz 802.11a CDD MODE IN THE 5.6 GHz BAND 10.2.5. TX ABOVE 1 GHz 802.11n HT20 STBC MODE IN THE 5.6 GHz BAND 10.2.6. TX ABOVE 1 GHz 802.11n HT20 STBC MODE IN THE 5.6 GHz BAND	211 211 D 223 D 231 237 250 259
10.3. PATCH ANTENNA	268 D 280 D 288 294 307 316
10.4. WORST-CASE BELOW 1 GHz (DIPOLE ANTENNA) 10.4.1. AC UNIT. 10.4.2. PoE UNIT. 10.5. WORST-CASE BELOW 1 GHz (DATOLE ANTENNA)	325 325 328
10.5. WORST-CASE BELOW 1 GHZ (PATCH ANTENNA) 10.5.1. AC UNIT 10.5.2. PoE MODULE PATCH ANTENNA	331 331 334
11. AC POWER LINE CONDUCTED EMISSIONS	337
11.1. AC MODEL RESULTS	338
11.2. POE MODEL RESULTS	342
12. DYNAMIC FREQUENCY SELECTION	346
12.1. OVERVIEW 12.1.1. LIMITS 12.1.2. TEST AND MEASUREMENT SYSTEM 12.1.3. SETUP OF EUT 12.1.4. DESCRIPTION OF EUT	346 346 349 352 353
12.2. RESULTS FOR 20 MHz BANDWIDTH	354 354 361 366 366 372 374

12.3.	RESULTS FOR 40 MHz BANDWIDTH	381
12.3.1	. TEST CHANNEL	
12.3.2	. RADAR WAVEFORMS AND TRAFFIC	
12.3.3	. CHANNEL AVAILABILITY CHECK TIME	
12.3.4	. OVERLAPPING CHANNEL TESTS	
12.3.5	. MOVE AND CLOSING TIME	
12.3.6	. NON-OCCUPANCY PERIOD	
12.3.7	. DETECTION BANDWIDTH	400
12.3.8	. IN-SERVICE MONITORING	
14. SET	UP PHOTOS	410
14. SET 14.1.	UP PHOTOS ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP	410 410
14. SET 14.1. 14.2.	UP PHOTOS <i>ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz)</i>	410 410 411
14. SET 14.1. 14.2. 14.2.1	UP PHOTOS ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz) AC UNIT	410 410 411 411
14. SET 14.1. 14.2. 14.2.1 14.2.2	UP PHOTOS ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz) AC UNIT POF UNIT	410 410 411 411 412
14. SET 14.1. 14.2. 14.2.1 14.2.2	UP PHOTOS ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz) AC UNIT POE UNIT	410 410 411 411 412
14. SET 14.1. 14.2. 14.2.1 14.2.2 14.3.	UP PHOTOS ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz) AC UNIT POE UNIT RADIATED RF MEASUREMENT SETUP (ABOVE 1 GHz)	410 410 411 411 412 413
14. SET 14.1. 14.2. 14.2.1 14.2.2 14.3. 14.4.	UP PHOTOS ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP. RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz) AC UNIT. POE UNIT RADIATED RF MEASUREMENT SETUP (ABOVE 1 GHz) POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP	

Page 6 of 417

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	ARUBA NETWORKS 1344 CROSSMAN AVENUE SUNNYVALE, CA 94089, U.S.A.
EUT DESCRIPTION:	WIRELESS MESH ROUTER
MODEL:	MSR4K43N0, MSR4K43N3
SERIAL NUMBER:	BS0000370 (RF) and BS0001469 (DFS)
DATE TESTED:	APRIL 8 - OCTOBER 23, 2013 (RF) and AUGUST 21 - SEPTEMBER 24, 2013 (DFS)

APPLICABLE STANDARDS				
STANDARD	TEST RESULTS			
CFR 47 Part 15 Subpart E	Pass			
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass			
INDUSTRY CANADA RSS-GEN Issue 3	Pass			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Verification Services Inc. By:

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Tested By:

Kristopher Nguyen EMC ENGINEER UL Verification Services Inc.

Page 7 of 417

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street		
Chamber A	Chamber D		
Chamber B	Chamber E		
Chamber C	Chamber F		

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://ts.nist.gov/standards/scopes/2000650.htm</u>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

Page 8 of 417

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

Page 9 of 417

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Wireless Mesh Router.

5.2. DESCRIPTION OF MODEL(s) DIFFERENCES

Difference between the two models is:

MSR4K43N0 is powered by PoE, and MSR4K43N3 is powered by AC/DC adapter.

The MSR4K43N3 model is chosen as the representative unit to be tested for the radio portion.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5260 - 5320	802.11a CDD	13.767	12.975	16.399
5260 - 5320	5260 - 5320 802.11n HT20 STBC		16.586	19.563
5270 - 5310	802.11n HT40 STBC	10.192	10.480	13.349
5500 - 5580	802.11a CDD	13.011	13.314	16.175
5660 - 5700	802.11a CDD	13.372	13.284	16.339
5500 - 5580	802.11n HT20 STBC	16.670	16.801	19.746
5660 - 5700	802.11n HT20 STBC	16.257	16.519	19.400
5510 - 5550	802.11n HT40 STBC	17.324	17.987	20.678
5670 - 5670	802.11n HT40 STBC	16.910	17.228	20.082
Patch Antenna (14	dBi)			-
5260 - 5320	802.11a CDD	9.364	7.906	11.706
5260 - 5320	5260 - 5320 802.11n HT20 STBC		11.889	15.251
5270 - 5310	802.11n HT40 STBC	7.898	7.811	10.865
5500 - 5580	802.11a CDD	7.850	8.928	11.433
5660 - 5700 802.11a CDD		8.395	8.107	11.264
5500 - 5580	802.11n HT20 STBC	11.597	11.877	14.750
5660 - 5700	802.11n HT20 STBC	11.645	11.317	14.494
5510 - 5550	802.11n HT40 STBC	12.646	13.895	16.326
5670 - 5670	802.11n HT40 STBC	12.910	12.936	15.933

Page 10 of 417

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio can utilize two antennas:

- 1) Dipole Antenna with a maximum peak gain of **9 dBi**.
- 2) Directional Patch antenna with a maximum peak gain of **14 dBi**. The 14 dBi antenna comes with a short cable with loss of 0.5 dB, so in effect the antenna gain is **13.5 dBi** if we take the short cable into consideration.

5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was Atheros Radio Test (ART), rev 09 Build B7.

Operating system is MeshOS_4.7.0.0.

5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps 802.11n HT20mode: MCS0, 6.5 Mbps 802.11n HT40mode: MCS0, 13.5 Mbps

The EUT was attached to a pole in vertical orientation similar to how it will be oriented in the field.

Multiple radios inside the EUT can transmit at the same time but using different antennas; therefore, colocation testing is not required.

The antenna port testing, radiated band edge and harmonics testing were performed on the AC powered unit, MSR4K43N3 as representative unit for the radio portion.

For radiated emissions 30-1000MHz and AC Line Conduction, testing was performed on both models; MSR4K43N0 and MSR4K43N3.

For radiated emission testing from 18 GHz to 40 GHz, mid channel for 11a CDD mode was investigated, for both antennas 9 dBi and 14 dBi, for both bands of 5.3 GHz and 5.6 Hz, at highest output power and no signals were found in that frequency range.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List							
Description Manufacturer Model Serial Number FCC ID							
Laptop	Lenovo	IMB Thinkpad T60	L3-V8612	N/A			
AC Adapter IBM 92P1109 11S92P1109Z1ZACU59X2M0 N/A							

I/O CABLES

I/O Cable List							
Cable Port # of identical Connector Cable Type Cable Remarks						Remarks	
No		ports	Туре		Length (m)		
1	AC	1	US 115V	Un -Shielded	4.5	N/A	
2	Ethernet	1	Ethernet	Shielded	2	N/A	
3	DC	1	US 115V	Un -Shielded	1	N/A	
4	AC	1	DC	Un -Shielded	1.8	N/A	

TEST SETUP

The EUT was mounted on a tripod stand and connected through Ethernet to a host laptop computer during the tests. Test software exercised the radio card

Page 12 of 417

SETUP DIAGRAM FOR TESTS



Page 13 of 417

6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List								
Description	Manufacturer	Model	Asset	Cal Date	Cal Due			
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/16/13	02/16/14			
EMI Test Receiver, 9kHz-7GHz	R&S	ESCI 7	1000741	07/13/12	07/13/13			
PXA Signal Analyzer	Agilent	N9030A	14615711	01/22/13	01/22/14			
Horn Antenna, 1-18GHz	ETS Lindgren	3117	T345	02/19/13	02/19/14			
Antenna, Horn, 18 GHz	EMCO	3115	C01218/1000614	01/18/13	01/18/14			
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/12	11/14/13			
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/28/13	06/28/14			
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	10/19/12	10/19/13			
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/20/12	08/20/13			
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/20/13	08/20/14			
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/12	12/13/13			
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/13	02/13/14			
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/13	01/16/14			
LISN, 30 MHz	FCC	50/250-25-2	C00626	08/15/13	08/15/14			
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	01/14/13	01/14/14			

Page 14 of 417

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

<u>LIMITS</u>

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time	Period	Duty Cycle	Duty Cycle Duty Duty Cycle		1/T
	В		x	Cycle	Correction Factor	Minimum VBW
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)
802.11a CDD	3.136	3.150	0.996	99.6%	0.00	0.010
802.11n HT20 STBC	2.918	2.932	0.995	99.5%	0.00	0.010
802.11n HT40 STBC	1.432	1.446	0.990	99.0%	0.00	0.010

7.2. MEASUREMENT METHOD FOR POWER AND PPSD

The Duty Cycle is greater than or equal to 98% therefore KDB 789033 Method SA-1 is used.

7.3. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz

The Duty Cycle is greater than or equal to 98%, KDB 789033 Method VB with Power RMS Averaging is used.

Page 15 of 417

7.4. DUTY CYCLE PLOTS

enter F	reg 5.3000	00000 G	Hz NO, Fast -+	Trig Free Run	Avg Type Log-Pur	TL-29-Ed and Aprole 2011 RACE 11 13 5 TURE MULTIME LAN DEL P	Frequency
10 031014	Ref Offset 11 Ref 30.00	LSS dB dBm	CONTINU			AMRTS 3 159 ms 2.27 dB	Auto Tune
						and again and the same	Center Free 5.30000000 GH
							Start Free 5.30000000 GH
							Stop Free 5 30000000 GH
Center 5 tes BW 1 02 2 F 0 04 4 F 5 7 8 9 0 1 2 2 1 0 4 4 5 7 8 9 1 1 2 2 1 0 4 4 5 8 0 1 0 4 4 5 8 0 1 1 1 1 1 1 1 1 1 1 1 1 1	300000000 8 MHz t (Δ) t (Δ) t (Δ)	3Hz 3, 3, 1, 1,	#VBW 136 ms (Δ) 07.0 us 160 ms (Δ) 92.5 us	50 MHz -0.21 dB 20.54 dBm 2.27 dB 18.10 dBm	Sweep apart of anciencian	Span 0 Hz 3.600 ms (2001 pts))	CF Step 8.000000 MH Audo Mar Freq Offse 0 H:



Page 16 of 417

enter F	reg 5.270000000	PHD Fast -+	Trig Free Bun	Avg Type: Log-Pwr	TACE - TOTAS TANK MARKANANA AND AND AND AND AND AND AND AND AN	Frequency
o celdi.	Ref Offset 11.65 dB Ref 30.00 dBm	Reantaw	Alten. 30 dB	a	Vikr3 1.446 ms 0.43 dB	Auto Tune
	- Water	Manue - March			and the second	Center Free 5.270000000 GH
						Start Free 5 270000000 GH
					1	Stop Free 5 270000000 GH
enter 5. es BW 8 1 02 2 F 1 04	270000000 GHz 8 MHz 12 HD 10 HZ 1 (Δ) 1 (Δ)	#VBW 1.432 ms (Å) 285.0 us 1.446 ms (Å)	50 MHz 3.60 dB 13.06 dBm 0.43 dB	Sweep 2.	Span 0 Hz 000 ms (2001 pts)	CF Ster B.000000 MH Audo Mar Freq Offse
4 F 5 7 8 9 0	t	285.0 us	13.06 dBm			0 H

Page 17 of 417

8. ANTENNA PORT TEST RESULTS (Dipole Antenna, 9 dBi) 8.1. 802.11a CDD 2TX MODE IN THE 5.3 GHz BAND

8.1.1. 20 dB BANDWIDTH

LIMITS

None; 20 dB bandwidth is shown to ensure operation is within the specified 5250-5350 MHz operation band.



Page 18 of 417



Page 19 of 417

8.1.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5260	27.65	26.15	
Mid	5300	28.80	26.25	
High	5320	27.35	29.00	

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Page 20 of 417

26 dB BANDWIDTH, Chain 0





Page 21 of 417



26 dB BANDWIDTH, Chain 1



Page 22 of 417





Page 23 of 417

8.1.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5260	16.594	16.453	
Mid	5300	16.536	16.509	
High	5320	16.477	16.553	

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Page 24 of 417

99% BANDWIDTH, Chain 0





Page 25 of 417



99% BANDWIDTH, Chain 1



Page 26 of 417

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Page 27 of 417

8.1.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0	Chain 1	Uncorrelated Chains
Antenna	Antenna	Directional
Gain	Gain	Gain
(dBi)	(dBi)	(dBi)
9.00	9.00	9.00

For PPSD, the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna	10 * Log (2 chains)	Correlated Chains
Gain		Directional Gain
(dBi)	(dB)	(dBi)
9.00	3.01	12.01

Page 28 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Uncorrelated	Correlated
		26 dB	99%	Directional	Directional
		BW	BW	Gain	Gain
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5260	26.15	16.453	9.00	12.01
Mid	5300	26.25	16.509	9.00	12.01
High	5320	27.35	16.477	9.00	12.01

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5260	21.00	23.16	29.16	20.16	4.99	11.00	4.99
Mid	5300	21.00	23.18	29.18	20.18	4.99	11.00	4.99
High	5320	21.00	23.17	29.17	20.17	4.99	11.00	4.99

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD
--------------------	------	---

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	3.888	5.990	8.075	20.16	-12.087
Mid	5300	13.495	12.586	16.075	20.18	-4.103
High	5320	13.767	12.975	16.399	20.17	-3.769

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	-7.36	-5.51	-3.33	4.99	-8.32
Mid	5300	2.16	0.76	4.53	4.99	-0.46
High	5320	2.29	1.54	4.94	4.99	-0.05

OUTPUT POWER AND PPSD, Chain 0





Page 30 of 417

arker 1 5.320	000000000 GHz	Trig Free Bun	May Type: RMS Avg/Heid: 100/100	TACE TOTA	Marker	
	If Gameta	Alten 20 dB		DET A	Select Marker	
Ref Offset 11.7 dB Nikr1 5.320 00 GHz Ref 20.00 dBm Band Power 13.767 dBm						
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			- And			
10					Deit	
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enter 5.32000 tes BW 1.0 M	GHz Hz #	VBW 3.0 MHz*	Sweep	Span 40.00 MHz 1.00 ms (601 pts)		
	5.320 00 GHz	0.921 dBm Ear	d Power 29.00 MHz	13,767 dBm		
2					Properties	
					Mor t of	

OUTPUT POWER AND PPSD, Chain 1



Page 31 of 417





Page 32 of 417

8.2. 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND

8.2.1. 20 dB BANDWIDTH

LIMITS

None; 20 dB bandwidth is shown to ensure operation is within the specified 5250-5350 MHz operation band.



Page 33 of 417



Page 34 of 417

8.2.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5260	28.92	27.60	
Mid	5300	25.75	27.10	
High	5320	28.45	28.40	

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Page 35 of 417

26 dB BANDWIDTH, Chain 0





Page 36 of 417


26 dB BANDWIDTH, Chain 1



Page 37 of 417





Page 38 of 417

8.2.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5260	17.751	17.740	
Mid	5300	17.797	17.620	
High	5320	17.755	17.665	

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Page 39 of 417

99% BANDWIDTH, Chain 0





Page 40 of 417



99% BANDWIDTH, Chain 1



Page 41 of 417





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Page 42 of 417

8.2.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 43 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5260	27.60	17.740	9.00
Mid	5300	25.75	17.620	9.00
High	5320	28.40	17.665	9.00

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5260	21.00	23.49	29.49	20.49	8.00	11.00	8.00
Mid	5300	21.00	23.46	29.46	20.46	8.00	11.00	8.00
High	5320	21.00	23.47	29.47	20.47	8.00	11.00	8.00

Duty Cycle	CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD
-------------------	---------	------	---

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	-8.906	-8.743	-5.813	20.49	-26.303
Mid	5300	16.520	16.586	19.563	20.46	-0.897
High	5320	16.655	15.895	19.302	20.47	-1.169

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	-16.04	-17.53	-13.71	8.00	-21.71
Mid	5300	4.85	4.73	7.80	8.00	-0.20
High	5320	4.88	3.95	7.45	8.00	-0.55

Page 44 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 45 of 417

111111 1 10100	20000000000 G	Hz Trig Free Run	Marg Type: RMS AvgHold: 100/100	TRACE 1 27 5	Marker
	i	GaincLow Atten: 20 dB	-	DETIA I INTE	Select Marker
Bel	Offset 11.7 dB f 20.00 dBm		Band Pow	er 16.855 dBm	
0		0			Norma
	and the second		-		
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nter 5.3200 es BW 1.0 I	0 GHz MHz	#VBW 3.0 MHz*	Sweep	Span 40.00 MHz 1.00 ms (601 pts)	or
N T	5.320	00 GHz 2.949 dBm Ba	ind Prover 29.00 MHz	16,655 dBm	
					Properties
				ĺ	Mon

OUTPUT POWER AND PPSD, Chain 1



Page 46 of 417





Page 47 of 417

8.3. 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND

8.3.1. 20 dB BANDWIDTH

LIMITS

None; 20 dB bandwidth is shown to ensure operation is within the specified 5250-5350 MHz operation band.



Page 48 of 417



Page 49 of 417

8.3.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5270	70.2	62.2
High	5310	70.4	67.0

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Page 50 of 417

26 dB BANDWIDTH, Chain 0





Page 51 of 417

26 dB BANDWIDTH, Chain 1





Page 52 of 417

8.3.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5270	36.328	36.323	
High	5310	36.296	36.310	

Page 53 of 417

99% BANDWIDTH, Chain 0





Page 54 of 417

99% BANDWIDTH, Chain 1





Page 55 of 417

8.3.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 56 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5270	62.2	36.323	9.00
High	5310	67.0	36.296	9.00

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5270	21.00	24.00	30.00	21.00	8.00	11.00	8.00
High	5310	21.00	24.00	30.00	21.00	8.00	11.00	8.00

Duty Cycle CF (dB) 0.00 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	-9.751	-2.662	-1.887	21.00	-22.887
High	5310	10.192	10.480	13.349	21.00	-7.651

PPSD Results

Channel	Frequency	Chain 0	in 0 Chain 1 Total		PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	(MHz) 5270	(dBm) -19.820	(dBm) -11.860	(dBm) -11.22	(dBm) 8.00	(dB) -19.22

Page 57 of 417

OUTPUT POWER AND PPSD, Chain 0





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Page 58 of 417

OUTPUT POWER AND PPSD, Chain 1





Page 59 of 417

8.4. 802.11a CDD 2TX MODE IN THE 5.6 GHz BAND

8.4.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5500	27.225	27.525
Mid	5580	29.025	29.325
High	5700	26.100	25.800

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Page 60 of 417

26 dB BANDWIDTH, Chain 0





Page 61 of 417



26 dB BANDWIDTH, Chain 1



Page 62 of 417





Page 63 of 417

8.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5500	16.473	16.482
Mid	5580	16.539	16.462
High	5700	16.500	16.445

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Page 64 of 417

99% BANDWIDTH, Chain 0





Page 65 of 417



99% BANDWIDTH, Chain 1



Page 66 of 417





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Page 67 of 417

8.4.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

For PPSD, the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna	10 * Log (2 chains)	Correlated Chains
Gain		Directional Gain
(dBi)	(dB)	(dBi)
9.00	3.01	12.01

Page 68 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Uncorrelated	Correlated
		26 dB	99%	Directional	Directional
		BW	BW	Gain	Gain
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5500	27.225	16.4730	9.00	12.01
Mid	5580	29.025	16.4620	9.00	12.01
High	5700	25.800	16.4450	9.00	12.01

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5500	21.00	23.17	29.17	20.17	4.99	11.00	4.99
Mid	5580	21.00	23.16	29.16	20.16	4.99	11.00	4.99
High	5700	21.00	23.16	29.16	20.16	4.99	11.00	4.99

 Duty Cycle CF (dB)
 0.00
 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	12.255	13.584	15.980	20.17	-4.187
Mid	5580	13.011	13.314	16.175	20.16	-3.989
High	5700	13.372	13.284	16.339	20.16	-3.822

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	2.03	1.58	4.82	4.99	-0.17
Mid	5580	1.49	1.99	4.76	4.99	-0.23
High	5700	0.41	2.26	4.44	4.99	-0.55

Page 69 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 70 of 417

AL 14 1210 -	P80 Willia	Trig Free Run	Avg Type: RMS AvgiHold: 100/100	TRACE 1.75 S	Frequency
Ref Offset 12.1 c	IF Gallectany	ALLER: 10 GB	Band Pow	1 5 700 00 GHz	Auto Tune
	-	0'	-		Center Freq 5.70000000 GHz
	~		~		Start Freq 5.68000000 GHz
					Stop Freq 5.72000000 GHz
enter 5.70000 GHz Res BW 1.0 MHz	VBW	3.0 MHz*	Sweep	Span 40.00 MHz 1.00 ms (601 pts)	CF Step 4.000000 MHz
N T	5.700 00 GHz	0.206 dBm Ear	d Power 29.50 MHz	13.372 dBm	Audo Mar
234667					Freq Offset 0 Hz
9 9 0 1					
			-		

OUTPUT POWER AND PPSD, Chain 1



Page 71 of 417





Page 72 of 417
8.4.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Chain 0

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	13.52	1.49	0.00	12.03	13	-0.97

Chain 1

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	13.25	1.99	0.00	11.26	13	-1.74

Page 73 of 417

PEAK EXCURSION, Chain 0



PEAK EXCURSION, Chain 1



Page 74 of 417

8.4.5. CONDUCTED WEATHER RADAR BAND EMISSIONS

LIMITS

Within 5600 – 5650 MHz band, -20 dBc relative to highest fundamental output power density per 100 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The authorized channel nearest to and less than 5600 MHz is measured.

The authorized channel nearest to and greater than 5650 MHz is measured.

Page 75 of 417

SPURIOUS EMISSIONS IN WEATHER RADAR BAND 5600 - 5650 MHz





Page 76 of 417





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Page 77 of 417

8.5. 802.11n HT20 STBC 2TX MODE IN THE 5.6 GHz BAND

8.5.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5500	33.750	30.150
Mid	5580	33.900	30.825
High	5700	31.575	28.800

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Page 78 of 417

26 dB BANDWIDTH, Chain 0





Page 79 of 417



26 dB BANDWIDTH, Chain 1



Page 80 of 417





Page 81 of 417

8.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5500	17.762	17.691
Mid	5580	17.781	17.739
High	5700	17.603	17.770

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Page 82 of 417

99% BANDWIDTH, Chain 0





Page 83 of 417



99% BANDWIDTH, Chain 1



Page 84 of 417





Page 85 of 417

8.5.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 86 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5500	30.150	17.691	9.00
Mid	5580	30.825	17.739	9.00
High	5700	28.800	17.603	9.00

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5500	21.00	23.48	29.48	20.48	8.00	11.00	8.00
Mid	5580	21.00	23.49	29.49	20.49	8.00	11.00	8.00
High	5700	21.00	23.46	29.46	20.46	8.00	11.00	8.00

Duty Cycle CF (dB) 0.00 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	16.670	16.801	19.746	20.48	-0.731
Mid	5580	16.040	16.355	19.211	20.49	-1.279
High	5700	16.257	16.519	19.400	20.46	-1.056

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	5.16	4.07	7.66	8.00	-0.34
Mid	5580	4.59	4.86	7.74	8.00	-0.26
High	5700	4.63	4.91	7.78	8.00	-0.22

Page 87 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 88 of 417

	PAC With -	Trig Free Run	Avg Type: RMS Avg/Hold: 100/100	THACE I CELS	Frequency
Ref Officet 12	If GaincLaw 2.1 dB	Atten: 16 dB	Band Pow	5.700 00 GHz	Auto Tune
20.00V		0			Center Free 5.70000000 GH
	-		-		Start Free 5.680000000 GH
					Stop Free 5.72000000 GH:
enter 5.70000 GHz Res BW 1.0 MHz	VBW	3.0 MHz*	Sweep	Span 40.00 MHz 1.00 ms (601 pts)	CF Step 4 000000 MH Auto Mar
2 3 4 5 5 5 7	5.700 60 GHZ	2789 GBM Ear	2 P 10 P 23.00 MHZ	16.267 GBM	Freq Offse 0 H:
9					

OUTPUT POWER AND PPSD, Chain 1



Page 89 of 417





Page 90 of 417

8.5.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Chain 0

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	12.51	4.62	0.00	7.89	13	-5.11

Chain 1

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	12.85	4.86	0.00	7.99	13	-5.01

Page 91 of 417

PEAK EXCURSION, Chain 0



PEAK EXCURSION, Chain 1



Page 92 of 417

8.5.5. CONDUCTED WEATHER RADAR BAND EMISSIONS

LIMITS

Within 5600 – 5650 MHz band, -20 dBc relative to highest fundamental output power density per 100 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The authorized channel nearest to and less than 5600 MHz is measured.

The authorized channel nearest to and greater than 5650 MHz is measured.

Page 93 of 417

SPURIOUS EMISSIONS IN WEATHER RADAR BAND 5600 - 5650 MHz





Page 94 of 417





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Page 95 of 417

8.6. 802.11n HT40 STBC 2TX MODE IN THE 5.6 GHz BAND

8.6.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5510	69.83	68.33
Mid	5550	71.83	63.00
High	5670	72.17	65.00

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Page 96 of 417

26 dB BANDWIDTH, Chain 0





Page 97 of 417



26 dB BANDWIDTH, Chain 1



Page 98 of 417





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Page 99 of 417

8.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5510	36.155	36.078	
Mid	5550	36.314	36.218	
High	5670	36.060	36.279	

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Page 100 of 417

99% BANDWIDTH, Chain 0





Page 101 of 417



99% BANDWIDTH, Chain 1



Page 102 of 417





Page 103 of 417

8.6.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 104 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5510	68.33	36.078	9.00
Mid	5550	63.00	36.218	9.00
High	5670	65.00	36.060	9.00

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5510	21.00	24.00	30.00	21.00	8.00	11.00	8.00
Mid	5550	21.00	24.00	30.00	21.00	8.00	11.00	8.00
High	5670	21.00	24.00	30.00	21.00	8.00	11.00	8.00

Duty Cycle CF (dB) 0.00 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	10.365	10.320	13.353	21.00	-7.647
Mid	5550	17.324	17.987	20.678	21.00	-0.322
High	5670	16.910	17.228	20.082	21.00	-0.918

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	-4.190	-4.370	-1.269	8.00	-9.269
Mid	5550	2.815	2.941	5.889	8.00	-2.111
High	5670	2.534	2.639	5.597	8.00	-2.403

Page 105 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 106 of 417



OUTPUT POWER AND PPSD, Chain 1



Page 107 of 417





Page 108 of 417
8.6.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Chain 0

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5500	11.54	2.815	0.00	8.73	13	-4.28

Chain 1

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5500	12.19	2.941	0.00	9.25	13	-3.75

Page 109 of 417

PEAK EXCURSION, Chain 0



PEAK EXCURSION, Chain 1



Page 110 of 417

8.6.5. CONDUCTED WEATHER RADAR BAND EMISSIONS

LIMITS

Within 5600 – 5650 MHz band, -20 dBc relative to highest fundamental output power density per 100 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The authorized channel nearest to and less than 5600 MHz is measured.

The authorized channel nearest to and greater than 5650 MHz is measured.

Page 111 of 417

SPURIOUS EMISSIONS IN WEATHER RADAR BAND 5600 - 5650 MHz





Page 112 of 417

	- 0	PHO: Fast	Trig Free Ru	#Ang	Type: RMS	TRACE 1.2 T 4 S S TYPE DEPARTMENT	Frequency
0 dB/div	Ref Offset	112.1 dB	HUN. IS SE		Mkr2	5.569 200 GHz -20.86 dBm	Auto Tune
eg 1-10 7-20 729	-	1 2 ²				-11/6.49	Center Fred 5.600600000 GH:
79 19 19	T	-		Wittenanger	-		Start Pres 5.512500000 GH
≈9 # b # b # b							Stop Free 5.887500000 GH
enter 5.) Res BW	50000 GH 100 kHz	z #VI	BW 300 kHz		Sweep	Span 175.0 MHz 16.7 ms (1001 pts)	CF Ster 17 50000 MH
1 N	1	5.658 700 GHz	2.96 dBm	HAUGH	AND DATED	HIMCHINARDE	Auto Mar
3 N 3 4 5 5		5.569.300 GPG	-20.06 dipm			2	Freq Offse 0 H
8 9 10							



Page 113 of 417

9. ANTENNA PORT TEST RESULTS (Patch Antenna, 14 dBi)

<u>Note:</u> The 14 dBi patch antenna comes with a short cable with loss of 0.5 dB, so in effect the antenna gain is **13.5 dBi** if we take the short cable into consideration.

9.1. 802.11a CDD 2TX MODE IN THE 5.3 GHz BAND

9.1.1. 20 dB BANDWIDTH

LIMITS

None; 20 dB bandwidth is shown to ensure operation is within the specified 5250-5350 MHz operation band.



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Page 114 of 417



Page 115 of 417

9.1.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5260	27.65	26.15
Mid	5300	28.80	26.25
High	5320	27.35	29.00

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Page 116 of 417

26 dB BANDWIDTH, Chain 0





Page 117 of 417



26 dB BANDWIDTH, Chain 1



Page 118 of 417





Page 119 of 417

9.1.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5260	16.594	16.453
Mid	5300	16.536	16.509
High	5320	16.477	16.553

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Page 120 of 417

99% BANDWIDTH, Chain 0





Page 121 of 417



99% BANDWIDTH, Chain 1



Page 122 of 417

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Page 123 of 417

9.1.4. OUTPUT POWER AND PPSD

<u>LIMITS</u>

FCC §15.407 (a) (1)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0	Chain 1	Uncorrelated Chains
Antenna	Antenna	Directional
Gain	Gain	Gain
(dBi)	(dBi)	(dBi)
13.50	13.50	13.50

For PPSD, the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna	10 * Log (2 chains)	Correlated Chains
Gain		Directional Gain
(dBi)	(dB)	(dBi)
13.50	3.01	16.51

Page 124 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Uncorrelated	Correlated
		26 dB	99%	Directional	Directional
		BW	BW	Gain	Gain
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5260	26.15	16.453	13.50	16.51
Mid	5300	26.25	16.509	13.50	16.51
High	5320	27.35	16.477	13.50	16.51

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5260	16.50	23.16	29.16	15.66	0.49	11.00	0.49
Mid	5300	16.50	23.18	29.18	15.68	0.49	11.00	0.49
High	5320	16.50	23.17	29.17	15.67	0.49	11.00	0.49

Duty Cycle CF (dB)0.00Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	3.888	5.990	8.075	15.66	-7.587
Mid	5300	9.364	7.906	11.706	15.68	-3.971
High	5320	8.872	6.500	10.856	15.67	-4.813

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	-7.360	-5.506	-3.325	0.49	-3.815
Mid	5300	-2.092	-3.640	0.213	0.49	-0.277
High	5320	-2.614	-4.093	-0.281	0.49	-0.771

OUTPUT POWER AND PPSD, Chain 0





Page 126 of 417

-	-	PHO	Mide Tri	g: Free Run	BAvg Tr Avgitte	rpe RMS Ist. 100/100	Tret A share	Frequency
Ref C	fiset 11.7 20.00 dt	dB Bm				Bang Par	1 3 320 00 GI	Auto Tun
00 110				0	Q2			Center Fre 5.32000000 GH
		-				X		Start // re 5.30000000 GH
10								Stop Fre 5.34000000 GH
enter 5.32000 Res BW 1.0 M	GHz Hz		#VBW 3.0	MHz*		Sweep	Span 40.00 M 1.00 ms (601 p	Hz CF Ste
N (2 N T 3 4 5 5		5.320 00 G 5.324 93 G	Hz 41 Hz 21	599 dBm Ban 514 dBm	d Power	28.00 MHz	8.872 dB	Freq Offse 0 H
7 8 9								

OUTPUT POWER AND PPSD, Chain 1



Page 127 of 417





Page 128 of 417

9.2. 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND

9.2.1. 20 dB BANDWIDTH

<u>LIMITS</u>

None; 20 dB bandwidth is shown to ensure operation is within the specified 5250-5350 MHz operation band.



Page 129 of 417



Page 130 of 417

9.2.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5260	28.92	27.60	
Mid	5300	25.75	27.10	
High	5320	28.45	28.40	

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Page 131 of 417

26 dB BANDWIDTH, Chain 0





Page 132 of 417



26 dB BANDWIDTH, Chain 1



Page 133 of 417





Page 134 of 417

9.2.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel Frequency		99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5260	17.751	17.740	
Mid	5300	17.797	17.620	
High	5320	17.755	17.665	

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Page 135 of 417

99% BANDWIDTH, Chain 0





Page 136 of 417



99% BANDWIDTH, Chain 1



Page 137 of 417





Page 138 of 417

9.2.4. OUTPUT POWER AND PPSD

<u>LIMITS</u>

FCC §15.407 (a) (1)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 139 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	
		26 dB	99%	Gain	
		BW	BW		
	(MHz)	(MHz)	(MHz)	(dBi)	
Low	5260	27.60	17.740	13.50	
Mid	5300	25.75	17.620	13.50	
High	5320	28.40	17.665	13.50	

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5260	16.50	23.49	29.49	15.99	3.50	11.00	3.50
Mid	5300	16.50	23.46	29.46	15.96	3.50	11.00	3.50
High	5320	16.50	23.47	29.47	15.97	3.50	11.00	3.50

Duty Cycle CF (dB) 0.00 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	-8.906	-8.743	-5.813	15.99	-21.803
Mid	5300	12.577	11.760	15.198	15.96	-0.762
High	5320	12.566	11.889	15.251	15.97	-0.720

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	-16.04	-17.53	-13.71	3.50	-17.21
Mid	5300	0.73	-0.13	3.33	3.50	-0.17
High	5320	0.83	-0.02	3.44	3.50	-0.06

Page 140 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 141 of 417



OUTPUT POWER AND PPSD, Chain 1



Page 142 of 417





Page 143 of 417

9.3. 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND

9.3.1. 20 dB BANDWIDTH

LIMITS

None; 20 dB bandwidth is shown to ensure operation is within the specified 5250-5350 MHz operation band.



Page 144 of 417


Page 145 of 417

9.3.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5270	70.2	62.2
High	5310	70.4	67.0

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Page 146 of 417

26 dB BANDWIDTH, Chain 0





Page 147 of 417

26 dB BANDWIDTH, Chain 1





Page 148 of 417

9.3.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5270	36.328	36.323
High	5310	36.296	36.310

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Page 149 of 417

99% BANDWIDTH, Chain 0





Page 150 of 417

99% BANDWIDTH, Chain 1





Page 151 of 417

9.3.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 152 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5270	62.2	36.323	13.50
High	5310	67.0	36 296	13 50

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5270	16.50	24.00	30.00	16.50	3.50	11.00	3.50
High	5310	16.50	24.00	30.00	16.50	3.50	11.00	3.50

Duty Cycle CF (dB) 0.00

Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	-9.751	-2.662	-1.887	16.50	-18.387
High	5310	7.898	7.811	10.865	16.50	-5.635

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHZ)	(dBm)	(aBm)	(aBm)	(aBm)	(aB)
Low	(MHZ) 5270	(dBm) -19.820	(dBm) -11.860	(dBm) -11.216	(dBm) 3.50	(ав) -14.716

OUTPUT POWER AND PPSD, Chain 0





Page 154 of 417

OUTPUT POWER AND PPSD, Chain 1





Page 155 of 417

9.4. 802.11a CDD 2TX MODE IN THE 5.6 GHz BAND

9.4.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5500	27.225	27.525	
Mid	5580	29.025	29.325	
High	5700	26.100	25.800	

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Page 156 of 417

26 dB BANDWIDTH, Chain 0





Page 157 of 417



26 dB BANDWIDTH, Chain 1



Page 158 of 417





Page 159 of 417

9.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5500	16.473	16.482	
Mid	5580	16.539	16.462	
High	5700	16.500	16.445	

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Page 160 of 417

99% BANDWIDTH, Chain 0





Page 161 of 417



99% BANDWIDTH, Chain 1



Page 162 of 417





Page 163 of 417

9.4.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

For PPSD, the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna	10 * Log (2 chains)	Correlated Chains
Gain		Directional Gain
(dBi)	(dB)	(dBi)
13.50	3.01	16.51

Page 164 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Uncorrelated	Correlated
		26 dB	99%	Directional	Directional
		BW	BW	Gain	Gain
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5500	27.225	16.473	13.50	16.51
Mid	5580	29.025	16.462	13.50	16.51
High	5700	25.800	16.445	13.50	16.51

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5500	16.50	23.17	29.17	15.67	0.49	11.00	0.49
Mid	5580	16.50	23.16	29.16	15.66	0.49	11.00	0.49
High	5700	16.50	23.16	29.16	15.66	0.49	11.00	0.49

 Duty Cycle CF (dB)
 0.00
 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	7.075	9.405	11.405	15.67	-4.263
Mid	5580	7.850	8.928	11.433	15.66	-4.232
High	5700	8.395	8.107	11.264	15.66	-4.397

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	-4.23	-1.96	0.06	0.49	-0.43
Mid	5580	-2.62	-2.44	0.48	0.49	-0.01
High	5700	-2.96	-3.32	-0.13	0.49	-0.62

Page 165 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 166 of 417



OUTPUT POWER AND PPSD, Chain 1



Page 167 of 417





Page 168 of 417

9.4.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Chain 0

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	5.58	-2.70	0.00	8.28	13	-4.72

Chain 1

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	5.23	-2.44	0.00	7.67	13	-5.33

Page 169 of 417

PEAK EXCURSION, Chain 0



PEAK EXCURSION, Chain 1



Page 170 of 417

9.4.5. CONDUCTED WEATHER RADAR BAND EMISSIONS

LIMITS

Within 5600 – 5650 MHz band, -20 dBc relative to highest fundamental output power density per 100 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The authorized channel nearest to and less than 5600 MHz is measured.

The authorized channel nearest to and greater than 5650 MHz is measured.

Page 171 of 417

SPURIOUS EMISSIONS IN WEATHER RADAR BAND 5600 - 5650 MHz





Page 172 of 417





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Page 173 of 417

9.5. 802.11n HT20 STBC 2TX MODE IN THE 5.6 GHz BAND

9.5.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5500	33.750	30.150
Mid	5580	33.900	30.825
High	5700	31.575	28.800

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Page 174 of 417

26 dB BANDWIDTH, Chain 0





Page 175 of 417



26 dB BANDWIDTH, Chain 1



Page 176 of 417





Page 177 of 417

9.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	99% BW	99% BW	
		Chain 0	Chain 1	
	(MHz)	(MHz)	(MHz)	
Low	5500	17.762	17.691	
Mid	5580	17.781	17.739	
High	5700	17.603	17.770	

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Page 178 of 417

99% BANDWIDTH, Chain 0





Page 179 of 417



99% BANDWIDTH, Chain 1



Page 180 of 417




Page 181 of 417

9.5.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 182 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5500	30.150	17.691	13.50
Mid	5580	30.825	17.739	13.50
High	5700	28.800	17.603	13.50

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5500	16.50	23.48	29.48	15.98	3.50	11.00	3.50
Mid	5580	16.50	23.49	29.49	15.99	3.50	11.00	3.50
High	5700	16.50	23.46	29.46	15.96	3.50	11.00	3.50

Duty Cycle CF (dB) 0	.00	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	10.788	12.127	14.519	15.98	-1.458
Mid	5580	11.597	11.877	14.750	15.99	-1.240
High	5700	11.645	11.317	14.494	15.96	-1.461

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	-0.87	0.45	2.85	3.50	-0.65
Mid	5580	-0.04	0.31	3.15	3.50	-0.35
High	5700	-0.01	-0.39	2.82	3.50	-0.68

Page 183 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 184 of 417



OUTPUT POWER AND PPSD, Chain 1



Page 185 of 417





Page 186 of 417

9.5.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Chain 0

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	12.51	-0.04	0.00	12.55	13	-0.45

Chain 1

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5580	12.85	0.31	0.00	12.54	13	-0.46

Page 187 of 417

PEAK EXCURSION, Chain 0



PEAK EXCURSION, Chain 1



Page 188 of 417

9.5.5. CONDUCTED WEATHER RADAR BAND EMISSIONS

LIMITS

Within 5600 – 5650 MHz band, -20 dBc relative to highest fundamental output power density per 100 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The authorized channel nearest to and less than 5600 MHz is measured.

The authorized channel nearest to and greater than 5650 MHz is measured.

Page 189 of 417

SPURIOUS EMISSIONS IN WEATHER RADAR BAND 5600 - 5650 MHz





Page 190 of 417





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Page 191 of 417

9.6. 802.11n HT40 STBC 2TX MODE IN THE 5.6 GHz BAND

9.6.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency	26 dB BW	26 dB BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5510	69.83	68.33
Mid	5550	71.83	63.00
High	5670	72.17	65.00

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Page 192 of 417

26 dB BANDWIDTH, Chain 0





Page 193 of 417



26 dB BANDWIDTH, Chain 1



Page 194 of 417





Page 195 of 417

9.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel Frequency		99% BW	99% BW
		Chain 0	Chain 1
	(MHz)	(MHz)	(MHz)
Low	5510	36.155	36.078
Mid	5550	36.314	36.218
High	5670	36.060	36.279

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Page 196 of 417

99% BANDWIDTH, Chain 0





Page 197 of 417



99% BANDWIDTH, Chain 1



Page 198 of 417





Page 199 of 417

9.6.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Page 200 of 417

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional
		26 dB	99%	Gain
		BW	BW	
	(MHz)	(MHz)	(MHz)	(dBi)
Low	5510	68.33	36.078	13.50
Mid	5550	63.00	36.218	13.50
High	5670	65.00	36.060	13.50

Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5510	16.50	24.00	30.00	16.50	3.50	11.00	3.50
Mid	5550	16.50	24.00	30.00	16.50	3.50	11.00	3.50
High	5670	16.50	24.00	30.00	16.50	3.50	11.00	3.50

Duty Cycle CF (dB) 0.00 Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	9.018	8.983	12.011	16.50	-4.489
Mid	5550	12.646	13.895	16.326	16.50	-0.174
High	5670	12.910	12.936	15.933	16.50	-0.567

PPSD Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	-5.640	-5.650	-2.63	3.50	-6.13
Mid	5550	-1.950	-0.584	1.80	3.50	-1.70
High	5670	-1.077	-1.612	1.67	3.50	-1.83

Page 201 of 417

OUTPUT POWER AND PPSD, Chain 0





Page 202 of 417



OUTPUT POWER AND PPSD, Chain 1



Page 203 of 417





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Page 204 of 417

9.6.4. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Chain 0

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5550	6.174	-1.950	0.00	8.124	13	-4.876

Chain 1

Channel	Frequency	PK Level	PSD	DCCF	Peak Excursion	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)	(dB)	(dB)	(dB)
Mid	5550	5.790	-0.584	0.00	6.374	13	-6.626

Page 205 of 417