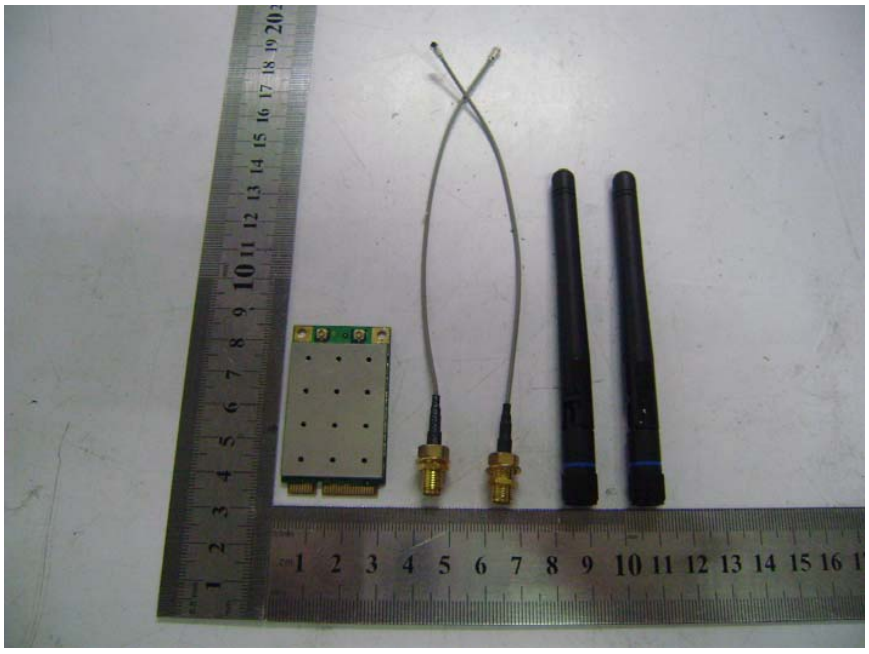
Compex Systems Pte Ltd

Wireless-A/B/G/N Network Mini PCIe Adapter

Model: WLE200NX

November 11, 2010
Report No.: 08U11572-7E
(This report supersedes NONE)



RF Test Report
TO: EN 301 893V1.5.1
SIEMIC, INC.
Accessing global markets

Modifications made to the product : None	
This Test Report is Issued Under the Authority of:	
Andy Hao	Jackson.chen
Andy Hao **Compliance Engineer**	**Jackson Chen** **Technical Manager**

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Test result presented in this test report is applicable to the representative sample only.

Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management through out a project. Our extensive experience with China, Asia Pacific, North America, European, and international compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC , RF/Wireless , Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
Hong Kong	OFTA , NIST	RF/Wireless ,Telecom
Australia	NATA, NIST	EMC, RF, Telecom , Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF , Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom , Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	iDA, NIST	EMC , RF , Telecom

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CONTENTS

2 Executive Summary & EUT information

The purpose of this test programme was to demonstrate compliance of the Compex Systems Pte Ltd , Wireless-A/B/G/N Network Mini PCIe Adapter, and model: WLE200NX against the current Stipulated Standards. The Wireless-A/B/G/N Network Mini PCIe Adapterhas demonstrated compliance with the EN 301 893 V1.5.1.

EUT Information

EUT Description	Please see attachment
Model No	WLE200NX
Input Power	DC 3.3V
Classification Per Stipulated Test Standard	Spread Spectrum System/Device

3 TECHNICAL DETAILS

Purpose	Compliance testing of WIFI Module with stipulated standard
Applicant / Client	Compex Systems Pte Ltd 135 Joo Seng Road, #08-01 PM Industrial Building Singapore 368363
Manufacturer	Compex Systems Pte Ltd 135 Joo Seng Road, #08-01 PM Industrial Building Singapore 368363
Laboratory performing the tests	SIEMIC Nanjing (China) Laboratories NO.2-1,Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel:+86(25)86730128/86730129 Fax:+86(25)86730127 Email:info@siemic.com
Test report reference number	08U11572-7E
Date EUT received	September 09, 2010
Standard applied	EN 301 893 V1.5.1
Dates of test (from – to)	September 09, 2010 to November 08, 2010
No of Units:	#2
Equipment Category:	DTS
Trade Name:	COMPEX
Model :	WLE200NX
RF Operating Frequency (ies)	2412 ~ 2472 MHz,2422~2462MHz,5180~5240MHz,5190 ~ 5230MHz,5260~5320MHz, 5270 ~ 5310MHz,5500~5700MHz, 5510 ~ 5670MHz
Modulation:	DSSS/OFDM

4 MODIFICATION

NONE

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Description Wireless-A/B/G/N Network Mini PCIe Adapter compliance with IEEE 802.11a/b/g/n, communicate with other WLAN device

Model No WLE200NX

Input Power DC 3.3V

5.2. MAXIMUM OUTPUT POWER

The highest conducted output power under normal environmental conditions in each mode is as follows:

With 0dBi or less antenna gain

Frequency Band (MHz)	Mode	Total Power (dBm)	Total Power (mW)
5180 - 5240	802.11a	Same as 802.11n HT20 data	
5180 - 5240	802.11n HT20	21.48	140.6
5190 - 5230	802.11n HT40	19.23	83.8

With 0dBi or less antenna gain

Frequency Band (MHz)	Mode	Total Power (dBm)	Total Power (mW)
5260 - 5320	802.11a	Same as 802.11n HT20 data	
5260 - 5320	802.11n HT20	18.59	72.3
5270 - 5310	802.11n HT40	18.12	64.9

With 0dBi or less antenna gain

Frequency Band (MHz)	Mode	Total Power (dBm)	Total Power (mW)
5500 - 5700	802.11a	Same as 802.11n HT20 data	
5500 - 5700	802.11n HT20	20.02	100.5
5510 - 5670	802.11n HT40	19.14	82.0

With 4.63 dBi antenna gain

Frequency Band (MHz)	Mode	Total Power (dBm)	Total Power (mW)
5180 - 5240	802.11a	Same as 802.11n HT20 data	
5180 - 5240	802.11n HT20	17.74	59.4
5190 - 5230	802.11n HT40	18.06	64.0

With 5.56 dBi antenna gain

Frequency Band (MHz)	Mode	Total Power (dBm)	Total Power (mW)
5260 - 5320	802.11a	Same as 802.11n HT20 data	
5260 - 5320	802.11n HT20	16.70	46.8
5270 - 5310	802.11n HT40	17.07	50.9

With 5.34 dBi antenna gain

Frequency Band (MHz)	Mode	Total Power (dBm)	Total Power (mW)
5500 - 5700	802.11a	Same as 802.11n HT20 data	
5500 - 5700	802.11n HT20	17.03	50.5
5510 - 5670	802.11n HT40	16.93	49.3

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

At the highest power setting the 2x2 configuration utilizes a set of PIFA antennas with maximum gain of 0 dBi.

At lower power settings the 2x2 configuration utilizes a set of PIFA antennas with maximum gain of 3.62 dBi from 2400 – 2483.5 MHz, 4.63 dBi from 5150 – 5250 MHz, 5.56 dBi from 5250 – 5350 MHz, and 5.34 dBi from 5470 – 5725 MHz.

5.4. OUTPUT POWER WITH OTHER ANTENNA GAINS

OUTPUT POWER UNDER NORMAL ENVIRONMENTAL CONDITIONS IN THE 5150 – 5250 MHz BAND WITH ANTENNA GAINS BETWEEN 0 dBi AND 4.63 dBi

802.11a and 802.11n HT20 MODES

Average Conducted Power
= (21.48 dBm - Antenna Assembly Gain) or 17.74 dBm, whichever is higher

802.11n HT40 MODE

Average Conducted Power
= (19.23 dBm - Antenna Assembly Gain) or 18.06 dBm, whichever is higher

OUTPUT POWER UNDER NORMAL ENVIRONMENTAL CONDITIONS IN THE 5250 – 5350 MHz BAND WITH ANTENNA GAINS BETWEEN 0 dBi AND 5.56 dBi

802.11a and 802.11n HT20 MODES

Average Conducted Power
= (18.59 dBm - Antenna Assembly Gain) or 16.70 dBm, whichever is higher

802.11n HT40 MODE

Average Conducted Power
= (18.12 dBm - Antenna Assembly Gain) or 17.07 dBm, whichever is higher

OUTPUT POWER UNDER NORMAL ENVIRONMENTAL CONDITIONS IN THE 5470 – 5725 MHz BAND WITH ANTENNA GAINS BETWEEN 0 dBi AND 5.34 dBi

802.11a and 802.11n HT20 MODES

Average Conducted Power
= (20.02 dBm - Antenna Assembly Gain) or 17.03 dBm, whichever is higher

802.11n HT40 MODE

Average Conducted Power
= (19.14 dBm - Antenna Assembly Gain) or 16.93 dBm, whichever is higher

5.5. SOFTWARE AND FIRMWARE

The test utility and driver software used during testing was Art ANWI 1.4 and Devlib Revision 0.6 Build #18 Art_11n.

5.6. WORST-CASE CONFIGURATIONS

The 2x2 configuration was used for all testing in this report.
Both FEM1 and FEM2 boards were evaluated on conducted and radiated emissions tests to find the worst case.

The worst-case data rates are determined to be as follows for each mode, based on the investigations by measuring the average power, peak power and PPSD across all the data rates, bandwidths, modulations and spatial stream modes.

The worst-case data rate for each mode is determined as follows; it is based on preliminary tests on the chipset which is utilized on this radio device:
All final tests in the 802.11a mode were made at 6Mbps.
All final tests in the 802.11n HT20 mode were made at MCS1.
All final tests in the 802.11n HT40 mode were made at MCS0.

It was determined that 802.11a mode data can be compliant as the 802.11n MIMO HT20 data.

For RF radiated and conducted spurious emissions, all tests were performed on FEM1 board.

For RF conducted emissions excepted spurious emissions, all tests were performed on FEM2 board.

All tests were performed with the highest output power setting, and where applicable to calculations, an antenna gain of 0 dBi.

For antenna gains between 0 dBi and the maximum possible gain at lower power settings, as documented above, EIRP, PSD and Frequency Range tests were performed at normal environmental conditions, and EIRP and Frequency Range tests were also performed at the worst-case environmental conditions from the highest power testing.

Preliminary test results demonstrate that the cabinet radiation shows only insignificant changes as a function of power level, over the range of power levels documented in this report. Final radiated and conducted spurious emissions were measured with the power set to the highest setting.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	**Manufacturer**	**Model**	**Serial Number**
Laptop	IBM	ThinkPad T42	ZZ-27001
AC Adapter	IBM	02K6749	11S02K6749Z122OM2436ST

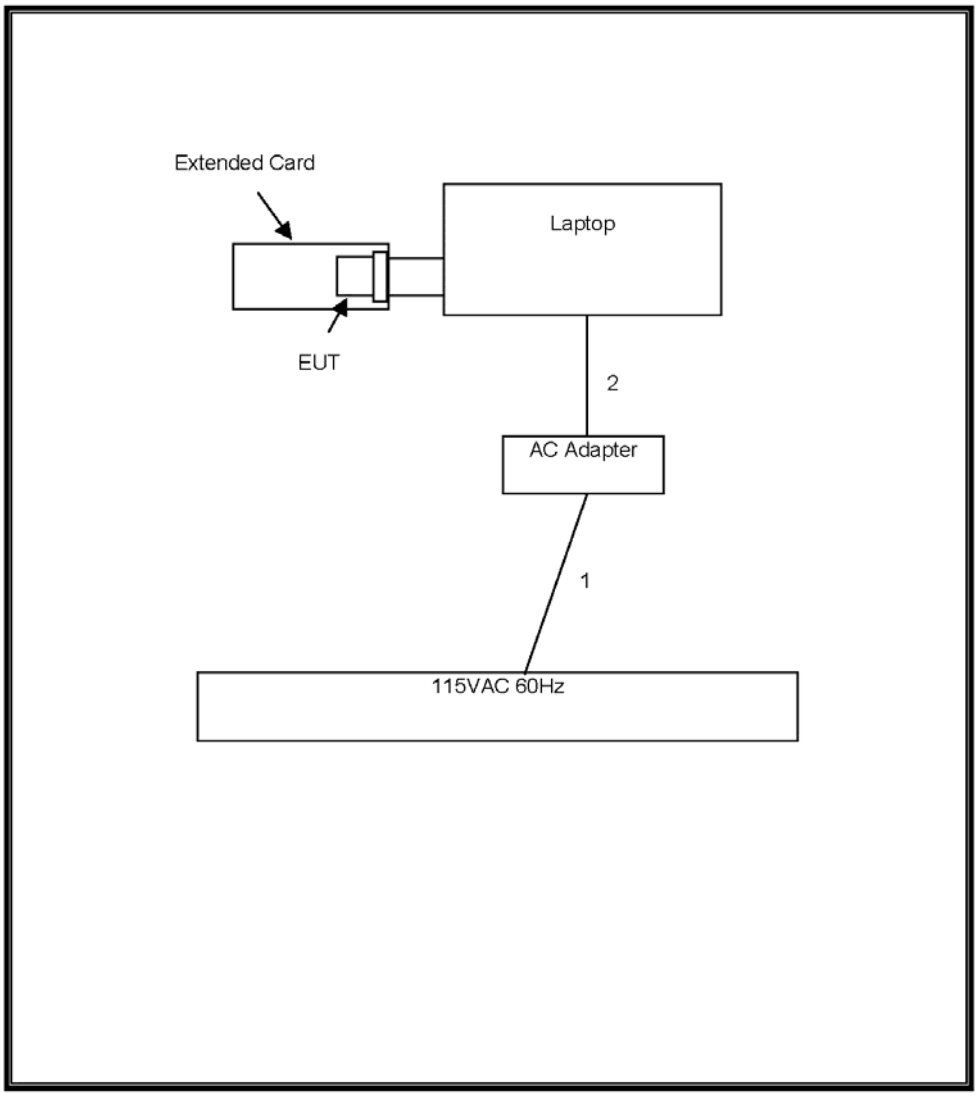
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	One Ferrite at Laptop End
2	DC	1	DC	Un-shielded	2m	N/A

TEST SETUP

The EUT is installed in a host laptop computer via an extended card during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



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, 44 GHz	Agilent / HP	E4446A	C01012	4/15/2010	4/15/2011
Peak Power Meter	Agilent / HP	E4416A	C00963	4/15/2010	4/15/2011
Peak / Average Power Sensor	Agilent	E9327A	C00964	4/15/2010	4/15/2011
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	2/6/2010	2/6/2011
Antenna, Horn, 18 GHz	EMCO	3115	C00945	4/15/2010	4/15/2011
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	2/6/2010	2/6/2011
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	2/6/2010	2/6/2011
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	2/6/2010	2/6/2011
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	2/6/2010	2/6/2011
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	2/6/2010	2/6/2011
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	8/3/2010	8/3/2011
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	8/3/2010	8/3/2011
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	8/3/2010	8/3/2011
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02679	CNR	CNR
Reject Filter, 5.47-5.725 GHz	Micro-Tronics	BRC13191	N02678	CNR	CNR
Reject Filter, 5.725-5.85 GHz	Micro-Tronics	BRC13192	N02676	CNR	CNR
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4407B	C01101	2/22/2010	2/22/2011
Oscilloscope, 100 MHz 4 Ch.	Agilent / HP	54601A	C00863	2/17/2010	2/17/2011
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	4/16/2010	4/16/2011

7. TEST RESULTS

7.1. NORMAL AND EXTREME CONDITIONS

LIMITS

None; for reporting purposes only.

RESULTS

Normal conditions are 25 deg C, 230 VAC.
The low temperature condition is 0 deg C.
The high temperature condition is 35 deg C.
The low voltage condition is 207 VAC.
The high voltage condition is 253 VAC.

7.2. DUTY CYCLE

LIMITS

None; for reporting purposes only.

RESULTS

Mode	Tx on (usec)	Tx on + Tx off (usec)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	100	100	100.00	0.00
802.11n HT20	100	100	100.00	0.00
802.11n HT40	100	100	100.00	0.00

7.3. CARRIER FREQUENCIES AND CHANNELIZATION

LIMIT

ETSI EN 301 893 Clause 4.2.2

The actual center frequency for any given channel declared by the manufacturer shall be maintained within the range of f_c +/- 20 ppm over Normal and Extreme conditions.

TEST PROCEDURE

ETSI EN 301 893 Clause 5.3.2.2.1

RESULTS

7.3.1. LOWER BAND 20 MHz BANDWIDTH

Channel Frequency (MHz) = 5180			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5179.9421	-57.9	103.6
Extreme T low, V low	5180.0457	45.7	103.6
Extreme T low, V high	5180.0456	45.6	103.6
Extreme T high V low	5179.9556	-44.4	103.6
Extreme T high, V high	5179.9556	-44.4	103.6

Channel Frequency (MHz) = 5320			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5319.9402	-59.8	106.4
Extreme T low, V low	5320.0508	50.8	106.4
Extreme T low, V high	5320.0515	51.5	106.4
Extreme T high V low	5319.9569	-43.1	106.4
Extreme T high, V high	5319.9575	-42.5	106.4

7.3.2. UPPER BAND 20 MHz BANDWIDTH

Channel Frequency (MHz) = 5500			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5499.9374	-62.6	110.0
Extreme T low, V low	5500.0431	43.1	110.0
Extreme T low, V high	5500.0439	43.9	110.0
Extreme T high V low	5499.9571	-42.9	110.0
Extreme T high, V high	5499.9543	-45.7	110.0

Channel Frequency (MHz) = 5700			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5699.9359	-64.1	114.0
Extreme T low, V low	5700.0413	41.3	114.0
Extreme T low, V high	5700.0413	41.3	114.0
Extreme T high V low	5699.9491	-50.9	114.0
Extreme T high, V high	5699.9510	-49.0	114.0

7.3.3. LOWER BAND 40 MHz BANDWIDTH

Channel Frequency (MHz) = 5190			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5189.9421	-57.9	103.8
Extreme T low, V low	5190.0470	47.0	103.8
Extreme T low, V high	5190.0479	47.9	103.8
Extreme T high V low	5189.9607	-39.3	103.8
Extreme T high, V high	5189.9577	-42.3	103.8

Channel Frequency (MHz) = 5310			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5309.9414	-58.6	106.2
Extreme T low, V low	5310.0427	42.7	106.2
Extreme T low, V high	5310.0448	44.8	106.2
Extreme T high V low	5309.9562	-43.8	106.2
Extreme T high, V high	5309.9568	-43.2	106.2

7.3.4. UPPER BAND 40 MHz BANDWIDTH

Channel Frequency (MHz) = 5510			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5509.9375	-62.5	110.2
Extreme T low, V low	5510.0421	42.1	110.2
Extreme T low, V high	5510.0438	43.8	110.2
Extreme T high V low	5509.9482	-51.8	110.2
Extreme T high, V high	5509.9481	-51.9	110.2

Channel Frequency (MHz) = 5670			
Condition	Measured Frequency (MHz)	Delta Frequency (kHz)	Delta +/- 20 ppm Limit (kHz)
Normal	5669.9359	-64.1	113.4
Extreme T low, V low	5670.0418	41.8	113.4
Extreme T low, V high	5670.0406	40.6	113.4
Extreme T high V low	5669.9492	-50.8	113.4
Extreme T high, V high	5669.9512	-48.8	113.4

7.4. NOMINAL CHANNEL BANDWIDTH AND OCCUPIED BANDWIDTH

LIMIT

ETSI EN 301 893 Clause 4.3.2

The nominal bandwidth shall be in the range from 10 MHz to 40 MHz.

The occupied channel bandwidth shall be between 80% and 100% of the declared nominal channel bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.

TEST PROCEDURE

ETSI EN 301 893 Clause 5.3.3.2.1

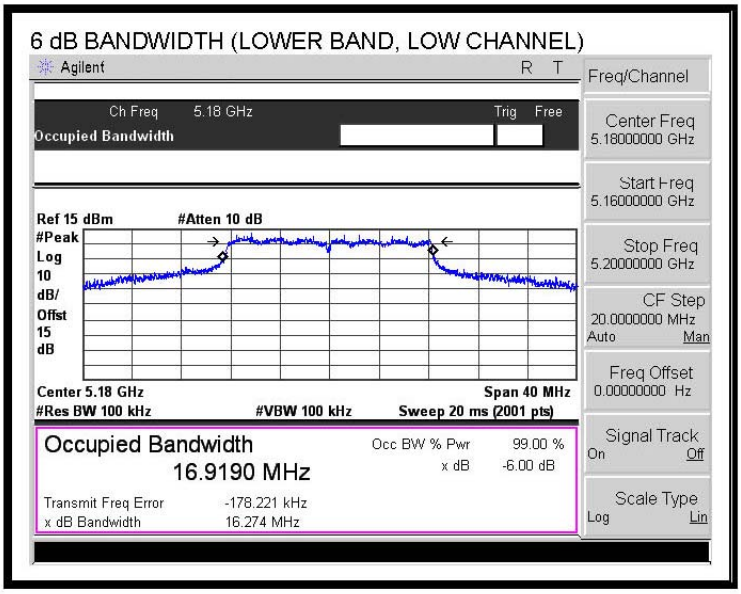
RESULTS

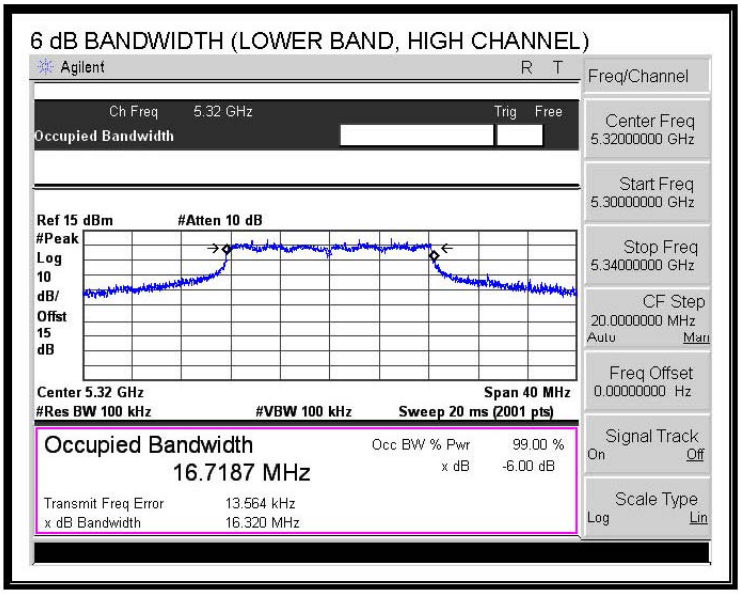
7.4.1. 802.11n HT20 MODE

Nominal Channel Bandwidth (MHz) = 20

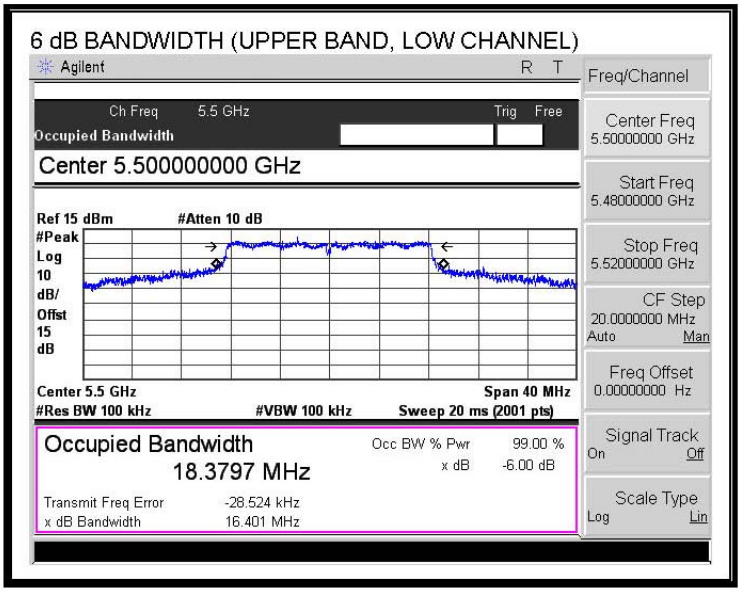
Frequency (MHz)	Occupied Bandwidth Minimum Limit (MHz)	Occupied Bandwidth Maximum Limit (MHz)	Occupied Bandwidth (MHz)
5180	16	20	16.27
5320	16	20	16.32
5500	16	20	16.40
5700	16	20	16.32

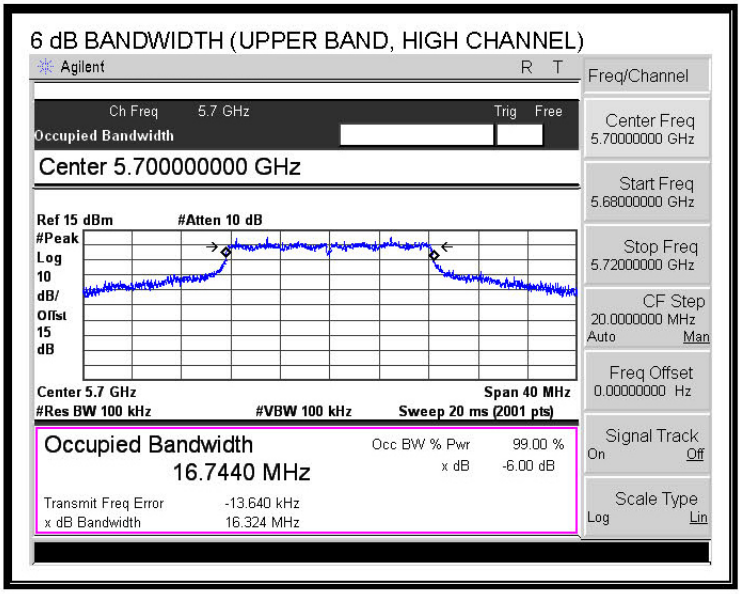
6 dB BANDWIDTH (LOWER BAND)





6 dB BANDWIDTH (UPPER BAND)



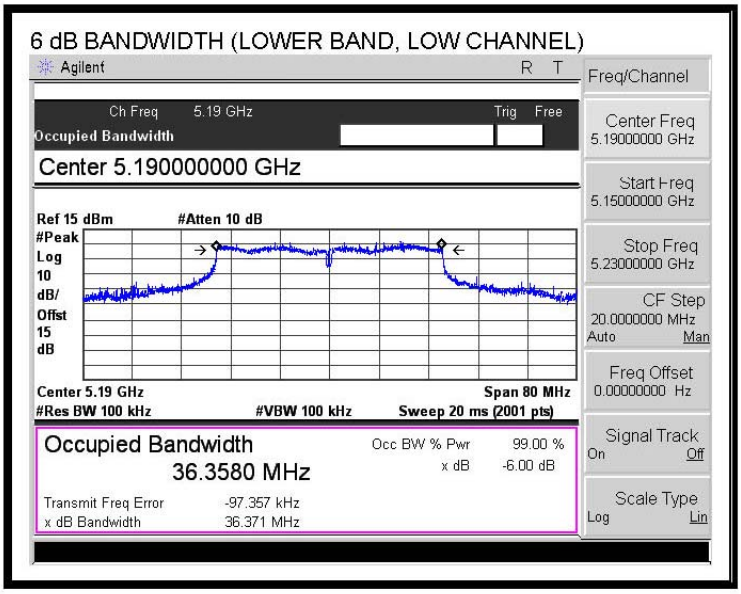


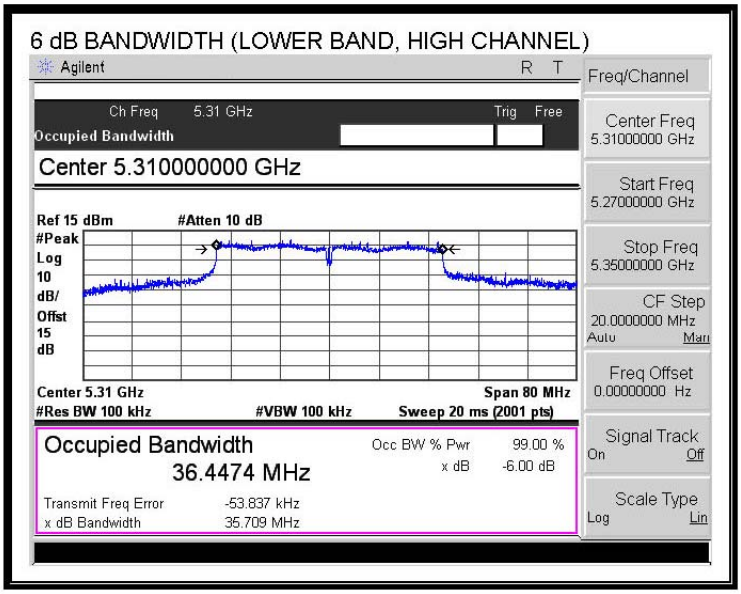
7.4.2. 802.11n HT40 MODE

Nominal Channel Bandwidth (MHz) = 40

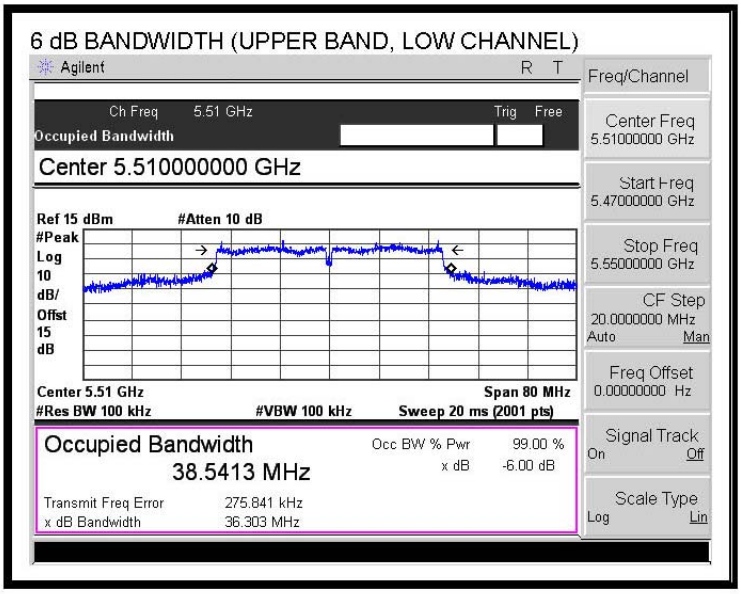
Frequency (MHz)	Occupied Bandwidth Minimum Limit (MHz)	Occupied Bandwidth Maximum Limit (MHz)	Occupied Bandwidth (MHz)
5190	32	40	36.37
5310	32	40	35.71
5510	32	40	36.30
5670	32	40	36.09

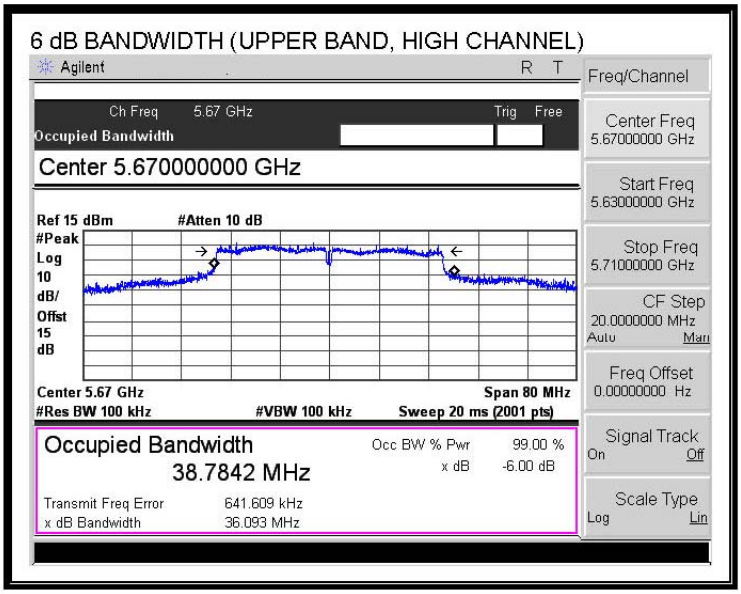
6 dB BANDWIDTH (LOWER BAND)





6 dB BANDWIDTH (UPPER BAND)





7.5. EFFECTIVE RADIATED POWER

LIMITS

ETSI EN 301 893 Clause 4.4.2

RF Output Power at Highest Power Level, without radar detection function, with TPC

Frequency Range (MHz)	Mean EIRP (dBm)
5150 to 5350	23
5470 to 5725	23

RF Output Power at Lowest Power Level, without radar detection function, with TPC

Frequency Range (MHz)	Mean EIRP (dBm)
5250 to 5350	17
5470 to 5725	17

TEST PROCEDURE

ETSI EN 301 893 Clause 5.3.4.2

RESULTS

Output Power = Test Cable Loss + Duty Cycle Factor + Power Meter Reading

7.5.1. 802.11n HT20 MODE (0dBi Antenna Gain)

LOWER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	0.00
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5180 MHz						
Normal	2.95	3.94	21.48	21.48	23	-1.52
Extreme T low, V low	3.67	4.02	21.86	21.86	23	-1.14
Extreme T low, V high	3.77	4.01	21.90	21.90	23	-1.10
Extreme T high V low	2.54	3.73	21.19	21.19	23	-1.81
Extreme T high, V high	2.50	3.77	21.19	21.19	23	-1.81
5320 MHz						
Normal	0.48	0.68	18.59	18.59	23	-4.41
Extreme T low, V low	0.56	0.88	18.73	18.73	23	-4.27
Extreme T low, V high	0.59	0.87	18.74	18.74	23	-4.26
Extreme T high V low	0.32	0.54	18.44	18.44	23	-4.56
Extreme T high, V high	0.36	0.55	18.47	18.47	23	-4.53

UPPER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	0.00
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5500 MHz						
Normal	0.77	1.08	18.94	18.94	23	-4.06
Extreme T low, V low	0.93	1.13	19.04	19.04	23	-3.96
Extreme T low, V high	0.95	1.22	19.10	19.10	23	-3.90
Extreme T high V low	0.53	0.99	18.78	18.78	23	-4.22
Extreme T high, V high	0.53	1.00	18.78	18.78	23	-4.22
5700 MHz						
Normal	2.03	1.99	20.02	20.02	23	-2.98
Extreme T low, V low	2.13	2.21	20.18	20.18	23	-2.82
Extreme T low, V high	2.17	2.19	20.19	20.19	23	-2.81
Extreme T high V low	1.88	1.85	19.88	19.88	23	-3.12
Extreme T high, V high	1.90	1.93	19.93	19.93	23	-3.07

LOWER BAND AT LOWEST POWER

Antenna Gain (dBi) =	0.0
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5180 MHz						
Normal	-1.72	-0.87	16.74	16.74	17	-0.26
Extreme T low, V low	-1.65	-0.74	16.84	16.84	17	-0.16
Extreme T low, V high	-1.63	-0.77	16.83	16.83	17	-0.17
Extreme T high V low	-2.00	-0.98	16.55	16.55	17	-0.45
Extreme T high, V high	-2.02	-0.95	16.56	16.56	17	-0.44
5320 MHz						
Normal	-1.43	-1.21	16.69	16.69	17	-0.31
Extreme T low, V low	-1.22	-1.02	16.89	16.89	17	-0.11
Extreme T low, V high	-1.21	-1.05	16.88	16.88	17	-0.12
Extreme T high V low	-1.50	-1.36	16.58	16.58	17	-0.42
Extreme T high, V high	-1.48	-1.34	16.60	16.60	17	-0.40

UPPER BAND AT LOWEST POWER

Antenna Gain (dBi) =	0.0
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5500 MHz						
Normal	-1.11	-1.85	16.55	16.55	17	-0.45
Extreme T low, V low	-0.95	-1.68	16.71	16.71	17	-0.29
Extreme T low, V high	-0.92	-1.66	16.74	16.74	17	-0.26
Extreme T high V low	-1.33	-1.96	16.38	16.38	17	-0.62
Extreme T high, V high	-1.25	-1.92	16.44	16.44	17	-0.56
5700 MHz						
Normal	-1.78	-1.45	16.40	16.40	17	-0.60
Extreme T low, V low	-1.70	-1.35	16.49	16.49	17	-0.51
Extreme T low, V high	-1.70	-1.33	16.50	16.50	17	-0.50
Extreme T high V low	-1.93	-1.60	16.25	16.25	17	-0.75
Extreme T high, V high	-1.91	-1.60	16.26	16.26	17	-0.74

7.5.2. 802.11n HT40 MODE (0dBi Antenna Gain)

LOWER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	0.0
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5190 MHz						
Normal	0.93	1.50	19.23	19.23	23	-3.77
Extreme T low, V low	1.12	1.64	19.40	19.40	23	-3.60
Extreme T low, V high	1.15	1.66	19.42	19.42	23	-3.58
Extreme T high V low	0.85	1.42	19.15	19.15	23	-3.85
Extreme T high, V high	0.84	1.43	19.16	19.16	23	-3.84
5310 MHz						
Normal	-0.13	0.34	18.12	18.12	23	-4.88
Extreme T low, V low	0.54	0.74	18.65	18.65	23	-4.35
Extreme T low, V high	0.55	0.77	18.67	18.67	23	-4.33
Extreme T high V low	-0.62	0.00	17.71	17.71	23	-5.29
Extreme T high, V high	-0.52	0.11	17.82	17.82	23	-5.18

UPPER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	0.0
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5510 MHz						
Normal	0.68	1.53	19.14	19.14	23	-3.86
Extreme T low, V low	0.98	1.75	19.39	19.39	23	-3.61
Extreme T low, V high	1.00	1.74	19.40	19.40	23	-3.60
Extreme T high V low	0.41	1.44	18.97	18.97	23	-4.03
Extreme T high, V high	0.50	1.50	19.04	19.04	23	-3.96
5670 MHz						
Normal	0.57	1.05	18.83	18.83	23	-4.17
Extreme T low, V low	0.66	1.10	18.90	18.90	23	-4.10
Extreme T low, V high	0.67	1.15	18.93	18.93	23	-4.07
Extreme T high V low	0.46	0.87	18.68	18.68	23	-4.32
Extreme T high, V high	0.46	0.88	18.69	18.69	23	-4.31

LOWER BAND AT LOWEST POWER

Antenna Gain (dBi) =	0.0
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5190 MHz						
Normal	-1.52	-1.96	16.28	16.28	17	-0.72
Extreme T low, V low	-1.22	-1.77	16.52	16.52	17	-0.48
Extreme T low, V high	-1.23	-1.75	16.53	16.53	17	-0.47
Extreme T high V low	-1.43	-2.10	16.26	16.26	17	-0.74
Extreme T high, V high	-1.43	-2.07	16.27	16.27	17	-0.73
5310 MHz						
Normal	-1.59	-1.58	16.43	16.43	17	-0.57
Extreme T low, V low	-1.32	-1.45	16.63	16.63	17	-0.37
Extreme T low, V high	-1.31	-1.42	16.65	16.65	17	-0.35
Extreme T high V low	-1.62	-1.58	16.41	16.41	17	-0.59
Extreme T high, V high	-1.63	-1.64	16.38	16.38	17	-0.62

UPPER BAND AT LOWEST POWER

Antenna Gain (dBi) =	0.0
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5510 MHz						
Normal	-1.78	-0.98	16.65	16.65	17	-0.35
Extreme T low, V low	-1.60	-0.85	16.80	16.80	17	-0.20
Extreme T low, V high	-1.59	-0.90	16.78	16.78	17	-0.22
Extreme T high V low	-1.91	-1.30	16.42	16.42	17	-0.58
Extreme T high, V high	-1.88	-1.33	16.41	16.41	17	-0.59
5670 MHz						
Normal	-1.33	-1.41	16.64	16.64	17	-0.36
Extreme T low, V low	-1.22	-1.31	16.75	16.75	17	-0.25
Extreme T low, V high	-1.21	-1.36	16.73	16.73	17	-0.27
Extreme T high V low	-1.52	-1.65	16.43	16.43	17	-0.57
Extreme T high, V high	-1.50	-1.68	16.42	16.42	17	-0.58

7.5.3. 802.11n HT20 MODE (with Antenna Gain)

LOWER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	4.63
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5180 MHz						
Normal	-0.53	-0.02	17.74	22.37	23	-0.63
Extreme T low, V low	-0.27	0.16	17.96	22.59	23	-0.41
Extreme T low, V high	-0.25	0.20	17.99	22.62	23	-0.38
Extreme T high V low	-0.74	-0.18	17.56	22.19	23	-0.81
Extreme T high, V high	-0.69	-0.15	17.60	22.23	23	-0.77

Antenna Gain for Chain 1 (dBi) =	5.56
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5320 MHz						
Normal	-1.50	-1.12	16.70	22.26	23	-0.74
Extreme T low, V low	-1.02	-0.85	17.08	22.64	23	-0.36
Extreme T low, V high	-1.05	-0.83	17.07	22.63	23	-0.37
Extreme T high V low	-1.71	-1.22	16.55	22.11	23	-0.89
Extreme T high, V high	-1.65	-1.22	16.58	22.14	23	-0.86

UPPER BAND AT HIGHEST POWER

Antenna Gain for (dBi) =	5.34
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5500 MHz						
Normal	-1.32	-0.68	17.02	22.36	23	-0.64
Extreme T low, V low	-1.11	-0.61	17.16	22.50	23	-0.50
Extreme T low, V high	-1.13	-0.63	17.14	22.48	23	-0.52
Extreme T high V low	-1.45	-0.86	16.87	22.21	23	-0.79
Extreme T high, V high	-1.42	-0.88	16.87	22.21	23	-0.79
5700 MHz						
Normal	-0.88	-1.08	17.03	22.37	23	-0.63
Extreme T low, V low	-0.63	-0.95	17.22	22.56	23	-0.44
Extreme T low, V high	-6.10	-0.95	15.21	20.55	23	-2.45
Extreme T high V low	-1.00	-1.32	16.85	22.19	23	-0.81
Extreme T high, V high	-0.95	-1.30	16.89	22.23	23	-0.77

LOWER BAND AT LOWEST POWER

Antenna Gain (dBi) =	4.63
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5180 MHz						
Normal	-6.38	-5.96	11.85	16.48	17	-0.52
Extreme T low, V low	-6.13	-5.82	12.04	16.67	17	-0.33
Extreme T low, V high	-6.11	-5.84	12.04	16.67	17	-0.33
Extreme T high V low	-6.50	-6.10	11.71	16.34	17	-0.66
Extreme T high, V high	-6.48	-6.08	11.73	16.36	17	-0.64

Antenna Gain (dBi) =	5.56
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5320 MHz						
Normal	-7.03	-6.74	11.13	16.69	17	-0.31
Extreme T low, V low	-6.66	-6.64	11.36	16.92	17	-0.08
Extreme T low, V high	-6.80	-6.70	11.26	16.82	17	-0.18
Extreme T high V low	-7.35	-7.18	10.75	16.31	17	-0.69
Extreme T high, V high	-7.26	-7.07	10.85	16.41	17	-0.59

UPPER BAND AT LOWEST POWER

Antenna Gain (dBi) =	5.34
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5500 MHz						
Normal	-7.32	-6.53	11.10	16.44	17	-0.56
Extreme T low, V low	-7.12	-6.32	11.31	16.65	17	-0.35
Extreme T low, V high	-7.10	-6.33	11.31	16.65	17	-0.35
Extreme T high V low	-7.65	-6.68	10.87	16.21	17	-0.79
Extreme T high, V high	-7.61	-6.59	10.94	16.28	17	-0.72
5700 MHz						
Normal	-7.17	-7.27	10.79	16.13	17	-0.87
Extreme T low, V low	-6.98	-7.13	10.96	16.30	17	-0.70
Extreme T low, V high	-6.95	-7.11	10.98	16.32	17	-0.68
Extreme T high V low	-7.18	-7.31	10.77	16.11	17	-0.89
Extreme T high, V high	-7.21	-7.29	10.76	16.10	17	-0.90

7.5.4. 802.11n HT40 MODE (with Antenna Gain)

LOWER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	4.63
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5190 MHz						
Normal	-0.13	0.22	18.06	22.69	23	-0.31
Extreme T low, V low	0.06	0.51	18.30	22.93	23	-0.07
Extreme T low, V high	0.09	0.43	18.27	22.90	23	-0.10
Extreme T high V low	-0.23	-0.06	17.87	22.50	23	-0.50
Extreme T high, V high	-0.23	-0.02	17.89	22.52	23	-0.48

Antenna Gain(dBi) =	5.56
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5310 MHz						
Normal	-1.18	-0.72	17.07	22.63	23	-0.37
Extreme T low, V low	-0.76	-0.53	17.37	22.93	23	-0.07
Extreme T low, V high	-0.80	-0.42	17.40	22.96	23	-0.04
Extreme T high V low	-1.54	-0.84	16.83	22.39	23	-0.61
Extreme T high, V high	-1.57	-0.86	16.81	22.37	23	-0.63

UPPER BAND AT HIGHEST POWER

Antenna Gain (dBi) =	5.34
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5510 MHz						
Normal	-1.60	-0.61	16.93	22.27	23	-0.73
Extreme T low, V low	-1.55	-0.50	17.02	22.36	23	-0.64
Extreme T low, V high	-1.53	-0.53	17.01	22.35	23	-0.65
Extreme T high V low	-1.78	-0.76	16.77	22.11	23	-0.89
Extreme T high, V high	-1.80	-0.70	16.80	22.14	23	-0.86
5670 MHz						
Normal	-1.31	-1.49	16.61	21.95	23	-1.05
Extreme T low, V low	-1.18	-1.33	16.76	22.10	23	-0.90
Extreme T low, V high	-1.20	-1.30	16.76	22.10	23	-0.90
Extreme T high V low	-1.54	-1.88	16.30	21.64	23	-1.36
Extreme T high, V high	-1.68	-1.74	16.30	21.64	23	-1.36

LOWER BAND AT LOWEST POWER

Antenna Gain (dBi) =	4.63
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5190 MHz						
Normal	-6.07	-5.73	12.11	16.74	17	-0.26
Extreme T low, V low	-5.89	-5.63	12.25	16.88	17	-0.12
Extreme T low, V high	-5.85	-5.69	12.24	16.87	17	-0.13
Extreme T high V low	-6.11	-5.96	11.98	16.61	17	-0.39
Extreme T high, V high	-6.08	-5.91	12.02	16.65	17	-0.35

Antenna Gain (dBi) =	5.56
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5310 MHz						
Normal	-7.24	-6.85	10.97	16.53	17	-0.47
Extreme T low, V low	-7.05	-6.50	11.24	16.80	17	-0.20
Extreme T low, V high	-7.00	-6.62	11.20	16.76	17	-0.24
Extreme T high V low	-7.34	-7.04	10.82	16.38	17	-0.62
Extreme T high, V high	-7.32	-7.00	10.85	16.41	17	-0.59

UPPER BAND AT LOWEST POWER

Antenna Gain (dBi) =	5.34
Duty Cycle Factor (dB) =	0.0
Test Cable Loss (dB) =	15.0

Condition	Measured Power Chain 0 (dBm)	Measured Power Chain 1 (dBm)	Output Power Chain 0 + 1 (dBm)	Output EIRP Chain 0 + 1 (dBm)	Limit (dBm)	Margin (dB)
5510 MHz						
Normal	-7.62	-6.88	10.78	16.12	17	-0.88
Extreme T low, V low	-7.35	-6.66	11.02	16.36	17	-0.64
Extreme T low, V high	-7.36	-6.62	11.04	16.38	17	-0.62
Extreme T high V low	-7.80	-7.00	10.63	15.97	17	-1.03
Extreme T high, V high	-7.80	-6.98	10.64	15.98	17	-1.02
5670 MHz						
Normal	-6.70	-6.87	11.23	16.57	17	-0.43
Extreme T low, V low	-6.54	-6.45	11.52	16.86	17	-0.14
Extreme T low, V high	-6.52	-6.53	11.49	16.83	17	-0.17
Extreme T high V low	-6.88	-6.98	11.08	16.42	17	-0.58
Extreme T high, V high	-6.91	-6.95	11.08	16.42	17	-0.58

7.6. POWER DENSITY AT THE HIGHEST POWER LEVEL

LIMIT

ETSI EN 301 893 Clause 4.4.2

Power Density at Highest Power Level, without radar detection function, with TPC

Frequency Range (MHz)	Mean Density Limit (dBm/MHz) EIRP
5150 to 5350	10
5470 to 5725	10

TEST PROCEDURE

ETSI EN 301 893 Clause 5.3.4.2.1.3

RESULTS

7.6.1. 802.11n HT20 MODE

LOWER BAND

EUT Antenna Gain for Chain 0 (dBi) =	0.00
EUT Antenna Gain for Chain 1 (dBi) =	0.00
Duty Cycle Factor (dB) =	0.00

Frequency (MHz)	Measured Density Chain 0 (dBm/MHz)	Measured Density Chain 1 (dBm/MHz)	Power Density EIRP Chains 0+1 (dBm/MHz)	Limit (dBm/MHz) EIRP	Margin (dB)
5180	4.32	5.77	8.12	10	-1.88
5320	2.32	2.42	5.38	10	-4.62

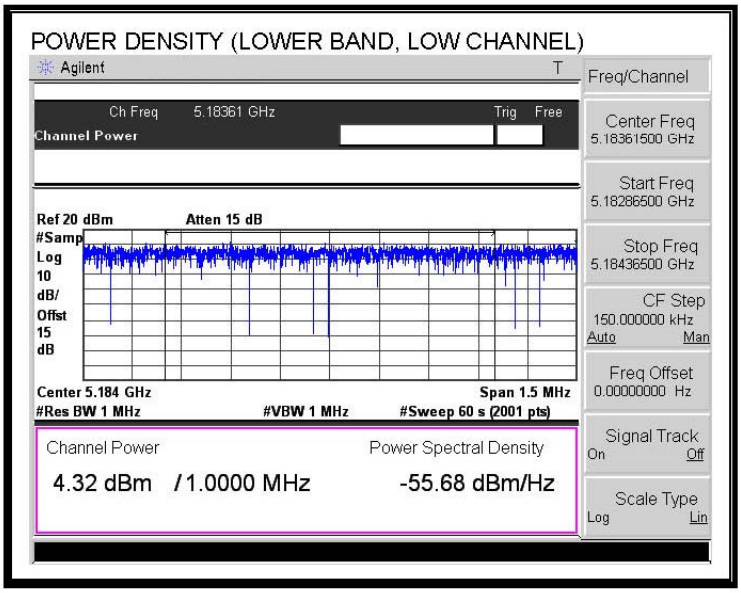
UPPER BAND

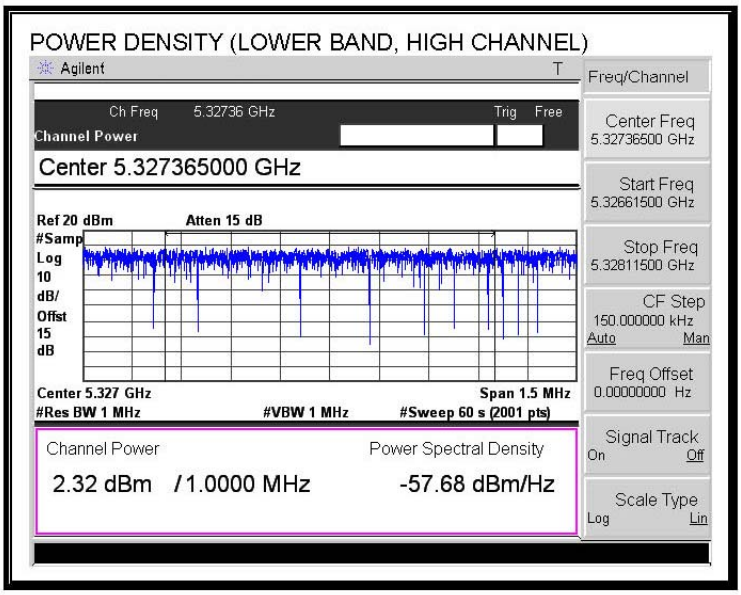
EUT Antenna Gain for Chain 0 (dBi) =	0.00
EUT Antenna Gain for Chain 1 (dBi) =	0.00
Duty Cycle Factor (dB) =	0.00

Frequency (MHz)	Measured Density Chain 0 (dBm/MHz)	Measured Density Chain 1 (dBm/MHz)	Power Density EIRP Chains 0+1 (dBm/MHz)	Limit (dBm/MHz) EIRP	Margin (dB)
5500	1.99	2.52	5.27	10	-4.73
5700	2.98	3.07	6.04	10	-3.96

CHAIN 0

POWER DENSITY (LOWER BAND)

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Agilent
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Trig Free
Channel Power
Center 5.327365000 GHz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Center 5.327 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
2.32 dBm /1.0000 MHz
Power Spectral Density
-57.68 dBm/Hz
Freq/Channel
Center Freq
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Start Freq
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Stop Freq
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Freq Offset
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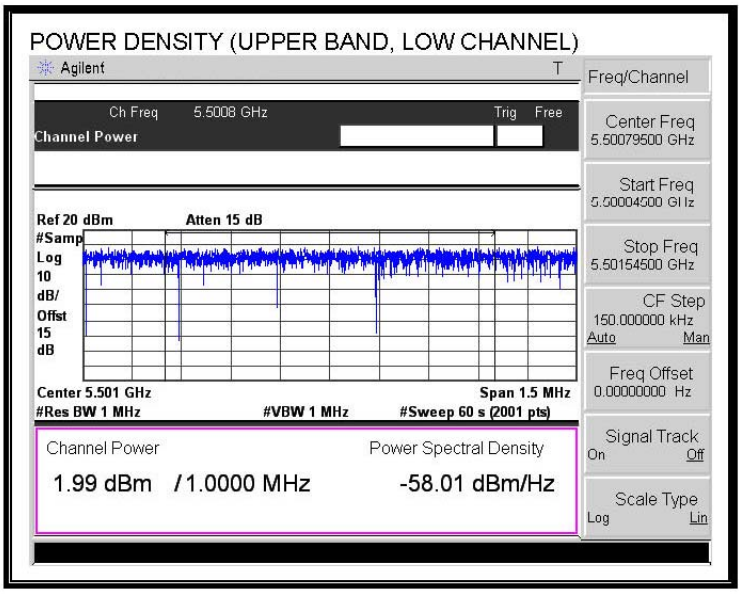
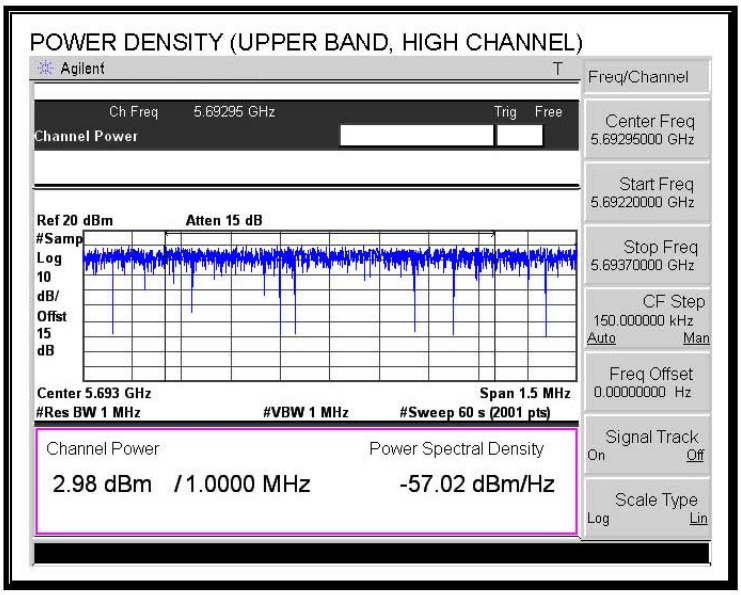
Signal Track
On Off
Scale Type
Log Lin

POWER DENSITY (LOWER BAND)




POWER DENSITY (UPPER BAND, HIGH CHANNEL)
Agilent
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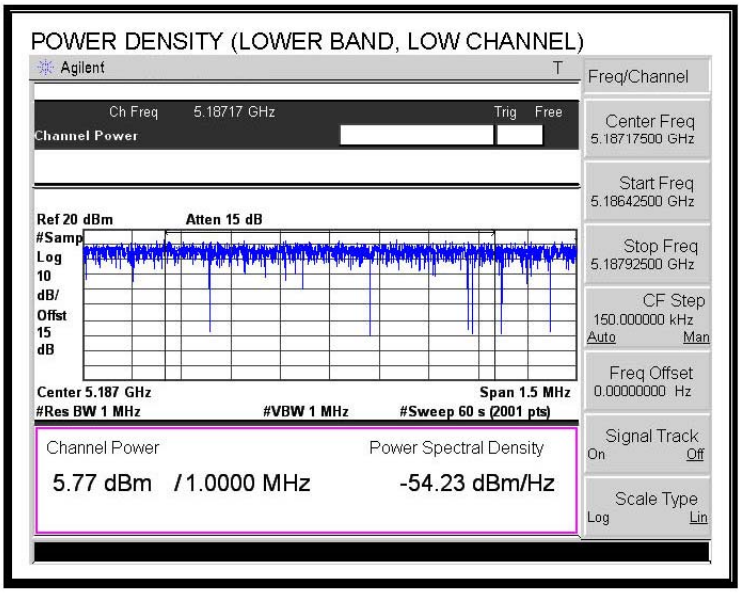
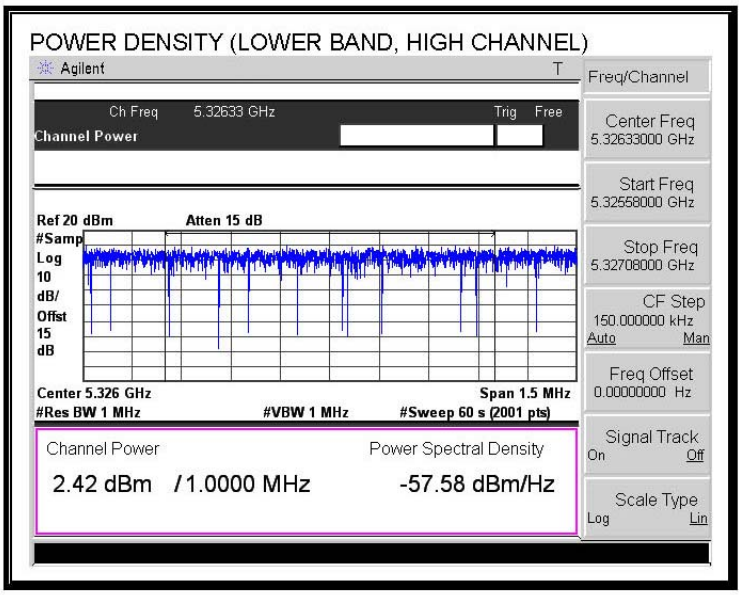
Start Freq
5.69220000 GHz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Stop Freq
5.69370000 GHz
CF Step
150.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Center 5.693 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
Power Spectral Density
2.98 dBm /1.0000 MHz
-57.02 dBm/Hz
Signal Track
On Off
Scale Type
Log Lin

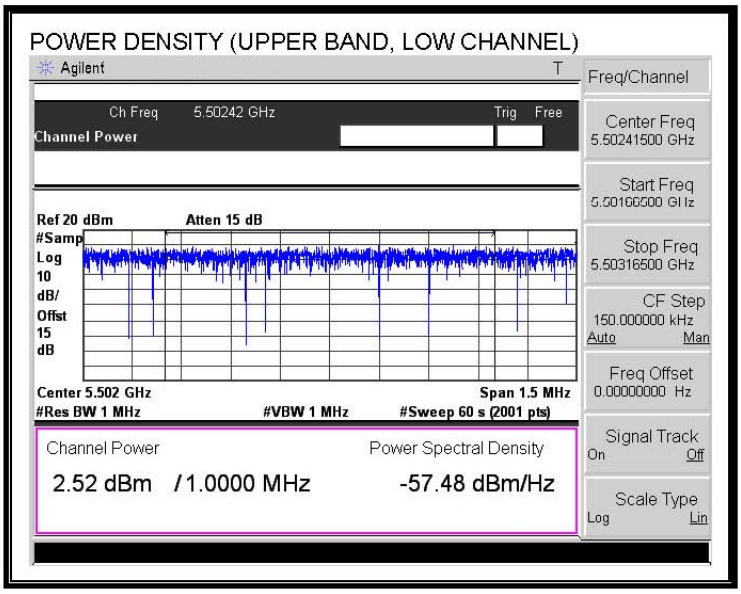
CHAIN 1

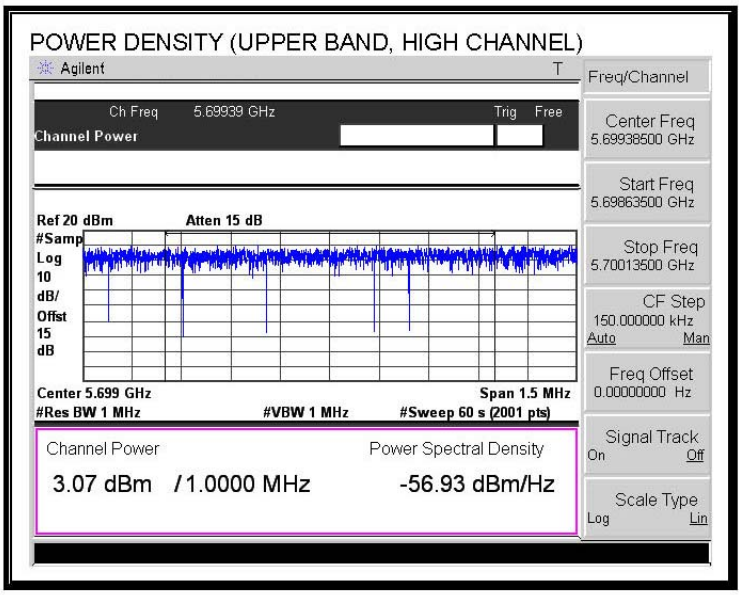
POWER DENSITY (LOWER BAND)




POWER DENSITY (LOWER BAND, HIGH CHANNEL)
Agilent
T
Freq/Channel
Ch Freq 5.32633 GHz
Trig Free
Channel Power
Center Freq
5.32633000 GHz
Start Freq
5.32558000 GHz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Stop Freq
5.32708000 GHz
CF Step
150.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Center 5.326 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
Power Spectral Density
2.42 dBm /1.0000 MHz
-57.58 dBm/Hz
Signal Track
On Off
Scale Type
Log Lin

POWER DENSITY (LOWER BAND)




POWER DENSITY (UPPER BAND, HIGH CHANNEL)
Agilent
T
Freq/Channel
Ch Freq 5.69939 GHz
Trig Free
Channel Power
Center Freq
5.69938500 GHz
Start Freq
5.69863500 GHz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Stop Freq
5.70013500 GHz
CF Step
150.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Center 5.699 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
Power Spectral Density
3.07 dBm /1.0000 MHz
-56.93 dBm/Hz
Signal Track
On Off
Scale Type
Log Lin

7.6.2. 802.11n HT40 MODE

LOWER BAND

EUT Antenna Gain for Chain 0 (dBi) =	0.00
EUT Antenna Gain for Chain 1 (dBi) =	0.00
Duty Cycle Factor (dB) =	0.00

Frequency (MHz)	Measured Density Chain 0 (dBm/MHz)	Measured Density Chain 1 (dBm/MHz)	Power Density EIRP Chains 0+1 (dBm/MHz)	Limit (dBm/MHz) EIRP	Margin (dB)
5190	-0.28	-0.11	2.82	10	-7.18
5310	-1.94	-1.70	1.19	10	-8.81

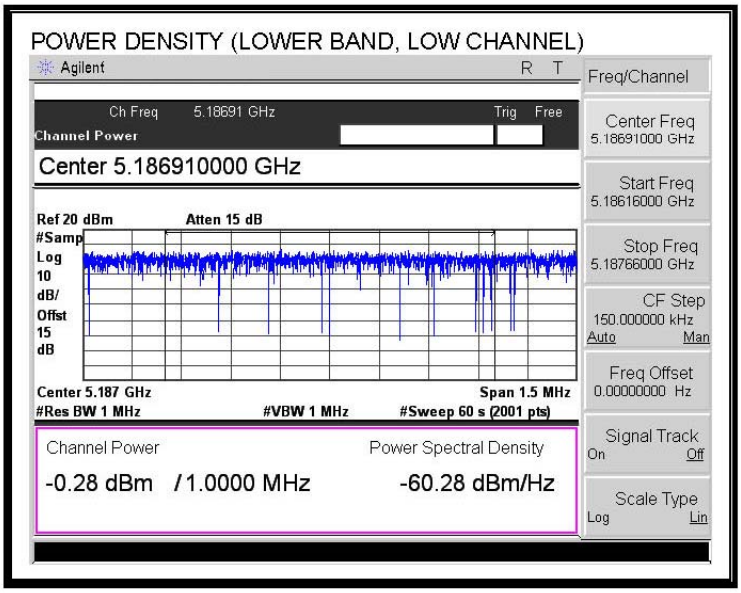
UPPER BAND

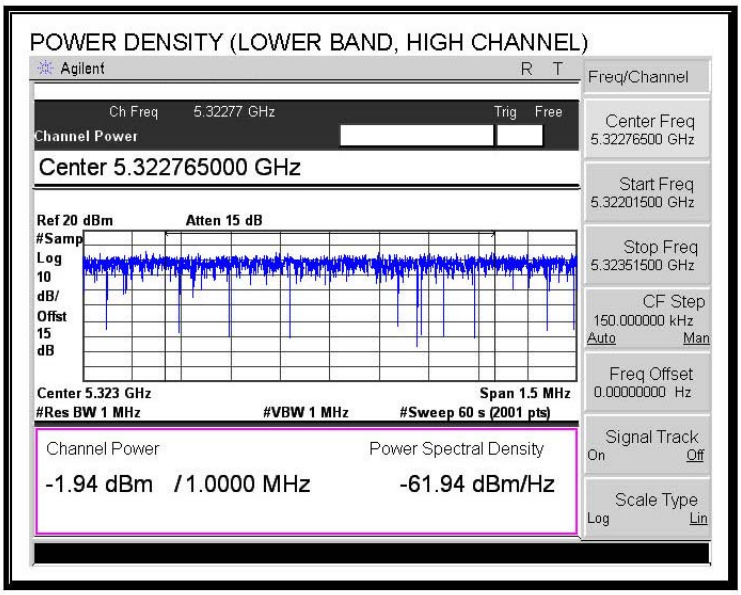
EUT Antenna Gain for Chain 0 (dBi) =	0.00
EUT Antenna Gain for Chain 1 (dBi) =	0.00
Duty Cycle Factor (dB) =	0.00

Frequency (MHz)	Measured Density Chain 0 (dBm/MHz)	Measured Density Chain 1 (dBm/MHz)	Power Density EIRP Chains 0+1 (dBm/MHz)	Limit (dBm/MHz) EIRP	Margin (dB)
5510	-0.91	-0.08	2.54	10	-7.46
5670	-0.91	-0.87	2.12	10	-7.88

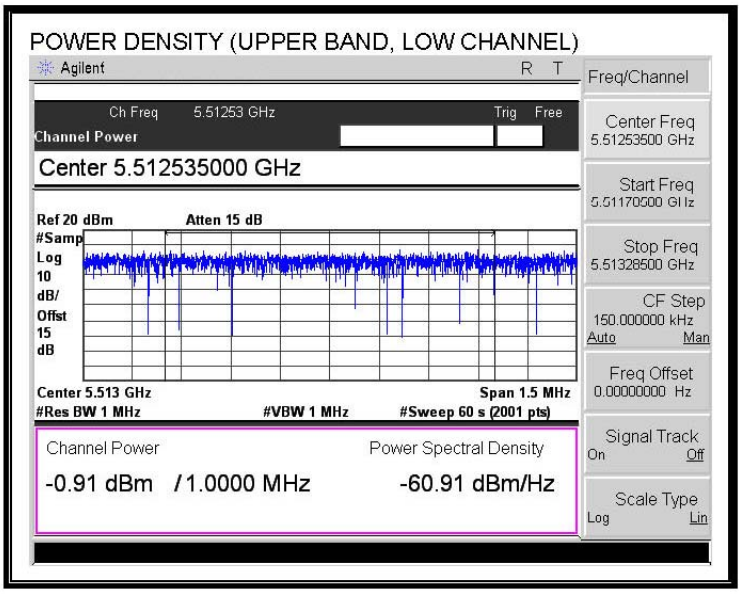
CHAIN 0

POWER DENSITY (LOWER BAND)

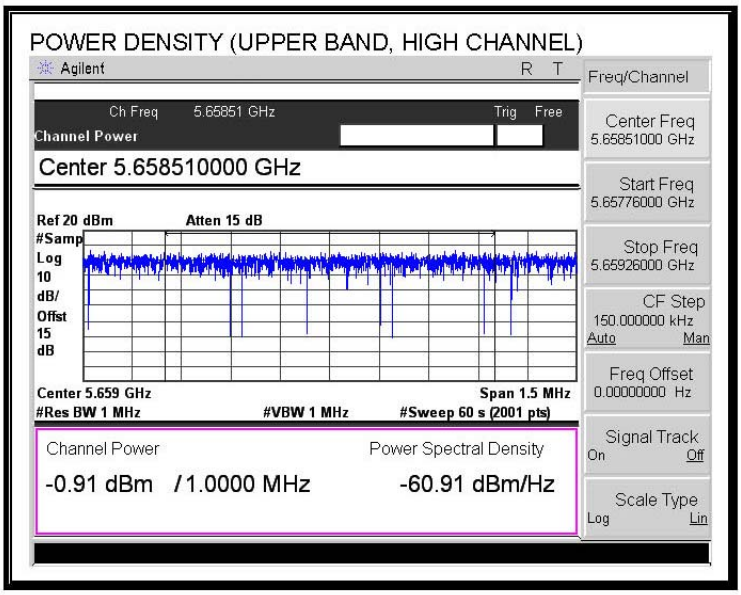



POWER DENSITY (LOWER BAND, HIGH CHANNEL)
Agilent
R T
Ch Freq 5.32277 GHz
Trig Free
Channel Power
Center 5.322765000 GHz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Center 5.323 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
-1.94 dBm
/1.0000 MHz
Power Spectral Density
-61.94 dBm/Hz
Freq/Channel
Center Freq
5.32276500 GHz
Start Freq
5.32201500 GHz
Stop Freq
5.32351500 GHz
CF Step
150.000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Scale Type
Log
Lin

POWER DENSITY (UPPER BAND)

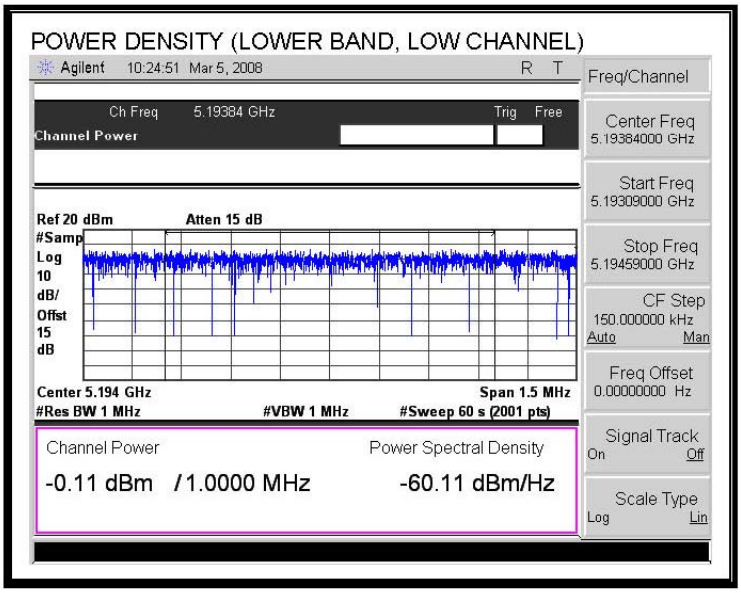


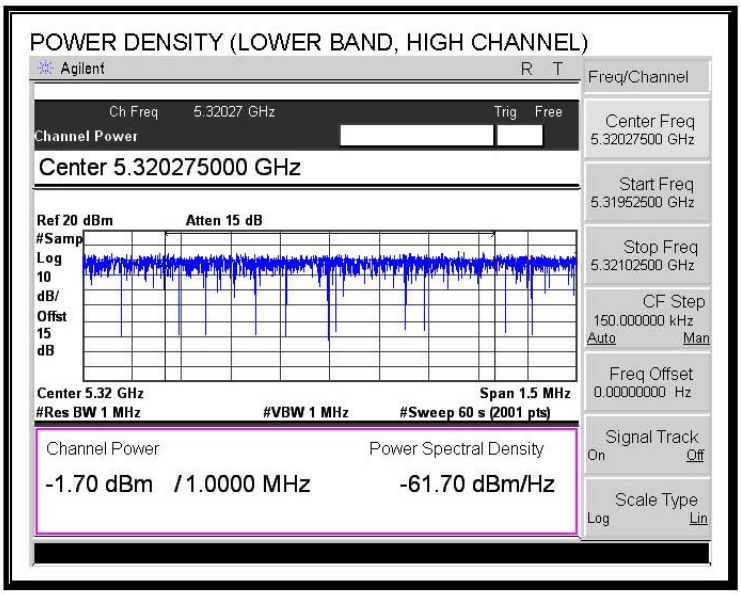
POWER DENSITY (UPPER BAND, HIGH CHANNEL)



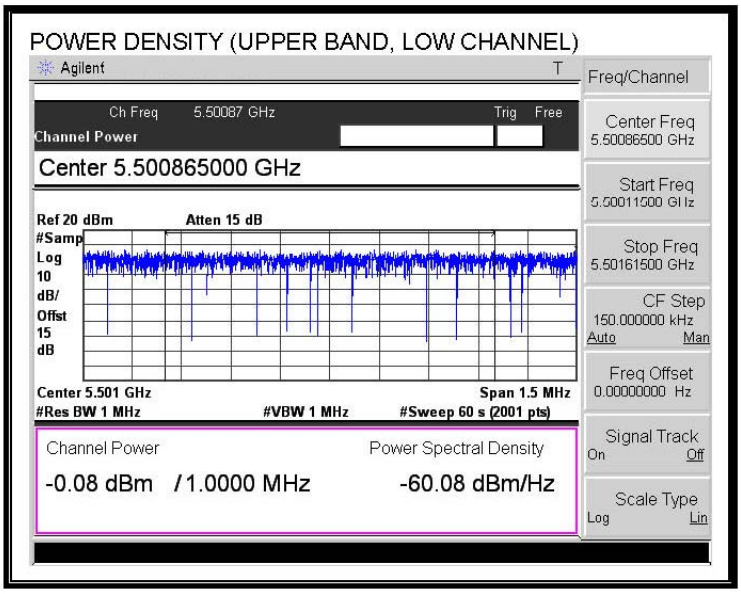
CHAIN 1

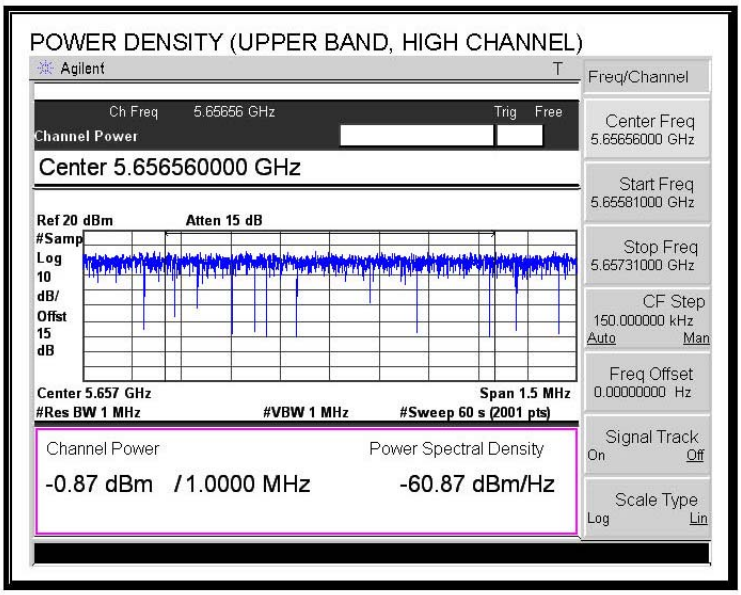
POWER DENSITY (LOWER BAND)




POWER DENSITY (LOWER BAND, HIGH CHANNEL)
Agilent
R T
Ch Freq 5.32027 GHz
Trig Free
Channel Power
Center 5.320275000 GHz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Center 5.32 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
-1.70 dBm
/1.0000 MHz
Power Spectral Density
-61.70 dBm/Hz
Freq/Channel
Center Freq
5.32027500 GHz
Start Freq
5.31952500 GHz
Stop Freq
5.32102500 GHz
CF Step
150.000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Scale Type
Log
Lin

POWER DENSITY (UPPER BAND)




POWER DENSITY (UPPER BAND, HIGH CHANNEL)
Agilent
T
Freq/Channel
Ch Freq 5.65656 GHz
Trig Free
Channel Power
Center 5.656560000 GHz
Center Freq
5.65656000 GHz
Start Freq
5.65581000 GHz
Stop Freq
5.65731000 GHz
CF Step
150.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Ref 20 dBm
Atten 15 dB
#Samp
Log
10
dB/
Offst
15
dB
Center 5.657 GHz
Span 1.5 MHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 60 s (2001 pts)
Channel Power
Power Spectral Density
-0.87 dBm / 1.0000 MHz
-60.87 dBm/Hz
Signal Track
On Off
Scale Type
Log Lin

7.7. TRANSMITTER UNWANTED EMISSIONS OUTSIDE THE 5 GHz RLAN BANDS

LIMIT

ETSI EN 301 893 Clause 4.5.1.2, Table 3

Frequency Range (MHz)	Maximum Power, ERP (dBm)	Bandwidth (kHz)
30 to 47	-36	100
47 to 74	-54	100
74 to 87.5	-36	100
87.5 to 118	-54	100
118 to 174	-36	100
174 to 230	-54	100
230 to 470	-36	100
470 to 862	-54	100
862 to 1000	-36	100
Frequency Range (GHz)	**Maximum Power, ERP (dBm)**	**Bandwidth (MHz)**
1 to 5.15	-30	1
5.35 to 5.47	-30	1
5.725 to 26	-30	1

TEST PROTOCOL

ETSI EN 301 893 Clause 5.3.5.1

The level of unwanted emissions are measured as

their power in a specified load (conducted spurious emissions); and their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation).

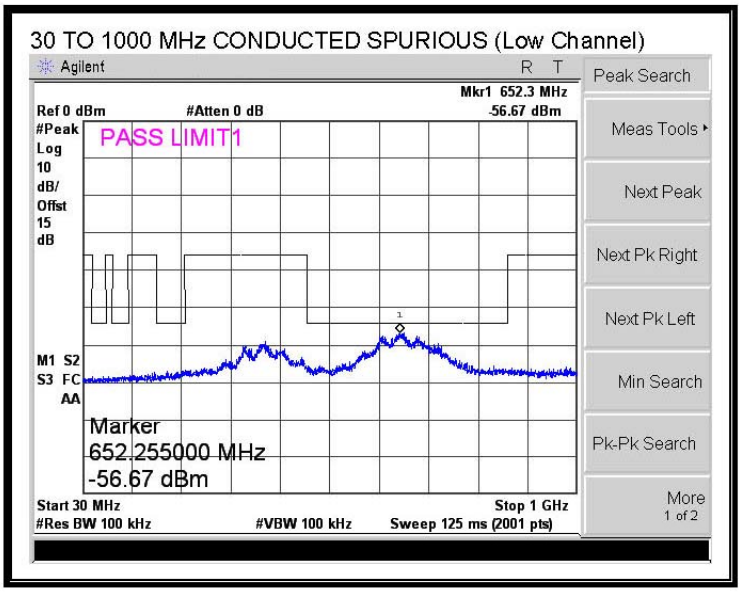
TEST PROCEDURE

ETSI EN 301 893 Clause 5.3.5.2

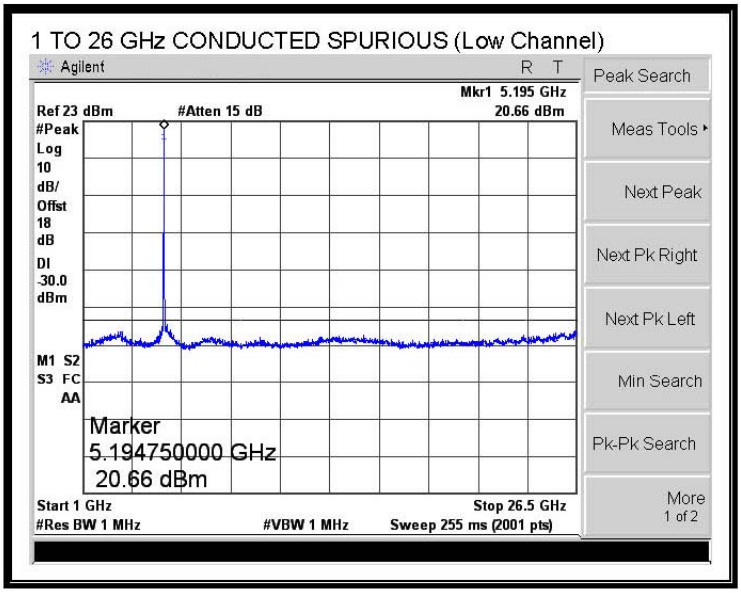
RESULTS

7.7.1. 802.11n HT20 MODE IN THE LOWER BAND

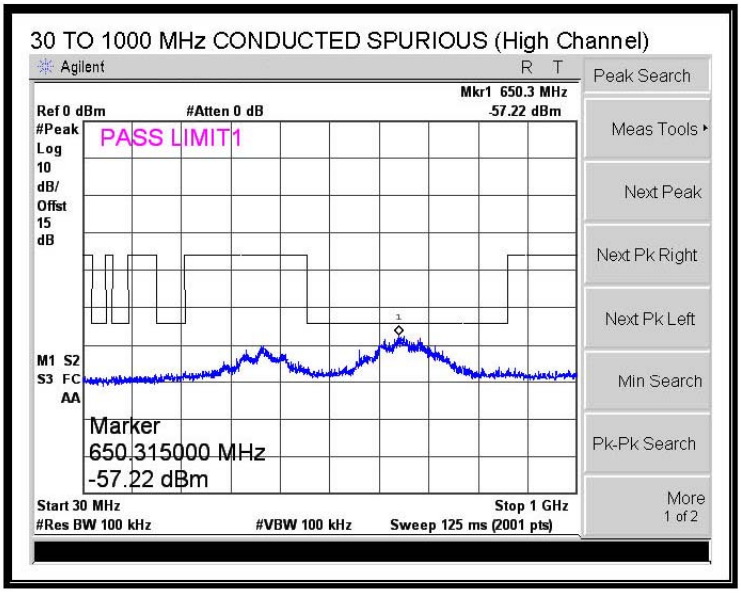
CONDUCTED SPURIOUS EMISSIONS



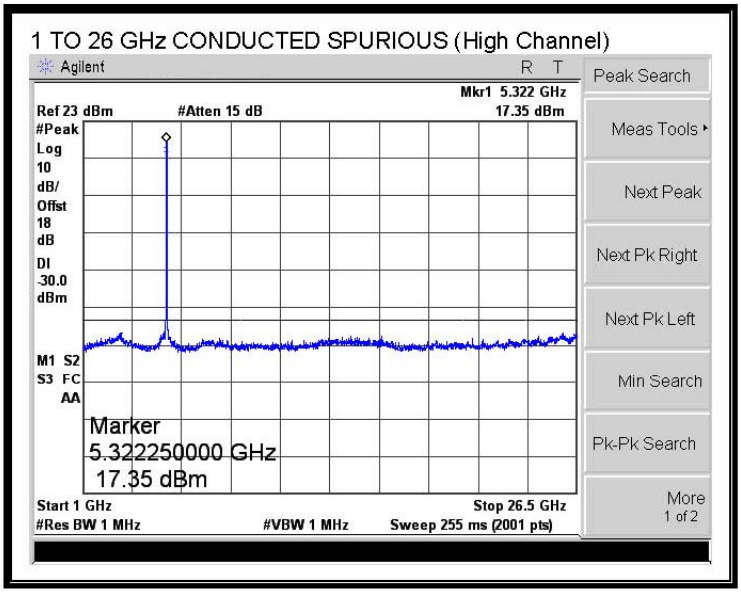
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)



1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS BELOW 1 GHz

30 - 1000MHz Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

Bilog Antenna	Cable	Pre-amplifer 8447D	Limit
5m Chamber Sunol Bilog	5m Chamber Cable	T5 8447D	ETSI 301 893 Tx

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low CH. (5180 MHz)										
57.50	47.5	H	-67.7	1.1	-2.9	-5.0	-73.8	-54.0	-19.8	
143.20	39.4	H	-68.5	1.5	-0.5	-2.7	-72.7	-36.0	-36.7	
398.60	41.3	H	-62.8	2.4	6.0	3.9	-61.3	-36.0	-25.3	
599.10	36.6	H	-66.1	2.9	6.9	4.8	-64.3	-54.0	-10.3	
615.90	34.2	H	-68.4	2.9	6.9	4.7	-66.6	-54.0	-12.6	
697.40	33.1	H	-68.0	3.1	6.8	4.6	-66.6	-54.0	-12.6	
55.90	46.3	V	-69.8	1.1	-3.3	-5.4	-76.3	-54.0	-22.3	
143.20	50.0	V	-58.6	1.5	-0.5	-2.7	-62.8	-36.0	-26.8	
398.60	52.5	V	-52.6	2.4	6.0	3.9	-51.0	-36.0	-15.0	
487.50	40.0	V	-63.3	2.6	6.2	4.0	-62.0	-54.0	-8.0	
599.10	42.0	V	-60.4	2.9	6.9	4.8	-58.5	-54.0	-4.5	
615.90	36.6	V	-65.4	2.9	6.9	4.7	-63.6	-54.0	-9.6	
697.40	36.9	V	-63.6	3.1	6.8	4.6	-62.1	-54.0	-8.1	
Hi CH. (5320 MHz)										
57.50	46.5	H	-68.7	1.1	-2.9	-5.0	-74.8	-54.0	-20.8	
143.20	39.7	H	-68.2	1.5	-0.5	-2.7	-72.4	-36.0	-36.4	
398.60	41.6	H	-62.6	2.4	6.0	3.9	-61.0	-36.0	-25.0	
599.10	36.5	H	-66.1	2.9	6.9	4.8	-64.3	-54.0	-10.3	
615.90	34.8	H	-67.8	2.9	6.9	4.7	-66.0	-54.0	-12.0	
697.40	33.0	H	-68.1	3.1	6.8	4.6	-66.6	-54.0	-12.6	
55.90	42.3	V	-73.9	1.1	-3.3	-5.4	-80.4	-54.0	-26.4	
143.20	49.6	V	-59.0	1.5	-0.5	-2.7	-63.1	-36.0	-27.1	
398.60	51.4	V	-53.7	2.4	6.0	3.9	-52.2	-36.0	-16.2	
487.50	39.3	V	-64.0	2.6	6.2	4.0	-62.7	-54.0	-8.7	
599.10	41.2	V	-61.2	2.9	6.9	4.8	-59.4	-54.0	-5.4	
615.90	35.9	V	-66.1	2.9	6.9	4.7	-64.3	-54.0	-10.3	
697.40	35.5	V	-65.0	3.1	6.8	4.6	-63.5	-54.0	-9.5	

Rev. 4.29.7

RADIATED SPURIOUS EMISSIONS ABOVE 1 GHz

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

EMCO Horn 1-18GHz: T73; S/N: 6717 @3m
Horn > 18GHz: T87-T90 ARA 18-40GHz & Mixer > 40GHz
Limit: ETSI 301 893 Tx
☐ High Pass Filter

Hi Frequency Cables: ☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

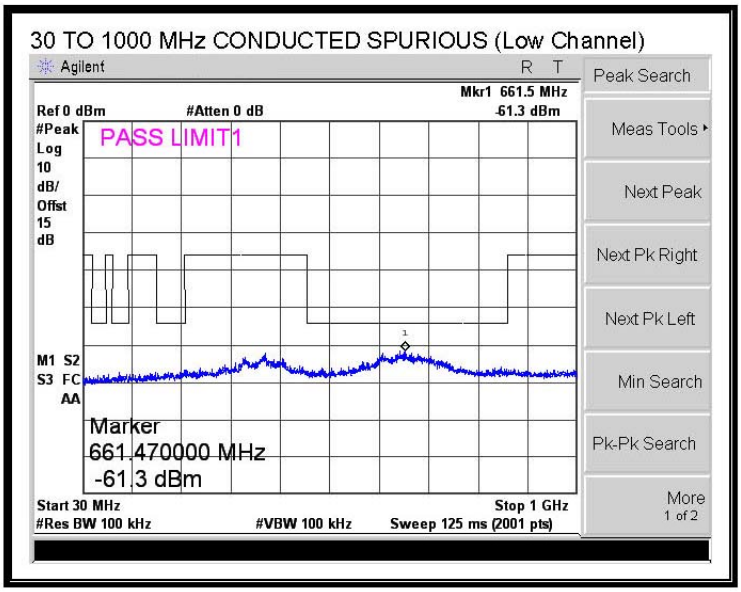
Pre-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 26-40GHz:

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch. (5180 MHz)										
10.360	39.0	H	-46.2	10.4	13.5	11.4	-45.2	-30.0	-15.2	
15.540	40.7	H	-38.9	12.7	16.0	13.8	-37.7	-30.0	-7.7	
10.360	41.0	V	-45.2	10.4	13.5	11.4	-44.2	-30.0	-14.2	
15.540	44.7	V	-34.8	12.7	16.0	13.8	-33.6	-30.0	-3.6	
Hi Ch. (5320 MHz)										
10.640	37.7	H	-46.5	10.7	13.6	11.5	-45.7	-30.0	-15.7	
15.960	40.4	H	-41.0	12.8	17.2	15.0	-38.8	-30.0	-8.8	
10.640	37.8	V	-47.5	10.7	13.6	11.5	-46.7	-30.0	-16.7	
15.960	44.9	V	-36.4	12.8	17.2	15.0	-34.2	-30.0	-4.2	
1.196	49.9	H	-58.4	3.3	6.9	4.7	-56.9	-30.0	-26.9	
1.328	54.1	H	-53.7	3.4	7.2	5.1	-52.0	-30.0	-22.0	
1.596	53.6	H	-53.0	3.8	7.8	5.7	-51.0	-30.0	-21.0	
2.492	46.8	H	-56.4	4.9	9.6	7.4	-53.9	-30.0	-23.9	
1.064	51.0	V	-58.6	3.1	6.6	4.4	-57.3	-30.0	-27.3	
1.328	54.4	V	-54.0	3.4	7.2	5.1	-52.4	-30.0	-22.4	
1.596	57.6	V	-49.6	3.8	7.8	5.7	-47.7	-30.0	-17.7	
2.492	49.0	V	-54.3	4.9	9.6	7.4	-51.8	-30.0	-21.8	

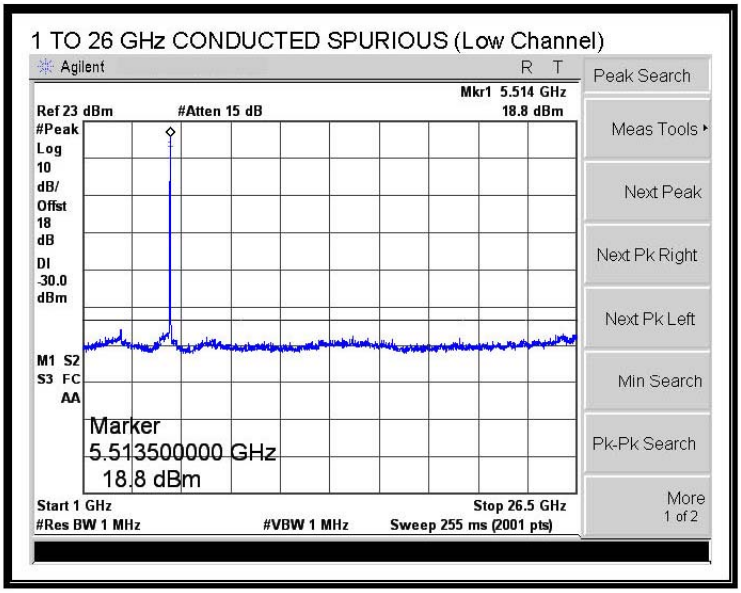
Rev. 4.12.7

7.7.2. 802.11n HT20 MODE IN THE UPPER BAND

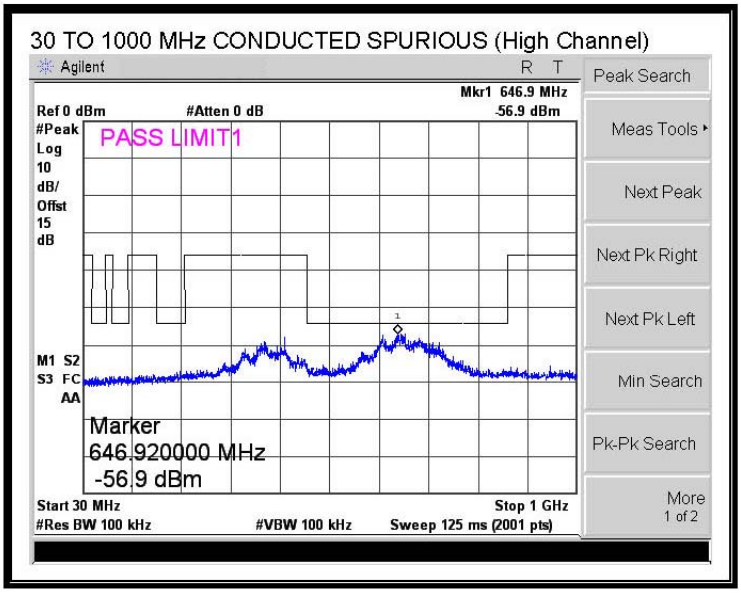
CONDUCTED SPURIOUS EMISSIONS



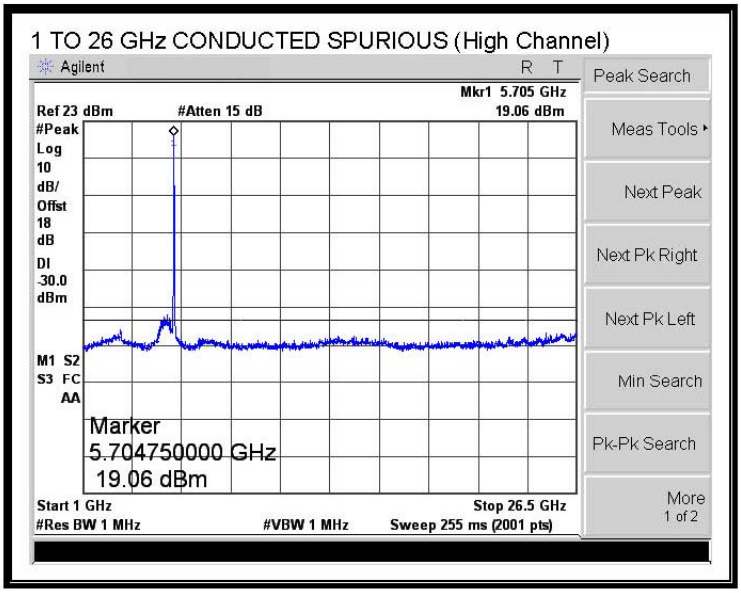
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)



1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS BELOW 1 GHz

30 - 1000MHz Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

Bilog Antenna	Cable	Pre-amplifer 8447D	Limit
5m Chamber Sunol Bilog	5m Chamber Cable	T5 8447D	ETSI 301 893 Tx

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low CH. (5500 MHz)										
57.50	43.3	H	-71.9	1.1	-2.9	-5.0	-78.0	-54.0	-24.0	
143.20	49.7	H	-58.3	1.5	-0.5	-2.7	-62.5	-36.0	-26.5	
398.60	50.9	H	-53.2	2.4	6.0	3.9	-51.7	-36.0	-15.7	
599.10	41.6	H	-61.1	2.9	6.9	4.8	-59.2	-54.0	-5.2	
615.90	35.6	H	-67.0	2.9	6.9	4.7	-65.2	-54.0	-11.2	
697.40	37.5	H	-63.6	3.1	6.8	4.6	-62.1	-54.0	-8.1	
73.60	48.1	V	-64.2	1.2	-1.3	-3.5	-68.9	-54.0	-14.9	
143.20	40.4	V	-68.2	1.5	-0.5	-2.7	-72.4	-36.0	-36.4	
398.60	41.7	V	-63.4	2.4	6.0	3.9	-61.9	-36.0	-25.9	
487.50	41.9	V	-61.4	2.6	6.2	4.0	-60.0	-54.0	-6.0	
599.10	36.9	V	-65.5	2.9	6.9	4.8	-63.6	-54.0	-9.6	
615.90	34.7	V	-67.3	2.9	6.9	4.7	-65.5	-54.0	-11.5	
697.40	33.4	V	-67.1	3.1	6.8	4.6	-65.6	-54.0	-11.6	
Hi CH. (5700 MHz)										
57.50	45.5	H	-69.7	1.1	-2.9	-5.0	-75.8	-54.0	-21.8	
143.20	50.1	H	-57.8	1.5	-0.5	-2.7	-62.0	-36.0	-26.0	
398.60	54.6	H	-49.6	2.4	6.0	3.9	-48.1	-36.0	-12.1	
599.10	42.2	H	-60.5	2.9	6.9	4.8	-58.6	-54.0	-4.6	
615.90	35.5	H	-67.1	2.9	6.9	4.7	-65.3	-54.0	-11.3	
697.40	36.9	H	-64.2	3.1	6.8	4.6	-62.7	-54.0	-8.7	
57.50	46.9	V	-69.4	1.1	-2.9	-5.0	-75.5	-54.0	-21.5	
143.20	40.5	V	-68.2	1.5	-0.5	-2.7	-72.3	-36.0	-36.3	
398.60	44.5	V	-60.6	2.4	6.0	3.9	-59.0	-36.0	-23.0	
487.50	39.6	V	-63.8	2.6	6.2	4.0	-62.4	-54.0	-8.4	
599.10	37.0	V	-65.4	2.9	6.9	4.8	-63.6	-54.0	-9.6	
615.90	34.3	V	-67.7	2.9	6.9	4.7	-65.9	-54.0	-11.9	
697.40	32.9	V	-67.6	3.1	6.8	4.6	-66.1	-54.0	-12.1	

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RADIATED SPURIOUS EMISSIONS ABOVE 1 GHz

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

EMCO Horn 1-18GHz: T73; S/N: 6717 @3m
Horn > 18GHz: T87 ARA 18-26GHz & Mixer > 26GHz
Limit: ETSI 301 893 Tx
☐ High Pass Filter

Hi Frequency Cables: ☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Pre-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 26-40GHz:

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch. (5500 MHz)										
11.000	40.6	H	-42.9	11.1	13.8	11.6	-42.3	-30.0	-12.3	
16.500	44.7	H	-32.1	13.0	15.7	13.5	-31.6	-30.0	-1.6	
11.000	43.0	V	-41.1	11.1	13.8	11.6	-40.6	-30.0	-10.6	
16.500	46.3	V	-31.0	13.0	15.7	13.5	-30.5	-30.0	-0.5	
Hi Ch. (5700 MHz)										
11.400	35.9	H	-46.1	11.5	13.9	11.8	-45.9	-30.0	-15.9	
17.100	40.0	H	-32.8	13.2	13.7	11.5	-34.5	-30.0	-4.5	
11.400	36.5	V	-46.2	11.5	13.9	11.8	-45.9	-30.0	-15.9	
17.100	42.9	V	-29.1	13.2	13.7	11.5	-30.8	-30.0	-0.8	
1.196	52.5	H	-55.8	3.3	6.9	4.7	-54.3	-30.0	-24.3	
1.328	52.9	H	-54.8	3.4	7.2	5.1	-53.2	-30.0	-23.2	
1.596	50.8	H	-55.7	3.8	7.8	5.7	-53.8	-30.0	-23.8	
2.492	47.1	H	-56.1	4.9	9.6	7.4	-53.6	-30.0	-23.6	
1.064	51.7	V	-58.0	3.1	6.6	4.4	-56.6	-30.0	-26.6	
1.328	52.9	V	-55.6	3.4	7.2	5.1	-54.0	-30.0	-24.0	
1.596	56.7	V	-50.5	3.8	7.8	5.7	-48.6	-30.0	-18.6	
2.492	48.8	V	-54.6	4.9	9.6	7.4	-52.1	-30.0	-22.1	

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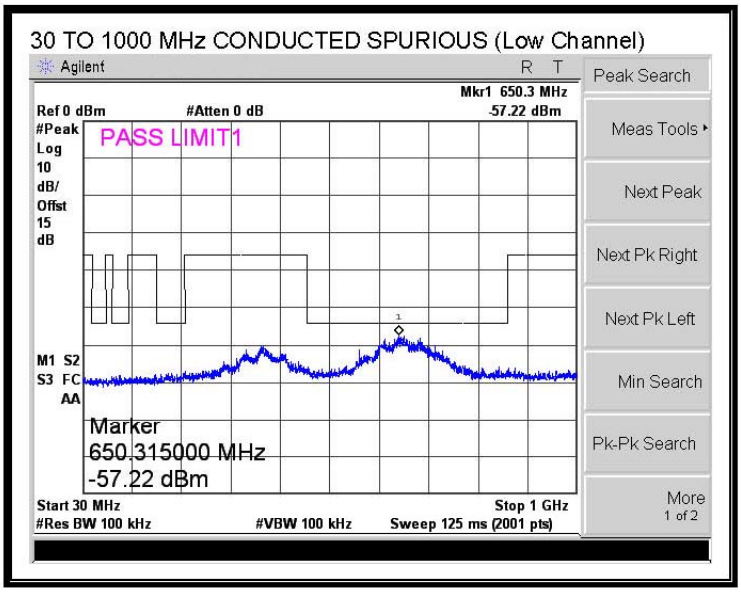
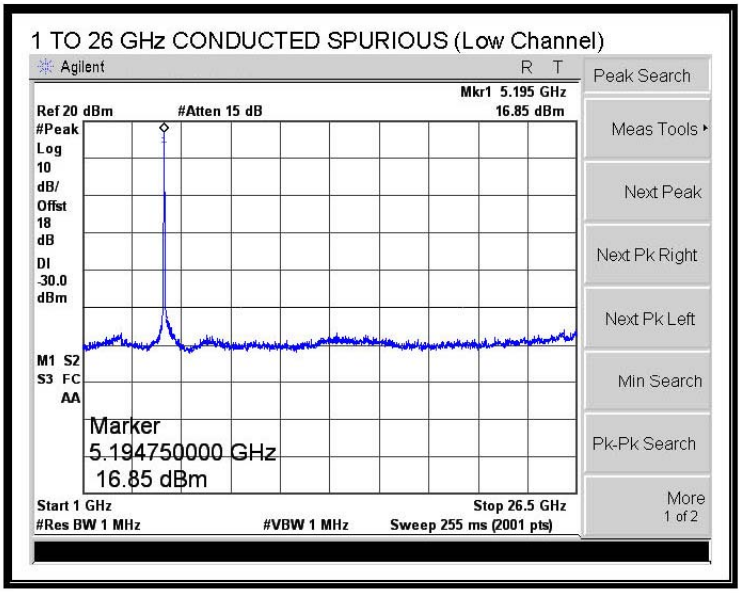
7.7.3. 802.11n HT40 MODE IN THE LOWER BAND

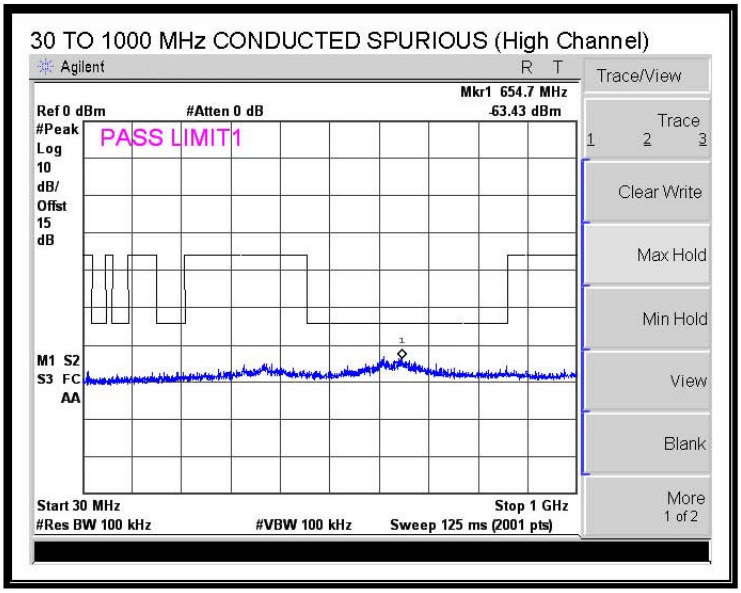
CONDUCTED SPURIOUS EMISSIONS



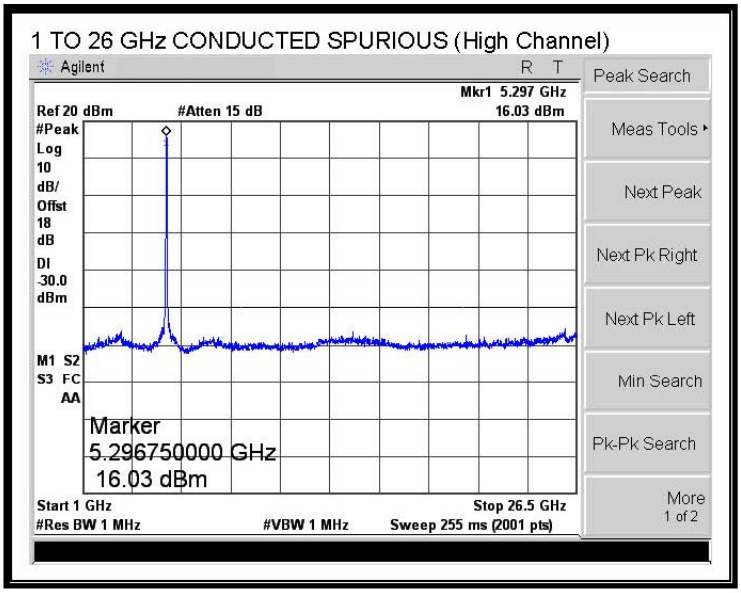
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)



1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS BELOW 1 GHz

30 - 1000MHz Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

Bilog Antenna	Cable	Pre-amplifer 8447D	Limit
5m Chamber Sunol Bilog	5m Chamber Cable	TS 8447D	ETSI 301 893 Tx

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low CH. (5190 MHz)										
57.50	40.2	H	-74.9	1.1	-2.9	-5.0	-81.0	-54.0	-27.0	
143.20	50.0	H	-58.0	1.5	-0.5	-2.7	-62.2	-36.0	-26.2	
398.60	52.9	H	-51.3	2.4	6.0	3.9	-49.8	-36.0	-13.8	
599.10	41.7	H	-61.0	2.9	6.9	4.8	-59.1	-54.0	-5.1	
615.90	36.4	H	-66.2	2.9	6.9	4.7	-64.4	-54.0	-10.4	
697.40	37.4	H	-63.7	3.1	6.8	4.6	-62.2	-54.0	-8.2	
55.90	45.2	V	-70.9	1.1	-3.3	-5.4	-77.4	-54.0	-23.4	
143.20	40.9	V	-67.8	1.5	-0.5	-2.7	-71.9	-36.0	-35.9	
398.60	43.6	V	-61.5	2.4	6.0	3.9	-60.0	-36.0	-24.0	
599.10	36.7	V	-65.6	2.9	6.9	4.8	-63.8	-54.0	-9.8	
615.90	34.8	V	-67.1	2.9	6.9	4.7	-65.3	-54.0	-11.3	
697.40	33.4	V	-67.1	3.1	6.8	4.6	-65.6	-54.0	-11.6	
Hi CH. (5310 MHz)										
57.50	44.2	H	-71.0	1.1	-2.9	-5.0	-77.1	-54.0	-23.1	
143.20	49.8	H	-58.1	1.5	-0.5	-2.7	-62.3	-36.0	-26.3	
398.60	54.9	H	-49.3	2.4	6.0	3.9	-47.8	-36.0	-11.8	
599.10	41.6	H	-61.0	2.9	6.9	4.8	-59.2	-54.0	-5.2	
615.90	36.2	H	-66.4	2.9	6.9	4.7	-64.6	-54.0	-10.6	
697.40	37.3	H	-63.8	3.1	6.8	4.6	-62.3	-54.0	-8.3	
55.90	44.0	V	-72.2	1.1	-3.3	-5.4	-78.7	-54.0	-24.7	
143.20	40.6	V	-68.0	1.5	-0.5	-2.7	-72.2	-36.0	-36.2	
398.60	42.4	V	-62.7	2.4	6.0	3.9	-61.1	-36.0	-25.1	
487.50	39.5	V	-63.9	2.6	6.2	4.0	-62.5	-54.0	-8.5	
599.10	37.2	V	-65.1	2.9	6.9	4.8	-63.3	-54.0	-9.3	
615.90	34.4	V	-67.5	2.9	6.9	4.7	-65.7	-54.0	-11.7	
697.40	33.4	V	-67.1	3.1	6.8	4.6	-65.6	-54.0	-11.6	

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RADIATED SPURIOUS EMISSIONS ABOVE 1 GHz

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

EMCO Horn 1-18GHz: T73; S/N: 6717 @3m
Horn > 18GHz: T87-T90 ARA 18-40GHz & Mixer > 40GHz
Limit: ETSI 301 893 Tx
High Pass Filter
Hi Frequency Cables: (2 ft) (2 ~ 3 ft) (4 ~ 6 ft) (12 ft)
Pre-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 26-40GHz

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch. (5190 MHz)										
10.400	39.5	H	-45.6	10.5	13.5	11.4	-44.7	-30.0	-14.7	
15.600	39.9	H	-40.0	12.7	16.2	14.0	-38.7	-30.0	-8.7	
10.400	39.7	V	-46.3	10.5	13.5	11.4	-45.4	-30.0	-15.4	
15.600	43.6	V	-36.2	12.7	16.2	14.0	-34.9	-30.0	-4.9	
Hi Ch. (5310 MHz)										
10.600	37.3	H	-47.1	10.7	13.6	11.5	-46.3	-30.0	-16.3	
15.900	38.0	H	-43.1	12.8	17.0	14.9	-41.0	-30.0	-11.0	
10.600	37.6	V	-47.8	10.7	13.6	11.5	-47.0	-30.0	-17.0	
15.900	45.0	V	-36.0	12.8	17.0	14.9	-34.0	-30.0	-4.0	
1.196	50.2	H	-58.2	3.3	6.9	4.7	-56.7	-30.0	-26.7	
1.328	53.5	H	-54.3	3.4	7.2	5.1	-52.7	-30.0	-22.7	
1.596	52.7	H	-53.9	3.8	7.8	5.7	-51.9	-30.0	-21.9	
2.492	46.0	H	-57.1	4.9	9.6	7.4	-54.6	-30.0	-24.6	
1.064	51.3	V	-58.3	3.1	6.6	4.4	-57.0	-30.0	-27.0	
1.328	55.2	V	-53.2	3.4	7.2	5.1	-51.6	-30.0	-21.6	
1.596	57.3	V	-49.9	3.8	7.8	5.7	-48.0	-30.0	-18.0	
2.492	46.3	V	-57.1	4.9	9.6	7.4	-54.6	-30.0	-24.6	

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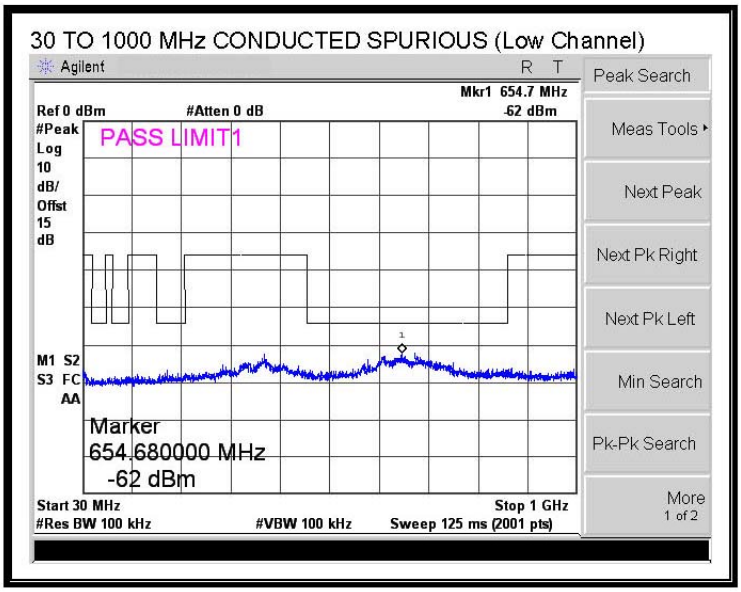
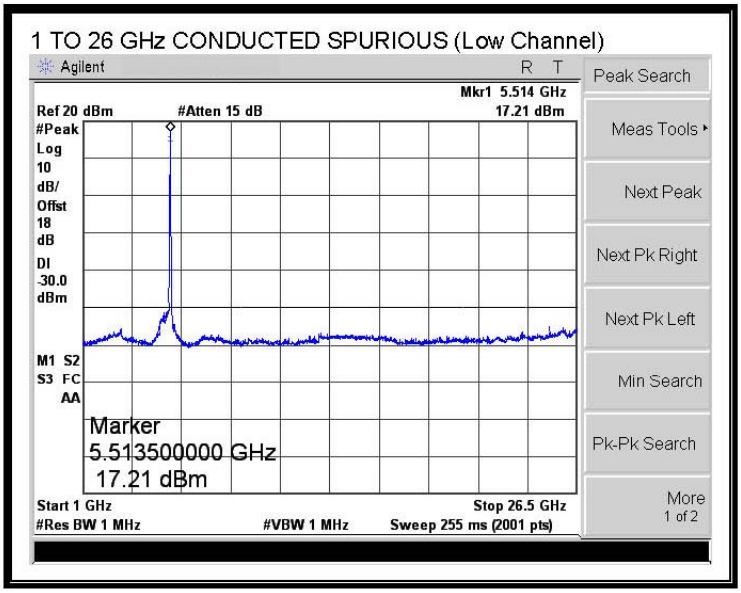
7.7.4. 802.11n HT40 MODE IN THE UPPER BAND

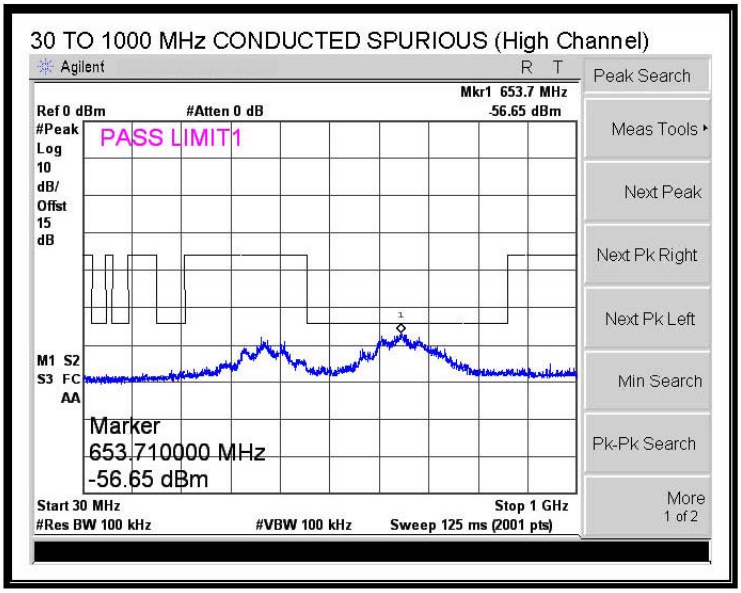
CONDUCTED SPURIOUS EMISSIONS



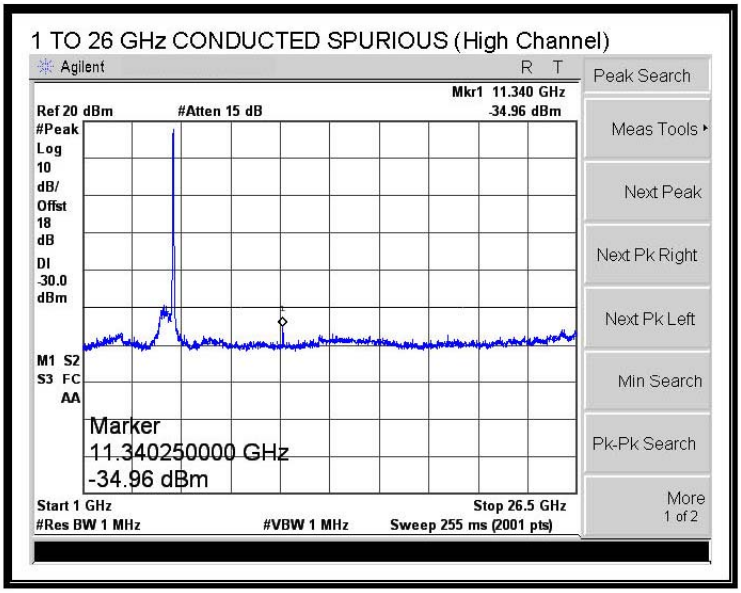
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)



1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS BELOW 1 GHz

30 - 1000MHz Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

Bilog Antenna	Cable	Pre-amplifer 8447D	Limit
5m Chamber Sunol Bilog	5m Chamber Cable	TS 8447D	ETSI 301 893 Tx

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low CH. (5510 MHz)										
57.50	44.0	H	-71.1	1.1	-2.9	-5.0	-77.2	-54.0	-23.2	
398.60	53.7	H	-50.5	2.4	6.0	3.9	-49.0	-36.0	-13.0	
487.50	37.8	H	-65.7	2.6	6.2	4.0	-64.3	-54.0	-10.3	
599.10	41.8	H	-60.9	2.9	6.9	4.8	-59.0	-54.0	-5.0	
615.90	35.6	H	-67.0	2.9	6.9	4.7	-65.2	-54.0	-11.2	
697.40	36.4	H	-64.6	3.1	6.8	4.6	-63.2	-54.0	-9.2	
57.50	45.2	V	-71.1	1.1	-2.9	-5.0	-77.2	-54.0	-23.2	
143.20	40.1	V	-68.5	1.5	-0.5	-2.7	-72.7	-36.0	-36.7	
398.60	44.3	V	-60.8	2.4	6.0	3.9	-59.3	-36.0	-23.3	
487.50	35.4	V	-67.9	2.6	6.2	4.0	-66.5	-54.0	-12.5	
599.10	36.4	V	-65.9	2.9	6.9	4.8	-64.1	-54.0	-10.1	
615.90	34.8	V	-67.2	2.9	6.9	4.7	-65.4	-54.0	-11.4	
697.40	33.1	V	-67.4	3.1	6.8	4.6	-65.9	-54.0	-11.9	
Hi CH. (5670 MHz)										
57.50	44.0	H	-71.2	1.1	-2.9	-5.0	-77.3	-54.0	-23.3	
143.20	49.7	H	-58.3	1.5	-0.5	-2.7	-62.4	-36.0	-26.4	
398.60	53.2	H	-51.0	2.4	6.0	3.9	-49.4	-36.0	-13.4	
599.10	41.2	H	-61.5	2.9	6.9	4.8	-59.6	-54.0	-5.6	
615.90	35.8	H	-66.7	2.9	6.9	4.7	-64.9	-54.0	-10.9	
697.40	36.3	H	-64.7	3.1	6.8	4.6	-63.3	-54.0	-9.3	
57.50	43.5	V	-72.8	1.1	-2.9	-5.0	-78.9	-54.0	-24.9	
143.20	40.4	V	-68.2	1.5	-0.5	-2.7	-72.4	-36.0	-36.4	
398.60	43.6	V	-61.5	2.4	6.0	3.9	-60.0	-36.0	-24.0	
487.50	34.4	V	-68.9	2.6	6.2	4.0	-67.5	-54.0	-13.5	
599.10	36.0	V	-66.4	2.9	6.9	4.8	-64.5	-54.0	-10.5	
615.90	34.6	V	-67.4	2.9	6.9	4.7	-65.6	-54.0	-11.6	
697.40	33.0	V	-67.5	3.1	6.8	4.6	-66.0	-54.0	-12.0	

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RADIATED SPURIOUS EMISSIONS ABOVE 1 GHz

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

EMCO Horn 1-18GHz: T73; S/N: 6717 @3m
Horn > 18GHz: T87 ARA 18-26GHz & Mixer > 26GHz
Limit: ETSI 301 893 Tx
High Pass Filter
Hi Frequency Cables: (2 ft) (2 ~ 3 ft) (4 ~ 6 ft) (12 ft)
Pre-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 26-40GHz

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch. (5510 MHz)										
11.020	40.8	H	-42.6	11.1	13.8	11.7	-42.1	-30.0	-12.1	
16.530	40.5	H	-36.1	13.0	15.6	13.4	-35.7	-30.0	-5.7	
11.020	41.4	V	-42.6	11.1	13.8	11.7	-42.1	-30.0	-12.1	
16.530	44.1	V	-33.0	13.0	15.6	13.4	-32.6	-30.0	-2.6	
Hi Ch. (5670 MHz)										
11.340	37.8	H	-44.5	11.5	13.9	11.8	-44.2	-30.0	-14.2	
17.010	38.3	H	-35.2	13.2	14.0	11.8	-36.6	-30.0	-6.6	
11.340	37.7	V	-45.2	11.5	13.9	11.8	-44.9	-30.0	-14.9	
17.010	41.2	V	-31.4	13.2	14.0	11.8	-32.8	-30.0	-2.8	
1.196	50.7	H	-57.7	3.3	6.9	4.7	-56.2	-30.0	-26.2	
1.328	53.5	H	-54.2	3.4	7.2	5.1	-52.6	-30.0	-22.6	
1.596	51.9	H	-54.6	3.8	7.8	5.7	-52.7	-30.0	-22.7	
2.492	46.5	H	-56.6	4.9	9.6	7.4	-54.1	-30.0	-24.1	
1.064	52.2	V	-57.4	3.1	6.6	4.4	-56.1	-30.0	-26.1	
1.328	54.9	V	-53.6	3.4	7.2	5.1	-52.0	-30.0	-22.0	
1.596	57.0	V	-50.2	3.8	7.8	5.7	-48.3	-30.0	-18.3	
2.492	47.3	V	-56.1	4.9	9.6	7.4	-53.6	-30.0	-23.6	

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7.8. TRANSMITTER UNWANTED EMISSIONS WITHIN THE 5 GHz RLAN BANDS

LIMIT

ETSI EN 301 893 Clause 4.5.2.1, Figure 1

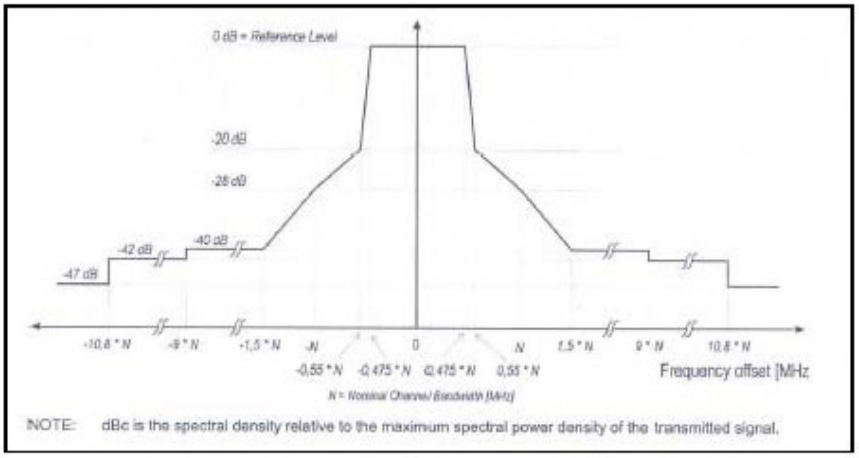


Figure (1)

TEST PROTOCOL

ETSI EN 301 893 Clause 5.3.6.1

The level of unwanted emissions shall be measured as their effective radiated power when radiated by cabinet and antenna.

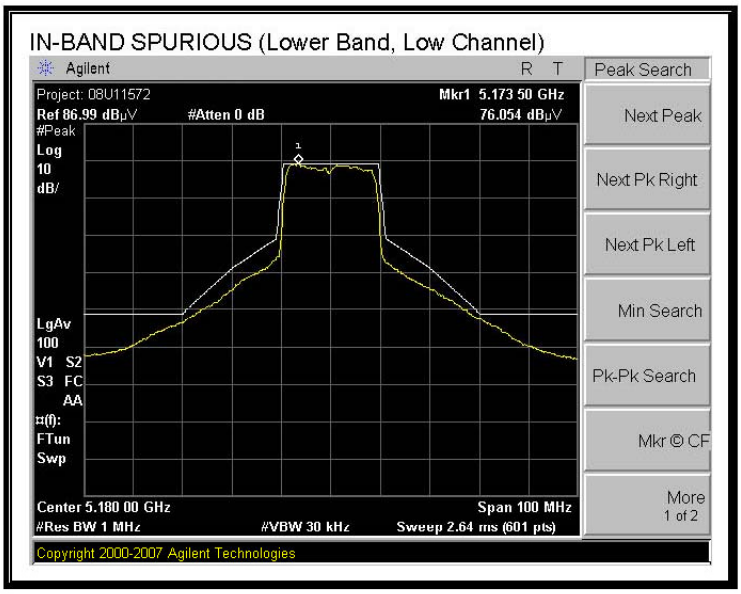
TEST PROCEDURE

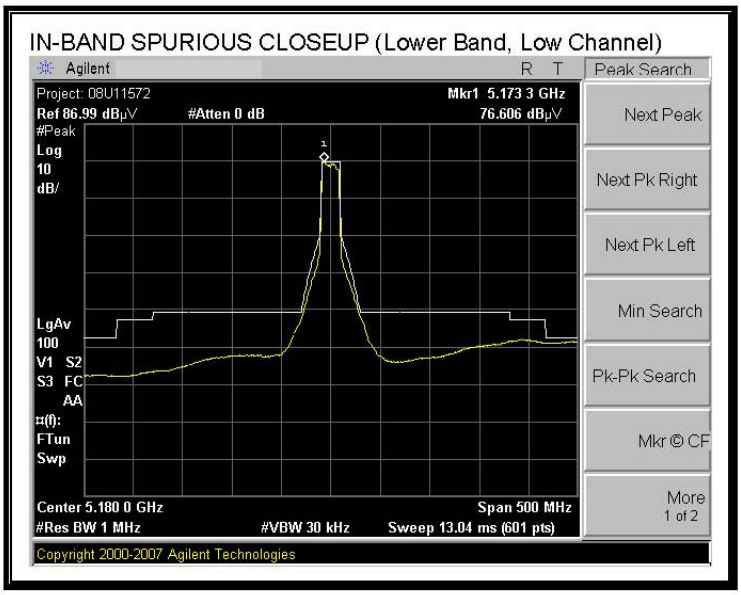
ETSI EN 301 893 Clause 5.3.6.2

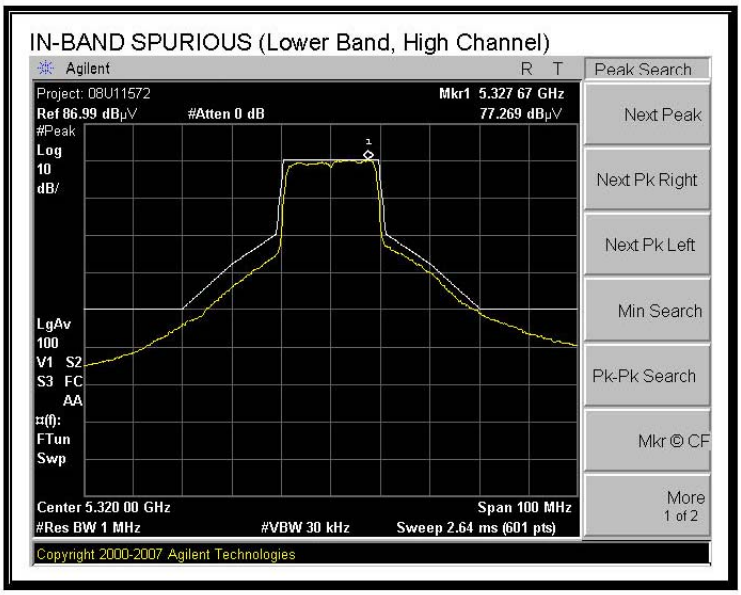
RESULTS

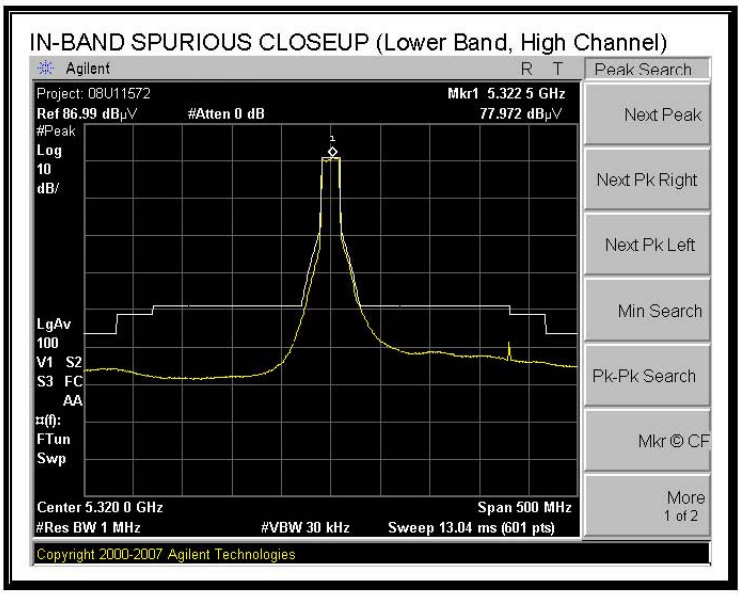
7.8.1. 802.11n HT20 MODE

IN-BAND SPURIOUS EMISSIONS, LOWER BAND

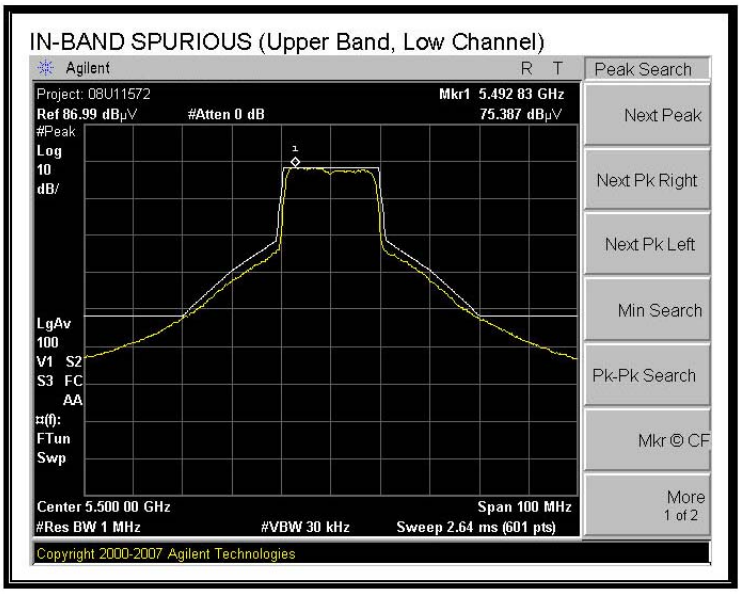


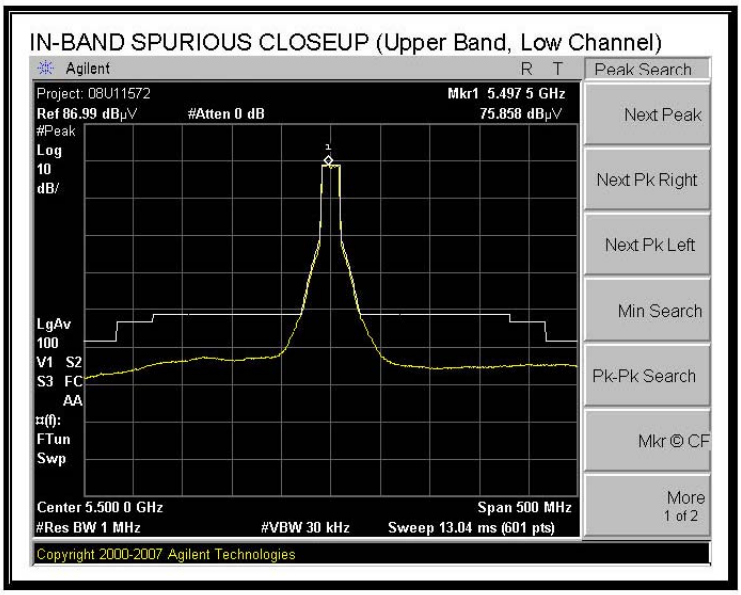

IN-BAND SPURIOUS CLOSEUP (Lower Band, Low Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.173 3 GHz
Ref 86.99 dBµV
#Atten 0 dB
76.606 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.180 0 GHz
Span 500 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 13.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

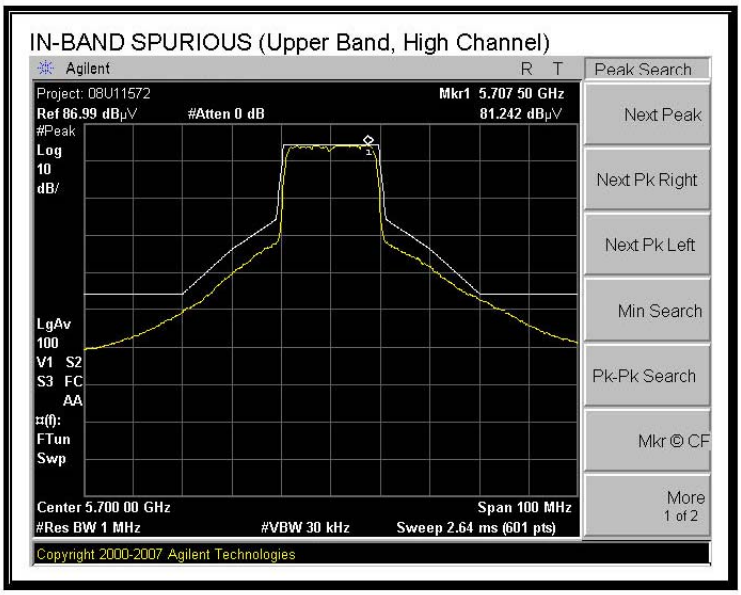

IN-BAND SPURIOUS (Lower Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.327 67 GHz
Ref 86.99 dBµV
#Atten 0 dB
77.269 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.320 00 GHz
Span 100 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 2.64 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

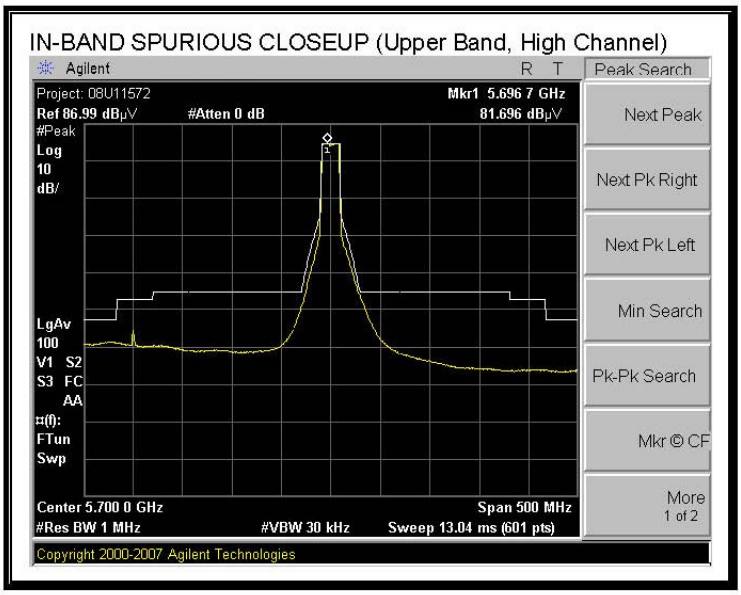

IN-BAND SPURIOUS CLOSEUP (Lower Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.322 5 GHz
Ref 86.99 dBµV
#Atten 0 dB
77.972 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.320 0 GHz
Span 500 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 13.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

IN-BAND SPURIOUS EMISSIONS, UPPER BAND



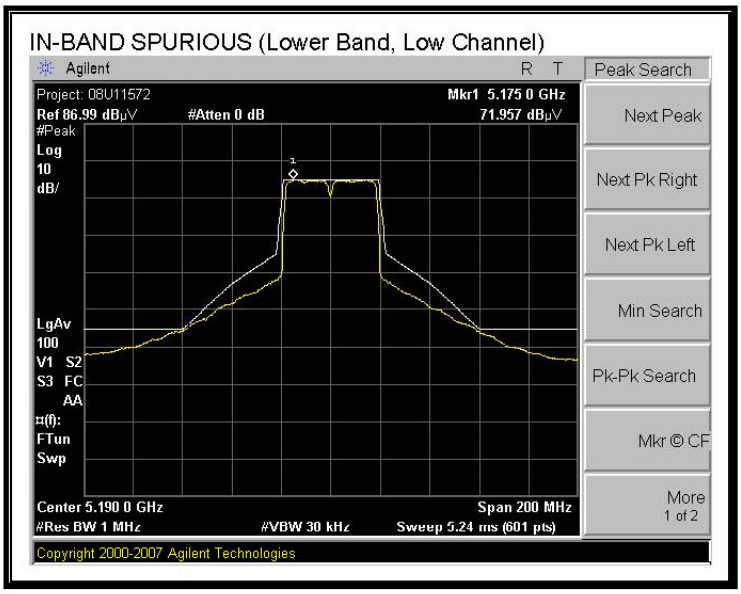

IN-BAND SPURIOUS CLOSEUP (Upper Band, Low Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.497 5 GHz
Ref 86.99 dBµV
#Atten 0 dB
75.858 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.500 0 GHz
Span 500 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 13.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

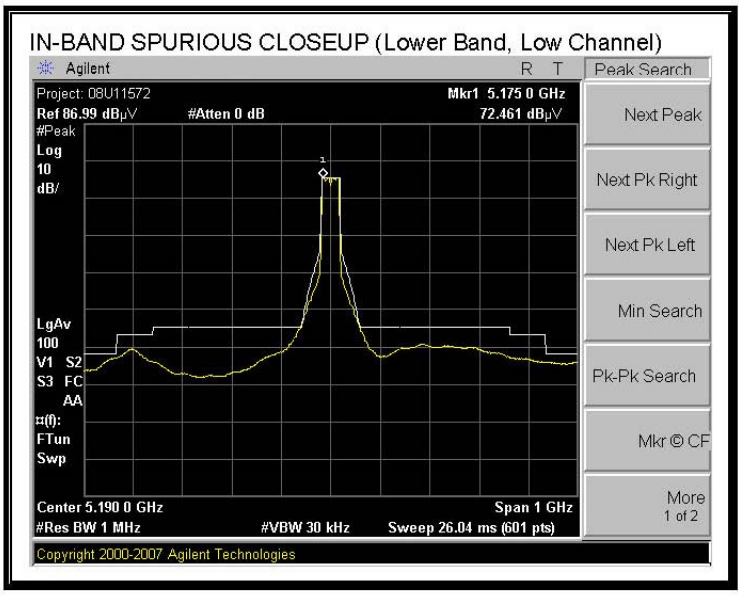

IN-BAND SPURIOUS (Upper Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.707 50 GHz
Ref 86.99 dBµV
#Atten 0 dB
81.242 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.700 00 GHz
Span 100 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 2.64 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

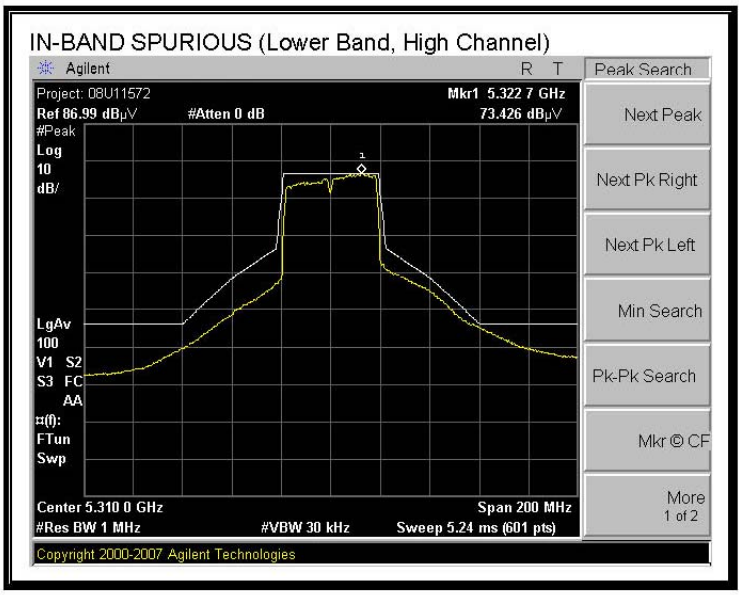

IN-BAND SPURIOUS CLOSEUP (Upper Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.696 7 GHz
Ref 86.99 dBµV
#Atten 0 dB
81.696 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.700 0 GHz
Span 500 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 13.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

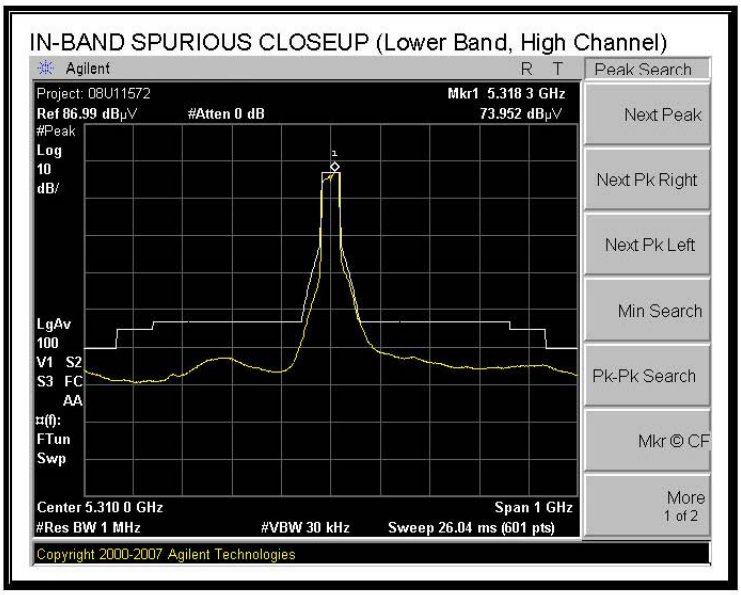
7.8.2. 802.11n HT40 MODE

IN-BAND SPURIOUS EMISSIONS, LOWER BAND

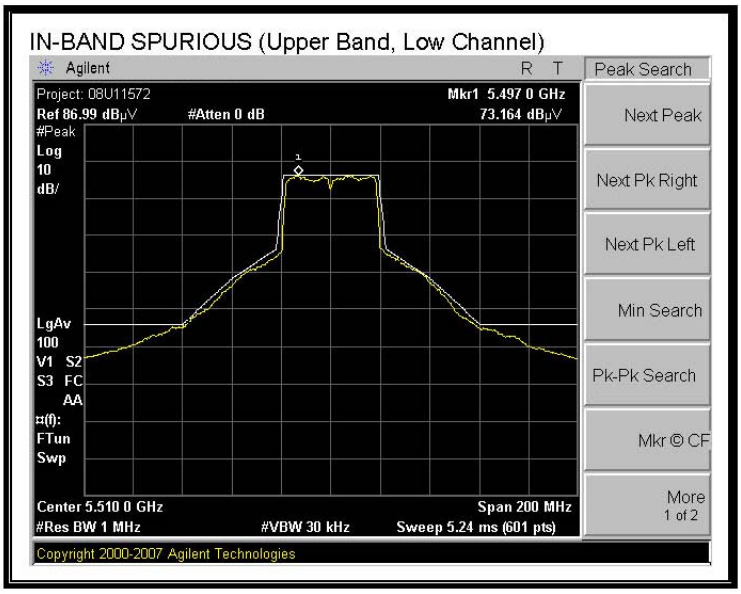


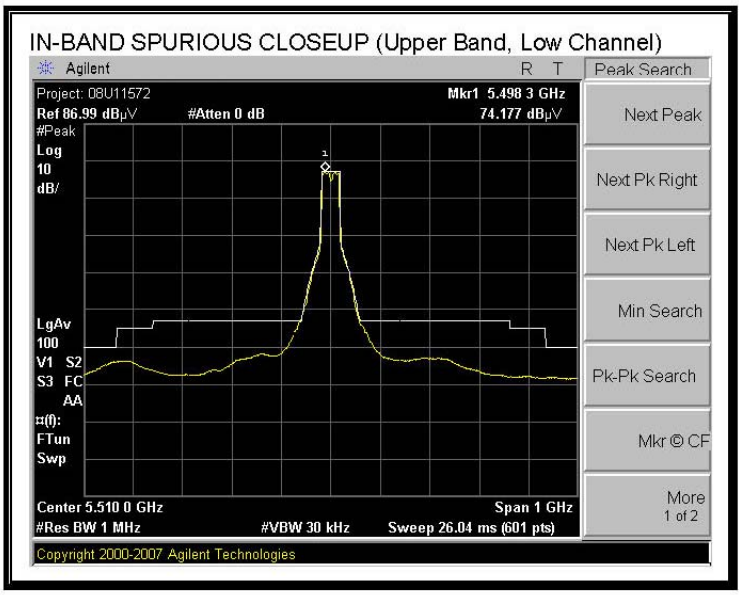

IN-BAND SPURIOUS CLOSEUP (Lower Band, Low Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.175 0 GHz
Ref 86.99 dBµV
#Atten 0 dB
72.461 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.190 0 GHz
Span 1 GHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 26.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

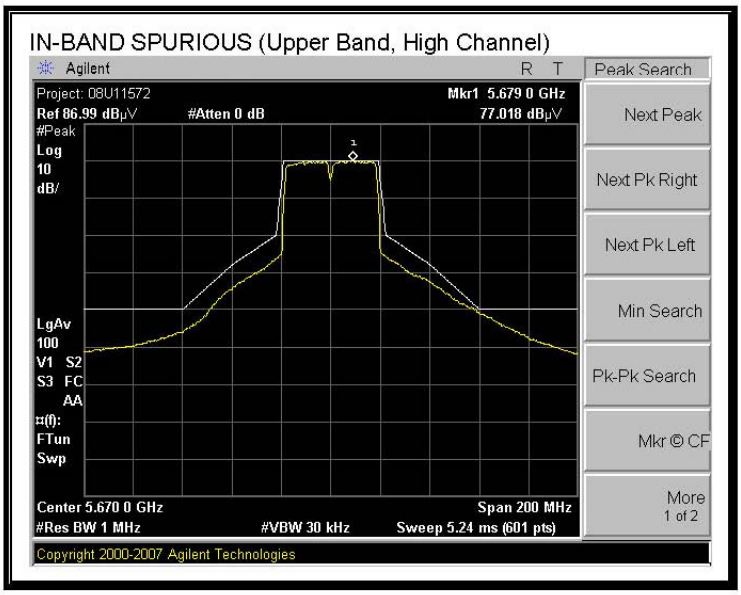

IN-BAND SPURIOUS (Lower Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.322 7 GHz
Ref 86.99 dBµV
#Atten 0 dB
73.426 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.310 0 GHz
Span 200 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 5.24 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

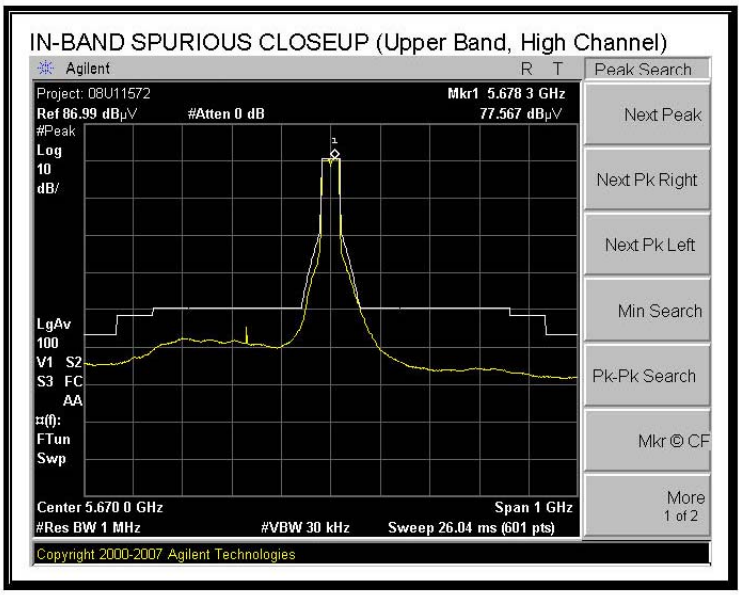

IN-BAND SPURIOUS CLOSEUP (Lower Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.318 3 GHz
Ref 86.99 dBµV
#Atten 0 dB
73.952 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.310 0 GHz
Span 1 GHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 26.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

IN-BAND SPURIOUS EMISSIONS, UPPER BAND




IN-BAND SPURIOUS CLOSEUP (Upper Band, Low Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.498 3 GHz
Ref 86.99 dBµV
#Atten 0 dB
74.177 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.510 0 GHz
Span 1 GHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 26.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies


IN-BAND SPURIOUS (Upper Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.679 0 GHz
Ref 86.99 dBµV
#Atten 0 dB
77.018 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.670 0 GHz
Span 200 MHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 5.24 ms (601 pts)
Copyright 2000-2007 Agilent Technologies


IN-BAND SPURIOUS CLOSEUP (Upper Band, High Channel)
Agilent
R T
Peak Search
Project: 08U11572
Mkr1 5.678 3 GHz
Ref 86.99 dBµV
#Atten 0 dB
77.567 dBµV
#Peak
Log
10
dB/
LgAv
100
V1 S2
S3 FC
AA
¤(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Center 5.670 0 GHz
Span 1 GHz
#Res BW 1 MHz
#VBW 30 kHz
Sweep 26.04 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

7.9. RECEIVER SPURIOUS EMISSIONS

LIMIT

ETSI EN 301 893 Clause 4.6.2, Table 4

Table 4: Narrowband Spurious Emissions Limits for Receivers

Frequency Range	Maximum Power (ERP)	Measurement Bandwidth
30 MHz to 1.0 GHz	-57 dBm	100 kHz
1.0 GHz to 26 GHz	-47 dBm	1 MHz

TEST PROTOCOL

ETSI EN 301 893 Clause 5.3.7.1

The levels of spurious emissions are measured as

their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation); or

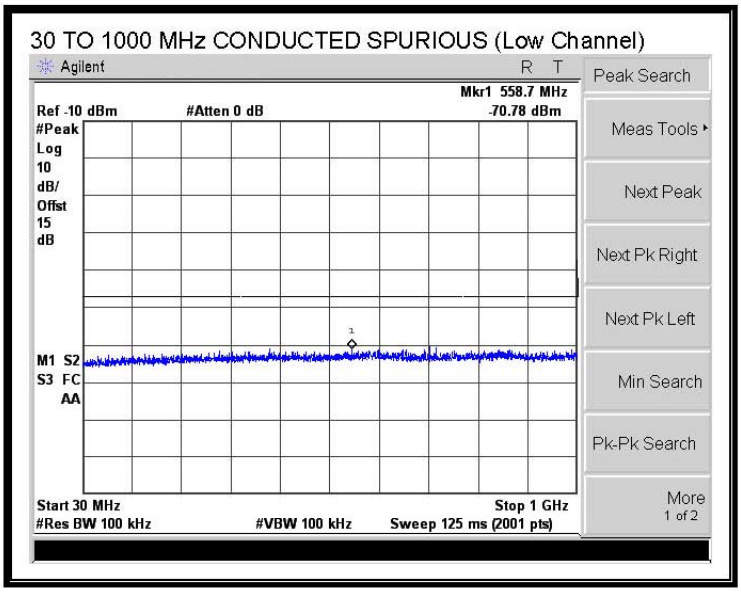
TEST PROCEDURE

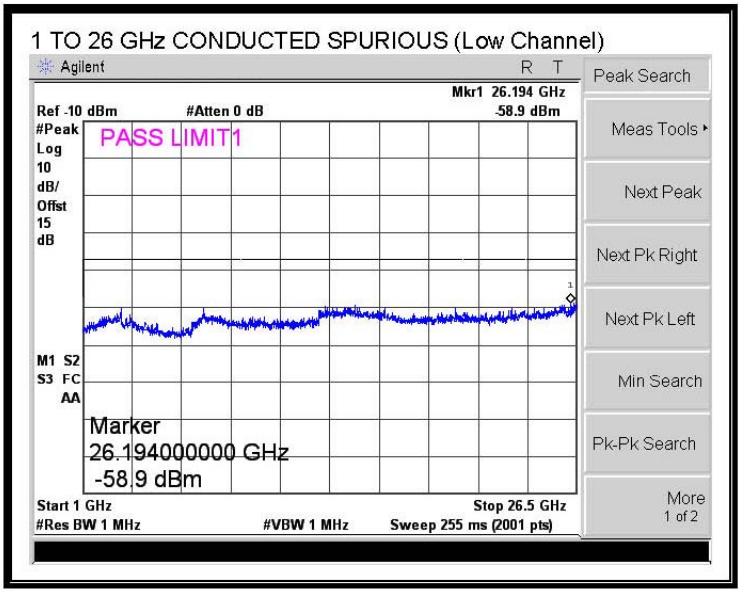
ETSI EN 301 893 Clause 5.3.7.2

RESULTS

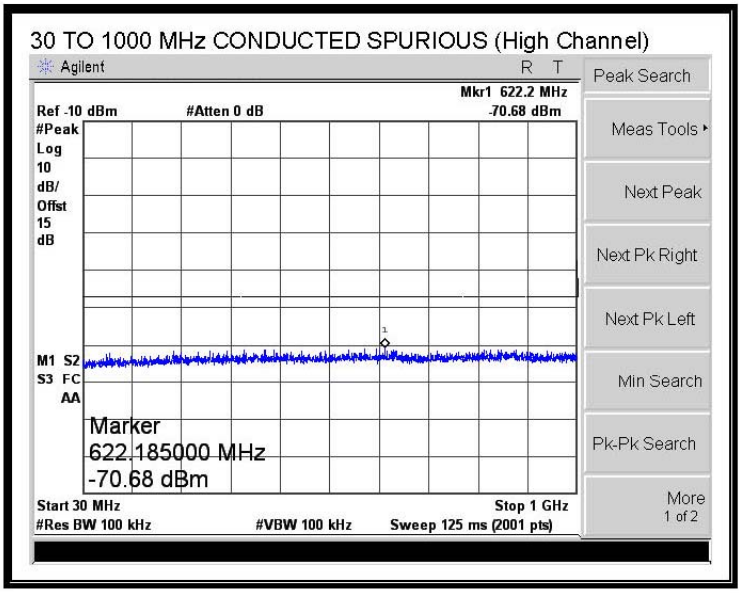
7.9.1. 20 MHz BANDWIDTH IN THE LOWER BAND

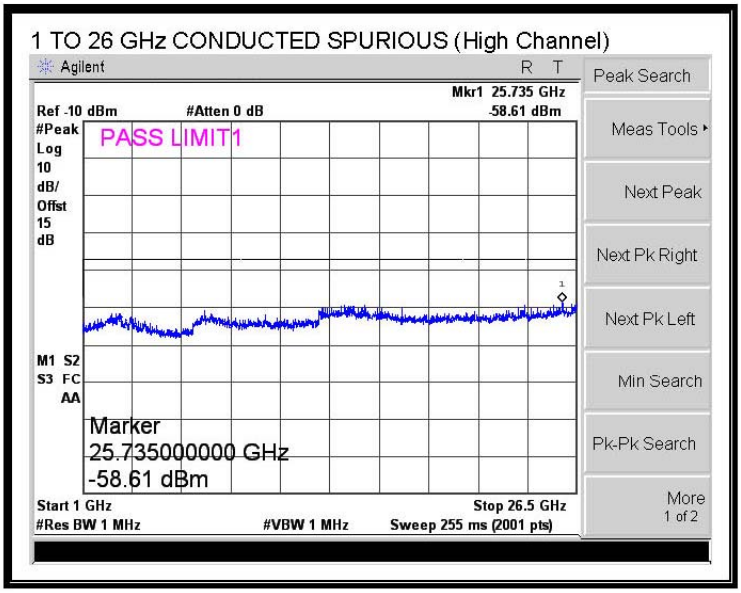
CONDUCTED SPURIOUS EMISSIONS




1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)
Agilent
R T
Mkr1 26.194 GHz
-58.9 dBm
Ref -10 dBm
#Atten 0 dB
#Peak
Log
10
dB/
Offst
15
dB
PASS LIMIT1
M1 S2
S3 FC
AA
Marker
26.194000000 GHz
-58.9 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 26.5 GHz
Sweep 255 ms (2001 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

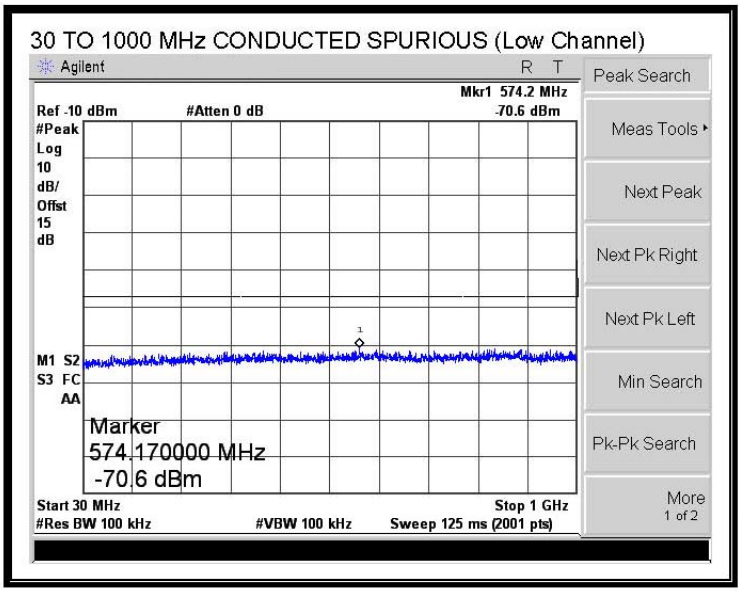
30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)



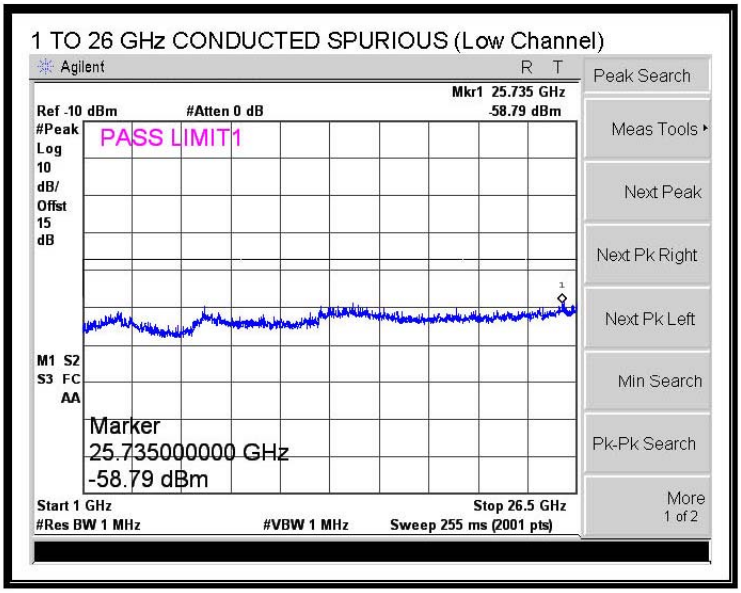

1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)
Agilent
R T
Mkr1 25.735 GHz
-58.61 dBm
Ref -10 dBm
#Atten 0 dB
#Peak
Log
10
dB/
Offst
15
dB
PASS LIMIT1
M1 S2
S3 FC
AA
Marker
25.735000000 GHz
-58.61 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 26.5 GHz
Sweep 255 ms (2001 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

7.9.2. 20 MHz BANDWIDTH IN THE UPPER BAND

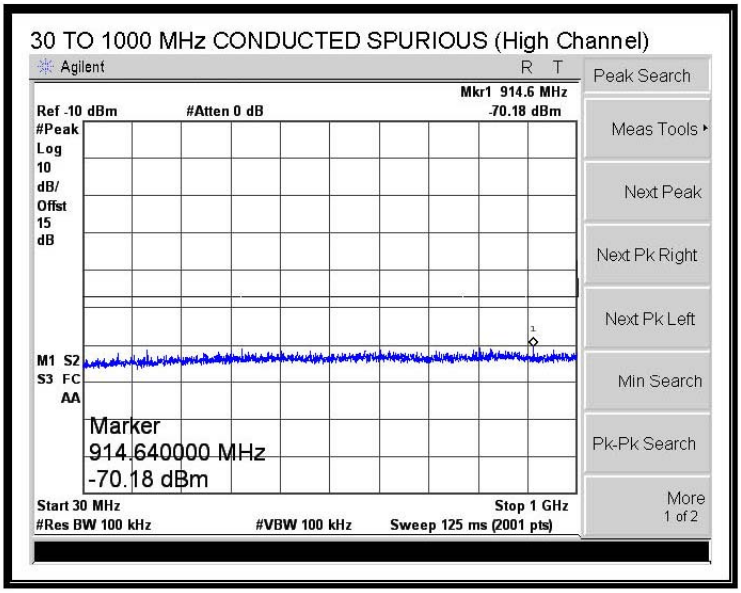
CONDUCTED SPURIOUS EMISSIONS



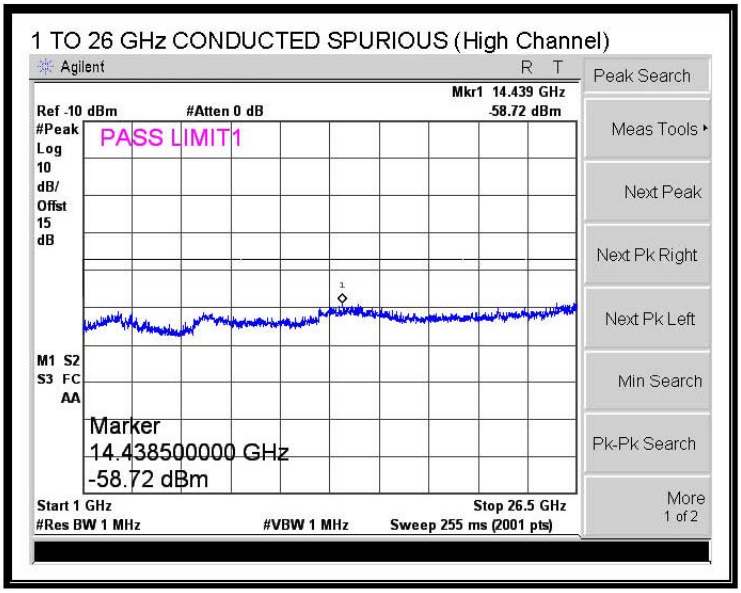
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)

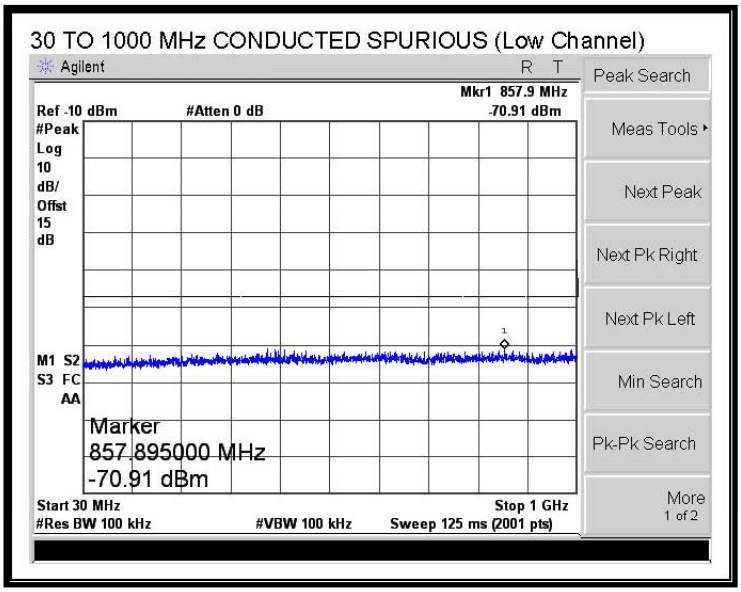


1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)

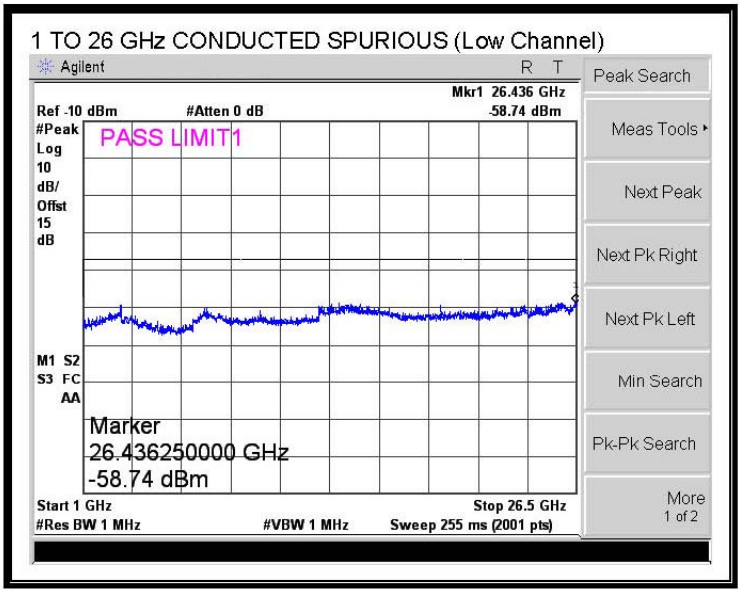


7.9.3. 40 MHz BANDWIDTH IN THE LOWER BAND

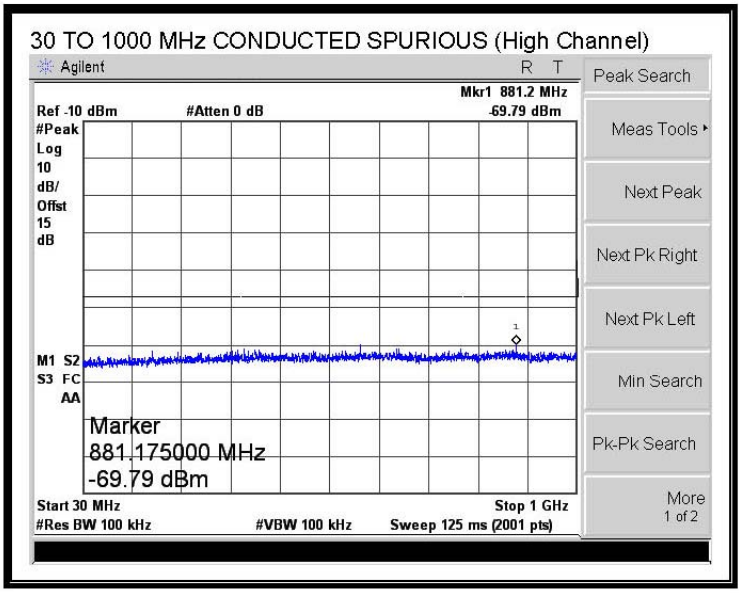
CONDUCTED SPURIOUS EMISSIONS



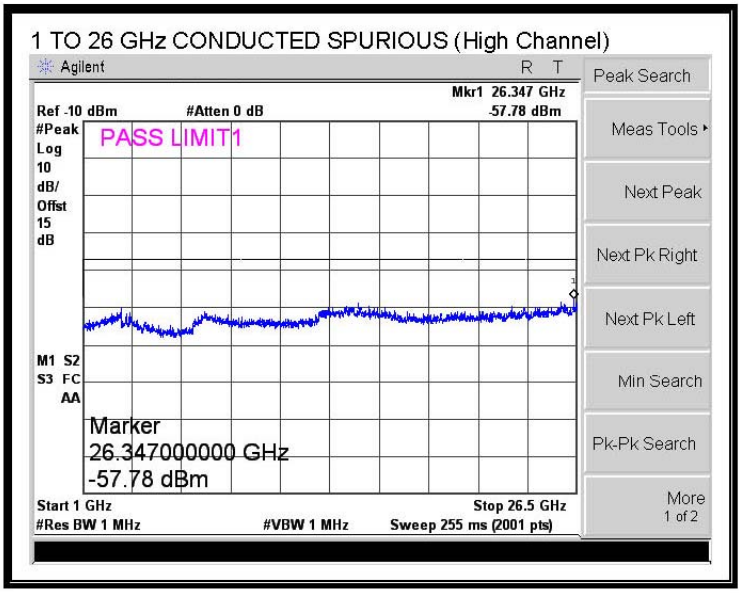
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)

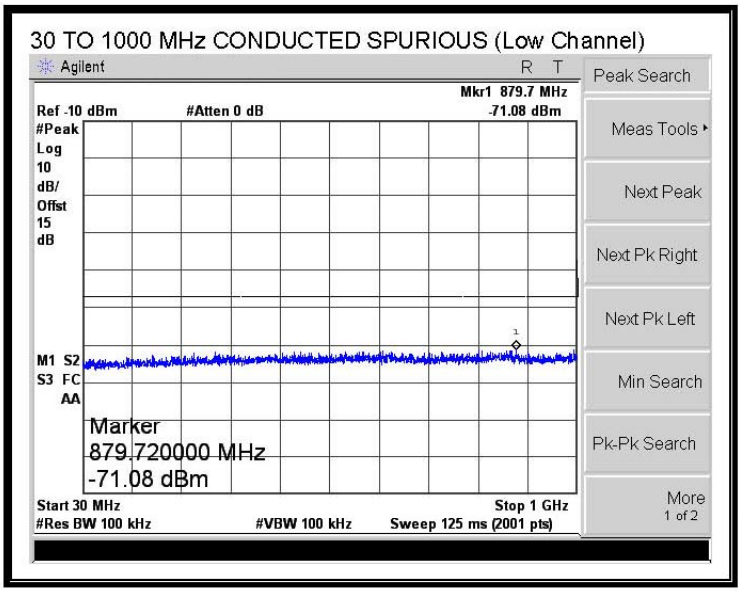


1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)

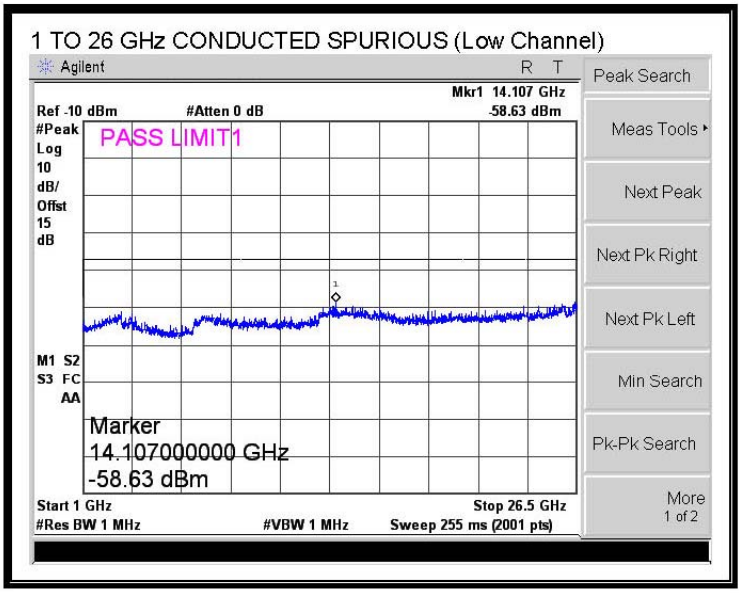


7.9.4. 40 MHz BANDWIDTH IN THE UPPER BAND

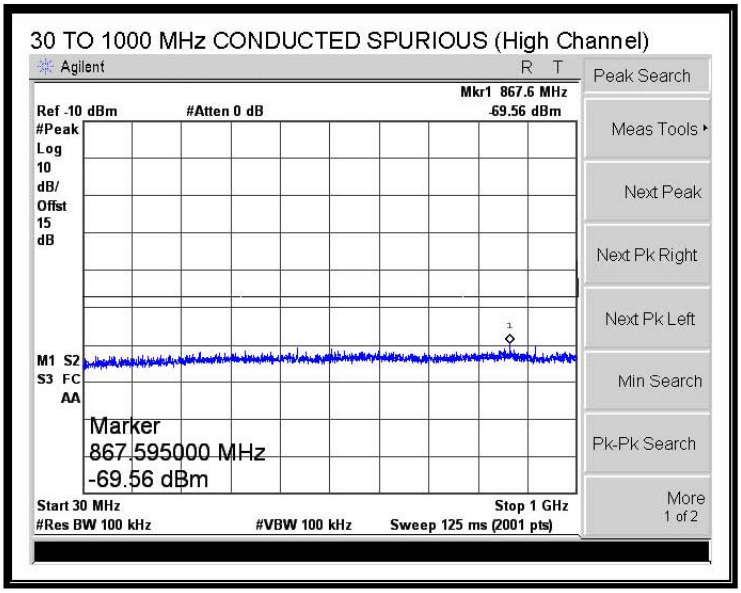
CONDUCTED SPURIOUS EMISSIONS



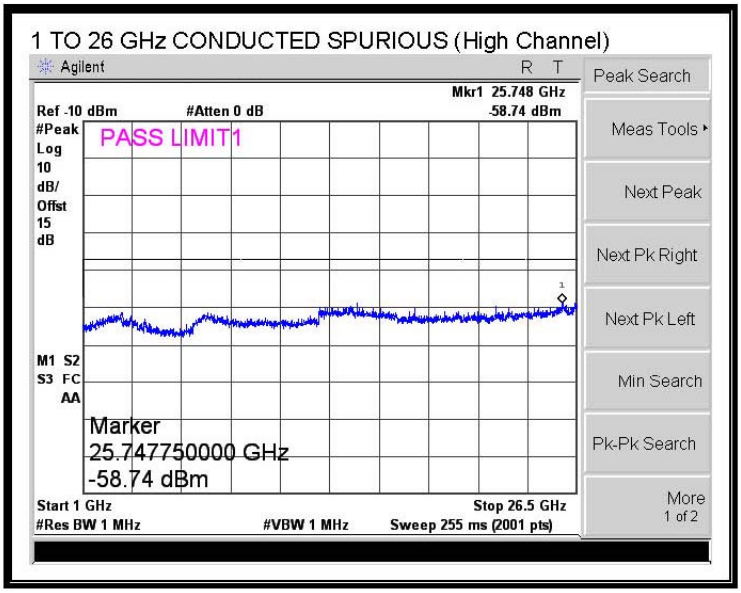
1 TO 26 GHz CONDUCTED SPURIOUS (Low Channel)



30 TO 1000 MHz CONDUCTED SPURIOUS (High Channel)



1 TO 26 GHz CONDUCTED SPURIOUS (High Channel)



RADIATED SPURIOUS EMISSIONS BELOW 1 GHz

30 - 1000MHz Substitution Measurement
Compliance Certification Services, Fremont 5m A-Chamber

Test Equipment:

Bilog Antenna	Cable	Pre-amplifier 8447D	Limit
5m Chamber Sunol Bilog	5m Chamber Cable	T5 8447D	ETSI 300 893 Rx

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP ERP	Limit (dBm)	Margin (dB)	Notes
Low Ch.										
144.50	43.5	H	-64.6	1.5	-0.3	-2.5	-68.6	-57.0	-11.6	
398.60	45.0	H	-59.2	2.4	6.0	3.9	-57.7	-57.0	-0.7	
599.40	38.2	H	-64.5	2.9	6.9	4.8	-62.6	-57.0	-5.6	
697.40	35.5	H	-65.6	3.1	6.8	4.6	-64.1	-57.0	-7.1	
398.60	41.0	V	-64.1	2.4	6.0	3.9	-62.6	-57.0	-5.6	
486.90	33.0	V	-70.3	2.6	6.2	4.0	-69.0	-57.0	-12.0	
599.40	34.5	V	-67.9	2.9	6.9	4.8	-66.0	-57.0	-9.0	
615.90	34.0	V	-68.0	2.9	6.9	4.7	-66.2	-57.0	-9.2	
HI Ch.										
144.50	45.0	H	-63.1	1.5	-0.3	-2.5	-67.1	-57.0	-10.1	
398.60	44.5	H	-59.7	2.4	6.0	3.9	-58.2	-57.0	-1.2	
486.90	36.5	H	-67.0	2.6	6.2	4.0	-65.6	-57.0	-8.6	
599.40	37.8	H	-64.9	2.9	6.9	4.8	-63.0	-57.0	-6.0	
697.40	31.0	H	-70.1	3.1	6.8	4.6	-68.6	-57.0	-11.6	
144.50	40.5	V	-68.2	1.5	-0.3	-2.5	-72.2	-57.0	-15.2	
398.60	41.0	V	-64.1	2.4	6.0	3.9	-62.6	-57.0	-5.6	
486.90	33.0	V	-70.3	2.6	6.2	4.0	-69.0	-57.0	-12.0	

Rev. 4.29.7

RADIATED SPURIOUS EMISSIONS ABOVE 1 GHz

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m B-Chamber

Test Equipment:

EMCO Horn 1-18 GHz: T73; S/N: 6717 @3m
Horn > 18GHz: T87-T90 ARA 18-40GHz & Mixer > 40GHz
Limit: ETSI 300 893 Rx
High Pass Filter
Hi Frequency Cables: (2 ft) (2~3 ft) (4~6 ft) (12 ft)
Pre-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 26-40GHz

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
1.196	49.3	H	-59.0	3.3	6.9	4.7	-57.5	-47.0	-10.5	
1.328	53.1	H	-54.7	3.4	7.2	5.1	-53.0	-47.0	-6.0	
1.596	52.2	H	-54.4	3.8	7.8	5.7	-52.4	-47.0	-5.4	
2.492	46.5	H	-56.7	4.9	9.6	7.4	-54.2	-47.0	-7.2	
1.064	50.7	V	-59.0	3.1	6.6	4.4	-57.6	-47.0	-10.6	
1.328	54.2	V	-54.3	3.4	7.2	5.1	-52.7	-47.0	-5.7	
1.596	57.0	V	-50.2	3.8	7.8	5.7	-48.3	-47.0	-1.3	
2.492	48.5	V	-54.9	4.9	9.6	7.4	-52.4	-47.0	-5.4	

Rev. 4.12.7

8. DYNAMIC FREQUENCY SELECTION

8.1. OVERVIEW

8.1.1. LIMITS

EN 301 893 Clause 4.7.2, Applicability of DFS Requirements

Requirement	Operating mode		
	Master	Slave (without radar detection)	Slave (with radar detection)
Channel Availability Check	✓	Not required	Not required
In-Service Monitoring	✓	Not required	✓
Channel Shutdown	✓	✓	✓
Non-Occupancy Period	✓	Not required	Not required
Uniform Spreading	✓	Not required	Not required

EN 301 893 Appendix D

Table D.1: DFS Requirement Values

Parameter	Value
Channel Availability Check Time	60 s
Channel Move Time	10 s
Channel Closing Transmission Time	260 ms
Non-Occupancy Time	30 min

Table D.2: Interference Threshold Values, Master

Maximum Transmit Power	Value (see note)
>= 200 mW (>= 23 dBm)	-64 dBm
< 200 mW (< 23 dBm)	-62 dBm
Note: This is the level at the input of the receiver assuming a 0 dBi receive antenna.	

Table D.3: Interference Threshold Values, Slave

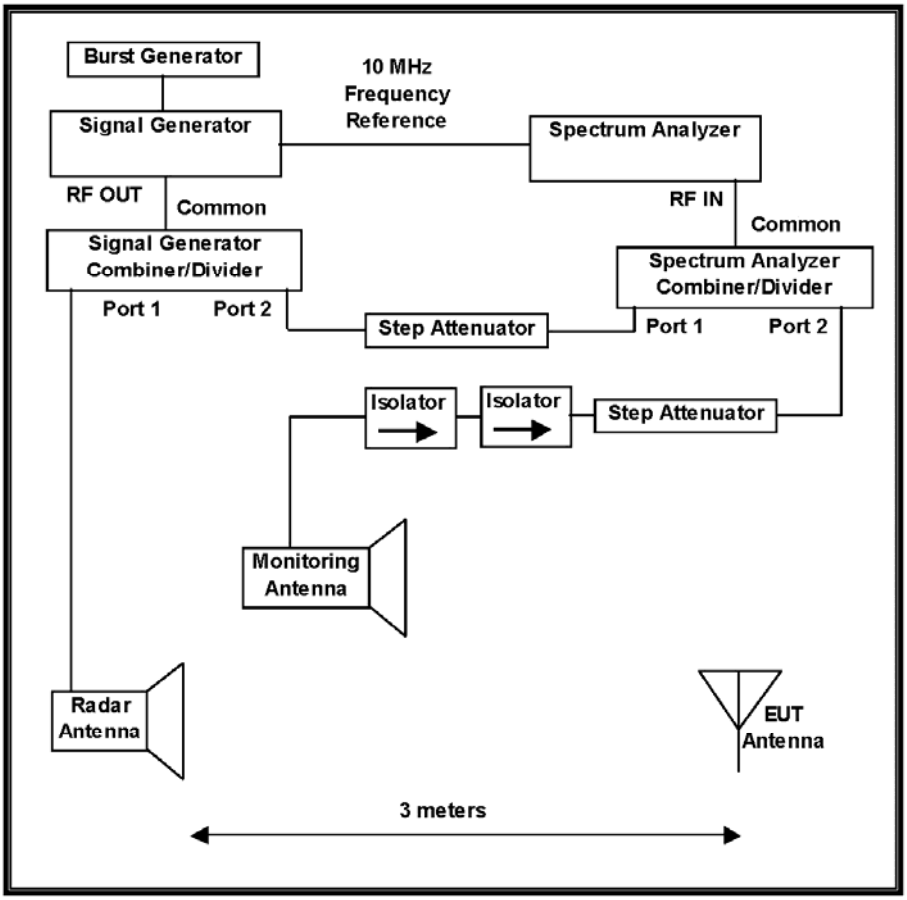
Maximum Transmit Power	Value (see note)
>= 200 mW (>= 23 dBm)	-64 dBm
< 200 mW (< 23 dBm)	N/A
Note: This is the level at the input of the receiver assuming a 0 dBi receive antenna.	

Table D.4: Parameters of DFS Test Signals

Radar Test Signal	Pulse Width (us)	PRF (pps)	Pulses per Burst	Detection Probability
1 – Fixed	1	750	15	> 60 %
2 - Variable	1, 2, 5	200, 300, 500, 800, 1000	10	> 60 %
3 - Variable	10, 15	200, 300, 500, 800, 1000	15	> 60 %
4 - Variable	1, 2, 5, 10, 15	1200, 1500, 1600	15	> 60 %
5 - Variable	1, 2, 5, 10, 15	2300, 3000, 3500, 4000	25	> 60 %
6 – Variable	20, 30	2000, 3000, 4000	20	> 60 %
Modulated	Modulation is +/- 2.5 MHz Linear FM Chirp			

8.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The radar signal generation equipment consists of a vector signal generator.

The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. 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.

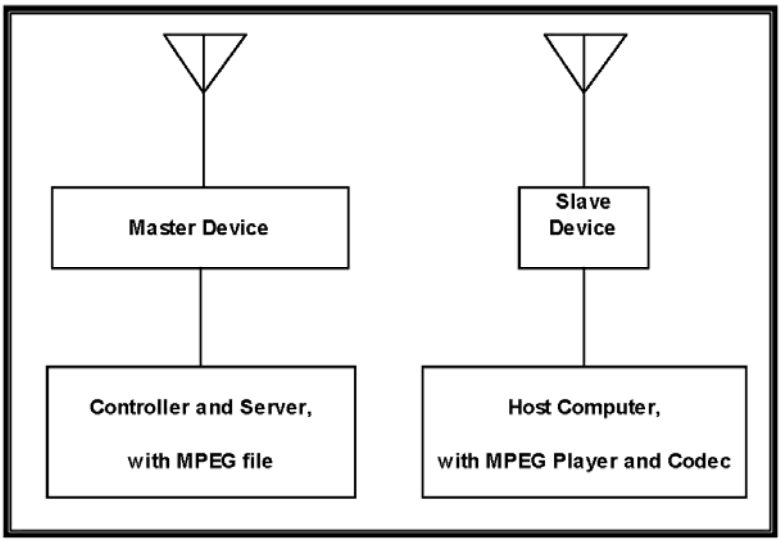
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	MY43360112	3/3/2011
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	US43320336	1/16/2011

8.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	Manufacturer	Model	Serial Number
AC Adapter	Compaq	PPP012L	565BC0ALL0J1BE
Laptop	Compaq	Presario 3000	CNU327025L
AC Adapter	IBM	92P1016	11S92P1016Z1ZAC66AJ0V9
Laptop	IBM	T42P	ZZ-27259

8.1.4. 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.

Two identical antennas are utilized to meet the diversity and MIMO operational requirements.

The EUT uses two transmitter/receiver chains, each connected to an antenna to perform radiated tests.

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 the media player with the V2.61 Codec package.

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 are implemented: 20 MHz and 40 MHz.

OVERVIEW OF MASTER DEVICE

The Master Device is a Cisco Access Point, Model 1252. 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.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm.

8.1.5. MEDIUM ACCESS PROTOCOL

REQUIREMENT

A medium access protocol shall be implemented by the equipment and shall be active under all circumstances.

MANUFACTURER'S DESCRIPTION OF MEDIUM ACCESS PROTOCOL

This is in a separate document.

8.1.6. USER ACCESS RESTRICTIONS

REQUIREMENT

DFS controls (hardware or software) related to radar detection shall not be accessible to the user so that the DFS requirements described in clauses 4.7.2.1 to 4.7.2.4 can neither be disabled nor altered.

MANUFACTURER'S DESCRIPTION OF USER ACCESS RESTRICTIONS

This is in a separate document.

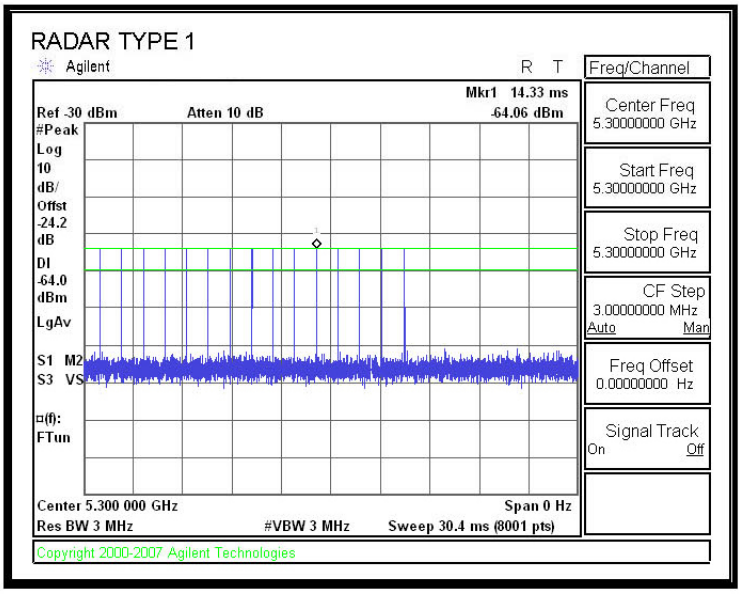
8.2. LOWER BAND RESULTS FOR 20 MHz BANDWIDTH

8.2.1. TEST CHANNEL

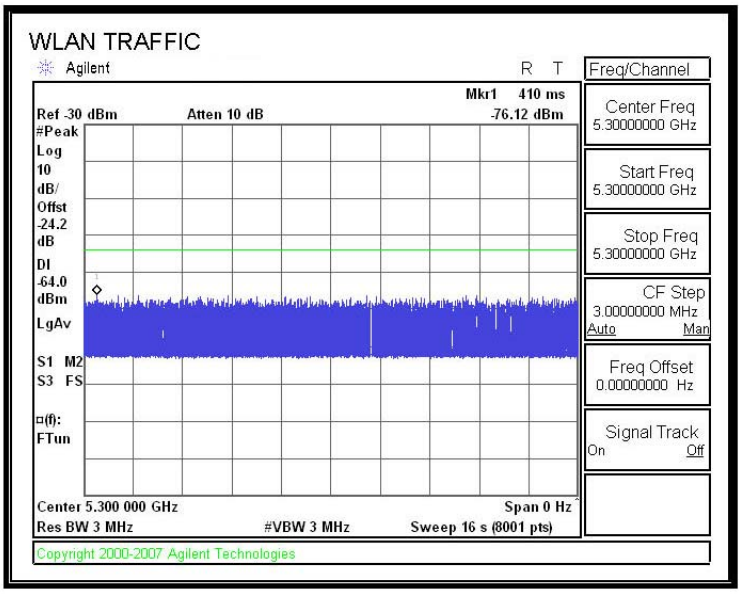
All tests were performed at a channel center frequency of 5300 MHz. Measurements were performed using radiated test methods.

8.2.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



PLOT OF WLAN TRAFFIC



8.2.3. 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)

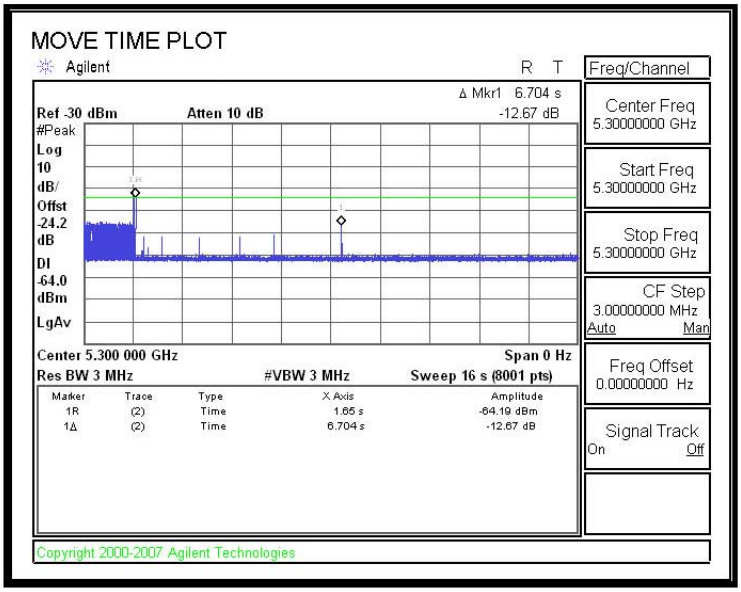
The observation period over which the aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
6.704	10

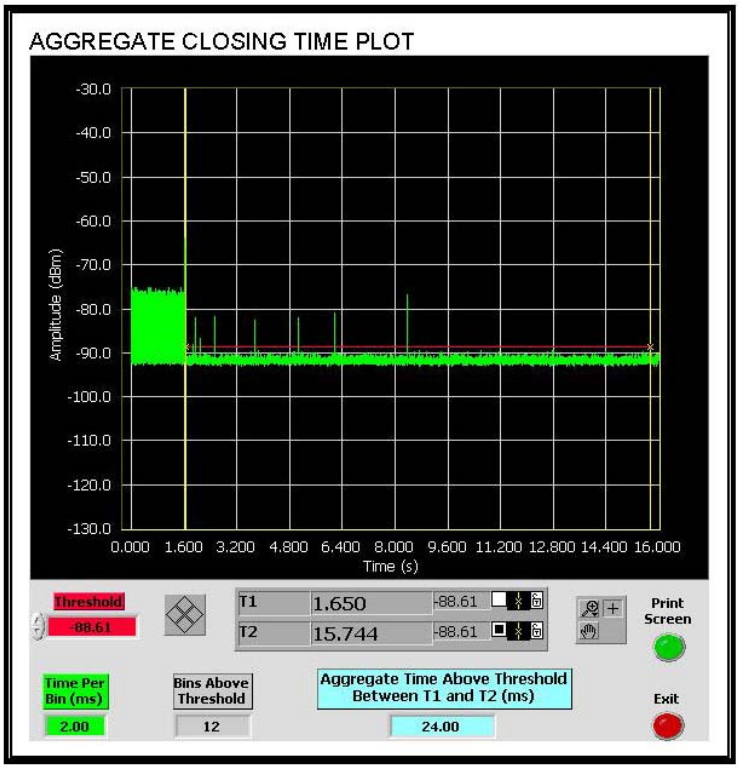
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
24.0	260

MOVE TIME


MOVE TIME PLOT
Agilent
R T
Freq/Channel
Δ Mkr1 6.704 s
-12.67 dB
Ref -30 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
-24.2
dB
Dl
-64.0
dBm
LgAv
Center Freq
5.30000000 GHz
Start Freq
5.30000000 GHz
Stop Freq
5.30000000 GHz
CF Step
3.00000000 MHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Center 5.300 000 GHz
Span 0 Hz
Res BW 3 MHz
#VBW 3 MHz
Sweep 16 s (8001 pts)
Marker Trace Type X Axis Amplitude
1R (2) Time 1.65 s -64.19 dBm
1Δ (2) Time 6.704 s -12.67 dB
Copyright 2000-2007 Agilent Technologies

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



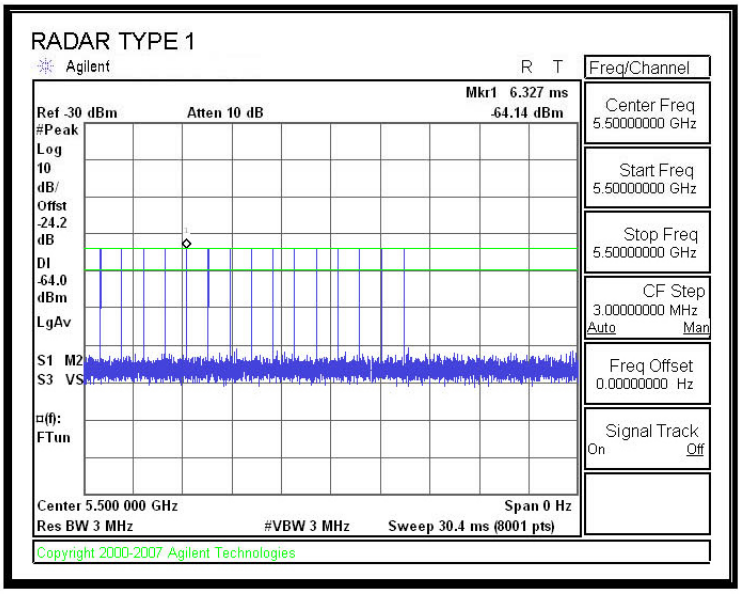
8.3. UPPER BAND RESULTS FOR 20 MHz BANDWIDTH

8.3.1. TEST CHANNEL

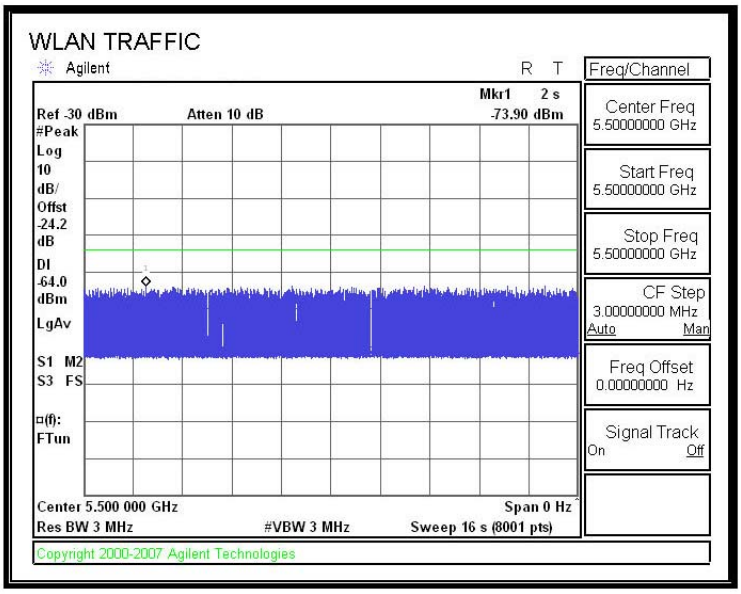
All tests were performed at a channel center frequency of 5500 MHz. Measurements were performed using radiated test methods.

8.3.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



PLOT OF WLAN TRAFFIC



8.3.3. 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)

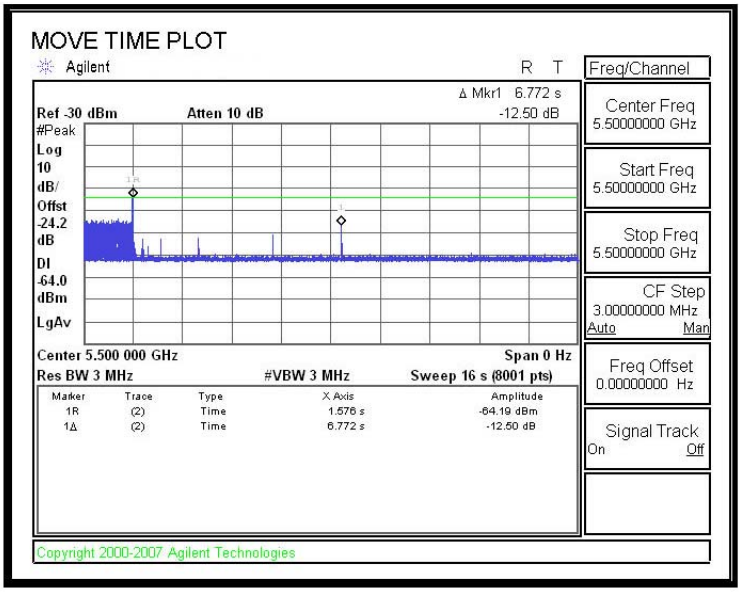
The observation period over which the aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
6.772	10

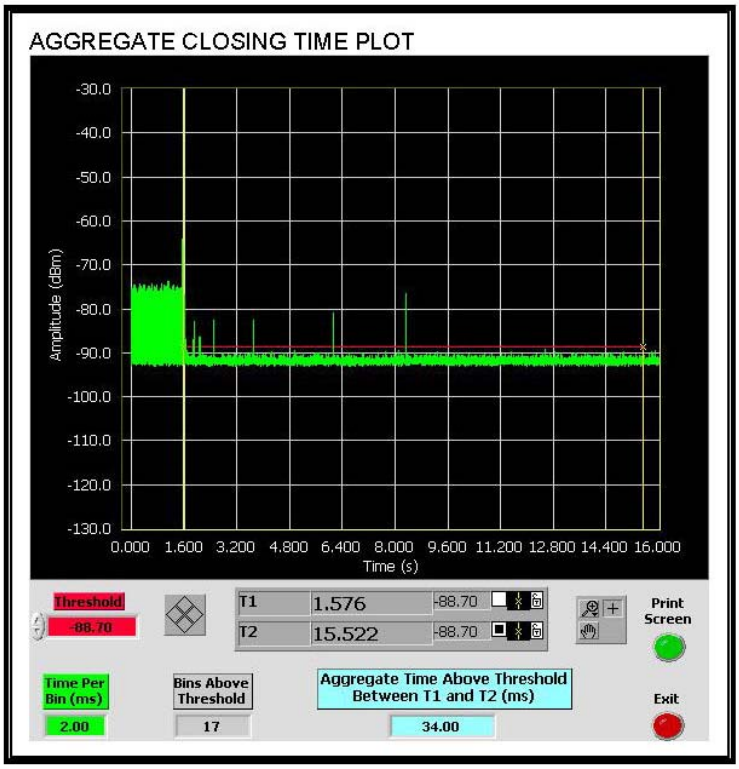
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
34.0	260

MOVE TIME


MOVE TIME PLOT
Agilent
R T
Freq/Channel
Δ Mkr1 6.772 s
-12.50 dB
Ref -30 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
-24.2
dB
Dl
-64.0
dBm
LgAv
Center Freq
5.50000000 GHz
Start Freq
5.50000000 GHz
Stop Freq
5.50000000 GHz
CF Step
3.00000000 MHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Center 5.500 000 GHz
Span 0 Hz
Res BW 3 MHz
#VBW 3 MHz
Sweep 16 s (8001 pts)
Marker Trace Type X Axis Amplitude
1R (2) Time 1.576 s -64.19 dBm
1Δ (2) Time 6.772 s -12.50 dB
Copyright 2000-2007 Agilent Technologies

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



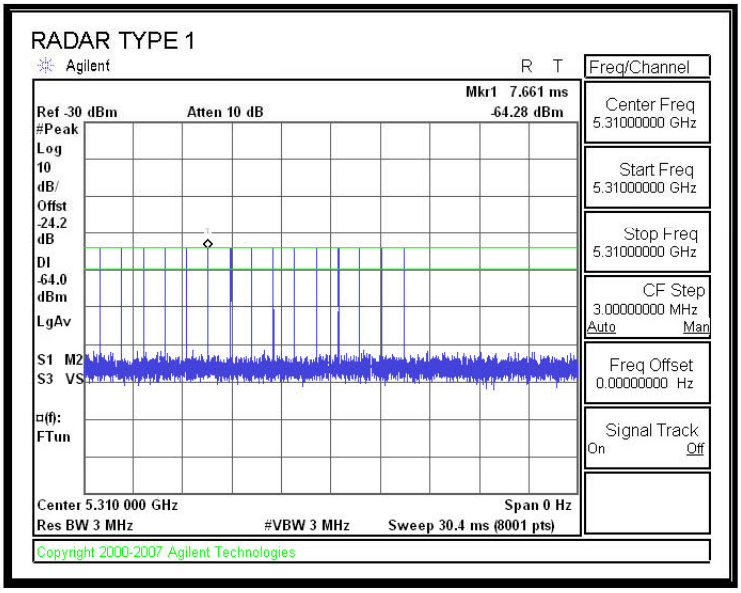
8.4. LOWER BAND RESULTS FOR 40 MHz BANDWIDTH

8.4.1. TEST CHANNEL

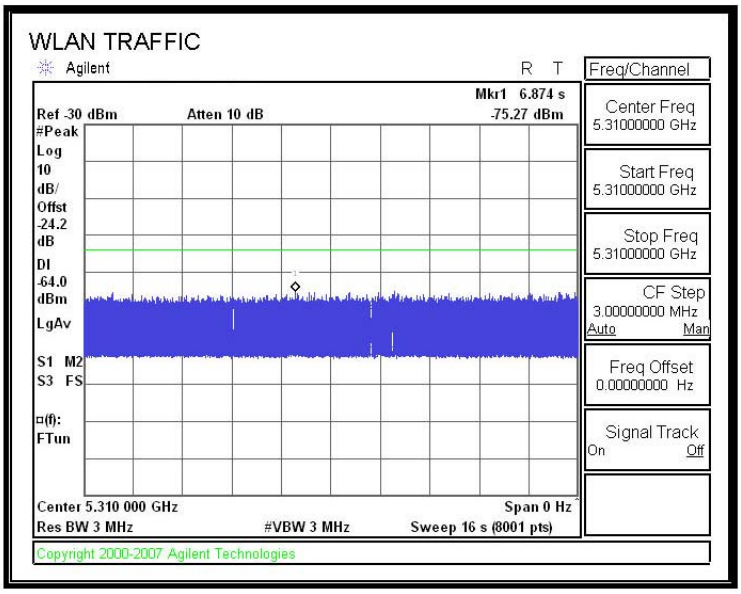
All tests were performed at a channel center frequency of 5310 MHz. Measurements were performed using radiated test methods.

8.4.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



PLOT OF WLAN TRAFFIC



8.4.3. 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)

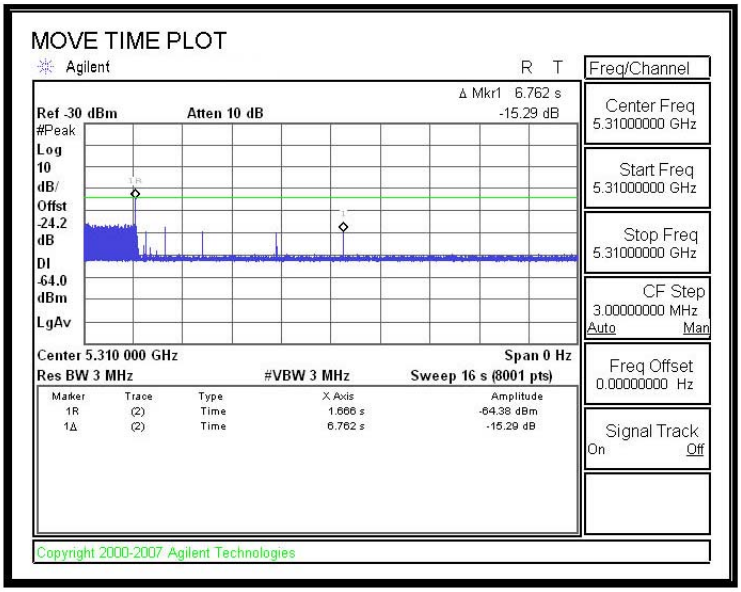
The observation period over which the aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
6.762	10

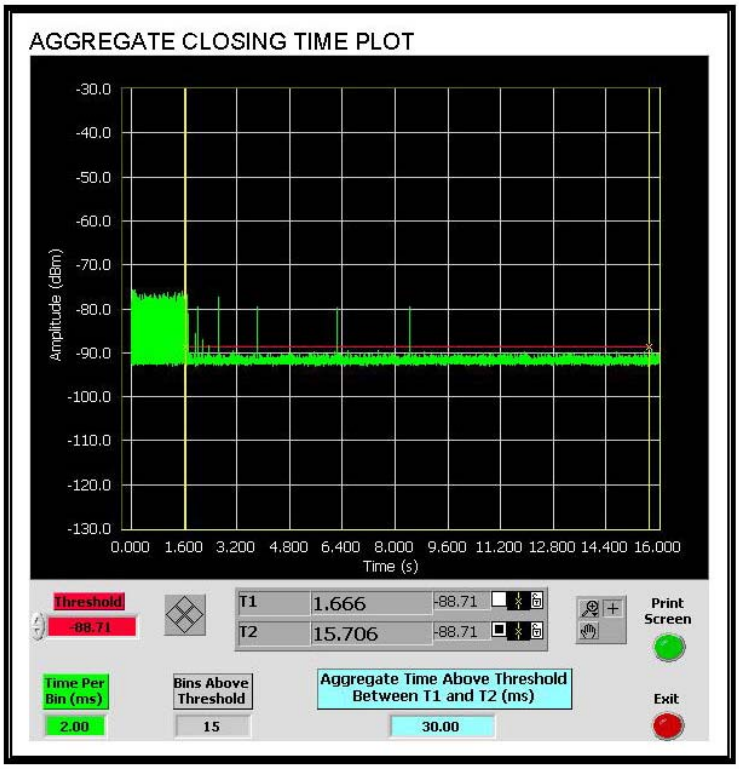
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
30.0	260

MOVE TIME


MOVE TIME PLOT
Agilent
R T
Freq/Channel
Δ Mkr1 6.762 s
-15.29 dB
Ref -30 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
-24.2
dB
Dl
-64.0
dBm
LgAv
Center 5.310 000 GHz
Span 0 Hz
Res BW 3 MHz
#VBW 3 MHz
Sweep 16 s (8001 pts)
Marker Trace Type X Axis Amplitude
1R (2) Time 1.666 s -64.38 dBm
1Δ (2) Time 6.762 s -15.29 dB
Center Freq
5.31000000 GHz
Start Freq
5.31000000 GHz
Stop Freq
5.31000000 GHz
CF Step
3.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2007 Agilent Technologies

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



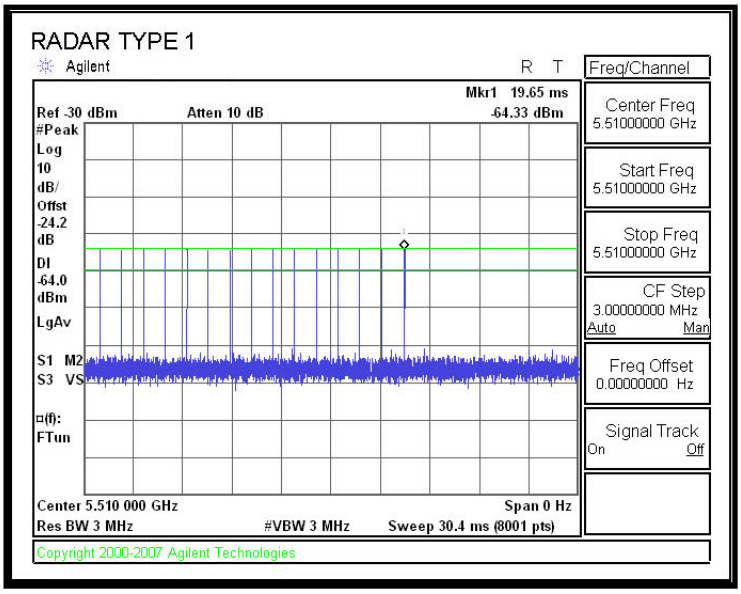
8.5. UPPER BAND RESULTS FOR 40 MHz BANDWIDTH

8.5.1. TEST CHANNEL

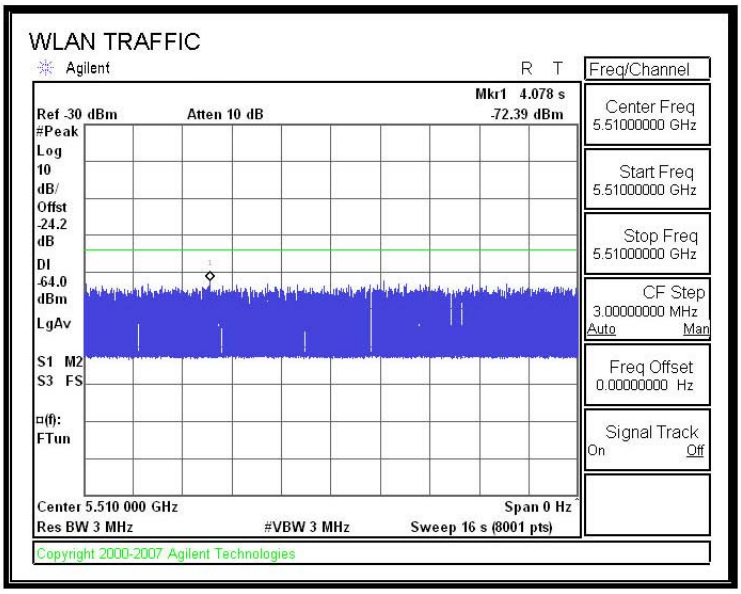
All tests were performed at a channel center frequency of 5510 MHz. Measurements were performed using radiated test methods.

8.5.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



PLOT OF WLAN TRAFFIC



8.5.3. 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)

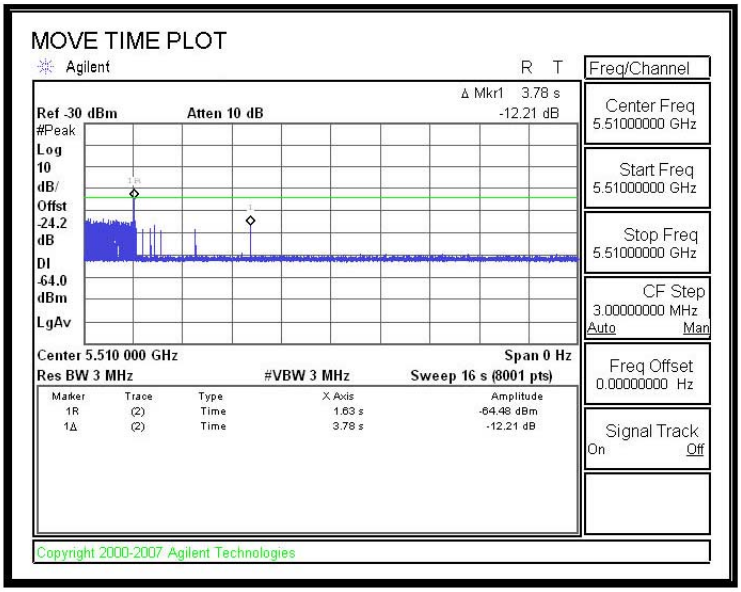
The observation period over which the aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
3.780	10

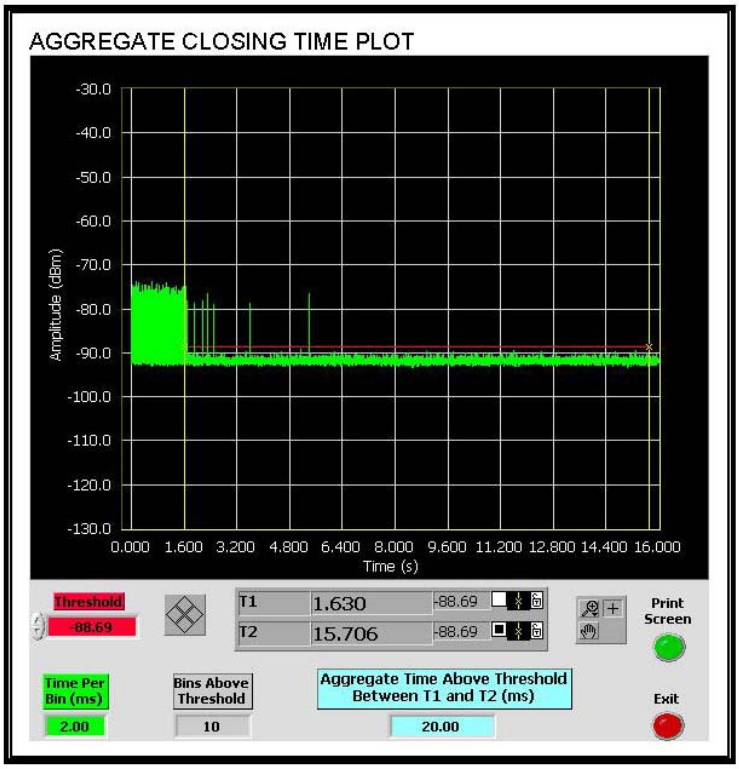
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
20.0	260

MOVE TIME


MOVE TIME PLOT
Agilent
R T
Δ Mkr1 3.78 s
-12.21 dB
Ref -30 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
-24.2
dB
Dl
-64.0
dBm
LgAv
Center 5.510 000 GHz
Span 0 Hz
Res BW 3 MHz
#VBW 3 MHz
Sweep 16 s (8001 pts)
Marker Trace Type X Axis Amplitude
1R (2) Time 1.63 s -64.48 dBm
1Δ (2) Time 3.78 s -12.21 dB
Freq/Channel
Center Freq
5.51000000 GHz
Start Freq
5.51000000 GHz
Stop Freq
5.51000000 GHz
CF Step
3.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2007 Agilent Technologies

AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

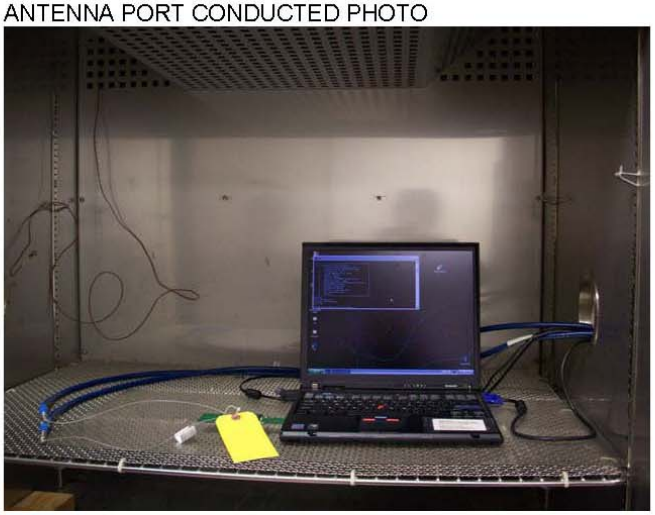
Only intermittent transmissions are observed during the aggregate monitoring period.



9. SETUP PHOTOS

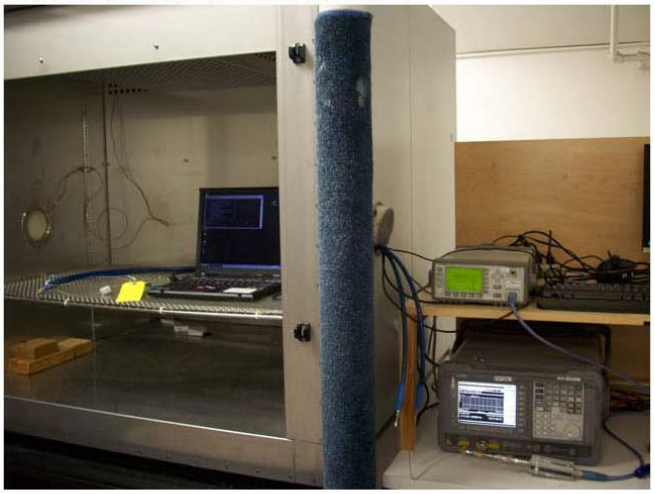
RF CONDUCTED MEASUREMENT AT ANTENNA PORT

ANTENNA PORT CONDUCTED PHOTO



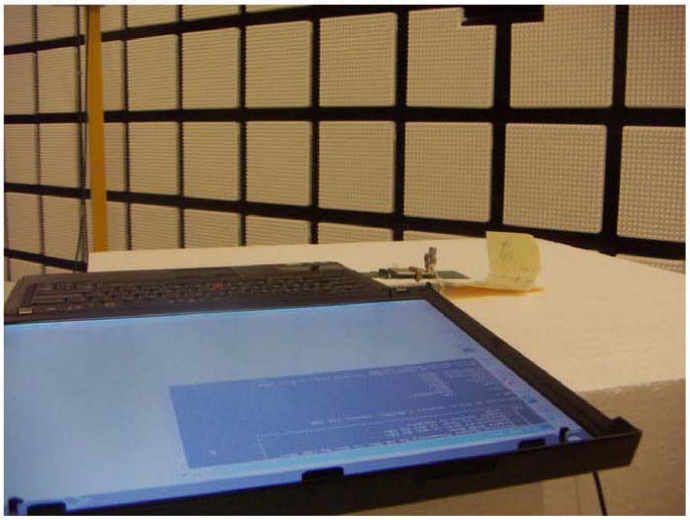
ENVIRONMENTAL CHAMBER SETUP

ENVIRONMENTAL CHAMBER PHOTO

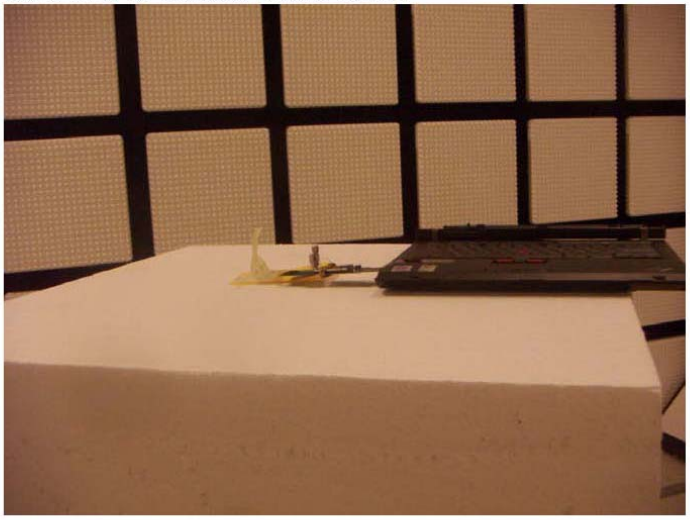


RADIATED SPURIOUS EMISSIONS

RADIATED SPURIOUS FRONT PHOTO



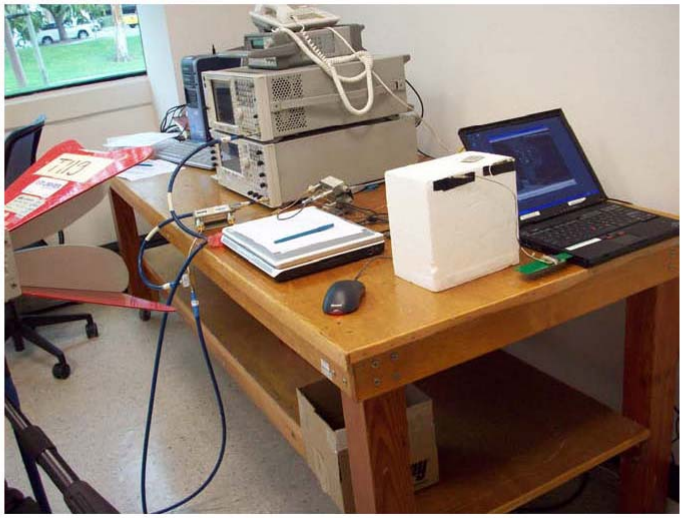
RADIATED SPURIOUS BACK PHOTO



DFS MEASUREMENT SETUP

DFS PHOTO

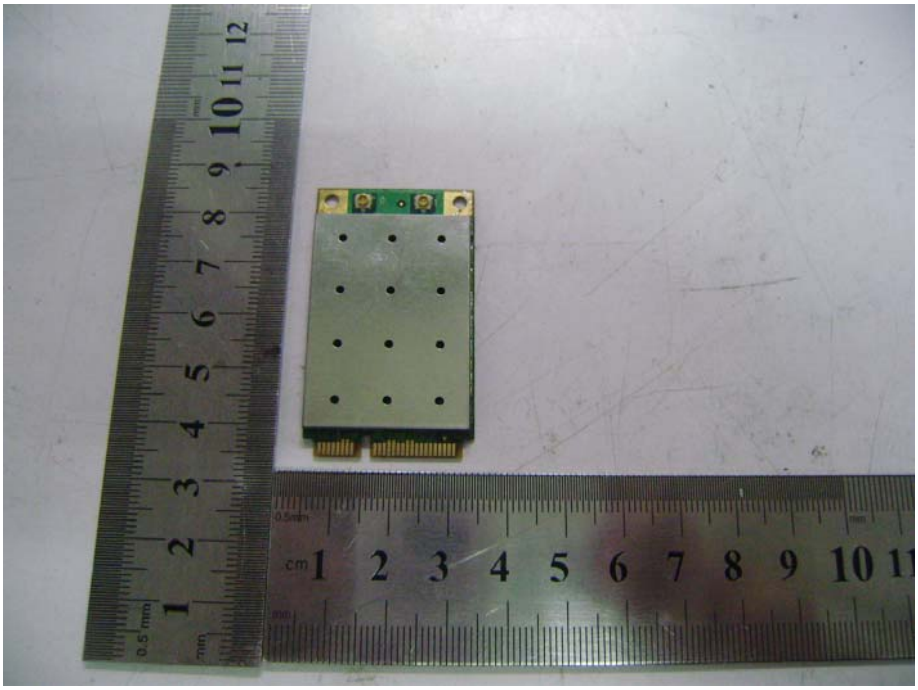
DFS FRONT PHOTO



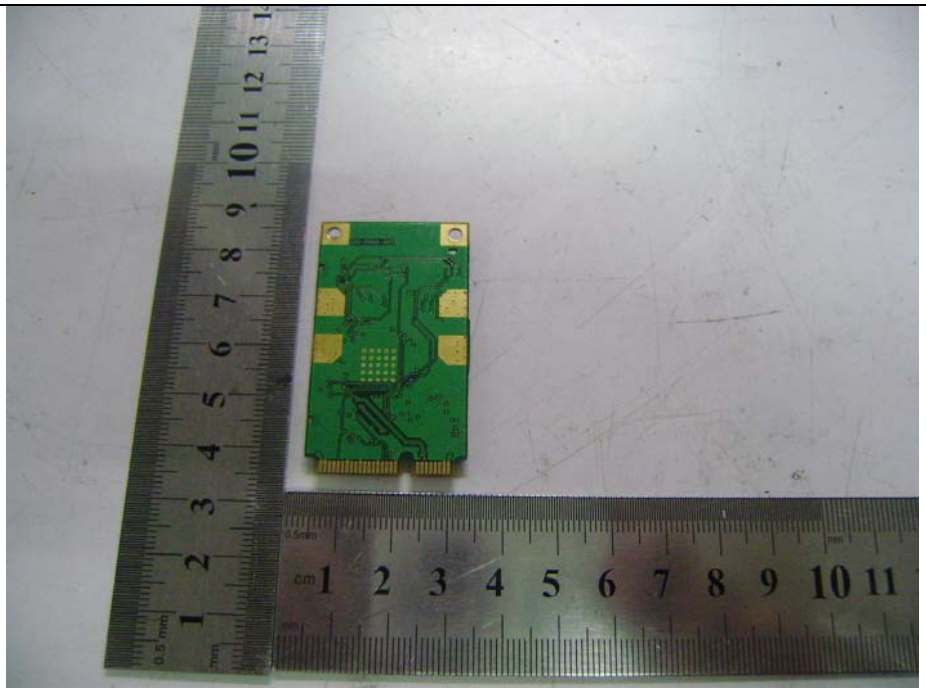
10. EUT PHOTOS

EUT View 1

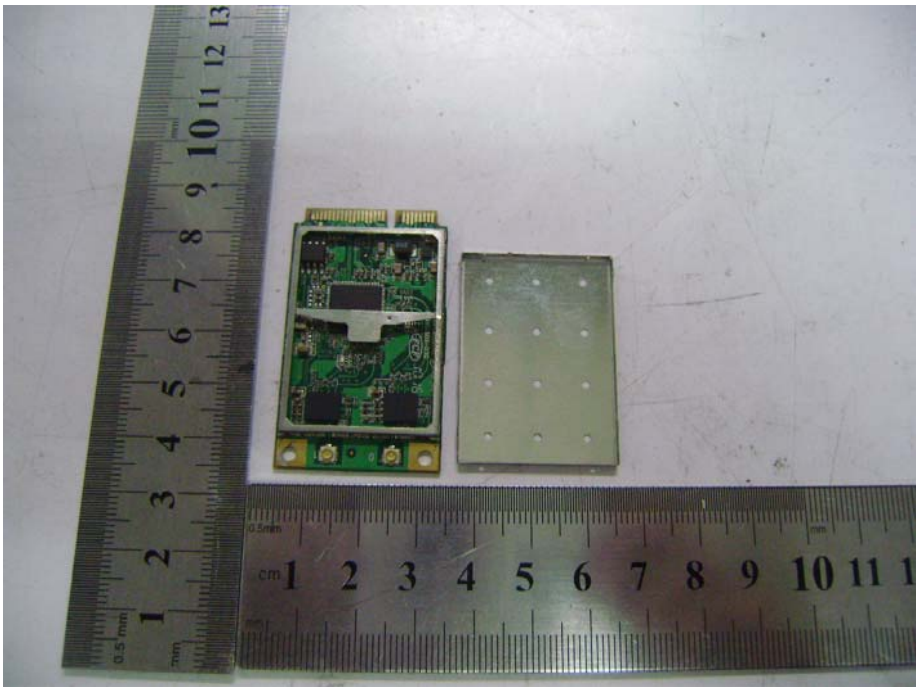
EUT View 2



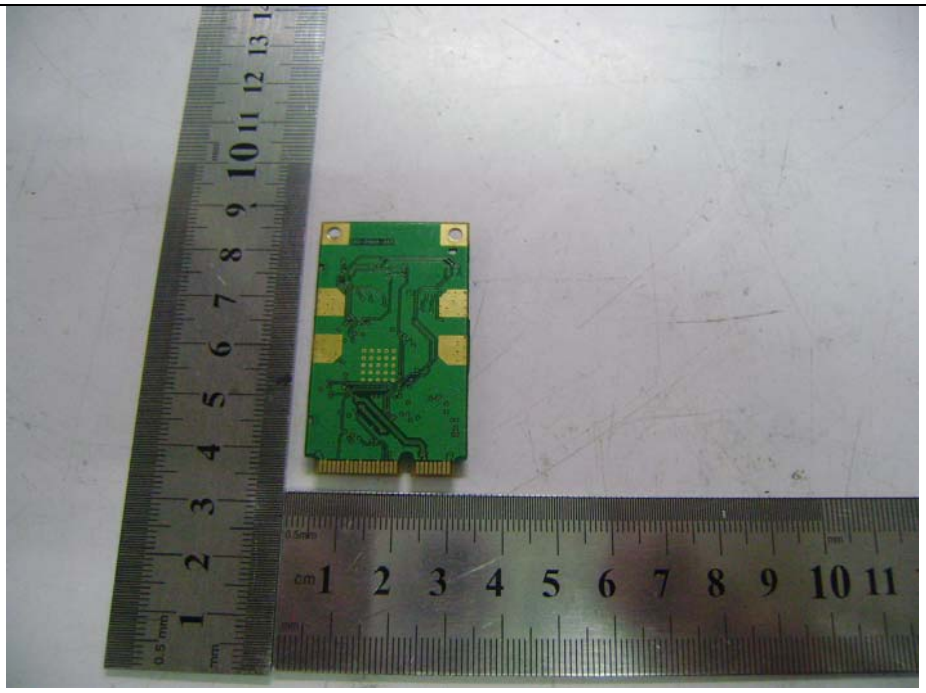
EUT View 3



Solder Board-Component View 1



Solder Board-Component View 2



Antenna View

Antenna Connect Cable View


cm 1 2 3 4 5 6 7 8 9 10