FCC RADIO TEST REPORT
FCC ID: 2ASMC-OBS-TAIL-01

Product： Tail Auto-Director AI Camera
Trade Mark： OBSBOT
Model Name： Tail Auto-Director AI Camera
Family Model： Red OAR-1609, Black OAB-1609
Report No.： S18122902102002

Prepared for

Remo Tech Co.,Ltd
Room 220,Building 6,Qianhai Shenzhen-Hong Kong Youth Innovat and Entrepreneur Hub,Shenzhen,China

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.
1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China
Tel.: +86-755-6115 6588
Fax.: +86-755-6115 6599
Website:http://www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name ..... : Remo Tech Co.,Ltd

Address ..... : Room 220,Building 6,Qianhai Shenzhen-Hong Kong Youth Innovat and Entrepreneur Hub,Shenzhen,China

Manufacturer's Name ..... : Remo Tech Co.,Ltd

Address ..... : Room 220,Building 6,Qianhai Shenzhen-Hong Kong Youth Innovat and Entrepreneur Hub,Shenzhen,China

Product description

Product name ..... : Tail Auto-Director AI Camera

Model and/or type reference : Tail Auto-Director AI Camera

Family Model..... : Red OAR-1609, Black OAB-1609

Standards ..... : FCC Part15.407

Test procedure ..... ANSI C63.10-2013 and KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 662911 D02 MIMO With Cross Polarized Antenna V01

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements/ the Industry Canada requirements.. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personnel only, and shall be noted in the revision of the document.

Date of Test .....

Date (s) of performance of tests ..... 18 Jan. 2019 ~ 05 Apr. 2019

Date of Issue..... 05 May. 2019

Test Result..... **Pass**

Testing Engineer : Eileen Liu.

(Eileen Liu)

Technical Manager : Jason chen

(Jason Chen)

Authorized Signatory : Sam. Chen

(Sam Chen)

Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	6
1.1 FACILITIES AND ACCREDITATIONS	7
1.2 MEASUREMENT UNCERTAINTY	7
2 . GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF EUT	8
2.2 DESCRIPTION OF TEST MODES	13
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	14
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	15
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	16
3 . EMC EMISSION TEST	18
3.1 CONDUCTED EMISSION MEASUREMENT	18
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	18
3.1.2 TEST PROCEDURE	19
3.1.3 DEVIATION FROM TEST STANDARD	19
3.1.4 TEST SETUP	19
3.1.5 EUT OPERATING CONDITIONS	19
3.2 RADIATED EMISSION MEASUREMENT	24
3.2.1 APPLICABLE STANDARD	24
3.2.2 CONFORMANCE LIMIT	24
3.2.3 MEASURING INSTRUMENTS	24
3.2.4 TEST CONFIGURATION	25
3.2.5 TEST PROCEDURE	26
3.2.6 TEST RESULTS (9KHZ – 30 MHZ)	27
3.2.7 TEST RESULTS (30MHZ – 1GHZ)	28
3.2.8 TEST RESULTS (1GHZ-26GHZ)	32
3.2.9 TEST RESULTS (26GHZ-40GHZ)	34
4 . POWER SPECTRAL DENSITY TEST	38
4.1 APPLIED PROCEDURES / LIMIT	38
4.2 TEST PROCEDURE	39
4.3 DEVIATION FROM STANDARD	39
4.4 TEST SETUP	39
4.5 EUT OPERATION CONDITIONS	39
4.6 TEST RESULTS	40
5 . 26DB & 99% EMISSION BANDWIDTH	48
5.1 APPLIED PROCEDURES / LIMIT	48
5.2 TEST PROCEDURE	48
5.3 EUT OPERATION CONDITIONS	49
5.4 TEST RESULTS	50

Table of Contents

	Page
6 . MINIMUM 6 DB BANDWIDTH	58
6.1 APPLIED PROCEDURES / LIMIT	58
6.2 TEST PROCEDURE	58
6.3 DEVIATION FROM STANDARD	58
6.4 TEST SETUP	58
6.5 EUT OPERATION CONDITIONS	58
6.6 TEST RESULTS	59
7 . MAXIMUM CONDUCTED OUTPUT POWER	63
7.1 PPLIED PROCEDURES / LIMIT	63
7.2 TEST PROCEDURE	63
7.3 DEVIATION FROM STANDARD	65
7.4 TEST SETUP	65
7.5 EUT OPERATION CONDITIONS	65
7.6 TEST RESULTS	66
8 . OUT OF BAND EMISSIONS	68
8.1 APPLICABLE STANDARD	68
8.2 TEST PROCEDURE	68
8.3 DEVIATION FROM STANDARD	68
8.4 TEST SETUP	68
8.5 EUT OPERATION CONDITIONS	68
8.6 TEST RESULTS	69
9.SPURIOUS RF CONDUCTED EMISSIONS	76
9.1CONFORMANCE LIMIT	76
9.2MEASURING INSTRUMENTS	76
9.3TEST SETUP	76
9.4TEST PROCEDURE	76
9.5TEST RESULTS	76
10. FREQUENCY STABILITY MEASUREMENT	91
10.1 LIMIT	91
10.2 TEST PROCEDURES	91
10.3 TEST SETUP LAYOUT	91
10.4 EUT OPERATION DURING TEST	91
10.5 TEST RESULTS	92
11. ANTENNA REQUIREMENT	98
11.1 STANDARD REQUIREMENT	98
11.2 EUT ANTENNA	98

Revision History

Report No.	Version	Description	Issued Date
S18122902102002	Rev.01	Initial issue of report	05 May. 2019

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	PASS	
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(6)	Spurious Radiated Emissions	PASS	
15.407 (a)(1) 15.407 (a)(3)	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	Minimum 6 dB bandwidth	PASS	
15.407 (a)(1) 15.407 (a)(3)	Maximum Conducted Output Power	PASS	
15.407(b)(1) 15.407(b)(4)	Band Edge	PASS	
15.407 (a)(1) 15.407 (a)(3)	Power Spectral Density	PASS	
15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab.	:	The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005) The Certificate Registration Number is L5516.
IC-Registration		The Certificate Registration Number is 9270A-1.
FCC- Accredited		Test Firm Registration Number: 463705. Designation Number: CN1184
A2LA-Lab.		The Certificate Registration Number is 4298.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).
Name of Firm	:	Shenzhen NTEK Testing Technology Co., Ltd.
Site Location	:	1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	±2.80dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(30MHz~1GHz)	±2.64dB
5	All emissions, radiated(1GHz~6GHz)	±2.40dB
6	All emissions, radiated(＞6GHz)	±2.52dB
7	Temperature	±0.5°C
8	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Tail Auto-Director AI Camera	
Trade Mark	OBSBOT	
Model Name	Tail Auto-Director AI Camera	
Family Model	Red OAR-1609, Black OAB-1609	
Model Difference	All models are the same circuit and RF module, except the appearance and color.	
FCC ID	2ASMC-OBS-TAIL-01	
Product Description	Mode Supported	☒802.11a ☒802.11n(HT20) ☒802.11n(HT40) ☒802.11ac(HT20) ☒802.11ac(HT40) ☒802.11ac(HT80)
	Data Rate	802.11 a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20):MCS0-MCS15; 802.11n(HT40):MCS0-MCS15; 802.11AC: NSS1,MCS0-MCS9,NSS2,MCS0-MCS9;
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
	Operating Frequency Range	☒5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80; ☒5745-5825 MHz for 802.11a/n(HT20)/ac20; 5755-5795 MHz for 802.11a/n(HT40)/ac40; 5775MHz for 802.11 ac80;
	Number of Channels	☒4 channels for 802.11a/n20/ac20 in the 5180-5240MHz band ; 2 channels for 802.11 n40/ac40 in the 5190-5230MHz band ; 1 channels for 802.11 ac80 in the 5210MHz band ; ☒5 channels for 802.11a/n20/ac20 in the 5745-5825MHz band ; 2 channels for 802.11 n40/ac40 in the 5755-5795MHz band ; 1 channels for 802.11 ac80 in the 5775MHz band ;
	Antenna Type	Antenna A: FPC Antenna Antenna B: FPC Antenna
	Antenna Gain	Antenna A: 3.75dBi Antenna B: 3.75dBi
	Smart system	☒SISO for 802.11a ☒MIMO for 802.11n/ac
	Antenna Gain	See Table for Filed Antenna
	Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.	

Ratings	DC 11.1V/1900mAh from Battery or DC 5V from USB Port
Adapter	Model:A824-120200U-UK2 Input: 100-240V~50/60Hz 0.7A Output: 5V⎓3A/9V⎓2.7A/12V⎓2A
HW Version	V1.0
SW Version	1.0.15
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. Frequency and Channel list for 802.11a/n(20MHz) band I (5180-5240MHz):

802.11a/n/ac(20MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-

Frequency and Channel list for 802.11n(40MHz) band I (5190-5230MHz):

802.11n /ac(40MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

802.11ac (80MHz) Carrier Frequency Channel	
Channel	Frequency (MHz)
42	5210

Frequency and Channel list for 802.11a/n(20 MHz) band IV (5745-5825MHz):

802.11a/n/ac(20 MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-

Frequency and Channel list for 802.11n(40MHz) band IV (5755-5795MHz):

802.11n/ac 40MHz Carrier Frequency Channel					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795	-	-

802.11ac 80MHz Carrier Frequency Channel	
Channel	Frequency (MHz)
155	5775

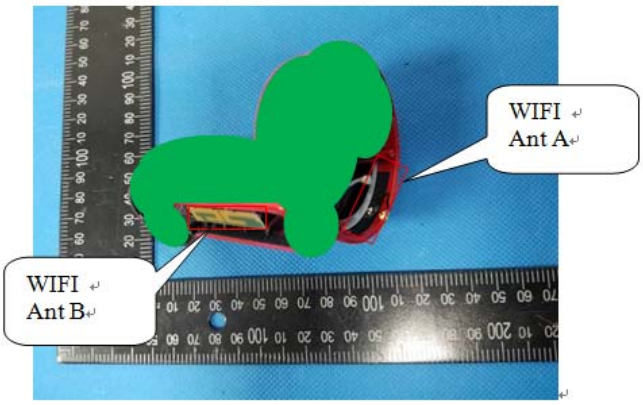
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1TX, 1RX
802.11n/ac	1TX/2TX, 1RX/2RX

5G Band:
For IEEE 802.11a mode (1TX, 2RX):
The EUT can support both 1TX and 2RX functions.
For 1TX
Only Chain 1 can be used as transmitting antenna.
Chain 1 and Chain 2 could receive simultaneously.

For IEEE 802.11n mode (1TX/2TX, 2RX):
The EUT can support both 1TX and 2TX functions.
For 1TX
Only Chain 1 can be used as transmitting antenna. When MCS 0~7 enable without TX-Beamforming/STBC.
Chain 1 and Chain 2 could receive simultaneously.
For 2TX
Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna. When TX-Beamforming/STBC enalbe/MCS 8~15 enable.
Chain 1 and Chain 2 could both transmit/receive simultaneously.
Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.

For IEEE 802.11ac mode (1TX/2TX, 2RX):
The EUT can support both 1TX and 2TX functions.
For 1TX
Only Chain 1 can be used as transmitting antenna. When 1SS MCS 0~9 enable without TX-Beamforming/STBC.
Chain 1 and Chain 2 could receive simultaneously.
For 2TX
Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna. When TX-Beamforming/STBC enalbe/2SS MCS 0~9 enable.
Chain 1 and Chain 2 could both transmit/receive simultaneously.
Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.



The Control software (tool_WIFI.exe) can control Model antenna A B,

For 5GHz mode, antenna A B are transmitting, May antennas simultaneously transmit.

And the data is recorded for radiated emission, and band edge.

For MIMO mode , Directional gain=$[10\log(10^{GA/20}+10^{GB/20})^2/N_{ANT}]$ dBi =6.76dBi in 5GHz

802.11n/ac 5GHz has MIMO mode.

Note: G_A means antenna gain for ANT A in Num.

G_B means antenna gain for ANT B in Num.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Normal Link Mode
Mode 2	802.11a/n/ac 20 CH36/ CH40/ CH 48 802.11a /n/ac 20 CH149/ CH157/ CH 165
Mode 3	802.11n/ac40 CH38/ CH 46 802.11n/ac40 CH 151 / CH 159
Mode 4	802.11ac80 CH 42/CH 155

For Radiated Emission	
Final Test Mode	Description
Mode 1	Normal Link Mode
Mode 2	802.11a/n/ac 20 CH36/ CH40/ CH 48 802.11a /n/ac 20 CH149/ CH157/ CH 165
Mode 3	802.11n/ac40 CH38/ CH 46 802.11n/ac40 CH 151 / CH 159
Mode 4	802.11 ac80 CH 42/CH 155

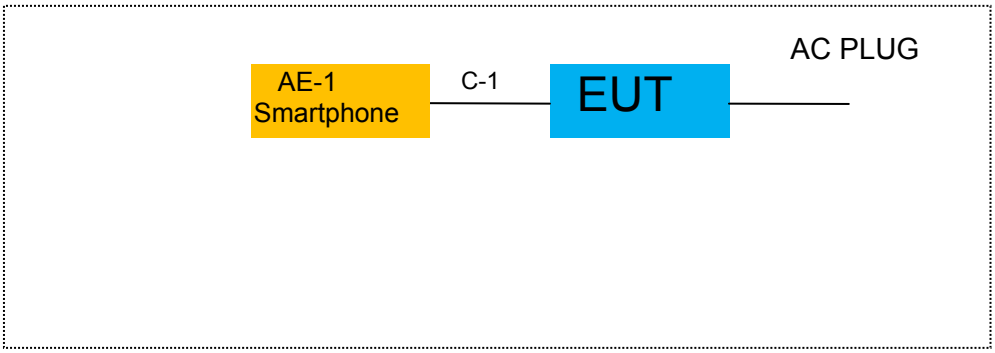
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

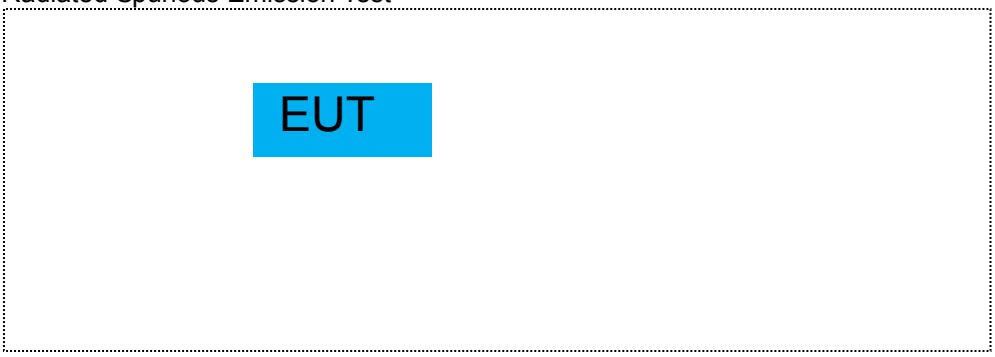
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

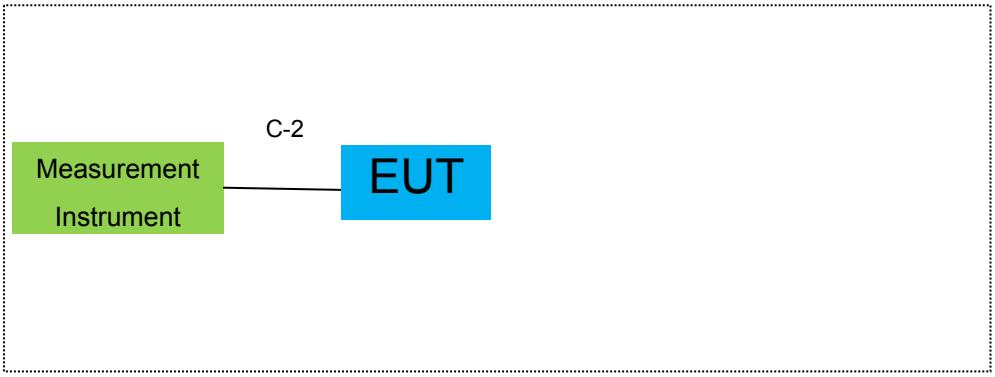
For AC Conducted Emission Mode



Radiated Spurious Emission Test



For Conducted Test Cases



Note:The temporary antenna connector is soldered on the FPCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.
EUT built-in battery-powered, The battery is fully-charged.

2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
AE-1	Smartphone	N/A	N/A	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	NO	NO	0.5m	
C-2	RF Cable	YES	NO	0.1m	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation& Conducted Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Aglient	E4407B	MY45108040	2018.05.19	2019.05.18	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2018.10.08	2019.10.07	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2018.10.08	2019.10.07	1 year
4	Test Receiver	R&S	ESPI7	101318	2018.05.19	2019.05.18	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2018.04.08	2019.04.07	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2018.05.19	2020.05.18	3 year
7	Horn Antenna	EM	EM-AH-10180	2011071402	2018.04.08	2019.04.07	1 year
8	Amplifier	EMC	EMC051835SE	980246	2018.08.05	2019.08.04	1 year
9	Active Loop Antenna	SCHWARZBECK	FMZB 1519 B	055	2018.11.03	2019.11.02	1 year
10	Power Meter	DARE	RPR3006W	15I00041SNO84	2018.08.05	2019.08.04	1 year
11	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2017.04.21	2020.04.20	3 year
12	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2017.04.21	2020.04.20	3 year
13	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2017.04.21	2020.04.20	3 year
14	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2017.04.21	2020.04.20	3 year
15	Filter	TRILTHIC	2400MHz	29	2017.04.19	2020.04.18	3 year
16	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A
17	Low Noise Amplifier	B&Z	BZ-P540-550850-452727	16476-11729	2018.04.09	2019.04.08	1 year
18	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	803	2018.11.03	2019.11.02	1 year

Note:
We will use the temporary antenna connector (soldered on the PCB board) When conducted test
And this temporary antenna connector is listed within the instrument list

AC Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2018.05.19	2019.05.18	1 year
2	LISN	R&S	ENV216	101313	2018.04.18	2019.04.19	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2018.05.19	2019.05.18	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2018.05.19	2020.05.18	3 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2017.04.21	2020.04.20	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2017.04.21	2020.04.20	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2017.04.21	2020.04.20	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable which is scheduled for calibration every 3 years.

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC/ RSS-247
0.50 -5.0	56.00	46.00	FCC/ RSS-247
5.0 -30.0	60.00	50.00	FCC/ RSS-247

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

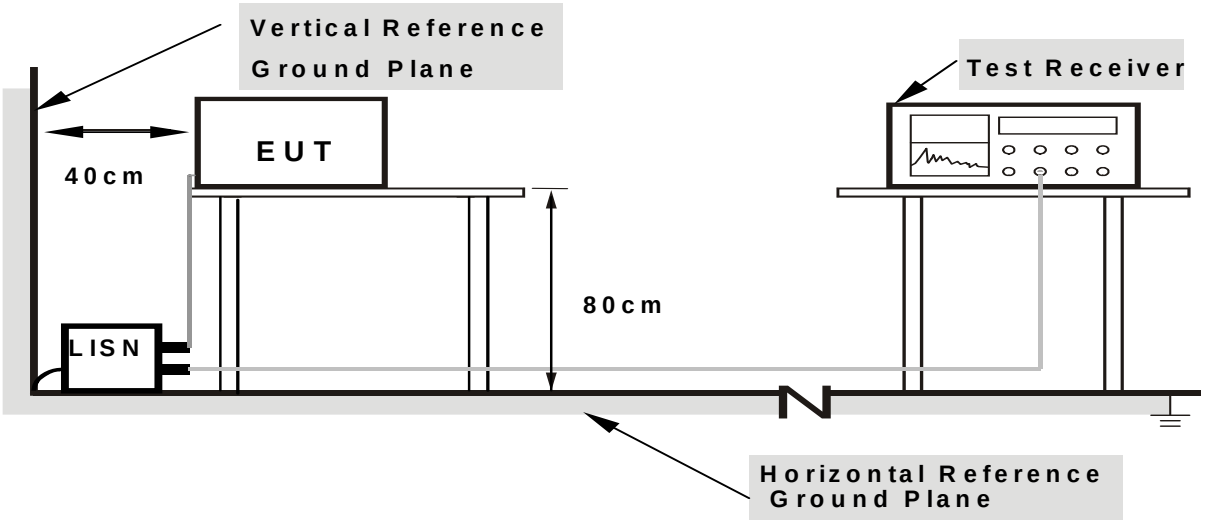
3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

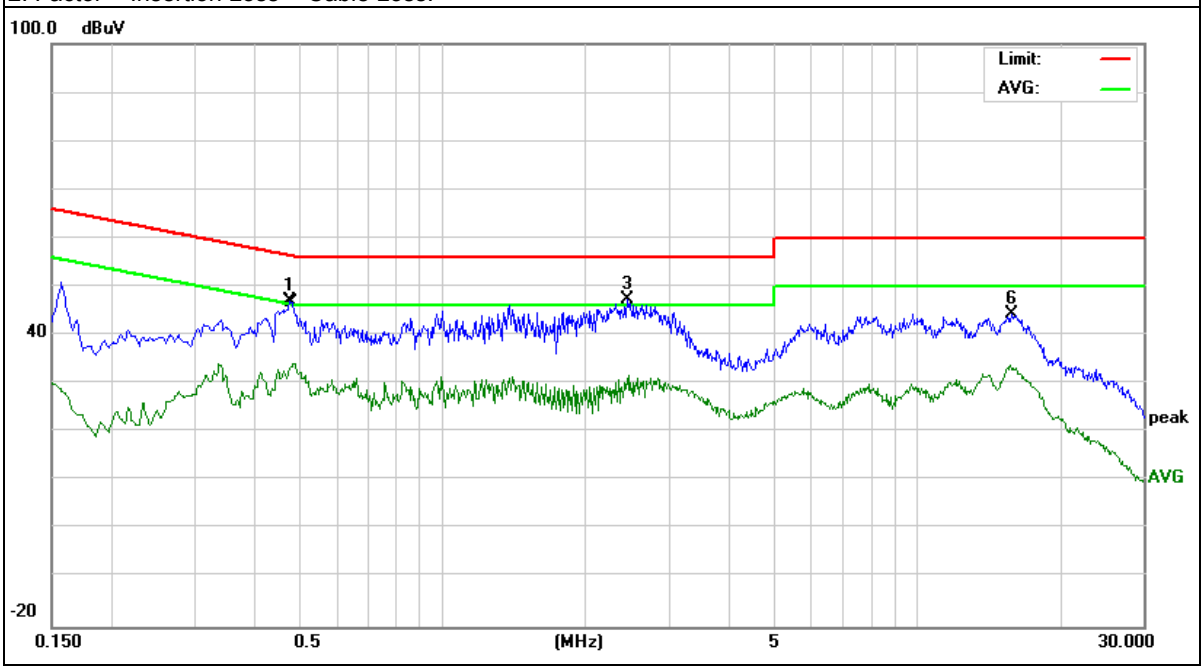
3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V from Adapter AC 120V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.4780	37.18	9.74	46.92	56.37	-9.45	QP
0.4860	24.33	9.74	34.07	46.24	-12.17	AVG
2.4500	37.51	9.79	47.30	56.00	-8.70	QP
2.4860	21.98	9.79	31.77	46.00	-14.23	AVG
15.7940	23.72	10.12	33.84	50.00	-16.16	AVG
15.8060	34.32	10.12	44.44	60.00	-15.56	QP

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

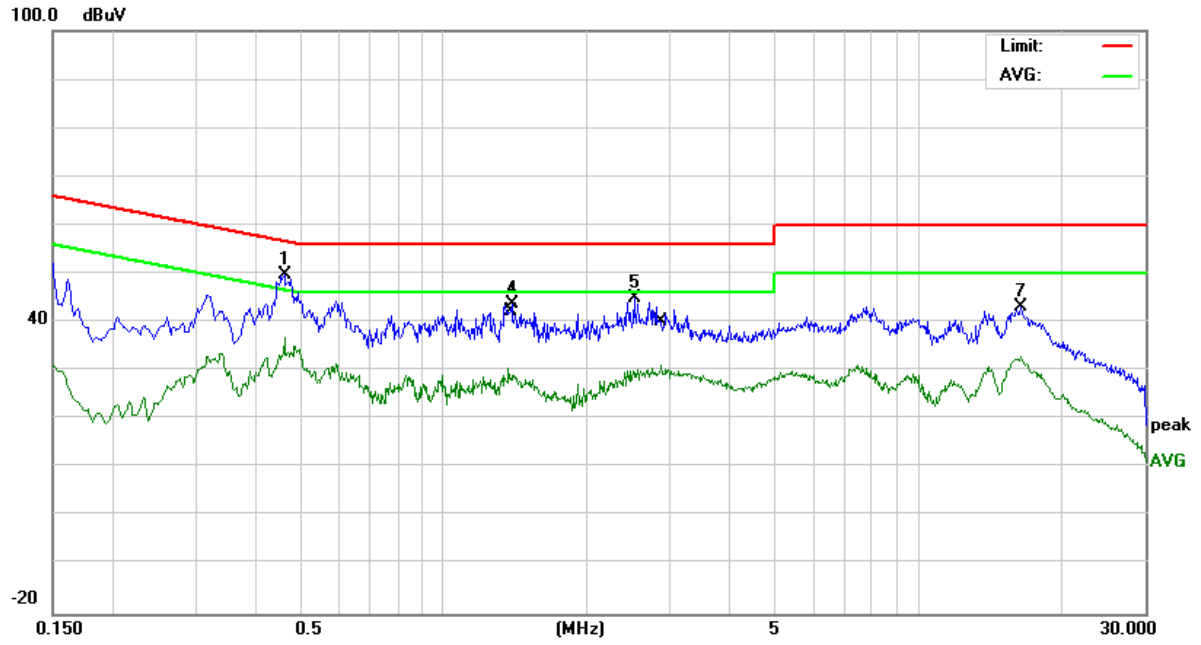


EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V from Adapter AC 120V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.4620	40.12	9.75	49.87	56.66	-6.79	QP
0.4620	27.21	9.75	36.96	46.66	-9.70	AVG
1.3700	20.82	9.76	30.58	46.00	-15.42	AVG
1.3900	34.12	9.76	43.88	56.00	-12.12	QP
2.5220	35.08	9.82	44.90	56.00	-11.10	QP
2.8699	21.25	9.86	31.11	46.00	-14.89	AVG
16.4020	33.14	10.13	43.27	60.00	-16.73	QP
16.4020	22.73	10.13	32.86	50.00	-17.14	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

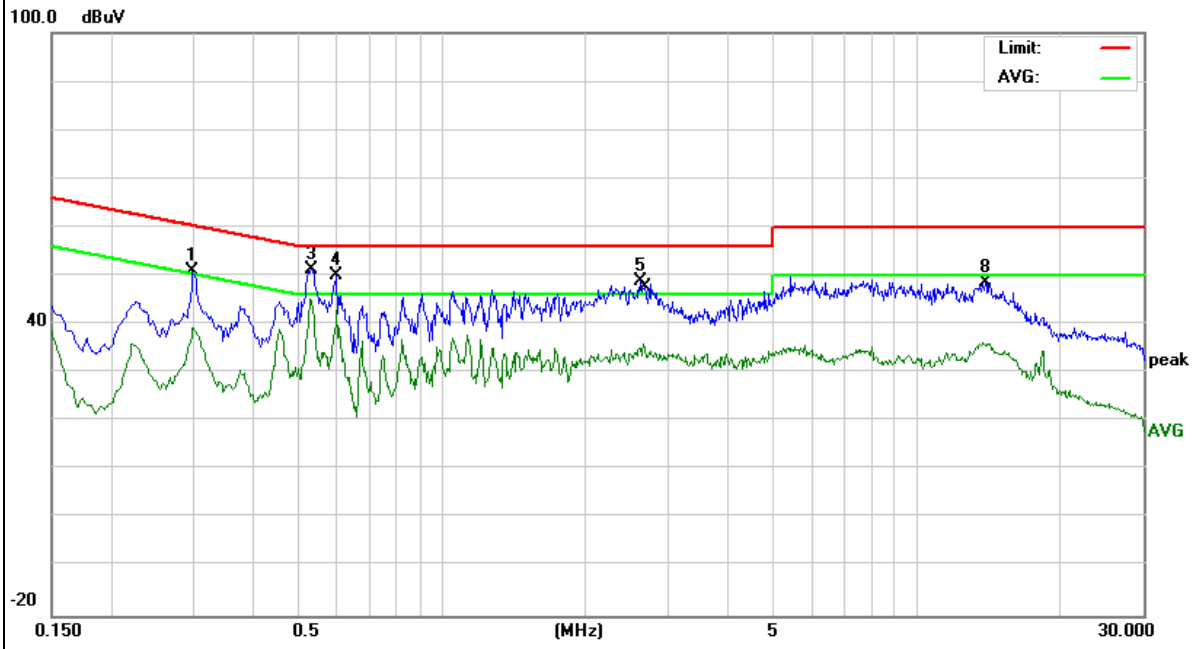


EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V from Adapter AC 240V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.2980	41.23	9.74	50.97	60.30	-9.33	QP
0.2980	29.59	9.74	39.33	50.30	-10.97	AVG
0.5299	41.56	9.74	51.30	56.00	-4.70	QP
0.5980	40.17	9.74	49.91	56.00	-6.09	QP
2.6180	38.95	9.80	48.75	56.00	-7.25	QP
2.6619	26.14	9.80	35.94	46.00	-10.06	AVG
13.8340	26.24	10.08	36.32	50.00	-13.68	AVG
13.9540	38.35	10.09	48.44	60.00	-11.56	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

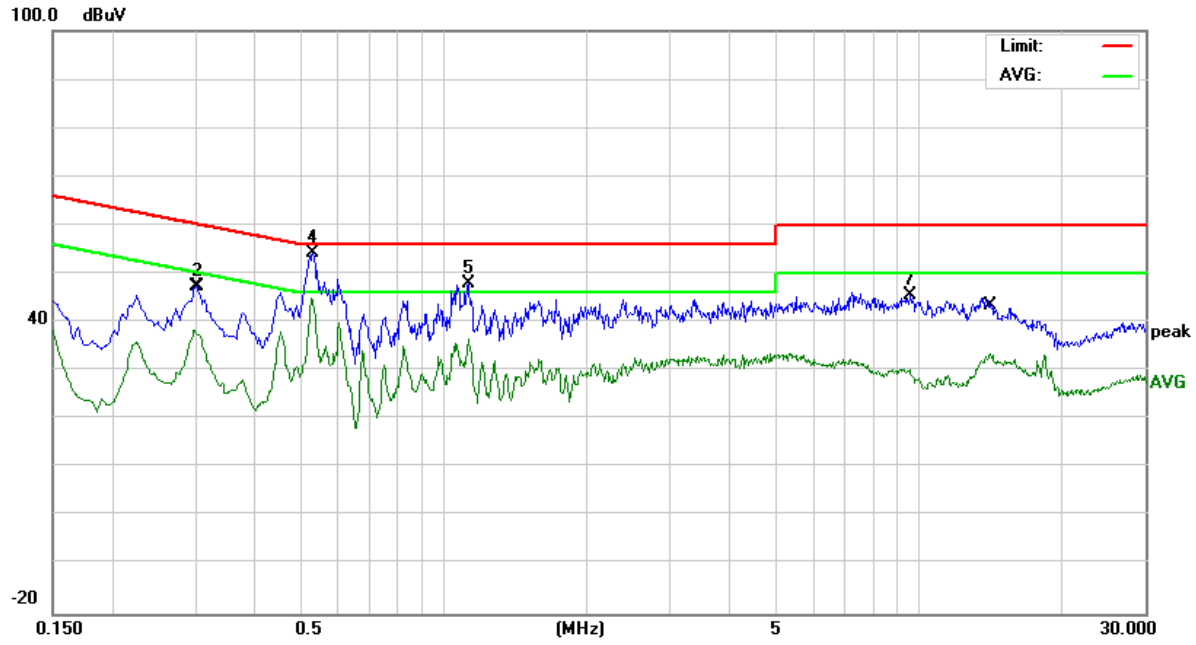


EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V from Adapter AC 240V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.2980	28.61	9.74	38.35	50.30	-11.95	AVG
0.3020	37.60	9.74	47.34	60.19	-12.85	QP
0.5260	35.05	9.75	44.80	46.00	-1.20	AVG
0.5300	44.61	9.75	54.36	56.00	-1.64	QP
1.1260	38.07	9.75	47.82	56.00	-8.18	QP
1.1260	26.75	9.75	36.50	46.00	-9.50	AVG
9.6380	35.49	10.04	45.53	60.00	-14.47	QP
14.1580	23.44	10.09	33.53	50.00	-16.47	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

3.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	24000/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

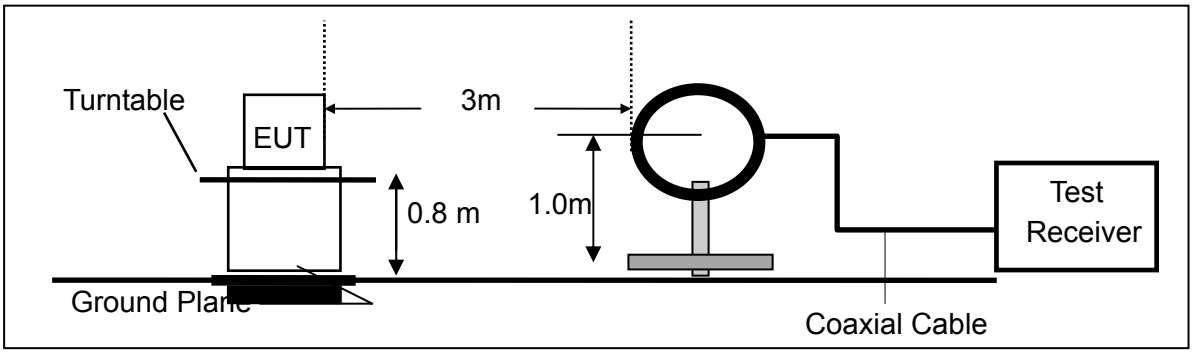
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

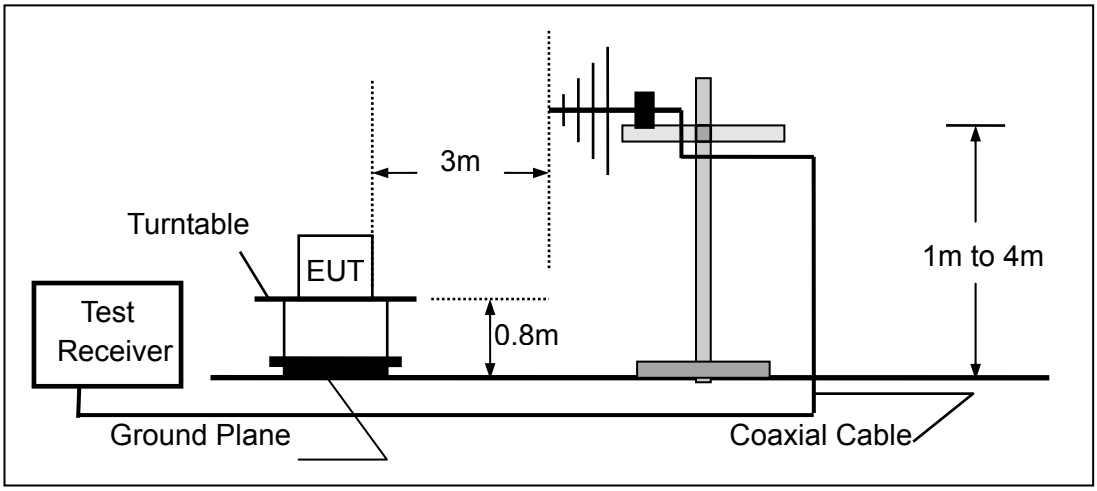
The Measuring equipment is listed in the section 6.3 of this test report.

3.2.4 TEST CONFIGURATION

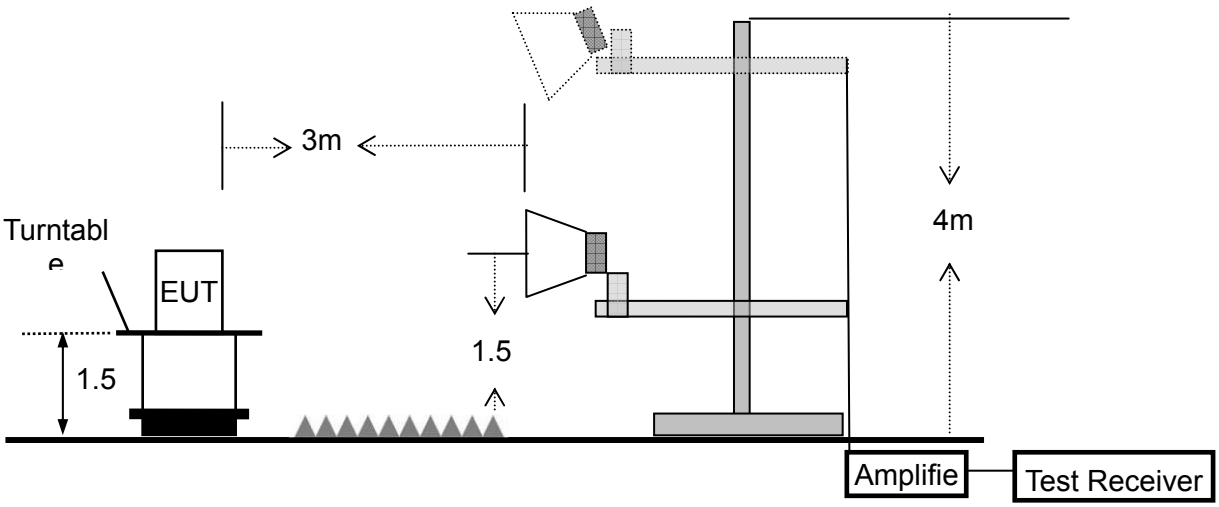
(a)For radiated emissions below 30MHz



(b)For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

3.2.6 TEST RESULTS (9KHZ – 30 MHZ)

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

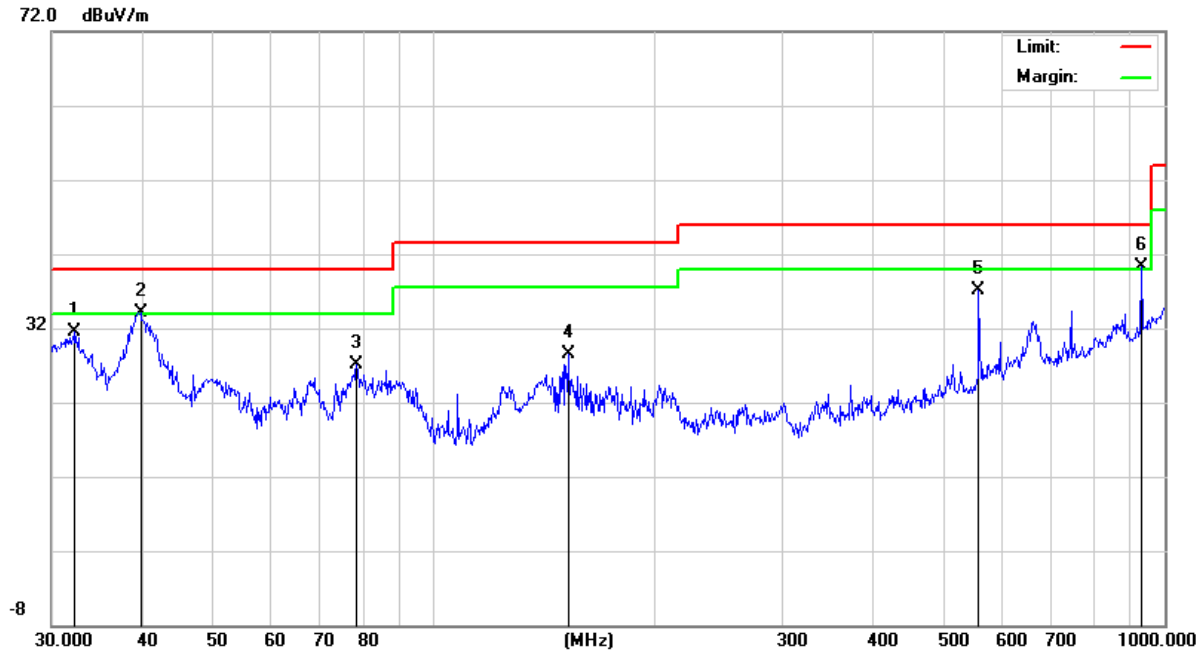
3.2.7 TEST RESULTS (30MHZ – 1GHZ)

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX(5.2G)- 802.11n40 (High CH)		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	32.2924	11.21	20.20	31.41	40.00	-8.59	QP
V	39.7146	17.72	16.44	34.16	40.00	-5.84	QP
V	78.4133	15.46	11.56	27.02	40.00	-12.98	QP
V	152.6639	17.25	11.19	28.44	43.50	-15.06	QP
V	556.7744	18.55	18.61	37.16	46.00	-8.84	QP
V	929.0081	14.53	25.76	40.29	46.00	-5.71	QP

Remark:

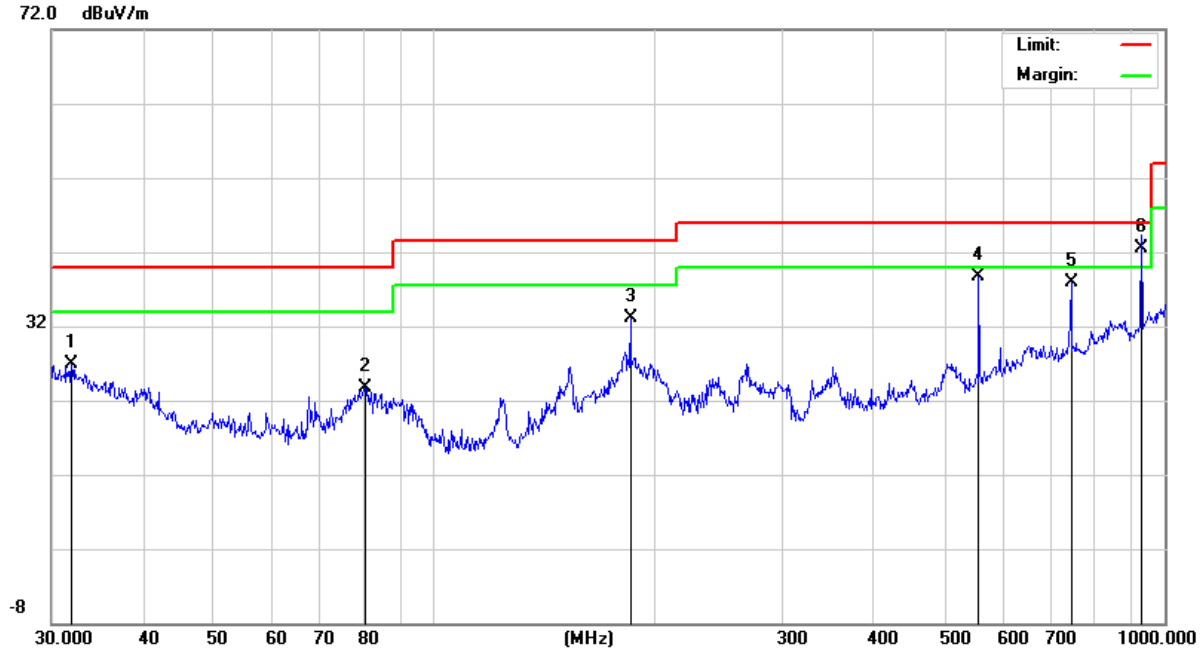
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	31.9542	6.56	20.37	26.93	40.00	-13.07	QP
H	80.6440	12.43	11.34	23.77	40.00	-16.23	QP
H	185.7880	20.42	12.70	33.12	43.50	-10.38	QP
H	556.7744	20.15	18.61	38.76	46.00	-7.24	QP
H	744.8659	15.59	22.39	37.98	46.00	-8.02	QP
H	929.0081	16.74	25.76	42.50	46.00	-3.50	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

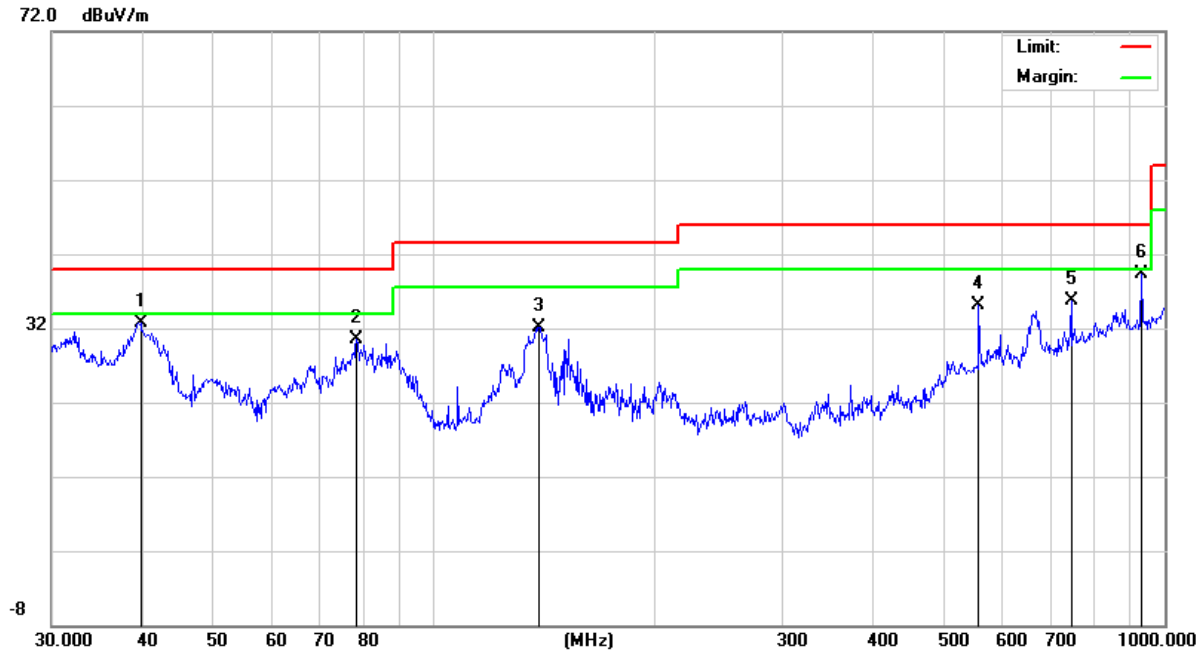


EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX(5.8G) - 802.11n20 (High CH)		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	39.7146	16.22	16.44	32.66	40.00	-7.34	QP
V	78.4133	18.96	11.56	30.52	40.00	-9.48	QP
V	139.3608	20.74	11.40	32.14	43.50	-11.36	QP
V	556.7744	16.55	18.61	35.16	46.00	-10.84	QP
V	744.8659	13.41	22.39	35.80	46.00	-10.20	QP
V	929.0081	13.53	25.76	39.29	46.00	-6.71	QP

Remark:

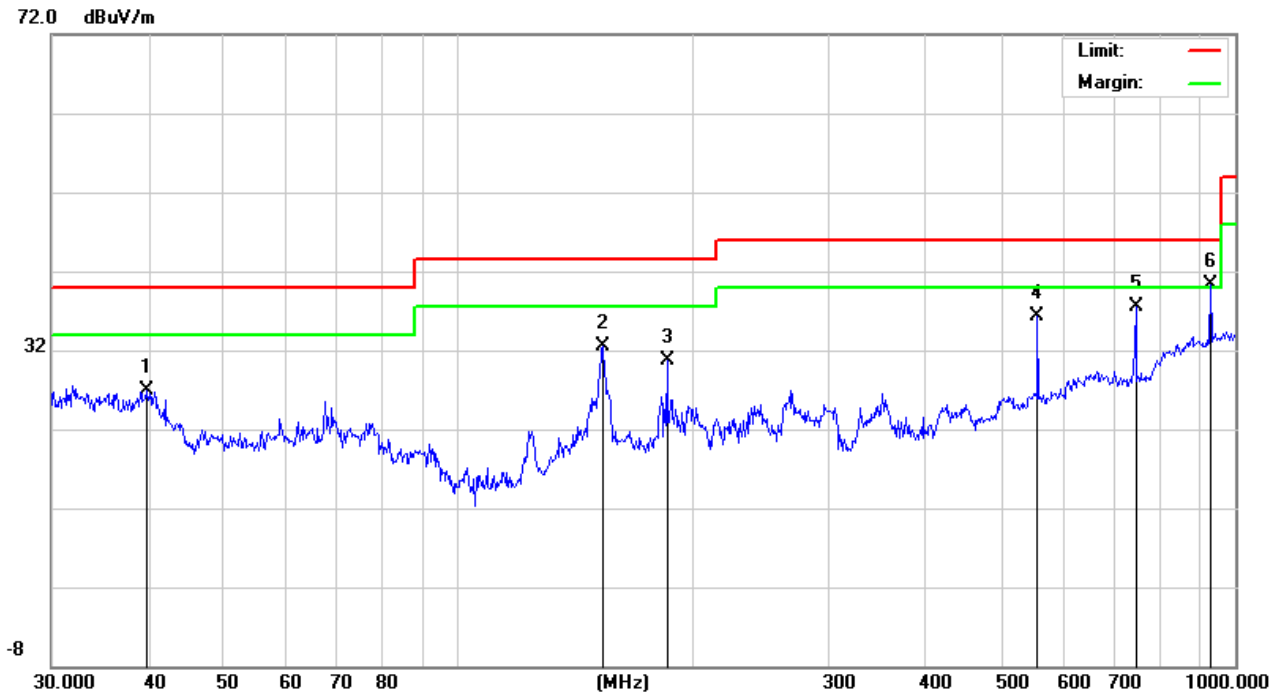
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	39.7146	10.52	16.44	26.96	40.00	-13.04	QP
H	153.7384	21.25	11.16	32.41	43.50	-11.09	QP
H	185.7880	17.92	12.70	30.62	43.50	-12.88	QP
H	556.7744	17.65	18.61	36.26	46.00	-9.74	QP
H	744.8659	15.09	22.39	37.48	46.00	-8.52	QP
H	929.0081	14.45	25.76	40.21	46.00	-5.79	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



3.2.8 TEST RESULTS (1GHz-26GHz)

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX(5.2G) - 802.11 n40 _5180~5240MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5190 MHz)-Above 1G									
Vertical	4435.39	60.70	5.94	35.40	44.00	58.04	74.00	-15.96	Pk
Vertical	4435.39	41.52	5.94	35.40	44.00	38.86	54.00	-15.14	AV
Vertical	10370.13	64.00	8.46	39.75	44.50	67.71	74.00	-6.29	Pk
Vertical	10370.13	41.17	8.46	39.75	44.50	44.88	54.00	-9.12	AV
Vertical	15540.82	60.20	10.12	38.80	44.10	65.02	74.00	-8.98	Pk
Vertical	15540.82	38.88	10.12	38.80	42.70	45.10	54.00	-8.90	AV
Horizontal	4434.16	62.58	5.94	35.18	44.00	59.70	74.00	-14.30	Pk
Horizontal	4434.16	42.98	5.94	35.18	44.00	40.10	54.00	-13.90	AV
Horizontal	10369.95	58.07	8.46	38.71	44.50	60.74	74.00	-13.26	Pk
Horizontal	10369.95	42.33	8.46	38.71	44.50	45.00	54.00	-9.00	AV
Horizontal	10540.38	56.65	10.12	38.38	44.10	61.05	74.00	-12.95	Pk
Horizontal	10540.38	40.11	10.12	38.38	44.10	44.51	54.00	-9.49	AV
High Channel (5230 MHz)-Above 1G									
Vertical	4592.78	57.82	6.48	36.35	44.05	56.60	74.00	-17.40	Pk
Vertical	4592.78	42.24	6.48	36.35	44.05	41.02	54.00	-12.98	AV
Vertical	10401.01	59.14	8.47	37.88	44.51	60.98	74.00	-13.02	Pk
Vertical	10401.01	40.57	8.47	37.88	44.51	42.41	54.00	-11.59	AV
Vertical	15600.08	59.36	10.12	38.80	44.10	64.18	74.00	-9.82	Pk
Vertical	15600.08	38.81	10.12	38.80	42.70	45.03	54.00	-8.97	AV
Horizontal	4592.39	57.50	6.48	36.37	44.05	56.30	74.00	-17.70	Pk
Horizontal	4592.39	44.17	6.48	36.37	44.05	42.97	54.00	-11.03	AV
Horizontal	10400.14	60.64	8.47	38.64	44.50	63.25	74.00	-10.75	Pk
Horizontal	10400.14	40.18	8.47	38.64	44.50	42.79	54.00	-11.21	AV
Horizontal	15600.47	59.22	10.12	38.38	44.10	63.62	74.00	-10.38	Pk
Horizontal	15600.47	40.43	10.12	38.38	44.10	44.83	54.00	-9.17	AV

Note:"802.11n40(5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value

has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5.8G) -- 802.11n20_5745~5825MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	4680.34	62.07	5.94	35.40	44.00	59.41	74.00	-14.59	Pk
Vertical	4680.34	43.78	5.94	35.40	44.00	41.12	54.00	-12.88	AV
Vertical	11490.45	58.40	8.46	39.75	44.50	62.11	74.00	-11.89	Pk
Vertical	11490.45	41.65	8.46	39.75	44.50	45.36	54.00	-8.64	AV
Vertical	17235.50	50.38	10.12	38.80	44.10	55.20	74.00	-18.80	Pk
Vertical	17235.50	39.88	10.12	38.80	42.70	46.10	54.00	-7.90	AV
Horizontal	4680.07	57.88	5.94	35.18	44.00	55.00	74.00	-19.00	Pk
Horizontal	4680.07	40.04	5.94	35.18	44.00	37.16	54.00	-16.84	AV
Horizontal	11490.32	57.33	8.46	38.71	44.50	60.00	74.00	-14.00	Pk
Horizontal	11490.32	40.73	8.46	38.71	44.50	43.40	54.00	-10.60	AV
Horizontal	17235.32	59.86	10.12	38.38	44.10	64.26	74.00	-9.74	Pk
Horizontal	17235.32	38.97	10.12	38.38	44.10	43.37	54.00	-10.63	AV
middle Channel (5785 MHz)-Above 1G									
Vertical	4592.22	60.99	6.48	36.35	44.05	59.77	74.00	-14.23	Pk
Vertical	4592.22	41.34	6.48	36.35	44.05	40.12	54.00	-13.88	AV
Vertical	11570.26	58.85	8.47	37.88	44.51	60.69	74.00	-13.31	Pk
Vertical	11570.26	41.41	8.47	37.88	44.51	43.25	54.00	-10.75	AV
Vertical	17355.69	59.74	10.12	38.8	44.10	64.56	74.00	-9.44	Pk
Vertical	17355.69	37.92	10.12	38.8	42.70	44.14	54.00	-9.86	AV
Horizontal	4592.13	58.30	6.48	36.37	44.05	57.10	74.00	-16.90	Pk
Horizontal	4592.13	41.15	6.48	36.37	44.05	39.95	54.00	-14.05	AV
Horizontal	11570.13	61.04	8.47	38.64	44.50	63.65	74.00	-10.35	Pk
Horizontal	11570.13	42.28	8.47	38.64	44.50	44.89	54.00	-9.11	AV
Horizontal	17355.34	60.85	10.12	38.38	44.10	65.25	74.00	-8.75	Pk
Horizontal	17355.34	41.85	10.12	38.38	44.10	46.25	54.00	-7.75	AV
High Channel (5825 MHz)-Above 1G									
Vertical	6039.66	61.25	7.10	37.24	43.50	62.09	74.00	-11.91	Pk
Vertical	6039.66	42.39	7.10	37.24	43.50	43.23	54.00	-10.77	AV
Vertical	11652.27	60.96	8.46	37.68	44.50	62.60	74.00	-11.40	Pk
Vertical	11652.27	42.35	8.46	37.68	44.50	43.99	54.00	-10.01	AV
Vertical	17473.59	59.82	10.12	38.8	44.10	64.64	74.00	-9.36	Pk
Vertical	17473.59	39.99	10.12	38.8	42.70	46.21	54.00	-7.79	AV
Horizontal	6039.48	59.48	7.10	37.24	43.50	60.32	74.00	-13.68	Pk
Horizontal	6039.48	40.82	7.10	37.24	43.50	41.66	54.00	-12.34	AV
Horizontal	11652.52	59.53	8.46	38.57	44.50	62.06	74.00	-11.94	Pk
Horizontal	11652.52	41.08	8.46	38.57	44.50	43.61	54.00	-10.39	AV
Horizontal	17474.53	57.44	10.12	38.38	44.10	61.84	74.00	-12.16	Pk
Horizontal	17474.53	40.57	10.12	38.38	44.10	44.97	54.00	-9.03	AV

Note:"802.11n20(5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value

has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.2.9 TEST RESULTS (26GHZ-40GHZ)

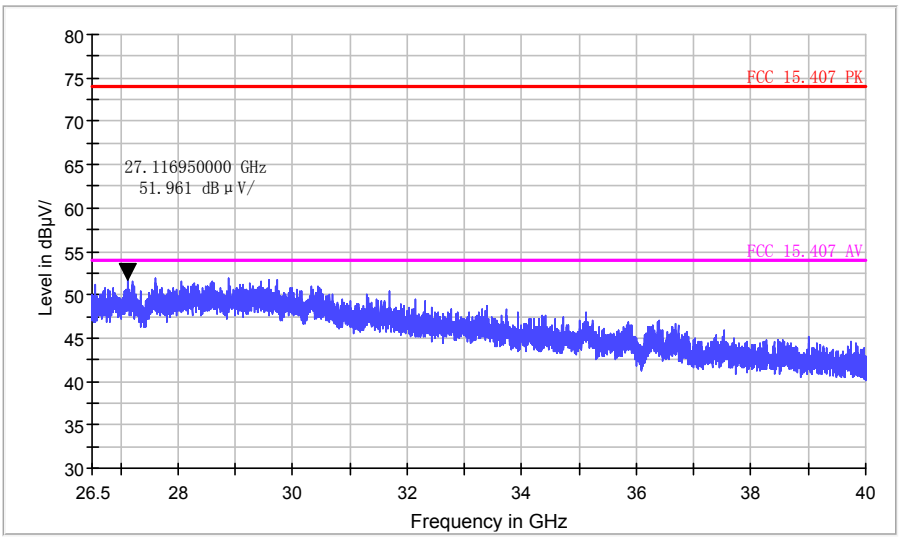
EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5.2G)-802.11n40 5150MHz~5250MHz , TX (5.8G)-802.11n20 5725MHz~5850MHz		

All the modulation modes have been tested, and the worst result was report as below:

Low Channel (5190 MHz)-Above 1G

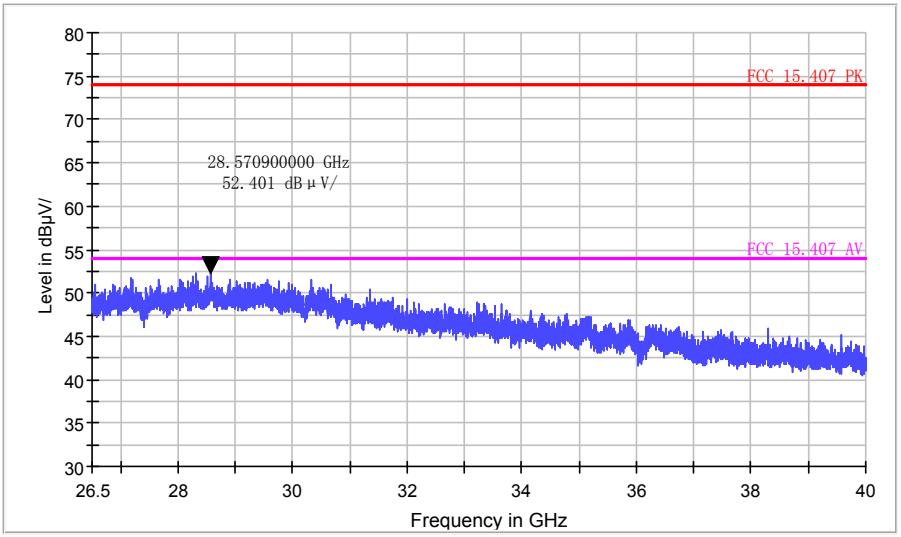
Horizontal

FCC Electric Field Strength 26.5-40GHz



Vertical

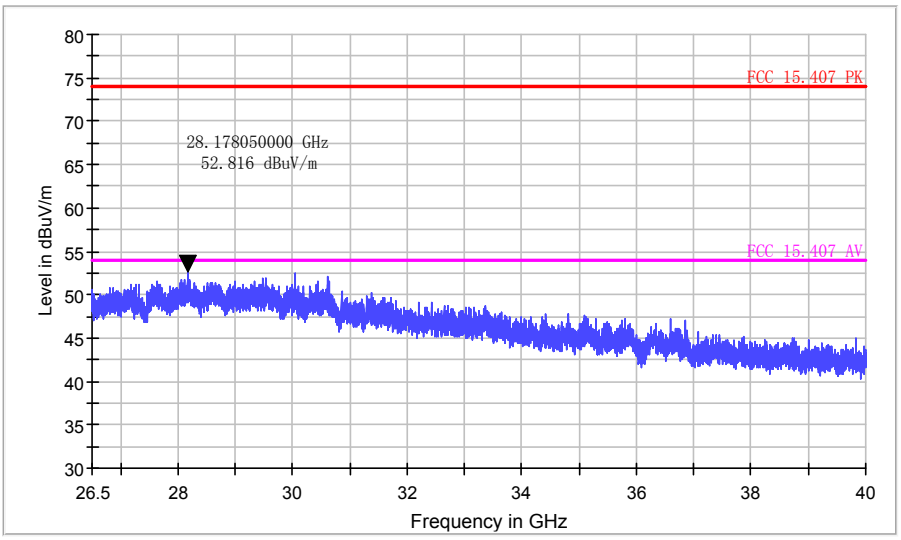
FCC Electric Field Strength 26.5-40GHz



High Channel (5230 MHz)-Above 1G

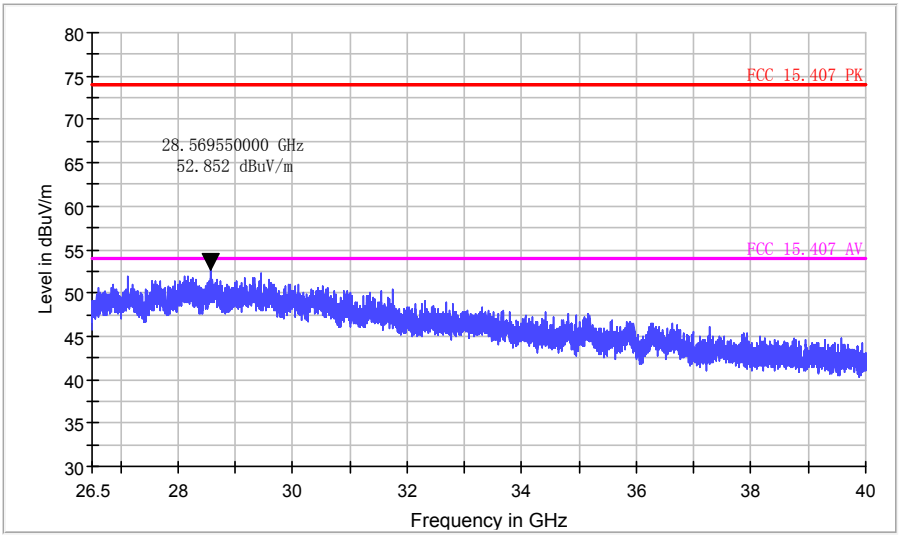
Horizontal

FCC Electric Field Strength 26.5-40GHz



Vertical

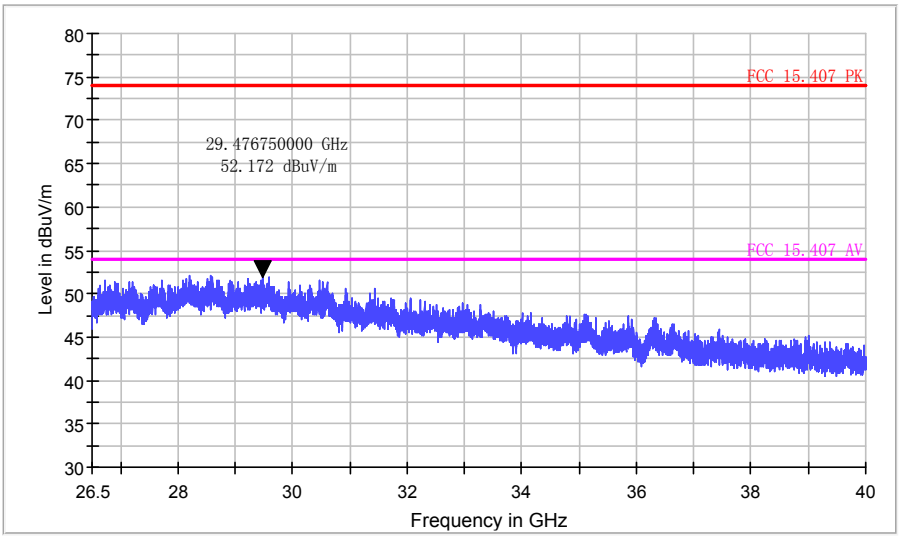
FCC Electric Field Strength 26.5-40GHz



Low Channel (5745 MHz)-Above 1G

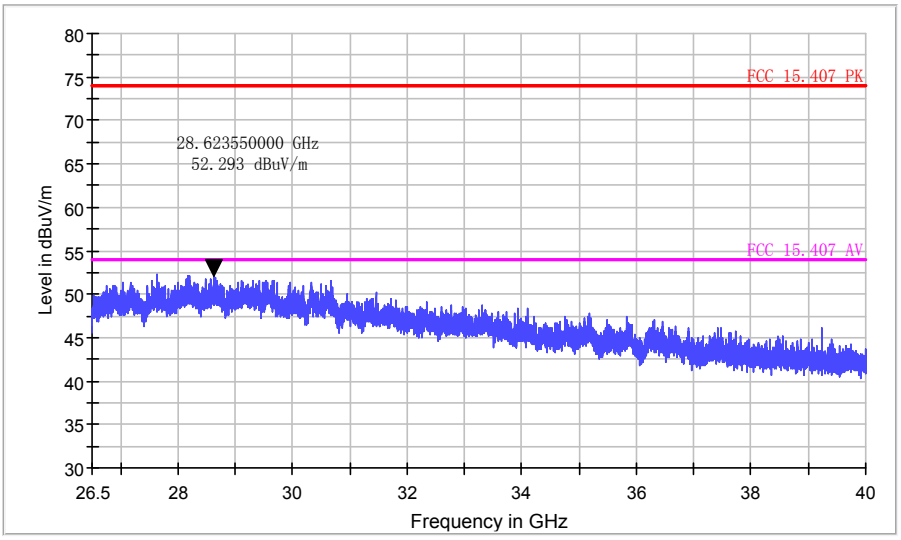
Horizontal

FCC Electric Field Strength 26.5-40GHz



Vertical

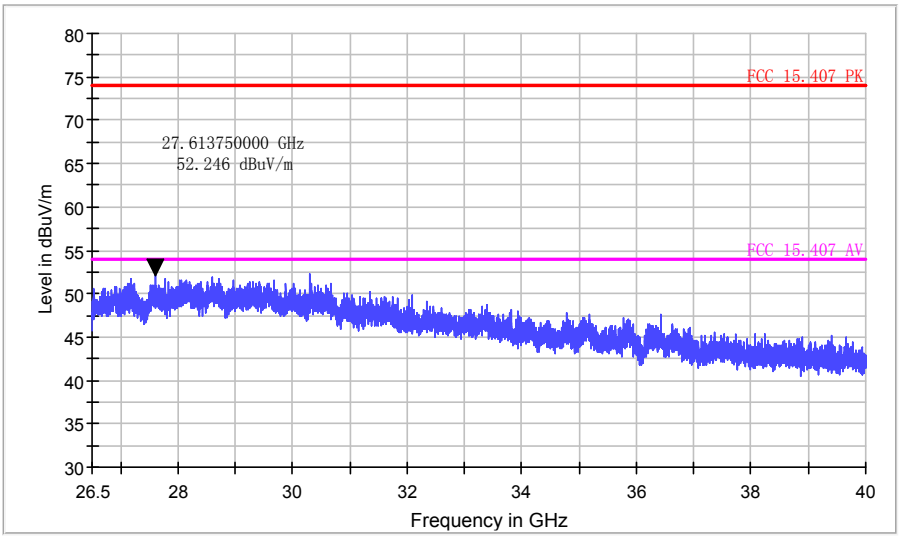
FCC Electric Field Strength 26.5-40GHz



High Channel (5825 MHz)-Above 1G

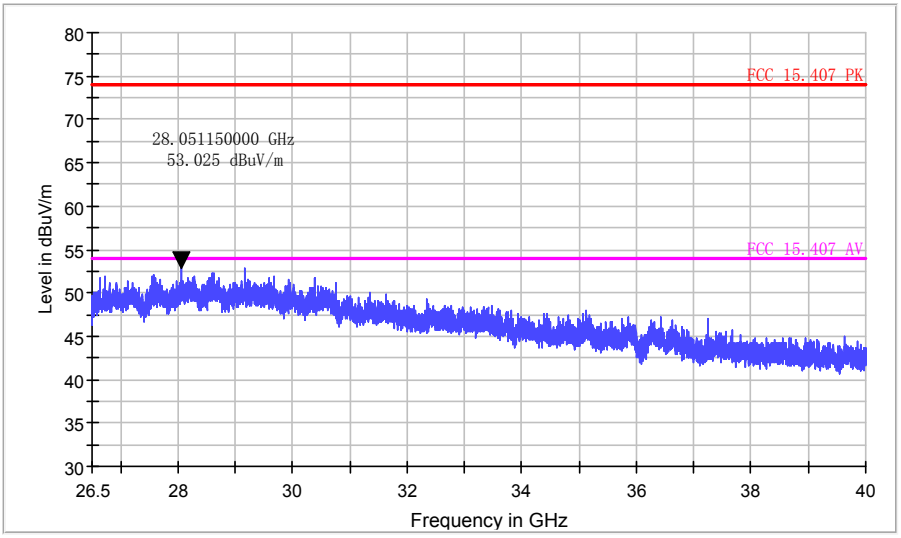
Horizontal

FCC Electric Field Strength 26.5-40GHz



Vertical

FCC Electric Field Strength 26.5-40GHz



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(3)

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz

(3)For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

,

4.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

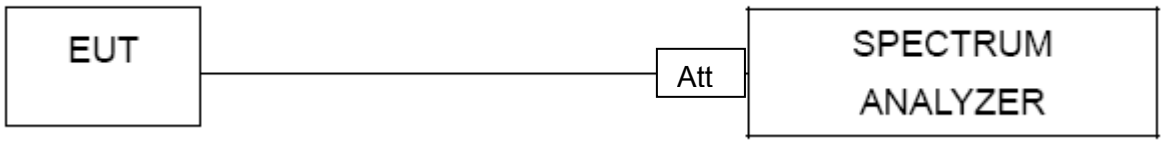
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

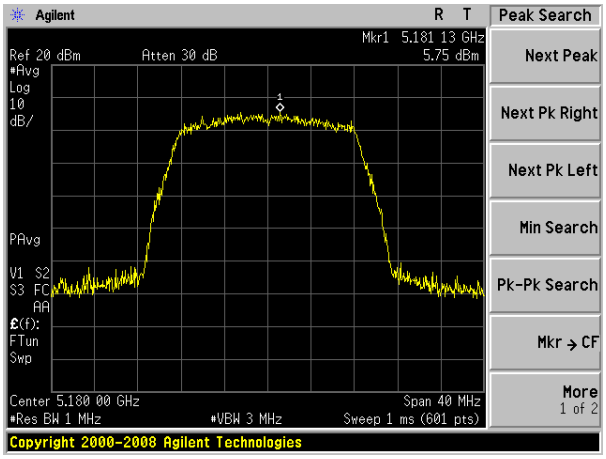
Mode	Frequency	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT A	ANT B		ANT A	ANT B		
802.11 a	5185 MHz	5.75	5.26	-	5.75	5.26	11	PASS
	5200 MHz	4.99	4.46	-	4.99	4.46	11	PASS
	5240 MHz	5.84	5.28	-	5.84	5.28	11	PASS
802.11 n20	5185 MHz	3.69	3.13	6.43	6.43		10.24	PASS
	5200 MHz	2.90	2.46	5.70	5.70		10.24	PASS
	5240 MHz	4.05	4.01	7.04	7.04		10.24	PASS
802.11 n40	5190 MHz	1.40	1.02	4.22	4.22		10.24	PASS
	5230 MHz	1.05	1.02	4.05	4.05		10.24	PASS
802.11 ac20	5185 MHz	3.07	2.96	6.03	6.03		10.24	PASS
	5200 MHz	3.39	3.11	6.26	6.26		10.24	PASS
	5240 MHz	4.48	4.26	7.38	7.38		10.24	PASS
802.11 ac40	5190 MHz	-1.61	-0.63	1.92	1.92		10.24	PASS
	5230 MHz	-0.82	-0.75	2.23	2.23		10.24	PASS
802.11 ac80	5210 MHz	-3.86	-3.99	-0.91	-0.91		10.24	PASS

Note: 1.Calculate power density= Measured Power Density+10log(1MHz/RBW)

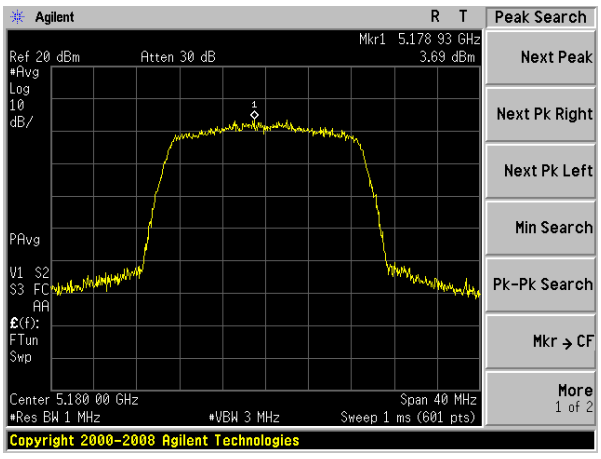
RBW=1MHz

2. For 802.11n/ac 5GHz has MIMO mode.Directional gain=6.76dbi
6.76 dbi>6.0 dbi so power density limit= 11-(6.76-6)=10.24dBm/MHz

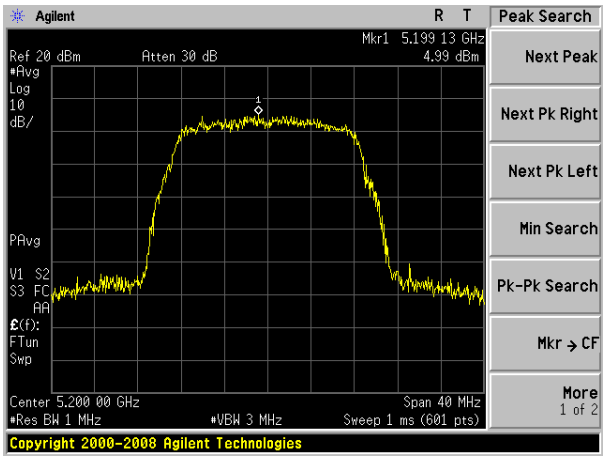
(802.11a) PSD plot on channel 36



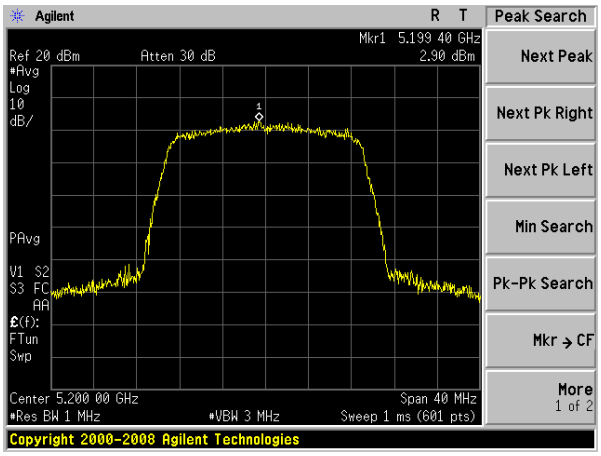
(802.11n20) PSD plot on channel 36



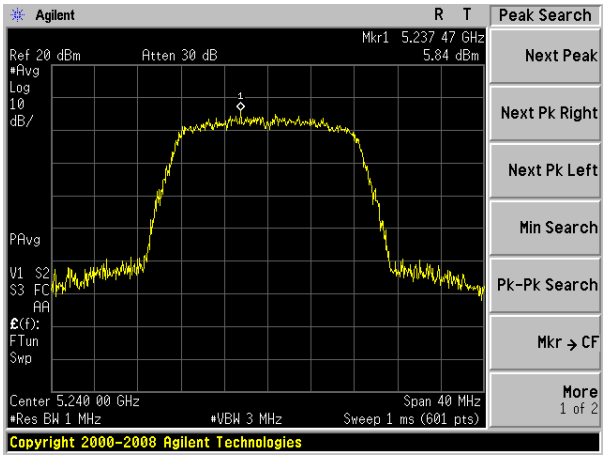
(802.11a) PSD plot on channel 40



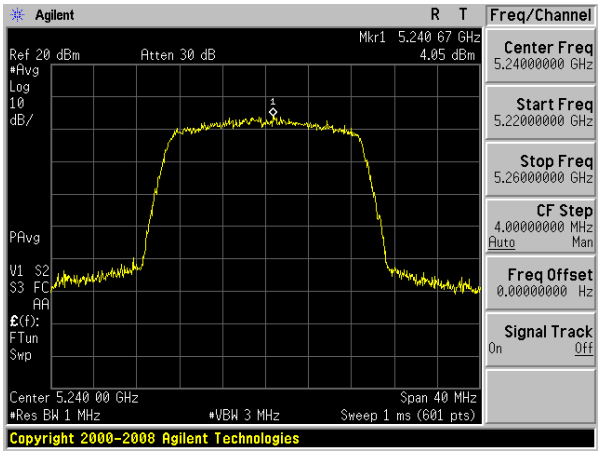
(802.11n20) PSD plot on channel 40



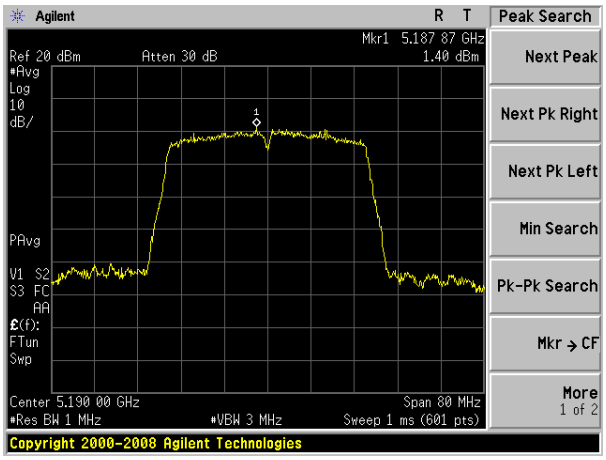
(802.11a) PSD plot on channel 48



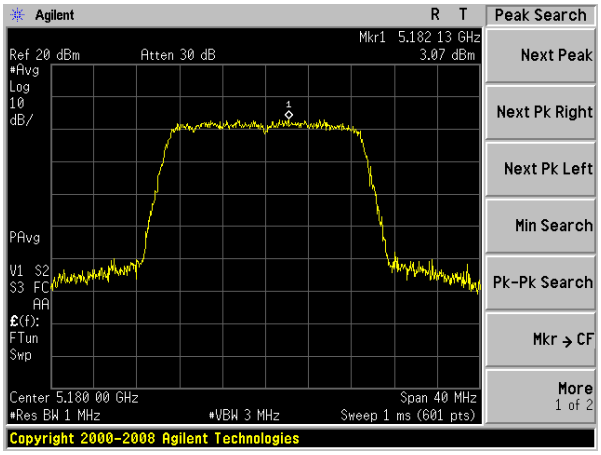
(802.11n20) PSD plot on channel 48



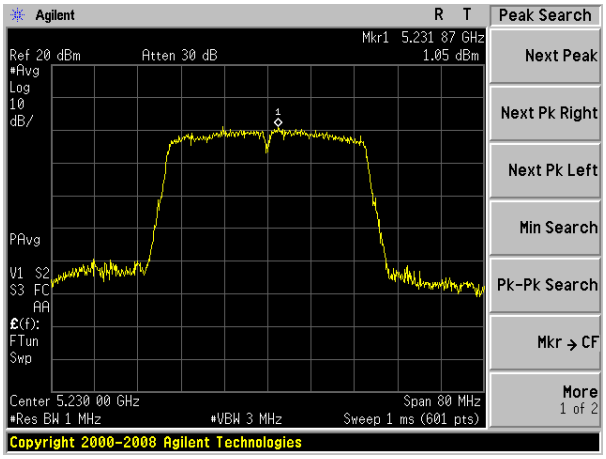
(802.11n40) PSD plot on channel 38



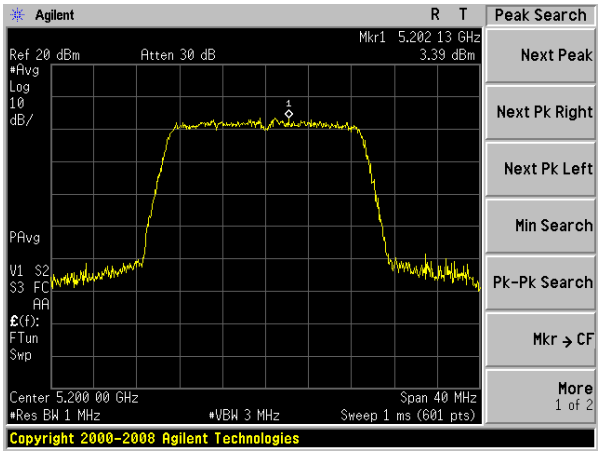
(802.11ac20) PSD plot on channel 36



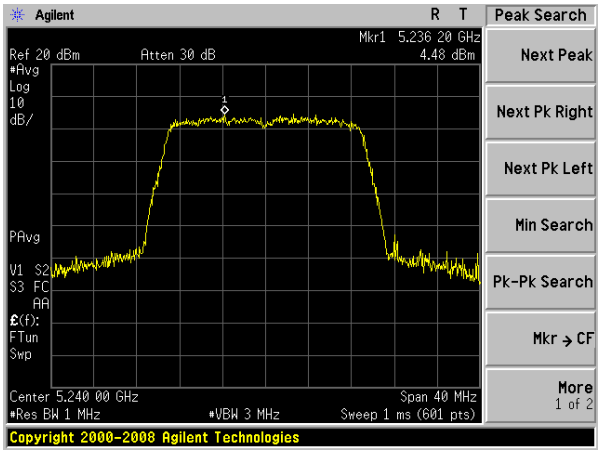
(802.11n40) PSD plot on channel 46



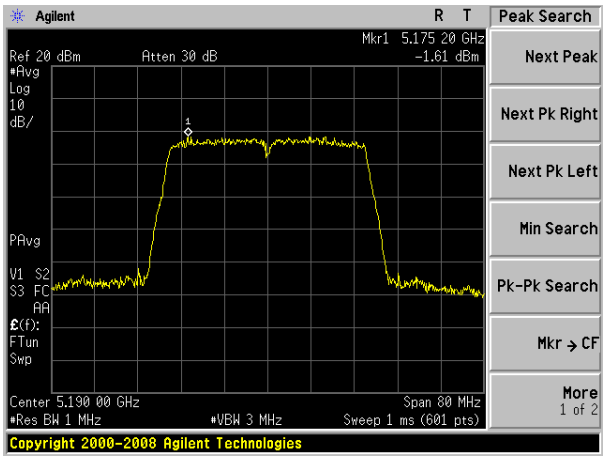
(802.11ac20) PSD plot on channel 40



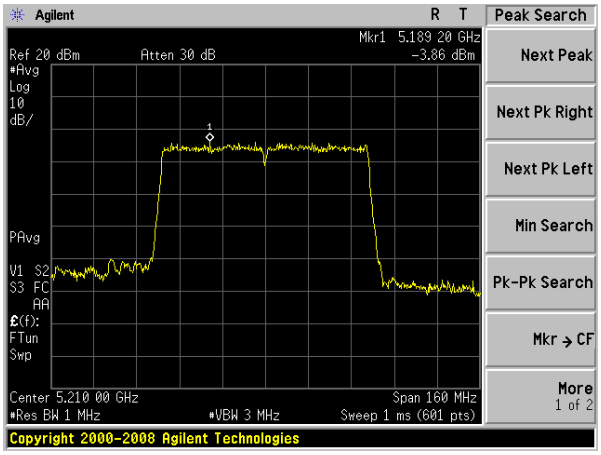
(802.11ac20) PSD plot on channel 48



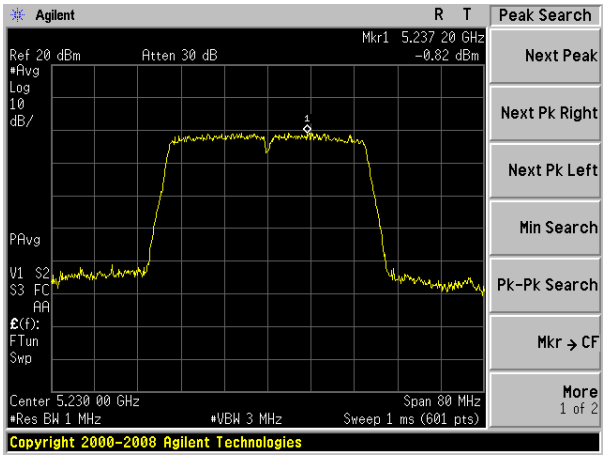
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



(802.11ac40) PSD plot on channel 46



EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band IV (5725-5850MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

Mode	Frequency	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT A	ANT B		ANT A	ANT B		
802.11 a	5745 MHz	9.68	8.67	-	9.68	8.67	30	PASS
	5785 MHz	9.60	9.12	-	9.60	9.12	30	PASS
	5825 MHz	9.43	9.78	-	9.43	9.78	30	PASS
802.11 n20	5745 MHz	9.02	7.68	11.41	11.41		29.24	PASS
	5785 MHz	9.51	9.21	12.37	12.37		29.24	PASS
	5825 MHz	7.56	7.34	10.46	10.46		29.24	PASS
802.11 n40	5755 MHz	5.99	5.21	8.63	8.63		29.24	PASS
	5795 MHz	6.69	6.35	9.53	9.53		29.24	PASS
802.11 ac20	5745 MHz	6.61	6.33	9.48	9.48		29.24	PASS
	5785 MHz	7.04	6.46	9.77	9.77		29.24	PASS
	5825 MHz	7.27	7.01	10.15	10.15		29.24	PASS
802.11 ac40	5755 MHz	5.20	5.05	8.14	8.14		29.24	PASS
	5795 MHz	5.72	5.34	8.54	8.54		29.24	PASS
802.11 ac80	5775 MHz	5.78	5.72	8.76	8.76		29.24	PASS

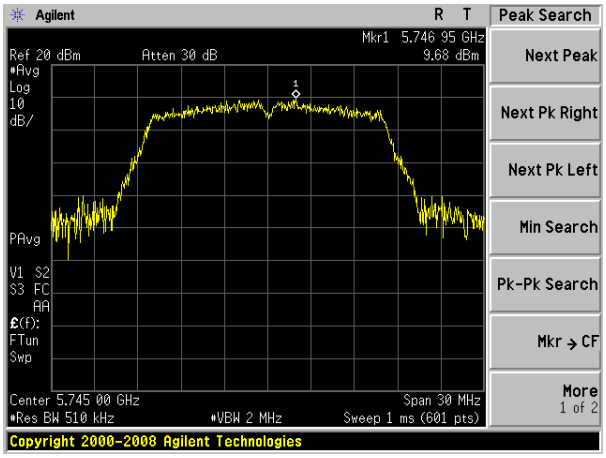
Note:

(1) Calculate power density= Measured Power Density+10log(500kHz/RBW)
RBW=0.51MHz

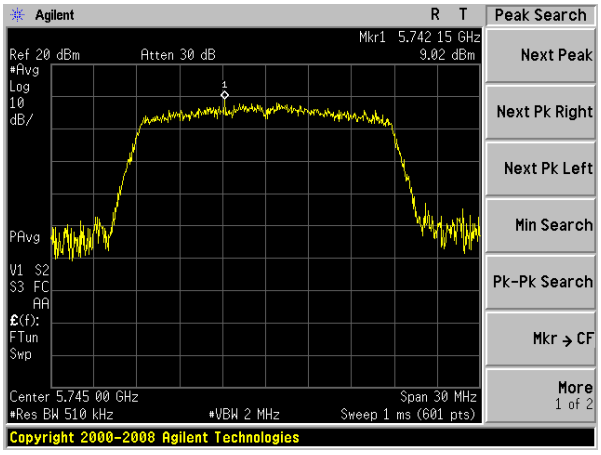
(2) For 802.11n/ac 5GHz has MIMO mode.Directional gain=6.76dbi

6.76dbi>6.0 dbi so power density limit= 30-(6.76-6)=29.24

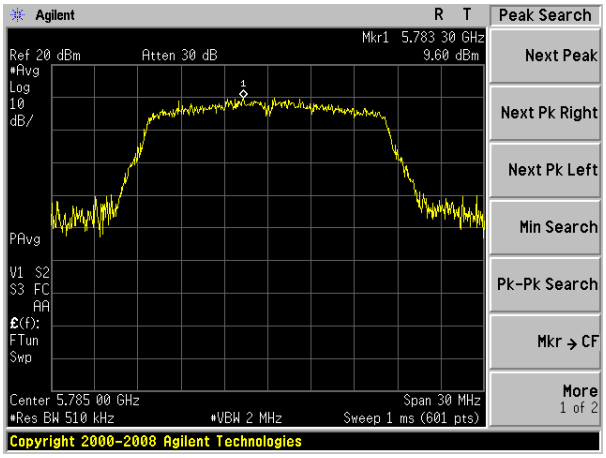
(802.11a) PSD plot on channel 149



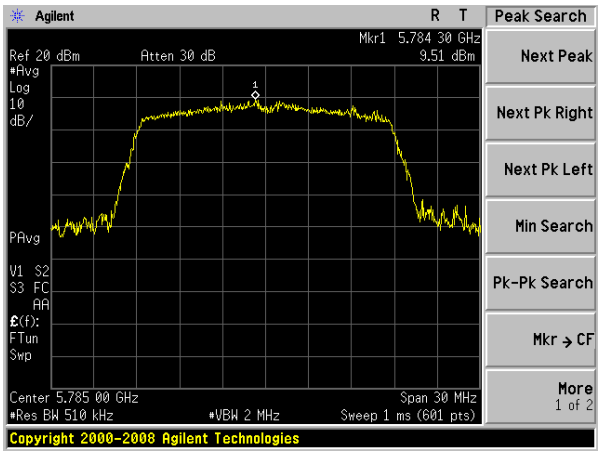
(802.11n20) PSD plot on channel 149



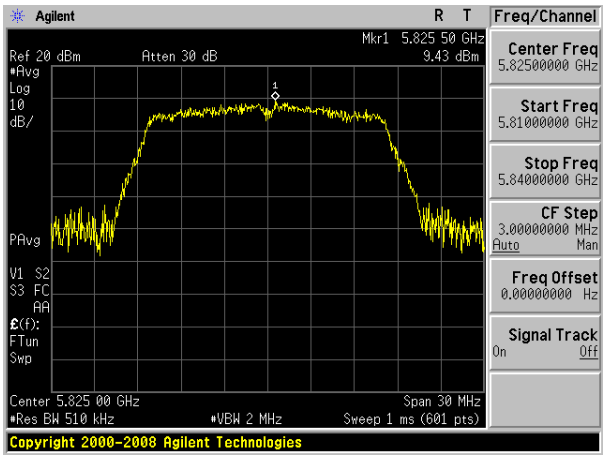
(802.11a) PSD plot on channel 157



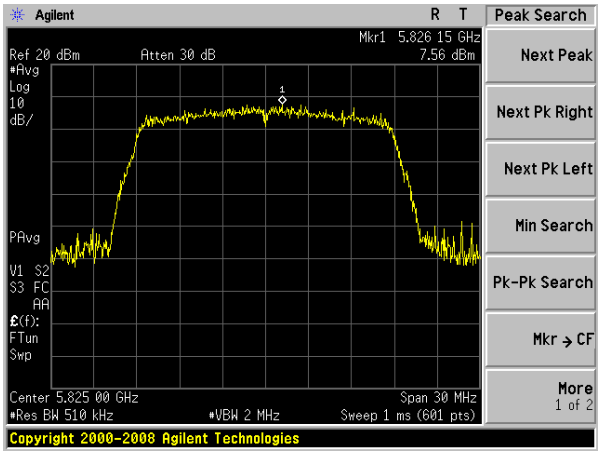
(802.11n20) PSD plot on channel 157



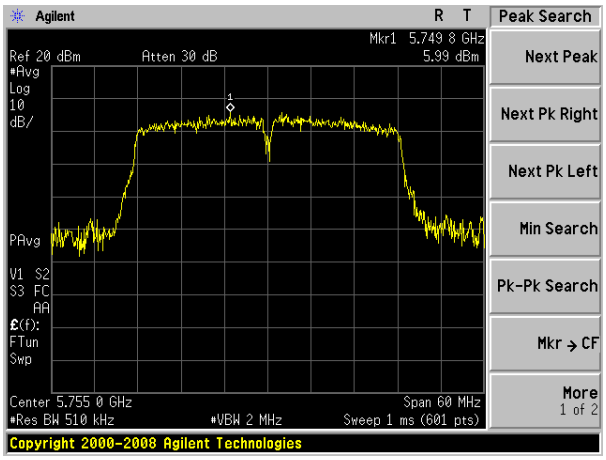
(802.11a) PSD plot on channel 165



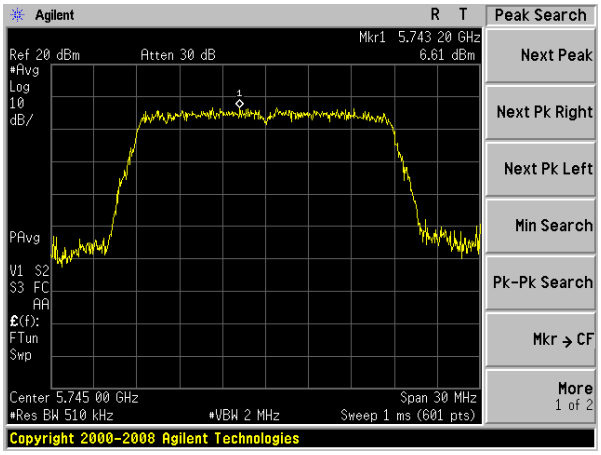
(802.11n20) PSD plot on channel 165



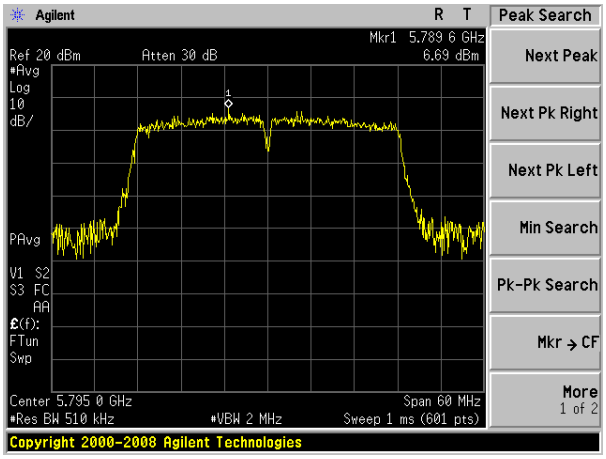
(802.11n40) PSD plot on channel 151



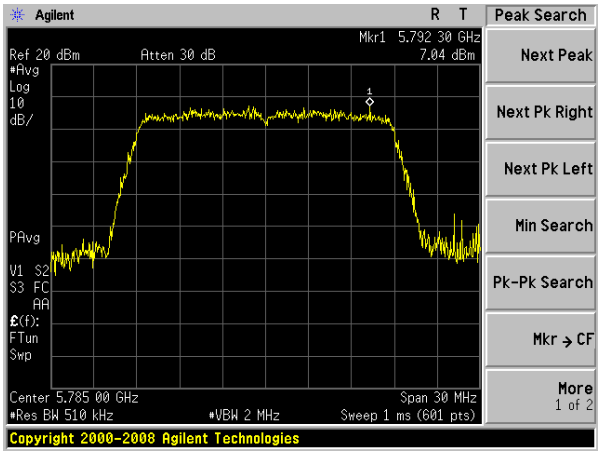
(802.11ac20) PSD plot on channel 149



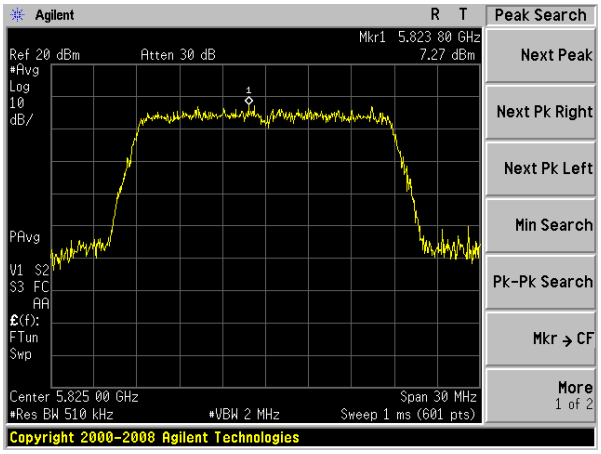
(802.11n40) PSD plot on channel 159



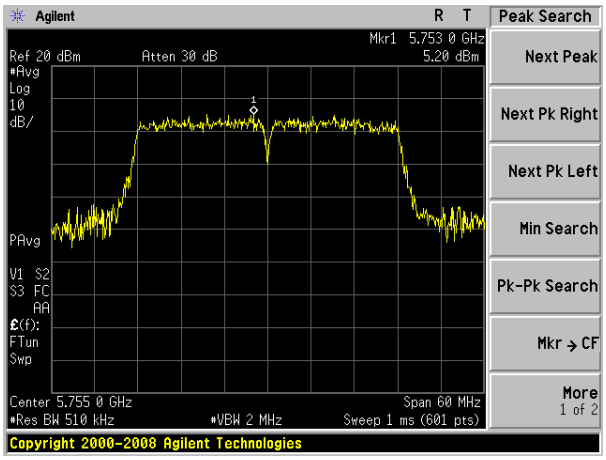
(802.11ac20) PSD plot on channel 157



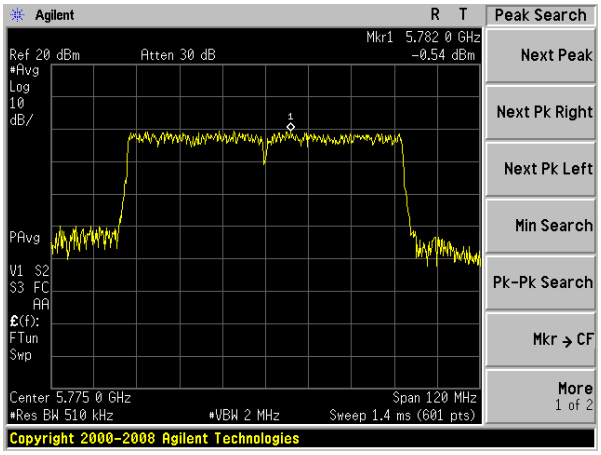
(802.11ac20) PSD plot on channel 165



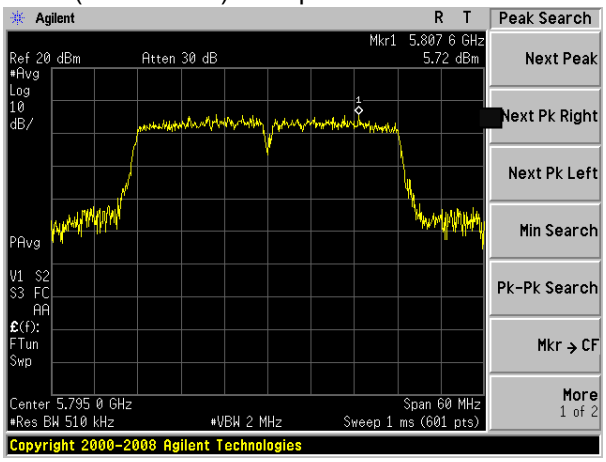
(802.11ac40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155



(802.11ac40) PSD plot on channel 159



5. 26DB & 99% EMISSION BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

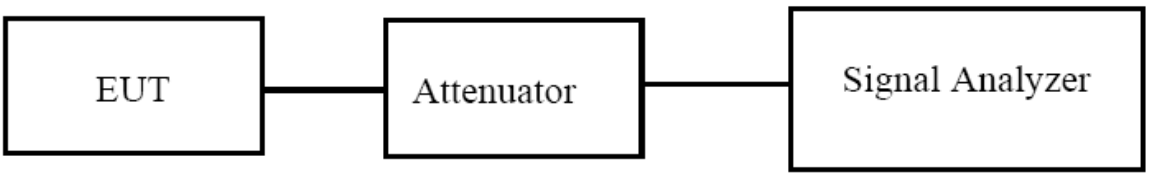
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

5.2 TEST PROCEDURE

a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.



5.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 TEST RESULTS

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

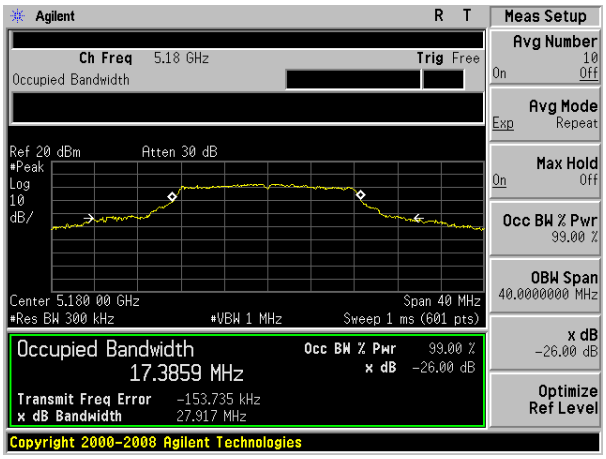
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

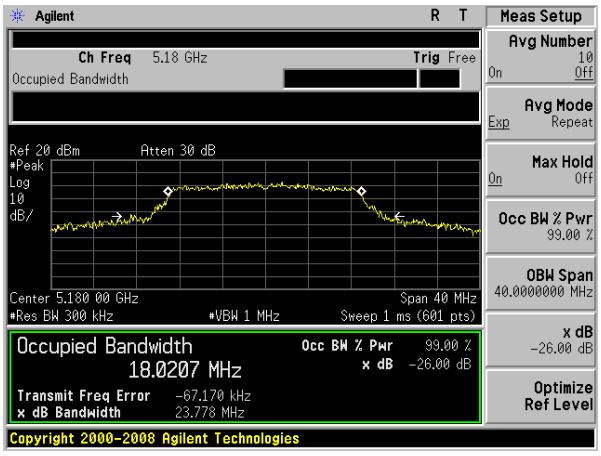
Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	99% bandwidth(MHz)	26dB bandwidth (MHz)	26dB bandwidth (MHz)	Result
			Antenna A	Antenna B	Antenna A	Antenna B	
802.11a	CH36	5180	17.3859	16.895	27.917	26.985	Pass
	CH40	5200	17.1154	16.966	26.545	27.244	Pass
	CH48	5240	17.0586	16.986	26.534	26.242	Pass
802.11 n20	CH36	5180	18.0207	17.946	23.778	23.531	Pass
	CH40	5200	18.0897	17.933	23.968	23.445	Pass
	CH48	5240	18.0929	17.943	23.978	23.654	Pass
802.11 n40	CH 38	5190	36.4553	36.256	47.928	47.415	Pass
	CH 46	5230	36.4094	36.263	42.116	45.534	Pass
802.11 ac20	CH36	5180	18.0637	18.012	25.004	25.114	Pass
	CH40	5200	18.0489	17.991	24.355	24.963	Pass
	CH48	5240	18.0559	18.009	26.337	26.127	Pass
802.11 ac40	CH 38	5190	36.4456	36.287	49.395	49.687	Pass
	CH 46	5230	36.5435	36.265	46.782	46.964	Pass
802.11 ac80	CH 42	5210	75.7183	74.955	95.464	95.231	Pass

Test plot

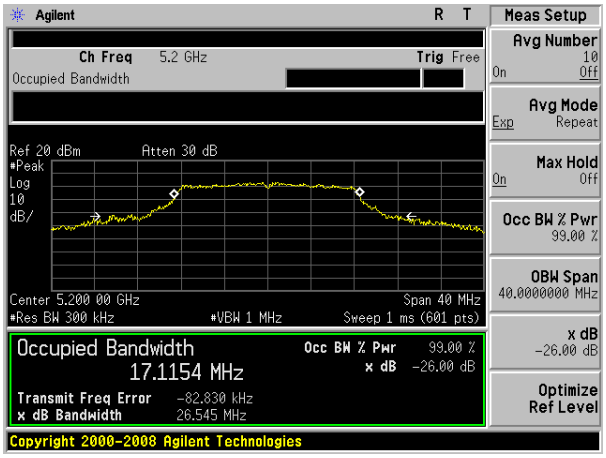
(802.11a) -26dB&99%Bandwidth plot on channel 36



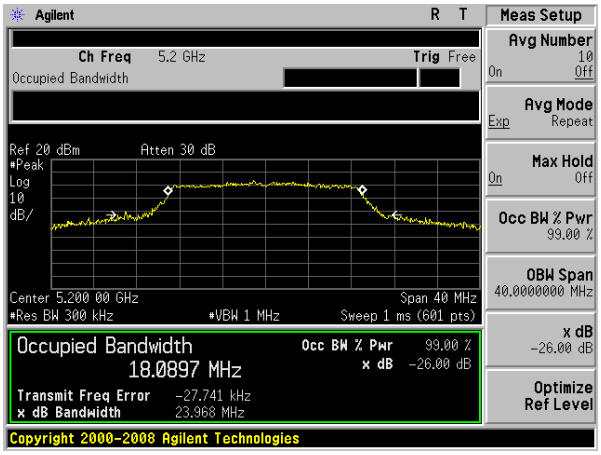
(802.11 n20) -26dB&99%Bandwidth plot on channel 36



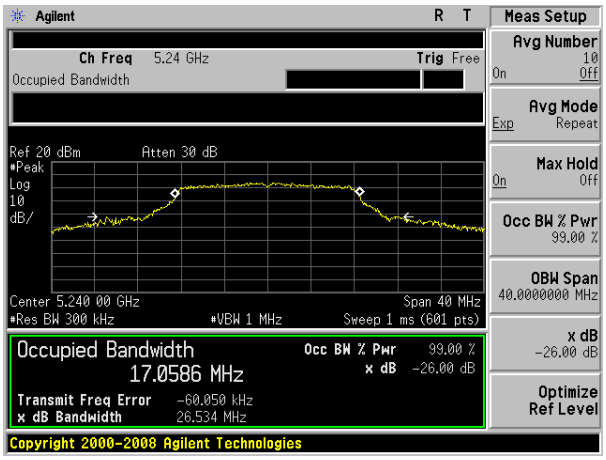
(802.11a) -26dB&99%Bandwidth plot on channel 40



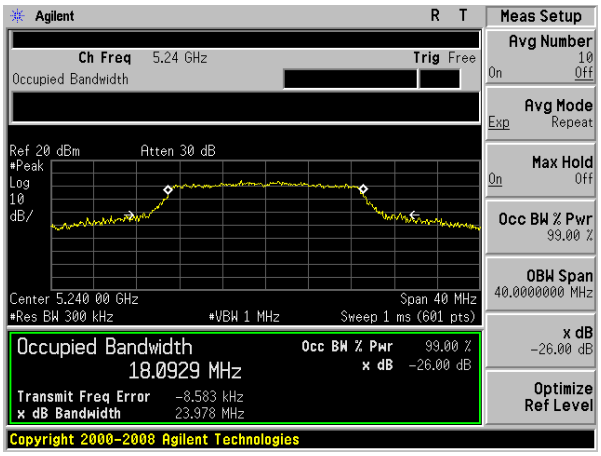
(802.11 n20) -26dB&99%Bandwidth plot on channel 40



(802.11a) -26dB&99%Bandwidth plot on channel 48

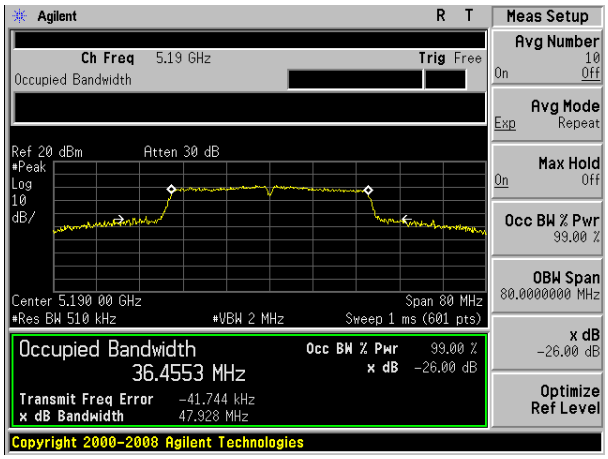


(802.11 n20) -26dB&99%Bandwidth plot on channel 48

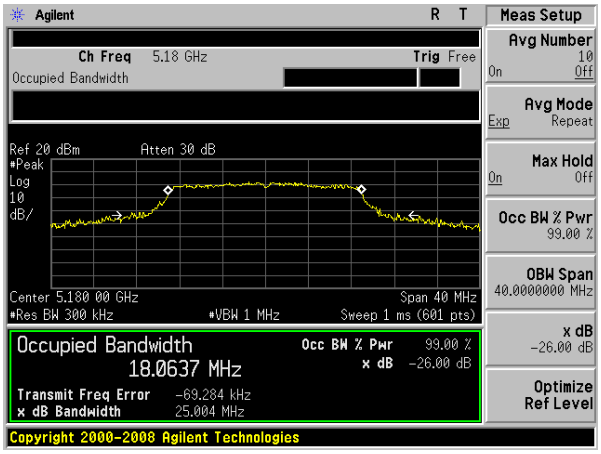


Test plot

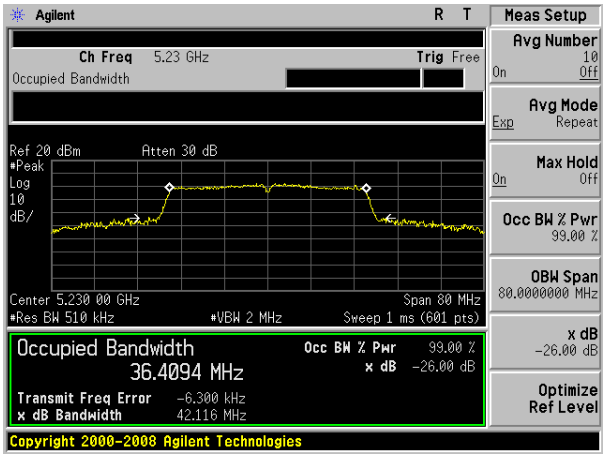
(802.11 n40) -26dB&99%Bandwidth plot on channel 38



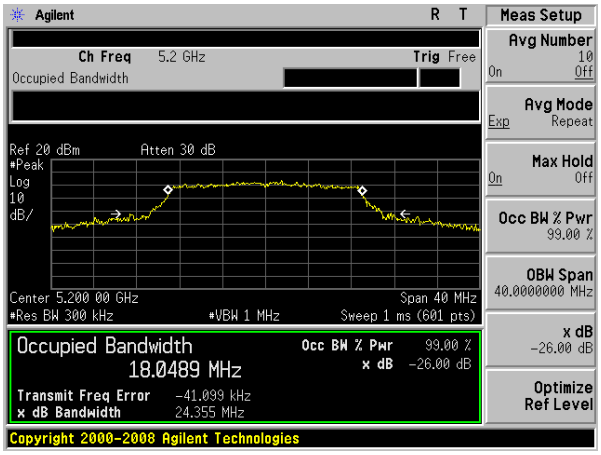
(802.11 AC20) -26dB&99%Bandwidth plot on channel 36



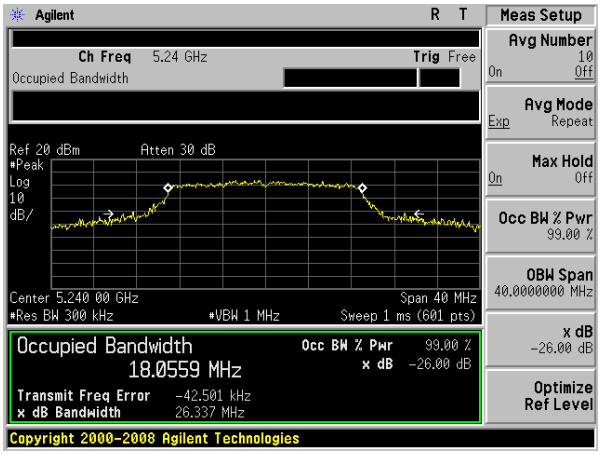
(802.11 n40) -26dB&99%Bandwidth plot on channel 46



(802.11 AC20) -26dB&99%Bandwidth plot on channel 40

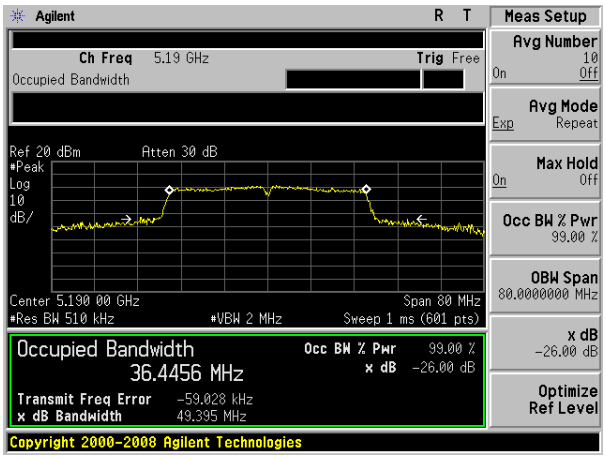


(802.11 AC20) -26dB&99%Bandwidth plot on channel 48

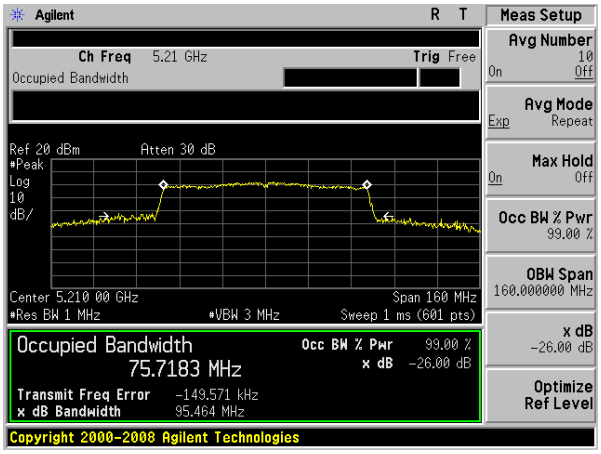


Test plot

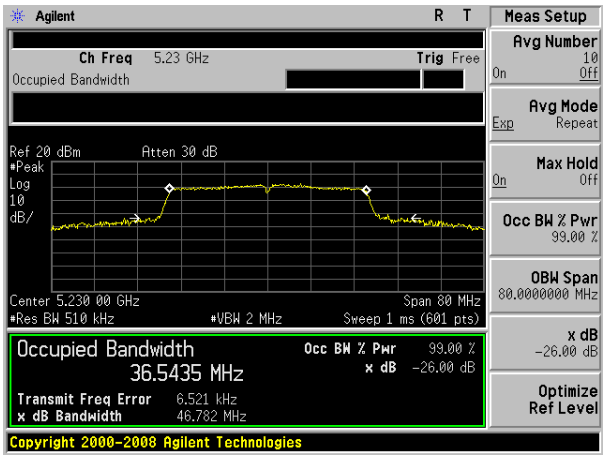
(802.11 AC40) -26dB&99%Bandwidth plot on channel 38



(802.11 AC80) -26dB&99%Bandwidth plot on channel 42



(802.11 AC40) -26dB&99%Bandwidth plot on channel 46



EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band IV(5725-5850MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

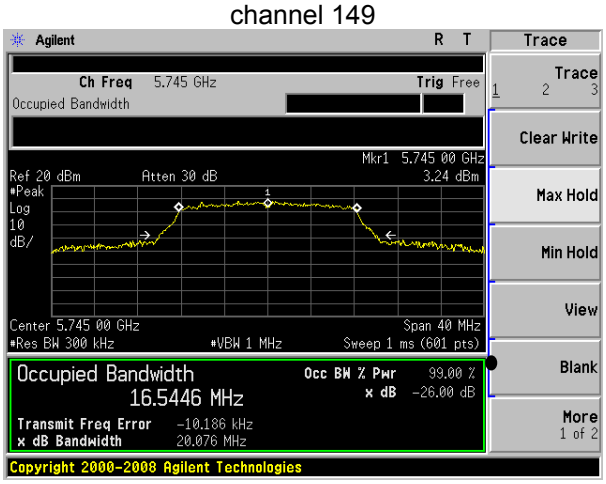
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

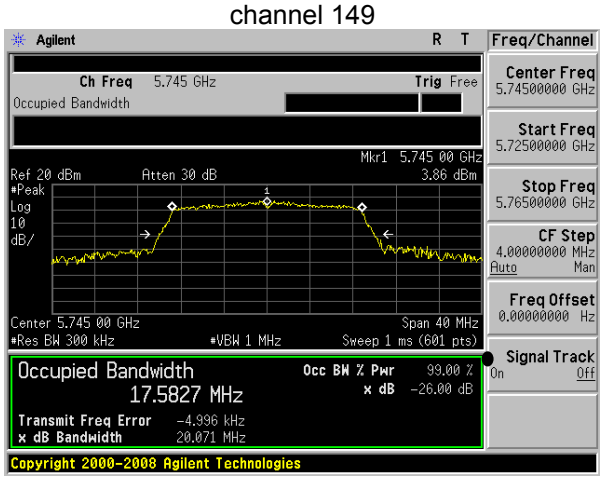
Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	99% bandwidth(MHz)	26dB bandwidth (MHz)	26dB bandwidth (MHz)	Result
			Antenna A	Antenna B	Antenna A	Antenna B	
802.11a	CH149	5745	16.5446	16.2313	20.076	20.123	Pass
	CH157	5785	16.5412	16.3452	19.812	19.312	Pass
	CH165	5825	16.5681	16.3234	19.705	19.455	Pass
802.11 n20	CH149	5745	17.5827	17.2353	20.071	19.456	Pass
	CH157	5785	17.5263	17.2456	19.911	19.542	Pass
	CH165	5825	17.6240	17.2344	20.070	19.864	Pass
802.11 n40	CH151	5755	36.1002	36.1042	40.483	40.125	Pass
	CH159	5795	36.2257	36.2342	39.922	40.224	Pass
802.11 ac20	CH149	5745	17.7581	17.2345	20.282	20.562	Pass
	CH157	5785	17.7617	17.3442	20.188	20.425	Pass
	CH165	5825	17.7619	17.4562	20.365	20.345	Pass
802.11 ac40	CH151	5755	36.4487	36.4232	44.205	44.114	Pass
	CH159	5795	36.4675	36.0765	42.875	42.364	Pass
802.11 ac80	CH155	5775	76.3105	76.1124	82.146	82.001	Pass

Test plot

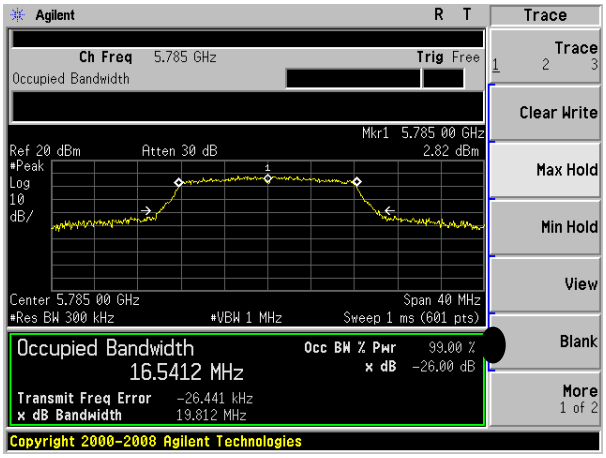
(802.11a) -26dB&99%Bandwidth plot on channel 149



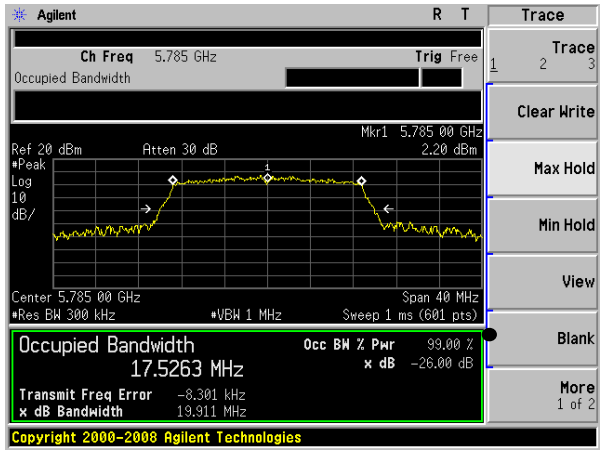
(802.11 n20) -26dB&99%Bandwidth plot on channel 149



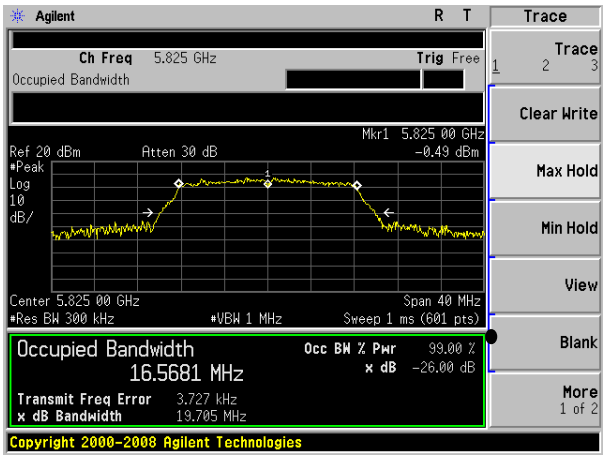
(802.11a) -26dB&99%Bandwidth plot on channel 157



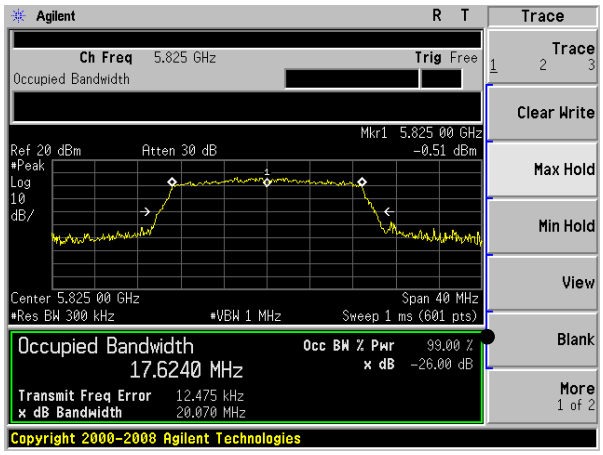
(802.11 n20) -26dB&99%Bandwidth plot on channel 157



(802.11a) -26dB&99%Bandwidth plot on channel 165

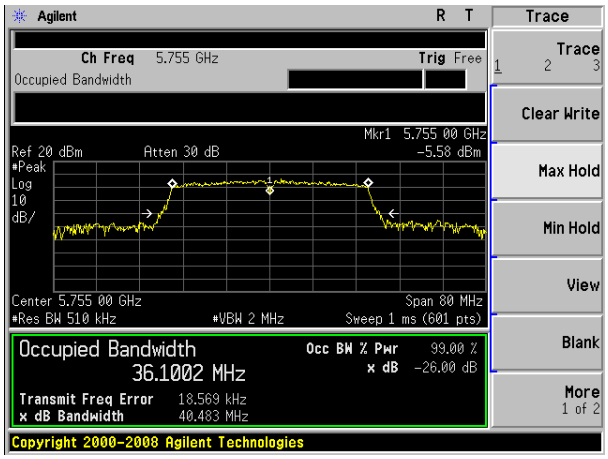


(802.11 n20) -26dB&99%Bandwidth plot on channel 165

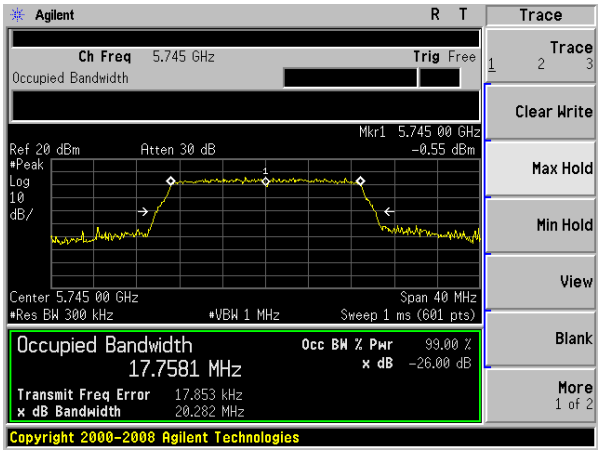


Test plot

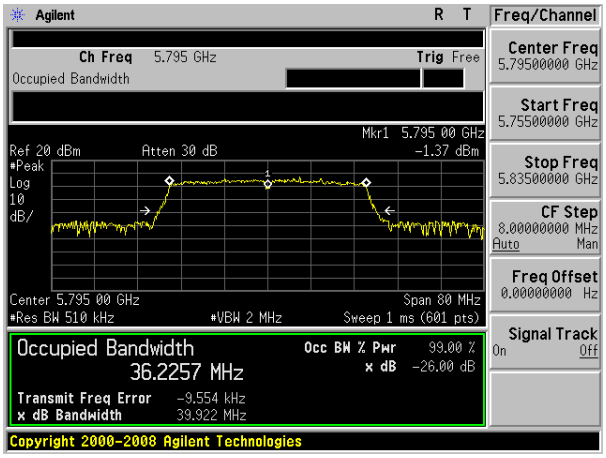
(802.11 n40) -26dB&99%Bandwidth plot on channel 151



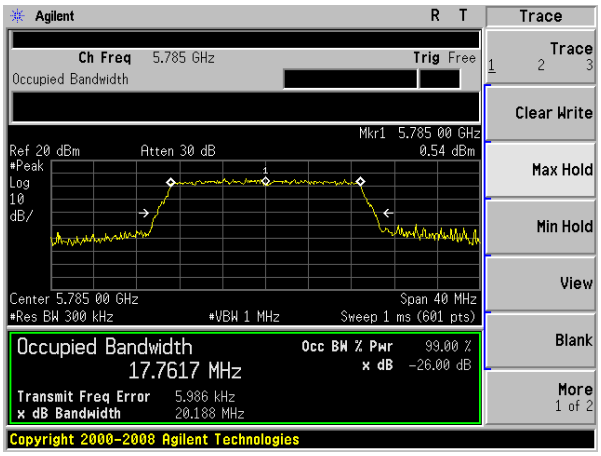
(802.11 AC20) -26dB&99%Bandwidth plot on channel 149



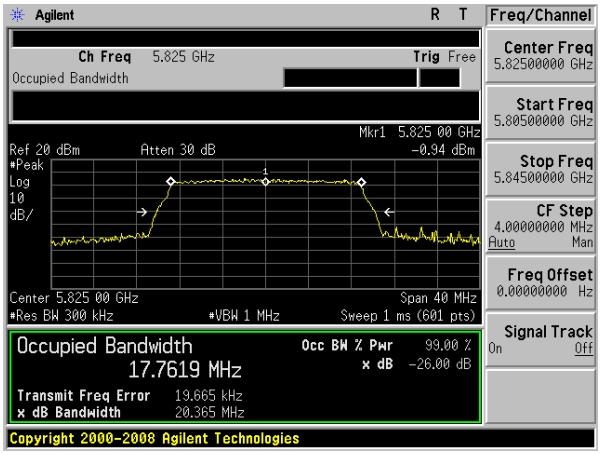
(802.11 n40) -26dB&99%Bandwidth plot on channel 159



(802.11 AC20) -26dB&99%Bandwidth plot on channel 157

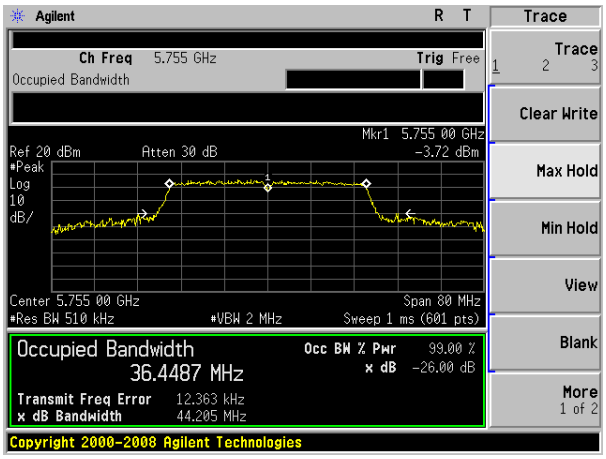


(802.11 AC20) -26dB&99%Bandwidth plot on channel 165

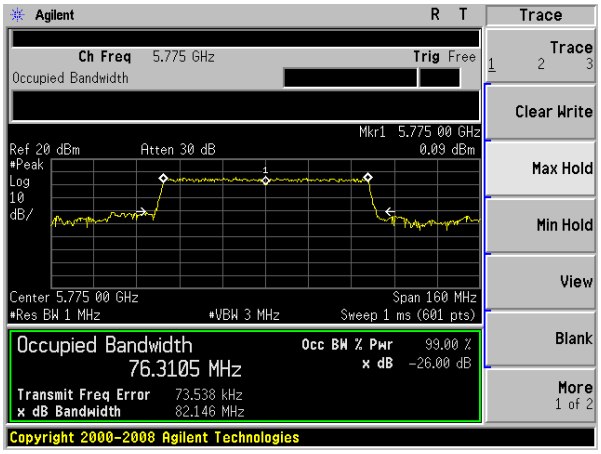


Test plot

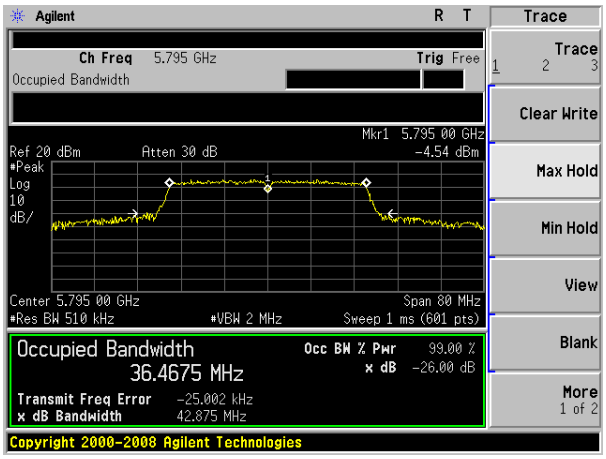
(802.11 AC40) -26dB&99%Bandwidth plot on channel 151



(802.11 AC80) -26dB&99%Bandwidth plot on channel 155



(802.11 AC40) -26dB&99%Bandwidth plot on channel 159



6. MINIMUM 6 DB BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(e)
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

6.2 TEST PROCEDURE

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

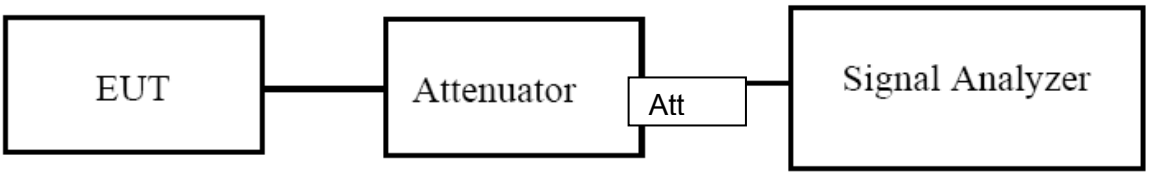
f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5G) Mode Frequency Band IV (5725-5850MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

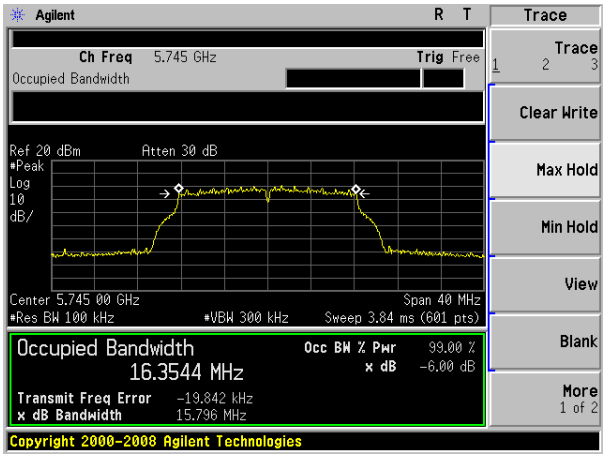
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

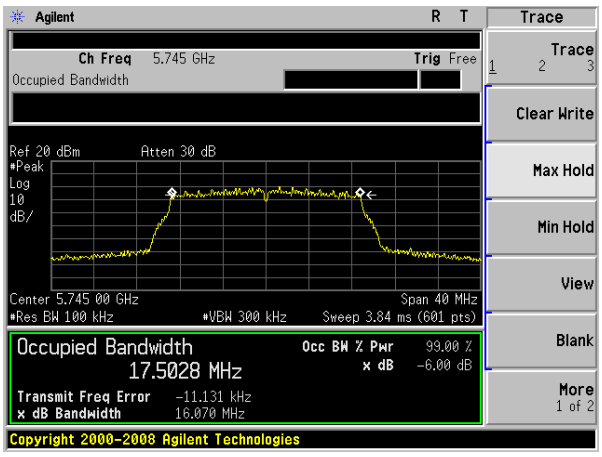
Mode	Channel	Frequency (MHz)	-6dB bandwidth (MHz)	-6dB bandwidth (MHz)	Limit (KHz)	Result
			Antenna A	Antenna B		
802.11a	149	5745	15.796	15.314	≧500	Pass
	157	5785	15.179	15.025	≧500	Pass
	165	5825	16.364	16.132	≧500	Pass
802.11 n20	149	5745	16.070	16.052	≧500	Pass
	157	5785	16.610	16.079	≧500	Pass
	165	5825	15.996	15.634	≧500	Pass
802.11 n40	151	5755	35.522	35.142	≧500	Pass
	159	5795	35.364	35.168	≧500	Pass
802.11 ac20	149	5745	17.690	17.348	≧500	Pass
	157	5785	17.655	17.689	≧500	Pass
	165	5825	17.312	17.364	≧500	Pass
802.11 ac40	149	5745	36.329	36.448	≧500	Pass
	157	5785	36.129	36.046	≧500	Pass
802.11 ac80	155	5775	76.392	76.249	≧500	Pass

Test plot

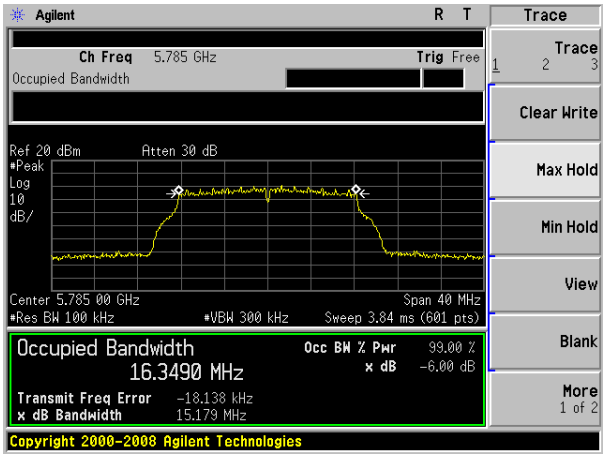
(802.11a) 6dB Bandwidth plot on channel 149



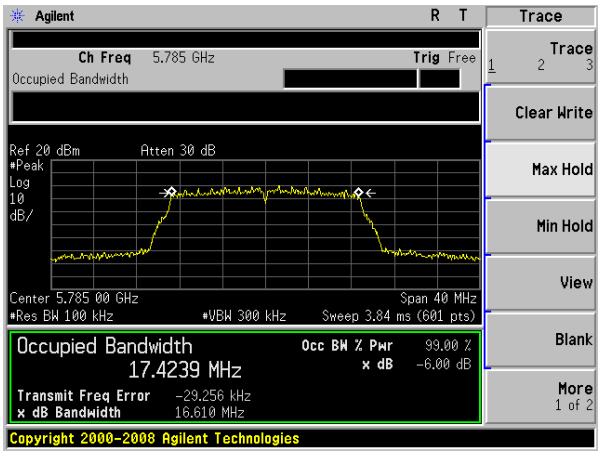
(802.11 n20) 6dB Bandwidth plot on channel 149



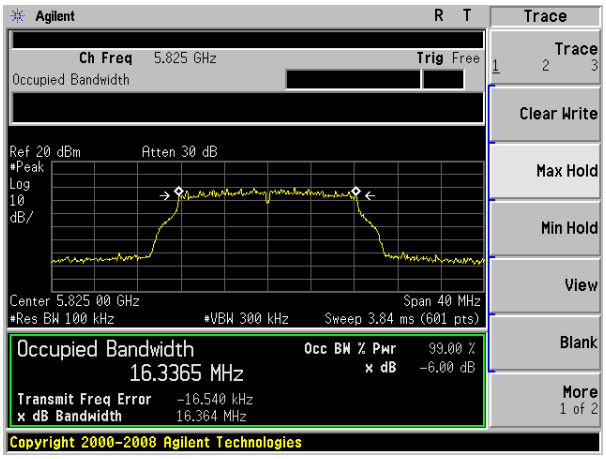
(802.11a) 6dB Bandwidth plot on channel 157



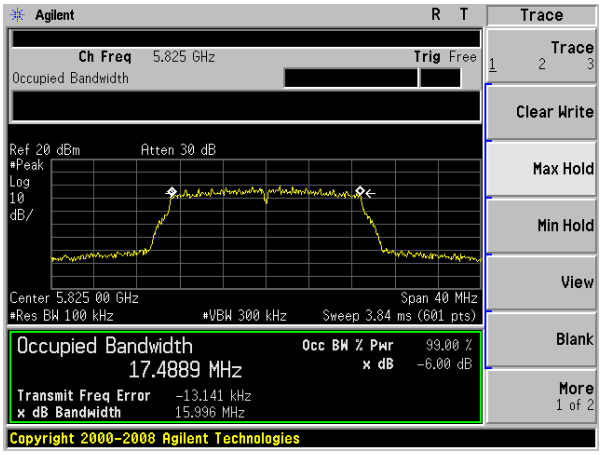
(802.11 n20) 6dB Bandwidth plot on channel 157



(802.11a) 6dB Bandwidth plot on channel 165

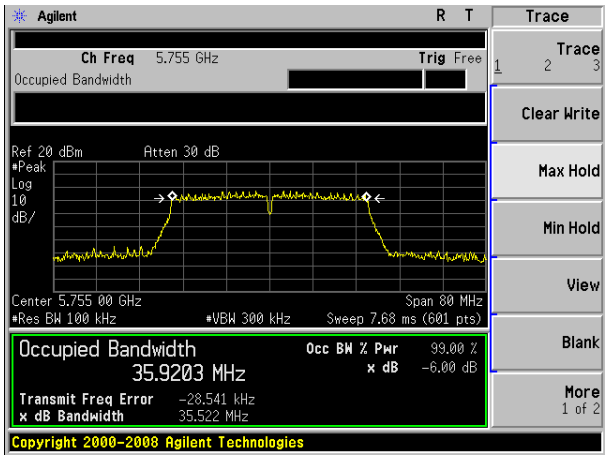


(802.11 n20) 6dB Bandwidth plot on channel 165

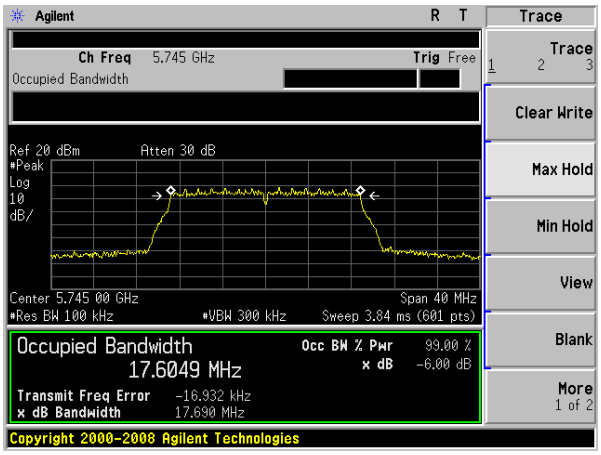


Test plot

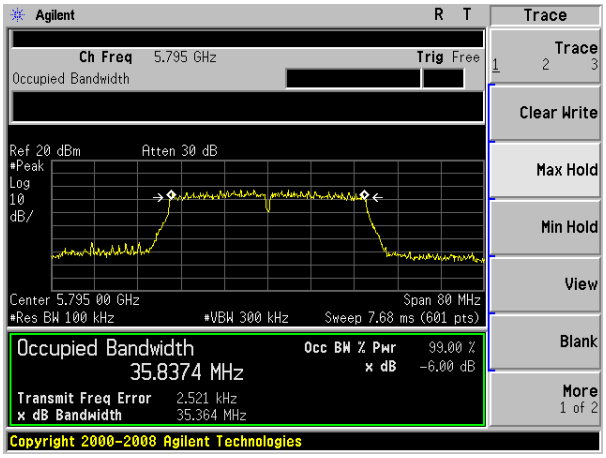
(802.11 n40) 6dB Bandwidth plot on channel 151



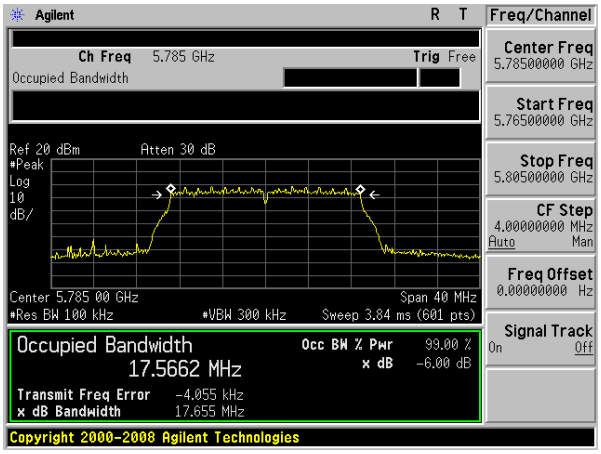
(802.11 AC20) 6dB Bandwidth plot on channel 149



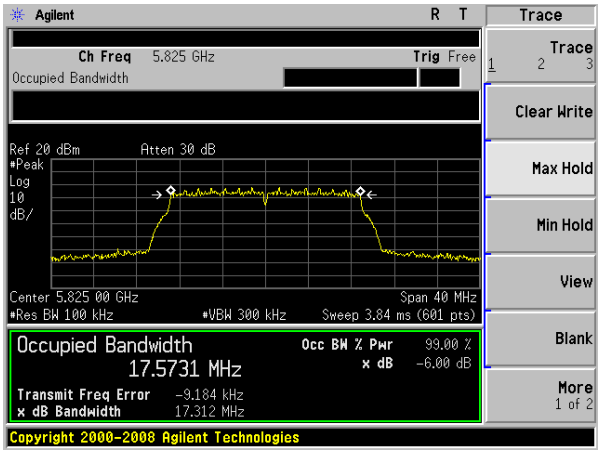
(802.11 n40) 6dB Bandwidth plot on channel 159



(802.11 AC20) 6dB Bandwidth plot on channel 157

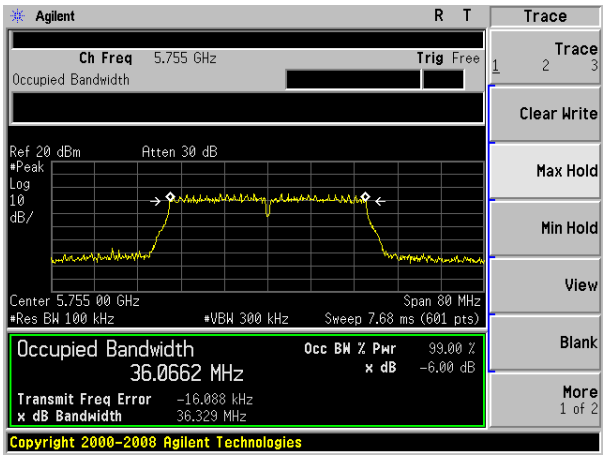


(802.11 AC20) 6dB Bandwidth plot on channel 165

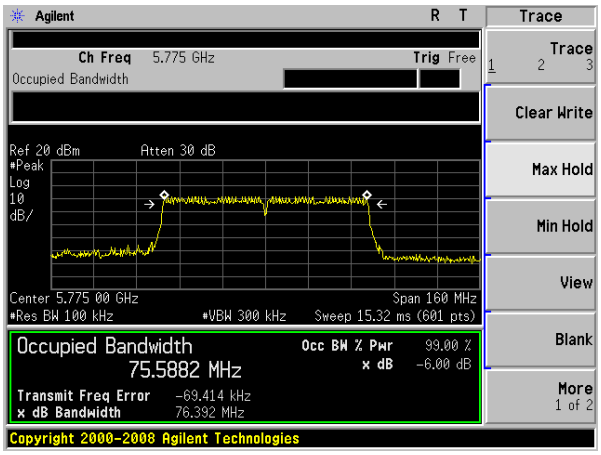


Test plot

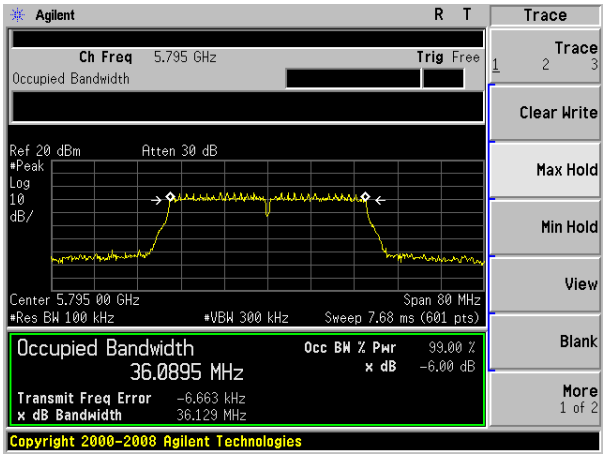
(802.11 AC40) 6dB Bandwidth plot on channel 151



(802.11 AC80) 6dB Bandwidth plot on channel 155



(802.11 AC40) 6dB Bandwidth plot on channel 159



7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407

The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5725~5850	1W

7.2 TEST PROCEDURE

· Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).

• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

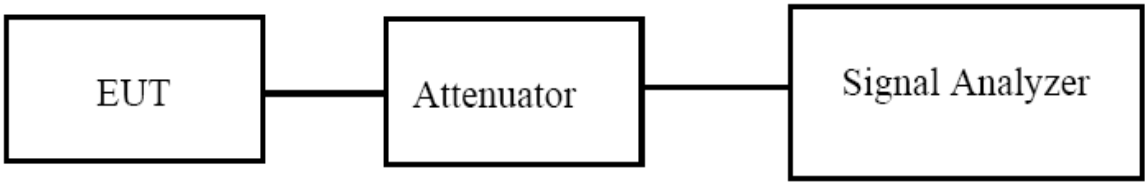
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5G) Mode Frequency Band I (5150-5250MHz)		

Note:

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

Test Channel	Frequency	Maximum output power. Antenna port		Total Power	LIMIT	Result
		(AV) (dBm)		(AV)		
	(MHz)	ANT A	ANT B	dBm	dBm	
TX 802.11a Mode						
CH36	5180	12.1	11.8	–	23.98	Pass
CH40	5200	12.2	12.1	–	23.98	Pass
CH48	5240	13.4	13.2	–	23.98	Pass
TX 802.11 n20M Mode						
CH36	5180	11.2	11.2	14.21	23.22	Pass
CH40	5200	11.4	11.1	14.26	23.22	Pass
CH48	5240	12.6	12.2	15.41	23.22	Pass
TX 802.11 n40M Mode						
CH38	5190	11.6	11.5	14.56	23.22	Pass
CH46	5230	12.7	12.5	15.61	23.22	Pass
TX 802.11 AC20M Mode						
CH36	5180	10.6	10.2	13.41	23.22	Pass
CH40	5200	10.9	10.5	13.71	23.22	Pass
CH48	5240	11.9	11.6	14.76	23.22	Pass
TX 802.11 AC40M Mode						
CH38	5190	10.8	10.5	13.66	23.22	Pass
CH46	5230	11.3	10.8	14.07	23.22	Pass
TX 802.11 AC80M Mode						
CH42	5210	11.1	10.8	13.96	23.22	Pass

Note: For 802.11n/ac 5GHz has MIMO mode.Directional gain=7.76dbi

7.76 dbi>6.0 dbi so power density limit= 23.98-(7.76-6)=22.9

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5G) Mode Frequency Band IV (5725-5850MHz)		

Note:

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

Test Channel	Frequency	Maximum output power. Antenna port		Total Power	LIMIT	Result
		(AV) (dBm)		(AV)		
	(MHz)	ANT A	ANT B	dBm	dBm	
TX 802.11a Mode						
CH 149	5745	9.7	9.3	–	30	Pass
CH 157	5785	9.5	9.2	–	30	Pass
CH 165	5825	9.6	9.3	–	30	Pass
TX 802.11 n20M Mode						
CH 149	5745	10.6	10.1	13.37	29.24	Pass
CH 157	5785	10.5	10.4	13.46	29.24	Pass
CH 165	5825	10.3	10.3	13.31	29.24	Pass
TX 802.11 n40M Mode						
CH 151	5755	8.9	8.8	11.86	29.24	Pass
CH 159	5795	8.8	8.8	11.81	29.24	Pass
TX 802.11 ac20M Mode						
CH 149	5745	9.5	9.4	12.46	29.24	Pass
CH 157	5785	9.3	9.2	12.26	29.24	Pass
CH 165	5825	9.3	9.1	12.21	29.24	Pass
TX 802.11 ac40M Mode						
CH 151	5755	8.9	8.8	11.86	29.24	Pass
CH 159	5795	8.7	8.8	11.76	29.24	Pass
TX 802.11 ac80M Mode						
CH 155	5775	7.5	7.4	10.46	29.24	Pass

Note: For 802.11n/ac 5GHz has MIMO mode.Directional gain=6.76dbi

6.76dbi>6.0dbi so power density limit= 30-(6.76-6)=29.24

8. OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

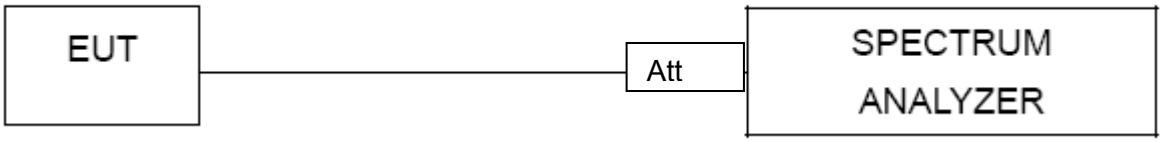
8.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

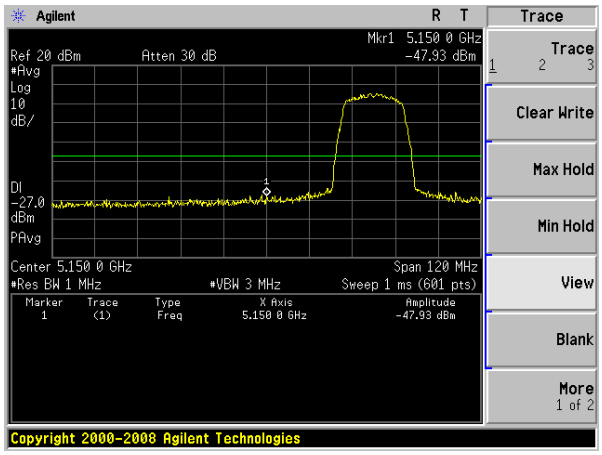
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

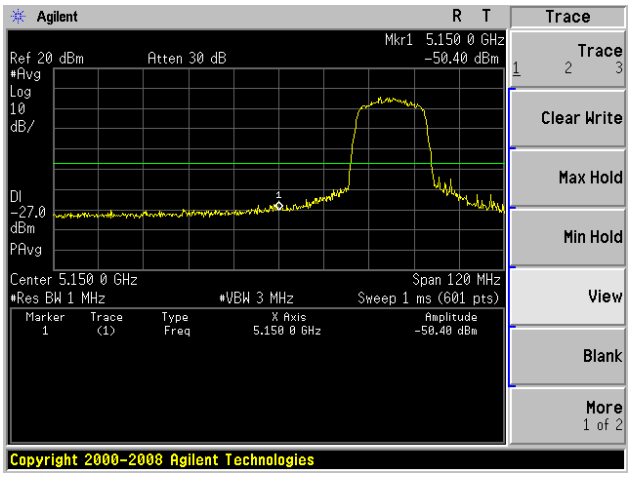
5.2G

5.15~5.25 GHz

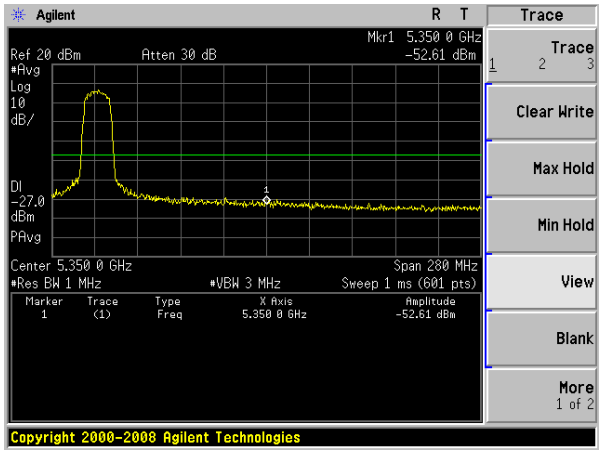
(802.11a) Band Edge, Left Side



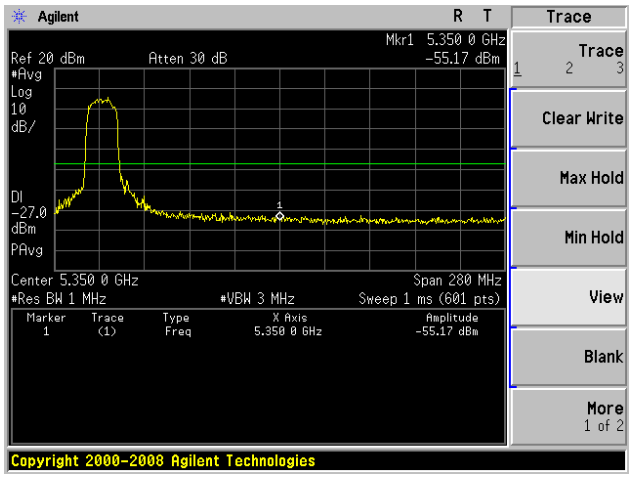
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

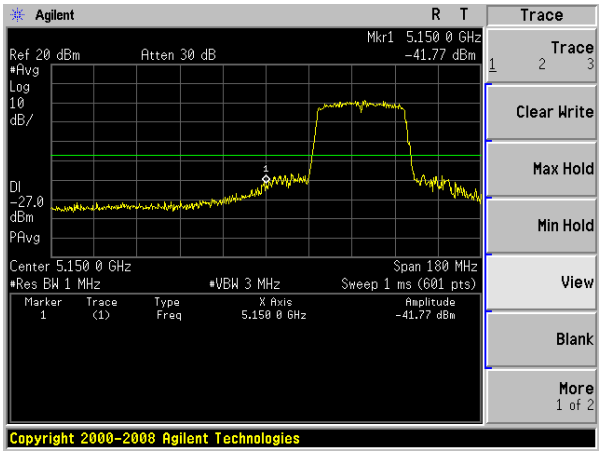


(802.11n20) Band Edge, Right Side

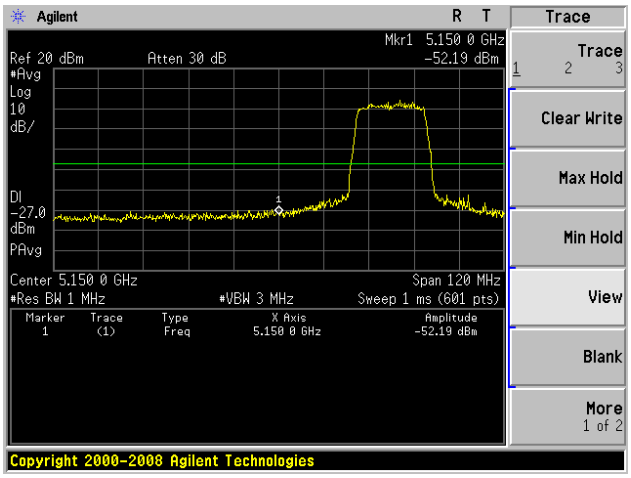


5.15~5.25 GHz

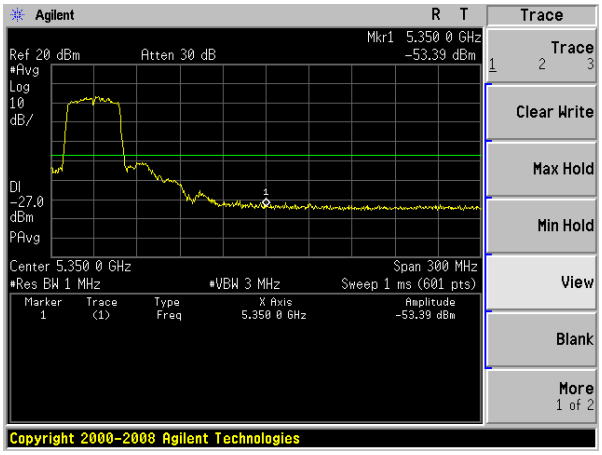
(802.11n40) Band Edge, Left Side



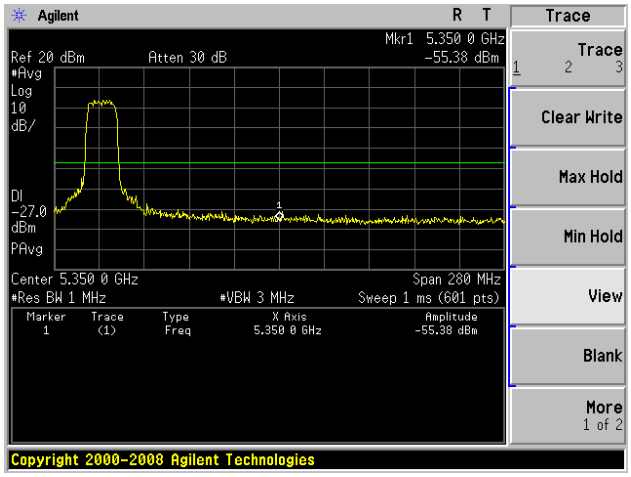
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side

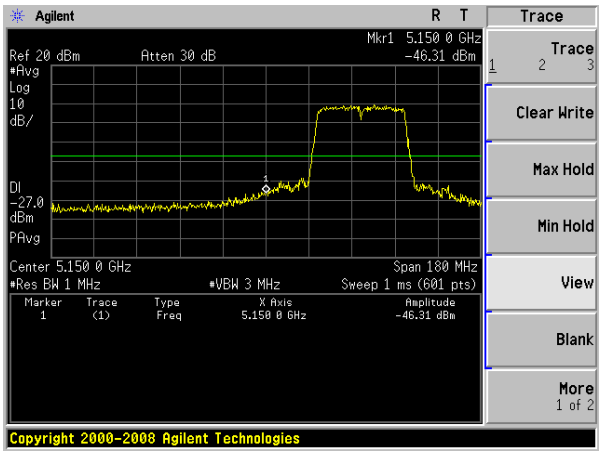


(802.11ac20) Band Edge, Right Side

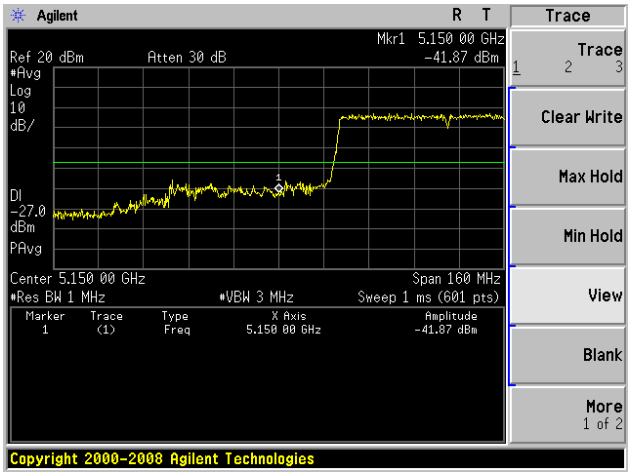


5.15~5.25 GHz

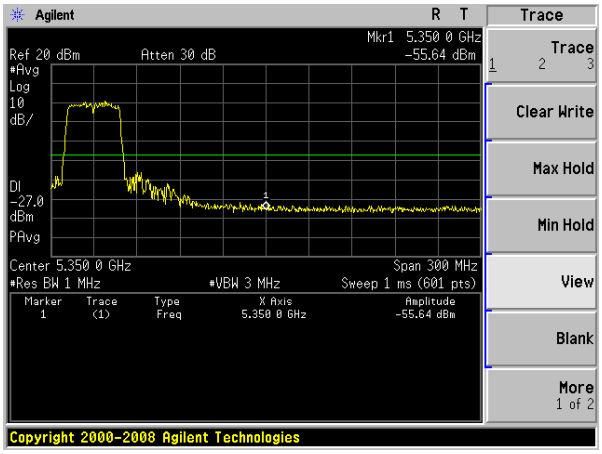
(802.11ac40) Band Edge, Left Side



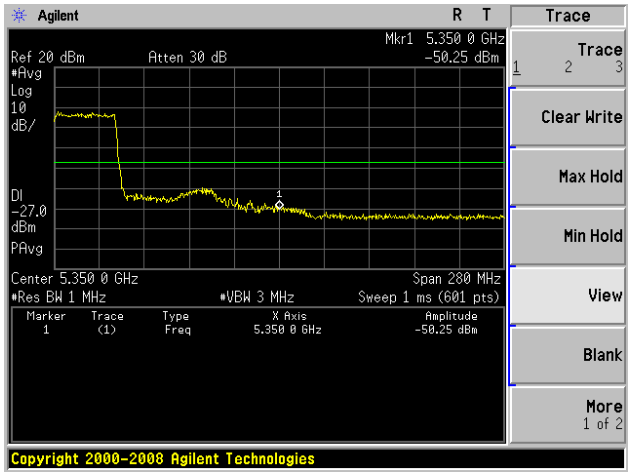
(802.11ac80) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side



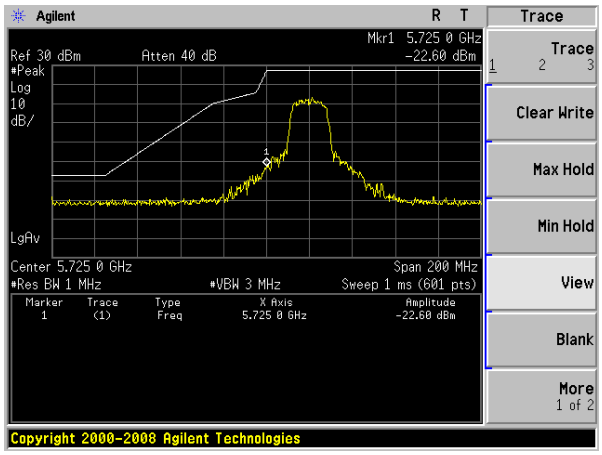
(802.11ac80) Band Edge, Right Side



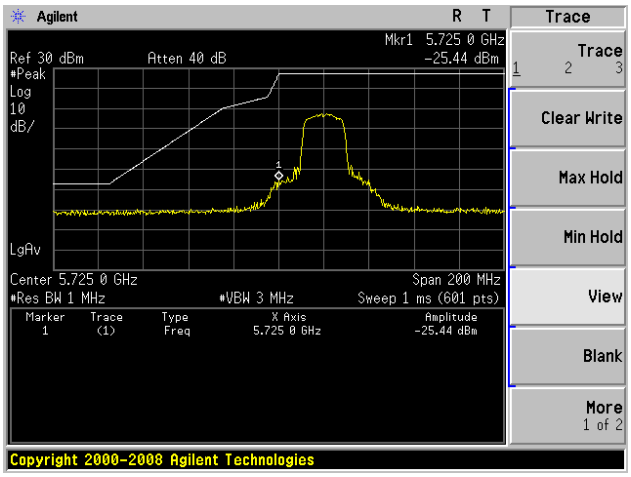
5.8G

5.75~5.85 GHz

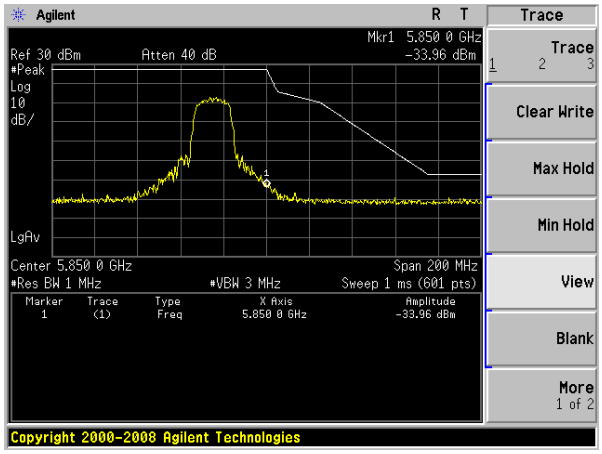
(802.11a) Band Edge, Left Side



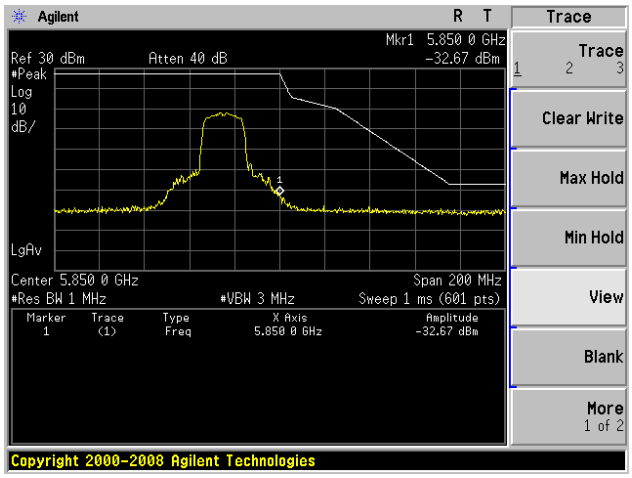
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

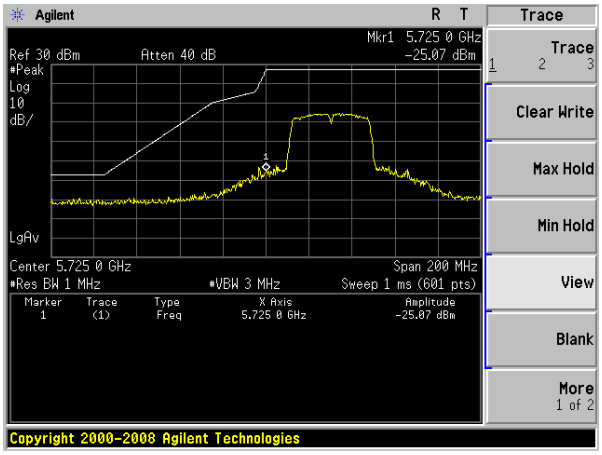


(802.11n20) Band Edge, Right Side

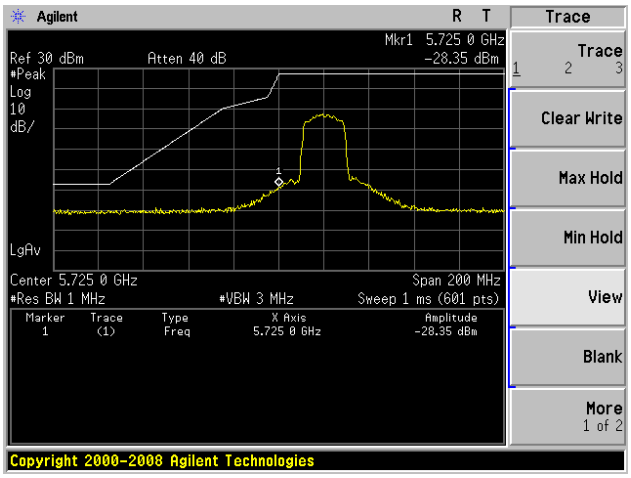


5.75~5.85 GHz

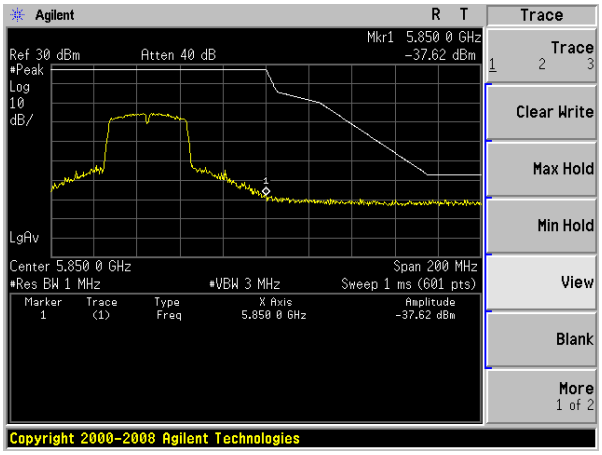
(802.11n40) Band Edge, Left Side



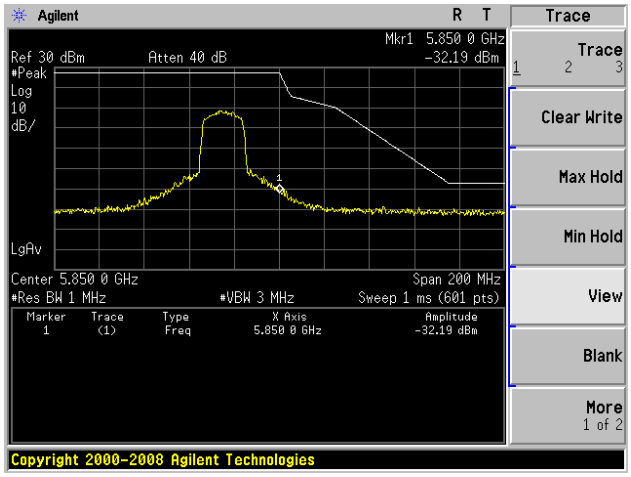
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side

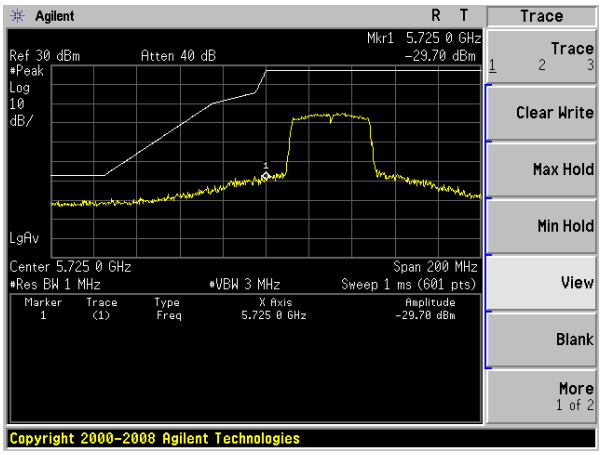


(802.11ac20) Band Edge, Right Side

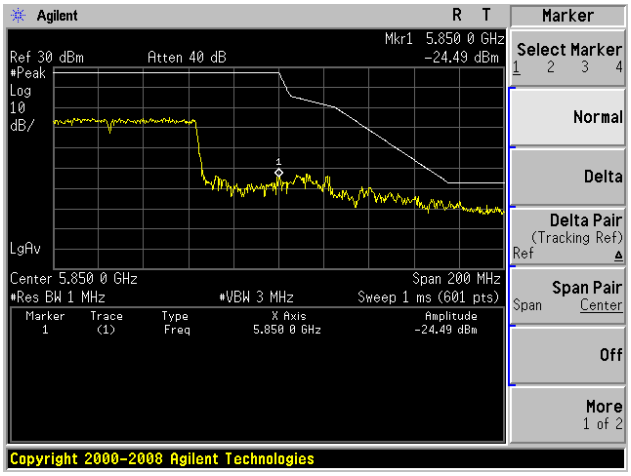


5.75~5.83 GHz

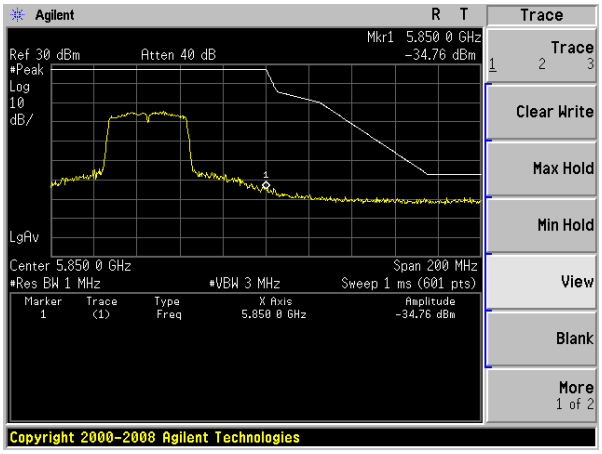
(802.11ac40) Band Edge, Left Side



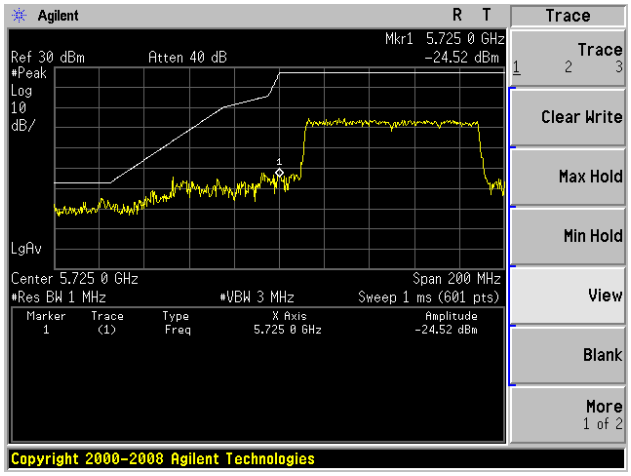
(802.11ac80) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side



(802.11ac80) Band Edge, Right Side



9.SPURIOUS RF CONDUCTED EMISSIONS

9.1CONFORMANCE LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

9.2MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

9.3TEST SETUP

Please refer to Section 6.1 of this test report.

9.4TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength , and mwasure frequeny range from 9KHz to 26.5GHz.

9.5TEST RESULTS

Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

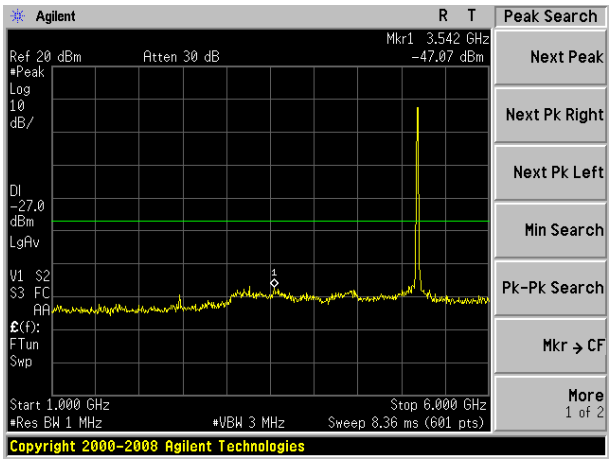
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

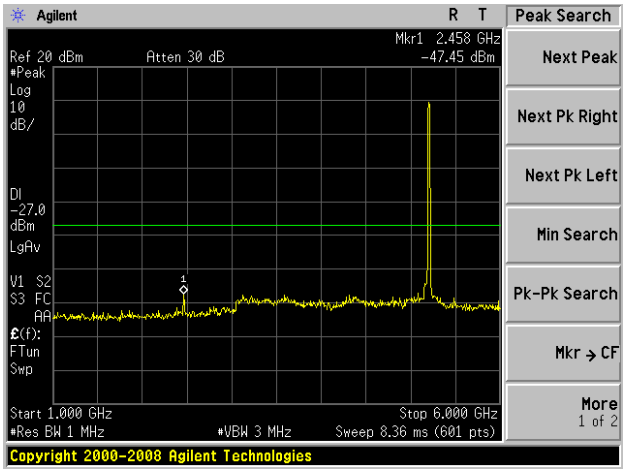
5.2G

Test Plot

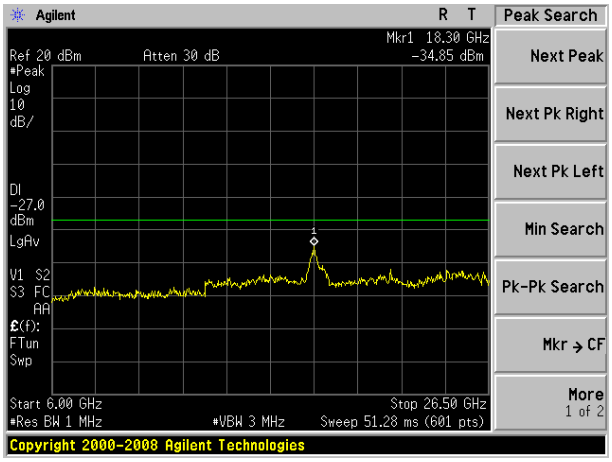
802.11a on channel 36



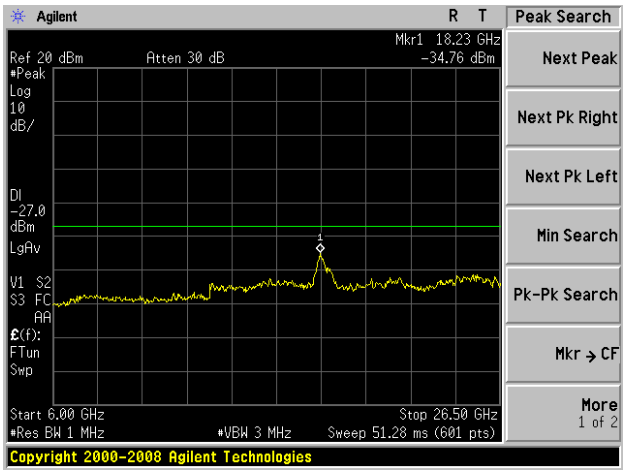
802.11a on channel 40



802.11a on channel 36

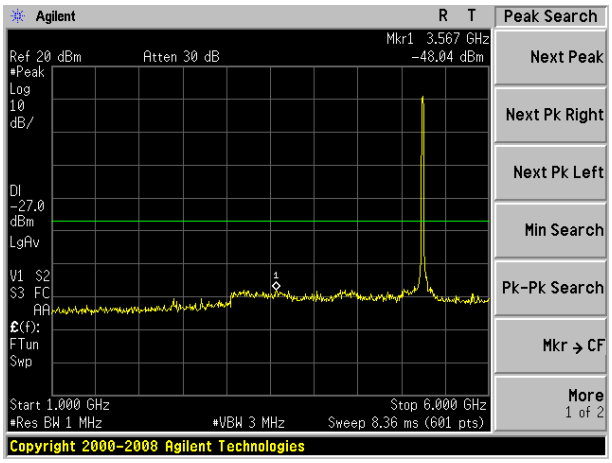


802.11a on channel 40

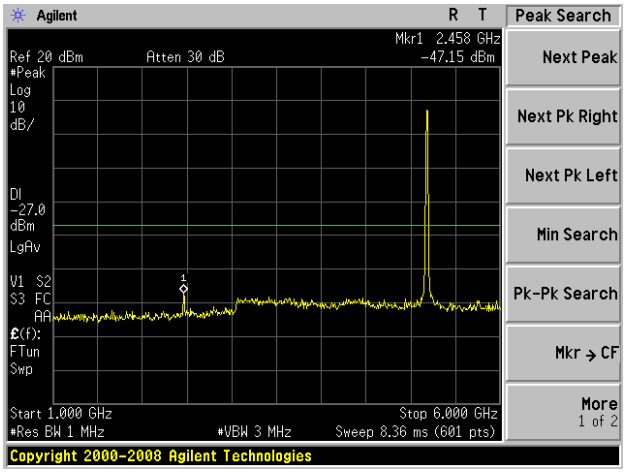


Test Plot

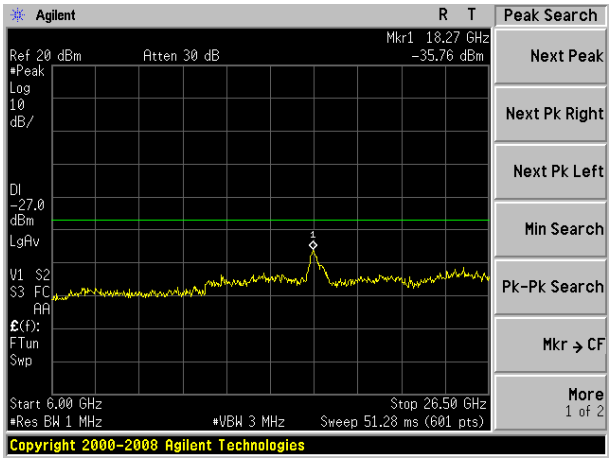
802.11a on channel 48



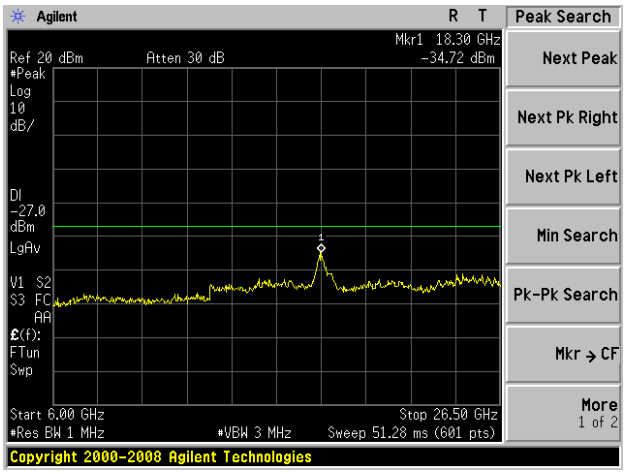
802.11n20 on channel 36



802.11a on channel 48

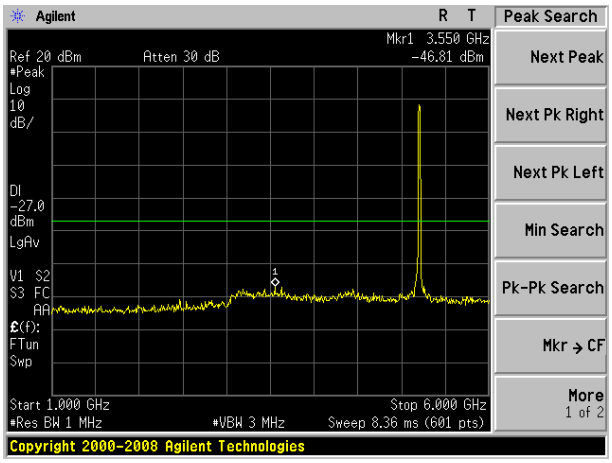


802.11n20 on channel 36

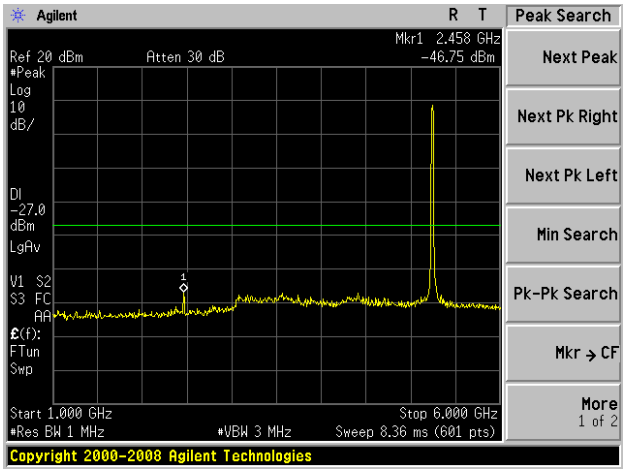


Test Plot

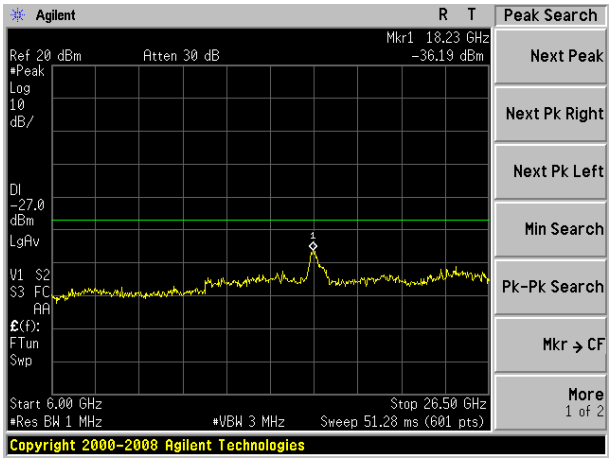
802.11n20 on channel 40



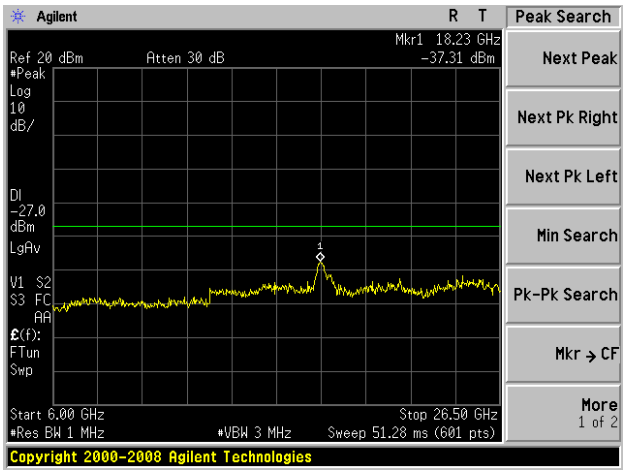
802.11n20 on channel 48



802.11n20 on channel 40

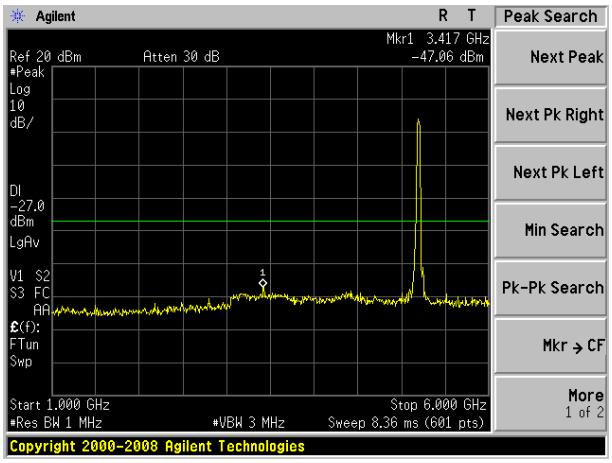


802.11n20 on channel 48

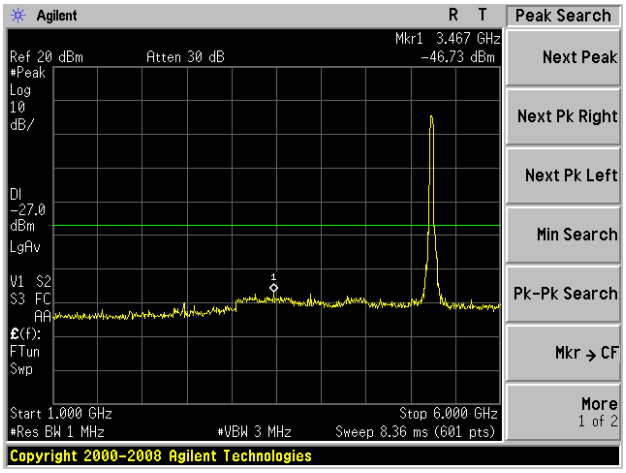


Test Plot

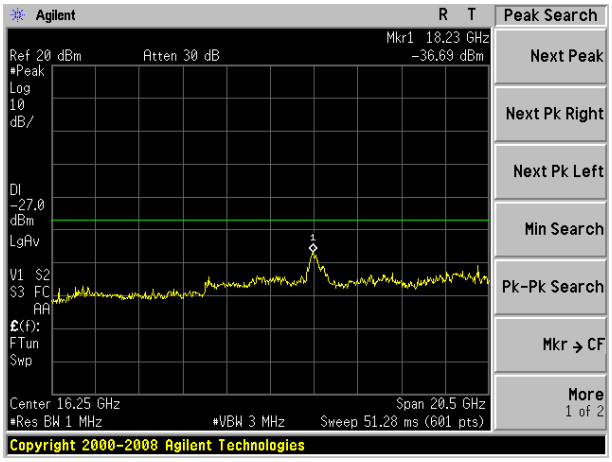
802.11n40 on channel 38



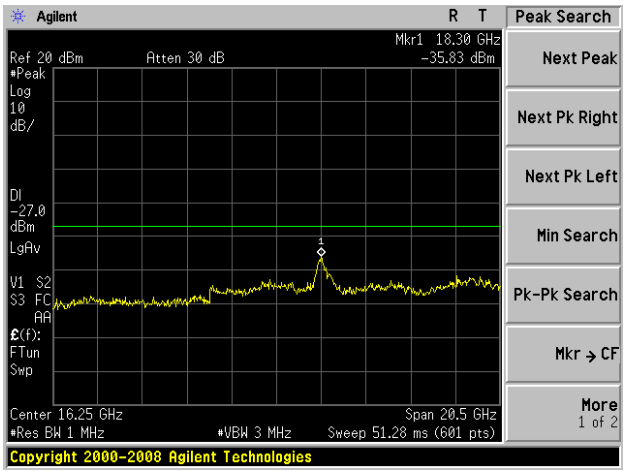
802.11n40 on channel 46



802.11n40 on channel 38

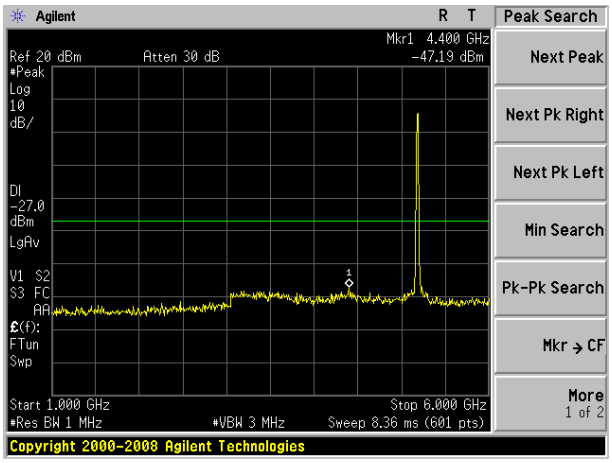


802.11n40 on channel 46

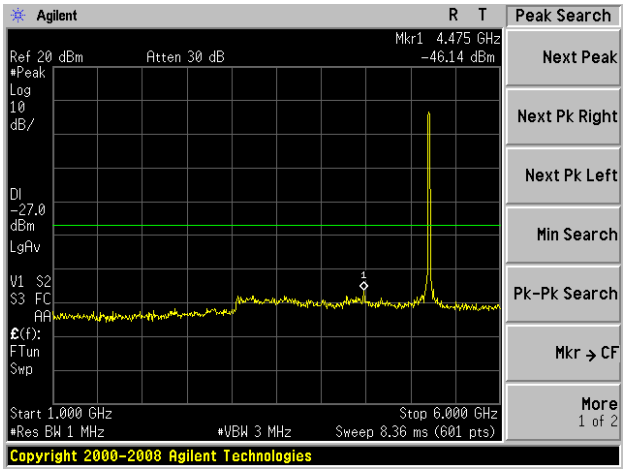


Test Plot

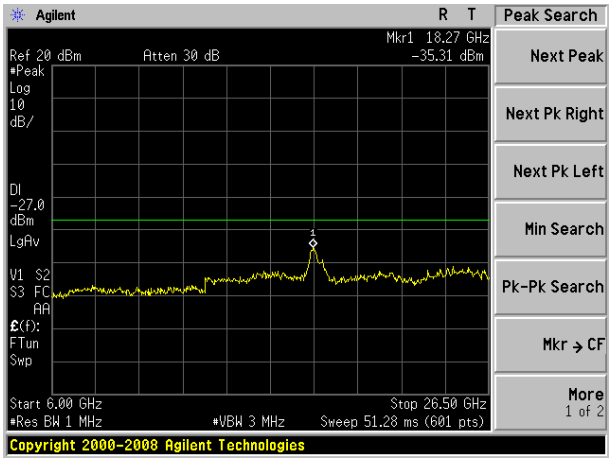
802.11ac20 on channel 36



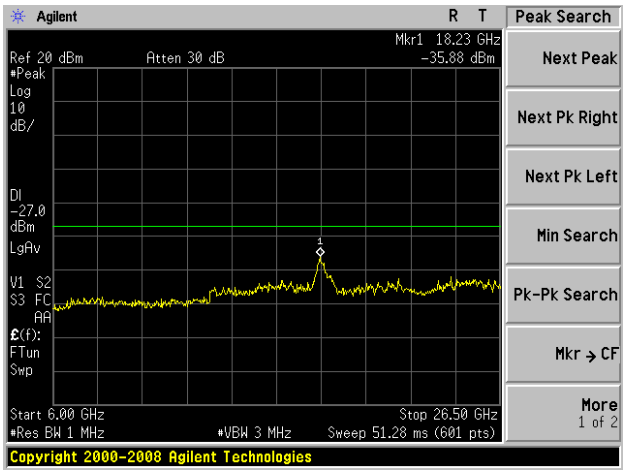
802.11ac20 on channel 40



802.11ac20 on channel 36

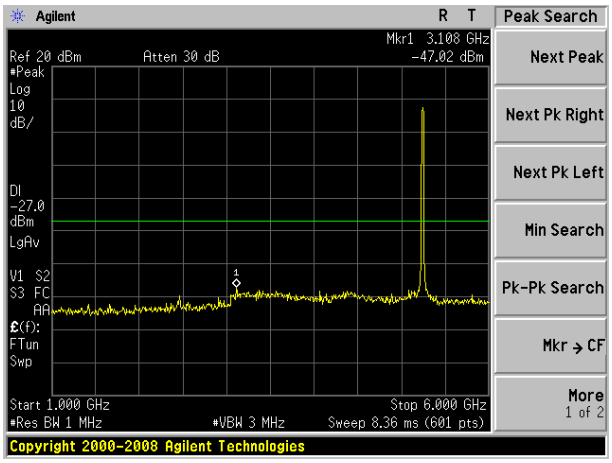


802.11ac20 on channel 40

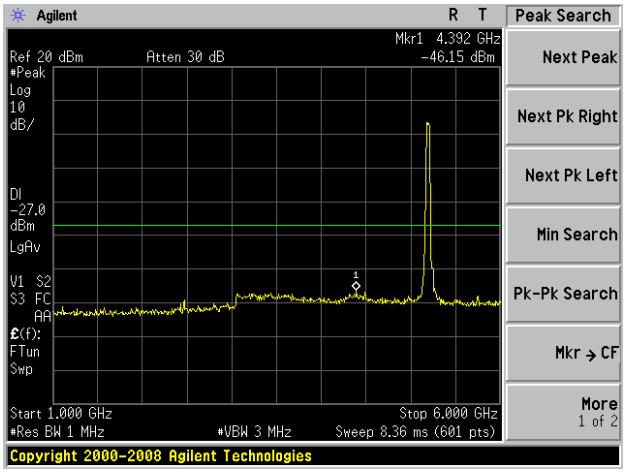


Test Plot

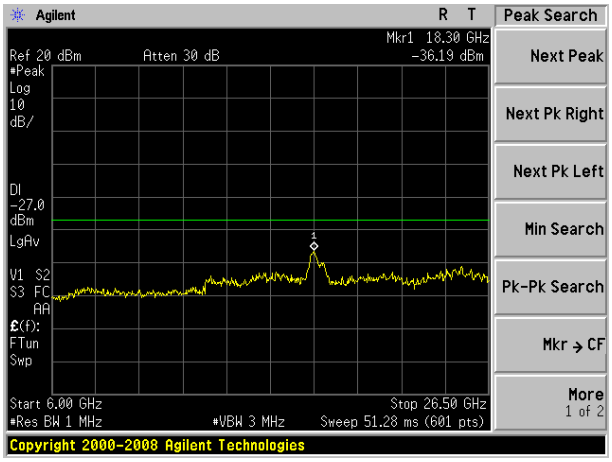
802.11ac20 on channel 48



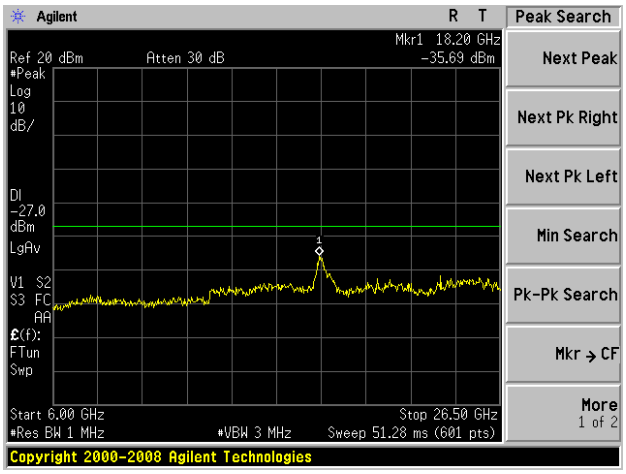
802.11ac40 on channel 38



802.11ac20 on channel 48

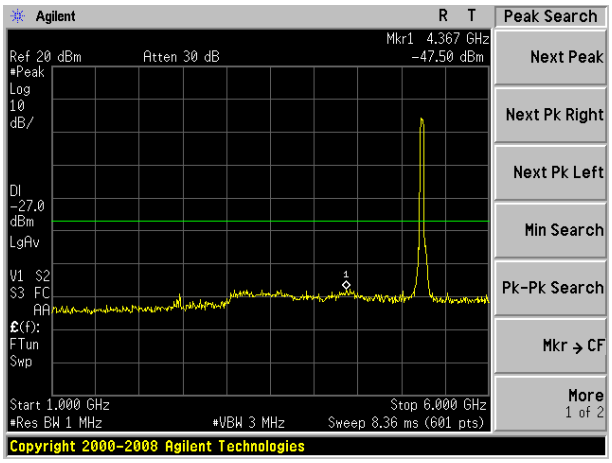


802.11ac40 on channel 38

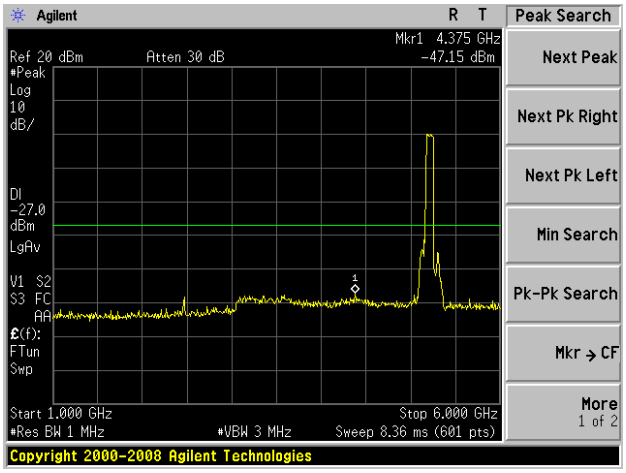


Test Plot

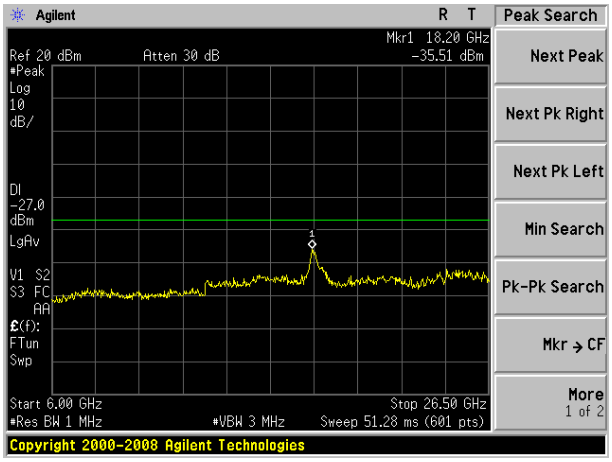
802.11ac40 on channel 46



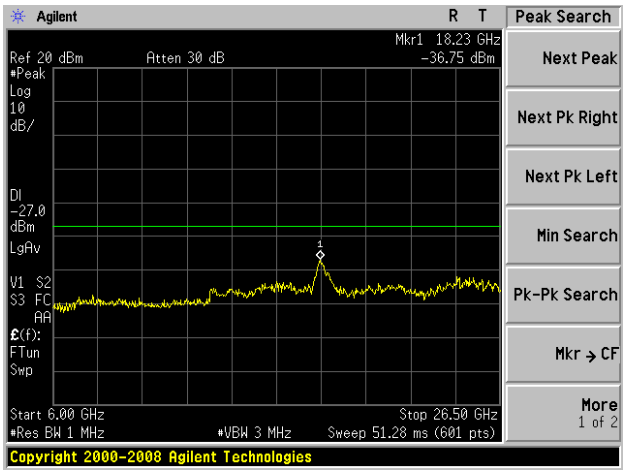
802.11ac80 on channel 42



802.11 ac40 on channel 46



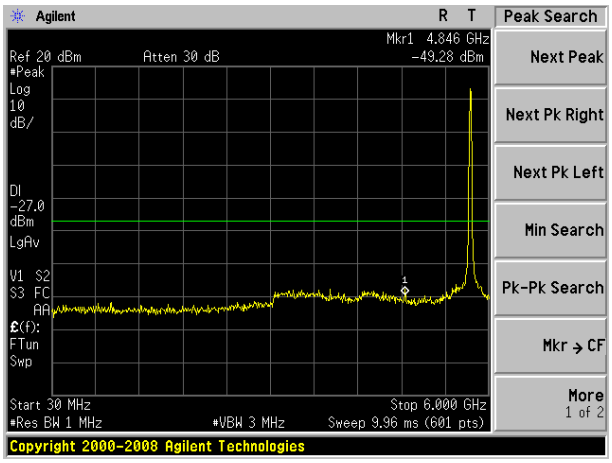
802.11 ac80 on channel 42



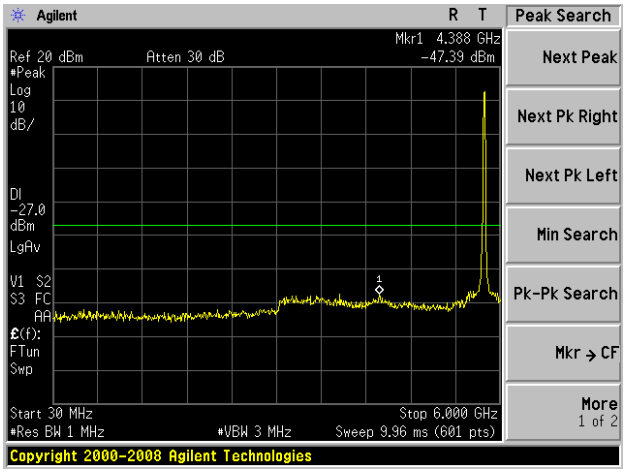
5.8G

Test Plot

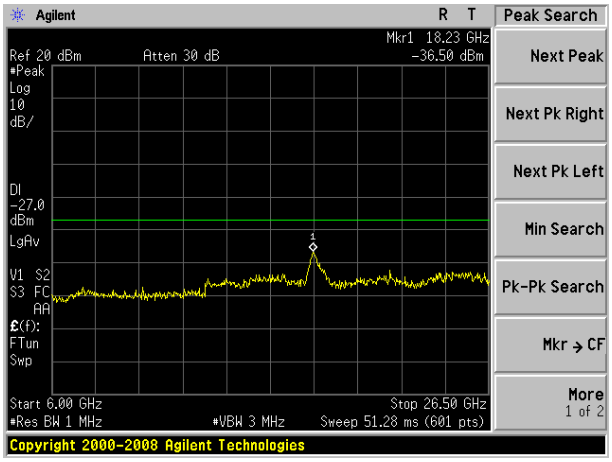
802.11a on channel 149



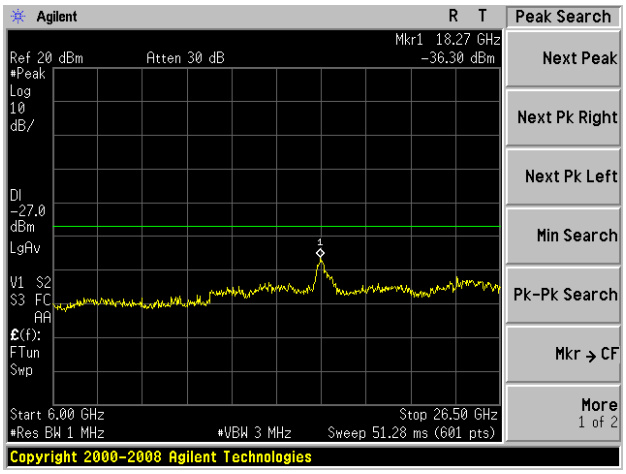
802.11a on channel 157



802.11a on channel 149

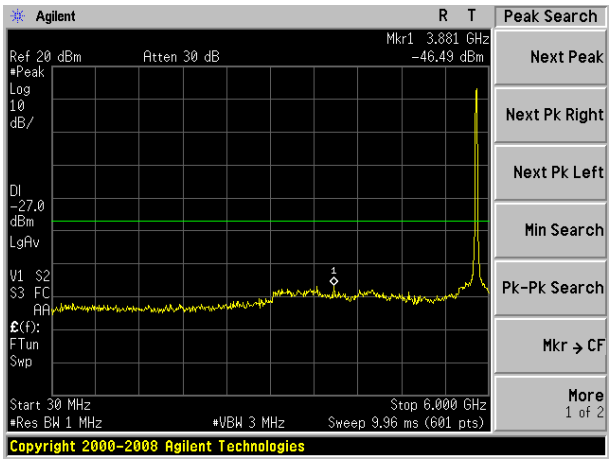


802.11a on channel 157

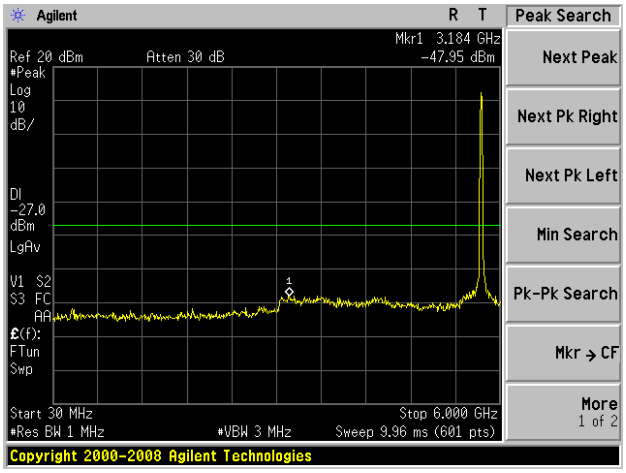


Test Plot

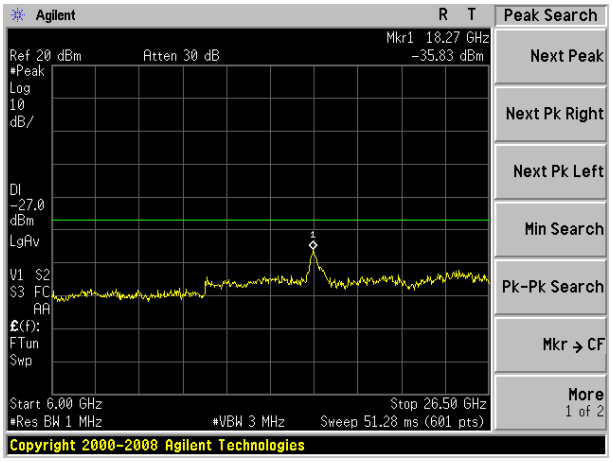
802.11a on channel 165



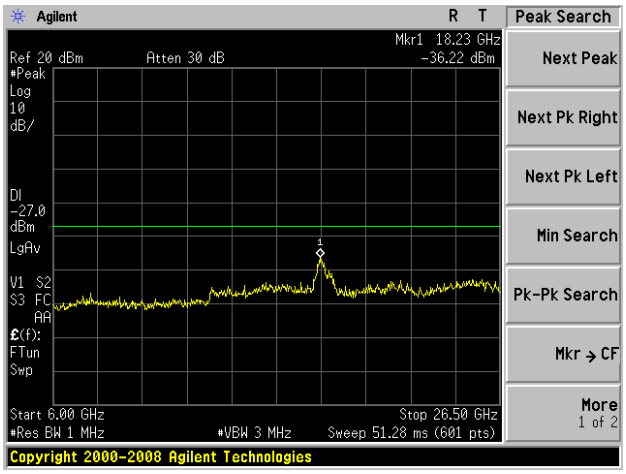
802.11n20 on channel 149



802.11a on channel 165

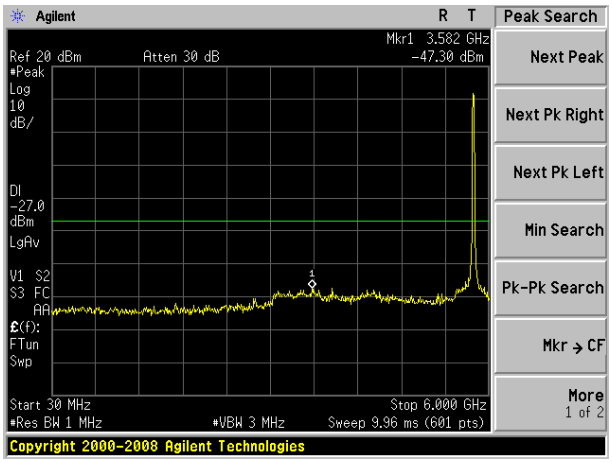


802.11n20 on channel 149

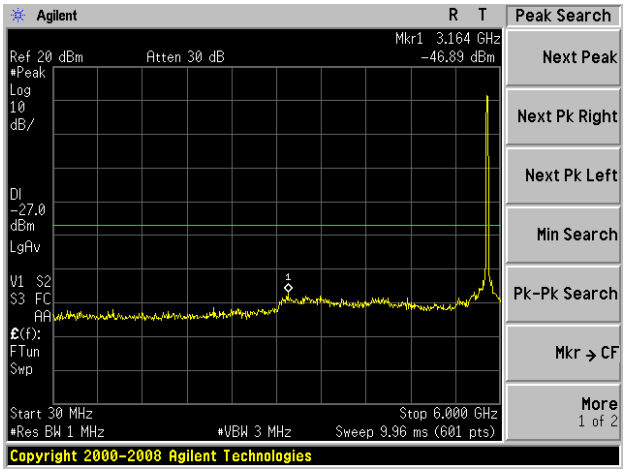


Test Plot

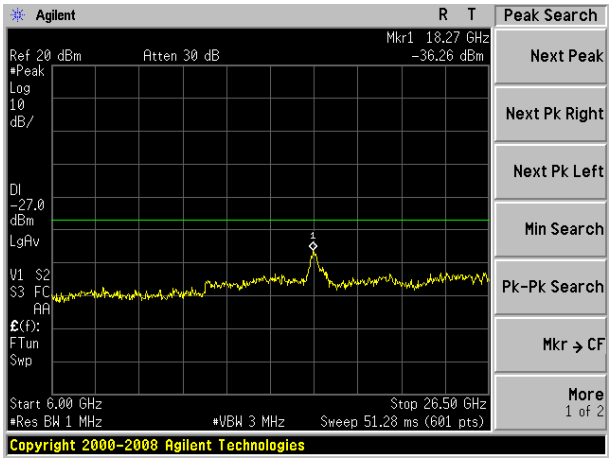
802.11n20 on channel 157



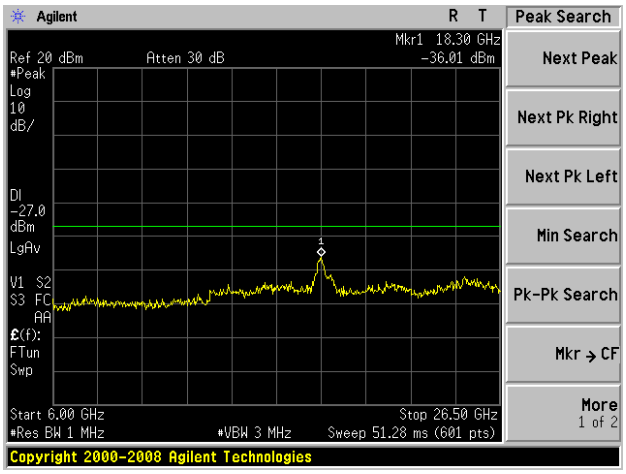
802.11n20 on channel 165



802.11n20 on channel 157

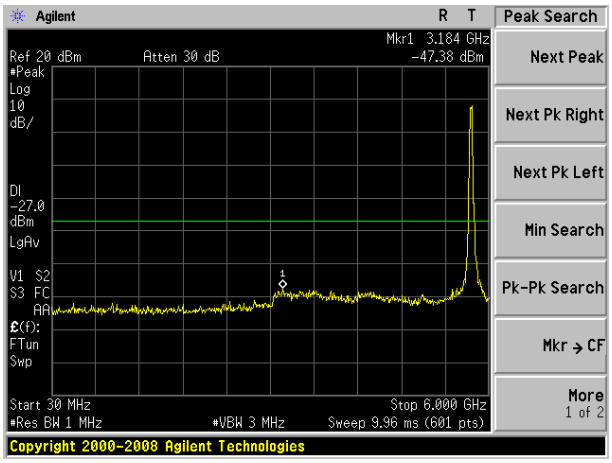


802.11n20 on channel 165

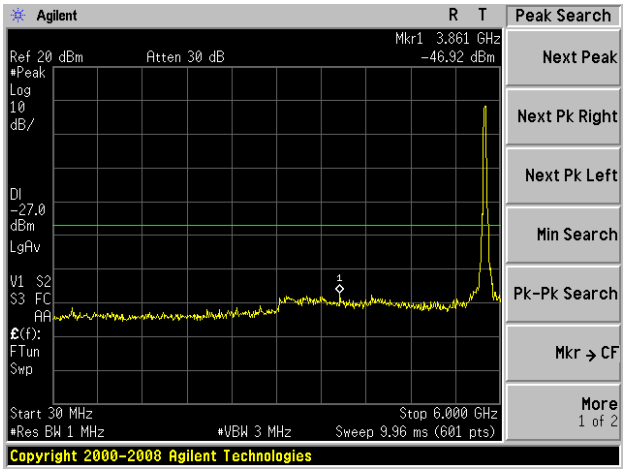


Test Plot

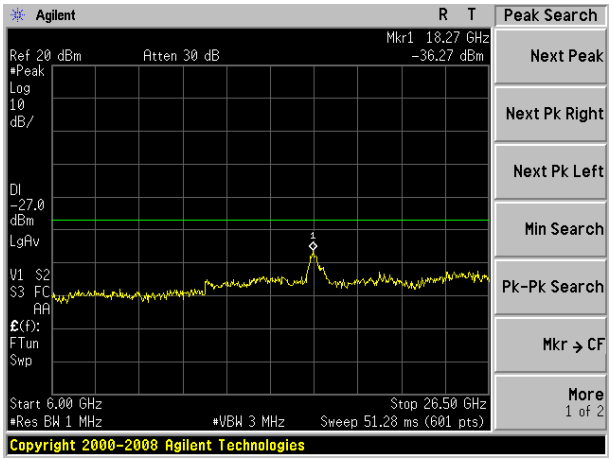
802.11n40 on channel 151



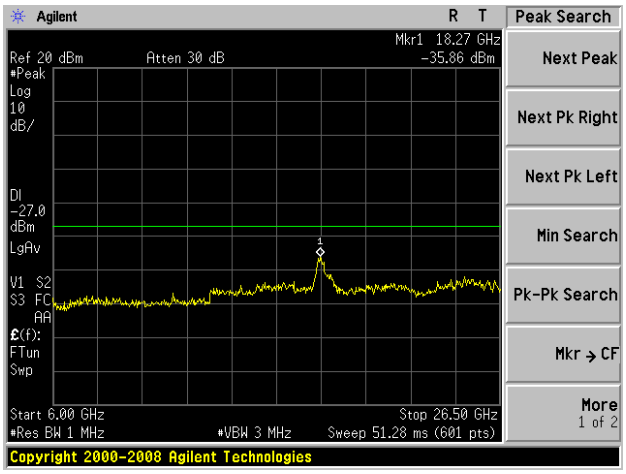
802.11n40 on channel 159



802.11n40 on channel 151

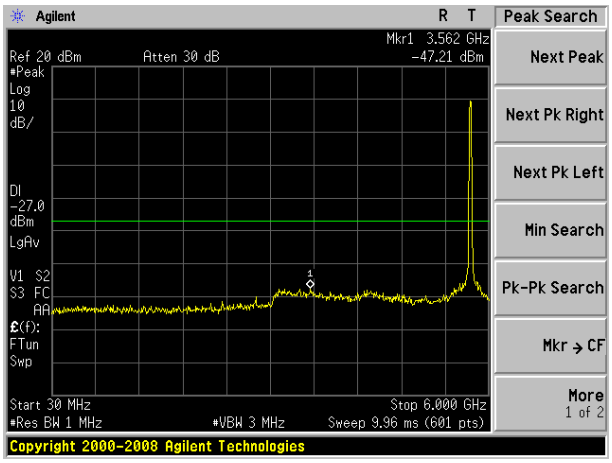


802.11n40 on channel 159

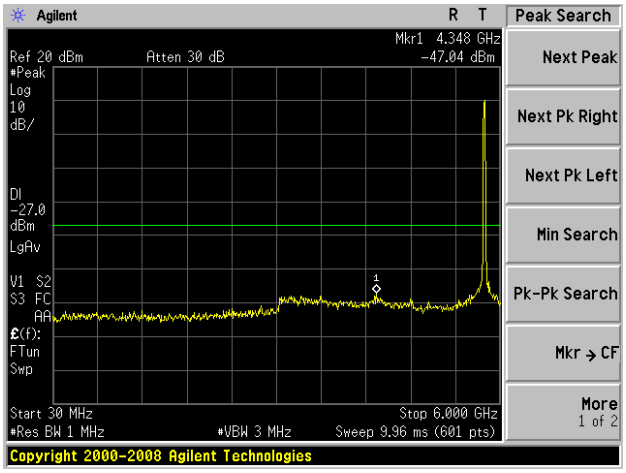


Test Plot

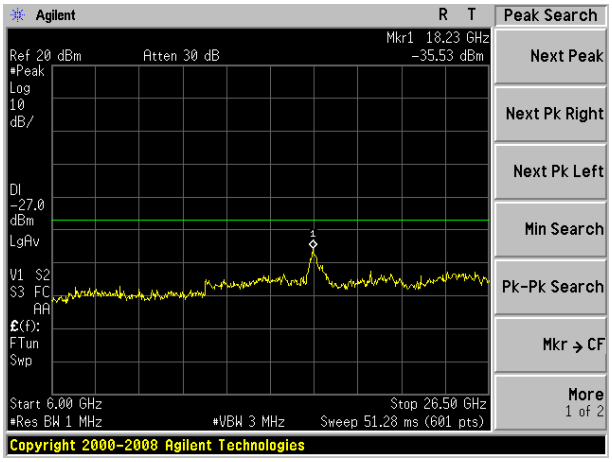
802.11ac20 on channel 149



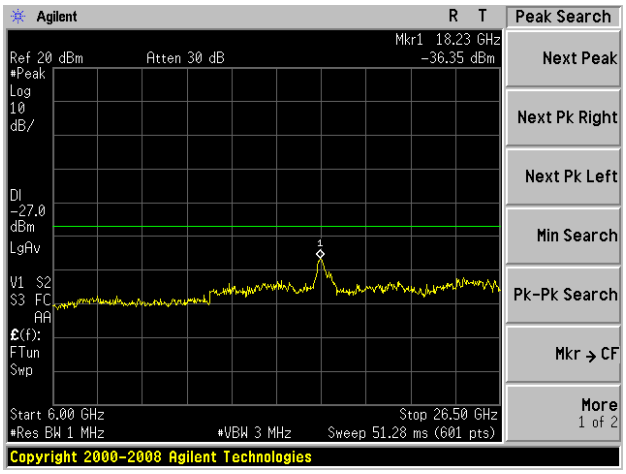
802.11ac20 on channel 157



802.11ac20 on channel 149

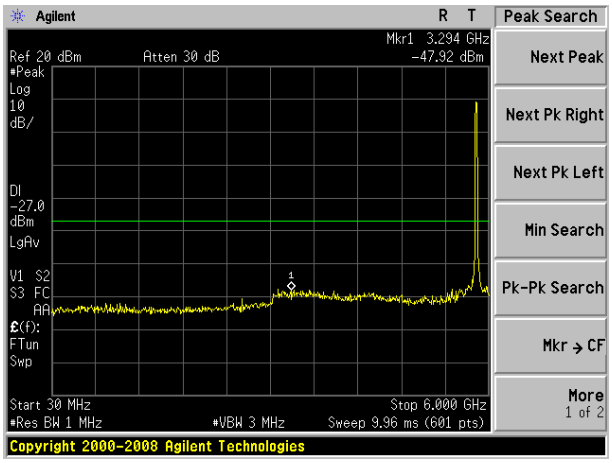


802.11ac20 on channel 157

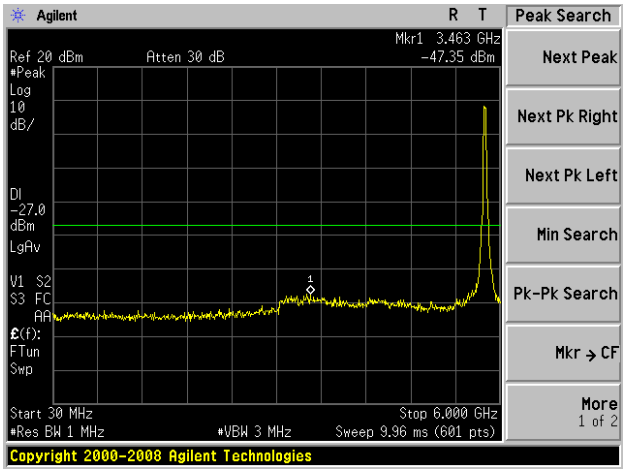


Test Plot

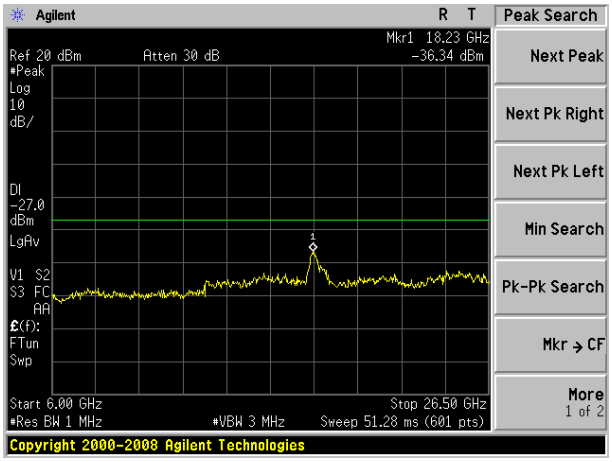
802.11ac20 on channel 165



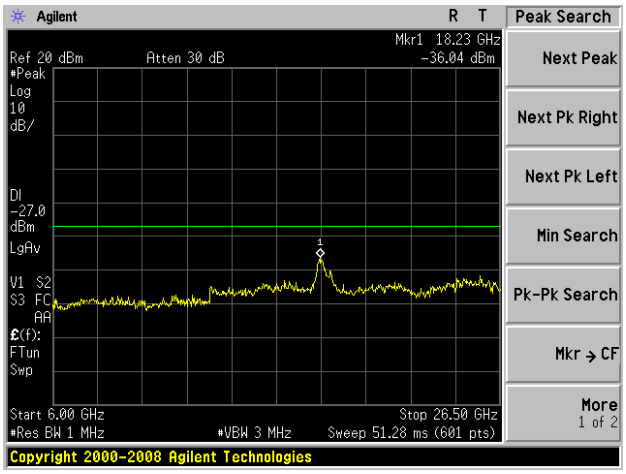
802.11ac40 on channel 151



802.11ac20 on channel 165

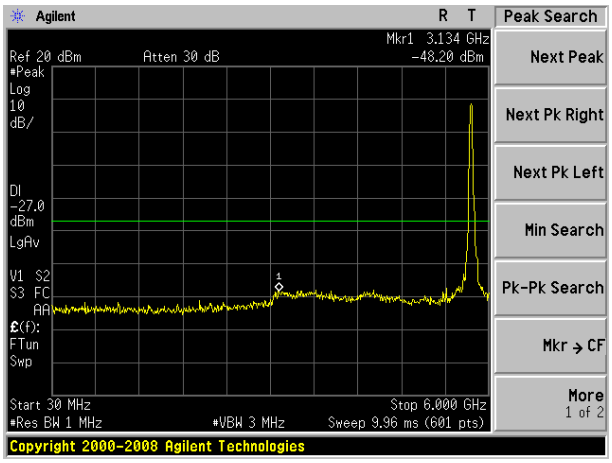


802.11ac40 on channel 151

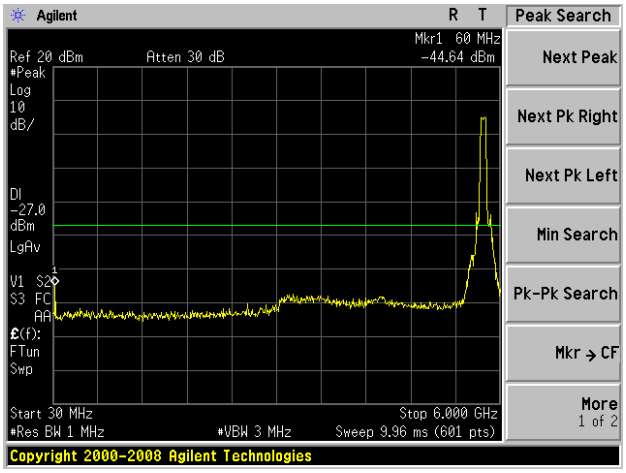


Test Plot

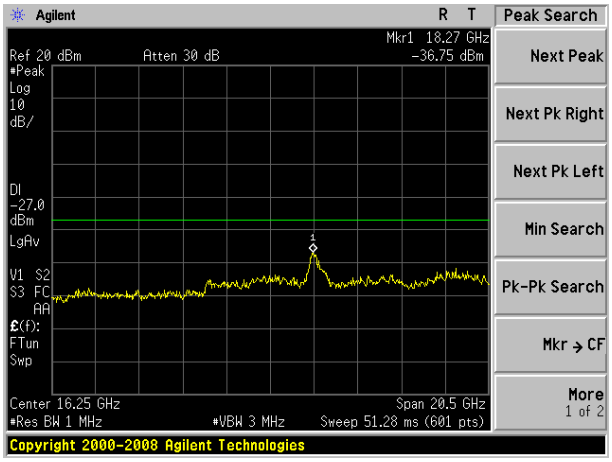
802.11ac40 on channel 159



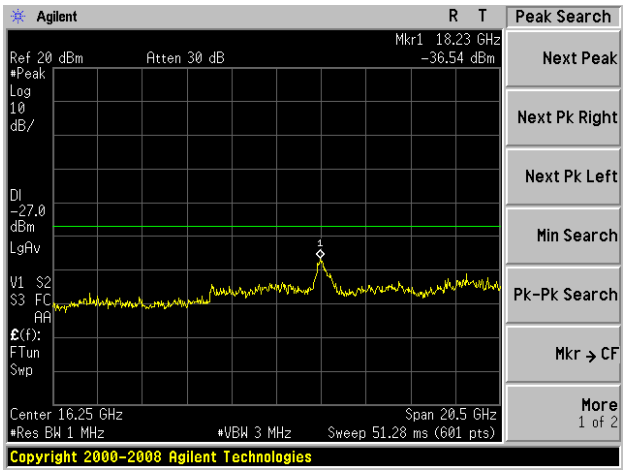
802.11ac80 on channel 155



802.11 ac40 on channel 159



802.11 ac80 on channel 155



10. Frequency Stability Measurement

10.1 LIMIT

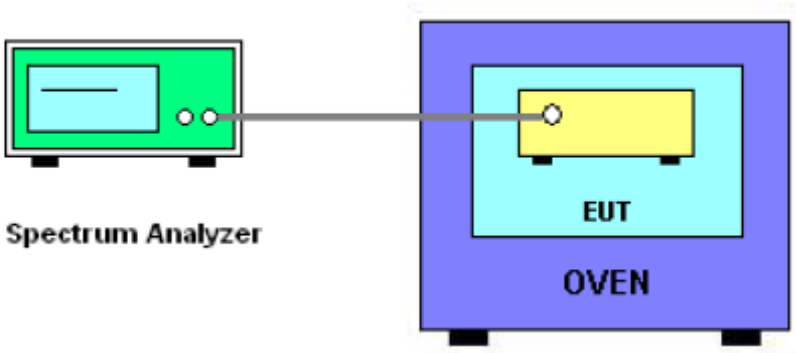
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

10.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10_6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

10.3 TEST SETUP LAYOUT



10.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

10.5 TEST RESULTS

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.10	5180.0235	5180	0.0235	-4.5367
		V max (V)	12.77	5180.0153	5180	0.0153	-2.9537
		V min (V)	9.44	5180.0124	5180	0.0124	-2.3938
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	11.1	T (°C)	-20	5180.0123	5180	0.0123	-2.3745
		T (°C)	-10	5180.0127	5180	0.0127	-2.4517
		T (°C)	0	5180.0265	5180	0.0265	-5.1158
		T (°C)	10	5180.0148	5180	0.0148	-2.8571
		T (°C)	20	5180.0132	5180	0.0132	-2.5483
		T (°C)	30	5180.0146	5180	0.0146	-2.8185
		T (°C)	40	5180.0129	5180	0.0129	-2.4903
		T (°C)	50	5180.0155	5180	0.0155	-2.9923
		T (°C)	60	5180.0173	5180	0.0173	-3.3398
		T (°C)	70	5180.0129	5180	0.0129	-2.4903
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.10	5200.0169	5200	0.0169	-3.2500
		V max (V)	12.77	5200.0127	5200	0.0127	-2.4423
		V min (V)	9.44	5200.0145	5200	0.0145	-2.7885
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	11.1	T (°C)	-20	5200.0324	5200	0.0324	-6.2308
		T (°C)	-10	5200.0136	5200	0.0136	-2.6154
		T (°C)	0	5200.0324	5200	0.0324	-6.2308
		T (°C)	10	5200.0219	5200	0.0219	-4.2115
		T (°C)	20	5200.0147	5200	0.0147	-2.8269
		T (°C)	30	5200.0134	5200	0.0134	-2.5769
		T (°C)	40	5200.0193	5200	0.0193	-3.7115
		T (°C)	50	5200.0185	5200	0.0185	-3.5577
		T (°C)	60	5200.0142	5200	0.0142	-2.7308
		T (°C)	70	5200.0135	5200	0.0135	-2.5962
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.10	5240.0129	5240	0.0129	-2.4618
		V max (V)	12.77	5240.0186	5240	0.0186	-3.5496
		V min (V)	9.44	5240.0169	5240	0.0169	-3.2252
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	11.1	T (°C)	-20	5240.0126	5240	0.0126	-2.4046
		T (°C)	-10	5240.0168	5240	0.0168	-3.2061
		T (°C)	0	5240.0166	5240	0.0166	-3.1679
		T (°C)	10	5240.0241	5240	0.0241	-4.5992
		T (°C)	20	5240.0137	5240	0.0137	-2.6145
		T (°C)	30	5240.0159	5240	0.0159	-3.0344
		T (°C)	40	5240.0189	5240	0.0189	-3.6069
		T (°C)	50	5240.0177	5240	0.0177	-3.3779
		T (°C)	60	5240.0139	5240	0.0139	-2.6527
		T (°C)	70	5240.0123	5240	0.0123	-2.3473
Limits				± 20 ppm			
Result				Complies			

EUT：	Tail Auto-Director AI Camera	Model Name. ：	Tail Auto-Director AI Camera
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency(5745-5850MHz)		

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.10	5745.00292	5745	0.00292	-0.5075
		V max (V)	12.77	5745.00539	5745	0.00539	-0.9390
		V min (V)	9.44	5745.00381	5745	0.00381	-0.6638
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	11.1	T (°C)	-20	5745.00467	5745	0.00467	-0.8121
		T (°C)	-10	5745.00085	5745	0.00085	-0.1484
		T (°C)	0	5745.00177	5745	0.00177	-0.3077
		T (°C)	10	5745.00227	5745	0.00227	-0.3956
		T (°C)	20	5745.00860	5745	0.00860	-1.4967
		T (°C)	30	5745.00591	5745	0.00591	-1.0280
		T (°C)	40	5745.00392	5745	0.00392	-0.6816
		T (°C)	50	5745.01309	5745	0.01309	-2.2780
		T (°C)	60	5745.00683	5745	0.00683	-1.1891
		T (°C)	70	5745.00132	5745	0.00132	-0.2299
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.10	5785.00276	5785	0.00276	-0.4772
		V max (V)	12.77	5785.00663	5785	0.00663	-1.1463
		V min (V)	9.44	5785.01004	5785	0.01004	-1.7355
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	11.1	T (°C)	-20	5785.01088	5785	0.01088	-1.8815
		T (°C)	-10	5785.00750	5785	0.00750	-1.2958
		T (°C)	0	5785.01190	5785	0.01190	-2.0567
		T (°C)	10	5785.00180	5785	0.00180	-0.3112
		T (°C)	20	5785.00157	5785	0.00157	-0.2708
		T (°C)	30	5785.01235	5785	0.01235	-2.1341
		T (°C)	40	5785.00440	5785	0.00440	-0.7603
		T (°C)	50	5785.00349	5785	0.00349	-0.6026
		T (°C)	60	5785.00771	5785	0.00771	-1.3326
		T (°C)	70	5785.01128	5785	0.01128	-1.9490
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.10	5825.01330	5825	0.01330	-2.2832
		V max (V)	12.77	5825.01162	5825	0.01162	-1.9942
		V min (V)	9.44	5825.00505	5825	0.00505	-0.8672
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	11.1	T (°C)	-20	5825.01213	5825	0.01213	-2.0817
		T (°C)	-10	5825.00700	5825	0.00700	-1.2021
		T (°C)	0	5825.00619	5825	0.00619	-1.0622
		T (°C)	10	5825.00883	5825	0.00883	-1.5153
		T (°C)	20	5825.00003	5825	0.00003	-0.0048
		T (°C)	30	5825.01028	5825	0.01028	-1.7656
		T (°C)	40	5825.00994	5825	0.00994	-1.7068
		T (°C)	50	5825.00904	5825	0.00904	-1.5521
		T (°C)	60	5825.00204	5825	0.00204	-0.3503
		T (°C)	70	5825.00972	5825	0.00972	-1.6681
Limits				± 20 ppm			
Result				Complies			

11. ANTENNA REQUIREMENT

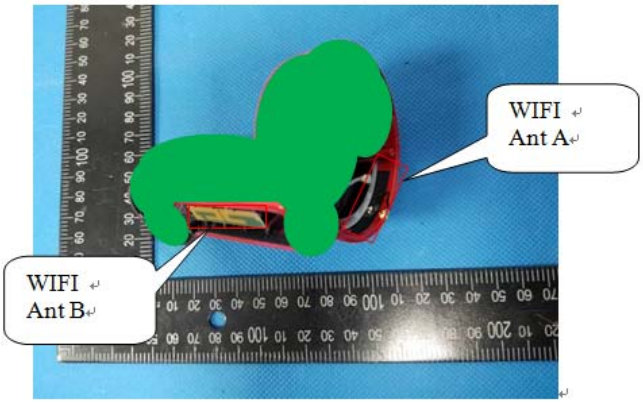
11.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

11.2 EUT ANTENNA

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1TX, 1RX
802.11n/ac	1TX/2TX, 1RX/2RX



The EUT antenna is permanent attached antenna. It comply with the standard requirement.

END OF REPORT