



ISO/IEC17025 Accredited Lab.

FCC ID TEST REPORT

for

MID

MODEL: PI070H04CA

Trade Mark: N/A

FCC ID: RQ2PI070H04CA

Test Report Number: 1304001352wifi

Issued Date: April 22, 2013

Issued for

XiangDe Electronics Technology (ShenZhen) CO., LTD
Blg C16 Fuyuan Industrial Area, Zhoushi Road, Xixiang Street, Baoan
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Issued By:

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1 TEST CERTIFICATION

Product:	MID
Model:	PI070H04CA
Trade Mark	N/A
Applicant:	XiangDe Electronics Technology (ShenZhen) CO., LTD Blg C16 Fuyuan Industrial Area, Zhoushi Road, Xixiang Street, Baoan District, ShenZhen,China
Factory:	XiangDe Electronics Technology (ShenZhen) CO., LTD Blg C16 Fuyuan Industrial Area, Zhoushi Road, Xixiang Street, Baoan District, ShenZhen,China
Tested:	April 04, 2013 ~ April 15, 2013
Test Voltage:	AC 120V/60Hz
Applicable Standards:	FCC Part 15 Subpart C: 2012 ANSI C63.4:2009

The above equipment has been tested by SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

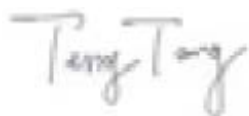
Tested By:



(Brown Lu)

Date:

2013-04-22



Check By:

(Terry Tang)

Date:

2013-04-22



Approved By:

(Jack Chung)

Date:

2013-04-22

2 TEST RESULT SUMMARY

FCC 15 Subpart C, Paragraph 15.247

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Pass
§15.207 (a)	Conducted Emissions	Pass
§15.247(d)	Spurious Emissions at Antenna Port	Pass
§15.205	Restricted Bands	Pass
§15.209, §15.205, §15.247(d)	Spurious Emissions	Pass
§15.247 (a)(2)	6 dB Bandwidth	Pass
§15.247(b)(3)	Maximum Peak Output Power	Pass
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Pass
§15.247(e)	Power Spectral Density	Pass

NOTE:

” N/A” denotes test is not applicable in this Test Report

The test result judgment is decided by the limit of test standard

All the test program has follow FCC new test procedure KDB558074, Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2009). Radiated testing was performed at an antenna to EUT distance 3 meters.

3 EUT DESCRIPTION

Product	MID
Trade Mark	N/A
Model	PI070H04CA
Applicant	XiangDe Electronics Technology (ShenZhen) CO., LTD
EUT Type	☒ Engineering Sample. ☐ Product Sample, ☐ Mass Product Sample.
Serial Number	N/A
Antenna Type	Internal Antenna
EUT Power Rating	Adapter: YS02-050200U Input: AC 100-240V 50/60Hz 0.32A Output: DC 5.0V 2A Li-ion Battery: DC 3.7V Charge Voltage: 4.2V
Temperature Range(Operating)	-10 ~50°C
Operating Frequency (WIFI)	802.11b/g/n: 2412MHz - 2462MHz
Type of Modulation	CCK, DQPSK, DBPSK for DSSS BPSK, QPSK, 16QAM and 64QAM for OFDM
Number of Channels	802.11b/g/n: 11 channels
Data rate	802.11b: 1-11Mbps 802.11g: 6-54Mbps 802.11n HT-20: 6.5-72.2Mbps

Note: N/A stand for no applicable.

4 SETUP OF EQUIPMENT UNDER TEST AND TEST EQUIPMENTS USED

EQUIPMENT/FACILITIES	MANUFACTURER	MODEL #	SERIAL NO.	CAL. DUE DATE	CAL. INTERVAL
EMI Test Receiver	R&S	ESCI	100005	12/16/2013	1 Year
LISN	LS	LS16	16010222 119	12/16/2013	1 Year
LISN(EUT)	Mestec	AN3016	04/10040	12/22/2013	1 Year
EMI Test Receiver	R&S	ESCI	100005	12/16/2013	1 Year
Spectrum Analyzer	R&S	FSU	100114	12/14/2013	1 Year
Pre Amplifier	H.P.	HP8447E	2945A02 715	12/16/2013	1 Year
Pre-Amplifier	Compliance	PAM0118	1360976	12/16/2013	1 Year
Bilog Antenna	SUNOL Sciences	JB3	A021907	12/10/2013	1 Year
Horn Antenna	Schwarzbeck	BBHA 9170	RS2036	12/10/2013	1 Year
Horn Antenna	Schwarzbeck	BBHA 9120	RS4051	12/10/2013	1 Year
Loop Antenna	Schwarzbeck	FESP5132	RS101	12/23/2013	1 Year
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	12/09/2013	1 Year
Cable	TIME MICROWAVE	--	--	12/09/2013	1 Year
System-Controller	CCS	N/A	N/A	N.C.R	1 Year
Turn Table	CCS	N/A	N/A	N.C.R	1 Year
Antenna Tower	CCS	N/A	N/A	N.C.R	1 Year
Spectrum analyzer	Agilent	E4407B	88156318	12/09/2013	1 Year

4.1. DESCRIPTION OF SUPPORT UNITS

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.

No.	Equipment	Model No.	Serial No.	Trade Name
1	Adapter	YS02-050200U	N/A	I.T.E POWER SUPPLY

Note:

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2. Description of Test Configuration

The Transmitter of EUT is an Android MID, nextbook and powered by host equipment; these is Digital Transmission system (DTS) and have modulation OFDM, DSSS, DBPSK, DQPSK, CCK, 16QAM, 64QAM. According exploratory test, EUT will have maximum output power in those data rate (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n: 6.5 Mbps), so those data rate were used for all test.

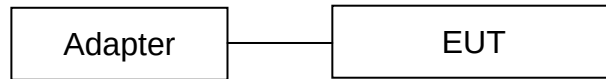
For 802.11b and 802.11g mode and 802.11n, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT was tested with Channel 1, 6 and 11 in 802.11b/g/n

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

4.3. CONFIGURATION OF SYSTEM UNDER TEST



(EUT: MID)

4.4. Justification

1. Set up EUT with the relative support equipments.
2. Make sure the test software control the EUT working state.
(according to the standard measurement).

5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-01

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.6\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.7\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.7\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT uses a inside jointing PCB Antenna, The Antenna is unique coupling antenna. The Antenna gain is 0dBi.please refer to the EUT internal photos.

§15.207 - CONDUCTED EMISSIONS

Applicable Standard

The specification used was with the FCC Part 15.207 limits.

Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the LISN. Maximizing procedure was performed on the six (6) highest emissions of the EUT. All data was recorded in the Quasi-peak and average detection mode.

Test Result

PASS

Test Mode: Operating

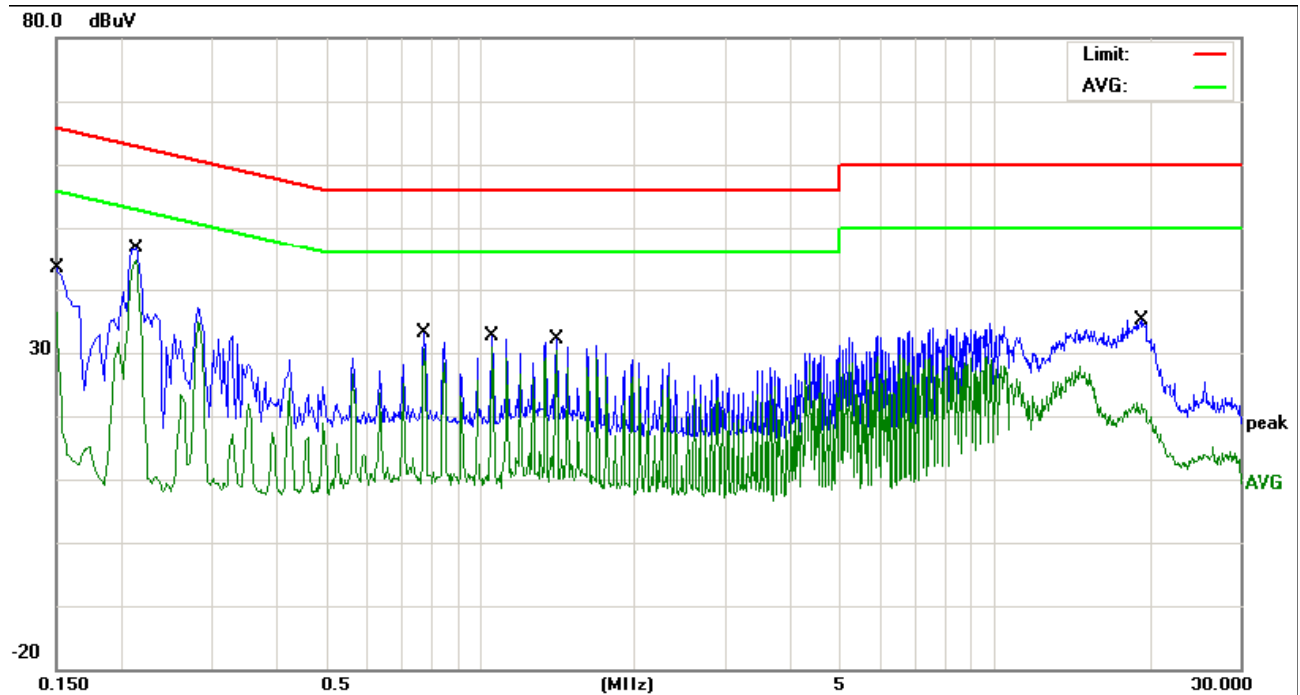
Environmental Conditions

Temperature:	26 °C
Relative Humidity:	60%
ATM Pressure:	100.0kPa

Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

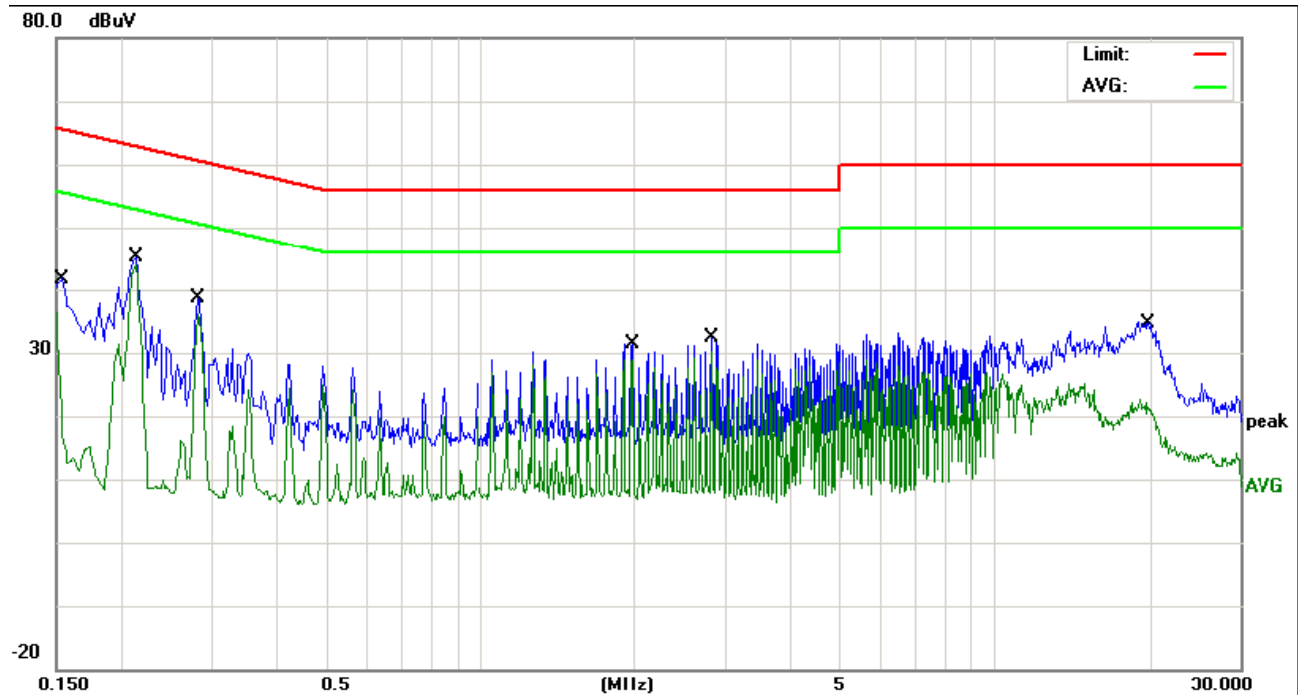
Phase: Live



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	32.80	10.45	43.25	65.99	-22.74	QP
2		0.1500	25.97	10.45	36.42	55.99	-19.57	AVG
3		0.2128	36.12	10.34	46.46	63.09	-16.63	QP
4	*	0.2128	33.84	10.34	44.18	53.09	-8.91	AVG
5		0.7780	22.43	10.59	33.02	56.00	-22.98	QP
6		0.7780	20.04	10.59	30.63	46.00	-15.37	AVG
7		1.0620	21.92	10.75	32.67	56.00	-23.33	QP
8		1.0620	20.02	10.75	30.77	46.00	-15.23	AVG
9		1.4140	21.48	10.73	32.21	56.00	-23.79	QP
10		1.4140	19.77	10.73	30.50	46.00	-15.50	AVG
11		19.3819	24.61	10.49	35.10	60.00	-24.90	QP
12		19.3819	11.34	10.49	21.83	50.00	-28.17	AVG

Remark: All of the Tx modes have been investigated, and only worst mode is presented in this report.

Phase:Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	29.97	10.45	40.42	65.99	-25.57	QP
2		0.1500	25.88	10.45	36.33	55.99	-19.66	AVG
3		0.2128	34.51	10.34	44.85	63.09	-18.24	QP
4	*	0.2128	33.13	10.34	43.47	53.09	-9.62	AVG
5		0.2819	28.12	10.59	38.71	60.76	-22.05	QP
6		0.2819	25.47	10.59	36.06	50.76	-14.70	AVG
7		1.9820	20.74	10.71	31.45	56.00	-24.55	QP
8		1.9820	18.10	10.71	28.81	46.00	-17.19	AVG
9		2.8300	21.64	10.68	32.32	56.00	-23.68	QP
10		2.8300	19.41	10.68	30.09	46.00	-15.91	AVG
11		19.7460	24.23	10.50	34.73	60.00	-25.27	QP
12		19.7460	9.85	10.50	20.35	50.00	-29.65	AVG

Remark:All of the Tx modes have been investigated, and only worst mode is presented in this report.

§15.209, §15.205, §15.247(d) - SPURIOUS EMISSIONS

Test Equipment

Please refer to section 4 this report.

Test Procedure

The out of band emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part Subpart C limits.

Environmental Conditions

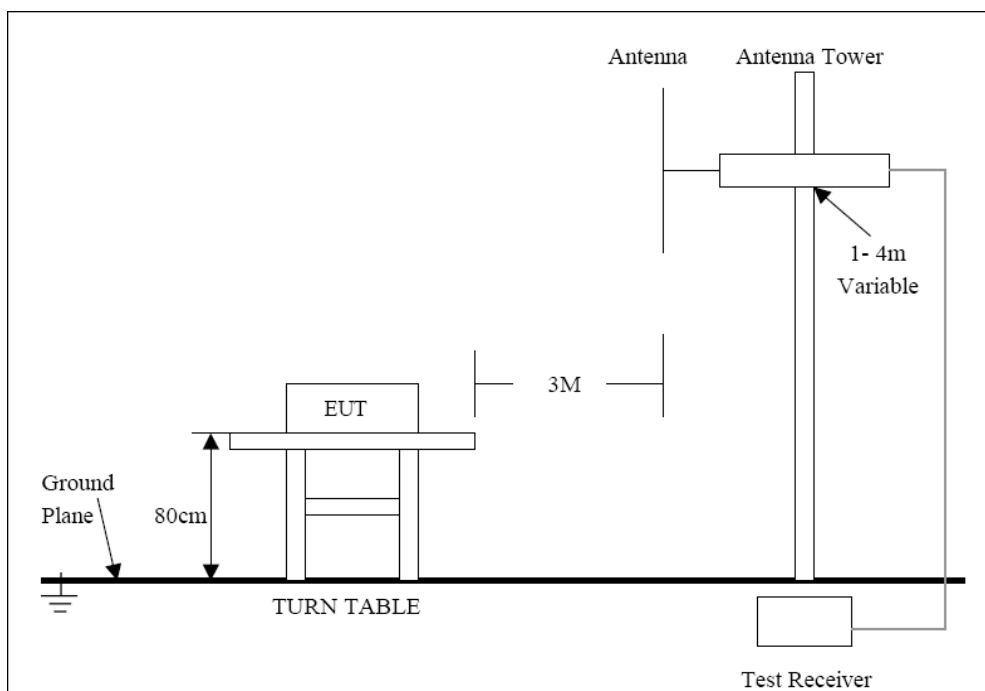
Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	100.0kPa

Radiated Test Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
9KHz-30MHz	10 kHz	30 kHz	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave



For the accrual test configuration, please refer to the related items-photos of Testing.

Radiated Emission Limit

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

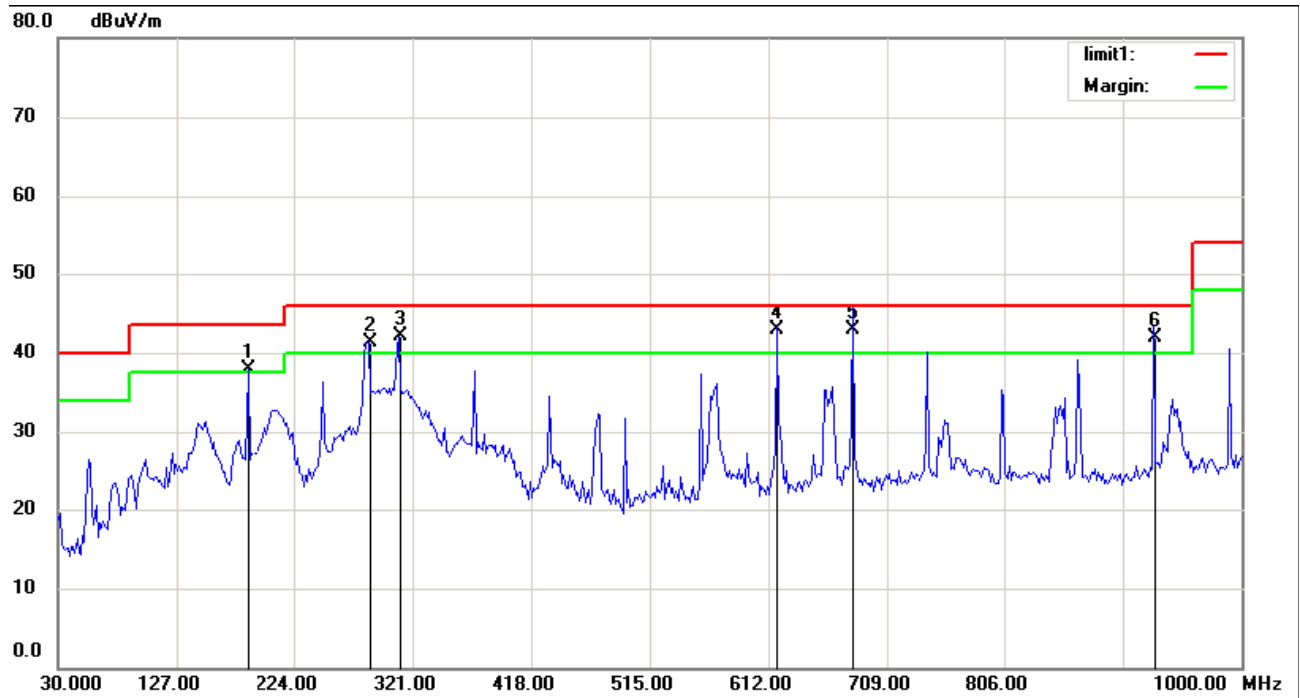
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F (kHz)	300
0.490–1.705	24000/F (kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Radiated Emission Test Result

Test Mode: Transmitting

NOTE:9KHz-30MHz the measurements were greater than 20dB below the limit.

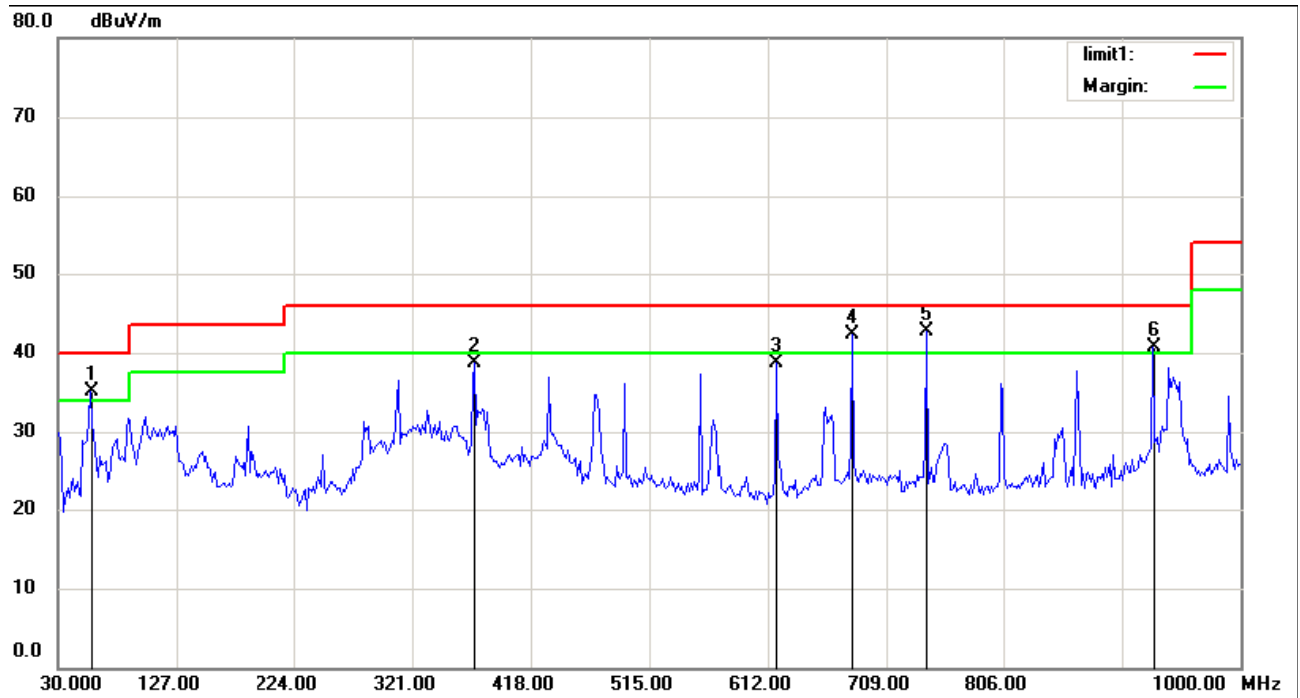
Horizontal:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	!	185.4487	27.20	10.61	37.81	43.50	-5.69	QP
2	!	284.9360	27.31	14.07	41.38	46.00	-4.62	QP
3	!	309.8077	28.01	14.11	42.12	46.00	-3.88	QP
4	*	619.1506	22.70	20.26	42.96	46.00	-3.04	QP
5	!	681.3301	20.60	22.22	42.82	46.00	-3.18	QP
6	!	928.4936	17.60	24.39	41.99	46.00	-4.01	QP

Remark: All of the Tx modes have been investigated, and only worst mode is presented in this report.

Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	!	56.4263	21.66	13.36	35.02	40.00	-4.98	QP
2		371.9871	22.50	16.13	38.63	46.00	-7.37	QP
3		619.1506	17.56	21.17	38.73	46.00	-7.27	QP
4	!	681.3301	19.03	23.35	42.38	46.00	-3.62	QP
5	*	743.5096	19.83	22.90	42.73	46.00	-3.27	QP
6	!	928.4936	16.25	24.47	40.72	46.00	-5.28	QP

Remark: All of the Tx modes have been investigated, and only worst mode is presented in this report.

Above 1GHz:

802.11b

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
7236	37.5	AV	360	1.5	V	35.4	4.51	33.7	43.71	54	10.29
4824	39.3	AV	250	1.2	V	31.3	4.64	33.4	41.84	54	12.16
7236	35.2	AV	45	1.4	H	35.4	4.51	33.7	41.41	54	12.59
4824	38.6	AV	60	1.6	H	31.3	4.64	33.4	41.14	54	12.86
4824	53.6	PK	180	1.3	V	31.3	4.64	33.4	56.14	74	17.86
7236	48.6	PK	300	1.5	V	35.4	4.51	33.7	54.81	74	19.19
7236	47.7	PK	100	1.5	H	35.4	4.51	33.7	53.91	74	20.09
4824	49.9	PK	210	1.1	H	31.3	4.64	33.4	52.44	74	21.56
Middle Channel (2437MHz)											
7311	40.6	AV	180	1.5	V	35.4	4.75	33.7	47.05	54	6.95
7311	39.1	AV	185	1.3	H	35.4	4.75	33.7	45.55	54	8.45
4874	41.7	AV	200	1.5	V	31.3	4.64	33.4	44.24	54	9.76
4874	40.5	AV	360	1.5	H	31.3	4.64	33.4	43.04	54	10.96
7311	53.8	PK	120	1.2	V	35.4	4.75	33.7	60.25	74	13.75
4874	55.6	PK	75	1.5	V	31.3	4.64	33.4	58.14	74	15.86
7311	50.4	PK	220	1.4	H	35.4	4.75	33.7	56.85	74	17.15
4874	52.6	PK	0	1.1	H	31.3	4.64	33.4	55.14	74	18.86
High Channel (2462MHz)											
7386	42.0	AV	160	1.3	V	35.3	4.75	33.7	48.35	54	5.65
7386	41.9	AV	245	1.4	H	35.3	4.75	33.7	48.25	54	5.75
4924	43.8	AV	360	1.5	V	32.0	4.64	33.4	47.04	54	6.96
4924	42.4	AV	45	1.5	H	32.0	4.64	33.4	45.64	54	8.36
7386	52.2	PK	90	1.2	V	35.3	4.75	33.7	58.55	74	15.45
4924	55.1	PK	0	1.4	V	32.0	4.64	33.4	58.34	74	15.66
4924	54.6	PK	200	1.4	H	32.0	4.64	33.4	57.84	74	16.16
7386	51.3	PK	180	1.2	H	35.3	4.75	33.7	57.65	74	16.35

802.11g

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
7236	38.6	AV	1.24	1.3	V	35.4	4.51	33.7	44.81	54	9.19
7236	37.8	AV	200	1.4	H	35.4	4.51	33.7	44.01	54	9.99
4824	40.7	AV	90	1.5	V	31.3	4.64	33.4	43.24	54	10.76
4824	39.1	AV	45	1.5	H	31.3	4.64	33.4	41.64	54	12.36
7236	46.5	PK	165	1.4	V	35.4	4.51	33.7	52.71	74	21.29
4824	49.8	PK	320	1.2	V	31.3	4.64	33.4	52.34	74	21.66
4824	47.5	PK	0	1.5	H	31.3	4.64	33.4	50.04	74	23.96
7236	42.7	PK	120	1.2	H	35.4	4.51	33.7	48.91	74	25.09
Middle Channel (2437MHz)											
7311	38.6	AV	200	1.5	H	35.4	4.75	33.7	45.05	54	8.95
4874	40.5	AV	120	1.4	H	31.3	4.64	33.4	43.04	54	10.96
7311	35.9	AV	320	1.3	V	35.4	4.75	33.7	42.35	54	11.65
4874	36.7	AV	190	1.3	V	31.3	4.64	33.4	39.24	54	14.76
7311	44.2	PK	45	1.5	H	35.4	4.75	33.7	50.65	74	23.35
7311	43.2	PK	360	1.4	V	35.4	4.75	33.7	49.65	74	24.35
4874	46.8	PK	0	1.4	V	31.3	4.64	33.4	49.34	74	24.66
4874	45.3	PK	60	1.2	H	31.3	4.64	33.4	47.84	74	26.16
High Channel (2462MHz)											
7386	38.2	AV	160	1.3	V	35.3	4.75	33.7	44.55	54	9.45
4924	41.3	AV	360	1.5	V	32.0	4.55	33.4	44.45	54	9.55
4924	40.5	AV	45	1.5	H	32.0	4.55	33.4	43.65	54	10.35
7386	37.1	AV	245	1.4	H	35.3	4.75	33.7	43.45	54	10.55
4924	54.7	PK	0	1.4	V	32.0	4.55	33.4	57.85	74	16.15
7386	50.6	PK	90	1.2	V	35.3	4.75	33.7	56.95	74	17.05
7386	47.6	PK	180	1.2	H	35.3	4.75	33.7	53.95	74	20.05
4924	49.4	PK	200	1.4	H	32.0	4.55	33.4	52.55	74	21.45

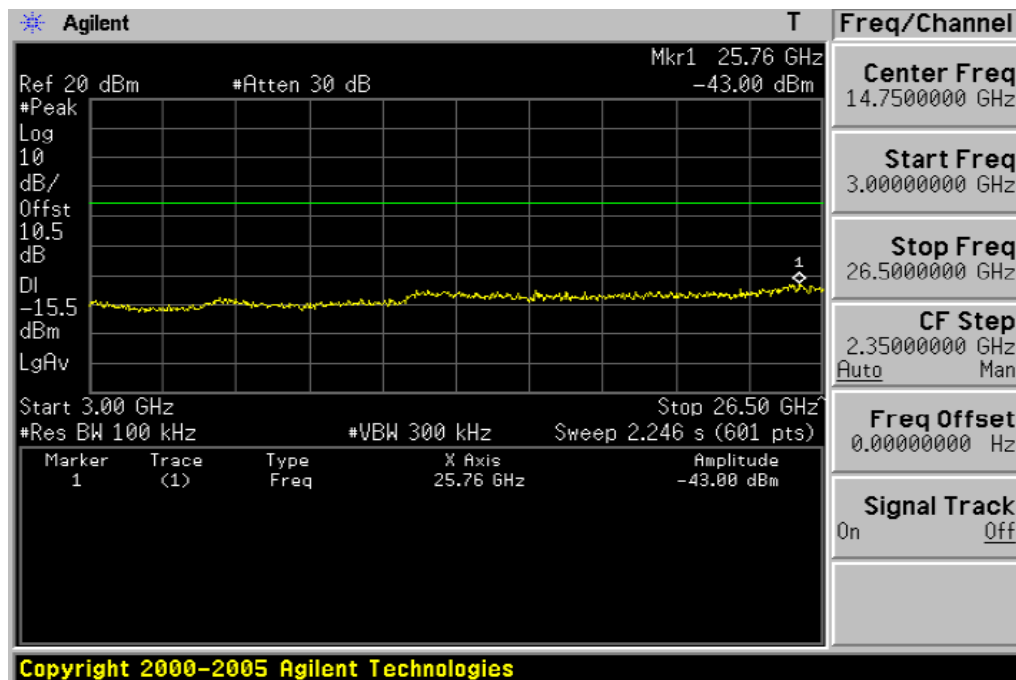
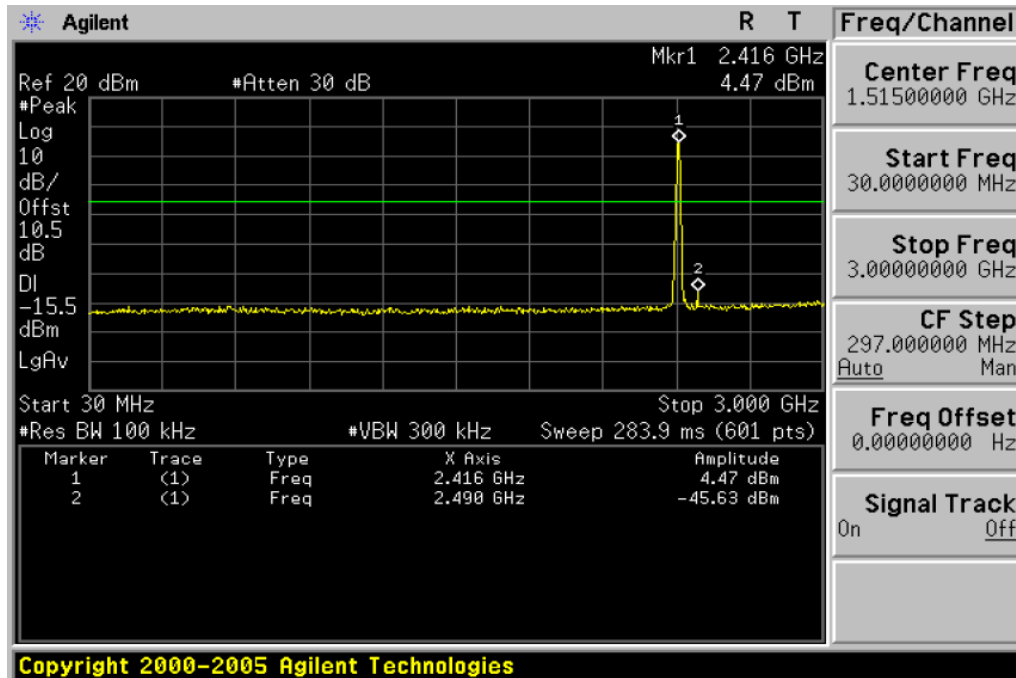
802.11n HT-20

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
7236	35.8	AV	355	1.3	V	41.3	8.90	34.1	51.9	54	2.10
4824	34.2	AV	120	1.3	H	41.3	8.90	34.1	50.3	54	3.70
7236	40.6	AV	100	1.4	H	36.1	6.38	34.2	48.88	54	5.12
4824	40.1	AV	90	1.5	V	36.1	6.38	34.2	48.38	54	5.62
4824	46.2	PK	165	1.2	V	41.3	8.90	34.1	62.3	74	11.70
7236	44.3	PK	45	1.4	H	41.3	8.90	34.1	60.4	74	13.60
7236	48.3	PK	210	1.5	V	36.1	6.38	34.2	56.58	74	17.42
4824	47.2	PK	200	1.2	H	36.1	6.38	34.2	55.48	74	18.52
Middle Channel (2437MHz)											
7311	34.7	AV	360	1.3	V	41.8	8.92	34.1	51.32	54	2.68
4874	34.1	AV	180	1.4	V	41.8	8.92	34.1	50.72	54	3.28
7311	52.9	PK	300	1.4	V	41.8	8.92	34.1	69.52	74	4.48
4874	38.4	AV	205	1.3	H	36.5	6.39	34.2	47.09	54	6.91
7311	48.5	PK	150	1.3	H	41.8	8.92	34.1	65.12	74	8.88
7311	36.1	AV	90	1.5	H	36.5	6.39	34.2	44.79	54	9.21
4874	53.4	PK	45	1.5	V	36.5	6.39	34.2	62.09	74	11.91
4874	50.6	PK	0	1.1	H	36.5	6.39	34.2	59.29	74	14.71
High Channel (2462MHz)											
7386	35.4	AV	210	1.5	H	42.0	8.90	34.3	52	54	2.00
4924	35.2	AV	0	1.3	V	42.0	8.90	34.3	51.8	54	2.20
4924	40.7	AV	115	1.4	H	36.4	6.39	34.2	49.29	54	4.71
7386	39.6	AV	45	1.4	V	36.4	6.39	34.2	48.19	54	5.81
4924	47.1	PK	180	1.4	V	42.0	8.90	34.3	63.7	74	10.30
7386	46.2	PK	95	1.4	H	42.0	8.90	34.3	62.8	74	11.20
7386	50.2	PK	360	1.5	V	36.4	6.39	34.2	58.79	74	15.21
4924	49.6	PK	265	1.1	H	36.4	6.39	34.2	58.19	74	15.81

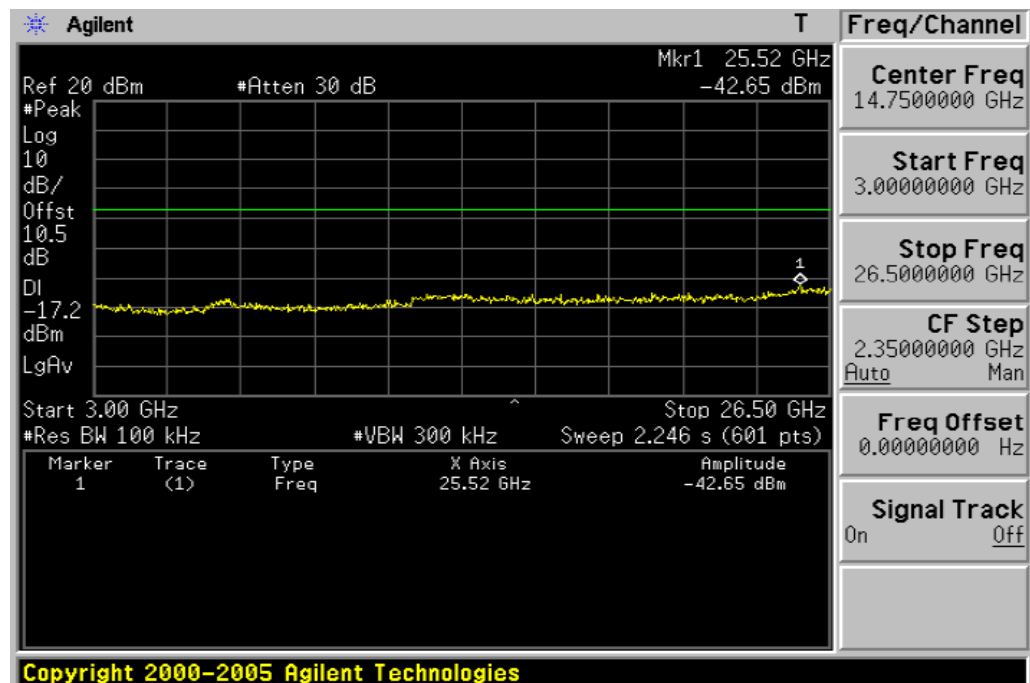
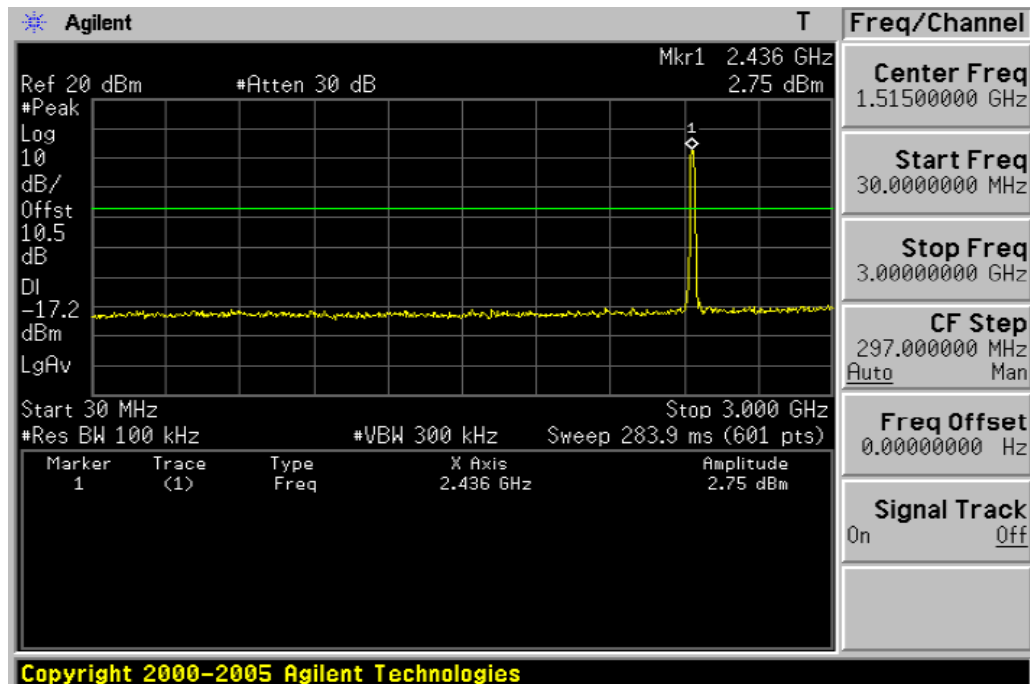
Antenna port conducted spurious emissions

802.11b mode:

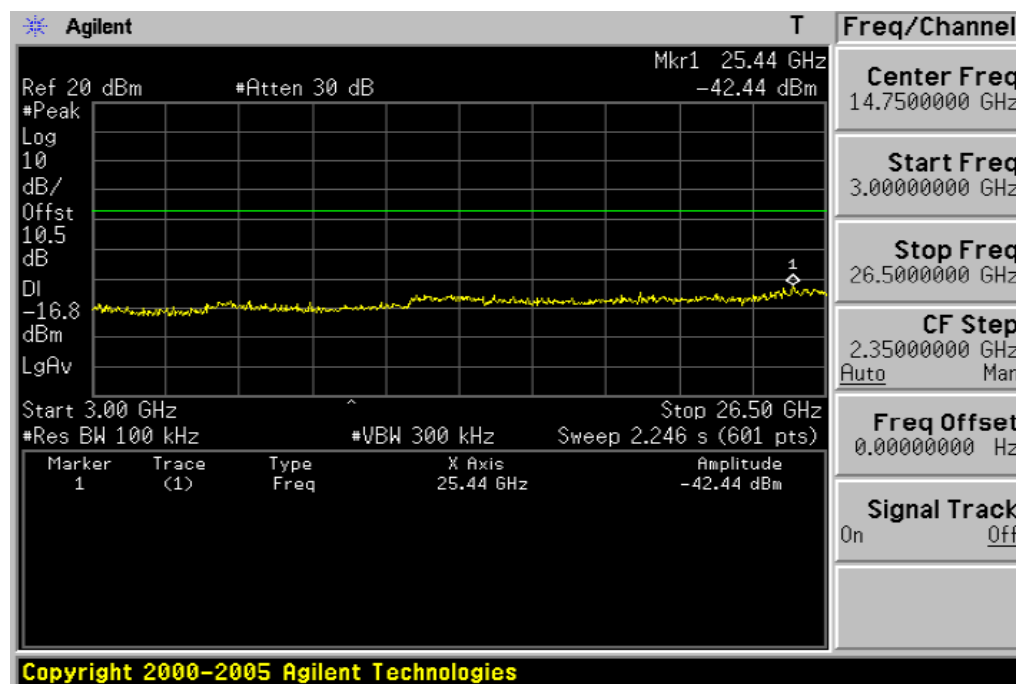
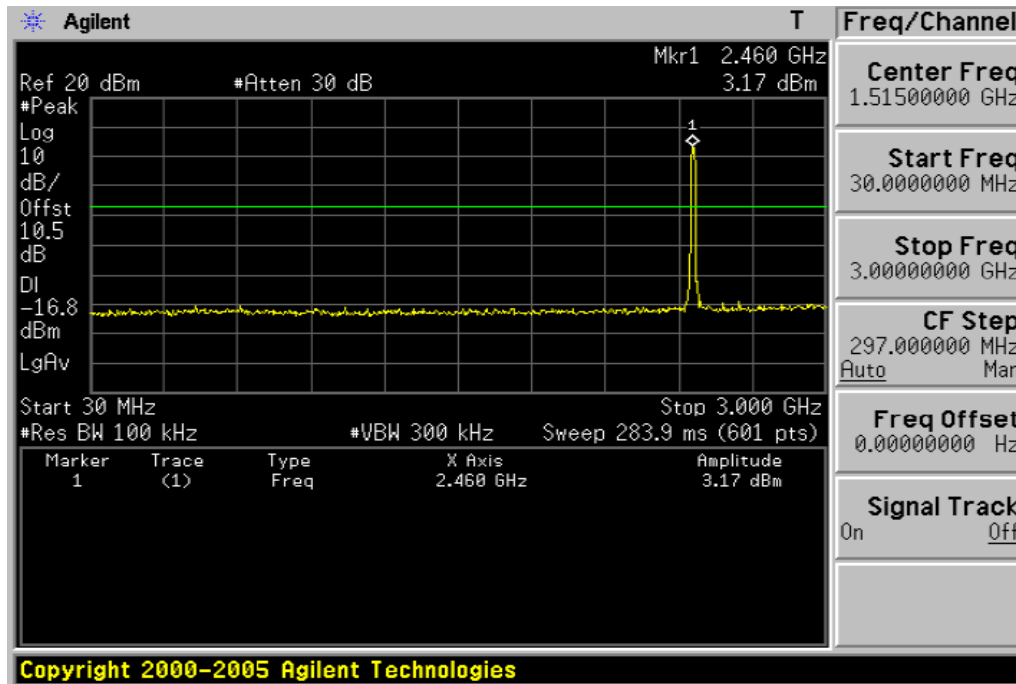
Low channel



Middle channel

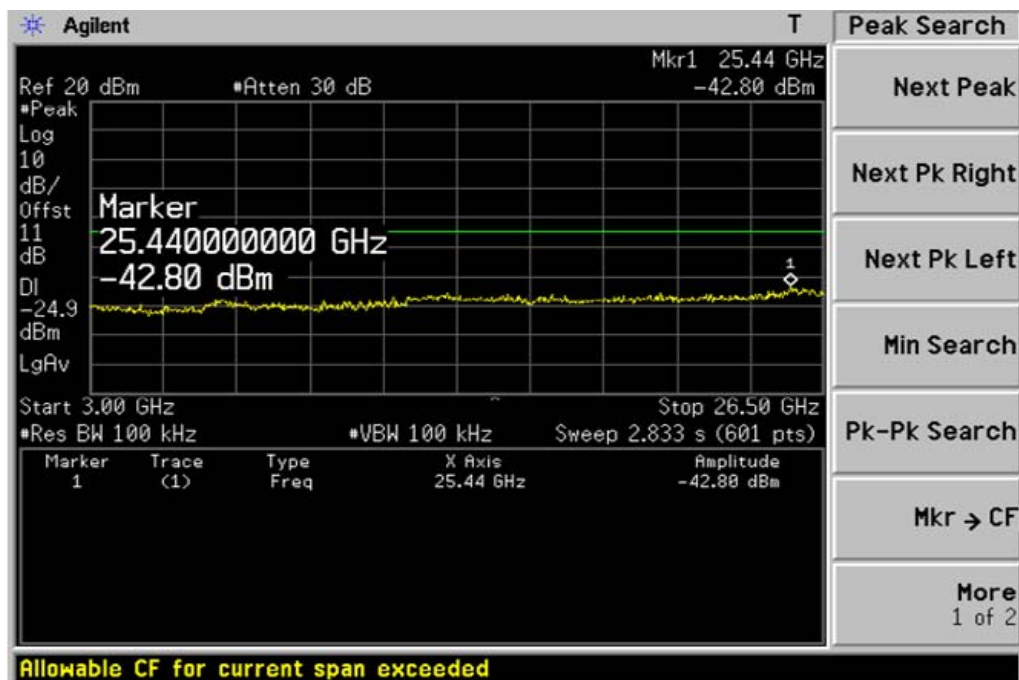
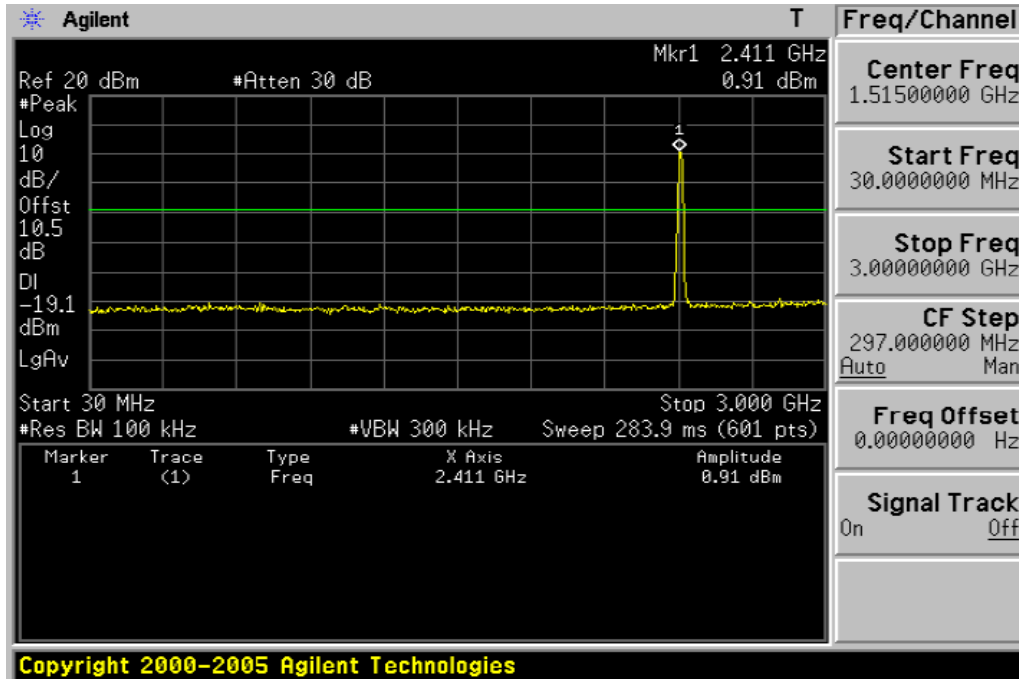


High channel

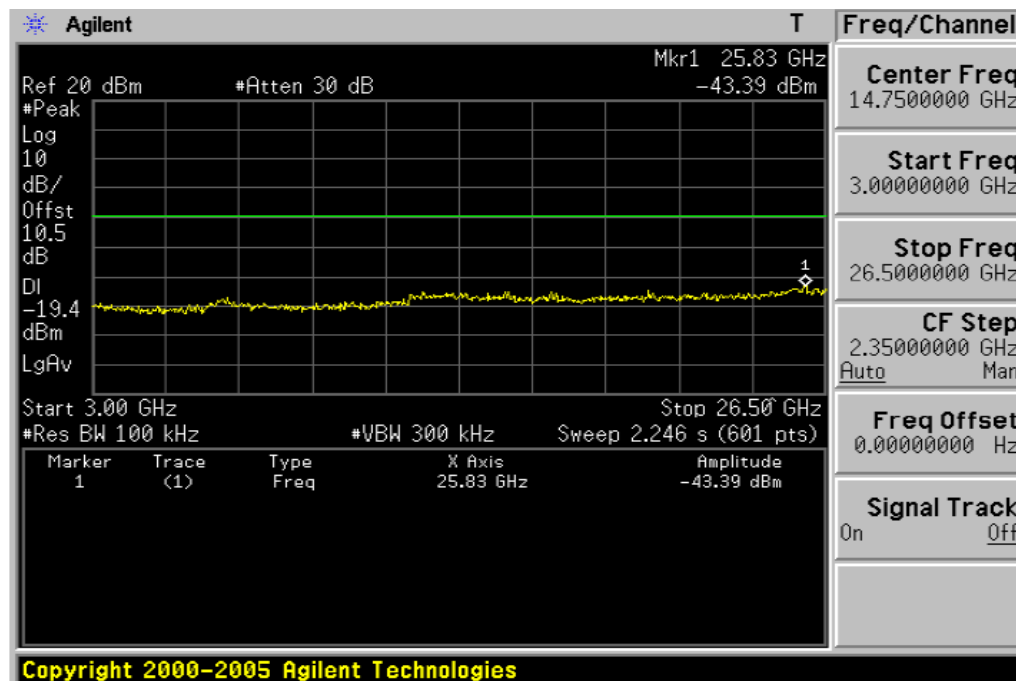
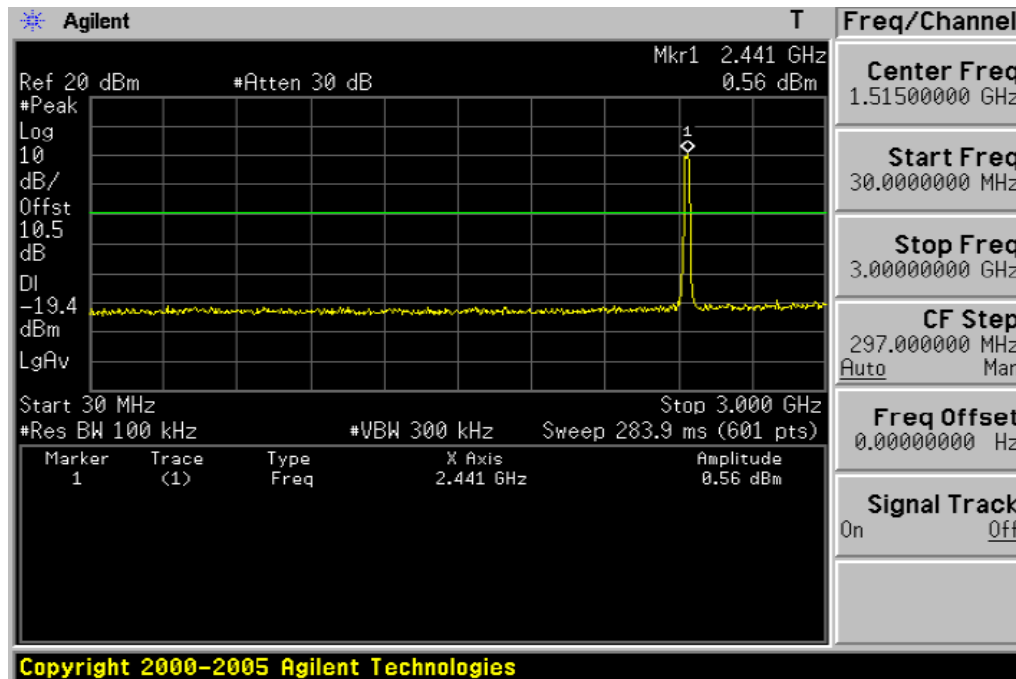


802.11g mode:

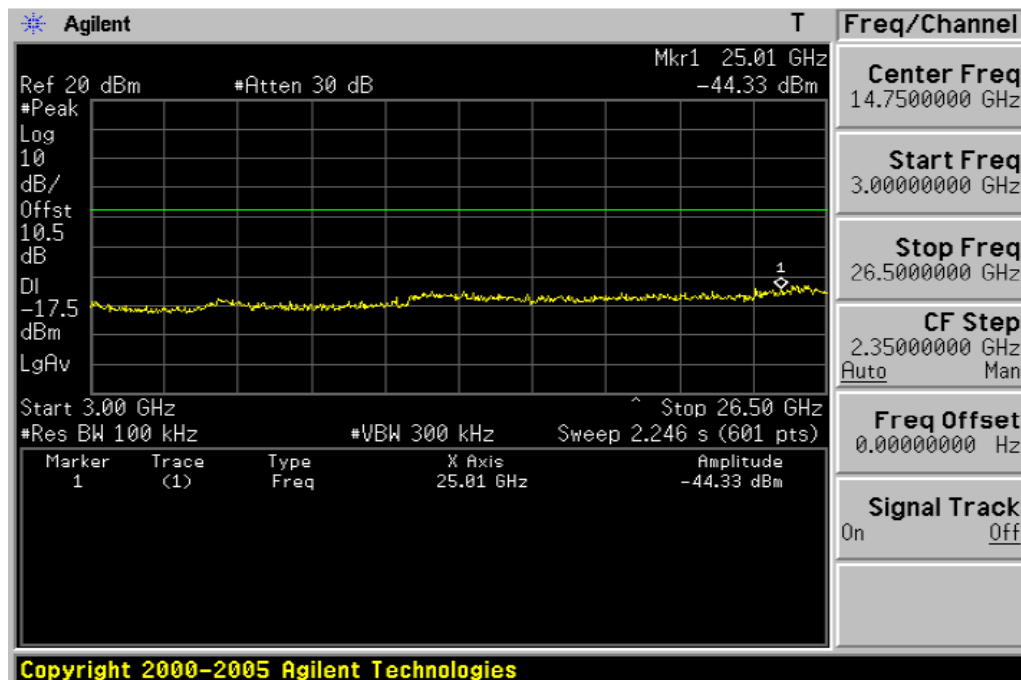
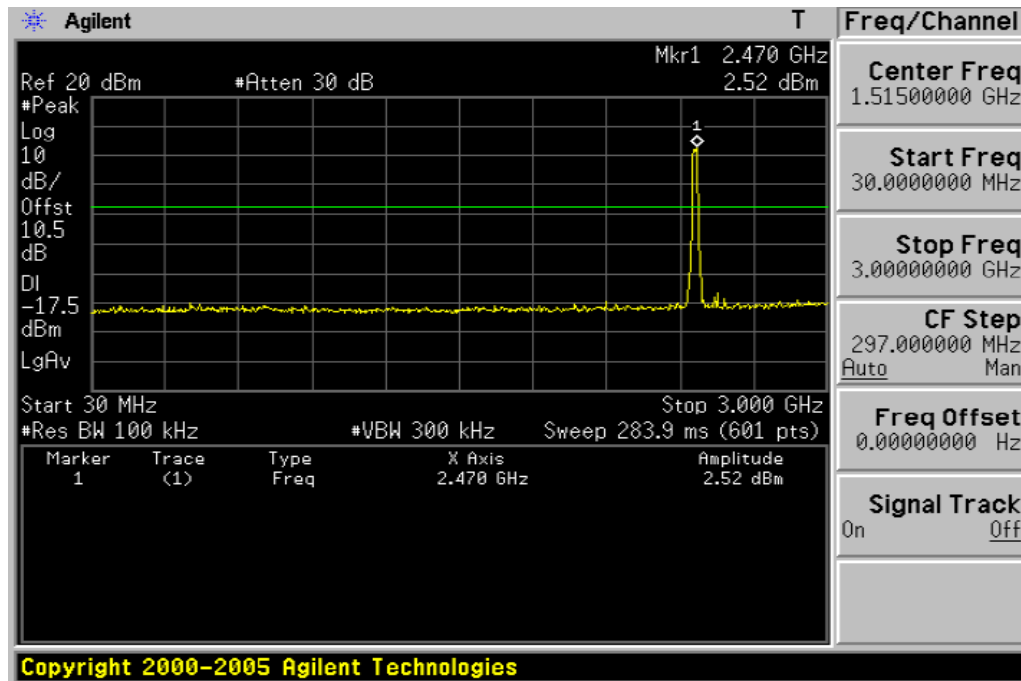
Low channel



Middle channel

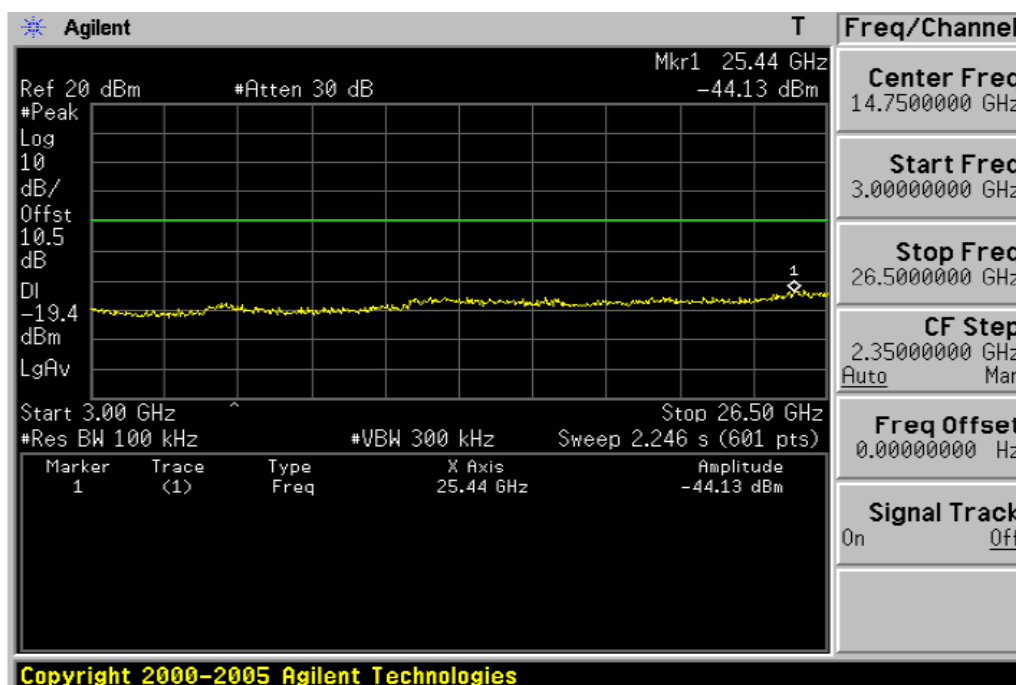
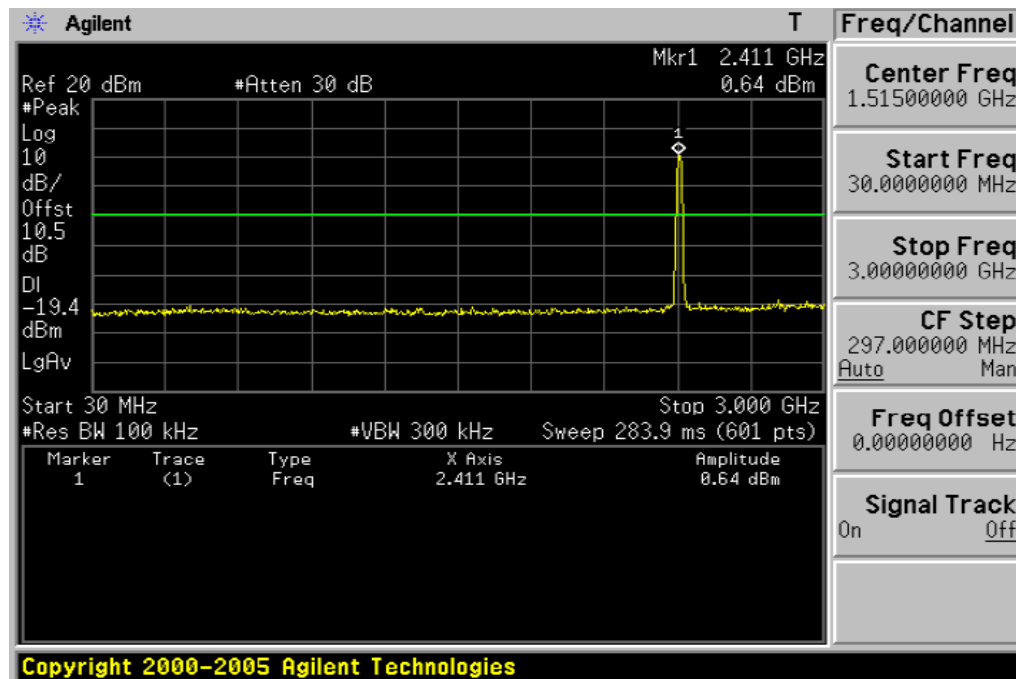


High channel

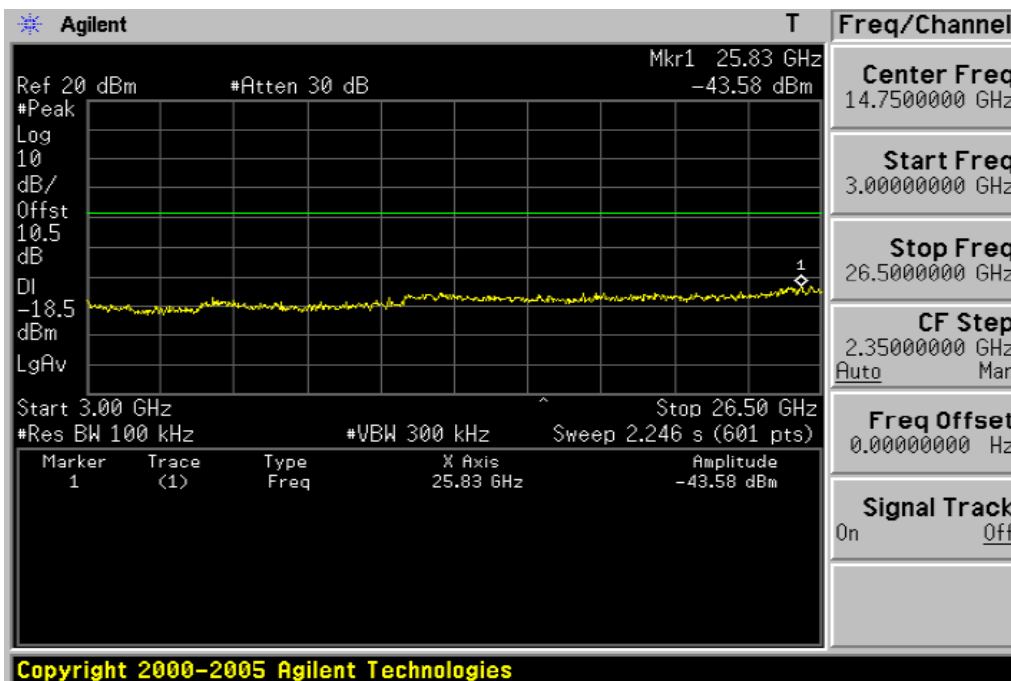
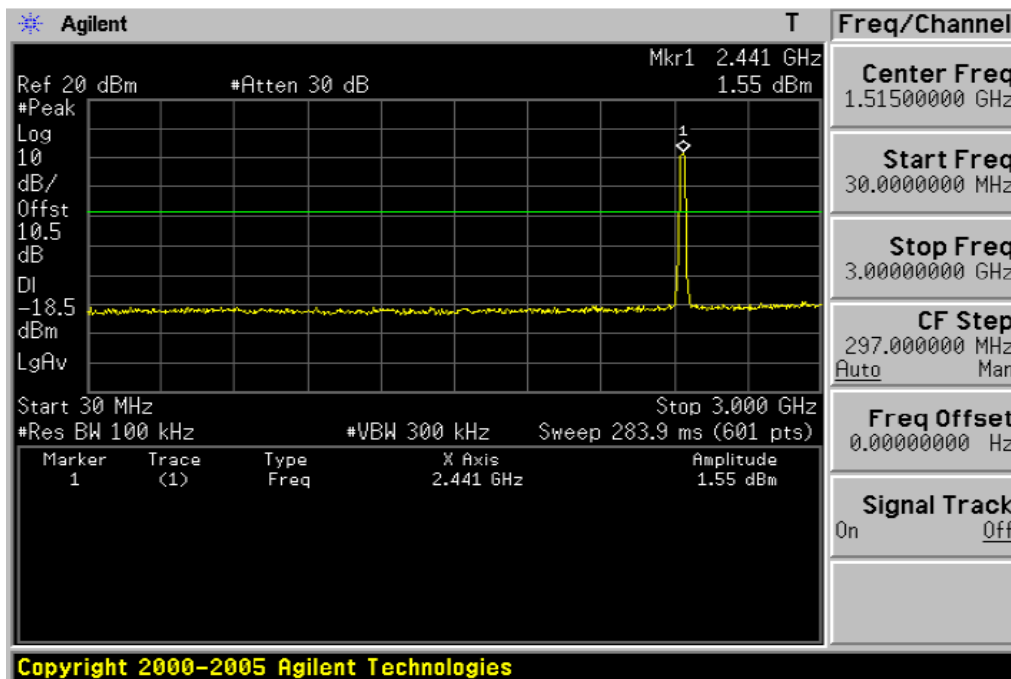


802.11n HT-20 Mode:

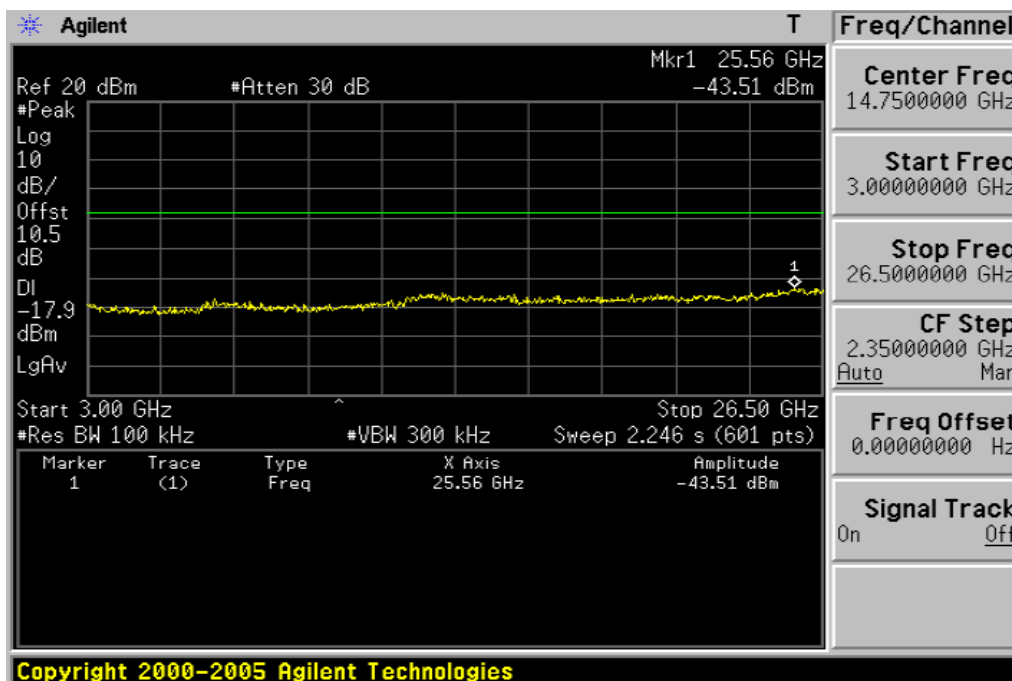
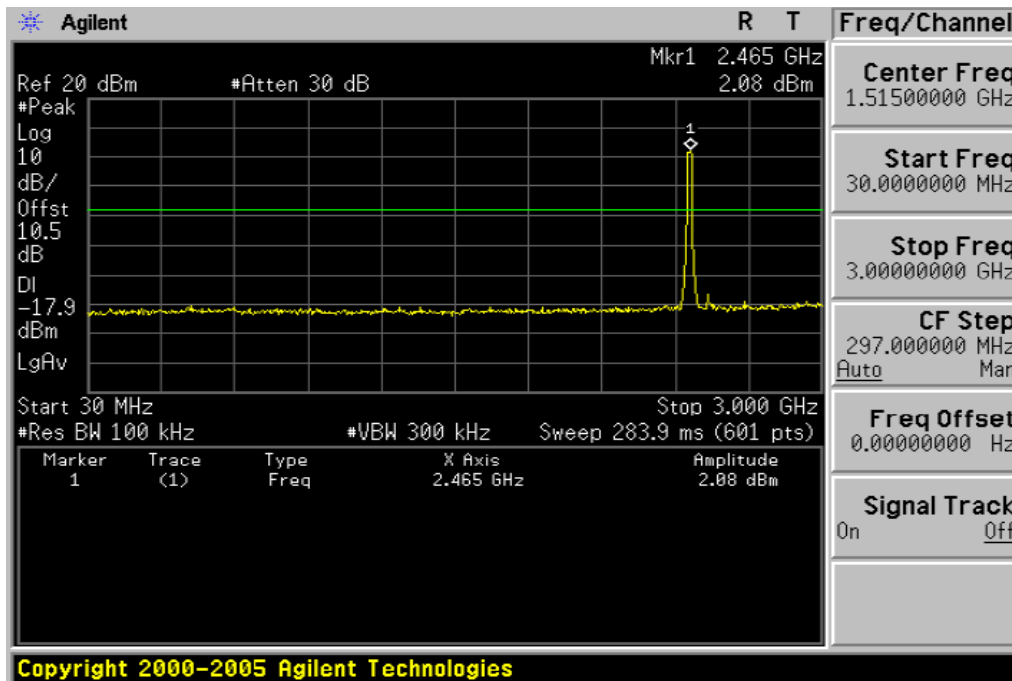
Low channel



Middle channel



High channel



§15.247(a) (2) – 6dB BANDWIDTH TESTING

Test Equipment

Please refer to Section 4 this report.

Test Procedure

The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. The transmitter output was connected to a spectrum analyzer and the parameter was set as below:

1. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	100.0kPa

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

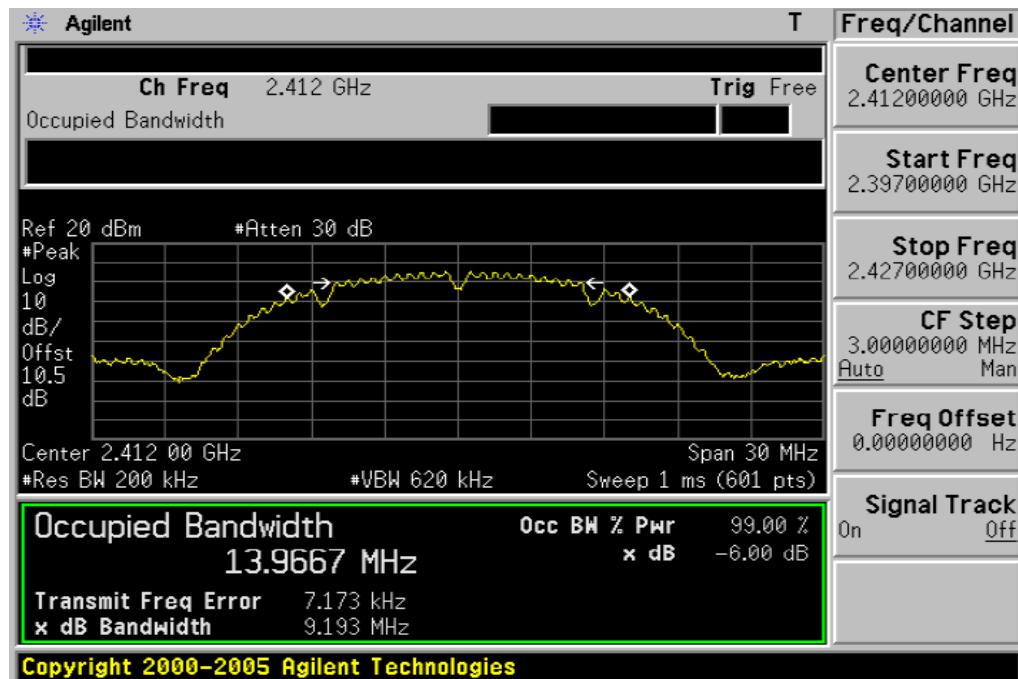
Test Result: Pass.

Please refer to the following tables

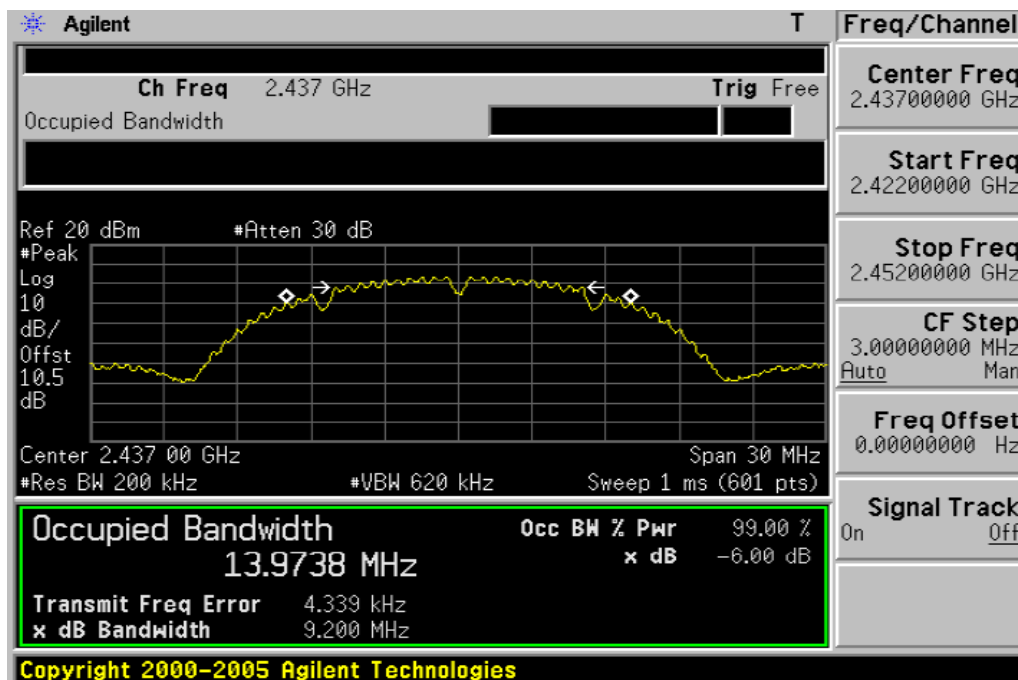
Channel Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)	Limit (kHz)	Ref. Plot
802.11b Mode				
2412	1	9193	> 500	PLOT 1
2437	1	9200	> 500	PLOT 2
2462	1	9190	> 500	PLOT 3
802.11g Mode				
2412	6	16076	> 500	PLOT 4
2437	6	16091	> 500	PLOT 5
2462	6	16180	> 500	PLOT 6
802.11n HT-20 Mode				
2412	6.5	17273	> 500	PLOT 7
2437	6.5	17213	> 500	PLOT 8
2462	6.5	17284	> 500	PLOT 9

802.11b Mode:

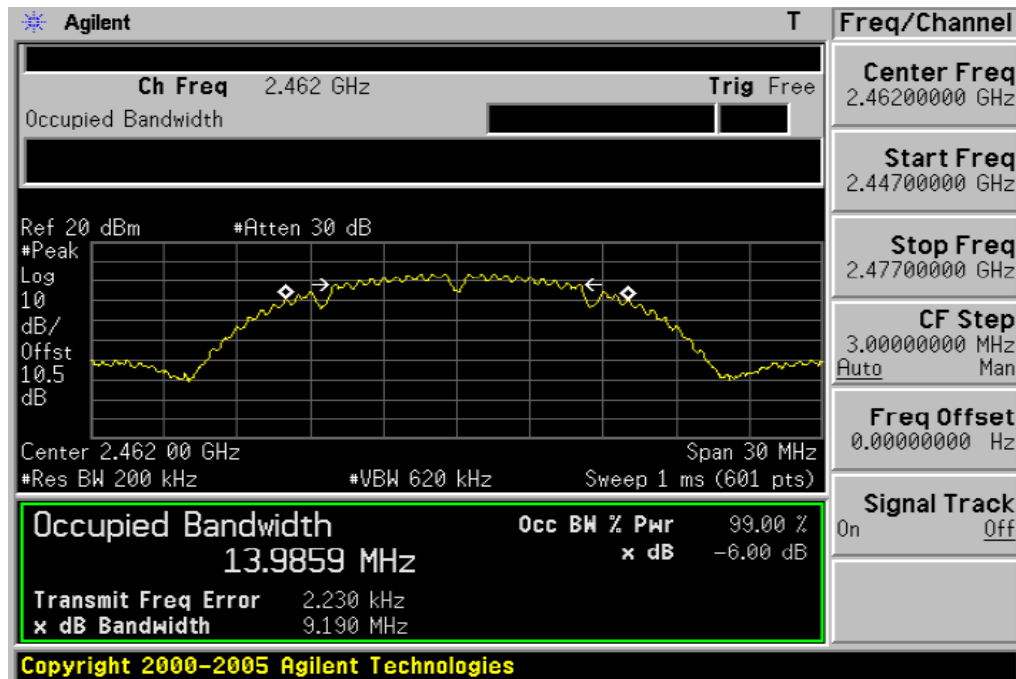
Low Channel



Middle channel

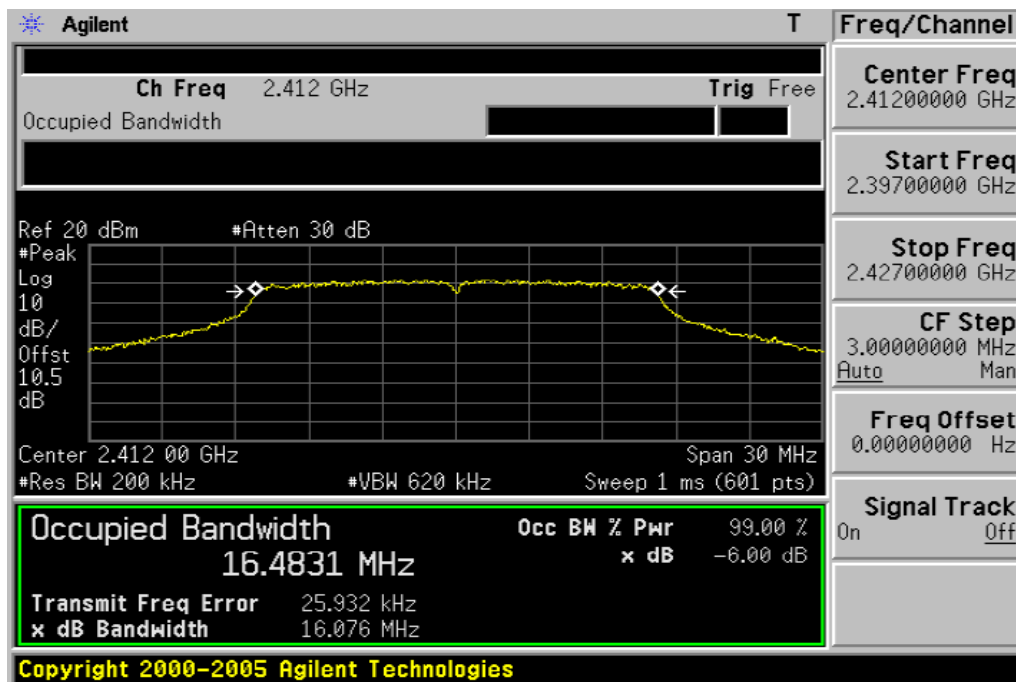


High Channel

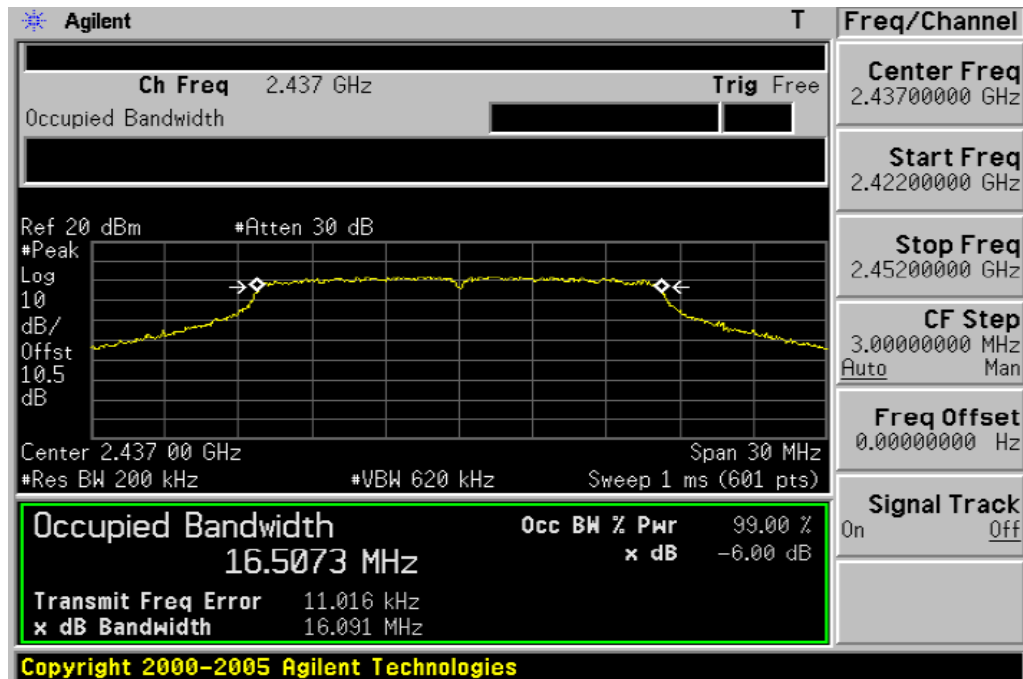


802.11g Mode:

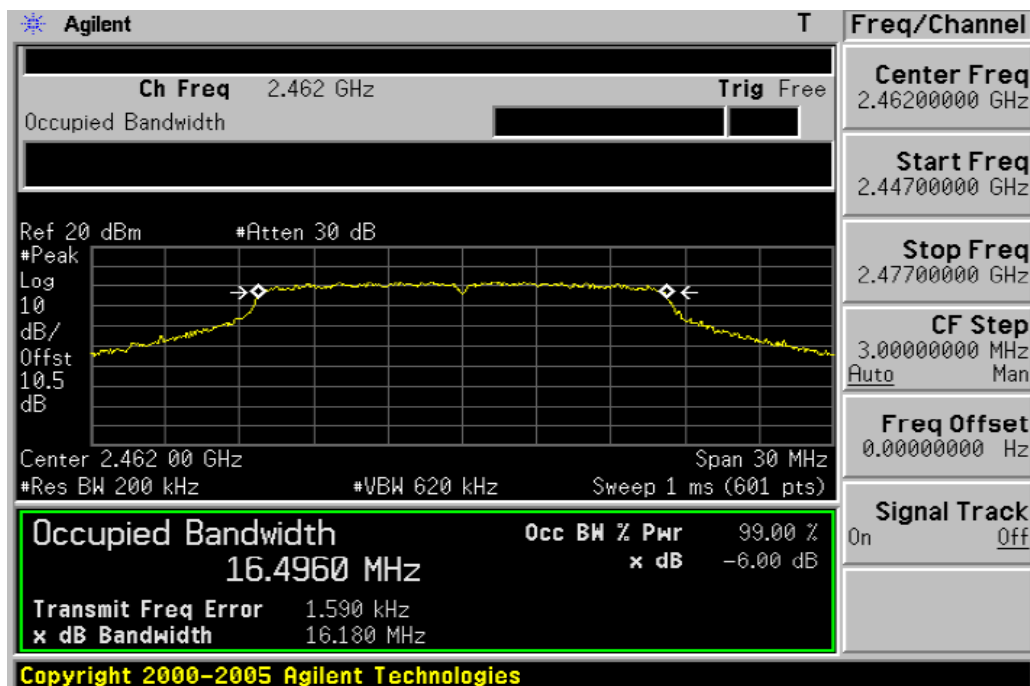
Low Channel



Middle Channel

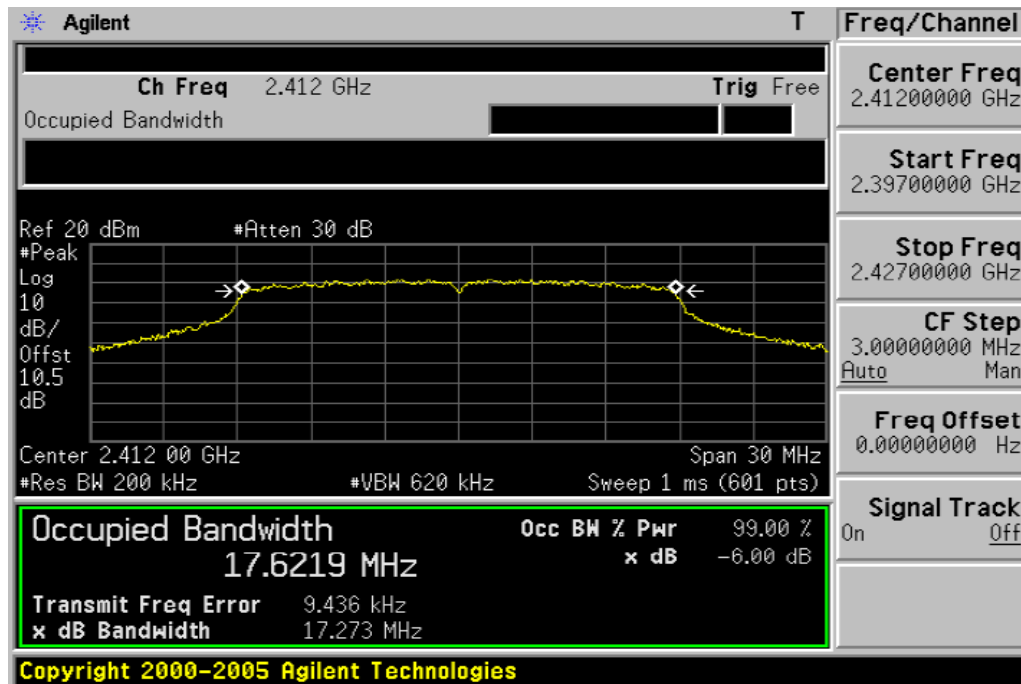


High Channel

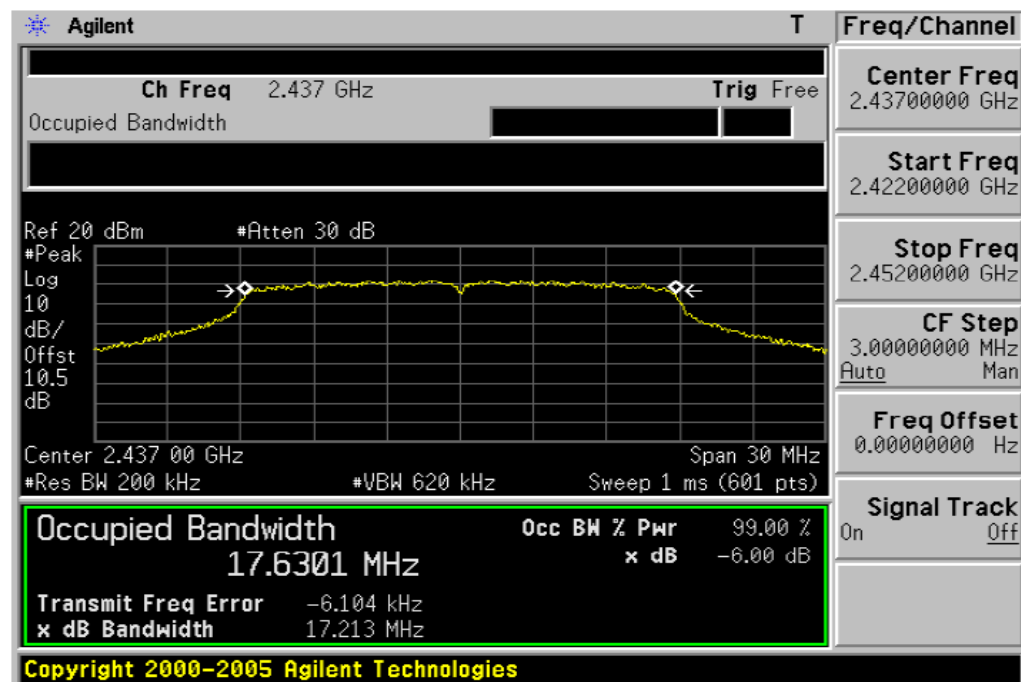


802.11n HT-20 Mode:

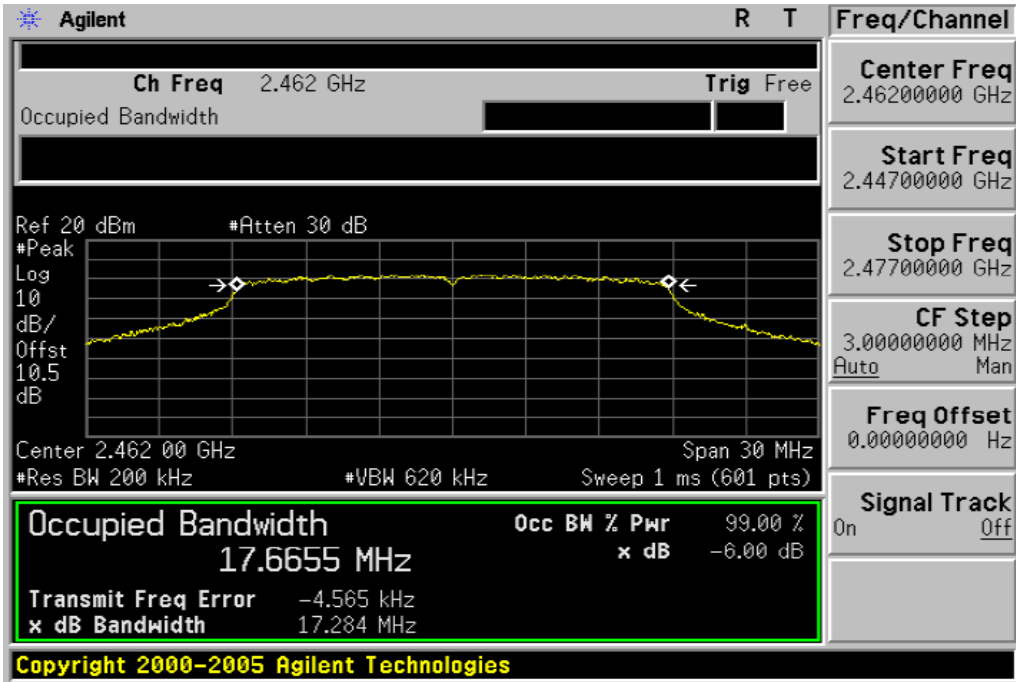
Low Channel



Middle Channel



High Channel



§15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Test Equipment

Please refer to Section 4 this report.

Test Procedure

This procedure should only be used when the maximum available RBW of the spectrum/signal analyzer is less than the DTS bandwidth. The transmitter output was connected to a spectrum analyzer and the parameter was set as below:

1. Set the RBW = maximum available (at least 1 MHz).
2. Set the VBW = 3 x RBW or maximum available setting (must be $\geq$ RBW).
3. Set the span to fully encompass the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	100.0kPa

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Result

802.11b Mode:

Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Power (dBm)	Limit (dBm)
Low	2412	1	9.52	30
Mid	2437	1	9.46	30
High	2462	1	9.13	30

802.11g Mode:

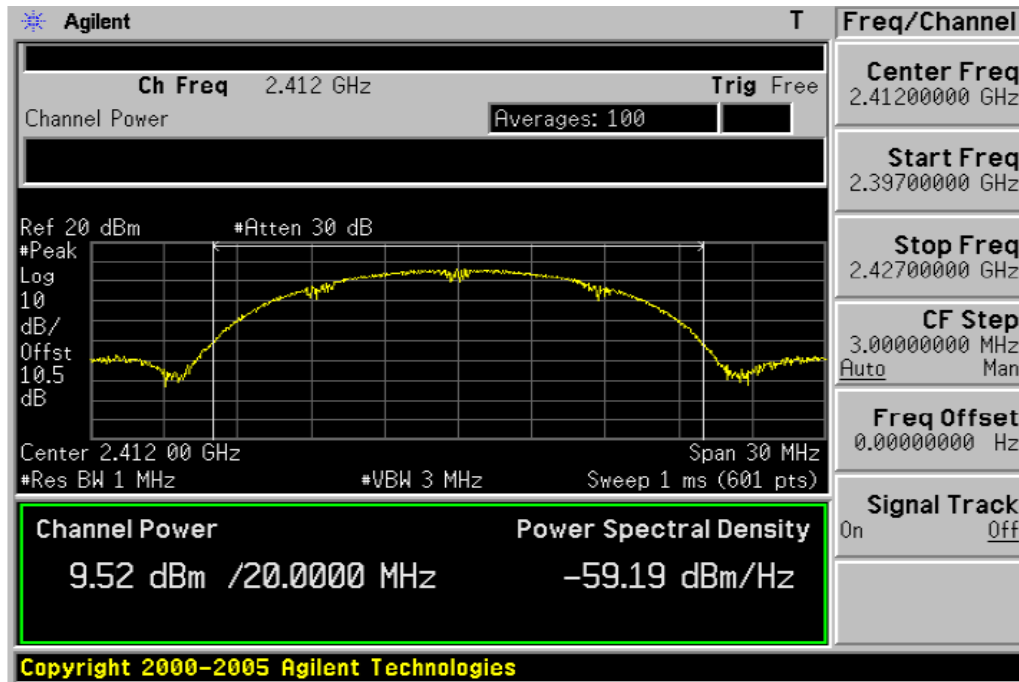
Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Power (dBm)	Limit (dBm)
Low	2412	6	9.31	30
Mid	2437	6	9.24	30
High	2462	6	9.48	30

802.11n HT20 Mode:

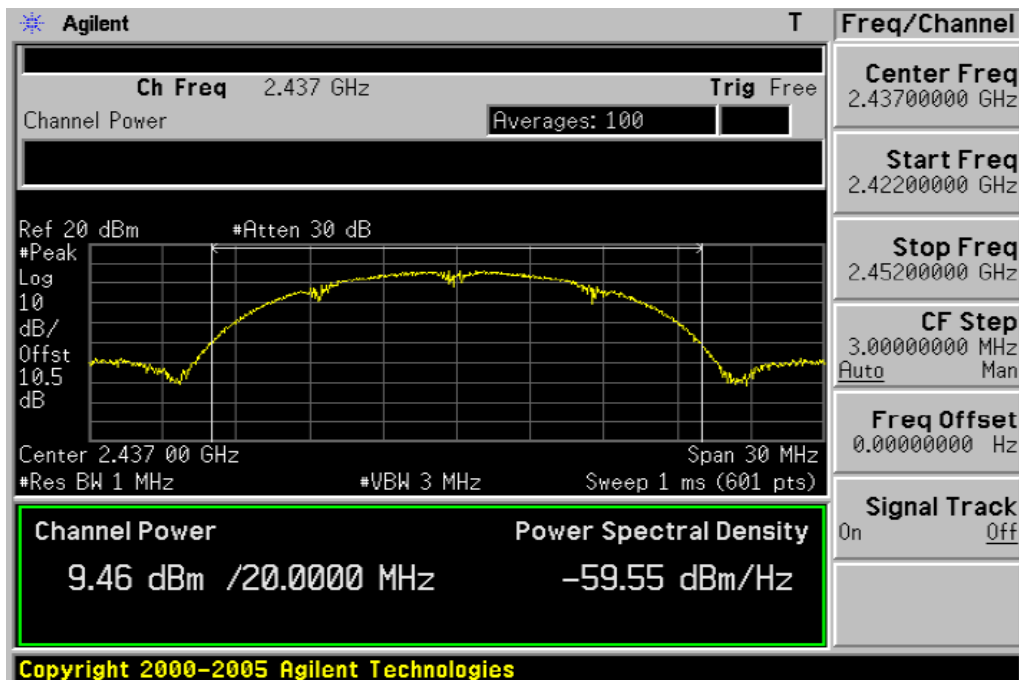
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Power Output (dBm)	Limit (dBm)
Low	2412	6.5	9.19	30
Mid	2437	6.5	9.15	30
High	2462	6.5	9.05	30

802.11b Mode:

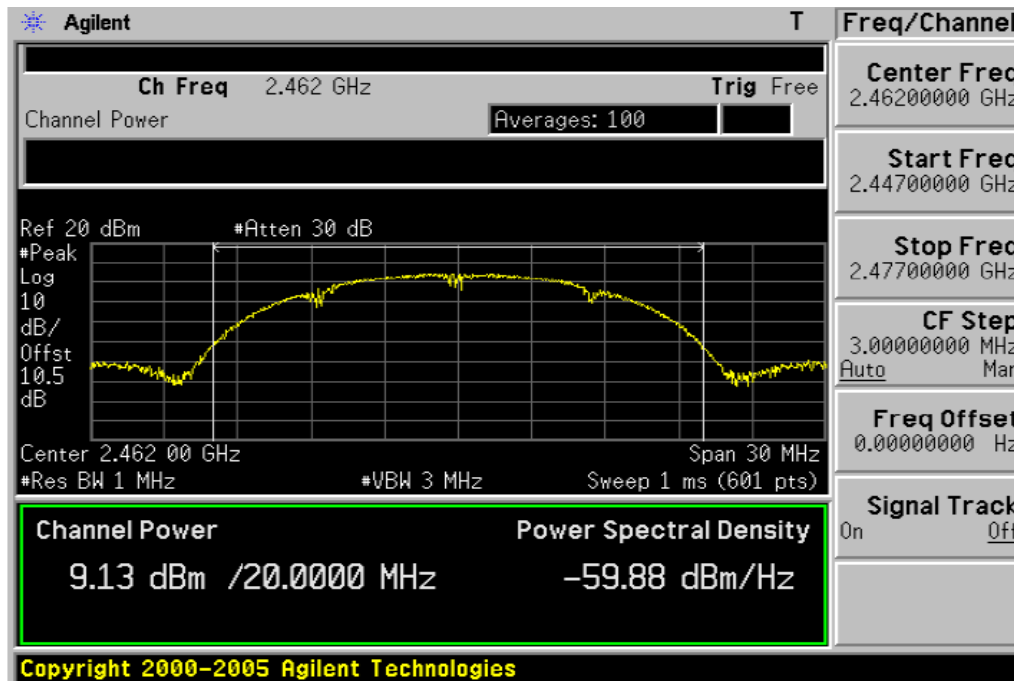
Low channel



Middle channel

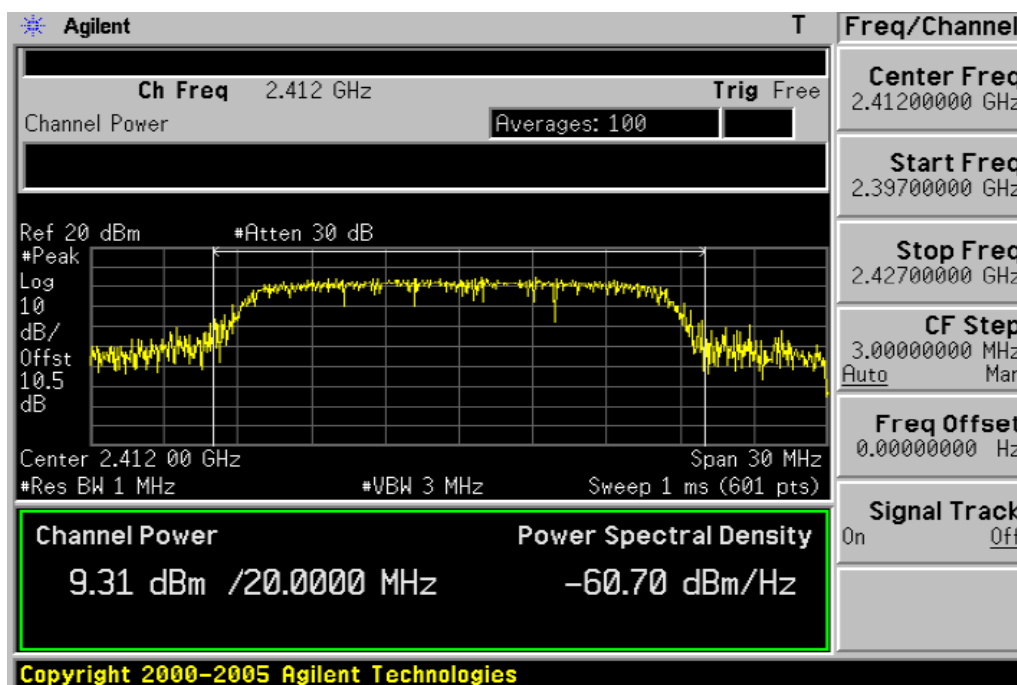


High channel

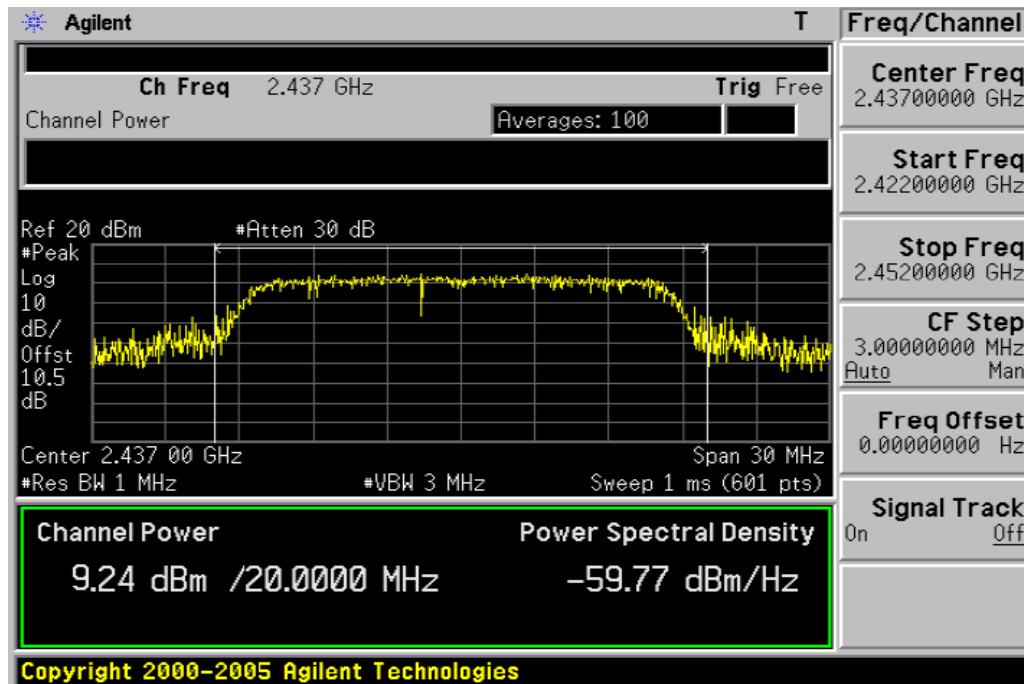


802.11g mode:

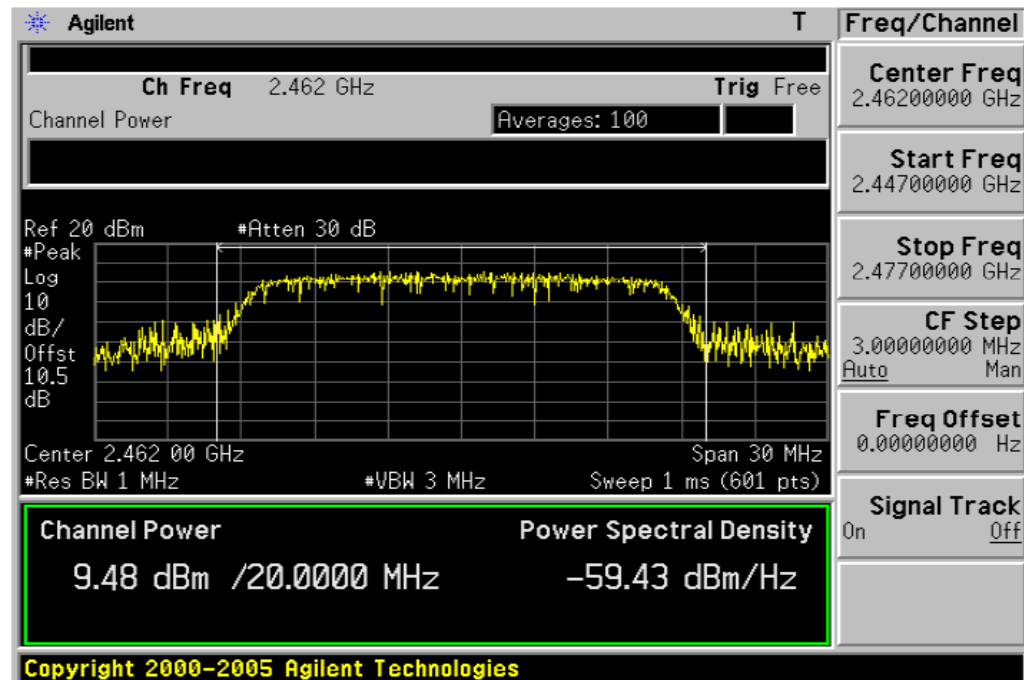
Low channel



Middle channel

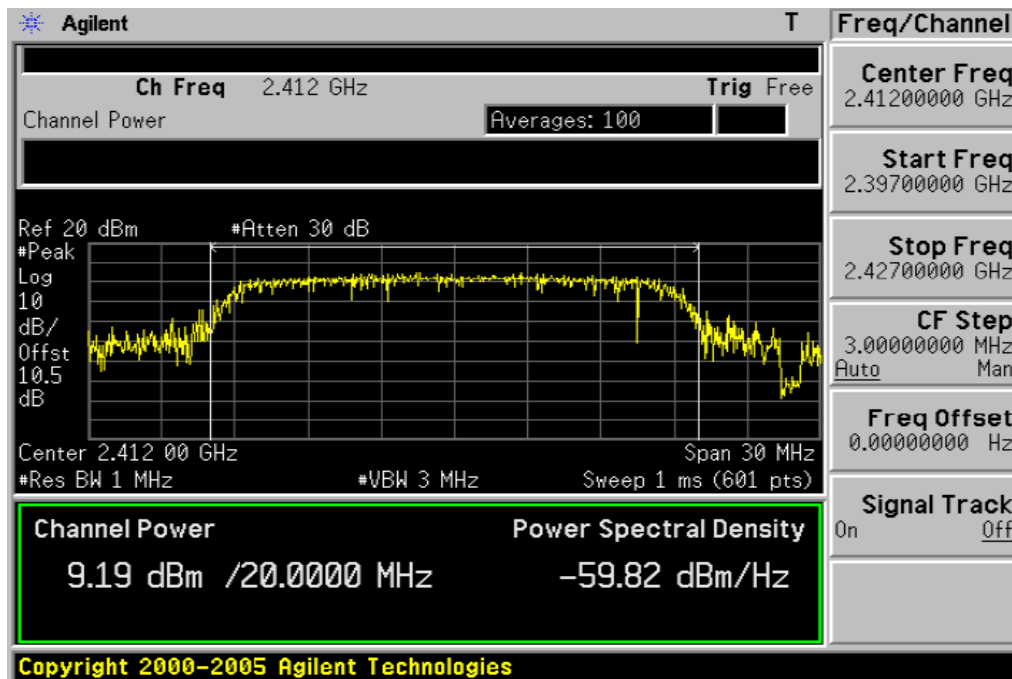


High channel

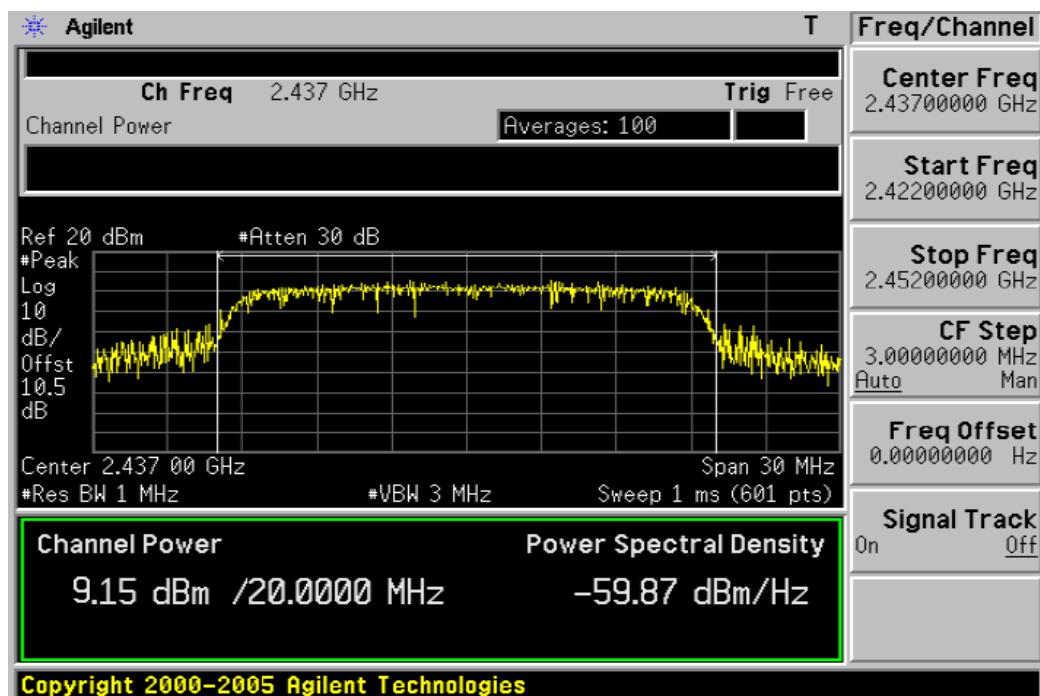


802.11n HT20 Mode:

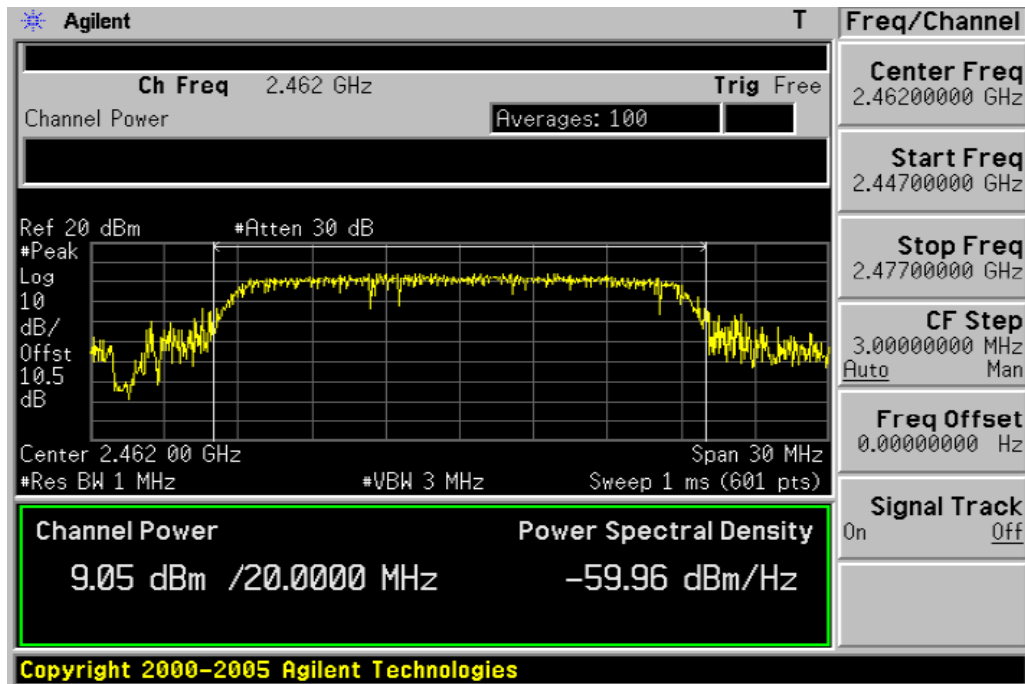
Low channel



Middle channel



High channel



§15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Test Equipment

Please refer to Section 4 this report.

Test Procedure

The out of band emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part Subpart C limits.

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	100.0kPa

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

Test Result

PASS

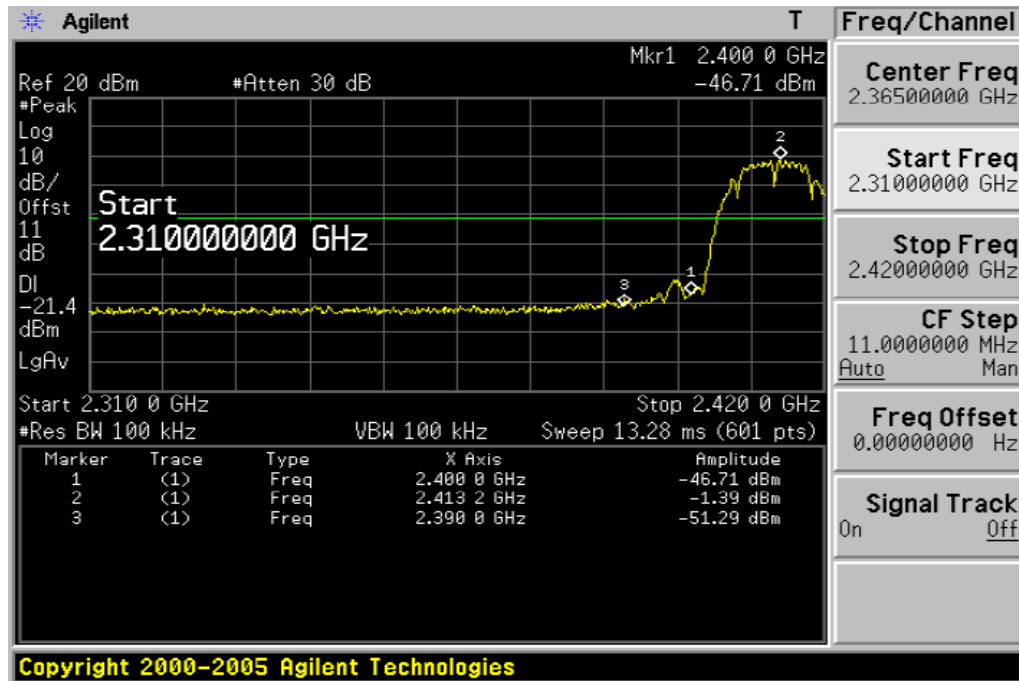
Above 1GHz:

802.11b

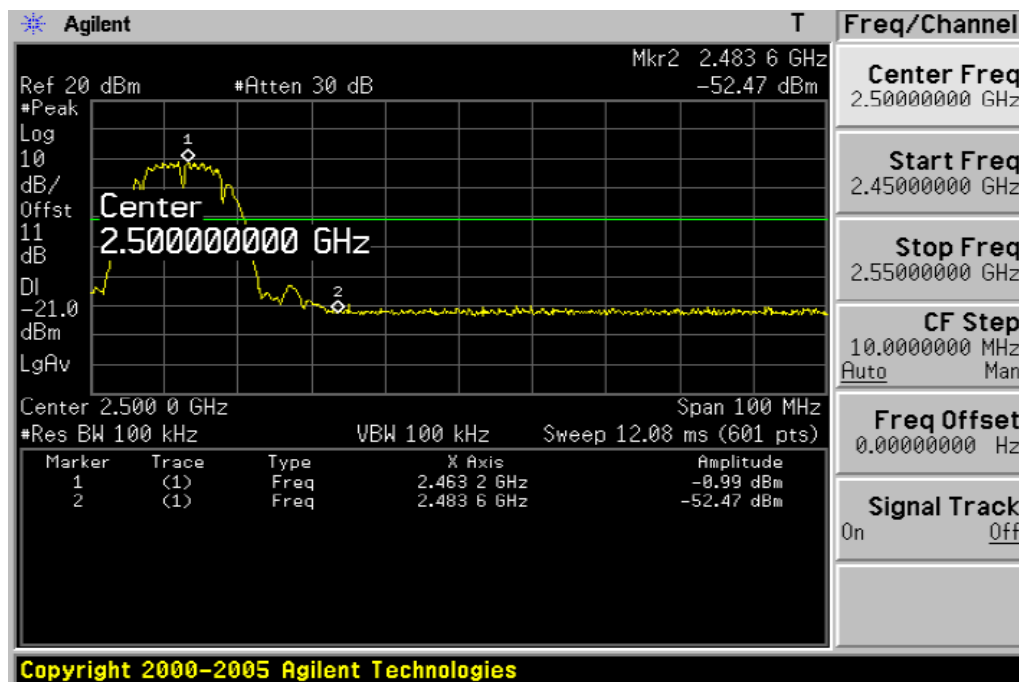
Indicated		result (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2390	45.33	AV	250	1.2	V	30.3	4.1	33.1	46.63	54	7.37
2390	45.44	AV	60	1.6	H	30.3	4.1	33.1	46.74	54	7.26
2390	55.63	PK	180	1.3	V	30.3	4.1	33.1	56.93	74	17.07
2390	55.86	PK	210	1.1	H	30.3	4.1	33.1	57.16	74	16.84
HighChannel (2462MHz)											
2483.5	36.91	AV	360	1.5	V	31	4.4	32.7	39.61	54	14.39
2483.5	37.85	AV	45	1.5	H	31	4.4	32.7	40.55	54	13.45
2483.5	46.58	PK	0	1.4	V	31	4.4	32.7	49.28	74	24.72
2483.5	47.88	PK	200	1.4	H	31	4.4	32.7	50.58	74	23.42

Note: the BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

Lowchannel



High channel

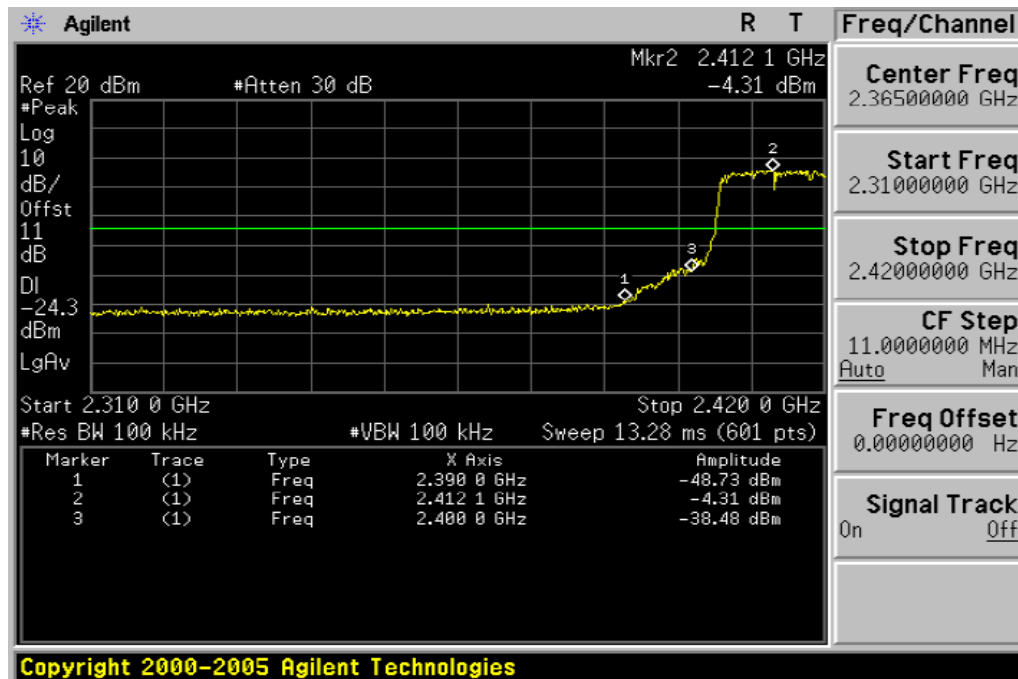


802.11g

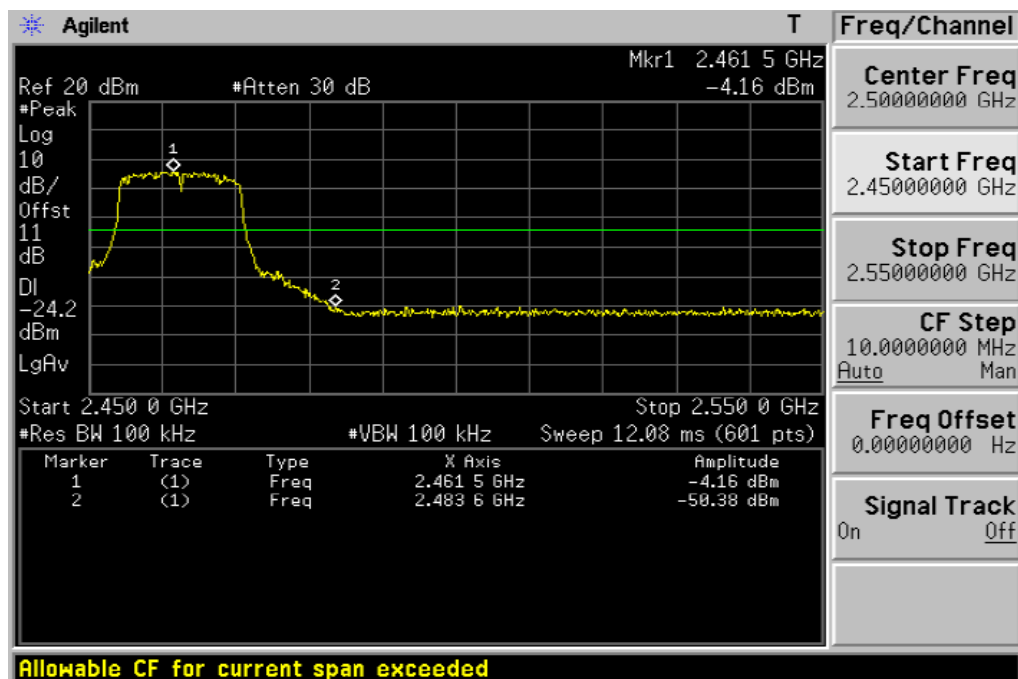
Indicated		result (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2390	39.47	AV	250	1.2	V	30.3	4.1	33.1	40.77	54	13.23
2390	46.92	AV	60	1.6	H	30.3	4.1	33.1	48.22	54	5.78
2390	54.35	PK	180	1.3	V	30.3	4.1	33.1	55.85	74	18.15
2390	64.63	PK	210	1.1	H	30.3	4.1	33.1	65.93	74	8.07
HighChannel (2462MHz)											
2483.5	39.22	AV	360	1.5	V	31	4.4	32.7	41.92	54	12.08
2483.5	43.71	AV	45	1.5	H	31	4.4	32.7	46.41	54	7.59
2483.5	55.50	PK	0	1.4	V	31	4.4	32.7	58.20	74	15.80
2483.5	59.91	PK	200	1.4	H	31	4.4	32.7	62.61	74	11.39

Note: the BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

Low channel



High channel

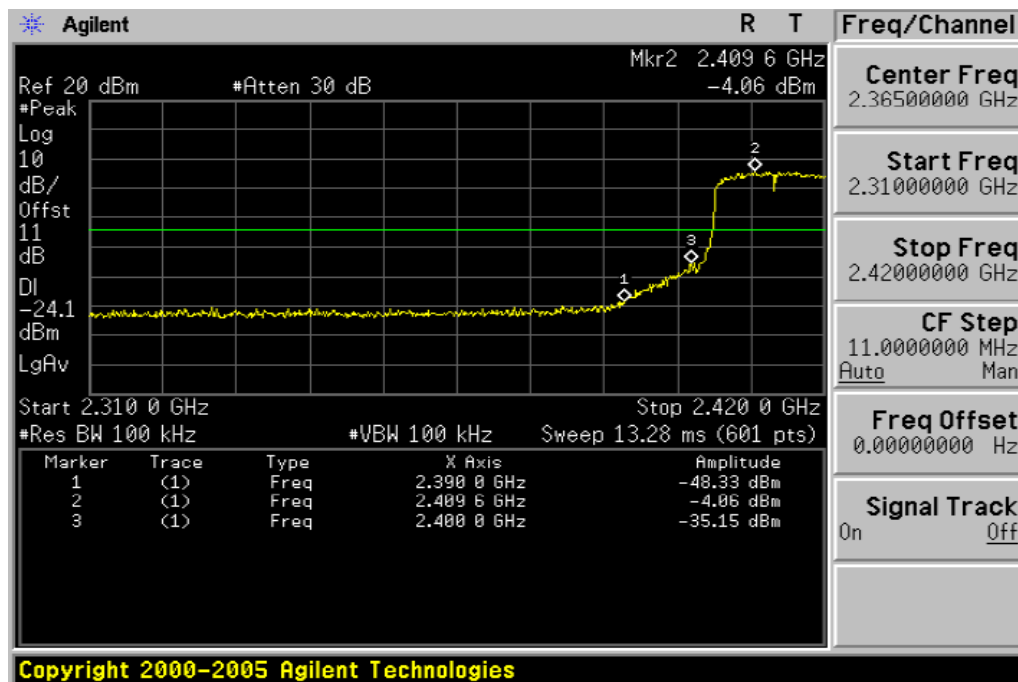


802.11n HT20

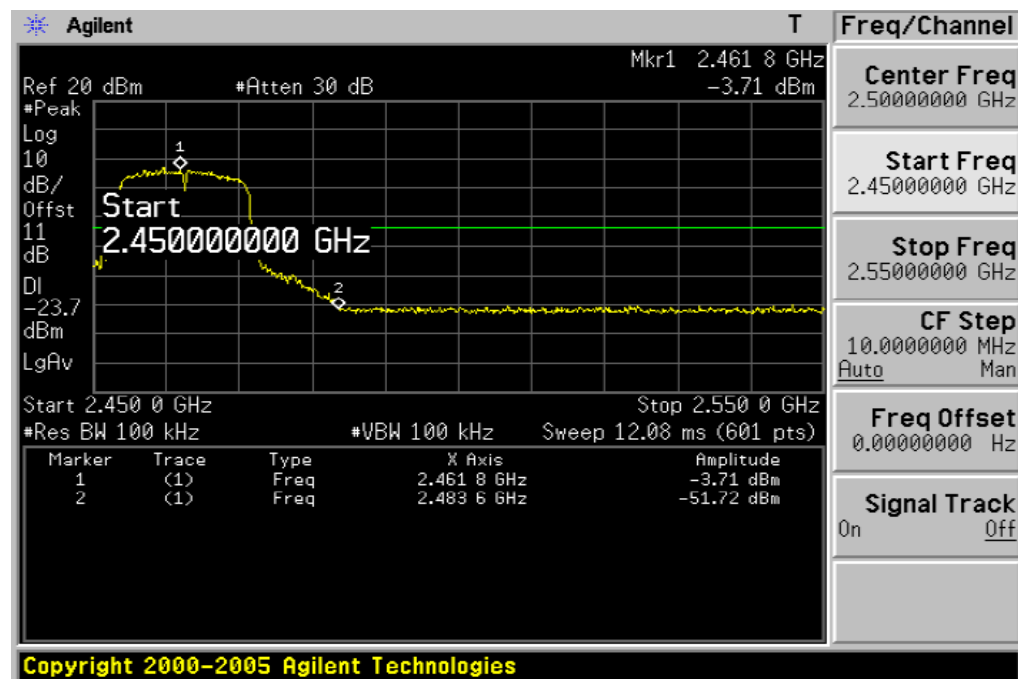
Indicated		result (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2390	44.41	AV	250	1.2	V	30.3	4.1	33.1	45.71	54	8.29
2390	47.70	AV	60	1.6	H	30.3	4.1	33.1	49.00	54	5.00
2390	61.37	PK	180	1.3	V	30.3	4.1	33.1	62.67	74	11.33
2390	62.81	PK	210	1.1	H	30.3	4.1	33.1	64.11	74	9.89
HighChannel (2462MHz)											
2483.5	38.05	AV	360	1.5	V	31	4.4	32.7	40.75	54	13.25
2483.5	40.31	AV	45	1.5	H	31	4.4	32.7	43.01	54	10.99
2483.5	57.34	PK	0	1.4	V	31	4.4	32.7	60.04	74	13.96
2483.5	58.79	PK	200	1.4	H	31	4.4	32.7	61.49	74	12.51

Note: the BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

Low channel



High channel



§15.247(e) - POWER SPECTRAL DENSITY

Test Equipment

Please refer to Section 4 this report.

Test Procedure

The transmitter output was connected to the spectrum analyzer and the parameter was set as below:

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW $\geq$ 3 kHz.
4. Set the VBW $\geq$ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55%
ATM Pressure:	100.0kPa

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

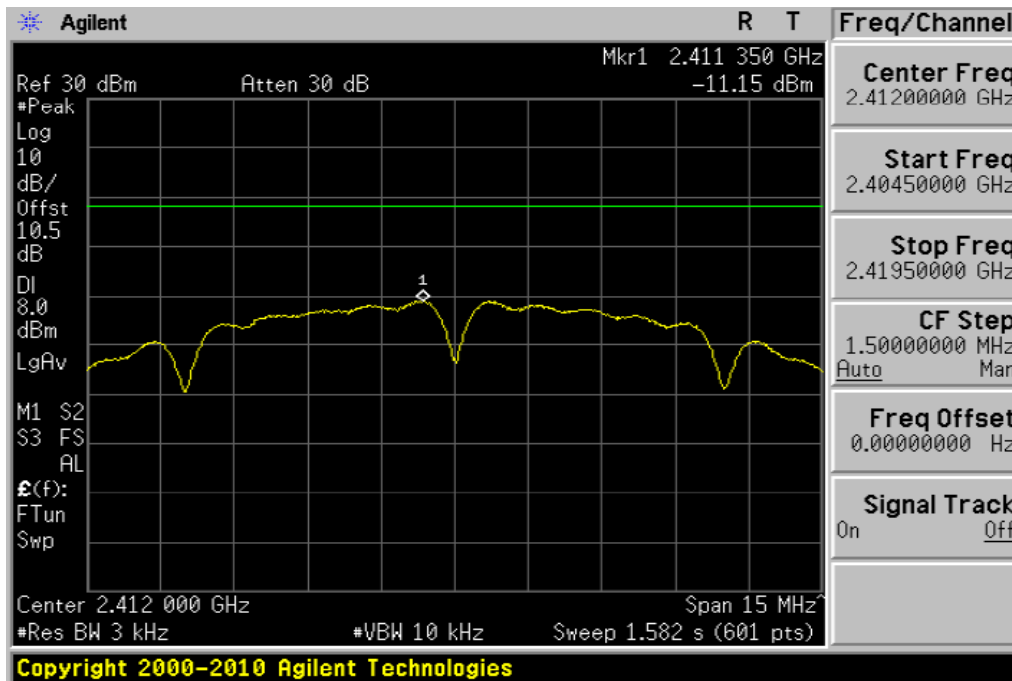
Test Result

PASS

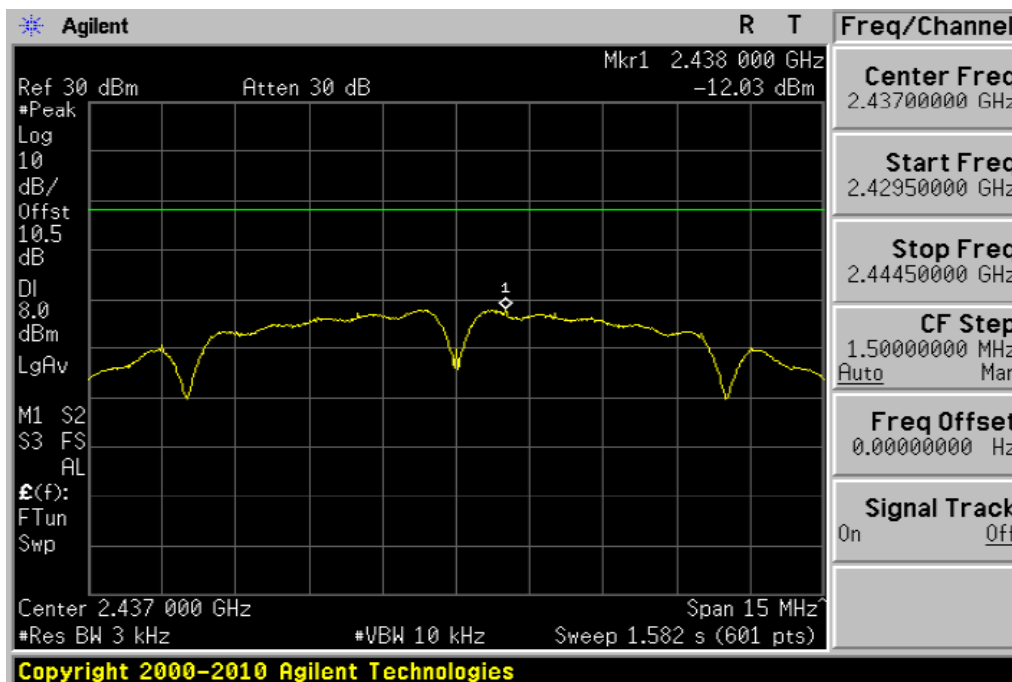
Channel Frequency (MHz)	Data Rate (Mbps)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	RESULT
802.11b Mode				
2412	1	-11.15	8	Compliant
2437	1	-12.03	8	Compliant
2462	1	-12.20	8	Compliant
802.11g Mode				
2412	6	-13.33	8	Compliant
2437	6	-13.31	8	Compliant
2462	6	-13.54	8	Compliant
802.11n HT20 Mode				
2412	6.5	-15.73	8	Compliant
2437	6.5	-14.91	8	Compliant
2462	6.5	-15.39	8	Compliant

802.11b Mode:

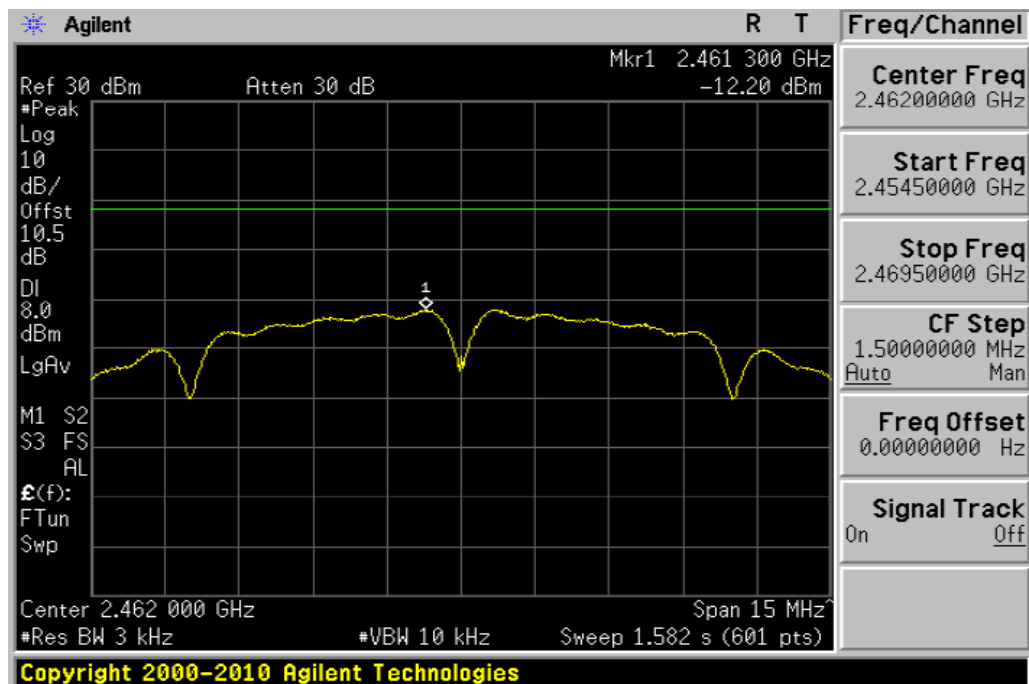
Low Channel



Middle Channel

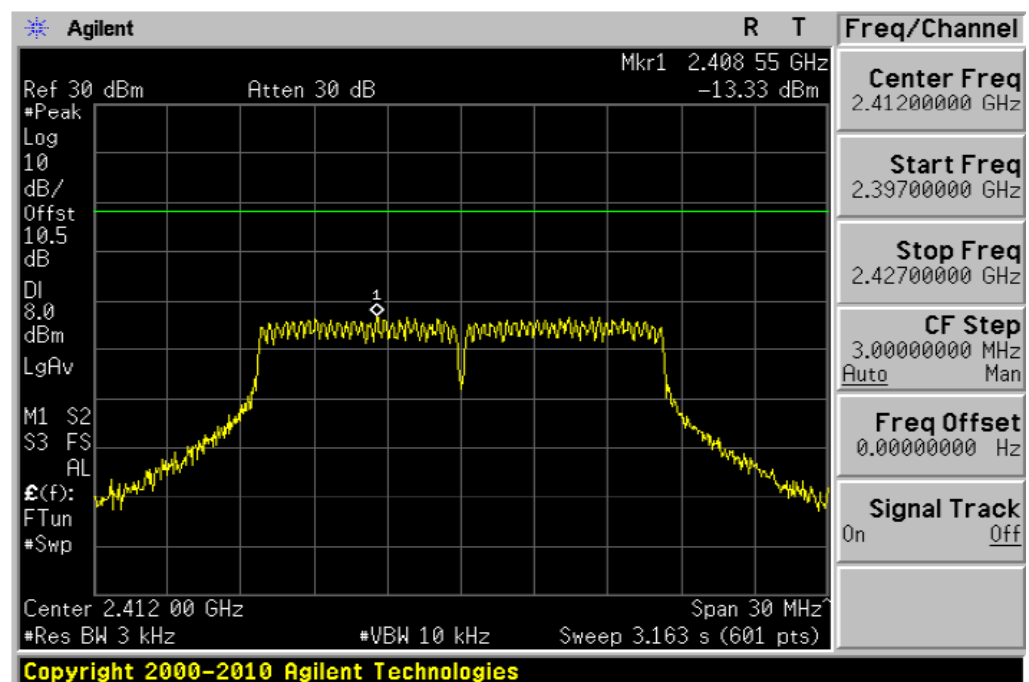


High Channel

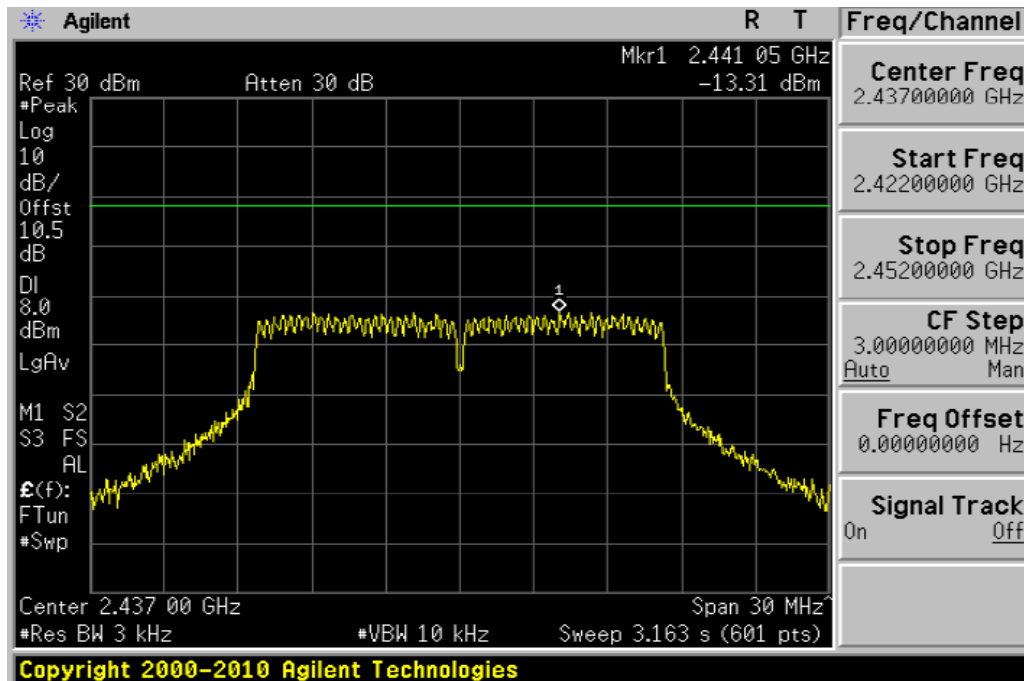


802.11g Mode:

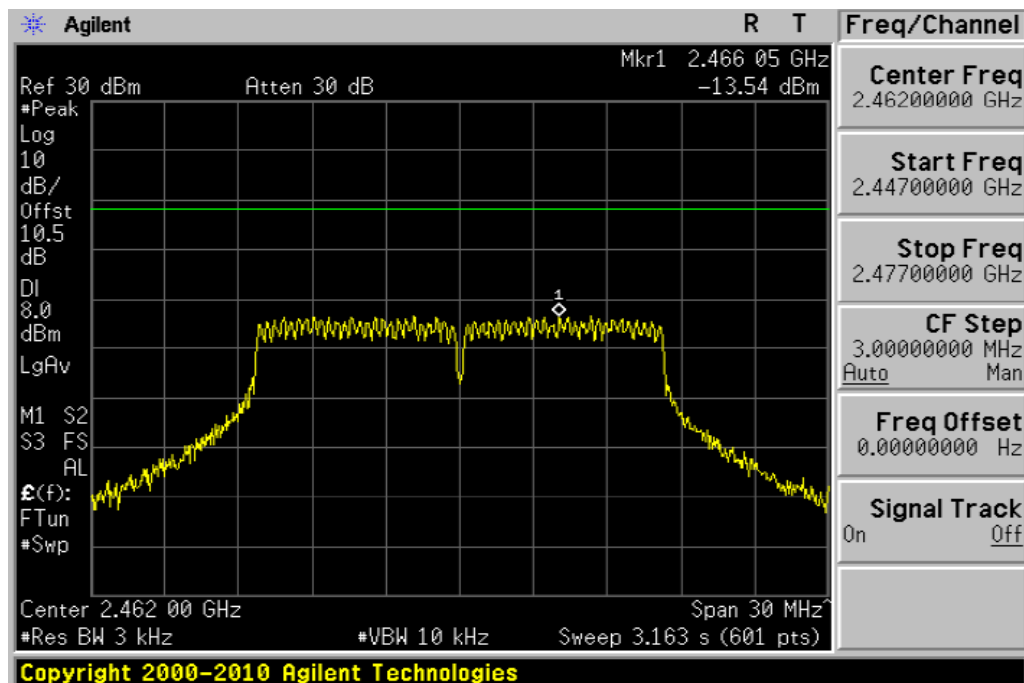
Low Channel



Middle Channel

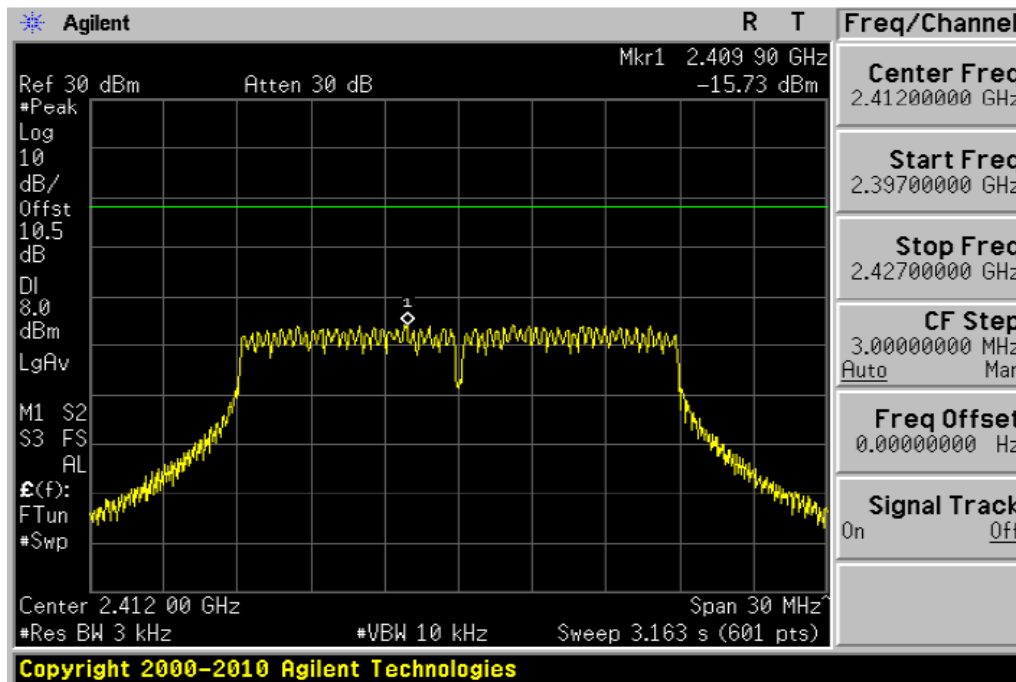


High Channel

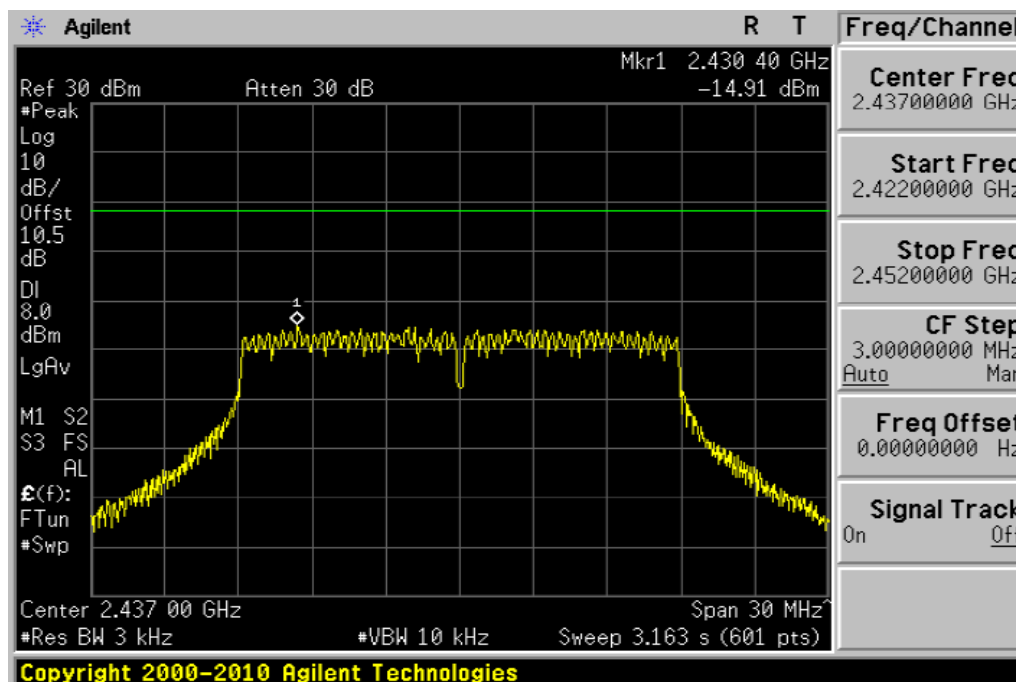


802.11n HT20 Mode:

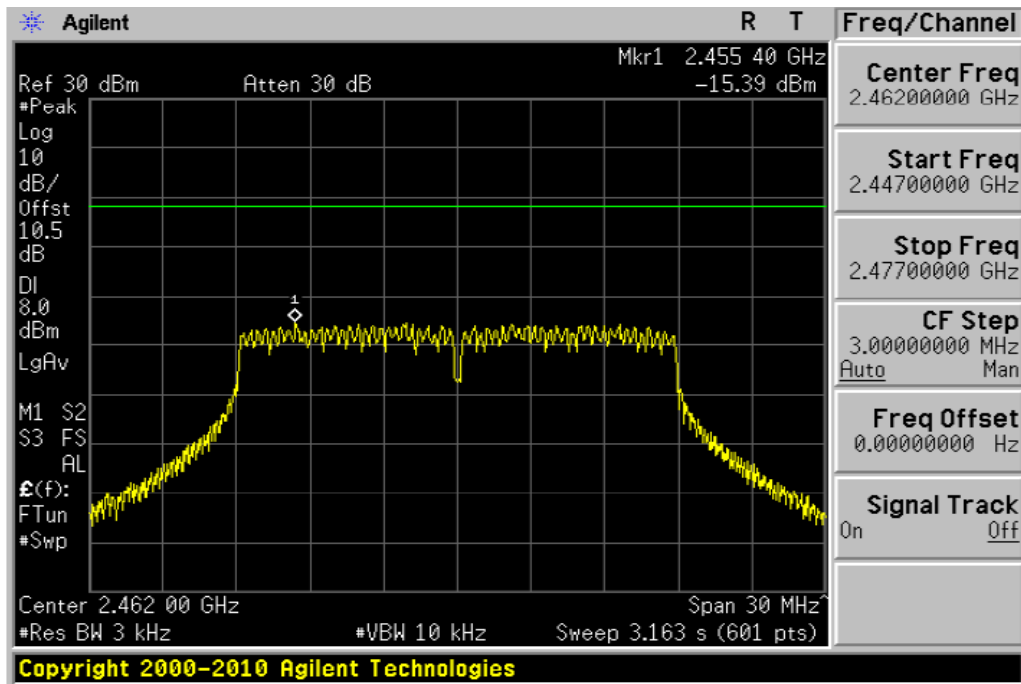
Low Channel



Middle Channel



High Channel

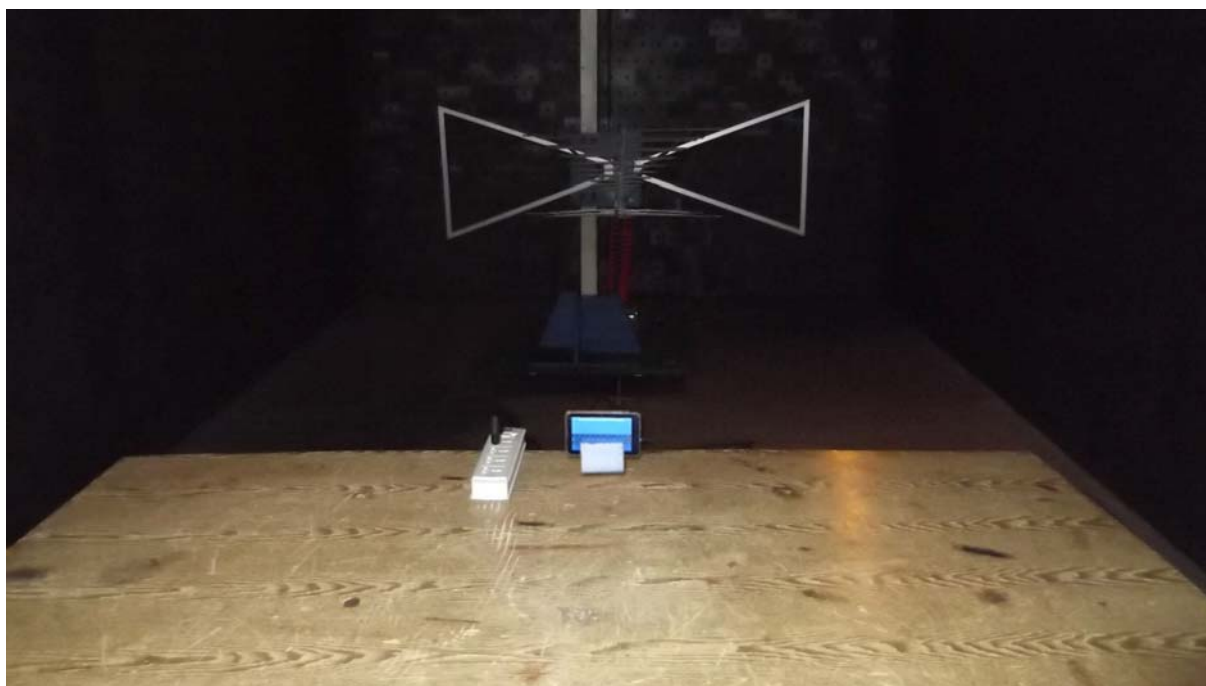


PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



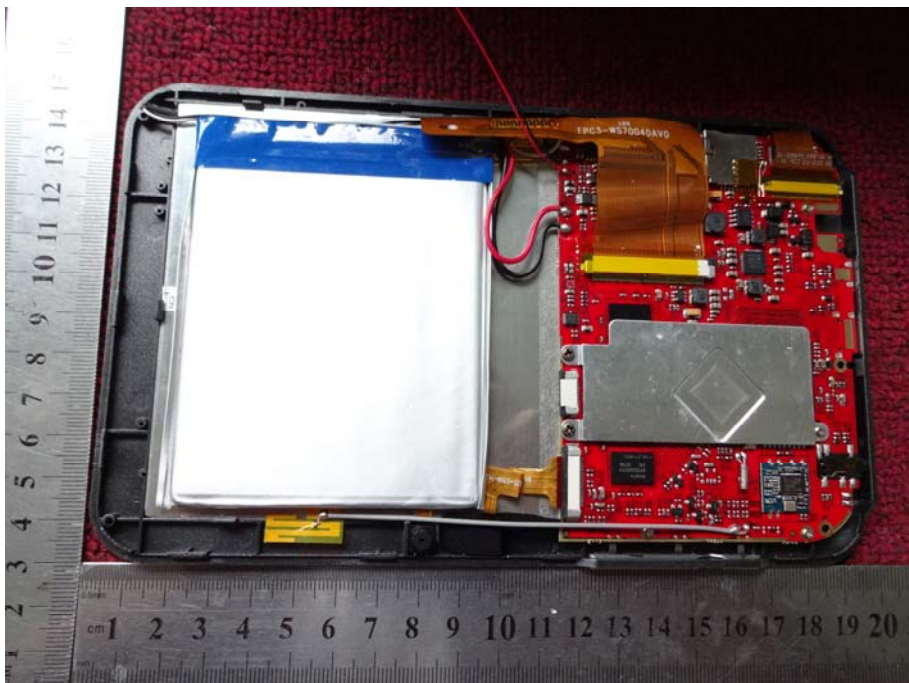
Appearance photograph of EUT



Internal photograph of EUT



Internal photograph of EUT



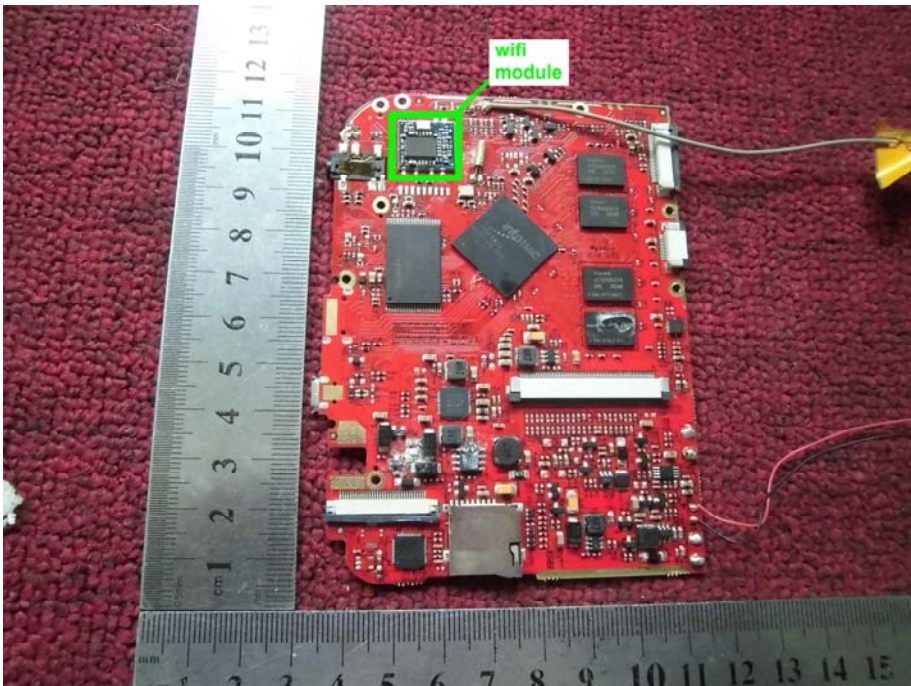
PCB photograph of EUT



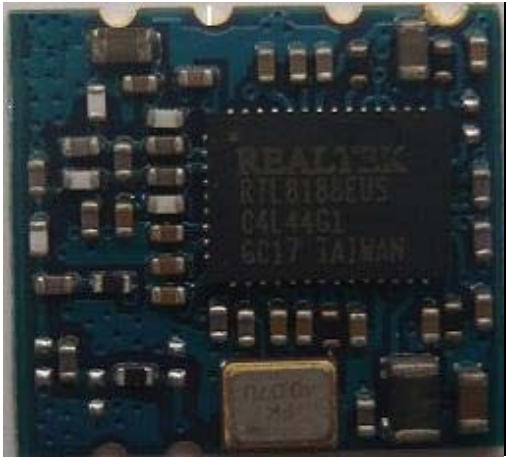
PCB photograph of EUT



Wifi module photograph of EUT



Wifi module photograph of EUT



ANT photograph of EUT

