

FCC TEST REPORT

Product : WIFI Module
Trade mark : Haier
Model/Type reference : MK-QTWIFI-04(A)
Add. Model No. : MK-QTWIFI-04(B)
Report Number : 1609260375RFC-1
Date of Issue : February 24, 2017
FCC ID : 2AGDJ-MKQTWIFI04
Test Standards : FCC 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

Qingdao Haier Intelligent Home Appliance Technology Co., Ltd
No.1 Haier Road Hi-tech Zone Qingdao, China

Prepared by:

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Version

Version No.	Date	Description
V1.0	February 24, 2017	Original



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1 General Information

1.1 Client Information

Applicant:	Qingdao Haier Intelligent Home Appliance Technology Co., Ltd
Address of Applicant:	No.1 Haier Road Hi-tech Zone Qingdao, China
Manufacturer:	Qingdao Haier Intelligent Home Appliance Technology Co., Ltd
Address of Manufacturer:	No.1 Haier Road Hi-tech Zone Qingdao, China

1.2 General Description of EUT

Product Name:	WIFI Module
Model No.(EUT):	MK-QTWIFI-04(A)
Add. Model No.:	MK-QTWIFI-04(B) (Both models with same module circuit. The differences are the PCB layout of peripheral circuit, connector and appearance. MK-QTWIFI-04(B) with USB connector (model: USB-A-A-02M), and the PCB is lengthened 4.8mm to place USB connector.)
Trade Mark:	Haier
EUT Supports Radio application:	Wlan 2400MHz-2483.5MHz 802.11b/g/n(HT20&HT40)
Power Supply:	DC 5V form connector (or USB port)
Sample Received Date:	January 23, 2017
Sample Tested Date:	January 23, 2017 ~ February 22, 2017

1.3 Product Specification subjective to this standard

Operation Frequency:	2400MHz-2483.5MHz
Channel Numbers:	802.11b/g/n(HT20): 13 Channels 802.11n(HT40): 9 Channels
Channel Separation:	Channels with 5MHz step
Transmit Data Rate:	802.11b: 1M/ 2M/ 5.5M/ 11M bps 802.11g: 6M/ 9M/ 12M/ 18M/ 24M/ 36M/ 48M/ 54M bps 802.11n: up to MCS7
Type of Modulation:	802.11b: DSSS(CCK,DQPSK,DBPSK) 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Test Software of EUT:	UI_mptool for Ameba
Sample Type:	Portable device
Antenna Type	PCB Antenna
Antenna Gain:	4 dBi
Normal Test Voltage:	5Vdc
Software Version:	N/A
Hardware Version:	HAIER_UPLuq_8711AF_2.1

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	5	2432MHz	9	2452MHz	13	2472MHz
2	2417MHz	6	2437MHz	10	2457MHz	--	--
3	2422MHz	7	2442MHz	11	2462MHz	--	--
4	2427MHz	8	2447MHz	12	2467MHz	--	--
Operation Frequency each of channel(802.11n HT40)							

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Channel	Frequency	Channel	Frequency	Channel	Frequency
3	2422MHz	6	2437MHz	9	2452MHz
4	2427MHz	7	2442MHz	10	2457MHz
5	2432MHz	8	2447MHz	11	2462MHz

1.4 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
PC	Lenovo	E450	SL10G10780	UnionTrust
Main board of air conditioner	-	SKFR-72L/WAB22A	-	Aplicant
Adapter	-	3582#	-	Aplicant

2) Cable

Cable No.	Description	Connector Type	Cable Type/Length	Supplied by
1	Antenna Cable	SMA	0.3m(Shielded)	UnionTrust
2	USB cable	-	0.4m(Shielded)	Aplicant

1.5 Test Location

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Tests were sub-contracted. (FCC 47 CFR Part 15 Subpart C Section 15.205/15.207/15.209)

Compliance Certification Services (Shenzhen) Inc.

No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town, Baoan Distr, Shenzhen, Guangdong, China.

Tel: 86 0755 28055000

Fax: 86 0755 29055221

1.6 Test Facility

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

Shenzhen UnionTrust Quality and Technology Co., Ltd.

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

Compliance Certification Services (Shenzhen) Inc.

FCC Registration Number is **441872**.

1.7 Deviation from Standards

None.

1.8 Abnormalities from Standard Conditions

None.

1.9 Other Information Requested by the Customer

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None.

1.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	3.8 dB
2	Conducted emission 150KHz-30MHz	3.4 dB
3	Radiated emission 9KHz-30MHz	4.9 dB
4	Radiated emission 30MHz-1GHz	4.7 dB
5	Radiated emission 1GHz-18GHz	5.1 dB
6	Radiated emission 18GHz-26GHz	5.2 dB
7	Radiated emission 26GHz-40GHz	5.2 dB

2 Test Summary

Tests for radiated and conducted emissions were performed. All measurements were performed according to the 2013 version of ANSI C63.10

Test Item	Test Requirement	Test method	Result
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS ¹
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS*
Conducted Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)	KDB 558074 D01 v03r05 Section 9.1.2	PASS ¹
6dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)	KDB 558074 D01 v03r05 Section 8.1	PASS ¹
Power Spectral Density	FCC 47 CFR Part 15 Subpart C Section 15.247 (e)	KDB 558074 D01 v03r05 Section 10.2	PASS ¹
Conducted Out of Band Emission	FCC 47 CFR Part 15 Subpart C Section 15.247(d)	KDB 558074 D01 v03r05 Section 11	PASS ¹
Radiated Spurious Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	KDB 558074 D01 v03r05 Section 12.1	PASS*
Band Edge Measurements (Radiated)	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	KDB 558074 D01 v03r05 Section 12.1	PASS*

Remark:

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

“*”: In this whole report “*” means tests were sub-contracted Item.

- These two models (MK-QTWIFI-04(A), MK-QTWIFI-04(B)) with same module circuit. After evaluation, the differences between these two models have no influence for RF conducted test.

3 Equipment List

3M Semi/full-anechoic Chamber						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
☒	PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	02-21-2016	02-20-2017
☒	Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
☒	Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
☒	Controller	CT	N/A	N/A	N.C.R	N.C.R
☒	Bilog Antenna	SCHAFFNER	CBL6143	5063	02-22-2016	02-21-2017
☒	Horn Antenna	SCHWARZBECK	BBHA9120	D286	02-21-2016	02-20-2017
☒	Loop Antenna	COM-POWER	AL-130	121044	02-21-2016	02-20-2017
☒	High Noise Amplifier	Agilent	8449B	3008A01838	02-22-2016	02-21-2017
☒	Horn Antenna	Schwarzbeck	BBHA9120	D286	02-22-2016	02-21-2017
☒	Temp. / Humidity Meter	Anymetre	JR913	N/A	02-22-2016	02-21-2017
☒	Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
☒	Test S/W	FARAO	LZ-RF / CCS-SZ-3A2			

Conducted Emission test						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
☒	EMI Test Receiver	R&S	ESCI	100783	02-22-2016	02-21-2017
☒	L.I.S.N	R&S	ENV216	101543-WX	02-22-2016	02-21-2017

RF test system						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	12-22-2016	12-22-2017
☐	Receiver	R&S	ESR7	1316.3003K07-101181-K3	12-22-2016	12-22-2017
☐	Receiver	R&S	ESIB26	100114	12-22-2016	12-22-2017
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	12-22-2016	12-22-2017
☐	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430023	12-22-2016	12-22-2017
☐	EXG-B RF Analog Signal Generator	KEYSIGHT	N5171B	MY53051777	01-09-2016	01-08-2018
☐	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	MY51350267	01-08-2016	01-07-2018
☐	4ch. Simultaneous Sampling 14 Bits 2MS/s	KEYSIGHT	U2531A	TW55193502	11-09-2015	11-08-2017
☐	Universal Radio Communication	R&S	CMU200	114713	12-22-2016	12-22-2017

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	Tester					
☐	Band rejection filter (5150MHz~5880MHz)	micro-tronics	BRM50716	G1868	06-15-2016	06-14-2017
☐	Band rejection filter (2400MHz~2500MHz)	micro-tronics	BRM50702	G248	06-21-2016	06-20-2017
☐	DC Source	KIKUSUI	PWR400L	LK003024	09-21-2016	09-20-2017
☐	Temp & Humidity chamber	Ispec	GL(U)04K A(W)	1692H201P3	09-21-2016	09-20-2017

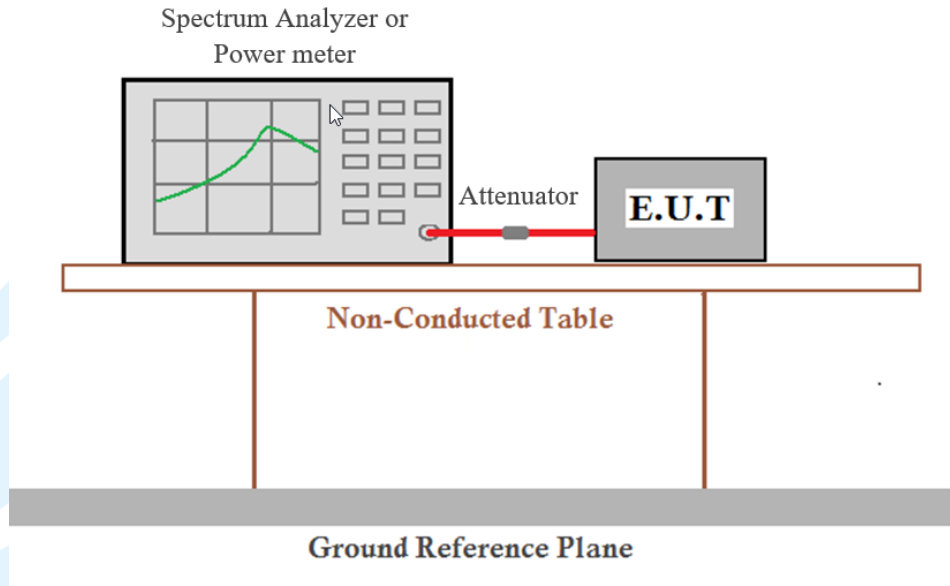
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4 Test Requirement

4.1 Test setup

4.1.1 For Conducted test setup



4.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

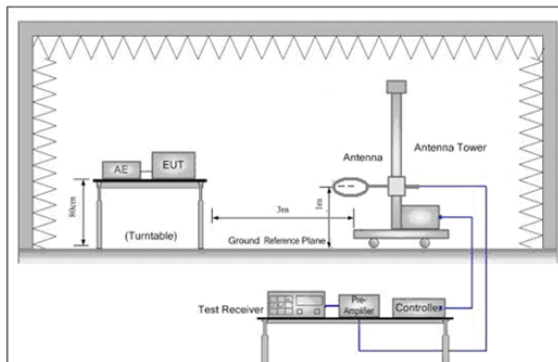


Figure 1. Below 30MHz

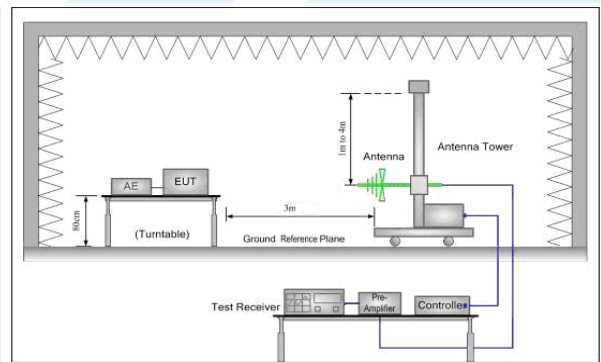


Figure 2. 30MHz to 1GHz

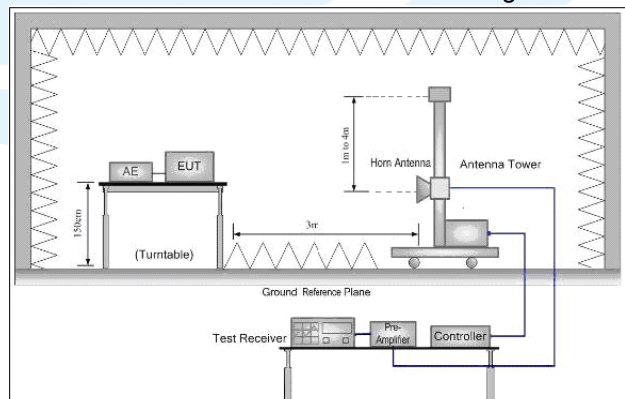
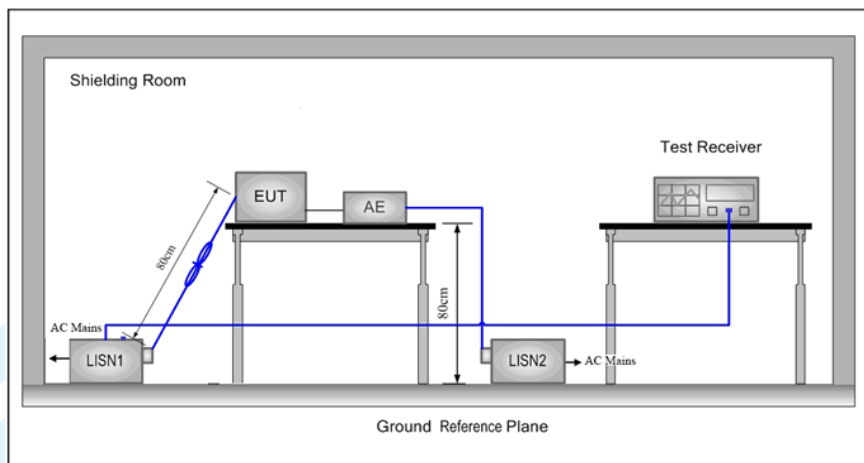


Figure 3. Above 1GHz

4.1.3 For Conducted Emissions test setup

Conducted Emissions setup



4.2 Test Environment

Operating Environment:	
Temperature:	25.3 °C
Humidity:	57 % RH
Atmospheric Pressure:	100.17 Kpa

4.3 System Test Configuration

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by DC 5V form connector (or USB port). Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency Band(GHz)	Mode	Antenna Port	Worst-case Orientation
Below 1GHz	1TX	Chain 0	Y-Portrait
Above 1GHz	1TX	Chain 0	Y-Portrait

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

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Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.4 Test Condition

4.4.1 Test channel

Test Mode	RF Channel				
	Low	Mid	High_CH11	High_CH12	High_CH13
802.11b/g/n(HT20)	Channel 1	Channel 6	Channel 11	Channel 12	Channel 13
	2412MHz	2437MHz	2462MHz	2467MHz	2472MHz
802.11n(HT40)	Channel 3	Channel 6	Channel 9	Channel 10	Channel 11
	2422MHz	2437MHz	2452MHz	2457MHz	2462MHz
Transmitting mode: Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.					

4.4.2 Test mode

Pre-scan under all rate at lowest channel.

Channel/ Frequency (MHz)	Maximum Conducted Average Power (dBm)							
802.11b								
Data Rate (Mbps)	1		2		5.5		11	
1(2412)	16.86		16.71		16.57		16.65	
802.11g								
Data Rate (Mbps)	6	9	12	18	24	36	48	54
1(2412)	11.74	11.68	11.69	11.76	11.78	11.83	12.03	12.06
802.11n(HT20)								
Data Rate (Mbps)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
1(2412)	9.37	9.18	9.18	9.18	9.22	9.35	9.31	9.44
802.11n(HT40)								
Data Rate (Mbps)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
3(2422)	9.09	9.02	9.22	9.33	9.38	9.51	9.59	9.64

So, the worst-case data rates see table below:

Mode	Worst-case data rates
802.11b	1 Mbps
802.11g	54 Mbps
802.11n HT20	MCS7
802.11n HT40	MCS7

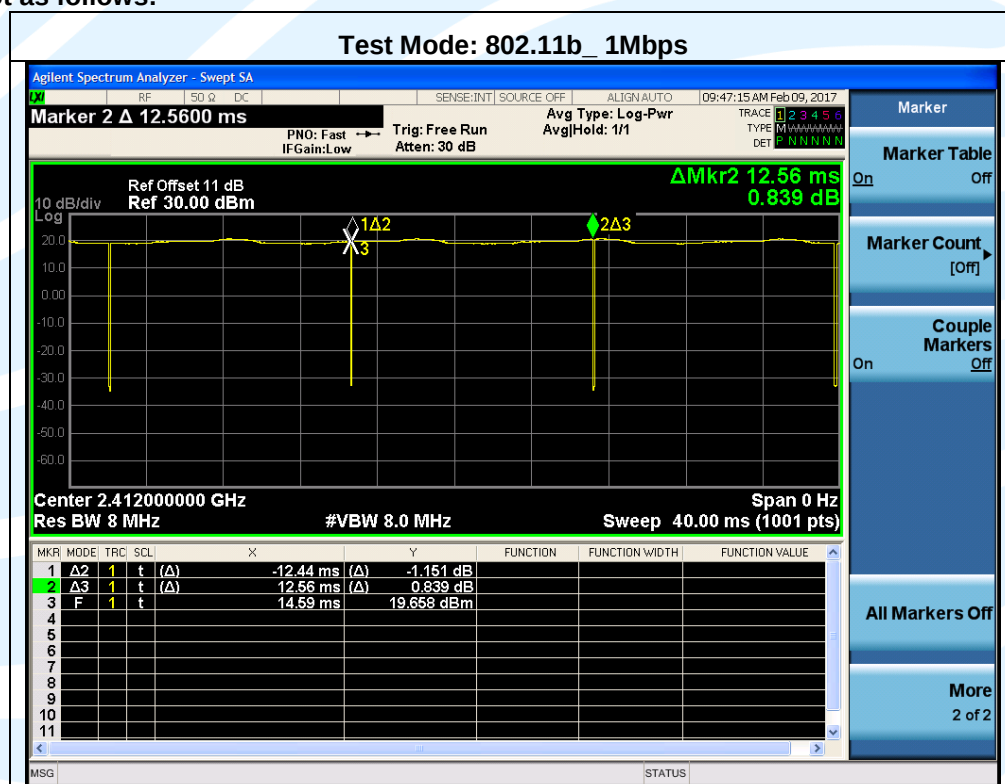
4.4.3 Duty Cycle

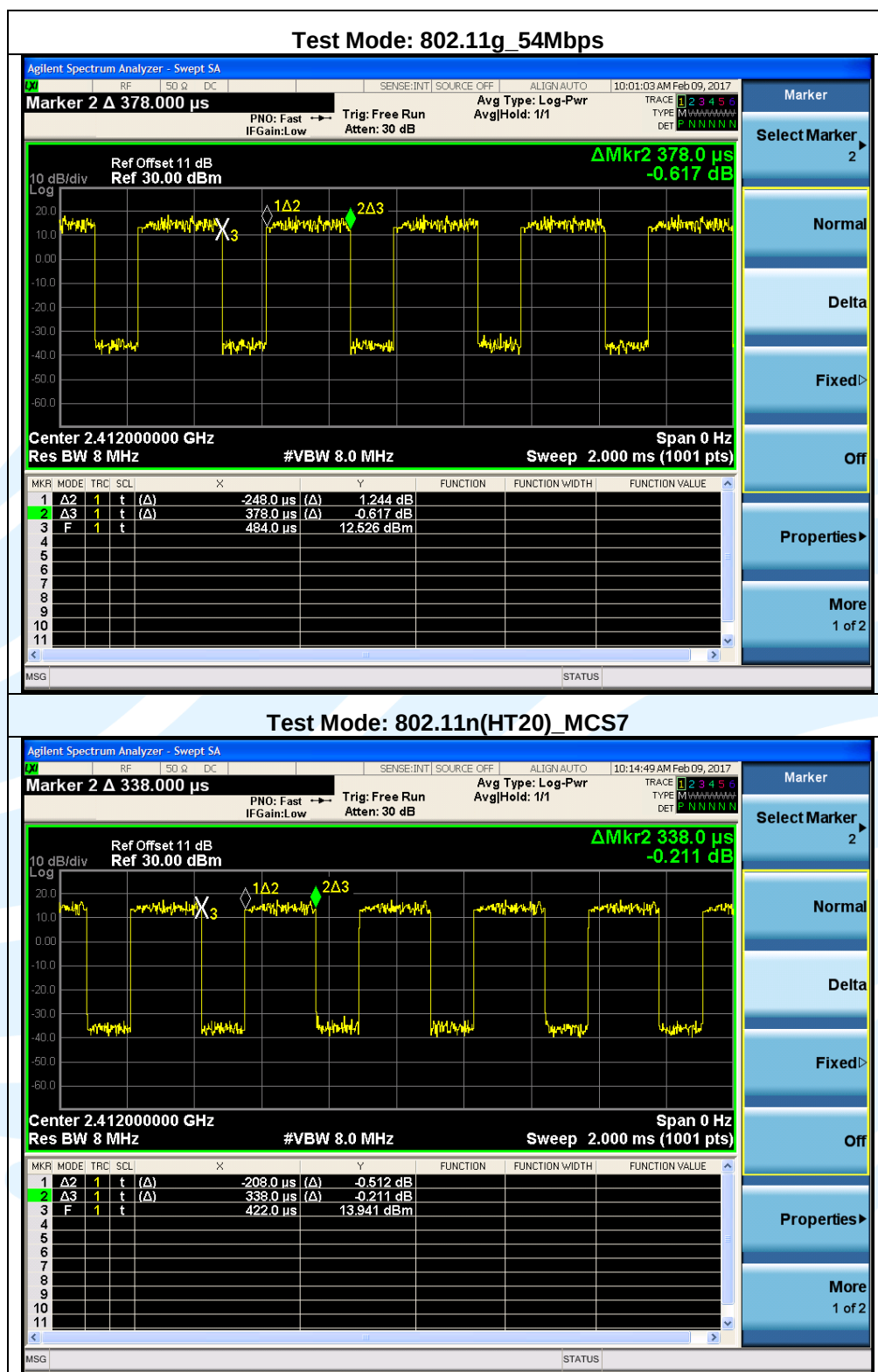
Mode	Data rates (Mbps)	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW(kHz)
802.11b	1	12.440	12.560	0.9904	99.04	0.00	0.01
802.11g	54	0.2480	0.3780	0.6561	65.61	1.83	4.03
802.11n(HT20)	MCS7	0.2080	0.3380	0.6154	61.54	2.11	4.81
802.11n(HT40)	MCS7	0.1190	0.2490	0.4779	47.79	3.21	8.40

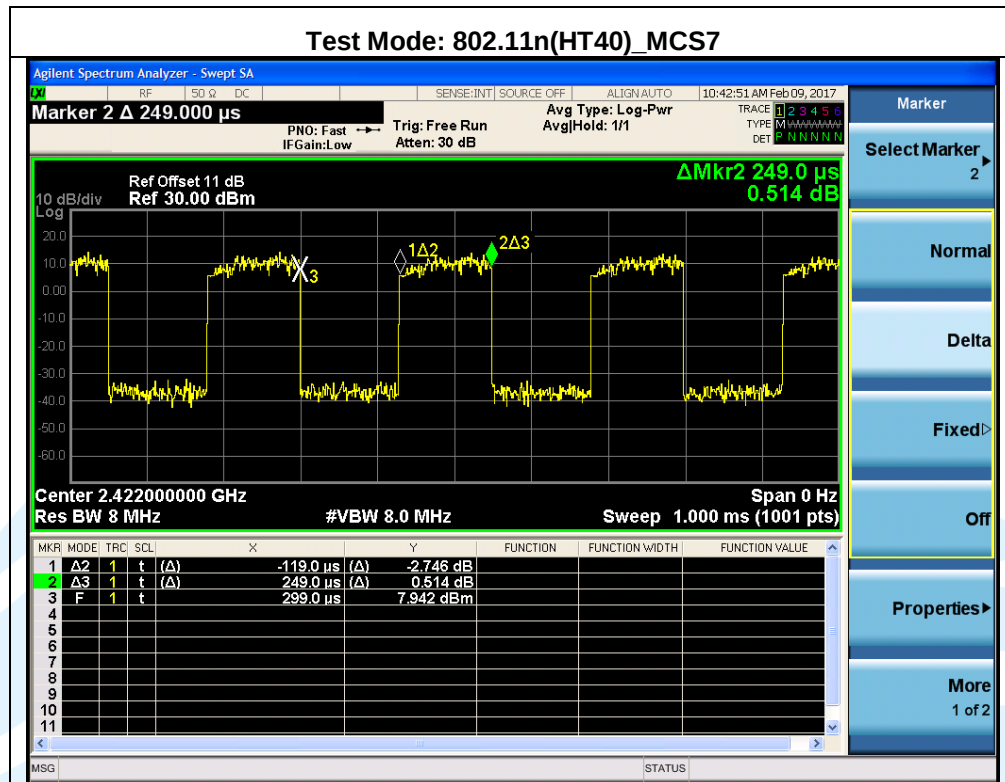
Remark:

- Duty cycle= On Time/ Period
- Duty Cycle factor = 10 * log(1/ Duty cycle)

The test plot as follows:







5 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
4	KDB 558074 D01 DTS Meas Guidance v03r05	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

5.1 Antenna Requirement

15.203 requirement:

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is 4 dBi.

5.2 Conducted Peak Output Power

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)
Test Method:	KDB 558074 D01 v03r05 Section 9.1.2 & Section 9.2.3
Limit:	For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.
Test Procedure:	- The output from the transmitter was connected to an attenuator and then to the input of the power meter. - Measure out each test modes' peak or average output power, record the power level. Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup:	Refer to section 4.1.1 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Transmitter mode
Test Results:	Pass
Test Data:	

Maximum Conducted Power:

Mode	Channel/ Frequency (MHz)	Data Rate (Mbps)	Maximum Conducted Power (dBm)		
			Peak Power	Average Power	
				Measured Power	Power with Duty Factor
802.11b	1(2412)	1	19.55	16.86	16.86
	6(2437)		19.23	16.24	16.24
	11(2462)		18.72	15.89	15.89
	12(2467)		17.69	14.72	14.72
	13(2472)		17.95	14.81	14.81
802.11g	1(2412)	54	22.57	12.06	13.89
	6(2437)		22.38	11.71	13.54
	11(2462)		22.26	11.32	13.15
	12(2467)		19.73	8.45	10.28
	13(2472)		19.23	8.31	10.14
802.11n (HT20)	1(2412)	MCS7	19.84	9.44	11.55
	6(2437)		19.79	9.41	11.52
	11(2462)		19.2	8.92	11.03
	12(2467)		19.09	8.73	10.84
	13(2472)		18.96	8.65	10.76
802.11n (HT40)	3(2422)	MCS7	19.2	9.64	12.85
	6(2437)		19.02	9.47	12.68
	9(2452)		18.83	9.25	12.46
	10(2457)		18.55	9.02	12.23
	11(2462)		18.52	8.97	12.18

Remark:

- Power with Duty Factor = Measured Power + Duty Cycle Factor

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5.3 6dB Bandwidth

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)
Test Method: KDB 558074 D01 v03r05 Section 8.1
Limit: For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz
Test Procedure: The output from the transmitter was connected to an attenuator and then to the input of the spectrum analyzer.

Use the following spectrum analyzer settings:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.1.1 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

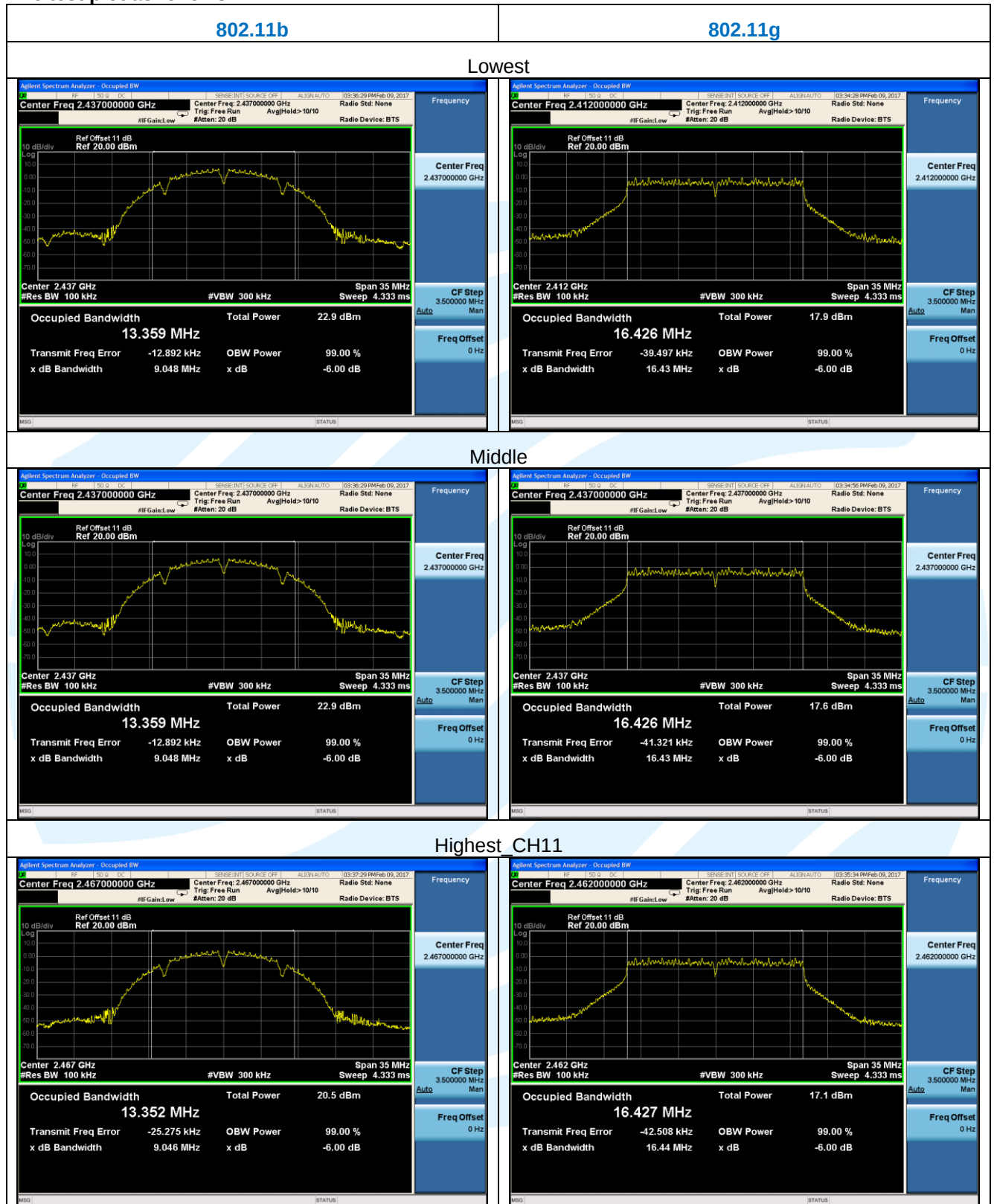
Occupied Bandwidth:

Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit	Result (Pass / Fail)
802.11b	1	2412	9.048	13.359	> 500 kHz	Pass
	6	2437	9.048	13.359	> 500 kHz	Pass
	11	2462	9.046	13.352	> 500 kHz	Pass
	12	2467	9.055	13.351	> 500 kHz	Pass
	13	2472	9.055	13.351	> 500 kHz	Pass
802.11g	1	2412	16.430	16.426	> 500 kHz	Pass
	6	2437	16.430	16.426	> 500 kHz	Pass
	11	2462	16.440	16.427	> 500 kHz	Pass
	12	2467	16.440	16.425	> 500 kHz	Pass
	13	2472	17.610	17.576	> 500 kHz	Pass
802.11n (HT20)	1	2412	17.610	17.576	> 500 kHz	Pass
	6	2437	17.600	17.574	> 500 kHz	Pass
	11	2462	17.600	17.574	> 500 kHz	Pass
	12	2467	17.600	17.574	> 500 kHz	Pass
	13	2472	17.600	17.574	> 500 kHz	Pass
802.11n (HT40)	3	2422	36.310	36.106	> 500 kHz	Pass
	6	2437	35.930	36.098	> 500 kHz	Pass
	9	2452	36.290	36.104	> 500 kHz	Pass
	10	2457	36.290	36.110	> 500 kHz	Pass
	11	2462	36.300	36.111	> 500 kHz	Pass

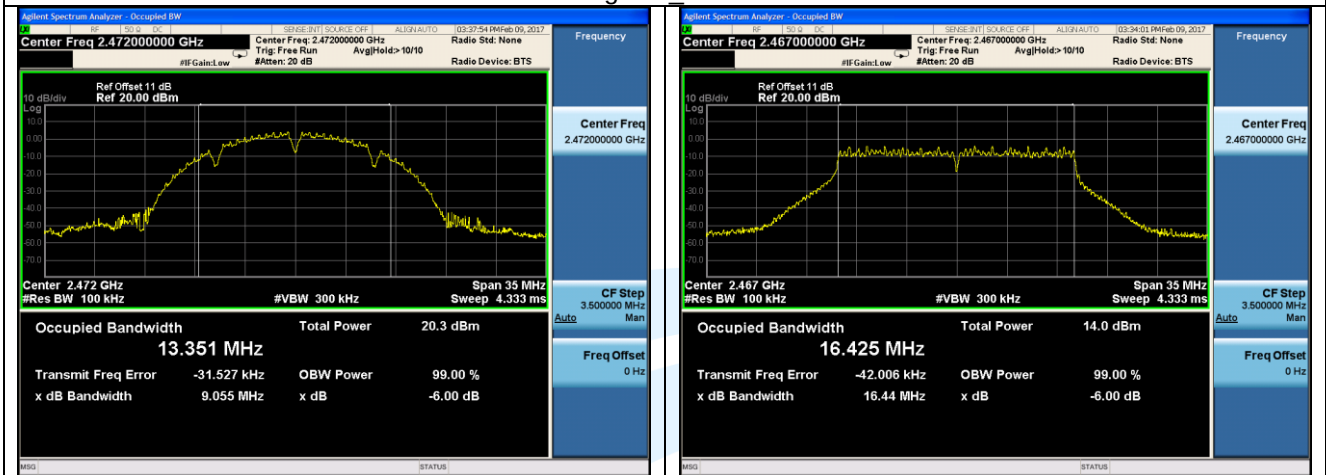
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Tel: +86-755-28230888 Fax: +86-755-28230886 E-mail: info@uttlab.com <http://www.uttlab.com>

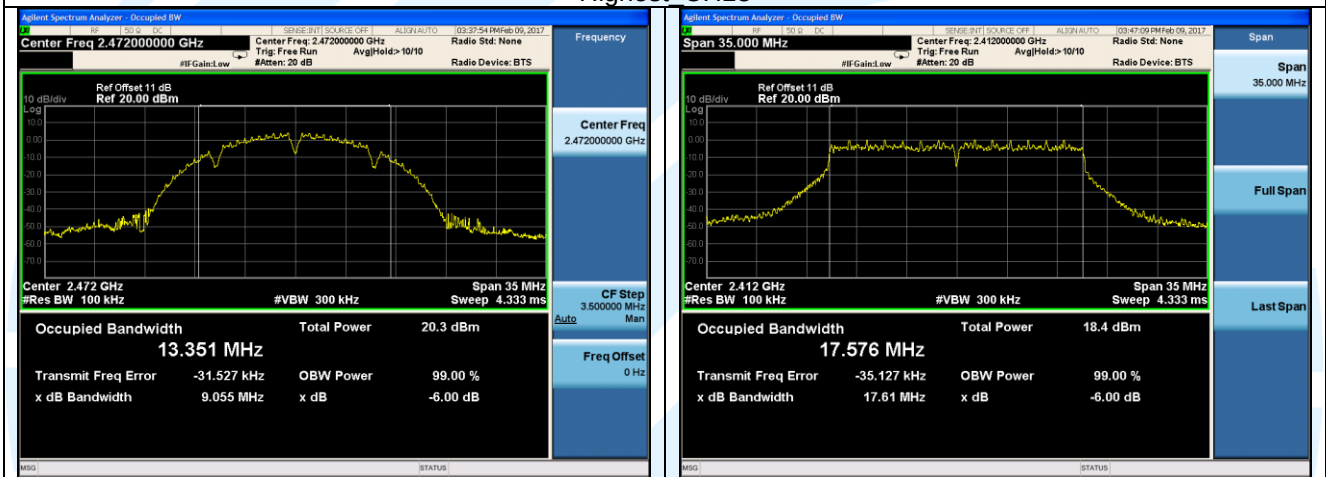
The test plot as follows:

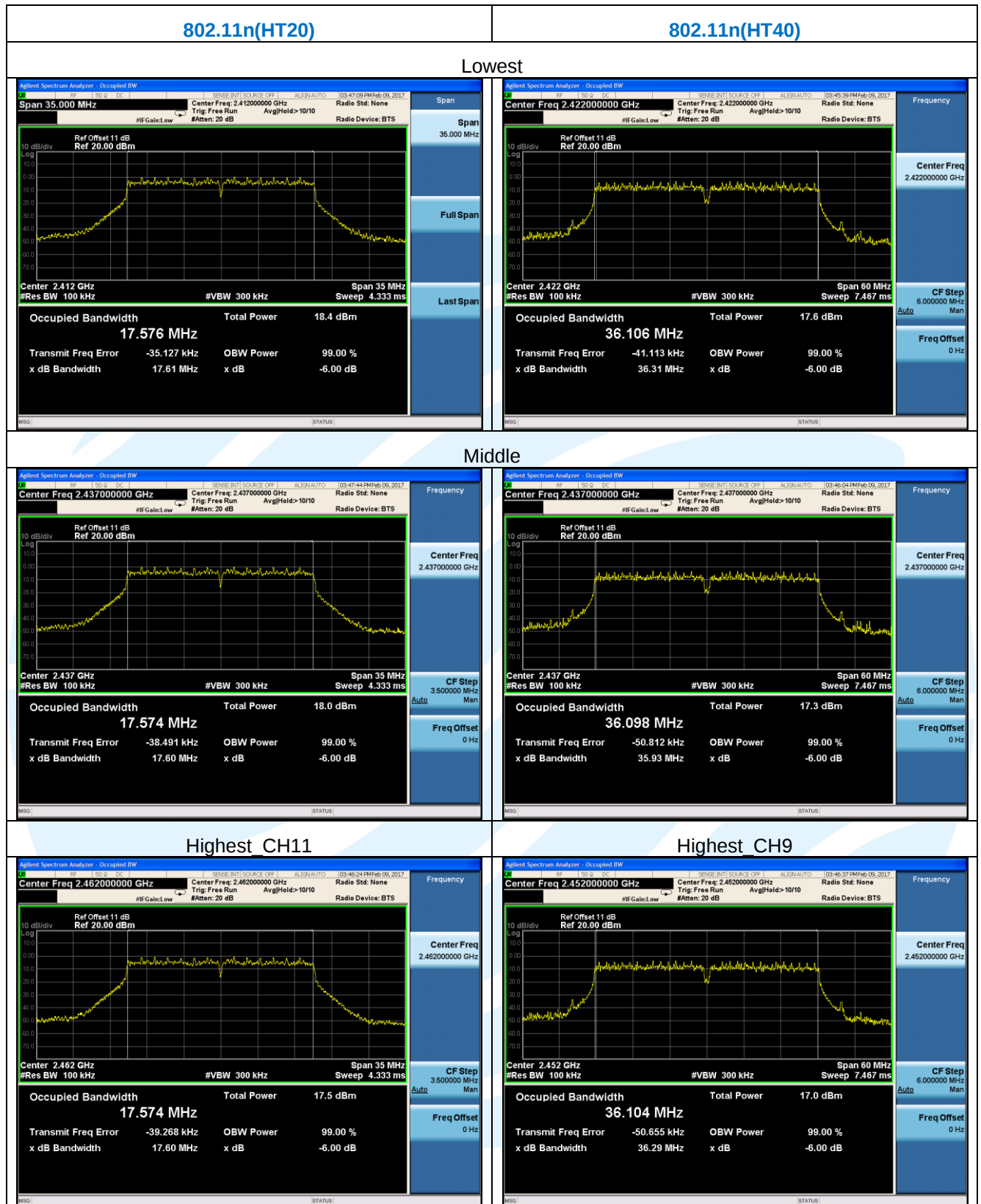


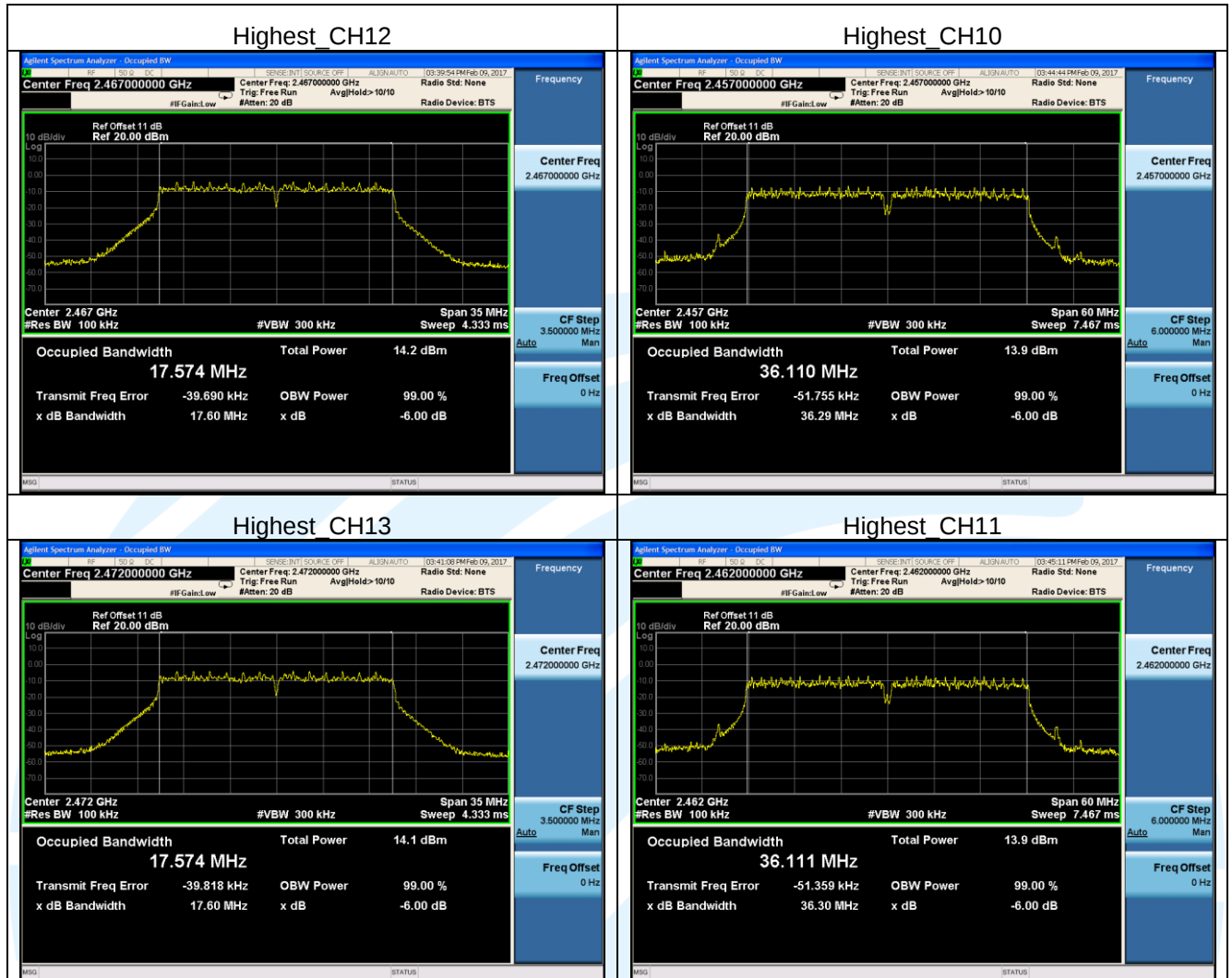
Highest CH12



Highest CH13







5.4 Power Spectral Density

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (e)
Test Method:	KDB 558074 D01 v03r05 Section 10.2
Limit:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
Test Procedure:	The output from the transmitter was connected to an attenuator and then to the input of the spectrum analyzer.

Use the following spectrum analyzer settings:

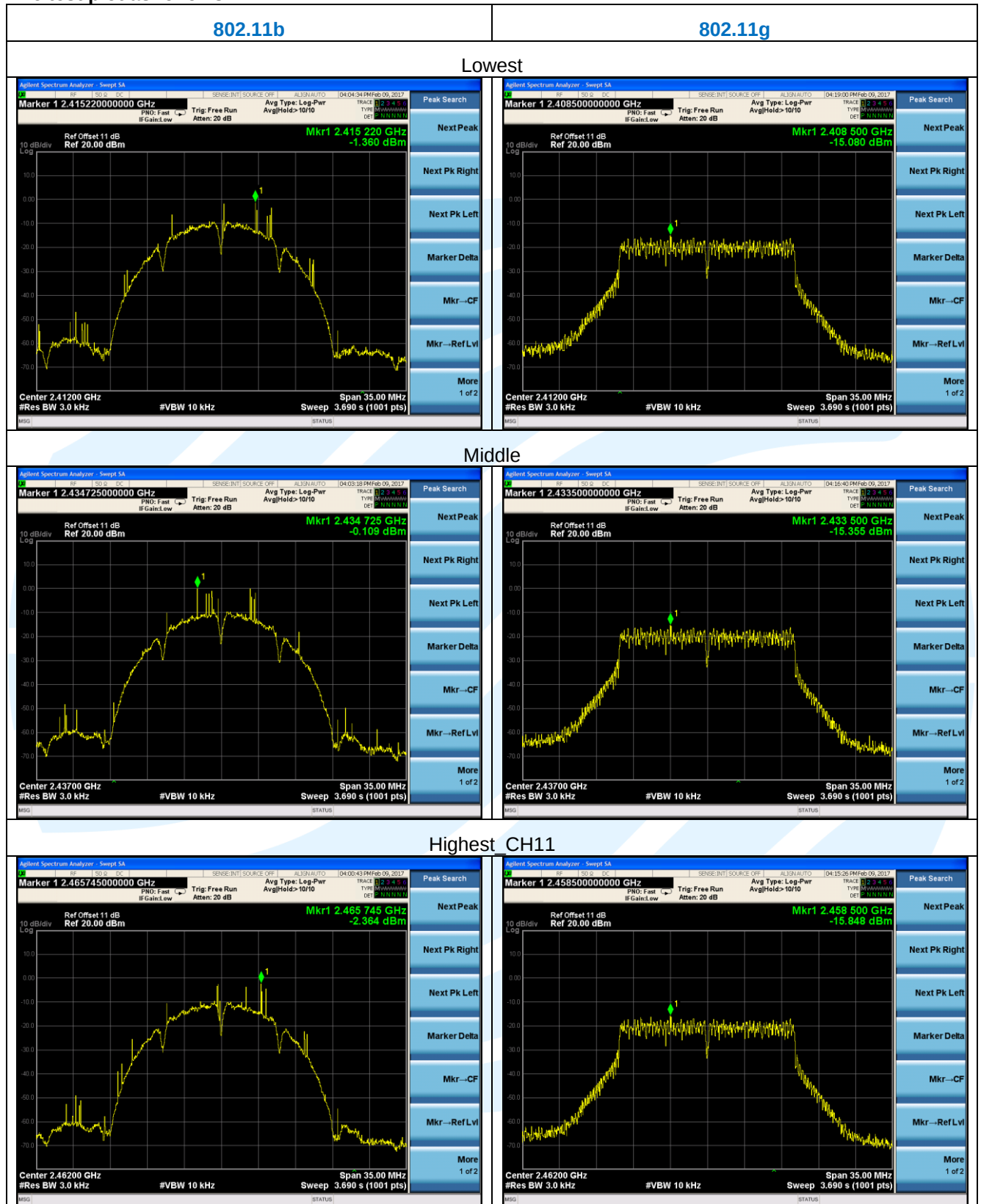
- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup:	Refer to section 4.1.1 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Transmitter mode
Test Results:	Pass
Test Data:	

Mode	Channel	Frequency (MHz)	PSD (dBm)	PSD Limit (dBm)	Result (Pass / Fail)
802.11b	1	2412	-1.360	8	Pass
	6	2437	-0.109	8	Pass
	11	2462	-2.364	8	Pass
	12	2467	-5.448	8	Pass
	13	2472	-6.338	8	Pass
802.11g	1	2412	-15.080	8	Pass
	6	2437	-15.335	8	Pass
	11	2462	-15.848	8	Pass
	12	2467	-18.519	8	Pass
	13	2472	-18.820	8	Pass
802.11n (HT20)	1	2412	-15.697	8	Pass
	6	2437	-16.318	8	Pass
	11	2462	-16.549	8	Pass
	12	2467	-19.488	8	Pass
	13	2472	-19.603	8	Pass
802.11n (HT40)	3	2422	-17.217	8	Pass
	6	2437	-17.339	8	Pass
	9	2452	-17.691	8	Pass
	10	2457	-20.734	8	Pass
	11	2462	-21.231	8	Pass

The test plot as follows:



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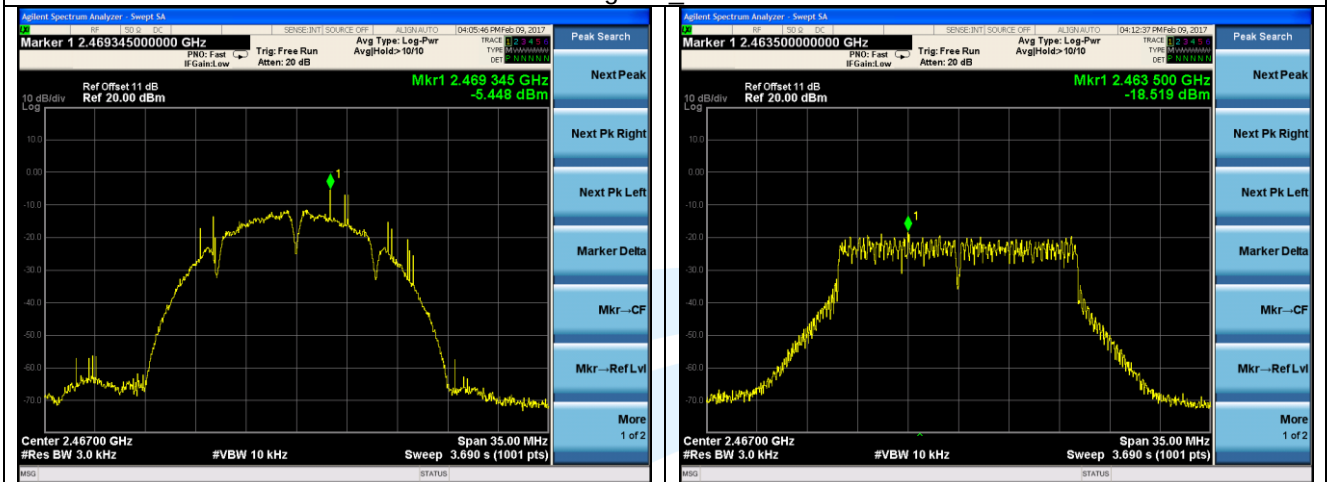
Tel: +86-755-28230888

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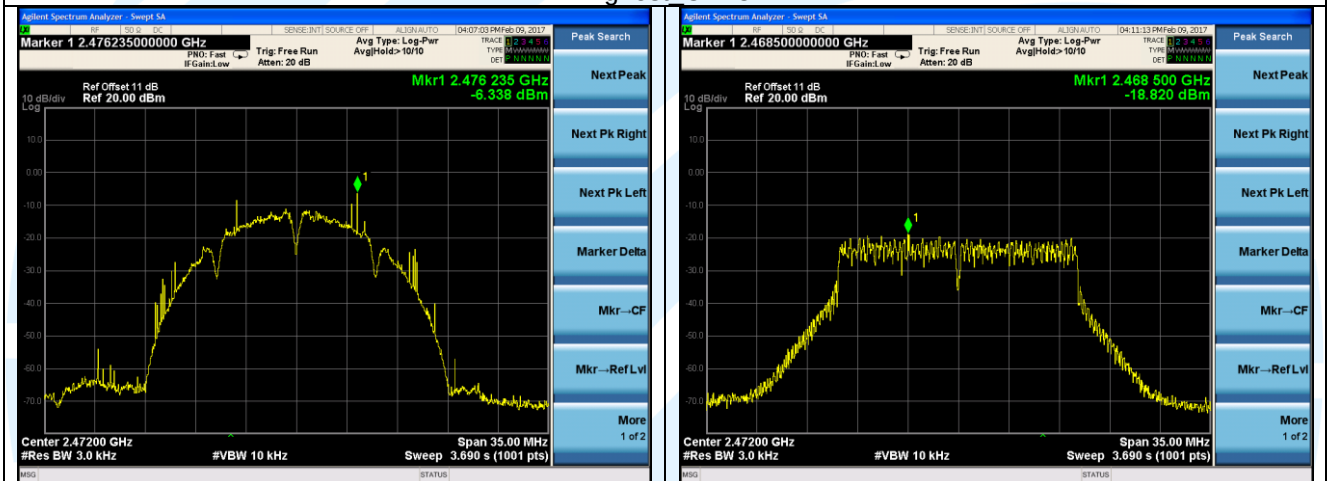
E-mail: info@uttlab.com

<http://www.uttlab.com>

Highest CH12



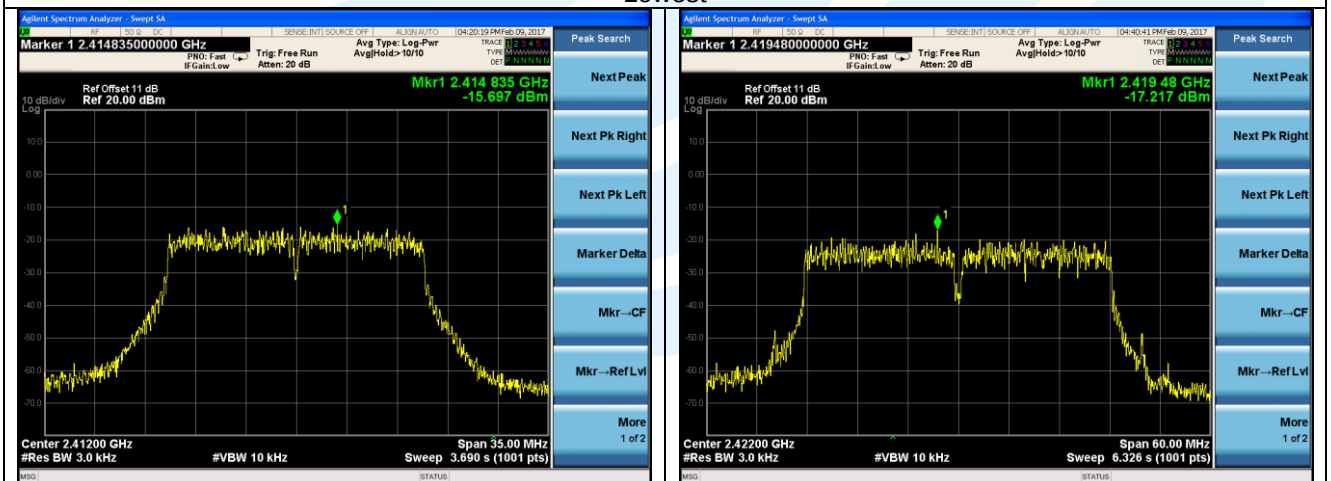
Highest CH13



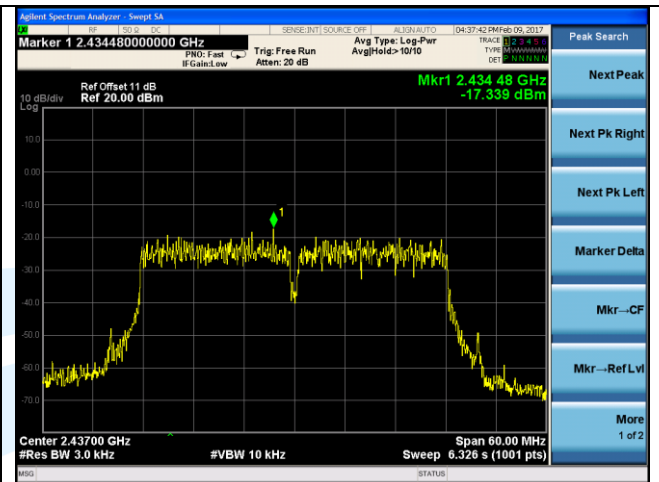
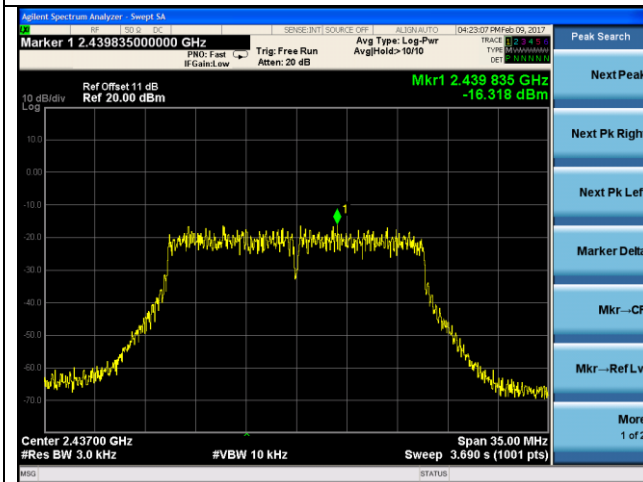
802.11n(HT20)

802.11n(HT40)

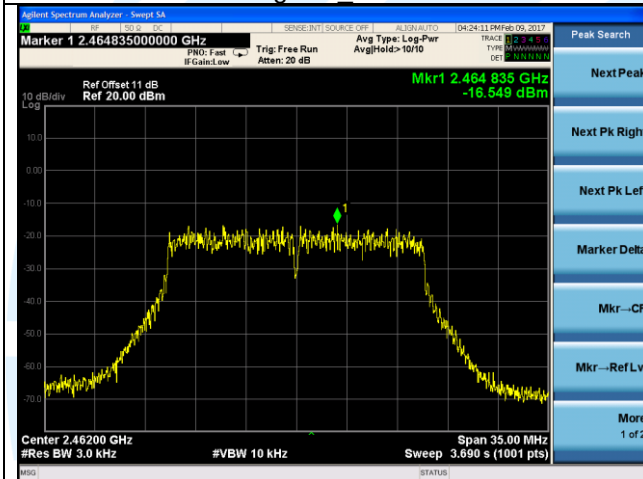
Lowest



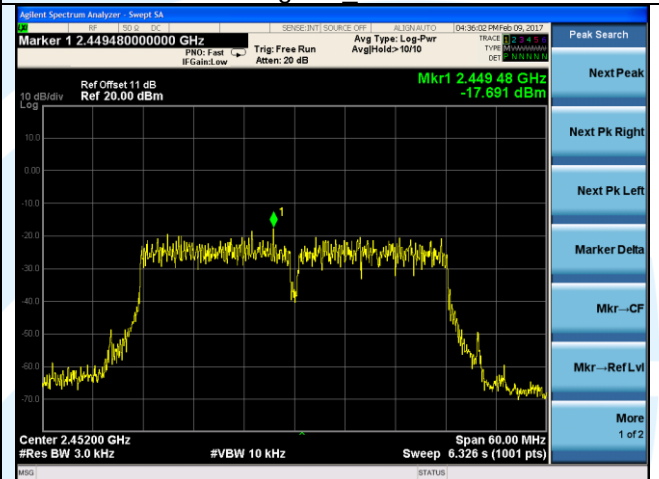
Middle



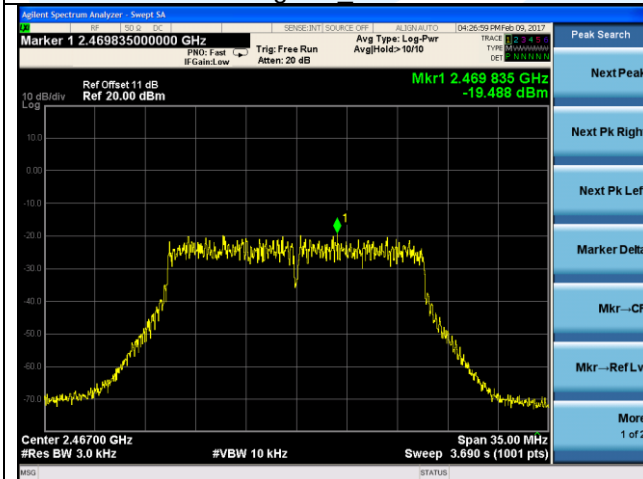
Highest CH11



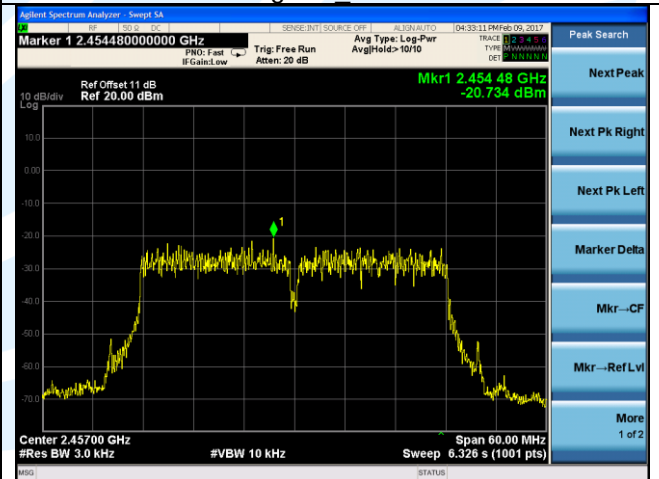
Highest CH9

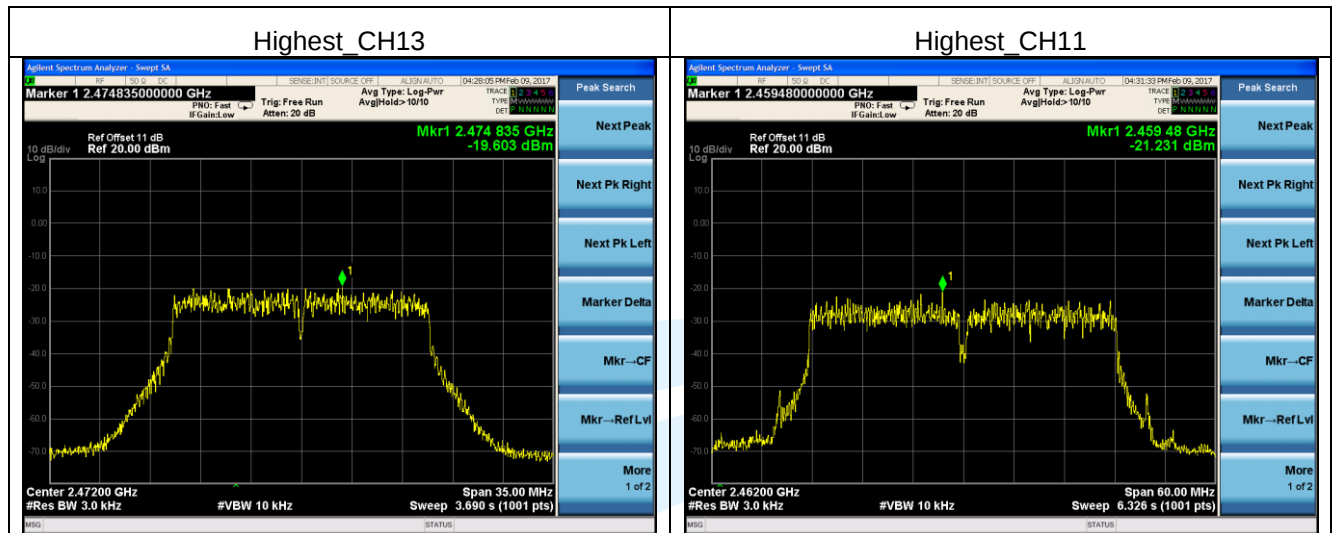


Highest CH12



Highest CH10





5.5 Conducted Out of Band Emission

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247(d)
Test Method:	KDB 558074 D01 v03r05 Section 11
Limit:	In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.
Test Procedure:	The output from the transmitter was connected to an attenuator and then to the input of the spectrum analyzer.

Use the following spectrum analyzer settings:

Step 1: Measurement Procedure REF

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.
- j) Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

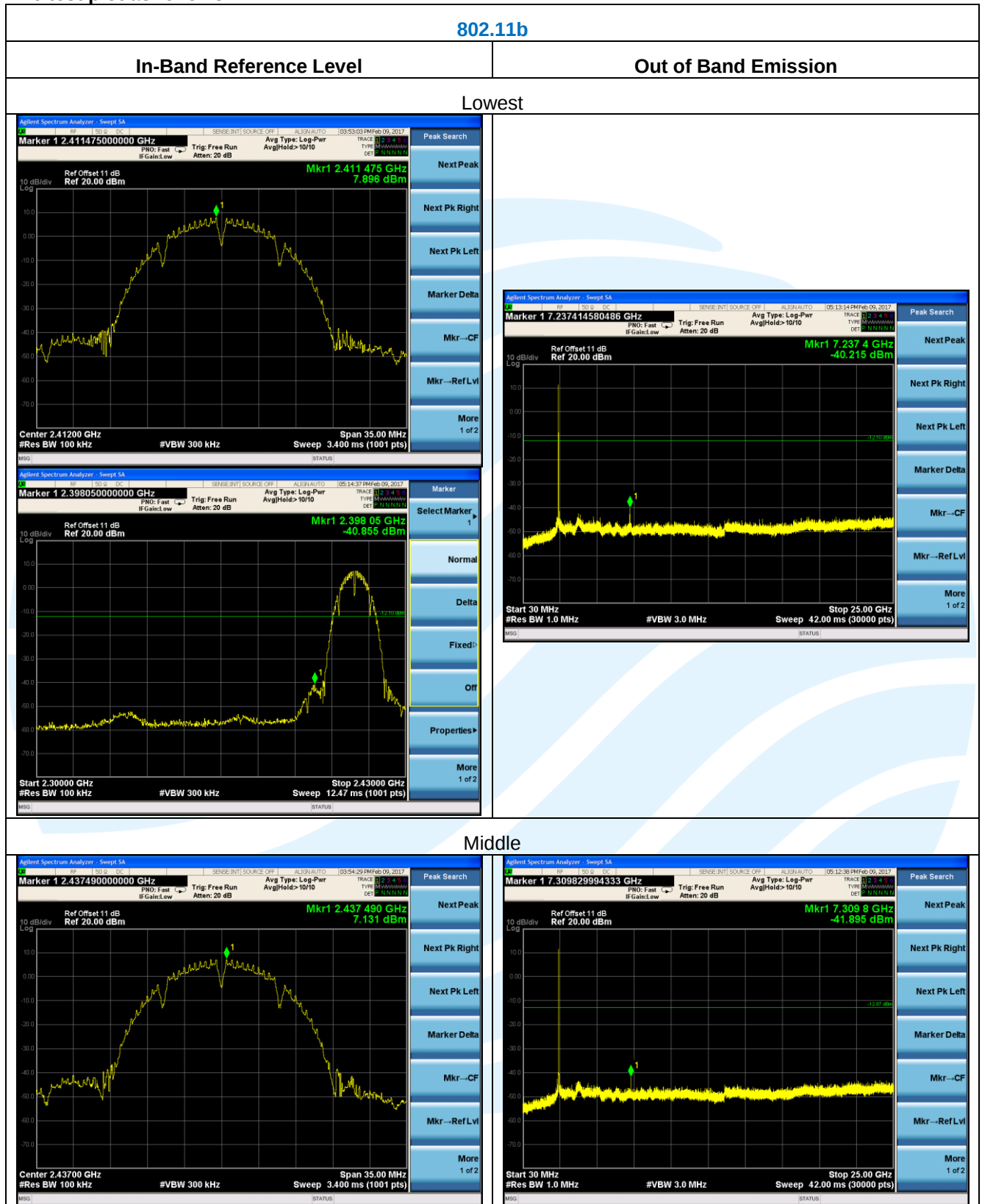
Step 2: Measurement Procedure OOB

- a) Set RBW = 100 kHz.
- b) Set VBW ≥ 300 kHz.
- c) Detector = peak.
- d) Sweep = auto couple.
- e) Trace Mode = max hold.
- f) Allow trace to fully stabilize.
- g) Use the peak marker function to determine the maximum amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup:	Refer to section 4.1.1 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Transmitter mode
Test Results:	Pass

The test plot as follows:



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