

FCC RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART E

Test Standard	FCC Part 15.407
FCC ID	PPQ-WN4519R
Brand name	LITE-ON
Applicant	Lite-On Technology Corp.
Product name	802.11a/b/g/n 2T2R Wireless LAN USB Module
Model No.	WN4519R
Test Result	Pass

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

The sample selected for test was production product and was provided by manufacturer.



Approved by:

Reviewed by:

A handwritten signature in black ink, appearing to read "Sam Chuang", written over a horizontal line.

A handwritten signature in black ink, appearing to read "Ian Tu", written over a horizontal line.

Sam Chuang
Manager

Ian Tu
Asst. Manager

Revision History

Rev.	Issue Date	Revisions	Revised By
00	February 4, 2017	Initial Issue	Angel Cheng

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Lite-On Technology Corp.				
Applicant address	Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C				
Equipment	802.11a/b/g/n 2T2R Wireless LAN USB Module				
Model Name	WN4519R				
Model Discrepancy	N/A				
EUT Functions	IEEE 802.11abgn				
Received Date	December 23, 2016				
Date of Test	December 25, 2016 ~ January 26, 2017				
Power Operation	☐ AC 120V/60Hz ☐ Adapter ☐ PoE ☒ Host system(NB) ☐ DC Type : ☐ Battery ☐ DC Power Supply ☐ External DC adapter				
Output Power(W)	Band	Mode	Frequency Range (MHz)	Output Power (W)	
	U-NII-1	IEEE 802.11a	5180 ~ 5240	0.0597	
		IEEE 802.11n HT 20 MHz	5180 ~ 5240	0.0761	
		IEEE 802.11n HT 40 MHz	5190 ~ 5230	0.0826	
	U-NII-2a	IEEE 802.11a	5260 ~ 5320	0.0583	
		IEEE 802.11n HT 20 MHz	5260 ~ 5320	0.0757	
		IEEE 802.11n HT 40 MHz	5270 ~ 5310	0.0826	
	U-NII-2c	IEEE 802.11a	5500 ~ 5725	0.0587	
		IEEE 802.11a	5720	0.0542	
		IEEE 802.11n HT 20 MHz	5500 ~ 5725	0.0738	
		IEEE 802.11n HT 20 MHz	5720	0.0724	
		IEEE 802.11n HT 40 MHz	5510 ~ 5670	0.0716	
	U-NII-3	IEEE 802.11n HT 40 MHz	5710	0.0716	
		IEEE 802.11a	5720	0.0067	
		IEEE 802.11a	5745 ~ 5825	0.0604	
		IEEE 802.11n HT 20 MHz	5720	0.0104	
IEEE 802.11n HT 20 MHz		5745 ~ 5825	0.0764		
		IEEE 802.11n HT 40 MHz	5710	0.0053	
		IEEE 802.11n HT 40 MHz	5755 ~ 5795	0.0718	

Remark:

1. All listed models are using an identical RF module with the only differences on number of key buttons mounted for additional functions.
2. Due to similarity of RF product constructions of given model series, only dedicated model as described in test report with the most complexity constructions was selected for testing and record.

1.2 EUT CHANNEL INFORMATION

Frequency Range	UNII-1	
	IEEE 802.11a	5180 ~ 5240 MHz
	IEEE 802.11n HT 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11n HT 40 MHz	5190 ~ 5230 MHz
	UNII-2a	
	IEEE 802.11a	5260 ~ 5320 MHz
	IEEE 802.11n HT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11n HT 40 MHz	5270 ~ 5310 MHz
	UNII-2c	
	IEEE 802.11a	5500 ~ 5700 MHz
	IEEE 802.11n HT 20 MHz	5500 ~ 5700 MHz
	IEEE 802.11n HT 20 MHz	5720 MHz
	IEEE 802.11n HT 40 MHz	5510 ~ 5670 MHz
	IEEE 802.11n HT 40 MHz	5710 MHz
	UNII-3	
	IEEE 802.11a	5745 ~ 5825 MHz
	IEEE 802.11n HT 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11n HT 40 MHz	5755 ~ 5795 MHz
Modulation Type	1. IEEE 802.11a mode: OFDM 2. IEEE 802.11n HT 20 MHz mode: OFDM 3. IEEE 802.11n HT 40 MHz mode: OFDM	

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Category	☒ Integral: antenna permanently attached ☐ External dedicated antennas ☐ External Unique antenna connector
Antenna Type	☒ PIFA ☐ PCB ☐ Dipole ☐ Coils
Antenna Gain	1. Auden / T-0082 Antenna 1: Gain: 2.99dBi Antenna 2: Gain: 2.70dBi 2. Walain / RFMTA200700NNLB002 Antenna 1: Gain: 2.62dBi Antenna 2: Gain: 2.49dBi
Power Directional gain	5.86 dBi
PSD Directional gain	5.86 dBi

Note: Directional gain = $10 \log[(10^{(G1/10)} + 10^{(G2/10)}) / N_{ant}]$ dBi.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Anderson Kuo	
Radiation	Kevin Kuo	
RF Conducted	Ian Tu	

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Power Sensor	Anritsu	MA2411B	917072	7/4/2016	7/3/2017
Spectrum Analyzer	R&S	FSV 40	101073	10/5/2016	10/4/2017
Spectrum Analyzer	Keysight	N9010B	MY55460167	6/15/2016	6/14/2017
Spectrum Analyzer	R&S	FSU 26	100258	6/27/2016	6/26/2017
Spectrum Analyzer	R&S	FSU 8	200114	7/26/2016	7/27/2017
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	5/4/2016	5/3/2017
USB Wideband Power Sensor	Agilent	U2021XA	MY54250027	5/12/2016	5/11/2017
USB Wideband Power Sensor	Agilent	U2021XA	MY54260016	5/12/2016	5/11/2017
USB Wideband Power Sensor	Agilent	U2021XA	MY54260020	5/12/2016	5/11/2017
USB Wideband Power Sensor	Agilent	U2021XA	MY54260007	5/12/2016	5/11/2017

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Spectrum Analyzer	Agilent	E4446A	US42510252	12/5/2016	12/4/2017
Loop Ant	COM-POWER	AL-130	121051	2/25/2016	2/24/2017
Bilog Antenna	Sunol Sciences	JB3	A030105	7/3/2016	7/2/2017
Pre-Amplifier	EMEC	EM330	60609	6/8/2016	6/7/2017
Horn Antenna	ETC	MCTD 1209	DRH13M02003	9/2/2016	9/1/2017
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	1/14/2016	9/7/2017
Horn Antenna	EMCO	3116	26370	1/14/2017	1/13/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R

AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
LISN	R&S	ENV216	101054	5/11/2016	5/10/2017
LISN	SCHWARZBECK	NSLK 8127	8127-541	11/22/2016	11/21/2017
Receiver	R&S	ESCI	101073	8/20/2016	8/19/2017

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

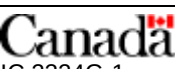
EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB	DELL	PP19L	R33002	E2KWM3945ABG

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.407, KDB 662911 D01 v02r01, KDB 789033 D02 v01r03, KDB 644545 D03 v01.

1.9 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

2. TEST SUMMERY

FCC Standard Sec.	Chapter	Test Item	Result
15.203	1.2	Antenna Requirement	Pass
15.207	4.1	AC Conducted Emission	Pass
15.403(i)	4.2	26dB Bandwidth	Pass
15.403(i)	4.2	6dB Bandwidth	Pass
15.407(a)	4.3	Output Power Measurement	Pass
15.407(a)	4.4	Power Spectral Density	Pass
15.407(b)	4.5	Radiation Band Edge	Pass
15.407(b)	4.5	Radiation Spurious Emission	Pass
15.407(g)	4.6	Frequency Stability	Pass
15.407 (h)	4.7	Dynamic frequency selection	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	1. IEEE 802.11a mode: 6Mbps 2. IEEE 802.11n HT 20 MHz mode: MCS8 3. IEEE 802.11n HT 40 MHz mode: MCS8			
Operating Frequency Range & Number of Channels				
		Mode	Frequency Range (MHz)	Number of Channels
	U-NII-1	IEEE 802.11a	5180 ~ 5240	4 Channels
		IEEE 802.11n HT 20 MHz	5180 ~ 5240	4 Channels
		IEEE 802.11n HT 40 MHz	5190 ~ 5230	2 Channels
	U-NII-2a	IEEE 802.11a	5260 ~ 5320	5 Channels
		IEEE 802.11n HT 20 MHz	5260 ~ 5320	5 Channels
		IEEE 802.11n HT 40 MHz	5270 ~ 5310	2 Channels
	U-NII-2c	IEEE 802.11a	5500 ~ 5700	4 Channels
		IEEE 802.11n HT 20 MHz	5500 ~ 5700	4 Channels
		IEEE 802.11n HT 20 MHz	5720	1 Channels
		IEEE 802.11n HT 40 MHz	5510 ~ 5670	2 Channels
		IEEE 802.11n HT 40 MHz	5710	1 Channels
	U-NII-3	IEEE 802.11a	5745 ~ 5825	5 Channels
		IEEE 802.11n HT 20 MHz	5745 ~ 5825	5 Channels
IEEE 802.11n HT 40 MHz		5755 ~ 5795	2 Channels	

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. Covered modes are test reduction modes. The output powers on the covered modes are equal to or less than the mode referenced and use the same module

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	☒ Horizontal ☐ Vertical

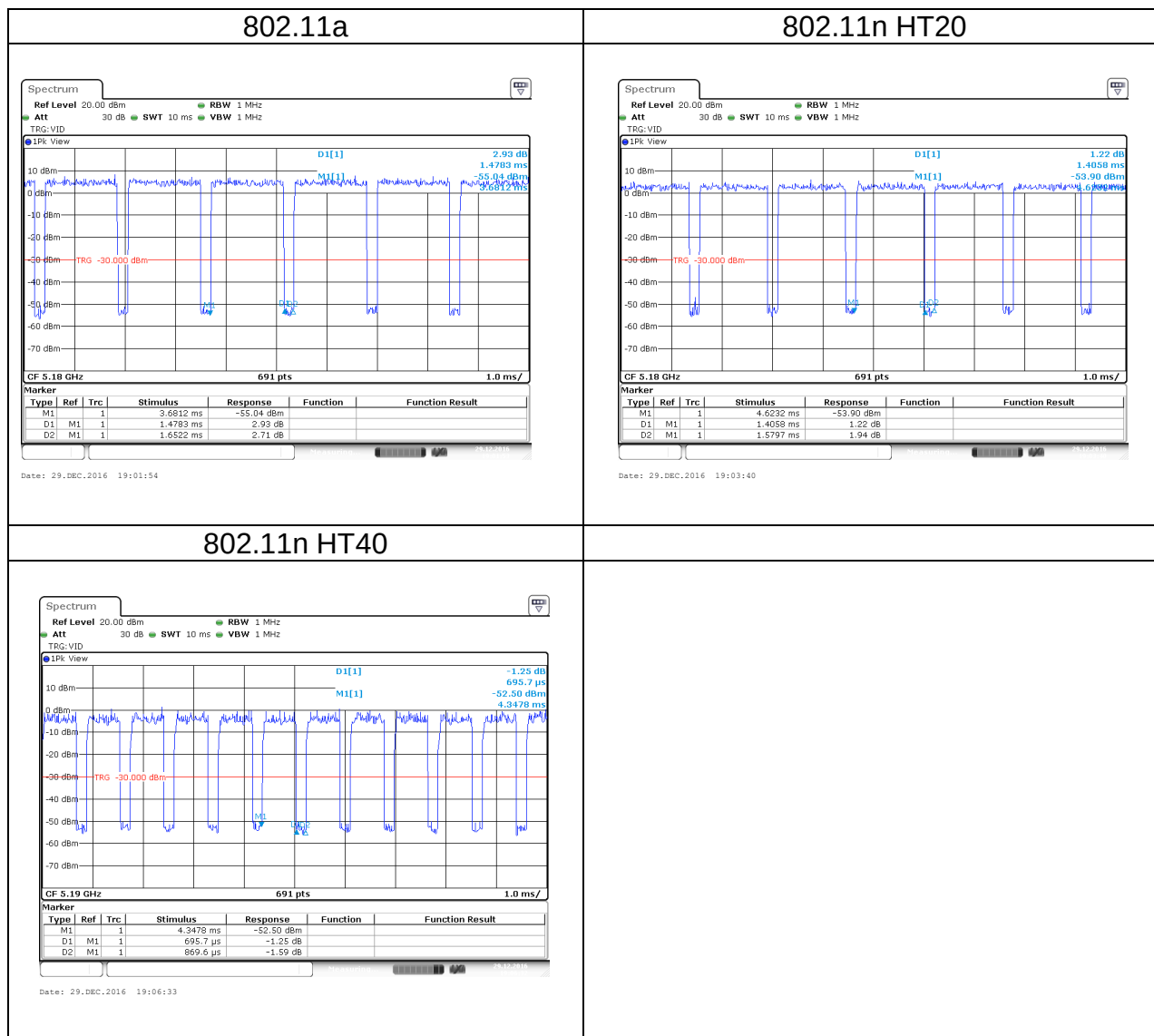
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable.
Worst Mode	☒ Mode 1 ☒ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case(X-Plane and Horizontal) were recorded in this report

3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
802.11a	1.4783	1.6522	89.47%	0.48
802.11n HT20	1.4058	1.5797	88.99%	0.51
802.11n HT40	0.6957	0.8696	80.00%	0.97



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range (MHz)	Limits(dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

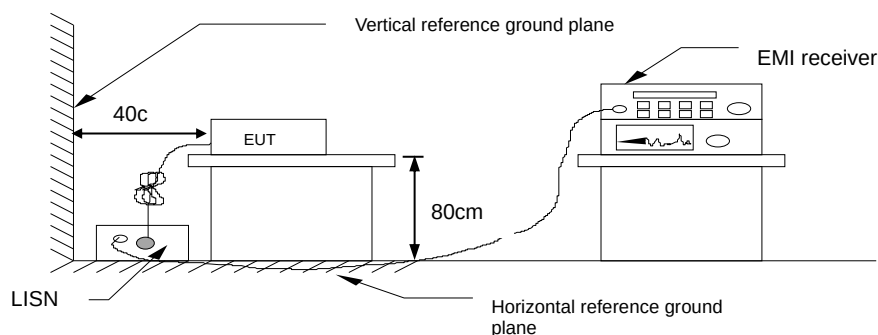
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup

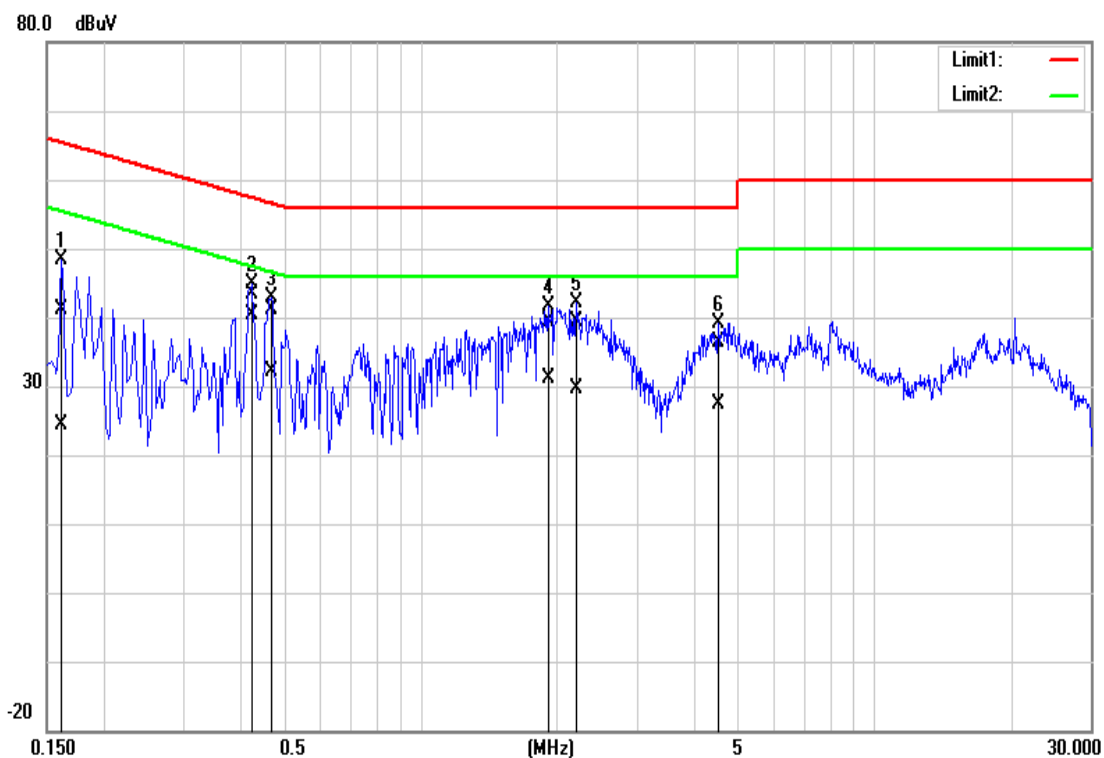


4.1.4 Test Result

Pass.

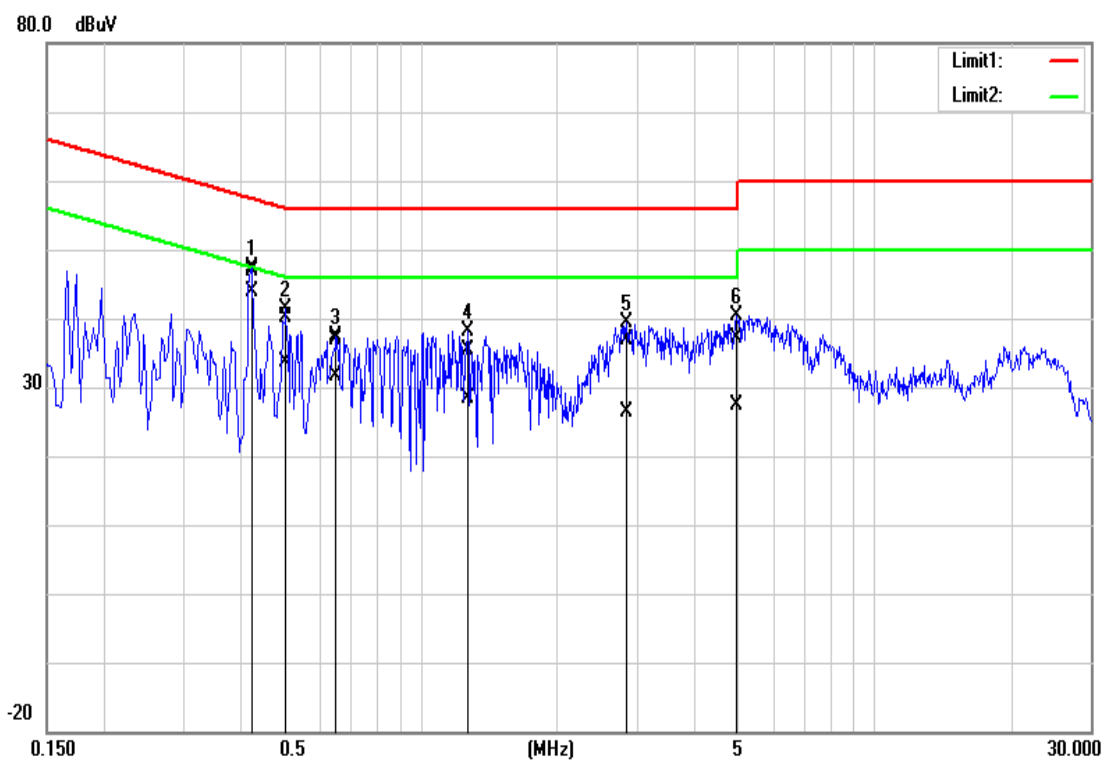
Test Data

Test Mode	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage	120Vac / 60Hz	Test Date	January 5, 2017
Phase	Line	Test Engineer	Anderson kuo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1620	31.29	14.61	9.82	41.11	24.44	65.36	55.36	-24.25	-30.92	Pass
0.4260	33.50	30.57	9.81	43.31	40.36	57.33	47.33	-14.02	-6.97	Pass
0.4700	31.30	22.47	9.81	41.11	32.22	56.51	46.51	-15.40	-14.29	Pass
1.9180	29.40	21.37	9.87	39.27	31.14	56.00	46.00	-16.73	-14.86	Pass
2.2100	29.41	19.66	9.88	39.29	29.52	56.00	46.00	-16.71	-16.48	Pass
4.5340	26.45	17.42	9.94	36.39	27.34	56.00	46.00	-19.61	-18.66	Pass

Test Mode	Mode 1	Temp/Hum	27(°C)/ 53%RH
Test Voltage	120Vac / 60Hz	Test Date	January 5, 2017
Phase	Neutral	Test Engineer	Anderson kuo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.4260	36.97	34.02	9.87	46.84	43.93	57.33	47.33	-10.49	-3.42	Pass
0.5060	30.14	23.87	9.87	40.01	33.75	56.00	46.00	-15.99	-12.28	Pass
0.6540	27.11	21.82	9.87	36.98	31.68	56.00	46.00	-19.02	-14.33	Pass
1.2740	25.47	18.36	9.89	35.36	28.25	56.00	46.00	-20.64	-17.72	Pass
2.8500	26.94	16.35	9.96	36.90	26.29	56.00	46.00	-19.10	-19.72	Pass
4.9980	27.01	17.24	10.07	37.08	27.24	56.00	46.00	-18.92	-18.71	Pass

4.2 26DB BANDWIDTH, 6DB BANDWIDTH

4.2.1 Test Limit

26 dB Bandwidth : For reporting purposes only.

6 dB Bandwidth : Least 500kHz.

4.2.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03 Section C, D, and ANSI 63.10:2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c,
 - (1) BW=20MHz : SA set RBW = 300kHz, VBW = 1MHz and Detector = Peak, to measurement 26 dB Bandwidth
 - (2) BW=40MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth
4. UNII-3, SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth
5. Measure and record the result. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

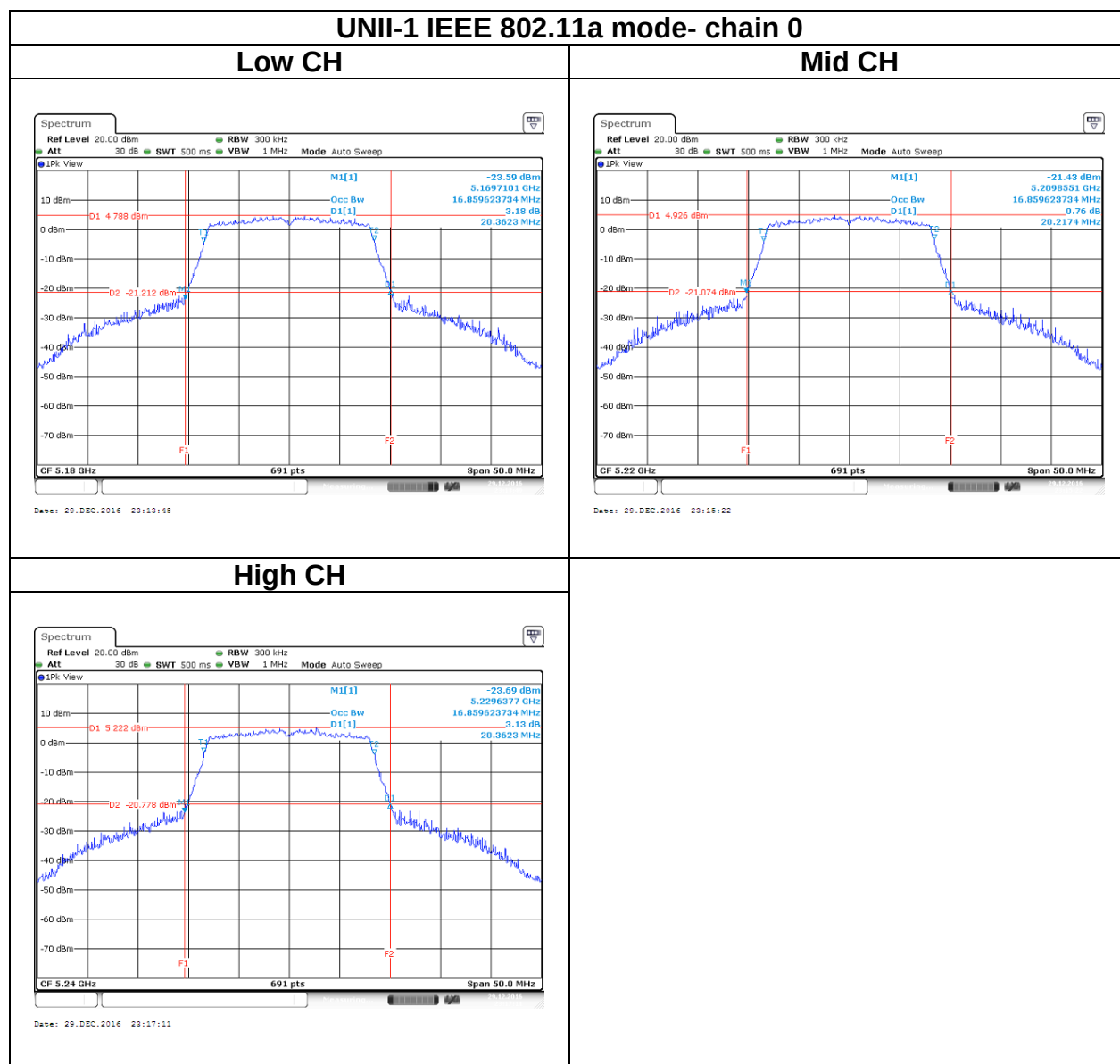
UNII-1 5150-5250 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5180	20.3623	-
Mid	5220	20.2174	-
High	5240	20.3623	-
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5180	20.6522	20.5797
Mid	5220	20.5072	20.1449
High	5240	20.5797	19.9275
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5190	41.971	42.203
High	5230	41.971	42.087

UNII-2a 5250-5350 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5260	22.8261	-
Mid	5280	21.3768	-
High	5320	22.1014	-
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5260	20.6522	20.6522
Mid	5280	20.7246	21.9565
High	5320	20.6522	21.3768
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5270	45.565	42.950
High	5310	45.850	42.490

UNII-2c 5475-5725 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5500	20.7971	-
Mid	5580	21.9565	-
High	5700	23.7681	-
Cross	5720	37.6519	-
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5500	20.5797	20.5797
Mid	5580	21.1594	20.7246
High	5700	20.8696	20.6522
Cross	5720	20.7810	20.9980
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5510	42.490	42.030
High	5670	42.370	43.530
Cross	5710	41.680	42.050

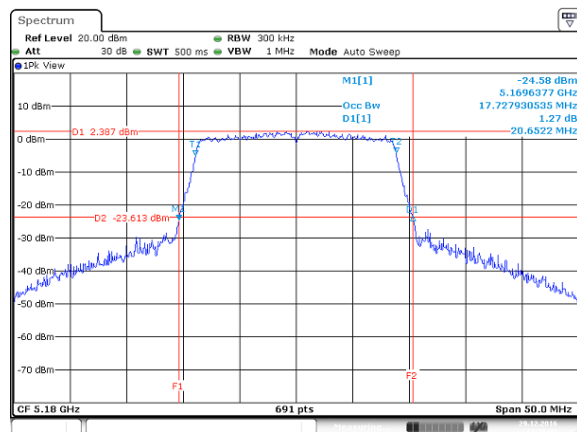
UNII-3 5725-5825MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5745	16.3043	-
Mid	5785	16.3478	-
High	5825	16.3478	-
Cross	5720	16.3478	-
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5745	17.0000	17.0000
Mid	5785	17.1304	17.0870
High	5825	17.1304	17.1304
Cross	5720	17.0870	17.0870
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5755	35.362	35.246
High	5795	35.362	35.246
Cross	5710	35.478	35.362

Test Data



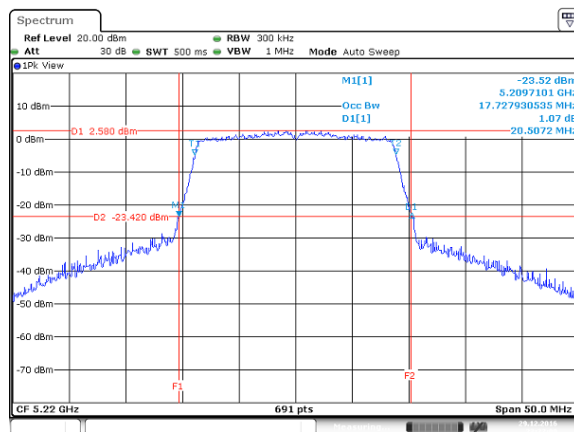
UNII-1 IEEE 802.11n HT20 mode- chain 0

Low CH



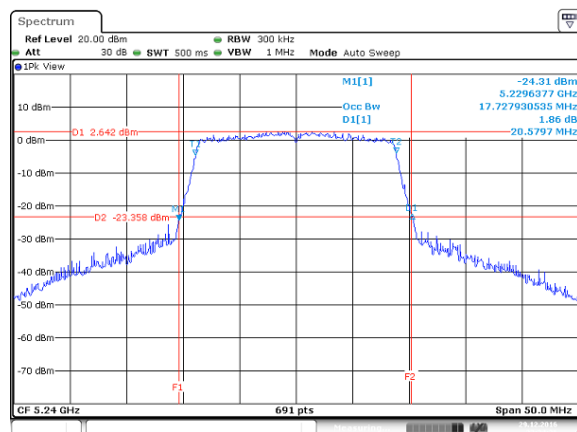
Date: 29.Dec.2016 23:20:45

Mid CH



Date: 29.Dec.2016 23:22:09

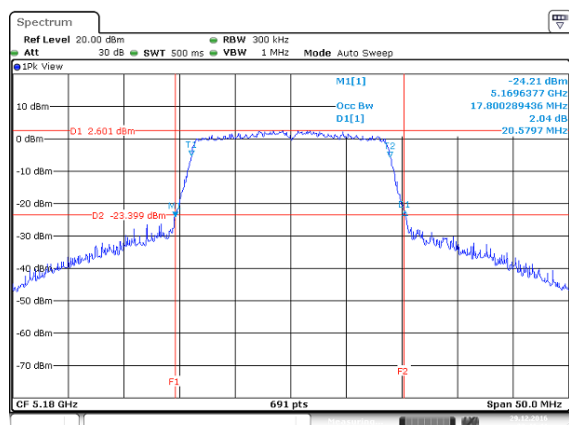
High CH



Date: 29.Dec.2016 23:24:26

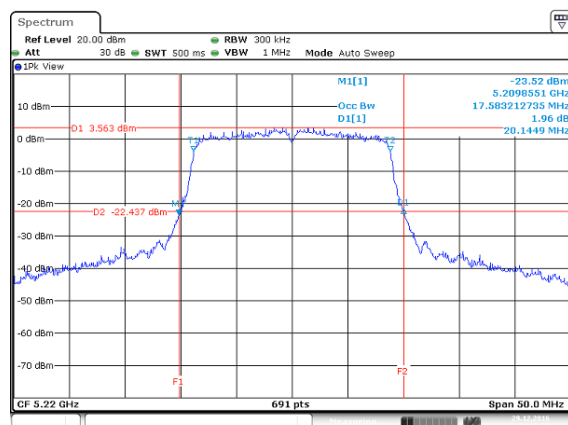
UNII-1 IEEE 802.11n HT20 mode- chain 1

Low CH



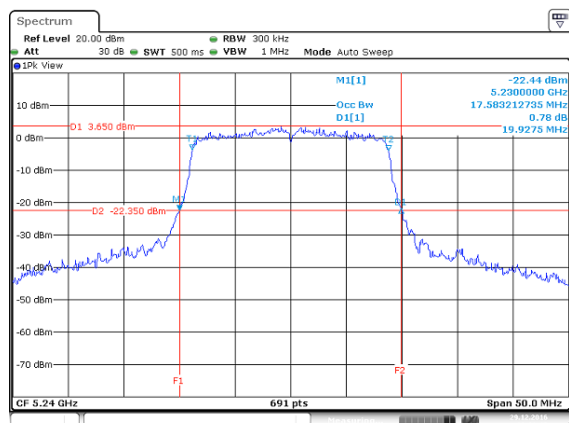
Date: 29.DEC.2016 23:41:41

Mid CH



Date: 29.DEC.2016 23:59:29

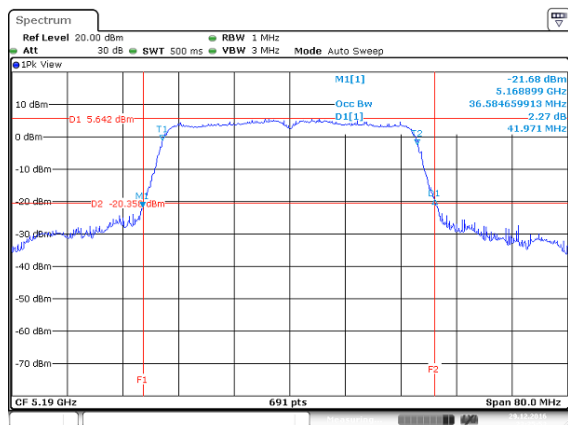
High CH



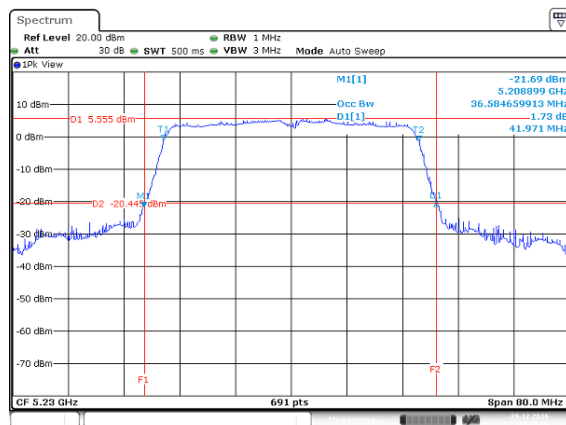
Date: 29.DEC.2016 23:55:17

UNII-1 IEEE 802.11n HT40 mode- chain 0

Low CH

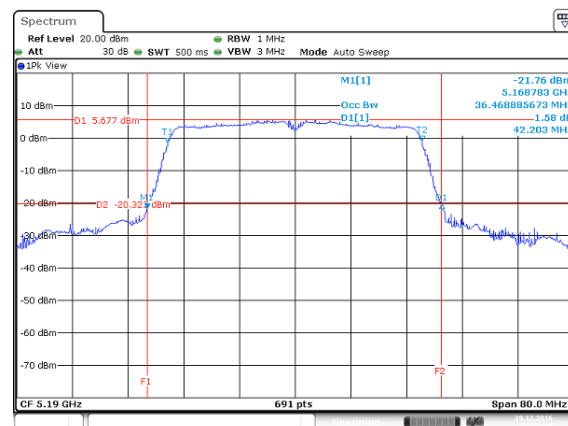


High CH

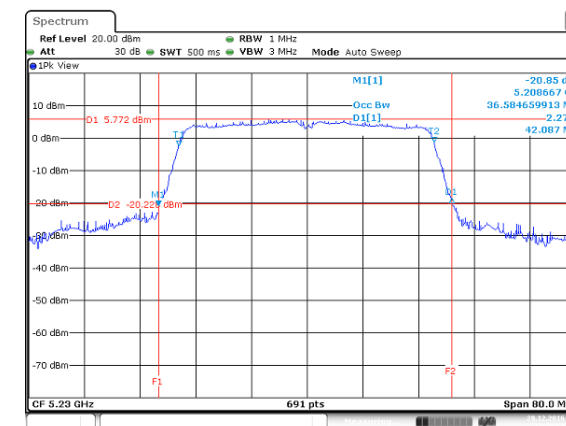


UNII-1 IEEE 802.11n HT40 mode- chain 1

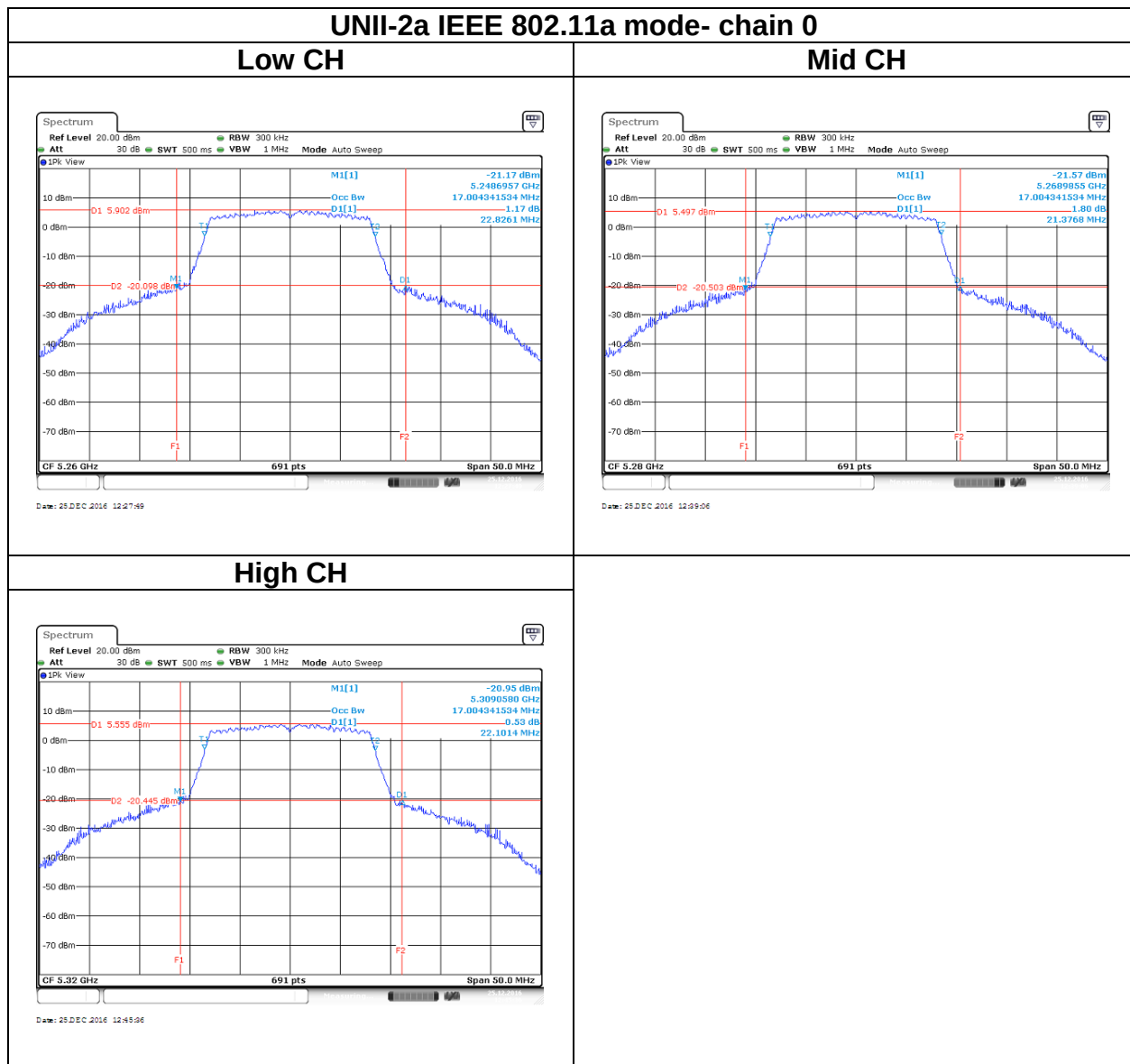
Low CH



High CH

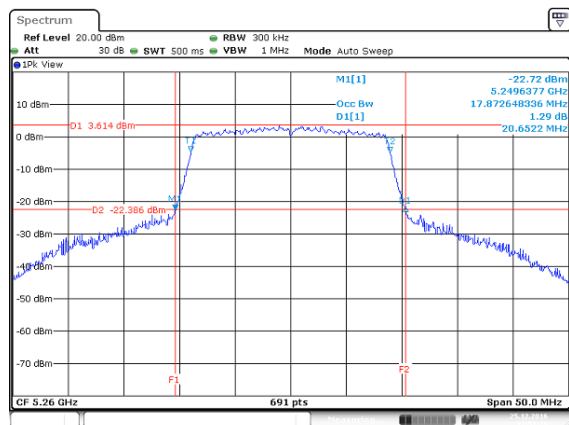


Test Data

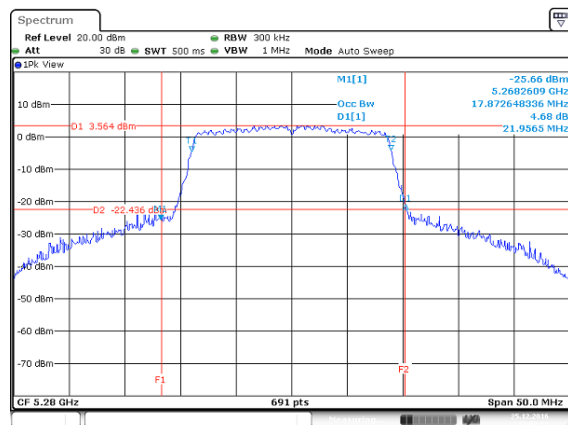


UNII-2a IEEE 802.11n HT20 mode- chain 1

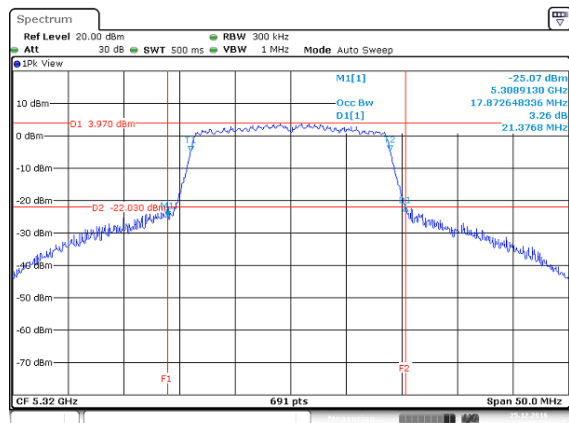
Low CH



Mid CH

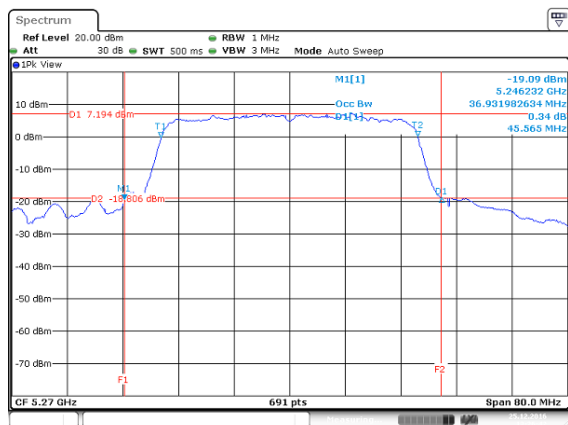


High CH

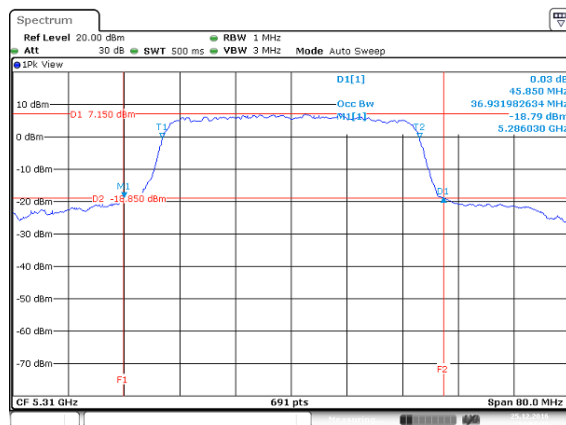


UNII-2a IEEE 802.11n HT40 mode- chain 0

Low CH

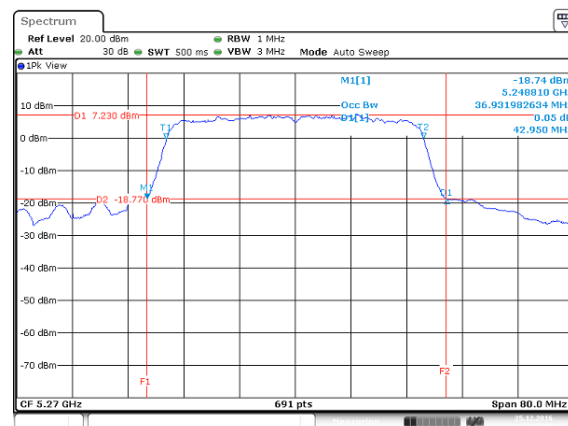


High CH

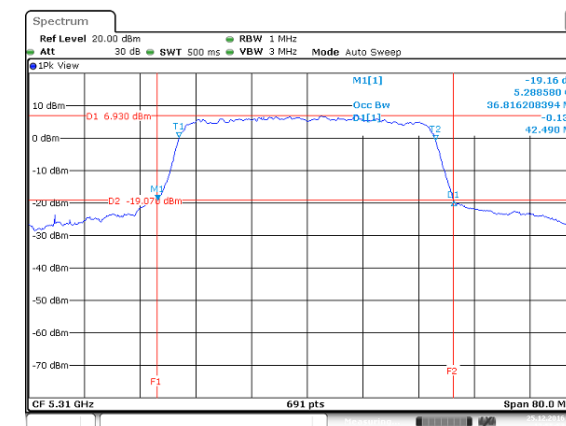


UNII-2a IEEE 802.11n HT40 mode- chain 1

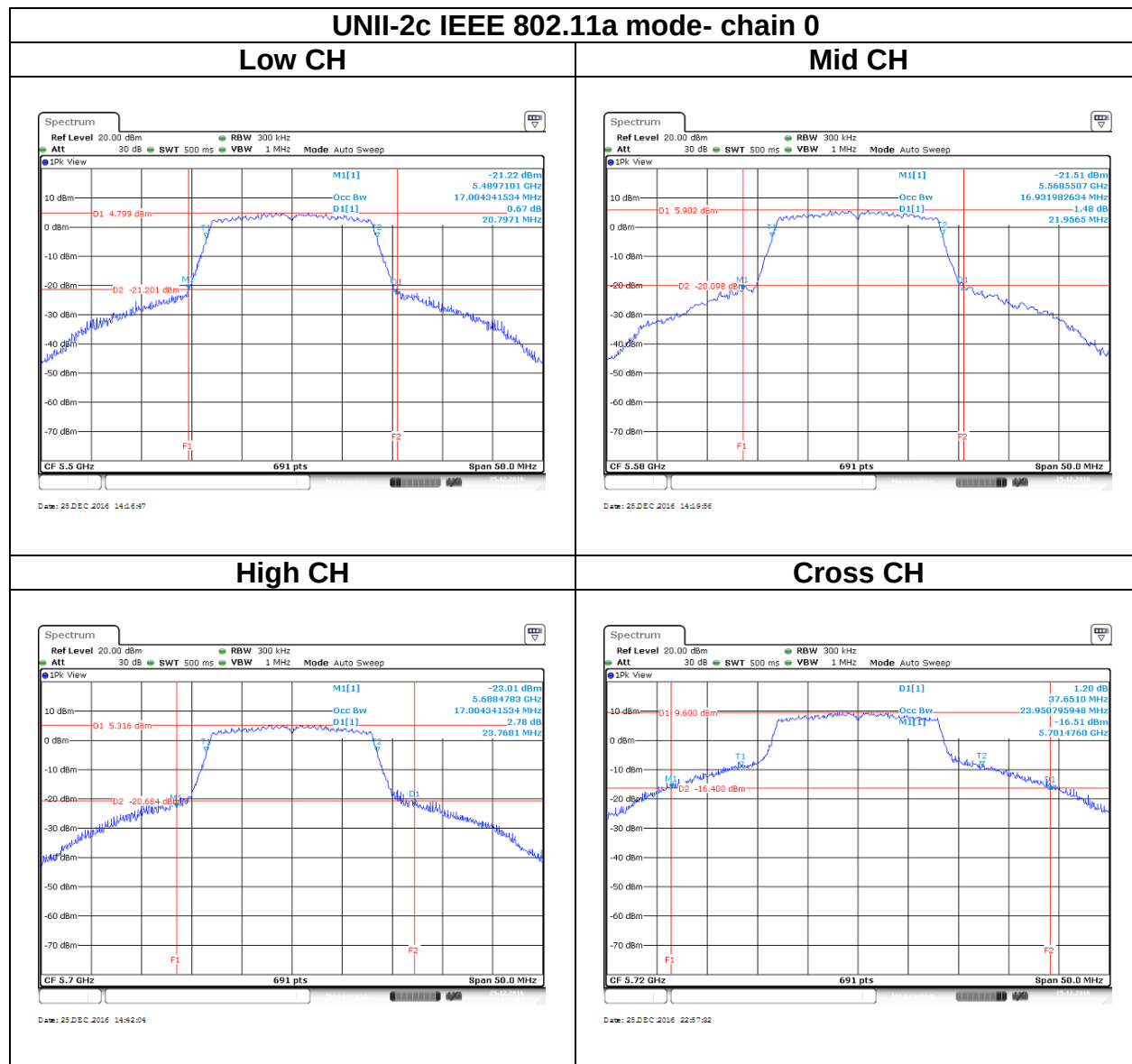
Low CH



High CH

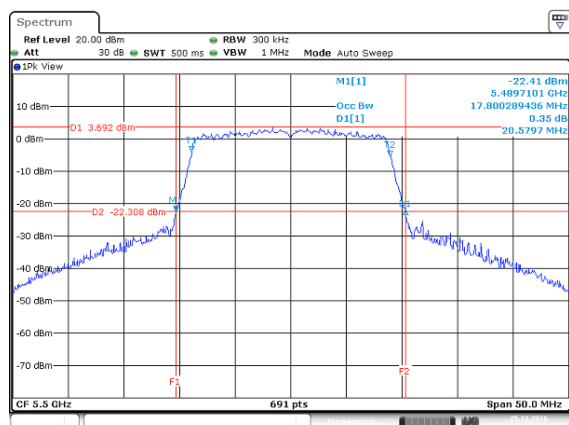


Test Data

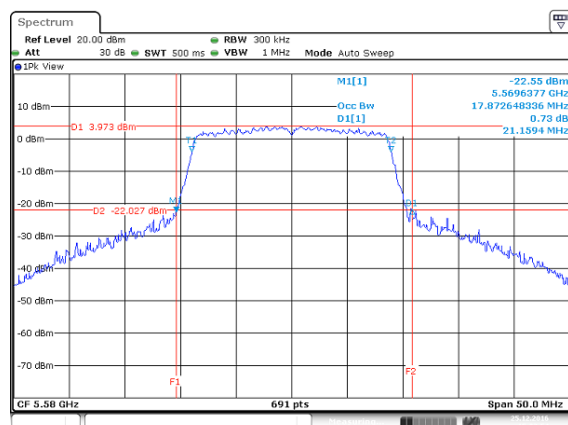


UNII-2c IEEE 802.11n HT20 mode- chain 0

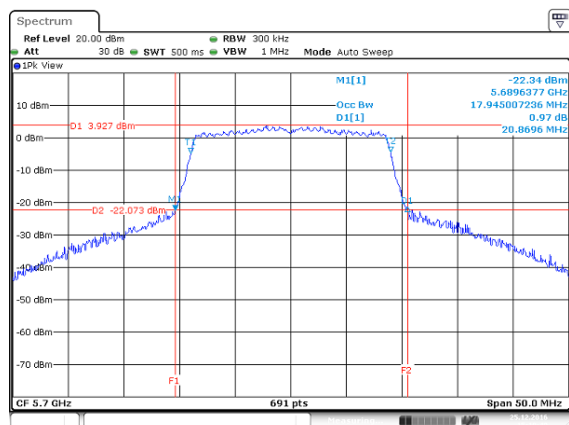
Low CH



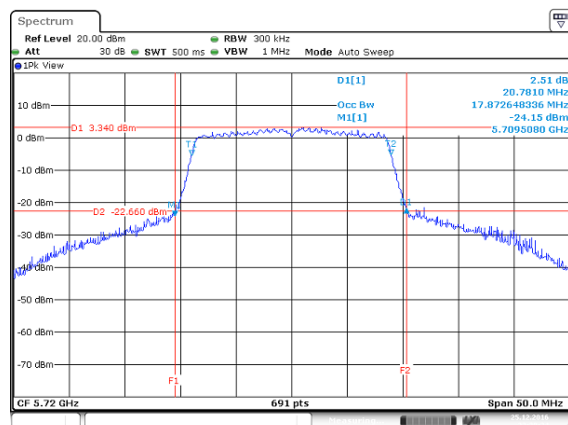
Mid CH



High CH

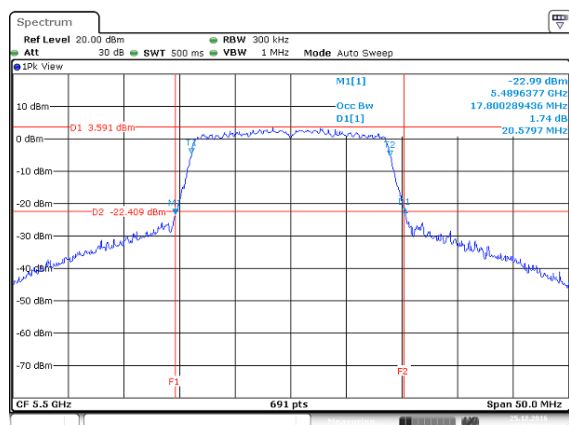


Cross CH



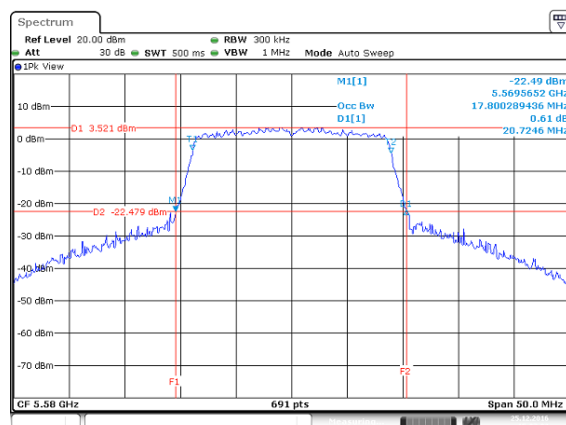
UNII-2c IEEE 802.11n HT20 mode- chain 1

Low CH



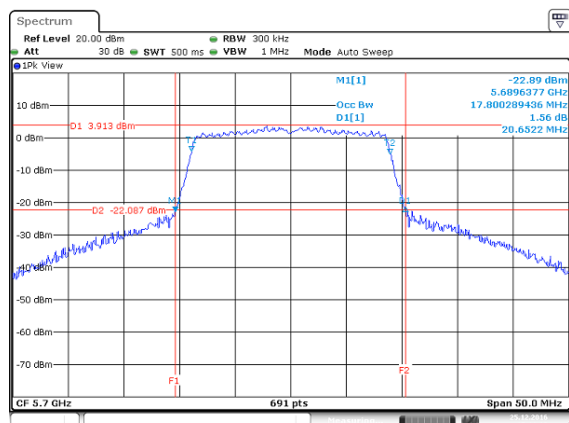
Date: 25 DEC 2016 14:51:45

Mid CH



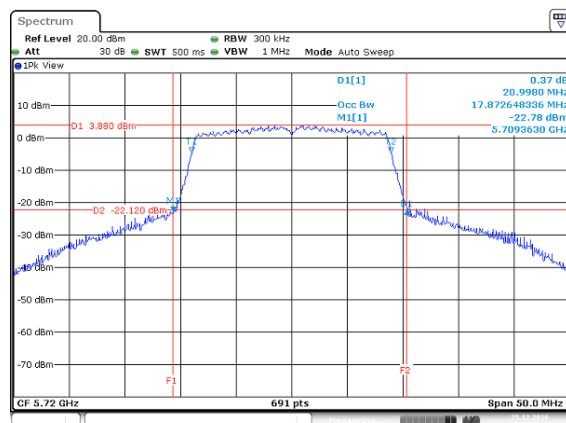
Date: 25 DEC 2016 15:07:02

High CH



Date: 25 DEC 2016 15:11:27

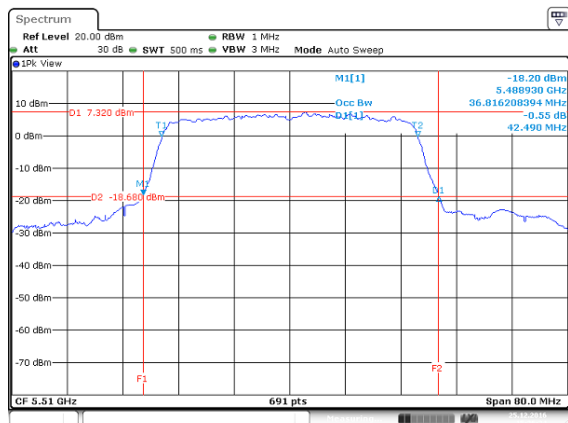
Cross CH



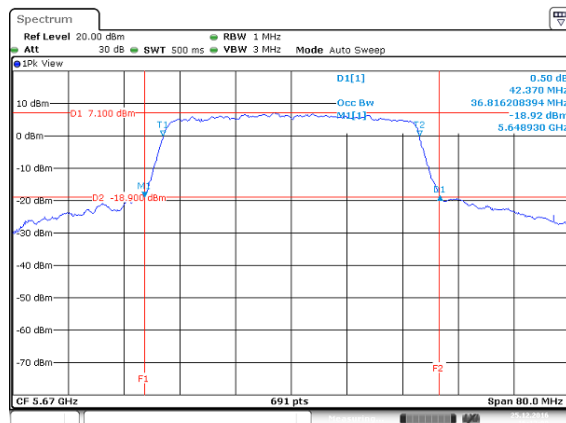
Date: 25 DEC 2016 23:22:00

UNII-2c IEEE 802.11n HT40 mode- chain 0

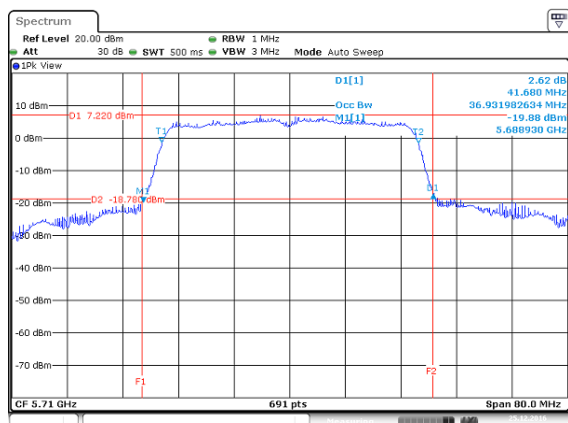
Low CH



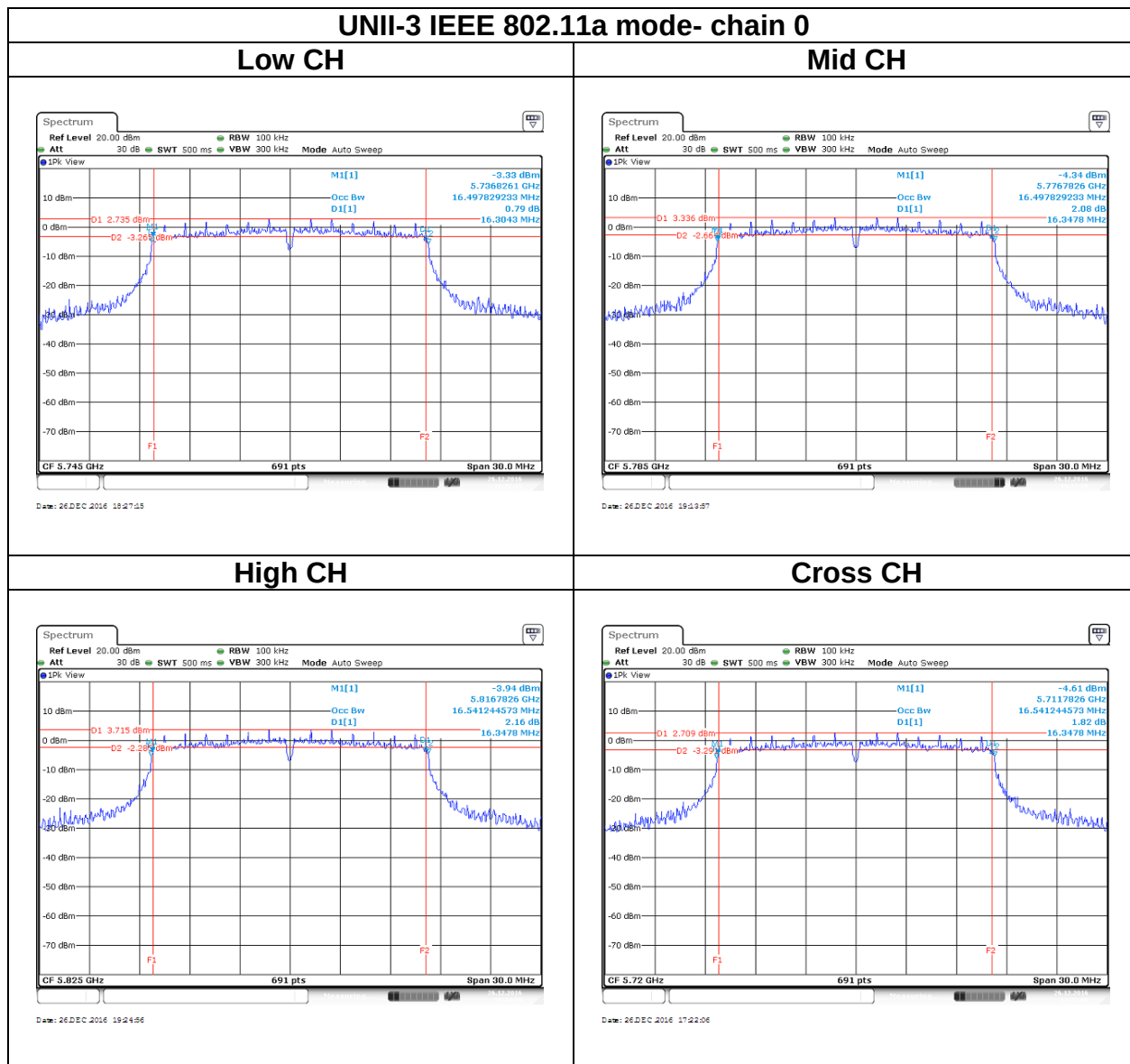
High CH

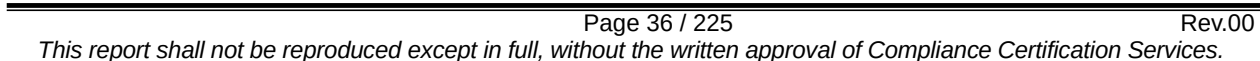


Cross CH



Test Data

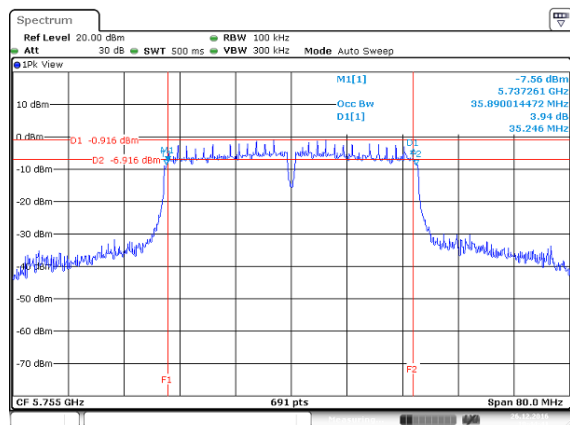




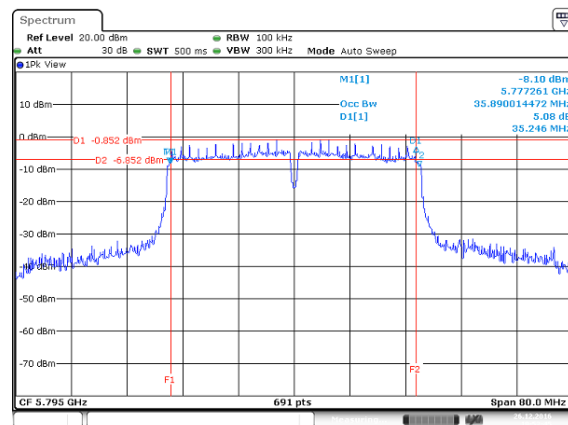
Date: 26 DEC 2016 17:32:37

UNII-3 IEEE 802.11n HT40 mode- chain 1

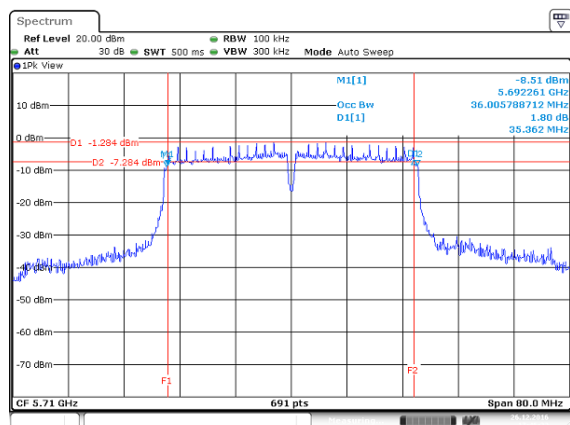
Low CH



High CH



Cross CH



4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3)

UNII-1 :

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW(24 dBm) and The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz ,provided the maximum antenna gain does not exceed 6 dBi. In addition, 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.

UNII-2a and 2c:

the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. and The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. 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.

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, 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.

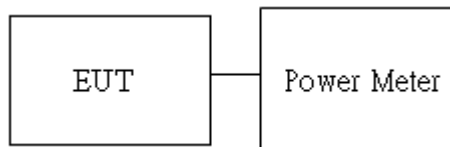
UNII-1 Limit	☒ Antenna not exceed 6 dBi : 24dBm (EIRP : 23dBm) ☐ Antenna with DG greater than 6 dBi : [Limit = $30 - (DG - 6)$]
UNII-2a/2c Limit	☒ Antenna not exceed 6 dBi : 24dBm (EIRP : 30dBm) ☐ Antenna with DG greater than 6 dBi : [Limit = $30 - (DG - 6)$]
UNII-3 Limit	☒ Antenna not exceed 6 dBi : 30dBm ☐ Antenna with DG greater than 6 dBi : [Limit = $30 - (DG - 6)$]

4.3.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03, Section E.3.b.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

Conducted output power :

UNII-1										
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
			chain0	chain1	chain0	chain1				
IEEE 802.11a Data rate: 6Mbps	36	5180	26.0	-	17.68	-	17.68	0.0586	5.86	24
	44	5220	26.0	-	17.76	-	17.76	0.0597		
	48	5240	26.0	-	17.67	-	17.67	0.0585		
IEEE 802.11n HT20 Data rate: MCS8	36	5180	25.0	25.0	15.79	15.82	18.82	0.0761		
	44	5220	25.0	25.0	15.71	15.82	18.78	0.0754		
	48	5240	25.0	25.0	15.62	15.89	18.77	0.0753		
IEEE 802.11n HT40 Data rate: MCS8	38	5190	1F	1E	12.92	12.83	15.89	0.0388		
	46	5230	25.0	25.0	16.12	16.20	19.17	0.0826		

UNII-2a										
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	AV Total Power (dBm)	DG (dBi)	Limit (dBm)
			chain0	chain1	chain0	chain1				
IEEE 802.11a Data rate: 6Mbps	52	5260	27	-	17.66	-	17.66	0.0583	5.86	24
	56	5280	27	-	17.63	-	17.63	0.0579		
	64	5320	25	-	17.45	-	17.45	0.0556		
IEEE 802.11n HT20 Data rate: MCS8	52	5260	26	26	15.68	15.59	18.65	0.0732		
	56	5280	26	26	15.76	15.80	18.79	0.0757		
	64	5320	20	1F	12.82	12.76	15.80	0.0380		
IEEE 802.11n HT40 Data rate: MCS8	54	5270	26	26	16.14	16.18	19.17	0.0826		
	62	5310	20	1F	12.83	12.94	15.90	0.0389		

UNII-2c										
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
			chain0	chain1	chain0	chain1				
IEEE 802.11a Data rate: 6Mbps	100	5500	22	-	15.60	-	15.60	0.0363	5.86	24
	116	5580	28	-	17.69	-	17.69	0.0587		
	140	5700	20	-	14.88	-	14.88	0.0308		
	144	5720	27	-	17.34	-	17.34	0.0542		
IEEE 802.11n HT20 Data rate: MCS8	100	5500	27	27	15.62	15.72	18.68	0.0738		
	116	5580	27	27	15.52	15.90	18.72	0.0745		
	140	5700	21	21	13.53	14.14	16.86	0.0485		
	144	5720	24	24	15.53	15.64	18.60	0.0724		
IEEE 802.11n HT40 Data rate: MCS8	102	5510	20	20	15.31	15.58	18.46	0.0701		
	110	5550	27	27	15.48	15.60	18.55	0.0716		
	134	5670	24	24	14.42	14.30	17.37	0.0546		
	142	5710	23	23	15.50	15.58	18.55	0.0716		

UNII-3										
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
			chain0	chain1	chain0	chain1				
IEEE 802.11a Data rate: 6Mbps	144	5720	25	-	8.24	-	8.24	0.0067	3.71	30
	149	5745	28	-	17.68	-	17.68	0.0586		
	157	5785	28	-	17.62	-	17.62	0.0578		
	165	5825	28	-	17.81	-	17.81	0.0604		
IEEE 802.11n HT20 Data rate: MCS0	144	5720	24	24	7.04	7.31	10.19	0.0104		
	149	5745	29	29	15.82	15.75	18.80	0.0758		
	157	5785	29	29	15.67	15.83	18.76	0.0752		
	165	5825	29	29	15.86	15.78	18.83	0.0764		
IEEE 802.11n HT40 Data rate: MCS0	142	5710	23	23	3.67	4.74	7.25	0.0053		
	151	5755	29	29	15.58	15.52	18.56	0.0718		
	159	5795	29	29	15.54	15.50	18.53	0.0713		