



FCC ID: P27ADSG130
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FCC RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

Test Standard	FCC Part 15.247
Brand name	ALARM.COM
Product name	Smart Gateway
Model No.	ADC-SG130
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)

Approved by:

Tested by:

Sam Chuang
Manager

Jerry Chuang
Engineer

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	February 21, 2019	Initial Issue	Allison Chen



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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.		
Manufacturer	SerComm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.		
Equipment	Smart Gateway		
Model No.	ADC-SG130		
Model Discrepancy	N/A		
Received Date	December 3, 2018		
Date of Test	December 18 ~ 21, 2018		
Output Power(W)	Mode	Output Power	
	IEEE 802.11b Mode	0.2339	
	IEEE 802.11g Mode	0.5177	
	IEEE 802.11n HT20 Mode	0.5007	
	IEEE 802.11n HT40 Mode	0.4657	
Power Supply	VDC from Power Adapter Brand: Asian Power Devices Inc. Model name: WB-12G12FU Input: 100-240Vac, 50-60Hz, 0.3A Max Output: 12Vdc, 1A		

1.2 EUT CHANNEL INFORMATION

Frequency Range	802.11b/g/n HT 20: 2412MHz ~ 2462MHz 802.11n HT 40: 2422MHz ~ 2452MHz
Modulation Type	1. IEEE 802.11b Mode: DSSS(DBPSK/DQPSK/CCK) 2. IEEE 802.11g Mode: OFDM (BPSK/QPSK/16QAM/64QAM) 3. IEEE 802.11n HT20 Mode : OFDM (BPSK/QPSK/16QAM/64QAM) 4. IEEE 802.11n HT40 Mode : OFDM (BPSK/QPSK/16QAM/64QAM)
Number of channel	1. IEEE 802.11b Mode: 11 Channels 2. IEEE 802.11g Mode: 11 Channels 3. IEEE 802.11n HT20 Mode : 11 Channels 4. IEEE 802.11n HT40 Mode : 7 Channels

Remark:

Refer as ANSI C63.10:2013 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 Type	☒ Monopole ☒ PCB ☐ Dipole ☐ Coils
Antenna Gain	Antenna 1: Monopole Antenna / 3.62 dBi Antenna 2: PCB Antenna / 4.99 dBi <i>Power Directional Gain: 4.36 dBi</i>
Antenna Connector	I-PEX for PCB Antenna

Notes:1. Power Directional Gain: $10\text{LOG}(((10^{(Ant1/10)}+10^{(Ant2/10)}))/2))$



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1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
AC Powerline Conducted Emission	+/- 1.2575

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	Dally Hong	-
Radiation	Jerry Chuang	-
RF Conducted	Jerry Chuang	-

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



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1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Power Meter	Anritsu	ML2495A	1149001	02/06/2018	02/05/2019
Power Seneor	Anritsu	MA2491A	030982	02/07/2018	02/06/2019
Signal Analyzer	R&S	FSV 40	101073	09/27/2018	09/26/2019

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	05/14/2018	05/13/2019
Bilog Antenna	Sunol Sciences	JB3	A030105	07/13/2018	07/12/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	06/29/2018	06/28/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	06/29/2018	06/28/2019
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	02/08/2018	02/07/2019
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	08/20/2018	08/19/2019
Loop Ant	COM-POWER	AL-130	121051	03/21/2018	03/20/2019
Pre-Amplifier	EMEC	EM330	060609	06/29/2018	06/28/2019
Pre-Amplifier	HP	8449B	3008A00965	06/29/2018	06/28/2019
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/31/2018	05/30/2019
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
CABLE	EMCI	CFD300-NL	CERF	06/29/2018	06/28/2019
EMI Test Receiver	R&S	ESCI	100064	07/24/2018	07/23/2019
LISN	SCHWARZBECK	NSLK 8127	8127-541	02/09/2018	02/08/2019
LISN	SCHAFFNER	NNB41	03/10013	02/06/2018	02/05/2019

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



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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(H)	Acer	Aspire 4320 series	N/A	QDS-BRCM1018

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 15.247, KDB 558074 D01, KDB 662911 D01.



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2. TEST SUMMERY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207(a)	4.1	AC Conducted Emission	Pass
15.247(a)(2)	4.2	6 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth (99%)	Pass
15.247(b)	4.3	Output Power Measurement	Pass
15.247(e)	4.4	Power Spectral Density	Pass
15.247(d)	4.5	Conducted Band Edge	Pass
15.247(d)	4.5	Conducted Spurious Emission	Pass
15.247(d)	4.6	Radiation Band Edge	Pass
15.247(d)	4.6	Radiation Spurious Emission	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	IEEE 802.11b Mode :1Mbps IEEE 802.11g Mode :6Mbps IEEE 802.11n HT20 Mode: MCS8 IEEE 802.11n HT40 Mode: MCS8
Test Channel Frequencies	IEEE 802.11b Mode: 1. Lowest Channel: 2412MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2462MHz IEEE 802.11g Mode: 1. Lowest Channel: 2412MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2462MHz IEEE 802.11n HT20 Mode: 1. Lowest Channel: 2412MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2462MHz IEEE 802.11n HT40 Mode: 1. Lowest Channel: 2422MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2452MHz
Operation Transmitter	IEEE 802.11b Mode: 2T2R IEEE 802.11g Mode: 2T2R IEEE 802.11n HT20 Mode: 2T2R IEEE 802.11n HT40 Mode: 2T2R

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Power supply Mode	Mode 1:EUT power by adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Power supply Mode	Mode 1:EUT power by adapter
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

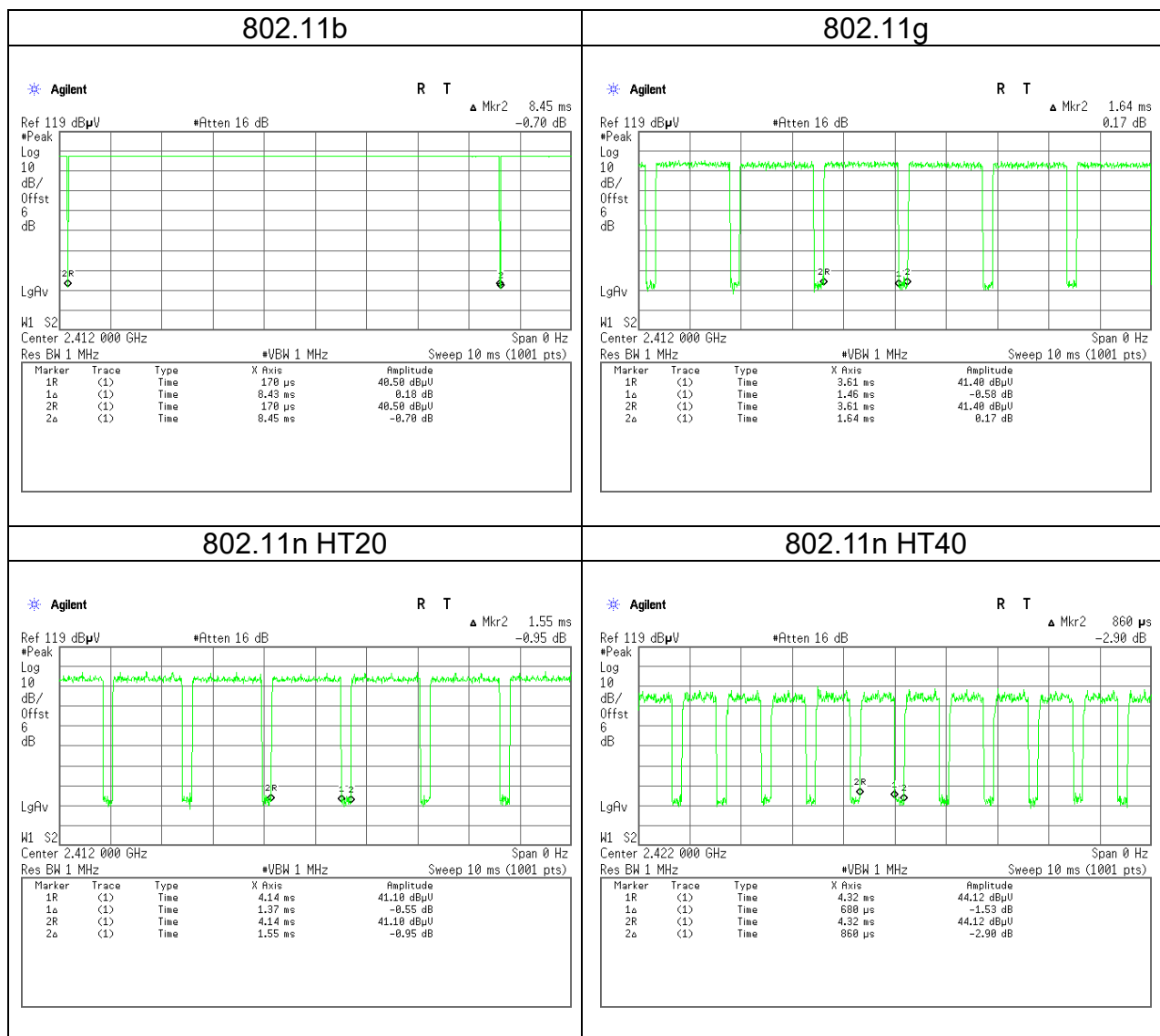
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1:EUT power by adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

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(Z-Plane and Horizontal) were recorded in this report
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

3.3 EUT DUTY CYCLE

Duty Cycle			
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)
802.11b	8.4300	8.4500	99.76%
802.11g	1.4600	1.6400	89.02%
802.11n HT20	1.3700	1.5500	88.39%
802.11n HT40	0.6800	0.8600	79.07%



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a)(2),

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

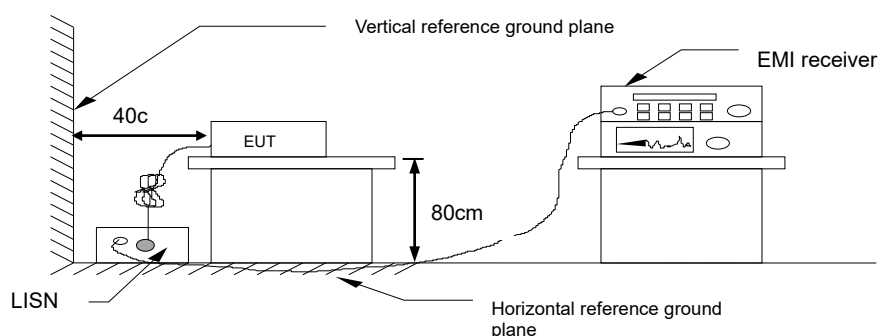
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10:2013 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



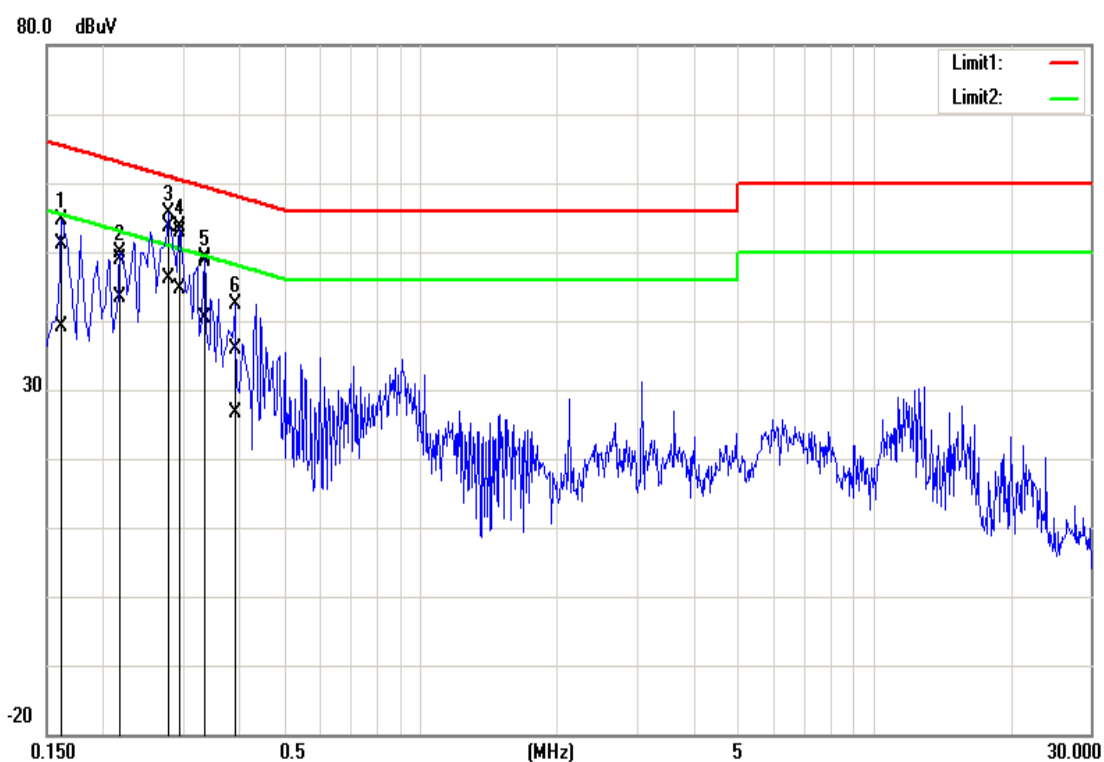
4.1.4 Test Result

Pass.

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Test Data

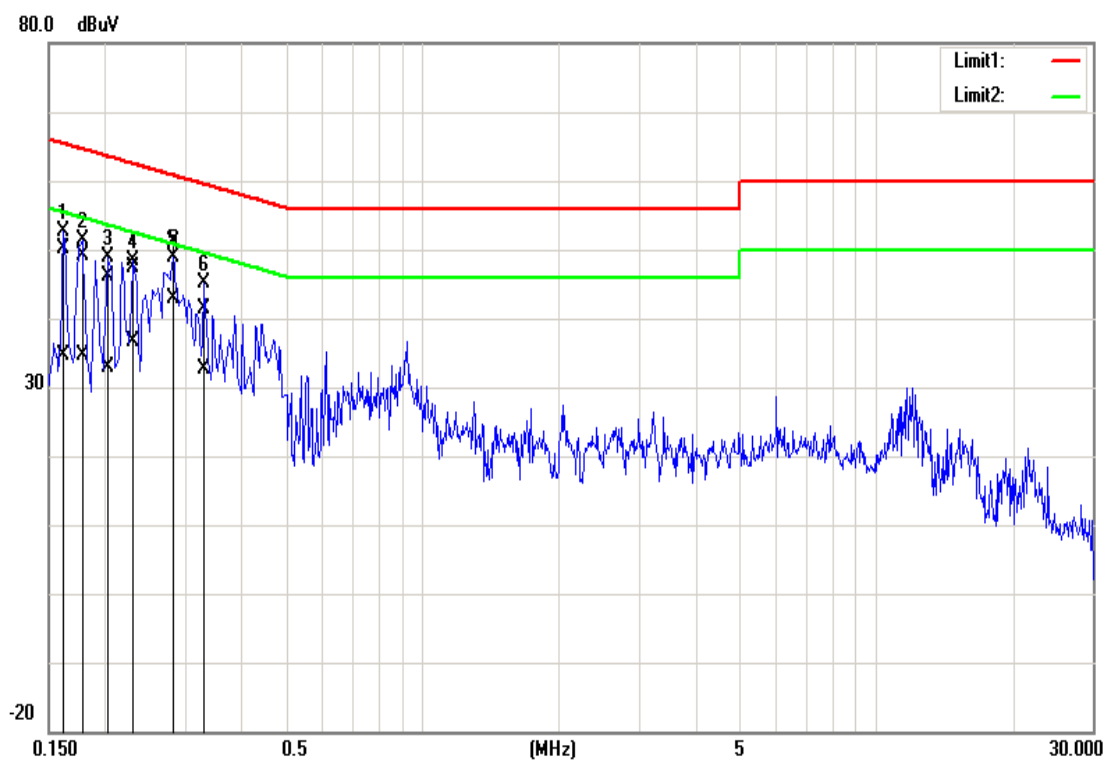
Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	120Vac / 60Hz	Test Date	2018/12/19
Phase:	Line	Test Engineer	Dally Hong



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1620	51.00	39.05	0.16	51.16	39.21	65.36	55.36	-14.20	-16.15	Pass
2	0.2180	48.60	43.13	0.16	48.76	43.29	62.89	52.89	-14.13	-9.60	Pass
3*	0.2780	53.41	46.03	0.16	53.57	46.19	60.88	50.88	-7.31	-4.69	Pass
4	0.2940	52.68	44.56	0.16	52.84	44.72	60.41	50.41	-7.57	-5.69	Pass
5	0.3340	48.42	40.11	0.18	48.60	40.29	59.35	49.35	-10.75	-9.06	Pass
6	0.3900	35.59	26.45	0.18	35.77	26.63	58.06	48.06	-22.29	-21.43	Pass

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Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	120Vac / 60Hz	Test Date	2018/12/19
Phase:	Neutral	Test Engineer	Dally Hong



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1620	49.84	34.47	0.19	50.03	34.66	65.36	55.36	-15.33	-20.70	Pass
2	0.1780	49.06	34.38	0.18	49.24	34.56	64.58	54.58	-15.34	-20.02	Pass
3	0.2020	45.96	32.73	0.18	46.14	32.91	63.53	53.53	-17.39	-20.62	Pass
4	0.2300	47.29	36.53	0.18	47.47	36.71	62.45	52.45	-14.98	-15.74	Pass
5*	0.2820	50.86	42.82	0.18	51.04	43.00	60.76	50.76	-9.72	-7.76	Pass
6	0.3300	41.25	32.43	0.19	41.44	32.62	59.45	49.45	-18.01	-16.83	Pass

4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

4.2.1 Test Limit

According to §15.247(a)(2),

6 dB Bandwidth :

Limit	Shall be at least 500kHz
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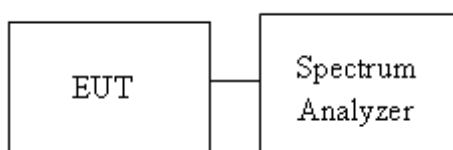
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as KDB 558074 D01 and ANSI C63.10: 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. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

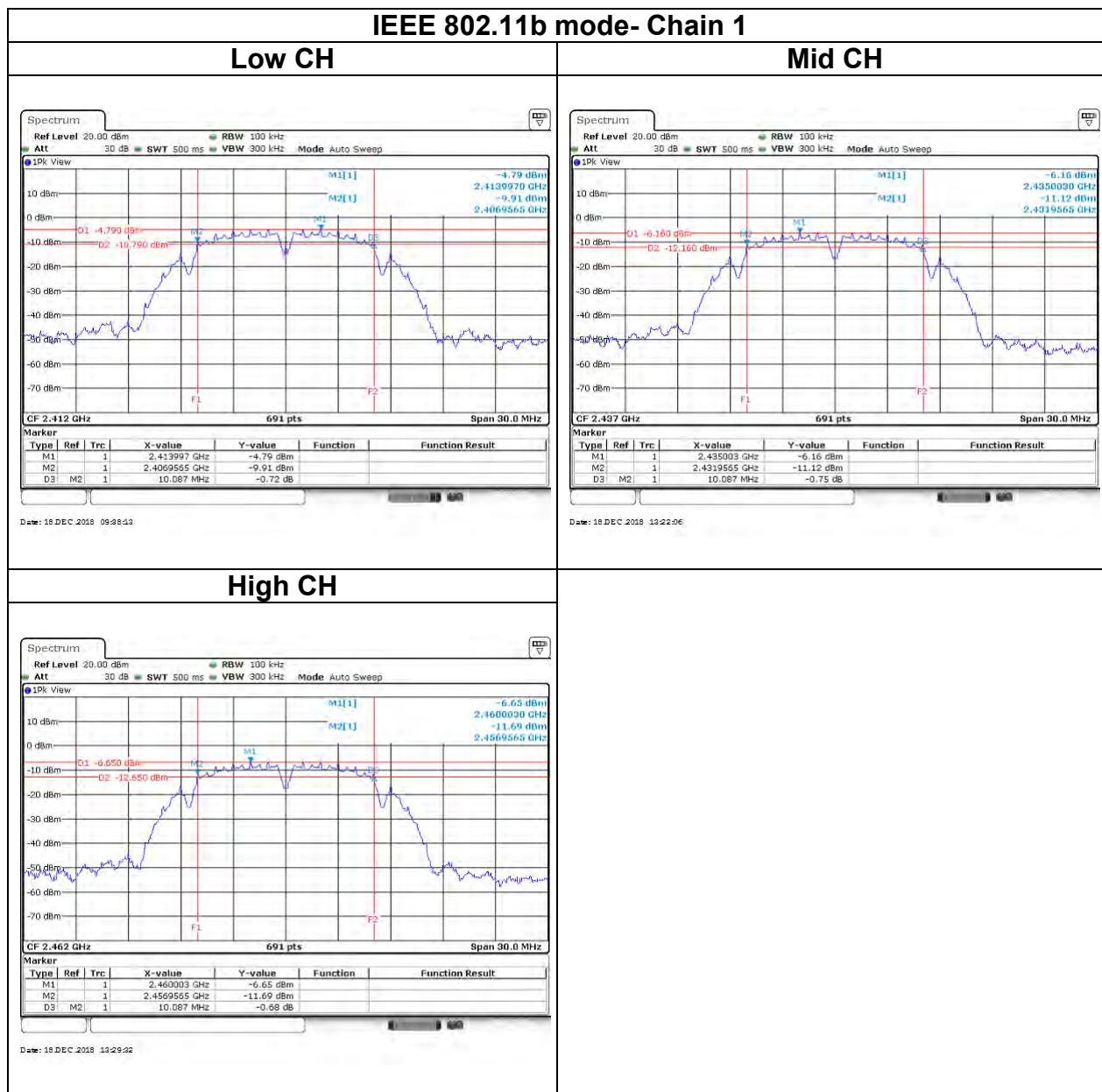
Test mode: IEEE 802.11b mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 1 OBW (99%) (MHz)	Chain 2 OBW (99%) (MHz)	Chain 1 6dB BW (MHz)	Chain 2 6dB BW (MHz)	6dB limit (kHz)
Low	2412	12.2865	12.2431	10.087	10.087	≥500
Mid	2437	12.2865	12.1997	10.087	10.087	
High	2462	12.2865	12.1997	10.087	10.087	

Test mode: IEEE 802.11g mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 1 OBW (99%) (MHz)	Chain 2 OBW (99%) (MHz)	Chain 1 6dB BW (MHz)	Chain 2 6dB BW (MHz)	6dB limit (kHz)
Low	2412	16.7149	16.7583	16.5652	16.5652	≥500
Mid	2437	16.7583	16.7149	16.5652	16.6087	
High	2462	16.7583	16.7149	16.5652	16.6087	

Test mode: IEEE 802.11n HT 20 mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 1 OBW (99%) (MHz)	Chain 2 OBW (99%) (MHz)	Chain 1 6dB BW (MHz)	Chain 2 6dB BW (MHz)	6dB limit (kHz)
Low	2412	17.6700	17.6266	17.6957	17.6087	≥500
Mid	2437	17.6700	17.6700	17.7391	17.6087	
High	2462	17.6700	17.6700	17.7826	17.6087	

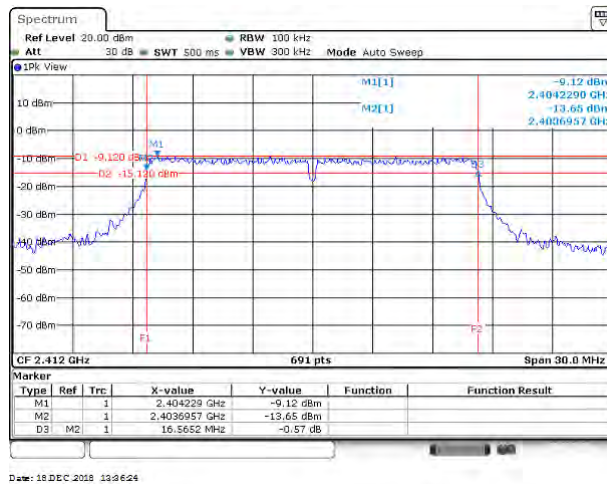
Test mode: IEEE 802.11n HT40 Mode / 2422-2452 MHz						
Channel	Frequency (MHz)	Chain 1 OBW (99%) (MHz)	Chain 2 OBW (99%) (MHz)	Chain 1 6dB BW (MHz)	Chain 2 6dB BW (MHz)	6dB limit (kHz)
Low	2422	36.8162	36.4688	36.522	36.406	>500
Mid	2437	36.9319	36.4688	36.638	36.406	
High	2452	36.8162	36.4688	36.522	36.522	

Test Data (6dB BANDWIDTH)

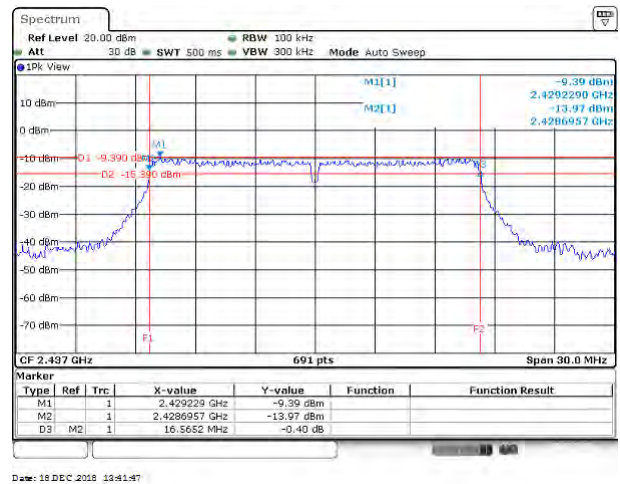


IEEE 802.11g mode- Chain 1

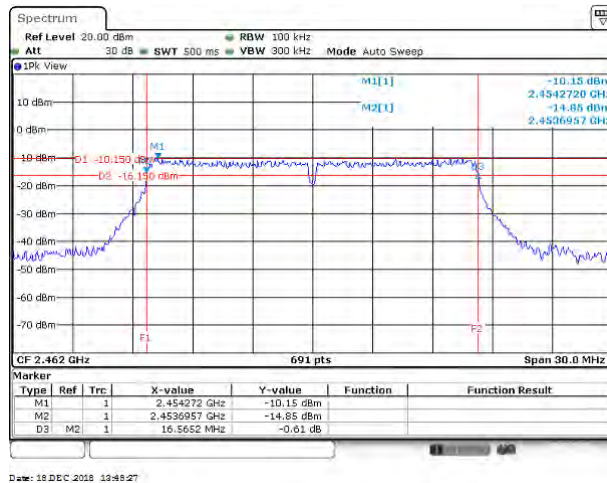
Low CH



Mid CH

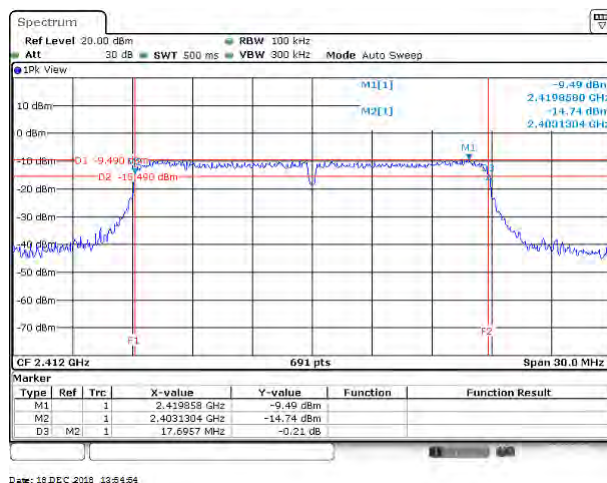


High CH

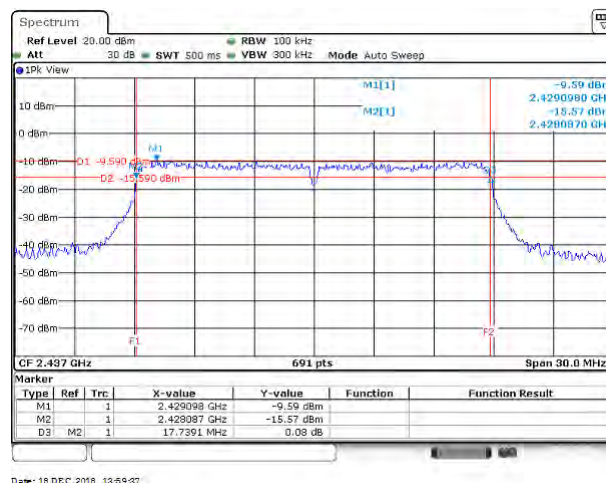


IEEE 802.11n HT20 mode- Chain 1

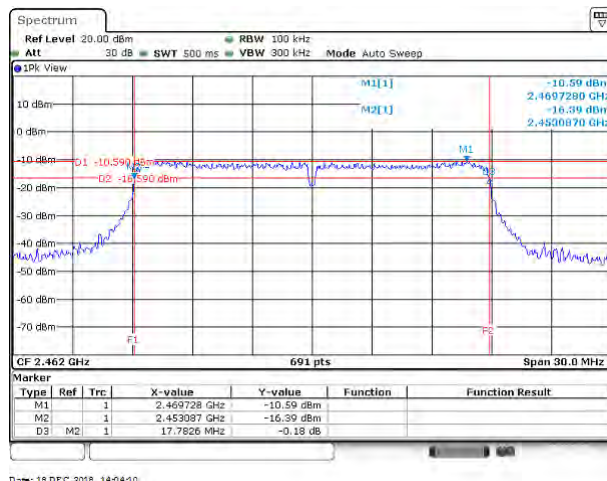
Low CH



Mid CH

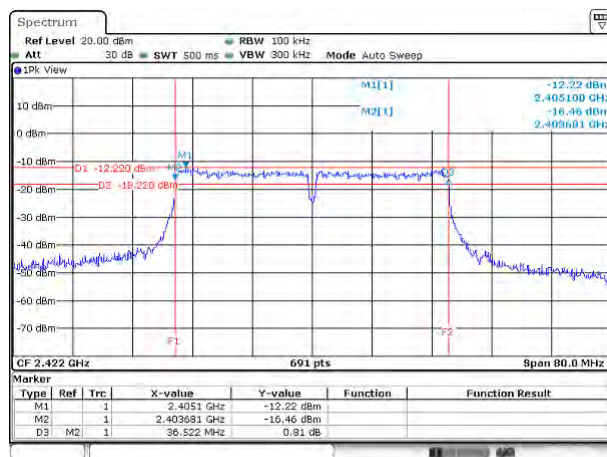


High CH

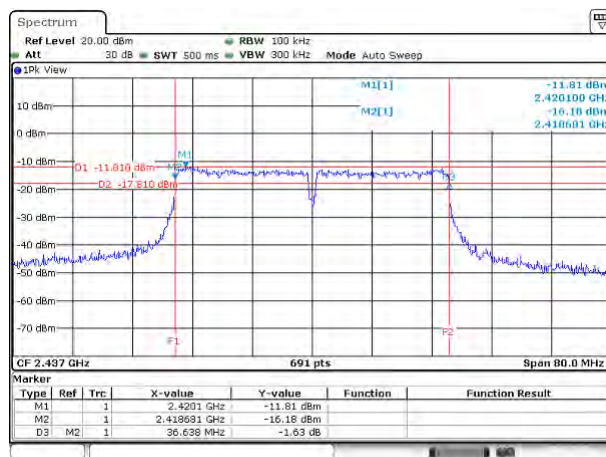


IEEE 802.11n HT40 mode- Chain 1

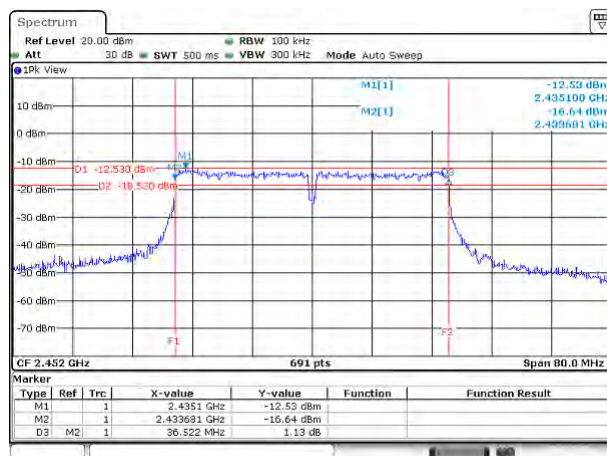
Low CH

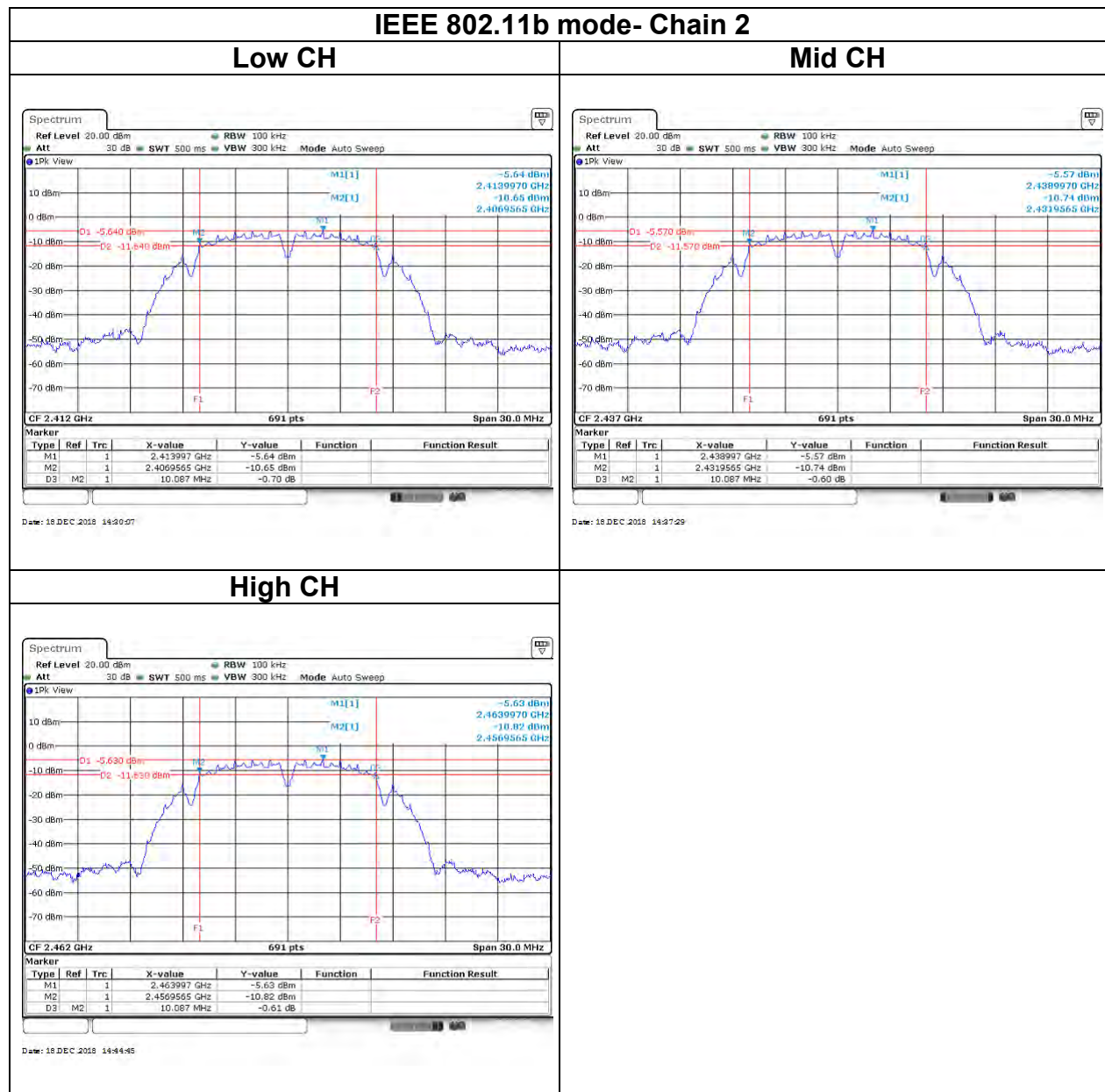


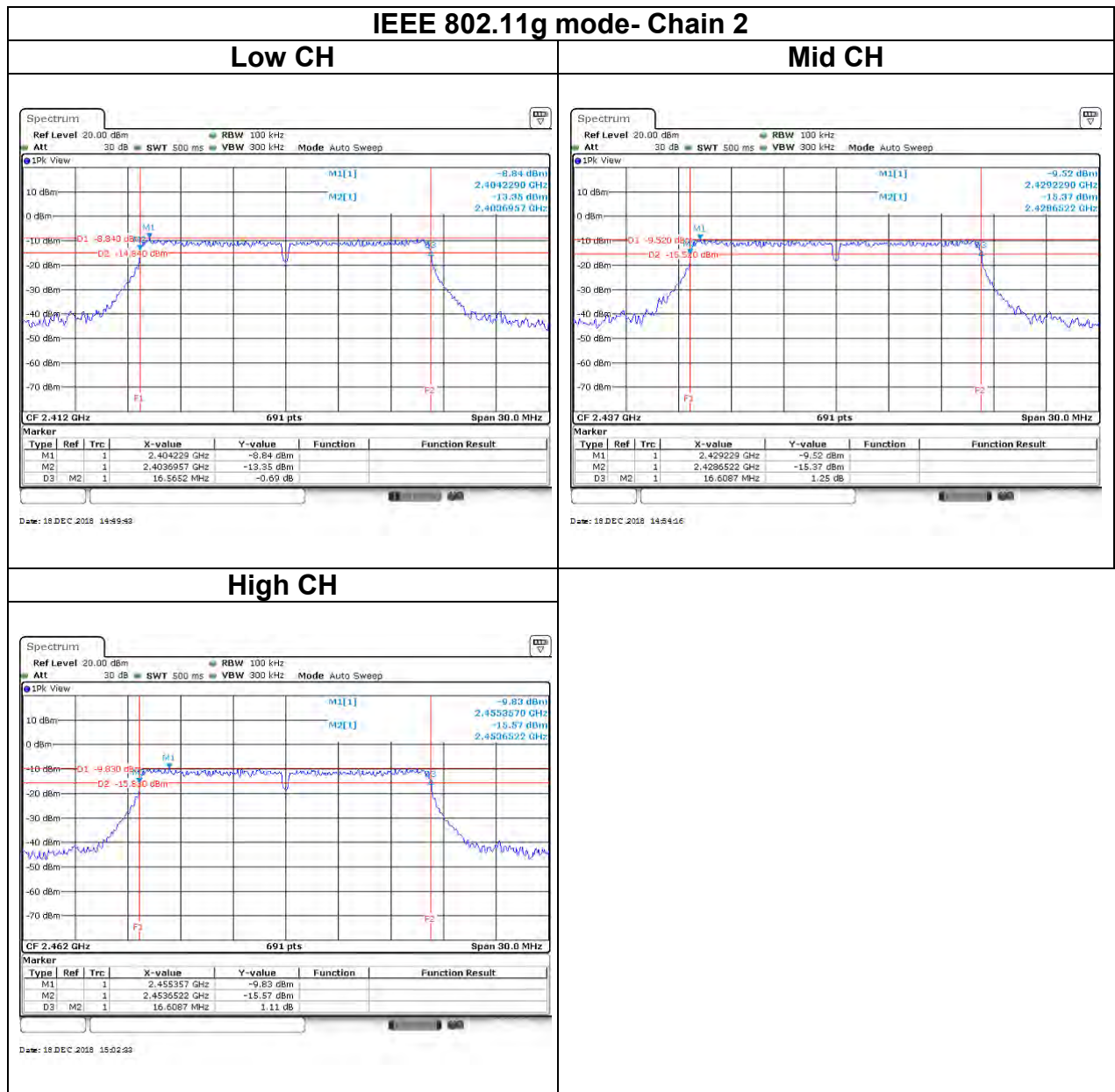
Mid CH



High CH

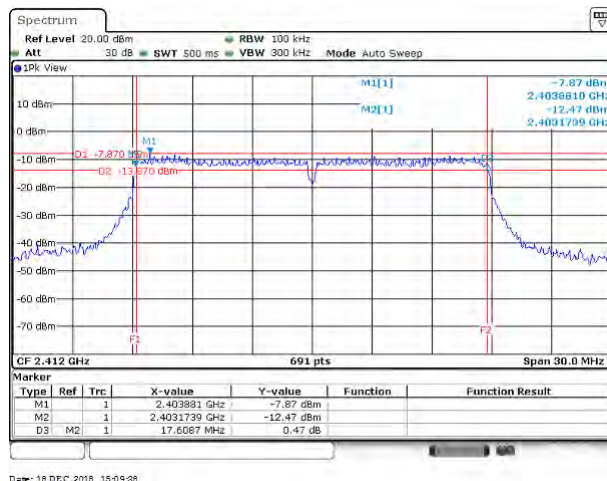




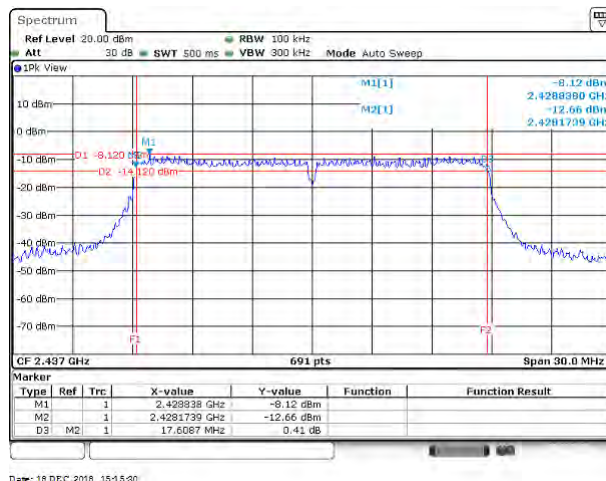


IEEE 802.11n HT20 mode- Chain 2

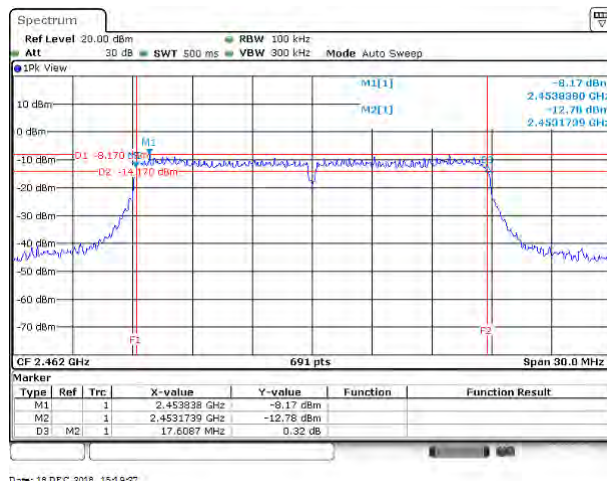
Low CH



Mid CH

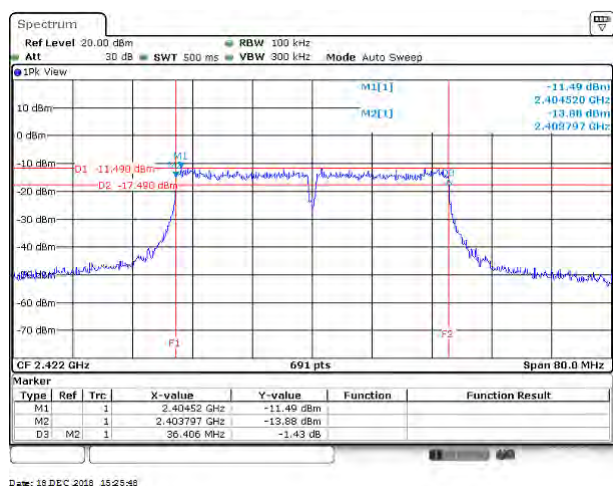


High CH

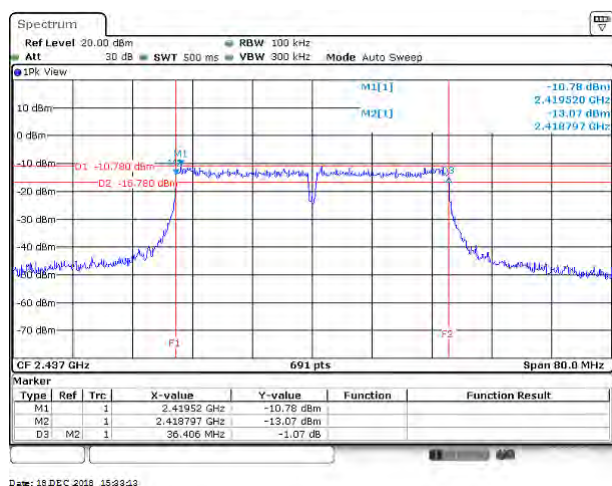


IEEE 802.11n HT40 mode- Chain 2

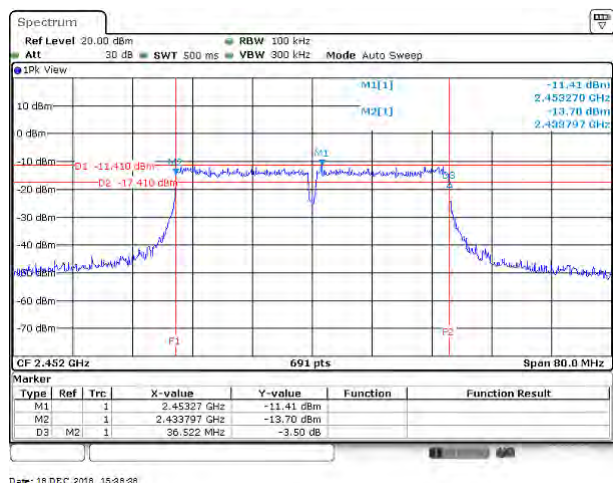
Low CH



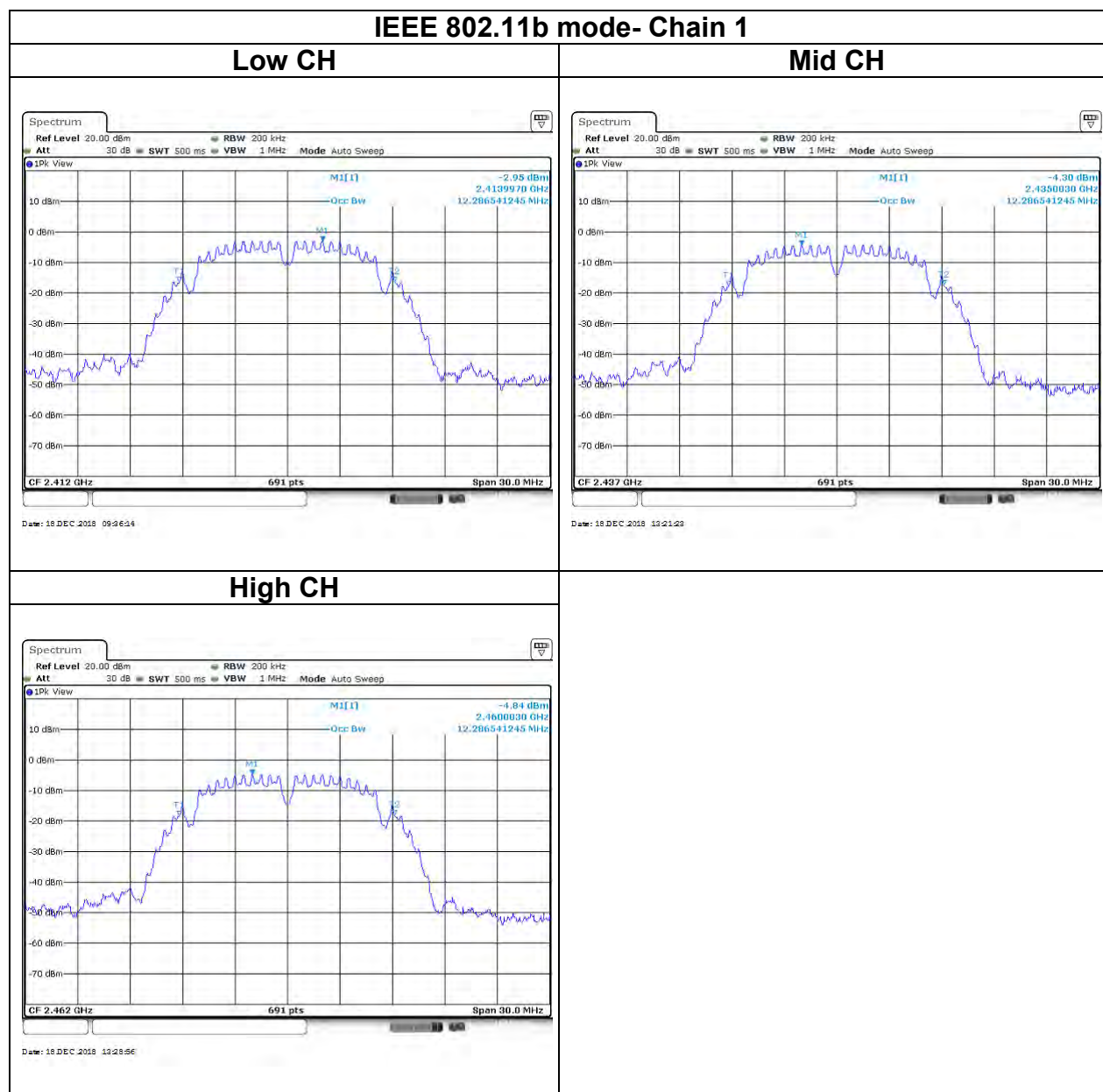
Mid CH



High CH

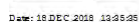


Test Data (BANDWIDTH 99%)

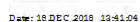


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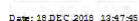
Low CH



Mid CH



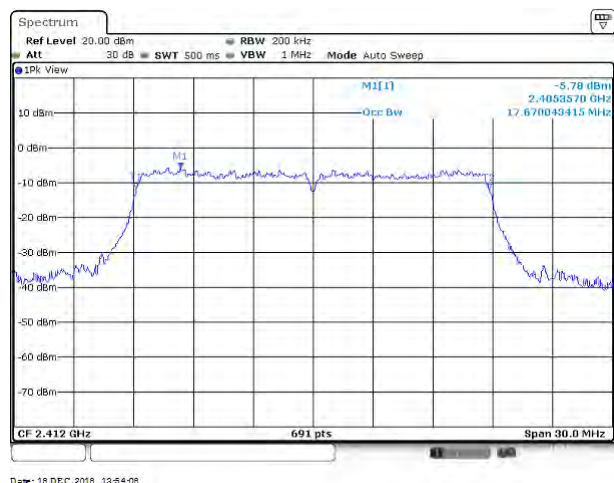
High CH



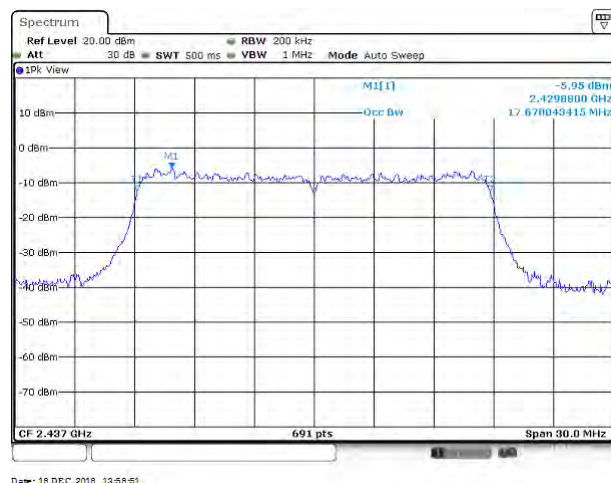
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IEEE 802.11n HT20 mode- Chain 1

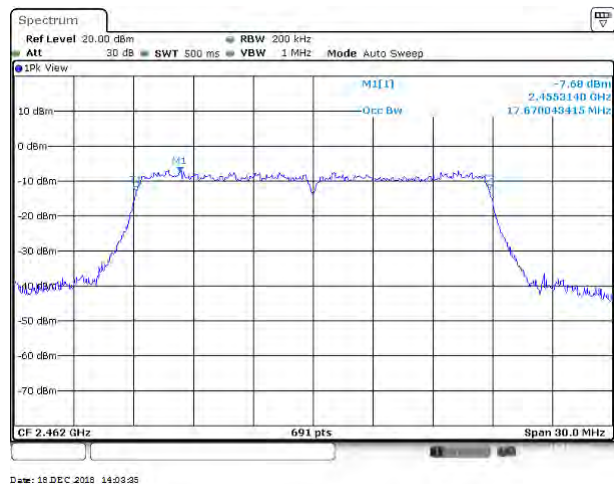
Low CH

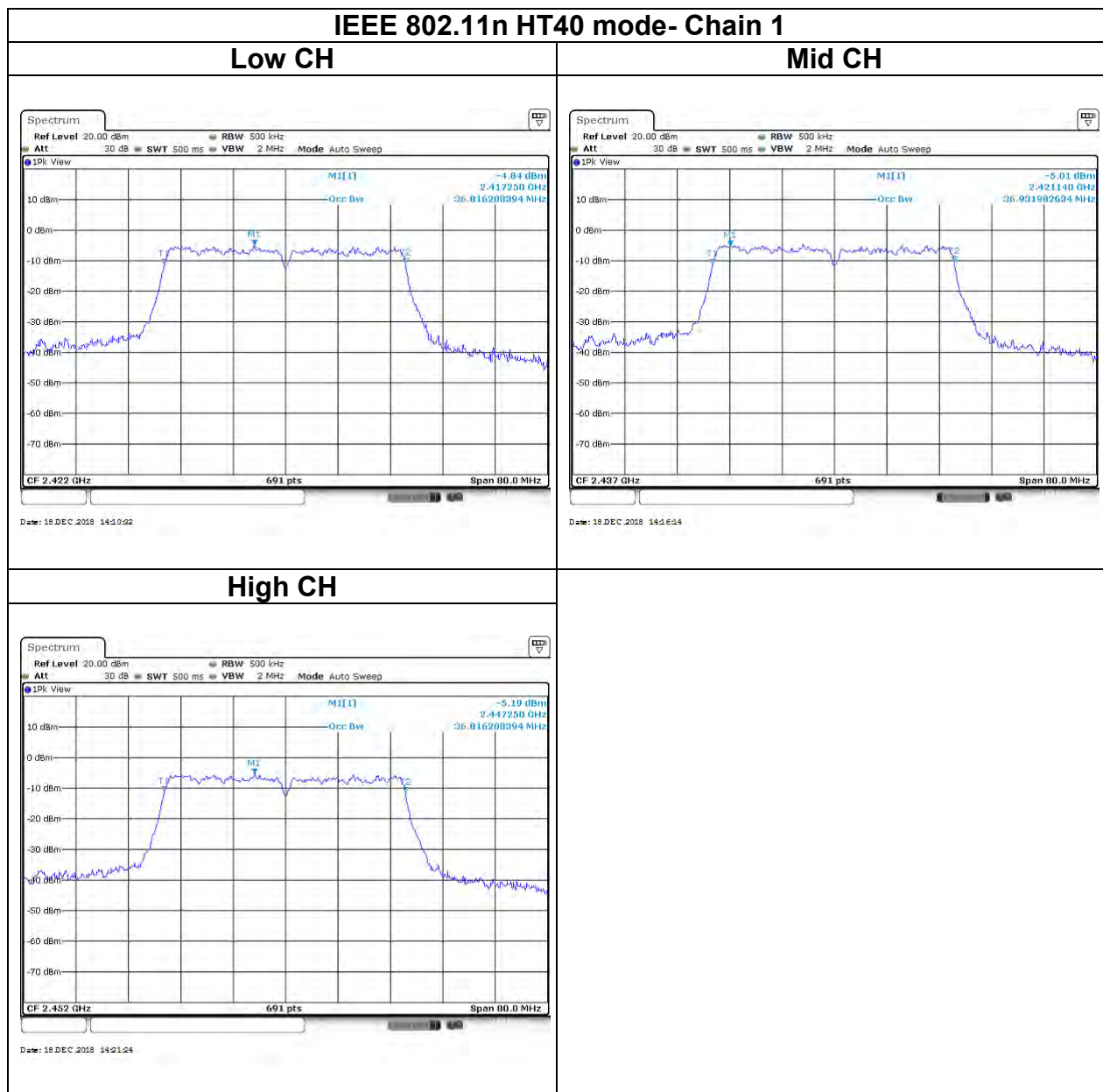


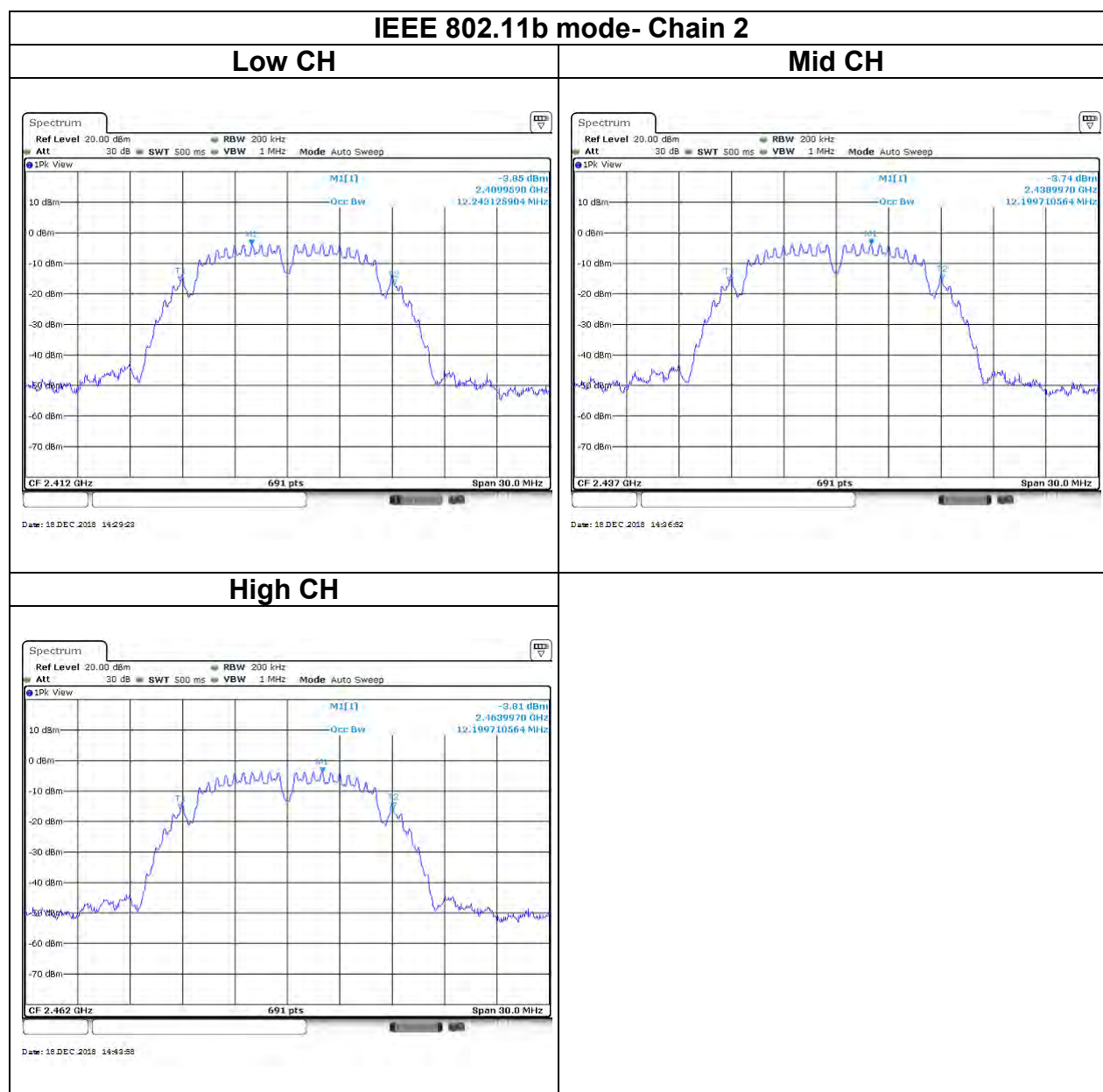
Mid CH



High CH





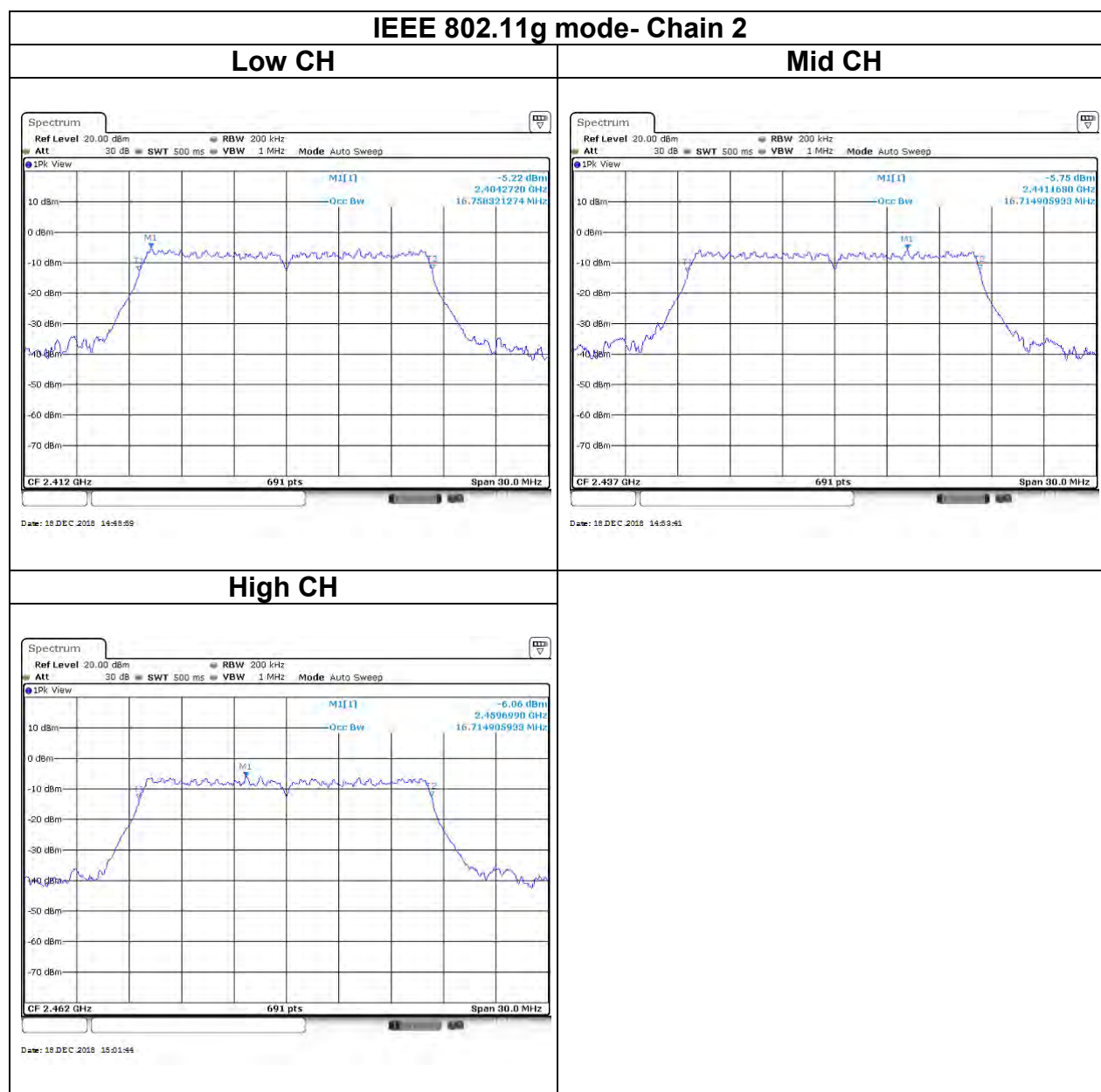




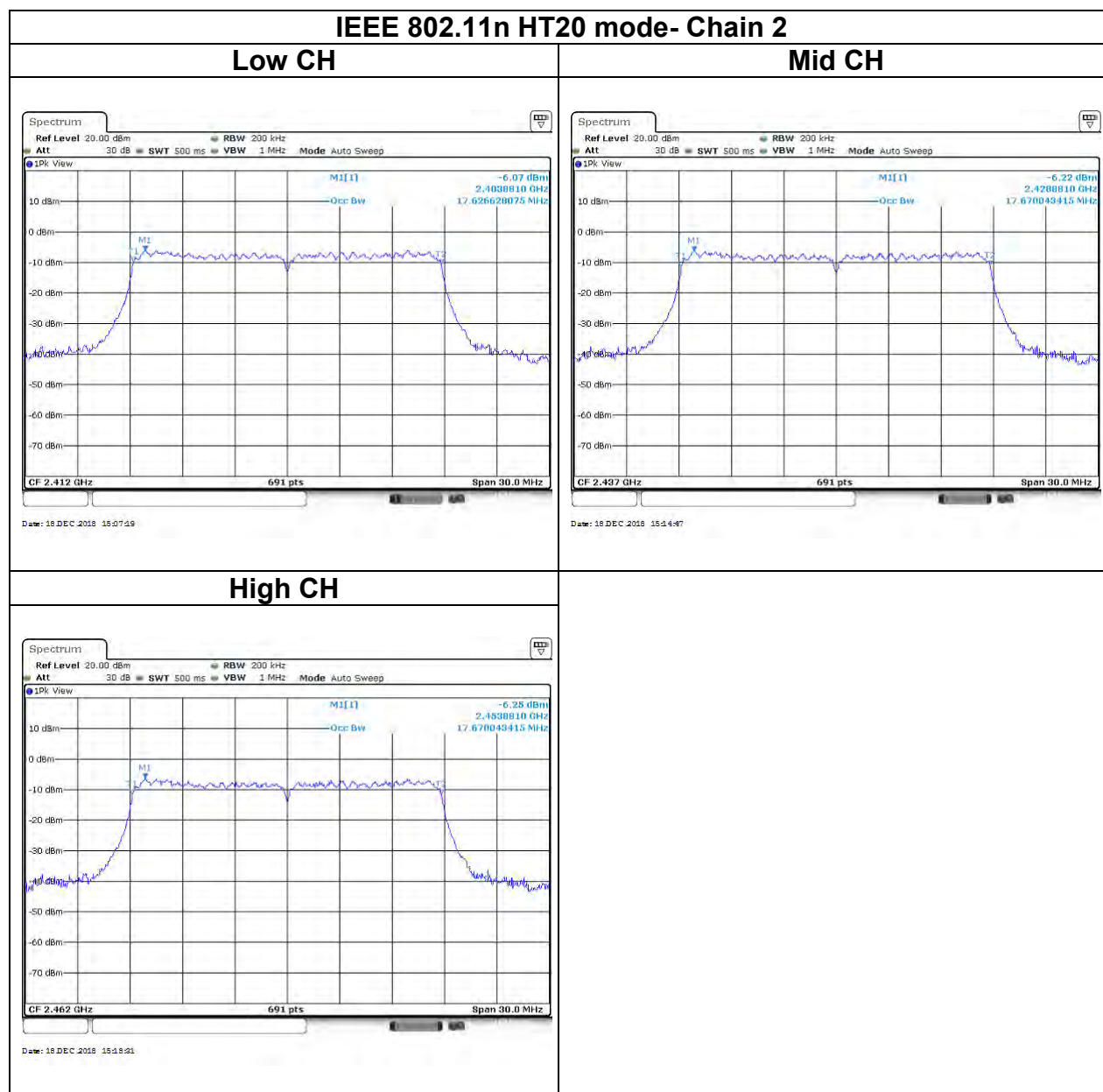
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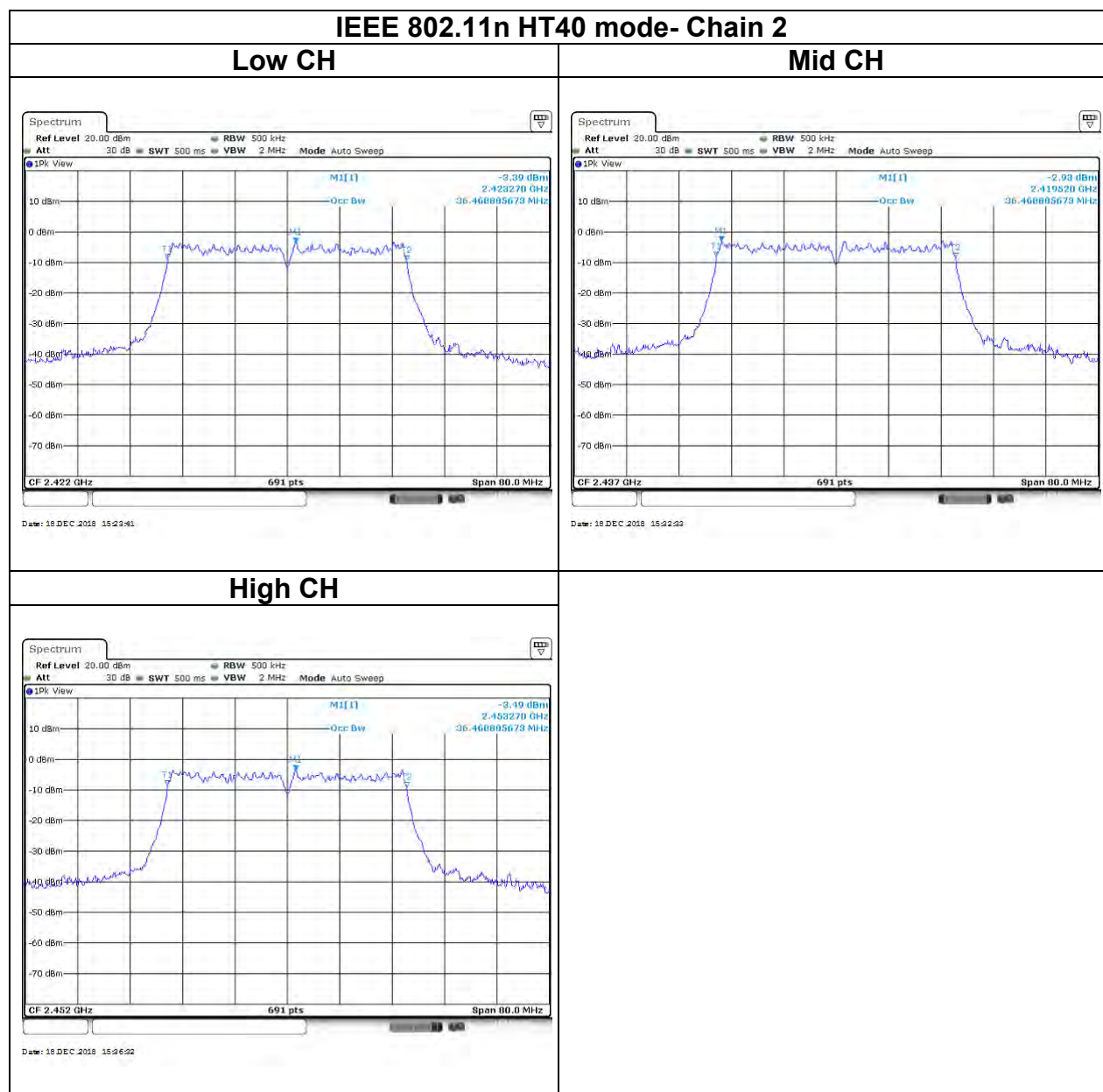
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4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.247(b),

Peak output power :

For systems using digital modulation in the 2400-2483.5 MHz: 1 Watt (30 dBm), base on the use of antennas with directional gain not exceed 6 dBi. If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Limit	☒ Antenna not exceed 6 dBi : 30dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6)] ☐ Point-to-point operation :
-------	---

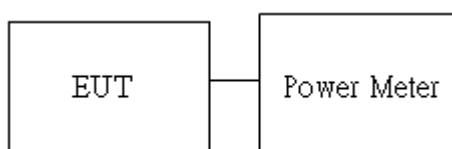
Average output power : For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as KDB 558074 D01.

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 Peak output power and Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

Peak output power :

Wifi 2.4G									
Config	CH	Freq. (MHz)	power set		PK Power(dBm)		PK Total Power (dBm)	PK Total Power (W)	Limit (dBm)
			chain1	chain2	chain1	chain2			
IEEE 802.11b Data rate: 1Mbps	Low	2412	0D	0D	18.26	18.41	21.35	0.1363	30
	Mid	2437	12	12	20.65	20.71	23.69	0.2339	
	High	2462	12	12	20.21	20.73	23.49	0.2233	
IEEE 802.11g Data rate: 6Mbps	Low	2412	11	11	24.12	24.01	27.08	0.5100	
	Mid	2437	12	12	23.75	24.21	27.00	0.5008	
	High	2462	12	12	23.82	24.42	27.14	0.5177	
IEEE 802.11n HT20 Data rate: MCS8	Low	2412	0D	0D	22.85	22.95	25.91	0.3900	
	Mid	2437	12	12	23.95	24.02	27.00	0.5007	
	High	2462	0D	0D	22.23	22.57	25.41	0.3478	
IEEE 802.11n HT40 Data rate: MCS8	Low	2422	8	8	20.47	20.59	23.54	0.2260	
	Mid	2437	14	14	23.61	23.73	26.68	0.4657	
	High	2452	8	8	20.23	20.44	23.35	0.2161	



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Average output power :

Wifi 2.4G					
Config	CH	Freq. (MHz)	AV Power(dBm)		AV Total Power (dBm)
			chain0	chain1	
IEEE 802.11b Data rate: 1Mbps	Low	2412	14.73	14.82	17.79
	Mid	2437	17.01	17.18	20.11
	High	2462	16.72	17.19	19.97
IEEE 802.11g Data rate: 6Mbps	Low	2412	16.06	15.98	19.03
	Mid	2437	16.01	16.25	19.14
	High	2462	15.41	16.29	18.88
IEEE 802.11n HT20 Data rate: MCS 8	Low	2412	14.28	14.58	17.44
	Mid	2437	16.12	16.36	19.25
	High	2462	13.47	14.21	16.87
IEEE 802.11n HT40 Data rate: MCS 0	Low	2422	11.93	12.14	15.05
	Mid	2437	16.18	16.44	19.32
	High	2452	11.54	11.83	14.70

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.247(e),

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.

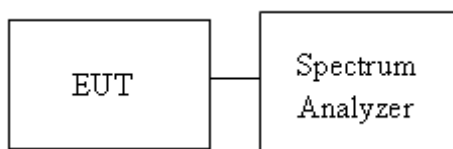
Limit	☒ Antenna not exceed 6 dBi : 8dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 8 – (DG – 6)] ☐ Point-to-point operation :
-------	---

4.4.2 Test Procedure

Test method Refer as KDB 558074 D01.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



4.4.4 Test Result

Test mode: IEEE 802.11b mode / 2412-2462 MHz					
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	2412	-15.33	-13.40	-11.25	8
Mid	2437	-13.62	-12.99	-10.28	
High	2462	-14.13	-13.06	-10.55	

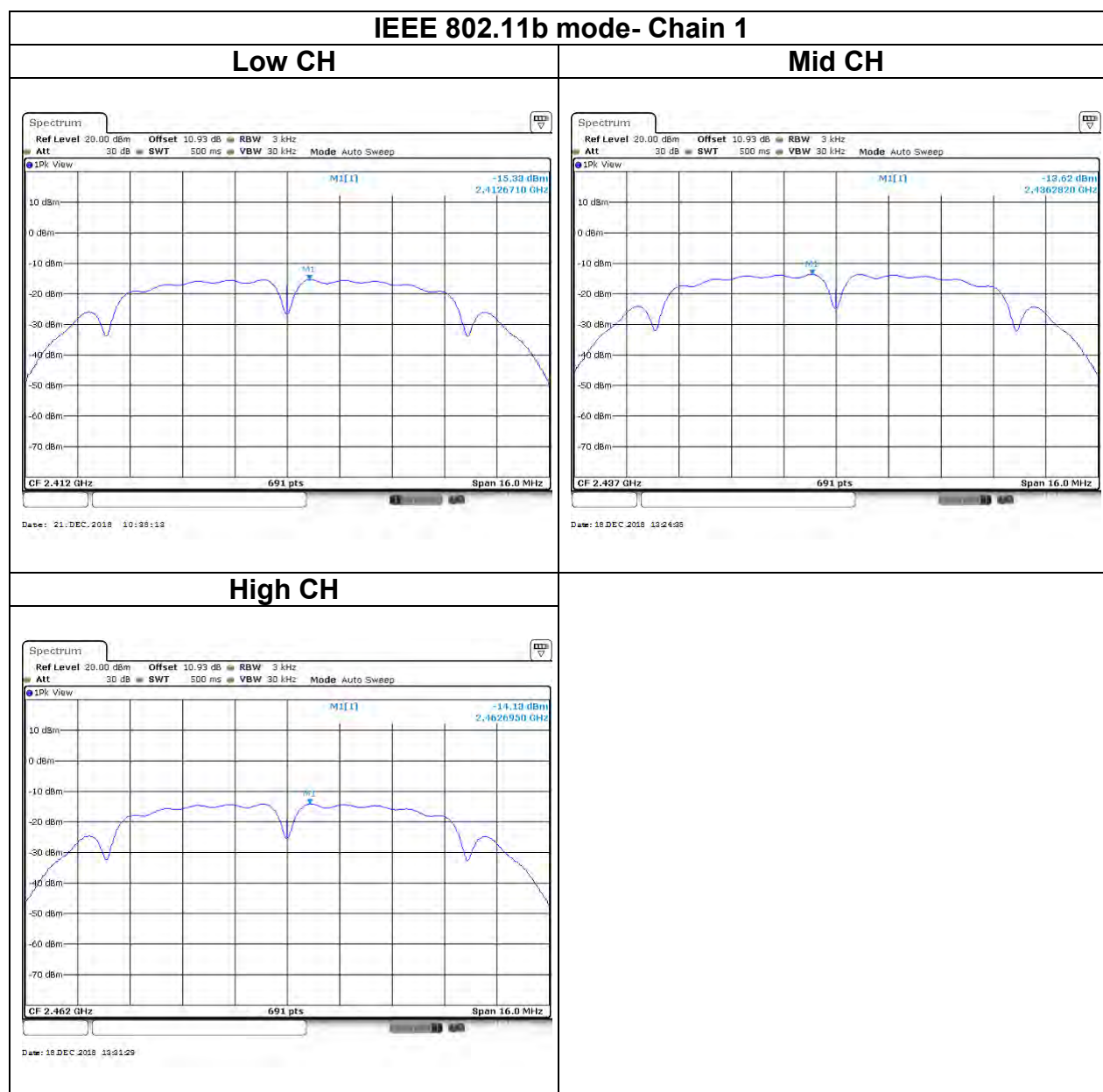
Test mode: IEEE 802.11g mode / 2412-2462 MHz					
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	2412	-12.90	-13.02	-9.95	8
Mid	2437	-13.22	-12.92	-10.06	
High	2462	-13.99	-12.60	-10.23	

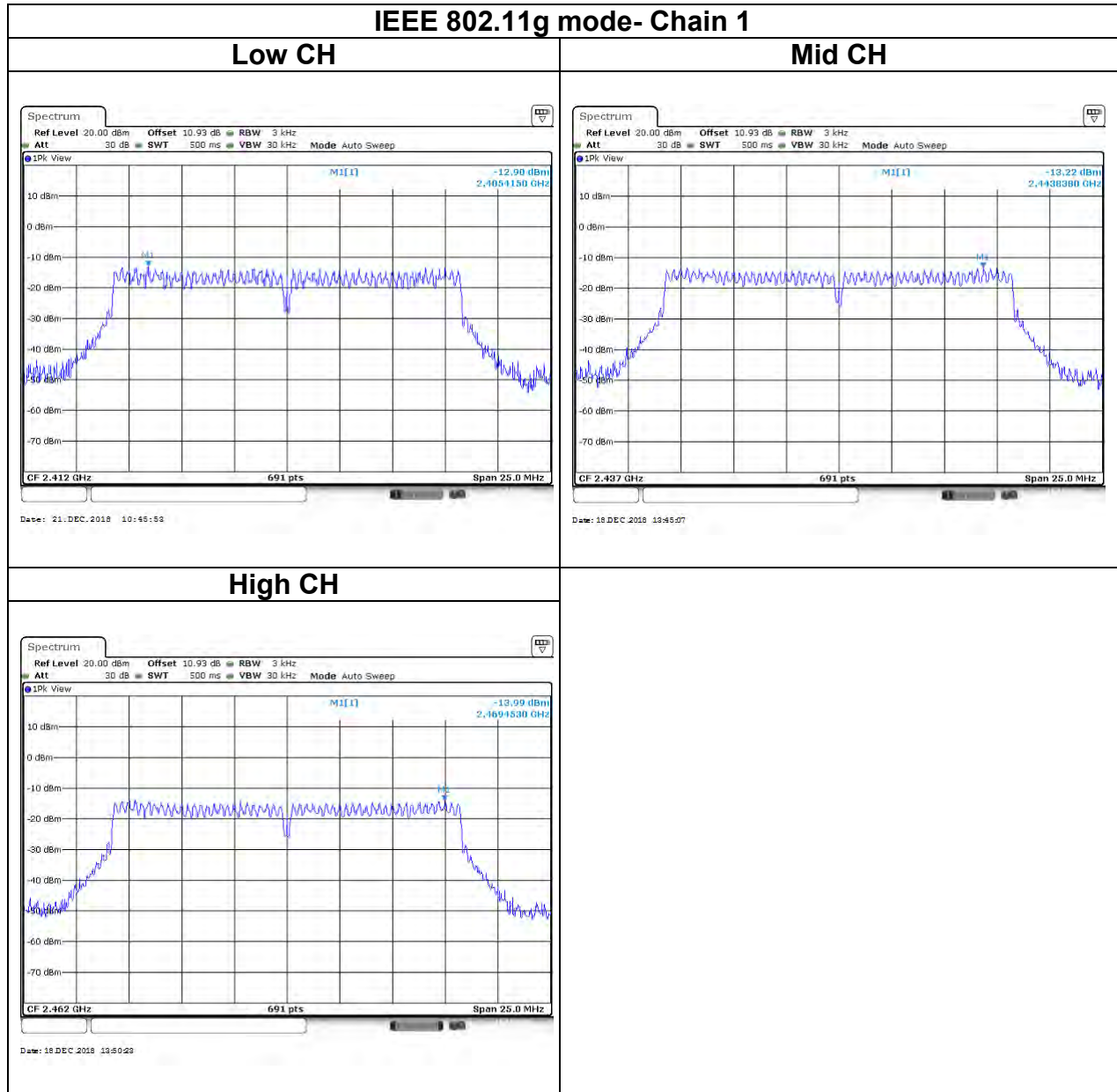
Test mode: IEEE 802.11n HT 20 mode / 2412-2462 MHz					
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	2412	-14.12	-12.92	-10.47	8
Mid	2437	-12.97	-11.69	-9.27	
High	2462	-14.34	-13.40	-10.83	

Test mode: IEEE 802.11n HT 40 mode / 2422-2452 MHz					
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	2422	-17.31	-17.90	-14.58	8
Mid	2437	-13.03	-14.03	-10.49	
High	2452	-18.02	-18.16	-15.08	



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Test Data

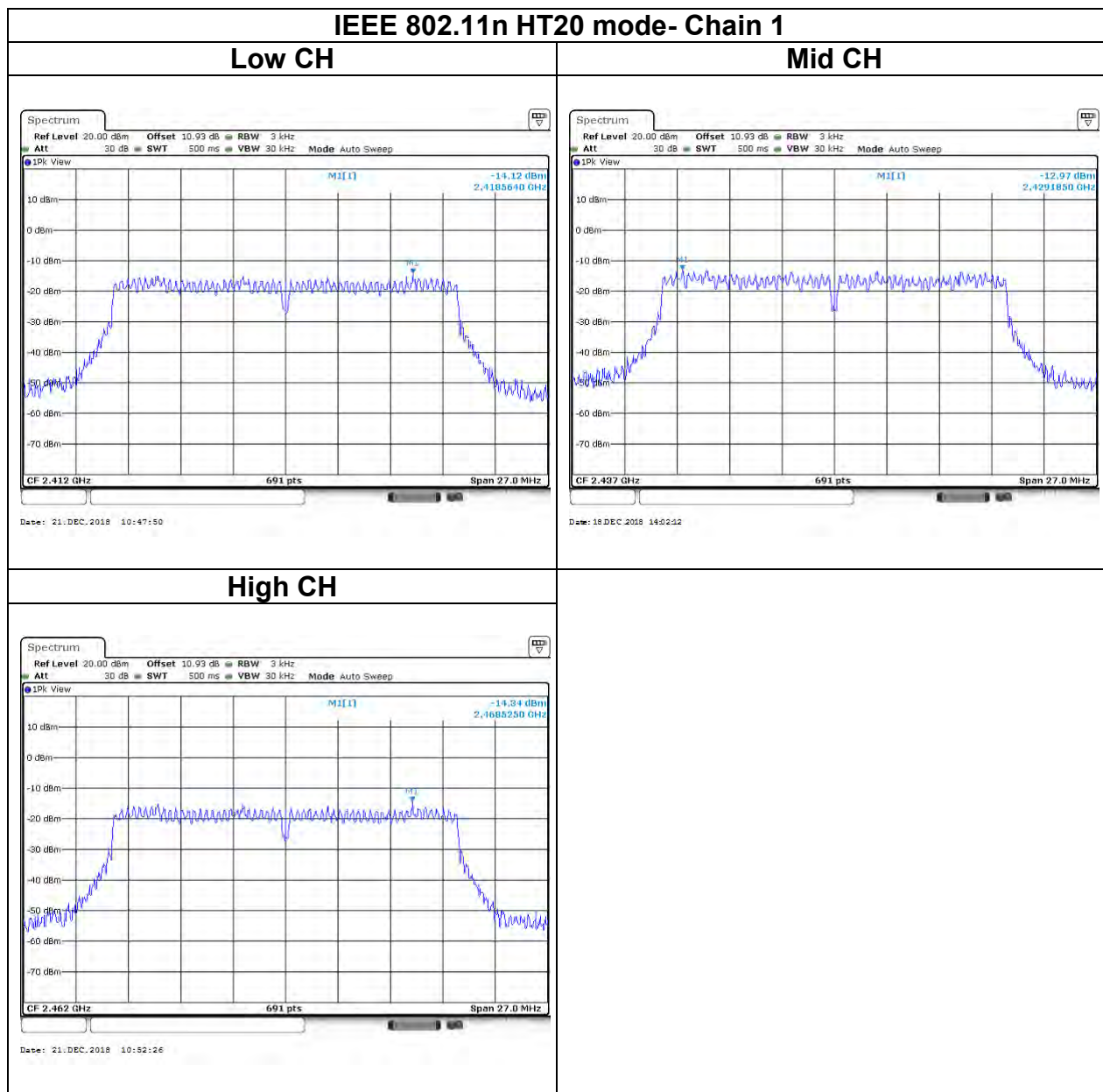


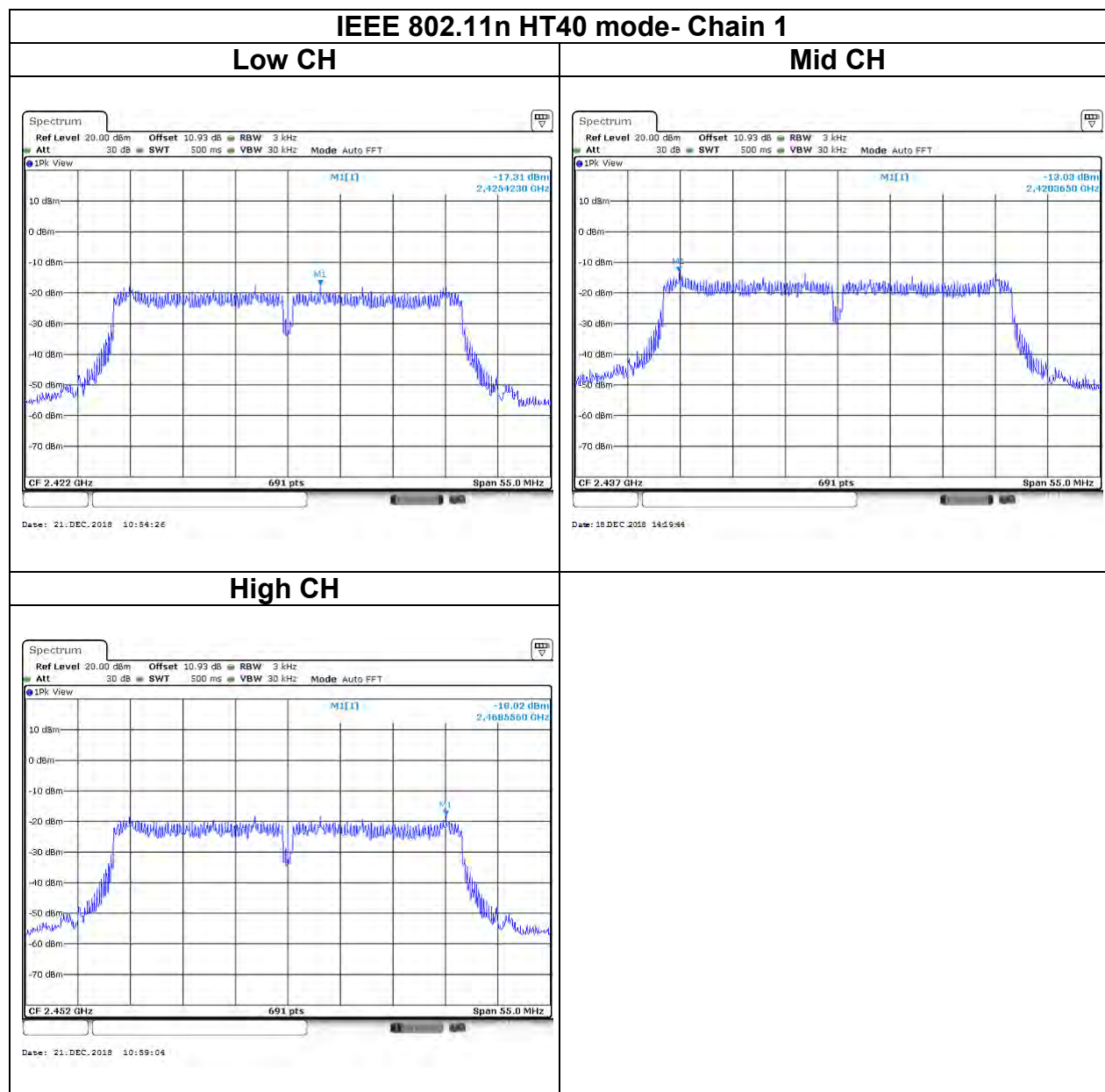


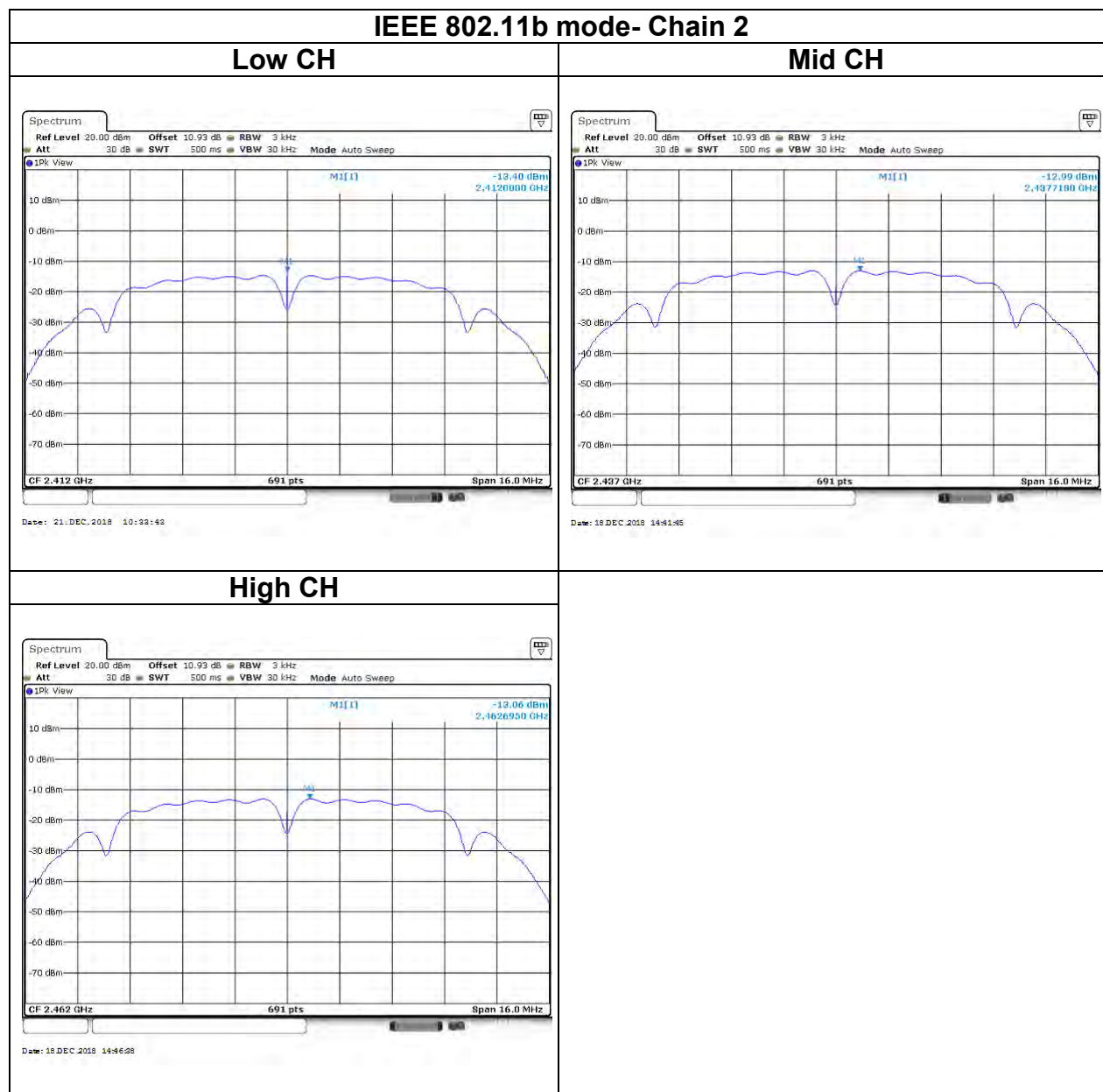
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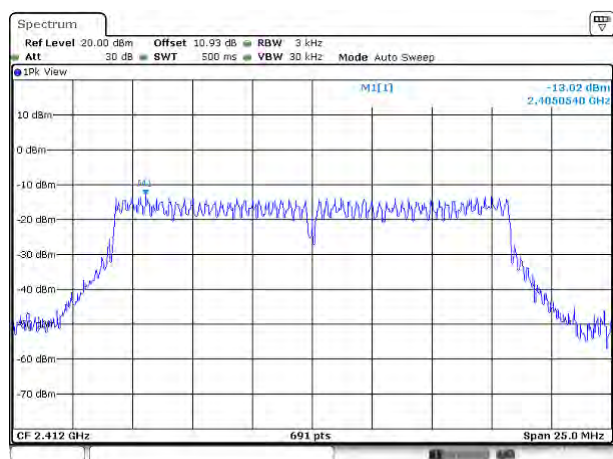
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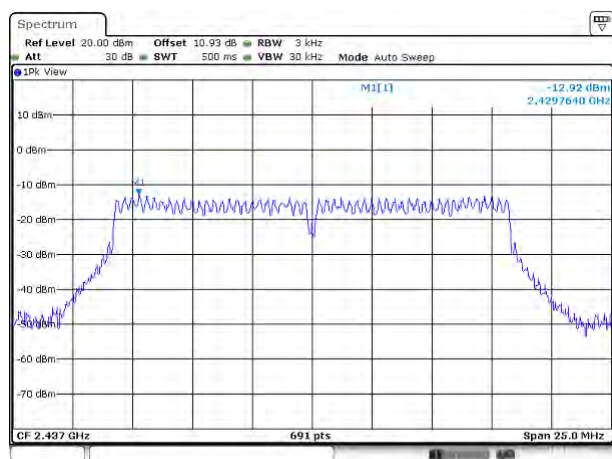
IEEE 802.11g mode- Chain 2

Low CH



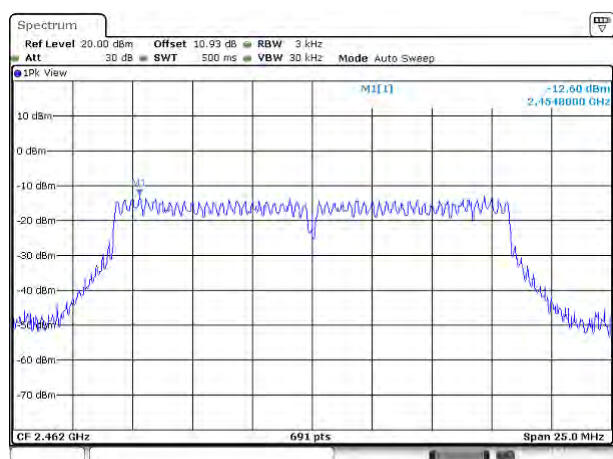
Date: 21 DEC 2018 10:49:18

Mid CH



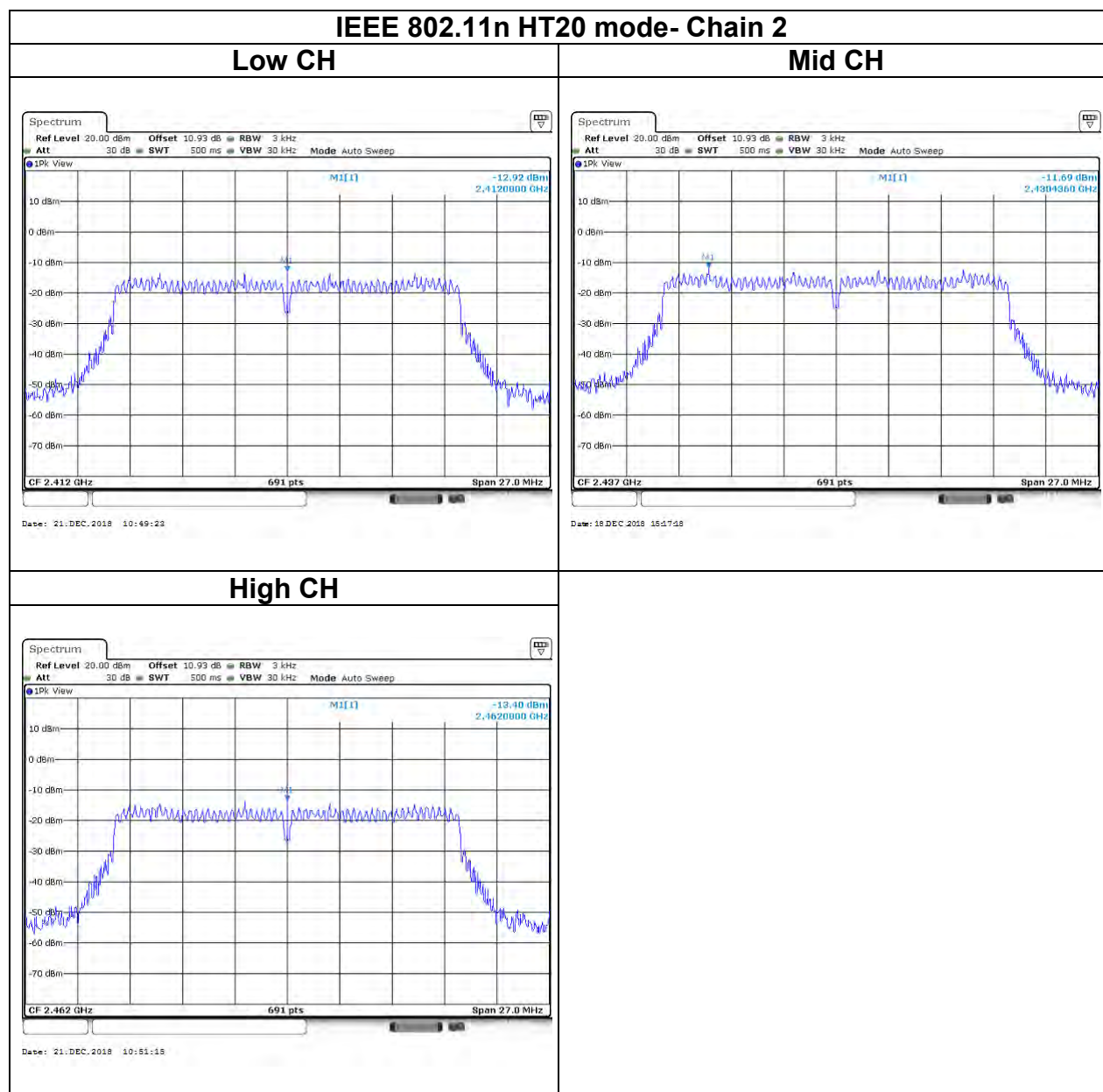
Date: 18 DEC 2018 14:56:09

High CH



Date: 18 DEC 2018 15:24:26

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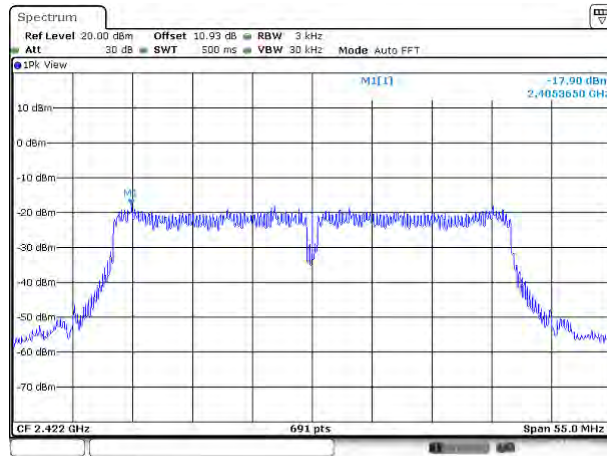
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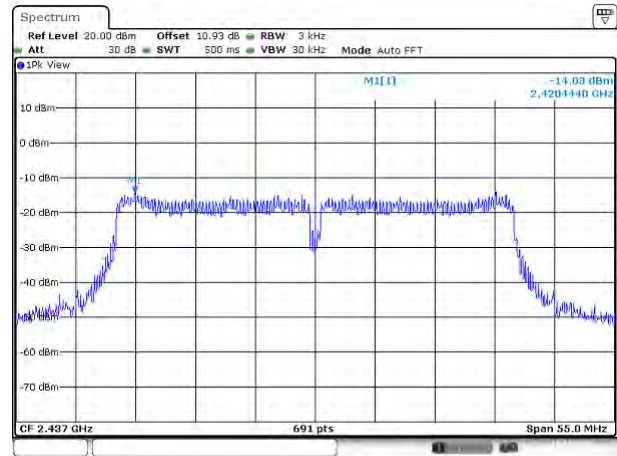
IEEE 802.11n HT40 mode- Chain 2

Low CH



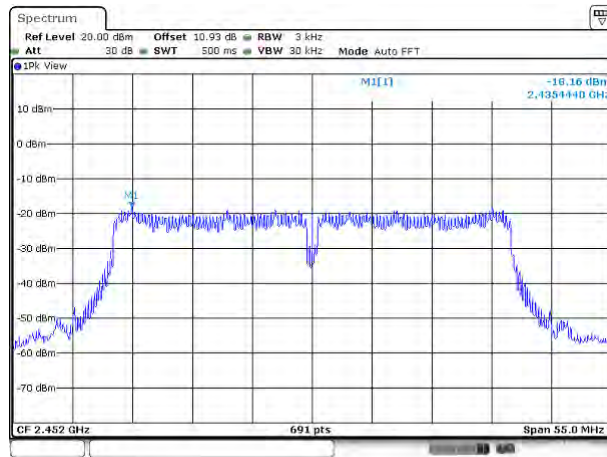
Date: 21 DEC 2018 10:55:37

Mid CH



Date: 18 DEC 2018 15:55:42

High CH



Date: 21 DEC 2018 10:57:21

4.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.247(d),

FCC: In any 100 kHz bandwidth outside the authorized frequency band,

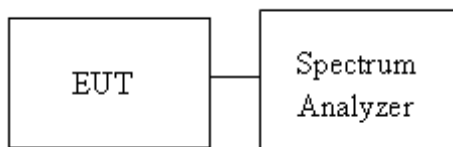
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

4.5.2 Test Procedure

Test method Refer as KDB 558074 D01.

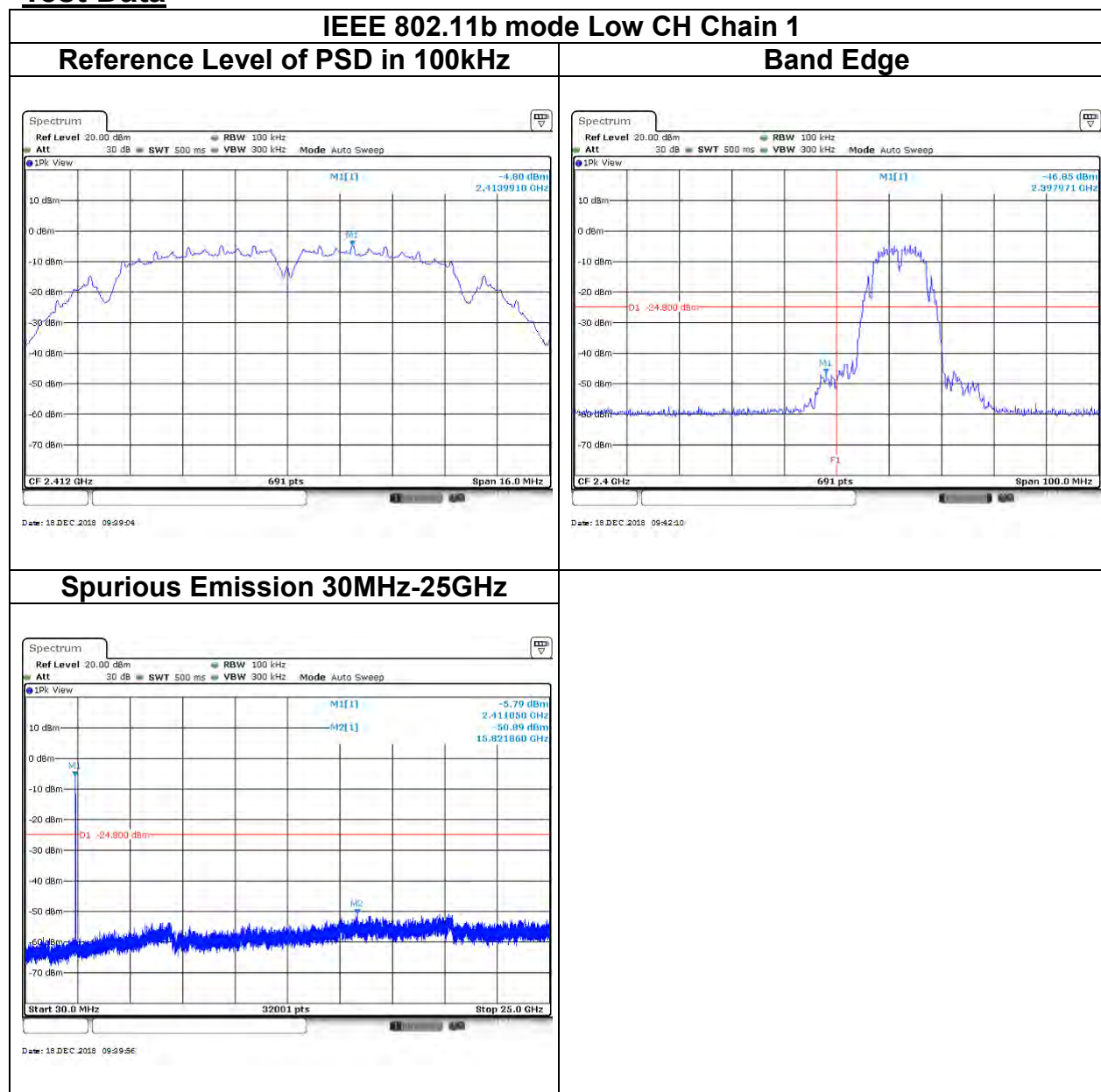
1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4.5.3 Test Setup

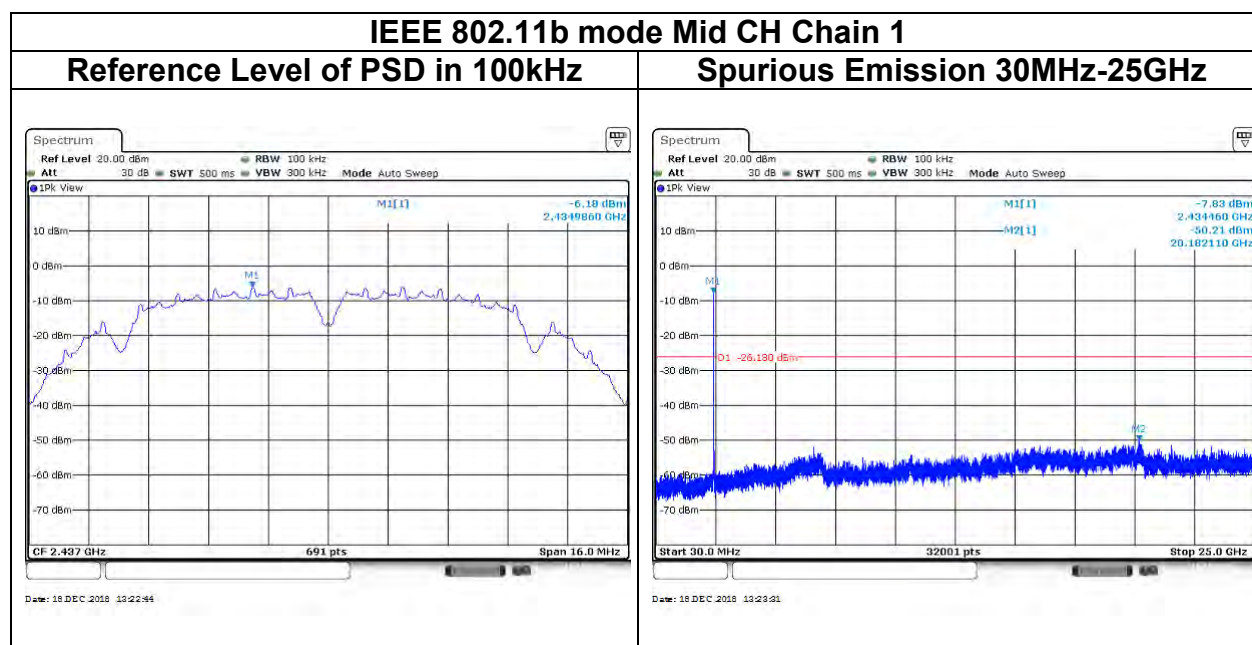


4.5.4 Test Result

Test Data

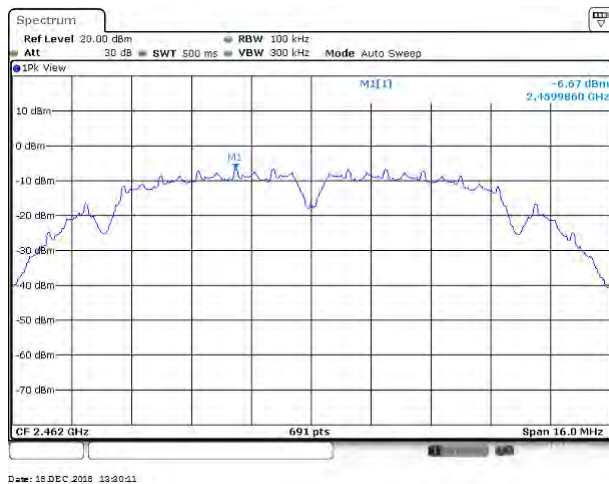


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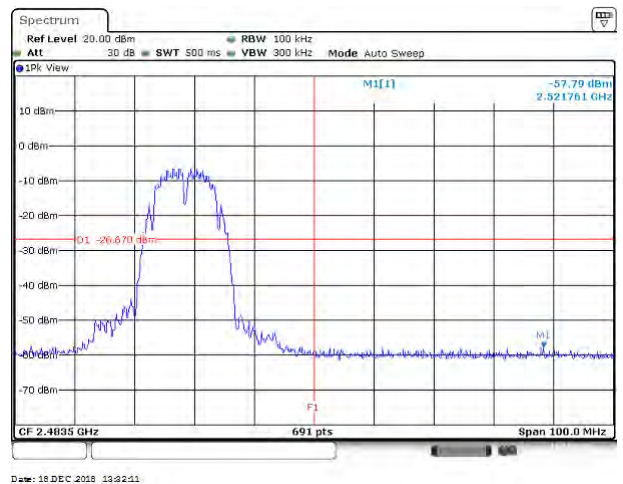


IEEE 802.11b mode High CH Chain 1

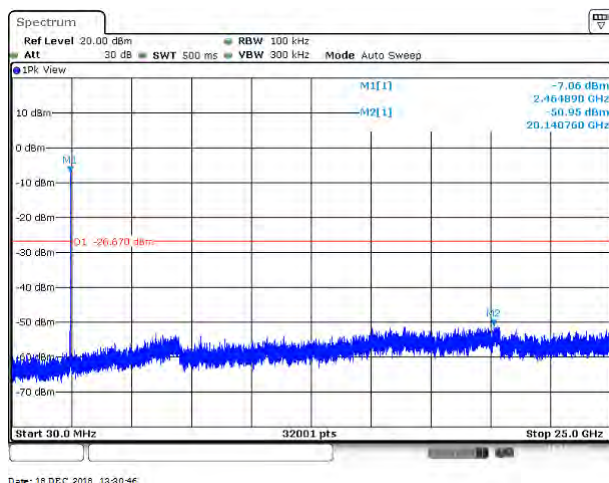
Reference Level of PSD in 100kHz



Band Edge



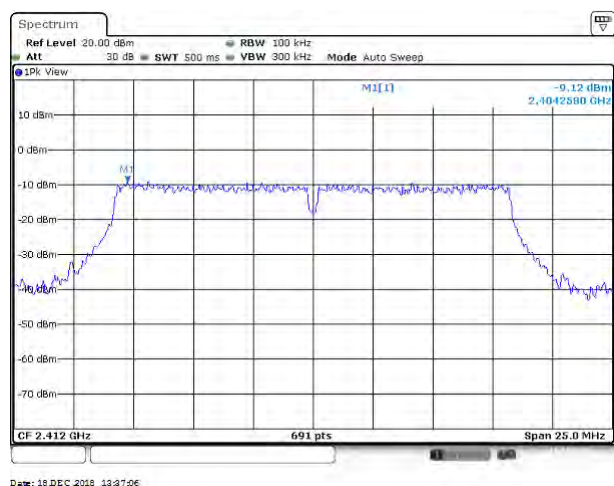
Spurious Emission 30MHz-25GHz



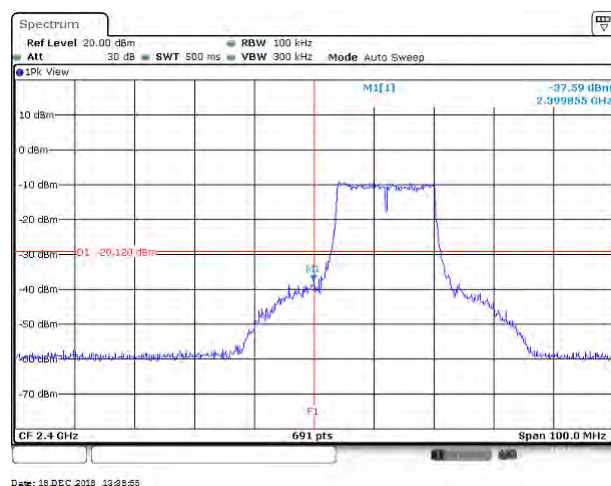
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IEEE 802.11g mode Low CH Chain 1

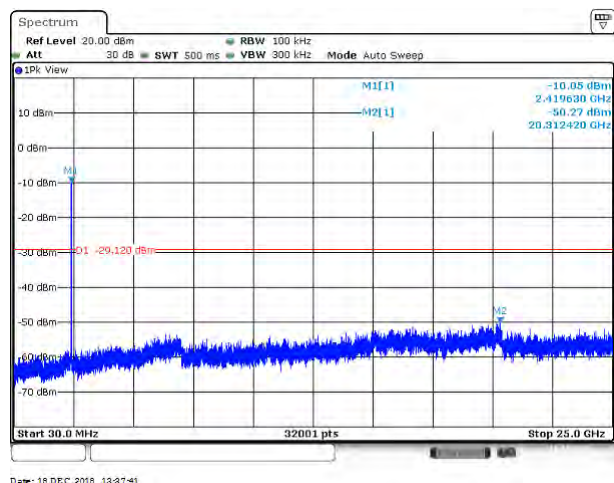
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz

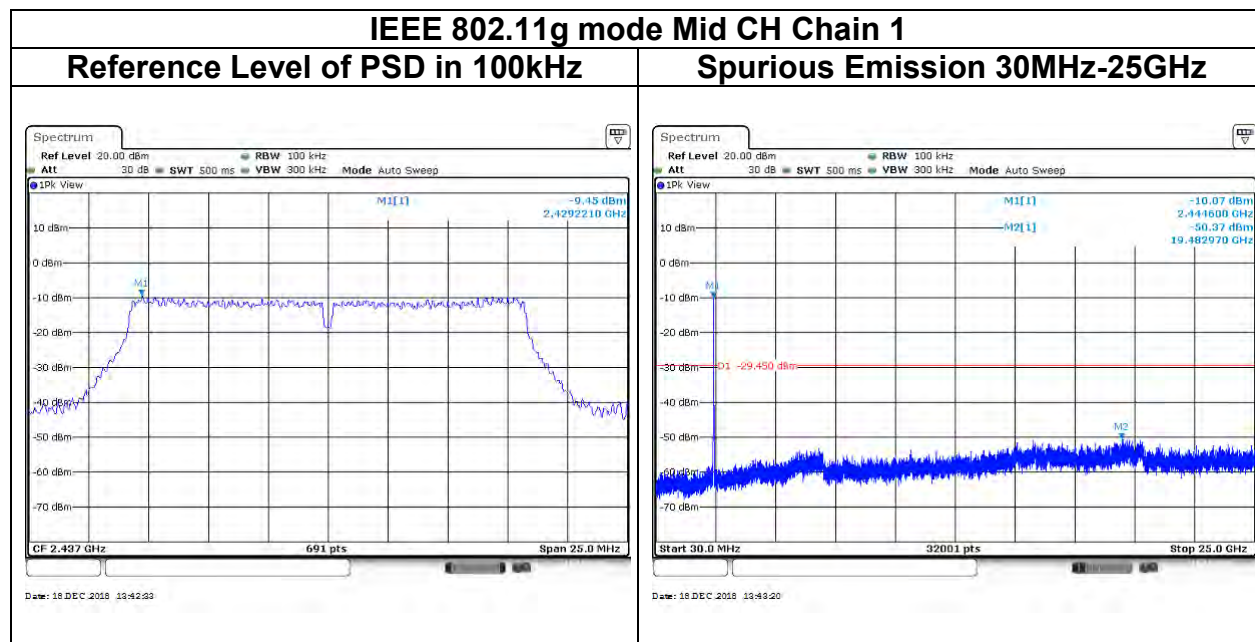




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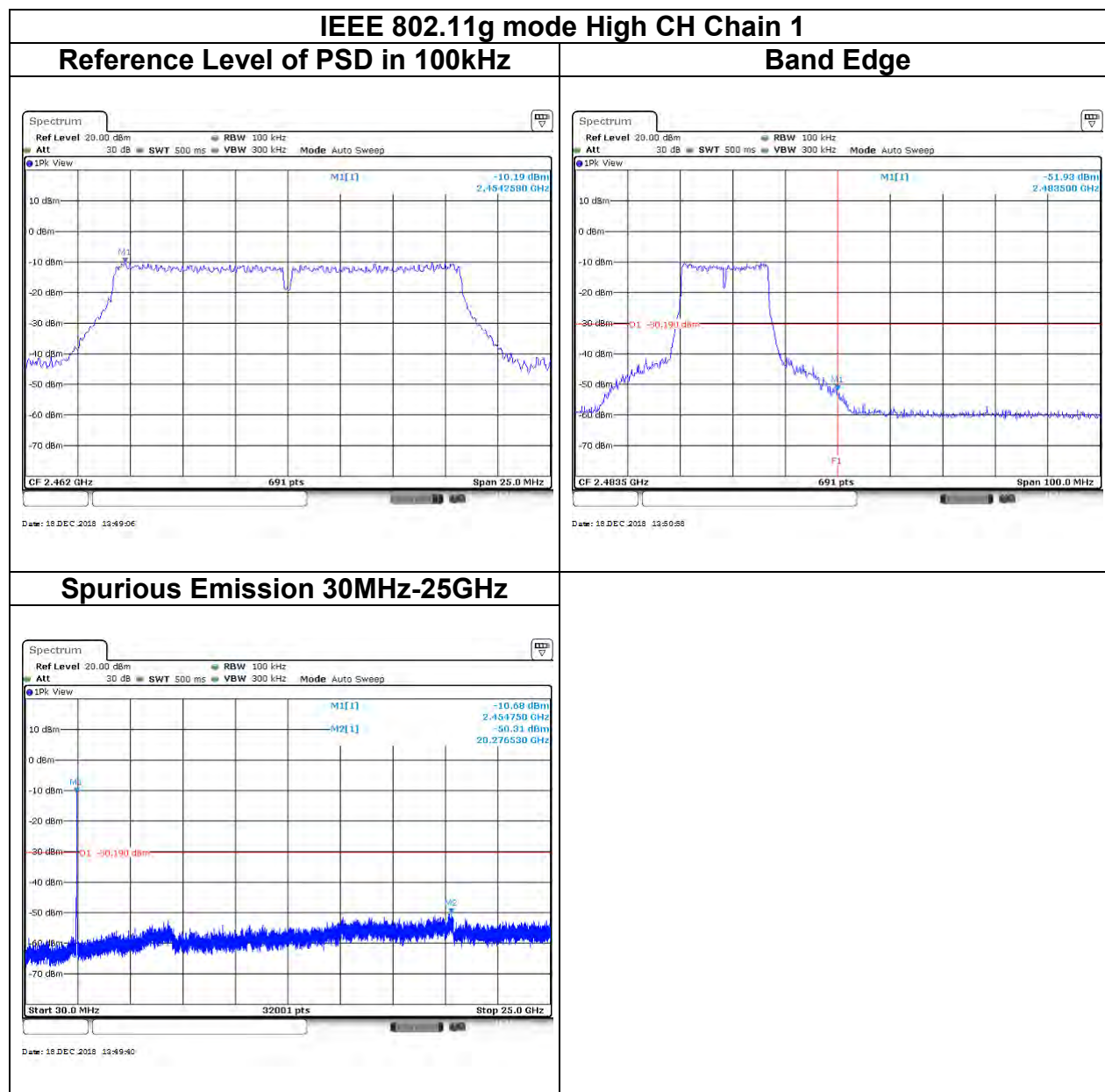


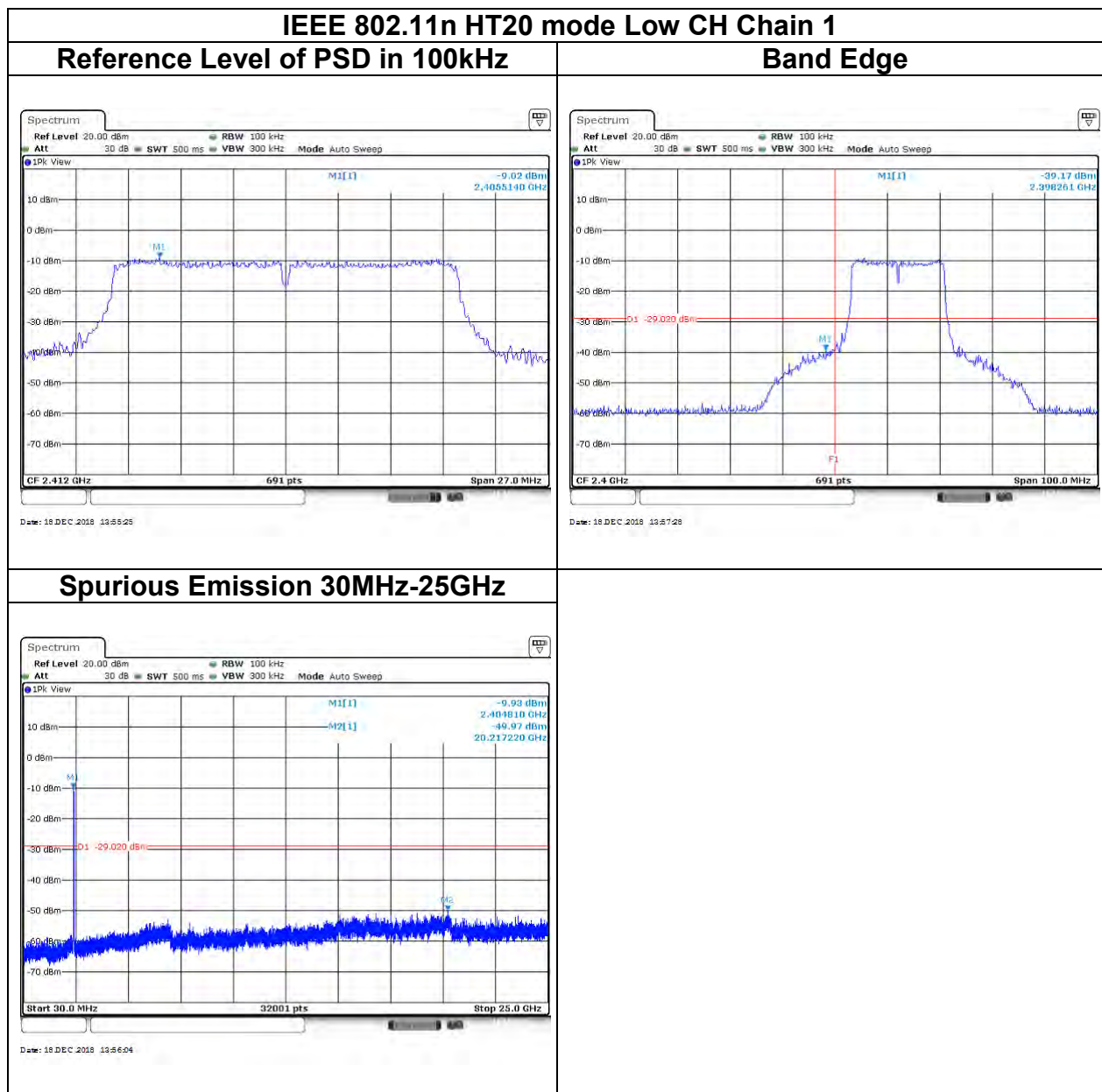


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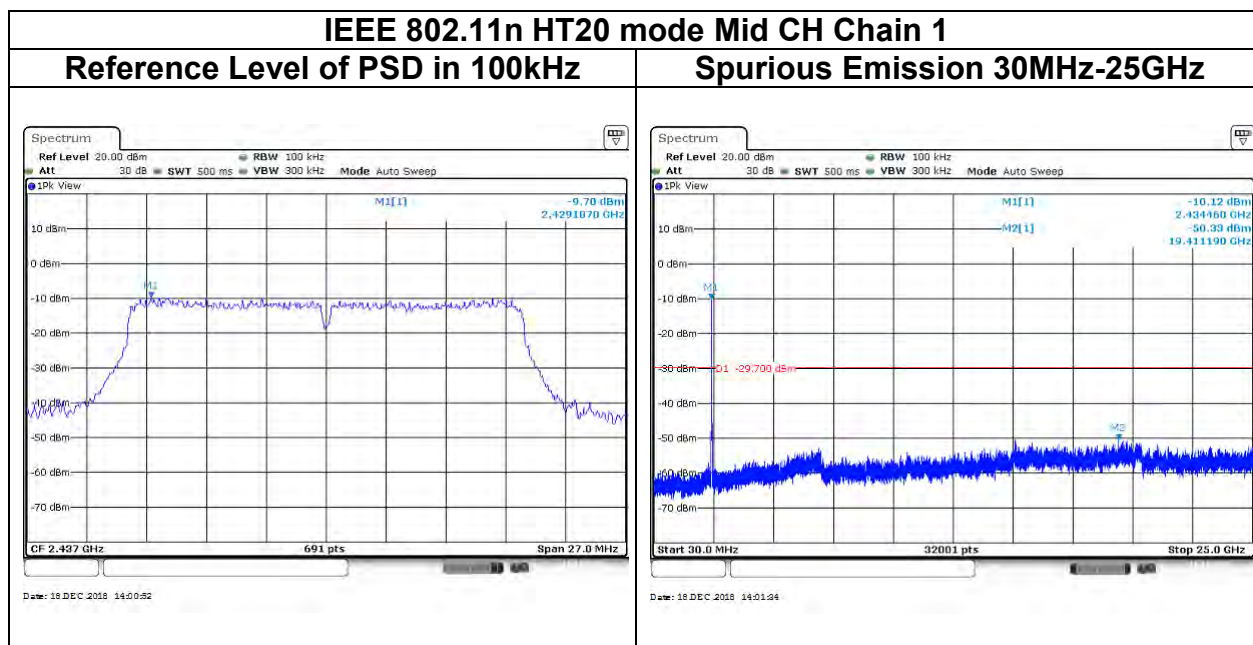
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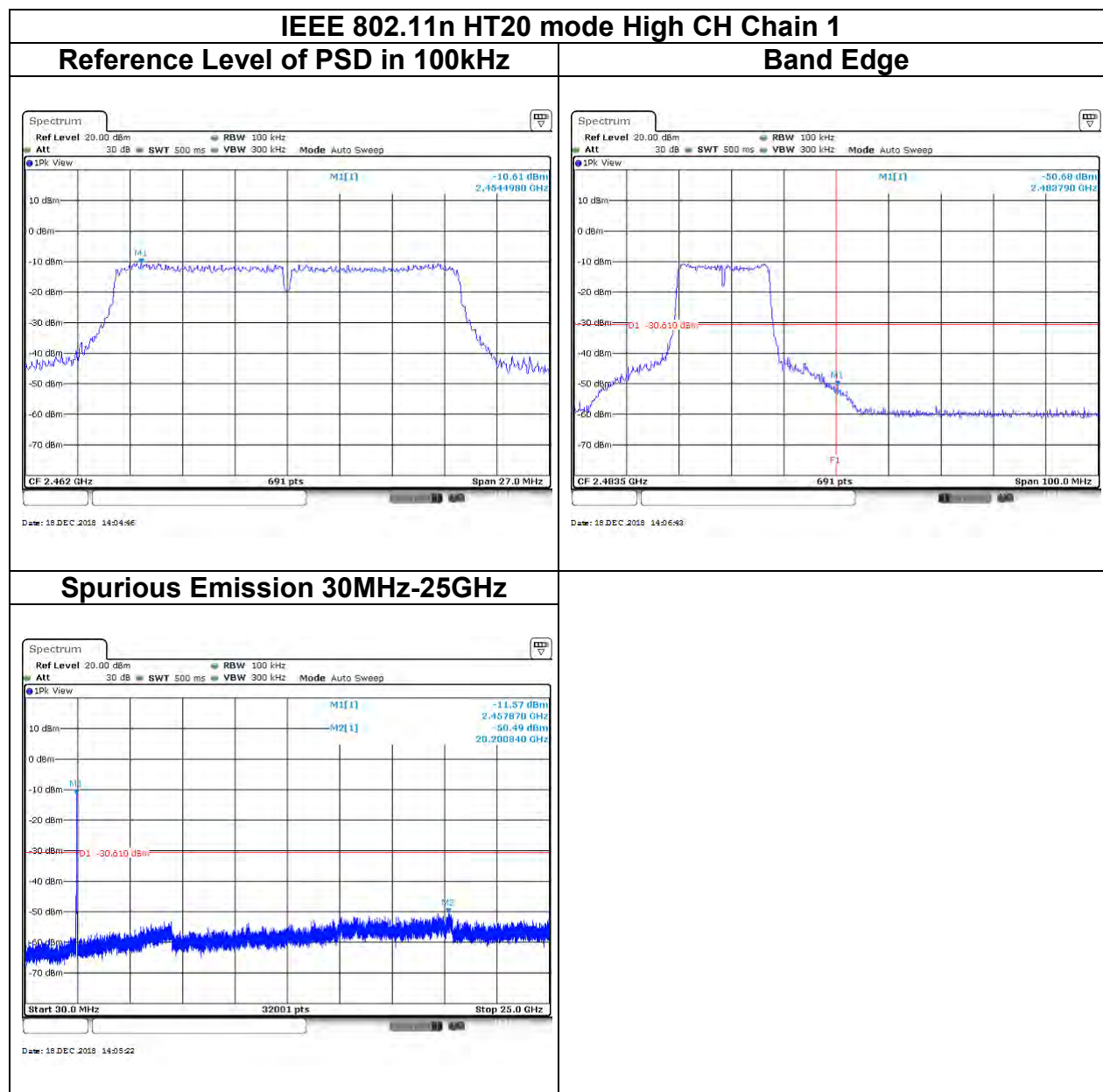




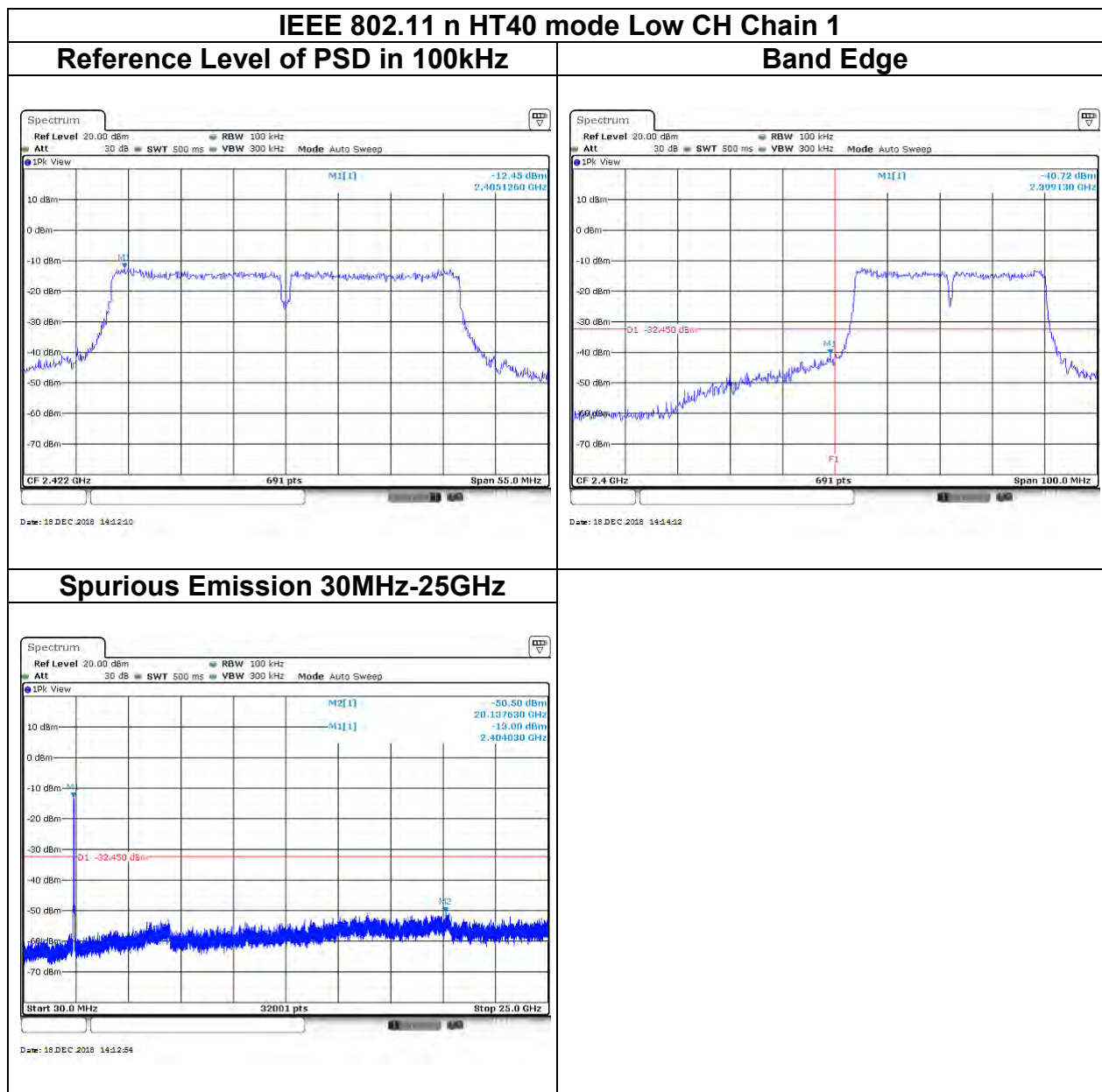


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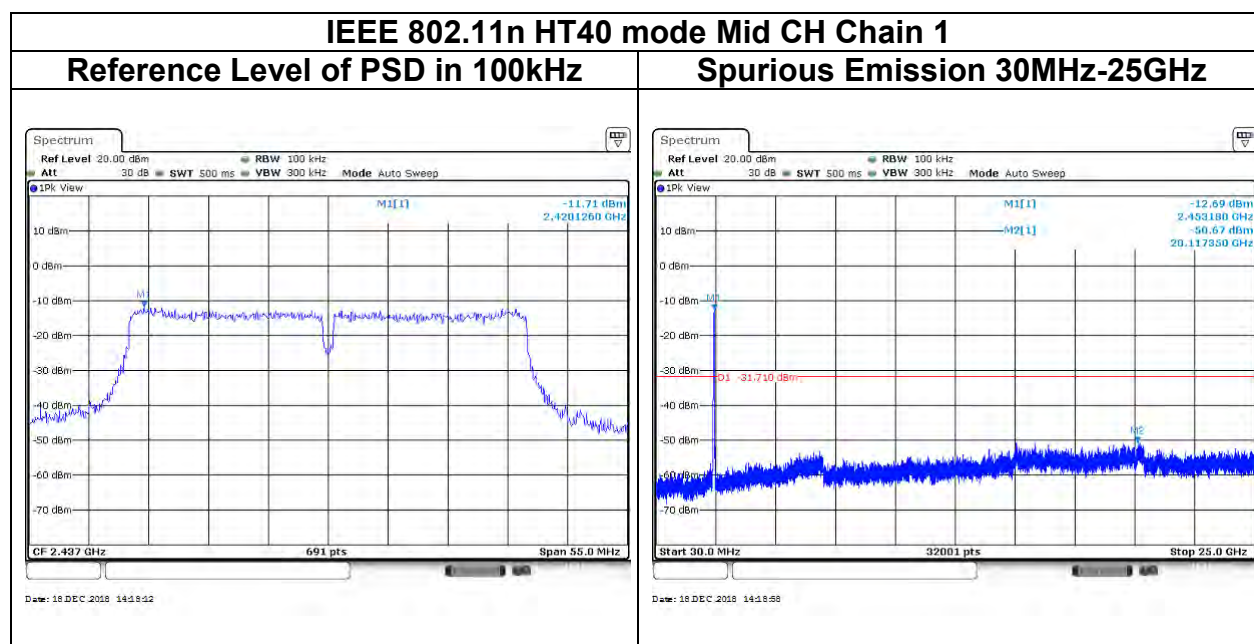


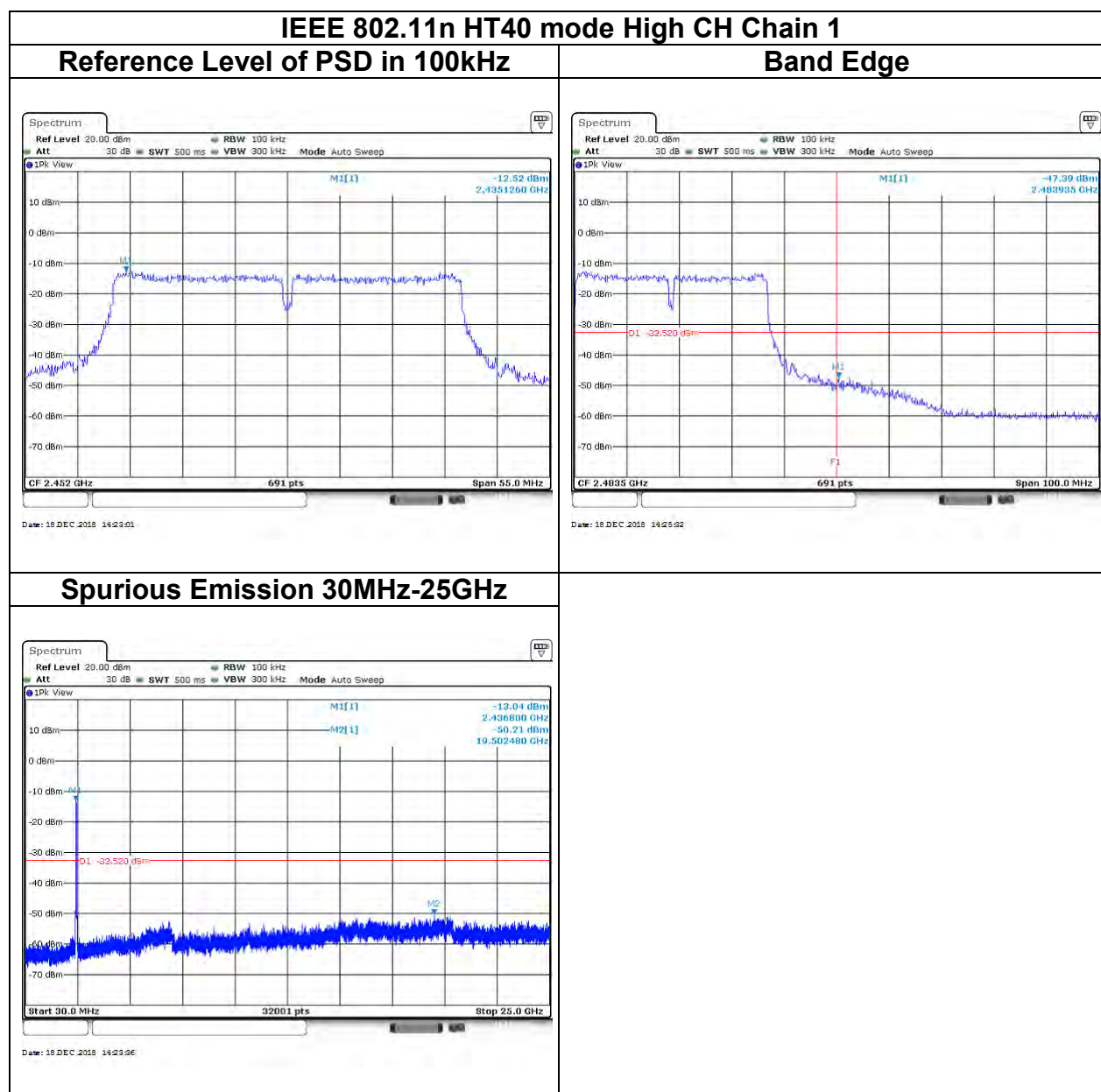


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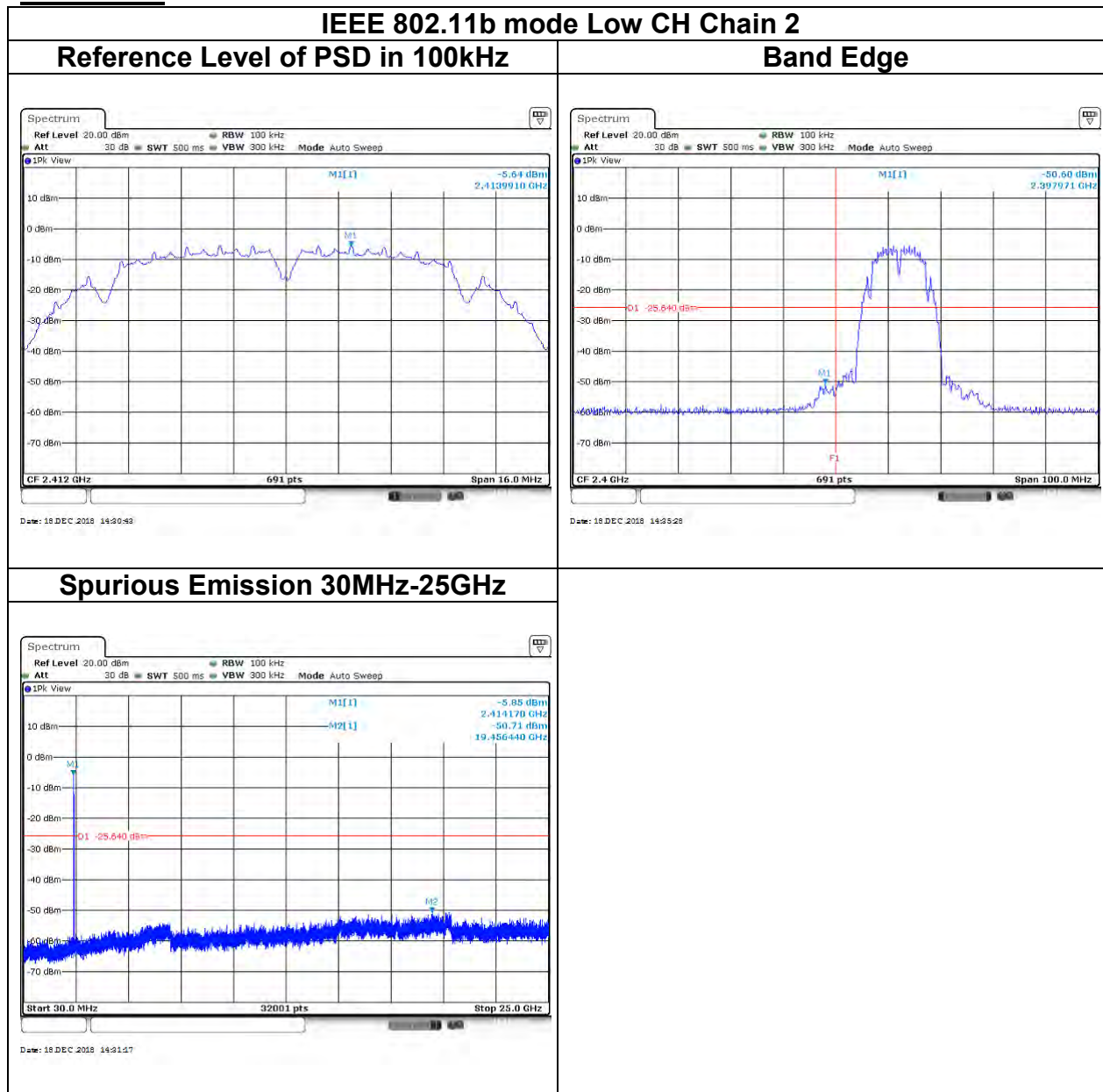


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Test Data

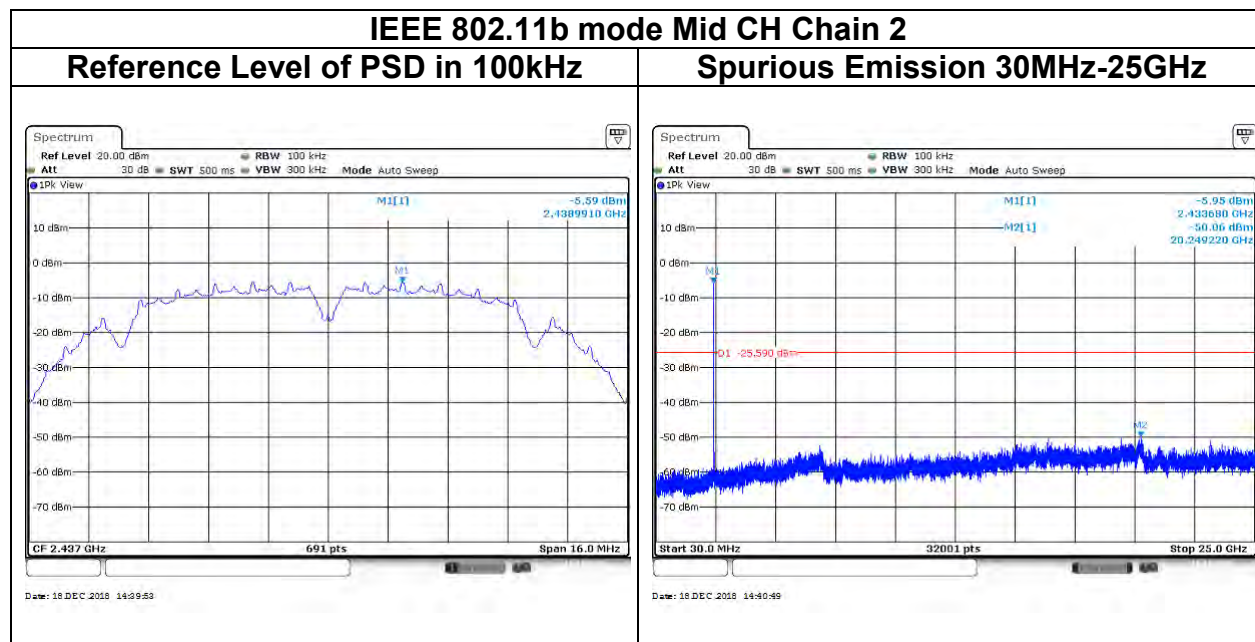




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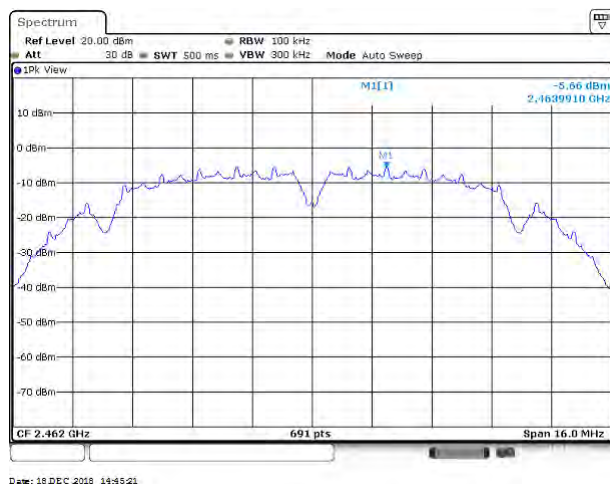
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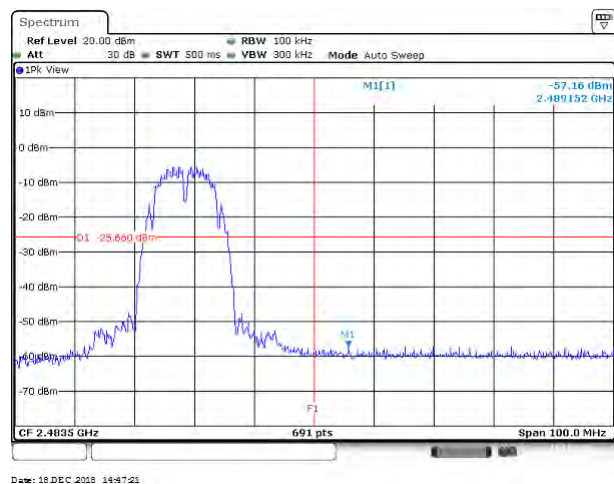


IEEE 802.11b mode High CH Chain 2

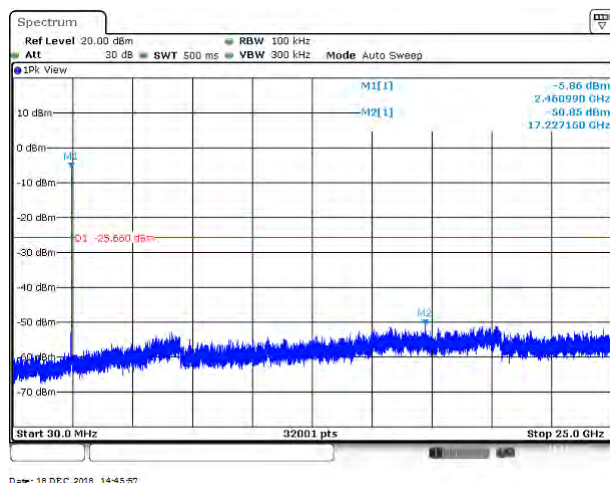
Reference Level of PSD in 100kHz

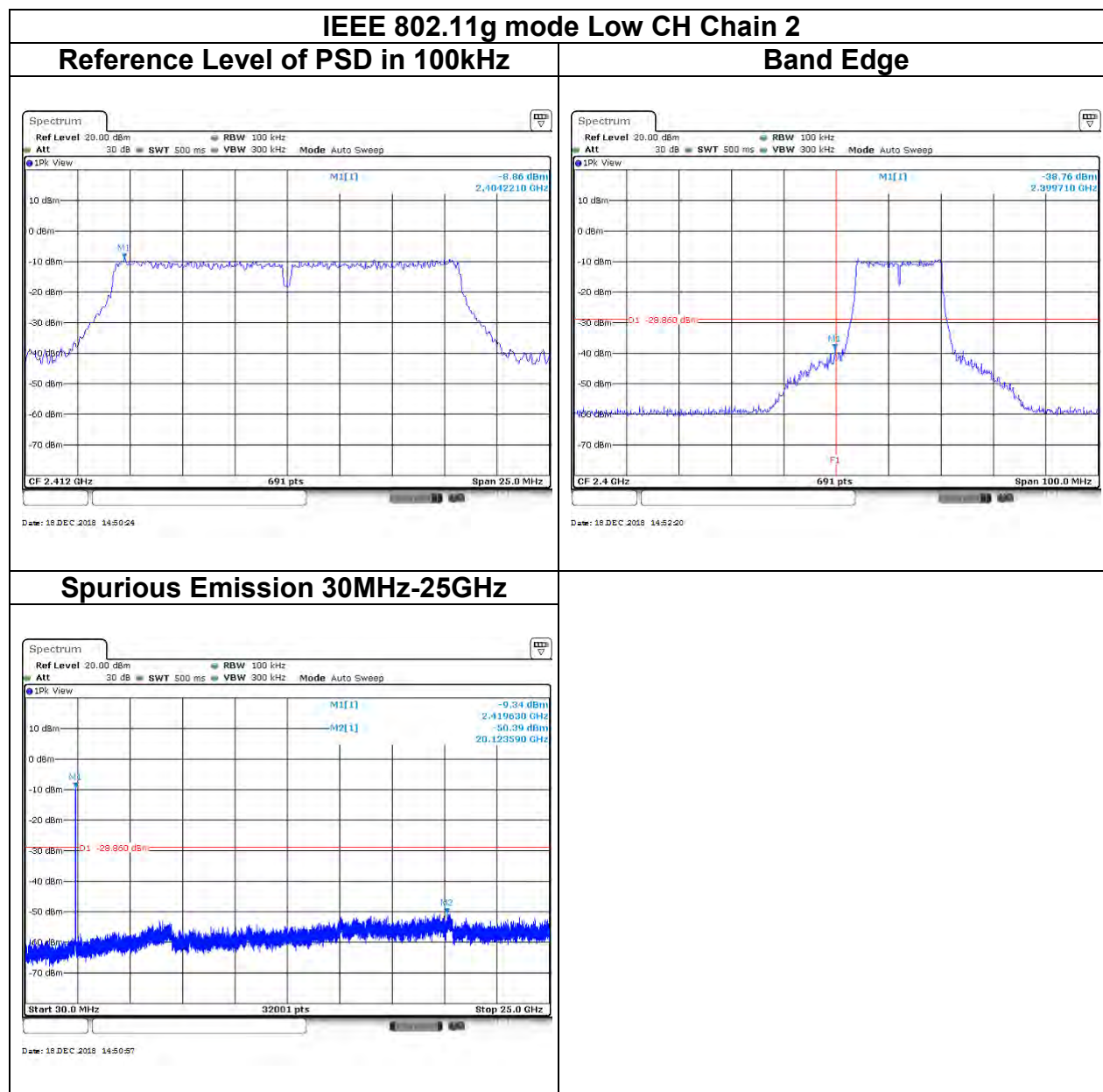


Band Edge



Spurious Emission 30MHz-25GHz



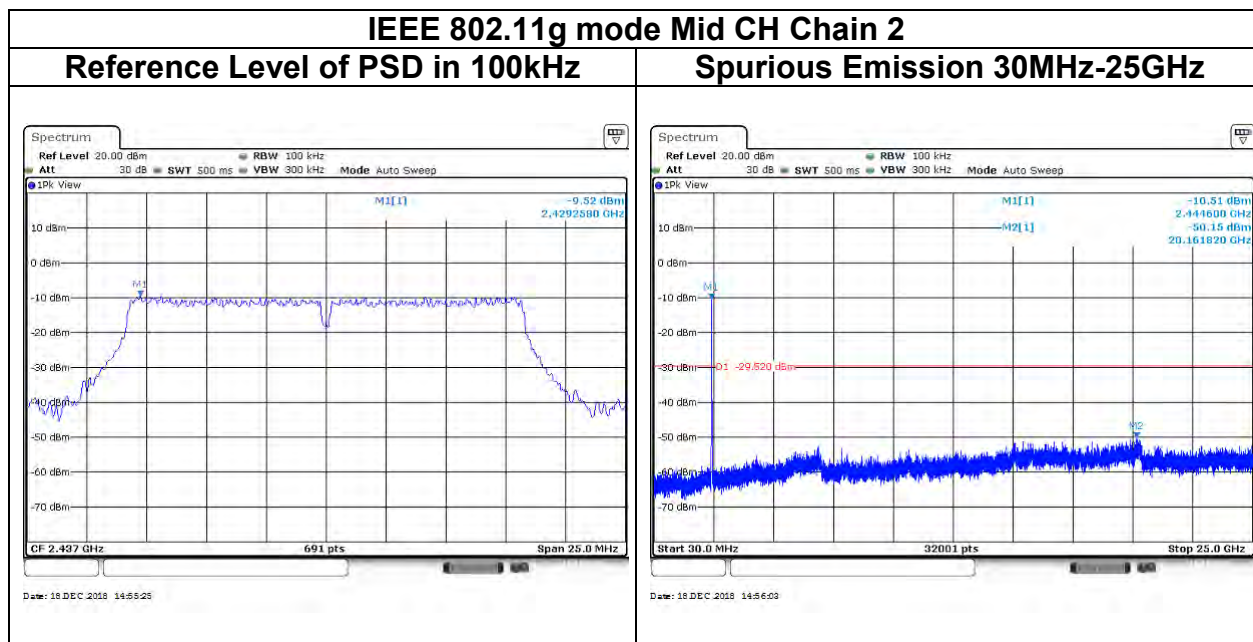


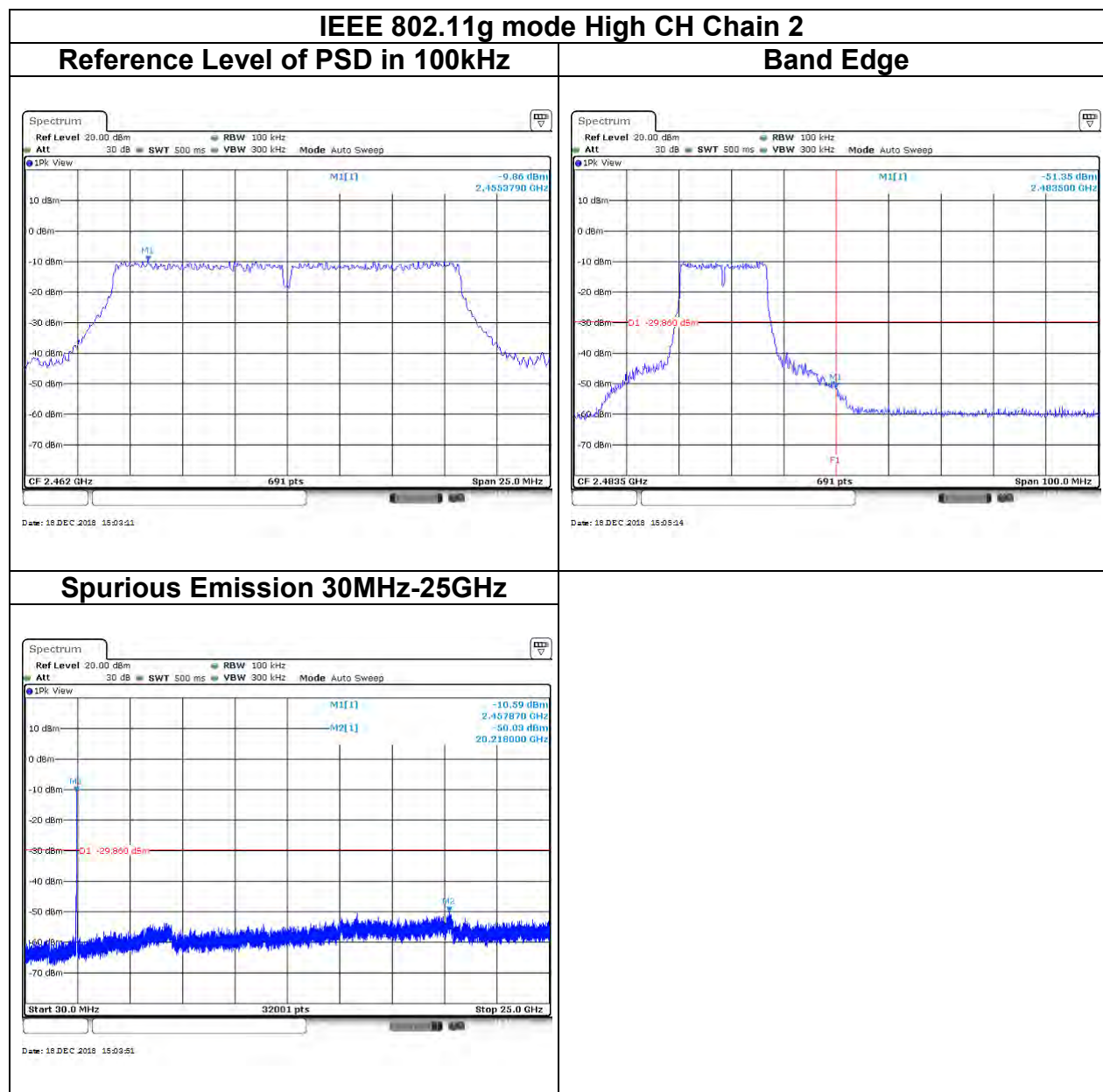


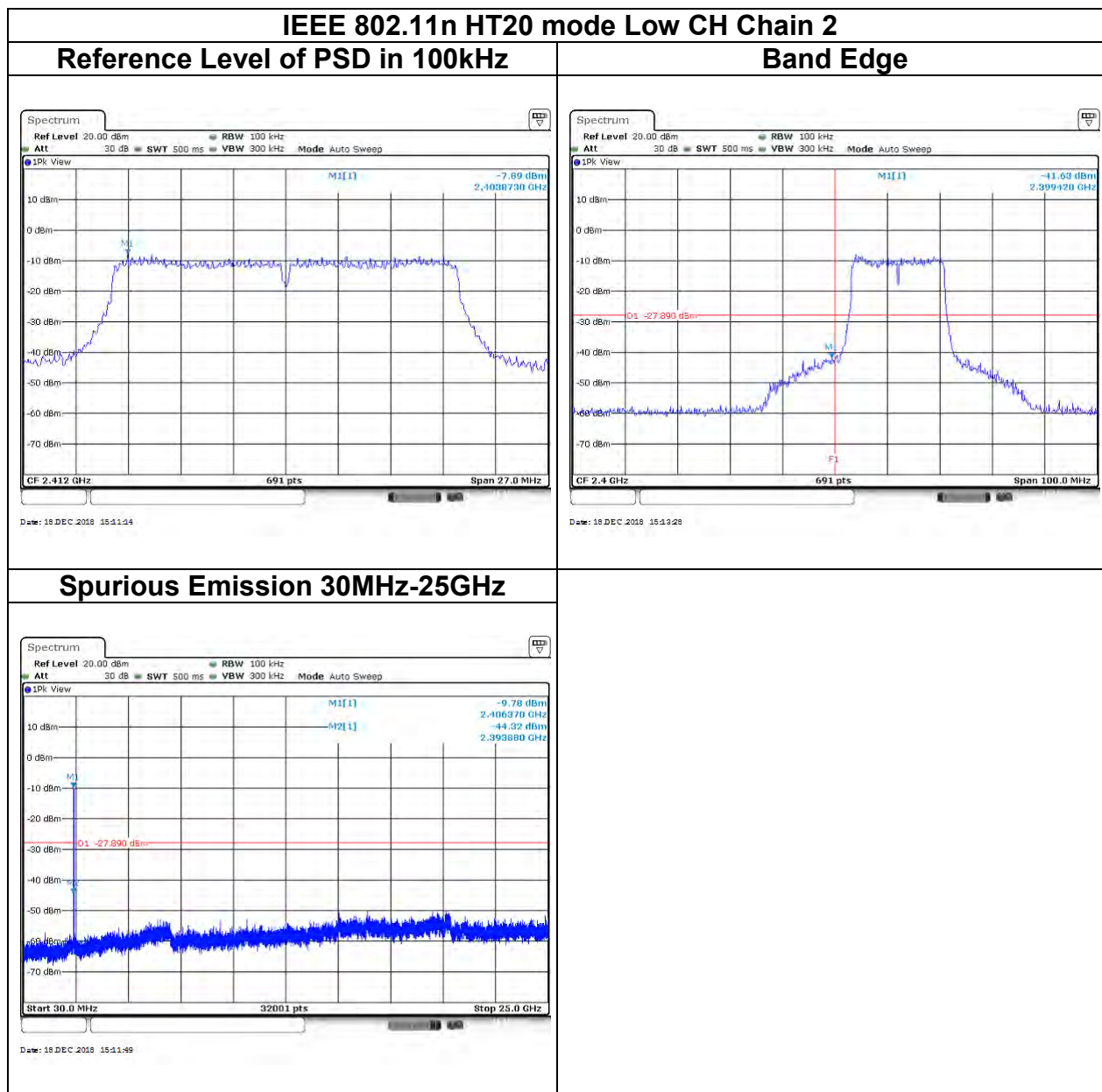
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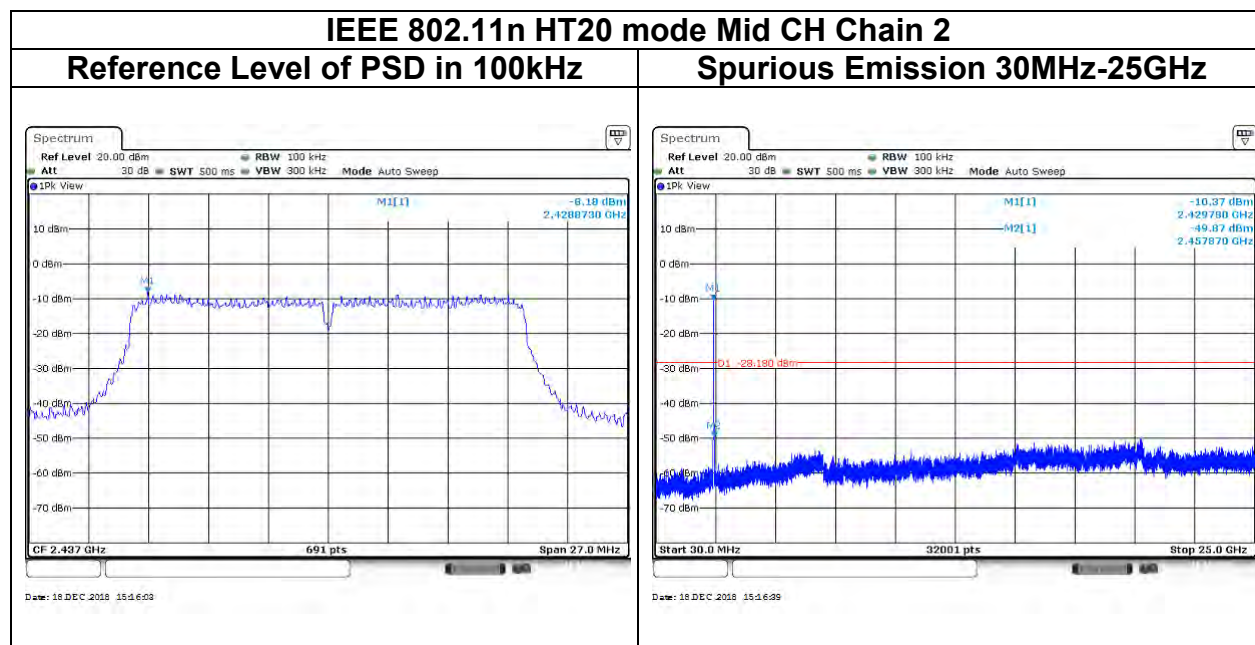


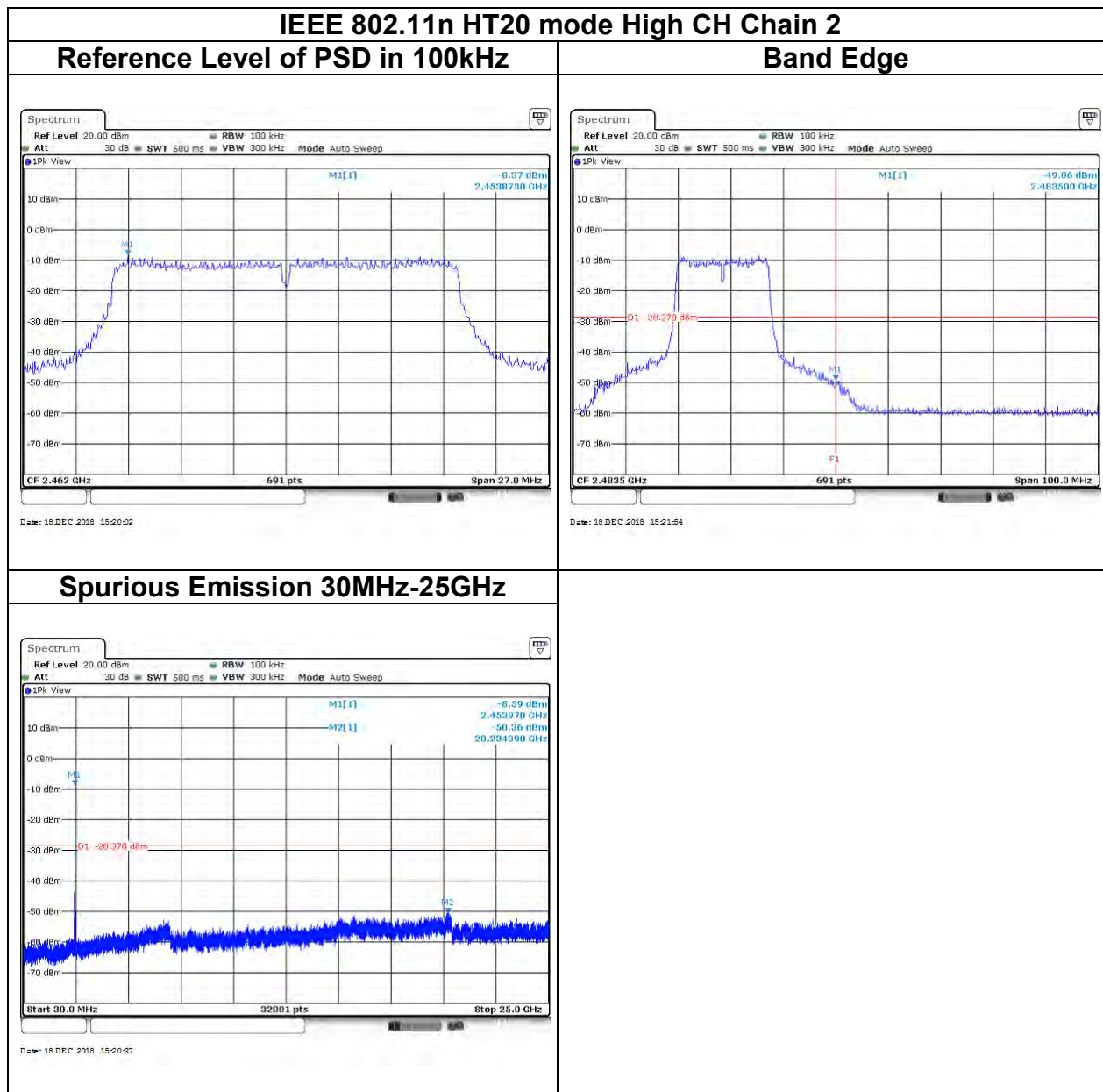




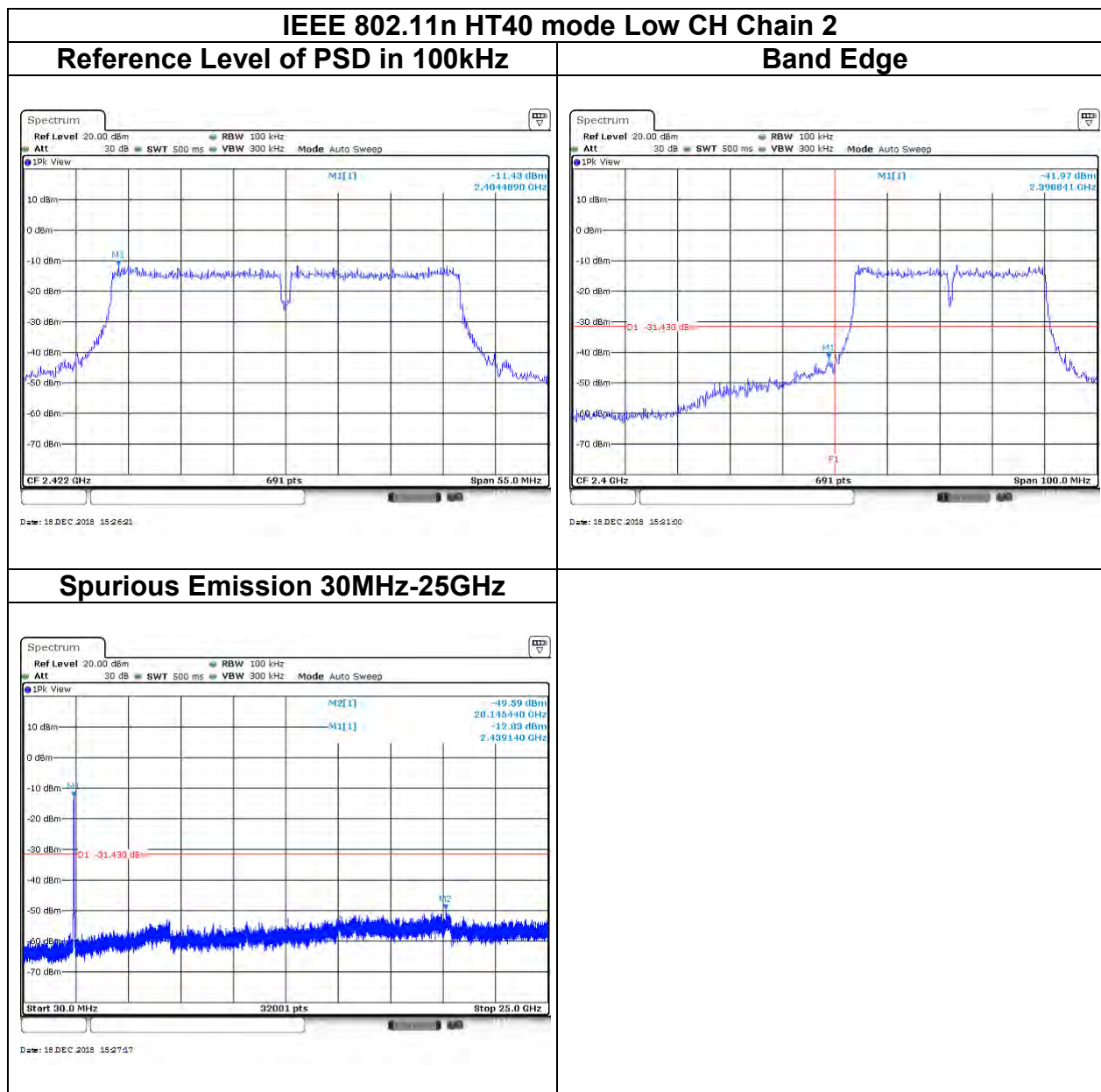


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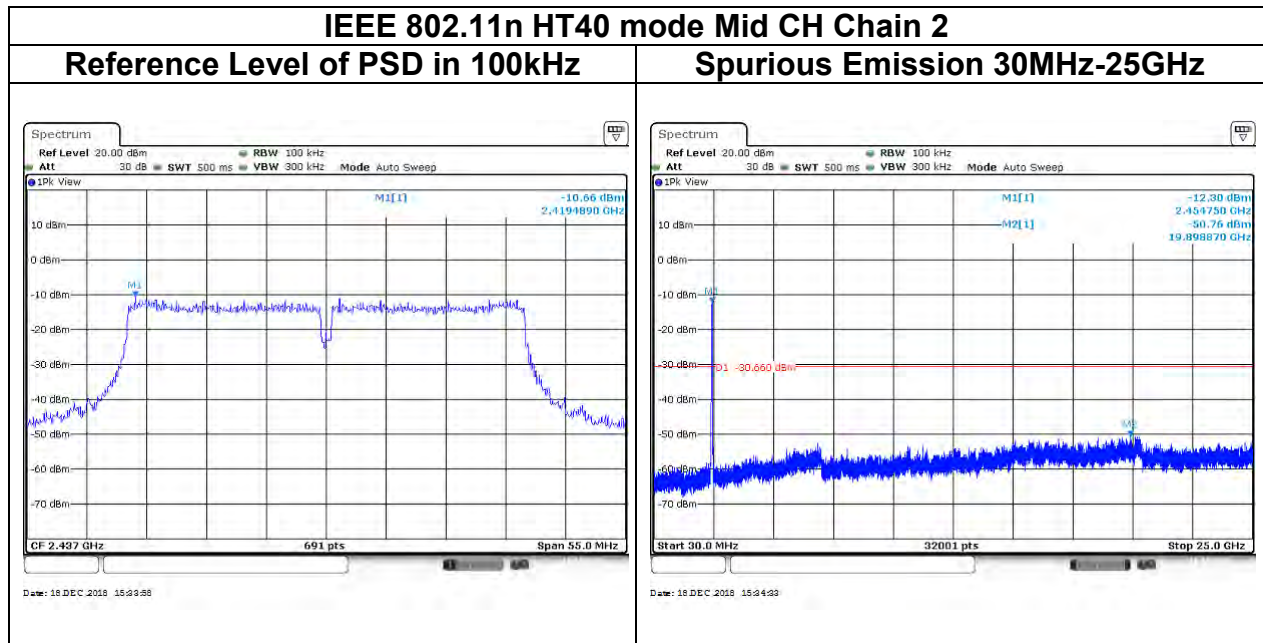


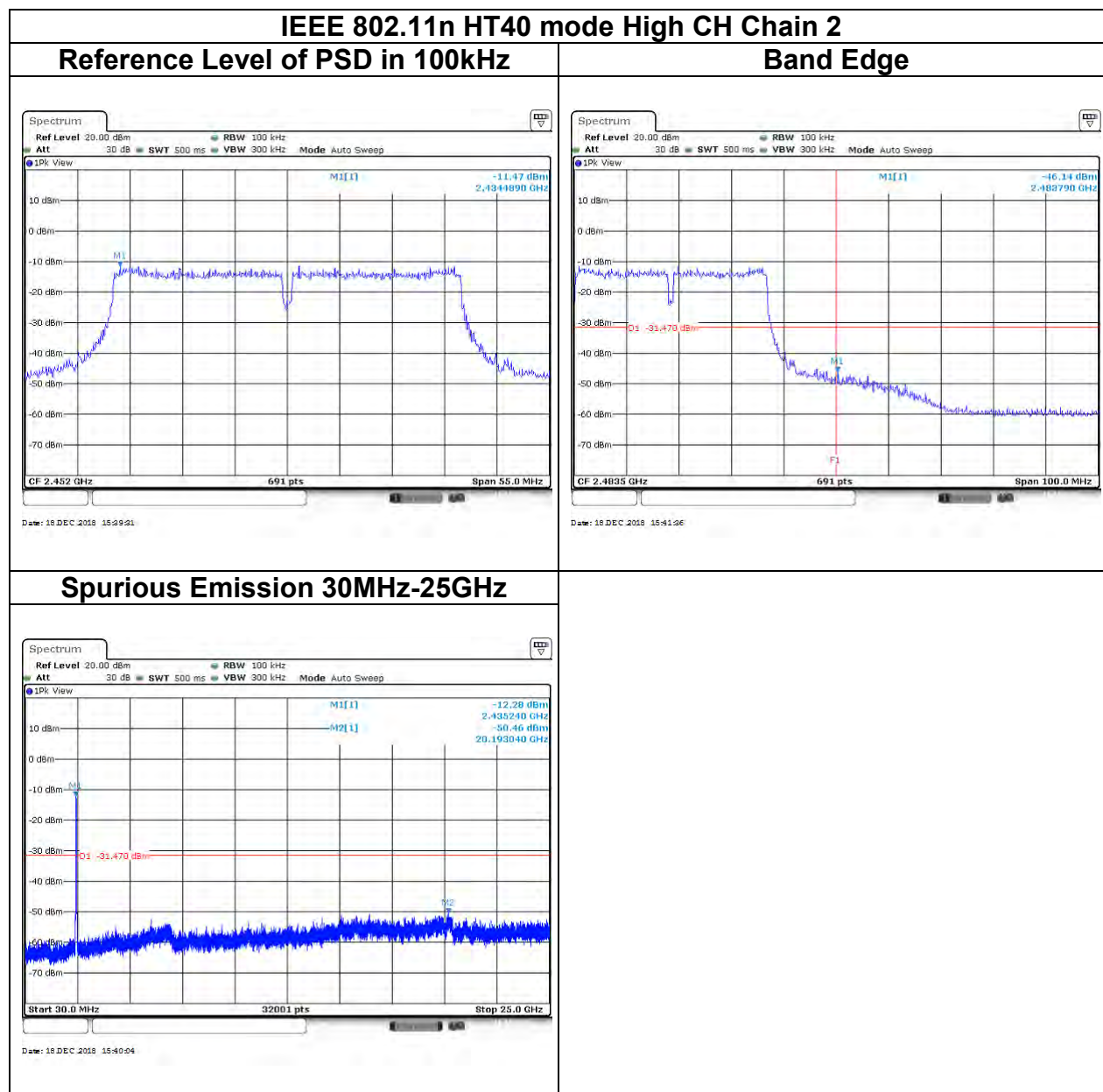


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4.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency	Field Strength (microvolts/m)	Measurement Distance (metres)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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4.6.2 Test Procedure

Test method Refer as KDB 558074 D01.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 9kHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

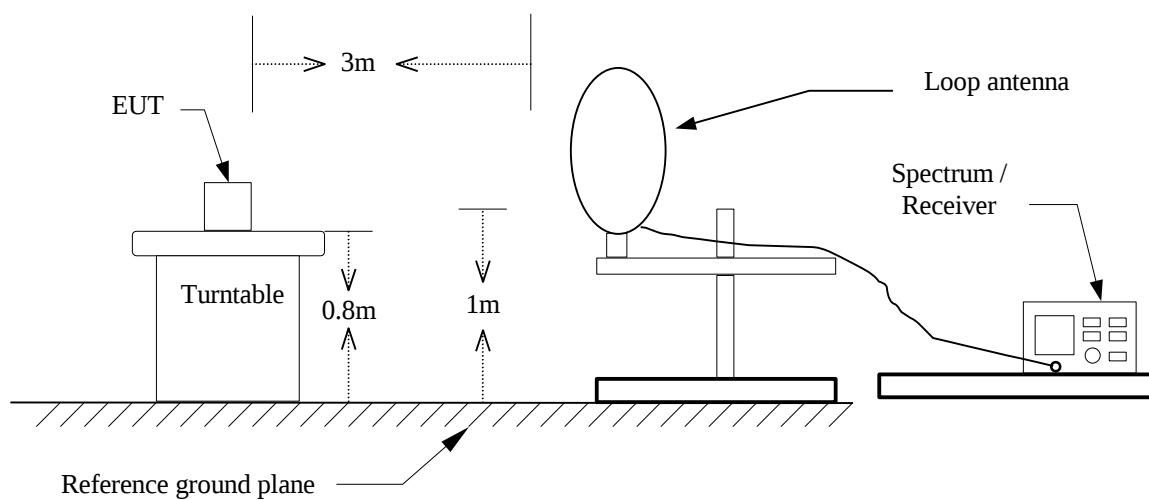
Remark:

1. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
2. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
4. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
 - *If Duty Cycle $\geq$ 98%, VBW=10Hz.
 - *If Duty Cycle < 98%, VBW=1/T.

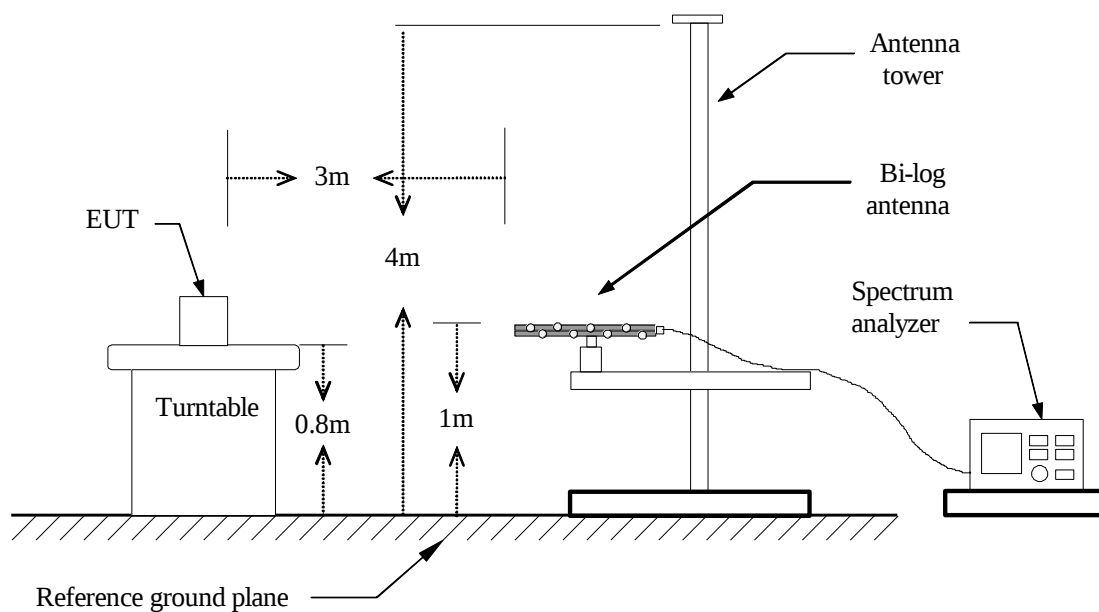
Configuration	Duty Cycle (%)	T(ms)	1/T (kHz)	VBW Setting
802.11b	99.76%	8.4300	-	10Hz
802.11g	89.02%	1.4600	0.685	750Hz
802.11n HT20	88.39%	1.3700	0.730	750Hz
802.11n HT40	79.07%	0.6800	1.471	1.5kHz

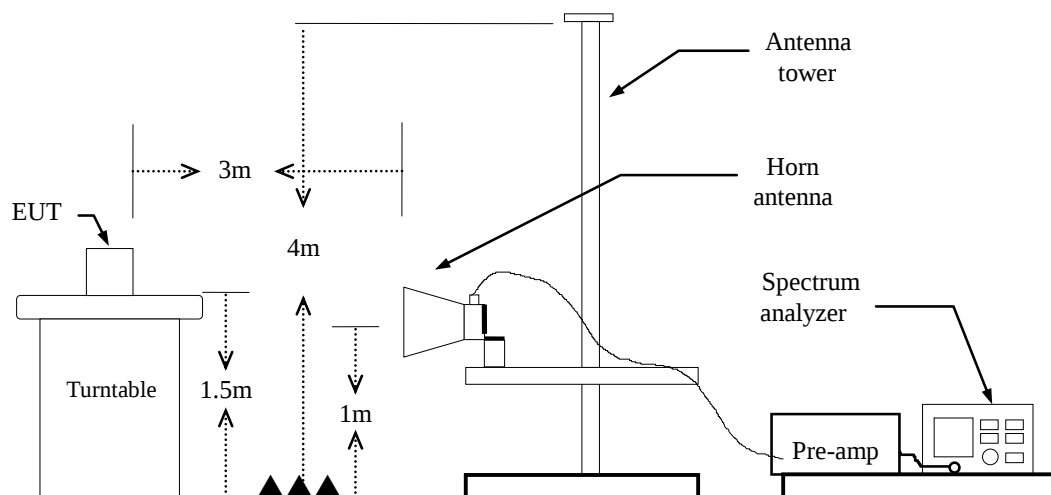
4.6.3 Test Setup

9kHz ~ 30MHz



30MHz ~ 1GHz

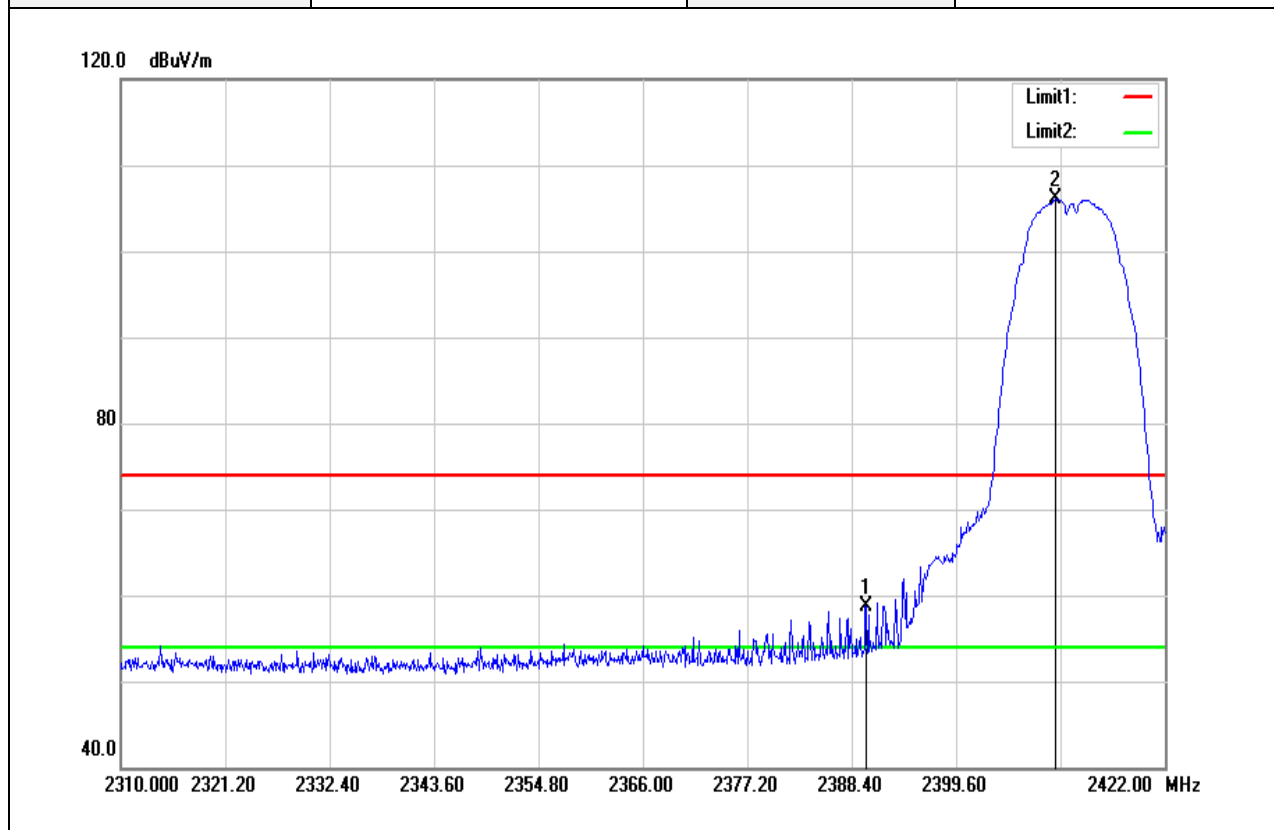


Above 1 GHz

4.6.4 Test Result

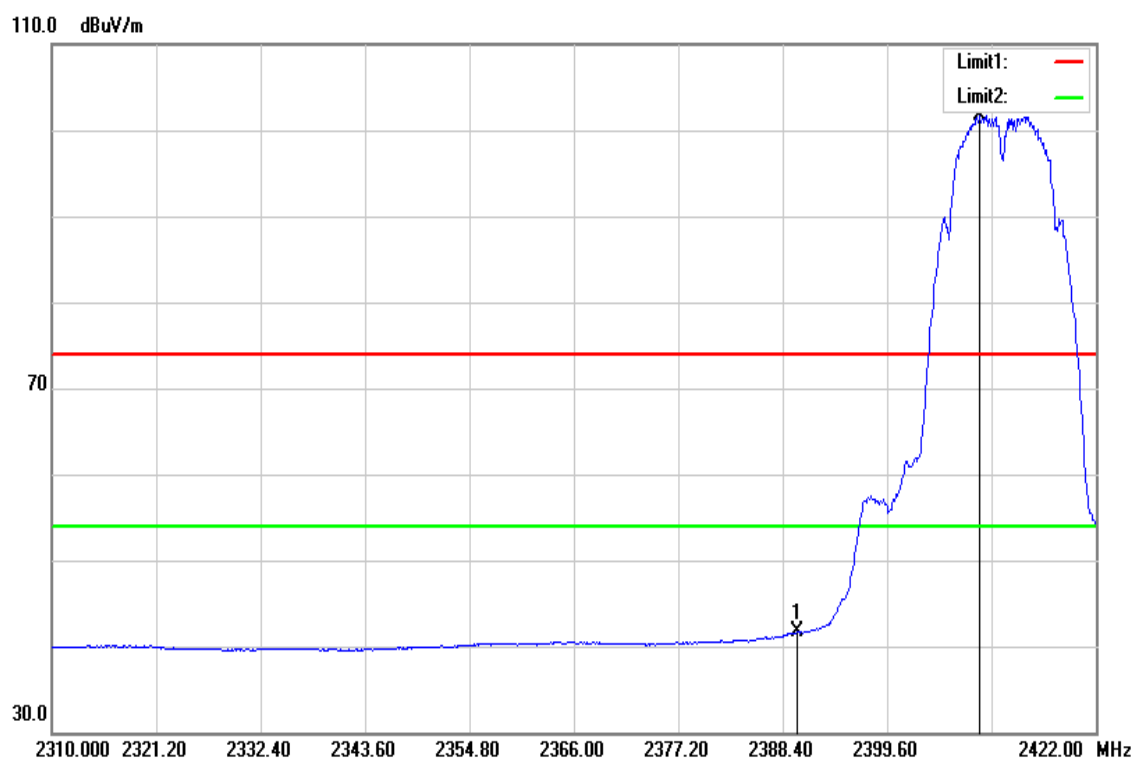
Band Edge Test Data

Test Mode	IEEE 802.11b Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



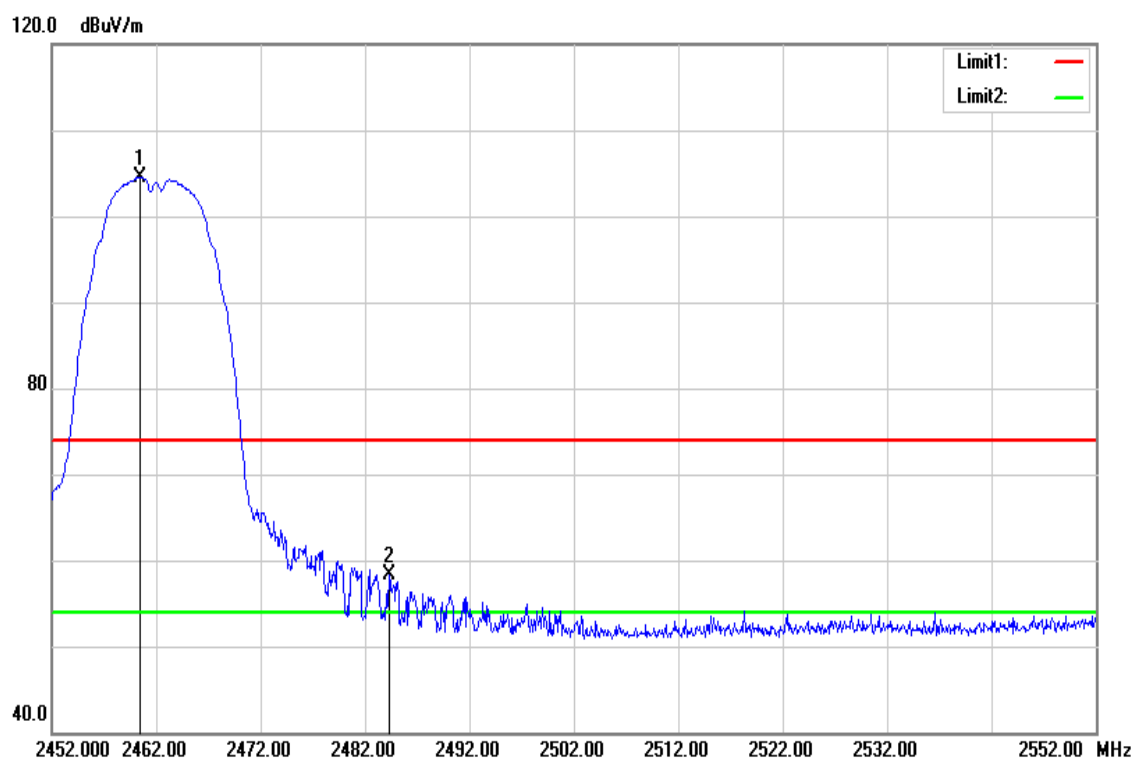
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.968	61.76	-3.13	58.63	74.00	-15.37	peak
2410.240	109.10	-3.08	106.02	-	-	peak

Test Mode	IEEE 802.11b Low CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



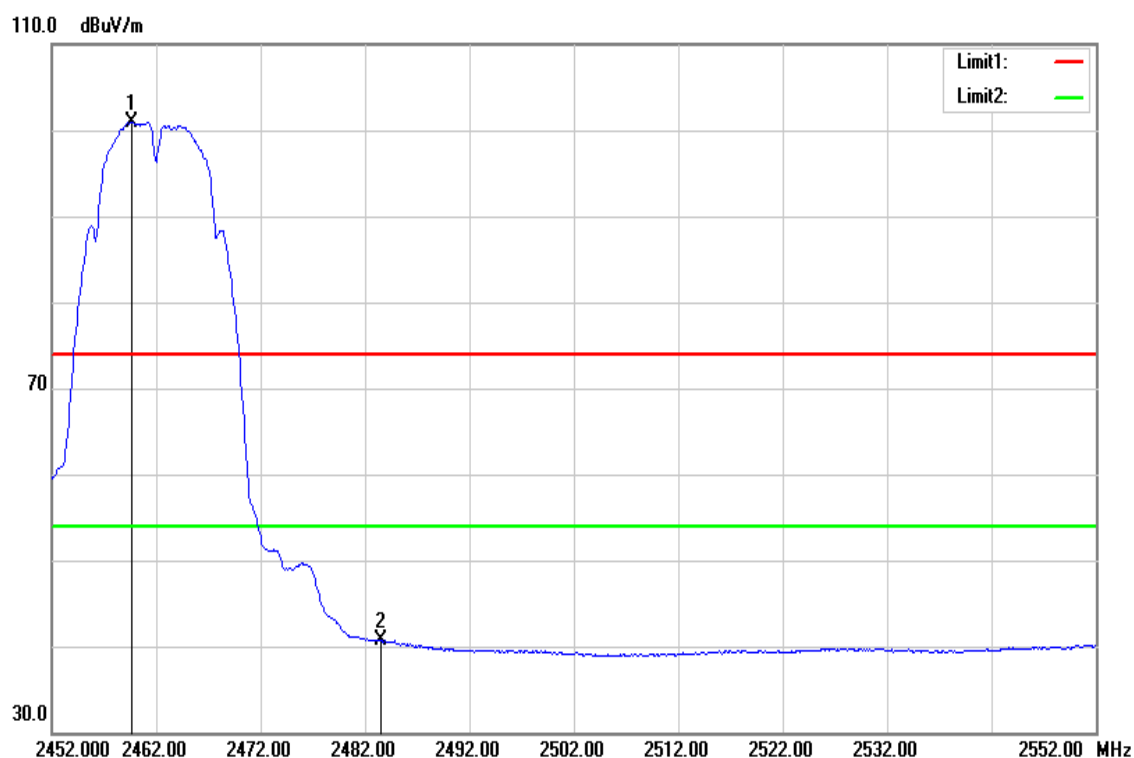
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	44.77	-3.13	41.64	54.00	-12.36	AVG
2409.568	104.83	-3.09	101.74	-	-	AVG

Test Mode	IEEE 802.11b High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



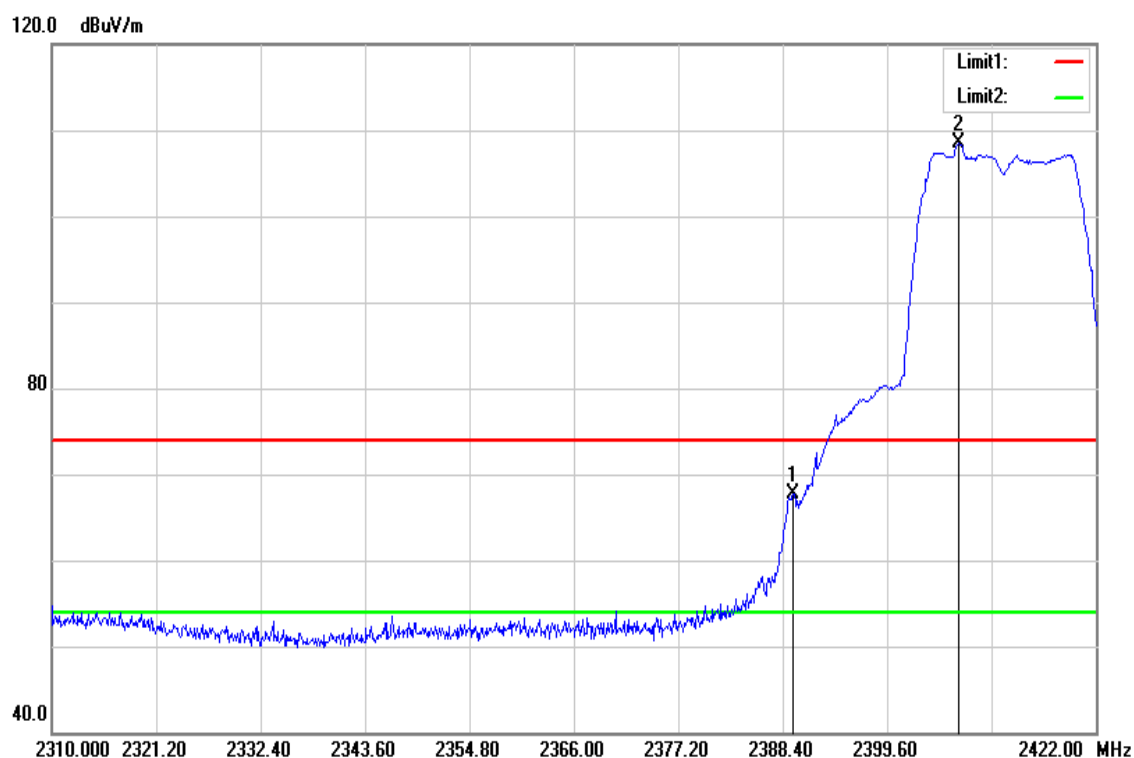
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2460.500	107.32	-2.84	104.48	-	-	peak
2484.300	60.98	-2.70	58.28	74.00	-15.72	peak

Test Mode	IEEE 802.11b High CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



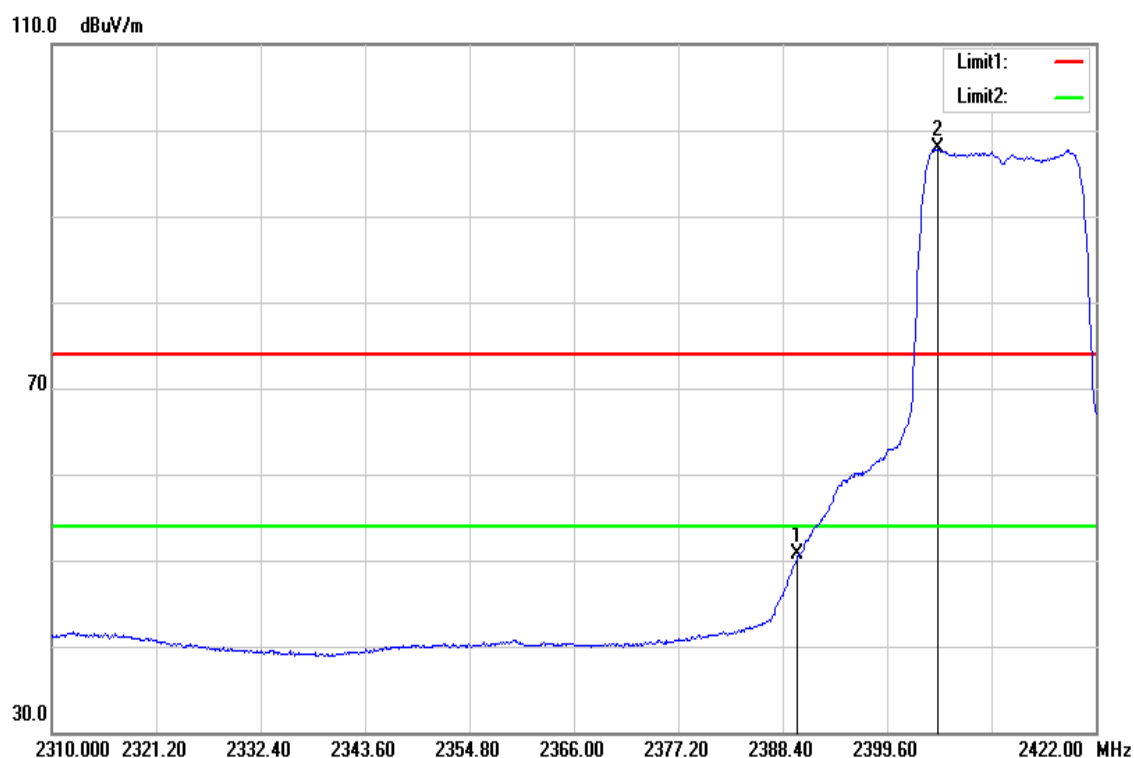
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2459.700	103.78	-2.84	100.94	-	-	AVG
2483.500	43.34	-2.71	40.63	54.00	-13.37	AVG

Test Mode	IEEE 802.11g Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



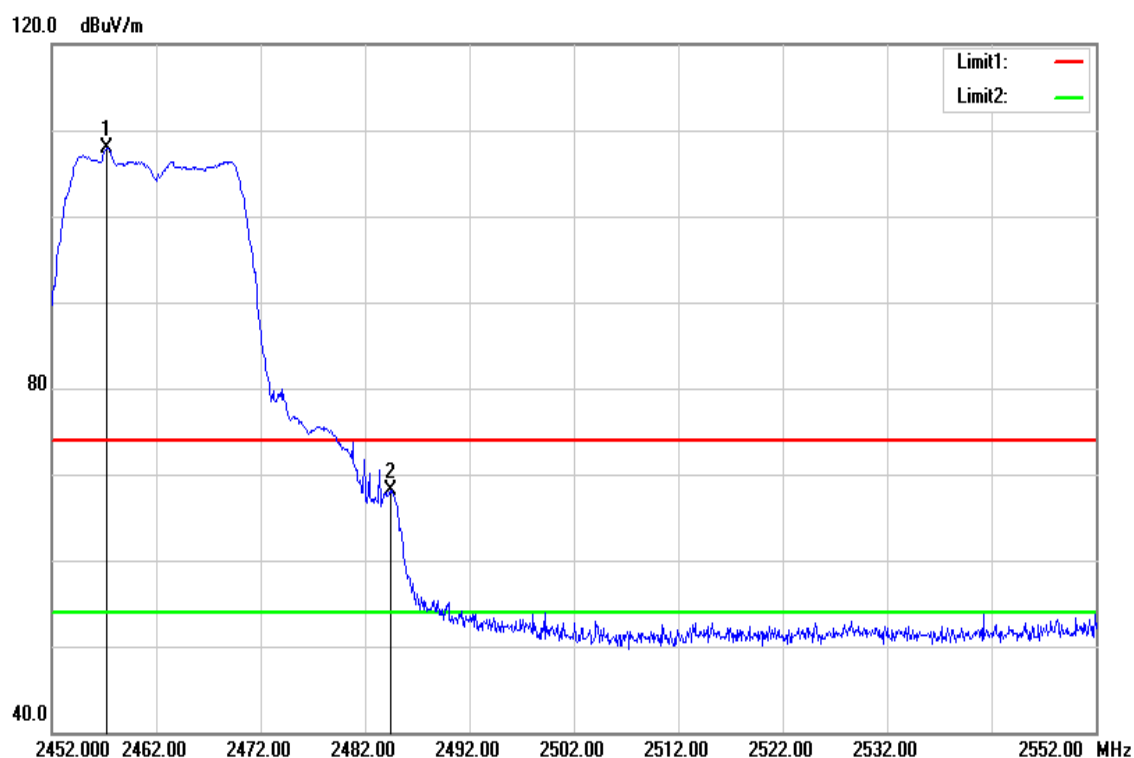
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.520	70.89	-3.13	67.76	74.00	-6.24	peak
2407.216	111.53	-3.09	108.44	-	-	peak

Test Mode	IEEE 802.11g Low CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



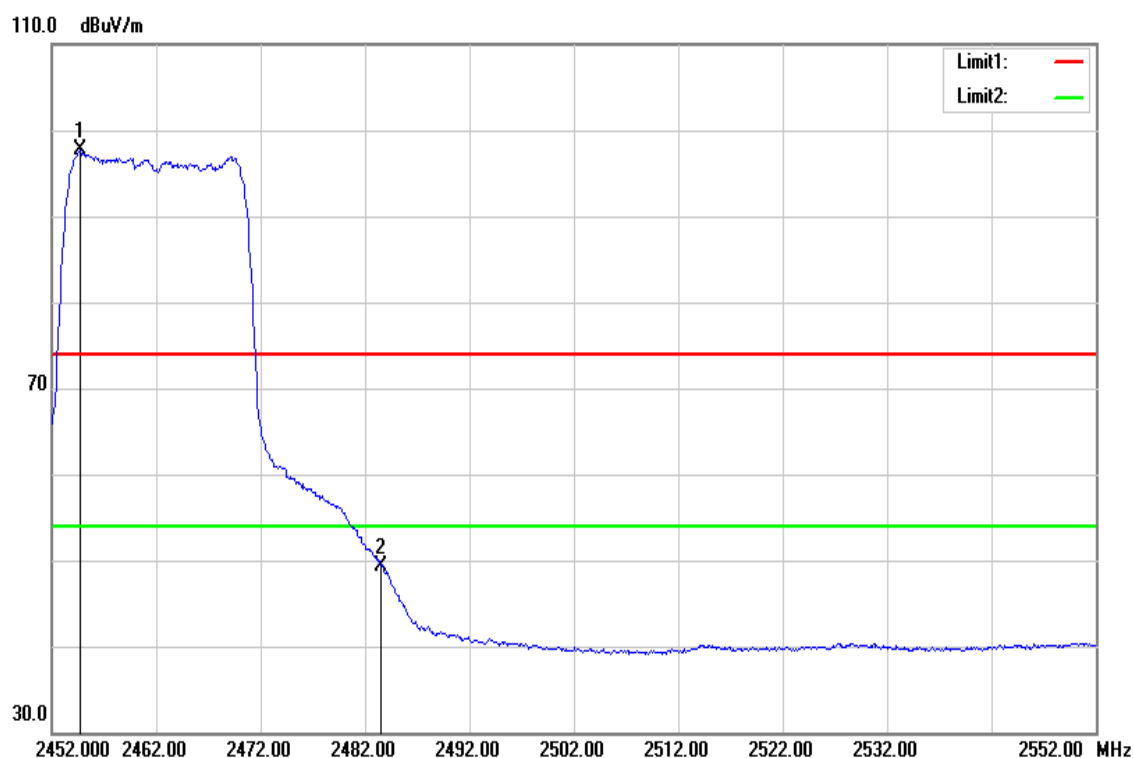
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	53.74	-3.13	50.61	54.00	-3.39	AVG
2404.976	101.01	-3.12	97.89	-	-	AVG

Test Mode	IEEE 802.11g High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



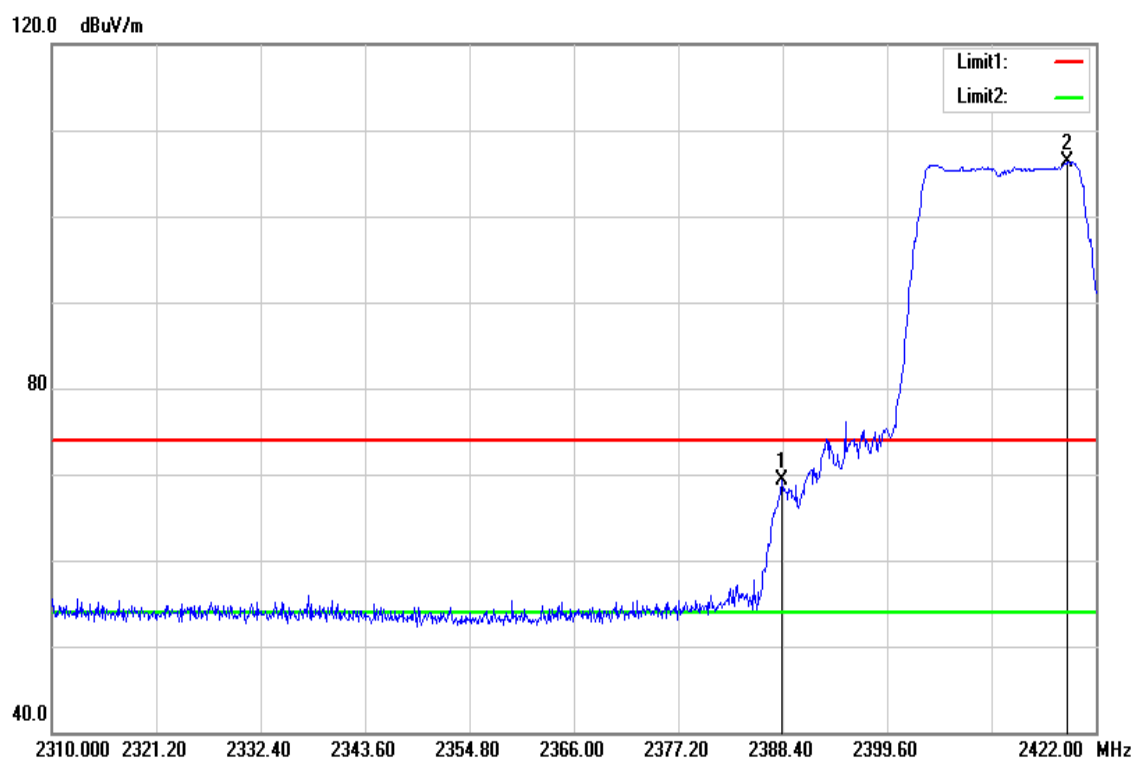
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2457.300	110.78	-2.85	107.93	-	-	peak
2484.400	70.86	-2.70	68.16	74.00	-5.84	peak

Test Mode	IEEE 802.11g High CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



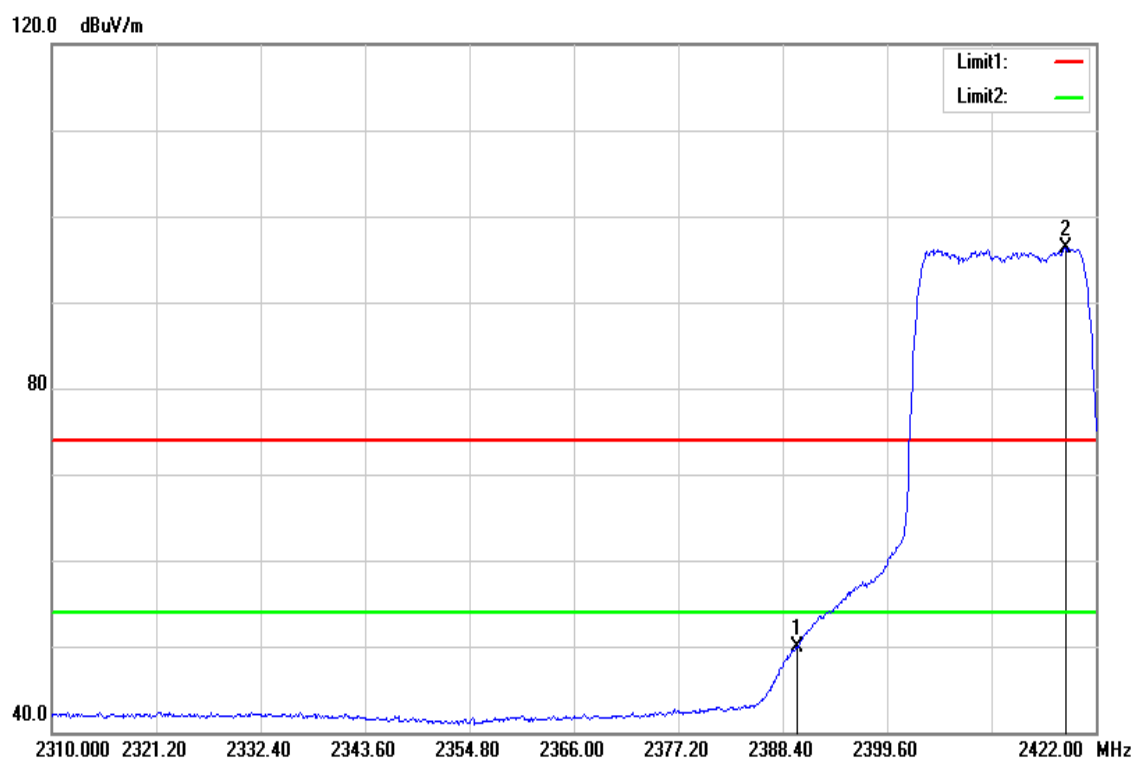
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2454.700	100.54	-2.87	97.67	-	-	AVG
2483.500	51.98	-2.71	49.27	54.00	-4.73	AVG

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



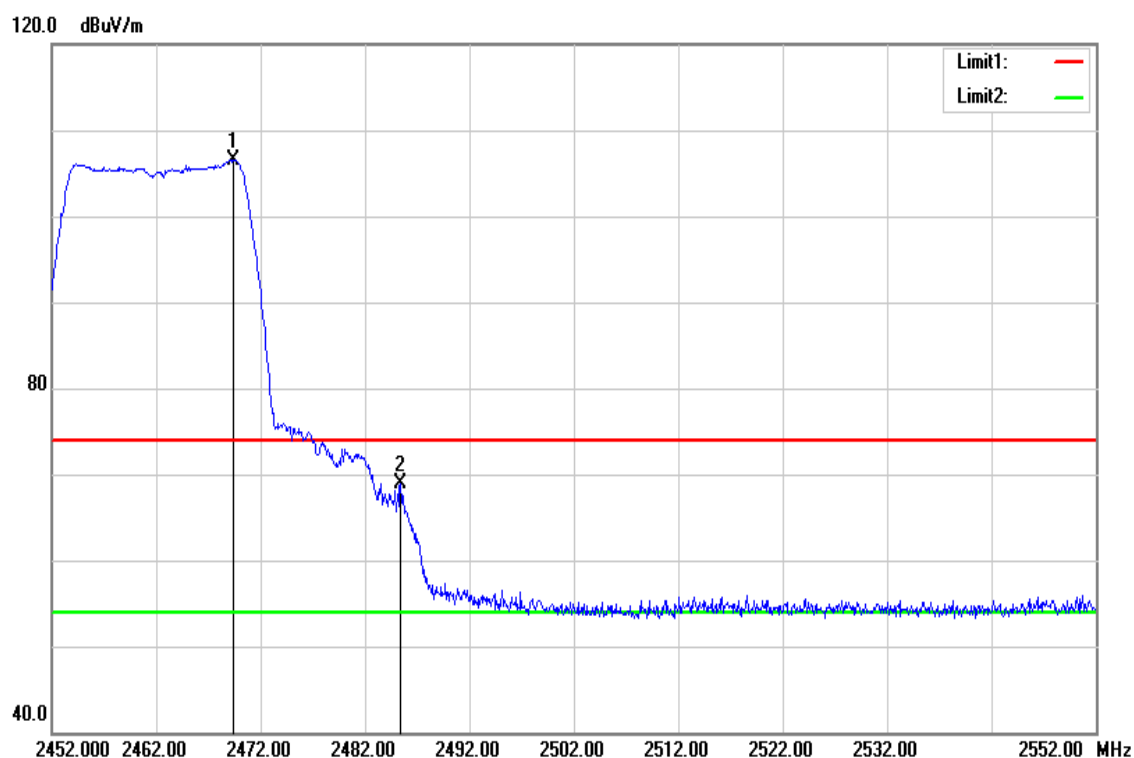
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2388.288	72.35	-3.12	69.23	74.00	-4.77	peak
2418.976	109.29	-3.04	106.25	-	-	peak

Test Mode	IEEE 802.11n HT20 Low CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



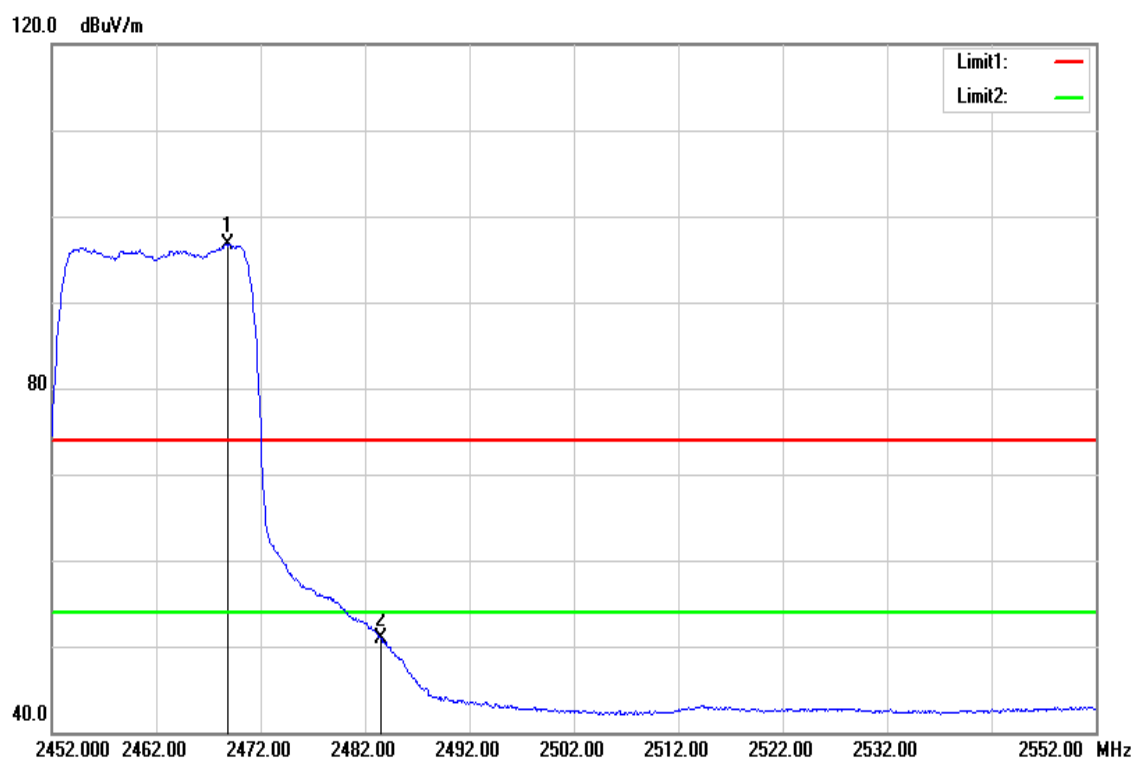
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	53.08	-3.13	49.95	54.00	-4.05	AVG
2418.752	99.39	-3.04	96.35	-	-	AVG

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



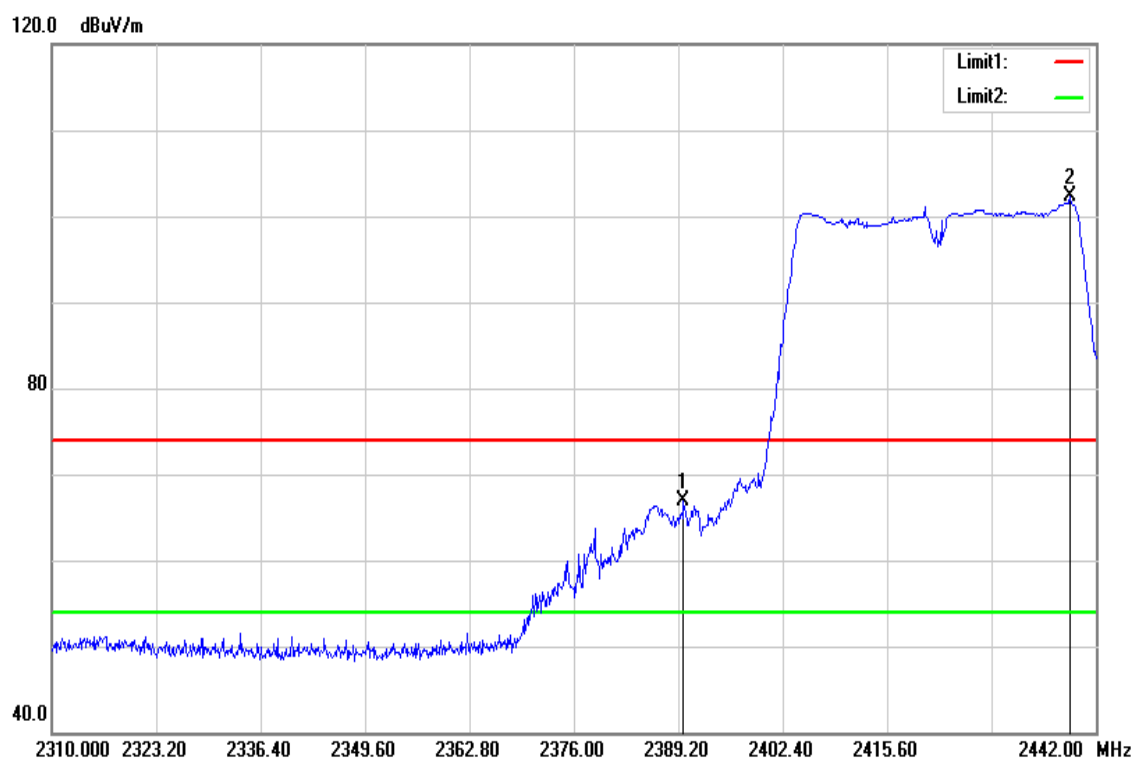
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2469.400	109.33	-2.78	106.55	-	-	peak
2485.400	71.67	-2.70	68.97	74.00	-5.03	peak

Test Mode	IEEE 802.11n HT20 High CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



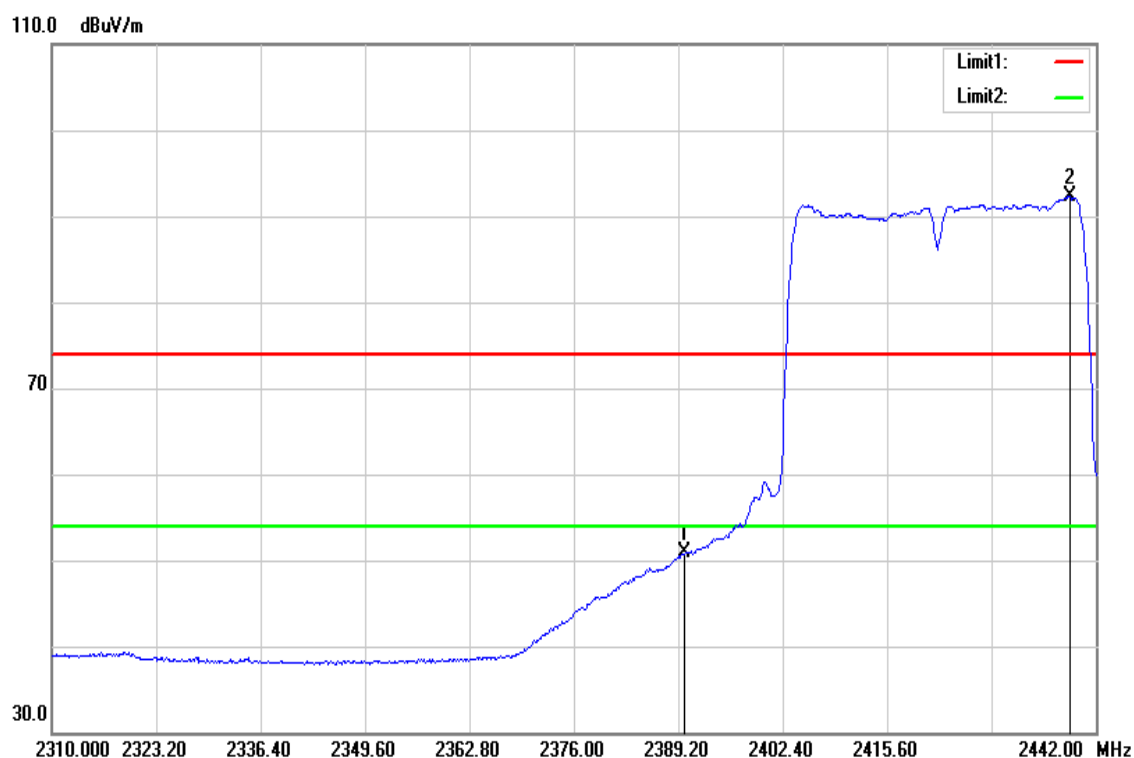
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2468.900	99.58	-2.78	96.80	-	-	AVG
2483.500	53.63	-2.71	50.92	54.00	-3.08	AVG

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



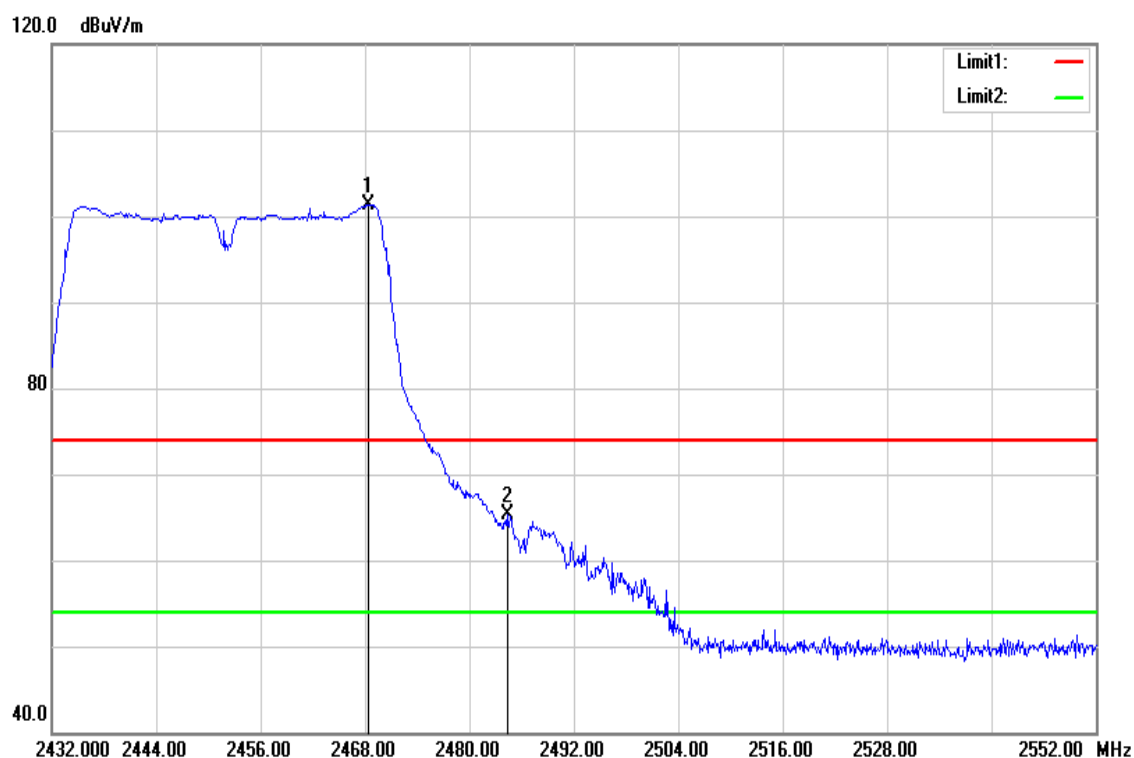
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2389.860	70.09	-3.13	66.96	74.00	-7.04	peak
2438.700	105.26	-2.94	102.32	-	-	peak

Test Mode	IEEE 802.11n HT40 Low CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		



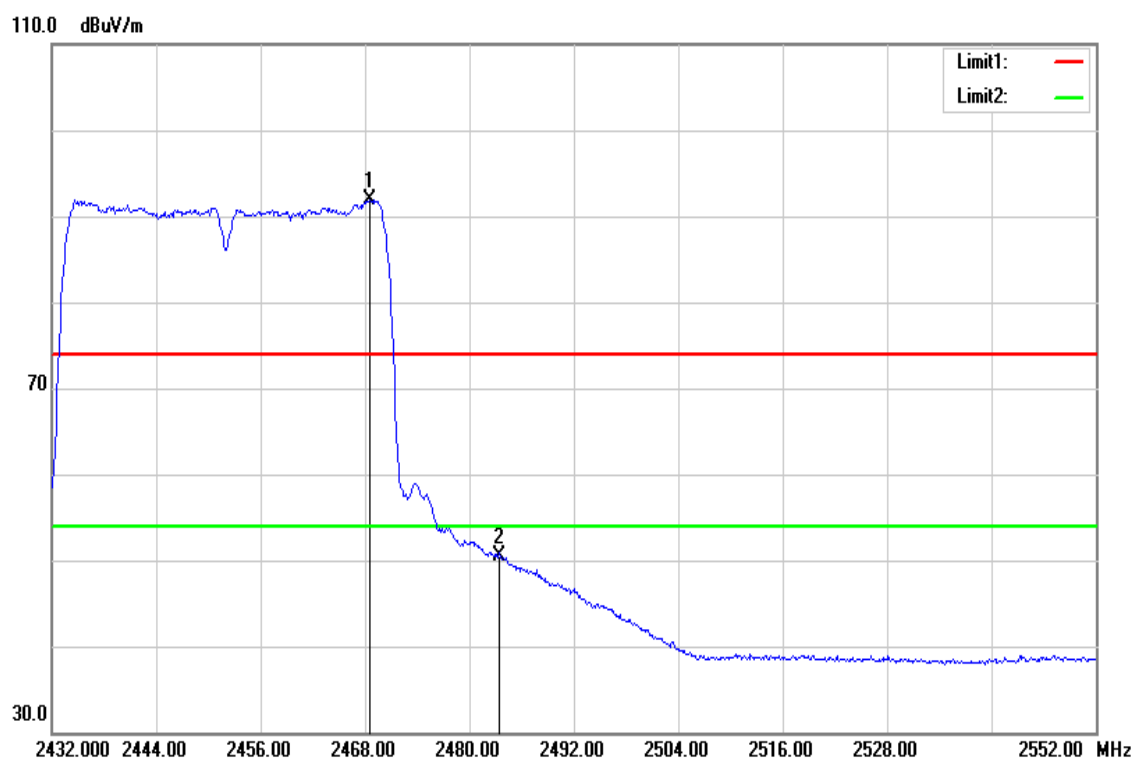
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	54.04	-3.13	50.91	54.00	-3.09	AVG
2438.700	95.25	-2.94	92.31	-	-	AVG

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2468.360	104.17	-2.80	101.37	-	-	peak
2484.320	67.97	-2.70	65.27	74.00	-8.73	peak

Test Mode	IEEE 802.11n HT40 High CH	Temperature:	22.1(°C)/ 50%RH
Test Item	Band Edge	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Average		

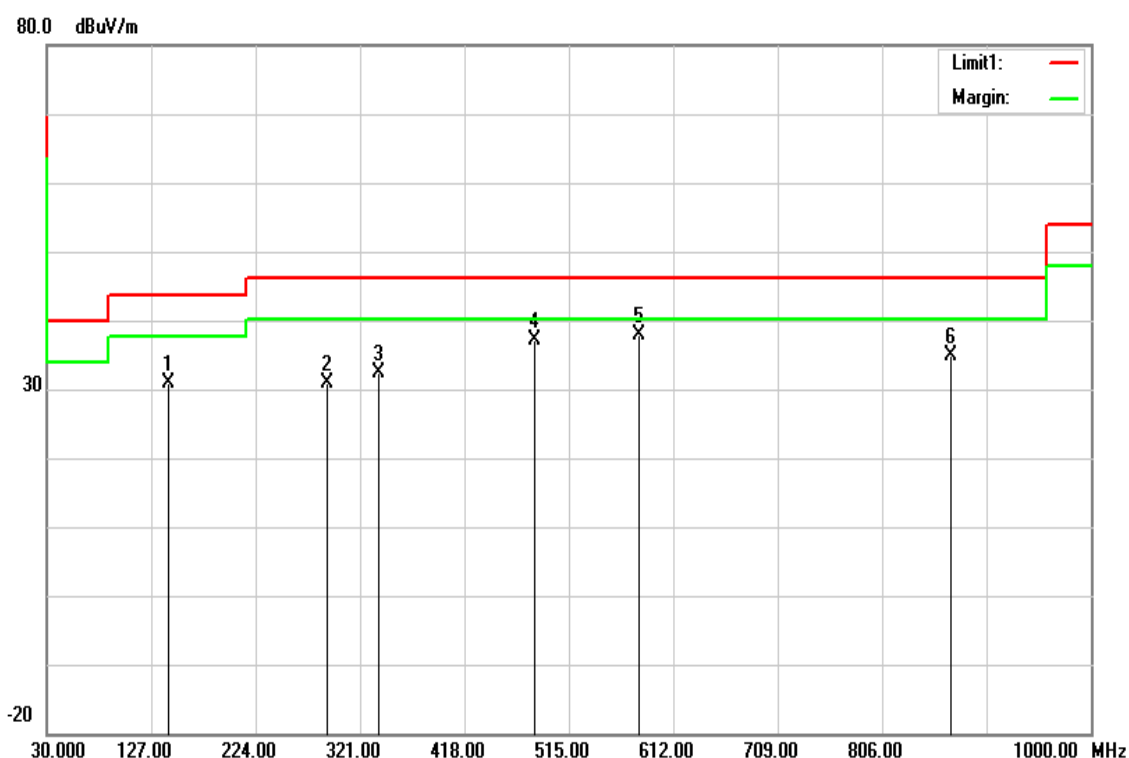


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2468.600	94.79	-2.80	91.99	-	-	AVG
2483.500	53.25	-2.71	50.54	54.00	-3.46	AVG

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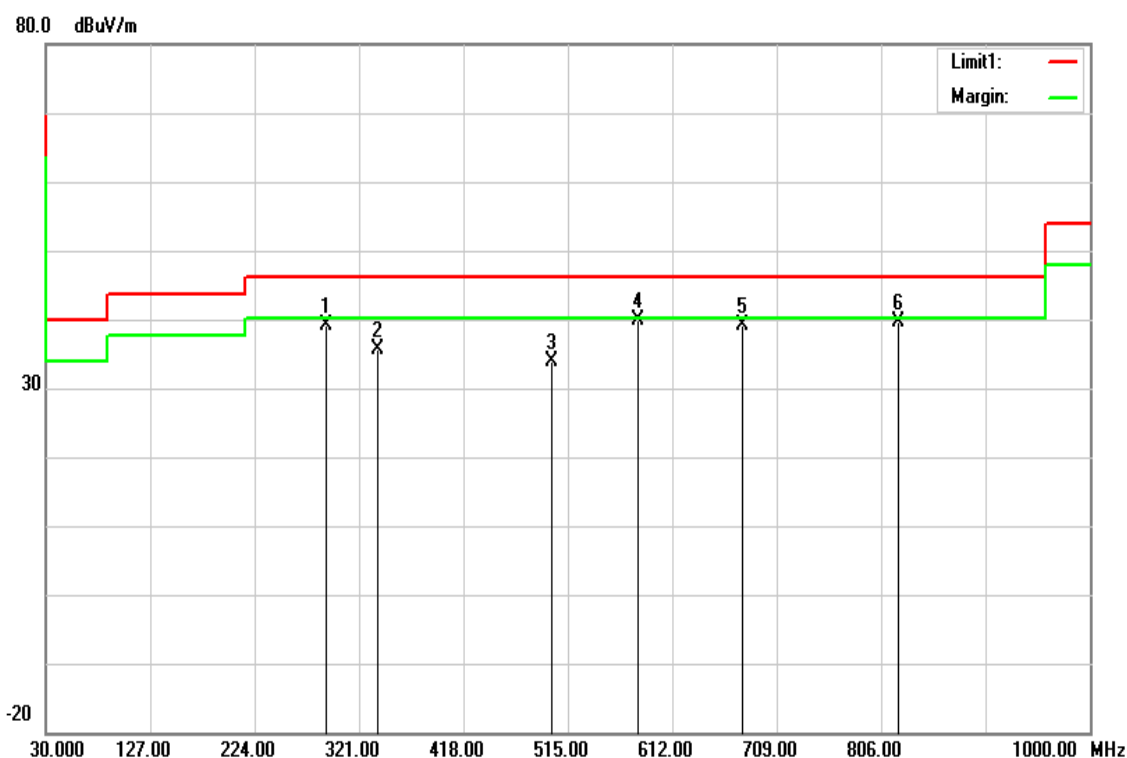
Below 1G Test Data

Test Mode	Mode 1	Temp/Hum	22.1(°C)/ 50%RH
Test Item	30MHz-1GHz	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Quasi-peak		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
143.4900	40.05	-9.17	30.88	43.52	-12.64	peak
289.9600	38.57	-7.63	30.94	46.02	-15.08	peak
338.4600	39.20	-6.70	32.50	46.02	-13.52	peak
482.9900	39.41	-2.25	37.16	46.02	-8.86	QP
579.9900	38.86	-0.88	37.98	46.02	-8.04	peak
870.0200	30.83	4.09	34.92	46.02	-11.10	peak

Test Mode	Mode 1	Temp/Hum	22.1(°C)/ 50%RH
Test Item	30MHz-1GHz	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak and Quasi-peak		

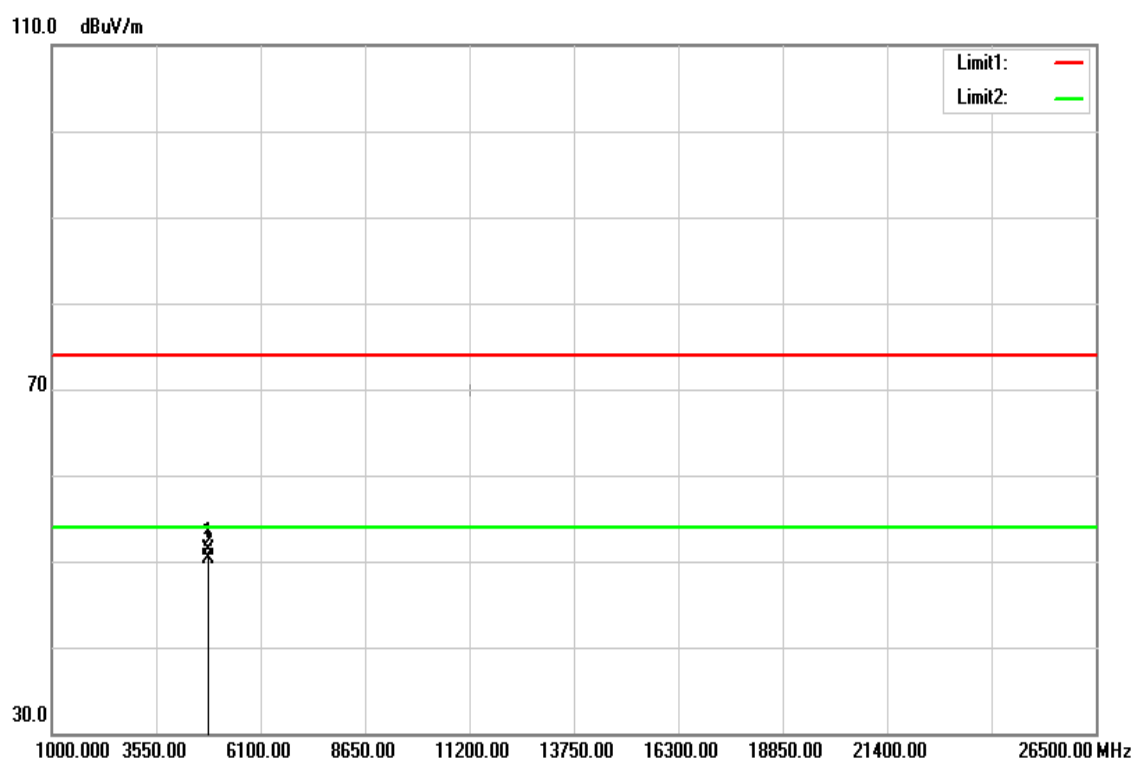


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
289.9600	46.68	-7.63	39.05	46.02	-6.97	peak
338.4600	42.38	-6.70	35.68	46.02	-10.34	peak
500.4500	36.04	-2.28	33.76	46.02	-12.26	peak
579.9900	40.81	-0.88	39.93	46.02	-6.09	peak
676.9900	38.43	0.77	39.20	46.02	-6.82	peak
821.5200	36.03	3.54	39.57	46.02	-6.45	QP

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Above 1G Test Data

Test Mode	IEEE 802.11b Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average		

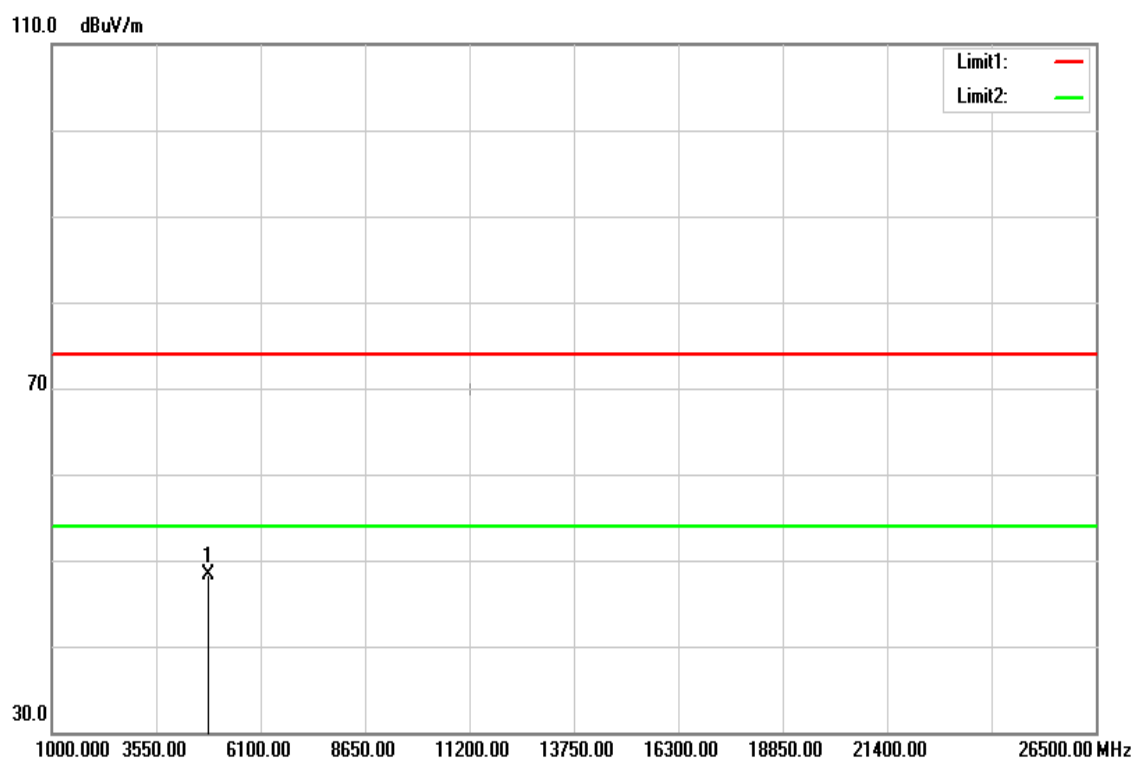


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	48.09	3.25	51.34	74.00	-22.66	peak
4827.000	47.13	3.25	50.38	54.00	-3.62	AVG
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode	IEEE 802.11b Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

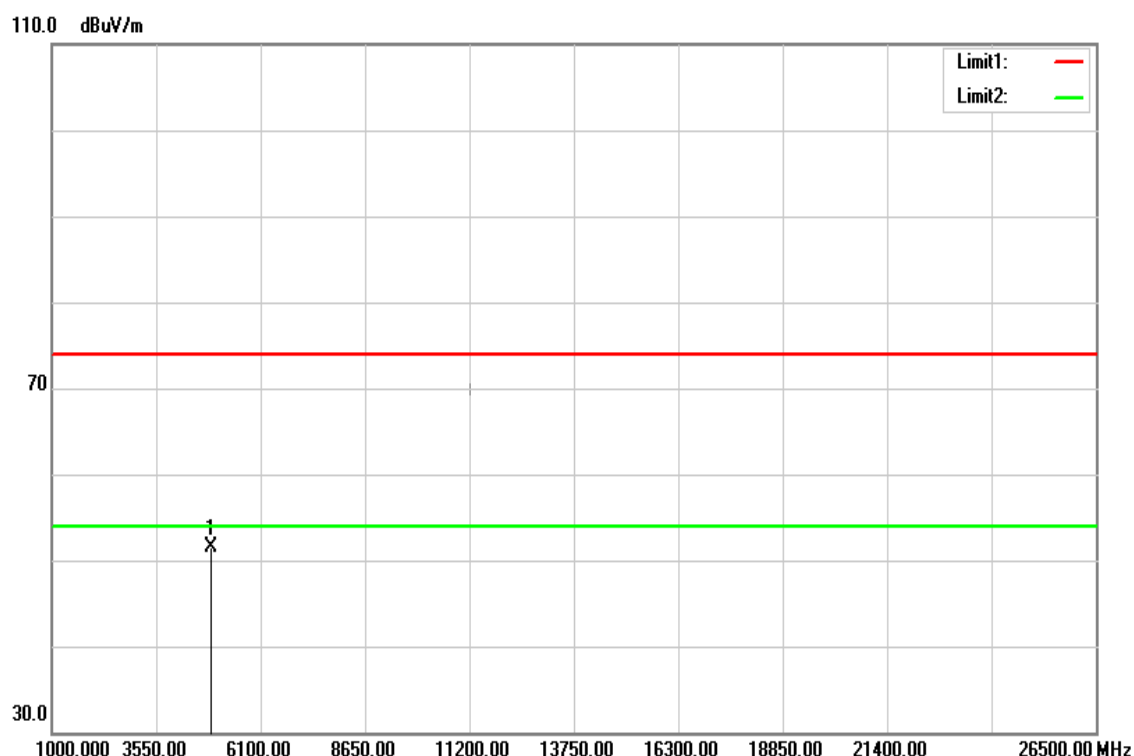


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	45.07	3.25	48.32	74.00	-25.68	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11b Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

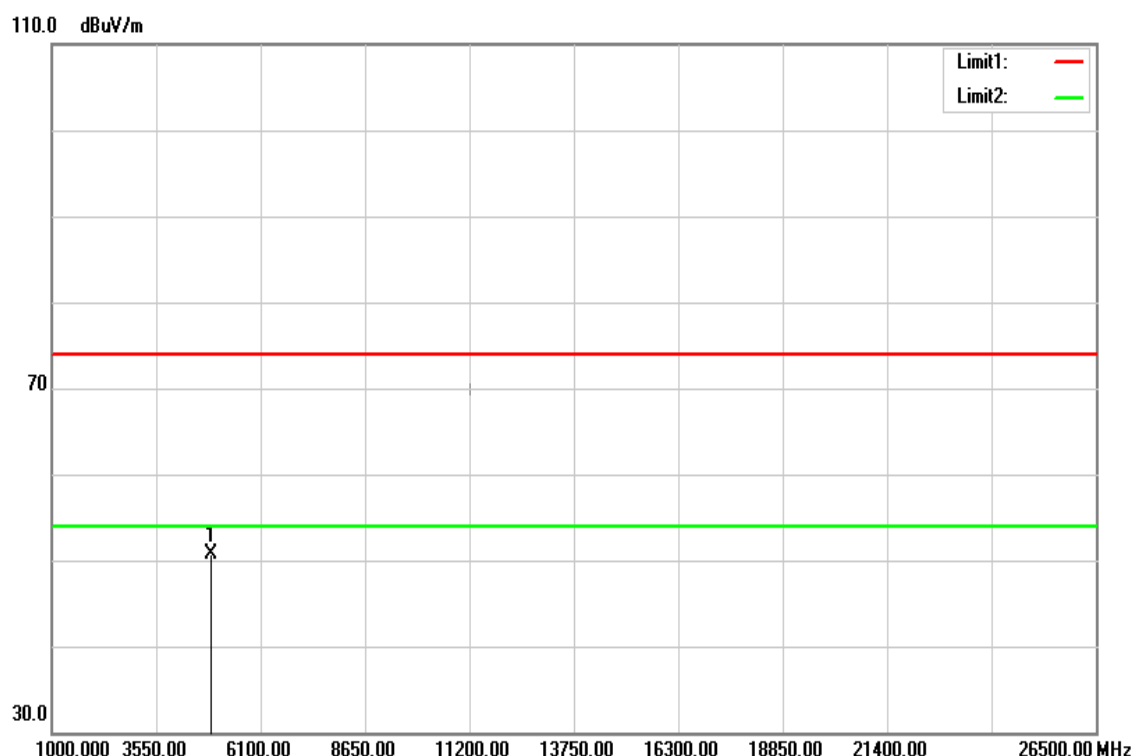


Frequency (MHz)	Reading (dBu)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	47.86	3.57	51.43	74.00	-22.57	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11b Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

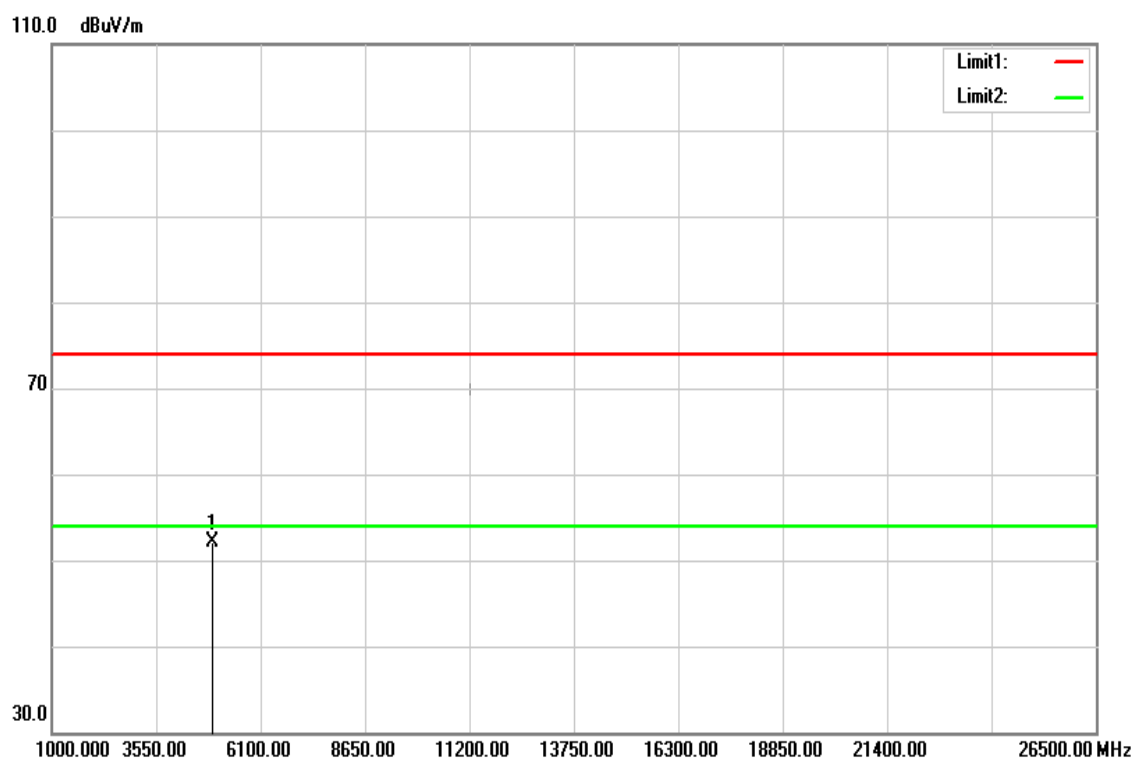


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	47.05	3.57	50.62	74.00	-23.38	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11b High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

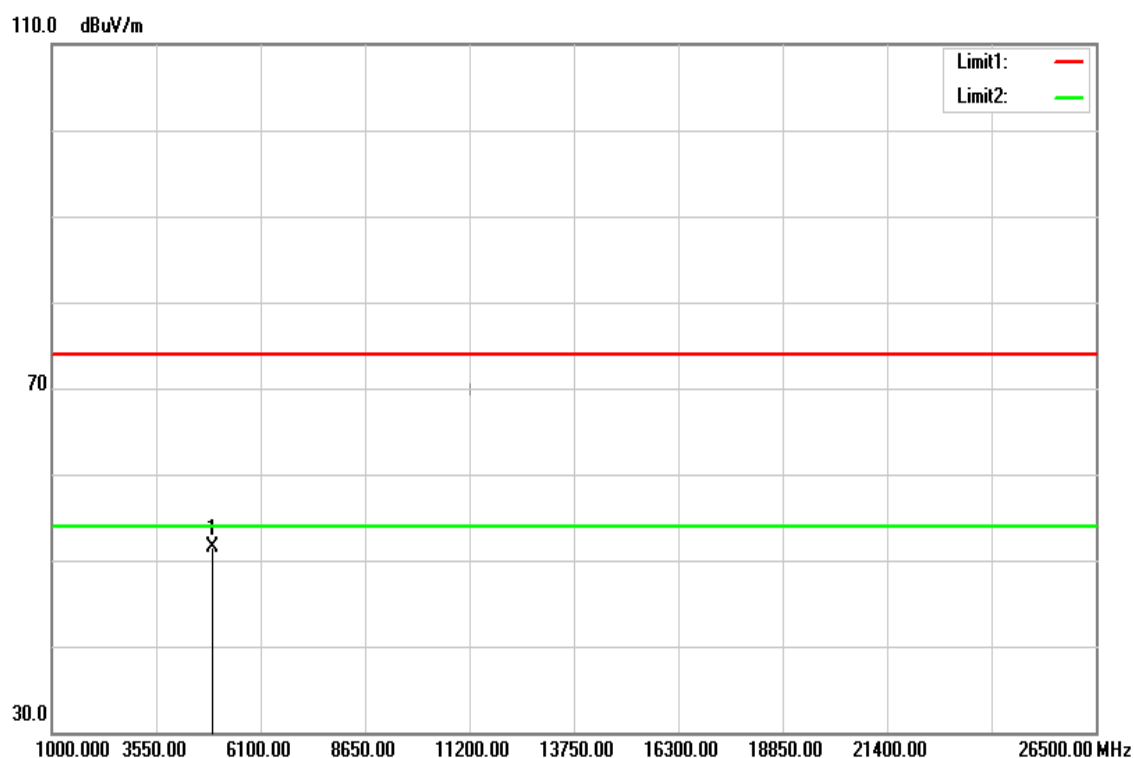


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	48.11	3.90	52.01	74.00	-21.99	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11b High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

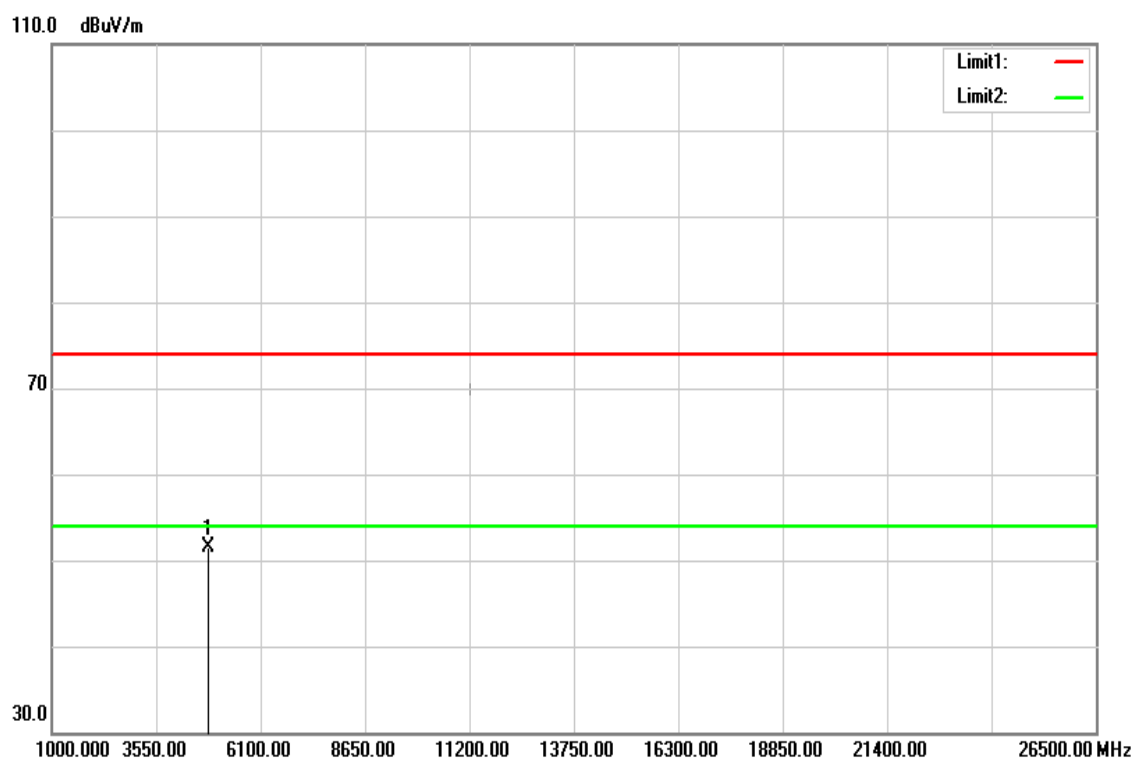


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	47.60	3.90	51.50	74.00	-22.50	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11g Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

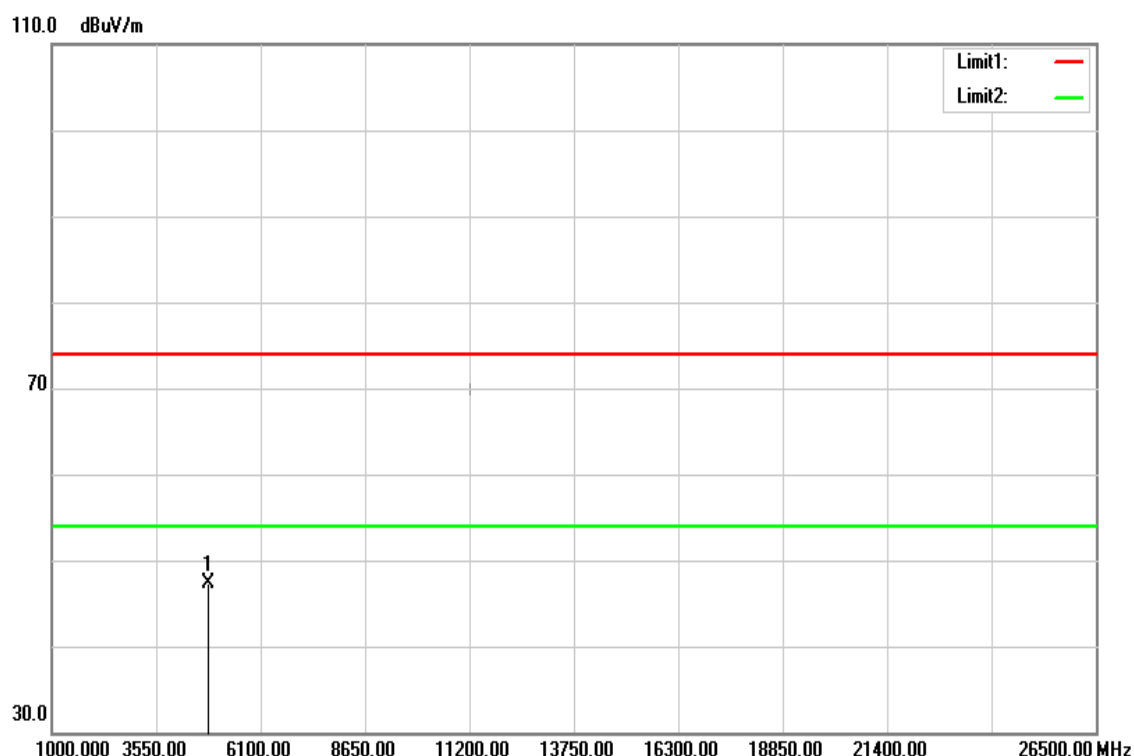


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4820.000	48.38	3.20	51.58	74.00	-22.42	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11g Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

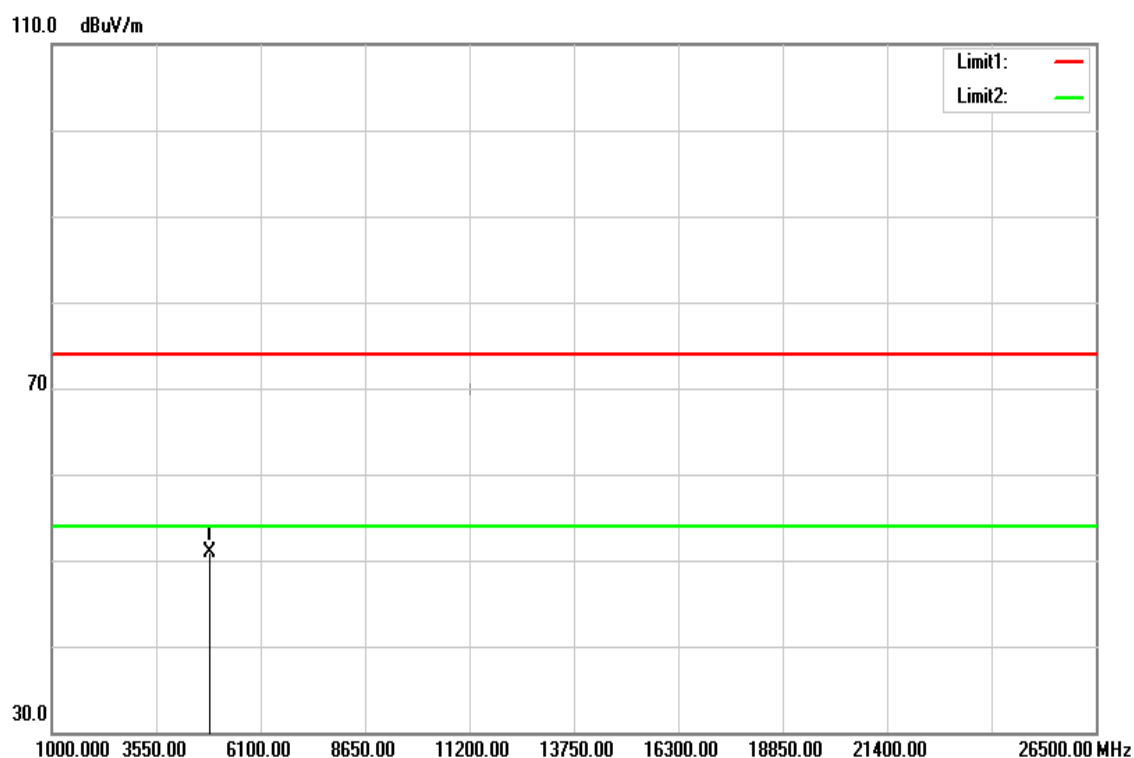


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	44.13	3.25	47.38	74.00	-26.62	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11g Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

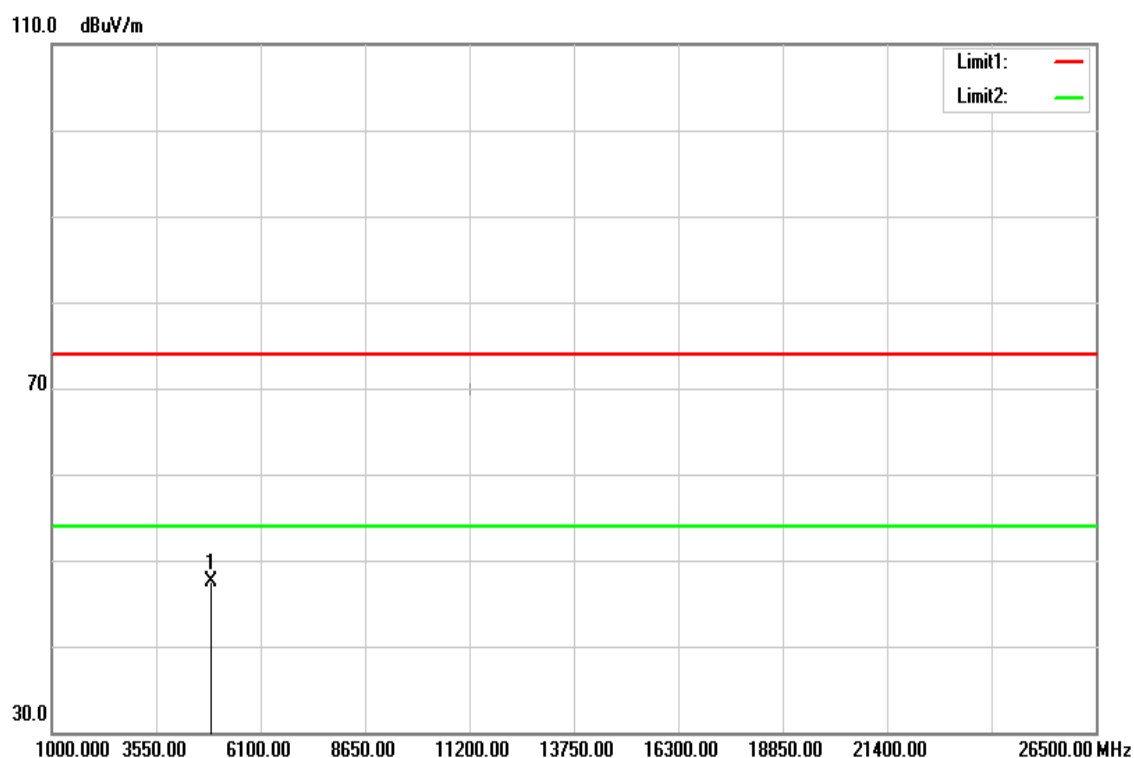


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4862.000	47.41	3.48	50.89	74.00	-23.11	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11g Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

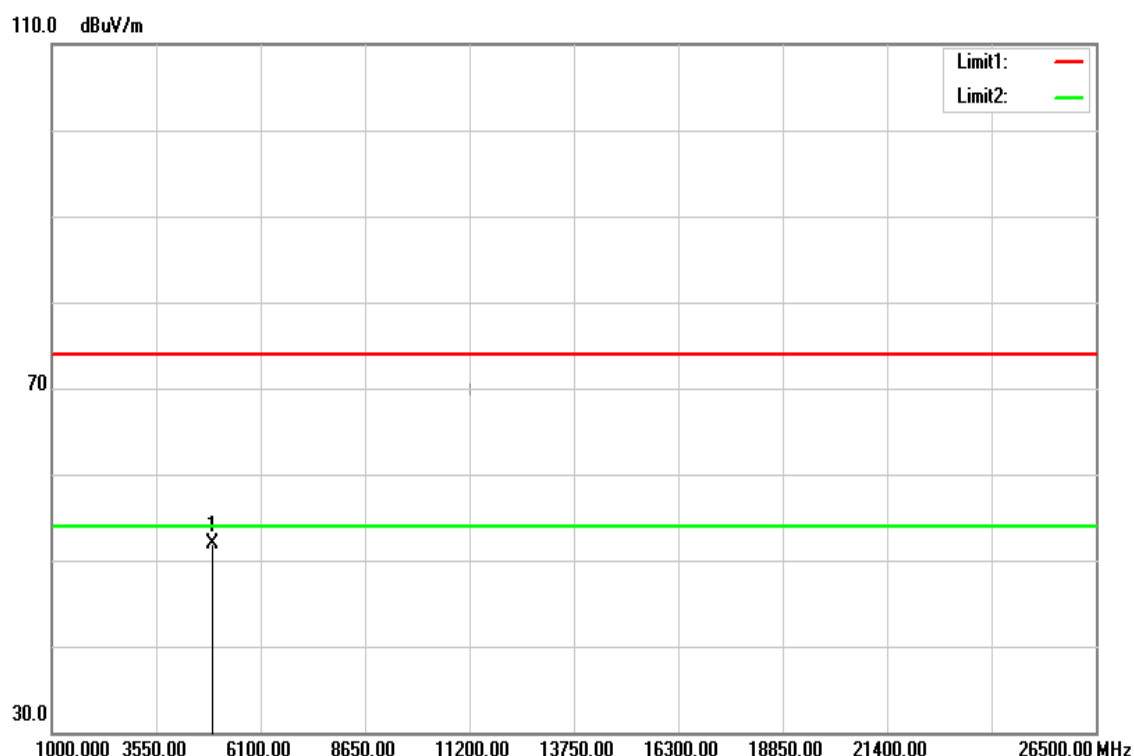


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	43.94	3.57	47.51	74.00	-26.49	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11g High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

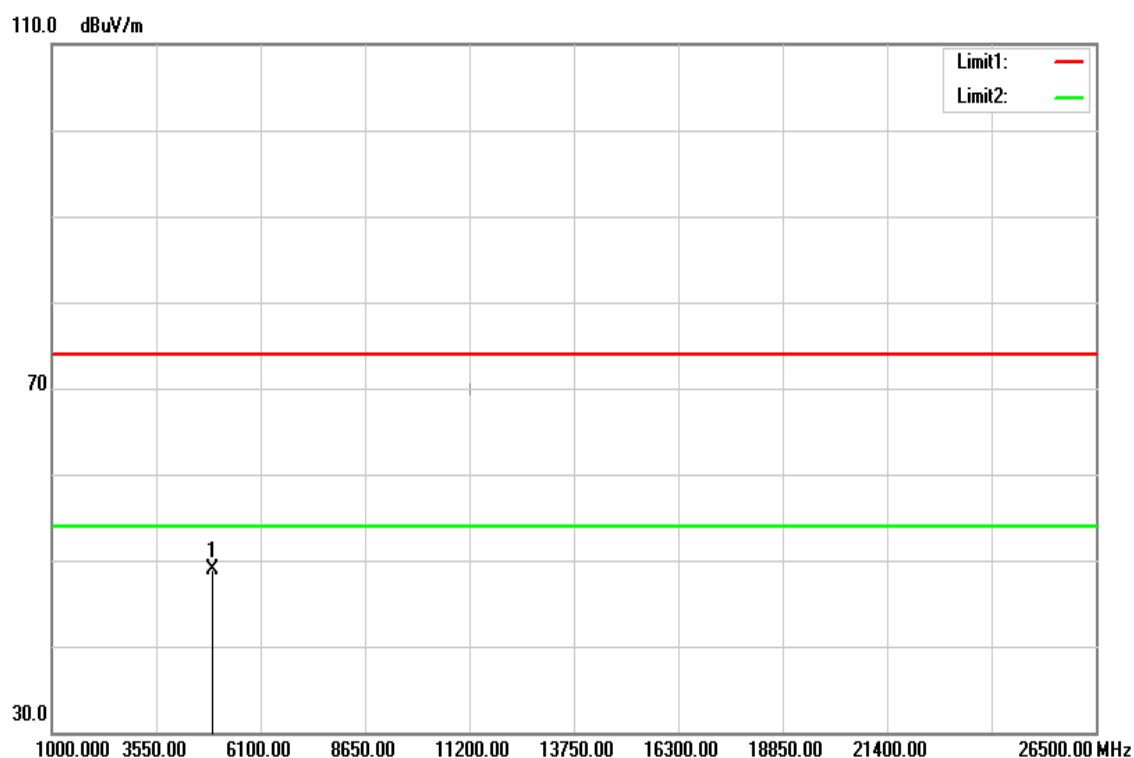


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4932.000	47.99	3.95	51.94	74.00	-22.06	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11g High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

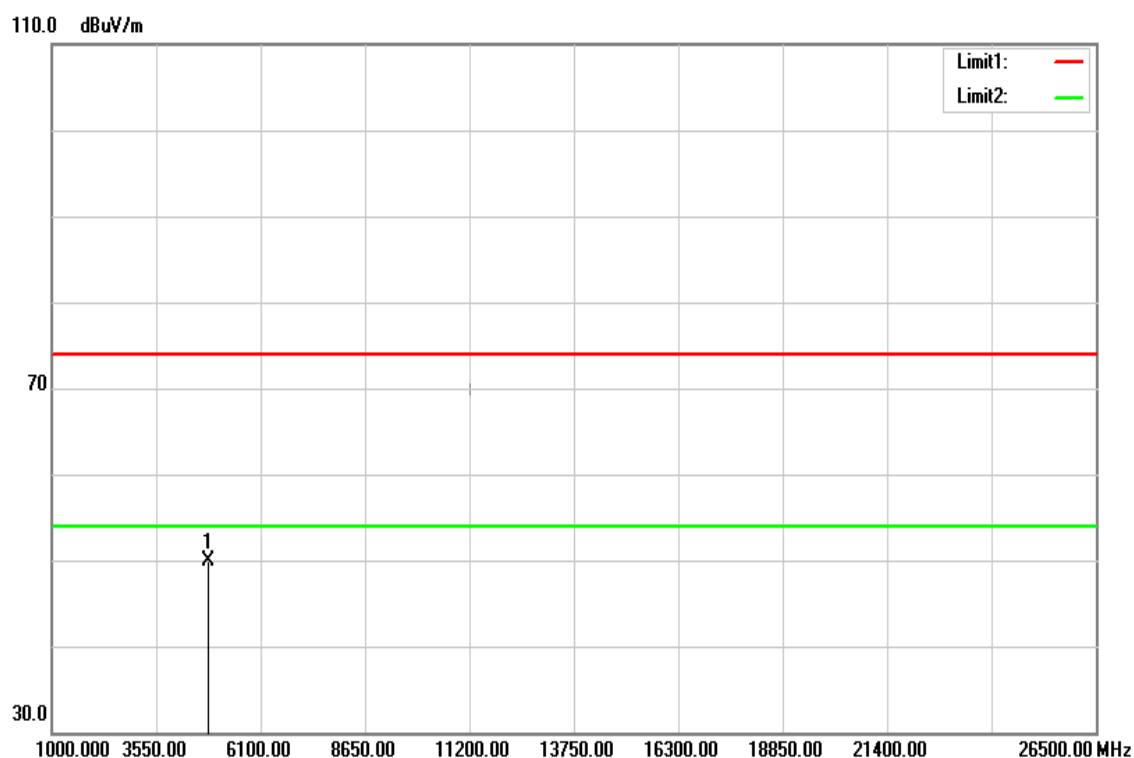


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	44.91	3.90	48.81	74.00	-25.19	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

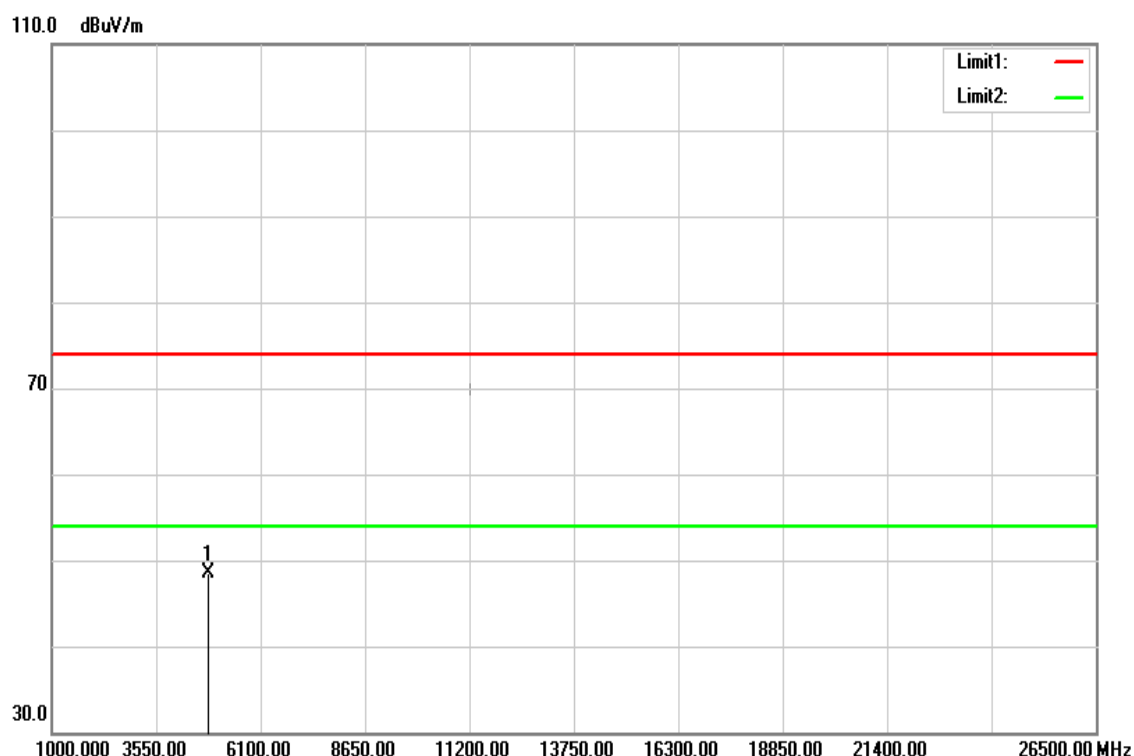


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4820.000	46.75	3.20	49.95	74.00	-24.05	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

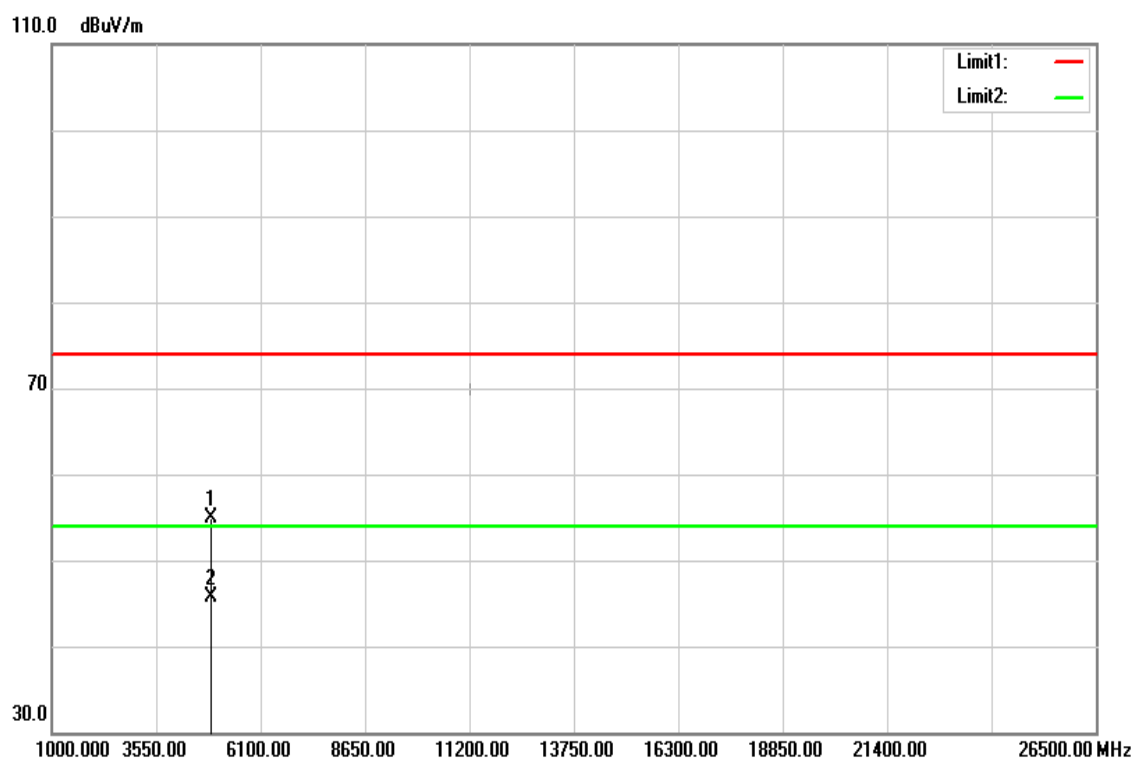


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	45.24	3.25	48.49	74.00	-25.51	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT20 Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak and Average		

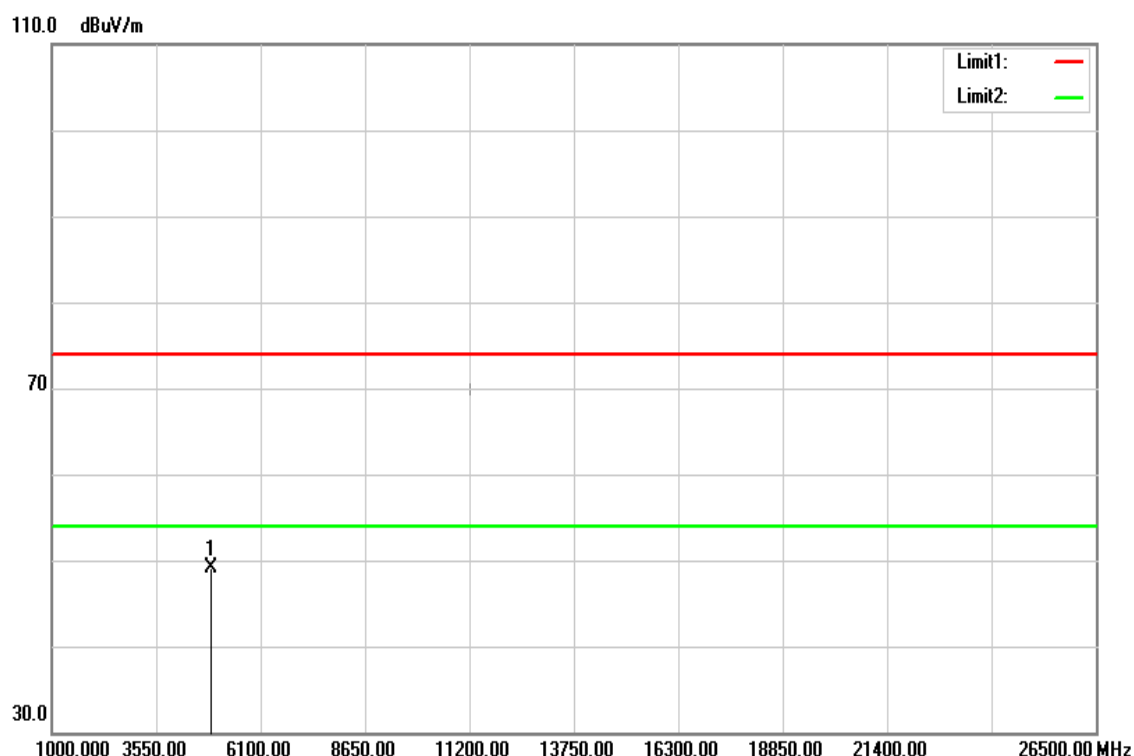


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	51.34	3.57	54.91	74.00	-19.09	peak
4876.000	42.11	3.57	45.68	54.00	-8.32	AVG
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode	IEEE 802.11n HT20 Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

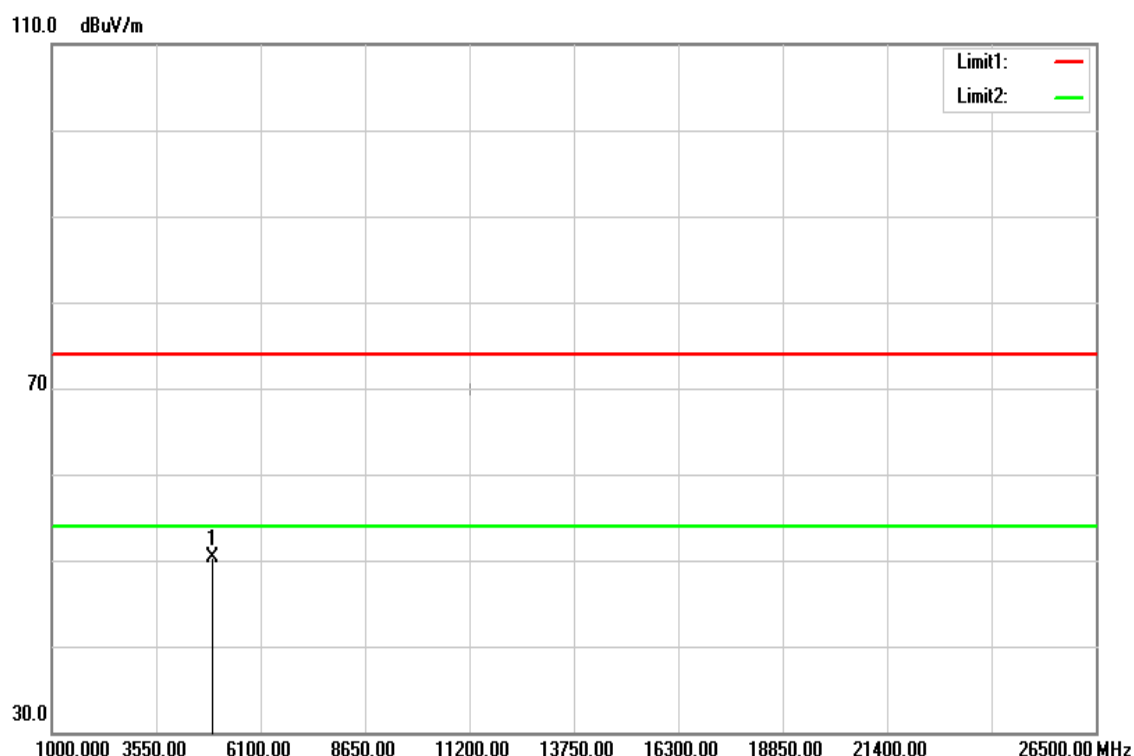


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	45.48	3.57	49.05	74.00	-24.95	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

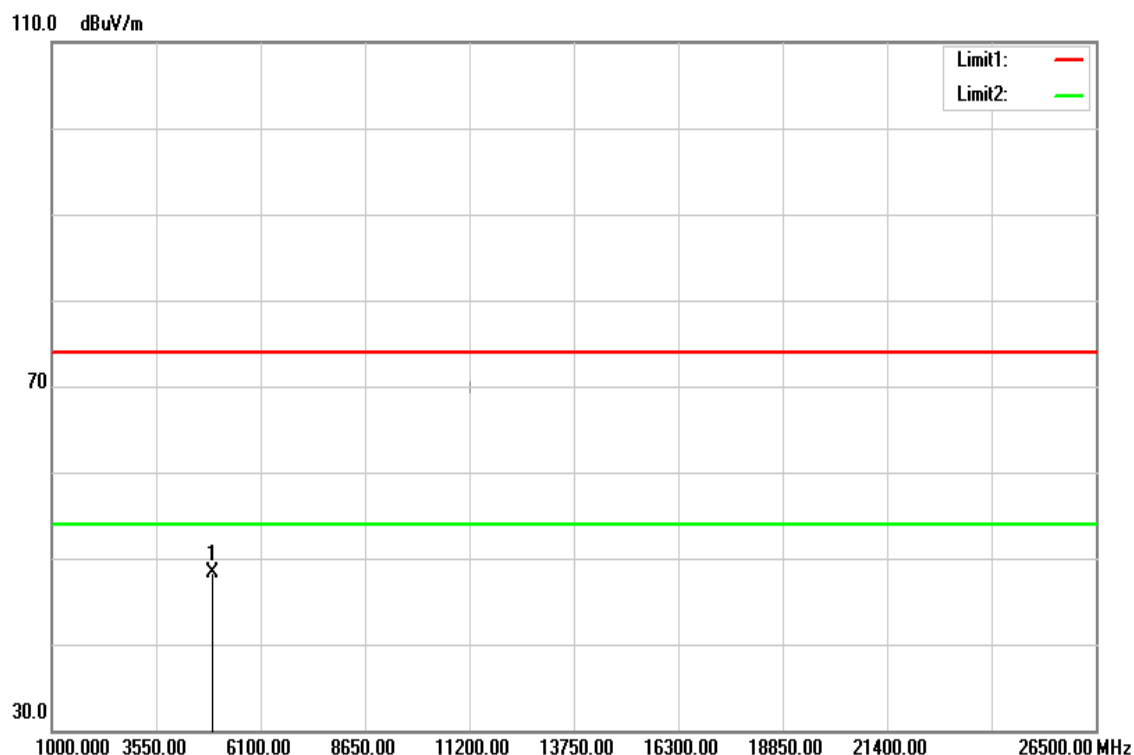


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	46.50	3.90	50.40	74.00	-23.60	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

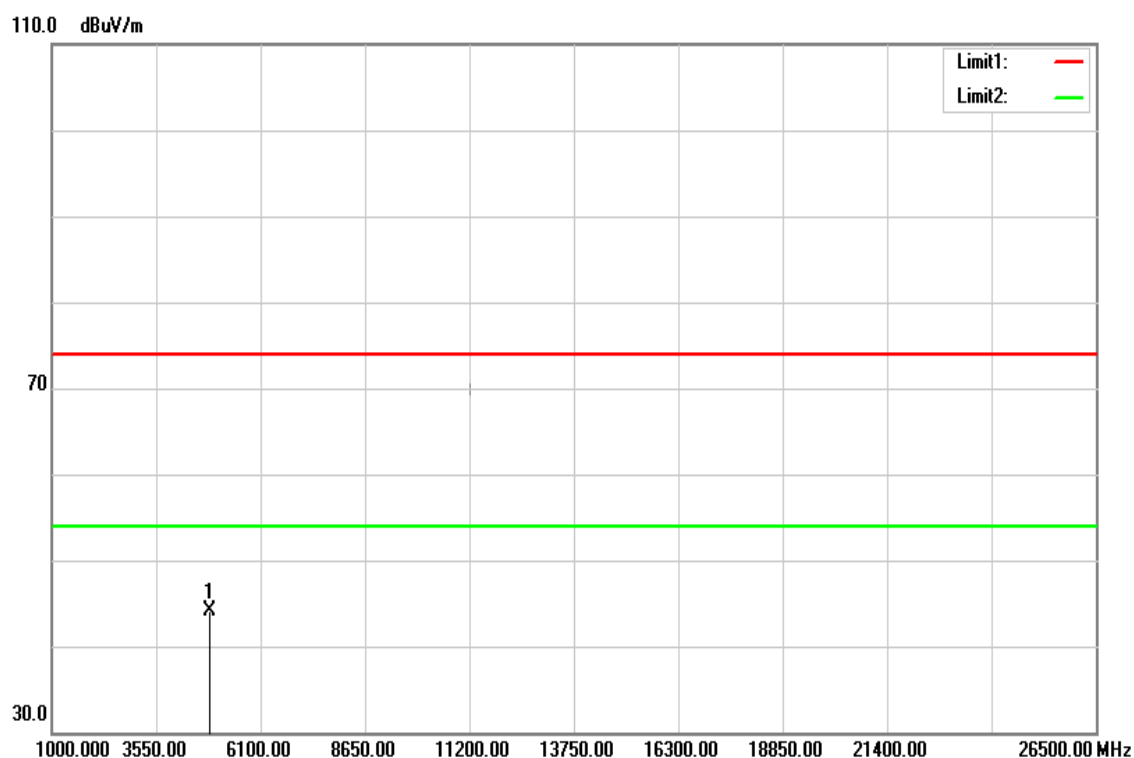


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4925.000	44.36	3.90	48.26	74.00	-25.74	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

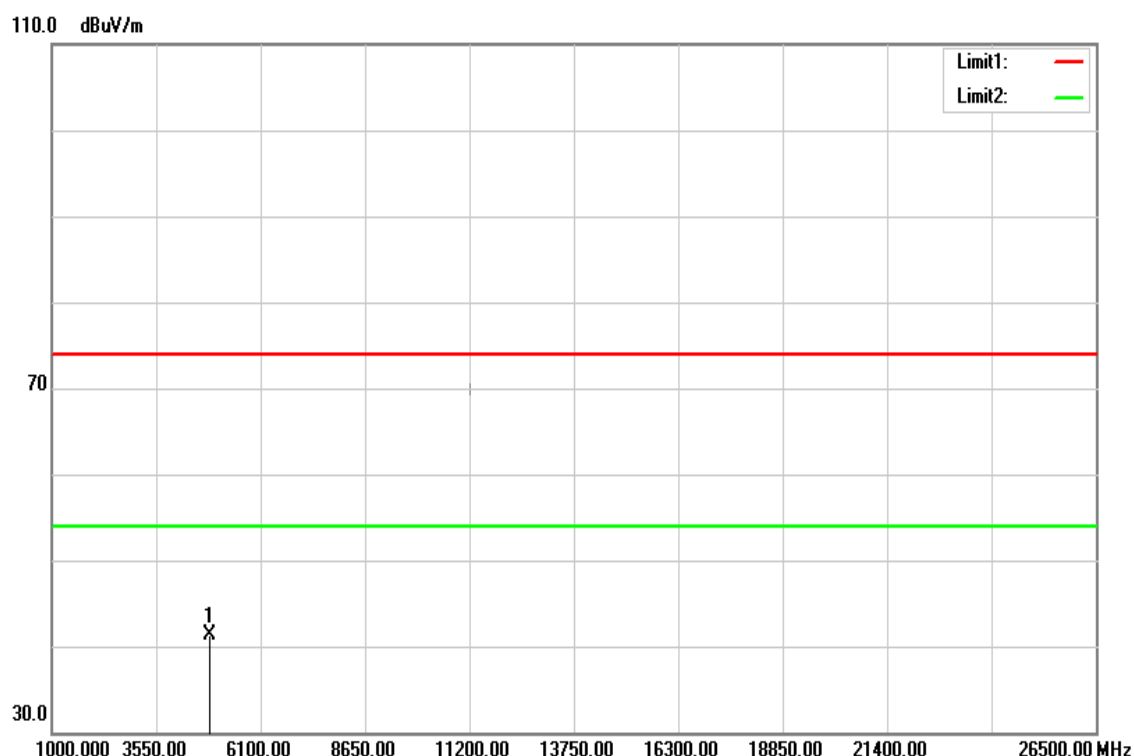


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4848.000	40.75	3.39	44.14	74.00	-29.86	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

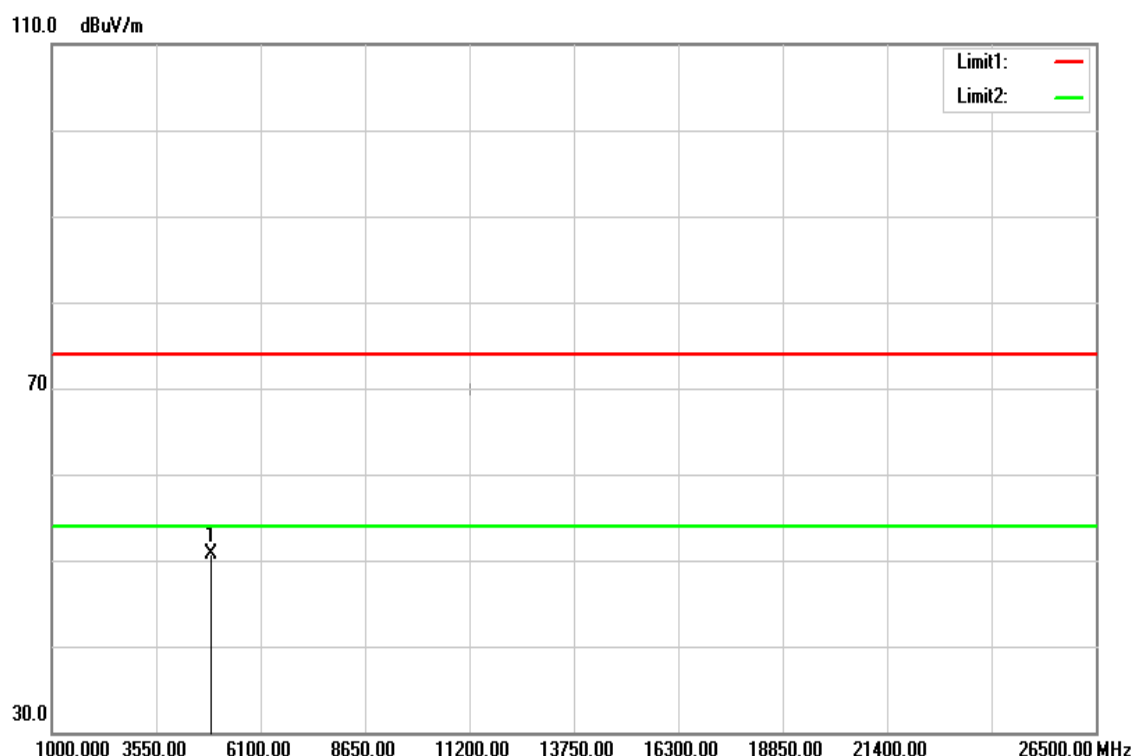


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4844.000	37.88	3.36	41.24	74.00	-32.76	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT40 Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

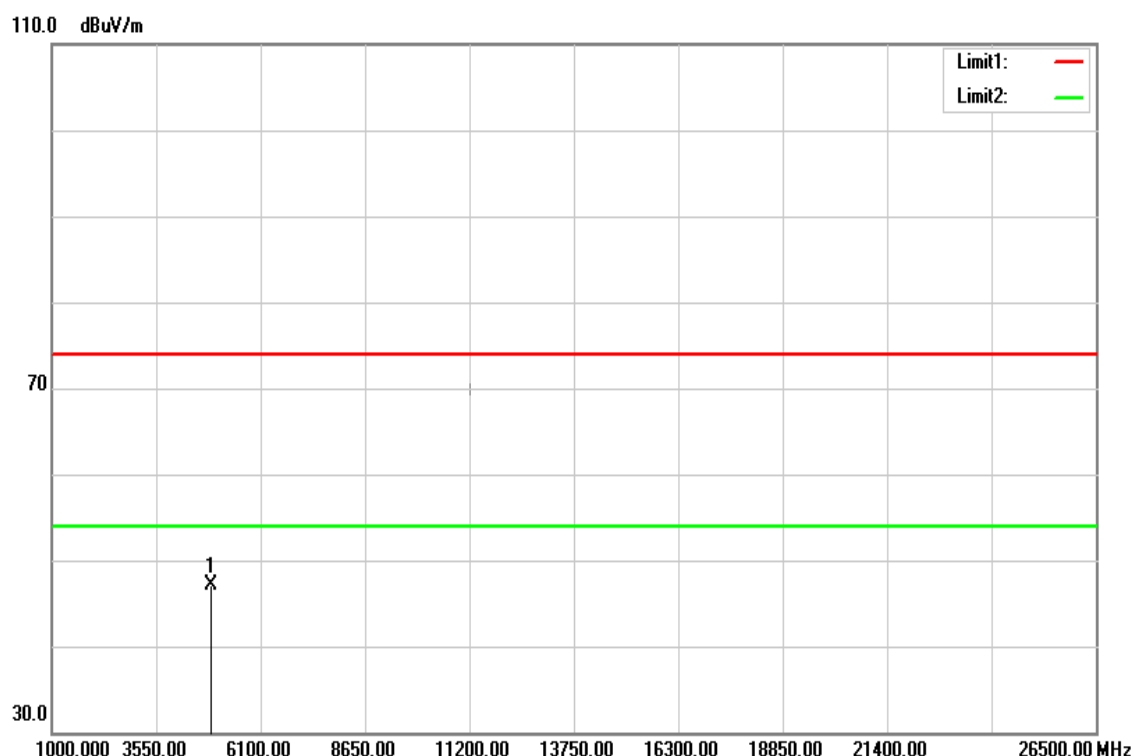


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4883.000	47.13	3.62	50.75	74.00	-23.25	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT40 Mid CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		

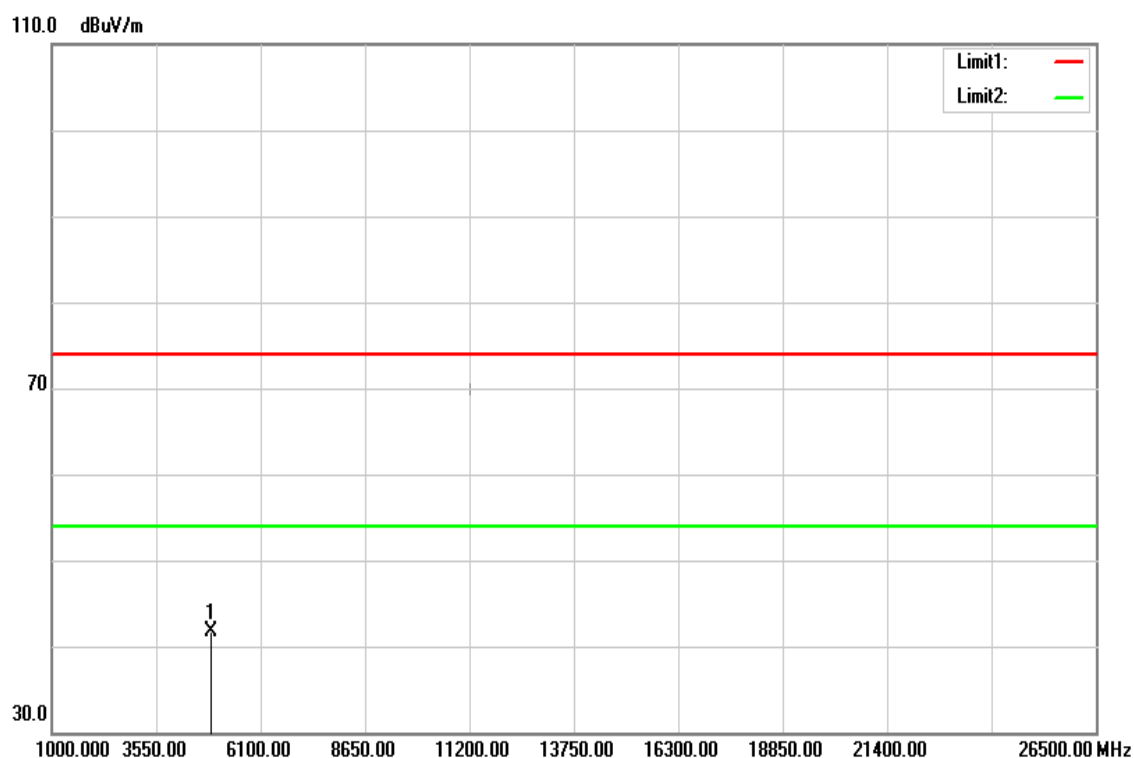


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4876.000	43.54	3.57	47.11	74.00	-26.89	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Vertical	Test Engineer	Jerry Chuang
Detector	Peak		

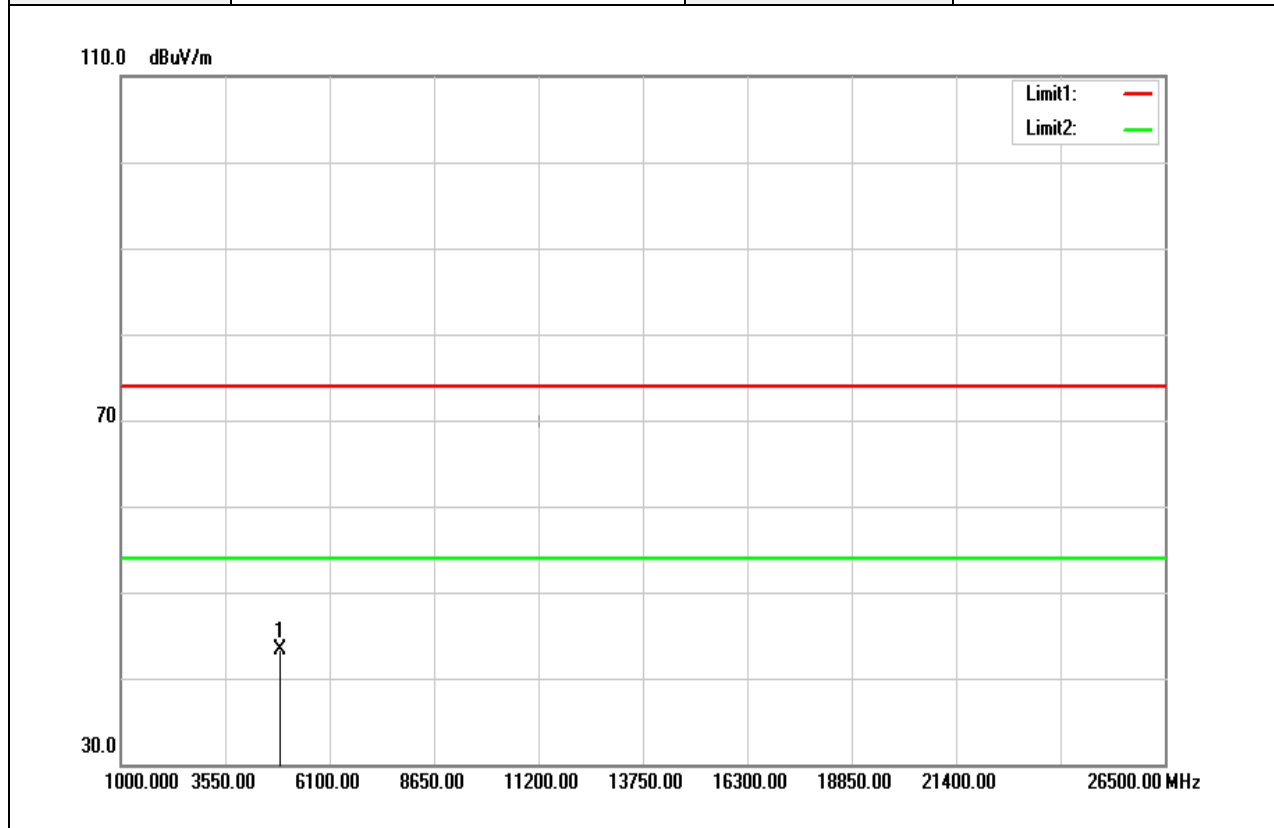


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4904.000	37.89	3.75	41.64	74.00	-32.36	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11n HT40 High CH	Temp/Hum	22.1(°C)/ 50%RH
Test Item	Harmonic	Test Date	December 20, 2018
Polarize	Horizontal	Test Engineer	Jerry Chuang
Detector	Peak		



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4904.000	39.57	3.75	43.32	74.00	-30.68	peak
N/A						

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

--End of Report--