RADIO TEST REPORT
FCC 47 CFR PART 15 SUBPART C

Test Standard	**FCC Part 15.247**
Product name	**Wireless Full HD Network Camera**
Brand Name	**Sercomm**
Model No.	**RC8520xxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "- " , for marketing purpose)**
Test Result	**Pass**
Statements of Conformity	**Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.**

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:

Kevin Tsai
Deputy Manager

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 28, 2021	Initial Issue	ALL	May Lin
01	August 24, 2021	See the following Note Rev. (01)	P.4-5, P.18	May Lin

Rev (01):
1. Revised the section 1.1、1.3、4.2.4.

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan
Manufacturer	Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan
Equipment	Wireless Full HD Network Camera
Model Name	RC8520xxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or “- “ , for marketing purpose)
Model Discrepancy	All the above models are identical except for the designation of model numbers. T the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or “-“ , for marketing purpose.
Trade Name	Sercomm
Received Date	May 10, 2021
Date of Test	June 09 ~ 11, 2021
Power Supply	VDC from Power Adapter 1. I.T.E POWER SUPPLY / MU05C2050100-A1 I/P: 100-240V~, 50-60Hz, 0.15A O/P: 5V, 1A 2. LUCENT TRANS / ONC16WI005 I/P: 100-240V~, 50-60Hz, 0.2A O/P: 5V, 1A

Remark:

1. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
2. Disclaimer: Variant information between/among model numbers / trademarks is provided by the applicant, test results of this report are applicable to the sample EUT received of main test model name.

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: CCK 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n HT 20 MHz mode : OFDM 4. IEEE 802.11n HT 40 MHz mode : OFDM
Number of channel	1. IEEE 802.11b mode: 11 Channels 2. IEEE 802.11g mode: 11 Channels 3. IEEE 802.11n HT 20 MHz mode : 11 Channels 4. IEEE 802.11n HT 40 MHz 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 Specification	☐ PIFA ☒ PCB ☐ Dipole ☐ Coils
Antenna Gain	Chain 0: 3.9 dBi Chain 1: 3.5 dBi Power Directional Gain: 6.71 dBi
Antenna connector	N/A

Notes:
1. Power Directional Gain = 10*log { [10^(Ant1/20) + 10^(Ant2/20) + … + 10^(Ant N /20)]^2 / N ANT} dBi
2. Two pcb detachable Antennas used which uses a unique coupling to the EUT meeting rule 15.203.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

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, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Jack Chen	-
Radiation	Ray Li	-
RF Conducted	Jack Chen	-

Remark: The lab has been recognized as the FCC accredited lad under the KDB 974614 D01 and is listed in the FCC pubic Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EXA Signal Analyzer	KEYSIGHT	N9010B	MY55460167	05/25/2021	05/24/2022
Coaxial Cable	Woken	WC12	CC003	06/29/2020	06/28/2021
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
Power Meter	Anritsu	ML2495A	1149001	05/24/2021	05/23/2022
Power Seneor	Anritsu	MA2491A	030982	05/24/2021	05/23/2022
Software	Radio Test Software.				

Remark:
1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

3M 966 Chamber Test Site					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal Date**	**Cal Due**
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/08/2021	02/07/2022
Bilog Antenna	Sunol Sciences	JB3	A030105	07/24/2020	07/23/2021
Horn Antenna	ETS LINDGREN	3116	00026370	12/11/2020	12/10/2021
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/24/2021	02/23/2022
Coaxial Cable	EMCI	EMC105	190914+327109/4	09/19/2020	09/18/2021
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/09/2020	12/08/2021
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	12/09/2020	12/08/2021
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/06/2021	01/05/2022
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/30/2020	09/29/2021
Loop Ant	COM-POWER	AL-130	121051	04/07/2021	04/06/2022
Pre-Amplifier	EMEC	EM330	060609	02/24/2021	02/23/2022
Pre-Amplifier	HP	8449B	3008A00965	12/25/2020	12/24/2021
Pre-Amplifier	MITEQ	AMF-6F-18004000-37-8P	985646	09/02/2020	09/01/2021
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	07/24/2020	07/23/2021
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
Software	e3 6.11-20180419c				

AC Power Line Conducted Emission Test Room					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
CABLE	EMCI	CFD300-NL	CERF	06/29/2020	06/28/2021
EMI Test Receiver	R&S	ESCI	100064	07/17/2020	07/16/2021
LISN	SCHAFFNER	NNB 41	03/10013	02/02/2021	02/01/2022
Software	EZ-EMC(CCS-3A1-CE)				

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

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

Support Equipment					
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**
	N/A				

Support Equipment					
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H

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 662911 D01.

2. TEST SUMMARY

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 :MCS0 IEEE 802.11n HT40 mode :MCS0
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 : 1T1R IEEE 802.11g mode : 1T1R 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.
2. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the power and PSD across all date rates, bandwidths, and modulations. The device supports SISO and MIMO at 802.11b/g/n20/n40 mode, per pre-test, MIMO 2TX mode was the worst and reported.

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 (Lucent)** **Mode 2: EUT power by Adapter (Leader)**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**

Radiated Emission Measurement Above 1G	
Test Condition	**Radiated Emission Above 1G**
Power supply Mode	**Mode 1: EUT power by Adapter (Lucent)** **Mode 2: EUT power by Adapter (Leader)**
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)**

Radiated Emission Measurement Below 1G	
Test Condition	**Radiated Emission Below 1G**
Power supply Mode	**Mode 1: EUT power by Adapter (Lucent)** **Mode 2: EUT power by Adapter (Leader)**
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 axis X and two polarity, for radiated measurement. The worst case (X-Plane) 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.

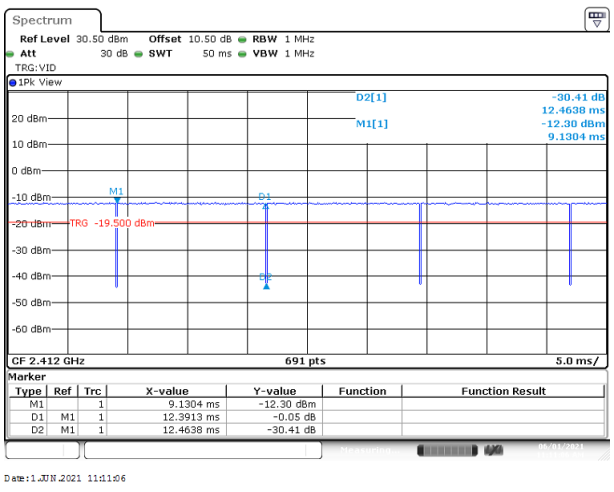
3.3 EUT DUTY CYCLE

Temperature: 25.1℃ **Test date:** June 01, 2021

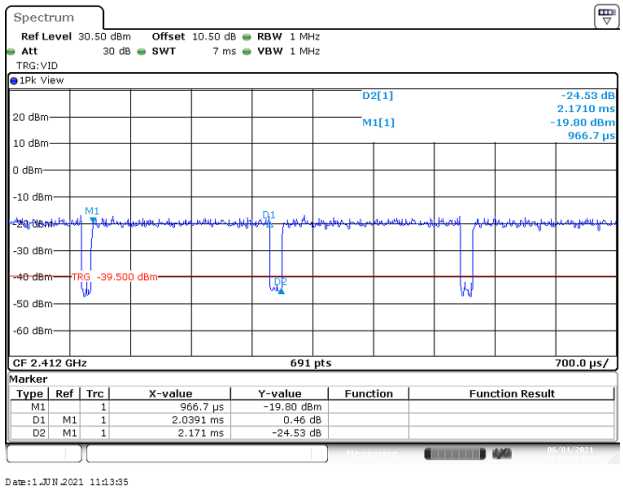
Humidity: 59% RH **Tested by:** Jack Chen

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	99.42	0.03	0.08	0.01
802.11g	93.92	0.27	0.49	1.00
802.11n HT20	97.92	0.09	0.52	1.00
802.11n HT40	85.05	0.70	1.10	2.00

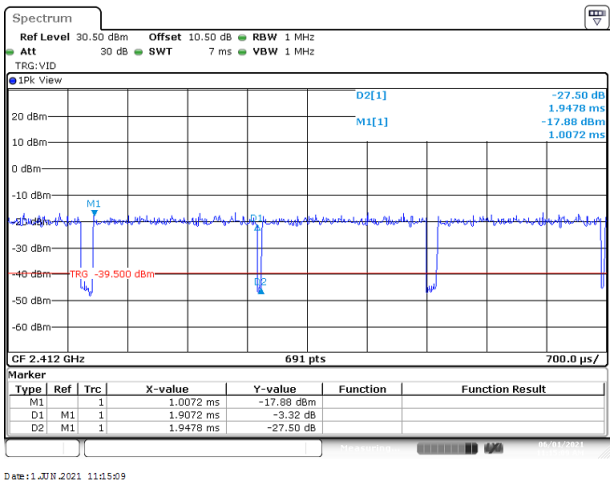
802.11b



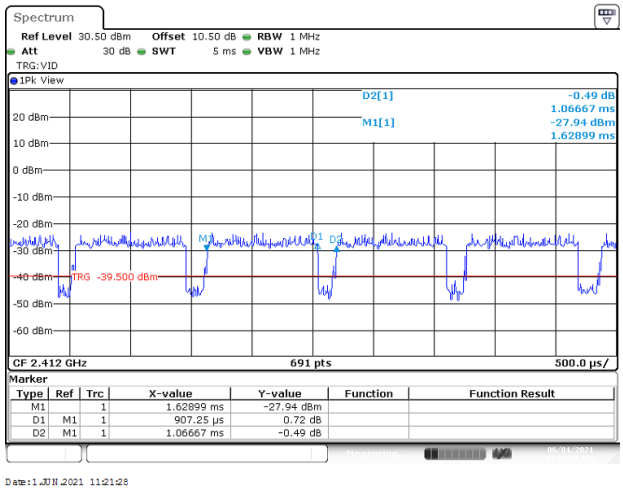
802.11g



802.11n HT20



802.11n HT40



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(dBμV)	
	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

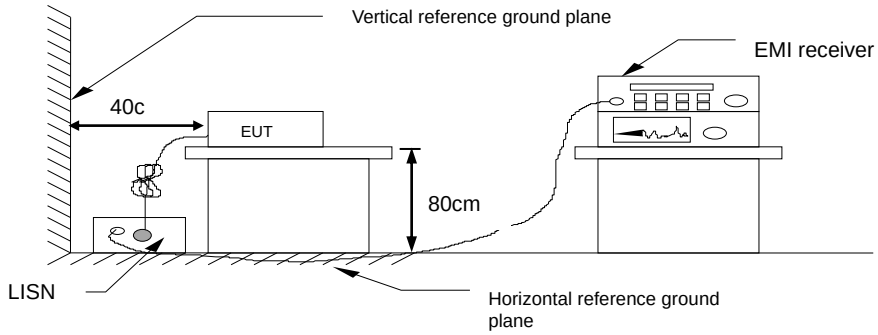
* Decreases with the logarithm of the frequency.

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

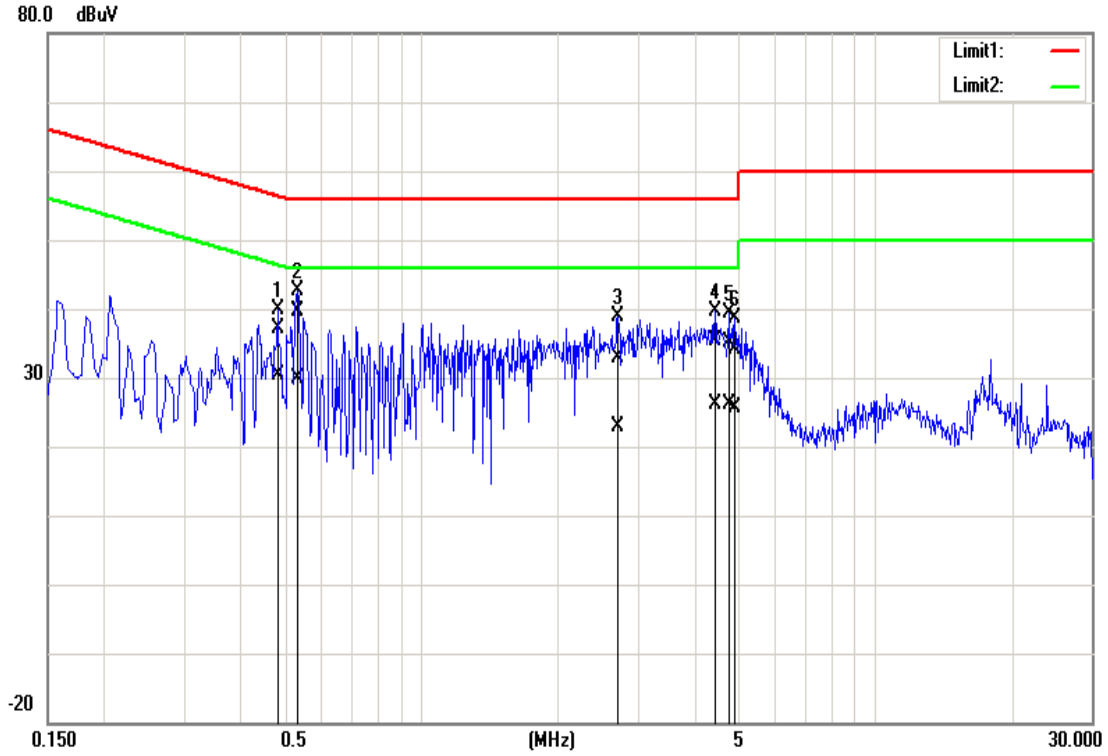


4.1.4 Test Result

Pass.

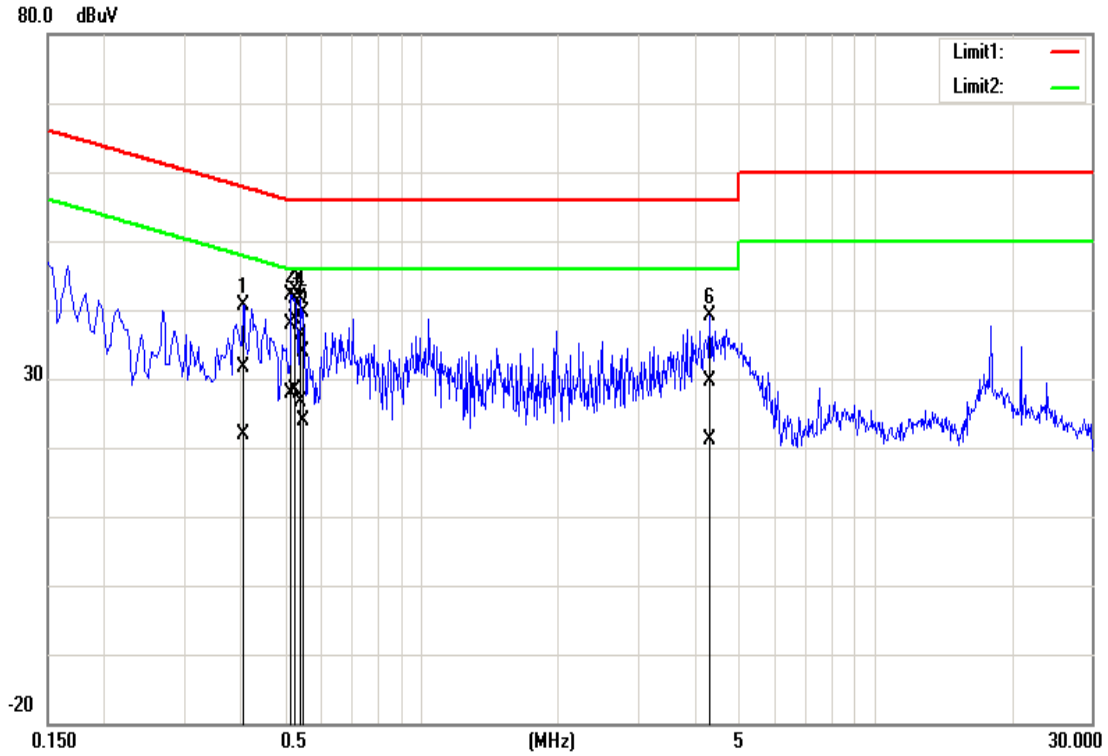
Test Data

Test Mode:	Mode 1	Temp/Hum	24.1(℃)/ 48.6%RH
Phase:	Line	Test Date	June 11, 2021
Test Voltage:	120Vac, 60Hz	Test Engineer	Jack Chen



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (d uV)	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
0.4820	26.74	20.14	10.29	37.03	30.43	56.30	46.30	-19.27	-15.87	Pass
0.5340	29.27	19.53	10.29	39.56	29.82	56.00	46.00	-16.44	-16.18	Pass
2.7100	22.49	12.67	10.33	32.82	23.00	56.00	46.00	-23.18	-23.00	Pass
4.4540	24.93	15.66	10.37	35.30	26.03	56.00	46.00	-20.70	-19.97	Pass
4.7580	24.72	15.71	10.38	35.10	26.09	56.00	46.00	-20.90	-19.91	Pass
4.9140	23.84	15.15	10.38	34.22	25.53	56.00	46.00	-21.78	-20.47	Pass

Test Mode:	Mode 1	Temp/Hum	24.1(℃)/ 48.6%RH
Phase:	Neutral	Test Date	June 11, 2021
Test Voltage:	120Vac, 60Hz	Test Engineer	Jack Chen



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
0.4060	21.33	11.60	10.29	31.62	21.89	57.73	47.73	-26.11	-25.84	Pass
0.5180	27.63	17.60	10.29	37.92	27.89	56.00	46.00	-18.08	-18.11	Pass
0.5260	28.32	18.08	10.29	38.61	28.37	56.00	46.00	-17.39	-17.63	Pass
0.5420	26.03	16.22	10.29	36.32	26.51	56.00	46.00	-19.68	-19.49	Pass
0.5500	23.65	13.62	10.29	33.94	23.91	56.00	46.00	-22.06	-22.09	Pass
4.3340	19.37	10.87	10.37	29.74	21.24	56.00	46.00	-26.26	-24.76	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

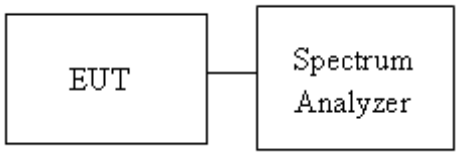
Occupied Bandwidth(99%) ： For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013,

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

Temperature:	25.1℃	**Test date:**	June 01, 2021
Humidity:	59% RH	**Tested by:**	Jack Chen

Test mode: IEEE 802.11b mode / 2412-2462 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 1 OBW (99%) (MHz)**	**Chain 0 6dB BW (MHz)**	**Chain 1 6dB BW (MHz)**	**6dB limit (kHz)**
Low	2412	14.9348	-	10.0435	-	≥500
Mid	2437	14.9782	-	10.0435	-	
High	2462	14.9348	-	10.0435	-	

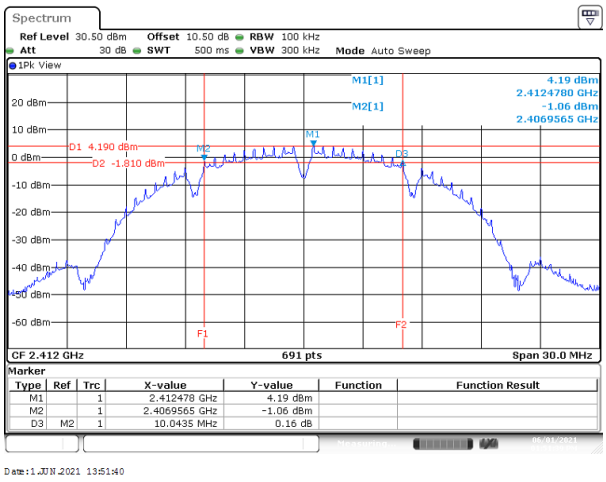
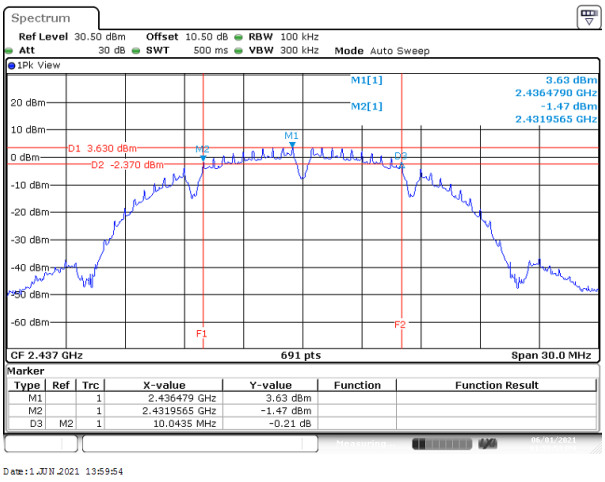
Test mode: IEEE 802.11g mode / 2412-2462 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 1 OBW (99%) (MHz)**	**Chain 0 6dB BW (MHz)**	**Chain 1 6dB BW (MHz)**	**6dB limit (kHz)**
Low	2412	16.6280	-	16.3478	-	≥500
Mid	2437	16.8885	-	16.3043	-	
High	2462	16.6714	-	16.3478	-	

Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 1 OBW (99%) (MHz)**	**Chain 0 6dB BW (MHz)**	**Chain 1 6dB BW (MHz)**	**6dB limit (kHz)**
Low	2412	17.6700	17.7134	17.5652	17.3043	≥500
Mid	2437	17.6700	17.7568	17.5652	17.5217	
High	2462	17.7134	17.7134	17.5652	15.5652	

Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 1 OBW (99%) (MHz)**	**Chain 0 6dB BW (MHz)**	**Chain 1 6dB BW (MHz)**	**6dB limit (kHz)**
Low	2422	36.1215	36.0057	35.826	35.478	≥500
Mid	2437	36.0057	36.0057	35.594	35.71	
High	2452	36.2373	36.1215	35.826	35.594	

Test Data

6dB BANDWIDTH

IEEE 802.11b mode- chain 0	
Low CH	**Mid CH**
	
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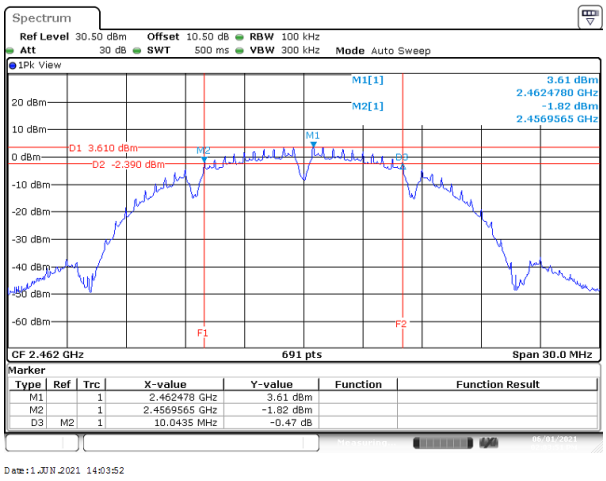
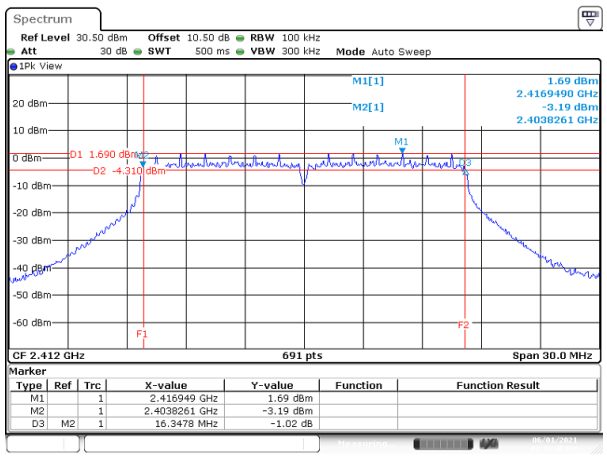
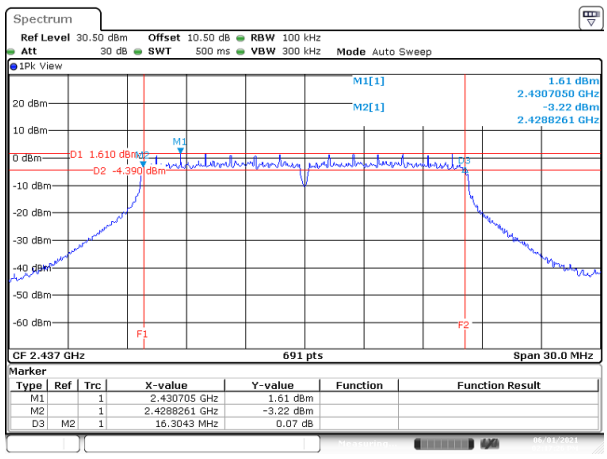
	

IEEE 802.11g mode- chain 0

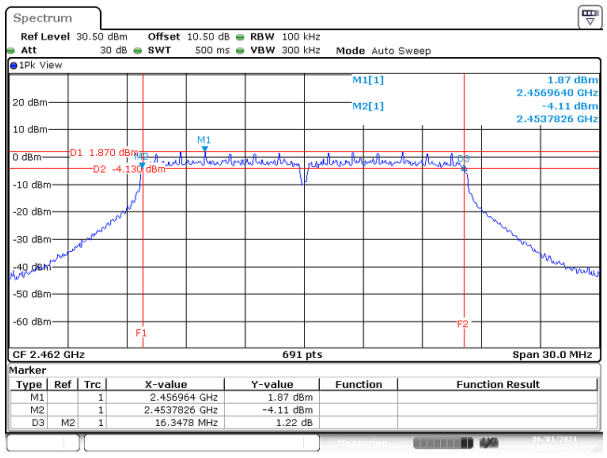
Low CH



Mid CH

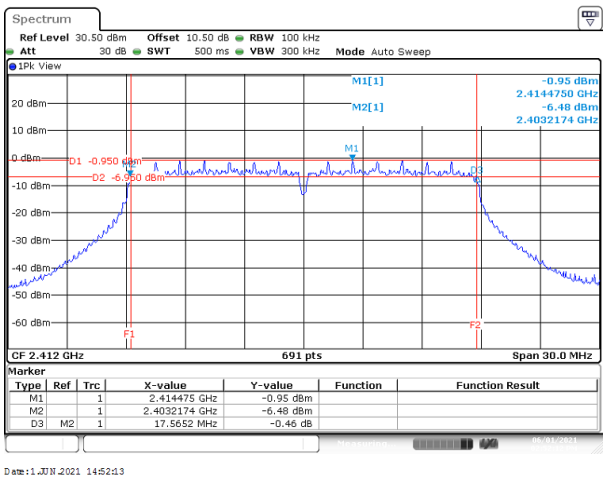


High CH

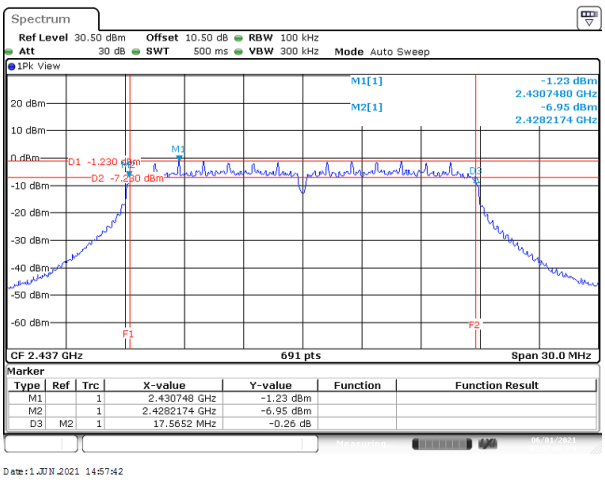


IEEE 802.11n HT20 mode- chain 0

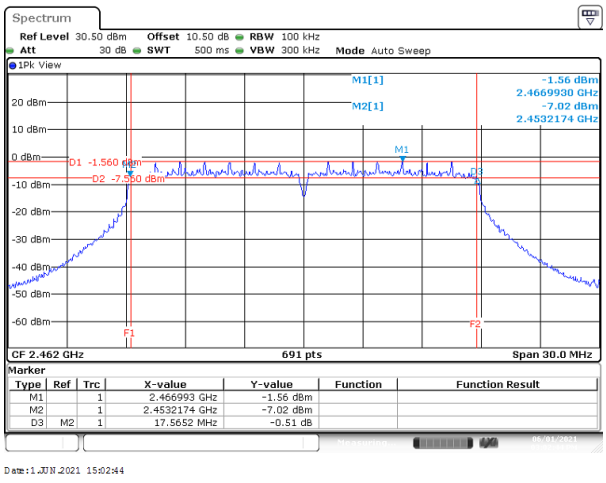
Low CH



Mid CH

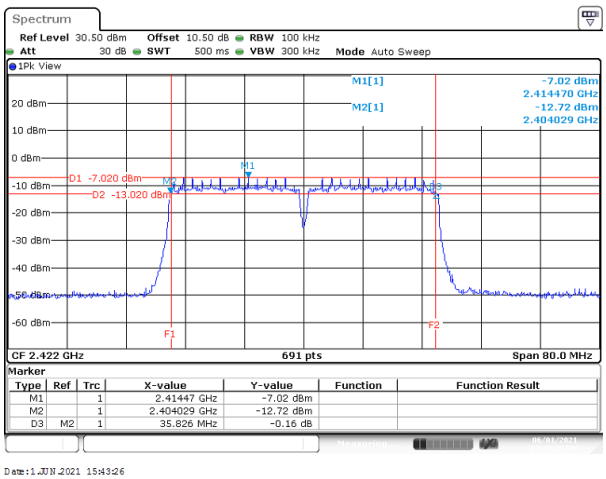


High CH

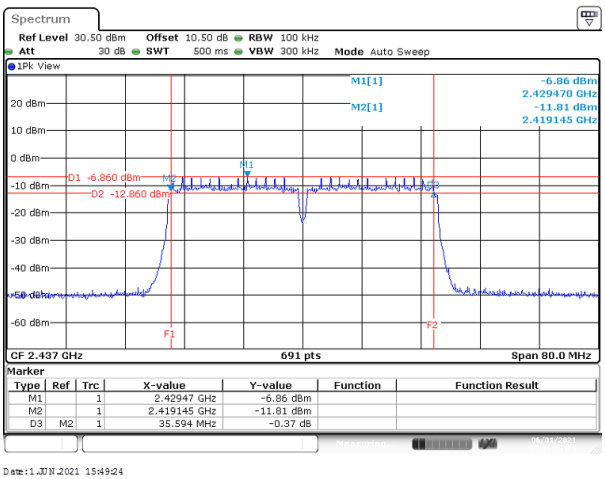


IEEE 802.11n HT40 mode- chain 0

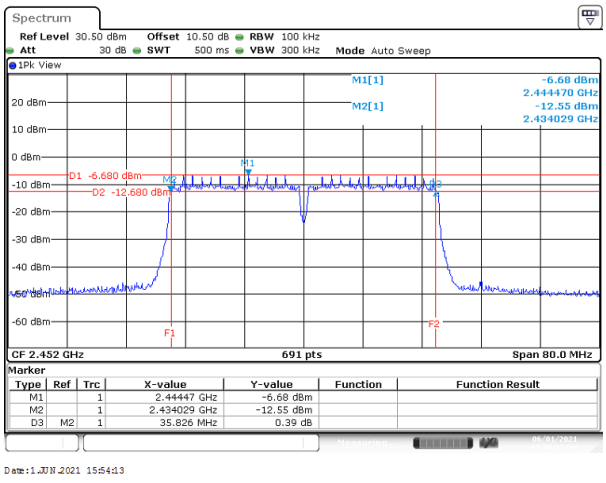
Low CH



Mid CH

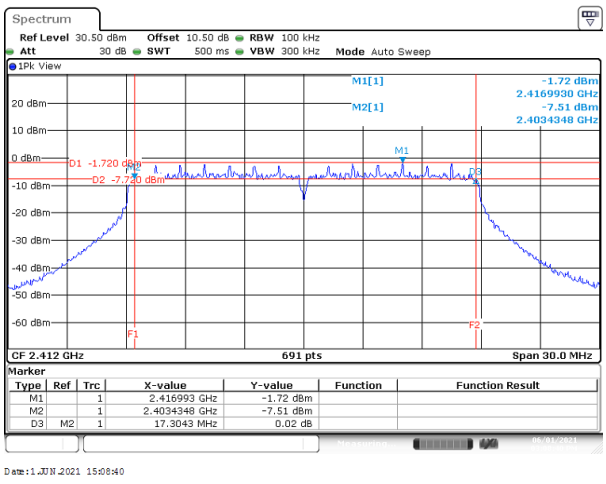


High CH

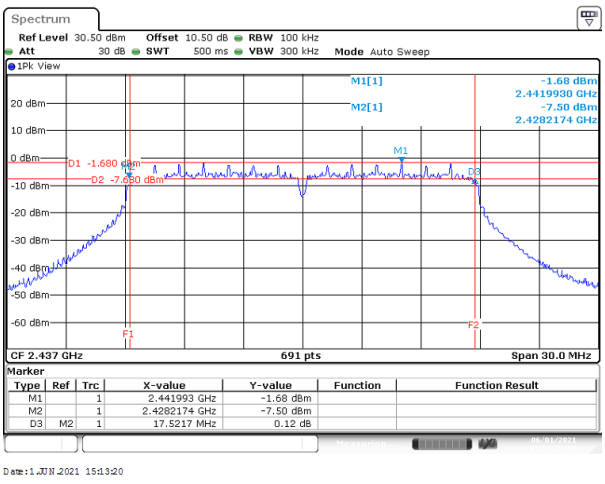


IEEE 802.11n HT20 mode- chain 1

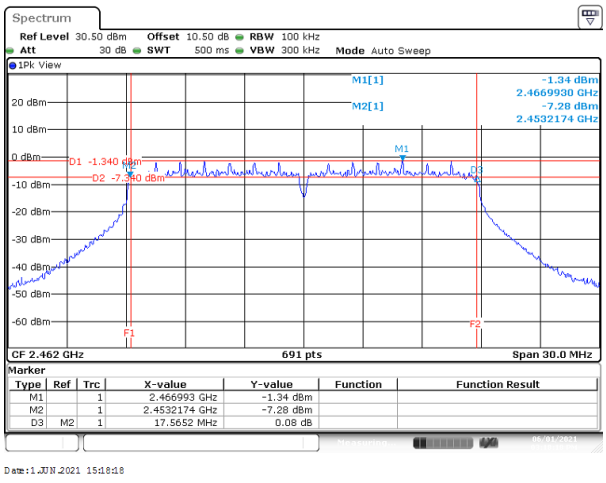
Low CH



Mid CH

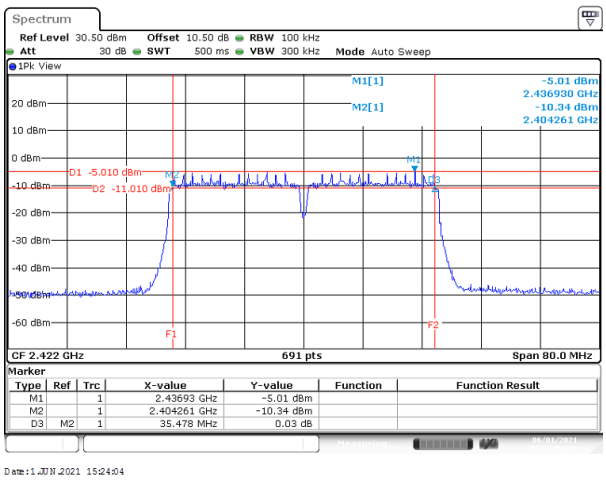


High CH

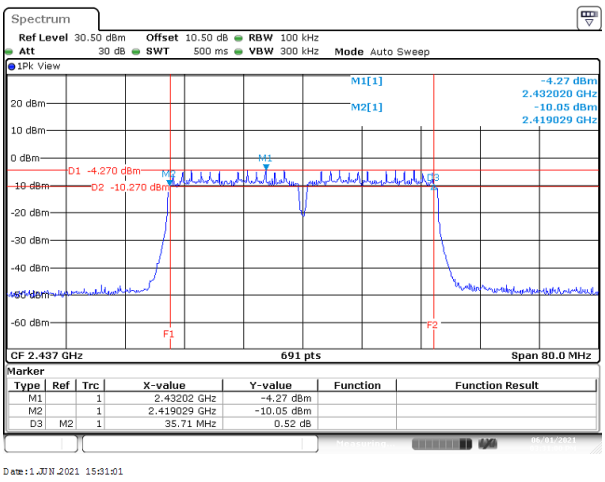


IEEE 802.11n HT40 mode- chain 1

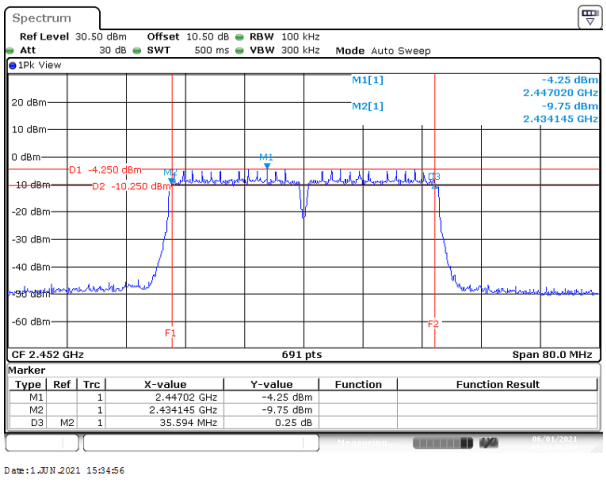
Low CH



Mid CH

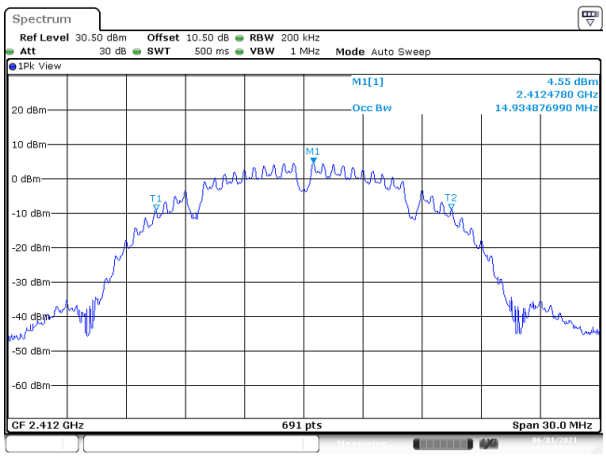
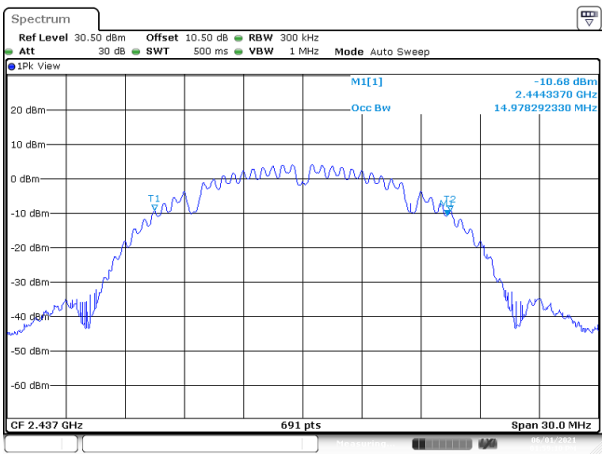
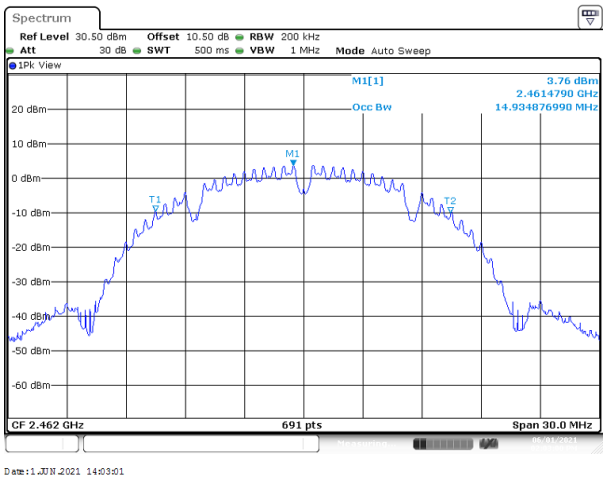


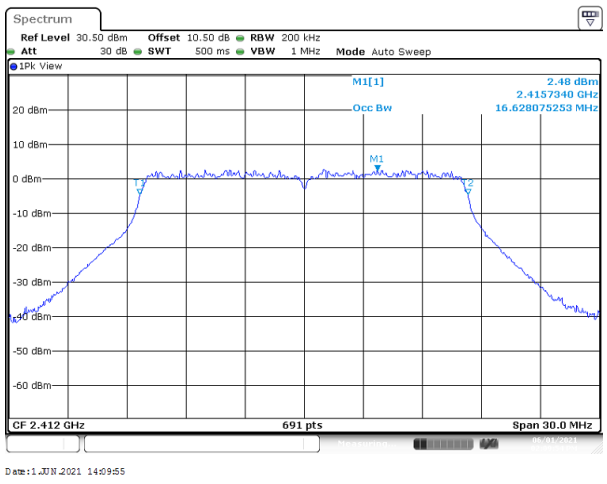
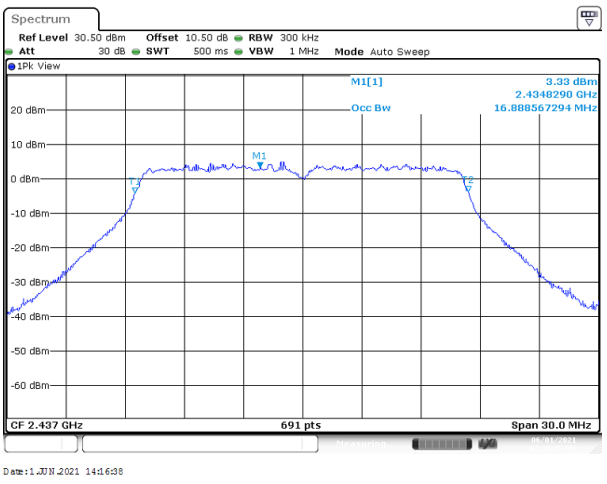
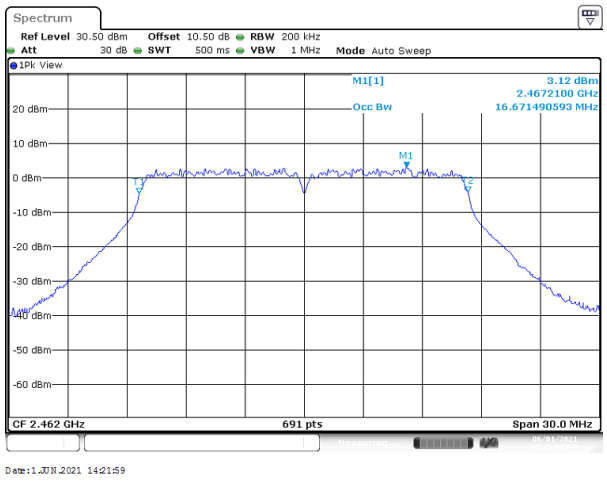
High CH

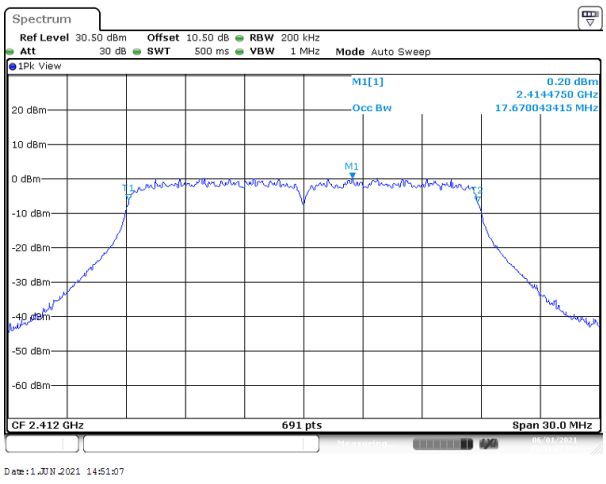
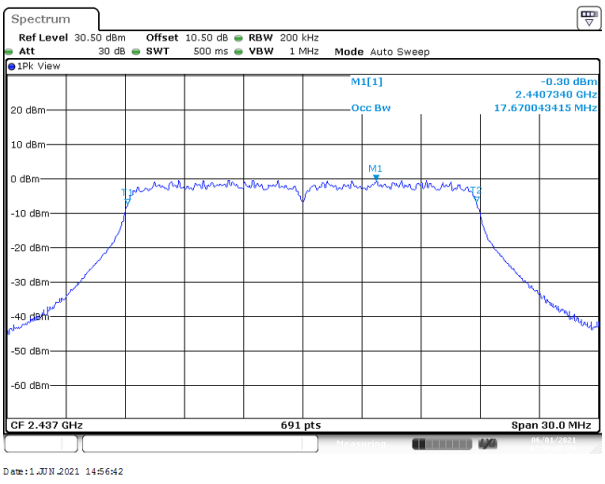
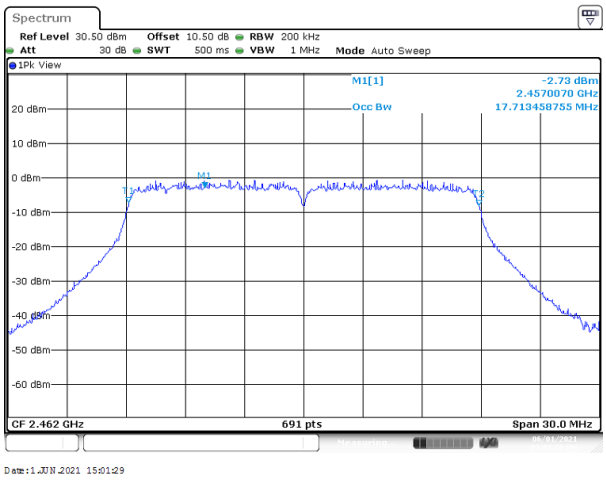


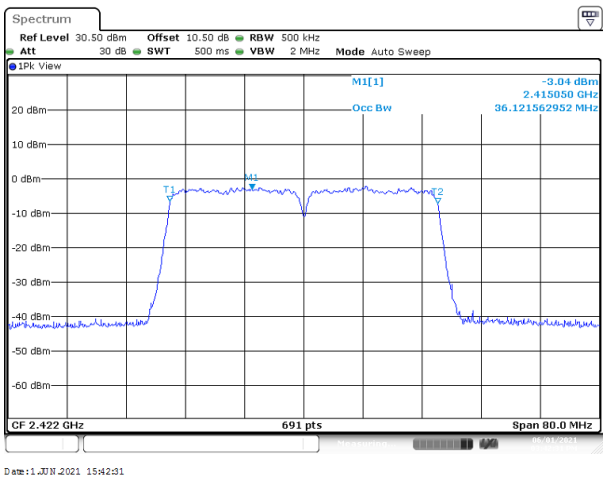
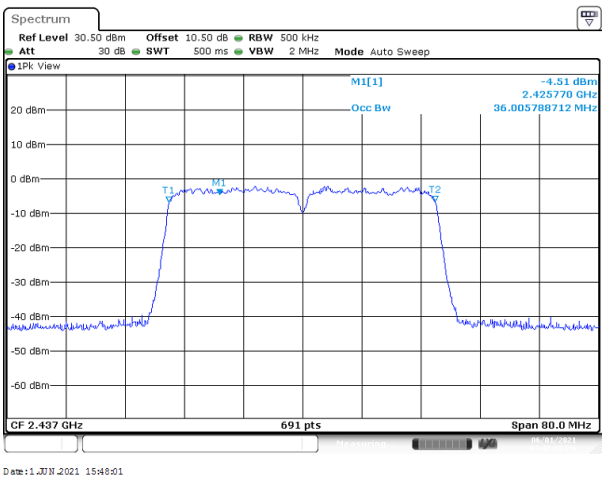
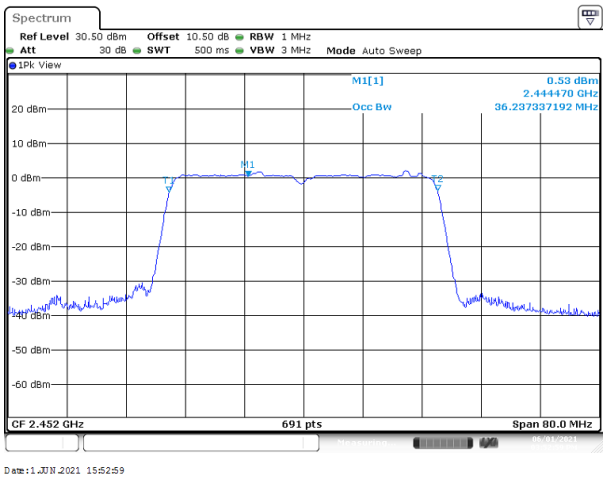
Test Data

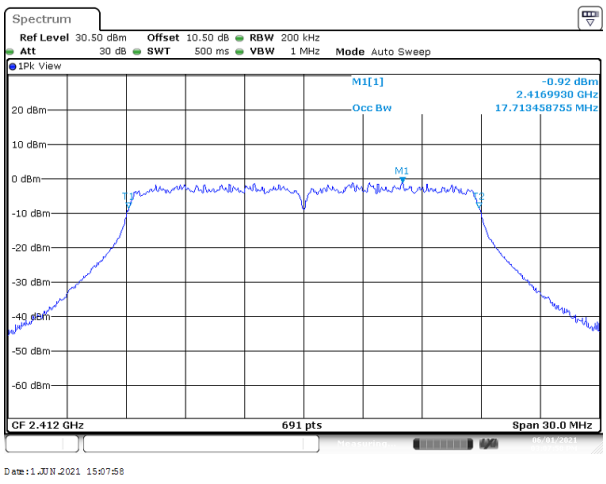
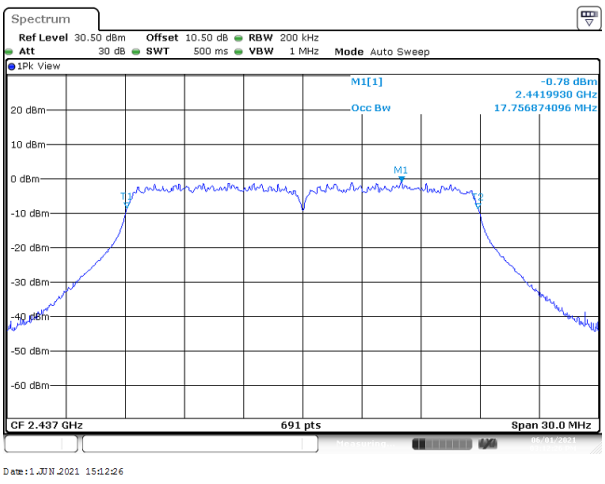
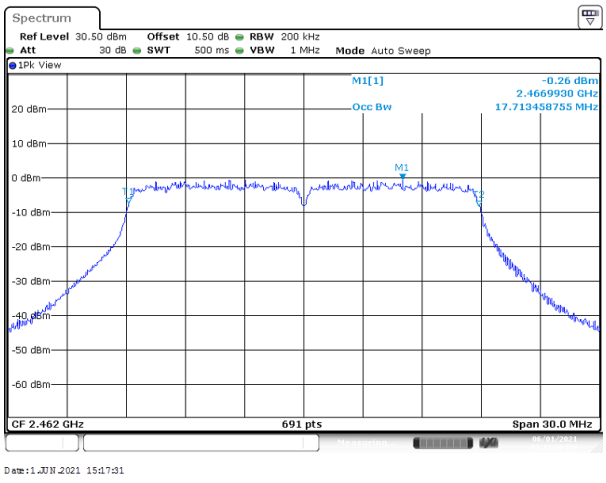
BANDWIDTH 99%

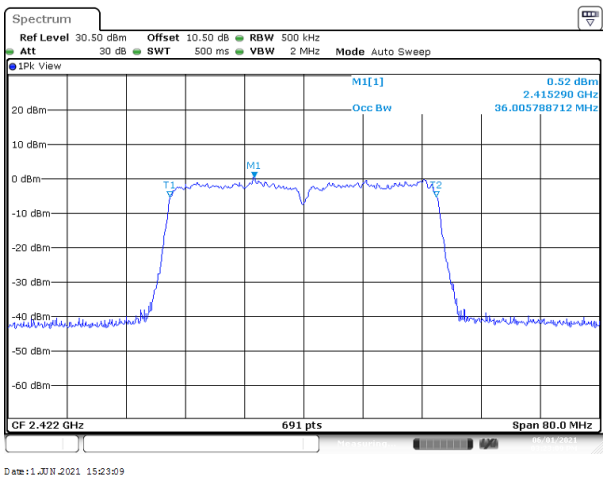
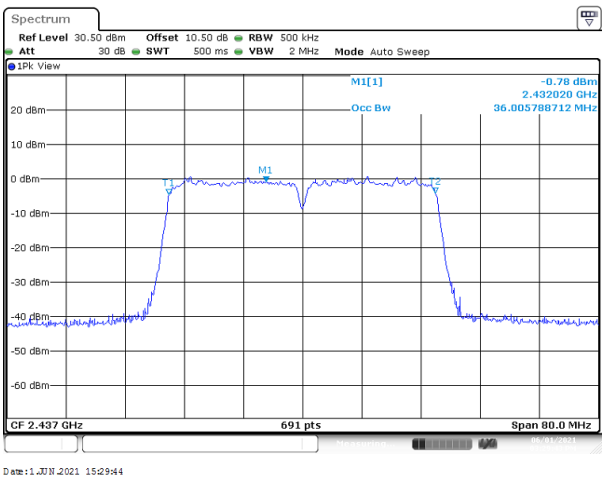
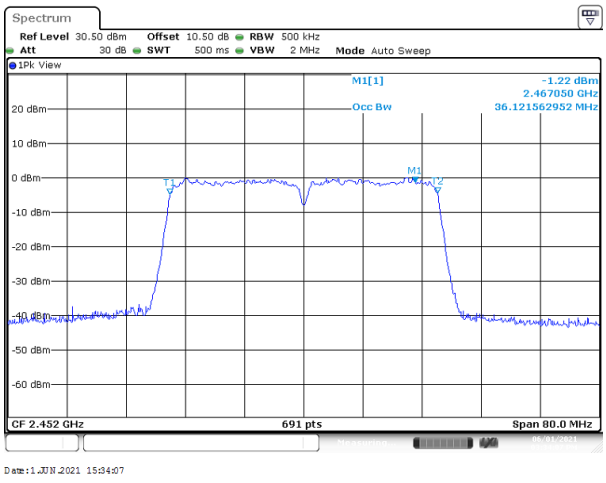
IEEE 802.11b mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

IEEE 802.11g mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

IEEE 802.11n HT40 mode- chain 0	
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	
	

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, and 5725-5850 MHz bands: 1 Watt(30 dBm) and the e.i.r.p. shall not exceed 4Watt(36 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：

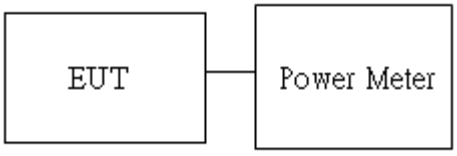
Average output power：For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

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

Temperature: 25.1℃ **Test date:** June 01, 2021

Humidity: 59% RH **Tested by:** Jack Chen

Peak output power：

Test Mode: IEEE 802.11b Mode

CH	Freq. (MHz)	Data Rate	Power Set		Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
			Chain0	Chain1	Chain0	Chain1	(dBm)		
1	2412	1	40	-	23.80	-	**23.80**	30	PASS
6	2437	1	40	-	23.78	-	23.78		PASS
11	2462	1	40	-	23.28	-	23.28		PASS

Test Mode: IEEE 802.11g Mode

CH	Freq. (MHz)	Data Rate	Power Set		Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
			Chain0	Chain1	Chain0	Chain1	(dBm)		
1	2412	6	38	-	24.07	-	24.07	30	PASS
6	2437	6	38	-	24.51	-	**24.51**		PASS
11	2462	6	39	-	24.00	-	24.00		PASS

Test Mode: IEEE 802.11n HT 20 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set		Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
			Chain0	Chain1	Chain0	Chain1	(dBm)		
1	2412	MCS0	34	34	21.71	20.85	24.31	29.89	PASS
6	2437	MCS0	34	34	21.23	21.03	24.14		PASS
11	2462	MCS0	34	35	21.99	21.84	**24.93**		PASS

Test Mode: IEEE 802.11n HT 40 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set		Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
			Chain0	Chain1	Chain0	Chain1	(dBm)		
3	2422	MCS0	32	33	21.63	21.96	24.81	29.89	PASS
6	2437	MCS0	32	34	21.62	21.79	24.72		PASS
9	2452	MCS0	33	34	21.72	22.10	**24.92**		PASS

Average output power：

Test Mode: IEEE 802.11b Mode

CH	Freq. (MHz)	Data Rate	Power Set		Avg. Output Power (dBm)		AV Total Power(dBm)
			Chain0	Chain1	Chain0	Chain1	(dBm)
1	2412	1	40	-	21.26	-	**21.26**
6	2437	1	40	-	21.18	-	21.18
11	2462	1	40	-	20.76	-	20.76

Test Mode: IEEE 802.11g Mode

CH	Freq. (MHz)	Data Rate	Power Set		Avg. Output Power (dBm)		AV Total Power(dBm)
			Chain0	Chain1	Chain0	Chain1	(dBm)
1	2412	6	38	-	14.45	-	14.45
6	2437	6	38	-	14.53	-	14.53
11	2462	6	39	-	14.80	-	**14.80**

Test Mode: IEEE 802.11n HT 20 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set		Avg. Output Power (dBm)		AV Total Power(dBm)
			Chain0	Chain1	Chain0	Chain1	(dBm)
1	2412	MCS0	34	34	11.67	11.19	14.54
6	2437	MCS0	34	34	11.72	11.49	14.71
11	2462	MCS0	34	35	11.32	12.14	**14.85**

Test Mode: IEEE 802.11n HT 40 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set		Avg. Output Power (dBm)		AV Total Power(dBm)
			Chain0	Chain1	Chain0	Chain1	(dBm)
3	2422	MCS0	32	33	11.31	11.12	14.32
6	2437	MCS0	32	34	11.19	11.57	14.49
9	2452	MCS0	33	34	11.37	11.52	**14.55**

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.

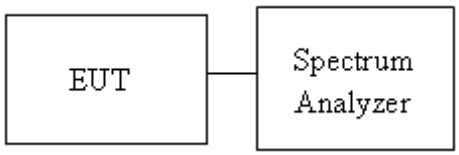
Limit	☐ Antenna not exceed 6 dBi：8dBm ☒ Antenna with DG greater than 6 dBi： [Limit = 8 – (DG – 6)] ☐ Point-to-point operation：

4.4.2 Test Procedure

Test method Refer as ANSI C63.10:2013,

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

Temperature:	25.1℃	**Test date:**	June 01, 2021
Humidity:	59% RH	**Tested by:**	Jack Chen

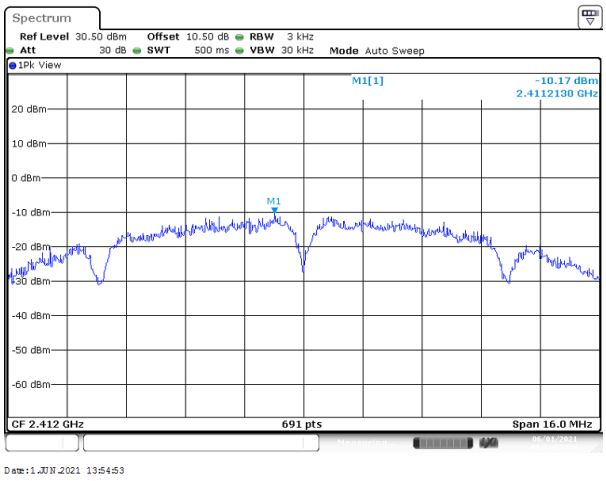
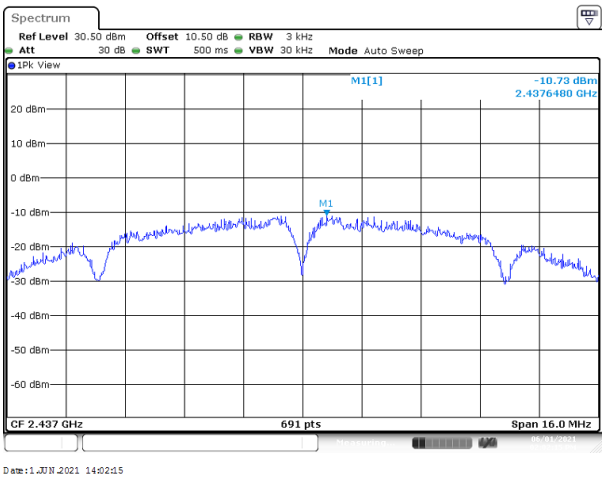
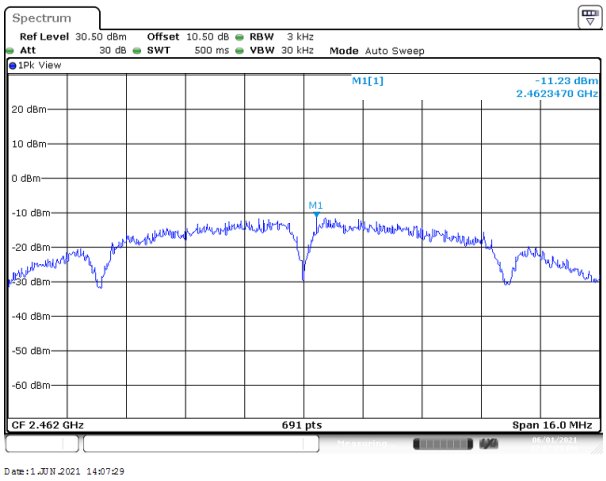
Test mode: IEEE 802.11b mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2412	-10.17	-	-10.17	8
Mid	2437	-10.73	-	-10.73	
High	2462	-11.23	-	-11.23	

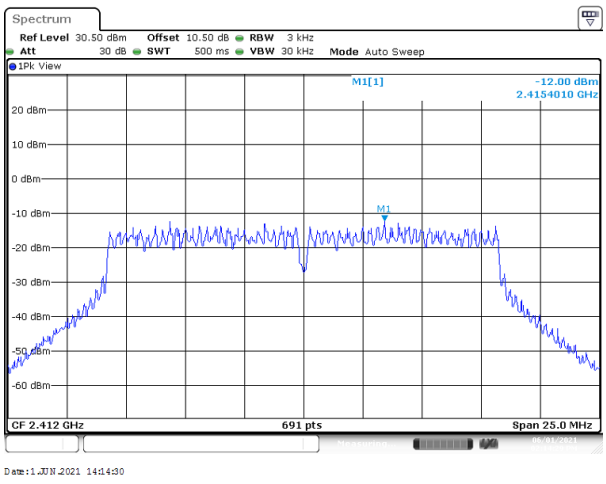
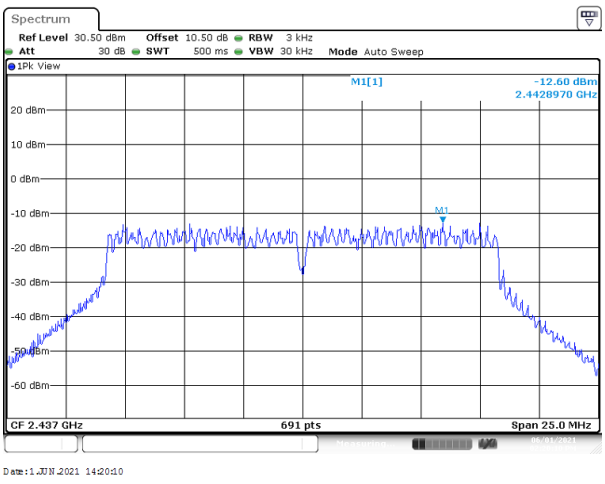
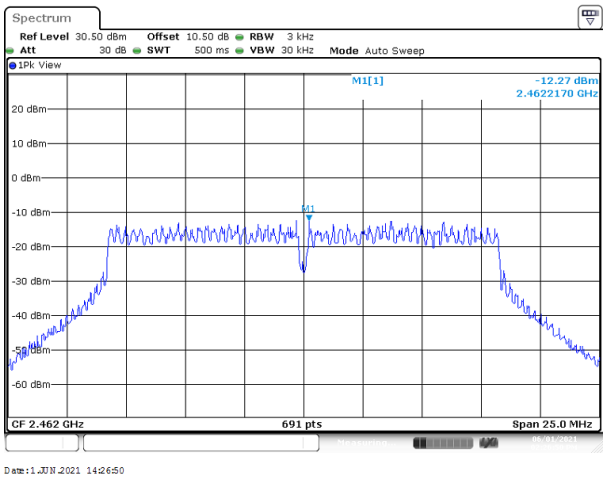
Test mode: IEEE 802.11g mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2412	-12	-	-12	8
Mid	2437	-12.6	-	-12.6	
High	2462	-12.27	-	-12.27	

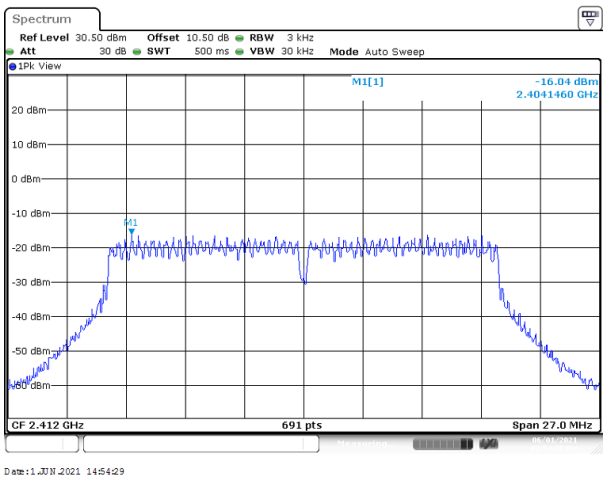
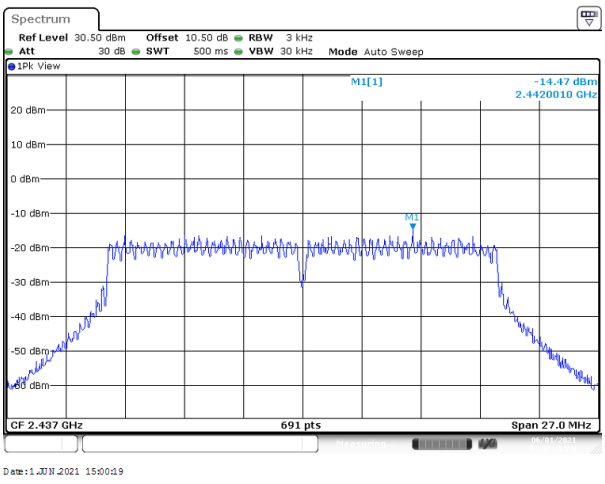
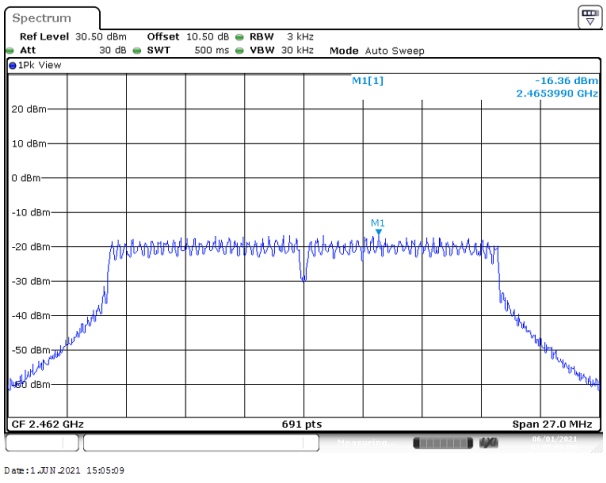
Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2412	-16.04	-16.45	-13.23	7.89
Mid	2437	-14.47	-16.37	-12.31	
High	2462	-16.36	-16.61	-13.32	

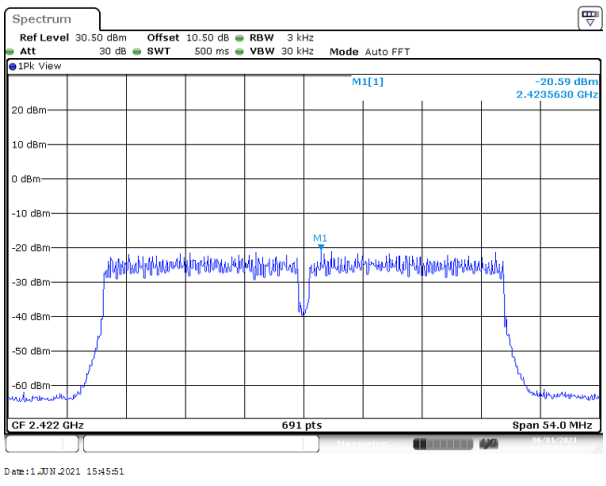
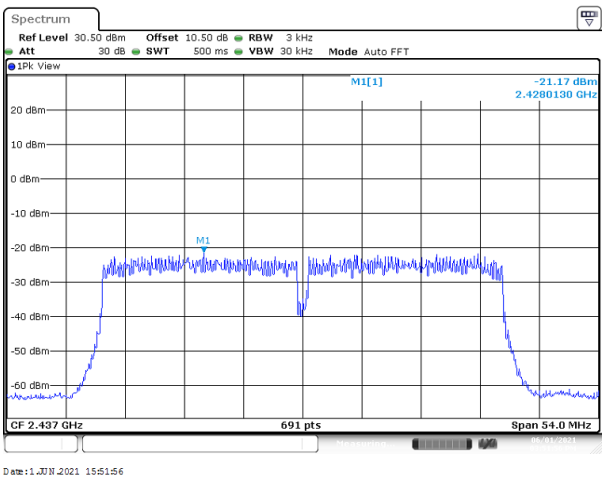
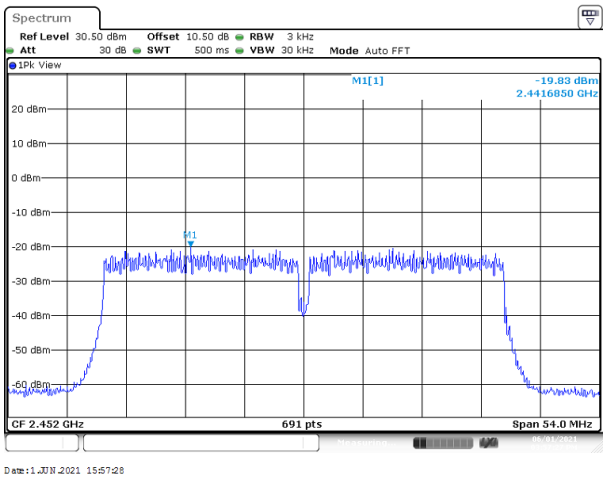
Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2422	-20.59	-19.06	-16.75	7.89
Mid	2437	-21.17	-17.97	-16.27	
High	2452	-19.83	-18.08	-15.86	

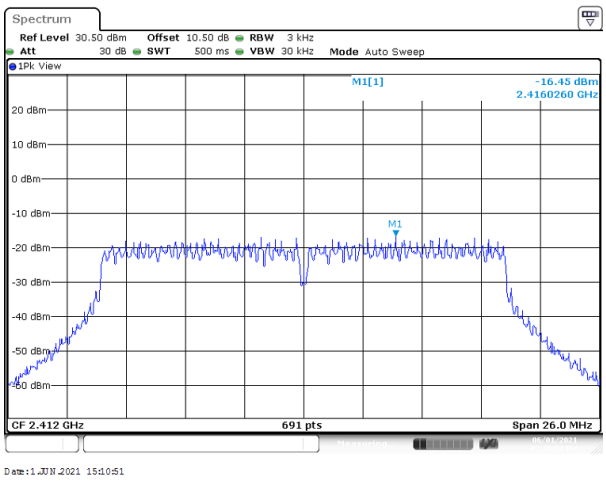
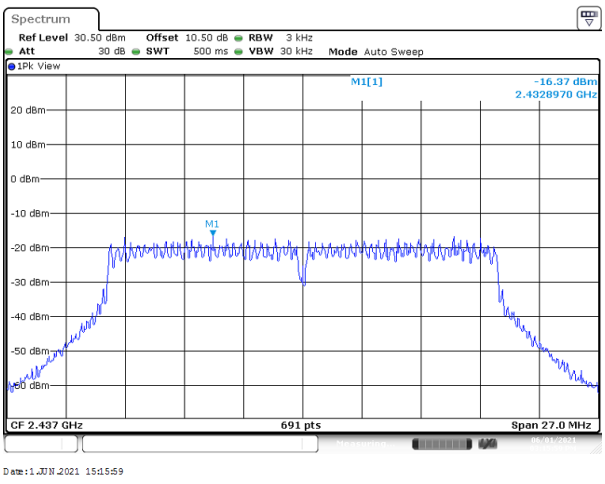
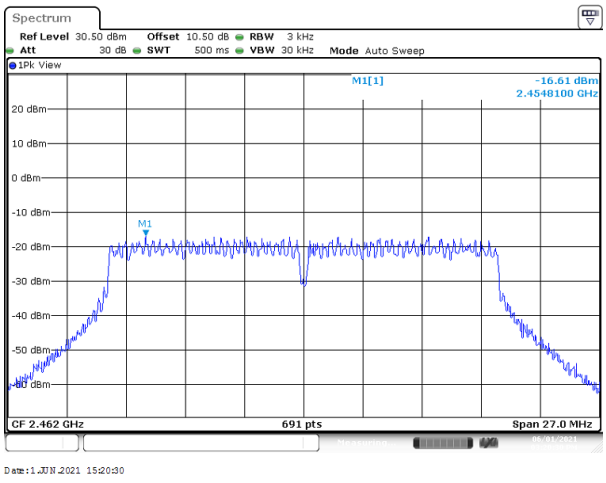
Test Data

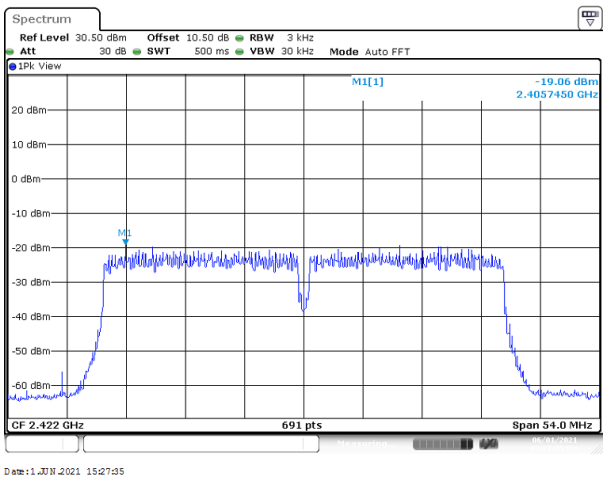
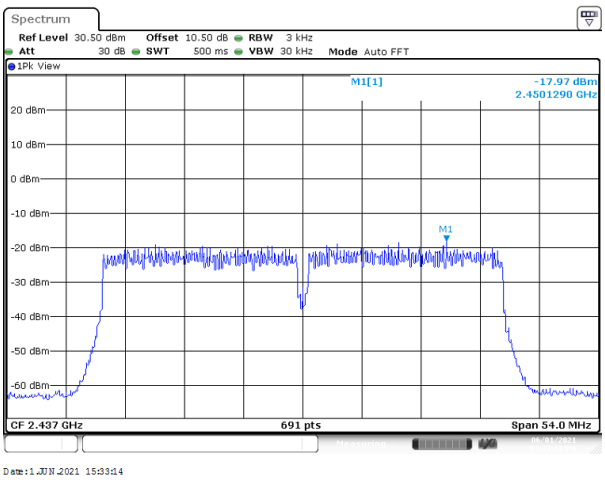
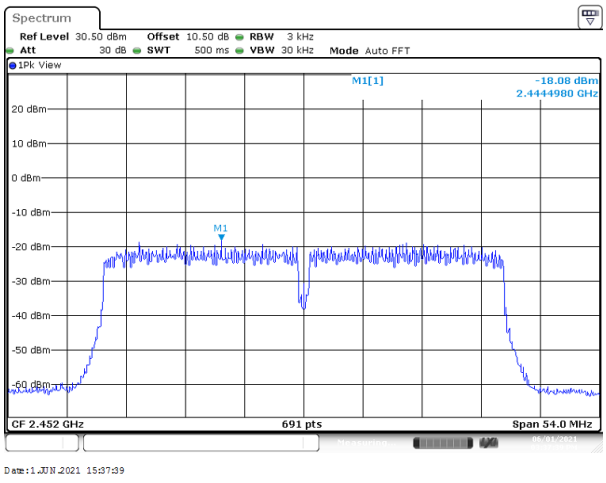
IEEE 802.11b mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

IEEE 802.11g mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

IEEE 802.11n HT40 mode- chain 0	
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	
	

4.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.247(d),

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

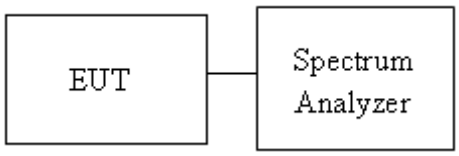
Test method Refer as KDB 662911 D01, ANSI C63.10:2013.

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. f 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



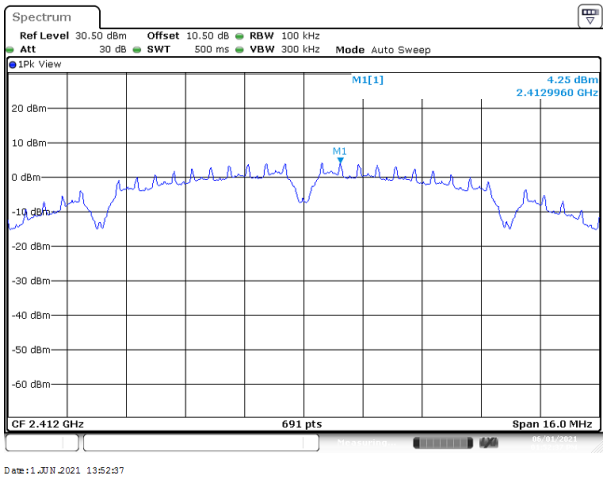
4.5.4 Test Result

Temperature:	25.1℃	**Test date:**	June 01, 2021
Humidity:	59% RH	**Tested by:**	Jack Chen

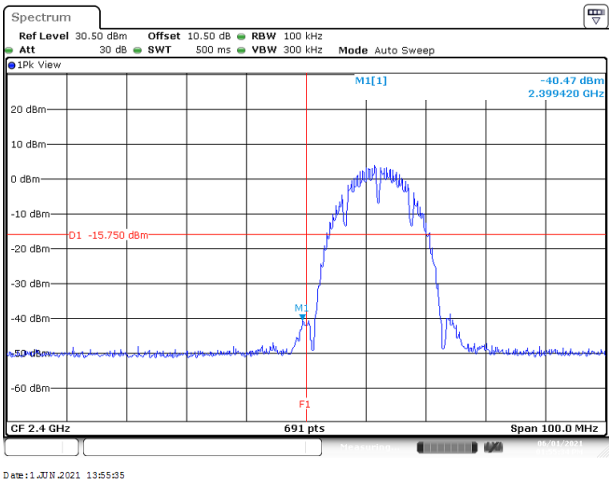
Test Data

IEEE 802.11b mode Low CH- chain 0

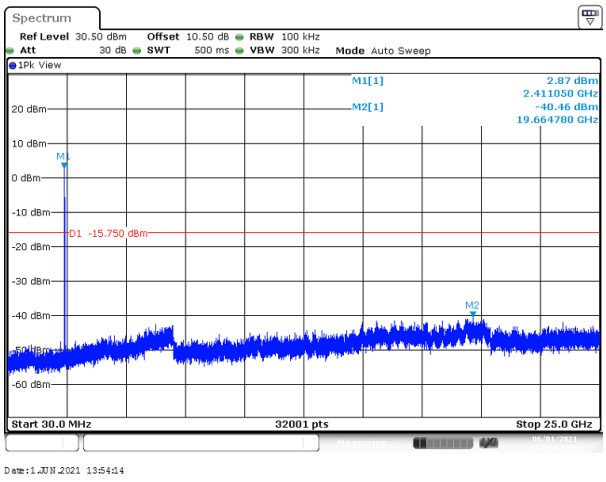
Reference Level of PSD in 100kHz

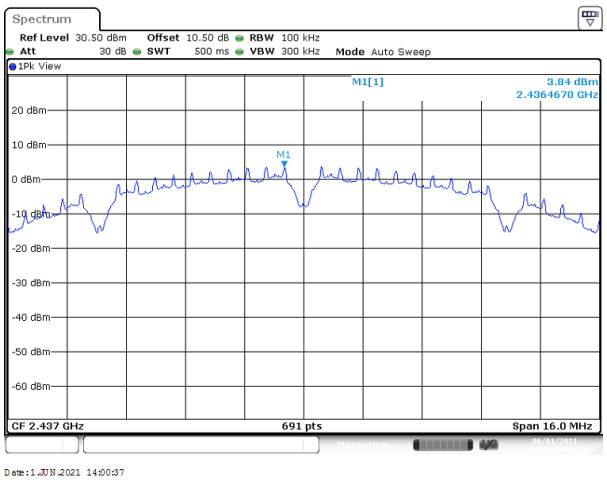
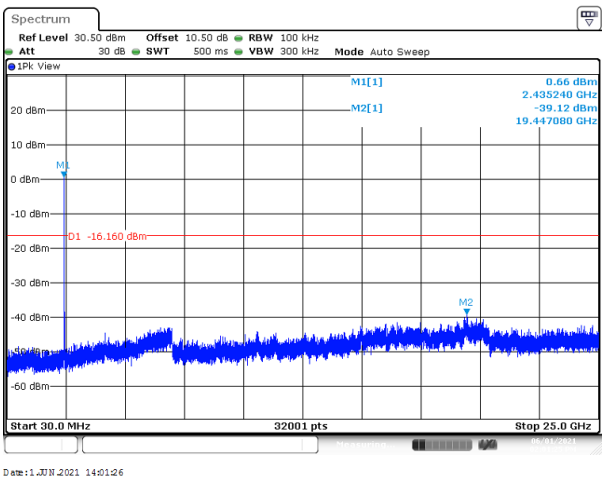


Band Edge



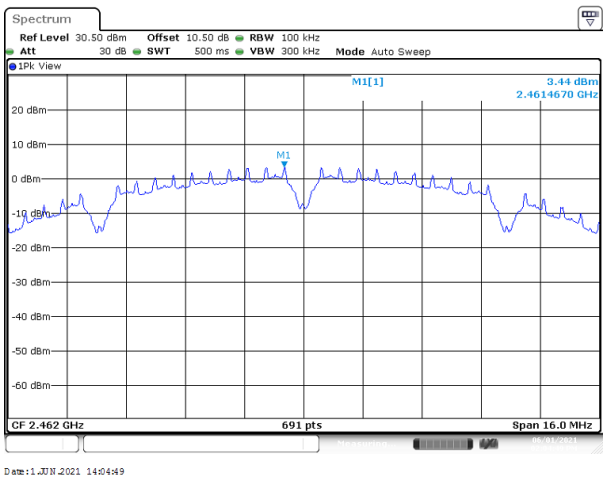
Spurious Emission 30MHz-25GHz



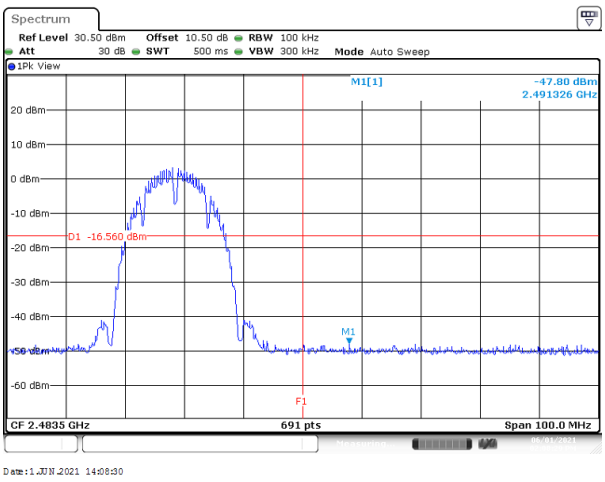
IEEE 802.11b mode Mid CH- chain 0	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

IEEE 802.11b mode High CH- chain 0

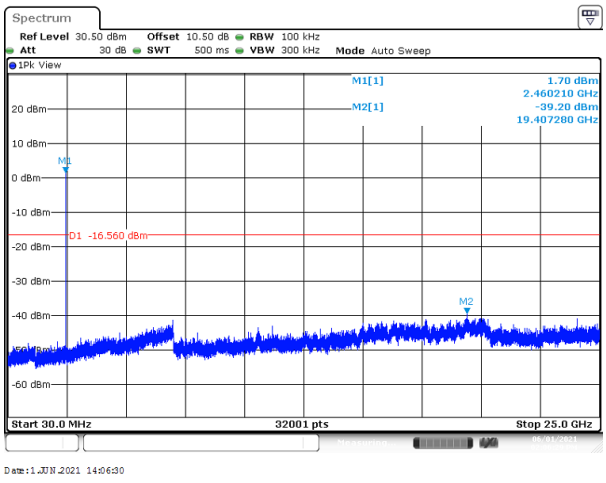
Reference Level of PSD in 100kHz

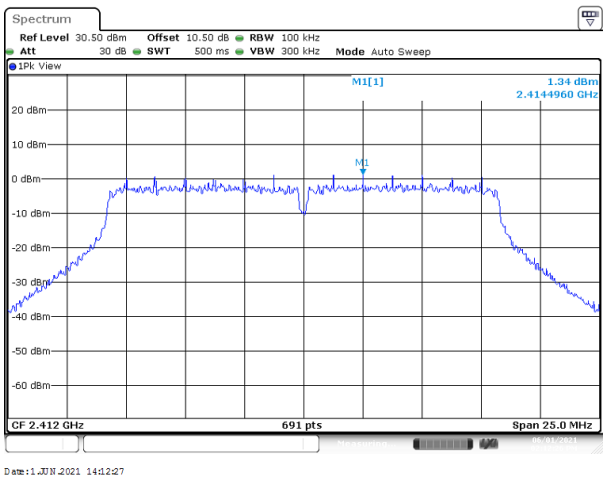
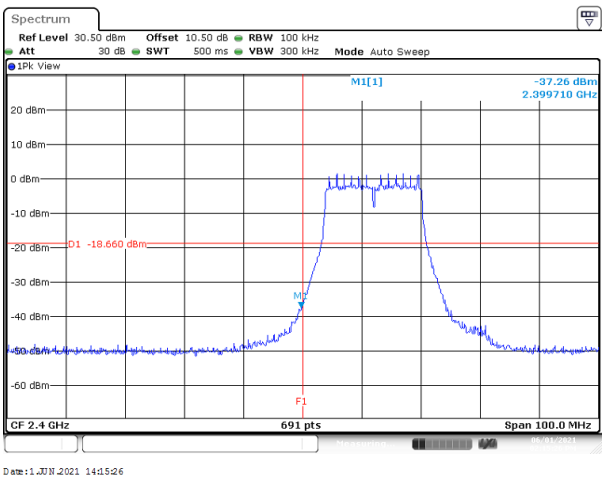
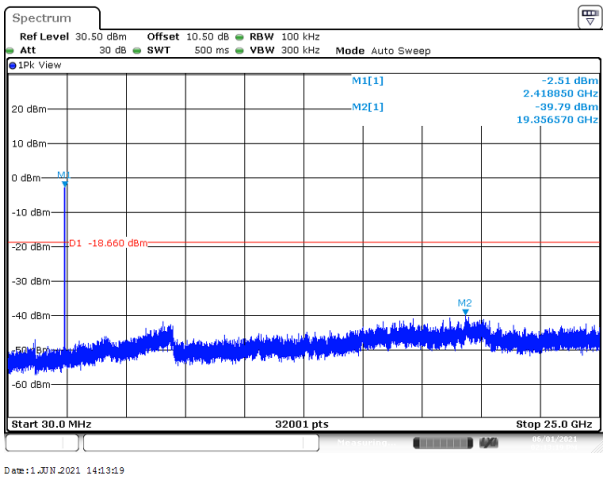


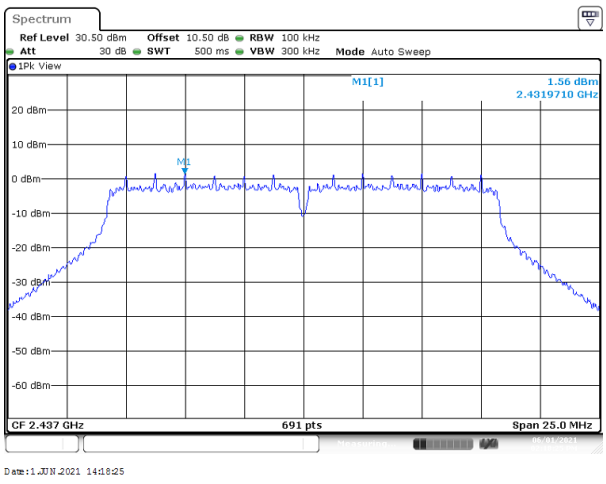
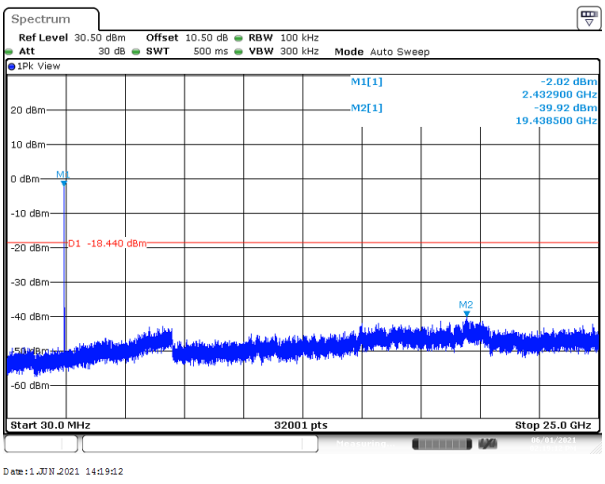
Band Edge

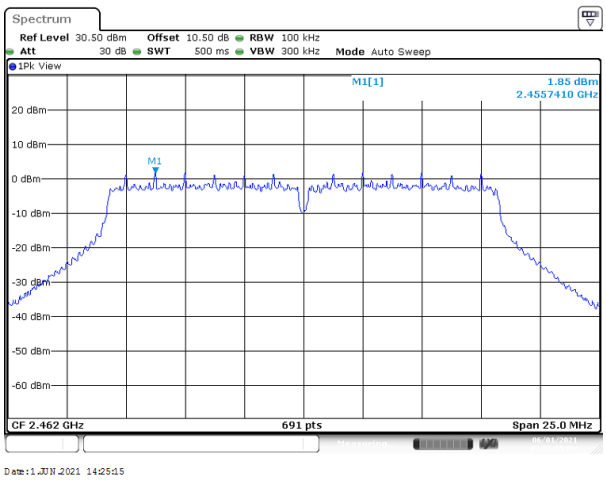
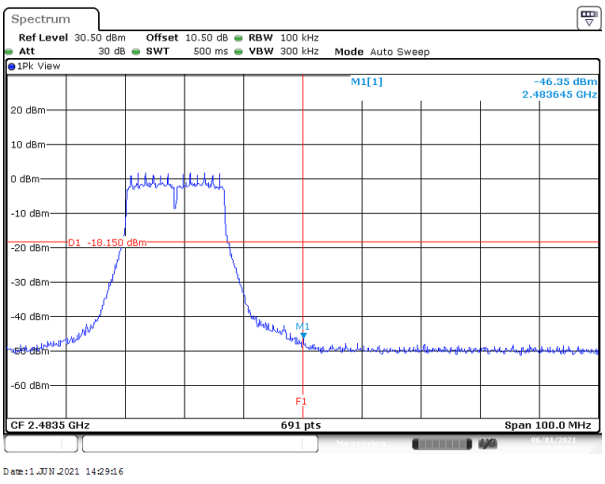
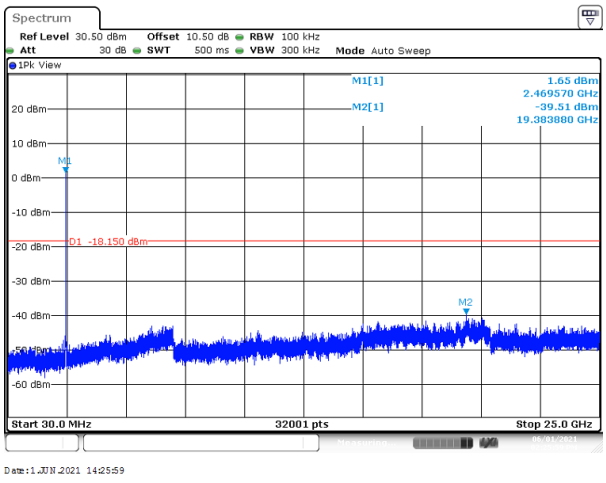


Spurious Emission 30MHz-25GHz



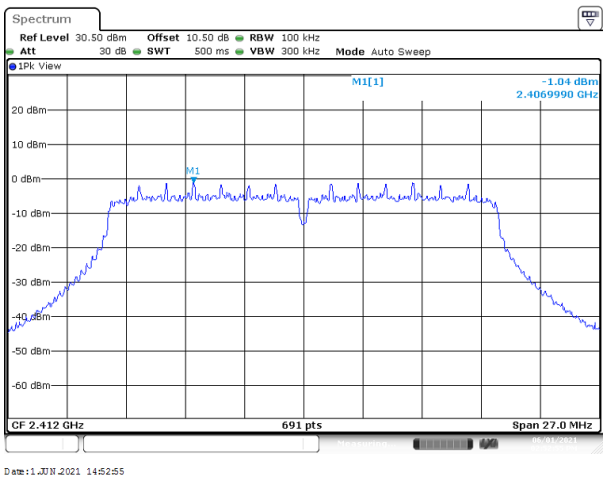
IEEE 802.11g mode Low CH- chain 0	
Reference Level of PSD in 100kHz	**Band Edge**
	
Spurious Emission 30MHz-25GHz	
	

IEEE 802.11g mode Mid CH- chain 0	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**
	

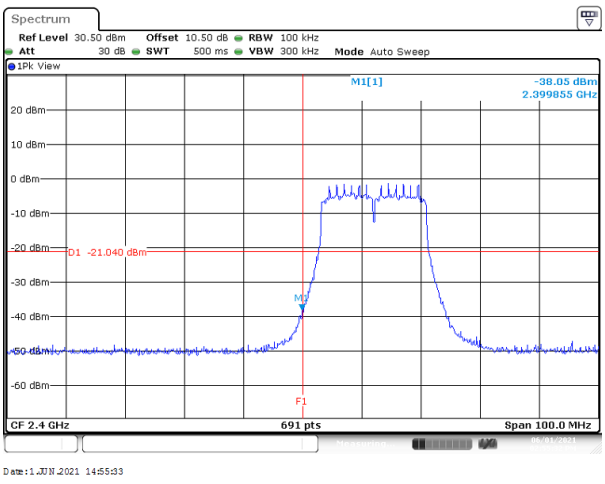
IEEE 802.11g mode High CH- chain 0	
Reference Level of PSD in 100kHz	**Band Edge**
	
Spurious Emission 30MHz-25GHz	
	

IEEE 802.11 n HT20 mode Low CH- chain 0

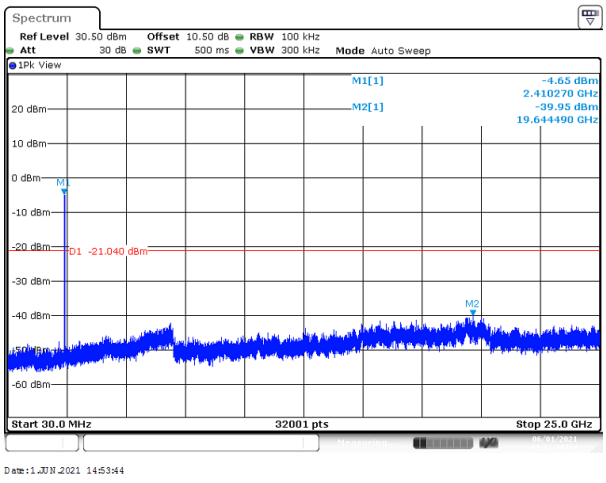
Reference Level of PSD in 100kHz



Band Edge



Spurious Emission 30MHz-25GHz



IEEE 802.11 n HT20 mode Mid CH- chain 0	
Reference Level of PSD in 100kHz	**Spurious Emission 30MHz-25GHz**