

TEST REPORT

Product : Smart Sweeping Robot
Trade mark : N/A
Model/Type reference : SI-340, SI-340A, SI-350
Serial Number : N/A
Report Number : EED32L00254501
FCC ID : 2AURN-SI
Date of Issue : Oct. 12, 2019
Test Standards : 47 CFR Part 15Subpart C
Test result : PASS

Prepared for:

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Oct. 12, 2019

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2 Version

Version No.	Date	Description
00	2019-10-12	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious Emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

The tested sample(s) and the sample information are provided by the client.

Model No.: SI-340, SI-340A, SI-350

Only the model SI-350 was tested, among which SI-340 and SI-340A are the same machine, the difference is only the supporting charging block is different;

The main circuit of si-340 and si-350 is exactly the same, and the wireless module is the same, the differences are as follows:

- 1、 Only the switch is different(SI-340 is mechanical switch, SI-350 is touch switch);
- 2、 The SI-350 is the main test model and the power is 30W, while the SI-340/SI-340A is 25W.

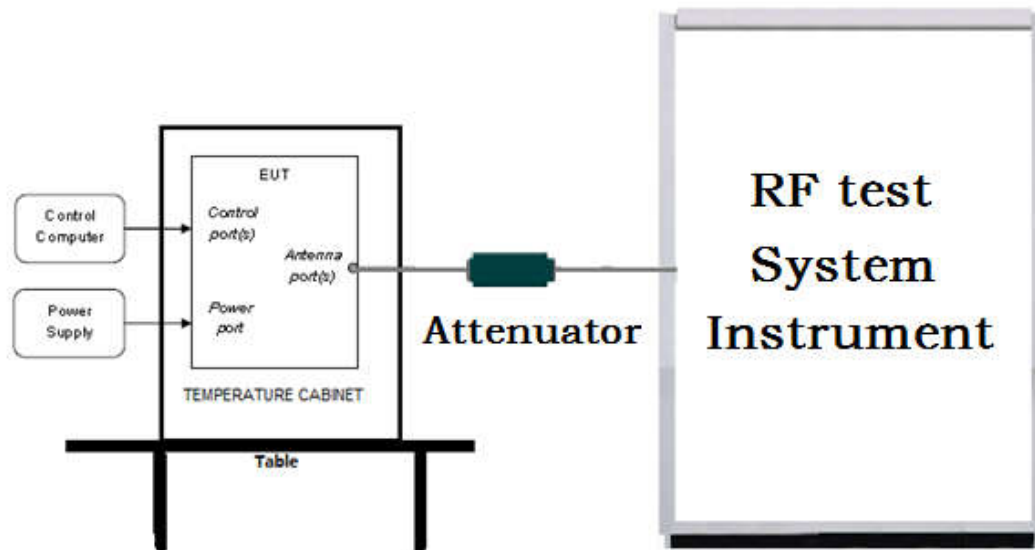
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5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

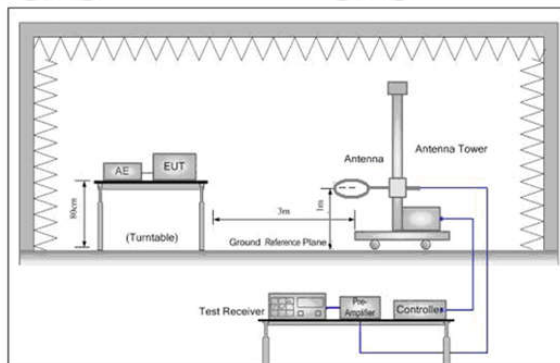


Figure 1. Below 30MHz

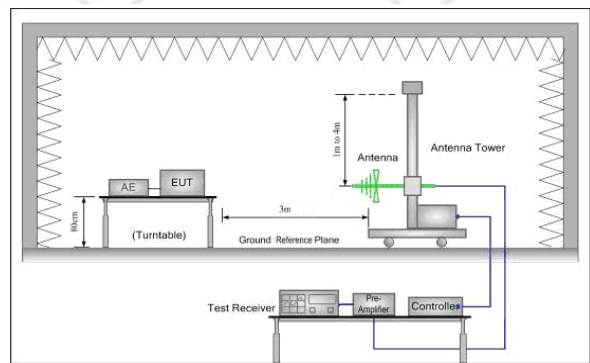


Figure 2. 30MHz to 1GHz

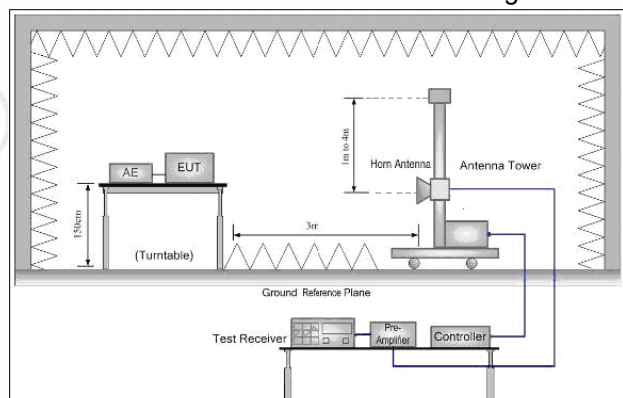
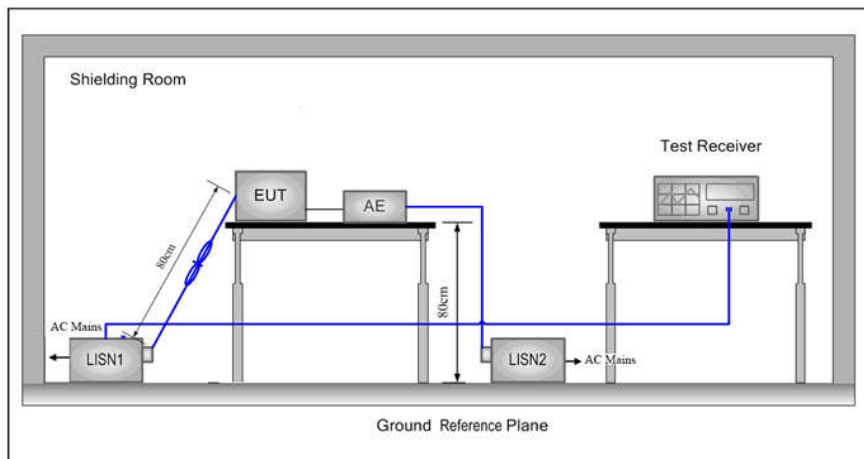


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	24.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11b/g/n(HT20)	2412MHz ~2462 MHz	Channel 1	Channel 6	Channel11
		2412MHz	2437MHz	2462MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

Test mode:

Pre-scan under all rate at lowest channel 1

Mode	802.11b							
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps				
Power(dBm)	17.97	18.06	18.19	18.22				
Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power(dBm)	17.26	17.25	17.22	17.19	17.17	17.14	17.12	17.10
Mode	802.11n (HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
Power(dBm)	16.10	16.07	16.05	16.01	15.98	15.97	15.95	15.93

Through Pre-scan, 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20).

6 General Information

6.1 Client Information

Applicant:	Sinsion Technology Industrial Co., Ltd
Address of Applicant:	No. 11, Tongle Rd., Tangxia town, Pengjiang District, Jiangmen City, Guangdong Province, China
Manufacturer:	Sinsion Technology Industrial Co., Ltd
Address of Manufacturer:	No. 11, Tongle Rd., Tangxia town, Pengjiang District, Jiangmen City, Guangdong Province, China
Factory:	Sinsion Technology Industrial Co., Ltd
Address of Factory:	No. 11, Tongle Rd., Tangxia town, Pengjiang District, Jiangmen City, Guangdong Province, China

6.2 General Description of EUT

Product Name:	Smart Sweeping Robot	
Model No.(EUT):	SI-340, SI-340A, SI-350	
Test Model No.:	SI-350	
Trade Mark:	N/A	
EUT Supports Radios application:	WiFi IEEE 802.11 /b/g/n(HT20) 2412MHz to 2462MHz	
Power Supply:	Adapter:	MODEL: YLS0241A-T190100 INPUT: 100-240V~50/60Hz 0.8A OUTPUT: 19.0V---1.0A
	Battery:	MODEL: ICR18650 Capacity: 2600mAh, 38.48Wh Nominal Voltage: 14.8V
Sample Received Date:	Sep. 09, 2019	
Sample tested Date:	Sep. 09, 2019 to Oct. 10, 2019	

6.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz					
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels					
Channel Separation:	5MHz					
Type of Modulation:	DSSS, OFDM					
Test Power Grade:	Mode	Channel	Frequency	Data Rate	Power Setting	
	802.11b	1	2412	1 Mbps	-3.25	
		6	2437		-3.25	
		11	2462		-5.25	
	802.11g	1	2412	6 Mbps	3.25	
		6	2437		3.25	
		11	2462		1.5	
	802.11n(HT20)	1	2412	MCS 0	4.25	
		6	2437		3.75	
		11	2462		2.25	
Test Software of EUT:	ESP Series Modules					
Antenna Type and Gain:	Type: PCB antenna Gain: 3 dBi					
Test Voltage:	DC 5V					

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

6.4 Description of Support Units

The EUT has been tested independently

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

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

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

RF test system					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Signal Generator	Keysight	E8257D	MY53401106	03-01-2019	02-29-2020
Spectrum Analyzer	Keysight	N9010A	MY54510339	03-01-2019	02-29-2020
Signal Generator	Keysight	N5182B	MY53051549	03-01-2019	02-29-2020
High-pass filter	Sinoscite	FL3CX03WG1 8NM12-0398-002	---	01-09-2019	01-08-2020
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-09-2019	01-08-2020
DC Power	Keysight	E3642A	MY54426035	03-01-2019	02-29-2020
PC-1	Lenovo	R4960d	---	03-01-2019	02-29-2020
BT&WI-FI Automatic control	R&S	OSP120	101374	03-01-2019	02-29-2020
RF control unit	JS Tonscend	JS0806-2	15860006	03-01-2019	02-29-2020
RF control unit	JS Tonscend	JS0806-1	15860004	03-01-2019	02-29-2020
RF control unit	JS Tonscend	JS0806-4	158060007	03-01-2019	02-29-2020
BT&WI-FI Automatic test software	JS Tonscend	JS1120-2	---	03-01-2019	02-29-2020

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	05-20-2019	05-19-2020
Temperature/ Humidity Indicator	Defu	TH128	/	06-14-2019	06-13-2020
Communication test set	Agilent	E5515C	GB47050534	03-01-2019	02-28-2022
Communication test set	R&S	CMW500	102898	01-18-2019	01-17-2020
LISN	R&S	ENV216	100098	05-08-2019	05-07-2020
LISN	schwarzbeck	NNLK8121	8121-529	05-08-2019	05-07-2020
Voltage Probe	R&S	ESH2-Z3 0299.7810.56	100042	06-13-2017	06-12-2020
Current Probe	R&S	EZ-17 816.2063.03	100106	05-20-2019	05-19-2020
ISN	TESEQ	ISN T800	30297	01-16-2019	01-15-2020
Barometer	changchun	DYM3	1188	06-20-2019	06-19-2020

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-401	12-21-2018	12-20-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-26-2019	07-25-2020
Microwave Preamplifier	Agilent	8449B	3008A02425	07-12-2019	07-11-2020
Microwave Preamplifier	Tonscend	EMC051845 SE	980380	01-16-2019	01-15-2020
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1869	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057410	06-05-2018	06-04-2021
Double ridge horn antenna	A.H.SYSTEMS	SAS-574	374	06-05-2018	06-04-2021
Pre-amplifier	A.H.SYSTEMS	PAP-1840-60	6041.6041	07-26-2019	07-25-2020
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Spectrum Analyzer	R&S	FSP40	100416	04-28-2019	04-27-2020
Receiver	R&S	ESCI	100435	05-20-2019	05-19-2020
Receiver	R&S	ESCI7	100938-003	11-23-2018	11-22-2019
Multi device Controller	maturo	NCD/070/10711112	---	01-09-2019	01-08-2020
Signal Generator	Agilent	E4438C	MY45095744	03-01-2019	02-29-2020
Signal Generator	Keysight	E8257D	MY53401106	03-01-2019	02-29-2020
Temperature/Humidity Indicator	Shanghai qixiang	HM10	1804298	07-26-2019	07-25-2020
Communication test set	Agilent	E5515C	GB47050534	03-01-2019	02-28-2022
Cable line	Fulai(7M)	SF106	5219/6A	01-09-2019	01-08-2020
Cable line	Fulai(6M)	SF106	5220/6A	01-09-2019	01-08-2020
Cable line	Fulai(3M)	SF106	5216/6A	01-09-2019	01-08-2020
Cable line	Fulai(3M)	SF106	5217/6A	01-09-2019	01-08-2020
High-pass filter	Sinoscite	FL3CX03WG18NM12-0398-002	---	01-09-2019	01-08-2020
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX01CA09CL12-0395-001	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX01CA08CL12-0393-001	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX02CA04CL12-0396-002	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX02CA03CL12-0394-001	---	01-09-2019	01-08-2020

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	06-19-2019	06-18-2020
Receiver	Keysight	N9038A	MY57290136	03-27-2019	03-26-2020
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-27-2019	03-26-2020
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-27-2019	03-26-2020
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-075	04-25-2018	04-24-2021
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-829	04-25-2018	04-24-2021
Communication Antenna	Schwarzbeck	CLSA 0110L	1014	02-14-2019	02-13-2020
Biconical antenna	Schwarzbeck	VUBA 9117	9117-381	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980596	05-22-2019	05-21-2020
Communication test set	R&S	CMW500	102898	01-18-2019	01-17-2020
Preamplifier	EMCI	EMC001330	980563	05-08-2019	05-07-2020
Preamplifier	Agilent	8449B	3008A02425	07-12-2019	07-11-2020
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-30-2019	04-29-2020
Signal Generator	KEYSIGHT	E8257D	MY53401106	03-01-2019	02-29-2020
Fully Anechoic Chamber	TDK	FAC-3	---	01-17-2018	01-16-2021
Filter bank	JS Tonscend	JS0806-F	188060094	04-10-2018	04-09-2021
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	01-09-2019	01-08-2020
Cable line	Times	EMC104-NMNM-1000	SN160710	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	01-09-2019	01-08-2020
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	01-09-2019	01-08-2020
Cable line	Times	HF160-KMKM-3.00M	393493-0001	01-09-2019	01-08-2020

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

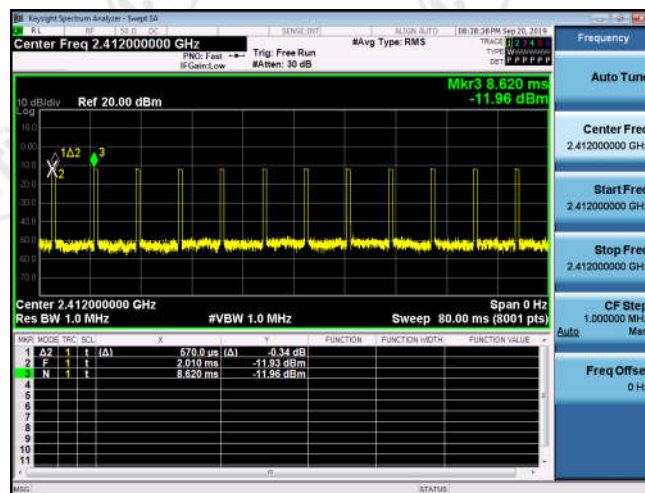
Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (b)(3)	ANSI C63.10	Conducted Peak Output Power	PASS	Appendix A)
Part15C Section 15.247 (a)(2)	ANSI C63.10	6dB Occupied Bandwidth	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI C63.10	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI C63.10	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI C63.10	Power Spectral Density	PASS	Appendix E)
Part15C Section 15.203/15.247 (c)	ANSI C63.10	Antenna Requirement	PASS	Appendix F)
Part15C Section 15.207	ANSI C63.10	AC Power Line Conducted Emission	PASS	Appendix G)
Part15C Section 15.205/15.209	ANSI C63.10	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI C63.10	Radiated Spurious Emissions	PASS	Appendix I)

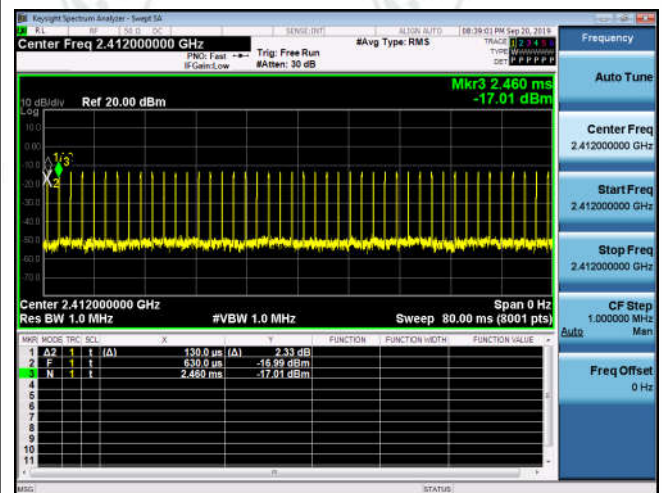
Duty Cycle

Duty Cycle			
Configuration	TX ON(ms)	TXALL(ms)	Duty Cycle(%)
802.11b	0.57	6.61	8.62%
802.11g	0.13	1.83	7.10%
802.11n HT20	0.13	1.83	7.10%

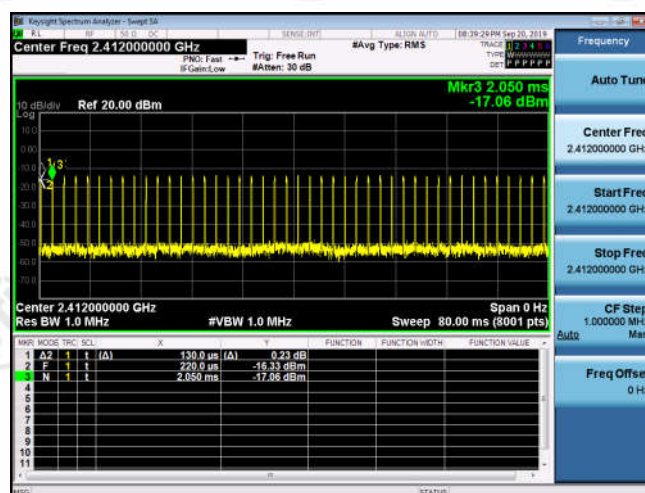
802.11b



802.11g



802.11n HT20



Appendix A): Conducted Peak Output Power

Test Limit

According to §15.247(b)(3),

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:
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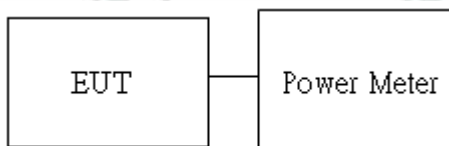
Average output power: For reporting purposes only.

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.

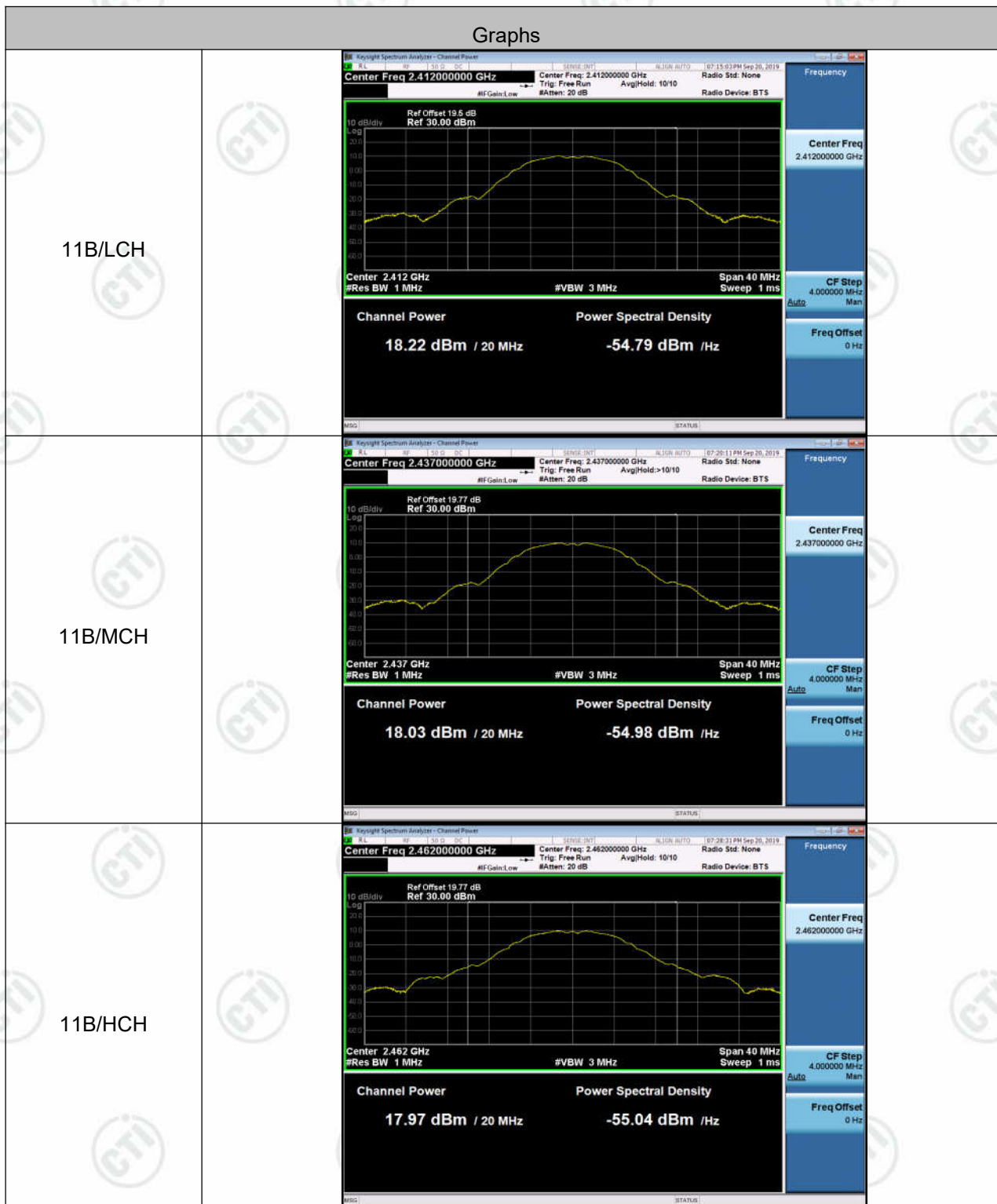
Test Setup

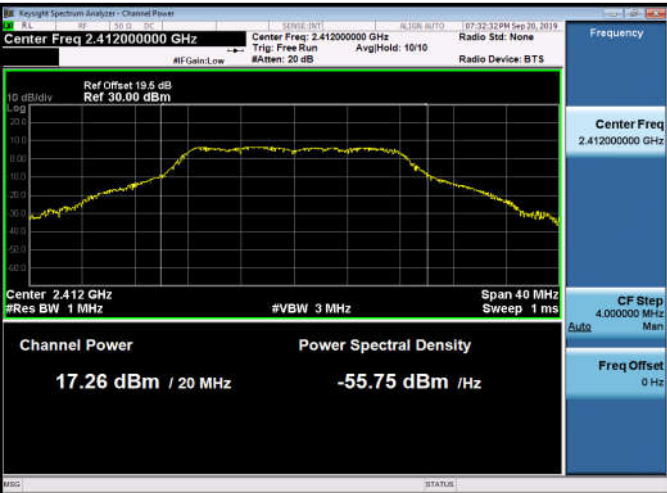
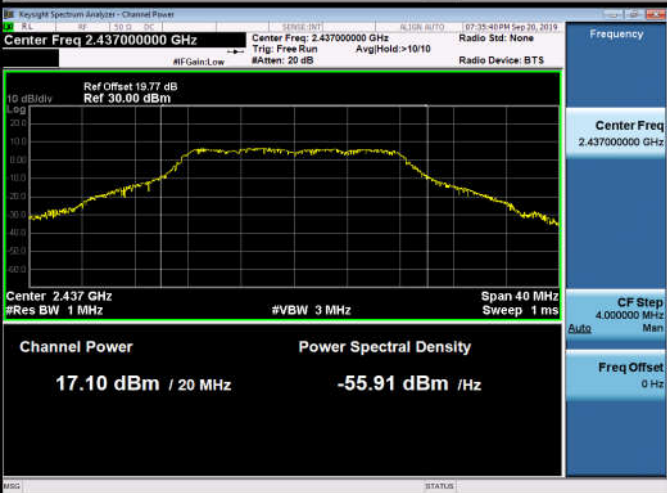


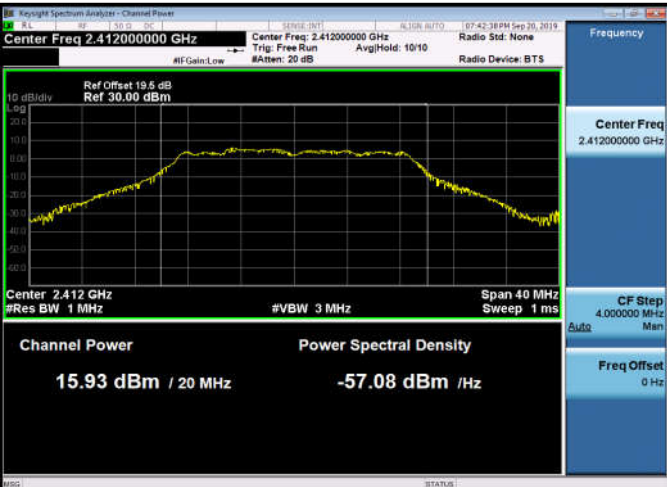
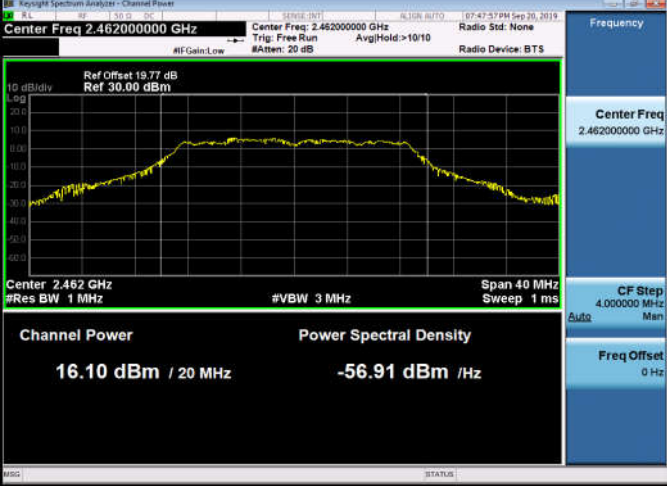
Result Table

Mode	Channel	Conducted Peak Output Power [dBm]	Verdict
11B	LCH	18.22	PASS
11B	MCH	18.03	PASS
11B	HCH	17.97	PASS
11G	LCH	17.26	PASS
11G	MCH	17.1	PASS
11G	HCH	17.2	PASS
11N20SISO	LCH	15.93	PASS
11N20SISO	MCH	16.06	PASS
11N20SISO	HCH	16.1	PASS

Test Graph



11G/LCH	 Keyight Spectrum Analyzer - Channel Power Center Freq 2.412000000 GHz Ref Offset 19.5 dB Ref 30.00 dBm Channel Power: 17.26 dBm / 20 MHz Power Spectral Density: -55.75 dBm / Hz Center Freq: 2.412 GHz #Res BW: 1 MHz #VBW: 3 MHz Span: 40 MHz Sweep: 1 ms CF Step: 4.000000 MHz Freq Offset: 0 Hz
11G/MCH	 Keyight Spectrum Analyzer - Channel Power Center Freq 2.437000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Channel Power: 17.10 dBm / 20 MHz Power Spectral Density: -55.91 dBm / Hz Center Freq: 2.437 GHz #Res BW: 1 MHz #VBW: 3 MHz Span: 40 MHz Sweep: 1 ms CF Step: 4.000000 MHz Freq Offset: 0 Hz
11G/HCH	 Keyight Spectrum Analyzer - Channel Power Center Freq 2.462000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Channel Power: 17.20 dBm / 20 MHz Power Spectral Density: -55.81 dBm / Hz Center Freq: 2.462 GHz #Res BW: 1 MHz #VBW: 3 MHz Span: 40 MHz Sweep: 1 ms CF Step: 4.000000 MHz Freq Offset: 0 Hz

11N20SISO/LCH	 Keyight Spectrum Analyzer - Channel Power Center Freq 2.412000000 GHz Ref Offset 19.5 dB Ref 30.00 dBm Channel Power: 15.93 dBm / 20 MHz Power Spectral Density: -57.08 dBm / Hz Center 2.412 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms Frequency: Center Freq 2.412000000 GHz CF Step 4.000000 MHz Freq Offset 0 Hz
11N20SISO/MCH	 Keyight Spectrum Analyzer - Channel Power Center Freq 2.437000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Channel Power: 16.06 dBm / 20 MHz Power Spectral Density: -56.95 dBm / Hz Center 2.437 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms Frequency: Center Freq 2.437000000 GHz CF Step 4.000000 MHz Freq Offset 0 Hz
11N20SISO/HCH	 Keyight Spectrum Analyzer - Channel Power Center Freq 2.462000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Channel Power: 16.10 dBm / 20 MHz Power Spectral Density: -56.91 dBm / Hz Center 2.462 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms Frequency: Center Freq 2.462000000 GHz CF Step 4.000000 MHz Freq Offset 0 Hz

Appendix B): 6dB Occupied Bandwidth

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.

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 6dB 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.

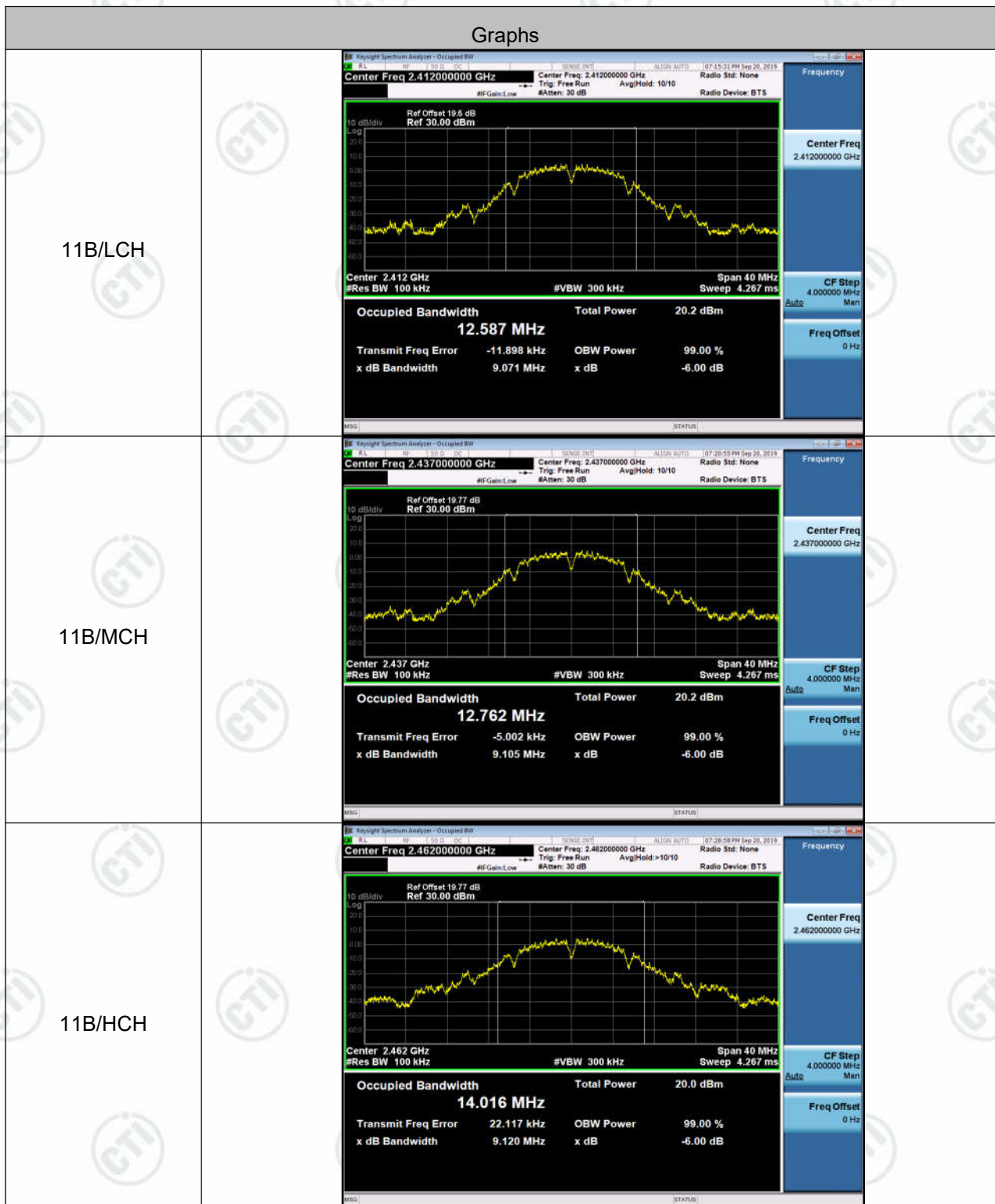
Test Setup

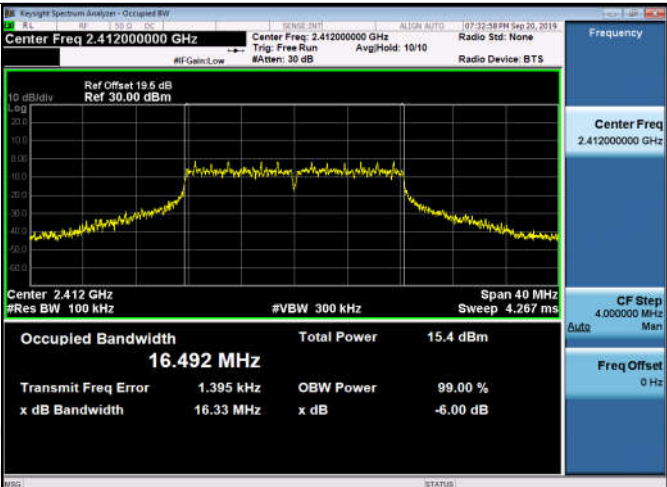
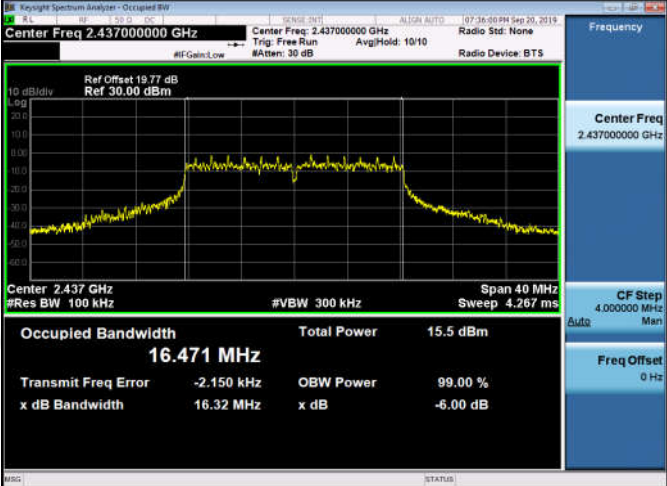
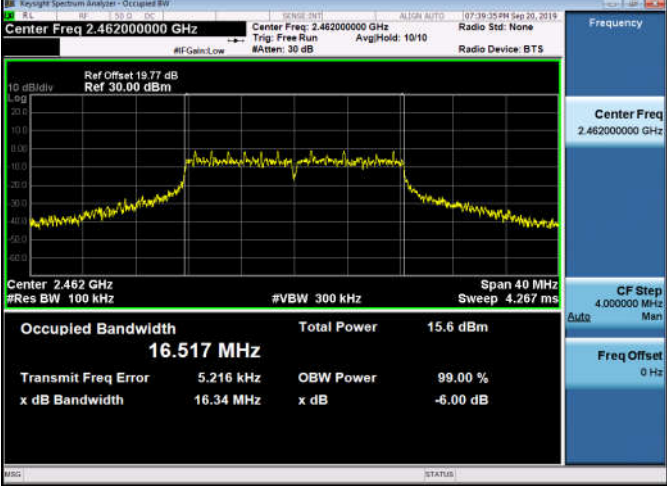


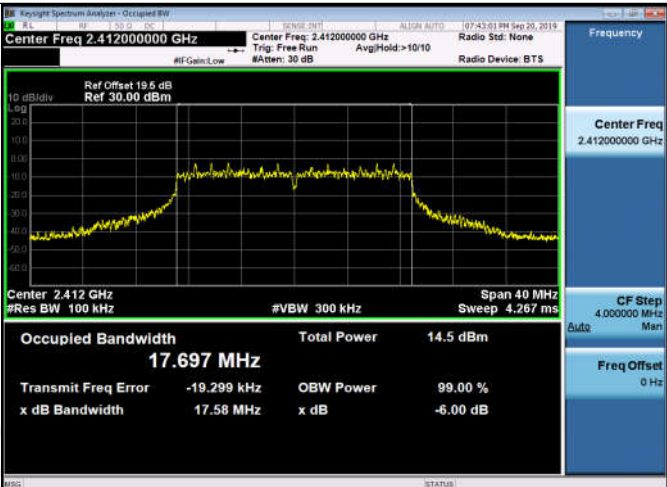
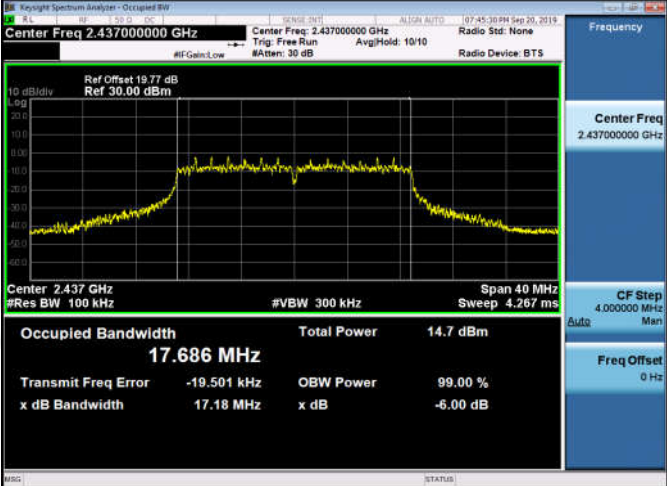
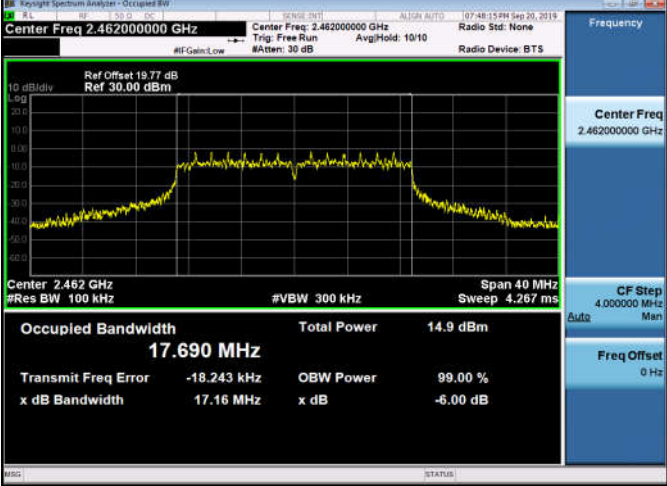
Result Table

Mode	Channel	6dB Bandwidth [MHz]	Verdict
11B	LCH	9.071	PASS
11B	MCH	9.105	PASS
11B	HCH	9.120	PASS
11G	LCH	16.33	PASS
11G	MCH	16.32	PASS
11G	HCH	16.34	PASS
11N20SISO	LCH	17.58	PASS
11N20SISO	MCH	17.18	PASS
11N20SISO	HCH	17.16	PASS

Test Graph



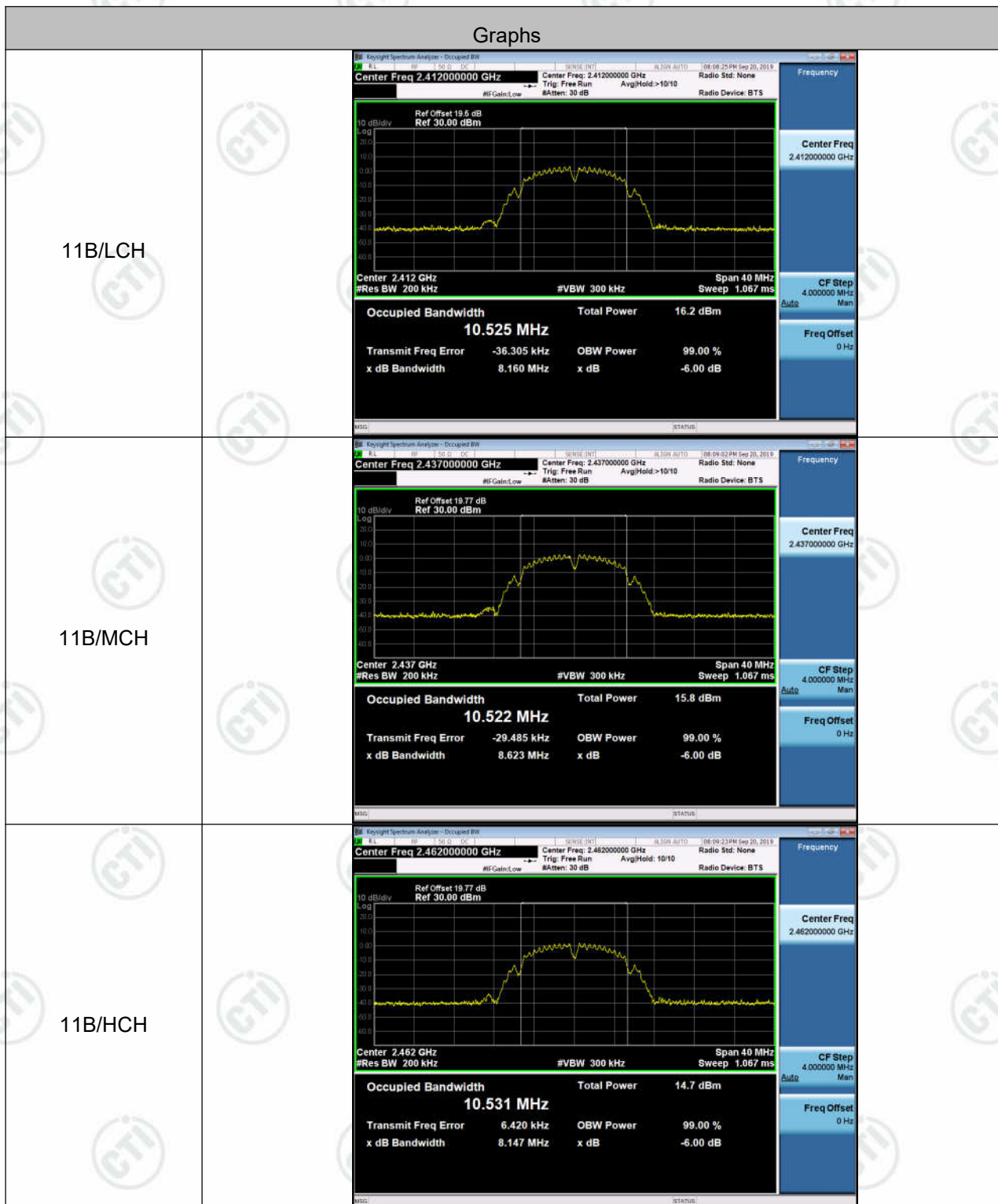
11G/LCH	 KeySight Spectrum Analyzer - Occupied BW Center Freq 2.412000000 GHz Ref Offset 19.5 dB Ref 30.00 dBm Center 2.412 GHz #Res BW 100 kHz Occupied Bandwidth 16.492 MHz Total Power 15.4 dBm Transmit Freq Error 1.395 kHz x dB Bandwidth 16.33 MHz OBW Power 99.00 % x dB -6.00 dB
11G/MCH	 KeySight Spectrum Analyzer - Occupied BW Center Freq 2.437000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.437 GHz #Res BW 100 kHz Occupied Bandwidth 16.471 MHz Total Power 15.5 dBm Transmit Freq Error -2.150 kHz x dB Bandwidth 16.32 MHz OBW Power 99.00 % x dB -6.00 dB
11G/HCH	 KeySight Spectrum Analyzer - Occupied BW Center Freq 2.462000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.462 GHz #Res BW 100 kHz Occupied Bandwidth 16.517 MHz Total Power 15.6 dBm Transmit Freq Error 5.216 kHz x dB Bandwidth 16.34 MHz OBW Power 99.00 % x dB -6.00 dB

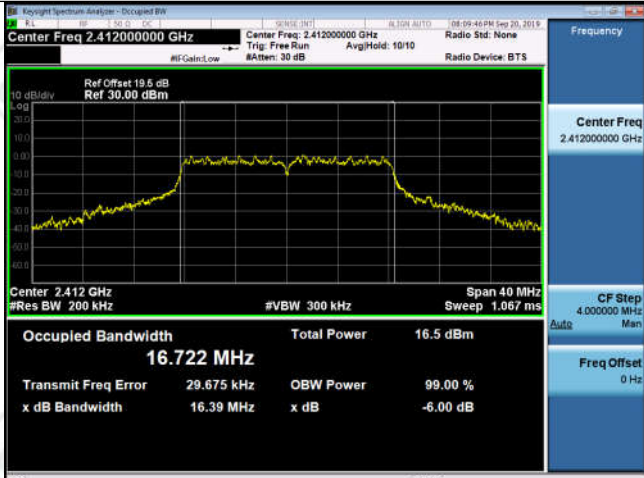
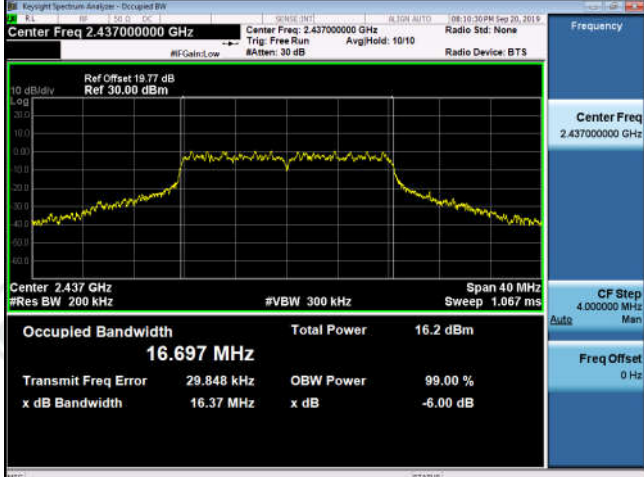
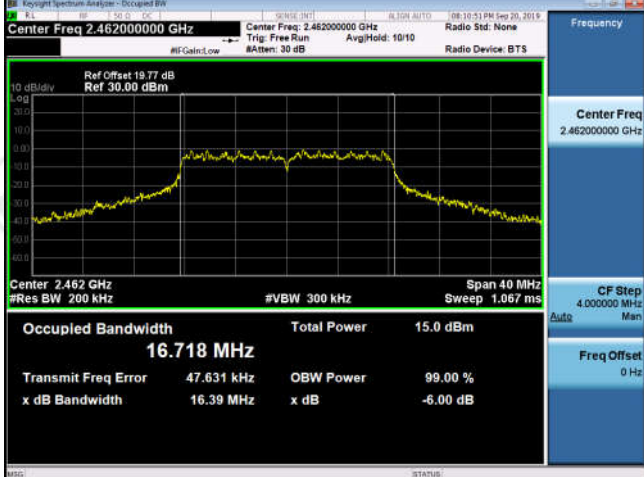
11N20SISO/LCH	 Key: Keysight Spectrum Analyzer - Occupied BW Center Freq 2.412000000 GHz Ref Offset 19.5 dB Ref 30.00 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 40 MHz Sweep 4.267 ms Occupied Bandwidth 17.697 MHz Total Power 14.5 dBm Transmit Freq Error -19.299 kHz OBW Power 99.00 % x dB Bandwidth 17.58 MHz x dB -6.00 dB Frequency Center Freq 2.412000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/MCH	 Key: Keysight Spectrum Analyzer - Occupied BW Center Freq 2.437000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 40 MHz Sweep 4.267 ms Occupied Bandwidth 17.686 MHz Total Power 14.7 dBm Transmit Freq Error -19.501 kHz OBW Power 99.00 % x dB Bandwidth 17.18 MHz x dB -6.00 dB Frequency Center Freq 2.437000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/HCH	 Key: Keysight Spectrum Analyzer - Occupied BW Center Freq 2.462000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 40 MHz Sweep 4.267 ms Occupied Bandwidth 17.690 MHz Total Power 14.9 dBm Transmit Freq Error -18.243 kHz OBW Power 99.00 % x dB Bandwidth 17.16 MHz x dB -6.00 dB Frequency Center Freq 2.462000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz

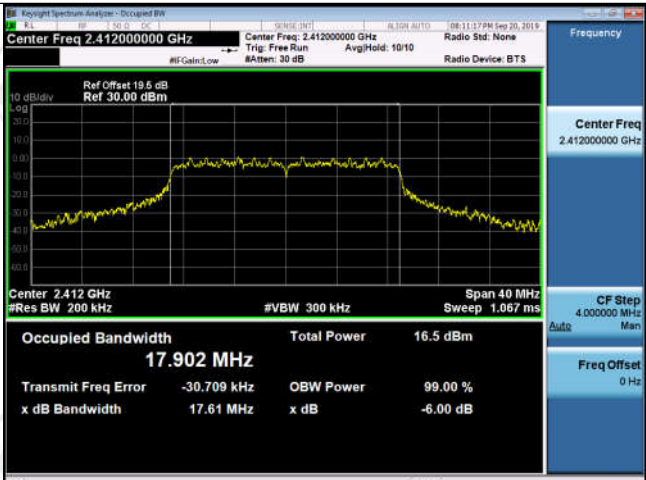
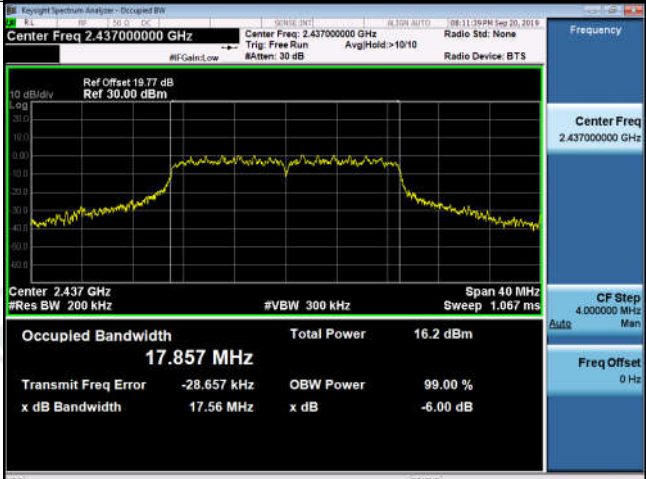
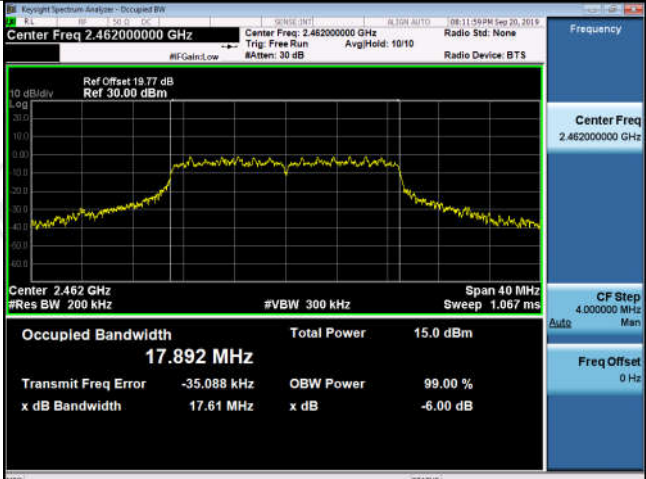
Occupied Bandwidth(99%)

Mode	Channel	99% OBW [MHz]	Verdict
11B	LCH	10.525	PASS
11B	MCH	10.522	PASS
11B	HCH	10.531	PASS
11G	LCH	16.722	PASS
11G	MCH	16.697	PASS
11G	HCH	16.718	PASS
11N20SISO	LCH	17.902	PASS
11N20SISO	MCH	17.857	PASS
11N20SISO	HCH	17.892	PASS

Test Graph



11G/LCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.412000000 GHz Ref Offset 19.5 dB Ref 30.00 dBm Center 2.412 GHz #Res BW 200 kHz #VBW 300 kHz Span 40 MHz Sweep 1.067 ms Occupied Bandwidth 16.722 MHz Total Power 16.5 dBm Transmit Freq Error 29.675 kHz OBW Power 99.00 % x dB Bandwidth 16.39 MHz x dB -6.00 dB Frequency Center Freq 2.412000000 GHz CF Step 4.000000 MHz Freq Offset 0 Hz
11G/MCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.437000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.437 GHz #Res BW 200 kHz #VBW 300 kHz Span 40 MHz Sweep 1.067 ms Occupied Bandwidth 16.697 MHz Total Power 16.2 dBm Transmit Freq Error 29.848 kHz OBW Power 99.00 % x dB Bandwidth 16.37 MHz x dB -6.00 dB Frequency Center Freq 2.437000000 GHz CF Step 4.000000 MHz Freq Offset 0 Hz
11G/HCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.462000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.462 GHz #Res BW 200 kHz #VBW 300 kHz Span 40 MHz Sweep 1.067 ms Occupied Bandwidth 16.718 MHz Total Power 15.0 dBm Transmit Freq Error 47.631 kHz OBW Power 99.00 % x dB Bandwidth 16.39 MHz x dB -6.00 dB Frequency Center Freq 2.462000000 GHz CF Step 4.000000 MHz Freq Offset 0 Hz

11N20SISO/LCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.412000000 GHz Ref Offset 19.5 dB Ref 30.00 dBm Center 2.412 GHz #Res BW 200 kHz #VBW 300 kHz Span 40 MHz Sweep 1.067 ms Occupied Bandwidth 17.902 MHz Total Power 16.5 dBm Transmit Freq Error -30.709 kHz OBW Power 99.00 % x dB Bandwidth 17.61 MHz x dB -6.00 dB Frequency Center Freq 2.412000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/MCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.437000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.437 GHz #Res BW 200 kHz #VBW 300 kHz Span 40 MHz Sweep 1.067 ms Occupied Bandwidth 17.857 MHz Total Power 16.2 dBm Transmit Freq Error -28.657 kHz OBW Power 99.00 % x dB Bandwidth 17.56 MHz x dB -6.00 dB Frequency Center Freq 2.437000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz
11N20SISO/HCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.462000000 GHz Ref Offset 19.77 dB Ref 30.00 dBm Center 2.462 GHz #Res BW 200 kHz #VBW 300 kHz Span 40 MHz Sweep 1.067 ms Occupied Bandwidth 17.892 MHz Total Power 15.0 dBm Transmit Freq Error -35.088 kHz OBW Power 99.00 % x dB Bandwidth 17.61 MHz x dB -6.00 dB Frequency Center Freq 2.462000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz

Appendix C): Band-edge for RF Conducted Emissions

Test Limit

According to §15.247(d),

In any 100 kHz bandwidth outside the authorized frequency band,

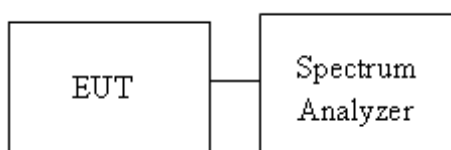
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

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.

Test Setup



Result Table

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	4.857	-43.084	-25.14	PASS
11B	HCH	4.297	-38.038	-25.7	PASS
11G	LCH	0.604	-43.067	-29.40	PASS
11G	HCH	-0.887	-42.887	-30.89	PASS
11N20SISO	LCH	0.042	-42.014	-29.96	PASS
11N20SISO	HCH	-1.555	-43.506	-31.56	PASS

Test Graph



11G/HCH	
11N20SISO/LCH	
11N20SISO/HCH	

Appendix D): RF Conducted Spurious Emissions

Test Limit

According to §15.247(d),

In any 100 kHz bandwidth outside the authorized frequency band,

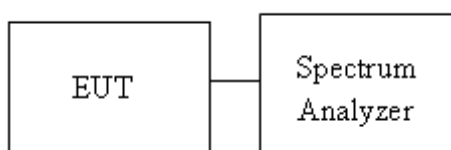
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

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.

Test Setup



Result Table

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
11B	LCH	4.746	<Limit	PASS
11B	MCH	4.869	<Limit	PASS
11B	HCH	4.652	<Limit	PASS
11G	LCH	-1.36	<Limit	PASS
11G	MCH	-1.475	<Limit	PASS
11G	HCH	-1.201	<Limit	PASS
11N20SISO	LCH	-1.911	<Limit	PASS
11N20SISO	MCH	-1.699	<Limit	PASS
11N20SISO	HCH	-1.604	<Limit	PASS

Test Graph







