FCCTest Report

Report No.:	HP191107DC010-FWL
FCC ID:	2ACYT-AZ720
Product Name	wireless module
Test Model:	AZ720
Series Model:	N/A
Received Date:	2019-11-12
Test Date:	2019-11-15~2019-12-12
Issued Date:	2019-12-17
Applicant Name:	SHENZHEN Hitevision Technology Co., Ltd.
Applicant Address:	No. 8, Qinglan 1st Road, Pingshan Shenzhen China
Issued By:	Hwa-Hsing (Dongguan) Testing Co., Ltd.
Lab Address:	No.101, Bld N1,Yuyuan 2Rd, Yuyuan Industrial Park, HuangJiang Town, Dongguan, China
Test Location:	No.101, Bld N1,Yuyuan 2Rd, Yuyuan Industrial Park, HuangJiang Town, Dongguan, China
FCC Designation Number:	CN1255
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

The above equipmenthas been tested by **Hwa-Hsing (Dongguan) Testing Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Dec. 17, 2019

Tank Tan//Engineer

Approved by : _____ , **Date:** Dec. 17, 2019

Harry Li/ Supervisor

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
HP191107DC010-FWL	Original Release	Dec. 17, 2019

1. Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013; KDB 558074 D01 15.247 Meas Guidance v05r02			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -6.35 dB at 0.1545MHz.
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -3.07 dB at 124.5690MHz.
15.247(d)	Band Edge Measurement	Pass	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB Bandwidth	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used. The device is professionally installed

1.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUTas specified in CISPR 16-4-2:
The listed uncertainties are the worst cases uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.66 dB
Radiated Emissions up to 1 GHz	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1000MHz	3.47 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	4.84 dB
	18GHz ~ 40GHz	4.62 dB

1.3 Modification Record

There were no modifications required for compliance.

2. General Information

2.1 General Description of EUT

Product Name	wireless module
Brand Name	N/A
Test Model	AZ720
FCC ID:	2ACYT-AZ720
Identification No. of EUT	N/A
Series Model	N/A
Model Difference	N/A
Status of EUT	Engineeringprototype
Power Supply Rating	DC12V from DC port input
Modulation Type	CCK, DQPSK,DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation technology	DSSS, OFDM
Transfer Rate	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 channels for 802.11b, 802.11g, 802.11n (20MHz) 7channels for 802.11n (40MHz)
Maximum Output Power	13.73dBm
Antenna Type	PCB antenna with 6dBi gain
Antenna Connector	I-PEX
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. Please refer to the EUT photo document (Reference No.:HP190708DC001) for detailed product photo.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.
3. The EUT incorporates a MIMO function. The WLAN function supports CDD mode with dual antenna transmission and dual antenna reception.

Support mode	Frequency band	Transmit and receive mode	Transmit and Receive Chain
802.11b	2412~2462MHz	MIMO	2TX,2RX
802.11g	2412~2462MHz	MIMO	2TX,2RX
802.11n HT20	2412~2462MHz	MIMO	2TX,2RX
802.11n HT40	2422~2452MHz	MIMO	2TX,2RX

2.2 Description of Test Channels

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (40MHz):

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

2.3 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable test items				Description
	RE≥1G	RE<1G	PLC	APCM	
802.11b	√	√	√	√	-
802.11g	√	√	√	√	-
802.11n (20MHz)	√	√	√	√	-
802.11n (40MHz)	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
Note: "-"means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data ratesand antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Tested Channel	Modulation Type	Data Rate (Mbps)
802.11b	1, 6, 11	DSSS	1.0
802.11g	1, 6, 11	OFDM	6.0
802.11n (20MHz)	1, 6, 11	OFDM	7.2
802.11n (40MHz)	3, 6, 9	OFDM	15.0

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data ratesand antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Tested Channel	Modulation Type	Data Rate (Mbps)
802.11b	1, 6, 11	DSSS	1

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data ratesand antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Tested Channel	Modulation Type	Data Rate (Mbps)
802.11b	1, 6, 11	DSSS	1

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	DSSS	1.0
-	802.11g	1 to 11	OFDM	6.0
-	802.11n (20MHz)	1 to 11	OFDM	7.2
-	802.11n (40MHz)	3 to 9	OFDM	15.0

Test Condition:

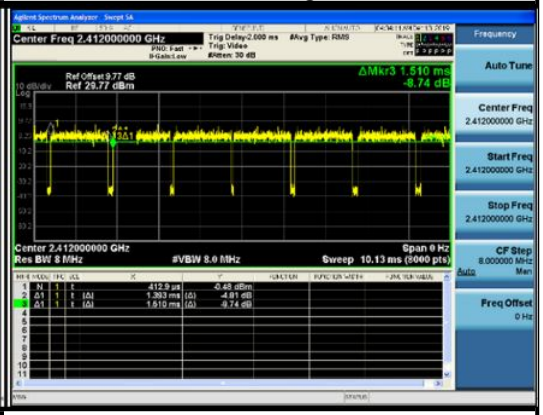
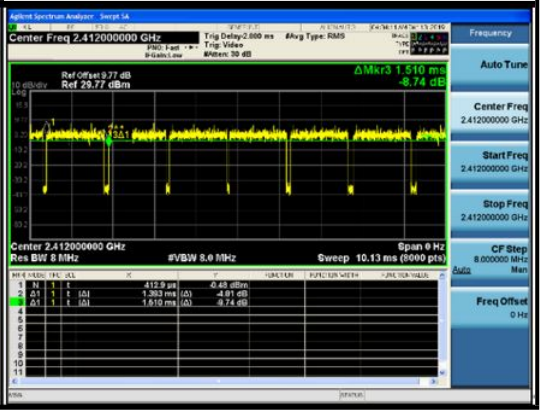
Applicabletest items	Environmental Conditions	Input Power	Tested by
RE≥1G	25deg. C, 65%RH	DC12V from dc port input	Tank Tan
RE<1G	25deg. C, 65%RH	DC12V from dc port input	Tank Tan
PLC	25deg. C, 65 %RH	DC12V from dc port input	Tank Tan
APCM	25deg. C, 65 %RH	DC12V from dc port input	Harry Li

Power setting value from test software:

Mode	Channel Number	FREQ. (MHz)	Power Setting	
			Ant 0	Ant 1
802.11b	1	2412	11	11
	6	2437	11	11
	11	2462	11	11
802.11g	1	2412	11	11
	6	2437	11	11
	11	2462	11	11
802.11 n20	1	2412	11	11
	6	2437	11	11
	11	2462	11	11
802.11 n40	1	2412	11	11
	6	2437	11	11
	11	2462	11	11

2.4 DutyCycleof Test Signal

802.11b: Duty cycle of test signal is 98.16 %, Duty cycle of test signal is >98%
Duty cycle = 8.413/8.570 = 98.16 %,
802.11g: Duty cycle of test signal is 89.30 %, Duty cycle of test signal is <98%
Duty cycle = 1.353/1.515 = 89.30 %,
Duty factor = 10 *log(1/0.893) = 0.49dB
802.11n HT20: Duty cycle of test signal is 97.153 %, Duty cycle of test signal is <98%
Duty cycle = 1.305/1.485= 87.87%,
Duty factor = 10 *log(1/0.878) = 0.56dB
802.11n HT40: Duty cycle of test signal is 94.433 %, Duty cycle of test signal is <98%
Duty cycle = 0.646/0.834= 77.45%,
Duty factor = 10 *log(1/0.944) = 1.11dB

802.11b	802.11g
	
802.11n HT20	802.11n HT40
	

2.5 Description of Support Units

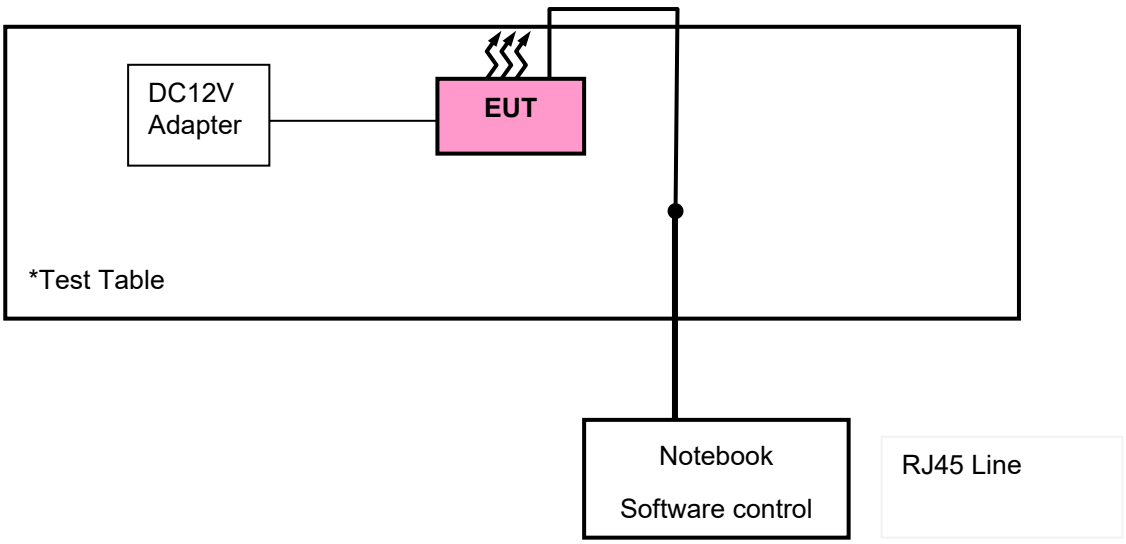
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	Lenovo	TP0093A	PF-12HMBU	N/A
2.	Mouse	DELL	MS111-L	CN-09RRC7-44751-0C6-04TR	N/A
3.	Adapter	ASUS	DC1202000	N/A	N/A

Insert Cable Connections to/from EUT provided by test team.

No.	Signal Cable Description Of The Above Support Units
1.	USB Line: Un-shieldin 1.0m
2.	DC Line: Un-shielding 1.5m
3.	AC Line: Un-shielding 1.5m
4.	RJ 45 cable Un-shielding 10 m

2.6 Configuration of System under Test



2.7 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 v02r01
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3. Test types and results

3.1 Radiated Emission and Bandedge Measurement

3.1.1 Limits of radiated emission andbandedge measurement

Radiated emissions which fall in the restricted bandsmust comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
EMI Test Receiver Rohde&Schwarz	ESCI 7	100962	2019-7-16	2020-7-15
Broadband antenna Schwarzbeck	VULB 9168	00937	2019-10-18	2020-10-17
3m Semi-anechoic Chamber MAORUI	9m*6m*6m	NSEMC003	2018-10-20	2020-10-19
Signal Amplifier Com-power	PAM-103	18020051	2019-10-18	2020-10-17
Attenuator Rohde&Schwarz	TS2GA-6dB	18101101	N/A	N/A
Test software FARAD	FARAD	EZ_EMCV1.1.4.2	N/A	N/A
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	2019-10-18	2020-10-17
Loop Antenna	HLA 6121	45745	2019-10-18	2020-10-17
Preamplifier EMCI	EMC001340	980201	2019-10-18	2020-10-17
Digital Multimete FLUKE	15B+	43512617WS	2019-10-18	2020-10-17
Horn Antenna Schwarzbeck	BBHA 9170	01959	2019-10-18	2020-10-17
Spectrum Analyzer Rohde&Schwarz	FSV-40N	101783	2019-10-18	2020-10-17
Broadband Coaxial Preamplifier Schwarzbeck	BBV 9718	00025	2019-10-18	2020-10-17
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170242	2019-10-18	2020-10-17
Pre-Amplifier EMCI	EMC 184045	980102	2019-10-18	2020-10-17
Spectrum Keysight	N9020A	MY51240612	2019-10-18	2020-10-17
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower&Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA.

2. The test was performed in Chamber 1.

3.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

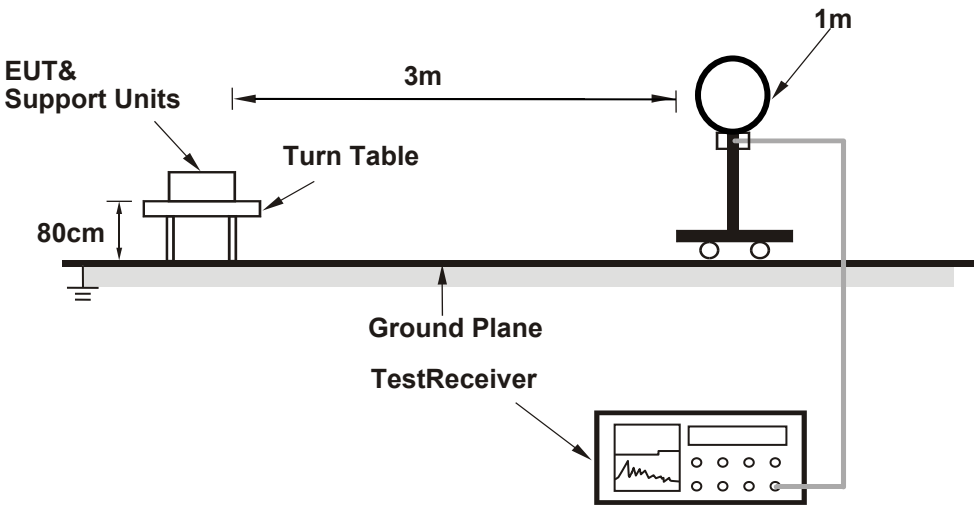
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 Deviation from Test Standard

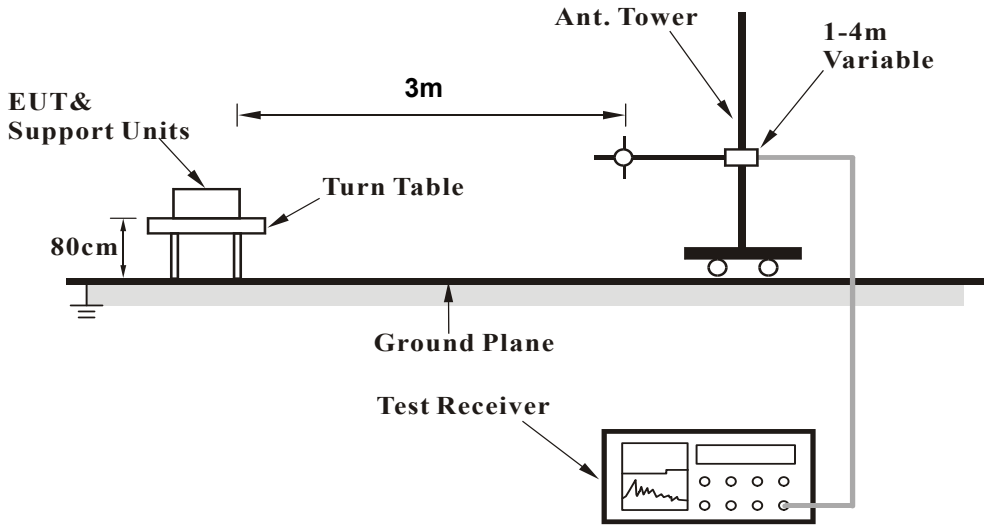
No deviation.

3.1.5 Test Set up

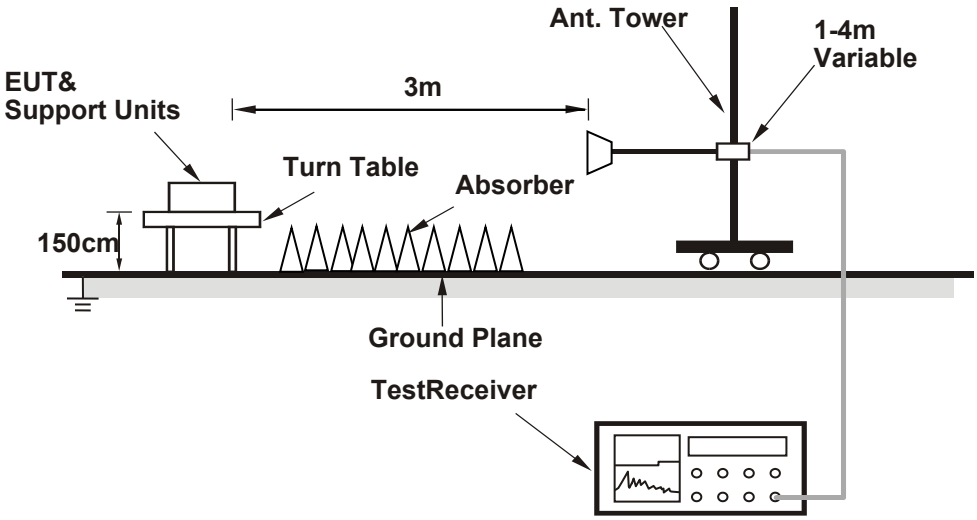
Radiated emission below 30MHz:



Frequency Range below 1GHz:



Frequency Range above 1GHz:



Directional Antenna.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.

b. Set the EUT under transmission condition continuously at specific channel frequency.

3.1.7 Test Results

Above 1GHz Data:

EUT Test Condition:	802.11b: 2412MHz TX		
Test Channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	42.43	-0.77	41.66	74.00	-32.34	peak	140	350	
2	2390.000	29.78	-0.77	29.01	54.00	-24.99	AVG	140	350	
3 *	2412.000	90.72	-0.71	90.01			peak	140	350	
4 *	2412.000	83.34	-0.71	82.63			AVG	140	350	
5	4824.000	43.95	5.59	49.54	74.00	-24.46	peak	114	351	
6	4824.000	36.34	5.59	41.93	54.00	-12.07	AVG	114	351	
7	7236.000	38.87	11.85	50.72	74.00	-23.28	peak	150	143	
8	7236.000	26.67	11.85	38.52	54.00	-15.48	AVG	150	143	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	38.63	-0.77	37.86	74.00	-36.14	peak	254	105	
2	2390.000	27.32	-0.77	26.55	54.00	-27.45	AVG	254	105	
3 *	2412.000	84.91	-0.71	84.20			peak	254	105	
4 *	2412.000	80.35	-0.71	79.64			AVG	254	105	
5	4824.000	45.59	5.59	51.18	74.00	-22.82	peak	300	109	
6	4824.000	38.41	5.59	44.00	54.00	-10.00	AVG	300	109	
7	7236.000	38.57	11.85	50.42	74.00	-23.58	peak	150	225	
8	7236.000	26.67	11.85	38.52	54.00	-15.48	AVG	150	225	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.

EUT Test Condition	802.11b: 2437MHz TX		
Test Channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	90.57	-0.65	89.92			peak	163	348	
2 *	2437.000	82.82	-0.65	82.17			AVG	163	348	
3	4874.000	42.58	6.16	48.74	74.00	-25.26	peak	129	254	
4	4874.000	35.70	6.16	41.86	54.00	-12.14	AVG	129	254	
5	7311.000	39.71	12.10	51.81	74.00	-22.19	peak	148	160	
6	7311.000	27.42	12.10	39.52	54.00	-14.48	AVG	148	160	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	84.47	-0.65	83.82			peak	263	112	
2 *	2437.000	79.89	-0.65	79.24			AVG	263	112	
3	4874.000	44.66	6.16	50.82	74.00	-23.18	peak	294	101	
4	4874.000	37.60	6.16	43.76	54.00	-10.24	AVG	294	101	
5	7311.000	39.89	12.10	51.99	74.00	-22.01	peak	150	293	
6	7311.000	27.48	12.10	39.58	54.00	-14.42	AVG	150	293	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.

EUT Test Condition	802.11b: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2462.000	86.99	-0.58	86.41			peak	100	350	
2 *	2462.000	79.89	-0.58	79.31			AVG	100	350	
3	2483.500	39.77	-0.51	39.26	74.00	-34.74	peak	100	350	
4	2483.500	27.43	-0.51	26.92	54.00	-27.08	AVG	100	350	
5	4924.000	43.80	6.32	50.12	74.00	-23.88	peak	137	213	
6	4924.000	37.29	6.32	43.61	54.00	-10.39	AVG	137	213	
7	7386.000	38.84	12.35	51.19	74.00	-22.81	peak	169	244	
8	7386.000	26.90	12.35	39.25	54.00	-14.75	AVG	169	244	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2462.000	80.72	-0.58	80.14			peak	241	297	
2 *	2462.000	74.23	-0.58	73.65			AVG	241	297	
3	2483.500	40.66	-0.51	40.15	74.00	-33.85	peak	241	297	
4	2483.500	27.38	-0.51	26.87	54.00	-27.13	AVG	241	297	
5	4924.000	42.34	6.32	48.66	74.00	-25.34	peak	186	178	
6	4924.000	33.70	6.32	40.02	54.00	-13.98	AVG	186	178	
7	7386.000	38.97	12.35	51.32	74.00	-22.68	peak	150	63	
8	7386.000	26.82	12.35	39.17	54.00	-14.83	AVG	150	63	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.

EUT Test Condition:	802.11g: 2412MHz TX		
Test Channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	44.27	-0.77	43.50	74.00	-30.50	peak	314	64	
2	2390.000	31.16	-0.77	30.39	54.00	-23.61	AVG	314	64	
3 *	2412.000	93.37	-0.71	92.66			peak	314	64	
4 *	2412.000	77.69	-0.71	76.98			AVG	314	64	
5	4824.000	43.04	5.59	48.63	74.00	-25.37	peak	122	184	
6	4824.000	30.63	5.59	36.22	54.00	-17.78	AVG	122	184	
7	7236.000	40.89	11.85	52.74	74.00	-21.26	peak	178	230	
8	7236.000	26.68	11.85	38.53	54.00	-15.47	AVG	178	230	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	41.71	-0.77	40.94	74.00	-33.06	peak	372	46	
2	2390.000	28.32	-0.77	27.55	54.00	-26.45	AVG	372	46	
3 *	2412.000	89.64	-0.71	88.93			peak	372	46	
4 *	2412.000	72.44	-0.71	71.73			AVG	372	46	
5	4824.000	41.08	5.59	46.67	74.00	-27.33	peak	150	236	
6	4824.000	28.33	5.59	33.92	54.00	-20.08	AVG	150	236	
7	7236.000	39.44	11.85	51.29	74.00	-22.71	peak	100	199	
8	7236.000	26.76	11.85	38.61	54.00	-15.39	AVG	100	199	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.

EUT Test Condition	802.11g: 2437MHz TX		
Test Channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	92.38	-0.65	91.73			peak	286	132	
2 *	2437.000	76.96	-0.65	76.31			AVG	286	132	
3	4874.000	41.43	6.16	47.59	74.00	-26.41	peak	153	265	
4	4874.000	29.81	6.16	35.97	54.00	-18.03	AVG	153	265	
5	7311.000	40.58	12.10	52.68	74.00	-21.32	peak	111	238	
6	7311.000	26.67	12.10	38.77	54.00	-15.23	AVG	111	238	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	88.84	-0.65	88.19			peak	367	52	
2 *	2437.000	71.29	-0.65	70.64			AVG	367	52	
3	4874.000	41.00	6.16	47.16	74.00	-26.84	peak	129	252	
4	4874.000	27.89	6.16	34.05	54.00	-19.95	AVG	129	252	
5	7311.000	40.63	12.10	52.73	74.00	-21.27	peak	103	175	
6	7311.000	26.82	12.10	38.92	54.00	-15.08	AVG	103	175	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.

EUT Test Condition	802.11g: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2462.000	88.00	-0.58	87.42			peak	297	123	
2 *	2462.000	70.74	-0.58	70.16			AVG	297	123	
3	2483.500	40.63	-0.51	40.12	74.00	-33.88	peak	297	123	
4	2483.500	29.88	-0.51	29.37	54.00	-24.63	AVG	297	123	
5	4924.000	42.58	6.32	48.90	74.00	-25.10	peak	172	264	
6	4924.000	28.75	6.32	35.07	54.00	-18.93	AVG	172	264	
7	7386.000	39.39	12.35	51.74	74.00	-22.26	peak	132	246	
8	7386.000	26.55	12.35	38.90	54.00	-15.10	AVG	132	246	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2462.000	83.52	-0.58	82.94			peak	315	49	
2 *	2462.000	68.11	-0.58	67.53			AVG	315	49	
3	2483.500	38.53	-0.51	38.02	74.00	-35.98	peak	315	49	
4	2483.500	26.85	-0.51	26.34	54.00	-27.66	AVG	315	49	
5	4924.000	40.96	6.32	47.28	74.00	-26.72	peak	100	175	
6	4924.000	28.09	6.32	34.41	54.00	-19.59	AVG	100	175	
7	7386.000	39.30	12.35	51.65	74.00	-22.35	peak	141	212	
8	7386.000	26.48	12.35	38.83	54.00	-15.17	AVG	141	212	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.

EUT Test Condition:	802.11n HT20: 2412MHz TX		
Test Channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	44.75	-0.77	43.98	74.00	-30.02	peak	313	52	
2	2390.000	31.56	-0.77	30.79	54.00	-23.21	AVG	313	52	
3 *	2412.000	93.86	-0.71	93.15			peak	313	52	
4 *	2412.000	77.97	-0.71	77.26			AVG	313	52	
5	4824.000	44.10	5.59	49.69	74.00	-24.31	peak	185	231	
6	4824.000	31.12	5.59	36.71	54.00	-17.29	AVG	185	231	
7	7236.000	41.79	11.85	53.64	74.00	-20.36	peak	164	212	
8	7236.000	26.58	11.85	38.43	54.00	-15.57	AVG	164	212	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	43.13	-0.77	42.36	74.00	-31.64	peak	364	58	
2	2390.000	29.08	-0.77	28.31	54.00	-25.69	AVG	364	58	
3 *	2412.000	90.85	-0.71	90.14			peak	364	58	
4 *	2412.000	73.24	-0.71	72.53			AVG	364	58	
5	4824.000	41.26	5.59	46.85	74.00	-27.15	peak	146	238	
6	4824.000	28.47	5.59	34.06	54.00	-19.94	AVG	146	238	
7	7236.000	40.00	11.85	51.85	74.00	-22.15	peak	107	211	
8	7236.000	26.85	11.85	38.70	54.00	-15.30	AVG	107	211	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.

EUT Test Condition	802.11n HT20: 2437MHz TX		
Test Channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	91.97	-0.65	91.32			peak	312	85	
2 *	2437.000	76.72	-0.65	76.07			AVG	312	85	
3	4874.000	40.96	6.16	47.12	74.00	-26.88	peak	100	127	
4	4874.000	29.65	6.16	35.81	54.00	-18.19	AVG	100	127	
5	7311.000	39.69	12.10	51.79	74.00	-22.21	peak	139	288	
6	7311.000	26.55	12.10	38.65	54.00	-15.35	AVG	139	288	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	88.27	-0.65	87.62			peak	100	354	
2 *	2437.000	69.83	-0.65	69.18			AVG	100	354	
3	4874.000	41.16	6.16	47.32	74.00	-26.68	peak	129	252	
4	4874.000	27.97	6.16	34.13	54.00	-19.87	AVG	129	252	
5	7311.000	41.14	12.10	53.24	74.00	-20.76	peak	103	175	
6	7311.000	26.77	12.10	38.87	54.00	-15.13	AVG	103	175	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.

EUT Test Condition	802.11n HT20: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2462.000	88.81	-0.58	88.23			peak	342	43	
2 *	2462.000	71.98	-0.58	71.40			AVG	342	43	
3	2483.500	41.85	-0.51	41.34	74.00	-32.66	peak	342	43	
4	2483.500	30.77	-0.51	30.26	54.00	-23.74	AVG	342	43	
5	4924.000	43.31	6.32	49.63	74.00	-24.37	peak	150	222	
6	4924.000	28.97	6.32	35.29	54.00	-18.71	AVG	150	222	
7	7386.000	40.11	12.35	52.46	74.00	-21.54	peak	148	315	
8	7386.000	26.59	12.35	38.94	54.00	-15.06	AVG	148	315	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2462.000	83.74	-0.58	83.16			peak	142	238	
2 *	2462.000	68.72	-0.58	68.14			AVG	142	238	
3	2483.500	40.19	-0.51	39.68	74.00	-34.32	peak	142	238	
4	2483.500	27.63	-0.51	27.12	54.00	-26.88	AVG	142	238	
5	4924.000	41.19	6.32	47.51	74.00	-26.49	peak	127	201	
6	4924.000	28.33	6.32	34.65	54.00	-19.35	AVG	127	201	
7	7386.000	39.37	12.35	51.72	74.00	-22.28	peak	165	154	
8	7386.000	26.73	12.35	39.08	54.00	-14.92	AVG	165	154	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.

EUT Test Condition:	802.11n HT40: 2422MHz TX		
Test Channel	Channel 3	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	47.34	-0.77	46.57	74.00	-27.43	peak	309	60	
2	2390.000	33.33	-0.77	32.56	54.00	-21.44	AVG	309	60	
3 *	2422.000	88.10	-0.68	87.42			peak	309	60	
4 *	2422.000	69.35	-0.68	68.67			AVG	309	60	
5	4844.000	43.64	5.82	49.46	74.00	-24.54	peak	132	189	
6	4844.000	29.84	5.82	35.66	54.00	-18.34	AVG	132	189	
7	7266.000	39.69	11.94	51.63	74.00	-22.37	peak	150	287	
8	7266.000	26.96	11.94	38.90	54.00	-15.10	AVG	150	287	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	2390.000	44.83	-0.77	44.06	74.00	-29.94	peak	331	48	
2	2390.000	30.20	-0.77	29.43	54.00	-24.57	AVG	331	48	
3 *	2422.000	84.51	-0.68	83.83			peak	331	48	
4 *	2422.000	63.19	-0.68	62.51			AVG	331	48	
5	4844.000	43.64	5.82	49.46	74.00	-24.54	peak	121	227	
6	4844.000	29.84	5.82	35.66	54.00	-18.34	AVG	121	227	
7	7266.000	39.69	11.94	51.63	74.00	-22.37	peak	100	142	
8	7266.000	26.96	11.94	38.90	54.00	-15.10	AVG	100	142	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2422MHz: Fundamental frequency.

EUT Test Condition	802.11n HT40: 2437MHz TX		
Test Channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	88.91	-0.65	88.26			peak	316	62	
2 *	2437.000	70.47	-0.65	69.82			AVG	316	62	
3	4874.000	44.31	6.16	50.47	74.00	-23.53	peak	128	230	
4	4874.000	30.05	6.16	36.21	54.00	-17.79	AVG	128	230	
5	7311.000	40.64	12.10	52.74	74.00	-21.26	peak	142	190	
6	7311.000	27.15	12.10	39.25	54.00	-14.75	AVG	142	190	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2437.000	82.07	-0.65	81.42			peak	362	50	
2 *	2437.000	64.63	-0.65	63.98			AVG	362	50	
3	4874.000	44.62	6.16	50.78	74.00	-23.22	peak	100	192	
4	4874.000	30.42	6.16	36.58	54.00	-17.42	AVG	100	192	
5	7311.000	40.88	12.10	52.98	74.00	-21.02	peak	187	233	
6	7311.000	27.17	12.10	39.27	54.00	-14.73	AVG	187	233	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.

EUT Test Condition	802.11n HT40: 2452MHz TX		
Test Channel	Channel 9	Frequency Range	1GHz ~ 25GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2452.000	85.75	-0.61	85.14			peak	136	349	
2 *	2452.000	65.33	-0.61	64.72			AVG	136	349	
3	2483.500	44.19	-0.51	43.68	74.00	-30.32	peak	136	349	
4	2483.500	28.94	-0.51	28.43	54.00	-25.57	AVG	136	349	
5	4904.000	41.85	6.46	48.31	74.00	-25.69	peak	101	287	
6	4904.000	29.99	6.46	36.45	54.00	-17.55	AVG	101	287	
7	7356.000	39.63	12.25	51.88	74.00	-22.12	peak	142	176	
8	7356.000	26.80	12.25	39.05	54.00	-14.95	AVG	142	176	
Antennal Polarity&TestDistance: Vertical at 3 m										
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1 *	2452.000	79.89	-0.61	79.28			peak	254	152	
2 *	2452.000	60.48	-0.61	59.87			AVG	254	152	
3	2483.500	40.69	-0.51	40.18	74.00	-33.82	peak	254	152	
4	2483.500	26.88	-0.51	26.37	54.00	-27.63	AVG	254	152	
5	4904.000	40.99	6.46	47.45	74.00	-26.55	peak	138	175	
6	4904.000	28.67	6.46	35.13	54.00	-18.87	AVG	138	175	
7	7356.000	39.21	12.25	51.46	74.00	-22.54	peak	100	326	
8	7356.000	26.72	12.25	38.97	54.00	-15.03	AVG	100	326	

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2452MHz: Fundamental frequency.

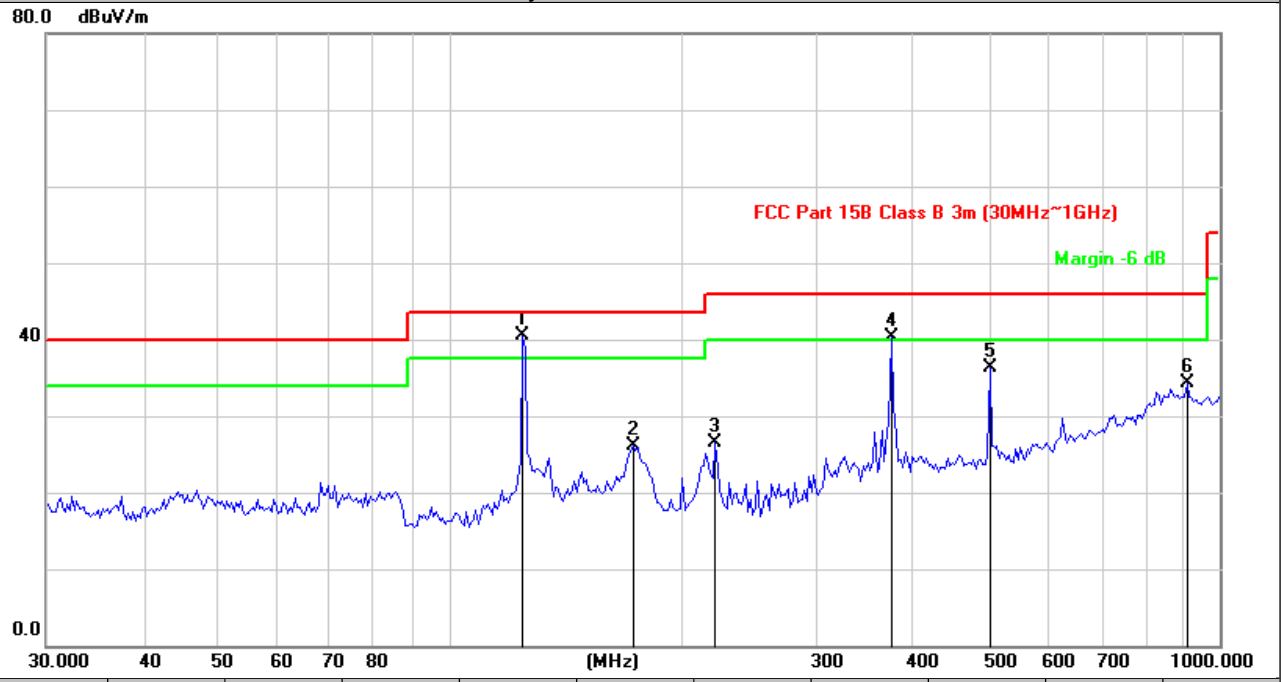
9kHz ~ 30MHz Data:

The amplitude of spurious emissions attenuated more than 20dB below the permissible value is not required to be report.

30MHz ~ 1GHz Worst-Case Data:

EUT Test Condition	802.11b 2462MHz TX		
Test Channel	Channel 11	Frequency Range	30MHz ~ 1GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank tan

Antennal Polarity&TestDistance: Horizontal at 3 m



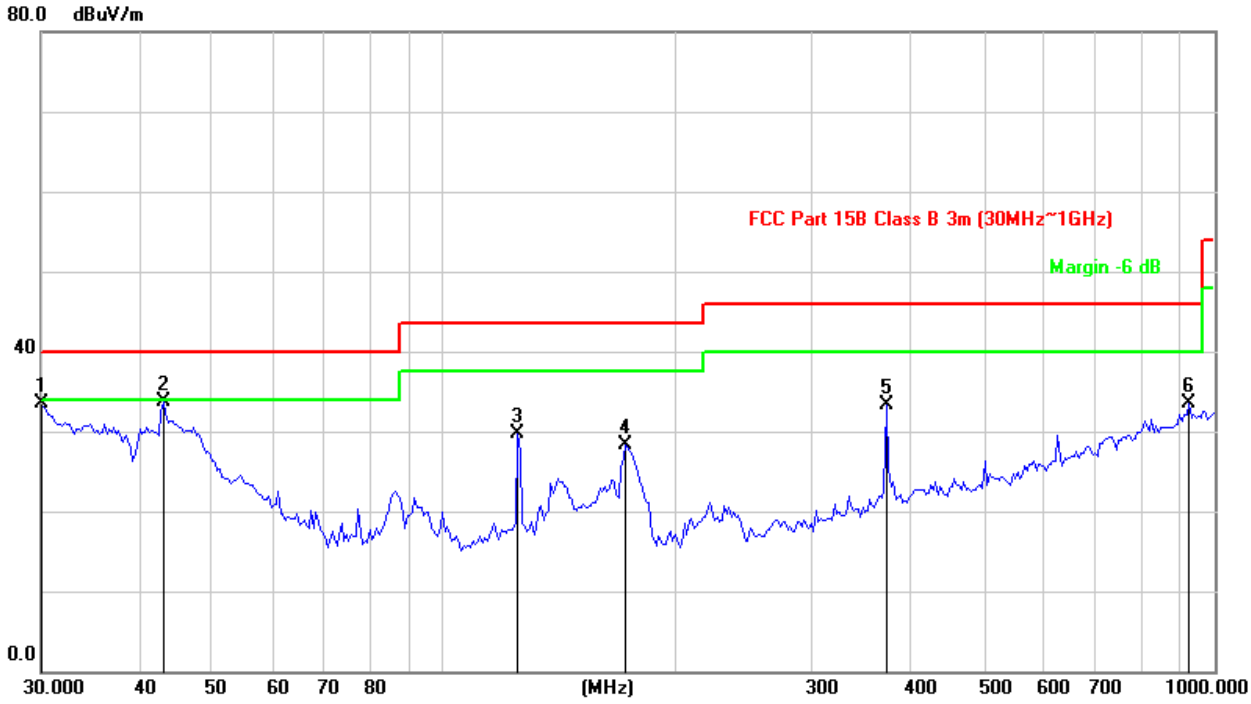
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	124.5690	55.11	-14.68	40.43	43.50	-3.07	QP	200	147	-
2	173.2050	39.33	-13.28	26.05	43.50	-17.45	QP	200	296	-
3	221.3920	42.29	-15.82	26.47	46.00	-19.53	QP	200	173	-
4	374.6225	50.27	-9.93	40.34	46.00	-5.66	QP	200	230	-
5	502.9395	43.90	-7.57	36.33	46.00	-9.67	QP	200	228	-
6	906.4823	32.72	1.51	34.23	46.00	-11.77	QP	100	125	-

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value

EUT Test Condition	802.11g:2462MHz TX		
Channel	Channel 11	Frequency Range	30MHz ~ 1GHz
Input Power	DC 12V from adapter	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25deg. C, 65%RH	Tested By	Tank Tan

Antennal Polarity&TestDistance: Vertical at 3 m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecter	Antenna Height (cm)	Table Angle (Degree)	Remark
1	30.0000	50.55	-17.12	33.43	40.00	-6.57	QP	100	211	-
2	43.2017	48.37	-14.68	33.69	40.00	-6.31	QP	100	132	-
3	124.5690	44.43	-14.68	29.75	43.50	-13.75	QP	100	150	-
4	171.9946	41.60	-13.27	28.33	43.50	-15.17	QP	100	179	-
5	374.6225	43.29	-9.93	33.36	46.00	-12.64	QP	100	266	-
6	925.7563	31.73	1.87	33.60	46.00	-12.40	QP	100	231	-

Remarks:

1.Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)

2.Margin value = Emission level – Limit value

3.2 Conducted Emission Measurement

3.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
EMI Test Receiver Rohde&Schwarz	ESCI3	101418	2019-09-18	2020-09-17
Artificial Mains Network Rohde&Schwarz	ENV216	3560.6550.15	2019-10-18	2020-10-17
Test software FARAD	EZ_EMC V1.1.4.2	N/A	N/A	N/A
Hygrothermograph Yuhuaze	HTC-1	NA	2019-10-18	2020-10-17
Digital Multimeter FLUKE	15B+	43512617WS	2019-10-18	2020-10-17

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA.
2. The test was performed in Shielded Room 1.

3.2.3 Test Procedures

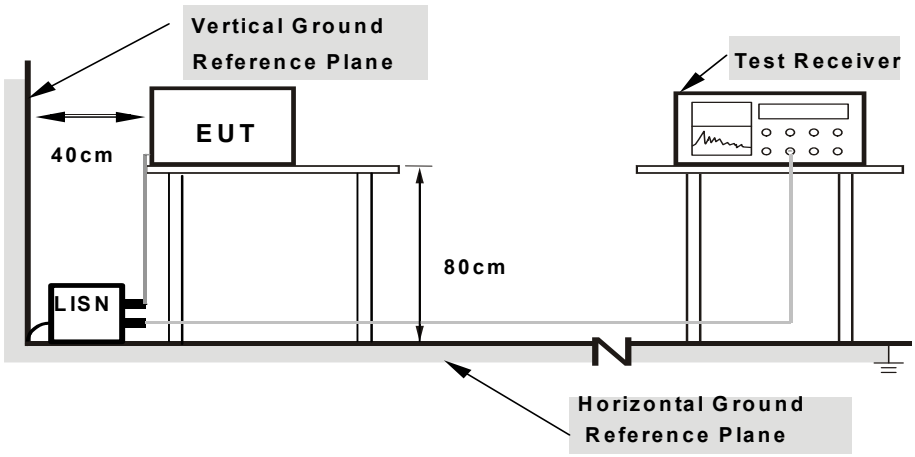
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB)was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 Deviationfrom Test Standard

No deviation.

3.2.5 Test setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.2.6 EUT Operating Conditions

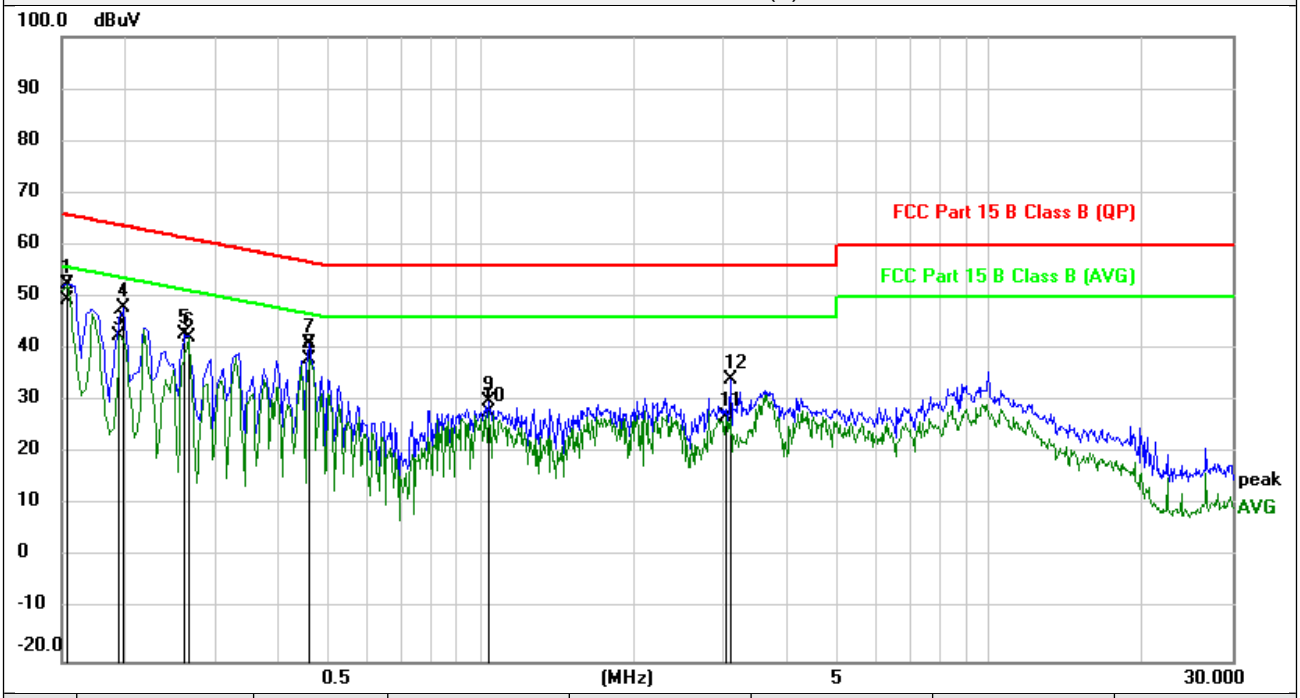
a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

3.2.7 Test Results

Conducted worst-case data (802.11b CH1)

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution andwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	DC 12V from adapter	Environmental Conditions	25℃, 60%RH
Tested by	Tank Tan	Test Date	2019/11/24

Phase Of Power: Line (L)



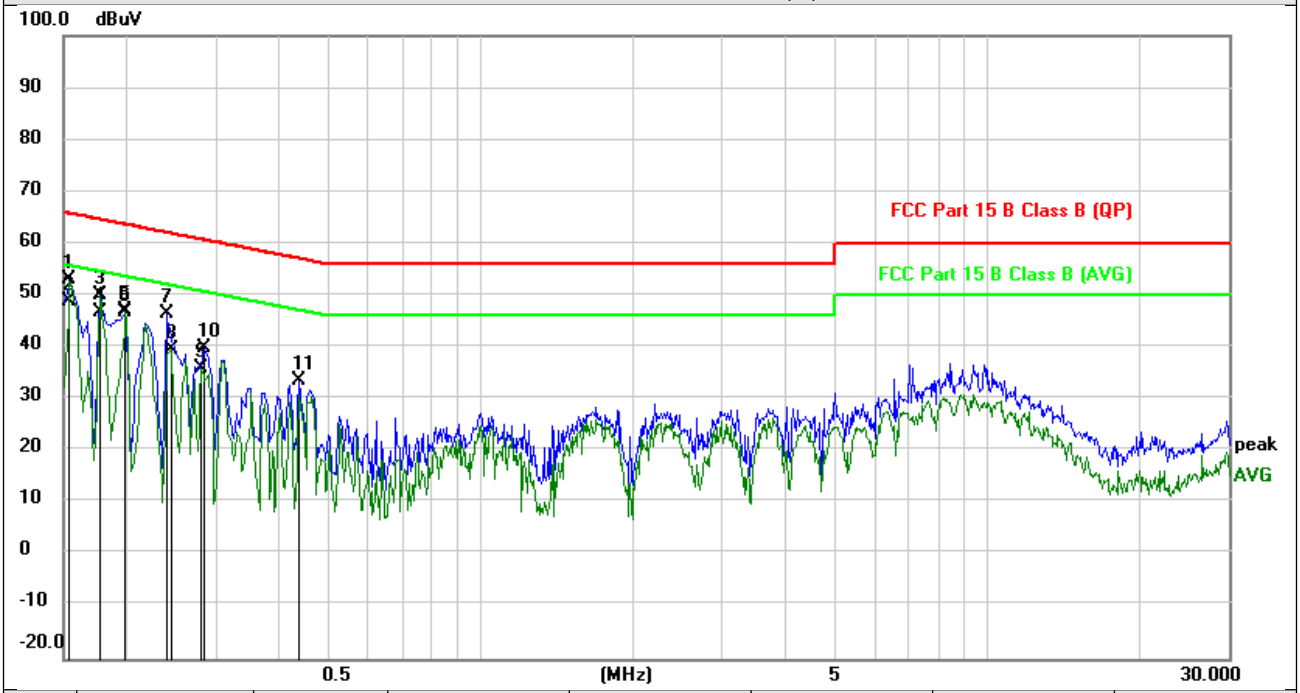
No	Frequency (MHz)	Reading (dBuV)	Correct Factor dB	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark Detecter
1	0.1545	42.92	9.65	52.57	65.75	-13.18	QP
2	0.1545	39.75	9.65	49.40	55.75	-6.35	AVG
3	0.1995	38.30	9.62	47.92	63.63	-15.71	QP
4	0.1949	33.05	9.62	42.67	53.83	-11.16	AVG
5	0.2625	33.11	9.62	42.73	61.35	-18.62	QP
6	0.2670	32.59	9.62	42.21	51.21	-9.00	AVG
7	0.4605	31.43	9.59	41.02	56.68	-15.66	QP
8	0.4605	28.34	9.59	37.93	46.68	-8.75	AVG
9	1.0365	20.28	9.55	29.83	56.00	-26.17	QP
10	1.0365	18.38	9.55	27.93	46.00	-18.07	AVG
11	3.1020	24.50	9.57	34.07	56.00	-21.93	QP
12	3.0345	17.49	9.57	27.06	46.00	-18.94	AVG

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution andwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	DC 12V from adapter	Environmental Conditions	25℃, 60%RH
Tested by	Tank Tan	Test Date	2019/11/24

Phase Of Power: Neutral (N)



No	Frequency (MHz)	Reading (dBuV)	Correct Factor dB	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark Detecter
1	0.1545	43.30	9.65	52.95	65.75	-12.80	QP
2	0.1545	39.23	9.65	48.88	55.75	-6.87	AVG
3	0.1770	40.43	9.63	50.06	64.63	-14.57	QP
4	0.1770	37.02	9.63	46.65	54.63	-7.98	AVG
5	0.1995	37.40	9.62	47.02	63.63	-16.61	QP
6	0.1995	37.19	9.62	46.81	53.63	-6.82	AVG
7	0.2400	36.97	9.62	46.59	62.10	-15.51	QP
8	0.2445	29.92	9.62	39.54	51.94	-12.40	AVG
9	0.2850	30.36	9.61	39.97	60.67	-20.70	QP
10	0.2805	26.48	9.61	36.09	50.80	-14.71	AVG
11	0.4380	23.92	9.58	33.50	57.10	-23.60	QP

REMARKS:

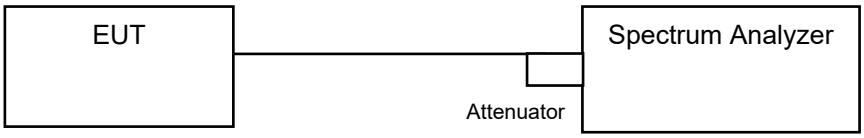
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

3.3 6dB Bandwidth Measurement

3.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 Test Setup



3.3.3 Test Instruments

Refer to section 10.1 to get information of above instrument.

3.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associatedwith the two amplitude points (upper and lower) that are attenuated by 6 dB relative to themaximum level measured in the fundamental emission

3.3.5 DeviationfromTest Standard

No deviation.

3.3.6 EUT Operating Conditions

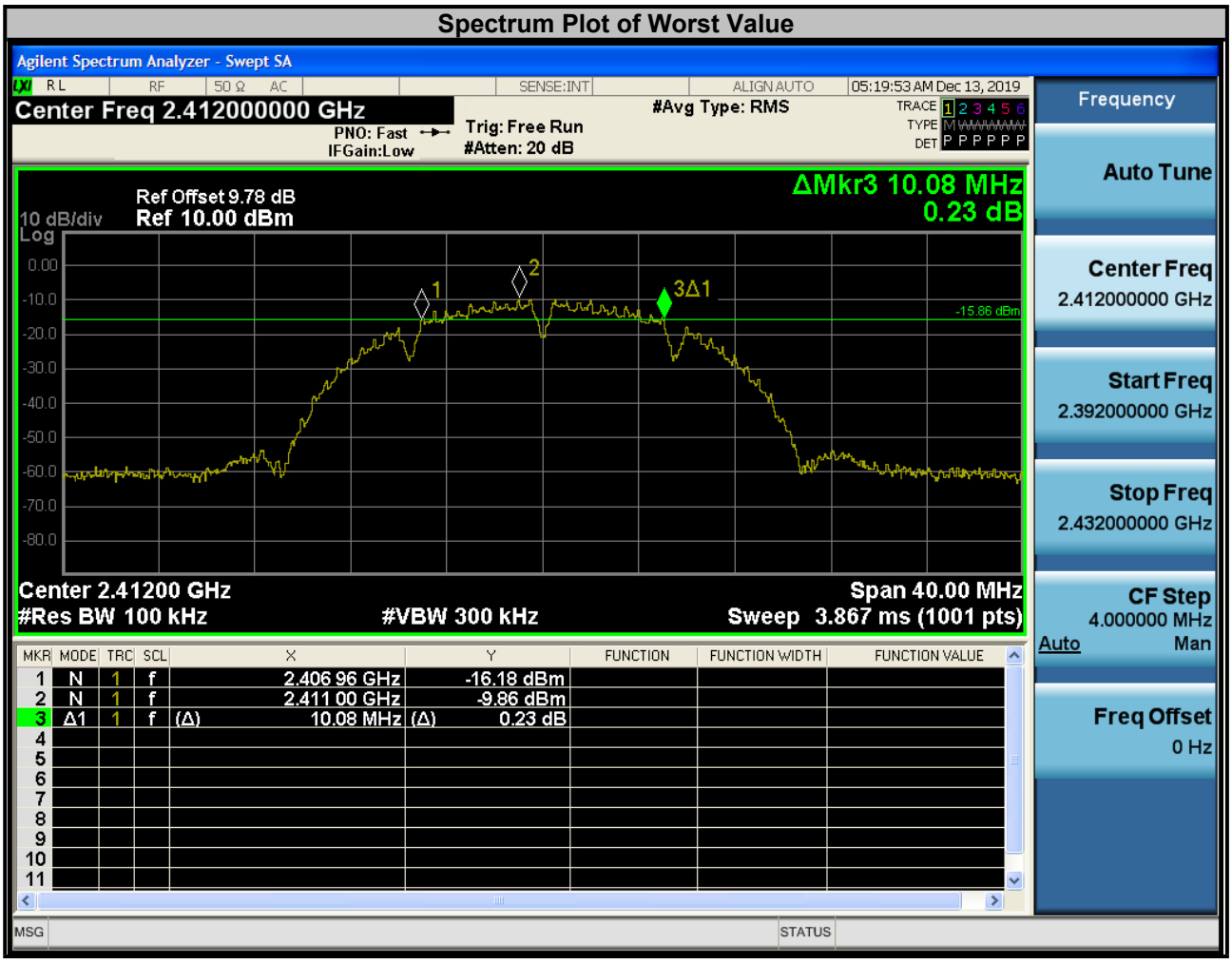
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth(MHz)		Minimum Limit (MHz)	Pass / Fail
		Ant 0	Ant 1		
1	2412	9.82	10.08	0.5	Pass
6	2437	9.82	9.86	0.5	Pass
11	2462	10.06	9.82	0.5	Pass

Spectrum Plot of Worst Value



802.11g

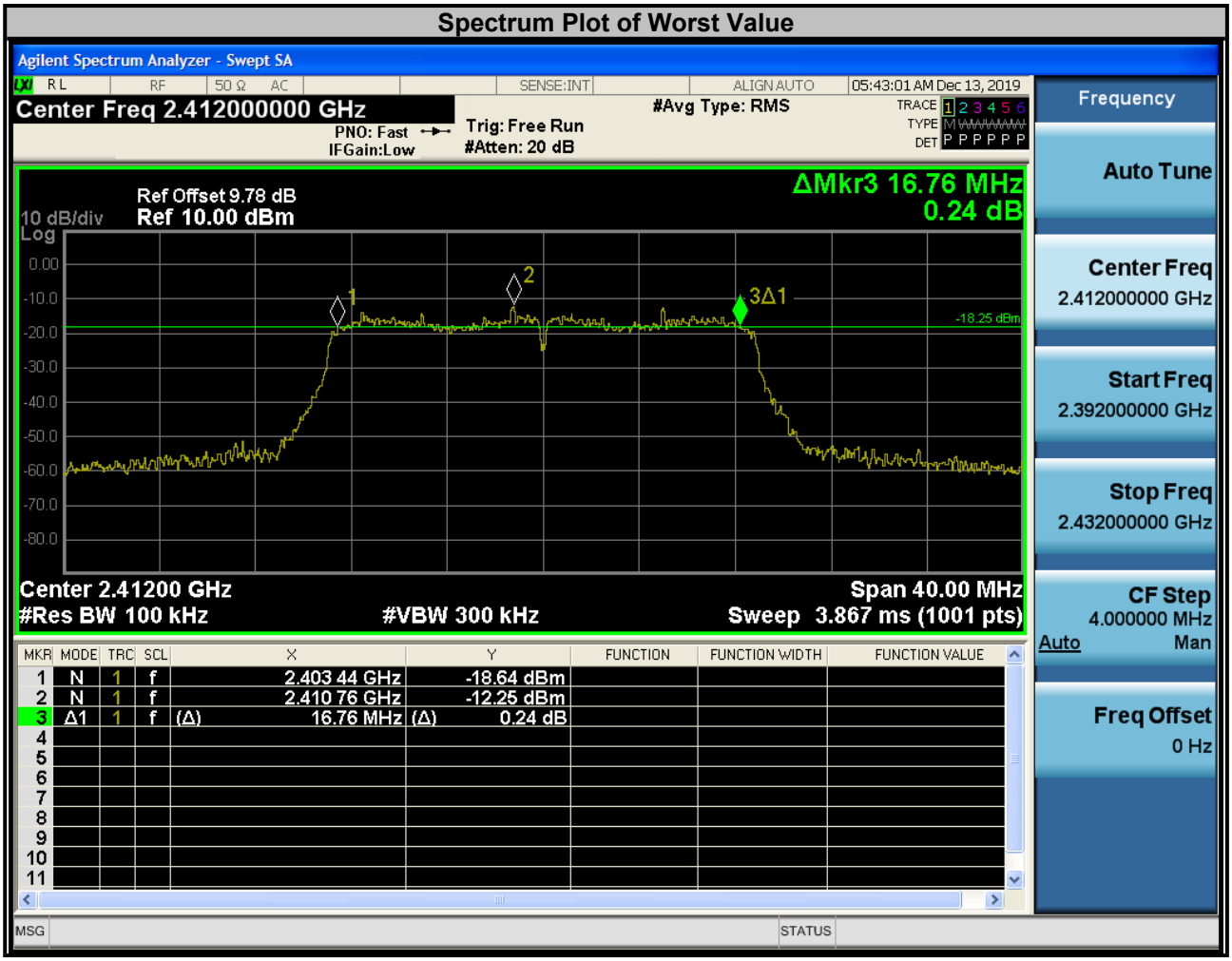
Channel	Frequency (MHz)	6dB Bandwidth(MHz)		Minimum Limit (MHz)	Pass / Fail
		Ant 0	Ant 1		
1	2412	16.36	16.40	0.5	Pass
6	2437	16.40	16.36	0.5	Pass
11	2462	16.40	16.40	0.5	Pass

Spectrum Plot of Worst Value

802.11n HT20

Channel	Frequency (MHz)	6dB Bandwidth(MHz)		Minimum Limit (MHz)	Pass / Fail
		Ant 0	Ant 1		
1	2412	16.56	16.76	0.5	Pass
6	2437	16.76	16.64	0.5	Pass
11	2462	16.36	16.72	0.5	Pass

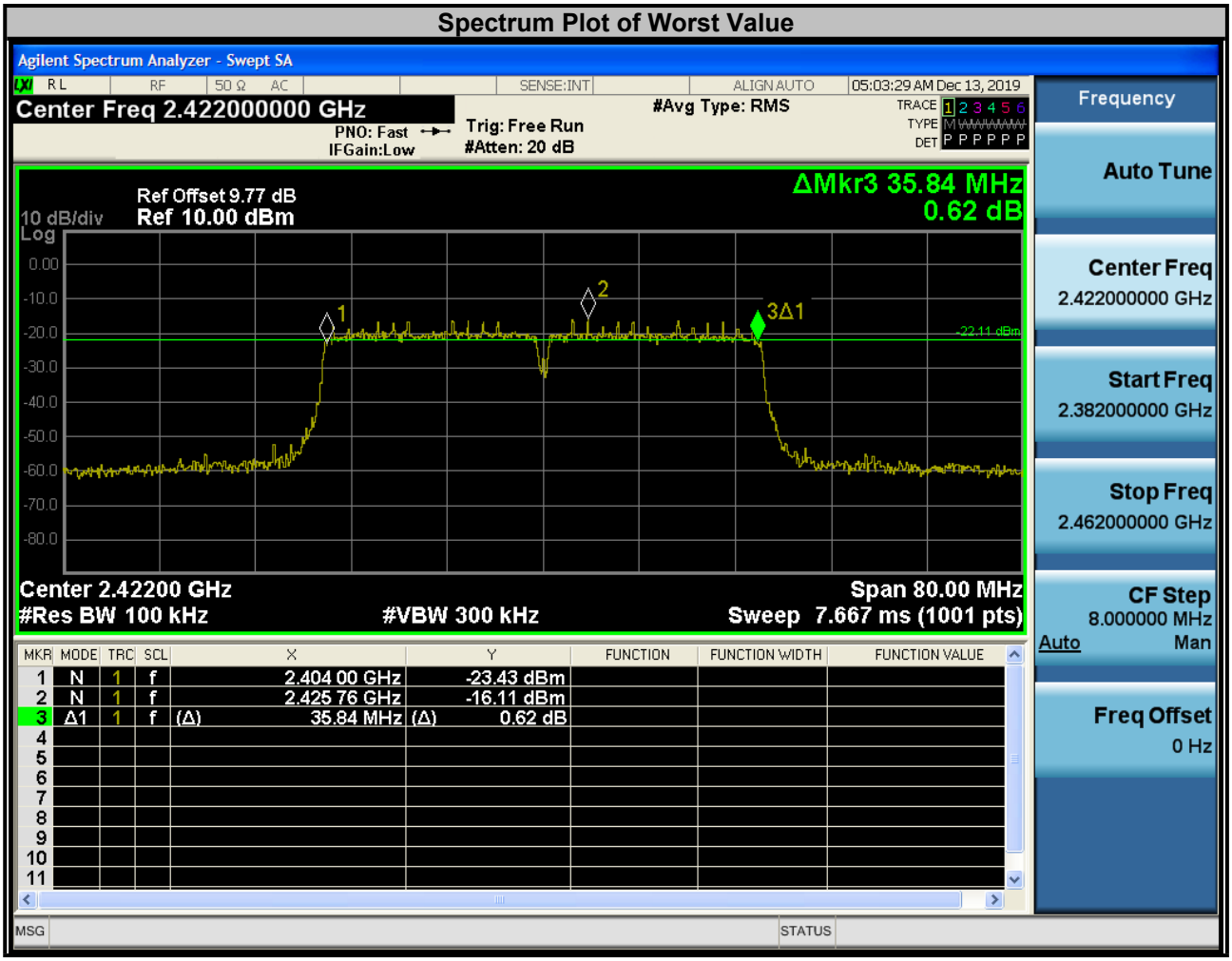
Spectrum Plot of Worst Value



802.11n HT40

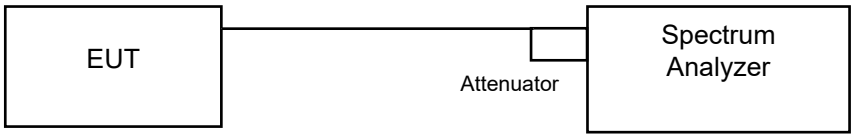
Channel	Frequency (MHz)	6dB Bandwidth(MHz)		Minimum Limit (MHz)	Pass / Fail
		Ant 0	Ant 1		
3	2422	35.84	35.60	0.5	Pass
6	2437	36.48	35.68	0.5	Pass
9	2452	35.44	35.84	0.5	Pass

Spectrum Plot of Worst Value



3.4 Occupied Bandwidth Measurement

3.4.1 Test Setup



3.4.2 Test Instruments

Refer to section 10.1 to get information of above instrument.

3.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidthand set the detector to peak. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.4.4 Deviation from Test Standard

No deviation.

3.4.5 EUT Operating Conditions

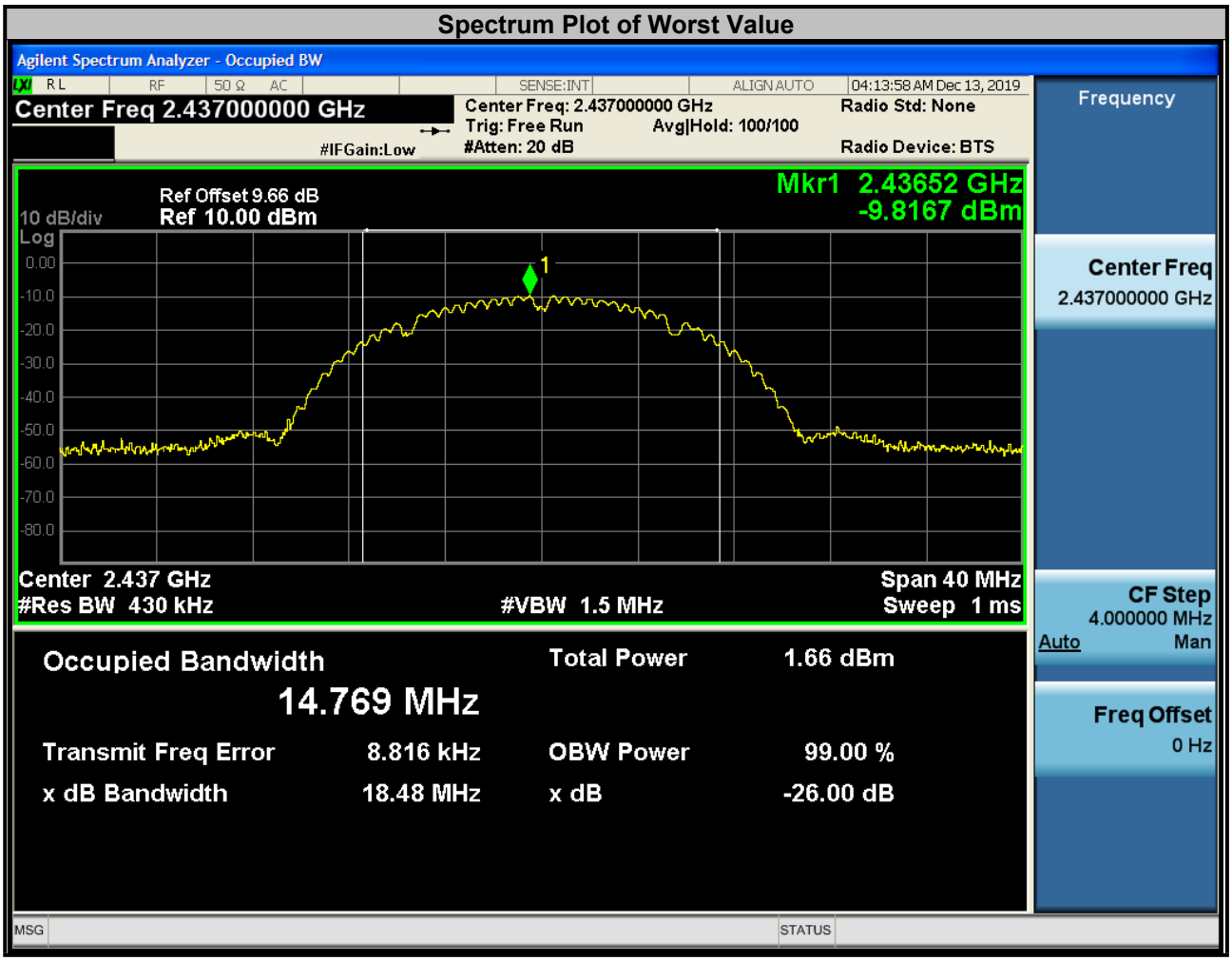
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.4.6 Test Results

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Ant 0	Ant 1	
1	2412	14.752	14.701	Pass
6	2437	14.769	14.760	Pass
11	2462	14.746	14.708	Pass

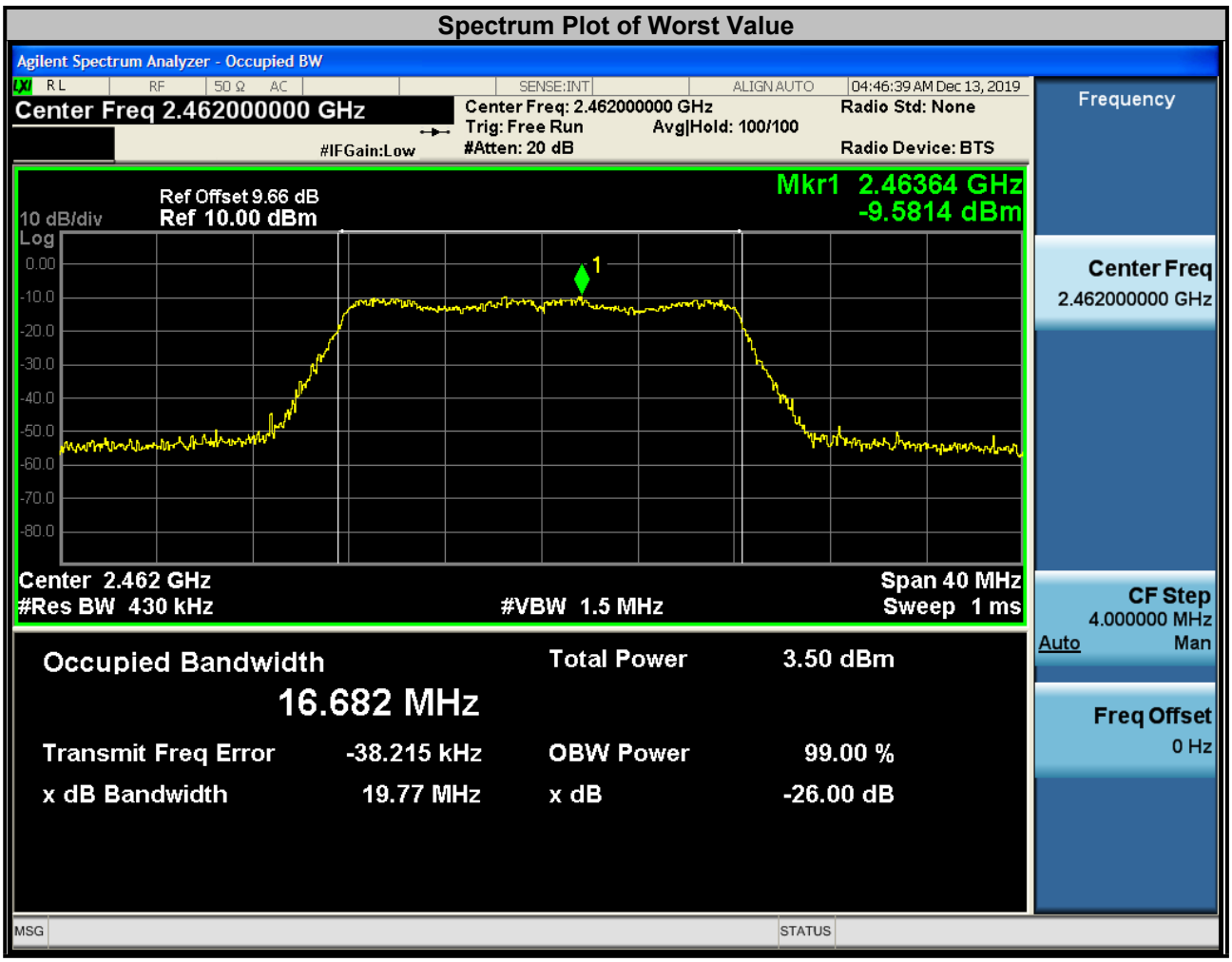
Spectrum Plot of Worst Value



802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Ant 0	Ant 1	
1	2412	16.768	16.623	Pass
6	2437	16.723	16.667	Pass
11	2462	16.682	16.676	Pass

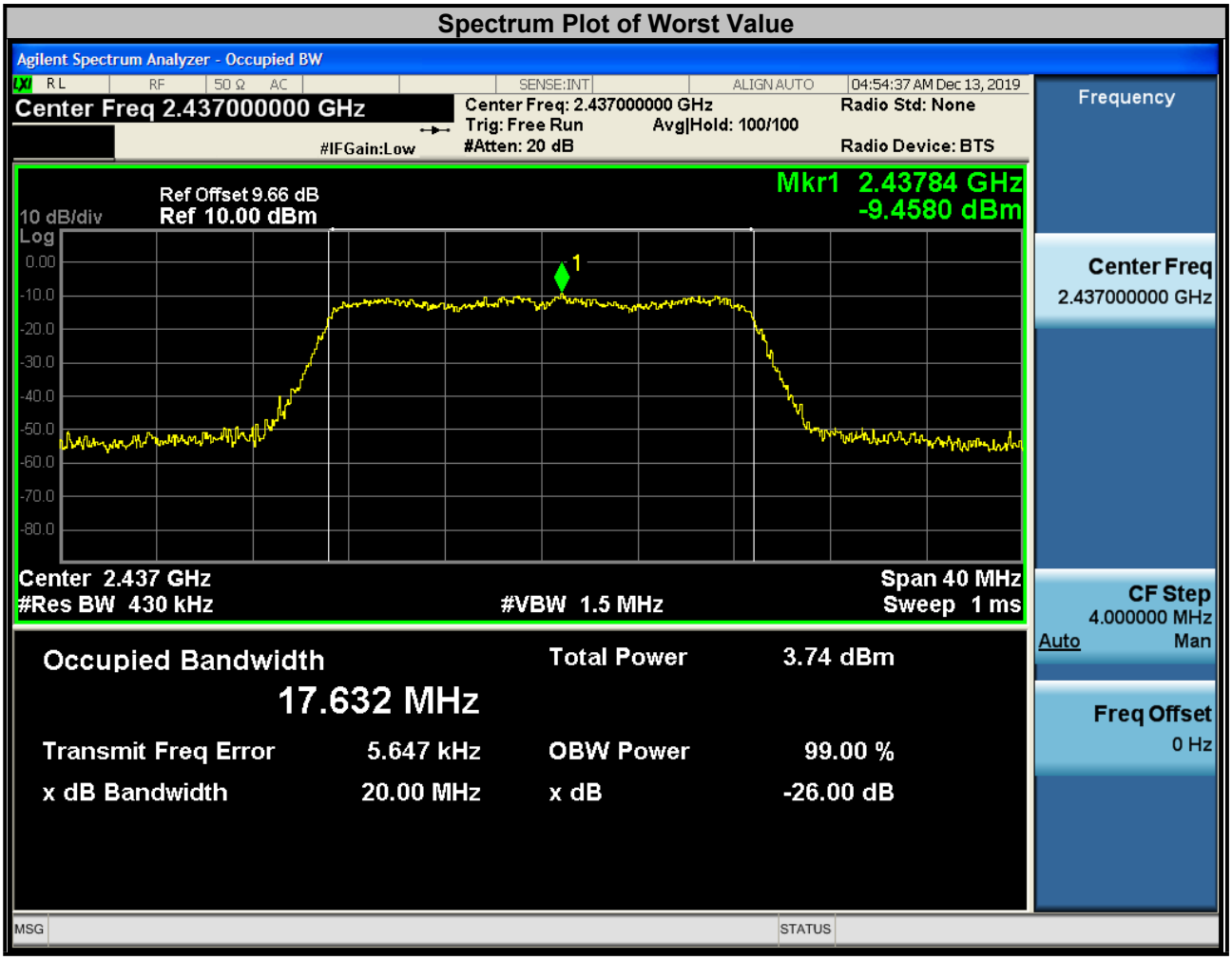
Spectrum Plot of Worst Value



802.11n HT20

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Ant 0	Ant 1	
1	2412	17.619	17.619	Pass
6	2437	17.632	17.627	Pass
11	2462	17.611	17.566	Pass

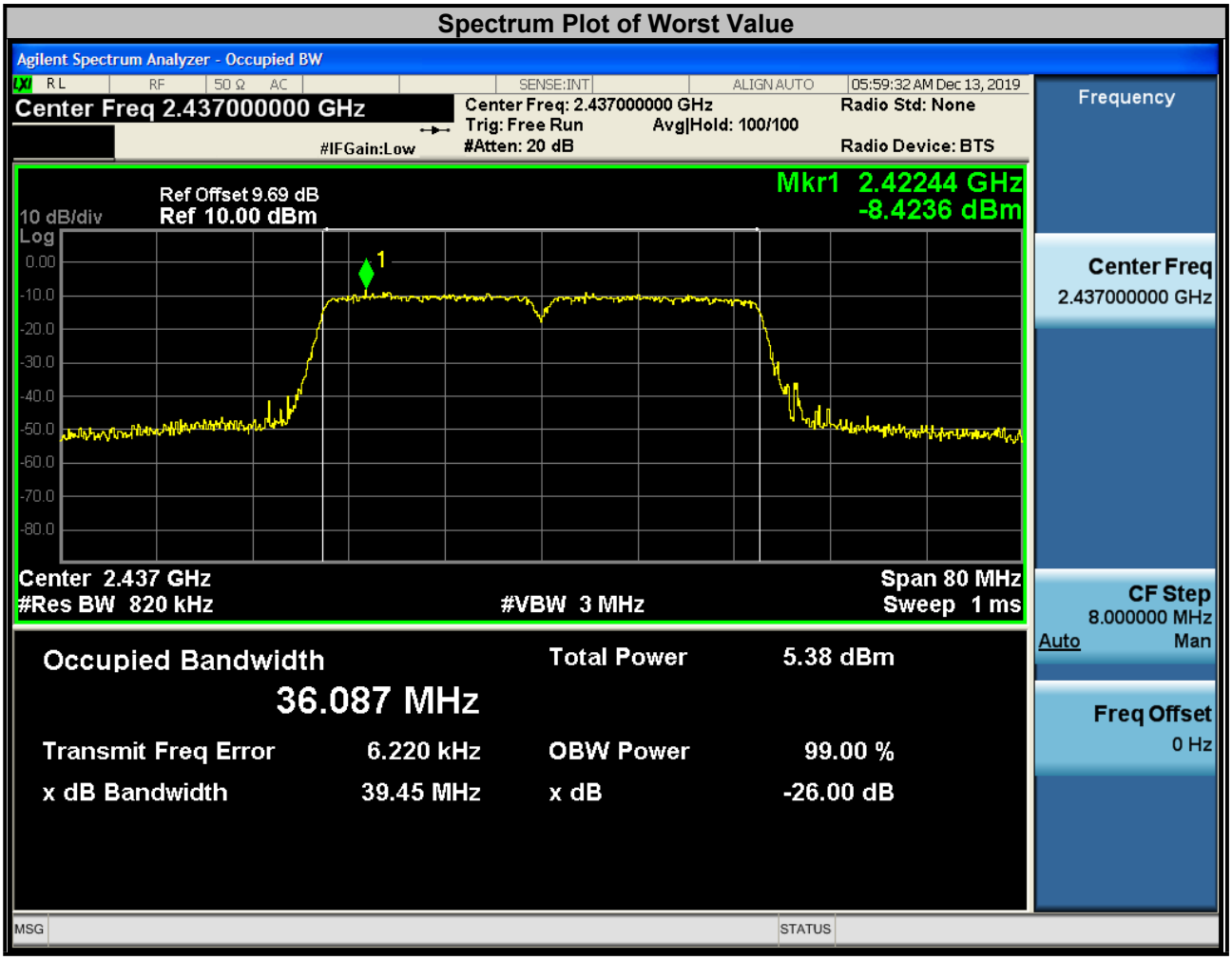
Spectrum Plot of Worst Value



802.11n HT40

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Ant 0	Ant 1	
3	2422	36.063	36.058	Pass
6	2437	36.065	36.087	Pass
9	2452	36.064	36.038	Pass

Spectrum Plot of Worst Value

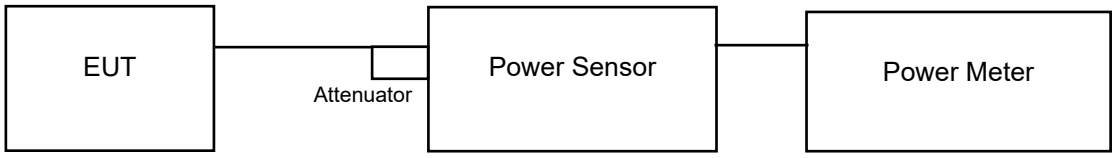


3.5 Conducted Output Power Measurement

3.5.1 Limits ofConducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHzbands: 1 Watt (30dBm)

3.5.2 Test Setup



3.5.3 TestInstruments

Refer to section 10.1 to get information of above instrument.

3.5.4 Test Procedures

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

3.5.5 Deviationfrom Test Standard

No deviation.

3.5.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.5.7 Test Results

802.11b

CH.	Fre. (MHz)	AveragePower (mW)		Average Power (dBm)		Total power (mW)	Total power (dBm)	Limit (dBm)
		Ant 0	Ant1	Ant 0	Ant1			
1	2412	9.141	9.333	9.61	9.70	18.474	12.67	26.99
6	2437	8.260	9.572	9.17	9.81	17.832	12.51	26.99
11	2462	8.222	8.551	9.15	9.32	16.773	12.25	26.99

802.11g

CH.	Fre. (MHz)	AveragePower (mW)		Average Power (dBm)		Total power (mW)	Total power (dBm)	Limit (dBm)
		Ant 0	Ant1	Ant 0	Ant1			
1	2412	10.447	10.328	10.19	10.14	20.775	13.18	26.99
6	2437	11.995	11.092	10.79	10.45	23.087	13.63	26.99
11	2462	11.220	12.388	10.50	10.93	**23.608**	**13.73**	26.99

802.11n HT20

CH.	Fre. (MHz)	AveragePower (mW)		Average Power (dBm)		Total power (mW)	Total power (dBm)	Limit (dBm)
		Ant 0	Ant1	Ant 0	Ant1			
1	2412	10.233	12.474	10.10	10.96	22.707	13.56	26.99
6	2437	11.588	10.544	10.64	10.23	22.132	13.45	26.99
11	2462	10.914	11.912	10.38	10.76	22.827	13.58	26.99

802.11n HT40

CH.	Fre. (MHz)	AveragePower (mW)		Average Power (dBm)		Total power (mW)	Total power (dBm)	Limit (dBm)
		Ant 0	Ant1	Ant 0	Ant1			
1	2412	8.337	7.962	9.21	9.01	16.298	12.12	26.99
6	2437	9.863	9.078	9.94	9.58	18.941	12.77	26.99
11	2462	9.376	8.299	9.72	9.19	17.674	12.47	26.99

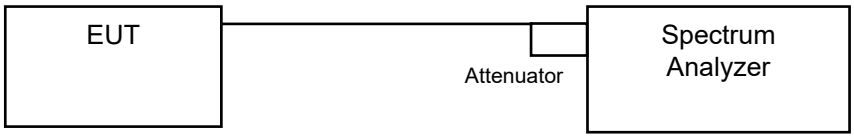
Directional gain = 6dBi + 10*loq(2)= 9.01dBi >6dBi, so the power density limit need to reduce 3.01dB

3.6 Power Spectral Density Measurement

3.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

3.6.2 Test Setup



3.6.3 Test Instruments

Refer to section 10.1 to get information of above instrument.

3.6.4 Test Procedure

a. Set the RBW = 10 kHz, VBW =30 kHz, Detector = peak.
b. Sweep time = auto couple, Trace mode = max hold,allow trace to fully stabilize.
c. Use the peak marker function to determine the maximum power level in any 100 kHz bandsegment within the fundamental EBW.

3.6.5 Deviationfrom Test Standard

No deviation.

3.6.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.6.7 Test Results

802.11b:

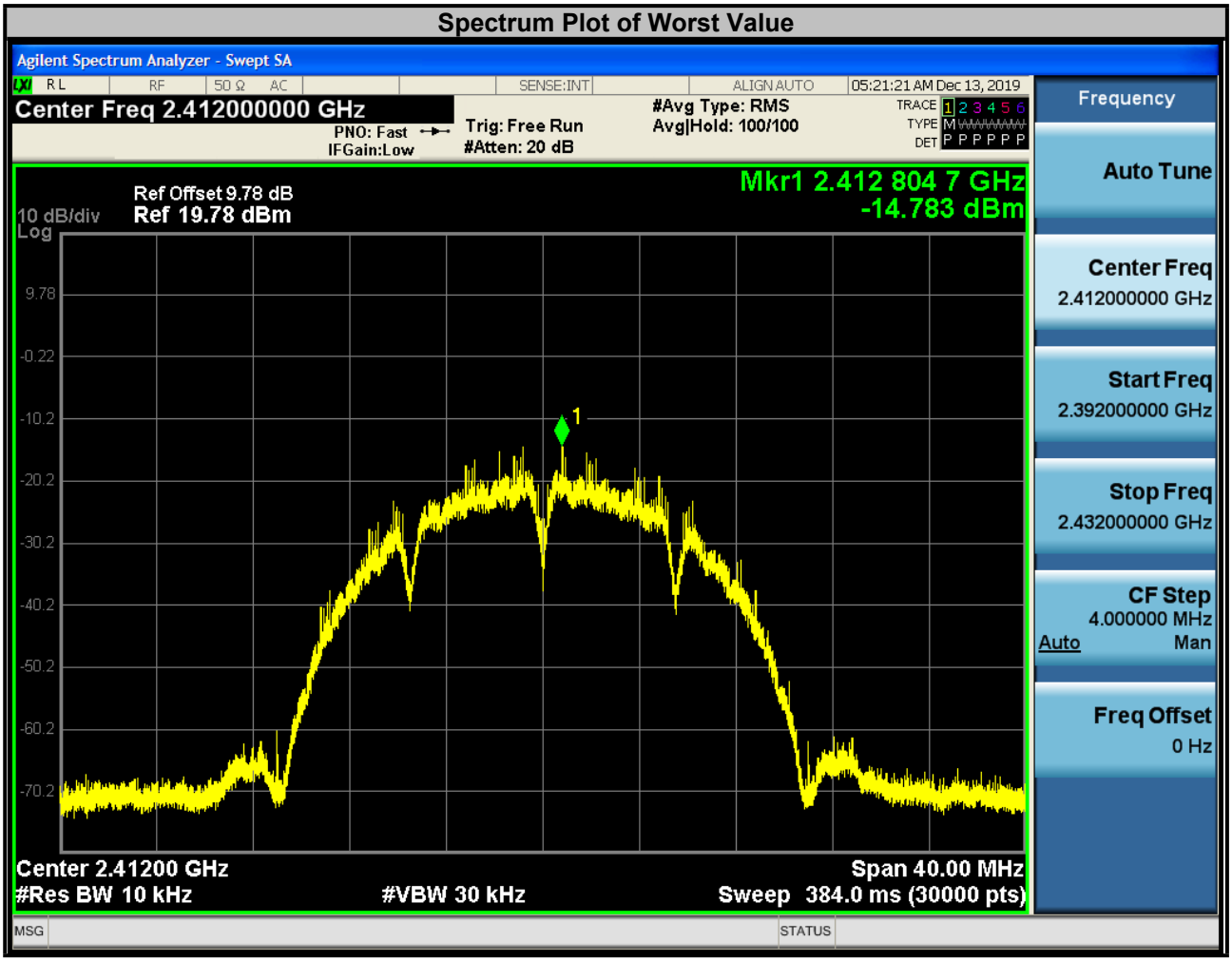
Channel	Frequency (MHz)	PSD (dBm/10kHz)		Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
		Ant 0	Ant 1			
1	2412	-14.864	-14.783	0.0548	4.99	Pass
6	2437	-15.249	-15.095	0.0519	4.99	Pass
11	2462	-15.260	-15.077	0.0489	4.99	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across ponding frequency bins on the various outputs by computer

2. Directional gain = 6dBi + 10*loq(2)= 9.01dBi >6dBi, so the power density limit need to reduce 3.01dB.

Spectrum Plot of Worst Value



802.11g:

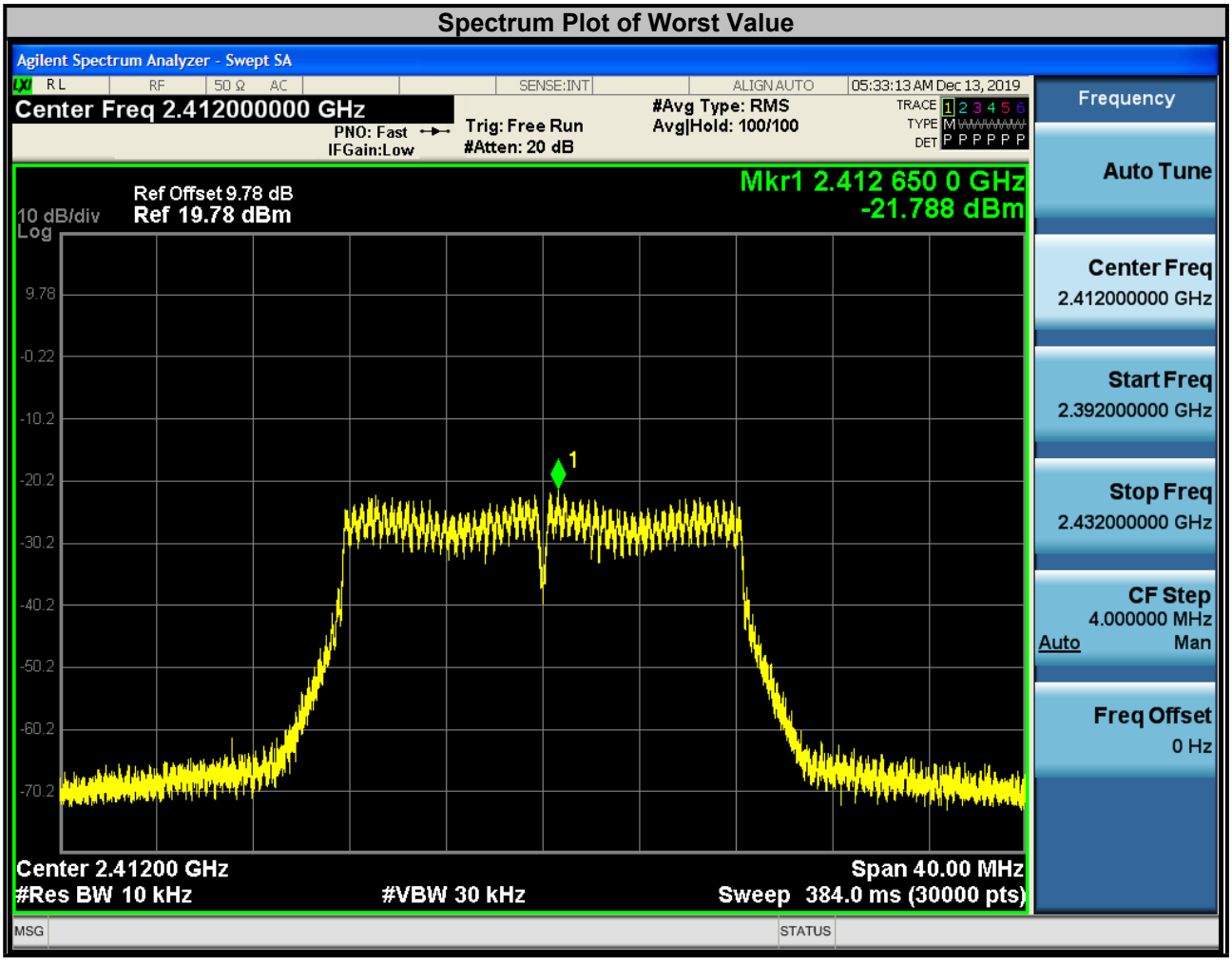
Channel	Frequency (MHz)	PSD (dBm/10kHz)		Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
		Ant 0	Ant 1			
1	2412	-23.233	-21.788	0.0114	4.99	Pass
6	2437	-23.131	-22.341	0.0107	4.99	Pass
11	2462	-23.590	-22.986	0.0094	4.99	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across ponding frequency bins on the various outputs by computer

2. Directional gain =6dBi + 10*loq(2)= 9.01dBi >6dBi, so the power density limit need to reduce 3.01dB.

Spectrum Plot of Worst Value



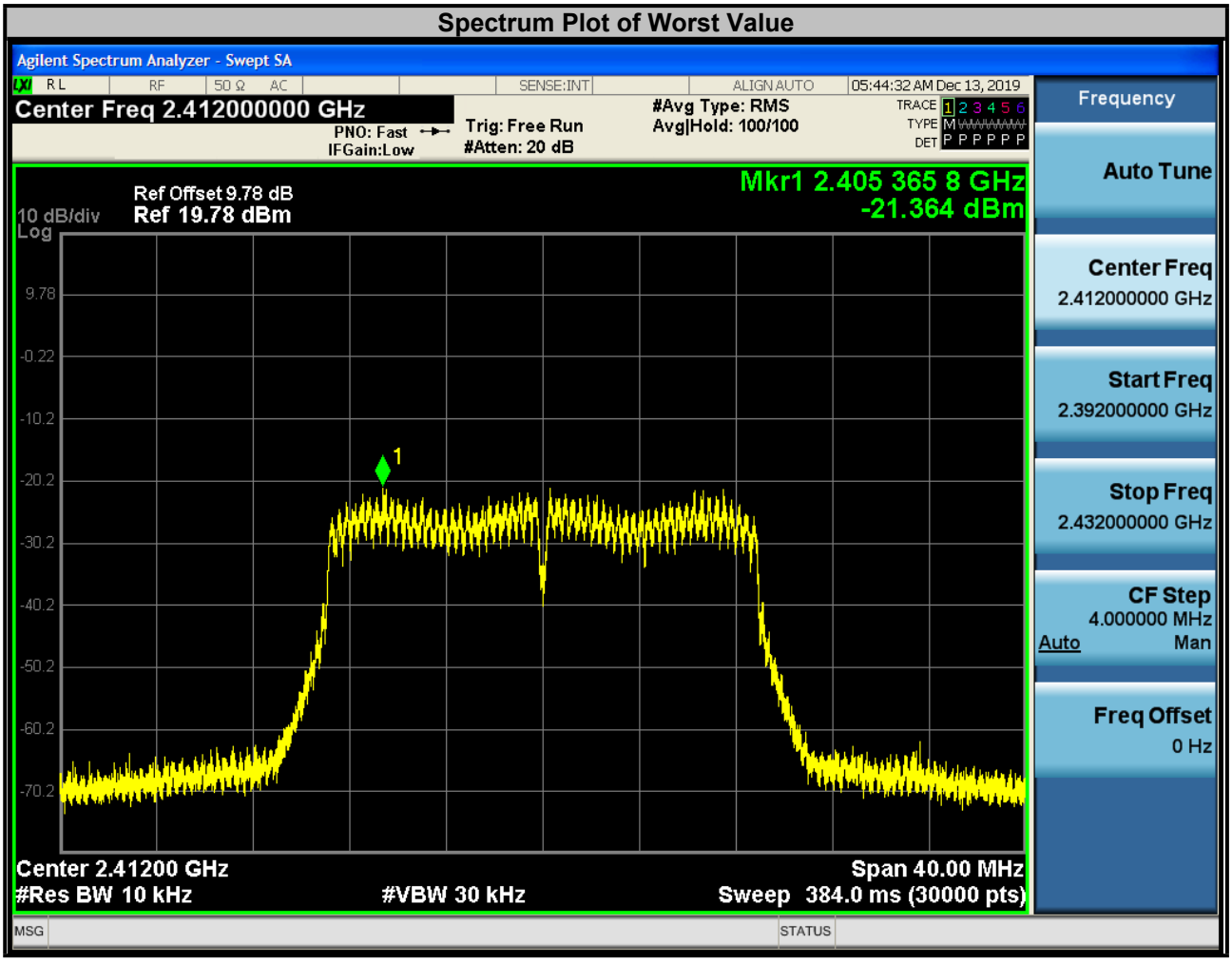
802.11n HT20:

Channel	Frequency (MHz)	PSD (dBm/10kHz)		Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
		Ant 0	Ant 1			
1	2412	-21.972	-21.364	0.0137	4.99	Pass
6	2437	-22.531	-22.218	0.0116	4.99	Pass
11	2462	-22.792	-22.343	0.0111	4.99	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across ponding frequency bins on the various outputs by computer

2. Directional gain =6dBi + 10*loq(2)= 9.01dBi >6dBi, so the power density limit need to reduce 3.01dB.



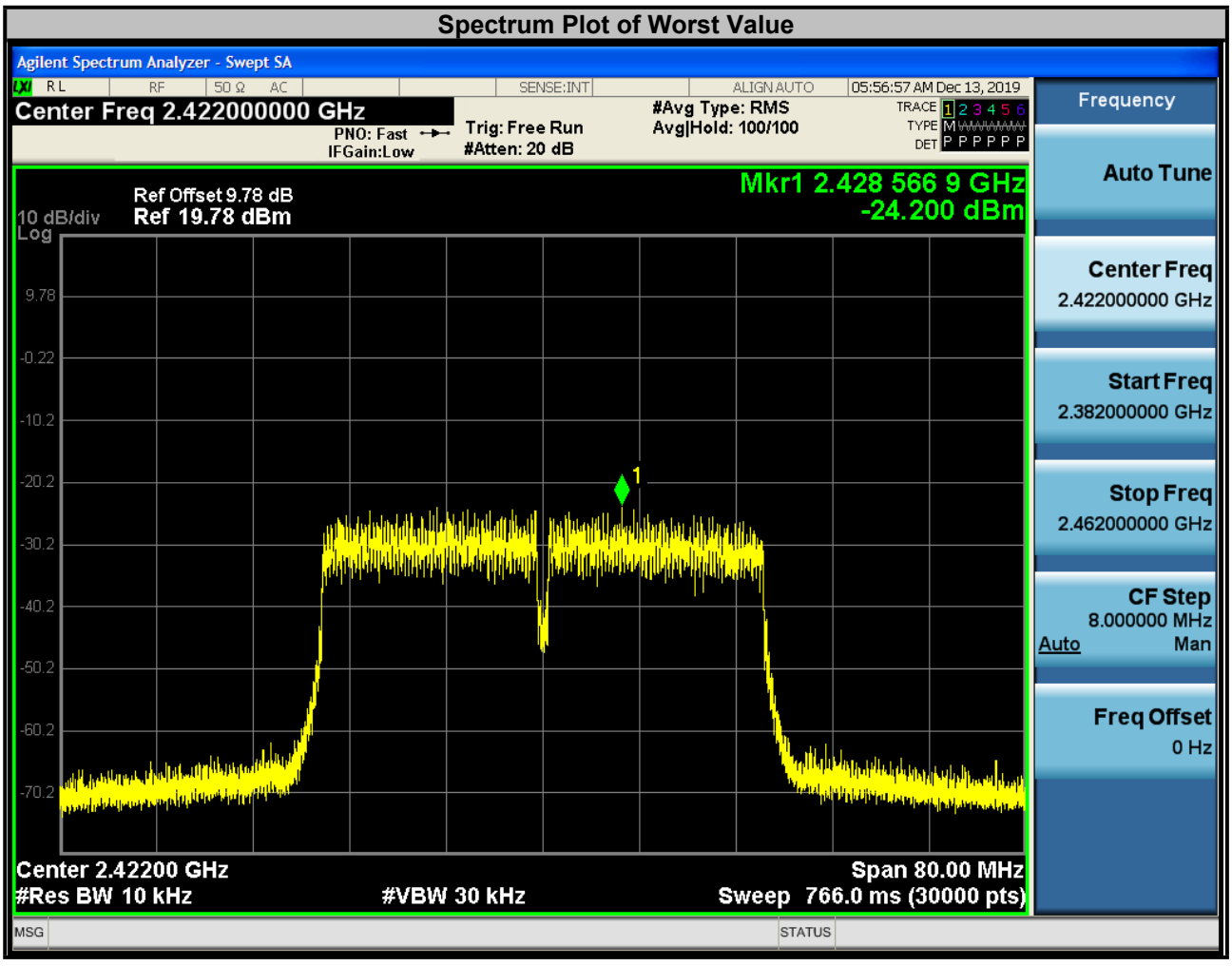
802.11n HT40:

Channel	Frequency (MHz)	PSD (dBm/10kHz)		Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
		Ant 0	Ant 1			
3	2422	-25.082	-24.200	0.0069	4.99	Pass
6	2437	-25.339	-24.627	0.0064	4.99	Pass
9	2452	-25.344	-25.083	0.0060	4.99	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across ponding frequency bins on the various outputs by computer

2. Directional gain =6dBi + 10*loq(2)= 9.01dBi >6dBi, so the power density limit need to reduce 3.01dB.

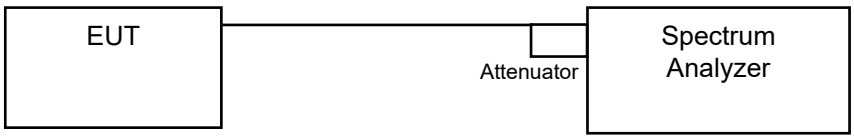


3.7 Conducted Out of Band Emission Measurement

3.7.1 Limits of Conducted Out of Band Emission Measurement

For average power：
Below –30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
For peak power:
Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth)

3.7.2 Test Setup



3.7.3 Test Instruments

Refer to section 10.1 to get information of above instrument.

3.7.4 Test Procedure

Measurement procedure REF
1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

3.7.5 Measurement procedure OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

3.7.6 Deviation from Test Standard

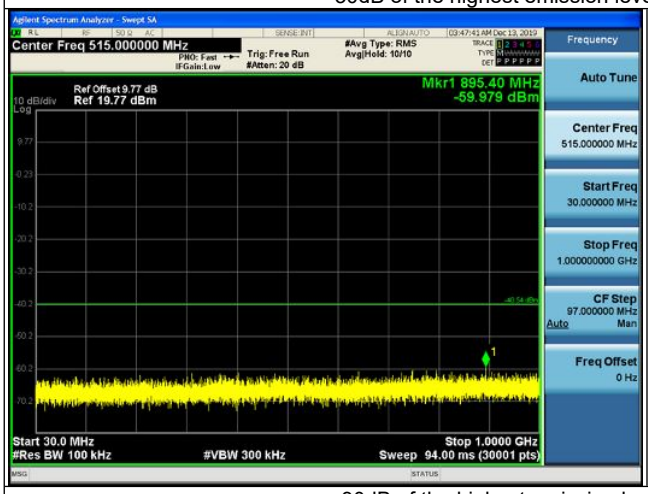
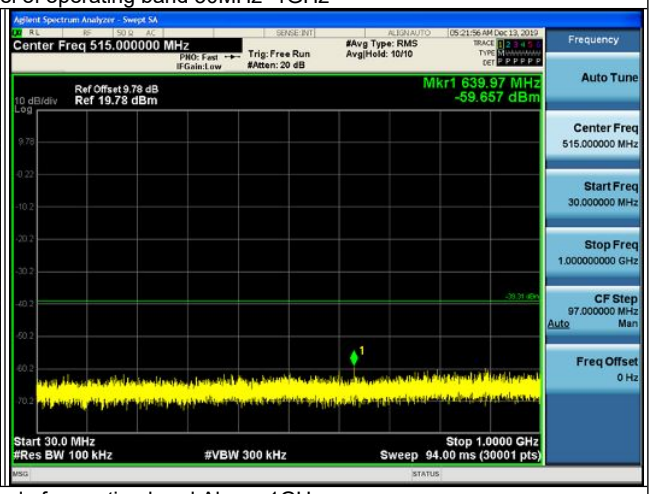
No deviation.

3.7.7 EUT Operating Condition

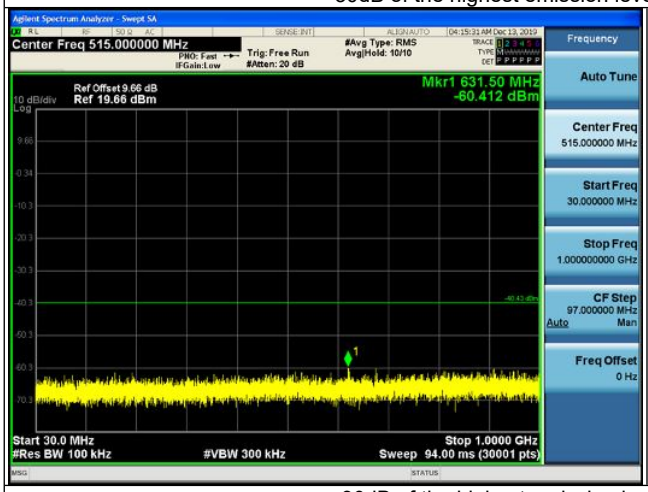
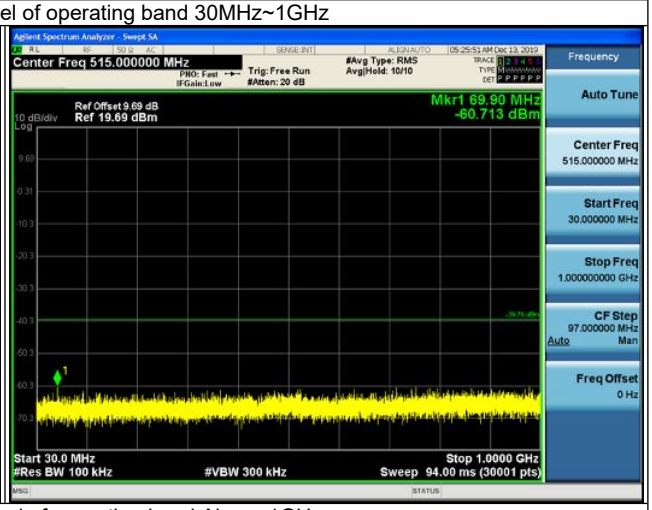
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.7.8 Test results

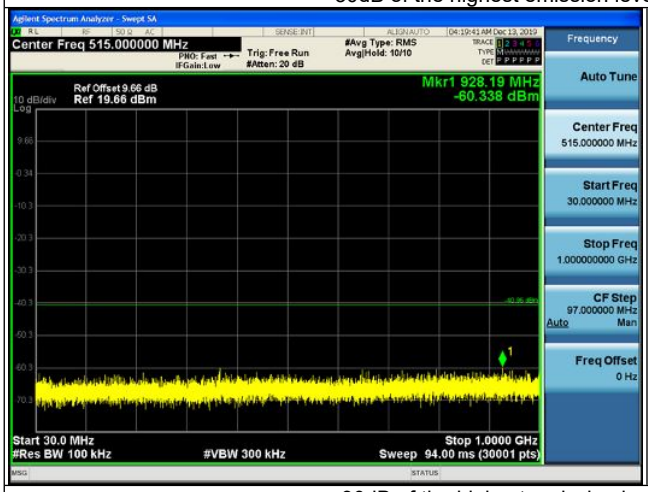
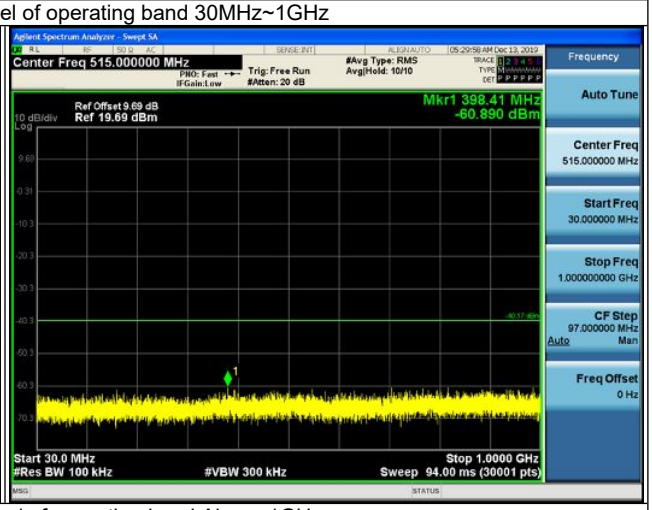
802.11b-Channel 1-2412MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

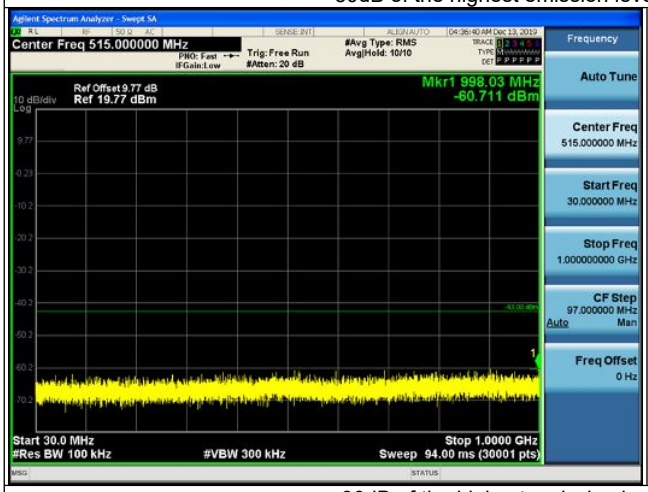
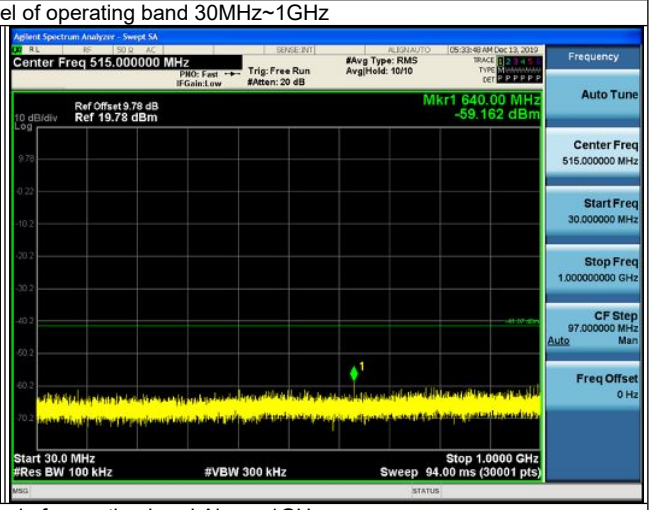
802.11b-Channel 6-2437MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

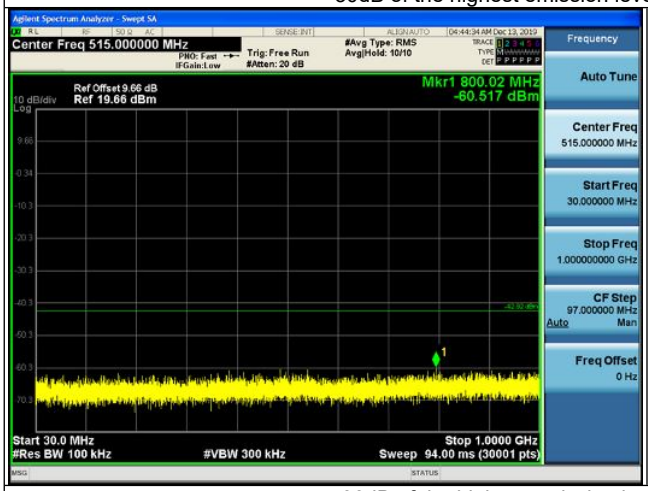
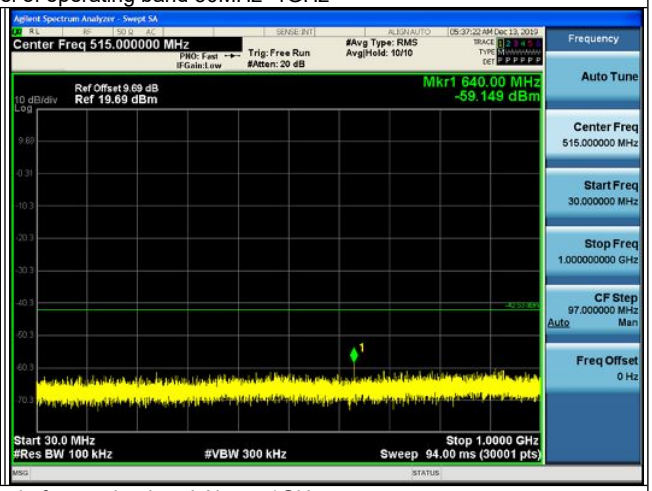
802.11b-Channel 11-2462MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

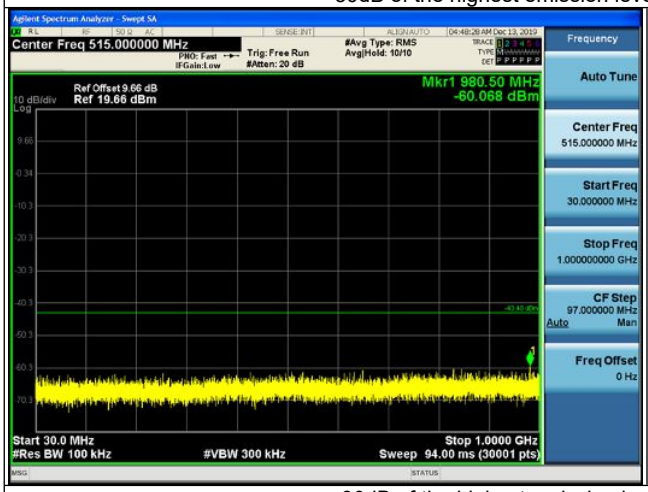
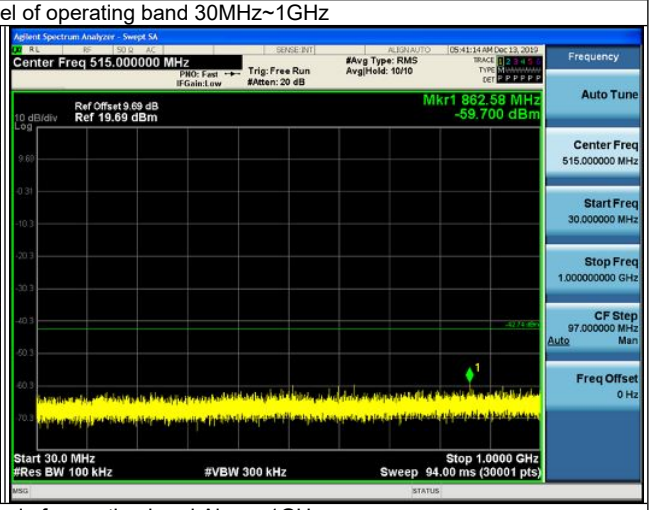
802.11g-Channel 1-2412MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

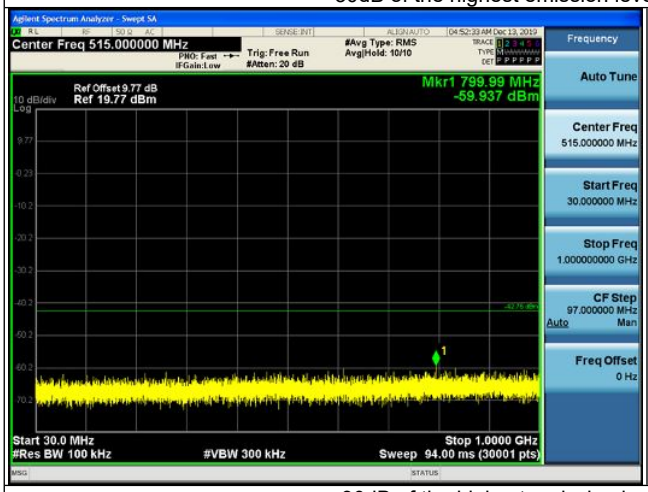
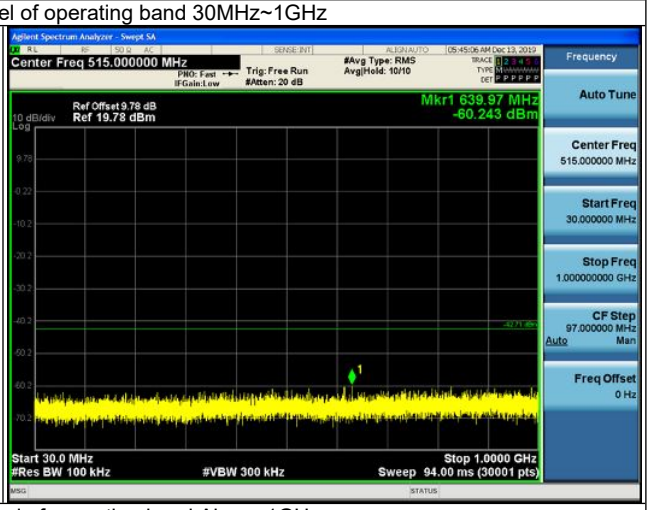
802.11g-Channel 6-2437MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

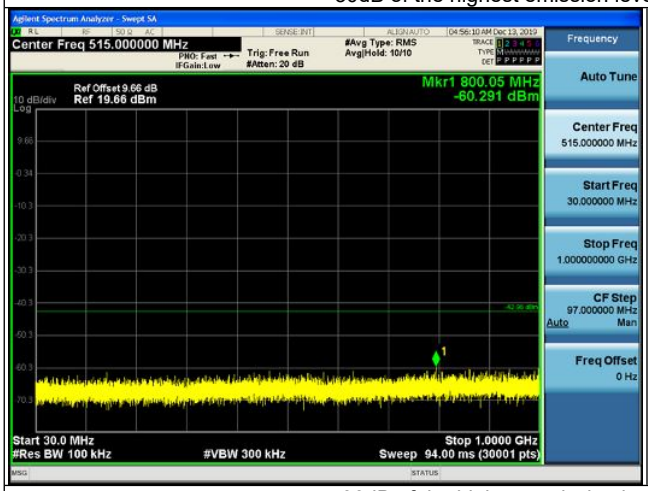
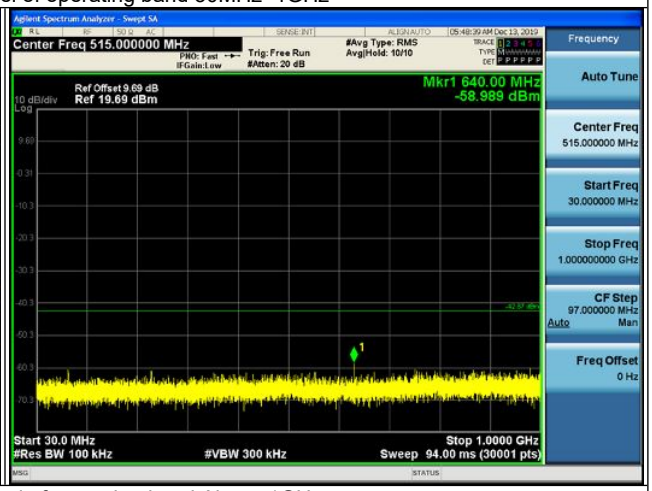
802.11g-Channel 11-2462MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

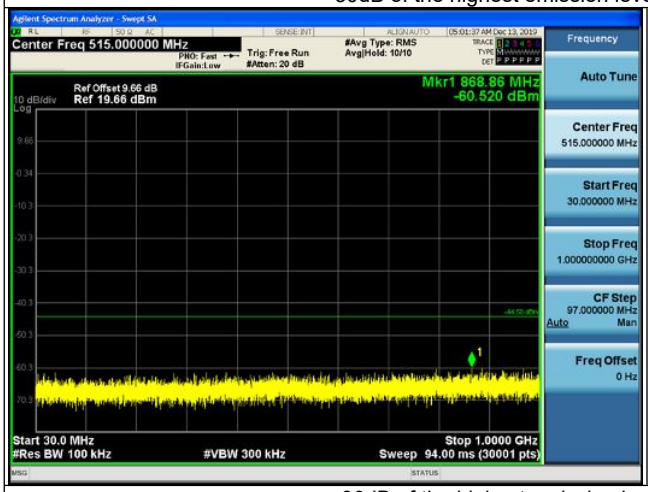
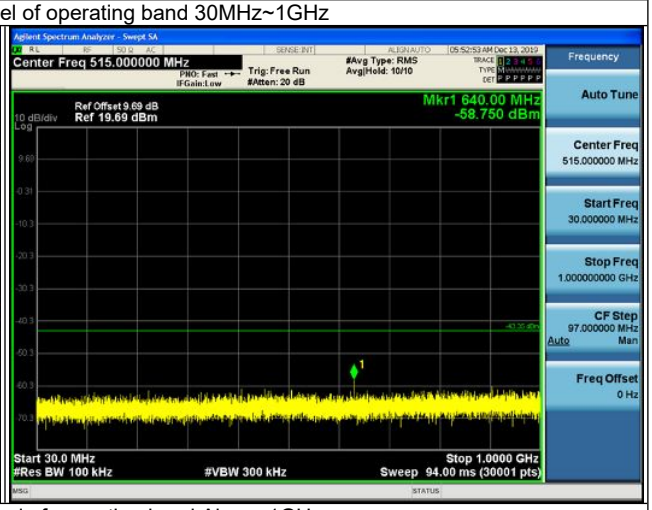
802.11n HT20-Channel 1-2412MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

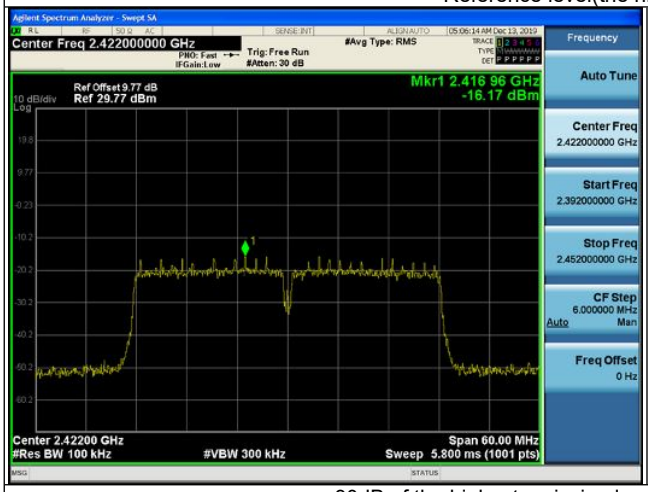
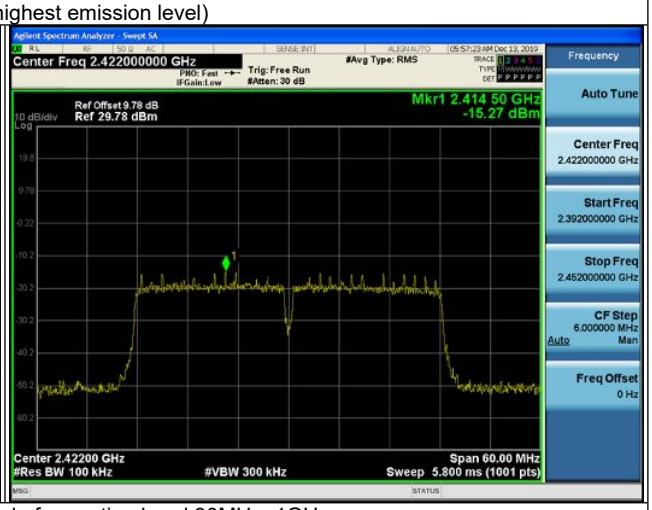
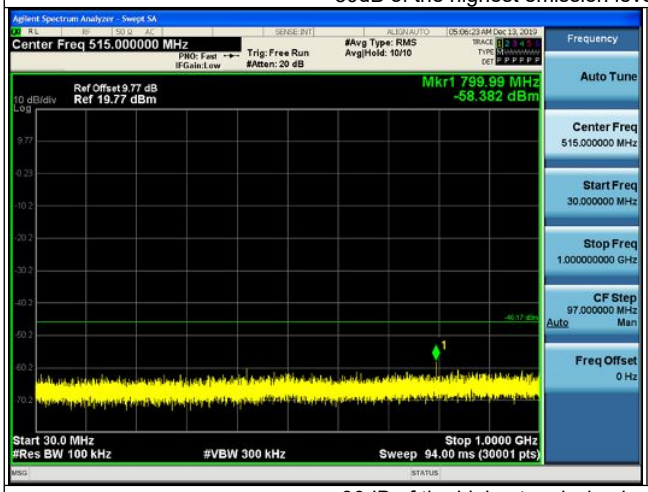
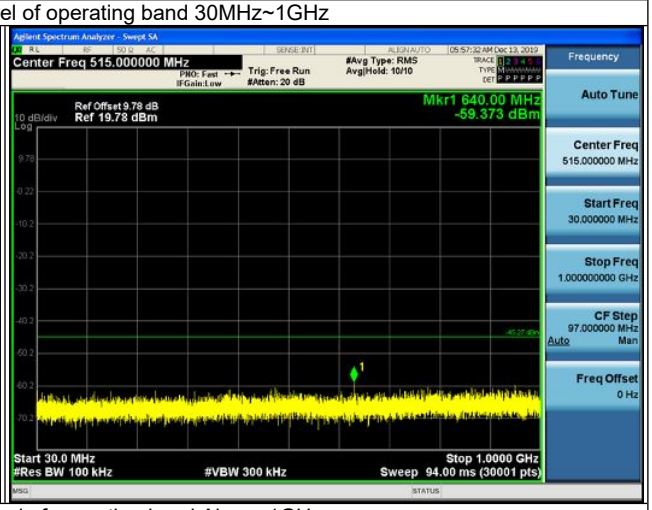
802.11n HT20-Channel 6-2437MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

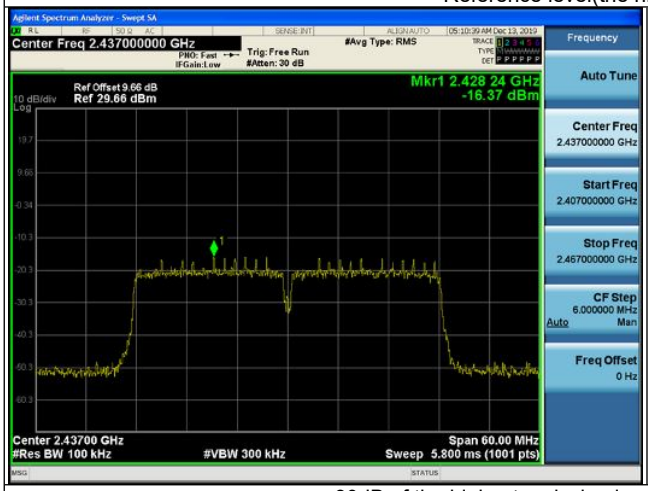
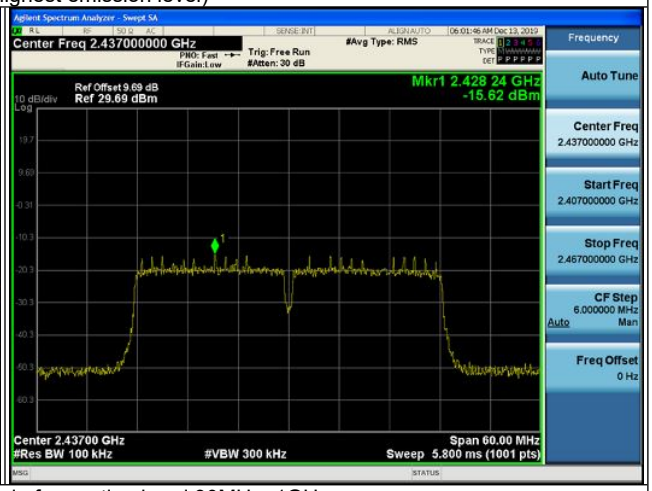
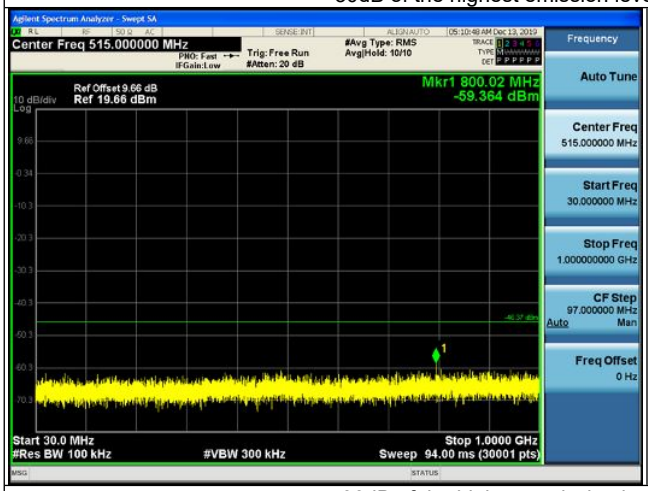
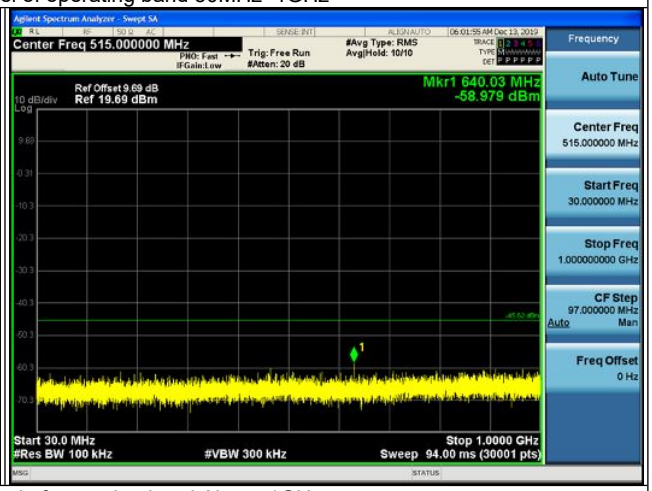
802.11n HT20-Channel 11-2462MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

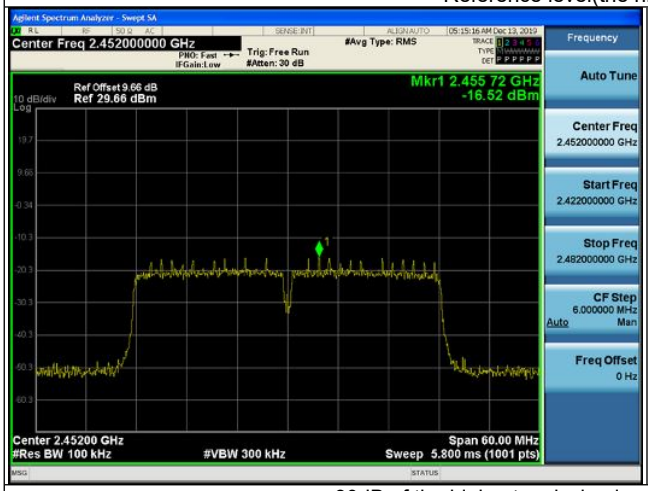
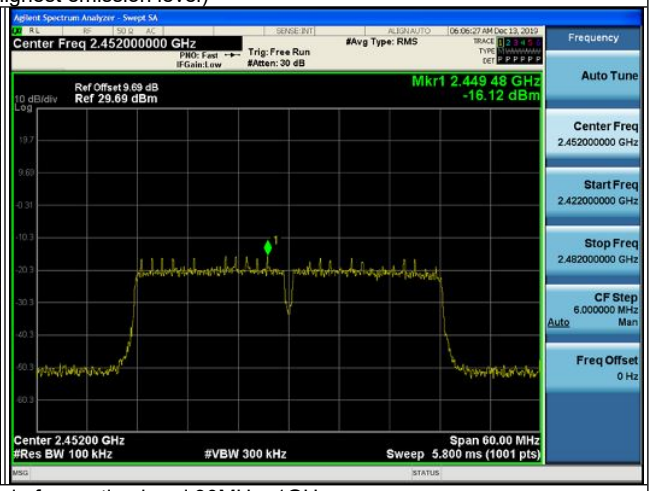
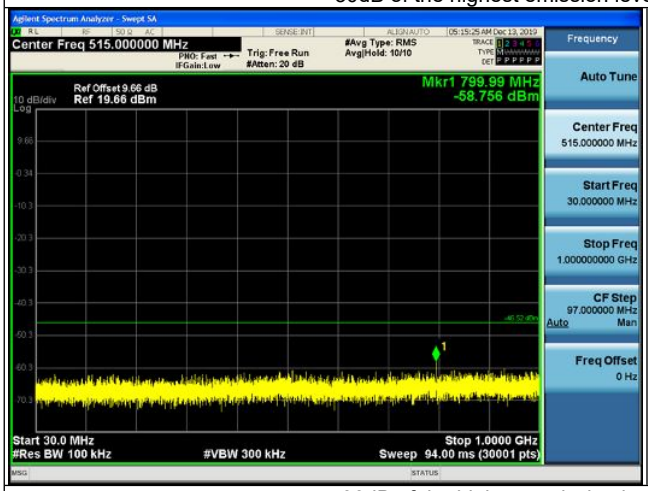
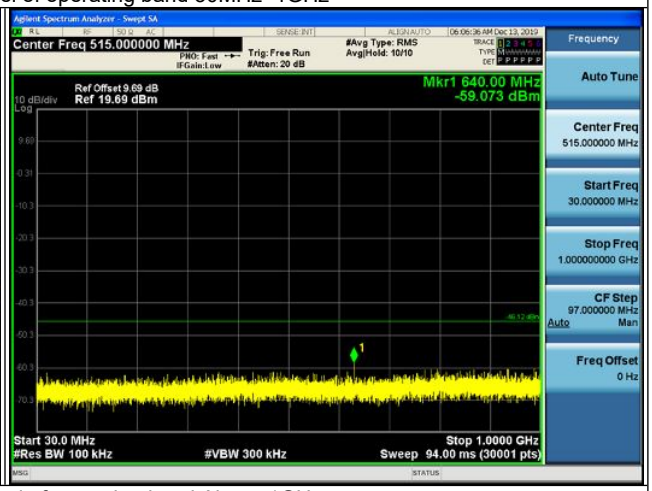
802.11n HT40-Channel 3-2422MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

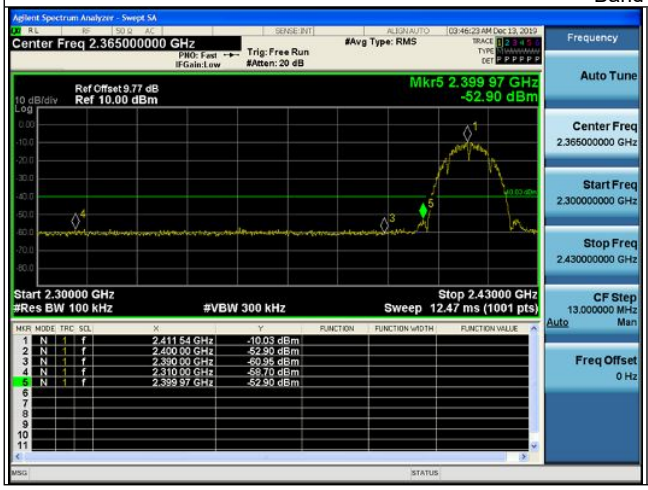
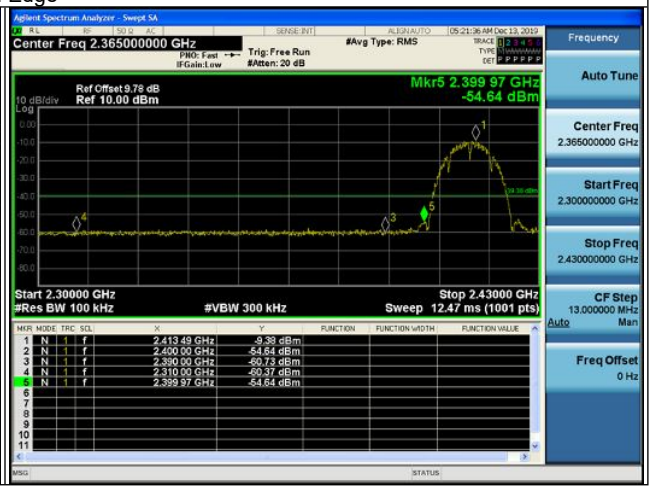
802.11n HT40-Channel 6-2437MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

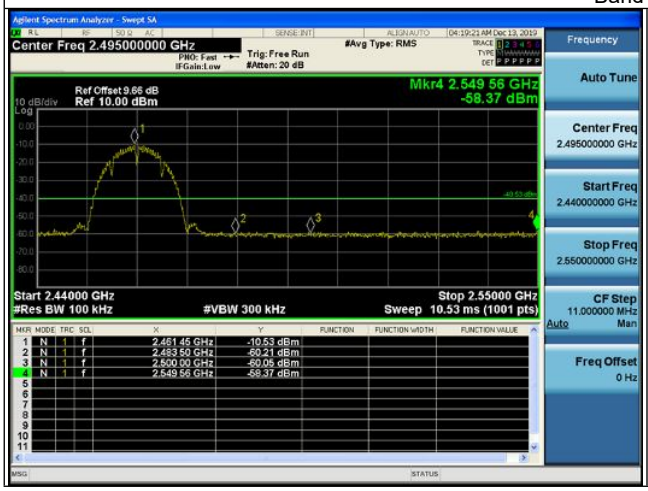
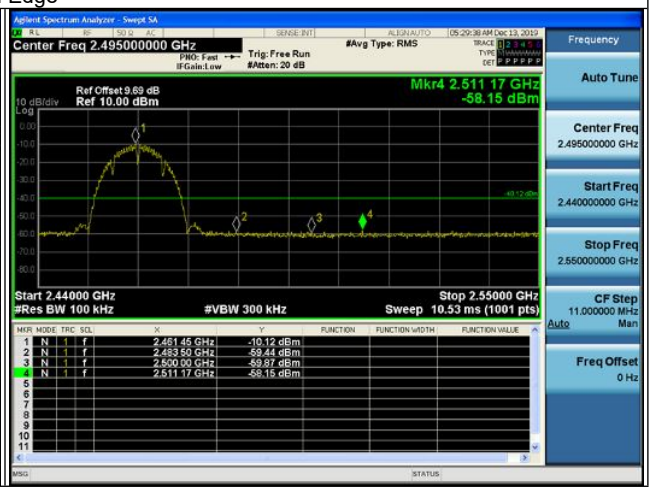
802.11n HT40-Channel 9-2452MHz

Ant 0	Ant 1
Reference level(the highest emission level)	
	
–30dB of the highest emission level of operating band 30MHz~1GHz	
	
–30dB of the highest emission level of operating band Above 1GHz	
	

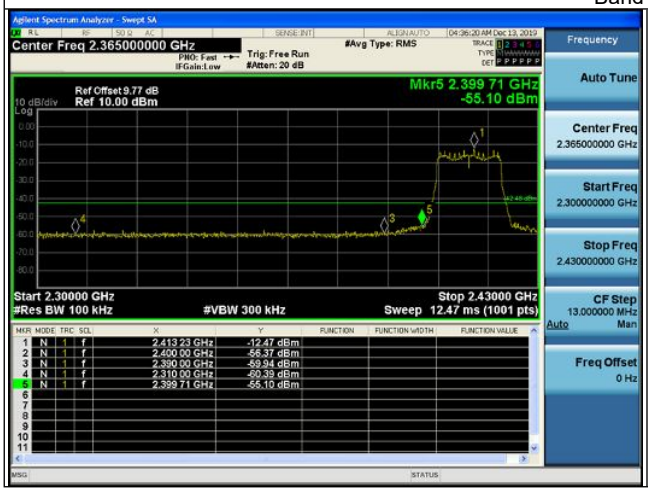
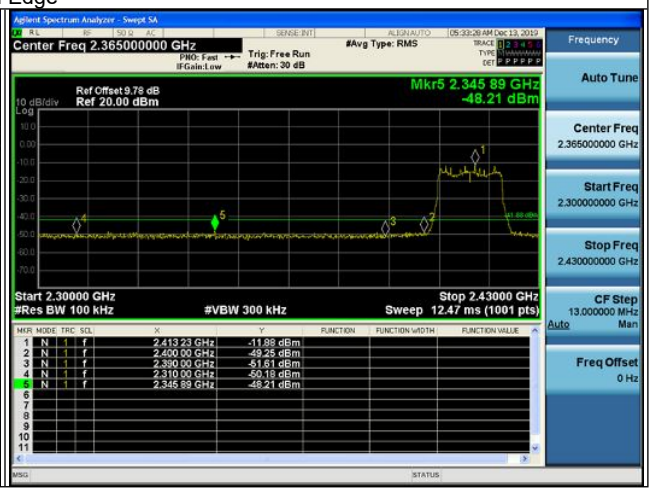
802.11b-Channel 1-2412MHz

Ant 0	Ant 1
Band Edge	
	

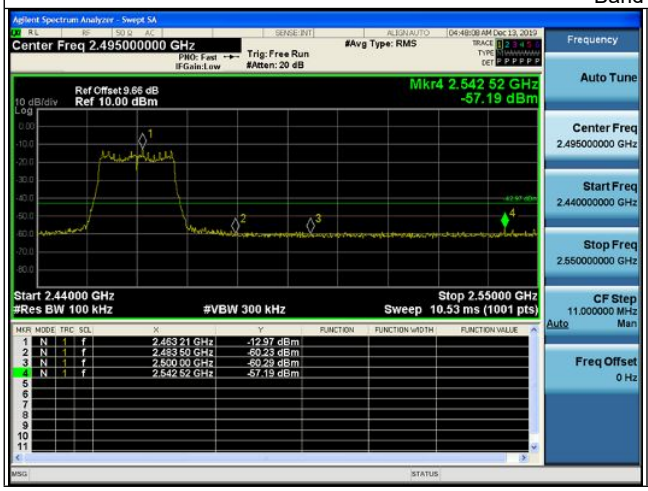
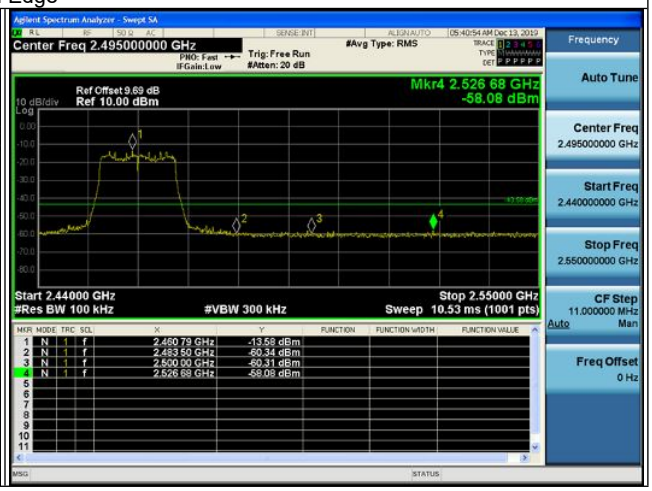
802.11b-Channel 11-2462MHz

Ant 0	Ant 1
Band Edge	
	

802.11g-Channel 1-2412MHz

Ant 0	Ant 1
Band Edge	
	

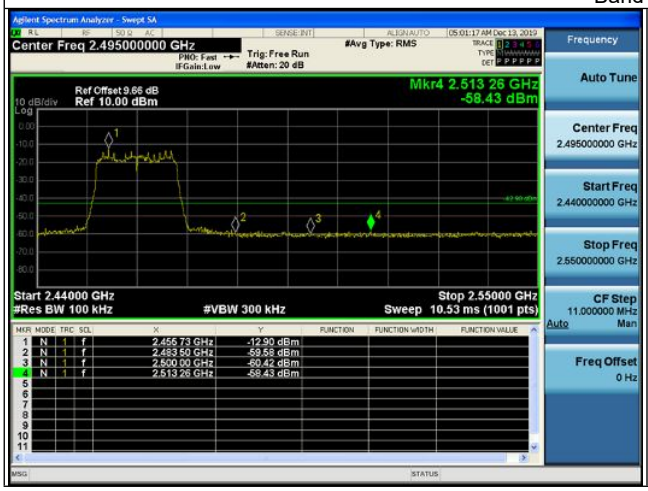
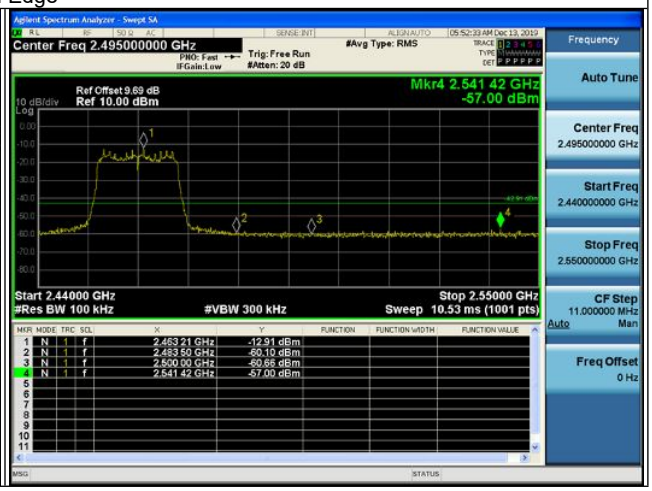
802.11g-Channel 11-2462MHz

Ant 0	Ant 1
Band Edge	
	

802.11n HT20-Channel 1-2412MHz

Ant 0	Ant 1
Band Edge	
	

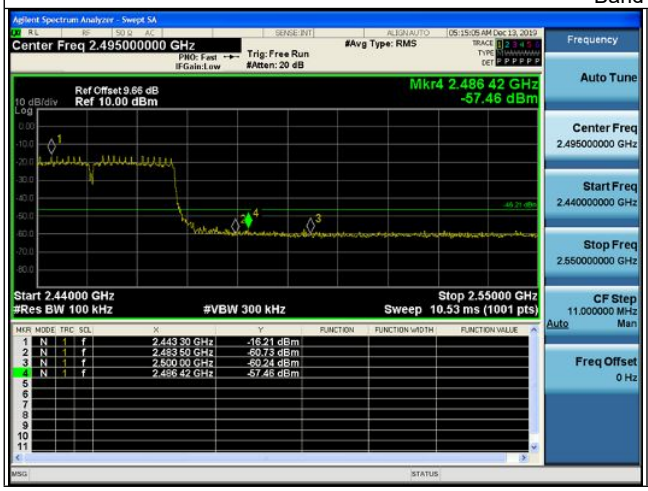
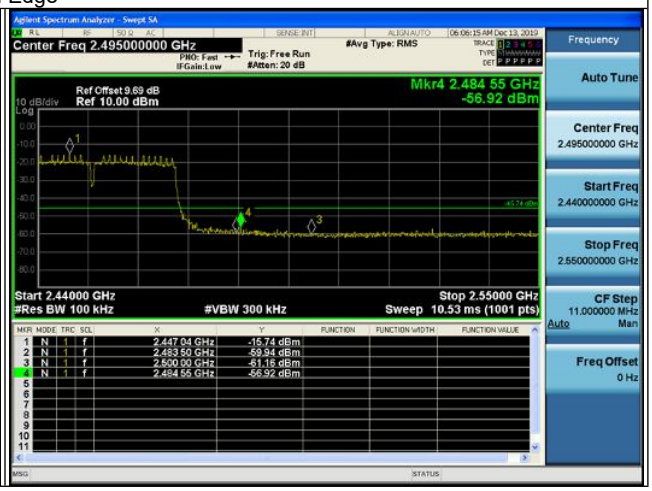
802.11n HT20-Channel 11-2462MHz

Ant 0	Ant 1
Band Edge	
	

02.11n HT40 Channel 3-2422MHz

Ant 0	Ant 1
Band Edge	
	

802.11n HT40-Channel 9-2452MHz

Ant 0	Ant 1
Band Edge	
	

4. Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

5. Test instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Spectrum Keysight	N9020A	MY51240612	2019/10/18	2020/10/17
Spectrum Analyzer Rohde&Schwarz	FSV-40N	101783	2019/10/18	2020/10/17
Power Meter10Hz~18GHz Tonscend	JS0806-2	188060126	2019/10/18	2020/10/17
Signal generator Keysight	N5182A	GB40051020	2019/10/18	2020/10/17
Signal generator Keysight	N5182A	MY47420944	2019/10/18	2020/10/17
Test Software Tonscend	JS0806-2	NA	NA	NA
Hygrothermograph Yuhuaze	HTC-1	NA	2019/10/18	2020/10/17

Note: 3. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA.

4. The test was performed in Chamber 1.

Appendix – Information on the Testing Laboratories

We, Hwa-Hsing (Dongguan) Co., Ltd.,A global provider of TESTING and CERTIFICATION services for consumer products, electronic products and wireless information technology products. Adhering to the core values “HONEST and TRUSTWORTHY, OBJECTIVE and IMPARTIALITY, RIGOROUS and AFFICIENT”, commitment to provide professional, perfect and efficient comprehensive ONE-STOP solution of TESTING and CERTIFICATION services for Manufacturers, Buyers, Traders, Brands, Retailers. Assist client to better manage risk, protect their brands, reduce costs and cut time to over 150 markets in global. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Contact Tel: 0769-83078199
Email:customerservice.dg@hwa-hsing.com
Web Site:www.hwa-hsing.com

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