

Test Report No.: 23122202-02-RF-US-03

FCC Part 15, Subpart C Test Report

FCC ID: ARS-10BDL3351T

Applicant: Top Victory Electronics (Taiwan) Co Ltd

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Manufacturer: MMD(Shanghai)Electronics Technology Co Ltd

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SHANGHAI 200241, CHINA

Product(s): Colour Monitor

Brand(s): Philips

Test Model(s): 10BDL3351T

Series Model(s): See section 2.1

Test Date: Mar. 13, 2024 ~ Apr. 02, 2024

Issued Date: Apr. 03, 2024

Issued By: Hwa-Hsing (Dongguan) Testing Co., Ltd.


Address: No.101, Building N1, Yuyuan 2 Road, Yuyuan Industrial Park, HuangJiang
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Test Firm Registration No.: 915896

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has 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 :



Nature Lee

Reviewed by :



Dragon Long

Approved by :



Scott He

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Release Control Record

Issue No.	Description	Date Issued
23122202-02-RF-US-03	Original Release	Apr. 03, 2024

1. Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247) KDB 558074 D01 15.247 Meas Guidance v05r02 KDB 662911 D01 v02r01 ANSI C63.10:2013			
Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit.
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit.
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

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.

1.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as 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	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.66 dB
Radiated Emissions up to 1 GHz	9KHz ~ 30MHz	2.16 dB
	30MHz ~ 1000MHz	3.47 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	4.84 dB
	18GHz ~ 40GHz	4.67 dB

1.2 Modification Record

There were no modifications required for compliance.

2. General Information

2.1 General Description of EUT

Product(s)	Colour Monitor
Test Model(s)	10BDL3351T
Sample No.	HS2403020002; HS2403020003
Series Model(s)	10BDL***** The "*" could be any alphanumeric character including blank for marketing differentiation.
Status of EUT	Engineering prototype
Power Supply Rating	DC 12V from Adapter or DC 48V from POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Transfer Rate	DSSS, OFDM
Operating Frequency	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 MCS7
Number of Channel	802.11b, 802.11g, 802.11n (20MHz): 2412 ~ 2462MHz
Maximum Output Power	22.84dBm(peak)
Antenna Type	PIFA Antenna
Max. Antenna Gain	2.2dBi
Antenna Connector	I-PEX
Accessory Device	N/A
Data Cable Supplied	Adapter Cable: Unshielded, 180cm

Note:

1. Please refer to the EUT photo document (Reference No.: 23122202-02-01&02) 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. For the test results, the EUT had been tested with all conditions, and only the worst case was shown in the test report.
4. Model difference: These models are only different from model name for trade purpose.
5. For the test results, the EUT had been tested with all power supply type, and only the worst case was shown in the test report.
6. The EUT incorporates SISO function. with 1 antenna transmission and 1 antenna reception.

Support mode	Frequency band	Transmit and receive mode	Transmit and Receive Chain
802.11b	2412~2462MHz	SISO	1TX/1RX
802.11g	2412~2462MHz	SISO	1TX/1RX
802.11n HT20	2412~2462MHz	SISO	1TX/1RX

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		

*Power setting value from test software:

Mode	Channel No.	Freq. (MHz)	Power Setting
802.11b	1	2412	Default
	6	2437	Default
	11	2462	Default
802.11g	1	2412	Default
	6	2437	Default
	11	2462	Default
802.11n20	1	2412	Default
	6	2437	Default
	11	2462	Default

2.3 Test Mode Applicability and Tested Channel Detail

Applicable test items	X-Axis	Y-Axis	Z-Axis	Voltage Supply
AC Power Conducted Emission	N/A	N/A	N/A	DC12V from adapter via AC120V input
Radiated Emissions	√	√	√	
Band Edge Measurement	N/A	N/A	N/A	
Antenna Port Emission	N/A	N/A	N/A	
6dB Bandwidth	N/A	N/A	N/A	
Occupied Bandwidth Measurement	N/A	N/A	N/A	
Conducted power	N/A	N/A	N/A	
Power Spectral Density	N/A	N/A	N/A	
1. The EUT had been pre-tested on the positioned of each 3 Axis. 2. "N/A" means no effect.				

Applicable test items	Antenna Transmit and receive mode	X-Axis	Y-Axis	Z-Axis
Radiated Emissions	SISO	√	√	√

- 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.

Test Condition:

Applicable test items	Environmental Conditions	Tested by
AC Power Conducted Emission	25deg. C, 65%RH	Jim Xu
Radiated Emissions	25deg. C, 65%RH	Jim Xu
Antenna Port Conducted Measurement	25deg. C, 65%RH	Dragon long

Radiated Emission Test (Above 1GHz):

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	MCS0

Radiated Emission Test (Below 1GHz):

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

Power Line Conducted Emission Test:

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.

EUT Configure Mode	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	MCS0

2.4 Description of Support Units

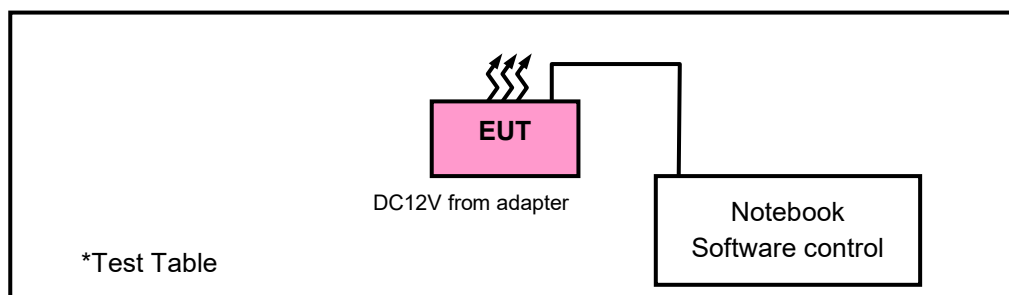
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	Lenovo	ThinkPad X280	SL10P97665	N/A

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

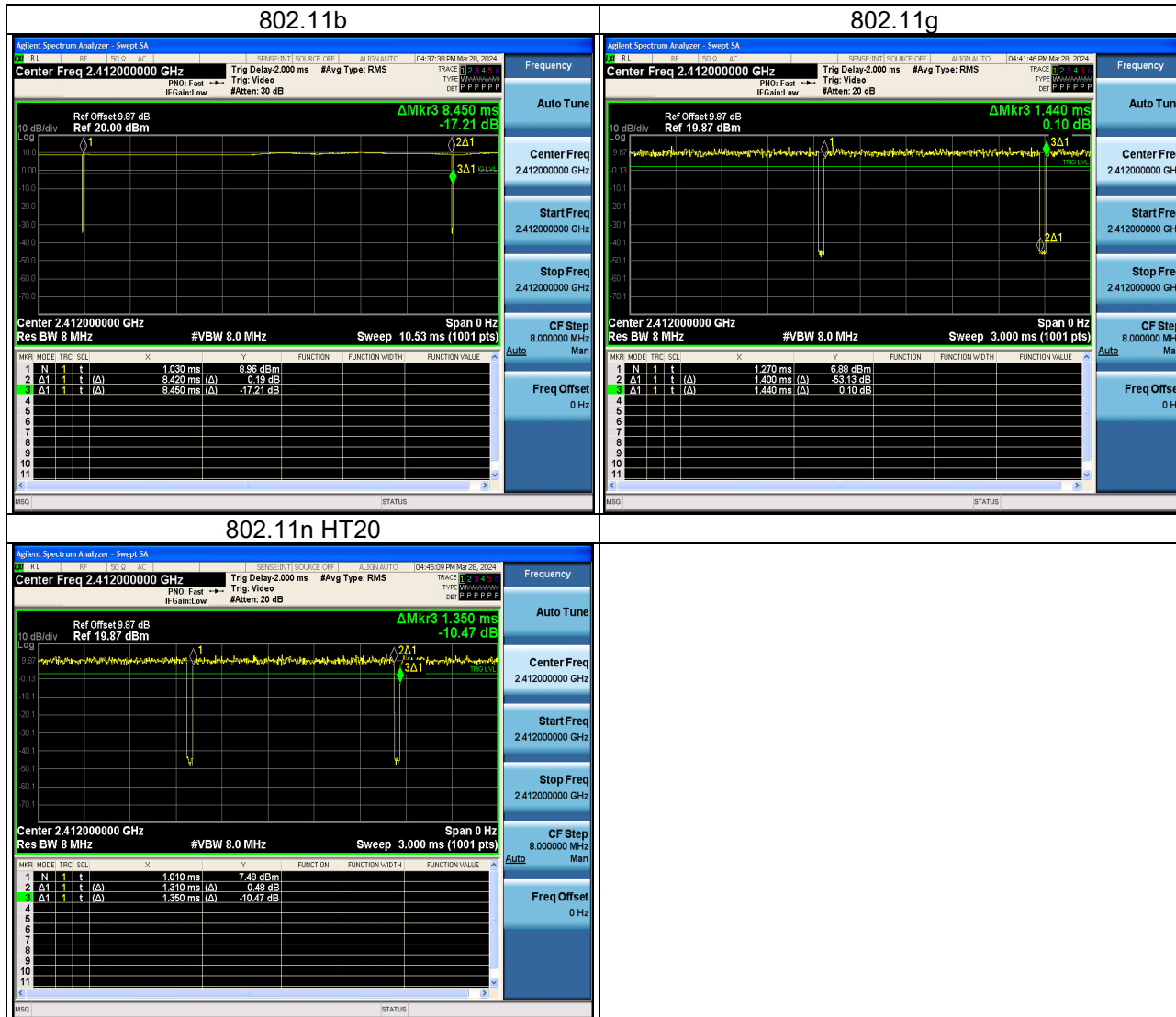
No.	Signal Cable Description Of The Above Support Units
1.	USB serial cable Un-shielding 1.0m

2.5 Configuration of System under Test



2.6 Duty Cycle of Test Signal

Test mode	Duty cycle (%)	Duty cycle factor=10*log (1/duty cycle) (dB)
802.11b	99.64	0.016
802.11g	97.22	0.122
802.11n HT20	97.04	0.130



3. Test Types and Results**3.1 Radiated Emission and Band-edge Measurement**

3.1.1 Limits of radiated emission and band-edge measurement

Radiated emissions which fall in the restricted bands must 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

* DTS emissions in non-restricted frequency bands Subclause 11.11 of ANSI C63.10 is applicable.
* DTS emissions in restricted frequency bands Subclause 11.12 of ANSI C63.10 is applicable.

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

Radiated emission below 30MHz:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	100962	2024-12-17
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	NSEMC003	2026-03-12**
Test software	FARAD	FARAD	EZ_EMCV1.1.4.2	N/A
Loop Antenna	EMCI	HLA 6121	56735	2024-05-04*
Antenna Tower	MF	MFA-440H	NA	NA
Turn Table	MF	MFT-201SS	NA	NA
Antenna Tower&Turn Table Controller	MF	MF-7802	NA	NA

Frequency Range below 1GHz:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver (9kHz~3GHz)	Rohde&Schwarz	ESPI 7	101978	2024-12-17
Broadband antenna (25MHz~2500MHz)	Schwarzbeck	VULB 9168	937	2024-08-18
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	HS-2018037	2026-03-12**
Signal Amplifier (30MHz~1000MHz)	Com-power	PAM-103	18020051	2024-08-06
Attenuator	R&S	TS2GA-6dB	18101101	N/A
Test software	FARAD	EZ_EMCV1.1.4.2	N/A	N/A

Frequency Range above 1GHz:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESPI 7	101978	2024-12-17
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	NSEMC003	2026-03-12**
Test software	FARAD	EZ_EMCV1.1.4.2	N/A	N/A
Digital Multimeter	FLUKE	15B+	43512617WS	2024-08-07
Horn Antenna	Schwarzbeck	BBHA 9170	979	2024-05-03*
Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101783	2024-12-17
Broadband Coaxial Pre-amplifier	Schwarzbeck	BBV 9718	25	2024-08-06
Pre-Amplifier	EMCI	EMC 184045SE	9870709	2024-12-17
Spectrum	Keysight	N9020A	MY51240612	2024-08-06

Note:

1. The calibration interval of the above test instruments is 12 months or 24 months (*) or 36 months (**).
2. The test was performed in 966.

3.1.3 Test Procedures

a. Peak emission levels are measured by setting the instrument as follow:

1) RBW & VBW setting as a function of frequency:

Frequency	RBW	VBW
9kHz~150kHz	200Hz	600Hz
0.15MHz~30MHz	9kHz	30kHz
30MHz~1000MHz	120kHz	300kHz
>1000MHz	1MHz	3MHz

- 2) Detector = peak.
- 3) Sweep time = auto.
- 4) Trace mode = max hold.
- 5) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be lengthened for low-duty-cycle applications.)

Note: If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement

b. Average emission levels are measured by setting the instrument as follow:

● Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously ($D \geq 98\%$), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

- 1) RBW=1 MHz (unless otherwise specified).
- 2) VBW $\geq 3 *RBW$.
- 3) Detector =RMS
- 4) Sweep time = auto.
- 5) Perform a trace average of at least 100 traces.

● Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), then the following procedure shall be used

- 1) The EUT shall be configured to operate at the maximum achievable duty cycle.
- 2) Measure the duty cycle D of the transmitter output signal as described in 11.6.
- 3) RBW=1 MHz (unless otherwise specified).
- 4) VBW $\geq 3 *RBW$.
- 5) Detector =RMS
- 6) Sweep time = auto.
- 7) Perform a trace average of at least 100 traces.

A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

*If power averaging (rms) mode was used in step 5). then the applicable correction factor is $[10 \log (1/ D)]$, where D is the duty cycle.

**If linear voltage averaging mode was used in step f). then the applicable correction factor is $[20 \log (1/D)]$, where D is the duty cycle.

***If a specific emission is demonstrated to be continuous ($D > 98\%$) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that.

● Reduced VBW Averaging across ON and OFF times of the EUT transmissions with max hold

If continuous transmission of the EUT ($D > 98\%$) cannot be achieved and the duty cycle is not constant (duty cycle variations exceed $\pm 2\%$), then the following procedure shall be used:

- 1) RBW = 1MHz.
 - 2) VBW $\geq 1/T$.
 - 3) Detector =peak
 - 4) Sweep time = auto.
 - 5) Trace mode = max hold.
 - 6) Allow max hold to run for at least $[50 \times (1/ D)]$ traces
- c. The EUT was placed on the top of a rotating table 0.8 meters (below 1GHz) / 1.5 meters (1-18GHz) / 1.5 meters (18-40GHz) above the reference ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The EUT was set 3meters away from the interference-receiving antenna (Below 1GHz) & (Above 1-18GHz), which was mounted on the top of a variable-height antenna tower. The EUT was set 1meters away from the interference-receiving antenna (18-40GHz).
- e. 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.
- f. 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.
- g. 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.
- h. 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:

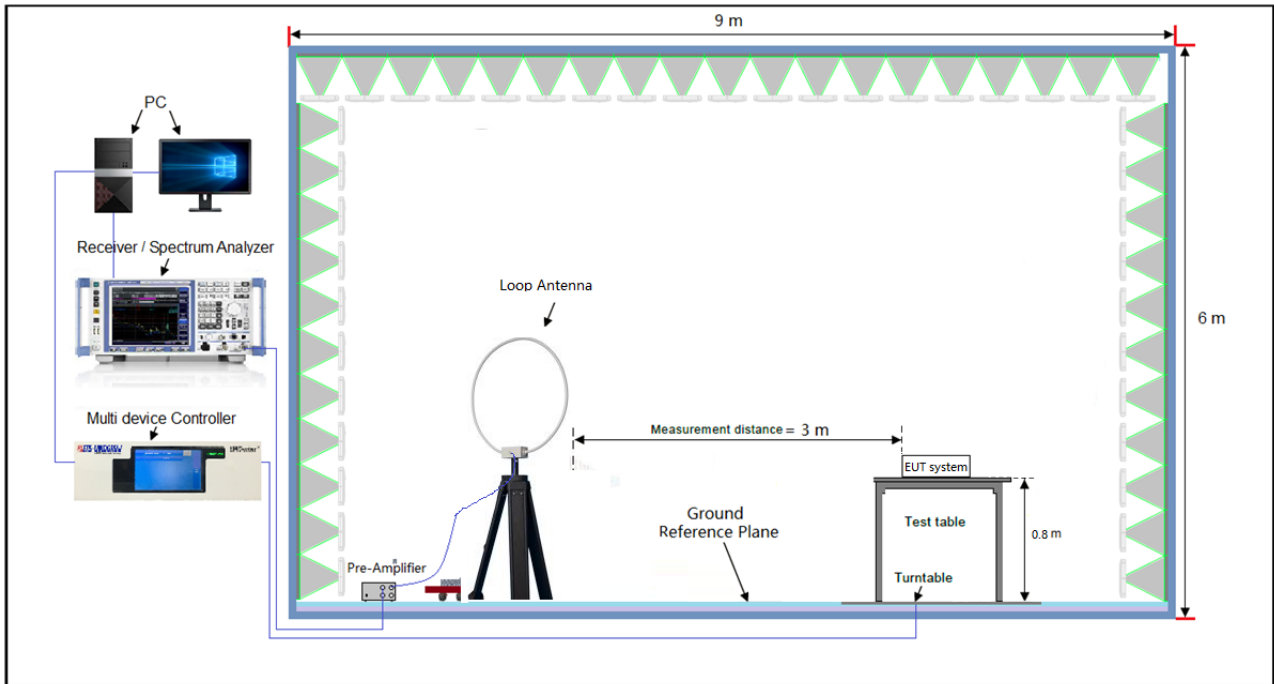
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth =3mHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth =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 $\geq 98\%$) 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

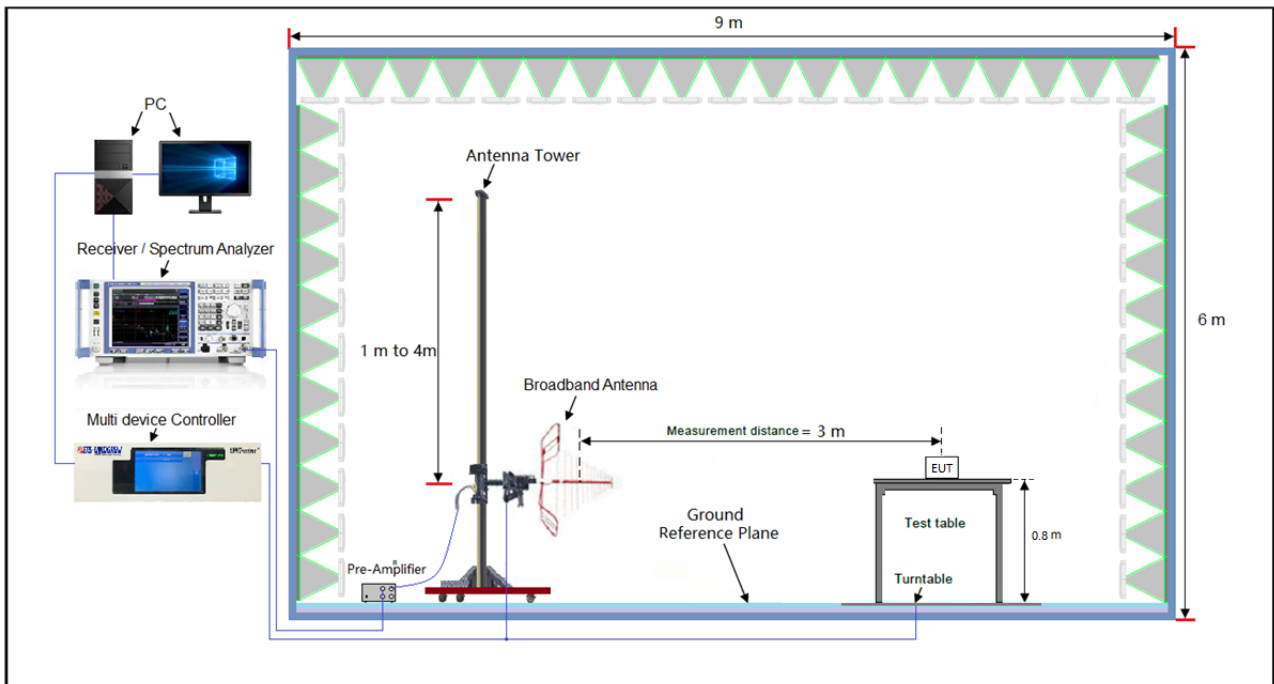
No deviation.

3.1.5 Test Setup

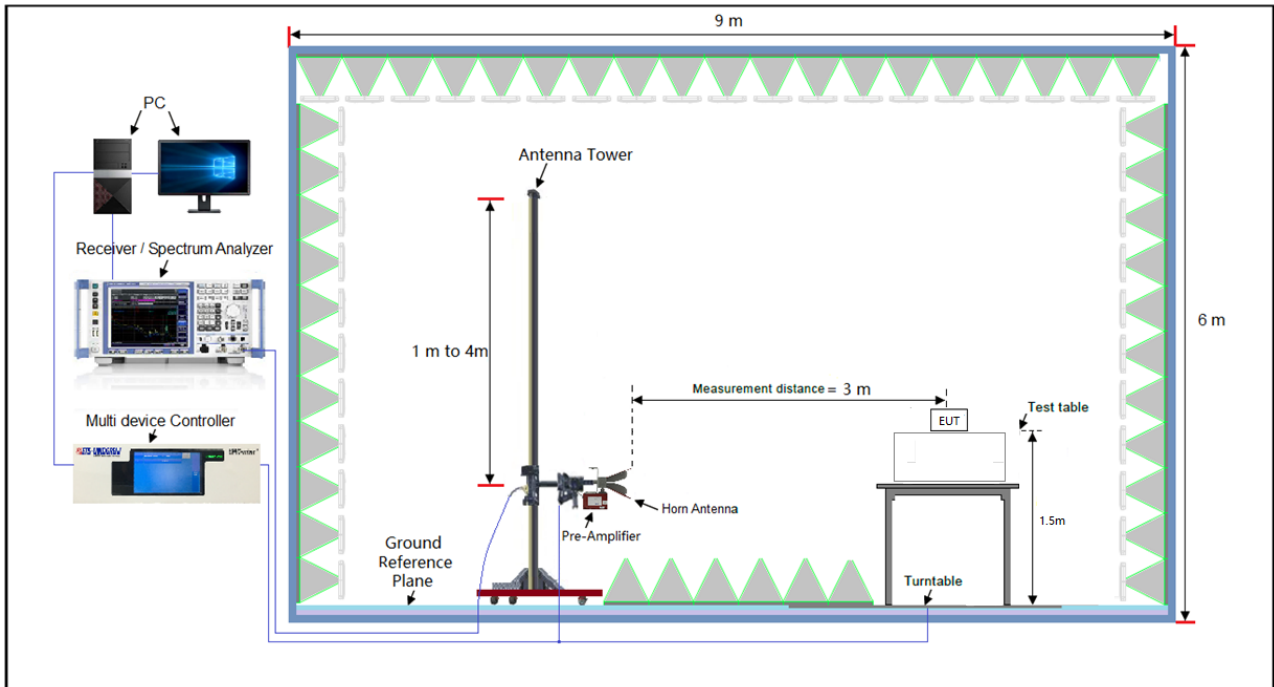
Radiated emission below 30MHz:



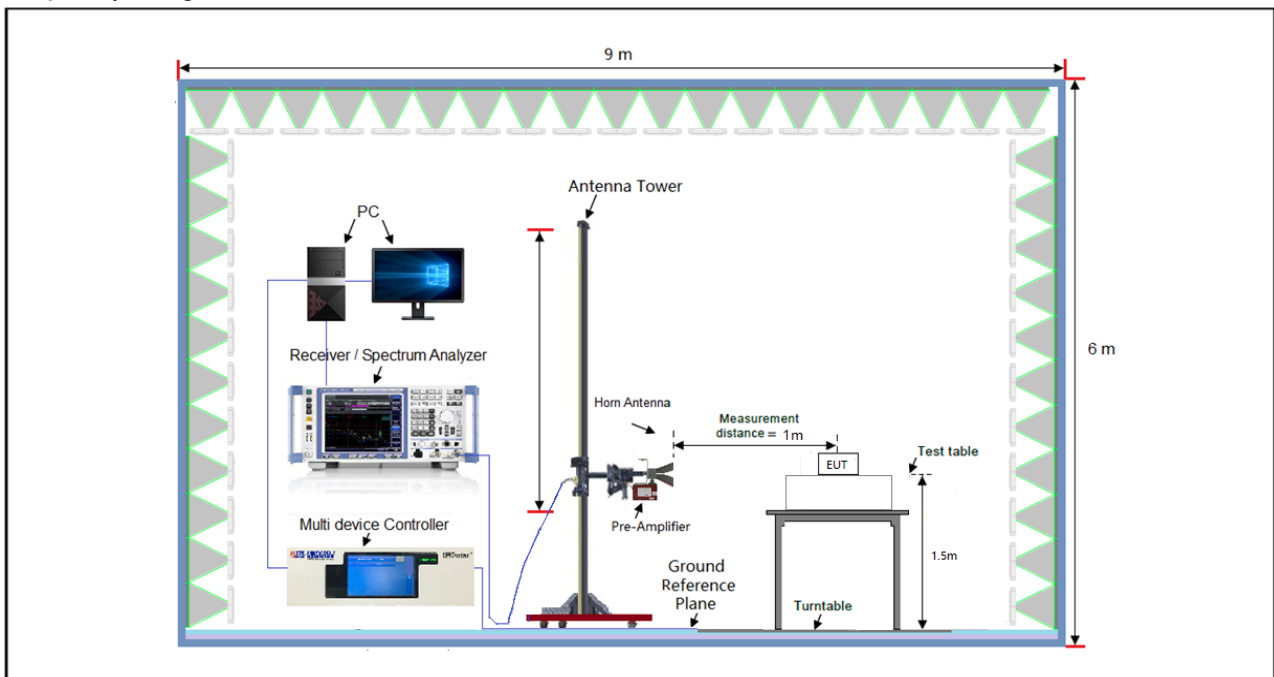
Frequency Range below 1GHz:



Frequency Range 1-18GHz:



Frequency Range 18-40GHz:



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.

Lab: [Hwa-Hsing \(Dongguan\) Testing Co., Ltd.](#)
 Address: [No.101, Building N1, Yuyuan 2 Road, Yuyuan Industrial Park, HuangJiang Town, Dongguan City, People's Republic of China](#)

Tel: [0769-83078199](tel:0769-83078199)
 Web.: www.hwa-hsing.com
 E-Mail: customerservice.dg@hwa-hsing.com

Release
 Ver. 1.5

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

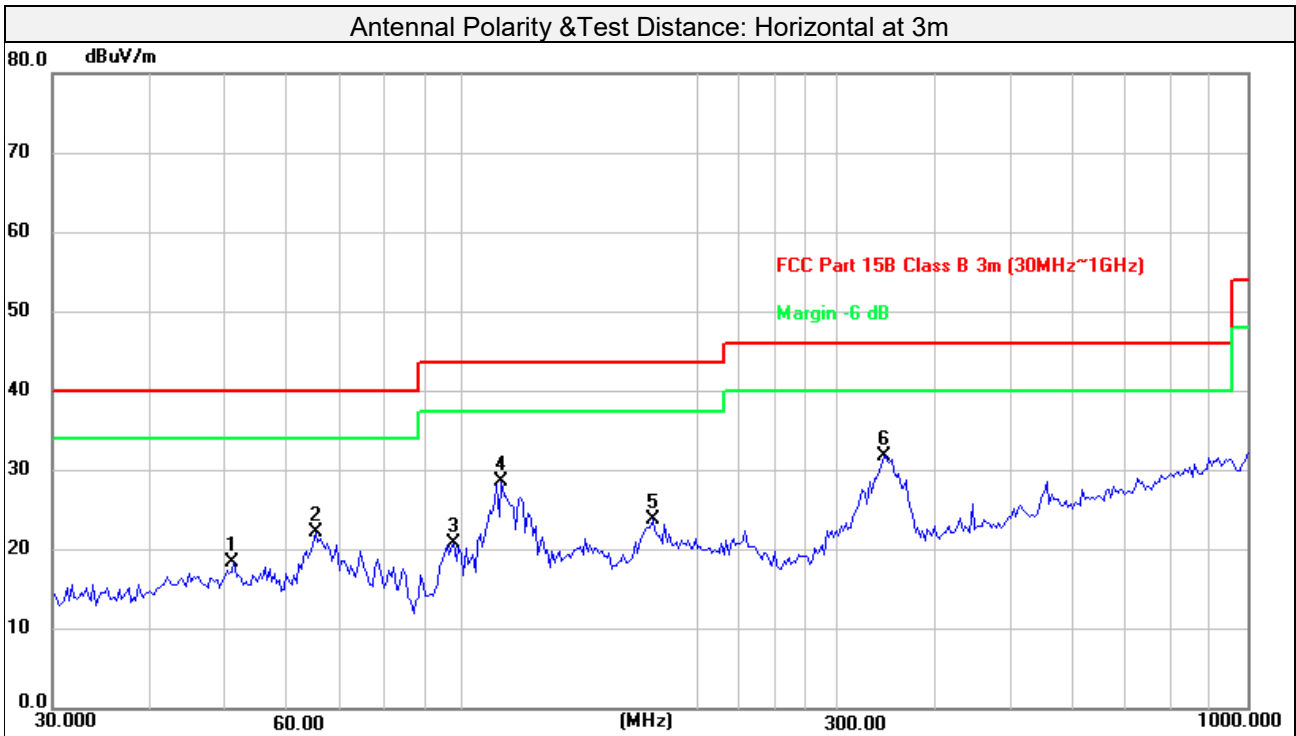
3.1.7 Test Results

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:

Test Mode	802.11b 2462MHz TX		
Test Channel	Channel 11	Frequency Range	30MHz ~ 1GHz
Detector Function	Peak (PK) Quasi-peak (QP)	Tested By	Jim Xu

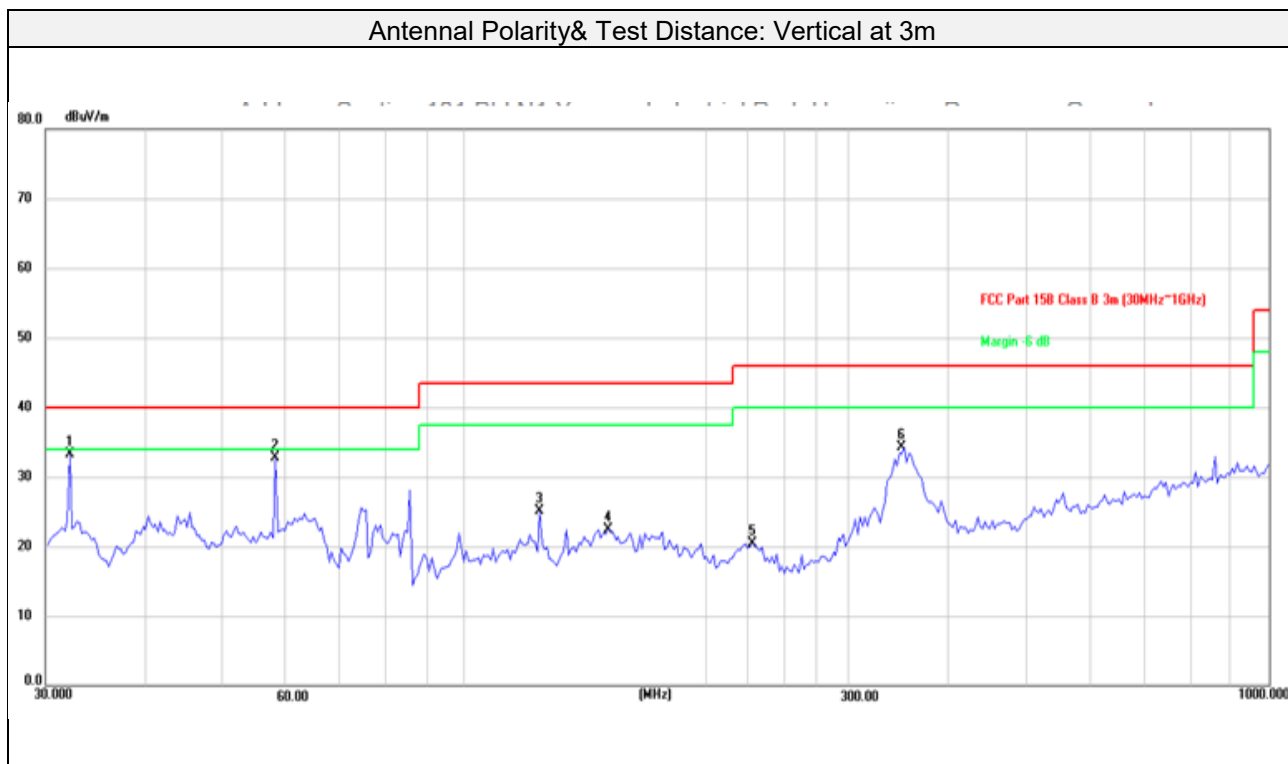


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	51.1209	33.51	-14.98	18.53	40.00	-21.47	peak	166	77
2	64.8865	37.88	-15.70	22.18	40.00	-17.82	peak	270	44
3	97.4560	40.12	-19.27	20.85	43.50	-22.65	peak	109	68
4	112.1305	45.14	-16.45	28.69	43.50	-14.81	peak	106	275
5	174.4241	37.73	-13.80	23.93	43.50	-19.57	peak	324	177
6	344.3855	43.75	-11.92	31.83	46.00	-14.17	peak	149	316

Remarks:

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

Test Mode	802.11b 2462MHz TX		
Test Channel	Channel 11	Frequency Range	30MHz ~ 1GHz
Detector Function	Peak (PK) Quasi-peak (QP)	Tested By	Jim Xu



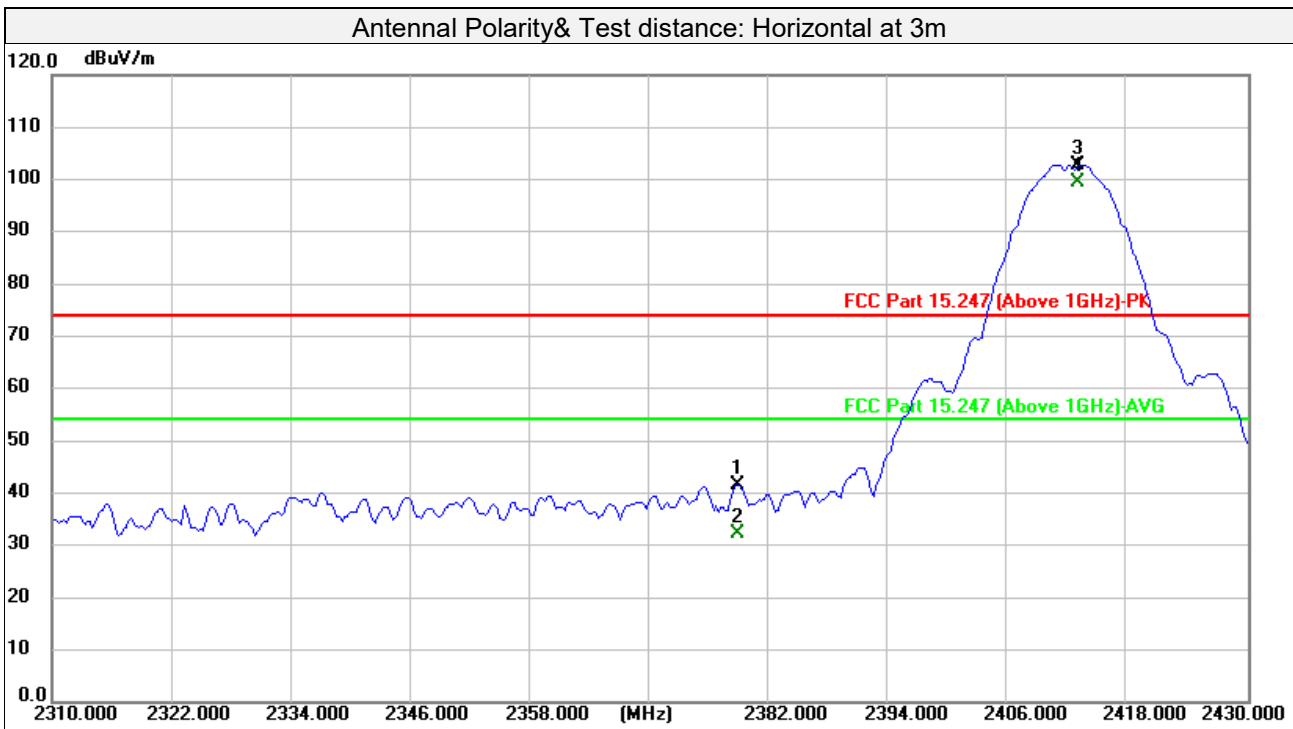
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	32.1794	51.10	-17.93	33.17	40.00	-6.83	peak	250	227
2	57.9992	48.20	-15.48	32.72	40.00	-7.28	peak	229	342
3	123.6985	40.47	-15.35	25.12	43.50	-18.38	peak	216	54
4	150.5378	36.66	-14.26	22.40	43.50	-21.10	peak	144	324
5	227.6906	35.91	-15.51	20.40	46.00	-25.60	peak	221	157
6	351.7079	46.05	-11.85	34.20	46.00	-11.80	peak	264	72

Remarks:

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

Above 1GHz Data:

Test Mode	802.11b: 2412MHz TX		
Test channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

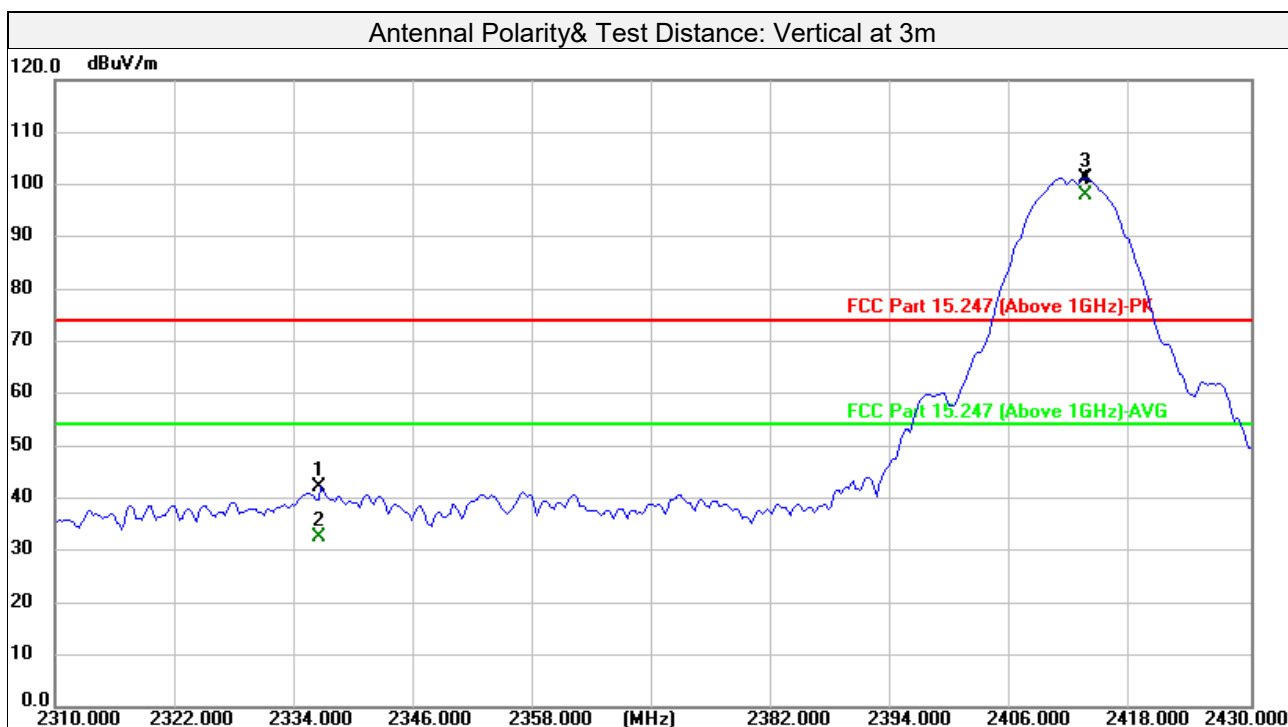


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2378.778	42.01	-0.43	41.58	74.00	-32.42	peak	128	232
2	2378.778	32.65	-0.43	32.22	54.00	-21.78	AVG	128	232
3	2413.166	103.25	-0.36	102.89			peak	128	232
4	2413.166	99.93	-0.36	99.57			AVG	128	232
5	4824.000	44.10	5.55	49.65	74.00	-24.35	peak	101	263
6	4824.000	38.80	5.55	44.35	54.00	-9.65	AVG	101	263
7	7236.000	45.19	12.47	57.66	74.00	-16.34	peak	100	226
8	7236.000	39.66	12.47	52.13	54.00	-1.87	AVG	100	226

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11b: 2412MHz TX		
Test channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2336.693	42.54	-0.53	42.01	74.00	-31.99	peak	318	61
2	2336.693	33.17	-0.53	32.64	54.00	-21.36	AVG	318	61
3	2413.407	101.58	-0.36	101.22			peak	318	61
4	2413.407	98.33	-0.36	97.97			AVG	318	61
5	4824.000	40.88	5.55	46.43	74.00	-27.57	peak	283	62
6	4824.000	30.38	5.55	35.93	54.00	-18.07	AVG	283	62
7	7236.000	42.32	12.47	54.79	74.00	-19.21	peak	229	3
8	7236.000	34.18	12.47	46.65	54.00	-7.35	AVG	229	3

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

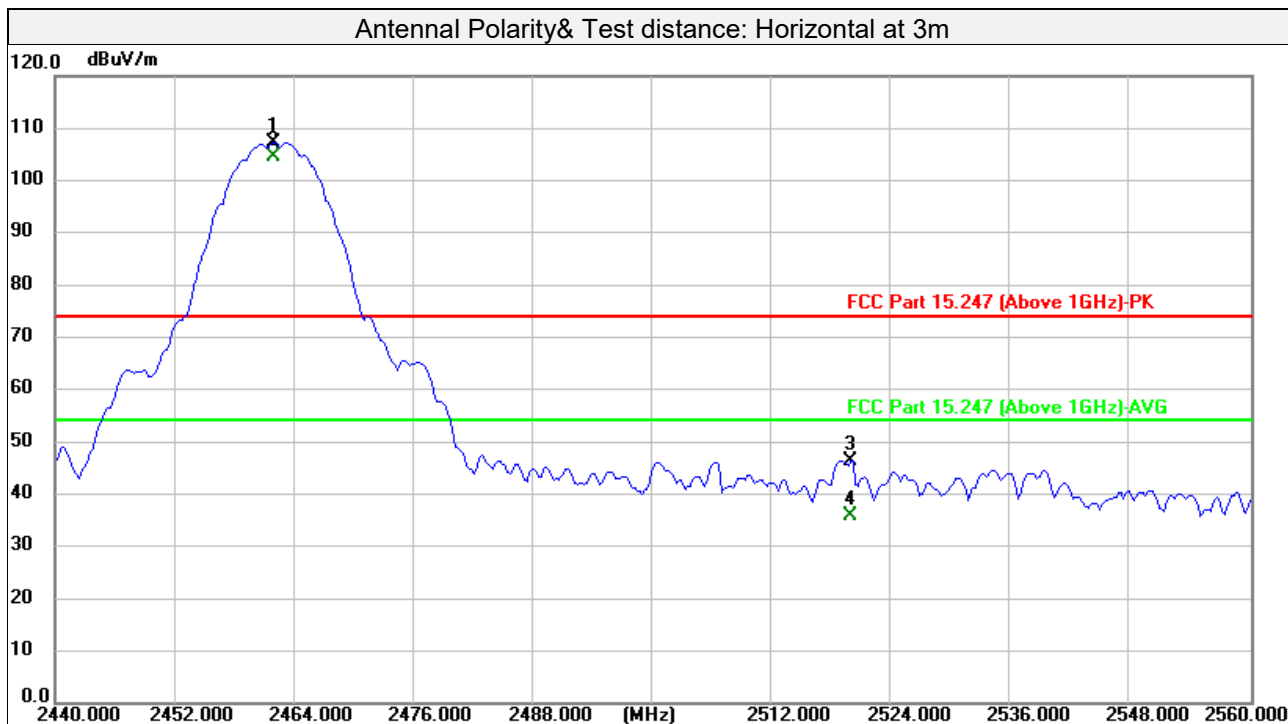
Test Mode	802.11b: 2437MHz TX		
Test channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

Antennal Polarity& Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2437.000	104.63	-0.31	104.32			peak	164	326
2	2437.000	101.05	-0.31	100.74			AVG	164	326
3	4874.000	43.19	6.16	49.35	74.00	-24.65	peak	100	226
4	4874.000	36.10	6.16	42.26	54.00	-11.74	AVG	100	226
5	7311.000	46.21	12.63	58.84	74.00	-15.16	peak	304	284
6	7311.000	39.96	12.63	52.59	54.00	-1.41	AVG	304	284
Antennal Polarity& Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2437.000	103.95	-0.31	103.64			peak	253	53
2	2437.000	100.55	-0.31	100.24			AVG	253	53
3	4874.000	41.63	6.16	47.79	74.00	-26.21	peak	122	263
4	4874.000	30.41	6.16	36.57	54.00	-17.43	AVG	122	263
5	7311.000	42.60	12.63	55.23	74.00	-18.77	peak	235	5
6	7311.000	33.81	12.63	46.44	54.00	-7.56	AVG	235	5

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11b: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

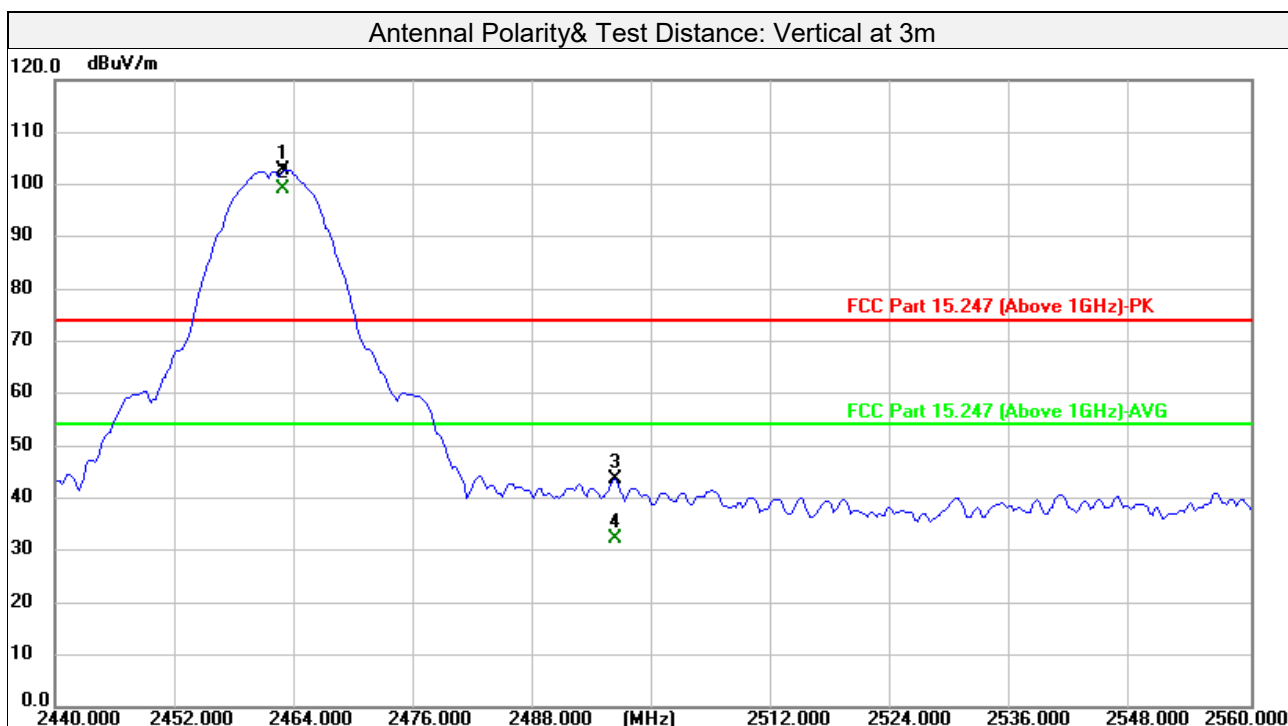


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2461.884	107.40	-0.26	107.14			peak	148	75
2	2461.884	104.91	-0.26	104.65			AVG	148	75
3	2520.080	46.56	-0.12	46.44	74.00	-27.56	peak	148	75
4	2520.080	36.10	-0.12	35.98	54.00	-18.02	AVG	148	75
5	4924.000	42.87	6.36	49.23	74.00	-24.77	peak	305	263
6	4924.000	35.49	6.36	41.85	54.00	-12.15	AVG	305	263
7	7386.000	45.06	12.79	57.85	74.00	-16.15	peak	299	286
8	7386.000	38.16	12.79	50.95	54.00	-3.05	AVG	299	286

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11b: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

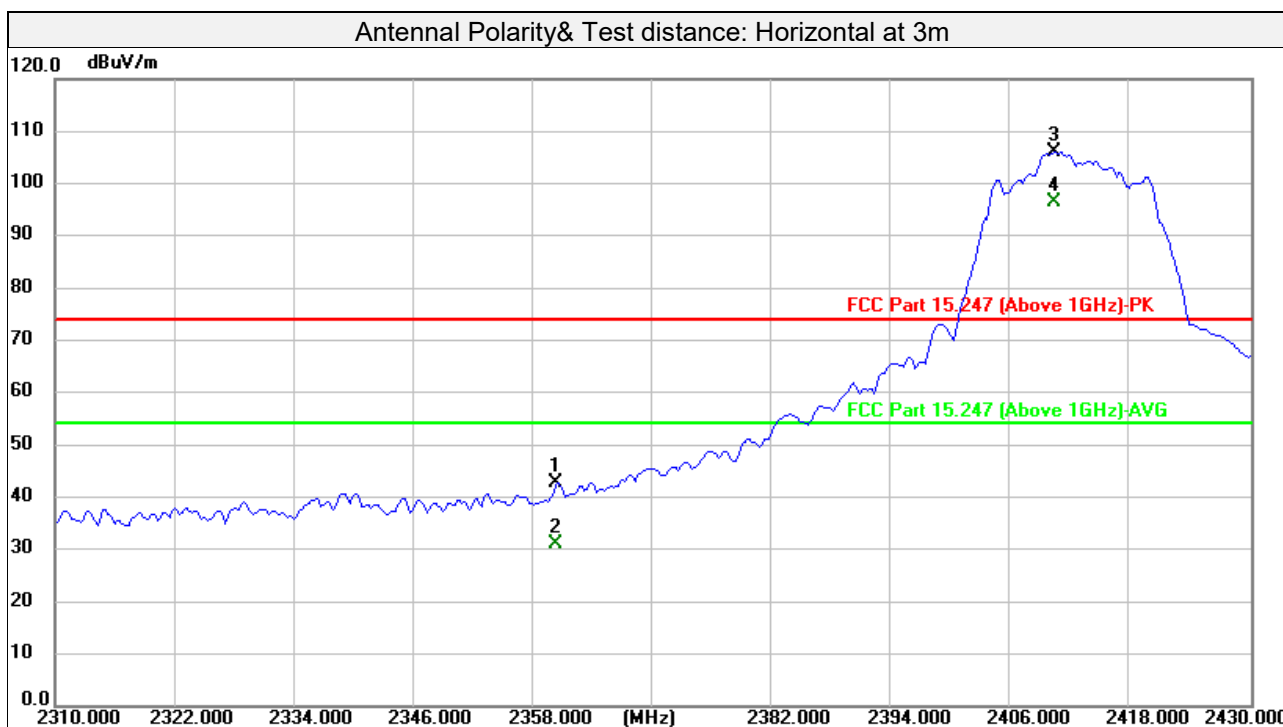


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2463.086	103.02	-0.26	102.76			peak	381	342
2	2463.086	99.53	-0.26	99.27			AVG	381	342
3	2496.273	43.68	-0.17	43.51	74.00	-30.49	peak	381	342
4	2496.273	32.35	-0.17	32.18	54.00	-21.82	AVG	381	342
5	4924.000	40.22	6.36	46.58	74.00	-27.42	peak	162	24
6	4924.000	29.89	6.36	36.25	54.00	-17.75	AVG	162	24
7	7386.000	41.97	12.79	54.76	74.00	-19.24	peak	100	360
8	7386.000	32.85	12.79	45.64	54.00	-8.36	AVG	100	360

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11g: 2412MHz TX		
Test channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

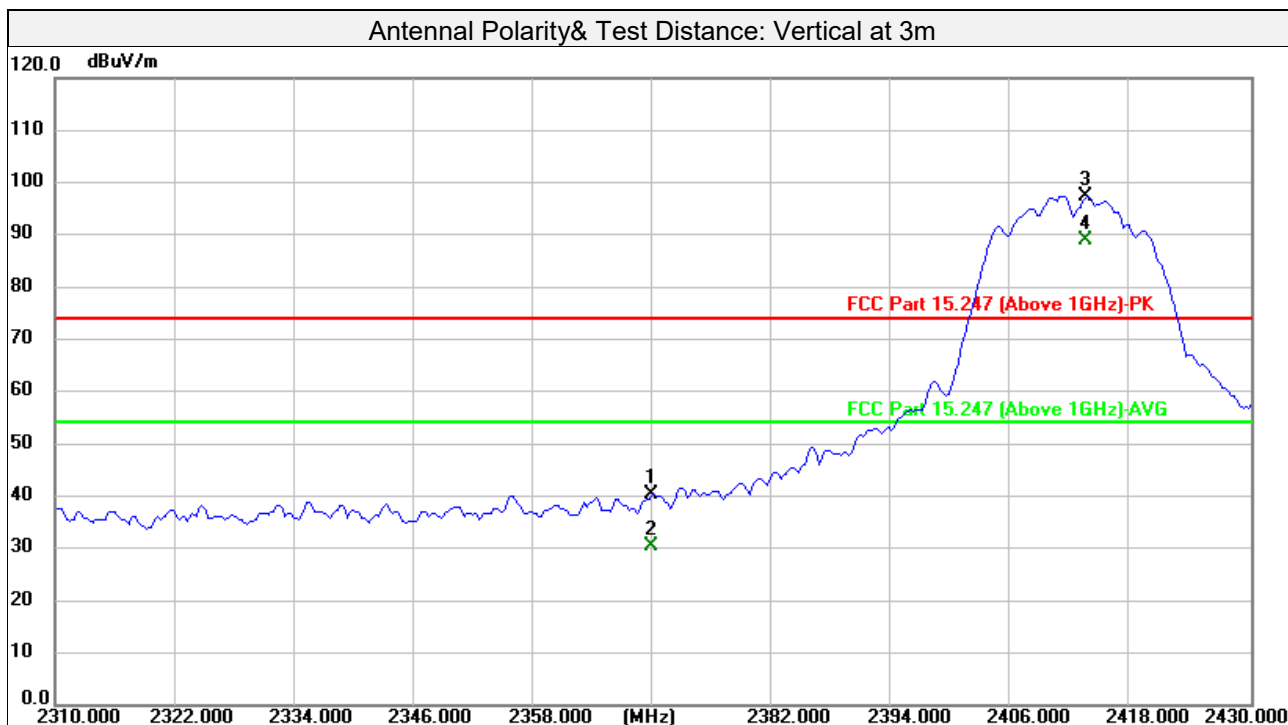


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2360.501	43.30	-0.47	42.83	74.00	-31.17	peak	145	322
2	2360.501	31.44	-0.47	30.97	54.00	-23.03	AVG	145	322
3	2410.281	106.37	-0.37	106.00			peak	145	322
4	2410.281	96.97	-0.37	96.60			AVG	145	322
5	4824.000	41.93	5.55	47.48	74.00	-26.52	peak	116	245
6	4824.000	31.83	5.55	37.38	54.00	-16.62	AVG	116	245
7	7236.000	46.92	12.47	59.39	74.00	-14.61	peak	376	280
8	7236.000	36.61	12.47	49.08	54.00	-4.92	AVG	376	280

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11g: 2412MHz TX		
Test channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2370.120	40.74	-0.45	40.29	74.00	-33.71	peak	100	137
2	2370.120	30.77	-0.45	30.32	54.00	-23.68	AVG	100	137
3	2413.647	97.71	-0.36	97.35			peak	100	137
4	2413.647	89.22	-0.36	88.86			AVG	100	137
5	4824.000	42.29	5.55	47.84	74.00	-26.16	peak	104	304
6	4824.000	31.59	5.55	37.14	54.00	-16.86	AVG	104	304
7	7236.000	41.88	12.47	54.35	74.00	-19.65	peak	127	56
8	7236.000	31.37	12.47	43.84	54.00	-10.16	AVG	127	56

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

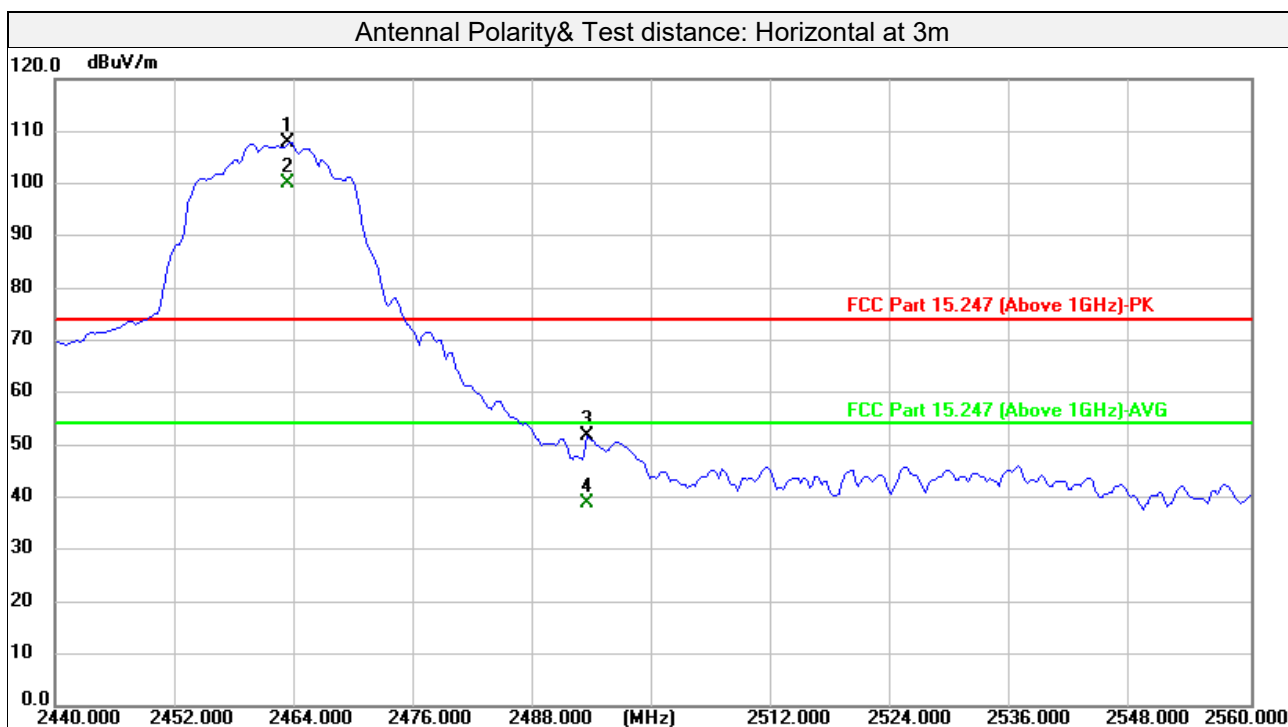
Test Mode	802.11g: 2437MHz TX		
Test channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

Antennal Polarity& Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2437.000	109.02	-0.31	108.71			peak	114	328
2	2437.000	100.14	-0.31	99.83			AVG	114	328
3	4874.000	50.43	6.16	56.59	74.00	-17.41	peak	136	242
4	4874.000	30.24	6.16	36.40	54.00	-17.60	AVG	136	242
5	7311.000	45.44	12.63	58.07	74.00	-15.93	peak	105	234
6	7311.000	34.90	12.63	47.53	54.00	-6.47	AVG	105	234
Antennal Polarity& Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2437.000	107.44	-0.31	107.13			peak	309	64
2	2437.000	98.71	-0.31	98.40			AVG	309	64
3	4874.000	42.51	6.16	48.67	74.00	-25.33	peak	115	236
4	4874.000	31.52	6.16	37.68	54.00	-16.32	AVG	115	236
5	7311.000	42.75	12.63	55.38	74.00	-18.62	peak	162	74
6	7311.000	33.60	12.63	46.23	54.00	-7.77	AVG	162	74

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11g: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

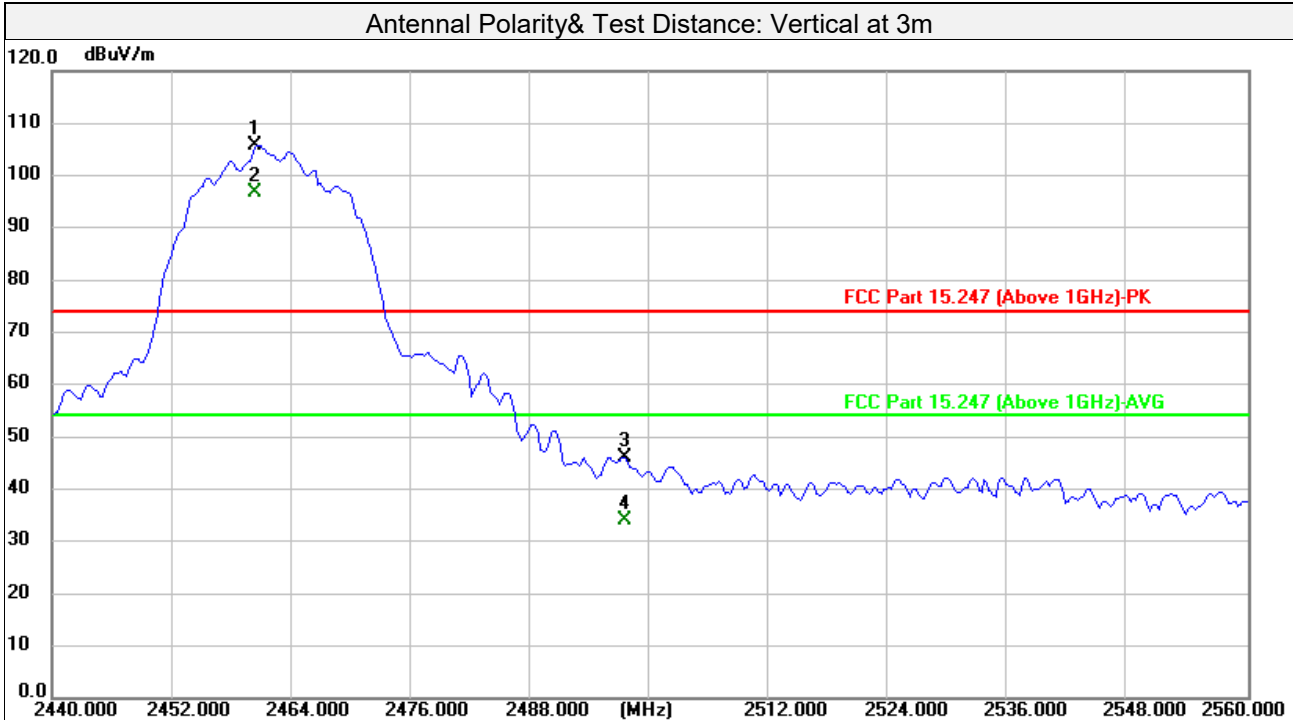


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2463.567	108.23	-0.26	107.97			peak	100	82
2	2463.567	100.44	-0.26	100.18			AVG	100	82
3	2493.387	52.05	-0.18	51.87	74.00	-22.13	peak	100	82
4	2493.387	38.91	-0.18	38.73	54.00	-15.27	AVG	100	82
5	4924.000	42.53	6.36	48.89	74.00	-25.11	peak	128	185
6	4924.000	31.76	6.36	38.12	54.00	-15.88	AVG	128	185
7	7386.000	44.96	12.79	57.75	74.00	-16.25	peak	100	214
8	7386.000	33.43	12.79	46.22	54.00	-7.78	AVG	100	214

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11g: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu



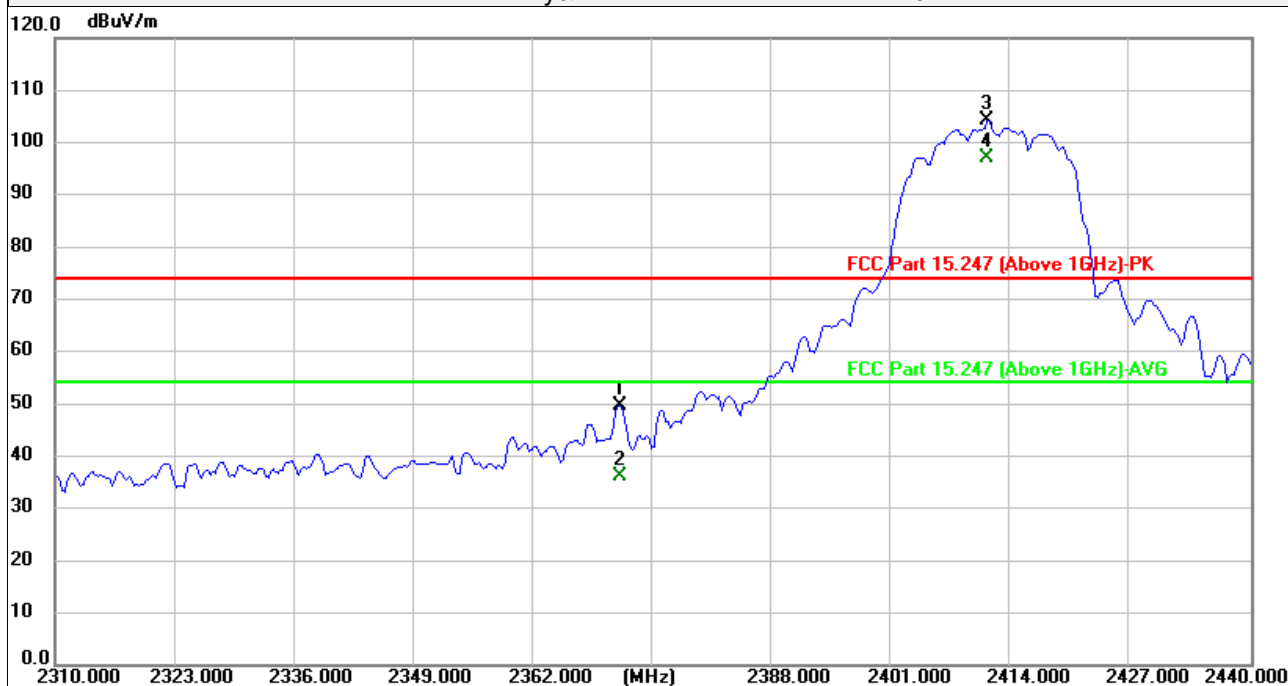
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2460.681	106.14	-0.25	105.89			peak	121	354
2	2460.681	96.94	-0.25	96.69			AVG	121	354
3	2497.475	46.22	-0.16	46.06	74.00	-27.94	peak	121	354
4	2497.475	34.20	-0.16	34.04	54.00	-19.96	AVG	121	354
5	4924.000	42.31	6.36	48.67	74.00	-25.33	peak	103	42
6	4924.000	31.24	6.36	37.60	54.00	-16.40	AVG	103	42
7	7386.000	42.49	12.79	55.28	74.00	-18.72	peak	157	273
8	7386.000	32.89	12.79	45.68	54.00	-8.32	AVG	157	273

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11n HT20: 2412MHz TX		
Test channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

Antennal Polarity& Test distance: Horizontal at 3m

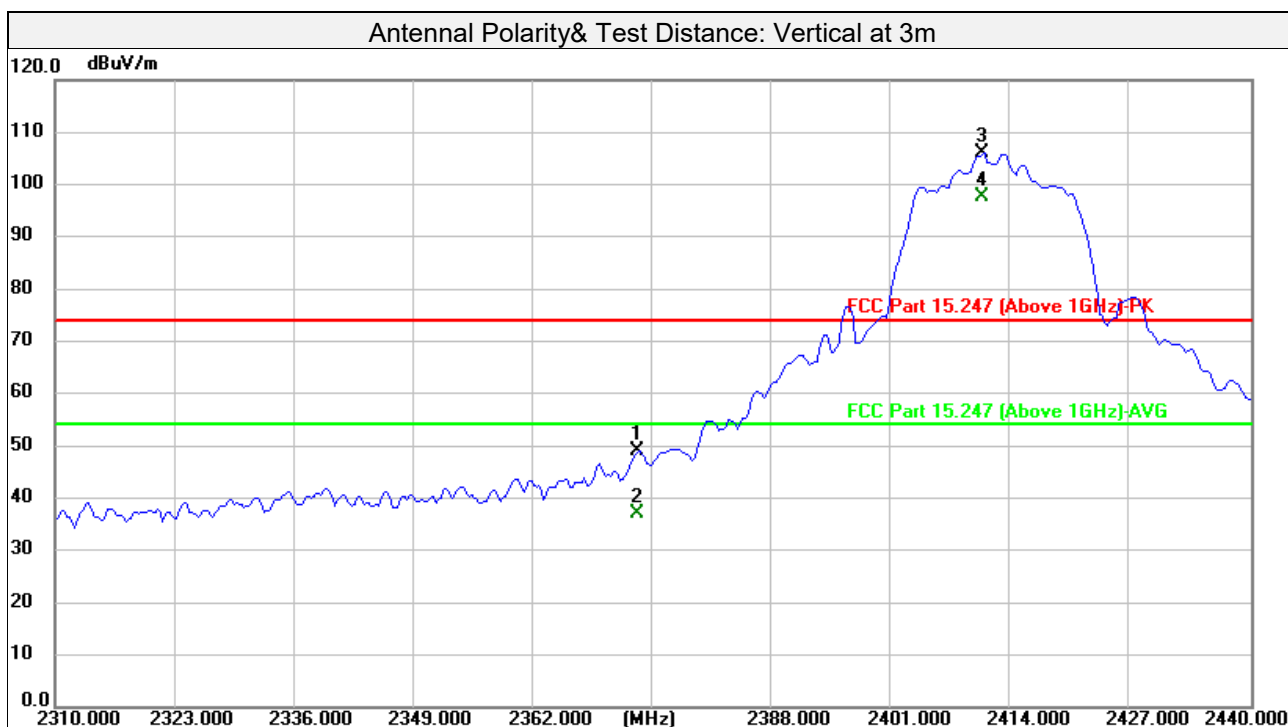


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2371.483	50.11	-0.46	49.65	74.00	-24.35	peak	100	202
2	2371.483	36.59	-0.46	36.13	54.00	-17.87	AVG	100	202
3	2411.343	104.51	-0.37	104.14			peak	100	202
4	2411.343	97.28	-0.37	96.91			AVG	100	202
5	4824.000	43.29	5.55	48.84	74.00	-25.16	peak	117	231
6	4824.000	31.71	5.55	37.26	54.00	-16.74	AVG	117	231
7	7236.000	50.02	12.47	62.49	74.00	-11.51	peak	378	285
8	7236.000	37.56	12.47	50.03	54.00	-3.97	AVG	378	285

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11n HT20: 2412MHz TX		
Test channel	Channel 1	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2373.567	49.37	-0.44	48.93	74.00	-25.07	peak	285	64
2	2373.567	37.47	-0.44	37.03	54.00	-16.97	AVG	285	64
3	2411.082	106.54	-0.37	106.17			peak	285	64
4	2411.082	98.09	-0.37	97.72			AVG	285	64
5	4824.000	43.46	5.55	49.01	74.00	-24.99	peak	126	185
6	4824.000	31.72	5.55	37.27	54.00	-16.73	AVG	126	185
7	7236.000	41.57	12.47	54.04	74.00	-19.96	peak	385	163
8	7236.000	31.73	12.47	44.20	54.00	-9.80	AVG	385	163

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2412MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

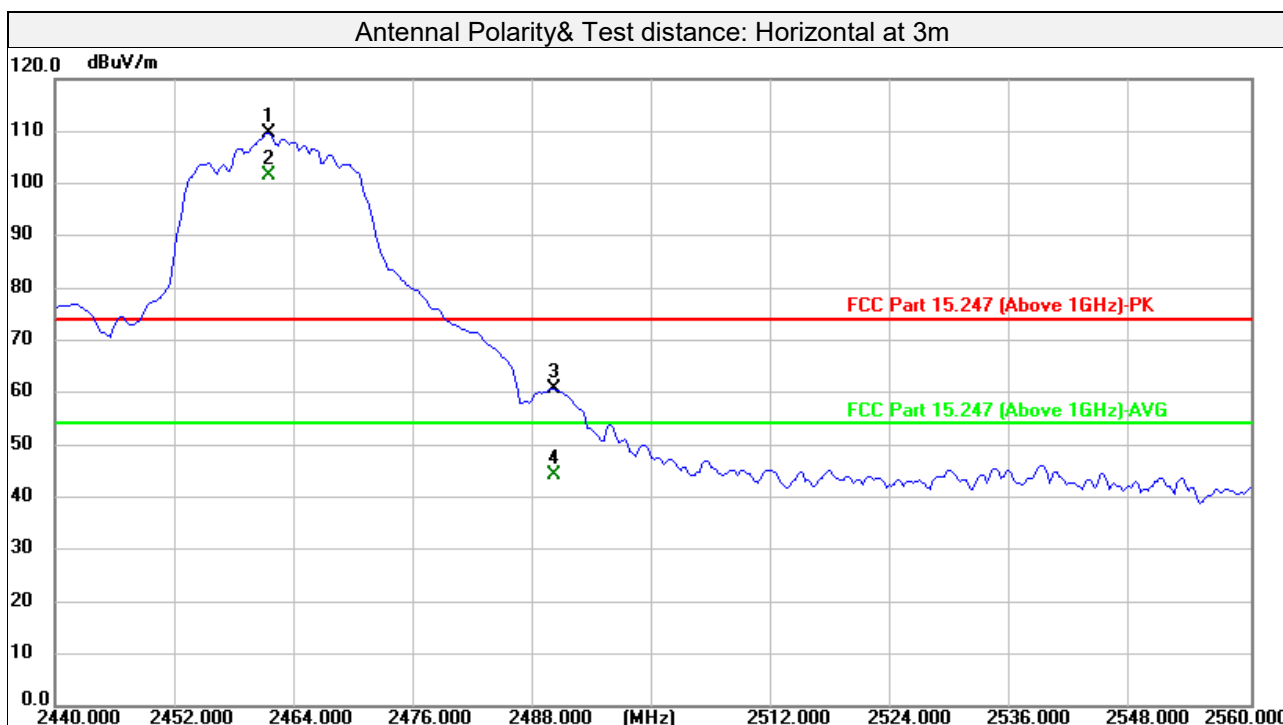
Test Mode	802.11n HT20: 2437MHz TX		
Test channel	Channel 6	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

Antennal Polarity& Test Distance: Horizontal at 3m									
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2437.000	109.98	-0.31	109.67			peak	113	322
2	2437.000	101.03	-0.31	100.72			AVG	113	322
3	4874.000	41.88	6.16	48.04	74.00	-25.96	peak	138	206
4	4874.000	29.83	6.16	35.99	54.00	-18.01	AVG	138	206
5	7311.000	46.41	12.63	59.04	74.00	-14.96	peak	367	279
6	7311.000	36.26	12.63	48.89	54.00	-5.11	AVG	367	279
Antennal Polarity& Test Distance: Vertical at 3m									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2437.000	107.36	-0.31	107.05	74.00	33.05	peak	313	62
2	2437.000	98.53	-0.31	98.22	54.00	44.22	AVG	313	62
3	4874.000	42.72	6.16	48.88	74.00	-25.12	peak	100	225
4	4874.000	31.56	6.16	37.72	54.00	-16.28	AVG	100	225
5	7311.000	44.08	12.63	56.71	74.00	-17.29	peak	129	261
6	7311.000	33.54	12.63	46.17	54.00	-7.83	AVG	129	261

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2437MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11n HT20: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu

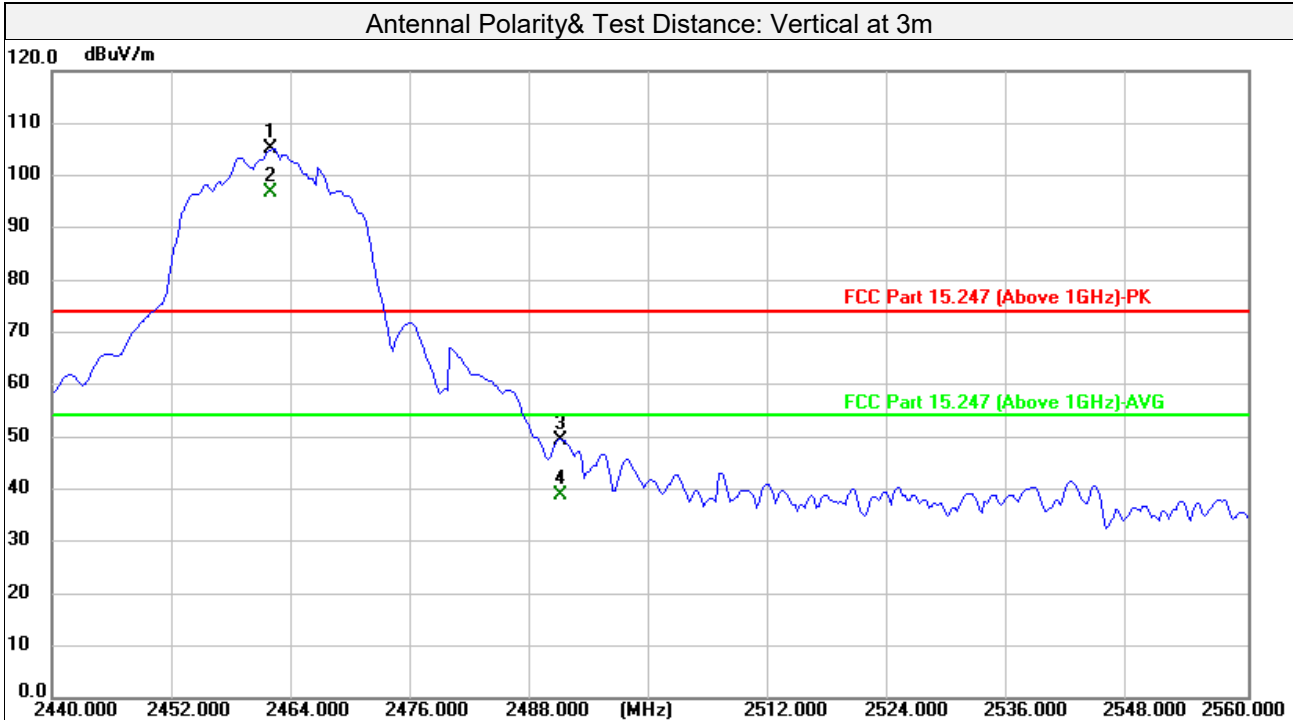


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2461.403	109.91	-0.26	109.65			peak	147	75
2	2461.403	101.89	-0.26	101.63			AVG	147	75
3	2490.020	60.87	-0.19	60.68	74.00	-13.32	peak	147	75
4	2490.020	44.41	-0.19	44.22	54.00	-9.78	AVG	147	75
5	4924.000	41.82	6.36	48.18	74.00	-25.82	peak	214	162
6	4924.000	30.46	6.36	36.82	54.00	-17.18	AVG	214	162
7	7386.000	44.89	12.79	57.68	74.00	-16.32	peak	143	208
8	7386.000	35.09	12.79	47.88	54.00	-6.12	AVG	143	208

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Test Mode	802.11n HT20: 2462MHz TX		
Test channel	Channel 11	Frequency Range	1GHz ~ 25GHz
Detector Function	Peak (PK) Average (AVG)	Tested By	Jim Xu



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Angle (Degree)
1	2462.124	105.41	-0.26	105.15			peak	121	346
2	2462.124	96.90	-0.26	96.64			AVG	121	346
3	2490.982	49.68	-0.18	49.50	74.00	-24.50	peak	121	346
4	2490.982	39.15	-0.18	38.97	54.00	-15.03	AVG	121	346
5	4924.000	43.21	6.36	49.57	74.00	-24.43	peak	113	207
6	4924.000	31.14	6.36	37.50	54.00	-16.50	AVG	113	207
7	7386.000	41.74	12.79	54.53	74.00	-19.47	peak	137	226
8	7386.000	31.38	12.79	44.17	54.00	-9.83	AVG	137	226

Remarks:

1. Emission Level = Read Level + Factor (Antenna Factor + Cable Loss - Preamp Factor)
2. Margin value = Emission level – Limit value
3. 2462MHz: Fundamental frequency.
4. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

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

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR 7	101961	2024-12-17
Artificial Mains Network	Rohde&Schwarz	ENV216	3560.6550.15	2024-12-17
Test software	FARAD	EZ_EMV V1.1.4.2	N/A	N/A

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

3.2.3 Test Procedures

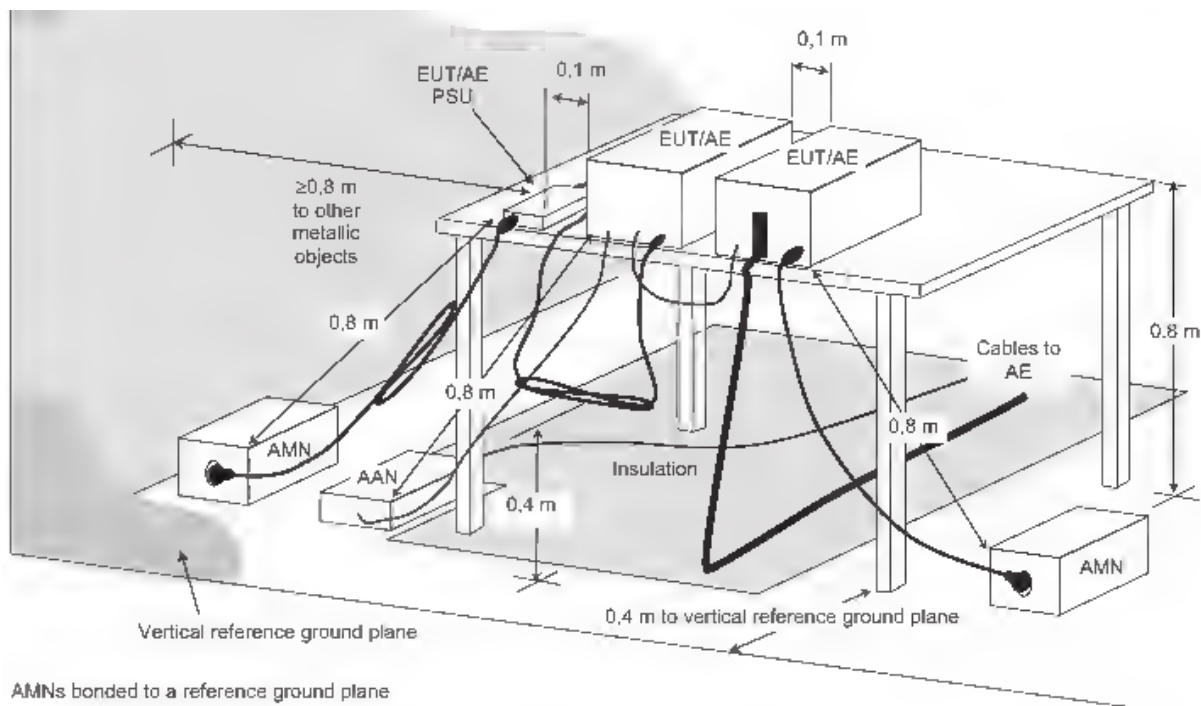
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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 Deviation from Test Standard

No deviation.

3.2.5 Test setup

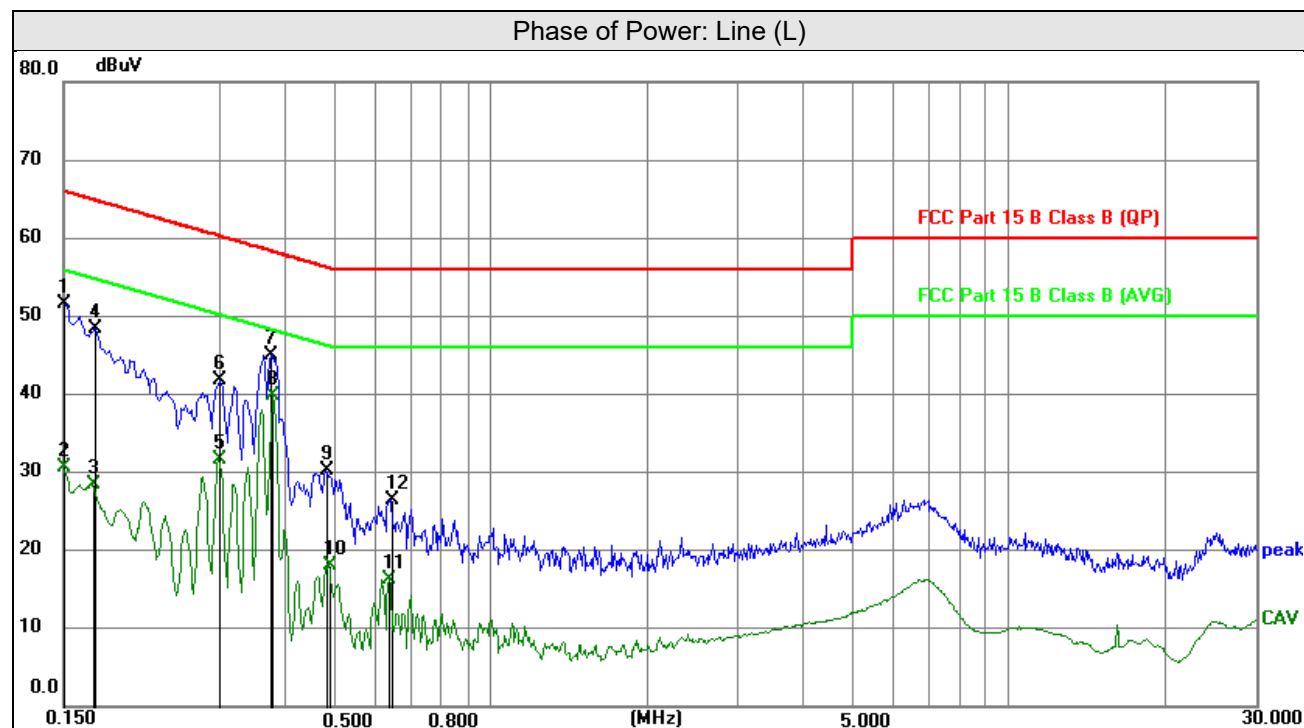


3.2.6 EUT Operating Conditions

- 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

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
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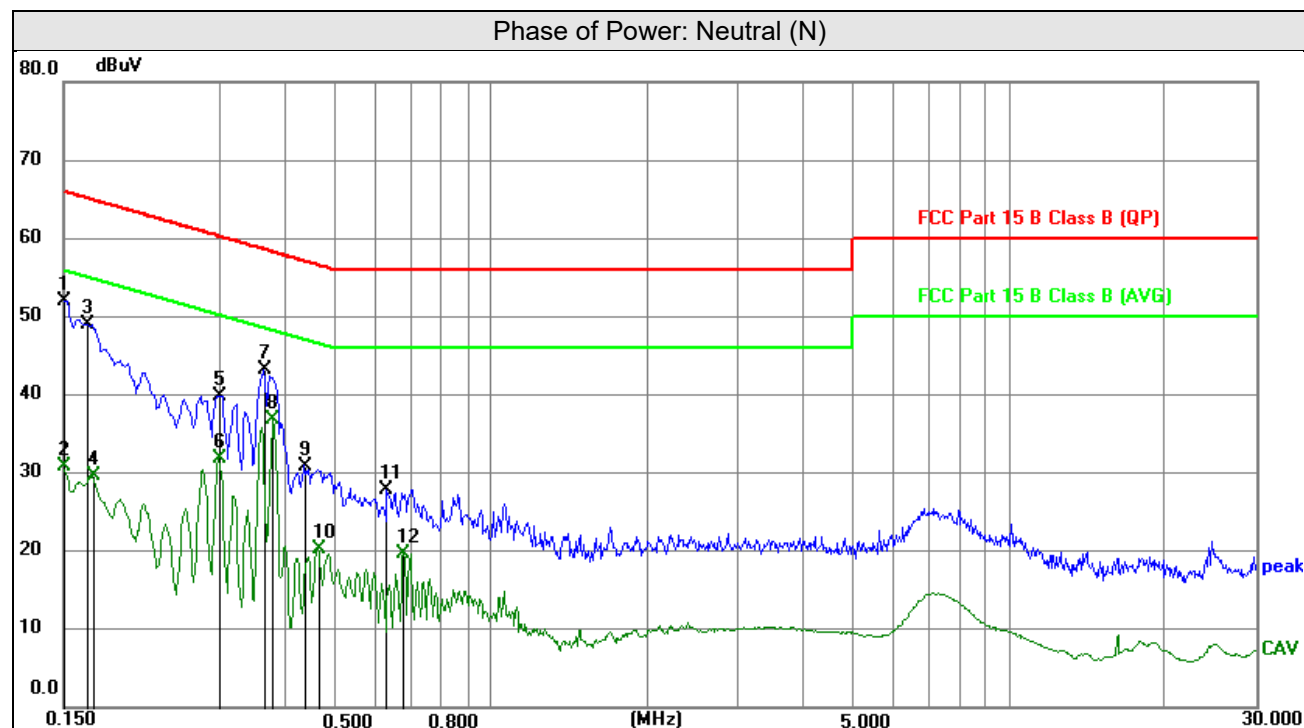


No	Frequency (MHz)	Reading (dBuV)	Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	41.37	10.19	51.56	66.00	-14.44	peak
2	0.1500	20.47	10.19	30.66	56.00	-25.34	AVG
3	0.1703	18.35	10.16	28.51	54.95	-26.44	AVG
4	0.1725	38.20	10.16	48.36	64.84	-16.48	peak
5	0.2985	21.36	10.20	31.56	50.28	-18.72	AVG
6	0.3007	31.61	10.20	41.81	60.22	-18.41	peak
7	0.3772	34.84	10.13	44.97	58.34	-13.37	peak
8	0.3817	29.76	10.12	39.88	48.24	-8.36	AVG
9	0.4830	20.09	10.10	30.19	56.29	-26.10	peak
10	0.4875	7.94	10.10	18.04	46.21	-28.17	AVG
11	0.6382	6.09	10.10	16.19	46.00	-29.81	AVG
12	0.6450	16.31	10.10	26.41	56.00	-29.59	peak

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 bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
-----------------	----------------	--	--------------------------------------



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	41.85	10.19	52.04	66.00	-13.96	peak
2	0.1500	20.73	10.19	30.92	56.00	-25.08	AVG
3	0.1658	38.86	10.17	49.03	65.17	-16.14	peak
4	0.1703	19.38	10.16	29.54	54.95	-25.41	AVG
5	0.2985	29.71	10.18	39.89	60.28	-20.39	peak
6	0.2985	21.55	10.18	31.73	50.28	-18.55	AVG
7	0.3660	33.15	10.12	43.27	58.59	-15.32	peak
8	0.3817	26.80	10.10	36.90	48.24	-11.34	AVG
9	0.4380	20.83	10.09	30.92	57.10	-26.18	peak
10	0.4650	10.15	10.11	20.26	46.60	-26.34	AVG
11	0.6337	17.77	10.10	27.87	56.00	-28.13	peak
12	0.6809	9.63	10.10	19.73	46.00	-26.27	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.

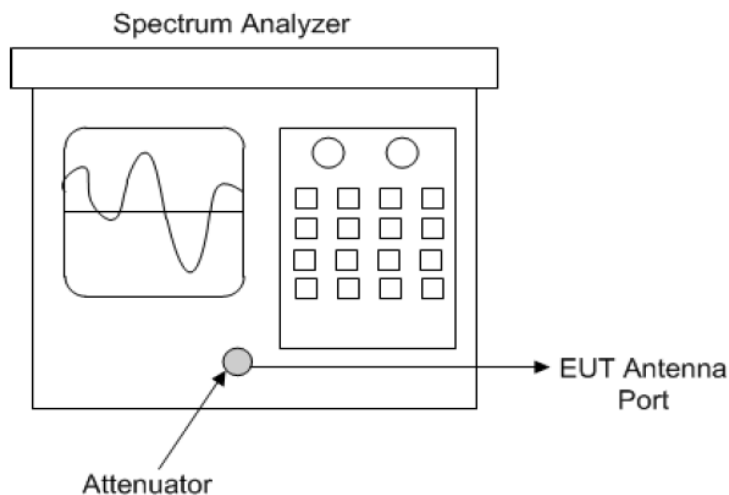
3.3 6dB Bandwidth Measurement

3.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

3.3.2 Test Setup

Subclause 11.8 of ANSI C63.10 is applicable.



3.3.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.3.4 Test Procedure

Option 1:

- a. Set resolution bandwidth (RBW) = 30kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. Sweep = auto couple.
- f. Allow the trace to stabilize.
- g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e. RBW= 100 kHz, VBW $\geq 3 \times$ RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care

shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

3.3.5 Deviation from Test Standard

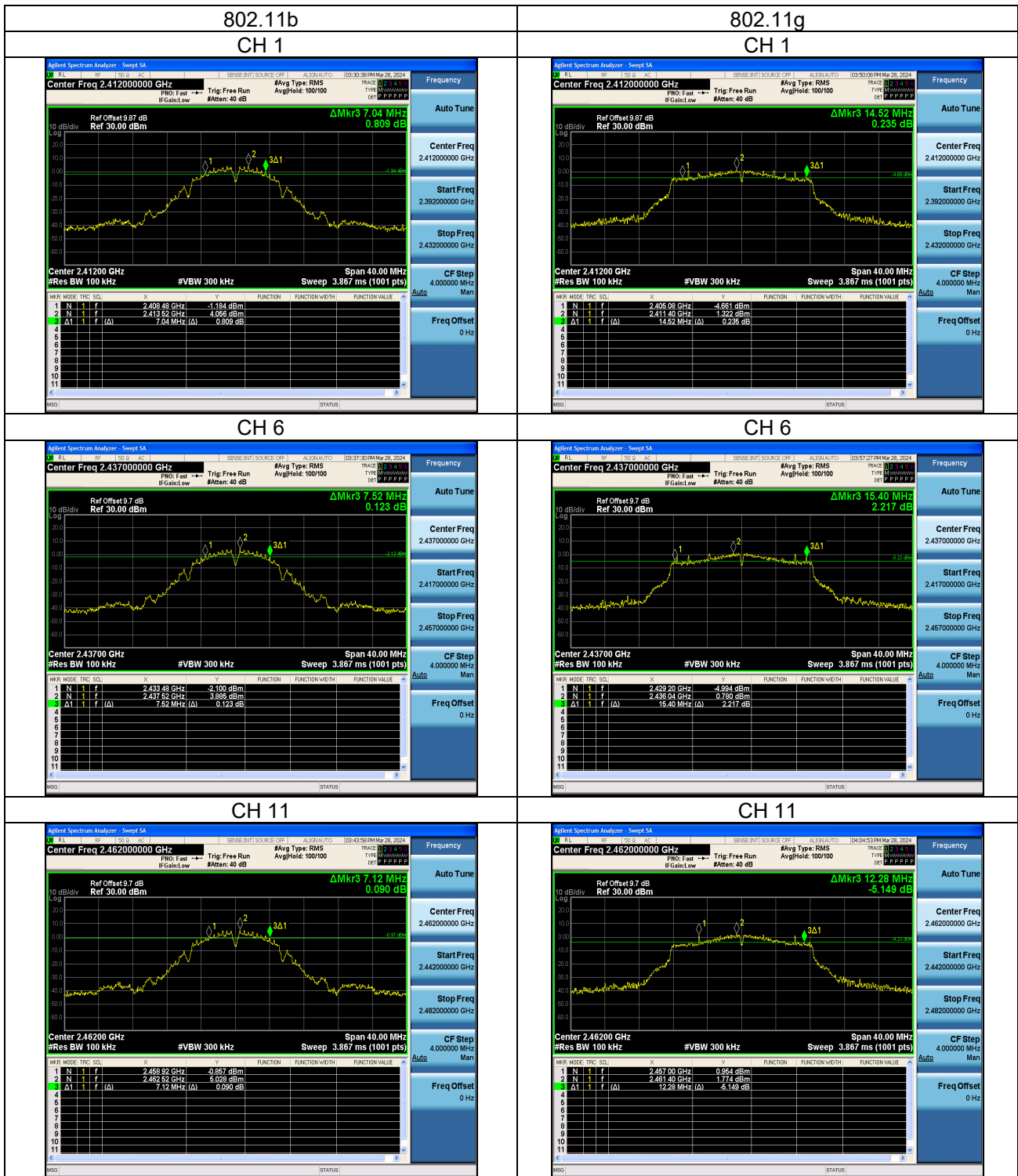
No deviation.

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

Test Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11b	1	2412	7.040	0.5	Pass
	6	2437	7.520	0.5	Pass
	11	2462	7.120	0.5	Pass
11g	1	2412	14.520	0.5	Pass
	6	2437	15.400	0.5	Pass
	11	2462	12.280	0.5	Pass
11n HT20	1	2412	15.040	0.5	Pass
	6	2437	13.920	0.5	Pass
	11	2462	15.040	0.5	Pass



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 E-Mail: customerservice.dg@hwa-hsing.com

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 Ver. 1.5

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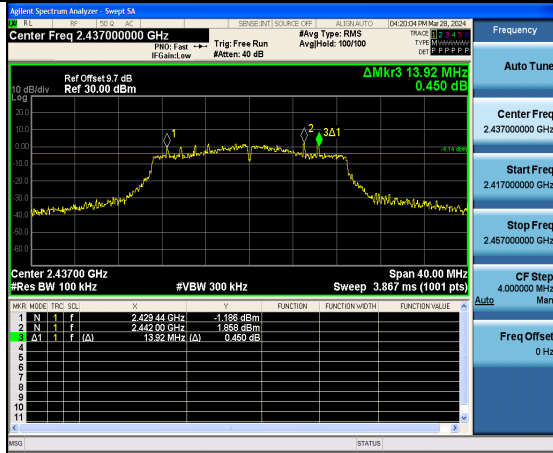
CH 1



CH 11

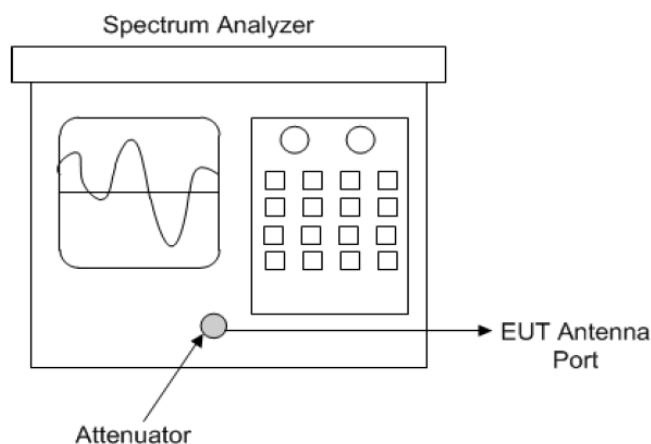


CH 6



3.4 Occupied Bandwidth Measurement

3.4.1 Test Setup



3.4.2 Test Instruments

Refer to section 5 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 bandwidth and 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

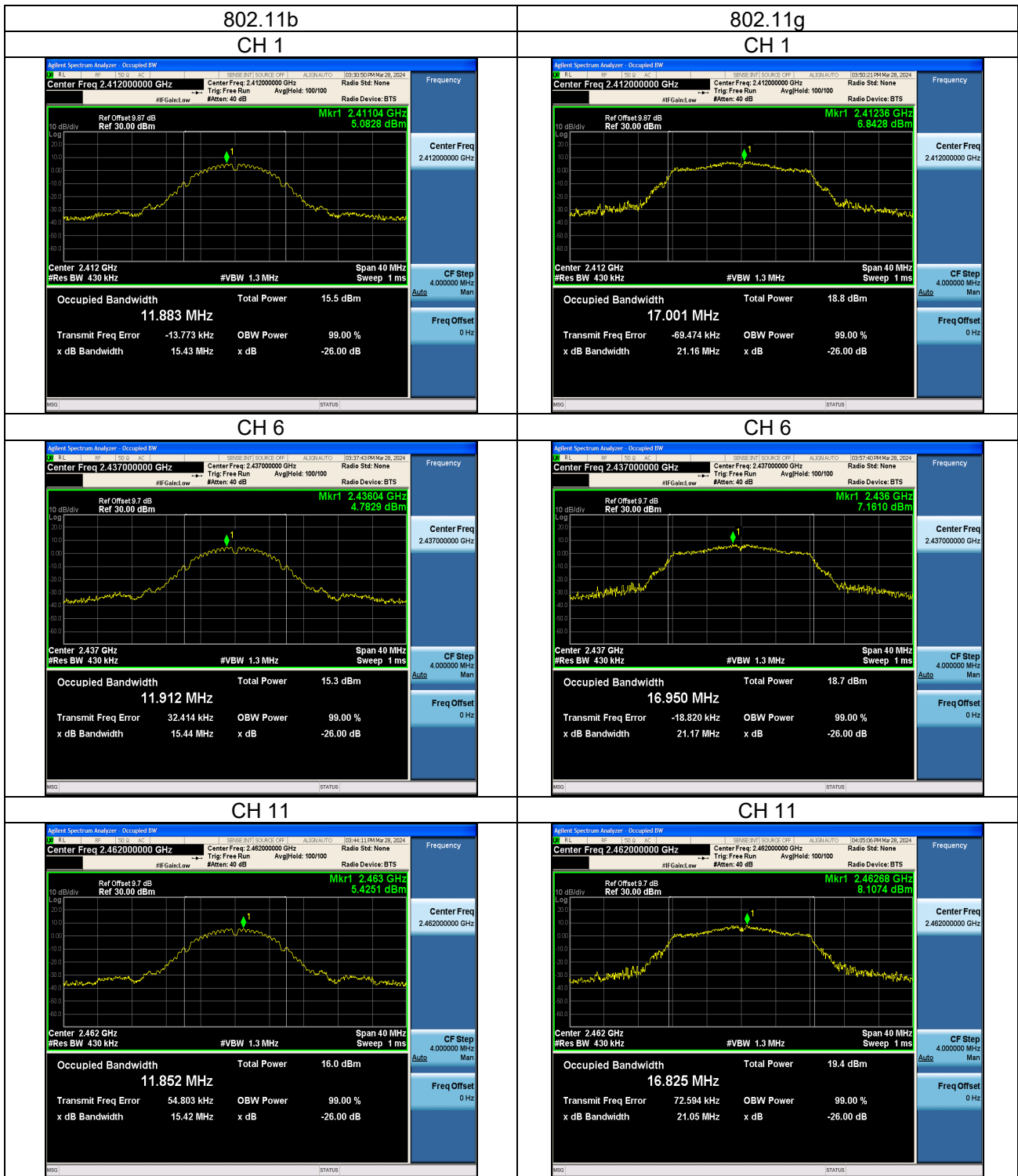
No deviation.

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

Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
11b	1	2412	11.883	Pass
	6	2437	11.912	Pass
	11	2462	11.852	Pass
11g	1	2412	17.001	Pass
	6	2437	16.950	Pass
	11	2462	16.825	Pass
11n HT20	1	2412	18.082	Pass
	6	2437	17.961	Pass
	11	2462	17.825	Pass





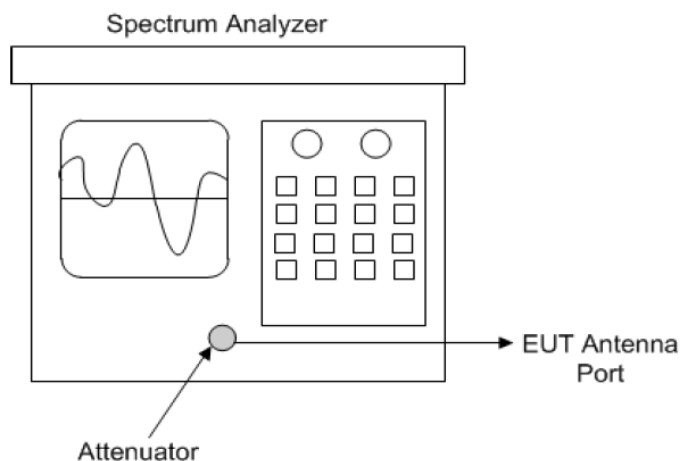
3.5 Conducted Output Power Measurement

3.5.1 Limits of Conducted Output Power Measurement

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

3.5.2 Test Setup

- Measurement using a spectrum analyzer (SA) Subclause 11.9.2.2 of ANSI C63.10 is applicable.



Spectrum analyzer output power test configuration

3.5.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.5.4 Test Procedures

Measurement using a spectrum analyzer (SA), Selection of test method:

The proper test method is selected based on the following criteria:

- Method AVGSA-1 or method AVGSA-1A (alternative)** shall be applied if either of the following conditions can be satisfied:
 - 1) The EUT transmits continuously (or with a $D > 98\%$).
 - 2) Sweep triggering can be implemented in such a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the instrument configured as in method AVGSA-1) is equal to or shorter than the duration T of each transmission from the EUT, and if those transmissions exhibit full power throughout their durations.
- Method AVGSA-2 or method AVGSA-2A (alternative)** shall be applied if the conditions of the preceding item a) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than +2%.
- Method AVGSA-3 or method AVGSA-3A (alternative)** shall be applied if the conditions of the preceding item a) and item b) cannot be achieved.

Method AVGSA-3 or method AVGSA-3A:

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c) SA Setting:
 - 1* Set span to at least 1.5 times the OBW
 - 2* Set sweep trigger to "free run."
 - 3* Set RBW= 1% to 5% of the OBW. not to exceed 1MHz.
 - 4* Set VBW $\geq 3 \times$ RBW
 - 5* Number of points in sweep $\geq 2 \times$ span /RBW. (This gives bin-to-bin spacing \leq RBW / 2. so that narrowband signals are not lost between frequency bins).
 - 6* Sweep time \leq (number of points in sweep) x T. where T is defined in 11.6. If this gives a sweep time less than the auto sweep time of the instrument. then method AVGSA-3 shall not be used (use AVGSA-3A). The purpose of this step is so that the averaging time in each bin is less than or equal to the minimum time of a transmission.
 - 7* Detector =RMS (power averaging).
 - 8* Trace mode =max hold.
 - 9* Allow max hold to run for at least 60 s or longer as needed to allow the trace to stabilize.
 - 10* Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function. then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

3.5.5 Deviation from Test Standard

No deviation.

3.5.6 EUT Operating Conditions

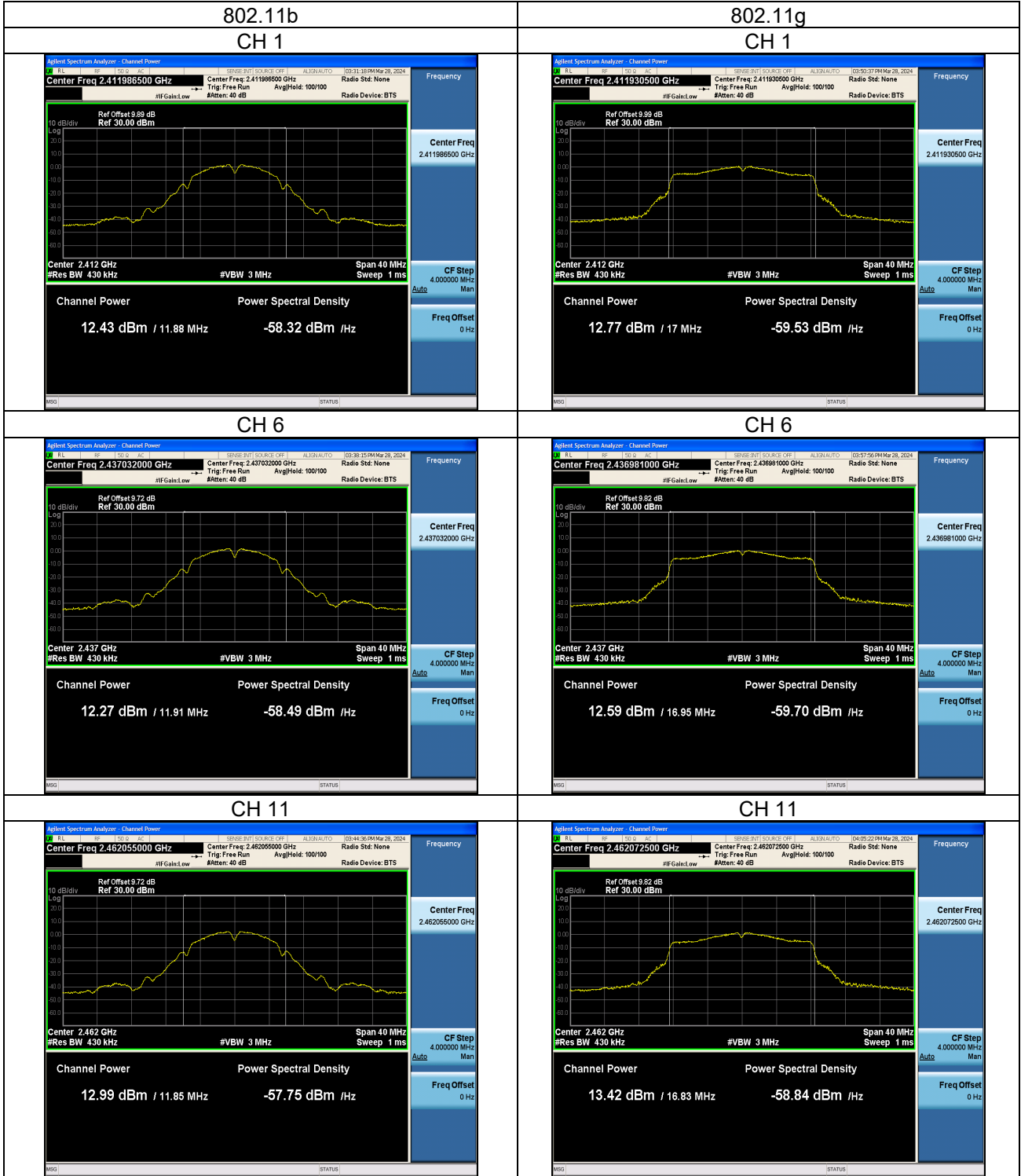
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.5.7 Test Results

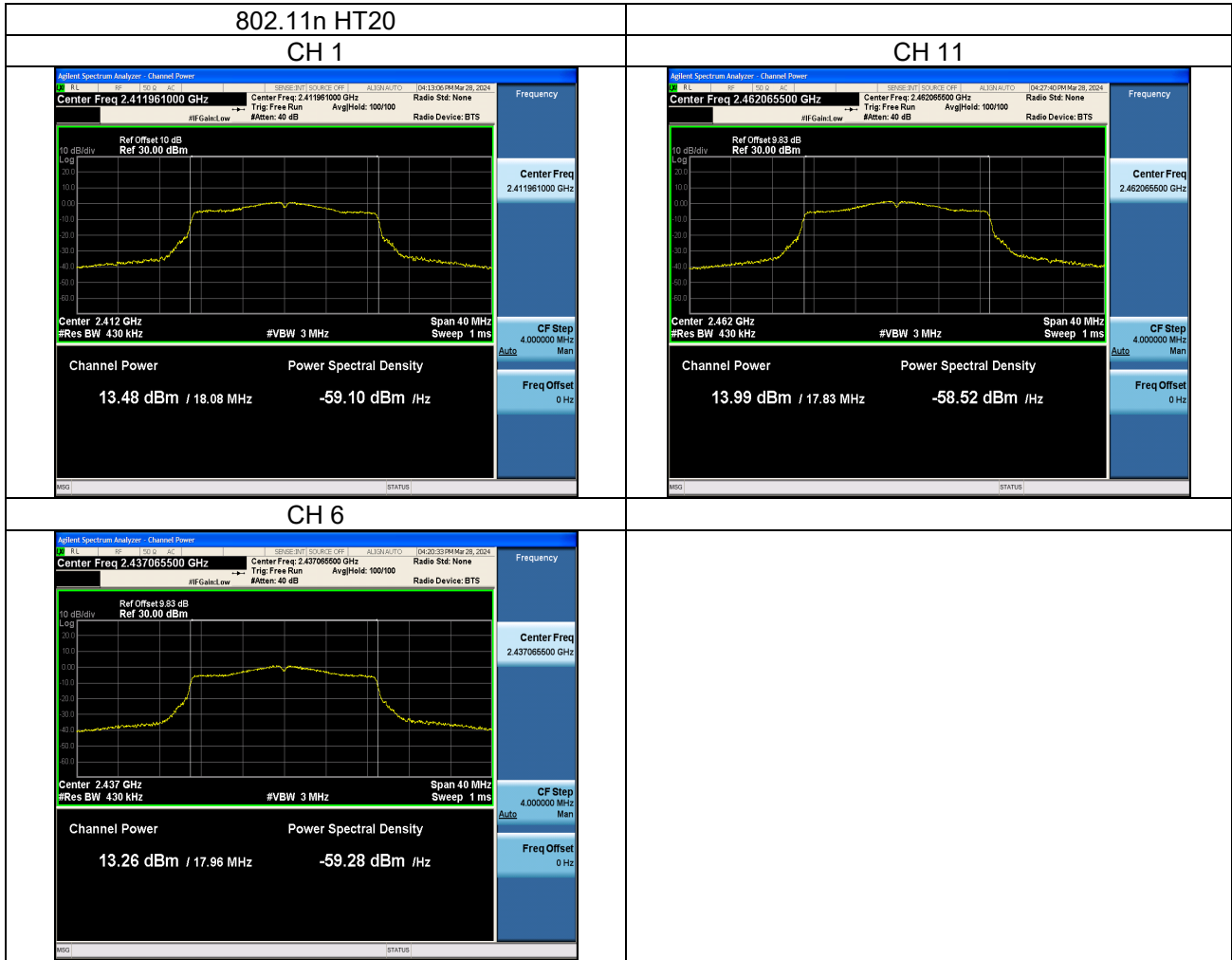
Test Mode	Test Channel	Channel Fre. (MHz)	Average Power (dBm)	Limit (dBm)
11b	1	2412	12.43	30
	6	2437	12.27	30
	11	2462	12.99	30
11g	1	2412	12.77	30
	6	2437	12.59	30
	11	2462	13.42	30
11n HT20	1	2412	13.48	30
	6	2437	13.26	30
	11	2462	13.99	30

Test Mode	Test Channel	Channel Fre. (MHz)	Peak Power (dBm)	Limit (dBm)
11b	1	2412	17.44	30
	6	2437	17.35	30
	11	2462	17.68	30
11g	1	2412	22.36	30
	6	2437	22.28	30
	11	2462	22.41	30
11n HT20	1	2412	22.84	30
	6	2437	22.48	30
	11	2462	23.22	30

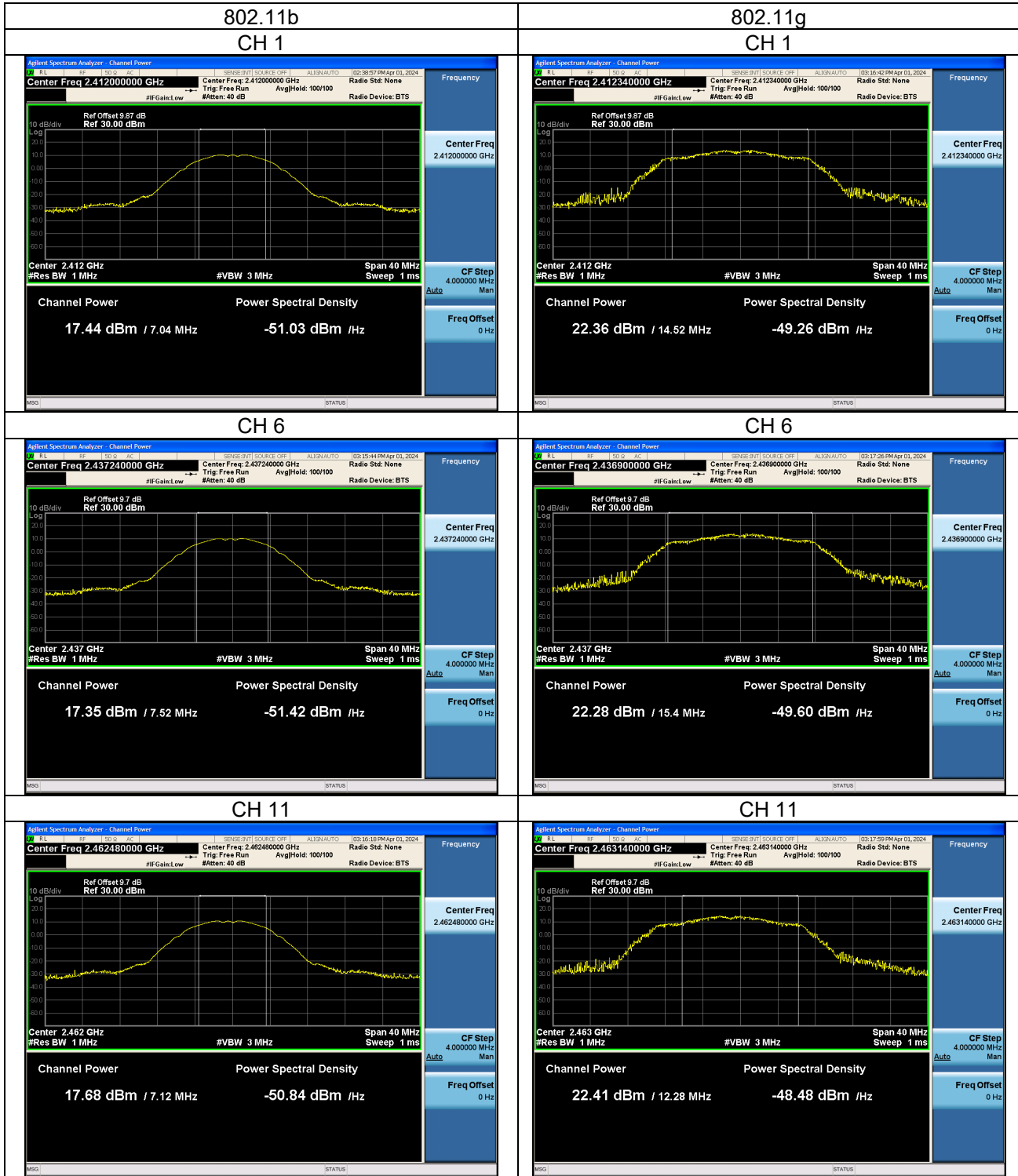
Average Power



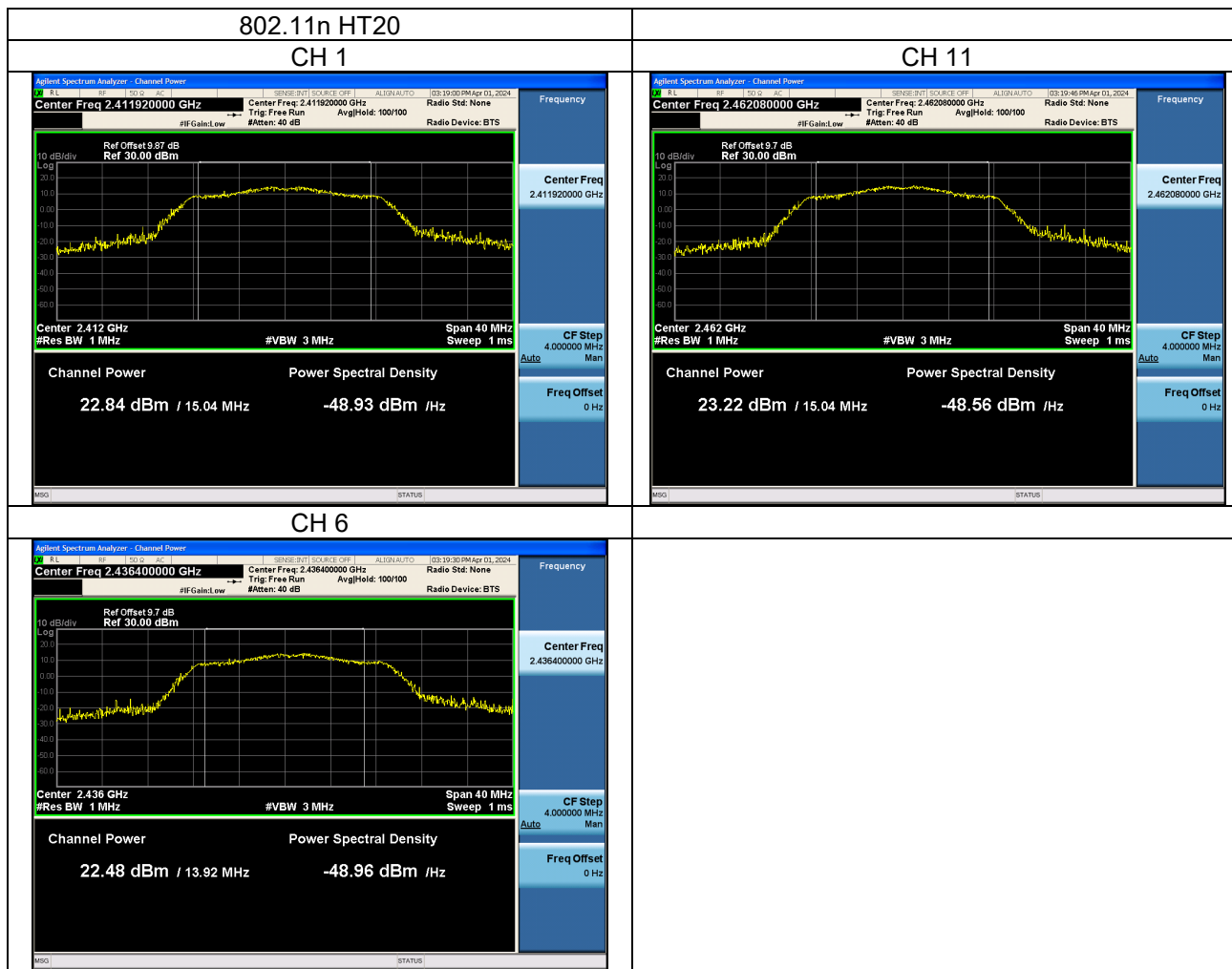
Average Power



Peak Power



Peak Power



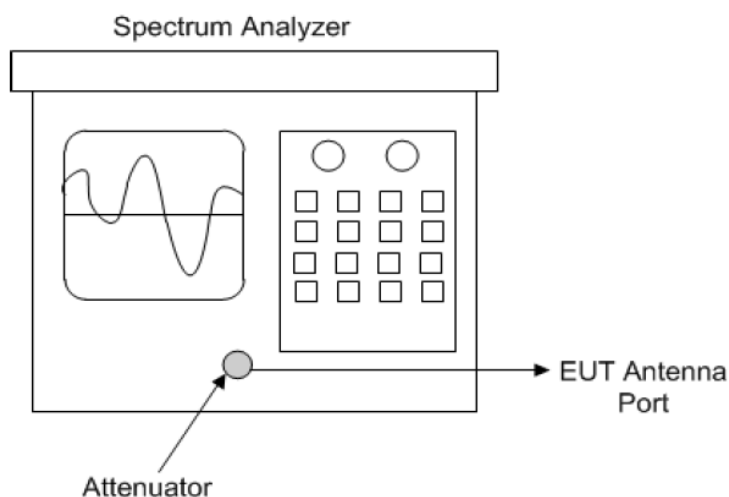
3.6 Power Spectral Density Measurement

3.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm/3kHz.

3.6.2 Test Setup

- DTS maximum power spectral density level in the fundamental emission Subclause 11.10 of ANSI C63.10 is applicable.



Spectrum analyzer test configuration

3.6.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.6.4 Test Procedure

- Method AVGPSD-1 or method AVGPSD-1A (alternative)** shall be applied if either of the following conditions can be satisfied:
 - 1) The EUT transmits continuously (or with a $D \geq 98\%$).
 - 2) Sweep triggering can be implemented in such a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep is equal to or shorter than the duration I of each transmission from the EUT, and if those transmissions exhibit full power throughout these durations.
- Method AVGPSD-2 or method AVGPSD-2A (alternative)** shall be applied if the conditions of the preceding item a) cannot be achieved. and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than $\pm 2\%$.
- Method AVGPSD-3 or method AVGPSD-3A (alternative)** shall be applied if the conditions of the preceding paragraphs a) and b) cannot be achieved.

Method AVGPSD-3:

Method AVGPSD-3 uses mms detection across ON and OFF times of the EUT with max hold. The following procedure is applicable when the EUT cannot be configured to transmit continuously (i.e. $D < 98\%$), when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level. and when the transmission duty cycle is not constant (i.e., duty cycle variations exceed $\pm 2\%$),

SA Setting:

- a. Set the instrument span to a minimum of 1.5 times the OBW.
 - b. Set sweep trigger to "free run."
 - c. Set the RBW = 3 kHz, VBW = 10 kHz,
 - d. Detector = RMS (power averaging).
 - e. Sweep time = Auto couple,
 - f. Allow max hold to run for at least 60 s or longer as needed to allow the trace to stabilize.
 - g. Use the peak marker function to determine the maximum PSD level.
- If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

3.6.5 Deviation from Test Standard

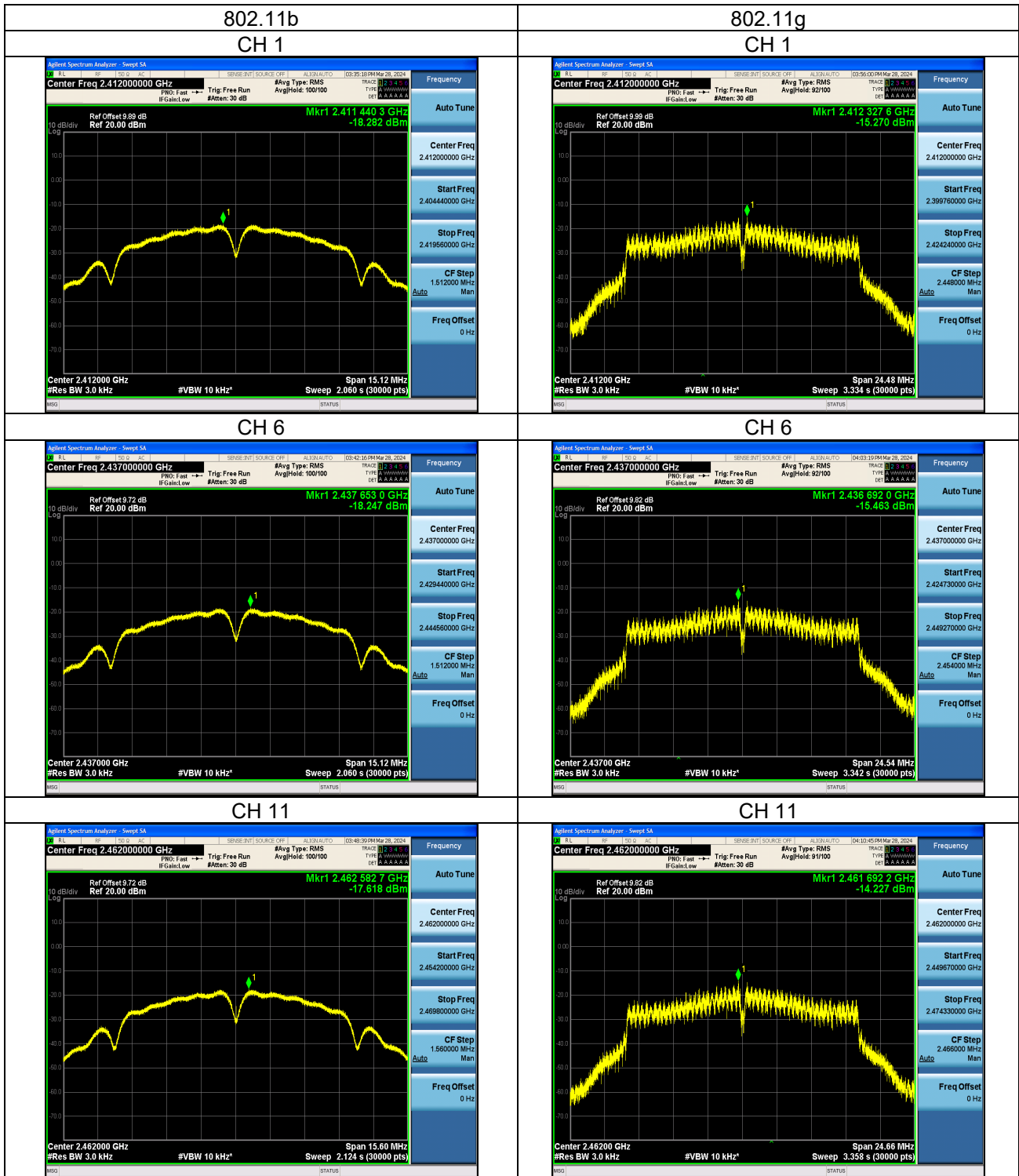
No deviation.

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.

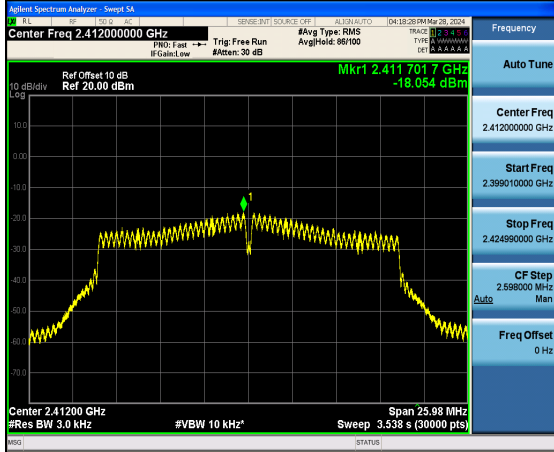
3.6.7 Test Results

Test Mode	CH.	Fre. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
11b	1	2412	-18.28	8
	6	2437	-18.25	8
	11	2462	-17.62	8
11g	1	2412	-15.27	8
	6	2437	-15.46	8
	11	2462	-14.23	8
11n HT20	1	2412	-18.05	8
	6	2437	-18.32	8
	11	2462	-16.74	8

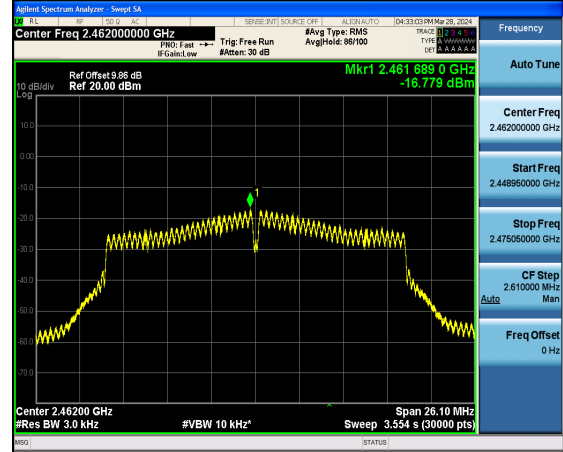


802.11n HT20

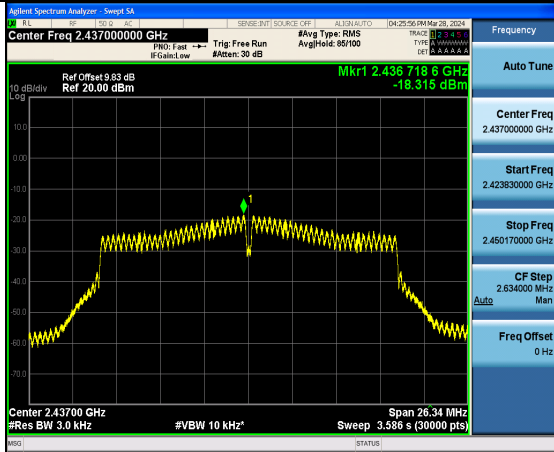
CH 1



CH 11



CH 6



CH 6



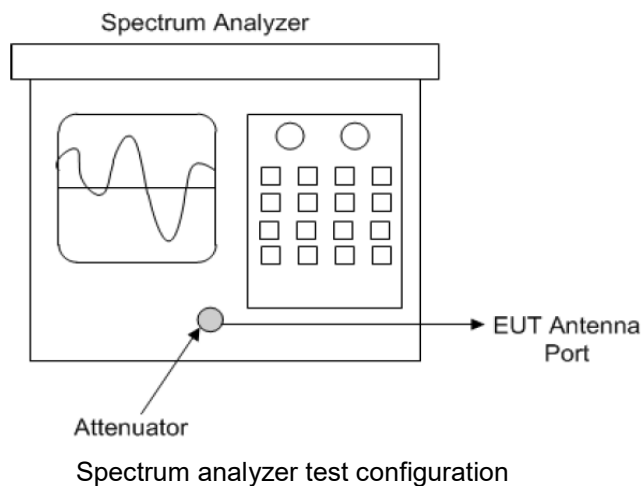
3.7 Conducted Out of Band Emission Measurement

3.7.1 Limits of Conducted Out of Band Emission Measurement

- a. **If the maximum peak conducted output power procedure was used to determine compliance as described in 11.9.1**, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).
- b. **If maximum conducted (average) output power was used to determine compliance as described in 11.9.2**, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

3.7.2 Test Setup

- DTS emissions in non-restricted frequency bands Subclause 11.11 of ANSI C63.10 is applicable.
- DTS emissions in restricted frequency bands Subclause 11.12 of ANSI C63.10 is applicable.



3.7.3 Test Instruments

Refer to section 5 to get information of above instrument.

3.7.4 Test Procedure

a. Establish a reference level by using the following procedure:

- 1) Set instrument center frequency to DTS channel center frequency.
- 2) Set the span to 21.5 times the DTS bandwidth)
- 3) Set the RBW= 100 kHz)
- 4) Set the VBW $\geq 3 \times$ RBW
- 5) Detector = peak
- 6) Sweep time = auto coupling
- 7) Trace mode =max hold
- 8) Allow trace to fully stabilize
- 9) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

b. Establish an emission level by using the following procedure:

- 1) Set the center frequency and span to encompass frequency range to be measured.
- 2) Set the RBW = 100 kHz
- 3) Set the VBW ≥ 300 kHz.
- 4) Detector = peak.
- 5) Sweep time = auto couple.
- 6) Trace mode = max hold.
- 7) Allow trace to fully stabilize.
- 8) Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

3.7.5 Deviation from Test Standard

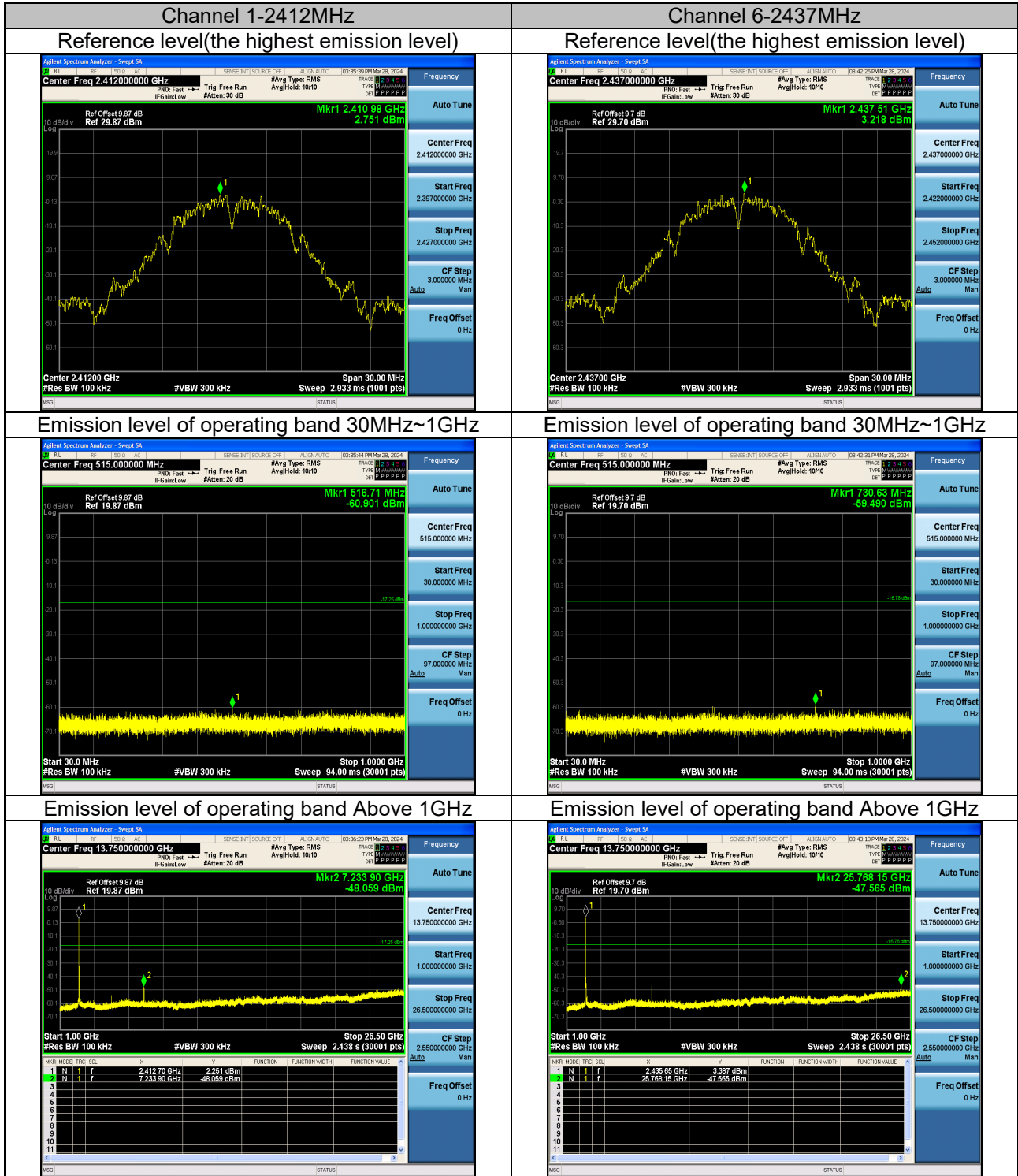
No deviation.

3.7.6 EUT Operating Condition

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

3.7.7 Test results

802.11b



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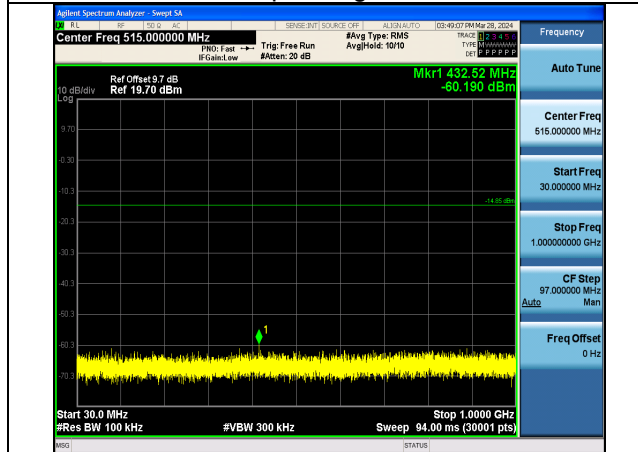
802.11b

Channel 11-2462MHz

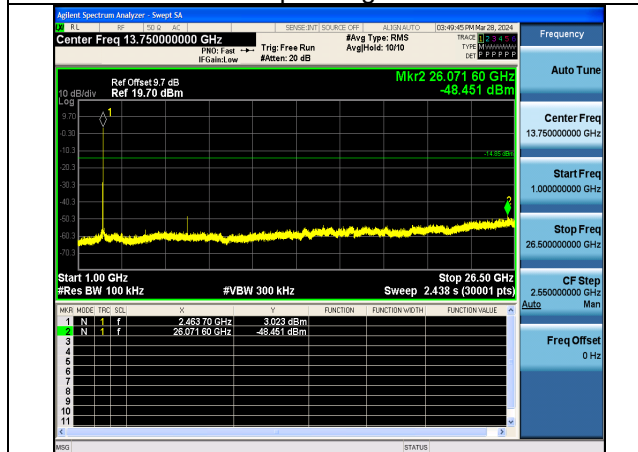
Reference level(the highest emission level)



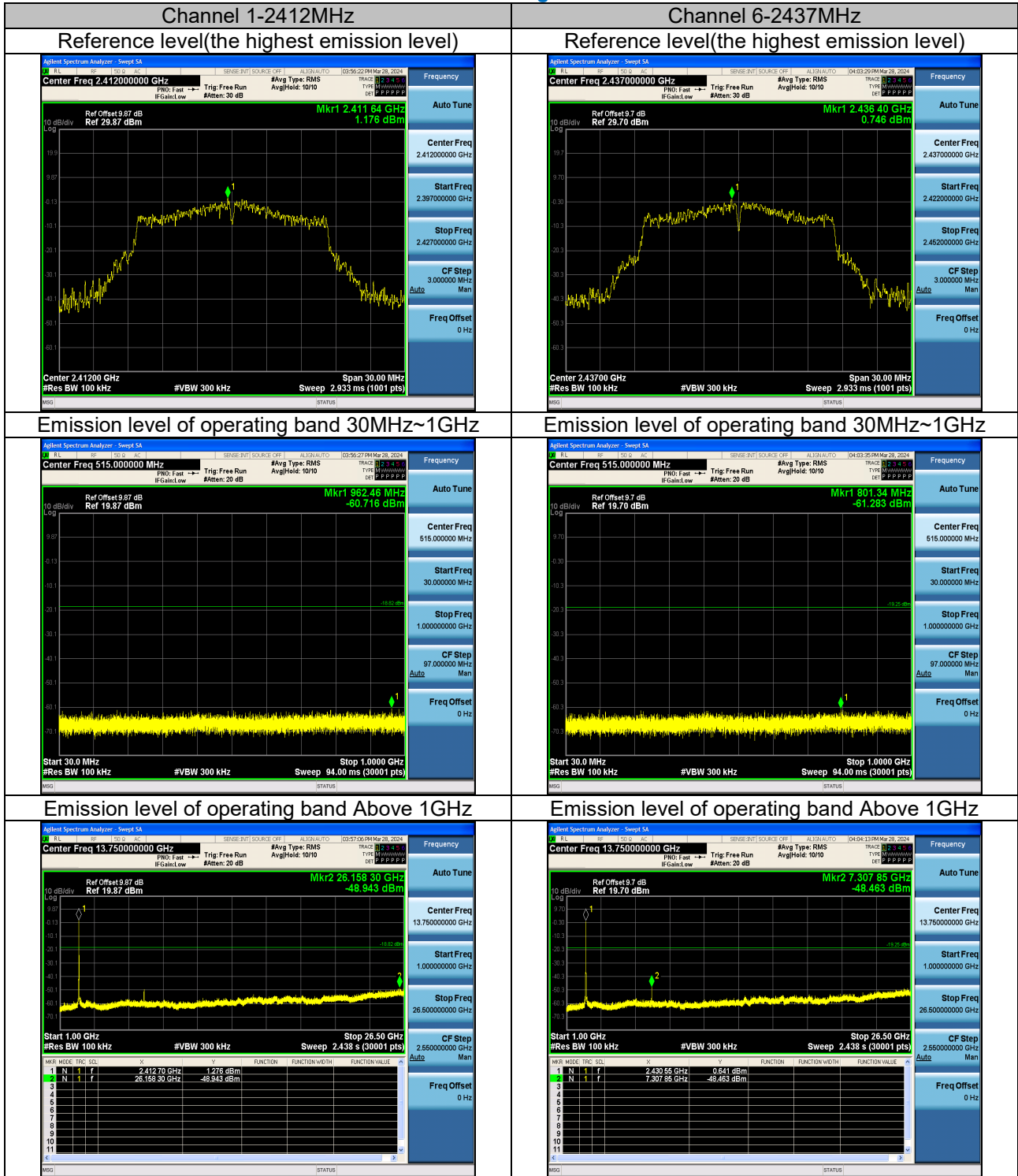
Emission level of operating band 30MHz~1GHz



Emission level of operating band Above 1GHz



802.11g



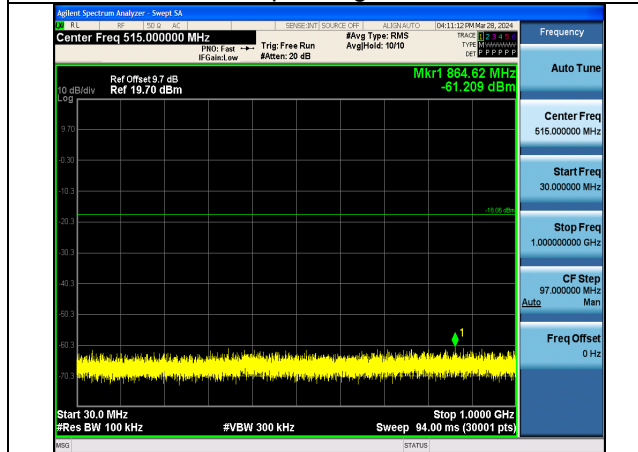
802.11g

Channel 11-2462MHz

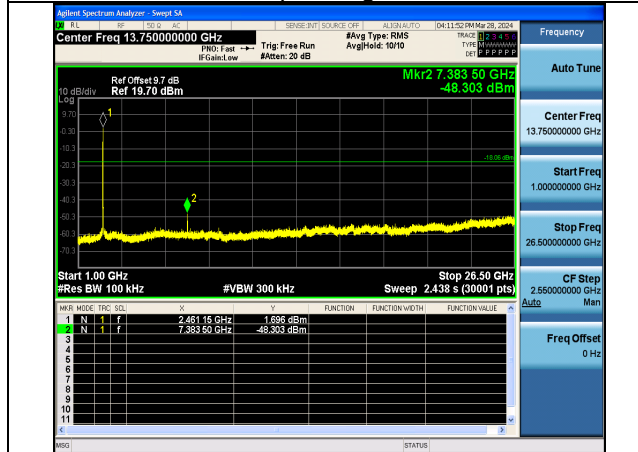
Reference level(the highest emission level)



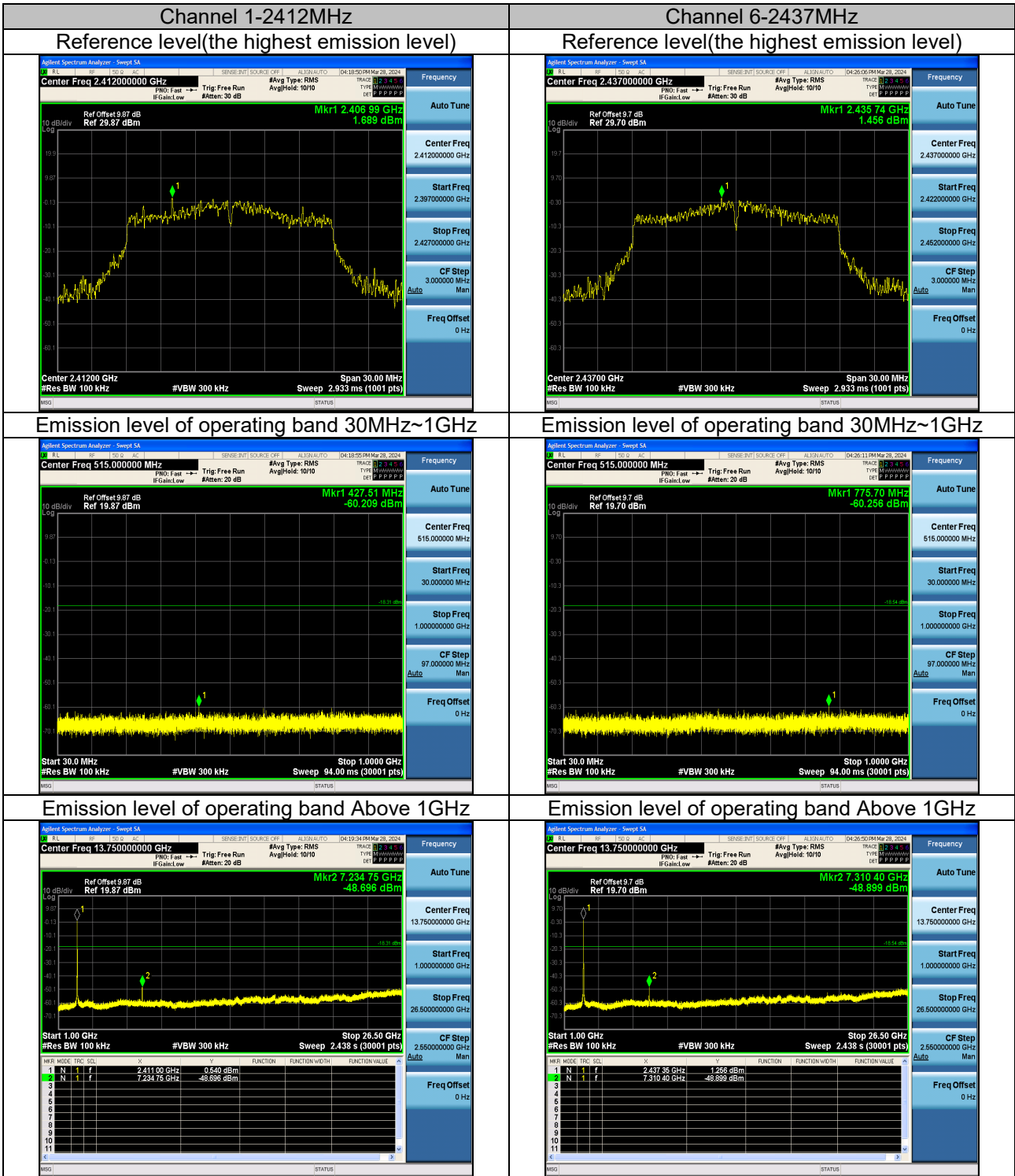
Emission level of operating band 30MHz~1GHz



Emission level of operating band Above 1GHz



802.11n HT20



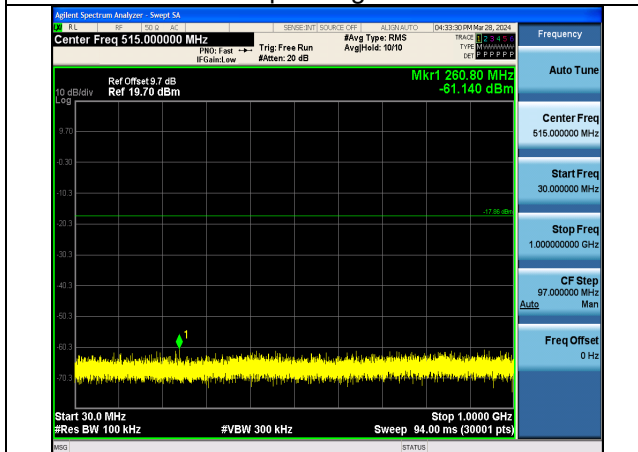
802.11n HT20

Channel 11-2462MHz

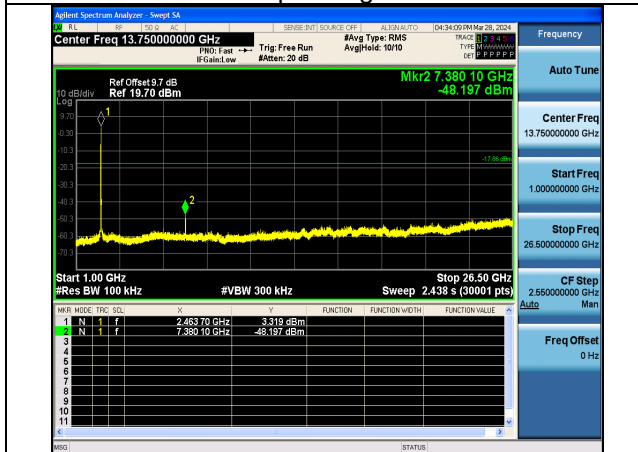
Reference level(the highest emission level)



Emission level of operating band 30MHz~1GHz



Emission level of operating band Above 1GHz



Test Report No.: 23122202-02-RF-US-03

Pictures of Test Arrangements

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

4. Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.Date
Spectrum	Keysight	N9020A	MY51240612	2024-08-06
Power Meter 10Hz~18GHz	Tonscend	JS0806-2	188060126	2024-08-06
Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101783	2024-12-17
Signal generator	Keysight	E4421	GB40051020	2025-03-14
Universal Switch Control Unit	Rohde&Schwarz	CMW500	12010002k50	2024-12-17
Humidity tester	Jingchuang	GSP-8A	CMA22B000592	2024-12-24
Test Software	Tonscend	JS0806-2	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months.
2. The test was performed in RF Chamber.

Appendix – Information on The Testing Laboratories

We, [Hwa-Hsing \(Dongguan\) Testing 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](tel:0769-83078199)

Email: Customerservice.dg@hwa-hsing.com

Web Site: www.hwa-hsing.com

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