

802.11g

Polar (H/V)	Frequency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector Type
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low channel:2412MHz							
V	4824.00	54.23	-0.43	53.80	74.00	-20.20	PK
V	4824.00	45.57	-0.43	45.14	54.00	-8.86	AV
V	7236.00	46.55	8.31	54.86	74.00	-19.14	PK
V	7236.00	36.13	8.31	44.44	54.00	-9.56	AV
H	4824.00	52.28	-0.43	51.85	74.00	-22.15	PK
H	4824.00	42.17	-0.43	41.74	54.00	-12.26	AV
H	7236.00	44.45	8.31	52.76	74.00	-21.24	PK
H	7236.00	35.59	8.31	43.90	54.00	-10.10	AV
Middle channel:2437MHz							
V	4874.00	51.55	-0.38	51.17	74.00	-22.83	PK
V	4874.00	44.49	-0.38	44.11	54.00	-9.89	AV
V	7311.00	44.26	8.83	53.09	74.00	-20.91	PK
V	7311.00	35.41	8.83	44.24	54.00	-9.76	AV
H	4874.00	49.05	-0.38	48.67	74.00	-25.33	PK
H	4874.00	39.39	-0.38	39.01	54.00	-14.99	AV
H	7311.00	42.91	8.83	51.74	74.00	-22.26	PK
H	7311.00	34.90	8.83	43.73	54.00	-10.27	AV
High channel:2462MHz							
V	4924.00	53.48	-0.32	53.16	74.00	-20.84	PK
V	4924.00	45.36	-0.32	45.04	54.00	-8.96	AV
V	7386.00	45.58	9.35	54.93	74.00	-19.07	PK
V	7386.00	35.98	9.35	45.33	54.00	-8.67	AV
H	4924.00	51.42	-0.32	51.10	74.00	-22.90	PK
H	4924.00	42.30	-0.32	41.98	54.00	-12.02	AV
H	7386.00	43.71	9.35	53.06	74.00	-20.94	PK
H	7386.00	36.38	9.35	45.73	54.00	-8.27	AV

Remark:

1.Emission Level = Meter Reading + Factor,

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Over= Emission Level - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB

4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n20

Polar (H/V)	Frequency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector Type
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low channel:2412MHz							
V	4824.00	52.99	-0.43	52.56	74.00	-21.44	PK
V	4824.00	42.98	-0.43	42.55	54.00	-11.45	AV
V	7236.00	43.96	8.31	52.27	74.00	-21.73	PK
V	7236.00	33.92	8.31	42.23	54.00	-11.77	AV
H	4824.00	51.76	-0.43	51.33	74.00	-22.67	PK
H	4824.00	42.11	-0.43	41.68	54.00	-12.32	AV
H	7236.00	42.24	8.31	50.55	74.00	-23.45	PK
H	7236.00	34.74	8.31	43.05	54.00	-10.95	AV
Middle channel:2437MHz							
V	4874.00	50.04	-0.38	49.66	74.00	-24.34	PK
V	4874.00	42.23	-0.38	41.85	54.00	-12.15	AV
V	7311.00	40.83	8.83	49.66	74.00	-24.34	PK
V	7311.00	32.82	8.83	41.65	54.00	-12.35	AV
H	4874.00	46.95	-0.38	46.57	74.00	-27.43	PK
H	4874.00	37.60	-0.38	37.22	54.00	-16.78	AV
H	7311.00	38.08	8.83	46.91	74.00	-27.09	PK
H	7311.00	30.91	8.83	39.74	54.00	-14.26	AV
High channel:2462MHz							
V	4924.00	46.34	-0.38	45.96	74.00	-28.04	PK
V	4924.00	38.55	-0.38	38.17	54.00	-15.83	AV
V	7386.00	36.11	8.83	44.94	74.00	-29.06	PK
V	7386.00	26.92	8.83	35.75	54.00	-18.25	AV
H	4924.00	45.28	-0.38	44.90	74.00	-29.10	PK
H	4924.00	34.47	-0.38	34.09	54.00	-19.91	AV
H	7386.00	33.60	8.83	42.43	74.00	-31.57	PK
H	7386.00	25.47	8.83	34.30	54.00	-19.70	AV

Remark:

1.Emission Level = Meter Reading + Factor,

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Over= Emission Level - Limit

2.If peak below the average limit, the average emission was no test.

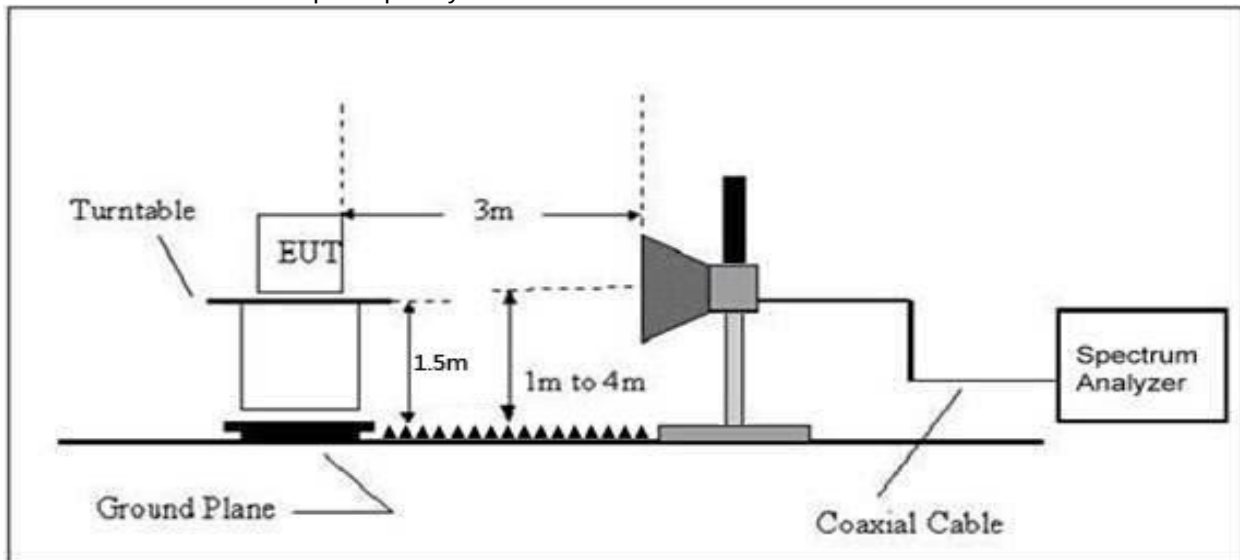
3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB

4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

8. Radiated Band Emission Measurement And Restricted Bands Of Operation

8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Above 1GHz



8.2 Limit

FCC Part15 C Section 15.209 and 15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1)The limit for radiated test was performed according to FCC PART 15C.
- (2)The tighter limit applies at the band edges.
- (3)Emission level (dBuV/m)=20log Emission level (uV/m).

8.3 Test Procedure

Receiver Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Above 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter chamber. 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 antenna height 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the Highest channel.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

8.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

8.5 Test Result

	Polar (H/V)	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measure- ment (dBuV/m)	Limits (dBuV/m)		Result
					PK	PK	AV	
802.11b	Low Channel 2412MHz							
	H	2390.00	54.16	-6.70	47.46	74.00	54.00	PASS
	H	2400.00	55.82	-6.71	49.11	74.00	54.00	PASS
	V	2390.00	54.14	-6.70	47.44	74.00	54.00	PASS
	V	2400.00	56.96	-6.71	50.25	74.00	54.00	PASS
	High Channel 2462MHz							
	H	2483.50	53.95	-6.79	47.16	74.00	54.00	PASS
	H	2485.00	56.72	-6.81	49.91	74.00	54.00	PASS
	V	2483.50	53.97	-6.79	47.18	74.00	54.00	PASS
	V	2485.00	56.64	-6.81	49.83	74.00	54.00	PASS
802.11g	Low Channel 2412MHz							
	H	2390.00	55.50	-6.70	48.80	74.00	54.00	PASS
	H	2400.00	58.22	-6.71	51.51	74.00	54.00	PASS
	V	2390.00	55.63	-6.70	48.93	74.00	54.00	PASS
	V	2400.00	59.10	-6.71	52.39	74.00	54.00	PASS
	High Channel 2462MHz							
	H	2483.50	53.94	-6.79	47.15	74.00	54.00	PASS
	H	2485.00	57.26	-6.81	50.45	74.00	54.00	PASS
	V	2483.50	55.99	-6.79	49.20	74.00	54.00	PASS
	V	2485.00	57.09	-6.81	50.28	74.00	54.00	PASS
Remark:								
1. Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level – Limit								
2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.								
3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB								
4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.								

	Polar (H/V)	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measure- ment (dBuV/m)	Limits (dBuV/m)		Result
					PK	PK	AV	
802.11 n20	Low Channel 2412MHz							
	H	2390.00	55.41	-6.70	48.71	74.00	54.00	PASS
	H	2400.00	57.13	-6.71	50.42	74.00	54.00	PASS
	V	2390.00	55.44	-6.70	48.74	74.00	54.00	PASS
	V	2400.00	58.03	-6.71	51.32	74.00	54.00	PASS
	High Channel 2462MHz							
	H	2483.50	54.99	-6.79	48.20	74.00	54.00	PASS
	H	2500.00	58.15	-6.81	51.34	74.00	54.00	PASS
	V	2483.50	54.59	-6.79	47.80	74.00	54.00	PASS
	V	2500.00	56.90	-6.81	50.09	74.00	54.00	PASS
Remark: 1. Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level – Limit 2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit. 3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.								

9. Power Spectral Density Test

9.1 Block Diagram Of Test Setup



9.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

9.3 Test Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz
4. Set the VBW $\geq 3 \times$ RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

9.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

9.5 Test Result

Temperature :	26℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX b Mode		

Frequency	Power Spectral Density(dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-10.772	8	PASS
2437 MHz	-10.733	8	PASS
2462 MHz	-8.834	8	PASS

TX CH01



TX CH06



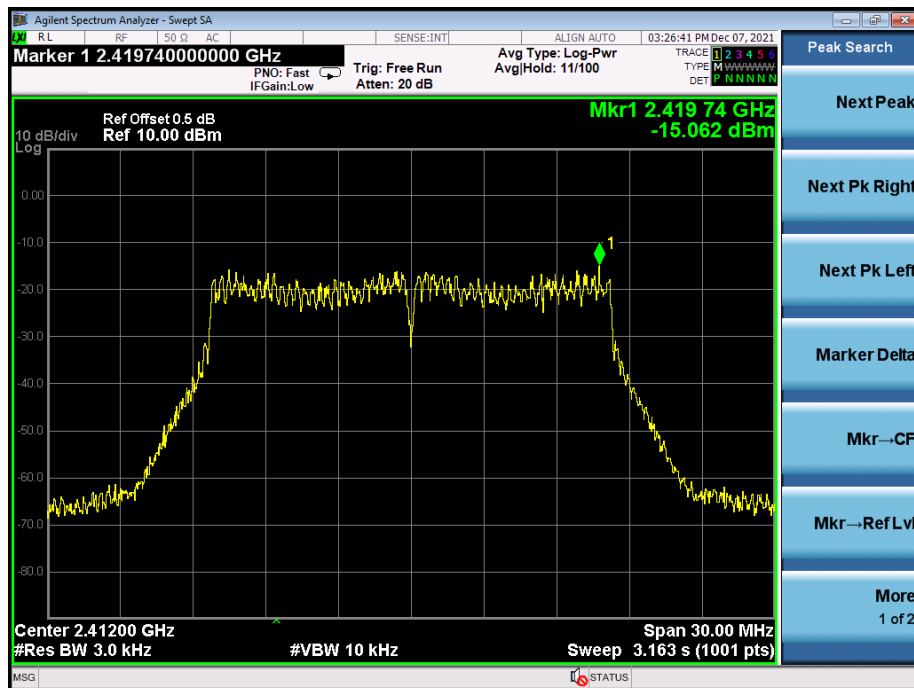
TX CH11



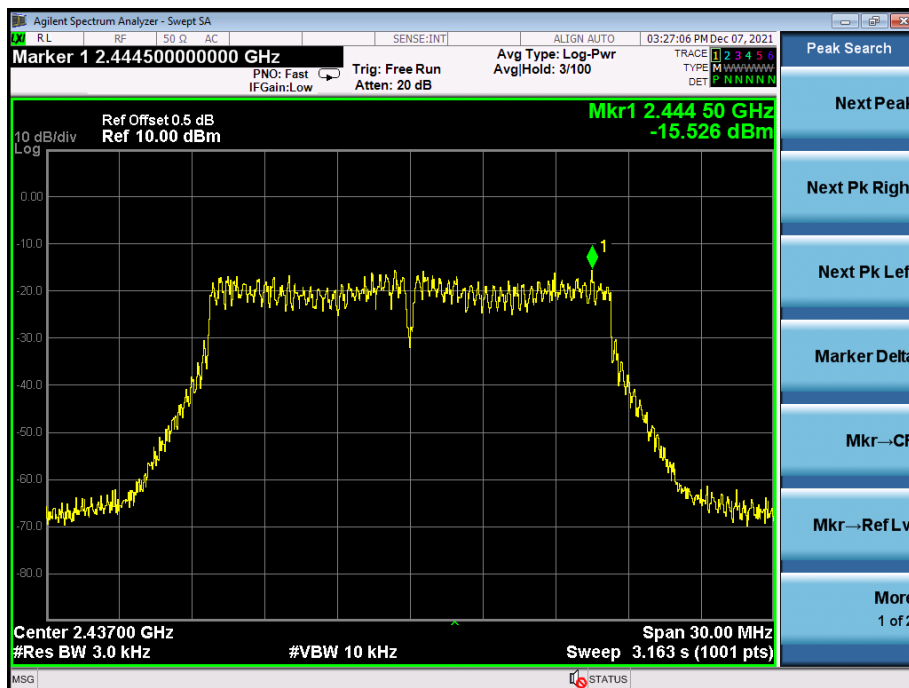
Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX g Mode		

Frequency	Power Spectral Density(dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-15.062	8	PASS
2437 MHz	-15.526	8	PASS
2462 MHz	-14.772	8	PASS

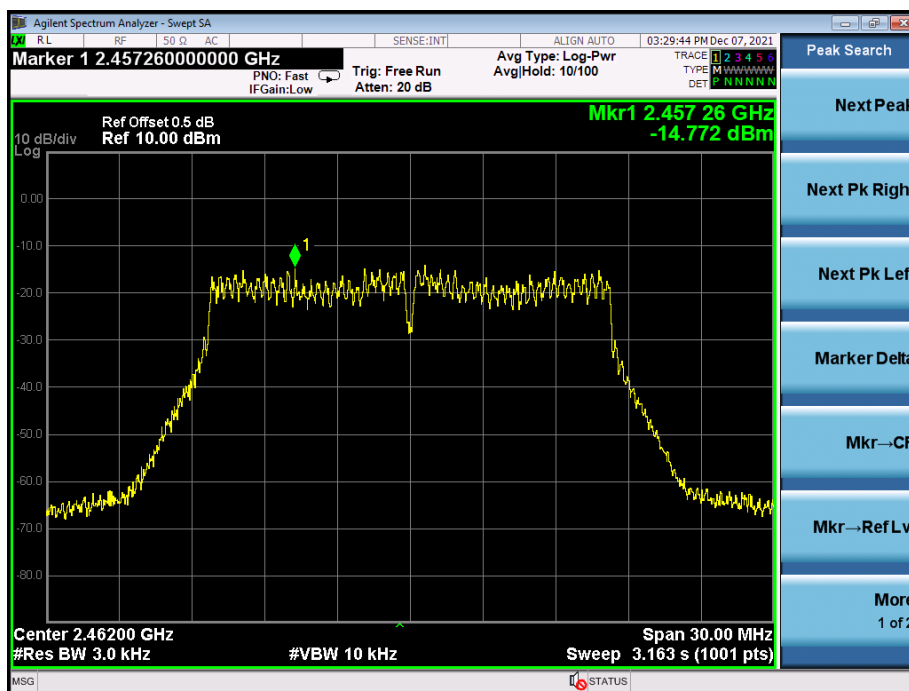
TX CH01



TX CH06



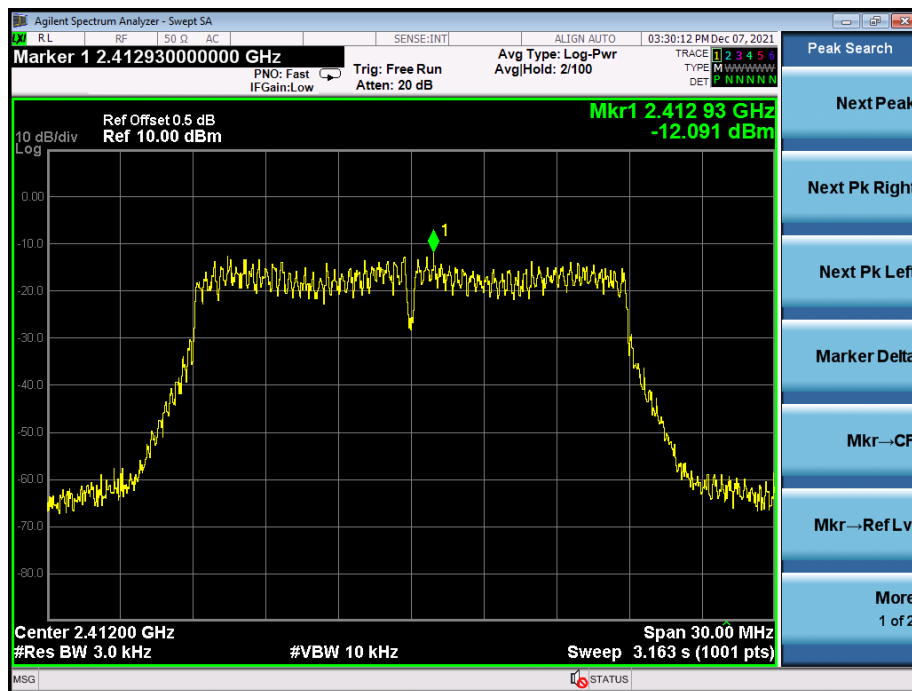
TX CH11



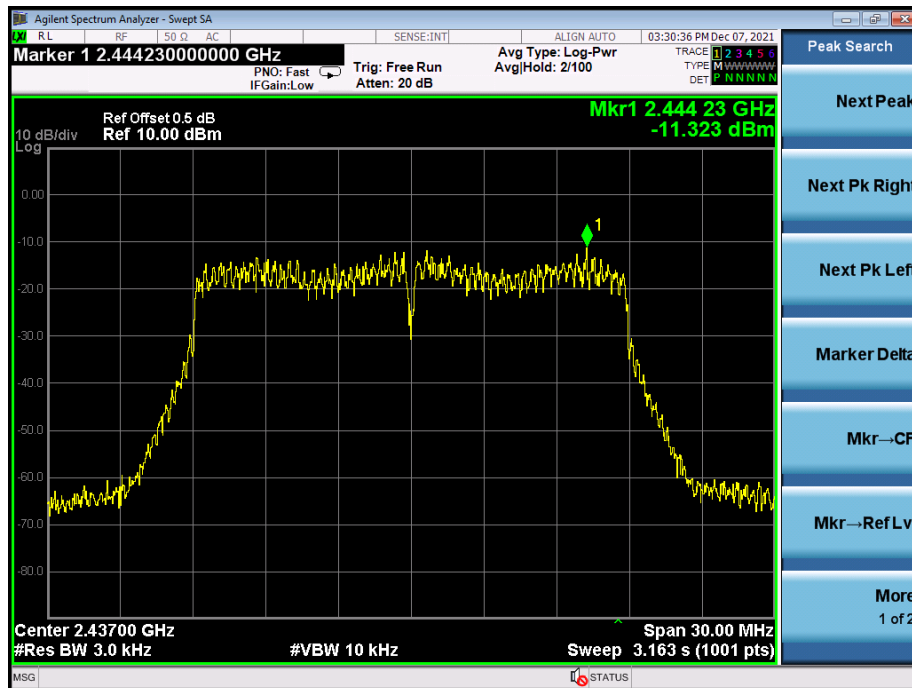
Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX n Mode(20M)		

Frequency	Power Spectral Density(dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-12.091	8	PASS
2437 MHz	-11.323	8	PASS
2462 MHz	-11.575	8	PASS

TX CH01



TX CH06



TX CH11



10. Bandwidth Test

10.1 Block Diagram Of Test Setup



10.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

10.3 Test Procedure

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

10.4 EUT Operating Conditions

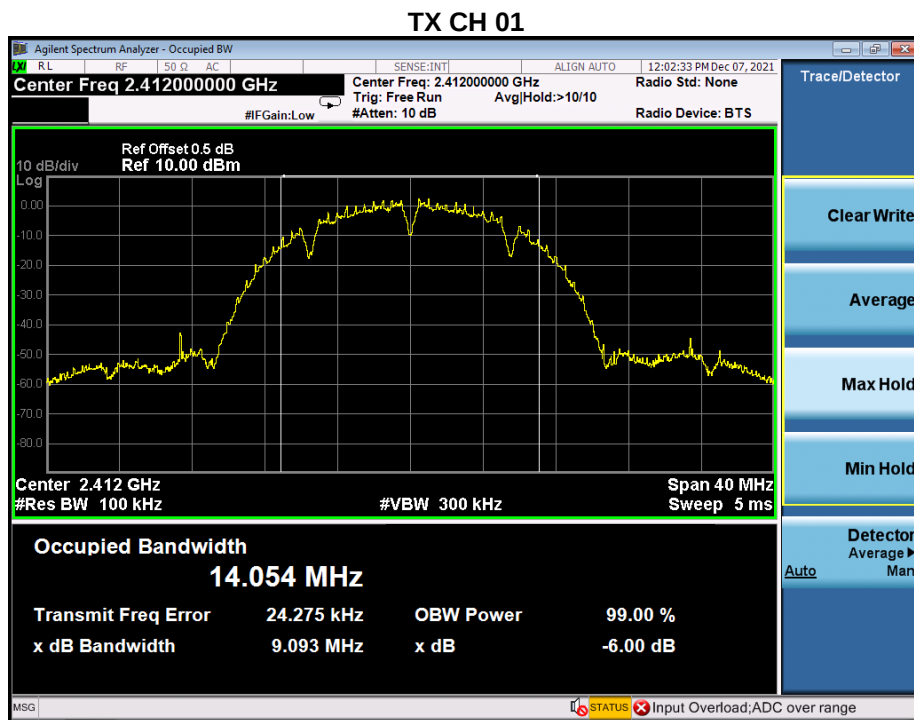
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

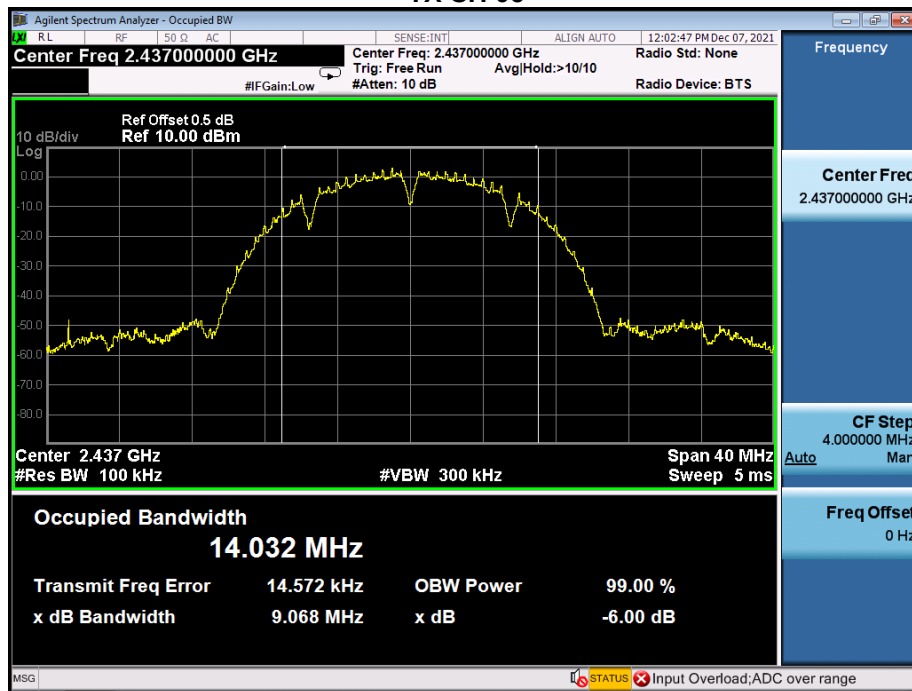
10.5 Test Result

Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX b Mode		

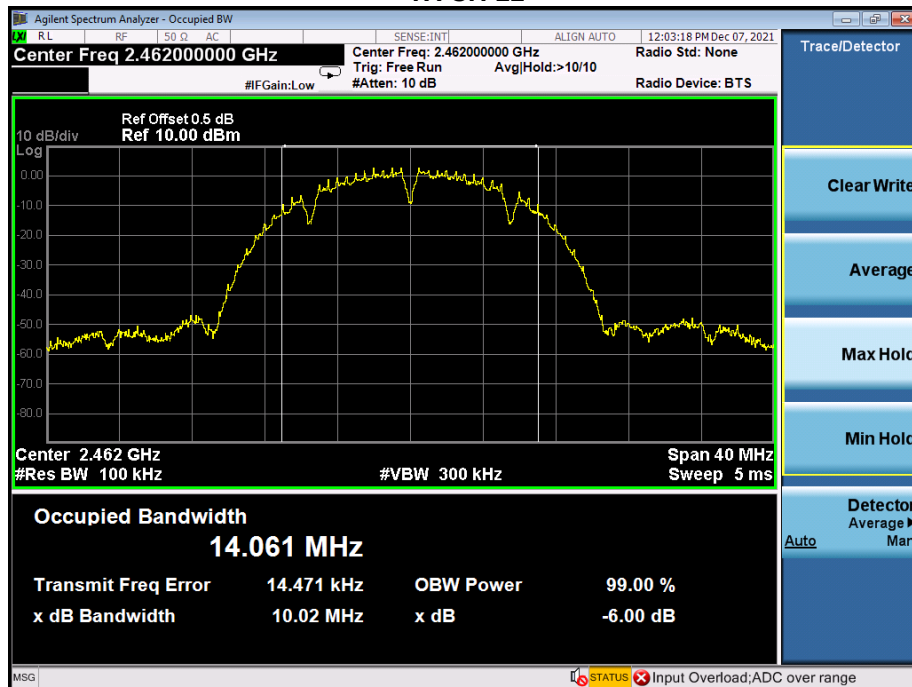
Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
2412	9.09	500	Pass
2437	9.07	500	Pass
2462	10.02	500	Pass



TX CH 06



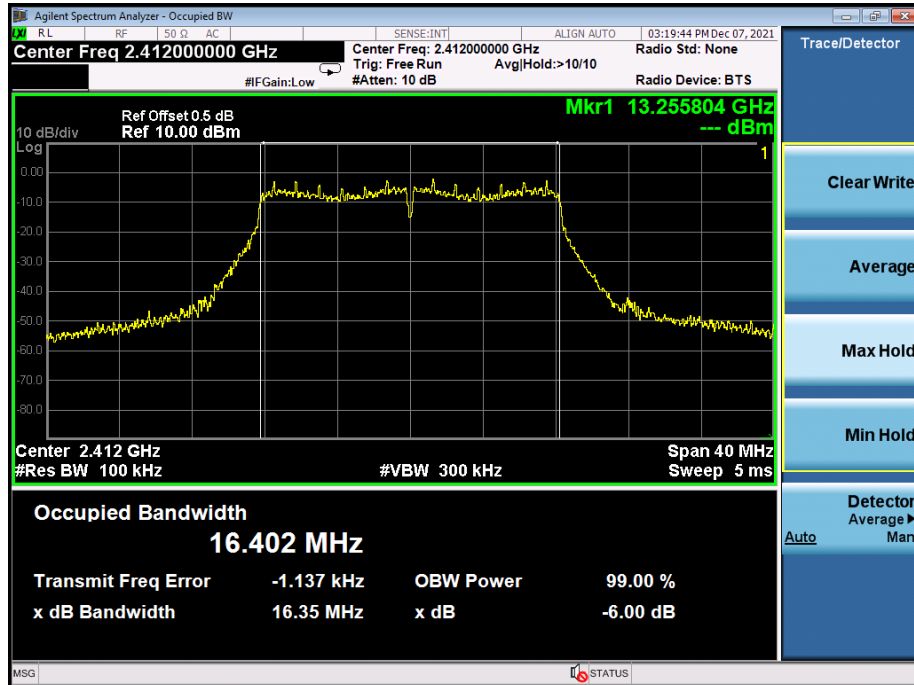
TX CH 11

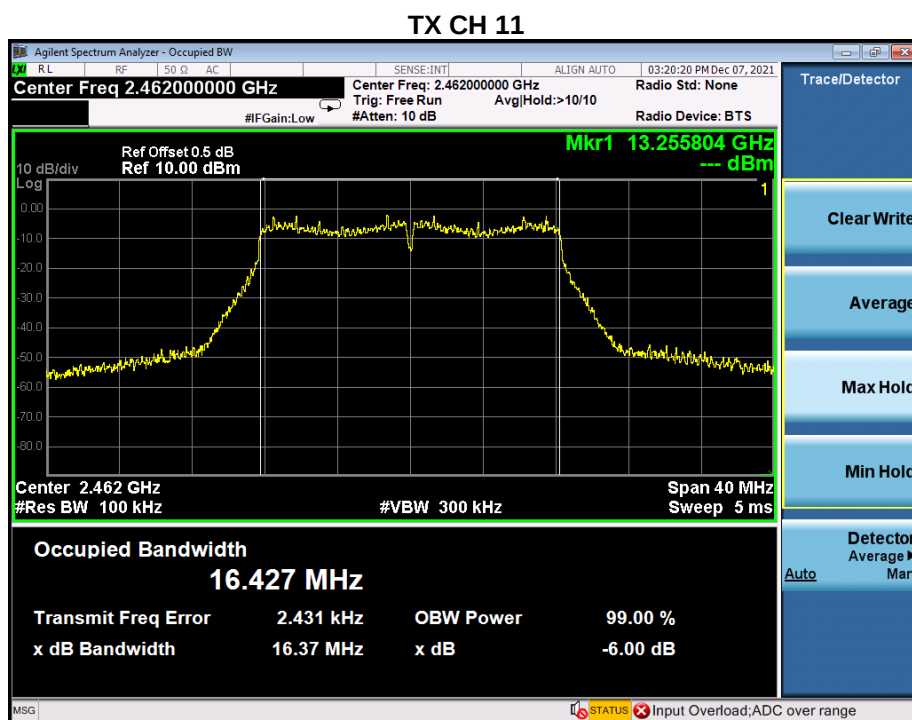
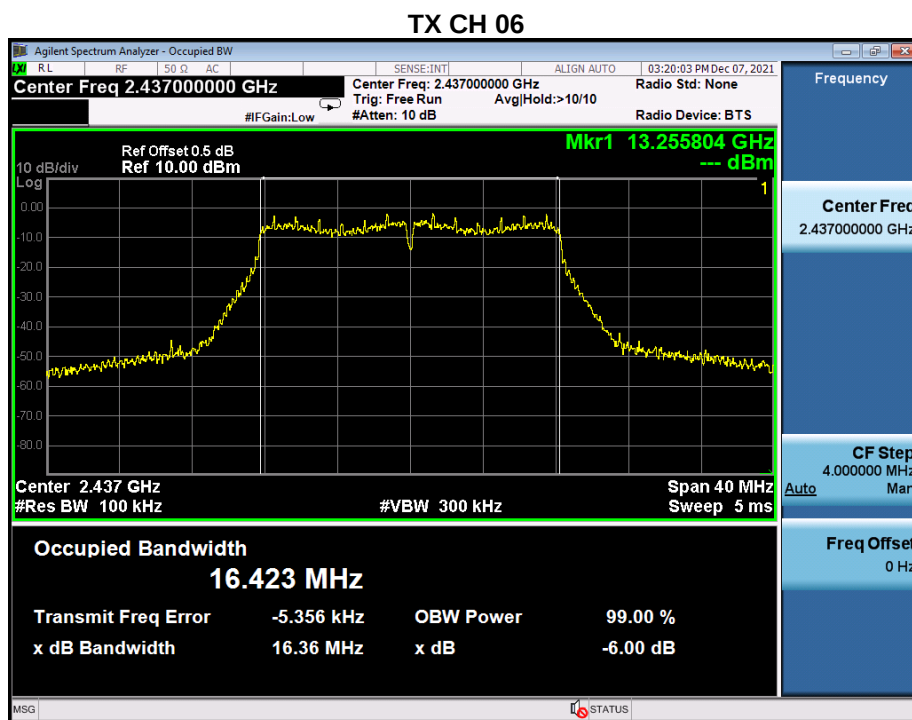


Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX g Mode		

Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
2412	16.35	500	Pass
2437	16.36	500	Pass
2462	16.37	500	Pass

TX CH 01

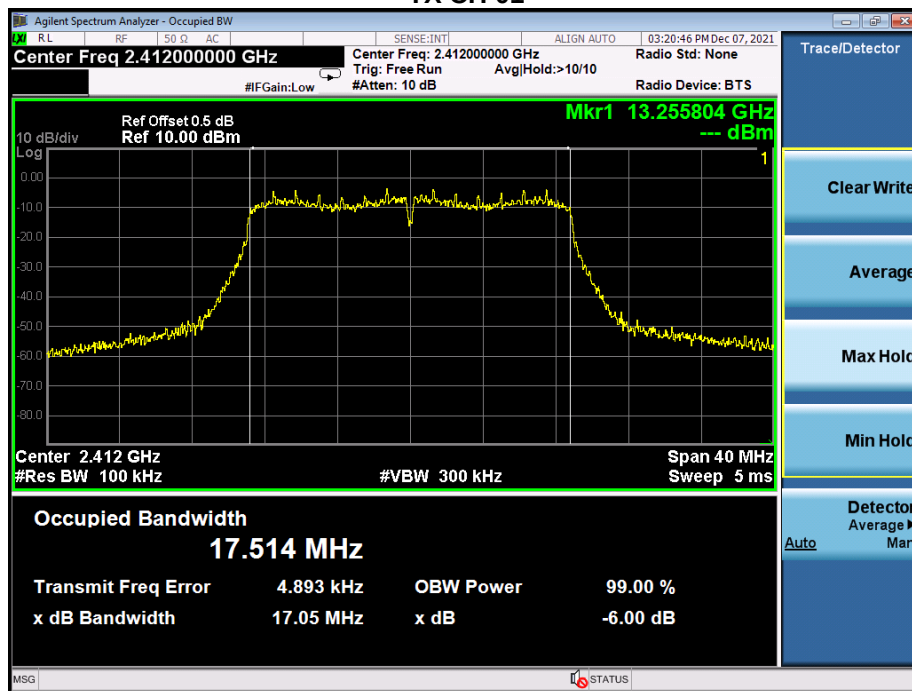




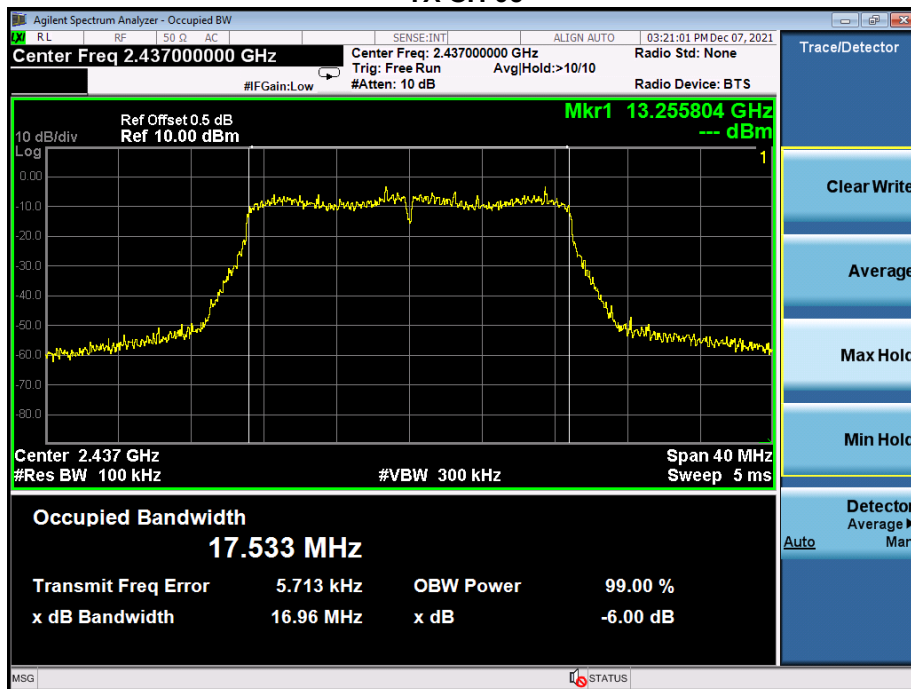
Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz
Test Mode :	TX n Mode(20M)		

Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
2412	17.05	500	Pass
2437	16.96	500	Pass
2462	17.07	500	Pass

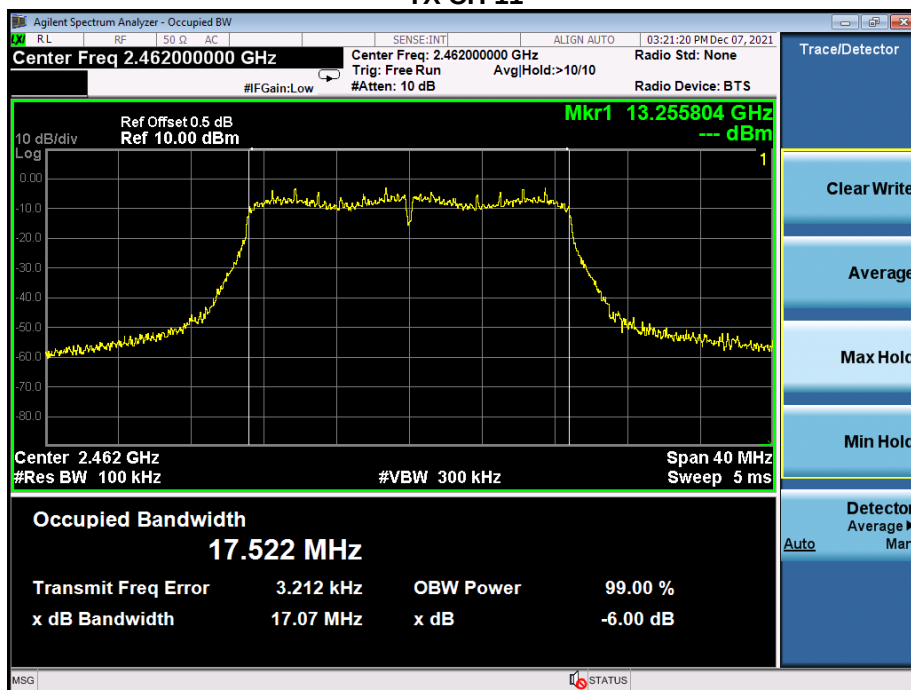
TX CH 01



TX CH 06



TX CH 11



11. Peak Output Power Test

11.1 Block Diagram Of Test Setup



11.2 Limit

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

11.3 Test Procedure

- a. The EUT was directly connected to the Power meter

11.4 EUT Operating Conditions

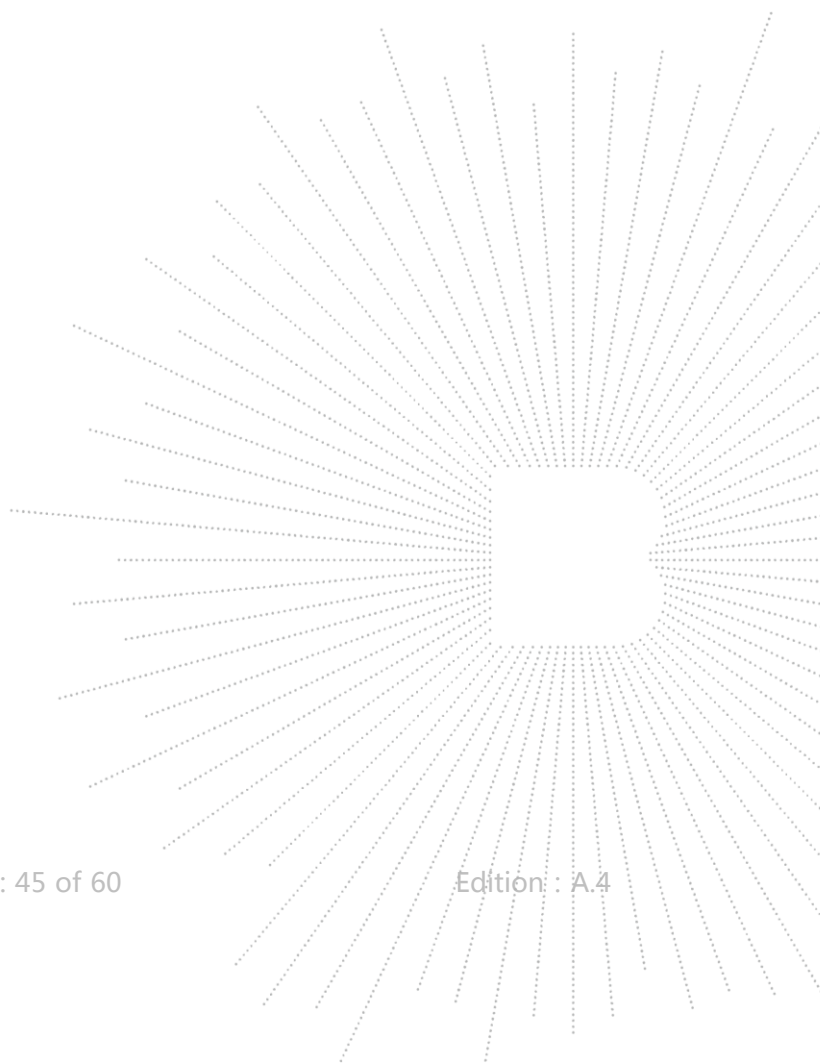
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

11.5 Test Result

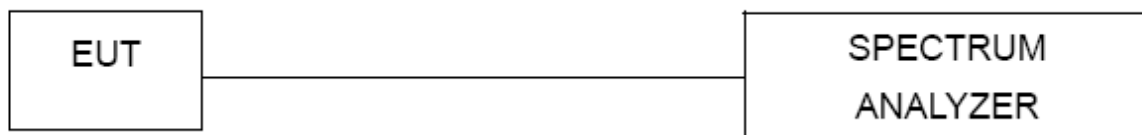
Temperature :	26℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz

	Frequency	Maximum Conducted Output Power(PK)	LIMIT
	(MHz)	(dBm)	dBm
802.11b	2412	14.148	30
	2437	14.409	30
	2462	14.269	30
802.11g	2412	13.184	30
	2437	13.530	30
	2462	13.285	30
802.11n20	2412	12.008	30
	2437	12.840	30
	2462	12.595	30



12. 100 KHz Bandwidth Of Frequency Band Edge

12.1 Block Diagram Of Test Setup



12.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

12.3 Test Procedure

Using the following spectrum analyzer setting:

- a) Set the RBW = 100KHz.
- b) Set the VBW = 300KHz.
- c) Sweep time = auto couple.
- d) Detector function = peak.
- e) Trace mode = max hold.
- f) Allow trace to fully stabilize..

12.4 EUT Operating Conditions

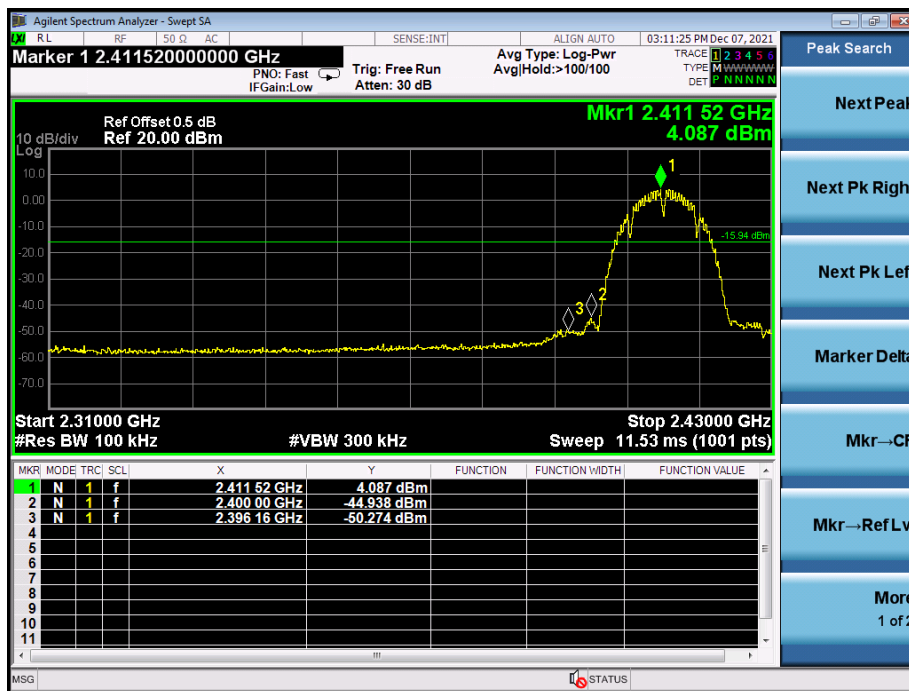
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

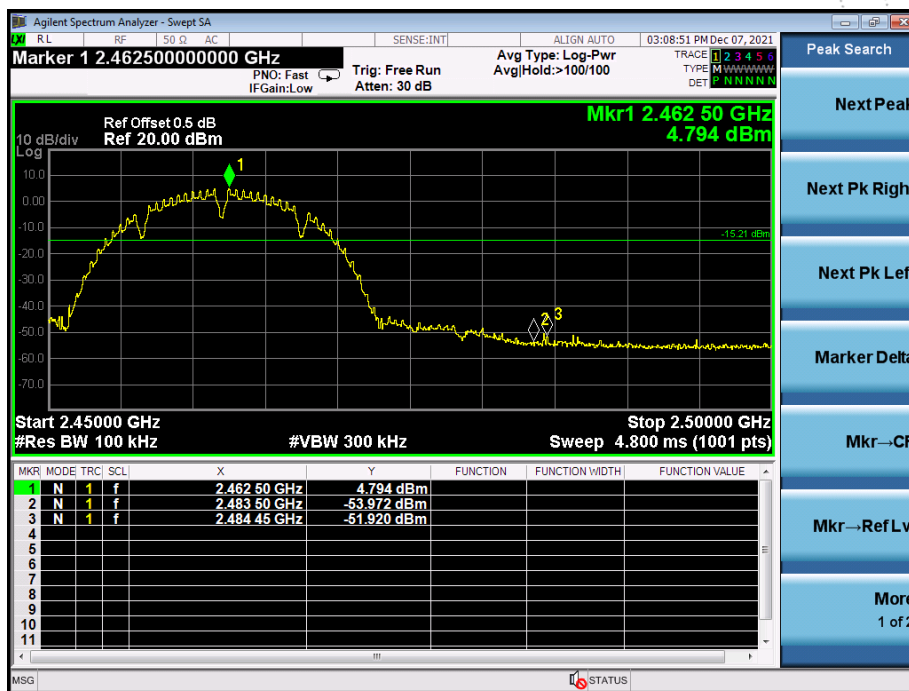
12.5 Test Result

Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC120V/60Hz

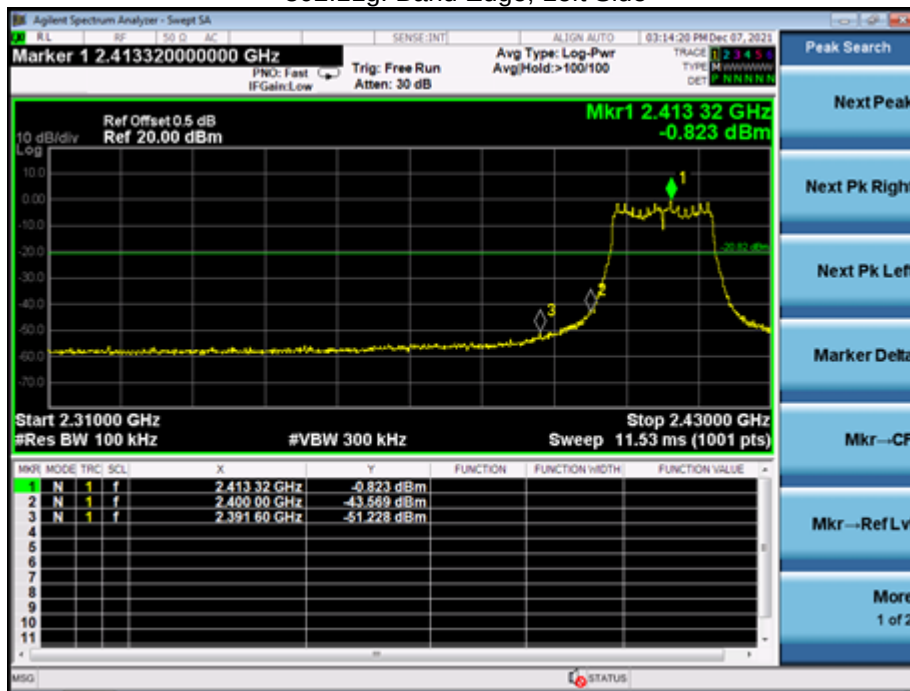
802.11b: Band Edge, Left Side



802.11b: Band Edge, Right Side



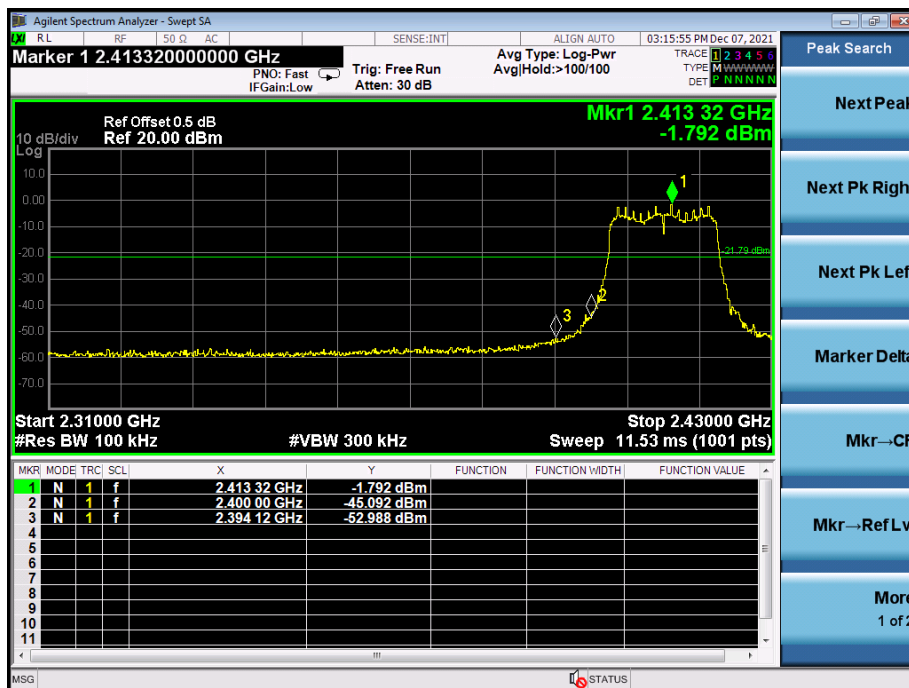
802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side



802.11n-HT20: Band Edge, Left Side



802.11n-HT20: Band Edge, Right Side

