

TEST REPORT

Test Report No.: 20171010020

Applicant: KUNSHAN KONKA ELECTRONICS CO., LTD.

Manufacturer: KUNSHAN KONKA ELECTRONICS CO., LTD.

Factory: /

Name of the sample: LED TV

Brand Name: element

Model: ELST5016S

Test Result: PASS

STATEMENT

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2. The test results presented in this report relate only to the sample and the item tested.
3. This test report is ineffective if it is without special inspection seal of the test laboratory.
4. If you have any question or comment, please bring them to our attention within 15 days, after you receive the test report. (Please lodge them to the assignment department if the task is consigned by the government.)
5. Please retake the samples in 60 days after you receive the report, the laboratory will dispose the samples after exceeding the time limit.
6. The test items in the report with accreditation symbols have already been accredited by related accreditation bodys(except for the items with *)

Date of test: 19/01/2017~23/01/2017

Tested by: Lu Jie
Lu Jie

Checked by: He Fei
He Fei

Approved by: Qin Feng
Qin Feng

Date: Feb. 24, 2017

Issued By: Jiangsu Electronic Information Product Quality Supervision & Inspection Institute

LAB Address: No.100 Jinshui Road, WuXi, Jiangsu, P.R.China

Test standard:

FCC 47 CFR, PART 15 SUBPART C Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSCI C63.10(2013) American National Standard for Testing Unlicensed Wireless Devices

KDB 558074 D01 DTS Meas Guidance v03r05 Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) Operating Under §15.247

Test item description:

Model/Type reference: ELST5016S

Ratings: AC 120V, 50/60Hz

Possible test case verdicts:

- test case does not apply to the test object: N/A
- test object does meet the requirement: P (Pass)
- test object does not meet the requirement: F (Fail)

General product information:

EUT is a LED TV with the size of 55", model number is ELST5016S(FCC ID:2AHAK-ELST5016S).The Highest Operation Frequency is 2462MHz. The main ports are as follows: Antenna port, Component port, VGA port, USB port, HDMI port.



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1 General Description

1.1 Testing Facility

All measurement facilities used to collect the measurement data are located at
No.100 Jinshui Road, WuXi, Jiangsu, P.R.China

The FCC Site Registration No. is 399439

The IC Site Registration No. is 12843A-1

1.2 Applicant

Name: KUNSHAN KONKA ELECTRONICS CO., LTD.

Address: No.189 East Qianjin Road, KUNSHAN, JIANGSU 215300 China

1.3 Manufacturer

Name: KUNSHAN KONKA ELECTRONICS CO., LTD.

Address: No.189 East Qianjin Road, KUNSHAN, JIANGSU 215300 China

1.4 Product Feature of Equipment Under Test

Product Name: LED TV

Brand Name:element

Model No.: ELST5016S

FCC ID:2AHAK-ELST5016S

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications and user's manual.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Standards Applicable for Testing

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

FCC 47 CFR, PART 15 SUBPART C

ANSCI C63.10(2013)

KDB 558074 D01 DTS Meas Guidance v03r05



2 Test Configuration of Equipment Under Test

Frequency range investigated:

Conducted Emission: 150kHz ~30MHz

Radiated Emission: 9kHz to the 10th harmonic of the highest fundamental frequency or to 40GHz, whichever is lower

Pre-Scan has been conducted to determine the worst-case mode across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, different channels and data rates were selected for the final test as listed in section 2.3.

2.1 Carrier Frequency Channel

Frequency Band	Channel	Frequency (MHz)	Channel	Frequency (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 Pre-Scanned RF Power

The manufacturer provides special test software named UTF-8 TeraTerm Pro to make the EUT transmit continuously with a constant duty cycle, control TX duty cycle >98% for TX test. Preliminary tests were performed in different data rate. Results with different data rate associated with the highest power were shown in the following tables.

IEEE 802.11b RF Power(dBm)				
Channel	Data Rate(Mbps)			
	1Mbps	2Mbps	5.5Mbps	11Mbps
1	21.0	20.8	20.8	20.8
6	20.8	--	--	--
11	20.9	--	--	--

IEEE 802.11g RF Power(dBm)								
Channel	Data Rate(Mbps)							
	6	9	12	18	24	36	48	54
1	24.1	24.0	24.0	24.0	23.9	24.0	24.0	23.9
6	24.0	--	--	--	--	--	--	--
11	23.5	--	--	--	--	--	--	--

IEEE 802.11n HT20 RF Power(dBm)								
Channel	MCS Index							
	MCS 0	MCS1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
1	23.9	23.8	24.0	23.8	23.2	23.5	23.6	23.4
6	23.7	--	--	--	--	--	--	--
11	23.5	--	--	--	--	--	--	--

IEEE 802.11n HT40 RF Power(dBm)								
Channel	MCS Index							
	MCS 0	MCS1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
3	24.3	24.2	24.0	24.1	23.5	23.7	23.6	23.5
6	24.1	--	--	--	--	--	--	--
9	24.2	--	--	--	--	--	--	--

2.3 Test Mode

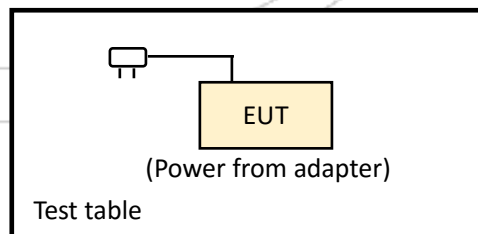
Based on the worst configuration found in the Preliminary tests, Final results of test modes, data rates and test channels are shown in the following table.

Test Cases			
Test Items	Mode	Data Rate	Test Channel
Maximum Peak Conducted Output Power	802.11b	1Mbps	1/6/11
	802.11g	6Mbps	1/6/11
	802.11n HT20	MCS0	1/6/11
	802.11n HT40	MCS0	3/6/9
Peak Power Spectral Density	802.11b	1Mbps	1/11
	802.11g	6Mbps	1/11
	802.11n HT20	MCS0	1/6/11
	802.11n HT40	MCS0	3/6/9
6dB and 99% Bandwidth Measurement	802.11b	1Mbps	1/6/11
	802.11g	6Mbps	1/6/11
	802.11n HT20	MCS0	1/6/11
	802.11n HT40	MCS0	3/6/9
Band-edge Measurement for RF Conducted Emission	802.11b	1Mbps	1/11
	802.11g	6Mbps	1/11
	802.11n HT20	MCS0	1/11
	802.11n HT40	MCS0	3/9
Radiated Band Edge	802.11b	1Mbps	1/11
	802.11g	6Mbps	1/11
	802.11n HT20	MCS0	1/11
	802.11n HT40	MCS0	3/9

Test Case			
Test Items	Mode	Data Rate	Test Channel
Spurious RF Conducted Emission	802.11b	1Mbps	1/6/11
	802.11g	6Mbps	1/6/11
	802.11n HT20	MCS0	1/6/11
	802.11n HT40	MCS0	3/6/9
Radiated Spurious Emission	802.11b	1Mbps	1/6/11
	802.11g	6Mbps	1/6/11
	802.11n HT20	MCS0	1/6/11
	802.11n HT40	MCS0	3/6/9
AC Conducted Emission Measurement	802.11b	1Mbps	1
Maximum Permissible Exposure(MPE)	802.11b	1Mbps	1
	802.11g	6Mbps	1
	802.11n HT20	MCS0	1
	802.11n HT40	MCS0	3

Note: For Radiated Emissions, By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

2.4 Connection Diagram of Test System



2.5 Test Equipment List

The EUT has been tested as an independent unit.

Instrument	Manufacturer	Model No.	S/N	Calibration Due	Calibration Interval
EMI Test Receiver	R&S	ESU	100186	2017.4.29	1 year
Broad-band antenna	ETS	3142C	00098968	2018.01.12	3 year
Horn antenna	Schwarz beck	BBHA9120D	9120D-513	2017.07.01	3 year
Horn antenna	TOYO Corporation	HAP06-18W	9120c-528	2018.12.26	3 year
Horn antenna	TOYO Corporation	HAP18-26W	00000032	2018.12.26	3 year
Loop antenna	R&S	HFH2-Z2	100256	2018.6.16	3 year

Instrument	Manufacturer	Model No.	S/N	Calibration Due	Calibration Interval
Preamplifier	Compliance Direction	PAP-1G18	8487	2017.4.29	1 year
Spectrum Analyzer	Agilent	N9010A	MY51440216	2017.11.04	1 year
Spectrum Analyzer	R&S	FSU43	100050	2017.03.06	1 year
EMI Test Receiver	R&S	ESCI7	100820	2017.2.24	1 year
EMI Test Receiver	R&S	ESCI	100065	2017.2.24	1 year
Artificial mains	R&S	ENV216	100497	2017.2.24	1 year
Shielded room	P.R.China	PB-4.95m×4m×3.3m	PB-05	2017.2.7	1 year
Shielded room	P.R.China	PB-7.7m×3.5m×3.3m	PB-06	2017.2.7	1 year
Shielded room	P.R.China	PB-4.4m×7.9m×2.8m	PB-04	2017.2.7	1 year
Semi-anechoic chamber	ETS	RFD-F/A-100	4400	2017.4.29	1 year
Semi-anechoic chamber	ETS	FACT-3	601	2017.2.24	1 year
Power Sensor	Keysight	U2021XA	MY54480008	2017.11.04	1 year
TOYO EMI SoftWare	TOYO Corporation	TOYO EMI Software	Ver 5.5.1	/	/

2.5 Support Equipment List

Equipment	Manufacturer	Model No.	S/N	NOTES
PC	HP Inc.	HSTNN-I62C-7	CNU0110JCY	Doc
AC Adapter	DELTA ELECTRONICS (JIANGSU) LTD.	PPP012D-S	WCNXF0AAR5K5QQ	/

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example: The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.3 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB). = 6.3 + 10 = 16.3(dB)

3 Summary of Test Result

The EUT has been tested according to the following specifications:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.247(b)(3)	Maximum Peak Conducted Output Power	Compliance
§15.247(e)	Peak Power Spectral Density	Compliance
§15.247(a)(2)	6dB and 99% Bandwidth Measurement	Compliance
§15.247(d)	Band-edge Measurement for RF Conducted Emission	Compliance
§15.247(d)	Radiated Band Edge	Compliance
§15.247(d)	Spurious RF Conducted Emission	Compliance
§15.247(d)	Radiated Spurious Emission	Compliance
§15.207(a)	AC Conducted Emission Measurement	Compliance
§15.247(i), §1.1307(b)(1)& §2.1091	Maximum Permissible Exposure(MPE)	Compliance

4 Test Result

4.1 Antenna Requirement

LIMIT

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

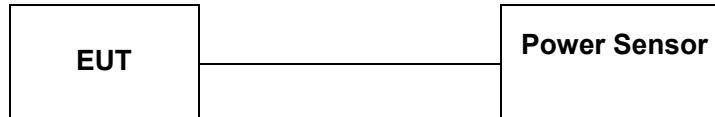
EUT Antenna: The EUT has an antenna arrangement for wifi, which the antenna maximum gain is 2.70 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance



4.2 Maximum Peak Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03r05:

PKPM1 Peak power meter method: The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Result
IEEE 802.11b	1	2412	21.0	30	Compliance
	6	2437	20.8		
	11	2462	20.9		
IEEE 802.11g	1	2412	24.1	30	Compliance
	6	2437	24.0		
	11	2462	23.5		
IEEE 802.11n HT20	1	2412	23.9	30	Compliance
	6	2437	23.7		
	11	2462	23.5		
IEEE 802.11n HT40	3	2422	24.3	30	Compliance
	6	2437	24.1		
	9	2452	24.2		

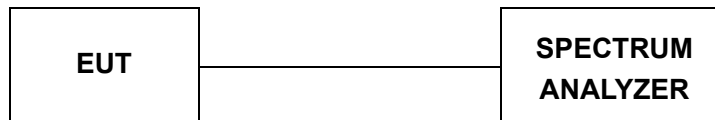
Note:

1. Measured output power at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss;



4.3 Peak Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03r05:

Method PKPSD (peak PSD): This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

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: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \text{ RBW}$.
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.

LIMIT

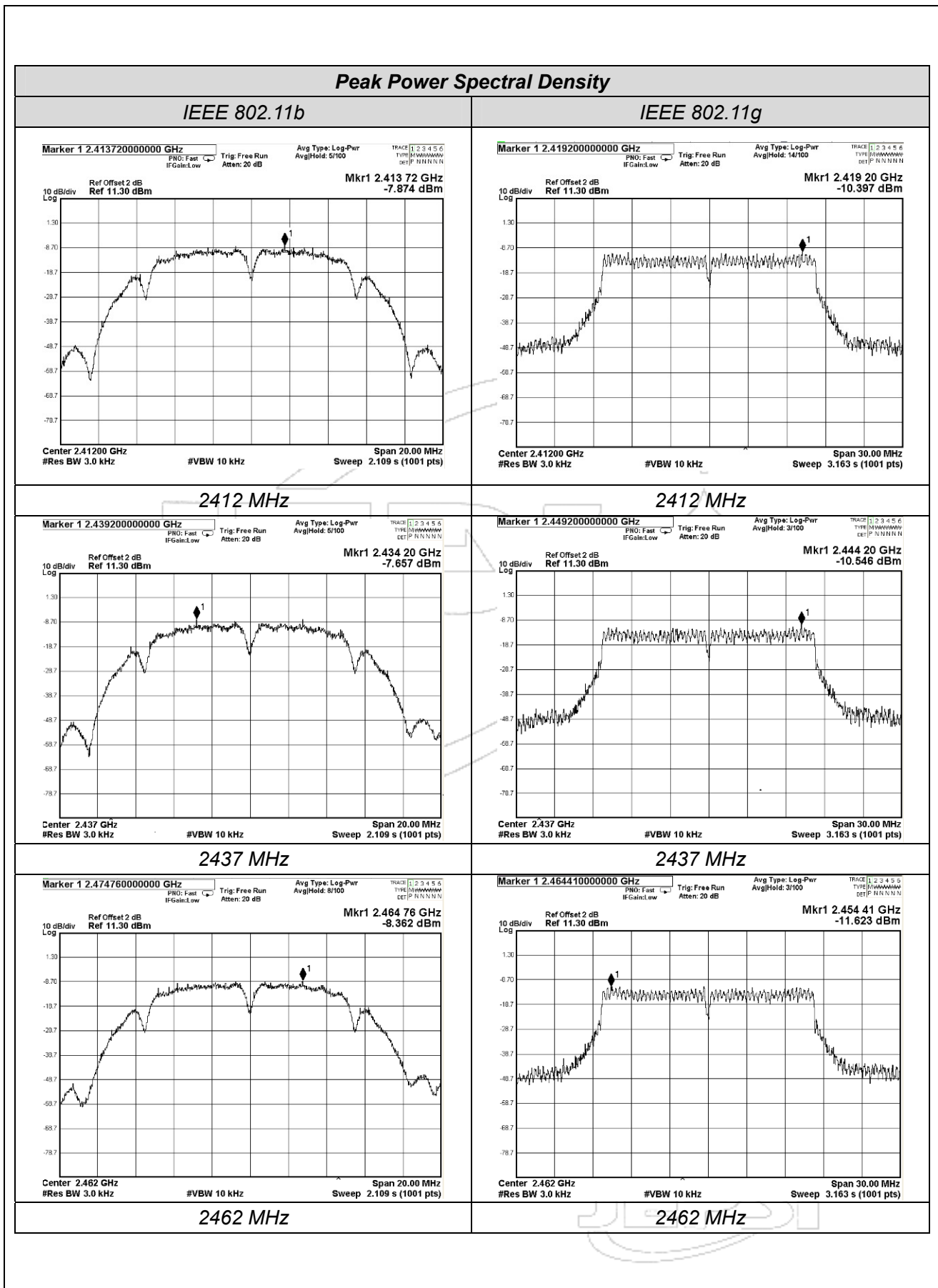
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3KHz)	Limits (dBm/3KHz)	Result
IEEE 802.11b	1	2412	-7.9	8	Compliance
	6	2437	-7.7		
	11	2462	-8.4		
IEEE 802.11g	1	2412	-10.4	8	Compliance
	6	2437	-10.5		
	11	2462	-11.6		

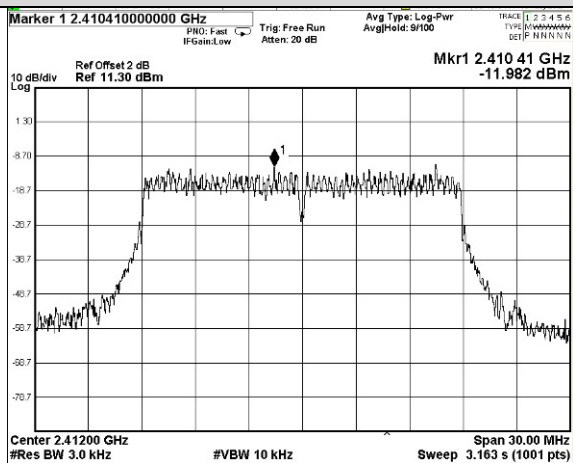
Test Mode	Channel	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3KHz)	Limits (dBm/3KHz)	Result
IEEE 802.11n HT20	1	2412	-12.0	8	Compliance
	6	2437	-10.4		
	11	2462	-11.8		
IEEE 802.11n HT40	3	2422	-13.7	8	Compliance
	6	2437	-14.4		
	9	2452	-14.9		



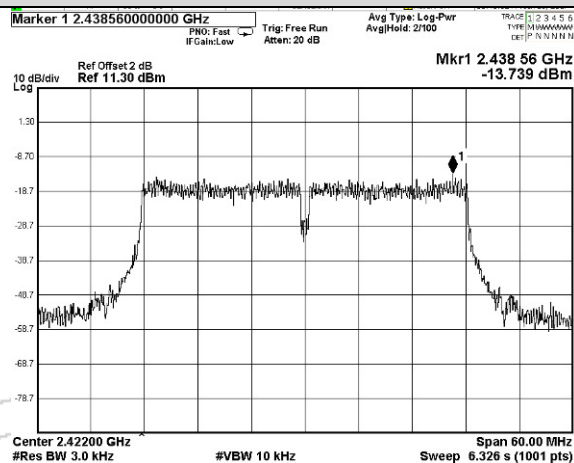


Peak Power Spectral Density

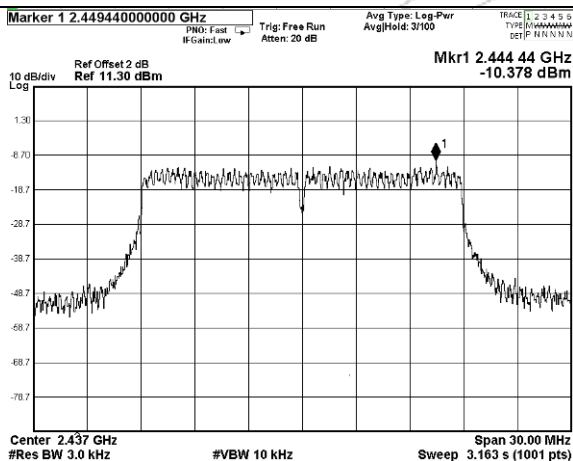
IEEE 802.11 n HT20



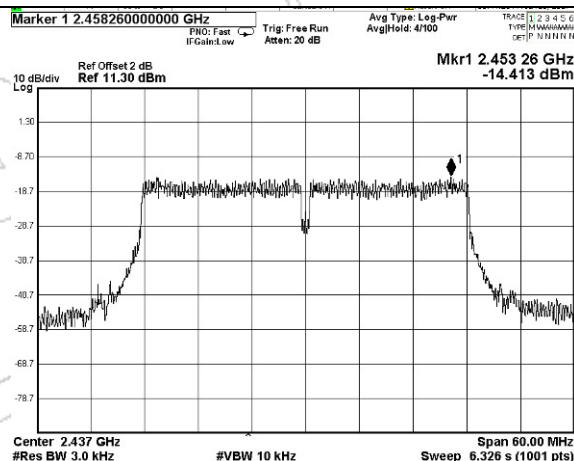
IEEE 802.11 n HT40



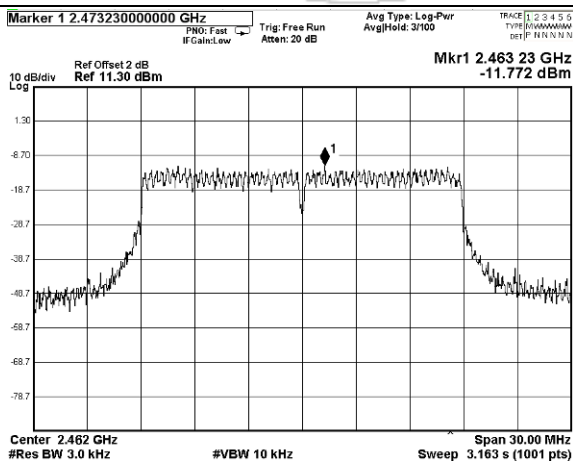
2412 MHz



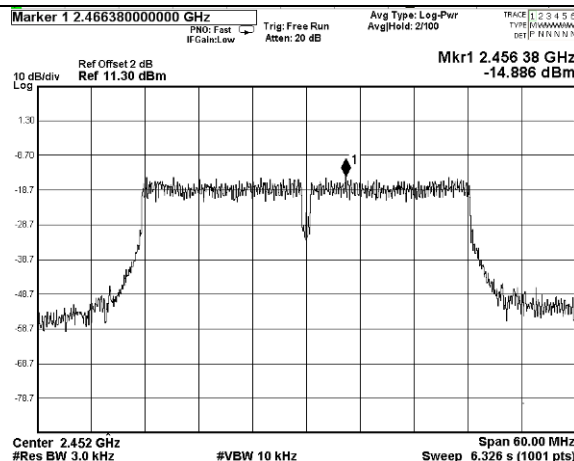
2422 MHz



2437 MHz



2437 MHz

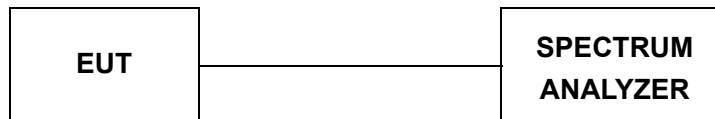


2462 MHz

2452 MHz

4.4 6dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03r05:

DTS Bandwidth Option1:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) ≥ 3 RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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.

LIMIT

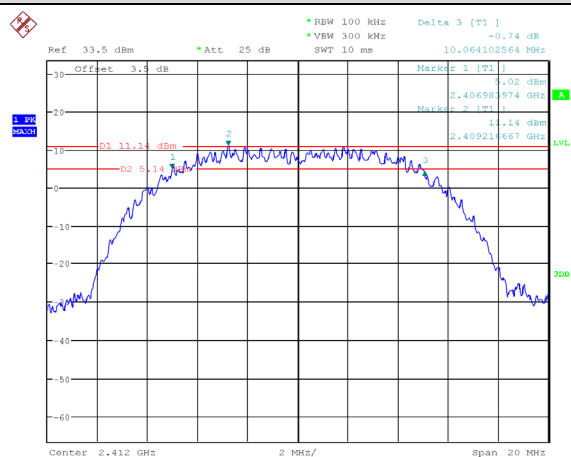
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

TEST RESULTS

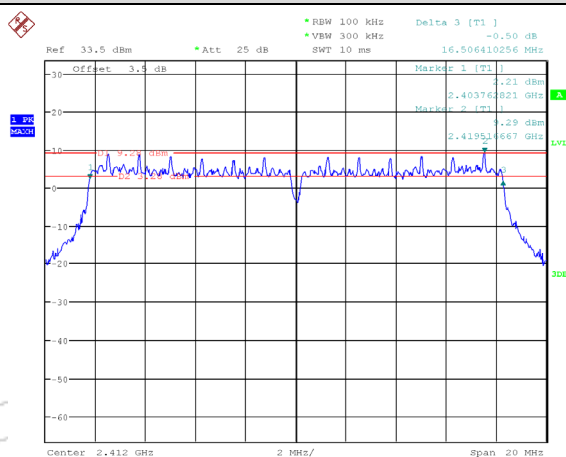
Test Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (MHz)	Result
IEEE 802.11b	1	2412	10.06	≥ 0.5	Compliance
	6	2437	10.03		
	11	2462	10.03		
IEEE 802.11g	1	2412	16.51	≥ 0.5	Compliance
	6	2437	16.51		
	11	2462	16.48		
IEEE 802.11n HT20	1	2412	16.44	≥ 0.5	Compliance
	6	2437	16.41		
	11	2462	16.41		
IEEE 802.11n HT40	3	2422	35.99	≥ 0.5	Compliance
	6	2437	35.99		
	9	2452	36.26		

6 dB Bandwidth

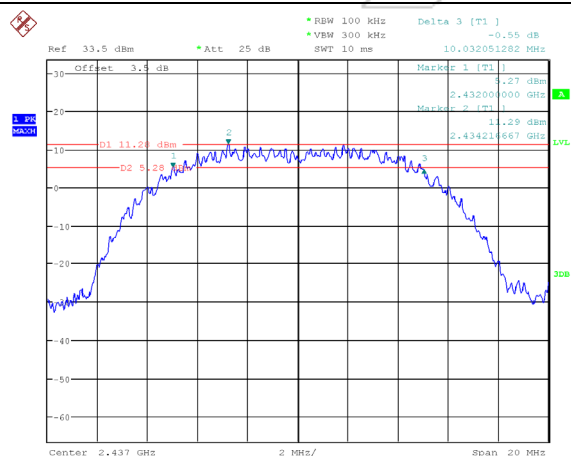
IEEE 802.11b



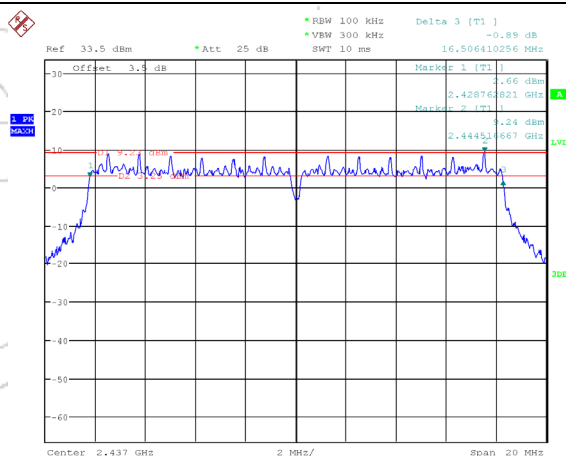
IEEE 802.11g



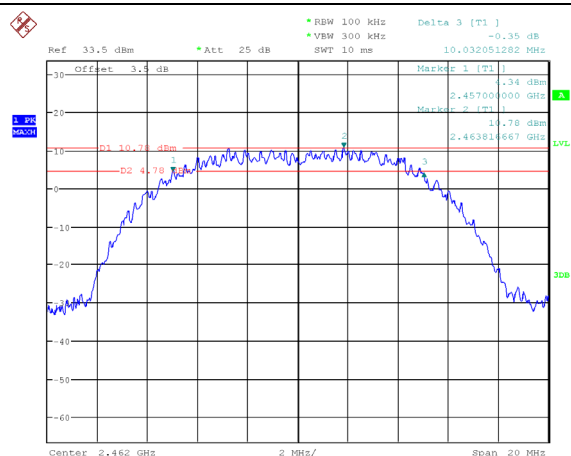
2412 MHz



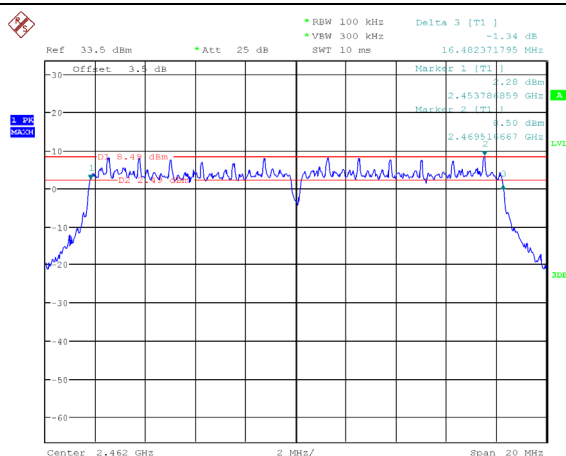
2412 MHz



2437 MHz

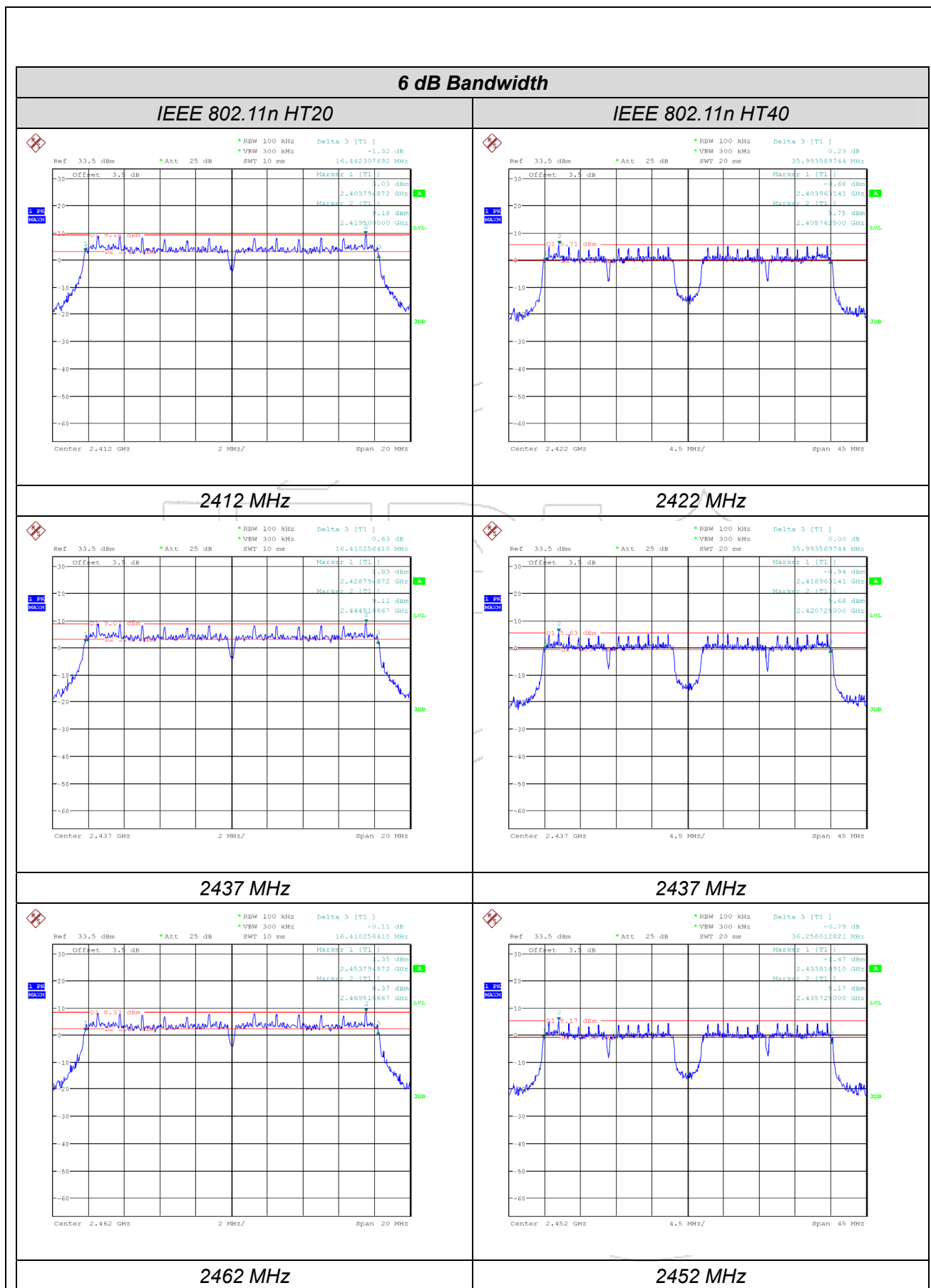


2437 MHz



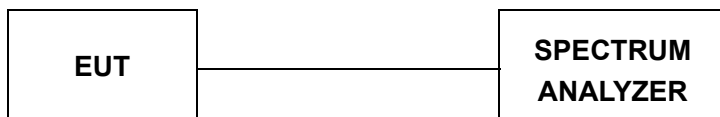
2462 MHz

2462 MHz



4.5 Band-edge Measurements for RF Conducted Emissions

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03r05:

1. Set RBW to 100kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
2. Detector = Peak; Sweep time = auto couple; Trace mode = max hold;
3. Allow trace to fully stabilize, then measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
4. Repeat above procedures until all measured frequencies were complete.

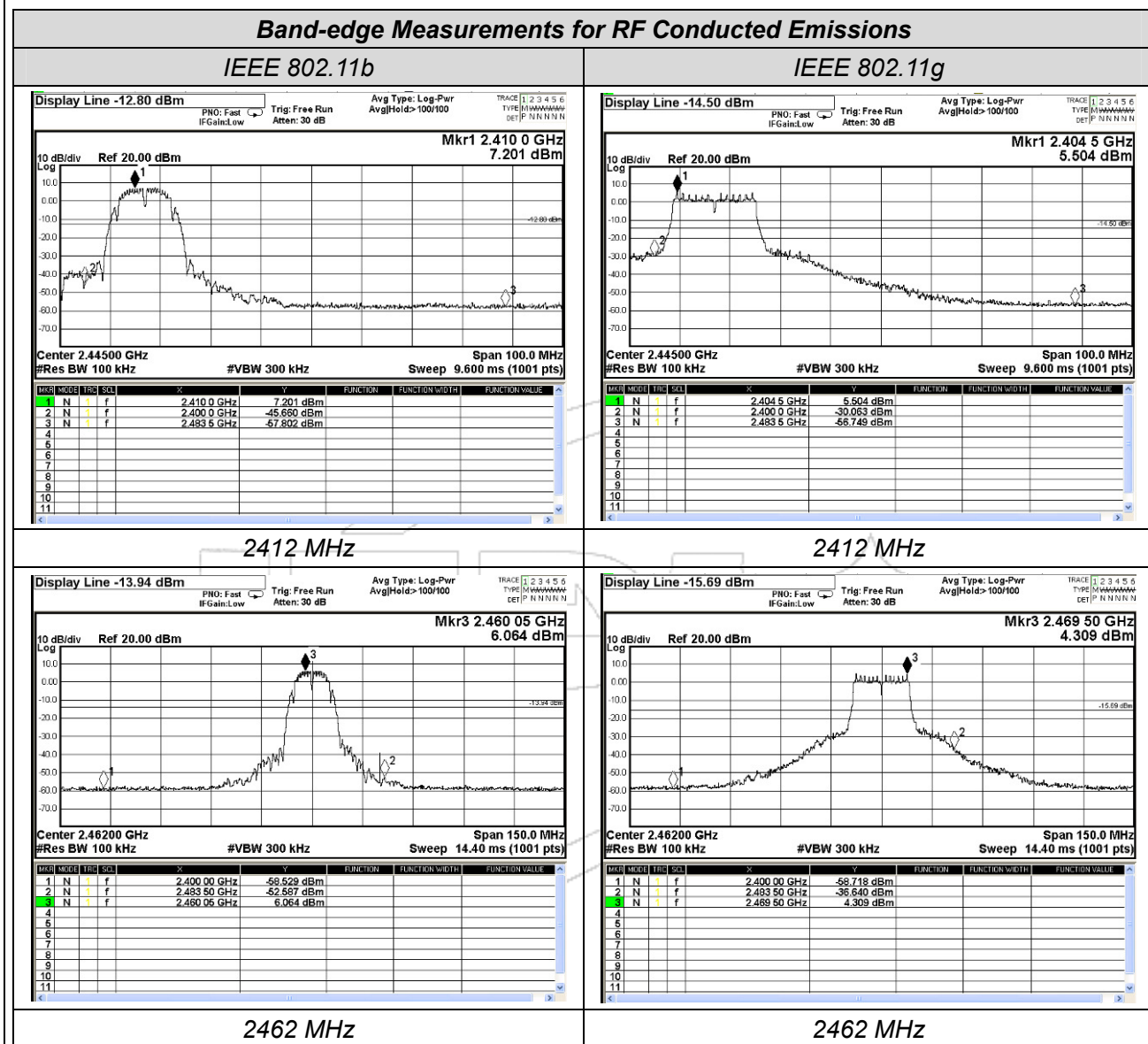
LIMIT

Below -20dB of the highest emission level in operating band.

TEST RESULTS

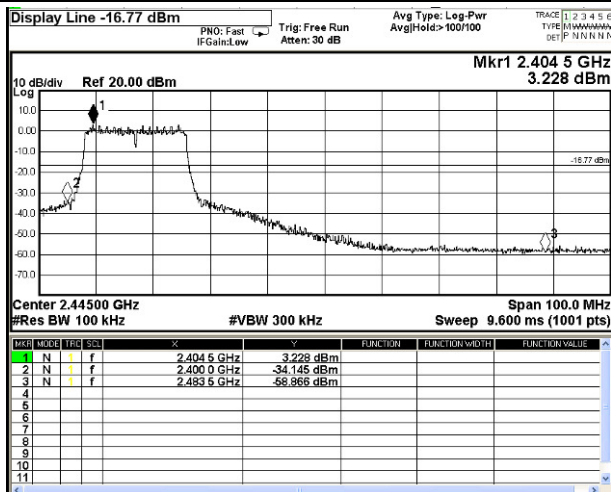
Test Mode	Channel	Frequency (MHz)	Conducted Band-edge Emission (dBc)	Limits (dBc)	Result
IEEE 802.11b	1	2412	<-20dBc	-20	Compliance
	11	2462	<-20dBc	-20	
IEEE 802.11g	1	2412	<-20dBc	-20	Compliance
	11	2462	<-20dBc	-20	
IEEE 802.11n HT20	1	2412	<-20dBc	-20	Compliance
	11	2462	<-20dBc	-20	
IEEE 802.11n HT40	3	2422	<-20dBc	-20	Compliance
	9	2452	<-20dBc	-20	



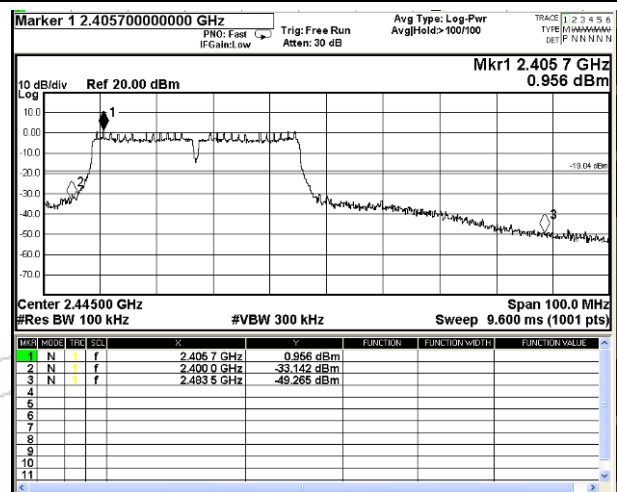


Band-edge Measurements for RF Conducted Emissions

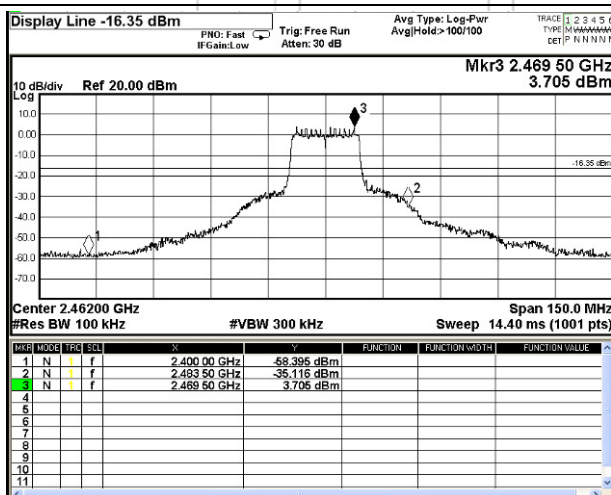
IEEE 802.11n HT20



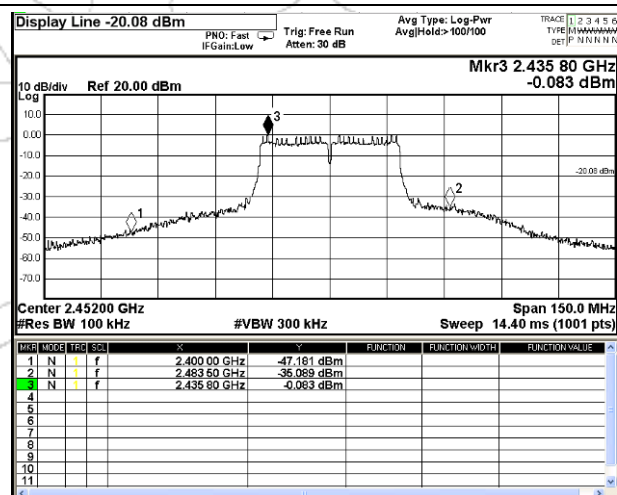
IEEE 802.11n HT40



2412 MHz



2422 MHz

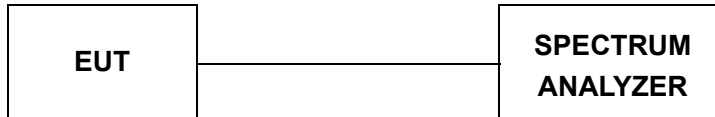


2462 MHz

2452 MHz

4.6 Radiated Band Edge

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03r05:

Antenna-port conducted measurements: Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).

2. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)

Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

3. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).

4. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship: $E = \text{EIRP} - 20\log D + 104.8$

Where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

5. Compare the resultant electric field strength level to the applicable regulatory limit.

LIMIT

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply With the radiated emission limits specified in § 15.209(a)



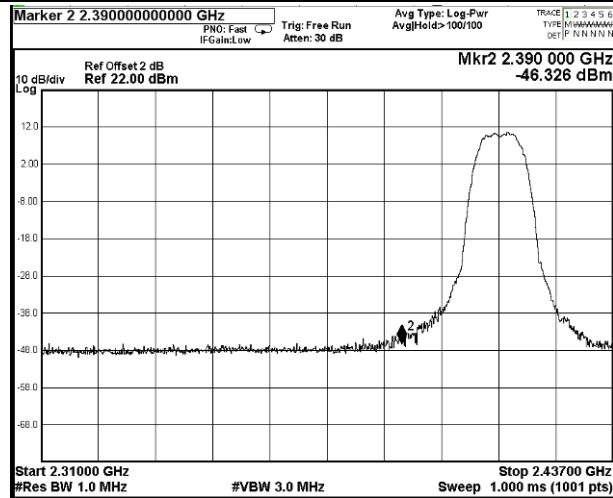
TEST RESULTS

Channel	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)
Test Mode: IEEE 802.11b							
1	2390.0	-46.3	2.70	0.0	51.7	Peak	74.0
1	2390.0	-57.2	2.70	0.0	40.8	AV	54.0
11	2483.5	-46.4	2.70	0.0	51.6	Peak	74.0
11	2483.5	-53.7	2.70	0.0	44.3	AV	54.0
Result: Compliance							
Test Mode: IEEE 802.11g							
1	2390.0	-39.5	2.70	0.0	58.5	Peak	74.0
1	2390.0	-46.2	2.70	0.0	51.8	AV	54.0
11	2483.5	-39.7	2.70	0.0	58.3	Peak	74.0
11	2483.5	-52.6	2.70	0.0	45.4	AV	54.0
Result: Compliance							
Test Mode: IEEE 802.11n HT20							
1	2390.0	-37.1	2.70	0.0	60.9	Peak	74.0
1	2390.0	-48.5	2.70	0.0	49.6	AV	54.0
11	2483.5	-40.9	2.70	0.0	57.1	Peak	74.0
11	2483.5	-53.5	2.70	0.0	44.5	AV	54.0
Result: Compliance							
Test Mode: IEEE 802.11n HT40							
3	2390.0	-38.1	2.70	0.0	59.9	Peak	74.0
3	2390.0	-47.5	2.70	0.0	50.5	AV	54.0
9	2483.5	-38.8	2.70	0.0	59.2	Peak	74.0
9	2483.5	-50.3	2.70	0.0	47.7	AV	54.0
Result: Compliance							

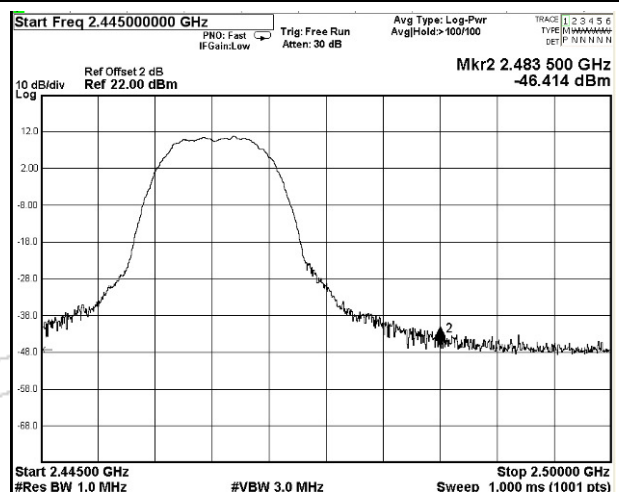


Radiated Band-edge

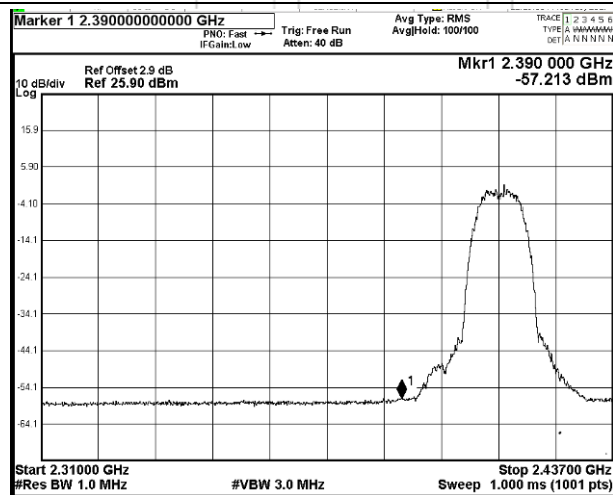
IEEE 802.11b



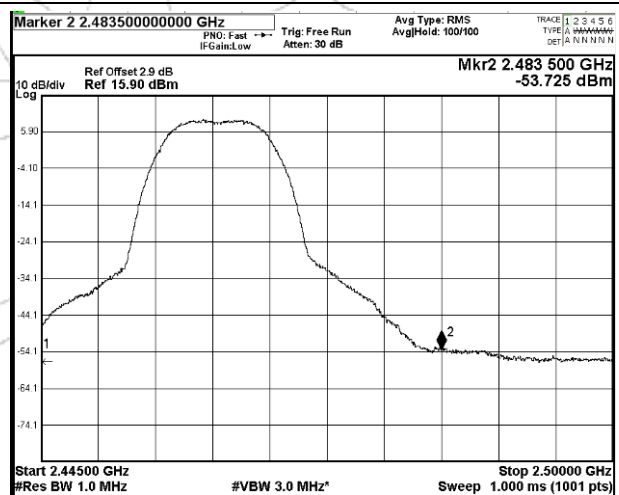
2412 MHz – Peak



2462 MHz – Peak



2412 MHz – Average

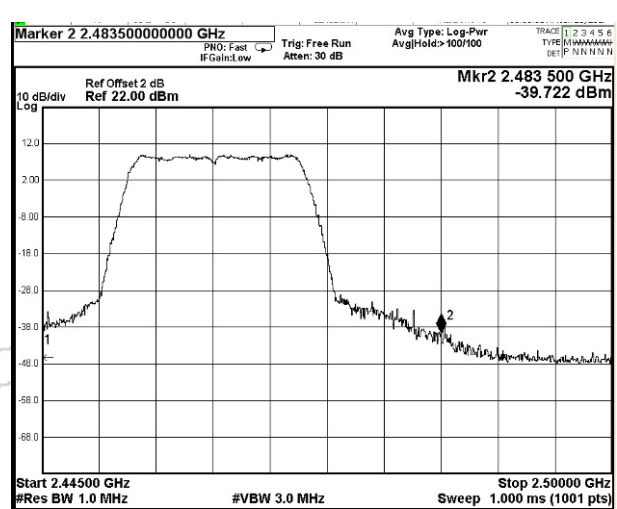
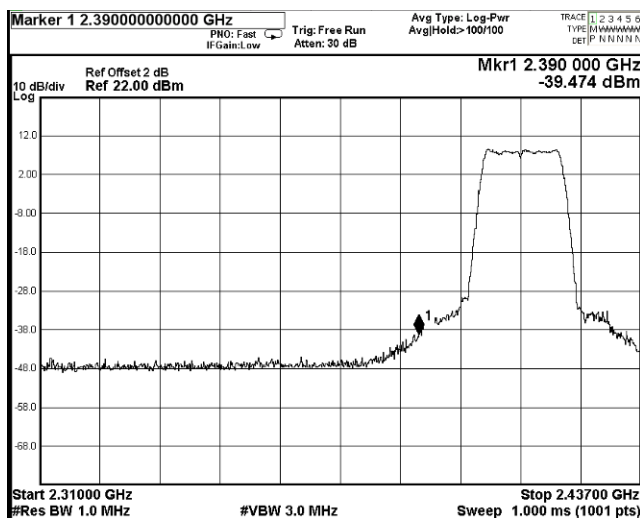


2462 MHz – Average

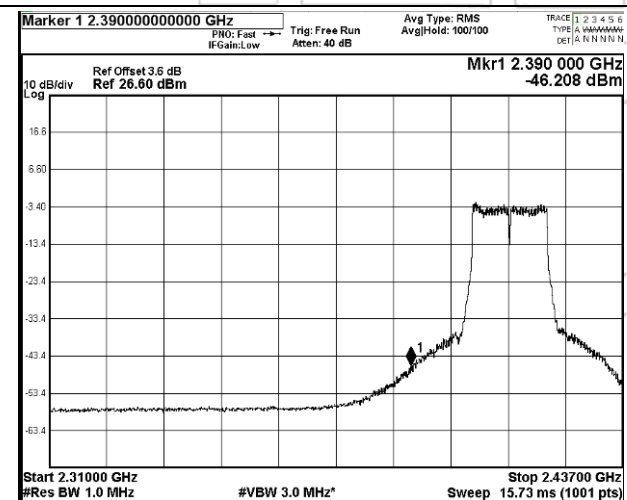


Radiated Band-edge

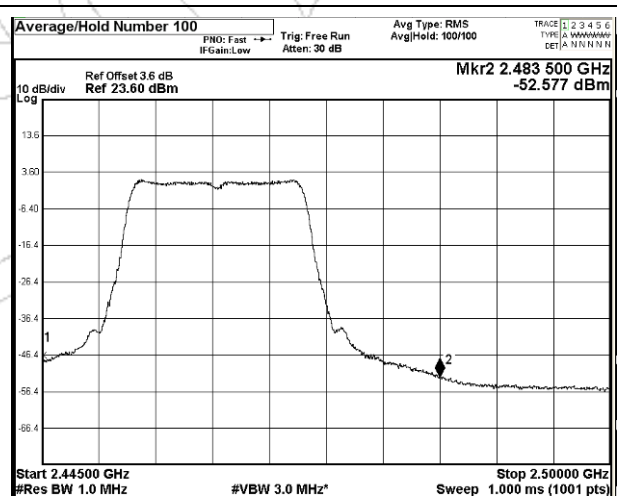
IEEE 802.11g



2412 MHz – Peak



2462 MHz – Peak



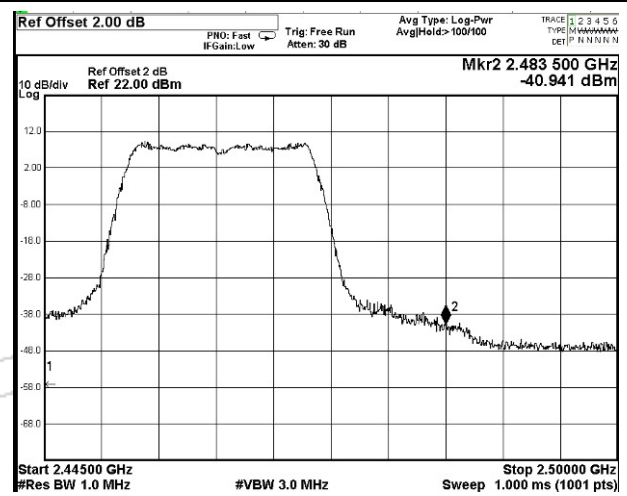
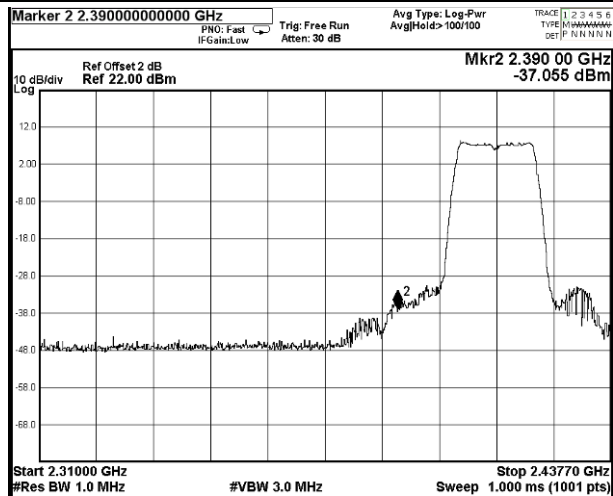
2412 MHz – Average

2462 MHz – Average

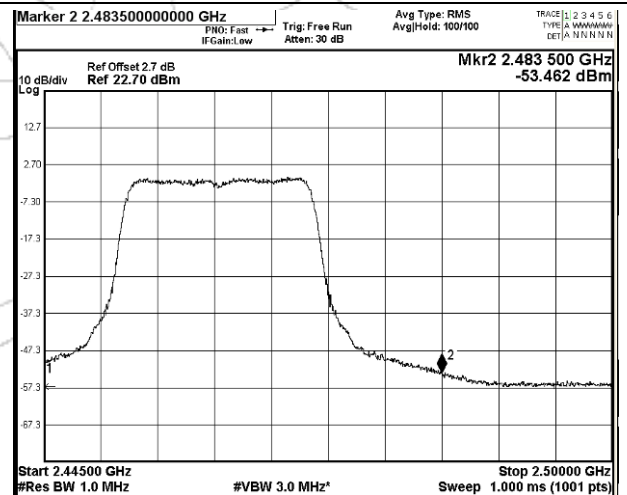
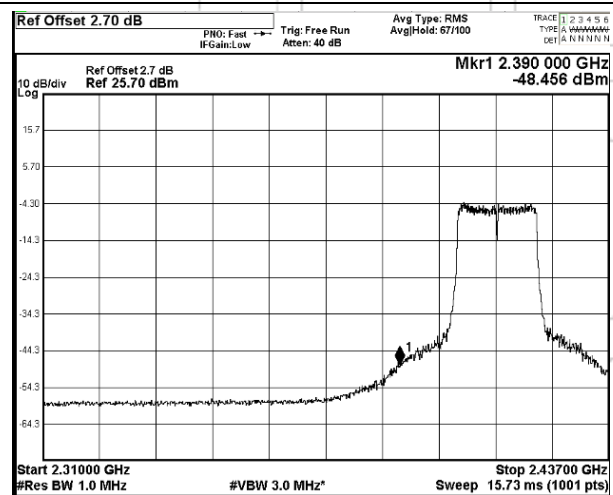


Radiated Band-edge

IEEE 802.11n HT20



2412 MHz – Peak



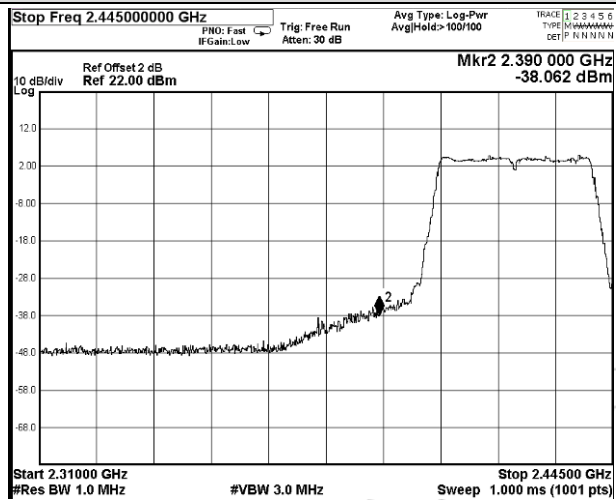
2412 MHz – Average

2462 MHz – Average

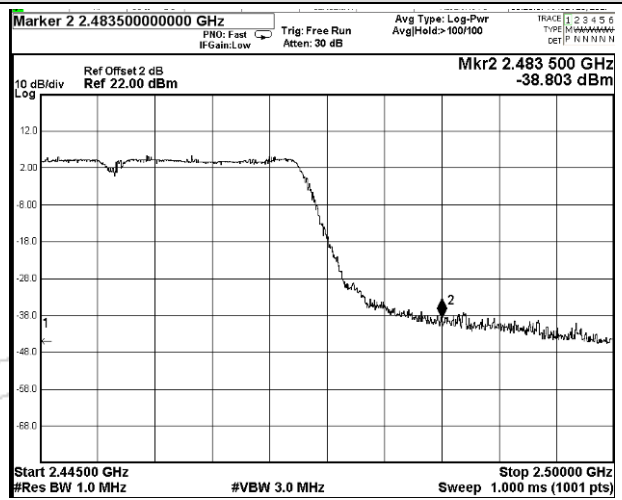


Radiated Band-edge

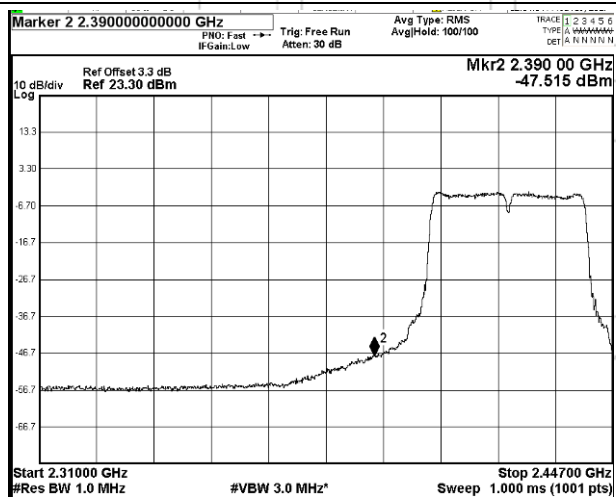
IEEE 802.11n HT40



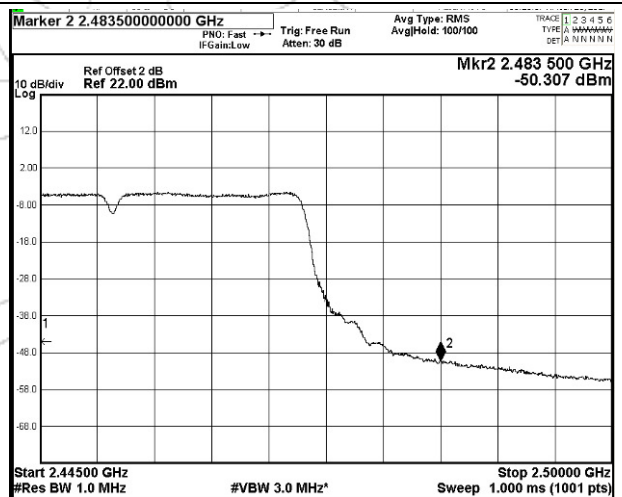
2422 MHz – Peak



2452 MHz – Peak



2422 MHz – Average

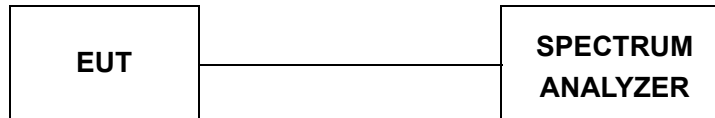


2452 MHz – Average



4.7 Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03r05:

1. Set RBW to 100kHz and VBW of spectrum analyzer to 300 kHz with a measurement frequency range from 30MHz to 25GHz.
2. Detector = Peak; Sweep time = auto couple; Trace mode = max hold;
3. Allow trace to fully stabilize, then measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
4. Repeat above procedures until all measured frequencies were complete.

LIMIT

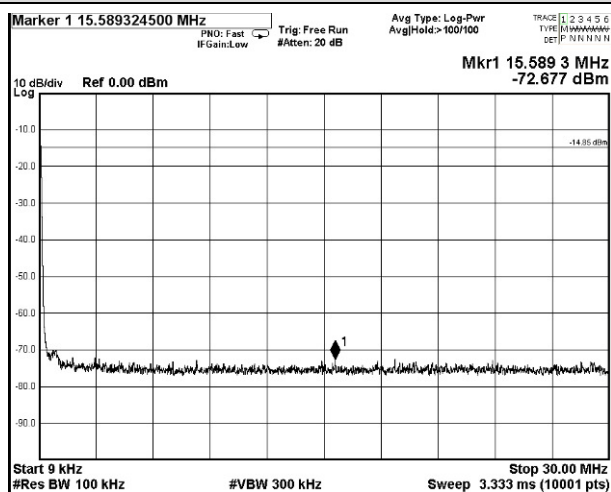
Below -20dB of the highest emission level in operating band.

TEST RESULTS

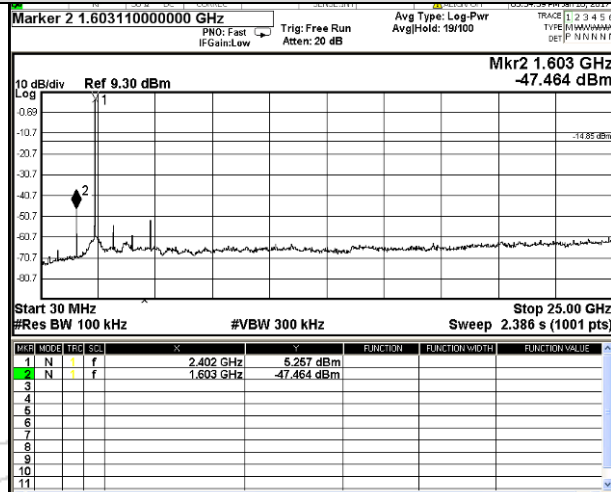
Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBc)	Limits (dBc)	Result
IEEE 802.11b	1	2412	<-20dBc	-20	Compliance
	6	2437	<-20dBc	-20	
	11	2462	<-20dBc	-20	
IEEE 802.11g	1	2412	<-20dBc	-20	Compliance
	6	2437	<-20dBc	-20	
	11	2462	<-20dBc	-20	
IEEE 802.11n HT20	1	2412	<-20dBc	-20	Compliance
	6	2437	<-20dBc	-20	
	11	2462	<-20dBc	-20	
IEEE 802.11n HT40	3	2422	<-20dBc	-20	Compliance
	6	2437	<-20dBc	-20	
	9	2452	<-20dBc	-20	

Spurious RF Conducted Emission

IEEE 802.11b 2412MHz

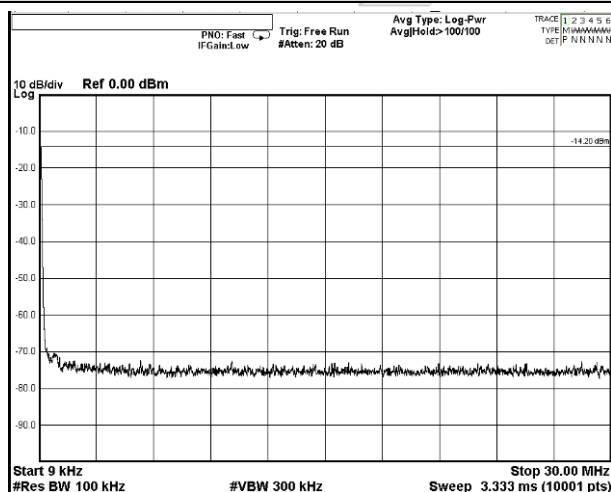


9kHz – 30MHz

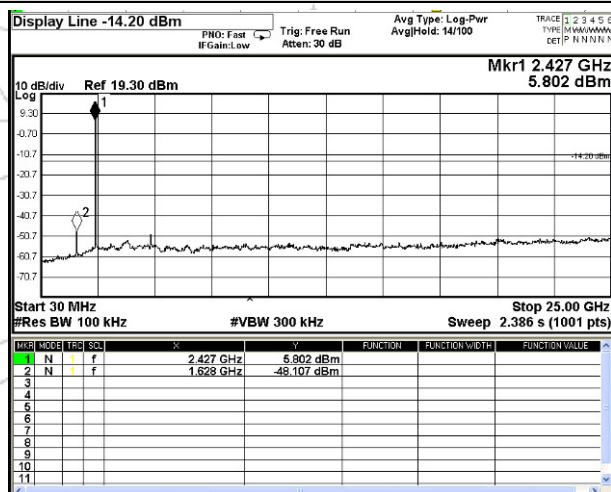


30MHz – 25GHz

IEEE 802.11b 2437 MHz

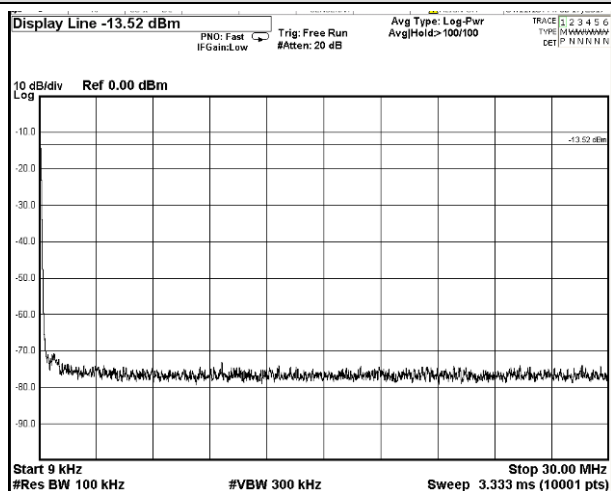


9kHz – 30MHz

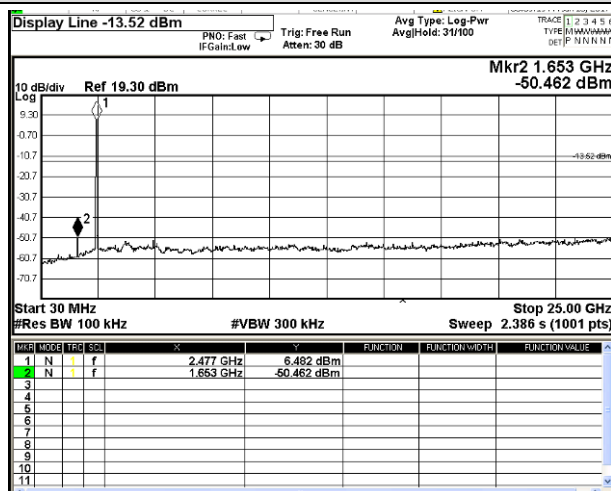


30MHz – 25GHz

IEEE 802.11b 2462 MHz



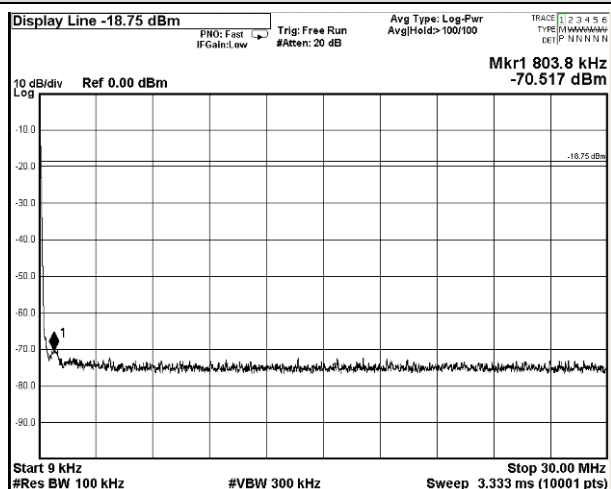
9kHz – 30MHz



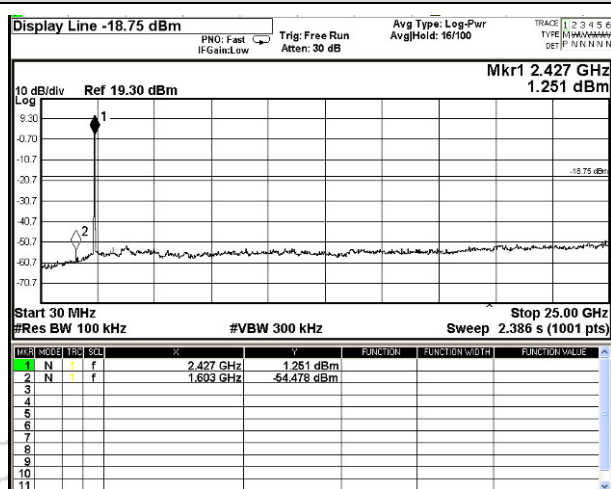
30MHz – 25GHz

Spurious RF Conducted Emission

IEEE 802.11g 2412 MHz

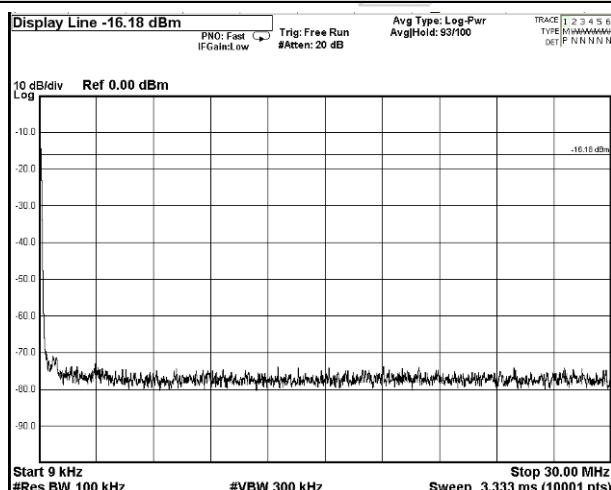


9kHz – 30MHz

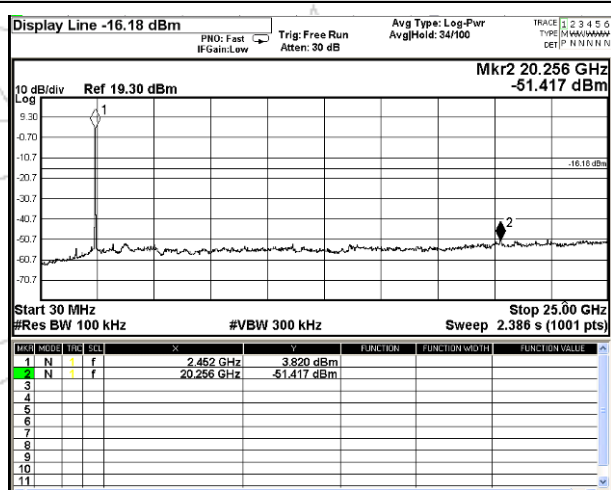


30MHz – 25GHz

IEEE 802.11g 2437 MHz

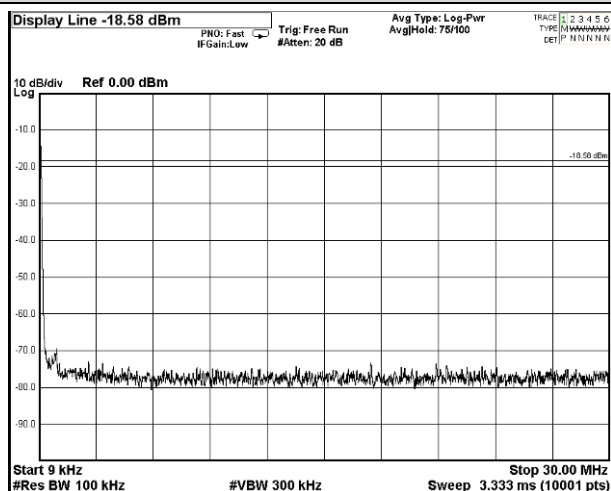


9kHz – 30MHz

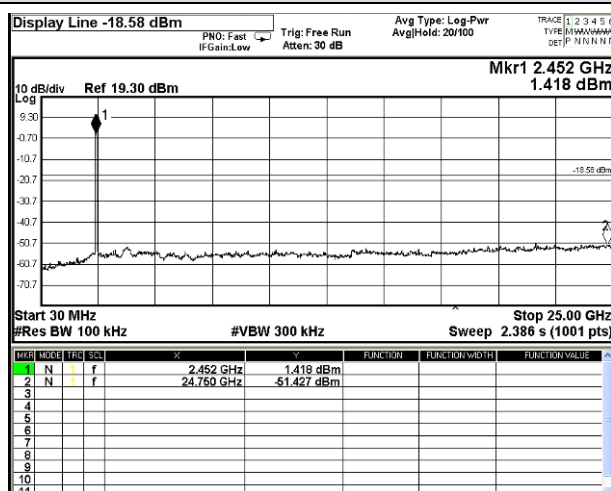


30MHz – 25GHz

IEEE 802.11g 2462 MHz



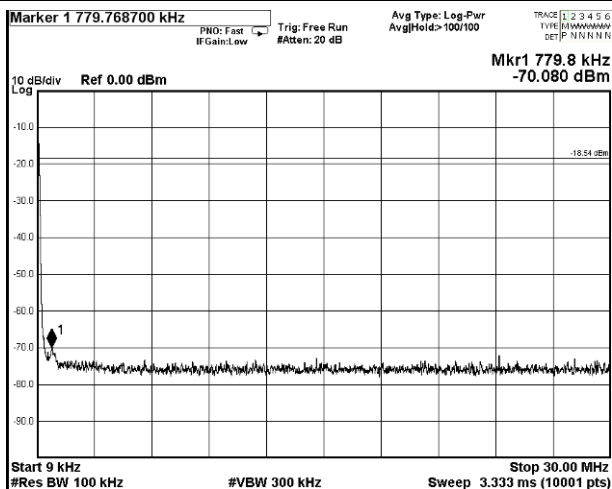
9kHz – 30MHz



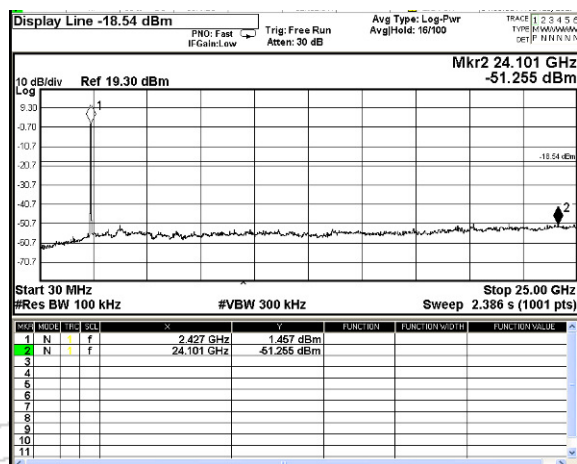
30MHz – 25GHz

Spurious RF Conducted Emissions

IEEE 802.11n HT20 2412 MHz

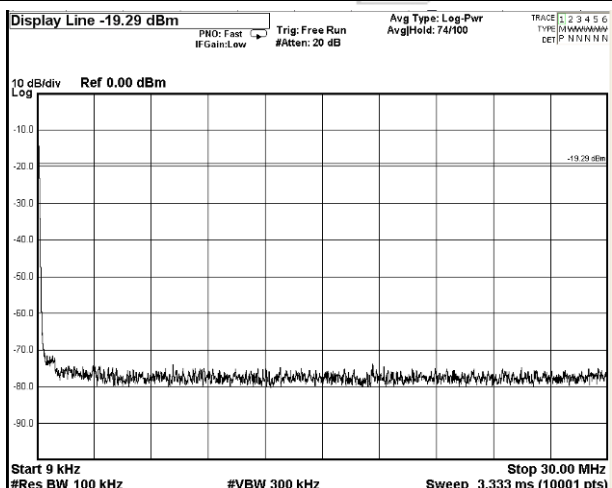


9kHz – 30MHz

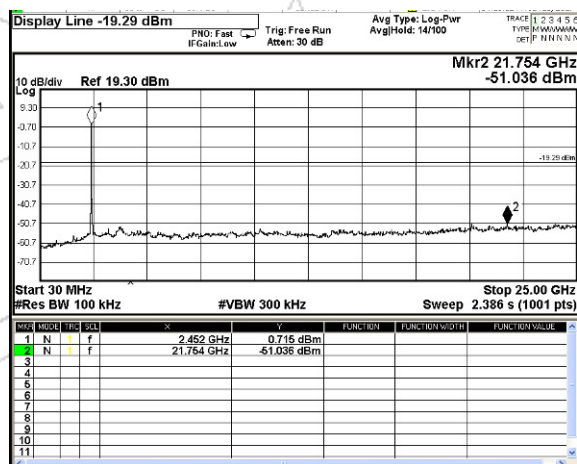


30MHz – 25GHz

IEEE 802.11n HT20 2437 MHz

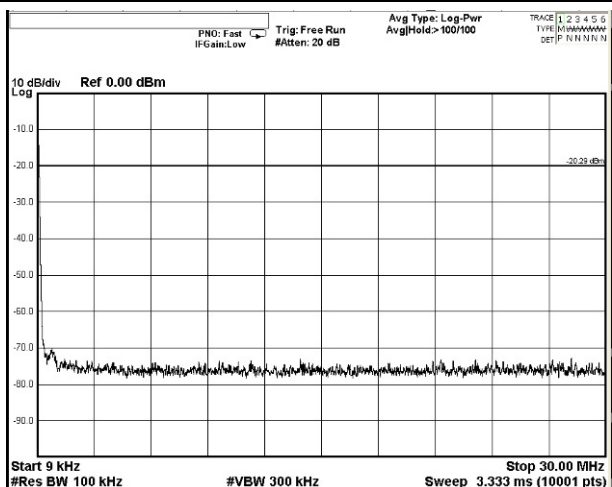


9kHz – 30MHz

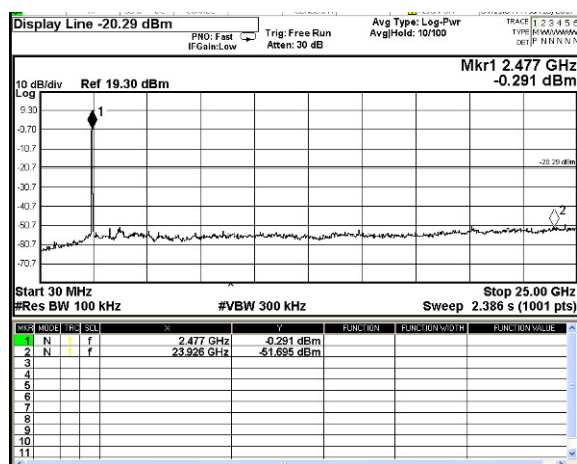


30MHz – 25GHz

IEEE 802.11n HT20 2462 MHz



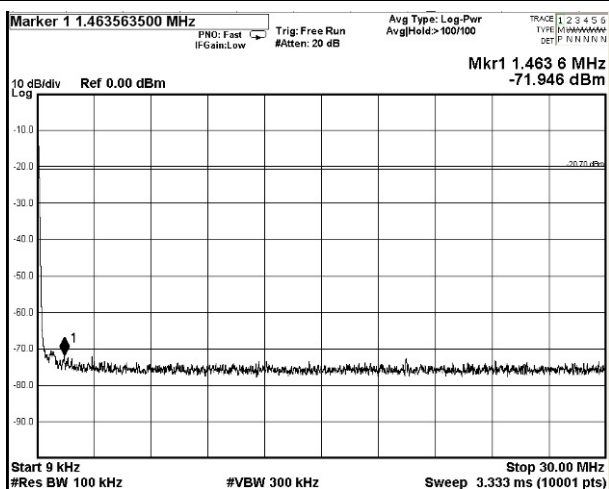
9kHz – 30MHz



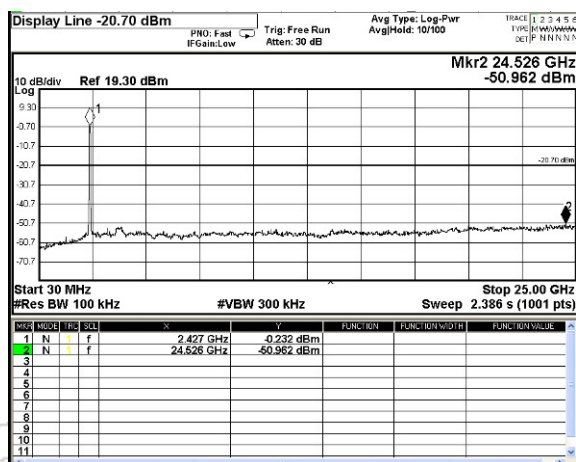
30MHz – 25GHz

Spurious RF Conducted Emissions

IEEE 802.11n HT40 2422 MHz

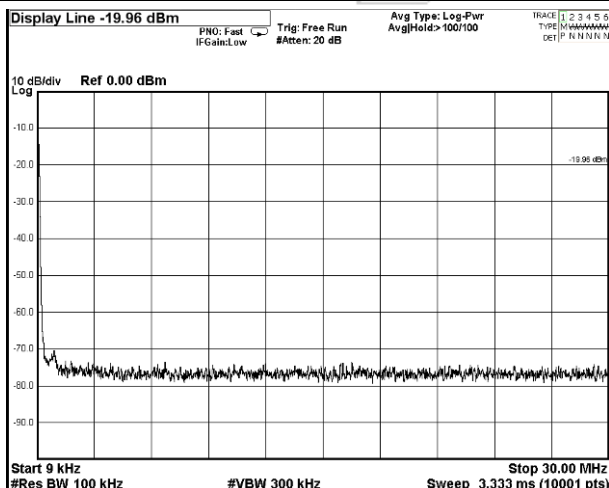


9kHz – 30MHz

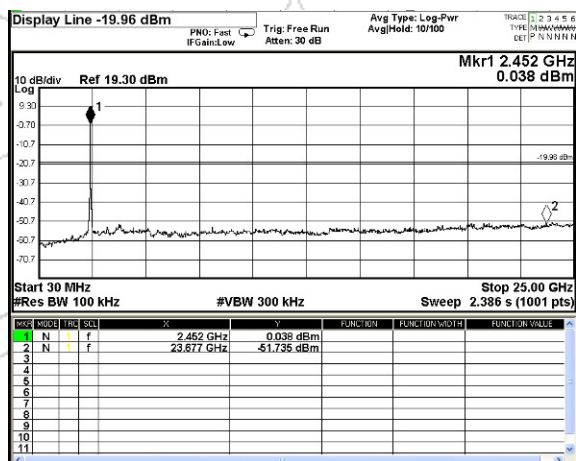


30MHz – 25GHz

IEEE 802.11n HT40 2437 MHz

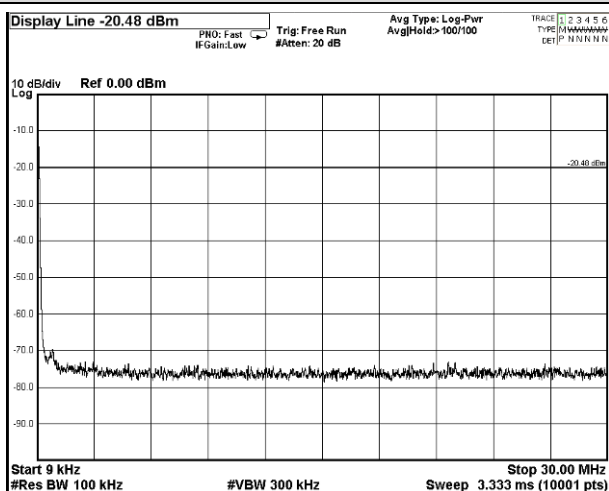


9kHz – 30MHz

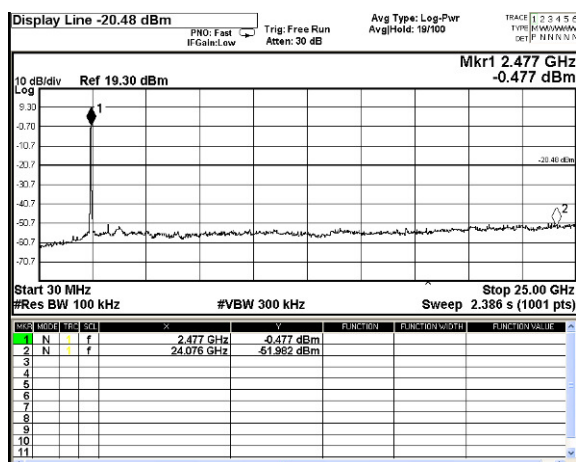


30MHz – 25GHz

IEEE 802.11n HT40 2462 MHz



9kHz – 30MHz

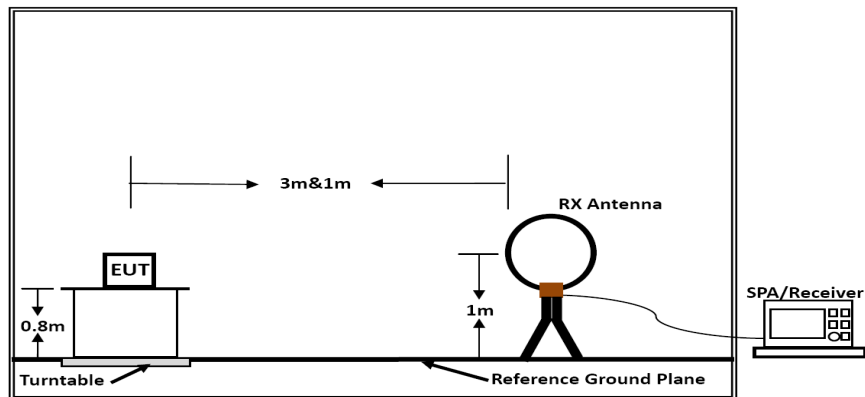


30MHz – 25GHz

4.8 Radiated Spurious Emission

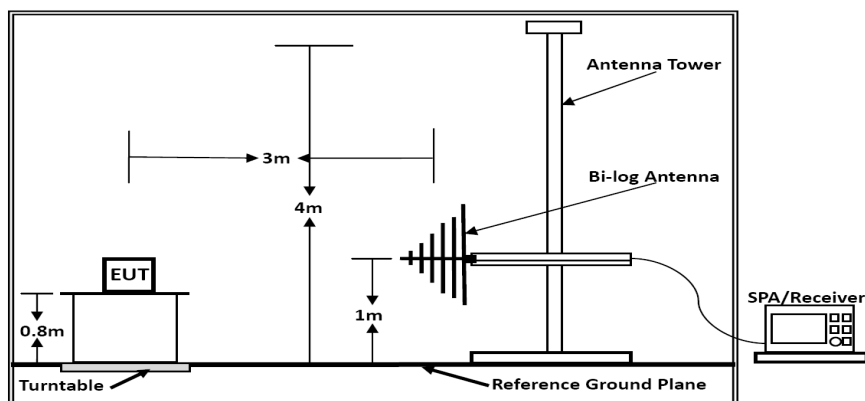
TEST CONFIGURATION

Frequency range: 9KHz – 30MHz



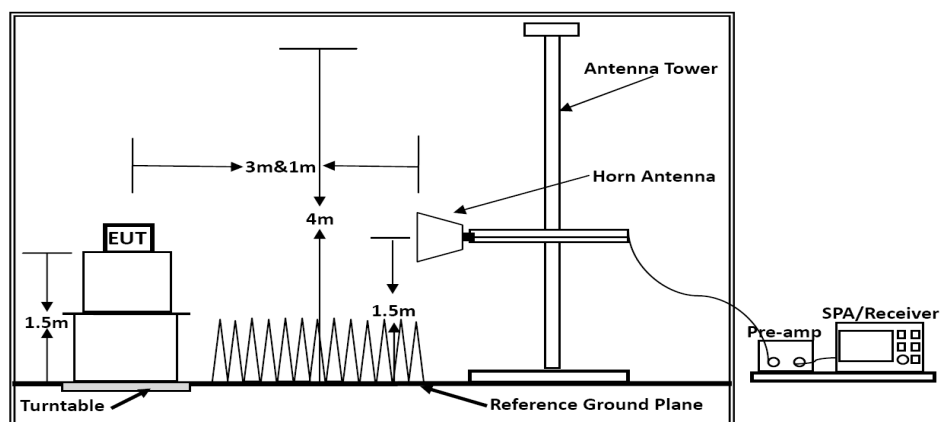
Below 30MHz

Frequency range: 30MHz – 1000MHz



Below 1GHz

Frequency range: 1GHz-25GHz



Above 1GHz

TEST PROCEDURE

According to the guidance in ANSI C63.10-2010:

To measure the maximum emission while the EUT is situated in three orthogonal planes (if appropriate), adjust the measurement antenna height and polarization etc. Measure frequency range from 9kHz to 25GHz.

1. The EUT was placed on a turn table which is 0.8m above ground plane for below 1GHz and 1.50m above ground plane for above 1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT maximum operation frequency was 2462MHz.so radiated emission test frequency range from 9 KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Loop Antenna	3
30MHz-1GHz	Broadband Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto	Peak
	Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

More procure as follows:

1) Sequence of testing 9 kHz to 30 MHz

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 0.8 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, turntable position, Ant position, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, turntable position, Ant position, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, turntable position, Ant position, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Premeasurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, turntable position, Ant position, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	300	$20\log(2400/F(\text{KHz}))+80$	$2400/F(\text{KHz})$
0.49-1.705	30	$20\log(24000/F(\text{KHz}))+40$	$24000/F(\text{KHz})$
1.705-30	30	$20\log(30)+40$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

Note:

Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBμV) + distance extrapolation factor [9.5 dB].



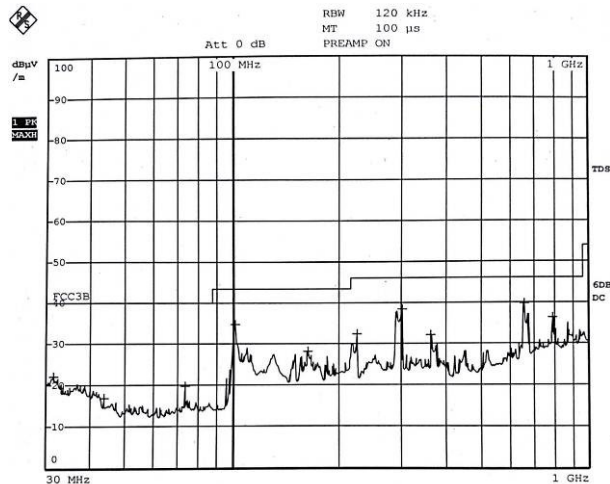
Test Result

Below 1GHz

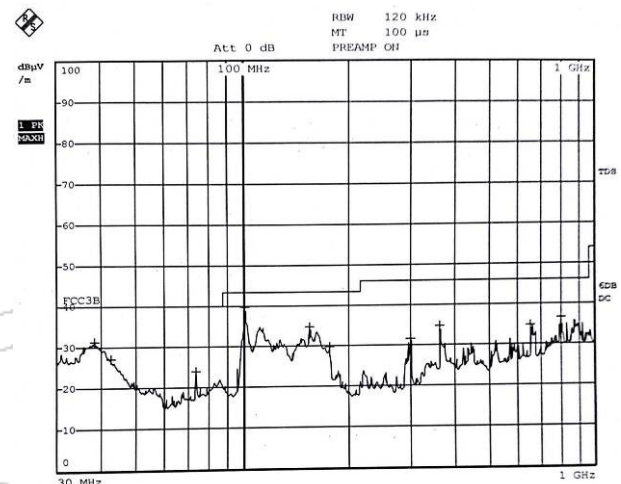
Radiated Spurious Emission

IEEE 802.11b 2412 MHz

Horizontal



Vertical



Frequency (MHz)	Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
101.84	31.1	12.4	43.5	115.2	35.8	H	QP
302.64	33.5	12.5	46.0	108.9	299.2	H	QP
660.84	33.8	12.2	46.0	100.1	173.0	H	QP
38.28	29.2	10.8	40.0	105.3	51.3	V	QP
101.12	37.5	6.0	43.5	122.7	29.6	V	QP
155.12	32.4	11.1	43.5	113.9	217.8	V	QP
Result: Compliance							

Note:

- 1) Pre-scan all mode and recorded the worst case results in this report (IEEE 802.11b (2412MHz)).
- 2) The amplitude of spurious emissions between 9kHz~30MHz which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Above 1GHz

Frequency (MHz)	Read Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
Test Mode: IEEE 802.11b				Test Channel: 1(2412MHz)			
3984.1	51.9	22.1	74.0	105.7	358.6	H	Peak
3984.1	30.0	24.0	54.0	105.7	358.6	H	Average
3999.4	56.5	17.5	74.0	117.2	356.9	V	Peak
3999.4	32.2	21.8	54.0	117.2	356.9	V	Average
4770.0	41.4	32.6	74.0	106.0	359.8	V	Peak
4770.0	28.4	25.6	54.0	106.0	359.8	V	Average
4820.9	42.5	31.5	74.0	109.9	31.0	H	Peak
4820.9	29.2	24.8	54.0	109.9	31.0	H	Average
7146.9	45.1	28.9	74.0	100.0	156.4	H	Peak
7146.9	31.8	22.2	54.0	100.0	156.4	H	Average
7324.0	45.3	28.7	74.0	118.7	208.7	V	Peak
7324.0	32.0	22.0	54.0	118.7	208.7	V	Average
Result: Compliance							
Test Mode: IEEE 802.11b				Test Channel: 6(2437MHz)			
4005.6	53.8	20.2	74.0	105.7	337.1	V	Peak
4005.6	31.9	22.1	54.0	105.7	337.1	V	Average
4019.2	53.2	20.8	74.0	103.2	359.9	H	Peak
4019.2	32.4	21.6	54.0	103.2	359.9	H	Average
4874.6	40.0	34.0	74.0	108.1	3.1	V	Peak
4874.6	28.6	25.4	54.0	108.1	3.1	V	Average
4876.0	39.7	34.3	74.0	103.5	35.0	H	Peak
4876.0	27.1	26.9	54.0	103.5	35.0	H	Average
7310.4	43.3	30.7	74.0	111.2	114.2	H	Peak
7310.4	30.9	23.1	54.0	111.2	114.2	H	Average
7312.6	44.8	29.2	74.0	112.9	337.1	V	Peak
7312.6	30.6	23.4	54.0	112.9	337.1	V	Average
Result: Compliance							



Frequency (MHz)	Read Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
Test Mode: IEEE 802.11b				Test Channel: 11(2462MHz)			
3977.2	55.3	18.7	74.0	126.8	356.1	V	Peak
3977.2	32.1	21.9	54.0	126.8	356.1	V	Average
4012.7	51.7	22.3	74.0	100.0	359.8	H	Peak
4012.7	29.9	24.1	54.0	100.0	359.8	H	Average
4924.8	43.1	30.9	74.0	100.8	11.0	H	Peak
4924.8	29.1	24.9	54.0	100.8	11.0	H	Average
4925.3	41.2	32.8	74.0	102.6	351.0	V	Peak
4925.3	27.6	26.4	54.0	102.6	351.0	V	Average
7385.1	45.3	28.7	74.0	103.2	119.5	H	Peak
7385.1	32.2	21.8	54.0	103.2	119.5	H	Average
7387.1	44.2	29.8	74.0	109.4	351.0	V	Peak
7387.1	29.1	24.9	54.0	109.4	351.0	V	Average
Result: Compliance							
Test Mode: IEEE 802.11g				Test Channel: 1(2412MHz)			
3995.4	50.2	23.8	74.0	100.9	337.7	H	Peak
3995.4	29.7	24.3	54.0	100.9	337.7	H	Average
4029.4	55.4	18.6	74.0	101.6	359.9	V	Peak
4029.4	33.1	20.9	54.0	101.6	359.9	V	Average
4822.6	41.3	32.7	74.0	100.9	359.9	V	Peak
4822.6	29.4	24.6	54.0	100.9	359.9	V	Average
4825.1	39.7	34.3	74.0	103.1	32.2	H	Peak
4825.1	27.8	26.2	54.0	103.1	32.2	H	Average
7235.6	42.8	31.2	74.0	100.5	337.0	V	Peak
7235.6	29.7	24.3	54.0	100.5	337.0	V	Average
7237.4	43.5	30.5	74.0	118.7	14.9	H	Peak
7237.4	30.7	23.3	54.0	118.7	14.9	H	Average
Result: Compliance							

Frequency (MHz)	Read Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
Test Mode: IEEE 802.11g				Test Channel: 6(2437MHz)			
3989.8	55.9	28.1	74.0	120.4	353.9	V	Peak
3989.8	32.9	21.1	54.0	120.4	353.9	V	Average
3998.8	48.3	25.7	74.0	119.3	341.7	H	Peak
3998.8	28.3	25.7	54.0	119.3	341.7	H	Average
4872.1	38.8	35.2	74.0	100.9	78.0	V	Peak
4872.1	27.9	26.1	54.0	100.9	78.0	V	Average
4875.6	40.5	33.5	74.0	102.8	37.7	H	Peak
4875.6	28.6	25.4	54.0	102.8	37.7	H	Average
7309.5	43.2	30.8	74.0	110.5	47.1	V	Peak
7309.5	31.1	22.9	54.0	110.5	47.1	V	Average
7311.3	43.1	30.9	74.0	107.9	285.2	H	Peak
7311.3	29.7	24.3	54.0	107.9	285.2	H	Average
Result: Compliance							
Test Mode: IEEE 802.11g				Test Channel: 11(2462MHz)			
4020.7	52.8	21.2	74.0	118.0	356.4	H	Peak
4020.7	30.2	23.8	54.0	118.0	356.4	H	Average
4036.7	55.0	19.0	74.0	116.8	354.0	V	Peak
4036.7	29.0	25.0	54.0	116.8	354.0	V	Average
4922.7	41.1	32.9	74.0	108.2	8.9	H	Peak
4922.7	28.7	25.3	54.0	108.2	8.9	H	Average
4923.6	40.6	33.4	74.0	100.9	350.6	V	Peak
4923.6	27.9	26.1	54.0	100.9	350.6	V	Average
7386.6	43.4	30.6	74.0	102.6	239.4	H	Peak
7386.6	30.9	23.1	54.0	102.6	239.4	H	Average
7388.4	43.4	30.6	74.0	104.9	359.9	V	Peak
7388.4	29.3	24.7	54.0	104.9	359.9	V	Average
Result: Compliance							



Frequency (MHz)	Read Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
Test Mode: IEEE 802.11n HT20				Test Channel: 1(2412MHz)			
4022.6	54.9	19.1	74.0	106.4	358.1	V	Peak
4022.6	32.4	21.6	54.0	106.4	358.1	V	Average
4036.2	51.2	22.8	74.0	106.1	338.4	H	Peak
4036.2	30.3	23.7	54.0	106.1	338.4	H	Average
4825.0	39.7	34.3	74.0	101.2	17.7	H	Peak
4825.0	27.7	26.3	54.0	101.2	17.7	H	Average
4825.9	39.1	34.9	74.0	104.3	355.8	V	Peak
4825.9	27.6	26.4	54.0	104.3	355.8	V	Average
7234.8	42.6	31.4	74.0	100.5	338.4	H	Peak
7234.8	27.8	26.2	54.0	100.5	338.4	H	Average
7235.6	41.6	32.4	74.0	117.4	324.3	V	Peak
7235.6	29.1	24.9	54.0	117.4	324.3	V	Average
Result: Compliance							
Test Mode: IEEE 802.11n HT20				Test Channel: 6(2437MHz)			
3990.2	55.8	18.2	74.0	120.4	358.4	V	Peak
3990.2	31.8	22.2	54.0	120.4	358.4	V	Average
4038.4	51.2	22.8	74.0	103.2	359.8	H	Peak
4038.4	28.0	26.0	54.0	103.2	359.8	H	Average
4872.9	39.0	35.0	74.0	109.3	357.1	V	Peak
4872.9	26.6	27.4	54.0	109.3	357.1	V	Average
4876.2	39.3	34.7	74.0	108.2	20.2	H	Peak
4876.2	27.4	26.6	54.0	108.2	20.2	H	Average
7307.4	43.4	30.6	74.0	105.1	218.6	V	Peak
7307.4	30.8	23.2	54.0	105.1	218.6	V	Average
7309.7	43.7	30.3	74.0	106.7	295.5	H	Peak
7309.7	30.6	23.4	54.0	106.7	295.5	H	Average
Result: Compliance							



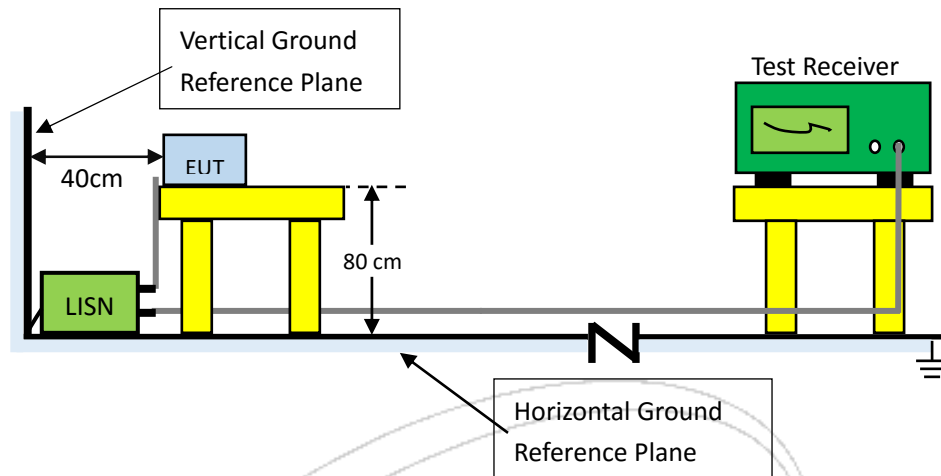
Frequency (MHz)	Read Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
Test Mode: IEEE 802.11n HT20				Test Channel: 11(2462MHz)			
3976.1	55.3	18.7	74.0	122.2	355.2	V	Peak
3976.1	31.4	22.6	54.0	122.2	355.2	V	Average
3995.2	52.1	21.9	74.0	100.1	359.3	H	Peak
3995.2	30.4	23.6	54.0	100.1	359.3	H	Average
4925.1	41.3	32.7	74.0	102.6	359.8	V	Peak
4925.1	29.6	24.4	54.0	102.6	359.8	V	Average
4927.2	42.4	31.6	74.0	103.7	11.6	H	Peak
4927.2	30.1	23.9	54.0	103.7	11.6	H	Average
7384.8	43.3	30.7	74.0	106.9	286.6	V	Peak
7384.8	29.8	24.2	54.0	106.9	286.6	V	Average
7387.9	44.0	30.0	74.0	108.8	201.4	H	Peak
7387.9	30.2	23.8	54.0	108.8	201.4	H	Average
Result: Compliance							
Test Mode: IEEE 802.11n HT40				Test Channel: 3(2422MHz)			
3991.8	55.0	19.0	74.0	113.1	356.8	V	Peak
3991.8	33.2	20.8	54.0	113.1	356.8	V	Average
4015.8	50.4	23.6	74.0	109.2	338.2	H	Peak
4015.8	30.7	23.3	54.0	109.2	338.2	H	Average
4843.2	39.7	34.3	74.0	112.5	270.9	H	Peak
4843.2	28.5	25.5	54.0	112.5	270.9	H	Average
4845.4	41.1	32.9	74.0	109.1	65.4	V	Peak
4845.4	28.6	25.4	54.0	109.1	65.4	V	Average
7266.2	43.4	30.6	74.0	105.1	19.8	H	Peak
7266.2	28.6	25.4	54.0	105.1	19.8	H	Average
7268.7	42.6	31.4	74.0	107.9	114.9	V	Peak
7268.7	29.3	24.7	54.0	107.9	114.9	V	Average
Result: Compliance							

Frequency (MHz)	Read Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Ant pos (cm)	Table Pos (deg)	Antenna Polarity [H/V]	remark
Test Mode: IEEE 802.11n HT40				Test Channel: 6(2437MHz)			
3985.2	49.7	24.3	74.0	120.4	358.4	V	Peak
3985.2	30.9	23.1	54.0	120.4	358.4	V	Average
4039.6	55.4	18.6	74.0	112.3	356.1	H	Peak
4039.6	35.2	18.8	54.0	112.3	356.1	H	Average
4872.8	41.1	32.9	74.0	103.6	356.1	V	Peak
4872.8	28.3	25.7	54.0	103.6	356.1	V	Average
4874.9	39.6	34.4	74.0	106.2	306.6	H	Peak
4874.9	27.7	26.3	54.0	106.2	306.6	H	Average
7314.4	43.6	30.4	74.0	110.9	330.7	V	Peak
7314.4	30.1	23.9	54.0	110.9	330.7	V	Average
7317.4	43.2	30.8	74.0	109.3	276.0	H	Peak
7317.4	30.3	23.7	54.0	109.3	276.0	H	Average
Result: Compliance							
Test Mode: IEEE 802.11n HT40				Test Channel: 9(2452MHz)			
3988.6	51.3	22.7	74.0	110.3	337.8	H	Peak
3988.6	29.2	24.8	54.0	110.3	337.8	H	Average
4012.4	54.8	19.2	74.0	106.2	356.5	V	Peak
4012.4	34.1	19.9	54.0	106.2	356.5	V	Average
4903.6	38.5	35.5	74.0	100.9	183.5	H	Peak
4903.6	27.3	26.7	54.0	100.9	183.5	H	Average
4905.9	39.5	34.5	74.0	101.7	309.9	V	Peak
4905.9	27.1	26.9	54.0	101.7	309.9	V	Average
7355.2	43.4	30.6	74.0	103.6	325.6	H	Peak
7355.2	28.9	25.1	54.0	103.6	325.6	H	Average
7358.9	43.2	30.8	74.0	106.7	95.7	V	Peak
7358.9	29.1	24.9	54.0	106.7	95.7	V	Average
Result: Compliance							



4.9 AC Conducted Emission Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) was not recorded.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

Note: * means decreasing linearly with the logarithm of the frequency

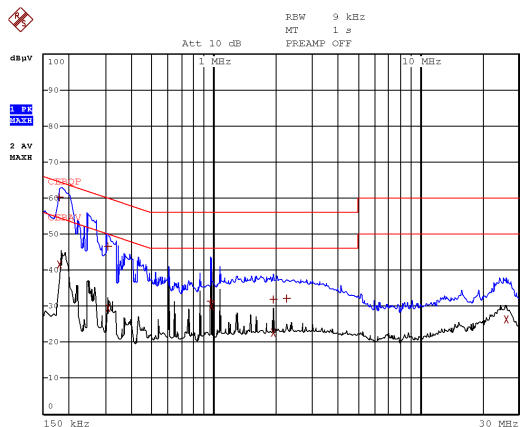


TEST RESULT

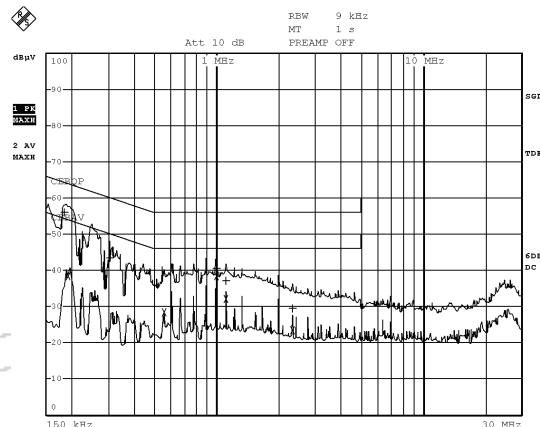
AC Conducted Emission Measurement

AC 120V/60Hz

Line



Neutral



Phase	Quasi-Peak			Average		
	Frequency (MHz)	Limits (dBμV)	Result (dBμV)	Frequency (MHz)	Limits (dBμV)	Result (dBμV)
Line	0.182	64.4	60.3	0.182	54.4	41.7
	0.306	60.1	46.5	0.306	50.1	46.5
	2.258	56.0	32.1	0.970	46.0	30.1
	Result: Compliance					
Neutral	0.186	64.2	56.1	0.194	53.9	38.6
	0.302	60.2	43.4	0.994	46.0	38.5
	0.994	56.0	40.4	1.106	46.0	32.2
	Result: Compliance					

Note: The adapter was connected to both AC 120V/60Hz and AC 240V/60Hz power source and the worst case result (AC 120V/60Hz) was recorded in this report.

4.10 Maximum Permissible Exposure(MPE)

LIMIT

According to subpart 15.247(i)and subpart§1.1310,system operating under the provisions if this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure(MPE)(§1.1310, §2.1093)

(B)Limits for General Population/uncontrolled Exposure				
Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm ²)	Averaging Time(minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

F=frequency in MHz;*=Plane-wave equivalent power density

According to §1.1310, §2.1093 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S=PG/4\pi R^2$ =power density (in appropriate units, e.g. mW/cm²) ;

P=power input to the antenna(in appropriate units, e.g., mW);

G=power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna(appropriate units, e.g., cm)

TEST RESULT

Mode	Frequency band (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		dBi	numeric	dBm	mW			
802.11 b	2412-2462	2.70	1.862	18.0	63.10	20	0.0234	1
802.11 g	2412-2462	2.70	1.862	15.0	31.62	20	0.0117	1
802.11n HT20	2412-2462	2.70	1.862	14.0	25.12	20	0.0093	1
802.11n HT40	2422-2452	2.70	1.862	14.0	25.12	20	0.0093	1
Result: Compliance								

Note:

The target power(Average): 802.11b:17dB±1dBm
802.11g:14dB±1dBm
802.11n:13dB±1dBm

which declared by the Manufacturer.

