TEST REPORT

Applicant:	ChamSys Ltd
Address of Applicant:	Unit 3B Richmond Works, Pitt Road, Freemantle, Southampton, SO15 3FQ United Kingdom
Manufacturer:	ChamSys Ltd
Address of Manufacturer:	Unit 3B Richmond Works, Pitt Road, Freemantle, Southampton, SO15 3FQ United Kingdom
Product name:	QuickQ Consoles, MagicQ Consoles
Model(s):	QuickQ Rack, MagicQ Consoles
Rating(s):	100-240V AC, 50/60Hz
Trademark:	CHAMSYS
Standards:	47 CFR PART 15 Subpart C section 15.247
FCC ID:	2AQWR-QUICKQR
Data of Receipt:	2024-02-19
Date of Test:	2024-02-19~2024-05-15
Date of Issue:	2024-05-15
Test Result	**Pass***

* In the configuration tested, the test item complied with the standards specified above.

Authorized for issue by:

Test by:

May.15,2024 Eleven Liang

Project Engineer

Date *Name/Position* *Signature*

Reviewed by:

May.15,2024 Bob Dai

Project Manager

Date *Name/Position* *Signature*

Testing Laboratory information:

Testing Laboratory Name	:	ITL Co., Ltd
Address	:	No. 8 Jinqianling Street 5, Huangjiang Town, Dongguan, Guangdong, 523757 P.R.C.
Testing location	:	Same as above
Tel	:	0086-769-39001678
Fax	:	0086-20-62824387
E-mail	:	itl@i-testlab.com

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 remarks:

The test results presented in this report relate only to the object tested.
The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

General product information:

The model QuickQ Rack, MagicQ Rack is identical to each other except for model names and appearance color.

All tests were performed on the model QuickQ Rack as representative.

Compared with the original product, the new Rack has the following changes:

The product may use three power supplies, their models are MW, XP, MORNSUN, and these three power supplies are not used together, but separately.

Model	Product Description	Differences	Power supply
QuickQ Rack	QuickQ Consoles	Black shell	MW, XP ,MORUNSUN
MagicQ Rack	MagicQ Consoles	Blue shell	MW, XP ,MORUNSUN

The transmitter module itself has not changed. Here are the changes:

Modified the front panel PCB (313-131) to include a power button for the product.

The front of the unit is now an aluminum extruded part, (301-247) change from a steel plate.

External metalwork updated to accommodate the new front extrusion, no change to material or material thickness.

Antenna connector changed due to FCC request.

All cosmetic aluminum extruded parts have been removed.

MagicQ Rack is mechanically and electrically identical to the QuickQ Rack. There is a cosmetic change to the front panel with it being painted blue and screen printed differently.

This application is comply with C2PC, based on original report No.D190807002-1, adding three power supplies model XP, MW, MORUNSUN and its corresponding conducted emission, radiated emissions test results. The rest of the test results are still referring to the original report.

1 Test Summary

Test	Test Requirement	Test method	Result
Antenna Requirement	FCC PART 15 C section 15.247 (c) and Section 15.203	FCC PART 15 C section 15.247 (c) and Section 15.203	PASS
Occupied Bandwidth	FCC PART 15 C section 15.247 (a)(2)	ANSI C63.10:2013	PASS
Maximum Peak Output Power	FCC PART 15 C section 15.247(b)(3)	ANSI C63.10: 2013	PASS
Peak Power Spectral Density	FCC PART 15 C section 15.247(e)	ANSI C63.10:2013	PASS
Conducted Spurious Emission (30MHz to 25GHz)	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10:2013	PASS
Radiated Spurious Emission (30 MHz to 25 GHz)	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10:2013	PASS
Band Edges Measurement	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10:2013	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207	ANSI C63.10:2013	PASS
Radiated Emissions which fall in the restricted bands	FCC PART 15 C section 15.209	ANSI C63.10:2013	PASS

Version

The original Test Report Ref. No. D190807002-1, dated Sept. 02, 2019 was modified on May.08, 2024 to include the following changes and/or additions, which were considered technical modifications:

Considering Remark in this report D240219001-1

Revision Record		
Version	**Date**	**Remark**
D190807002-1	2019-09-02	Original report
D240219001-1	2024-05-08	Add new machine model MagicQ Rack, three power supply model MW, MORNSUN, XP and their Radiated Emissions, Conducted Emissions Test Results.

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3 General Information

3.1 Client Information

Applicant: ChamSys Ltd

Address of Applicant: Unit 3B Richmond Works, Pitt Road, Freemantle, Southampton, SO15 3FQ United Kingdom

3.2 General Description of E.U.T.

Name: QuickQ Consoles

Model No.: QuickQ Rack

Trade Mark: CHAMSYS

Operating Frequency: 802.11 b/g/n(HT20): 2412MHz-2462MHz; 802.11 n(HT40): 2422MHz-2452MHz

Channels:

802.11b, 802.11g, 802.11n(20MHz): 11

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

802.11n(40MHz): 7

Working Frequency of Each Channel:			
channel	Frequency	channel	Frequency
3	2422		
4	2427		
5	2432		
6	2437		
7	2442		
8	2447		
9	2452		

Type of Modulation CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM

Antenna Type: SMA-reverse antenna with 3dBi peak Gain

Function: QuickQ Consoles

3.3 Details of E.U.T.

EUT Power Supply: 120Vac, 60Hz

Test mode: The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz,
TM2	802.11g	2412MHz, 2437MHz, 2462MHz,
TM3	802.11n(20MHz)	2412MHz, 2437MHz, 2462MHz,
TM4	802.11n(40MHz)	2422MHz, 2437MHz, 2452MHz,

Power cord: /

3.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

3.5 Test Location

All tests were performed at:

ITL Co., Ltd
No. 8 Jinqianling Street 5, Huangjiang Town, Dongguan, Guangdong, 523757 P.R.C.
0086-769-39001678
itl@i-testlab.com

No tests were sub-contracted.

3.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

3.7 Abnormalities from Standard Conditions

None.

3.8 Other Information Requested by the Customer

None.

3.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS Lab code:L9342**
- **FCC Designation No.:CN5035**
- **IC Registration NO.: 12593A**
- **NVLAP LAB CODE: 600199-0**

3.10 Measurement Uncertainty

The below measurement uncertainties given below are based on a 95% confidence level (base on a coverage factor (k=2).)

Parameter	Uncertainty
Radio frequency	2.25%
total RF power, conducted	±1.34 dB
RF power density , conducted	±1.49 dB
All emissions, radiated	±2.72 dB
Temperature	±5.02 dB
Humidity	±0.8°C
DC and low frequency voltages	±1.5 %

4 Instruments Used during Test

No.	Test Equipment	Manufacturer	Model	Serial No.	Cal Data	Due Date
DGITL- 301	Semi-Anechoic chamber	ETS•Lindgren	9*6*6	CT000874-1181	2023.08.02	2026.08.02
DGITL- 307	EMI test receiver	SCHWARZBECK	ESVS10	833616/003	2024.03.15	2025.03.15
DGITL-376	Wideband Radio Communication Tester	SCHWARZBECK	CMW500	LR114195	2024.03.15	2025.03.15
DGITL-349a	Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	259268	2024.03.15	2025.03.15
DGITL- 306	Spectrum Analyzer	Agilent Technologies	N9010A	MY54200334	2024.03.15	2025.03.15
DGITL- 352	Pre Amplifier	MInl-CIrcuits	ZFC-1000HX	SN292801110	2024.03.15	2025.03.15
DGITL-375	Spectrum Analyzer	SCHWARZBECK	FSV40-N	6625-01-588-5515	2024.03.15	2025.03.15
DGITL-309	Horn Antenna	ETS Lindgren	3117	SN00152265	2023.05.14	2025.05.14
DGITL-308	Bilog Antenna	ETS· Lindgren	3142E	156975	2023.05.14	2025.05.14
DGITL-350	Wideband Amplifier Super Ultra	MInl-CIrcuits	ZVA-183X-S+	SN986401426	2024.03.15	2025.03.15
DGITL-371	Pre Amplifier	teramicrowave	TALA-0040G35	18081001	2024.03.15	2025.03.15

5 Test Results

5.1 E.U.T. test conditions

Test Voltage: 120Vac, 60Hz

Temperature: 23.2 -25.0 °C

Humidity: 38-50 % RH

Atmospheric Pressure: 1000 -1010 mbar

Requirements:

15.31(e): For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

15.32: Power supplies and CPU boards used with personal computers and for which separate authorizations are required to be obtained shall be tested as follows: Testing shall be in accordance with the procedures specified in Section 15.31 of this part.

Test frequencies and frequency range:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which	Number of	Location in frequency range
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz,
At or above 10 GHz to below	5th harmonic of highest fundamental frequency or to 100 GHz,
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz,

EUT channels and frequencies list:

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

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz,
TM2	802.11g	2412MHz, 2437MHz, 2462MHz,
TM3	802.11n(20MHz)	2412MHz, 2437MHz, 2462MHz,
TM4	802.11n(40MHz)	2422MHz, 2437MHz, 2452MHz,

5.2 Antenna requirement

Standard requirement

15.203 requirement:

For intentional device. According to 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.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna

The antenna is a SMA-reverse antenna and no consideration of replacement. The best case gain of the antenna is 3dBi.

Test result: The unit does meet the FCC requirements.

5.3 Occupied Bandwidth

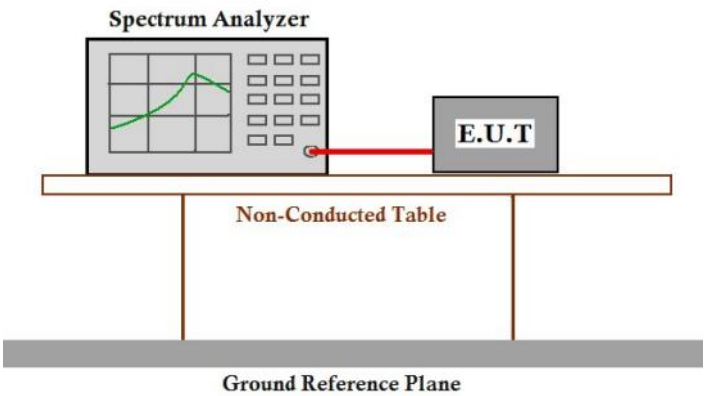
Test Requirement: FCC Part 15 C section 15.247

(a)(2)Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Method: ANSI C63.10:2013

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

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (Cable loss =0.5dB) from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW=100kHz. VBW = 300kHz, Sweep = auto; Detector Function = Peak. Trace = Max Hold, Set span to encompass the entire emission bandwidth of the signal.
3. Mark the peak power frequency and -6dB (upper and lower) power frequency.
4. Repeat until all the test status is investigated.
5. Report the worst case.

Test result (6 dB bandwidth)

Test Mode	Test Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
802.11b	2412	9.340	≥500	Pass
	2437	9.887	≥500	Pass
	2462	10.49	≥500	Pass
802.11g	2412	16.53	≥500	Pass
	2437	16.51	≥500	Pass
	2462	16.51	≥500	Pass
802.11n(HT20)	2412	17.76	≥500	Pass
	2437	17.76	≥500	Pass
	2462	17.72	≥500	Pass
802.11n(HT40)	2422	36.11	≥500	Pass
	2437	36.36	≥500	Pass
	2452	36.06	≥500	Pass

The unit does meet the FCC requirements.

6dB bandwidth:

Result plot as follows:

802.11b

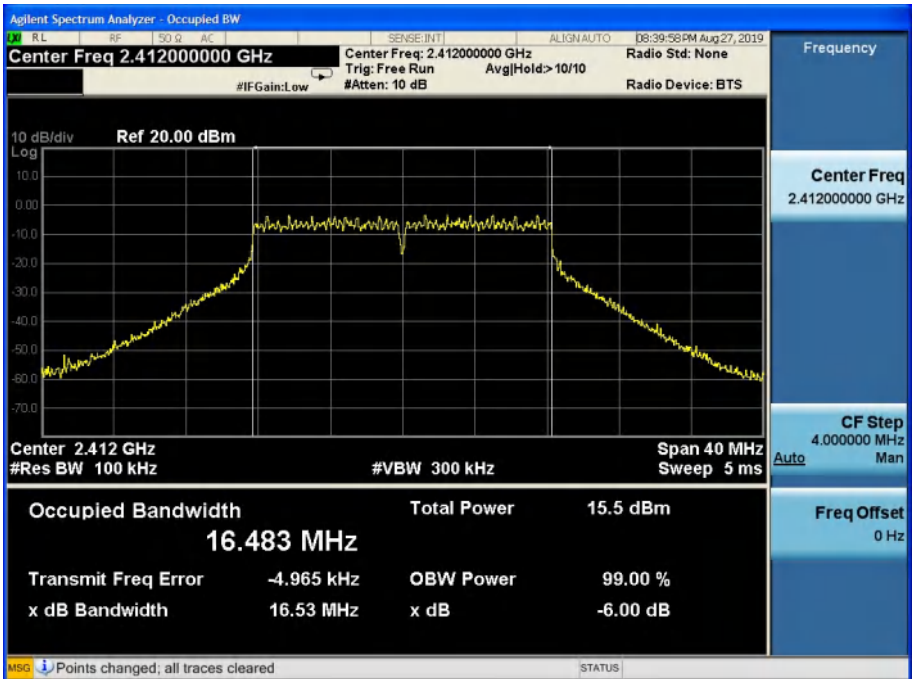
Channel 1:2.412GHz:

Channel 6:2.437GHz:

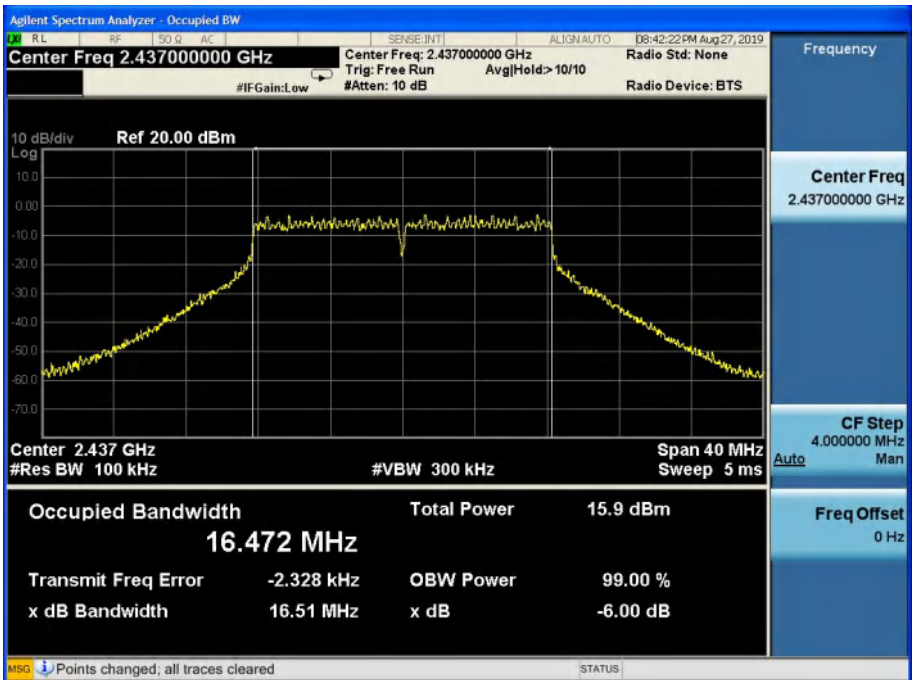
Channel 11:2.462GHz:

802.11g

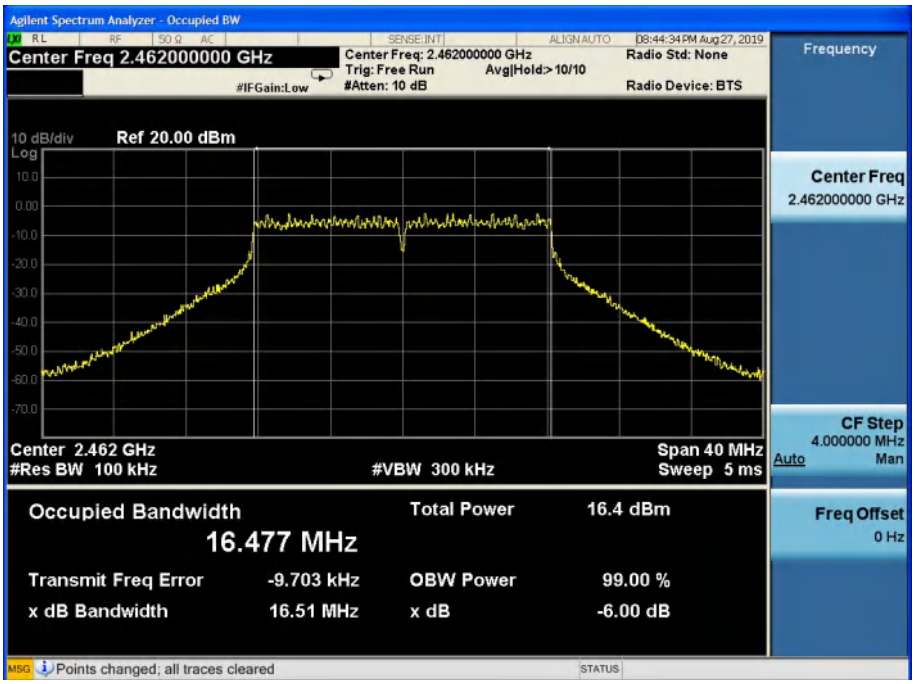
Channel 1:2.412GHz:



Channel 6:2.437GHz:

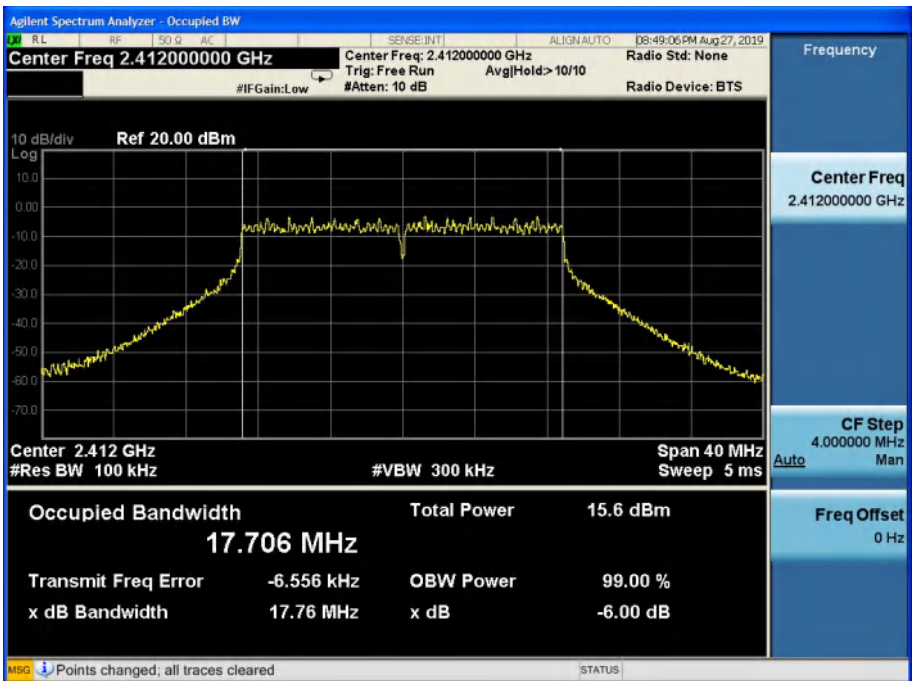


Channel 11:2.462GHz:

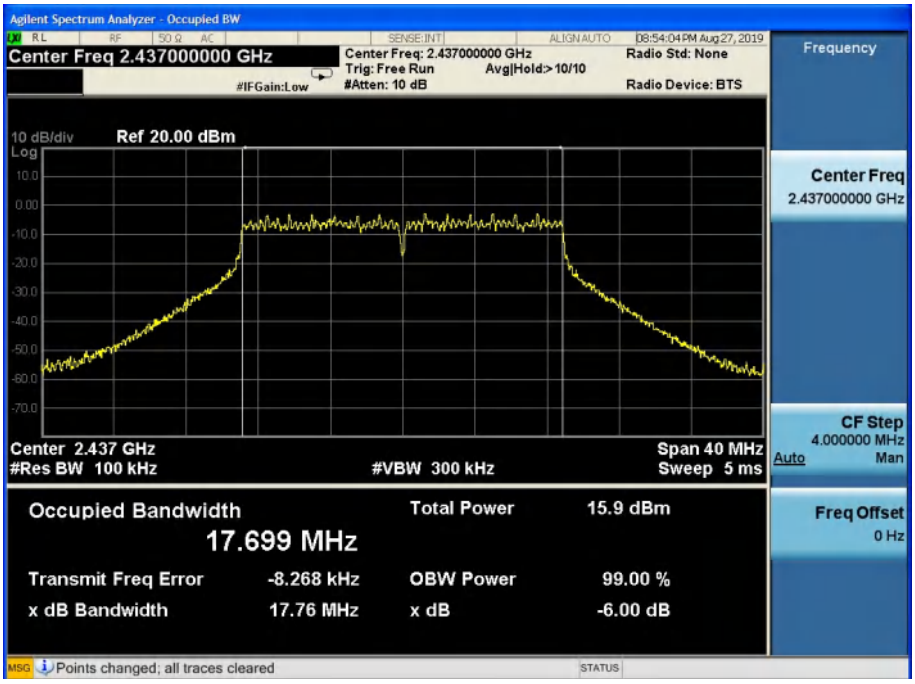


802.11n(HT20)

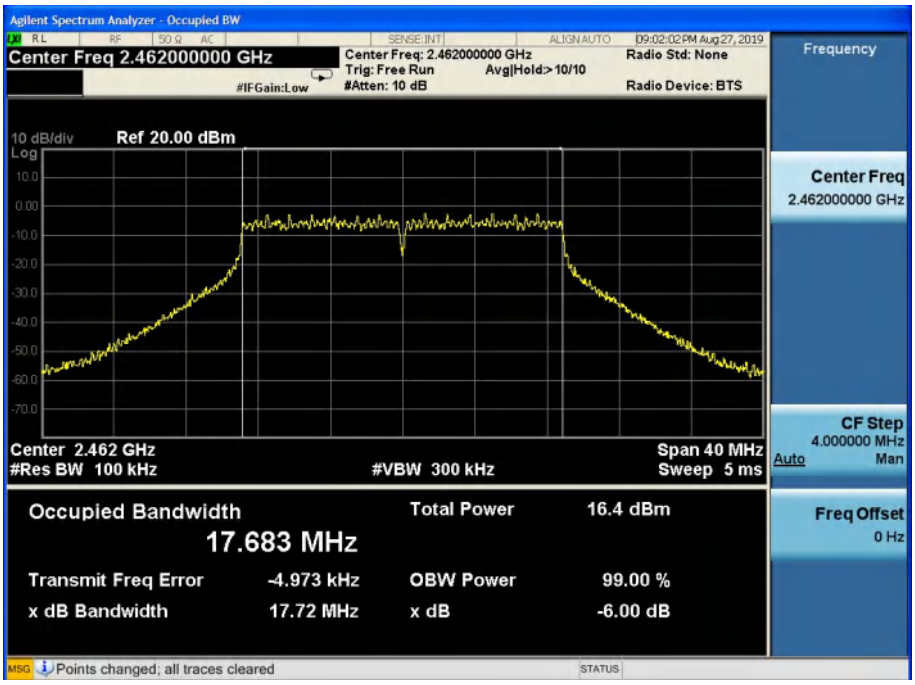
Channel 1:2.412GHz:



Channel 6:2.437GHz:

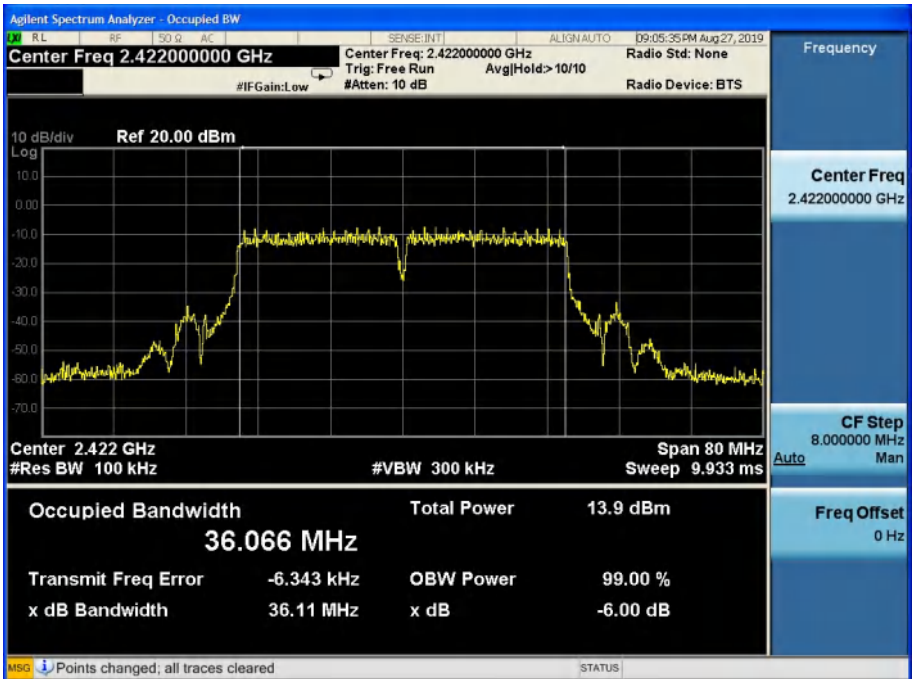


Channel 11:2.462GHz:

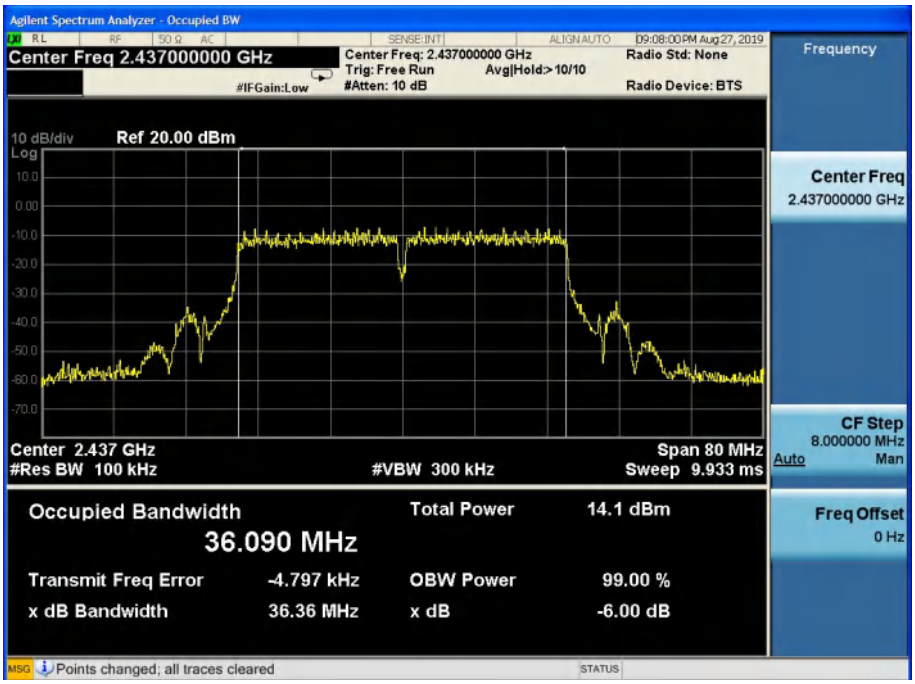


802.11n(HT40)

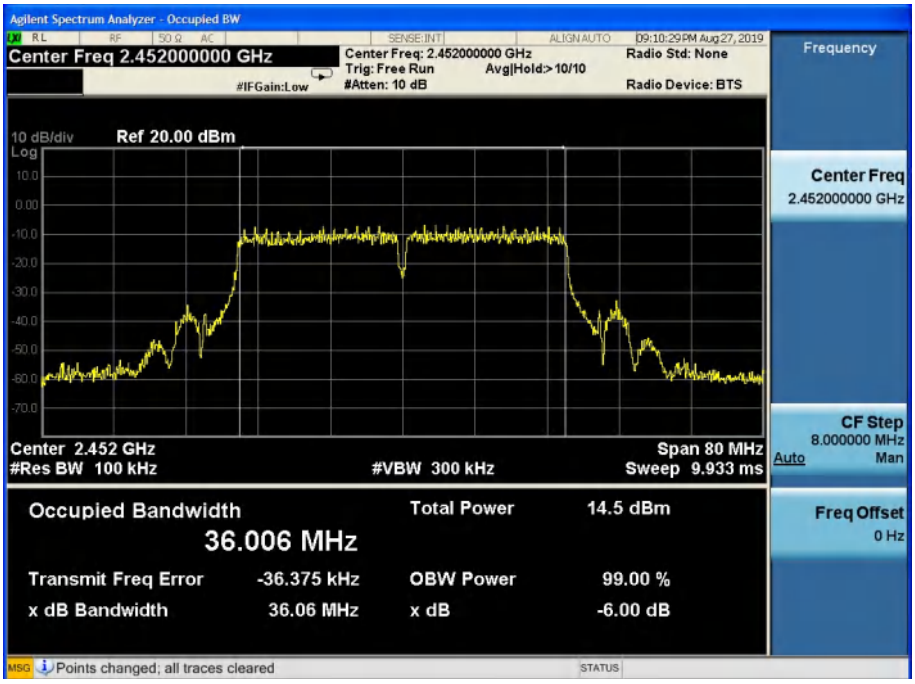
Channel 3:2.422GHz:



Channel 6:2.437GHz:



Channel 9:2.452GHz:



5.4 Maximum Peak Output Power

Test Requirement: FCC Part 15 C section 15.247

(b)(3) For systems using digital modulation in the 902-928 MHz,

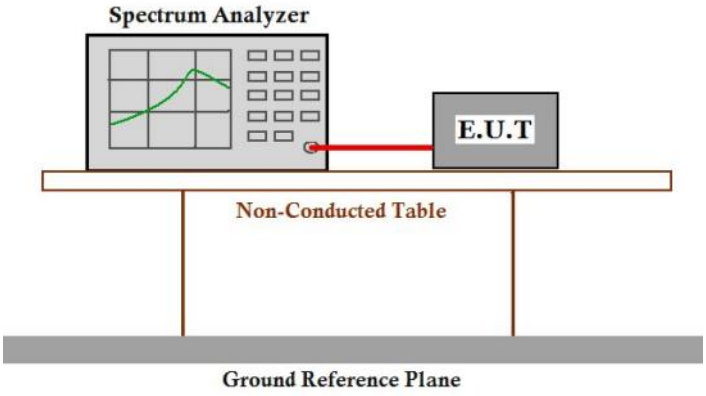
2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b) (1), (b) (2), and (b) (3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Method: ANSI C63.10:2013

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

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (Cable loss =0.5dB) from the antenna port to the spectrum.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1 % to 5% of OBW, not to exceed 1 MHz
4. Set VBW ≥ 3 x RBW.
5. Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. If transmit duty cycle < 98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle ≥ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
8. Trace average 100 traces in power averaging mode.

9. 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, sum the spectrum levels (in power
units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

10. Repeat until all the test status is investigated.

11. Report the worst case.

Test Data:

Test mode	Test Channel	Test Result (dBm)	Limit (dBm)
802.11b	2412	17.29	30
	2437	17.95	30
	2462	18.16	30
802.11g	2412	15.79	30
	2437	16.22	30
	2462	16.82	30
802.11n(HT20)	2412	15.85	30
	2437	16.20	30
	2462	16.77	30
802.11n(HT40)	2422	14.85	30
	2437	15.04	30
	2452	15.51	30

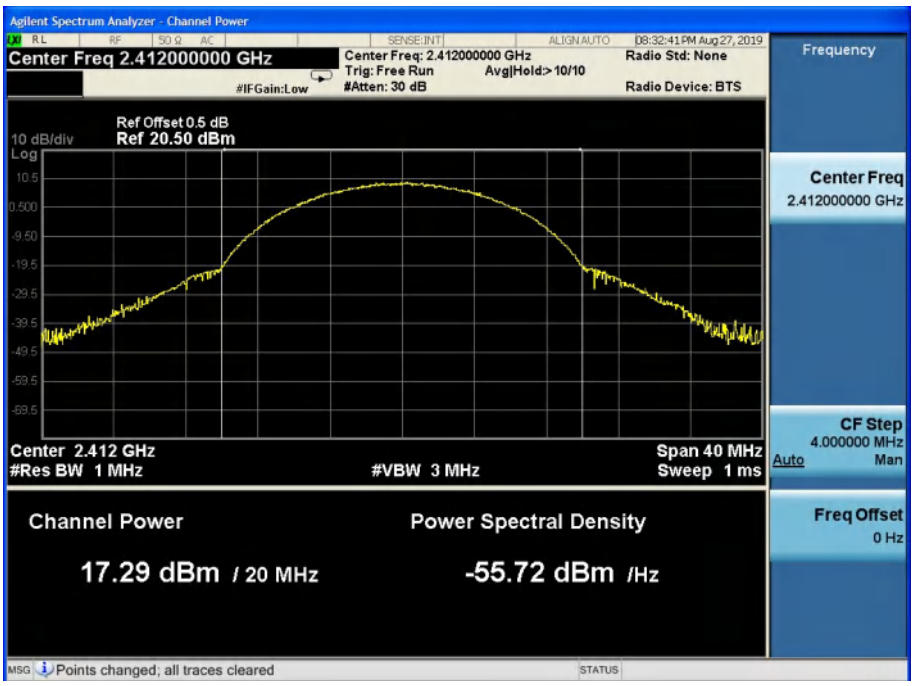
Remark: 1) Cable loss=0.5dB

The unit does meet the FCC requirements.

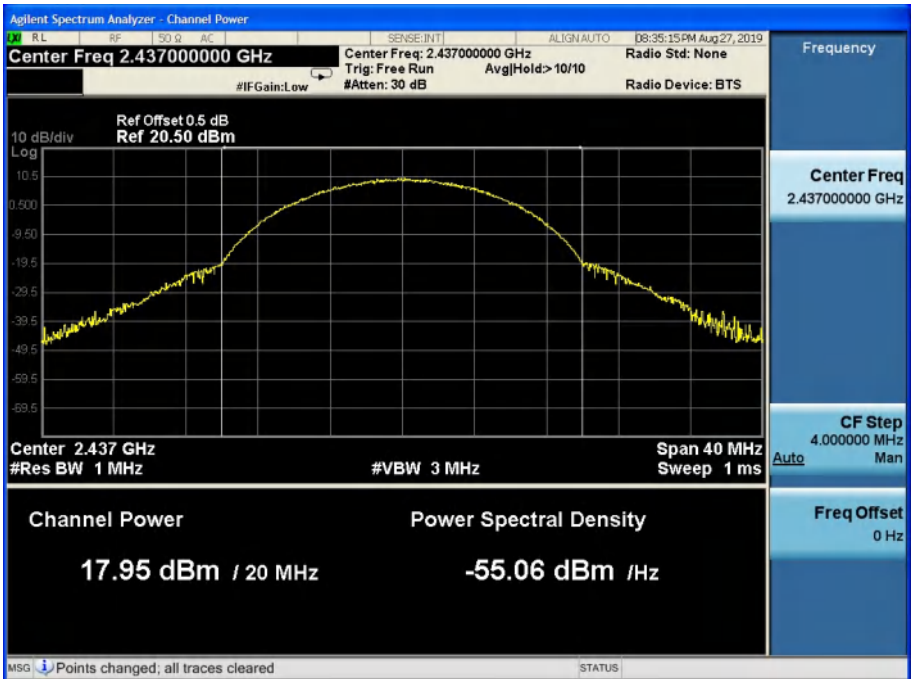
Result plot as follows:

802.11b

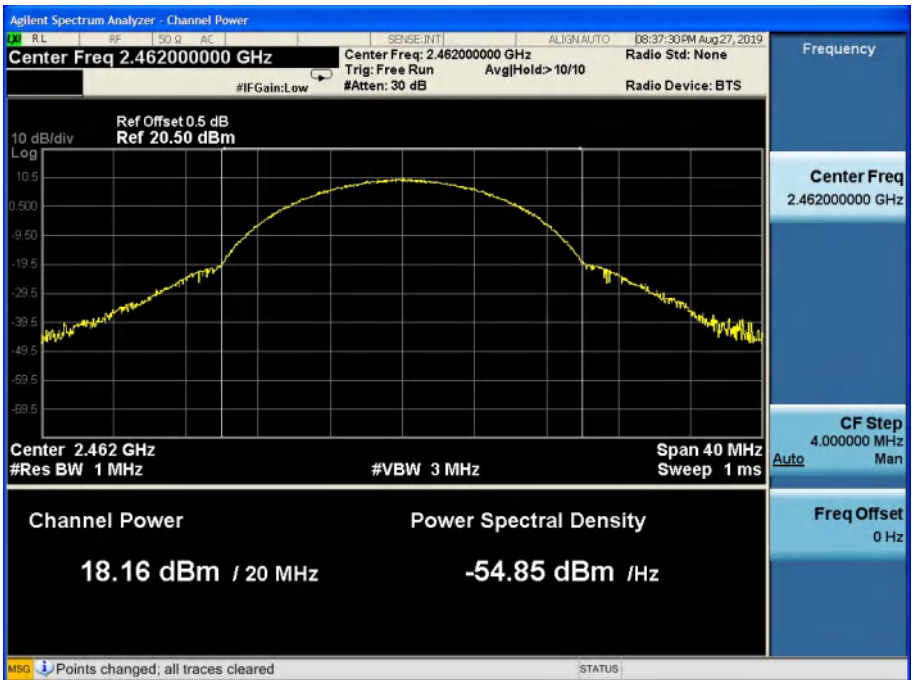
Channel 1:2.412GHz:



Channel 6:2.437GHz:



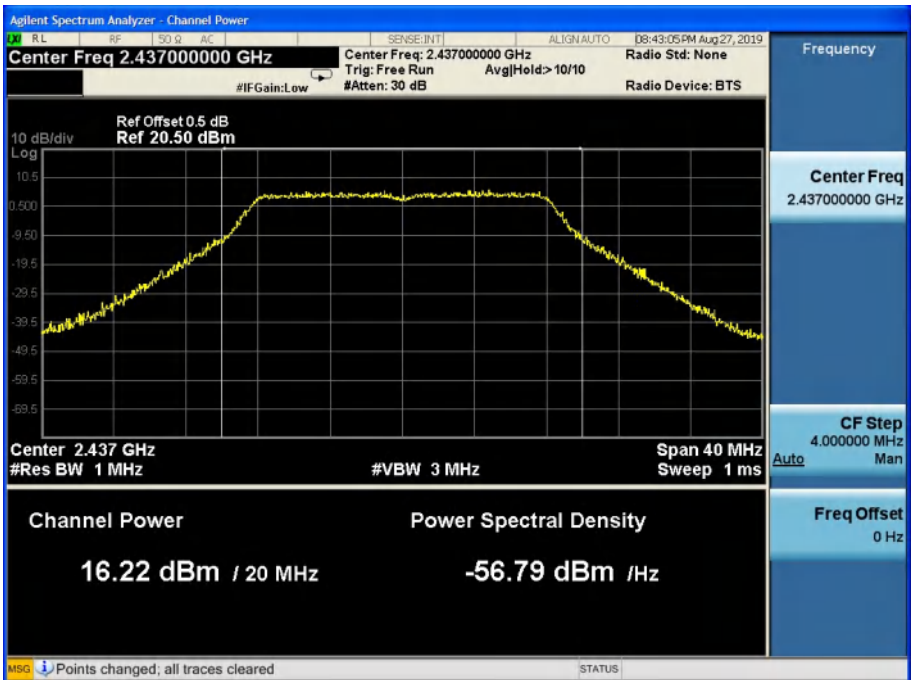
Channel 11:2.462GHz:



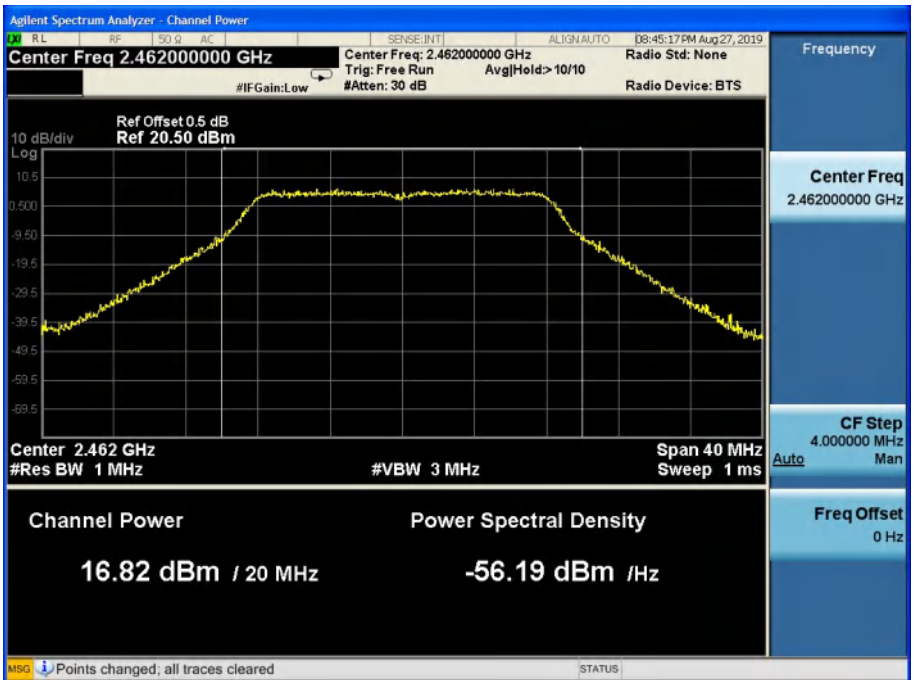
802.11g

Channel 1:2.412GHz:

Channel 6:2.437GHz:

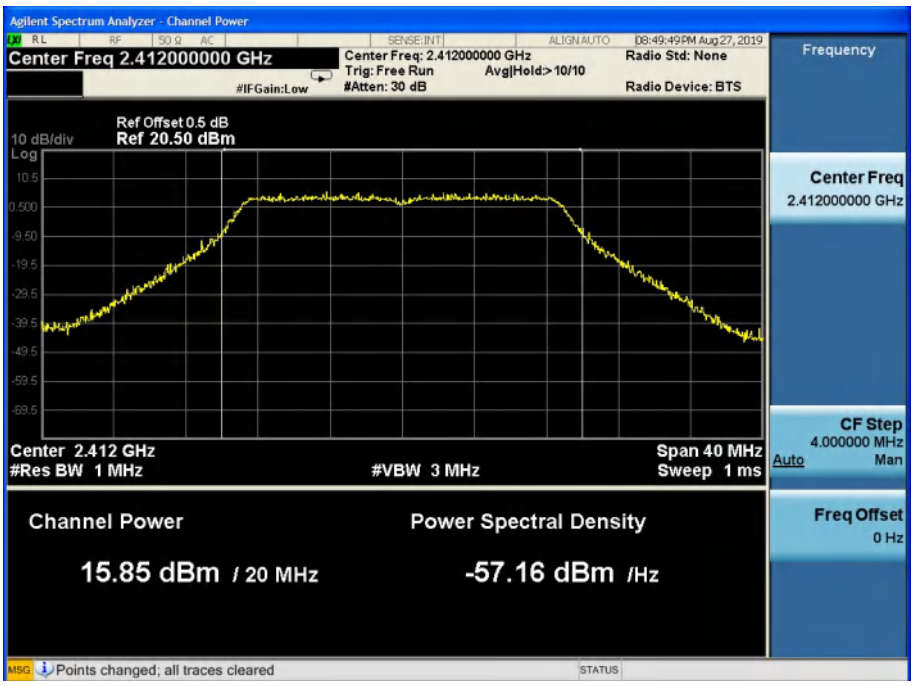


Channel 11:2.462GHz:

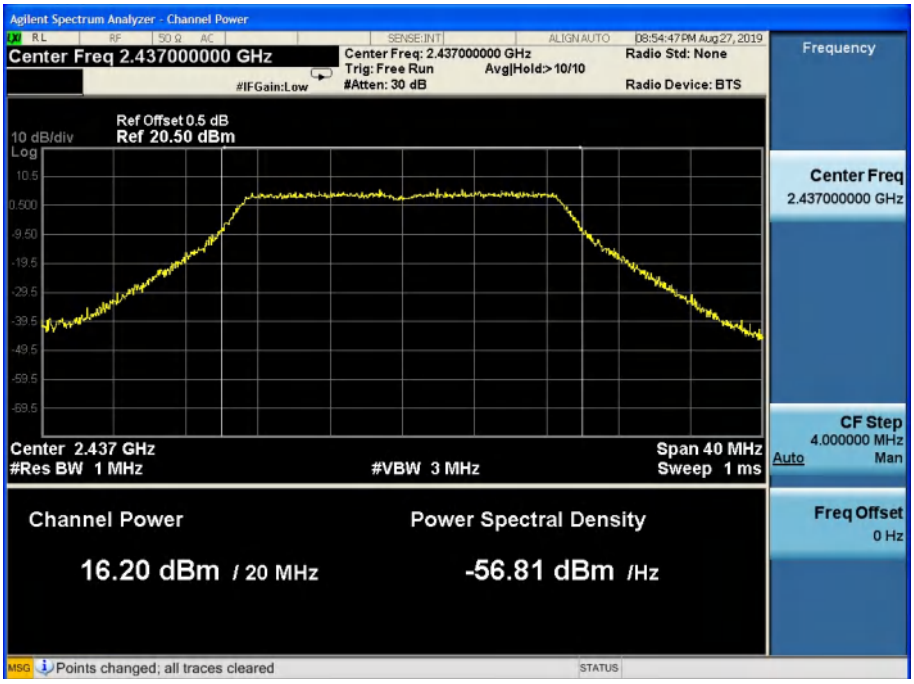


802.11n(HT20)

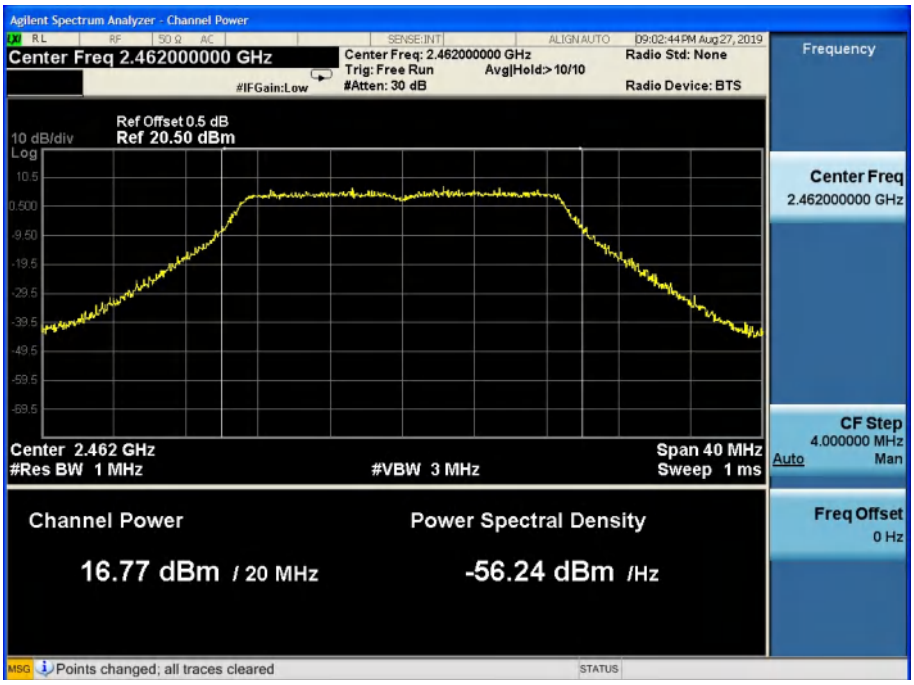
Channel 1:2.412GHz:



Channel 6:2.437GHz:

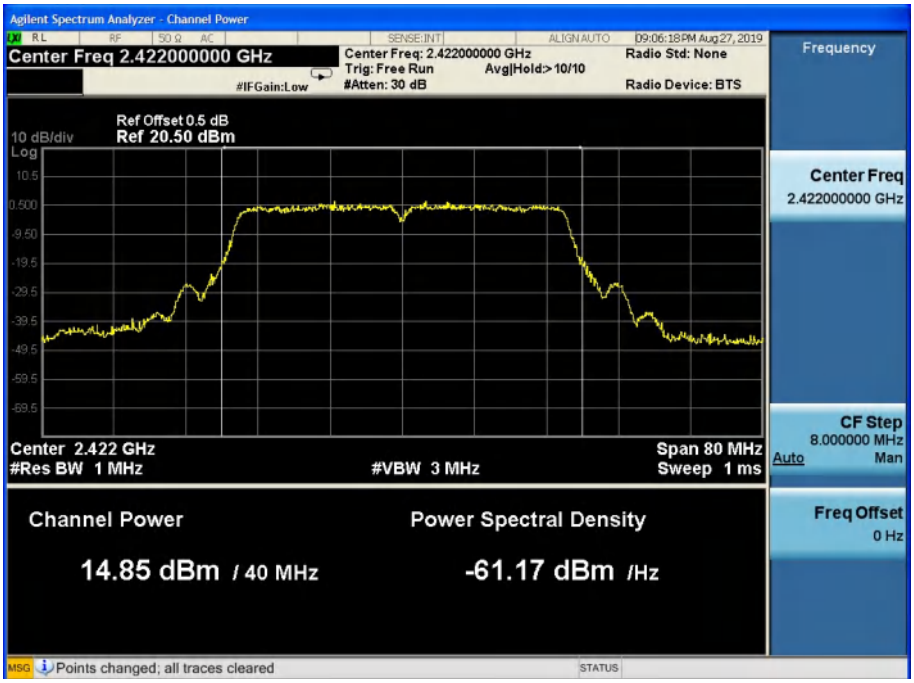


Channel 11:2.462GHz:

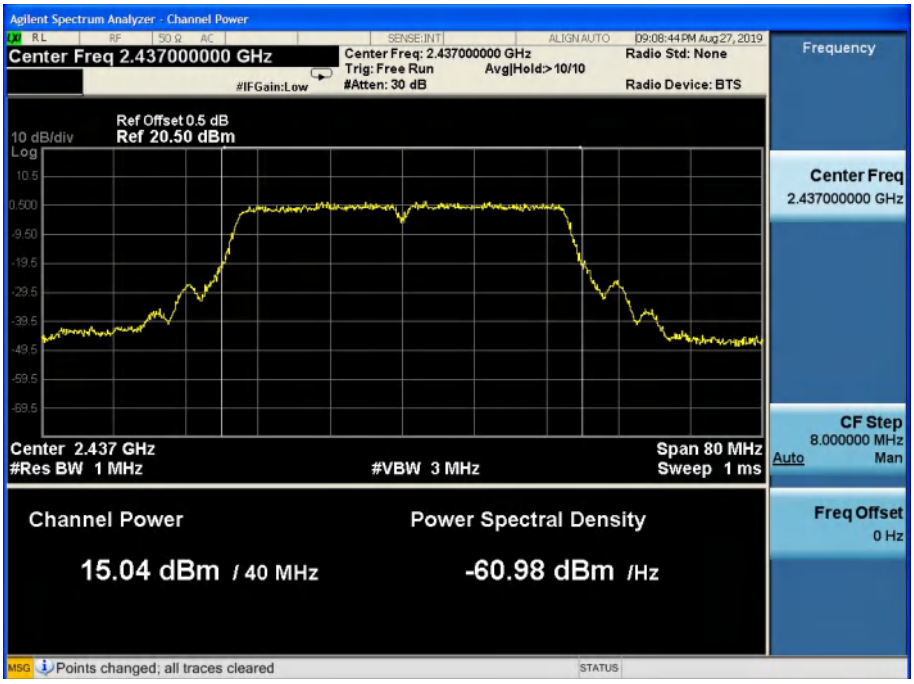


802.11n(HT40)

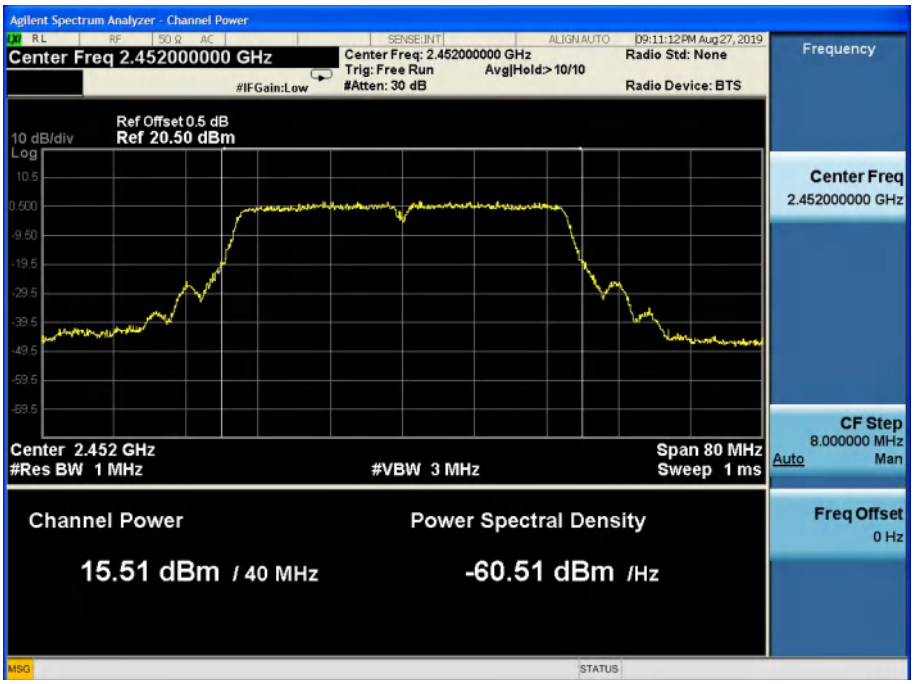
Channel 3:2.422GHz:



Channel 6:2.437GHz:



Channel 9:2.452GHz:



5.5 Peak Power Spectral Density

Test Requirement: FCC Part 15 C section 15.247

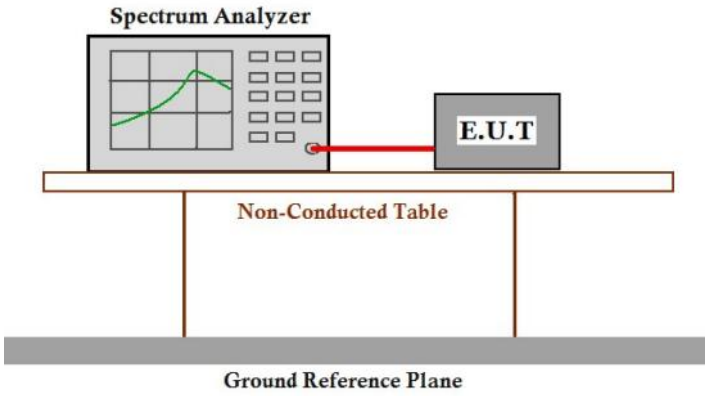
(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Method: ANSI C63.10:2013

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

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (Cable loss =0.5 dB) from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer:

   a) Set instrument centre frequency to DTS channel centre frequency.

   b) Set the instrument span to 1.5 times the OBW.

   c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.

   d) Set the VBW ≥ [3 × RBW].

   e) Detector = power average (rms).

   f) Ensure that the number of measurement points in the sweep ≥ 2 × span / RBW.

   g) Manually set the sweep time to: ≥ [10 × (number of measurement points in sweep) × (transmission symbol period)], but no less than the auto sweep time.

   NOTE—The transmission symbol period (in seconds) is the reciprocal of the symbol rate (in baud or symbols per second). Note that each symbol can represent one or several data bits, and thus, the symbol rate should not be confused with the gross bit rate (expressed in bits/second). In no case should the sweep time be set less than the auto sweep time.

   h) Perform the measurement over a single sweep.

   i) Use the peak marker function to determine the maximum amplitude level.

   j) If 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. Repeat until all the test status is investigated.
4. Report the worst case.

Test result:

Test mode	Test Channel	Test Result (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-19.38	8
	2437	-19.00	
	2462	-18.37	
802.11g	2412	-23.63	
	2437	-23.89	
	2462	-22.96	
802.11n(HT20)	2412	-24.04	
	2437	-23.79	
	2462	-22.41	
802.11n(HT40)	2422	-27.01	
	2437	-28.28	
	2452	-27.45	

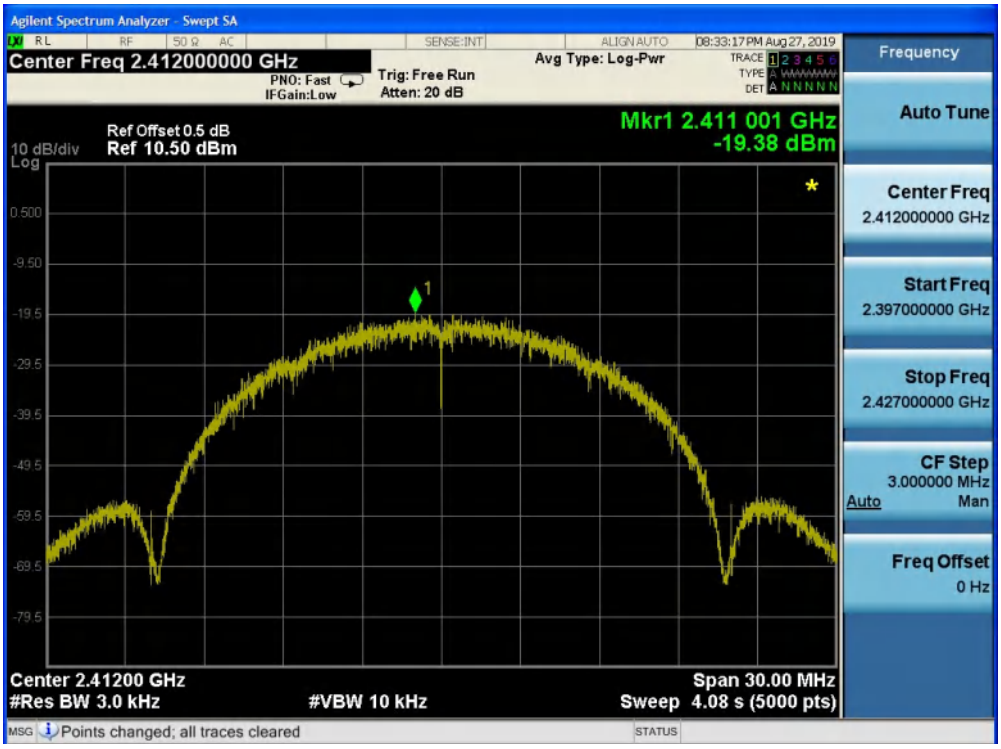
Remark: 1) Output Peak Power=Reading Peak Power+Cable loss
2) Cable loss=0.5dB

The unit does meet the FCC requirements.

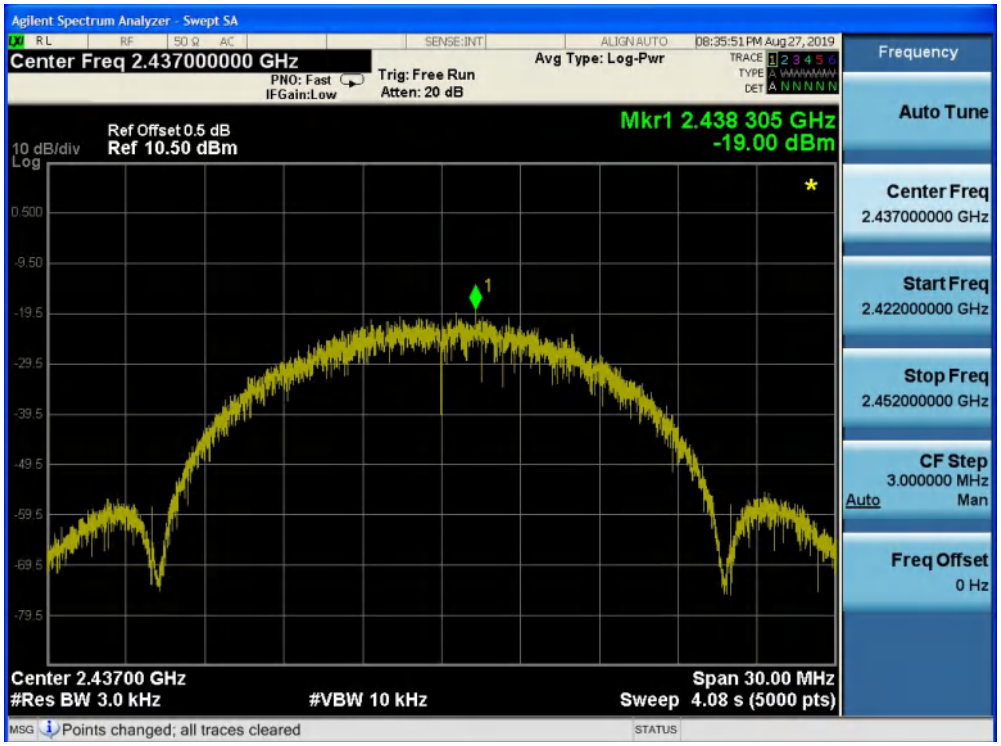
Result plot as follows:

802.11b

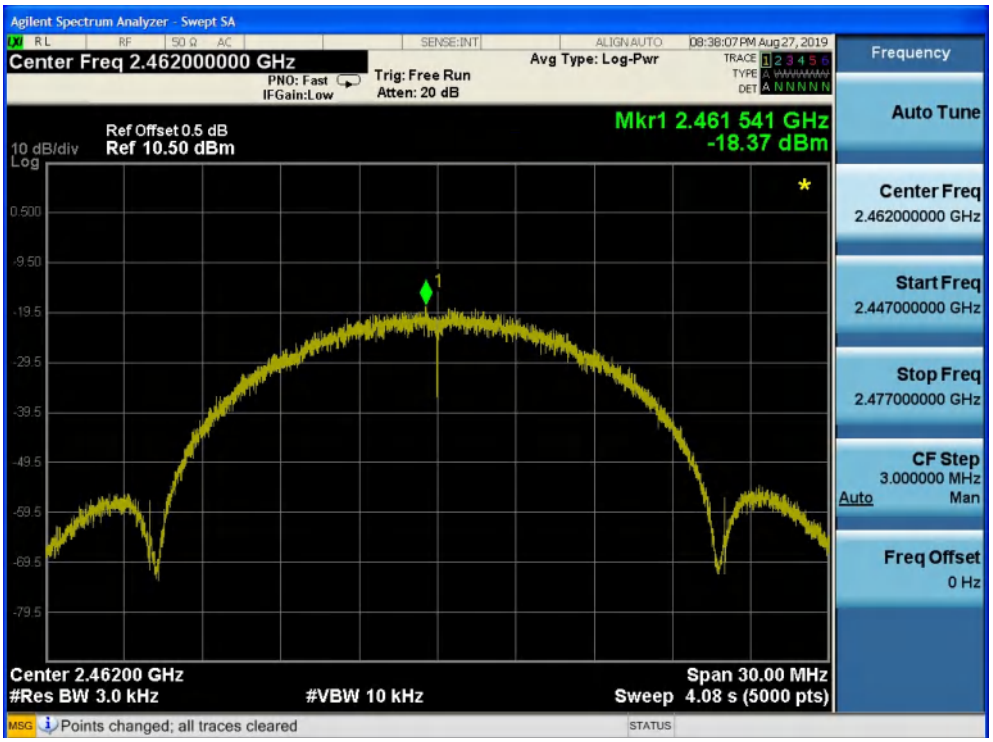
Channel 1:2.412 GHz:



Channel 6: 2.437GHz:

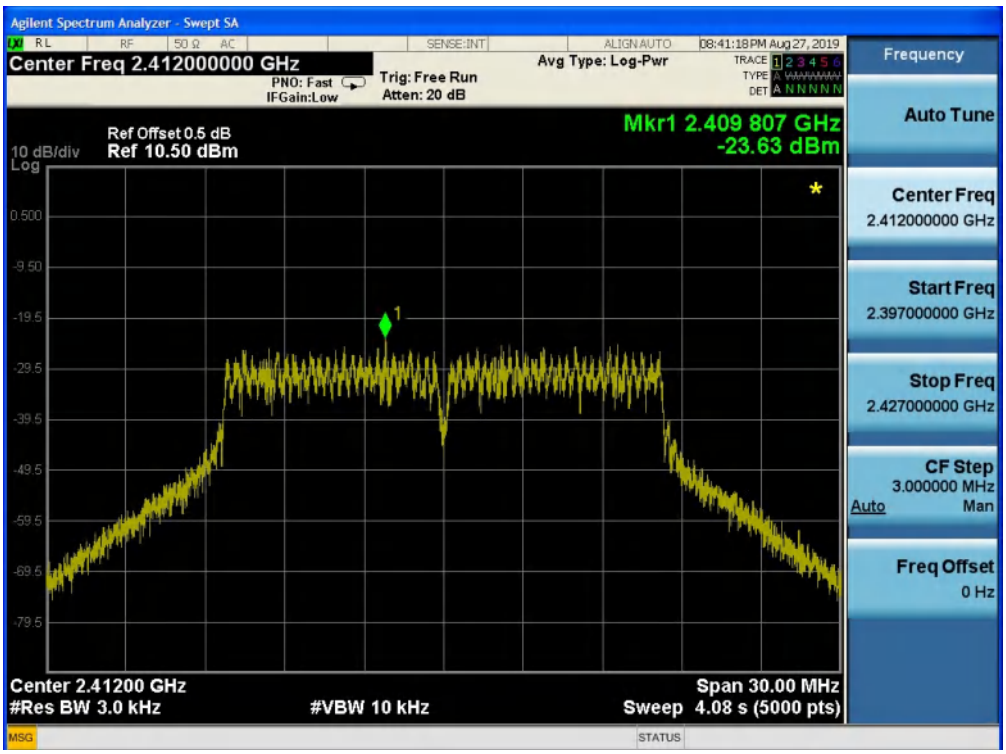


Channel 11:2.462 GHz:

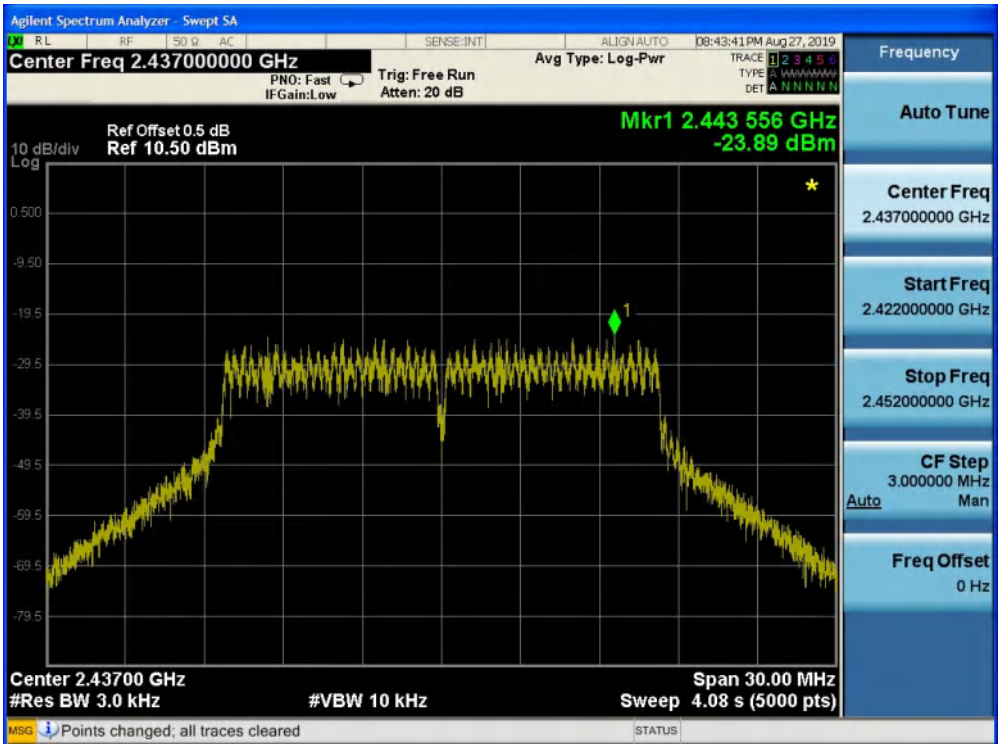


802.11g

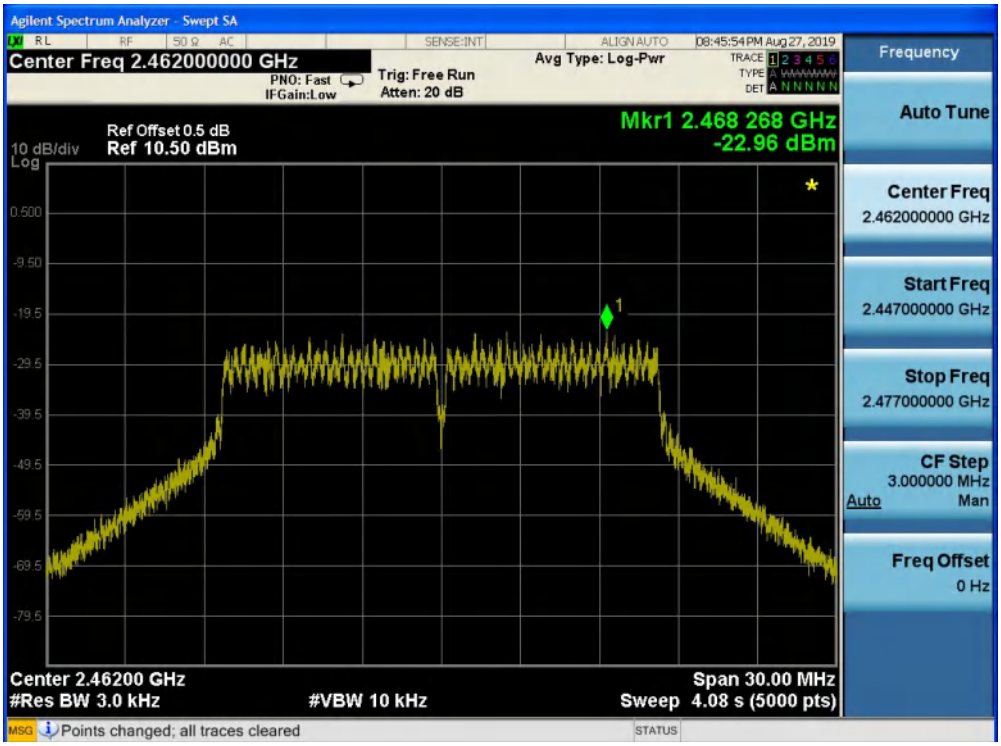
Channel 1:2.412 GHz:



Channel 6: 2.437GHz:

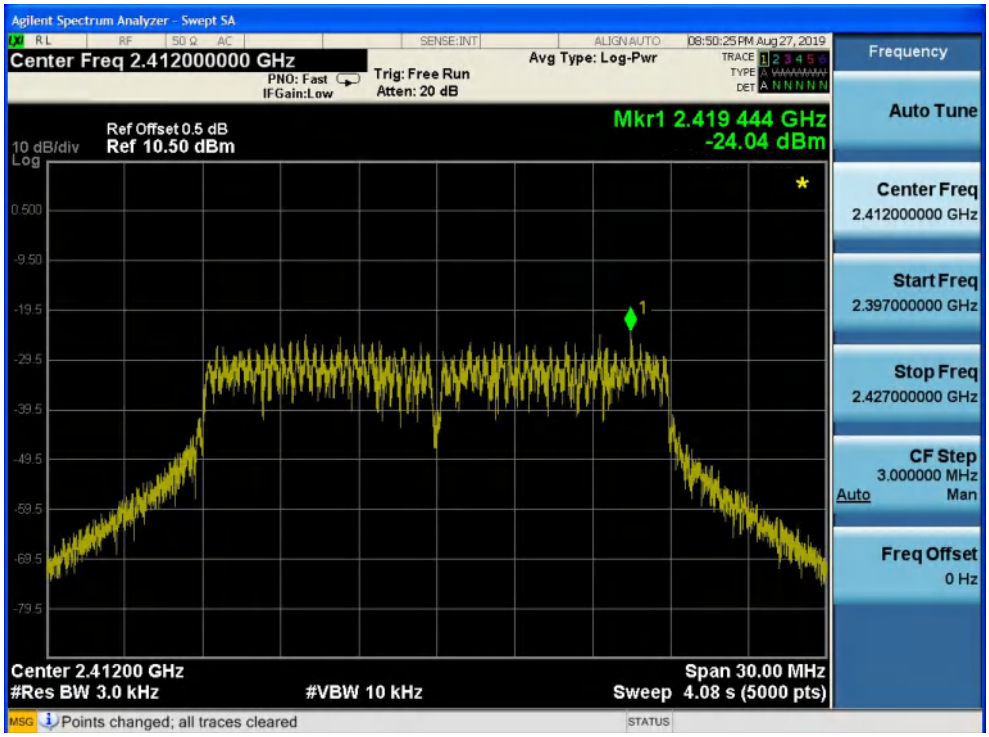


Channel 11:2.462 GHz:

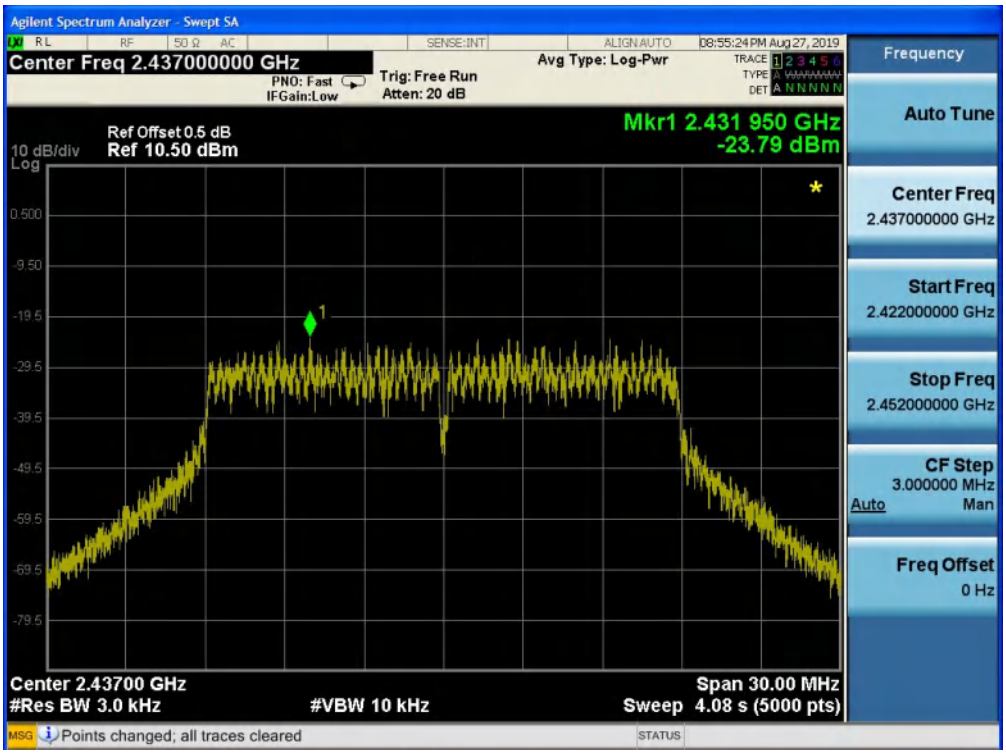


802.11n (HT20)

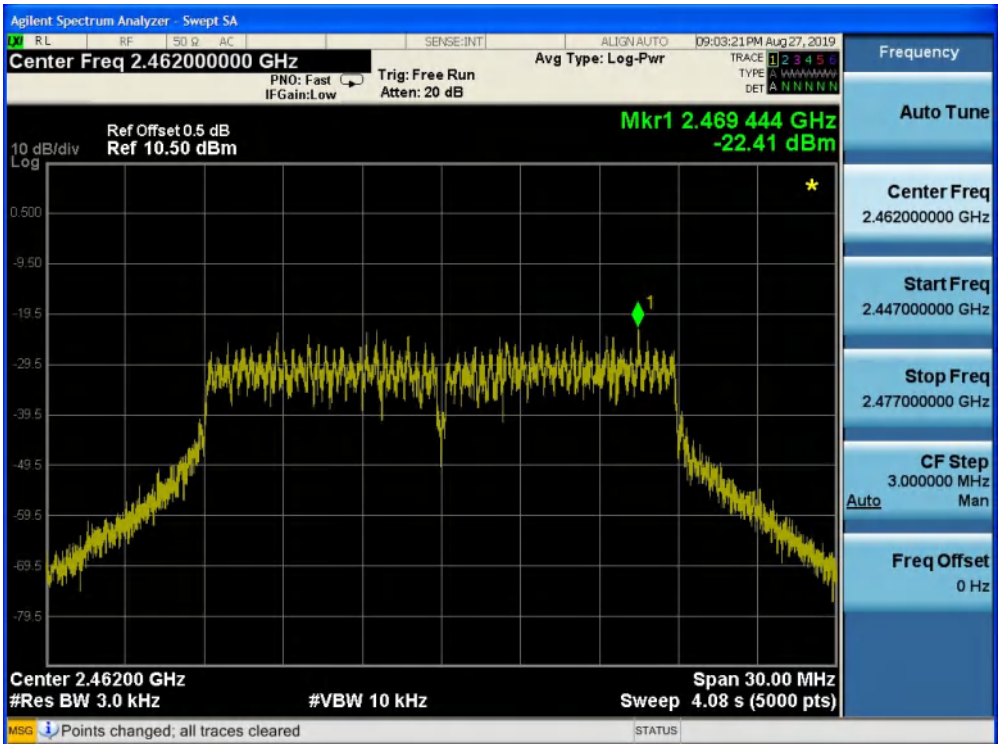
Channel 1:2.412 GHz:



Channel 6: 2.437GHz:

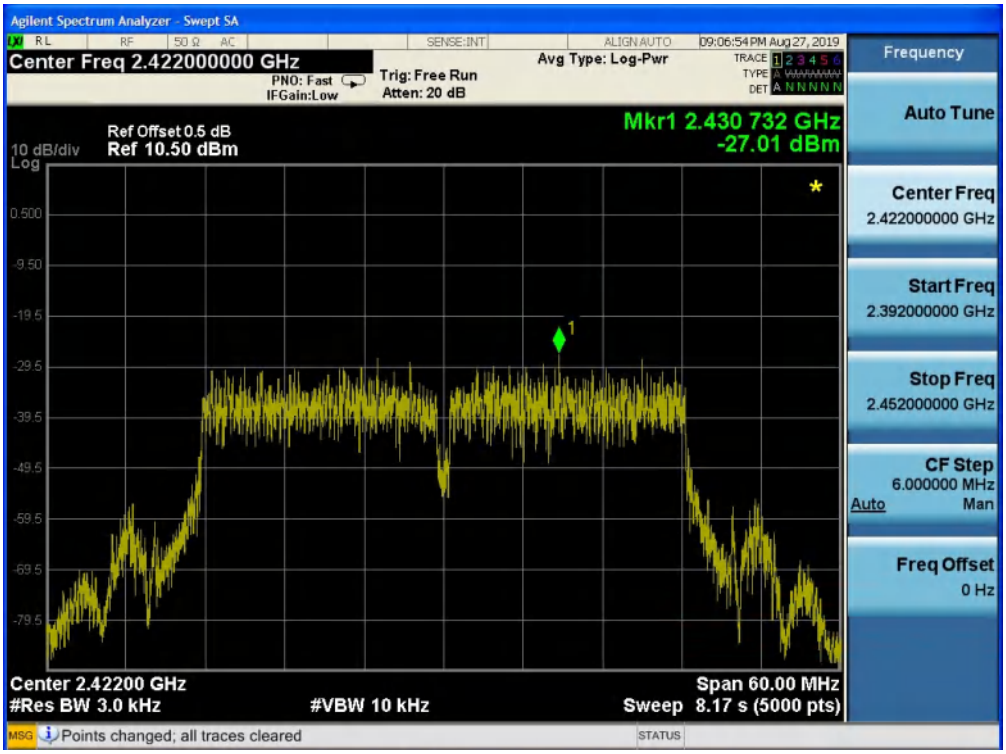


Channel 11:2.462 GHz:

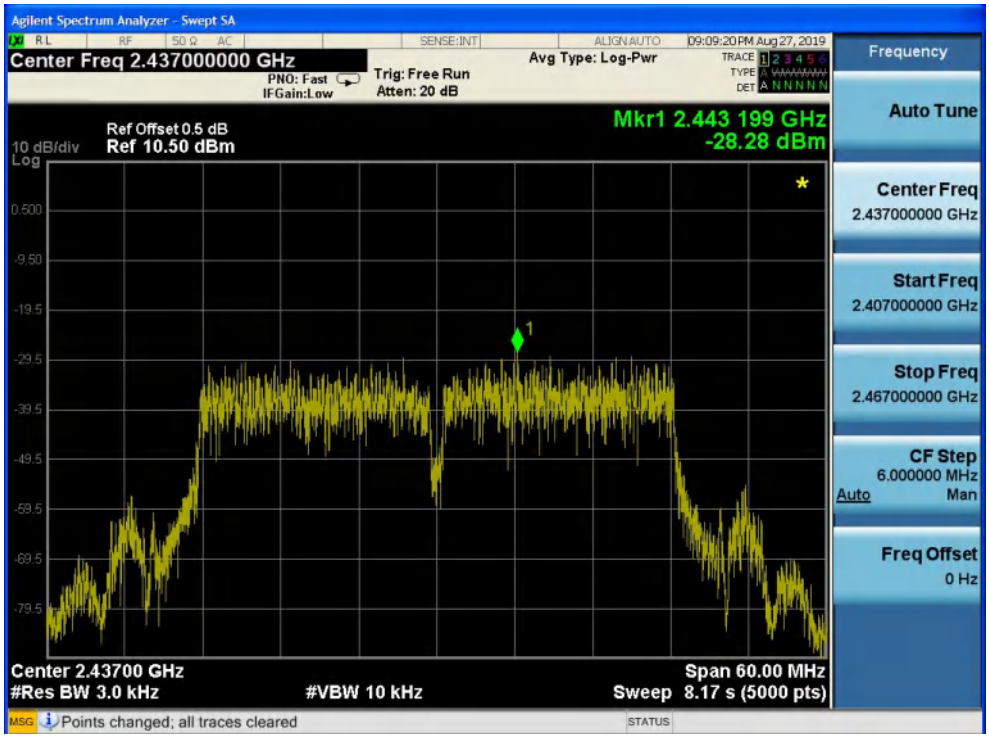


802.11n (HT40)

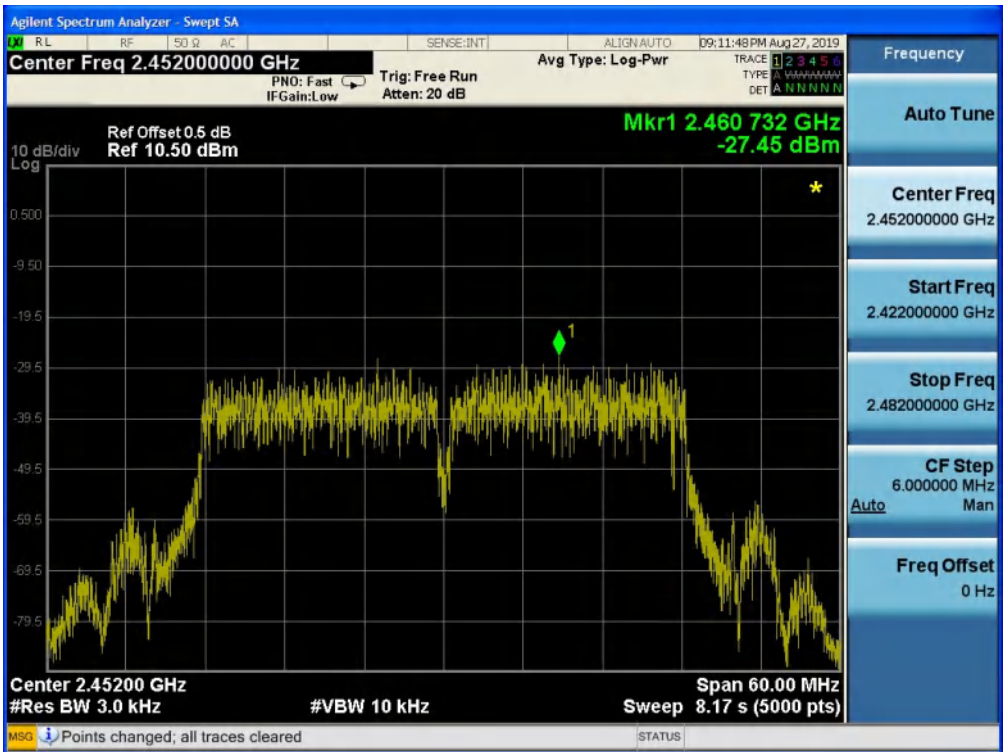
Channel 3:2.422 GHz:



Channel 6:2.437GHz:



Channel 6:2.452 GHz:



5.6 Conducted Spurious Emissions

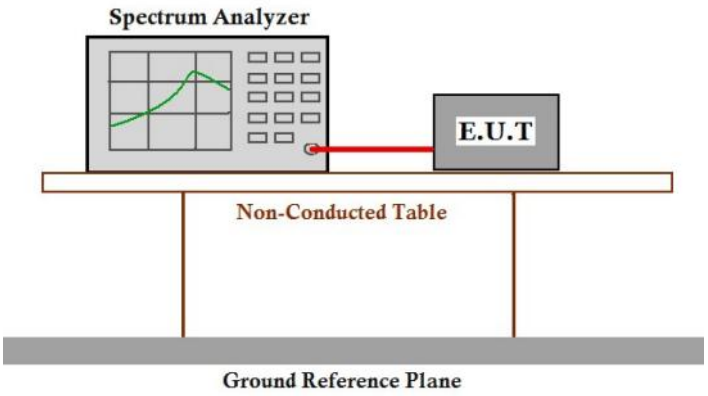
Test Requirement: FCC Part 15 C section 15.247

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. Provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Method: ANSI C63.10:2013

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

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer: RBW=100 KHz, VBW = 300KHz. Sweep = auto; Detector Function = Peak. Trace = Max Hold, Scan up through 10th harmonic.
3. Measure the Conducted Spurious Emissions of the test frequency with special test status.
4. Repeat until all the test status is investigated.
5. Report the worst case.

Result plot as follows:

802.11b

Channel 1: 2.412 GHz

Channel 6: 2.437GHz:

Channel 11: 2.462 GHz

802.11g

Channel 1: 2.412 GHz

Channel 6: 2.437GHz:

Channel 11: 2.462 GHz

802.11n(HT20)

Channel 1: 2.412 GHz

Channel 6: 2.437GHz:

Channel 11: 2.462 GHz

802.11n(HT40)

Channel 3: 2.422 GHz

Channel 6: 2.437GHz:

Channel 9: 2.452 GHz

The unit does meet the FCC requirements.

5.7 Radiated Spurious Emissions

Test Requirement: FCC Part 15 C section 15.247
(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, and provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Method: ANSI C63.10:2013

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

Detector: For PK value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW Sweep
= auto

Detector function = peak

Trace = max hold

For AV value:

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f <1 GHz, 9kHz for <30MHz

VBW =10Hz

Sweep = auto

Detector function = peak

Trace = max hold

15.209 Limit: 40.0 dBμV/m between 30MHz & 88MHz

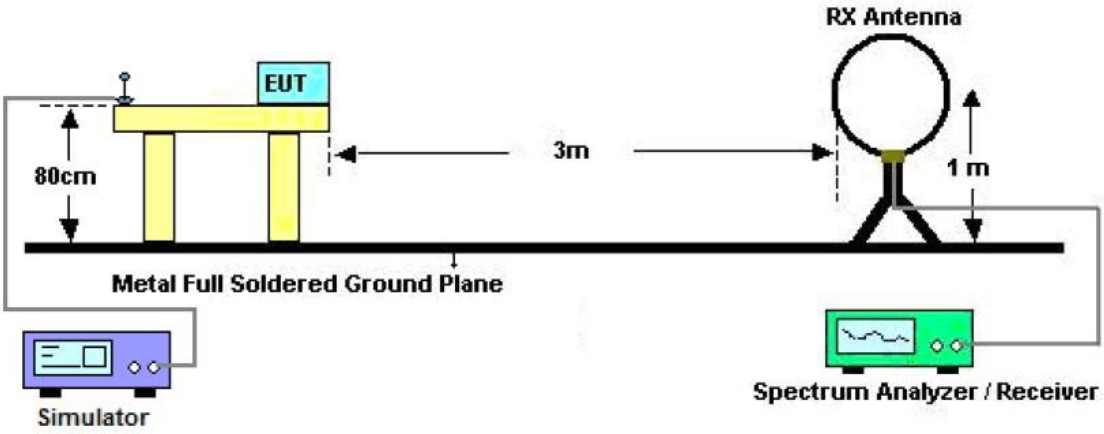
43.5 dBμV/m between 88MHz & 216MHz

46.0 dBμV/m between 216MHz & 960MHz

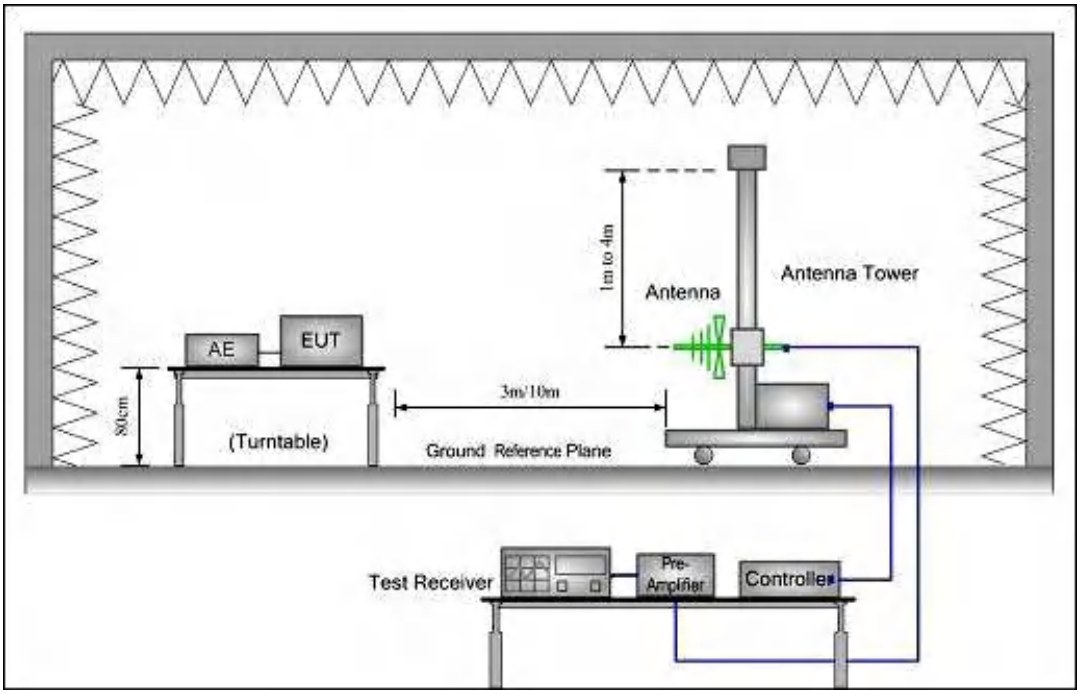
54.0 dBμV/m above 960MHz

Test Configuration:

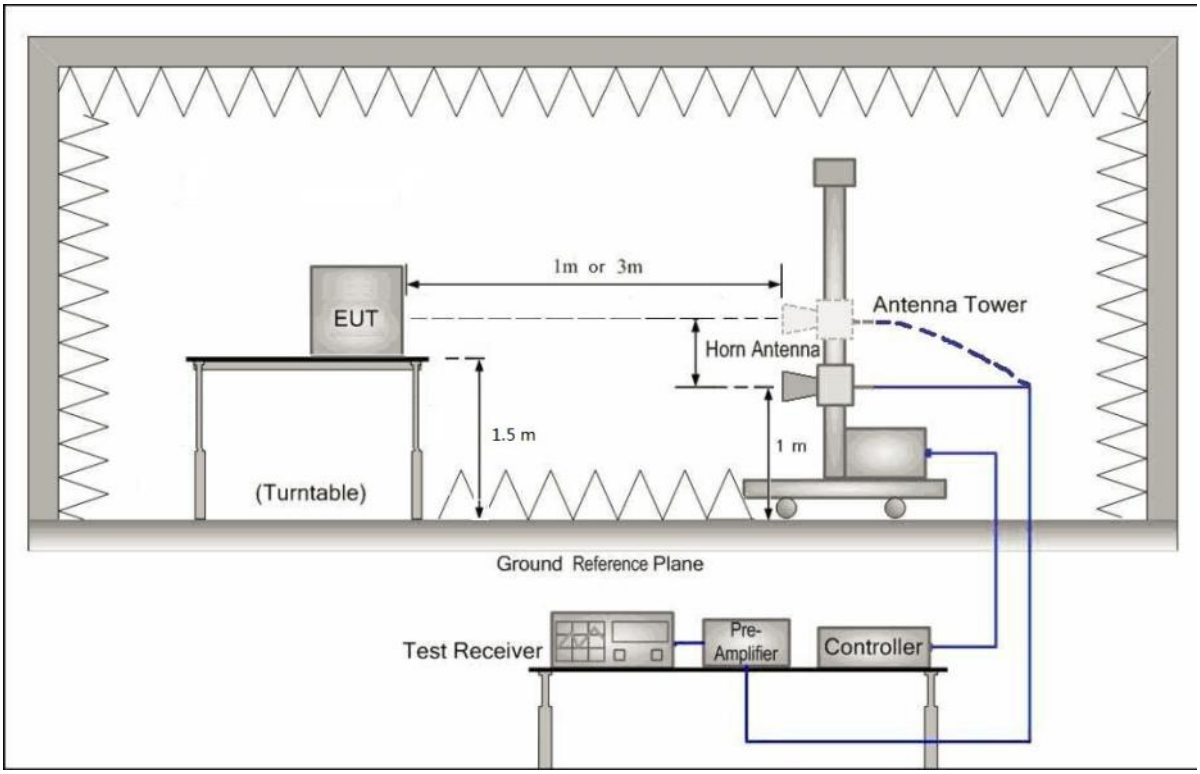
1) 9kHz to 30MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 40 GHz emissions:



Test Procedure: (1) The receiver was scanned from 0.009MHz to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only. The worst case emissions were reported.

(2) Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

(3) Pre-test under all modes below 1GHz, choose the worst case mode record On the report.

5.7.1 Harmonic and other spurious emissions

Worst case mode 802.11b

Test at Channel 1 (2.412 GHz) in transmitting status

9kHz~30MHz Test result

The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

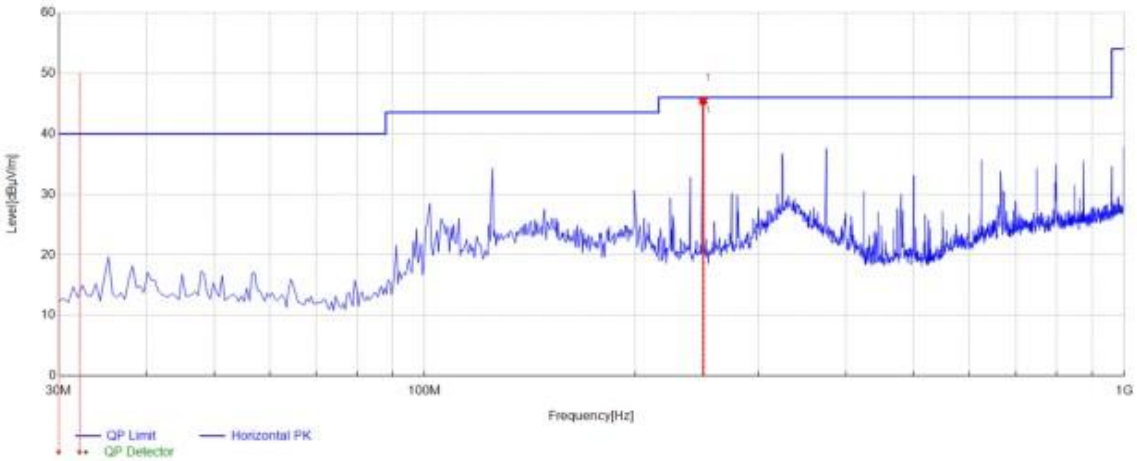
30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

With Power Supply MW

Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

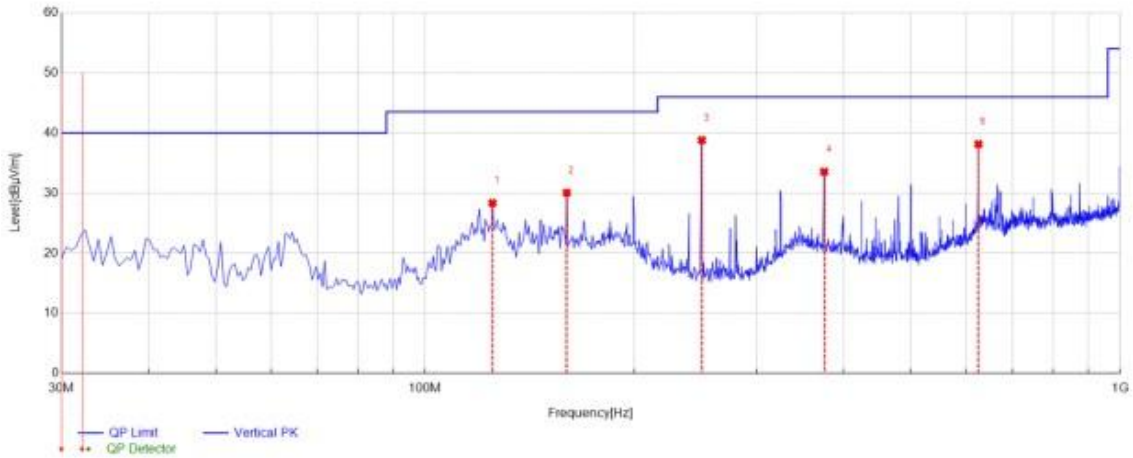
PK Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	250.080	45.47	-17.95	46.00	0.53	100	203	Horizontal	PASS

QP Final Data List									
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	250.0075	-17.95	45.22	46.00	0.78	100	203	Horizontal	PASS

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

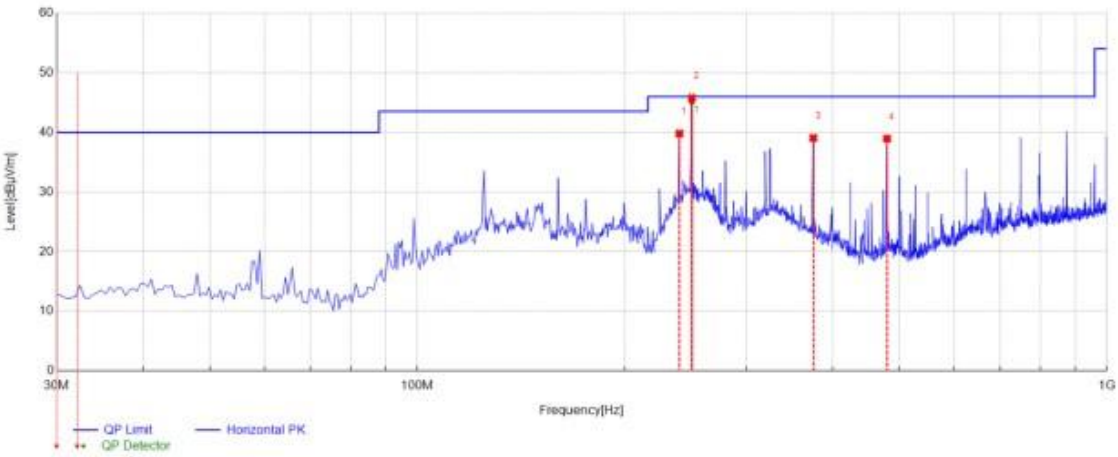
PK Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	125.012	28.36	-17.86	43.50	15.14	100	348	Vertical	PASS
2	159.915	30.07	-15.83	43.50	13.43	100	14	Vertical	PASS
3	250.080	38.81	-17.95	46.00	7.19	200	225	Vertical	PASS
4	375.147	33.56	-14.44	46.00	12.44	100	238	Vertical	PASS
5	625.282	38.15	-8.41	46.00	7.85	100	182	Vertical	PASS

With Power Supply MORNSUN

Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

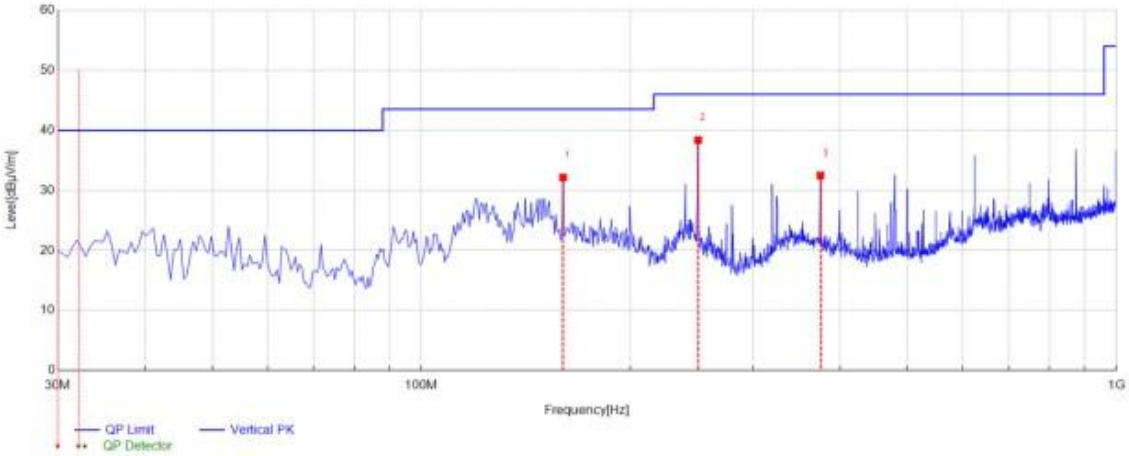
PK Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	239.900	39.80	-18.23	46.00	6.20	100	155	Horizontal	PASS
2	250.080	45.77	-17.95	46.00	0.23	100	203	Horizontal	PASS
3	375.147	39.07	-14.44	46.00	6.93	100	116	Horizontal	PASS
4	479.855	38.97	-11.65	46.00	7.03	200	294	Horizontal	PASS

QP Final Data List									
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	249.9930	-17.95	45.05	46.00	0.95	100	203	Horizontal	PASS

Vertical:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

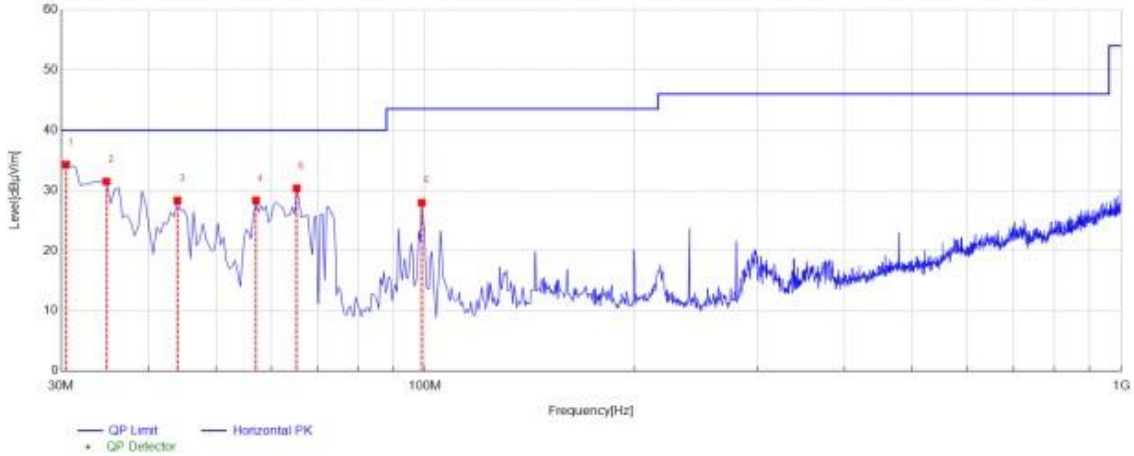
PK Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	159.915	32.15	-15.83	43.50	11.35	100	275	Vertical	PASS
2	250.080	38.39	-17.95	46.00	7.61	200	250	Vertical	PASS
3	375.147	32.49	-14.44	46.00	13.51	100	235	Vertical	PASS

With Power Supply XP

Horizontal:

Peak scan

Level (dBµV/m)



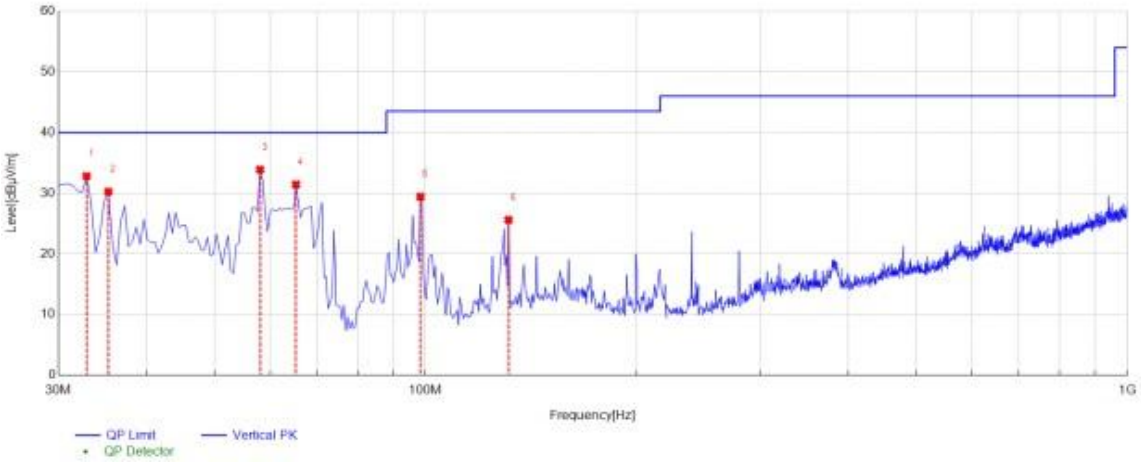
Quasi-peak measurement

PK Suspected Data List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	30.4848	34.28	-17.14	40.00	5.72	200	175	Horizontal	PASS
2	34.8476	31.48	-16.35	40.00	8.52	100	140	Horizontal	PASS
3	44.0580	28.33	-15.78	40.00	11.67	200	127	Horizontal	PASS
4	57.1464	28.33	-16.92	40.00	11.67	100	201	Horizontal	PASS
5	65.3873	30.34	-18.00	40.00	9.66	200	250	Horizontal	PASS
6	98.8356	27.96	-20.08	43.50	15.54	100	44	Horizontal	PASS

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

PK Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	32.9085	32.81	-16.71	40.00	7.19	200	76	Vertical	PASS
2	35.3323	30.25	-16.26	40.00	9.75	200	255	Vertical	PASS
3	58.1159	33.90	-17.00	40.00	6.10	100	317	Vertical	PASS
4	65.3873	31.44	-18.00	40.00	8.56	200	199	Vertical	PASS
5	98.3508	29.43	-20.08	43.50	14.07	100	219	Vertical	PASS
6	131.314	25.62	-17.39	43.50	17.88	200	54	Vertical	PASS

Spurious emissions above 1GHz

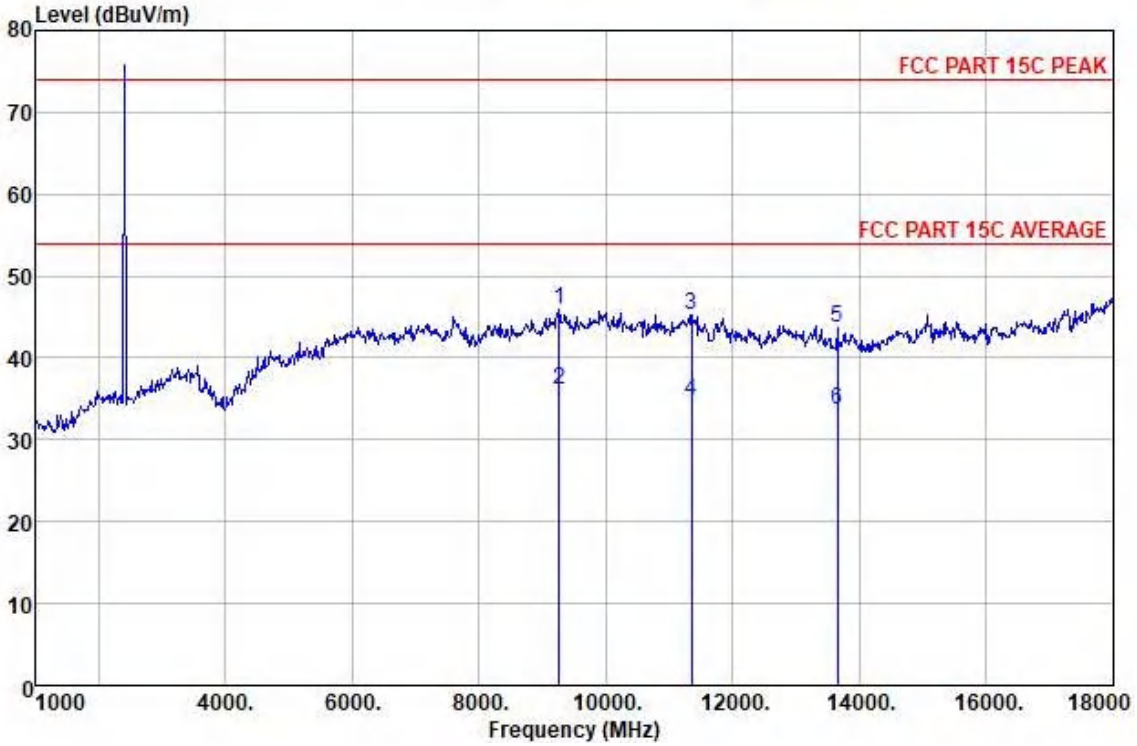
With Power Supply MW

Test at Channel 1 (2.412 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
9262.000	34.25	38.80	0.00	27.18	45.87	74.00	-28.13	HORIZONTAL	Peak
9262.000	24.48	38.80	0.00	27.18	36.10	54.00	-17.90	HORIZONTAL	Average
11353.000	32.77	39.48	0.00	26.99	45.26	74.00	-28.74	HORIZONTAL	Peak
11353.000	22.19	39.48	0.00	26.99	34.68	54.00	-19.32	HORIZONTAL	Average
13648.000	30.25	39.76	0.00	26.29	43.72	74.00	-30.28	HORIZONTAL	Peak
13648.000	20.19	39.76	0.00	26.29	33.66	54.00	-20.34	HORIZONTAL	Average

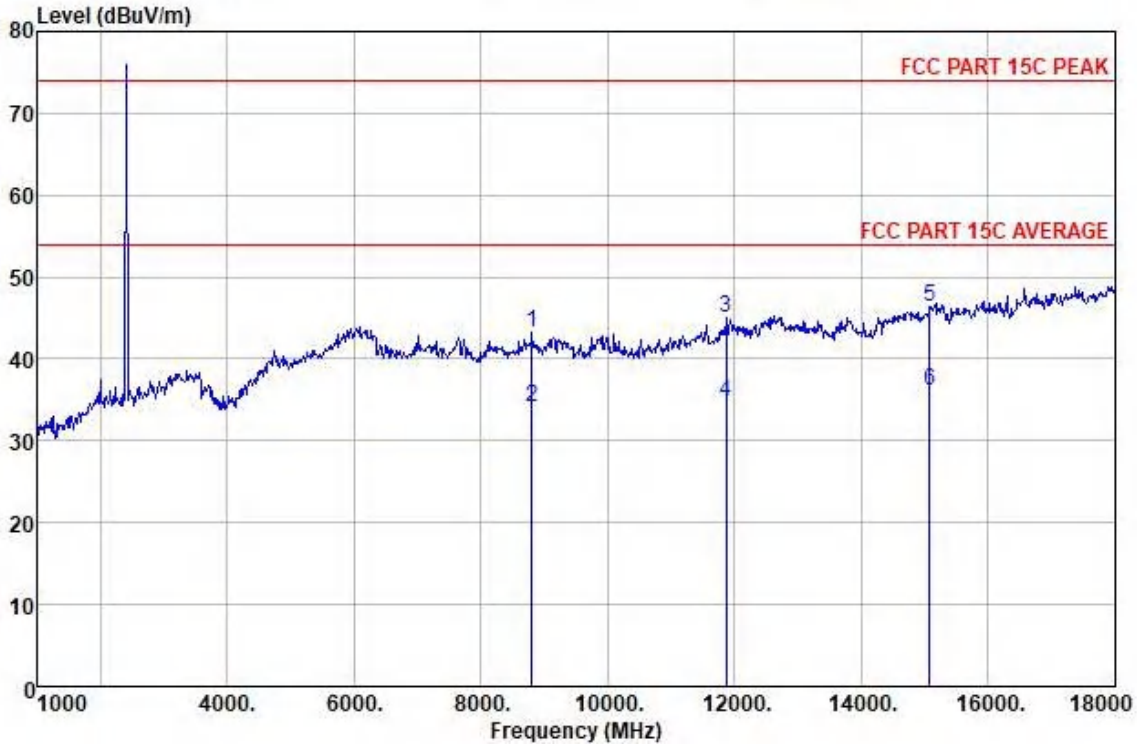
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
8803.000	32.01	38.41	0.00	27.23	43.19	74.00	-30.81	VERTICAL	Peak
8803.000	22.95	38.41	0.00	27.23	34.13	54.00	-19.87	VERTICAL	Average
11863.000	32.22	39.60	0.00	26.88	44.94	74.00	-29.06	VERTICAL	Peak
11863.000	22.15	39.60	0.00	26.88	34.87	54.00	-19.13	VERTICAL	Average
15076.000	32.50	39.99	0.00	26.06	46.43	74.00	-27.57	VERTICAL	Peak
15076.000	22.20	39.99	0.00	26.06	36.13	54.00	-17.87	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

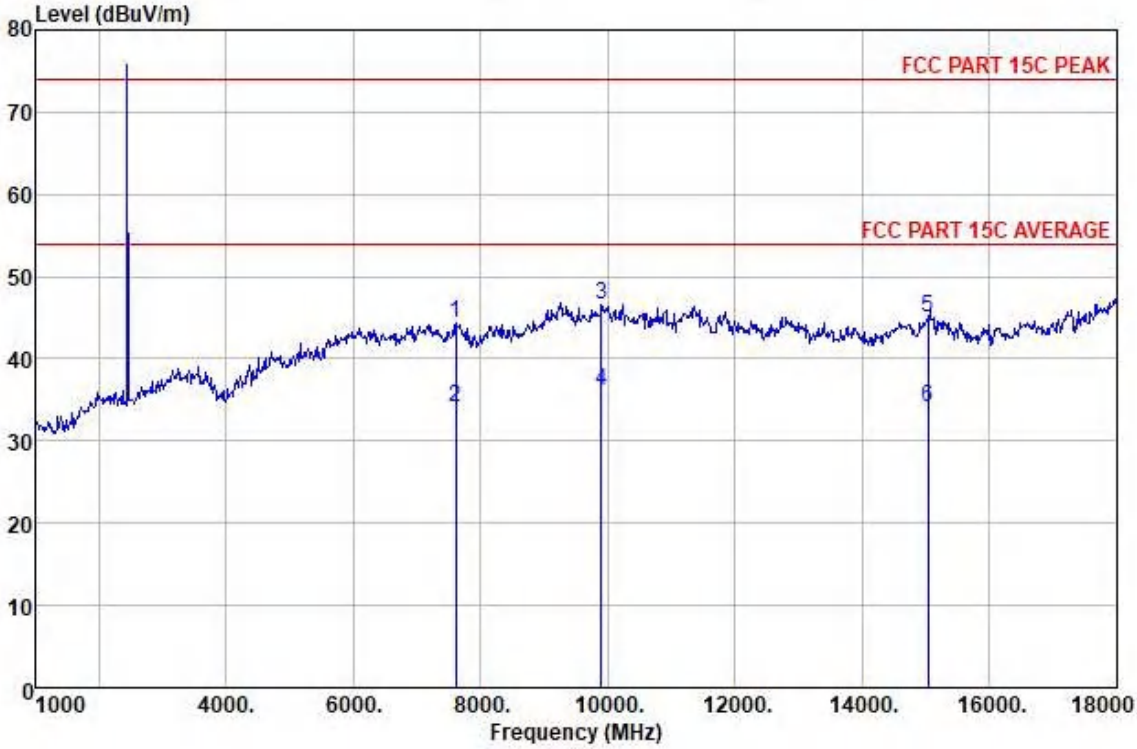
Note: The emission above limit is fundamental emission, which is not subject to the limit.

Test at Channel 7 (2.442 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
7613.000	34.61	37.15	0.00	27.32	44.44	74.00	-29.56	HORIZONTAL	Peak
7613.000	24.22	37.15	0.00	27.32	34.05	54.00	-19.95	HORIZONTAL	Average
9891.000	34.74	38.96	0.00	27.11	46.59	74.00	-27.41	HORIZONTAL	Peak
9891.000	24.15	38.96	0.00	27.11	36.00	54.00	-18.00	HORIZONTAL	Average
15025.000	30.98	40.06	0.00	26.07	44.97	74.00	-29.03	HORIZONTAL	Peak
15025.000	20.16	40.06	0.00	26.07	34.15	54.00	-19.85	HORIZONTAL	Average

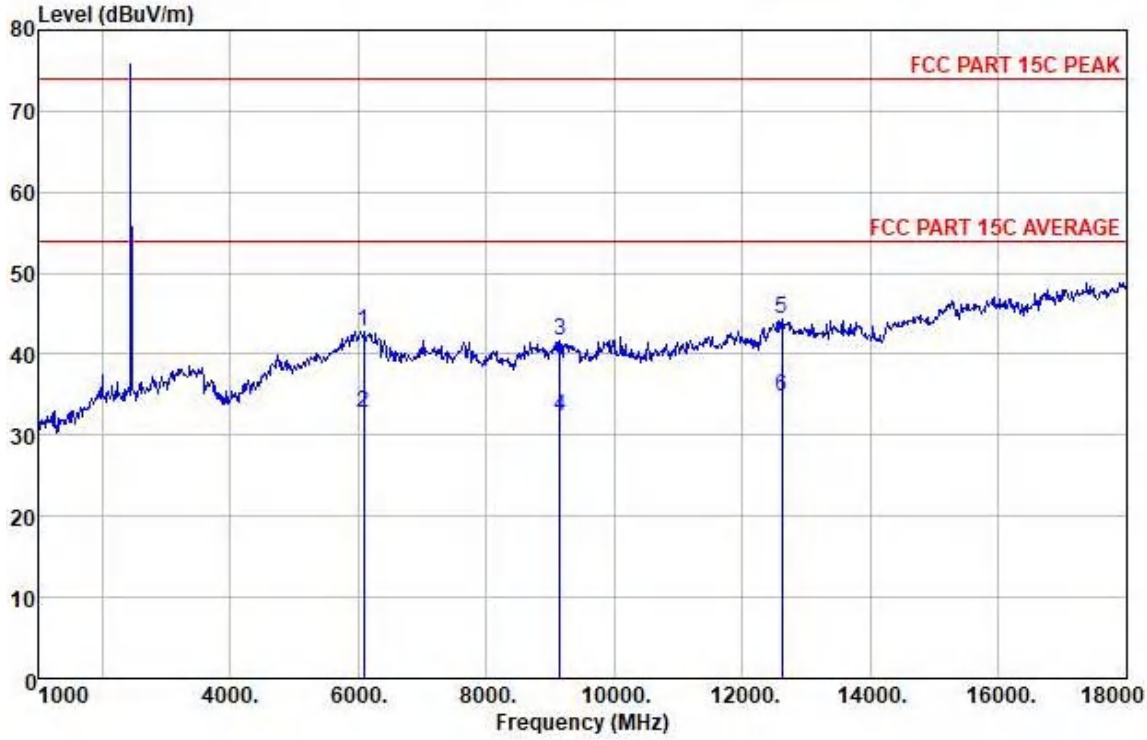
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
6083.000	34.28	35.92	0.00	27.41	42.79	74.00	-31.21	VERTICAL	Peak
6083.000	24.15	35.92	0.00	27.41	32.66	54.00	-21.34	VERTICAL	Average
9143.000	30.01	38.80	0.00	27.19	41.65	74.00	-32.35	VERTICAL	Peak
9143.000	20.71	38.80	0.00	27.19	32.32	54.00	-21.68	VERTICAL	Average
12611.000	31.21	39.77	0.00	26.64	44.34	74.00	-29.66	VERTICAL	Peak
12611.000	21.54	39.77	0.00	26.64	34.67	54.00	-19.33	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

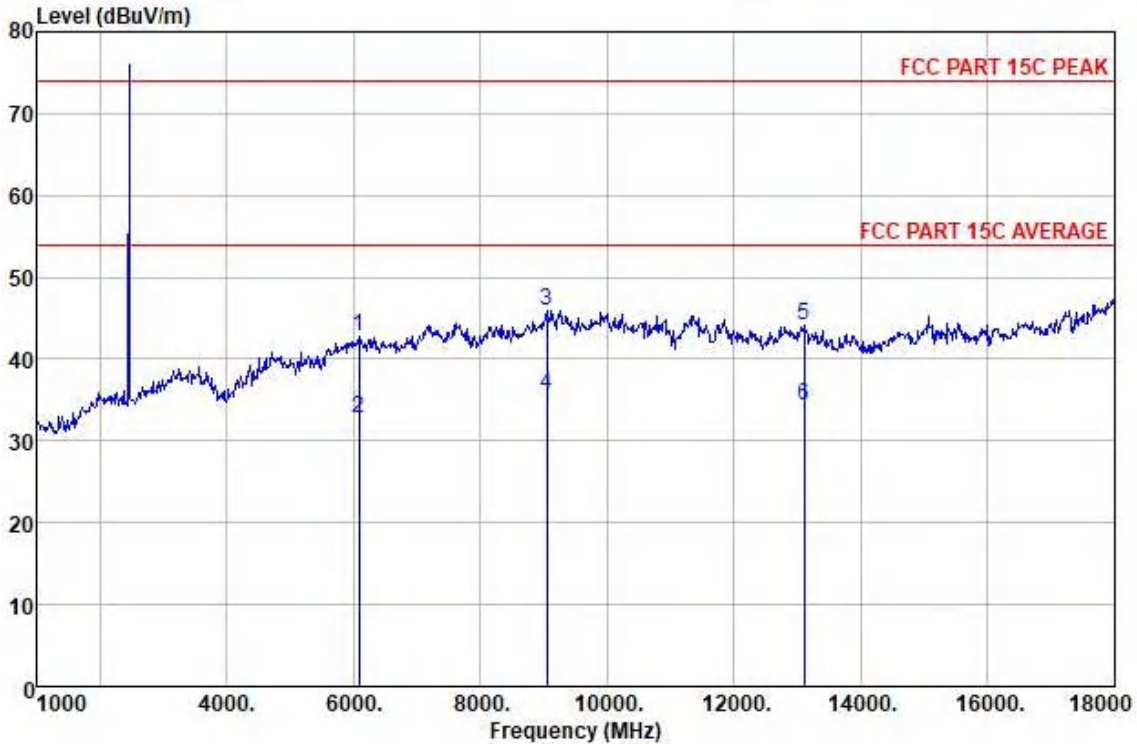
Note: The emission above limit is fundamental emission, which is not subject to the limit.

Test at Channel 11 (2.462 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
6083.000	34.28	35.92	0.00	27.41	42.79	74.00	-31.21	HORIZONTAL	Peak
6083.000	24.18	35.92	0.00	27.41	32.69	54.00	-21.31	HORIZONTAL	Average
9041.000	34.29	38.80	0.00	27.21	45.88	74.00	-28.12	HORIZONTAL	Peak
9041.000	24.12	38.80	0.00	27.21	35.71	54.00	-18.29	HORIZONTAL	Average
13104.000	30.04	40.55	0.00	26.45	44.14	74.00	-29.86	HORIZONTAL	Peak
13104.000	20.16	40.55	0.00	26.45	34.26	54.00	-19.74	HORIZONTAL	Average

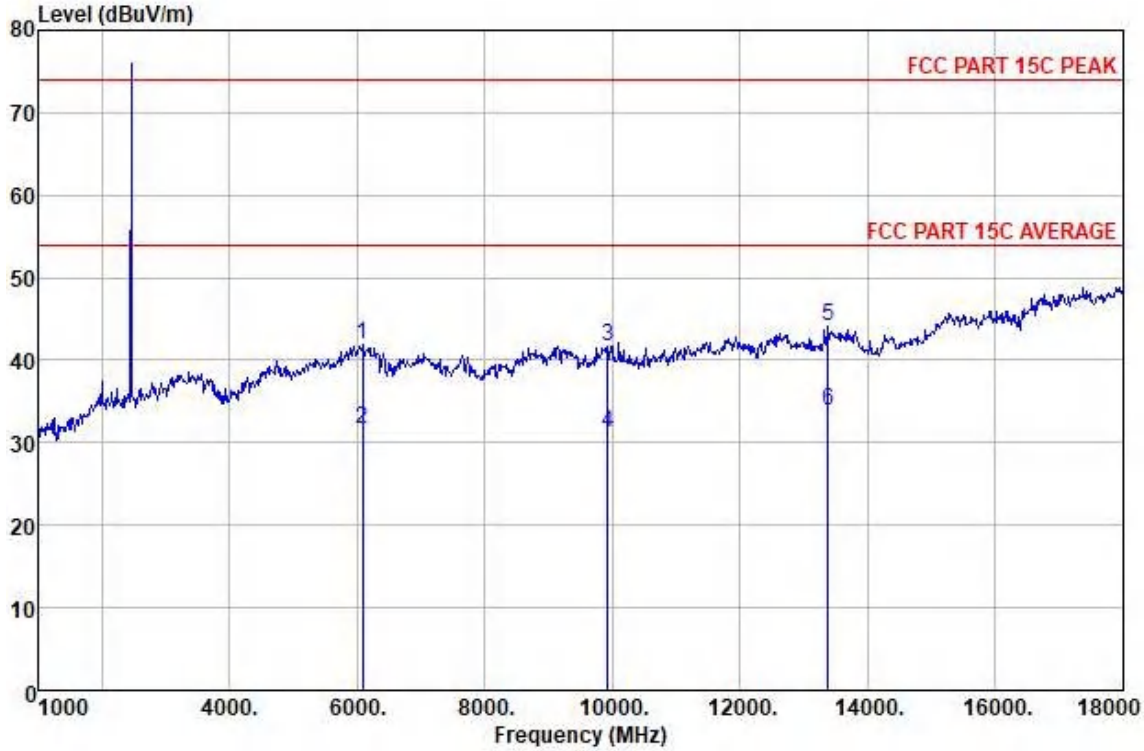
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
6083.000	33.28	35.92	0.00	27.41	41.79	74.00	-32.21	VERTICAL	Peak
6083.000	23.12	35.92	0.00	27.41	31.63	54.00	-22.37	VERTICAL	Average
9925.000	29.82	38.97	0.00	27.11	41.68	74.00	-32.32	VERTICAL	Peak
9925.000	19.26	38.97	0.00	27.11	31.12	54.00	-22.88	VERTICAL	Average
13376.000	30.34	40.17	0.00	26.36	44.15	74.00	-29.85	VERTICAL	Peak
13376.000	20.12	40.17	0.00	26.36	33.93	54.00	-20.07	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

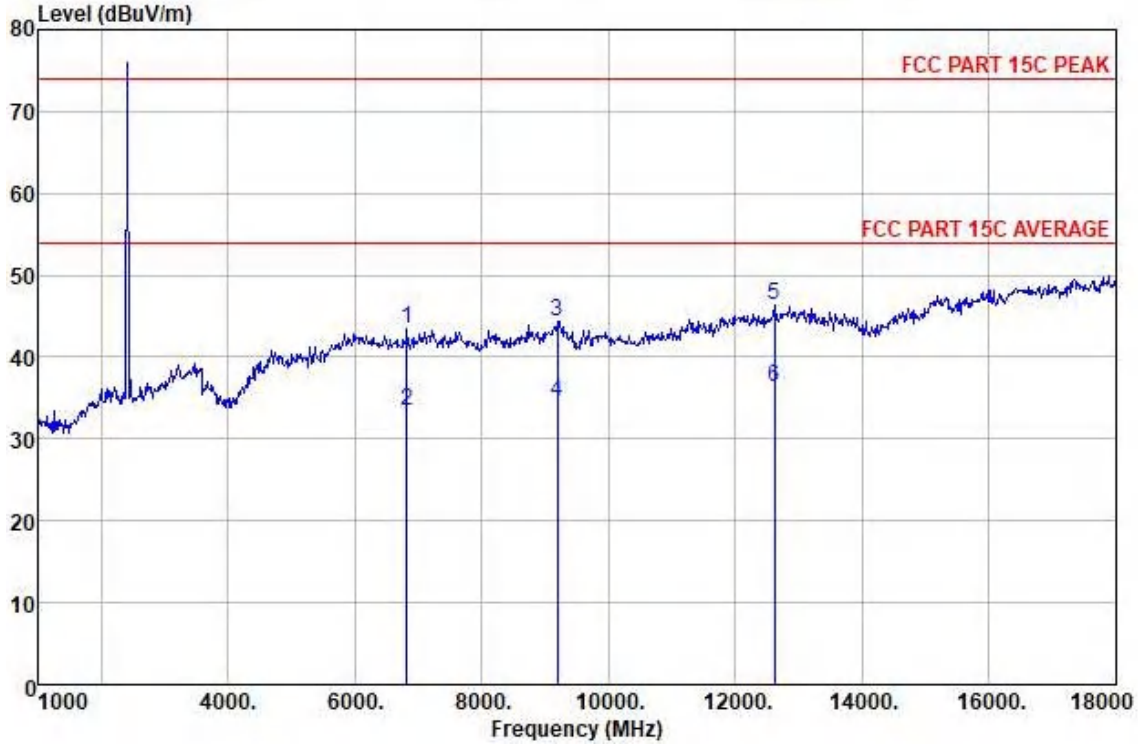
With Power Supply XP

Test at Channel 1 (2.412 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
6814.000	34.62	36.07	0.00	27.35	43.34	74.00	-30.66	HORIZONTAL	Peak
6814.000	24.68	36.07	0.00	27.35	33.40	54.00	-20.60	HORIZONTAL	Average
9194.000	32.81	38.80	0.00	27.19	44.42	74.00	-29.58	HORIZONTAL	Peak
9194.000	22.90	38.80	0.00	27.19	34.51	54.00	-19.49	HORIZONTAL	Average
12611.000	33.13	39.77	0.00	26.64	46.26	74.00	-27.74	HORIZONTAL	Peak
12611.000	23.19	39.77	0.00	26.64	36.32	54.00	-17.68	HORIZONTAL	Average

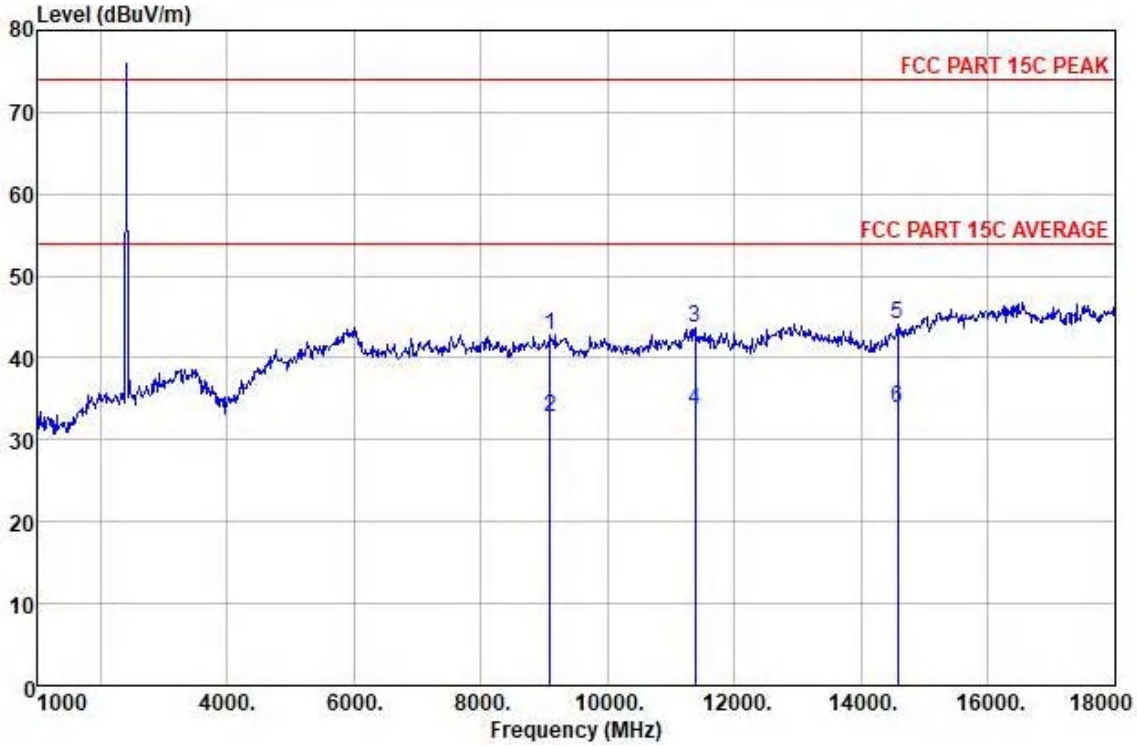
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
9092.000	31.24	38.80	0.00	27.20	42.84	74.00	-31.16	VERTICAL	Peak
9092.000	21.13	38.80	0.00	27.20	32.73	54.00	-21.27	VERTICAL	Average
11370.000	31.27	39.50	0.00	26.99	43.78	74.00	-30.22	VERTICAL	Peak
11370.000	21.15	39.50	0.00	26.99	33.66	54.00	-20.34	VERTICAL	Average
14566.000	30.51	39.75	0.00	26.14	44.12	74.00	-29.88	VERTICAL	Peak
14566.000	20.15	39.75	0.00	26.14	33.76	54.00	-20.24	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

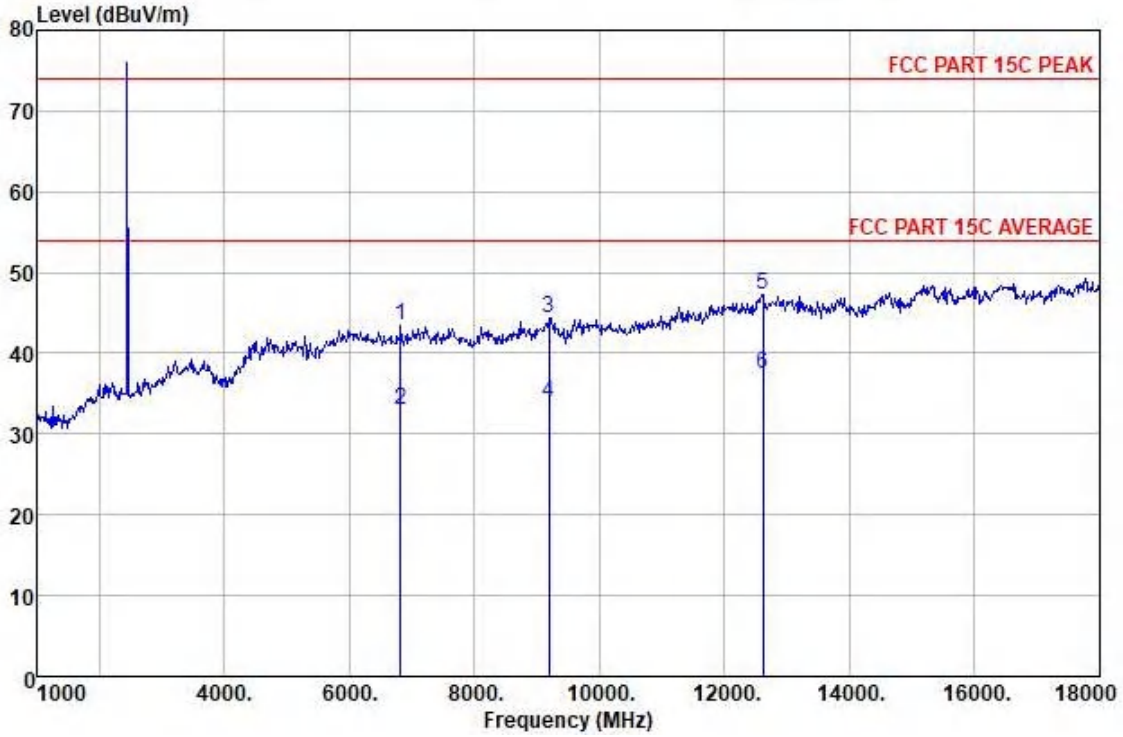
Note: The emission above limit is fundamental emission, which is not subject to the limit.

Test at Channel 7 (2.442 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
6814.000	34.62	36.07	0.00	27.35	43.34	74.00	-30.66	HORIZONTAL	Peak
6814.000	24.24	36.07	0.00	27.35	32.96	54.00	-21.04	HORIZONTAL	Average
9194.000	32.81	38.80	0.00	27.19	44.42	74.00	-29.58	HORIZONTAL	Peak
9194.000	22.25	38.80	0.00	27.19	33.86	54.00	-20.14	HORIZONTAL	Average
12611.000	34.13	39.77	0.00	26.64	47.26	74.00	-26.74	HORIZONTAL	Peak
12611.000	24.23	39.77	0.00	26.64	37.36	54.00	-16.64	HORIZONTAL	Average

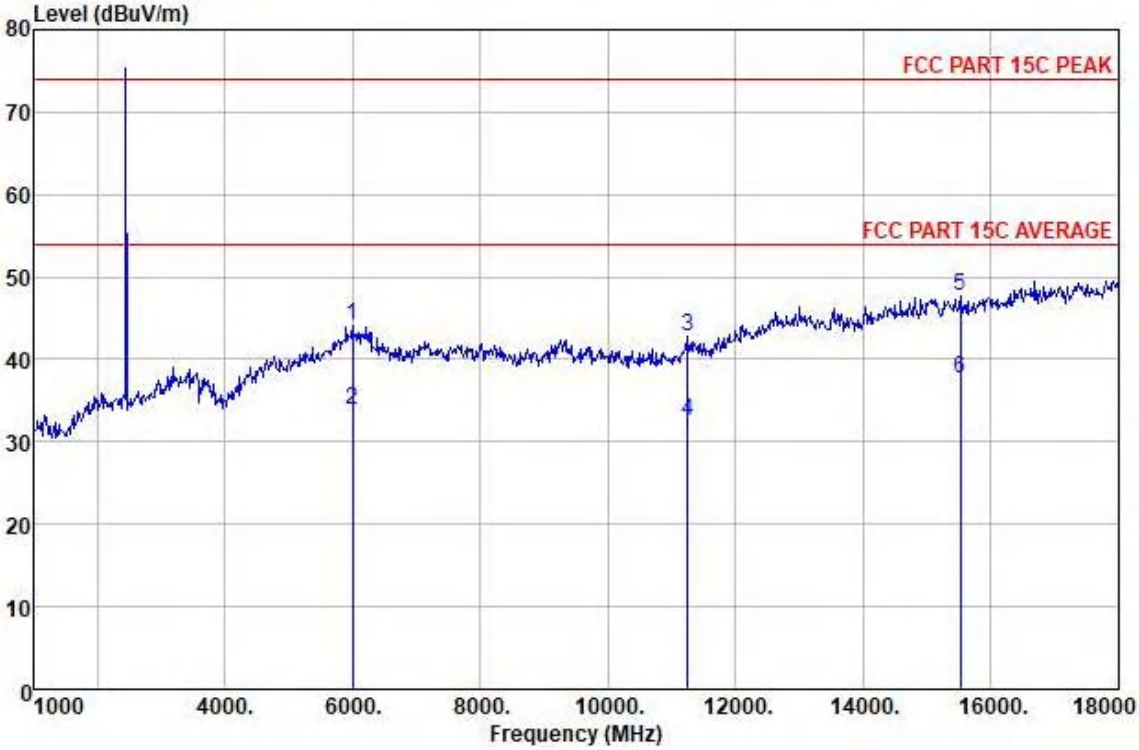
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
5998.000	35.63	35.99	0.00	27.42	44.20	74.00	-29.80	VERTICAL	Peak
5998.000	25.38	35.99	0.00	27.42	33.95	54.00	-20.05	VERTICAL	Average
11251.000	30.29	39.40	0.00	27.00	42.69	74.00	-31.31	VERTICAL	Peak
11251.000	20.20	39.40	0.00	27.00	32.60	54.00	-21.40	VERTICAL	Average
15518.000	34.18	39.40	0.00	25.99	47.59	74.00	-26.41	VERTICAL	Peak
15518.000	24.24	39.40	0.00	25.99	37.65	54.00	-16.35	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss – Preamp Factor

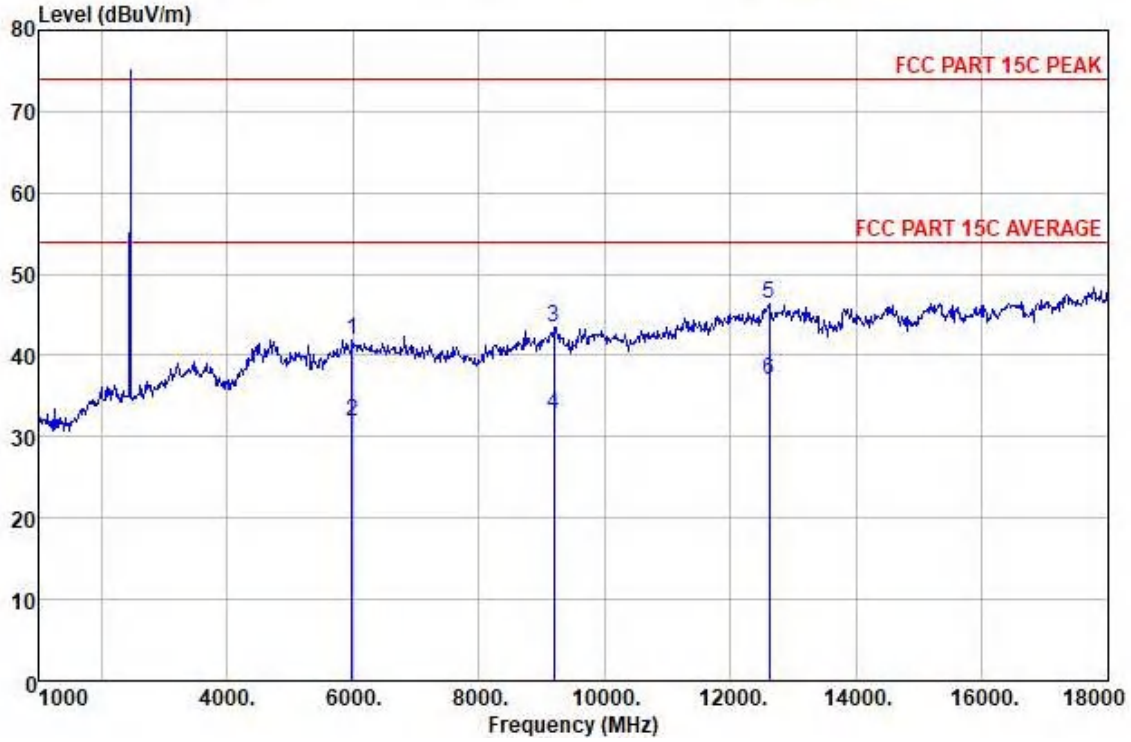
Note: The emission above limit is fundamental emission, which is not subject to the limit.

Test at Channel 11 (2.462 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
5981.000	33.36	35.92	0.00	27.42	41.86	74.00	-32.14	HORIZONTAL	Peak
5981.000	23.32	35.92	0.00	27.42	31.82	54.00	-22.18	HORIZONTAL	Average
9194.000	31.81	38.80	0.00	27.19	43.42	74.00	-30.58	HORIZONTAL	Peak
9194.000	21.15	38.80	0.00	27.19	32.76	54.00	-21.24	HORIZONTAL	Average
12611.000	33.13	39.77	0.00	26.64	46.26	74.00	-27.74	HORIZONTAL	Peak
12611.000	23.92	39.77	0.00	26.64	37.05	54.00	-16.95	HORIZONTAL	Average

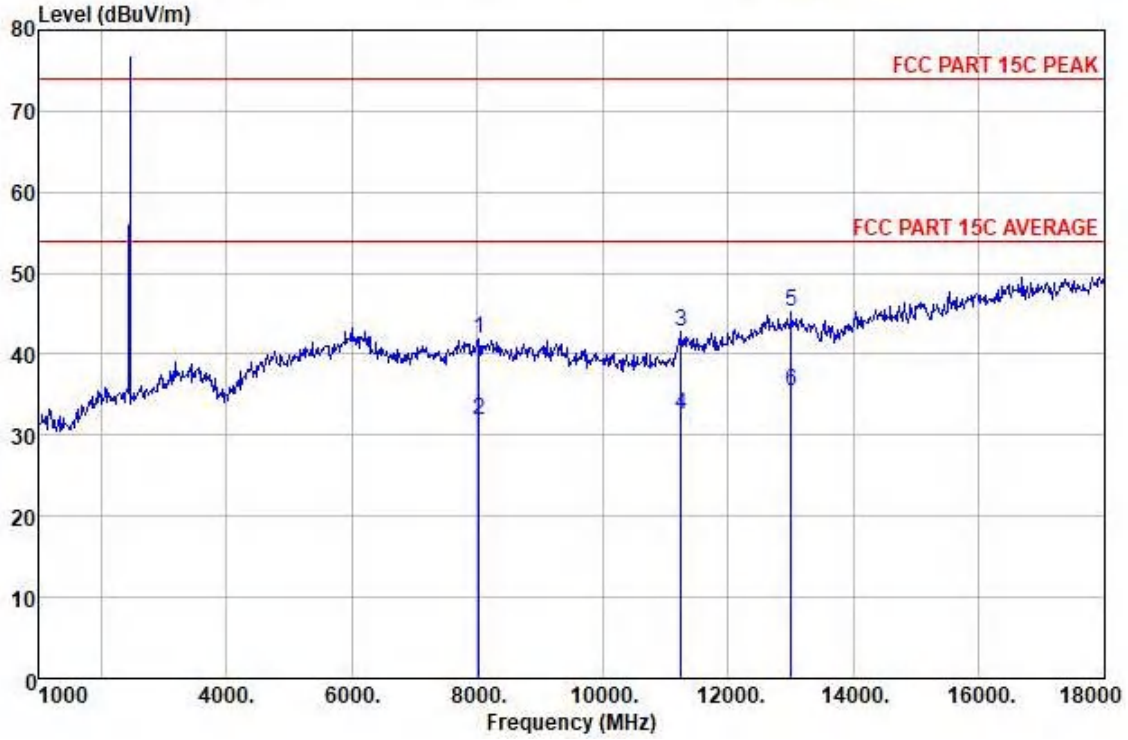
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
8021.000	32.17	37.03	0.00	27.30	41.90	74.00	-32.10	VERTICAL	Peak
8021.000	22.19	37.03	0.00	27.30	31.92	54.00	-22.08	VERTICAL	Average
11251.000	30.29	39.40	0.00	27.00	42.69	74.00	-31.31	VERTICAL	Peak
11251.000	20.15	39.40	0.00	27.00	32.55	54.00	-21.45	VERTICAL	Average
13002.000	31.03	40.70	0.00	26.48	45.25	74.00	-28.75	VERTICAL	Peak
13002.000	21.12	40.70	0.00	26.48	35.34	54.00	-18.66	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

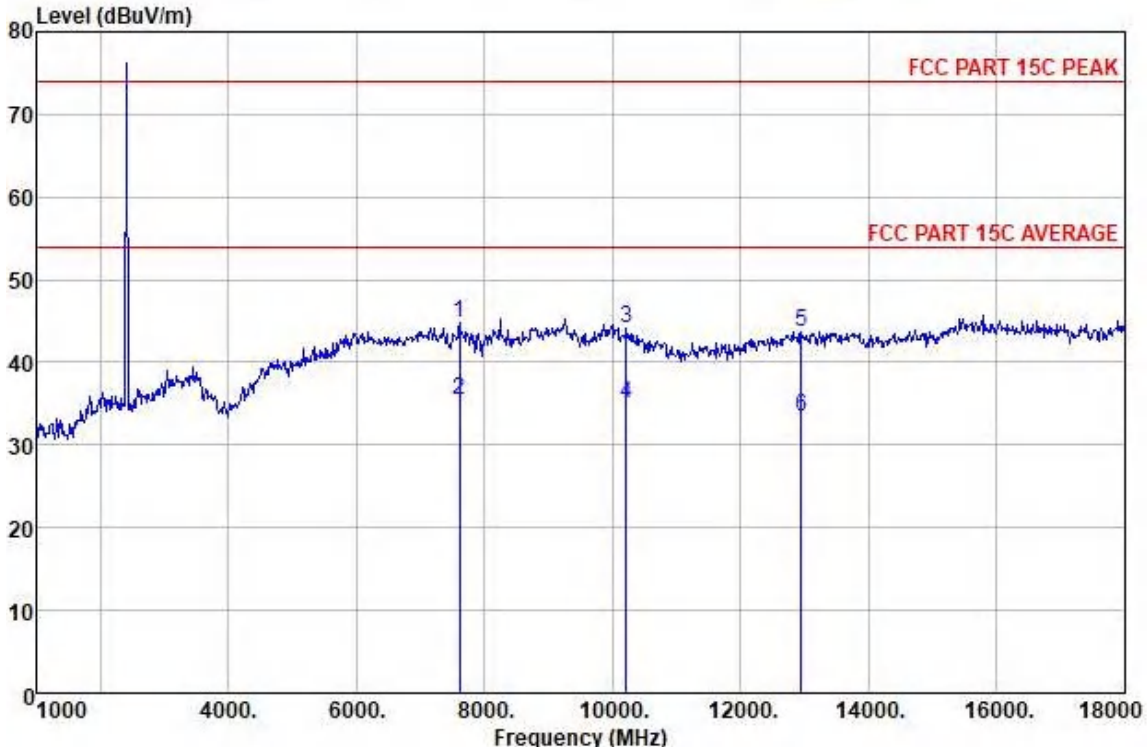
Note: The emission above limit is fundamental emission, which is not subject to the limit.

With Power Supply MORNSUN

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
7613.000	35.05	37.15	0.00	27.32	44.88	74.00	-29.12	HORIZONTAL	Peak
7613.000	25.59	37.15	0.00	27.32	35.42	54.00	-18.58	HORIZONTAL	Average
10214.000	32.32	38.83	0.00	27.09	44.06	74.00	-29.94	HORIZONTAL	Peak
10214.000	23.19	38.83	0.00	27.09	34.93	54.00	-19.07	HORIZONTAL	Average
12951.000	29.63	40.58	0.00	26.50	43.71	74.00	-30.29	HORIZONTAL	Peak
12951.000	19.27	40.58	0.00	26.50	33.35	54.00	-20.65	HORIZONTAL	Average

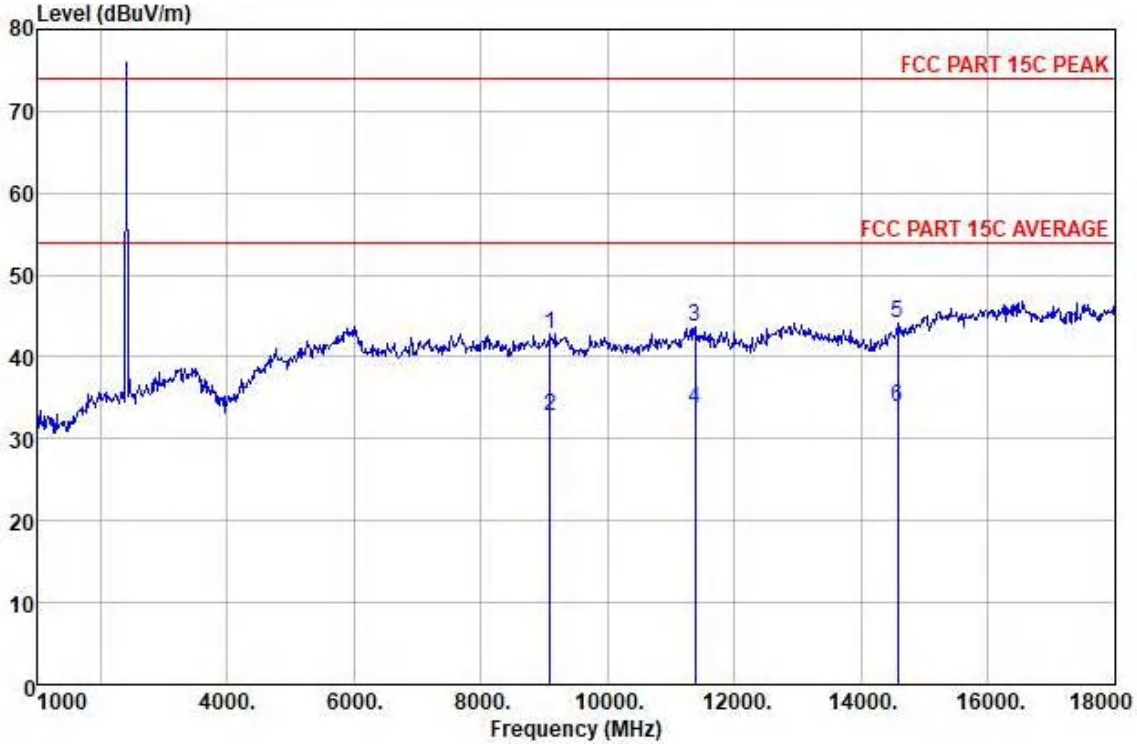
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
9092.000	31.24	38.80	0.00	27.20	42.84	74.00	-31.16	VERTICAL	Peak
9092.000	21.13	38.80	0.00	27.20	32.73	54.00	-21.27	VERTICAL	Average
11370.000	31.27	39.50	0.00	26.99	43.78	74.00	-30.22	VERTICAL	Peak
11370.000	21.15	39.50	0.00	26.99	33.66	54.00	-20.34	VERTICAL	Average
14566.000	30.51	39.75	0.00	26.14	44.12	74.00	-29.88	VERTICAL	Peak
14566.000	20.15	39.75	0.00	26.14	33.76	54.00	-20.24	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

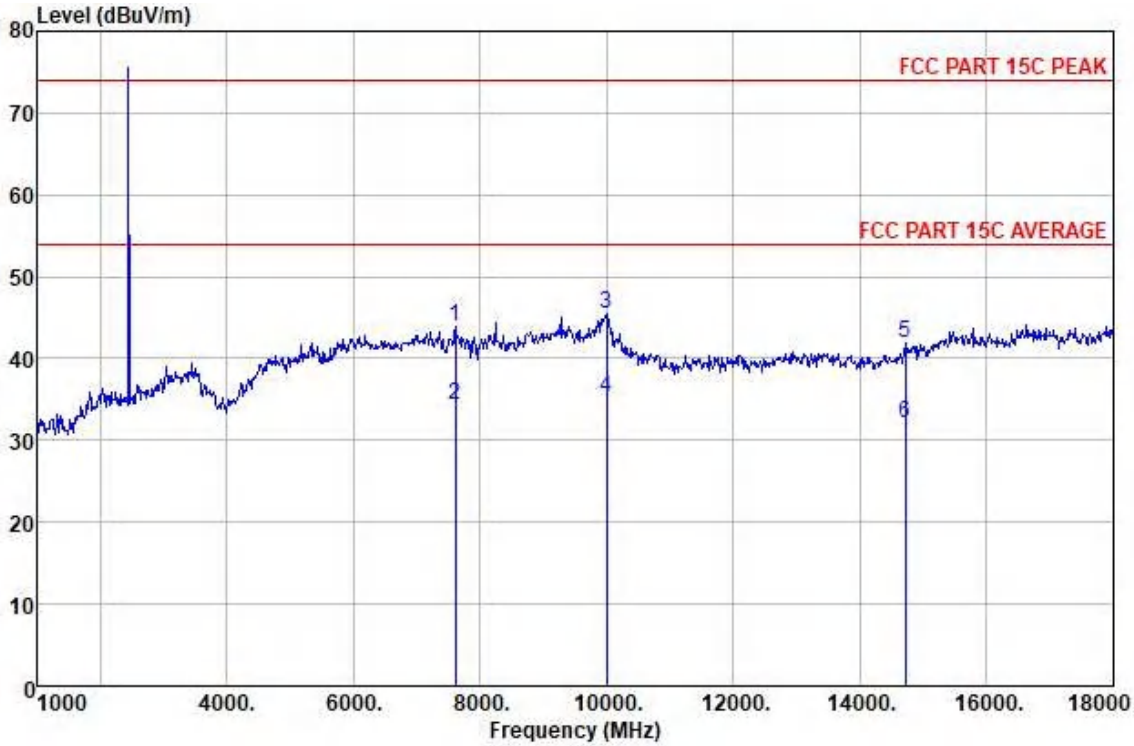
Note: The emission above limit is fundamental emission, which is not subject to the limit.

Test at Channel 7 (2.442 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
7613.000	34.05	37.15	0.00	27.32	43.88	74.00	-30.12	HORIZONTAL	Peak
7613.000	24.59	37.15	0.00	27.32	34.42	54.00	-19.58	HORIZONTAL	Average
9993.000	33.63	39.00	0.00	27.10	45.53	74.00	-28.47	HORIZONTAL	Peak
9993.000	23.38	39.00	0.00	27.10	35.28	54.00	-18.72	HORIZONTAL	Average
14719.000	28.03	39.88	0.00	26.11	41.80	74.00	-32.20	HORIZONTAL	Peak
14719.000	18.31	39.88	0.00	26.11	32.08	54.00	-21.92	HORIZONTAL	Average

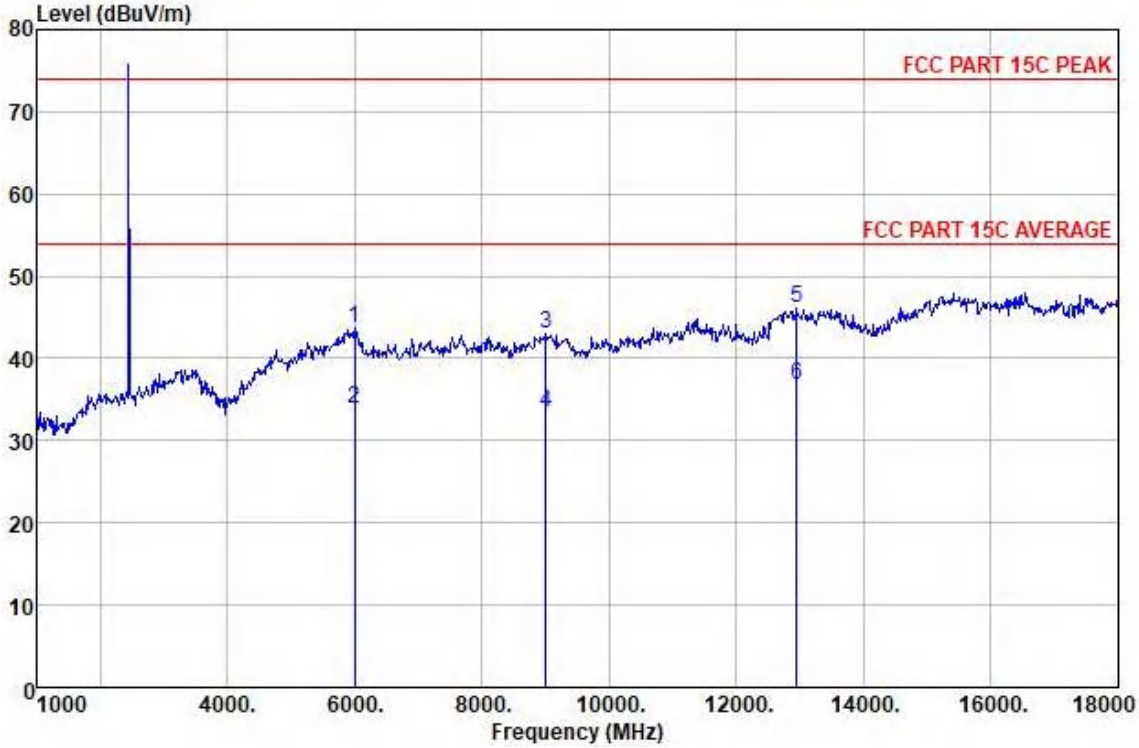
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
5998.000	35.16	35.99	0.00	27.42	43.73	74.00	-30.27	VERTICAL	Peak
5998.000	25.33	35.99	0.00	27.42	33.90	54.00	-20.10	VERTICAL	Average
9007.000	31.47	38.80	0.00	27.21	43.06	74.00	-30.94	VERTICAL	Peak
9007.000	21.90	38.80	0.00	27.21	33.49	54.00	-20.51	VERTICAL	Average
12951.000	32.04	40.58	0.00	26.50	46.12	74.00	-27.88	VERTICAL	Peak
12951.000	22.71	40.58	0.00	26.50	36.79	54.00	-17.21	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

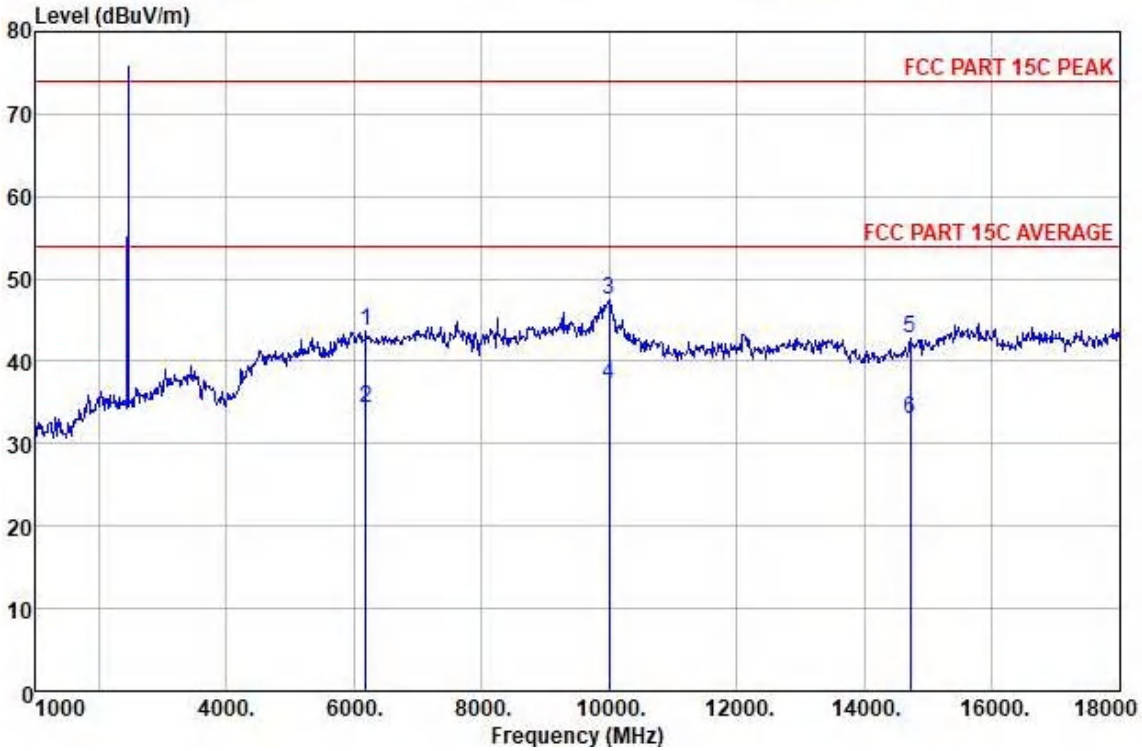
Note: The emission above limit is fundamental emission, which is not subject to the limit.

Test at Channel 11 (2.462 GHz) in transmitting status

Horizontal:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
6185.000	35.32	35.81	0.00	27.40	43.73	74.00	-30.27	HORIZONTAL	Peak
6185.000	25.92	35.81	0.00	27.40	34.33	54.00	-19.67	HORIZONTAL	Average
9993.000	35.63	39.00	0.00	27.10	47.53	74.00	-26.47	HORIZONTAL	Peak
9993.000	25.38	39.00	0.00	27.10	37.28	54.00	-16.72	HORIZONTAL	Average
14719.000	29.03	39.88	0.00	26.11	42.80	74.00	-31.20	HORIZONTAL	Peak
14719.000	19.30	39.88	0.00	26.11	33.07	54.00	-20.93	HORIZONTAL	Average

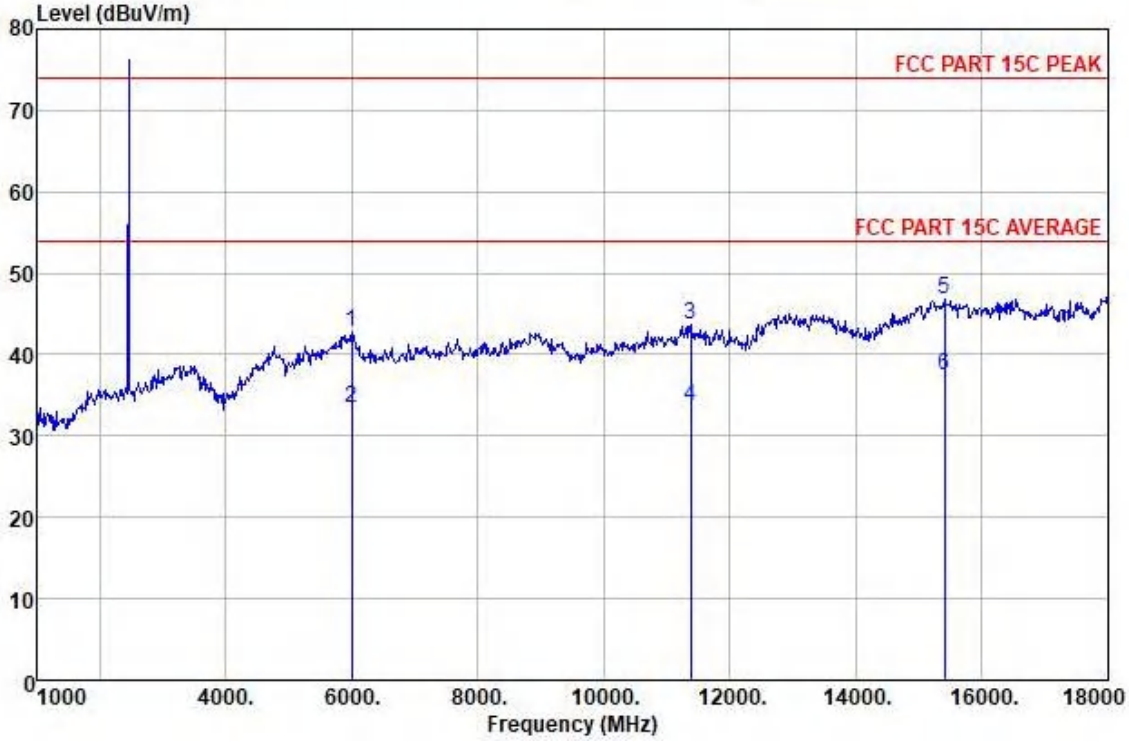
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



Freq MHz	Read Level dBuV	Antenna Factor dB	Cable Loss dB	Preamp Factor dB	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Pol/Phase	Remark
5998.000	34.16	35.99	0.00	27.42	42.73	74.00	-31.27	VERTICAL	Peak
5998.000	24.93	35.99	0.00	27.42	33.50	54.00	-20.50	VERTICAL	Average
11370.000	31.27	39.50	0.00	26.99	43.78	74.00	-30.22	VERTICAL	Peak
11370.000	21.12	39.50	0.00	26.99	33.63	54.00	-20.37	VERTICAL	Average
15399.000	33.35	39.54	0.00	26.01	46.88	74.00	-27.12	VERTICAL	Peak
15399.000	23.99	39.54	0.00	26.01	37.52	54.00	-16.48	VERTICAL	Average

Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor

Note: The emission above limit is fundamental emission, which is not subject to the limit.

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Correct= Antenna Factor + Cable Factor –Preamplifier Factor,

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

Remark:

1) .For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonics of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 3rd harmonic.
2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the FCC requirements.

5.8 Radiated Emissions which fall in the restricted bands

Test Requirement:	FCC Part 15 C section 15.247 (d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	ANSI C63.10:2013
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dBμV/m between 30MHz & 88MHz; 43.5 dBμV/m between 88MHz & 216MHz; 46.0 dBμV/m between 216MHz & 960MHz; 54.0 dBμV/m above 960MHz.
Detector:	For PK value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW =10Hz Sweep = auto Detector function = peak Trace = max hold

Section 15.205 Restricted bands of operation.

(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
[1]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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

Test Result:

Pre-test under all modes; choose the worst case mode record on the report.

Test mode: 802.11b

Frequency (MHz)	Reading Level (dBμV/m)	Correct (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization	Detector
Low Channel							
2310.000	32.14	6.54	38.68	74.00	-35.32	H	PK
2310.000	18.74	6.54	25.28	54.00	-28.72	H	AV
2390.000	32.64	6.61	39.25	74.00	-34.75	V	PK
2390.000	19.05	6.61	25.66	54.00	-28.34	V	AV
High Channel							
2483.500	33.26	6.70	39.96	74.00	-34.04	H	PK
2483.500	19.48	6.70	26.18	54.00	-27.82	H	AV
2500.000	32.67	6.72	39.39	74.00	-34.61	V	PK
2500.000	18.48	6.72	25.20	54.00	-28.80	V	AV

Test mode: 802.11n(HT40)

Frequency (MHz)	Reading Level (dBμV/m)	Correct (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization	Detector
Low Channel							
2310.000	31.25	6.54	37.79	74.00	-36.21	H	PK
2310.000	18.63	6.54	25.17	54.00	-28.83	H	AV
2390.000	32.73	6.61	39.34	74.00	-34.66	V	PK
2390.000	19.43	6.61	26.04	54.00	-27.96	V	AV
High Channel							
2483.500	33.73	6.70	40.43	74.00	-33.57	H	PK
2483.500	19.84	6.70	26.54	54.00	-27.46	H	AV
2500.000	33.63	6.72	40.35	74.00	-33.65	V	PK
2500.000	18.93	6.72	25.65	54.00	-28.35	V	AV

5.9 Band Edges Requirement

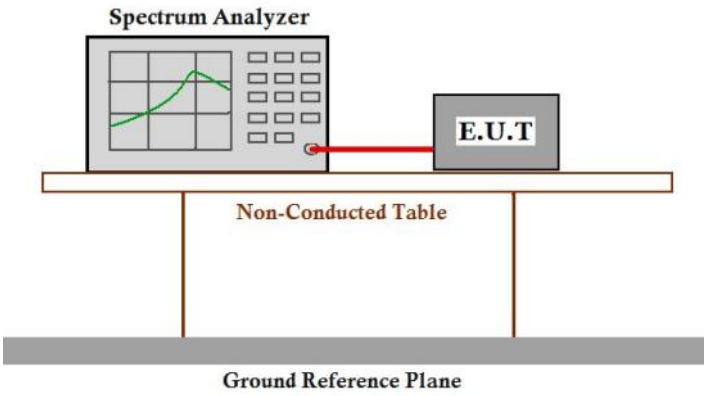
Test Requirement: FCC Part 15 C section 15.247
(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 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. Provided the transmitter demonstrates compliance with the peak conducted power limits.

Frequency Band: 2400 MHz to 2483.5 MHz

Test Method: ANSI C63.10:2013

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

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set RBW=100 kHz, VBW=300 KHz, suitable frequency span including 1000 kHz bandwidth from band edge.
3. Measure the Conducted Spurious Emissions and Radiated Emissions of the test frequency with special test status.
4. Repeat until all the test status is investigated.
5. Report the worse.

Test result with plots as follows:

The band edges was measured and recorded Result:

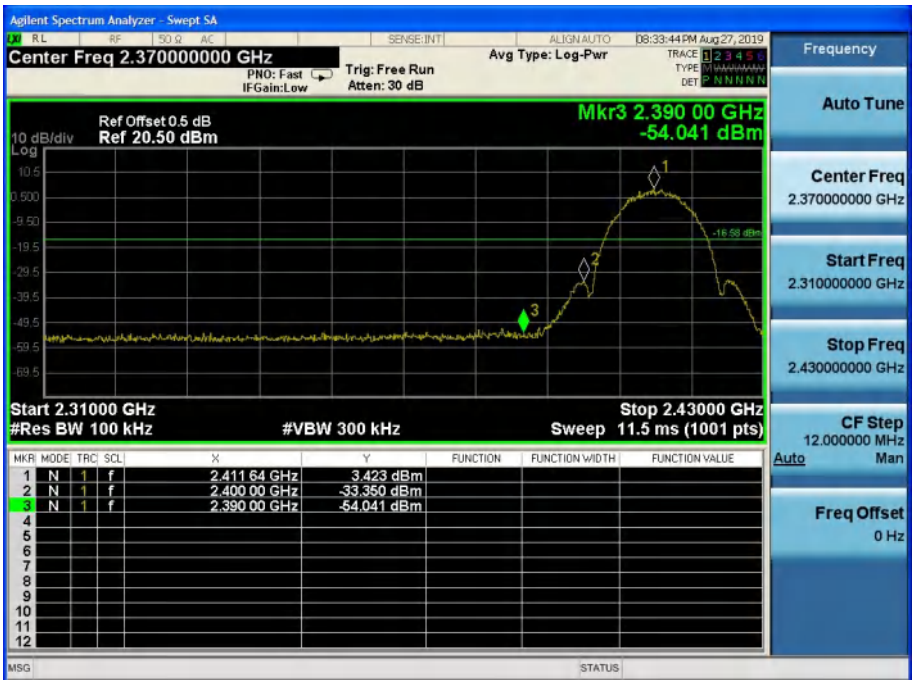
The Lower Edges attenuated more than 20dB.

The Upper Edges attenuated more than 20dB.

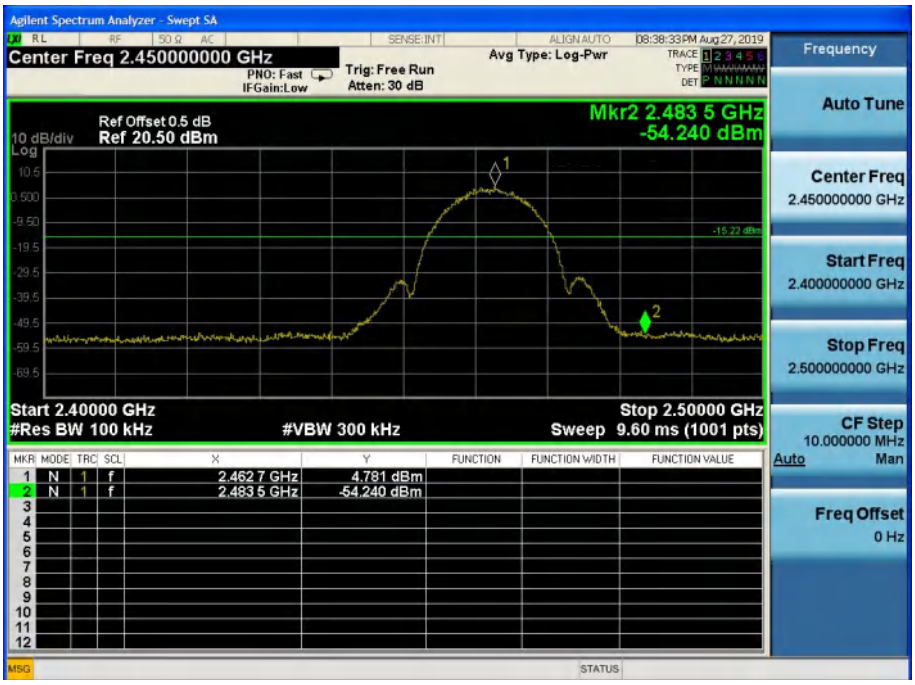
Result plot as follows:

802.11b

Channel 1: 2.412 GHz

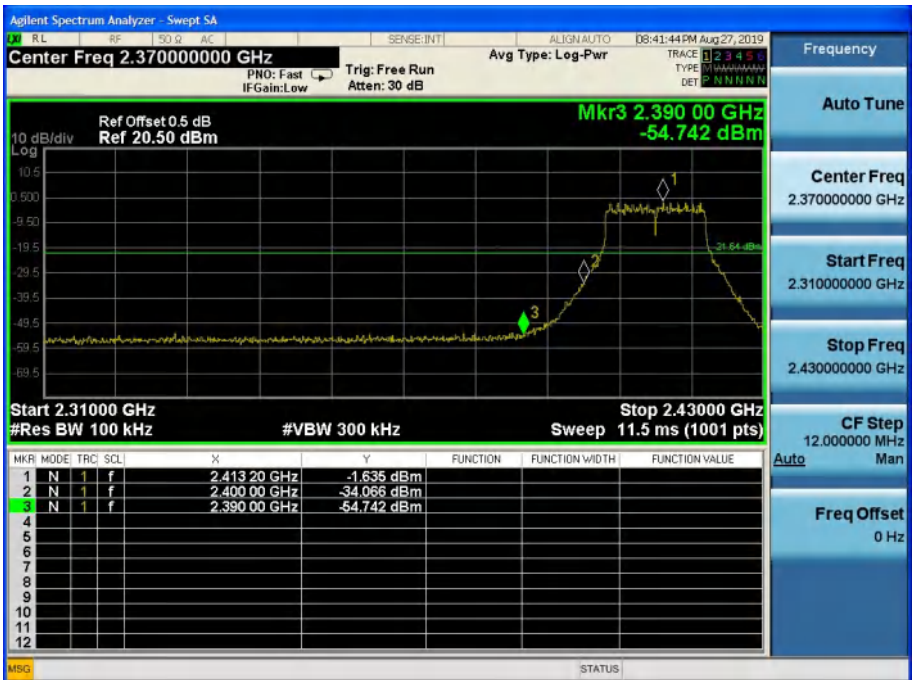


Channel 11: 2.462 GHz

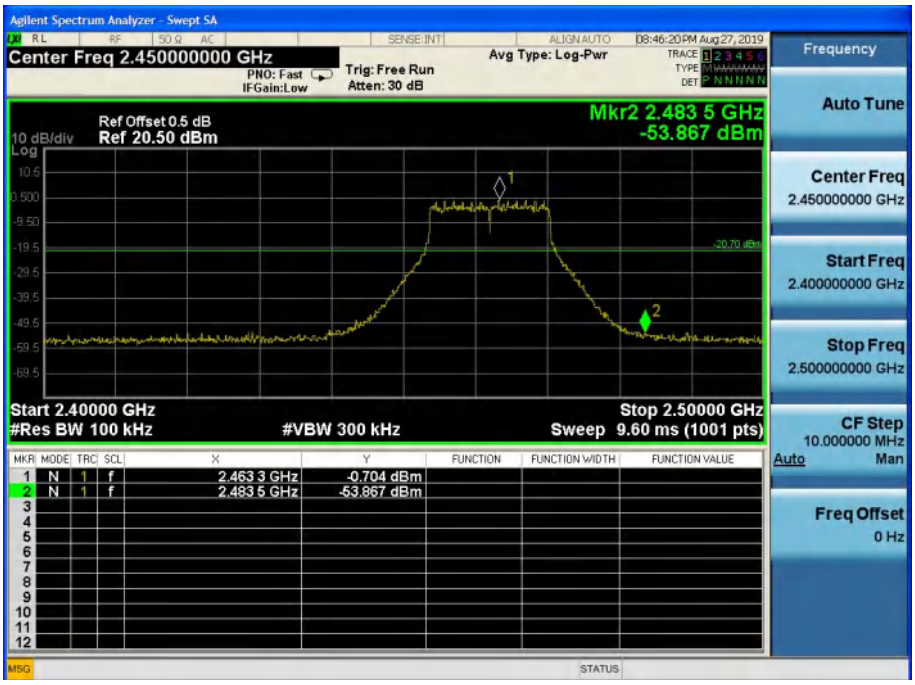


802.11g

Channel 1: 2.412 GHz

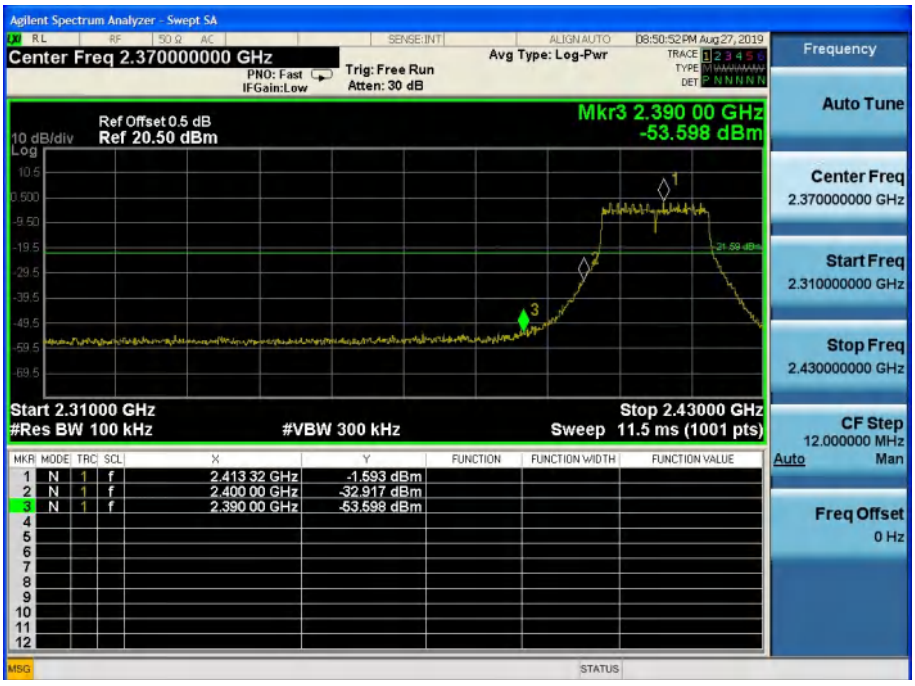


Channel 11: 2.462 GHz

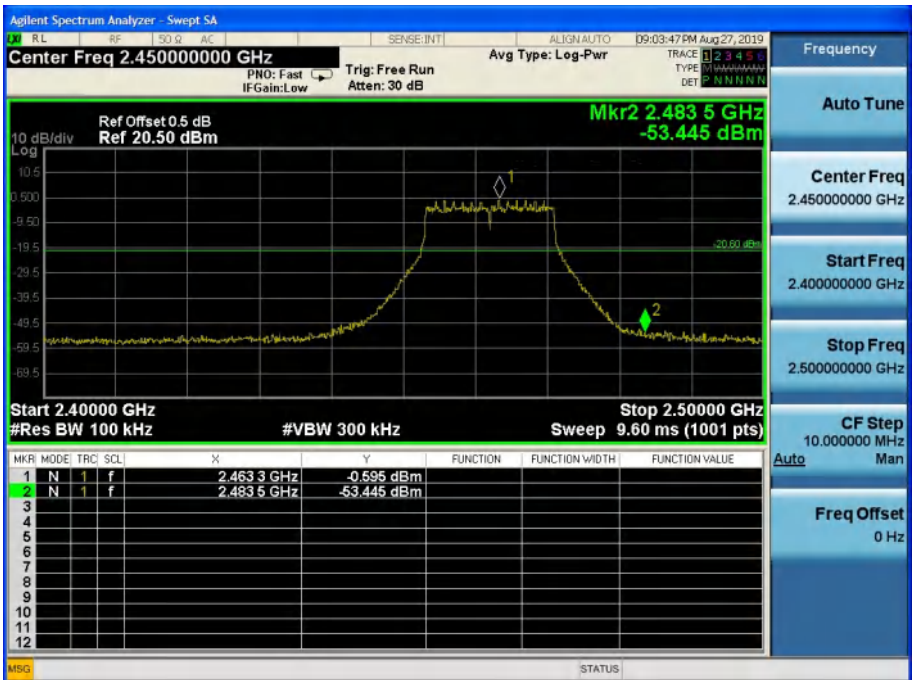


802.11n(HT20)

Channel 1: 2.412 GHz



Channel 11: 2.462 GHz



802.11n(HT40)

Channel 3: 2.422 GHz

Channel 9: 2.452 GHz

Test result: The unit does meet the FCC requirements.

5.10 Conducted Emissions at Mains Terminals 150 kHz to 30MHz

Test Requirement: FCC Part 15 C section 15.207

Test Voltage: 120V~ 60Hz

Test Method: ANSI C63.10:2013 Clause 6.2

Frequency Range: 150 kHz to 30 MHz

Detector: Peak for pre-scan (9 kHz Resolution Bandwidth)

Test Limit

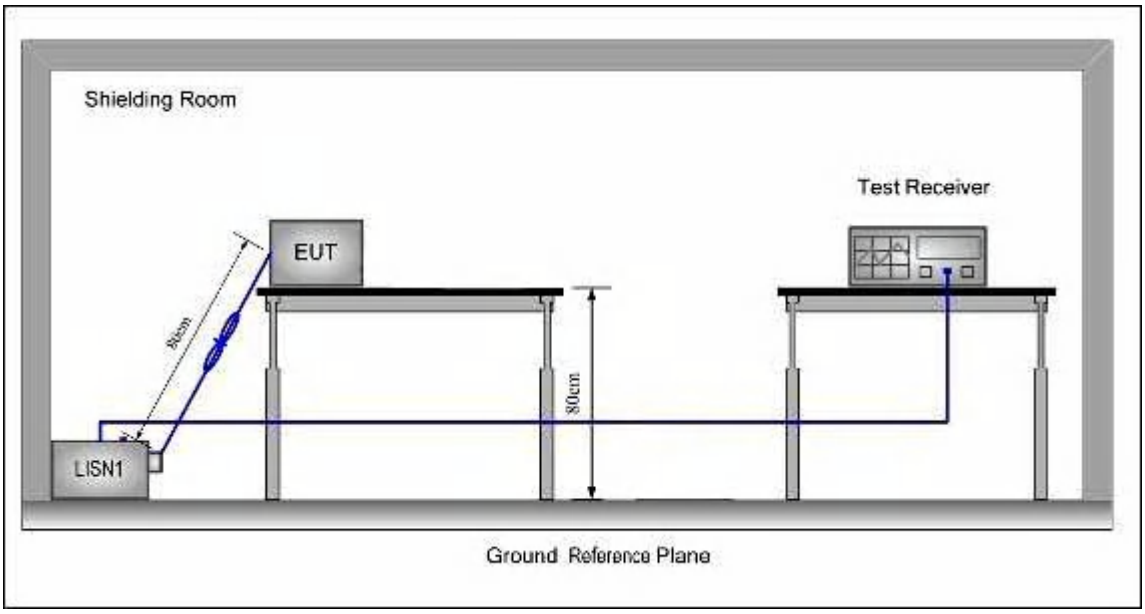
Limits for conducted disturbance at the mains ports of class B

Frequency Range	Class B Limit dB(μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

EUT Operation: Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, channels and antenna ports (if EUT with antenna diversity architecture).

Test Configuration:



Test procedure:

1. The mains terminal disturbance voltage test was conducted in a shielded room.

2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

5.10.1 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

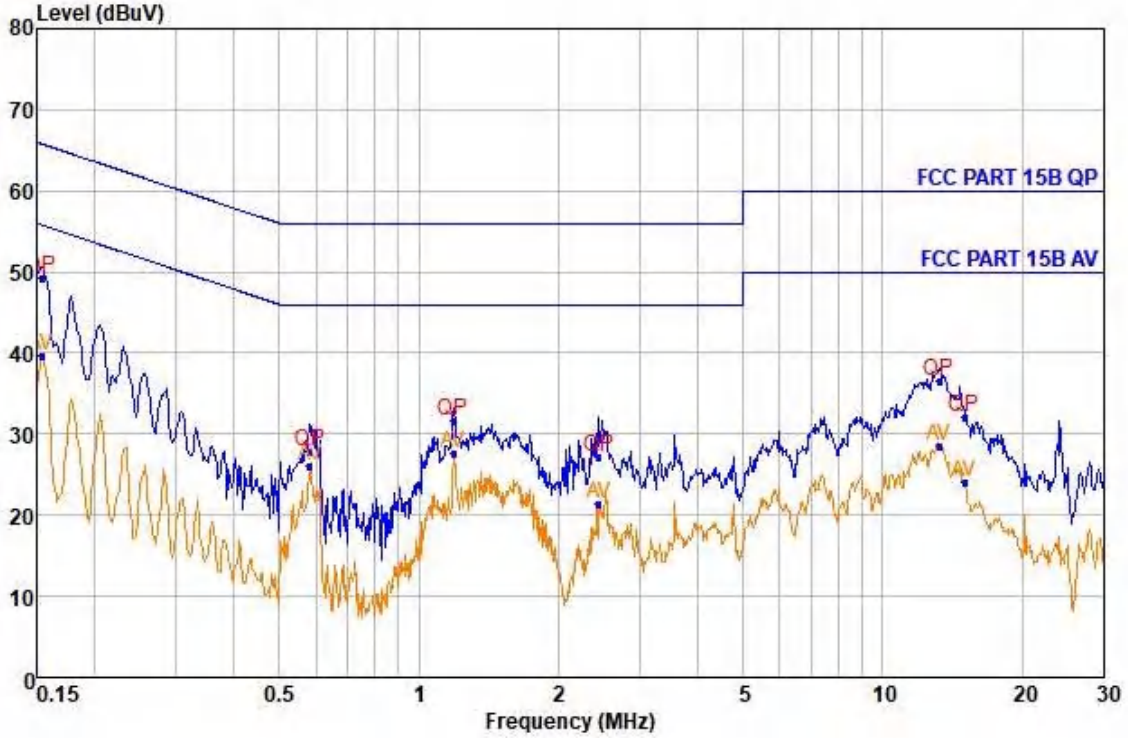
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the communicating was worst case mode.

The following Quasi-Peak and Average measurements were performed on the EUT

With Power Supply MW
Live line:

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement

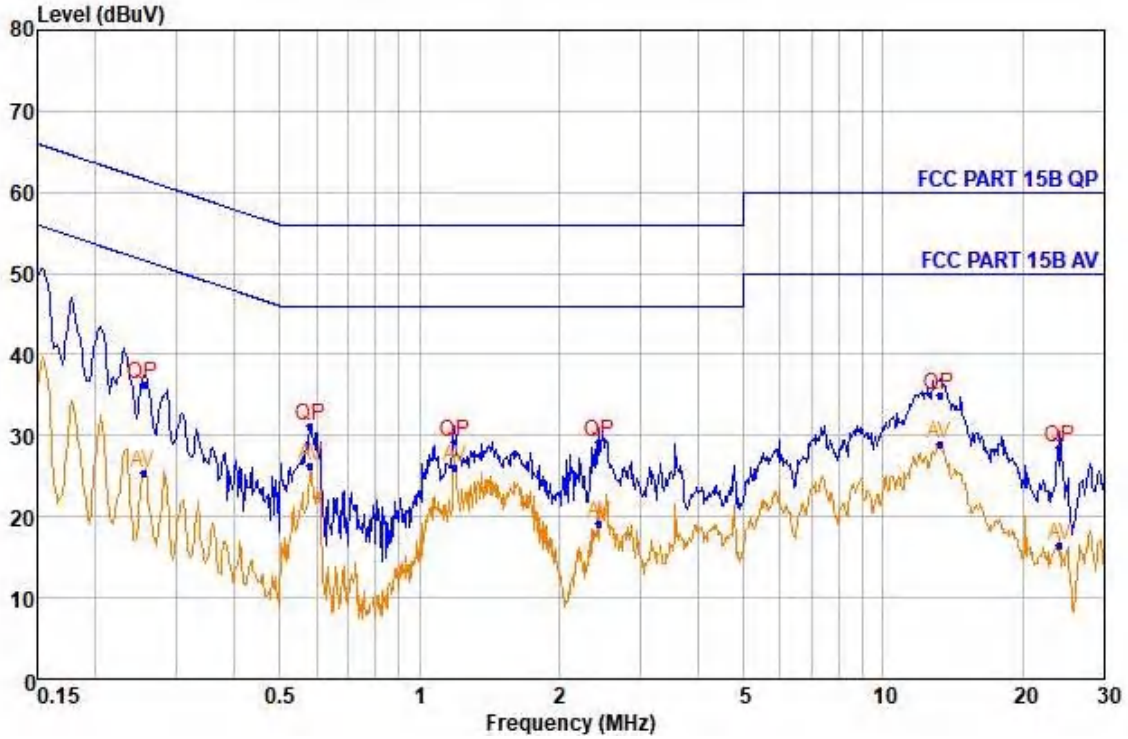
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.154	49.18	QP	9.70	0.20	65.80	-16.62
2	0.154	39.70	Average	9.70	0.20	55.78	-16.08
3	0.581	27.84	QP	9.68	0.28	56.00	-28.16
4	0.581	26.13	Average	9.68	0.28	46.00	-19.87
5	1.189	31.57	QP	9.67	0.32	56.00	-24.43
6	1.189	27.58	Average	9.67	0.32	46.00	-18.42
7	2.442	27.13	QP	9.64	0.36	56.00	-28.87
8	2.442	21.34	Average	9.64	0.36	46.00	-24.66
9	13.234	36.50	QP	9.69	0.45	60.00	-23.50
10	13.234	28.44	Average	9.69	0.45	50.00	-21.56
11	15.000	32.10	QP	9.71	0.46	60.00	-27.90
12	15.000	23.98	Average	9.71	0.46	50.00	-26.02

Level=Read Level + LISN Factor + Cable Loss

Neutral Line

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.253	36.41	QP	9.64	0.23	61.64	-25.23
2	0.253	25.41	Average	9.64	0.23	51.64	-26.23
3	0.582	31.23	QP	9.65	0.28	56.00	-24.77
4	0.582	26.23	Average	9.65	0.28	46.00	-19.77
5	1.191	29.11	QP	9.63	0.32	56.00	-26.89
6	1.191	26.11	Average	9.63	0.32	46.00	-19.89
7	2.448	29.08	QP	9.62	0.36	56.00	-26.92
8	2.448	19.08	Average	9.62	0.36	46.00	-26.92
9	13.267	35.03	QP	9.63	0.45	60.00	-24.97
10	13.267	29.03	Average	9.63	0.45	50.00	-20.97
11	24.015	28.54	QP	9.63	0.49	60.00	-31.46
12	24.015	16.54	Average	9.63	0.49	50.00	-33.46

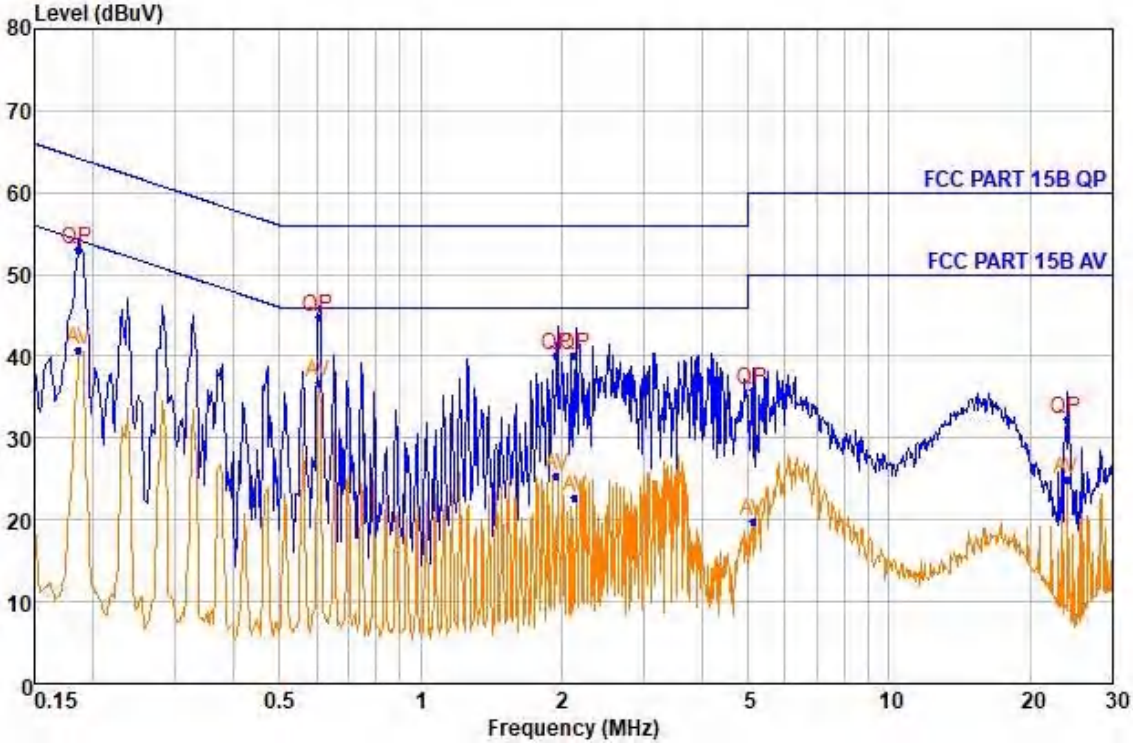
Level=Read Level + LISN Factor + Cable Loss

With Power Supply MORNSUN

Live Line:

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

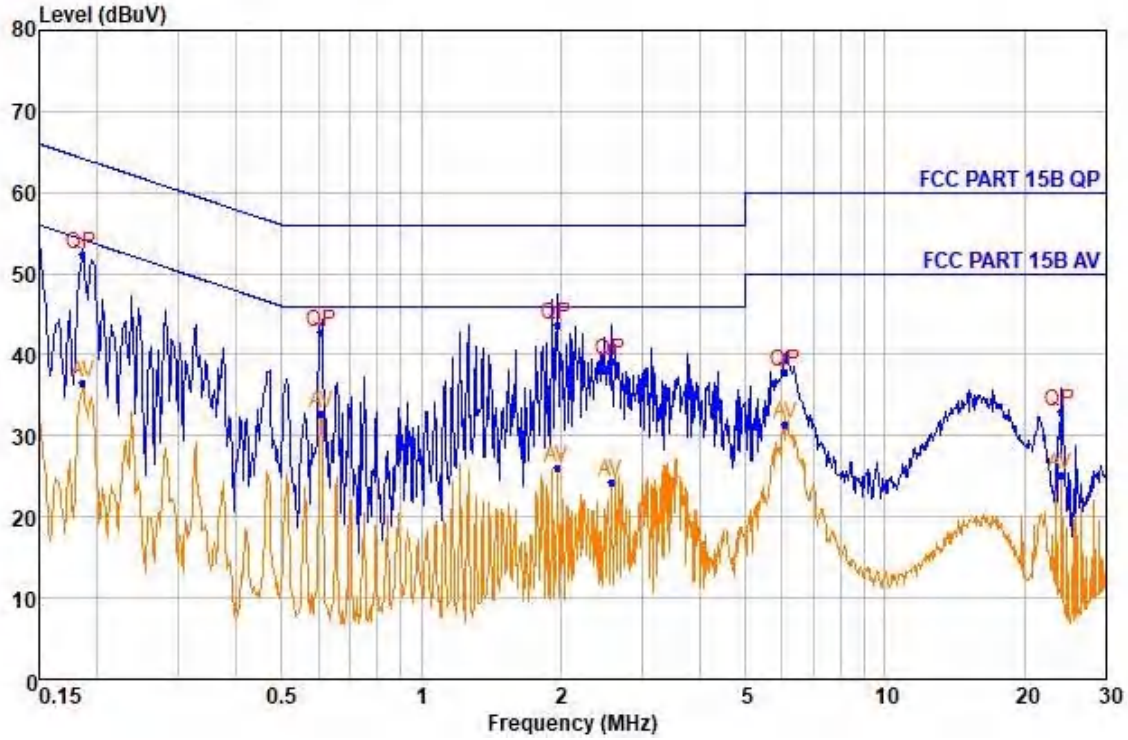
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.186	53.14	QP	9.69	0.21	64.22	-11.08
2	0.186	40.77	Average	9.68	0.21	64.20	-23.43
3	0.606	44.70	QP	9.68	0.28	56.00	-11.30
4	0.606	36.66	Average	9.68	0.28	56.00	-19.34
5	1.955	40.02	QP	9.65	0.35	56.00	-15.98
6	1.955	25.35	Average	9.65	0.35	56.00	-30.65
7	2.138	40.18	QP	9.65	0.35	56.00	-15.82
8	2.138	22.71	Average	9.65	0.35	56.00	-33.29
9	5.128	35.95	QP	9.61	0.40	60.00	-24.05
10	5.128	19.82	Average	9.61	0.40	60.00	-40.18
11	23.966	32.36	QP	9.67	0.49	60.00	-27.64
12	23.966	25.03	Average	9.67	0.49	60.00	-34.97

Level=Read Level + LISN Factor + Cable Loss

Neutral Line:

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.186	52.39	QP	9.65	0.21	64.22	-11.83
2	0.186	36.46	Average	9.65	0.21	64.20	-27.74
3	0.610	42.76	QP	9.64	0.28	56.00	-13.24
4	0.610	32.84	Average	9.64	0.28	56.00	-23.16
5	1.965	43.63	QP	9.62	0.35	56.00	-12.37
6	1.965	26.18	Average	9.62	0.35	56.00	-29.82
7	2.561	39.22	QP	9.62	0.36	56.00	-16.78
8	2.561	24.33	Average	9.62	0.36	56.00	-31.67
9	6.107	37.96	QP	9.62	0.41	60.00	-22.04
10	6.107	31.42	Average	9.62	0.41	60.00	-28.58
11	23.966	32.88	QP	9.63	0.49	60.00	-27.12
12	23.966	25.12	Average	9.63	0.49	60.00	-34.88

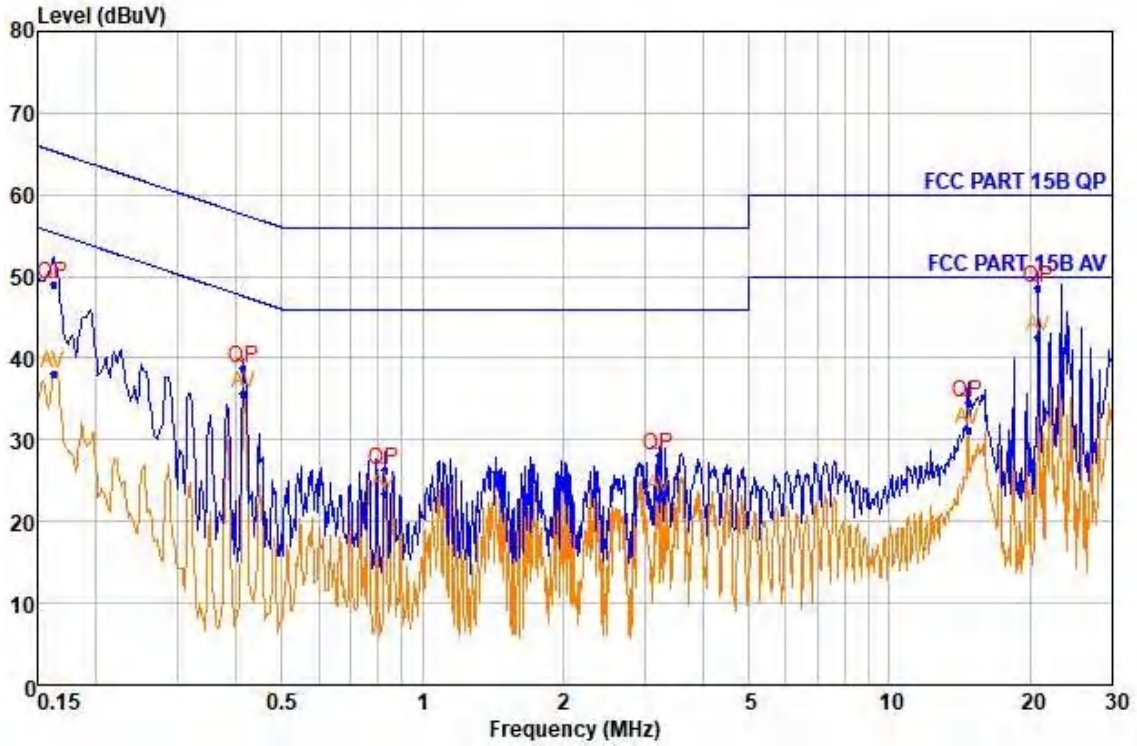
Level=Read Level + LISN Factor + Cable Loss

With Power Supply XP

Live Line:

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

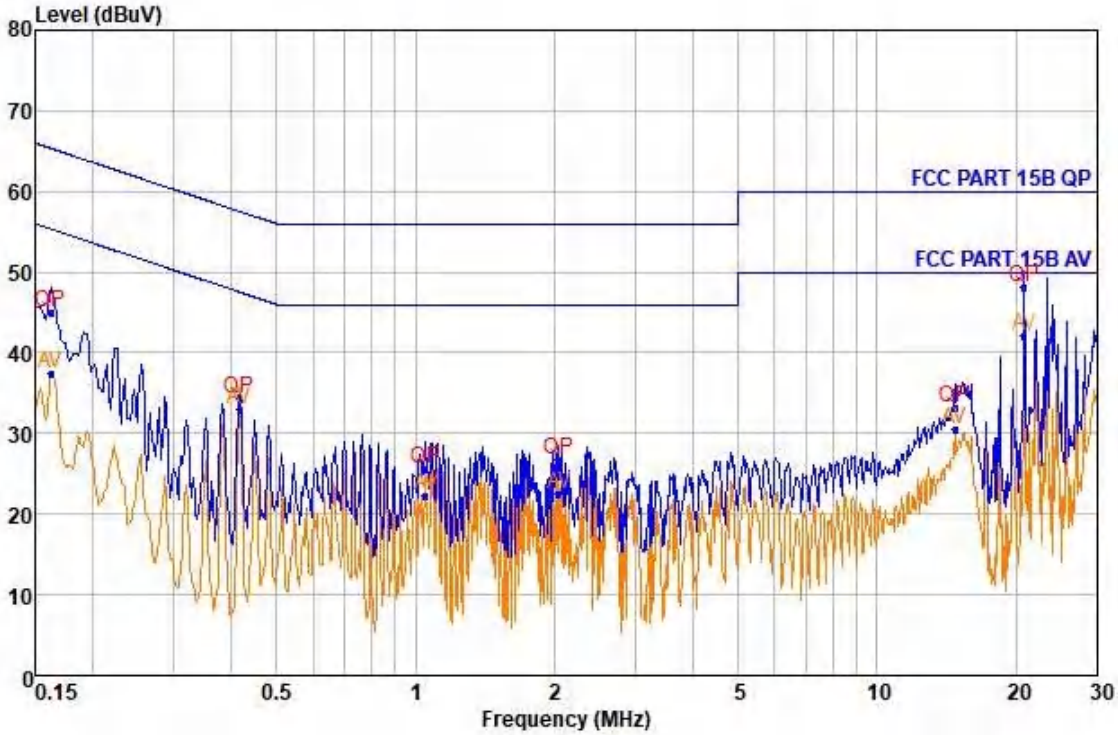
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.162	49.01	QP	9.69	0.20	65.34	-16.33
2	0.162	38.02	Average	9.69	0.20	65.34	-27.32
3	0.414	38.79	QP	9.66	0.26	57.57	-18.78
4	0.414	35.70	Average	9.66	0.26	57.57	-21.87
5	0.828	26.37	QP	9.69	0.30	56.00	-29.63
6	0.830	23.45	Average	9.69	0.30	56.00	-32.55
7	3.218	28.07	QP	9.62	0.37	56.00	-27.93
8	3.218	23.04	Average	9.62	0.37	56.00	-32.96
9	14.722	34.59	QP	9.71	0.46	60.00	-25.41
10	14.722	31.22	Average	9.71	0.46	60.00	-28.78
11	20.814	48.50	QP	9.68	0.48	60.00	-11.50
12	20.814	42.50	Average	9.68	0.48	60.00	-17.50

Level=Read Level + LISN Factor + Cable Loss

Neutral Line:

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.162	45.00	QP	9.69	0.20	65.34	-20.34
2	0.162	37.45	Average	9.69	0.20	65.34	-27.89
3	0.416	34.42	QP	9.66	0.26	57.52	-23.10
4	0.416	32.88	Average	9.66	0.26	57.52	-24.64
5	1.052	25.69	QP	9.63	0.31	56.00	-30.31
6	1.052	22.39	Average	9.63	0.31	56.00	-33.61
7	2.039	26.71	QP	9.62	0.35	56.00	-29.29
8	2.039	22.54	Average	9.62	0.35	56.00	-33.46
9	14.722	33.13	QP	9.63	0.46	60.00	-26.87
10	14.722	30.44	Average	9.63	0.46	60.00	-29.56
11	20.814	48.08	QP	9.62	0.48	60.00	-11.92
12	20.814	42.08	Average	9.62	0.48	60.00	-17.92

Level=Read Level + LISN Factor + Cable Loss

-- End of test report -