FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

Wireless controller

MODEL NUMBER: VEN-3S-3R-HC

FCC ID: 2ANSS-VEN-3S-3R-HC

REPORT NUMBER: 4788198318-2

ISSUE DATE: May 10, 2018

Prepared for

Guangzhou automation technology co.,ltd
ROOM201,2ND BUILDING, 10TH HEPING ROAD,HUIJIANG VILLAGE,DASHI STREET,PANYU DISTRICT, GUANGZHOU.

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	05/10/2018	Initial Issue	

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Summary of Test Results			
Clause	**Test Items**	FCC/IC Rules	Test Results
1	6dB Bandwidth and 99% Bandwidth	FCC 15.247 (a) (2)	PASS
2	Peak Conducted Output Power	FCC 15.247 (b) (3)	PASS
3	Power Spectral Density	FCC 15.247 (e)	PASS
4	Conducted Bandedge and Spurious Emission	FCC 15.247 (d)	PASS
5	Radiated Bandedge and Spurious Emission	FCC 15.247 (d) FCC 15.209 FCC 15.205	PASS
6	Conducted Emission Test For AC Power Port	FCC 15.207	PASS
7	Antenna Requirement	FCC 15.203	PASS

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Guangzhou automation technology co.,ltd
Address:	ROOM201,2ND BUILDING, 10TH HEPING ROAD,HUIJIANG VILLAGE,DASHI STREET,PANYU DISTRICT, GUANGZHOU

Manufacturer Information

Company Name:	Guangzhou automation technology co.,ltd
Address:	ROOM201,2ND BUILDING, 10TH HEPING ROAD,HUIJIANG VILLAGE,DASHI STREET,PANYU DISTRICT, GUANGZHOU

EUT Description

Product Name	Wireless controller
Brand Name	TIS
Model Name	VEN-3S-3R-HC
Serial Number	Refer to 5.1.DESCRIPTION OF EUT
Model Difference	Refer to 5.1.DESCRIPTION OF EUT
Date Tested	November 26, 2017 ~ May 10, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

Tested By:

Kebo Zhang
Engineer

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo

Laboratory Manager

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with 558074 D01 DTS Meas Guidance v04, 414788 D01 Radiated Test Site v01, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Accreditation Certificate	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. The Certificate Registration Number is 4102.01. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The Designation Number is CN1187. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320.

Note: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

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4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-18Gz)
	5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Equipment	Wireless controller
Model Name	VEN-3S-3R-HC
Serial Number	VEN-1S-1R-HC,VEN-1G-1S-HC,VEN-2S-1R-HC VEN-2S-1R-HC,VEN-3S-1R-HC
Model Difference	VEN-1S-1R-HC, VEN-1G-1S-HC, VEN-2S-1R-HC, they are the same, only the model name is different. (There has only one relays inside the product.) VEN-2S-1R-HC, VEN-3S-1R-HC, they are the same, only the model name is different. (There have two relays inside the product.) VEN-3S-3R-HC (There have three relays inside the product.) All the models are the same except for the model name and the number of relays.
Radio Technology	IEEE802.11b/g/n HT20
Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz
Modulation	IEEE 802.11b: DSSS(CCK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)
Power Supply	AC120V/60Hz

5.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	Number of Transmit Chains (NTX)	IEE Std. 802.11	Frequency (MHz)	Channel Number	Max PK Conducted Power (dBm)
2412-2462	1	IEEE 802.11b	2412-2462	1-11[11]	16.051
2412-2462	1	IEEE 802.11g	2412-2462	1-11[11]	21.144
2412-2462	1	IEEE 802.11nHT20	2412-2462	1-11[11]	20.702

5.3. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2425	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	N/A	N/A

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5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel (MHz)
IEEE 802.11b	LCH :CH01 2412
	MCH: CH06 2437
	HCH: CH11 2462
IEEE 802.11g	LCH :CH01 2412
	MCH: CH06 2437
	HCH: CH11 2462
IEEE 802.11n HT20	LCH :CH01 2412
	MCH: CH06 2437
	HCH: CH11 2462

5.5. THE WORSE CASE CONFIGURATIONS

Test Software Version	DutApiWiFiMW30XBrdigeUart
Test Mode	Setting data rate (Mbps)
IEEE 802.11b	CCK_1Mbps
	CCK_1Mbps
	CCK_1Mbps
IEEE 802.11g	NO HT_6Mbps
	NO HT_6Mbps
	NO HT_6Mbps
IEEE 802.11n HT20	HT20_MCS_0_20
	HT20_MCS_0_20
	HT20_MCS_0_20

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5.6. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
Voltage :	VL	N/A
	VN	AC 120V/60Hz
	VH	N/A

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2412-2462	PCB Antenna	3.0

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	☒1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.
IEEE 802.11g	☒1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT20	☒1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.

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5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	T460S	SL10K24796 JS
2	USB serial board	N/A	N/A	N/A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	NA	NA	NA	NA	N/A

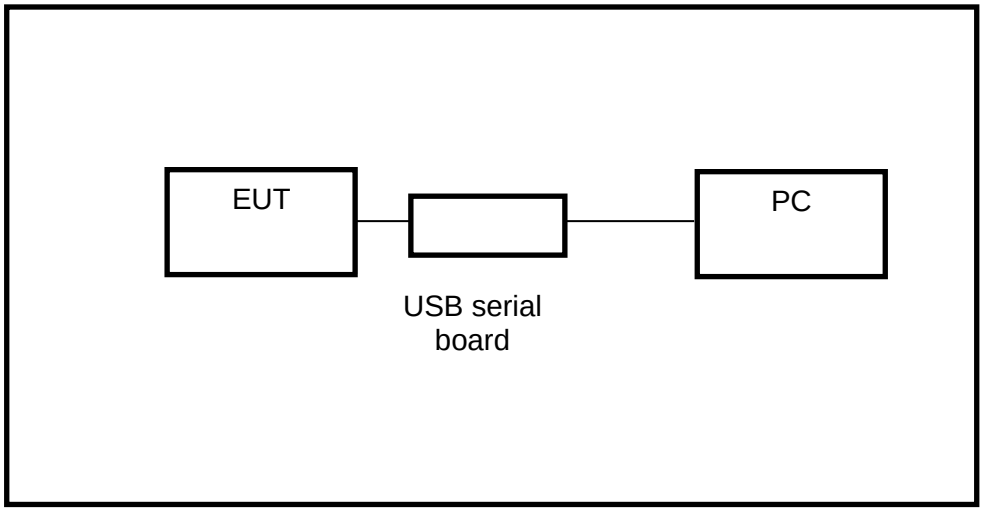
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	NA	N/A	NA	NA

TEST SETUP

The EUT can work in engineering mode with a software through a PC.

SETUP DIAGRAM FOR TESTS



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5.9. MEASURING INSTRUMENT AND SOFTWARE USED

The previous calibrated time:

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	101961	Dec.20, 2016	Dec.19, 2017
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.20, 2016	Dec.19, 2017
☑	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Feb.10, 2017	Feb.10, 2018
Software						
Used	Description		Manufacturer	Name	Version	
☑	Test Software for Conducted disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Feb. 24, 2017	Feb. 24, 2018
☑	Preamplifier	HP	8447D	2944A09099	Feb. 13, 2017	Feb. 13, 2018
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec. 20, 2016	Dec. 20, 2017
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Jan. 14, 2017	Jan. 14, 2018
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec. 20, 2016	Dec. 20, 2017
Software						
Used	Description		Manufacturer	Name	Version	
☑	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec. 20, 2016	Dec. 20, 2017
☑	Power Meter	Keysight	N9031A	MY55416024	Feb. 13, 2017	Feb. 13, 2018
☑	Power Sensor	Keysight	N9323A	MY55440013	Feb. 13, 2017	Feb. 13, 2018

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The last calibrated time:

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	101961	Dec.12,2017	Dec.11,2018
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.12,2017	Dec.11,2018
☑	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.12,2017	Dec.11,2018
Software						
Used	Description		Manufacturer	Name	Version	
☑	Test Software for Conducted disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec.12,2017	Dec.11,2018
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Jan.09, 2019
☑	Preamplifier	HP	8447D	2944A09099	Dec.12,2017	Dec.11,2018
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12,2017	Dec.11,2018
☑	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Jan. 09, 2019
☑	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Jan.06, 2016	Jan.06, 2019
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.12,2017	Dec.11,2018
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12,2017	Dec.11,2018
☑	Loop antenna	Schwarzbeck	1519B	00008	Mar. 26, 2016	Mar. 25, 2019
Software						
Used	Description		Manufacturer	Name	Version	
☑	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.12,2017	Dec.11,2018
☑	Power Meter	Keysight	N1911A	MY55416024	Dec.12,2017	Dec.11,2018
☑	Power Sensor	Keysight	N1921A	MY51100041	Dec.12,2017	Dec.11,2018

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6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

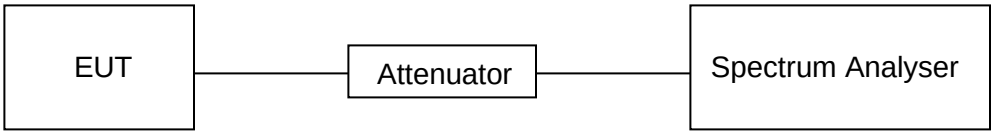
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



RESULTS

ANTENNA1

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/B Minimum VBW (KHz)
11b	4.19	4.71	0.89	89	0.51	0.24
11g	0.69	0.79	0.87	87	0.60	1.45
11n20	0.66	0.76	0.87	87	0.60	1.52

Note: Duty Cycle Correction Factor=10log (1/x).
Where: x is Duty Cycle (Linear)
Where: B is On Time

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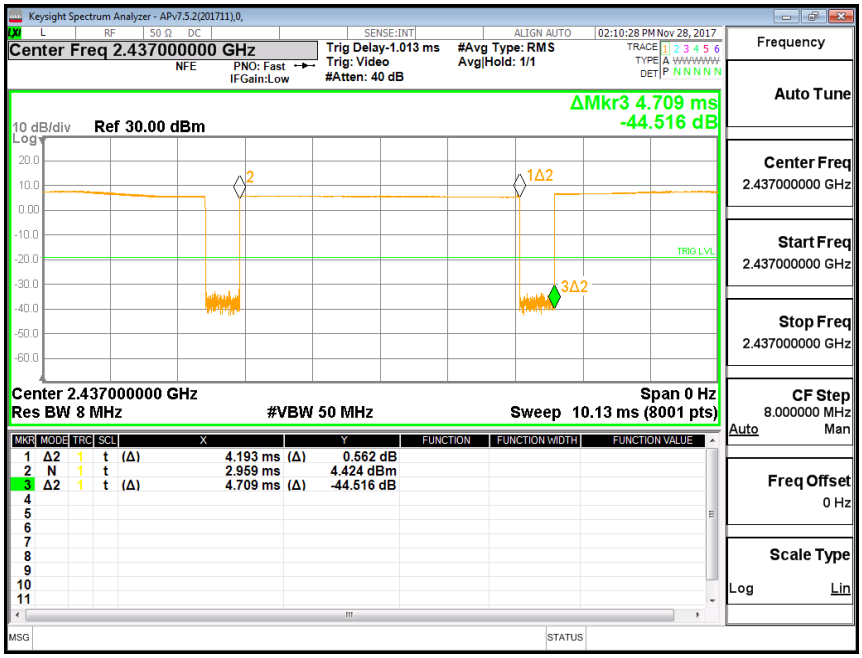
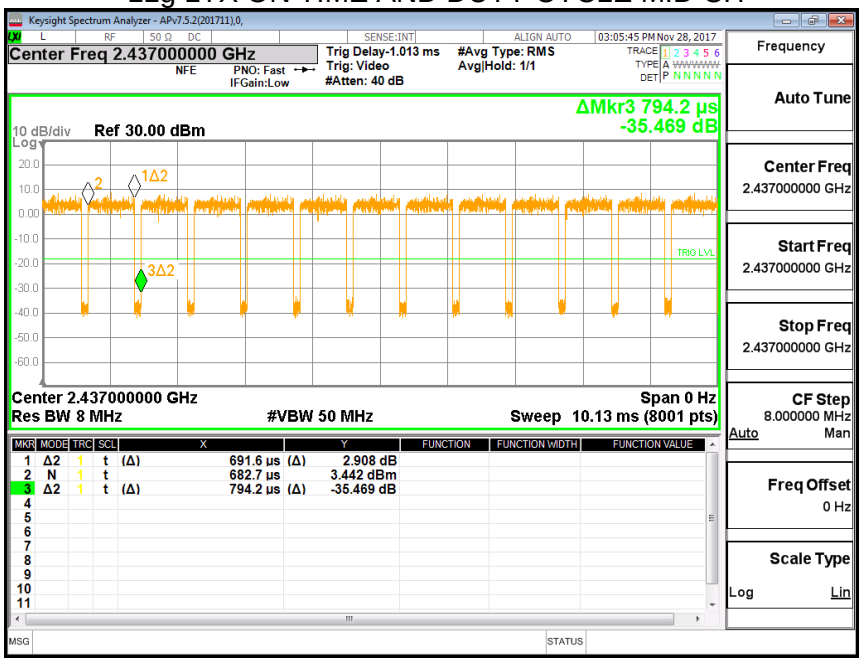
11b 1TX ON TIME AND DUTY CYCLE MID CH



11g 1TX ON TIME AND DUTY CYCLE MID CH



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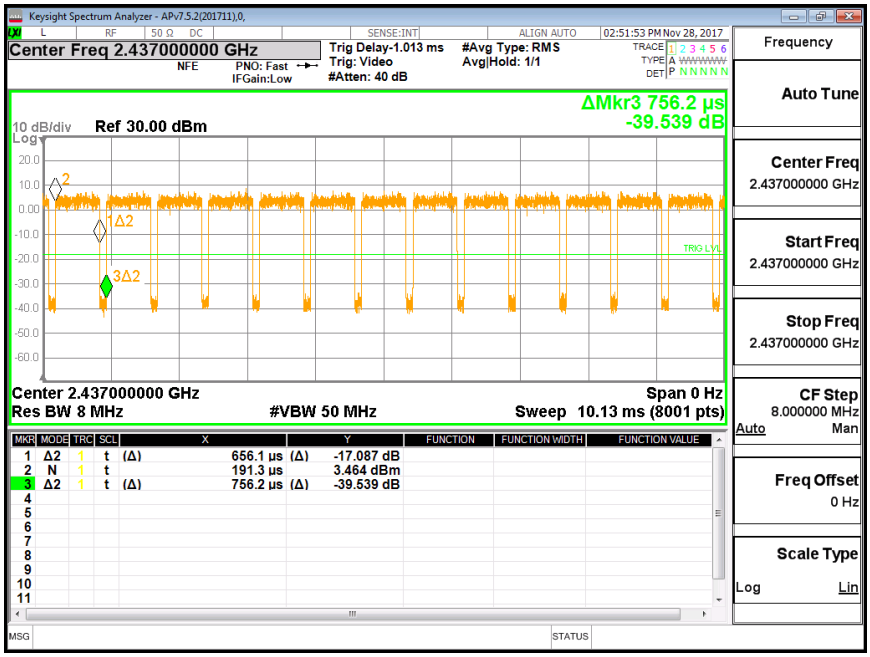
11n20 CDD ON TIME AND DUTY CYCLE MID CH



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6.2. 6 dB DTS BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(a)(2)	6 dB Bandwidth	>= 500KHz	2400-2483.5

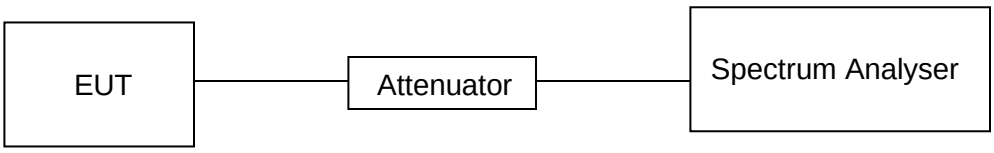
TEST PROCEDURE

KDB 558074D01 Section 8.1 test method.
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth :100K
VBW	For 6dB Bandwidth : ≥3 × RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and 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.

TEST SETUP



RESULTS

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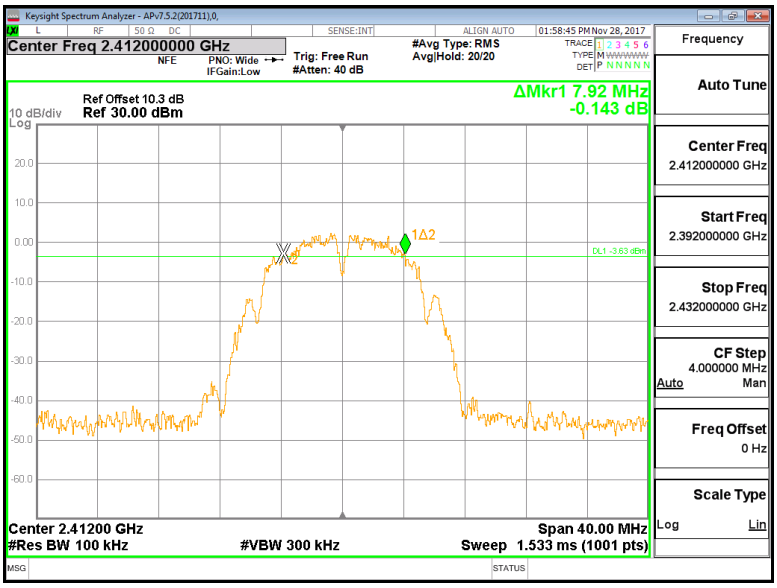
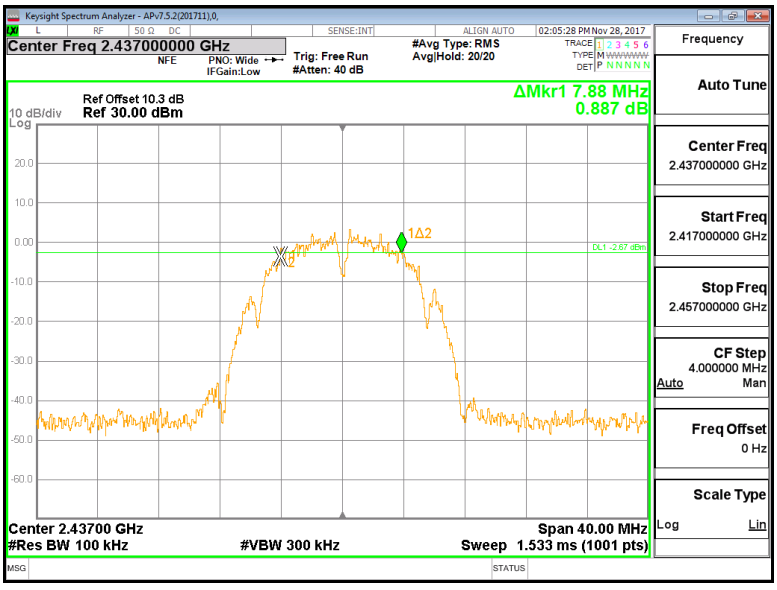
6.2.1. 802.11b MODE

Frequency (MHz)	6dB bandwidth (MHz)	Limit For 6dB (kHz)	Result
2412	7.92	500	Pass
2437	7.88	500	Pass
2462	7.52	500	Pass

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



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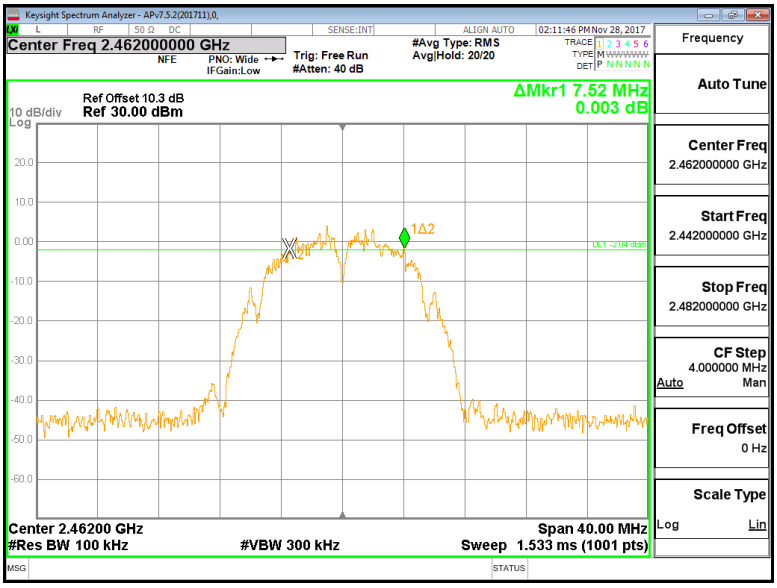
6 dB BANDWIDTH HIGH CH



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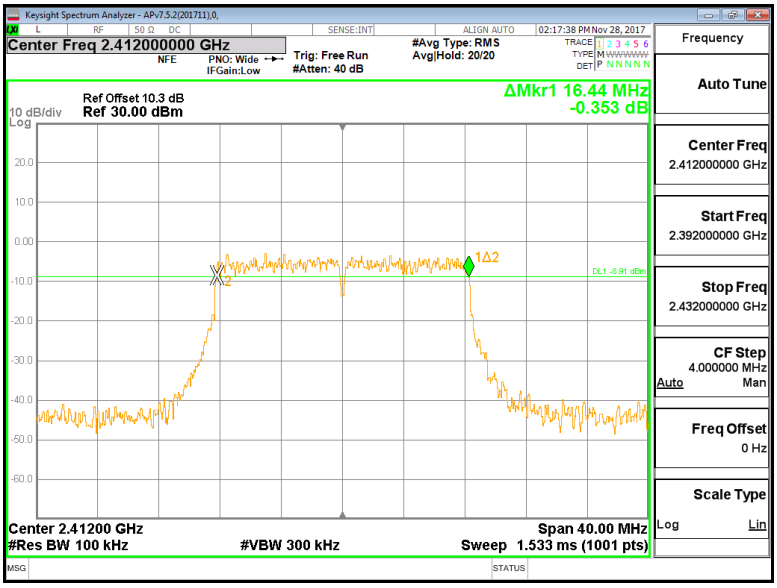
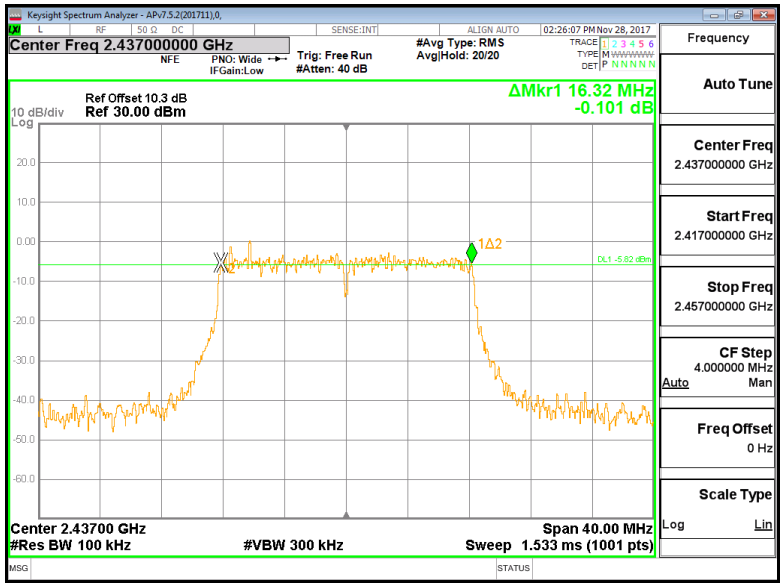
6.2.2. 802.11g MODE

Frequency (MHz)	6dB bandwidth (MHz)	Limit For 6dB (kHz)	Result
2412	16.44	500	Pass
2437	16.32	500	Pass
2462	16.32	500	Pass

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



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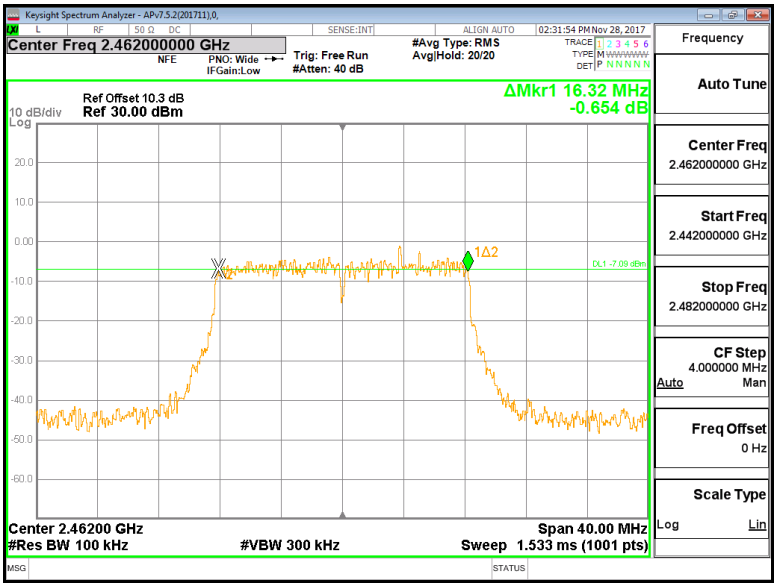
6 dB BANDWIDTH HIGH CH



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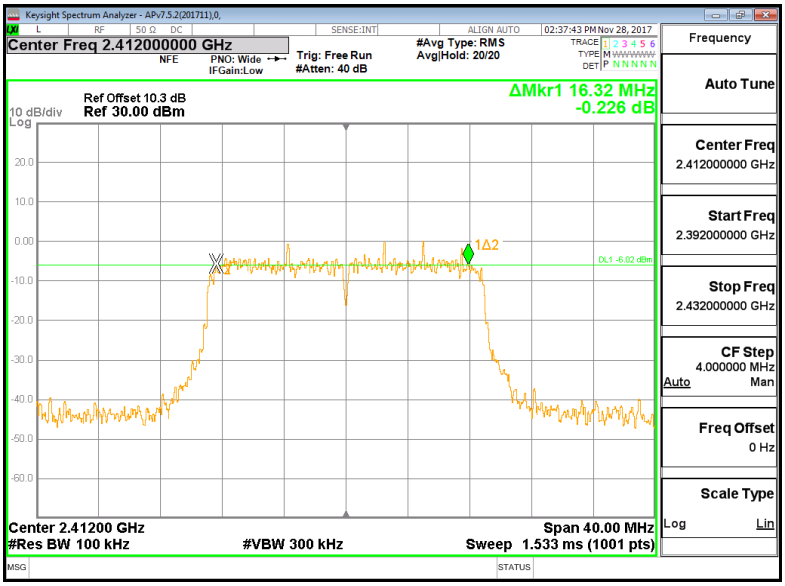
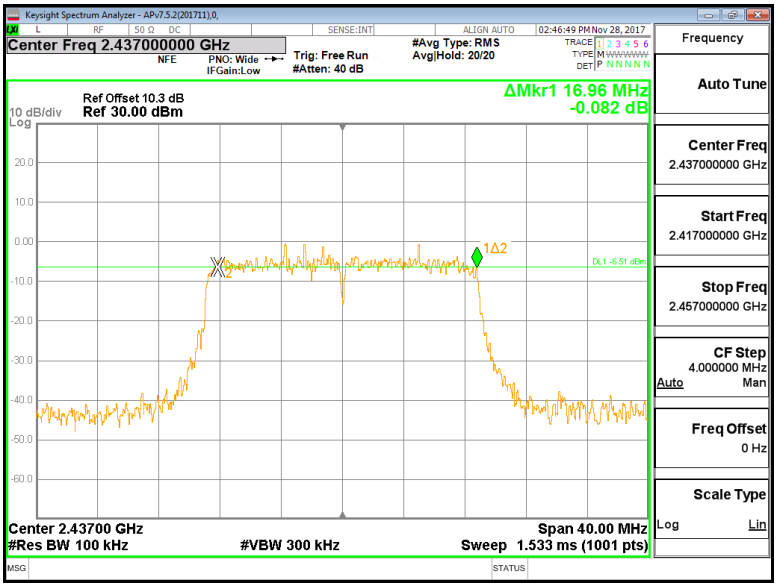
6.2.3. 802.11n20 MODE

Frequency (MHz)	6dB bandwidth (MHz)	Limit For 6dB (kHz)	Result
2412	16.32	500	Pass
2437	16.96	500	Pass
2462	17.00	500	Pass

6 dB BANDWIDTH LOW CH



6 dB BANDWIDTH MID CH



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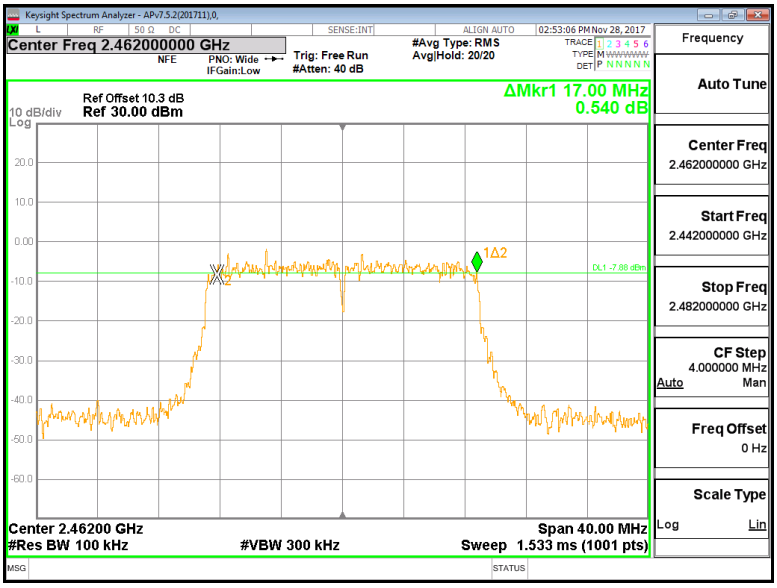
6 dB BANDWIDTH HIGH CH



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6.3. PEAK CONDUCTED OUTPUT POWER

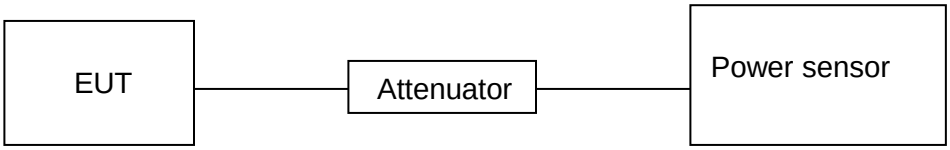
LIMITS

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

TEST PROCEDURE

KDB558074D01 section 9.1.3 for peak measurement and 9.2.3 for average measurement.
Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure peak power each channel.

TEST SETUP



RESULTS

Mode	Channel	Peak. Power [dBm]	Verdict
11B	2412	16.051	PASS
11B	2437	15.756	PASS
11B	2462	15.843	PASS
11G	2412	20.698	PASS
11G	2437	21.144	PASS
11G	2462	20.287	PASS
11N20	2412	20.160	PASS
11N20	2437	20.702	PASS
11N20	2462	19.848	PASS

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Mode	Channel	Average. Power [dBm]	Verdict
11B	2412	12.398	PASS
11B	2437	11.724	PASS
11B	2462	10.966	PASS
11G	2412	9.158	PASS
11G	2437	10.310	PASS
11G	2462	9.776	PASS
11N20	2412	10.803	PASS
11N20	2437	10.269	PASS
11N20	2462	9.599	PASS

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6.4. POWER SPECTRAL DENSITY

LIMITS

FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC §15.247 (e)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

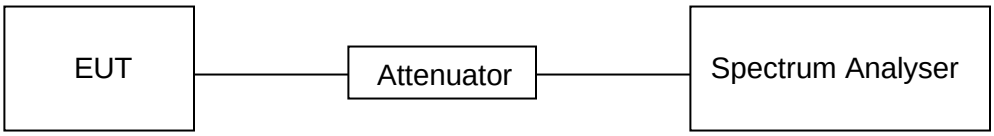
TEST PROCEDURE

KDB 558074D01 section 10.2 test method.
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	3 kHz ≤ RBW ≤ 100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST SETUP



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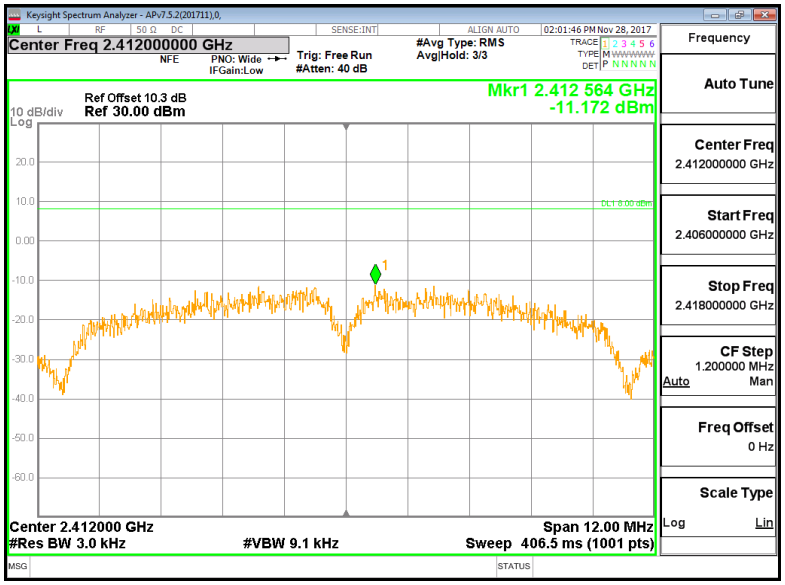
RESULTS

6.4.1. 802.11b MODE

Channel	Meas.Level [dBm/30kHz]	Limit(dBm)	Verdict
2412	-11.172	8	PASS
2437	-11.106	8	PASS
2462	-11.810	8	PASS

PSD LOW CH



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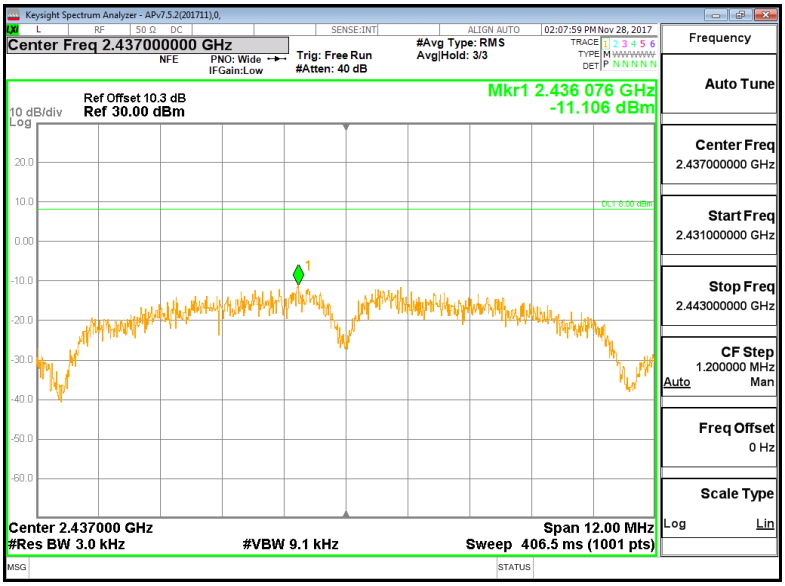
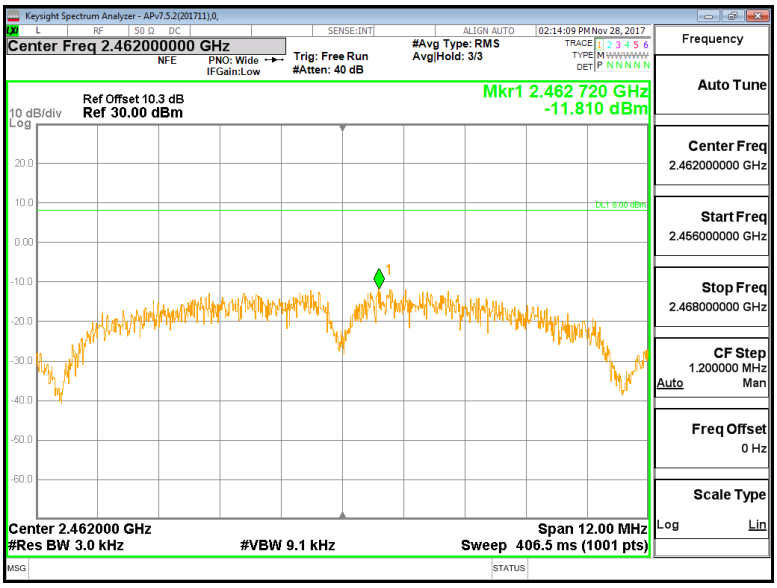
PSD MID CH



PSD HIGH CH



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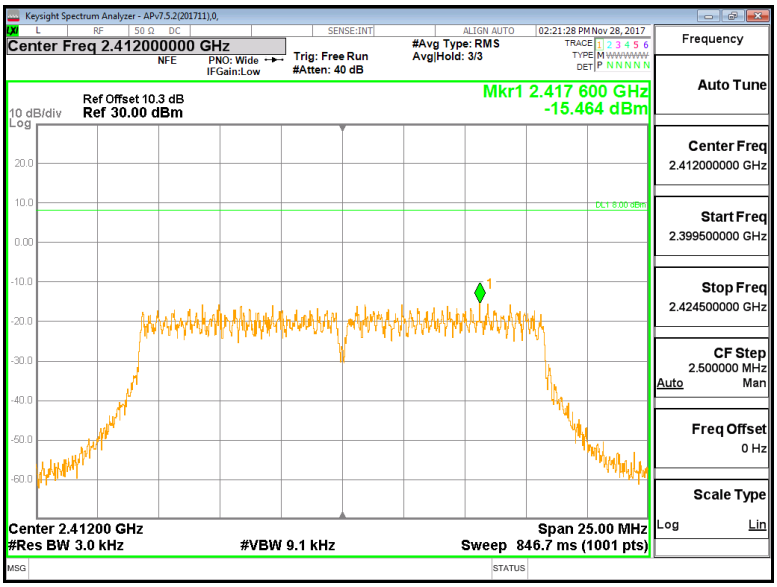
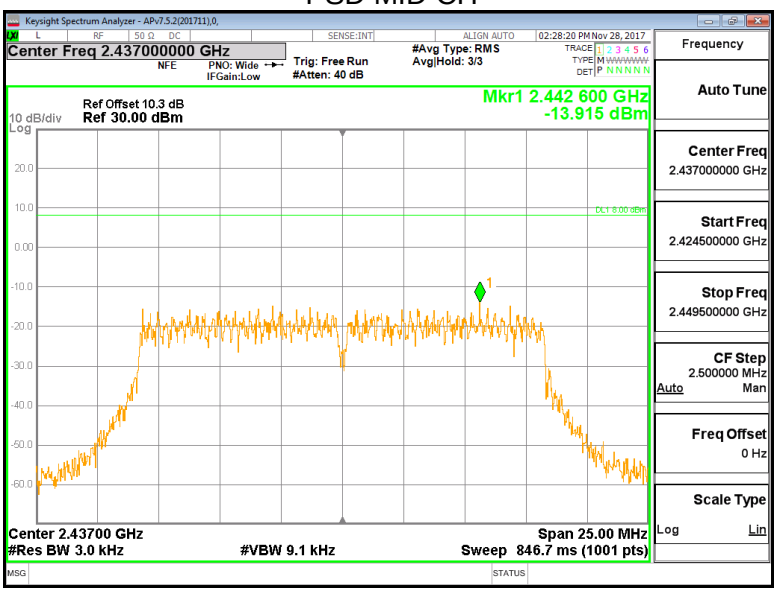
6.4.2. 802.11g MODE

Channel	Meas.Level [dBm/30kHz]	Limit(dBm)	Verdict
2412	-15.464	8	PASS
2437	-13.915	8	PASS
2462	-15.049	8	PASS

PSD LOW CH



PSD MID CH



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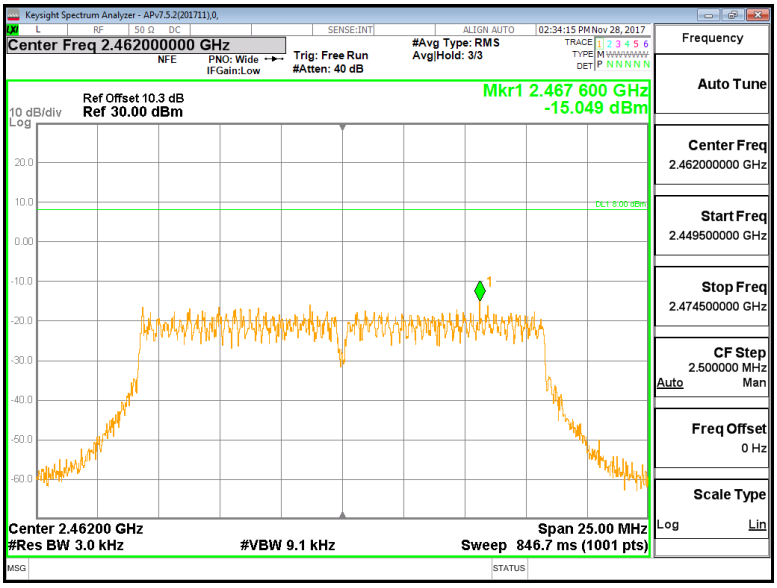
PSD HIGH CH



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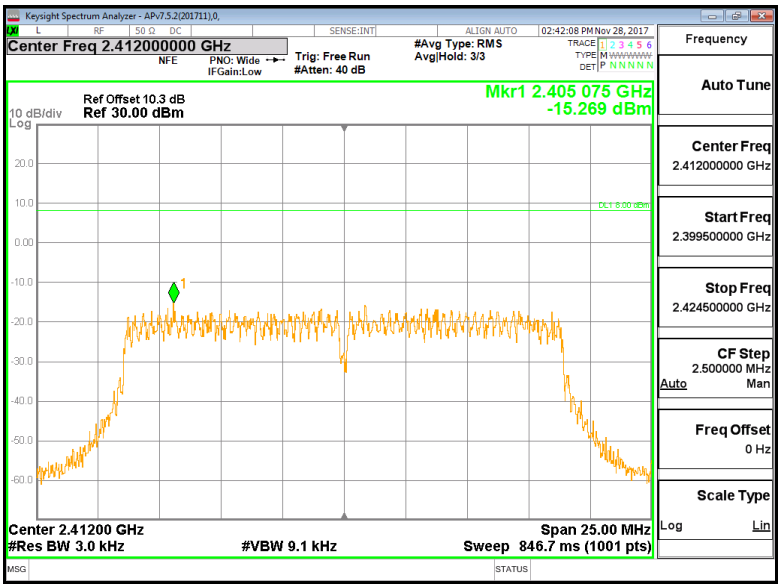
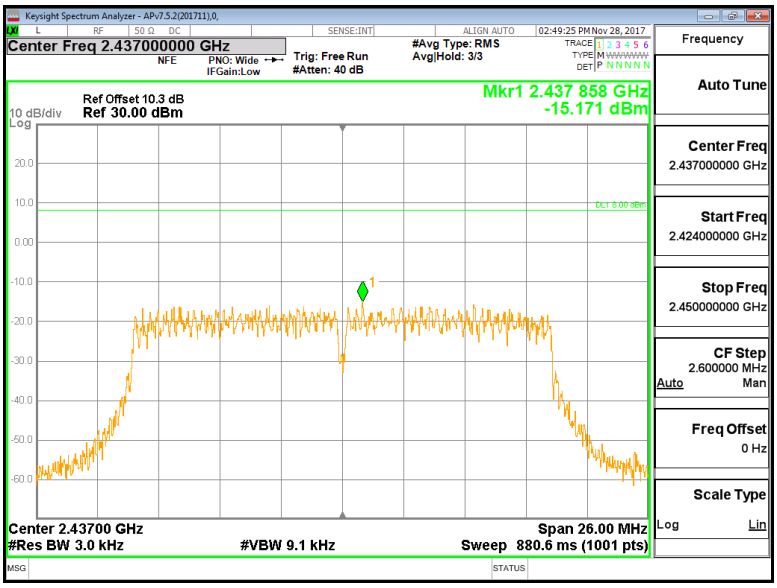
6.4.3. 802.11n20 MODE

Channel	Meas.Level [dBm/30kHz]	Limit(dBm)	Verdict
2412	-15.269	8	PASS
2437	-15.171	8	PASS
2462	-15.713	8	PASS

PSD LOW CH



PSD MID CH



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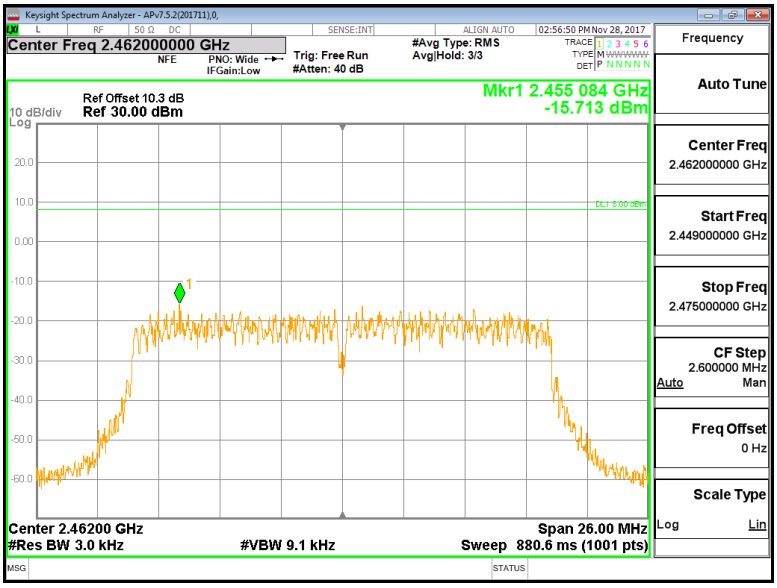
PSD HIGH CH



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6.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

KDB 558074D01 section 11 test method.
Connect the UUT to the spectrum analyser and use the following settings:

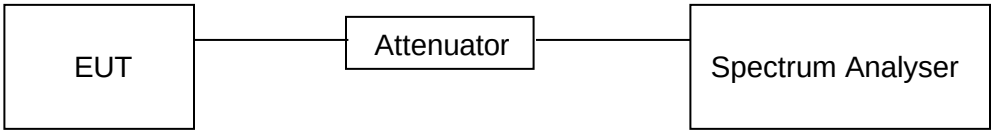
Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level**.**

TEST SETUP



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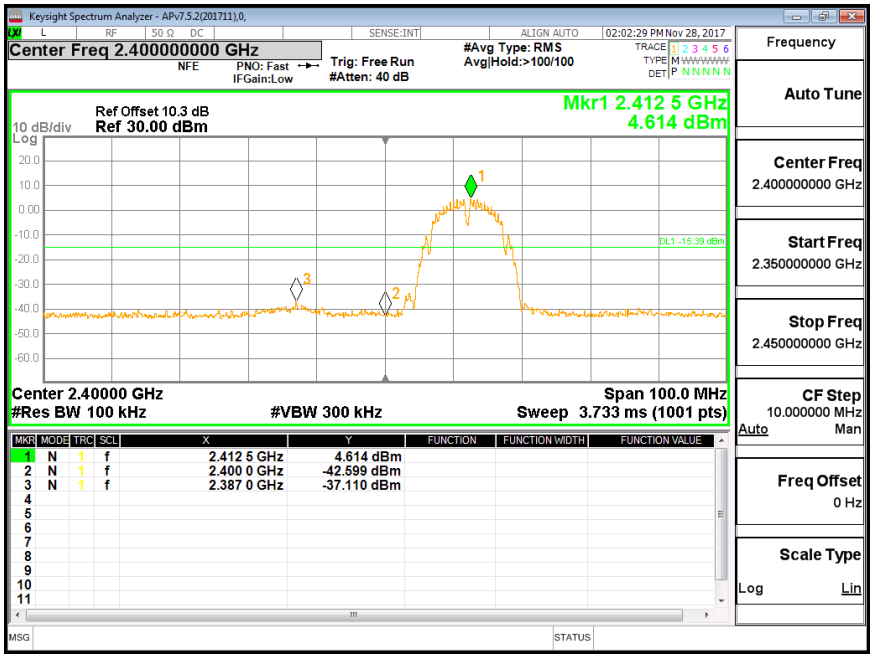
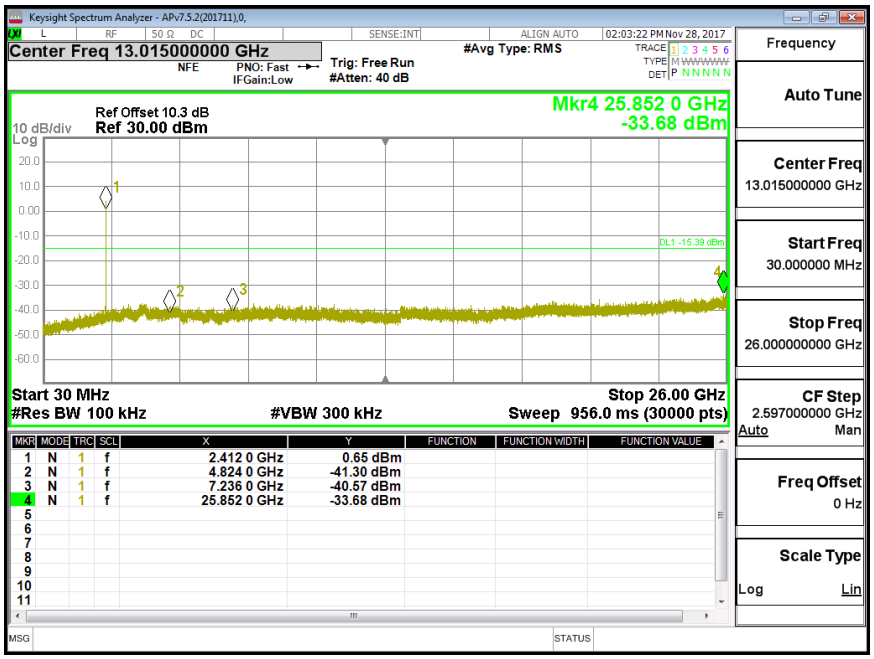
RESULTS

6.5.1. 802.11b MODE

LOW CH BANDEDAGE



LOW CH SPURIOUS EMISSIONS 30M-26G



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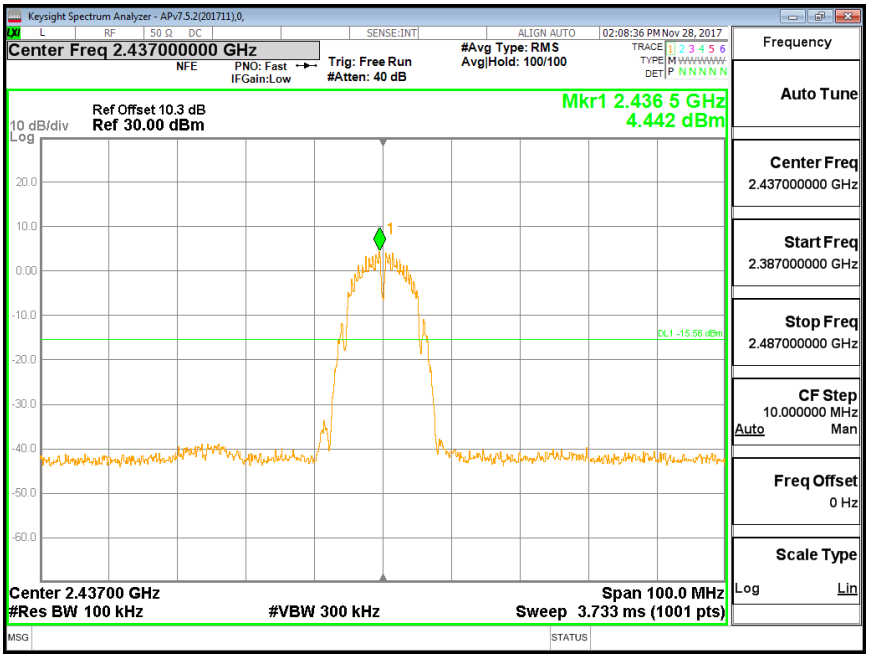
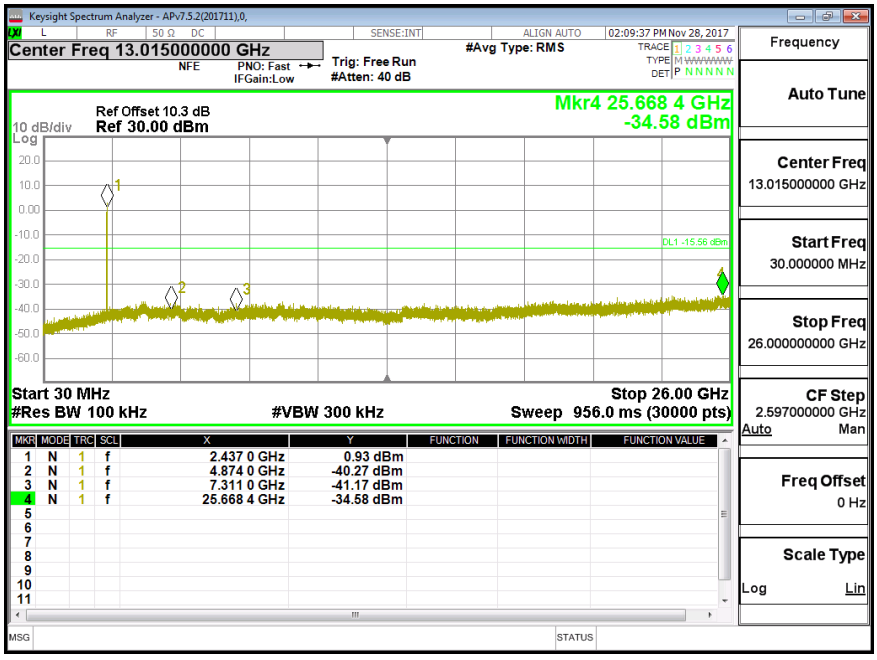
MID CH BANDEDAGE



MID CH SPURIOUS EMISSIONS 30M-26G



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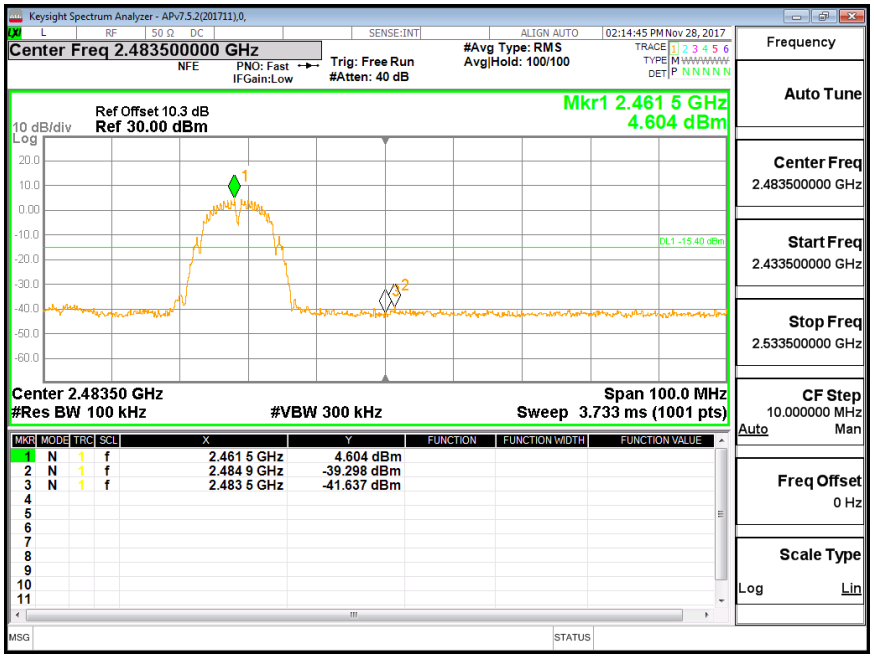
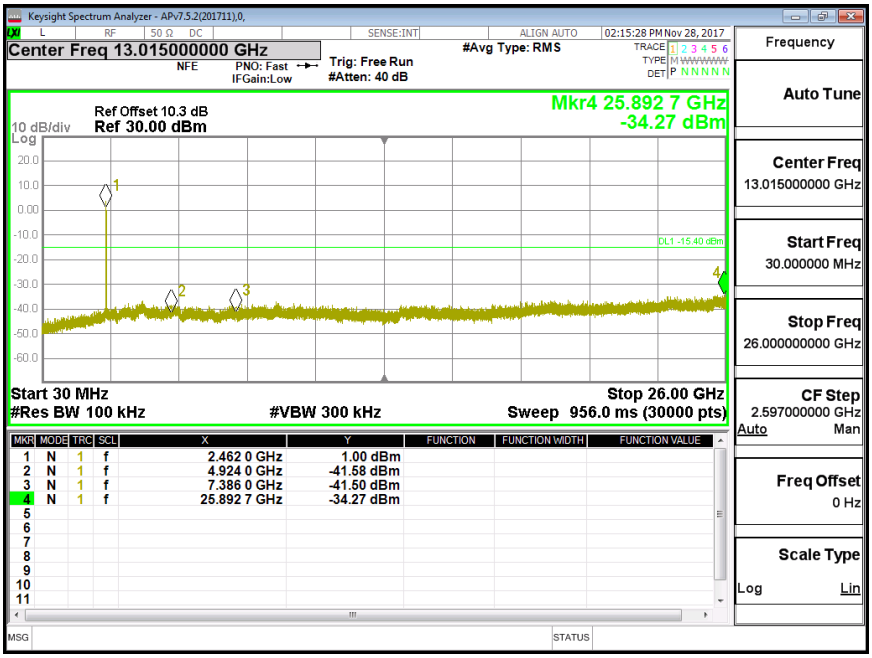
HIGH CH BANDEDAGE



HIGH CH SPURIOUS EMISSIONS 30M-26G



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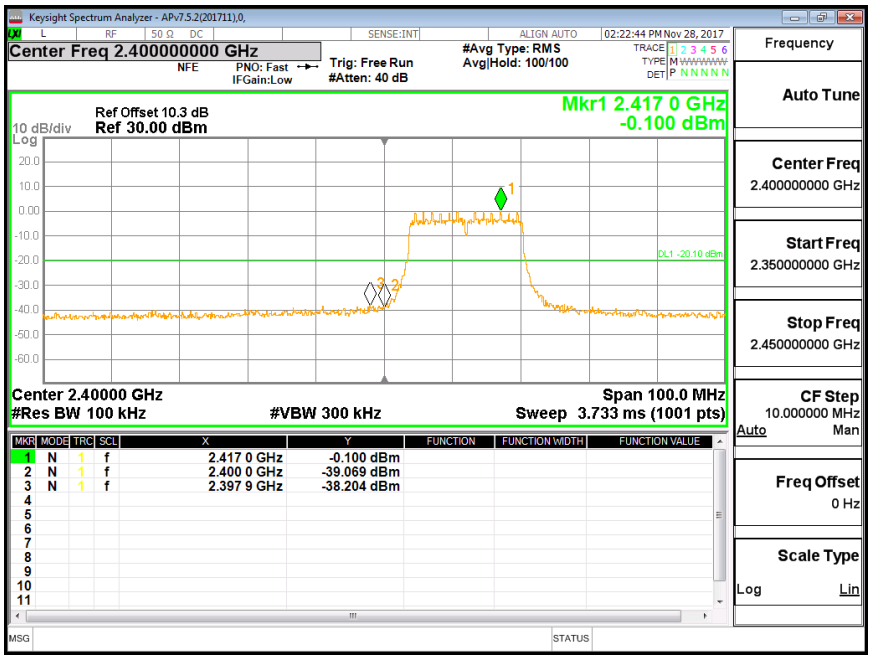
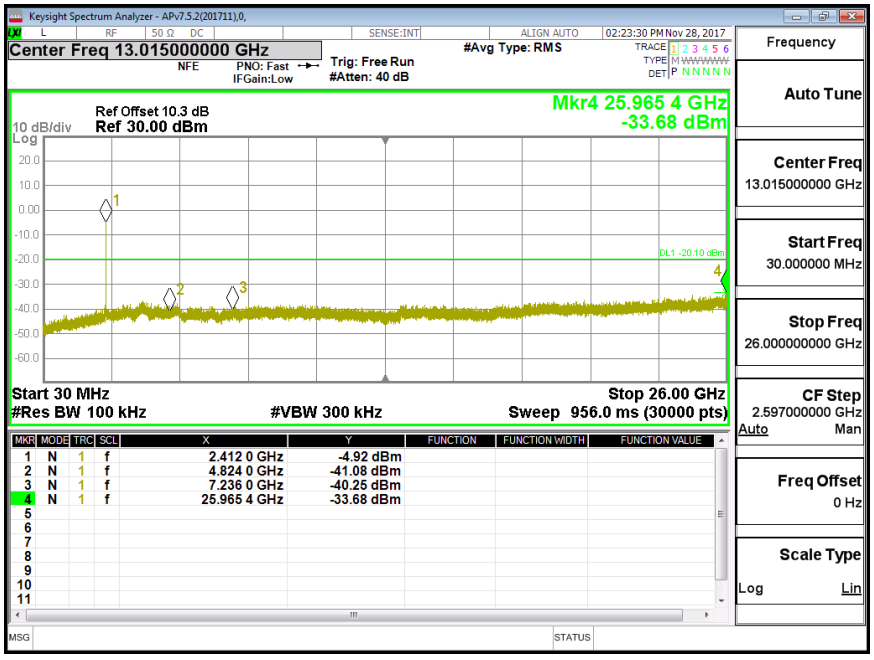
6.5.2. 802.11g MODE

LOW CH BANDEDAGE



LOW CH SPURIOUS EMISSIONS 30M-26G



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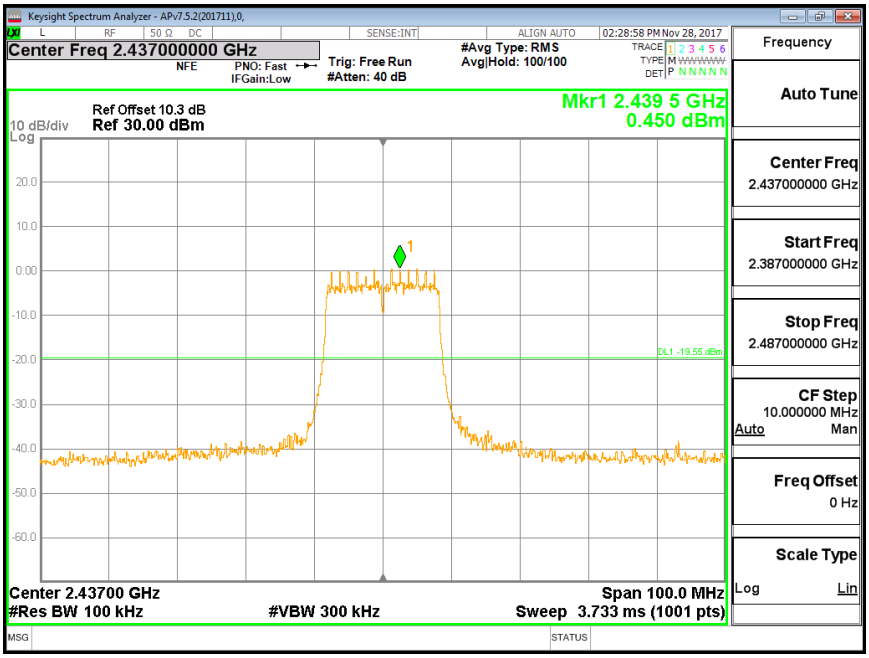
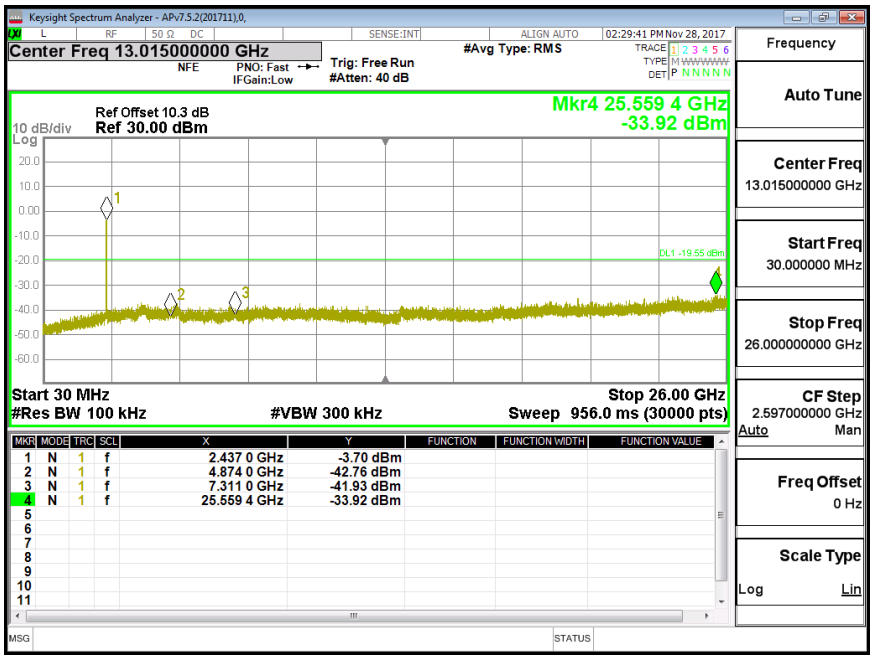
MID CH BANDEDAGE



MID CH SPURIOUS EMISSIONS 30M-26G



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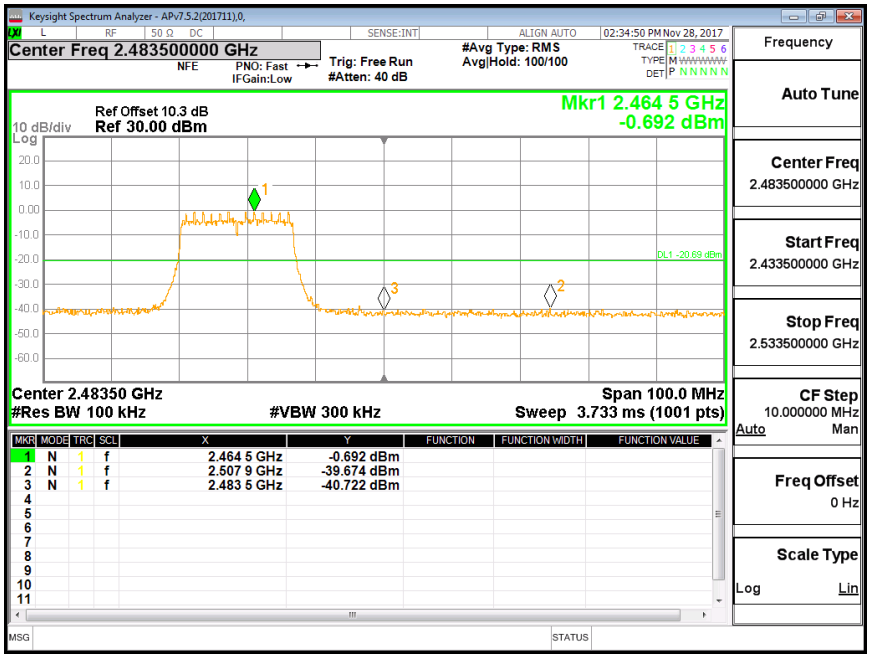
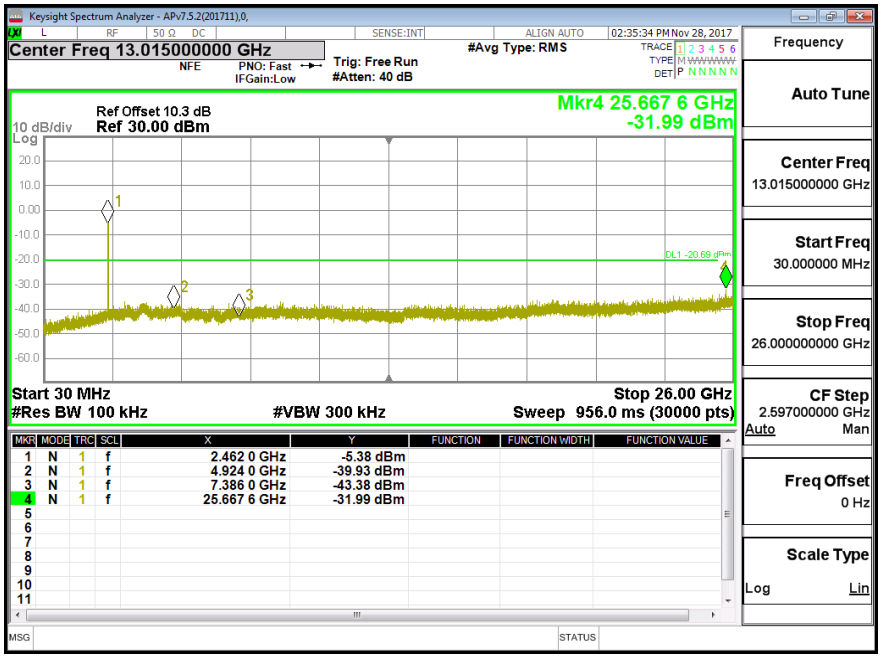
HIGH CH BANDEDAGE



HIGH CH SPURIOUS EMISSIONS 30M-26G



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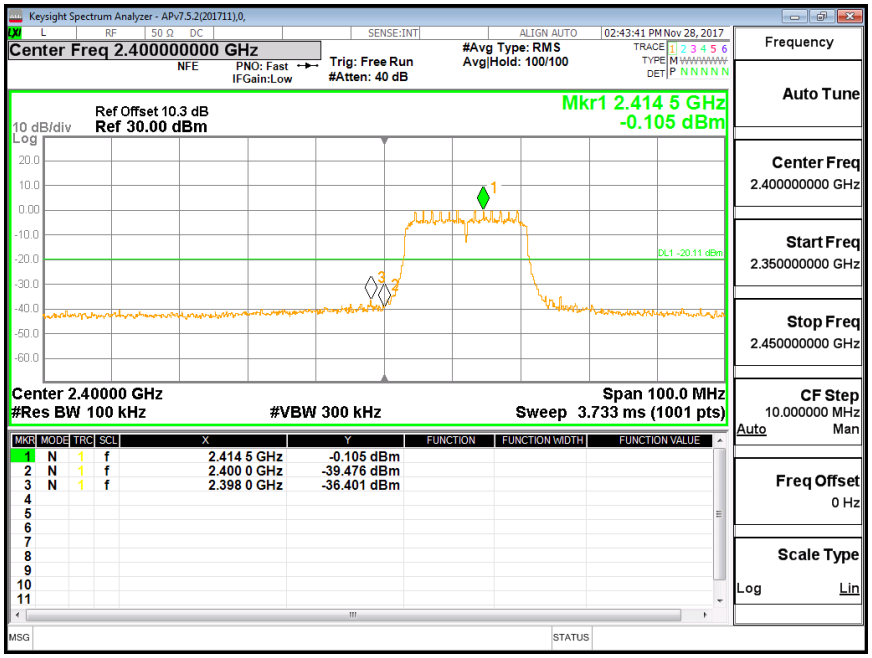
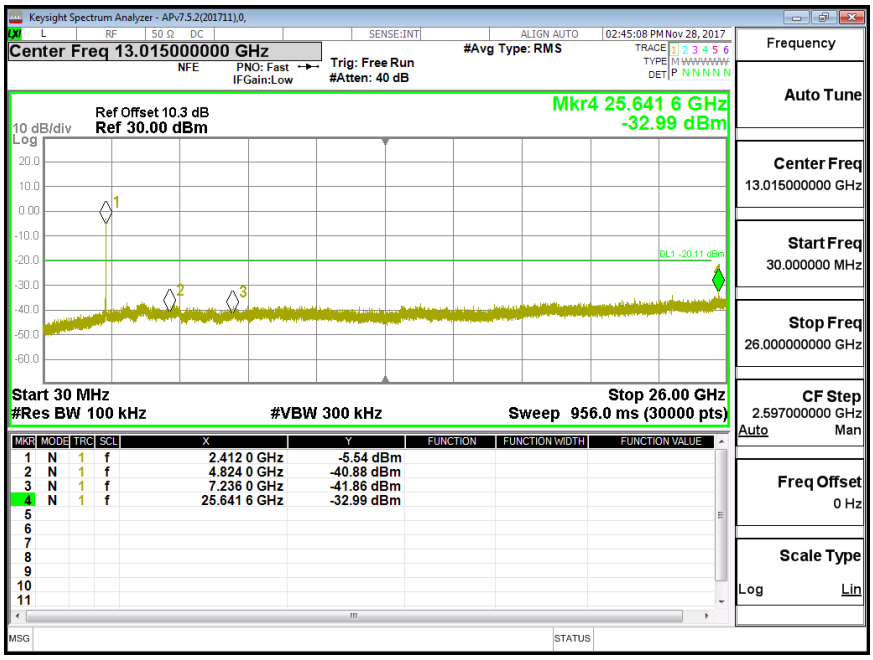
6.5.3. 802.11n20 MODE

LOW CH BANDEDAGE



LOW CH SPURIOUS EMISSIONS 30M-26G



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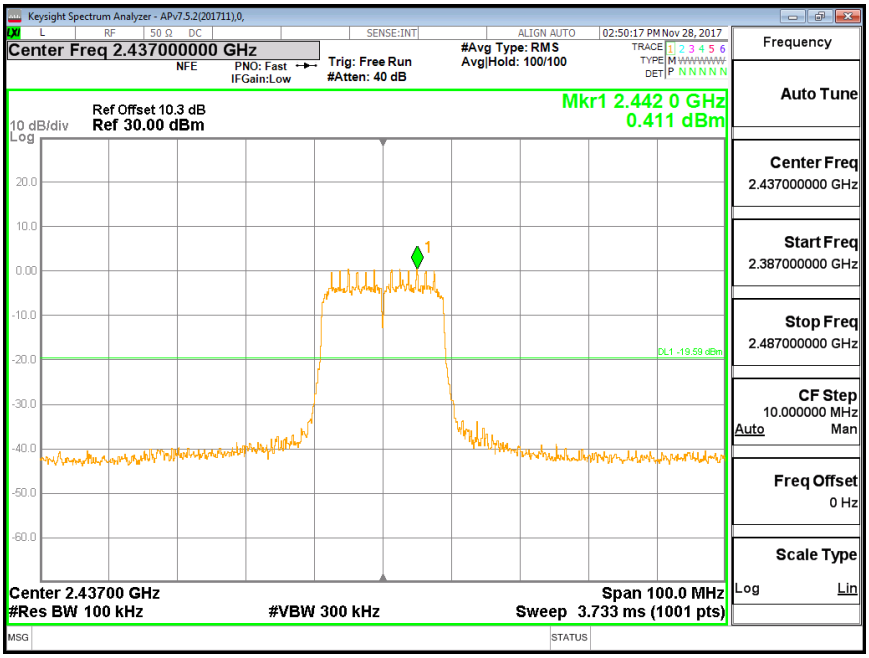
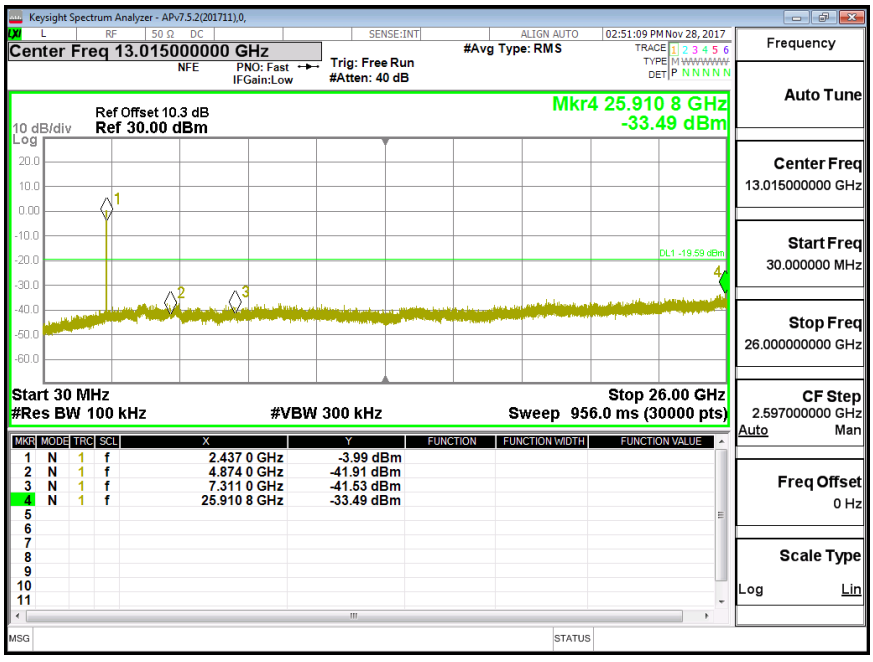
MID CH BANDEDAGE



MID CH SPURIOUS EMISSIONS 30M-26G



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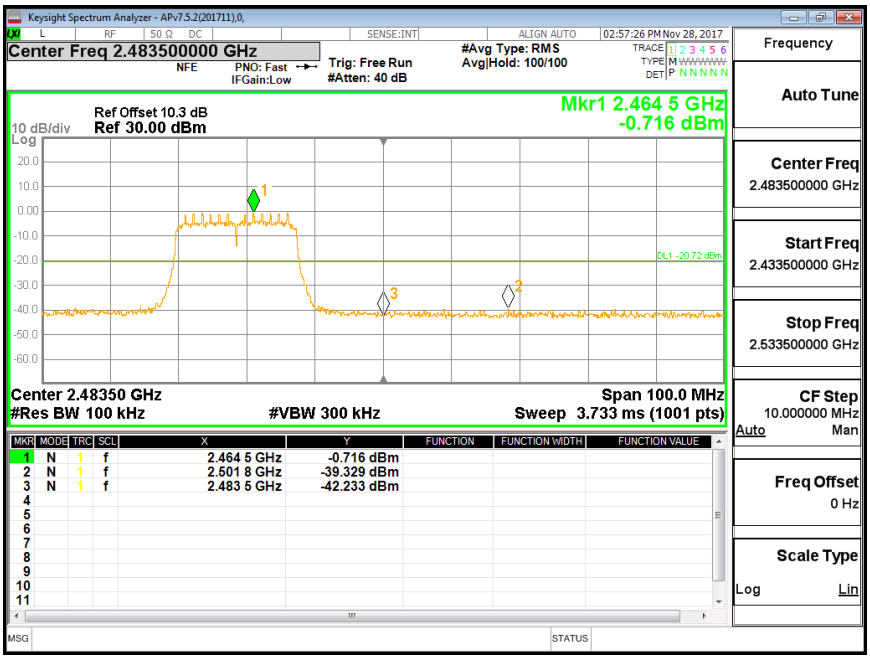
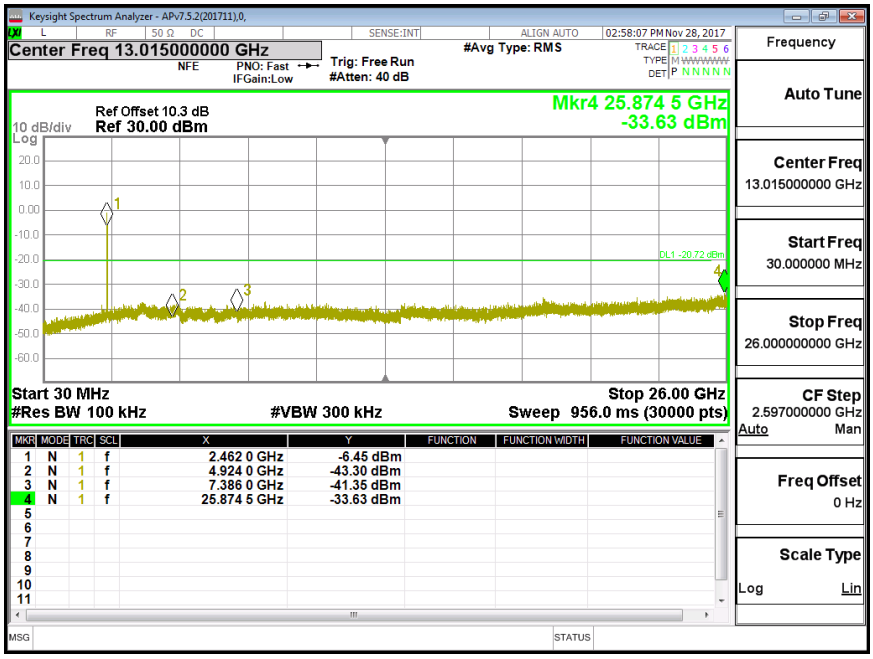
HIGH CH BANDEDAGE



HIGH CH SPURIOUS EMISSIONS 30M-26G



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7. RADIATED TEST RESULTS

LIMITS

Please refer to FCC §15.205 and §15.209

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

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Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Restricted bands of operation

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	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

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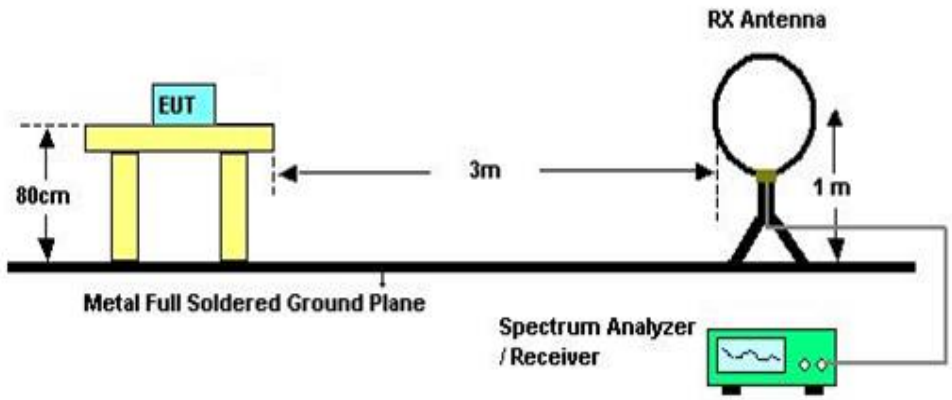
TEST SETUP AND PROCEDURE

Below 30MHz



The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

6. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

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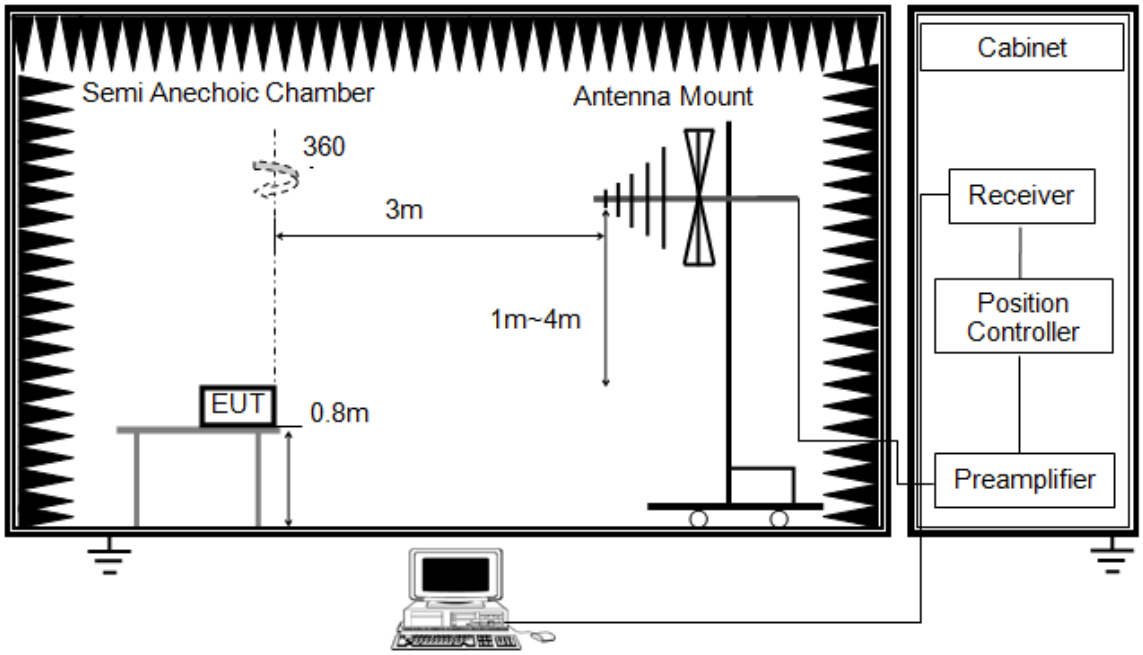
Below 1G



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

6. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration)

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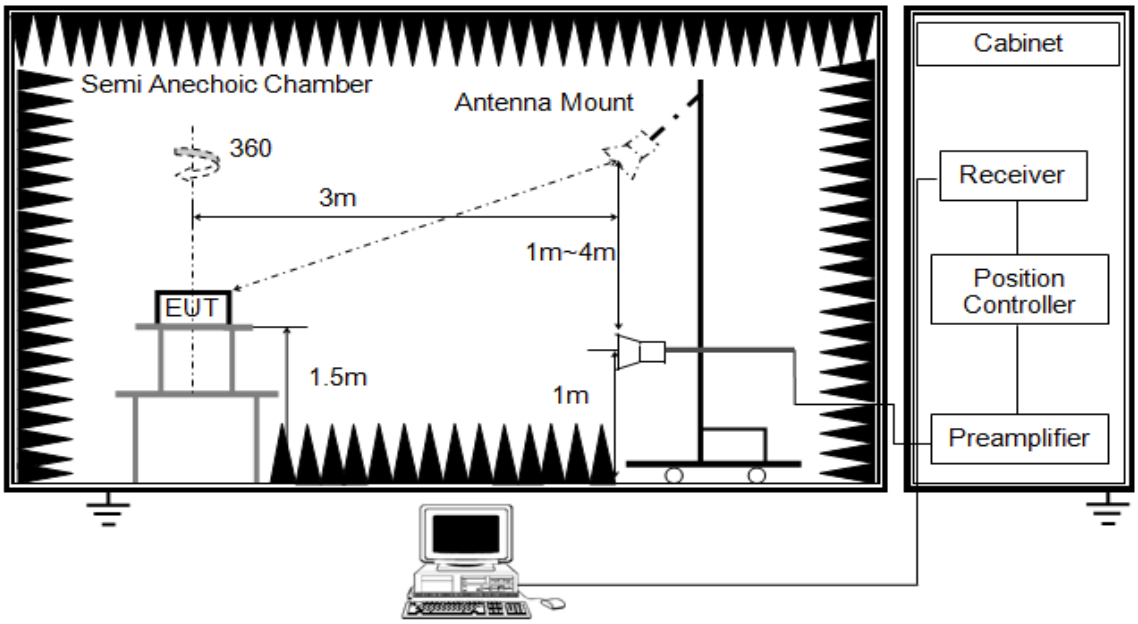
ABOVE 1G



The setting of the spectrum analyser

RBW	1M
VBW	PEAK: 3M AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector. For the Duty Cycle please refer to clause 6.1.ON TIME AND DUTY CYCLE.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

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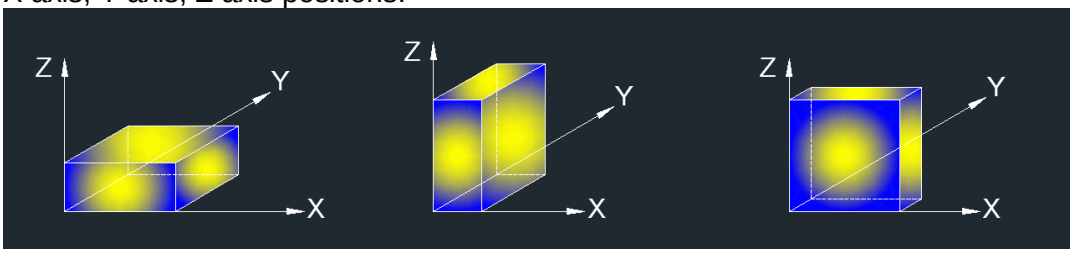
X axis, Y axis, Z axis positions:

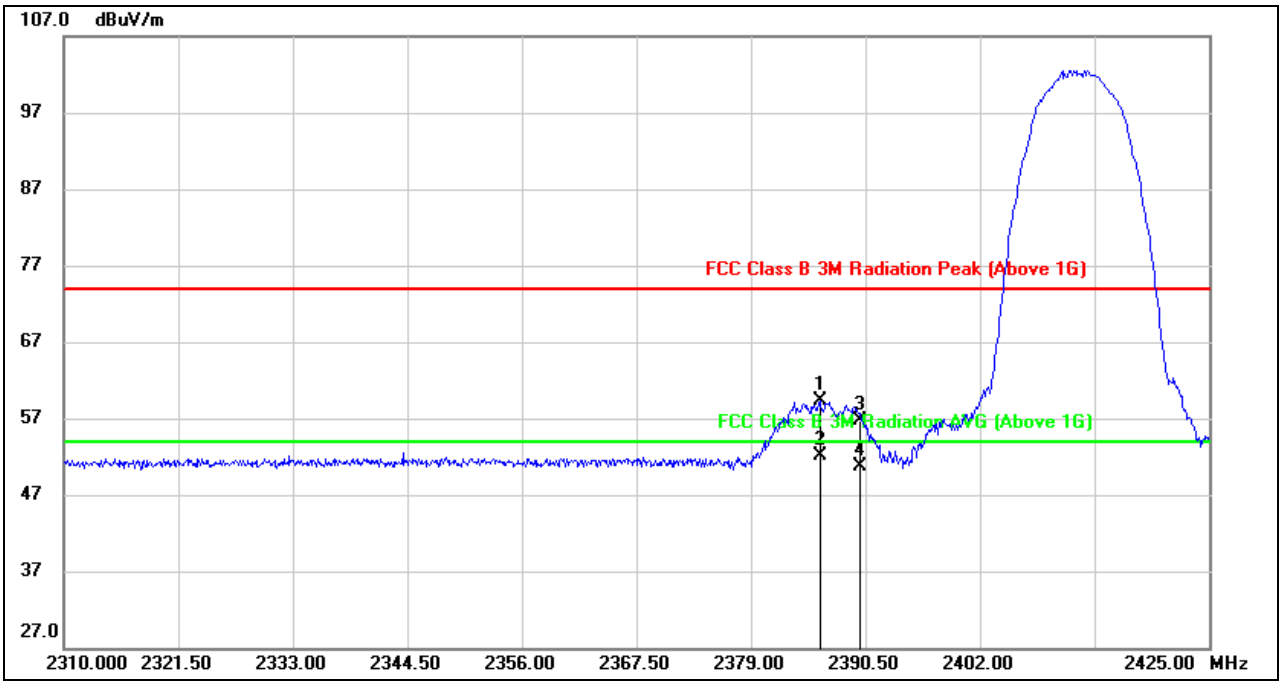


Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report

7.1. RESTRICTED BANDEDGE FOR VEN-3S-3R-HC

7.1.1. 802.11b MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2385.900	26.20	33.17	59.37	74.00	-14.63	peak
2	2385.900	18.99	33.17	52.16	54.00	-1.84	AVG
3	2390.000	23.61	33.14	56.75	74.00	-17.25	peak
4	2390.000	17.65	33.14	50.79	54.00	-3.21	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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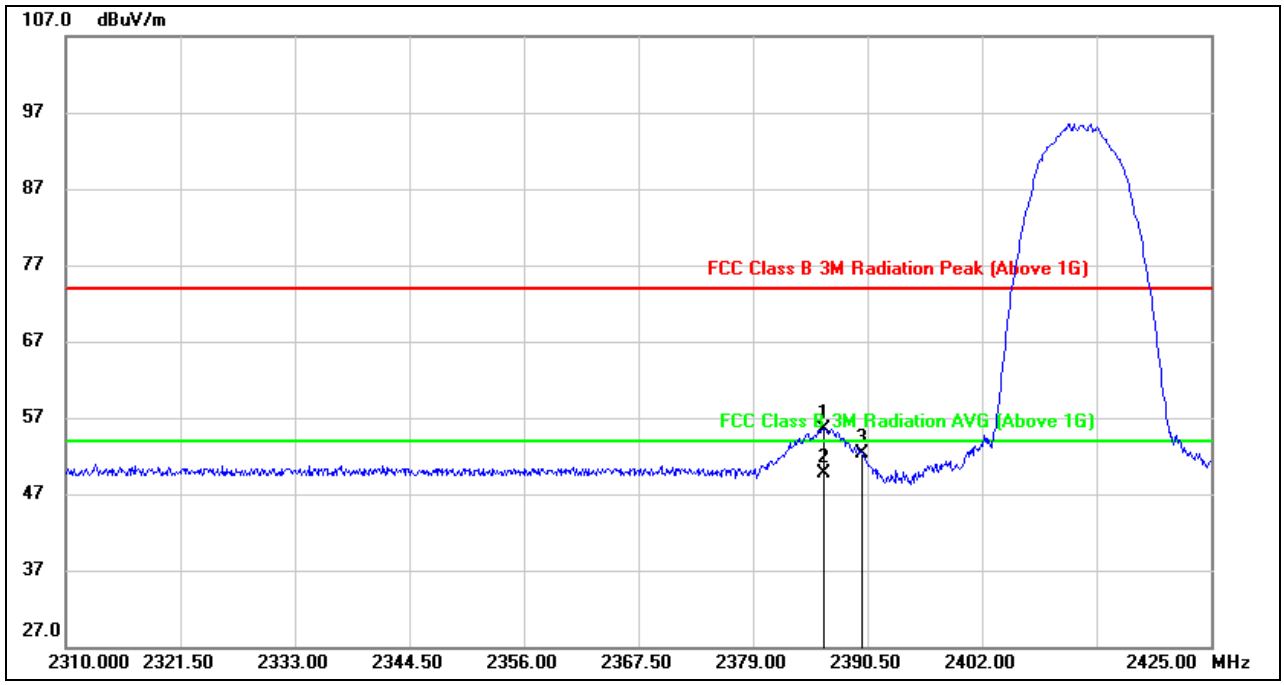
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.130	22.25	33.27	55.52	74.00	-18.48	peak
2	2386.130	16.47	33.27	49.74	54.00	-4.26	AVG
3	2390.000	18.96	33.24	52.20	74.00	-21.80	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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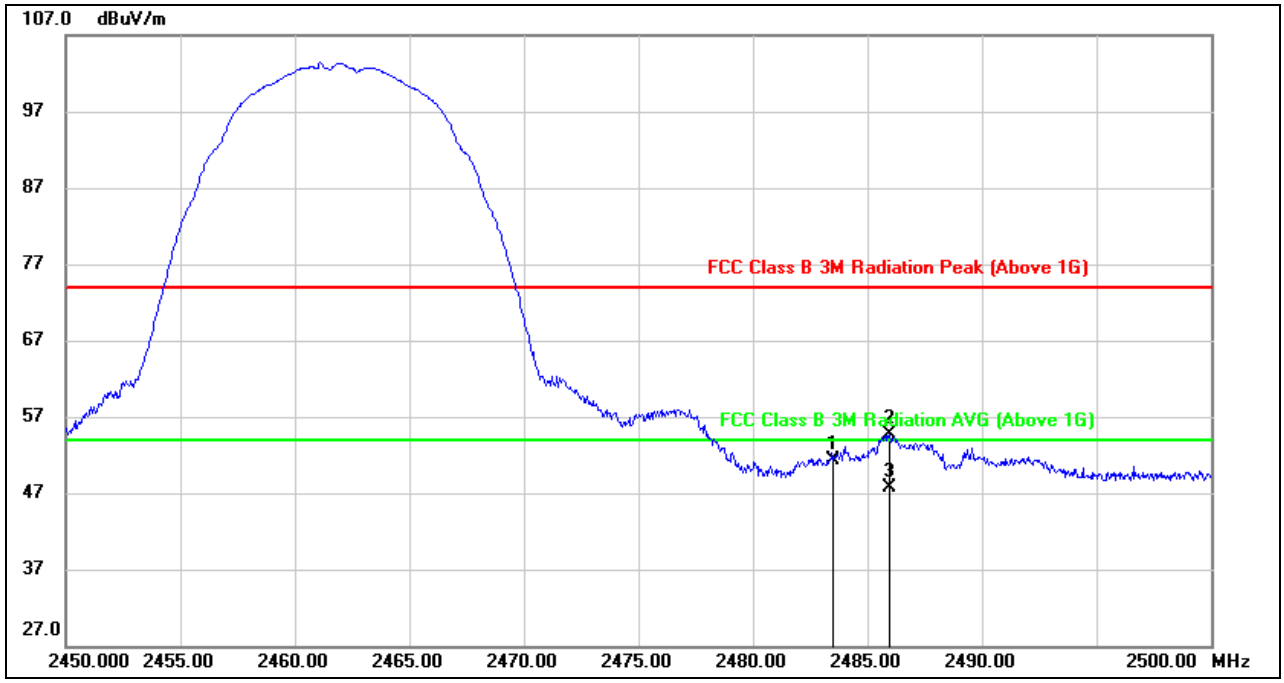
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	18.45	32.78	51.23	74.00	-22.77	peak
2	2485.950	21.95	32.79	54.74	74.00	-19.26	peak
3	2485.950	14.98	32.79	47.77	54.00	-6.23	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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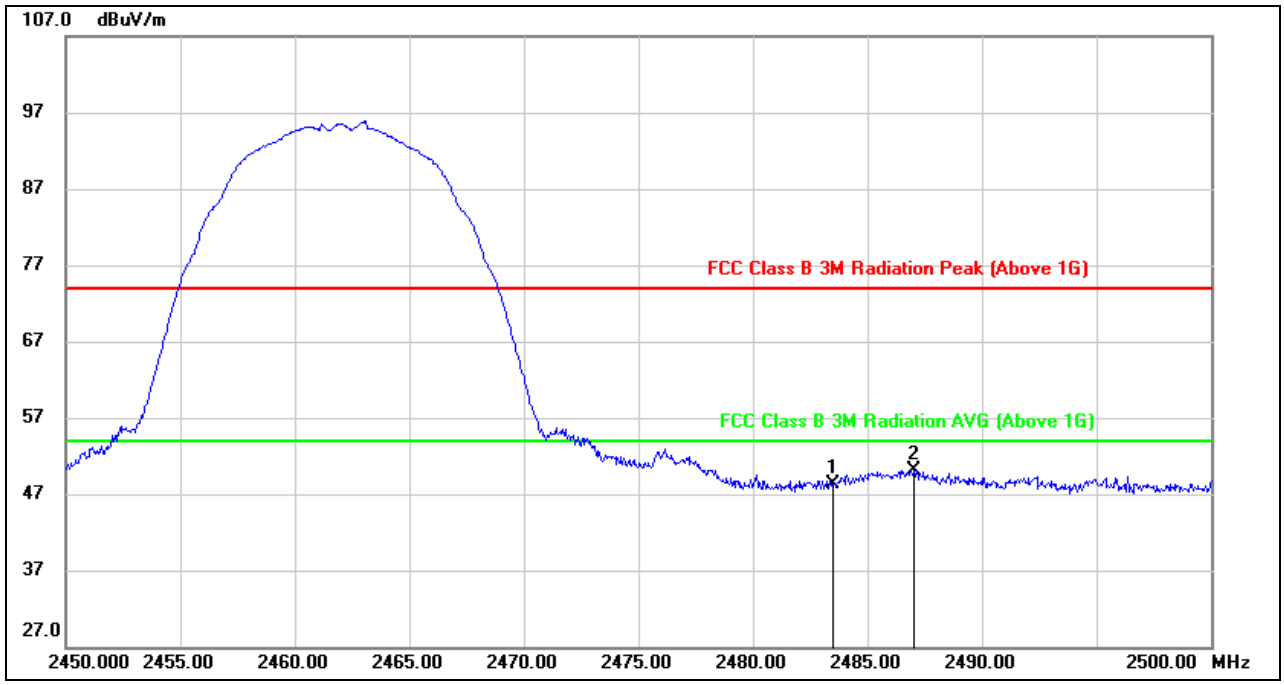
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	15.45	32.88	48.33	74.00	-25.67	peak
2	2487.000	17.19	32.89	50.08	74.00	-23.92	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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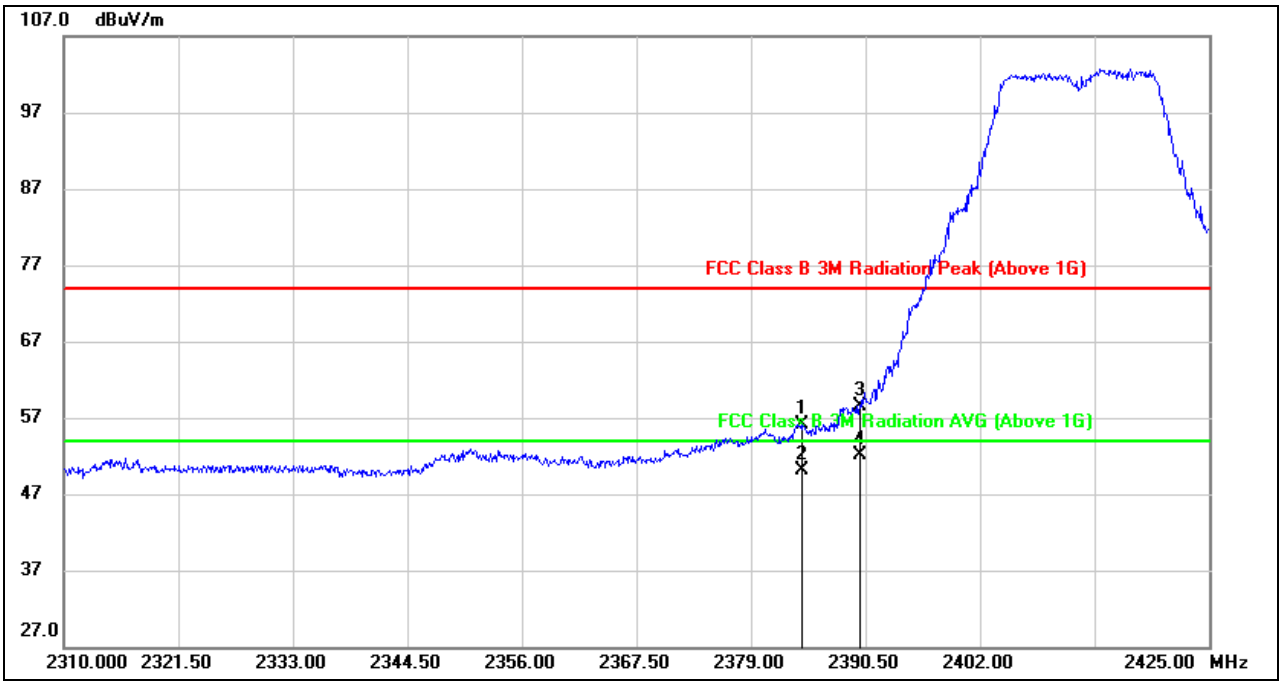
7.1.2. 802.11g MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2384.175	23.00	33.19	56.19	74.00	-17.81	peak
2	2384.175	16.89	33.19	50.08	54.00	-3.92	AVG
3	2390.000	25.31	33.14	58.45	74.00	-15.55	peak
4	2390.000	18.98	33.14	52.12	54.00	-1.88	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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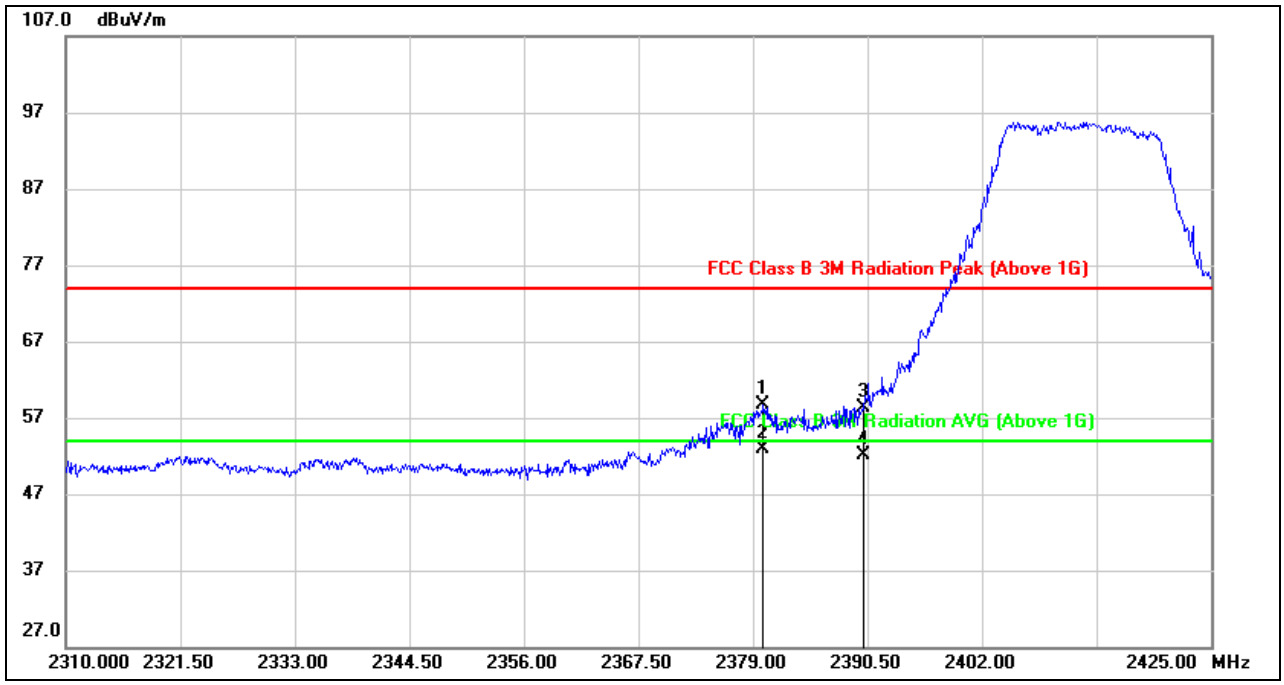
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2380.035	25.39	33.31	58.70	74.00	-15.30	peak
2	2380.035	19.58	33.31	52.89	74.00	-21.11	peak
3	2390.000	24.98	33.24	58.22	74.00	-15.78	peak
4	2390.000	18.89	33.24	52.13	54.00	-1.87	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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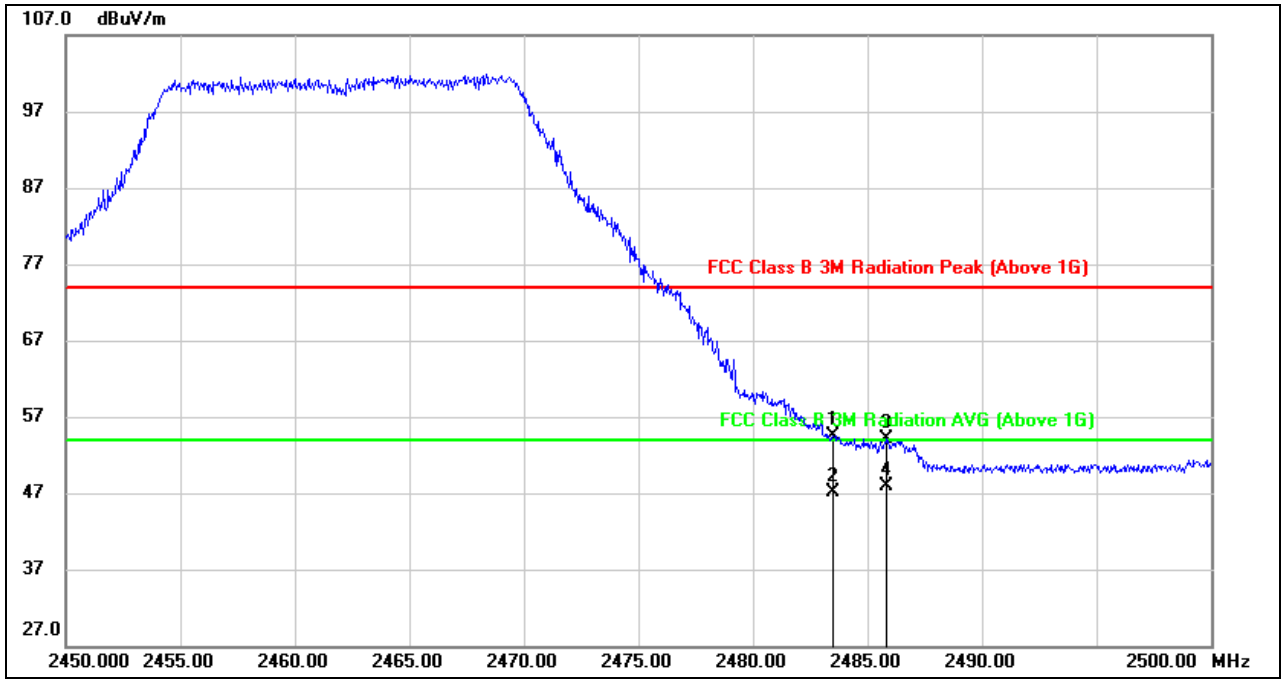
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	21.67	32.78	54.45	74.00	-19.55	peak
2	2483.500	14.25	32.78	47.03	54.00	-6.97	AVG
3	2485.850	21.24	32.79	54.03	74.00	-19.97	peak
4	2485.850	15.02	32.79	47.81	54.00	-6.19	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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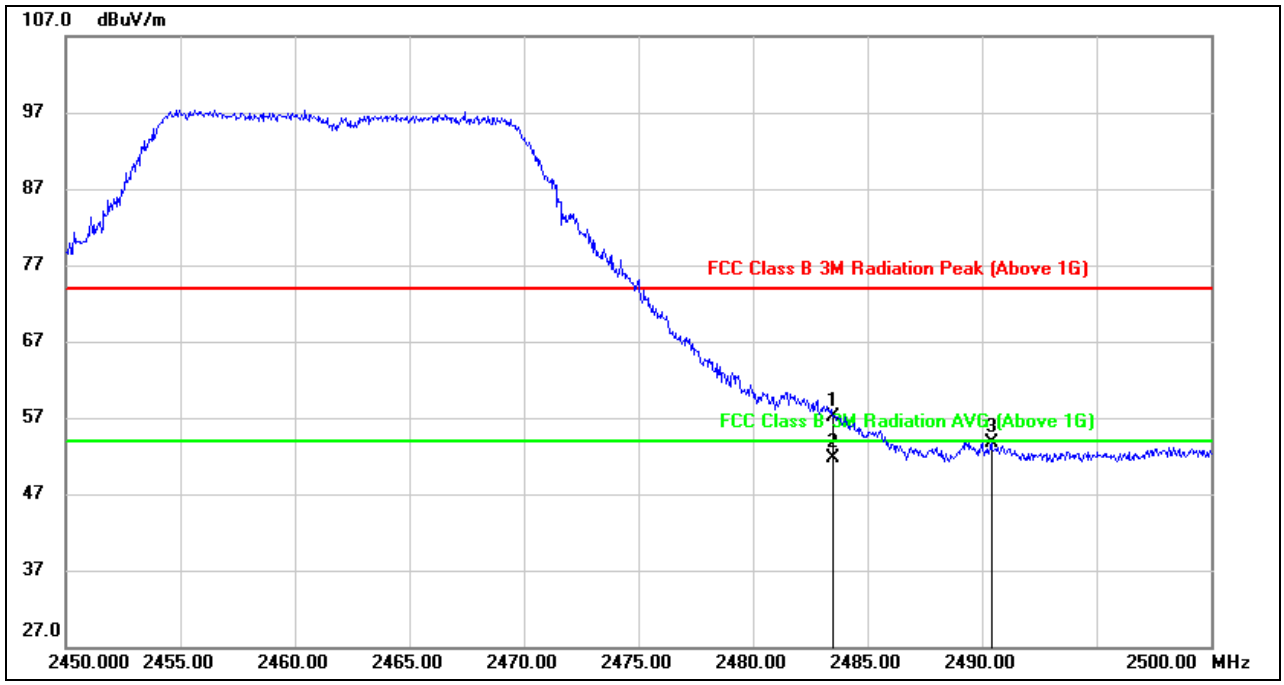
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	24.26	32.88	57.14	74.00	-16.86	peak
2	2483.500	18.87	32.88	51.75	54.00	-2.25	AVG
3	2490.400	20.91	32.88	53.79	74.00	-20.21	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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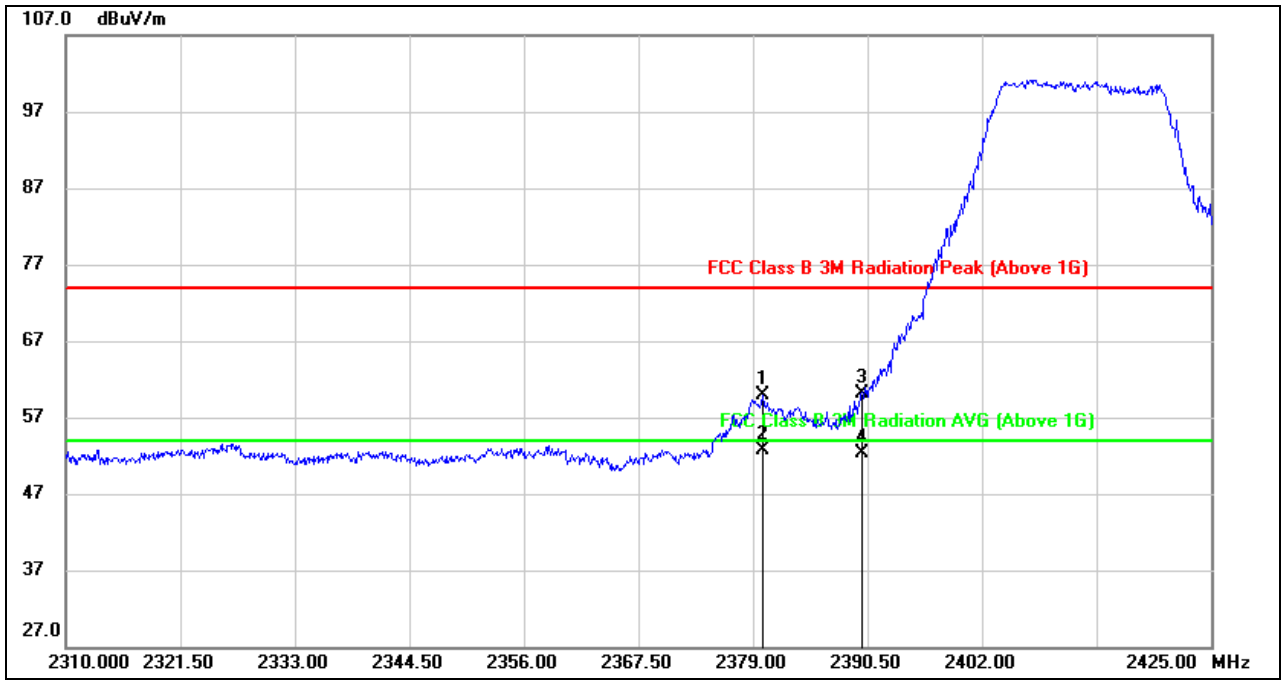
7.1.1. 802.11n20 MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2380.035	26.78	33.21	59.99	74.00	-14.01	peak
2	2380.035	19.58	33.21	52.79	54.00	-1.21	AVG
3	2390.000	26.97	33.14	60.11	74.00	-13.89	peak
4	2390.000	19.25	33.14	52.39	54.00	-1.61	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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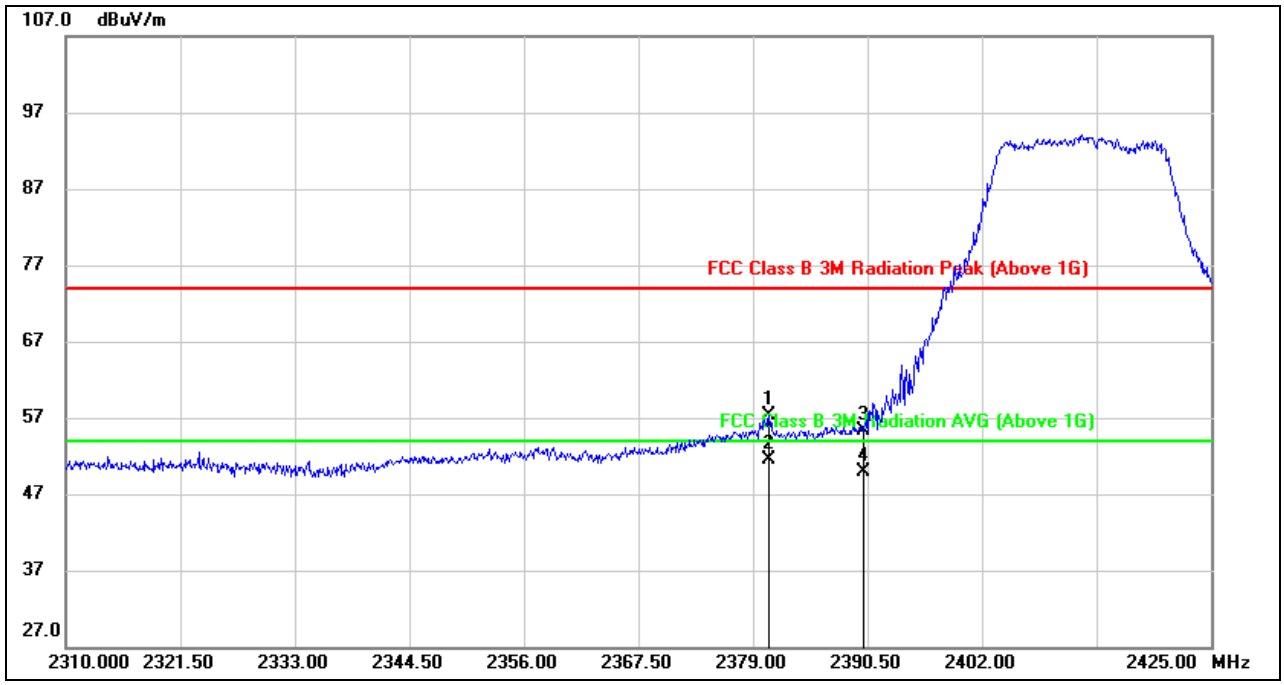
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2380.610	24.08	33.30	57.38	74.00	-16.62	peak
2	2380.610	18.25	33.30	51.55	54.00	-2.45	AVG
3	2390.000	22.09	33.24	55.33	74.00	-18.67	peak
4	2390.000	16.58	33.24	49.82	54.00	-4.18	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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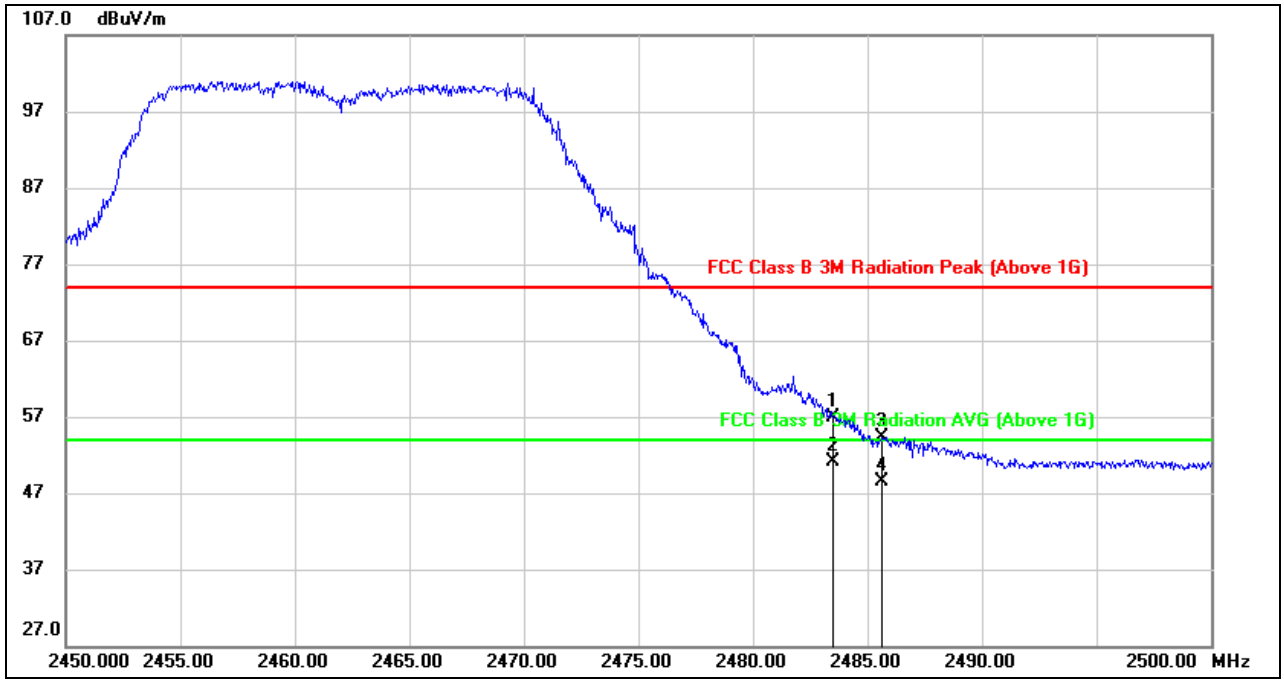
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	24.19	32.78	56.97	74.00	-17.03	peak
2	2483.500	18.28	32.78	51.06	54.00	-2.94	AVG
3	2485.650	21.61	32.79	54.40	74.00	-19.60	peak
4	2485.650	15.77	32.79	48.56	54.00	-5.44	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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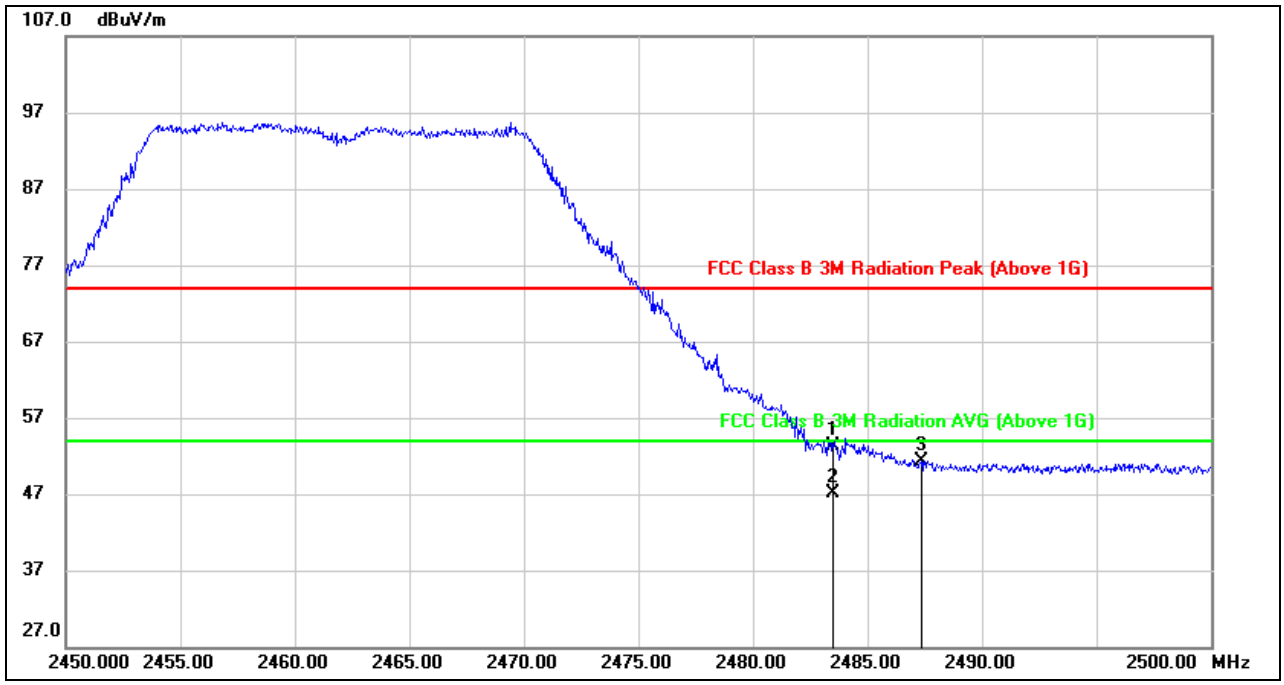
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	20.38	32.88	53.26	74.00	-20.74	peak
2	2483.500	14.22	32.88	47.10	54.00	-6.90	AVG
3	2487.350	18.49	32.89	51.38	74.00	-22.62	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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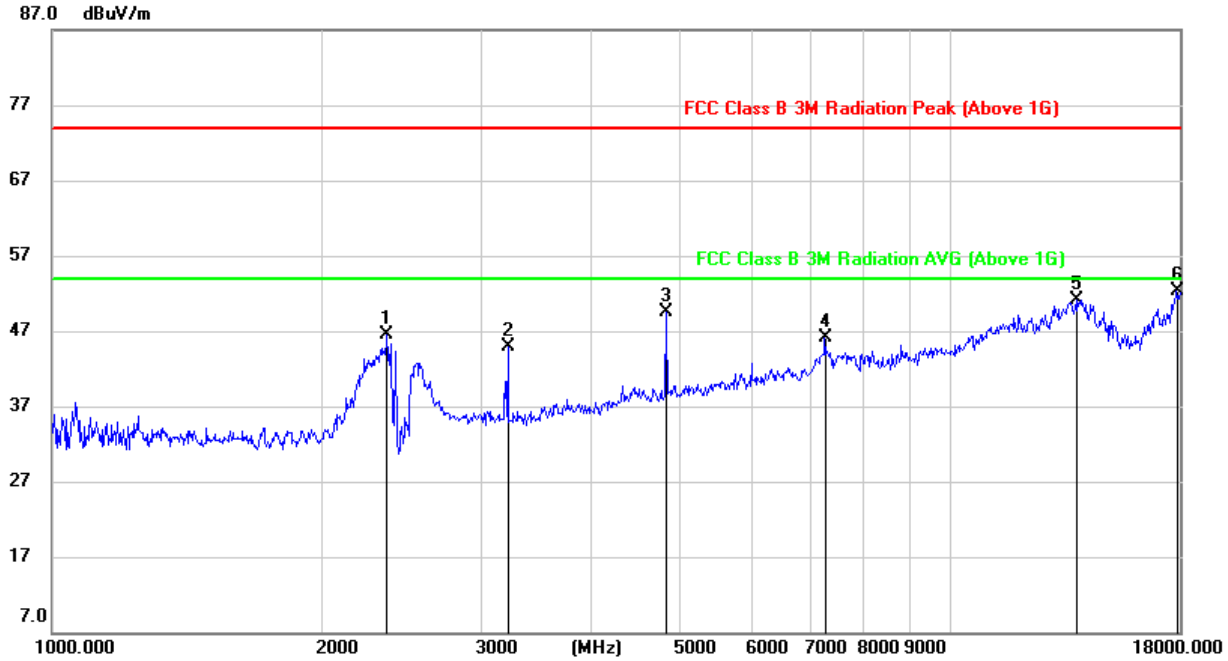
7.2. SPURIOUS EMISSIONS (1~18GHz) FOR VEN-3S-3R-HC

7.2.1. 802.11b MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2359.478	55.13	-8.72	46.41	74.00	-27.59	peak
2	3214.623	51.32	-6.36	44.96	74.00	-29.04	peak
3	4831.962	50.91	-1.44	49.47	74.00	-24.53	peak
4	7263.015	40.17	5.95	46.12	74.00	-27.88	peak
5	13797.088	32.16	19.00	51.16	74.00	-22.84	peak
6	17896.247	26.51	25.75	52.26	74.00	-21.74	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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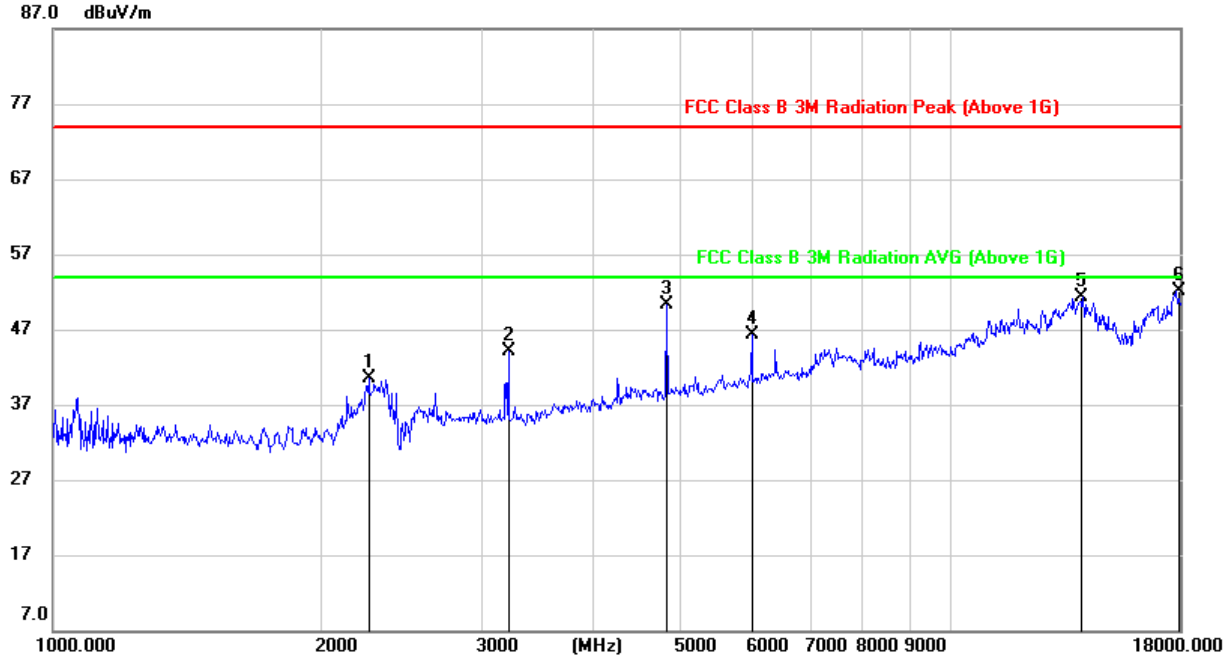
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2252.846	48.84	-8.33	40.51	74.00	-33.49	peak
2	3214.623	50.41	-6.33	44.08	74.00	-29.92	peak
3	4831.962	51.69	-1.41	50.28	74.00	-23.72	peak
4	6001.626	44.24	2.10	46.34	74.00	-27.66	peak
5	14038.447	32.49	18.80	51.29	74.00	-22.71	peak
6	17896.247	26.18	25.99	52.17	74.00	-21.83	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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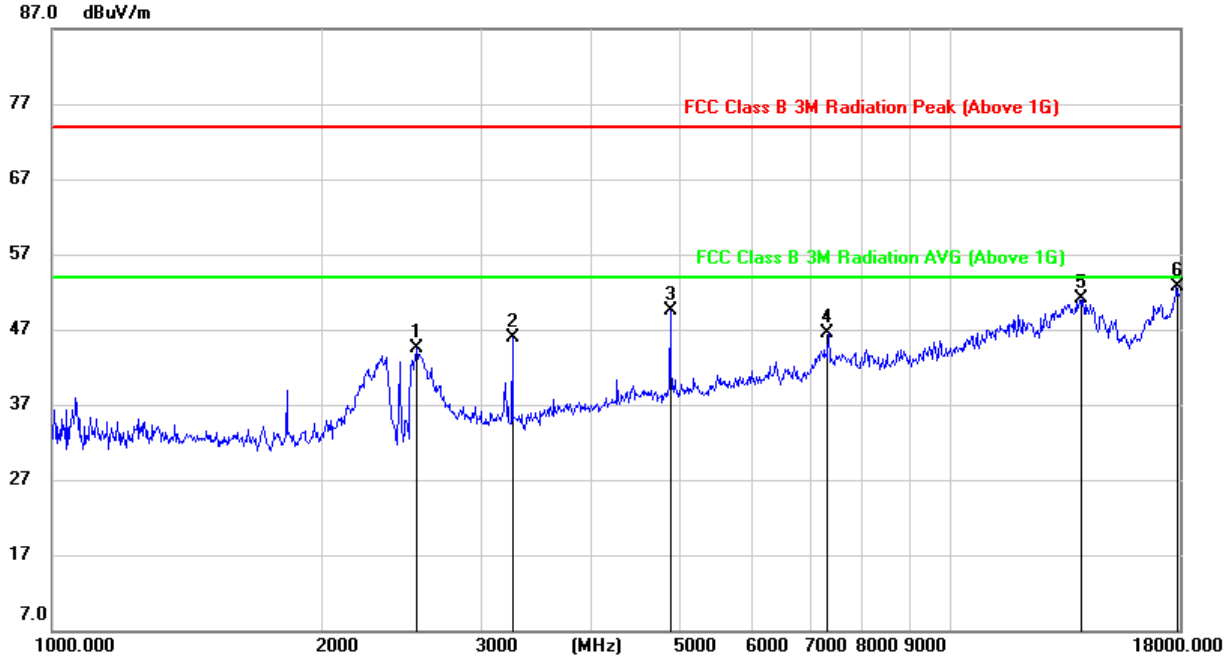
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2543.625	53.55	-9.12	44.43	74.00	-29.57	peak
2	3252.005	52.36	-6.40	45.96	74.00	-28.04	peak
3	4874.043	50.50	-0.95	49.55	74.00	-24.45	peak
4	7305.122	40.63	5.92	46.55	74.00	-27.45	peak
5	14038.447	32.23	18.86	51.09	74.00	-22.91	peak
6	17896.247	26.90	25.75	52.65	74.00	-21.35	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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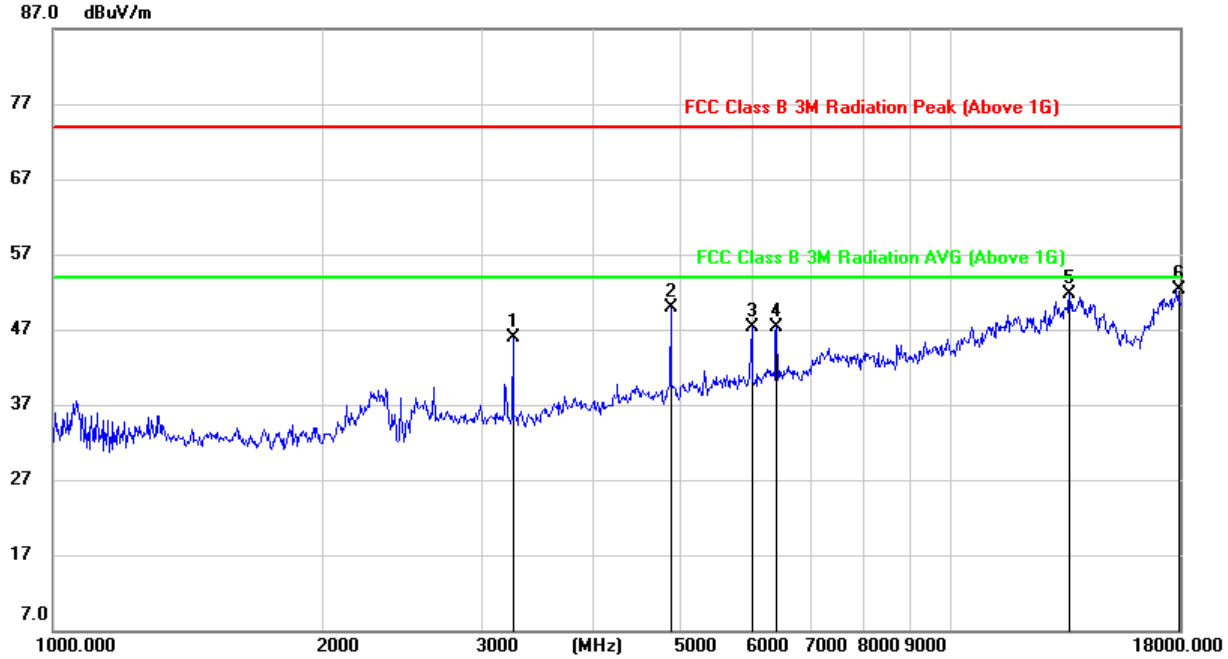
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	3252.005	52.19	-6.31	45.88	74.00	-28.12	peak
2	4874.043	50.93	-1.00	49.93	74.00	-24.07	peak
3	6001.626	45.28	2.10	47.38	74.00	-26.62	peak
4	6395.654	44.26	3.11	47.37	74.00	-26.63	peak
5	13559.879	32.42	19.29	51.71	74.00	-22.29	peak
6	17896.247	26.32	25.99	52.31	74.00	-21.69	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

Note: All the antennas had been tested, but only the worst data record in the report.

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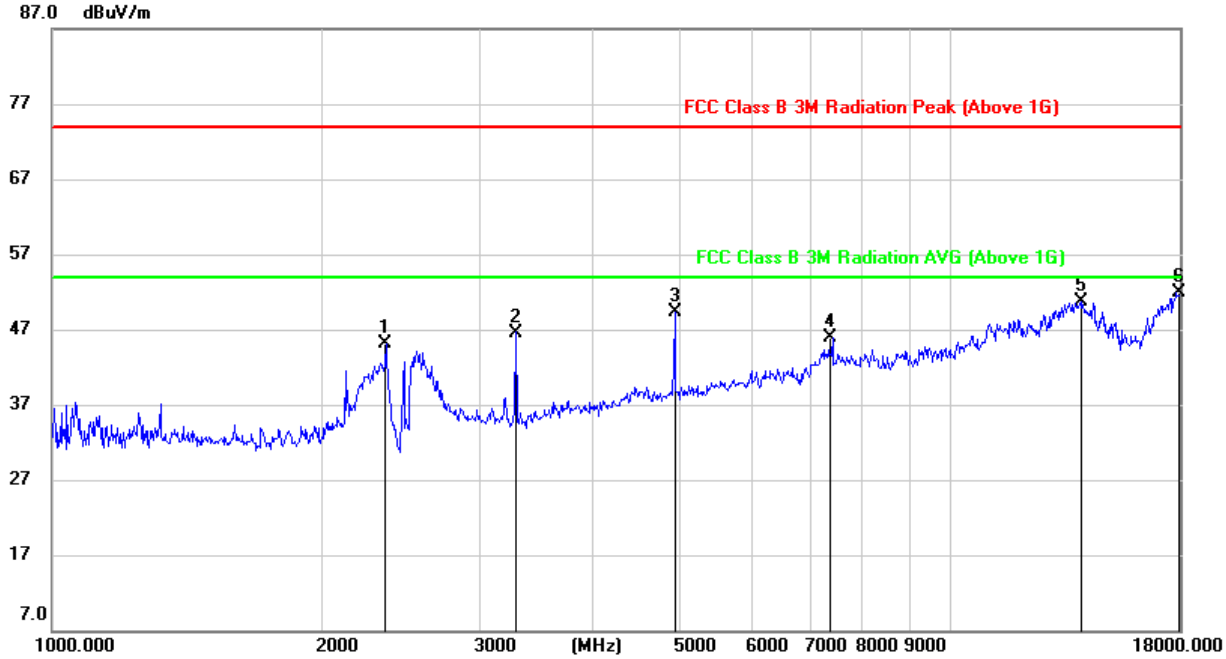
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2352.668	53.85	-8.68	45.17	74.00	-28.83	peak
2	3280.326	53.04	-6.44	46.60	74.00	-27.40	peak
3	4930.721	49.98	-0.72	49.26	74.00	-24.74	peak
4	7390.070	40.60	5.27	45.87	74.00	-28.13	peak
5	13997.929	31.82	18.87	50.69	74.00	-23.31	peak
6	17896.247	26.14	25.75	51.89	74.00	-22.11	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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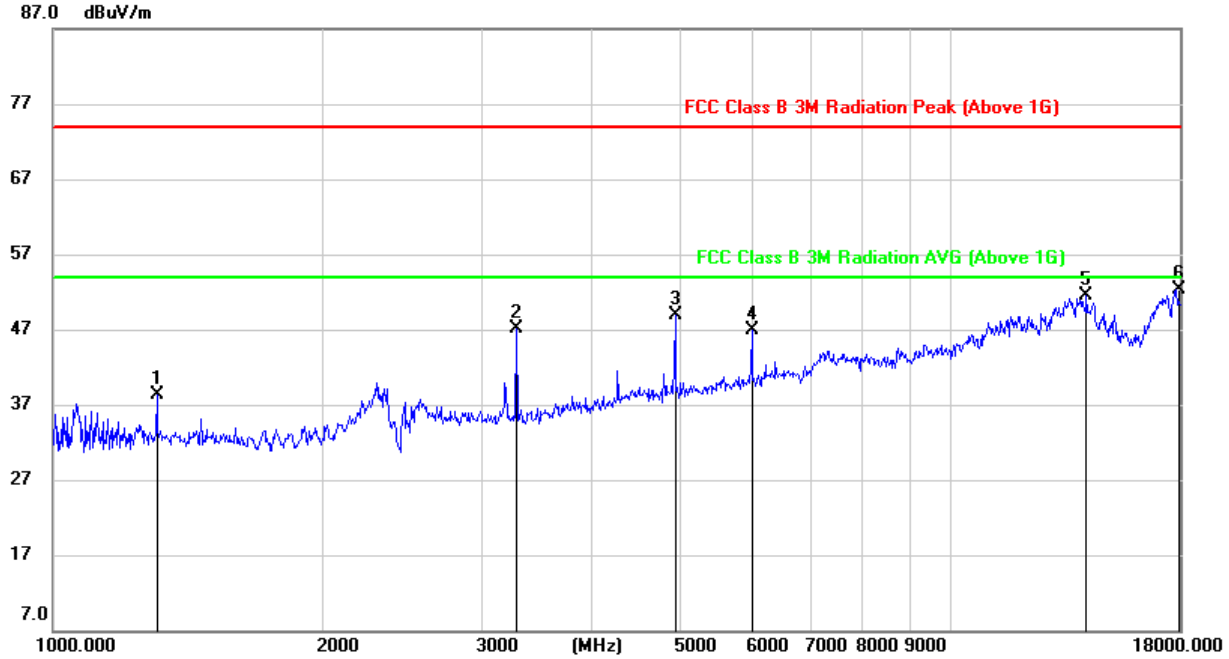
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1304.623	51.32	-13.01	38.31	74.00	-35.69	peak
2	3280.326	53.56	-6.40	47.16	74.00	-26.84	peak
3	4930.721	49.62	-0.76	48.86	74.00	-25.14	peak
4	6001.626	44.76	2.10	46.86	74.00	-27.14	peak
5	14201.694	33.05	18.39	51.44	74.00	-22.56	peak
6	17896.247	26.22	25.99	52.21	74.00	-21.79	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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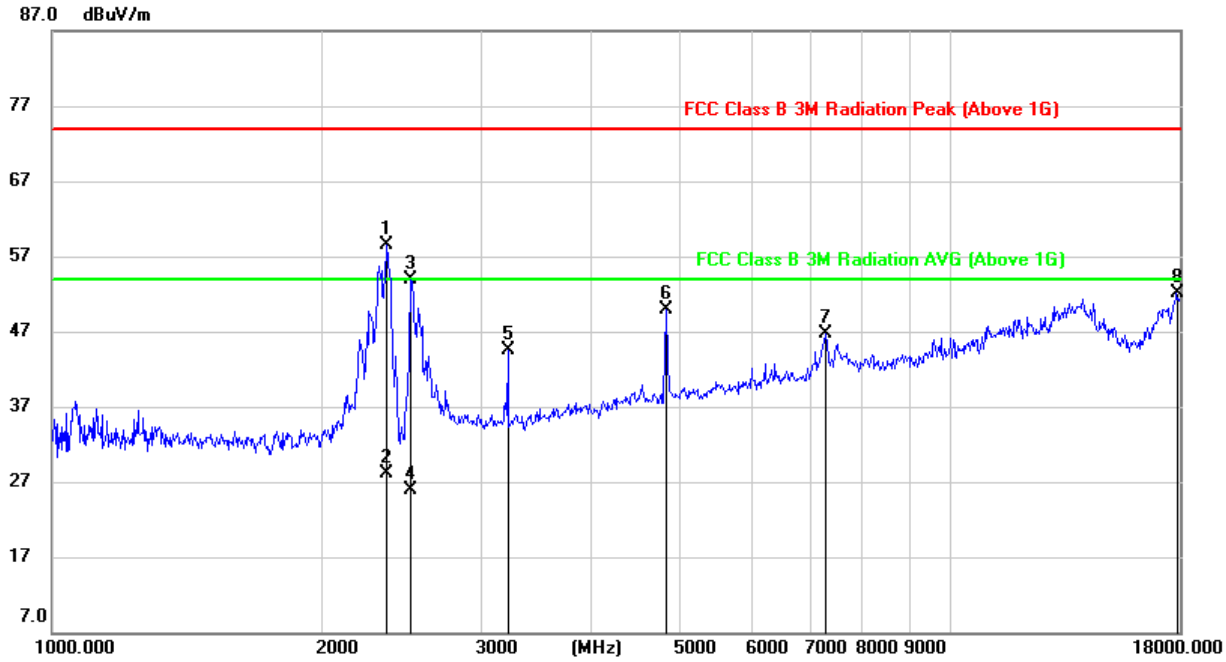
7.2.1. 802.11g MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2359.858	67.28	-8.72	58.56	74.00	-15.44	peak
2	2359.858	36.73	-8.72	28.01	54.00	-25.99	AVG
3	2513.547	63.14	-9.19	53.95	74.00	-20.05	peak
4	2513.547	35.05	-9.19	25.86	54.00	-28.14	AVG
5	3214.623	50.83	-6.36	44.47	74.00	-29.53	peak
6	4831.962	51.34	-1.44	49.90	74.00	-24.10	peak
7	7263.015	40.71	5.95	46.66	74.00	-27.34	peak
8	17896.247	26.39	25.75	52.14	74.00	-21.86	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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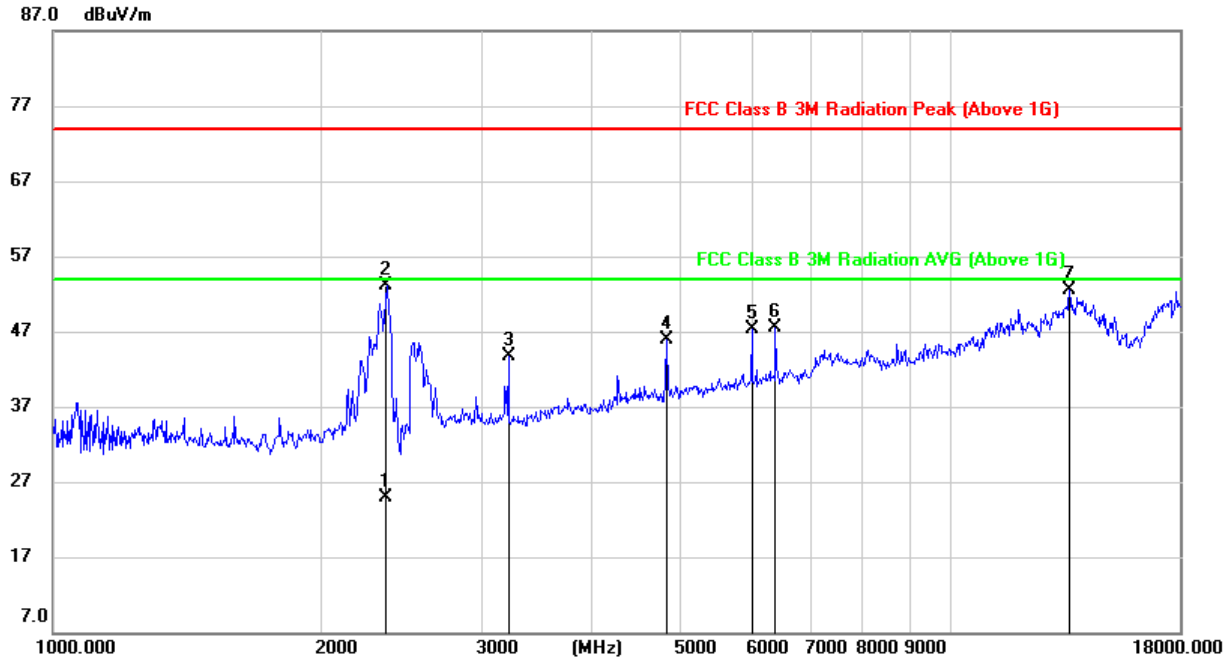
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2352.608	33.57	-8.58	24.99	54.00	-29.01	AVG
2	2352.668	61.72	-8.58	53.14	74.00	-20.86	peak
3	3214.623	50.00	-6.33	43.67	74.00	-30.33	peak
4	4831.962	47.40	-1.41	45.99	74.00	-28.01	peak
5	6001.626	45.14	2.10	47.24	74.00	-26.76	peak
6	6377.195	44.49	3.08	47.57	74.00	-26.43	peak
7	13559.879	33.12	19.29	52.41	74.00	-21.59	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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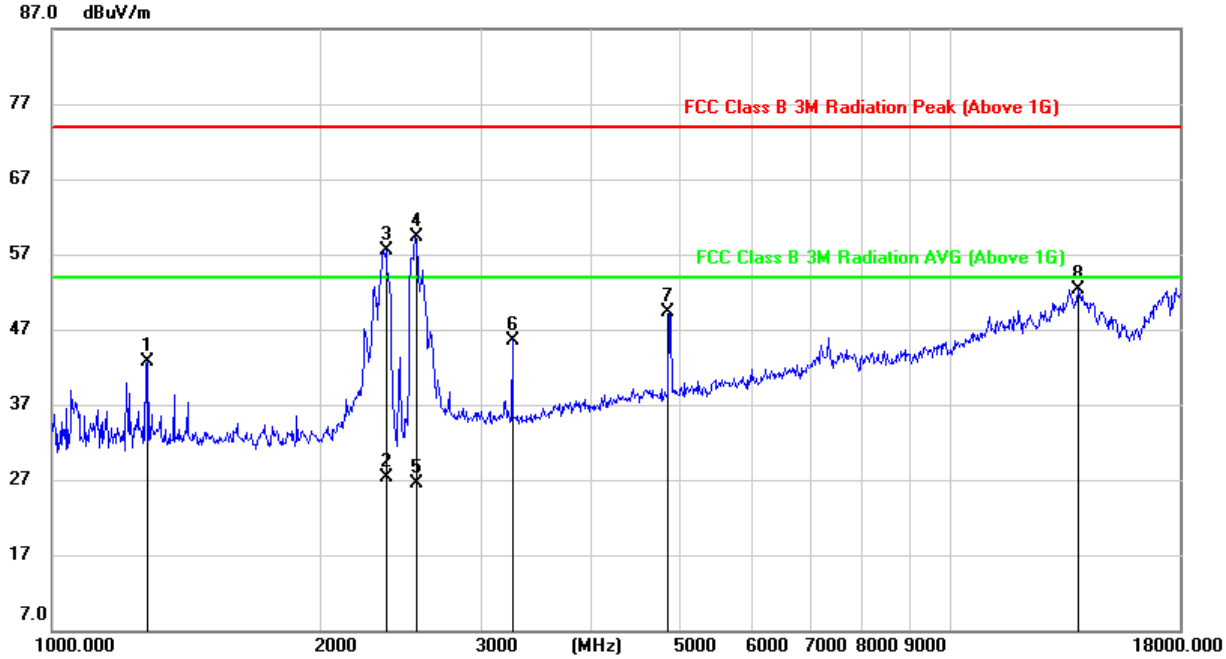
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1278.492	55.69	-12.93	42.76	74.00	-31.24	peak
2	2358.542	36.06	-8.71	27.35	54.00	-26.65	AVG
3	2358.545	66.25	-8.71	57.54	74.00	-16.46	peak
4	2545.034	68.33	-9.12	59.21	74.00	-14.79	peak
5	2545.034	35.72	-9.12	26.60	54.00	-27.40	AVG
6	3252.005	52.00	-6.40	45.60	74.00	-28.40	peak
7	4859.975	50.45	-1.11	49.34	74.00	-24.66	peak
8	13877.076	33.24	18.99	52.23	74.00	-21.77	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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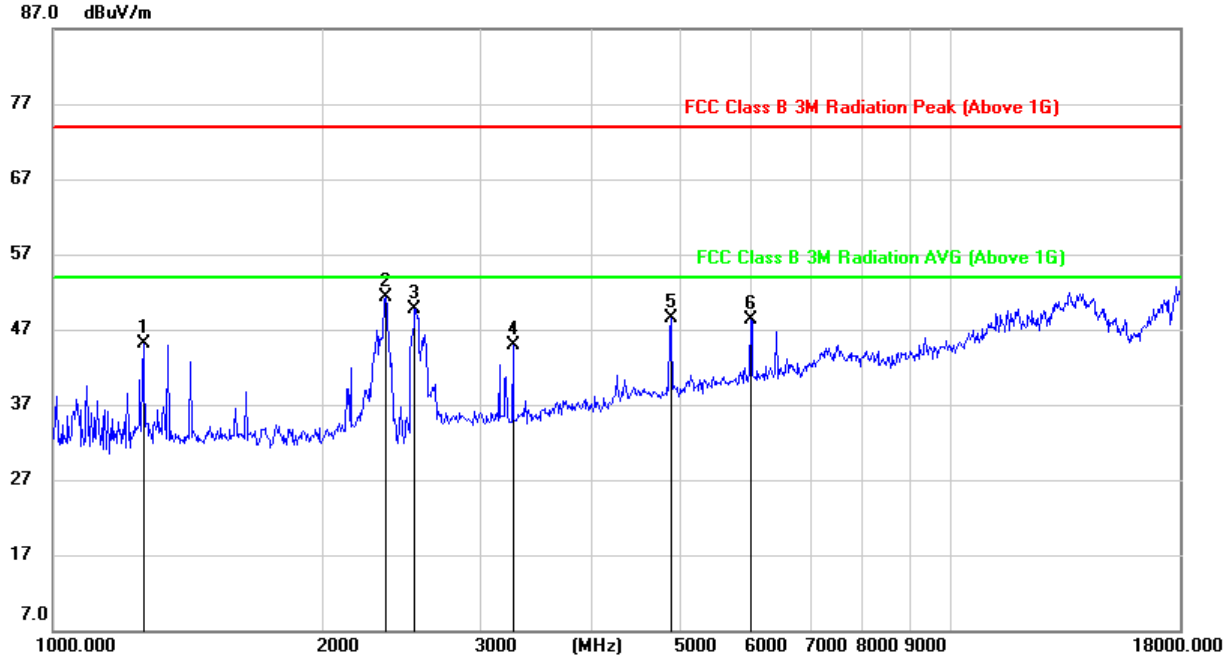
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1260.149	58.12	-13.09	45.03	74.00	-28.97	peak
2	2345.878	59.80	-8.52	51.28	74.00	-22.72	peak
3	2528.963	58.74	-9.05	49.69	74.00	-24.31	peak
4	3252.005	51.31	-6.31	45.00	74.00	-29.00	peak
5	4874.043	49.49	-1.00	48.49	74.00	-25.51	peak
6	5984.305	46.33	2.00	48.33	74.00	-25.67	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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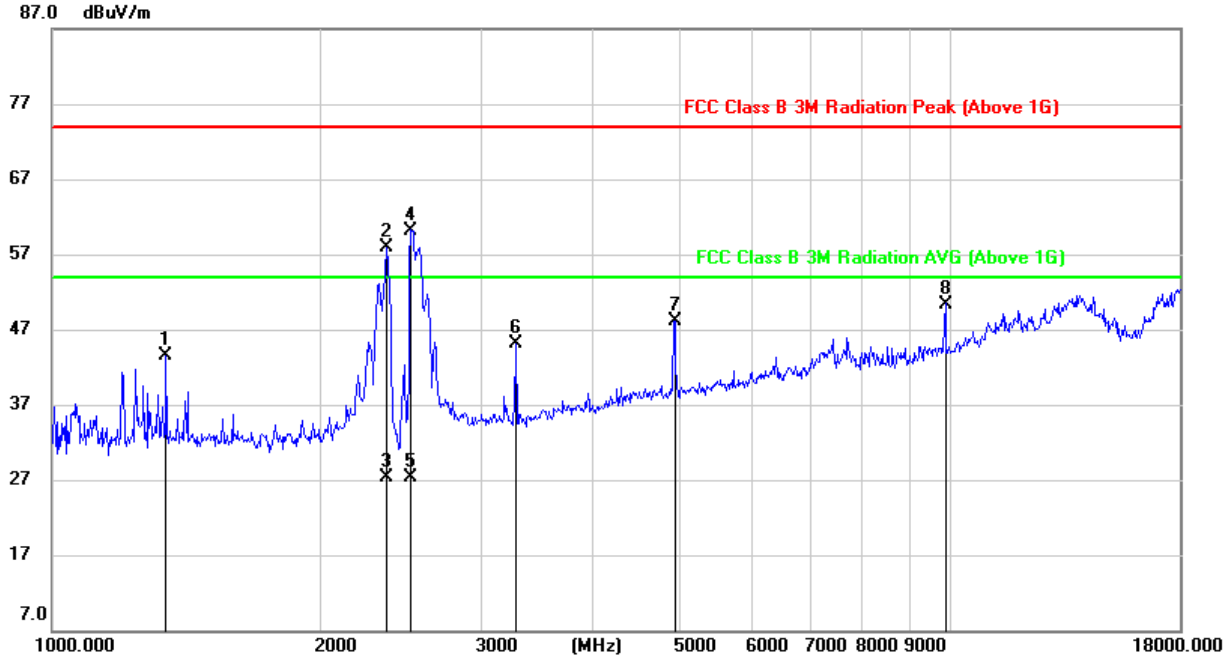
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1339.006	56.31	-12.79	43.52	74.00	-30.48	peak
2	2354.386	66.68	-8.70	57.98	74.00	-16.02	peak
3	2354.386	36.06	-8.70	27.36	54.00	-26.64	AVG
4	2512.128	69.39	-9.19	60.20	74.00	-13.80	peak
5	2512.128	36.52	-9.19	27.33	54.00	-26.67	AVG
6	3280.326	51.58	-6.44	45.14	74.00	-28.86	peak
7	4930.721	48.91	-0.72	48.19	74.00	-25.81	peak
8	9866.789	40.82	9.58	50.40	74.00	-23.60	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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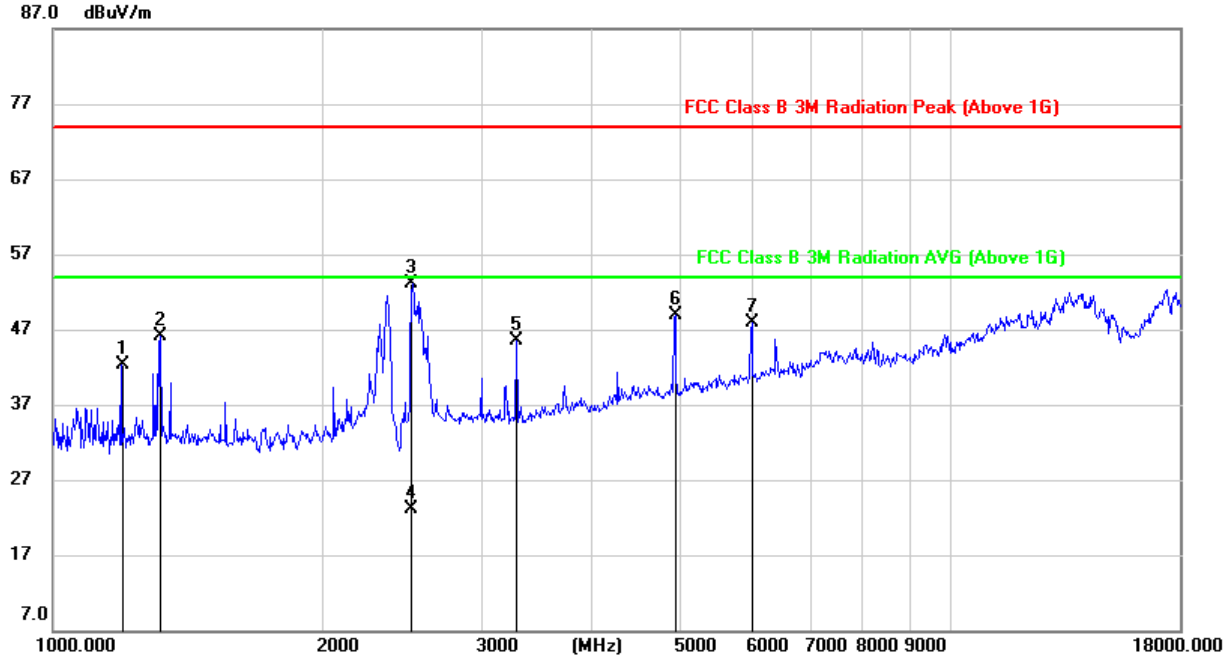
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1192.811	55.98	-13.63	42.35	74.00	-31.65	peak
2	1315.985	59.16	-12.96	46.20	74.00	-27.80	peak
3	2511.249	62.19	-9.09	53.10	74.00	-20.90	peak
4	2511.249	32.16	-9.09	23.07	54.00	-30.93	AVG
5	3280.326	51.91	-6.40	45.51	74.00	-28.49	peak
6	4930.721	49.71	-0.76	48.95	74.00	-25.05	peak
7	6001.626	45.83	2.10	47.93	74.00	-26.07	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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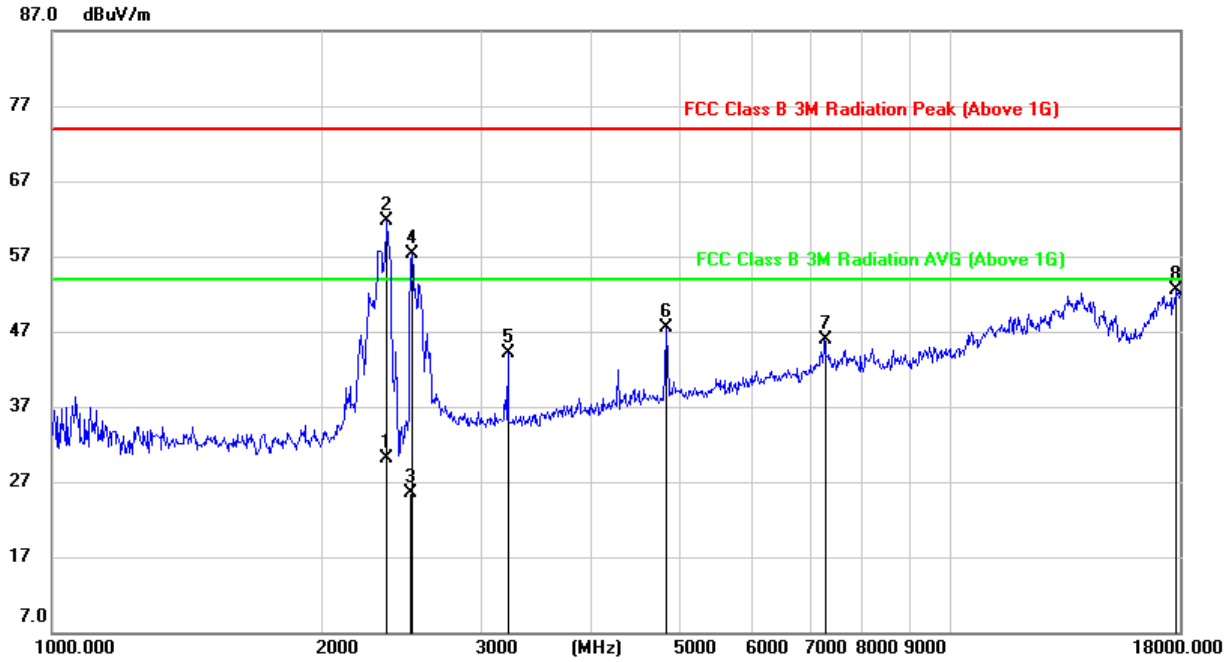
7.2.1. 802.11n20 MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2359.458	38.85	-8.72	30.13	54.00	-23.87	AVG
2	2359.478	70.44	-8.72	61.72	74.00	-12.28	peak
3	2513.347	34.74	-9.19	25.55	54.00	-28.45	AVG
4	2514.386	66.49	-9.19	57.30	74.00	-16.70	peak
5	3214.623	50.44	-6.36	44.08	74.00	-29.92	peak
6	4831.962	48.93	-1.44	47.49	74.00	-26.51	peak
7	7263.015	39.89	5.95	45.84	74.00	-28.16	peak
8	17793.092	26.73	25.79	52.52	74.00	-21.48	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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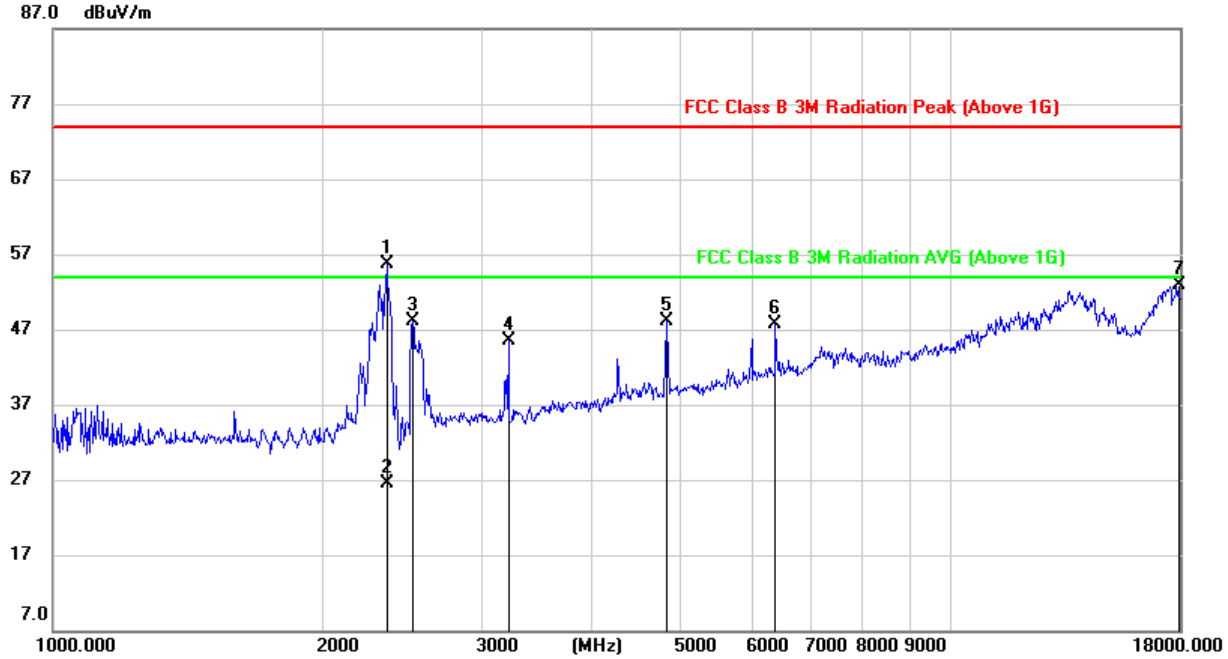
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2355.745	64.38	-8.61	55.77	74.00	-18.23	peak
2	2355.745	35.12	-8.61	26.51	54.00	-27.49	AVG
3	2514.386	57.22	-9.09	48.13	74.00	-25.87	peak
4	3214.623	51.85	-6.33	45.52	74.00	-28.48	peak
5	4831.962	49.58	-1.41	48.17	74.00	-25.83	peak
6	6377.195	44.69	3.08	47.77	74.00	-26.23	peak
7	17896.247	26.84	25.99	52.83	74.00	-21.17	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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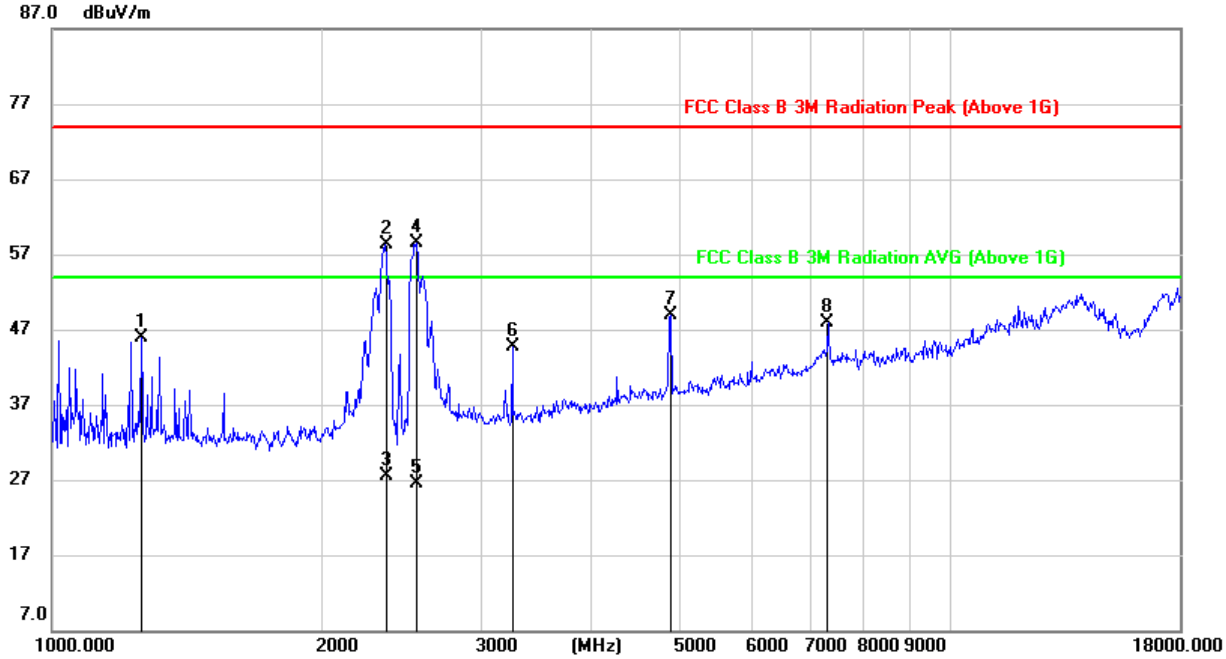
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1256.512	59.07	-13.15	45.92	74.00	-28.08	peak
2	2355.848	67.04	-8.71	58.33	74.00	-15.67	peak
3	2355.848	36.12	-8.71	27.41	54.00	-26.59	AVG
4	2543.125	67.70	-9.12	58.58	74.00	-15.42	peak
5	2543.125	35.62	-9.12	26.50	54.00	-27.50	AVG
6	3252.005	51.13	-6.40	44.73	74.00	-29.27	peak
7	4874.043	49.82	-0.95	48.87	74.00	-25.13	peak
8	7305.122	41.96	5.92	47.88	74.00	-26.12	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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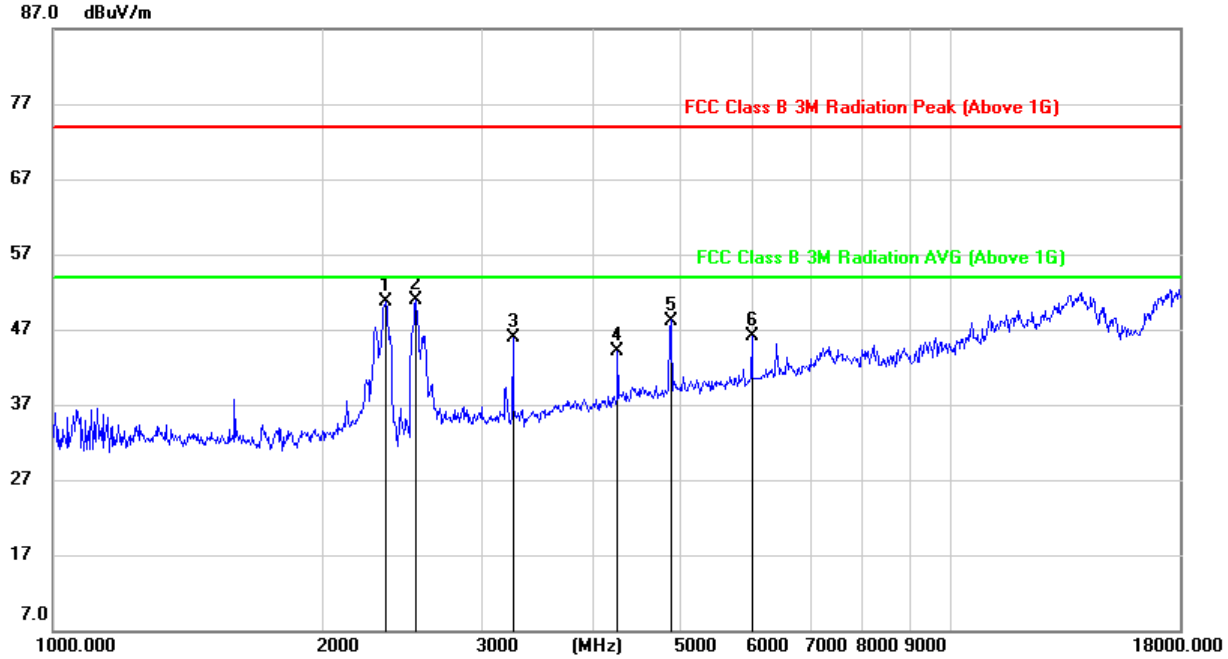
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2345.878	59.24	-8.52	50.72	74.00	-23.28	peak
2	2536.283	59.95	-9.04	50.91	74.00	-23.09	peak
3	3252.005	52.18	-6.31	45.87	74.00	-28.13	peak
4	4254.921	47.33	-3.21	44.12	74.00	-29.88	peak
5	4874.043	49.20	-1.00	48.20	74.00	-25.80	peak
6	6001.626	44.04	2.10	46.14	74.00	-27.86	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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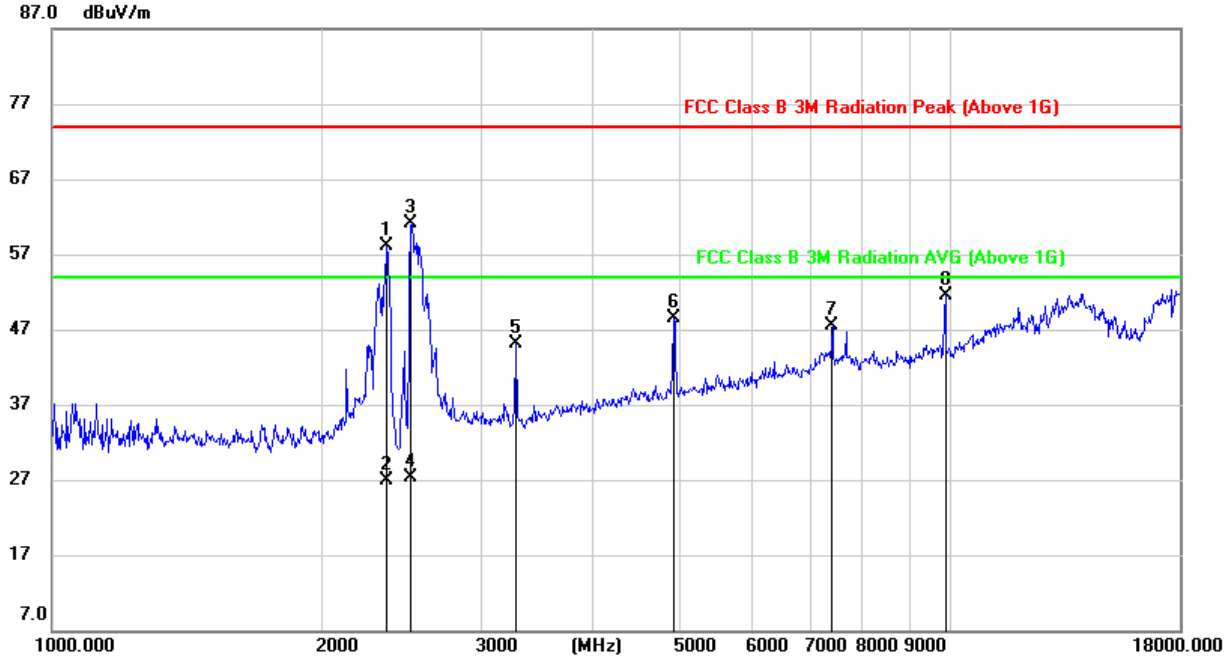
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2355.182	66.79	-8.70	58.09	74.00	-15.91	peak
2	2355.182	35.53	-8.70	26.83	54.00	-27.17	AVG
3	2512.028	70.29	-9.19	61.10	74.00	-12.90	peak
4	2512.028	36.41	-9.19	27.22	54.00	-26.78	AVG
5	3280.326	51.61	-6.44	45.17	74.00	-28.83	peak
6	4916.490	49.27	-0.68	48.59	74.00	-25.41	peak
7	7390.070	42.22	5.27	47.49	74.00	-26.51	peak
8	9866.789	42.02	9.58	51.60	74.00	-22.40	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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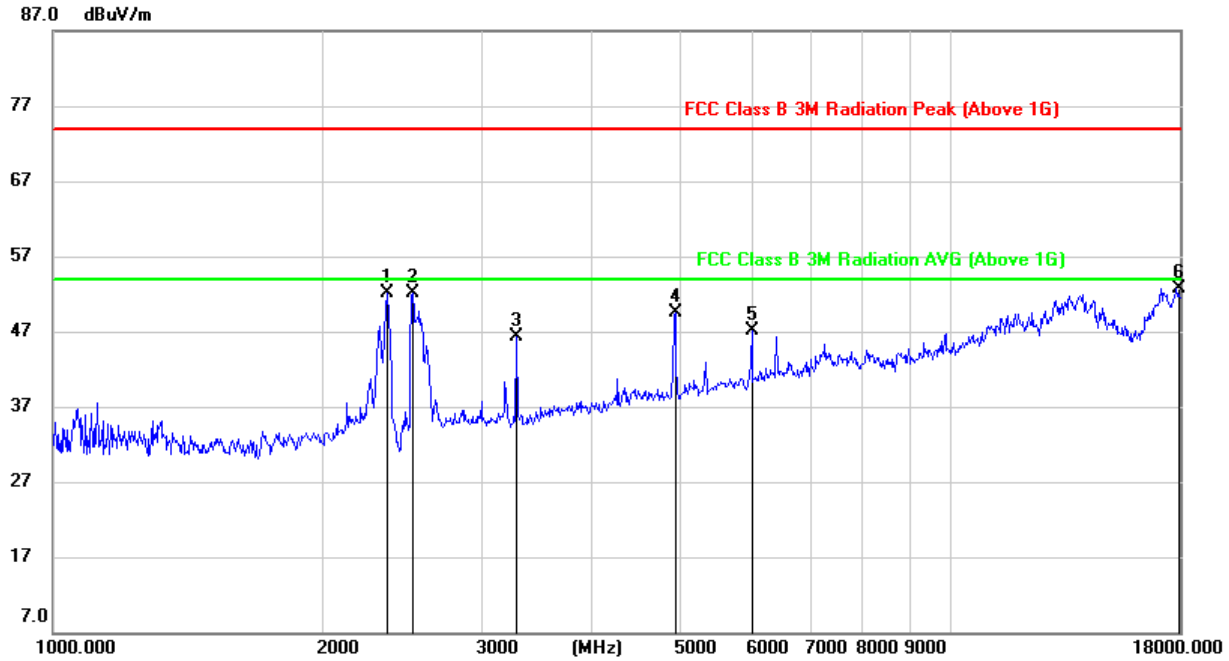
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2359.478	60.63	-8.62	52.01	74.00	-21.99	peak
2	2514.386	61.22	-9.09	52.13	74.00	-21.87	peak
3	3280.326	52.67	-6.40	46.27	74.00	-27.73	peak
4	4930.721	50.21	-0.76	49.45	74.00	-24.55	peak
5	6001.626	44.99	2.10	47.09	74.00	-26.91	peak
6	17896.247	26.80	25.99	52.79	74.00	-21.21	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.
5. For transmit duration, please refer to clause 6.1.

Note: The pre-scan had been done for all the three models VEN-1S-1R-HC, VEN-2S-1R-HC, VEN-3S-3R-HC, but only the worst data recorded in the report.

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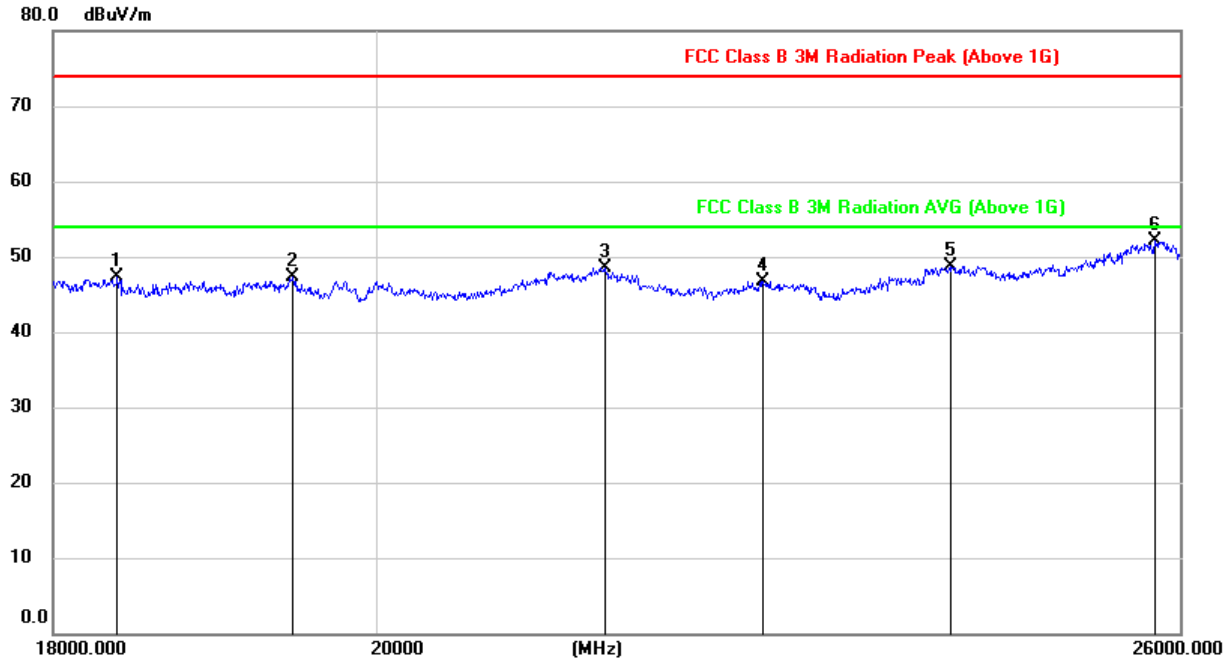
7.3. SPURIOUS EMISSIONS 18~26GHz FOR VEN-3S-3R-HC

7.3.1. 802.11b MODE

SPURIOUS EMISSIONS (HIGH CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	18381.267	52.65	-5.40	47.25	74.00	-26.75	peak
2	19466.541	52.85	-5.55	47.30	74.00	-26.70	peak
3	21553.903	53.10	-4.61	48.49	74.00	-25.51	peak
4	22692.588	50.54	-3.74	46.80	74.00	-27.20	peak
5	24120.948	51.49	-2.79	48.70	74.00	-25.30	peak
6	25790.510	52.71	-0.68	52.03	74.00	-21.97	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

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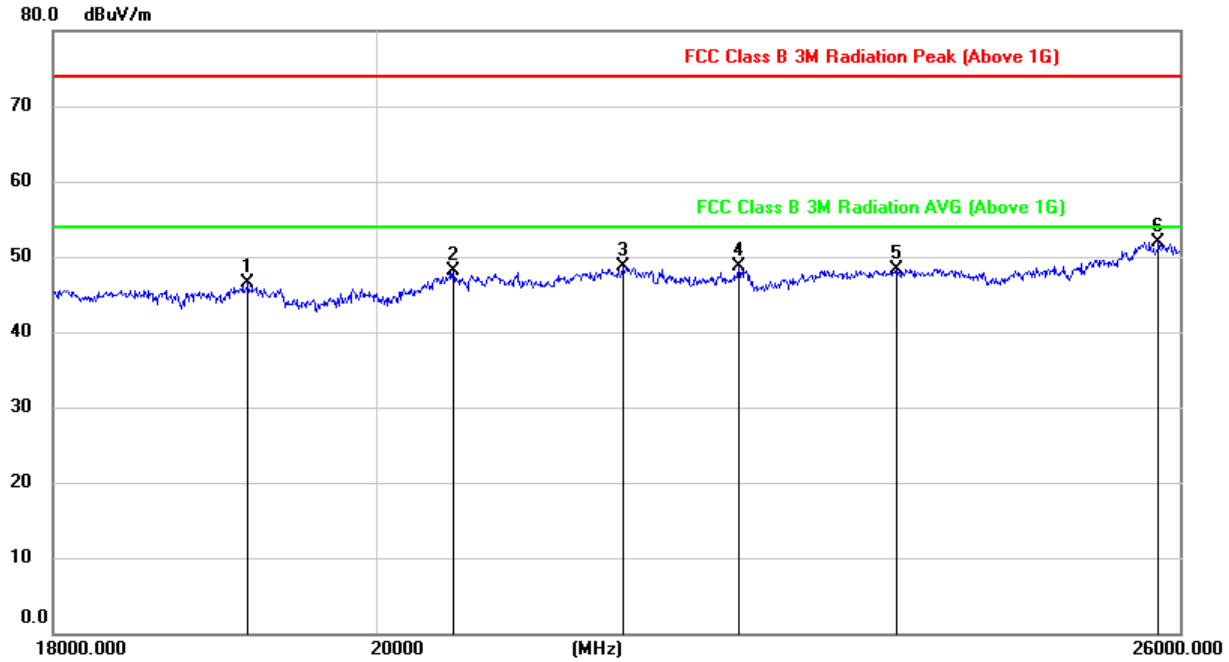
SPURIOUS EMISSIONS (HIGH CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	19182.303	52.08	-5.49	46.59	74.00	-27.41	peak
2	20510.030	53.36	-5.35	48.01	74.00	-25.99	peak
3	21681.091	53.10	-4.43	48.67	74.00	-25.33	peak
4	22518.026	52.55	-3.87	48.68	74.00	-25.32	peak
5	23698.930	51.54	-3.18	48.36	74.00	-25.64	peak
6	25818.977	52.73	-0.74	51.99	74.00	-22.01	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.

Note: All the modes had been tested, but only the worst data were recorded in the report.

Note: The pre-scan had been done for all the three models VEN-1S-1R-HC, VEN-2S-1R-HC, VEN-3S-3R-HC, but only the worst data recorded in the report.

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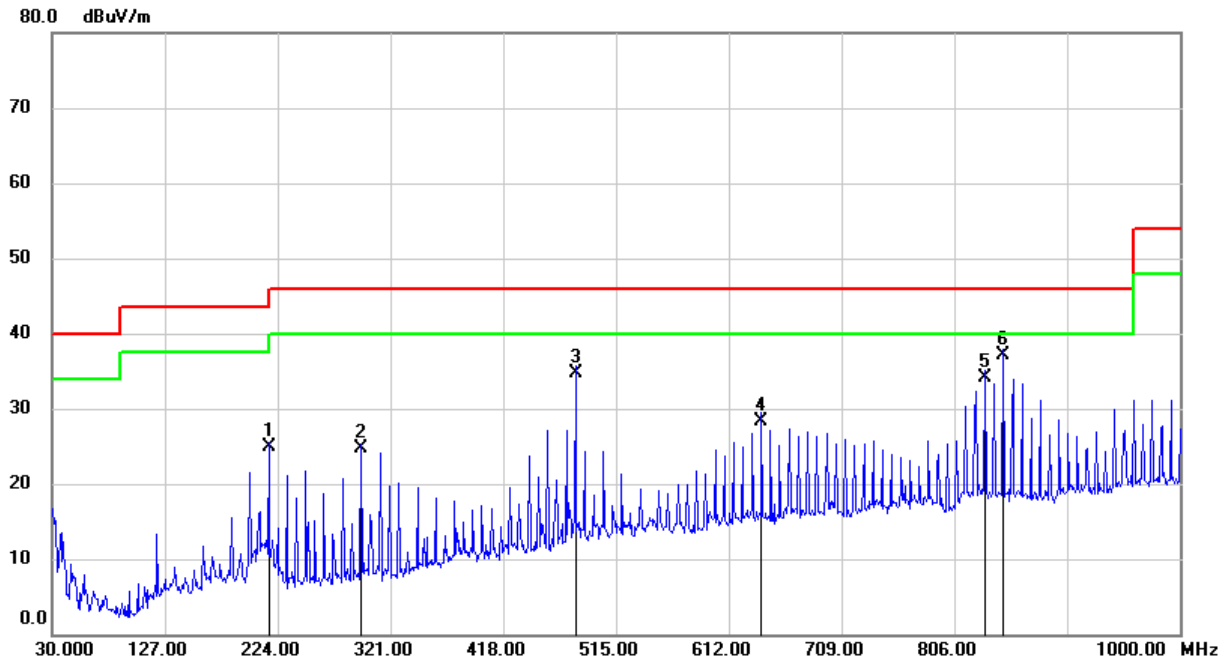
7.4. SPURIOUS EMISSIONS 30M ~ 1 GHz

7.4.1. 802.11b MODE for Serial Number of VEN-3S-3R-HC

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	216.2400	53.43	-28.45	24.98	46.00	-21.02	QP
2	295.7800	52.60	-27.95	24.65	46.00	-21.35	QP
3	480.0800	57.31	-22.66	34.65	46.00	-11.35	QP
4	640.1300	48.73	-20.40	28.33	46.00	-17.67	QP
5	832.1900	50.83	-16.67	34.16	46.00	-11.84	QP
6	847.7100	54.39	-17.38	37.01	46.00	-8.99	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

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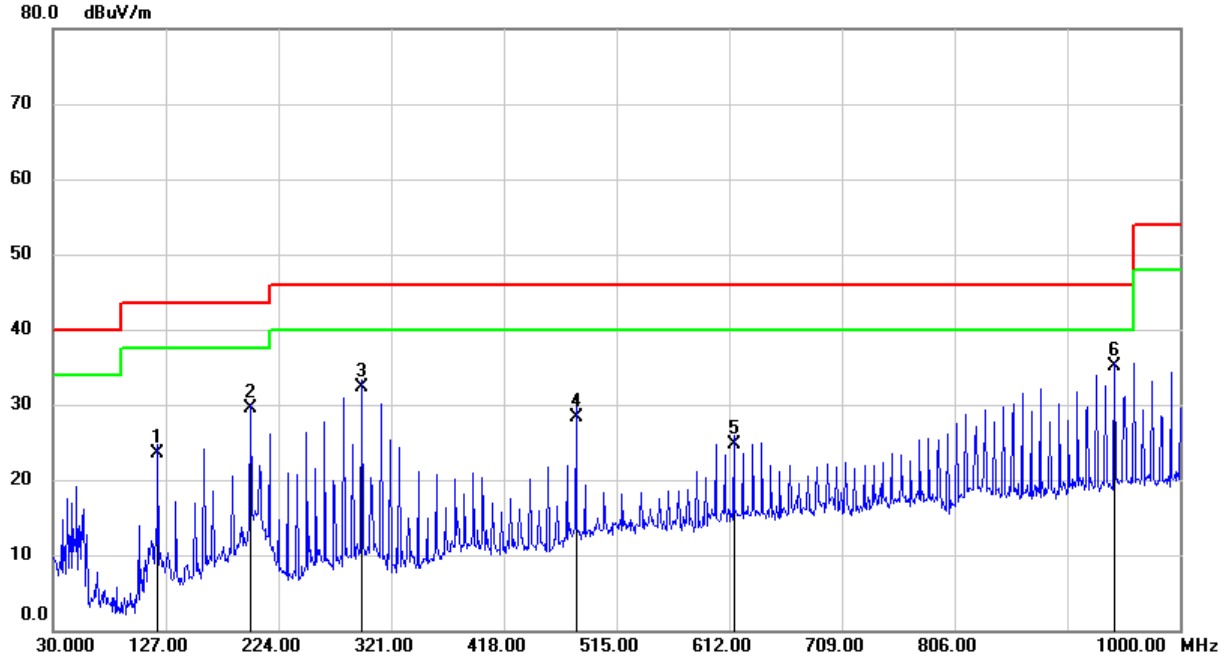
SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	120.2100	54.30	-30.76	23.54	43.50	-19.96	QP
2	199.7500	57.64	-28.12	29.52	43.50	-13.98	QP
3	295.7800	60.29	-27.95	32.34	46.00	-13.66	QP
4	480.0800	51.03	-22.66	28.37	46.00	-17.63	QP
5	615.8800	45.22	-20.58	24.64	46.00	-21.36	QP
6	943.7400	51.01	-15.96	35.05	46.00	-10.95	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

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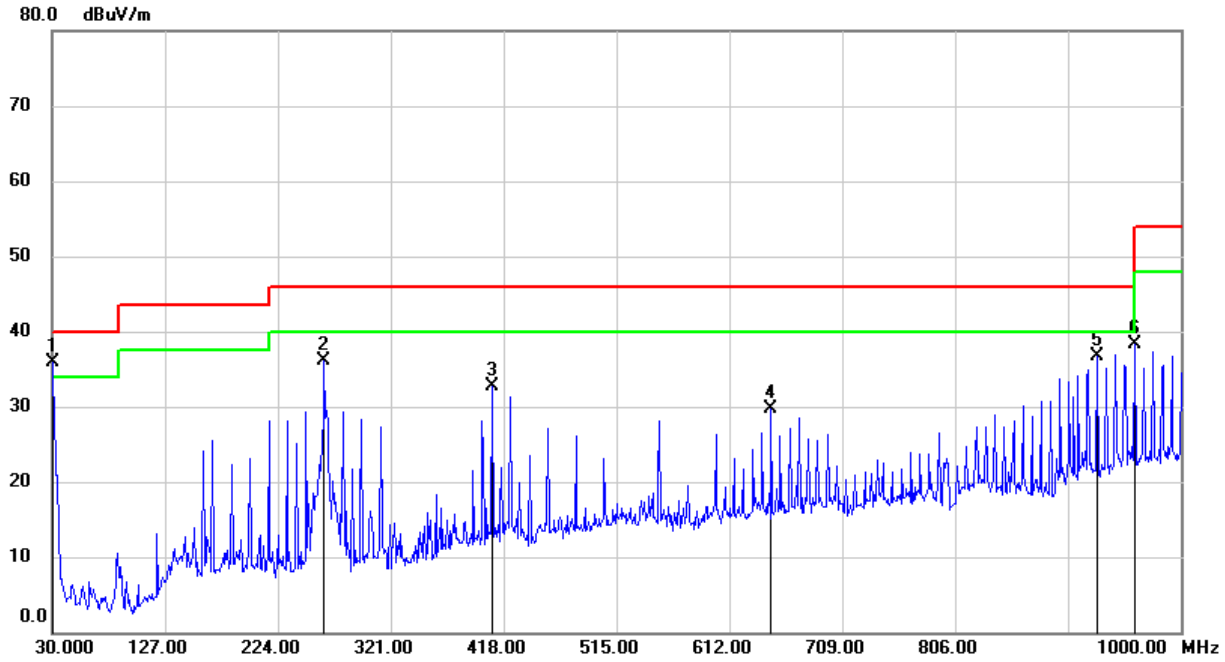
7.4.2. 802.11b MODE for Serial Number of VEN-1S-1R-HC

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	53.70	-17.88	35.82	40.00	-4.18	peak
2	263.7700	52.58	-16.40	36.18	46.00	-9.82	peak
3	408.3000	45.69	-12.92	32.77	46.00	-13.23	peak
4	647.8900	39.05	-9.42	29.63	46.00	-16.37	peak
5	928.2200	41.86	-5.10	36.76	46.00	-9.24	peak
6	960.2300	42.29	-3.94	38.35	54.00	-15.65	peak

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

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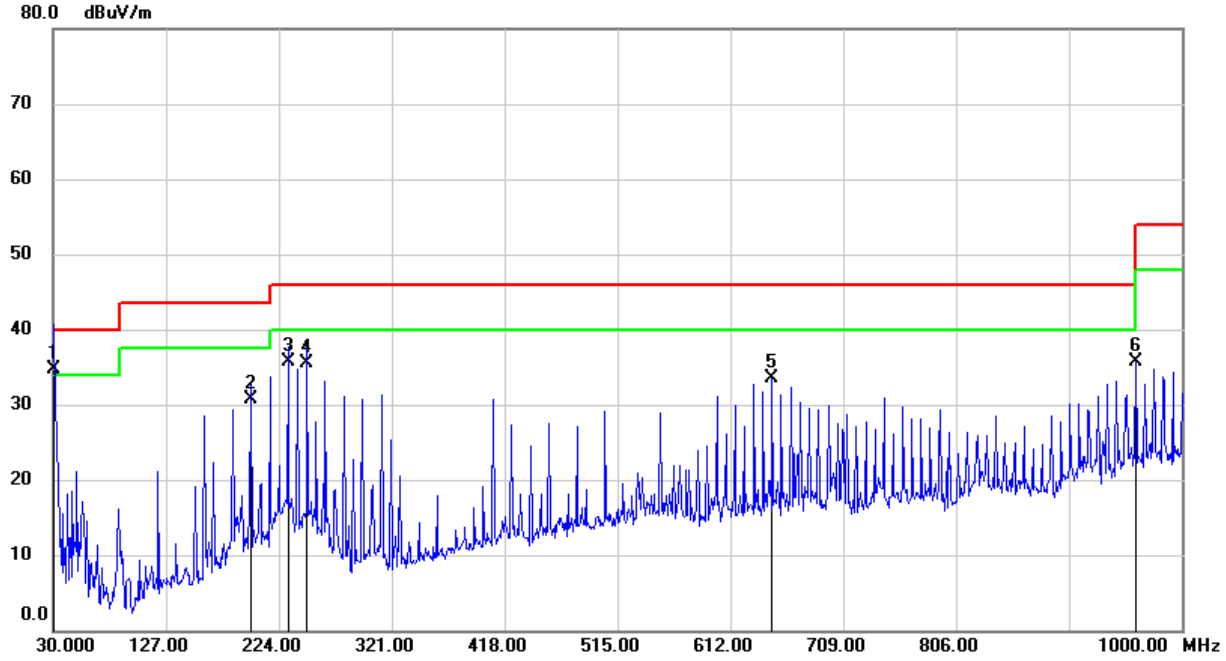
SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	52.50	-17.88	34.62	40.00	-5.38	QP
2	199.7500	46.93	-16.30	30.63	43.50	-12.87	QP
3	231.7600	52.60	-16.99	35.61	46.00	-10.39	QP
4	248.2500	52.54	-17.04	35.50	46.00	-10.50	QP
5	647.8900	42.88	-9.42	33.46	46.00	-12.54	QP
6	960.2300	39.56	-3.94	35.62	54.00	-18.38	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

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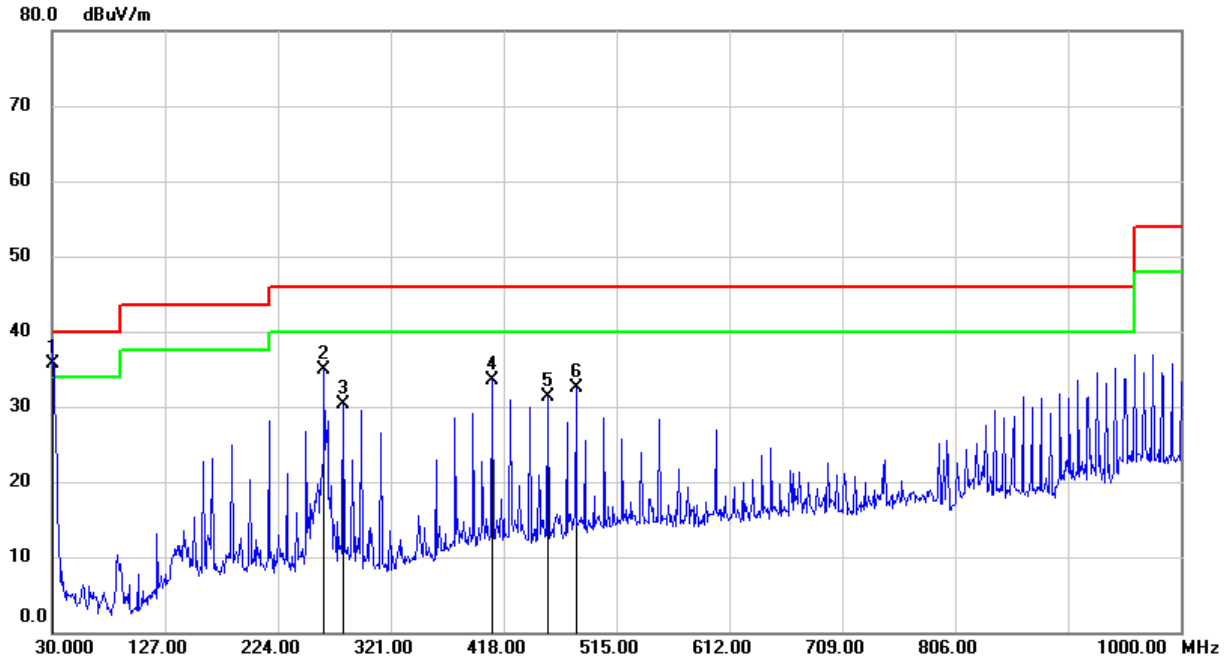
7.4.3. 802.11b MODE for Serial Number of VEN-2S-2R-HC

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	53.53	-17.88	35.65	40.00	-4.35	QP
2	263.7700	51.35	-16.40	34.95	46.00	-11.05	QP
3	280.2600	46.28	-15.91	30.37	46.00	-15.63	QP
4	408.3000	46.39	-12.92	33.47	46.00	-12.53	QP
5	455.8300	43.94	-12.67	31.27	46.00	-14.73	QP
6	480.0800	43.66	-11.09	32.57	46.00	-13.43	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

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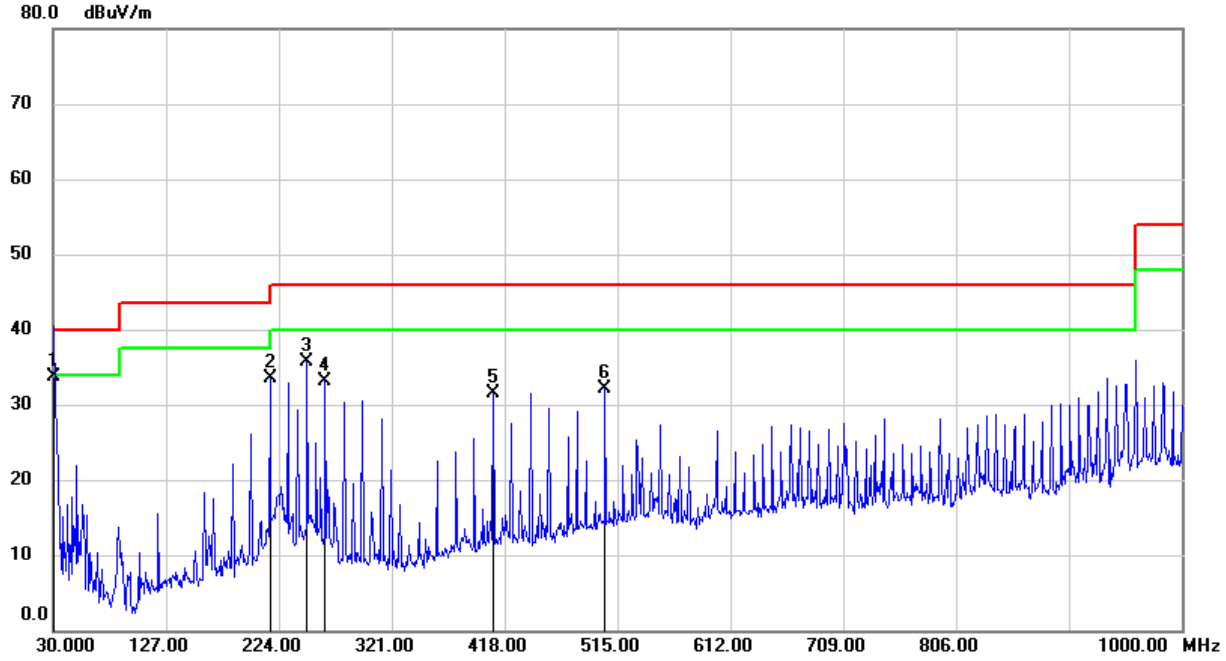
SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	30.9700	51.62	-17.88	33.74	40.00	-6.26	QP
2	216.2400	49.95	-16.54	33.41	46.00	-12.59	QP
3	248.2500	52.69	-17.04	35.65	46.00	-10.35	QP
4	263.7700	49.59	-16.40	33.19	46.00	-12.81	QP
5	408.3000	44.39	-12.92	31.47	46.00	-14.53	QP
6	504.3300	42.54	-10.49	32.05	46.00	-13.95	QP

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

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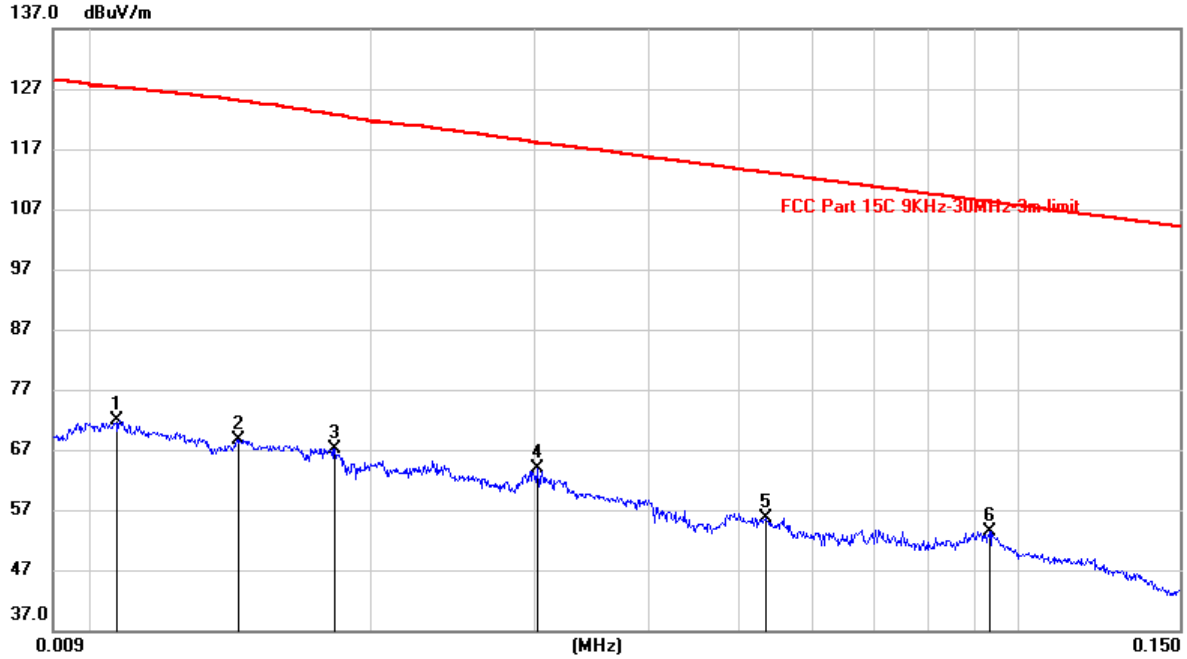
7.5. SPURIOUS EMISSIONS BELOW 30M

7.5.1. 802.11b MODE

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

9KHz~ 150KHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0106	51.54	20.22	71.76	127.24	-55.48	peak
2	0.0143	48.49	20.25	68.74	125.01	-56.27	peak
3	0.0182	46.91	20.29	67.20	122.66	-55.46	peak
4	0.0302	43.46	20.31	63.77	118.01	-54.24	peak
5	0.0534	35.41	20.31	55.72	113.08	-57.36	peak
6	0.0932	33.23	20.25	53.48	108.23	-54.75	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

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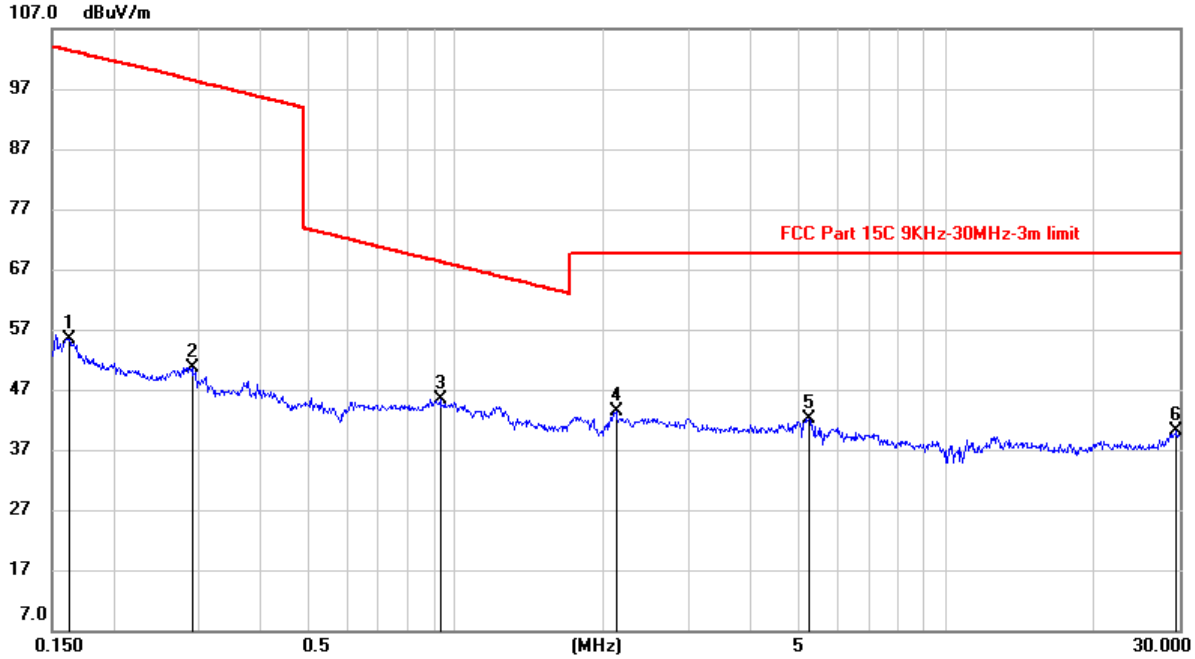
150KHz ~ 30M



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	0.1621	35.06	20.41	55.47	103.41	-47.94	peak
2	0.2893	30.36	20.31	50.67	98.44	-47.77	peak
3	0.9282	25.00	20.37	45.37	68.26	-22.89	peak
4	2.1323	22.69	20.75	43.44	69.54	-26.10	peak
5	5.2769	21.36	20.84	42.20	69.54	-27.34	peak
6	29.5269	18.30	21.95	40.25	69.54	-29.29	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

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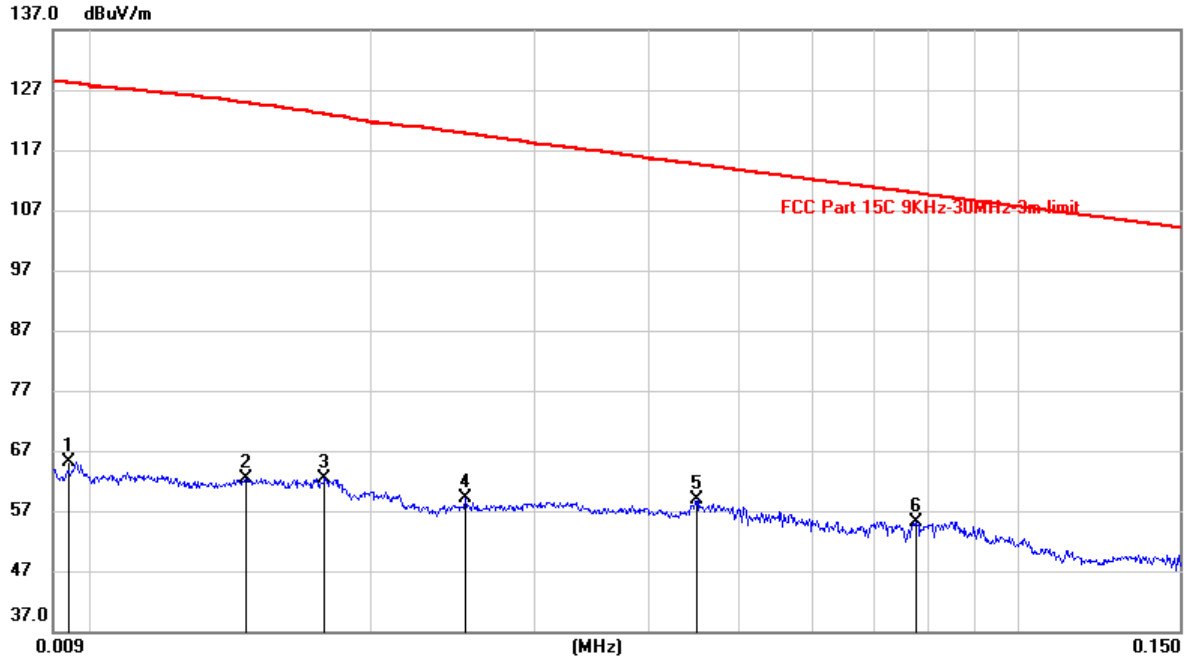
SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)

9KHz~ 150KHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0094	44.90	20.26	65.16	128.06	-62.90	peak
2	0.0146	42.23	20.26	62.49	124.83	-62.34	peak
3	0.0177	42.04	20.29	62.33	122.96	-60.63	peak
4	0.0252	38.79	20.31	59.10	119.75	-60.65	peak
5	0.0449	38.68	20.31	58.99	114.61	-55.62	peak
6	0.0777	34.84	20.30	55.14	109.81	-54.67	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

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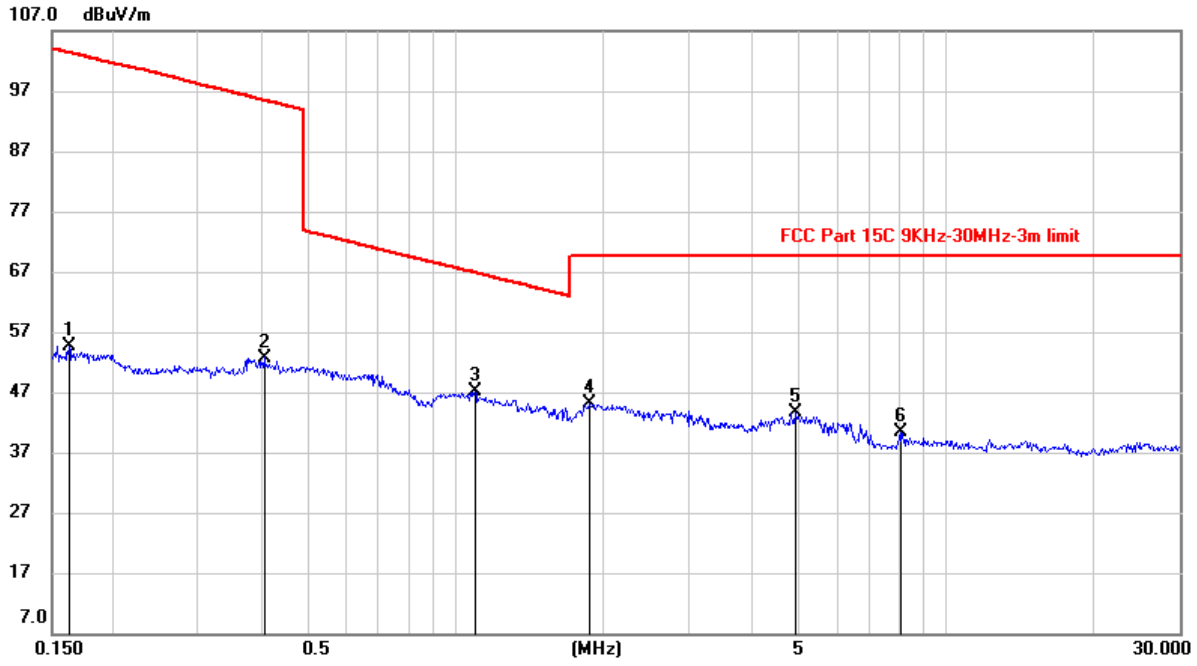
150KHz ~ 30M



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	0.1621	34.11	20.41	54.52	103.41	-48.89	peak
2	0.4061	32.48	20.27	52.75	95.44	-42.69	peak
3	1.0939	26.73	20.41	47.14	66.83	-19.69	peak
4	1.8770	24.48	20.69	45.17	69.54	-24.37	peak
5	4.9256	22.77	20.84	43.61	69.54	-25.93	peak
6	8.0624	19.39	20.97	40.36	69.54	-29.18	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

Note: All the modes had been tested, but only the worst data were recorded in the report.

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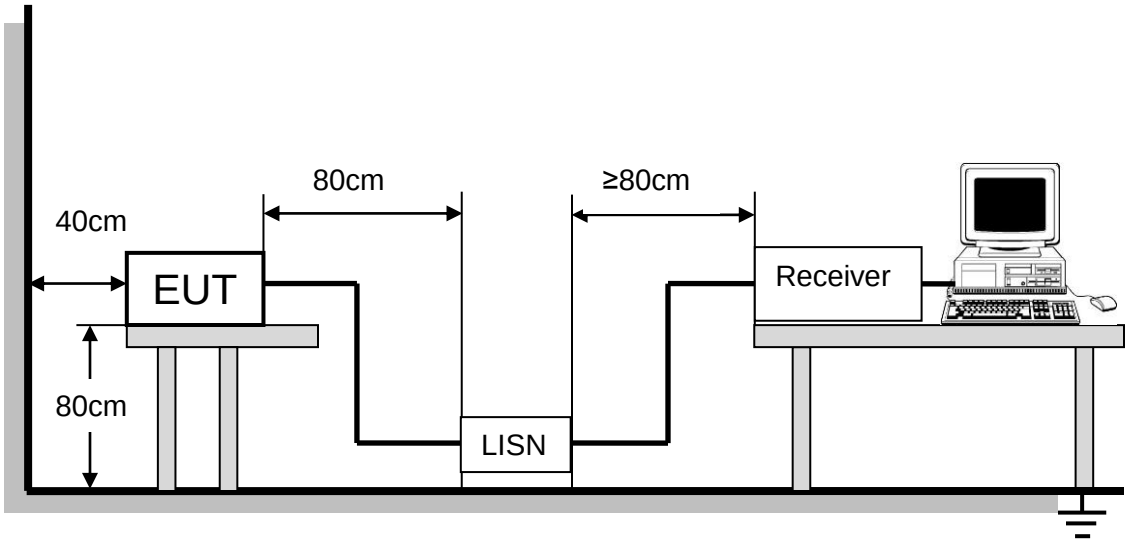
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST SETUP AND PROCEDURE



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10 -2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

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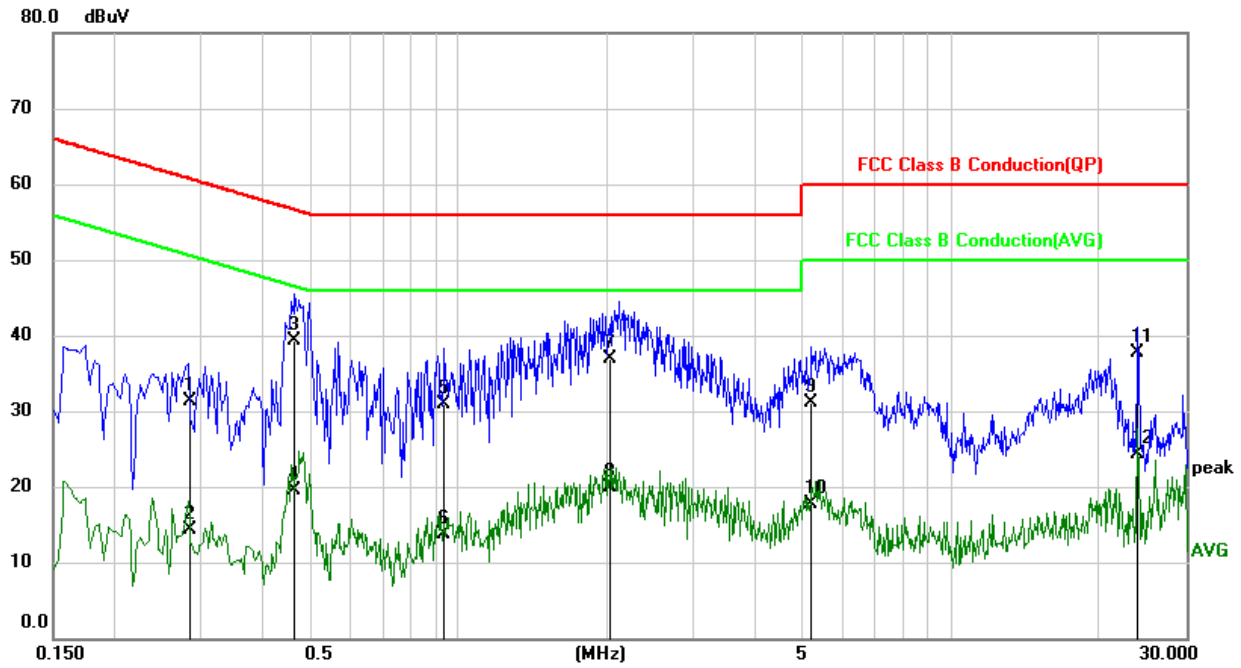
8.1.1. 802.11b MODE for Serial Number of VEN-3S-3R-HC

LINE N RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2845	21.61	9.65	31.26	60.68	-29.42	QP
2	0.2845	4.57	9.65	14.22	50.68	-36.46	AVG
3	0.4652	29.61	9.65	39.26	56.60	-17.34	QP
4	0.4652	9.87	9.65	19.52	46.60	-27.08	AVG
5	0.9361	21.23	9.67	30.90	56.00	-25.10	QP
6	0.9361	4.10	9.67	13.77	46.00	-32.23	AVG
7	2.0257	27.17	9.67	36.84	56.00	-19.16	QP
8	2.0257	10.18	9.67	19.85	46.00	-26.15	AVG
9	5.2112	21.30	9.73	31.03	60.00	-28.97	QP
10	5.2112	7.92	9.73	17.65	50.00	-32.35	AVG
11	23.9671	27.68	9.93	37.61	60.00	-22.39	QP
12	23.9671	14.29	9.93	24.22	50.00	-25.78	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

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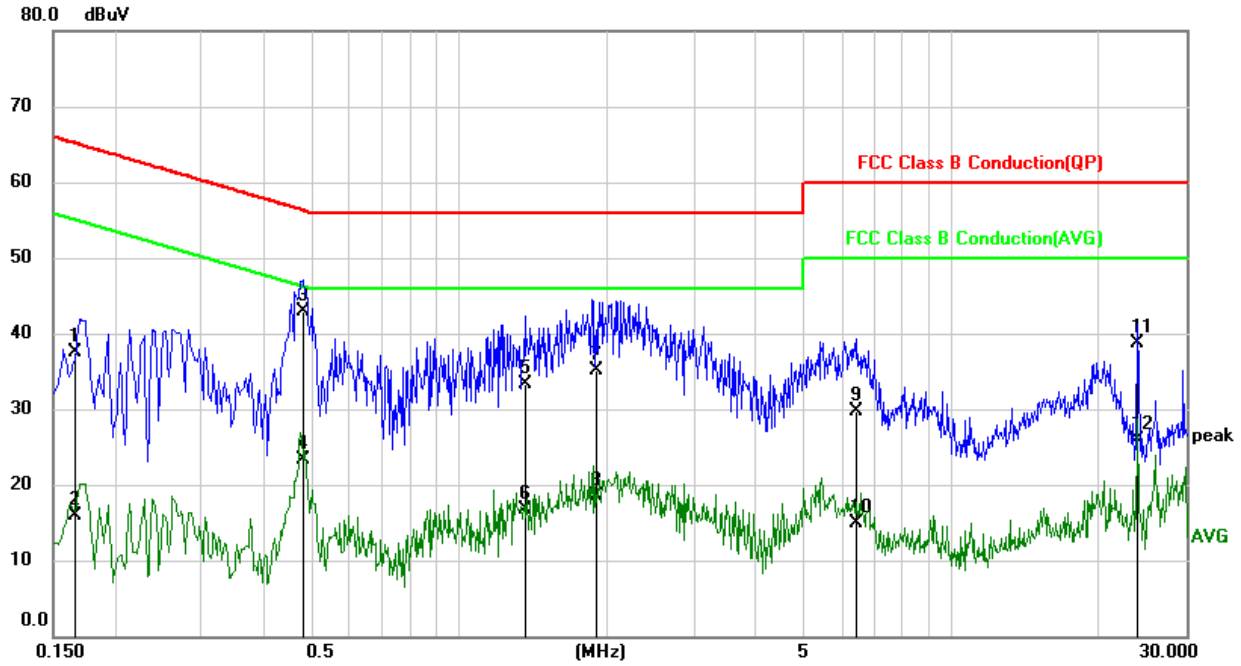
LINE L RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1654	27.79	9.66	37.45	65.19	-27.74	QP
2	0.1654	6.23	9.66	15.89	55.19	-39.30	AVG
3	0.4819	33.23	9.65	42.88	56.31	-13.43	QP
4	0.4819	13.56	9.65	23.21	46.31	-23.10	AVG
5	1.3595	23.65	9.67	33.32	56.00	-22.68	QP
6	1.3595	6.96	9.67	16.63	46.00	-29.37	AVG
7	1.8950	25.45	9.68	35.13	56.00	-20.87	QP
8	1.8950	8.89	9.68	18.57	46.00	-27.43	AVG
9	6.4593	19.95	9.73	29.68	60.00	-30.32	QP
10	6.4593	5.11	9.73	14.84	50.00	-35.16	AVG
11	23.9705	28.73	9.88	38.61	60.00	-21.39	QP
12	23.9705	15.99	9.88	25.87	50.00	-24.13	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

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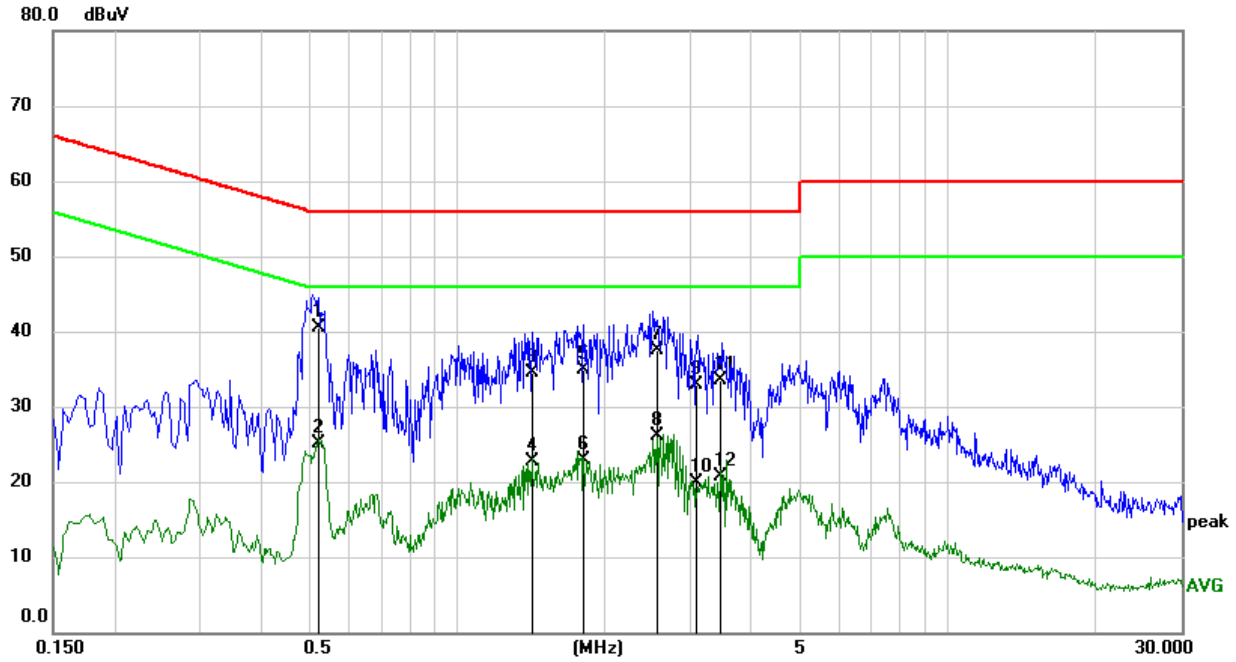
8.1.2. 802.11b MODE for Serial Number of VEN-1S-1R-HC

LINE N RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.5200	31.16	9.42	40.58	56.00	-15.42	QP
2	0.5200	15.64	9.42	25.06	46.00	-20.94	AVG
3	1.4230	25.00	9.43	34.43	56.00	-21.57	QP
4	1.4230	13.31	9.43	22.74	46.00	-23.26	AVG
5	1.8158	25.53	9.45	34.98	56.00	-21.02	QP
6	1.8158	13.50	9.45	22.95	46.00	-23.05	AVG
7	2.5549	28.11	9.46	37.57	56.00	-18.43	QP
8	2.5549	16.67	9.46	26.13	46.00	-19.87	AVG
9	3.0668	23.40	9.46	32.86	56.00	-23.14	QP
10	3.0668	10.44	9.46	19.90	46.00	-26.10	AVG
11	3.4439	24.11	9.46	33.57	56.00	-22.43	QP
12	3.4439	11.33	9.46	20.79	46.00	-25.21	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

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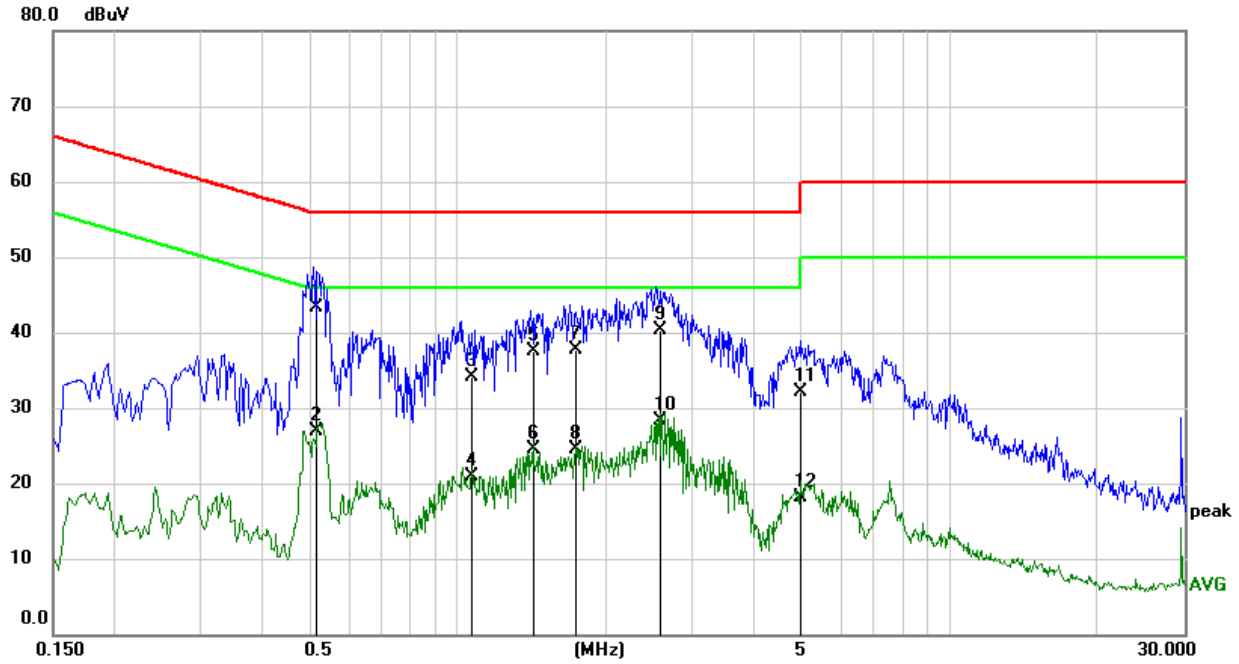
LINE L RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.5179	33.66	9.63	43.29	56.00	-12.71	QP
2	0.5179	17.22	9.63	26.85	46.00	-19.15	AVG
3	1.0680	24.40	9.64	34.04	56.00	-21.96	QP
4	1.0680	11.19	9.64	20.83	46.00	-25.17	AVG
5	1.4221	27.88	9.64	37.52	56.00	-18.48	QP
6	1.4221	14.91	9.64	24.55	46.00	-21.45	AVG
7	1.7456	28.00	9.65	37.65	56.00	-18.35	QP
8	1.7456	14.88	9.65	24.53	46.00	-21.47	AVG
9	2.5970	30.65	9.66	40.31	56.00	-15.69	QP
10	2.5970	18.57	9.66	28.23	46.00	-17.77	AVG
11	4.9584	22.50	9.68	32.18	56.00	-23.82	QP
12	4.9584	8.43	9.68	18.11	46.00	-27.89	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

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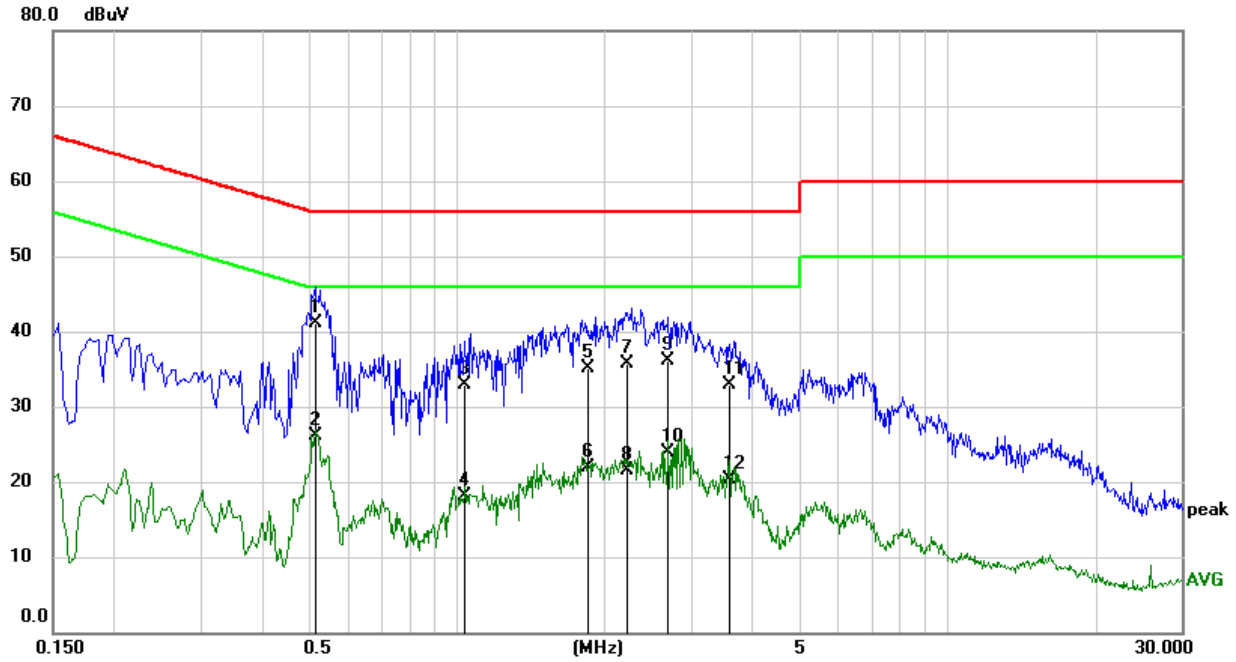
8.1.3. 802.11b MODE for Serial Number of VEN-2S-2R-HC

LINE N RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.5178	31.67	9.42	41.09	56.00	-14.91	QP
2	0.5178	16.65	9.42	26.07	46.00	-19.93	AVG
3	1.0370	23.39	9.43	32.82	56.00	-23.18	QP
4	1.0370	8.68	9.43	18.11	46.00	-27.89	AVG
5	1.8500	25.59	9.45	35.04	56.00	-20.96	QP
6	1.8500	12.38	9.45	21.83	46.00	-24.17	AVG
7	2.2400	26.19	9.45	35.64	56.00	-20.36	QP
8	2.2400	12.06	9.45	21.51	46.00	-24.49	AVG
9	2.7069	26.67	9.46	36.13	56.00	-19.87	QP
10	2.7069	14.38	9.46	23.84	46.00	-22.16	AVG
11	3.6059	23.44	9.47	32.91	56.00	-23.09	QP
12	3.6059	10.91	9.47	20.38	46.00	-25.62	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

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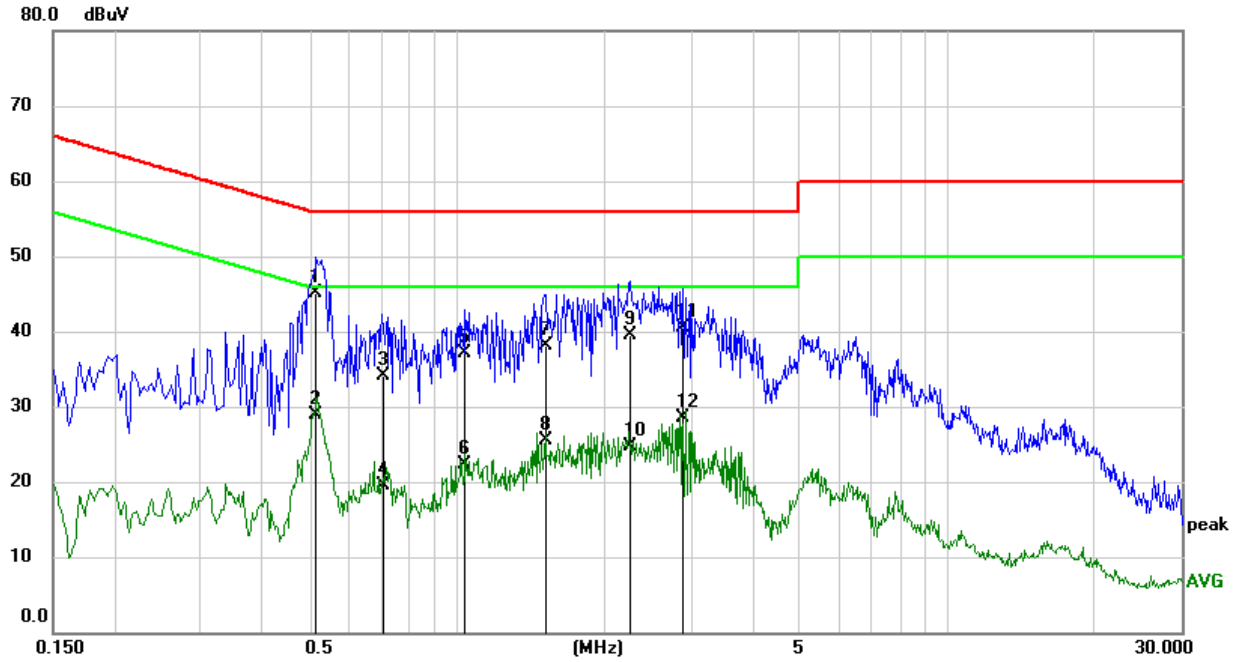
LINE L RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.5106	35.44	9.63	45.07	56.00	-10.93	QP
2	0.5106	19.36	9.63	28.99	46.00	-17.01	AVG
3	0.7075	24.41	9.64	34.05	56.00	-21.95	QP
4	0.7075	9.95	9.64	19.59	46.00	-26.41	AVG
5	1.0407	27.44	9.64	37.08	56.00	-18.92	QP
6	1.0407	12.63	9.64	22.27	46.00	-23.73	AVG
7	1.5135	28.37	9.65	38.02	56.00	-17.98	QP
8	1.5135	15.86	9.65	25.51	46.00	-20.49	AVG
9	2.2479	29.88	9.65	39.53	56.00	-16.47	QP
10	2.2479	15.10	9.65	24.75	46.00	-21.25	AVG
11	2.8907	30.89	9.66	40.55	56.00	-15.45	QP
12	2.8907	18.79	9.66	28.45	46.00	-17.55	AVG

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Note: All the modes had been tested, but only the worst data were recorded in the report.

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9. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §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 a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. 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.

ANTENNA CONNECTOR

EUT has a PCB antenna without antenna connector.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.

END OF REPORT

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