RADIO TEST REPORT
FOR
FCC CFR 47, PART 15, SUBPART C
INDUSTRY CANADA RSS-210, ISSUE 8

PRODUCT NAME	Brady Print Server
PRODUCT MODEL NUMBER	BNCBTWIFI
FCC ID	NUC-BNCBTWIFI
IC ID	3287A-BNCBTWIFI
MANUFACTURER	Brady World Wide Inc
TEST REPORT NUMBER	**XUC 1042IND246-A**
TEST REPORT DATE	19th May 2011
TEST REPORT VERSION	1.0
ISSUED TO	**Brady World Wide Inc** 6555 W Good Hope Road, Milwaukee, WI 53223 Phone: 1-414-228-5940 e-mail: jeff_mueller@bradycorp.com and **Brady Corporation Asia Pacific Pte Ltd.** 1 Kaki Bukit Crescent, Singapore - 416236 Phone: +65 6477 7261
ISSUED BY	**TARANG** Wipro Technologies, SJP2, Survey#70,77,78/8A, Dodda Kanelli, Sarjapur road, Bangalore-560 035. Karnataka. India. Tel: +91-80-30292929 Fax: +91-80-30298200 Email: tarang.planet@wipro.com Web: www.wipro.com

REVISION HISTORY

S. No	Version	Date	Change History	Remarks
1	0.01	17th Dec 2010	Initial version for internal review	
2	0.02	20th Dec 2010	Updated after internal review	
3	0.03	05th Jan 2011	Updated band edge and dwell time measurements for Bluetooth	
4	0.04	06th Jan 2011	Updated after internal review	
5	0.05	28th Feb 2011	Updated to show that the potential future upgrade of devices on the Full Featured module are also compatible as per the referred standards	
6	0.06	9th Mar 2011	Updated after internal review	
7	0.07	11th Apr 2011	Updated with only Wi-Fi results. Updated with Occupied Bandwidth measurement	
8	0.08	12th Apr 2011	Updated after internal review	
9	0.09	21st Apr 2011	Updated after internal review	
10	0.10	27th Apr 2011	Updated after internal review, moved setup photos as a separate exhibit, antenna gain details added	
11	0.11	3rd May 2011	Updated the “Issued To” field in Page 1	
12	0.12	10th May 2011	Updated the “Issued To” field in Page 1 to include Brady Corporation Asia Pacific Pte Ltd	
13	1.0	19th May 2011	Approved report by Tarang lab	

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1 TEST DESCRIPTION & RESULT

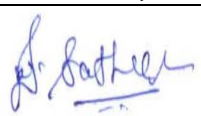
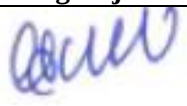
Applicant	**Brady World Wide Inc** 6555 W Good Hope Road, Milwaukee, WI 53223 Phone: 1-414-228-5940; e-mail: jeff_mueller@bradycorp.com
Manufacturer	Brady World Wide Inc
Equipment Under Test	Brady Print Server
Model	BNCBTWIFI
Serial Number	008
No. of samples tested	1
Date of Test	04th Dec 2010 to 10th Apr 2011
Date of Submission	19th May 2011
Venue of Test	**Tarang,** Wipro Technologies, SJP2, Survey#70,77,78/8A, Dodda Kanelli, Sarjapur road, Bangalore-560 035. Karnataka. India.

Applicable Standard	Description	Criteria / Class	Results
FCC	CFR 47, Part 15, Subpart C	NA	Pass
Industry Canada	RSS-210, Issue 8	NA	Pass

Brady Print Server was tested by Tarang Lab as per the standards that are listed in the table above. Based on the observations during the test and interpretations by Tarang lab, results have been indicated. The test results produced by in this report shall apply only to the sample that has been tested under the specific conditions and modes of testing as described in the report. Any measurement uncertainties listed in this report are for information only and have not been taken into account in the results.

The results shall stand invalid, in case there are any modifications / additions / removals to the hardware or software or end use atmosphere to the product tested. This report shall not be modified or in any way revised unless it is expressly permitted and endorsed by Tarang through a duly authorized representative. Particulars on Manufacturer / Supplier / EUT configuration / performance criteria, given in this report, are based on the information given by the customer, along with test request. Tarang does not assume any responsibility for the correctness of that information for the above mentioned equipment under test.

Customer acknowledges that this is a precertification test report and shall not be construed valid for product sale nor shall customer attempt to claim product certification or approval or endorsement of any kind by any agency of the Federal Government or any Government. Customer shall have to take appropriate clearance to make the product available to the target market.

Prepared by	Reviewed by	Approved by
Aagiru Vamshi Krishna	**Sathesh Kumar L, Satheesh I**	**Nagaraj C S**
		
Test Engineer	Lead Test Engineer, Technical Manager	Technical Manager

2 SUMMARY OF TESTS, FACILITY AND ACCREDITATION

2.1 TEST DETAILS

The tests documented in this report are performed according to the following standards:

- ANSI C63.4-2000
- FCC CFR 47, Part 15
- RSS-210 Issue 8

2.2 TEST FACILITY DETAILS

All the tests were carried out at Tarang –Product Qualification and Compliance Planet located at Wipro Limited, SJP2, Dodda Kanelli, Sarjapur road, Bangalore. Karnataka. India. 560 035.
Following are the accreditation and listing details for Tarang.

Accreditation / Listing body	Registration / Company / Certificate Number
FCC (Federal Communications Commission)	Registration Number: 799247 http://www.fcc.gov/
IC (Industry Canada)	Company Number: 9023A http://www.ic.gc.ca

2.3 CALIBRATION

All measuring instruments used to perform the tests listed and reported in this document are calibrated as per the manufacturer recommendation and are traceable to ISO17025.

2.4 MEASUREMENT UNCERTAINTY

The following measurement uncertainties are applicable to the relevant tests that are mentioned below:

Test	Uncertainty
Radiated Emission (30 MHz to 1 GHz), 3 meter	±4.12 dB (95% confidence)
Radiated Emission (1 GHz to 18 GHz), 3 meter	±4.25 dB (95% confidence)
Radiated Emission (18 GHz to 40 GHz), 3 meter	±4.63 dB (95% confidence)

2.5 ENVIRONMENTAL CONDITION

All measurements are carried out in controlled environment in the lab as follows:

Temperature (deg C)	**22 ± 3**
Relative Humidity (% RH)	**50 ± 5**

3 EQUIPMENT UNDER TEST (EUT)

3.1 DESCRIPTION OF THE EUT

The product is designed to give additional connectivity interface for Brady printers via Ethernet, Blue tooth or WLAN (full featured). The product gets connected to the printer via USB interface.

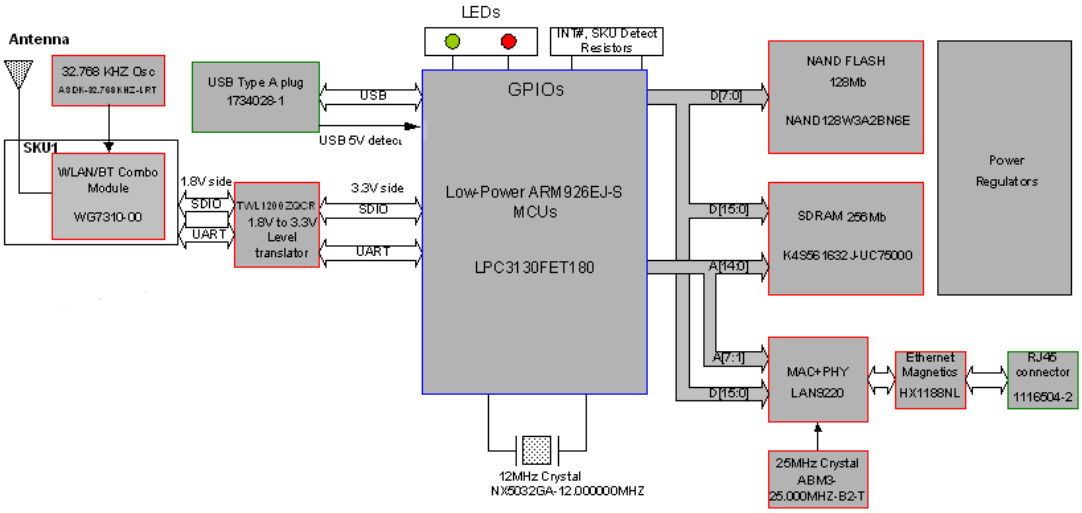
The product has 4 variants in total as follows:

Variant	Description	Regulatory Model Number	Details
SKU1	Brady Network Card - Bluetooth, WIFI, LAN Version	BNCBTWIFI	Full featured version of the product with wired LAN, Bluetooth and Wireless LAN
SKU2	Brady Network Card - Bluetooth and WIFI Version	BNCBTWIFI	Reduced version of SKU1, with Bluetooth and Wireless LAN only (wired LAN removed)
SKU3	Brady Network Card - Bluetooth Version	BNCBT	Contains only Bluetooth interface (Wired LAN and Wireless LAN removed)
SKU4	Brady Network Card - LAN Version	BNCLAN	Reduced version of SKU1, with wired LAN only (Bluetooth and Wireless LAN removed)

3.2 SOFTWARE AND FIRMWARE DETAILS

BPS Firmware Alpha 3.0 was used for the testing.

3.3 PRODUCT CONFIGURATION DETAILS



Based on the Processor and Memories used onboard, 2 variants as follows were tested and the results furnished below apply to both variants.

Variant	Processor	SDRAM	NAND Flash
Variant 1	NXP LPC3130FET180	Samsung K4S561632J-UC75	ST NAND128W3A2BN6
Variant 2	NXP LPC3141FET180	Hynix H57V2562GTR-75C	ST NAND512W3A2DN6

The above figure shows the block diagram of BPS unit. The BPS unit connected to a laptop which has all the application software via a shielded USB cable not exceeding 3m in length. In the normal setup the laptop's power supply will be connected to mains. We will be using a grounded cable for the laptop power supply. The power supply will be external to the laptop. An Ethernet cable was connected to a PC outside the semi-anechoic chamber for communication during the test. BPS was communicating to a WLAN router or Laptop over wired LAN interface. BPS was communicating through BT port with a laptop. At a time only one of the communication channels (Wired LAN, WLAN and BT) shall be operational.

3.4 TRANSMIT POWER DETAILS

The peak power output specification of the transmitter as per the device transceiver datasheet provided by the vendor at various modes is as listed below.

Frequency Range	Mode	Output power (dBm)	Output power (W)
2.412 to 2.472 GHz	802.11b	15	31.6 mW
2.412 to 2.472 GHz	802.11g	15	31.6 mW
2.412 to 2.472 GHz	802.11n	15	31.6 mW

3.5 DETAILS OF ANTENNA

The details of antenna used on the product is as listed below.

Manufacturer	Model Number	Average Gain (dBi)	Frequency Range (MHz)
Advanced Ceramic X (ACX)	AT8010-E2R9HAA	0.5	2400 to 2500

3.6 TEST SETUP DETAILS

3.6.1 SUPPORTING EQUIPMENT

Item	Manufacturer	Model Number	Serial Number	FCC ID
Laptop PC	DELL	LATITUDE D620	GMXVN1S	NA

3.6.2 I/O CABLES AND CONNECTORS

Item	Connector	Cable type	Cable length
USB cable	Type A Male to Type A Female	Shielded	3m
Ethernet cable	RJ45 to RJ45	Un-shielded	5m

3.6.3 TEST SETUP DETAILS

3.6.3.1 RADIATED EMISSION TEST SETUP DETAILS

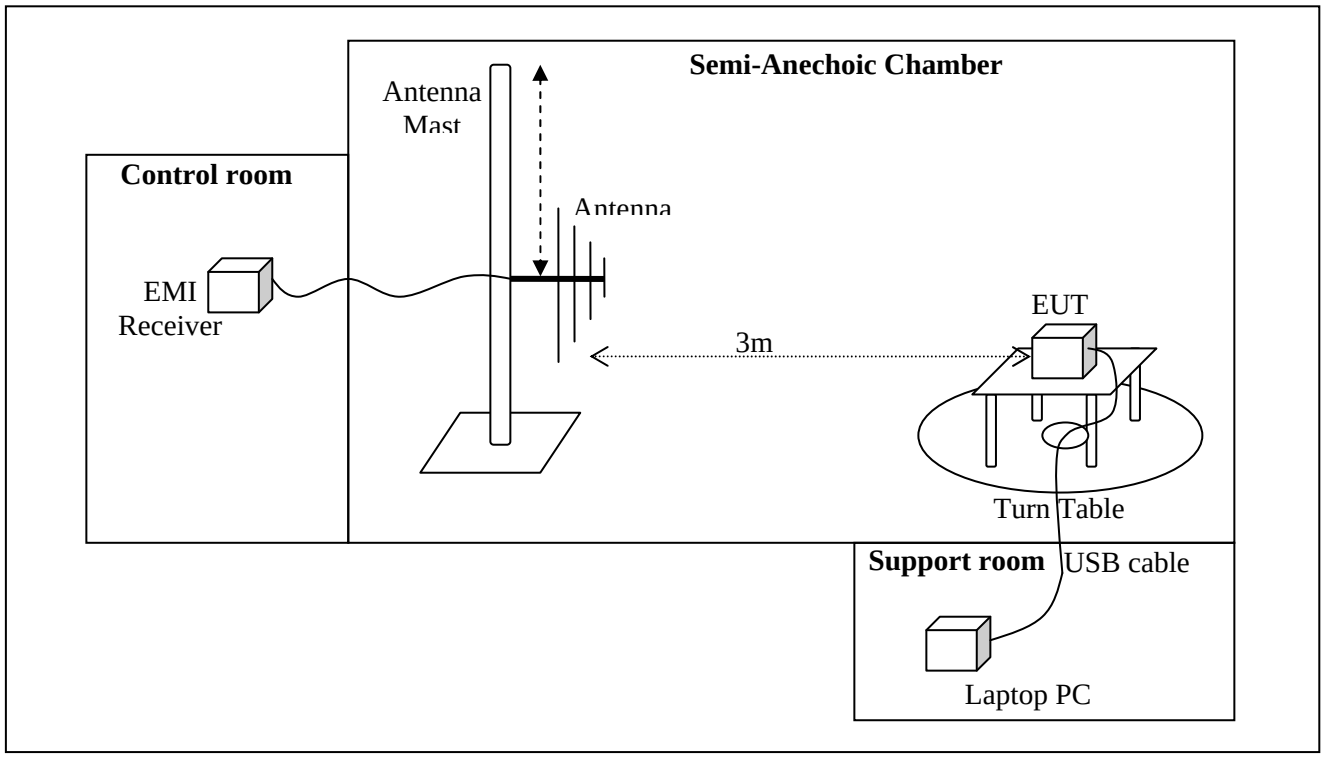


Figure 1: Test setup for Radiated Emission test

3.6.3.2 ANTENNA CONDUCTED MEASUREMENT TEST SETUP DETAILS

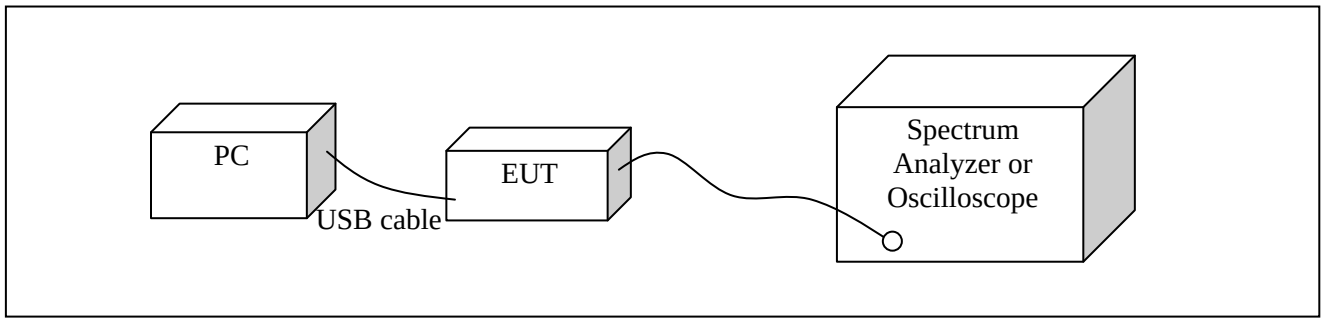


Figure 2: Test setup for Conducted measurements on the wireless ports

4 INSTRUMENTATION AND CALIBRATION

4.1 TEST AND MEASURING EQUIPMENT

The following list contains measuring equipments used for testing. The equipments confirm to the required standards. Calibration of all test and measuring equipments including any accessories that may affect such calibration are checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manual.

4.2 EQUIPMENTS USED

Name of Equipment	Manufacture	Model No.	Serial No.	Calibration Due
Spectrum Analyzer	Agilent	E4407B	MY45112947	22nd Feb 2012
Oscilloscope	Tektronix	DPO71604	B010382	31st Aug 2011
EMI receiver	Rohde & Schwarz	ESIB40	100306	30th Jul 2011
Hybrid Log Periodic Antenna	TDK RF Solutions	HLP-3003C	130334	20th Mar 2011
Broadband Horn Antenna	Schwarzbeck Mess Electronik	BBHA 9170	9170-344	20th Mar 2011
Double Ridge Broad Band Horn Antenna	Schwarzbeck Mess Electronik	BBHA 9120 D	9120D-687	20th Mar 2011
RF Cable	Colemann	M17-84/RG223	NA	NA

5 APPLICABILITY OF TESTS

The following table summarizes and provides reference to the tests that are applicable and carried out for this product.

5.1 APPLICABLE TESTS FOR 802.11b, 802.11g AND 802.11n PORT

S. No	Standard	Name of the test	Section of standard	Applicability	Port
1	FCC Part 15	Restricted bands of operation	15.205	Yes	WiFi
2	FCC Part 15	Conducted Emission	15.207	No (Product is DC powered)	NA
3	FCC Part 15	Radiated Emission	15.209	Yes	Product
4	FCC Part 15	6 dB bandwidth (>= 500 KHz)	15.247 (a) (2)	Yes	WiFi
5	FCC Part 15	Peak conducted o/p power (<= 1W)	15.247 (b) (3)	Yes	WiFi
6	FCC Part 15	Directional antenna gains greater than 6 dBi	15.247 (c)	No (Antenna gain <6dBi)	NA
7	FCC Part 15	Conducted Spurious Emission	15.247 (d)	Yes	WiFi
8	FCC Part 15	Power Spectral Density in any 3KHz band	15.247 (e)	Yes	WiFi
9	FCC Part 15	Band Edge measurement (Radiated and conducted)	15.247 (d)	Yes	WiFi
10	FCC Part 15	Systems using hybrid modulation	15.247 (f)	No (No hybrid modulation used)	NA
11	RSS-GEN	Occupied Bandwidth measurement	4.6.1	Yes	WiFi

6 TEST RESULTS FOR WI-FI PORT

6.1 WI-FI 801.11b MODE

6.1.1 RESTRICTED BAND OF OPERATION

6.1.1.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limits
FCC Part 15, Subpart C	15.205	In the operating range of this product, the limits are: f_L > 2.39 GHz, f_H < 2.4835 GHz
RSS-210 (Refers to) RSS-GEN	2.2 7.2.2	In the operating range of this product, the limits are: f_L > 2.39 GHz, f_H < 2.655 GHz

f_L = Lower operating frequency range
f_H = Higher operating frequency range

6.1.1.2 TEST PROCEDURE

S. No	Procedure
1	Connect the transmitter output to a Spectrum Analyzer
2	Select the lowest possible channel of the carrier (Eg: 1st channel)
3	Measure the frequency at 20dB below the peak power at this carrier and record this as f_L
4	Select the highest possible channel of the carrier (Eg. 13th channel)
5	Measure the higher frequency at 20dB below the peak power at this carrier and record this as f_H

Note: While it may be sufficient that the center frequency of the carrier is within the limits, the lower and higher frequencies of the carrier envelop have been taken into account for this measurement.

6.1.1.3 RESULT

Parameter	Limit	Measured	Result
f_L	Min 2.39 GHz (FCC and RSS-210)	2.402500	Pass
f_H	Max 2.4835 GHz (FCC)	2.481375	Pass
f_H	Max 2.655 GHz (RSS-210)	2.481375	Pass

6.1.1.4 RESULT (SUPPORTING GRAPHS / DATA)

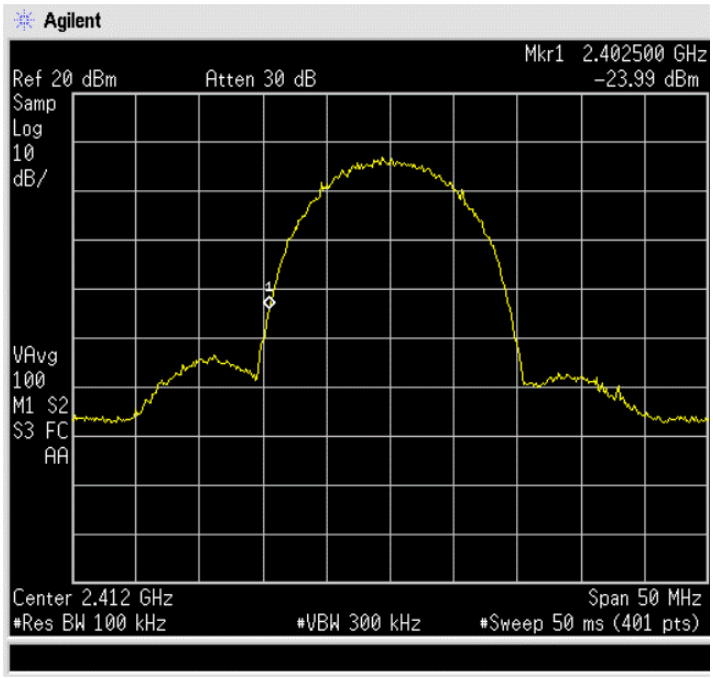


Figure 3: Measured f_L at Channel 1 – 802.11b

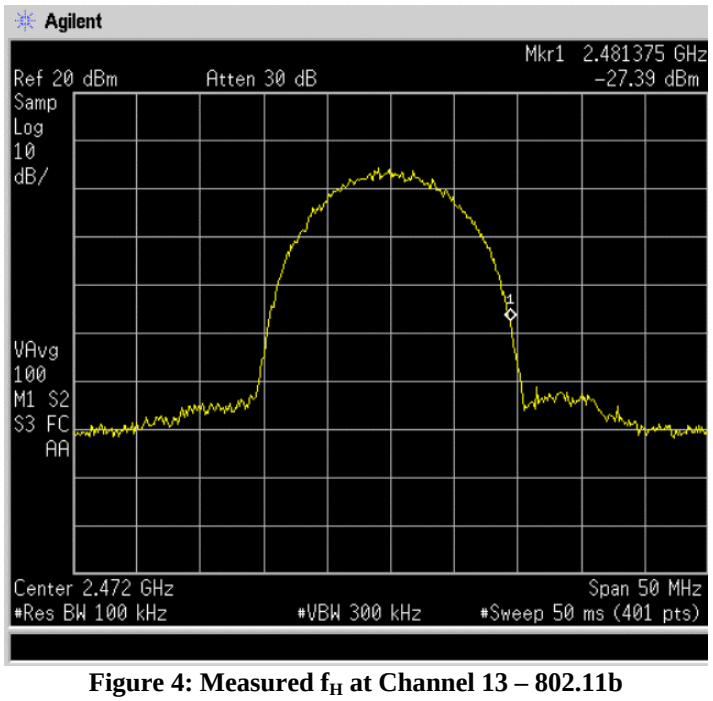


Figure 4: Measured f_H at Channel 13 – 802.11b

6.1.2 RADIATED EMISSION

6.1.2.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Frequency range	Max Limit (dBµV/m) at 3 meter
FCC Part 15, Subpart C	15.209	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0
RSS-210 (Refers to) RSS-GEN	2.6 7.2.5	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0

6.1.2.2 TEST PROCEDURE

S. No	Procedure
1	Test procedure is as per ANSI C63.4: 2000
2	EUT is placed on a 0.8m non-conductive table. This table is positioned on an automated turn table.
3	Antennas are positioned 3m away from the EUT
4	EUT is configured to function with the default channel in the selected band
5	A peak scan was carried out at various azimuth angles and antenna heights ranging from 1m to 4m.
6	The highest level of Radiated Emission was recorded
7	Quasi-peak measurements were carried out at the identified peaks for <1GHz and Average measurements were carried out above 1GHz
8	These values are compared against the limit specified by the standard

6.1.2.3 RESULT

Parameter	Limit	Measured	Result
Radiated Emission	Refer 6.1.2.1	Refer 6.1.2.4	Pass

6.1.2.4 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 1

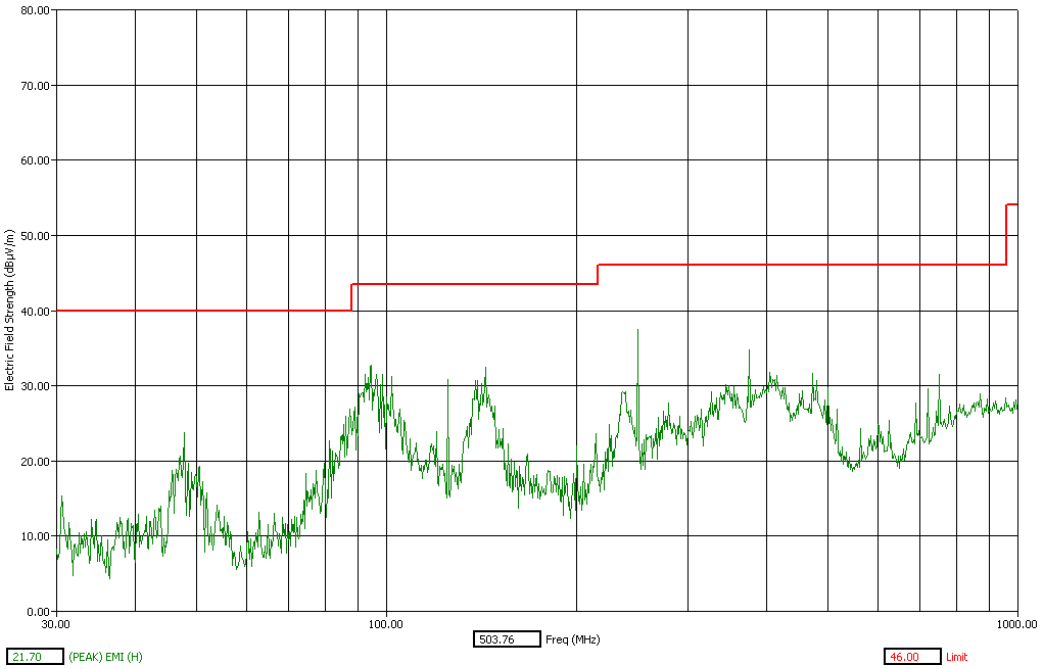


Figure 5: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11b, Channel 1

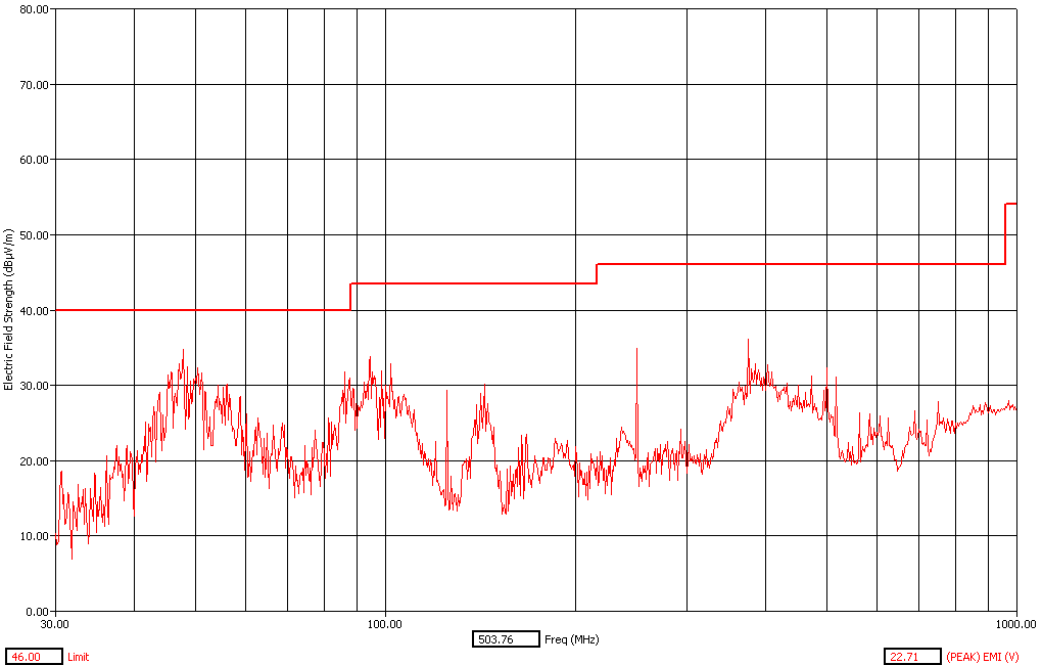


Figure 6: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11b, Channel 1

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	(QP) Trace (dBµV)	EUT Ttbl Agl (deg)	Twr Ht (cm)	Cable (dB)	Transducer (dB)	Preamp (dB)
47.80	V	35.33	40.00	-4.67	55.65	172.80	103.00	2.11	9.97	32.41
50.45	V	35.84	40.00	-4.16	55.93	180.10	100.00	2.16	10.13	32.38
86.05	V	27.60	40.00	-12.40	46.48	180.00	100.00	2.83	10.49	32.20
94.40	H	27.64	43.50	-15.86	48.83	111.50	337.00	2.96	8.12	32.28
125.00	H	31.35	43.50	-12.15	49.52	93.00	329.00	3.41	10.80	32.39
125.00	V	31.85	43.50	-11.65	48.03	205.80	103.00	3.41	12.80	32.39
143.30	H	32.54	43.50	-10.96	49.80	266.80	228.00	3.66	11.32	32.25
250.00	H	38.40	46.00	-7.60	54.53	91.50	131.00	4.90	11.20	32.23
250.00	V	34.64	46.00	-11.36	50.17	313.80	100.00	4.90	11.80	32.23
375.05	H	32.86	46.00	-13.14	44.64	306.80	100.00	5.96	15.00	32.75

Figure 7: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11b, Channel 1

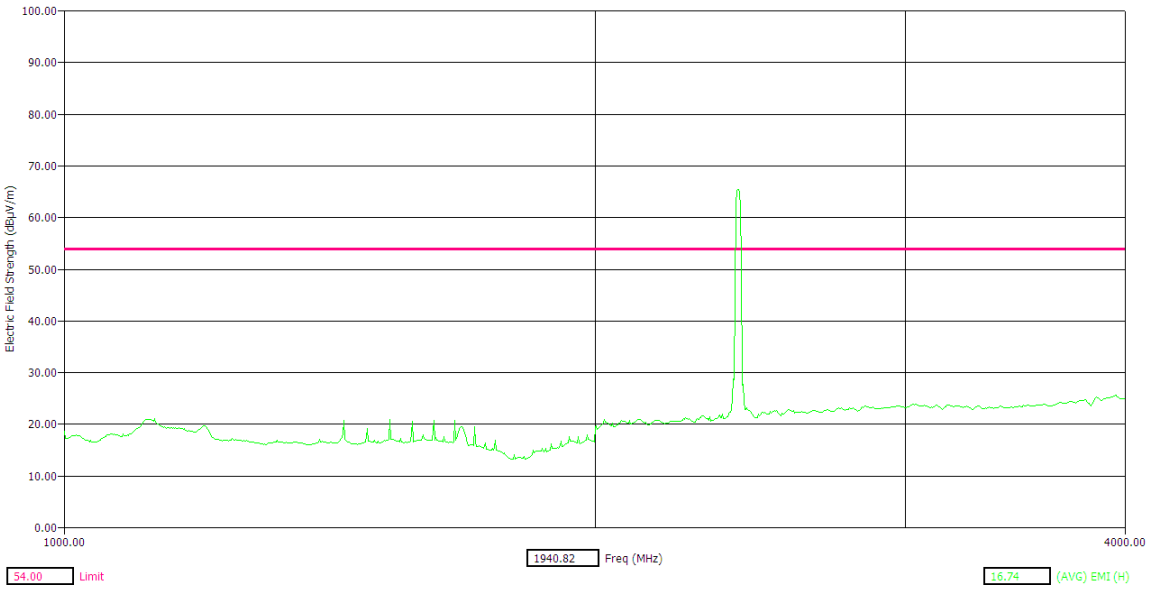


Figure 8: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 4 GHz – 802.11b, Channel 1

Note: The emission seen above the limit line is from the 802.11b carrier, which is intentional.

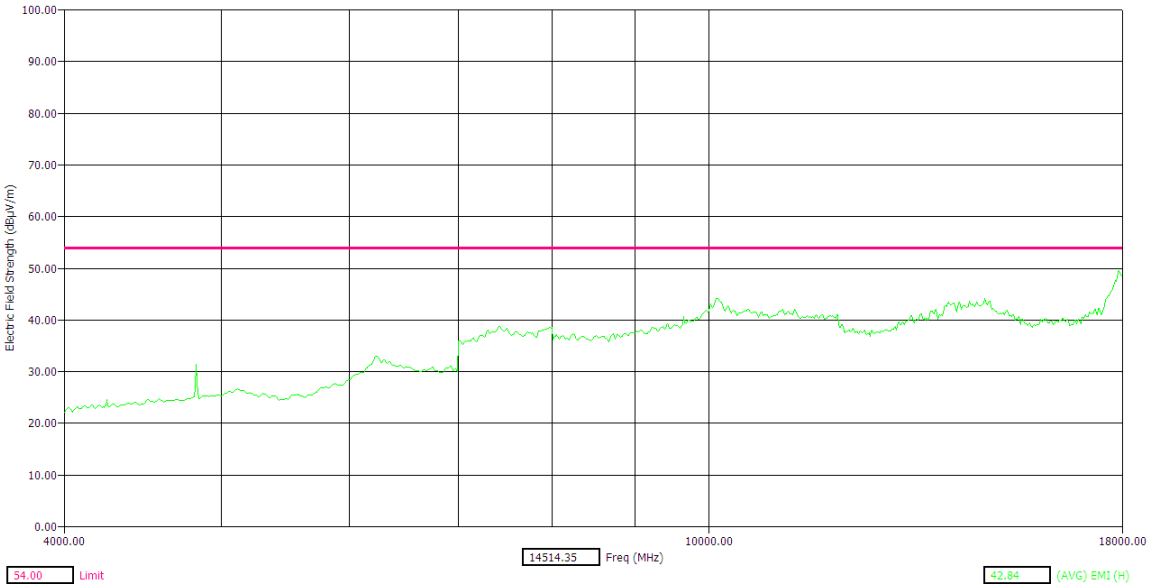


Figure 9: Radiated Emission (Average) – Horizontal polarization – 4 GHz to 18 GHz – 802.11b, Channel 1

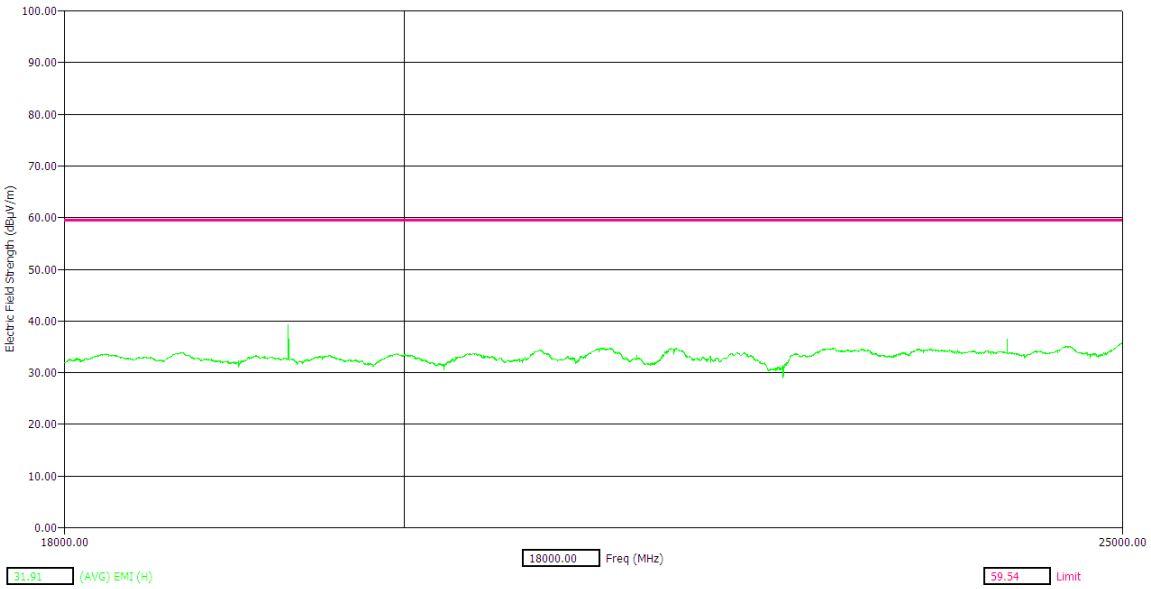


Figure 10: Radiated Emission (Average) – Horizontal polarization – 18 GHz to 25 GHz – 802.11b, Channel 1

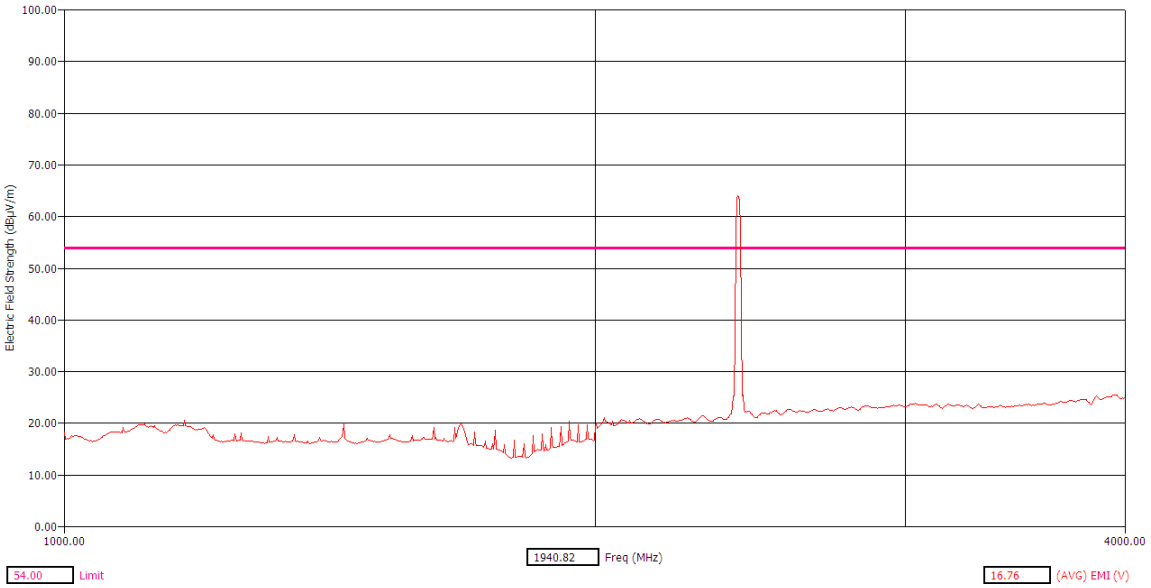


Figure 11: Radiated Emission (Average) – Vertical polarization – 1 GHz to 4 GHz – 802.11b, Channel 1

Note: The emission seen above the limit line is from the 802.11b carrier, which is intentional.

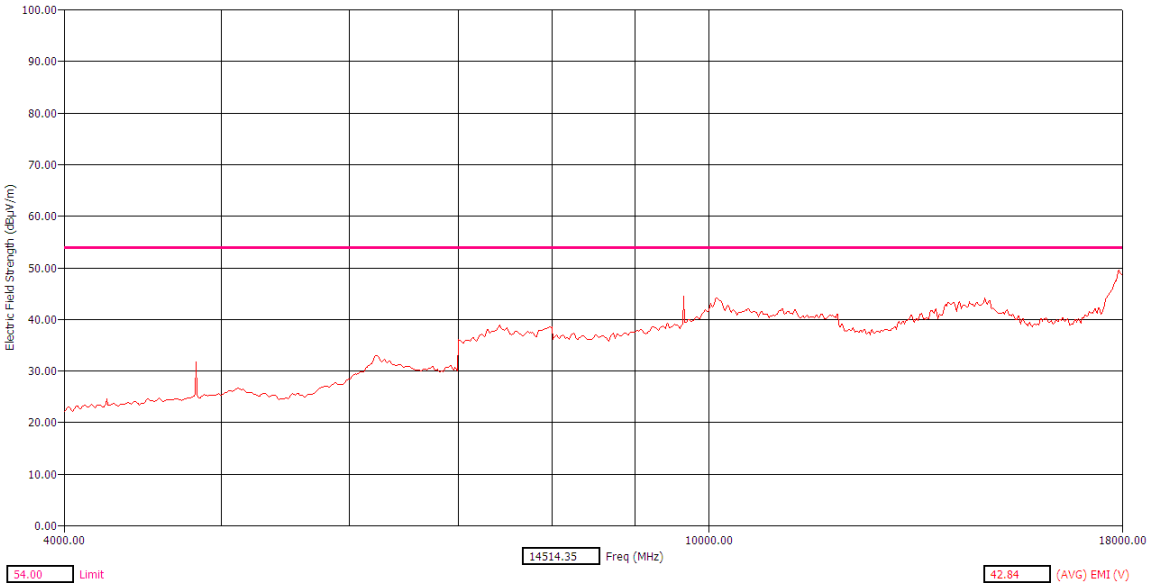


Figure 12: Radiated Emission (Average) – Vertical polarization – 4GHz to 18GHz – 802.11b, Channel 1

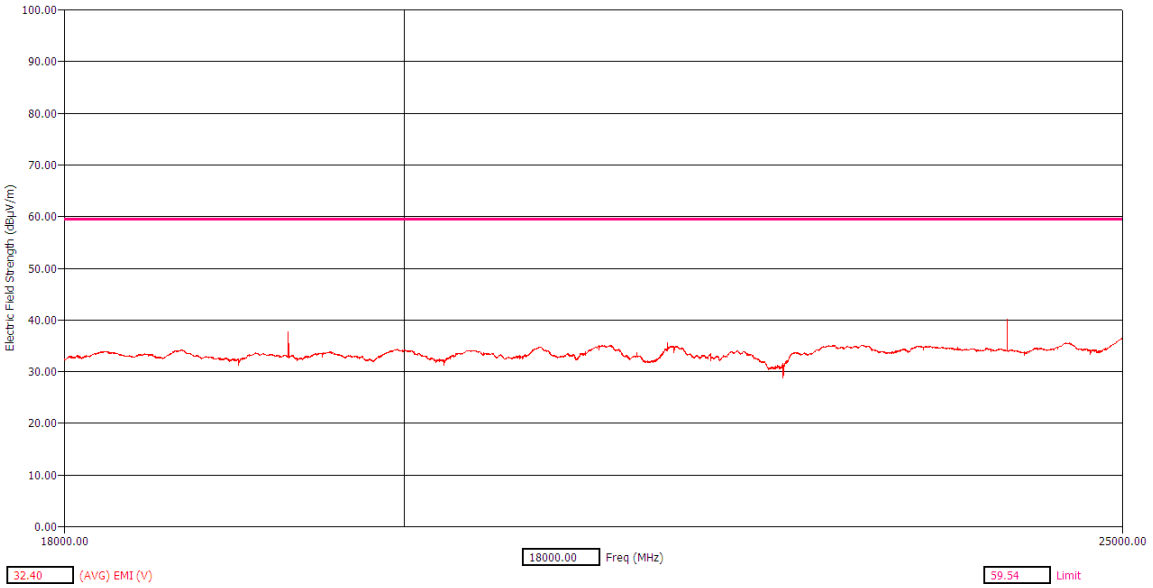


Figure 13: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11b, Channel 1

6.1.2.5 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 6

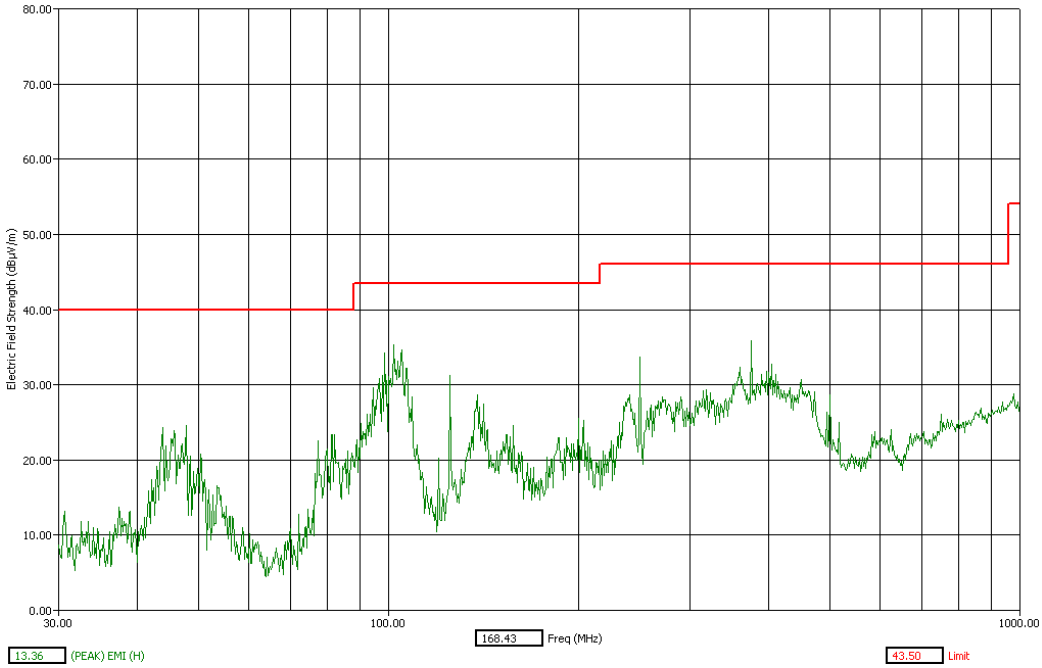


Figure 14 Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11b, Channel 6

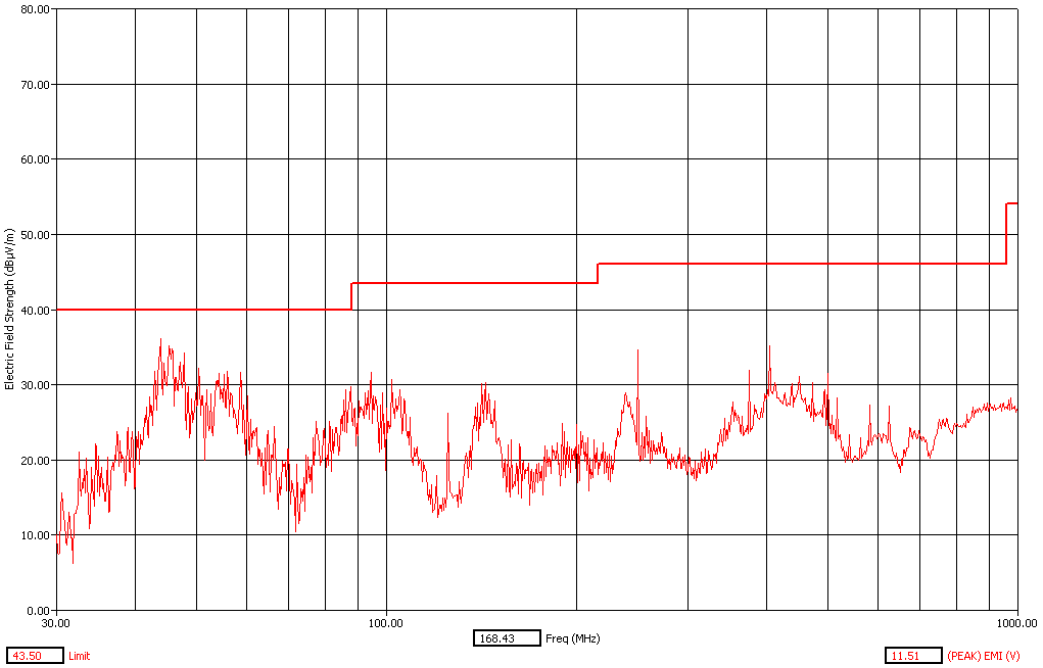


Figure 15: Radiated Emission (Peak) –Vertical polarization – 30 MHz to 1 GHz – 802.11b, Channel 6

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
43.80	V	31.20	40.00	-8.80	181.90	100.00	51.80	2.03	9.82	32.44
47.80	V	30.11	40.00	-9.89	175.10	103.00	50.43	2.11	9.97	32.41
101.85	H	34.66	43.50	-8.84	77.70	186.00	55.34	3.08	8.60	32.36
125.00	H	31.14	43.50	-12.36	64.50	249.00	49.32	3.41	10.80	32.39
125.00	V	22.35	43.50	-21.15	60.50	100.00	38.53	3.41	12.80	32.39
250.00	H	34.41	46.00	-11.59	252.80	122.00	50.53	4.90	11.20	32.23
250.00	V	31.09	46.00	-14.91	342.50	100.00	46.61	4.90	11.80	32.23

Figure 16: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11b, Channel 6

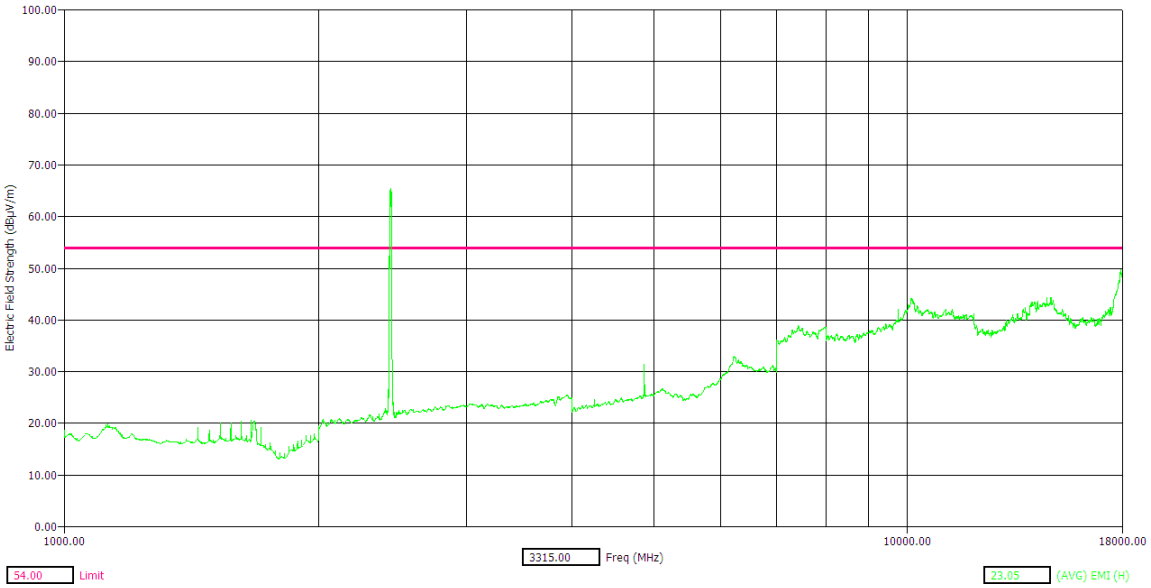


Figure 17: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 18 GHz – 802.11b, Channel 6

Note: The emission seen above the limit line is from the 802.11b carrier, which is intentional.

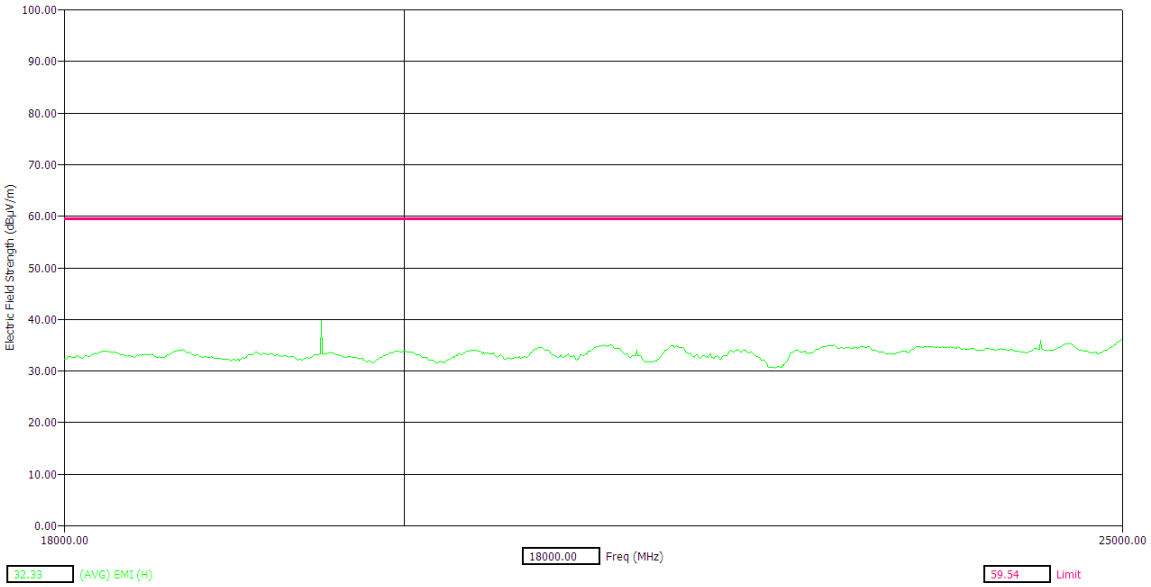


Figure 18: Radiated Emission (Average) – Horizontal polarization – 18 GHz to 25 GHz – 802.11b, Channel 6

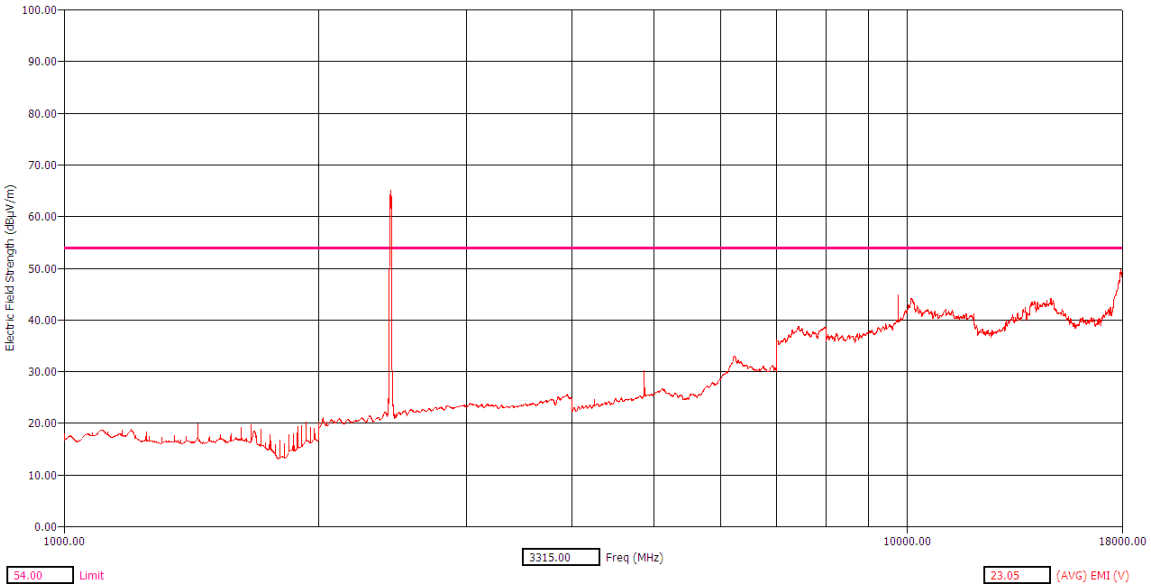


Figure 19: Radiated Emission (Average) – Vertical polarization – 1GHz to 18GHz – 802.11b, Channel 6

Note: The emission seen above the limit line is from the 802.11b carrier, which is intentional.

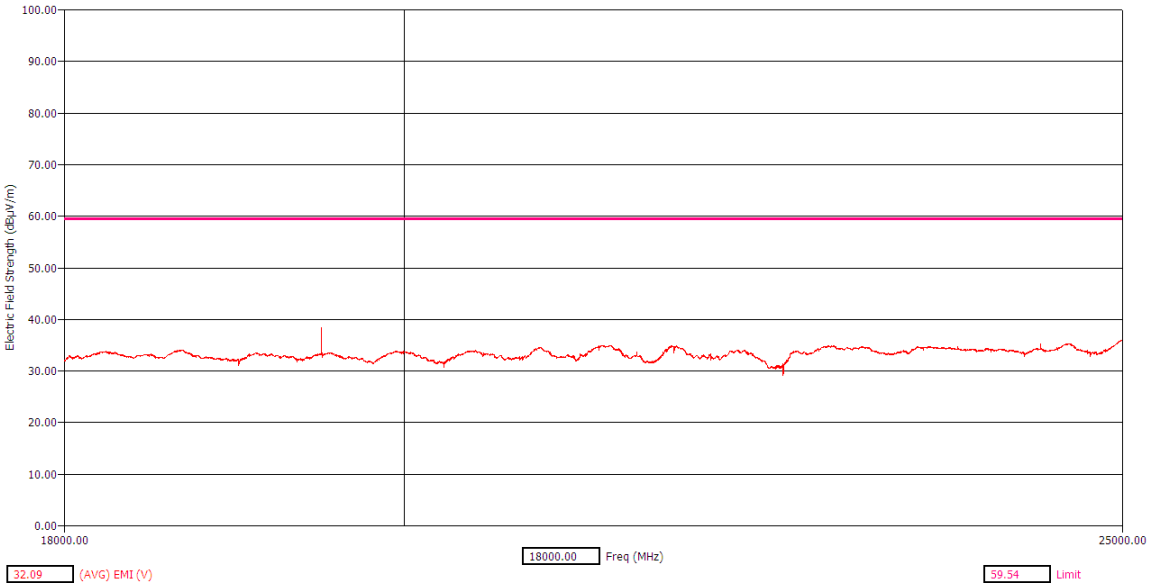


Figure 20: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11b, Channel 6

6.1.2.6 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 11

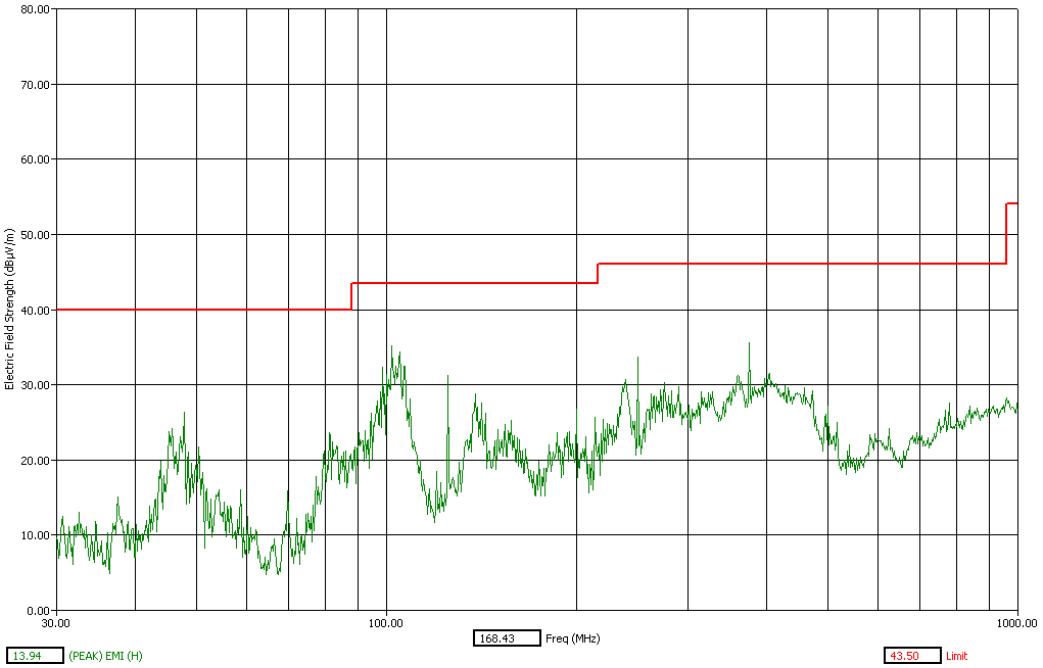


Figure 21: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11b, Channel 11

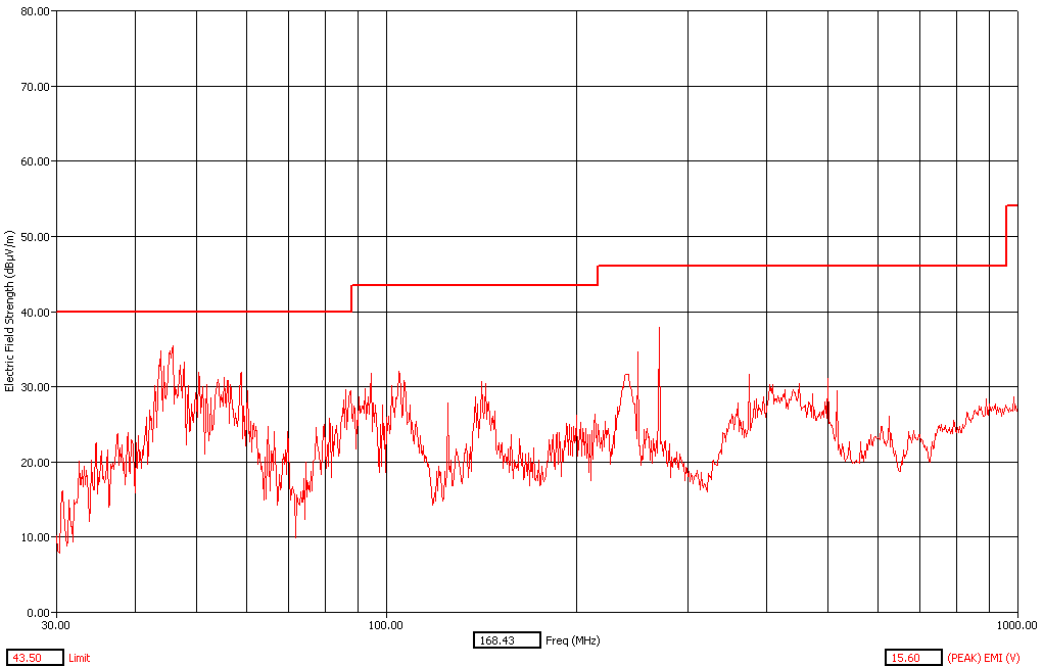


Figure 22: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11b, Channel 11

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
45.80	V	34.39	40.00	-5.61	195.90	100.00	54.91	2.07	9.85	32.43
101.85	H	33.85	43.50	-9.65	262.00	328.00	54.53	3.08	8.60	32.36
125.00	H	31.93	43.50	-11.57	90.00	289.00	50.11	3.41	10.80	32.39
125.00	V	28.15	43.50	-15.35	180.00	103.00	44.33	3.41	12.80	32.39
250.00	H	35.48	46.00	-10.52	254.00	137.00	51.61	4.90	11.20	32.23
250.00	V	30.48	46.00	-15.52	350.70	239.00	46.01	4.90	11.80	32.23
270.00	V	15.85	46.00	-30.15	293.90	112.00	29.93	5.09	13.25	32.41
375.05	H	35.89	46.00	-10.11	245.80	100.00	47.68	5.96	15.00	32.75

Figure 23: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11b, Channel 11

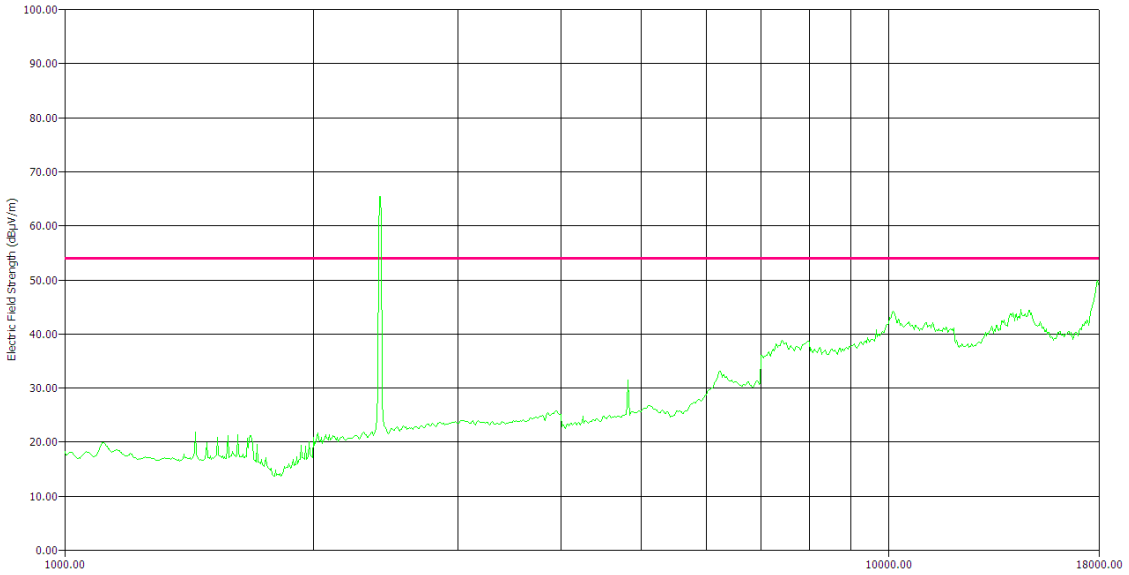


Figure 24: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 18 GHz – 802.11b, Channel 11

Note: The emission seen above the limit line is from the 802.11b carrier, which is intentional.

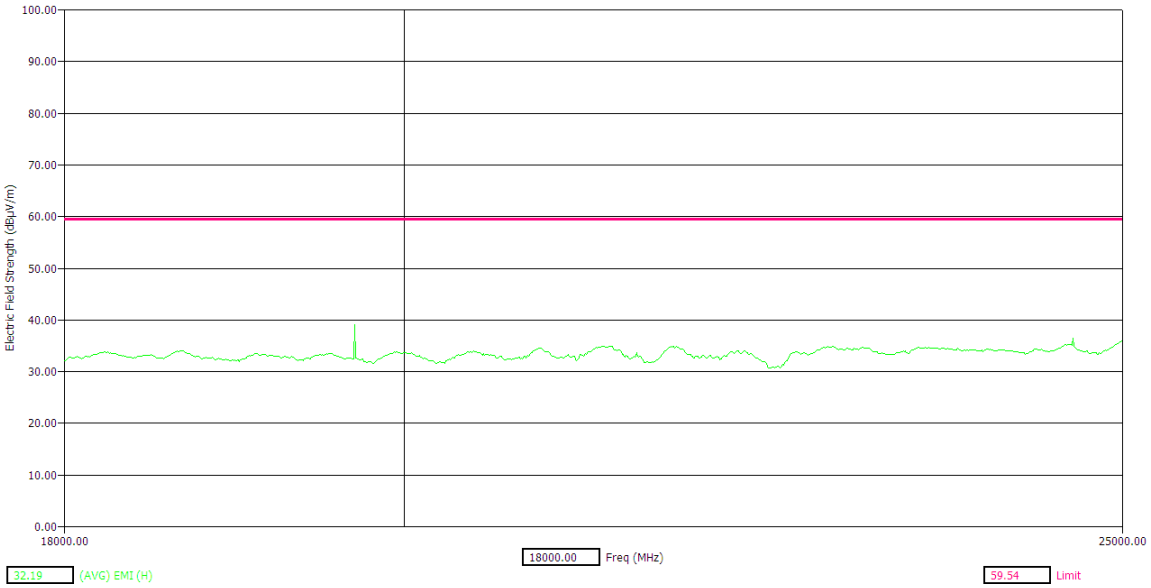


Figure 25: Radiated Emission (Average) – Horizontal polarization 18 GHz to 25 GHz – 802.11b, Channel 11

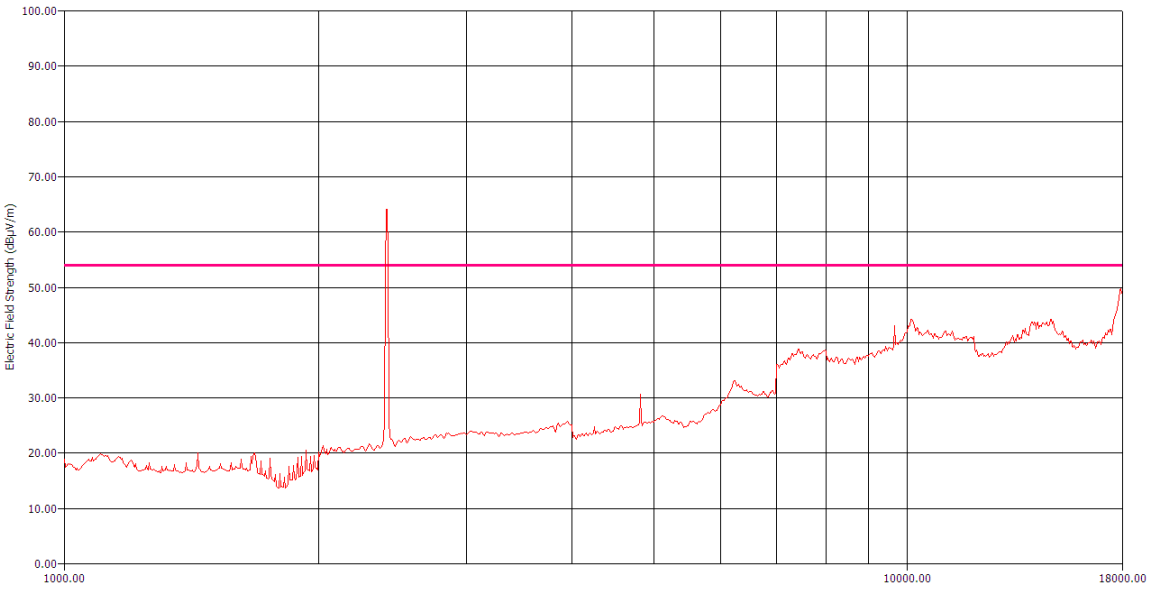


Figure 26: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11b, Channel 11

Note: The emission seen above the limit line is from the 802.11b carrier, which is intentional.

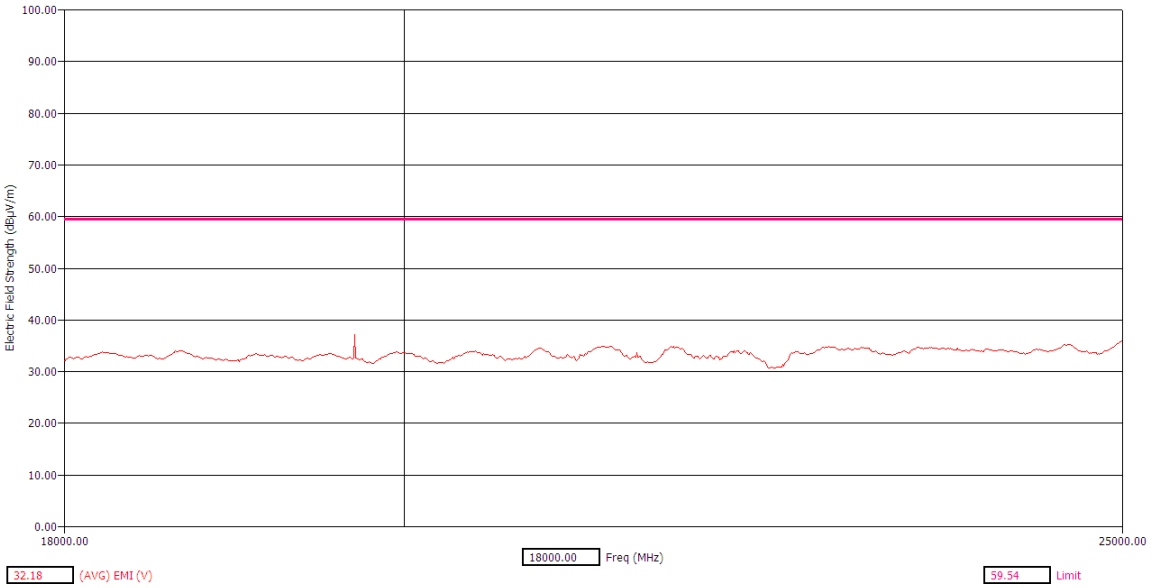


Figure 27: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11b, Channel 11

6.1.3 6dB BANDWIDTH

6.1.3.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (a) (2)	The 6dB bandwidth > 500 KHz
RSS-210	A8.2	The 6dB bandwidth > 500 KHz

6.1.3.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11b band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Detect the carrier envelop in the Spectrum Analyzer
4	The 6dB bandwidth below the peak power was calculated on the envelop
5	This measured bandwidth is compared against the limit and the result declared

6.1.3.3 RESULT

Band, Channel	Frequency (GHz)	Limit	Measured	Result
802.11b, 1 (Low)	2.412	500 KHz or more	9 MHz	PASS
802.11b, 6 (Mid)	2.437	500 KHz or more	10.125 MHz	PASS
802.11b, 11 (High)	2.462	500 KHz or more	10.375 MHz	PASS

6.1.3.4 RESULT (SUPPORTING GRAPHS / DATA)

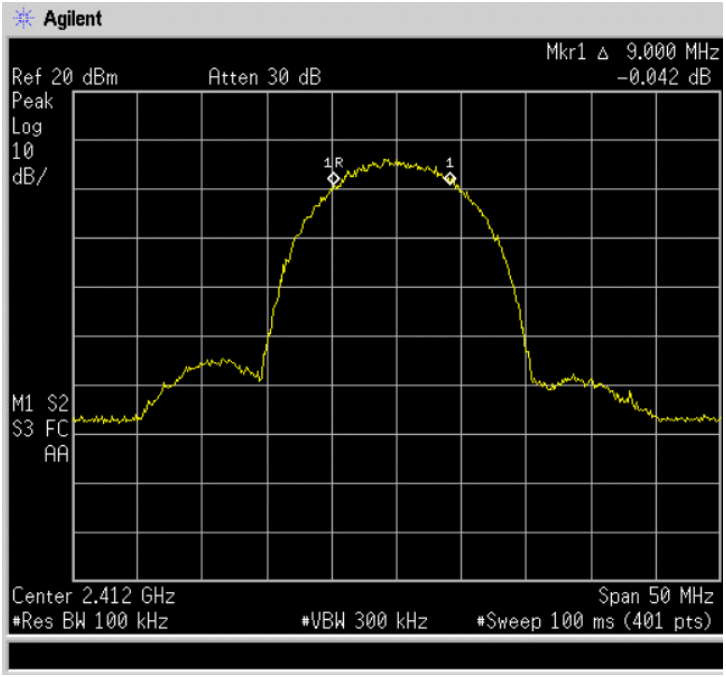


Figure 28: 6dB bandwidth – 802.11b, Low channel (1)

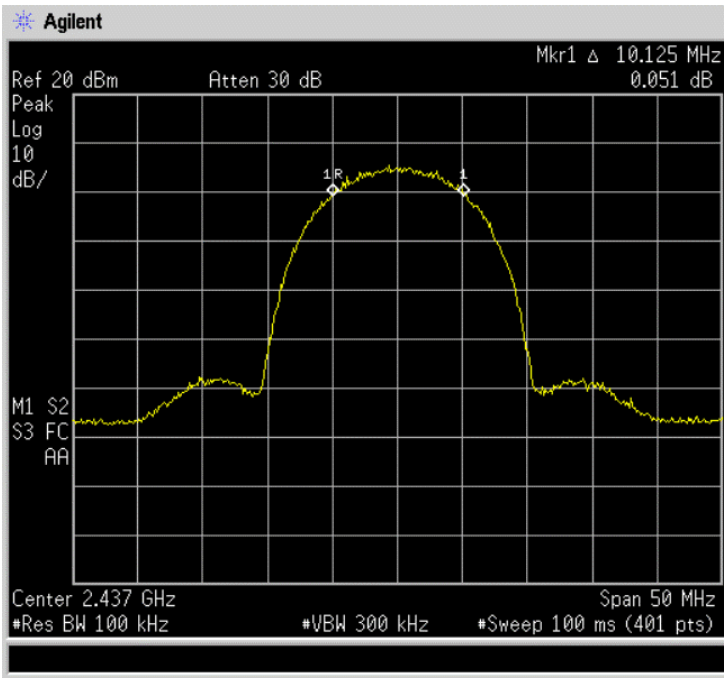


Figure 29: 6dB bandwidth – 802.11b, Mid channel (6)

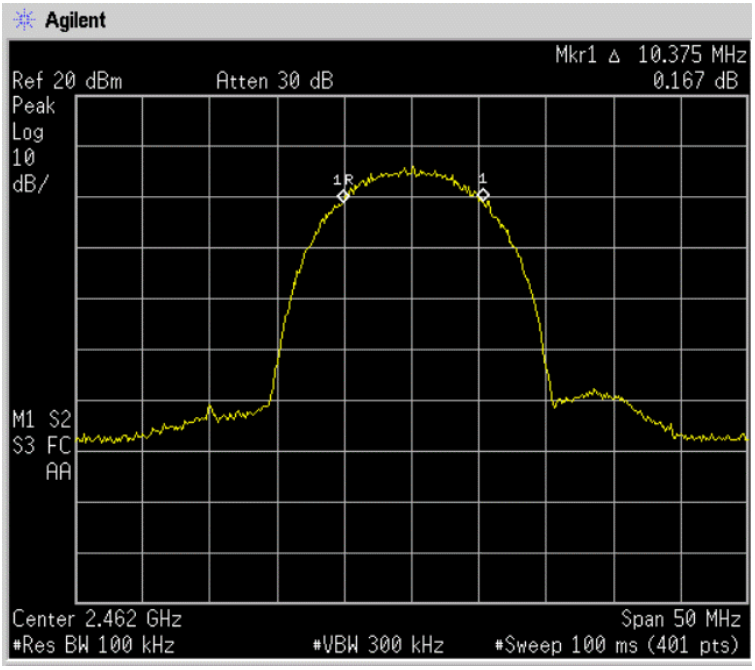


Figure 30: 6dB bandwidth – 802.11b, High channel (11)

6.1.4 PEAK CONDUCTED OUTPUT POWER

6.1.4.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (b) (3)	Peak conducted output power < 1 Watt
RSS-210	A8.4 (4)	Peak conducted output power < 1 Watt

6.1.4.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11b band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Appropriate Digital Transmission System test procedure is followed as per FCC recommendation. In this case, Option 2, Method 3 was selected based on the bandwidth of the carrier.
4	Add the measured cable loss of the cable that was used for the measurement (1.8dB)
5	This measured value is compared against the limit and the result declared

6.1.4.3 RESULT

Band, Channel	Frequency (GHz)	Measured power (dBm)	Cable loss (dB)	Total power (dBm)	Total power (mW)	Limit (mW)	Result
802.11b, 1 (Low)	2.412	10.82	1.8	12.62	18.28	1000	Pass
802.11b, 6 (Mid)	2.437	10.25	1.8	12.05	16.03	1000	Pass
802.11b, 11 (High)	2.462	10.20	1.8	12.00	15.84	1000	Pass

Note: Transmit duty cycle considered is = 1
No antenna gain is considered as this is conducted measurement without antenna

6.1.4.4 RESULT (SUPPORTING GRAPHS / DATA)

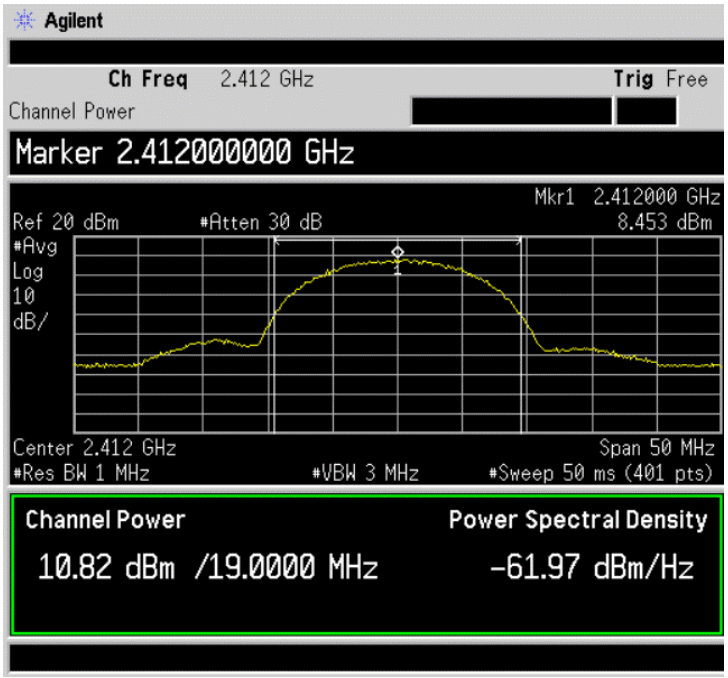


Figure 31: Peak conducted output power – 802.11b, Low channel (1)

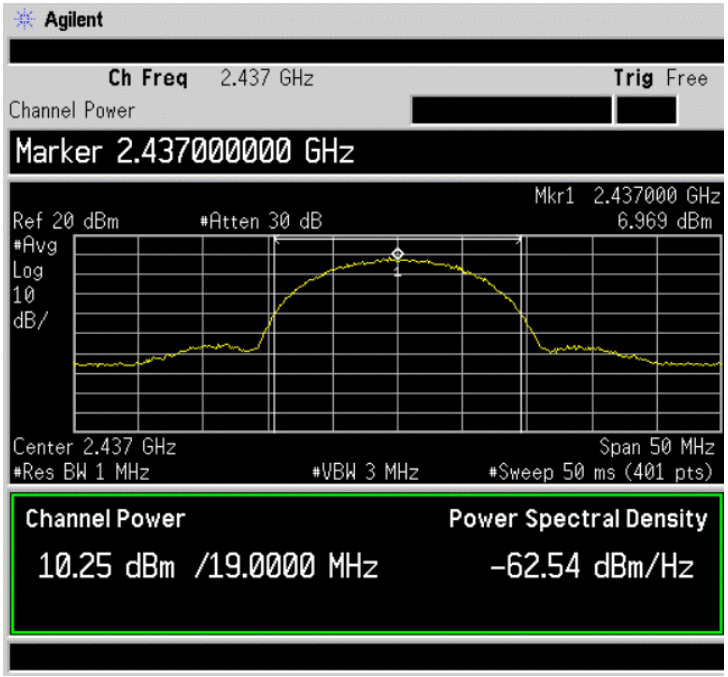


Figure 32: Peak conducted output power – 802.11b, Mid channel (6)

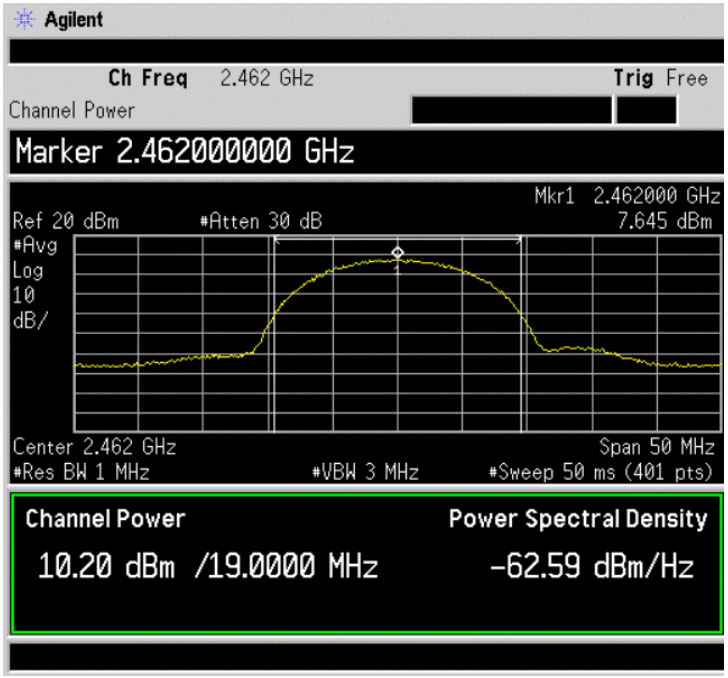


Figure 33: Peak conducted output power – 802.11b, High channel (11)

6.1.5 CONDUCTED SPURIOUS EMISSION

6.1.5.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (d)	In any 100KHz band outside the intentional band, emissions shall be 30dB below the peak power
RSS-210	A8.5	In any 100KHz band outside the intentional band, emissions shall be 30dB below the peak power

6.1.5.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11b band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Set the start frequency on the Spectrum Analyzer as 40 MHz
4	Set the start frequency on the Spectrum Analyzer as 26.5 GHz
5	Examine the complete band for any spurious emissions that exceed the value that is 30dB below the peak power in the intentional band
6	Based on the measured spurious emissions outside the intentional band, the result is declared

6.1.5.3 RESULT

Band, Channel	Limit	Measured	Result
802.11b, 1 (Low)	30db below the peak power measured	Refer 6.1.5.4	Pass
802.11b, 6 (Mid)			
802.11b, 11 (High)			

6.1.5.4 RESULT (SUPPORTING GRAPHS / DATA)

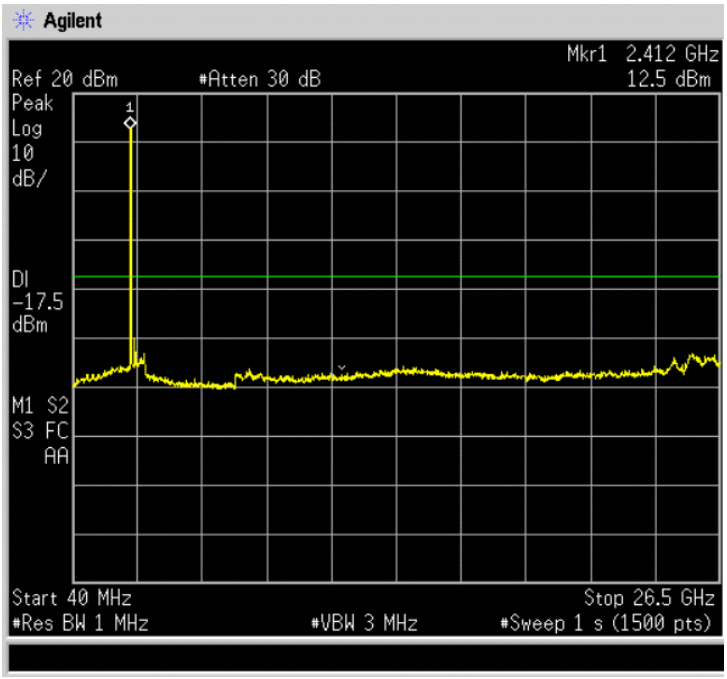


Figure 34: Conducted Spurious Emission – 802.11b, Low channel (1)

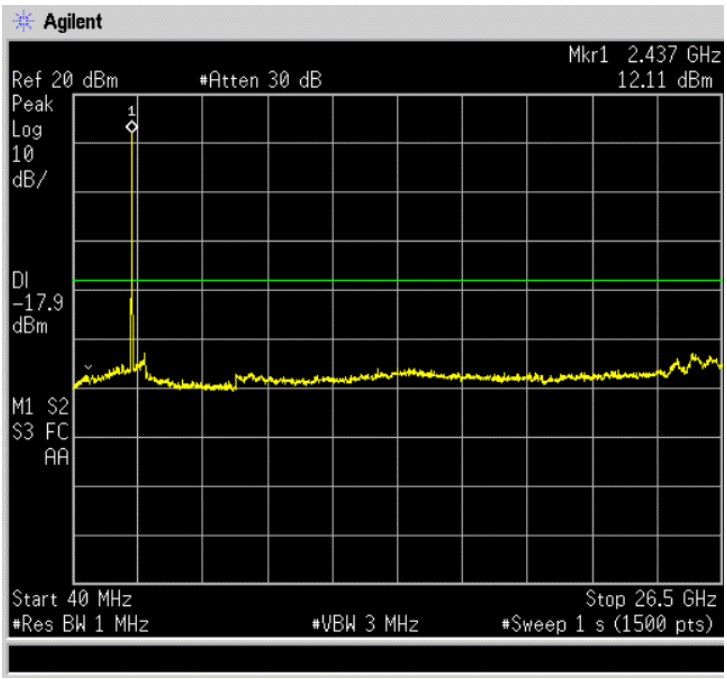


Figure 35: Conducted Spurious Emission – 802.11b, Mid channel (6)

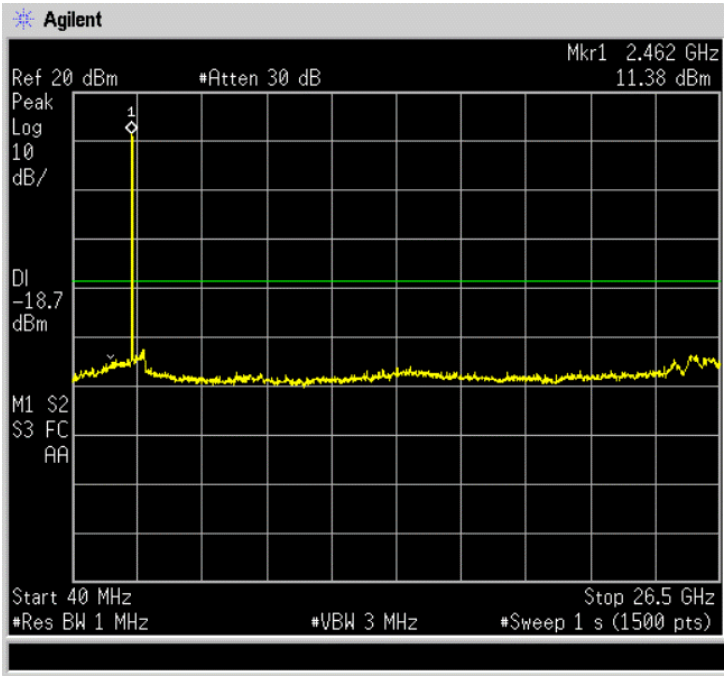


Figure 36: Conducted Spurious Emission – 802.11b, High channel (11)

6.1.6 POWER SPECTRAL DENSITY

6.1.6.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (e)	Conducted power spectral density shall not be greater than 8 dBm in any 3 kHz band
RSS-210	A8.2 (b)	Conducted power spectral density shall not be greater than 8 dBm in any 3 kHz band

6.1.6.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11b band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 3 KHz and Video Bandwidth to 300KHz
4	Select Span of 300 KHz and Sweep time of 100s in the Spectrum Analyzer
5	Record the peak power shown as power spectral density
6	Based on the recorded value, the result is declared

6.1.6.3 RESULT

Band, Channel	Limit	Channel	Frequency (GHz)	Measured (dBm)	Result
802.11b, 1 (Low)	8 dBm	1	2.412	-6.658	Pass
802.11b, 6 (Mid)	8 dBm	6	2.437	-7.148	Pass
802.11b, 11 (High)	8 dBm	11	2.462	-7.107	Pass

6.1.6.4 RESULT (SUPPORTING GRAPHS / DATA)

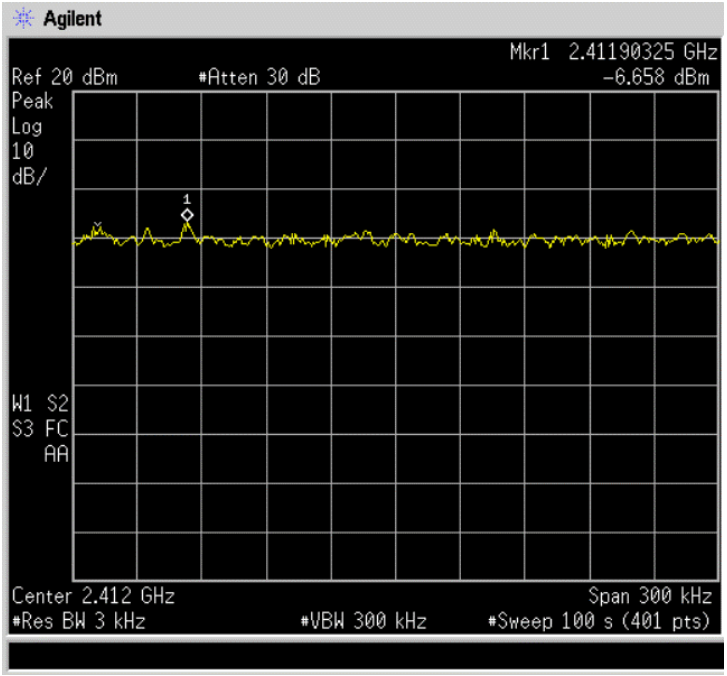


Figure 37: Power Spectral Density – 802.11b, Low channel (1)

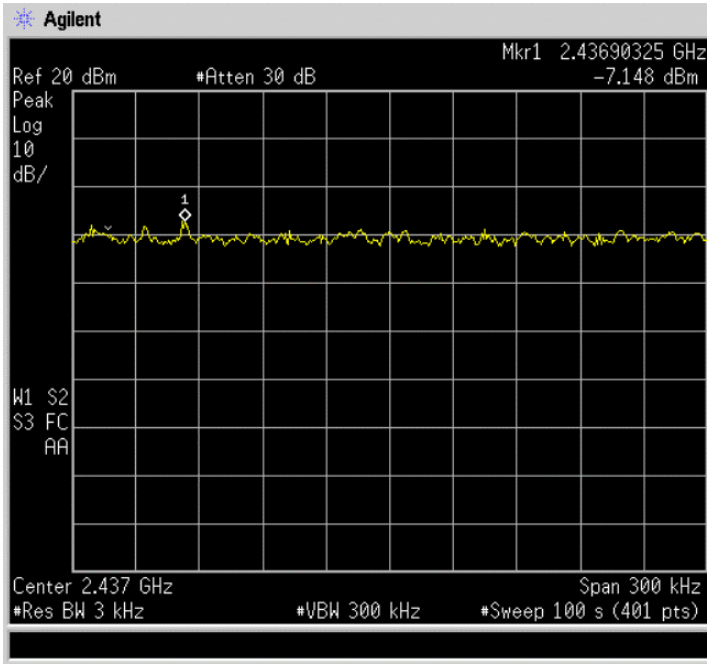


Figure 38: Power Spectral Density – 802.11b, Mid channel (6)

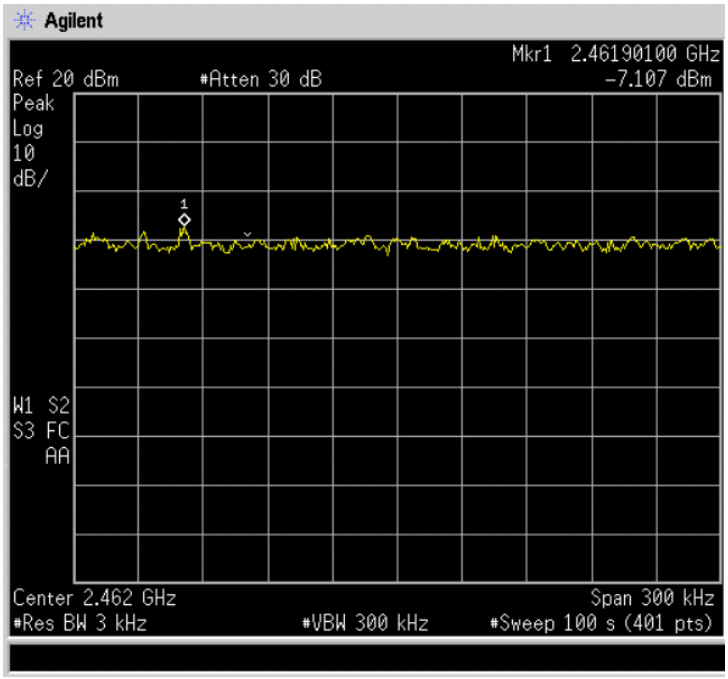


Figure 39: Power Spectral Density – 802.11b, High channel (11)

6.1.7 BAND EDGE MEASUREMENTS RADIATED

6.1.7.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Frequency range	Max Average Limit (dBµV/m) at 3 meter	Max Peak Limit (dBµV/m) at 3 meter
FCC Part 15, Subpart C	15.209	30 MHz to 88 MHz	40.0	60.0
		88 MHz to 216 MHz	43.5	63.5
		216 MHz to 960 MHz	46.0	66.0
		960 MHz to 1 GHz	54.0	74.0
		Above 1 GHz	54.0	74.0
RSS-210 (Refers to) RSS-GEN	A8.5 7.2.5	30 MHz to 88 MHz	40.0	60.0
		88 MHz to 216 MHz	43.5	63.5
		216 MHz to 960 MHz	46.0	66.0
		960 MHz to 1 GHz	54.0	74.0
		Above 1 GHz	54.0	74.0

6.1.7.2 TEST PROCEDURE

S. No	Procedure
1	EUT is placed on a 0.8m non-conductive table. This table is positioned on an automated turn table.
2	Antennas are positioned 3m away from the EUT
3	EUT is configured to function with the default channel in the selected band
4	A peak and average scan was carried out at various azimuth angles and antenna heights fixed to 1m.
5	The highest level of Radiated Emission was recorded
6	These values are compared against the limit specified by the standard

6.1.7.3 RESULT

Frequency (MHz)	Horizontal Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Detector
2399.5	20.02	54	-33.98	Pass	Average
2395.0	19.81	54	-34.19	Pass	Average
2391.5	19.54	54	-34.46	Pass	Average
2483.5	21.19	54	-32.81	Pass	Average
2487.5	21.35	54	-32.65	Pass	Average
2490.0	20.77	54	-33.23	Pass	Average
2397.5	45.72	74	-28.28	Pass	Peak
2392.5	39.83	74	-34.17	Pass	Peak
2395.0	41.76	74	-32.24	Pass	Peak
2483.5	41.24	74	-32.76	Pass	Peak
2487.0	39.25	74	-34.75	Pass	Peak
2490.0	37.88	74	-36.12	Pass	Peak

Frequency (MHz)	Vertical Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Detector
2399.5	20.02	54	-33.98	Pass	Average
2395.0	19.79	54	-34.21	Pass	Average
2391.5	19.54	54	-34.46	Pass	Average
2483.5	20.05	54	-33.95	Pass	Average
2487.5	20.46	54	-33.54	Pass	Average
2490.0	20.41	54	-33.59	Pass	Average
2397.5	38.08	74	-35.92	Pass	Peak
2392.5	34.14	74	-39.86	Pass	Peak
2395.0	34.39	74	-39.61	Pass	Peak
2483.5	37.07	74	-36.93	Pass	Peak
2487.0	36.95	74	-37.05	Pass	Peak
2490.0	32.93	74	-41.07	Pass	Peak

6.1.8 BAND EDGE MEASUREMENTS CONDUCTED

6.1.8.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (d)	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
RSS-210	A8.5	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

6.1.8.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1) and High(13) channels of the 802.11b band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 100 KHz and Video Bandwidth to 100KHz
4	Select Span of 115 MHz and Sweep time of 1s in the Spectrum Analyzer
5	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
6	Based on the recorded value, the result is declared

6.1.8.3 RESULT (SUPPORTING GRAPHS / DATA)

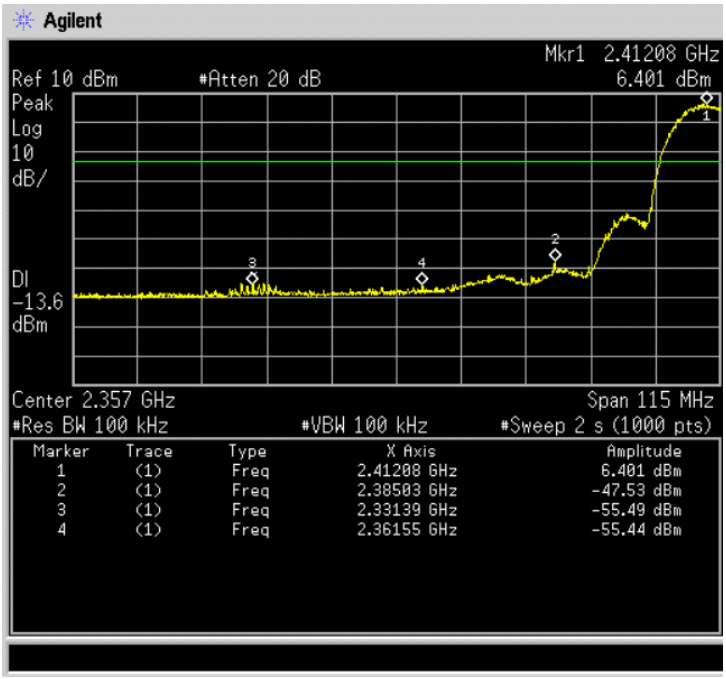


Figure 40: Low Band Edge – 802.11b, Low channel (1)

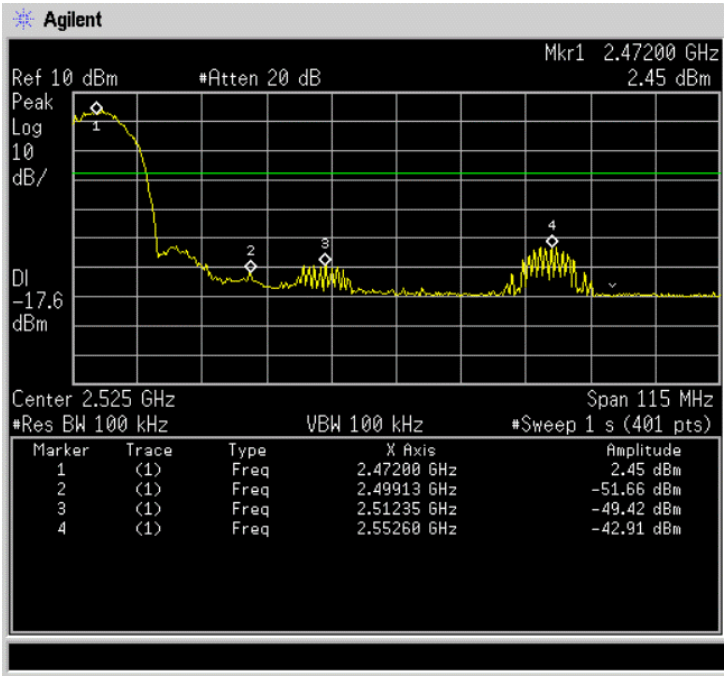


Figure 41: High Band Edge – 802.11b, High channel (13)

6.1.9 OCCUPIED BANDWIDTH MEASUREMENTS

6.1.9.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
RSS Gen	4.6.1	Occupied Bandwidth (OBW) is the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency.

6.1.9.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11b band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 100 KHz and Video Bandwidth to 300KHz
4	Select Span of 18 MHz and Sweep time of 1s in the Spectrum Analyzer
5	Based on the recorded value, the result is declared

6.1.9.3 RESULT (SUPPORTING GRAPHS / DATA)

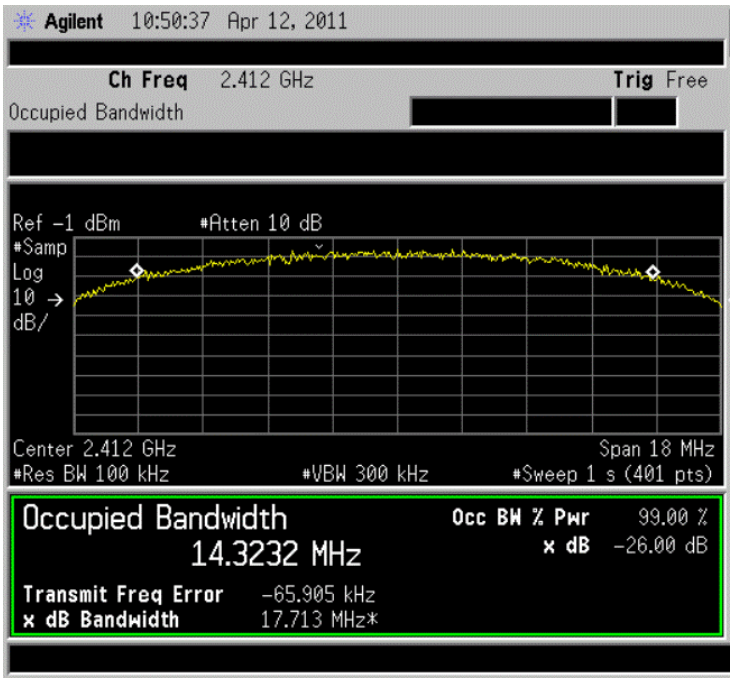


Figure 42: Occupied Bandwidth Measurement – 802.11b, Low channel (1)

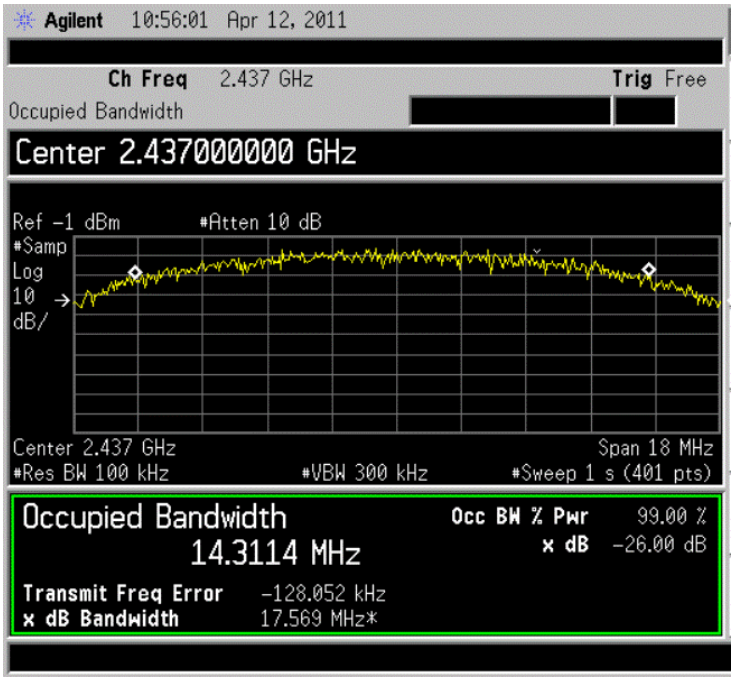


Figure 43: Occupied Bandwidth Measurement – 802.11b, Mid channel (6)

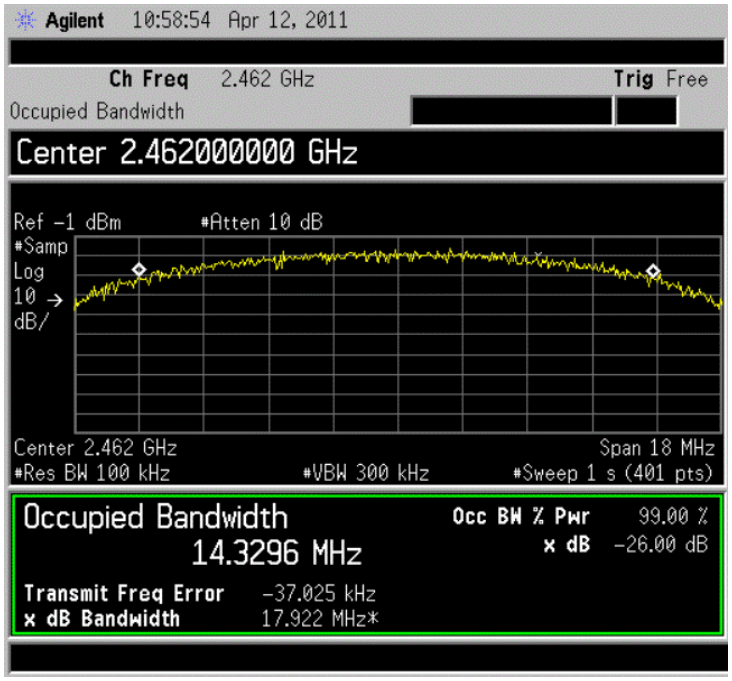


Figure 44: Occupied Bandwidth Measurement – 802.11b, High channel (11)

6.2 WI-FI 801.11g MODE

6.2.1 RESTRICTED BAND OF OPERATION

6.2.1.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limits
FCC Part 15, Subpart C	15.205	In the operating range of this product, the limits are: f_L > 2.39 GHz, f_H < 2.4835 GHz
RSS-210 (Refers to) RSS-GEN	2.2 7.2.2	In the operating range of this product, the limits are: f_L > 2.39 GHz, f_H < 2.655 GHz

f_L = Lower operating frequency range
f_H = Higher operating frequency range

6.2.1.2 TEST PROCEDURE

S. No	Procedure
1	Connect the transmitter output to a Spectrum Analyzer
2	Select the lowest possible channel of the carrier (Eg. 1st channel)
3	Measure the frequency at 20dB below the peak power at this carrier and record this as f_L
4	Select the highest possible channel of the carrier (Eg. 13th channel)
5	Measure the higher frequency at 20dB below the peak power at this carrier and record this as f_H

Note: While it may be sufficient that the center frequency of the carrier is within the limits, the lower and higher frequencies of the carrier envelop have been taken into account for this measurement.

6.2.1.3 RESULT

Parameter	Limit	Measured	Result
f_L	Min 2.39 GHz (FCC and RSS-210)	2.400750	Pass
f_H	Max 2.4835 GHz (FCC)	2.482500	Pass
f_H	Max 2.655 GHz (RSS-210)	2.482500	Pass

6.2.1.4 RESULT (SUPPORTING GRAPHS / DATA)

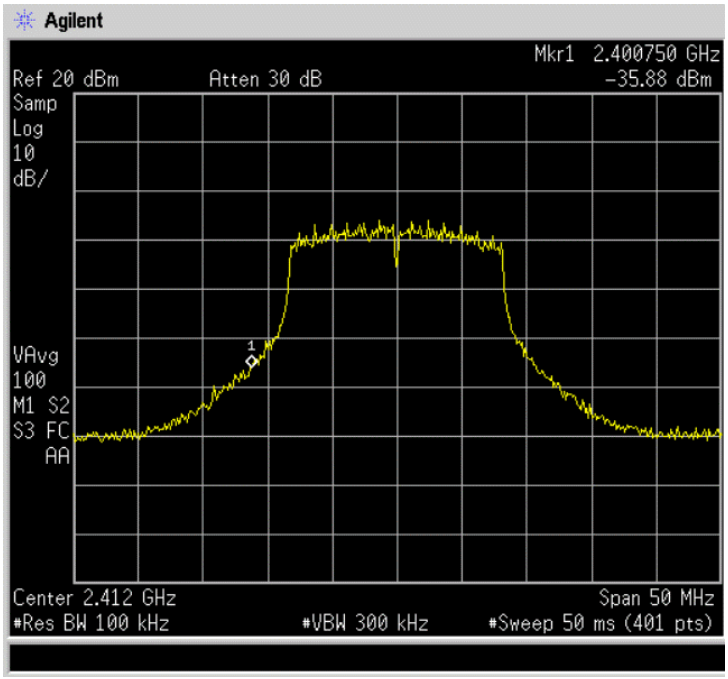


Figure 45: Measured f_L at Channel 1 – 802.11g

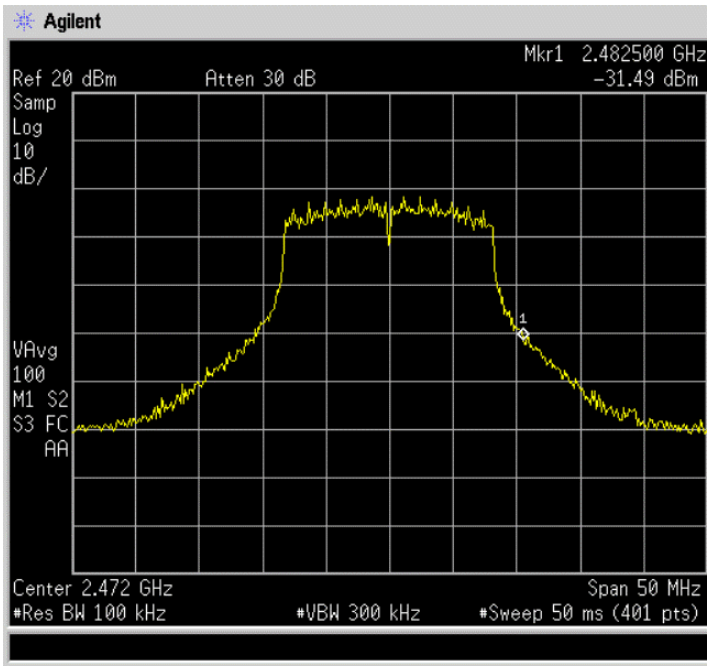


Figure 46: Measured f_H at Channel 13 – 802.11g

6.2.2 RADIATED EMISSION

6.2.2.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Frequency range	Max Limit (dBµV/m) at 3 meter
FCC Part 15, Subpart C	15.209	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0
RSS-210 (Refers to) RSS-GEN	2.6 7.2.5	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0

6.2.2.2 TEST PROCEDURE

S. No	Procedure
1	Test procedure is as per ANSI C63.4: 2000
2	EUT is placed on a 0.8m non-conductive table. This table is positioned on an automated turn table.
3	Antennas are positioned 3m away from the EUT
4	EUT is configured to function with the default channel in the selected band
5	A peak scan was carried out at various azimuth angles and antenna heights ranging from 1m to 4m.
6	The highest level of Radiated Emission was recorded
7	Quasi-peak measurements were carried out at the identified peaks for <1GHz and Average measurements were carried out above 1GHz
8	These values are compared against the limit specified by the standard

6.2.2.3 RESULT

Parameter	Limit	Measured	Result
Radiated Emission	Refer 6.1.2.1	Refer 6.1.2.4	Pass

6.2.2.4 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 1

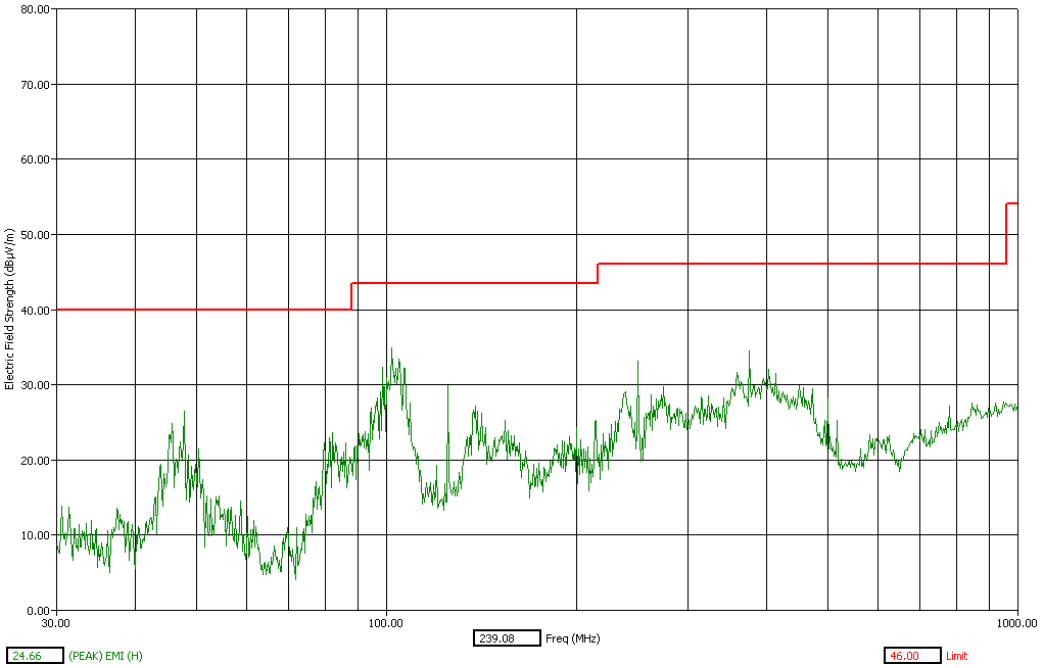


Figure 47: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11g, Channel 1

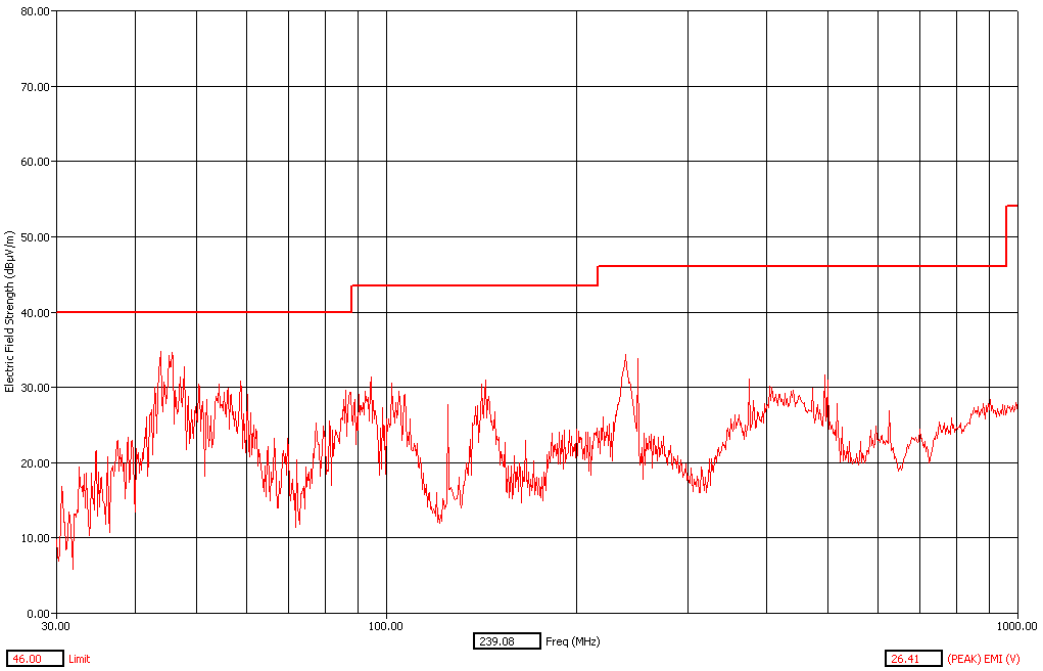


Figure 48: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11g, Channel 1

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
43.80	V	31.78	40.00	-8.22	183.20	100.00	52.37	2.03	9.82	32.44
101.85	H	33.07	43.50	-10.43	262.00	327.00	53.75	3.08	8.60	32.36
125.00	H	32.14	43.50	-11.36	85.80	251.00	50.31	3.41	10.80	32.39
125.00	V	28.14	43.50	-15.36	112.40	100.00	44.32	3.41	12.80	32.39
238.60	V	32.20	46.00	-13.80	282.10	100.00	47.70	4.76	12.11	32.36
250.00	H	33.27	46.00	-12.73	257.90	125.00	49.40	4.90	11.20	32.23
250.00	V	33.74	46.00	-12.26	338.40	100.00	49.26	4.90	11.80	32.23
375.00	H	35.65	46.00	-10.35	250.60	100.00	47.43	5.96	15.00	32.75

Figure 49: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11g, Channel 1

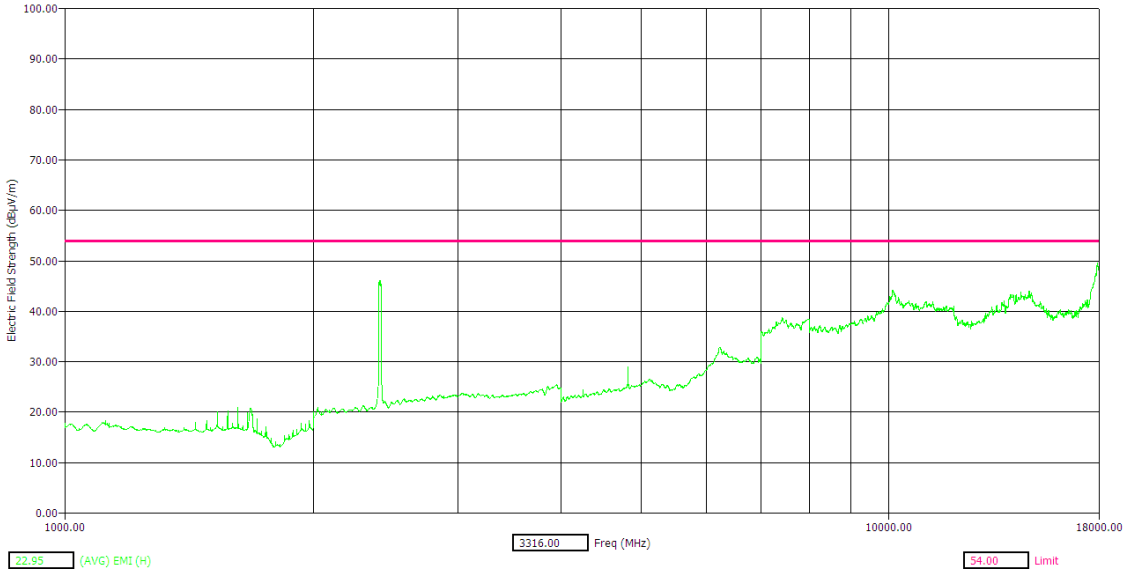


Figure 50: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 18 GHz – 802.11g, Channel 1

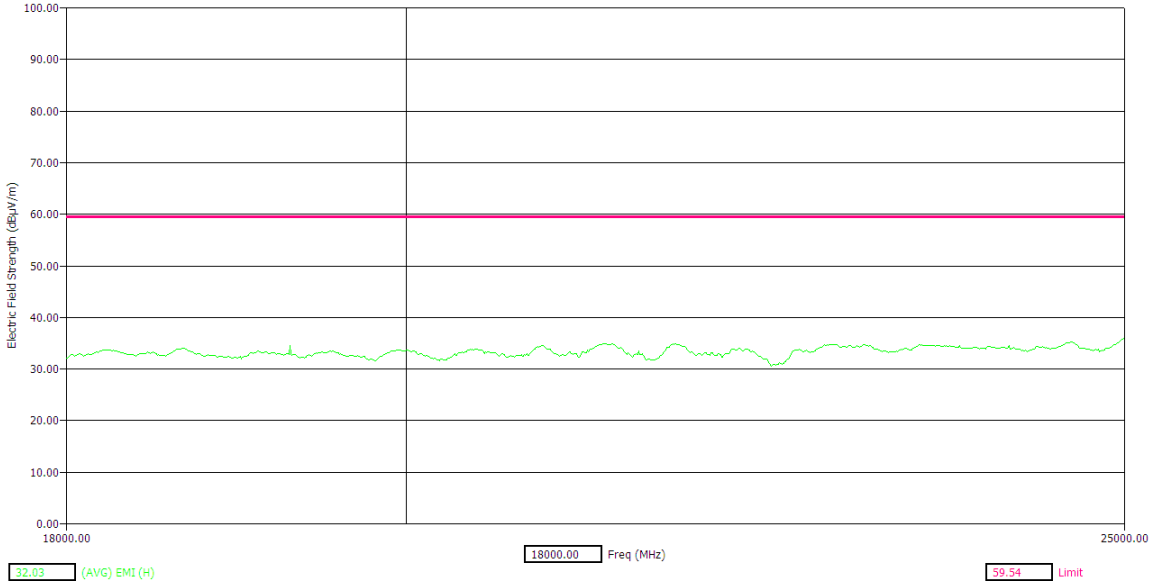


Figure 51: Radiated Emission (Average) – Horizontal polarization – 18 GHz to 25 GHz – 802.11g, Channel 1

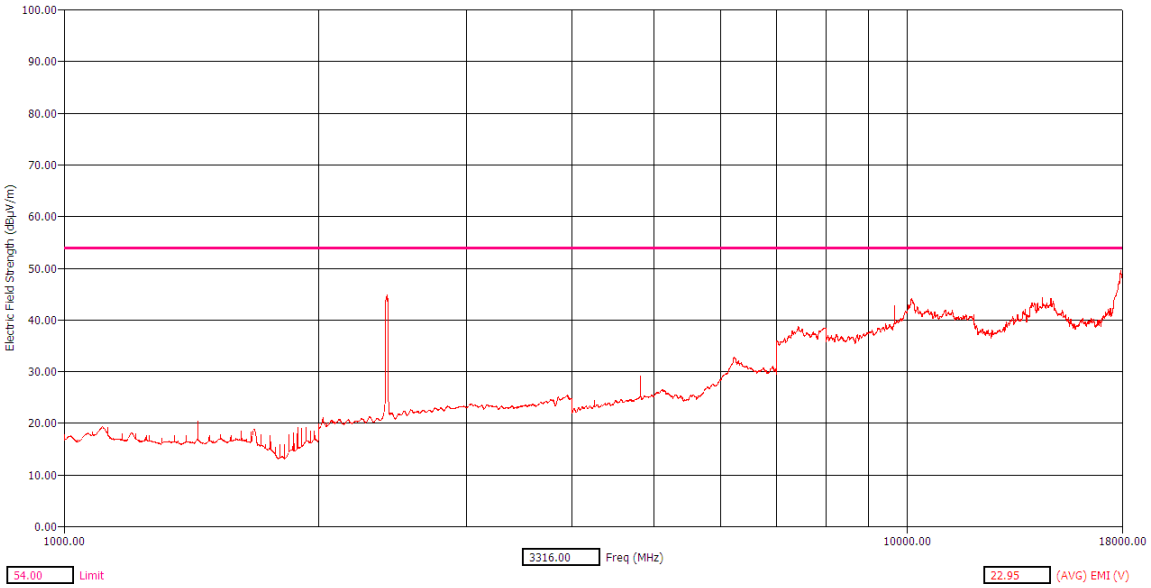


Figure 52: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11g, Channel 1

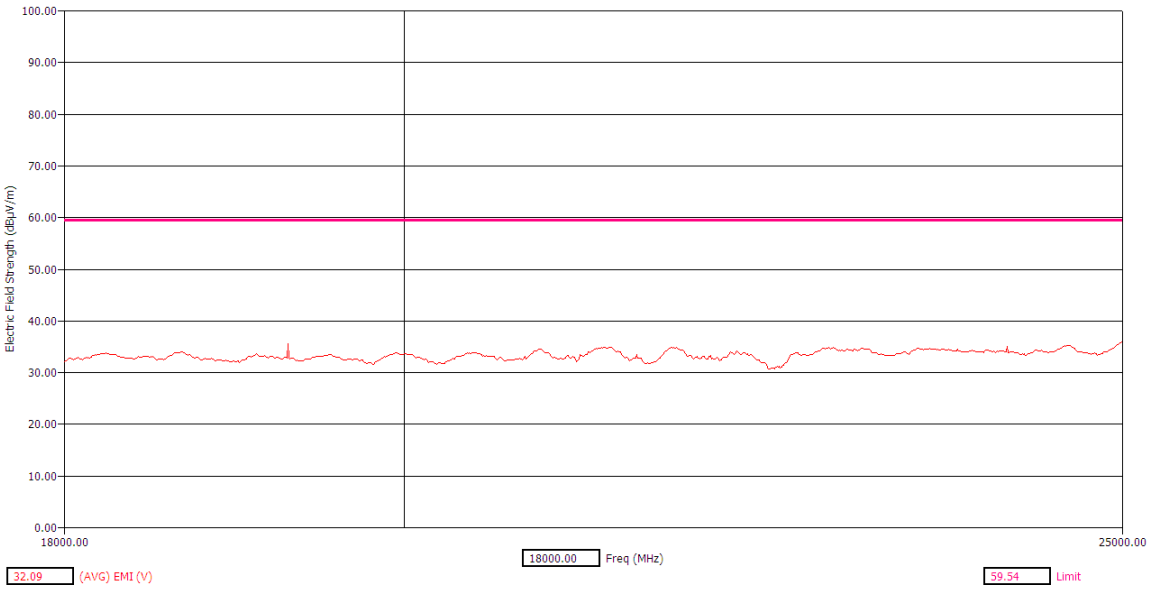


Figure 53: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11g, Channel 1

6.2.2.5 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 6

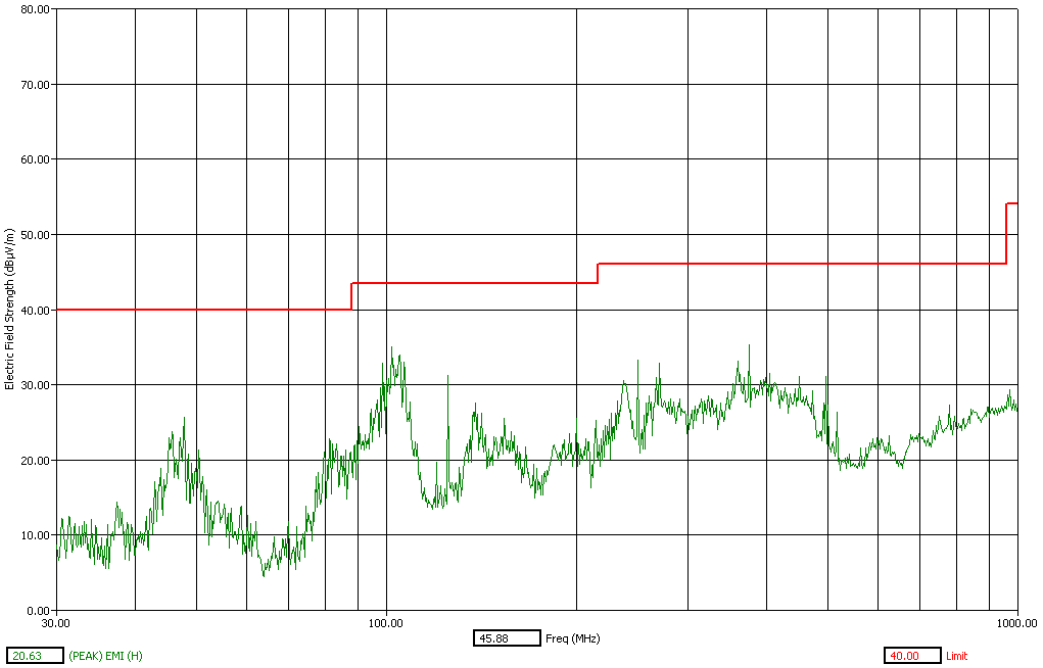


Figure 54: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11g, Channel 6

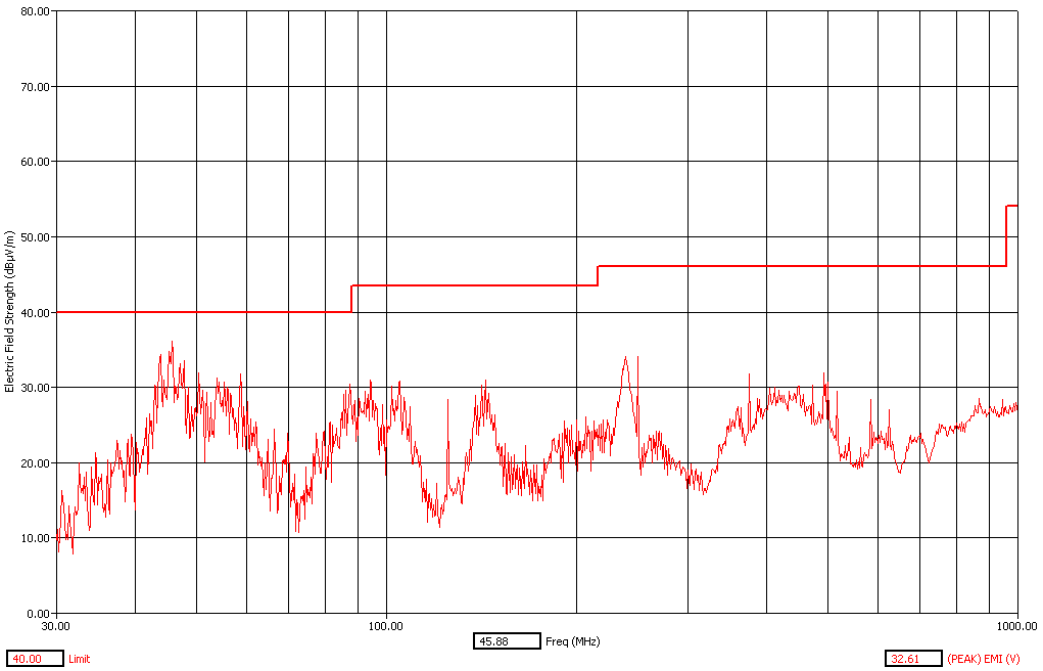


Figure 55: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11g, Channel 6

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
45.75	V	35.16	40.00	-4.84	256.10	103.00	55.67	2.07	9.85	32.43
101.85	H	33.94	43.50	-9.56	262.80	326.00	54.62	3.08	8.60	32.36
125.00	H	30.52	43.50	-12.98	81.80	173.00	48.70	3.41	10.80	32.39
125.00	V	28.61	43.50	-14.89	120.60	100.00	44.78	3.41	12.80	32.39
250.00	H	34.27	46.00	-11.73	252.10	122.00	50.40	4.90	11.20	32.23
250.00	V	33.68	46.00	-12.32	338.50	100.00	49.21	4.90	11.80	32.23

Figure 56: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11g, Channel 6

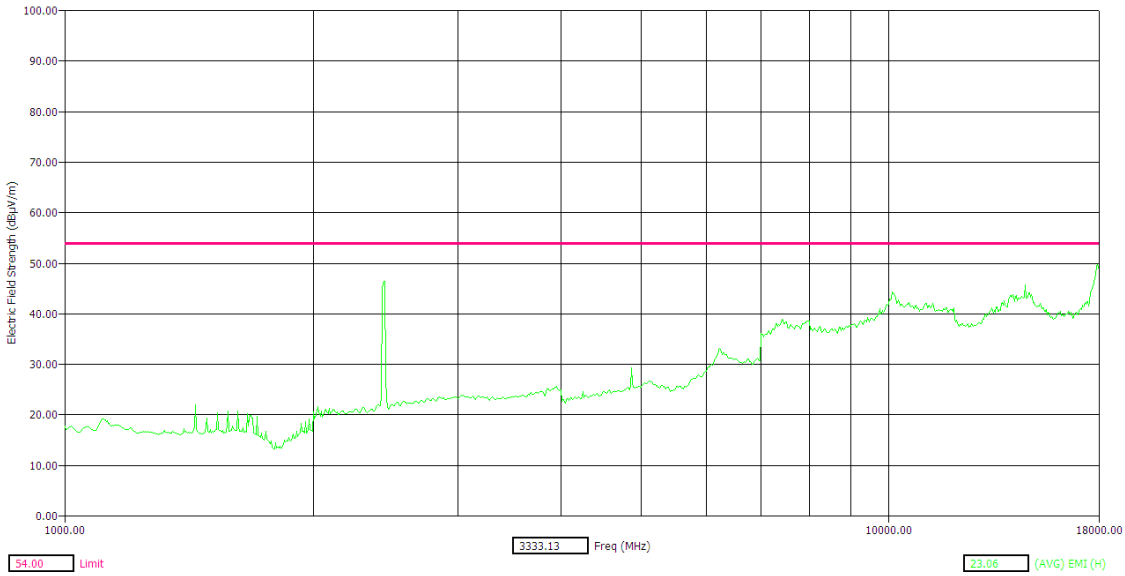


Figure 57: Radiated Emission (Average) – Horizontal polarization – 1GHz to 18GHz – 802.11g, Channel 6

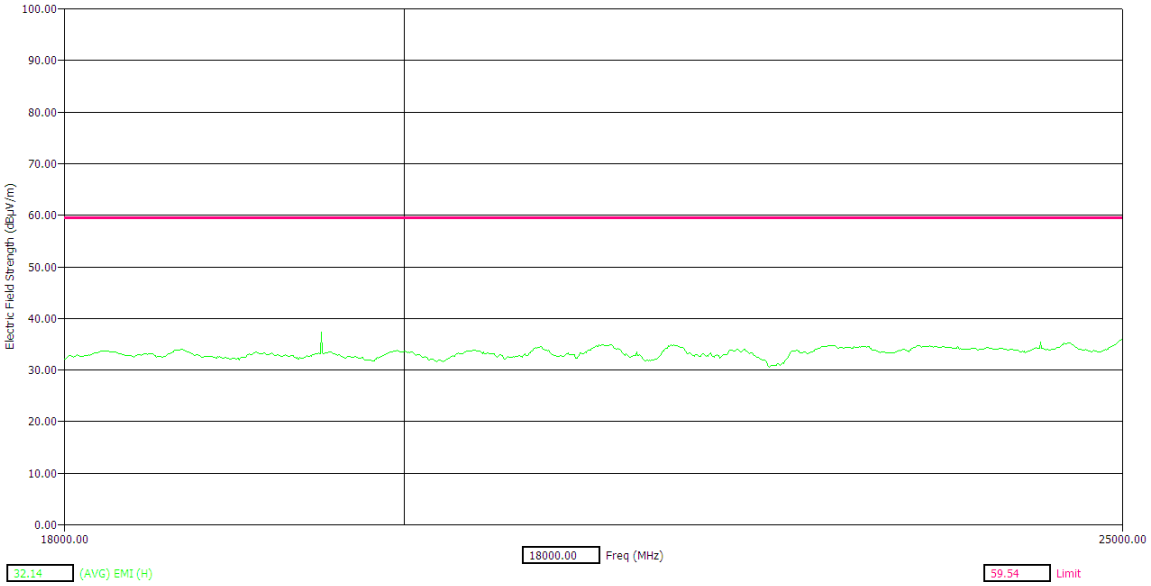


Figure 58: Radiated Emission (Average) – Horizontal polarization – 18 GHz to 25 GHz – 802.11g, Channel 6

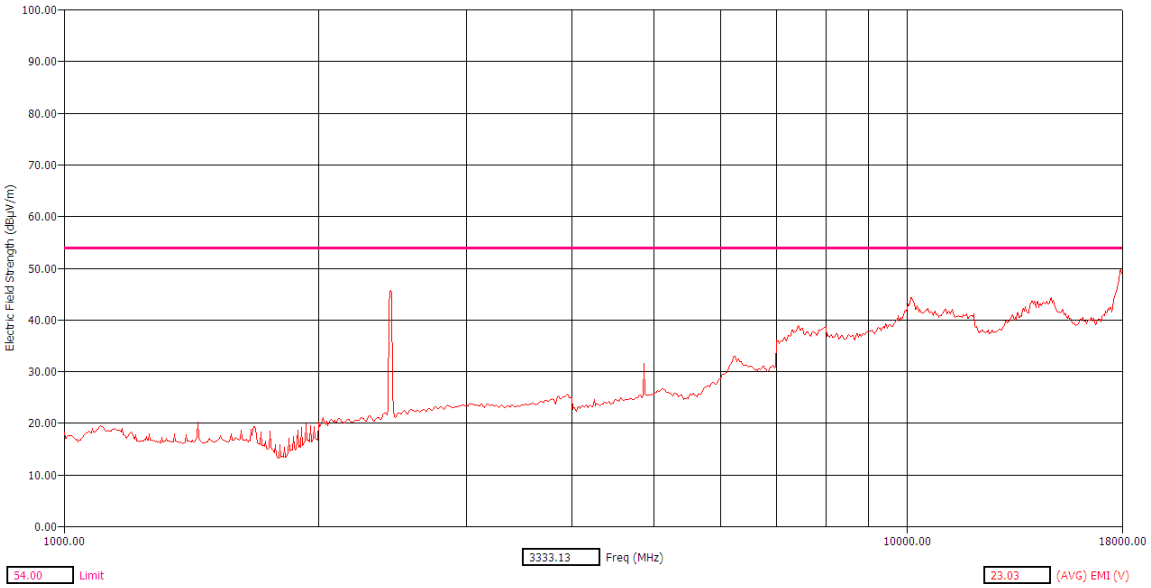


Figure 59: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11g, Channel 6

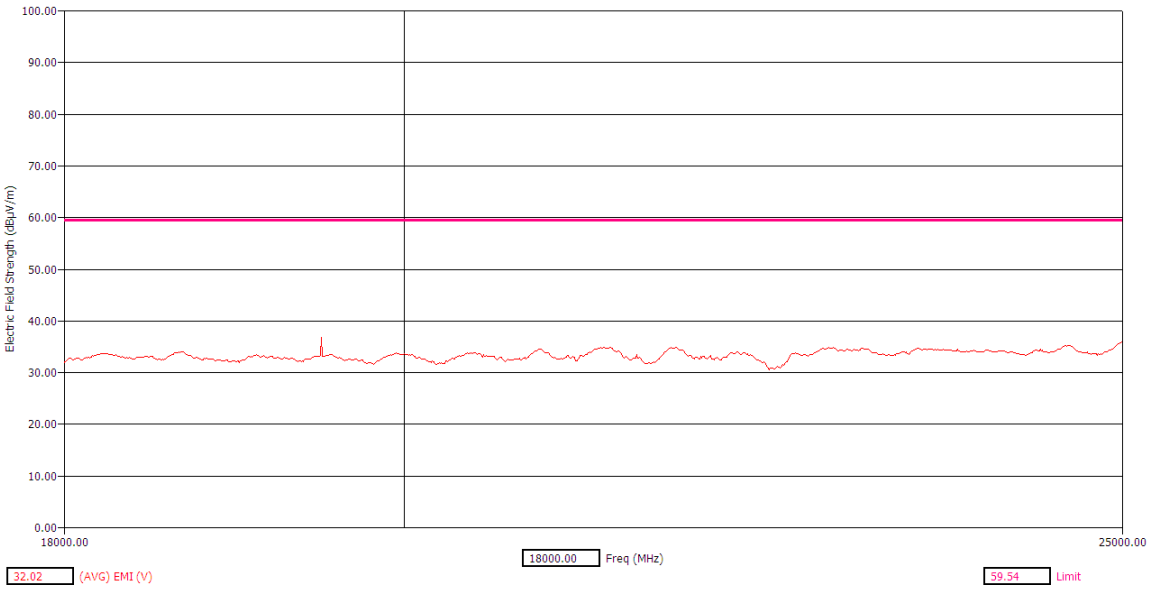


Figure 60: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11g, Channel 6

6.2.2.6 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 11

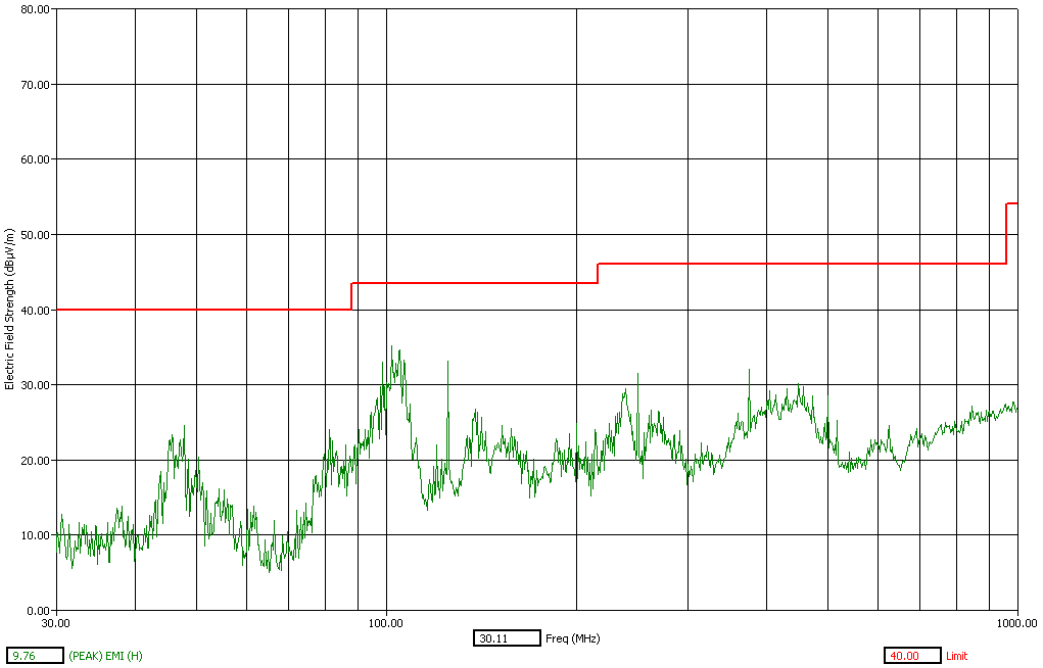


Figure 61: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11g, Channel 11

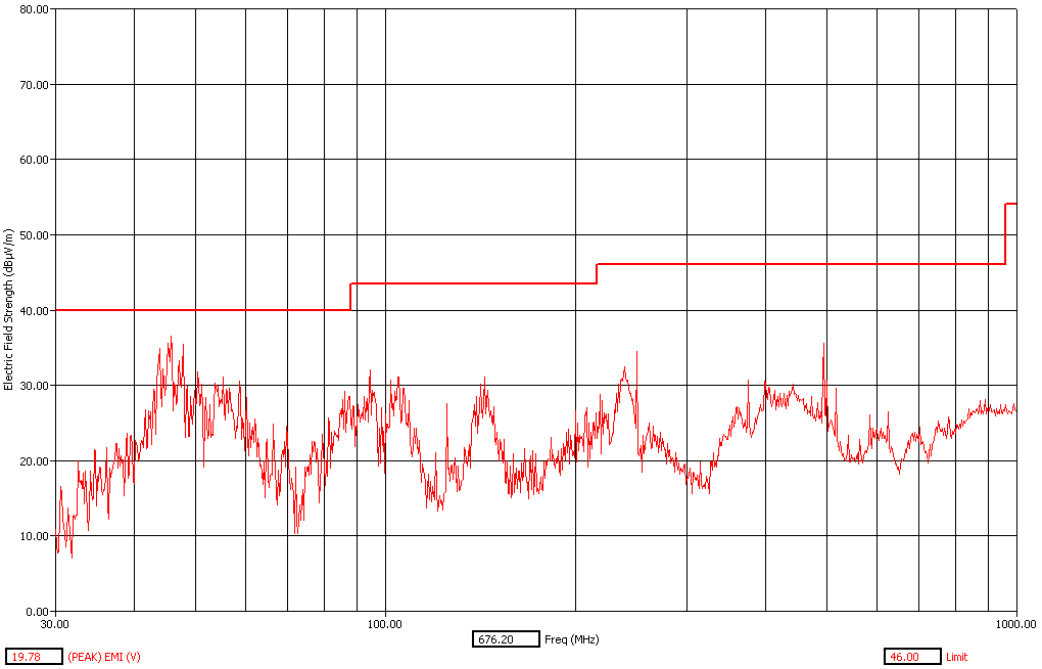


Figure 62: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11g, Channel 11

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
45.75	V	34.43	40.00	-5.57	265.80	100.00	54.95	2.07	9.85	32.43
101.95	H	34.12	43.50	-9.38	262.80	321.00	54.80	3.08	8.60	32.36
125.00	H	28.77	43.50	-14.73	85.70	400.00	46.94	3.41	10.80	32.39
125.00	V	28.31	43.50	-15.19	180.00	100.00	44.49	3.41	12.80	32.39
250.00	H	33.19	46.00	-12.81	258.00	110.00	49.32	4.90	11.20	32.23
250.00	V	30.47	46.00	-15.53	350.70	100.00	46.00	4.90	11.80	32.23
493.96	V	23.08	46.00	-22.92	140.30	100.00	30.23	6.84	18.15	32.14

Figure 63: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11g, Channel 11

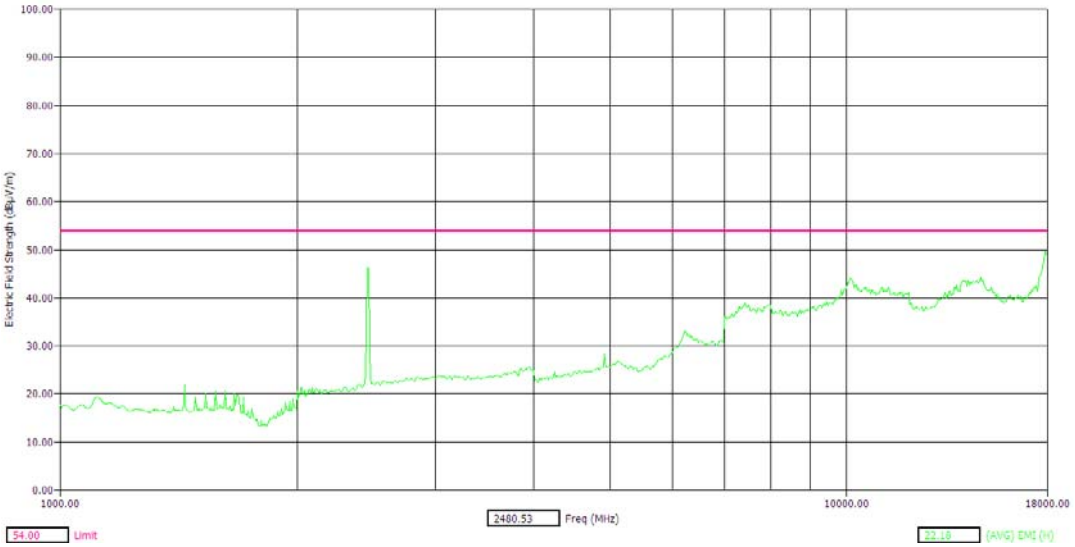


Figure 64: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 18 GHz – 802.11g, Channel 11

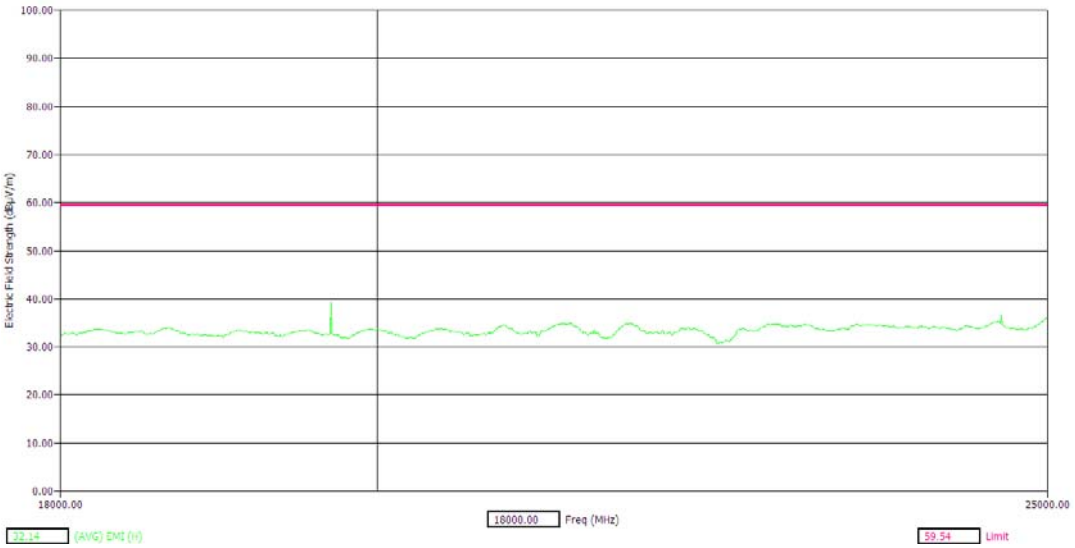


Figure 65: Radiated Emission (Average) – Horizontal polarization – 18 GHz to 25 GHz – 802.11g, Channel 11

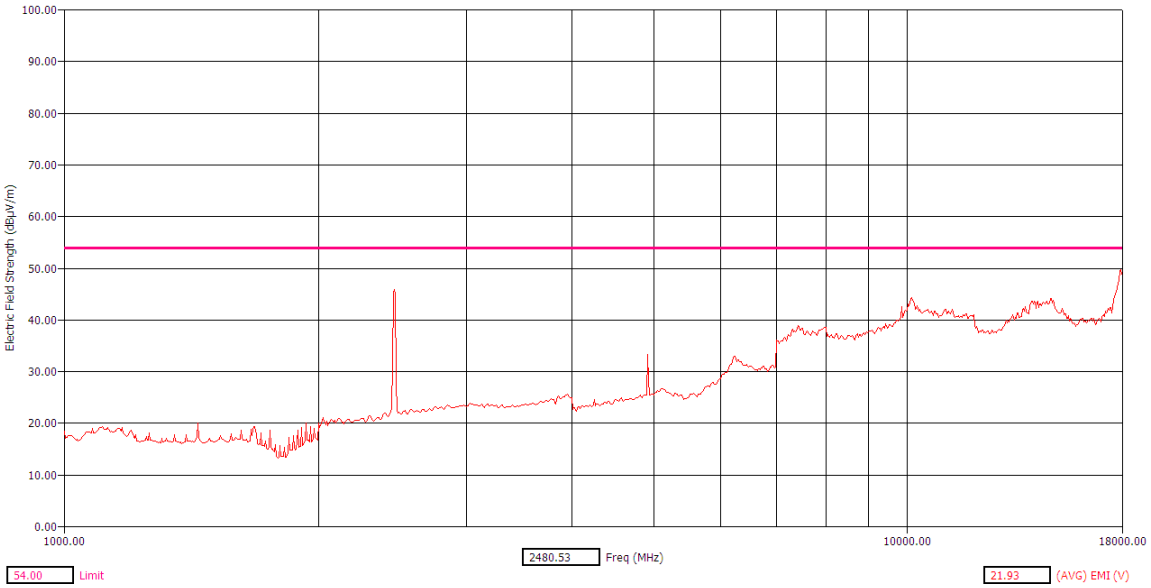


Figure 66: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11g, Channel 11

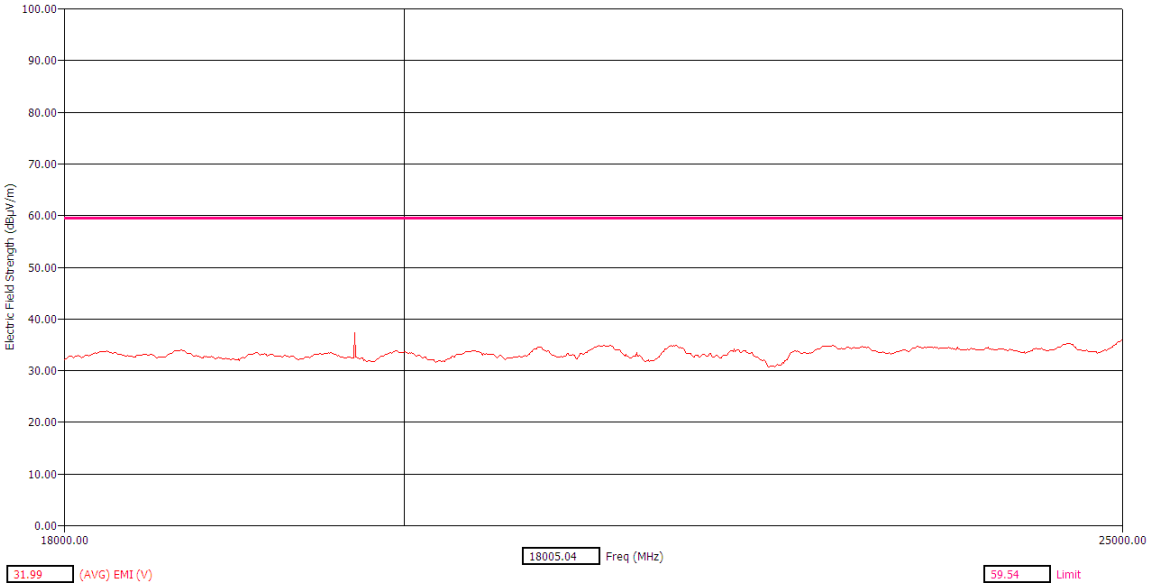


Figure 67: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11g, Channel 11

6.2.3 6dB BANDWIDTH

6.2.3.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (a) (2)	The 6dB bandwidth > 500 KHz
RSS-210	A8.2	The 6dB bandwidth > 500 KHz

6.2.3.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11g band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Detect the carrier envelop in the Spectrum Analyzer
4	The 6dB bandwidth below the peak power was calculated on the envelop
5	This measured bandwidth is compared against the limit and the result declared

6.2.3.3 RESULT

Band, Channel	Frequency (GHz)	Limit	Measured	Result
802.11g, 1 (Low)	2.412	500 KHz or more	16.5 MHz	Pass
802.11g, 6 (Mid)	2.437	500 KHz or more	16.5 MHz	Pass
802.11g, 11 (High)	2.462	500 KHz or more	16.5 MHz	Pass

6.2.3.4 RESULT (SUPPORTING GRAPHS / DATA)

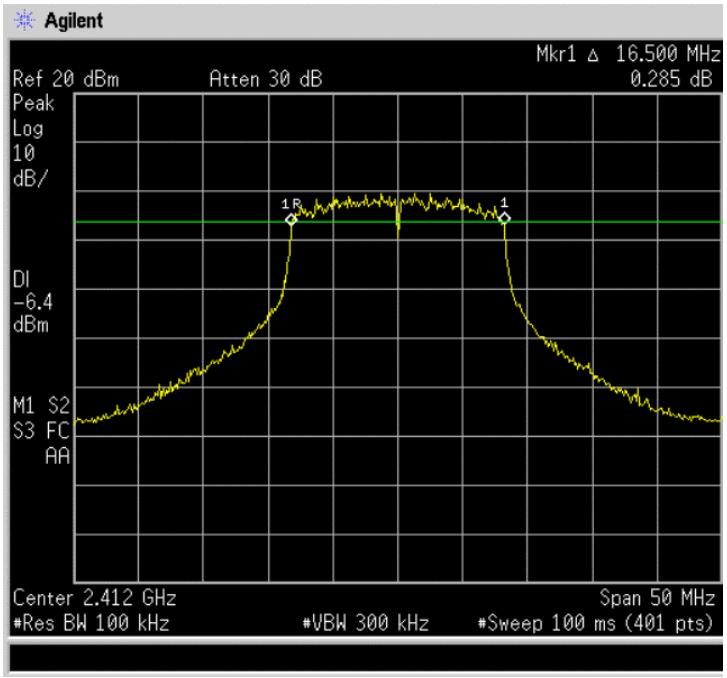


Figure 68: 6dB bandwidth – 802.11g, Low channel (1)

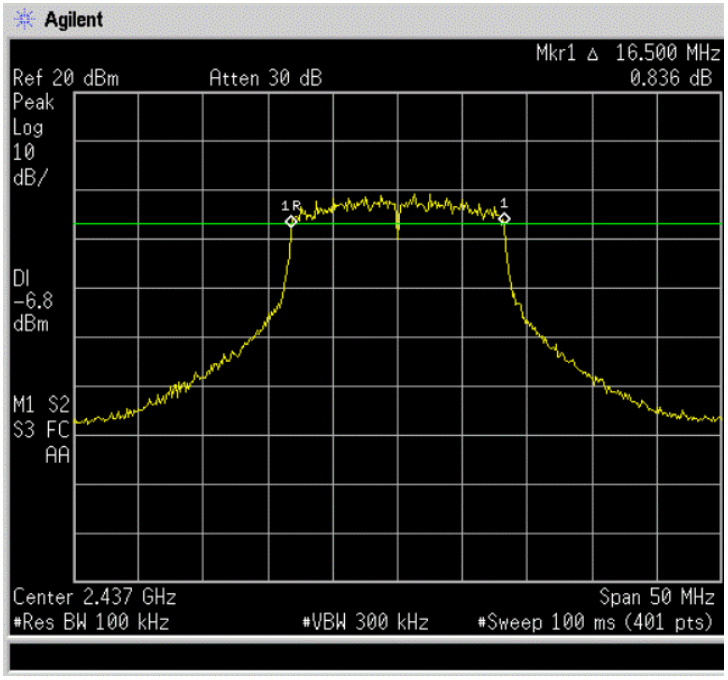


Figure 69: 6dB bandwidth – 802.11g, Mid channel (6)

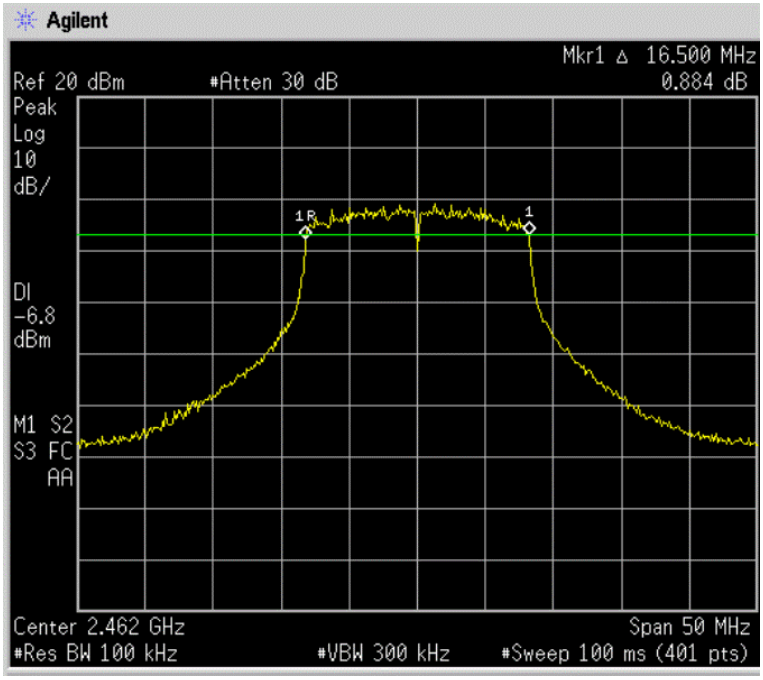


Figure 70: 6dB bandwidth – 802.11g, High channel (11)

6.2.4 PEAK CONDUCTED OUTPUT POWER

6.2.4.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (b) (3)	Peak conducted output power < 1 Watt
RSS-210	A8.4 (4)	Peak conducted output power < 1 Watt

6.2.4.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11g band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Appropriate Digital Transmission System test procedure is followed as per FCC recommendation. In this case, Option 2, Method 3 was selected based on the bandwidth of the carrier.
4	Add the measured cable loss of the cable that was used for the measurement (1.8dB)
5	This measured value is compared against the limit and the result declared

6.2.4.3 RESULT

Band, Channel	Frequency (GHz)	Measured power (dBm)	Cable loss (dB)	Total power (dBm)	Total power (mW)	Limit (mW)	Result
802.11g, 1 (Low)	2.412	-5.96	1.8	-4.16	0.383	1000	Pass
802.11g, 6 (Mid)	2.437	-2.68	1.8	-0.88	0.8165	1000	Pass
802.11g, 11 (High)	2.462	-8.59	1.8	-6.79	0.209	1000	Pass

Note: Transmit duty cycle considered is = 1
No antenna gain is considered as this is conducted measurement without antenna

6.2.4.4 RESULT (SUPPORTING GRAPHS / DATA)

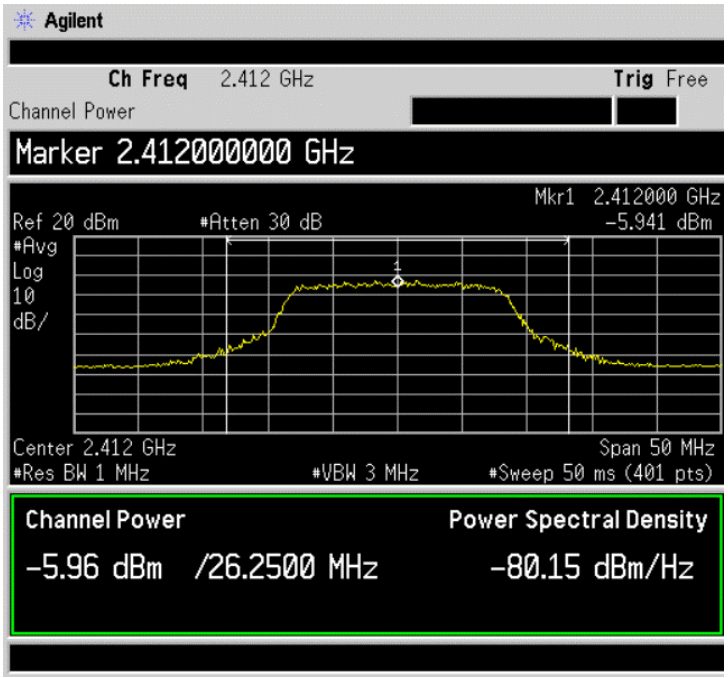


Figure 71: Peak conducted output power – 802.11g, Low channel (1)

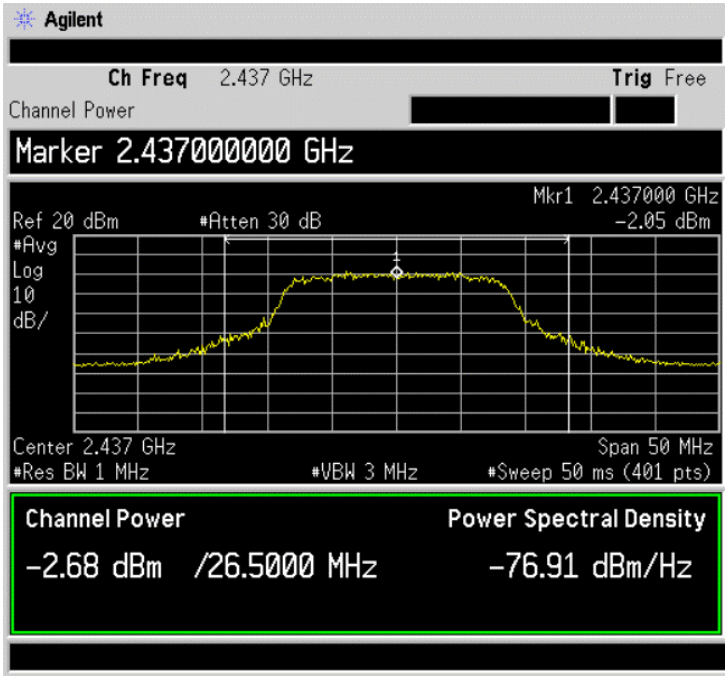


Figure 72: Peak conducted output power – 802.11g, Mid channel (6)

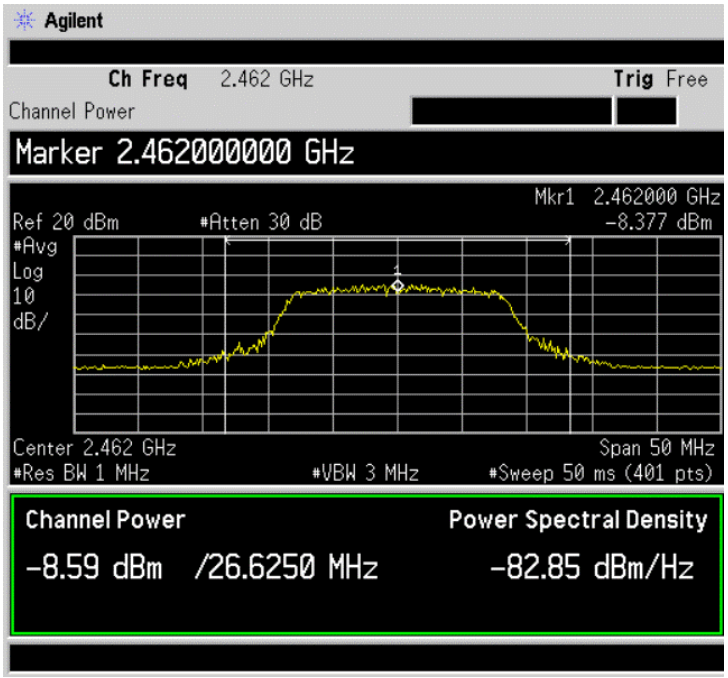


Figure 73: Peak conducted output power – 802.11g, High channel (11)

6.2.5 CONDUCTED SPURIOUS EMISSION

6.2.5.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (d)	In any 100KHz band outside the intentional band, emissions shall be 30dB below the peak power
RSS-210	A8.5	In any 100KHz band outside the intentional band, emissions shall be 30dB below the peak power

6.2.5.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11g band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Set the start frequency on the Spectrum Analyzer as 40 MHz
4	Set the start frequency on the Spectrum Analyzer as 26.5 GHz
5	Examine the complete band for any spurious emissions that exceed the value that is 30dB below the peak power in the intentional band
6	Based on the measured spurious emissions outside the intentional band, the result is declared

6.2.5.3 RESULT

Band, Channel	Limit	Measured	Result
802.11g, 1 (Low)	30db below the peak power measured	Refer 6.1.5.4	Pass
802.11g, 6 (Mid)			
802.11g, 11 (High)			

6.2.5.4 RESULT (SUPPORTING GRAPHS / DATA)

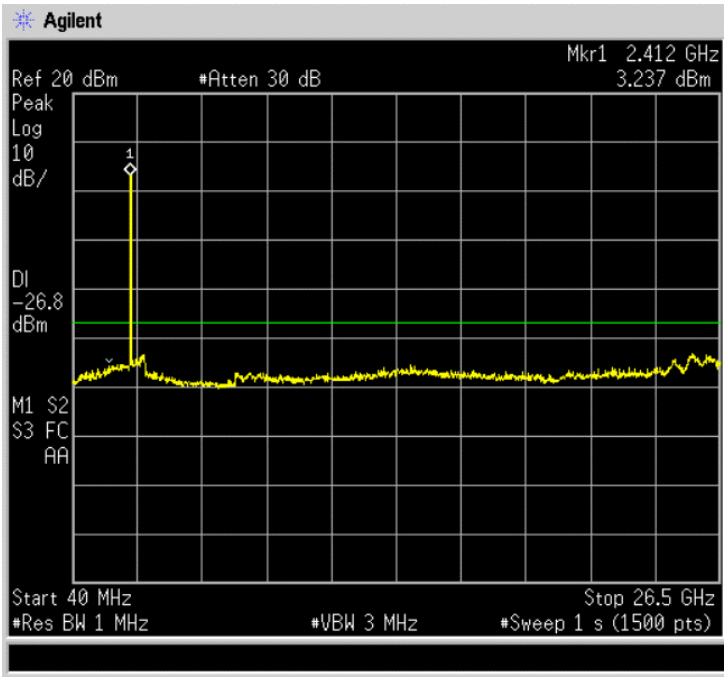


Figure 74: Conducted Spurious Emission – 802.11g, Low channel (1)

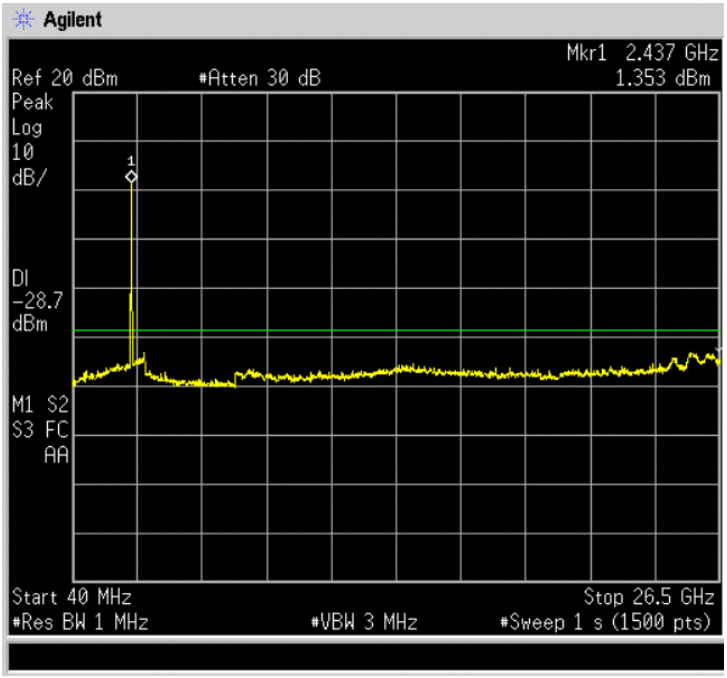


Figure 75: Conducted Spurious Emission – 802.11g, Mid channel (6)

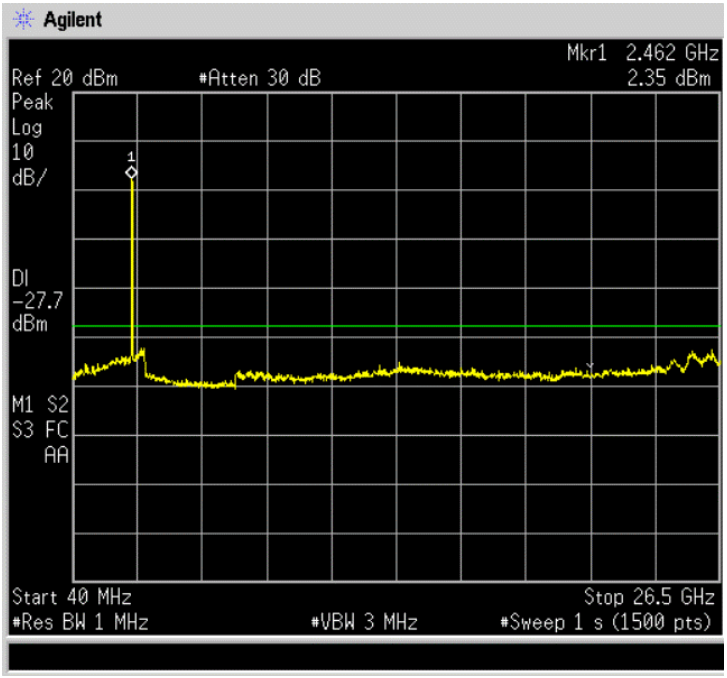


Figure 76: Conducted Spurious Emission – 802.11g, High channel (11)

6.2.6 POWER SPECTRAL DENSITY

6.2.6.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (e)	Conducted power spectral density shall not be greater than 8 dBm in any 3 kHz band
RSS-210	A8.2 (b)	Conducted power spectral density shall not be greater than 8 dBm in any 3 kHz band

6.2.6.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11g band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT
3	In the Spectrum Analyzer set Resolution Bandwidth to 3 KHz and Video Bandwidth to 300KHz
4	Select Span of 300 KHz and Sweep time of 100s in the Spectrum Analyzer
5	Record the peak power shown as power spectral density
6	Based on the recorded value, the result is declared

6.2.6.3 RESULT

Band, Channel	Limit	Channel	Frequency (GHz)	Measured (dBm)	Result
802.11g, 1 (Low)	8 dBm	1	2.412	-24.92	Pass
802.11g, 6 (Mid)	8 dBm	6	2.437	-26.32	Pass
802.11g, 11 (High)	8 dBm	11	2.462	-26.98	Pass

6.2.6.4 RESULT (SUPPORTING GRAPHS / DATA)

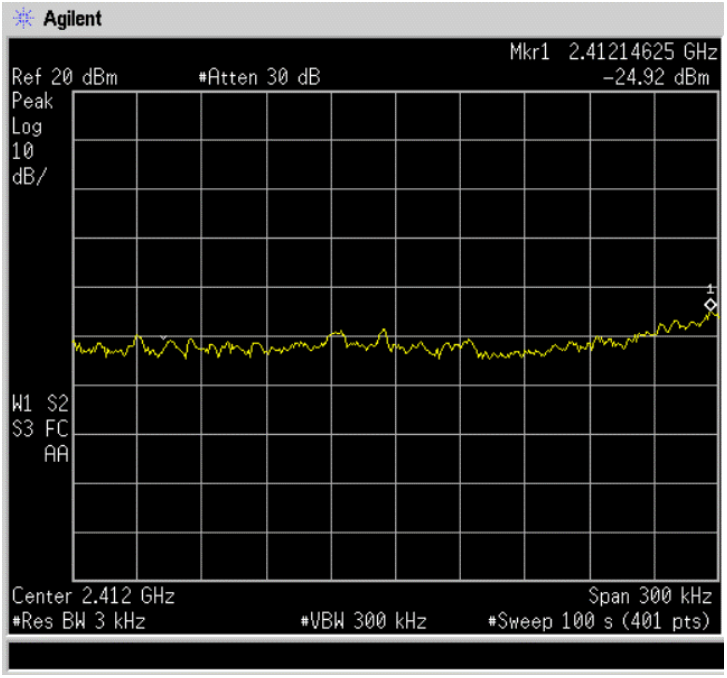


Figure 77: Power Spectral Density – 802.11g, Low channel (1)

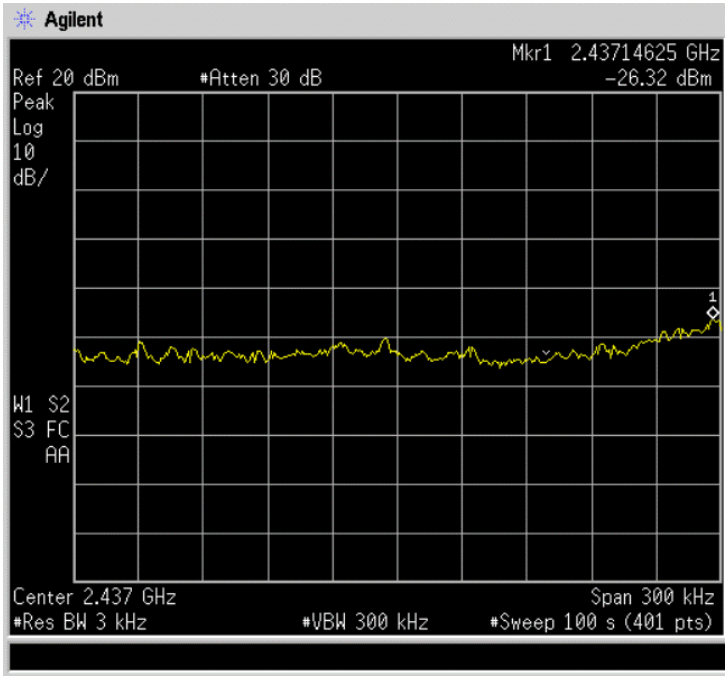


Figure 78: Power Spectral Density – 802.11g, Mid channel (6)

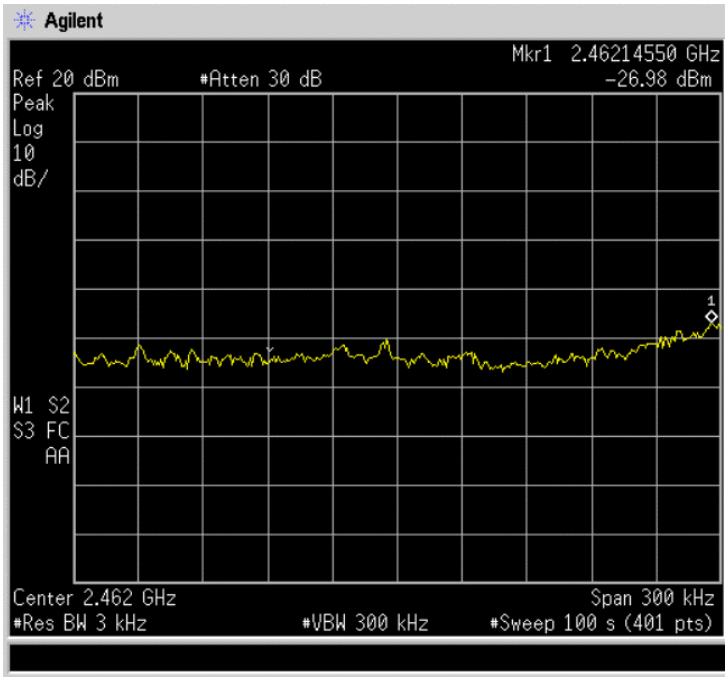


Figure 79: Power Spectral Density – 802.11g, High channel (11)

6.2.7 BAND EDGE MEASUREMENTS RADIATED

6.2.7.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Frequency range	Max Average Limit (dBµV/m) at 3 meter	Max Peak Limit (dBµV/m) at 3 meter
FCC Part 15, Subpart C	15.209	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0	60.0 63.5 66.0 74.0 74.0
RSS-210 (Refers to) RSS-GEN	A8.5 7.2.5	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0	60.0 63.5 66.0 74.0 74.0

6.2.7.2 TEST PROCEDURE

S. No	Procedure
1	EUT is placed on a 0.8m non-conductive table. This table is positioned on an automated turn table.
2	Antennas are positioned 3m away from the EUT
3	EUT is configured to function with the default channel in the selected band
4	A peak and average scan was carried out at various azimuth angles and antenna heights fixed to 1m.
5	The highest level of Radiated Emission was recorded
6	These values are compared against the limit specified by the standard

6.2.7.3 RESULT

Frequency (MHz)	Horizontal level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Detector
2399.5	21.82	54	-32.18	Pass	Average
2395.0	20.65	54	-33.35	Pass	Average
2390.0	19.75	54	-34.25	Pass	Average
2483.5	23.57	54	-30.43	Pass	Average
2487.5	20.62	54	-33.38	Pass	Average
2495.5	21.97	54	-32.03	Pass	Average
2399.0	63.12	74	-10.88	Pass	Peak
2396.0	54.34	74	-19.66	Pass	Peak
2389.5	42.01	74	-31.99	Pass	Peak
2484.0	63.88	74	-10.12	Pass	Peak
2486.0	58.75	74	-15.25	Pass	Peak
2488.0	50.36	74	-23.64	Pass	Peak

Frequency (MHz)	Vertical level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Detector
2399.5	21.05	54	-32.95	Pass	Average
2395.0	20.23	54	-33.77	Pass	Average
2390.0	19.54	54	-34.46	Pass	Average
2483.5	23.57	54	-30.43	Pass	Average
2487.5	20.24	54	-33.76	Pass	Average
2495.5	20.03	54	-33.97	Pass	Average
2399.0	53.88	74	-20.12	Pass	Peak
2396.0	43.13	74	-30.87	Pass	Peak
2389.5	32.41	74	-41.59	Pass	Peak
2484.0	56.31	74	-17.69	Pass	Peak
2486.0	50.06	74	-23.94	Pass	Peak
2488.0	44.74	74	-29.26	Pass	Peak

6.2.8 BAND EDGE MEASUREMENTS CONDUCTED

6.2.8.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (d)	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
RSS-210	A8.5	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

6.2.8.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1) and High(13) channels of the 802.11g band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 100 KHz and Video Bandwidth to 100KHz
4	Select Span of 115 MHz and Sweep time of 1s in the Spectrum Analyzer
5	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
6	Based on the recorded value, the result is declared

6.2.8.3 RESULT (SUPPORTING GRAPHS / DATA)

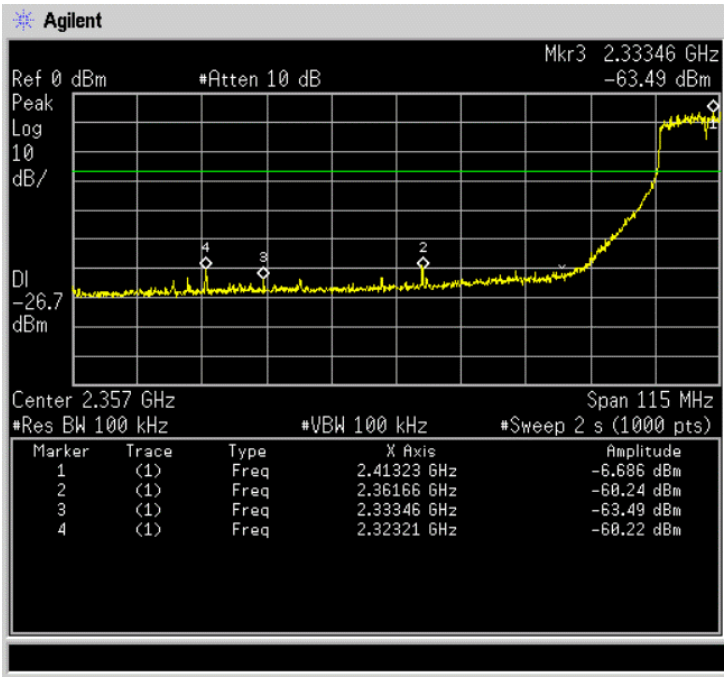


Figure 80: Low Band Edge – 802.11g, Low channel (1)

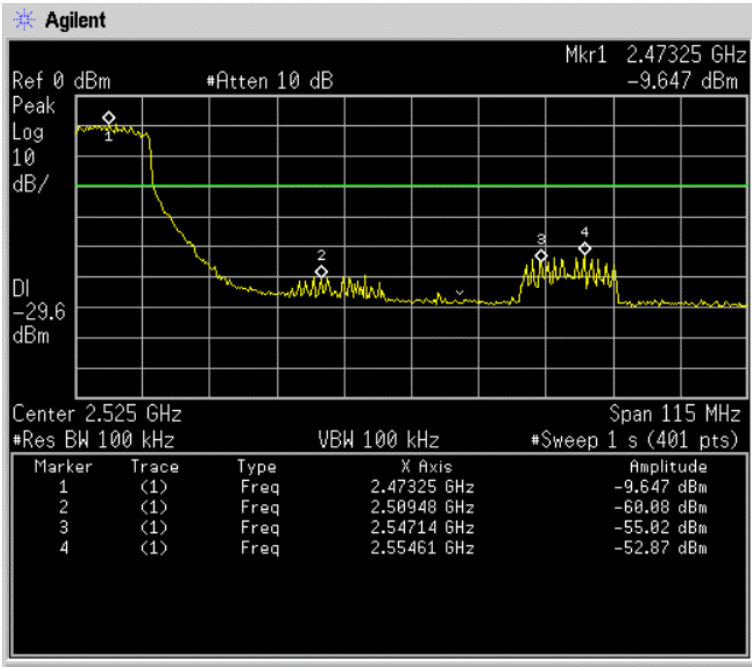


Figure 81: High Band Edge – 802.11g, High channel (13)

6.2.9 OCCUPIED BANDWIDTH MEASUREMENTS

6.2.9.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
RSS Gen	4.6.1	Occupied Bandwidth (OBW) is the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency.

6.2.9.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11g band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 100 KHz and Video Bandwidth to 300KHz
4	Select Span of 18 MHz and Sweep time of 1s in the Spectrum Analyzer
5	Based on the recorded value, the result is declared

6.2.9.3 RESULT (SUPPORTING GRAPHS / DATA)

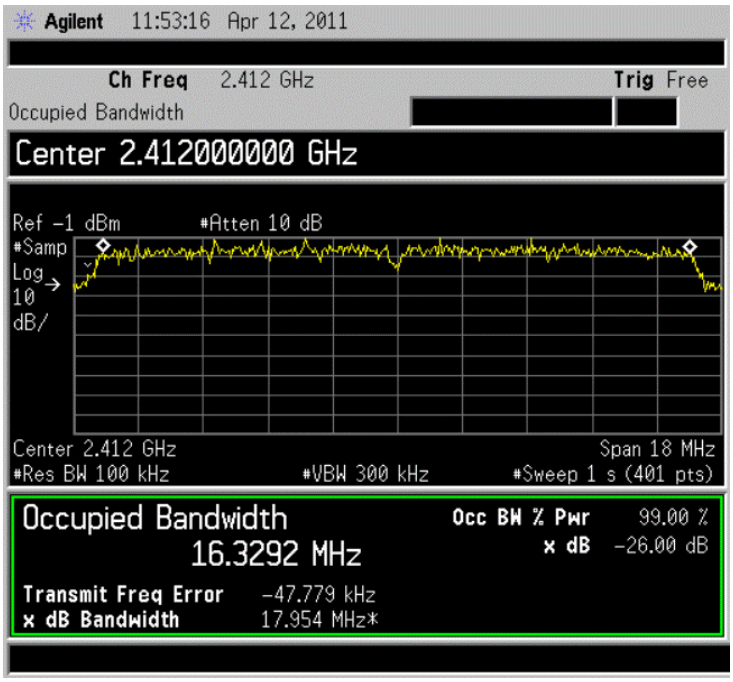


Figure 82: Occupied Bandwidth Measurement – 802.11g, Low channel (1)

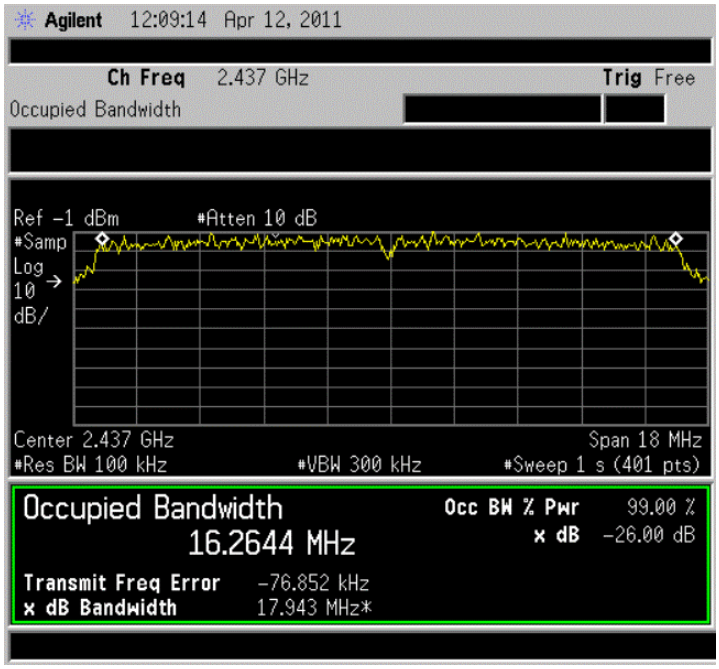


Figure 83: Occupied Bandwidth Measurement – 802.11g, Mid channel (6)

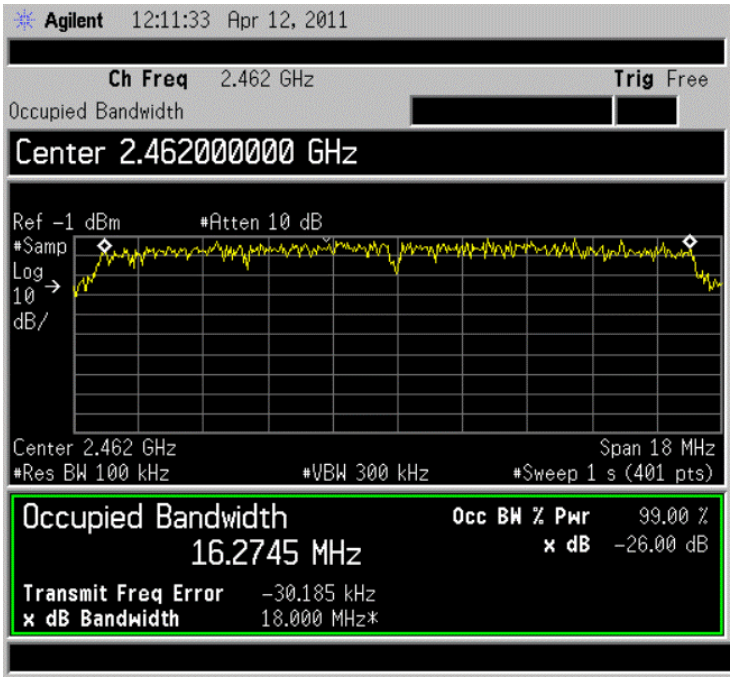


Figure 84: Occupied Bandwidth Measurement – 802.11g, High channel (11)

6.3 WI-FI 801.11N MODE

6.3.1 RESTRICTED BAND OF OPERATION

6.3.1.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limits
FCC Part 15, Subpart C	15.205	In the operating range of this product, the limits are: f_L > 2.39 GHz, f_H < 2.4835 GHz
RSS-210 (Refers to) RSS-GEN	2.2 7.2.2	In the operating range of this product, the limits are: f_L > 2.39 GHz, f_H < 2.655 GHz

f_L = Lower operating frequency range
f_H = Higher operating frequency range

6.3.1.2 TEST PROCEDURE

S. No	Procedure
1	Connect the transmitter output to a Spectrum Analyzer
2	Select the lowest possible channel of the carrier (Eg. 1st channel)
3	Measure the frequency at 30dBm below the peak power at this carrier and record this as f_L
4	Select the highest possible channel of the carrier (Eg. 13th channel)
5	Measure the higher frequency at 30dBm below the peak power at this carrier and record this as f_H

Note: While it may be sufficient that the center frequency of the carrier is within the limits, the lower and higher frequencies of the carrier envelop have been taken into account for this measurement.

6.3.1.3 RESULT

Parameter	Limit	Measured	Result
f_L	Min 2.39 GHz (FCC and RSS-210)	2.401125	Pass
f_H	Max 2.4835 GHz (FCC)	2.482750	Pass
f_H	Max 2.655 GHz (RSS-210)	2.482750	Pass

6.3.1.4 RESULT (SUPPORTING GRAPHS / DATA)

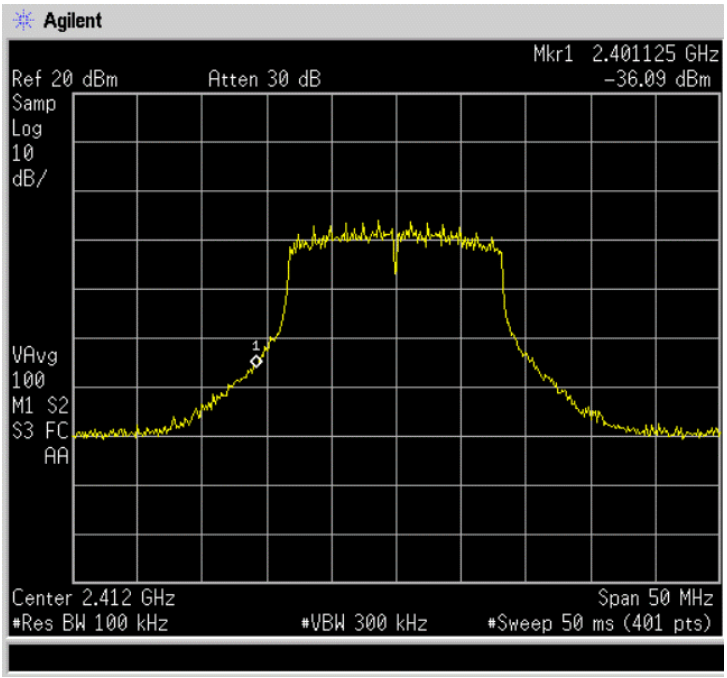


Figure 85: Measured f_L at Channel 1 – 802.11n

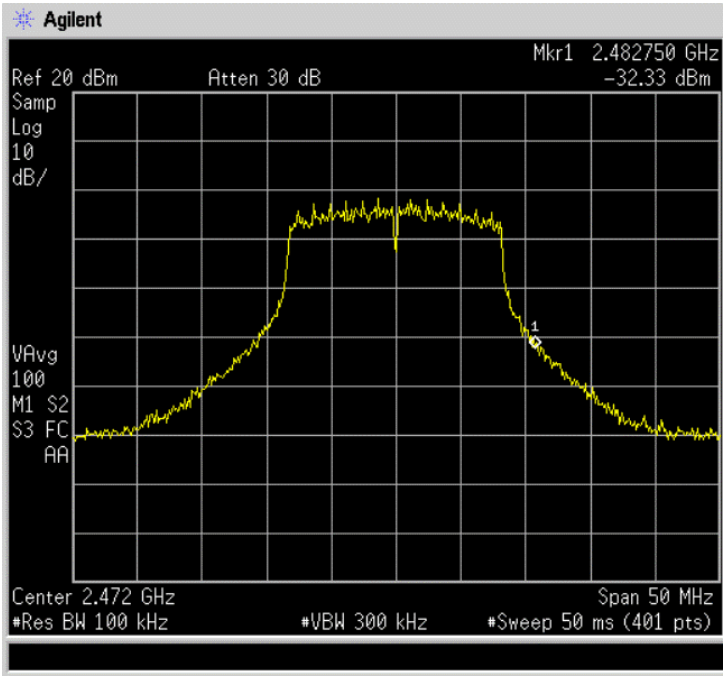


Figure 86: Measured f_H at Channel 13 – 802.11n

6.3.2 RADIATED EMISSION

6.3.2.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Frequency range	Max Limit (dBµV/m) at 3 meter
FCC Part 15, Subpart C	15.209	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0
RSS-210 (Refers to) RSS-GEN	2.6 7.2.5	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0

6.3.2.2 TEST PROCEDURE

S. No	Procedure
1	Test procedure is as per ANSI C63.4: 2000
2	EUT is placed on a 0.8m non-conductive table. This table is positioned on an automated turn table.
3	Antennas are positioned 3m away from the EUT
4	EUT is configured to function with the default channel in the selected band
5	A peak scan was carried out at various azimuth angles and antenna heights ranging from 1m to 4m.
6	The highest level of Radiated Emission was recorded
7	Quasi-peak measurements were carried out at the identified peaks for <1GHz and Average measurements were carried out above 1GHz
8	These values are compared against the limit specified by the standard

6.3.2.3 RESULT

Parameter	Limit	Measured	Result
Radiated Emission	Refer 6.1.2.1	Refer 6.1.2.4	Pass

6.3.2.4 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 1

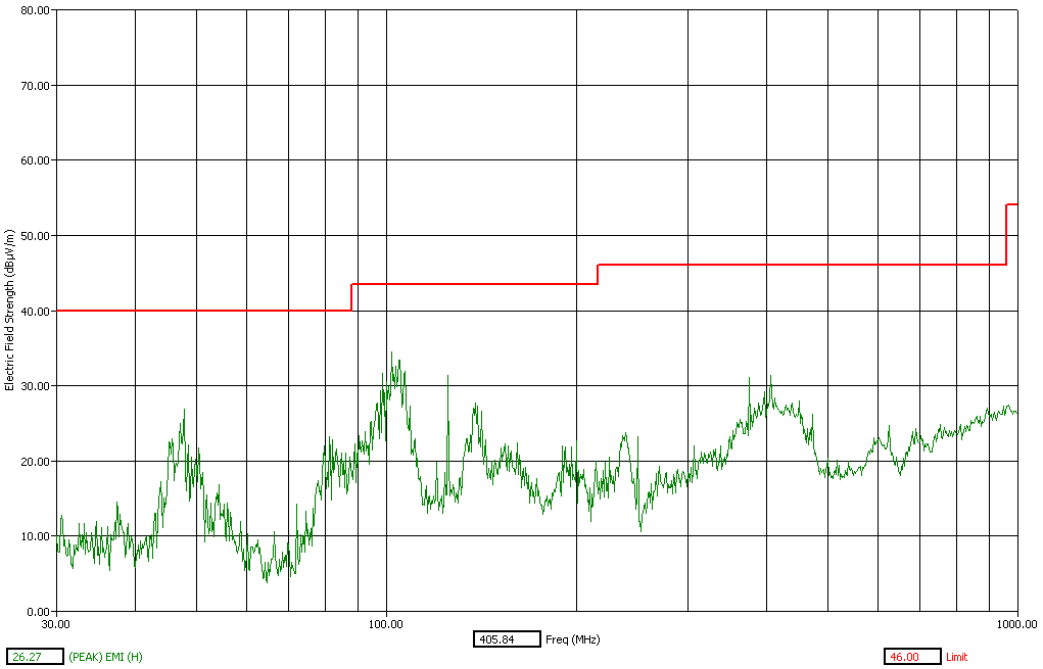


Figure 87: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11n, Channel 1

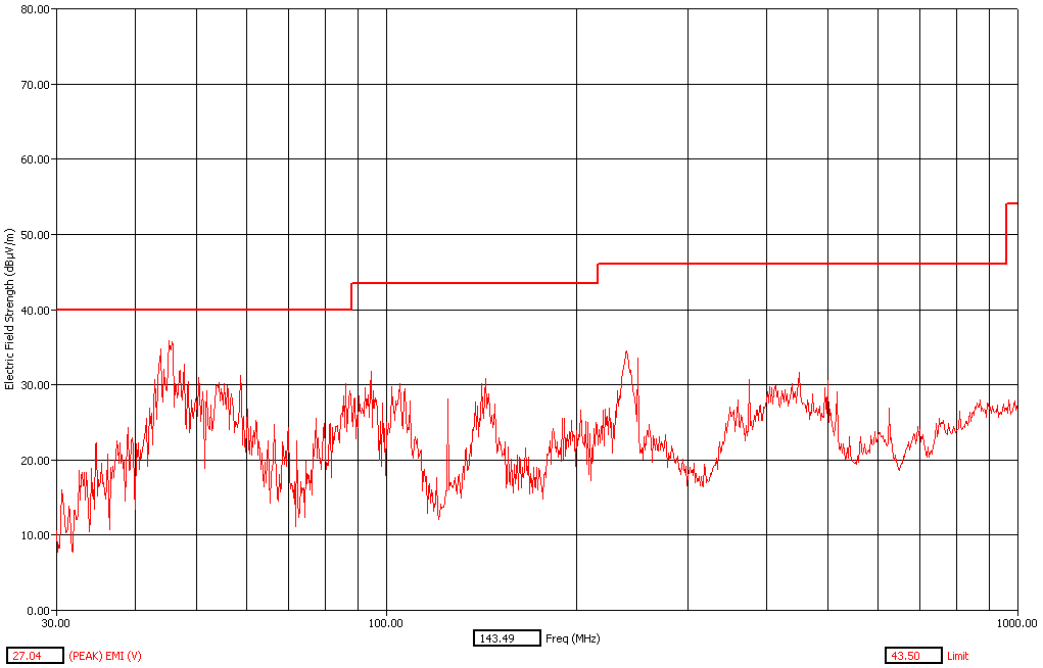


Figure 88: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11n, Channel 1

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
45.75	V	35.17	40.00	-4.83	260.90	100.00	55.69	2.07	9.85	32.43
101.85	H	33.76	43.50	-9.74	258.10	337.00	54.43	3.08	8.60	32.36
125.00	H	31.90	43.50	-11.60	94.00	149.00	50.07	3.41	10.80	32.39
125.00	V	25.13	43.50	-18.37	113.30	161.00	41.30	3.41	12.80	32.39
250.00	V	31.84	46.00	-14.16	317.10	100.00	47.37	4.90	11.80	32.23
375.00	H	35.59	46.00	-10.41	250.70	103.00	47.38	5.96	15.00	32.75

Figure 89: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11n, Channel 1

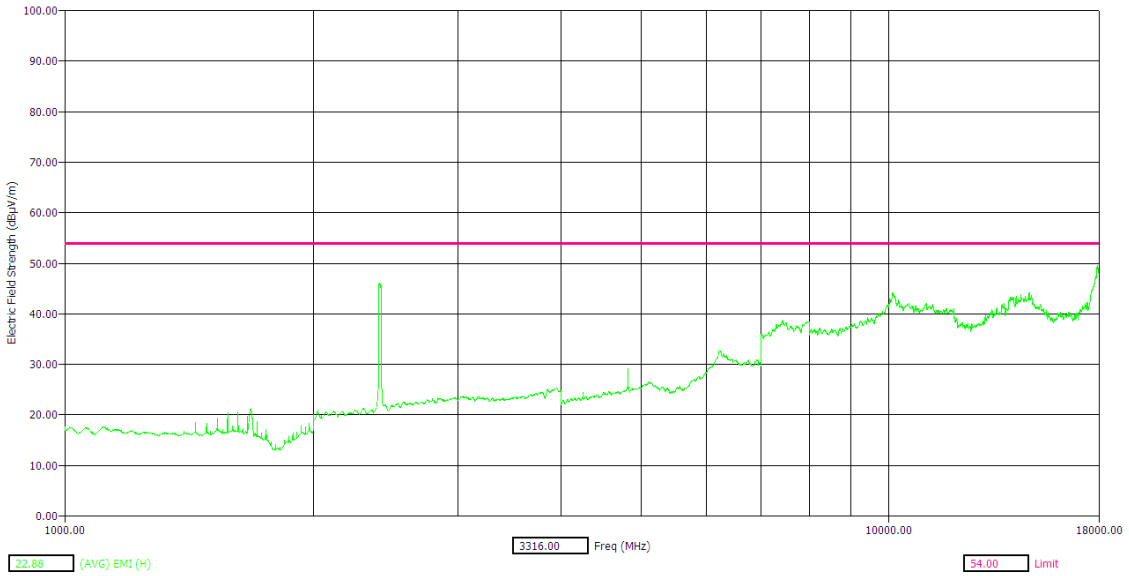


Figure 90: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 18 GHz – 802.11n, Channel 1

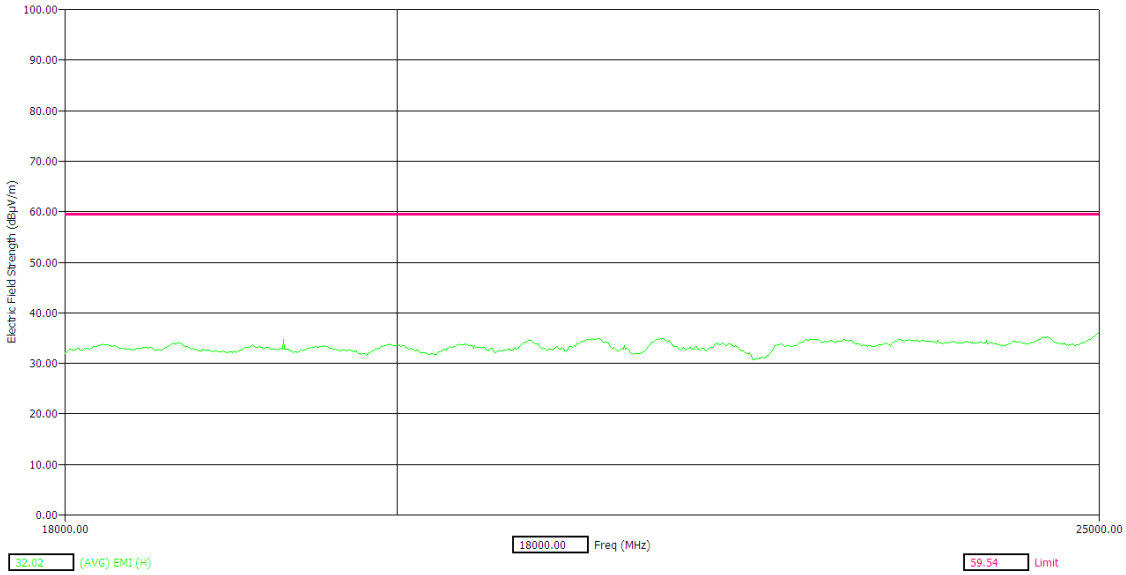


Figure 91: Radiated Emission (Average) – Horizontal polarization – 18 GHz to 25 GHz – 802.11n, Channel 1

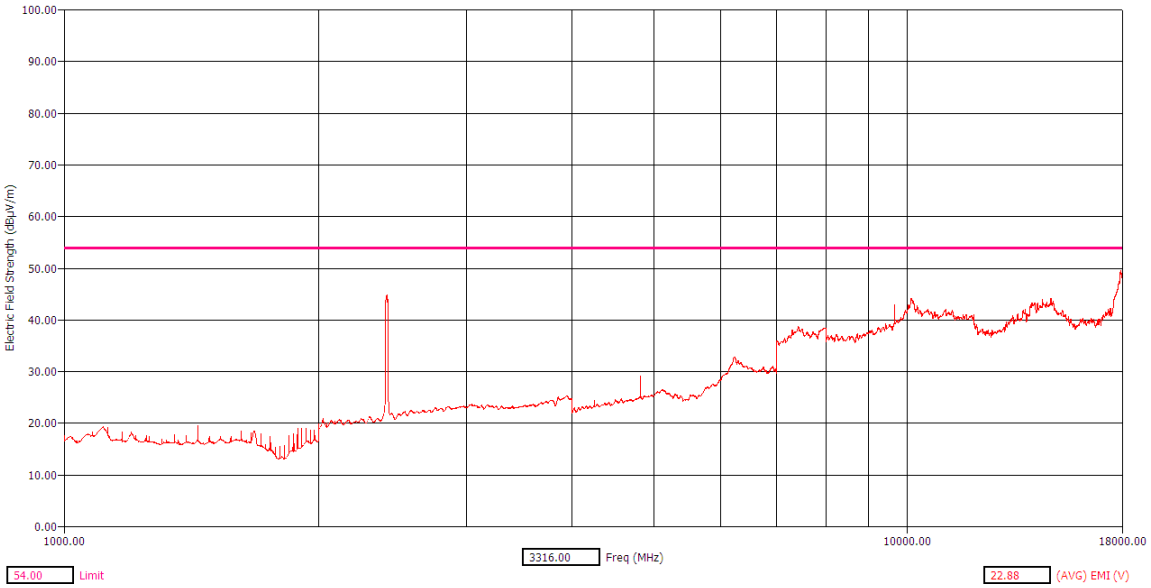


Figure 92: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11n, Channel 1

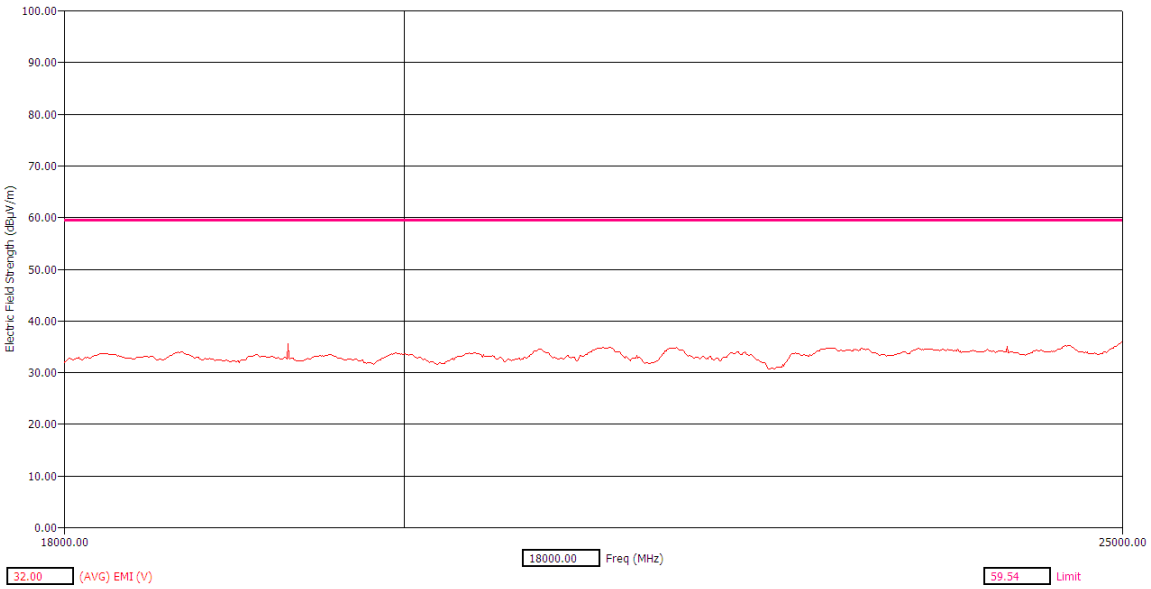


Figure 93: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11n, Channel 1

6.3.2.5 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 6

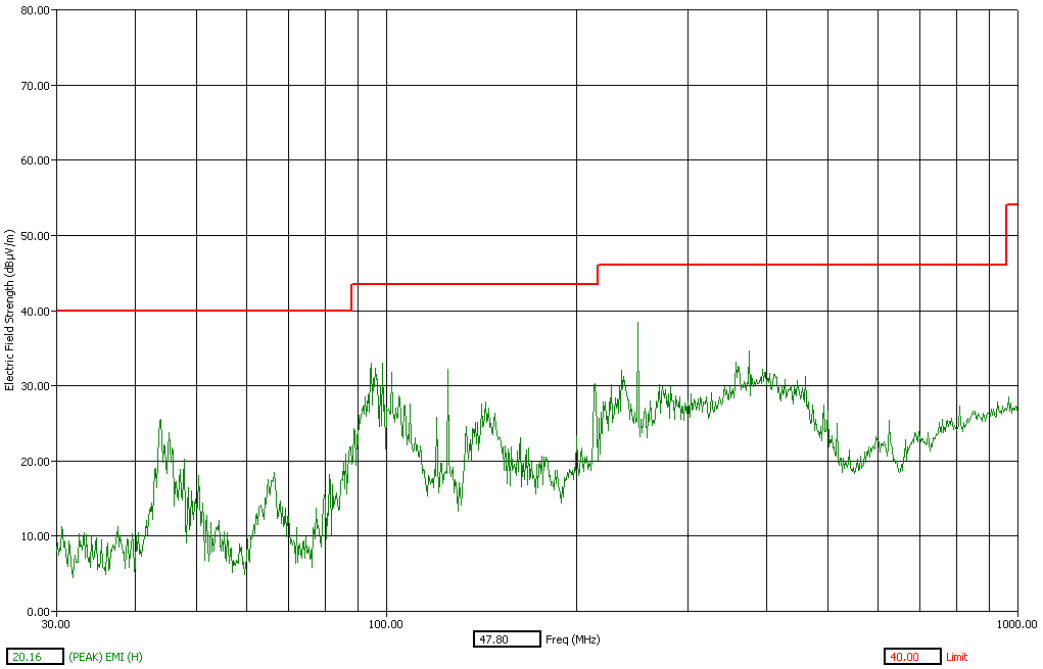


Figure 94: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11n, Channel 6

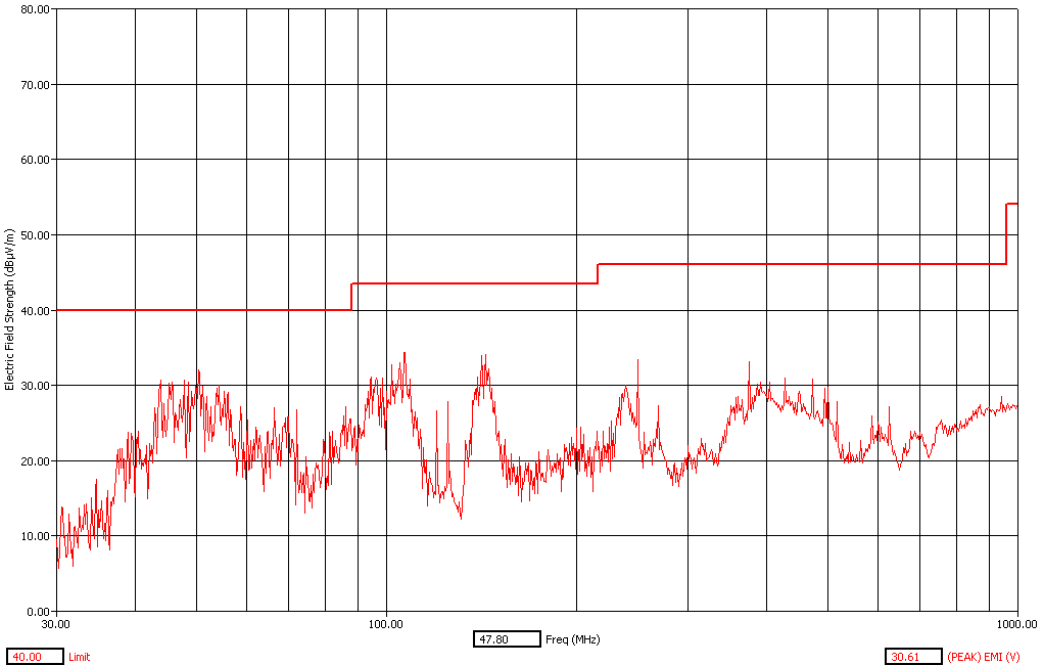


Figure 95: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11n, Channel 6

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
43.80	V	29.90	40.00	-10.10	292.80	100.00	50.49	2.03	9.82	32.44
47.80	V	23.92	40.00	-16.08	85.70	100.00	44.25	2.11	9.97	32.41
125.00	H	34.17	43.50	-9.33	105.20	265.00	52.35	3.41	10.80	32.39
125.00	V	22.15	43.50	-21.35	205.80	103.00	38.32	3.41	12.80	32.39
250.00	V	33.86	46.00	-12.14	54.90	100.00	49.39	4.90	11.80	32.23
250.05	H	38.21	46.00	-7.79	98.70	135.00	54.33	4.90	11.20	32.23

Figure 96: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11n, Channel 6

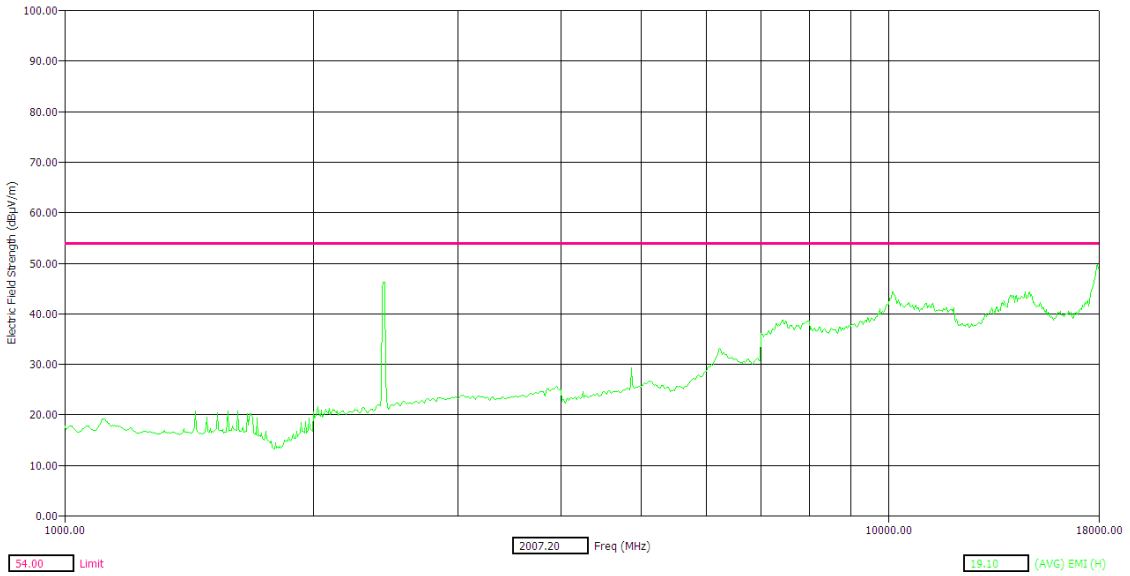


Figure 97: Radiated Emission (Average) – Horizontal polarization – 1 GHz to 18 GHz – 802.11n, Channel 6

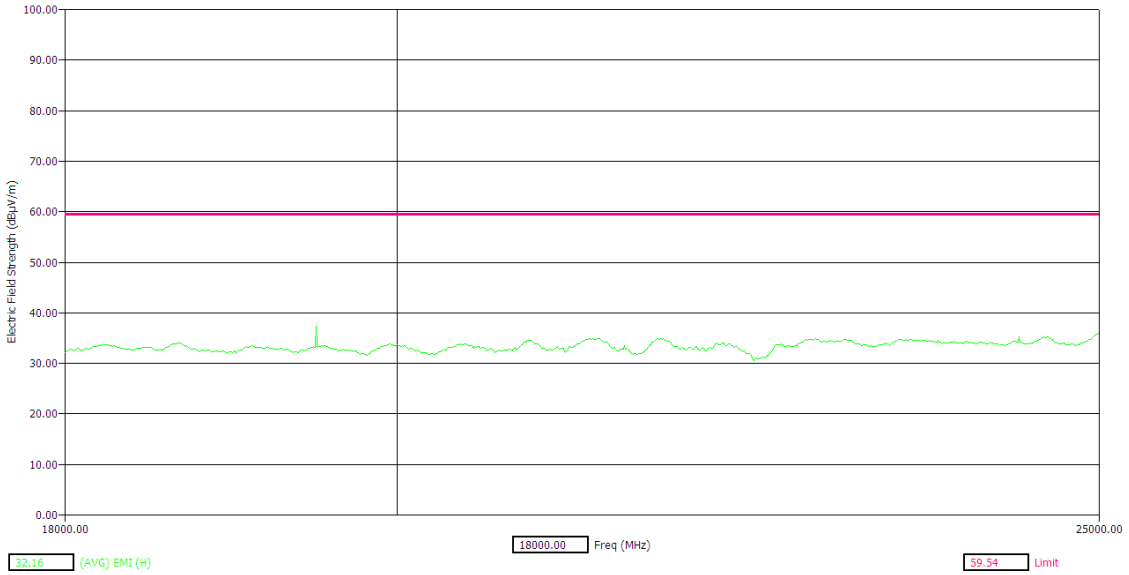


Figure 98: Radiated Emission (Average) – Horizontal polarization 18 GHz to 25 GHz – 802.11n, Channel 6

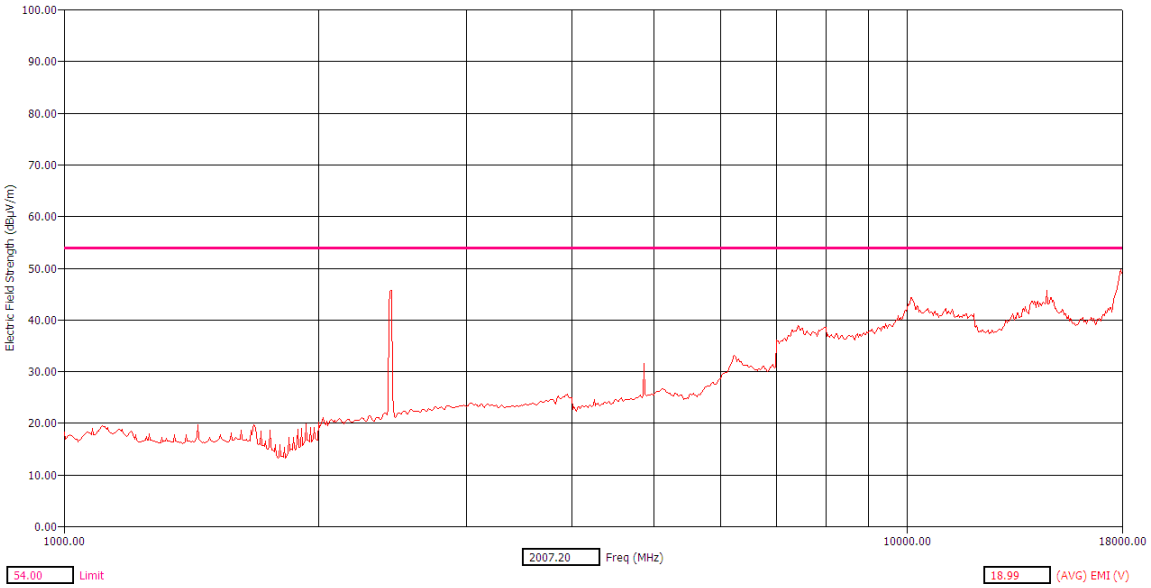


Figure 99: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11n, Channel 6

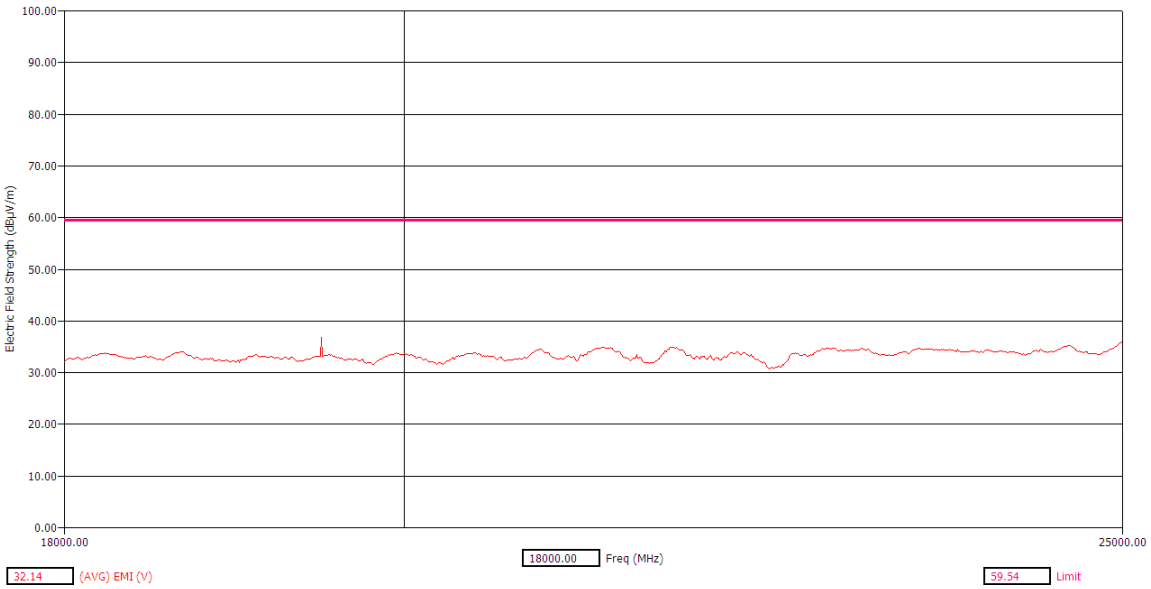


Figure 100: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11n, Channel 6

6.3.2.6 RESULT (SUPPORTING GRAPHS / DATA) – CHANNEL 11

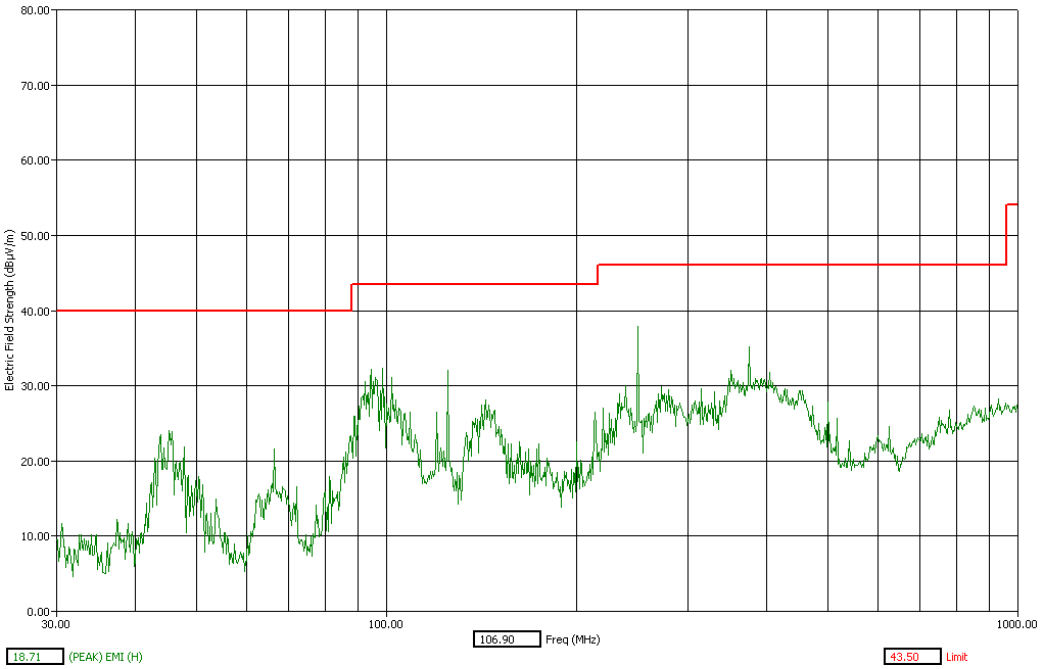


Figure 101: Radiated Emission (Peak) – Horizontal polarization – 30 MHz to 1 GHz – 802.11n, Channel 11

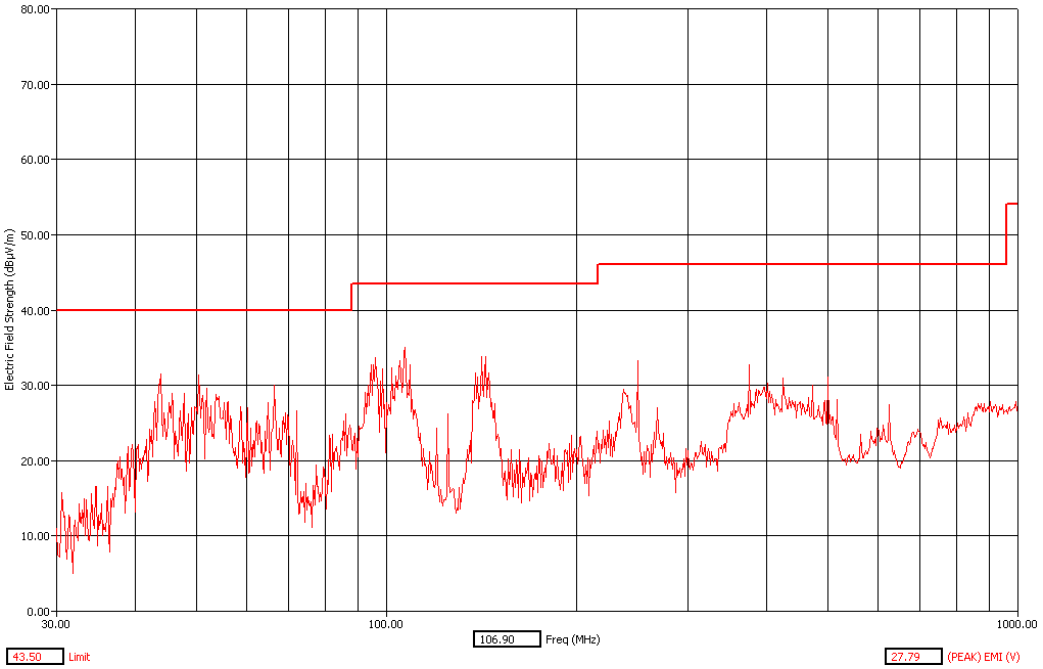


Figure 102: Radiated Emission (Peak) – Vertical polarization – 30 MHz to 1 GHz – 802.11n, Channel 11

Freq (MHz)	Pol	(QP) EMI (dBµV/m)	Limit (dBµV/m)	(QP) Margin (dB)	EUT Ttbl Agl (deg)	Twr Ht (cm)	(QP) Trace (dBµV)	Cable (dB)	Transducer (dB)	Preamp (dB)
43.80	V	29.35	40.00	-10.65	321.90	103.00	49.94	2.03	9.82	32.44
106.75	V	32.64	43.50	-10.86	266.80	100.00	52.20	3.15	9.68	32.39
125.00	H	32.44	43.50	-11.06	76.90	277.00	50.62	3.41	10.80	32.39
125.00	V	20.28	43.50	-23.22	246.20	112.00	36.46	3.41	12.80	32.39
250.05	H	39.09	46.00	-6.91	87.50	136.00	55.22	4.90	11.20	32.23
250.05	V	33.56	46.00	-12.44	297.70	100.00	49.09	4.90	11.80	32.23
375.05	H	35.70	46.00	-10.30	278.30	100.00	47.48	5.96	15.00	32.75

Figure 103: Radiated Emission – Quasi-peak table - 30 MHz to 1 GHz – 802.11n, Channel 11

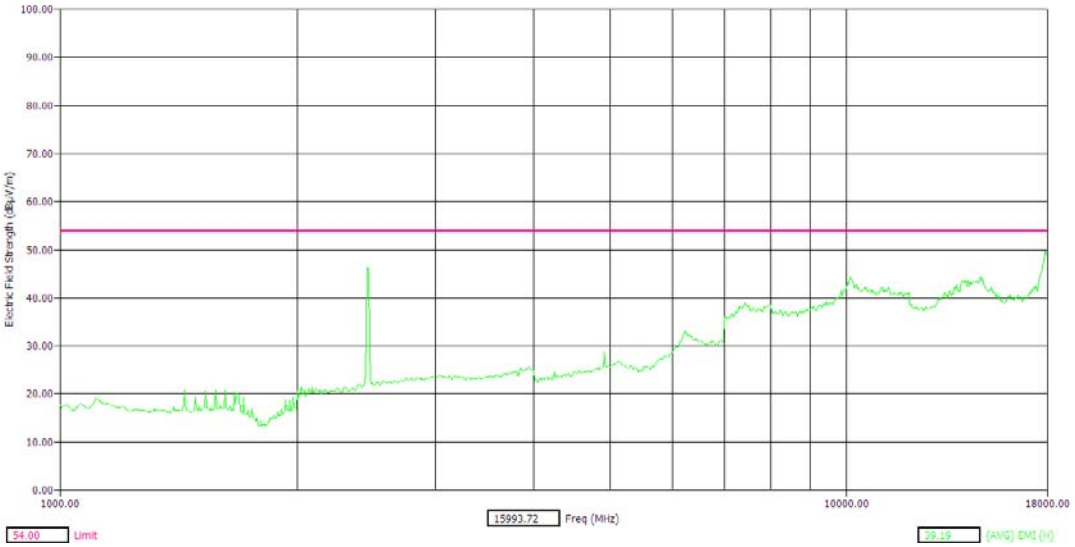


Figure 104: Radiated Emission (Average) – Horizontal polarization – 1GHz to 18GHz – 802.11n, Channel 11

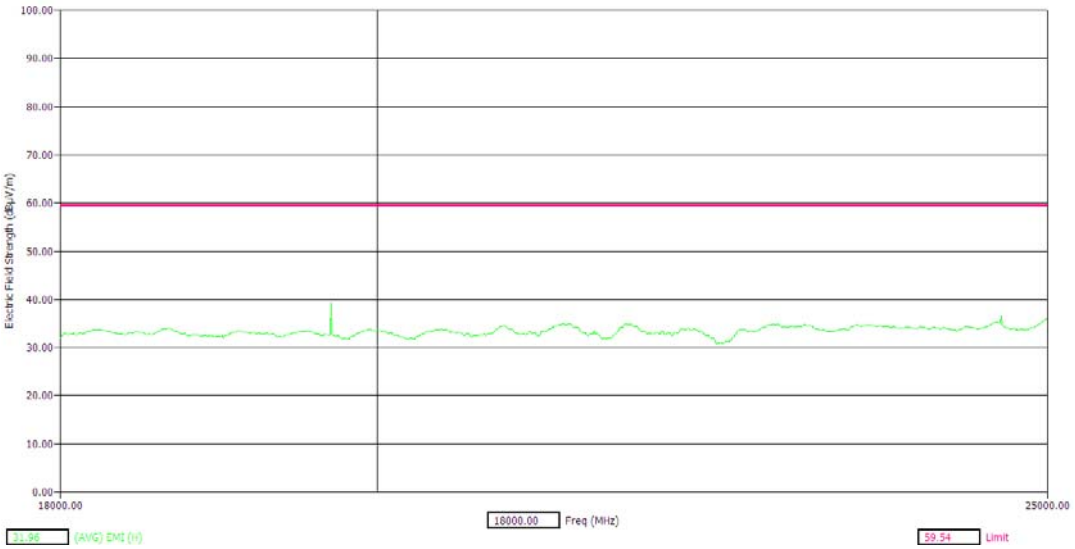


Figure 105: Radiated Emission (Average) – Horizontal polarization 18 GHz to 25 GHz – 802.11n, Channel 11

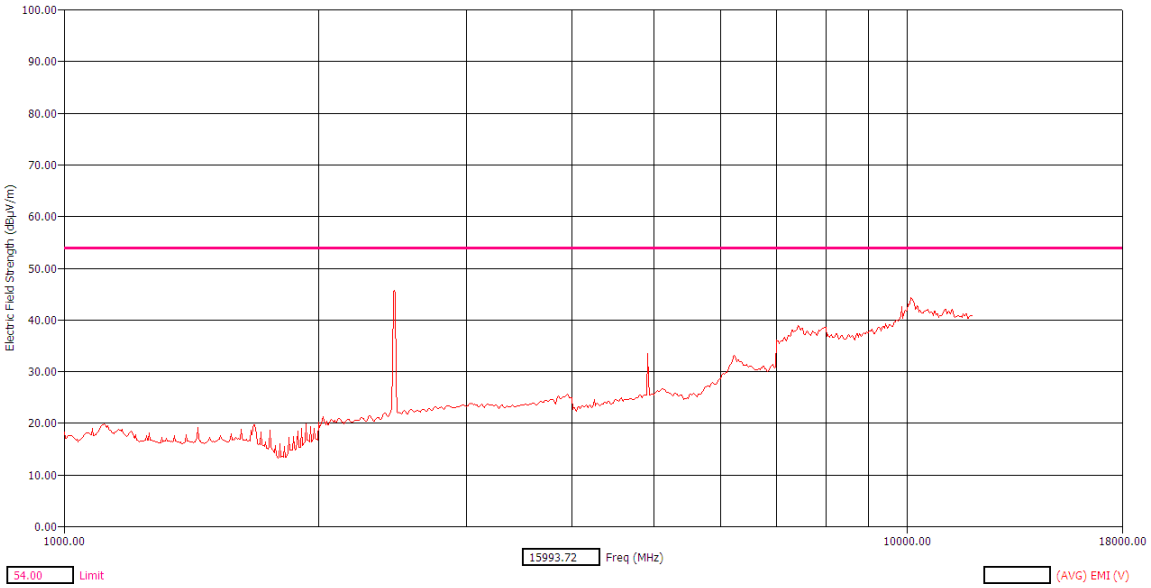


Figure 106: Radiated Emission (Average) – Vertical polarization – 1 GHz to 18 GHz – 802.11n, Channel 11

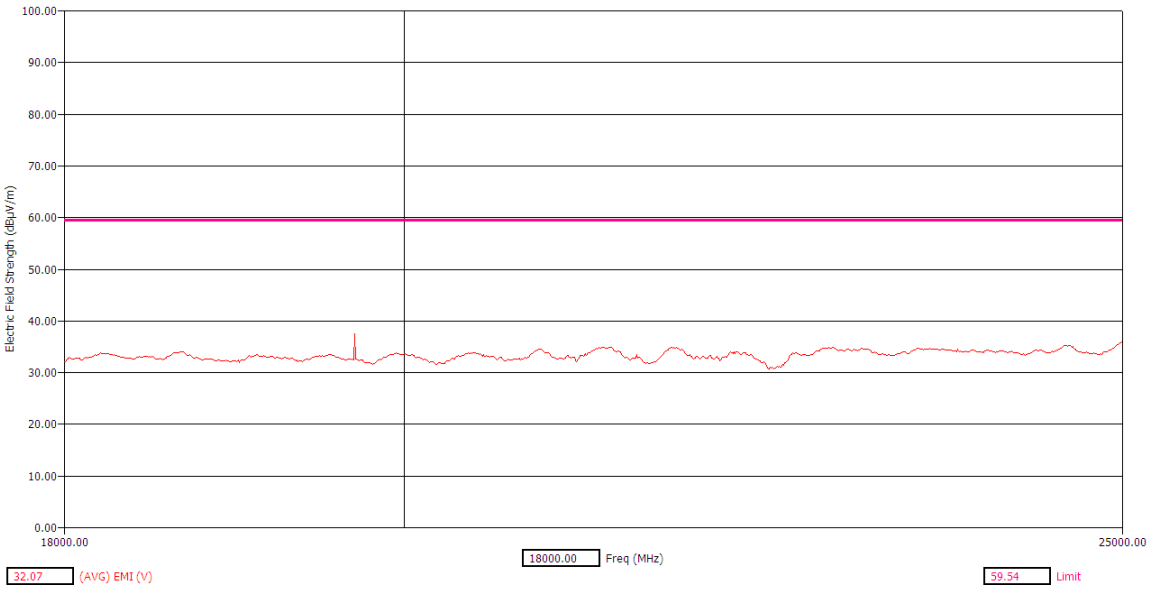


Figure 107: Radiated Emission (Average) – Vertical polarization – 18 GHz to 25 GHz – 802.11n, Channel 11

6.3.3 6dB BANDWIDTH

6.3.3.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (a) (2)	The 6dB bandwidth > 500 KHz
RSS-210	A8.2	The 6dB bandwidth > 500 KHz

6.3.3.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11n band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Detect the carrier envelop in the Spectrum Analyzer
4	The 6dB bandwidth below the peak power was calculated on the envelop
5	This measured bandwidth is compared against the limit and the result declared

6.3.3.3 RESULT

Band, Channel	Frequency (GHz)	Limit	Measured	Result
802.11n, 1 (Low)	2.412	500 KHz or more	16.0 MHz	Pass
802.11n, 6 (Mid)	2.437	500 KHz or more	15.5 MHz	Pass
802.11n, 11 (High)	2.462	500 KHz or more	16.5 MHz	Pass

6.3.3.4 RESULT (SUPPORTING GRAPHS / DATA)

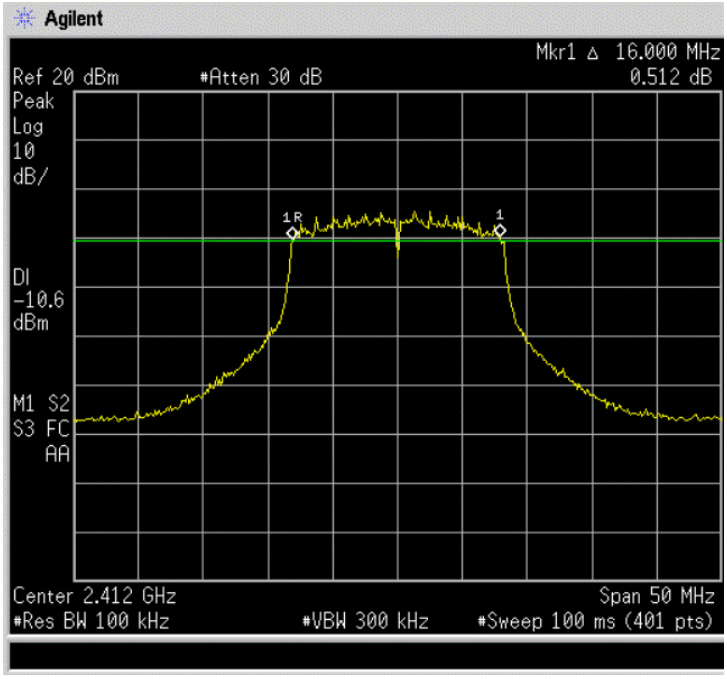


Figure 108: 6dB bandwidth – 802.11n, Low channel (1)

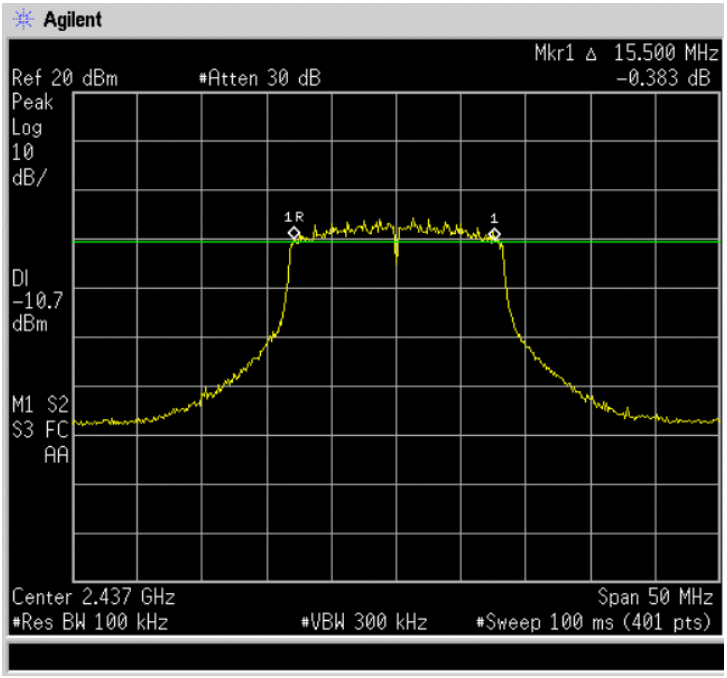


Figure 109: 6dB bandwidth – 802.11n, Mid channel (6)

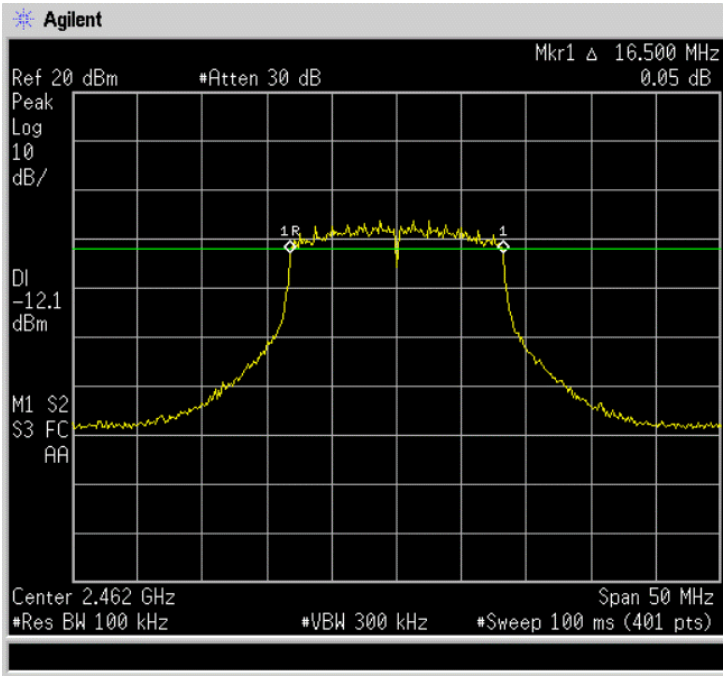


Figure 110: 6dB bandwidth – 802.11n, High channel (11)

6.3.4 PEAK CONDUCTED OUTPUT POWER

6.3.4.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (b) (3)	Peak conducted output power < 1 Watt
RSS-210	A8.4 (4)	Peak conducted output power < 1 Watt

6.3.4.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11n band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Appropriate Digital Transmission System test procedure is followed as per FCC recommendation. In this case, Option 2, Method 3 was selected based on the bandwidth of the carrier.
4	Add the measured cable loss of the cable that was used for the measurement (1.8dB)
5	This measured value is compared against the limit and the result declared

6.3.4.3 RESULT

Band, Channel	Frequency (GHz)	Measured power (dBm)	Cable loss (dB)	Total power (dBm)	Total power (mW)	Limit (mW)	Result
802.11n, 1 (Low)	2.412	-6.55	1.8	-4.75	0.334	1000	Pass
802.11n, 6 (Mid)	2.437	-7.56	1.8	-5.76	0.265	1000	Pass
802.11n, 11 (High)	2.462	-8.55	1.8	-6.75	0.211	1000	Pass

Note: Transmit duty cycle considered is = 1
No antenna gain is considered as this is conducted measurement without antenna

6.3.4.4 RESULT (SUPPORTING GRAPHS / DATA)

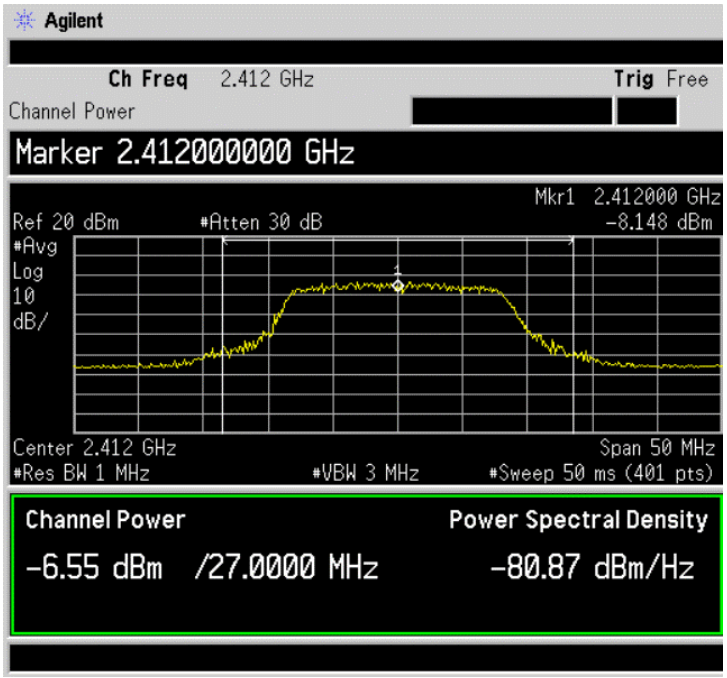


Figure 111: Peak conducted output power – 802.11n, Low channel (1)

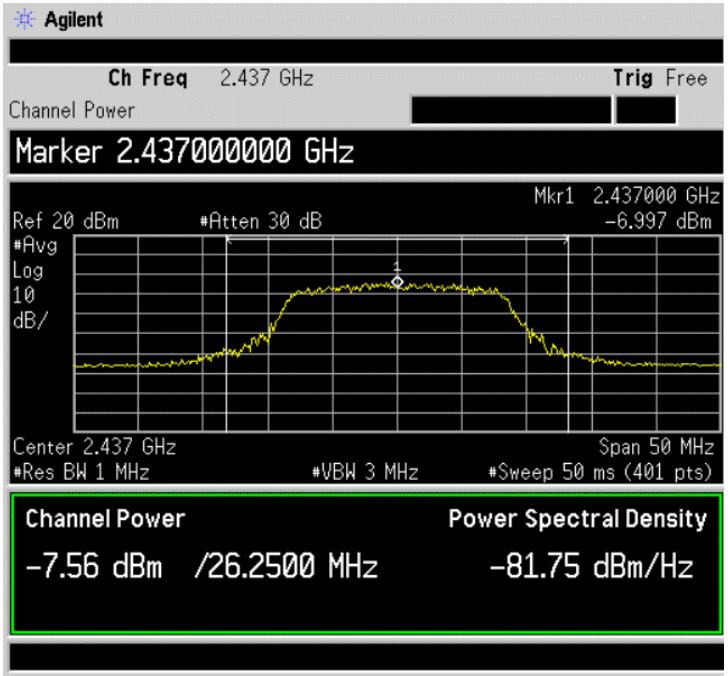


Figure 112: Peak conducted output power – 802.11n, Mid channel (6)

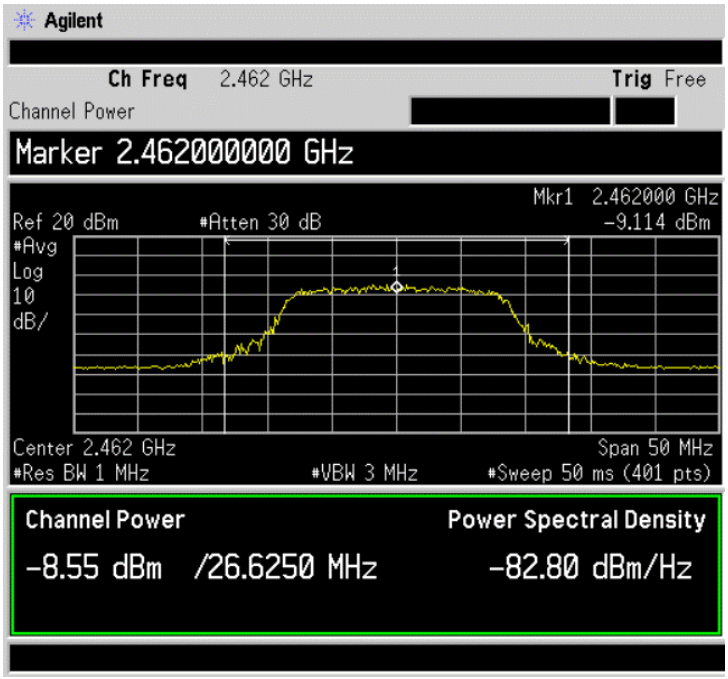


Figure 113: Peak conducted output power – 802.11n, High channel (11)

6.3.5 CONDUCTED SPURIOUS EMISSION

6.3.5.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (d)	In any 100KHz band outside the intentional band, emissions shall be 30dB below the peak power
RSS-210	A8.5	In any 100KHz band outside the intentional band, emissions shall be 30dB below the peak power

6.3.5.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11n band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	Set the start frequency on the Spectrum Analyzer as 40 MHz
4	Set the start frequency on the Spectrum Analyzer as 26.5 GHz
5	Examine the complete band for any spurious emissions that exceed the value that is 30dB below the peak power in the intentional band
6	Based on the measured spurious emissions outside the intentional band, the result is declared

6.3.5.3 RESULT

Band, Channel	Limit	Measured	Result
802.11n, 1 (Low)	30db below the peak power measured	Refer 6.1.5.4	Pass
802.11n, 6 (Mid)			
802.11n, 11 (High)			

6.3.5.4 RESULT (SUPPORTING GRAPHS / DATA)

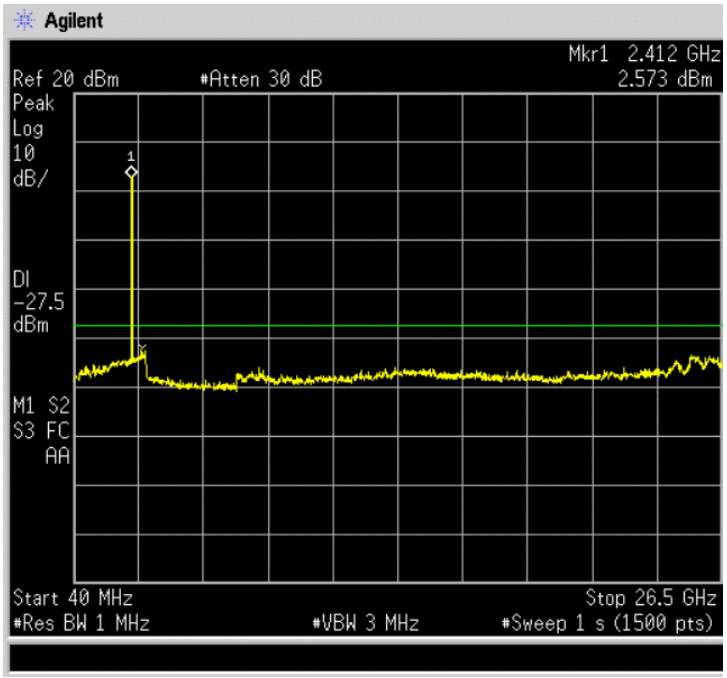


Figure 114: Conducted Spurious Emission – 802.11n, Low channel (1)

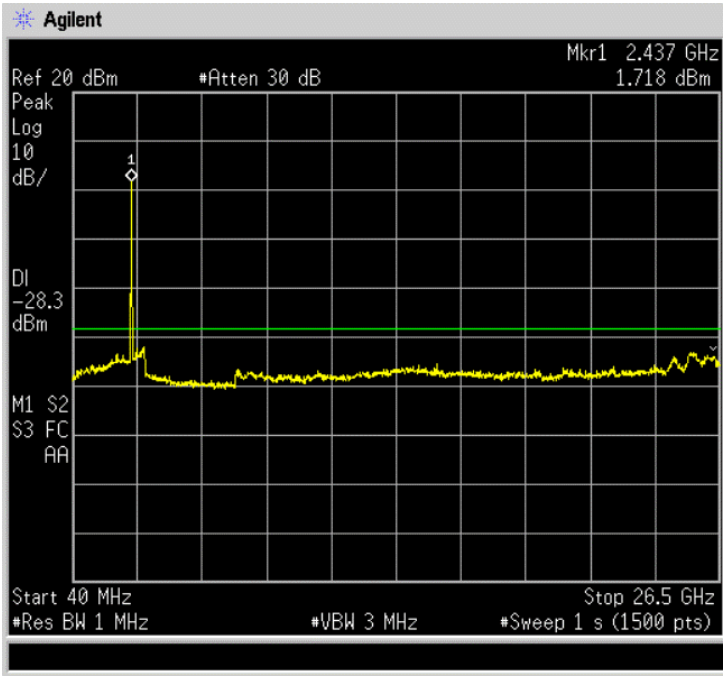


Figure 115: Conducted Spurious Emission – 802.11n, Mid channel (6)

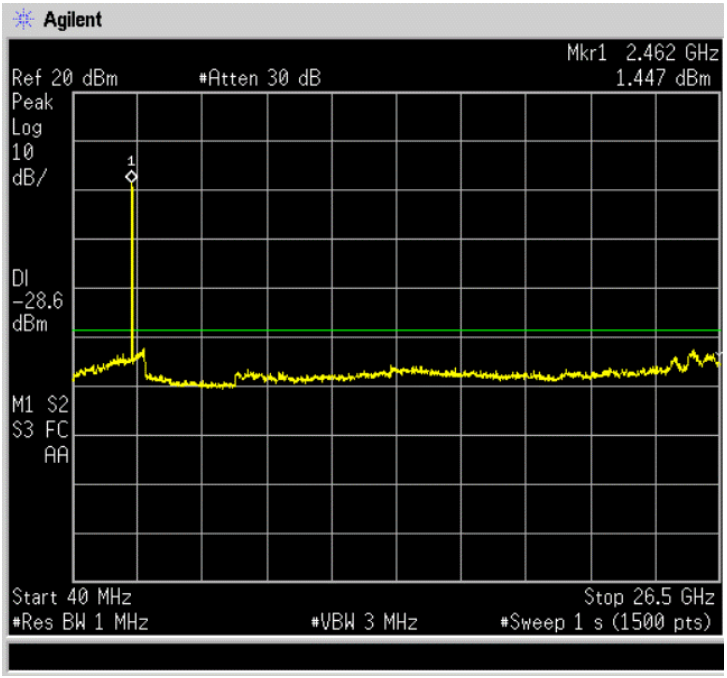


Figure 116: Conducted Spurious Emission – 802.11n, High channel (11)

6.3.6 POWER SPECTRAL DENSITY

6.3.6.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (e)	Conducted power spectral density shall not be greater than 8 dBm in any 3 kHz band
RSS-210	A8.2 (b)	Conducted power spectral density shall not be greater than 8 dBm in any 3 kHz band

6.3.6.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11n band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT
3	In the Spectrum Analyzer set Resolution Bandwidth to 3 KHz and Video Bandwidth to 300KHz
4	Select Span of 300 KHz and Sweep time of 100s in the Spectrum Analyzer
5	Record the peak power shown as power spectral density
6	Based on the recorded value, the result is declared

6.3.6.3 RESULT

Band, Channel	Limit	Channel	Frequency (GHz)	Measured (dBm)	Result
802.11n, 1 (Low)	8 dBm	1	2.412	-24.75	Pass
802.11n, 6 (Mid)	8 dBm	6	2.437	-26.15	Pass
802.11n, 11 (High)	8 dBm	11	2.462	-26.98	Pass

6.3.6.4 RESULT (SUPPORTING GRAPHS / DATA)

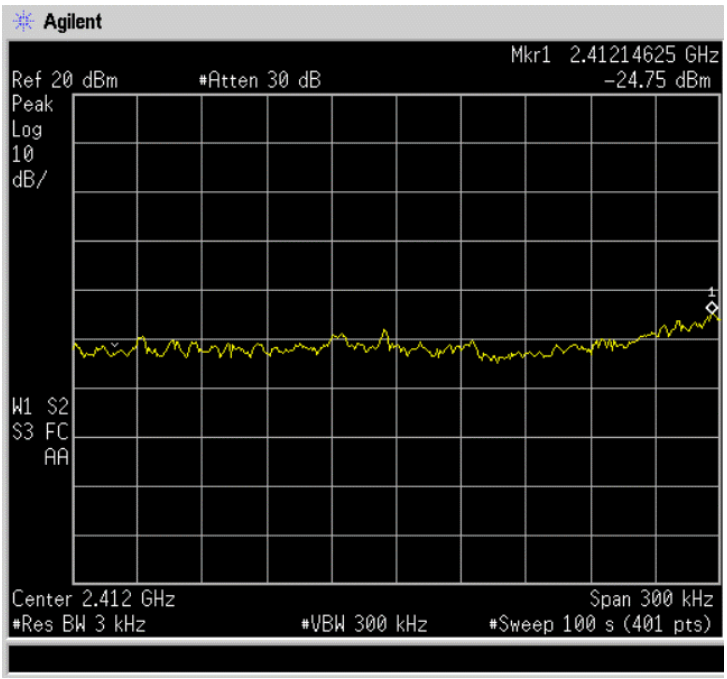


Figure 117: Power Spectral Density – 802.11n, Low channel (1)

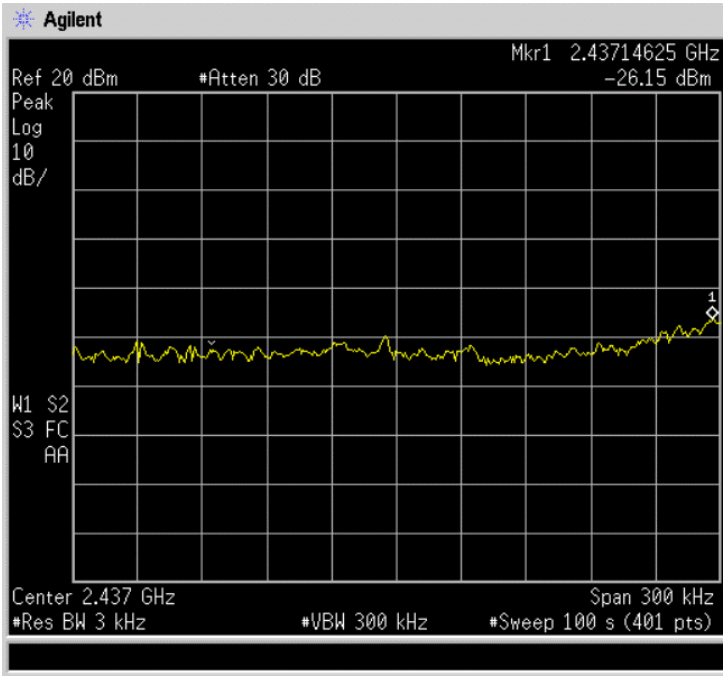


Figure 118: Power Spectral Density – 802.11n, Mid channel (6)

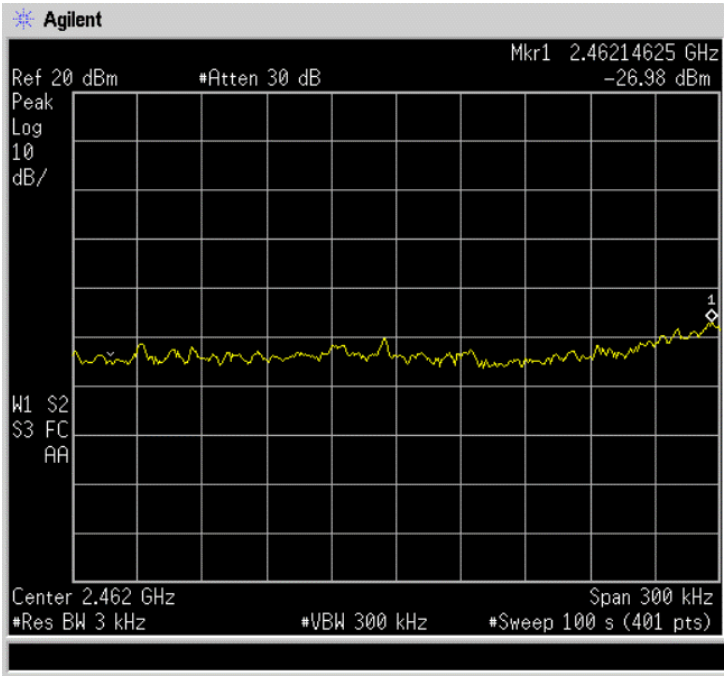


Figure 119: Power Spectral Density – 802.11n, High channel (11)

6.3.7 BAND EDGE MEASUREMENTS RADIATED

6.3.7.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Frequency range	Max Average Limit (dBµV/m) at 3 meter	Max Peak Limit (dBµV/m) at 3 meter
FCC Part 15, Subpart C	15.209	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0	60.0 63.5 66.0 74.0 74.0
RSS-210 (Refers to) RSS-GEN	A8.5 7.2.5	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 1 GHz Above 1 GHz	40.0 43.5 46.0 54.0 54.0	60.0 63.5 66.0 74.0 74.0

6.3.7.2 TEST PROCEDURE

S. No	Procedure
1	EUT is placed on a 0.8m non-conductive table. This table is positioned on an automated turn table.
2	Antennas are positioned 3m away from the EUT
3	EUT is configured to function with the default channel in the selected band
4	A peak and average scan was carried out at various azimuth angles and antenna heights fixed to 1m.
5	The highest level of Radiated Emission was recorded
6	These values are compared against the limit specified by the standard

6.3.7.3 RESULT

Frequency (MHz)	Horizontal level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Detector
2399.5	21.84	54	-32.16	Pass	Average
2396.5	20.99	54	-33.01	Pass	Average
2390.0	19.65	54	-34.35	Pass	Average
2483.5	23.51	54	-30.49	Pass	Average
2497.0	21.94	54	-32.06	Pass	Average
2499.5	21.75	54	-32.25	Pass	Average
2399.0	66.93	74	-07.07	Pass	Peak
2397.5	60.61	74	-13.39	Pass	Peak
2394.0	50.39	74	-23.61	Pass	Peak
2484.5	64.06	74	-09.94	Pass	Peak
2486.0	57.16	74	-16.84	Pass	Peak
2491.0	41.78	74	-32.22	Pass	Peak

Frequency (MHz)	Vertical level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result	Detector
2399.5	21.03	54	-32.97	Pass	Average
2396.5	20.39	54	-33.61	Pass	Average
2390.0	19.49	54	-34.51	Pass	Average
2483.5	20.27	54	-33.73	Pass	Average
2497.0	20.02	54	-33.98	Pass	Average
2499.5	19.85	54	-34.15	Pass	Average
2399.5	53.08	74	-20.92	Pass	Peak
2397.5	46.23	74	-27.77	Pass	Peak
2394.0	39.49	74	-34.51	Pass	Peak
2484.5	52.11	74	-21.89	Pass	Peak
2486.5	51.85	74	-22.15	Pass	Peak
2491.0	35.44	74	-38.56	Pass	Peak

6.3.8 BAND EDGE MEASUREMENTS CONDUCTED

6.3.8.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
FCC Part 15, Subpart C	15.247 (d)	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
RSS-210	A8.5	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

6.3.8.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1) and High(13) channels of the 802.11n band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 100 KHz and Video Bandwidth to 100KHz
4	Select Span of 115 MHz and Sweep time of 1s in the Spectrum Analyzer
5	Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
6	Based on the recorded value, the result is declared

6.3.8.3 RESULT (SUPPORTING GRAPHS / DATA)

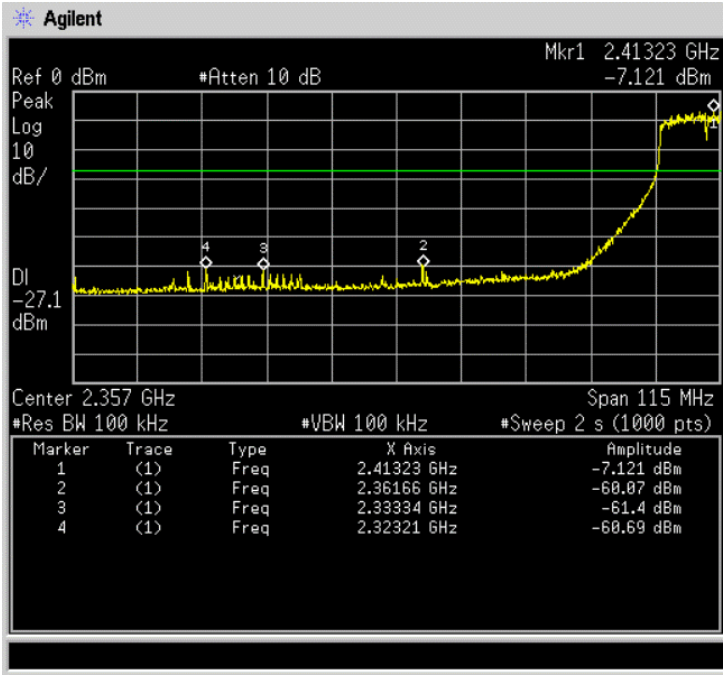


Figure 120: Low Band Edge – 802.11n, Low channel (1)

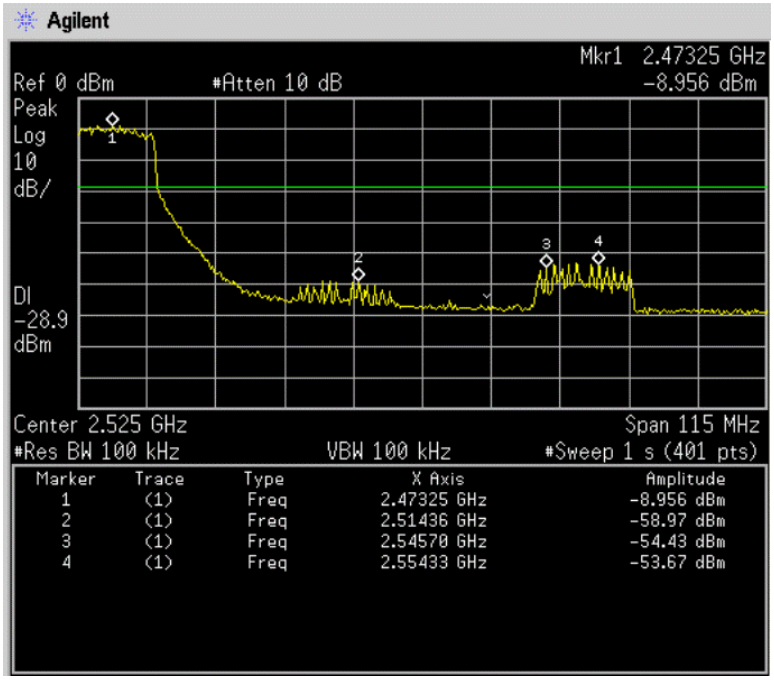


Figure 121: High Band Edge – 802.11n, High channel (13)

6.3.9 OCCUPIED BANDWIDTH MEASUREMENTS

6.3.9.1 REFERENCE SECTION & LIMITS

Standard	Reference section	Limit
RSS Gen	4.6.1	Occupied Bandwidth (OBW) is the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency.

6.3.9.2 TEST PROCEDURE

S. No	Procedure
1	This test was carried out for Low(1), Mid(6) and High(11) channels of the 802.11n band
2	Connect the transmitter output to a Spectrum Analyzer. Select an appropriate channel on the EUT.
3	In the Spectrum Analyzer set Resolution Bandwidth to 100 KHz and Video Bandwidth to 300KHz
4	Select Span of 19 MHz and Sweep time of 1s in the Spectrum Analyzer
5	Based on the recorded value, the result is declared

6.3.9.3 RESULT (SUPPORTING GRAPHS / DATA)

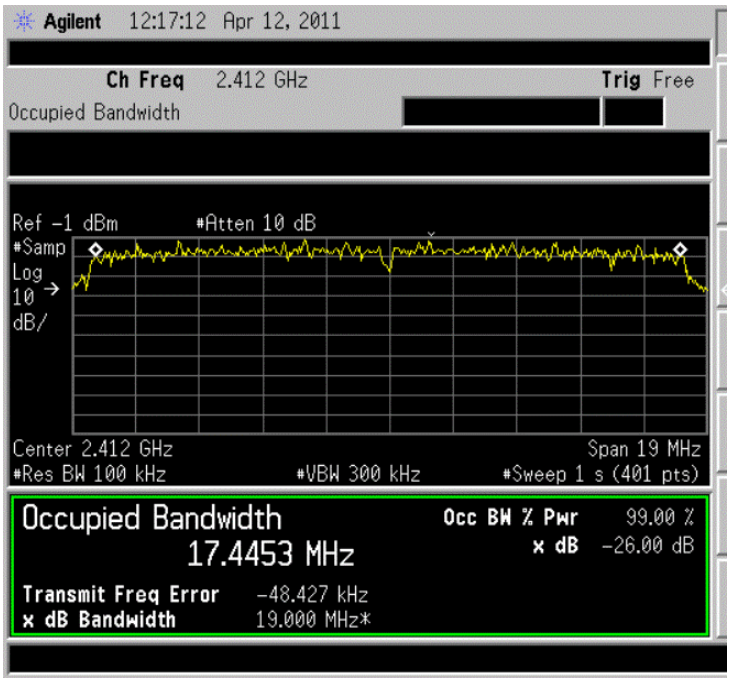


Figure 122: Occupied Bandwidth Measurement – 802.11n, Low channel (1)

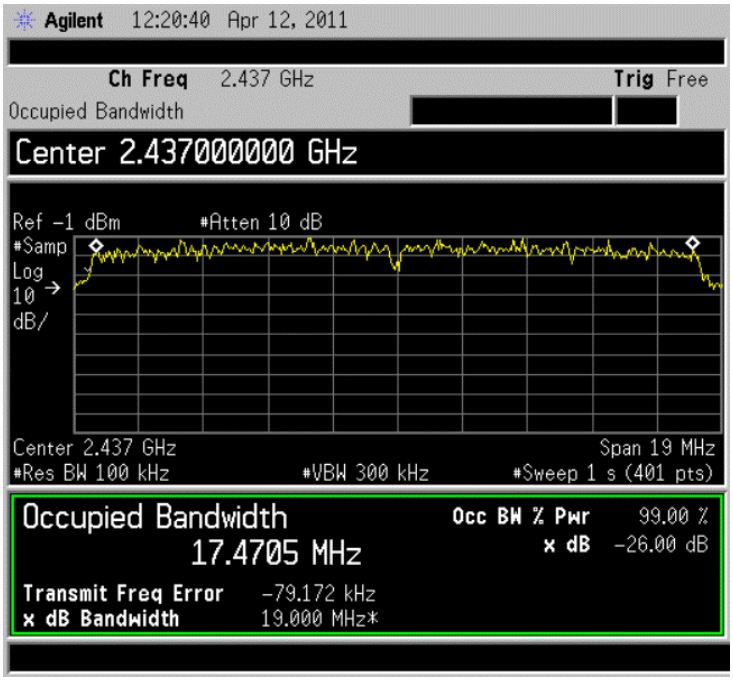


Figure 123: Occupied Bandwidth Measurement – 802.11n, Mid channel (6)

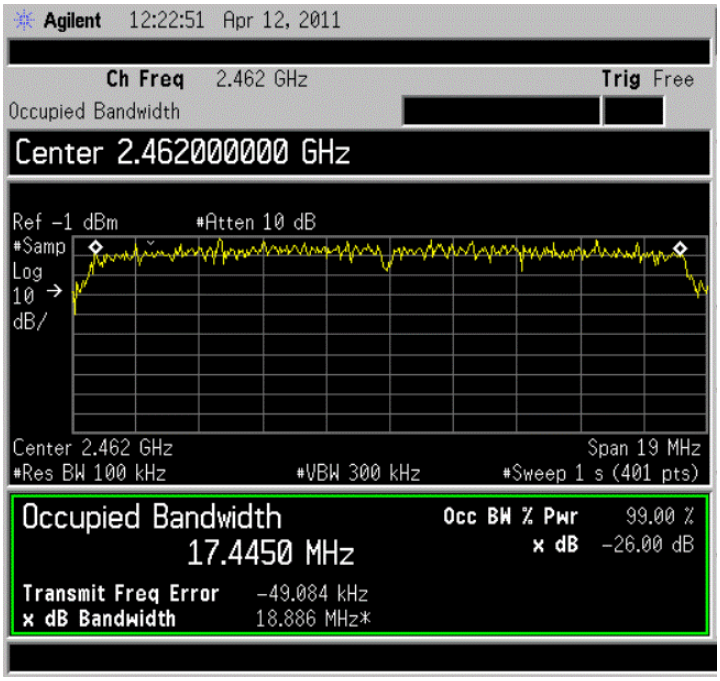


Figure 124: Occupied Bandwidth Measurement – 802.11n, High channel (11)

7 APPENDIX 1 – ACRONYMS

WLAN	Wireless Local Area Network
PC	Personal Computer
CFR	Code of Federal Regulations
EUT	Equipment Under Test
NABL	National Accreditation Board for Testing and Calibration Laboratories, India
dBm	Decibel milliWatt
mW	milliWatt
WiFi	Wireless Fidelity
dBi	Decibel Isotropic
dbµV	Decibel microVolts
USB	Universal Serial Bus
FCC	Federal Communications Commission
IC	Industry Canada
KHz	Kilo Hertz
MHz	Mega Hertz
GHz	Giga Hertz