



RF TEST REPORT

Report No.: SET2015-13488

Product Name: Xtreamer Mini Android PC

FCC ID: ZYAWONDERPLUS

Model No. : Xtreamer Wonder Plus

Applicant: XTREAMER LIMITED

Address: Flat A, 15F Hiller Commercial Building 65-67 Bonham Strand East,
Sheung Wan, Hongkong

Issued by: CCIC-SET

Lab Location: Electronic Testing Building, Shahe Road, Xili, Nanshan District,
Shenzhen, 518055, P. R. China

Tel: 86 755 26627338 **Fax:** 86 755 26627238

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Test Report

Product Name : Xtreamer Mini Android PC

Model No. : Xtreamer Wonder Plus

Trade Name..... : XTREAMER

Brand Name : XTREAMER

Applicant..... : XTREAMER LIMITED

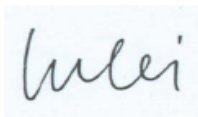
Applicant Address..... : Flat A, 15F Hiller Commercial Building 65-67 Bonham Strand East, Sheung Wan, Hongkong

Manufacturer..... : XTREAMER LIMITED

Manufacturer Address : Flat A, 15F Hiller Commercial Building 65-67 Bonham Strand East, Sheung Wan, Hongkong

Test Standards..... : 47 CFR Part 15 Subpart C: Radio Frequency Devices
ANSI C63.10:2009: American National Standard for Testing Unlicensed Wireless Devices
KDB558074 D01 DTS Meas Guidance v03r03

Test Result : PASS

Tested by : 
2015.09.19

Lu Lei, Test Engineer

Reviewed by..... : 
2015.09.19

Zhu Qi, Senior EGINEER

Approved by : 
2015.09.19

Wu Li'an, Manager



TABLE OF CONTENTS

1.	GENERAL INFORMATION	5
1.1	EUT Description.....	5
1.2	Test Standards and Results	6
1.3	Facilities and Accreditations	7
1.3.1	Facilities	7
1.3.2	Test Environment Conditions.....	7
2.	47 CFR PART 15C REQUIREMENTS.....	8
2.1	Antenna requirement.....	8
2.1.1	Applicable Standard	8
2.1.2	Antenna Information	8
2.1.3	Result: comply	8
2.2	Peak Output Power	9
2.2.1	Requirement	9
2.2.2	Measuring Instruments.....	9
2.2.3	Test Setup	9
2.2.4	Test Procedures	9
2.2.5	Test Result	10
2.3	6Db Bandwidth.....	11
2.3.1	Limit of 6dB Bandwidth	11
2.3.2	Measuring Instruments.....	11
2.3.3	Test Setup	11
2.3.4	Test Procedures	11
2.3.5	Test Result	12
2.4	Conducted Band Edges and Spurious Emissions.....	18
2.4.1	Limit of Conducted Band Edges and Spurious Emissions	18
2.4.2	Measuring Instruments.....	18
2.4.3	Test Setup	18
2.4.4	Test Procedure	18
2.4.5	Test Results of Conducted Band Edges	19
2.4.6	Test Result of Conducted Spurious Emission	22



2.5	Power spectral density (PSD)	31
2.5.1	Limit of Power Spectral Density	31
2.5.2	Measuring Instruments	31
2.5.3	Test Setup	31
2.5.4	Test Procedures	31
2.5.5	Test Results of Power spectral density	32
2.6	Radiated Band Edge and Spurious Emission	38
2.6.1	Limit of Radiated Band Edges and Spurious Emission	38
2.6.2	Measuring Instruments	38
2.6.3	Test Setup	38
2.6.4	Test Procedures	40
2.6.5	Test Results of Radiated Band Edge and Spurious Emission	41
2.7	Conducted Emission	52
2.7.1	Limit of Conducted Emission	52
2.7.2	Measuring Instruments	52
2.7.3	Test Setup	52
2.7.4	Test Procedures	53
2.7.5	Test Results of Conducted Emission	53
3.	LIST OF MEASURING EQUIPMENT	56

Change History		
Issue	Date	Reason for change
1.0	2015-09-19	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	Xtreamer Mini Android PC	
Hardware Version	RM-MPEG-114AG VER1.0	
Software Version	N/A	
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n (HT20) Bluetooth V3.0+EDR / Bluetooth V4.0LE	
Frequency Range	WLAN	802.11b/g/n-20MHz: 2.412GHz - 2.462GHz
Channel Number	WLAN	802.11b/g/n-20MHz: 11
Bit Rate of Transmitter	WLAN	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n up to 65 Mbps
Modulation Type	WLAN	DSSS (802.11b), OFDM (802.11g/n)
Antenna Type	Omni-directional	
Antenna Gain	5dBi	

Note 1: The EUT is a Xtreamer Mini Android PC, it contains WIFI operating at 2.4GHz ISM band; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report.

Note 2: The frequencies allocated is $F \text{ (MHz)} = 2412 + 5 * (n - 1)$ ($1 \leq n \leq 11$). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 4: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

Note 5: Please refer to the report (Report No.:ER350301AC), which is issued by CCIC-SET.

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Wi-Fi, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2012	Radio Frequency Devices
2	ANSI C63.10 2009	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.203	Antenna Requirement	PASS
2	15.247(b)	Peak Output Power	PASS
3	15.247(a)	6dB Bandwidth	PASS
4	15.247(d)	Conducted Band Edges and Spurious Emission	PASS
5	15.247(e)	Power spectral density (PSD)	PASS
6	15.207	Conducted Emission	PASS
7	15.209 15.247(d)	Radiated Band Edges and Spurious Emission	PASS

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2009.

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item.

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency
1	2412MHz	5	2432MHz	9	2452MHz
2	2417MHz	6	2437MHz	10	2457MHz
3	2422MHz	7	2442MHz	11	2462MHz
4	2427MHz	8	2447MHz		



Test Items	Mode	Data Rate	Channel
Peak Conducted Output Power	11b/DSSS	1 Mbps	1/6/11
Power Spectral Density			
6dB Bandwidth			
Spurious RF conducted emission	11g/OFDM	6 Mbps	1/6/11
Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11n(20MHz)/OFDM	MCS 0	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	MCS 0	1/11

1.3 Facilities and Accreditations

1.3.1 Facilities

CNAS-Lab Code: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 406086, valid time is until Nov. 18, 2017.

IC-Registration No.: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on July. 15, 2013, valid time is until July. 15, 2016.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C - 35°C
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa



2. 47 CFR PART 15C REQUIREMENTS

2.1 Antenna requirement

2.1.1 Applicable Standard

According 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.

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

2.1.2 Antenna Information

Antenna Category: Omni-directiona antenna

An Omni-directiona antenna was soldered to the antenna port of EUT via an adaptor cable can't be removed.

Antenna General Information:

No.	EUT Model	Ant. Cat.	Gain(dBi)
1	Xtremer Mini Android PC	Omni-directiona	5.0

2.1.3 Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2 Peak Output Power

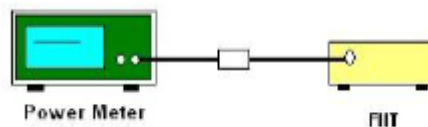
2.2.1 Requirement

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

2.2.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3 Test Setup



2.2.4 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 v03r03.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

**2.2.5 Test Result**

Test mode	Channel	Frequency (MHz)	RF Power(dBm)	Limit (dBm)	Verdict
802.11b	1	2412	16.21	30	PASS
	6	2437	16.27		PASS
	11	2462	16.03		PASS
802.11g	1	2412	14.57		PASS
	6	2437	14.22		PASS
	11	2462	14.09		PASS
802.11n20	1	2412	13.74		PASS
	6	2437	13.52		PASS
	11	2462	12.93		PASS

Note: All data rates are testing, but the worse case data rate was record in the report.

2.3 6Db Bandwidth

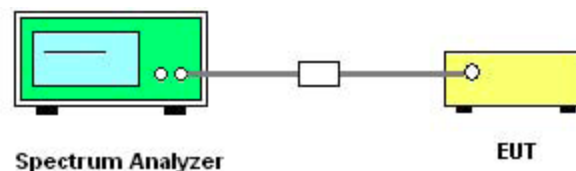
2.3.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3 Test Setup

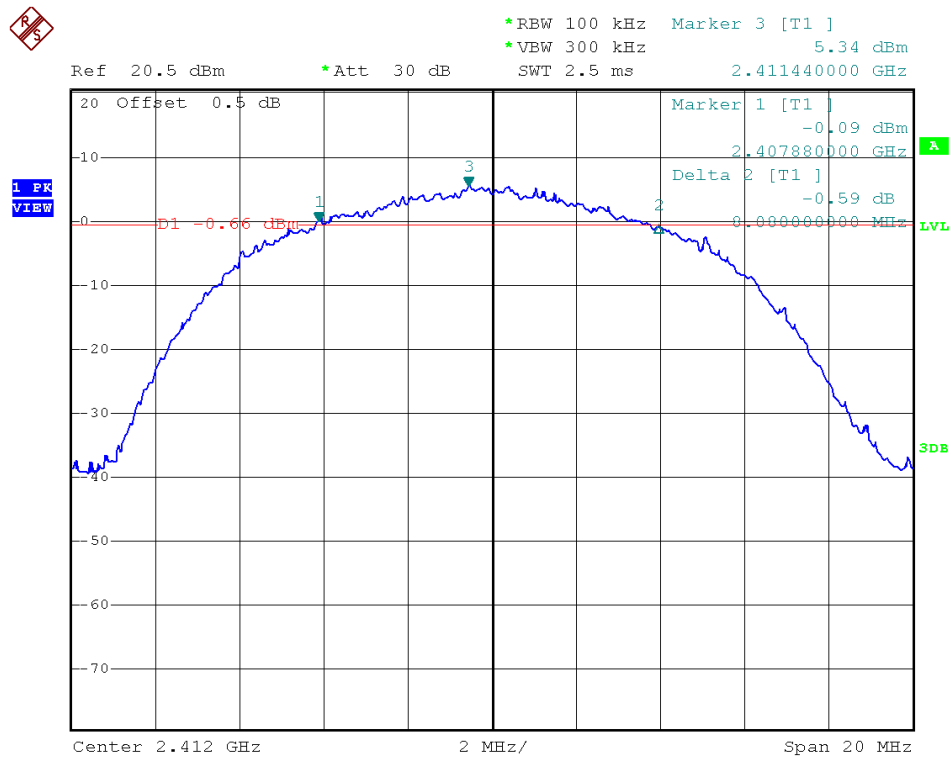


2.3.4 Test Procedures

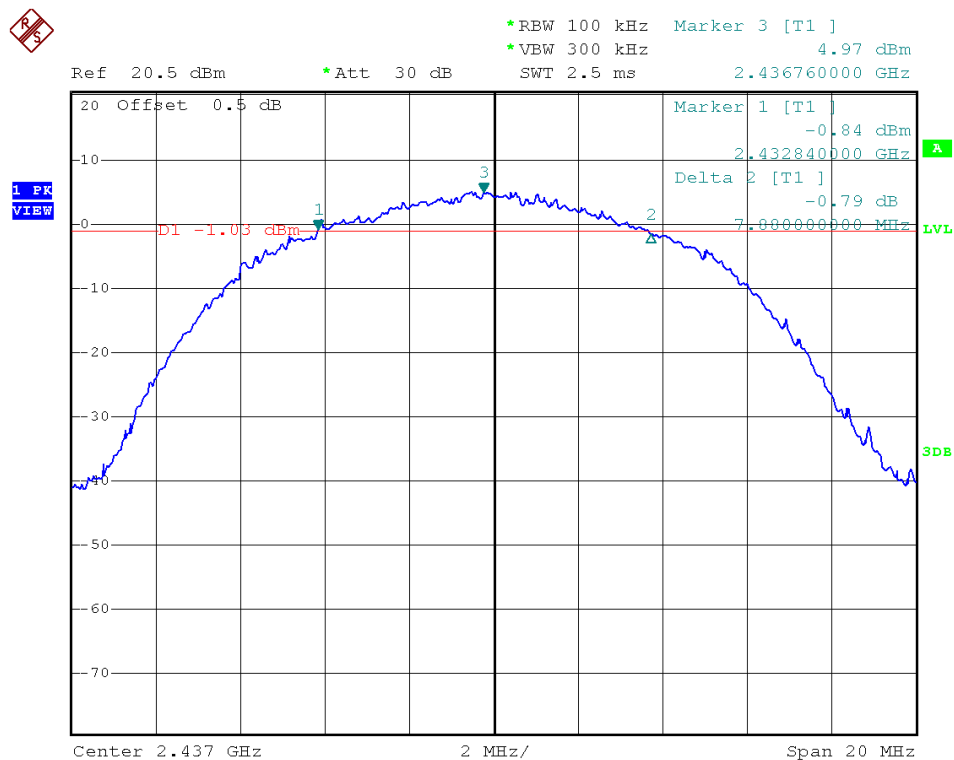
1. The testing follows FCC KDB558074 D01 v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 30 kHz and set the Video bandwidth (VBW) = 100 kHz.
6. Measure and record the results in the test report.

2.3.5 Test Result

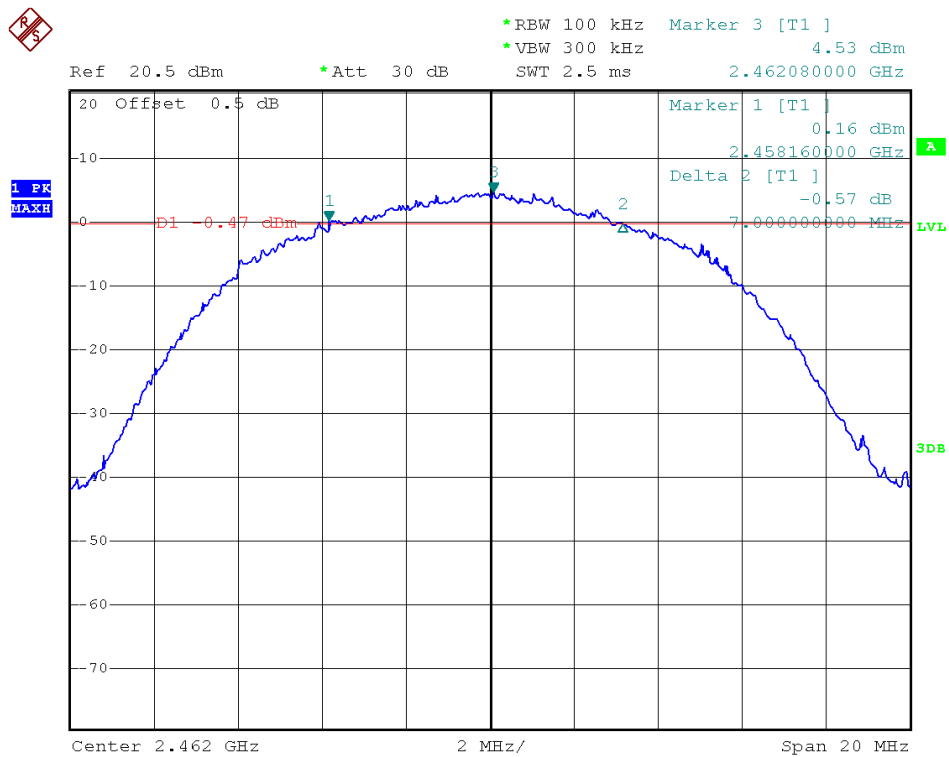
Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (MHz)	Result
802.11b	1	2412	8.08	≥ 0.5	PASS
	6	2437	7.84		PASS
	11	2462	7.88		PASS
802.11g	1	2412	16.40		PASS
	6	2437	16.35		PASS
	11	2462	16.40		PASS
802.11n20	1	2412	17.30		PASS
	6	2437	17.25		PASS
	11	2462	17.00		PASS



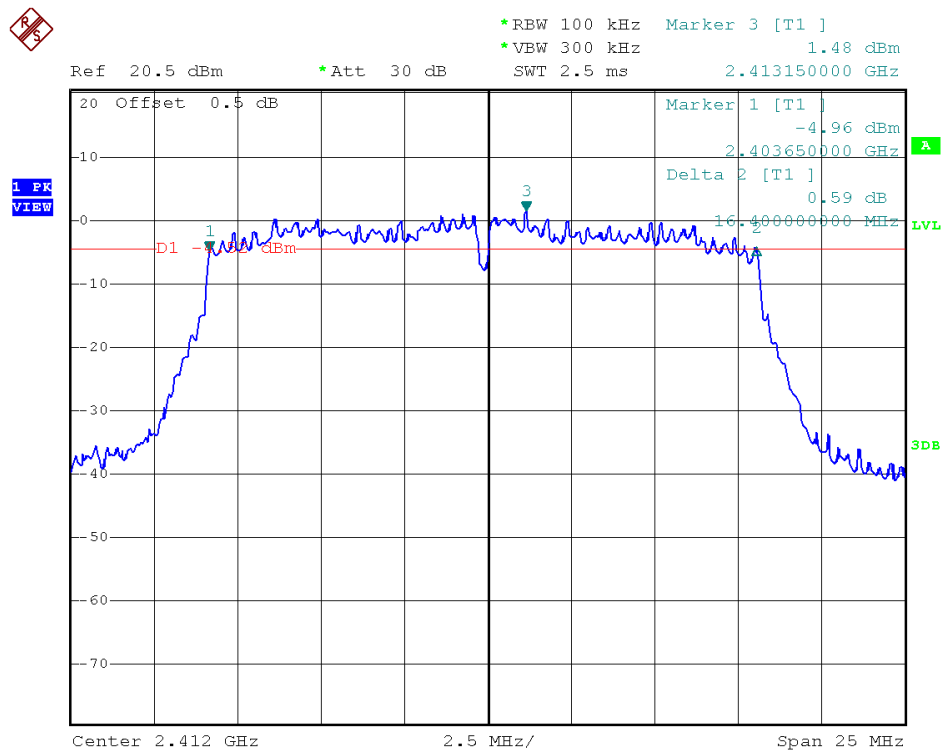
802.11b - 6 dB Bandwidth Plot on channel 1



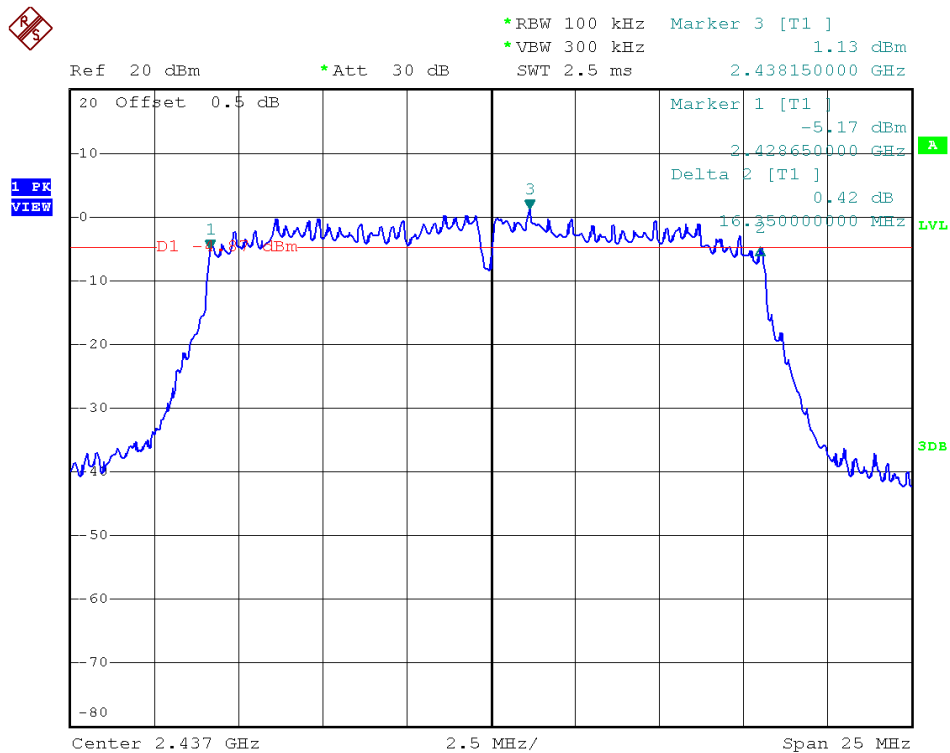
802.11b - 6 dB Bandwidth Plot on channel 6



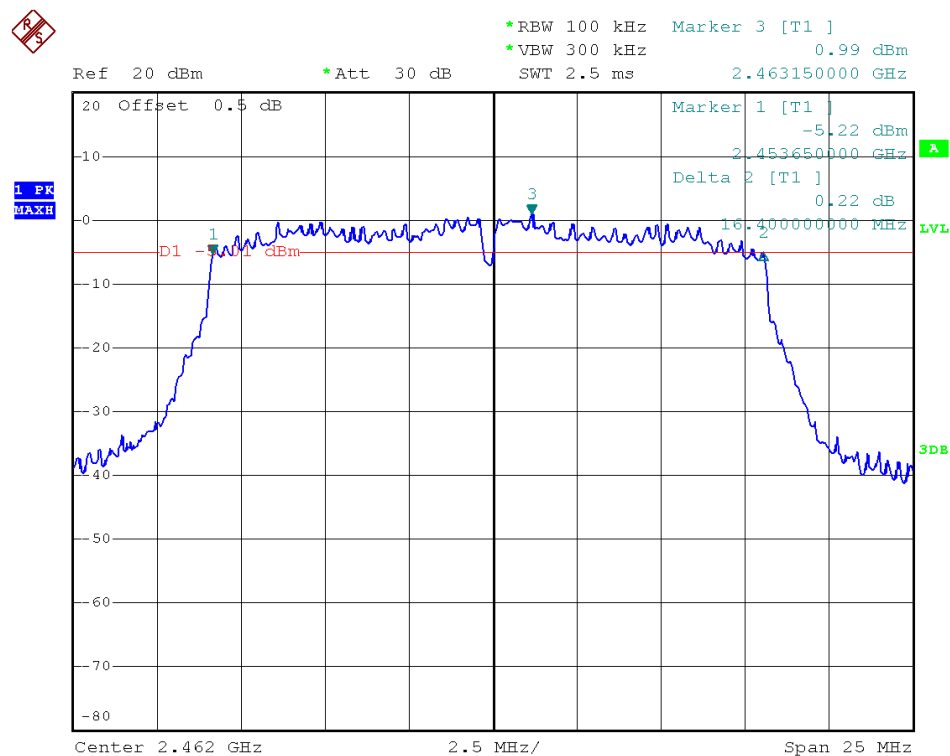
802.11b - 6 dB Bandwidth Plot on channel 11



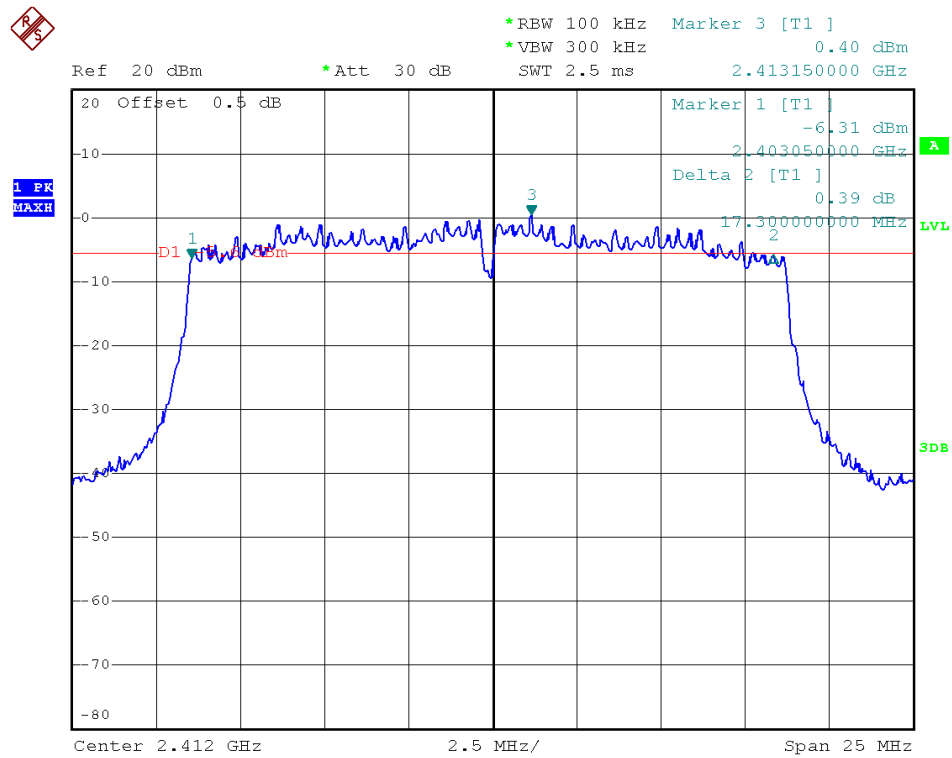
802.11g - 6 dB Bandwidth Plot on channel 1



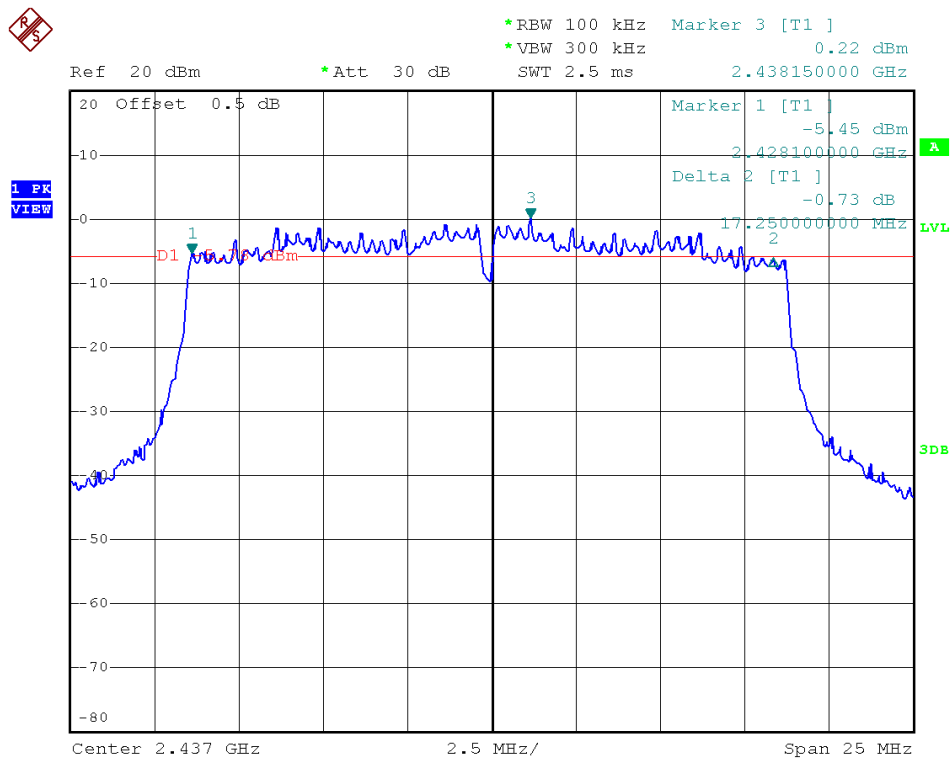
802.11g - 6 dB Bandwidth Plot on channel 6



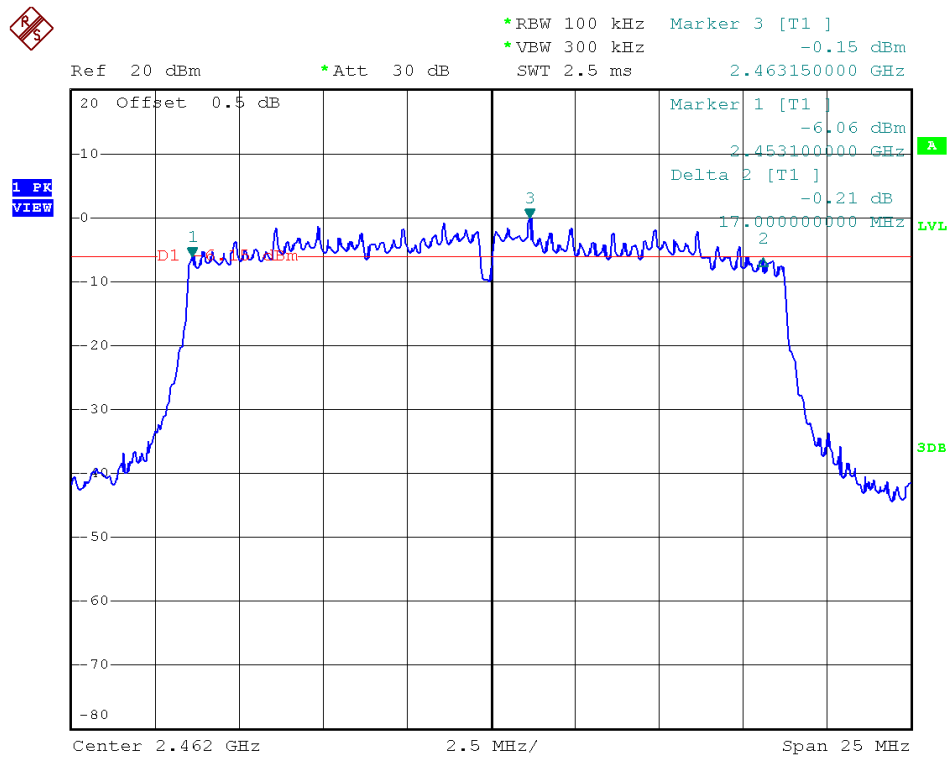
802.11g - 6 dB Bandwidth Plot on channel 11



802.11n20 - 6 dB Bandwidth Plot on channel 1



802.11n20 - 6 dB Bandwidth Plot on channel 6



802.11n20 - 6 dB Bandwidth Plot on channel 11

2.4 Conducted Band Edges and Spurious Emissions

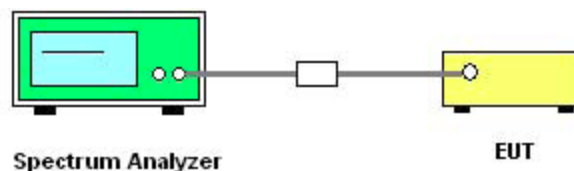
2.4.1 Limit of Conducted Band Edges and Spurious Emissions

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

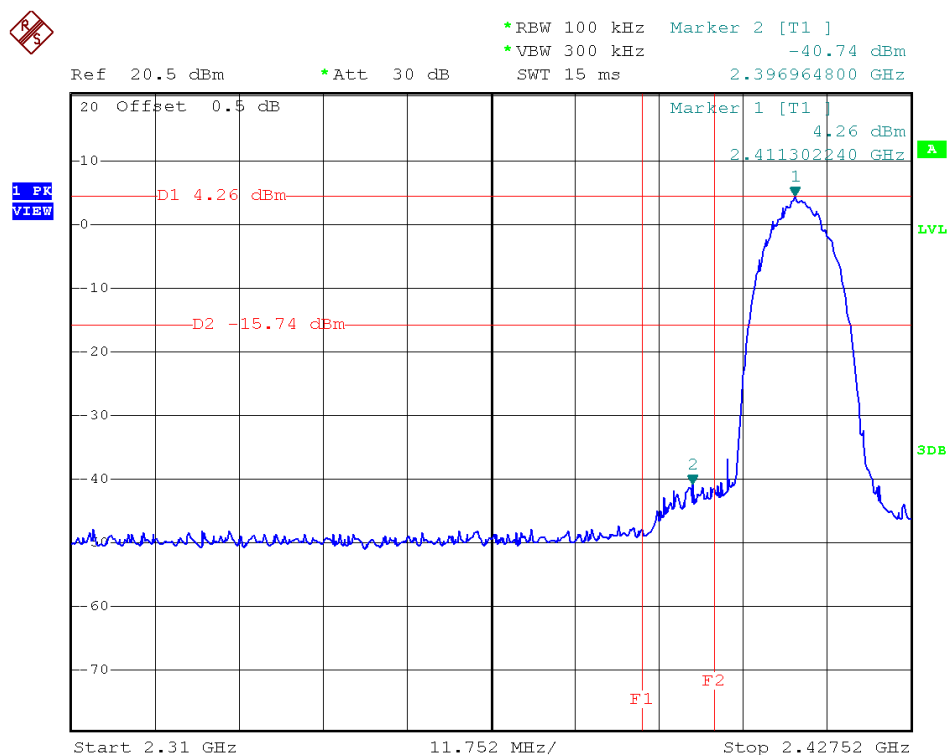
2.4.3 Test Setup



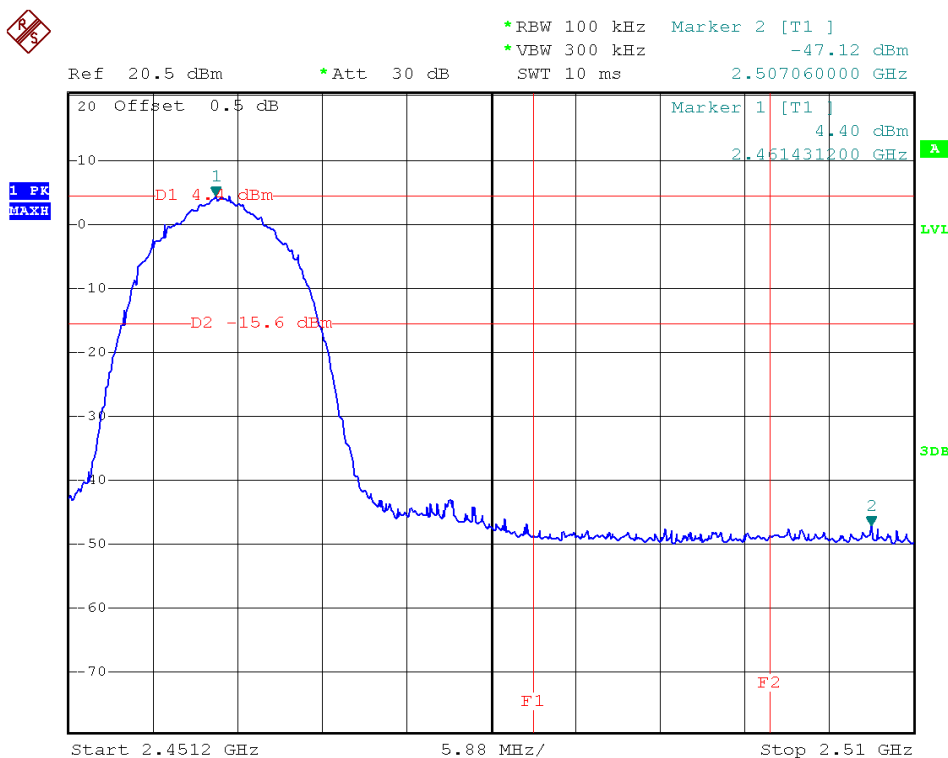
2.4.4 Test Procedure

1. The testing follows FCC KDB558074 D01 v03r03.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

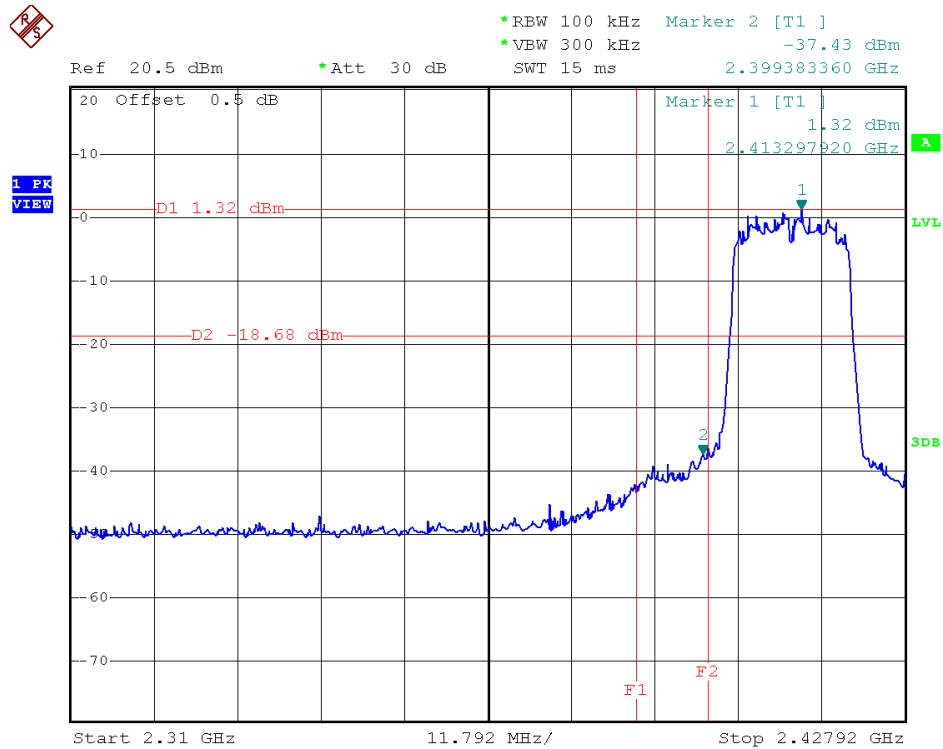
2.4.5 Test Results of Conducted Band Edges



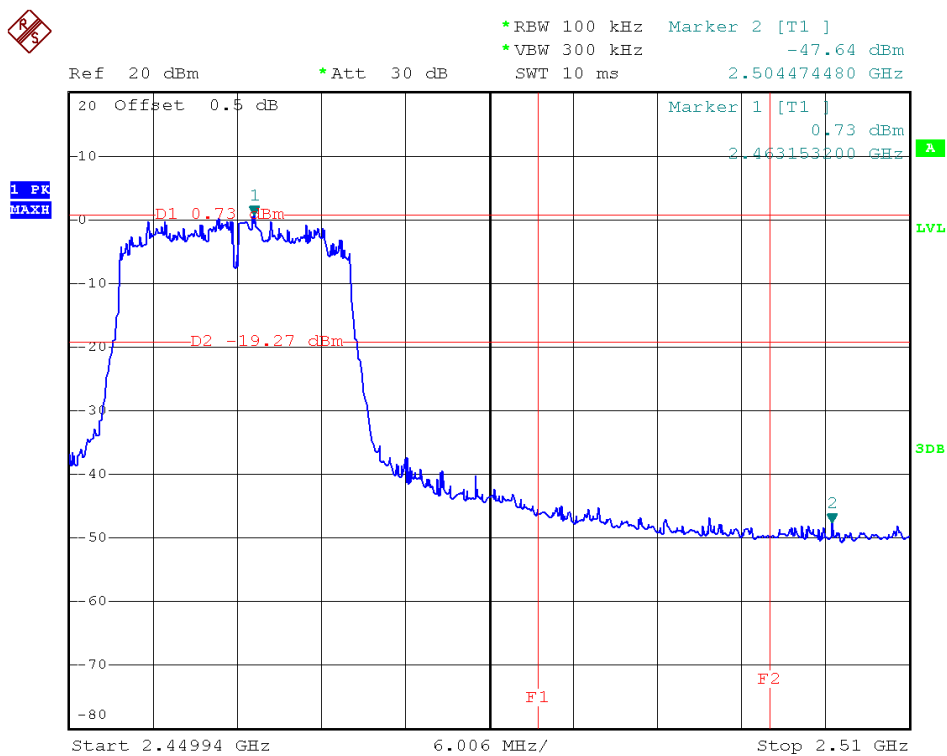
802.11b - Low Band Edge Plot on Channel 1



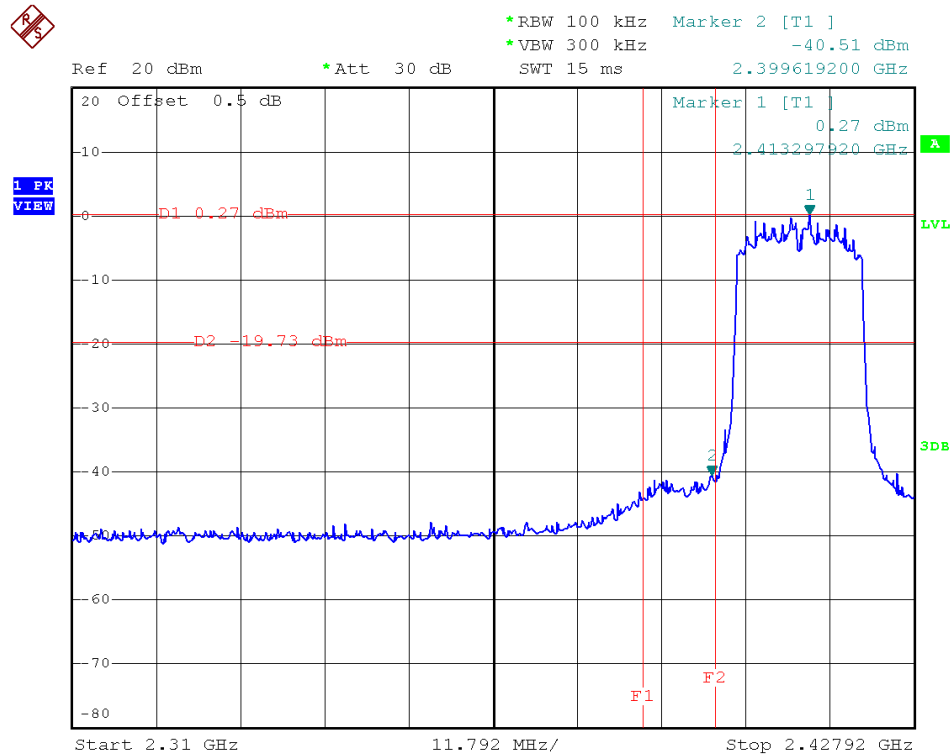
802.11b - High Band Edge Plot on Channel 11



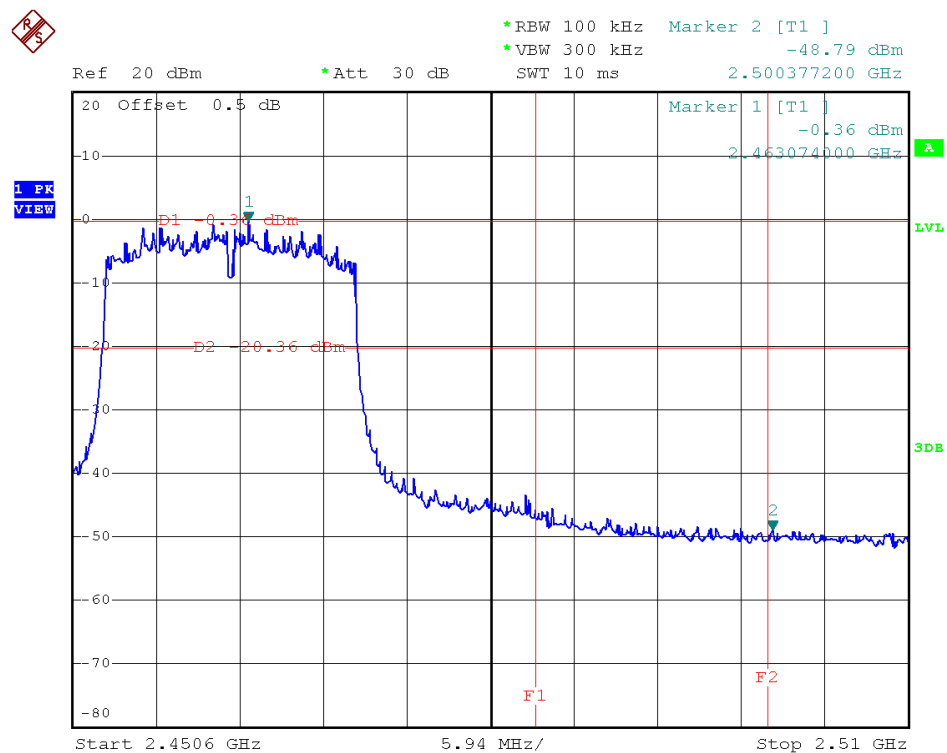
802.11g - Low Band Edge Plot on Channel 1



802.11g - High Band Edge Plot on Channel 11



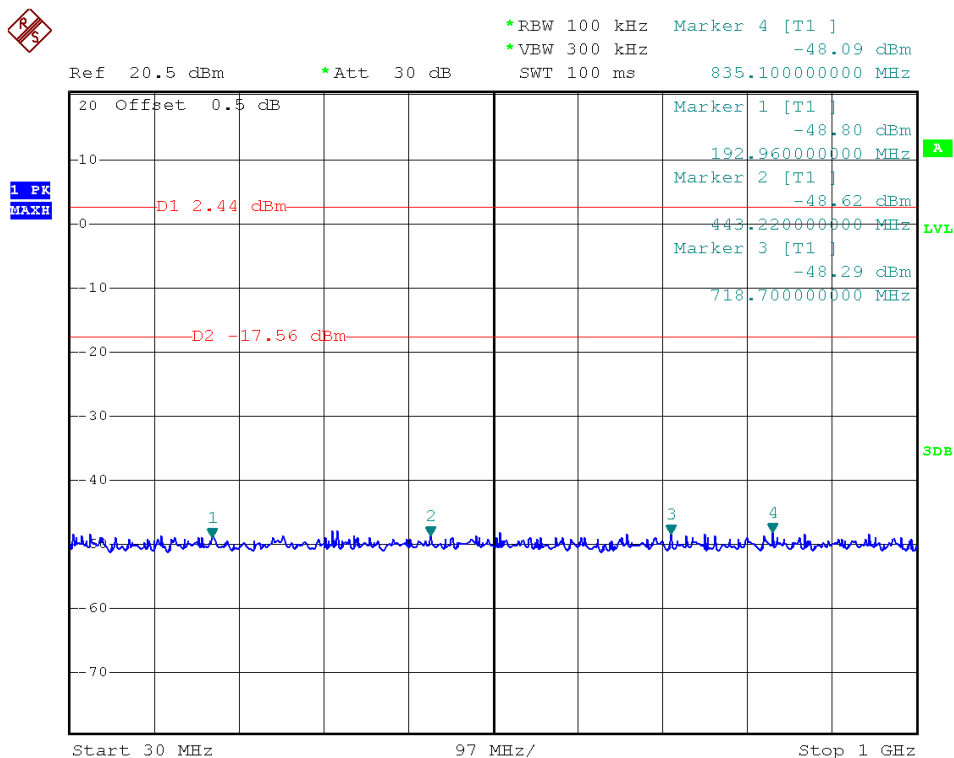
802.11n20 - Low Band Edge Plot on Channel 1



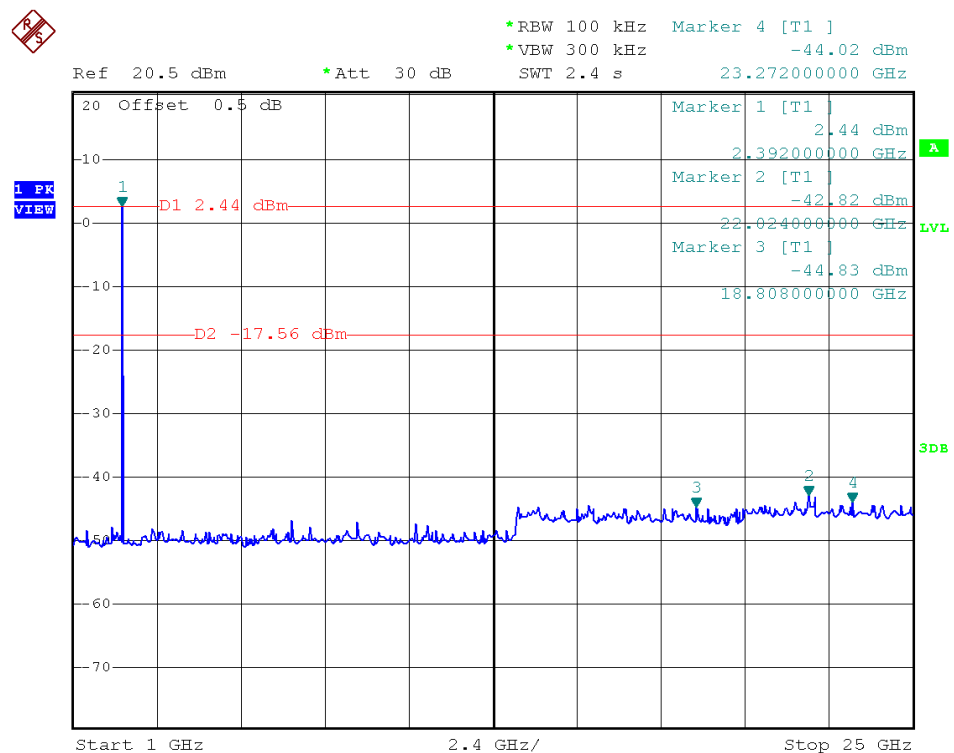
802.11n20 - High Band Edge Plot on Channel 11

2.4.6 Test Result of Conducted Spurious Emission

802.11b - Conducted Spurious Emission Plot on channel 1

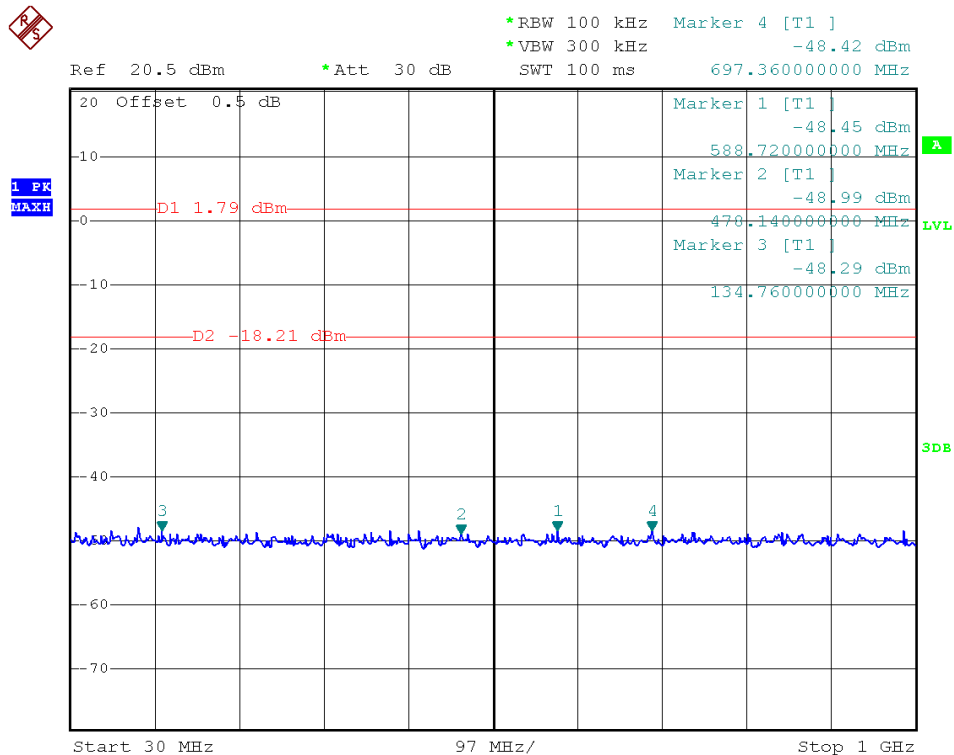


Channel = 1, 30MHz to 1GHz

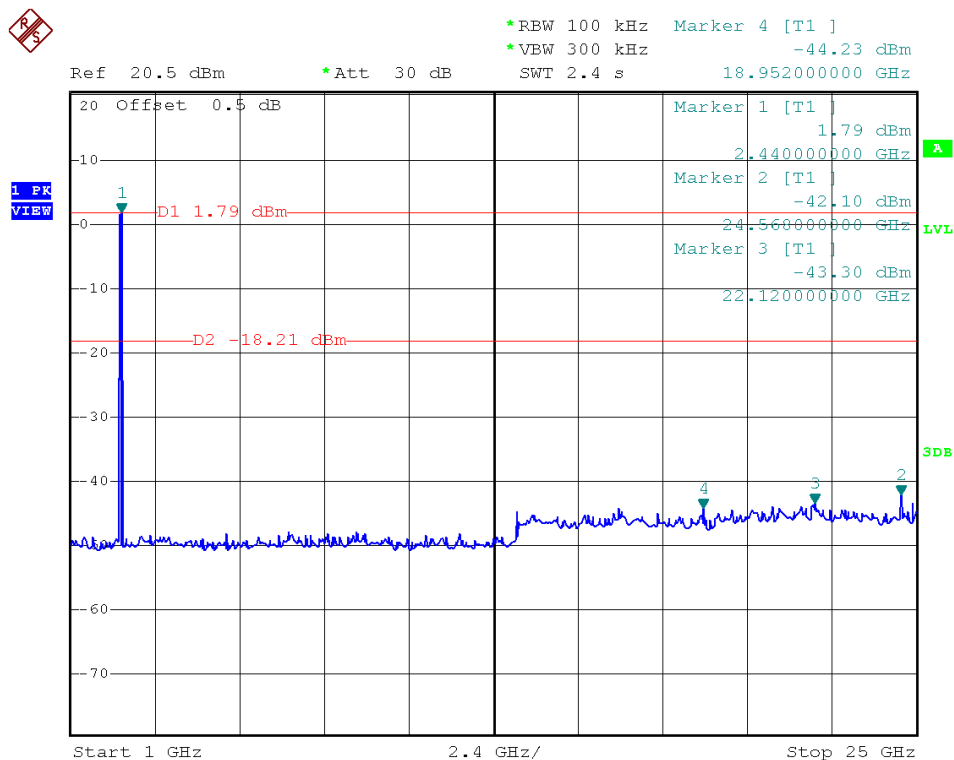


Channel = 1, 1GHz to 25GHz

802.11b - Conducted Spurious Emission Plot on channel 6

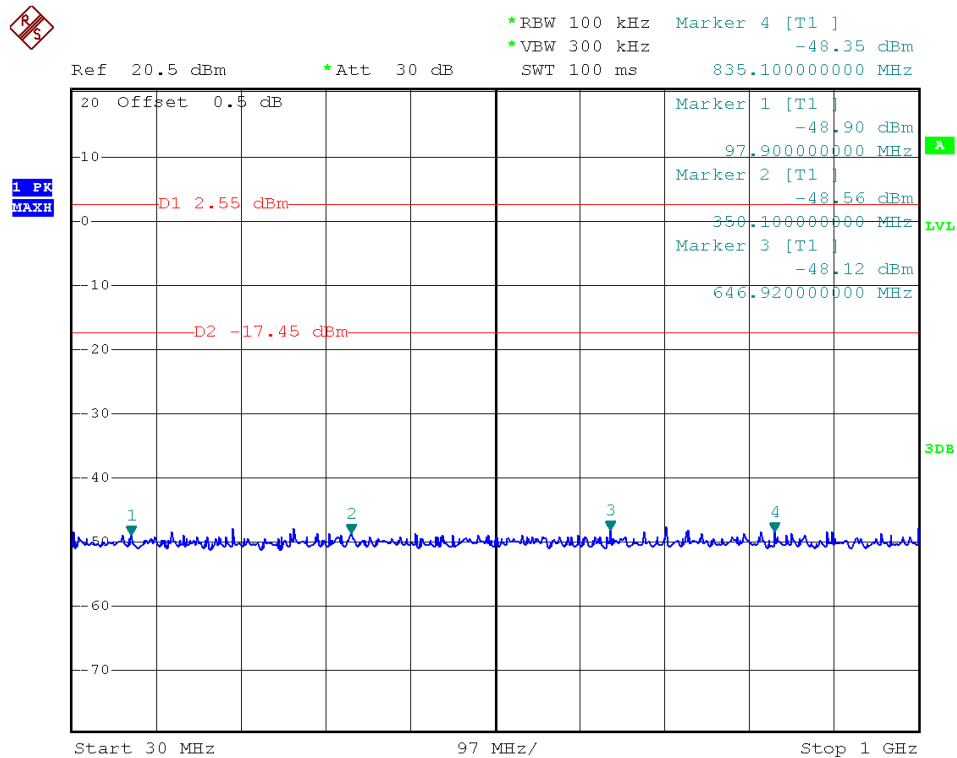


Channel = 6, 30MHz to 1GHz

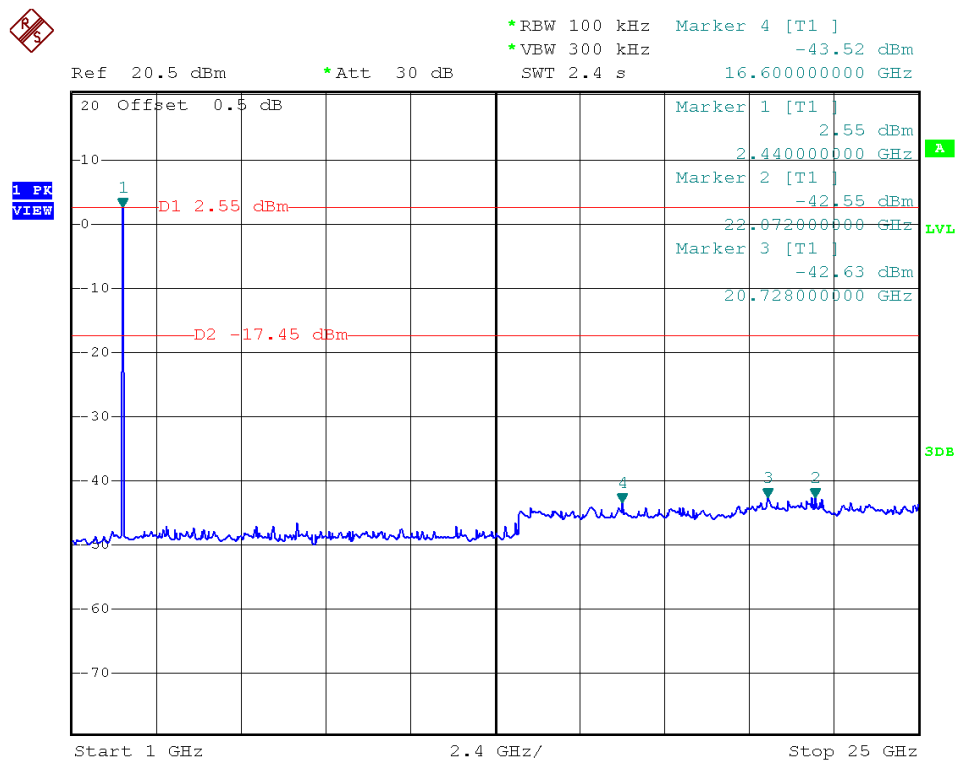


Channel = 6, 1GHz to 25GHz

802.11b - Conducted Spurious Emission Plot on channel 11

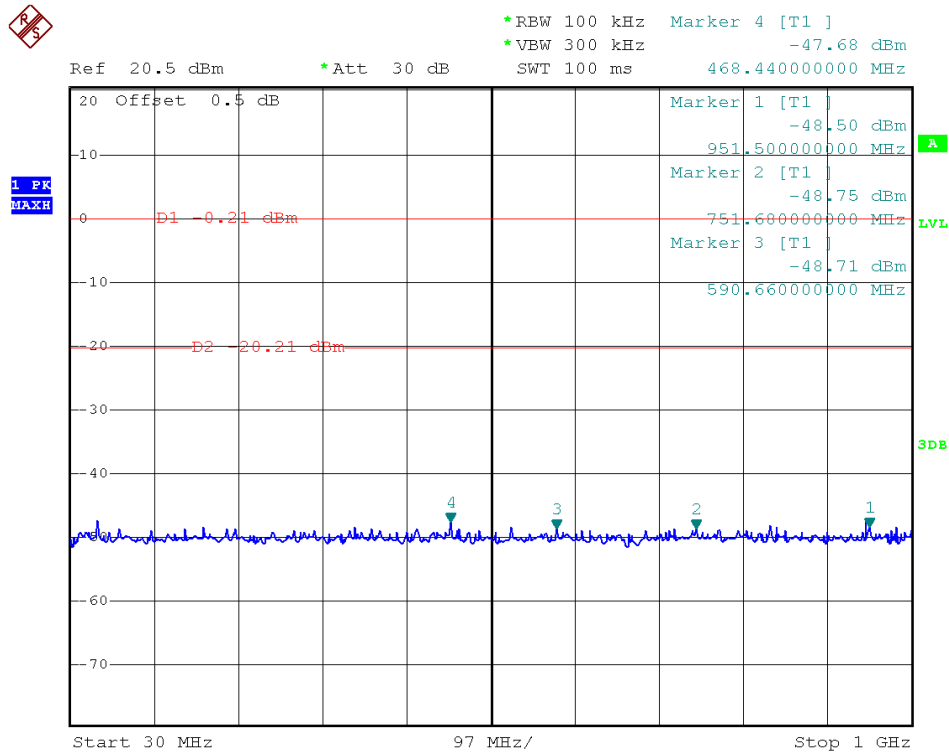


Channel = 11, 30MHz to 25GHz

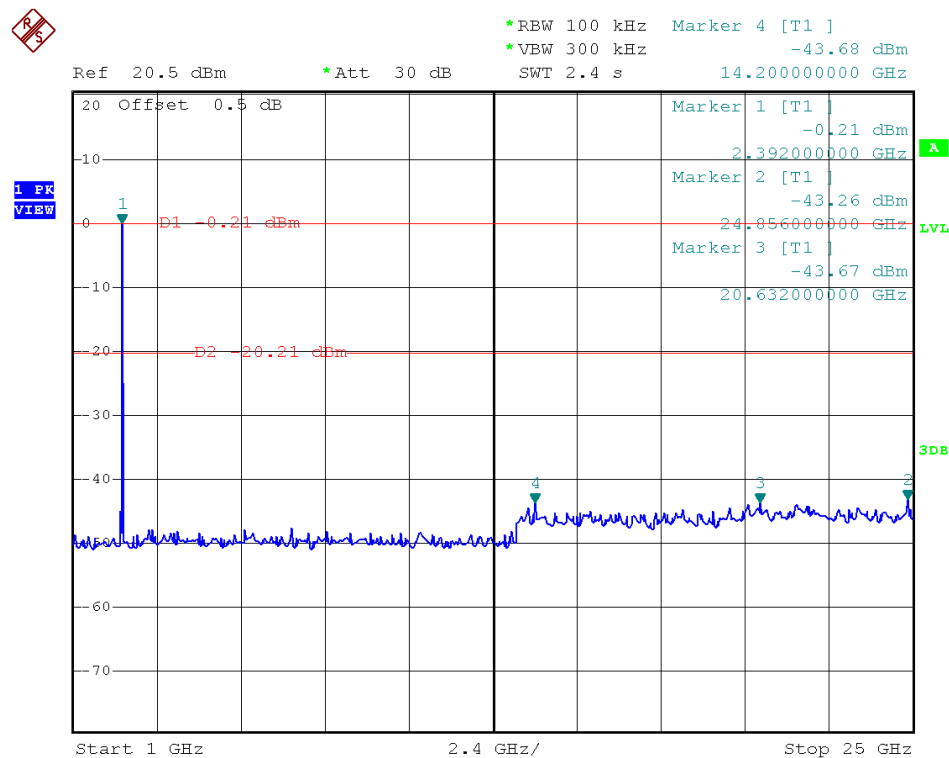


Channel = 11, 30MHz to 25GHz

802.11g - Conducted Spurious Emission Plot on channel 1

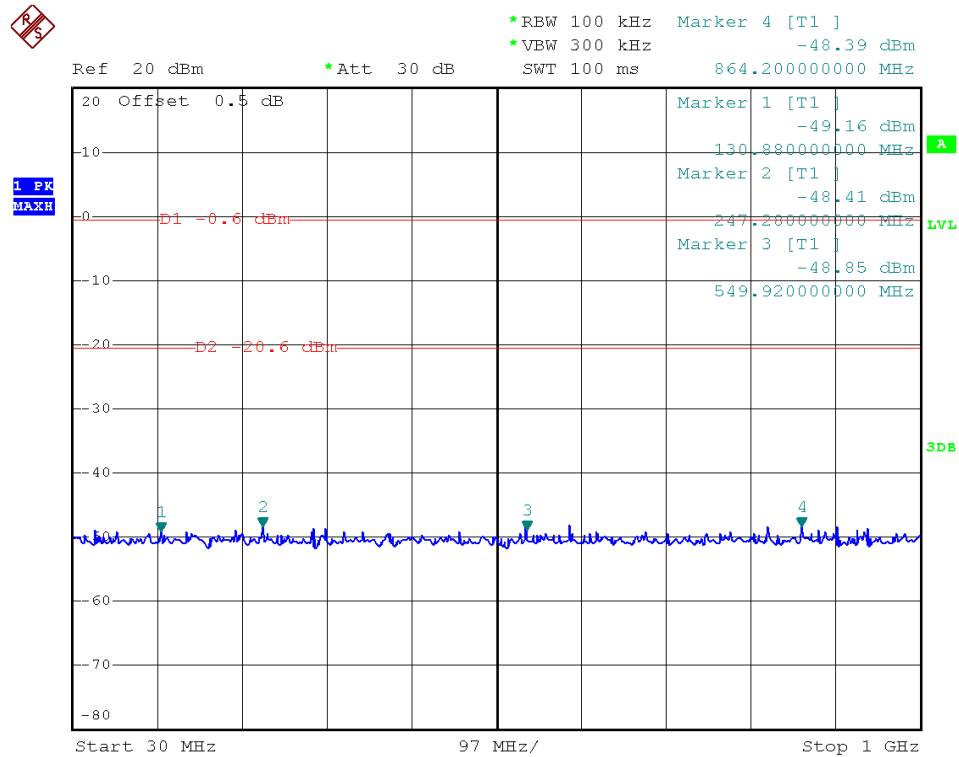


Channel = 1, 30MHz to 1GHz

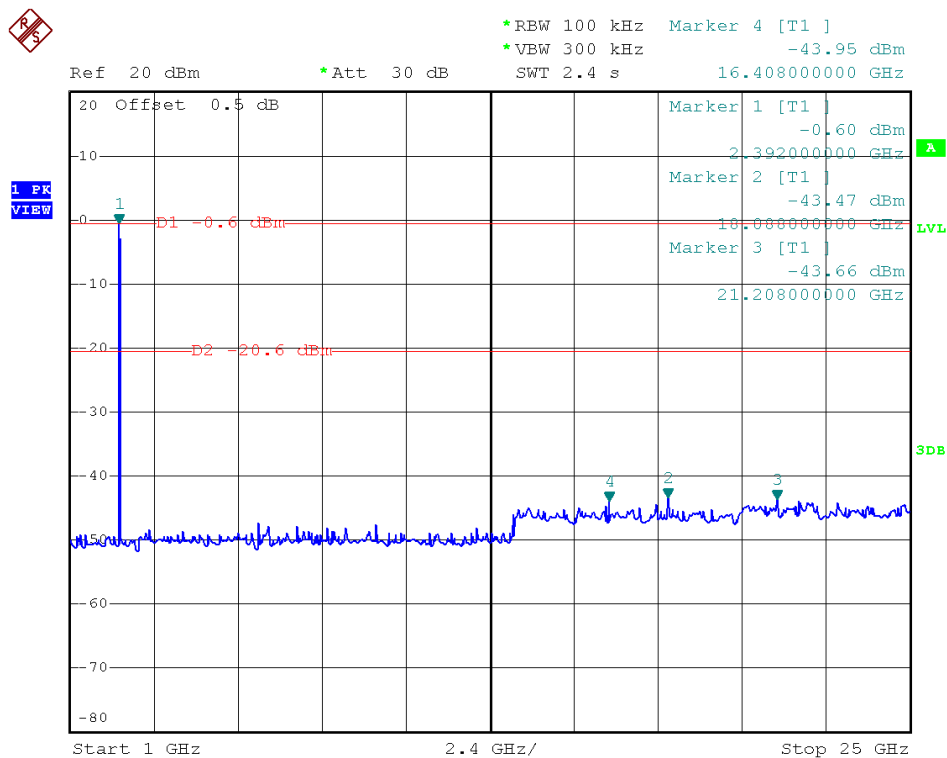


Channel = 1, 1GHz to 25GHz

802.11g - Conducted Spurious Emission Plot on channel 6

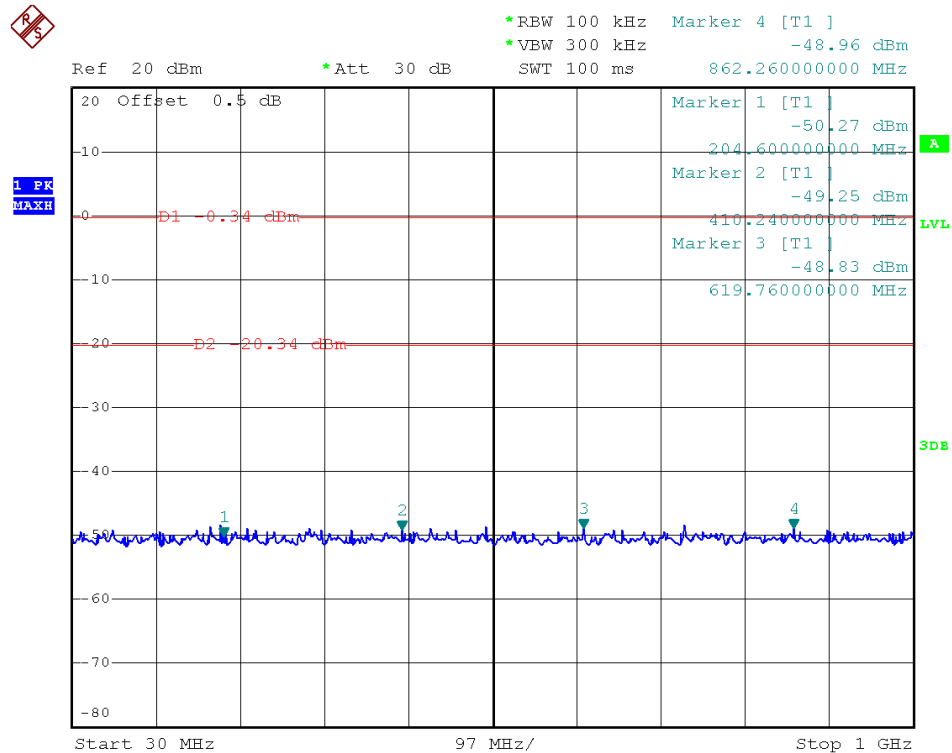


Channel = 6, 30MHz to 1GHz

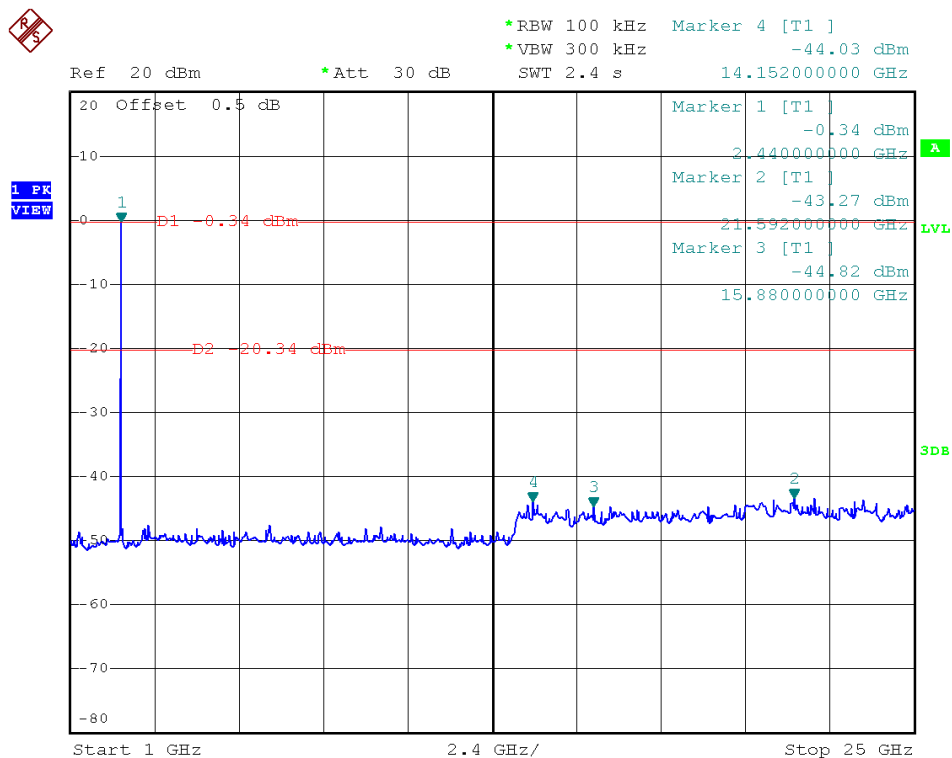


Channel = 6, 1GHz to 25GHz

802.11g - Conducted Spurious Emission Plot on channel 11

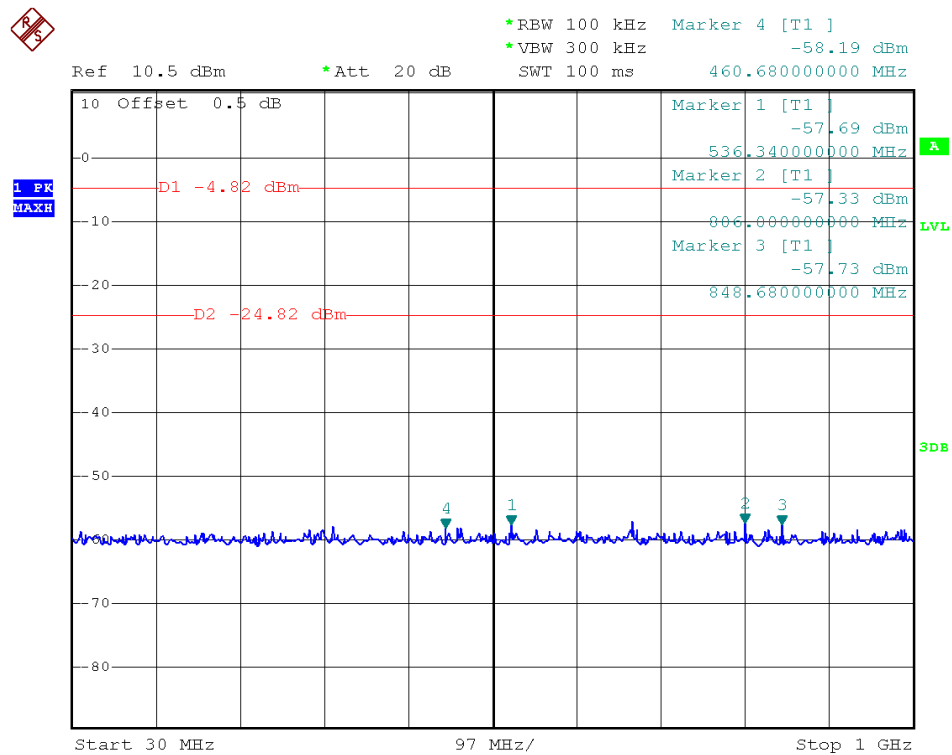


Channel = 11, 30MHz to 25GHz

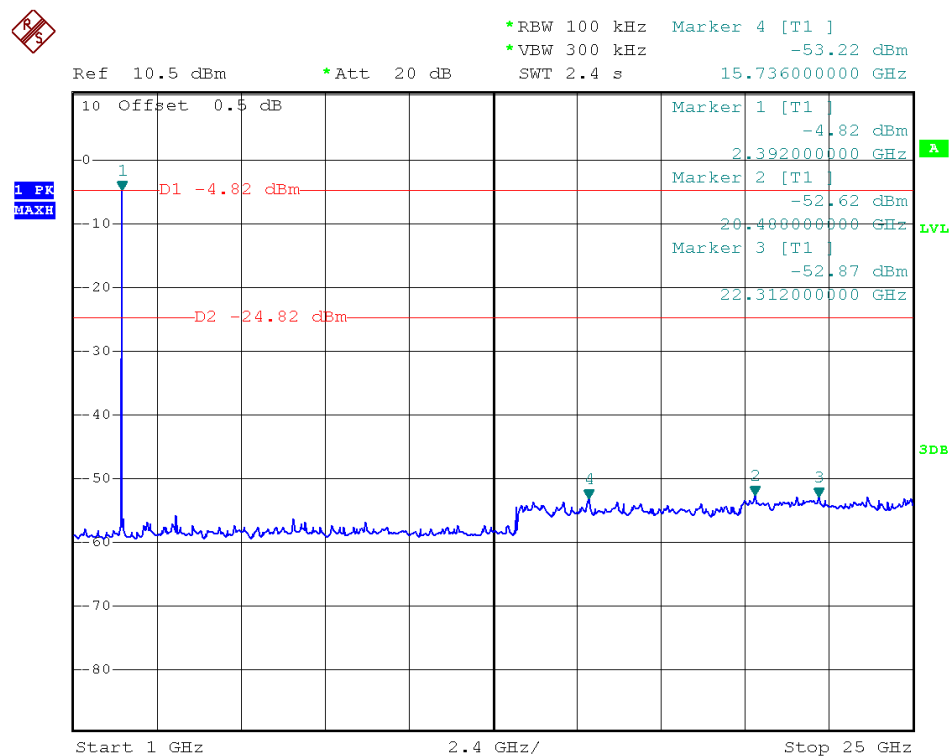


Channel = 11, 30MHz to 25GHz

802.11n20 - Conducted Spurious Emission Plot on channel 1

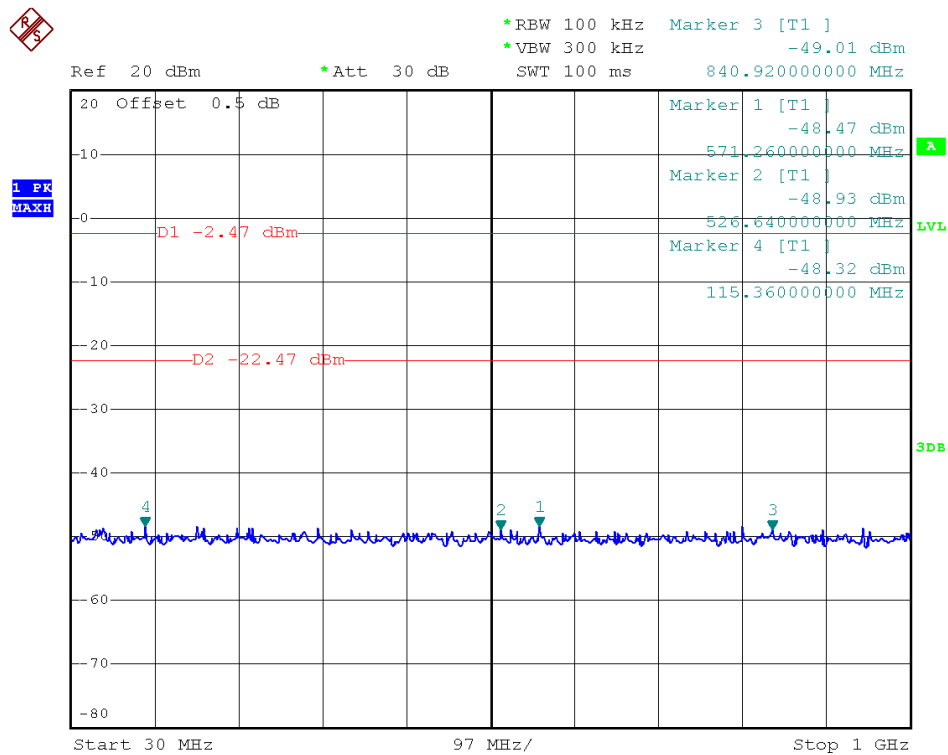


Channel = 1, 30MHz to 1GHz

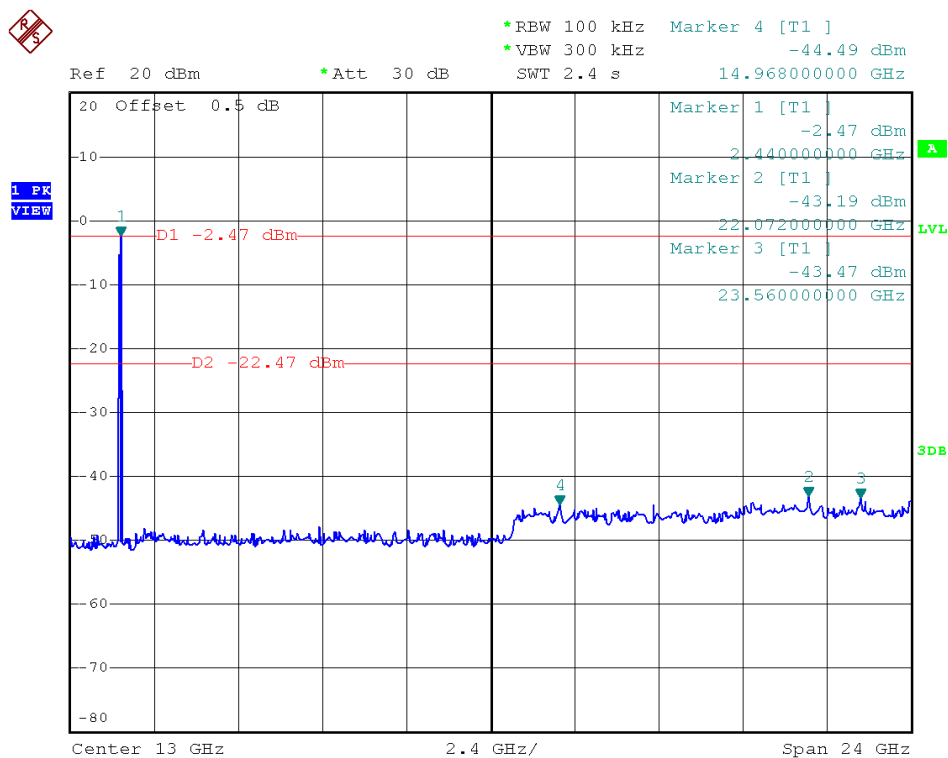


Channel = 1, 1GHz to 25GHz

802.11n20 - Conducted Spurious Emission Plot on channel 6

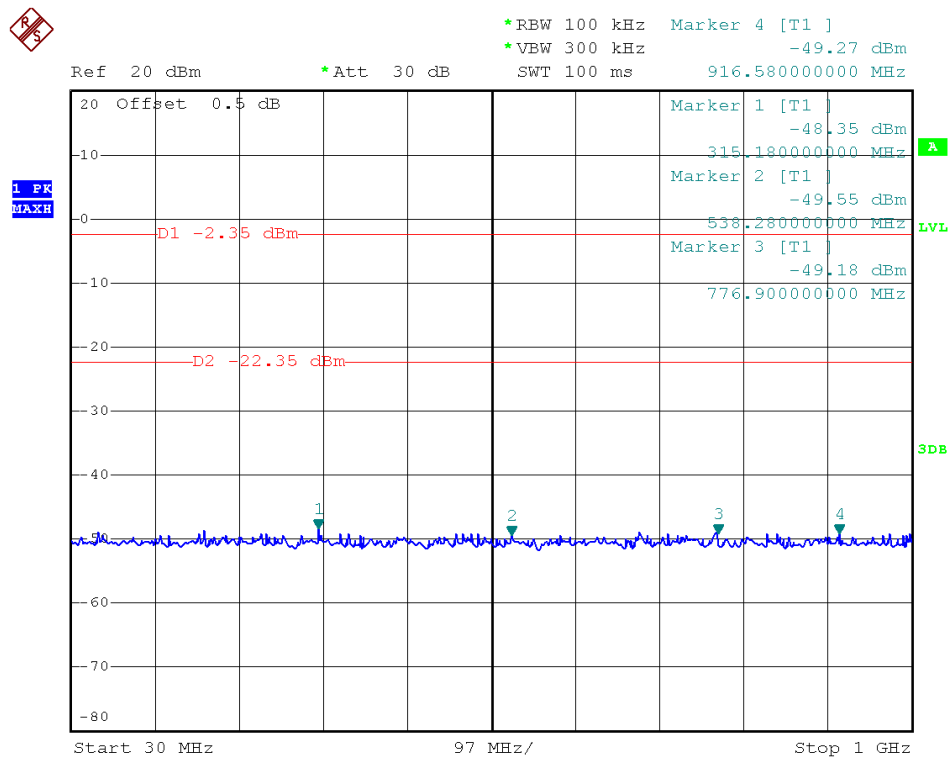


Channel = 6, 30MHz to 1GHz

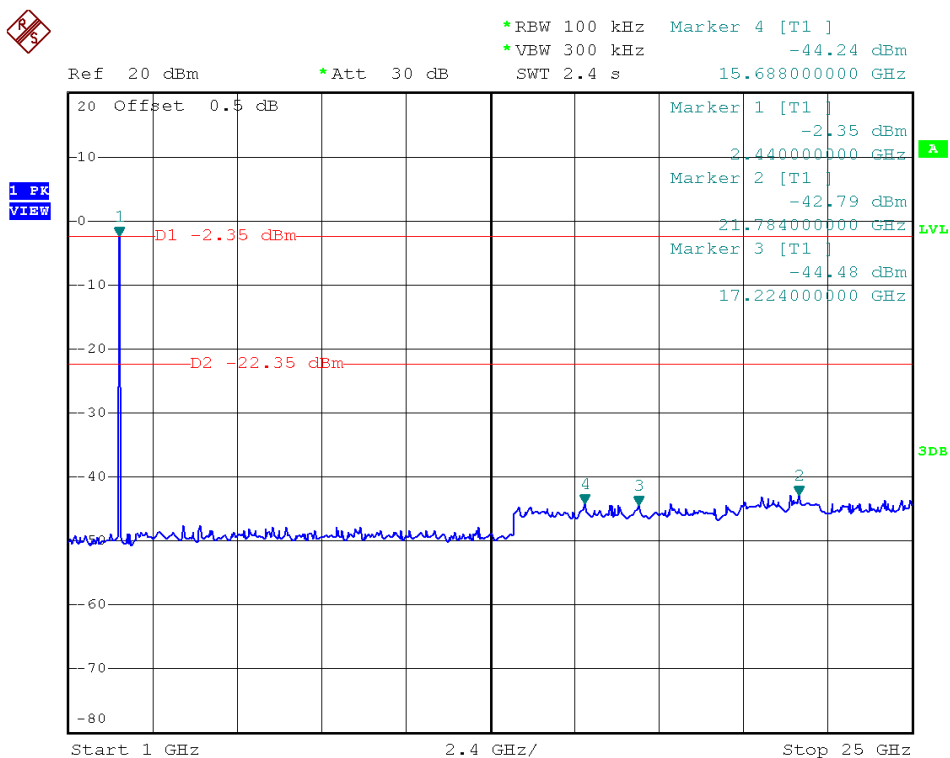


Channel = 6, 1GHz to 25GHz

802.11n20 - Conducted Spurious Emission Plot on channel 11



Channel = 11, 30MHz to 25GHz



Channel = 11, 30MHz to 25GHz

2.5 Power spectral density (PSD)

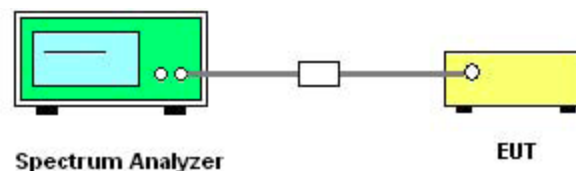
2.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

2.5.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3 Test Setup



2.5.4 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB558074 D01 v03r03.

2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.

4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.

6. Measure and record the results in the test report.

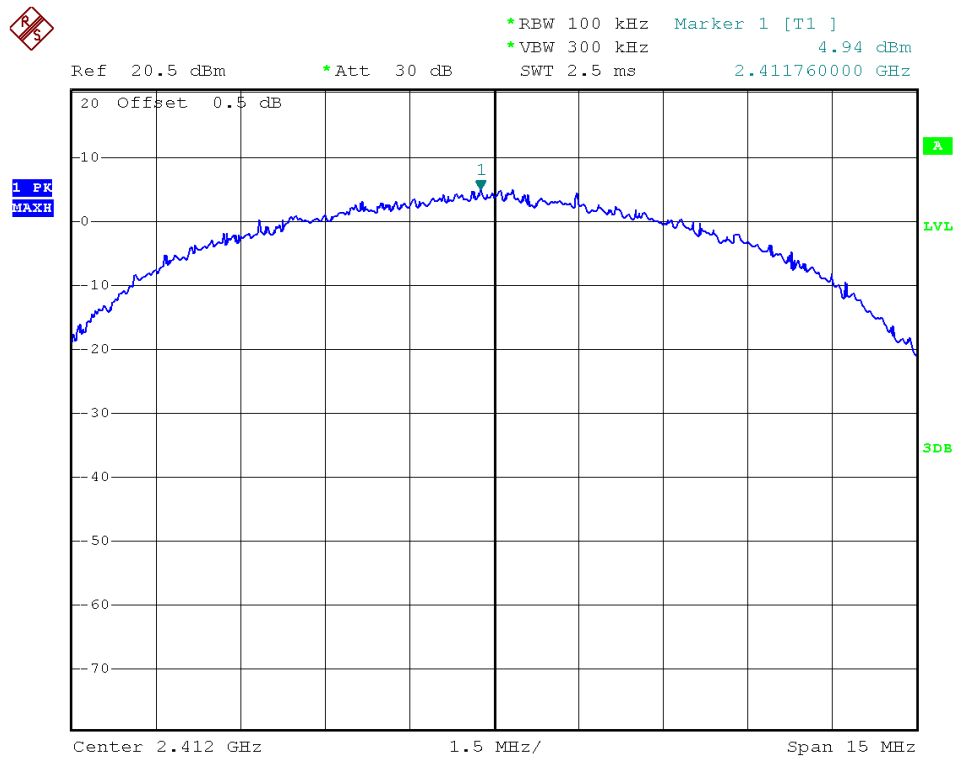
7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

2.5.5 Test Results of Power spectral density

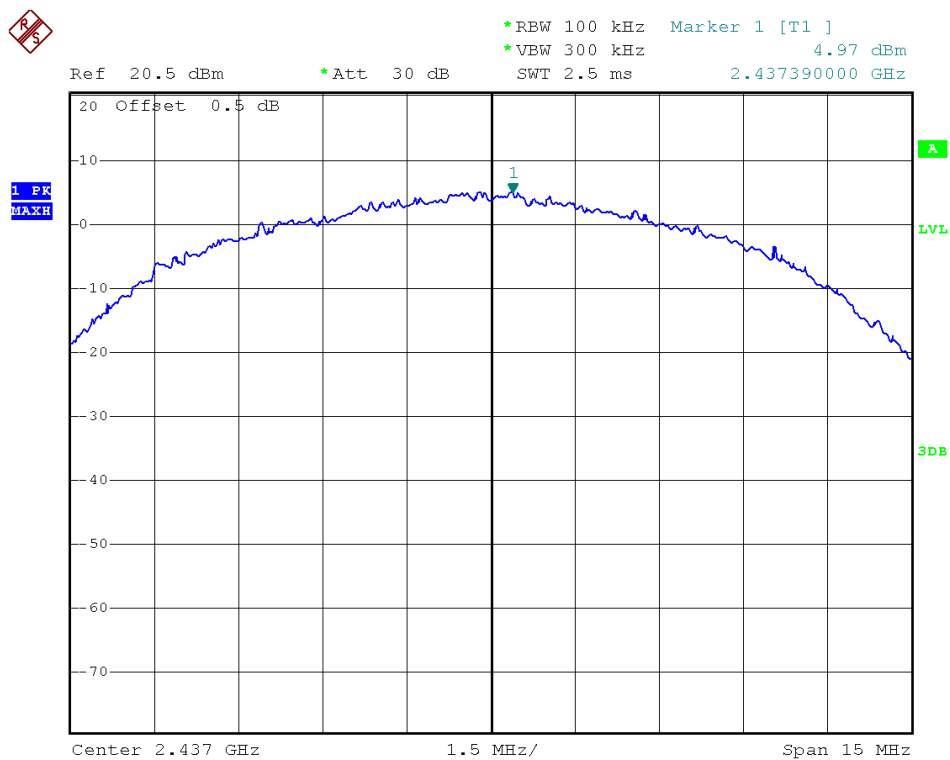
Spectral power density (dBm)						
Test mode	Channel	Frequency (MHz)	PSD/100kHz (dBm)	PSD/3kHz (dBm)	Limit (dBm/3kHz)	Verdict
802.11b	1	2412	4.94	-10.26	8	PASS
	6	2437	4.97	-10.23		PASS
	11	2462	4.81	-10.39		PASS
802.11g	1	2412	1.47	-13.73		PASS
	6	2437	1.13	-14.07		PASS
	11	2462	0.93	-14.27		PASS
802.11n20	1	2412	0.42	-14.78		PASS
	6	2437	0.25	-14.95		PASS
	11	2462	-0.09	-15.29		PASS
Measurement uncertainty: ±1.3dB						

Note:

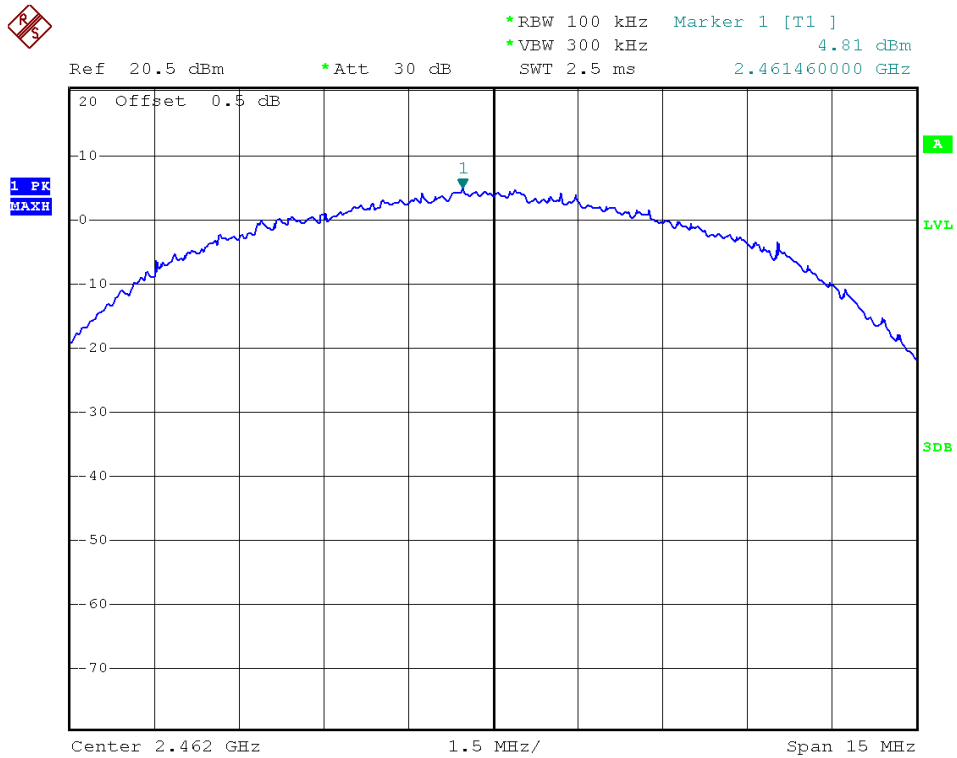
1. Measured power density (dBm) has offset with cable loss.
2. Bandwidth correction: $10\log(3\text{kHz}/100\text{kHz})=-15.2\text{dB}$



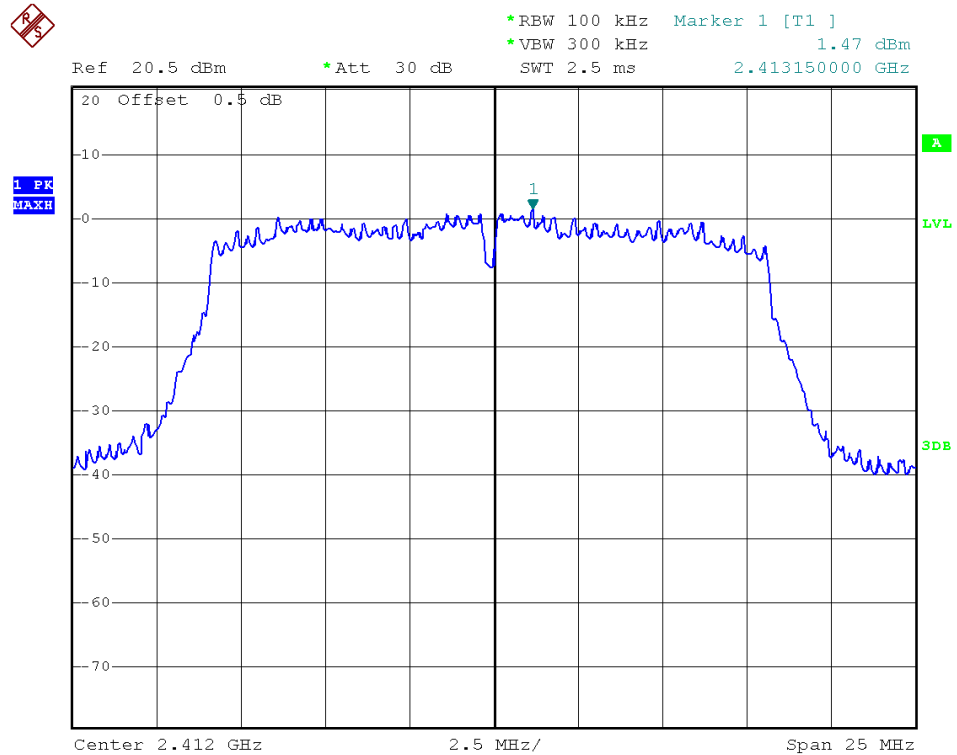
802.11b - Channel 1



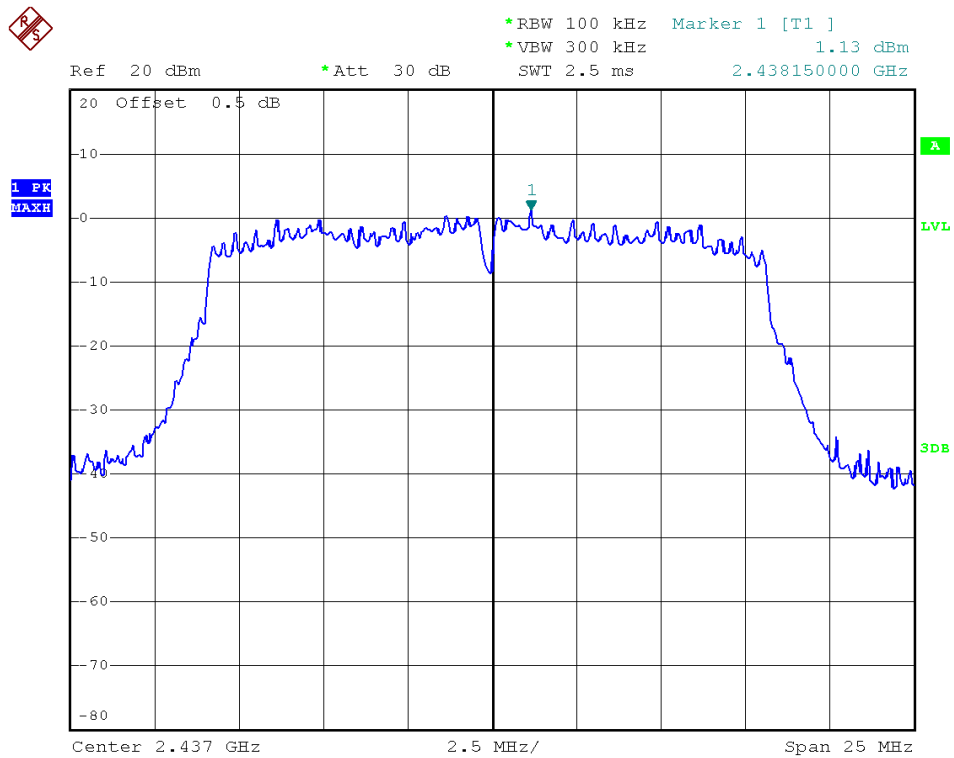
802.11b - Channel 6



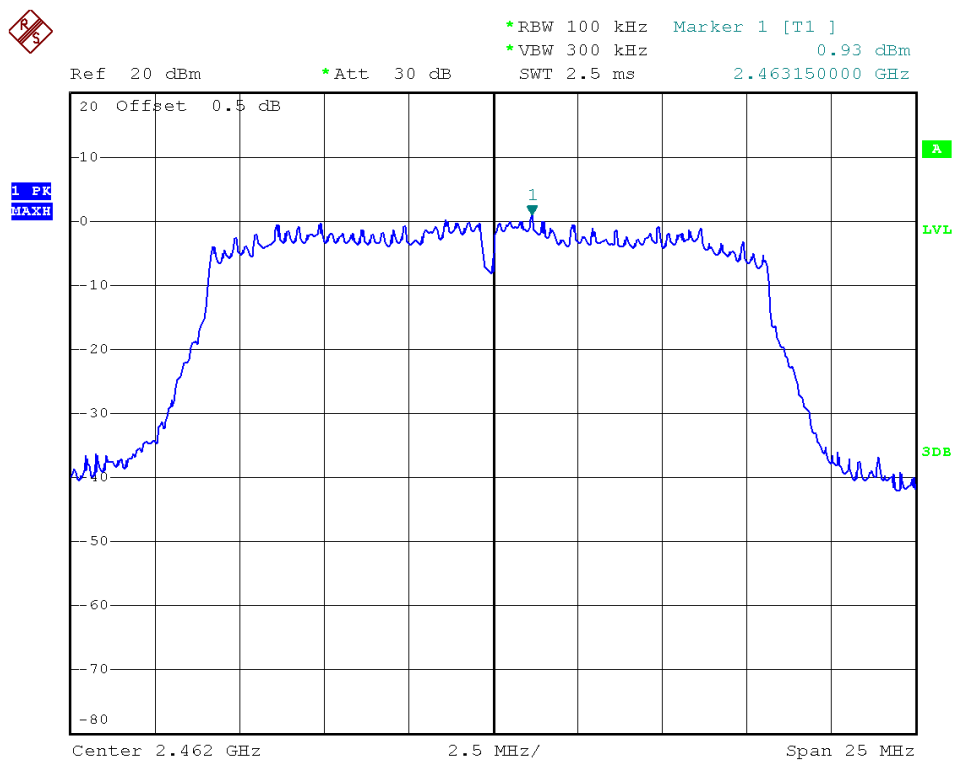
802.11b - Channel 11



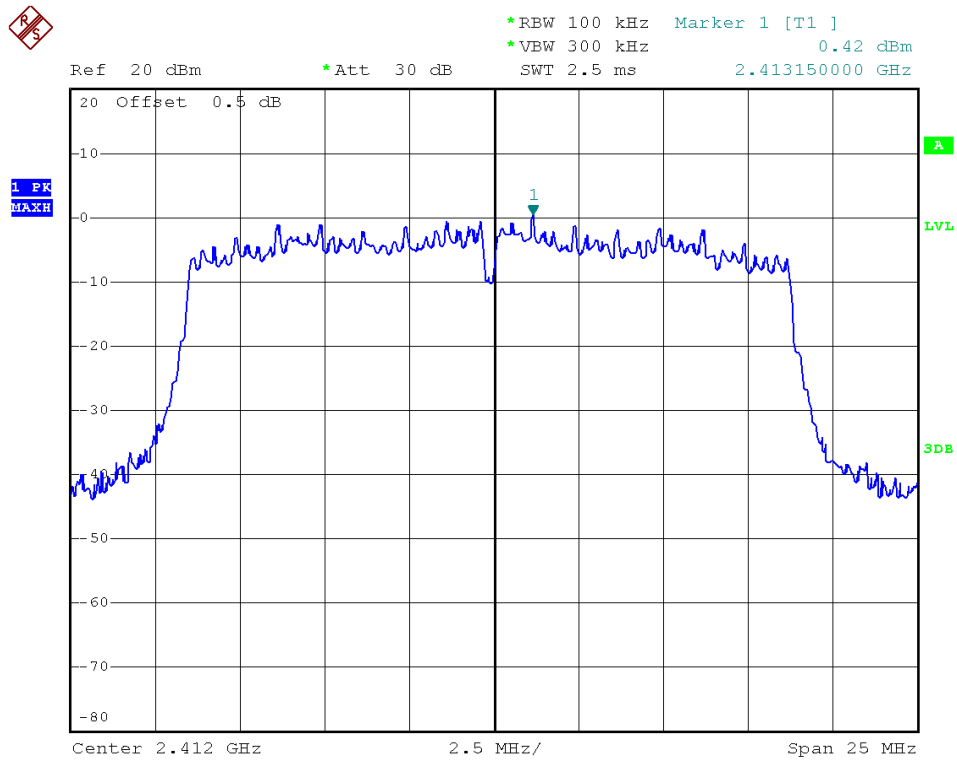
802.11g - Channel 1



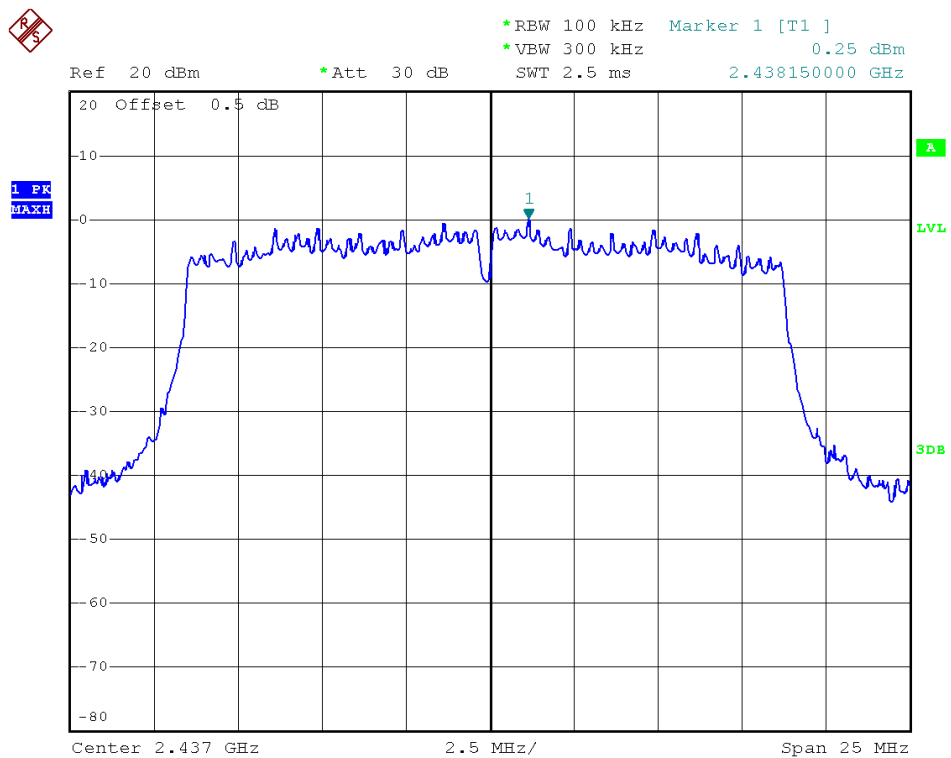
802.11g - Channel 6



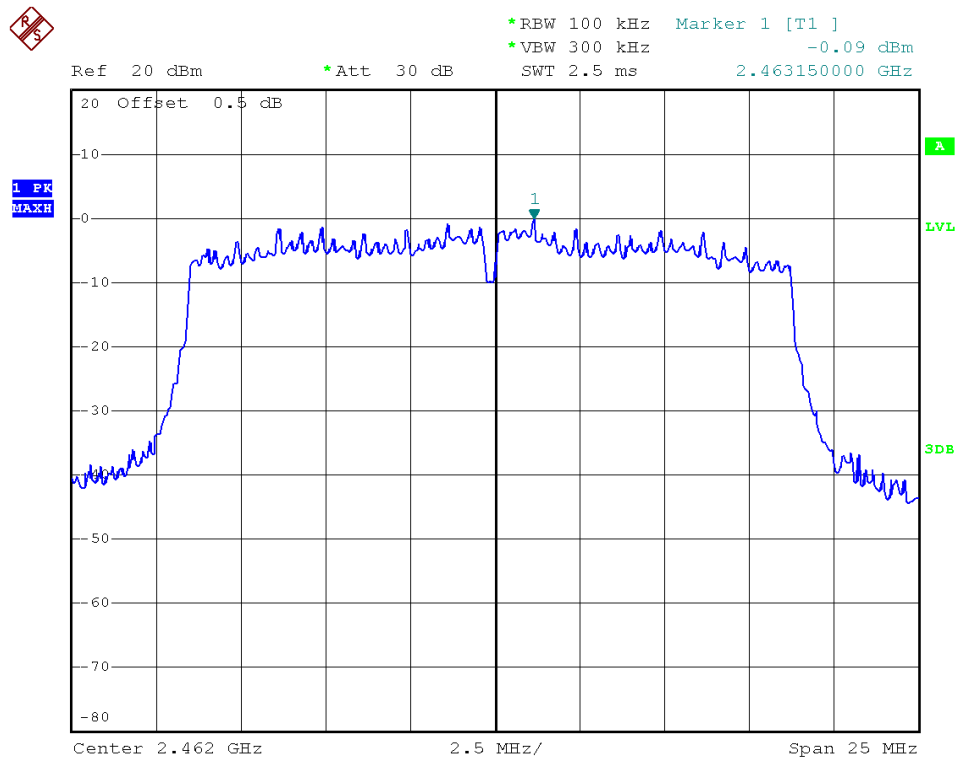
802.11g - Channel 11



802.11n20 - Channel 1



802.11n20 - Channel 6



802.11n20 - Channel 11

2.6 Radiated Band Edge and Spurious Emission

2.6.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

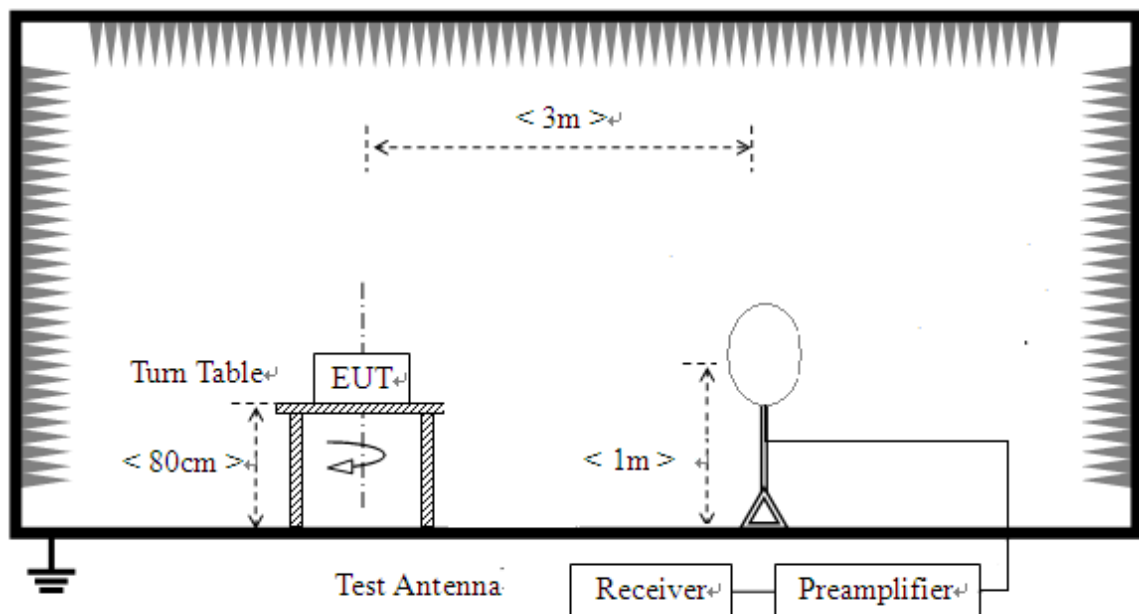
Note: Wireless charger configuration was evaluated.

2.6.2 Measuring Instruments

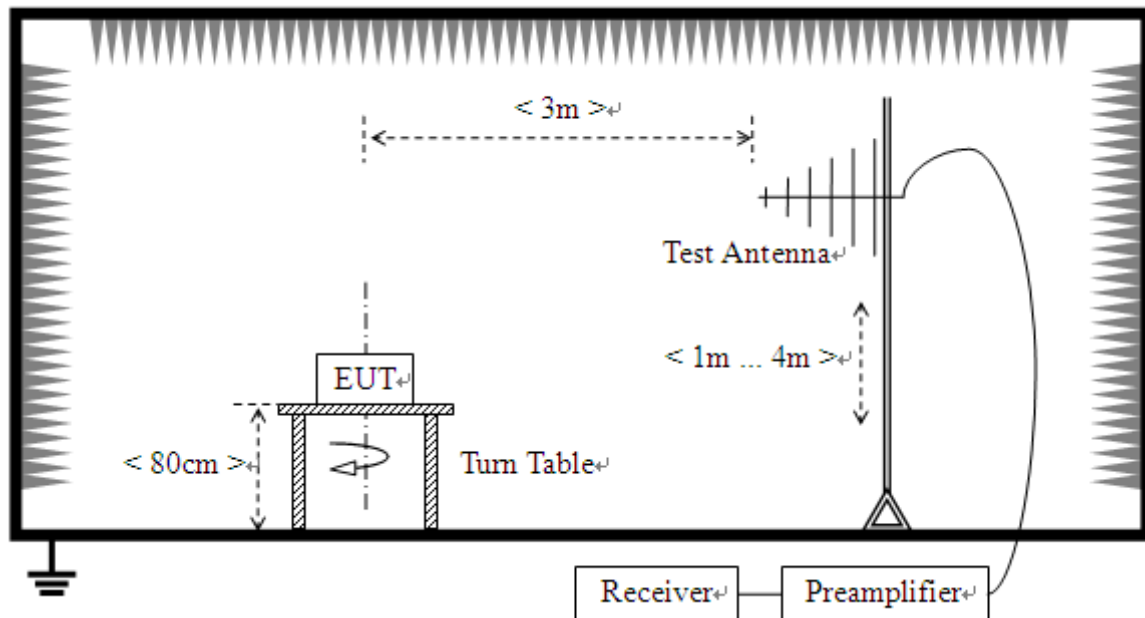
The measuring equipment is listed in the section 3 of this test report.

2.6.3 Test Setup

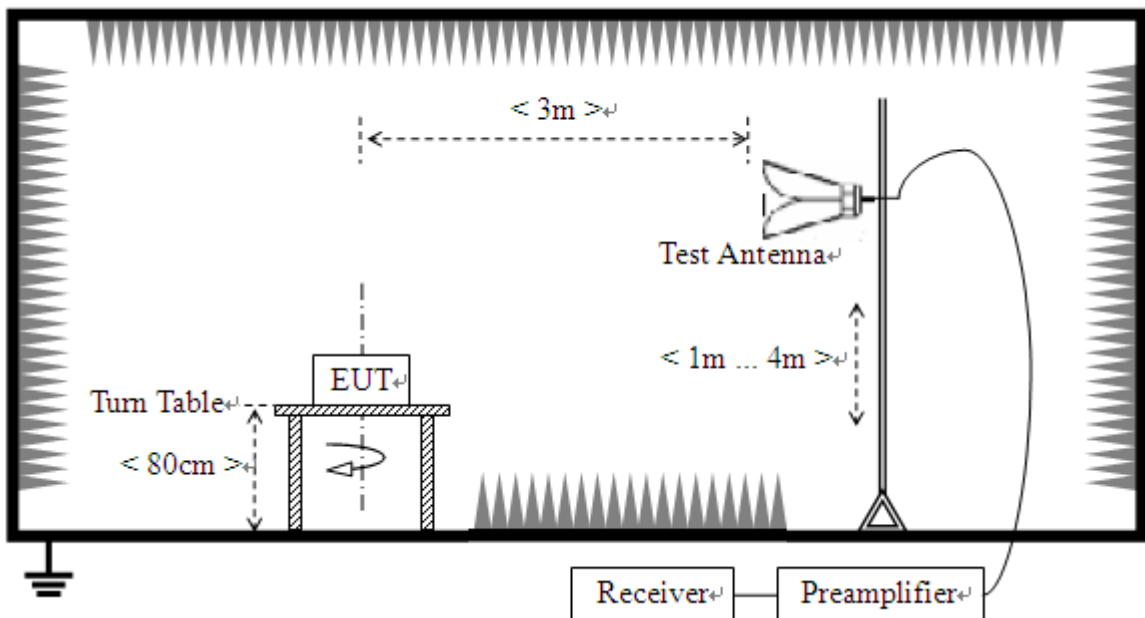
For radiated emissions from 9 KHz to 30 MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4 Test Procedures

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.

Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

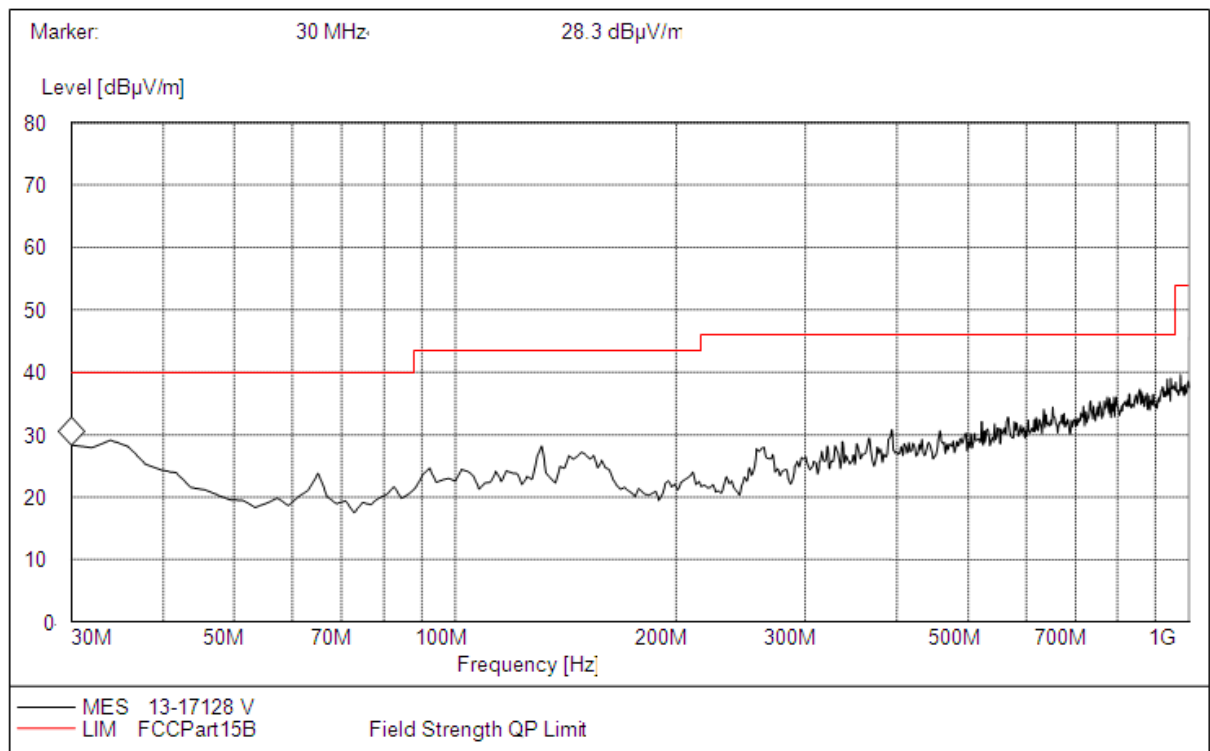
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

2.6.5 Test Results of Radiated Band Edge and Spurious Emission

For 9 kHz to 30MHz

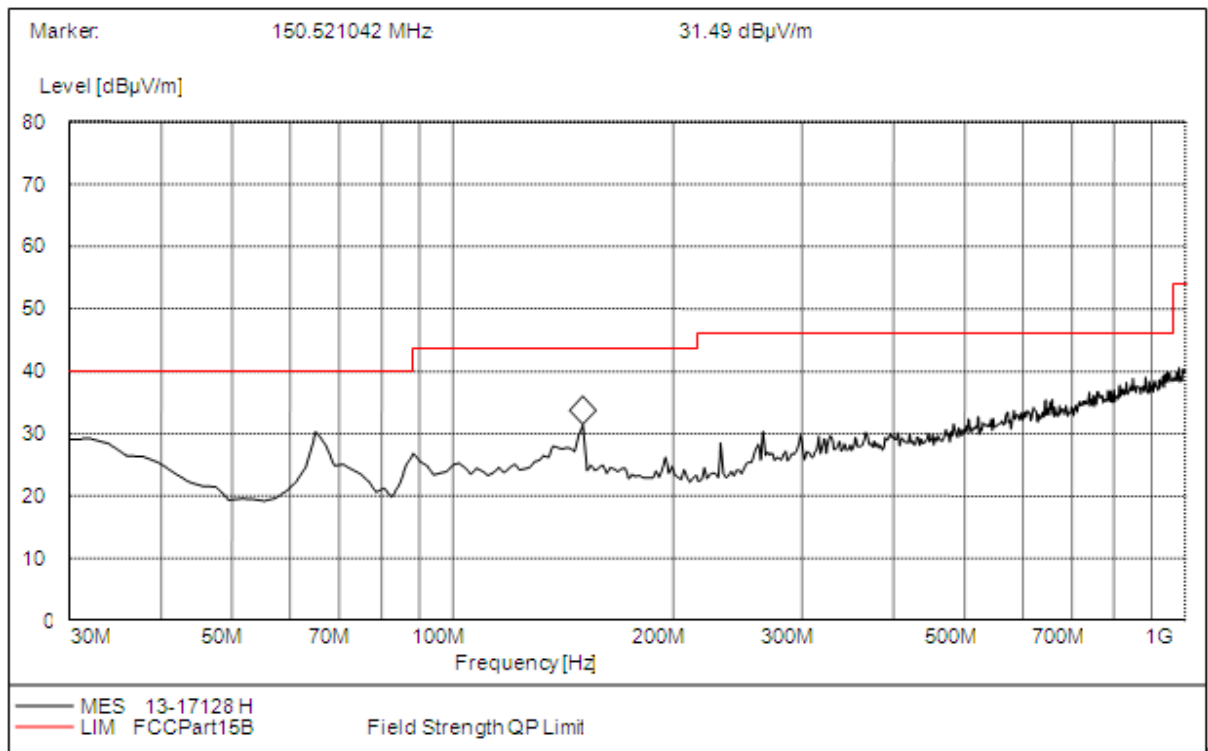
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1000 MHz



Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBμV/m)	Margin (dB)	Antenna	Verdict
30.000000	28.30	120.000	100.0	40.00	11.70	Vertical	Pass
143.2463406	28.25	120.000	100.0	43.50	15.25	Vertical	Pass
561.1415243	32.76	120.000	100.0	46.00	13.24	Vertical	Pass

(Plot A: 30MHz to 1GHz, Antenna Vertical)



Frequency (MHz)	QuasiPeak (dBμ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBμ V/m)	Margin (dB)	Antenna	Verdict
65.102204	30.12	120.000	100.0	40.00	9.88	Horizontal	Pass
150.521042	31.49	120.000	100.0	43.50	12.02	Horizontal	Pass
569.293425	33.01	120.000	100.0	46.00	12.99	Horizontal	Pass

(Plot B: 30MHz to 1GHz, Antenna Horizontal)



For 1GHz to 25 GHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b_2412MHz)									
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	2390.00	56.40	PK	74.00	-17.60	1.01 H	228	24.20	32.20
2	2390.00	43.60	AV	54.00	-10.40	1.01 H	228	11.40	32.20
3	*2412.00	101.70	PK	/	/	1.03 H	112	69.50	32.20
4	*2412.00	97.70	AV	/	/	1.03 H	112	65.50	32.20
5	4824.00	51.40	PK	74.00	-22.60	1.00 H	254	46.10	5.30
6	4824.00	46.50	AV	54.00	-7.50	1.00 H	254	41.20	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b_2412MHz)									
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	2390.00	55.4	PK	74.00	-18.6	1.11 V	228	23.20	32.20
2	2390.00	44.3	AV	54.00	-9.7	1.11 V	228	12.10	32.20
3	*2412.00	114.7	PK	/	/	1.09 V	112	82.50	32.20
4	*2412.00	112.9	AV	/	/	1.03 V	112	80.70	32.20
5	4824.00	54.4	PK	74.00	-19.6	1.21 V	254	49.10	5.30
6	4824.00	43.5	AV	54.00	-10.5	1.21 V	254	38.20	5.30

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b_2437MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2437.00	107.7	PK	/	/	1.01 H	210	75.50	32.20
2	*2437.00	106.4	AV	/	/	1.01 H	210	74.20	32.20
3	4874.00	54.2	PK	74.00	-19.8	1.03 H	272	48.90	5.30
4	4874.00	44.0	AV	54.00	-10.0	1.03 H	272	38.70	5.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b_2437MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2437.00	109.00	PK	/	/	1.09 V	112	76.80	32.20
2	*2437.00	105.30	AV	/	/	1.09 V	112	73.10	32.20
3	4874.00	56.80	PK	74.00	-17.20	1.21 V	254	51.50	5.30
4	4874.00	46.50	AV	54.00	-7.50	1.21 V	254	41.20	5.30


ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b_2462MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2462.00	107.7	PK	/	/	1.05 H	215	75.40	32.30
2	*2462.00	105.5	AV	/	/	1.05 H	215	73.20	32.30
3	2483.50	56.8	PK	74.00	-17.2	1.05 H	211	24.40	32.40
4	2483.50	44.5	AV	54.00	-9.5	1.05 H	211	12.10	32.40
5	4924.00	52.1	PK	74.00	-21.9	1.45 H	320	46.60	5.50
6	4924.00	46.3	AV	54.00	-7.7	1.45 H	320	40.80	5.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b_2462MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2462.00	114.5	PK	/	/	1.05 V	174	82.20	32.30
2	*2462.00	113.8	AV	/	/	1.05 V	174	81.50	32.30
3	2483.50	57.5	PK	74.00	-16.5	1.05 V	177	25.10	32.40
4	2483.50	44.7	AV	54.00	-9.3	1.05 V	177	12.30	32.40
5	4924.00	54.9	PK	74.00	-19.1	1.45 V	201	49.40	5.50
6	4924.00	45.6	AV	54.00	-8.4	1.45 V	201	40.10	5.50


ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g_2412MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	2390.00	56.3	PK	74.0	-17.7	1.01 H	228	24.10	32.20
2	2390.00	43.4	AV	54.0	-10.6	1.01 H	228	11.20	32.20
3	*2412.00	102.1	PK	/	/	1.03 H	112	69.90	32.20
4	*2412.00	97.6	AV	/	/	1.03 H	112	65.40	32.20
5	4824.00	51.7	PK	74.00	-22.3	1.00 H	254	46.40	5.30
6	4824.00	48.5	AV	54.00	-5.5	1.00 H	254	43.20	5.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g_2412MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	2390.00	56.1	PK	74.0	-17.9	1.11 V	228	23.90	32.20
2	2390.00	43.4	AV	54.0	-10.6	1.11 V	228	11.20	32.20
3	*2412.00	116.9	PK	/	/	1.09 V	112	84.70	32.20
4	*2412.00	113.6	AV	/	/	1.03 V	112	81.40	32.20
5	4824.00	54.4	PK	74.00	-19.6	1.21 V	254	49.10	5.30
6	4824.00	44.7	AV	54.00	-9.3	1.21 V	254	39.40	5.30


ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g_2437MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2437.00	108.0	PK	/	/	1.01 H	210	75.80	32.20
2	*2437.00	105.6	AV	/	/	1.01 H	210	73.40	32.20
3	4874.00	53.4	PK	74.00	-20.6	1.03 H	272	48.10	5.30
4	4874.00	44.0	AV	54.00	-10.0	1.03 H	272	38.70	5.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g_2437MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2437.00	108.3	PK	/	/	1.09 V	112	76.10	32.20
2	*2437.00	107.7	AV	/	/	1.09 V	112	75.50	32.20
3	4874.00	56.8	PK	74.00	-17.2	1.21 V	254	51.50	5.30
4	4874.00	44.5	AV	54.00	-9.5	1.21 V	254	39.20	5.30


ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g_2462MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2462.00	109.7	PK	/	/	1.05 H	215	77.40	32.30
2	*2462.00	107.9	AV	/	/	1.05 H	215	75.60	32.30
3	2483.50	57.3	PK	74.0	-16.7	1.05 H	211	24.90	32.40
4	2483.50	44.2	AV	54.0	-9.8	1.05 H	211	11.80	32.40
5	4924.00	52.4	PK	74.0	-21.6	1.45 H	320	46.90	5.50
6	4924.00	44.2	AV	54.0	-9.8	1.45 H	320	38.70	5.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g_2462MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2462.00	120.6	PK	/	/	1.05 V	174	88.30	32.30
2	*2462.00	116.8	AV	/	/	1.05 V	174	84.50	32.30
3	2483.50	55.5	PK	74.0	-18.5	1.05 V	177	23.10	32.40
4	2483.50	44.7	AV	54.0	-9.3	1.05 V	177	12.30	32.40
5	4924.00	53.9	PK	74.0	-20.1	1.45 V	201	48.40	5.50
6	4924.00	45.9	AV	54.0	-8.1	1.45 V	201	40.40	5.50

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20_2412MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	2390.00	59.3	PK	74.0	-14.7	1.01 H	228	27.10	32.20
2	2390.00	42.7	AV	54.0	-11.3	1.01 H	228	10.50	32.20
3	*2412.00	104.4	PK	/	/	1.03 H	112	72.20	32.20
4	*2412.00	102.0	AV	/	/	1.03 H	112	69.80	32.20
5	4824.00	54.8	PK	74.00	-19.2	1.00 H	254	49.50	5.30
6	4824.00	46.6	AV	54.00	-7.4	1.00 H	254	41.30	5.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20_2412MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	2390.00	57.7	PK	74.0	-16.3	1.11 V	228	25.50	32.20
2	2390.00	43.7	AV	54.0	-10.3	1.11 V	228	11.50	32.20
3	*2412.00	117.1	PK	/	/	1.09 V	112	84.90	32.20
4	*2412.00	115	AV	/	/	1.03 V	112	82.80	32.20
5	4824.00	54.4	PK	74.00	-19.6	1.21 V	254	49.10	5.30
6	4824.00	44.9	AV	54.00	-9.1	1.21 V	254	39.60	5.30


ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20_2437MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2437.00	114.3	PK	/	/	1.01 H	210	82.10	32.20
2	*2437.00	114.1	AV	/	/	1.01 H	210	81.90	32.20
3	4874.00	57.8	PK	74.00	-16.2	1.03 H	272	52.50	5.30
4	4874.00	45.2	AV	54.00	-8.8	1.03 H	272	39.90	5.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20_2437MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2437.00	114.0	PK	/	/	1.09 V	112	81.80	32.20
2	*2437.00	115.3	AV	/	/	1.09 V	112	83.10	32.20
3	4874.00	56.8	PK	74.00	-17.2	1.21 V	254	51.50	5.30
4	4874.00	45.5	AV	54.00	-8.5	1.21 V	254	40.20	5.30

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20_2462MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2462.00	111.2	PK	/	/	1.05 H	215	78.90	32.30
2	*2462.00	109.9	AV	/	/	1.05 H	215	77.60	32.30
3	2483.50	56.3	PK	74.0	-17.7	1.05 H	211	23.90	32.40
4	2483.50	44.1	AV	54.0	-9.9	1.05 H	211	11.70	32.40
5	4924.00	53.4	PK	74.0	-20.6	1.45 H	320	47.90	5.50
6	4924.00	46.3	AV	54.0	-7.7	1.45 H	320	40.80	5.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20_2462MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)
1	*2462.00	110.5	PK	/	/	1.05 V	174	78.20	32.30
2	*2462.00	107.8	AV	/	/	1.05 V	174	75.50	32.30
3	2483.50	55.5	PK	74.0	-18.5	1.05 V	177	23.10	32.40
4	2483.50	44.7	AV	54.0	-9.3	1.05 V	177	12.30	32.40
5	4924.00	55.9	PK	74.0	-18.1	1.45 V	201	50.40	5.50
6	4924.00	46.4	AV	54.0	-7.6	1.45 V	201	40.90	5.50

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
- Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level - Limit value
5. " * ": Fundamental frequency.

2.7 Conducted Emission

2.7.1 Limit of Conducted Emission

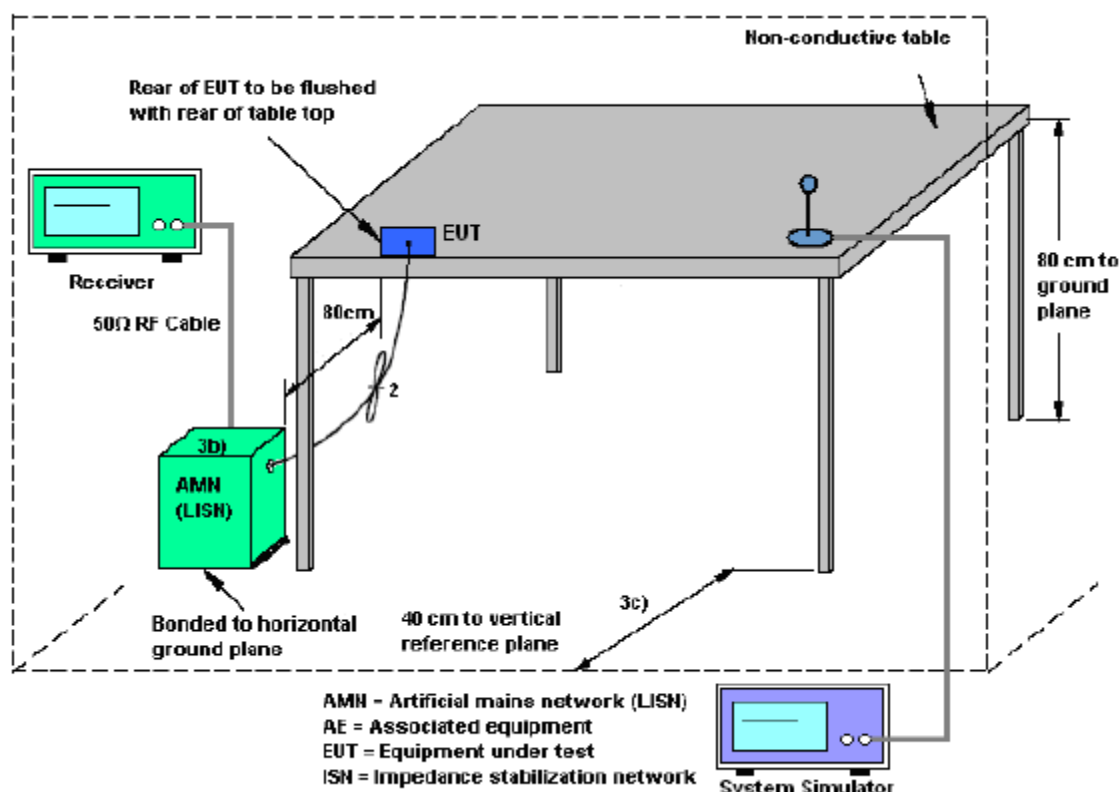
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

2.7.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3 Test Setup

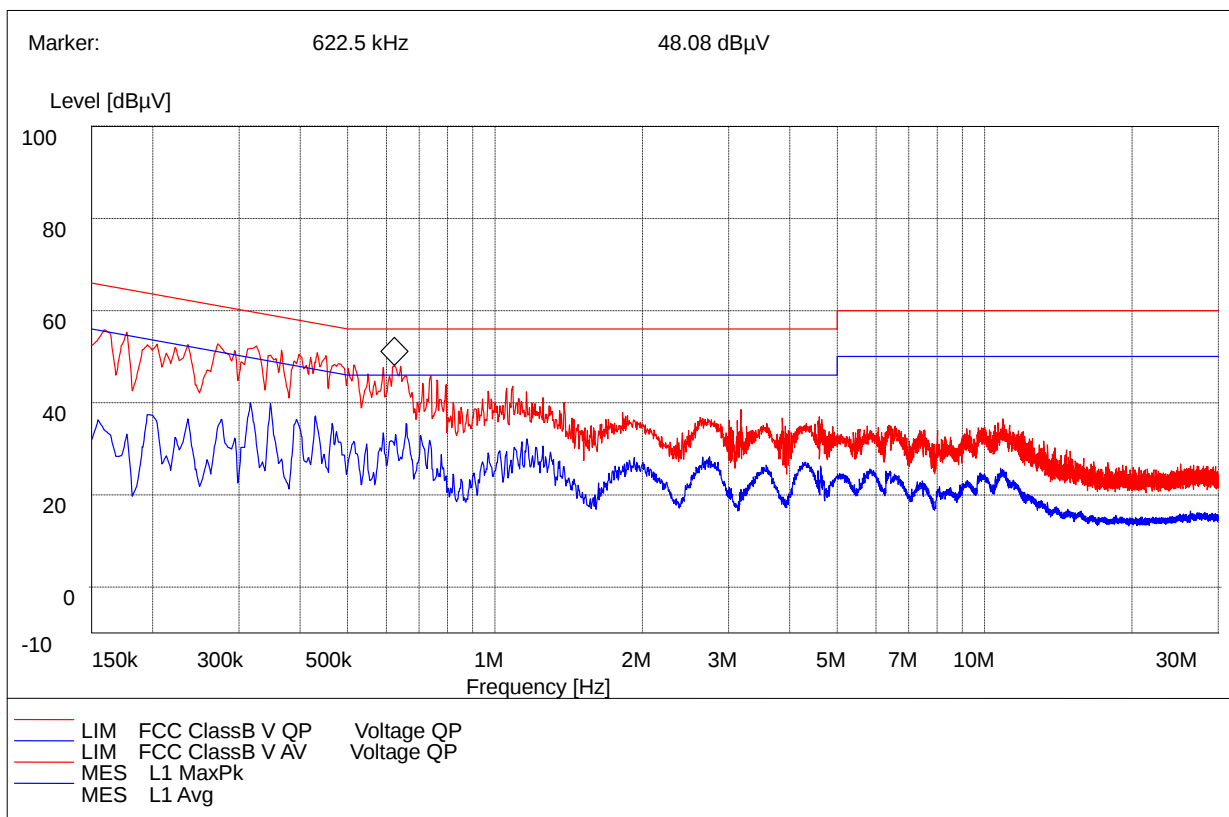


2.7.4 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.7.5 Test Results of Conducted Emission

The EUT configuration of the emission tests is Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter).



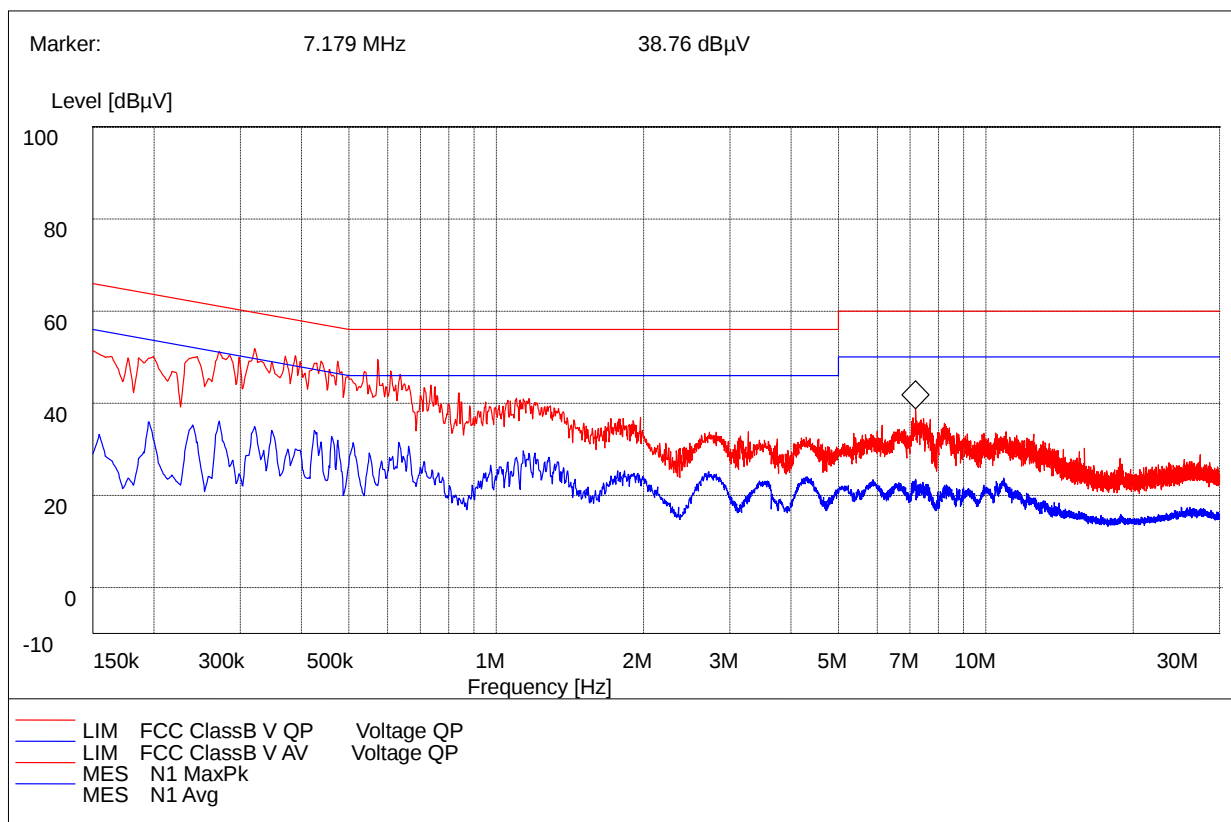
Conducted Disturbance at Mains Terminals

L Test Data

QP			AV		
Frequency (MHz)	Limits (dB μ V)	Measurement Value (dB μ V)	Frequency (MHz)	Limits (dB μ V)	Measurement Value (dB μ V)
0.159000	65.50	54.54	0.159000	55.50	34.06
0.271500	61.10	52.63	0.271500	51.10	34.51
0.622500	56.00	47.22	0.622500	46.00	30.78

L Test Curve

(Plot A: L Phase)



Conducted Disturbance at Mains Terminals					
N Test Data					
QP			AV		
Frequency (MHz)	Limits (dB μ V)	Measurement Value (dB μ V)	Frequency (MHz)	Limits (dB μ V)	Measurement Value (dB μ V)
0.321000	59.70	50.21	0.321000	49.70	34.97
0.474000	56.00	48.23	0.474000	46.00	31.53
0.609000	56.00	46.25	0.609000	46.00	27.55
N Test Curve					

(Plot B: N Phase)

Test Result: PASS



3. LIST OF MEASURING EQUIPMENT

Description	Manufacturer	Model	Serial No.	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB26	A0304218	2015.06.02	2016.06.01	Radiation
Full-Anechoic Chamber	Albatross	12.8m*6.8m*6.4m	A0412372	2015.01.05	2016.01.04	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2015.06.02	2016.06.01	Radiation
Bilog Antenna	Schwarzbeck	VULB 9163	9163-274	2015.06.02	2016.06.01	Radiation
Double ridge horn antenna	R&S	HF906	100150	2015.06.02	2016.06.01	Radiation
Ultra-wideband antenna	R&S	HL562	100089	2015.06.02	2016.06.01	Radiation
Test Antenna – Horn (18-26.5GHz)	ETS	3160-09	A0902607	2015.06.02	2016.06.01	Radiation
Amplifier 20M~3GHz	R&S	PAP-0203H	22018	2015.06.02	2016.06.01	Radiation
Ampilier 1G~18GHz	R&S	MITEQ AFS42-00101800	25-S-42	2015.06.02	2016.06.01	Radiation
Ampilier 18G~40GHz	R&S	JS42-18002600-28-5A	12111.0980.00	2015.06.02	2016.06.01	Radiation
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2015.07.07	2016.07.06	Conducted
Power Meter	R&S	NRVS	1020.1809.02	2015.06.02	2016.06.01	Conducted
Power Sensor	R&S	NRV-Z4	823.3618.03	2015.06.02	2016.06.01	Conducted
LISN	ROHDE&SC HWARZ	ESH2-Z5	A0304221	2015.06.02	2016.06.01	Conducted
Test Receiver	R&S	ESCS30	A0304260	2015.06.02	2016.06.01	Conducted
Cable	SUNHNER	SUCOFLEX 100	/	2015.06.02	2016.06.01	Radiation
Cable	SUNHNER	SUCOFLEX 104	/	2015.06.02	2016.06.01	Radiation

*** END OF REPORT ***