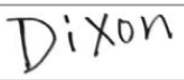
FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.....:	**MWR1407002801**	
FCC ID.....:	**ZGAGX-7012**	
Compiled by (position+printed name+signature)..:	File administrators Martin Ao	
Supervised by (position+printed name+signature)..:	Test Engineer Martin Ao	
Approved by (position+printed name+signature)..:	Manager Dixon Hao	
Date of issue.....:	July 09, 2014	
Representative Laboratory Name .:	**Maxwell International Co., Ltd.**	
Address .....:	Room 509, Hongfa center building, Baoan District, Shenzhen, Guangdong, China	
Testing Laboratory Name .....:	**Shenzhen CTL Testing Technology Co., Ltd.**	
Address .....:	Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan,Shenzhen,China	
Applicant's name.....:	**Gardex electronics company Limited**	
Address .....:	No.0309 Bldg B,Marina Bay center,Haixiu Rd,Baoan District Center	
Test specification .....**:**		
Standard .....:	**FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz**	
TRF Originator.....:	Maxwell International Co., Ltd.	
Master TRF.....:	Dated 2011-05	

Test item description .....:	MID
Trade Mark .....:	/
Model/Type reference.....:	UDI7012
Listed Models .....:	/
Manufacturer.....:	**Gardex electronics company Limited**
Modulation Type .....:	DSSS(CCK,DQPSK,DBPSK),OFDM(64QAM,16QAM,QPSK, BPSK)
Operation Frequency.....:	From 2412MHz to 2462MHz
Rating .....:	DC 3.70V
Result.....:	**PASS**

TEST REPORT

Test Report No. :	MWR1407002801	July 09, 2014 Date of issue

Equipment under Test	:	MID
Model /Type	:	UDI7012
Listed Models	:	/
Applicant	:	**Gardex electronics company Limited**
Address	:	No.0309 Bldg B,Marina Bay center,Haixiu Rd,Baoan District Center
Manufacturer		**Gardex electronics company Limited**
Address	:	No.0309 Bldg B,Marina Bay center,Haixiu Rd,Baoan District Center

Test Result	PASS

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10: American National Standard for Testing Unlicensed Wireless Devices

KDB558074 D01 v03r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	July 01, 2014
Testing commenced on	:	July 01, 2014
Testing concluded on	:	July 08, 2014

2.2. Product Description

The **Gardex electronics company Limited**'s Model: UDI7012 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	MID
Model Number	UDI7012
FCC ID	ZGAGX-7012
WLAN	Supported 802.11b/802.11g/802.11n
Antenna Type	Internal
WLAN FCC Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
WLAN Modulation	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Android Version	Android 4.2.2

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.70V

2.4. Description of the test mode

IEEE 802.11b/g/n: The product support Third channels but only use Eleventh channels in USA.

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

2.5. Short description of the Equipment under Test (EUT)

MID (M/N: UDI7012))

For more details, refer to the user's manual of the EUT.

2.6. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides command to control the EUT for staying in continous transmitting and receiving mode according to KDB558074 requirement for Duty Cycle more than 98% for testing.

2.7. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: ZGAGX-7012** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.9. Modifications

No modifications were implemented to meet testing criteria.

2.10. NOTE

1. The EUT is a MID with WiFi fuction,The functions of the EUT listed as below:

	Test Standards	Reference Report
WiFi	FCC Part 15 C 15.247	MWR1407002801
RF Exposure	FCC Part 2 §2.1093	MWR1407002802

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	√	—	—	—
802.11g	√	—	—	—
802.11n(20MHz)	√	—	—	—
802.11n(40MHz)	√	—	—	—

3. The EUT incorporates a SISO function,Physically,the EUT provides one completed transmitter and one completed receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen,China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. 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 970318, Dec 19, 2013

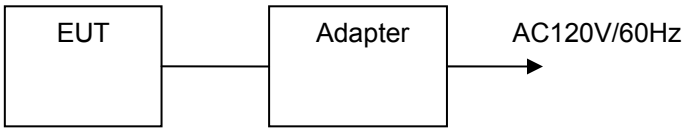
3.3. Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Adapter:

Model: HNB050200U
Input: 100-240V～50/60Hz 0.35A MAX
Output: OUTPUT: 5.0V DC 2A
Power Cable: 60cm
○ Shielded ● Unshielded

3.5. Test Description

FCC PART 15 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

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.

Test Items	Mode	Data Rate	Channel
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11n(40MHz)/OFDM	13.5Mbps	3/6/9
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(40MHz)/OFDM	13.5Mbps	3/9

3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen CTL Testing Technology Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 9KHz-30MHz	2.88 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)
Emission Mask	---------	(1)
Modulation Characteristic	---------	(1)
Transmitter Frequency Behavior	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.7. Equipments Used during the Test

AC Power Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Artificial Mains	Rohde&Schwarz	ENV216	101316	2014/07/02
2	EMI Test Receiver	Rohde&Schwarz	ESCI3	103710	2014/07/02
3	Pulse Limiter	Com-Power	LIT-153	53226	2014/07/01
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2013/07/12
2	EMI TEST Receivcer	Rohde&Schwarz	ESCI3	103710	2014/07/02
3	EMI TEST Software	Audix	E3	N/A	N/A
4	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A
5	HORN ANTENNA	Sunol Sciences Corp.	DRH-118	A062013	2013/07/12
6	Amplifer	HP	8447D	3113A07663	2013/10/27
7	Preamplifier	HP	8349B	3155A00882	2014/07/03
8	Amplifer	Compliance Direction systems	PAP1-4060	129	2014/07/03
9	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2014/06/29
10	TURNTABLE	MATURO	TT2.0	----	N/A
11	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
12	Horn Antenna	SCHWARZBECK	BBHA9170	25849	2014/06/21
13	Spectrum Analyzer	Rohde&Schwarz	FSU26	201148	2014/07/02

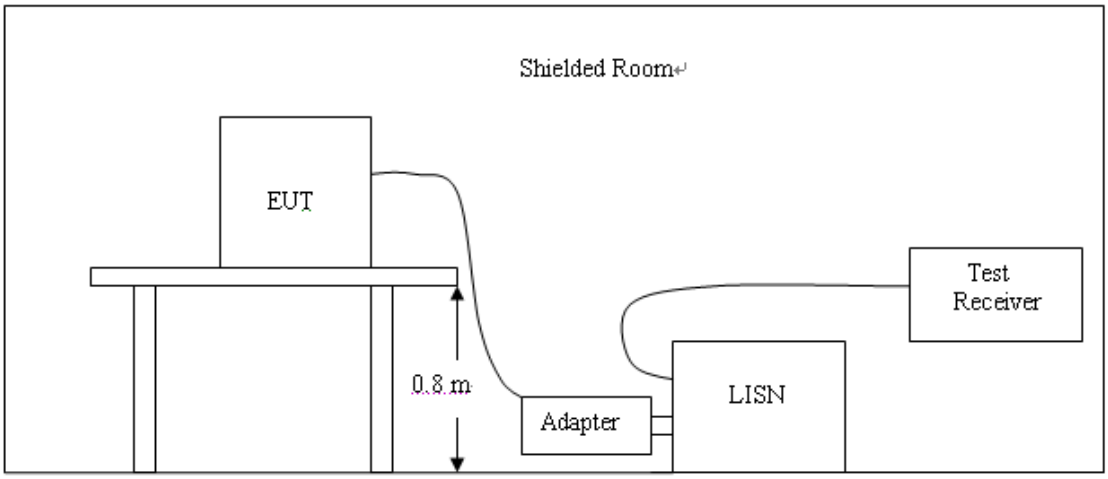
Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	Rohde&Schwarz	FSU26	201148	2014/07/02
2	Power Sensor	Rohde&Schwarz	NRR-Z81	256697	2014/07/02

The Cal.Interval was one year

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2009.
2. Support equipment, if needed, was placed as per ANSI C63.10-2009
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2009
4. The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

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

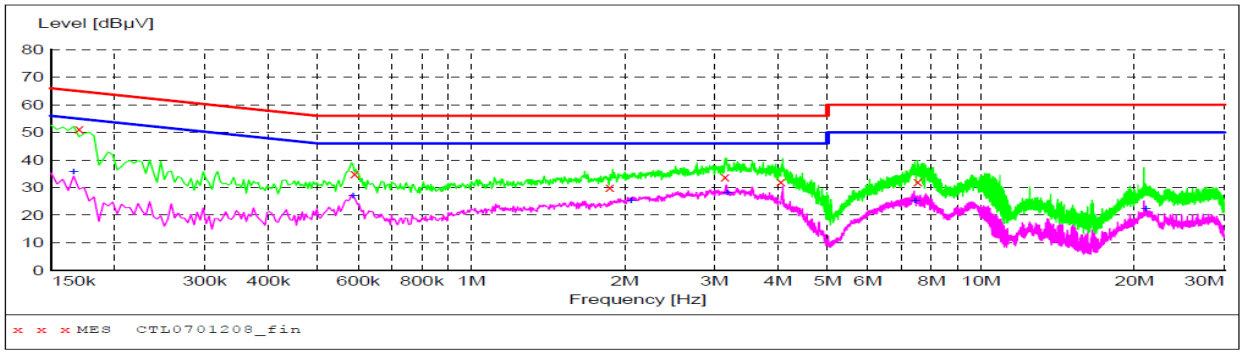
Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

The AC Power Conducted Emission measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode,the middle channel) is the worst case for all the test modes and channels.

SCAN TABLE: "Voltage (9K-30M) FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL0701208_fin"

7/01/2014 7:34PM

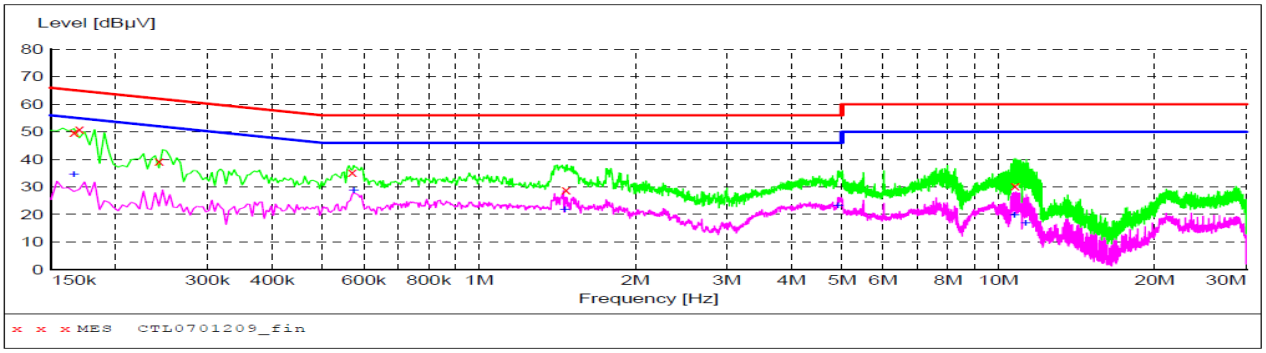
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.170000	51.20	12.6	65	13.8	QP	N	GND
0.590000	34.90	10.4	56	21.1	QP	N	GND
1.870000	29.90	10.5	56	26.1	QP	N	GND
3.146000	33.80	10.5	56	22.2	QP	N	GND
4.050000	32.00	10.5	56	24.0	QP	N	GND
7.518000	32.10	10.6	60	27.9	QP	N	GND

MEASUREMENT RESULT: "CTL0701208_fin2"

7/01/2014 7:34PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.166000	35.50	12.7	55	19.7	AV	N	GND
0.586000	26.80	10.4	46	19.2	AV	N	GND
2.058000	25.20	10.5	46	20.8	AV	N	GND
3.182000	27.90	10.5	46	18.1	AV	N	GND
7.426000	25.10	10.6	50	24.9	AV	N	GND
21.054000	22.10	11.0	50	27.9	AV	N	GND

SCAN TABLE: "Voltage (9K-30M) FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL0701209_fin"

7/01/2014 7:37PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.166000	49.80	12.7	65	15.4	QP	L1	GND
0.170000	50.80	12.6	65	14.2	QP	L1	GND
0.242000	39.40	11.4	62	22.6	QP	L1	GND
0.570000	35.40	10.4	56	20.6	QP	L1	GND
1.470000	28.90	10.5	56	27.1	QP	L1	GND
10.770000	30.30	10.7	60	29.7	QP	L1	GND

MEASUREMENT RESULT: "CTL0701209_fin2"

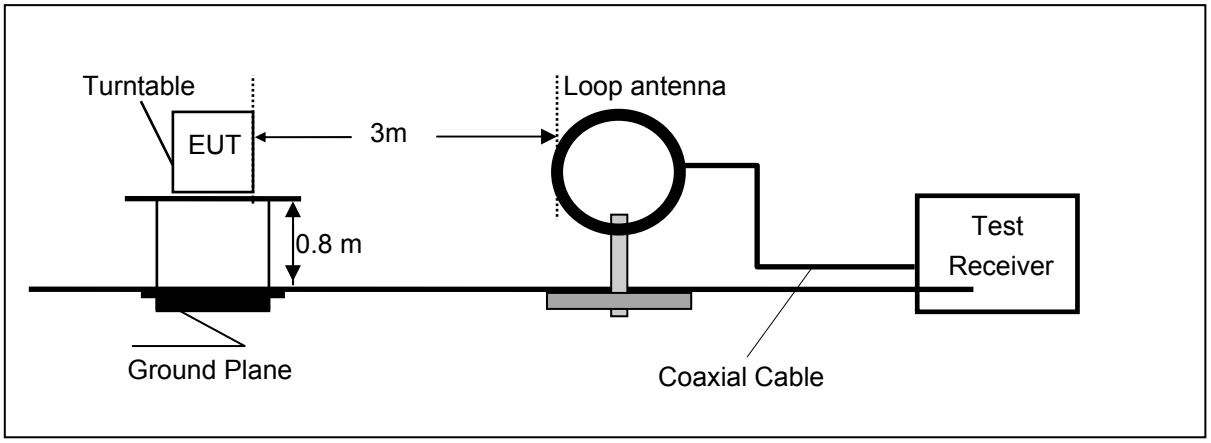
7/01/2014 7:37PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.166000	34.30	12.7	55	20.9	AV	L1	GND
0.574000	28.70	10.4	46	17.3	AV	L1	GND
1.462000	21.60	10.5	46	24.4	AV	L1	GND
4.910000	23.00	10.5	46	23.0	AV	L1	GND
10.730000	19.50	10.7	50	30.5	AV	L1	GND
11.290000	16.60	10.7	50	33.4	AV	L1	GND

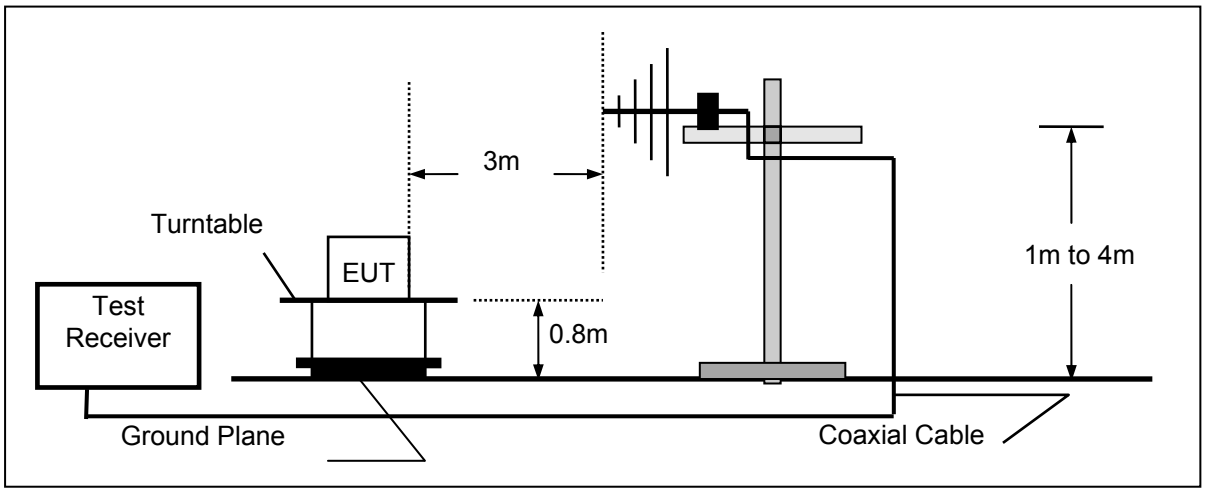
4.2. Radiated Emission

TEST CONFIGURATION

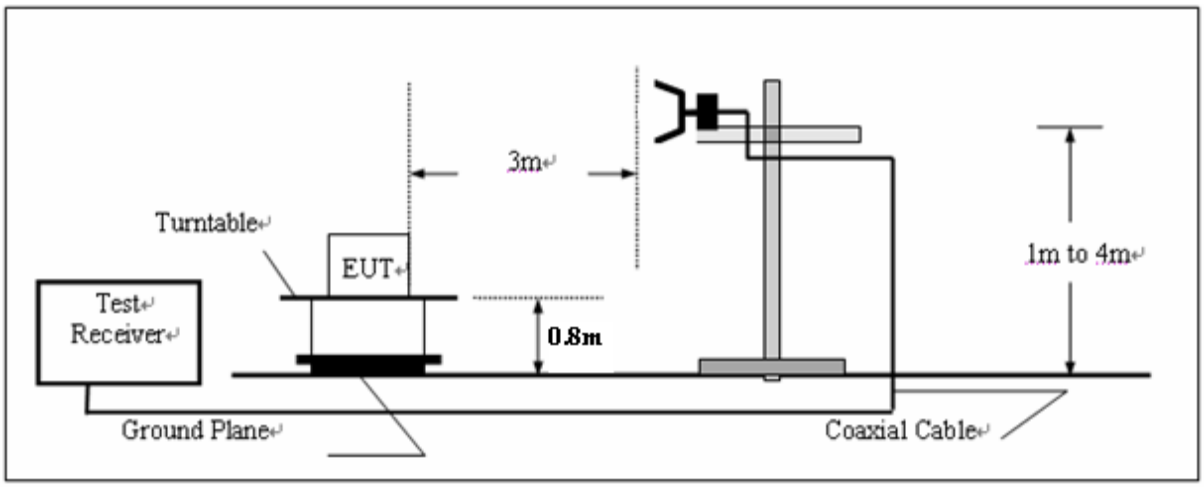
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.

3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2462MHz.so radiated emission test frequency band from 9KHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values.

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

TEST RESULTS

Remark:

1. The radiated measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode,the middle channel) is the worst case for all the test mode and channel.
2. Bilog Antenna for the radiation emission test below 1G.
3. HORN ANTENNA for the radiation emission test above 1G.
4. We tested both battery powered and powered by adapter charging mode at three orientations,recored woest case at powered by adapter charging mode.

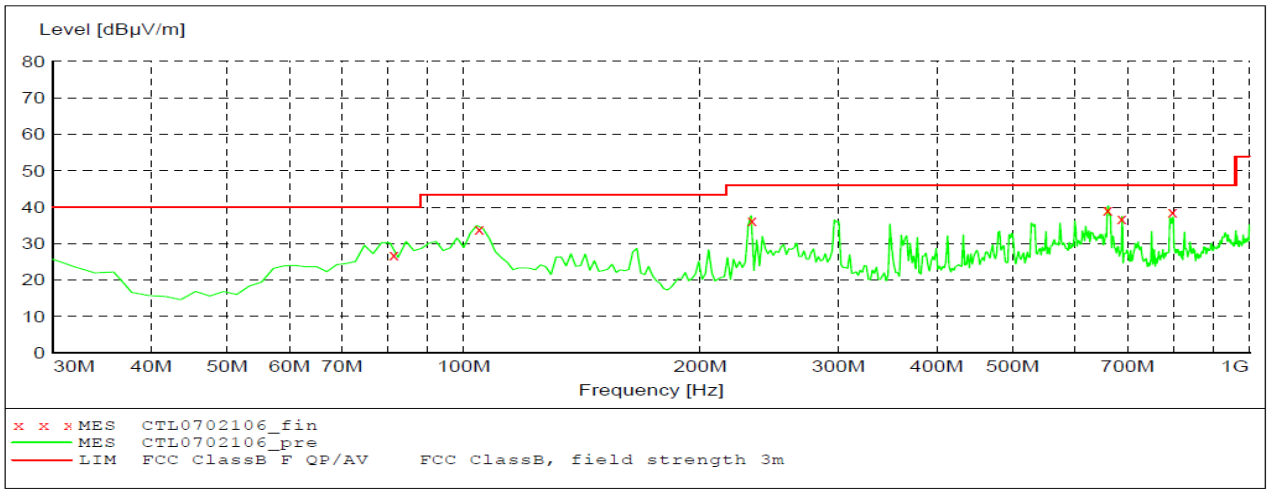
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
12.00	49.25	69.54	20.29	QP	PASS
24.00	48.77	69.54	20.77	QP	PASS

For 30MHz to 1000MHz

SCAN TABLE: "test Field(30M-1G)QP"

Short Description:			Field Strength(30M-1G)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	15.0	120 kHz	2014



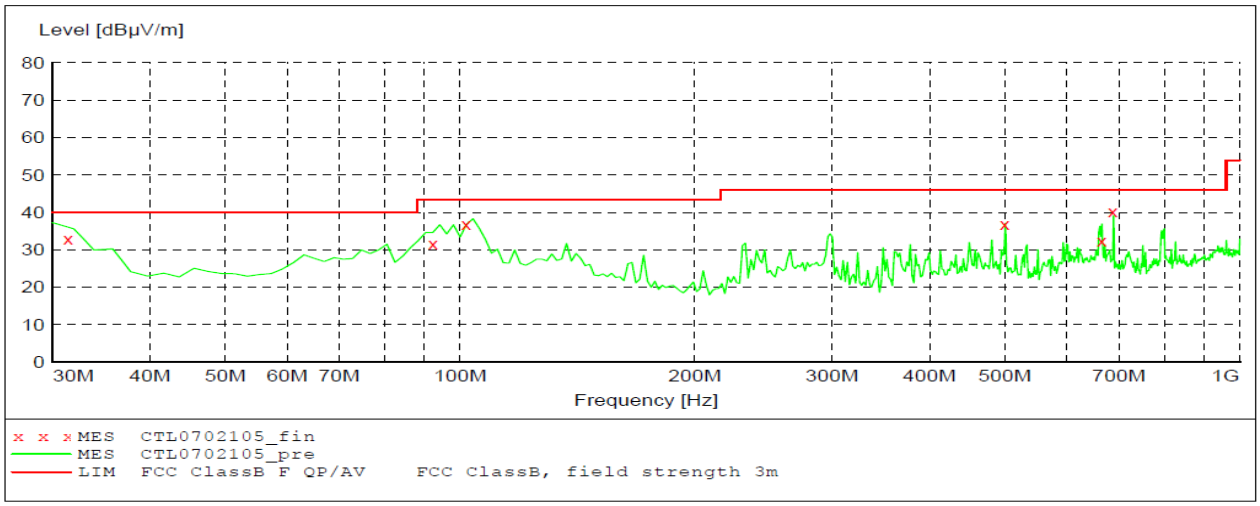
MEASUREMENT RESULT: "CTL0702106_fin"

7/2/2014 12:21AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
81.480000	26.90	-22.4	40.0	13.1	QP	327.0	188.00	HORIZONTAL
104.700000	34.10	-19.3	43.5	9.4	QP	251.0	183.00	HORIZONTAL
232.920000	36.20	-20.4	46.0	9.8	QP	100.0	264.00	HORIZONTAL
660.360000	39.30	-11.0	46.0	6.7	QP	147.0	152.00	HORIZONTAL
688.080000	36.90	-10.9	46.0	9.1	QP	100.0	163.00	HORIZONTAL
798.900000	38.60	-8.8	46.0	7.4	QP	118.0	179.00	HORIZONTAL

SCAN TABLE: "test Field(30M-1G)QP"

Short Description:			Field Strength(30M-1G)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	15.0	120 kHz	20114



MEASUREMENT RESULT: "CTL0702105_fin"

7/2/2014 12:11AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.440000	33.00	-10.9	40.0	7.0	QP	100.0	196.00	VERTICAL
92.340000	31.70	-20.5	43.5	11.8	QP	114.0	225.00	VERTICAL
101.880000	36.70	-19.6	43.5	6.8	QP	100.0	218.00	VERTICAL
499.980000	36.80	-14.3	46.0	9.2	QP	100.0	280.00	VERTICAL
665.460000	32.40	-11.1	46.0	13.6	QP	100.0	235.00	VERTICAL
688.080000	40.10	-10.9	46.0	5.9	QP	124.0	168.00	VERTICAL

For 1GHz to 25GHz

802.11b Mode(above 1GHz)

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	52.56	PK	74.00	21.44	1.00	26	50.46	31.60	7.00	36.5	2.10
1	4824.00	42.89	AV	54.00	11.11	1.00	26	40.79	31.60	7.00	36.5	2.10
2	7236.00	57.78	PK	74.00	16.22	1.00	127	46.85	37.33	8.90	35.3	10.93
2	7236.00	41.36	AV	54.00	12.64	1.00	127	30.43	37.33	8.90	35.3	10.93

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)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	50.14	PK	74.00	23.86	1.00	347	48.04	31.60	7.00	36.5	2.10
1	4824.00	40.02	AV	54.00	13.98	1.00	347	37.92	31.60	7.00	36.5	2.10
2	7236.00	56.81	PK	74.00	17.19	1.00	122	45.88	37.33	8.90	35.3	10.93
2	7236.00	43.15	AV	54.00	10.85	1.00	122	32.22	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	49.98	PK	74.00	24.02	1.00	125	47.86	31.02	7.60	36.5	2.12
1	4874.00	39.46	AV	54.00	14.54	1.00	125	37.34	31.02	7.60	36.5	2.12
2	7311.00	54.47	PK	74.00	19.53	1.00	97	43.39	37.28	8.60	34.8	11.08
2	7311.00	40.15	AV	54.00	13.85	1.00	97	29.07	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	46.85	PK	74.00	27.15	1.00	333	44.73	31.02	7.60	36.5	2.12
1	4874.00	34.44	AV	54.00	19.56	1.00	333	32.32	31.02	7.60	36.5	2.12
2	7311.00	53.19	PK	74.00	20.81	1.00	177	42.11	37.28	8.60	34.8	11.08
2	7311.00	42.22	AV	54.00	11.78	1.00	177	31.14	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	55.67	PK	74.00	18.33	1.00	74	53.29	31.58	7.00	36.2	2.38
1	4924.00	47.02	AV	54.00	6.98	1.00	74	44.64	31.58	7.00	36.2	2.38
2	7386.00	55.66	PK	74.00	18.34	1.00	164	43.95	38.51	8.50	35.3	11.71
2	7386.00	40.52	AV	54.00	13.48	1.00	164	28.81	38.51	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	52.56	PK	74.00	21.44	1.00	7	50.18	31.58	7.00	36.2	2.38
1	4924.00	42.69	AV	54.00	11.31	1.00	7	40.31	31.58	7.00	36.2	2.38
2	7386.00	56.14	PK	74.00	17.86	1.00	262	44.43	38.51	8.50	35.3	11.71
2	7386.00	39.78	AV	54.00	14.22	1.00	262	28.07	38.51	8.50	35.3	11.71

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
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. For Wireless 802.11b mode at 1Mbps.

802.11g Mode(above 1GHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2412MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	54.18	PK	74.00	19.82	1.00	145	52.08	31.6	7.00	36.5	2.10
1	4824.00	43.02	AV	54.00	10.98	1.00	145	40.92	31.6	7.00	36.5	2.10
2	7236.00	58.44	PK	74.00	15.56	1.00	33	47.51	37.33	8.90	35.3	10.93
2	7236.00	41.38	AV	54.00	12.62	1.00	33	30.45	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2412MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	52.89	PK	74.00	21.11	1.00	291	50.79	31.60	7.00	36.5	2.10
1	4824.00	40.41	AV	54.00	13.59	1.00	191	38.31	31.60	7.00	36.5	2.10
2	7236.00	57.63	PK	74.00	16.37	1.00	125	46.70	37.33	8.90	35.3	10.93
2	7236.00	43.87	AV	54.00	10.13	1.00	125	32.94	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	50.45	PK	74.00	23.55	1.00	78	48.33	31.02	7.60	36.5	2.12
1	4874.00	39.81	AV	54.00	14.19	1.00	78	37.69	31.02	7.60	36.5	2.12
2	7311.00	54.03	PK	74.00	19.97	1.00	156	42.95	37.28	8.60	34.8	11.08
2	7311.00	40.00	AV	54.00	14.00	1.00	156	28.92	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	47.46	PK	74.00	26.54	1.00	313	45.34	31.02	7.60	36.5	2.12
1	4874.00	33.87	AV	54.00	20.13	1.00	313	31.75	31.02	7.60	36.5	2.12
2	7311.00	54.11	PK	74.00	19.89	1.00	275	43.03	37.28	8.60	34.8	11.08
2	7311.00	41.68	AV	54.00	12.32	1.00	275	30.60	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	56.48	PK	74.00	17.52	1.00	49	54.10	31.58	7.00	36.2	2.38
1	4924.00	45.45	AV	54.00	8.55	1.00	49	43.07	31.58	7.00	36.2	2.38
2	7311.00	56.82	PK	74.00	17.18	1.00	346	45.11	38.51	8.50	35.3	11.71
2	7311.00	40.14	AV	54.00	13.86	1.00	346	28.43	38.51	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	53.97	PK	74.00	20.03	1.00	114	51.59	31.58	7.00	36.2	2.38
1	4924.00	42.11	AV	54.00	11.89	1.00	114	39.73	31.58	7.00	36.2	2.38
2	7386.00	55.74	PK	74.00	18.26	1.00	129	44.03	38.51	8.50	35.3	11.71
2	7386.00	39.58	AV	54.00	14.42	1.00	129	27.87	38.51	8.50	35.3	11.71

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
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. For Wireless 802.11g mode at 6Mbps.

802.11n(20MHz) Mode(above 1GHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2412MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	53.96	PK	74.00	20.04	1.00	144	51.86	31.60	7.00	36.5	2.10
1	4824.00	42.42	AV	54.00	11.58	1.00	144	40.32	31.60	7.00	36.5	2.10
2	7236.00	58.11	PK	74.00	15.89	1.00	176	47.18	37.33	8.90	35.3	10.93
2	7236.00	41.69	AV	54.00	12.31	1.00	176	30.76	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2412MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	52.14	PK	74.00	21.86	1.00	79	50.04	31.60	7.00	36.5	2.10
1	4824.00	40.08	AV	54.00	13.92	1.00	79	37.98	31.60	7.00	36.5	2.10
2	7236.00	57.75	PK	74.00	16.25	1.00	66	46.82	37.33	8.90	35.3	10.93
2	7236.00	43.66	AV	54.00	10.34	1.00	66	32.73	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	51.22	PK	74.00	22.78	1.00	146	49.10	31.02	7.60	36.5	2.12
1	4874.00	39.79	AV	54.00	14.21	1.00	146	37.67	31.02	7.60	36.5	2.12
2	7311.00	55.30	PK	74.00	18.70	1.00	277	44.22	37.28	8.60	34.8	11.08
2	7311.00	40.85	AV	54.00	13.15	1.00	277	29.77	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	48.16	PK	74.00	25.84	1.00	215	46.04	31.02	7.60	36.5	2.12
1	4874.00	36.85	AV	54.00	17.15	1.00	215	34.73	31.02	7.60	36.5	2.12
2	7311.00	55.37	PK	74.00	18.63	1.00	124	44.29	37.28	8.60	34.8	11.08
2	7311.00	42.99	AV	54.00	11.01	1.00	124	31.91	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	54.91	PK	74.00	19.09	1.00	36	52.53	31.58	7.00	36.2	2.38
1	4924.00	40.14	AV	54.00	13.86	1.00	36	37.76	31.58	7.00	36.2	2.38
2	7386.00	57.05	PK	74.00	16.95	1.00	181	45.34	38.51	8.50	35.3	11.71
2	7386.00	40.01	AV	54.00	13.99	1.00	181	28.30	38.51	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	53.56	PK	74.00	20.44	1.00	322	51.18	31.58	7.00	36.2	2.38
1	4924.00	40.45	AV	54.00	13.55	1.00	322	38.07	31.58	7.00	36.2	2.38
2	7386.00	57.71	PK	74.00	16.29	1.00	179	46.00	38.51	8.50	35.3	11.71
2	7386.00	40.09	AV	54.00	13.91	1.00	179	28.38	38.51	8.50	35.3	11.71

REMARKS: 1. Emission level (dBuV/m) =Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+CableFactor (dB)-Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. For Wireless 802.11n (20MHz) mode at 6.5Mbps.

802.11n(40MHz) Mode(above 1GHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2422MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4844.00	54.85	PK	74.00	19.15	1.00	122	52.74	31.01	7.30	36.2	2.11
1	4844.00	42.67	AV	54.00	11.33	1.00	122	40.56	31.01	7.30	36.2	2.11
2	7266.00	57.82	PK	74.00	16.18	1.00	141	47.02	36.70	8.90	34.8	10.80
2	7266.00	41.77	AV	54.00	12.23	1.00	141	30.97	36.70	8.90	34.8	10.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2422MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4844.00	55.03	PK	74.00	18.97	1.00	168	52.92	31.01	7.30	36.2	2.11
1	4844.00	41.14	AV	54.00	12.86	1.00	168	39.03	31.01	7.30	36.2	2.11
2	7266.00	58.41	PK	74.00	15.59	1.00	175	47.61	36.70	8.90	34.8	10.80
2	7266.00	43.01	AV	54.00	10.99	1.00	175	32.21	36.70	8.90	34.8	10.80

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	53.23	PK	74.00	20.77	1.00	146	51.11	31.02	7.60	36.5	2.12
1	4874.00	40.07	AV	54.00	13.93	1.00	146	37.95	31.02	7.60	36.5	2.12
2	7311.00	56.45	PK	74.00	17.55	1.00	22	45.37	37.28	8.60	34.8	11.08
2	7311.00	40.91	AV	54.00	13.09	1.00	22	29.83	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	53.02	PK	74.00	20.98	1.00	310	50.90	31.02	7.60	36.5	2.12
1	4874.00	40.14	AV	54.00	13.86	1.00	310	38.02	31.02	7.60	36.5	2.12
2	7311.00	56.48	PK	74.00	17.52	1.00	174	45.40	37.28	8.60	34.8	11.08
2	7311.00	43.16	AV	54.00	10.84	1.00	174	32.08	37.28	8.60	34.8	11.08

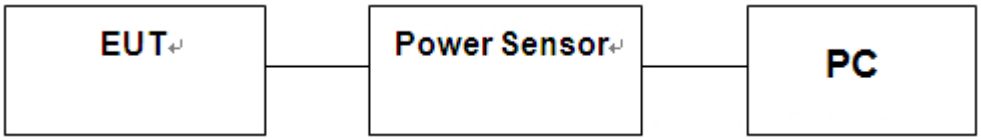
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2452MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4904.00	53.56	PK	74.00	20.44	1.00	46	51.29	31.47	7.00	36.2	2.27
1	4904.00	40.00	AV	54.00	14.00	1.00	46	37.73	31.47	7.00	36.2	2.27
2	7356.00	56.42	PK	74.00	17.58	1.00	187	44.77	38.45	8.50	35.3	11.65
2	7356.00	39.86	AV	54.00	14.14	1.00	187	28.21	38.45	8.50	35.3	11.65

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2452MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4904.00	52.25	PK	74.00	21.75	1.00	349	49.98	31.47	7.00	36.2	2.27
1	4904.00	39.79	AV	54.00	14.21	1.00	349	37.52	31.47	7.00	36.2	2.27
2	7356.00	56.12	PK	74.00	17.88	1.00	186	44.47	38.45	8.50	35.3	11.65
2	7356.00	39.54	AV	54.00	14.46	1.00	186	27.89	38.45	8.50	35.3	11.65

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
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. For Wireless 802.11n (40MHz) mode at 13.5Mbps.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03:
PKPM1 Peak power meter method: The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
Maximum conducted (average) output power: As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
1. The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
2. At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
3. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.
Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

Remark:We measured output power at difference data rate for each mode and recorded woest case for each mode.

4.3.1 802.11b Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	9.12	30	PASS
6	2437	9.56	30	PASS
11	2462	9.41	30	PASS

Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.

4.3.2 802.11g Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	9.56	30	PASS
6	2437	9.63	30	PASS
11	2462	9.24	30	PASS

Note: 1. For 802.11g mode at finial test to get the worst-case emission at 6Mbps.
2.The test results including the cable lose.

4.3.3 802.11n(20MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	9.08	30	PASS
6	2437	9.66	30	PASS
11	2462	9.32	30	PASS

Note: 1. For 802.11n(20MHz) mode at finial test to get the worst-case emission at 6.5Mbps.
2.The test results including the cable lose.

4.3.4 802.11n(20MHz) Test Mode

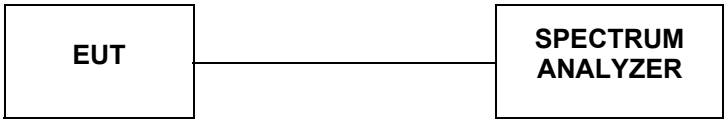
A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
3	2422	9.34	30	PASS
6	2437	9.53	30	PASS
9	2452	9.47	30	PASS

Note: 1. For 802.11n(40MHz) mode at finial test to get the worst-case emission at 13.5Mbps.
2.The test results including the cable lose.

4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 558074 D01 V03 Method PKPSD (peak PSD) This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

LIMIT

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

TEST RESULTS

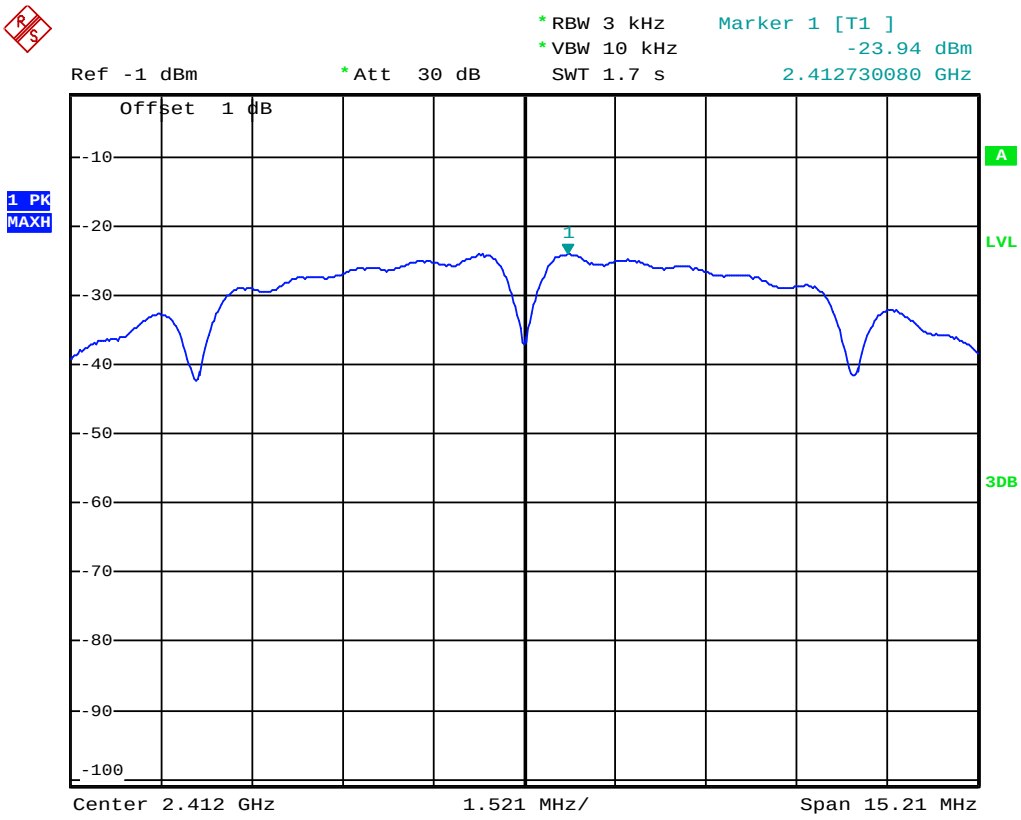
4.4.1 802.11b Test Mode

A. Test Verdict

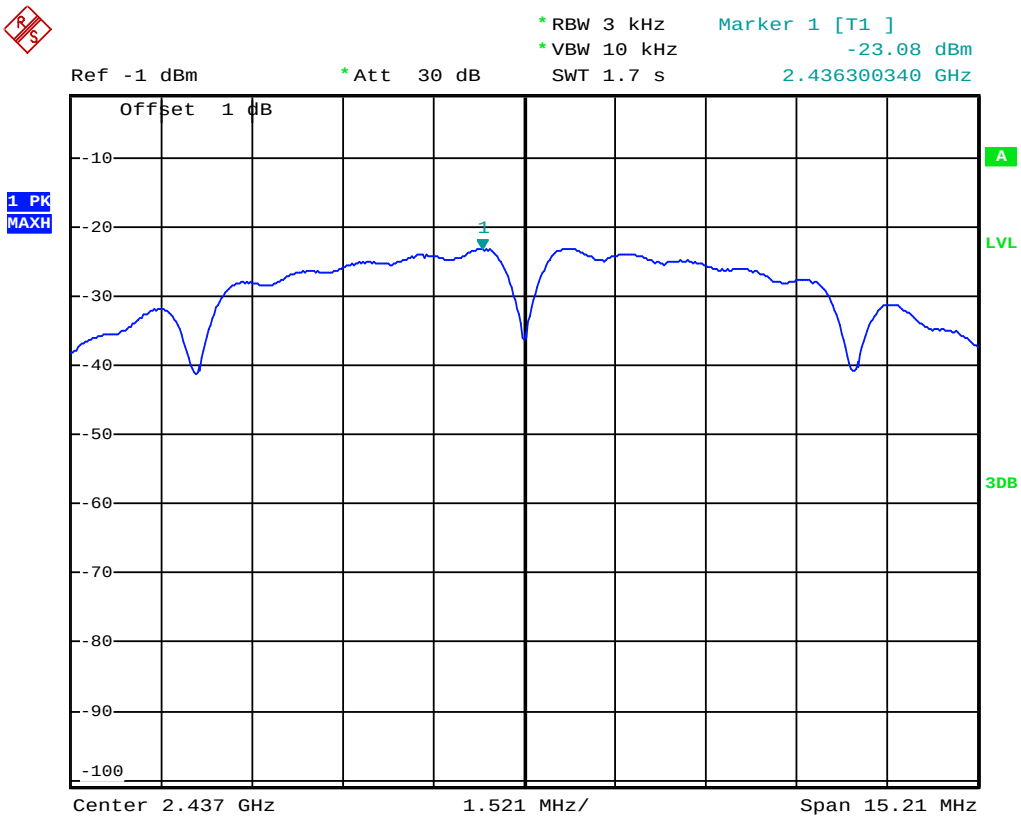
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-23.94	Plot 4.4.1 A	8	PASS
6	2437	-23.08	Plot 4.4.1 B	8	PASS
11	2462	-22.40	Plot 4.4.1 C	8	PASS

Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.

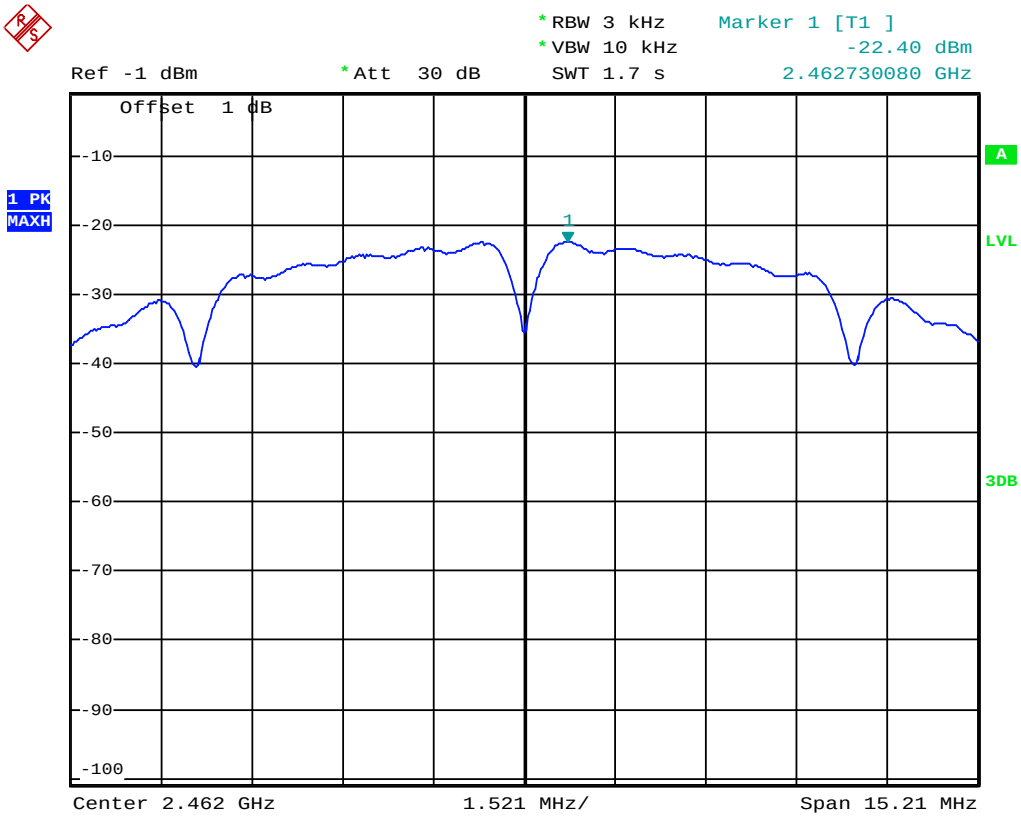
B. Test Plots



(Plot 4.4.1 A: Channel 1: 2412MHz @ 802.11b)



(Plot 4.4.1 B: Channel 6: 2437MHz @ 802.11b)



(Plot 4.4.1 C: Channel 11: 2462MHz @ 802.11b)

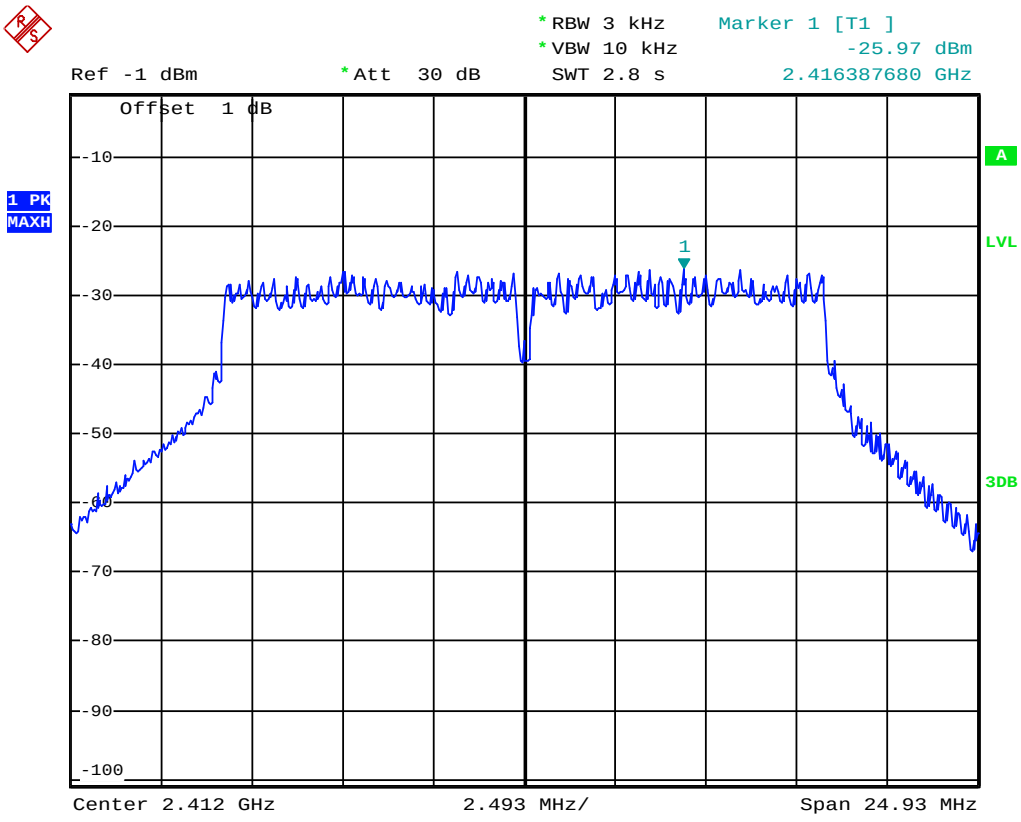
4.4.2 802.11g Test Mode

A. Test Verdict

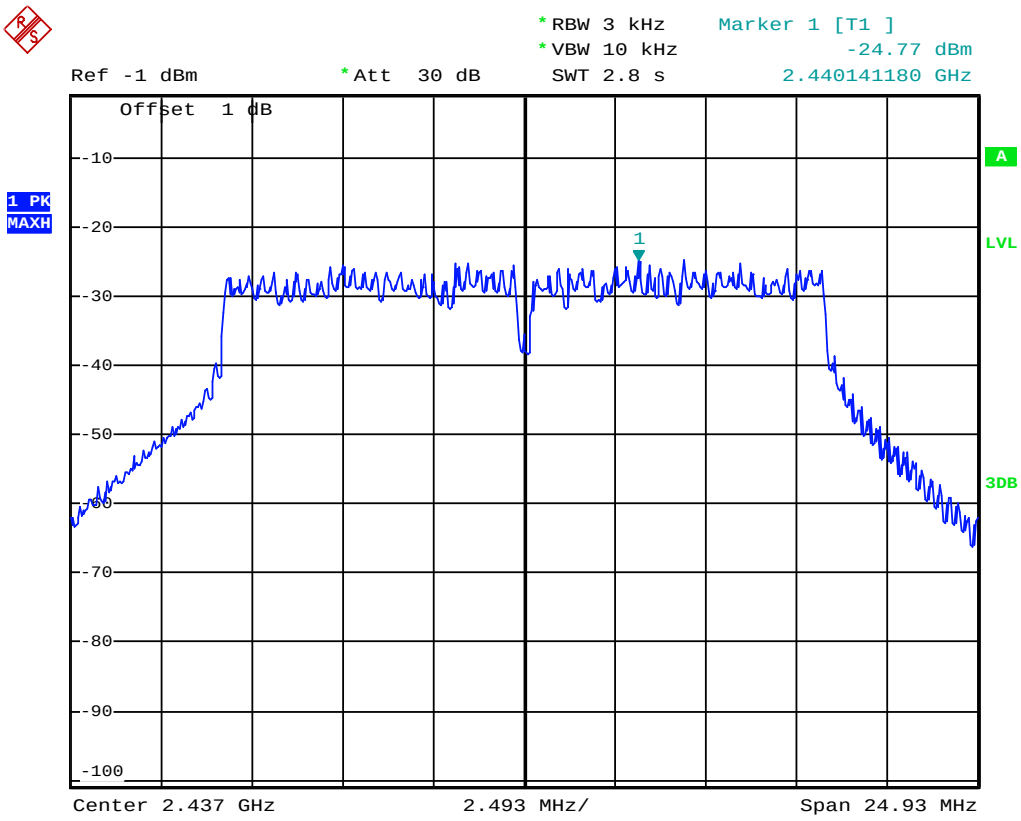
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-25.97	Plot 4.4.2 A	8	PASS
6	2437	-24.77	Plot 4.4.2 B	8	PASS
11	2462	-24.29	Plot 4.4.2 C	8	PASS

Note: 1. For 802.11g mode at finial test to get the worst-case emission at 6Mbps.
2.The test results including the cable lose.

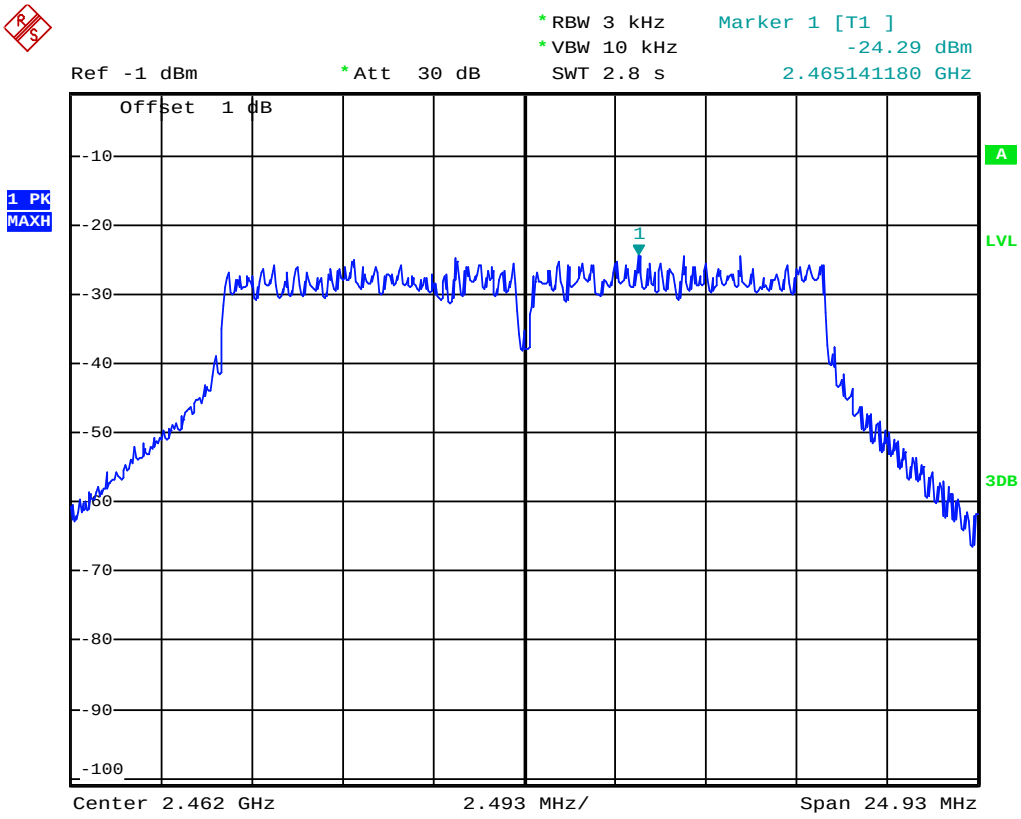
B. Test Plots



(Plot 4.4.2 A: Channel 1: 2412MHz @ 802.11g)



(Plot 4.4.2 B: Channel 6: 2437MHz @ 802.11g)



(Plot 4.4.2 C: Channel 11: 2462MHz @ 802.11g)

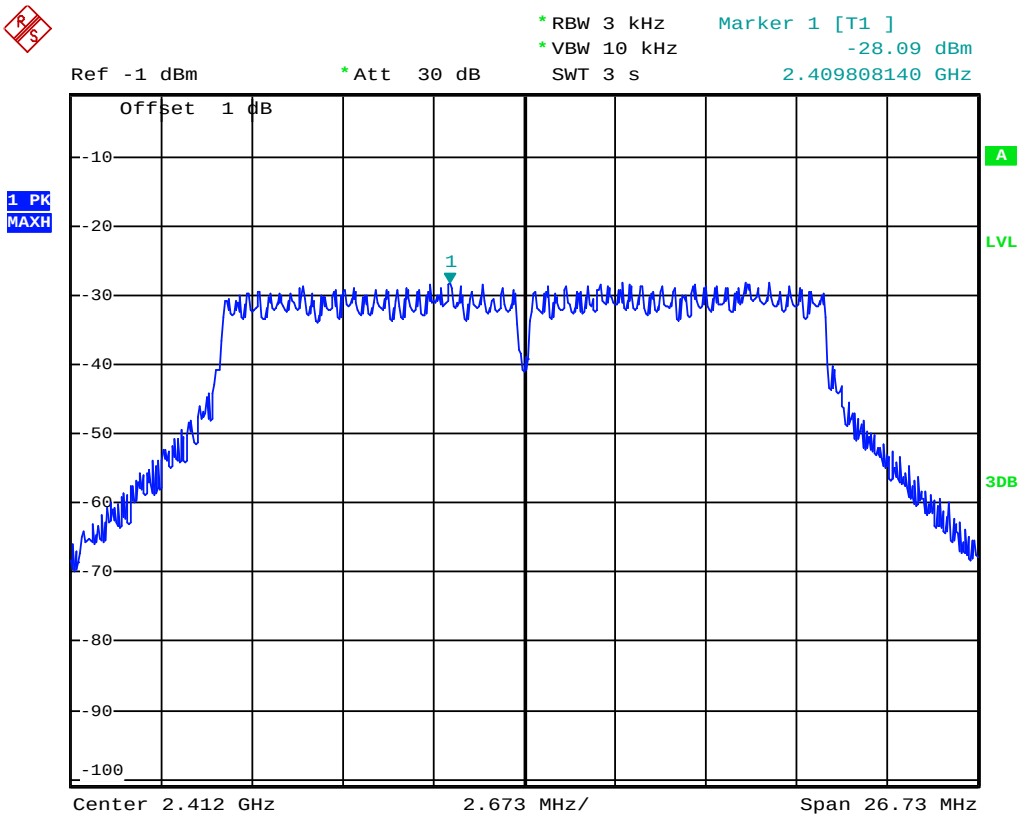
4.4.3 802.11n(20MHz) Test Mode

A. Test Verdict

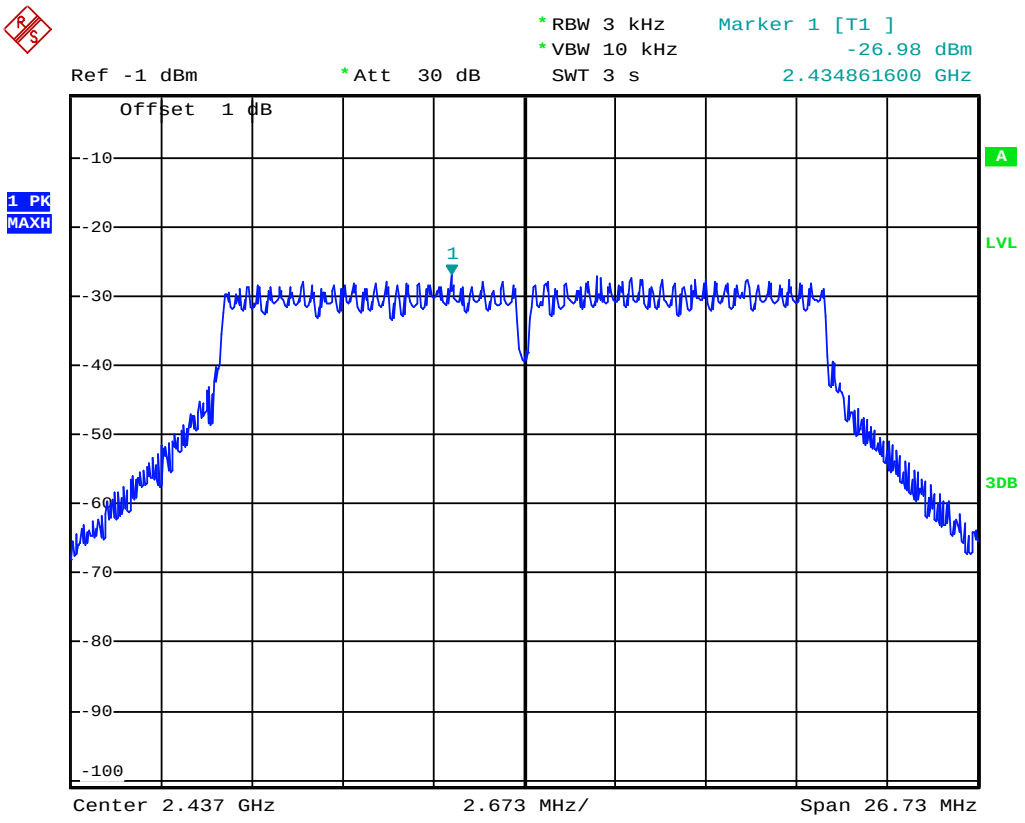
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-28.09	Plot 4.4.3 A	8	PASS
6	2437	-26.98	Plot 4.4.3 B	8	PASS
11	2462	-26.41	Plot 4.4.3 C	8	PASS

Note: 1. For 802.11n(20MHz) mode at finial test to get the worst-case emission at 6.5Mbps.
2.The test results including the cable lose.

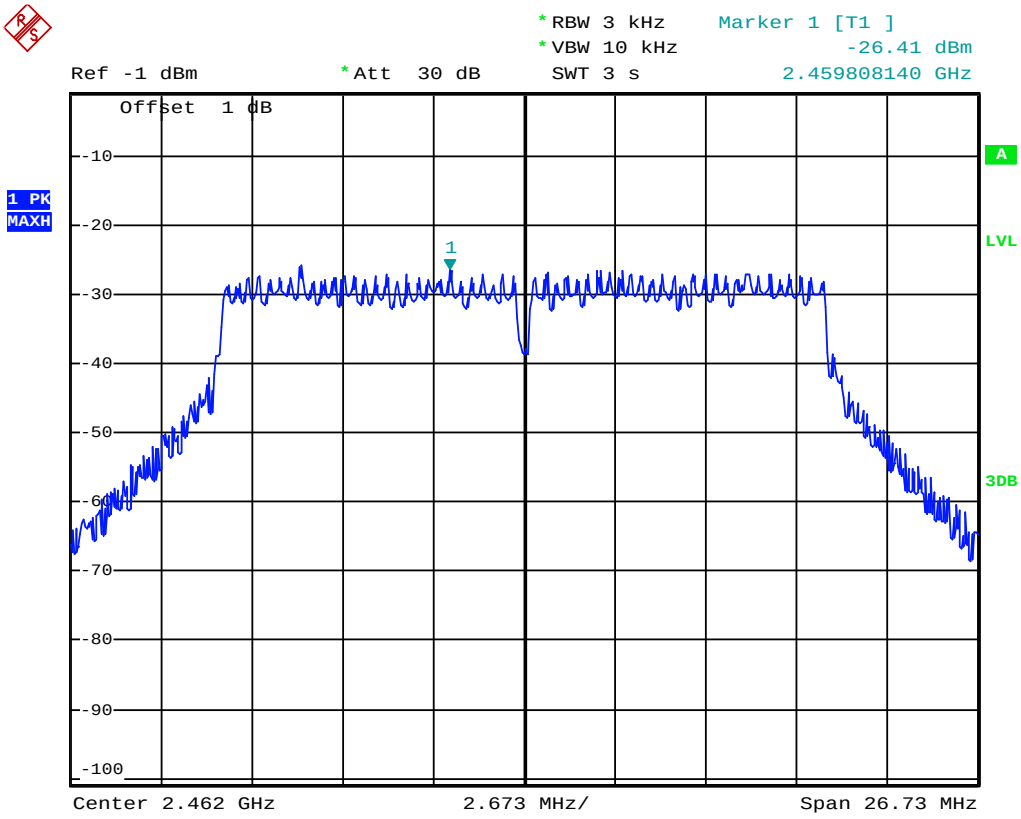
B. Test Plots



(Plot 4.4.3 A: Channel 1: 2412MHz @ 802.11n(20MHz))



(Plot 4.4.3 B: Channel 6: 2437MHz @ 802.11n(20MHz))



(Plot 4.4.3 C: Channel 11: 2462MHz @ 802.11n(20MHz))

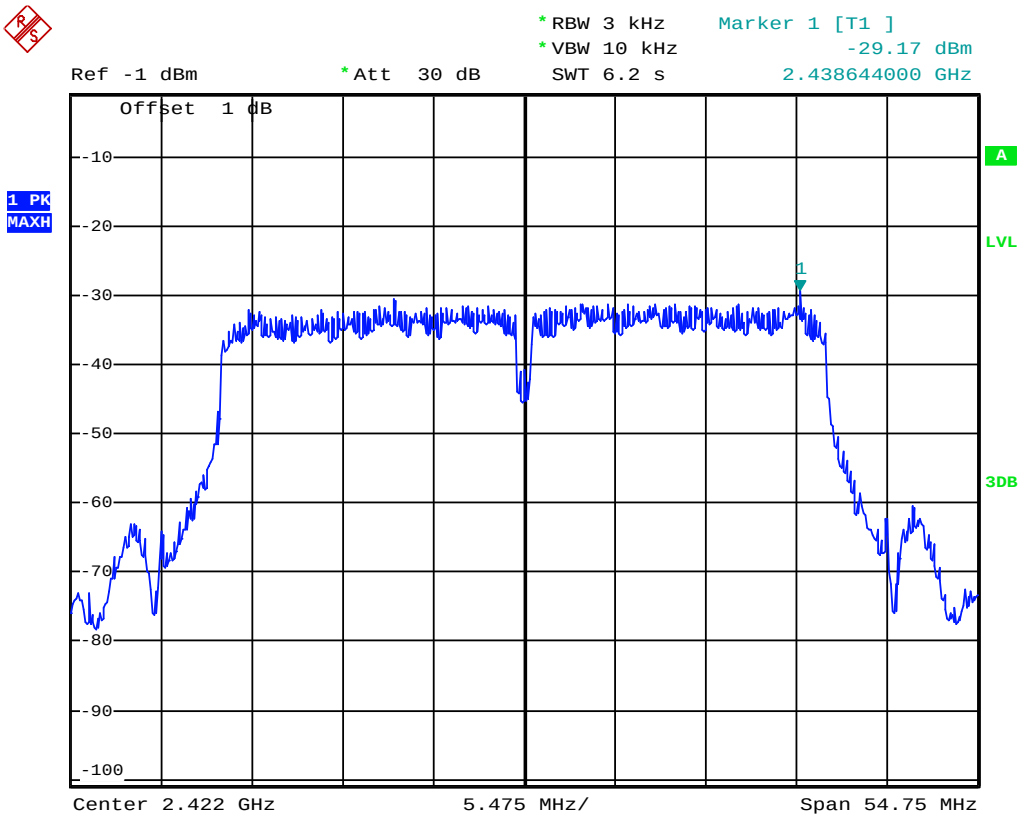
4.4.4 802.11n(40MHz) Test Mode

A. Test Verdict

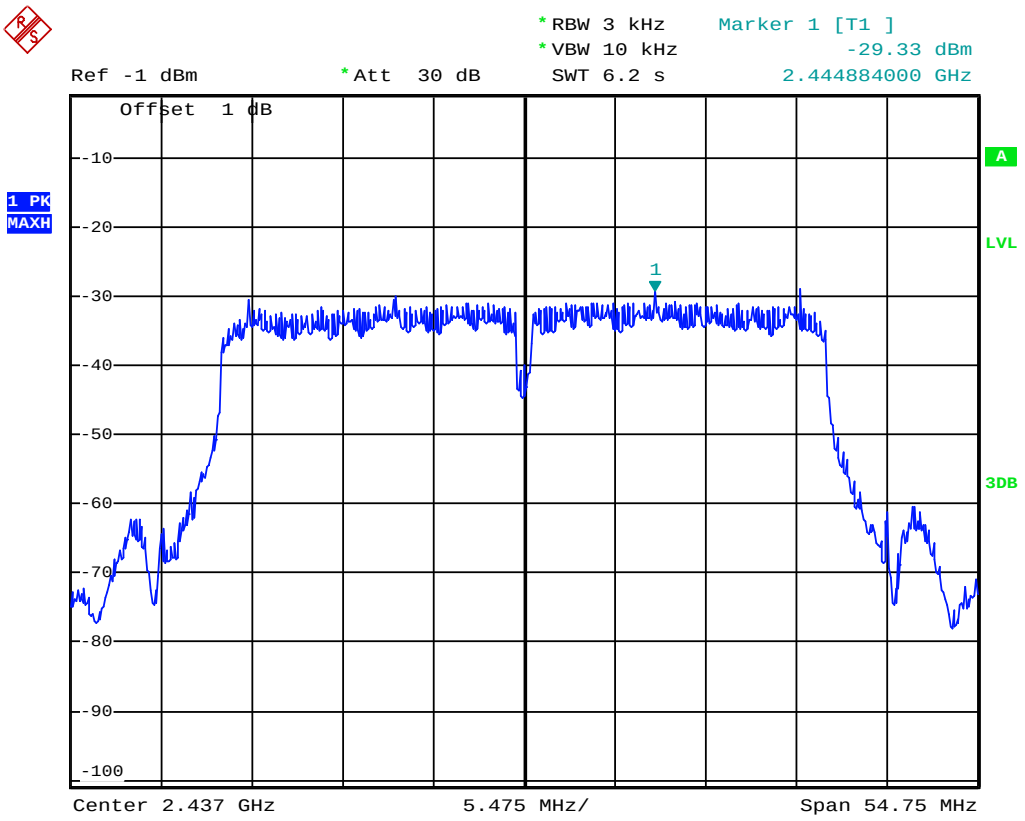
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
3	2422	-29.17	Plot 4.4.4 A	8	PASS
6	2437	-29.33	Plot 4.4.4 B	8	PASS
9	2452	-29.52	Plot 4.4.4 C	8	PASS

Note: 1. For 802.11n(40MHz) mode at finial test to get the worst-case emission at 13.5Mbps.
2.The test results including the cable lose.

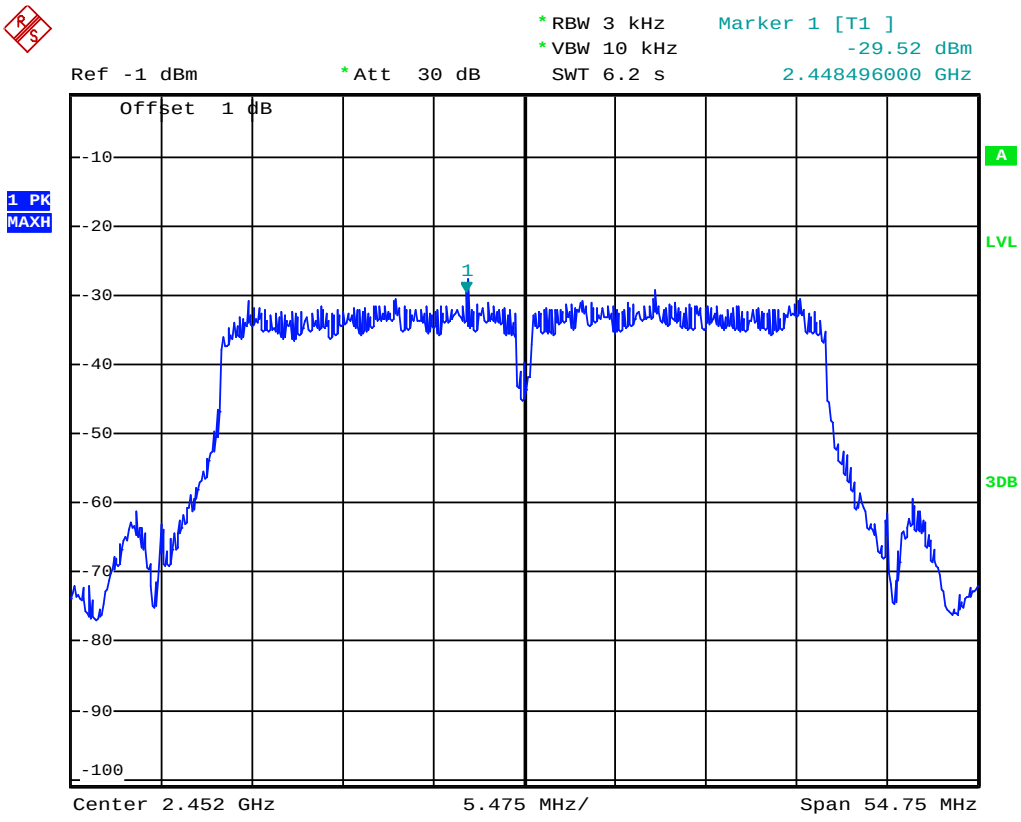
B. Test Plots



(Plot 4.4.4 A: Channel 3: 2422MHz @ 802.11n(40MHz))



(Plot 4.4.4 B: Channel 6: 2437MHz @ 802.11n(40MHz))



(Plot 4.4.4 C: Channel 6: 2452MHz @ 802.11n(40MHz))

4.5. Band Edge Compliance of RF Emission

TEST REQUIREMENT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

According to KDB 558074 D01 V03 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
    E = EIRP – 20log D + 104.8

where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

11. Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.
12. Compare the resultant electric field strength level to the applicable regulatory limit.
13. Perform radiated spurious emission test dures until all measured frequencies were complete.

LIMIT

Below -20dB of the highest emission level in operating band.
Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply

with the radiated emission limits specified in § 15.209(a)

TEST RESULTS

Remark:The Bandedge was measured at difference data rate for each mode and recorded worst case for each mode.

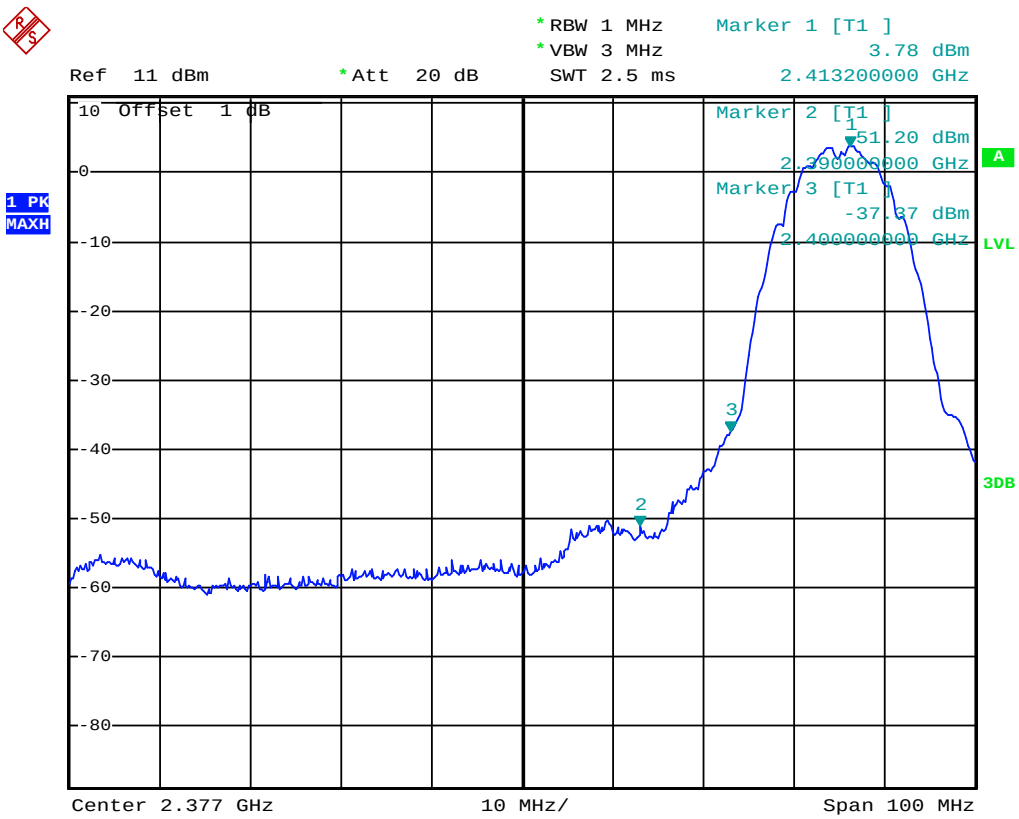
4.5.1 802.11b Test Mode

A. Test Verdict

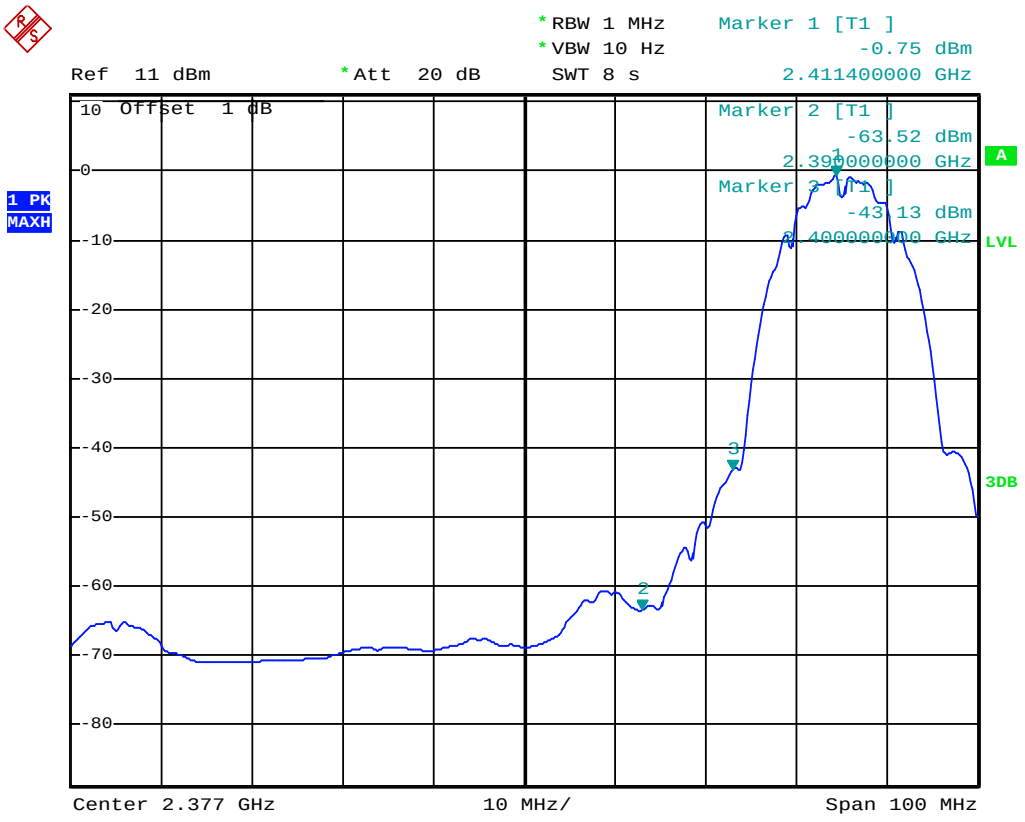
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-51.20	1.50	0.00	46.06	Peak	74.00	Plot 4.5.1 A1
2390.00	-63.52	1.50	0.00	33.74	AV	54.00	Plot 4.5.1 A2
2412.00	3.78	1.50	0.00	101.04	Peak	---	Plot 4.5.1 A1
2412.00	-0.75	1.50	0.00	96.51	AV	---	Plot 4.5.1 A2
2462.00	5.33	1.50	0.00	102.59	Peak	---	Plot 4.5.1 A3
2462.00	0.82	1.50	0.00	98.08	AV	---	Plot 4.5.1 A4
2483.50	-49.97	1.50	0.00	47.29	Peak	74.00	Plot 4.5.1 A3
2483.50	-60.31	1.50	0.00	36.95	AV	54.00	Plot 4.5.1 A4

Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.
3. "---" means that the fundamental frequency not for 15.209 limits requirement.

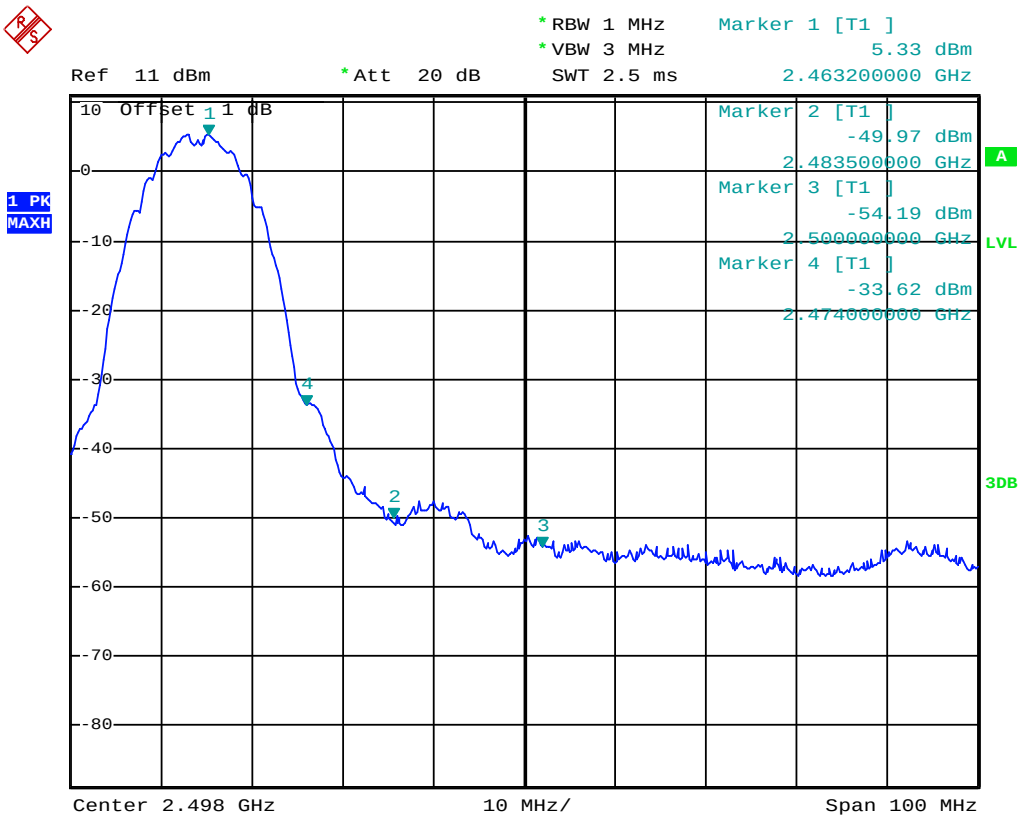
B. Test Plots



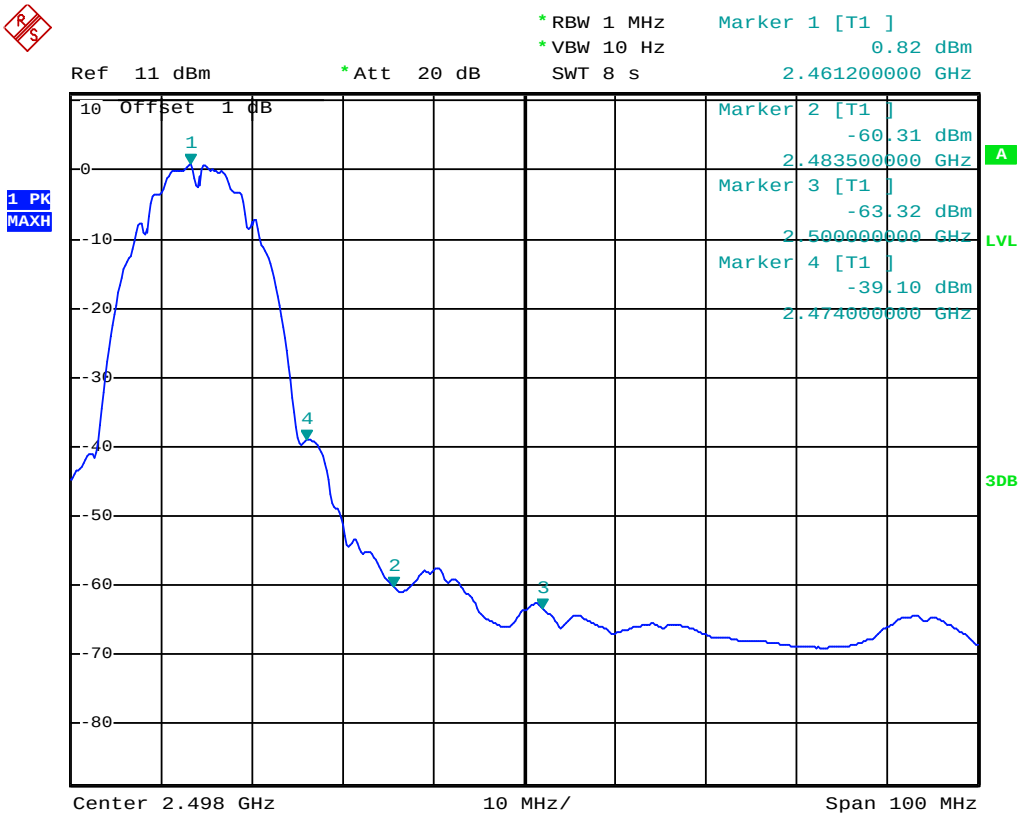
(Plot 4.5.1 A1: Channel 1: 2412MHz @ 802.11b)



(Plot 4.5.1 A2: Channel 1: 2412MHz @ 802.11b)



(Plot 4.5.1 A3: Channel 11: 2462MHz @ 802.11b)



(Plot 4.5.1 A4: Channel 11: 2462MHz @ 802.11b)

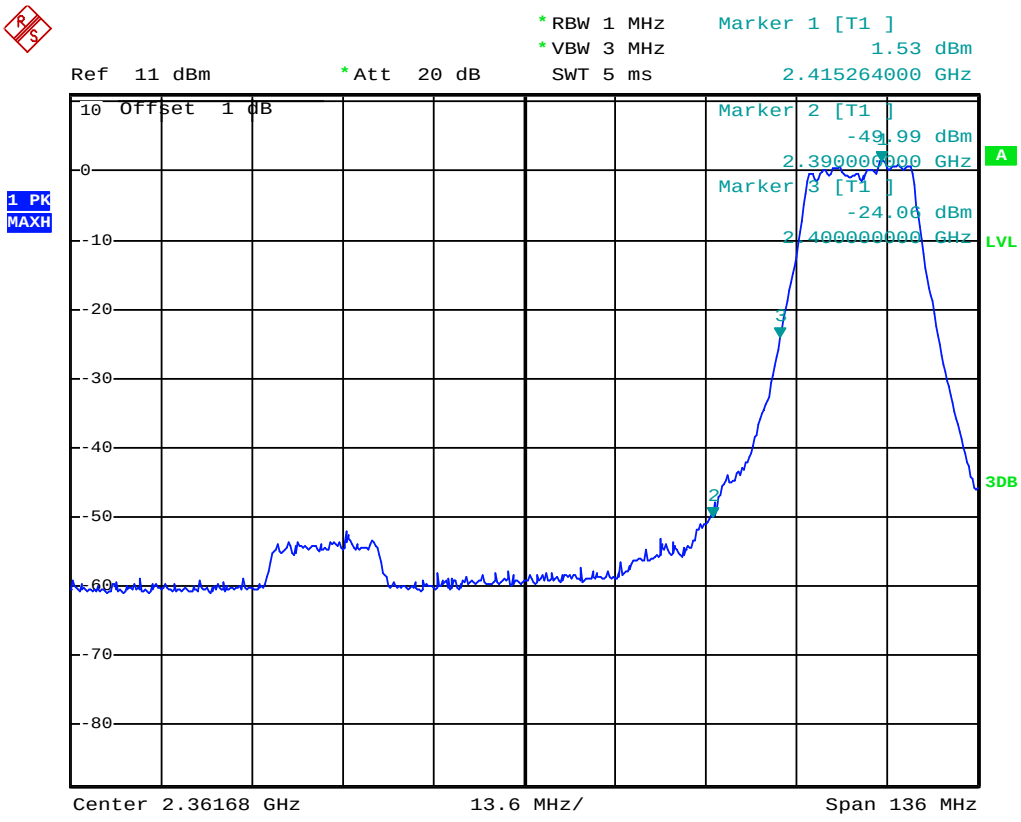
4.5.2 802.11g Test Mode

A. Test Verdict

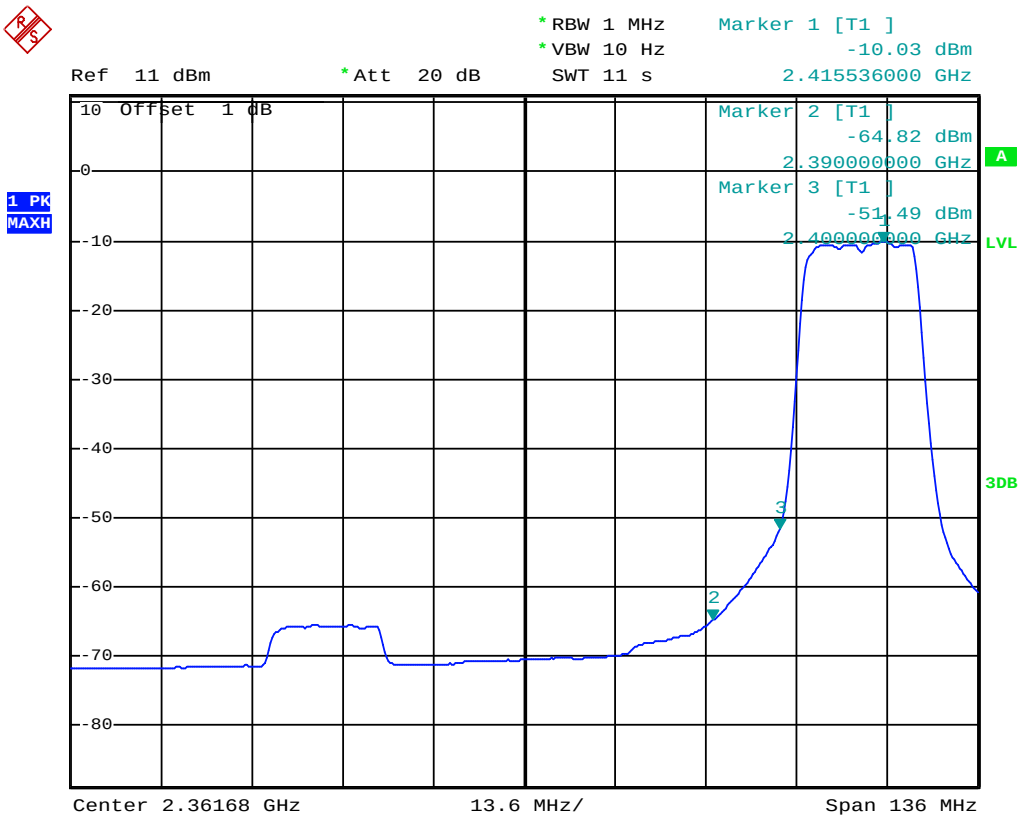
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-49.99	1.50	0.00	47.27	Peak	74.00	Plot 4.5.2 A1
2390.00	-64.82	1.50	0.00	32.44	AV	54.00	Plot 4.5.2 A2
2412.00	1.53	1.50	0.00	98.79	Peak	---	Plot 4.5.2 A1
2412.00	-10.03	1.50	0.00	87.23	AV	---	Plot 4.5.2 A2
2462.00	2.99	1.50	0.00	100.25	Peak	---	Plot 4.5.2 A3
2462.00	-8.63	1.50	0.00	88.63	AV	---	Plot 4.5.2 A4
2483.50	-49.27	1.50	0.00	47.99	Peak	74.00	Plot 4.5.2 A3
2483.50	-62.61	1.50	0.00	34.65	AV	54.00	Plot 4.5.2 A4

Note: 1. For 802.11g mode at finial test to get the worst-case emission at 6Mbps.
2.The test results including the cable lose.
3. "---" means that the fundamental frequency not for 15.209 limits requirement.

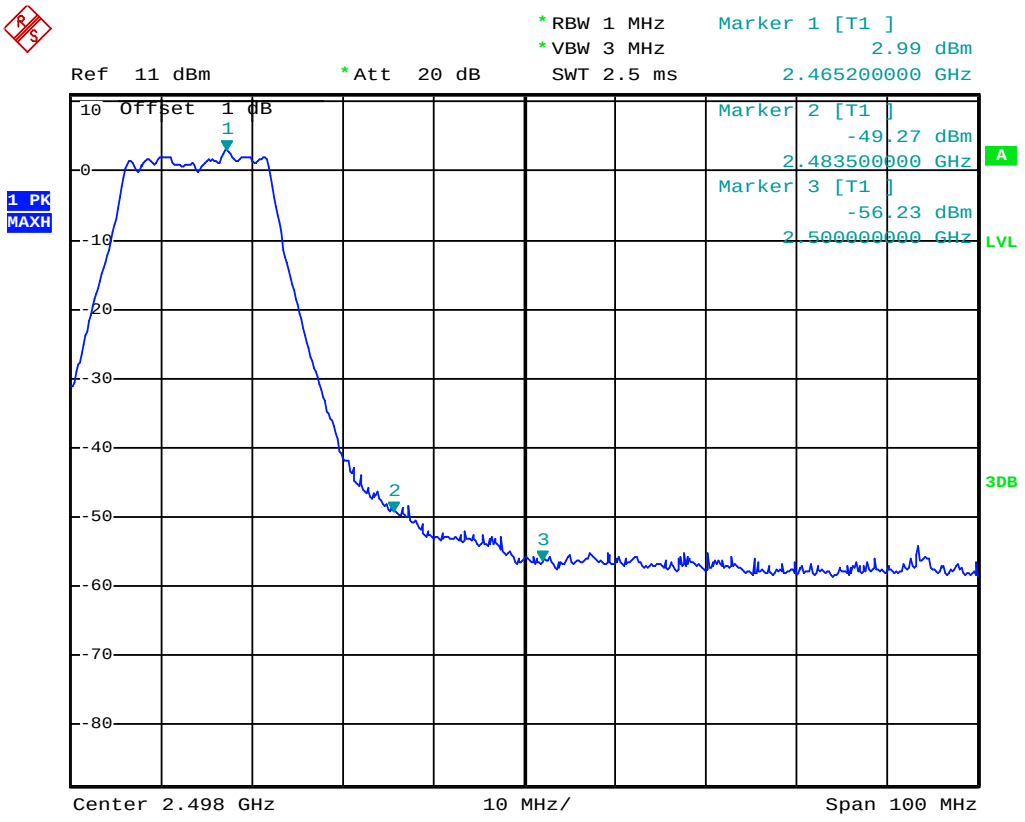
B. Test Plots



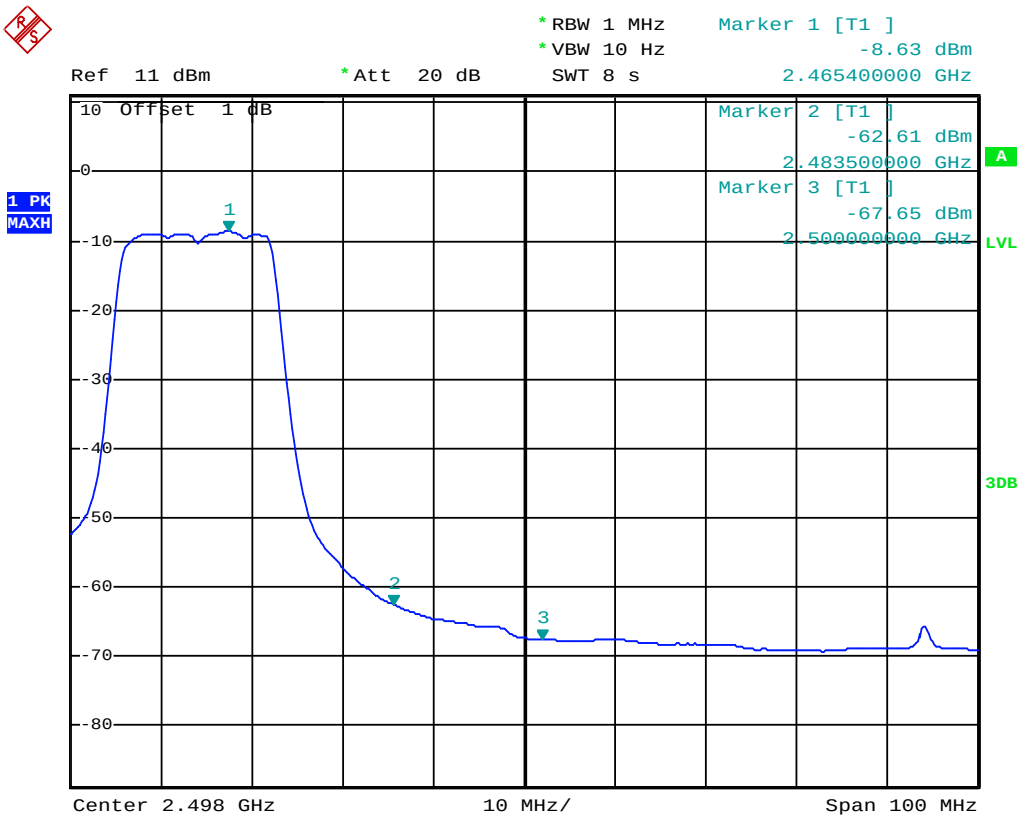
(Plot 4.5.2 A1: Channel 1: 2412MHz @ 802.11g)



(Plot 4.5.2 A2: Channel 1: 2412MHz @ 802.11g)



(Plot 4.5.2 A3: Channel 11: 2462MHz @ 802.11g)



(Plot 4.5.2 A4: Channel 11: 2462MHz @ 802.11g)

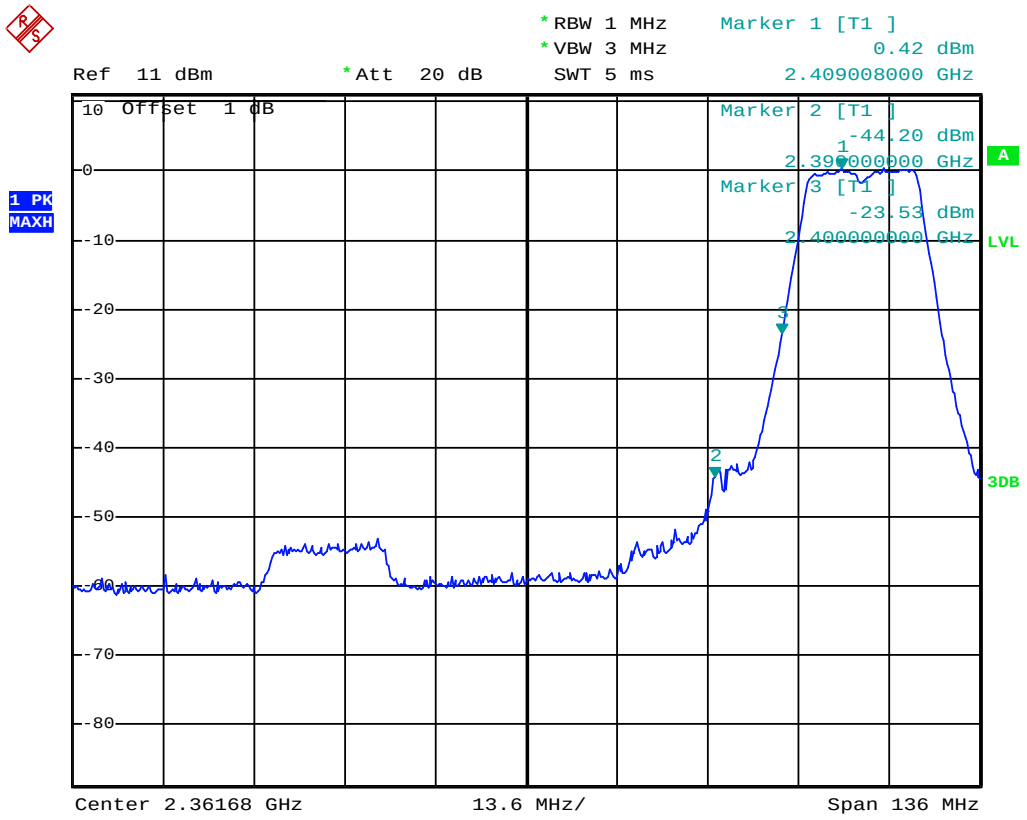
4.5.3 802.11n(20MHz) Test Mode

A. Test Verdict

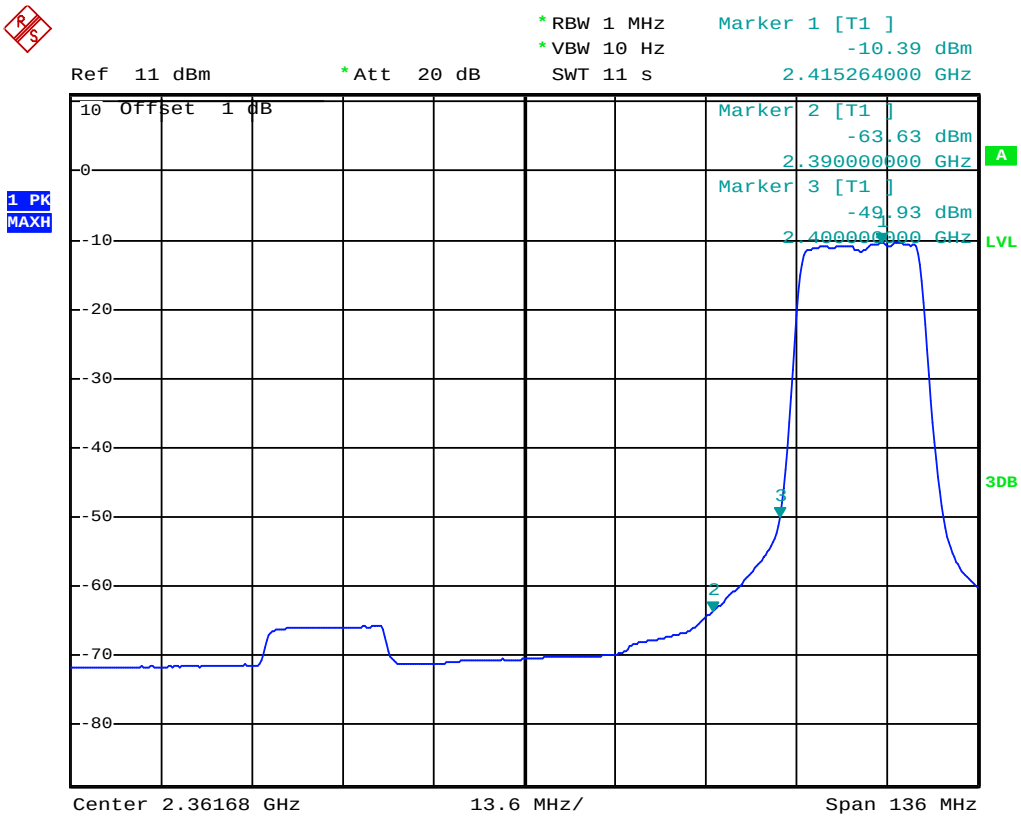
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-44.20	1.50	0.00	53.06	Peak	74.00	Plot 4.5.3 A1
2390.00	-63.63	1.50	0.00	33.63	AV	54.00	Plot 4.5.3 A2
2412.00	0.42	1.50	0.00	97.68	Peak	---	Plot 4.5.3 A1
2412.00	-10.39	1.50	0.00	86.87	AV	---	Plot 4.5.3 A2
2462.00	1.98	1.50	0.00	99.24	Peak	---	Plot 4.5.3 A3
2462.00	-8.86	1.50	0.00	88.40	AV	---	Plot 4.5.3 A4
2483.50	-47.15	1.50	0.00	50.11	Peak	74.00	Plot 4.5.3 A3
2483.50	-61.78	1.50	0.00	35.48	AV	54.00	Plot 4.5.3 A4

Note: 1. For 802.11n(20MHz) mode at finial test to get the worst-case emission at 6.5Mbps.
2.The test results including the cable lose.
3. "---" means that the fundamental frequency not for 15.209 limits requirement.

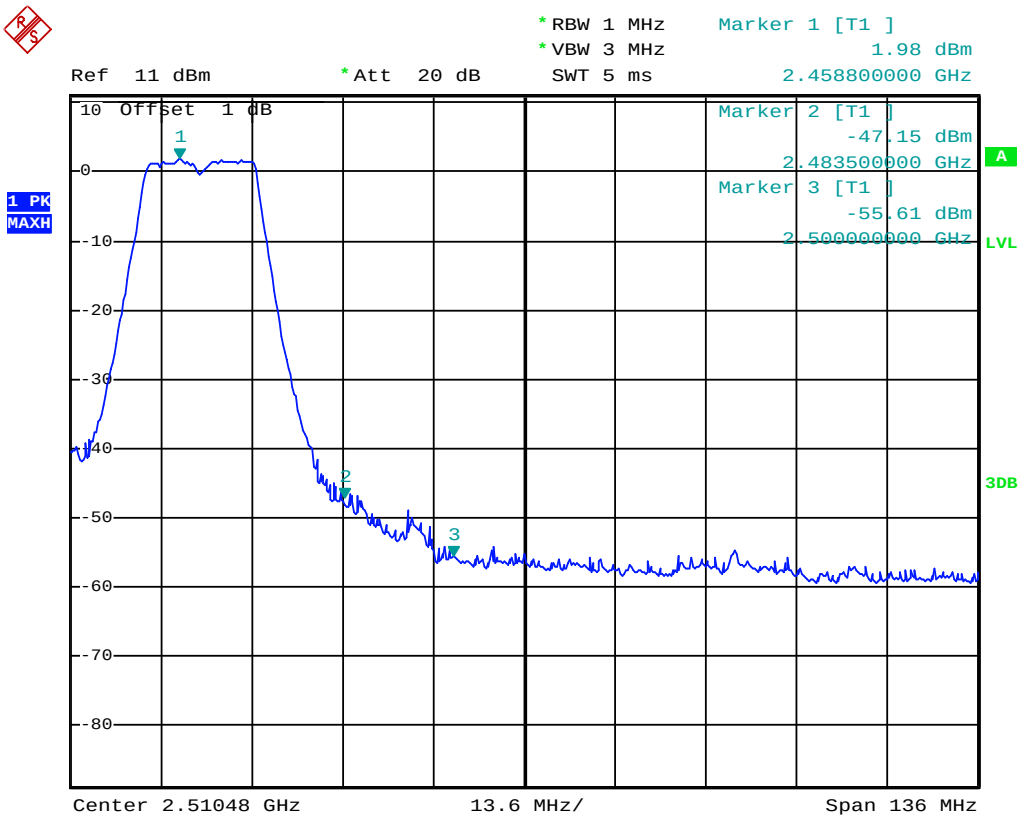
B. Test Plots



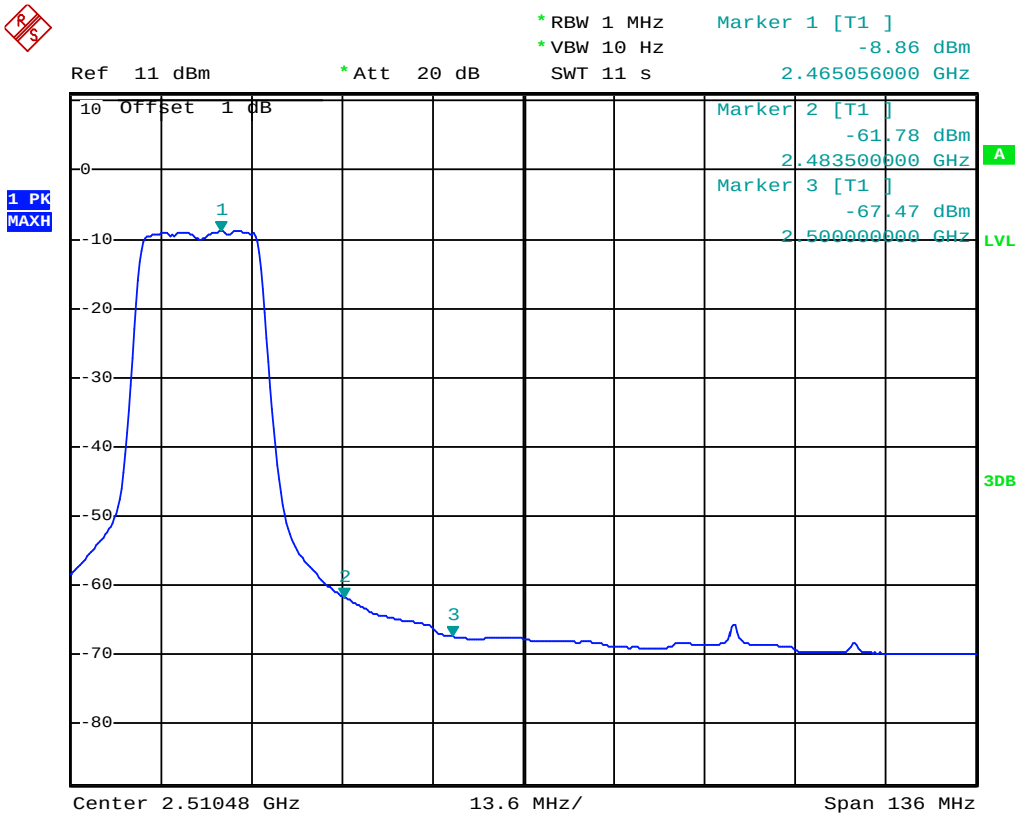
(Plot 4.5.3 A1: Channel 1: 2412MHz @ 802.11n(20MHz))



(Plot 4.5.3 A2: Channel 1: 2412MHz @ 802.11n(20MHz))



(Plot 4.5.3 A3: Channel 11: 2462MHz @ 802.11n(20MHz))



(Plot 4.5.3 A4: Channel 11: 2462MHz @ 802.11n(20MHz))

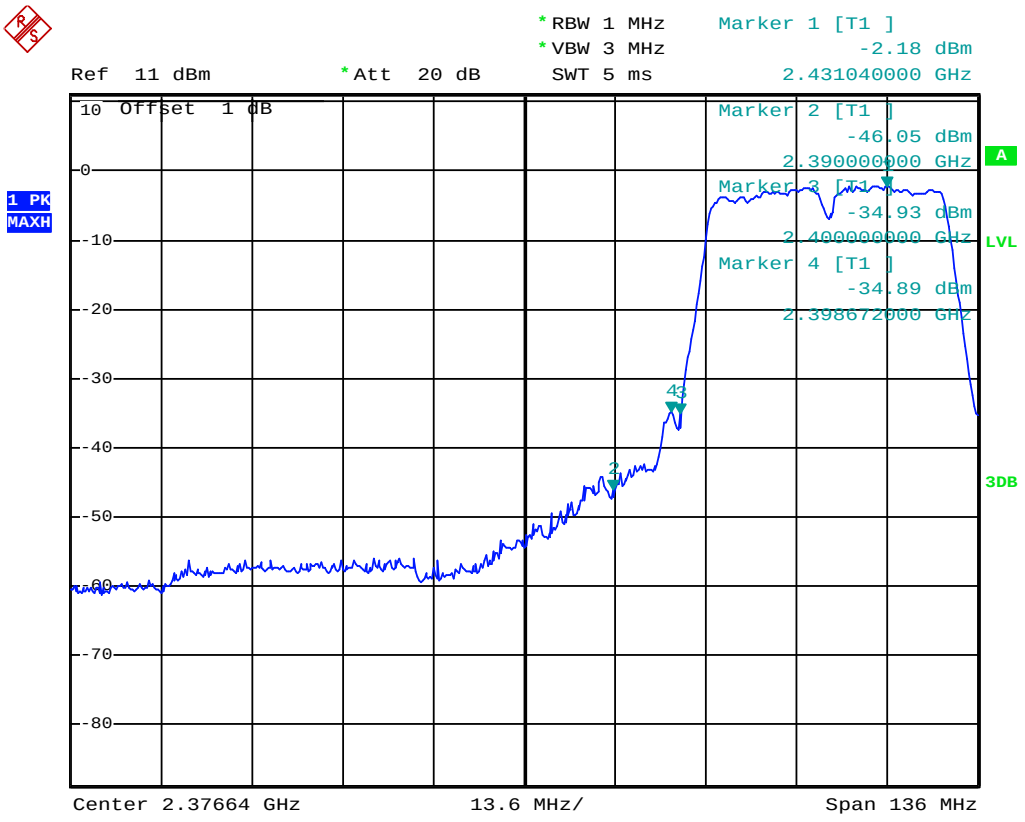
4.5.4 802.11n(40MHz) Test Mode

A. Test Verdict

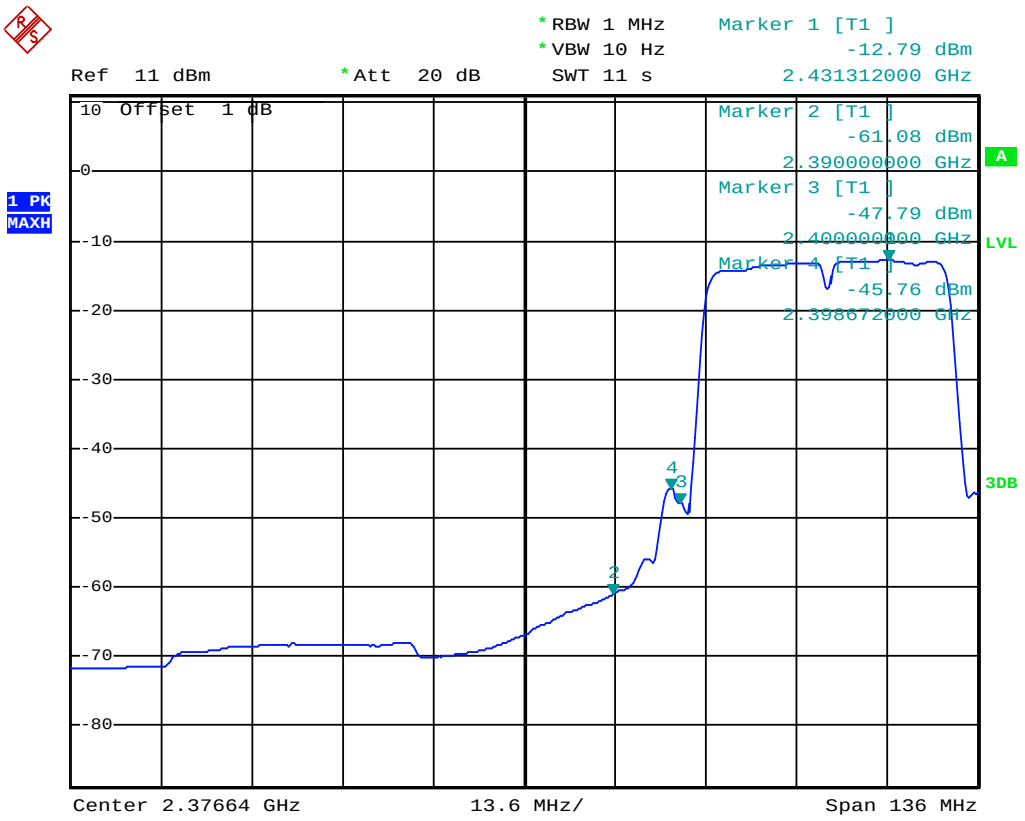
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-46.05	1.50	0.00	51.21	Peak	74.00	Plot 4.5.4 A1
2390.00	-61.08	1.50	0.00	36.18	AV	54.00	Plot 4.5.4 A2
2422.00	-2.18	1.50	0.00	95.08	Peak	---	Plot 4.5.4 A1
2422.00	-12.79	1.50	0.00	84.47	AV	---	Plot 4.5.4 A2
2452.00	-1.27	1.50	0.00	95.99	Peak	---	Plot 4.5.4 A3
2452.00	-11.87	1.50	0.00	85.39	AV	---	Plot 4.5.4 A4
2483.50	-45.28	1.50	0.00	51.98	Peak	74.00	Plot 4.5.4 A3
2483.50	-61.47	1.50	0.00	35.79	AV	54.00	Plot 4.5.4 A4

Note: 1. For 802.11n(40MHz) mode at finial test to get the worst-case emission at 13.5Mbps.
2.The test results including the cable lose.
3. "---" means that the fundamental frequency not for 15.209 limits requirement.

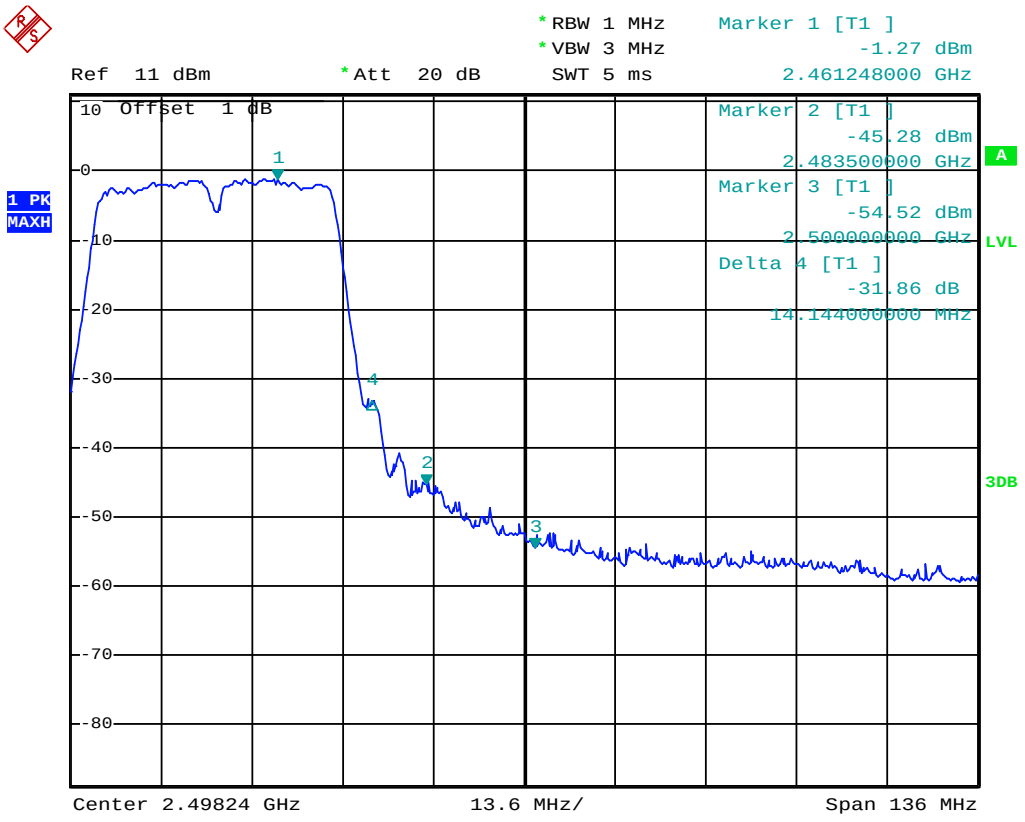
B. Test Plots



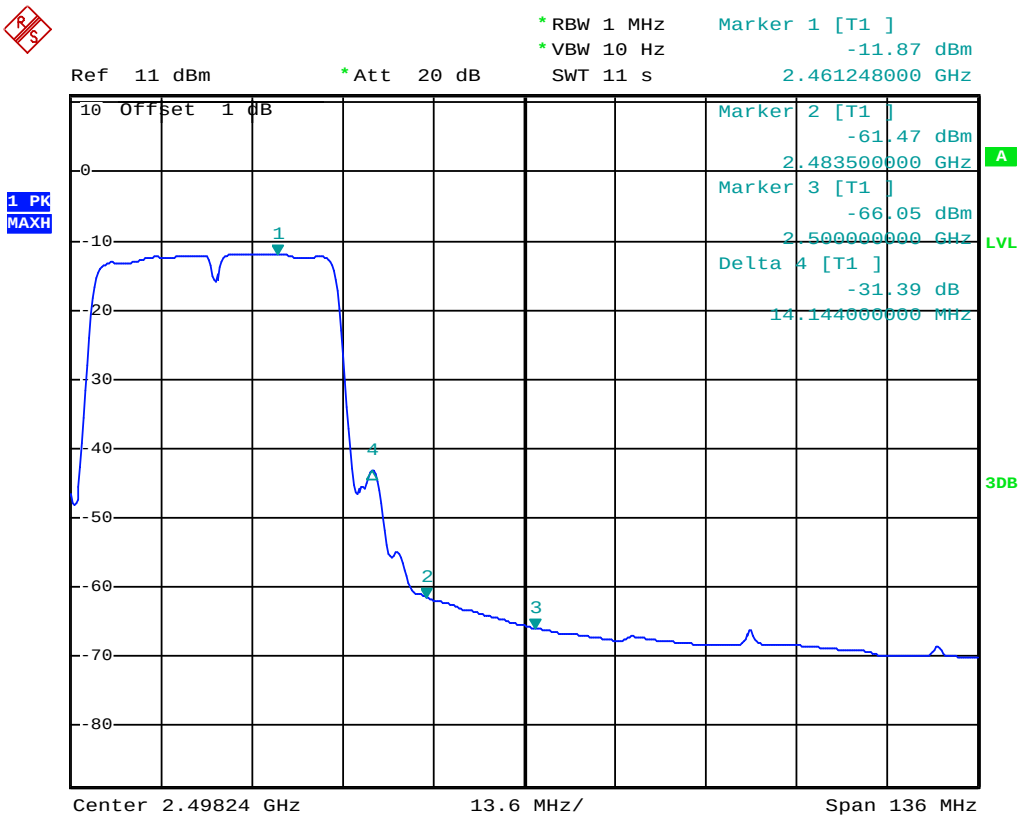
(Plot 4.5.4 A1: Channel 3: 2422MHz @ 802.11n(40MHz))



(Plot 4.5.4 A2: Channel 3: 2422MHz @ 802.11n(40MHz))



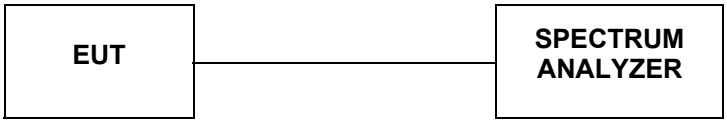
(Plot 4.5.4 A3: Channel 9: 2452MHz @ 802.11n(40MHz))



(Plot 4.5.4 A4: Channel 9: 2452MHz @ 802.11n(40MHz))

4.6. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and mwasure frequeny range from 30MHz to 26.5GHz.

LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

TEST RESULTS

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

4.6.1 802.11b Test Mode

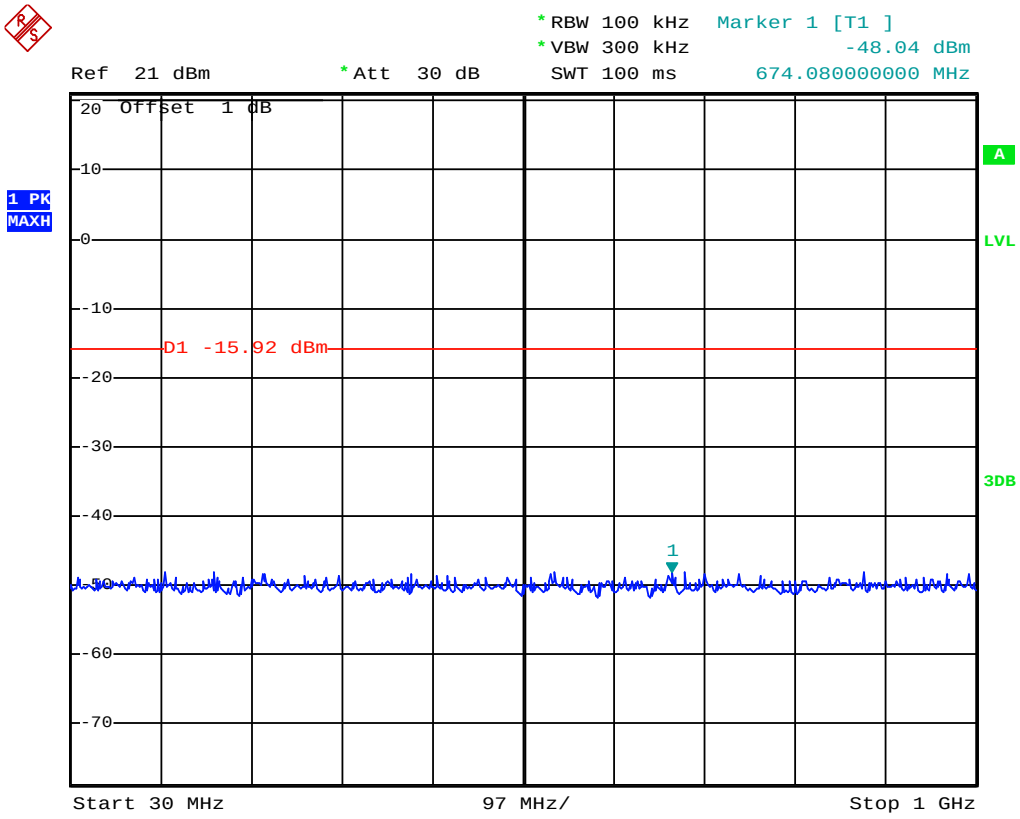
A. Test Verdict

Channel	Frequency (MHz)	Refer to Plot	Limit (dBc)	Verdict
1	2412	Plot 4.6.1 A1	-20	PASS
		Plot 4.6.1 A2	-20	PASS
		Plot 4.6.1 A3	-20	PASS
		Plot 4.6.1 A4	-20	PASS
6	2437	Plot 4.6.1 B1	-20	PASS
		Plot 4.6.1 B2	-20	PASS
		Plot 4.6.1 B3	-20	PASS
		Plot 4.6.1 B1	-20	PASS
11	2462	Plot 4.6.1 C1	-20	PASS
		Plot 4.6.1 C2	-20	PASS
		Plot 4.6.1 C3	-20	PASS
		Plot 4.6.1 C4	-20	PASS

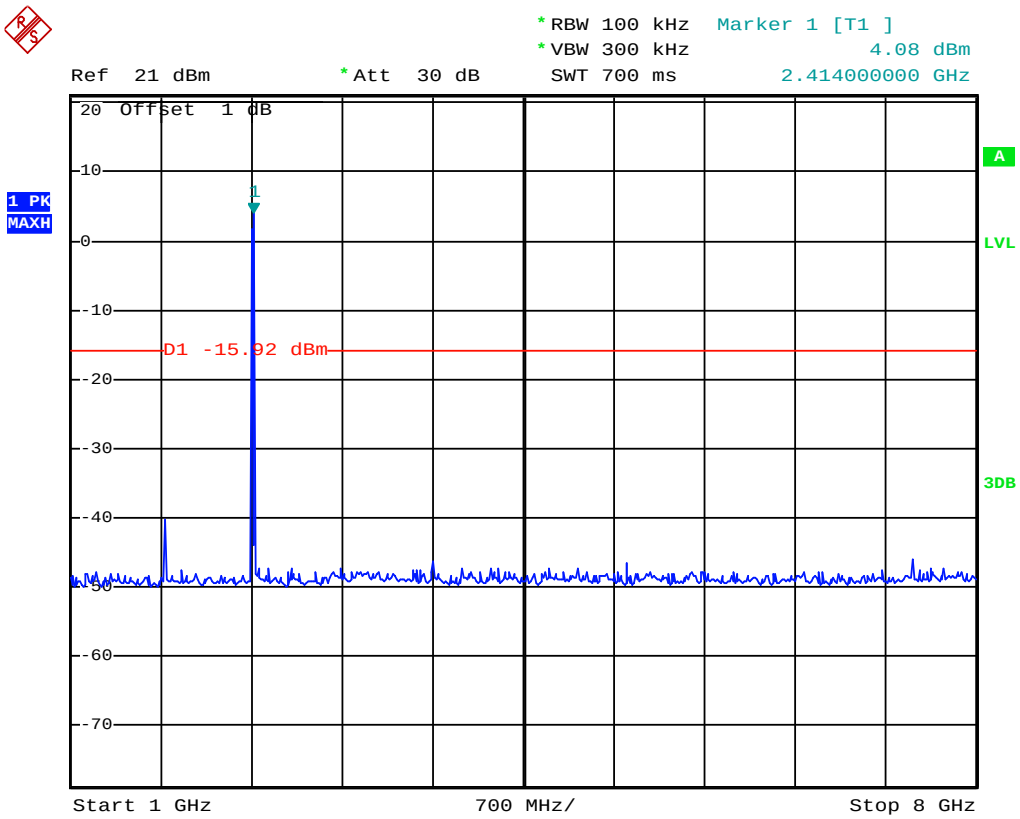
Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-49.54	Peak	-20	Plot 4.6.1 D	PASS
2483.50	-52.32	Peak	-20	Plot 4.6.1 E	PASS

Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.

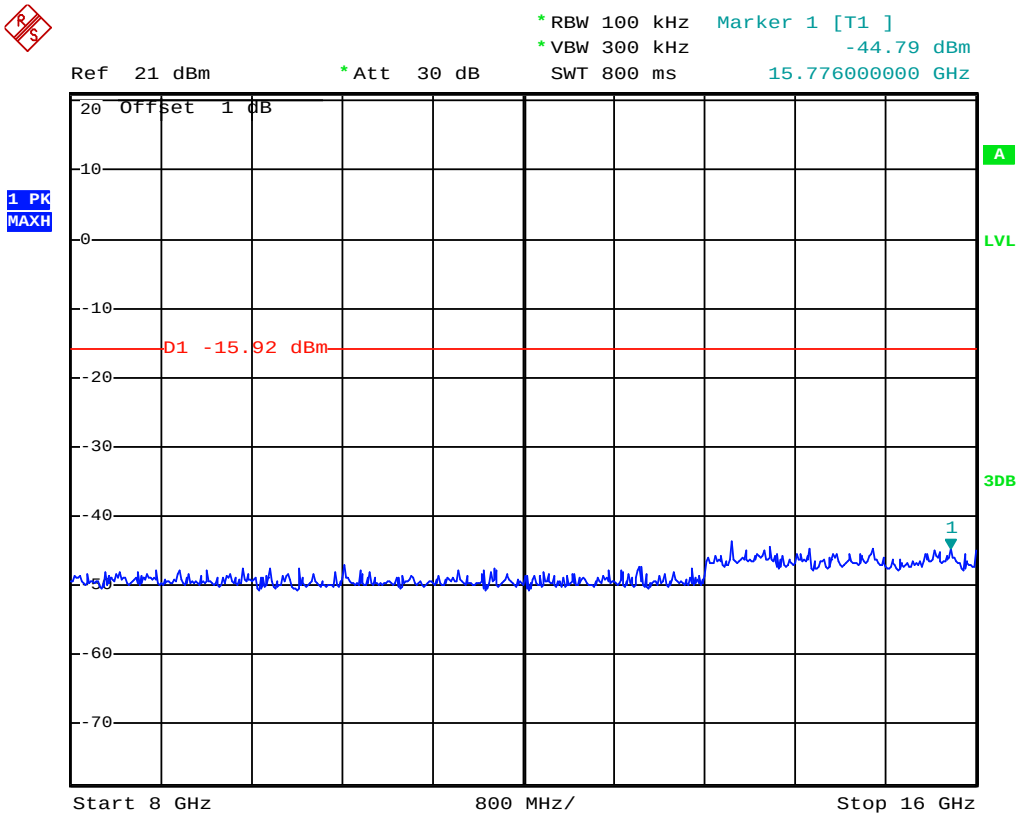
B. Test Plots



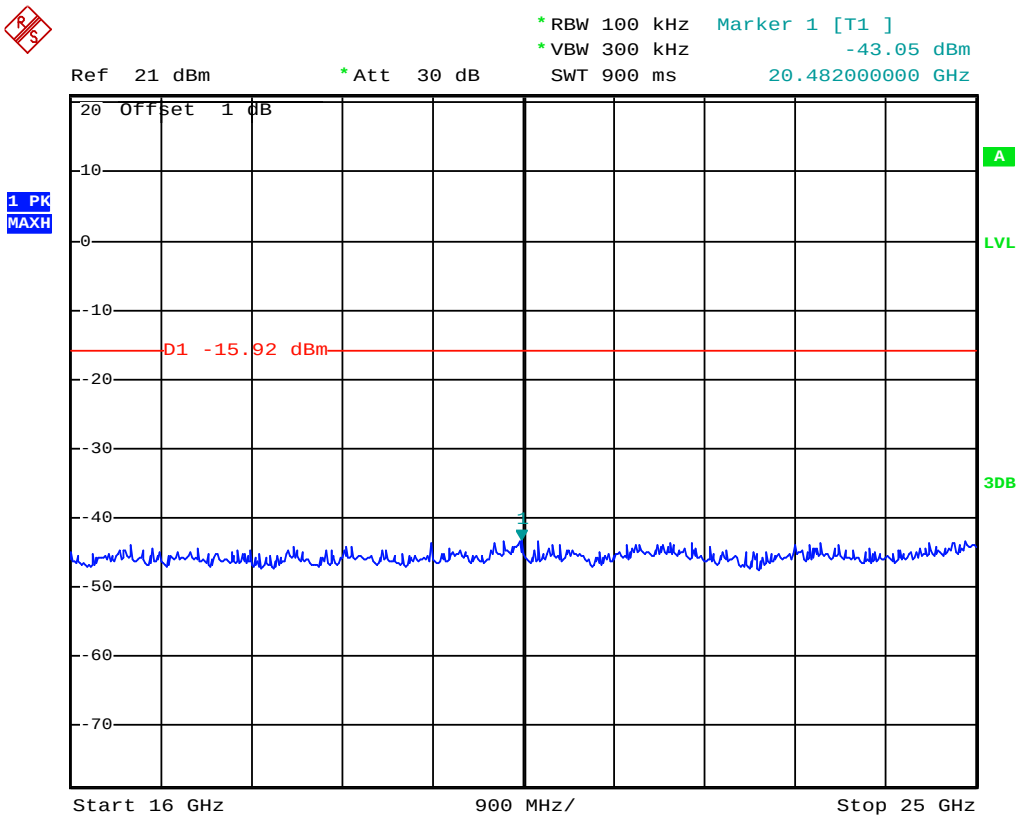
(Plot 4.6.1 A1: Channel 1: 2412MHz @ 802.11b)



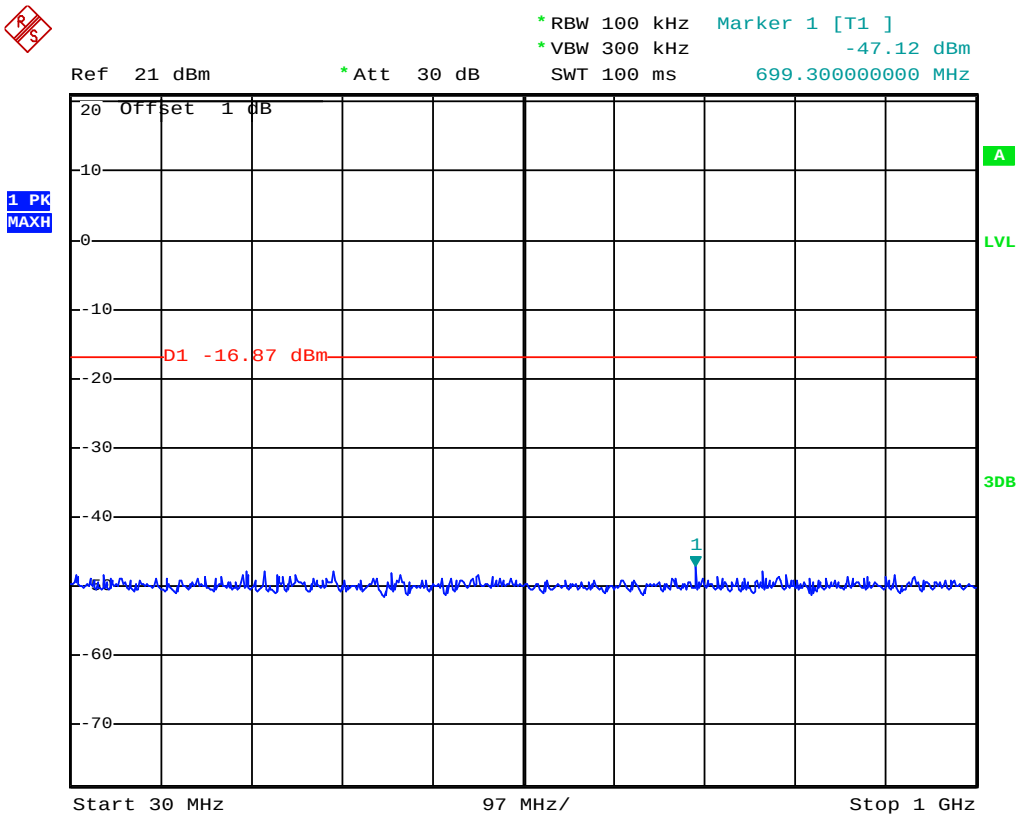
(Plot 4.6.1 A2: Channel 1: 2412MHz @ 802.11b)



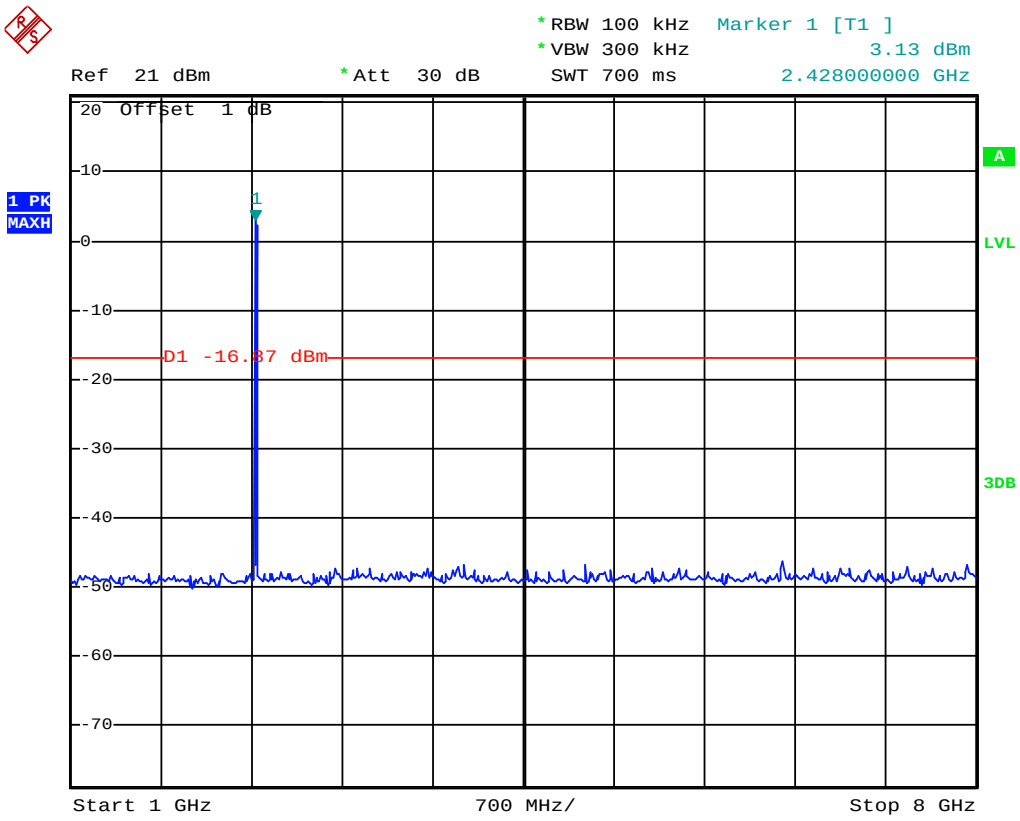
(Plot 4.6.1 A3: Channel 1: 2412MHz @ 802.11b)



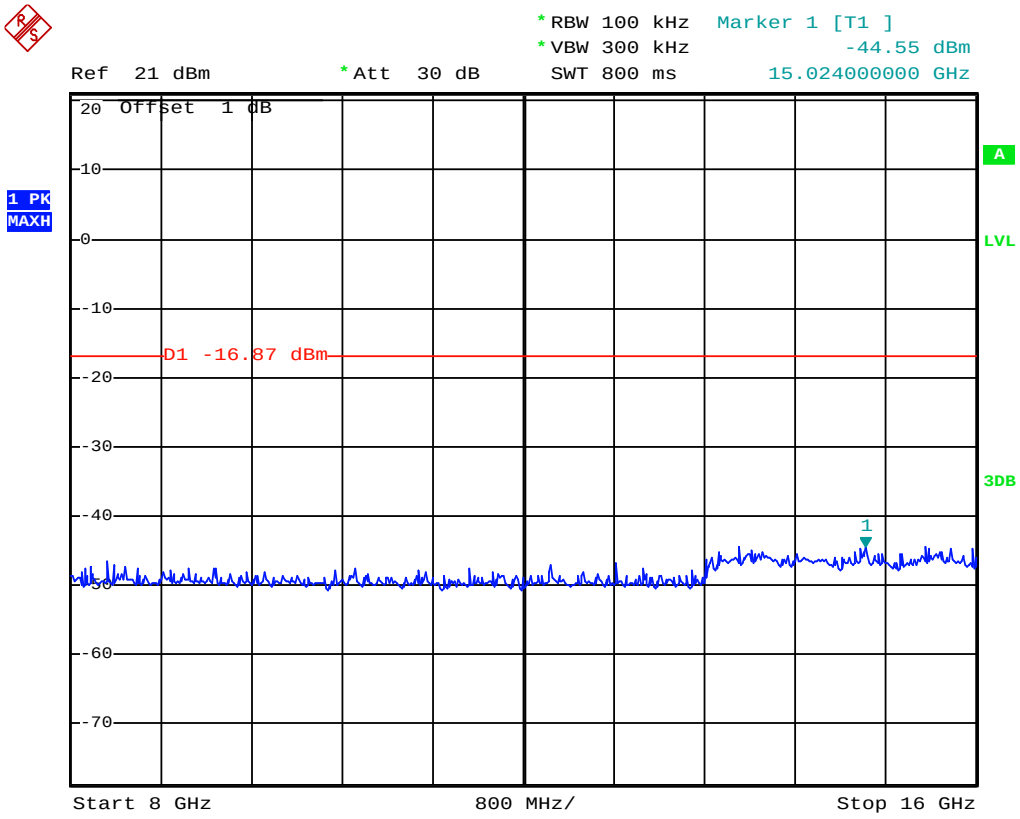
(Plot 4.6.1 A4: Channel 1: 2412MHz @ 802.11b)



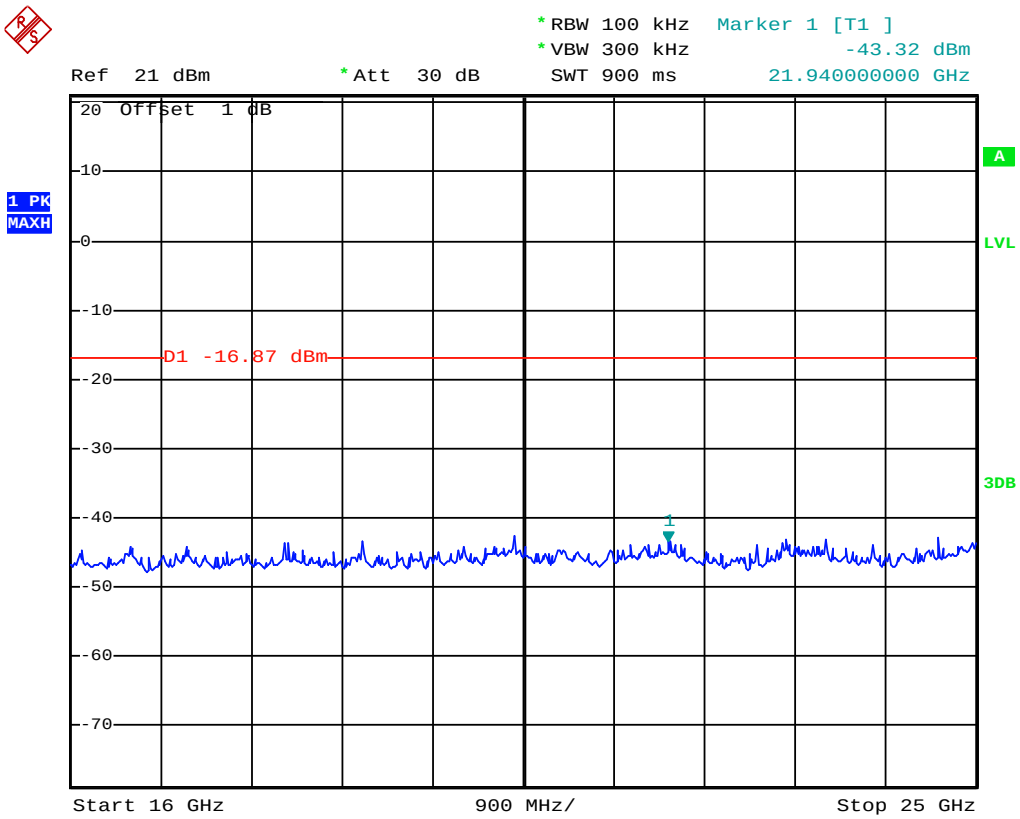
(Plot 4.6.1 B1: Channel 6: 2437MHz @ 802.11b)



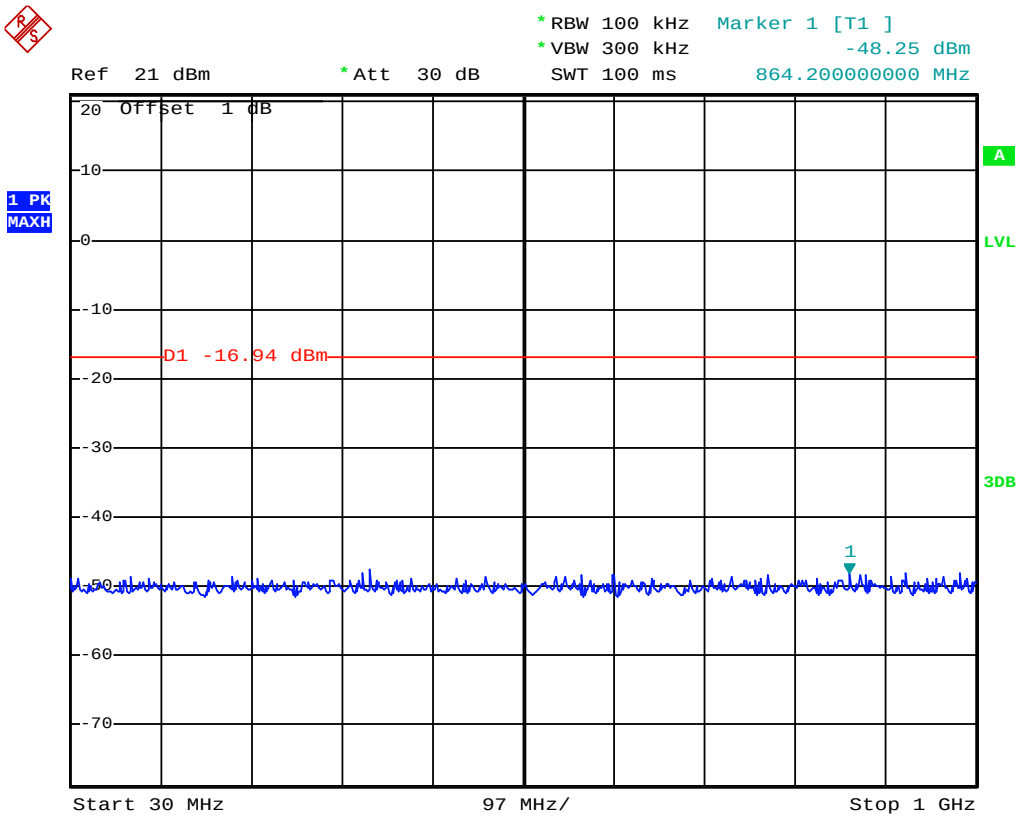
(Plot 4.6.1 B2: Channel 6: 2437MHz @ 802.11b)



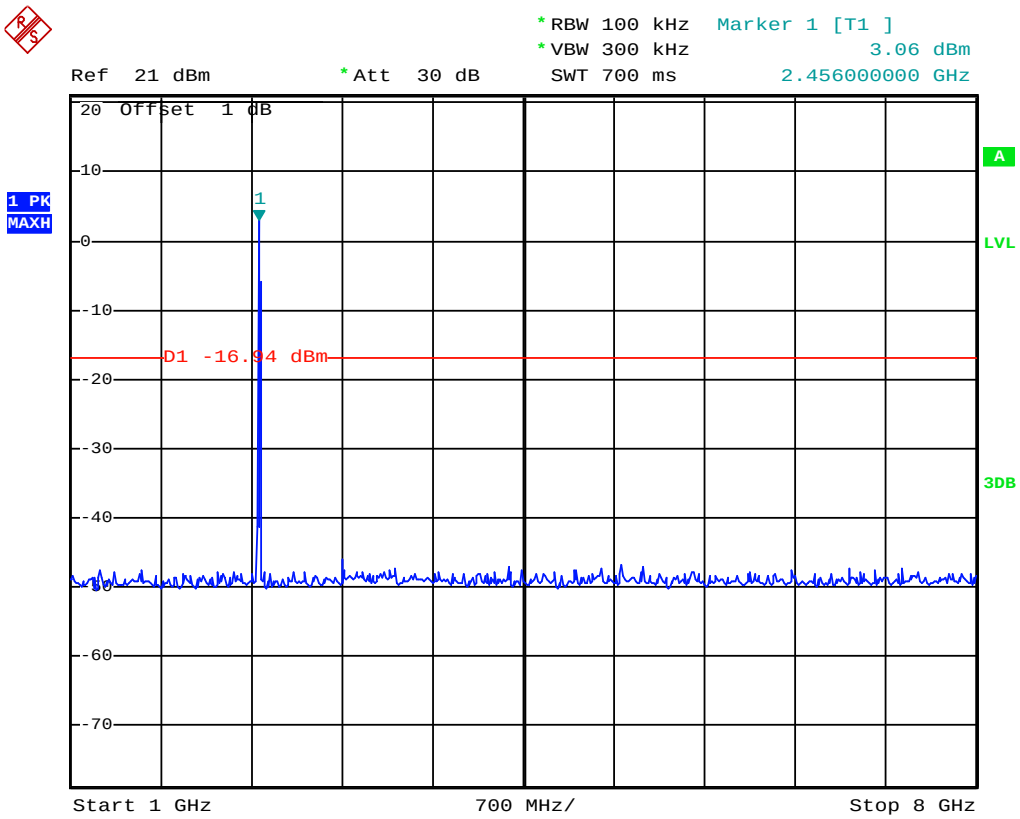
(Plot 4.6.1 B3: Channel 6: 2437MHz @ 802.11b)



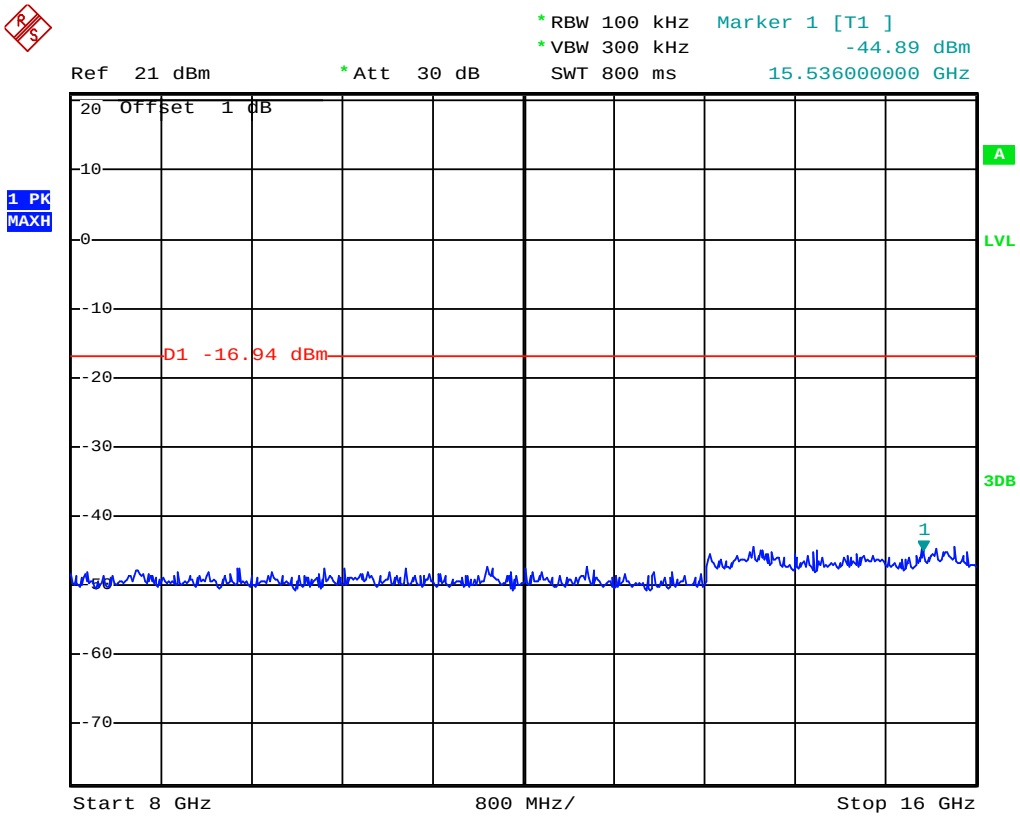
(Plot 4.6.1 B4: Channel 6: 2437MHz @ 802.11b)



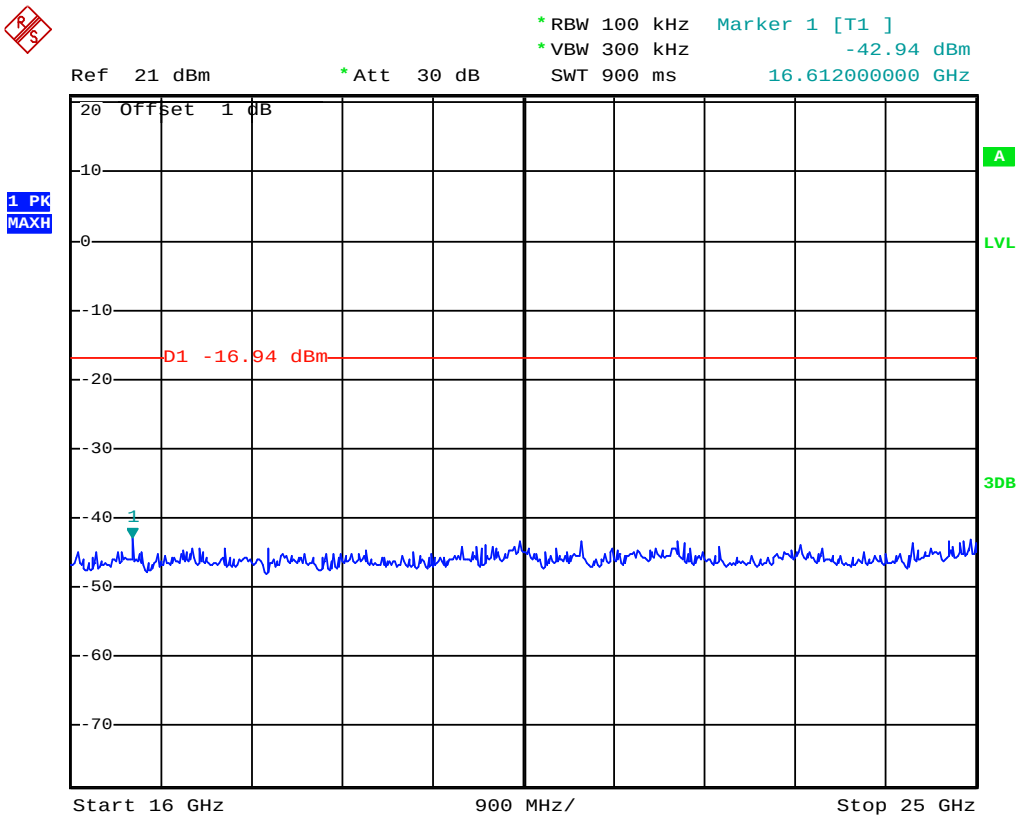
(Plot 4.6.1 C1: Channel 11: 2462MHz @ 802.11b)



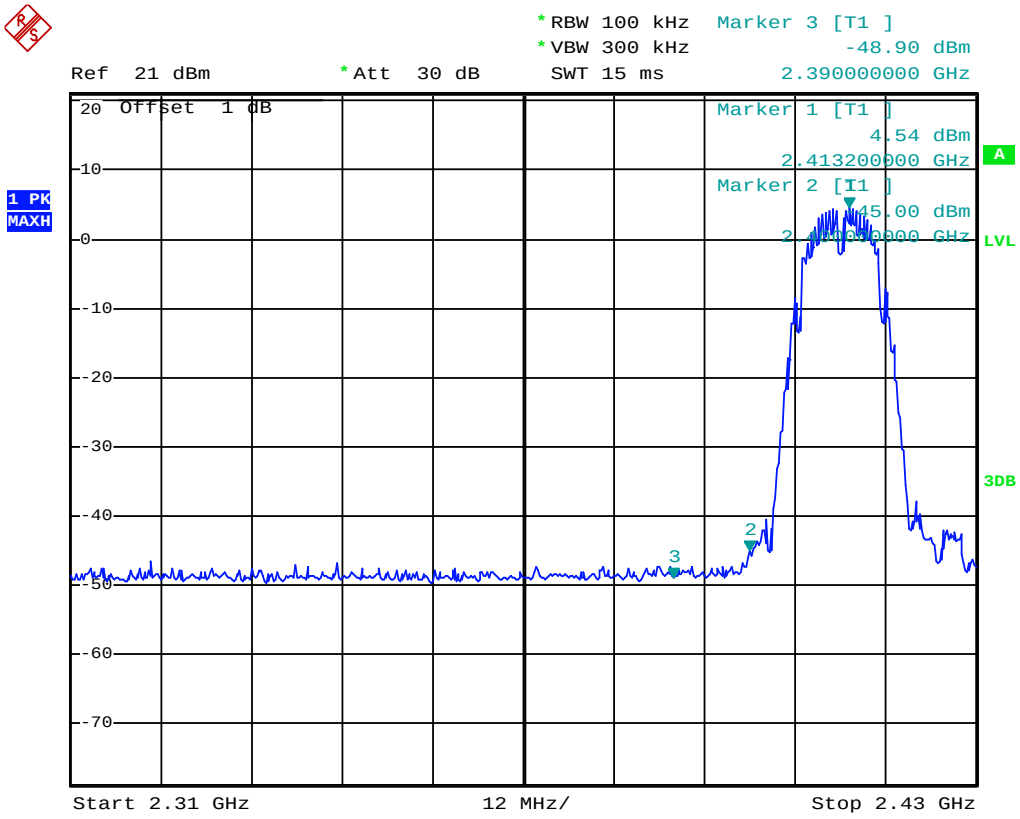
(Plot 4.6.1 C2: Channel 11: 2462MHz @ 802.11b)



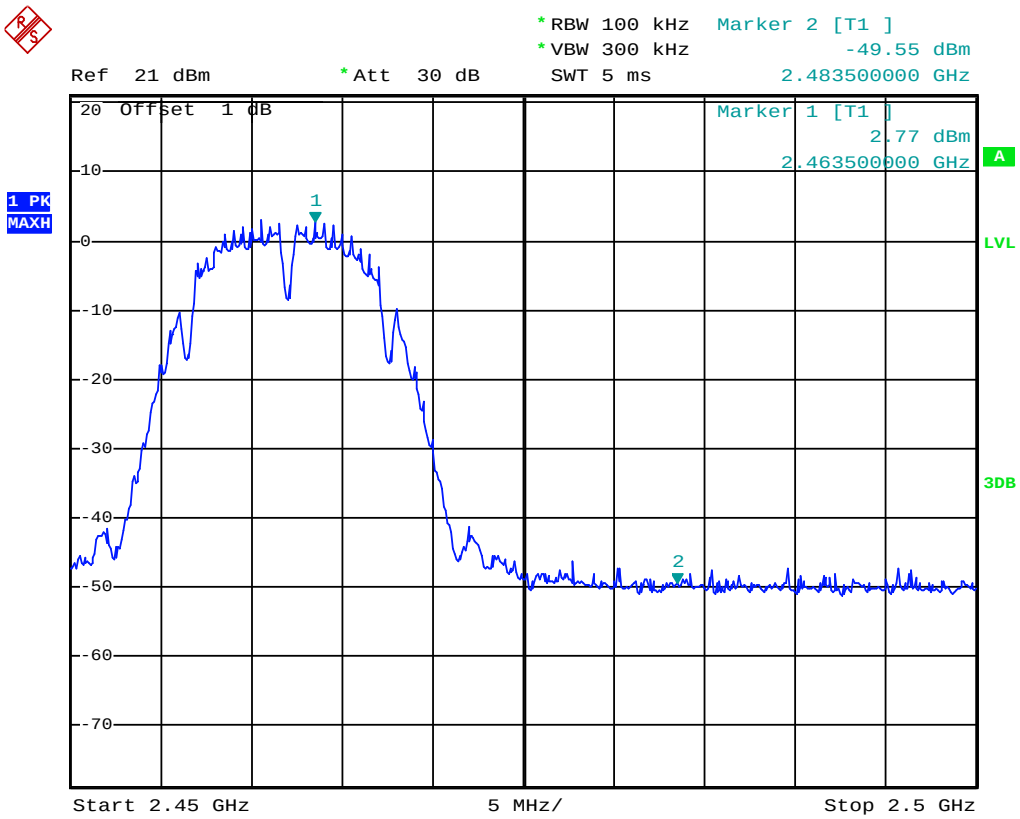
(Plot 4.6.1 C3: Channel 11: 2462MHz @ 802.11b)



(Plot 4.6.1 C4: Channel 11: 2462MHz @ 802.11b)



(Plot 4.6.1 D: Channel 1: 2412MHz @ 802.11b)



(Plot 4.6.1 E: Channel 11: 2462MHz @ 802.11b)

4.6.2 802.11g Test Mode

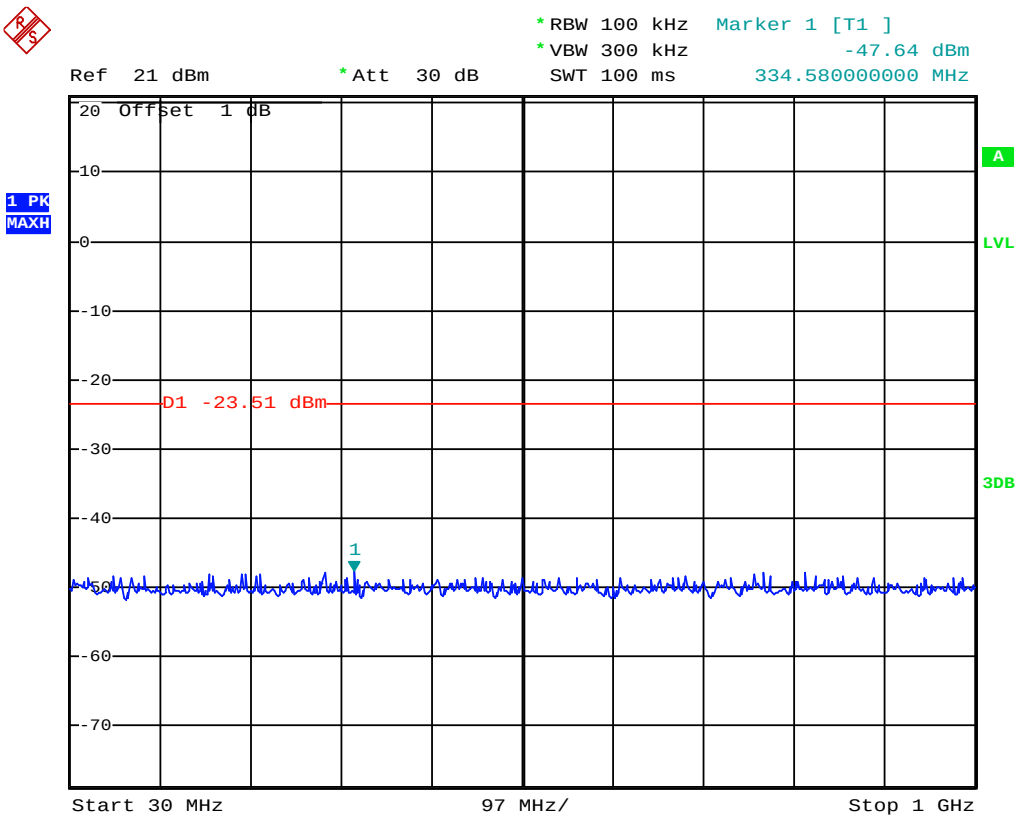
A. Test Verdict

Channel	Frequency (MHz)	Refer to Plot	Limit (dBc)	Verdict
1	2412	Plot 4.6.2 A1	-20	PASS
		Plot 4.6.2 A2	-20	PASS
		Plot 4.6.2 A3	-20	PASS
		Plot 4.6.2 A4	-20	PASS
6	2437	Plot 4.6.2 B1	-20	PASS
		Plot 4.6.2 B2	-20	PASS
		Plot 4.6.2 B3	-20	PASS
		Plot 4.6.2 B4	-20	PASS
11	2462	Plot 4.6.2 C1	-20	PASS
		Plot 4.6.2 C2	-20	PASS
		Plot 4.6.2 C3	-20	PASS
		Plot 4.6.2 C4	-20	PASS

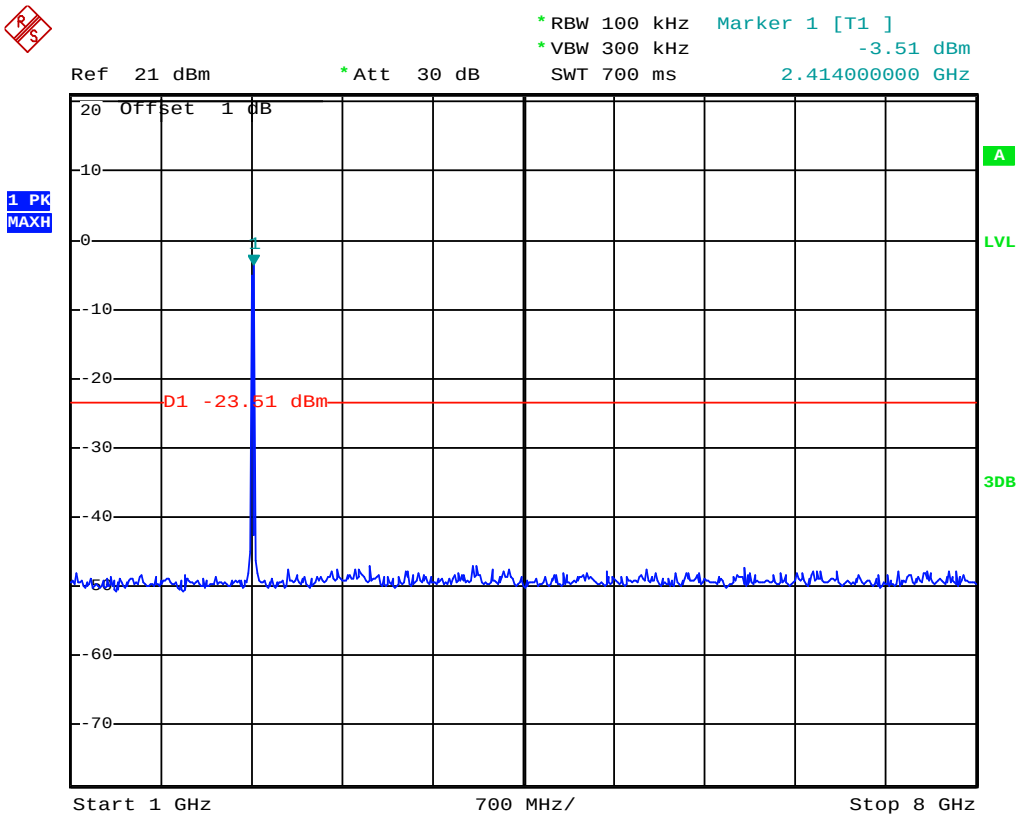
Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-44.17	Peak	-20	Plot 4.6.2 D	PASS
2483.50	-46.50	Peak	-20	Plot 4.6.2 E	PASS

Note: 1. For 802.11g mode at finial test to get the worst-case emission at 6Mbps.
2.The test results including the cable lose.

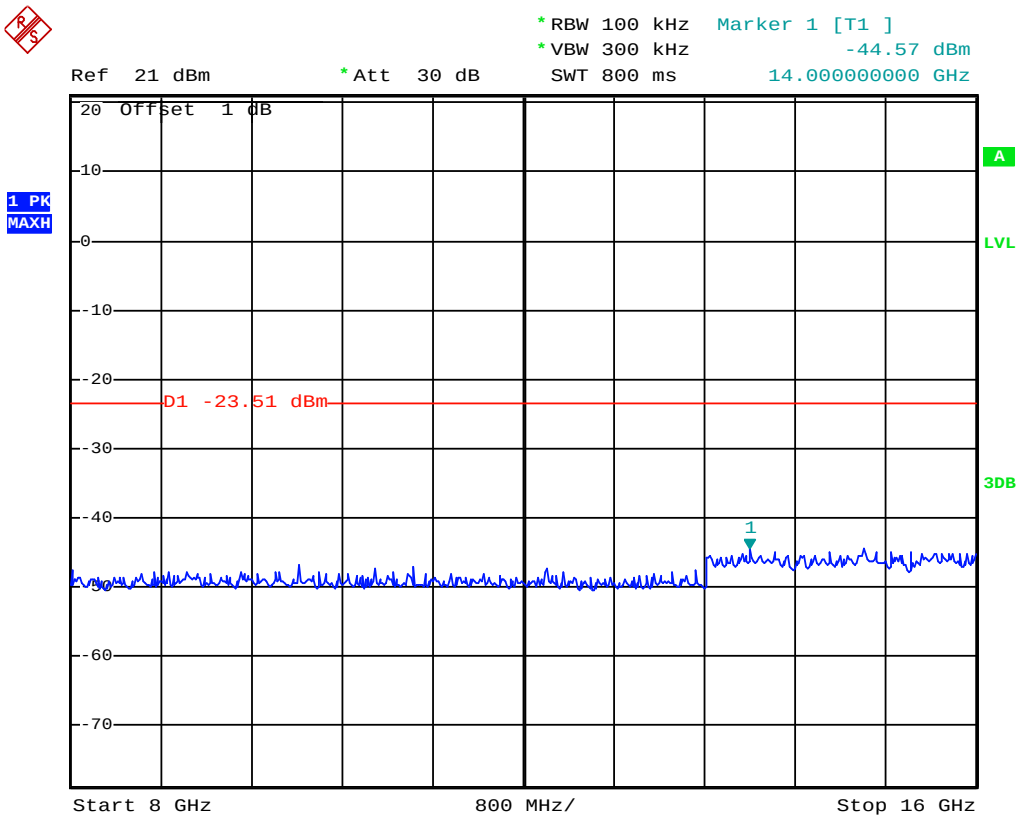
B. Test Plots



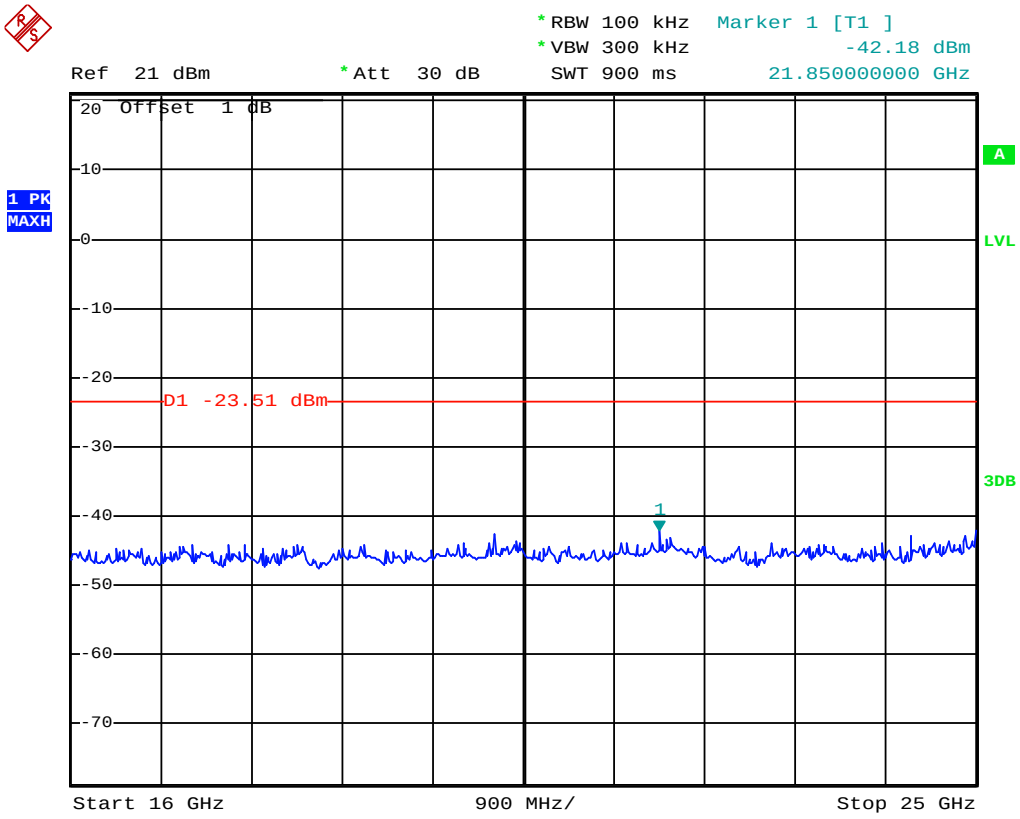
(Plot 4.6.2 A1: Channel 1: 2412MHz @ 802.11g)



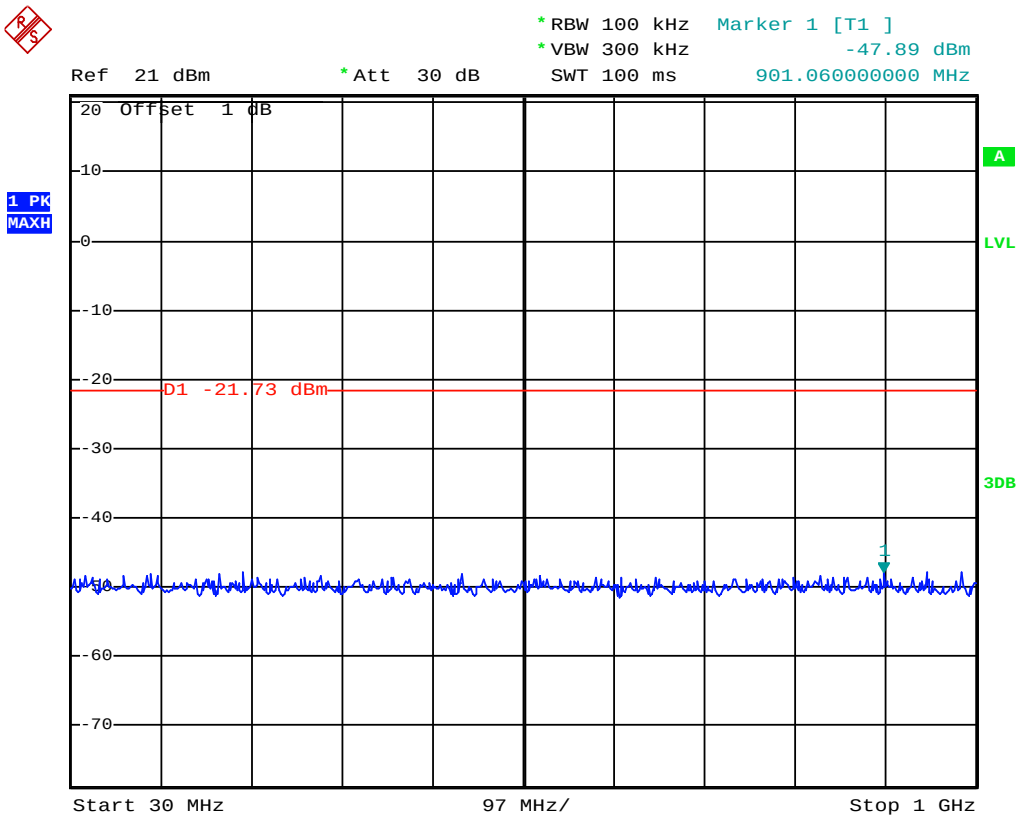
(Plot 4.6.2 A2: Channel 1: 2412MHz @ 802.11g)



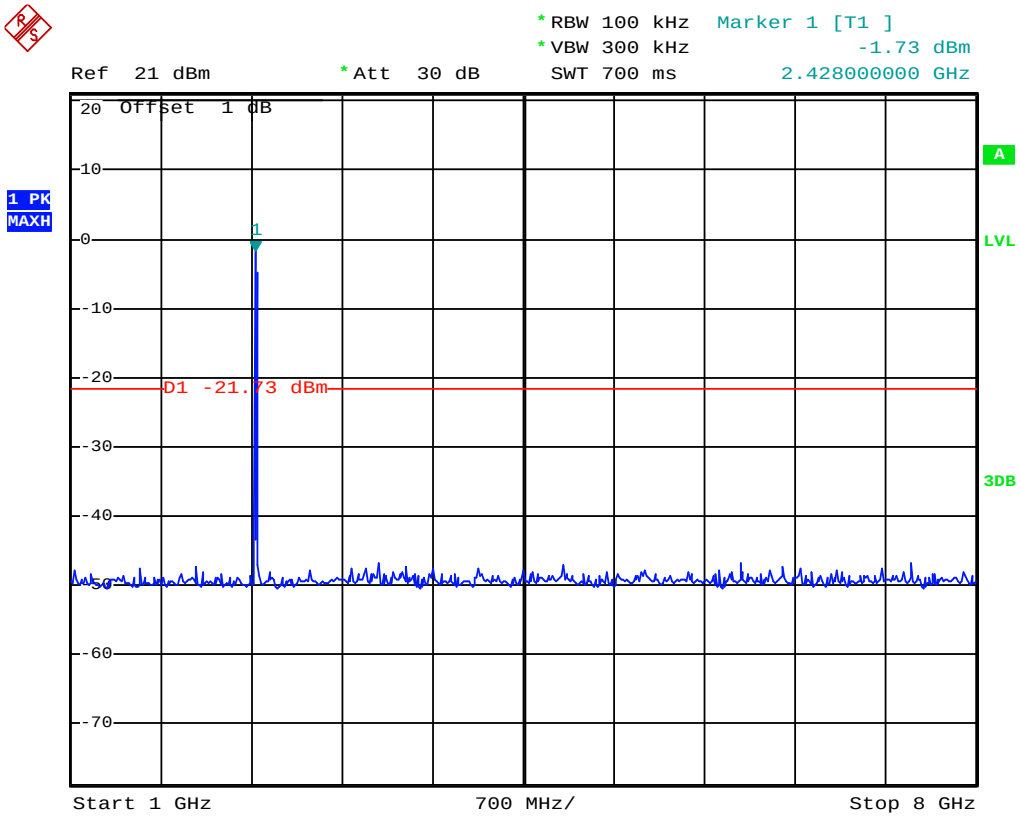
(Plot 4.6.2 A3: Channel 1: 2412MHz @ 802.11g)



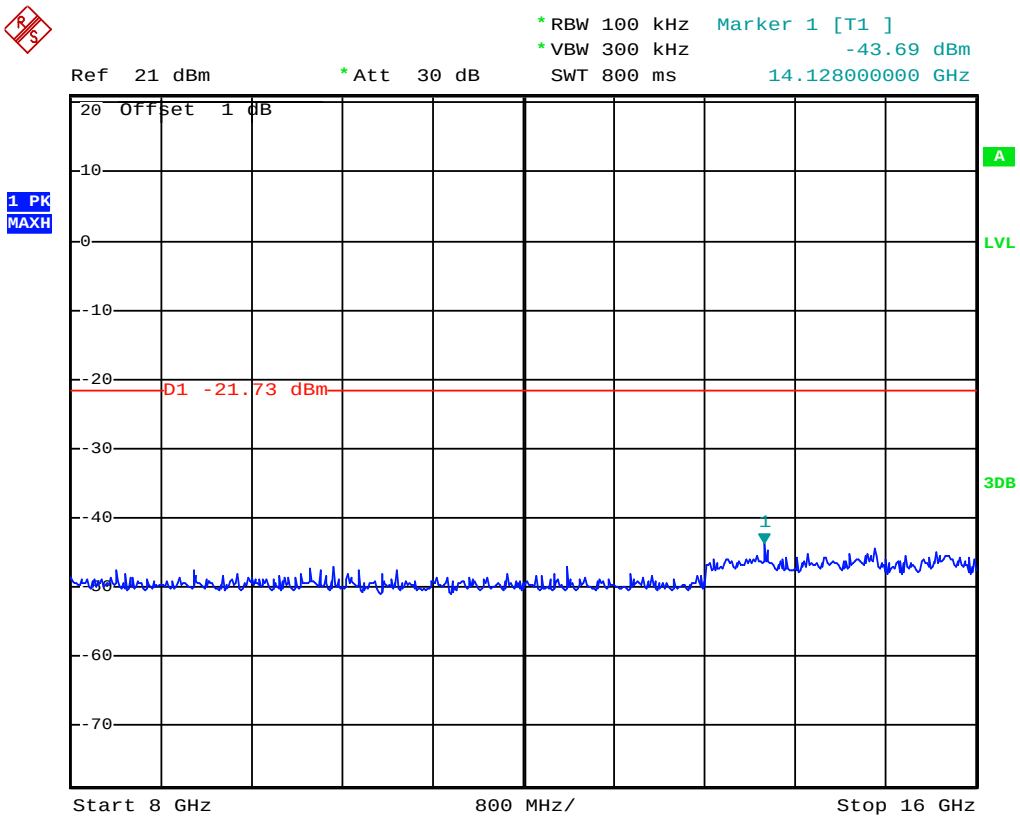
(Plot 4.6.2 A4: Channel 1: 2412MHz @ 802.11g)



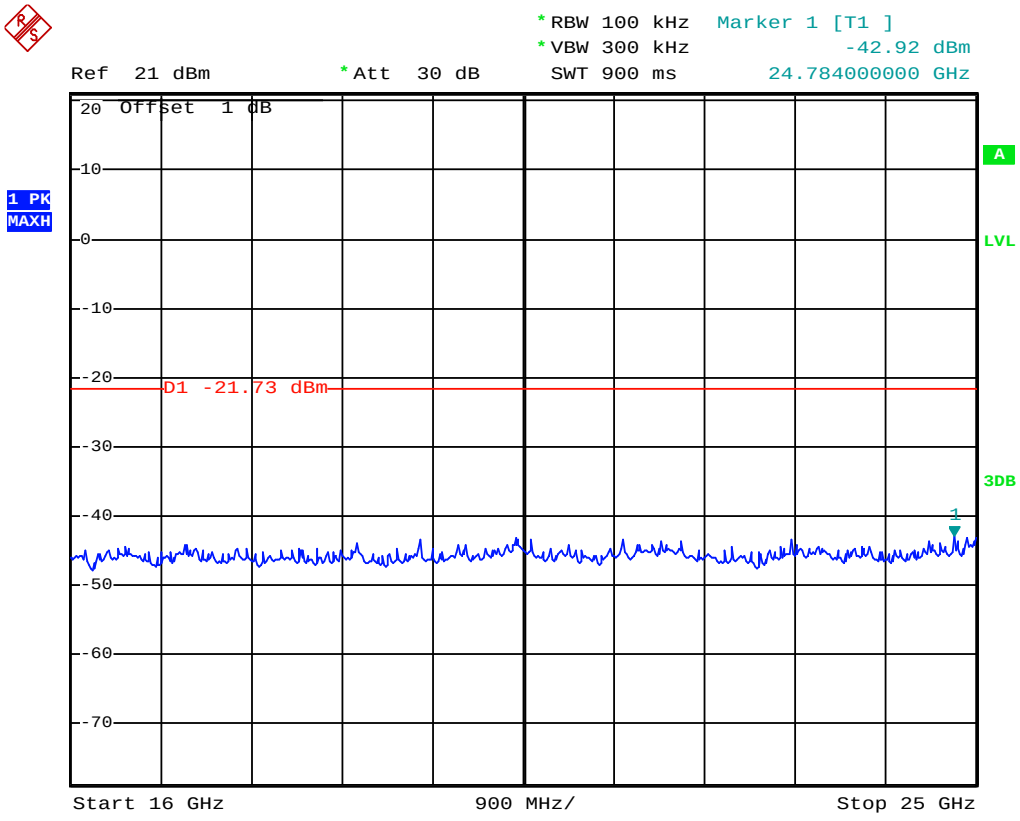
(Plot 4.6.2 B1: Channel 6: 2437MHz @ 802.11g)



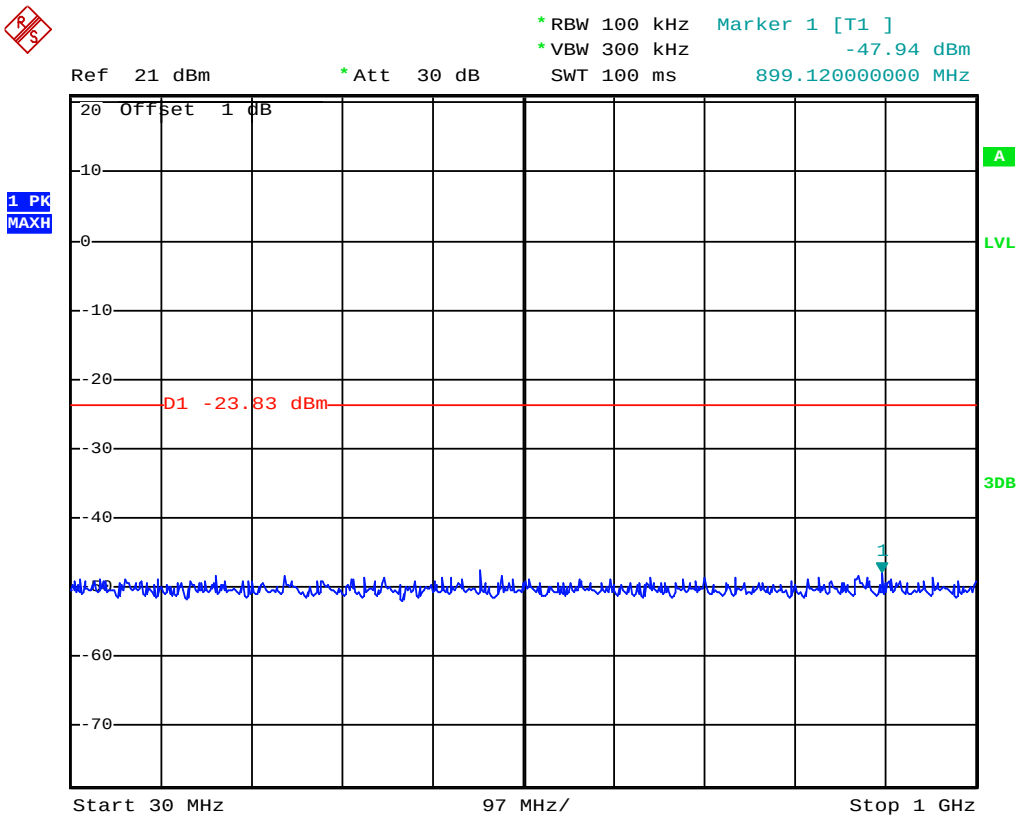
(Plot 4.6.2 B2: Channel 6: 2437MHz @ 802.11g)



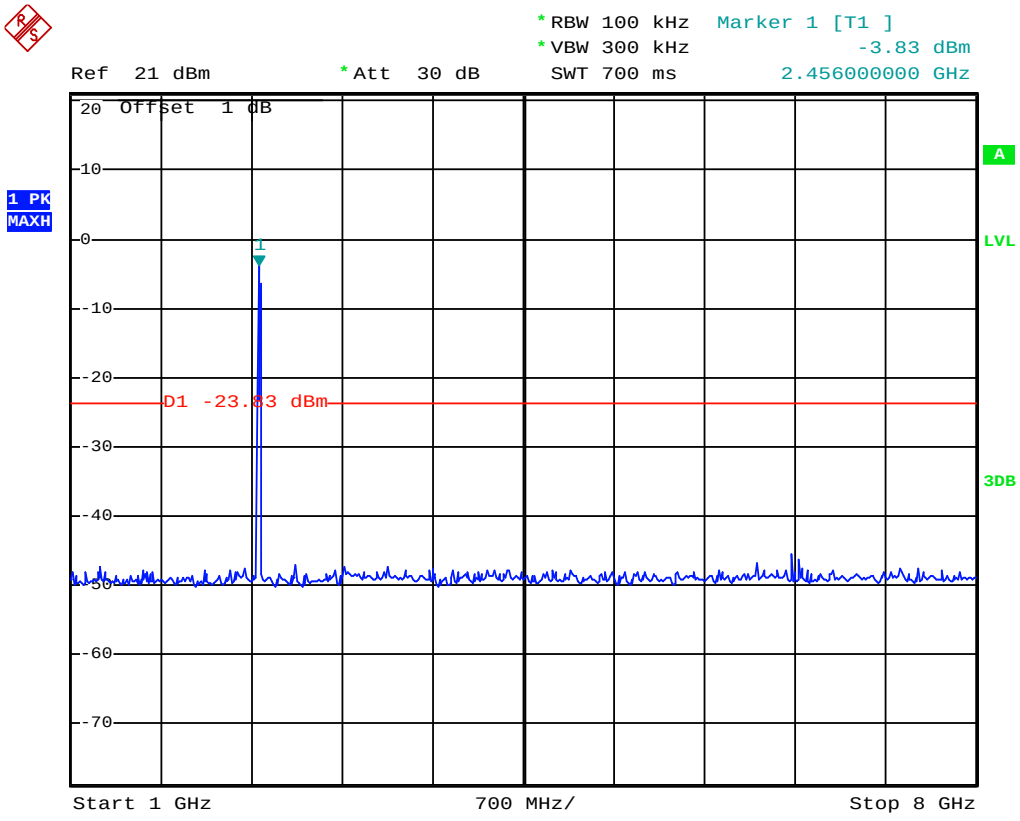
(Plot 4.6.2 B3: Channel 6: 2437MHz @ 802.11g)



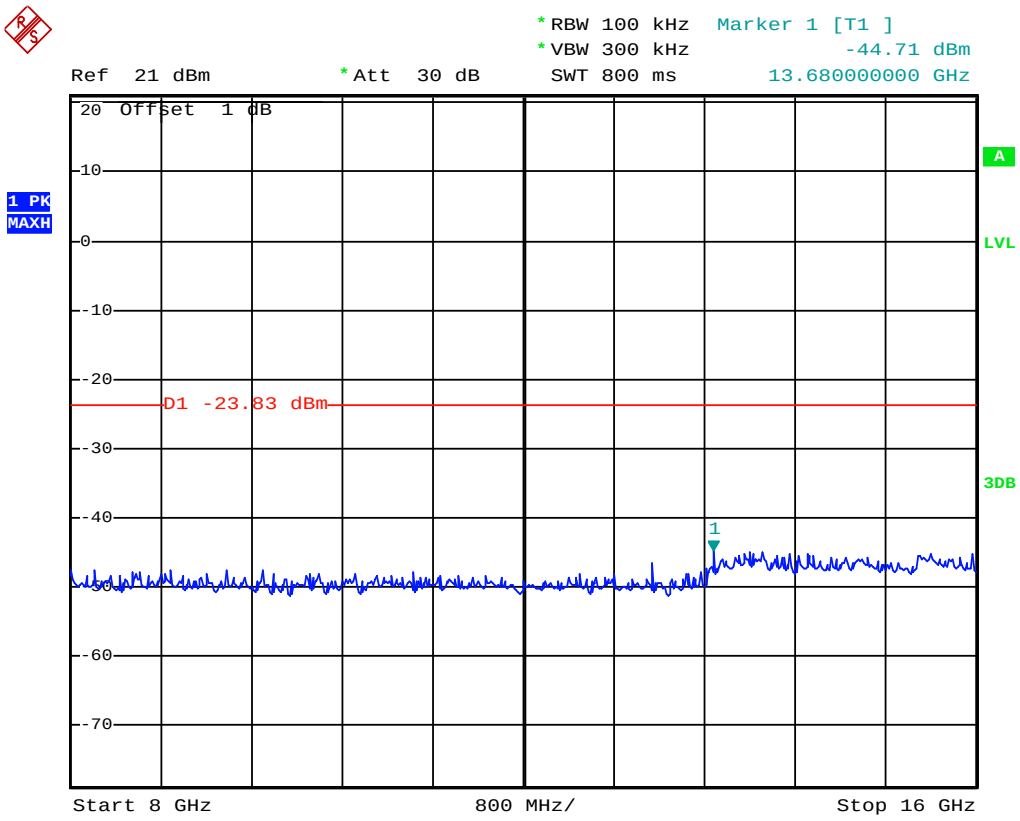
(Plot 4.6.2 B4: Channel 6: 2437MHz @ 802.11g)



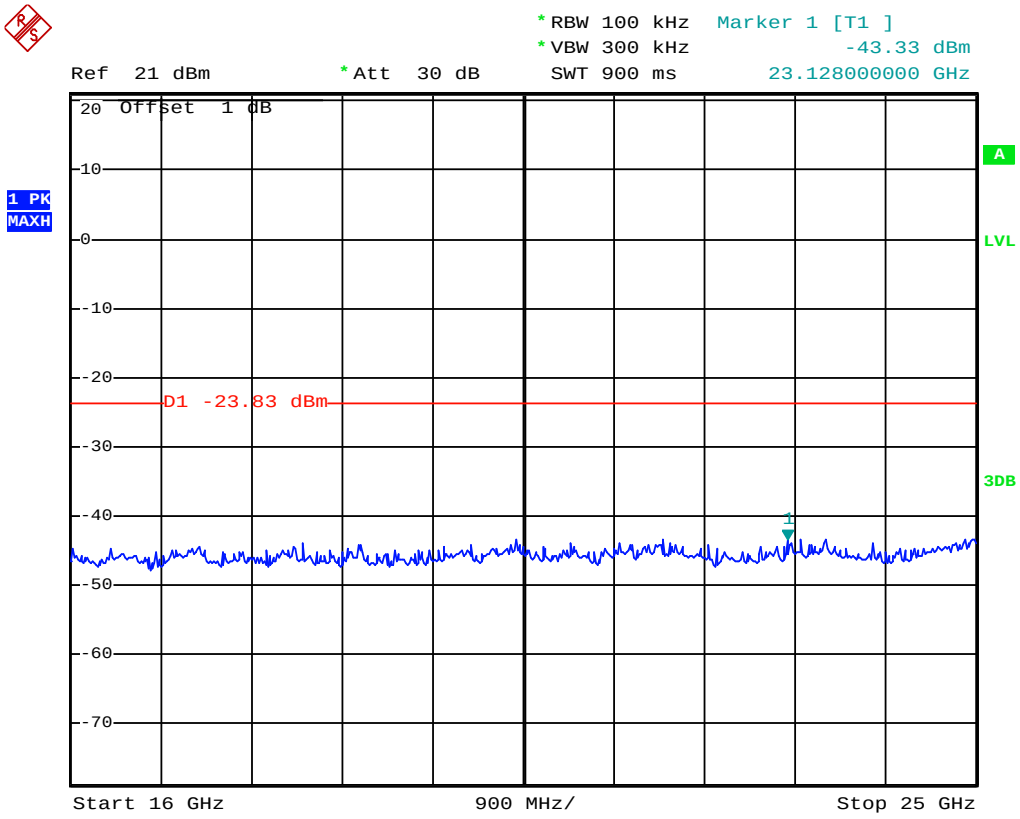
(Plot 4.6.2 C1: Channel 11: 2462MHz @ 802.11g)



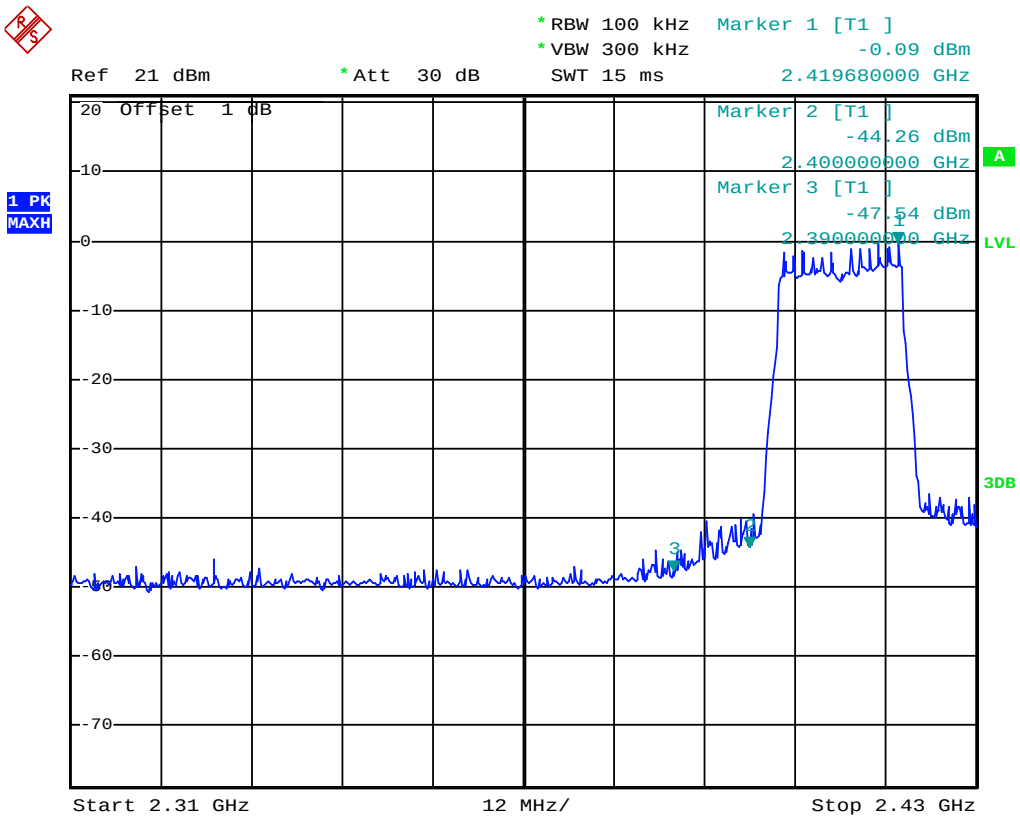
(Plot 4.6.2 C2: Channel 11: 2462MHz @ 802.11g)



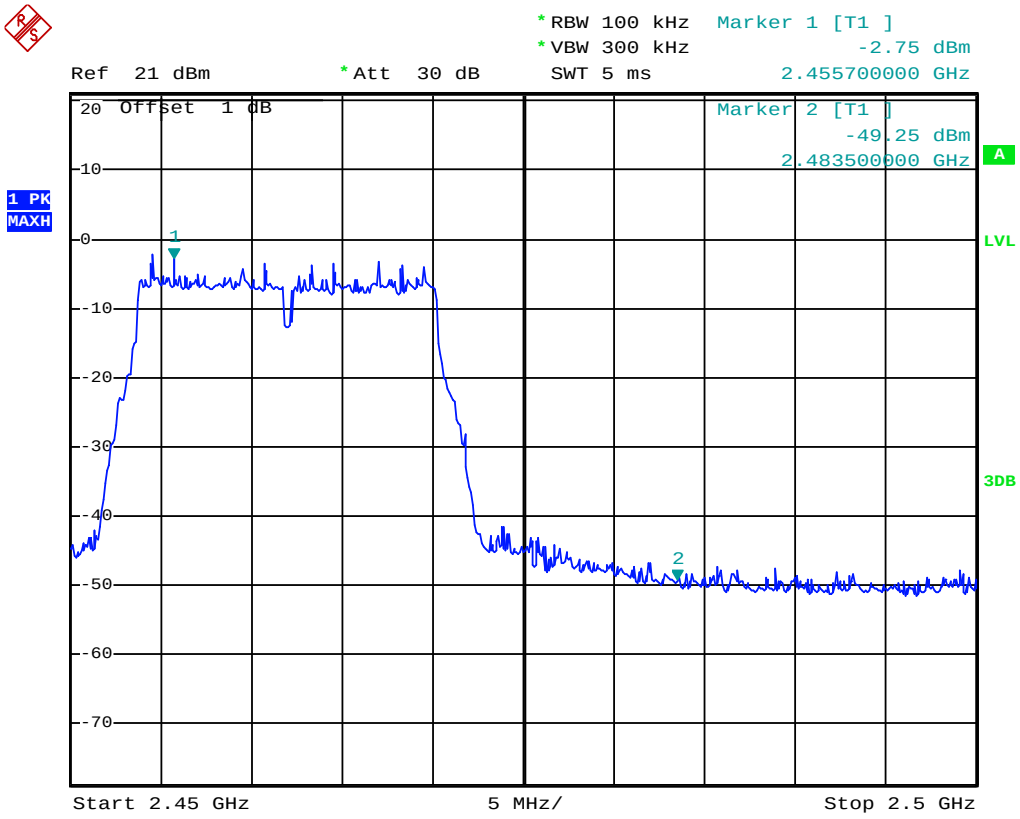
(Plot 4.6.2 C3: Channel 11: 2462MHz @ 802.11g)



(Plot 4.6.2 C4: Channel 11: 2462MHz @ 802.11g)



(Plot 4.6.2 D: Channel 1: 2412MHz @ 802.11g)



(Plot 4.6.2 E: Channel 11: 2462MHz @ 802.11g)

4.6.3 802.11n(20MHz) Test Mode

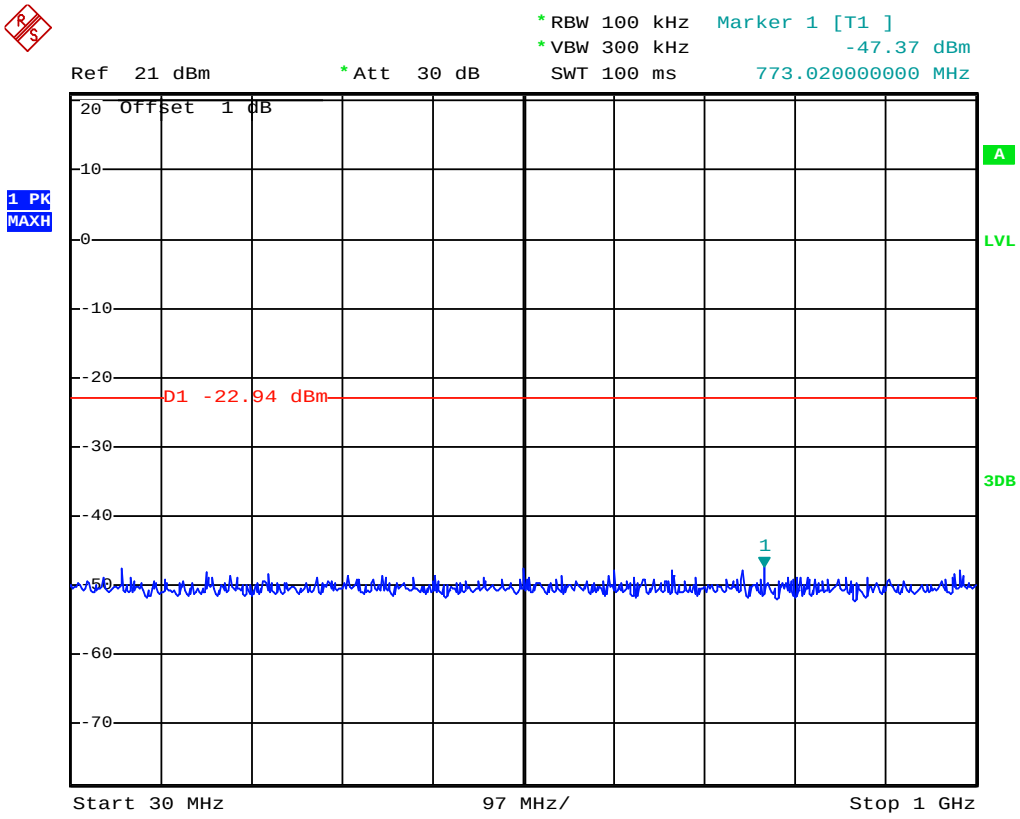
A. Test Verdict

Channel	Frequency (MHz)	Refer to Plot	Limit (dBc)	Verdict
1	2412	Plot 4.6.3 A1	-20	PASS
		Plot 4.6.3 A2	-20	PASS
		Plot 4.6.3 A3	-20	PASS
		Plot 4.6.3 A4	-20	PASS
6	2437	Plot 4.6.3 B1	-20	PASS
		Plot 4.6.3 B2	-20	PASS
		Plot 4.6.3 B3	-20	PASS
		Plot 4.6.3 B4	-20	PASS
11	2462	Plot 4.6.3 C1	-20	PASS
		Plot 4.6.3 C2	-20	PASS
		Plot 4.6.3 C3	-20	PASS
		Plot 4.6.3 C4	-20	PASS

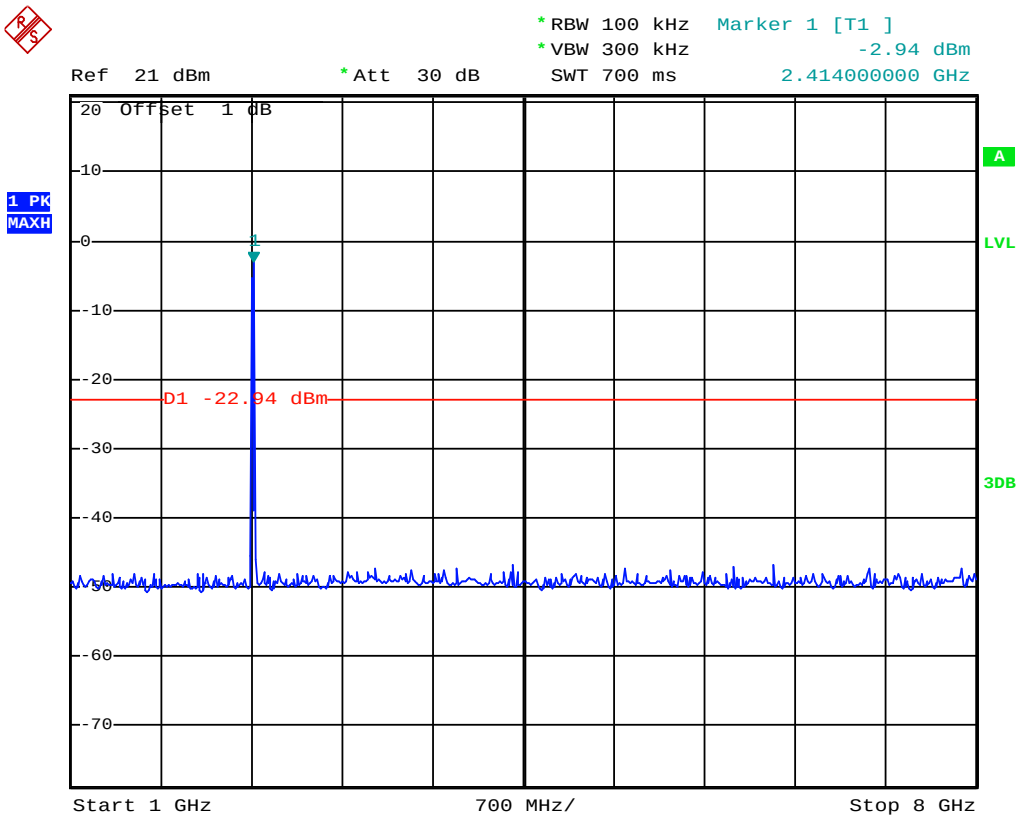
Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-38.71	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-45.90	Peak	-20	Plot 4.6.3 E	PASS

Note: 1. For 802.11n(20MHz) mode at finial test to get the worst-case emission at 6.5Mbps.
2.The test results including the cable lose.

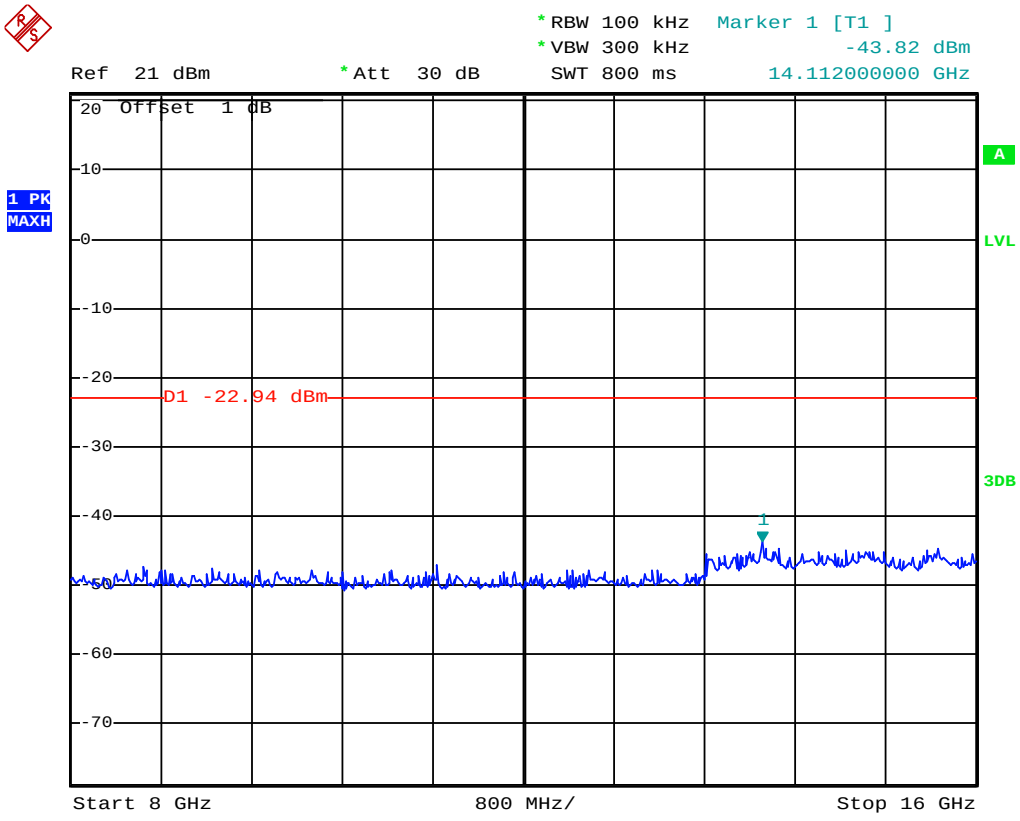
B. Test Plots



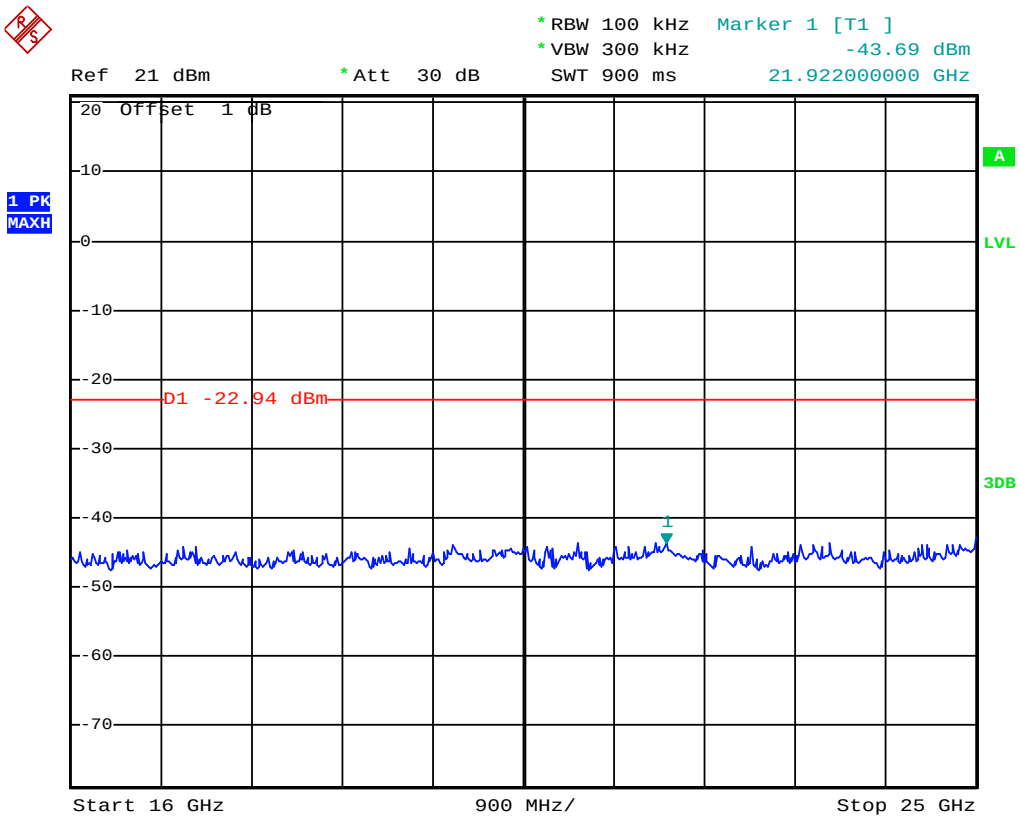
(Plot 4.6.3 A1: Channel 1: 2412MHz @ 802.11n(20MHz))



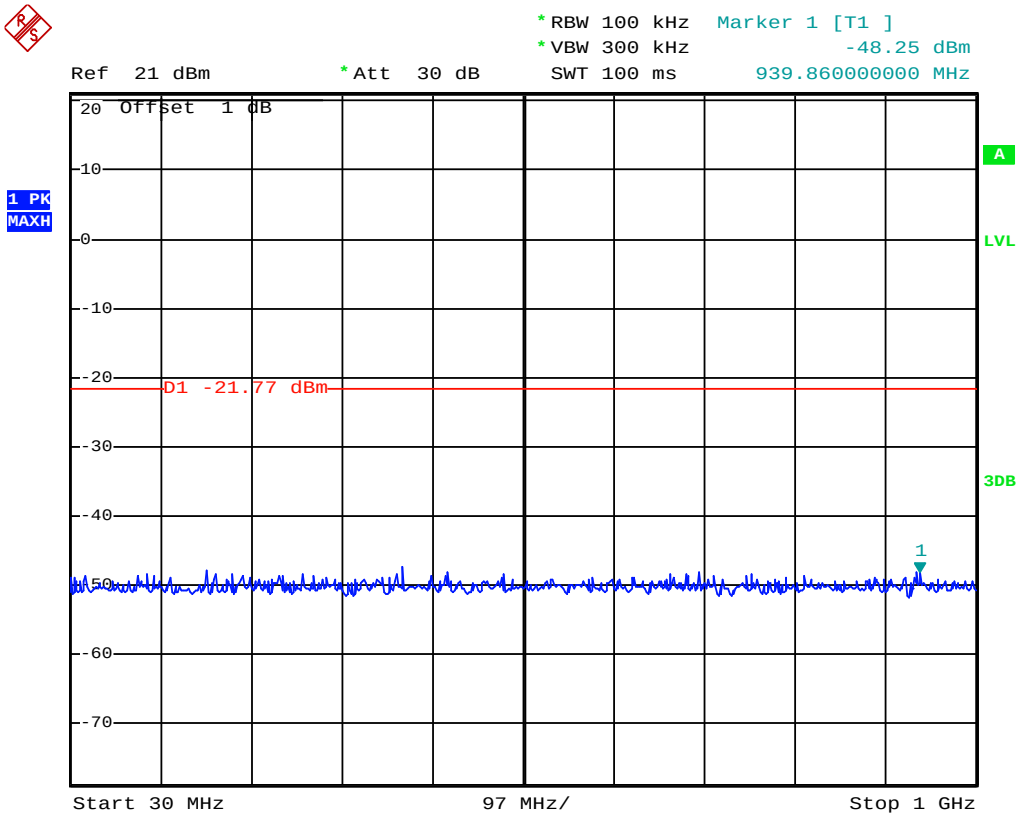
(Plot 4.6.3 A2: Channel 1: 2412MHz @ 802.11n(20MHz))



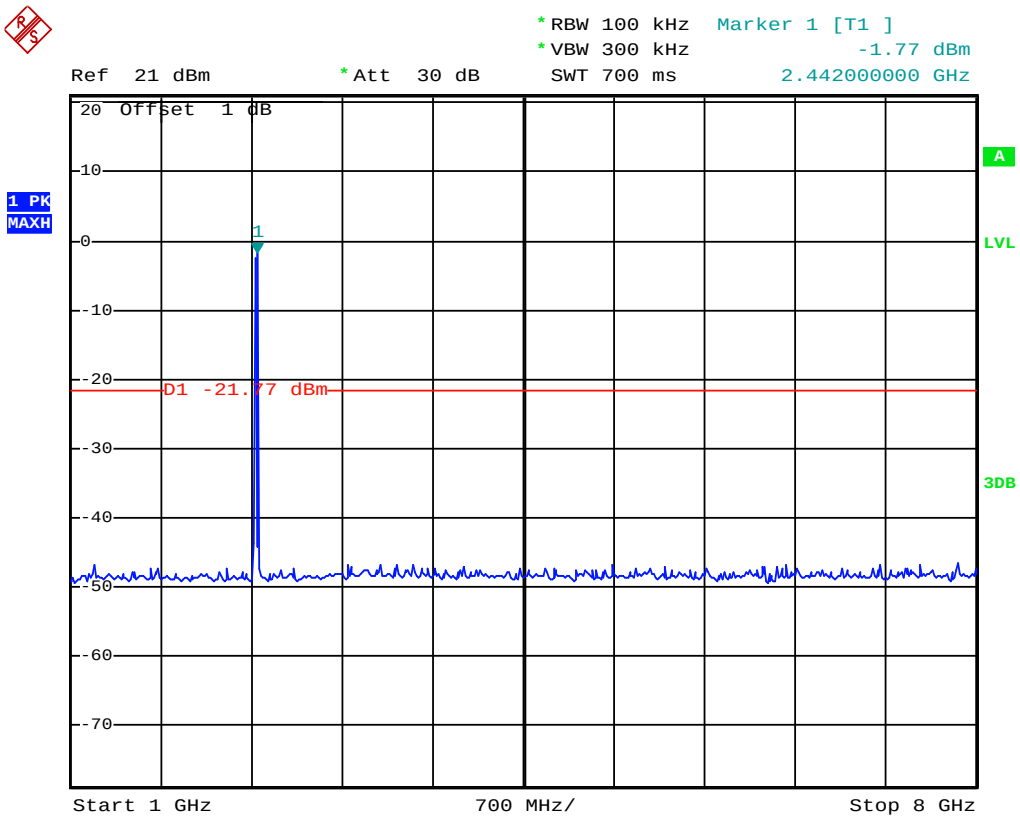
(Plot 4.6.3 A3: Channel 1: 2412MHz @ 802.11n(20MHz))



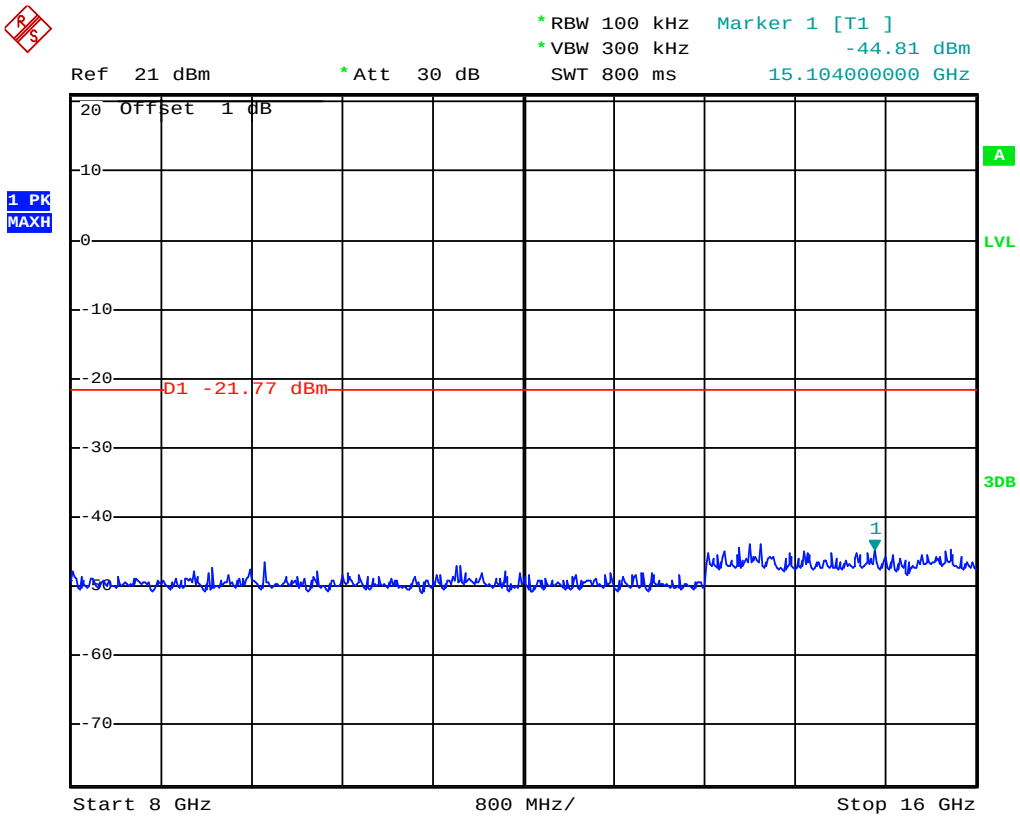
(Plot 4.6.3 A4: Channel 1: 2412MHz @ 802.11n(20MHz))



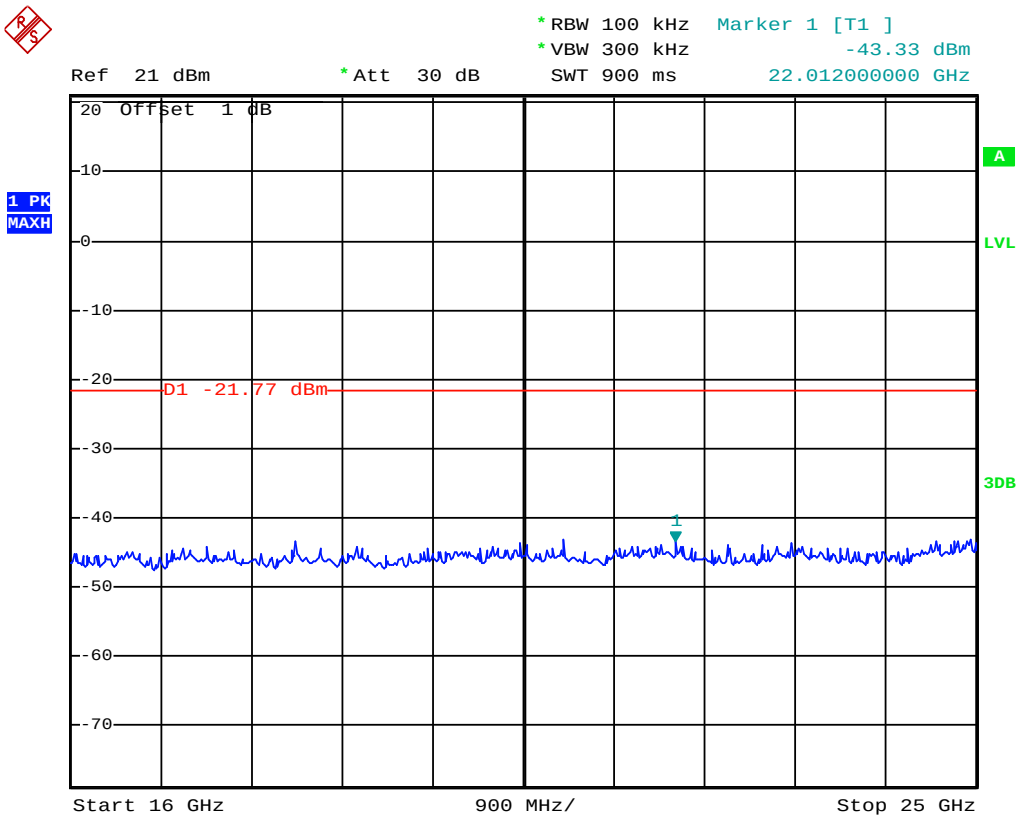
(Plot 4.6.3 B1: Channel 6: 2437MHz @ 802.11n(20MHz))



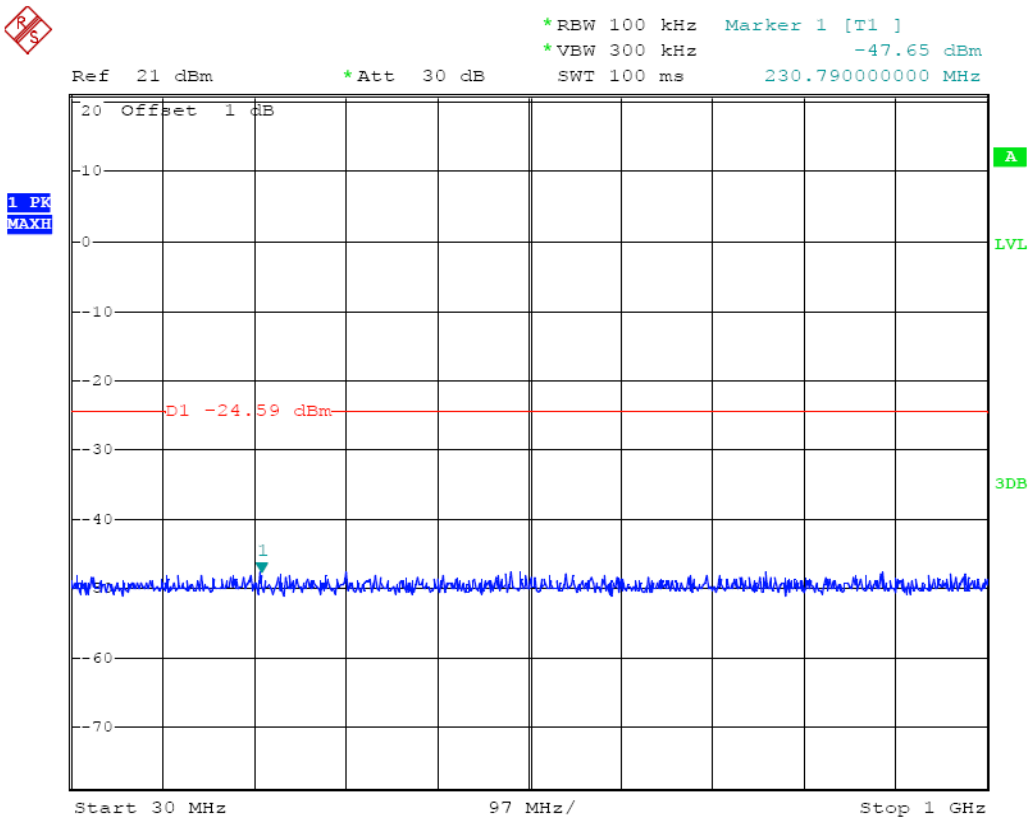
(Plot 4.6.3 B2: Channel 6: 2437MHz @ 802.11n(20MHz))



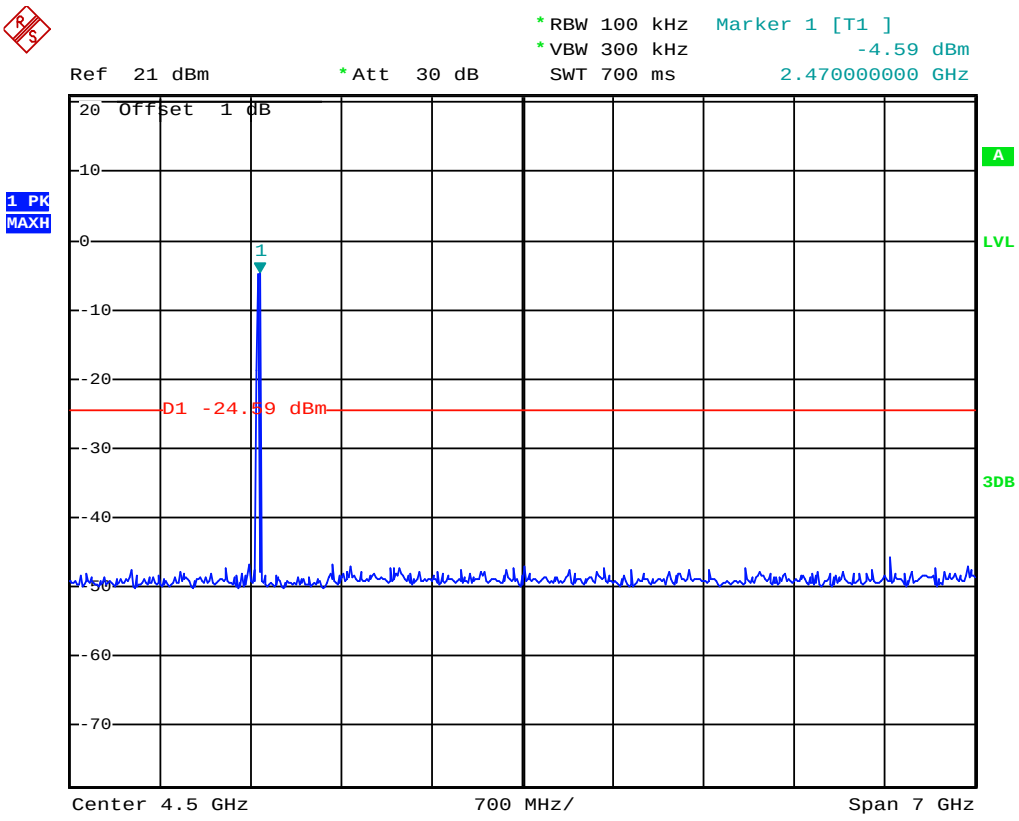
(Plot 4.6.3 B3: Channel 6: 2437MHz @ 802.11n(20MHz))



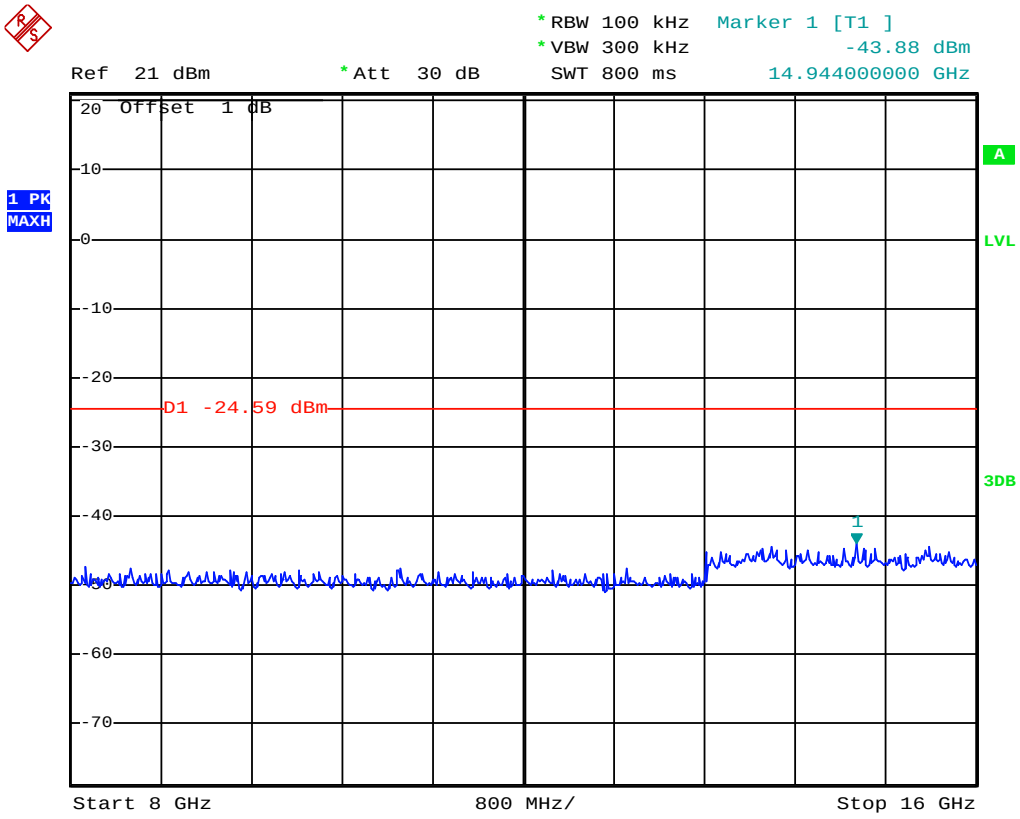
(Plot 4.6.3 B4: Channel 6: 2437MHz @ 802.11n(20MHz))



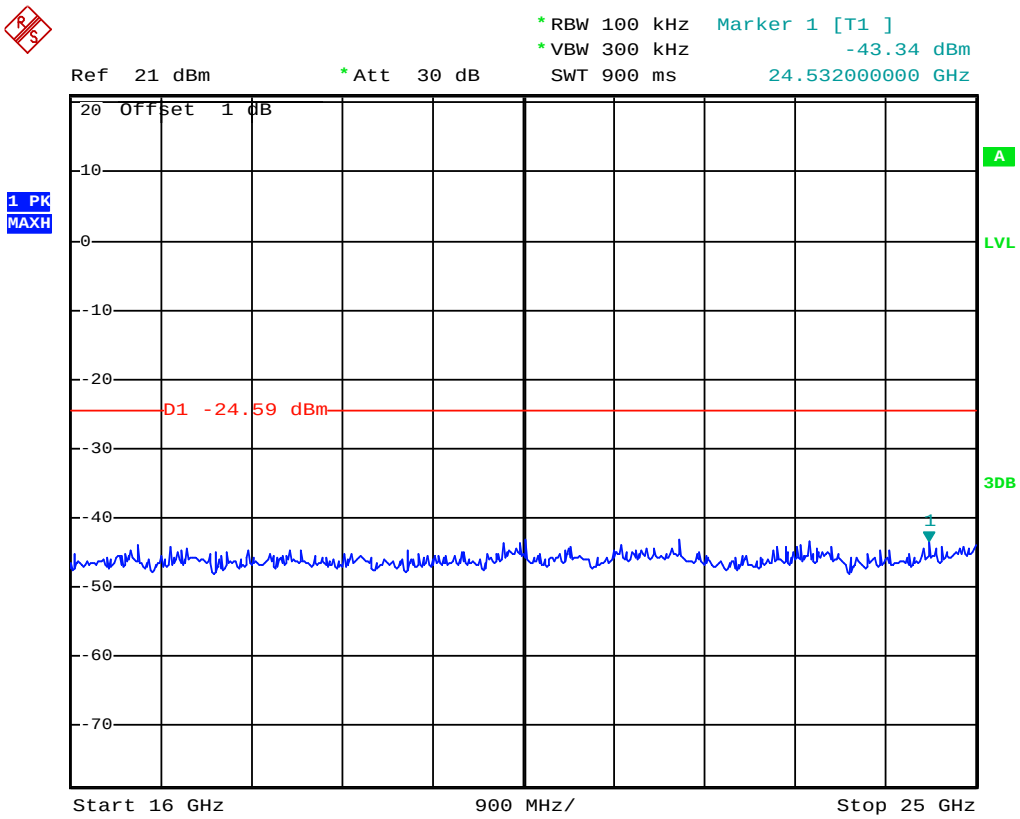
(Plot 4.6.3 C1: Channel 11: 2462MHz @ 802.11n(20MHz))



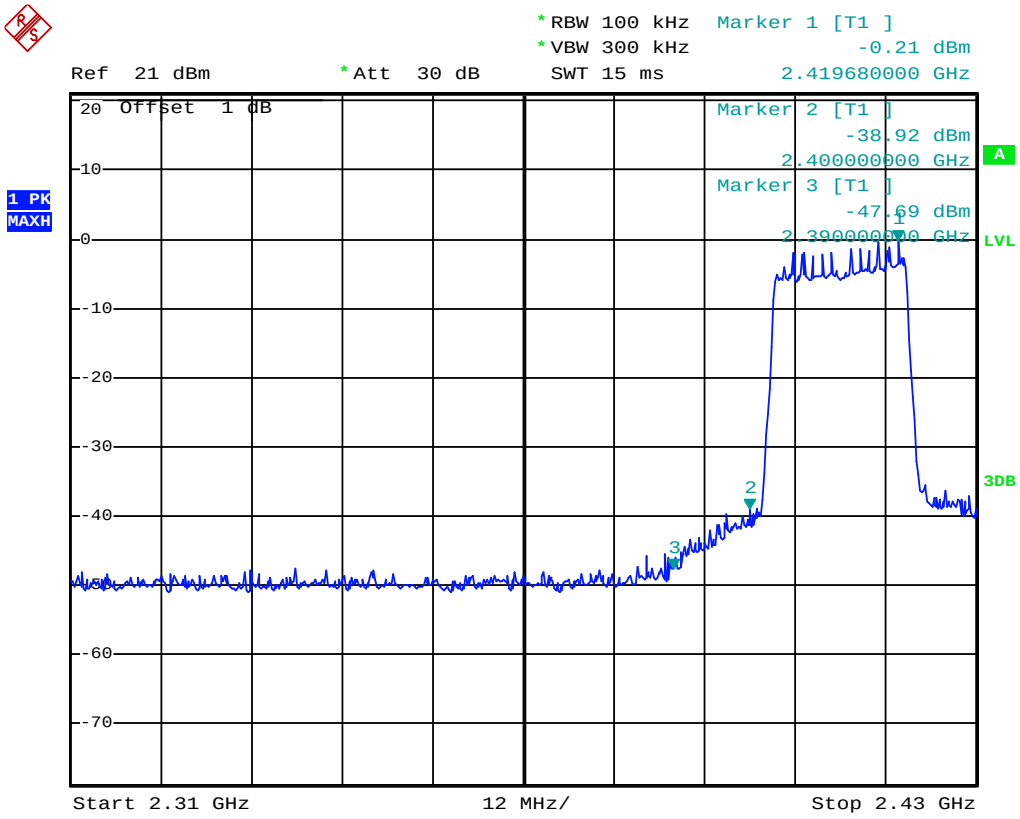
(Plot 4.6.3 C2: Channel 11: 2462MHz @ 802.11n(20MHz))



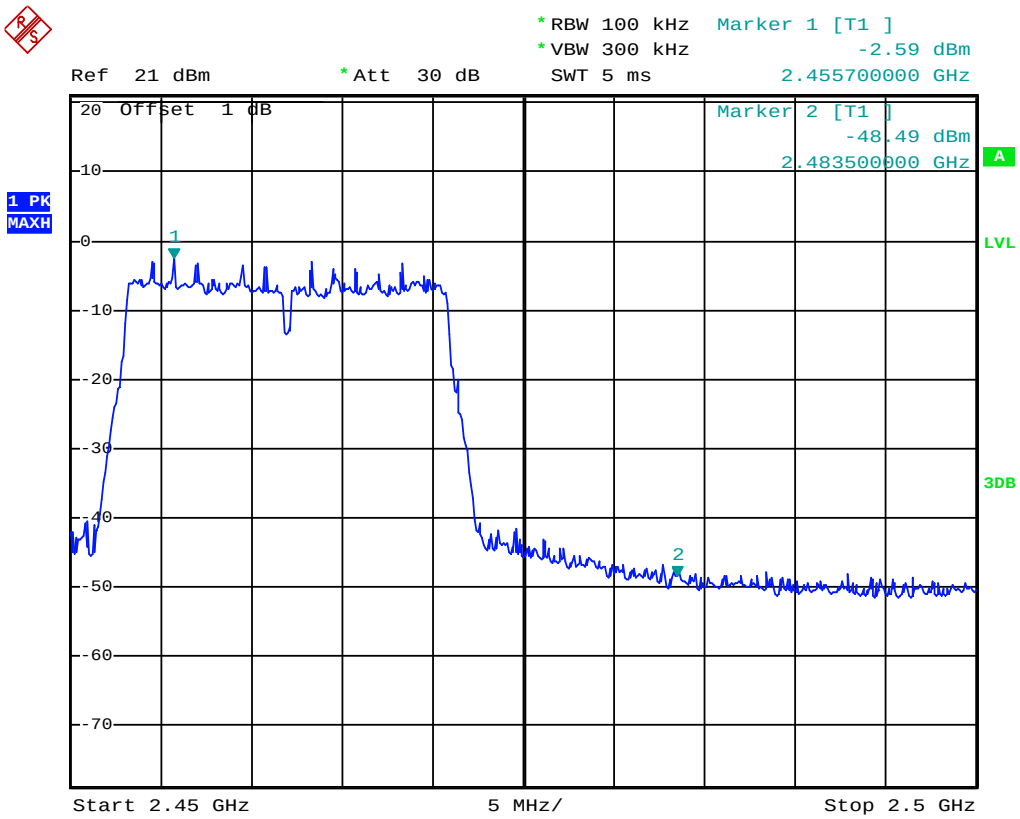
(Plot 4.6.3 C3: Channel 11: 2462MHz @ 802.11n(20MHz))



(Plot 4.6.3 C4: Channel 11: 2462MHz @ 802.11n(20MHz))



(Plot 4.6.3 D: Channel 1: 2412MHz @ 802.11n(20MHz))



(Plot 4.6.3 E: Channel 11: 2462MHz @ 802.11n(20MHz))

4.6.4 802.11n(40MHz) Test Mode

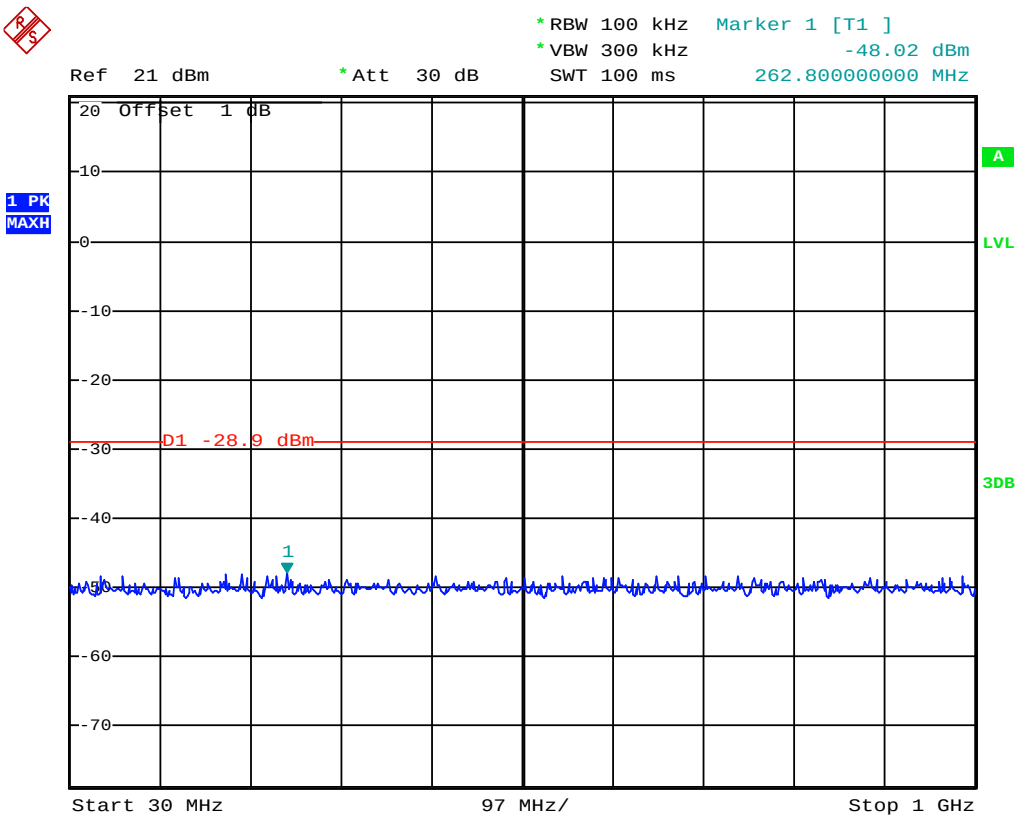
A. Test Verdict

Channel	Frequency (MHz)	Refer to Plot	Limit (dBc)	Verdict
3	2422	Plot 4.6.4 A1	-20	PASS
		Plot 4.6.4 A2	-20	PASS
		Plot 4.6.4 A3	-20	PASS
		Plot 4.6.4 A4	-20	PASS
6	2437	Plot 4.6.4 B1	-20	PASS
		Plot 4.6.4 B2	-20	PASS
		Plot 4.6.4 B3	-20	PASS
		Plot 4.6.4 B4	-20	PASS
9	2452	Plot 4.6.4 C1	-20	PASS
		Plot 4.6.4 C2	-20	PASS
		Plot 4.6.4 C3	-20	PASS
		Plot 4.6.4 C4	-20	PASS

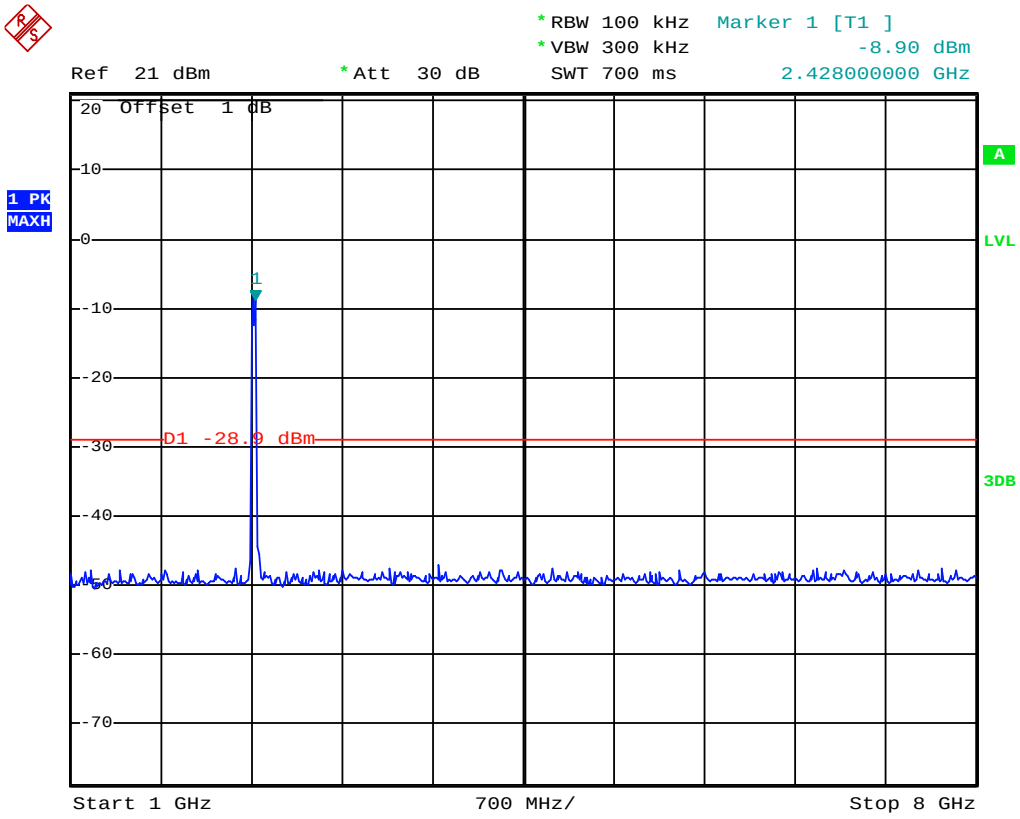
Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-41.40	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-41.45	Peak	-20	Plot 4.6.3 E	PASS

Note: 1. For 802.11n(40MHz) mode at finial test to get the worst-case emission at 13.5Mbps.
2.The test results including the cable lose.

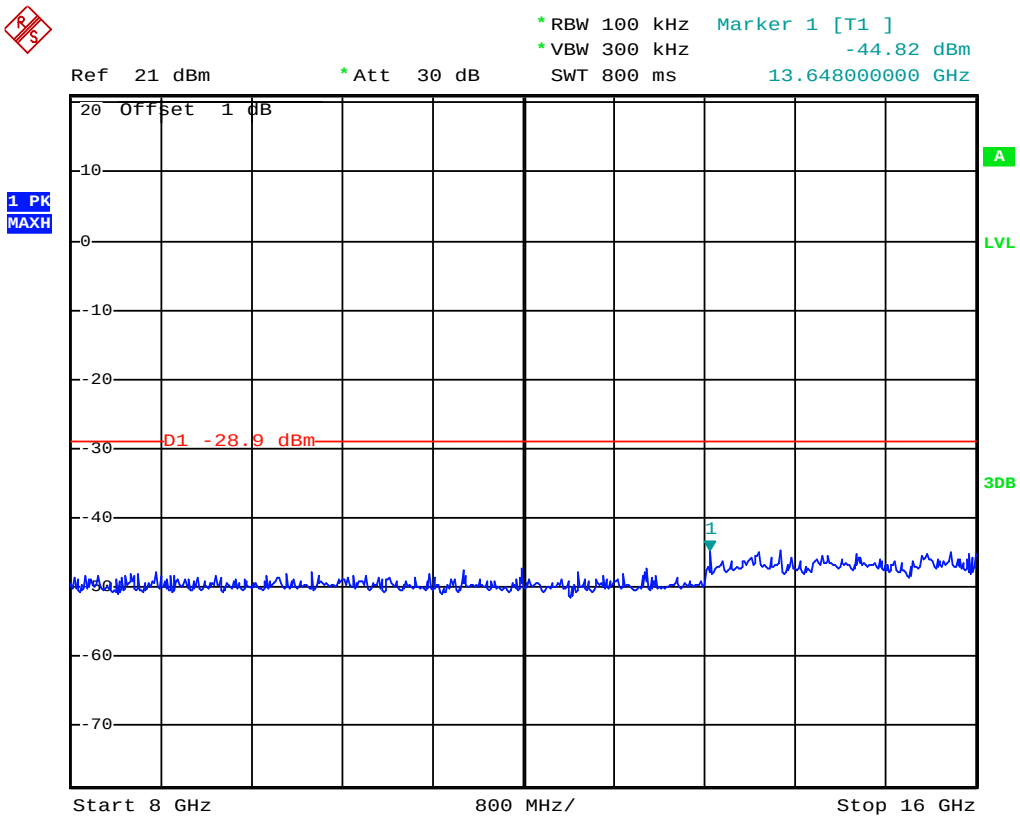
B. Test Plots



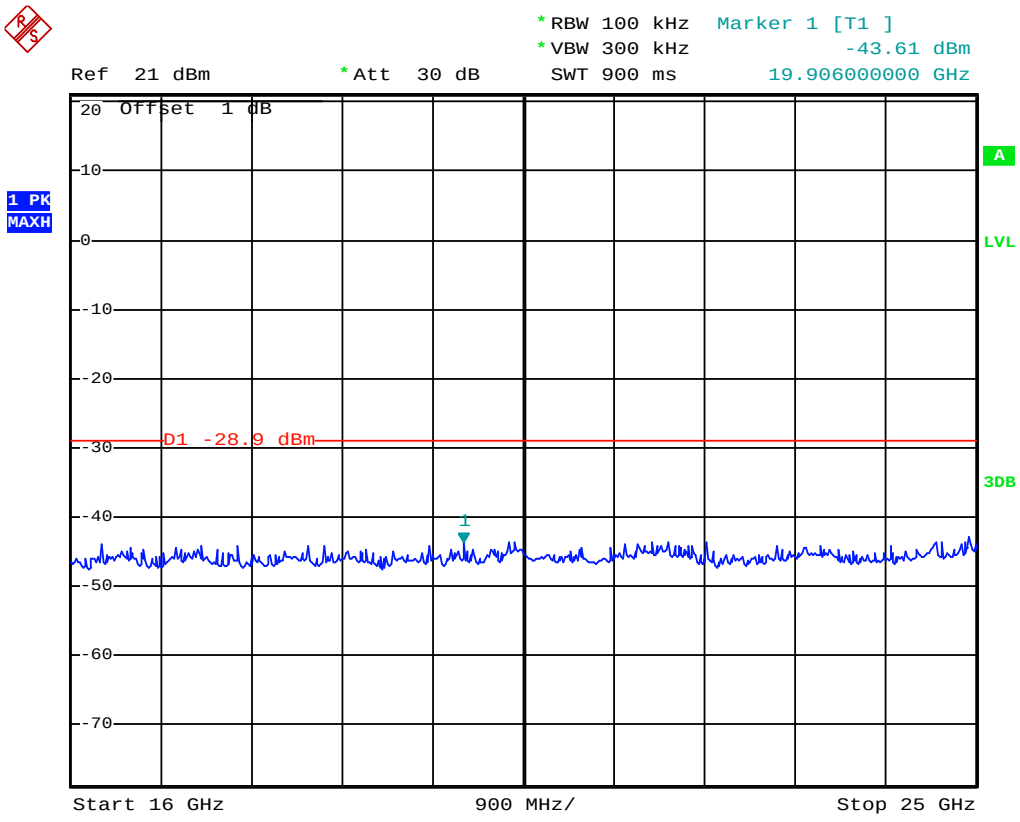
(Plot 4.6.4 A1: Channel 3: 2422MHz @ 802.11n(40MHz))



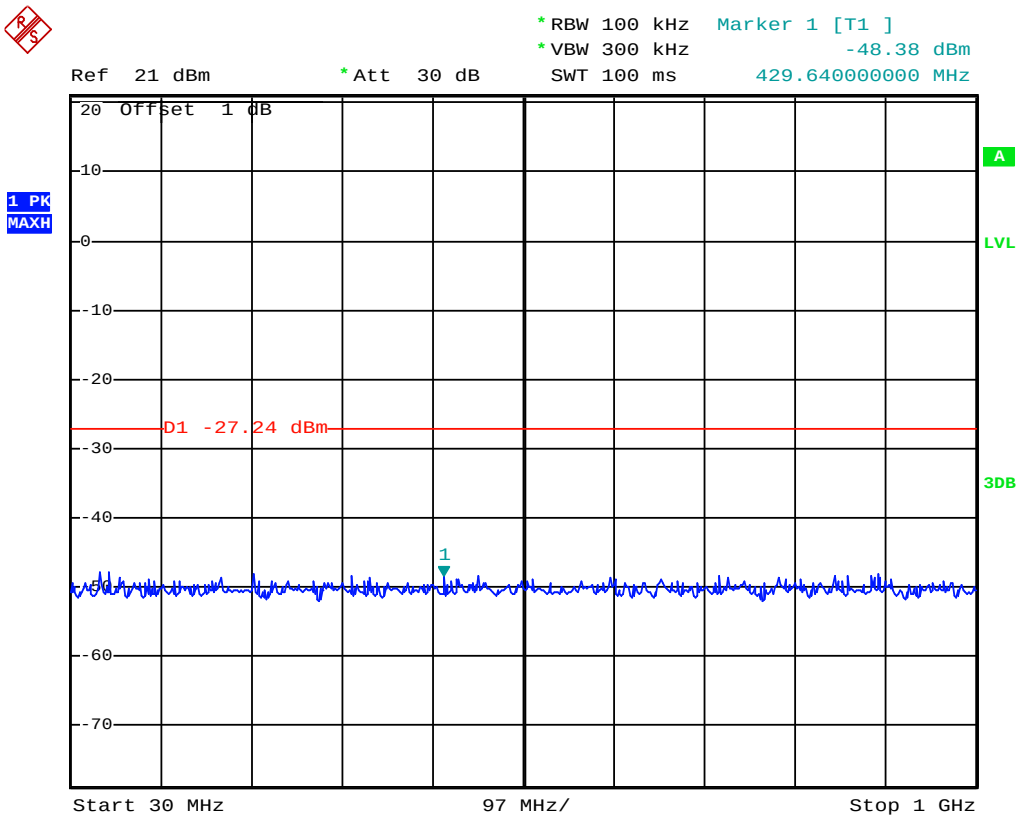
(Plot 4.6.4 A2: Channel 3: 2422MHz @ 802.11n(40MHz))



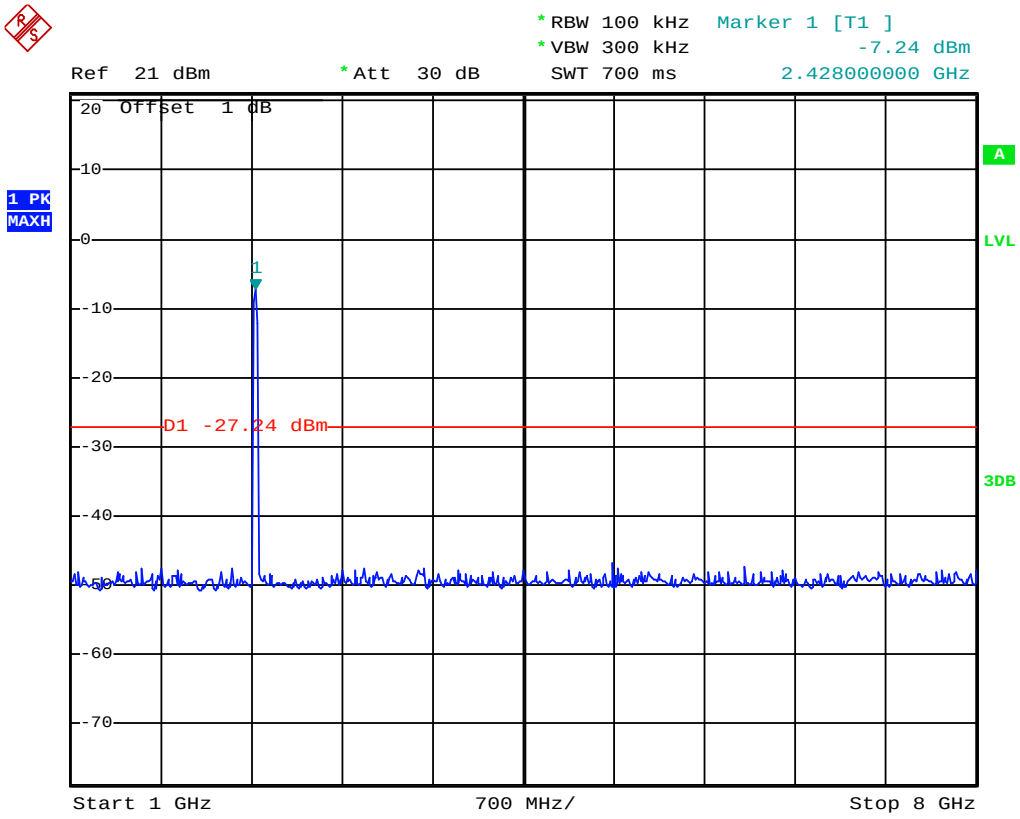
(Plot 4.6.4 A3: Channel 3: 2422MHz @ 802.11n(40MHz))



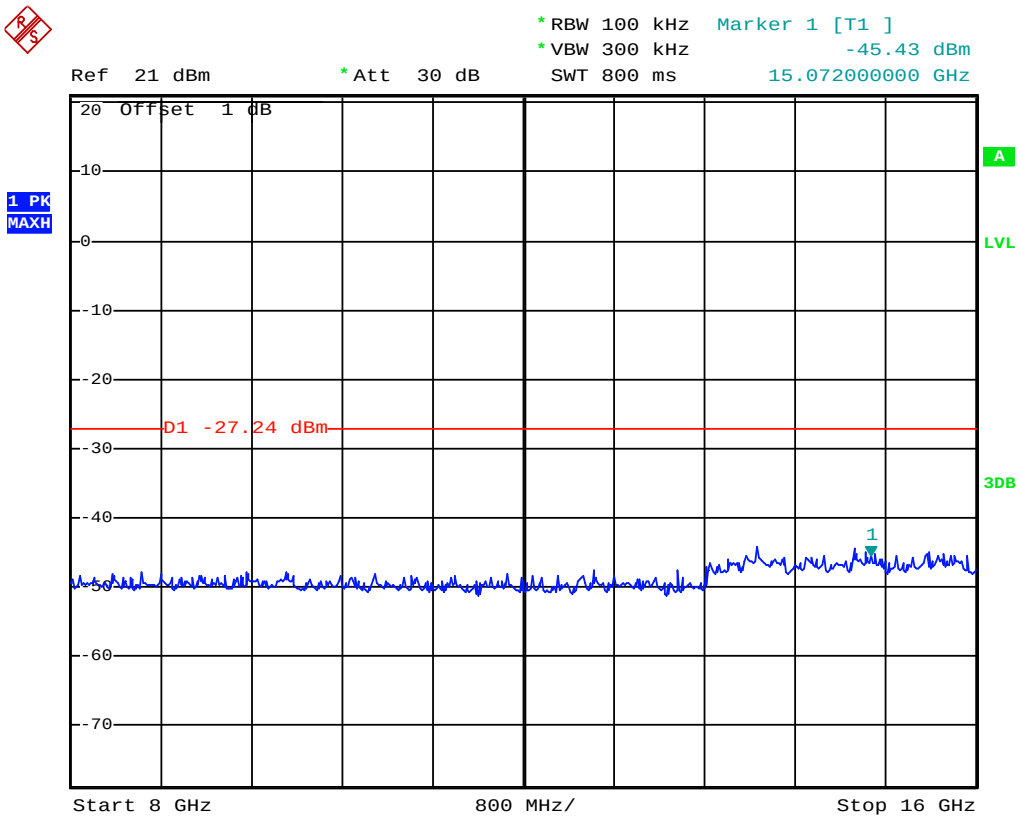
(Plot 4.6.4 A4: Channel 3: 2422MHz @ 802.11n(40MHz))



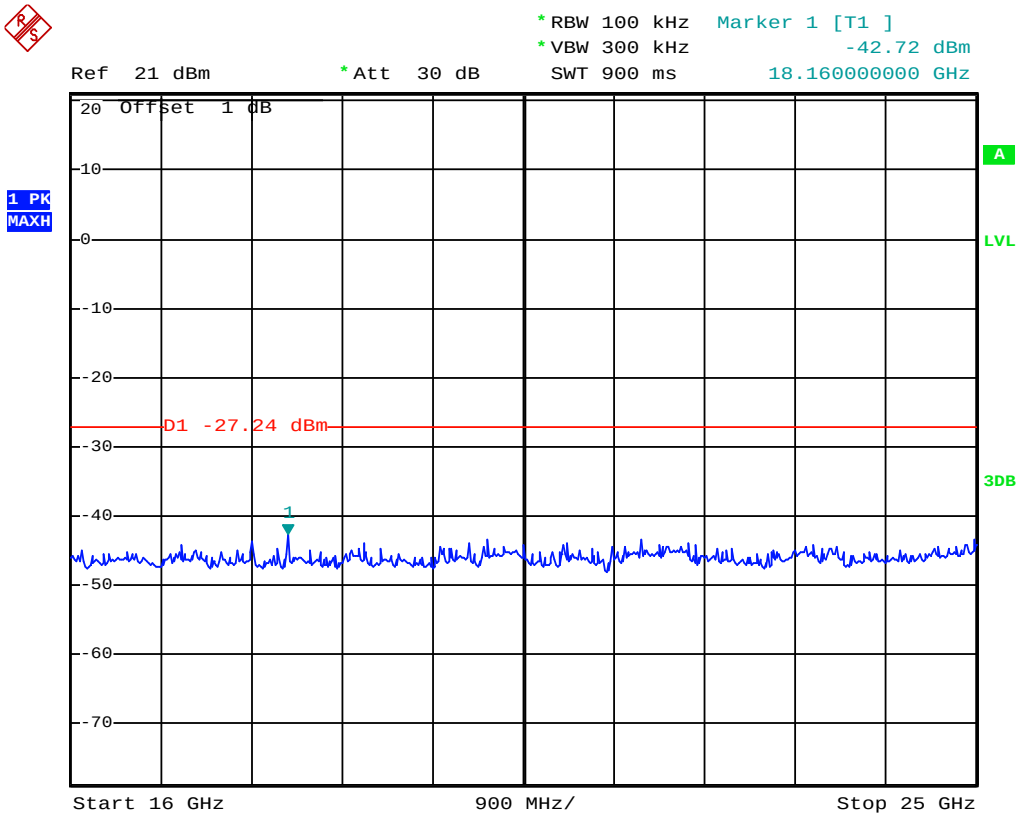
(Plot 4.6.4 B1: Channel 6: 2437MHz @ 802.11n(40MHz))



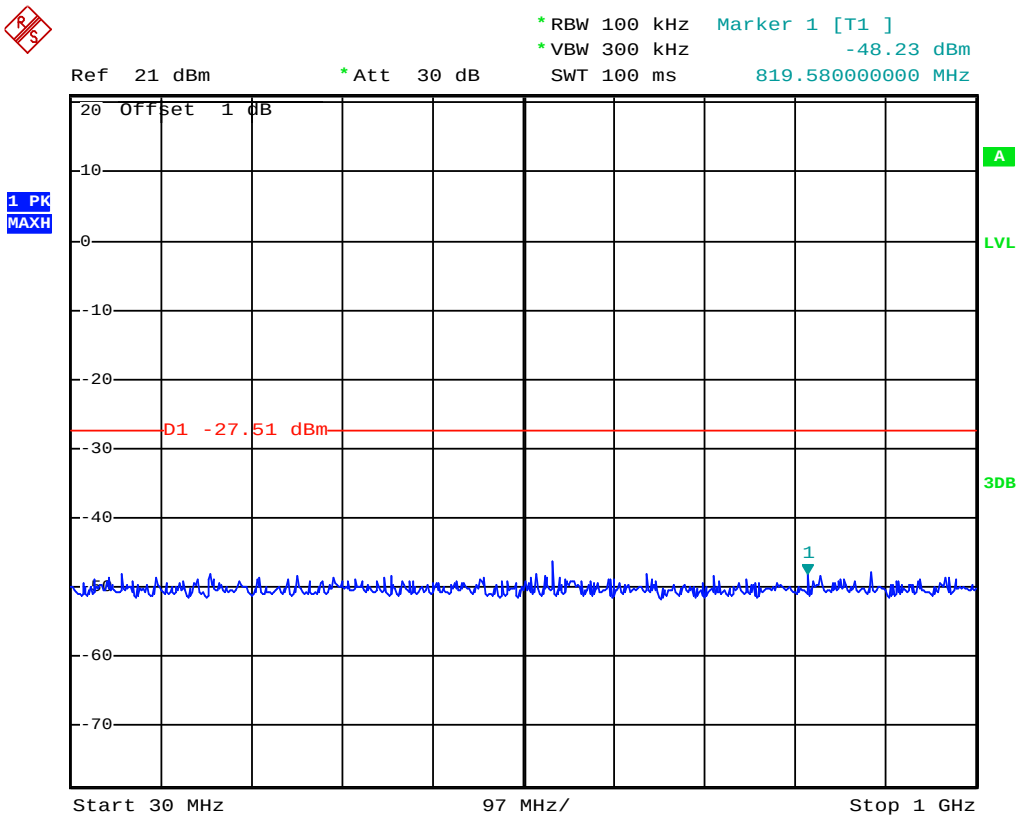
(Plot 4.6.4 B2: Channel 6: 2437MHz @ 802.11n(40MHz))



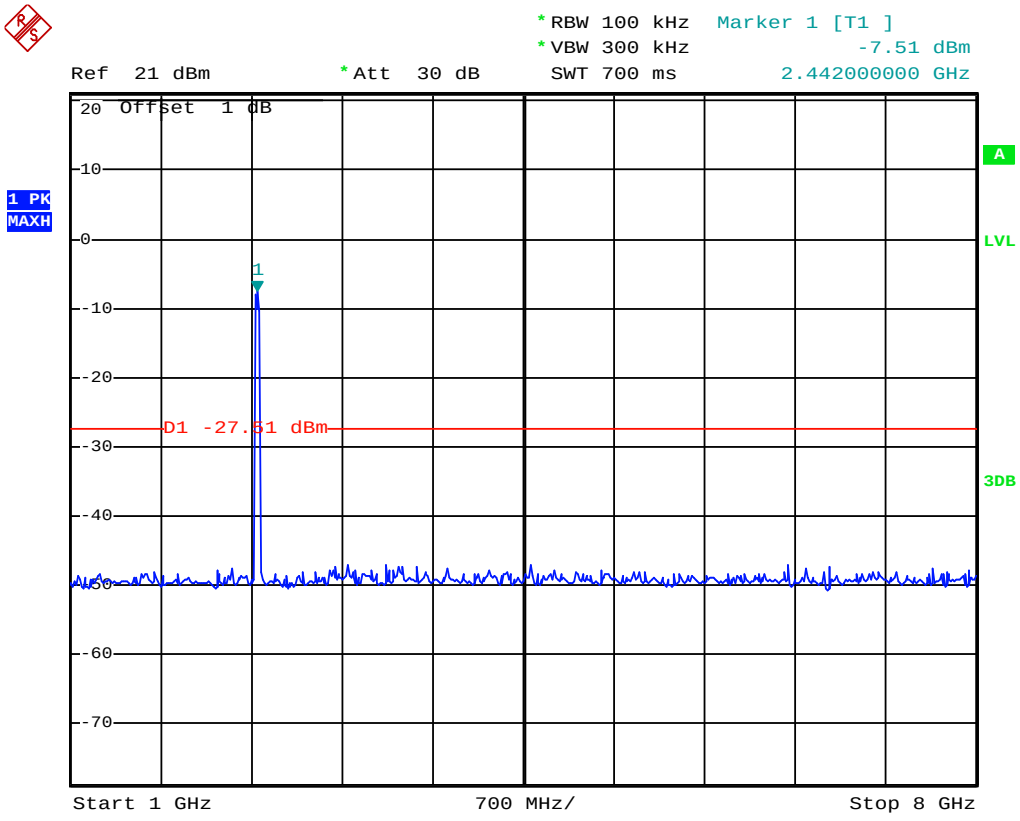
(Plot 4.6.4 B3: Channel 6: 2437MHz @ 802.11n(40MHz))



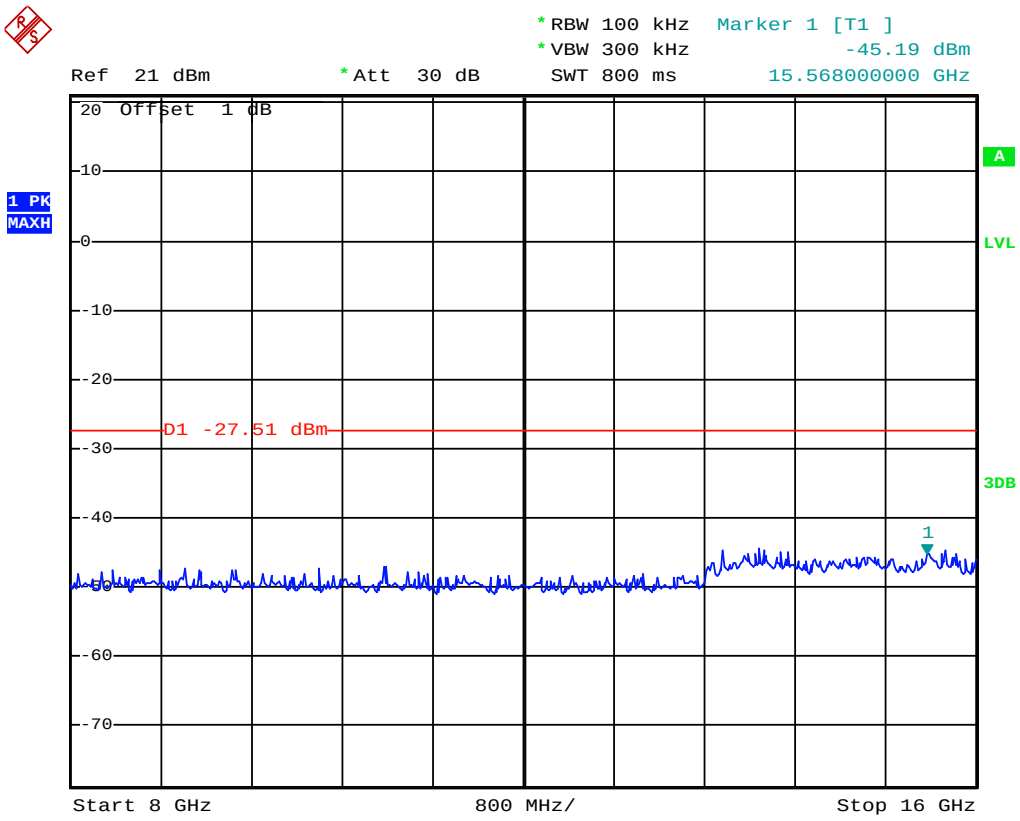
(Plot 4.6.4 B4: Channel 6: 2437MHz @ 802.11n(40MHz))



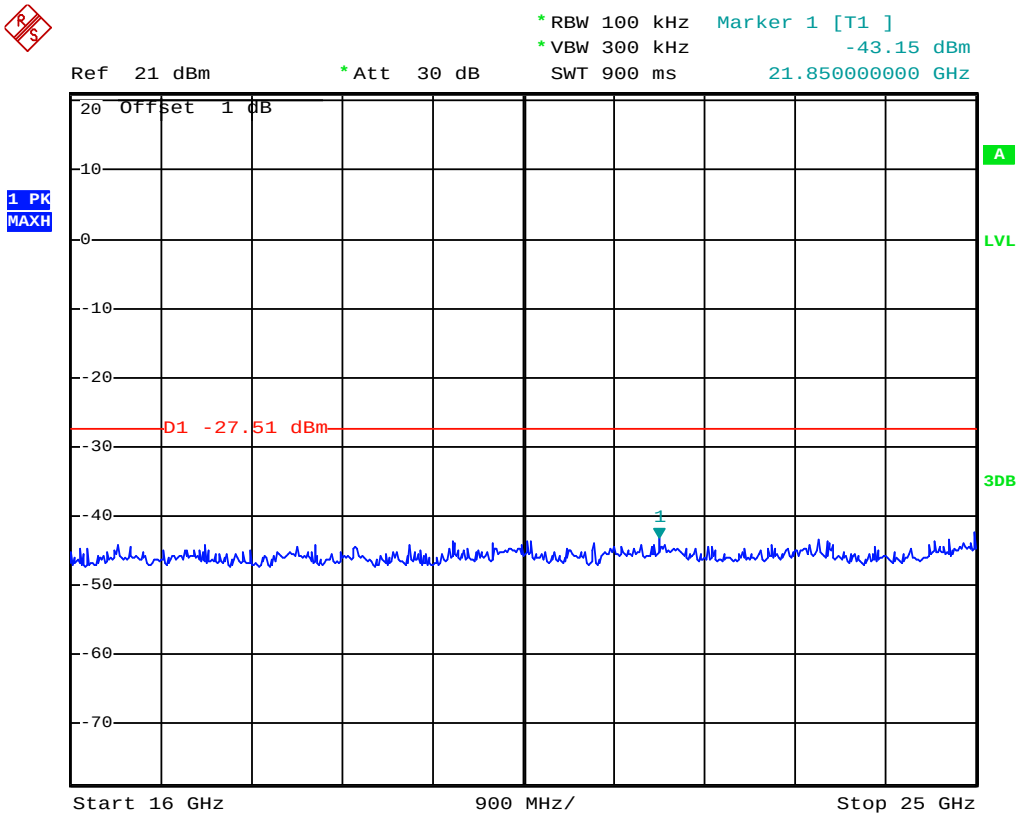
(Plot 4.6.4 C1: Channel 9: 2452MHz @ 802.11n(40MHz))



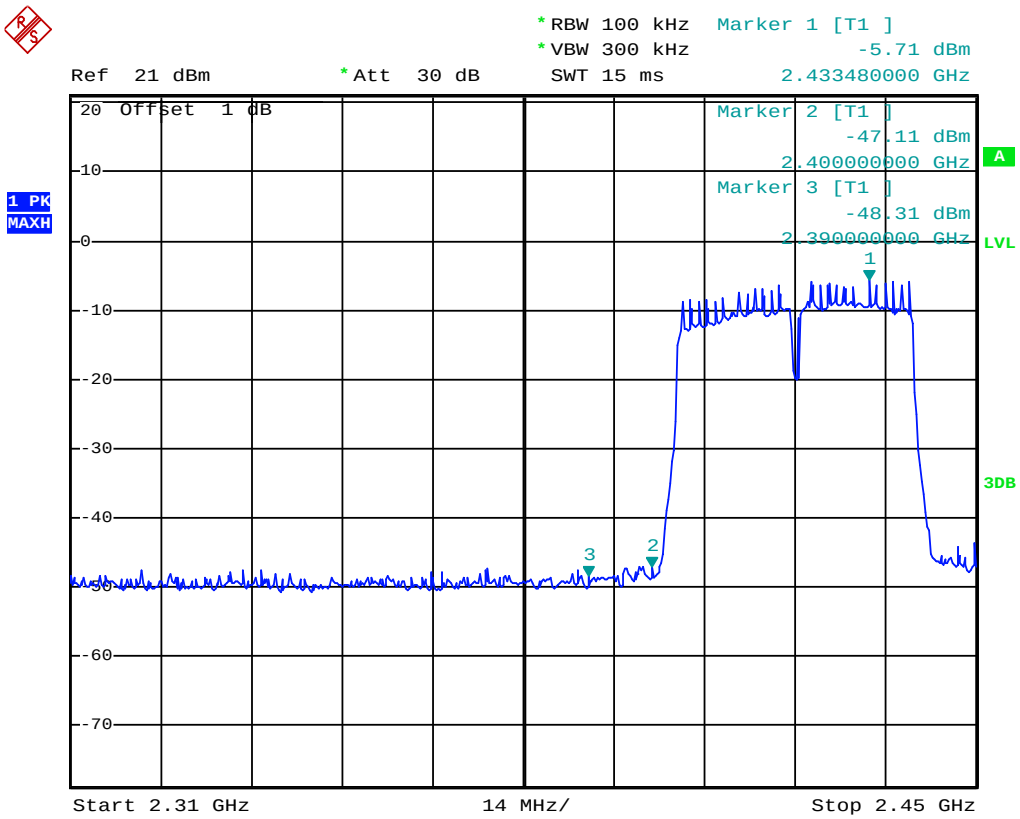
(Plot 4.6.4 C2: Channel 9: 2452MHz @ 802.11n(40MHz))



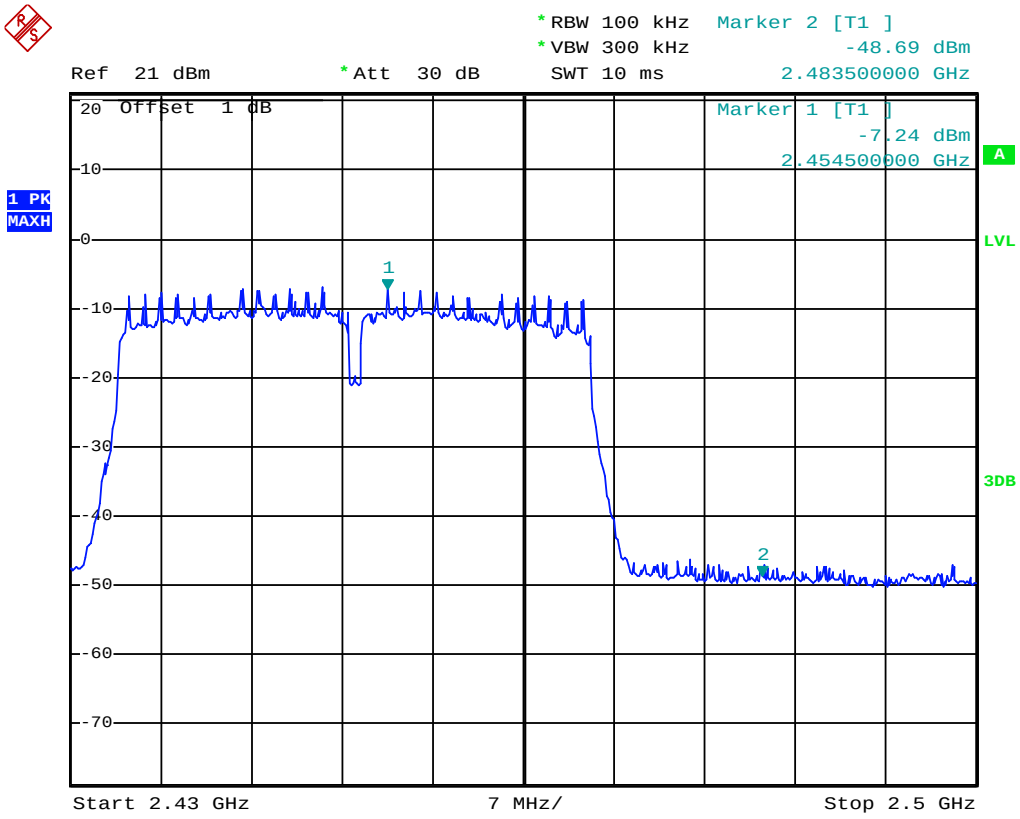
(Plot 4.6.4 C3: Channel 9: 2452MHz @ 802.11n(40MHz))



(Plot 4.6.4 C4: Channel 9: 2452MHz @ 802.11n(40MHz))



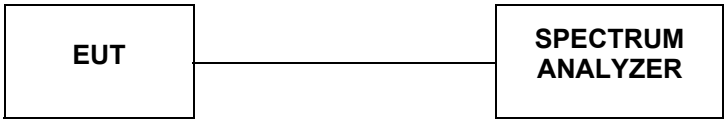
(Plot 4.6.4 D: Channel 3: 2422MHz @ 802.11n(40MHz))



(Plot 4.6.4 E: Channel 9: 2452MHz @ 802.11n(40MHz))

4.7. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100 KHz and VBW=300KHz.
The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
According to KDB558074 D01 V03 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

LIMIT

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

TEST RESULTS

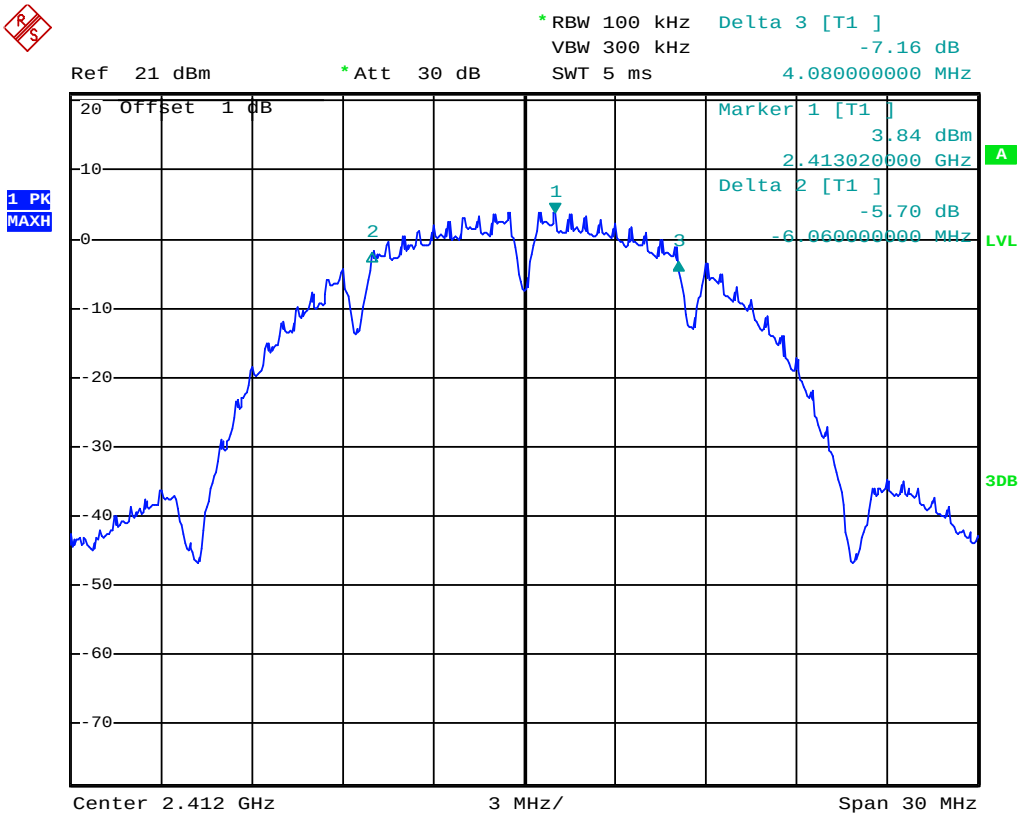
4.7.1 801.11b Test Mode

A. Test Verdict

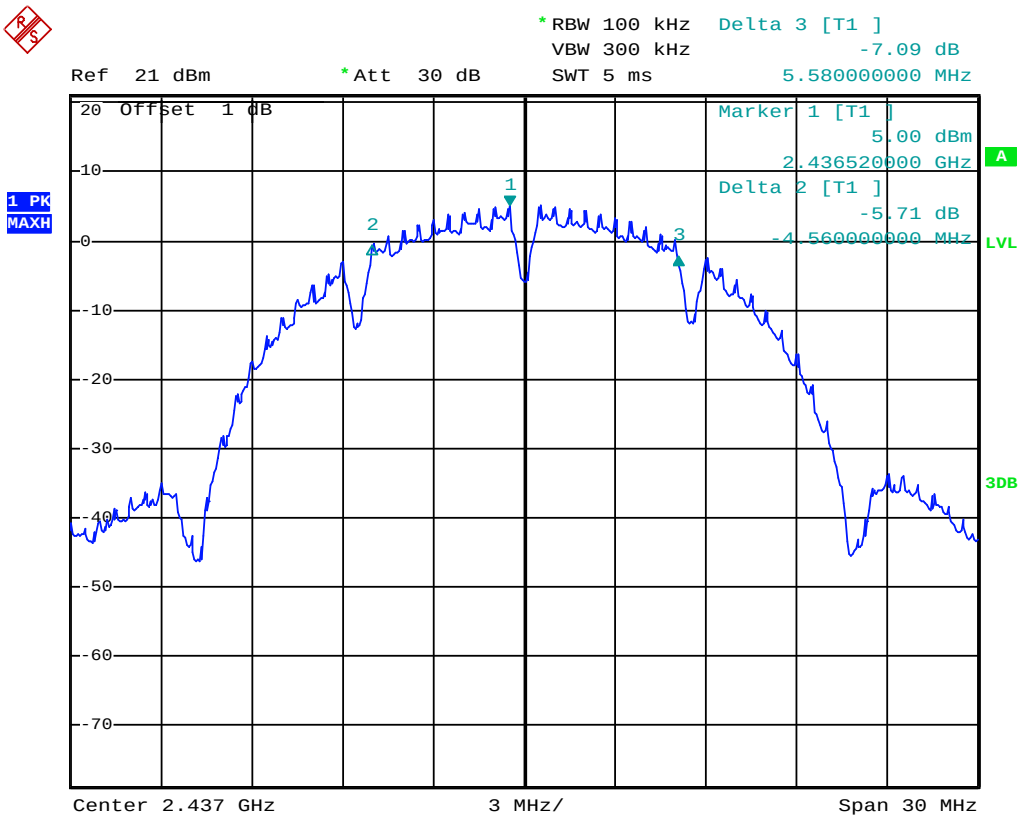
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	10.14	Plot 4.7.1 A	≥500	PASS
6	2437	10.14	Plot 4.7.1 B	≥500	PASS
11	2462	10.14	Plot 4.7.1 C	≥500	PASS

Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.

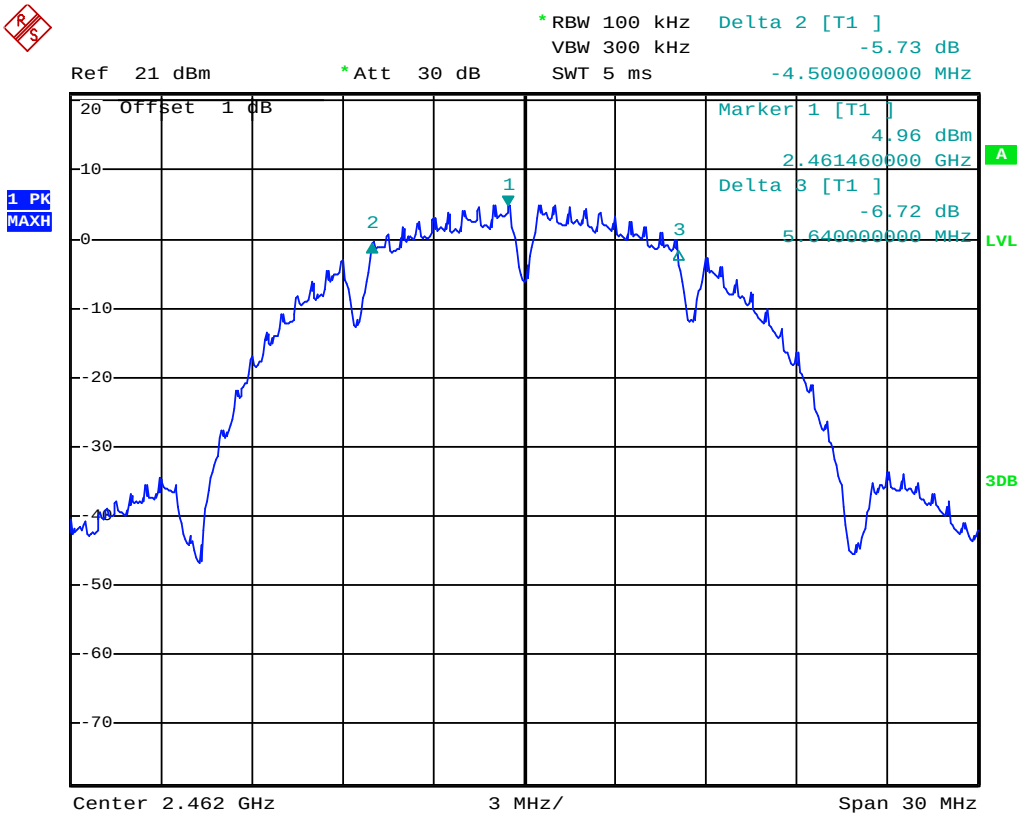
B. Test Plots



(Plot 4.7.1 A: Channel 1: 2412MHz @ 802.11b)



(Plot 4.7.1 B: Channel 6: 2437MHz @ 802.11b)



(Plot 4.7.1 C: Channel 11: 2462MHz @ 802.11b)

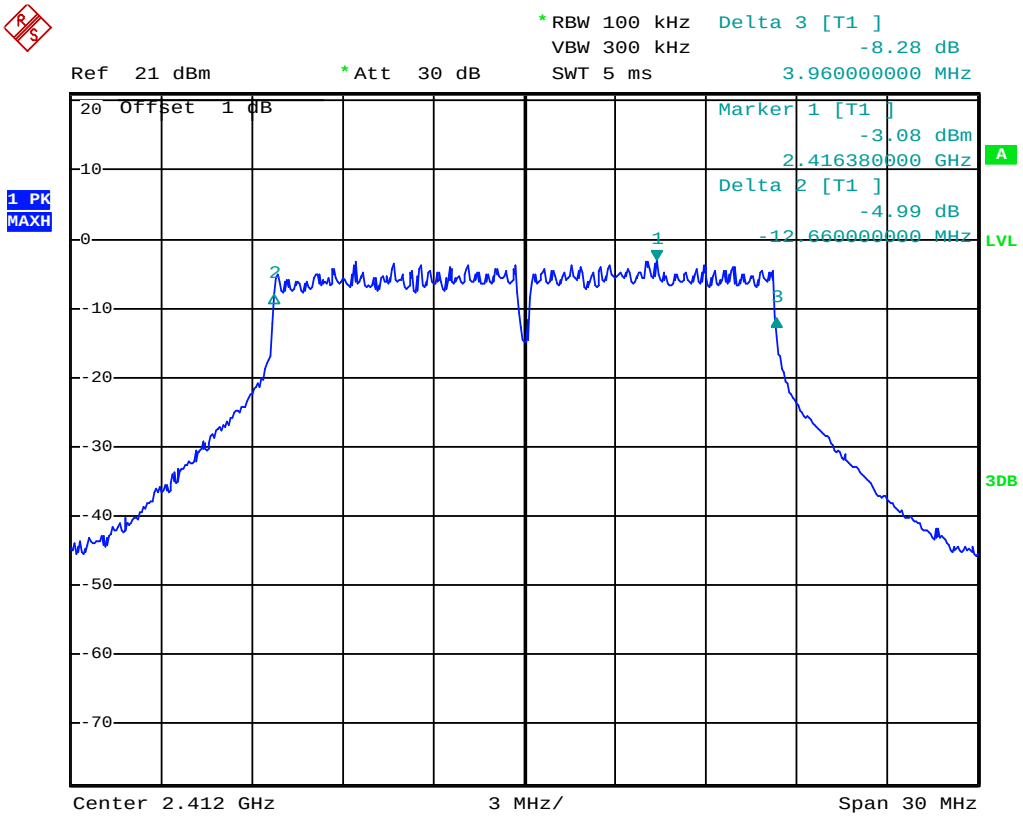
4.7.2 801.11g Test Mode

A. Test Verdict

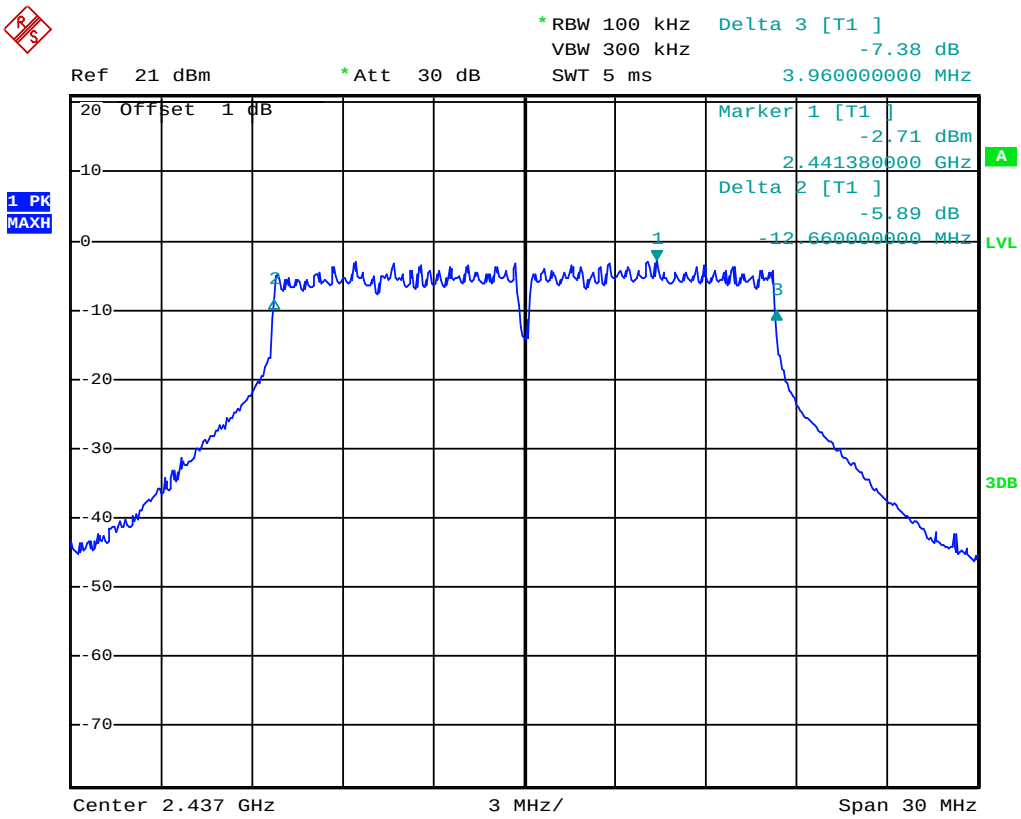
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	16.62	Plot 4.7.2 A	≥500	PASS
6	2437	16.62	Plot 4.7.2 B	≥500	PASS
11	2462	16.62	Plot 4.7.2 C	≥500	PASS

Note: 1. For 802.11g mode at finial test to get the worst-case emission at 6Mbps.
2.The test results including the cable lose.

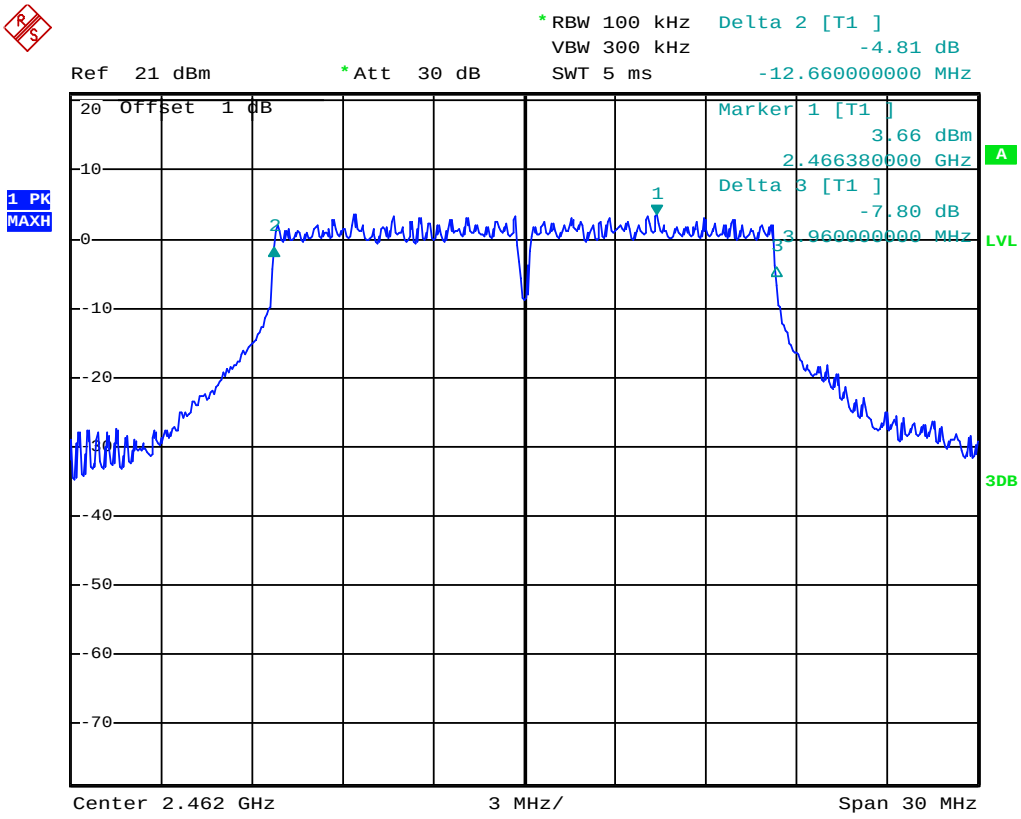
B. Test Plots



(Plot 4.7.2 A: Channel 1: 2412MHz @ 802.11g)



(Plot 4.7.2 B: Channel 6: 2437MHz @ 802.11g)



(Plot 4.7.2 C: Channel 11: 2462MHz @ 802.11g)

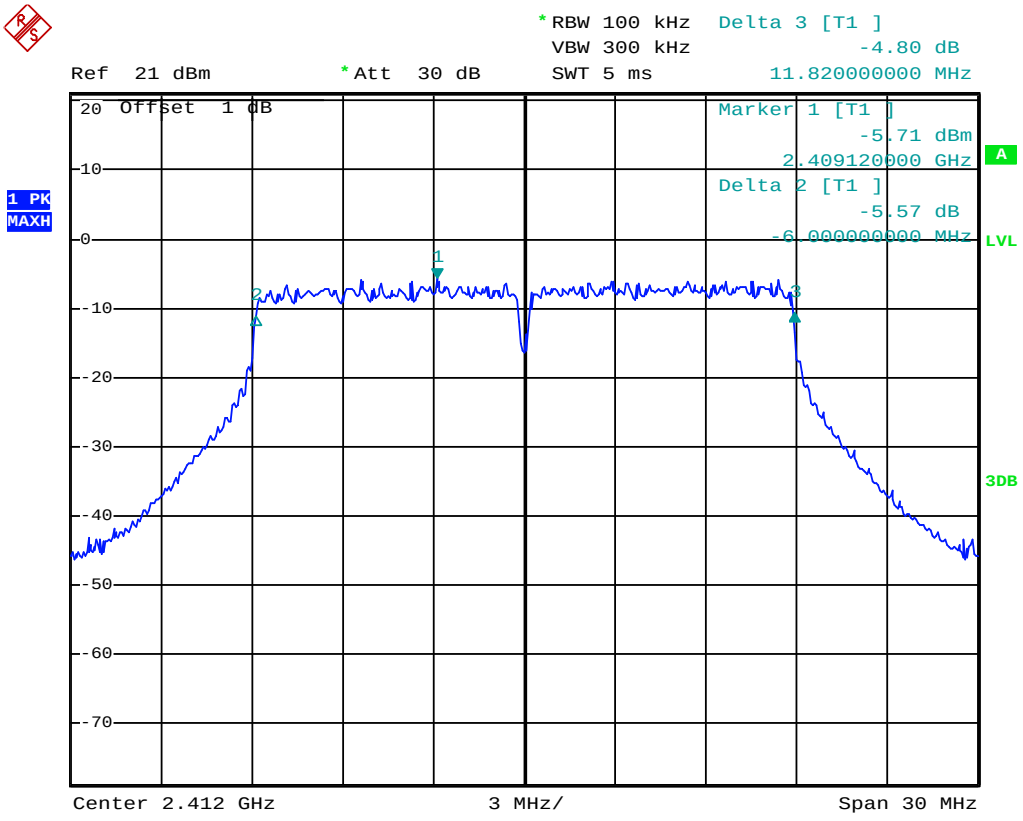
4.7.3 801.11n(20MHz) Test Mode

A. Test Verdict

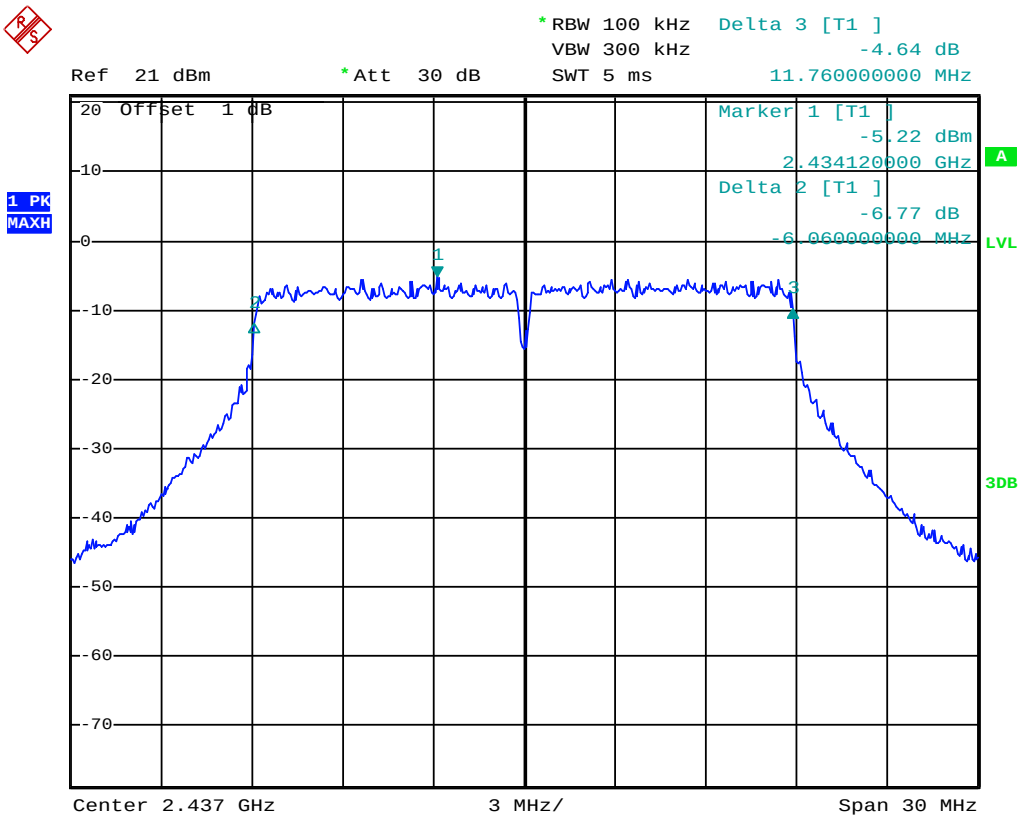
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	17.82	Plot 4.7.3 A	≥500	PASS
6	2437	17.82	Plot 4.7.3 B	≥500	PASS
11	2462	17.82	Plot 4.7.3 C	≥500	PASS

Note: 1. For 802.11n(20MHz) mode at finial test to get the worst-case emission at 6.5Mbps.
2.The test results including the cable lose.

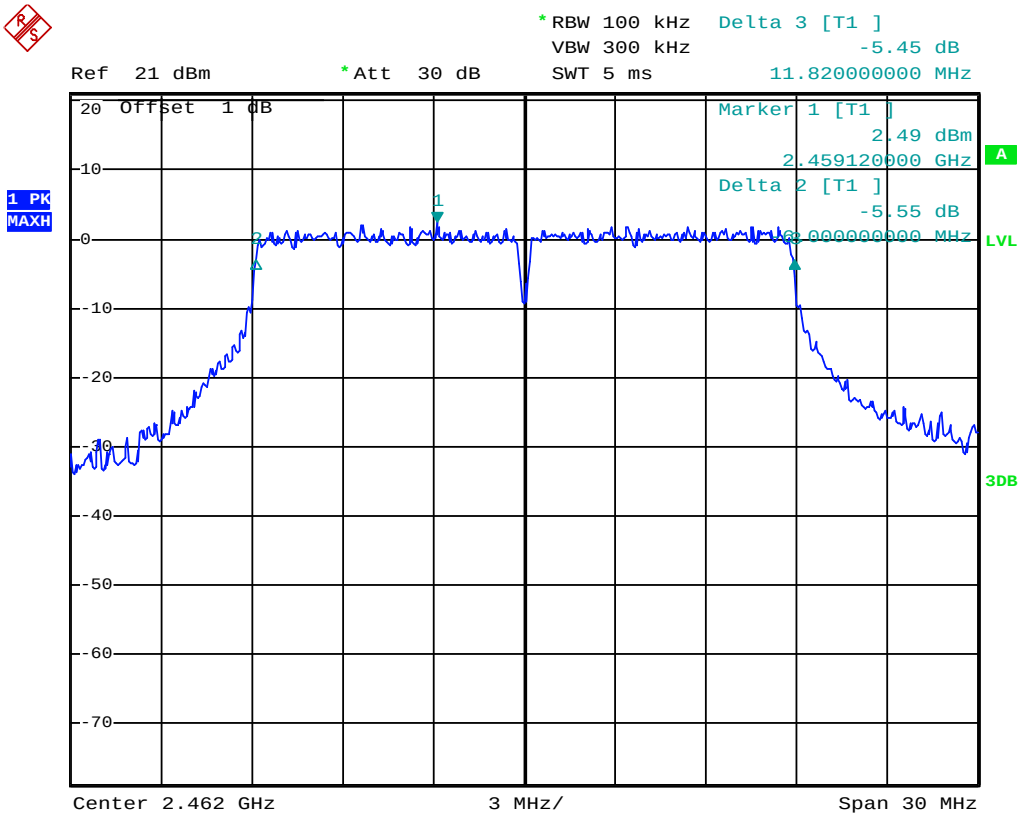
B. Test Plots



(Plot 4.7.3 A: Channel 1: 2412MHz @ 802.11n(20MHz))



(Plot 4.7.3 B: Channel 6: 2437MHz @ 802.11n(20MHz))



(Plot 4.7.3 C: Channel 11: 2462MHz @ 802.11n(20MHz))

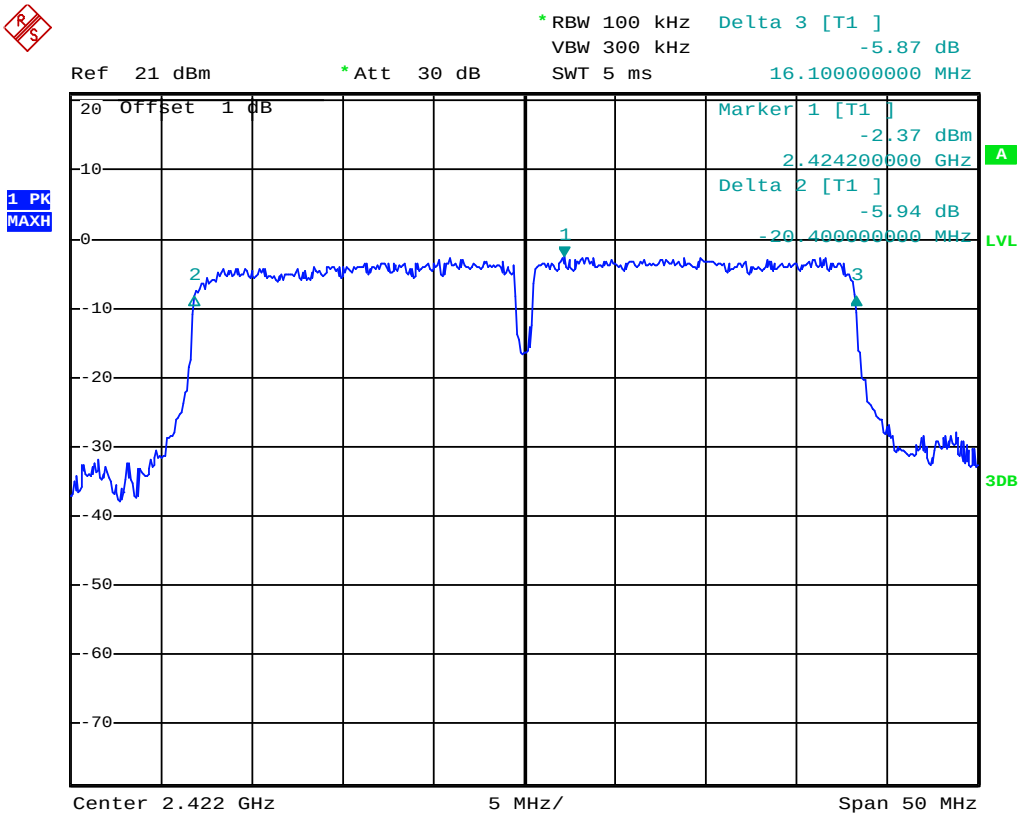
4.7.4 801.11n(40MHz) Test Mode

A. Test Verdict

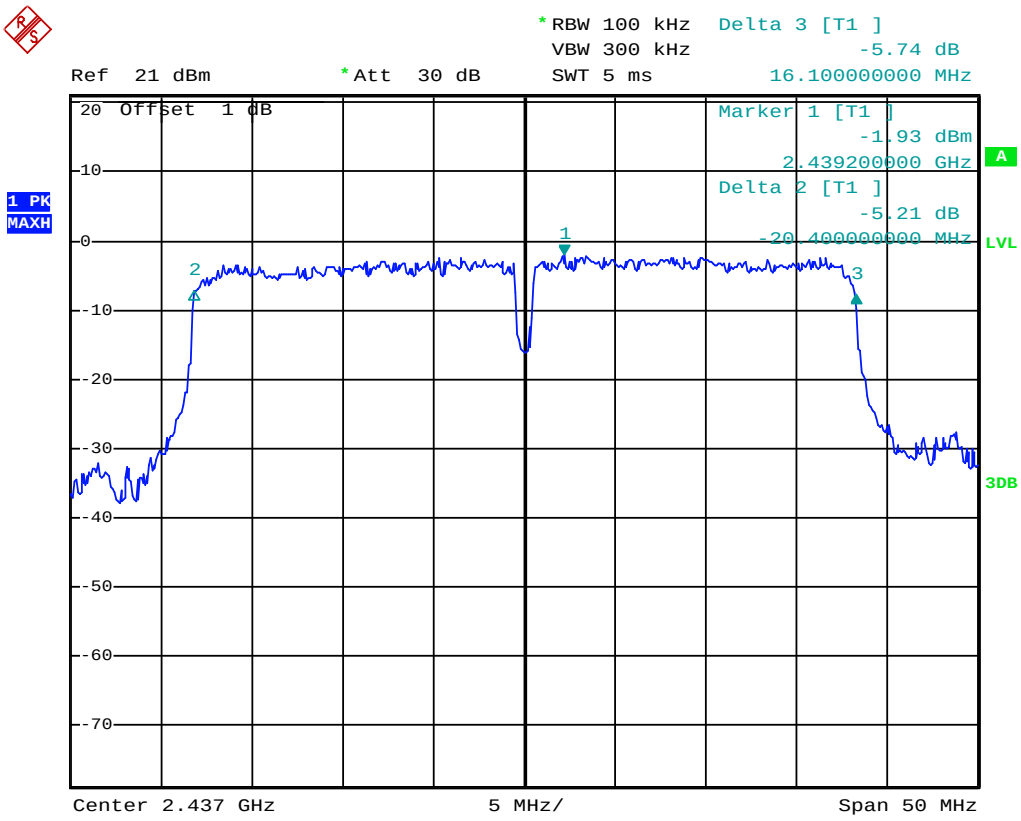
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
3	2422	36.50	Plot 4.7.4 A	≥500	PASS
6	2437	36.50	Plot 4.7.4 B	≥500	PASS
9	2452	36.50	Plot 4.7.4 C	≥500	PASS

Note: 1. For 802.11n(40MHz) mode at finial test to get the worst-case emission at 13.5Mbps.
2.The test results including the cable lose.

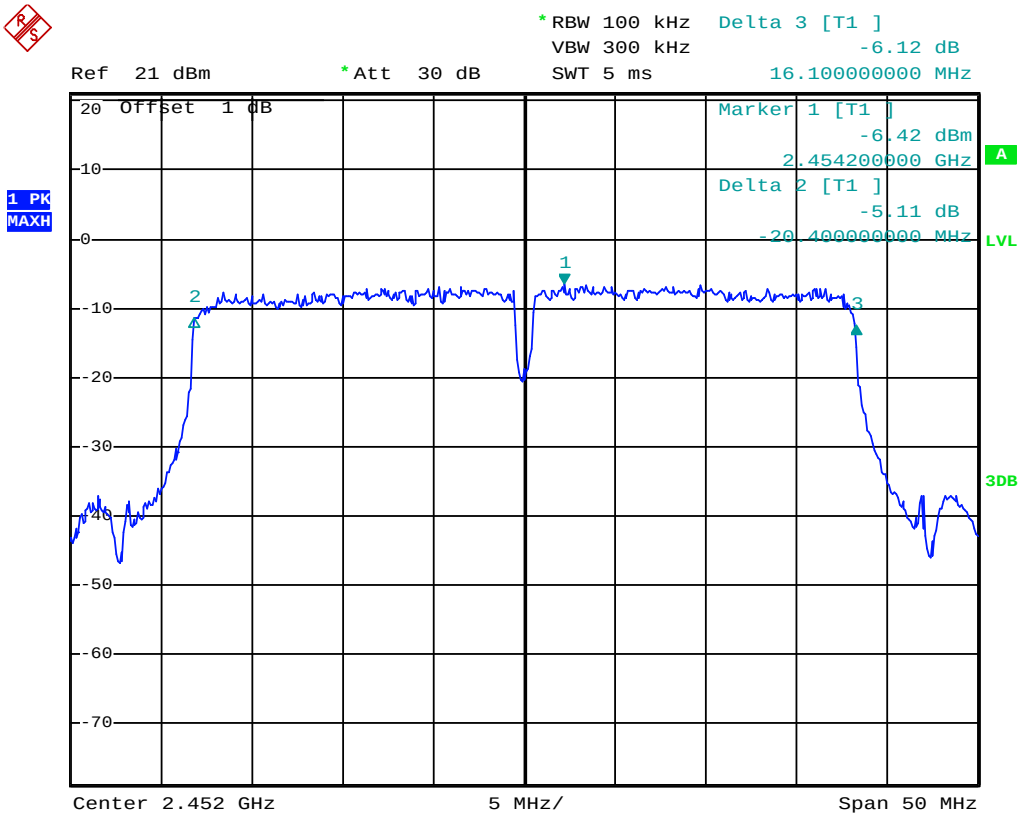
B. Test Plots



(Plot 4.7.4 A: Channel 3: 2422MHz @ 802.11n(40MHz))



(Plot 4.7.3 B: Channel 6: 2437MHz @ 802.11n(40MHz))



(Plot 4.7.4 C: Channel 9: 2452MHz @ 802.11n(40MHz))

4.8. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

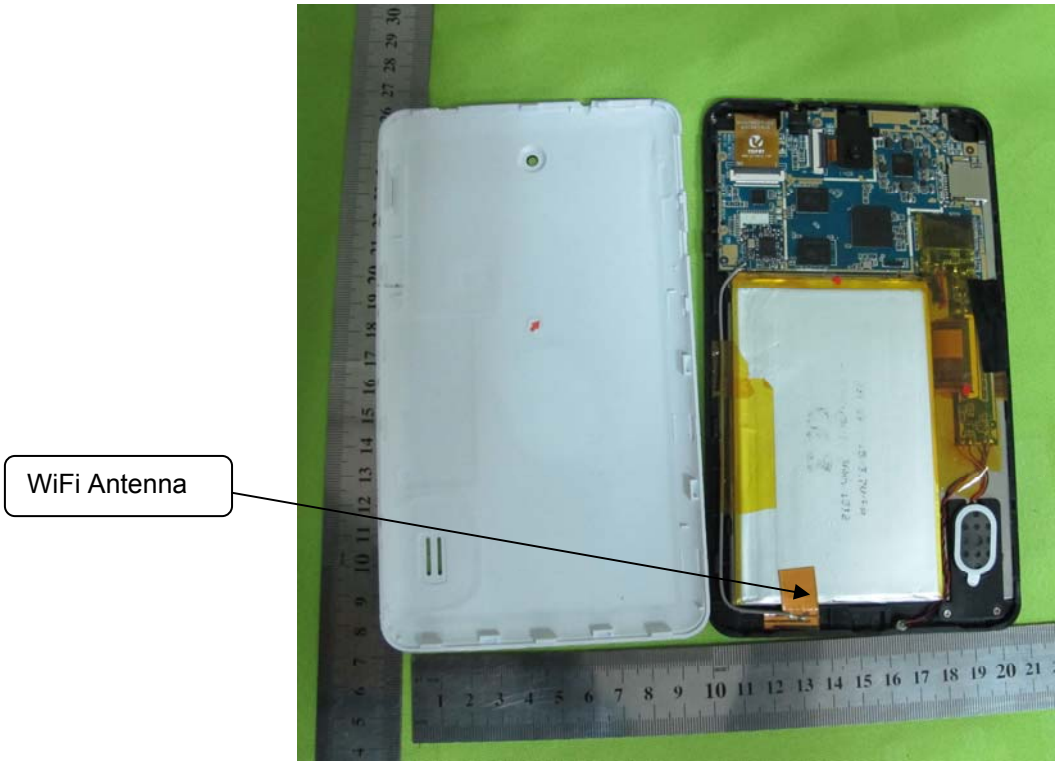
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

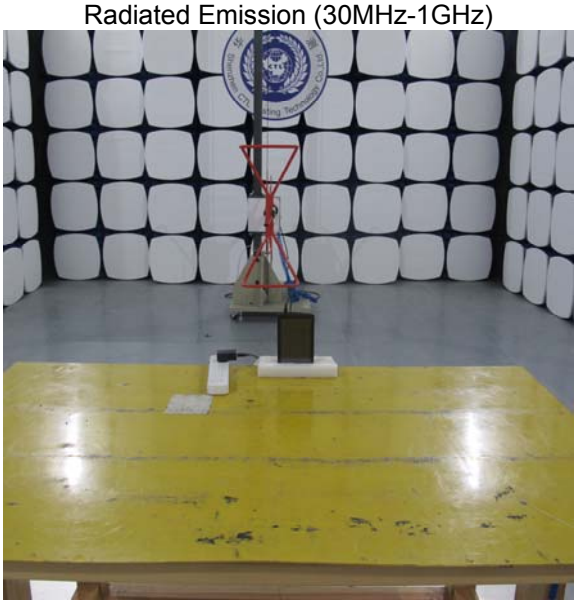
Antenna Connected Construction

The maximum antenna gain of WLAN uesed was 1.50 dBi.

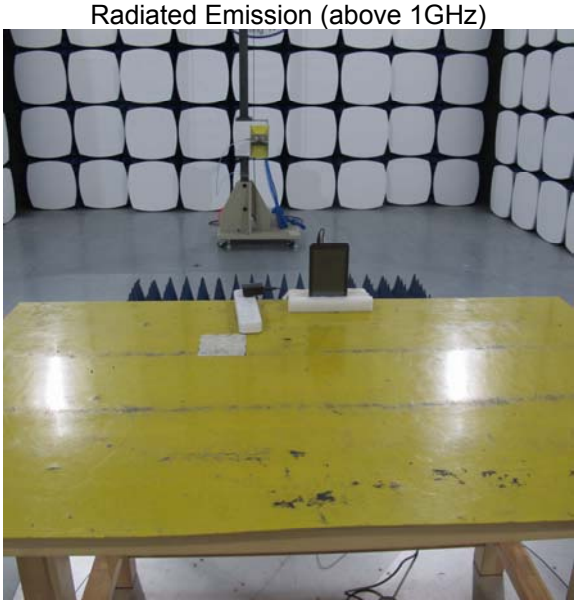


5. Test Setup Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (above 1GHz)



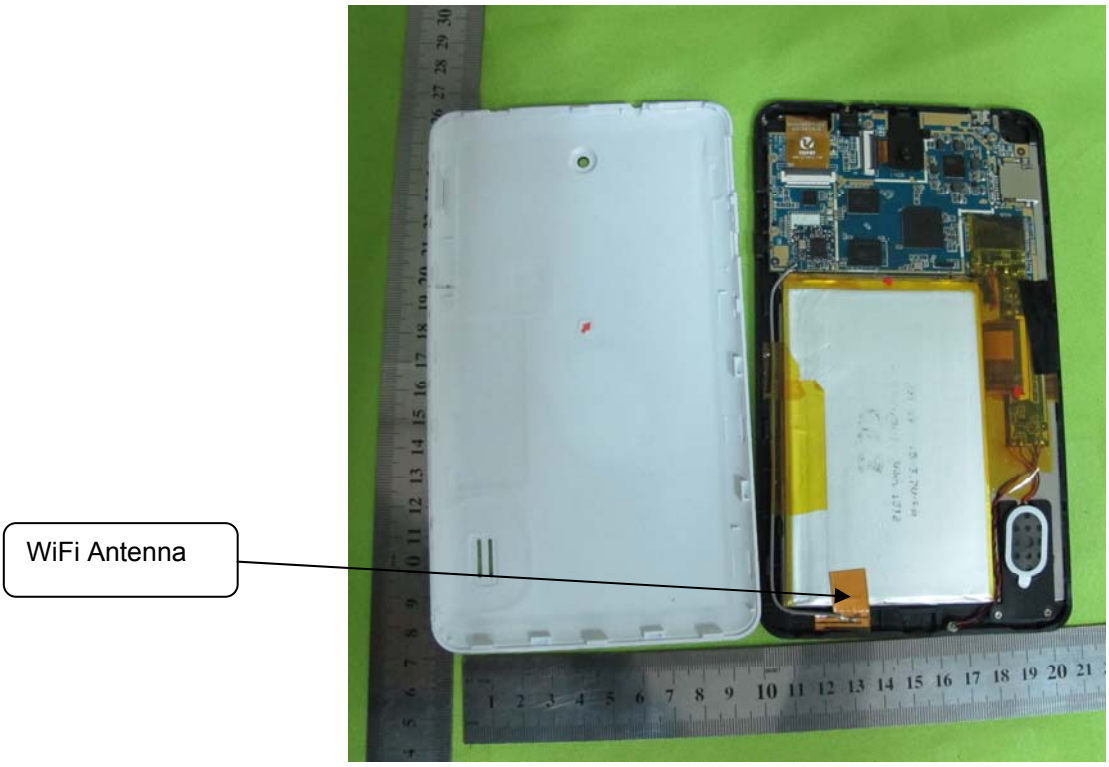
Conducted Emission (AC Mains)

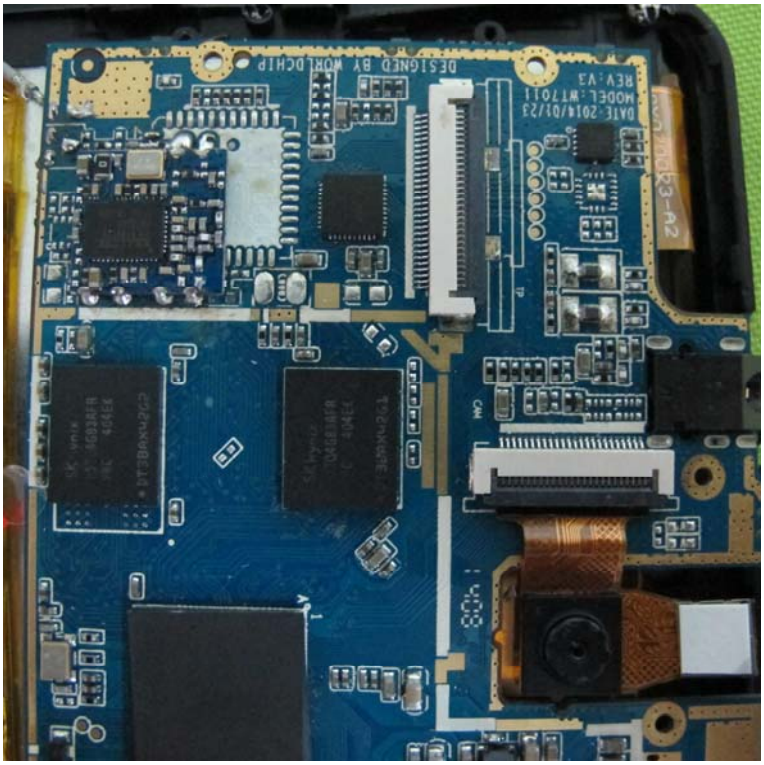
6. External and Internal Photos of the EUT

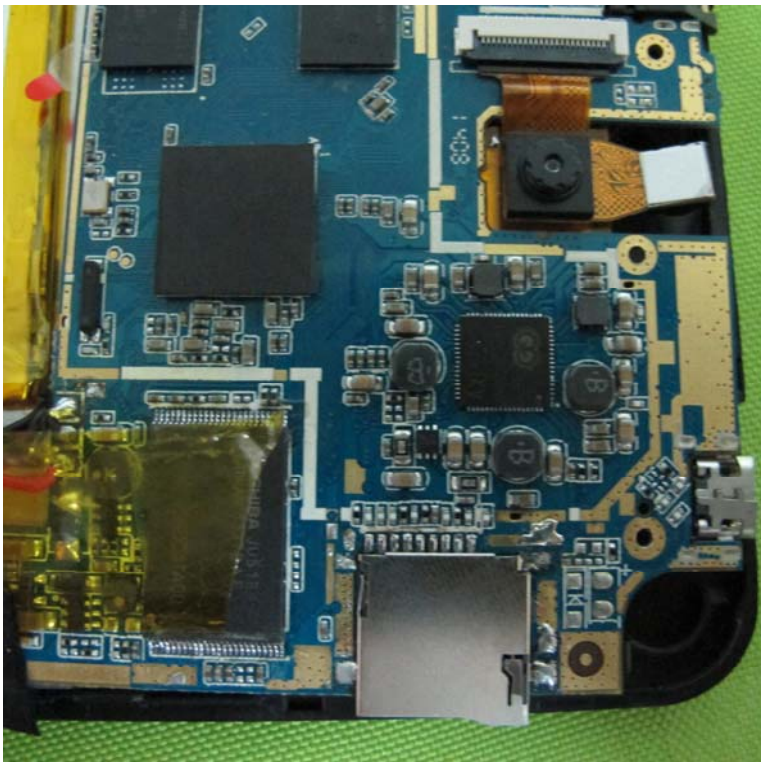
External photos of the EUT

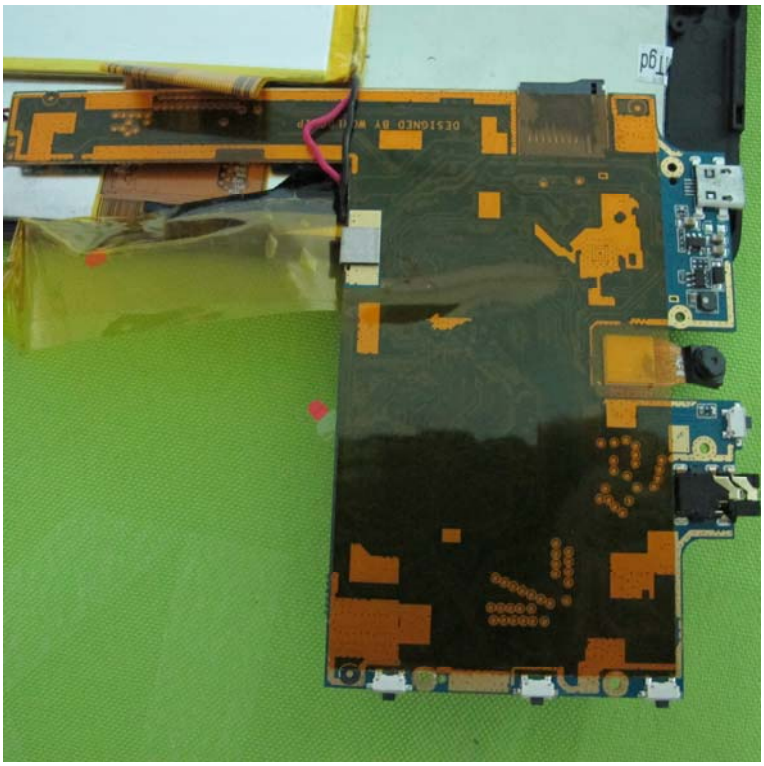

AC ADAPTER
MODEL:HNB050200U
INPUT:AC 100-240V~
50/60Hz 0.35A MAX
OUTPUT:5.0V ⎓ 2.0A
LISTED
I.T.E
Power Supply
36CZ
E305498
CAUTION
MADE IN CHINA
Jun.,2014

Internal photos of the EUT




DESIGNED BY MORLCHIP
REV:V3
MODEL:M7011
DATE:2014/01/23





.....End of Report.....