

FCC TEST REPORT
for
Jiuzhou Group Holdings Limited-Digital Dept.

MID
Model No.: QB101

Prepared for : Jiuzhou Group Holdings Limited-Digital Dept.
Address : 2F, B5d Building, Yingzhan Industrial Zone, Longtian
Community, Kengzi Street, Longgang, Shenzhen, 518122, China

Prepared By : Coffee-T Electronics Technology Co Ltd
Address : Unit 12, 8F Honghai Building, Qianhai
Road, Nanshan, Shenzhen, China
+86-755-86622903
+86-755-86622819

Report Number : CTE14KR-802F
Date of Test : Aug. 11 ~18, 2014
Date of Report : Aug. 18, 2014

TABLE OF CONTENT

1. GENERAL INFORMATION	4
1.1 Description of Device (EUT)	4
1.2 Support Equipment	5
1.3 Description of Test Facility	6
1.4 Measurement Uncertainty	6
2. TEST METHODOLOGY	7
2.1 Summary of Test Results	7
2.2 Description of Test Modes	7
3. CONDUCTED EMISSION TEST	8
3.1 Block Diagram of Test Setup	8
3.2 Power Line Conducted Emission Measurement Limits (15.207)	8
3.3 Configuration of EUT on Measurement	8
3.4 Operating Condition of EUT	8
3.5 Test Procedure	9
3.6 Test equipment	9
3.7 Power Line Conducted Emission Measurement Results	9
4. FCC PART 15.247 REQUIREMENTS FOR DSSS & OFDM MODULATION.....	12
4.1 Test Setup	12
4.2 6dB Bandwidth	12
4.3 Maximum Peak output power test	19
4.4 Band Edges Measurement	24
4.5 Peak Power Spectral Density	29
4.6 Radiated Emissions	36
5. PHOTOGRAPH.....	43
5.1 Photo of Conducted Emission Measurement	43
5.2 Photo of Radiation Emission Test	44

TEST REPORT

Applicant : Jiuzhou Group Holdings Limited-Digital Dept.
Manufacturer : Jiuzhou Group Holdings Limited-Digital Dept.
EUT : MID
Model No. : QB101
Serial No. : N/A
Trade Mark : MID
Rating : DC 3.7V, 1.5A, 5.5W

Measurement Procedure Used:
FCC Part15 Subpart C, Paragraph 15.247

The device described above is tested by Coffee-T Electronics Technology Co Ltd to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Coffee-T Electronics Technology Co Ltd is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Coffee-T Electronics Technology Co Ltd.

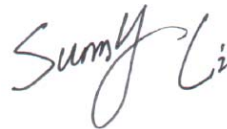
Date of Test : Aug. 11 ~18, 2014



Prepared by : (Tested Engineer / Angel Wu)



Reviewer : (Project Manager / Jason Chen)



Approved & Authorized Signer : (Manager /Sumy Li)

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT : MID

Model Number : QB101

Test Power Supply : DC 3.7V

Frequency : 2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20))

Channels : 11 For (802.11b/802.11g/802.11n(HT20))

Modulation : 802.11b CCK
802.11g OFDM
802.11n MCS

Antenna Type : Internal

Antenna Gain : 0 dBi

Applicant : Jiuzhou Group Holdings Limited-Digital Dept.

Address : 2F, B5d Building, Yingzhan Industrial Zone, Longtian Community,
Kengzi Street, Longgang, Shenzhen, 518122, China

Manufacturer : Jiuzhou Group Holdings Limited-Digital Dept.

Address : 2F, B5d Building, Yingzhan Industrial Zone, Longtian Community,
Kengzi Street, Longgang, Shenzhen, 518122, China

Date of receiver : Aug. 11, 2014

Date of Test : Aug. 11 ~18, 2014

1.2 Support Equipment

PC	: Manufacturer: DELL M/N: OPTIPLEX 380 S/N: 1J63X2X CE , FCC: DOC
MONITOR	: Manufacturer: DELL M/N: E170Sc S/N: CN-00V539-64180-055-0UPS CE , FCC: DOC
KEYBOARD	: Manufacturer: DELL M/N: SK-8115 S/N: CN-0DJ313-71616-06C-02XN CE , FCC: DOC Cable: 1m, unshielded
MOUSE	: Manufacturer: DELL M/N: M-UARDEL7 S/N: N/A CE , FCC: DOC Cable: 1m, unshielded
Power Cord of Printer	: Non-shielded, Detachable, 0.8m, w/o core
USB Cable for Printer	: Non-Shielded , 1.5m
Power Line	Non-Shielded, 1.5m
VGA Cable	: Non-Shielded, 1.5m
Network Cable	: Non-Shielded, 1.5m

1.3 Description of Test Facility

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

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, 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 752021, July 10, 2013.

1.4 Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC Part 15, Paragraph 15.247.

2.1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS

2.2 Description of Test Modes

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps lowest data rate (worst case) are chosen for the final testing.

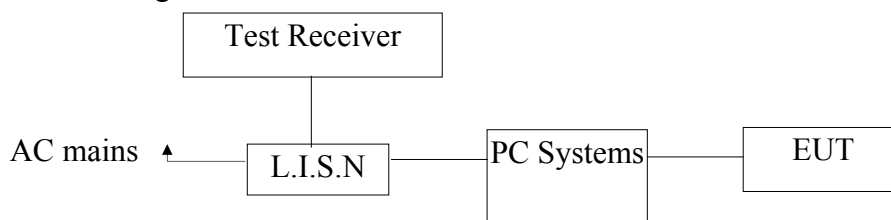
IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20): Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with MCS 0 Mbps lowest data rate (the worst case) are chosen for the final testing.

3. Conducted Emission Test

3.1 Block Diagram of Test Setup

3.1.1 Block diagram of connection between the EUT and simulators



3.2 Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3 Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4 Operating Condition of EUT

3.4.1 Setup the EUT and simulator as shown as Section 3.1.

3.4.2 Turn on the power of all equipment.

3.4.3 Let the EUT work in test mode (ON) and measure it.

3.5 Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

3.6 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 23, 2014	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 23, 2014	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 23, 2014	1 Year

3.7 Power Line Conducted Emission Measurement Results

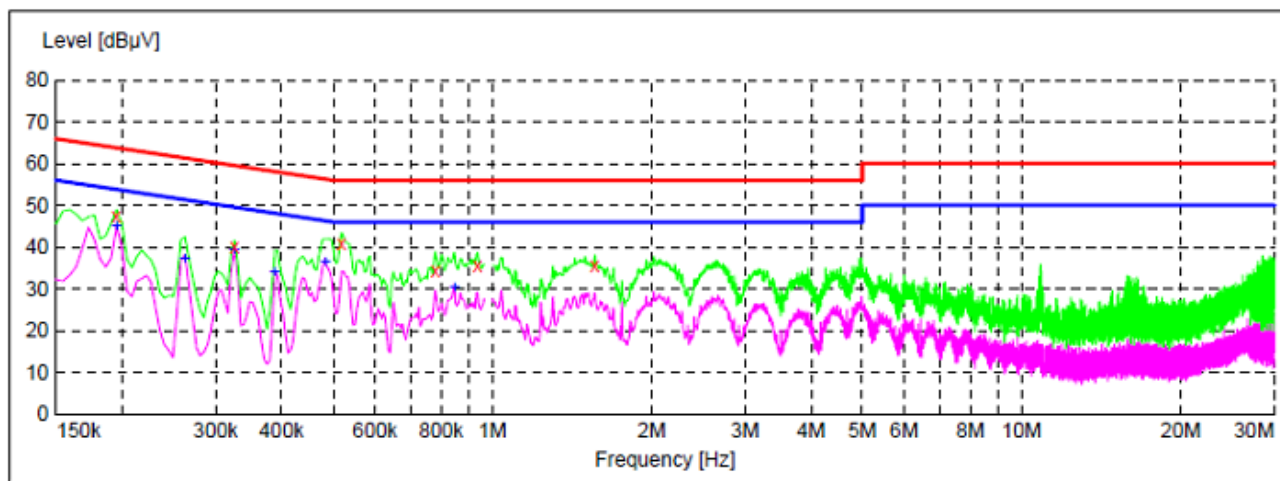
PASS.

The frequency range from 150KHz to 30 MHz is investigated.

Please refer the following pages.

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: ON
Test Specification: DC 5V Via USB Port
Comment: L
Tem:25℃ Hum:50%

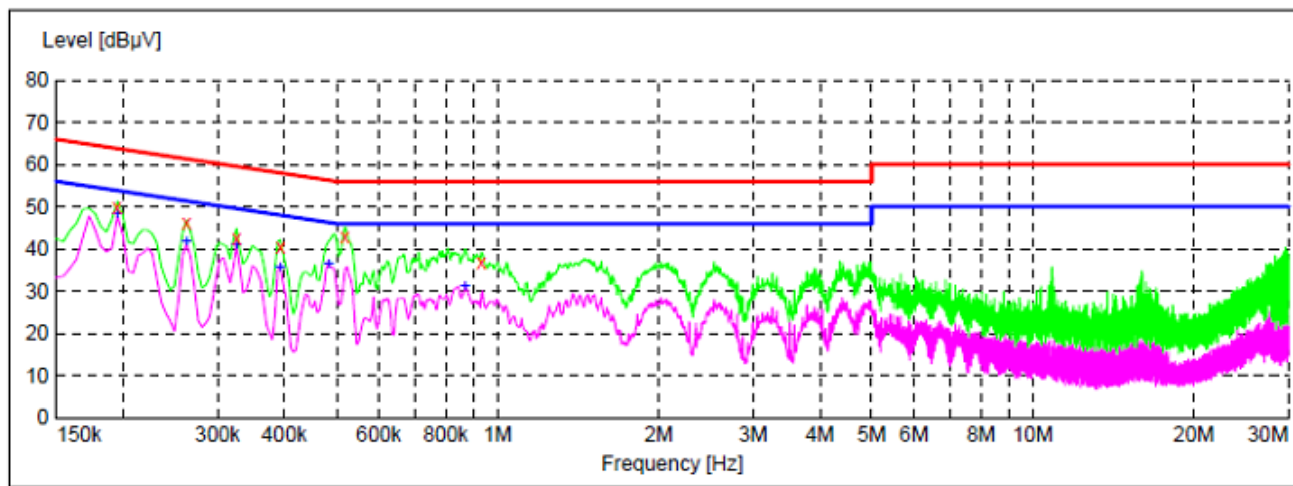


Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	47.40	20.1	64	16.4	QP	L1	GND
0.325500	39.90	20.1	60	19.7	QP	L1	GND
0.519000	41.00	20.1	56	15.0	QP	L1	GND
0.780000	34.60	20.1	56	21.4	QP	L1	GND
0.937500	35.60	20.1	56	20.4	QP	L1	GND
1.562500	35.60	20.3	56	20.4	QP	L1	GND

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	45.00	20.1	54	8.8	AV	L1	GND
0.262500	37.20	20.1	51	14.2	AV	L1	GND
0.325500	39.40	20.1	50	10.2	AV	L1	GND
0.388500	33.90	20.1	48	14.2	AV	L1	GND
0.483000	36.40	20.1	46	9.9	AV	L1	GND
0.847500	30.20	20.1	46	15.8	AV	L1	GND

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: ON
Test Specification: DC 5V Via USB Port
Comment: N
Tem:25°C Hum:50%

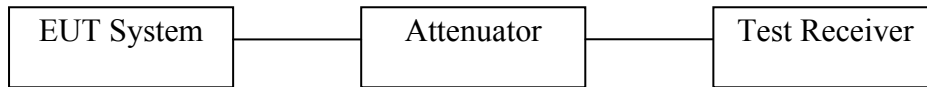


Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	50.00	20.1	64	13.8	QP	N	GND
0.262500	46.10	20.1	61	15.3	QP	N	GND
0.325500	42.40	20.1	60	17.2	QP	N	GND
0.393000	40.40	20.1	58	17.6	QP	N	GND
0.519000	43.00	20.1	56	13.0	QP	N	GND
0.933000	36.70	20.1	56	19.3	QP	N	GND

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	48.10	20.1	54	5.7	AV	N	GND
0.262500	41.80	20.1	51	9.6	AV	N	GND
0.325500	40.80	20.1	50	8.8	AV	N	GND
0.393000	35.70	20.1	48	12.3	AV	N	GND
0.483000	36.30	20.1	46	10.0	AV	N	GND
0.870000	31.10	20.1	46	14.9	AV	N	GND

4. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

4.1 Test Setup



4.2 6dB Bandwidth

a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

b. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
 RBW = 100kHz, VBW $\geq$ 3*RBW = 300kHz,
 Detector= Peak
 Trace mode= Max hold.
 Sweep- auto couple.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

c. Test Setup See 4.1

d. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2014	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2014	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

e. Test Results

Pass.

f. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	10.08	>500	Pass
Mid	2437	10.08		Pass
High	2462	10.08		Pass

Test mode: IEEE 802.11g

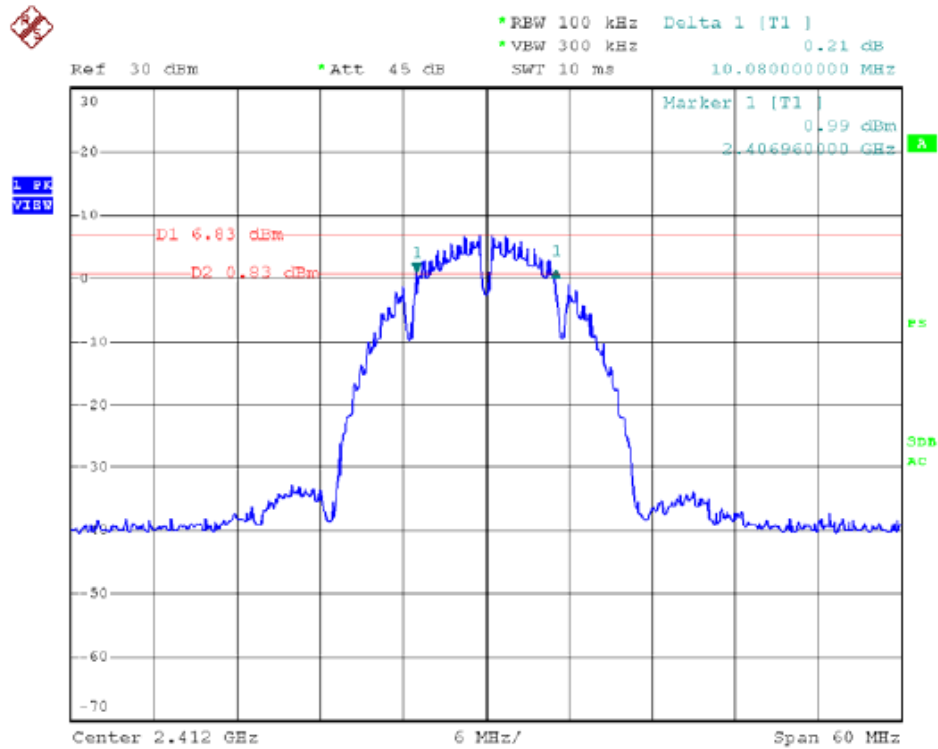
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.50	>500	Pass
Mid	2437	16.50		Pass
High	2462	16.50		Pass

Test mode: IEEE 802.11n (HT20)

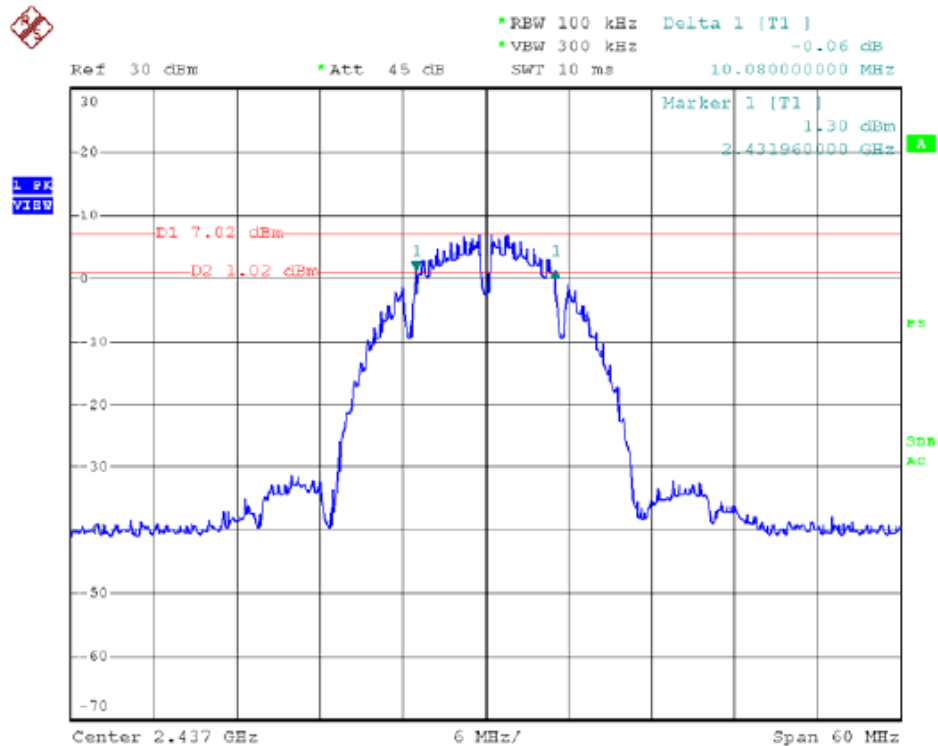
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	17.60	>500	Pass
Mid	2437	17.60		Pass
High	2462	17.60		Pass

Test Plots See the following page.

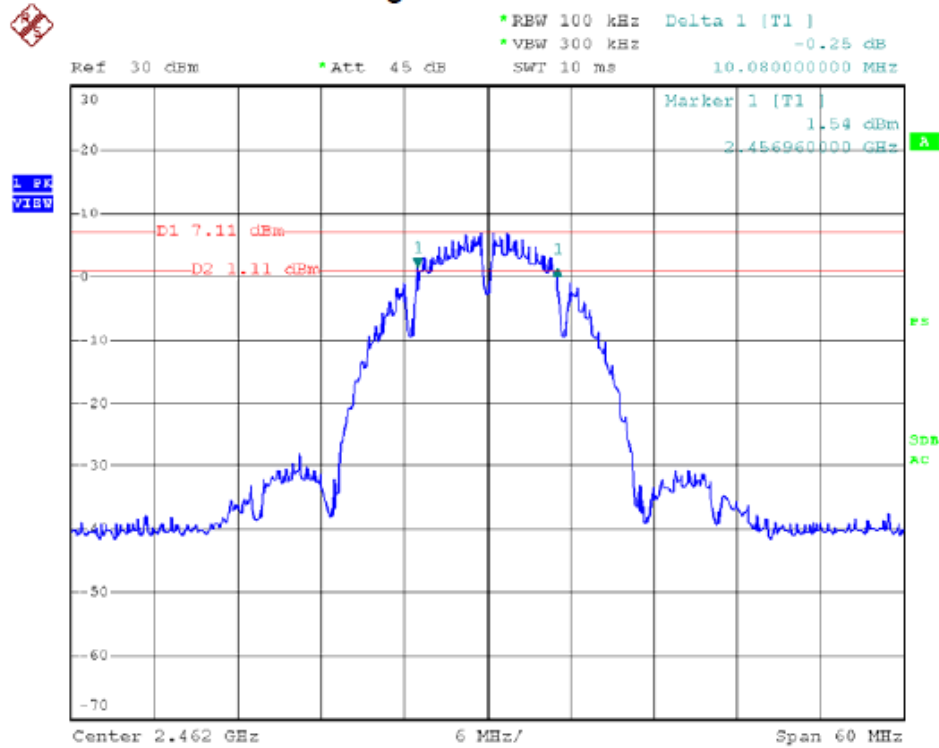
Test Mode: 802.11b---Low



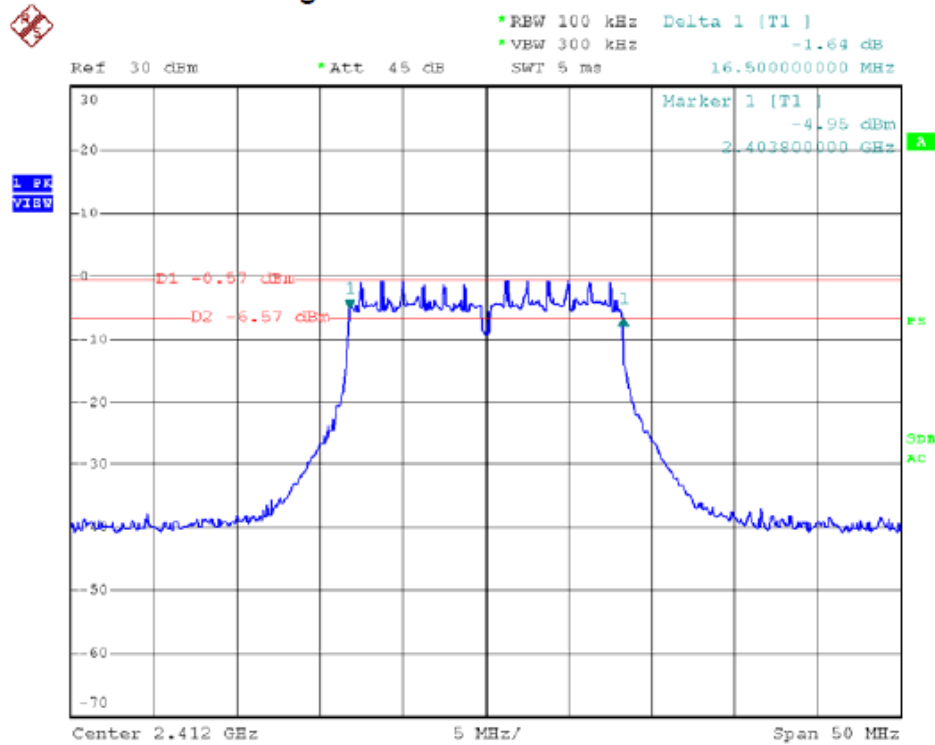
Test Mode: 802.11b---Mid



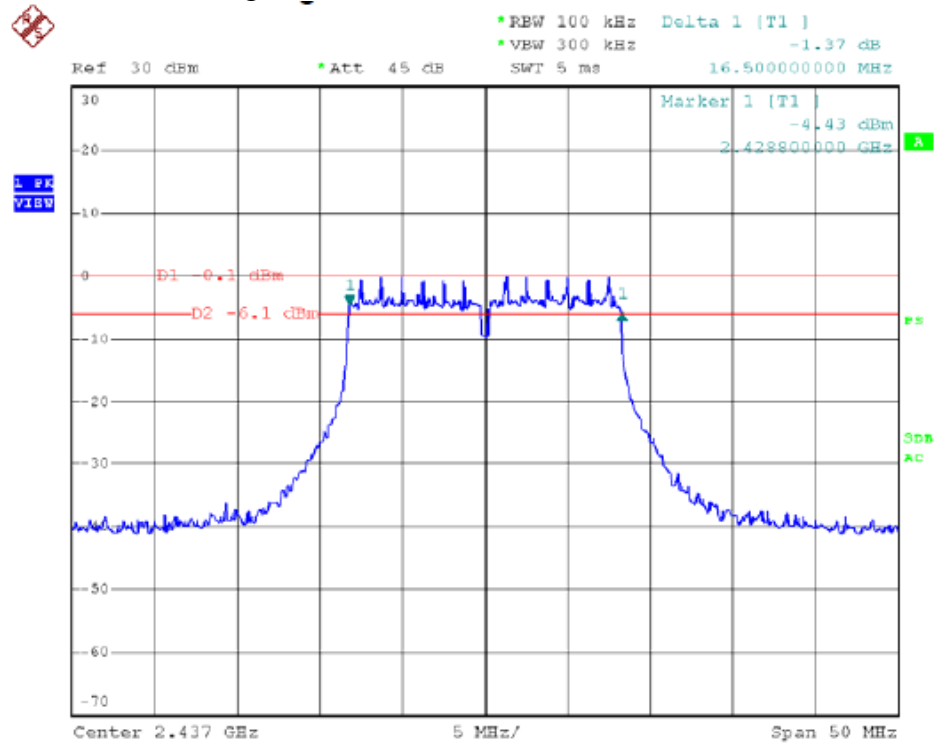
Test Mode: 802.11b---High



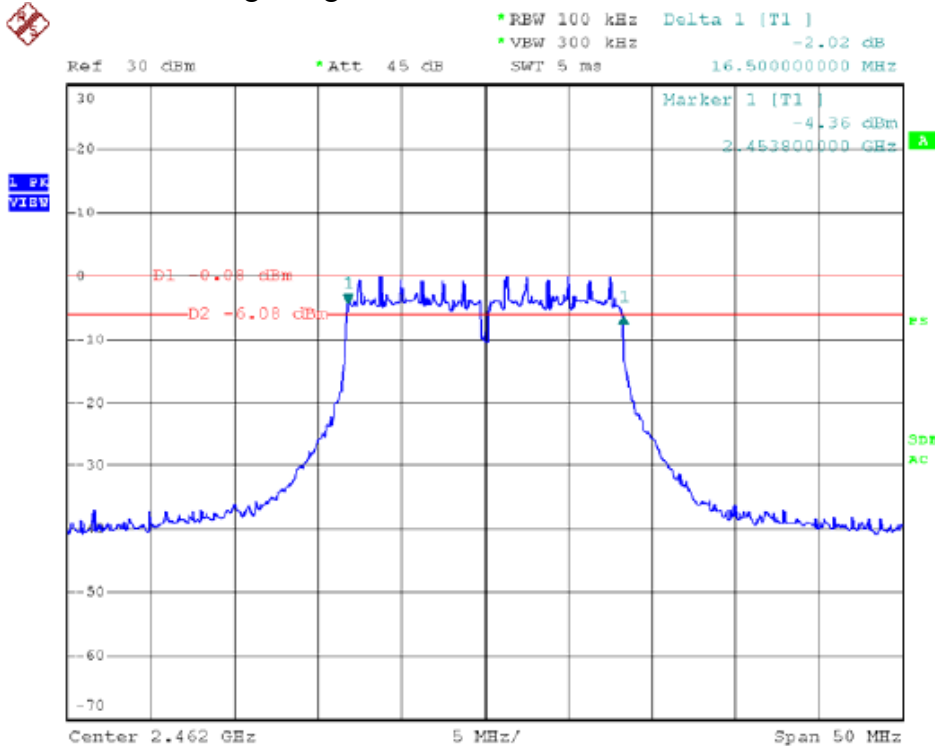
Test Mode: 802.11g---Low



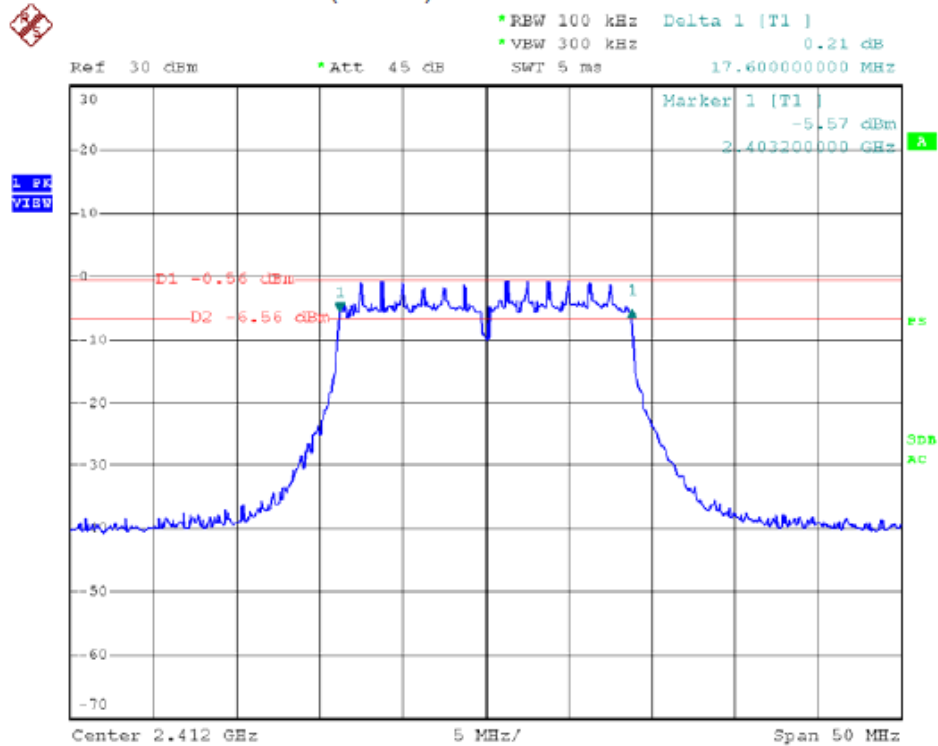
Test Mode: 802.11g---Mid



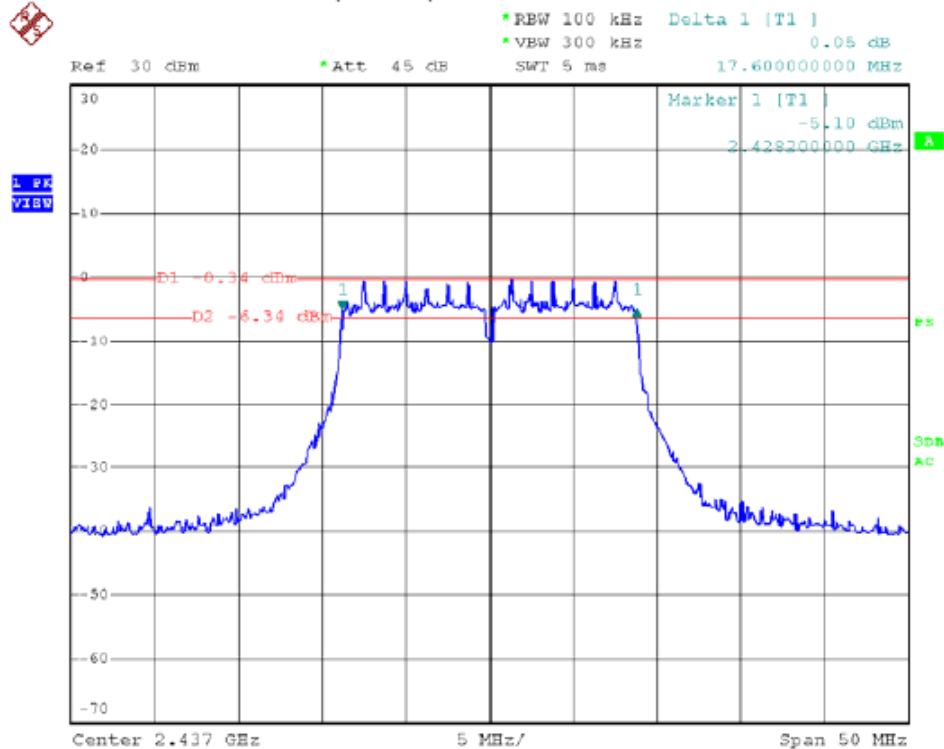
Test Mode: 802.11g---High



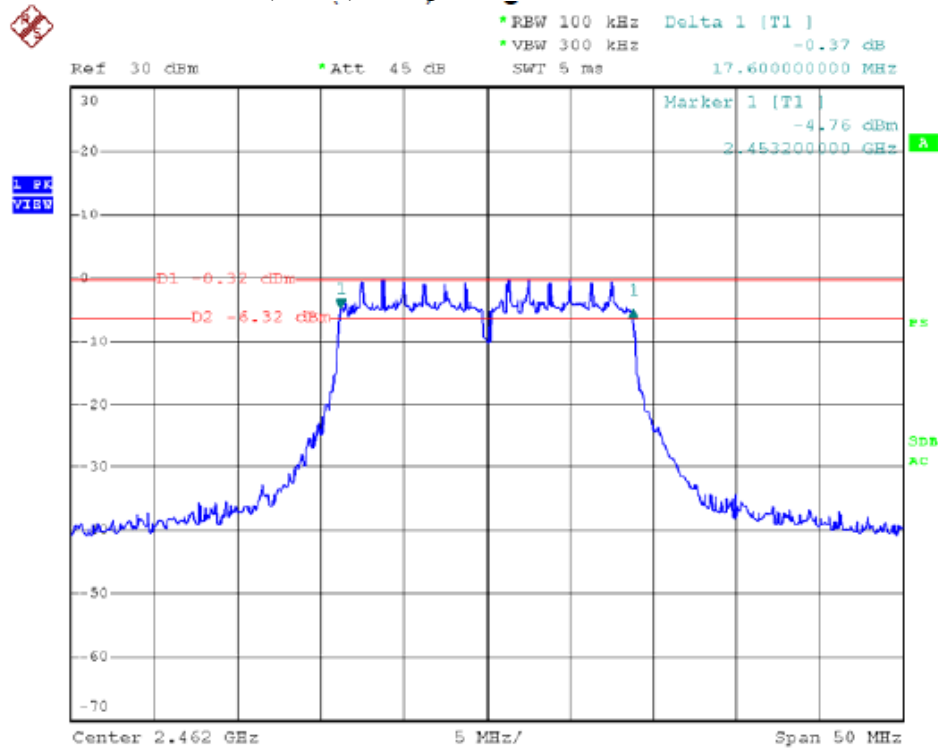
Test Mode: 802.11n (HT20)---Low



Test Mode: 802.11n (HT20)---Mid



Test Mode: 802.11n (HT20)---High



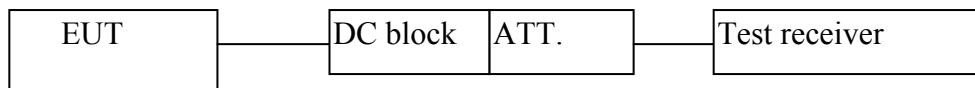
4.3 Maximum Peak output power test

a. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. Configuration of Measurement



c. Data Rates

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6.5Mbps data rate (the worst case) are chosen for the final testing.

d. Test Procedure

This test was according the kDB 558074 9.1.2:

1. This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.
2. Set the RBW = 1 MHz.
3. Set the VBW $\geq 3 \times$ RBW = 3 MHz.
4. Set the span $\geq 1.5 \times$ DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

e. Test Equipment

Same as the equipment listed in 4.2.

f. Test Results

Pass.

g. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	8.43	30	1	Pass
Mid	2437	7.51			Pass
High	2462	6.59			Pass

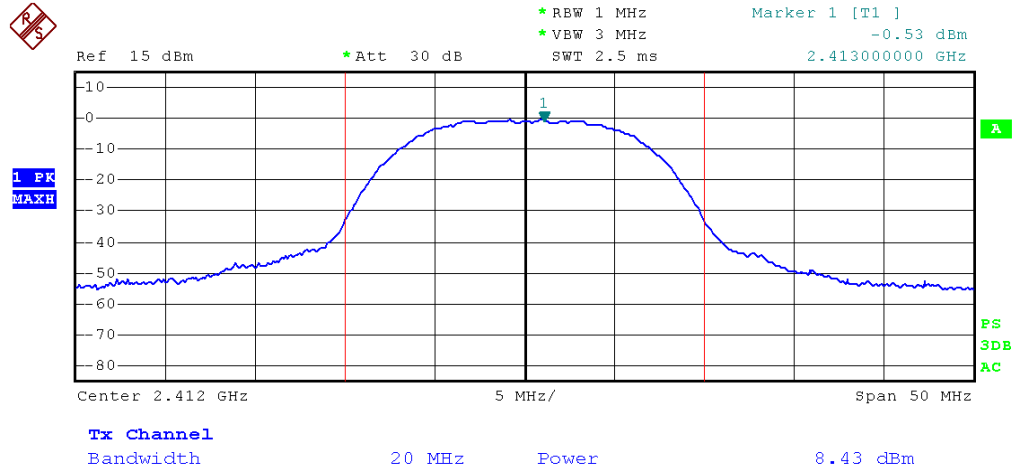
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	7.36	30	1	Pass
Mid	2437	6.73			Pass
High	2462	6.04			Pass

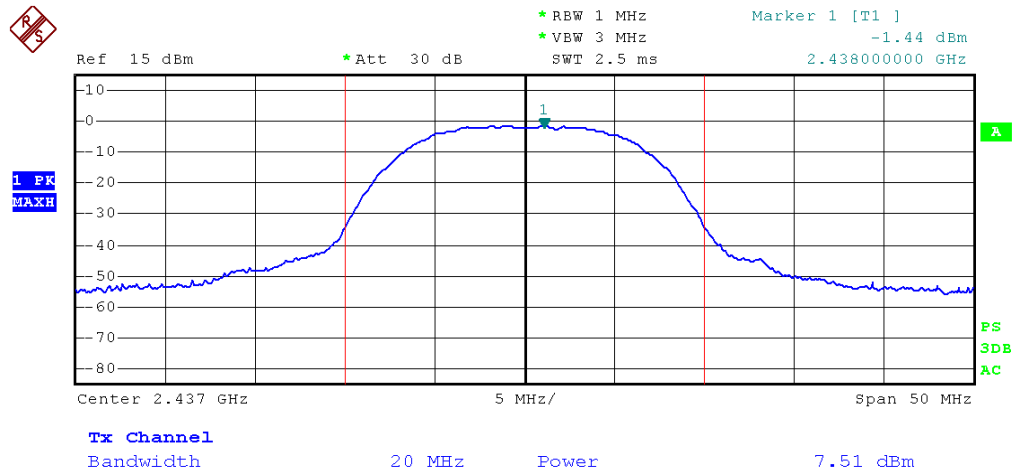
Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	7.30	30	1	Pass
Mid	2437	6.73			Pass
High	2462	5.93			Pass

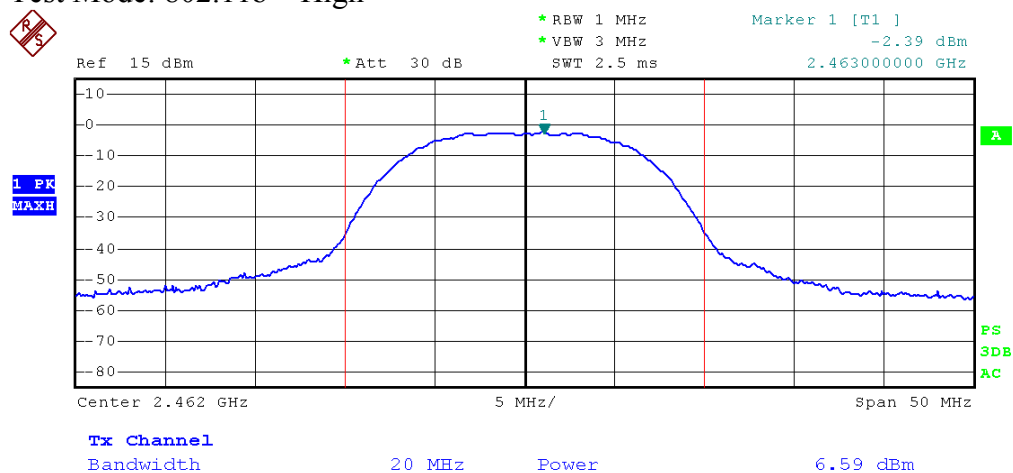
Test Mode: 802.11b---Low



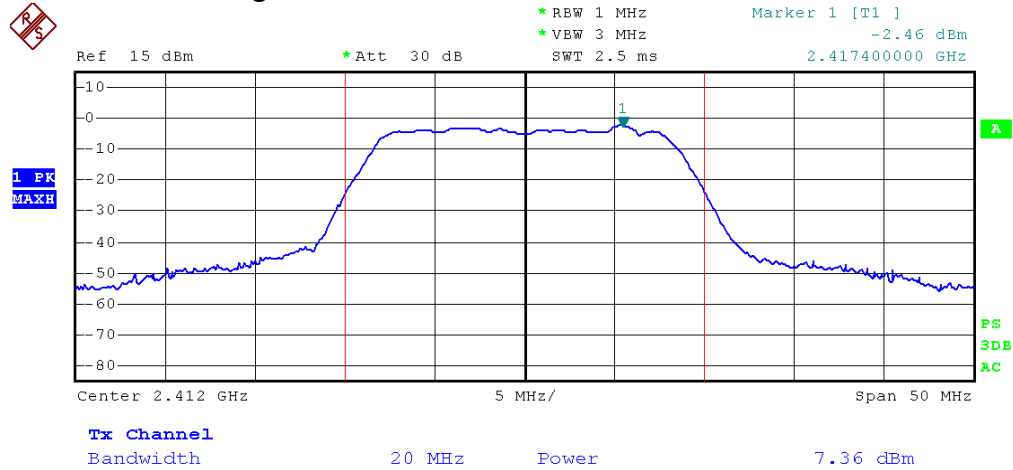
Test Mode: 802.11b---Mid



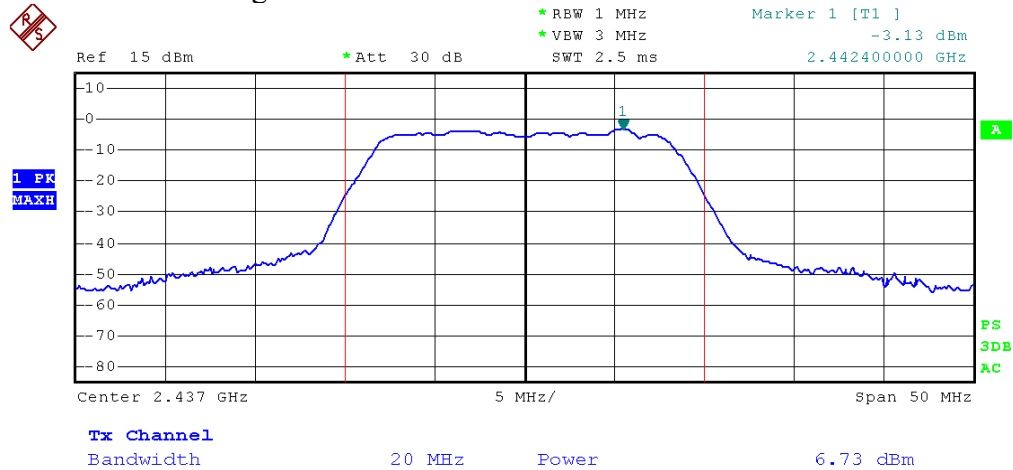
Test Mode: 802.11b---High



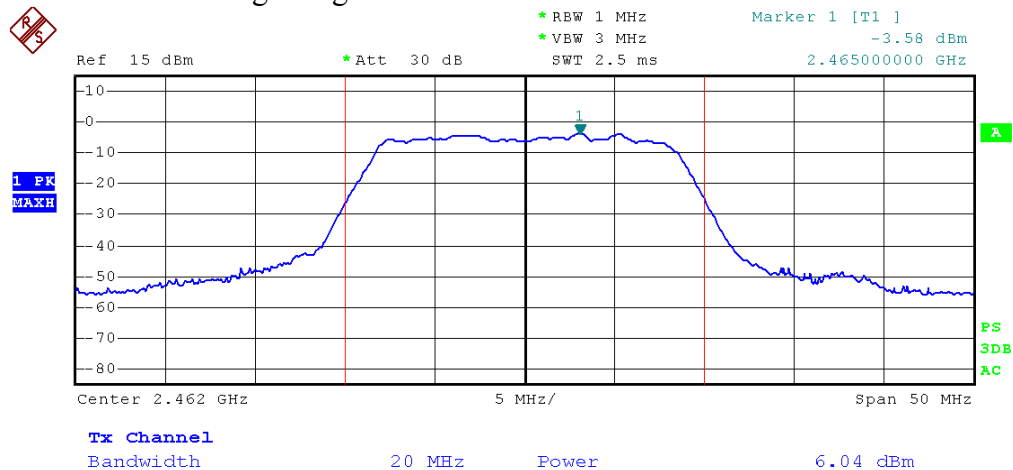
Test Mode: 802.11g---Low



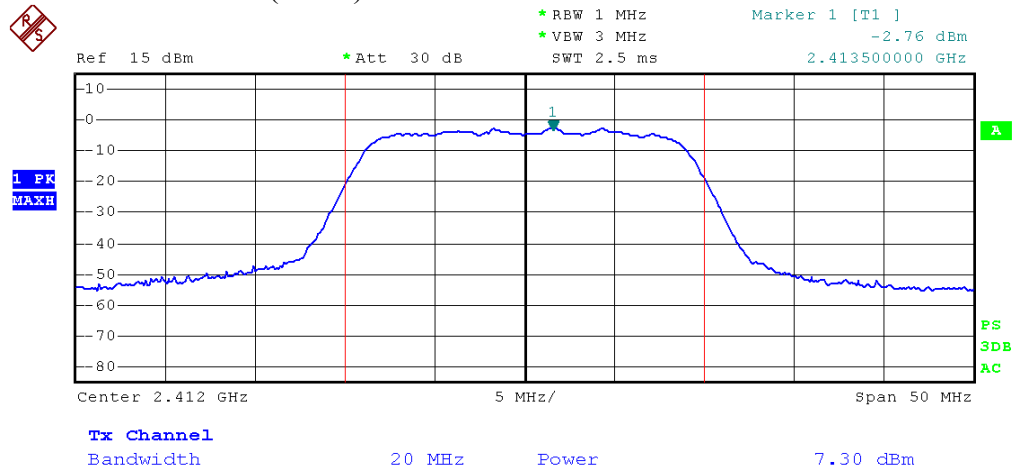
Test Mode: 802.11g---Mid



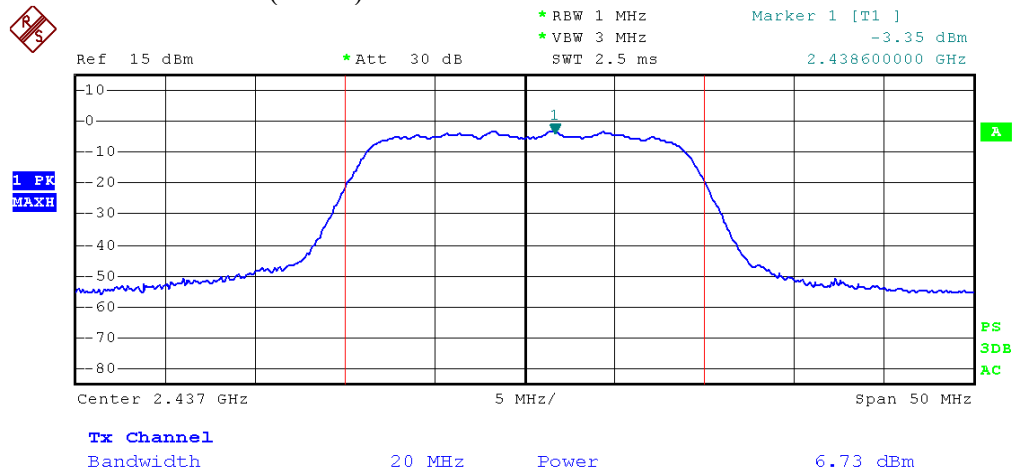
Test Mode: 802.11g---High



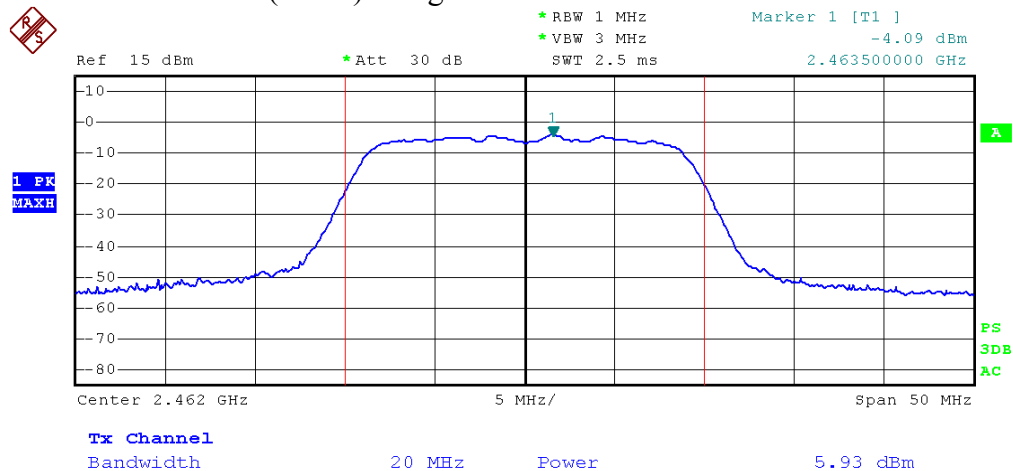
Test Mode: 802.11n(HT20)---Low



Test Mode: 802.11n(HT20)---Mid



Test Mode: 802.11n(HT20)---High



4.4 Band Edges Measurement

a. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. 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).

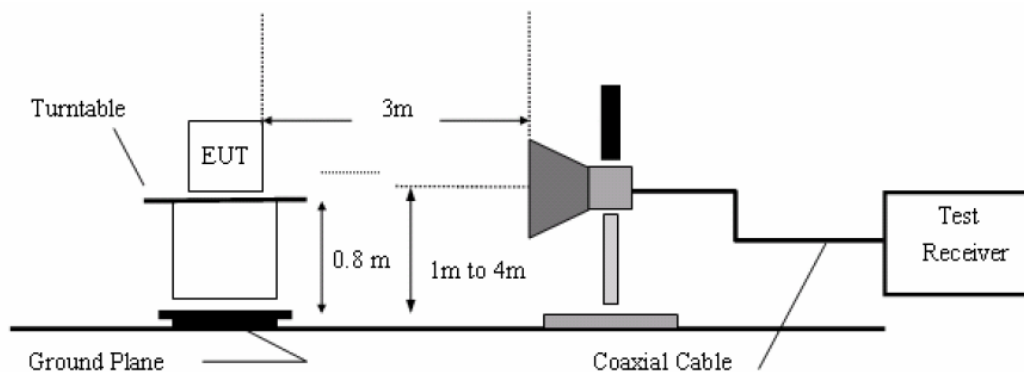
b. Test Procedure

1. Conducted Method:

- 1) Set RBW=100KHz, VBW=300KHz
- 2) Detector=peak
- 3) Sweep time= auto
- 4) Trace mode=max hold.

2. Radiated Method:

- 1) The EUT is placed on a turntable, which is 0.8m above the ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Peak detector: RBW=1MHz, VBW=3MHz, SWT=AUTO
Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO
The EUT is tested in 9*6*6 Chamber.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.



a. Test Equipment

Same as the equipment listed in 4.2.

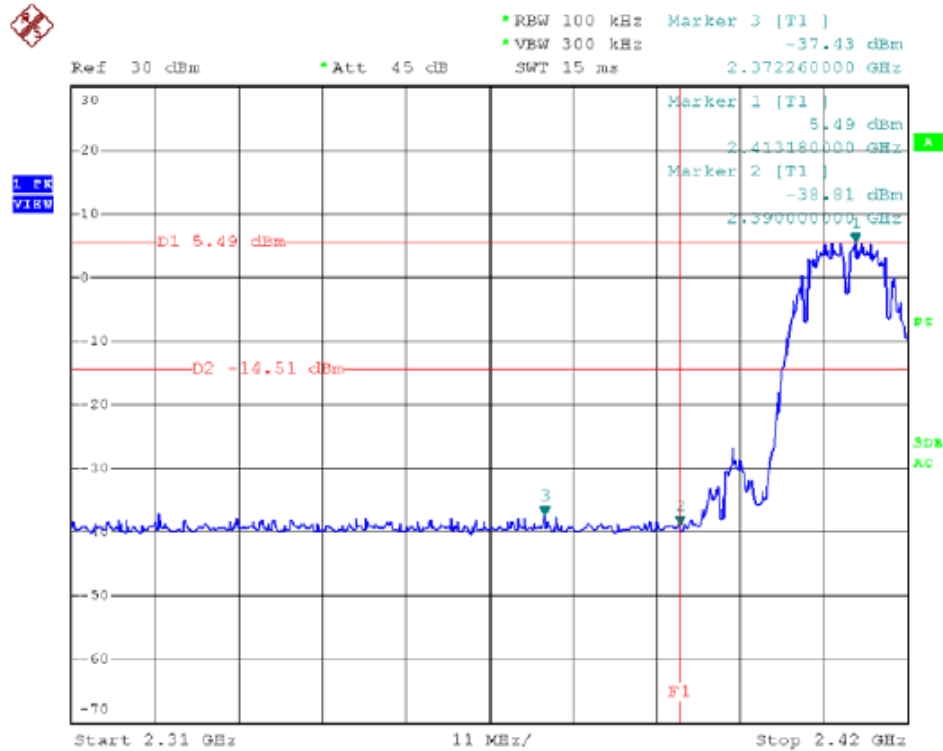
b. Test Results

Pass.

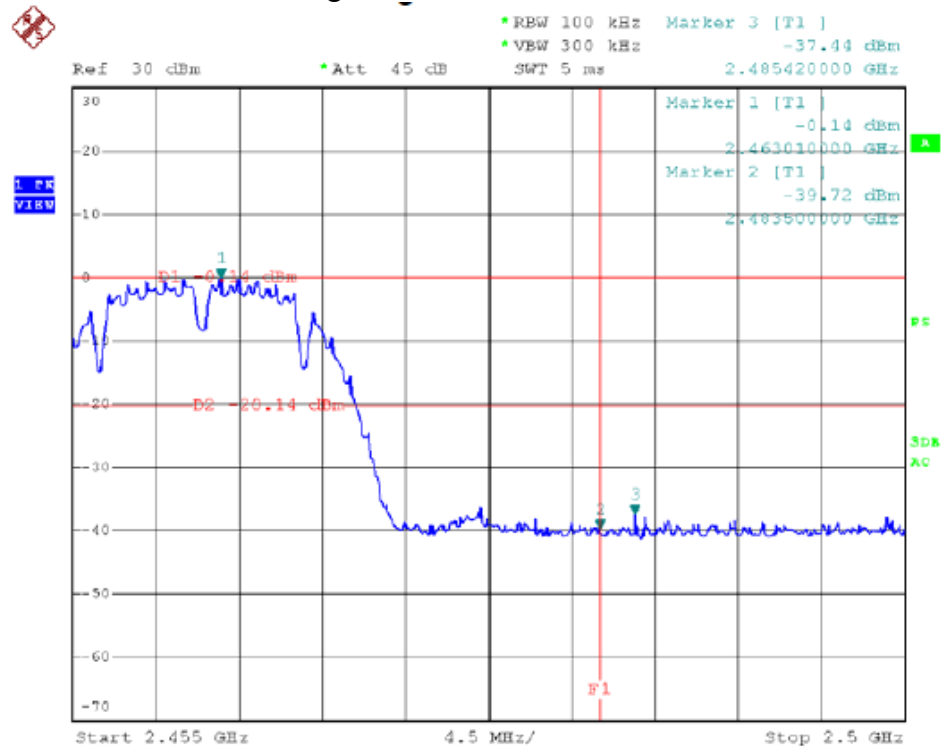
c. Test Plots

See the following page.

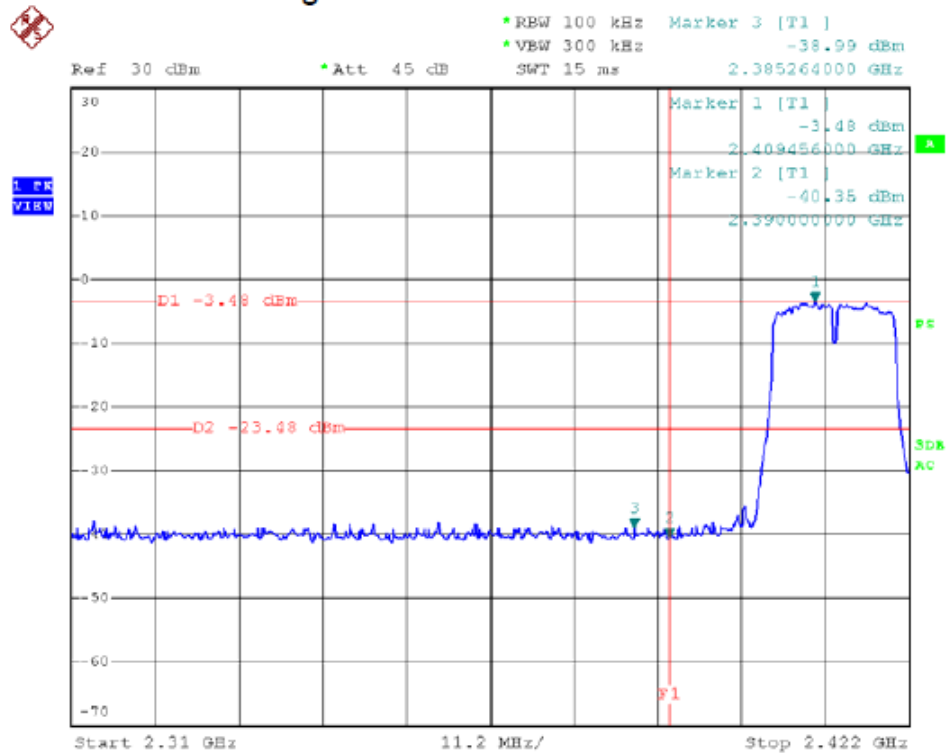
Test Mode: 802.11b ---Low



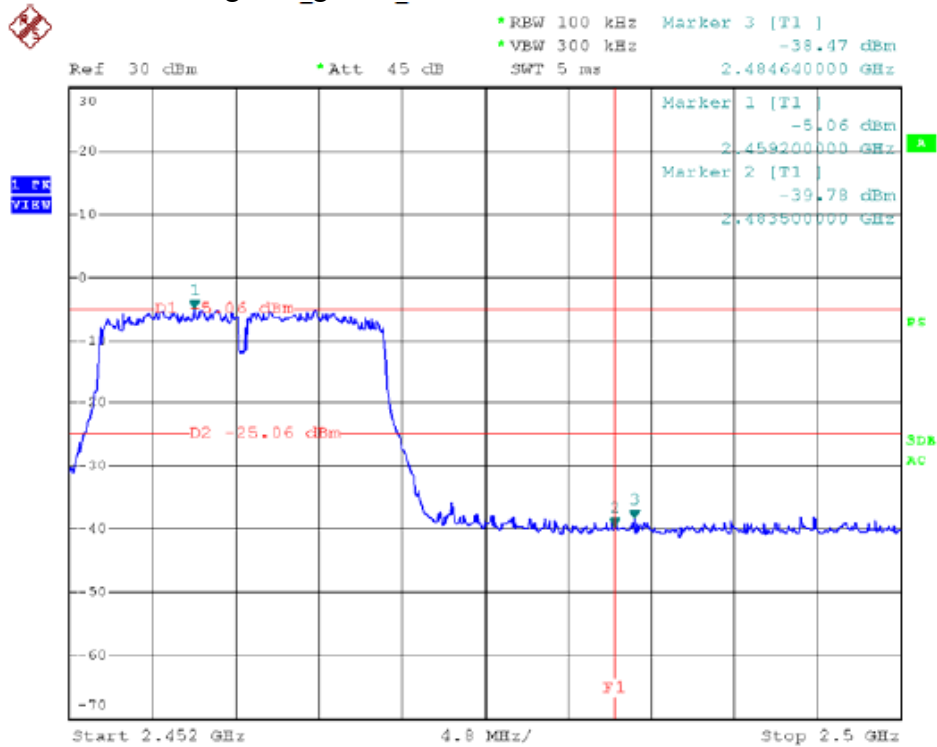
Test Mode: 802.11b ---High



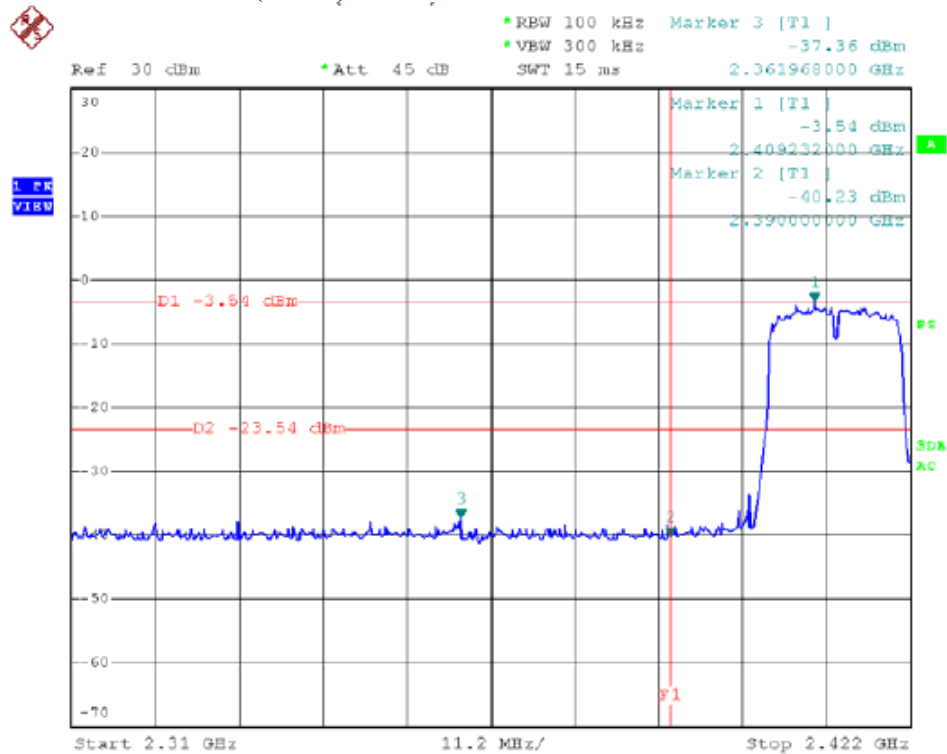
Test Mode: 802.11g ---Low



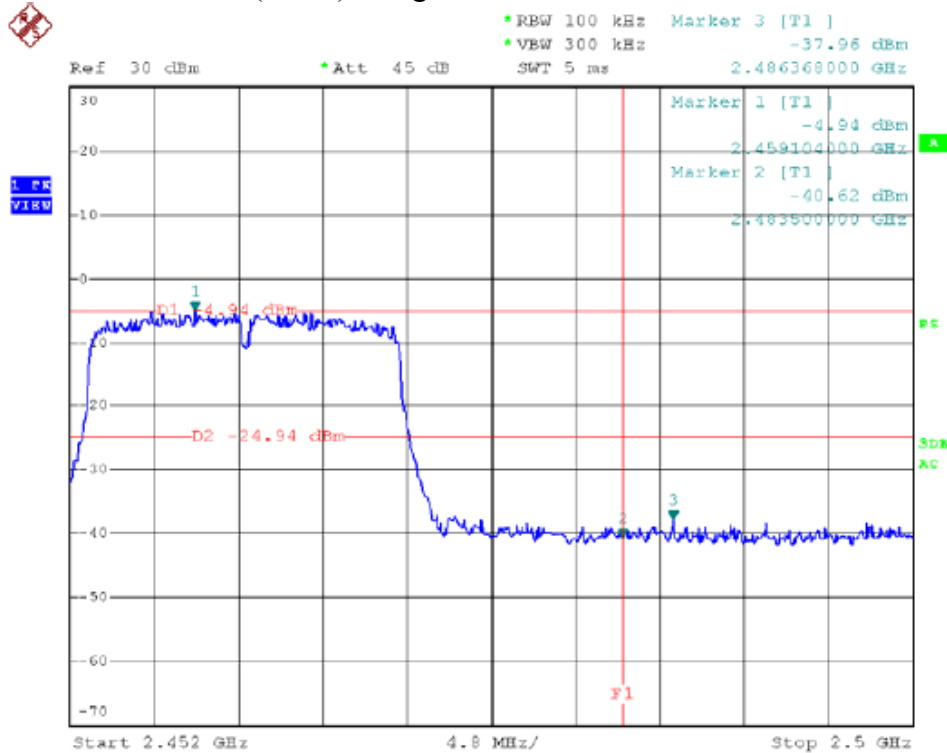
Test Mode: 802.11g ---High



Test Mode: 802.11n (HT20) ---Low



Test Mode: 802.11n (HT20)---High



2. Radiated emission Test

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Remark
		PK	AV	PK	AV	
<2400	V	59.11	36.17	74.00	54.00	802.11b
	V	56.89	37.61	74.00	54.00	802.11g
	V	53.29	35.77	74.00	54.00	802.11n (HT20)
>2483.5	V	52.51	38.22	74.00	54.00	802.11b
	V	57.49	36.46	74.00	54.00	802.11g
	V	50.22	38.01	74.00	54.00	802.11n (HT20)
<2400	H	57.01	37.29	74.00	54.00	802.11b
	H	54.44	38.06	74.00	54.00	802.11g
	H	52.62	35.77	74.00	54.00	802.11n (HT20)
>2483.5	H	51.03	38.12	74.00	54.00	802.11b
	H	53.11	36.65	74.00	54.00	802.11g
	H	50.95	38.74	74.00	54.00	802.11n (HT20)

4.5 Peak Power Spectral Density

a. Limit

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

b. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5MHz, Sweep=500s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

c. Test Equipment

Same as the equipment listed in 4.2.

d. Test Setup

See 4.1

e. Test Results

Pass

f. Test Data

Please refer to the following data.

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-22.15	-	8.00	Pass
Mid	2437	-20.80	-		Pass
High	2462	-20.88	-		Pass

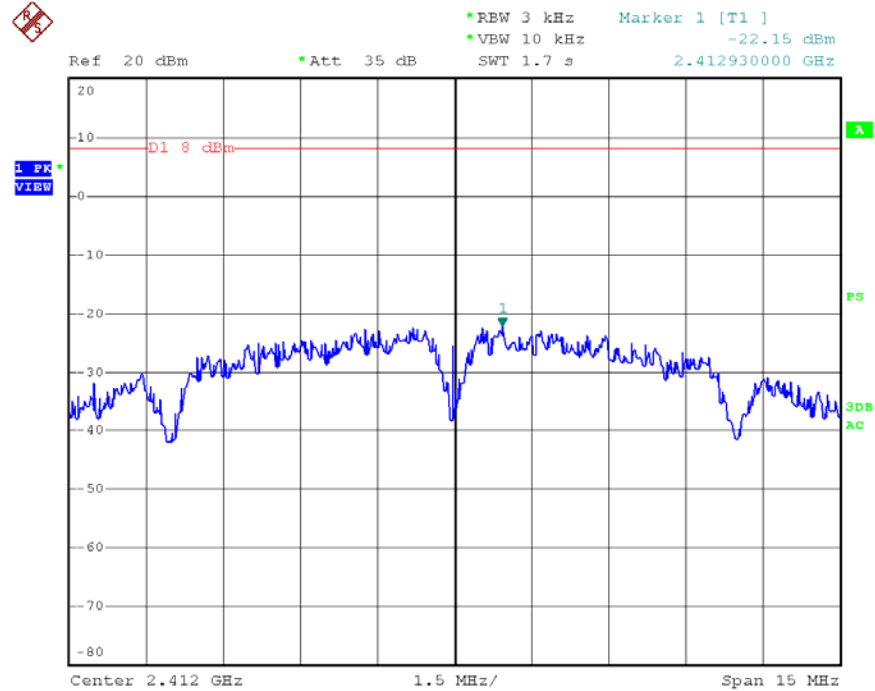
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Σ PPSD (dBm)	Limit (dBm)	Result
Low	2412	-29.43	-	8.00	Pass
Mid	2437	-25.26	-		Pass
High	2462	-24.92	-		Pass

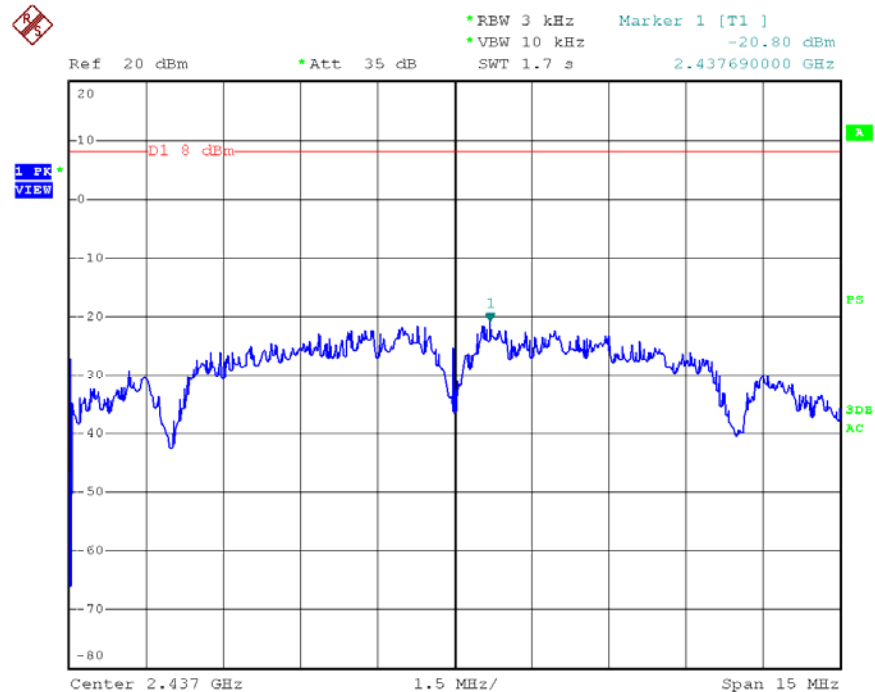
Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-25.77	-	8.00	Pass
Mid	2437	-25.27	-		Pass
High	2462	-24.78	-		Pass

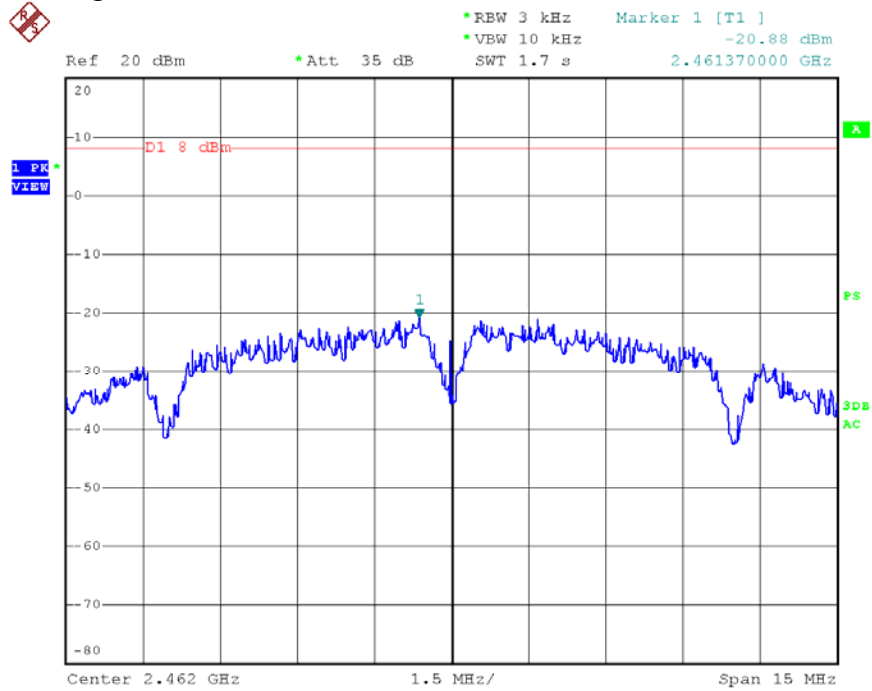
g. Test Plot See the following pages
802.11 b CH--Low



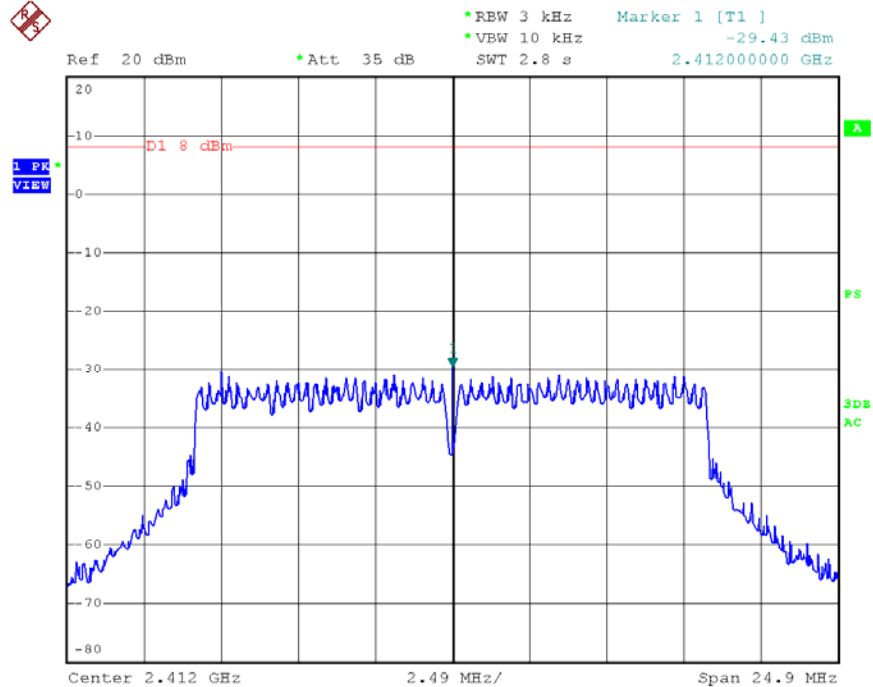
802.11 b CH--Mid



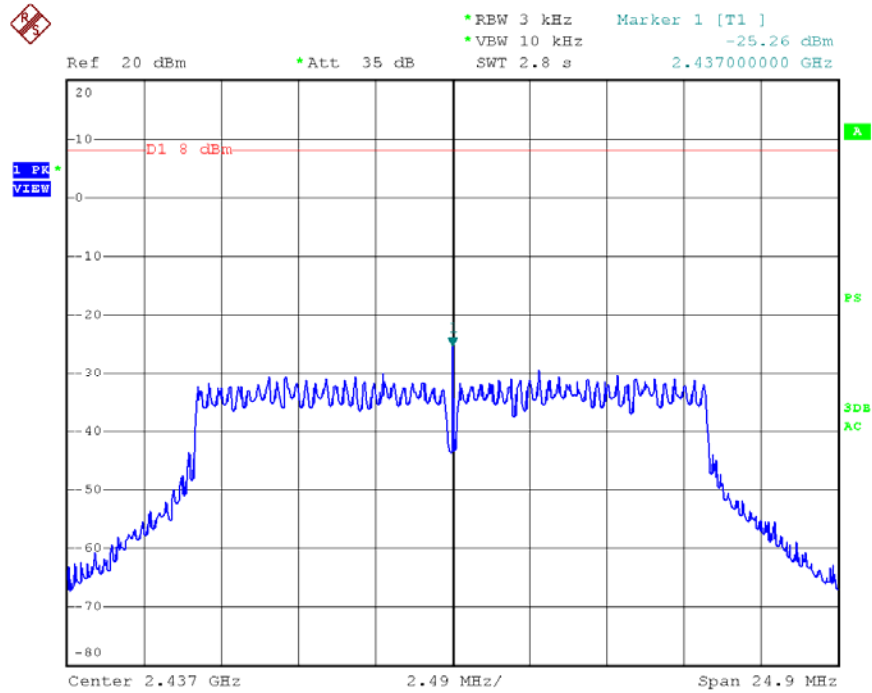
802.11 b CH--High



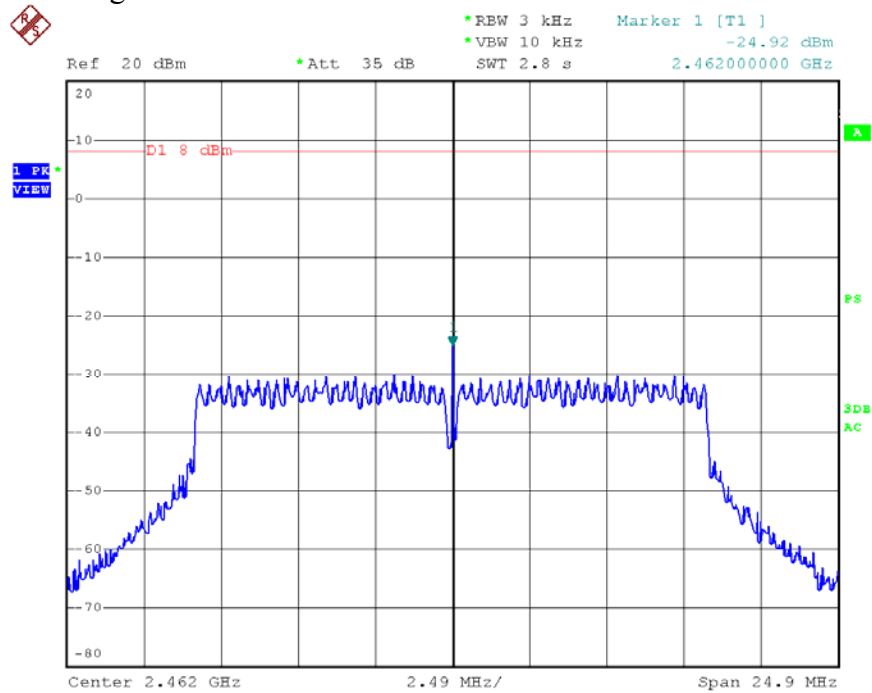
802.11g CH--Low



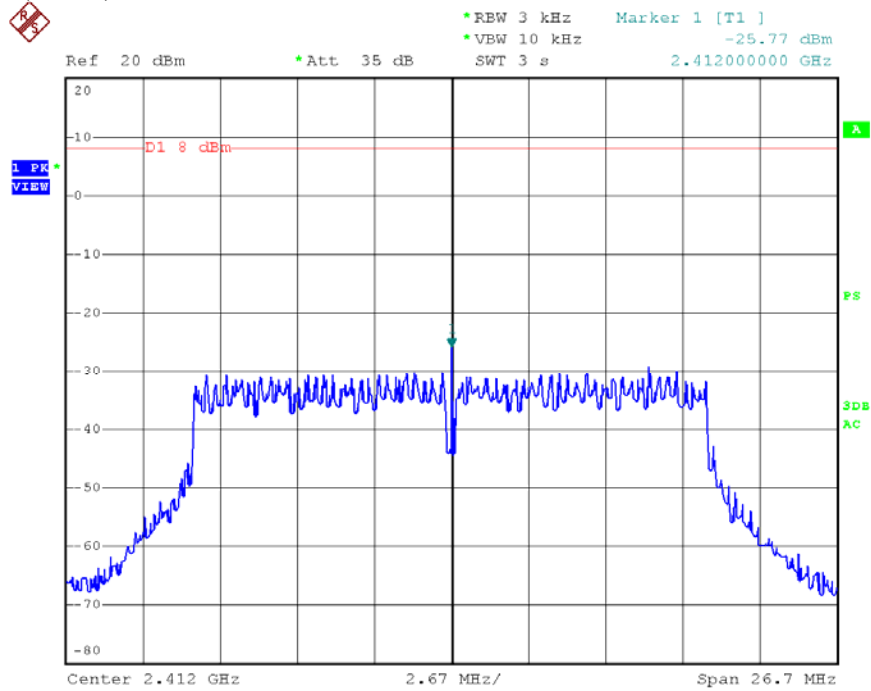
802.11g CH--Mid



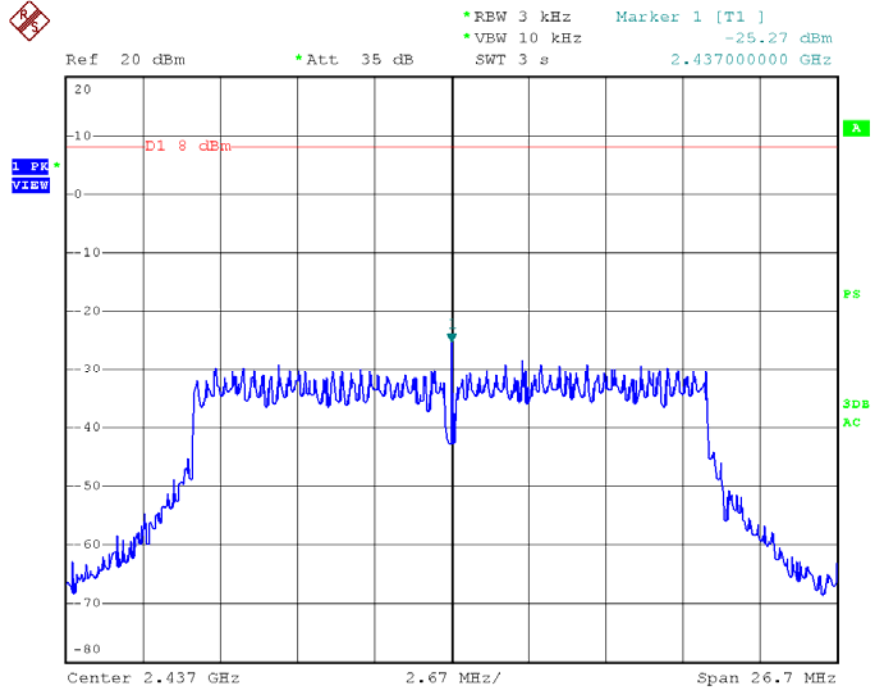
802.11g CH--High



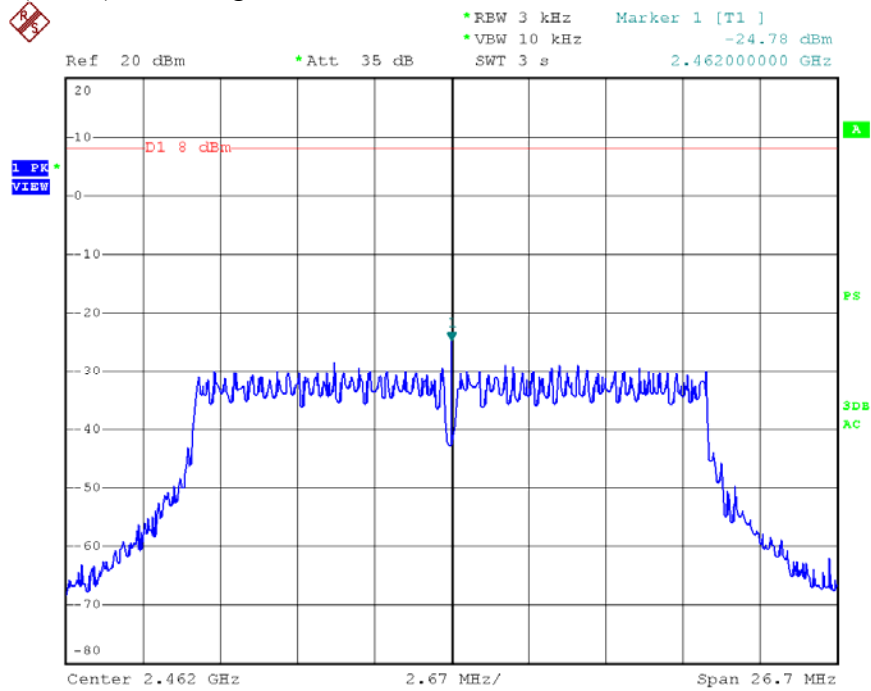
802.11n (HT20) CH—Low



802.11n (HT20) CH—Mid



802.11n (HT20) CH—High



4.6 Radiated Emissions

4.6.1.1 Test Limits (< 30 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

4.6.1.2. Test Limits (≥ 30 MHz)

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz	40 dBuV/m
902-928 MHz		88 - 216 MHz	43.5
2.4-2.4835 GHz		216 - 960 MHz	46
94 dBuV/m @3m	54 dBuV/m @3m	ABOVE 960 MHz	54dBuV/m

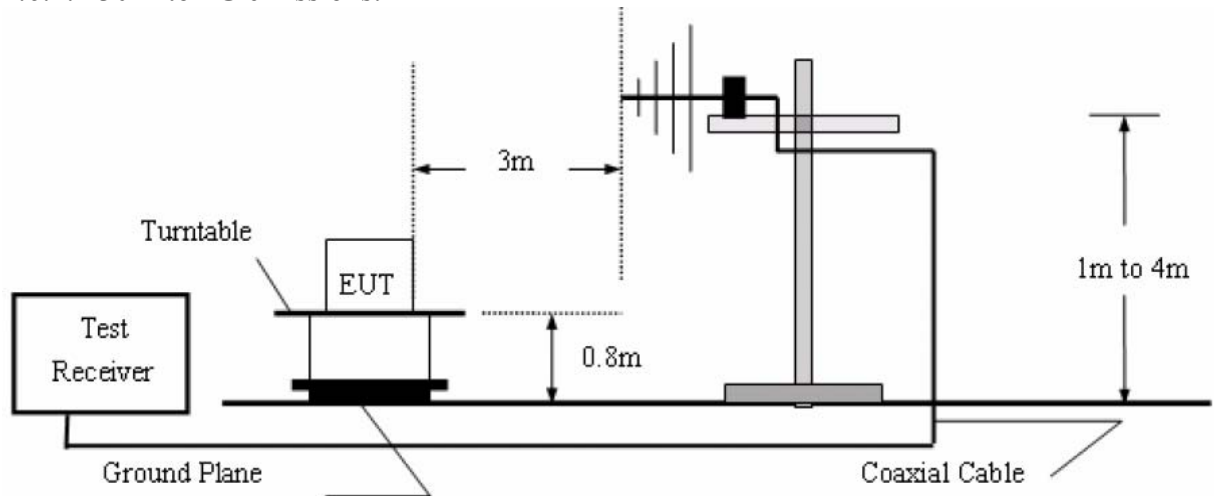
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Equipment

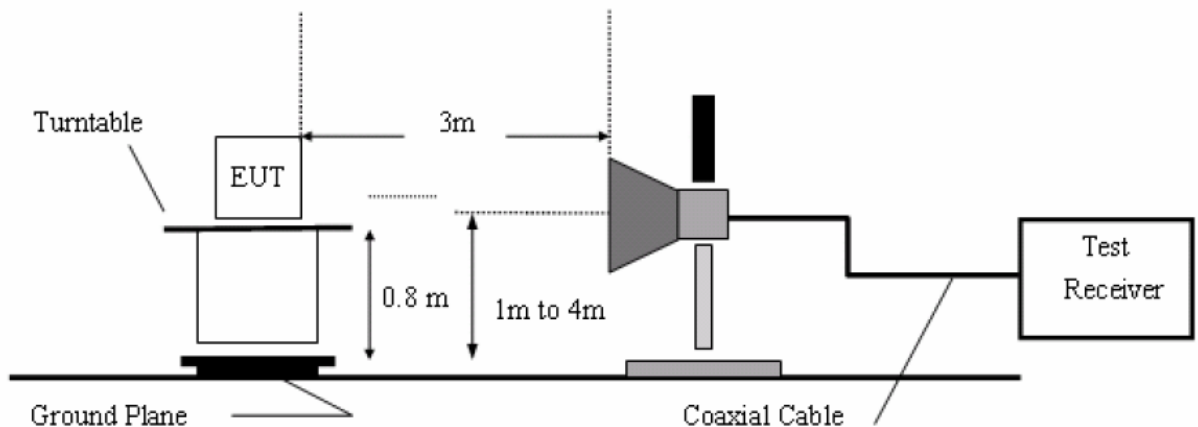
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2014	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
4.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
5.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2014	1 Year
6.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

4.6.2. Test Configuration:

4.6.2.1 30M to 1G emissions:



4.6.2.2 1G to 40G emissions:



4.6.3 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz.

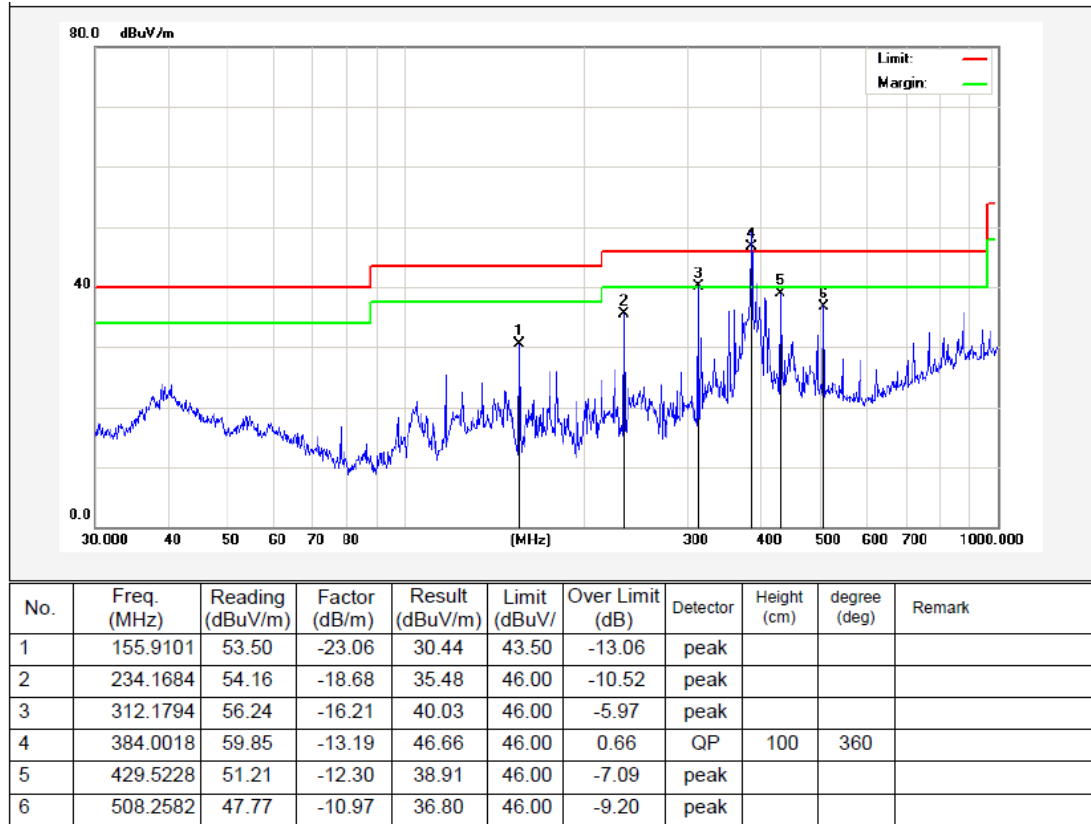
The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 4.6.4.

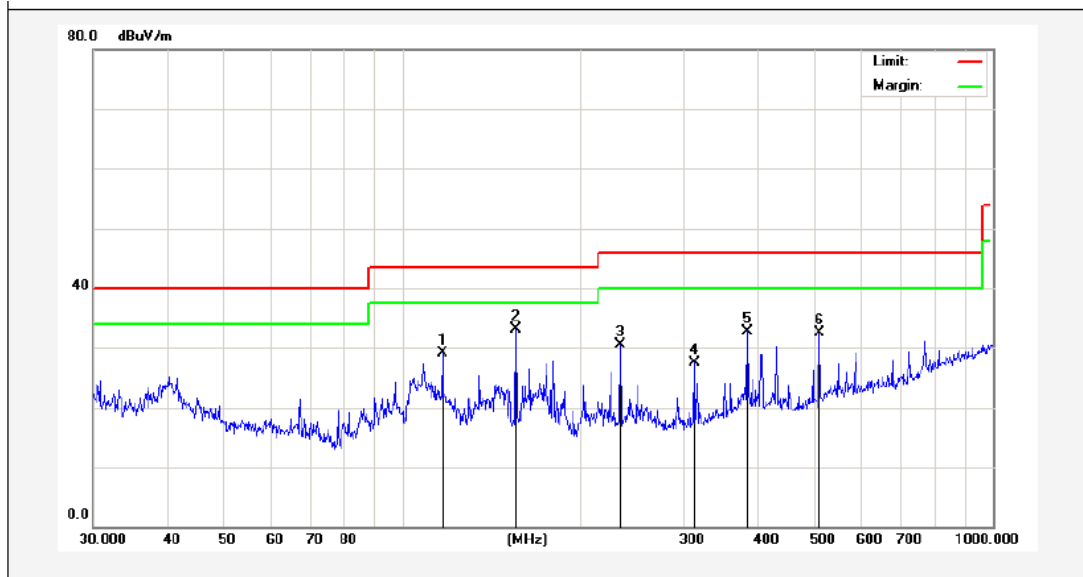
4.6.4 Test Results

Please refer to the following pages.

WiFi Mode: Horizontal



WiFi Mode: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	116.9495	45.32	-16.12	29.20	43.50	-14.30	peak			
2	155.9101	51.23	-18.06	33.17	43.50	-10.33	peak			
3	234.1684	44.93	-14.39	30.54	46.00	-15.46	peak			
4	312.1794	41.98	-14.43	27.55	46.00	-18.45	peak			
5	383.9318	44.99	-12.19	32.80	46.00	-13.20	peak			
6	508.2582	43.31	-10.81	32.50	46.00	-13.50	peak			

Above 1 GHz (The worst Mode)

Operation Mode: TX / IEEE 802.11g / CH Low

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4824	H	57.01	35.76	4.58	34.94	62.41	---	74.00	54.00	-11.59	Peak
2.	4824	H	37.19	35.76	4.58	34.94	---	42.59	74.00	54.00	-11.41	AVG
3.	7240	H	43.25	37.85	5.63	35.25	51.48	---	74.00	---	-22.52	Peak
4.	9648	H	44.03	39.39	6.34	35.70	54.06	---	74.00	---	-19.94	Peak
5.	12060	H	---	---	---	---	---	---	---	---	---	---
6.	14472	H	---	---	---	---	---	---	---	---	---	---
7.	16884	H	---	---	---	---	---	---	---	---	---	---
8.	19296	H	---	---	---	---	---	---	---	---	---	---
9.	21708	H	---	---	---	---	---	---	---	---	---	---
10.	24120	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4824	V	51.94	35.13	4.58	34.94	56.71	---	74.00	54.00	-17.29	Peak
2.	4824	V	38.29	35.13	4.58	34.94	---	43.06	74.00	54.00	-10.94	AVG
3.	7240	V	42.88	36.90	5.63	35.25	50.16	---	74.00	---	-23.84	Peak
4.	9648	V	43.12	38.57	6.34	35.70	52.33	---	74.00	---	-21.67	Peak
5.	12060	V	---	---	---	---	---	---	---	---	---	---
6.	14472	V	---	---	---	---	---	---	---	---	---	---
7.	16884	V	---	---	---	---	---	---	---	---	---	---
8.	19296	V	---	---	---	---	---	---	---	---	---	---
9.	21708	V	---	---	---	---	---	---	---	---	---	---
10.	24120	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11g / CH Mid

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4874	H	49.12	35.83	4.61	34.93	54.63	---	74.00	54.00	-19.37	Peak
2.	4874	H	38.05	35.83	4.61	34.93	---	43.56	74.00	54.00	-10.44	AVG
3.	7311	H	42.04	37.86	5.64	35.26	50.28	---	74.00	54.00	-23.72	Peak
4.	9748	H	42.07	39.51	6.36	35.70	52.24	---	74.00	---	-21.76	Peak
5.	12185	H	---	---	---	---	---	---	---	---	---	---
6.	14622	H	---	---	---	---	---	---	---	---	---	---
7.	17059	H	---	---	---	---	---	---	---	---	---	---
8.	19496	H	---	---	---	---	---	---	---	---	---	---
9.	21933	H	---	---	---	---	---	---	---	---	---	---
10.	24370	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4874	V	49.00	35.18	4.61	34.93	53.86	---	74.00	54.00	-20.14	Peak
2.	4874	V	37.26	35.18	4.61	34.93	---	42.12	74.00	54.00	-11.88	AVG
3.	7311	V	42.09	36.92	5.64	35.26	49.39	---	74.00	54.00	-24.61	Peak
4.	9748	V	39.15	38.71	6.36	35.70	48.52	---	74.00	---	-25.48	Peak
5.	12185	V	---	---	---	---	---	---	---	---	---	---
6.	14622	V	---	---	---	---	---	---	---	---	---	---
7.	17059	V	---	---	---	---	---	---	---	---	---	---
8.	19496	V	---	---	---	---	---	---	---	---	---	---
9.	21933	V	---	---	---	---	---	---	---	---	---	---
10.	24370	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

Operation Mode: TX / IEEE 802.11g / CH High

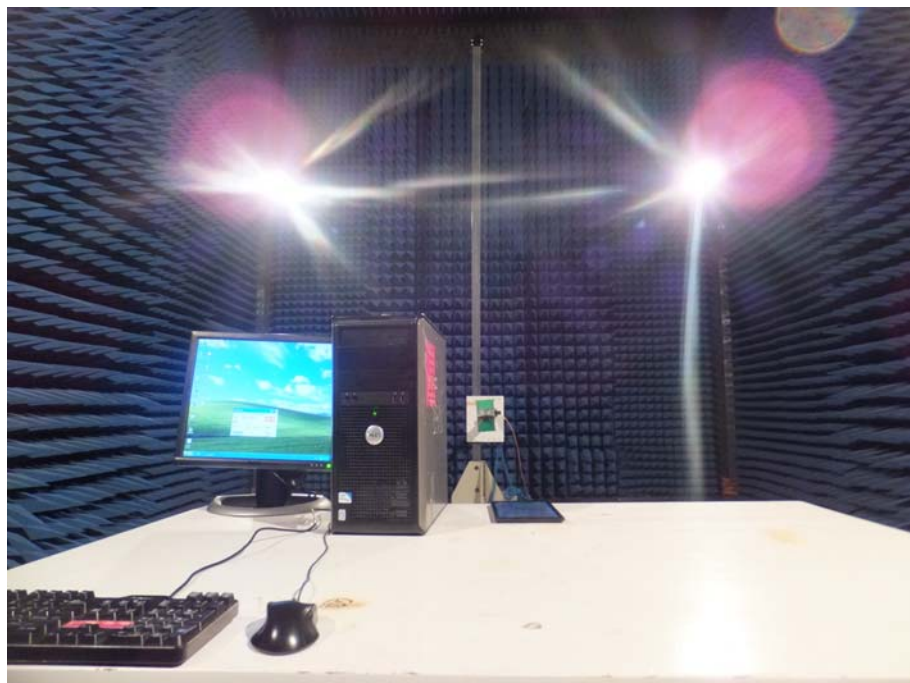
Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4924	H	46.25	35.90	4.68	34.92	51.91	---	74.00	54.00	-22.09	Peak
2.	4924	H	36.21	35.90	4.68	34.92	---	41.87	74.00	54.00	-12.13	AVG
3.	7386	H	41.79	37.88	5.65	35.28	50.04	---	74.00	54.00	-23.96	Peak
4.	9848	H	42.08	39.61	6.38	35.70	52.37	---	74.00	---	-21.63	Peak
5.	12310	H	---	---	---	---	---	---	---	---	---	---
6.	14772	H	---	---	---	---	---	---	---	---	---	---
7.	17234	H	---	---	---	---	---	---	---	---	---	---
8.	19696	H	---	---	---	---	---	---	---	---	---	---
9.	22158	H	---	---	---	---	---	---	---	---	---	---
10.	24620	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4924	V	48.01	35.23	4.68	34.92	53.00	---	74.00	54.00	-21.00	Peak
2.	4924	V	40.25	35.23	4.68	34.92	---	45.24	74.00	54.00	-8.76	AVG
3.	7386	V	42.19	36.96	5.65	35.28	49.52	---	74.00	54.00	-24.48	Peak
4.	9848	V	42.33	38.81	6.38	35.70	51.82	---	74.00	---	-22.18	Peak
5.	12310	V	---	---	---	---	---	---	---	---	---	---
6.	14772	V	---	---	---	---	---	---	---	---	---	---
7.	17234	V	---	---	---	---	---	---	---	---	---	---
8.	19696	V	---	---	---	---	---	---	---	---	---	---
9.	22158	V	---	---	---	---	---	---	---	---	---	---
10.	24620	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

5. PHOTOGRAPH

5.1 Photo of Conducted Emission Measurement



5.2 Photo of Radiation Emission Test



Appendix I (External Photos)

Figure 1
The EUT-Front View



Figure 2
The EUT-Back View



Figure 3
The EUT-Port View



Appendix II (Internal Photos)

Figure 4
The EUT-Inside View



Figure 5
PCB of the EUT View

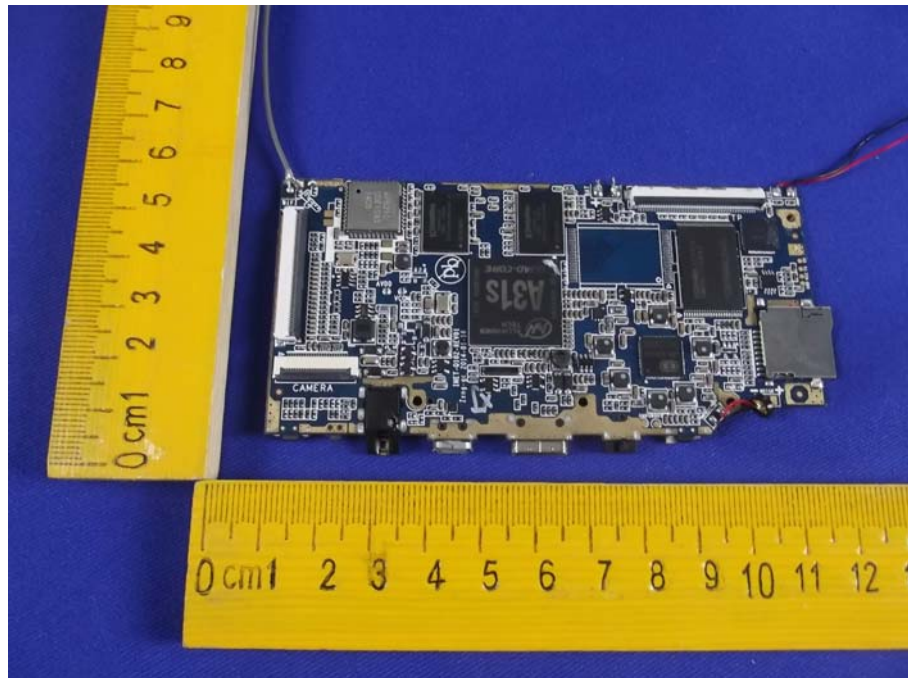


Figure 6
PCB of the EUT View

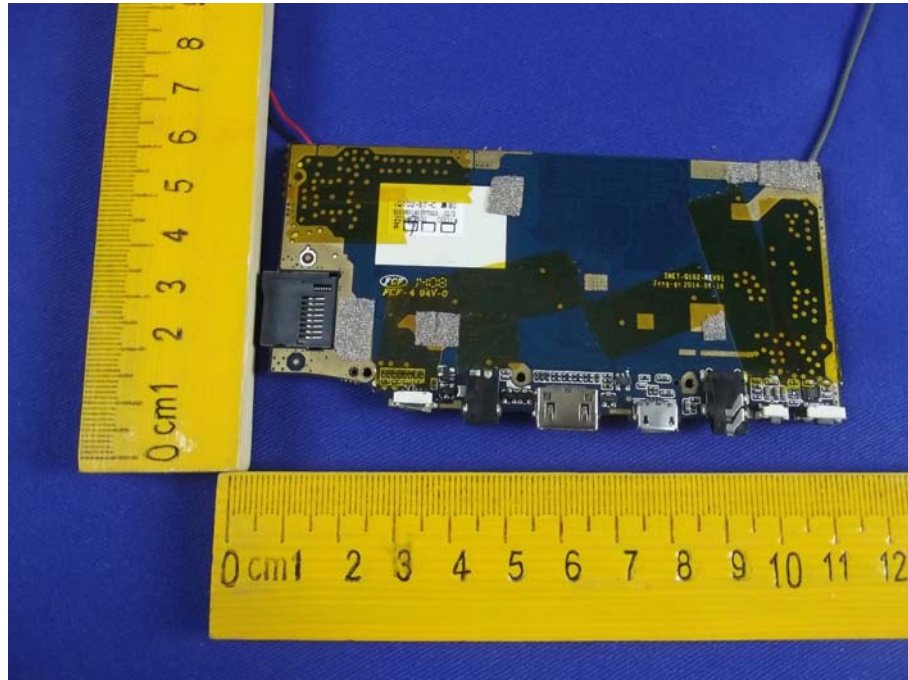


Figure 7
PCB of the Module View

