FCC ID TEST REPORT

for

M-Freedom

Model: WS-301

FCC ID: 2ABH6-GGMMWS-301

Prepared for: Shenzhen GGMM Industrial Company Limited
Room110, F518 Idea Land, Baoyuan Road, Baoan District, Shenzhen

Prepared by: Shenzhen TCT Testing Technology Co.,Ltd
1F, Building 1, Yibaolai Industrial Park, Qiaotou Village, Fuyong Town, Baoan District, Shenzhen, Guangdong, China

TEL: +86-0755-27673339
FAX: +86-0755-27673332

Report Number：TCT140428012F2-1
Date of Test： May. 01-May.14, 2014
Date of Report： May. 15, 2014

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1.0 General Details

1.1 Test Lab Details

Name :	Shenzhen Tongce Testing Lab
Address:	1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China
Telephone:	13410377511
Fax:	--

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

FCC Registration Number: 572331

Shenzhen TCT Testing Technology Co., Ltd., Shenzhen EMC Laboratory: Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

Registration Number: 572331

Industry Canada (IC)

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

Registration Number IC: 10668A-1

1.2 Applicant Details

Applicant:	Shenzhen GGMM Industrial Company Limited
Address:	Room110, F518 Idea Land, Baoyuan Road, Baoan District, Shenzhen
Telephone:	86-0755-27953188
Fax:	86-0755-27953322

Manufacturer:	Shenzhen GGMM Industrial Company Limited
Address:	Building No5, Yongxin Street, Shiyan, Baoan District, Shenzhen
Telephone:	86-0755-27953188
Fax:	86-0755-27953322

1.3 Description of EUT

Product:	M-Freedom
Model No.:	WS-301
Additional Model No.:	N.A.
Brand Name:	GGMM
Operation Frequency:	IEEE 802.11b: 2412-2462 MHz IEEE 802.11g: 2412-2462 MHz IEEE 802.11n: 2412-2462 MHz(HT 20), 2422-2452 MHz(HT 40)
Channel number:	IEEE 802.11b/g: 11, IEEE 802.11n: 11(HT 20), 7(HT 40)
Channel spacing:	5 MHz
Modulation Type:	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM
Antenna Designation:	There are 2 PCB antennas in this device but only one antenna is for transmitting and receiving. The other one is only for receiving.
Power supply:	Input: 100-240V ~50-60Hz 1.5A Output: 18V-2000mA

1.4 Statement

N.A.

1.5 Test Engineer

The sample tested by 

Printed name: Jack Kang

2.0 Test equipments and Associated Equipment used during the test.

2.1 Test Equipments

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	July 7, 2013	July 6, 2014
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	July 8, 2013	July 7, 2014
System Controller	CT	SC100	-	July 8, 2013	July 7, 2014
Spectrum Analyzer	ROHDE&SCHWARZ	FSU	1166.1660.03	July 7, 2013	July 6, 2014
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014
Pre-amplifier	Teseq	LAN6900	--	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8447D	83153007374	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8449B	3008A01738	July 8, 2013	July 7, 2014
Loop antenna	A.R.A.	PLA-1030/ B	1029	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3117	--	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3160	--	July 8, 2013	July 7, 2014
EMI Test Receiver	R&S	ESCS30	100139	July 7, 2013	July 6, 2014
LISN	AFJ	LS16C	16010222119	July 7, 2013	July 6, 2014

2.2 AE used during the test

Equipment type	Manufacturer	Model

3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:		
Test Item	CFR 47 Section	Result
AC Power Line Conducted Emission	15.207(a)	Complies
Maximum Peak Output Power	15.247(b)(3)	Complies
6 dB bandwidth	15.247 (a)(2)	Complies
Maximum Power Density	15.247(e)	Complies
Band age Measurement	15.247 (d), 15.205 (a), 15.209 (a)	Complies
Radiated Emission	15.209	Complies
Antenna Requirement	15.203,15.247(c)	Complies
RF Exposure	15.247(b), 1.1307(b)	Complies

Note: N/A=Not Applicable

3.2 Test Standards

FCC Part 15:2013 Subpart C, Paragraph 15.247

KDB 558074 D01 DTS Meas Guidance v03r01

4.0 EUT Modification

No modification by Shenzhen TCT Testing Technology Co., Ltd.

5.0 Measurement Uncertainty（95% confidence levels, k=2)

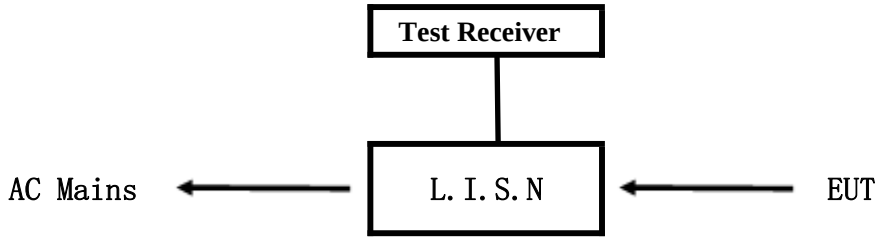
No.	Item	MU
1.	Radio Frequency	±1×10^{-9}
2.	Temperature	±0.1℃
3.	Humidity	±1.0%
4.	RF power, conducted	±0.34dB
5.	RF power density, conducted	±1.45dB
6.	Spurious emissions, conducted	±3.70dB
7.	All emissions, radiated	±4.50dB

Note: 1) For IEEE 802.11b/g/n (HT 20): Low channel: 2412MHz, Middle channel: 2437MHz, High channel: 2462MHz

For IEEE 802.11n (HT 40): Low channel: 2422MHz, Middle channel: 2437MHz, High channel: 2452MHz

6.0 Power Line Conducted Emission Test

6.1 Schematics of the test



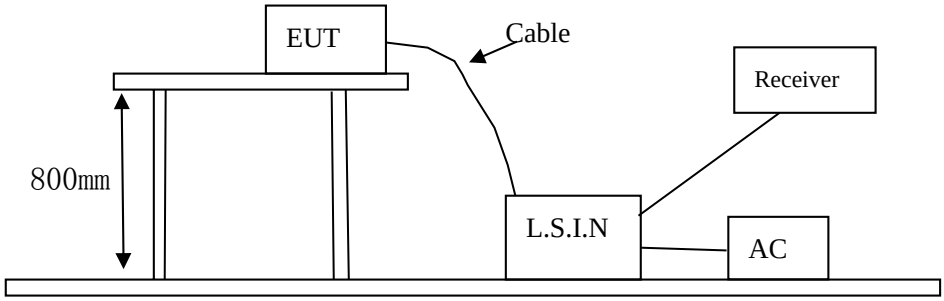
EUT: Equipment Under Test

6.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009.The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



6.3 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009

A Setup the EUT and simulators as shown on the following

B Enable AF signal and confirm EUT active to normal condition

6.4 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
EMI Test Receiver	R&S	ESCS30	100139	July 7, 2013	July 6, 2014
LISN	AFJ	LS16C	16010222119	July 7, 2013	July 6, 2014

6.5 Conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

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

6.6 Test specification:

Environmental conditions: Temperature: 23° C Humidity: 51% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

The test was carried out in the following operation mode(s):

- Tx mode

6.7 Test result

Min. limit margin >10 dB from 0.15MHz to 30MHz

The requirements are FULFILLED

Remarks: 1) According to FCC part 15.207.

A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT Description:	M-Freedom
Operation Mode:	Normal operational mode
Tested By:	Beryl Zhao
Test date:	May. 08, 2014

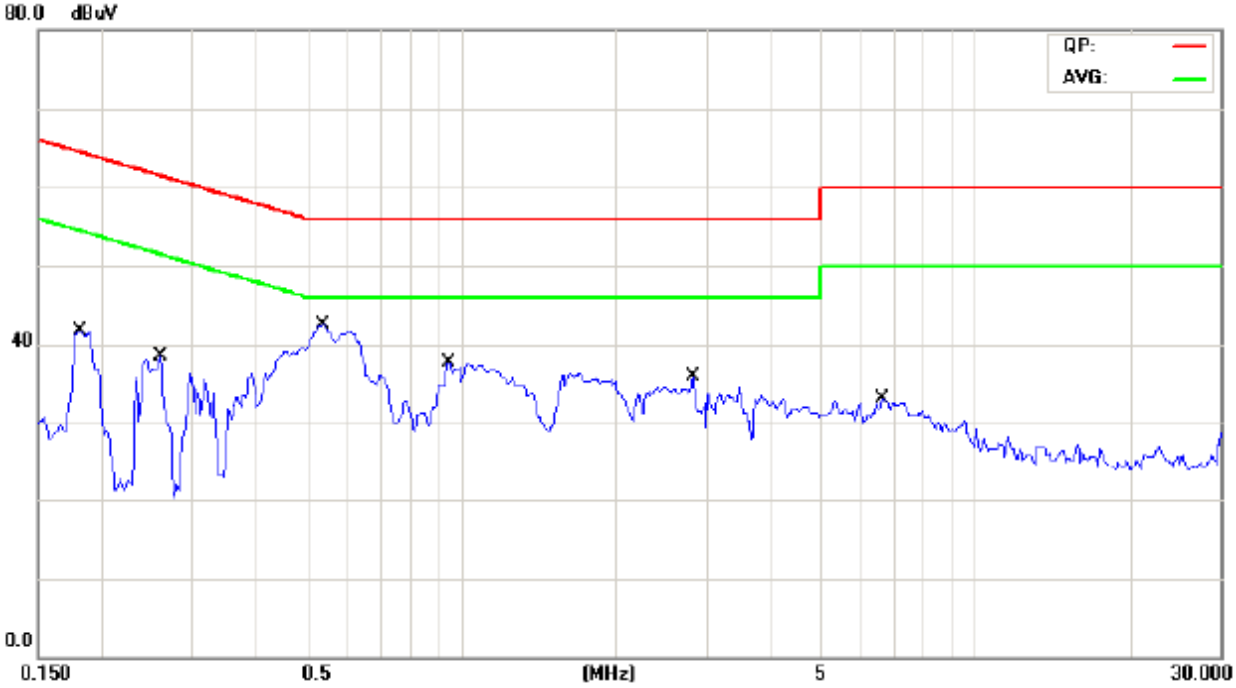
Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.1852	36.85	20.55	--	--	64.24	54.24
0.2437	34.29	21.24	--	--	61.97	51.97
0.5289	38.43	23.91	--	--	56.00	46.00
0.9469	33.95	27.61	--	--	56.00	46.00
2.8297	29.06	24.44	--	--	56.00	46.00
5.3477	29.79	24.69	--	--	60.00	50.00

B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT Description:	M-Freedom
Operation Mode:	Normal operational mode
Tested By:	Beryl Zhao
Test Date:	May. 08, 2014

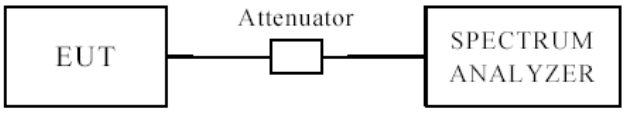
Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.1812	--	--	36.55	19.83	64.43	54.43
0.2594	--	--	33.87	19.87	61.45	51.45
0.5406	--	--	38.72	24.72	56.00	46.00
0.9431	--	--	33.19	25.75	56.00	46.00
2.8375	--	--	31.15	28.11	56.00	46.00
6.6250	--	--	30.66	25.97	60.00	50.00

7.0 Maximum Peak Output Power

7.1 Test Setup



7.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

7.3 Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r01， the transmitter output was connected to the spectrum analyzer through an attenuator. The spectrum analyzer is setting as follows: RBW=1 MHz, VBW=3 MHz, Span=encompass the DTS bandwidth, Detector=peak, Sweep time=auto couple, Trace mode= max hold. Allow trace to fully stabilize. Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges.

7.4 Test Equipment:

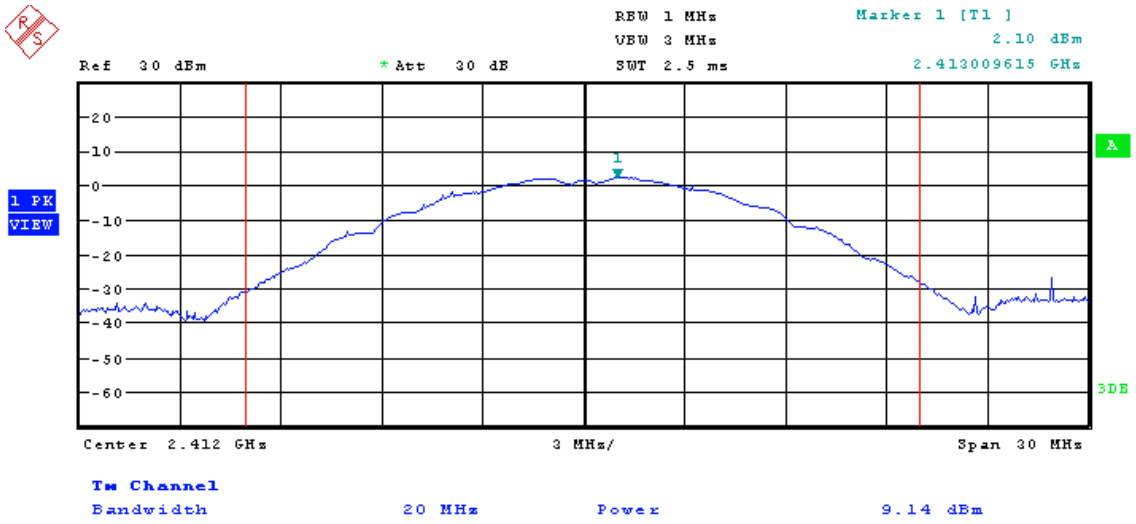
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSU	1166.1660.03	July 7, 2013	July 6, 2014

7.5 Test Result

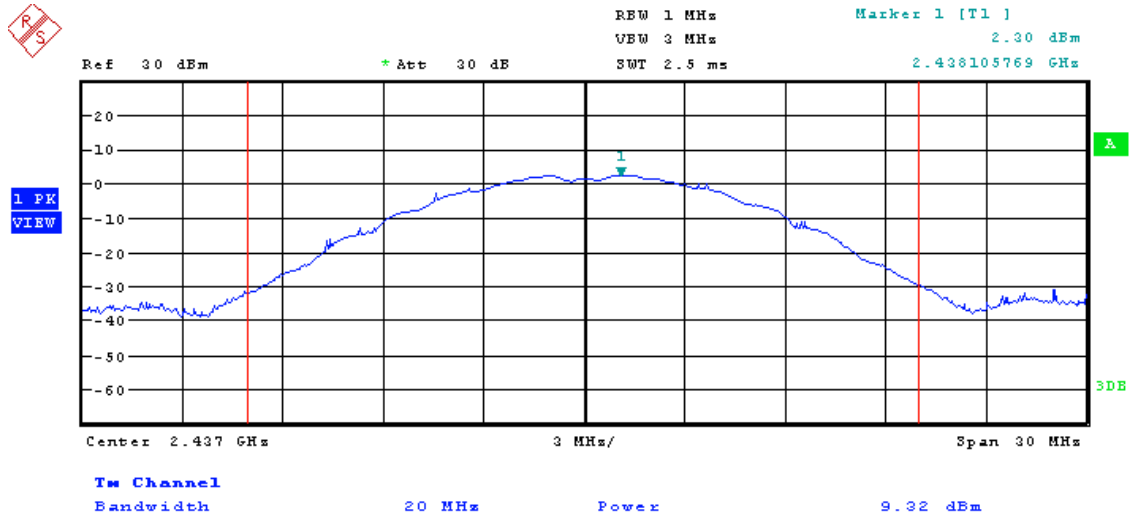
IEEE 802.11b mode			
Test channel	Peak output power (dBm)	Limit (dBm)	Result
Lowest	9.14	30	Pass
Middle	9.32	30	Pass
Highest	11.8	30	Pass
IEEE 802.11g mode			
Test channel	Peak output power (dBm)	Limit (dBm)	Result
Lowest	11.92	30	Pass
Middle	13.81	30	Pass
Highest	**16.99**	30	Pass
IEEE 802.11n (HT 20) mode			
Test channel	Peak output power (dBm)	Limit (dBm)	Result
Lowest	12.06	30	Pass
Middle	12.87	30	Pass
Highest	15.77	30	Pass
IEEE 802.11n(HT 40) mode			
Test channel	Peak output power (dBm)	Limit (dBm)	Result
Lowest	13.30	30	Pass
Middle	14.16	30	Pass
Highest	14.38	30	Pass

Test Mode: IEEE 802.11b mode

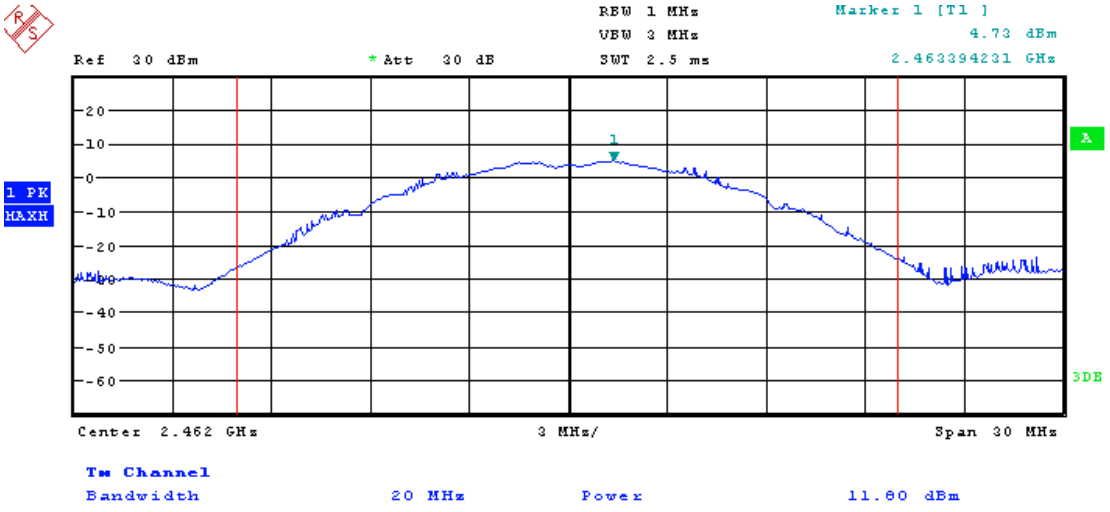
Low Channel



Middle channel

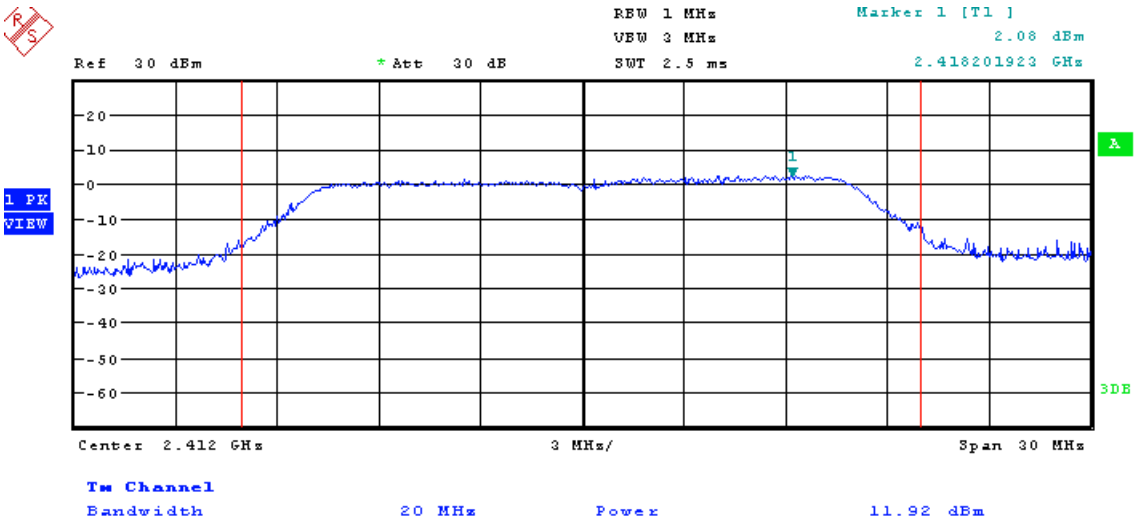


High channel

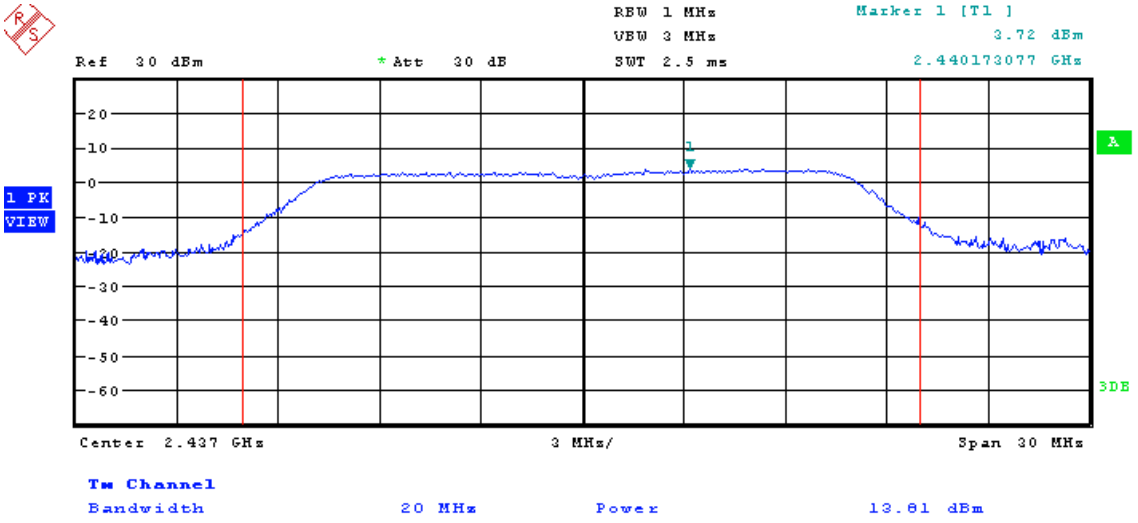


Test Mode: IEEE 802.11g mode

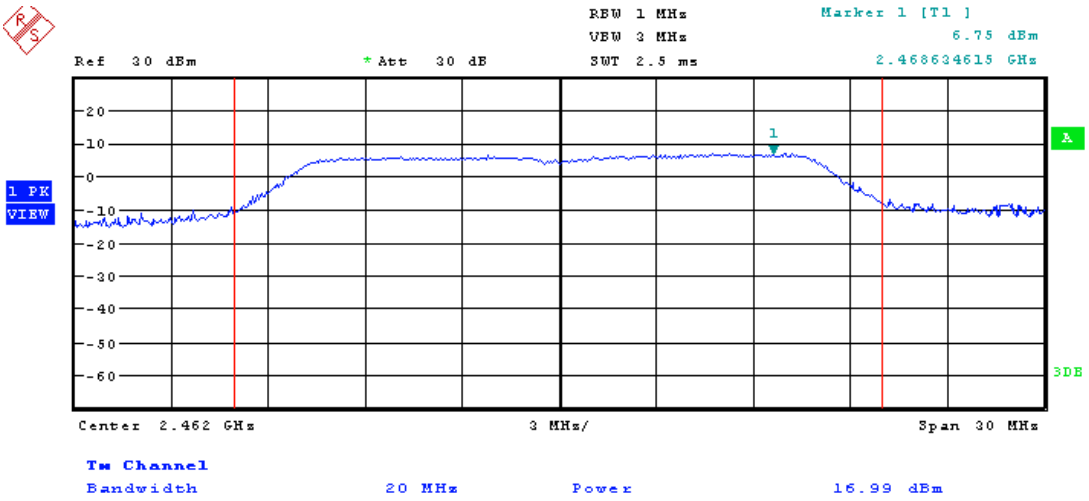
Low channel



Middle channel

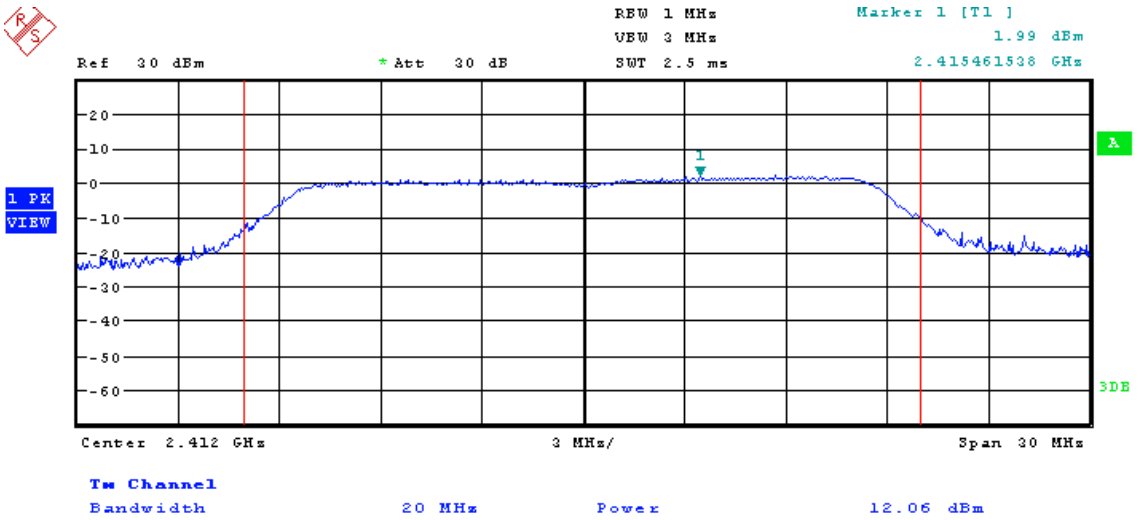


High channel

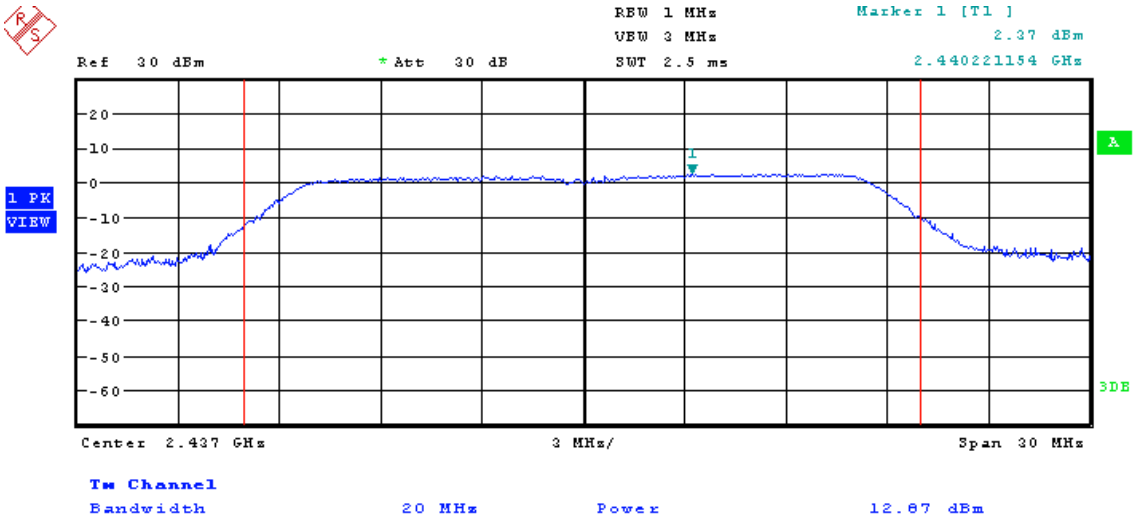


Test Mode: IEEE 802.11n (HT 20) mode

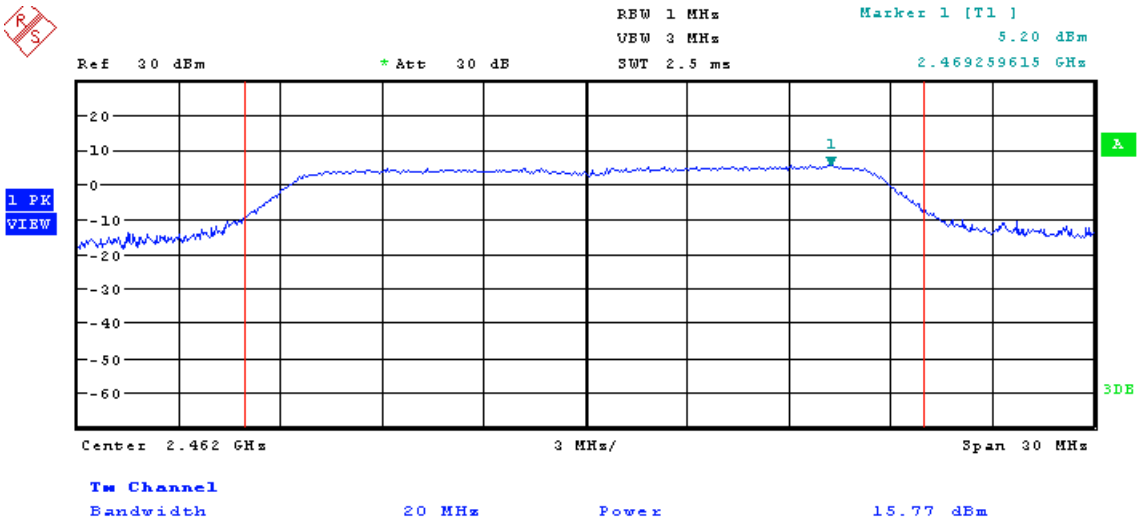
Low Channel



Middle channel

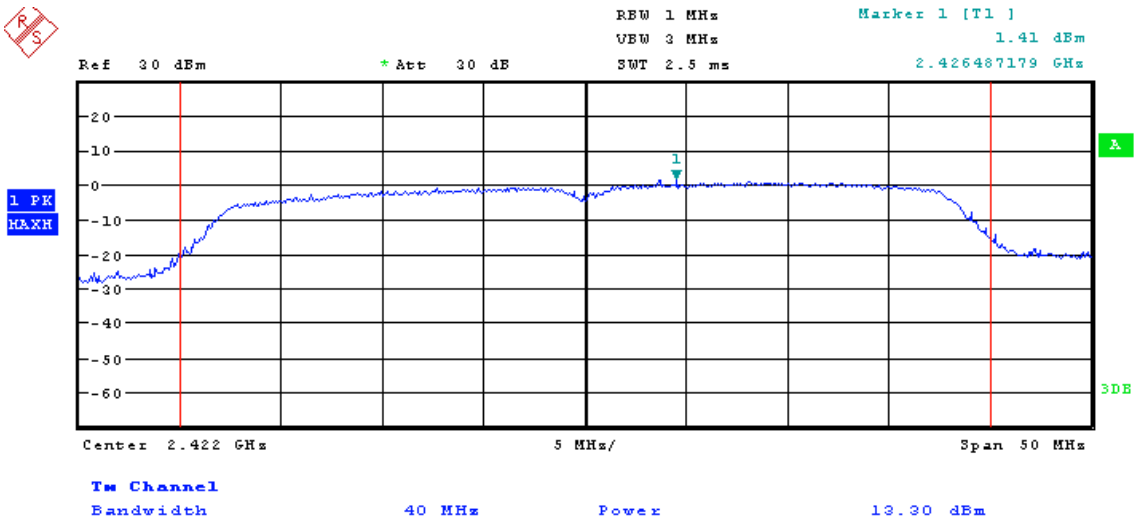


High channel

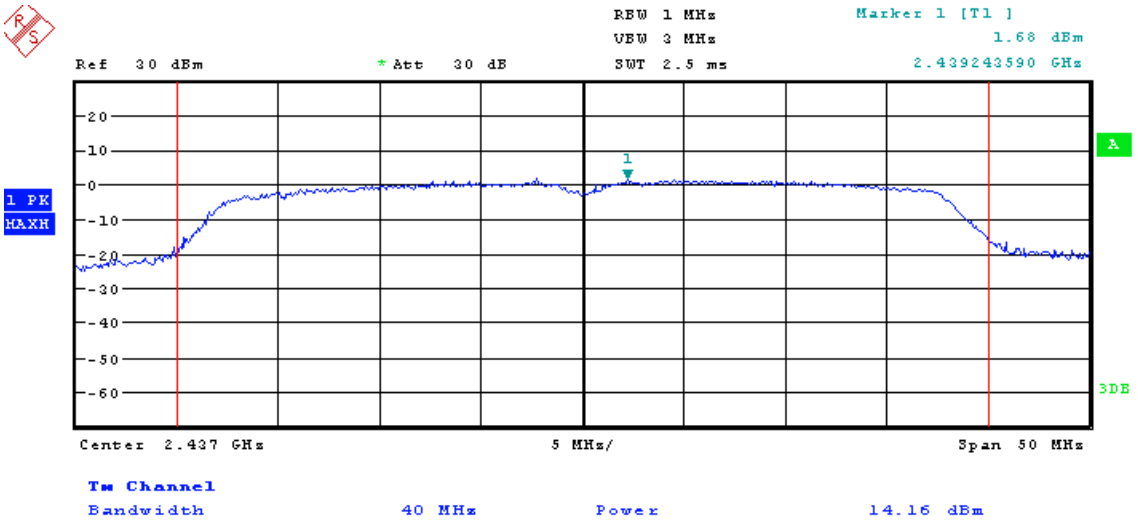


Test Mode: IEEE 802.11n (HT 40) mode

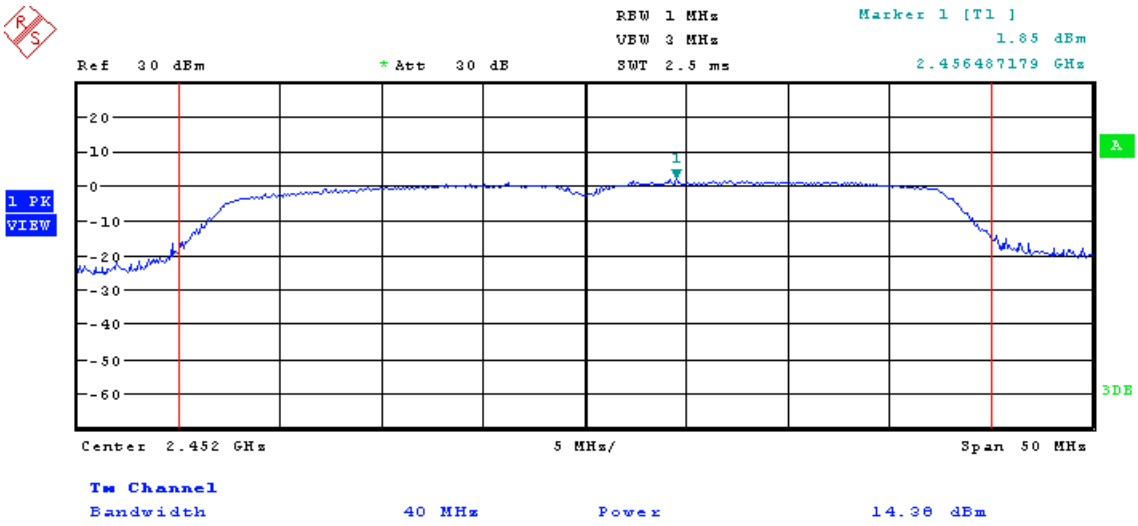
Low channel



Middle channel

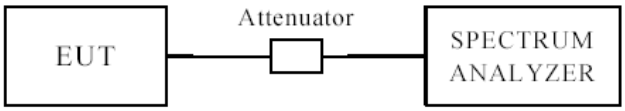


High channel



8.0 6dB Bandwidth Measurement

8.1 Test Setup



8.2 Limits of 6dB Bandwidth Measurement

The minimum of 6 dB Bandwidth is >500 kHz

8.3 Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r01， the transmitter output was connected to the spectrum analyzer through an attenuator. The spectrum analyzer is setting as follows: RBW=100 kHz, VBW=300 kHz, Detector=Peak, Trace mode=max hold, Sweep=auto couple. The 6dB bandwidth is defined as the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

8.4 Test Equipment:

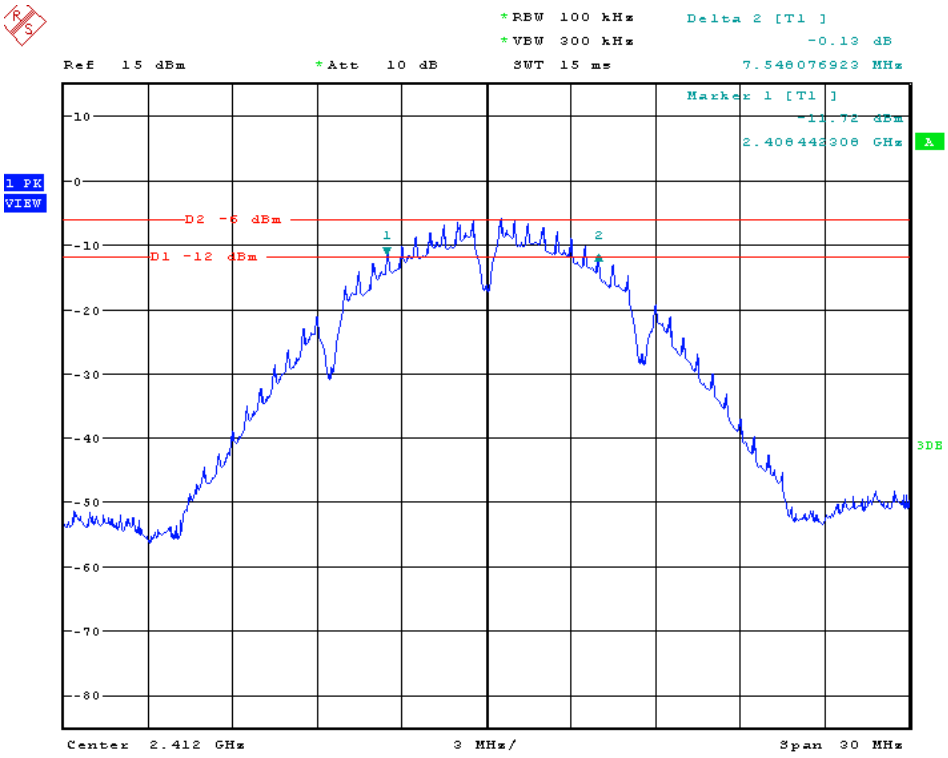
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSU	1166.1660.03	July 7, 2013	July 6, 2014

8.5 Test Result

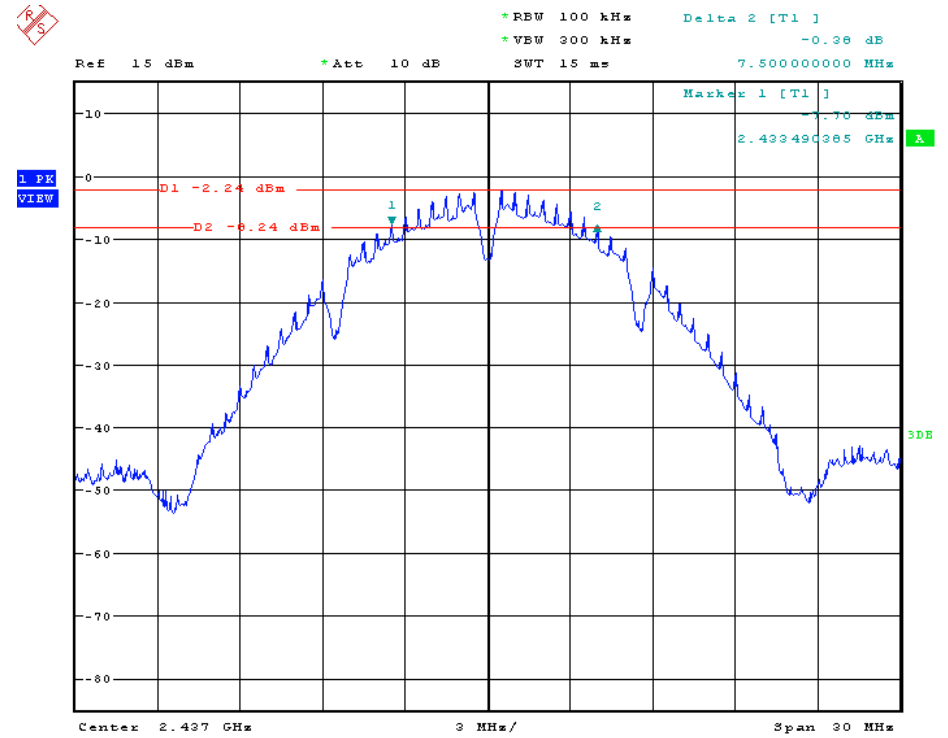
IEEE 802.11b mode			
Test channel	6 dB occupied bandwidth (MHz)	Limit (kHz)	Result
Lowest	7.55	500	Pass
Middle	7.50	500	Pass
Highest	7.98	500	Pass
IEEE 802.11g mode			
Test channel	6 dB occupied bandwidth (MHz)	Limit (kHz)	Result
Lowest	16.39	500	Pass
Middle	16.35	500	Pass
Highest	16.35	500	Pass
IEEE 802.11n(HT 20) mode			
Test channel	6 dB occupied bandwidth (MHz)	Limit (kHz)	Result
Lowest	17.60	500	Pass
Middle	17.36	500	Pass
Highest	17.55	500	Pass
IEEE 802.11n(HT 40) mode			
Test channel	6 dB occupied bandwidth (MHz)	Limit (kHz)	Result
Lowest	34.21	500	Pass
Middle	34.13	500	Pass
Highest	35.34	500	Pass

Test Mode: IEEE 802.11b mode

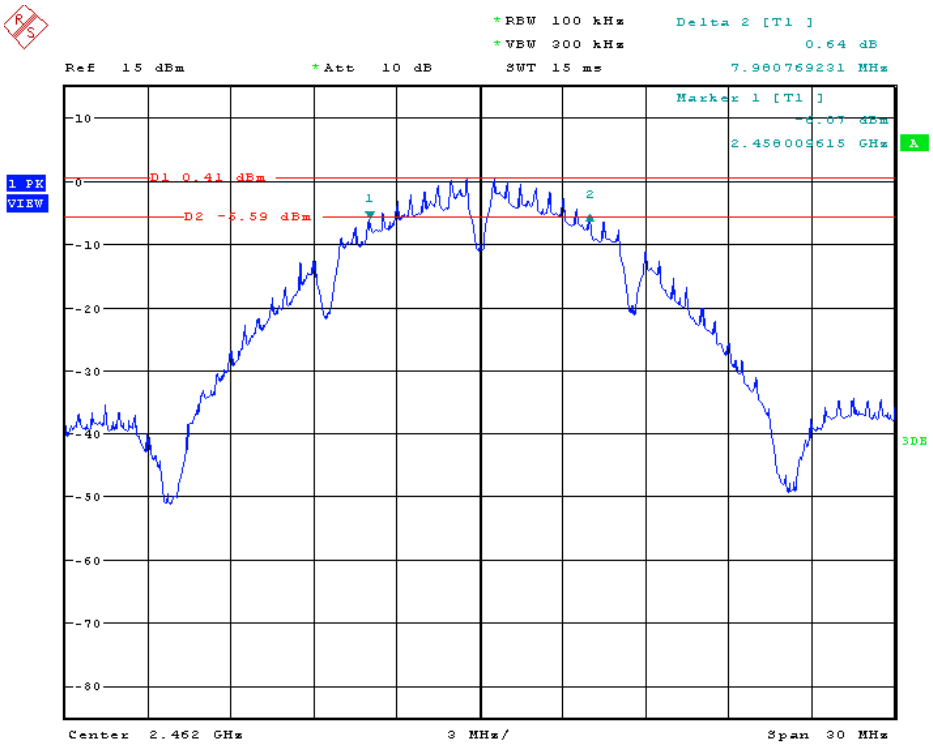
Low channel



Middle channel

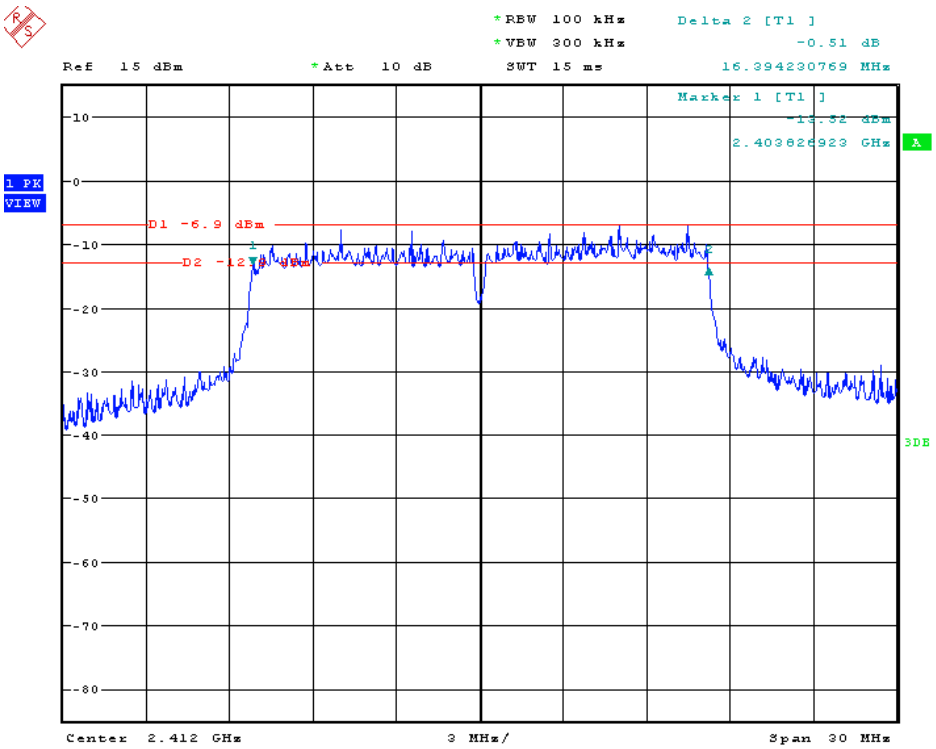


High channel

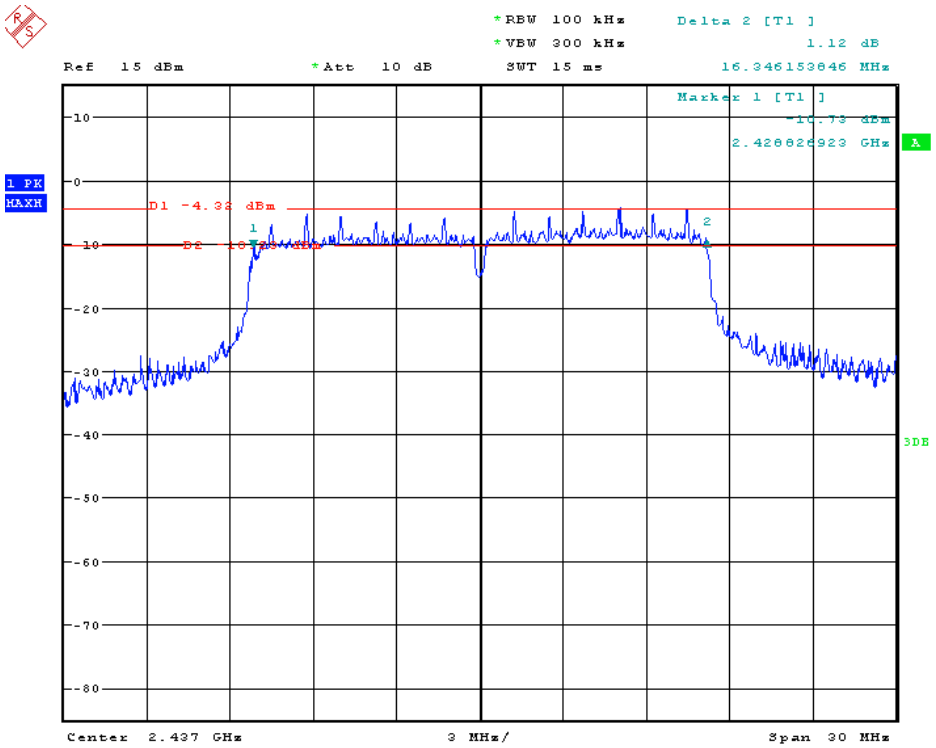


Test Mode: IEEE 802.11g mode

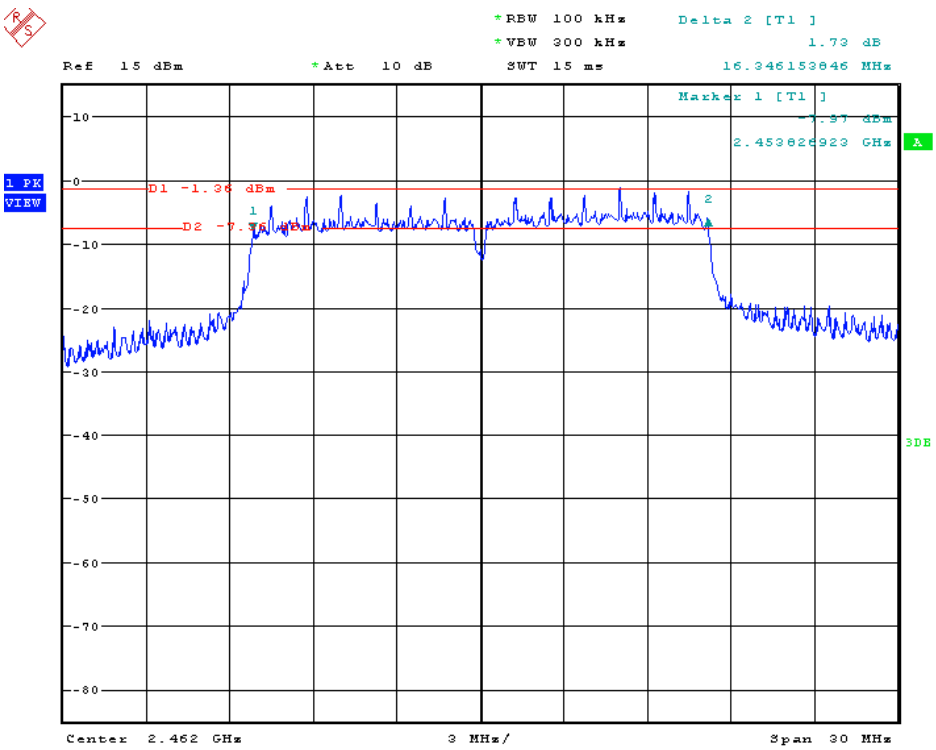
Low channel



Middle channel

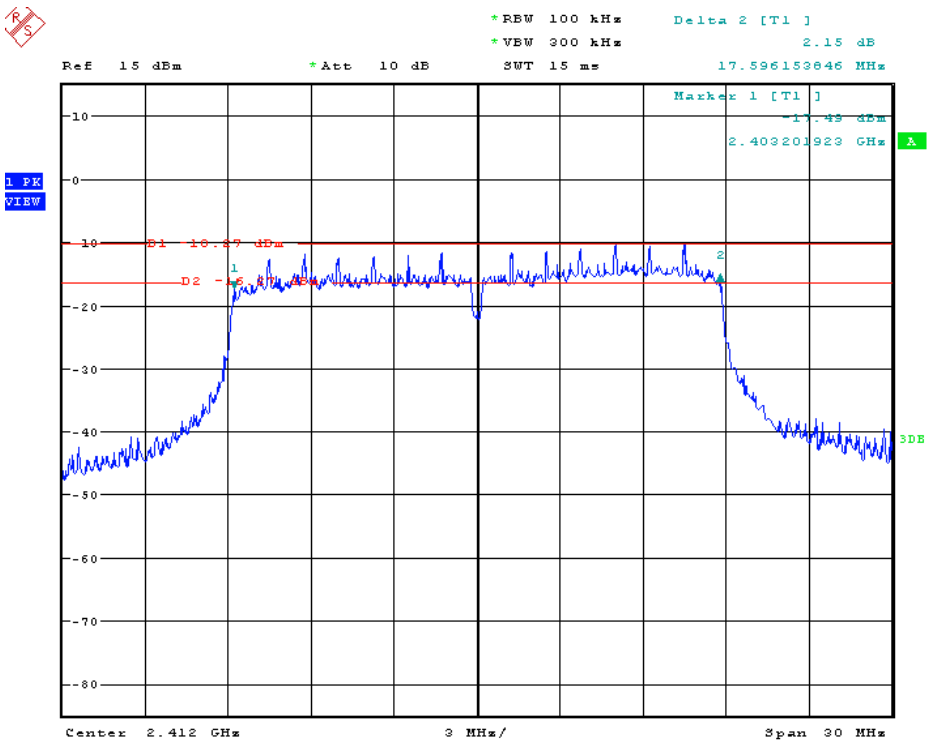


High channel

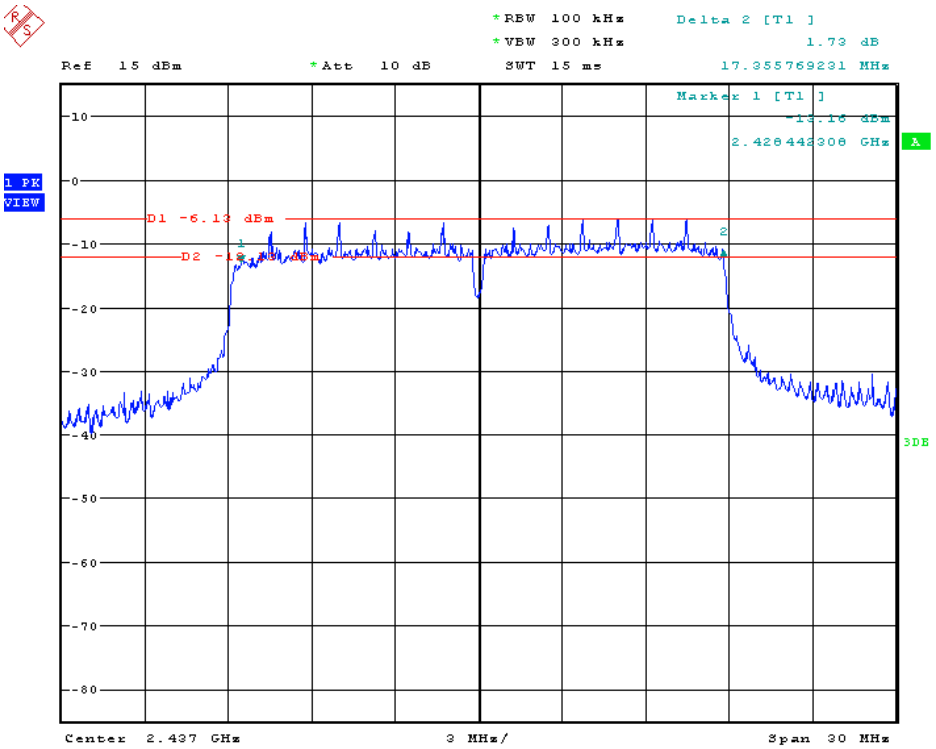


Test Mode: IEEE 802.11n (HT 20) mode

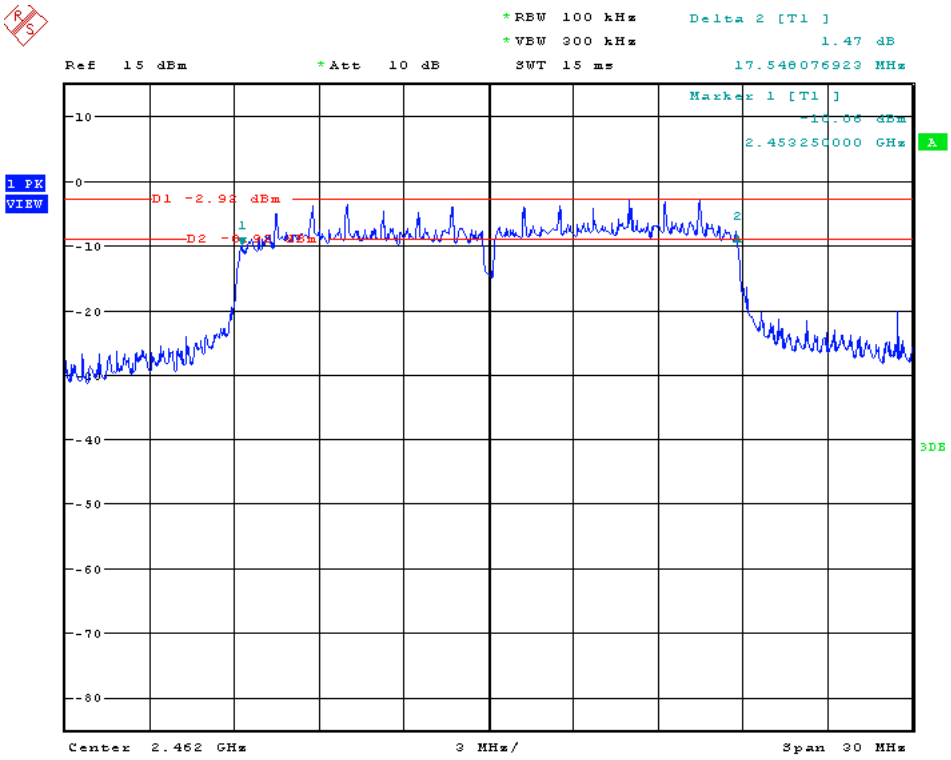
Low channel



Middle channel

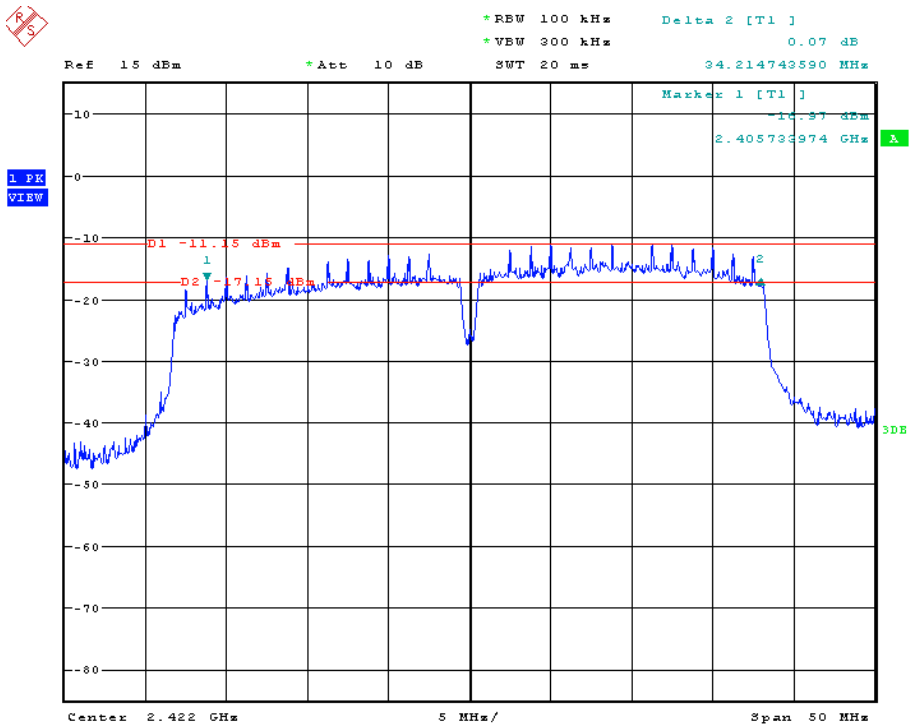


High channel

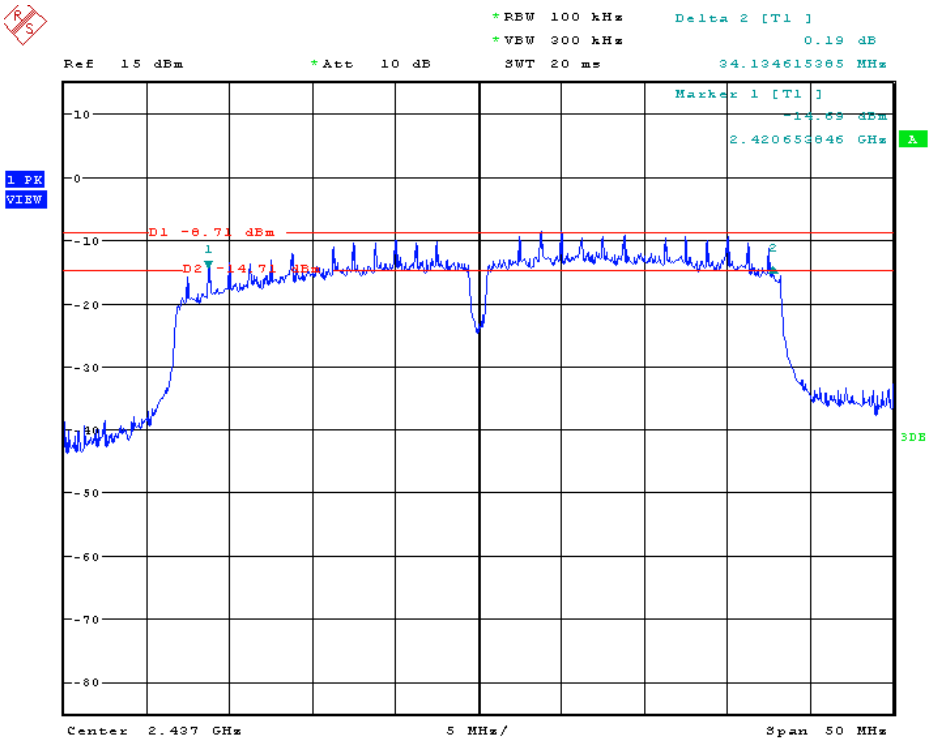


Test Mode: IEEE 802.11n(HT 40) mode

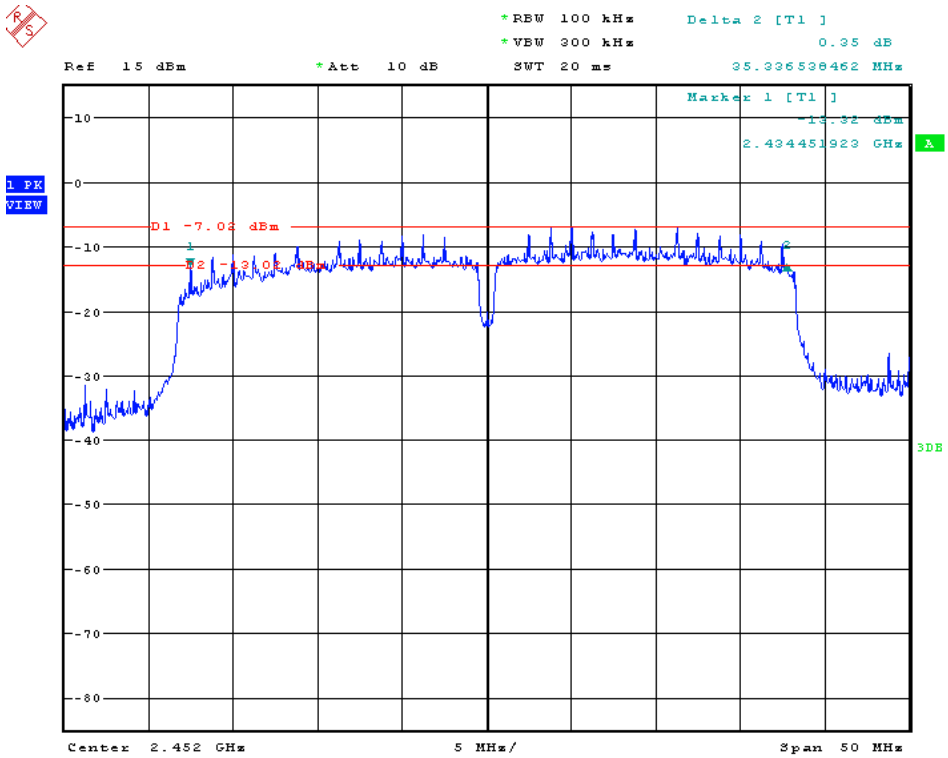
Low channel



Middle channel

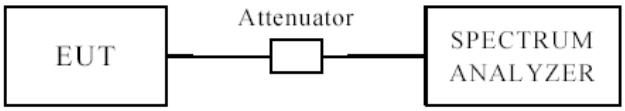


High channel



9.0 Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density is 8 dBm in any 3 kHz.

9.3 Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r01， the transmitter output was connected to the spectrum analyzer through an attenuator.

The spectrum analyzer is setting as follows:

1) Set analyzer centre frequency to DTS channel centre frequency.
2) Set the span to 1.5 times the DTS channel bandwidth.
3) Set the RBW>=3 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.
10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

9.4 Test Equipment:

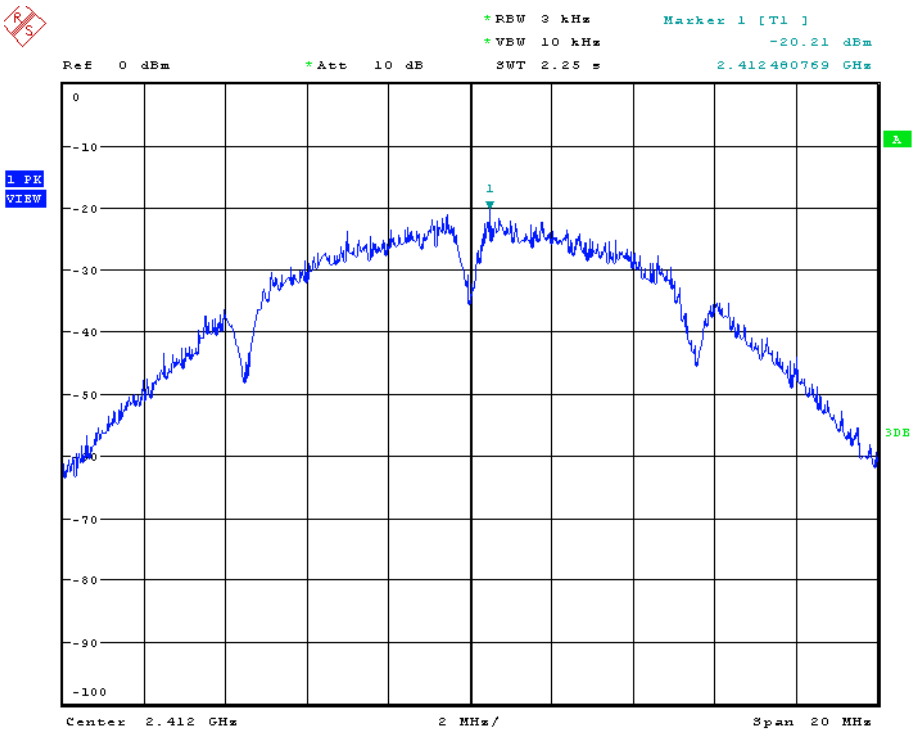
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSU	1166.1660.03	July 7, 2013	July 6, 2014

9.5 Test Result

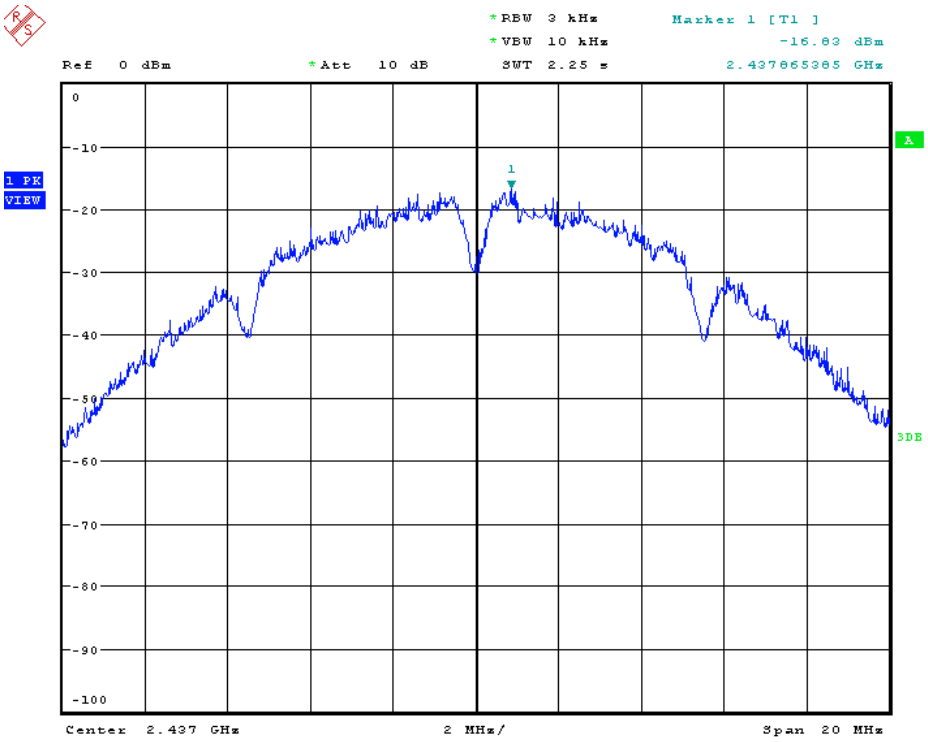
IEEE 802.11b mode			
Test channel	Peak Power Spectral Density (dBm)	Limit (dBm)	Result
Lowest	-20.21	8	Pass
Middle	-16.83	8	Pass
Highest	-14.13	8	Pass
IEEE 802.11g mode			
Test channel	Peak Power Spectral Density (dBm)	Limit (dBm)	Result
Lowest	-24.40	8	Pass
Middle	-20.09	8	Pass
Highest	-16.66	8	Pass
IEEE 802.11n(HT 20) mode			
Test channel	Peak Power Spectral Density (dBm)	Limit (dBm)	Result
Lowest	-26.09	8	Pass
Middle	-21.13	8	Pass
Highest	-18.58	8	Pass
IEEE 802.11n(HT 40) mode			
Test channel	Peak Power Spectral Density (dBm)	Limit (dBm)	Result
Lowest	-25.66	8	Pass
Middle	-24.64	8	Pass
Highest	-21.76	8	Pass

Test Mode: IEEE 802.11b mode

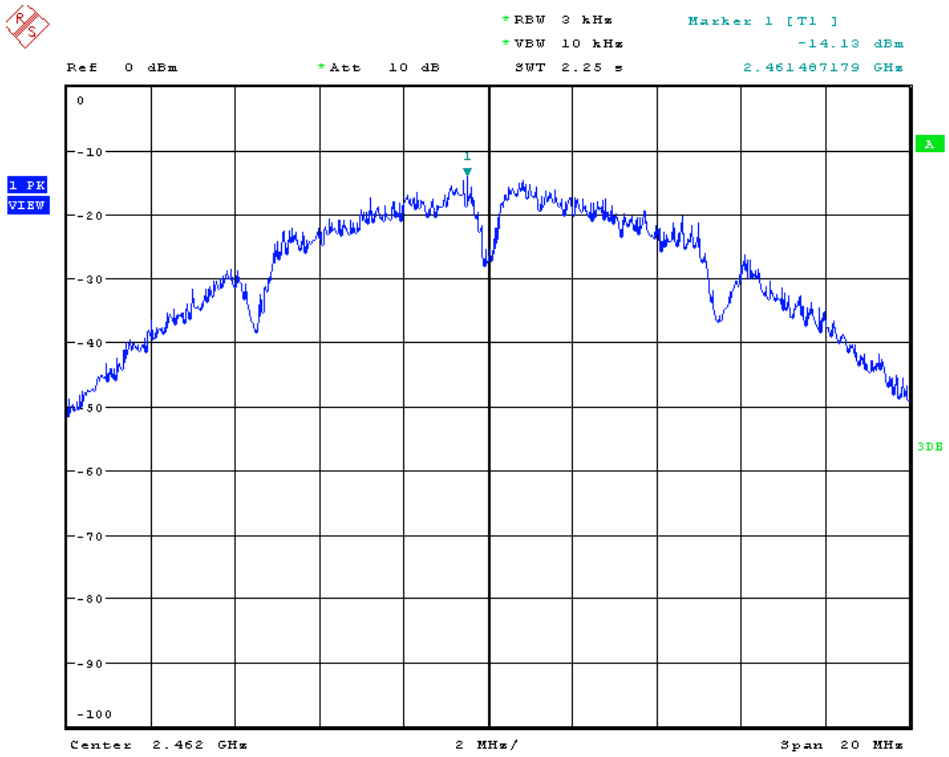
Low channel



Middle channel

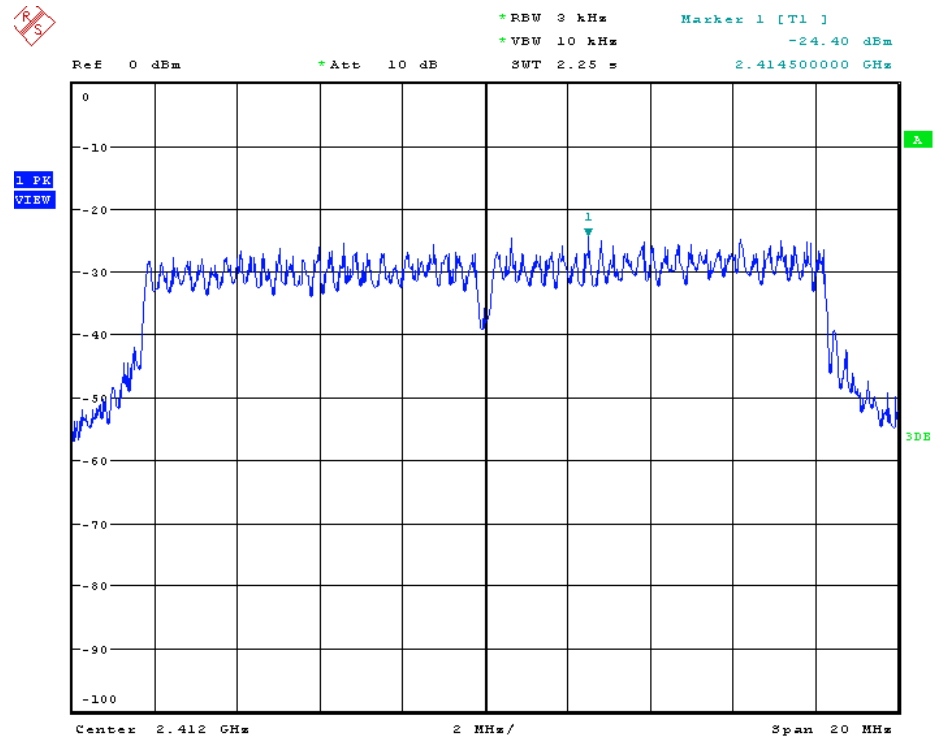


High channel

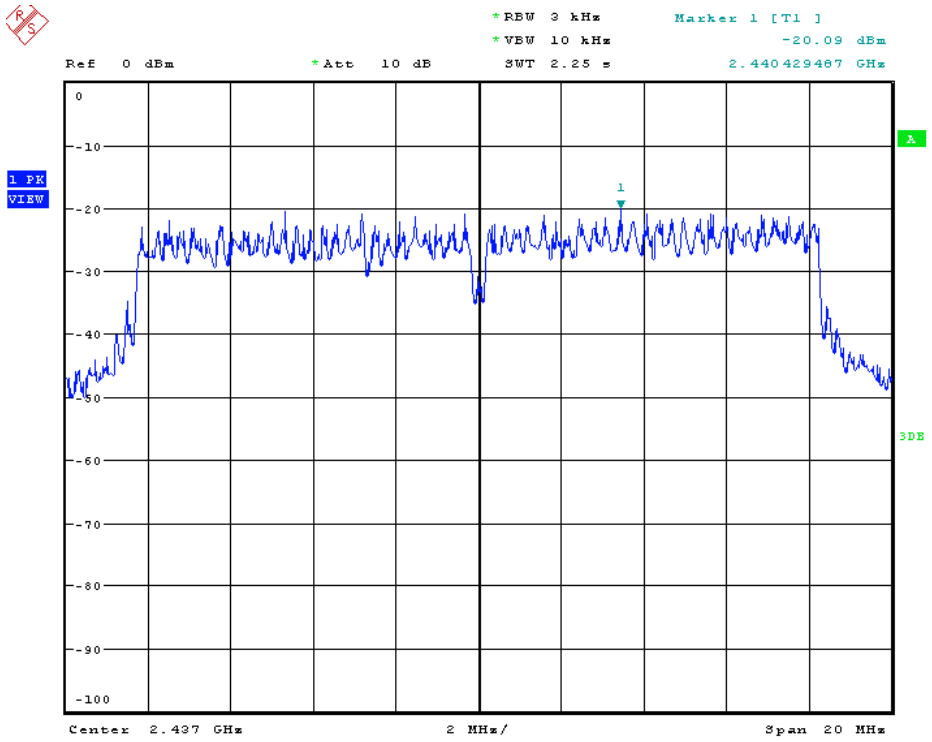


Test Mode: IEEE 802.11g mode

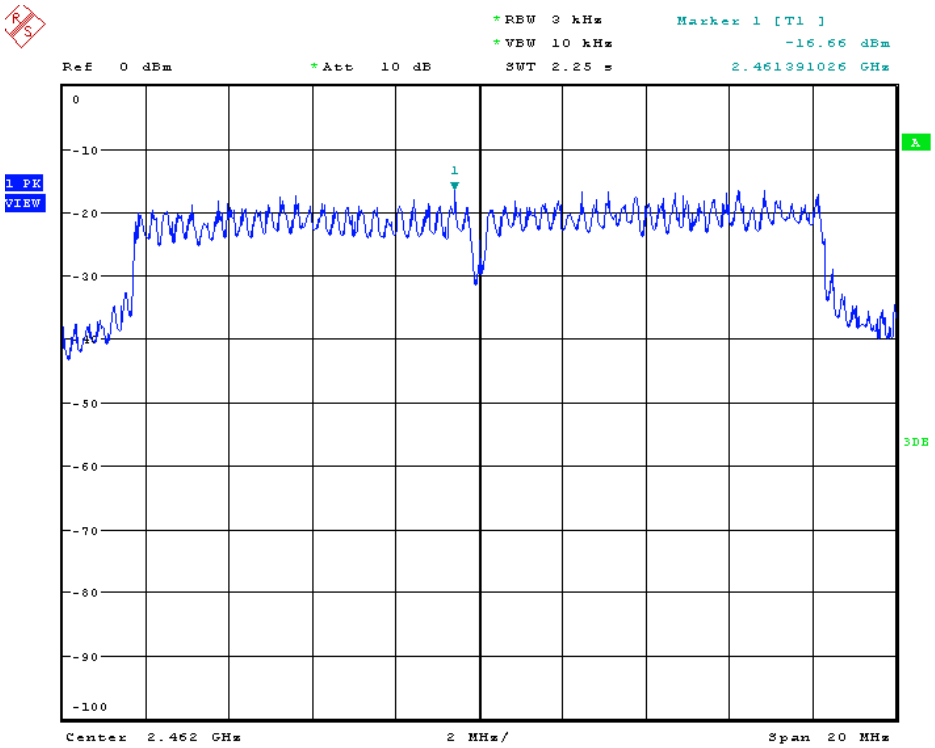
Low channel



Middle channel

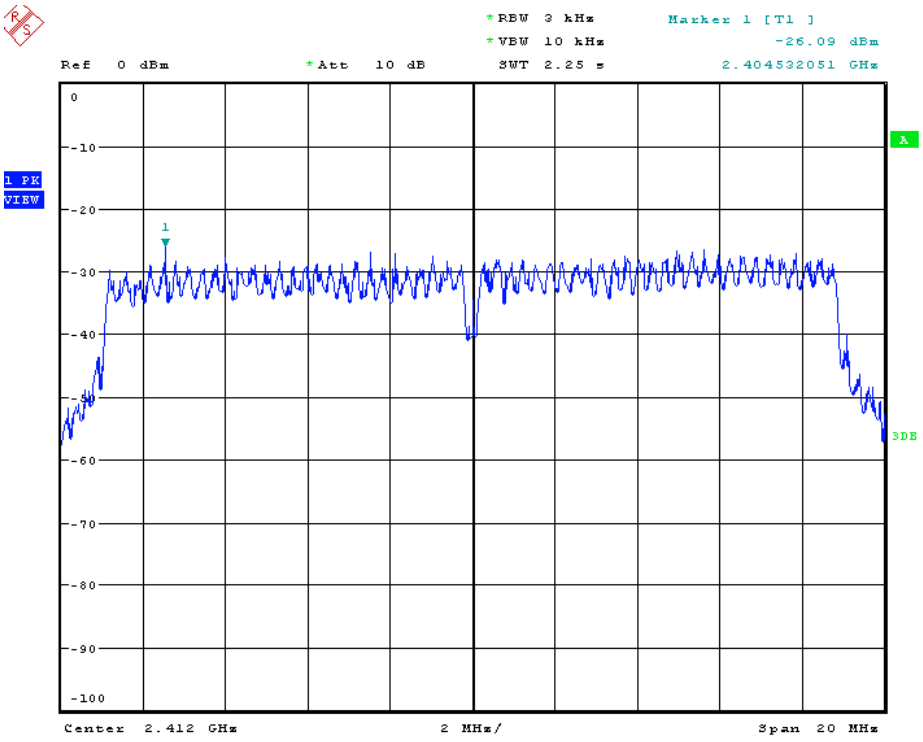


High channel

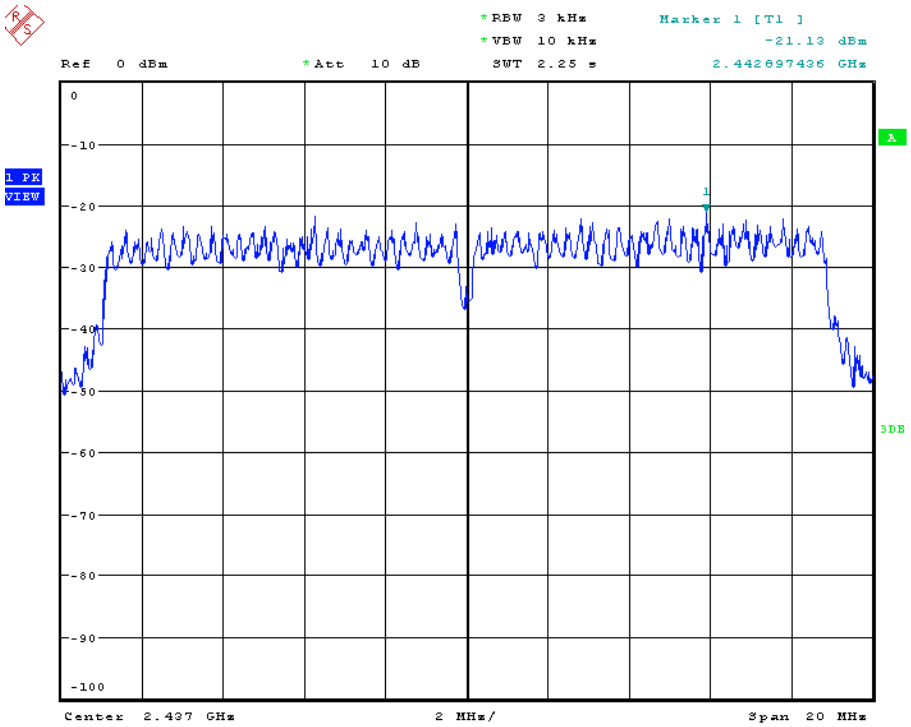


Test Mode: IEEE 802.11n (HT 20) mode

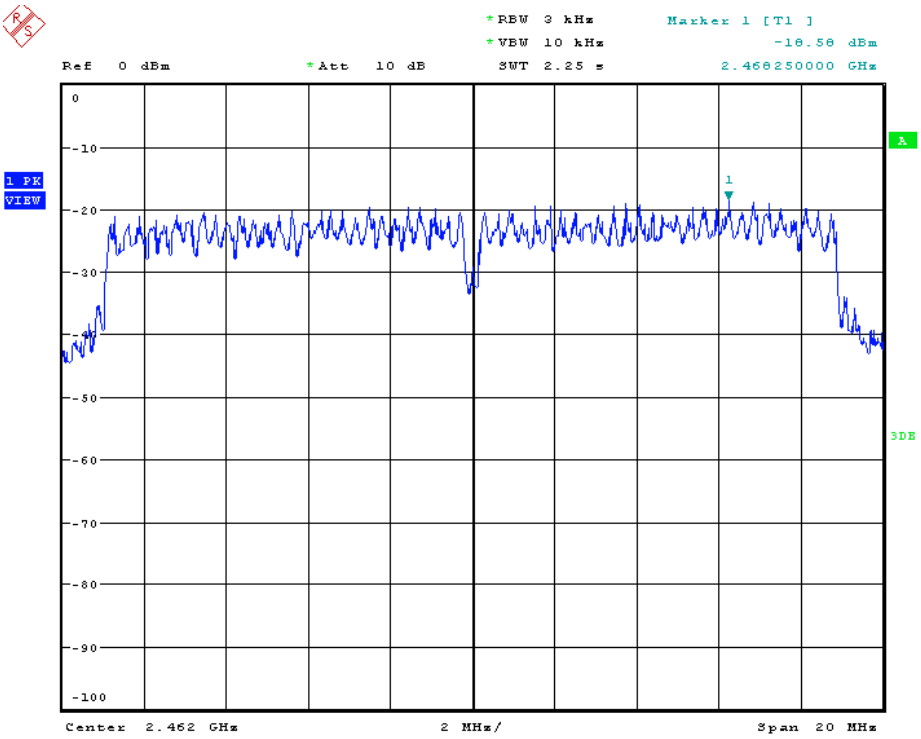
Low channel



Middle channel

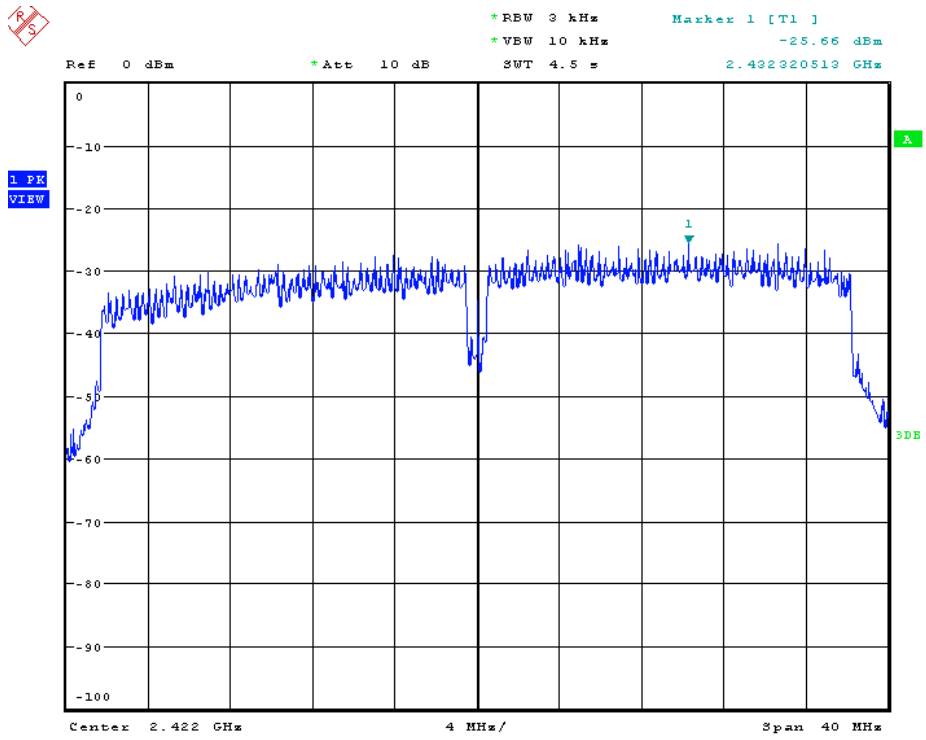


High channel

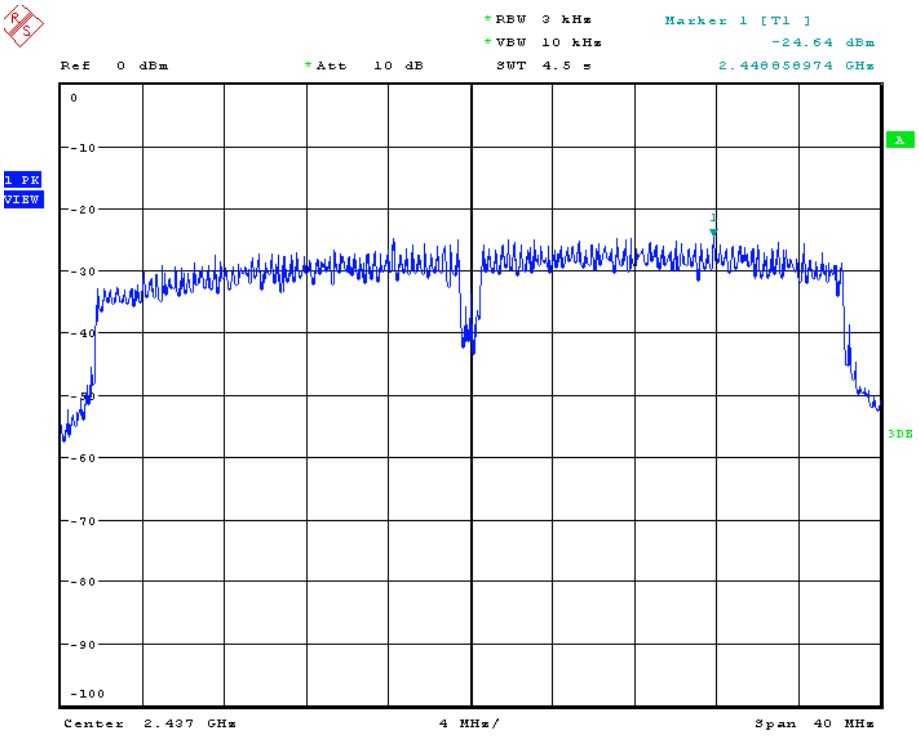


Test Mode: IEEE 802.11n(HT 40) mode

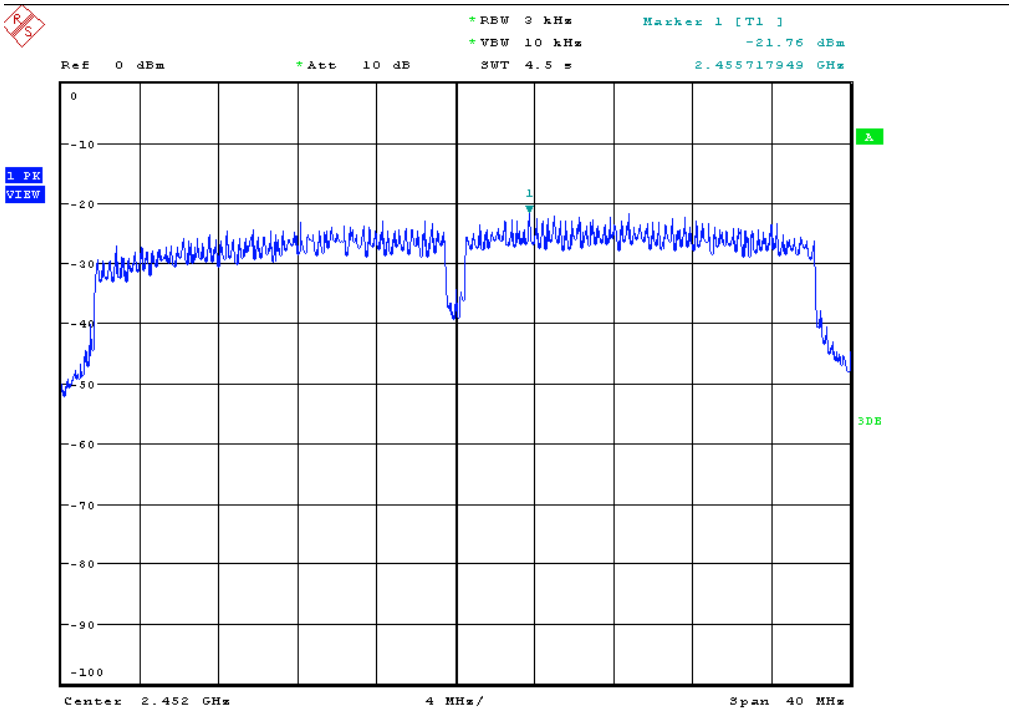
Low channel



Middle channel



High channel



10.0 Band age Measurement

10.1 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSU	1166.1660.03	July 7, 2013	July 6, 2014
Pre-amplifier	Agilent	8449B	3008A01738	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3117	--	July 8, 2013	July 7, 2014

10.2 Test specification:

Environmental conditions: Temperature 22° C Humidity: 50% Atmospheric pressure: 103kPa

10.3 Limit:

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 15.209(a)

10.4 Test Procedure

The EUT was setup according to ANSI C63.10:2009 and tested according to ANSI 63.10:2009 for compliance to FCC 47 CFR 15.247 requirements. The EUT is placed on a turn table which is 0.8 m above ground. The turn table is rotated 360 degrees to determine to the position of the maximum emission level. The EUT was positioned such That the distance from antenna to the EUT was 3 metres. The antenna is scanned from 1 metre to 4 metres to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2009 on radiated measurement.

Spectrum analyzer parameters setting as shown below:

1): Peak: RBW=1MHz, VBW=1MHz, Sweep=Auto

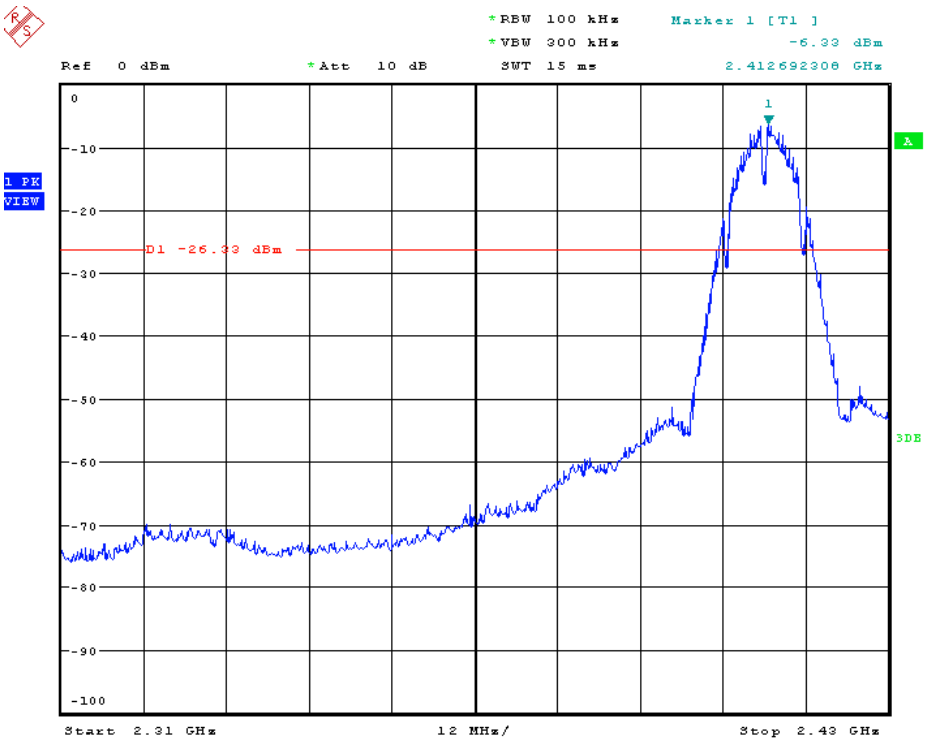
2): Average: RBW=1MHz, VBW=10Hz, Sweep=Auto

10.5 Test Result:

Test plots:

Test Mode: IEEE 802.11b mode

Low channel

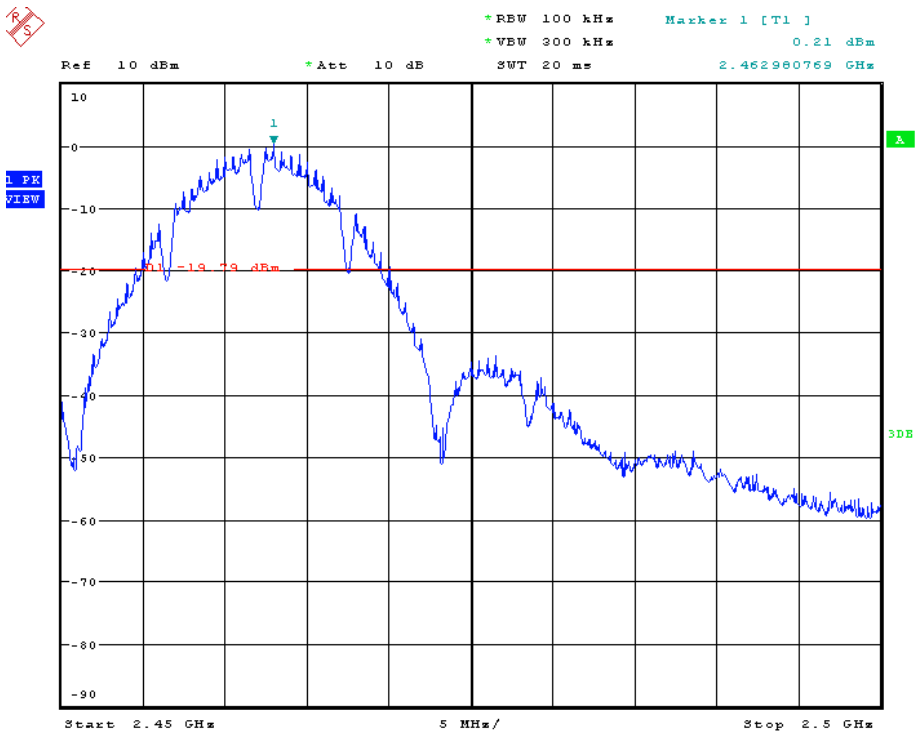


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 44.12 dBuV/m@3m at 2385.7MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

High channel



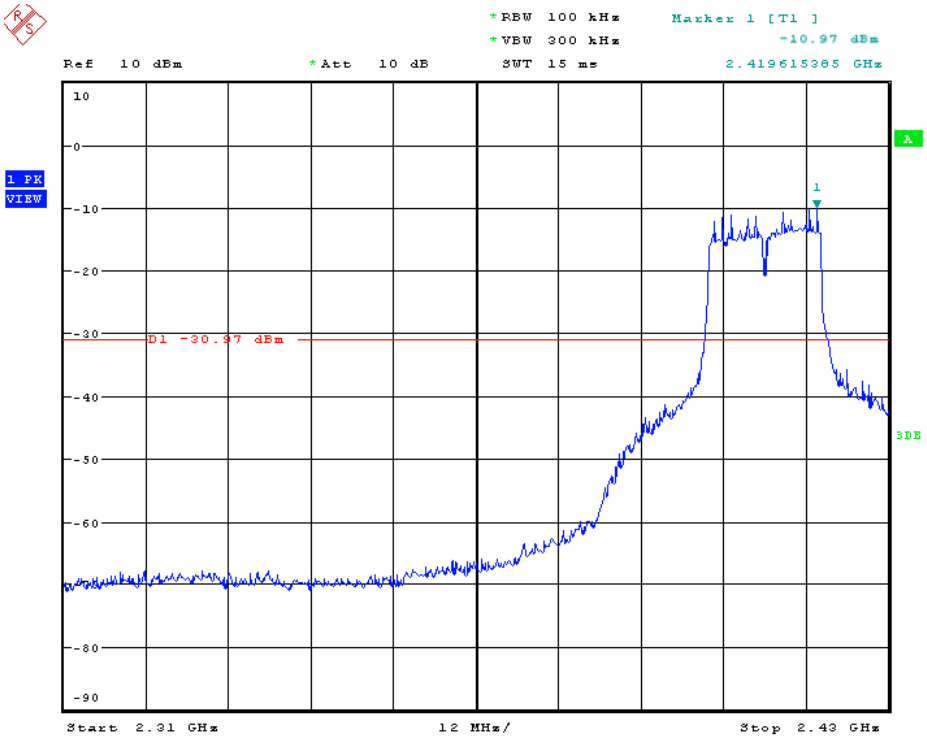
Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 44.36 dBuV/m@3m at 2488.4MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

Test Mode: IEEE 802.11g mode

Low channel

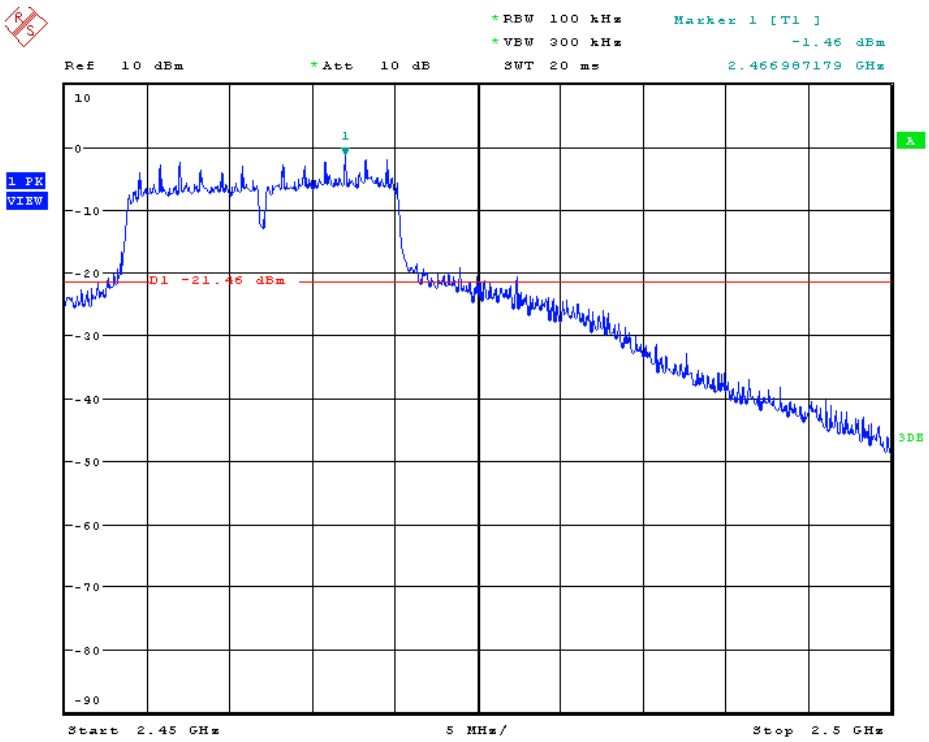


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 44.18 dBuV/m@3m at 2388.8MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

High channel



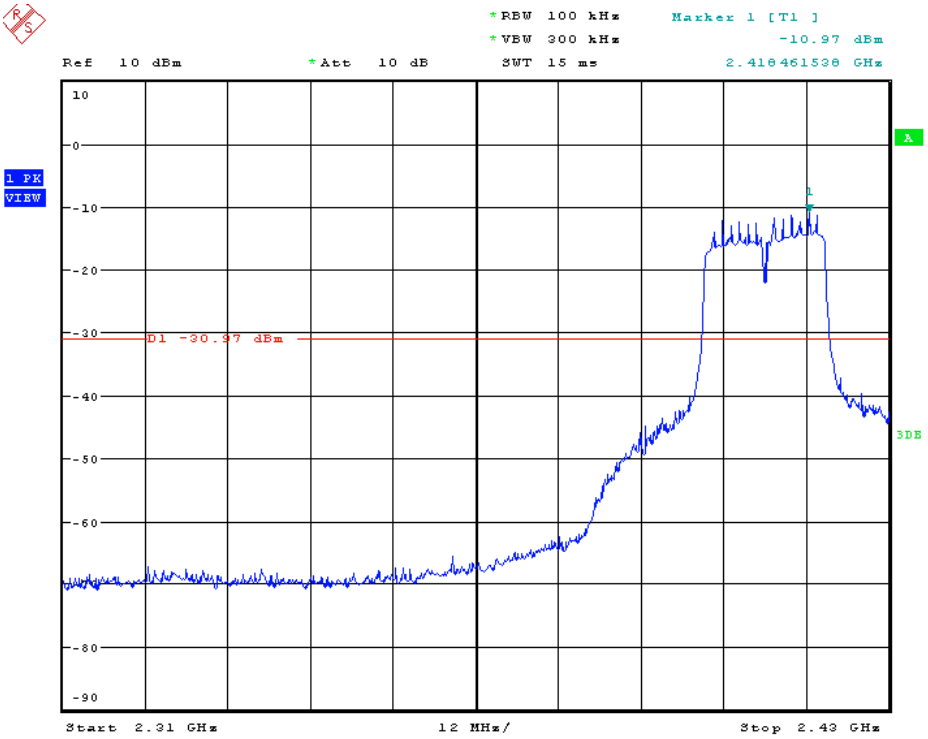
Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 47.36 dBuV/m@3m at 2485.8MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

Test Mode: IEEE 802.11n (HT 20) mode

Low channel

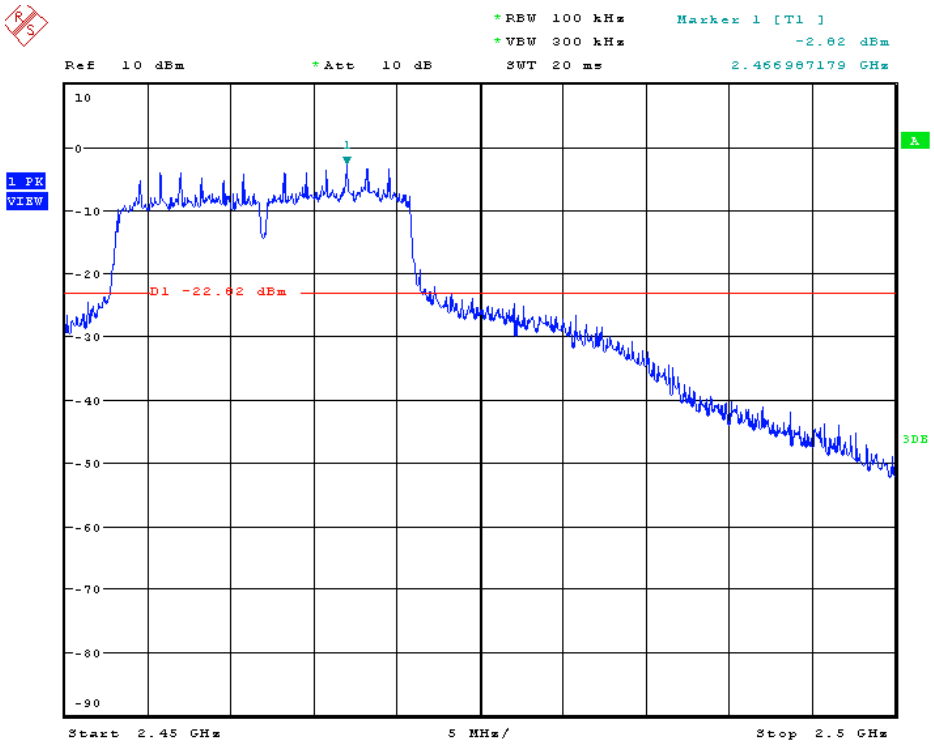


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 43.29 dBuV/m@3m at 2360.0MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

High channel



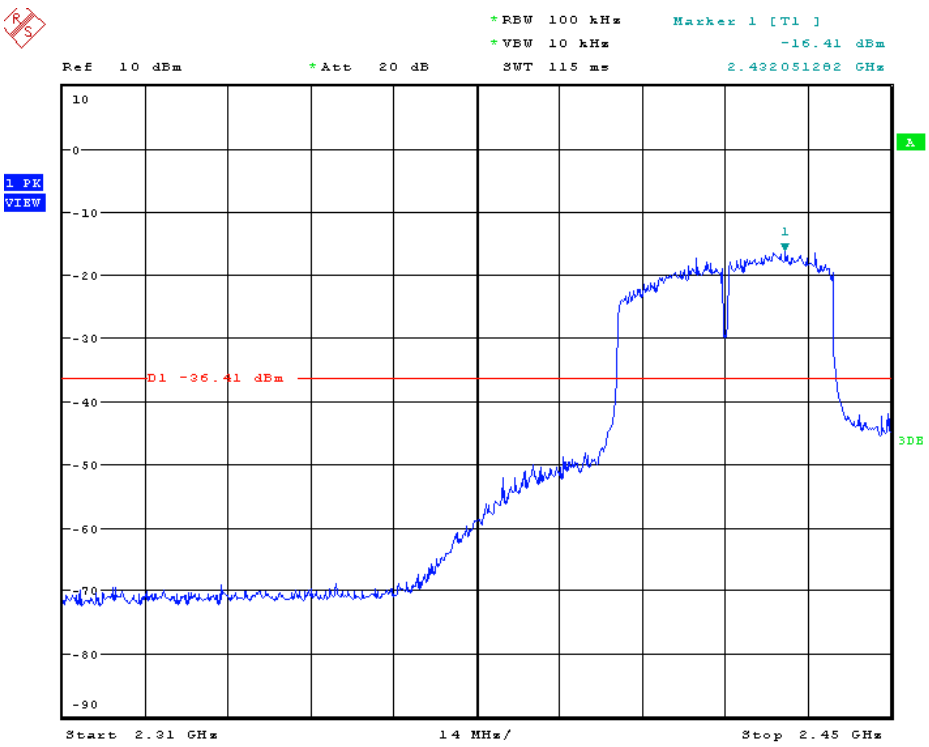
Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 51.00 dBuV/m@3m at 2488.6MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

Test Mode: IEEE 802.11n (HT 40) mode

Low channel

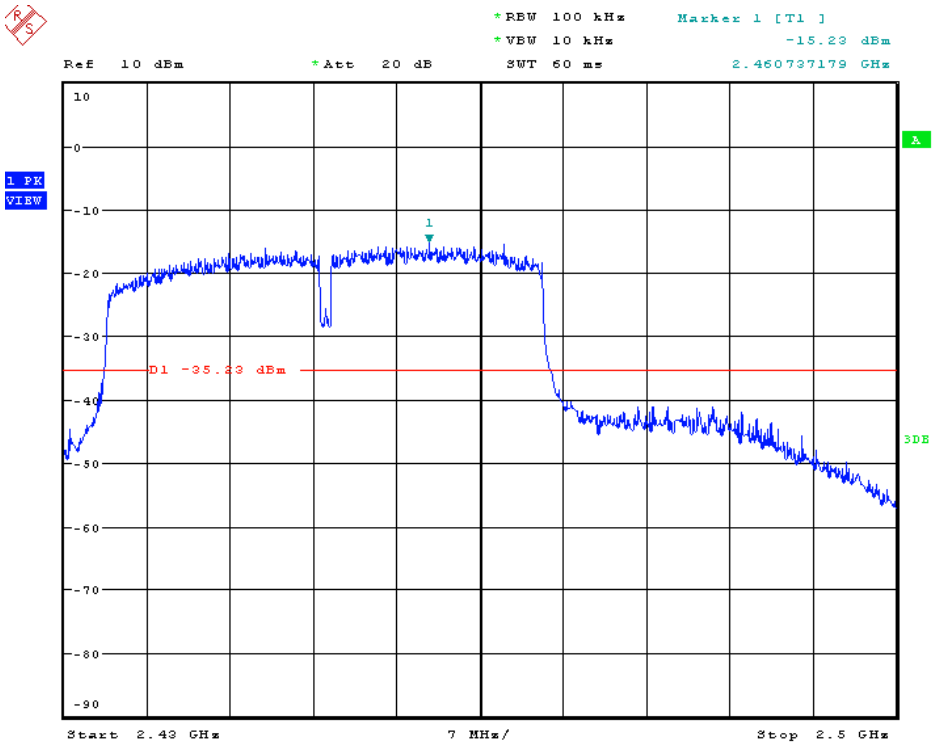


Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

2) The maximum emission was 46.73 dBuV/m@3m at 2367.5MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

High channel



Remark: 1) The radiated measurement was made in horizontal and vertical polarity;

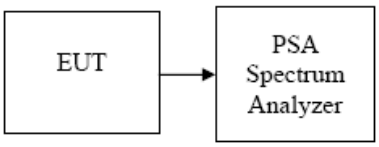
2) The maximum emission was 45.21 dBuV/m@3m at 2478.5MHz, which is less than the Average limit.

3) Radiated emissions which fall in the restricted band, as defined in 15.205(a), comply with the radiated emission limits specified in 15.209(a).

11.0 Spurious Emission Test

11.1 Conducted emissions Measurement

11.1.1 Test configuration



11.1.2 Limit:

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)).

11.1.3 Test procedure:

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site. The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz. Measurements are made over the 30MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

11.1.4 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014

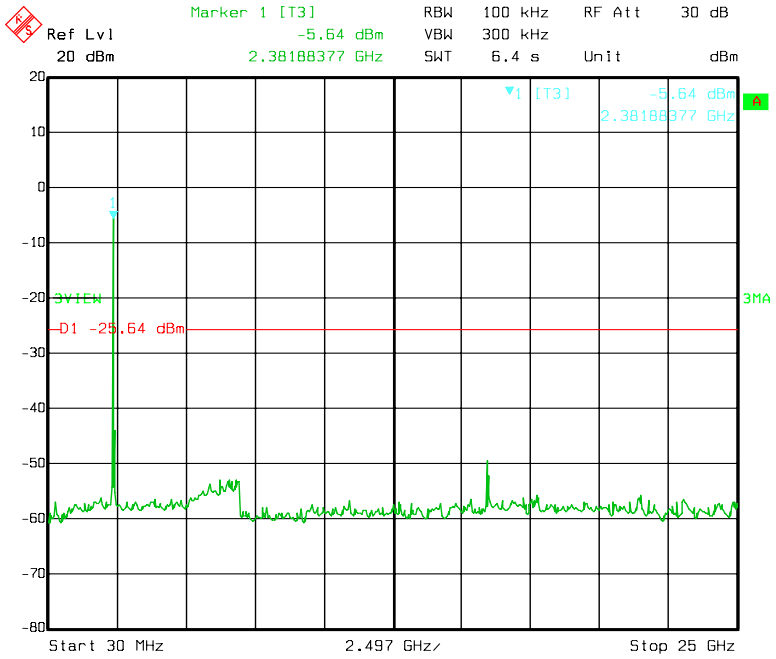
11.1.5 Test Result:

Test plots please refer to next pages.

Note: Conducted emissions measurements below 30 MHz were made, and the maximum peak was detected, which is much less the limit. So it is not submitted in the report.

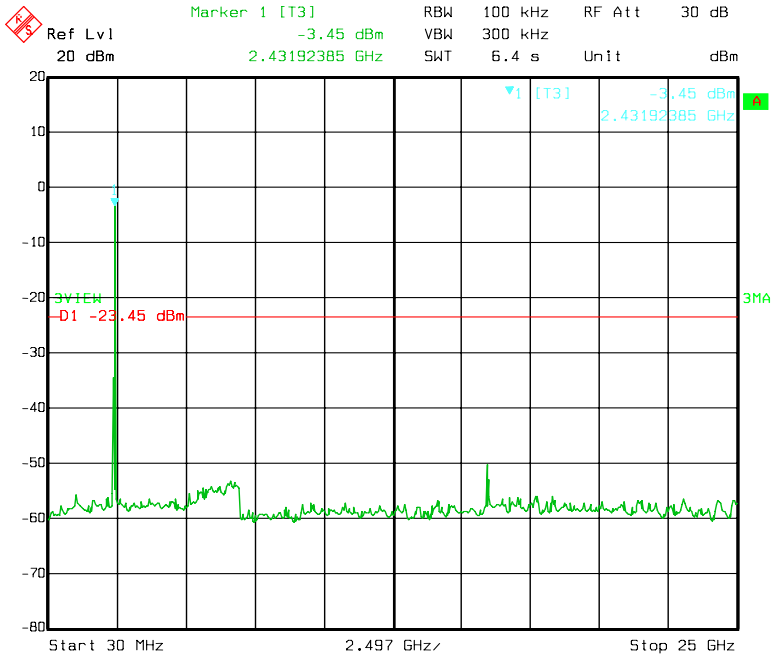
Test Mode: IEEE 802.11b mode

Low channel



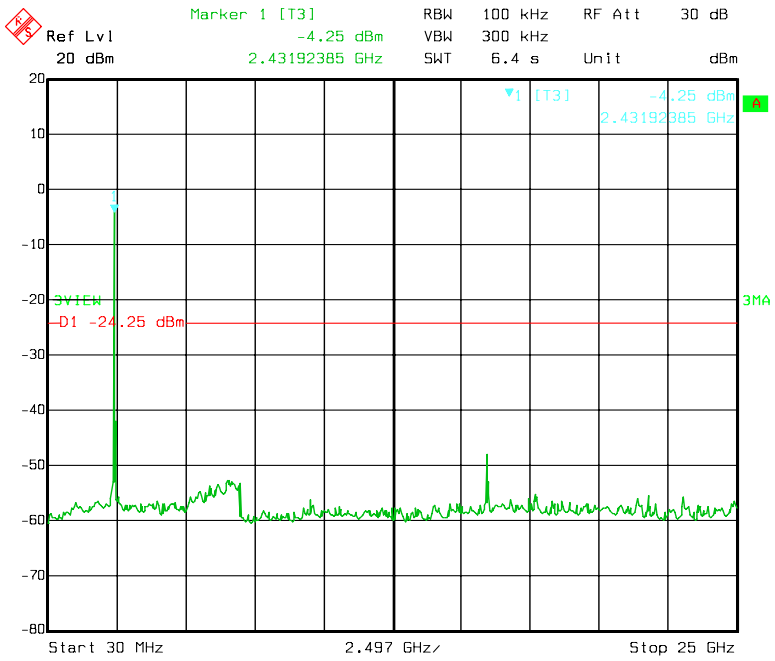
Note: Sweep points=10001pts

Middle channel



Note: Sweep points=10001pts

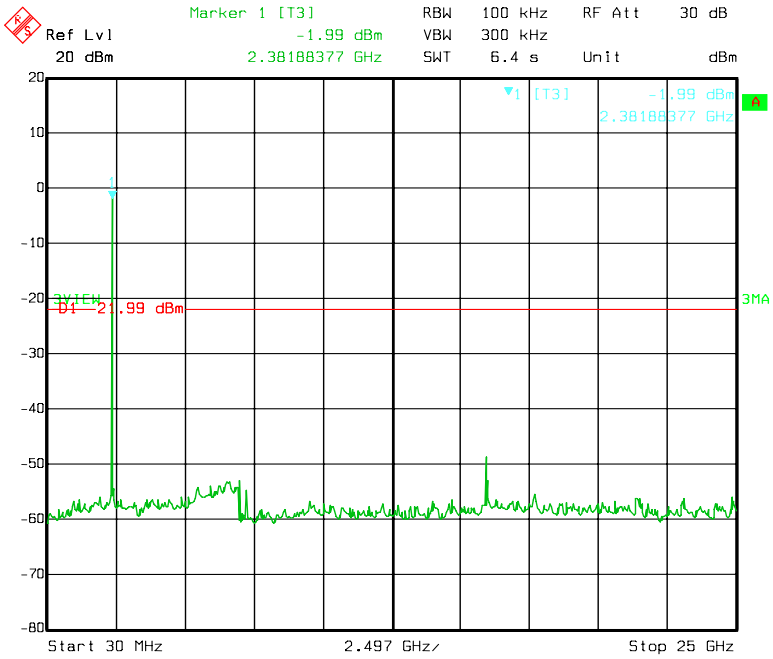
High channel



Note: Sweep points=10001pts

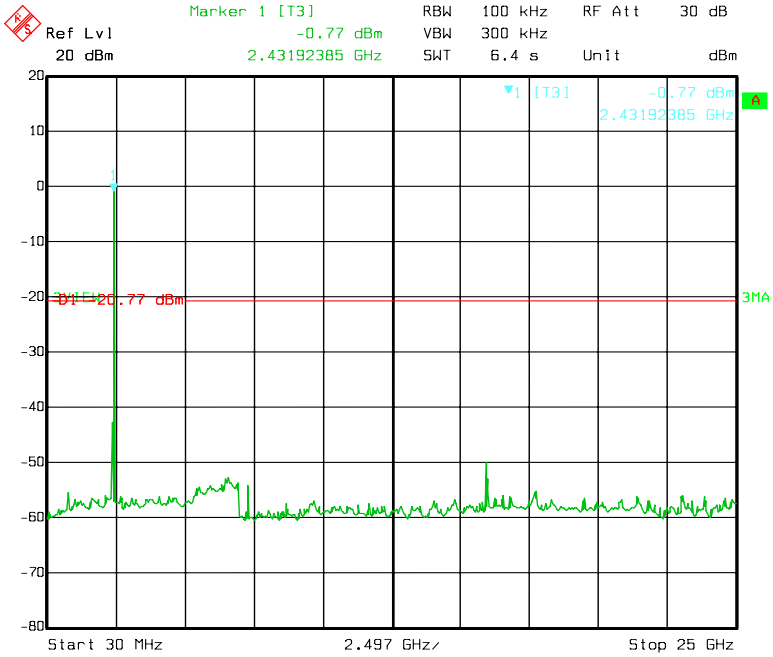
Test Mode: IEEE 802.11g mode

Low channel



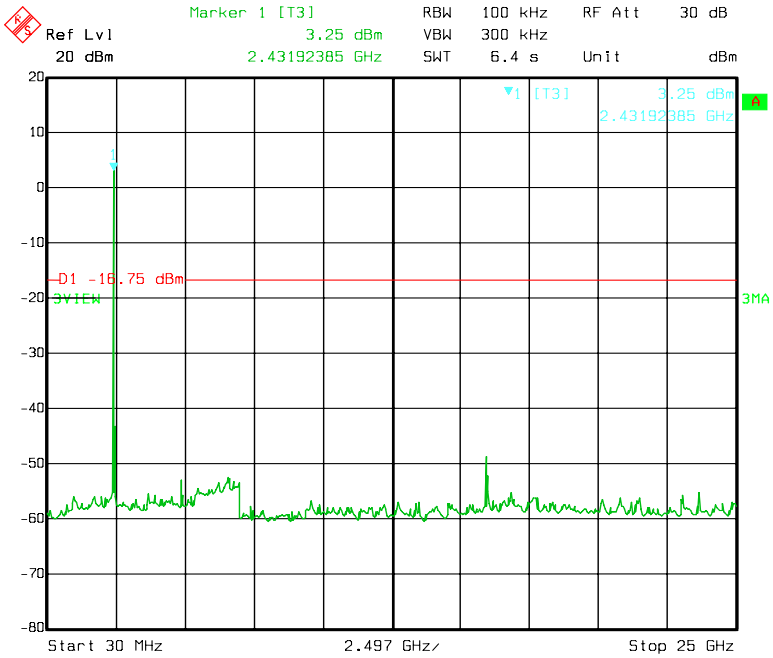
Note: Sweep points=10001pts

Middle channel



Note: Sweep points=10001pts

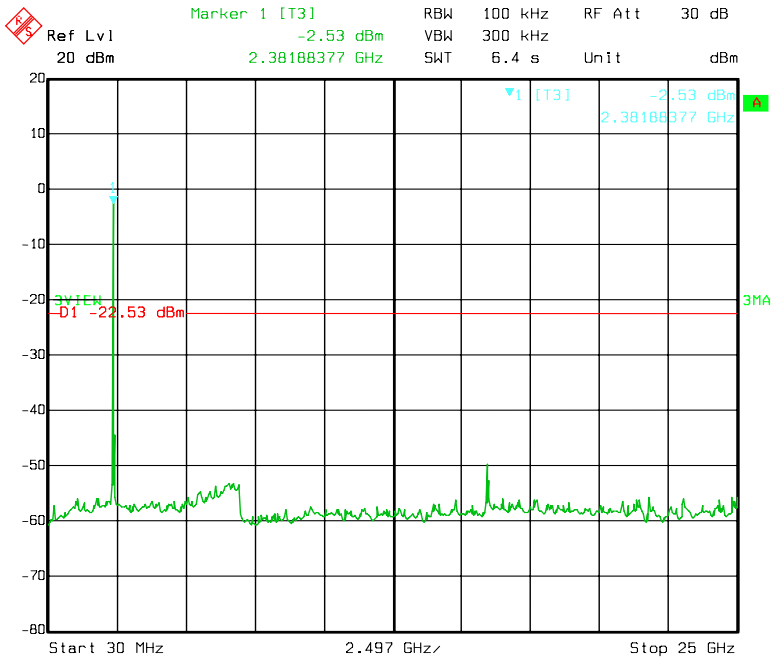
High channel



Note: Sweep points=10001pts

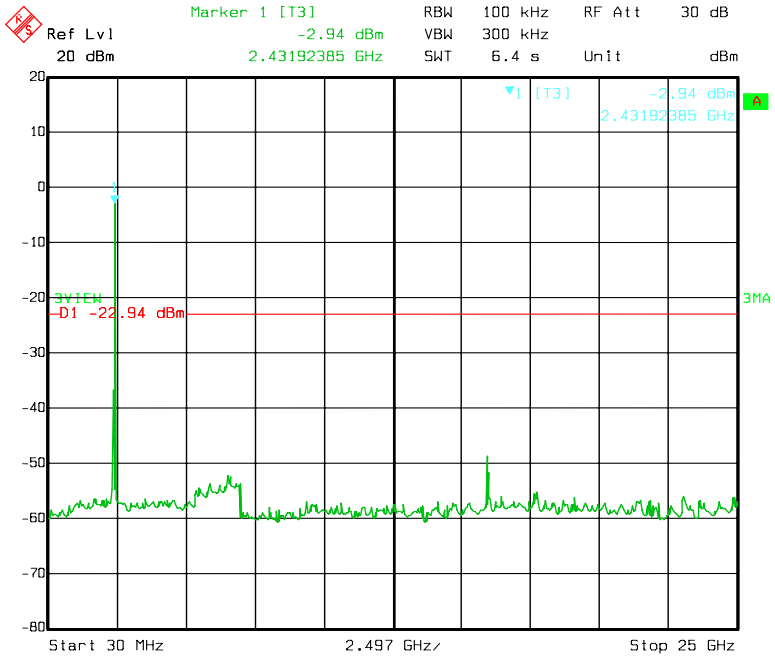
Test Mode: IEEE 802.11n(HT 20) mode

Low channel



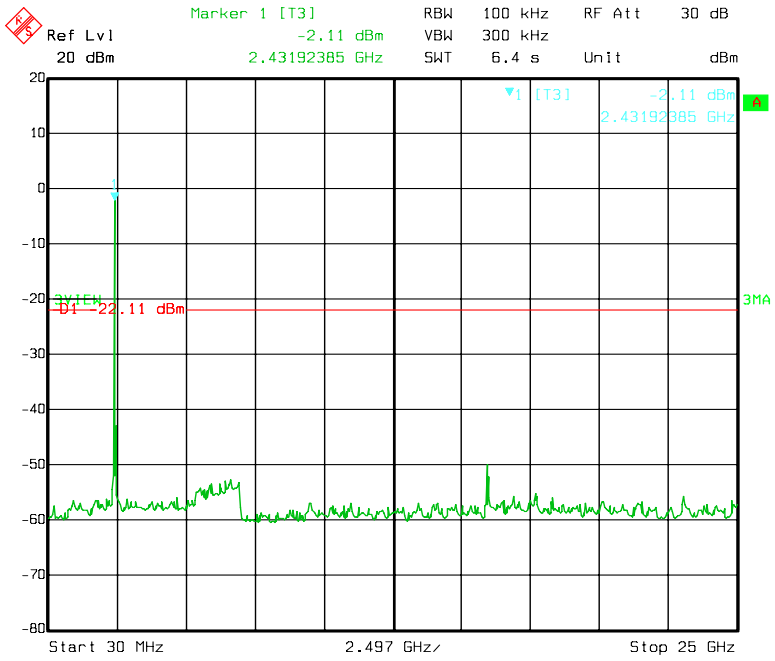
Note: Sweep points=10001pts

Middle channel



Note: Sweep points=10001pts

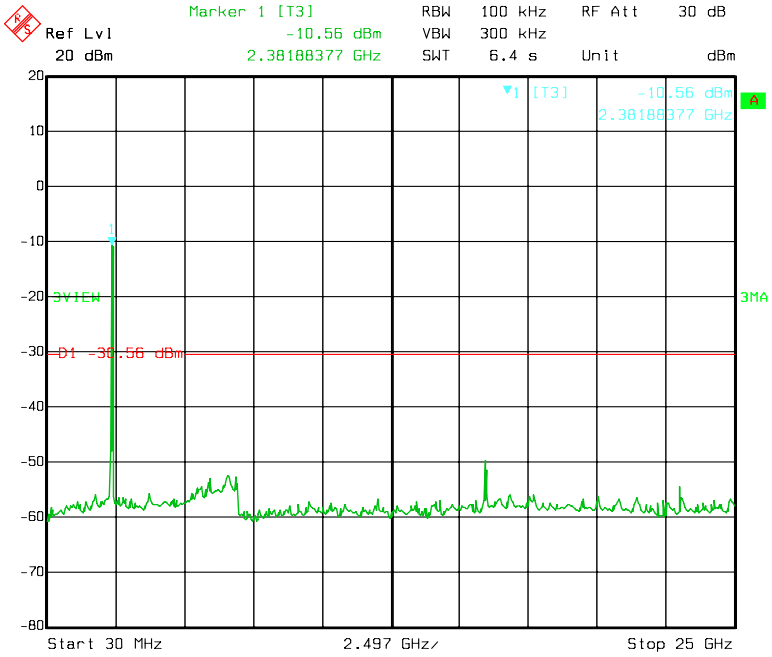
High channel



Note: Sweep points=10001pts

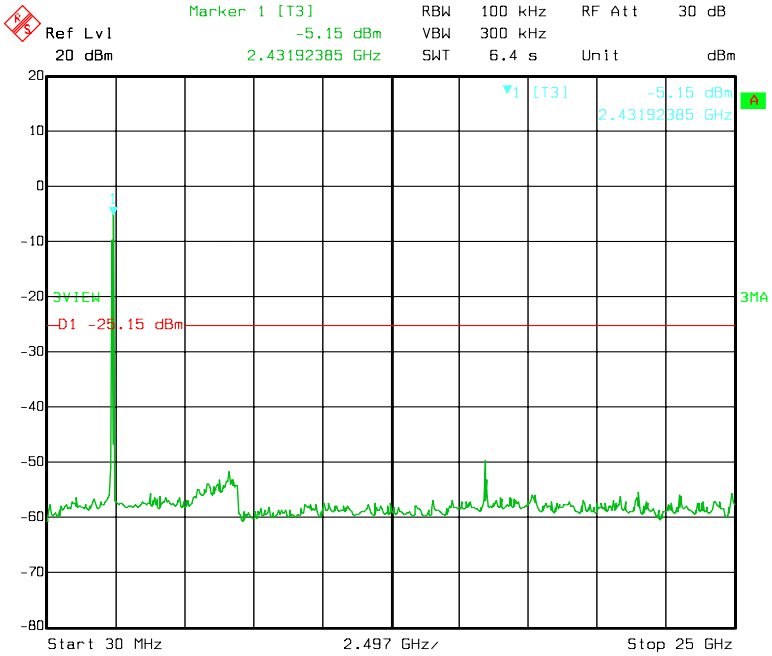
Test Mode: IEEE 802.11n(HT 40) mode

Low channel



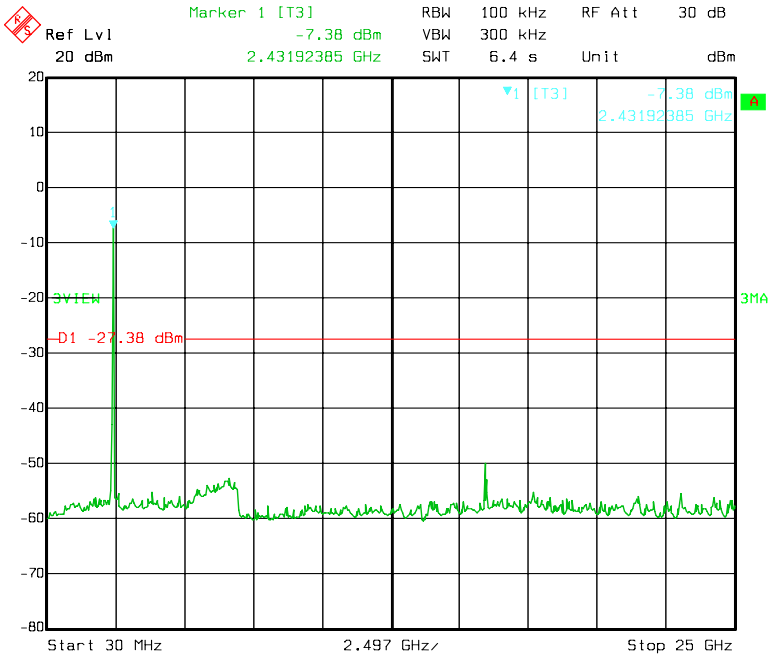
Note: Sweep points=10001pts

Middle channel



Note: Sweep points=10001pts

High channel



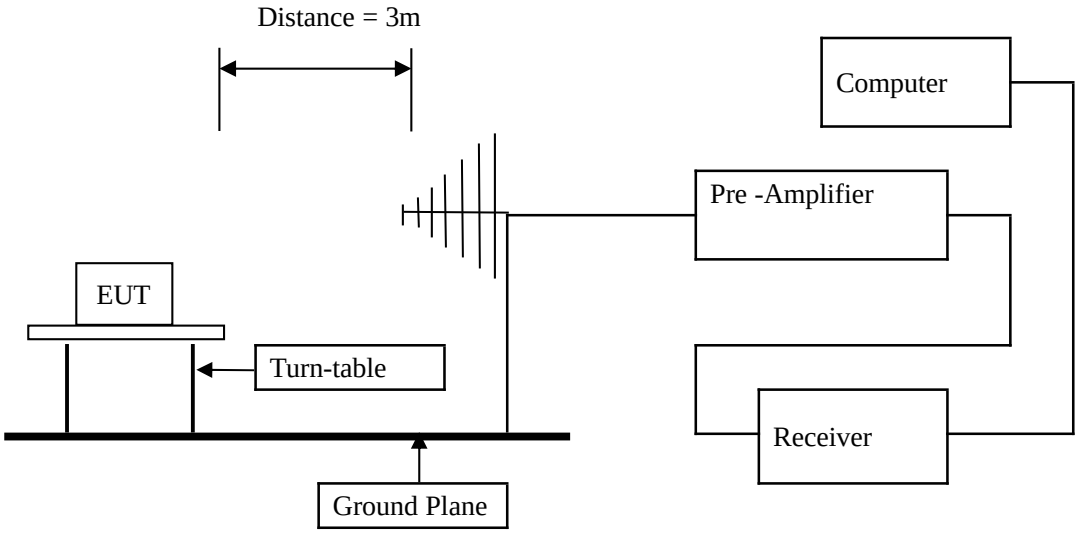
Note: Sweep points=10001pts

11.2 Radiated emissions Measurement

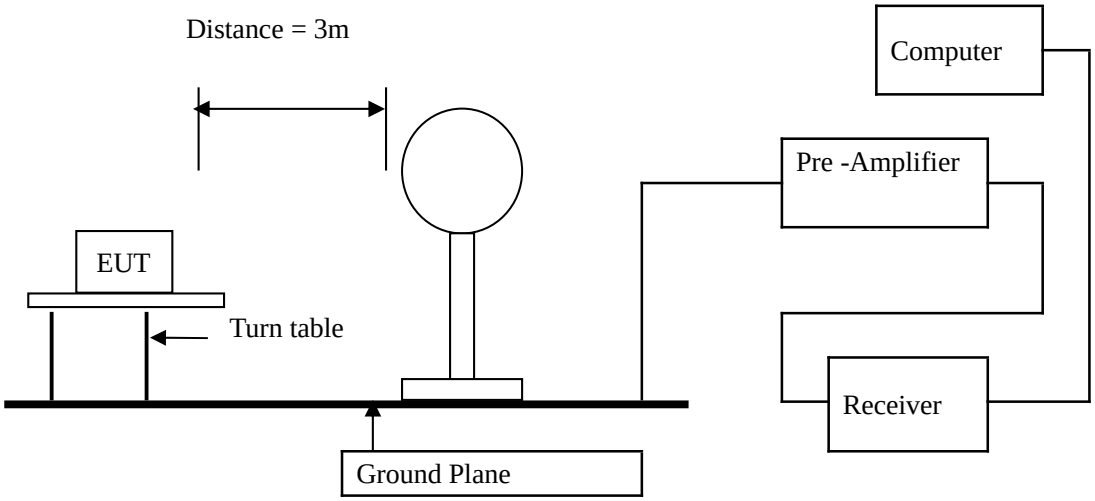
11.2.1 Test Method and test Procedure:

1) The EUT was tested according to ANSI C63.10 –2009.
2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.
3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5) The antenna polarization: Vertical polarization and Horizontal polarization.

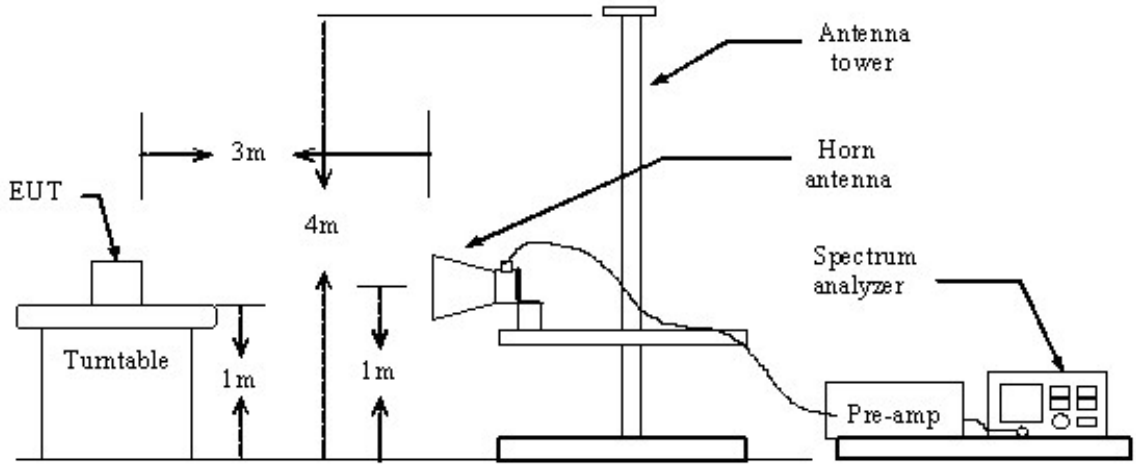
Block diagram of Test setup



Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency above 1GHz



11.2.2 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009

11.2.3 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	20log 2400/F (kHz) + 80
0.490-1.705	3	20log 24000/F (kHz) + 40
1.705-30	3	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1) RF Voltage (dBuV) = 20 log RF Voltage (uV)

2) In the Above Table, the tighter limit applies at the band edges.

3) Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4) This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5) All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK and AV detector.

6) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)

11.2.4 Test Equipment:

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	July 7, 2013	July 6, 2014
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 7, 2013	July 6, 2014
Pre-amplifier	Teseq	LNA6900	--	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8447D	83153007374	July 8, 2013	July 7, 2014
Pre-amplifier	Agilent	8449B	3008A01738	July 8, 2013	July 7, 2014
Loop antenna	A.R.A.	PLA-1030/B	1029	July 8, 2013	July 7, 2014
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3117	--	July 8, 2013	July 7, 2014
Horn Antenna	ETS LINDGREN	3160	--	July 8, 2013	July 7, 2014

11.2.5 Test specification:

Environmental conditions: Temperature 22° C Humidity: 51% Atmospheric pressure: 103kPa

11.2.6 Test result

A Radiated Emission (9 kHz----30 MHz)

Note: 1) Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor
2) The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

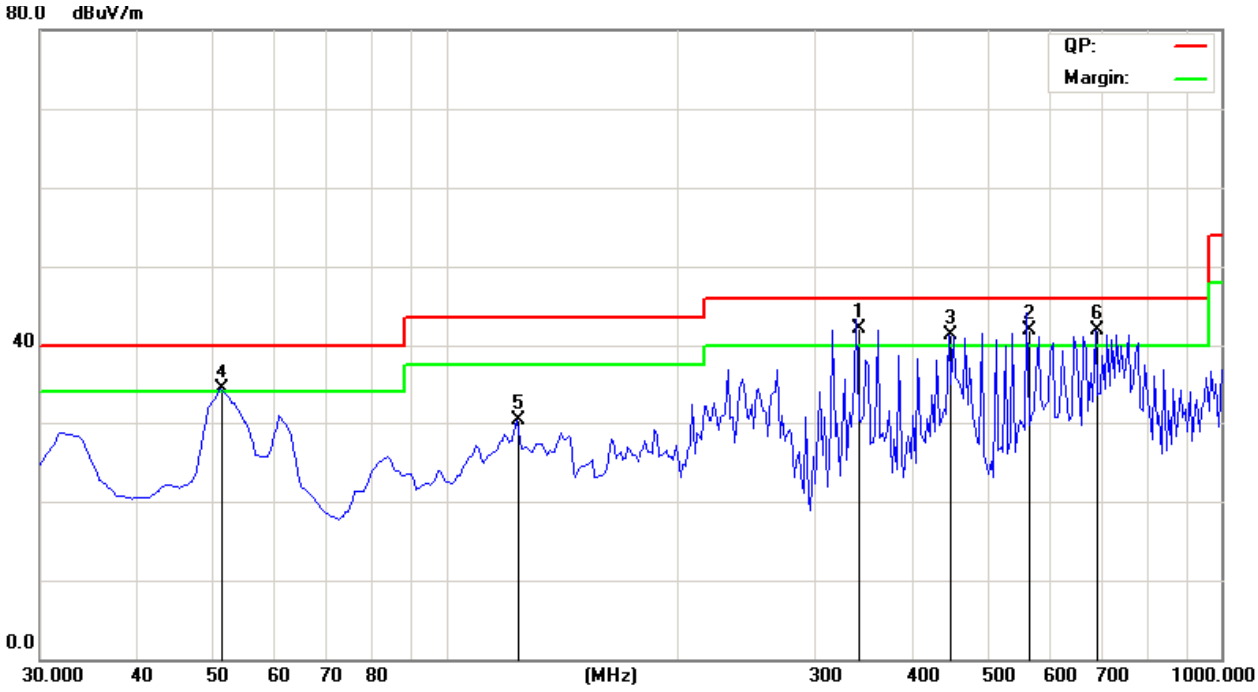
Result: Pass

Frequency (MHz)	Level@3m (dB μ V/m)	Limit@3m (dB μ V/m)
--	--	--
--	--	--
--	--	--
--	--	--

B General Radiated Emissions Data

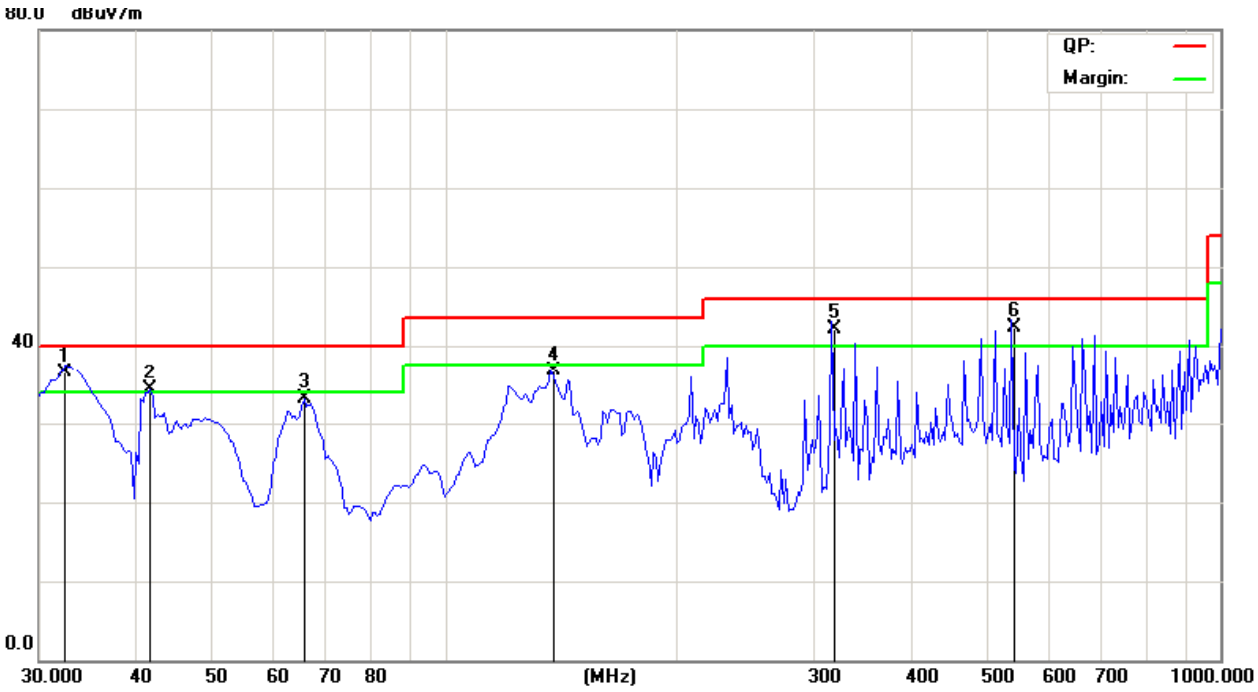
Please refer to following diagram for individual

Radiated Emission In Horizontal (30MHz----1000MHz)



Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
51.3828	34.23	H	40.00
123.3066	30.30	H	43.50
341.0220	42.13	H	46.00
447.9360	41.24	H	46.00
562.6253	41.90	H	46.00
692.8654	41.91	H	46.00

Radiated Emission In Vertical (30MHz----1000MHz)



Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
32.4107	30.19	V	40.00
41.7406	28.41	V	40.00
65.9067	26.37	V	40.00
136.9138	28.76	V	43.50
317.6954	38.75	V	46.00
539.2984	23.45	V	46.00

Note: Measurements were conducted in all three channels (high, middle, low) with IEEE 802.11b mode, IEEE 802.11g mode, IEEE 802.11n(HT20), IEEE 802.11n(HT40), and the worst case (high channel in IEEE 802.11g mode) was submitted only.

C Fundamental & Harmonics Radiated Emission Data (1000MHz-25000MHz)

IEEE 802.11b mode: Low channel: 2412 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	52.14	---	-4.20	47.94	---	74.00	54.00	-6.06
4824.00	H	48.65	---	-3.94	44.71	---	74.00	54.00	-9.29
5600.00	H	49.32	---	-2.83	46.49	---	74.00	54.00	-7.51
7236.00	H	48.01	---	0.52	48.53	---	74.00	54.00	-5.47
16884.00	H	43.25	---	6.73	49.98	---	74.00	54.00	-4.02
24120.00	H	41.61	---	8.11	49.72	---	74.00	54.00	-4.28
1310.01	V	50.34	---	-4.25	46.09	---	74.00	54.00	-7.91
4824.00	V	49.65	---	-3.94	45.71	---	74.00	54.00	-8.29
5600.00	V	49.32	---	-2.87	46.45	---	74.00	54.00	-7.55
7236.00	V	45.21	---	0.52	45.73	---	74.00	54.00	-8.27
16884.00	V	40.25	---	6.73	46.98	---	74.00	54.00	-7.02
24120.00	V	40.61	---	8.11	48.72	---	74.00	54.00	-5.28

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11b mode: Middle channel: 2437 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	52.87	---	-4.20	48.67	---	74.00	54.00	-5.33
4874.00	H	49.39	---	-3.98	45.41	---	74.00	54.00	-8.59
5600.00	H	50.51	---	-2.83	47.68	---	74.00	54.00	-6.32
7311.00	H	49.58	---	0.57	50.15	---	74.00	54.00	-3.85
17059.00	H	43.36	---	6.79	50.15	---	74.00	54.00	-3.85
24370.00	H	42.07	---	8.16	50.23	---	74.00	54.00	-3.77
1310.01	V	52.12	---	-4.25	47.87	---	74.00	54.00	-6.13
4874.00	V	51.84	---	-3.98	47.86	---	74.00	54.00	-6.14
5600.00	V	51.86	---	-2.87	48.99	---	74.00	54.00	-5.01
7311.00	V	48.29	---	0.57	48.86	---	74.00	54.00	-5.14
17059.00	V	40.96	---	6.79	47.75	---	74.00	54.00	-6.25
24370.00	V	41.46	---	8.16	49.62	---	74.00	54.00	-4.38

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11b mode: High channel: 2462 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	50.56	---	-4.20	46.36	---	74.00	54.00	-7.64
4924.00	H	52.58	---	-3.98	48.60	---	74.00	54.00	-5.40
5600.00	H	51.74	---	-2.83	48.91	---	74.00	54.00	-5.09
7386.00	H	48.46	---	0.57	49.03	---	74.00	54.00	-4.97
17234.00	H	43.33	---	6.79	50.12	---	74.00	54.00	-3.88
24620.00	H	41.58	---	8.16	49.74	---	74.00	54.00	-4.26
1310.01	V	52.54	---	-4.25	48.29	---	74.00	54.00	-5.71
4924.00	V	53.13	---	-3.98	49.15	---	74.00	54.00	-4.85
5600.00	V	52.01	---	-2.87	49.14	---	74.00	54.00	-4.86
7386.00	V	48.28	---	0.57	48.85	---	74.00	54.00	-5.15
17234.00	V	40.83	---	6.79	47.62	---	74.00	54.00	-6.38
24620.00	V	41.55	---	8.16	49.71	---	74.00	54.00	-4.29

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11g mode: Low channel: 2412 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	51.49	---	-4.20	47.29	---	74.00	54.00	-6.71
4824.00	H	51.06	---	-3.94	47.12	---	74.00	54.00	-6.88
5600.00	H	51.77	---	-2.83	48.94	---	74.00	54.00	-5.06
7236.00	H	46.69	---	0.52	47.21	---	74.00	54.00	-6.79
16884.00	H	42.24	---	6.73	48.97	---	74.00	54.00	-5.03
24120.00	H	41.27	---	8.11	49.38	---	74.00	54.00	-4.62
1310.01	V	50.11	---	-4.25	45.86	---	74.00	54.00	-8.14
4824.00	V	50.47	---	-3.94	46.53	---	74.00	54.00	-7.47
5600.00	V	50.18	---	-2.87	47.31	---	74.00	54.00	-6.69
7236.00	V	44.52	---	0.52	45.04	---	74.00	54.00	-8.96
16884.00	V	38.37	---	6.73	45.10	---	74.00	54.00	-8.90
24120.00	V	39.86	---	8.11	47.97	---	74.00	54.00	-6.03

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11g mode: Middle channel: 2437 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	50.44	---	-4.20	46.24	---	74.00	54.00	-7.76
4874.00	H	50.73	---	-3.98	46.75	---	74.00	54.00	-7.25
5600.00	H	50.40	---	-2.83	47.57	---	74.00	54.00	-6.43
7311.00	H	47.34	---	0.57	47.91	---	74.00	54.00	-6.09
17059.00	H	41.43	---	6.79	48.22	---	74.00	54.00	-5.78
24370.00	H	40.71	---	8.16	48.87	---	74.00	54.00	-5.13
1310.01	V	50.01	---	-4.25	45.76	---	74.00	54.00	-8.24
4874.00	V	51.05	---	-3.98	47.07	---	74.00	54.00	-6.93
5600.00	V	50.16	---	-2.87	47.29	---	74.00	54.00	-6.71
7311.00	V	47.87	---	0.57	48.44	---	74.00	54.00	-5.56
17059.00	V	40.27	---	6.79	47.06	---	74.00	54.00	-6.94
24370.00	V	38.87	---	8.16	47.03	---	74.00	54.00	-6.97

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11g mode: High channel: 2462 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	54.93	---	-4.20	50.73	---	74.00	54.00	-3.27
4924.00	H	54.54	---	-3.98	50.56	---	74.00	54.00	-3.44
5600.00	H	49.93	---	-2.83	47.10	---	74.00	54.00	-6.90
7386.00	H	46.78	---	0.57	47.35	---	74.00	54.00	-6.65
17234.00	H	41.04	---	6.79	47.83	---	74.00	54.00	-6.17
24620.00	H	40.82	---	8.16	48.98	---	74.00	54.00	-5.02
1310.01	V	54.9	---	-4.25	50.65	---	74.00	54.00	-3.35
4924.00	V	54.27	---	-3.98	50.29	---	74.00	54.00	-3.71
5600.00	V	49.84	---	-2.87	46.97	---	74.00	54.00	-7.03
7386.00	V	48.07	---	0.57	48.64	---	74.00	54.00	-5.36
17234.00	V	40.77	---	6.79	47.56	---	74.00	54.00	-6.44
24620.00	V	38.61	---	8.16	46.77	---	74.00	54.00	-7.23

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11n(HT20) mode: Low channel: 2412 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	50.26	---	-4.20	46.06	---	74.00	54.00	-7.94
4824.00	H	52.28	---	-3.94	48.34	---	74.00	54.00	-5.66
5600.00	H	50.64	---	-2.83	47.81	---	74.00	54.00	-6.19
7236.00	H	48.81	---	0.52	49.33	---	74.00	54.00	-4.67
16884.00	H	43.71	---	6.73	50.44	---	74.00	54.00	-3.56
24120.00	H	40.99	---	8.11	49.10	---	74.00	54.00	-4.90
1310.01	V	51.10	---	-4.25	46.85	---	74.00	54.00	-7.15
4824.00	V	52.00	---	-3.94	48.06	---	74.00	54.00	-5.94
5600.00	V	52.04	---	-2.87	49.17	---	74.00	54.00	-4.83
7236.00	V	48.84	---	0.52	49.36	---	74.00	54.00	-4.64
16884.00	V	39.95	---	6.73	46.68	---	74.00	54.00	-7.32
24120.00	V	41.14	---	8.11	49.25	---	74.00	54.00	-4.75

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11n(HT20) mode: Middle channel: 2437 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	51.36	---	-4.20	47.16	---	74.00	54.00	-6.84
4874.00	H	52.69	---	-3.98	48.71	---	74.00	54.00	-5.29
5600.00	H	51.66	---	-2.83	48.83	---	74.00	54.00	-5.17
7311.00	H	48.20	---	0.57	48.77	---	74.00	54.00	-5.23
17059.00	H	43.06	---	6.79	49.85	---	74.00	54.00	-4.15
24370.00	H	40.91	---	8.16	49.07	---	74.00	54.00	-4.93
1310.01	V	52.36	---	-4.25	48.11	---	74.00	54.00	-5.89
4874.00	V	51.64	---	-3.98	47.66	---	74.00	54.00	-6.34
5600.00	V	51.20	---	-2.87	48.33	---	74.00	54.00	-5.67
7311.00	V	48.50	---	0.57	49.07	---	74.00	54.00	-4.93
17059.00	V	40.66	---	6.79	47.45	---	74.00	54.00	-6.55
24370.00	V	42.16	---	8.16	50.32	---	74.00	54.00	-3.68

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11n(HT20) mode: High channel: 2462 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	50.44	---	-4.20	46.24	---	74.00	54.00	-7.76
4924.00	H	52.54	---	-3.98	48.56	---	74.00	54.00	-5.44
5600.00	H	51.95	---	-2.83	49.12	---	74.00	54.00	-4.88
7386.00	H	48.92	---	0.57	49.49	---	74.00	54.00	-4.51
17234.00	H	43.38	---	6.79	50.17	---	74.00	54.00	-3.83
24620.00	H	41.00	---	8.16	49.16	---	74.00	54.00	-4.84
1310.01	V	52.69	---	-4.25	48.44	---	74.00	54.00	-5.56
4924.00	V	55.05	---	-3.98	51.07	---	74.00	54.00	-2.93
5600.00	V	52.12	---	-2.87	49.25	---	74.00	54.00	-4.75
7386.00	V	48.15	---	0.57	48.72	---	74.00	54.00	-5.28
17234.00	V	40.34	---	6.79	47.13	---	74.00	54.00	-6.87
24620.00	V	41.75	---	8.16	49.91	---	74.00	54.00	-4.09

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11n(HT40) mode: Low channel: 2422 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	51.31	---	-4.20	47.11	---	74.00	54.00	-6.89
4844.00	H	52.90	---	-3.94	48.96	---	74.00	54.00	-5.04
5600.00	H	51.21	---	-2.83	48.38	---	74.00	54.00	-5.62
7266.00	H	48.51	---	0.52	49.03	---	74.00	54.00	-4.97
16954.00	H	43.48	---	6.73	50.21	---	74.00	54.00	-3.79
24220.00	H	40.64	---	8.11	48.75	---	74.00	54.00	-5.25
1310.01	V	51.19	---	-4.25	46.94	---	74.00	54.00	-7.06
4844.00	V	52.16	---	-3.94	48.22	---	74.00	54.00	-5.78
5600.00	V	52.15	---	-2.87	49.28	---	74.00	54.00	-4.72
7266.00	V	48.33	---	0.52	48.85	---	74.00	54.00	-5.15
16954.00	V	39.96	---	6.73	46.69	---	74.00	54.00	-7.31
24220.00	V	40.84	---	8.11	48.95	---	74.00	54.00	-5.05

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11n(HT40) mode: Middle channel: 2437 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	51.73	---	-4.20	47.53	---	74.00	54.00	-6.47
4874.00	H	52.75	---	-3.98	48.77	---	74.00	54.00	-5.23
5600.00	H	51.68	---	-2.83	48.85	---	74.00	54.00	-5.15
7311.00	H	48.74	---	0.57	49.31	---	74.00	54.00	-4.69
17059.00	H	43.77	---	6.79	50.56	---	74.00	54.00	-3.44
24370.00	H	41.27	---	8.16	49.43	---	74.00	54.00	-4.57
1310.01	V	52.73	---	-4.25	48.48	---	74.00	54.00	-5.52
4874.00	V	52.83	---	-3.98	48.85	---	74.00	54.00	-5.15
5600.00	V	52.09	---	-2.87	49.22	---	74.00	54.00	-4.78
7311.00	V	48.29	---	0.57	48.86	---	74.00	54.00	-5.14
17059.00	V	40.28	---	6.79	47.07	---	74.00	54.00	-6.93
24370.00	V	41.83	---	8.16	49.99	---	74.00	54.00	-4.01

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

IEEE 802.11n(H40) mode: High channel: 2452 MHz									
Freq. (MHz)	Ant. Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor (dB)	Emission Level		Peak limit (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
1299.89	H	54.55	---	-4.20	50.35	---	74.00	54.00	-3.65
4904.00	H	51.98	---	-3.98	48.00	---	74.00	54.00	-6.00
5600.00	H	51.86	---	-2.83	49.03	---	74.00	54.00	-4.97
7356.00	H	48.72	---	0.57	49.29	---	74.00	54.00	-4.71
17164.00	H	41.95	---	6.79	48.74	---	74.00	54.00	-5.26
24520.00	H	40.81	---	8.16	48.97	---	74.00	54.00	-5.03
1310.01	V	50.5	---	-4.25	46.25	---	74.00	54.00	-7.75
4904.00	V	48.65	---	-3.98	44.67	---	74.00	54.00	-9.33
5600.00	V	51.80	---	-2.87	48.93	---	74.00	54.00	-5.07
7356.00	V	48.61	---	0.57	49.18	---	74.00	54.00	-4.82
17164.00	V	40.25	---	6.79	47.04	---	74.00	54.00	-6.96
24520.00	V	41.26	---	8.16	49.42	---	74.00	54.00	-4.58

Notes: 1) Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

2) Radiated emissions measured in frequencies above 1GHz were made with peak detector and Average (AV) detector.

3) Average test would be performed if the peak readings were greater than the average limit.

4) Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

5) Emission Level=Peak (AV) Reading + Correction Factor;

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

6) Margin (dB) = Emission Level (Peak) (dBuV/m)-Average limit (dBuV/m)

12.0 Antenna Requirement

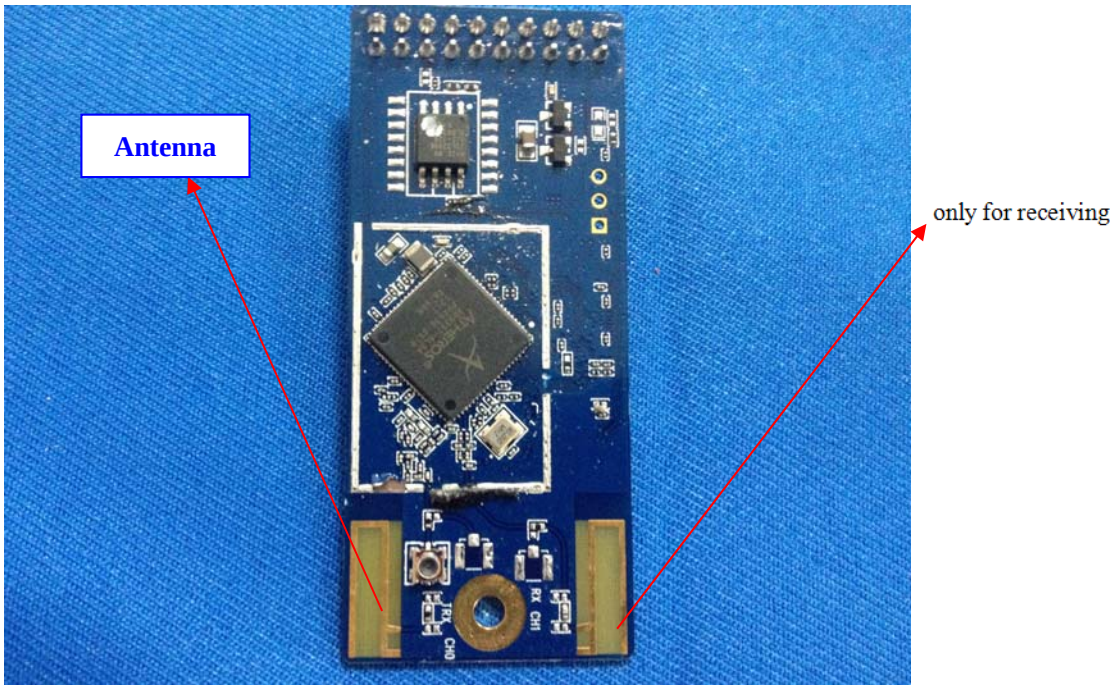
12.1 Standard Applicable

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 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

12.2 Antenna Specification

According to the manufacturer declared, the EUT has a PCB antenna; the directional gain of antenna is 0 dBi, and and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.



END OF REPORT