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Report No.: CQASZ160501307E-01
Report Version: V01

MEASUREMENT REPORT
FCC Test Report

Applicant:	Shenzhen Jisiwei Intelligent Technology Co., Ltd
Address of Applicant:	7010, B2 District, Wan Zhong Cheng Home Square, Minzhi Street, Longhua New District, Shenzhen City, Guangdong Province, P. R. China
Manufacturer:	Shenzhen Jisiwei Intelligent Technology Co., Ltd
Address of Manufacturer:	7010, B2 District, Wan Zhong Cheng Home Square, Minzhi Street, Longhua New District, Shenzhen City, Guangdong Province, P. R. China
Equipment Under Test (EUT):	
Product:	Cloud Robot Vacuum Cleaner
Model No.:	S+
Brand Name:	JISIWEI
FCC ID:	2AILE-S
Standards:	47 CFR Part 15, Subpart C
Date of Test:	2016-05-10 to 2016-05-17
Date of Issue:	2016-05-17
Test Result :	**PASS***

Reviewed By: _____
(Aaron Ma)

Approved By: _____
(Owen Zhou)

Shenzhen Centre Quality Accreditation Technology Co., Ltd.

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* In the configuration tested, the EUT complied with the standards specified above.

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ160501307E-01	Rev.01	Initial report	2016-05-17

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	KDB558074 D01 v03r05	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	KDB558074 D01 v03r05	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	KDB558074 D01 v03r05	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01 v03r05	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01 v03r05	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS

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5 General Information

5.1 Client Information

Applicant:	Shenzhen Jisiwei Intelligent Technology Co., Ltd
Address of Applicant:	7010, B2 District, Wan Zhong Cheng Home Square, Minzhi Street, Longhua New District, Shenzhen City, Guangdong Province, P. R. China
Manufacturer:	Shenzhen Jisiwei Intelligent Technology Co., Ltd
Address of Manufacturer:	7010, B2 District, Wan Zhong Cheng Home Square, Minzhi Street, Longhua New District, Shenzhen City, Guangdong Province, P. R. China

5.2 General Description of EUT

Product Name:	Cloud Robot Vacuum Cleaner	
Model No.:	S+	
Trade Mark:	JISIWEI	
Hardware version:	V1.0	
Software version:	V1.0	
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz	
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels	
Channel Separation:	5MHz	
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK)	
Sample Type:	mobile production	
Test Software of EUT:	RF test tool (manufacturer declare)	
Antenna Type and Gain:	Type: internal antenna with ipex connector Gain:5.0dBi	
Power Supply:	Adapter:	Mode : K25V190100U Input: AC 100V-240V 50/60Hz 0.6A Output: DC 19.0V 1.0A
	Battery:	Rechargeable battery 1: DC14.8V, 2600mAh Model: 18650 Date of manufacture :2015.11.11
		Rechargeable battery 2: DC14.8V, 2600mAh Model: 18650 Date of manufacture :2016.04.14
Test Voltage:	AC120V/60Hz	

Note:

Rechargeable battery 1 and Rechargeable battery 2 are used in test, Using rechargeable battery 1 is the worst case. Only the worst case is recorded in the report.

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel(802.11n HT40)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2422MHz	4	2437MHz	7	2452MHz
2	2427MHz	5	2442MHz		
3	2432MHz	6	2447MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

For 802.11n (HT40):

Channel	Frequency
The Lowest channel	2422MHz
The Middle channel	2437MHz
The Highest channel	2452MHz

The output power setting of EUT is set in the factory and followed the max. peak level in below.

802.11b	16dBm±1dB
802.11g	20dBm±1dB
802.11n(HT20)	18dBm±1dB
802.11n(HT20)	18dBm±1dB

Note:

1. Software (RF test tool) provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2. The rechargeable battery is fully-charged batter.

5.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

Operated Mode for Worst Duty Cycle:	
Test Signal Duty Cycle(x)	Average correction factor(dB)
100% - IEEE802.11b	0
100% - IEEE802.11g	0
100% - IEEE802.11n (HT20)	0
100% - IEEE802.11n (HT40)	0

5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Adapter	Guanjin	K25V190100U

5.5 Test Location

All tests were performed at:

Shenzhen CTL Testing Technology Co., Ltd., Shenzhen EMC Laboratory,

1/F.-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, Guangdong, China

5.6 Test Facility

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

FCC – Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

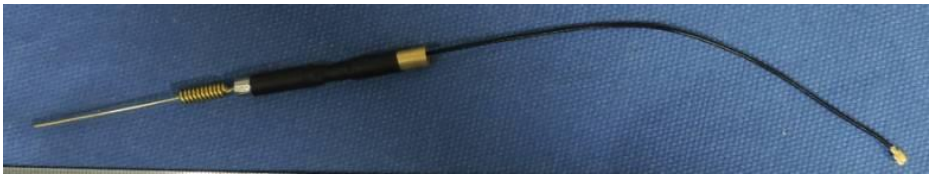
None.

5.10 Equipment List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
1	Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/01
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI3	103710	2016/06/01
3	Spectrum Analyzer	Agilent	E4407B	MY45108355	2016/05/20
4	Controller	EM Electronics	Controller EM 1000	N/A	2016/05/20
5	Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/18
6	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25841	2016/05/18
7	Active Loop Antenna	Daze	ZN30900A	N/A	2016/05/18
8	Spectrum Analyzer	R&S	FSU	MY41440676	2016/05/18
9	LISN	R&S	ENV216	101316	2016/06/01
10	LISN	SCHWARZBECK	NSLK8127	8127687	2016/06/01
11	Microwave Preamplifier	HP	8349B	3155A00882	2016/05/18
12	Preamplifier	HP	8447D	3113A07663	2016/05/18
13	Transient Limiter	Com-Power	LIT-153	532226	2016/06/01
14	Temperature/Humidity Meter	Gangxing	CTH-608	02	2016/05/19
15	Climate Chamber	ESPEC	EL-10KA	A20120523	2016/05/19
16	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2016/05/19
17	High-Pass Filter	K&L	41SH10-1375/U12750-O/O	N/A	2016/05/19
18	RF Cable(0-1GHz)	HUBER+SUHNER	RG174	N/A	2016/05/19
19	RF Cable(1-25GHz)	HUBER+SUHNER	RG214	N/A	2016/05/19

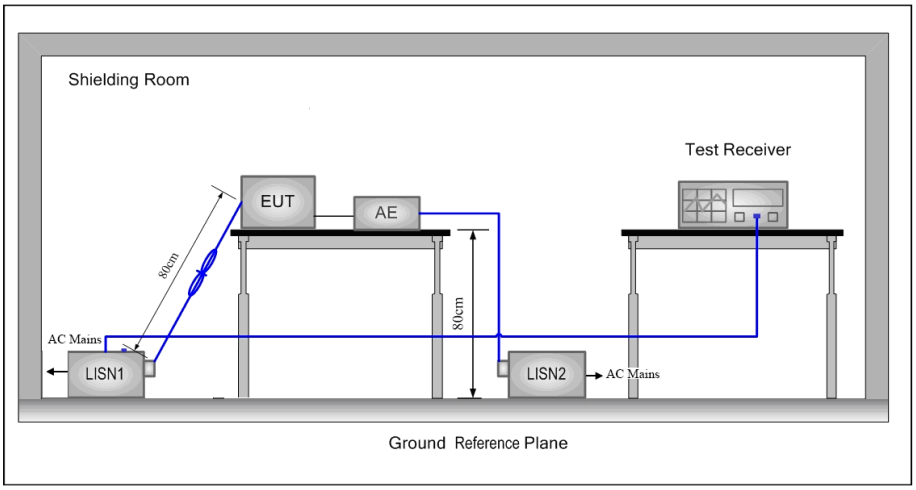
6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	
The antenna is internal antenna with ipex connector. The best case gain of the antenna is 5.0dBi.	

6.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test Procedure:</td><td>1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</td></tr>
</table>

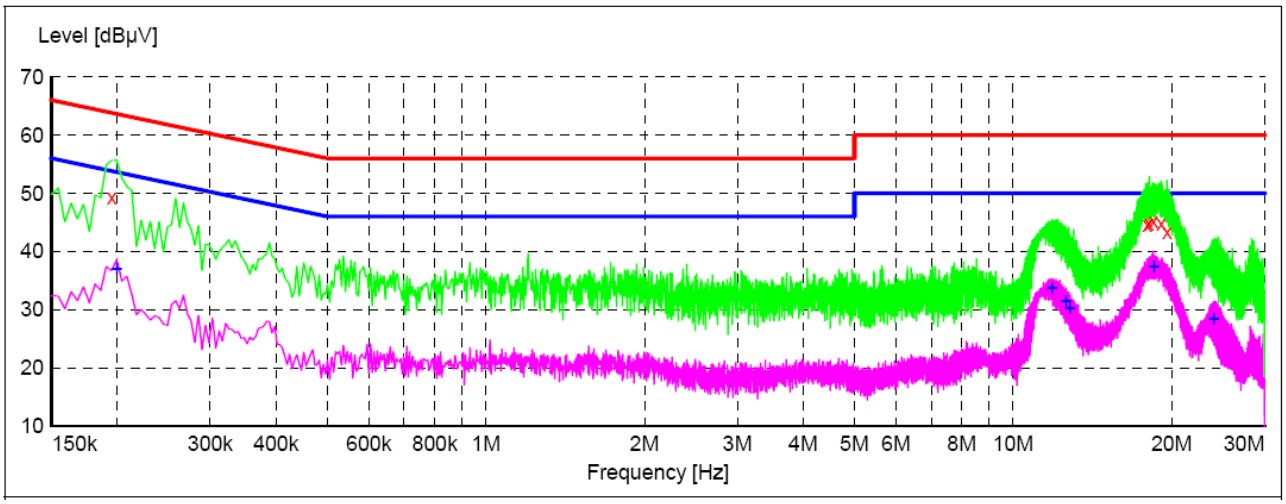
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode. Mode a: Connect the AC-DC adaptor with the charging hole on unit. Mode b: Connect the unit return to the charging station under stand-by or working mode.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case. Charge + Transmitting mode. Mode a: Connect the AC-DC adaptor with the charging hole on unit. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Voltage:	AC120V/60Hz
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

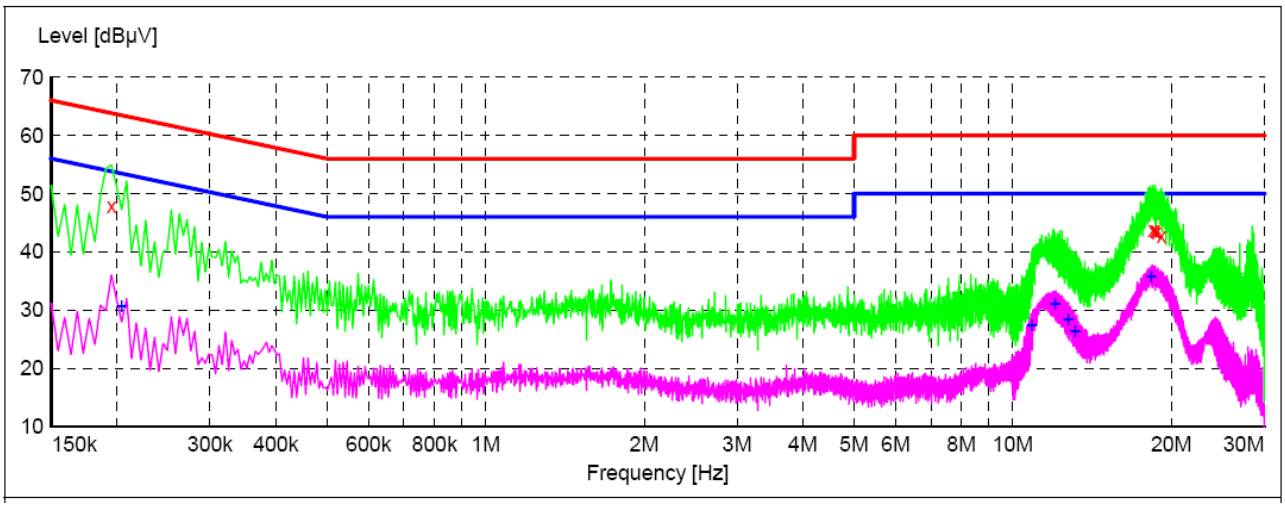
Live Line:



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195001	49.30	10.2	64	14.5	QP	L1	GND
17.952001	44.50	10.8	60	15.5	QP	L1	GND
18.096001	44.80	10.8	60	15.2	QP	L1	GND
18.433501	45.30	10.9	60	14.7	QP	L1	GND
19.099501	44.70	10.9	60	15.3	QP	L1	GND
19.599001	43.30	10.9	60	16.7	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199501	36.90	10.2	54	16.7	AV	L1	GND
11.859001	33.70	10.6	50	16.3	AV	L1	GND
12.610501	31.50	10.6	50	18.5	AV	L1	GND
12.822001	30.20	10.6	50	19.8	AV	L1	GND
18.510001	37.50	10.9	50	12.5	AV	L1	GND
24.036001	28.40	11.1	50	21.6	AV	L1	GND

Neutral Line:



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195001	47.90	10.2	64	15.9	QP	N	GND
18.411001	43.80	10.9	60	16.2	QP	N	GND
18.627001	43.70	10.9	60	16.3	QP	N	GND
18.636001	43.50	10.9	60	16.5	QP	N	GND
18.748501	43.40	10.9	60	16.6	QP	N	GND
19.140001	42.80	10.9	60	17.2	QP	N	GND

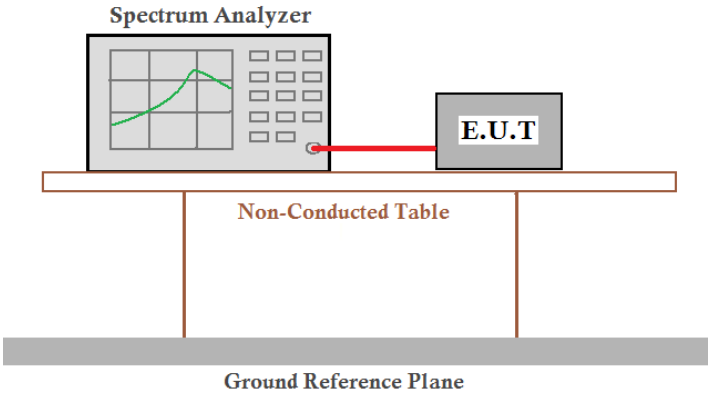
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204001	30.70	10.2	53	22.7	AV	N	GND
10.878001	27.30	10.6	50	22.7	AV	N	GND
12.043501	31.10	10.6	50	18.9	AV	N	GND
12.763501	28.40	10.6	50	21.6	AV	N	GND
13.137001	26.40	10.6	50	23.6	AV	N	GND
18.339001	35.80	10.9	50	14.2	AV	N	GND

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

6.3 Conducted Peak Output Power

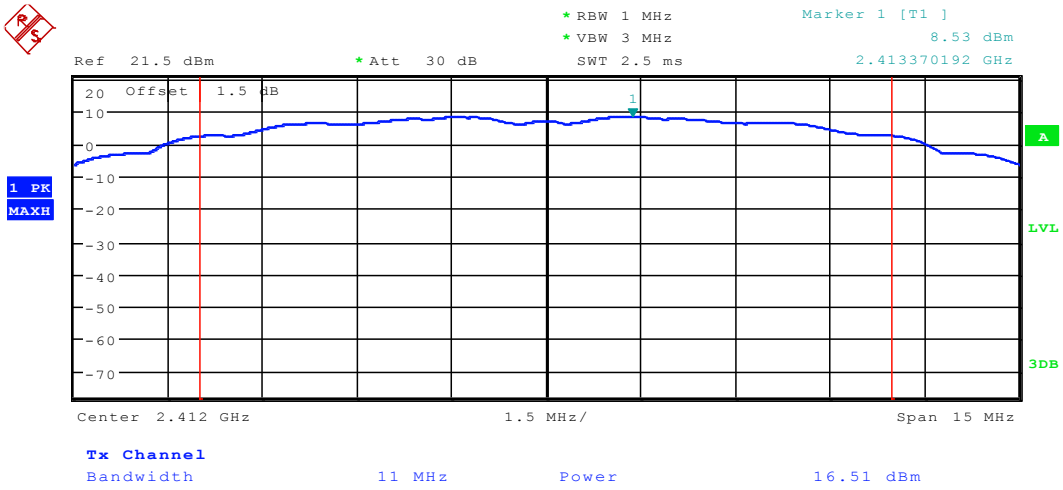
Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	KDB558074 D01 v03r05
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40) Only the worst case is recorded in the report.
Limit:	30dBm
Test Results:	Pass

Measurement Data

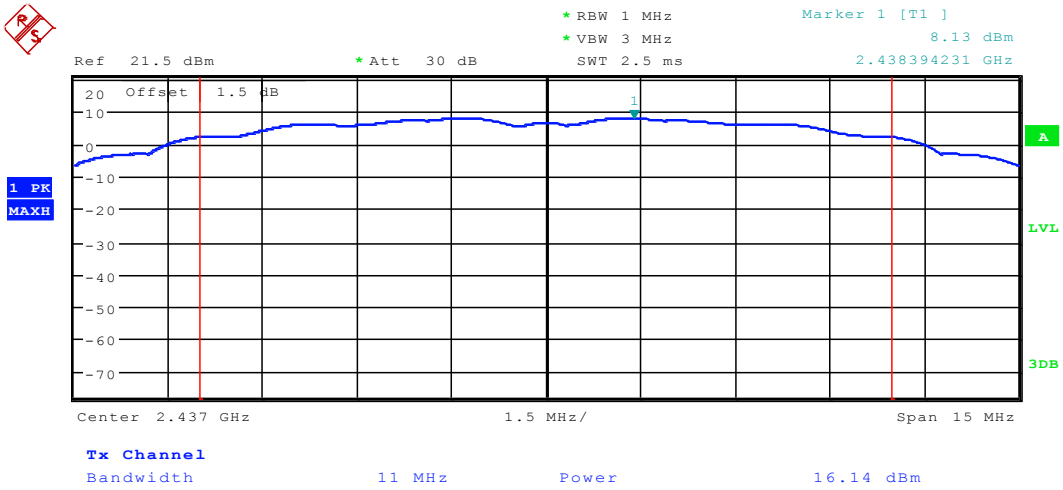
802.11b mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	16.51	30.00	Pass
Middle	16.14	30.00	Pass
Highest	16.05	30.00	Pass
802.11g mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	20.65	30.00	Pass
Middle	20.63	30.00	Pass
Highest	20.30	30.00	Pass
802.11n(HT20)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	18.43	30.00	Pass
Middle	18.20	30.00	Pass
Highest	17.77	30.00	Pass
802.11n(HT40)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	18.45	30.00	Pass
Middle	18.62	30.00	Pass
Highest	18.36	30.00	Pass

Test plot as follows:

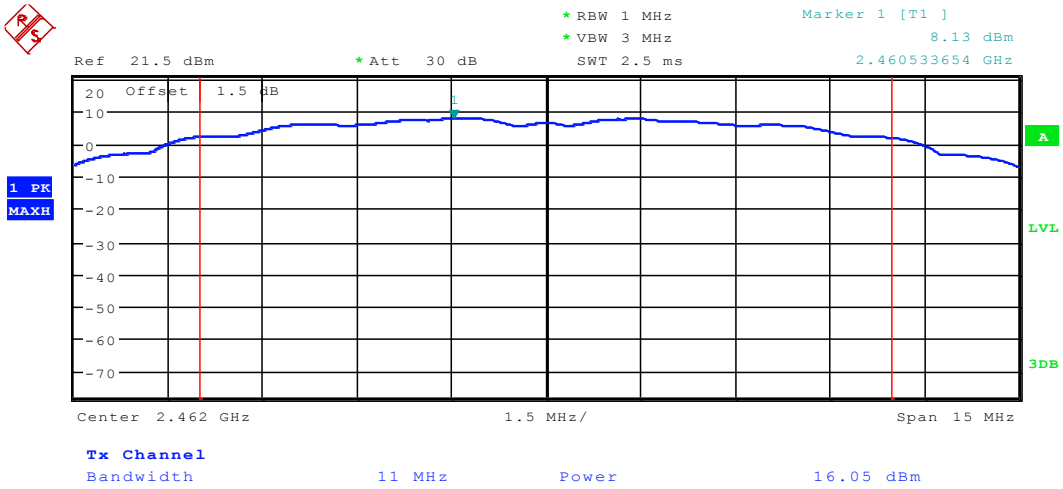
Test mode:	802.11b	Test channel:	Lowest



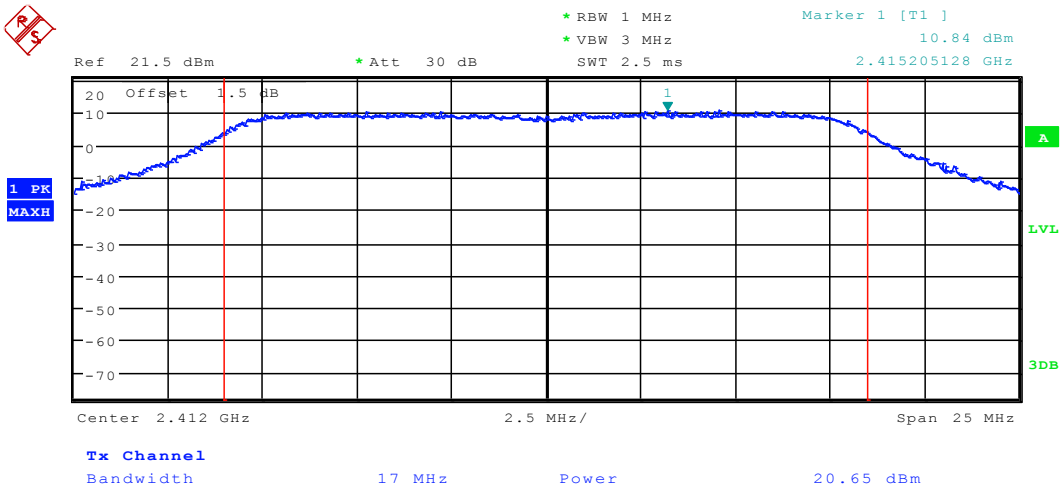
Test mode:	802.11b	Test channel:	Middle



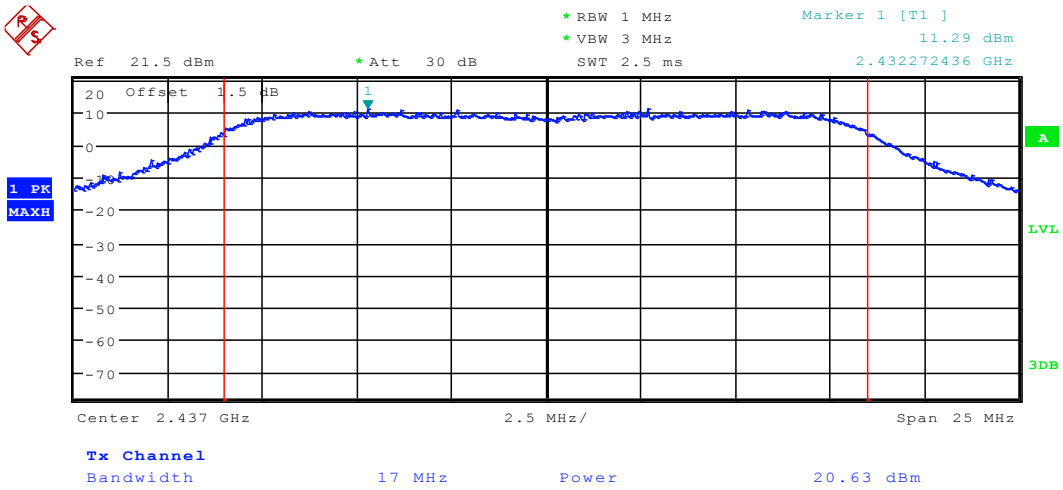
Test mode:	802.11b	Test channel:	Highest



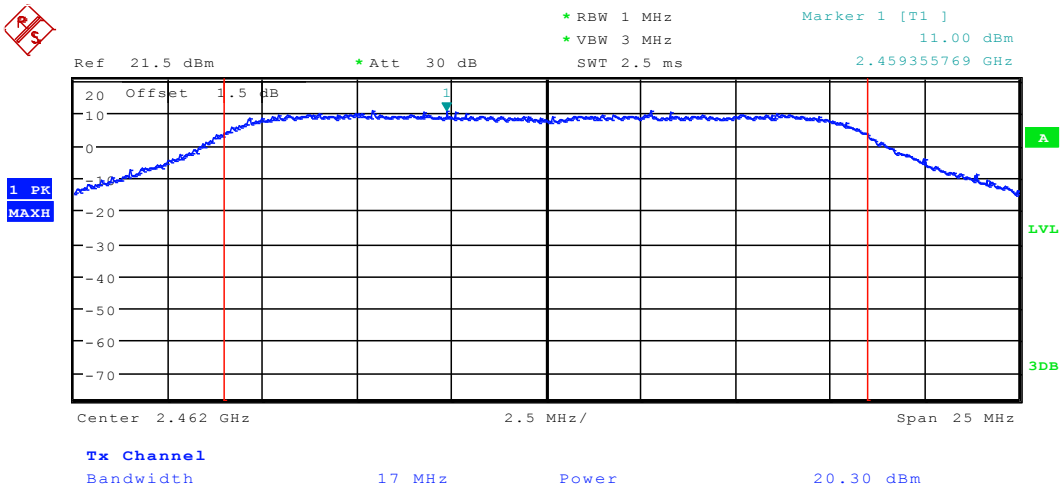
Test mode:	802.11g	Test channel:	Lowest



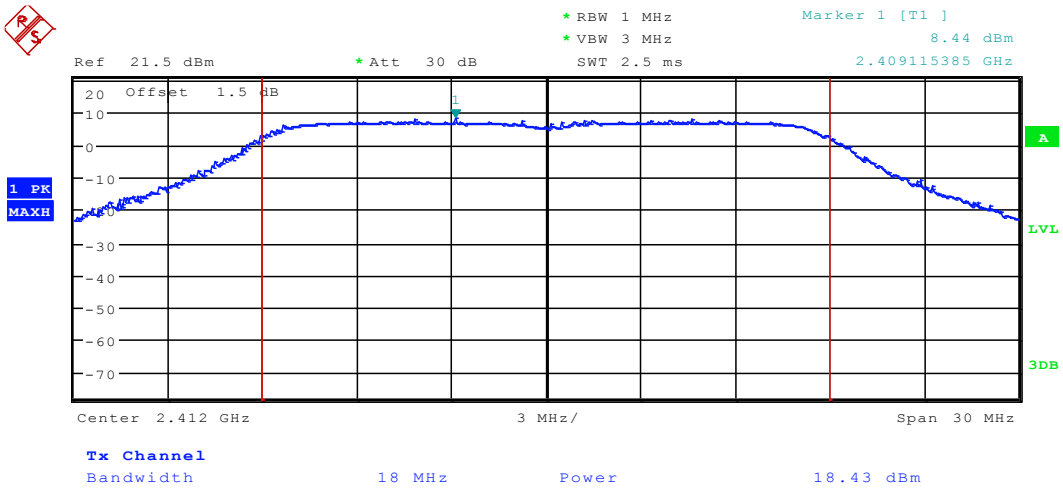
Test mode:	802.11g	Test channel:	Middle



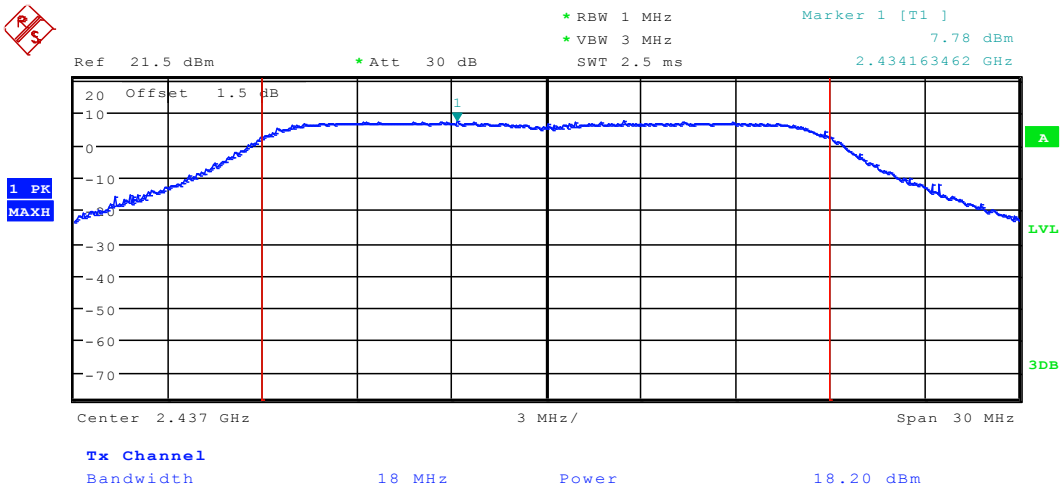
Test mode:	802.11g	Test channel:	Highest



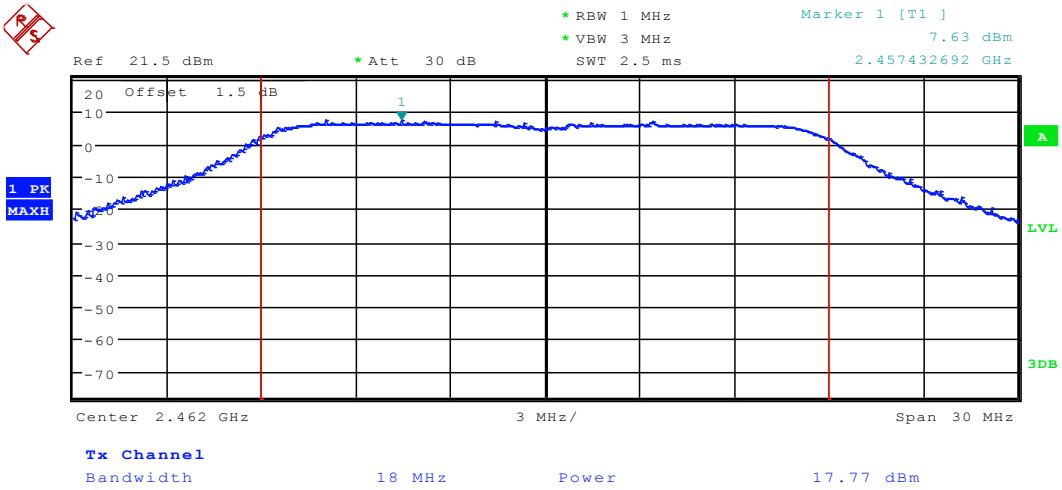
Test mode:	802.11n(HT20)	Test channel:	Lowest



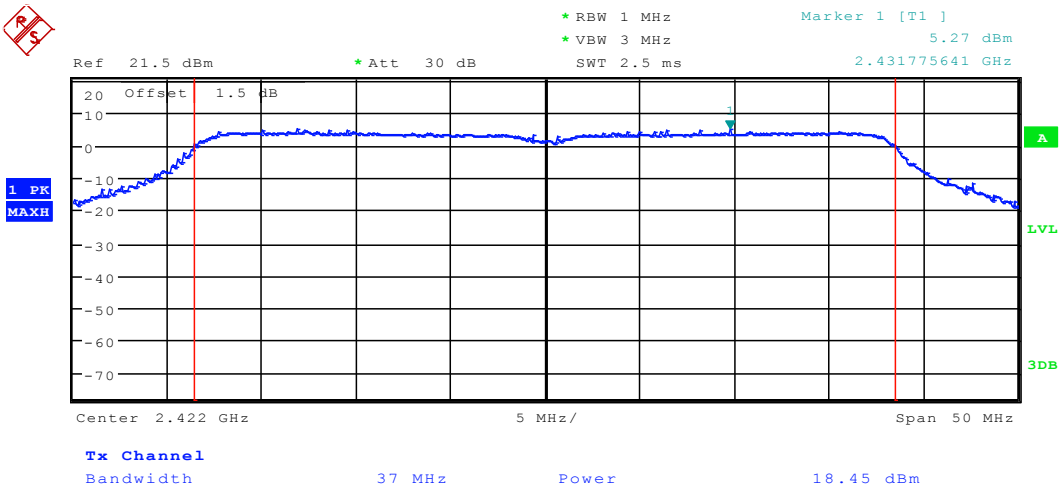
Test mode:	802.11n(HT20)	Test channel:	Middle



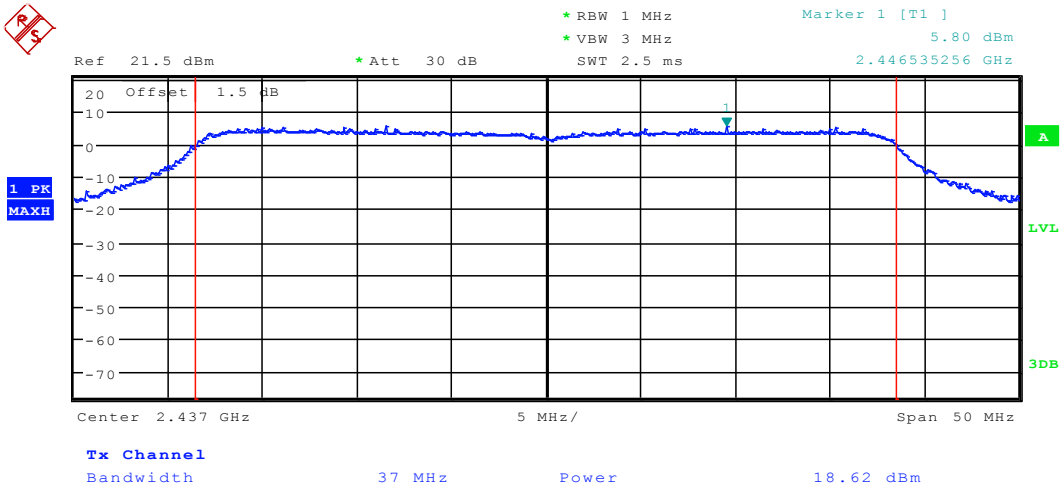
Test mode:	802.11n(HT20)	Test channel:	Highest



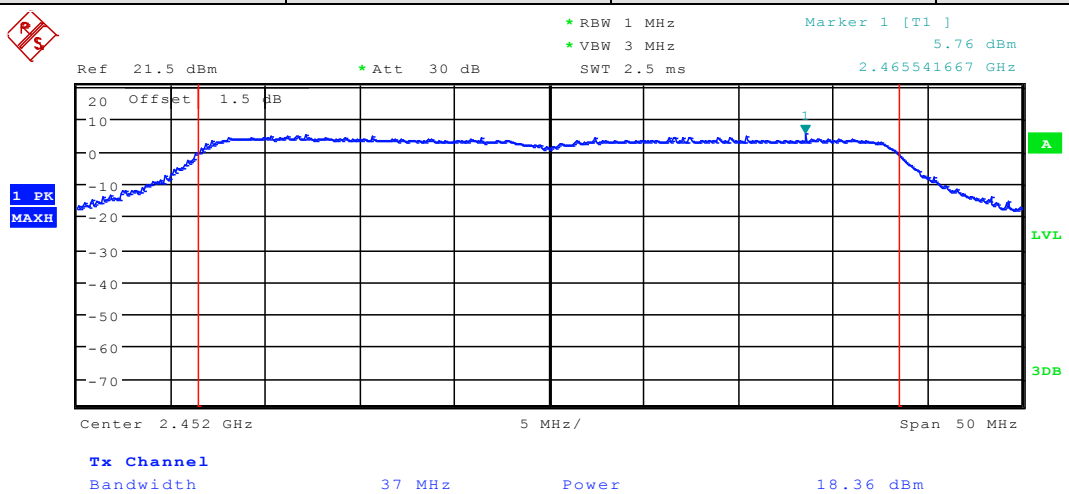
Test mode:	802.11n(HT40)	Test channel:	Lowest



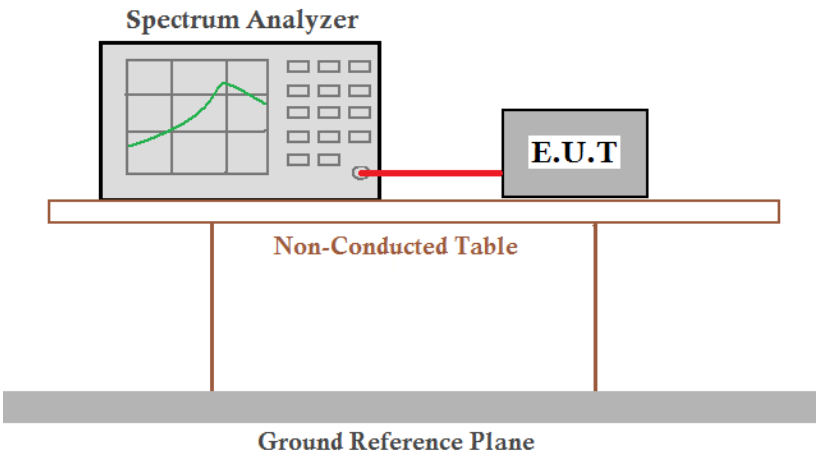
Test mode:	802.11n(HT40)	Test channel:	Middle



Test mode:	802.11n(HT40)	Test channel:	Highest



6.4 6dB Occupy Bandwidth

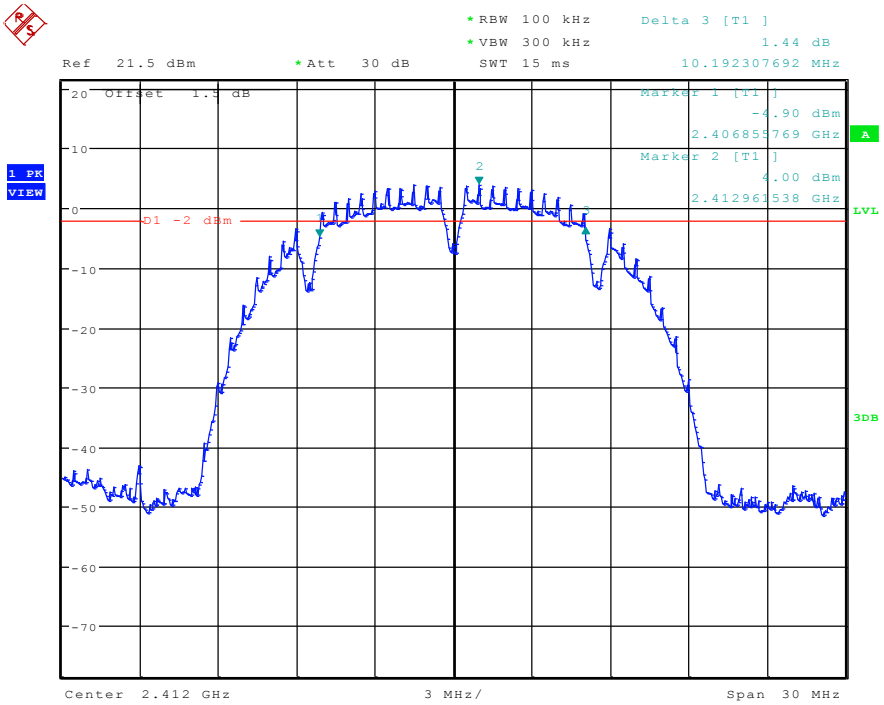
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	KDB558074 D01 v03r05
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)
Limit:	≥ 500 kHz
Test Results:	Pass

Measurement Data

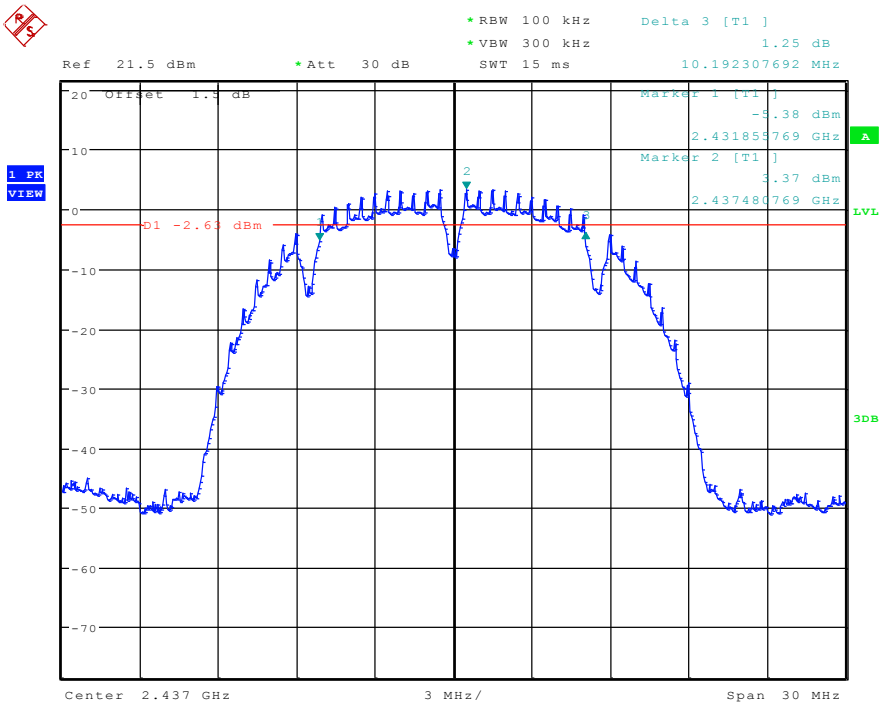
802.11b mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	10.1923	≥500	Pass
Middle	10.1923	≥500	Pass
Highest	10.1923	≥500	Pass
802.11g mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	16.6827	≥500	Pass
Middle	16.6346	≥500	Pass
Highest	16.6346	≥500	Pass
802.11n(HT20) mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	17.8846	≥500	Pass
Middle	17.9327	≥500	Pass
Highest	17.8846	≥500	Pass
802.11n(HT40)mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	36.7788	≥500	Pass
Middle	36.7788	≥500	Pass
Highest	36.7788	≥500	Pass

Test plot as follows:

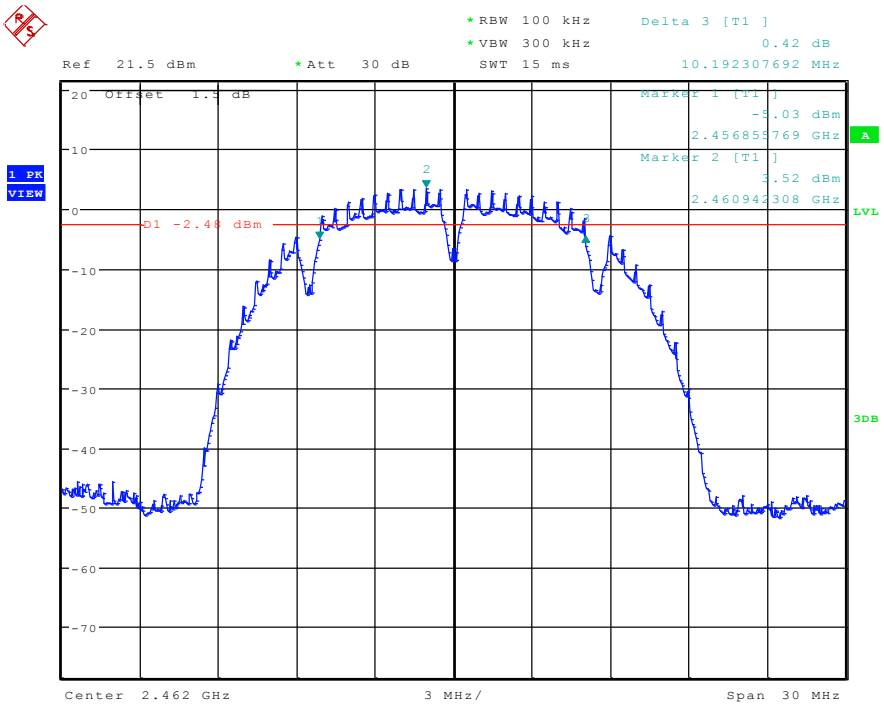
Test mode:	802.11b	Test channel:	Lowest



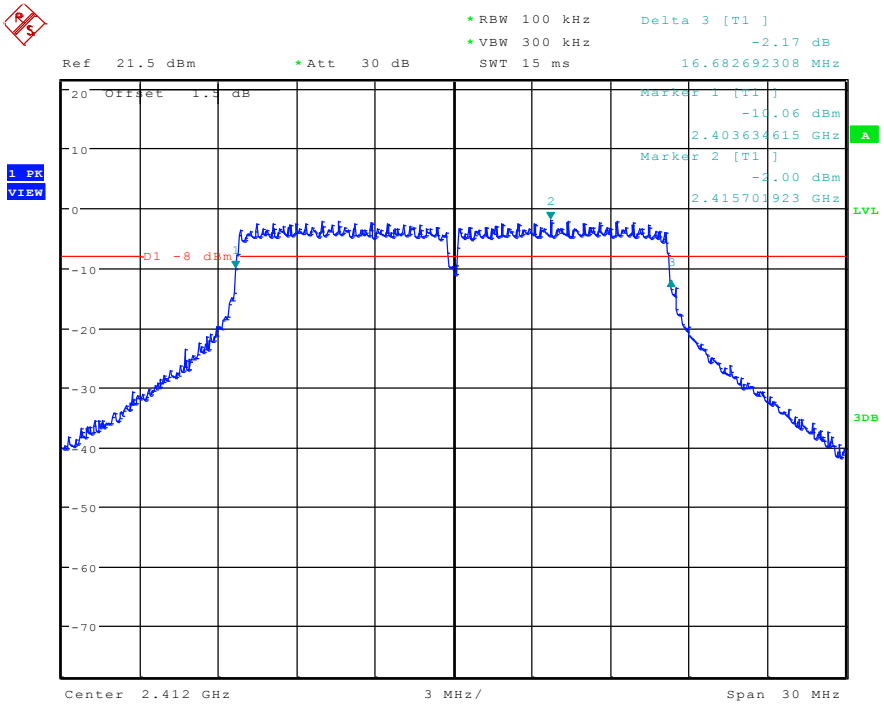
Test mode:	802.11b	Test channel:	Middle



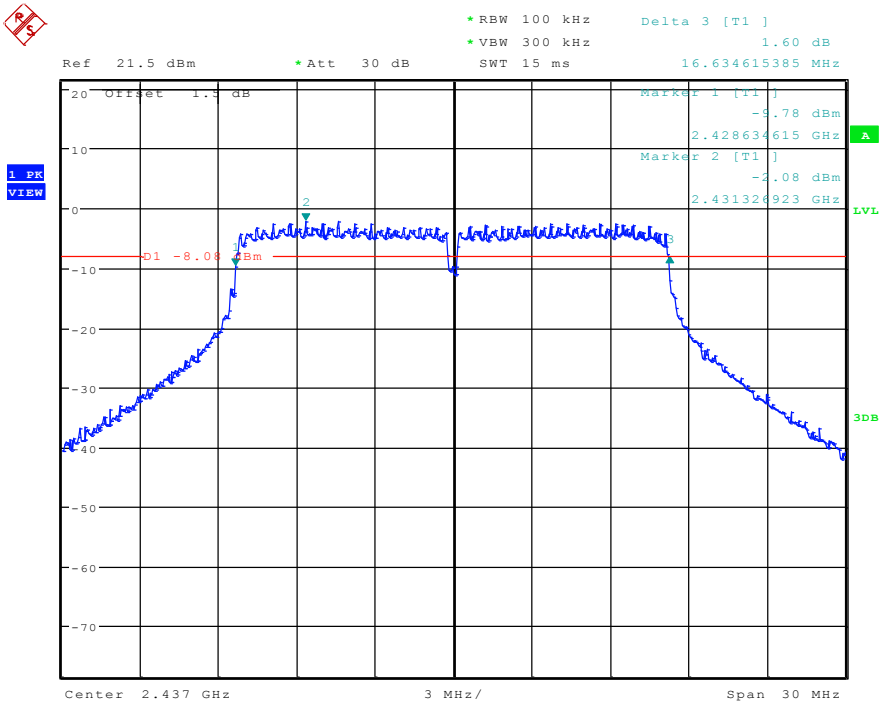
Test mode:	802.11b	Test channel:	Highest



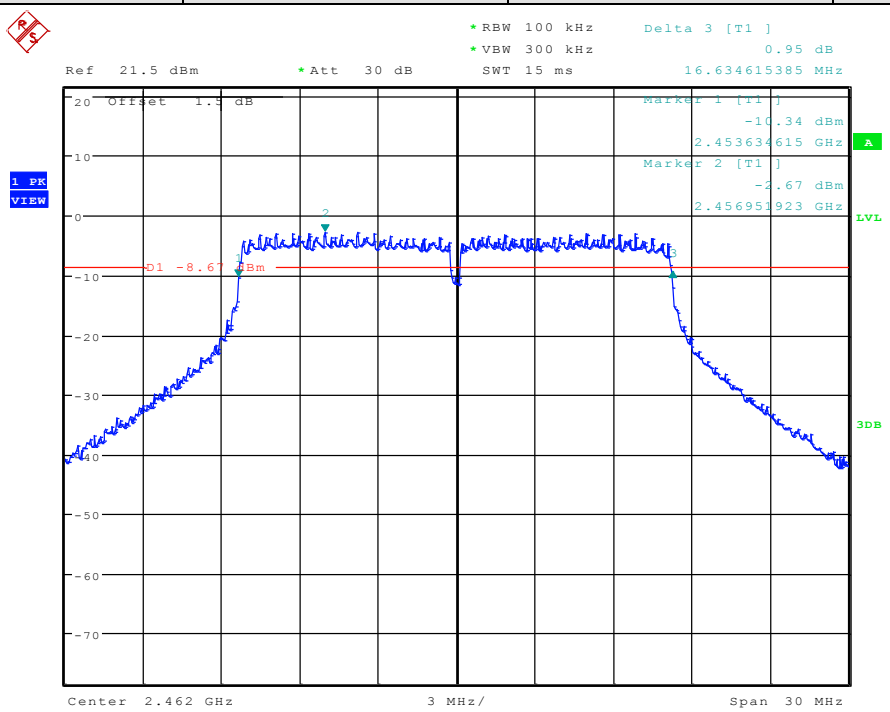
Test mode:	802.11g	Test channel:	Lowest



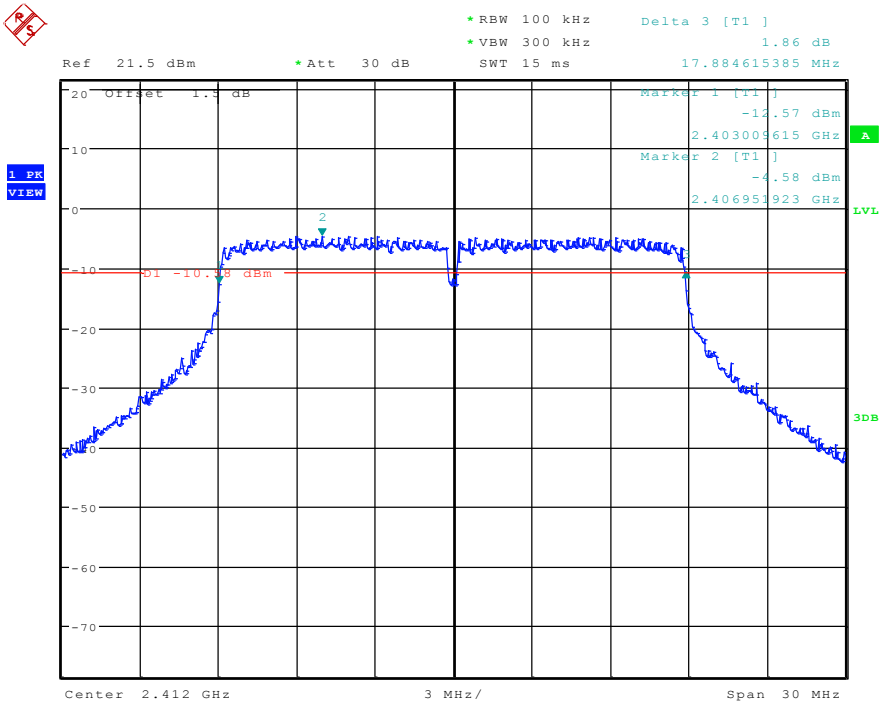
Test mode:	802.11g	Test channel:	Middle



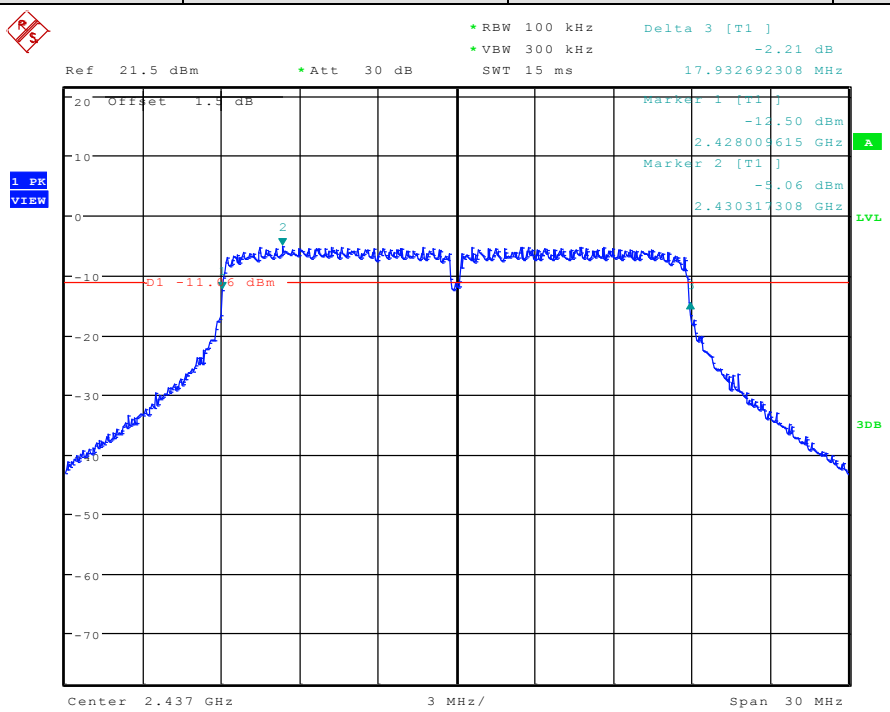
Test mode:	802.11g	Test channel:	Highest



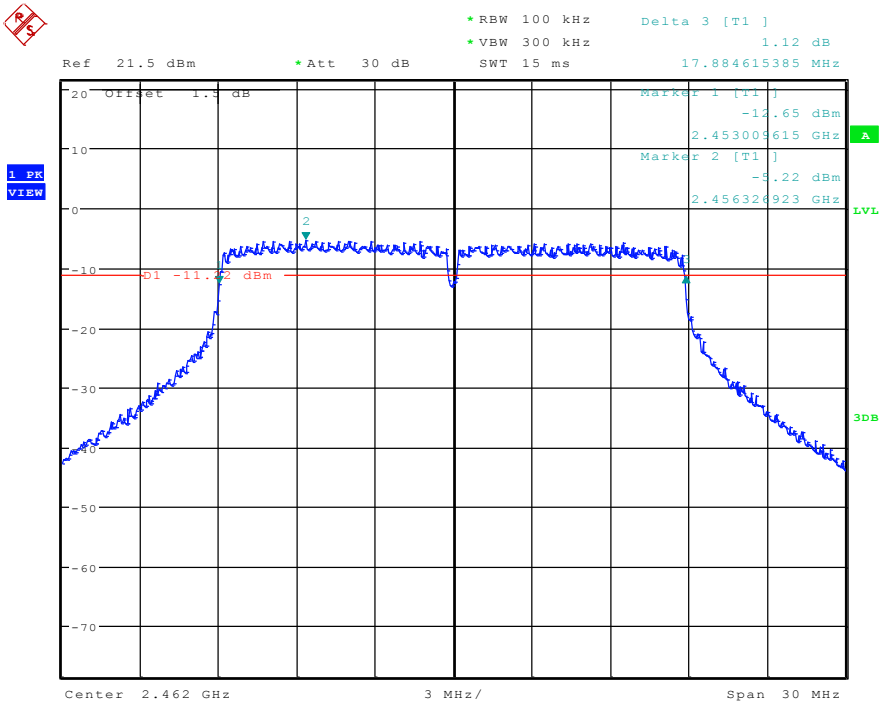
Test mode:	802.11n(HT20)	Test channel:	Lowest



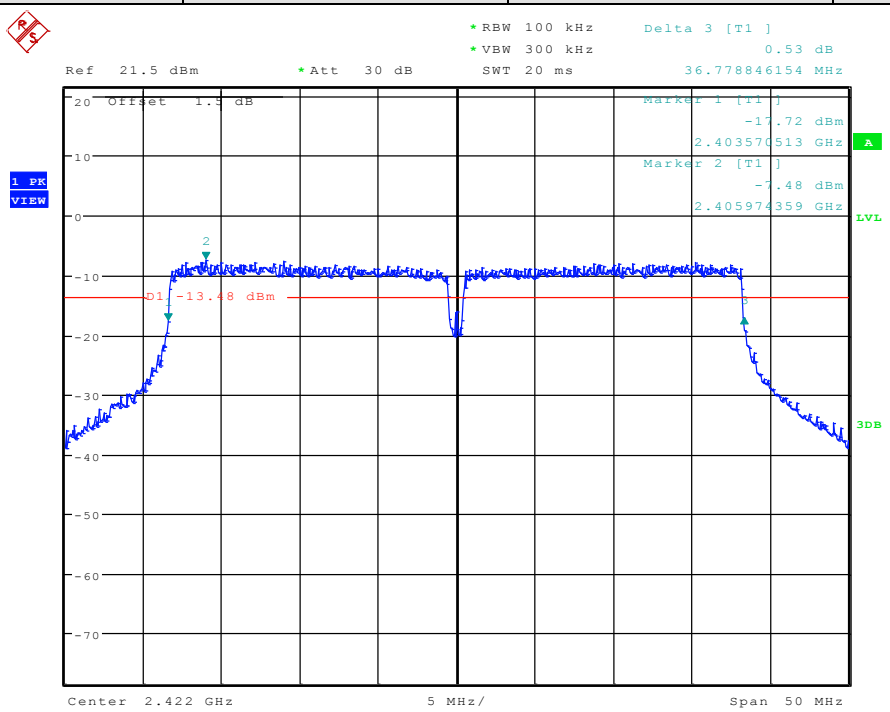
Test mode:	802.11n(HT20)	Test channel:	Middle



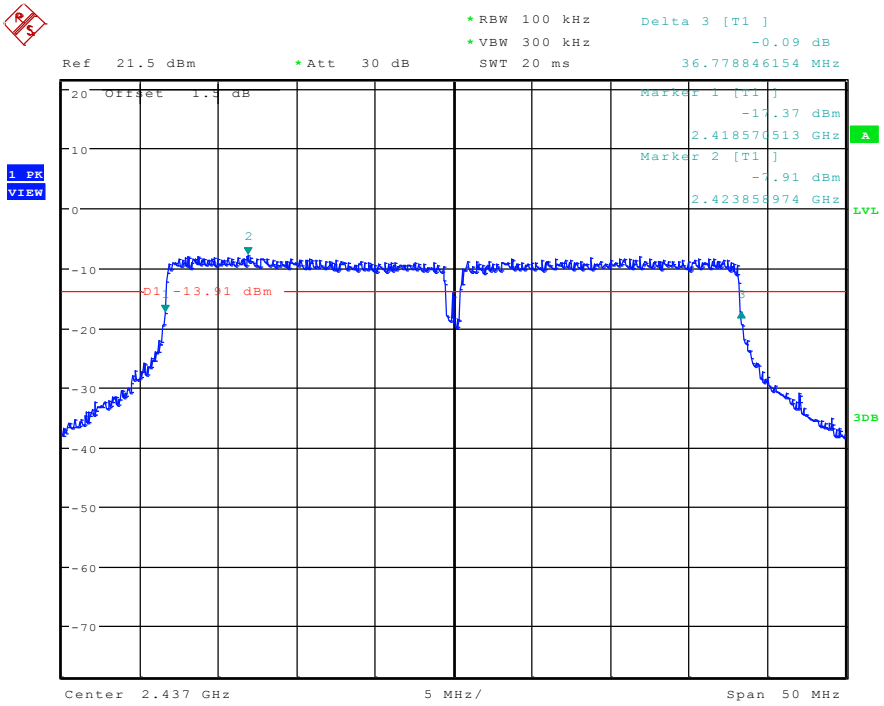
Test mode:	802.11n(HT20)	Test channel:	Highest



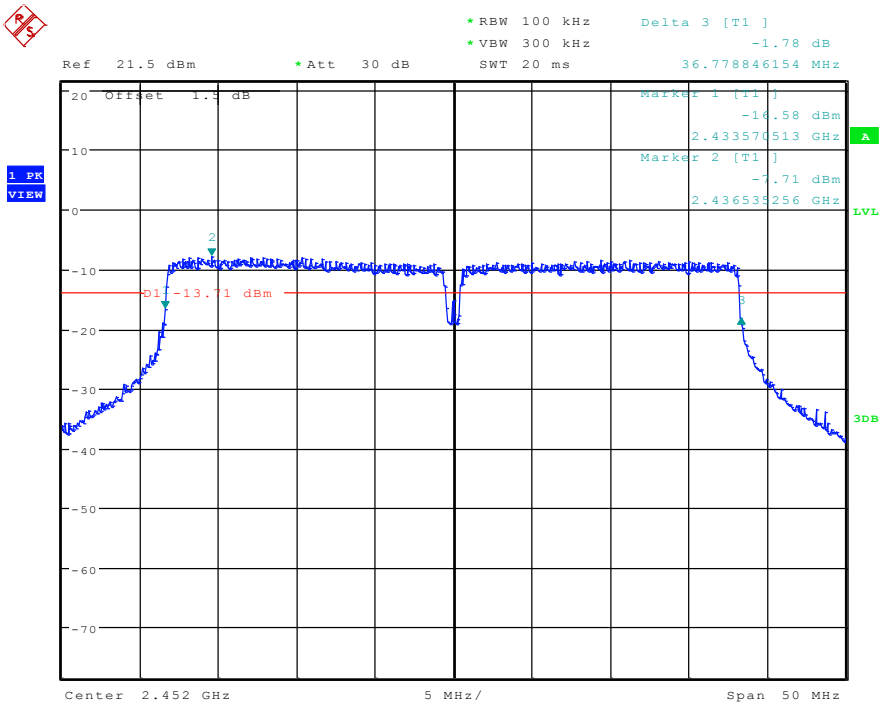
Test mode:	802.11n(HT40)	Test channel:	Lowest



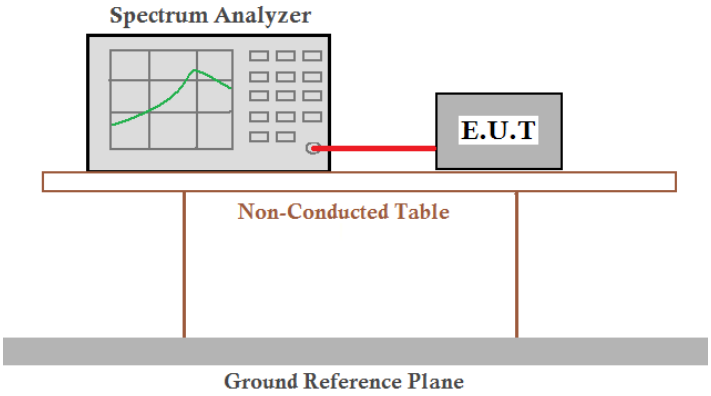
Test mode:	802.11n(HT40)	Test channel:	Middle



Test mode:	802.11n(HT40)	Test channel:	Highest



6.5 Power Spectral Density

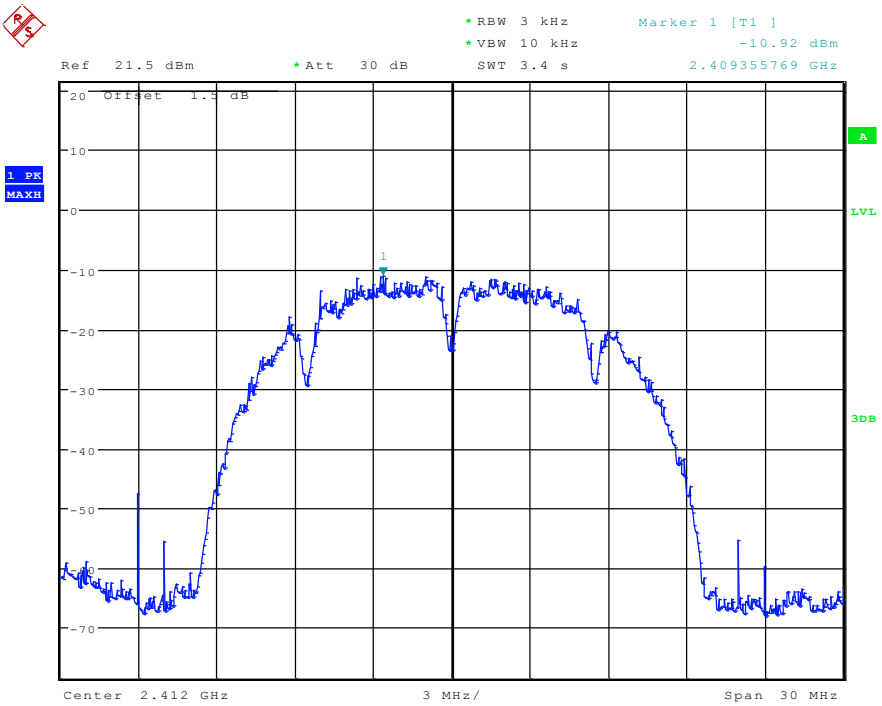
Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	KDB558074 D01 v03r05
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

Measurement Data

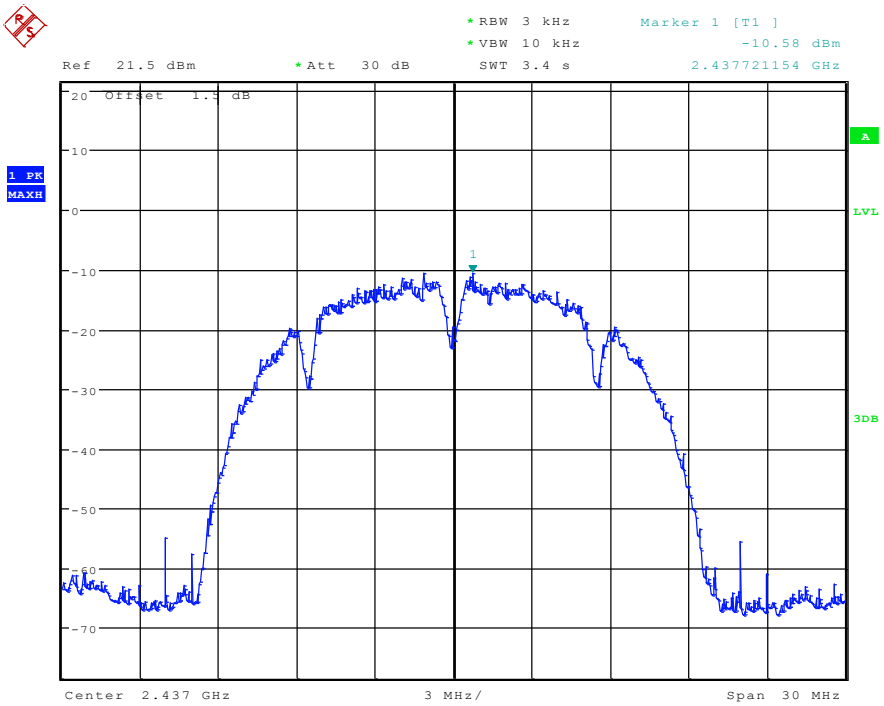
802.11b mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-10.92	≤8.00	Pass
Middle	-10.58	≤8.00	Pass
Highest	-10.55	≤8.00	Pass
802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-14.11	≤8.00	Pass
Middle	-13.41	≤8.00	Pass
Highest	-14.76	≤8.00	Pass
802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-16.22	≤8.00	Pass
Middle	-16.58	≤8.00	Pass
Highest	-16.82	≤8.00	Pass
802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-19.58	≤8.00	Pass
Middle	-18.93	≤8.00	Pass
Highest	-18.95	≤8.00	Pass

Test plot as follows:

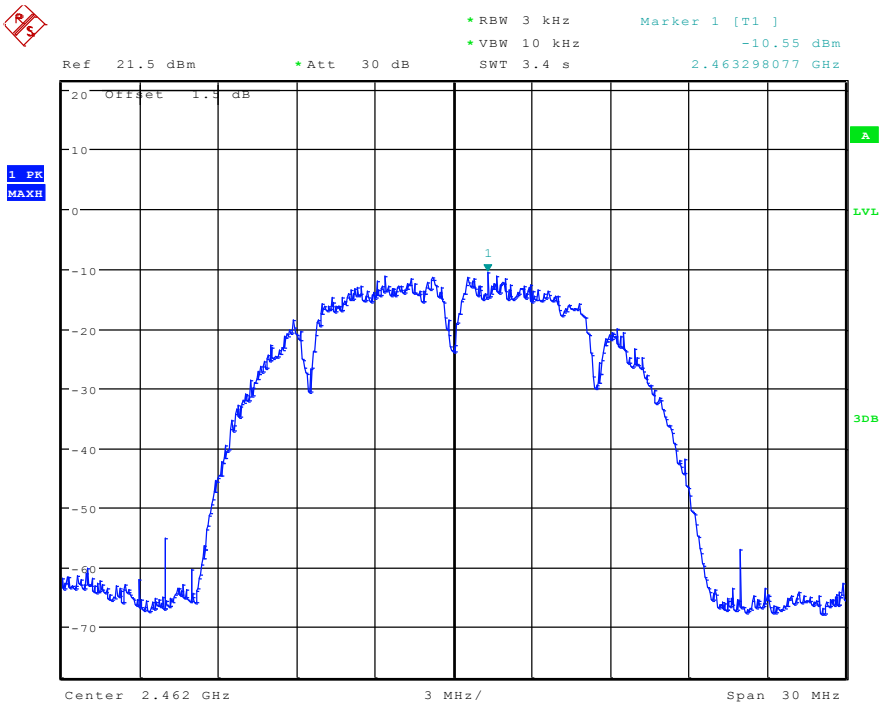
Test mode:	802.11b	Test channel:	Lowest



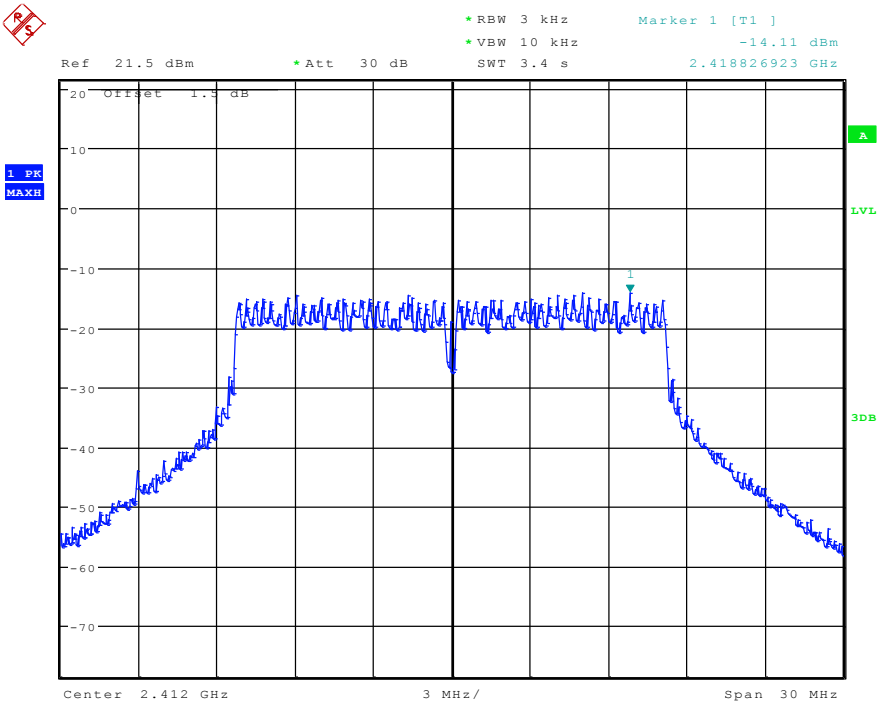
Test mode:	802.11b	Test channel:	Middle



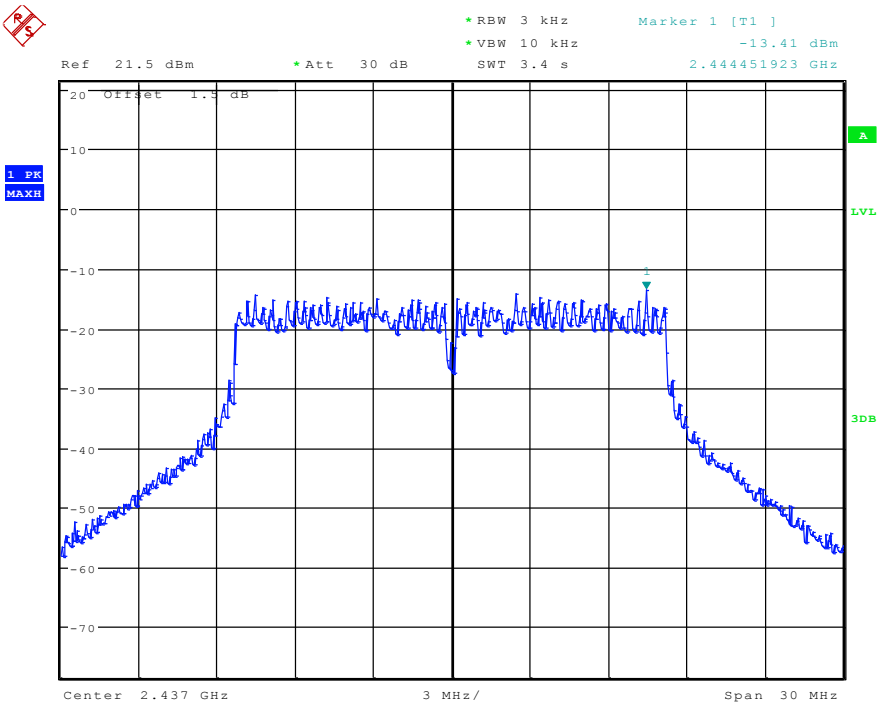
Test mode:	802.11b	Test channel:	Highest



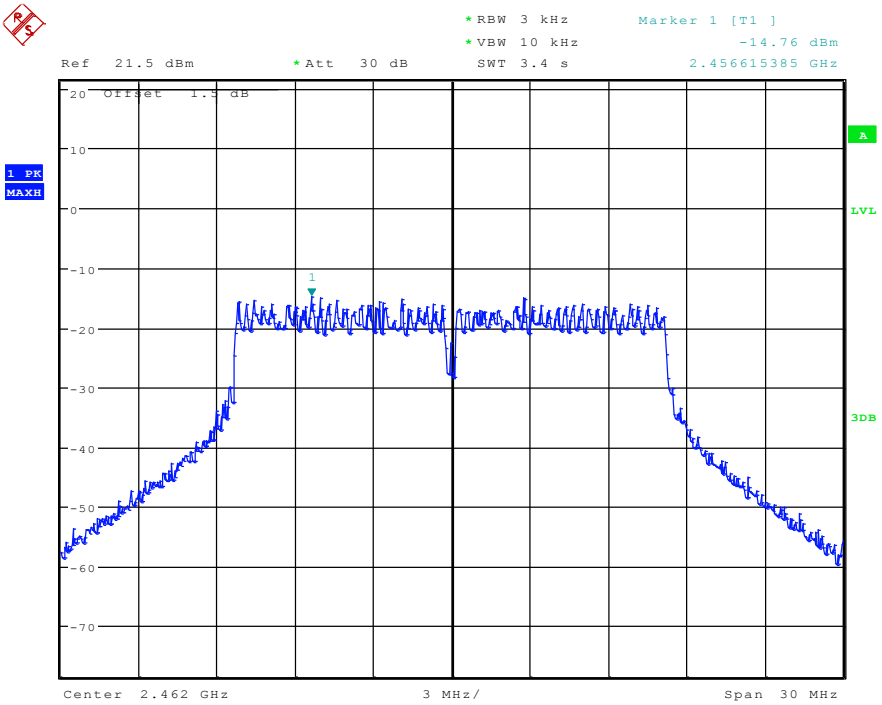
Test mode:	802.11g	Test channel:	Lowest



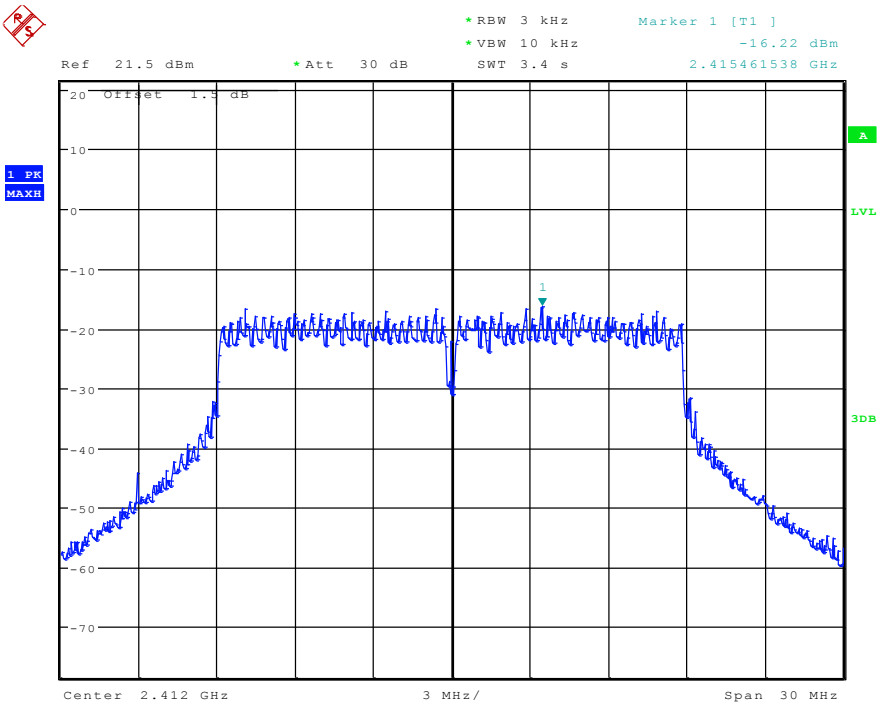
Test mode:	802.11g	Test channel:	Middle



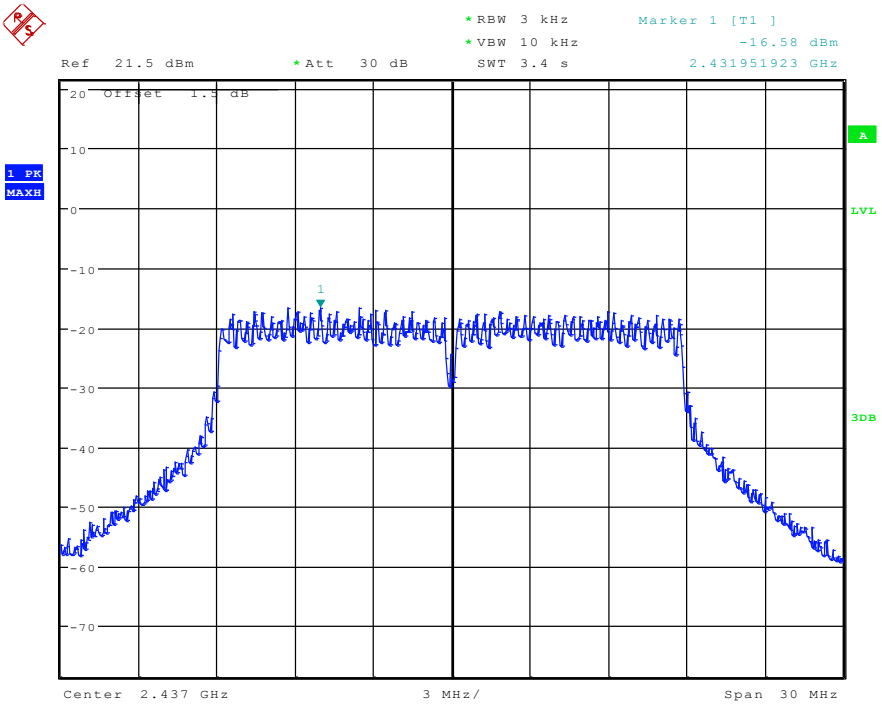
Test mode:	802.11g	Test channel:	Highest



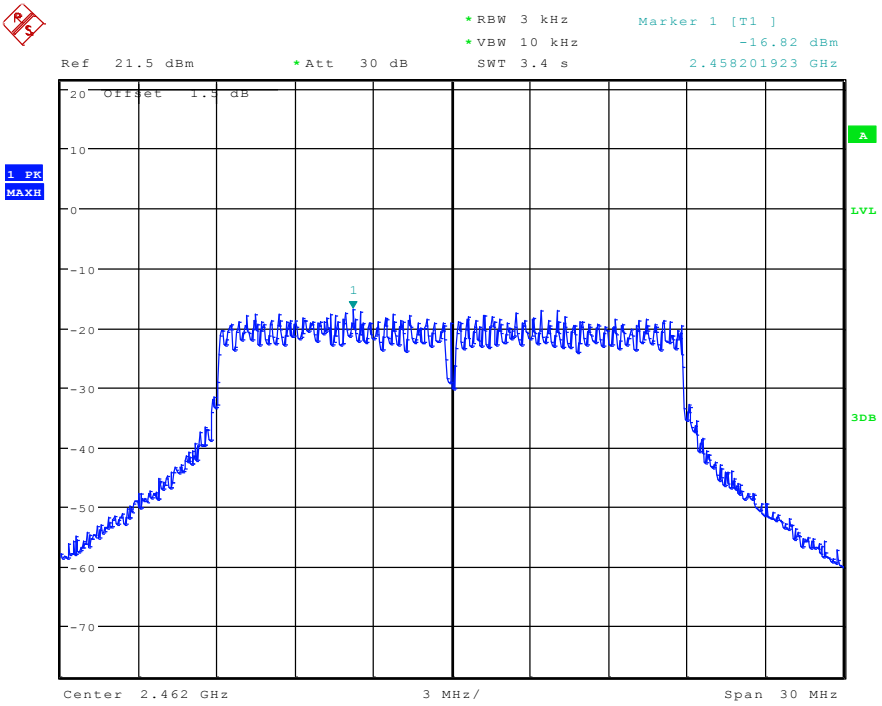
Test mode:	802.11n(HT20)	Test channel:	Lowest



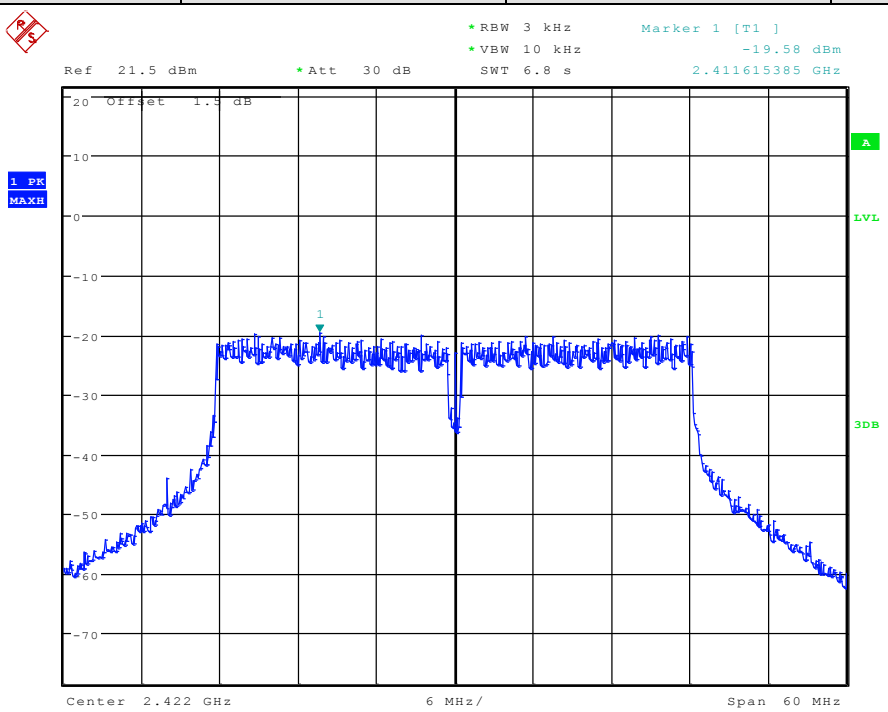
Test mode:	802.11n(HT20)	Test channel:	Middle



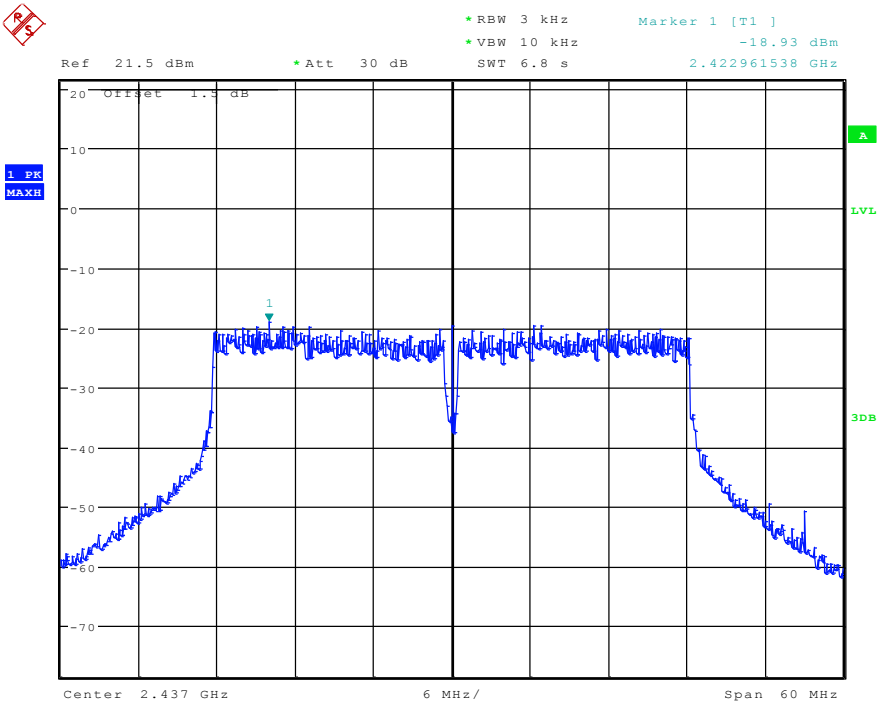
Test mode:	802.11n(HT20)	Test channel:	Highest



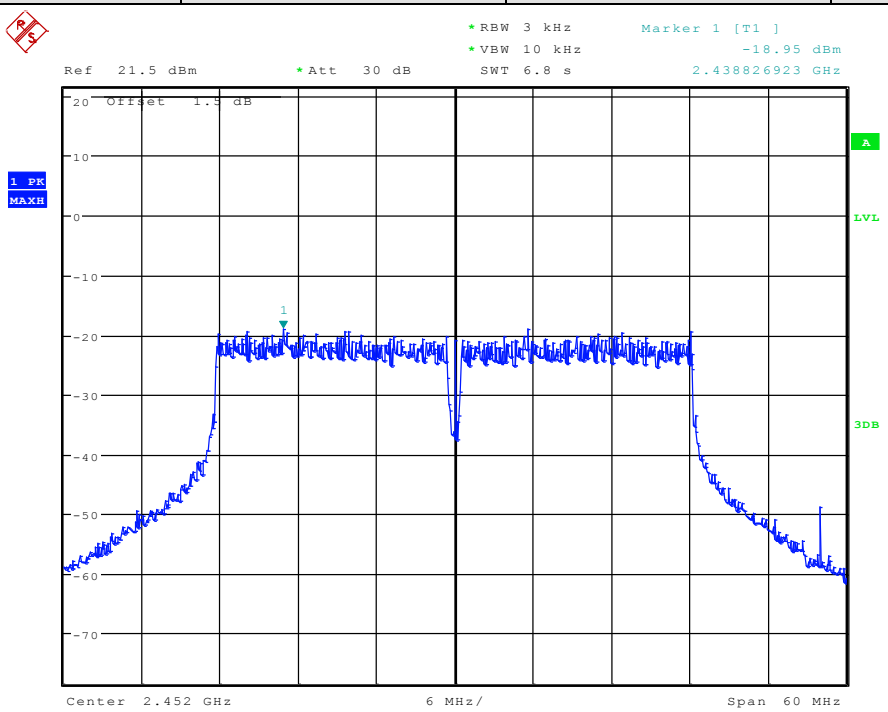
Test mode:	802.11n(HT40)	Test channel:	Lowest



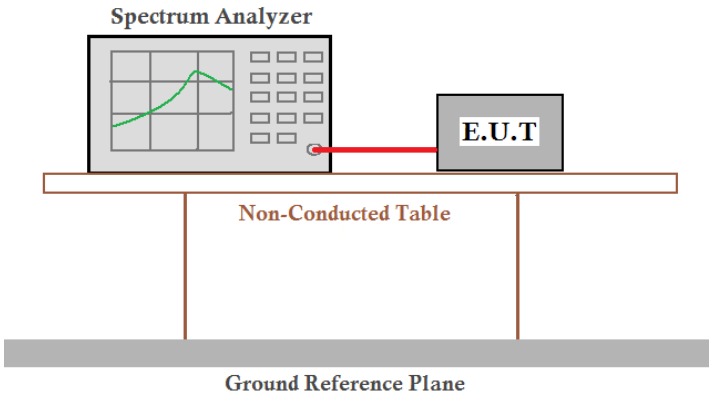
Test mode:	802.11n(HT40)	Test channel:	Middle



Test mode:	802.11n(HT40)	Test channel:	Highest

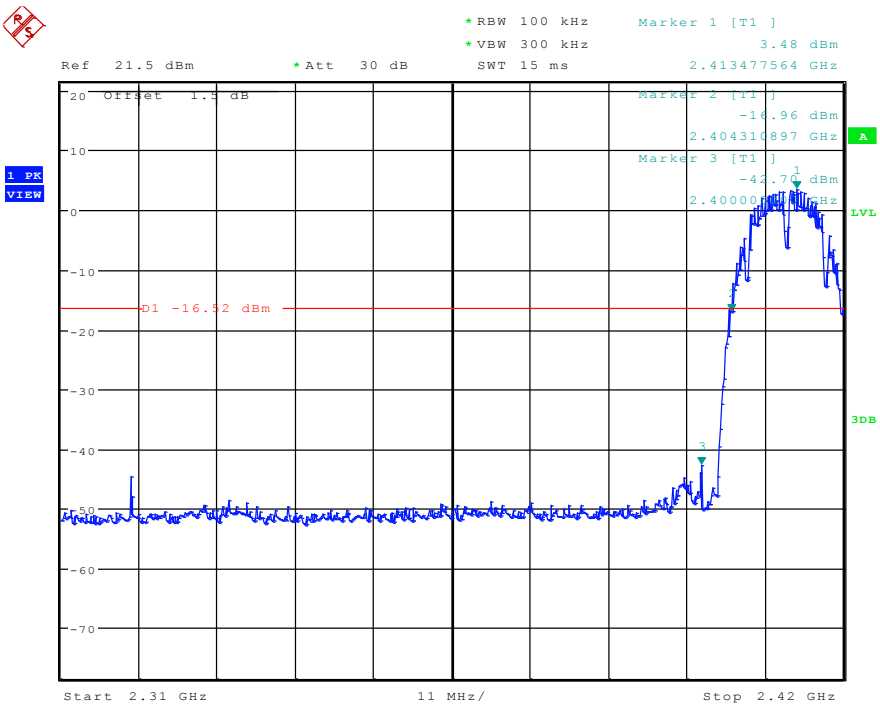


6.6 Band-edge for RF Conducted Emissions

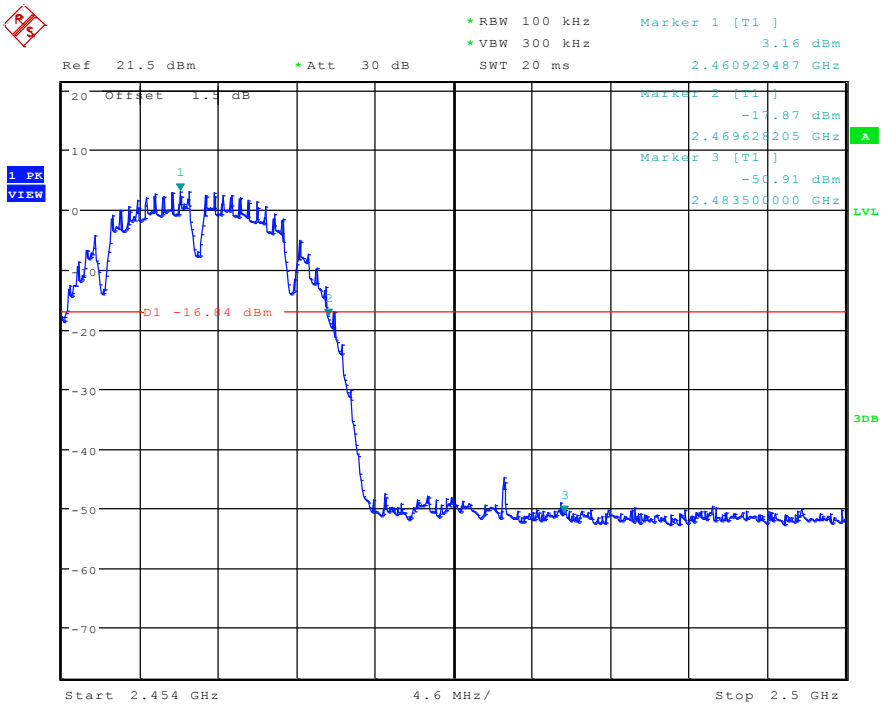
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01 v03r05
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
. Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Test plot as follows:

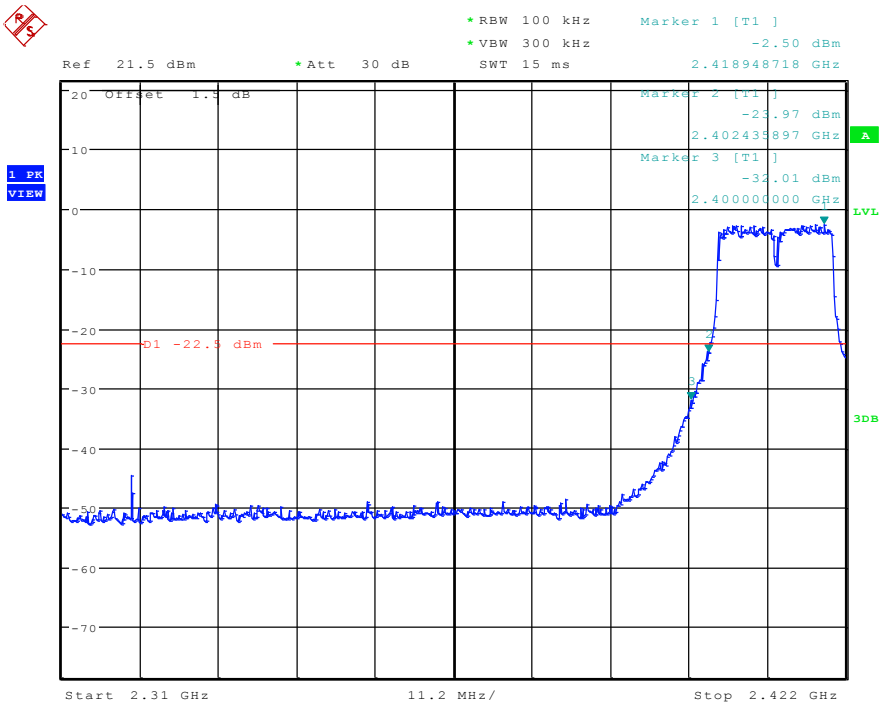
Test mode:	802.11b	Test channel:	Lowest



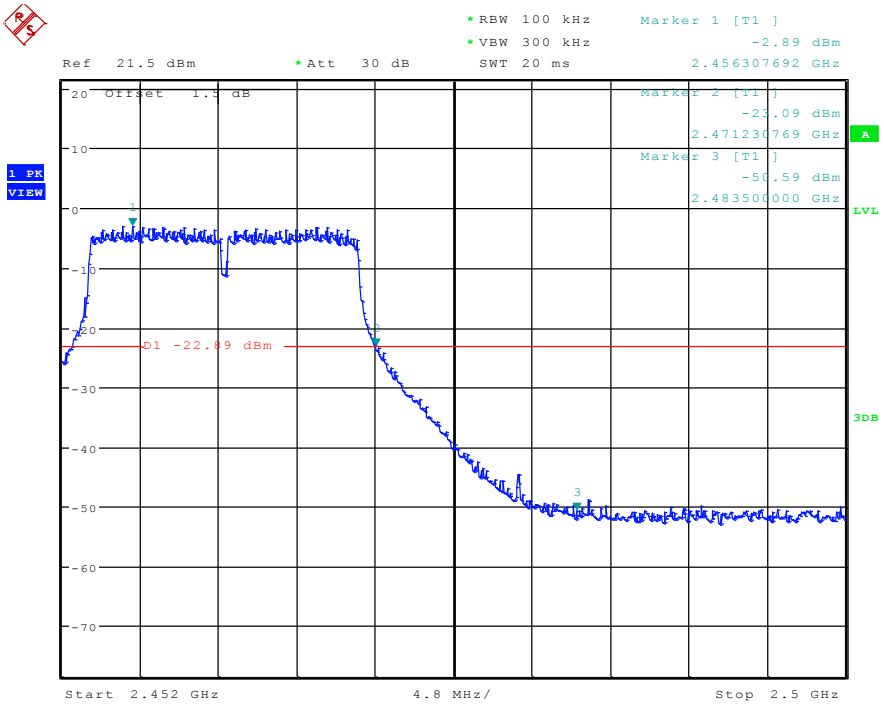
Test mode:	802.11b	Test channel:	Highest



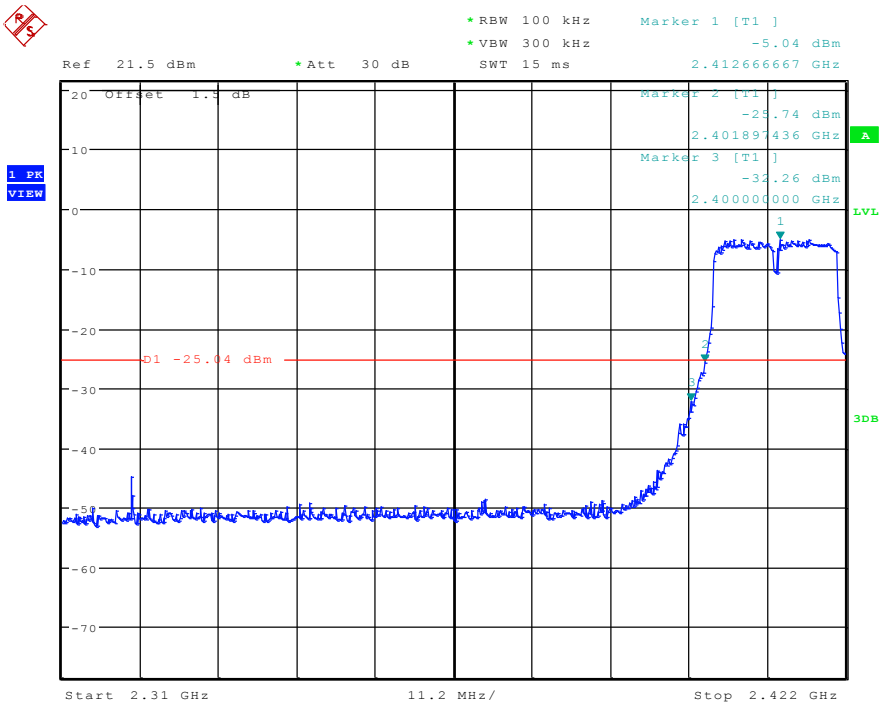
Test mode:	802.11g	Test channel:	Lowest



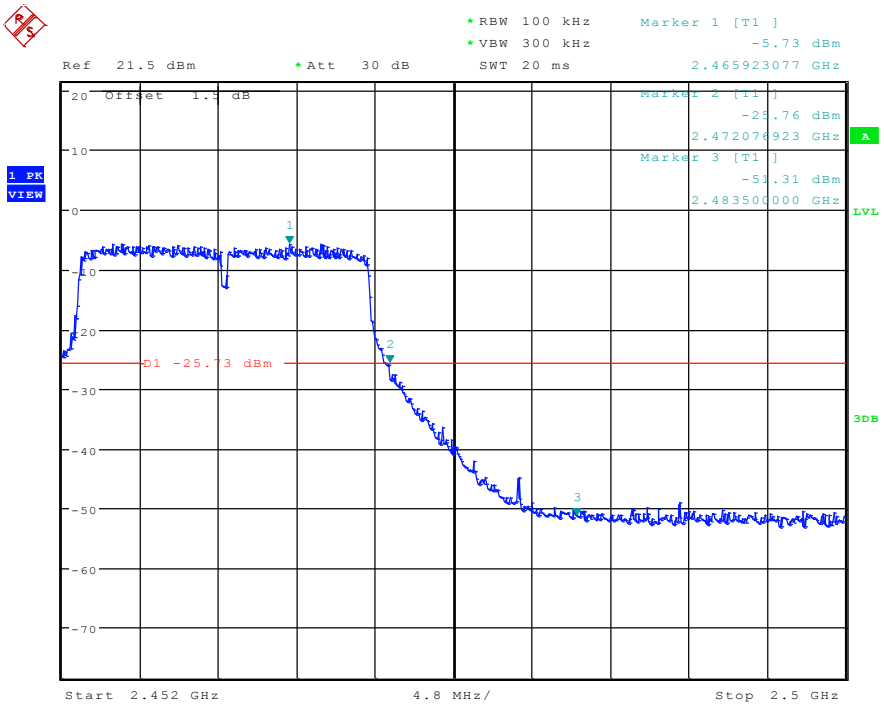
Test mode:	802.11g	Test channel:	Highest



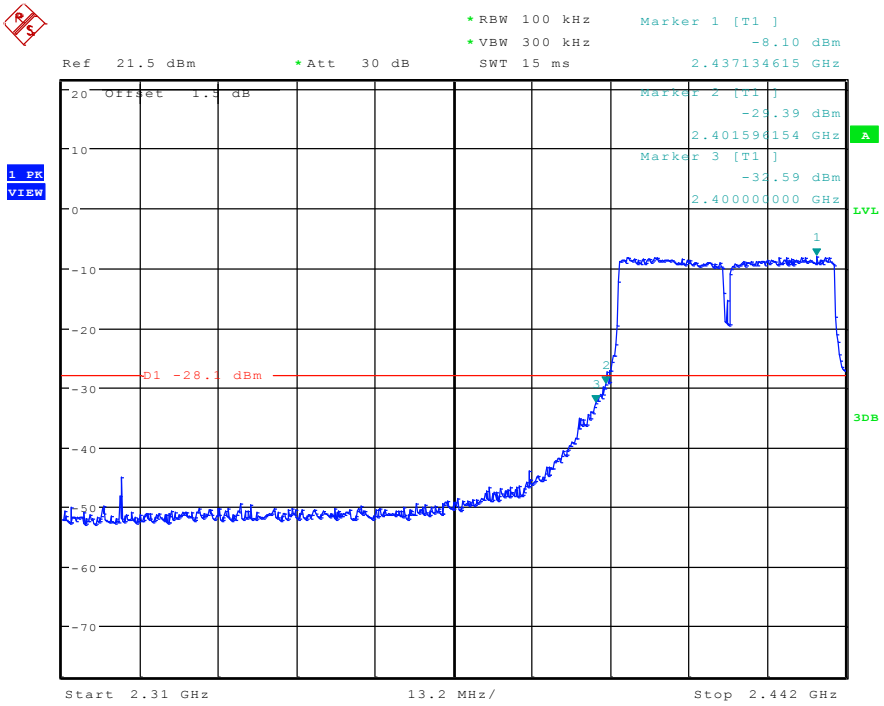
Test mode:	802.11n(HT20)	Test channel:	Lowest



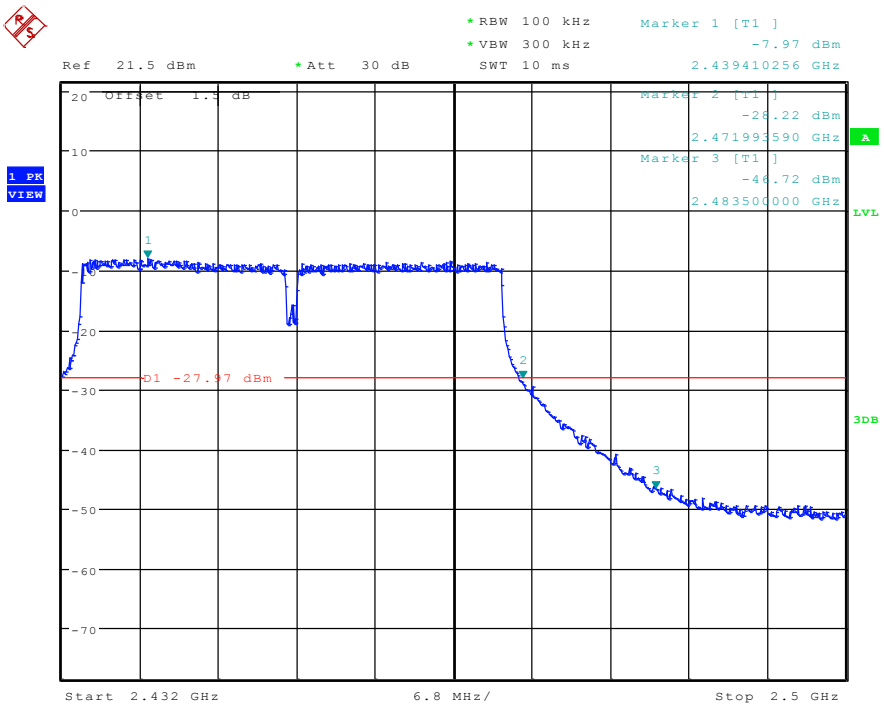
Test mode:	802.11n(HT20)	Test channel:	Highest



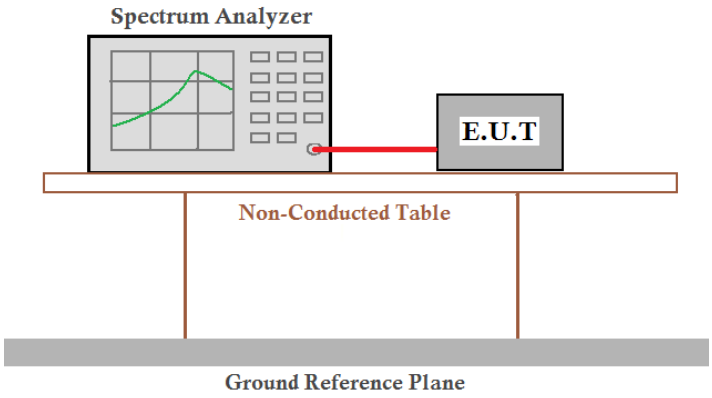
Test mode:	802.11n(HT40)	Test channel:	Lowest



Test mode:	802.11n(HT40)	Test channel:	Highest

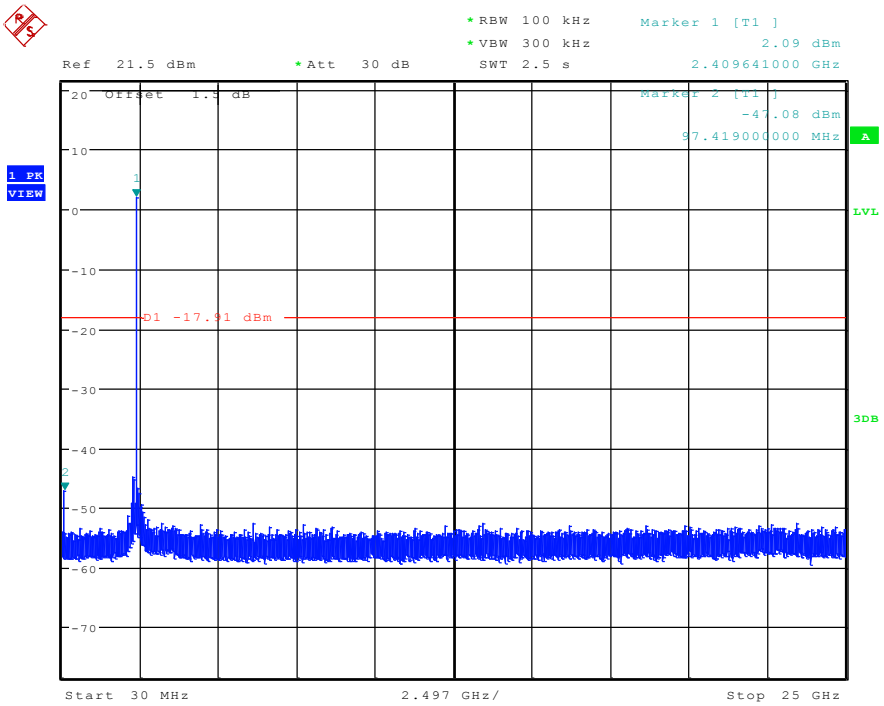


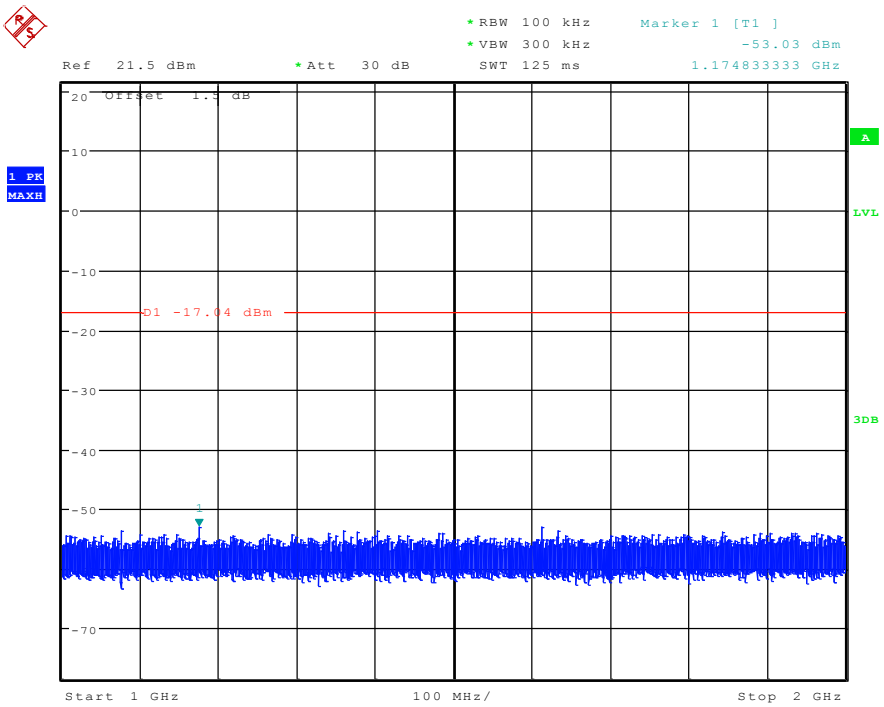
6.7 RF Conducted Spurious Emissions

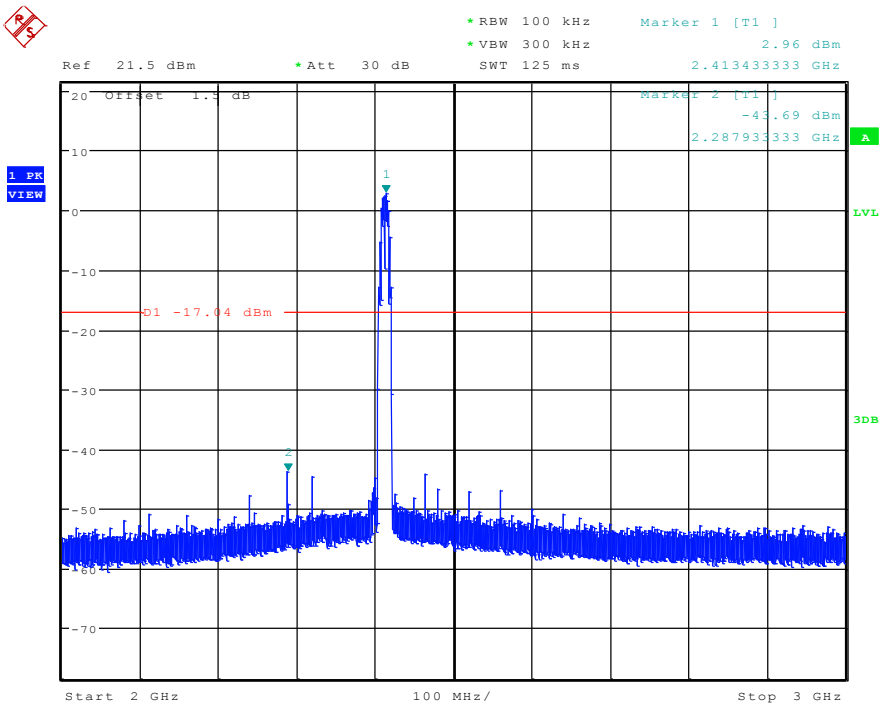
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01 v03r05
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

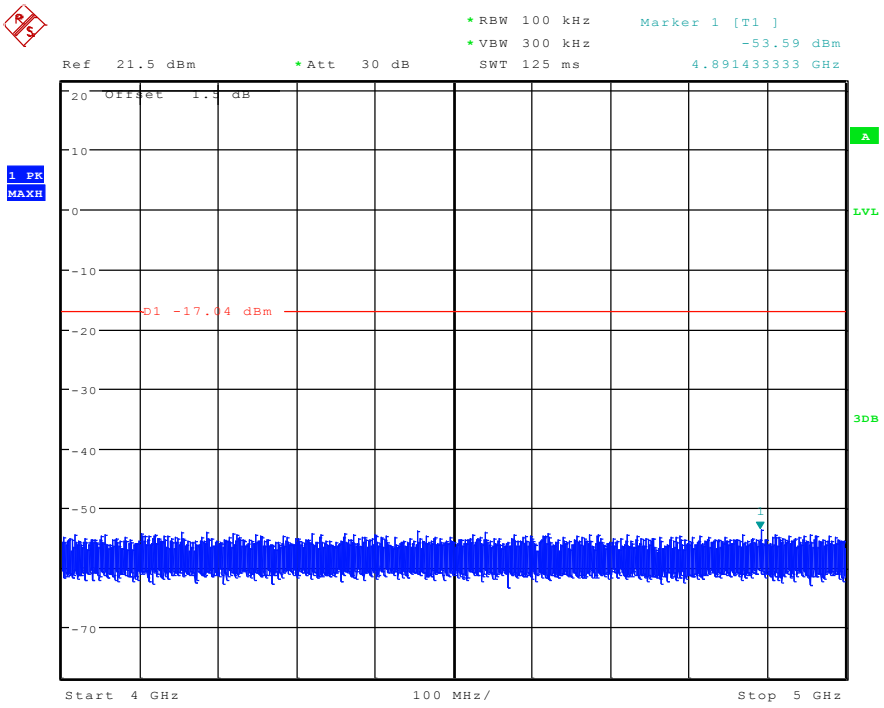
Test plot as follows:

Test mode:	802.11b	Test channel:	Lowest

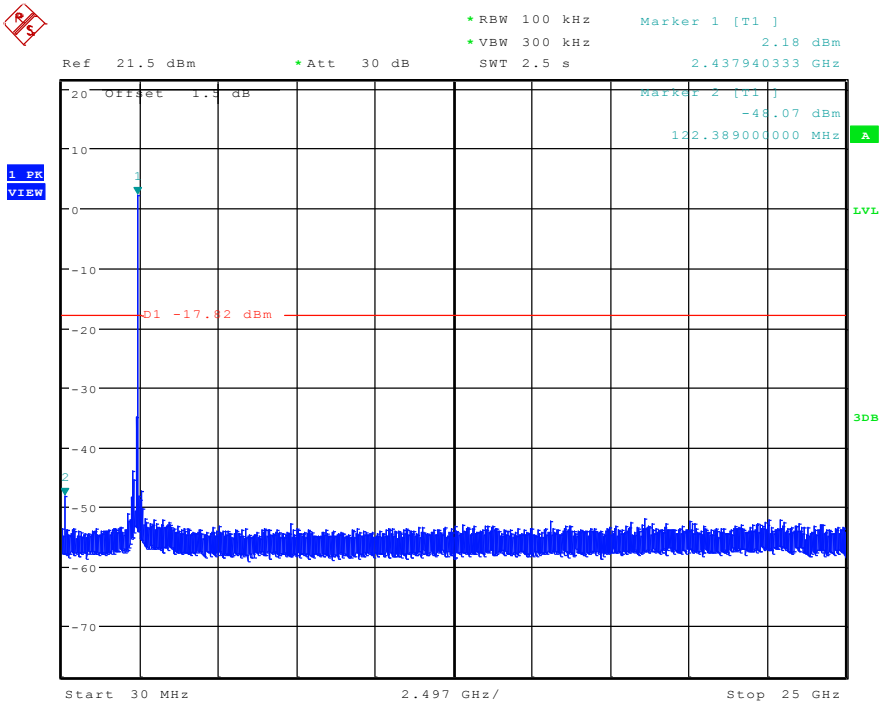


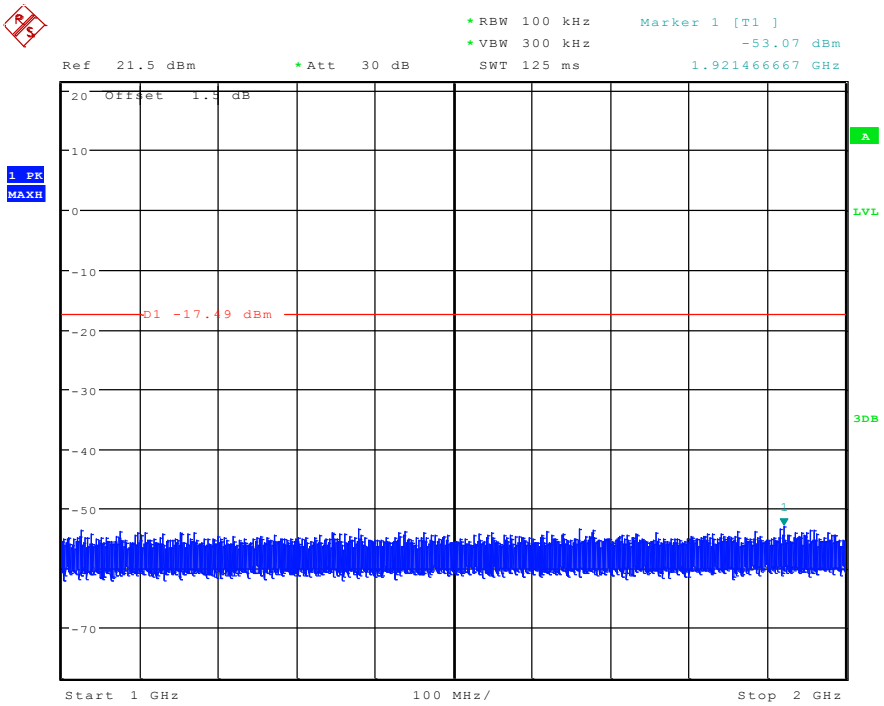


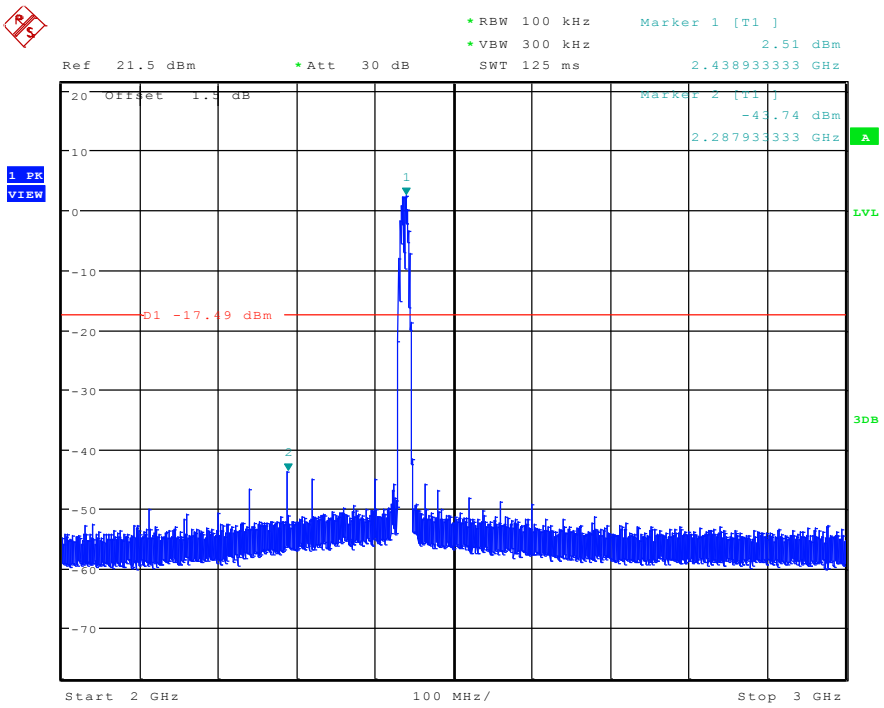

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
2.96 dBm
2.413433333 GHz
Marker 2 [T1]
-43.69 dBm
2.287933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -17.04 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

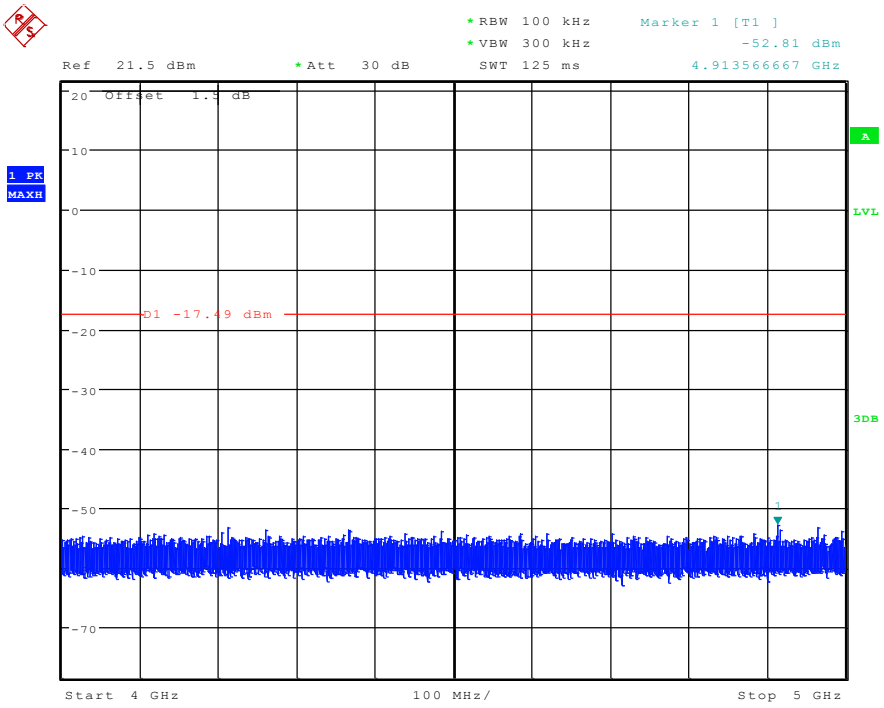

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.59 dBm
4.891433333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -17.04 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11b	Test channel:	Middle

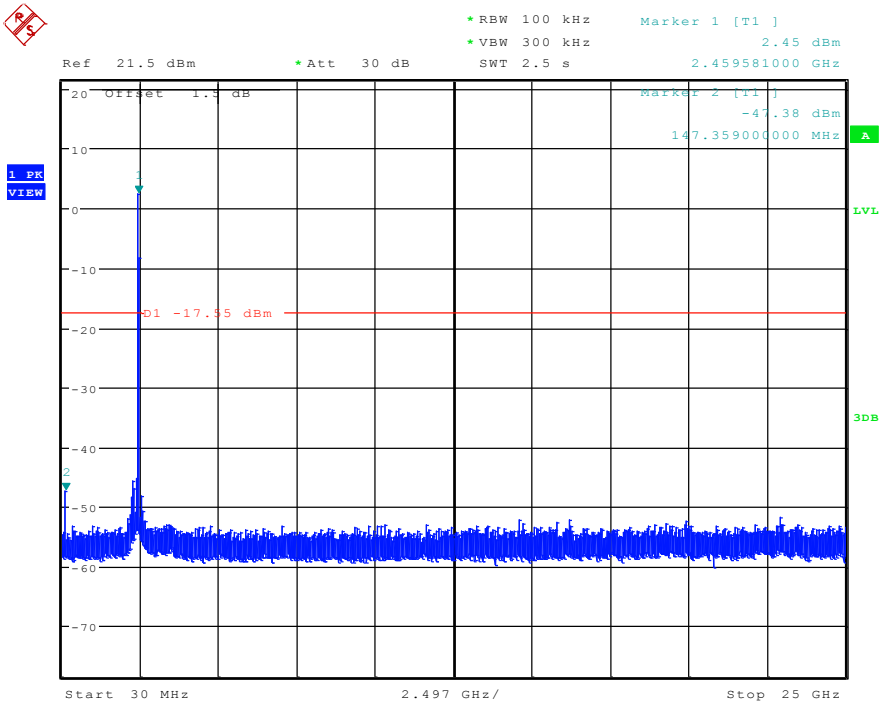


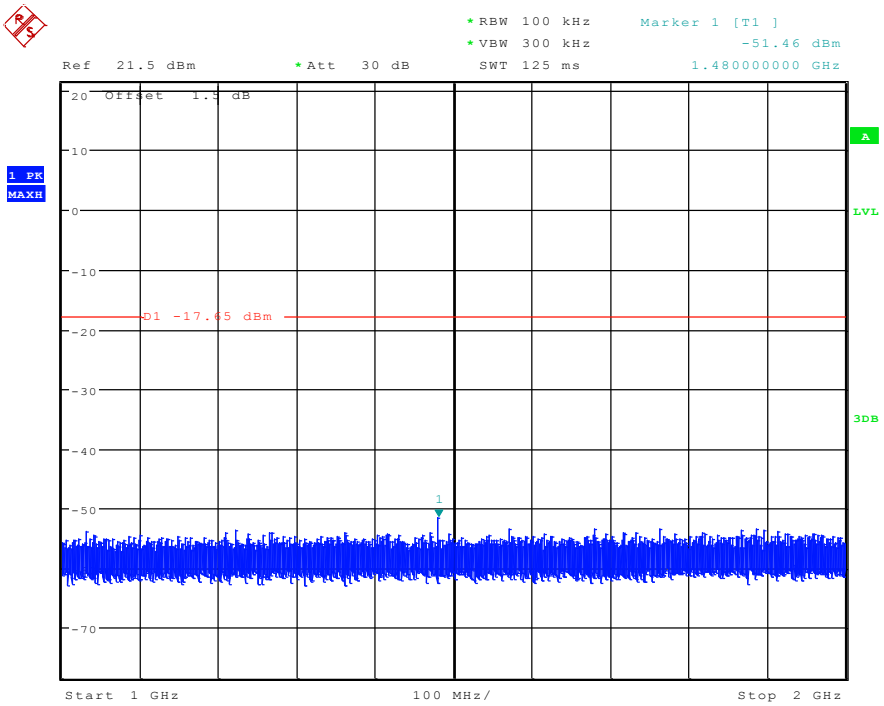


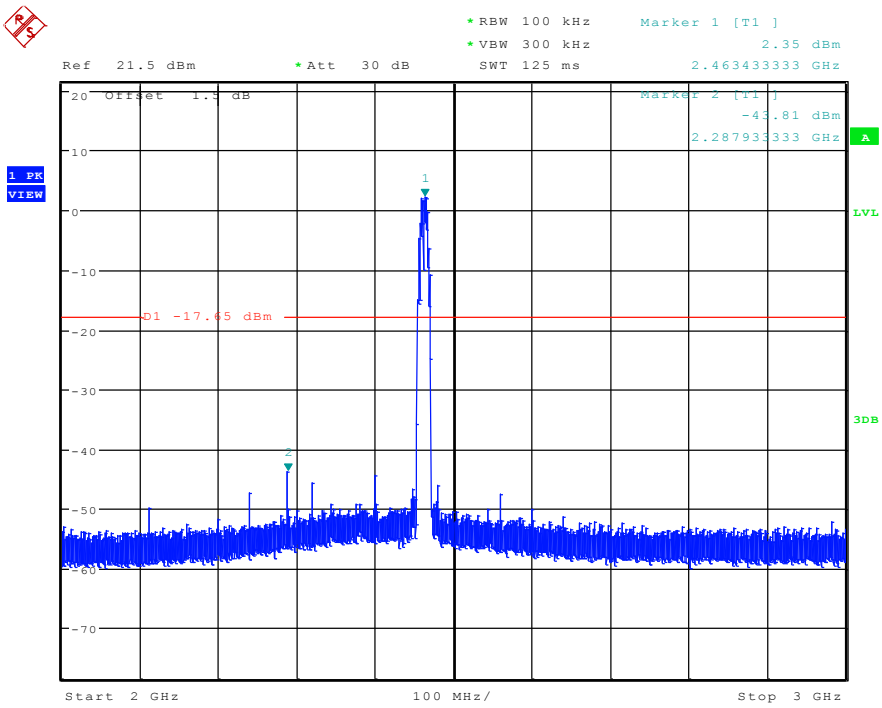

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
2.51 dBm
2.438933333 GHz
Marker 2 [T1]
-43.74 dBm
2.287933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -17.49 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

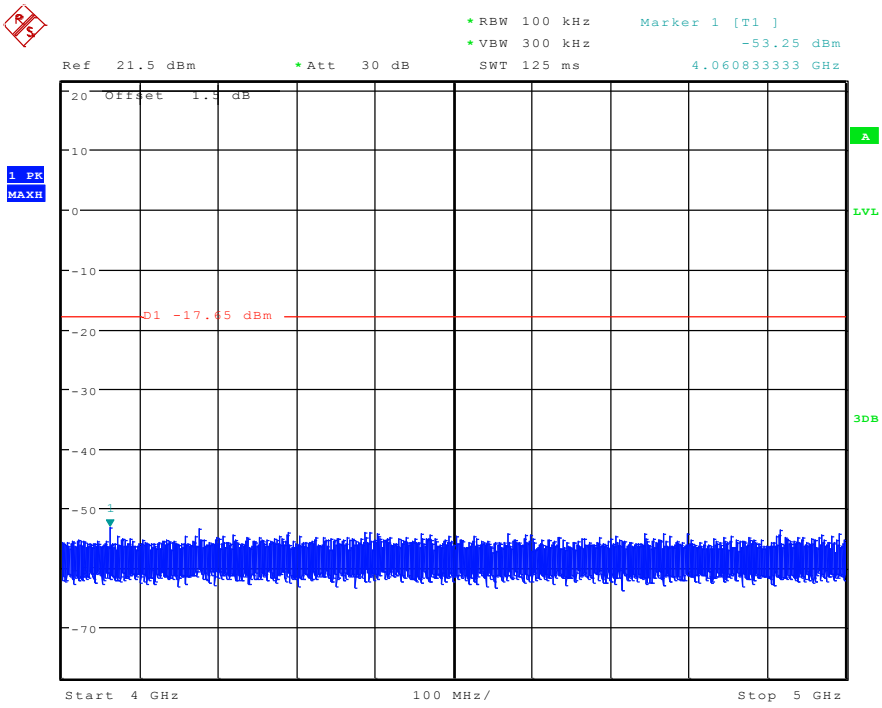

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-52.81 dBm
4.913566667 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -17.49 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11b	Test channel:	Highest

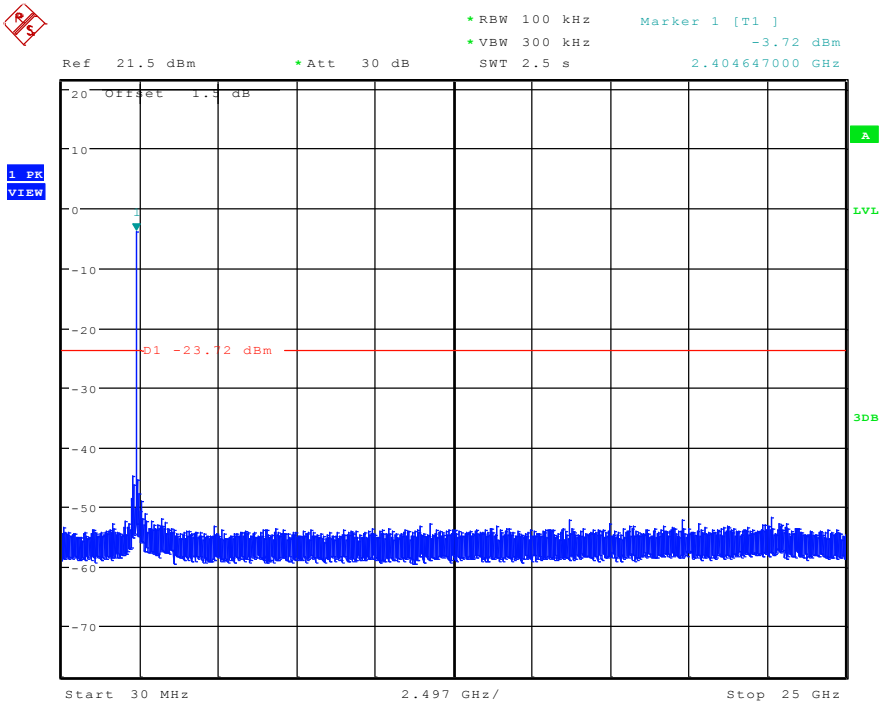


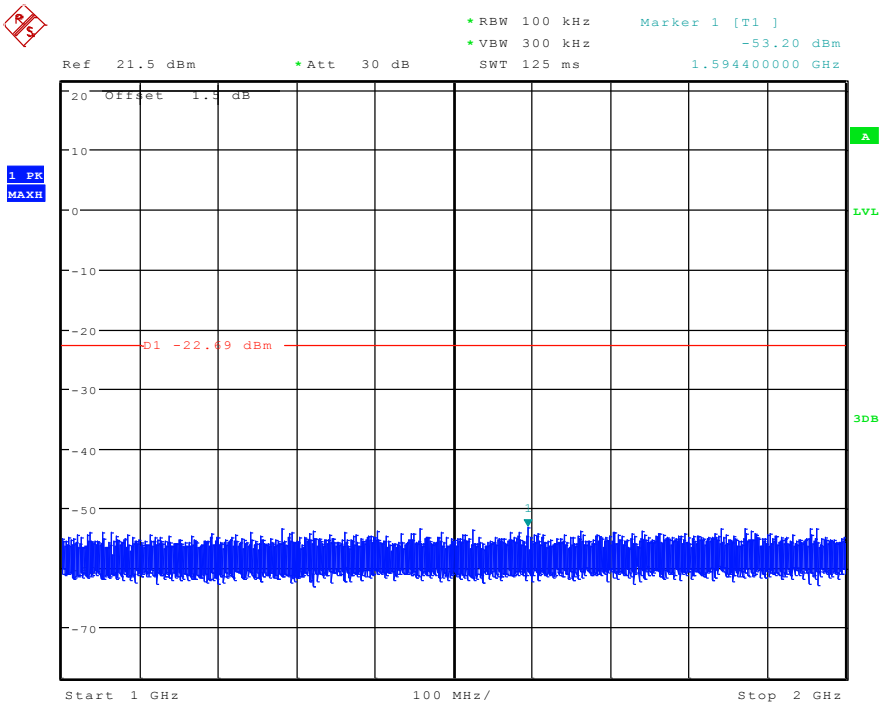


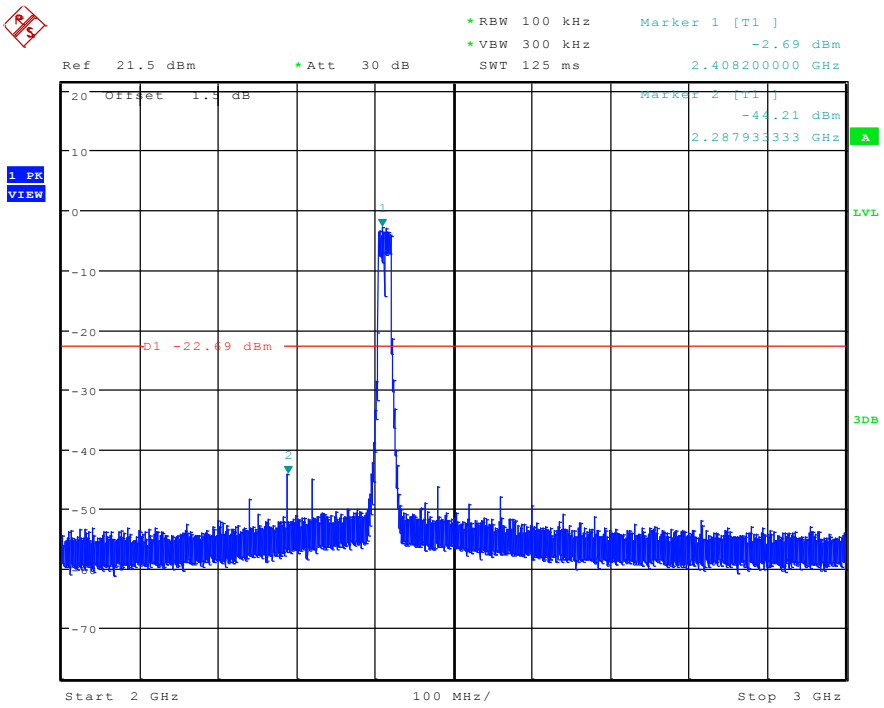

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
2.35 dBm
2.463433333 GHz
Marker 2 [T1]
-43.81 dBm
2.287933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -17.65 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

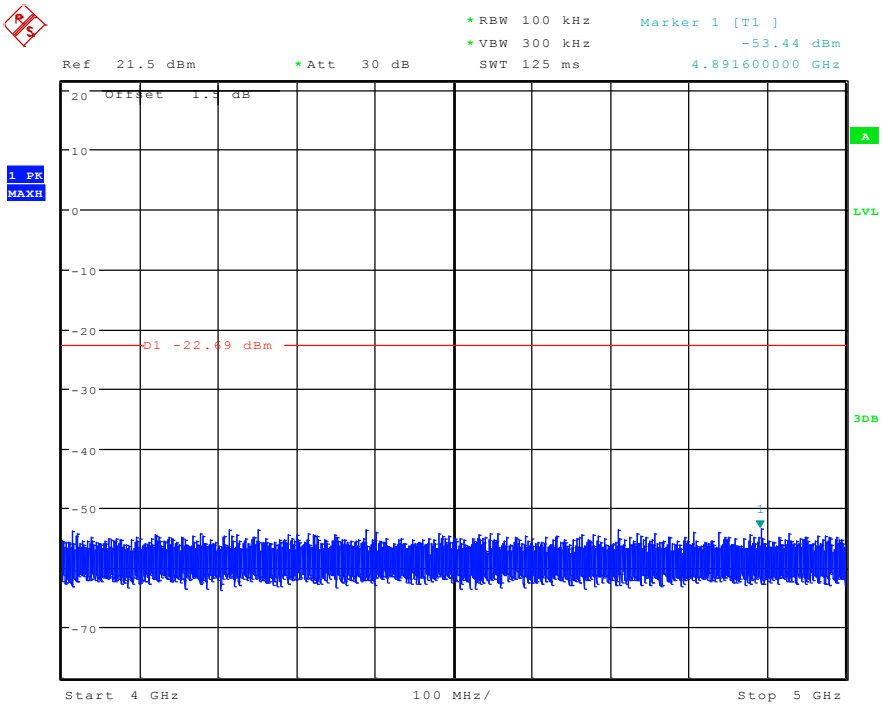

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.25 dBm
4.060833333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -17.65 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11g	Test channel:	Lowest

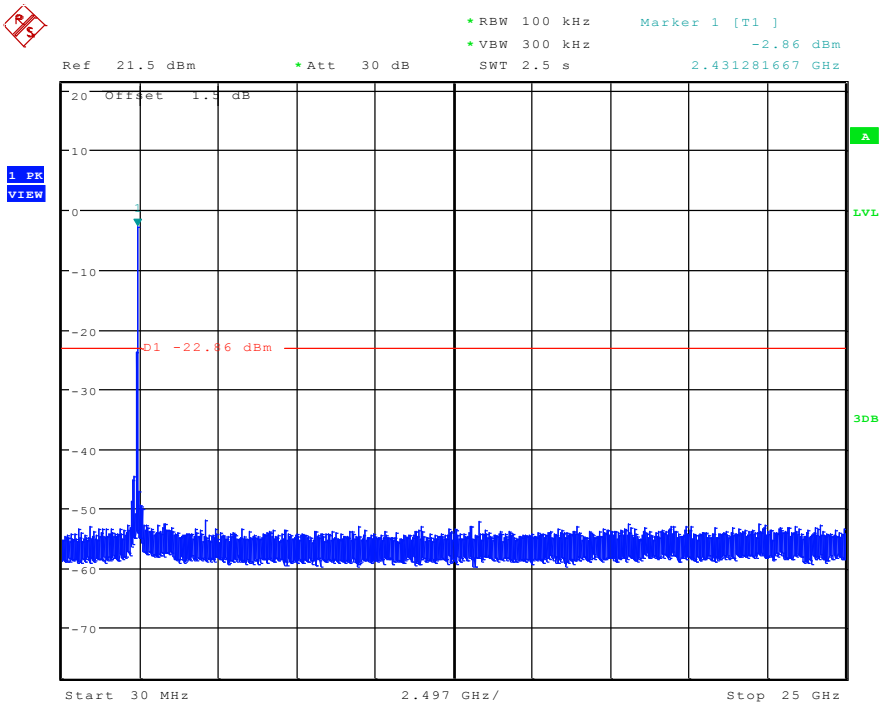


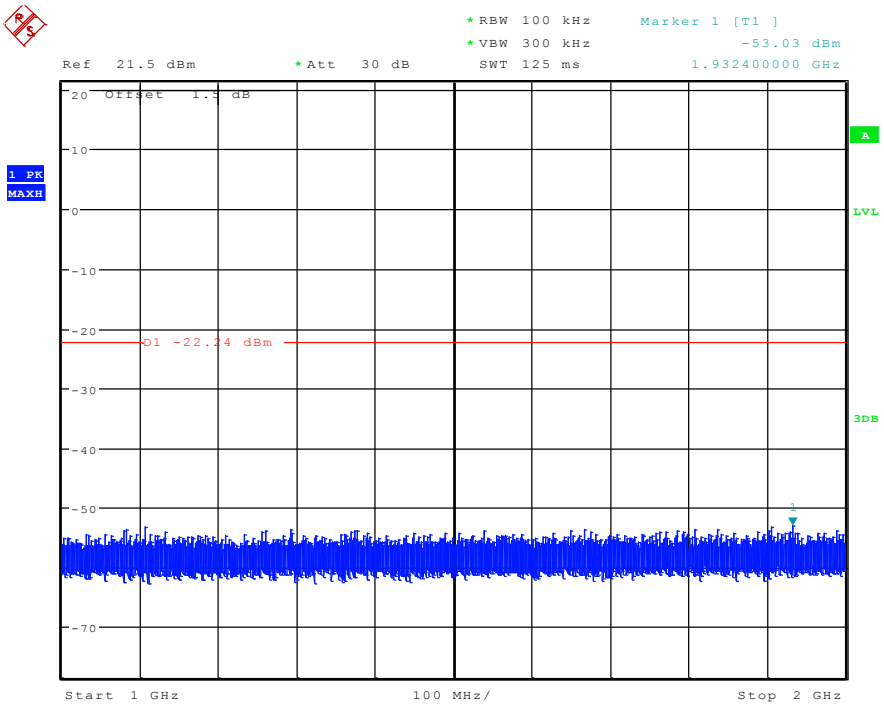


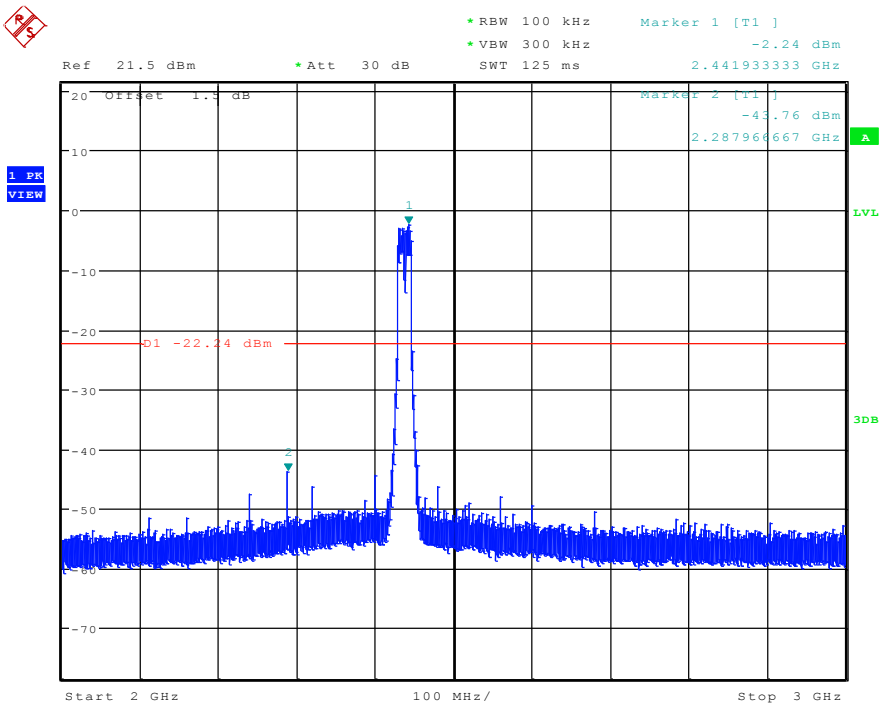

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-2.69 dBm
2.408200000 GHz
Marker 2 [T1]
-44.21 dBm
2.287933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
D1 -22.69 dBm
A
LVL
3DB
Start 2 GHz
100 MHz/
Stop 3 GHz

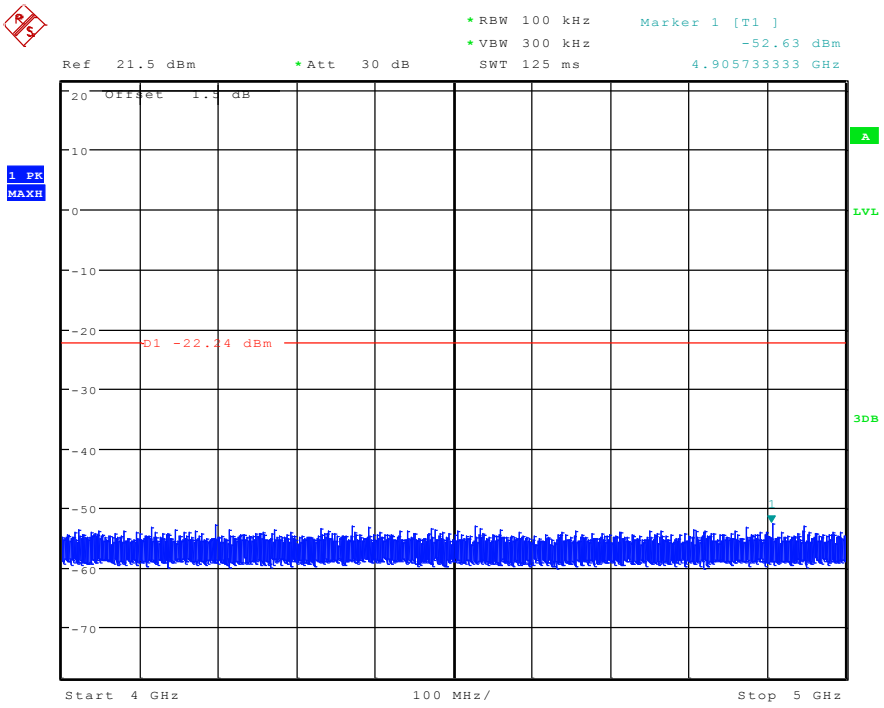

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.44 dBm
4.891600000 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
D1 -22.69 dBm
A
LVL
3DB
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11g	Test channel:	Middle

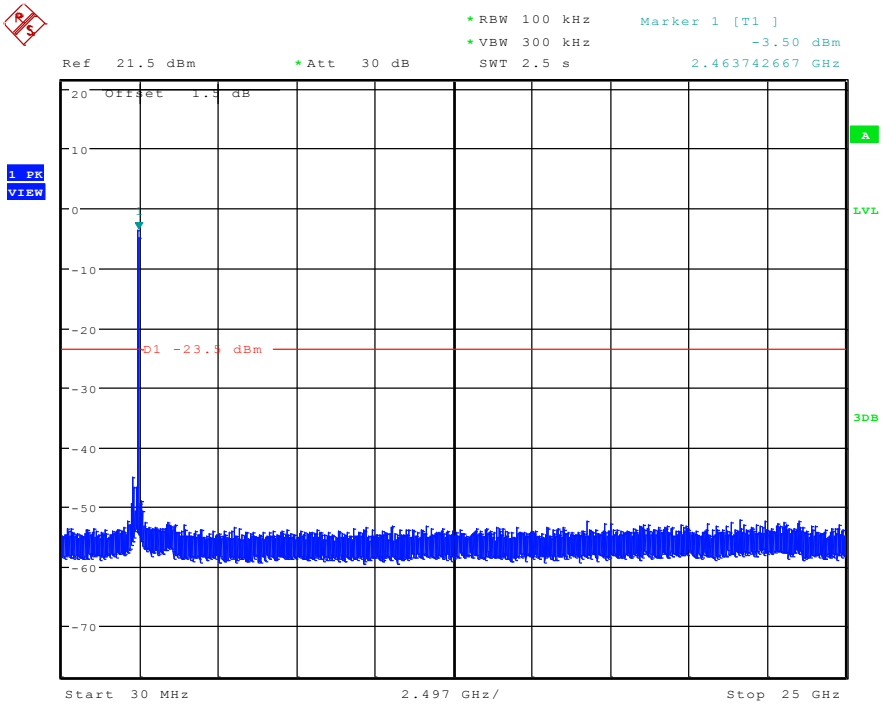


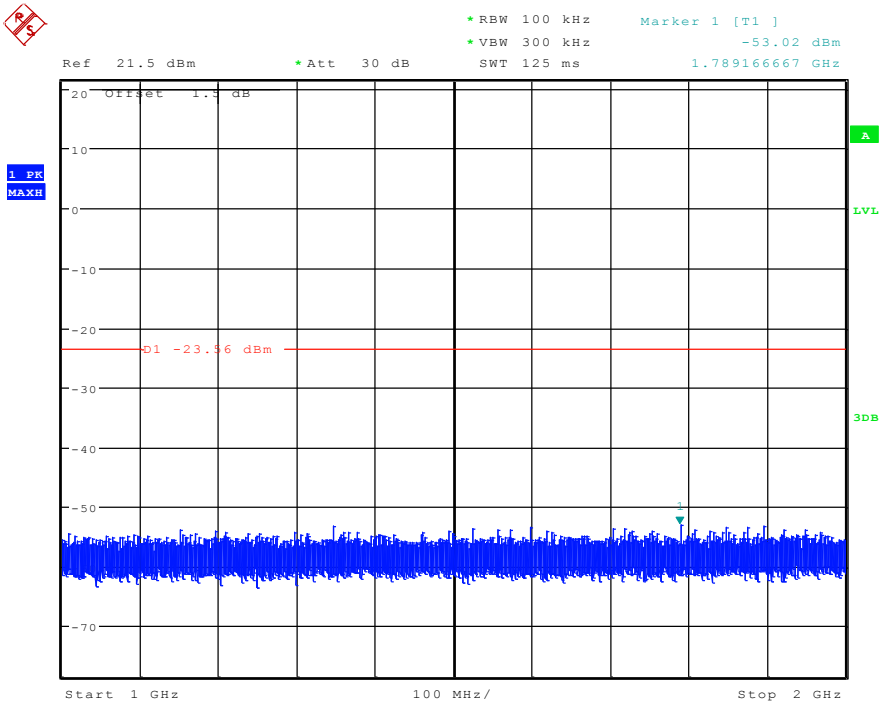


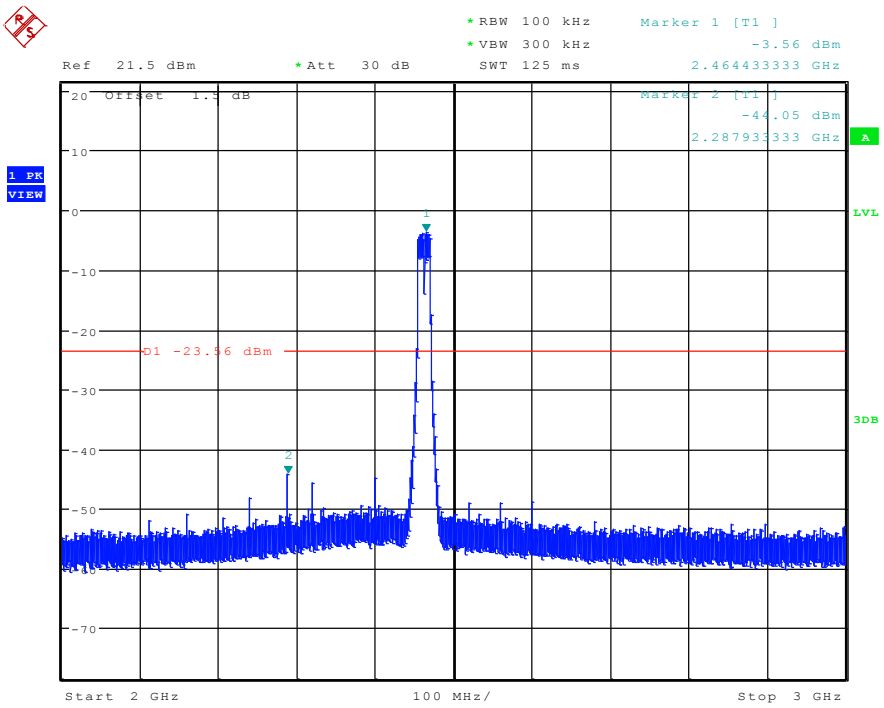

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-2.24 dBm
2.441933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
Marker 2 [T1]
-43.76 dBm
2.287966667 GHz
1 PK
VIEW
D1 -22.24 dBm
A
LVL
3DB
Start 2 GHz
100 MHz/
Stop 3 GHz

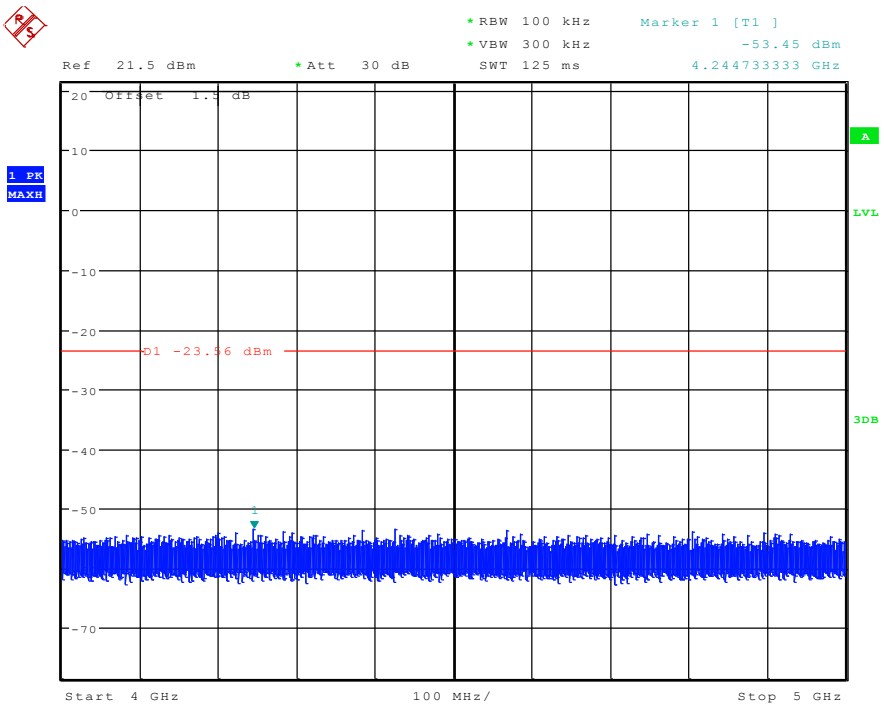

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-52.63 dBm
4.905733333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
D1 -22.24 dBm
A
LVL
3DB
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11g	Test channel:	Highest

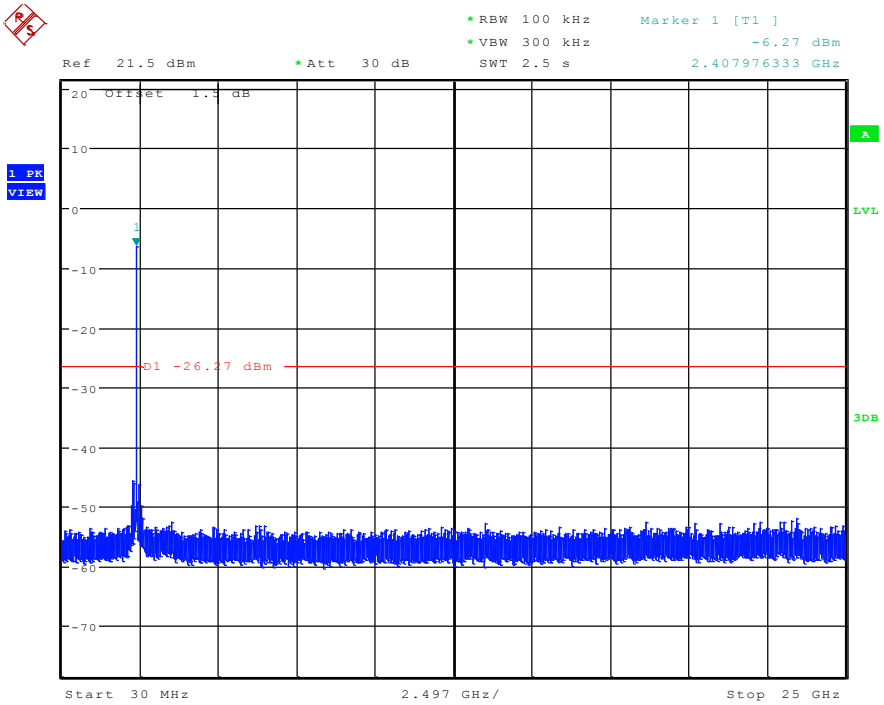


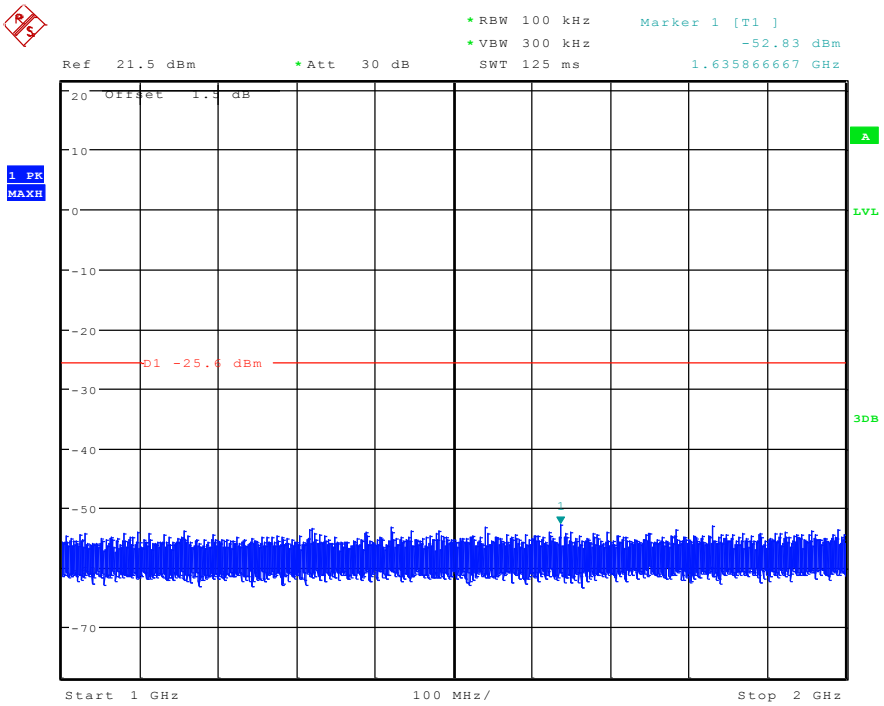


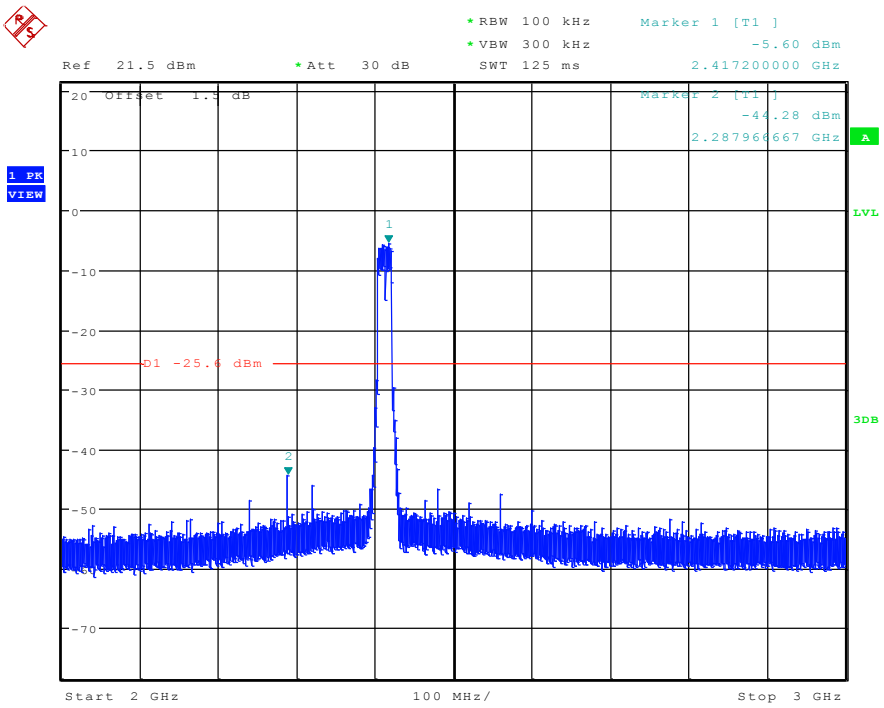

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-3.56 dBm
2.464433333 GHz
Marker 2 [T1]
-44.05 dBm
2.287933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -23.96 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

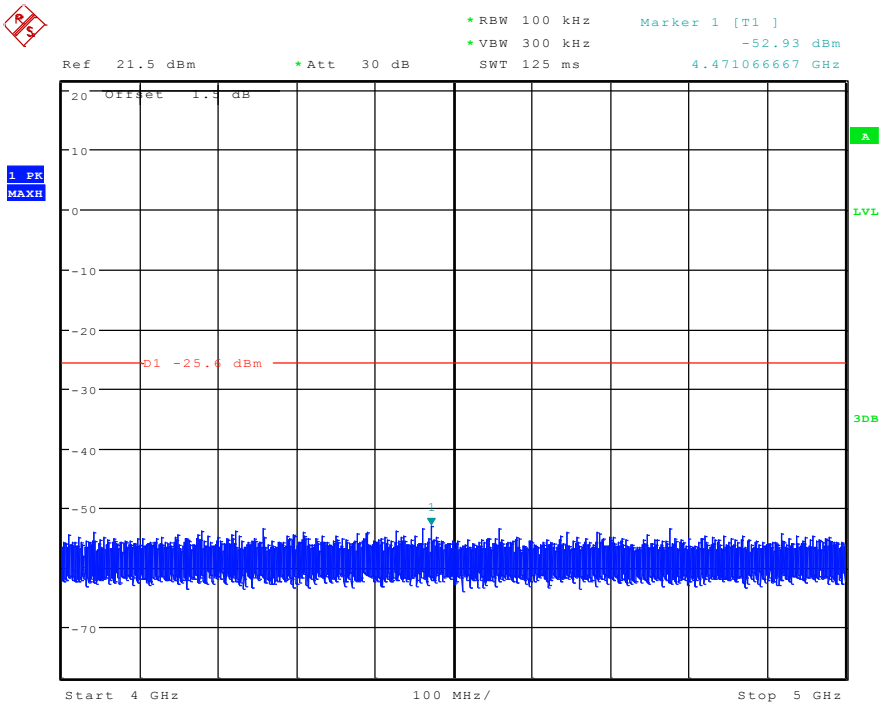

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.45 dBm
4.244733333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -23.96 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11n(HT20)	Test channel:	Lowest

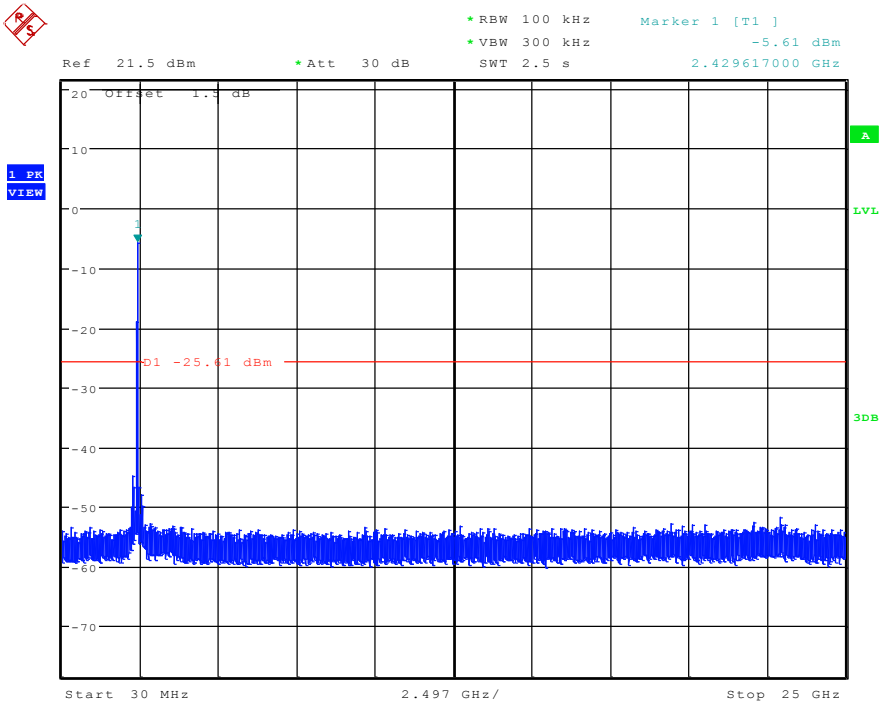


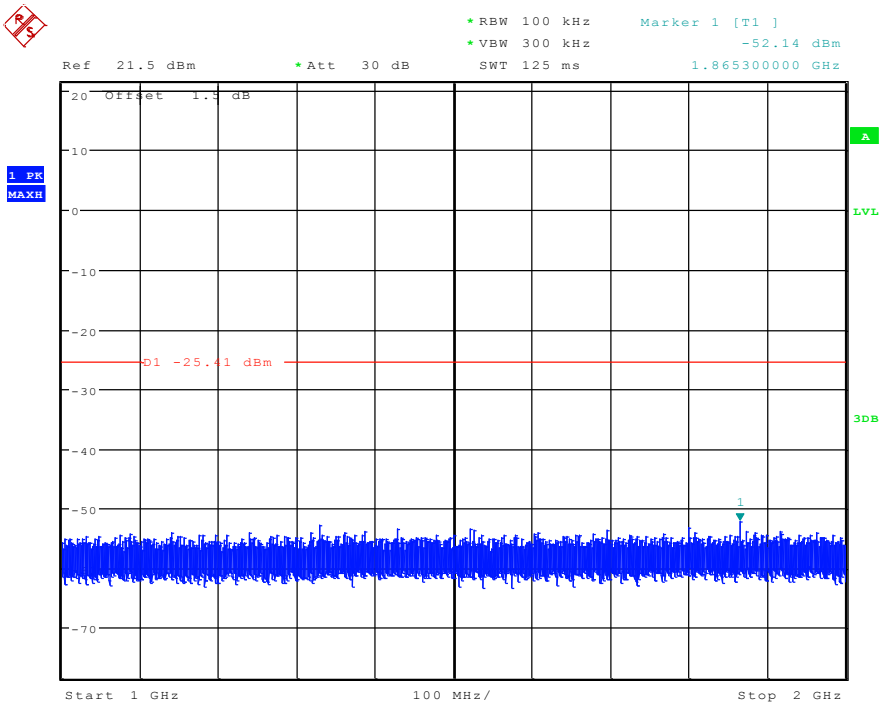


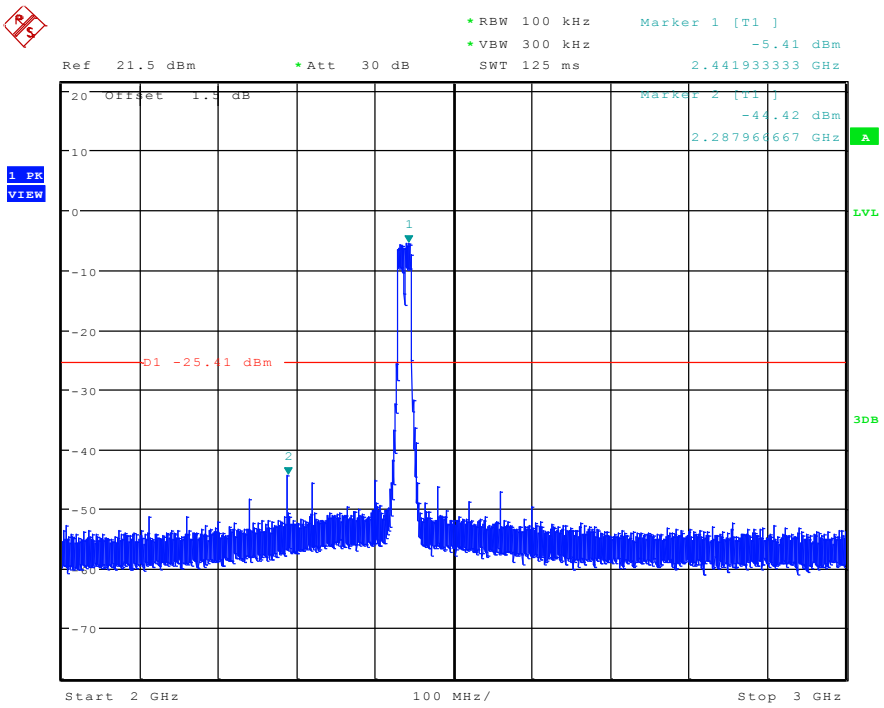

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-5.60 dBm
2.417200000 GHz
Marker 2 [T1]
-44.28 dBm
2.287966667 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -25.6 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

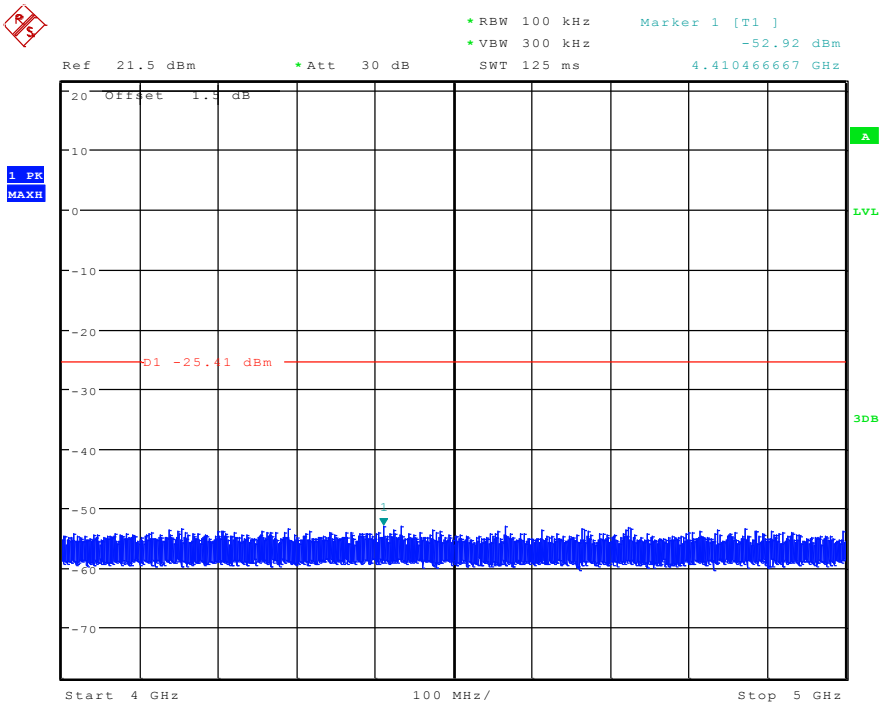

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-52.93 dBm
4.471066667 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -25.6 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11n(HT20)	Test channel:	Middle

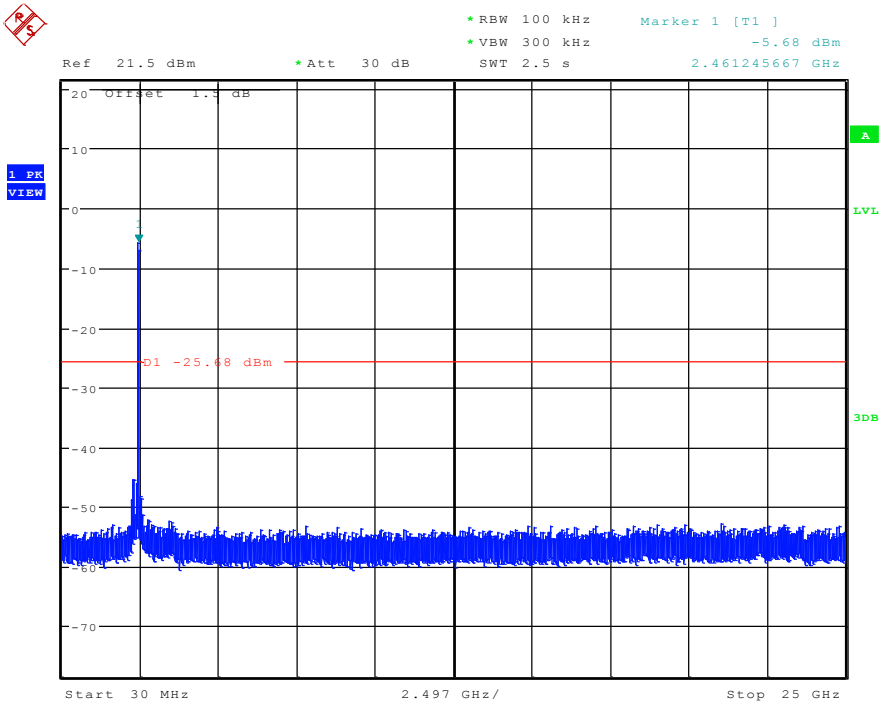


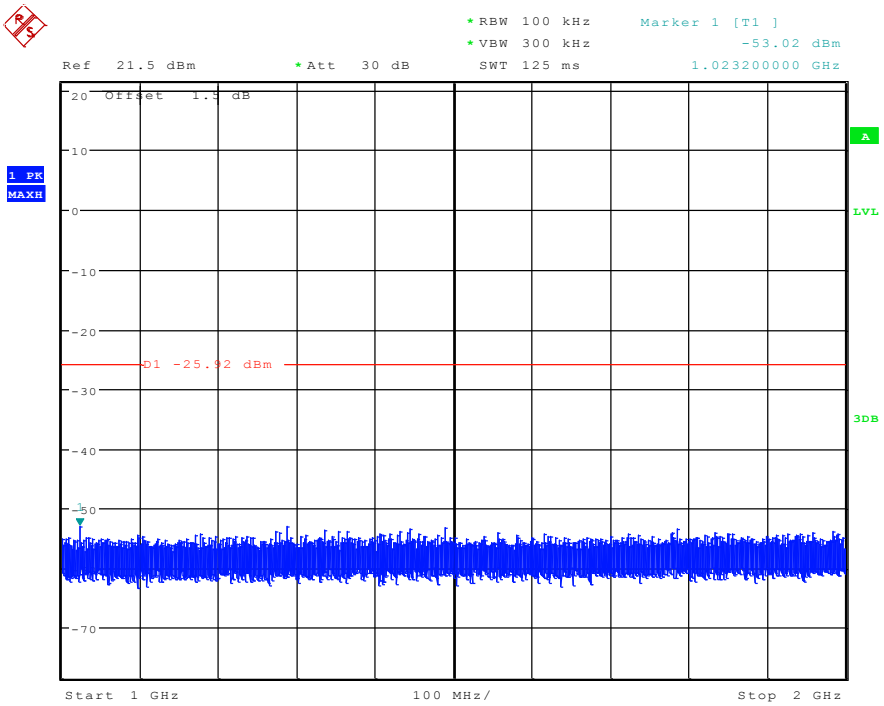


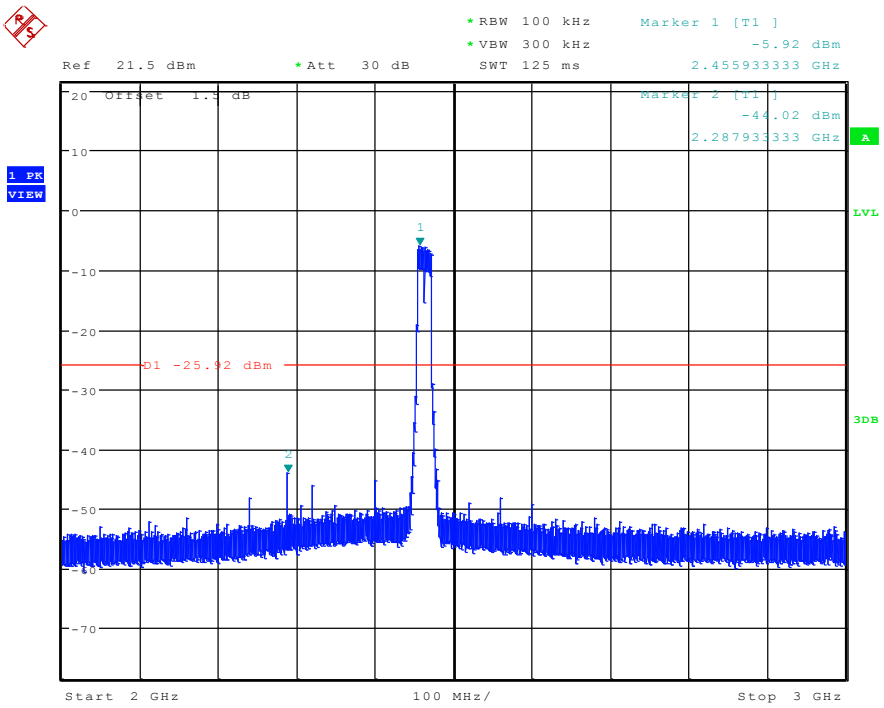

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-5.41 dBm
2.441933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
Marker 2 [T1]
-44.42 dBm
2.287966667 GHz
1 PK
VIEW
A
LVL
3DB
D1 -25.41 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

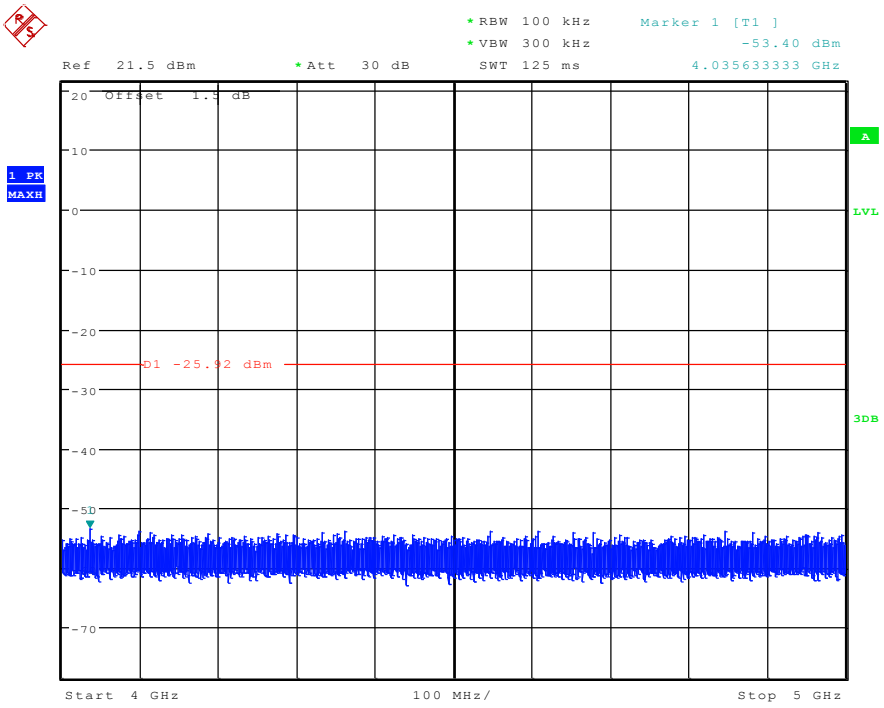

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-52.92 dBm
4.410466667 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -25.41 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11n(HT20)	Test channel:	Highest

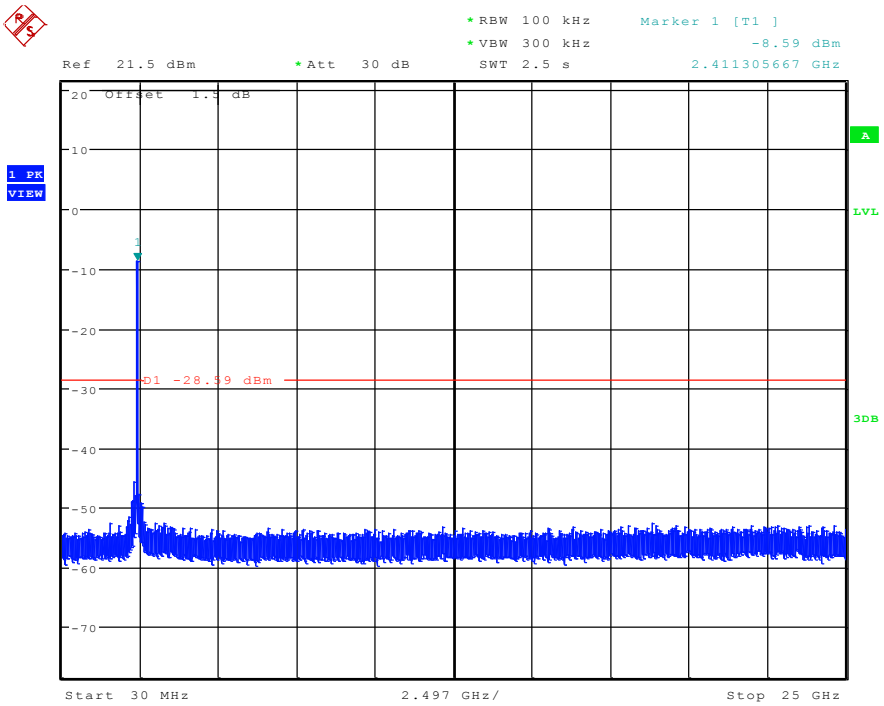


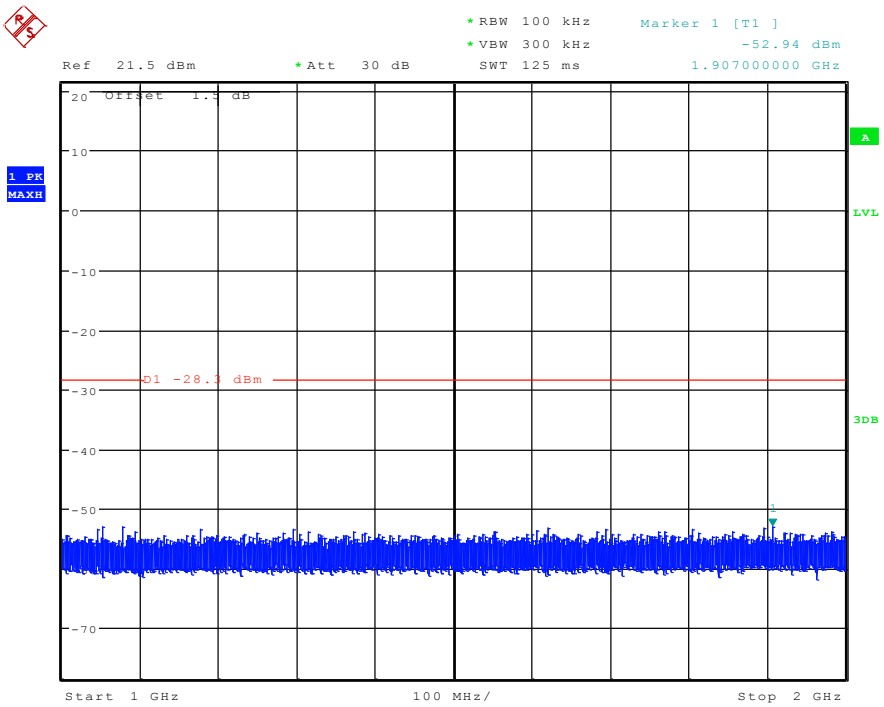


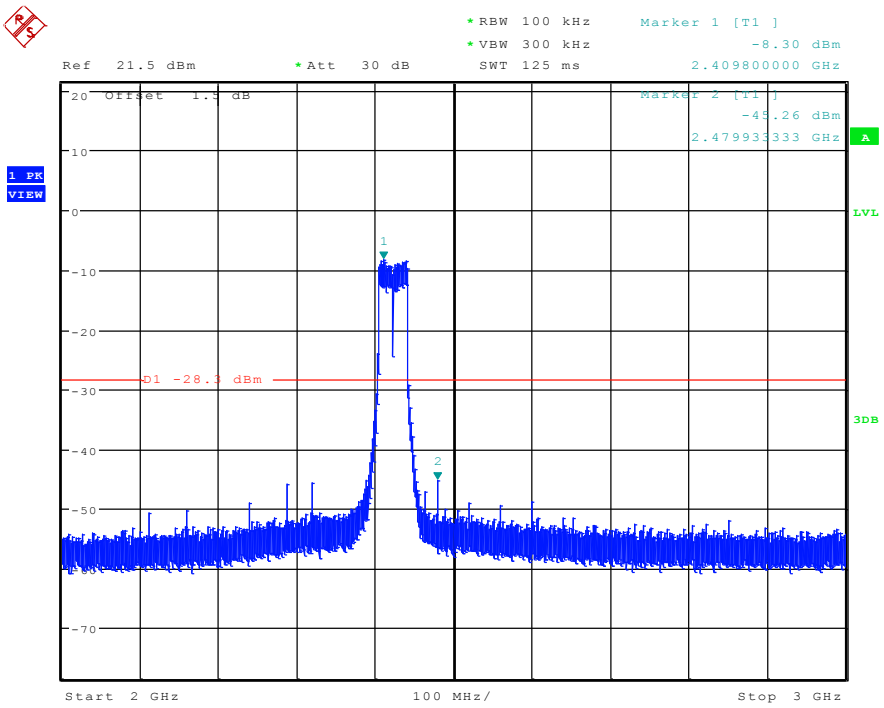

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-5.92 dBm
2.455933333 GHz
Marker 2 [T1]
-44.02 dBm
2.287933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -25.92 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

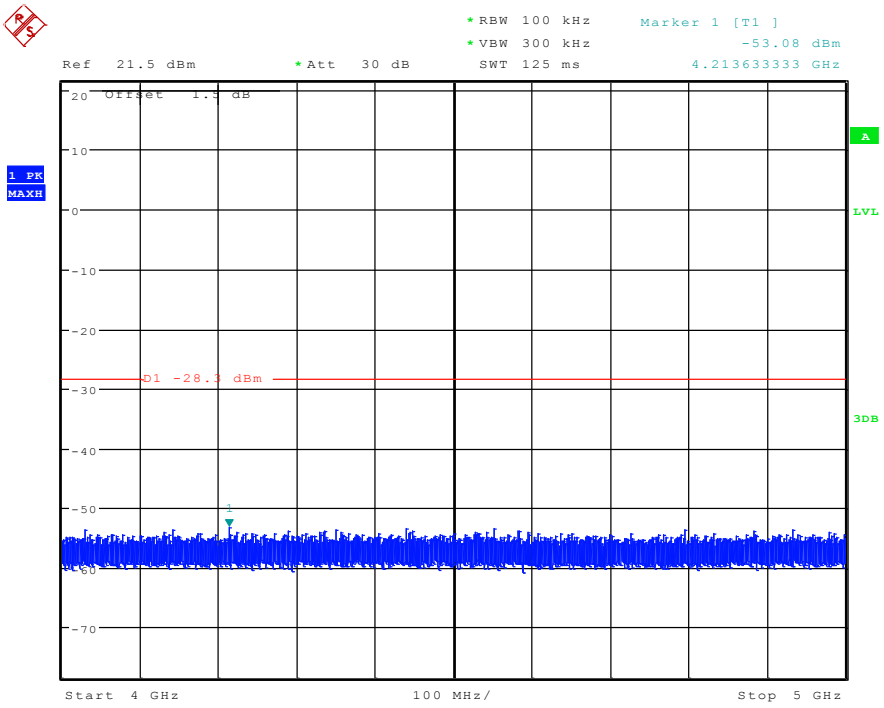

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.40 dBm
4.035633333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -25.92 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11n(HT40)	Test channel:	Lowest

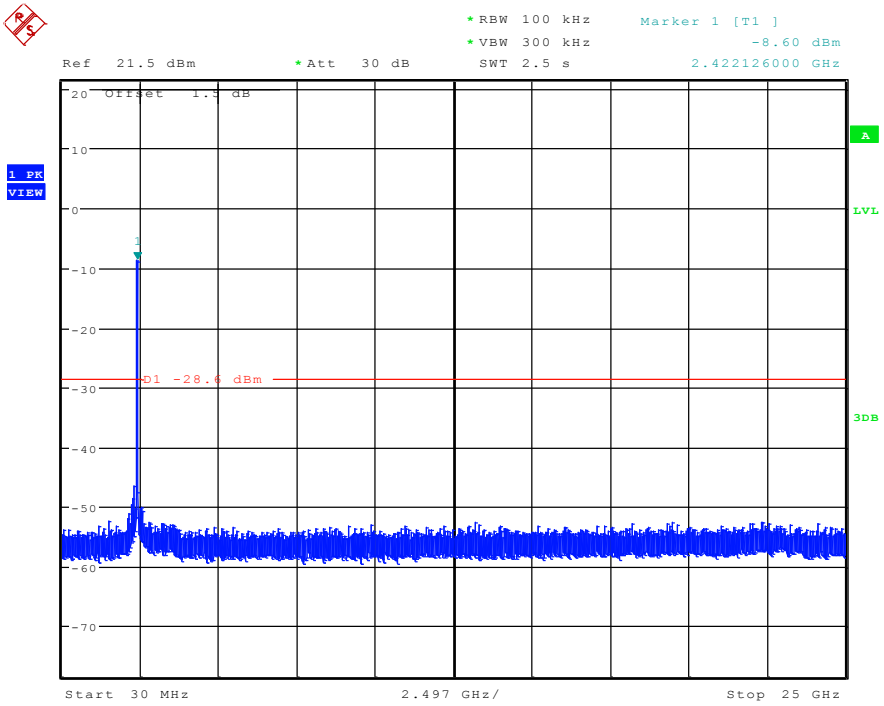


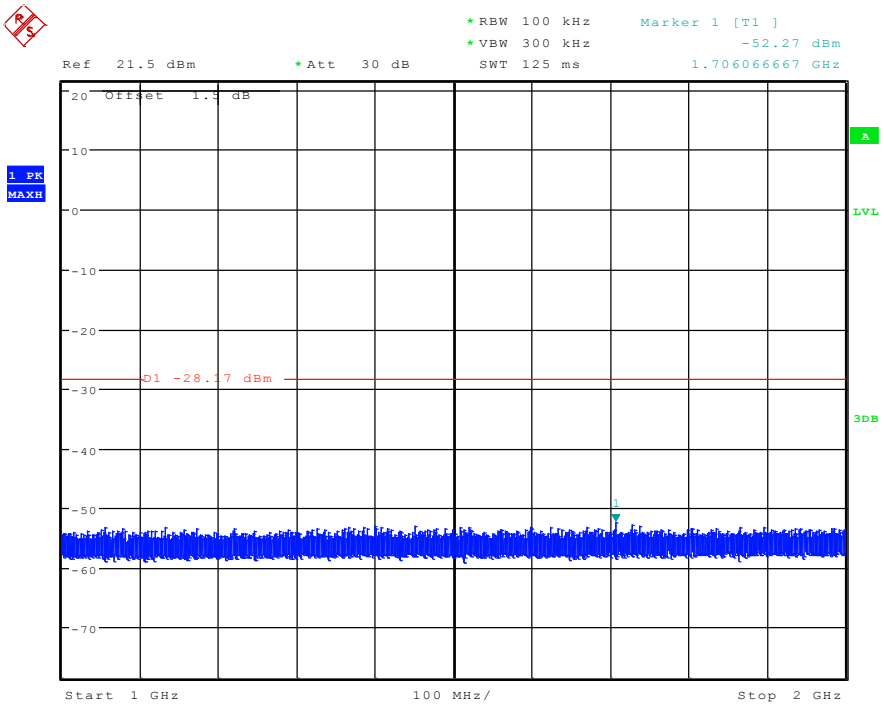


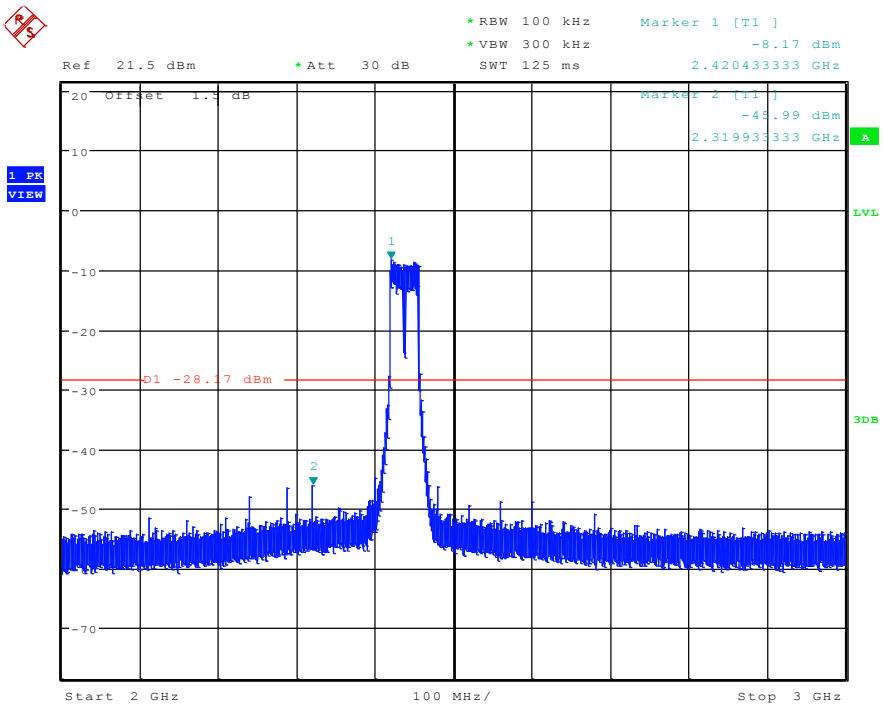

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-8.30 dBm
2.409800000 GHz
Marker 2 [T1]
-45.26 dBm
2.479933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -28.3 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

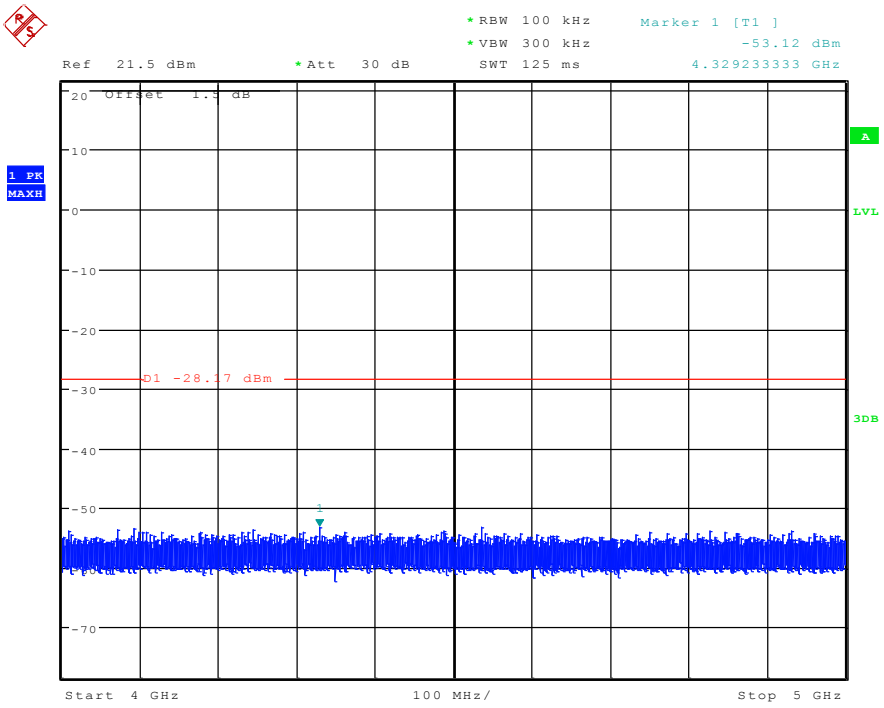

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.08 dBm
4.213633333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -28.3 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11n(HT40)	Test channel:	Middle

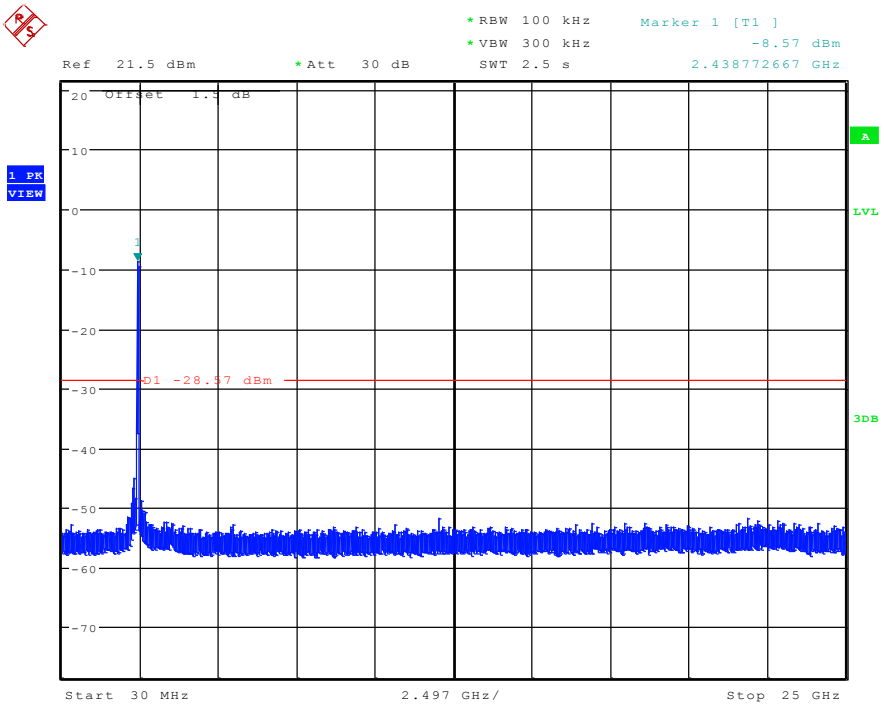


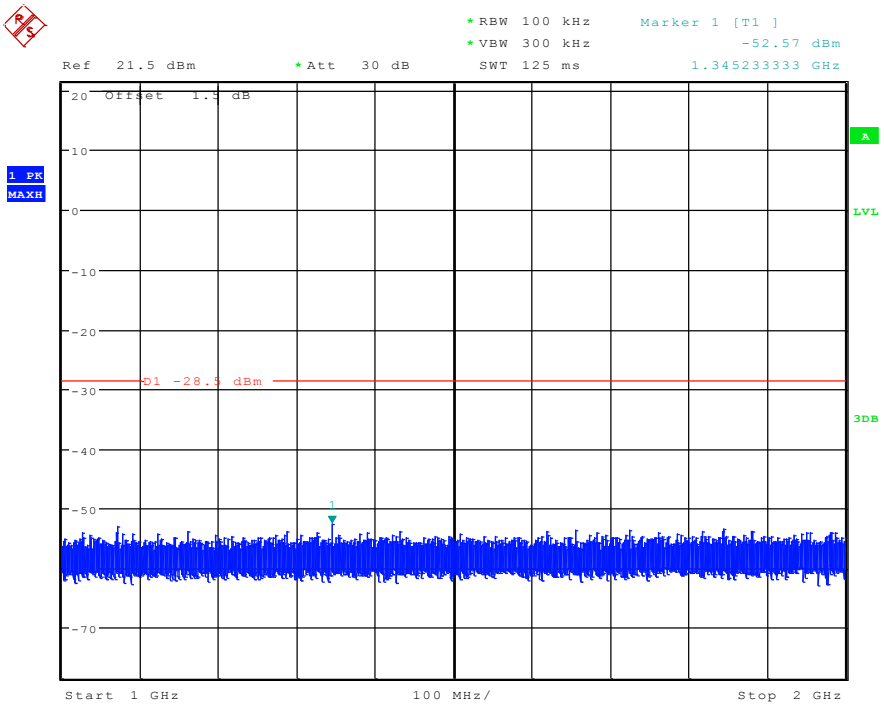


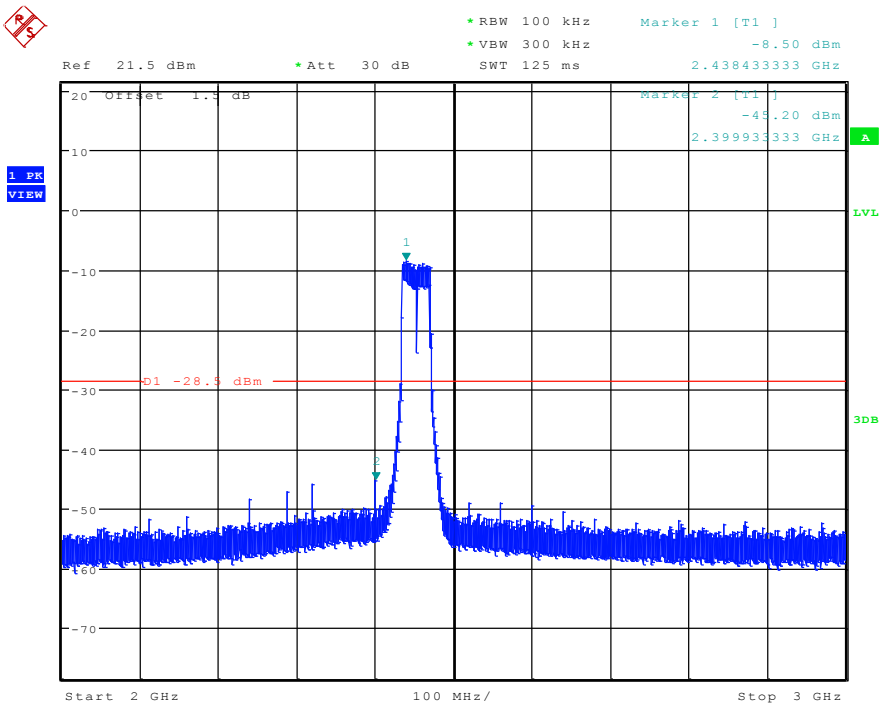

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-8.17 dBm
2.420433333 GHz
Marker 2 [T1]
-45.99 dBm
2.319933333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -28.17 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

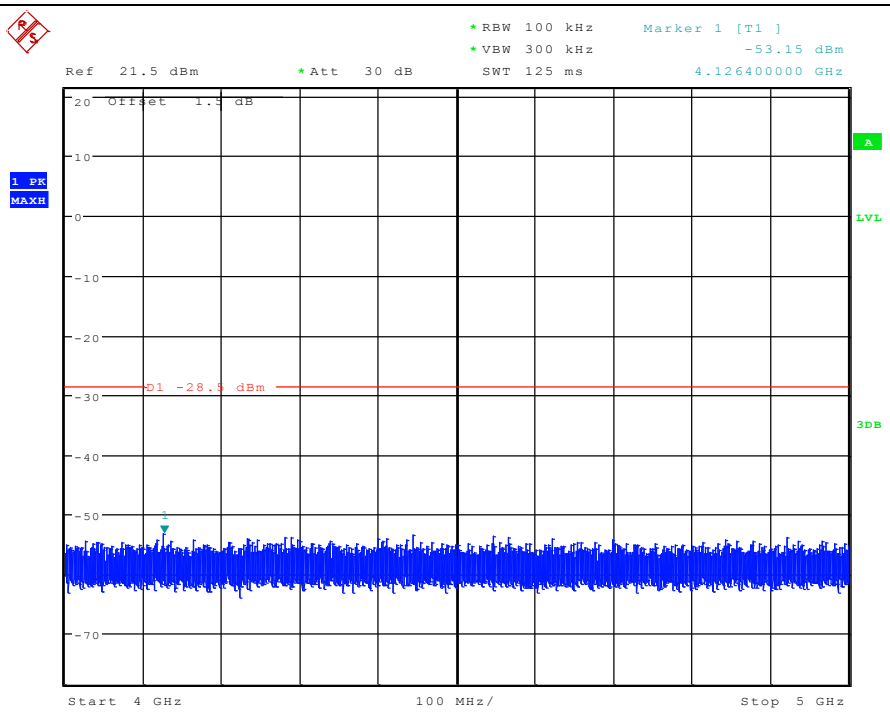

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.12 dBm
4.329233333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -28.17 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

Test mode:	802.11n(HT40)	Test channel:	Highest









Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

6.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Setup:	

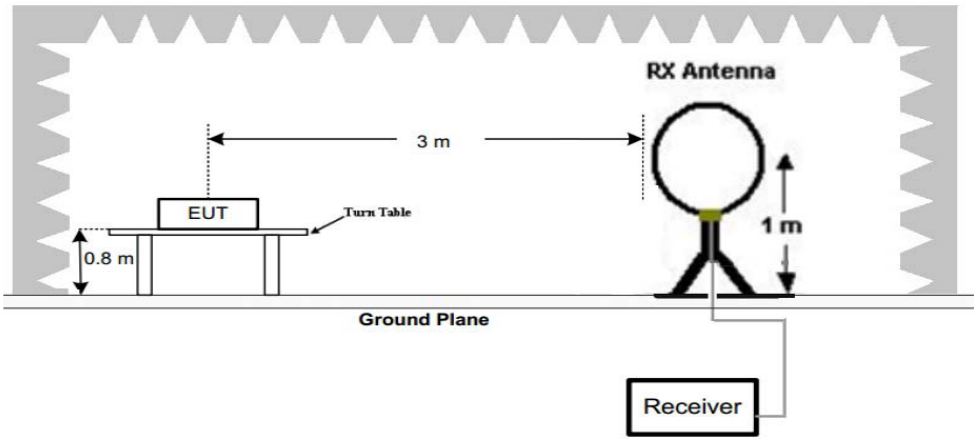


Figure 1. Below 30MHz

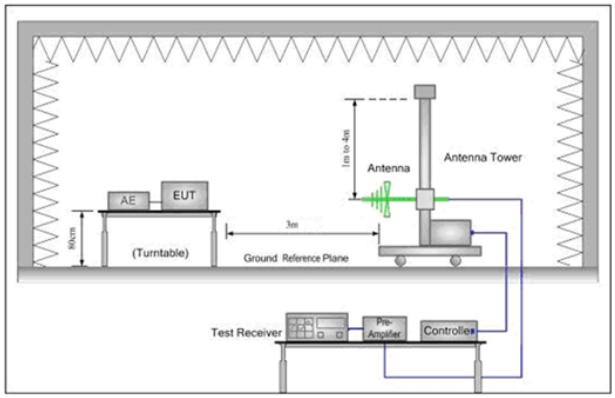


Figure 2. 30MHz to 1GHz

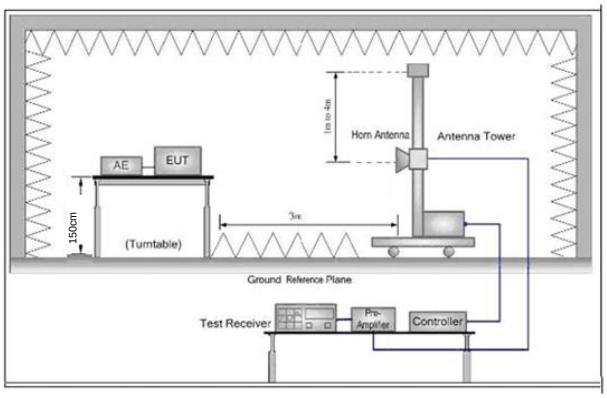


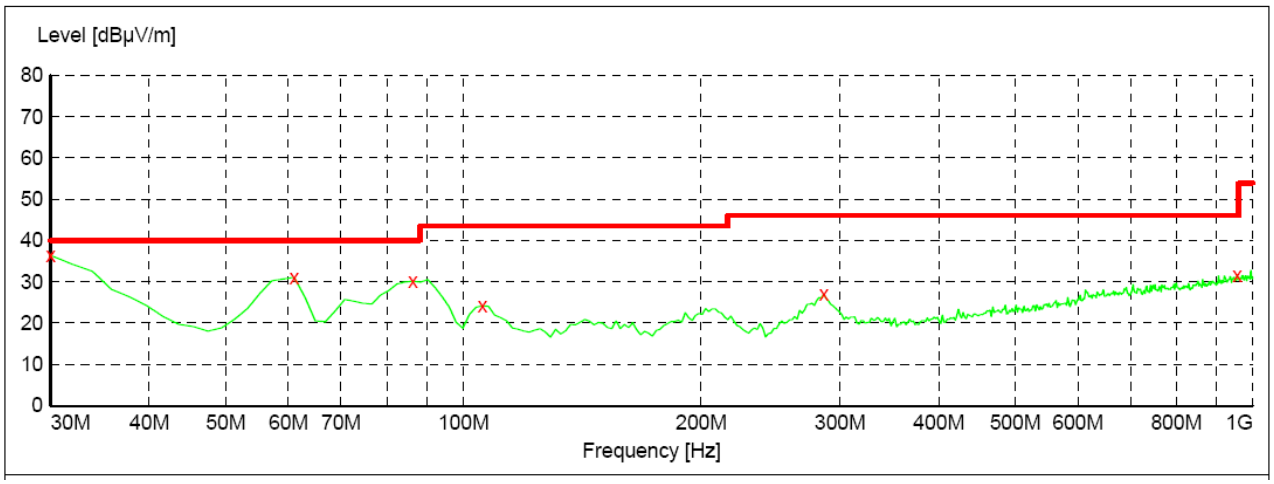
Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode, Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode and Charge +Transmitting mode, found the Charge +Transmitting mode which it is worse case Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40) For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test voltage	AC120V/60Hz
Test Results:	Pass

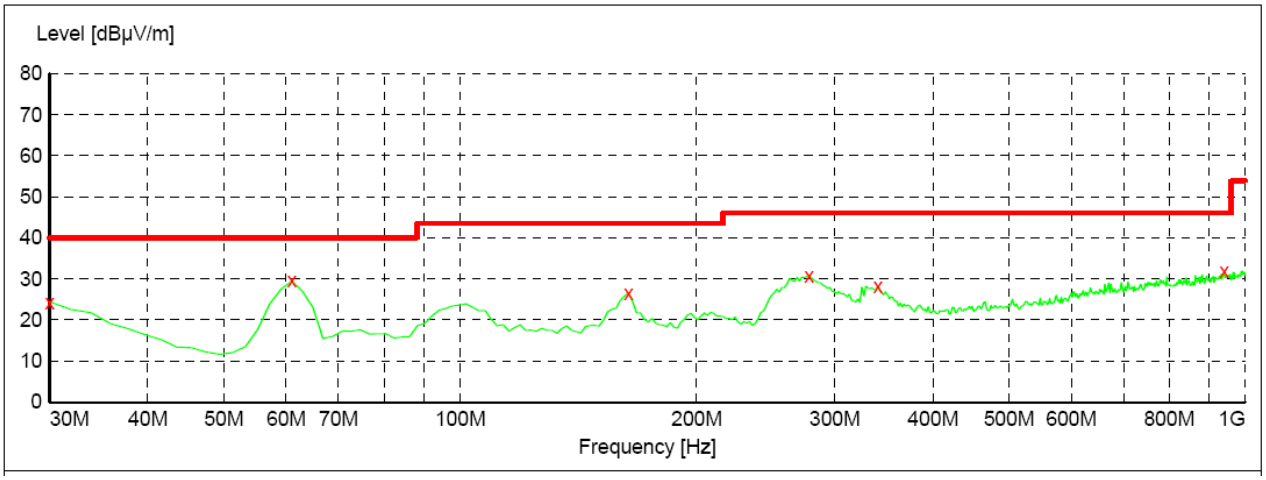
6.8.1 Radiated emission below 1GHz

30MHz~1GHz（QP）		
Test mode:	Charge +Transmitting	Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	36.40	21.1	40.0	3.6
61.040000	31.10	8.4	40.0	8.9
86.260000	30.10	9.3	40.0	9.9
105.660000	24.20	12.9	43.5	19.3
286.080000	27.10	15.4	46.0	18.9
955.380000	31.70	26.7	46.0	14.3

Test mode:	Charge +Transmitting	Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	24.40	21.1	40.0	15.6
61.040000	29.50	8.4	40.0	10.5
163.860000	26.60	13.9	43.5	16.9
278.320000	30.90	15.4	46.0	15.1
340.400000	28.30	16.6	46.0	17.7
939.860000	31.90	26.5	46.0	14.1

6.8.2 Transmitter emission above 1GHz

Test mode:	802.11b(1Mbps)	Test channel:	Lowest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4824.123	52.13	-5.18	46.95	74	-27.05	peak	H
4824.123	36.70	-5.18	31.52	54	-22.48	AVG	H
7236.201	51.41	-6.45	44.96	74	-29.04	peak	H
7236.201	38.20	-6.45	31.75	54	-22.25	AVG	H
4824.152	54.15	-5.18	48.97	74	-25.03	peak	V
4824.152	39.22	-5.18	34.04	54	-19.96	AVG	V
7236.217	54.45	-6.45	48.00	74	-26.00	peak	V
7236.217	41.87	-6.45	35.42	54	-18.58	AVG	V

Test mode:	802.11b(1Mbps)	Test channel:	Middle

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4874.138	50.22	-5.19	45.03	74	-28.97	peak	H
4874.138	36.96	-5.19	31.77	54	-22.23	AVG	H
7311.024	48.77	-6.47	42.30	74	-31.70	peak	H
7311.024	35.11	-6.47	28.64	54	-25.36	AVG	H
4874.133	48.48	-5.19	43.29	74	-30.71	peak	V
4874.133	37.57	-5.19	32.38	54	-21.62	AVG	V
7311.078	48.41	-6.47	41.94	74	-32.06	peak	V
7311.078	35.66	-6.47	29.19	54	-24.81	AVG	V

Test mode:	802.11b(1Mbps)	Test channel:	Highest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4924.174	51.19	-5.2	45.99	74	-28.01	peak	H
4924.174	38.79	-5.2	33.59	54	-20.41	AVG	H
7386.251	51.20	-6.47	44.73	74	-29.27	peak	H
7386.251	37.80	-6.47	31.33	54	-22.67	AVG	H
4924.196	50.35	-5.2	45.15	74	-28.85	peak	V
4924.196	37.17	-5.2	31.97	54	-22.03	AVG	V
7386.201	50.96	-6.47	44.49	74	-29.51	peak	V
7386.201	37.84	-6.47	31.37	54	-22.63	AVG	V

Remark:

1) The 1Mbps of rate of 802.11b is the worst case.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

6.9 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:

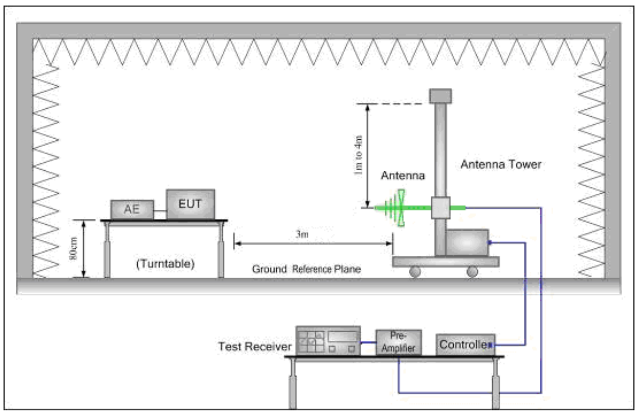


Figure 1. 30MHz to 1GHz

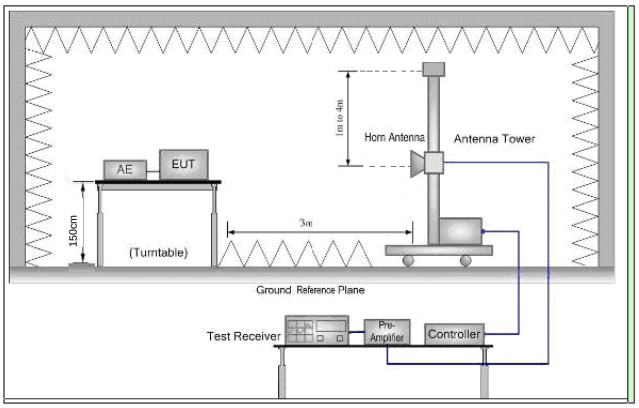


Figure 2. Above 1 GHz

Test Procedure:

a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the

	measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel g. Test the EUT in the lowest channel , the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode, Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode and Charge +Transmitting mode, found the Charge +Transmitting mode which it is worse case Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40) Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Test data:

Worse case mode:		802.11b(1Mbps)		Test channel:		Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2390.000	48.31	-4.36	43.95	74	-30.05	peak	H
2390.000	35.26	-4.36	30.90	54	-23.10	AVG	H
2412.137	102.02	-4.37	97.65	74	23.65	peak	H
2412.152	88.39	-4.37	84.02	54	30.02	AVG	H
2390.000	48.89	-4.36	44.53	74	-29.47	peak	V
2390.000	34.49	-4.36	30.13	54	-23.87	AVG	V
2412.344	101.79	-4.37	97.42	74	23.42	peak	V
2413.496	86.10	-4.37	81.73	54	27.73	AVG	V

Worse case mode:		802.11b(1Mbps)		Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2462.738	98.45	-4.19	94.26	74	20.26	peak	H
2462.916	86.87	-4.19	82.68	54	28.68	AVG	H
2483.500	51.97	-4.22	47.75	74	-26.25	peak	H
2483.500	35.54	-4.22	31.32	54	-22.68	AVG	H
2462.494	102.73	-4.19	98.54	74	24.54	peak	V
2461.555	86.50	-4.19	82.31	54	28.31	AVG	V
2483.500	51.48	-4.22	47.26	74	-26.74	peak	V
2483.500	37.65	-4.22	33.43	54	-20.57	AVG	V

Worse case mode:		802.11g(6Mbps)		Test channel:		Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol. H/V
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
2390.000	48.82	-4.36	44.46	74	-29.54	peak	H
2390.000	35.04	-4.36	30.68	54	-23.32	AVG	H
2412.886	101.51	-4.37	97.14	74	23.14	peak	H
2413.226	87.88	-4.37	83.51	54	29.51	AVG	H
2390.000	49.16	-4.36	44.80	74	-29.20	peak	V
2390.000	35.14	-4.36	30.78	54	-23.22	AVG	V
2413.191	101.86	-4.37	97.49	74	23.49	peak	V
2412.163	85.42	-4.37	81.05	54	27.05	AVG	V

Worse case mode:		802.11g(6Mbps)		Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol. H/V
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
2461.783	99.00	-4.19	94.81	74	20.81	peak	H
2462.132	86.14	-4.19	81.95	54	27.95	AVG	H
2483.500	52.10	-4.22	47.88	74	-26.12	peak	H
2483.500	35.97	-4.22	31.75	54	-22.25	AVG	H
2462.021	102.74	-4.19	98.55	74	24.55	peak	V
2462.378	86.67	-4.19	82.48	54	28.48	AVG	V
2483.500	51.54	-4.22	47.32	74	-26.68	peak	V
2483.500	37.46	-4.22	33.24	54	-20.76	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2390.000	48.63	-4.36	44.27	74	-29.73	peak	H
2390.000	35.86	-4.36	31.50	54	-22.50	AVG	H
2412.554	101.42	-4.37	97.05	74	23.05	peak	H
2413.020	88.08	-4.37	83.71	54	29.71	AVG	H
2390.000	49.32	-4.36	44.96	74	-29.04	peak	V
2390.000	35.20	-4.36	30.84	54	-23.16	AVG	V
2412.454	102.23	-4.37	97.86	74	23.86	peak	V
2412.532	85.37	-4.37	81.00	54	27.00	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2461.829	99.32	-4.19	95.13	74	21.13	peak	H
2461.928	86.04	-4.19	81.85	54	27.85	AVG	H
2483.500	51.87	-4.22	47.65	74	-26.35	peak	H
2483.500	35.95	-4.22	31.73	54	-22.27	AVG	H
2462.783	102.63	-4.19	98.44	74	24.44	peak	V
2462.367	85.58	-4.19	81.39	54	27.39	AVG	V
2483.500	51.10	-4.22	46.88	74	-27.12	peak	V
2483.500	37.24	-4.22	33.02	54	-20.98	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2390.000	48.46	-4.36	44.10	74	-29.90	peak	H
2390.000	35.53	-4.36	31.17	54	-22.83	AVG	H
2421.086	100.93	-4.37	96.56	74	22.56	peak	H
2421.717	86.29	-4.37	81.92	54	27.92	AVG	H
2390.000	49.18	-4.36	44.82	74	-29.18	peak	V
2390.000	34.73	-4.36	30.37	54	-23.63	AVG	V
2421.246	100.61	-4.37	96.24	74	22.24	peak	V
2421.778	83.93	-4.37	79.56	54	25.56	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
2451.707	97.06	-4.19	92.87	74	18.87	peak	H
2452.931	82.75	-4.19	78.56	54	24.56	AVG	H
2483.500	53.29	-4.22	49.07	74	-24.93	peak	H
2483.500	38.38	-4.22	34.16	54	-19.84	AVG	H
2451.542	100.67	-4.19	96.48	74	22.48	peak	V
2452.381	83.70	-4.19	79.51	54	25.51	AVG	V
2483.500	53.85	-4.22	49.63	74	-24.37	peak	V
2483.500	39.35	-4.22	35.13	54	-18.87	AVG	V

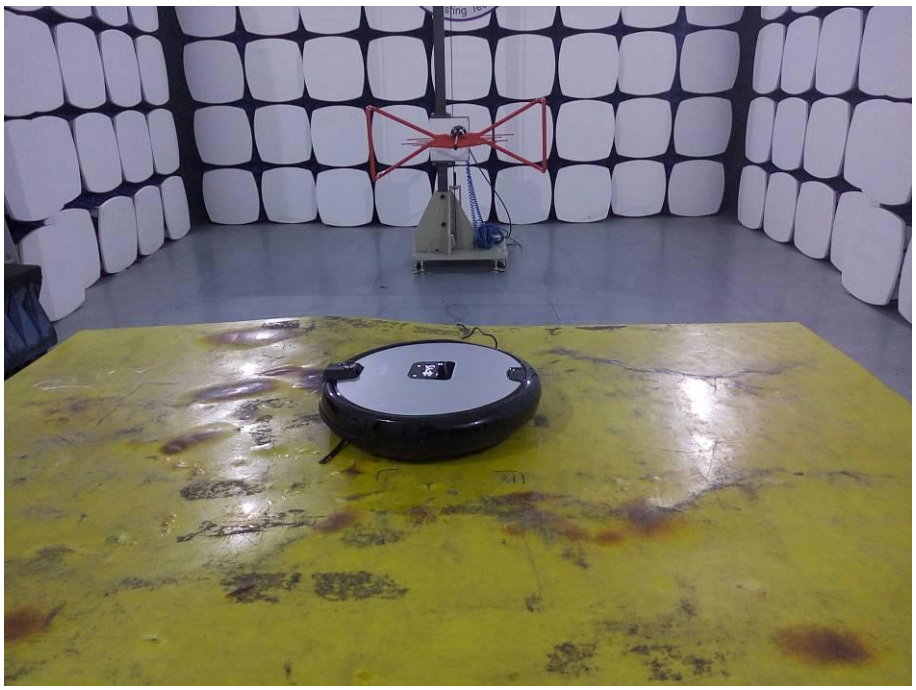
Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

7 Photographs - EUT Test Setup

Test model No.: S+

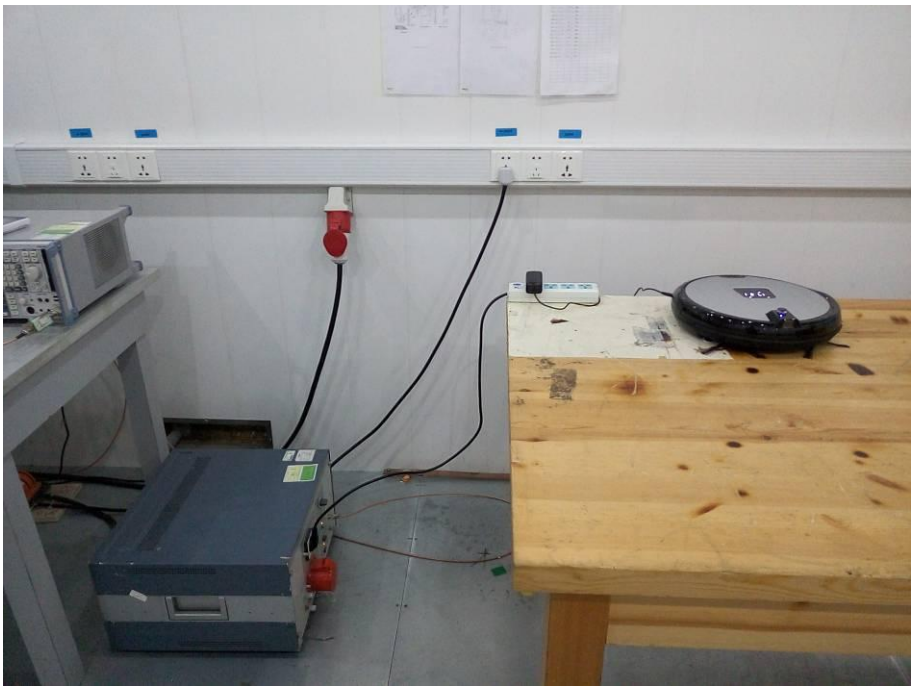
7.1 Radiated Spurious Emission



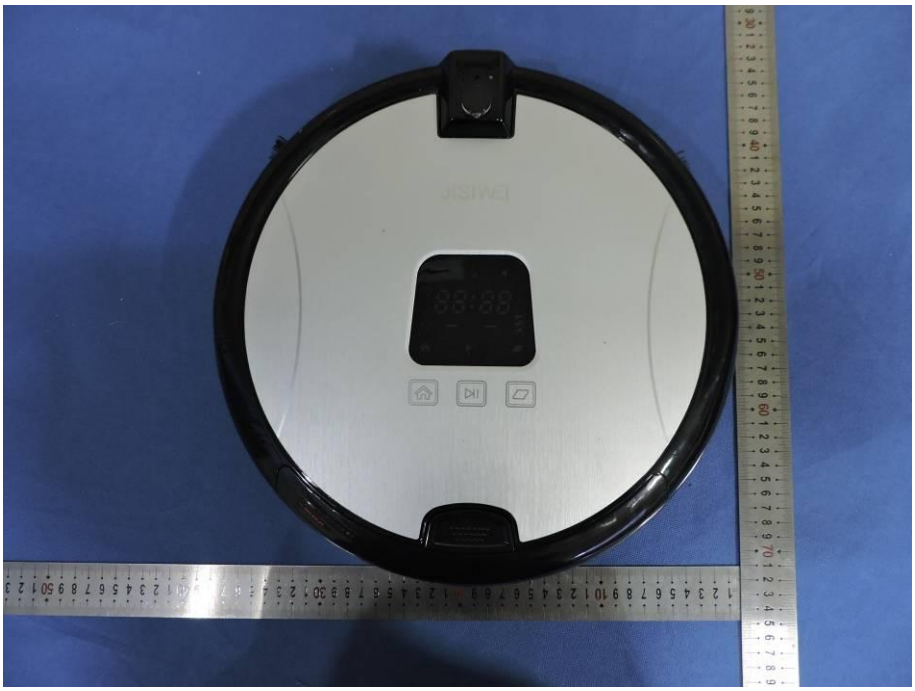
Below 1GHz: The EUT is placed in the 0.8 m high test table

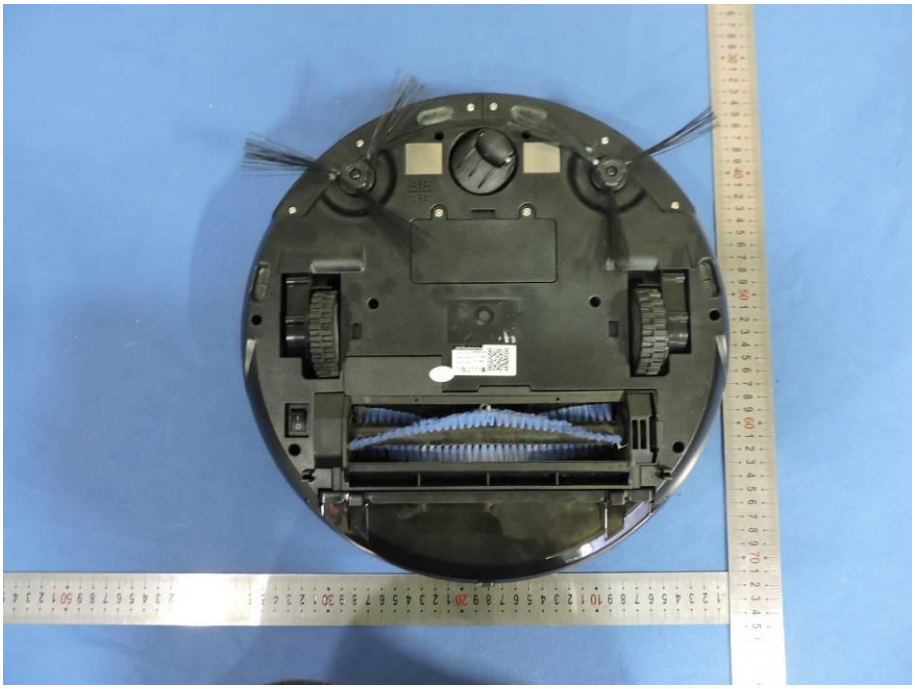
Above 1GHz: Test height 1.5m, the styrofoam block placed in the 0.8 m high test table

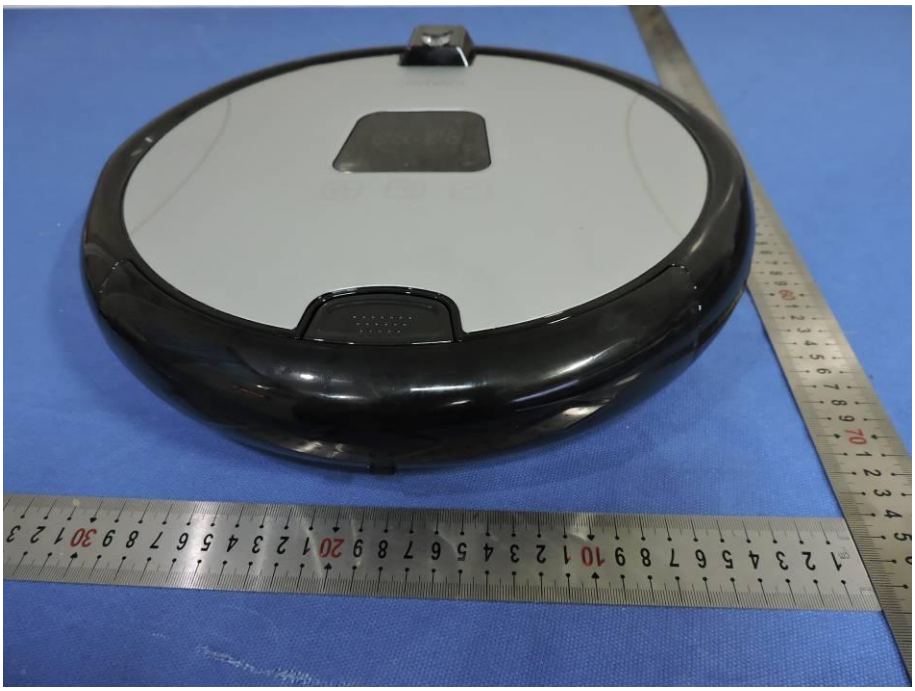
7.2 Conducted Emission

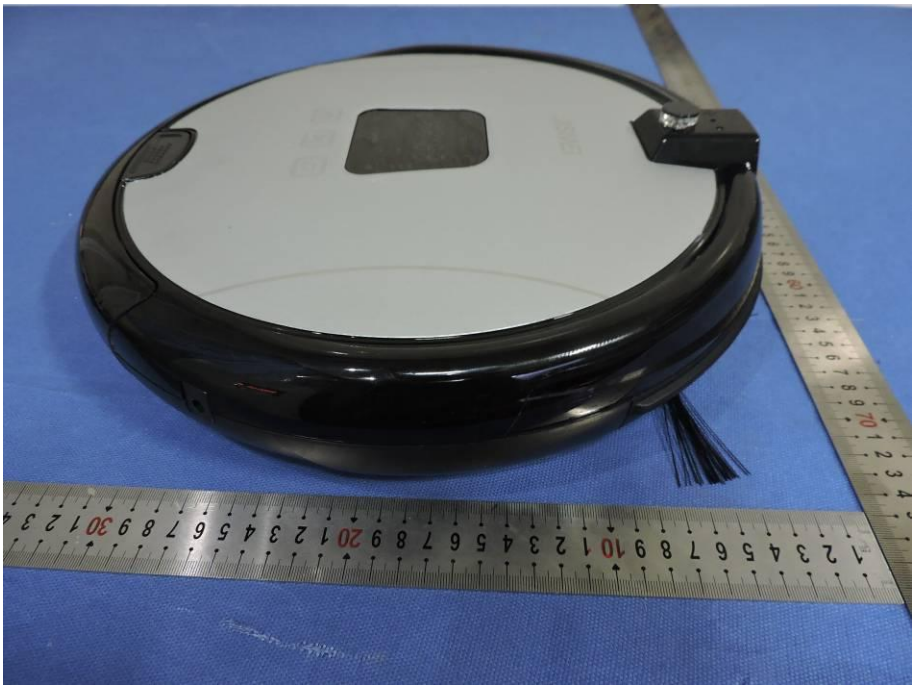


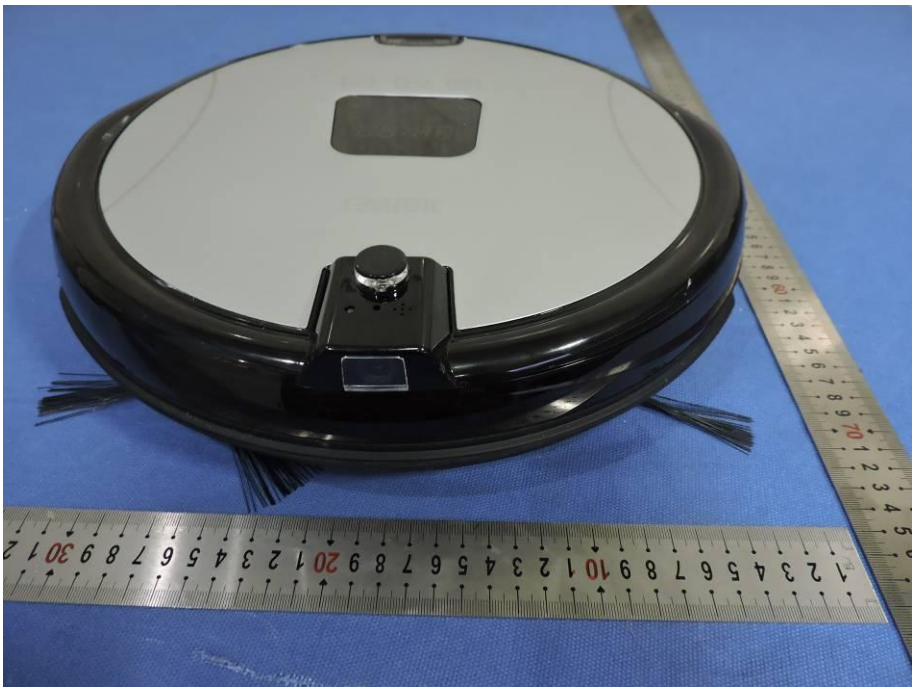
8 Photographs - EUT Constructional Details

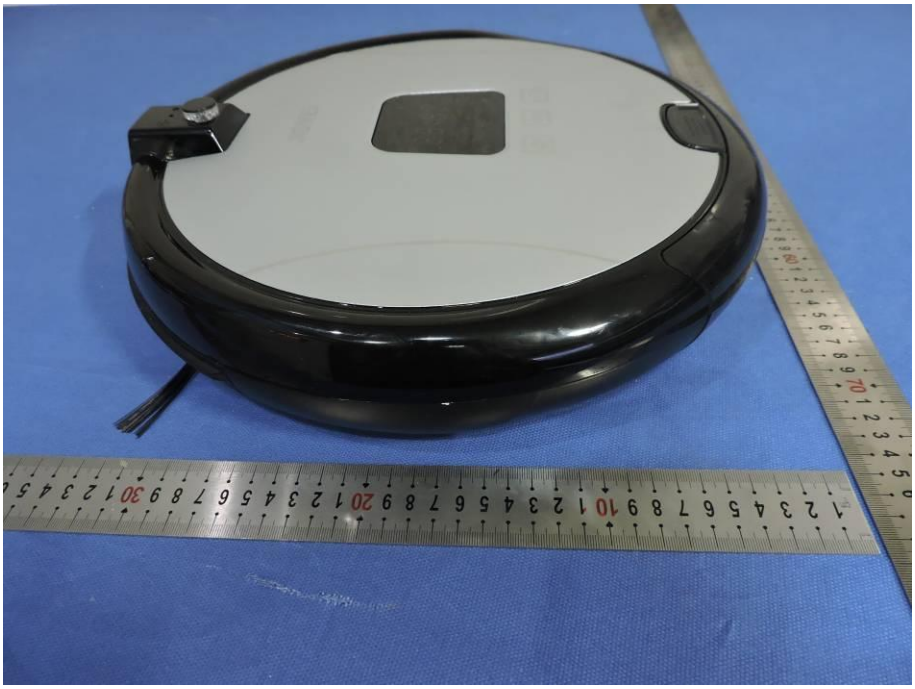


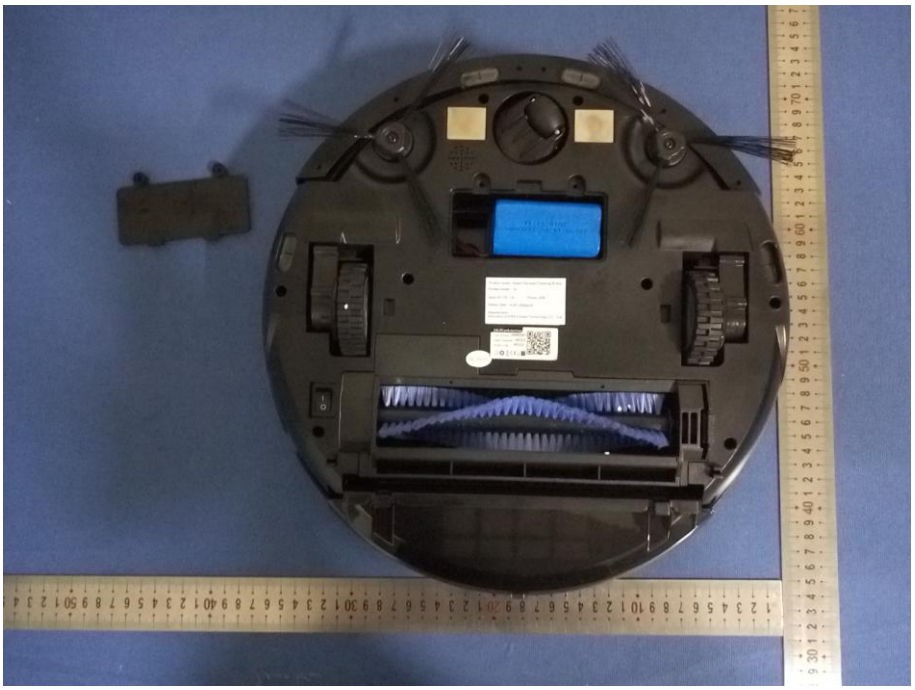


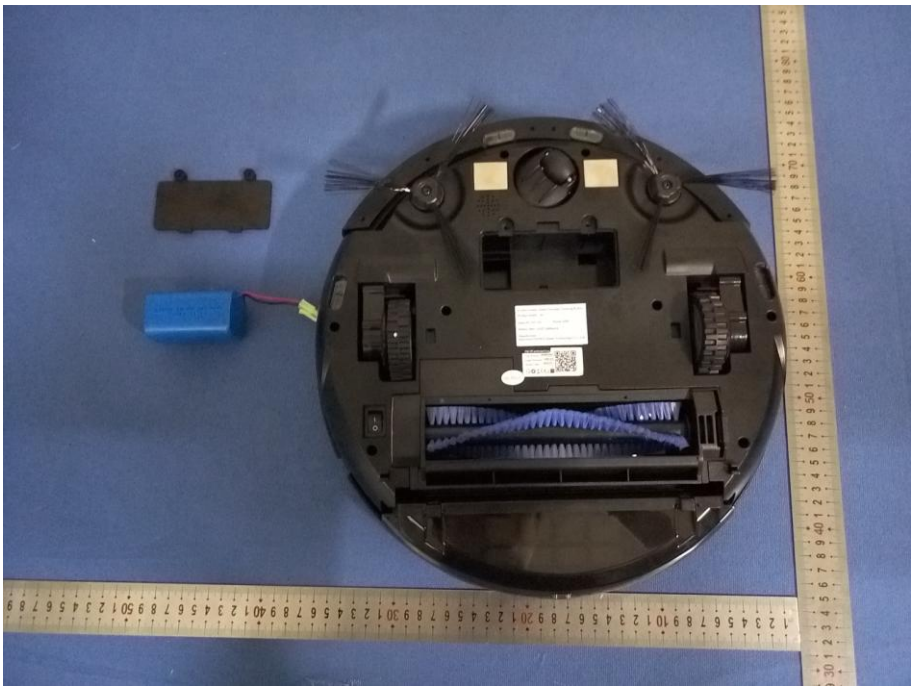


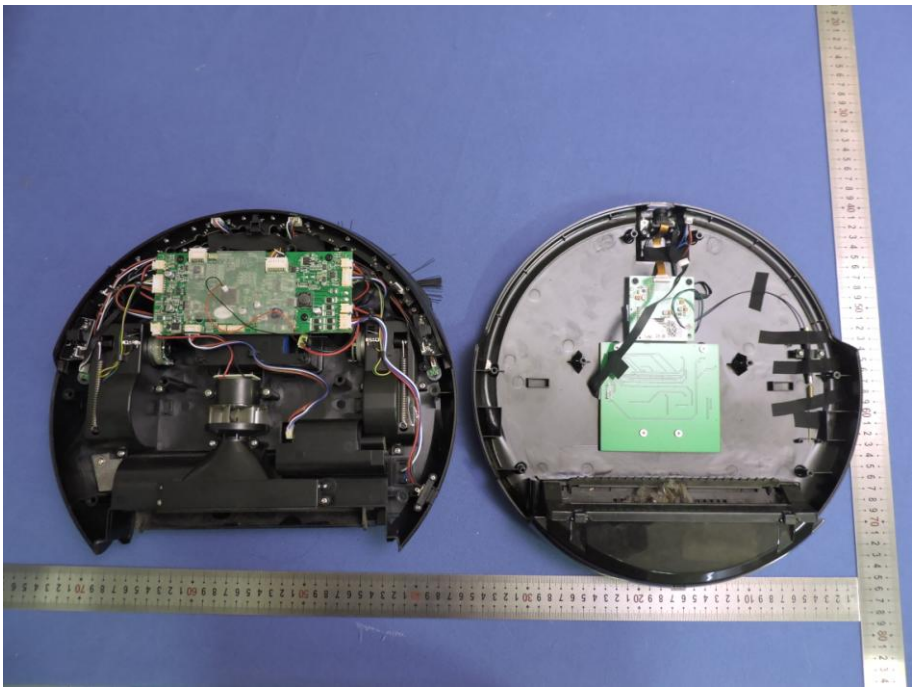


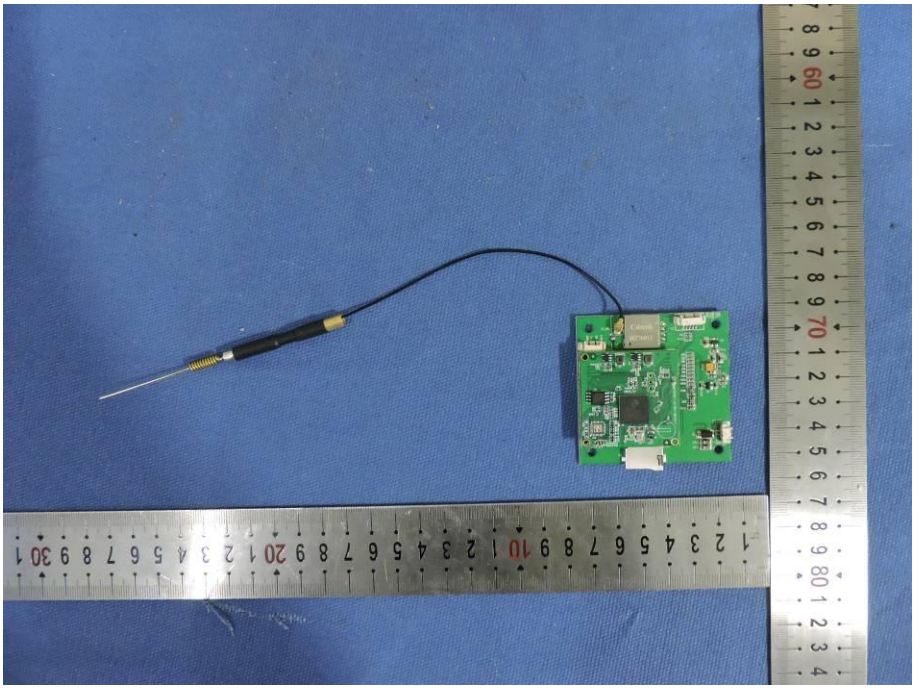


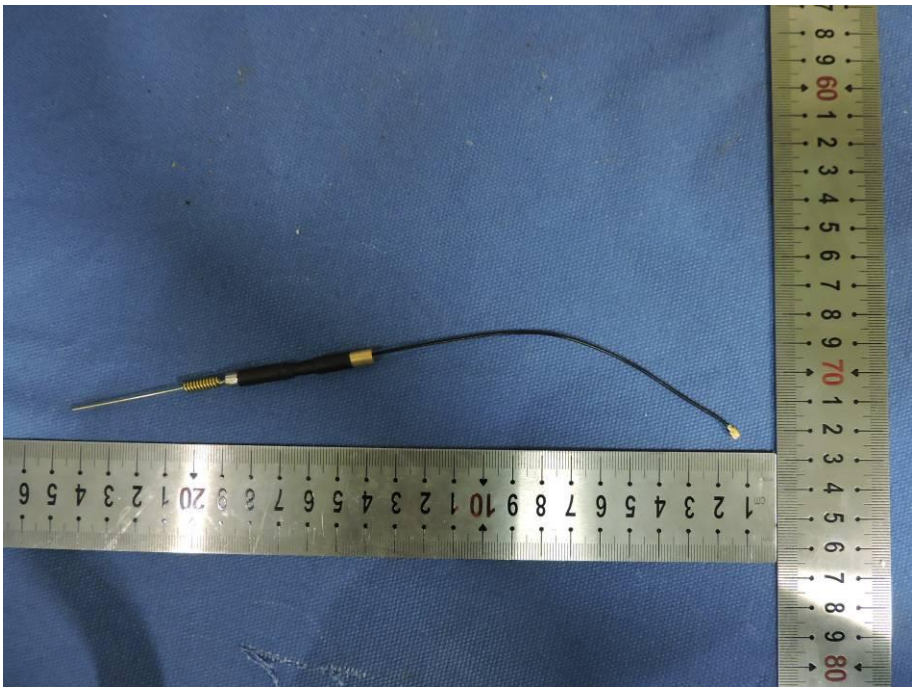


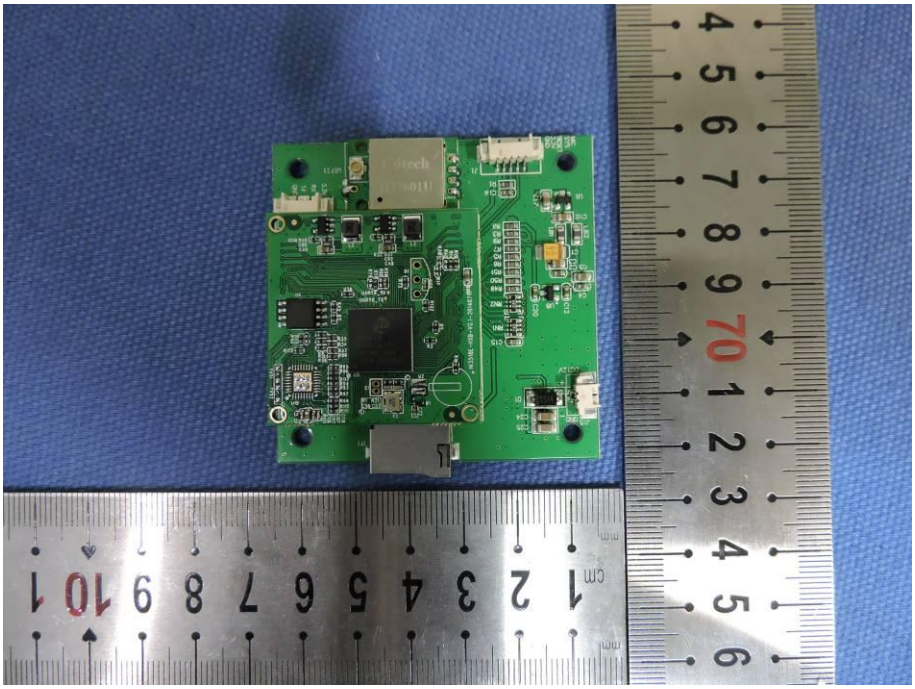


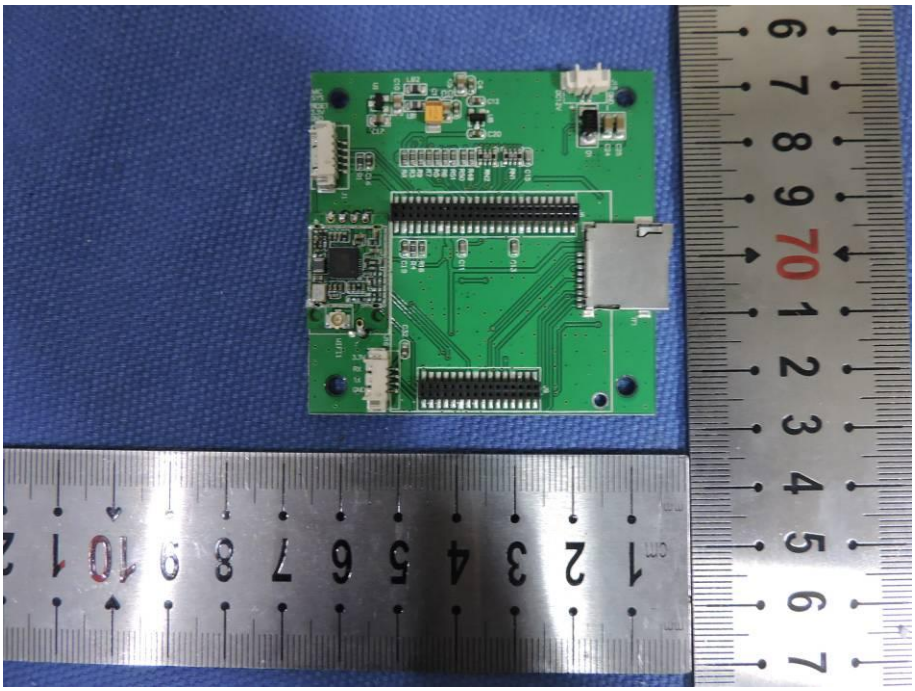


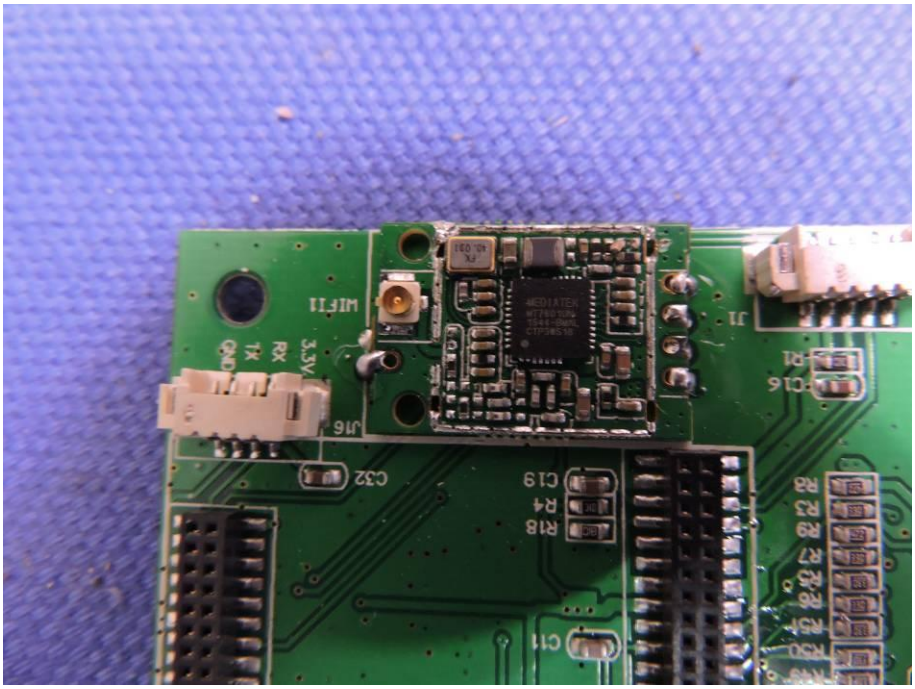








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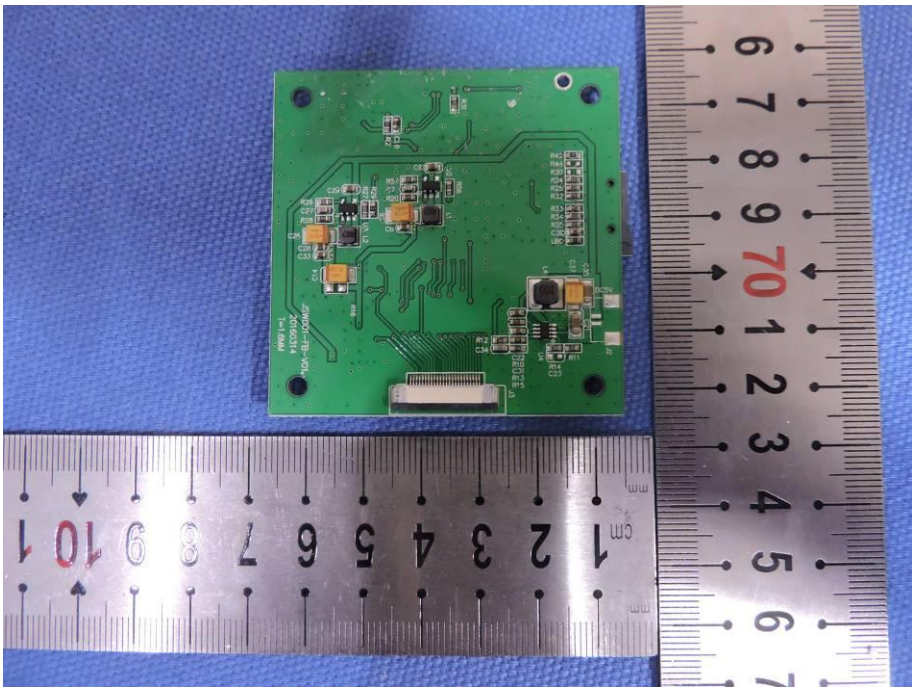
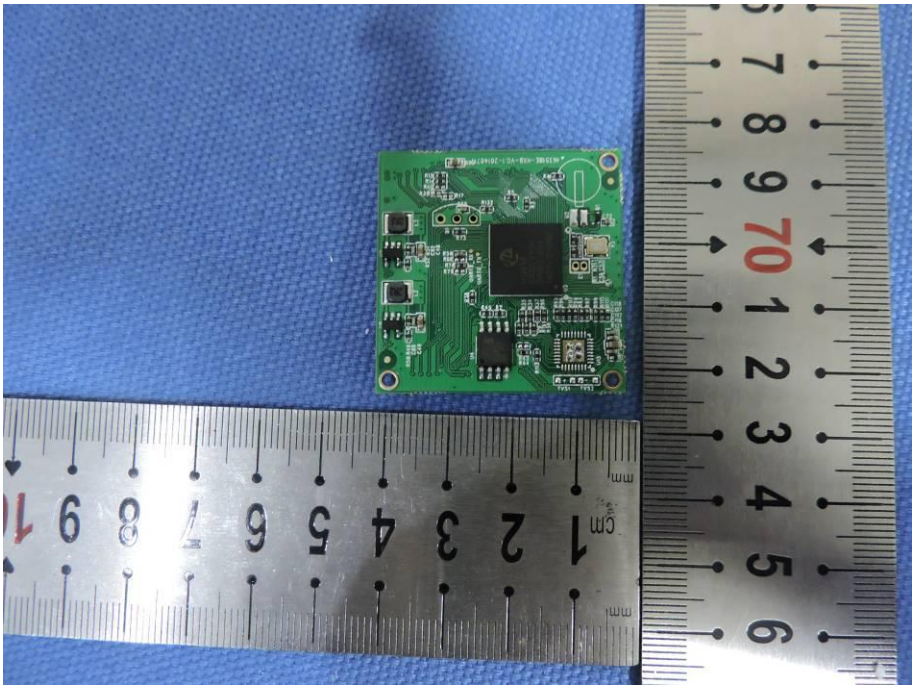
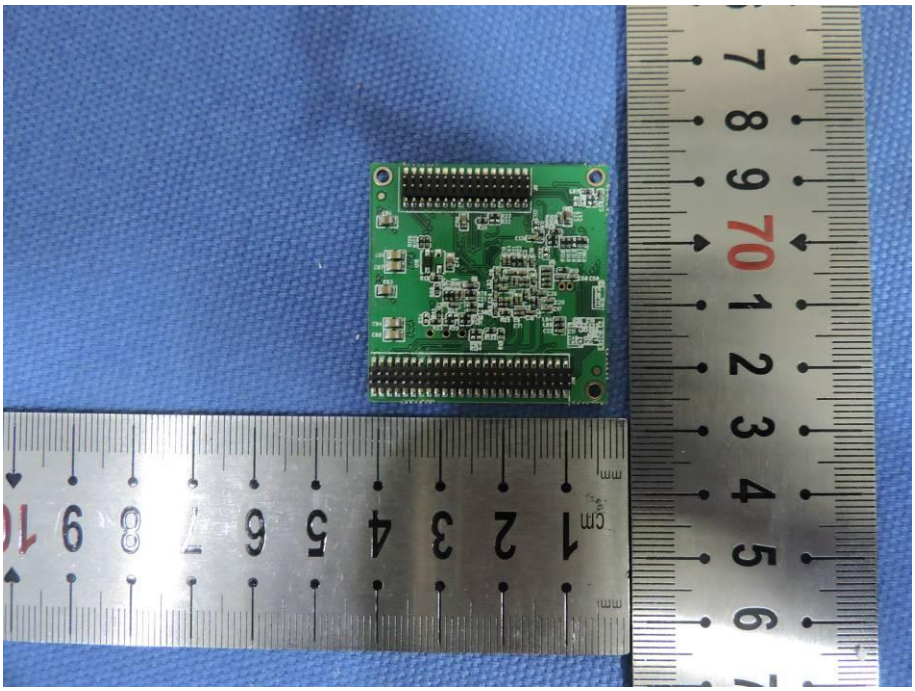
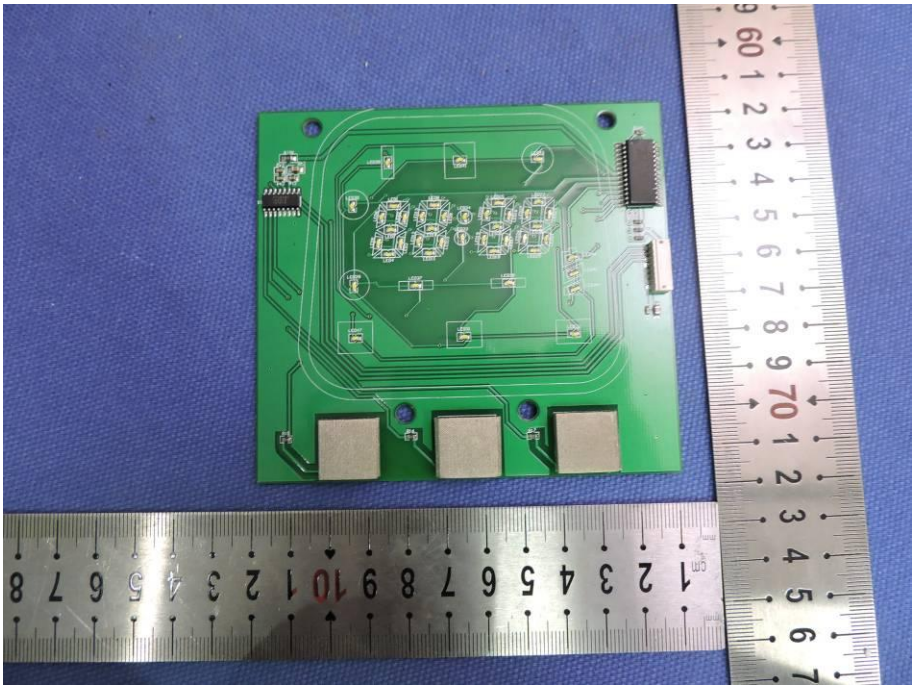
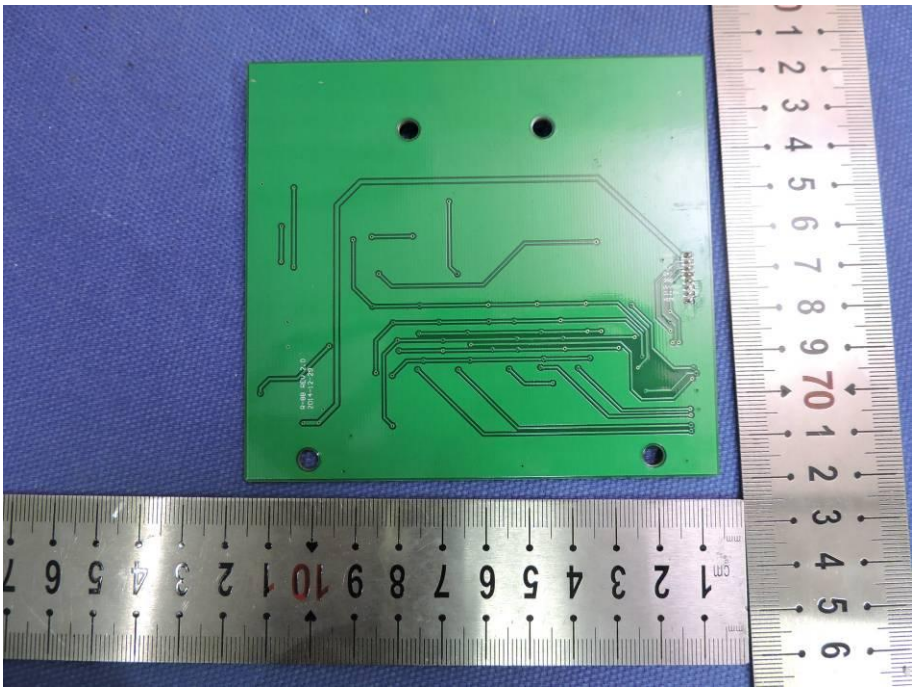
RX
GND
J16
J1
C32
C19
R4
R18
C11
C16

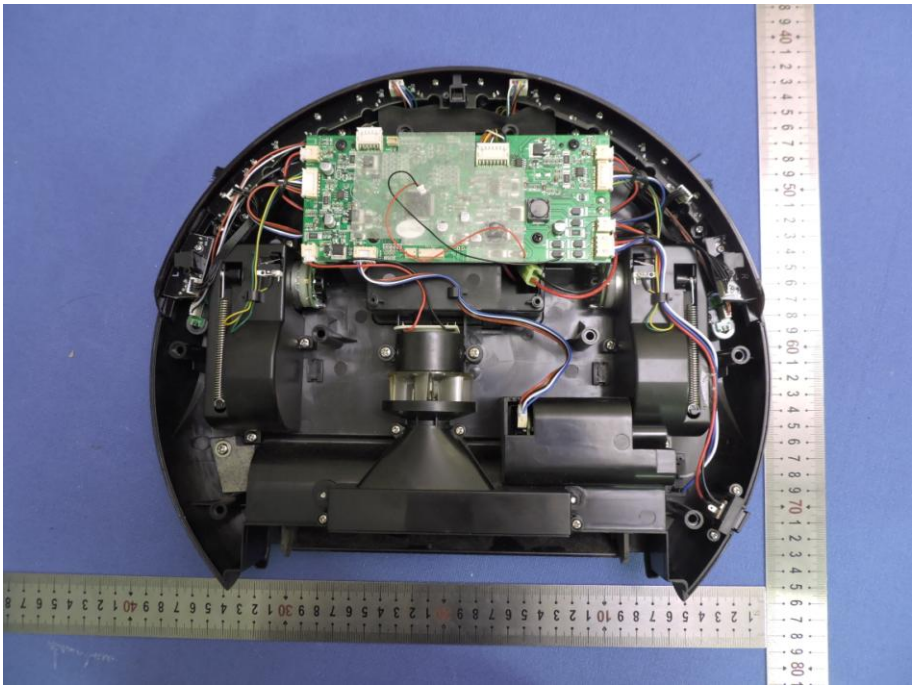


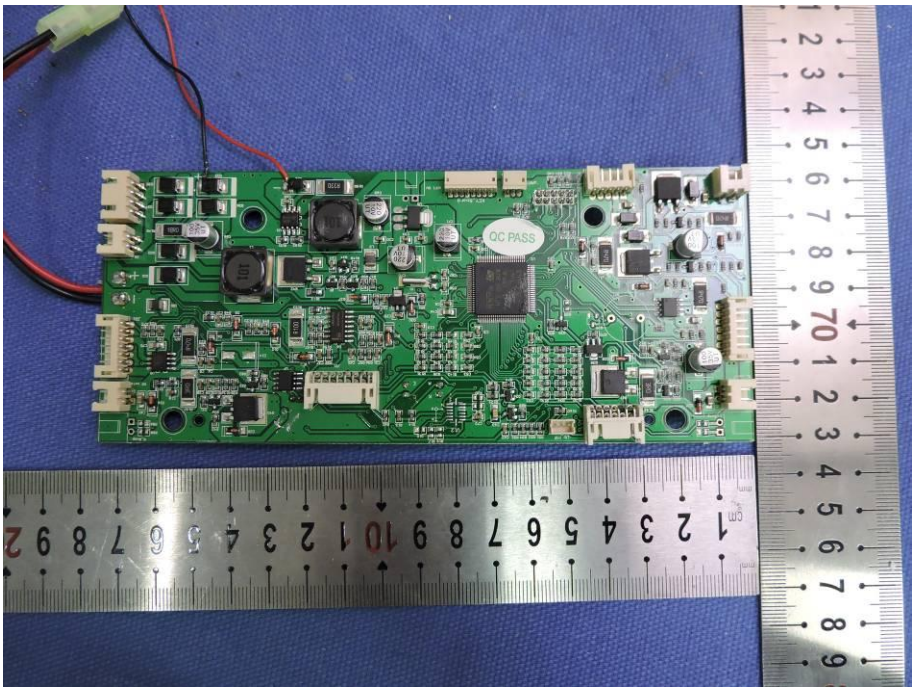


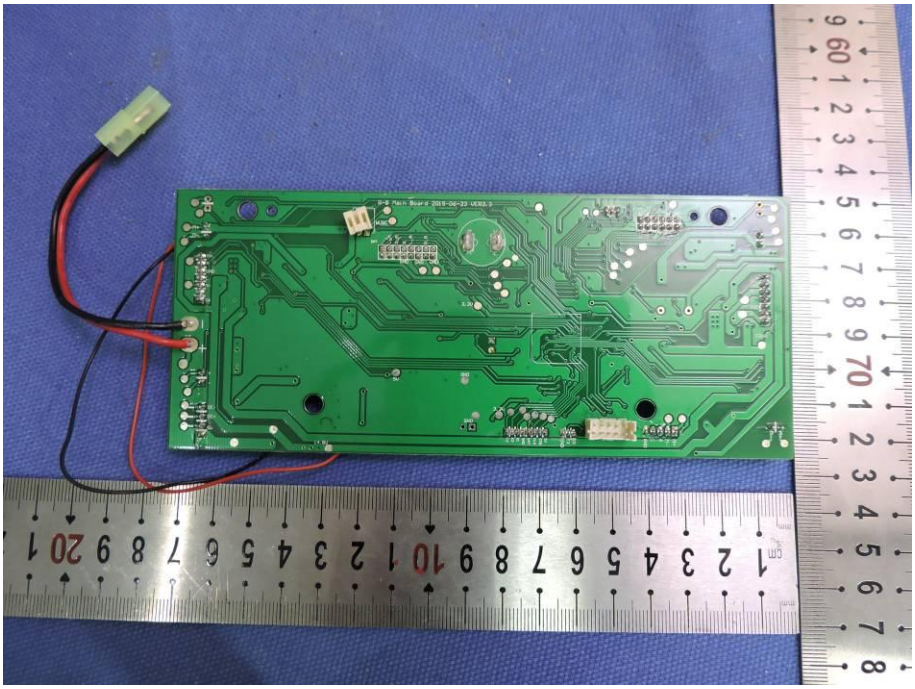


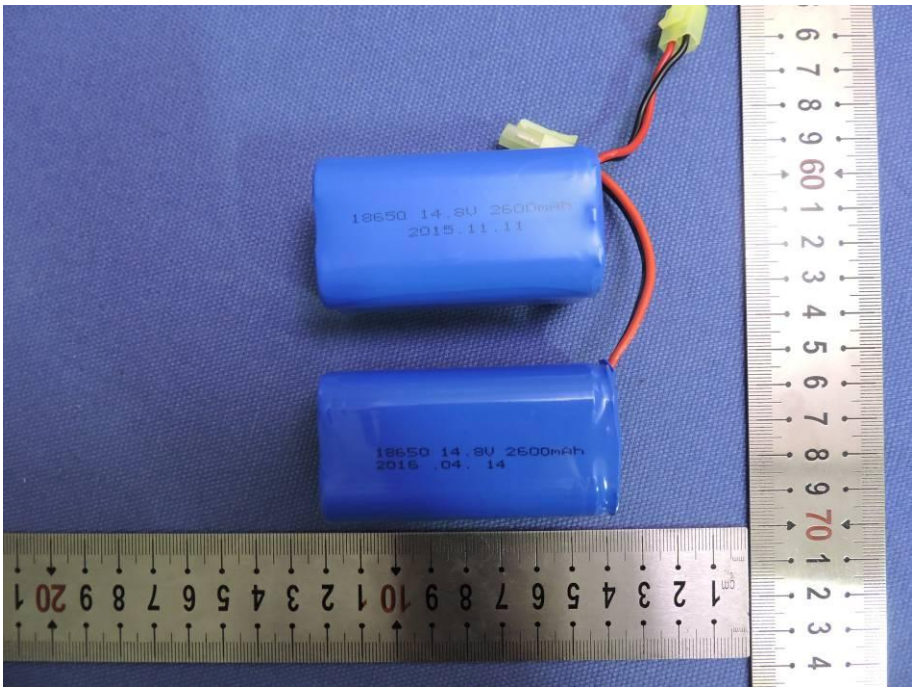







QC PASS




18650 14.8V 2600mAh
2015.11.11
18650 14.8V 2600mAh
2016 .04. 14


CLASS 2 POWER SUPPLY
1603
MODEL:K25V190100U
INPUT:100-240V~50/60Hz 0.6A
OUTPUT:19.0V ⎓ 1.0A
CONFORMS TO UL STD.1310
CERTIFIED TO CSA STD C22.2 NO.223
c ETL us
Intertek
4006448
MADE IN CHINA
See instructions for input voltage conversion
Dongguan Guanjin Electronics Technology Co.,Ltd