FCC PART 15.247

TEST REPORT

For

Shanghai Huace Navigation Technology LTD.

Building C, 599 Gaojing Road, Qingpu District, Shanghai, China

FCC ID: SY4-B01007

Report Type:	Product Type:
Original Report	Data Collector

Test Engineer:	Ada Yu
Report Number:	RKS170428003-00B
Report Date:	2017-10-31
Reviewed By:	Oscar Ye RF Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai Huace Navigation Technology LTD.
Tested Model	LT40
Series Model	LT40 WXYZ (WXYZ= 0-9, a-z)
Product Type	Data Collector
Dimension	164.8 mm(L)×86.0 mm(W)×19.3 mm(H)
Power Supply	DC 3.8V from rechargeable battery and DC 5.0V form adapter

Adapter Information:
Model: EA1012AVRU-050
Input: AC100-240 V 50/60Hz 1.0A
Output:5.0V, 2.4A

** Note: The difference between tested model and series model was explained in the declaration letter.*

**All measurement and test data in this report was gathered from production sample serial number: 20170424005. (Assigned by the BACL. The EUT supplied by the applicant was received on 2017-04-24)*

Objective

This report is prepared on behalf of Shanghai Huace Navigation Technology LTD. in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part15.247 DSS, Part 22H/24E/27 PCE & Part 15B JBP submissions with FCC ID: SY4-B01007.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB558074 D01 DTS Meas Guidance v04.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	4.88dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road,Kunshan,Jiangsu province,China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b, 802.11g and 802.11n-HT20 mode, 11 channels are provided to testing:

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

EUT was tested with Channel 1, 6 and 11.

For 802.11n-HT40 mode, 7 channels are provided to testing

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	8	2447
4	2427	9	2452
5	2432	/	/
6	2437	/	/
7	2442	/	/

EUT was tested with Channel 3, 6 and 9.

For BLE mode, 40 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	…	…
…	…	…	…
…	…	…	…
…	…	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

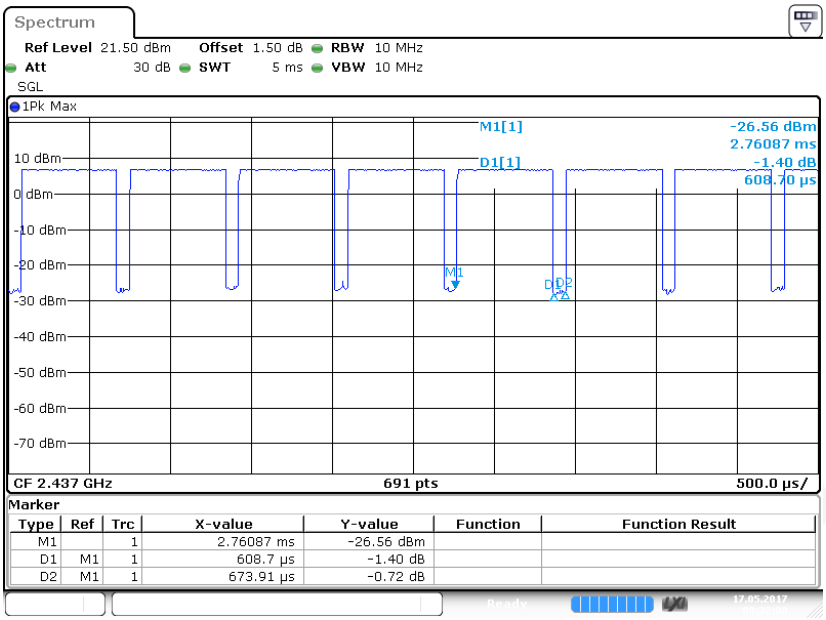
EUT was tested in the engineering mode.

Pre-scan with all the data rates, below data rates are the worst case for Wi-Fi test:

Mode	Data rate	Power level
802.11b	1 Mbps	16
802.11g	6 Mbps	16
802.11n-HT20	MCS0	16
802.11n-HT40	MCS0	16
BLE	/	0

Duty Cycle:

802.11b Mode Middle Channel



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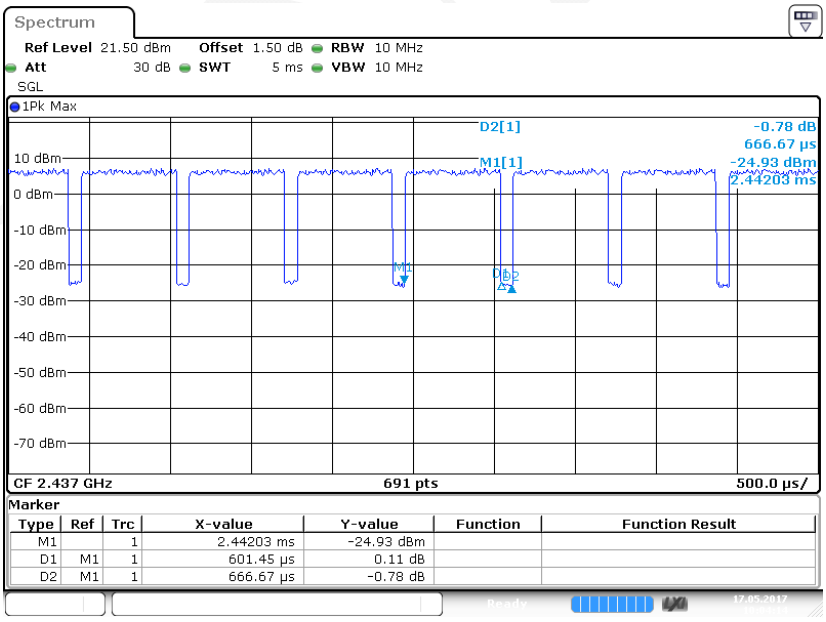
802.11g Mode Middle Channel



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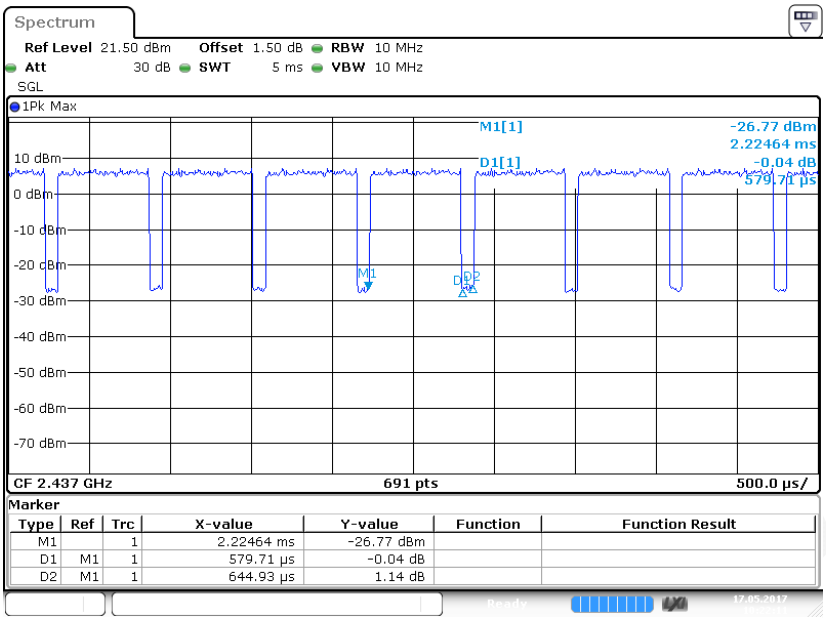
802.11n-HT20 Mode Middle Channel



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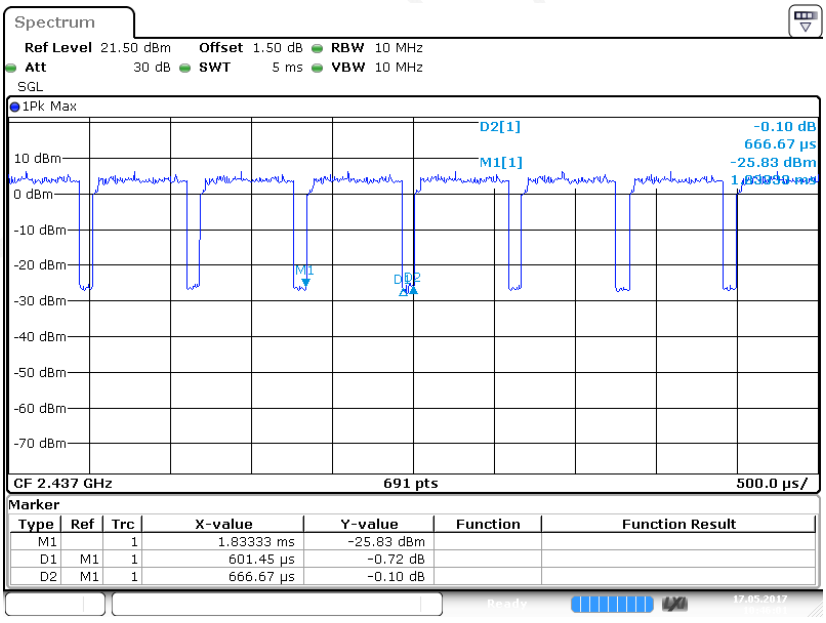
802.11n-HT40 Mode Middle Channel



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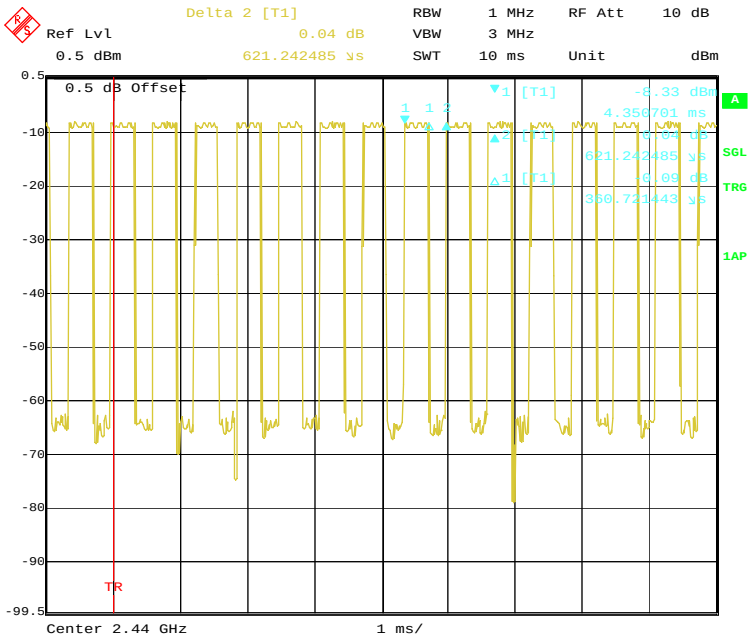
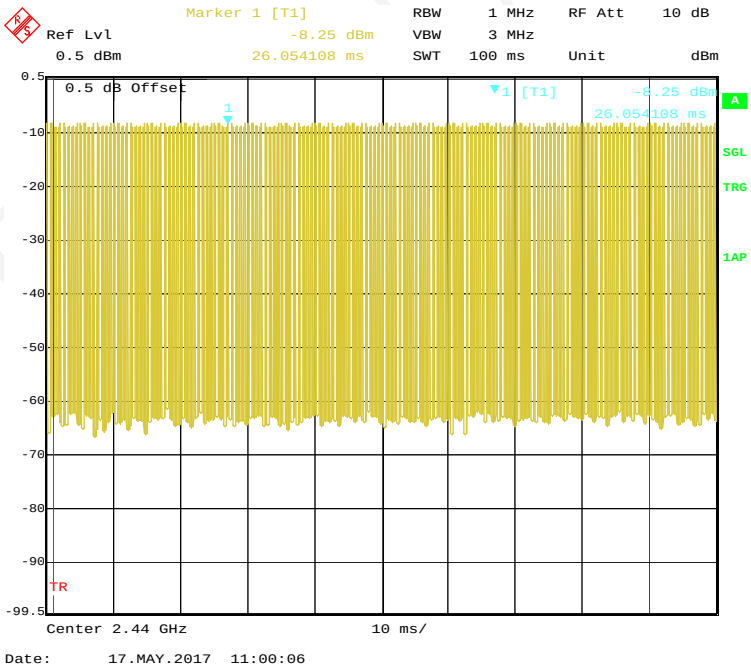
BLE Mode Middle Channel duty cycle





Band	Duty Cycle	T(us)	1/T(kHz)	VBW Setting	10log(1/x)
802.11b	90.36	609	1.64	3kHz	0.44
802.11g	90.10	601	1.66	3kHz	0.45
802.11n-HT20	89.92	580	1.72	3kHz	0.46
802.11n-HT40	90.10	601	1.66	3kHz	0.45
BLE	58.06%	0.361	2.770	3kHz	2.36

Support Equipment List and Details

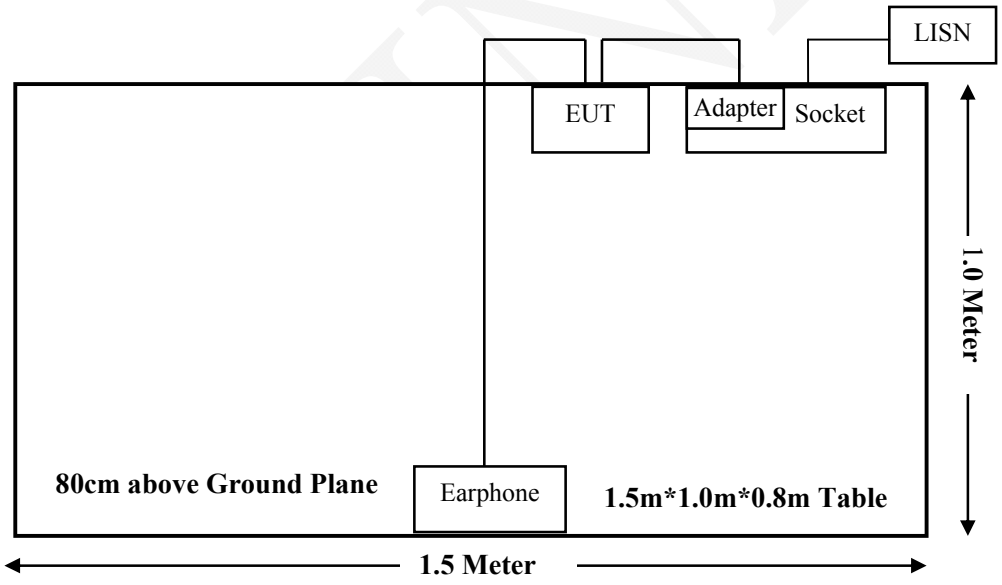
Manufacturer	Description	Model	Serial Number
Huace	Earphone	/	/

External I/O Cable

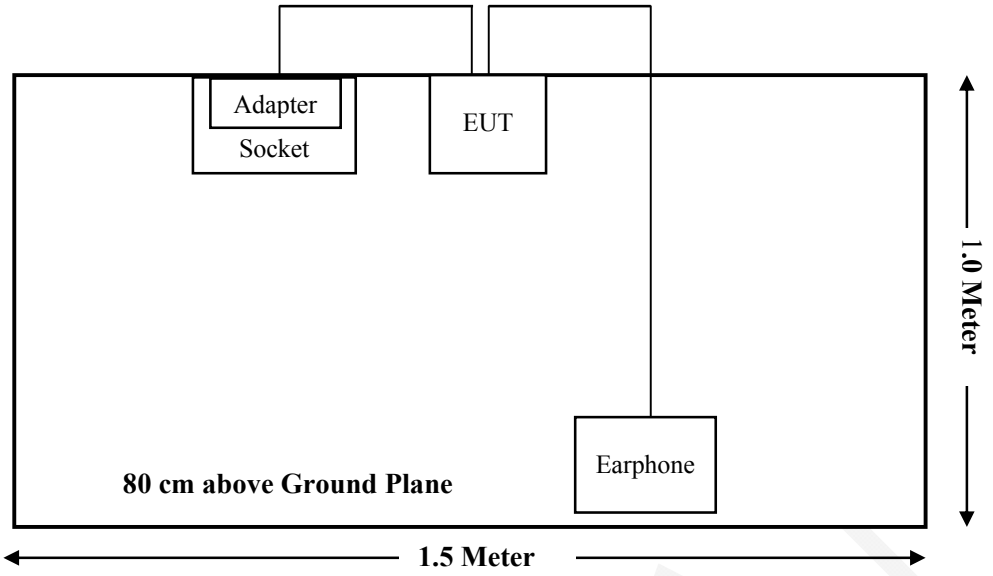
Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup

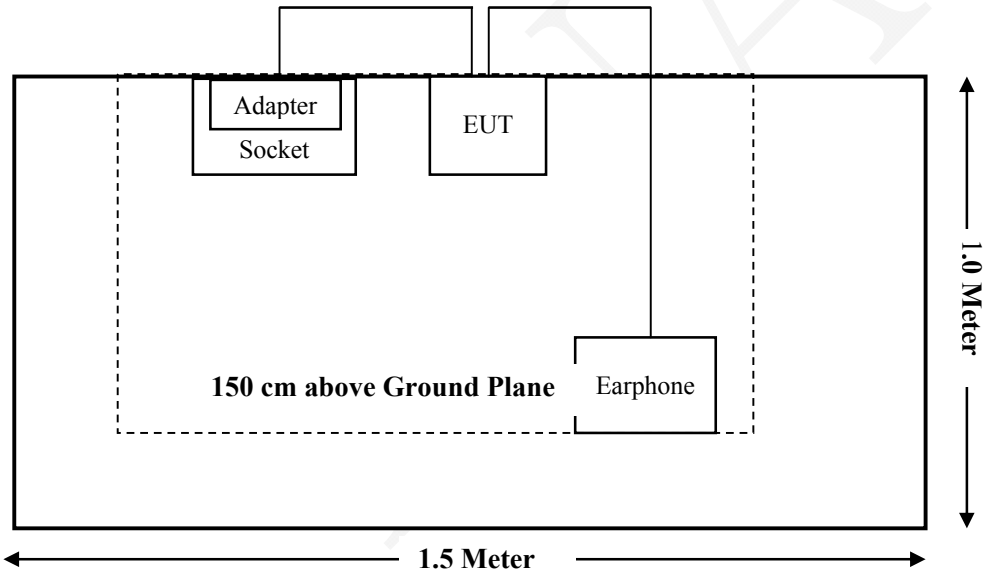
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i),§1.1310& §2.1093	RF EXPOSURE	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Conducted Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-24
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-12
Sonoma Instrunent	Pre-amplifier	330	171377	2016-12-12	2017-12-11
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-12-12	2017-12-11
Heatsink Required	Amplifier	QLW-18405536-J0	15964001009	2016-12-12	2017-12-11
R&S	Auto test Software	EMC32	100361	/	/
Haojintech	Coaxial Cable	Cable-1	001	2016-12-12	2017-12-11
Haojintech	Coaxial Cable	Cable-2	002	2016-12-12	2017-12-11
Haojintech	Coaxial Cable	Cable-3	003	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-12-12	2017-12-11
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2016-09-21	2017-09-20
Rohde & Schwarz	FSV40 Signal Analyzer	FSV40	101116	2016-07-22	2017-07-21
Agilent	Power Meter	N1912A	MY5000492	2016-11-18	2017-11-17
Agilent	Power Sensor	N1921A	MY54210024	2016-11-18	2017-11-17
Huace	RF Cable	N/A	N/A	2017-05-13	2018-05-12
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-09
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2016-11-25	2017-11-24
Rohde & Schwarz	CE Test software	EMC 32	100357	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2016-09-08	2017-09-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.247 (i), §1.1310& §2.1093 –RF EXPOSURE

Applicable Standard

According to§2.1093and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v06:

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

Measurement Result

Mode	Frequency Range	Target Output power		Minimum test separation distance required for the exposure conditions
	(MHz)	(dBm)	(mW)	(mm)
802.11b	2412-2462	8.80	7.586	5.00
802.11g		7.30	5.370	5.00
802.11n-HT20		6.50	4.467	5.00
802.11n-HT40	2422-2452	6.10	4.074	5.00
BLE	2402-2480	-7.00	0.200	5.00

Note: For above output power are all declared by the manufacturer.

For 2.4G Wi-Fi mode: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√ f(GHz)]= 7.586/5* √ 2.462= **2.4 <3.0**.

For BLE mode: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√ f(GHz)]=0.20/5* √ 2.48= **0.06<3.0**.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has a FPCB antenna arrangement for Wi-Fi & BLE, which the antenna gain is 2.5 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

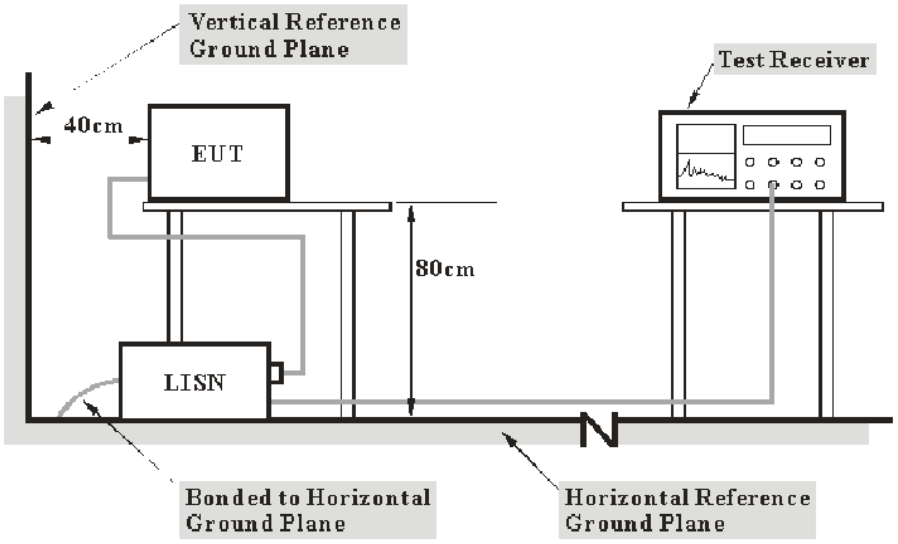
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

Environmental Conditions

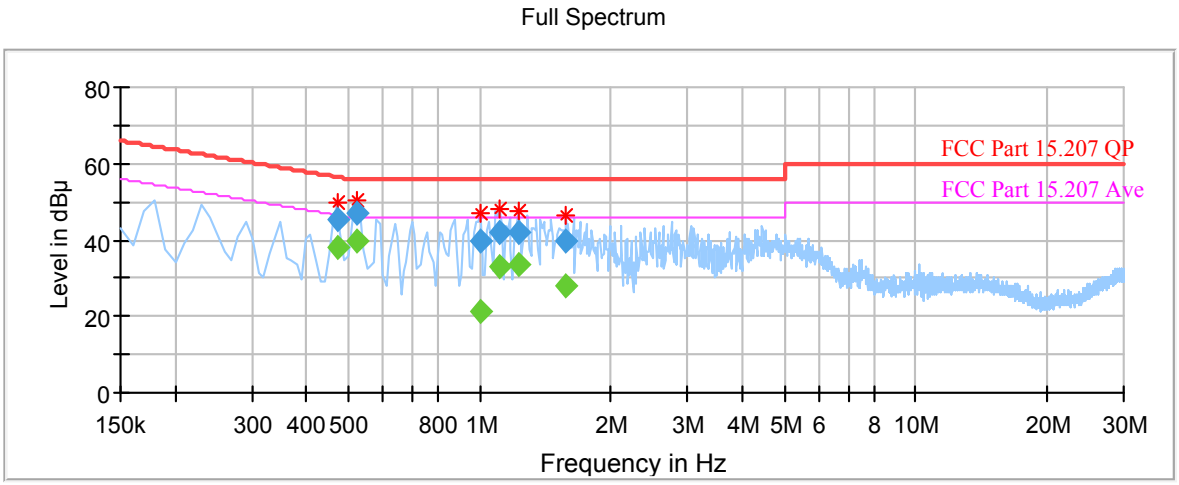
Temperature:	20.2 ℃
Relative Humidity:	55 %
ATM Pressure:	101.3 kPa

The testing was performed by Ada Yu on 2017-05-17.

EUT operation mode: Transmitting(Worst case).

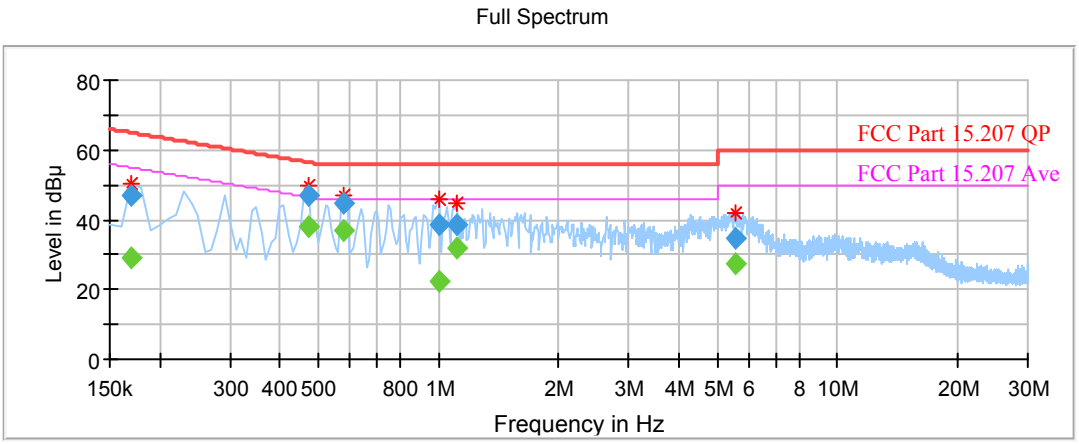
Wi-Fi Mode:

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.470000	---	38.07	9.000	L1	10.1	8.44	46.51	Compliance
0.470000	45.15	---	9.000	L1	10.1	11.36	56.51	Compliance
0.520000	---	39.66	9.000	L1	10.1	6.34	46.00	Compliance
0.520000	47.24	---	9.000	L1	10.1	8.76	56.00	Compliance
1.000000	---	21.22	9.000	L1	9.9	24.78	46.00	Compliance
1.000000	39.62	---	9.000	L1	9.9	16.38	56.00	Compliance
1.110000	---	32.99	9.000	L1	9.9	13.01	46.00	Compliance
1.110000	41.97	---	9.000	L1	9.9	14.03	56.00	Compliance
1.230000	---	33.39	9.000	L1	9.9	12.61	46.00	Compliance
1.230000	42.05	---	9.000	L1	9.9	13.95	56.00	Compliance
1.580000	---	28.22	9.000	L1	9.9	17.78	46.00	Compliance
1.580000	39.86	---	9.000	L1	9.9	16.14	56.00	Compliance

AC 120V/60 Hz, Neutral

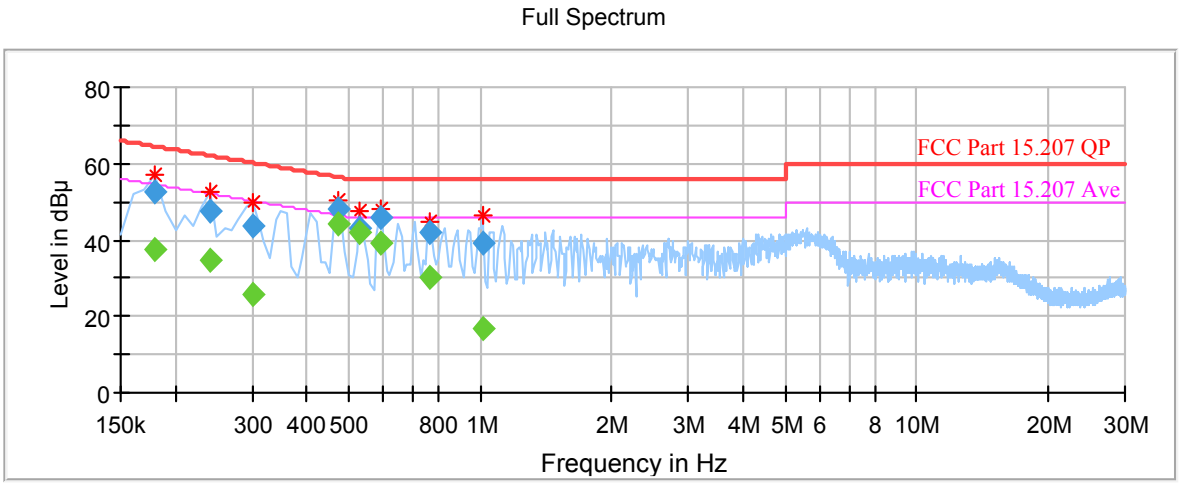


Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170000	---	29.19	9.000	N	10.1	25.77	54.96	Compliance
0.170000	46.90	---	9.000	N	10.1	18.06	64.96	Compliance
0.470000	---	37.96	9.000	N	10.1	8.55	46.51	Compliance
0.470000	47.10	---	9.000	N	10.1	9.41	56.51	Compliance
0.580000	---	36.83	9.000	N	10.1	9.17	46.00	Compliance
0.580000	44.74	---	9.000	N	10.1	11.26	56.00	Compliance
1.000000	---	22.24	9.000	N	9.9	23.76	46.00	Compliance
1.000000	38.72	---	9.000	N	9.9	17.28	56.00	Compliance
1.110000	---	31.83	9.000	N	9.9	14.17	46.00	Compliance
1.110000	38.71	---	9.000	N	9.9	17.29	56.00	Compliance
5.530000	---	27.52	9.000	N	9.9	22.48	50.00	Compliance
5.530000	34.83	---	9.000	N	9.9	25.17	60.00	Compliance

Note:
1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
2) Corrected Amplitude = Reading + Corr.
3) Margin = Limit –Corrected Amplitude

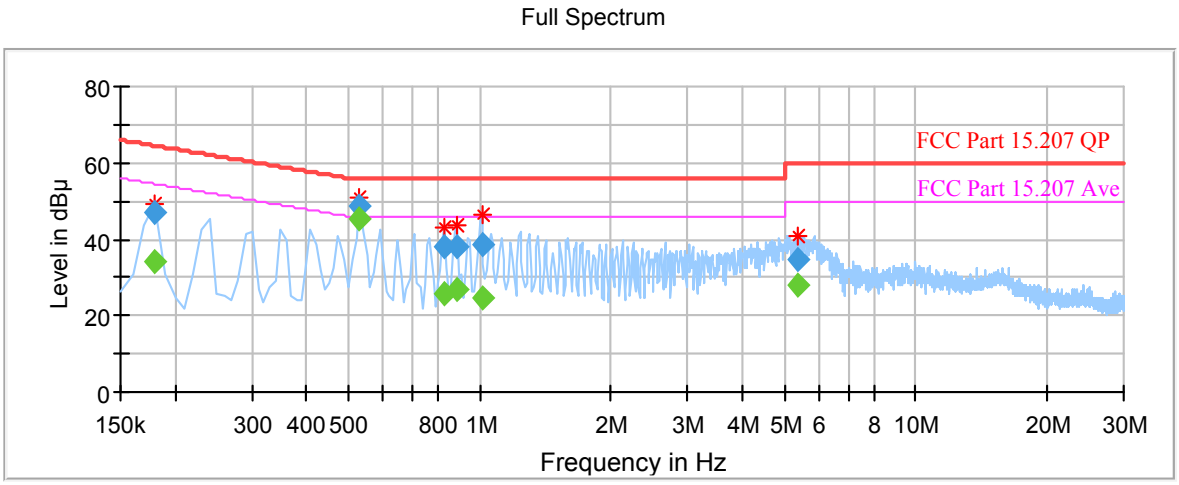
BLE Mode:

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.180000	---	37.36	9.000	L1	10.0	17.13	54.49	Compliance
0.180000	52.82	---	9.000	L1	10.0	11.67	64.49	Compliance
0.240000	---	34.95	9.000	L1	10.0	17.15	52.10	Compliance
0.240000	47.40	---	9.000	L1	10.0	14.70	62.10	Compliance
0.300000	---	25.50	9.000	L1	10.0	24.74	50.24	Compliance
0.300000	43.54	---	9.000	L1	10.0	16.70	60.24	Compliance
0.470000	---	44.20	9.000	L1	10.1	2.31	46.51	Compliance
0.470000	48.05	---	9.000	L1	10.1	8.46	56.51	Compliance
0.530000	---	41.92	9.000	L1	10.1	4.08	46.00	Compliance
0.530000	43.34	---	9.000	L1	10.1	12.66	56.00	Compliance
0.590000	---	39.08	9.000	L1	10.0	6.92	46.00	Compliance
0.590000	45.76	---	9.000	L1	10.0	10.24	56.00	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.180000	---	34.24	9.000	N	10.1	20.25	54.49	Compliance
0.180000	47.03	---	9.000	N	10.1	17.46	64.49	Compliance
0.530000	---	45.37	9.000	N	10.1	0.63	46.00	Compliance
0.530000	48.91	---	9.000	N	10.1	7.09	56.00	Compliance
0.830000	---	25.78	9.000	N	10.0	20.22	46.00	Compliance
0.830000	37.93	---	9.000	N	10.0	18.07	56.00	Compliance
0.890000	---	26.67	9.000	N	10.0	19.33	46.00	Compliance
0.890000	38.00	---	9.000	N	10.0	18.00	56.00	Compliance
1.010000	---	24.81	9.000	N	9.9	21.19	46.00	Compliance
1.010000	38.56	---	9.000	N	9.9	17.44	56.00	Compliance
5.370000	---	27.72	9.000	N	9.9	22.28	50.00	Compliance
5.370000	34.84	---	9.000	N	9.9	25.16	60.00	Compliance

Note:
1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
2) Corrected Amplitude = Reading + Corr.
3) Margin = Limit –Corrected Amplitude

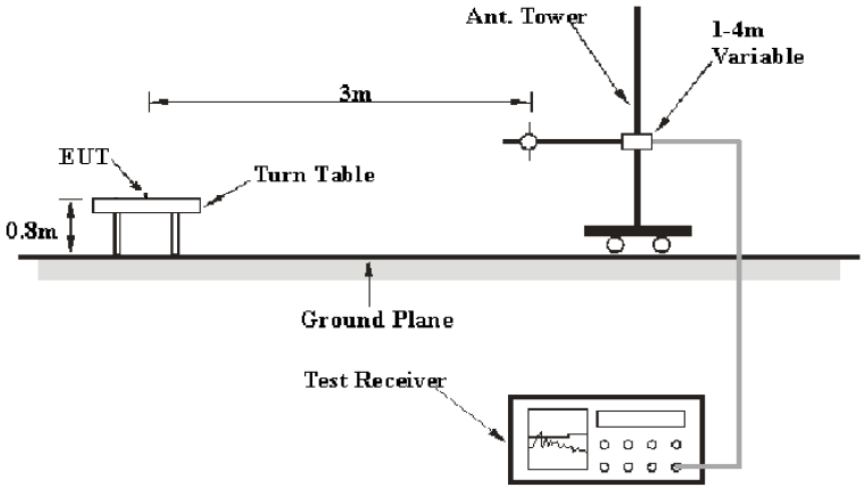
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

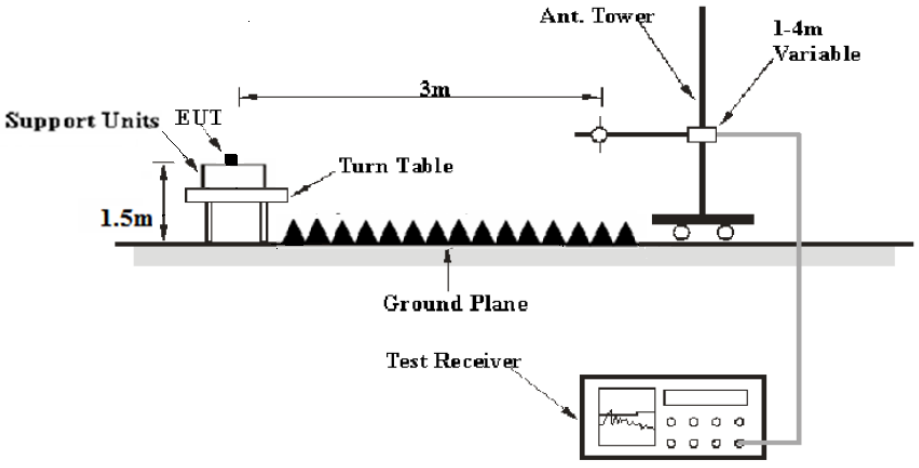
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP

Frequency Range	Item	RBW	Video B/W	Duty cycle	Detector
1GHz – 25GHz	PK Value	1MHz	3 MHz	Any	PK
	AV Value	1MHz	10 Hz	>98%	PK
		1MHz	1/T	<98%	

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak detection mode for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data

Environmental Conditions

Temperature:	24.1 ℃
Relative Humidity:	54 %
ATM Pressure:	101.2kPa

The testing was performed by Ada Yu on 2017-05-17.

EUT operation mode: Transmitting (Scan with X-Axis, Y-Axis and Z-Axis position, the worst case was recorded)

30MHz-25GHz

802.11b Mode:

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Low Channel (2412 MHz)									
99.98	35.29	QP	289	143	H	-11.18	24.11	43.5	19.39
2412.00	105.55	PK	69	214	V	-6.17	99.38	/	/
2412.00	101.65	Ave	69	214	V	-6.17	95.48	/	/
2412.00	104.32	PK	294	249	H	-6.17	98.15	/	/
2412.00	100.58	Ave	294	249	H	-6.17	94.41	/	/
2390.00	46.21	PK	69	128	V	-6.22	39.99	74.0	34.01
2390.00	43.11	Ave	69	128	V	-6.22	36.89	54.0	17.11
2400.00	48.23	PK	280	123	V	-6.19	42.04	74.0	31.96
2400.00	43.22	Ave	280	123	V	-6.19	37.03	54.0	16.97
1498.26	45.26	PK	279	113	H	-9.47	35.79	74.0	38.21
1498.26	41.11	Ave	279	113	H	-9.47	31.64	54.0	22.36
4824.00	45.32	PK	201	247	V	1.66	46.98	74.0	27.02
4824.00	40.61	Ave	201	247	V	1.66	42.27	54.0	11.73
7236.00	42.01	PK	14	103	V	7.58	49.59	74.0	24.41
7236.00	31.25	Ave	14	103	V	7.58	38.83	54.0	15.17

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Middle Channel (2437 MHz)									
99.98	35.26	QP	45	184	H	-11.18	24.08	43.5	19.42
2437.00	106.47	PK	265	182	V	-6.11	100.36	/	/
2437.00	101.77	Ave	265	182	V	-6.11	95.66	/	/
2437.00	103.54	PK	356	225	H	-6.11	97.43	/	/
2437.00	99.71	Ave	356	225	H	-6.11	93.60	/	/
1367.28	45.67	PK	291	153	H	-10.25	35.42	74.0	38.58
1367.28	41.20	Ave	291	153	H	-10.25	30.95	54.0	23.05
3465.72	46.84	PK	6	170	V	-2.03	44.81	74.0	29.19
3465.72	42.01	Ave	6	170	V	-2.03	39.98	54.0	14.02
4874.00	50.13	PK	71	192	V	1.77	51.90	74.0	22.10
4874.00	45.66	Ave	71	192	V	1.77	47.43	54.0	6.57
6714.35	46.17	PK	266	132	H	6.52	52.69	74.0	21.31
6714.35	41.38	Ave	266	132	H	6.52	47.90	54.0	6.10
7311.00	41.67	PK	116	190	V	7.66	49.33	74.0	24.67
7311.00	28.94	Ave	116	190	V	7.66	36.60	54.0	17.40

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	(PK/QP/Ave.)		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
High Channel (2462 MHz)									
99.98	35.11	QP	244	209	H	-11.18	23.93	43.5	19.57
2462.00	106.11	PK	23	206	V	-6.06	100.05	/	/
2462.00	104.34	Ave	23	206	V	-6.06	98.28	/	/
2462.00	103.07	PK	295	175	H	-6.06	97.01	/	/
2462.00	98.35	Ave	295	175	H	-6.06	92.29	/	/
2483.50	46.28	PK	156	140	V	-6.01	40.27	74.0	33.73
2483.50	42.01	Ave	156	140	V	-6.01	36.00	54.0	18.00
1437.54	45.31	PK	130	122	V	-9.83	35.48	74.0	38.52
1437.54	41.03	Ave	130	122	V	-9.83	31.20	54.0	22.80
4924.00	52.13	PK	179	241	V	1.89	54.02	74.0	19.98
4924.00	57.32	Ave	179	241	V	1.89	59.21	54.0	-5.21
6374.11	46.11	PK	67	220	H	5.45	51.56	74.0	22.44
6374.11	41.25	Ave	67	220	H	5.45	46.70	54.0	7.30
7386.00	42.01	PK	99	231	V	7.73	49.74	74.0	24.26
7386.00	30.17	Ave	99	231	V	7.73	37.90	54.0	16.10

802.11g Mode:

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Low Channel (2412 MHz)									
99.98	33.61	QP	92	223	H	-11.18	22.43	43.5	21.07
2412.00	103.48	PK	265	202	V	-6.17	97.31	/	/
2412.00	98.56	Ave	265	202	V	-6.17	92.39	/	/
2412.00	100.46	PK	238	217	H	-6.17	94.29	/	/
2412.00	95.87	Ave	238	217	H	-6.17	89.70	/	/
2390.00	51.03	PK	31	170	V	-6.22	44.81	74.0	29.19
2390.00	46.05	Ave	31	170	V	-6.22	39.83	54.0	14.17
2400.00	55.63	PK	302	129	V	-6.19	49.44	74.0	24.56
2400.00	51.22	Ave	302	129	V	-6.19	45.03	54.0	8.97
1533.67	44.26	PK	270	234	H	-9.30	34.96	74.0	39.04
1533.67	39.28	Ave	270	234	H	-9.30	29.98	54.0	24.02
4824.00	48.12	PK	153	162	V	1.66	49.78	74.0	24.22
4824.00	43.21	Ave	153	162	V	1.66	44.87	54.0	9.13
7236.00	40.35	PK	70	203	V	7.58	47.93	74.0	26.07
7236.00	25.37	Ave	70	203	V	7.58	32.95	54.0	21.05

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Middle Channel (2437 MHz)									
99.98	33.59	QP	325	142	H	-11.18	22.41	43.5	21.09
2437.00	104.50	PK	109	234	V	-6.11	98.39	/	/
2437.00	99.38	Ave	109	234	V	-6.11	93.27	/	/
2437.00	101.71	PK	300	151	H	-6.11	95.60	/	/
2437.00	96.63	Ave	300	151	H	-6.11	90.52	/	/
1964.50	45.31	PK	212	141	H	-7.26	38.05	74.0	35.95
1964.50	41.02	Ave	212	141	H	-7.26	33.76	54.0	20.24
3368.51	46.25	PK	333	131	V	-2.28	43.97	74.0	30.03
3368.51	41.35	Ave	333	131	V	-2.28	39.07	54.0	14.93
4874.00	48.97	PK	41	132	V	1.77	50.74	74.0	23.26
4874.00	43.25	Ave	41	132	V	1.77	45.02	54.0	8.98
6827.64	44.61	PK	112	116	H	6.85	51.46	74.0	22.54
6827.64	40.15	Ave	112	116	H	6.85	47.00	54.0	7.00
7311.00	39.84	PK	27	180	V	7.66	47.50	74.0	26.50
7311.00	25.68	Ave	27	180	V	7.66	33.34	54.0	20.66

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
High Channel (2462 MHz)									
99.98	33.44	QP	325	250	H	-11.18	22.26	43.5	21.24
2462.00	103.54	PK	115	216	V	-6.06	97.48	/	/
2462.00	98.69	Ave	115	216	V	-6.06	92.63	/	/
2462.00	100.73	PK	127	246	H	-6.06	94.67	/	/
2462.00	95.56	Ave	127	246	H	-6.06	89.50	/	/
2483.50	47.51	PK	227	135	V	-6.01	41.50	74.0	32.50
2483.50	42.68	Ave	227	135	V	-6.01	36.67	54.0	17.33
1543.28	45.31	PK	354	172	V	-9.25	36.06	74.0	37.94
1543.28	40.26	Ave	354	172	V	-9.25	31.01	54.0	22.99
4924.00	48.22	PK	2	116	V	1.89	50.11	74.0	23.89
4924.00	43.26	Ave	2	116	V	1.89	45.15	54.0	8.85
6825.54	43.68	PK	169	116	H	6.84	50.52	74.0	23.48
6825.54	35.00	Ave	169	116	H	6.84	41.84	54.0	12.16
7386.00	41.02	PK	235	193	V	7.73	48.75	74.0	25.25
7386.00	29.76	Ave	235	193	V	7.73	37.49	54.0	16.51

802.11n-HT20 Mode:

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Low Channel (2412 MHz)									
99.98	34.16	QP	241	226	H	-11.18	22.98	43.5	20.52
2412.00	103.15	PK	24	144	V	-6.17	96.98	/	/
2412.00	98.21	Ave	24	144	V	-6.17	92.04	/	/
2412.00	101.24	PK	17	180	H	-6.17	95.07	/	/
2412.00	96.19	Ave	17	180	H	-6.17	90.02	/	/
2390.00	46.31	PK	127	177	V	-6.22	40.09	74.0	33.91
2390.00	41.28	Ave	127	177	V	-6.22	35.06	54.0	18.94
2400.00	50.22	PK	223	155	V	-6.19	44.03	74.0	29.97
2400.00	45.68	Ave	223	155	V	-6.19	39.49	54.0	14.51
1623.11	44.33	PK	160	149	H	-8.88	35.45	74.0	38.55
1623.11	39.24	Ave	160	149	H	-8.88	30.36	54.0	23.64
4824.00	49.56	PK	273	198	V	1.66	51.22	74.0	22.78
4824.00	44.37	Ave	273	198	V	1.66	46.03	54.0	7.97
7236.00	40.33	PK	160	138	V	7.58	47.91	74.0	26.09
7236.00	25.94	Ave	160	138	V	7.58	33.52	54.0	20.48

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Middle Channel (2437 MHz)									
99.98	34.59	QP	172	184	H	-11.18	23.41	43.5	20.09
2437.00	103.91	PK	85	149	V	-6.11	97.80	/	/
2437.00	98.82	Ave	85	149	V	-6.11	92.71	/	/
2437.00	102.21	PK	225	227	H	-6.11	96.10	/	/
2437.00	97.13	Ave	225	227	H	-6.11	91.02	/	/
1498.33	46.28	PK	52	211	H	-9.47	36.81	74.0	37.19
1498.33	41.39	Ave	52	211	H	-9.47	31.92	54.0	22.08
3326.47	44.28	PK	84	215	V	-2.39	41.89	74.0	32.11
3326.47	37.56	Ave	84	215	V	-2.39	35.17	54.0	18.83
4874.00	49.85	PK	183	246	V	1.77	51.62	74.0	22.38
4874.00	44.63	Ave	183	246	V	1.77	46.40	54.0	7.60
6749.34	45.12	PK	276	111	H	6.62	51.74	74.0	22.26
6749.34	40.06	Ave	276	111	H	6.62	46.68	54.0	7.32
7311.00	41.62	PK	159	138	V	7.66	49.28	74.0	24.72
7311.00	28.33	Ave	159	138	V	7.66	35.99	54.0	18.01

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
High Channel (2462 MHz)									
99.98	34.61	QP	87	152	H	-11.18	23.43	43.5	20.07
2462.00	103.34	PK	278	147	V	-6.06	97.28	/	/
2462.00	98.22	Ave	278	147	V	-6.06	92.16	/	/
2462.00	101.68	PK	119	175	H	-6.06	95.62	/	/
2462.00	96.57	Ave	119	175	H	-6.06	90.51	/	/
2483.50	46.94	PK	31	158	V	-6.01	40.93	74.0	33.07
2483.50	41.38	Ave	31	158	V	-6.01	35.37	54.0	18.63
1567.34	45.26	PK	111	108	V	-9.14	36.12	74.0	37.88
1567.34	41.02	Ave	111	108	V	-9.14	31.88	54.0	22.12
4924.00	48.53	PK	35	204	V	1.89	50.42	74.0	23.58
4924.00	43.17	Ave	35	204	V	1.89	45.06	54.0	8.94
6617.32	44.22	PK	152	230	H	6.25	50.47	74.0	23.53
6617.32	39.56	Ave	152	230	H	6.25	45.81	54.0	8.19
7386.00	40.29	PK	203	129	V	7.73	48.02	74.0	25.98
7386.00	25.37	Ave	203	129	V	7.73	33.10	54.0	20.90

802.11n-HT40 Mode:

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Low Channel (2422 MHz)									
99.98	34.68	QP	296	194	H	-11.18	23.50	43.5	20.00
2422.00	100.39	PK	162	214	V	-6.14	94.25	/	/
2422.00	95.02	Ave	162	214	V	-6.14	88.88	/	/
2422.00	97.47	PK	180	152	H	-6.14	91.33	/	/
2422.00	93.17	Ave	180	152	H	-6.14	87.03	/	/
2390.00	50.13	PK	115	146	V	-6.22	43.91	74.0	30.09
2390.00	45.21	Ave	115	146	V	-6.22	38.99	54.0	15.01
2400.00	57.37	PK	190	193	V	-6.19	51.18	74.0	22.82
2400.00	52.01	Ave	190	193	V	-6.19	45.82	54.0	8.18
1609.51	45.38	PK	8	203	H	-8.94	36.44	74.0	37.56
1609.51	40.24	Ave	8	203	H	-8.94	31.30	54.0	22.70
4844.00	50.13	PK	109	181	V	1.66	51.79	74.0	22.21
4844.00	45.21	Ave	109	181	V	1.66	46.87	54.0	7.13
7266.00	40.26	PK	176	227	V	7.58	47.84	74.0	26.16
7266.00	25.94	Ave	176	227	V	7.58	33.52	54.0	20.48

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Middle Channel (2437 MHz)									
99.98	34.72	QP	164	188	H	-11.18	23.54	43.5	19.96
2437.00	100.43	PK	104	140	V	-6.11	94.32	/	/
2437.00	95.22	Ave	104	140	V	-6.11	89.11	/	/
2437.00	97.08	PK	139	104	H	-6.11	90.97	/	/
2437.00	91.07	Ave	139	104	H	-6.11	84.96	/	/
1296.74	46.21	PK	123	151	H	-10.68	35.53	74.0	38.47
1296.74	41.03	Ave	123	151	H	-10.68	30.35	54.0	23.65
3417.54	44.05	PK	209	127	V	-4.75	39.30	74.0	34.70
3417.54	38.67	Ave	209	127	V	-4.75	33.92	54.0	20.08
4874.00	51.03	PK	318	205	V	1.77	52.80	74.0	21.20
4874.00	46.28	Ave	318	205	V	1.77	48.05	54.0	5.95
6665.47	44.69	PK	175	172	H	6.38	51.07	74.0	22.93
6665.47	38.51	Ave	175	172	H	6.38	44.89	54.0	9.11
7311.00	40.26	PK	182	232	V	7.66	47.92	74.0	26.08
7311.00	25.38	Ave	182	232	V	7.66	33.04	54.0	20.96

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
High Channel (2452 MHz)									
99.98	34.28	QP	27	245	H	-11.18	23.10	43.5	20.40
2452.00	101.06	PK	176	122	V	-6.08	94.98	/	/
2452.00	95.65	Ave	176	122	V	-6.08	89.57	/	/
2452.00	97.76	PK	100	222	H	-6.08	91.68	/	/
2452.00	92.88	Ave	100	222	H	-6.08	86.80	/	/
2483.50	51.03	PK	311	138	V	-6.01	45.02	74.0	28.98
2483.50	46.05	Ave	311	138	V	-6.01	40.04	54.0	13.96
1554.66	44.30	PK	67	186	V	-9.20	35.10	74.0	38.90
1554.66	38.26	Ave	67	186	V	-9.20	29.06	54.0	24.94
4904.00	50.24	PK	121	144	V	1.89	52.13	74.0	21.87
4904.00	45.29	Ave	121	144	V	1.89	47.18	54.0	6.82
6625.68	45.12	PK	292	144	H	6.28	51.40	74.0	22.60
6625.68	40.02	Ave	292	144	H	6.28	46.30	54.0	7.70
7356.00	41.03	PK	212	155	V	7.73	48.76	74.0	25.24
7356.00	27.58	Ave	212	155	V	7.73	35.31	54.0	18.69

BLE Mode:

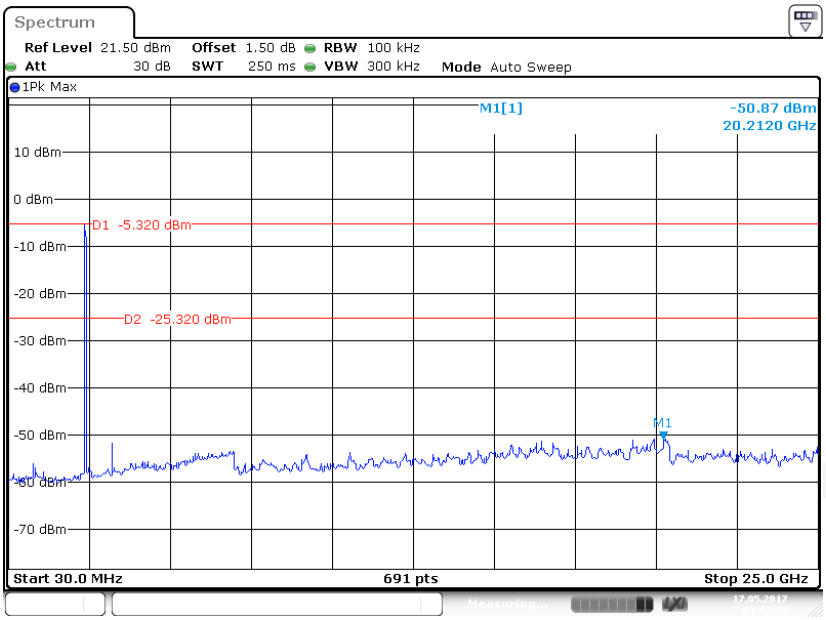
Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Low Channel (2402 MHz)									
73.20	31.26	QP	203	162	V	-5.35	25.91	40	14.09
2402.00	88.26	PK	102	199	V	-6.19	82.07	/	/
2402.00	83.17	Ave	102	199	V	-6.19	76.98	/	/
2402.00	87.98	PK	184	219	H	-6.19	81.79	/	/
2402.00	82.34	Ave	184	219	H	-6.19	76.15	/	/
2390.00	45.02	PK	182	190	V	-6.22	38.80	74	35.20
2390.00	40.67	Ave	182	190	V	-6.22	34.45	54	19.55
2400.00	46.14	PK	245	113	V	-6.19	39.95	74	34.05
2400.00	41.25	Ave	245	113	V	-6.19	35.06	54	18.94
1200.00	44.12	PK	61	169	H	-11.25	32.87	74	41.13
1200.00	39.98	Ave	61	169	H	-11.25	28.73	54	25.27
4804.00	45.39	PK	289	158	V	1.61	47.00	74	27.00
4804.00	40.17	Ave	289	158	V	1.61	41.78	54	12.22
7206.00	41.05	PK	315	123	V	7.55	48.60	74	25.40
7206.00	30.18	Ave	315	123	V	7.55	37.73	54	16.27

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
Middle Channel (2440 MHz)									
73.20	32.57	QP	269	196	V	-5.35	27.22	40	12.78
2440.00	91.37	PK	259	245	V	-6.17	85.20	/	/
2440.00	86.22	Ave	259	245	V	-6.17	80.05	/	/
2440.00	89.15	PK	73	244	H	-6.17	82.98	/	/
2440.00	85.46	Ave	73	244	H	-6.17	79.29	/	/
1200.00	45.16	PK	58	222	H	-11.25	33.91	74	40.09
1200.00	40.26	Ave	58	222	H	-11.25	29.01	54	24.99
3060.00	44.05	PK	114	228	H	-3.08	40.97	74	33.03
3060.00	38.67	Ave	114	228	H	-3.08	35.59	54	18.41
4880.00	46.97	PK	72	224	V	1.79	48.76	74	25.24
4880.00	41.59	Ave	72	224	V	1.79	43.38	54	10.62
6469.00	44.13	PK	192	190	H	5.80	49.93	74	24.07
6469.00	39.47	Ave	192	190	H	5.80	45.27	54	8.73
7320.00	40.98	PK	127	124	V	7.67	48.65	74	25.35
7320.00	29.31	Ave	127	124	V	7.67	36.98	54	17.02

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/205/209	
	Reading	PK/QP/Ave		Height	Polar			Limit	Margin
(MHz)	(dBµV)		Degree	(cm)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
High Channel (2480MHz)									
73.20	31.89	QP	259	141	V	-5.35	26.54	40	13.46
2480.00	89.15	PK	281	213	V	-6.01	83.14	/	/
2480.00	84.79	Ave	281	213	V	-6.01	78.78	/	/
2480.00	88.61	PK	67	132	H	-6.01	82.60	/	/
2480.00	83.67	Ave	67	132	H	-6.01	77.66	/	/
2483.50	45.26	PK	35	166	V	-6.01	39.25	74	34.75
2483.50	40.35	Ave	35	166	V	-6.01	34.34	54	19.66
2584.00	43.61	PK	0	169	H	-5.51	38.10	74	35.90
2584.00	34.33	Ave	0	169	H	-5.51	28.82	54	25.18
4960.00	45.27	PK	239	180	V	1.97	47.24	74	26.76
4960.00	40.36	Ave	239	180	V	1.97	42.33	54	11.67
6469.00	43.68	PK	191	133	H	5.80	49.48	74	24.52
6469.00	35.17	Ave	191	133	H	5.80	40.97	54	13.03
7440.00	40.83	PK	277	129	V	7.79	48.62	74	25.38
7440.00	24.03	Ave	277	129	V	7.79	31.82	54	22.18

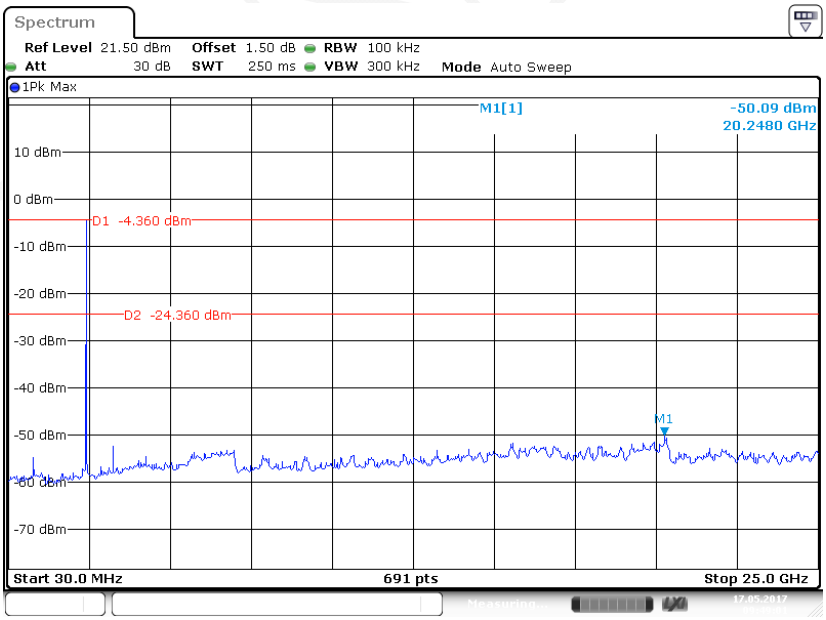
Conducted Spurious Emissions at Antenna Port

802.11b Low Channel



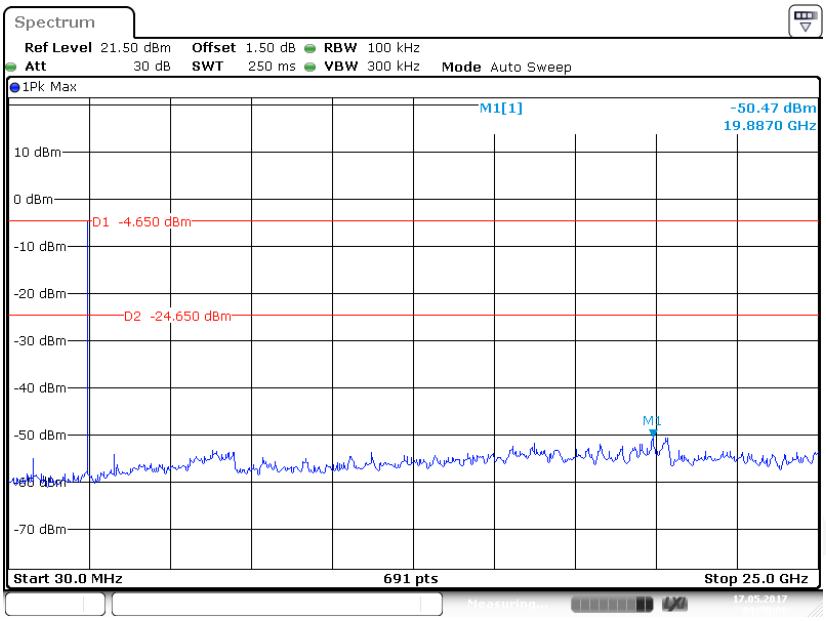
Date: 17.MAY.2017 09:52:25

802.11b Middle Channel



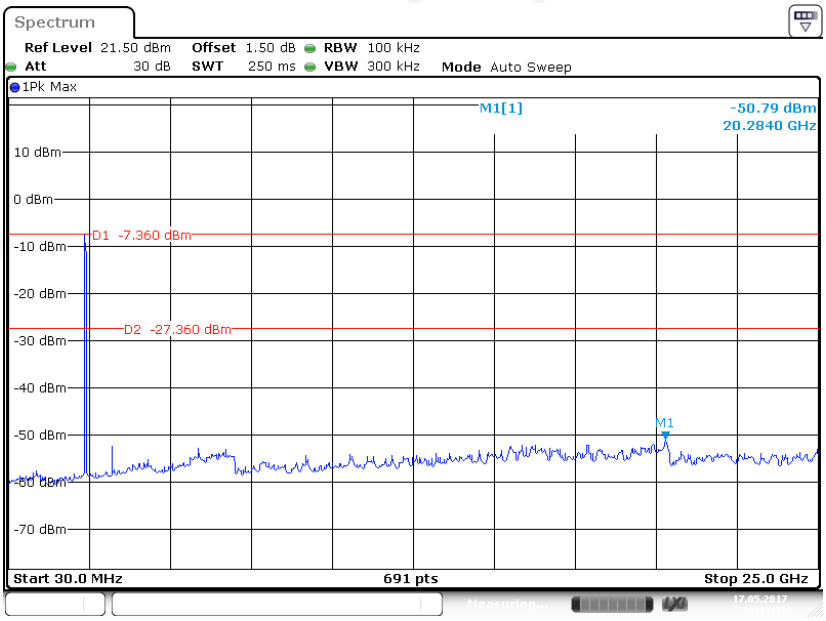
Date: 17.MAY.2017 09:49:01

802.11b High Channel



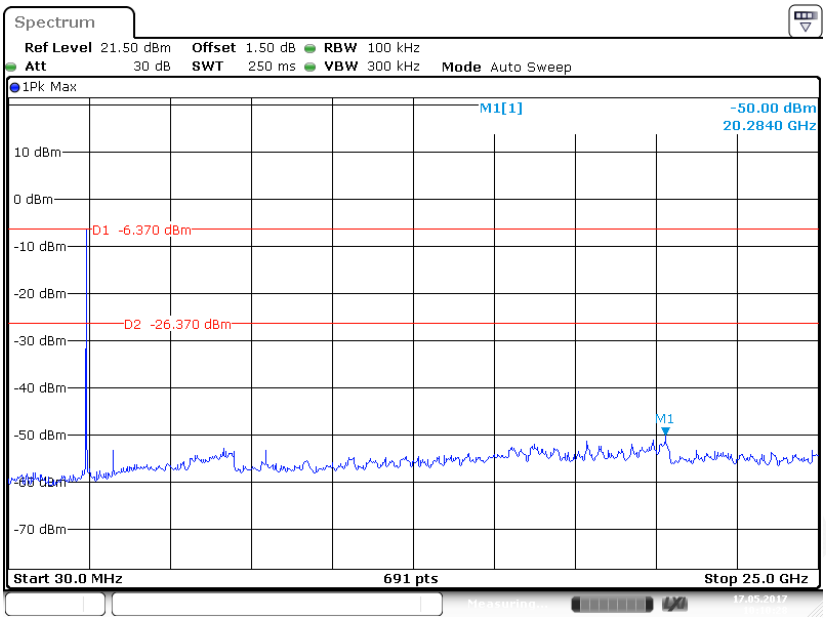
Date: 17.MAY.2017 09:50:06

802.11g Low Channel



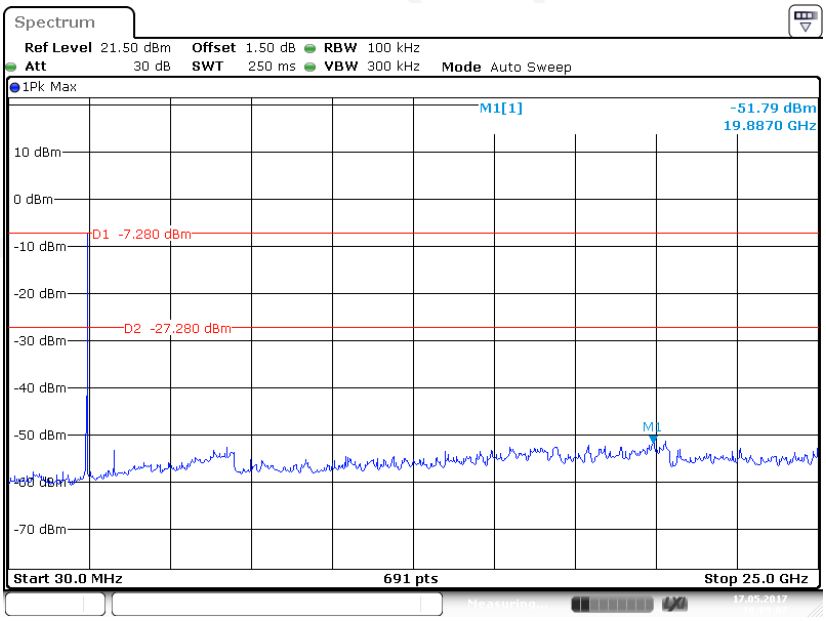
Date: 17.MAY.2017 10:11:35

802.11g Middle Channel



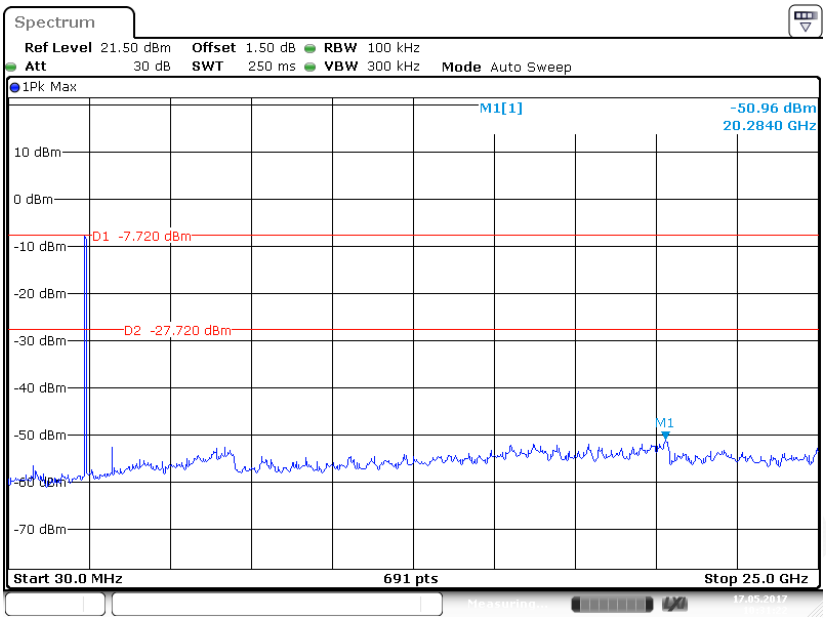
Date: 17.MAY.2017 10:10:28

802.11g High Channel



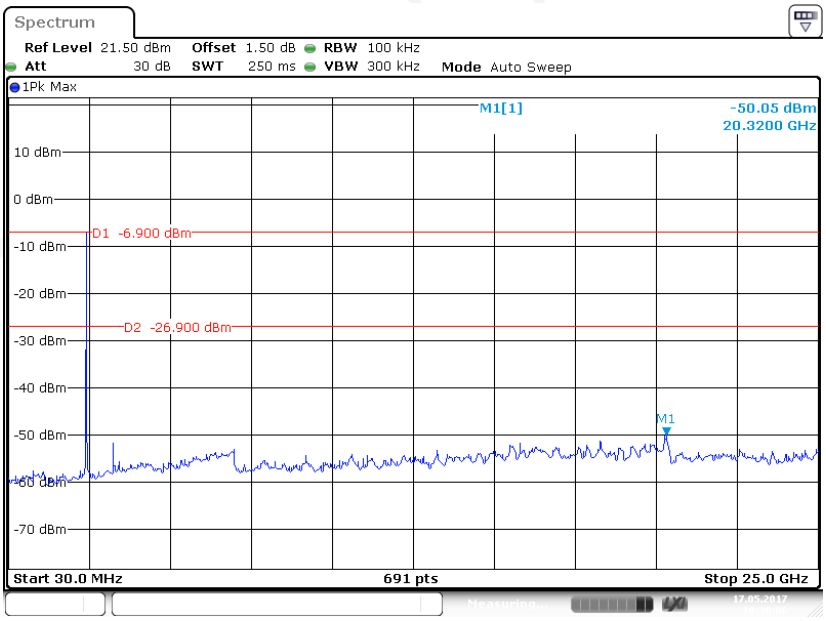
Date: 17.MAY.2017 10:09:08

802.11n-HT20 Low Channel



Date: 17.MAY.2017 10:31:22

802.11n-HT20 Middle Channel



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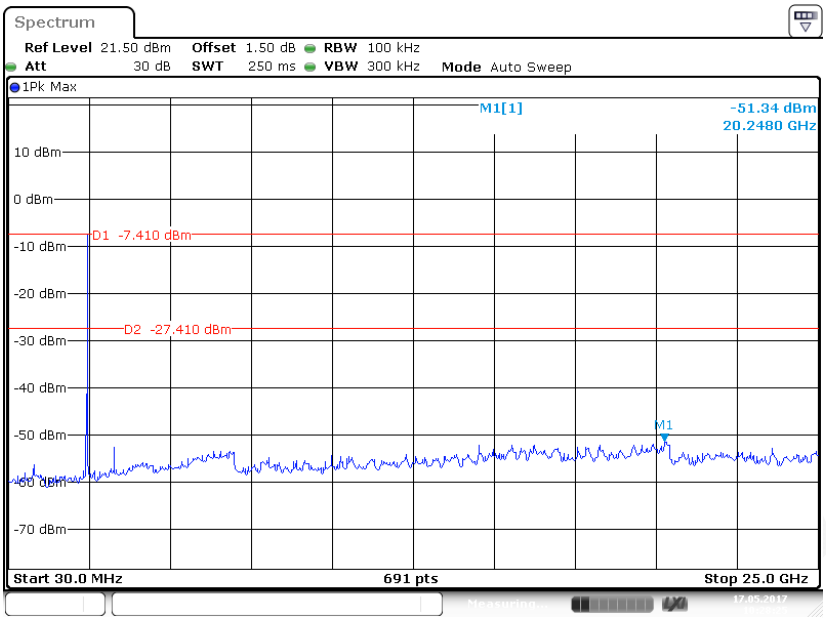
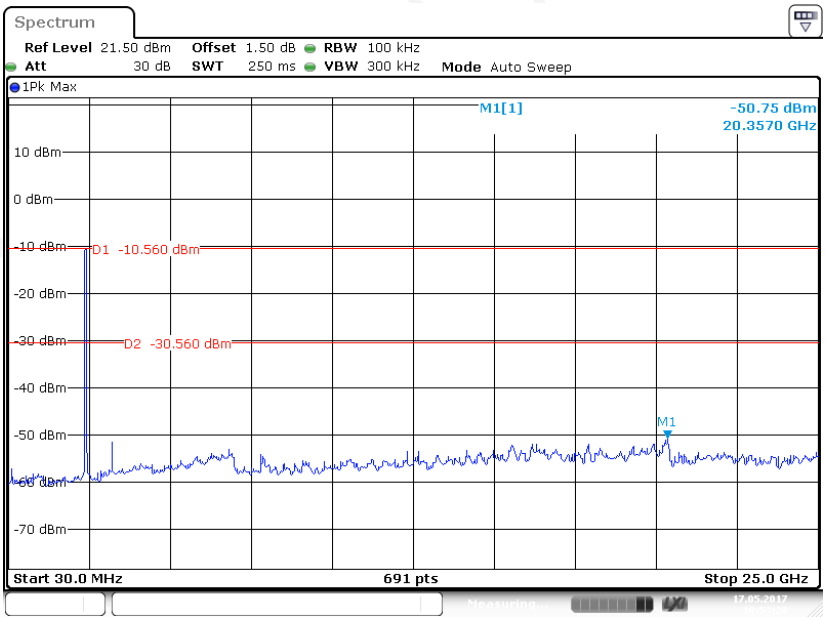
802.11n-HT20 High Channel



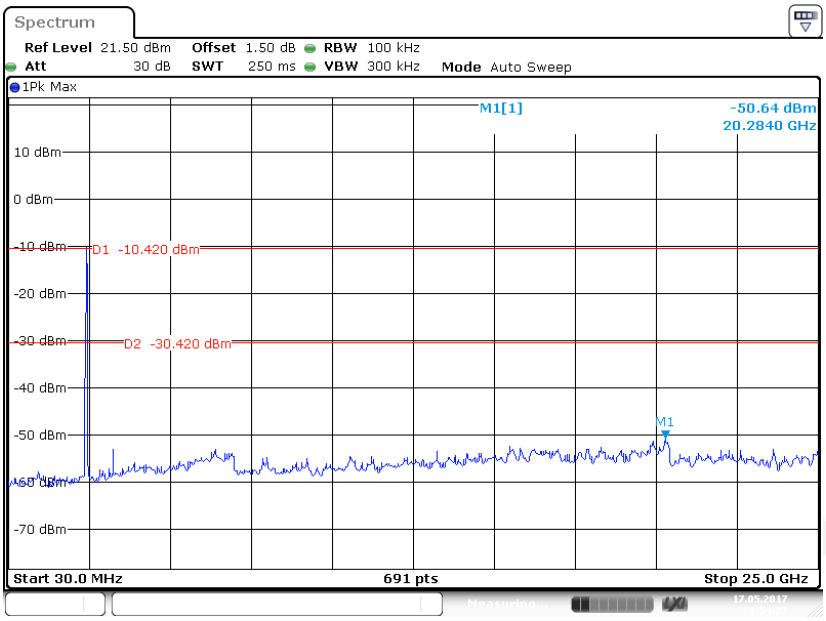
Date: 17.MAY.2017 10:28:25

802.11n-HT40 Low Channel



Date: 17.MAY.2017 10:53:28

802.11n-HT40 Middle Channel



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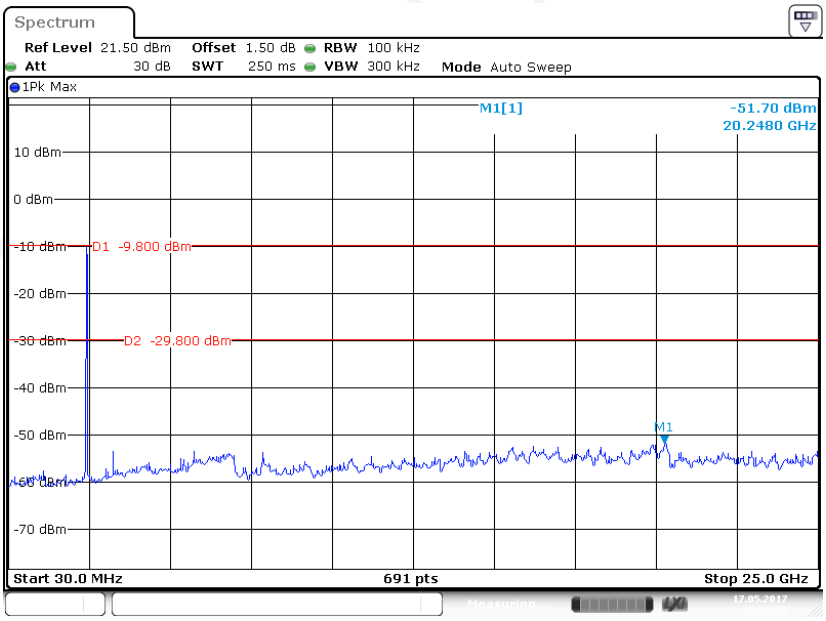
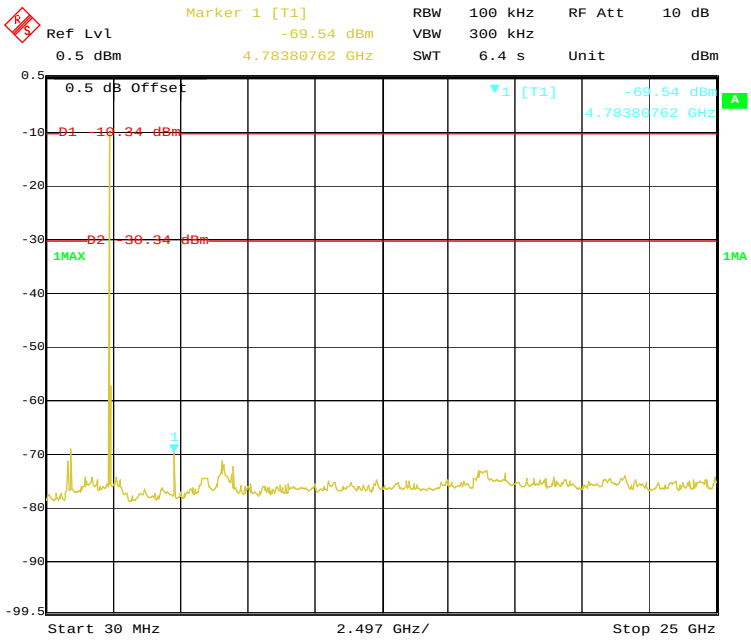
802.11n-HT40 High Channel

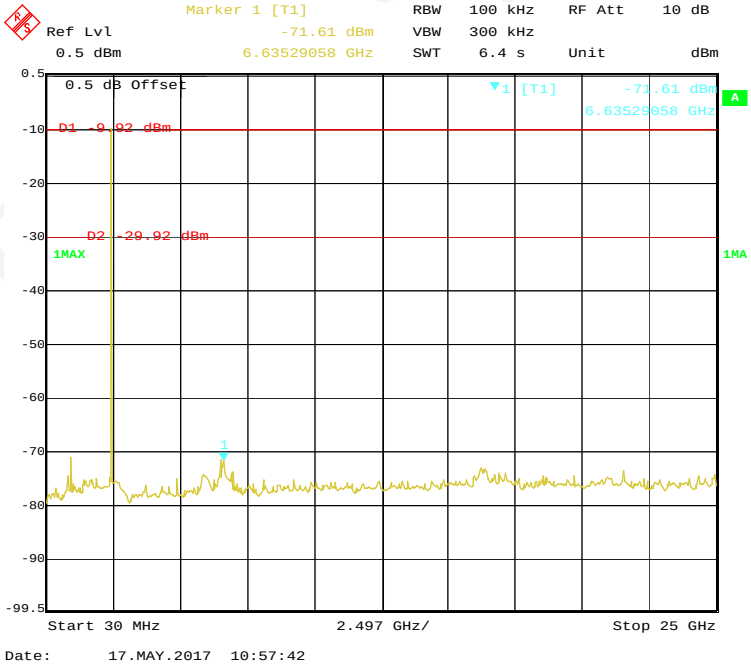


Date: 17.MAY.2017 10:54:53

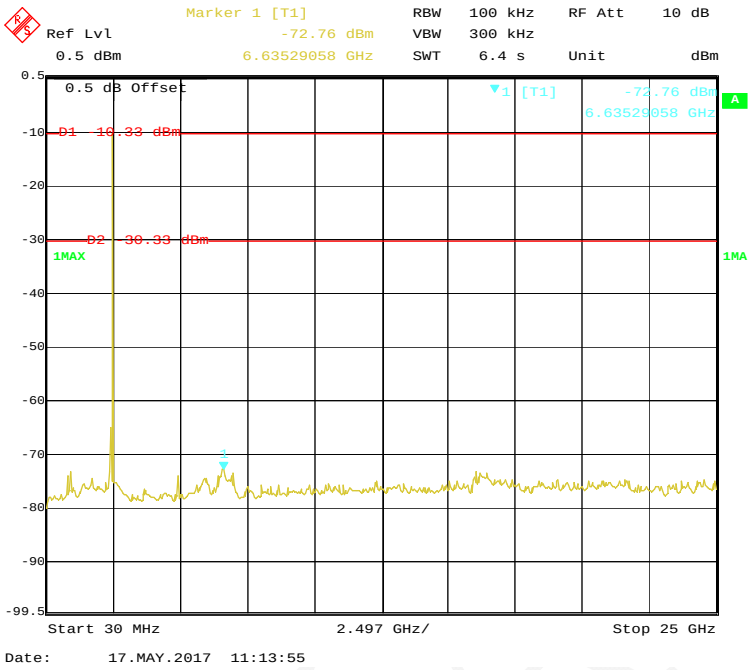
BLE Mode Low Channel



BLE Mode Middle Channel



BLE Mode High Channel



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Data

Environmental Conditions

Temperature:	24.1 ℃
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

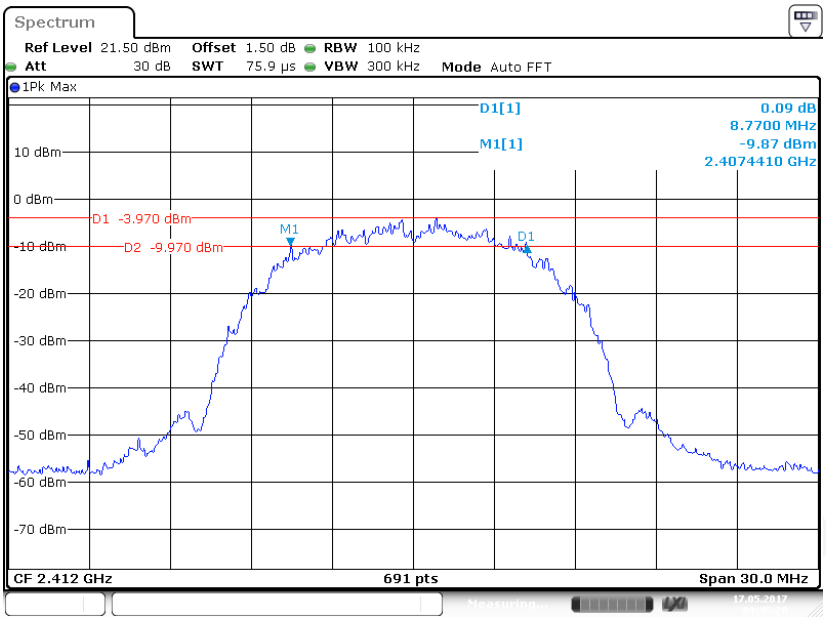
The testing was performed by Ada Yu on 2017-05-17.

Test Result: Pass.

EUT operation mode: Transmitting

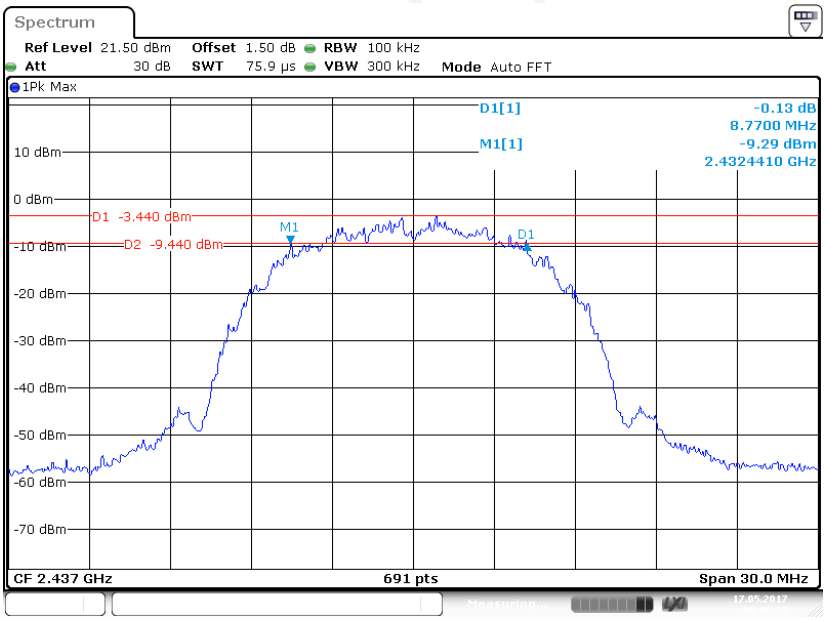
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b mode			
Low	2412	8.77	≥0.5
Middle	2437	8.77	≥0.5
High	2462	8.77	≥0.5
802.11g mode			
Low	2412	16.06	≥0.5
Middle	2437	16.28	≥0.5
High	2462	16.24	≥0.5
802.11n-HT20 mode			
Low	2412	17.15	≥0.5
Middle	2437	17.24	≥0.5
High	2462	17.19	≥0.5
802.11n-HT40 mode			
Low	2422	35.77	≥0.5
Middle	2437	35.51	≥0.5
High	2452	35.43	≥0.5
BLE mode			
Low	2402	0.73	≥0.5
Middle	2440	0.73	≥0.5
High	2480	0.72	≥0.5

802.11b Low Channel



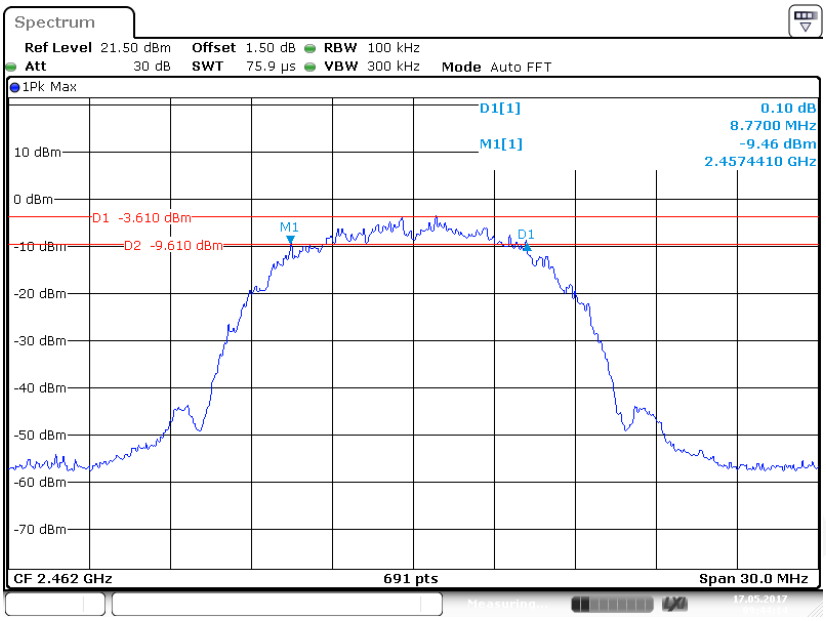
Date: 17.MAY.2017 09:45:20

802.11b Middle Channel



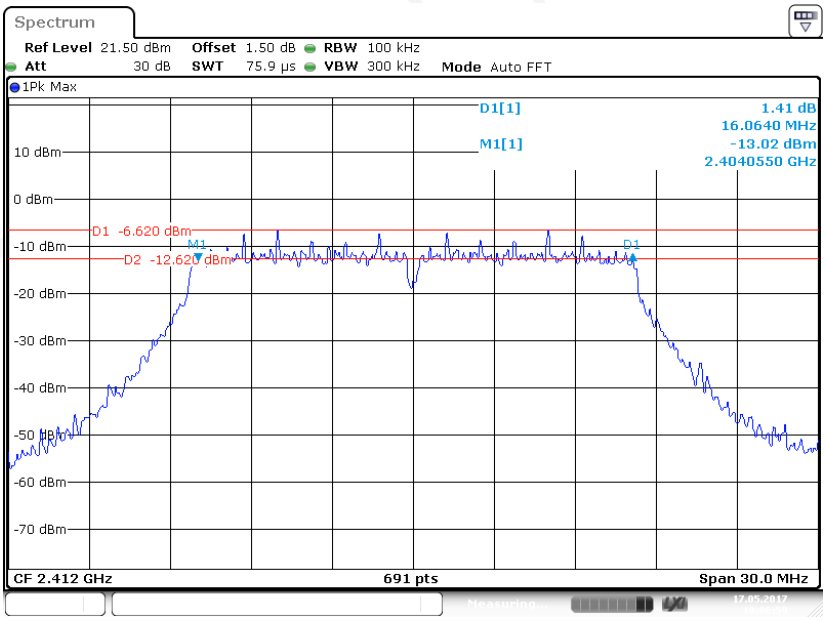
Date: 17.MAY.2017 09:46:39

802.11b High Channel



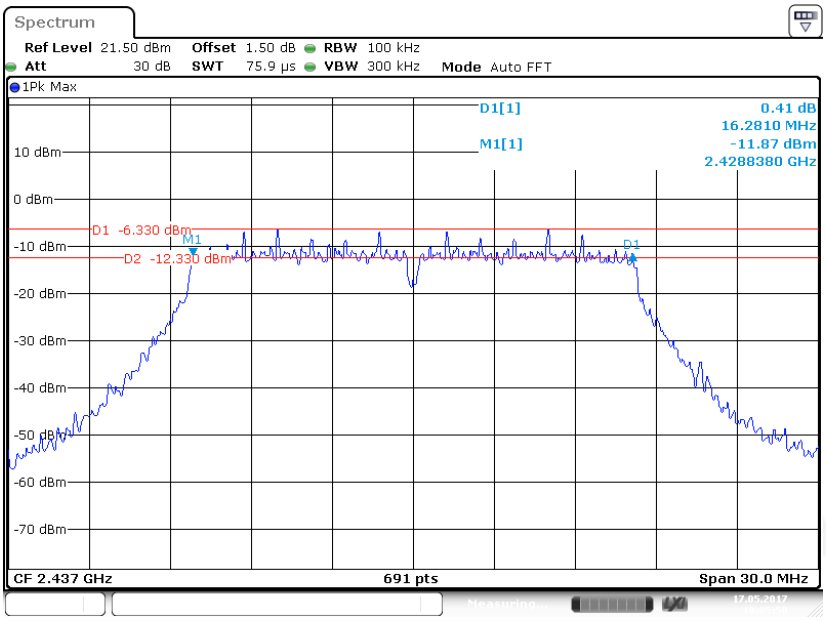
Date: 17.MAY.2017 09:44:14

802.11g Low Channel



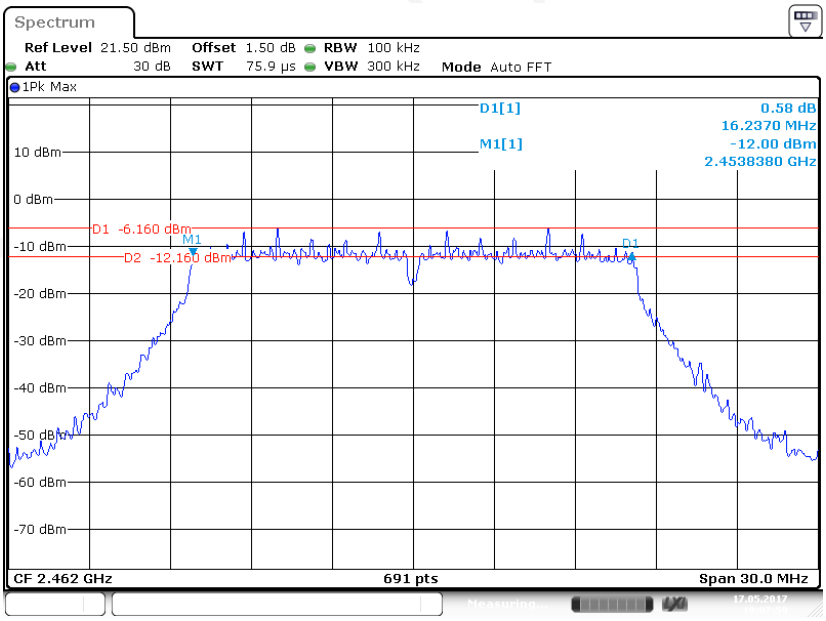
Date: 17.MAY.2017 10:06:59

802.11g Middle Channel



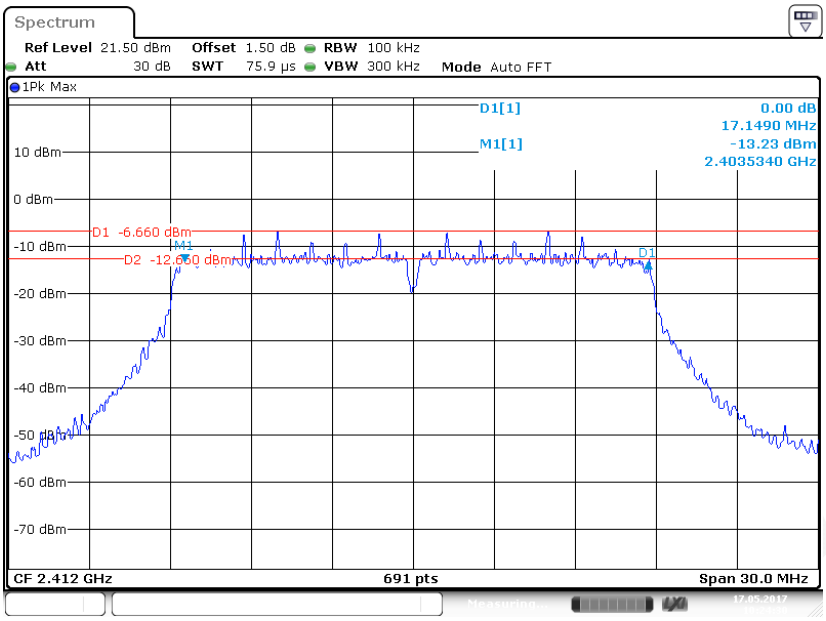
Date: 17.MAY.2017 10:05:50

802.11g High Channel



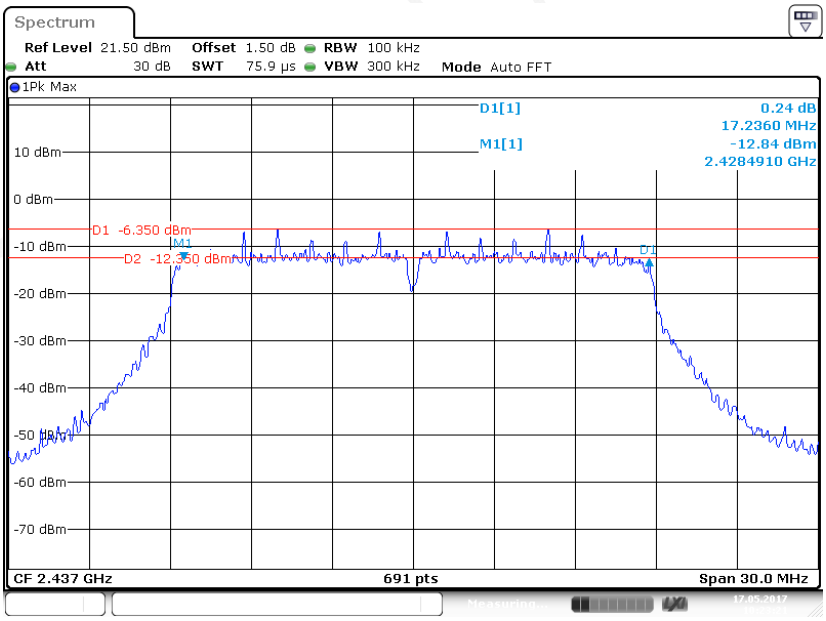
Date: 17.MAY.2017 10:07:59

802.11n-HT20 Low Channel



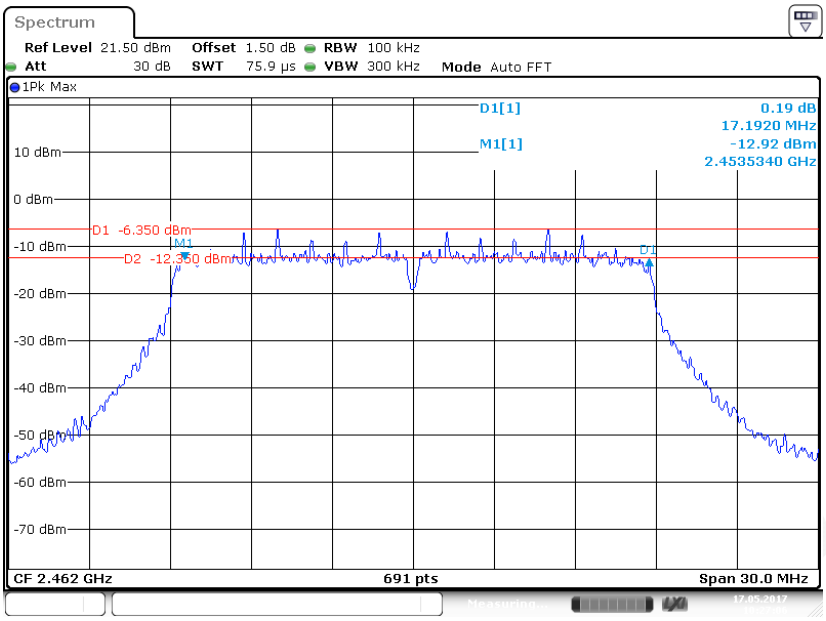
Date: 17.MAY.2017 10:24:30

802.11n-HT20 Middle Channel



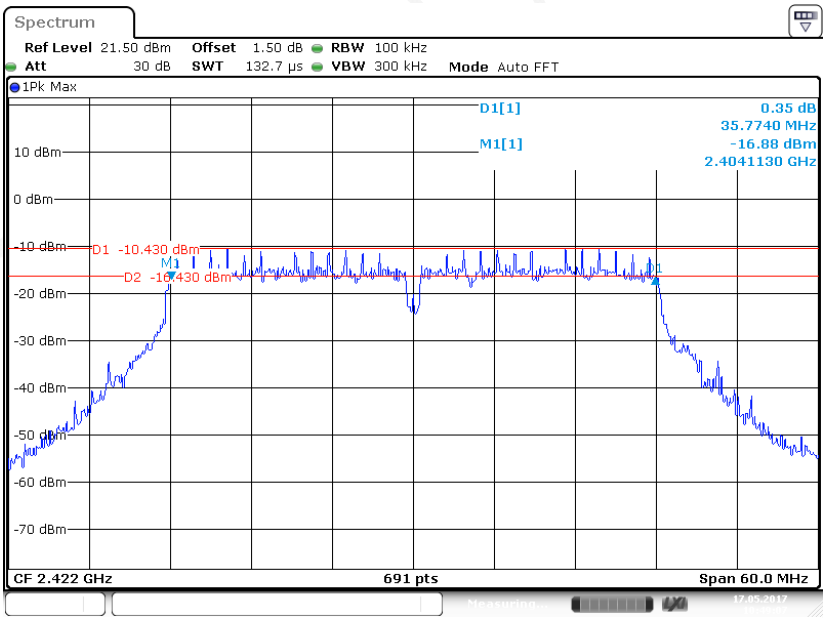
Date: 17.MAY.2017 10:23:21

802.11n-HT20 High Channel



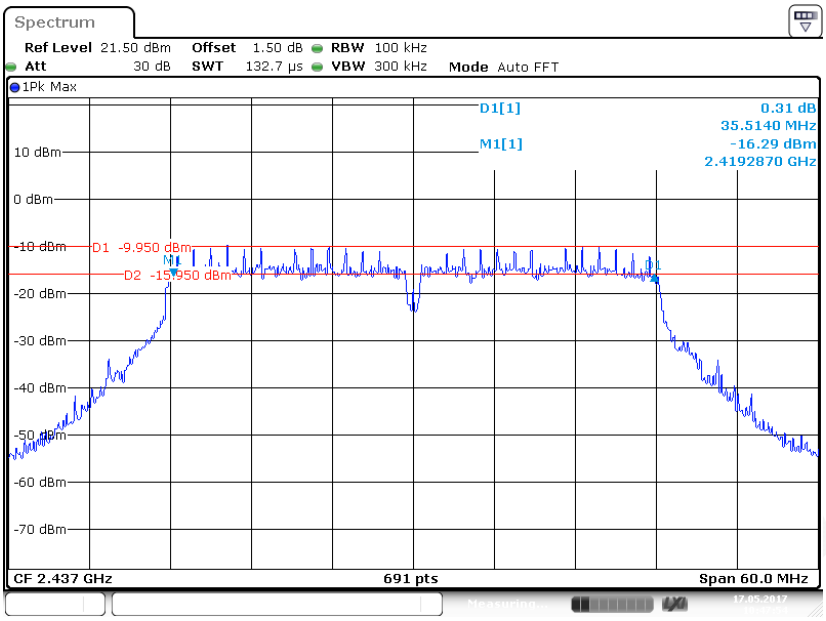
Date: 17.MAY.2017 10:27:07

802.11n-HT40 Low Channel



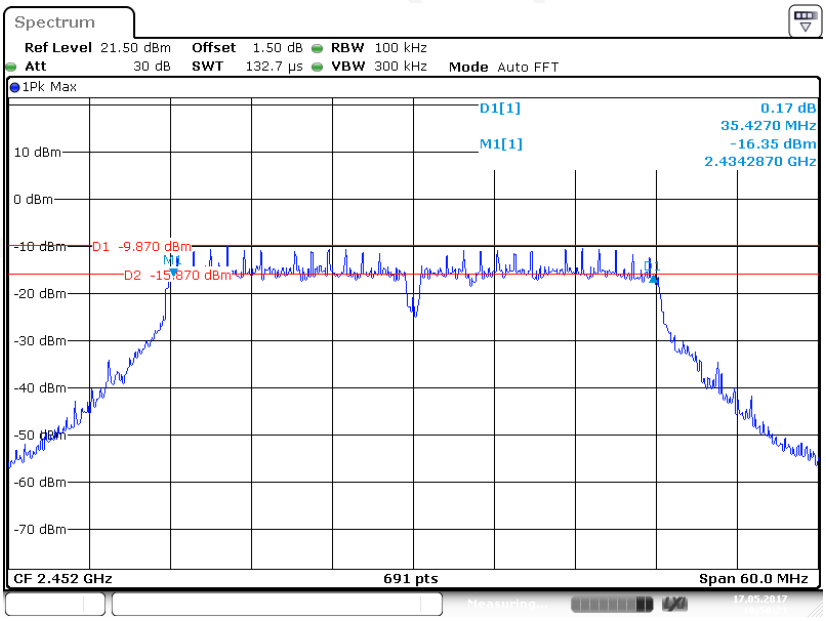
Date: 17.MAY.2017 10:49:07

802.11n-HT40 Middle Channel



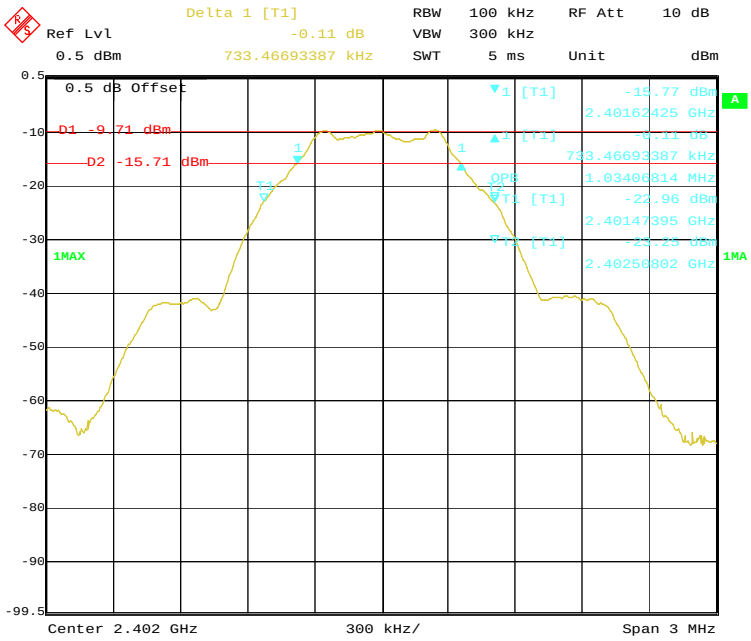
Date: 17.MAY.2017 10:47:54

802.11n-HT40 High Channel

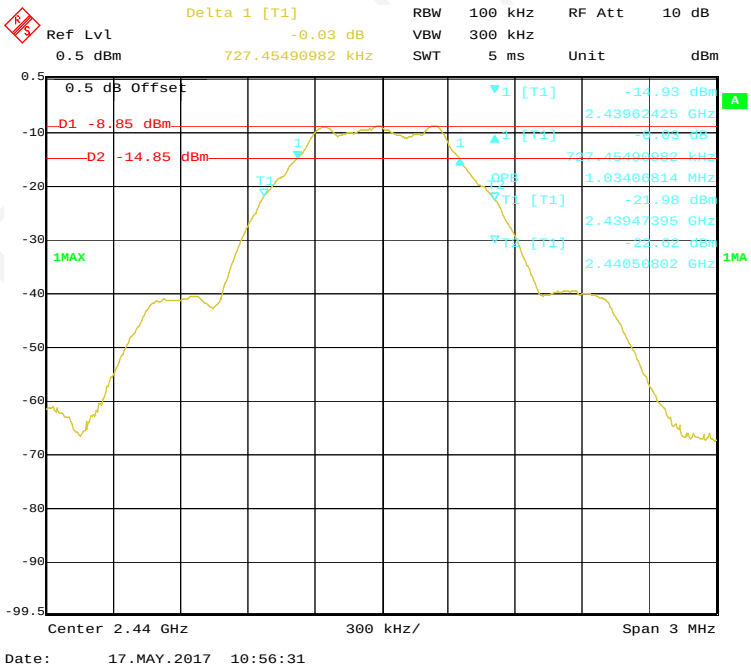


Date: 17.MAY.2017 10:50:21

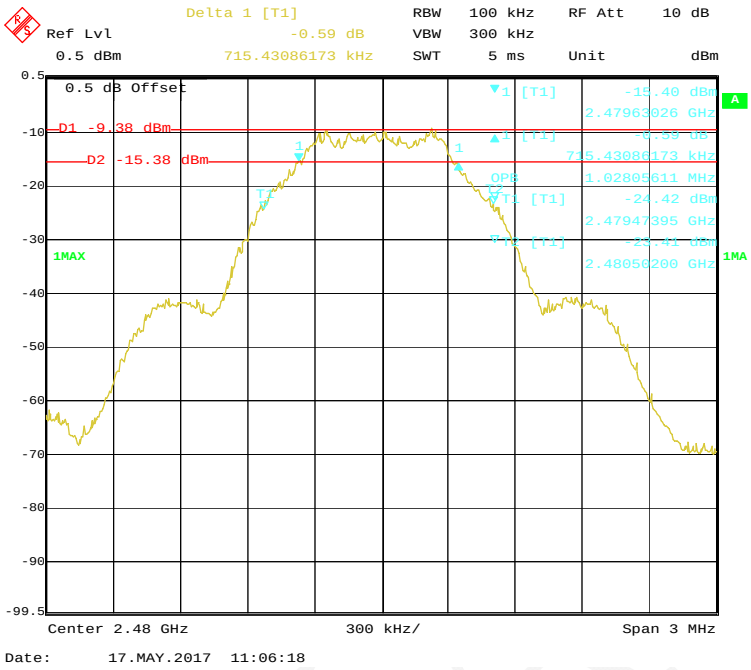
BLE Mode Low Channel



BLE Mode Middle Channel



BLE Mode High Channel



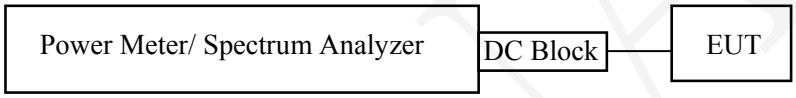
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	23.8℃
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Ada Yu on 2017-05-17.

EUT operation mode: Transmitting

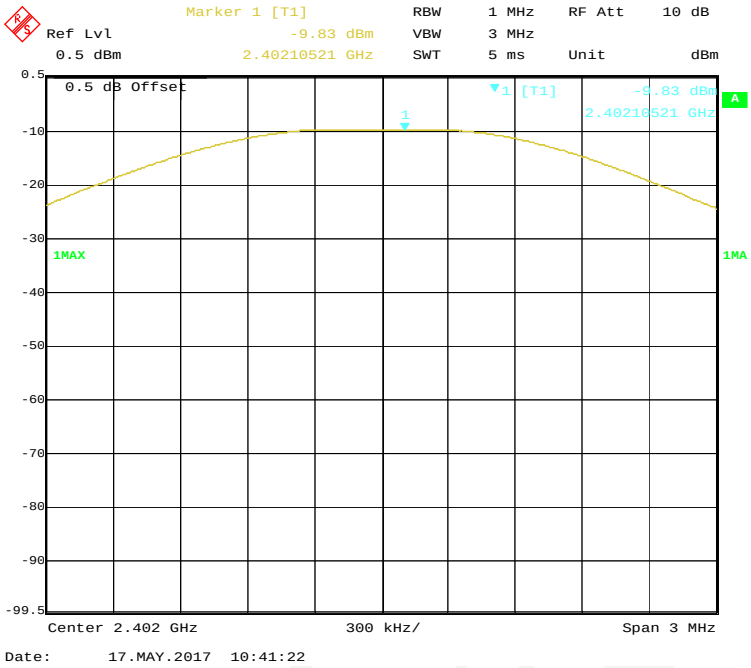
Wi-Fi:

Channel	Frequency	Max Conducted Peak Output Power	Max Conducted Average Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	(dBm)	
802.11b					
Low	2412	12.01	8.76	30	Pass
Middle	2437	11.79	8.75	30	Pass
High	2462	11.62	8.60	30	Pass
802.11g					
Low	2412	11.24	6.33	30	Pass
Middle	2437	11.66	7.24	30	Pass
High	2462	11.59	6.94	30	Pass
802.11n-HT20					
Low	2412	11.15	5.23	30	Pass
Middle	2437	11.60	6.45	30	Pass
High	2462	11.51	5.68	30	Pass
802.11n-HT40					
Low	2422	11.35	5.59	30	Pass
Middle	2437	11.65	6.06	30	Pass
High	2452	11.55	6.01	30	Pass

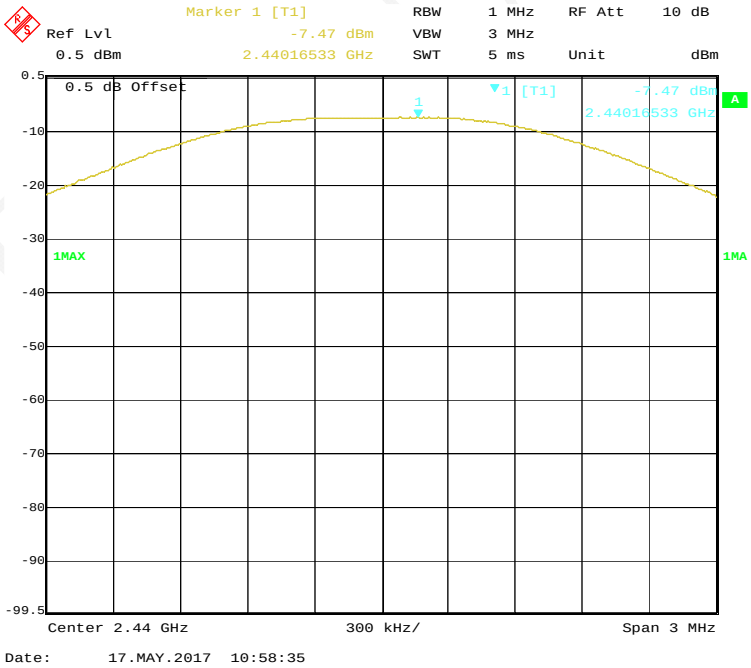
BLE:

Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
BLE				
Low	2402	-9.83	30	Pass
Middle	2440	-7.47	30	Pass
High	2480	-8.25	30	Pass

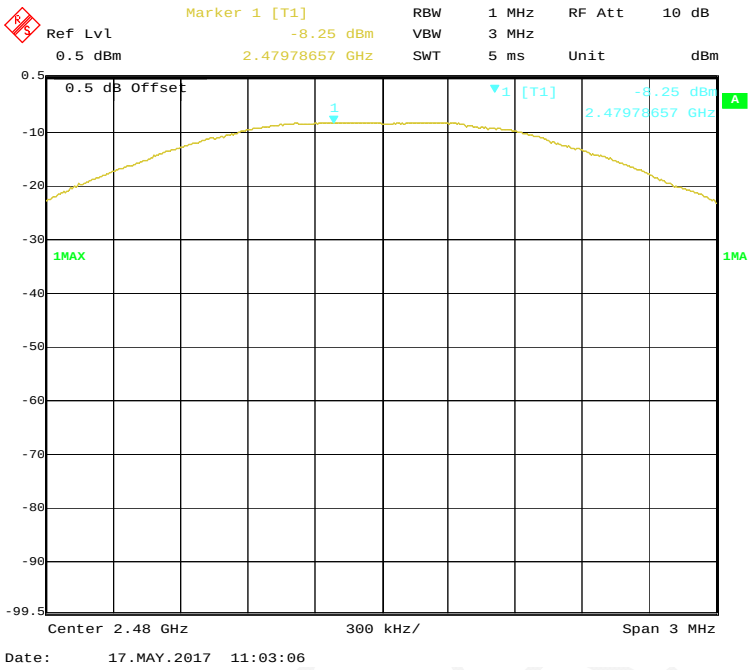
BLE Mode Low Channel Power



BLE Mode Middle Channel Power



BLE Mode High Channel Power



FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

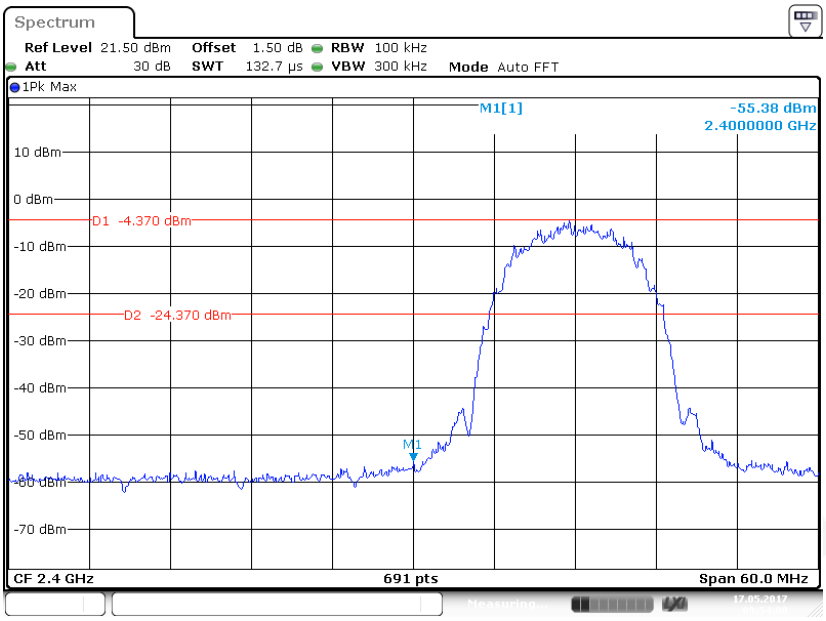
Temperature:	24.1 ℃
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Ada Yu on 2017-05-17.

Test Result: *Compliance*

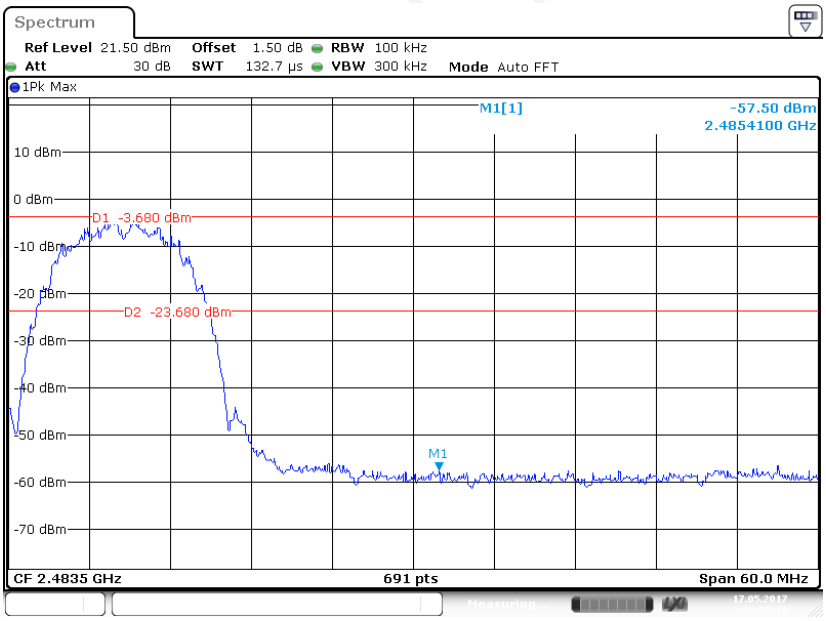
EUT operation mode: Transmitting

802.11b: Band Edge, Left Side



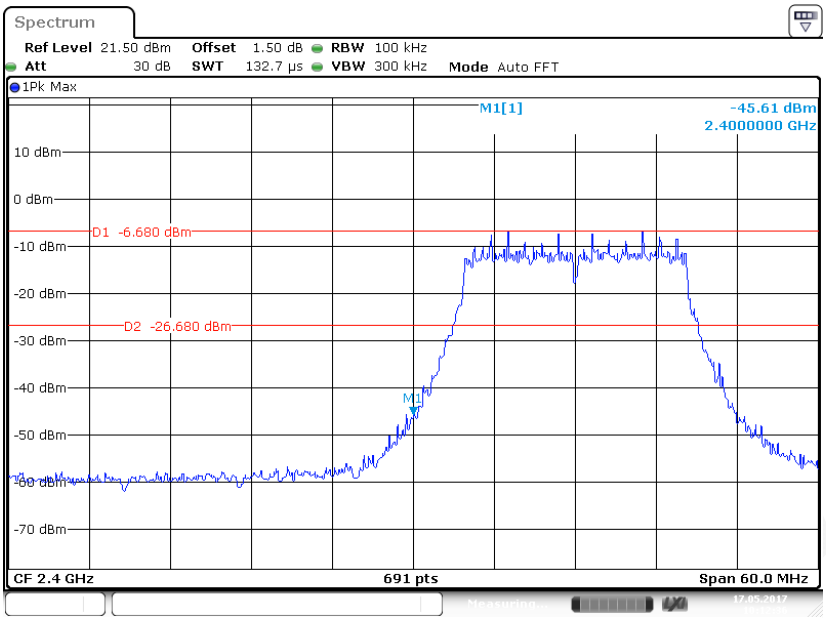
Date: 17.MAY.2017 09:54:00

802.11b: Band Edge, Right Side



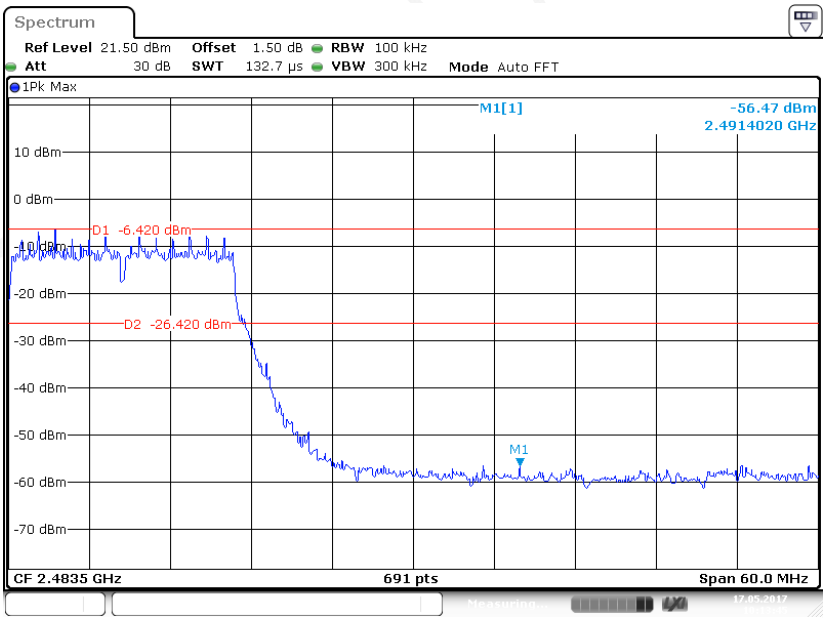
Date: 17.MAY.2017 09:55:16

802.11g: Band Edge, Left Side



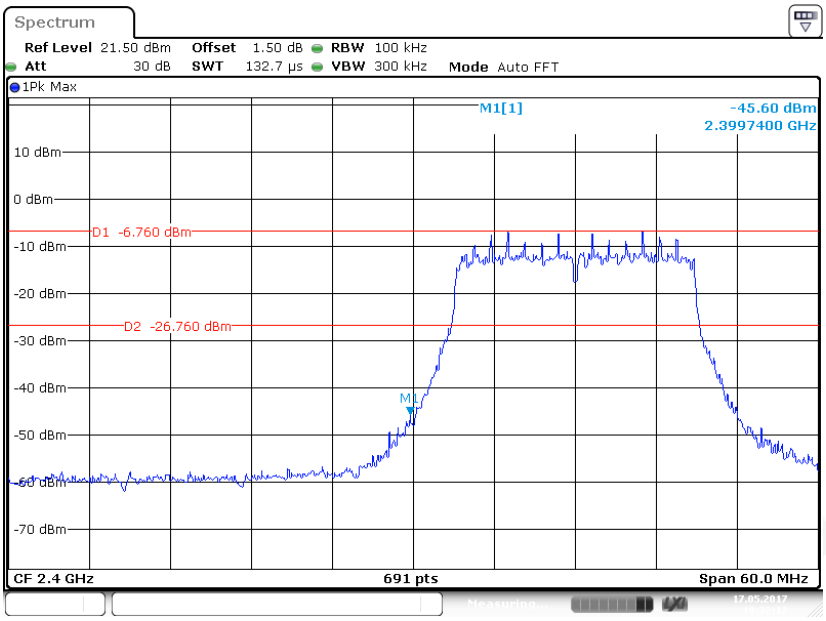
Date: 17.MAY.2017 10:12:36

802.11g: Band Edge, Right Side



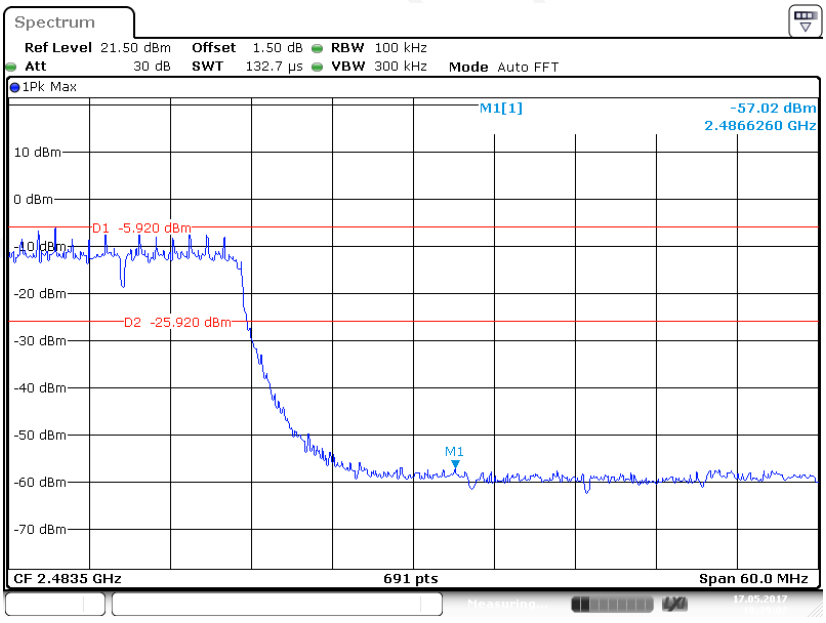
Date: 17.MAY.2017 10:13:45

802.11n-HT20: Band Edge, Left Side



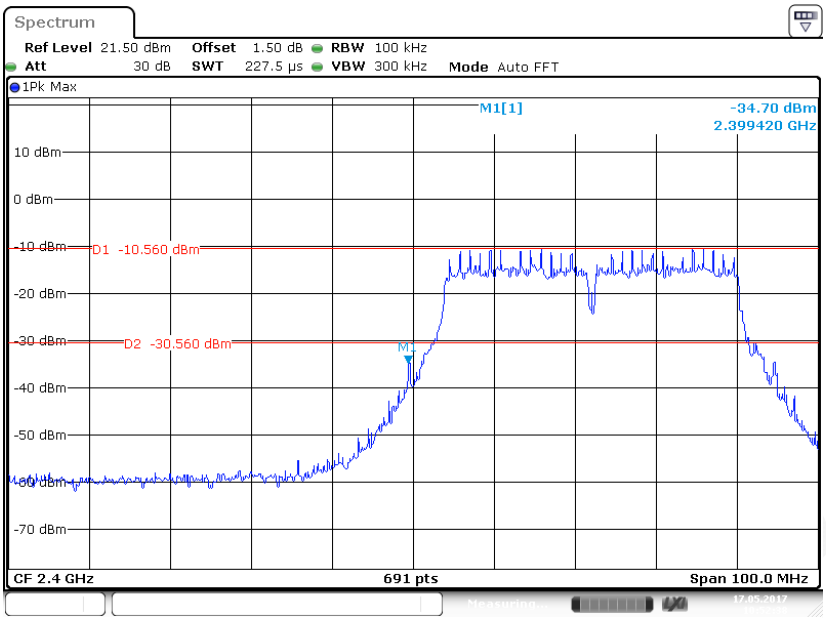
Date: 17.MAY.2017 10:32:12

802.11n-HT20: Band Edge, Right Side



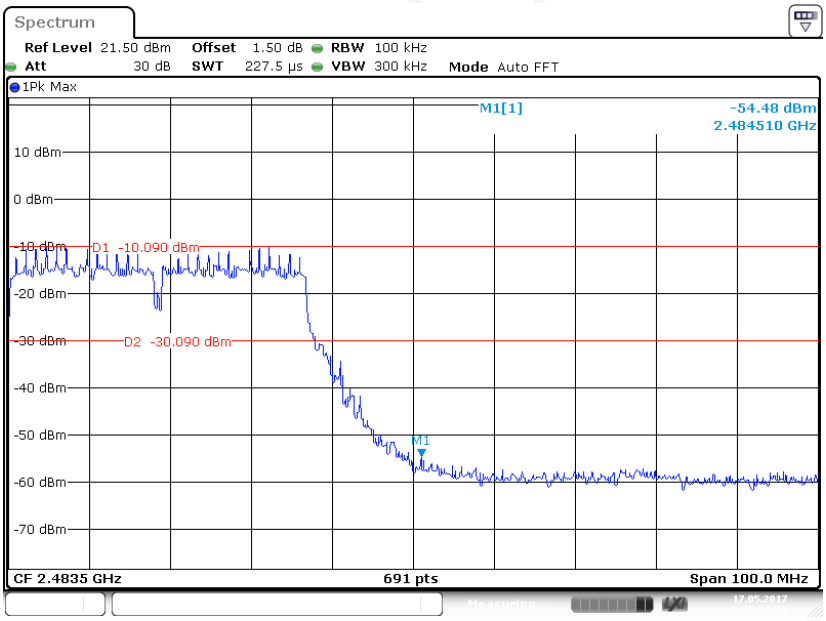
Date: 17.MAY.2017 10:39:03

802.11n-HT40: Band Edge, Left Side



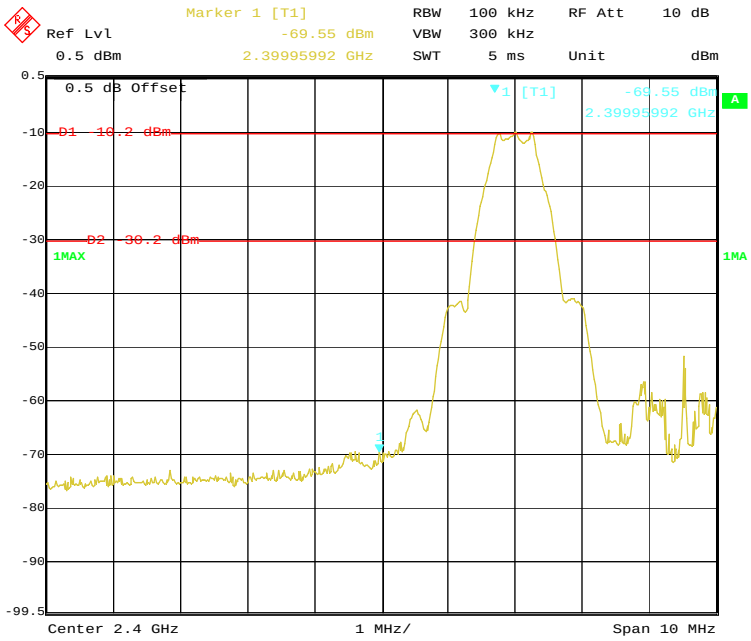
Date: 17.MAY.2017 10:52:37

802.11n-HT40: Band Edge, Right Side

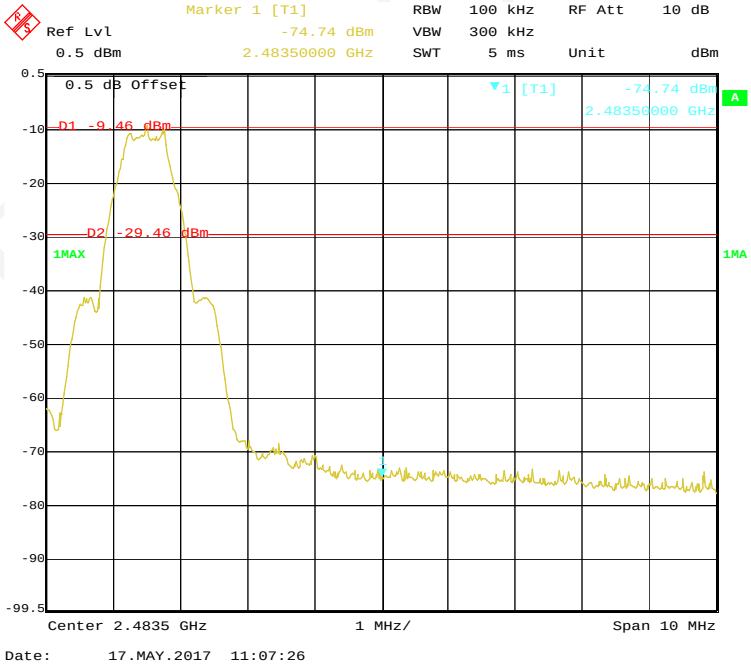


Date: 17.MAY.2017 10:51:39

BLE: Band Edge, Left Side



BLE: Band Edge, Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to KDB558074 D01 DTS Meas Guidance v04.

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to: 3kHz≤ RBW≤100 kHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Data

Environmental Conditions

Temperature:	24.1 ℃
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

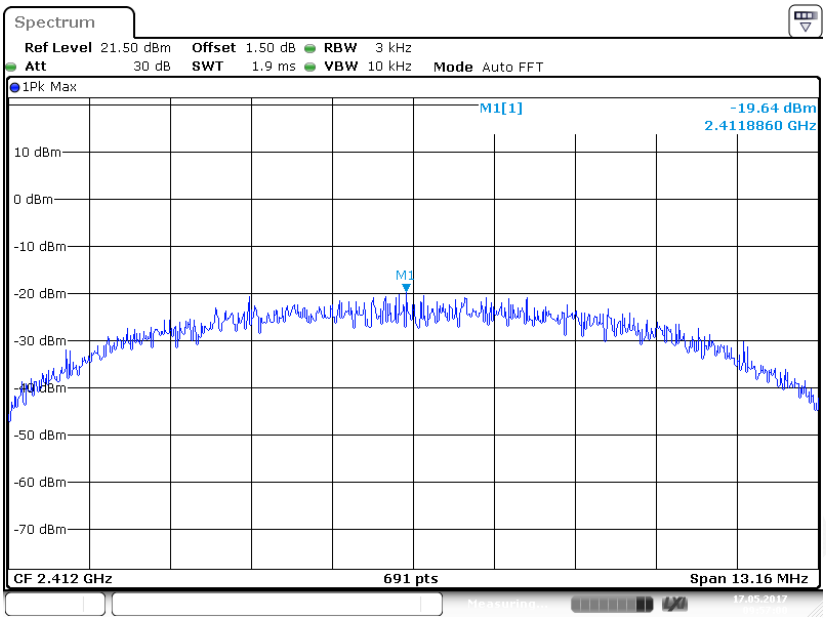
The testing was performed by Ada Yu on 2017-05-17.

EUT operation mode: Transmitting

Test Result: Pass

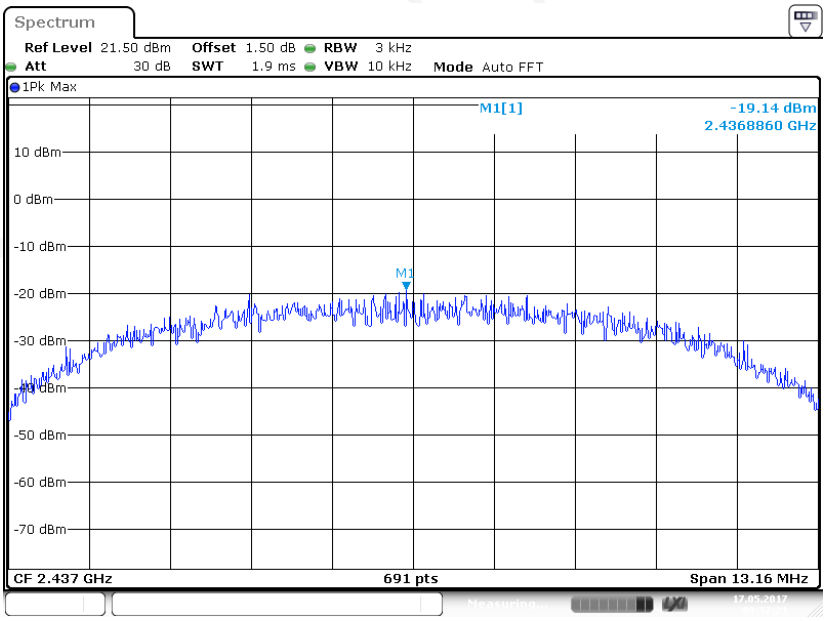
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-19.64	≤8
Middle	2437	-19.14	≤8
High	2462	-19.39	≤8
802.11g mode			
Low	2412	-22.89	≤8
Middle	2437	-22.45	≤8
High	2462	-22.62	≤8
802.11n-HT20 mode			
Low	2412	-23.14	≤8
Middle	2437	-22.74	≤8
High	2462	-22.93	≤8
802.11n-HT40 mode			
Low	2422	-25.31	≤8
Middle	2437	-25.08	≤8
High	2452	-25.52	≤8
BLE mode			
Low	2402	-25.10	≤8
Middle	2440	-23.50	≤8
High	2480	-24.57	≤8

Power Spectral Density , 802.11b Low Channel



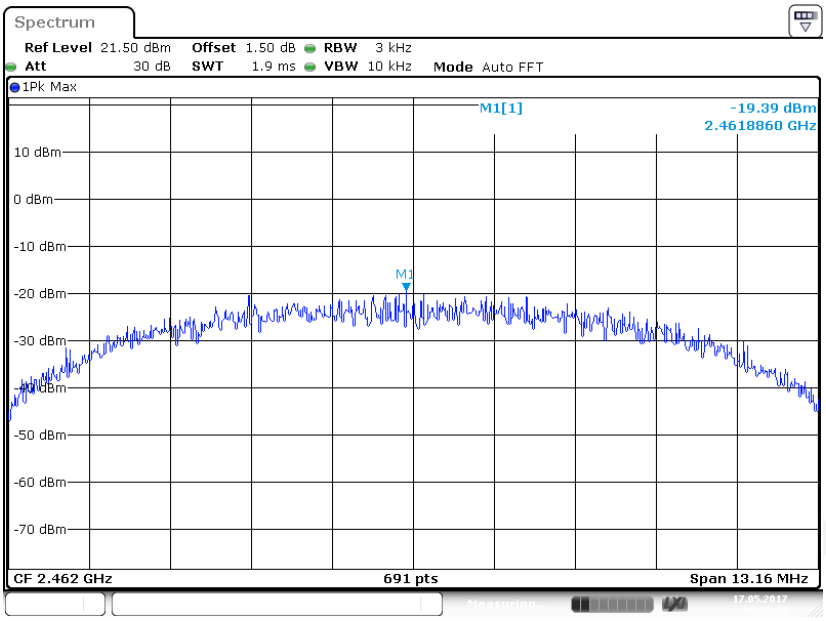
Date: 17.MAY.2017 09:57:00

Power Spectral Density , 802.11b Middle Channel



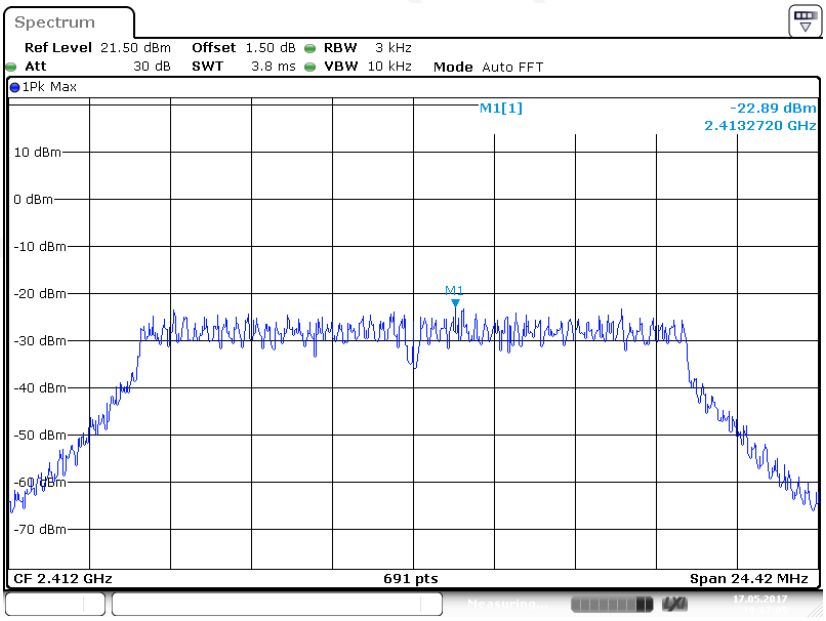
Date: 17.MAY.2017 09:57:21

Power Spectral Density , 802.11b High Channel



Date: 17.MAY.2017 09:56:28

Power Spectral Density , 802.11g Low Channel



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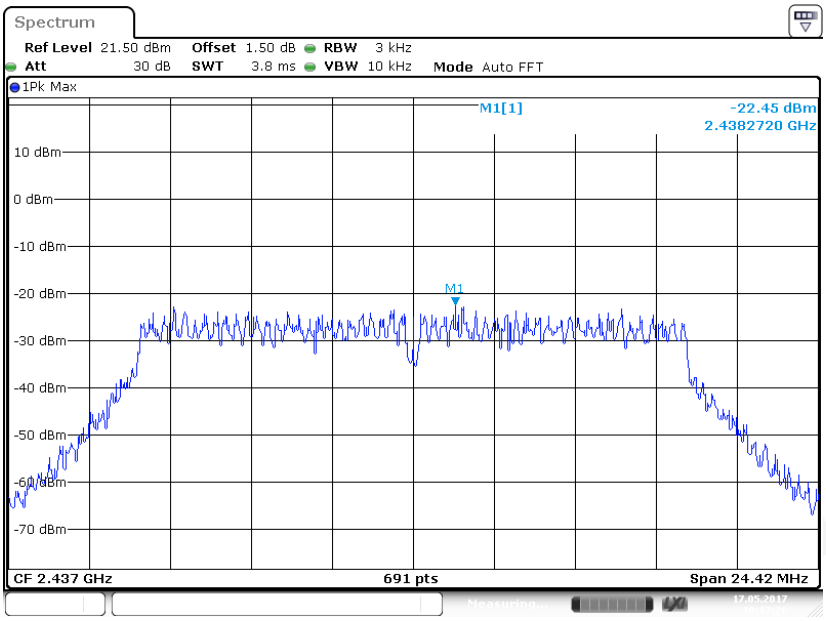
Power Spectral Density , 802.11g Middle Channel



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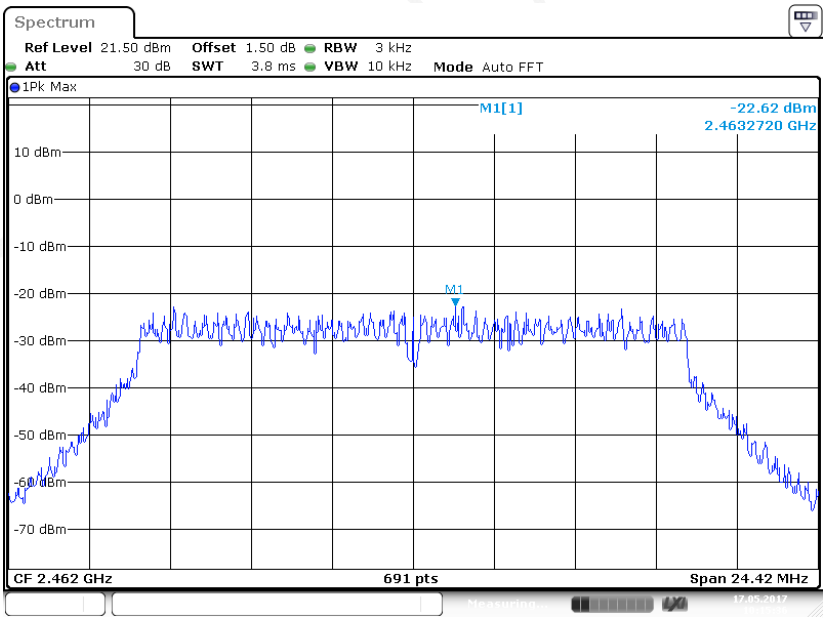
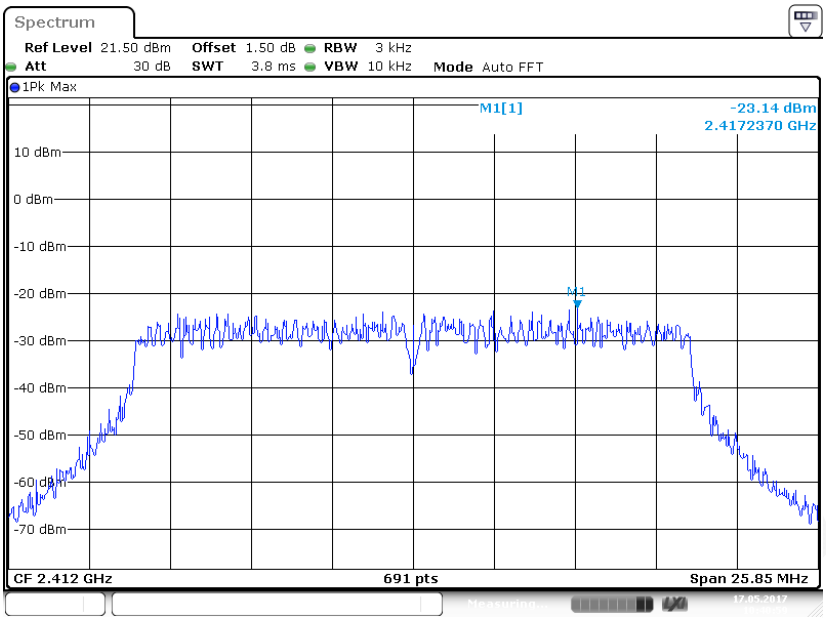
Power Spectral Density , 802.11g High Channel



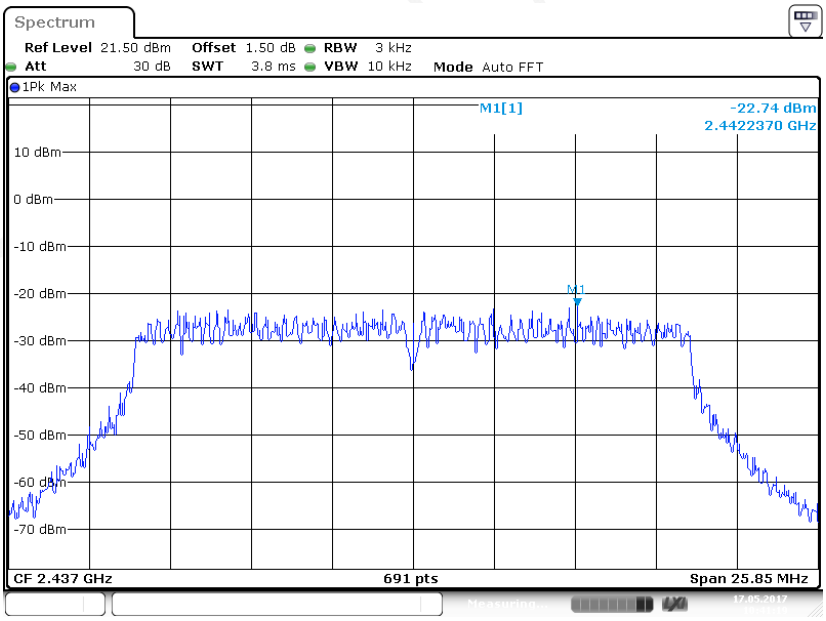
Date: 17.MAY.2017 10:15:36

Power Spectral Density , 802.11n-HT20 Low Channel



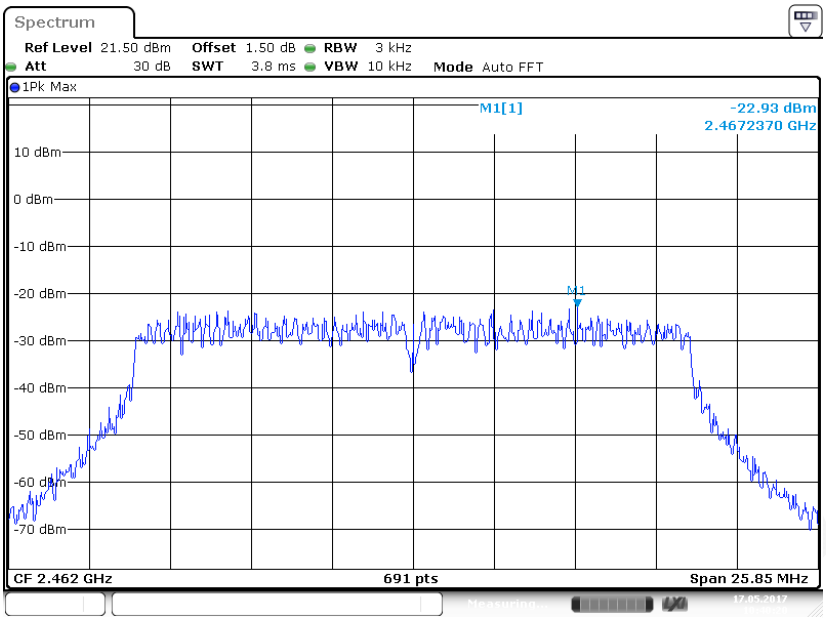
Date: 17.MAY.2017 10:40:59

Power Spectral Density , 802.11n-HT20 Middle Channel



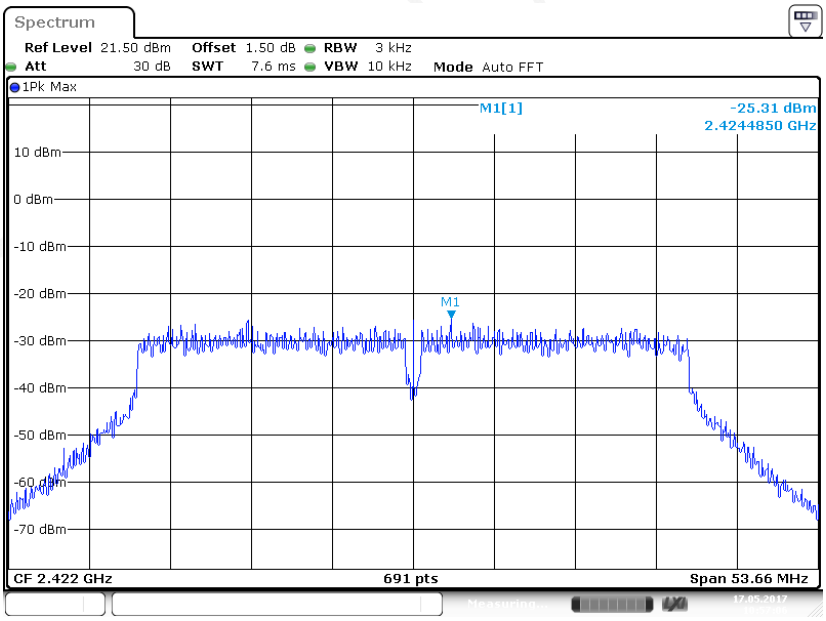
Date: 17.MAY.2017 10:41:20

Power Spectral Density , 802.11n-HT20 High Channel



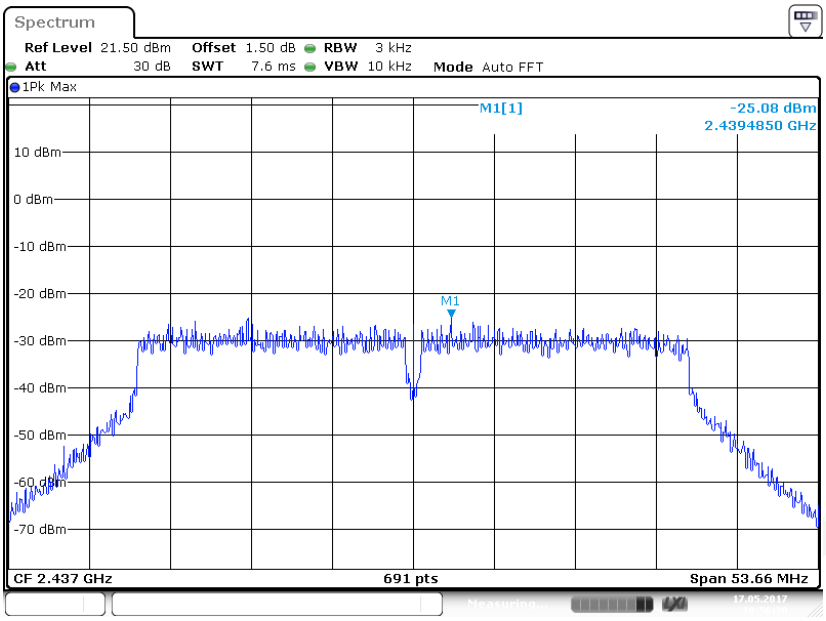
Date: 17.MAY.2017 10:40:20

Power Spectral Density , 802.11n-HT40 Low Channel



Date: 17.MAY.2017 10:57:07

Power Spectral Density , 802.11n-HT40 Middle Channel



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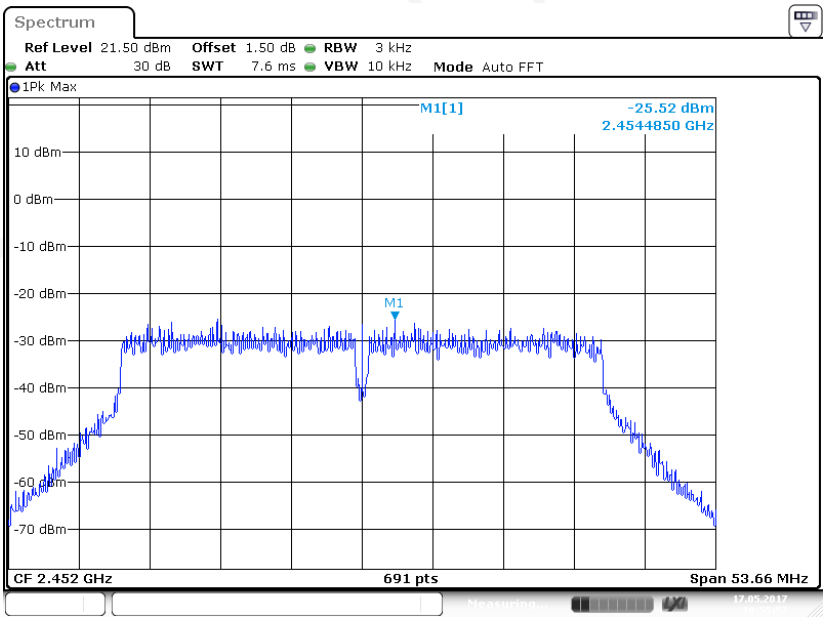
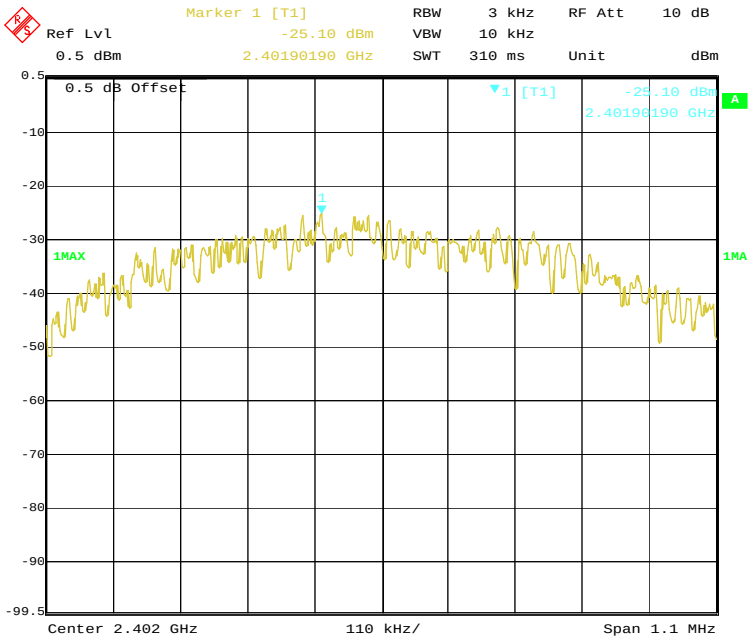
Power Spectral Density , 802.11n-HT40 High Channel

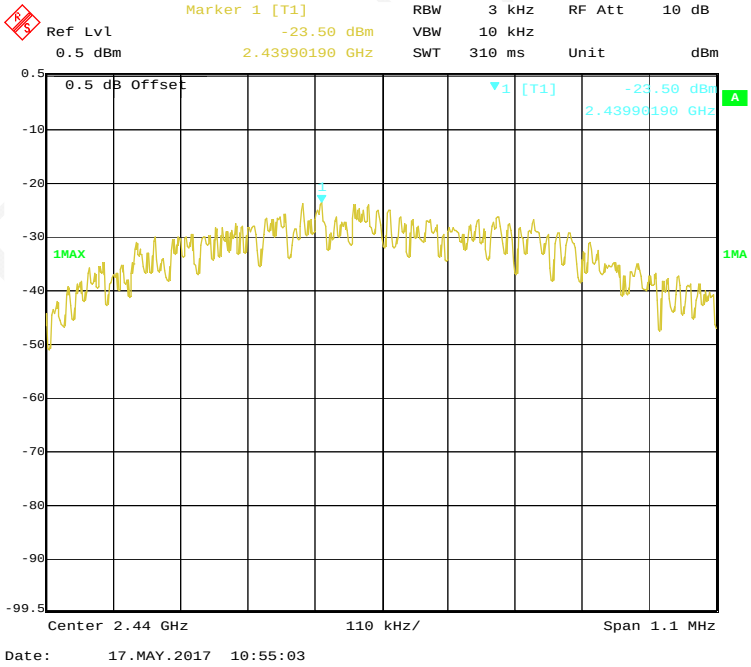


Date: 17.MAY.2017 10:55:58

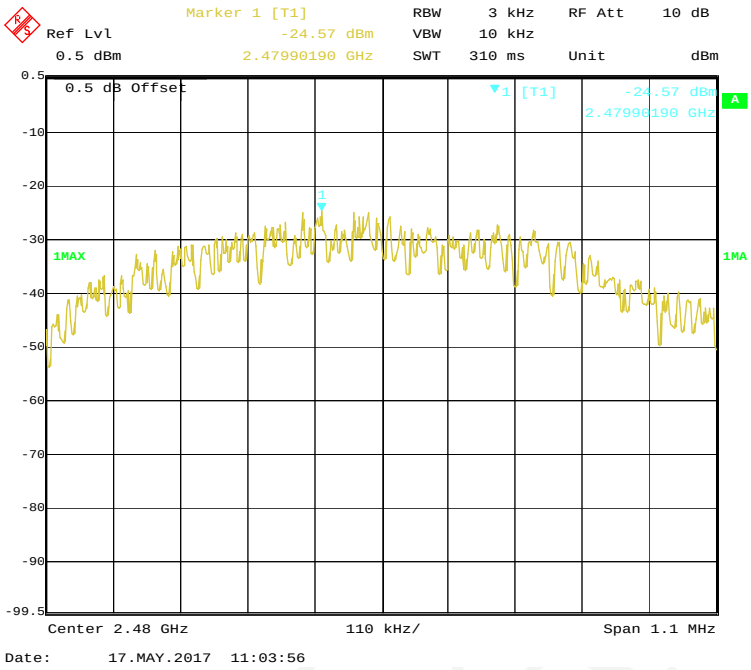
Power Spectral Density , BLE Mode Low Channel



Power Spectral Density , BLE Mode Middle Channel



Power Spectral Density , BLE Mode High Channel



******* END OF REPORT *******