

TEST REPORT

Reference No. : WTS18S09122875-2W
FCC ID..... : 2AQ7Q-DB0355
Applicant : DTEN Inc.
Address : 97 E. Brokaw Road, Suite 300, San Jose, California 95112, United States
Manufacturer : DTEN Inc.
Address : 97 E. Brokaw Road, Suite 300, San Jose, California 95112, United States
Factory : JIANGSU ECHOM SCIENCE&TECHNOLOGY CO.,LTD.
Address : No.168, Qianjin East Road, Kunshan City, Suzhou City, Jiangsu Province, China.
Product..... : DTEN Board D7
Model(s)..... : DB0355
Standards : FCC CFR47 Part 15 C Section 15.247: 2018
Date of Receipt sample..... : 2018-09-04
Date of Test..... : 2018-09-05 to 2018-11-19
Date of Issue : 2018-11-20
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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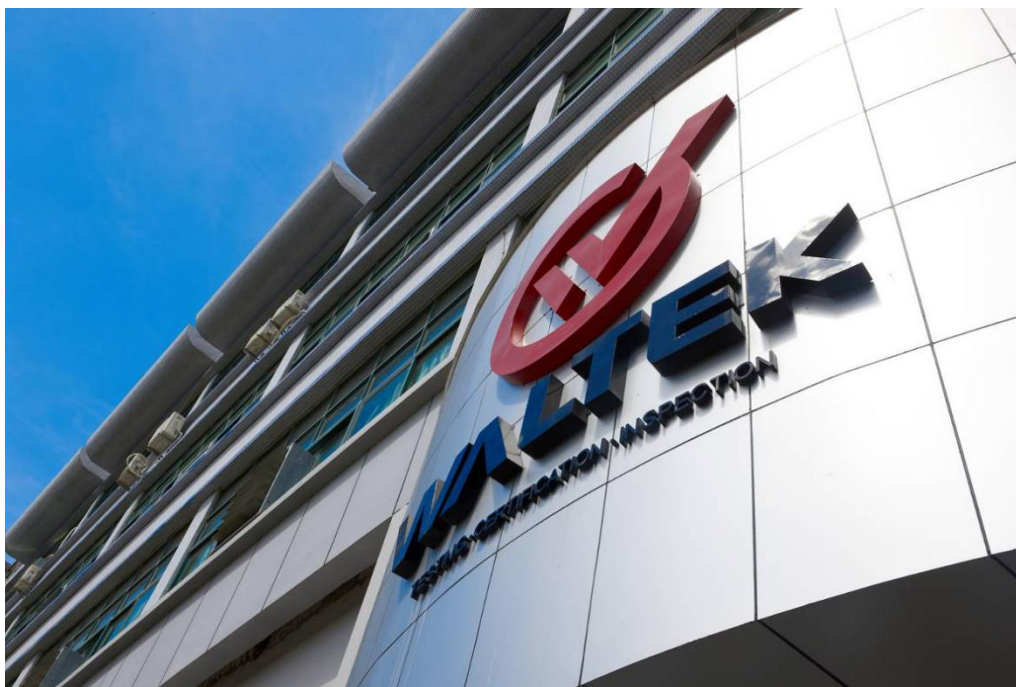


Philo Zhong

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), ISED Canada (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

2.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ SDoC(VOC/DOC)	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. ISED Canada Registration No.: 7760A			

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd.	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

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2. Revision History

Test report #	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S09122875-2W	2018-09-04	2018-09-05 to 2018-11-19	2018-11-20	Original	-	Valid

4 General Information

4.1 General Description of E.U.T

Product:	DTEN Board D7
Model(s):	DB0355
Operation Frequency:	BLE: 2402-2480MHz 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz~2452MHz
Antenna installation:	Integrated Antenna
Antenna Gain:	Ant.1: 2dBi; Ant.2: 2dBi; Ant.3: 2dBi for module 1 Ant.4: 2dBi; Ant.5: 2dBi for module 2 Ant.3 for BLE; Ant.1, Ant.2, Ant.4 and Ant.5 for 2.4G WiFi (The EUT contain two different module.)
Type of modulation:	BLE(GFSK) IEEE 802.11b (CCK/QPSK/BPSK,11Mbps max.) IEEE 802.11g (BPSK/QPSK/16QAM/64QAM,54Mbps max.) IEEE 802.11n (BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max., HT40:150Mbps max.)

4.2 Details of E.U.T

Ratings	Input: AC 100-240V~, 50/60Hz, 3A
---------	----------------------------------

4.3 Channel List

BLE:

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	1	2404	2	2406	3	2408
4	2410	5	2412	6	2414	7	2416
8	2418	9	2420	10	2422	11	2424
12	2426	13	2428	14	2430	15	2432
16	2434	17	2436	18	2438	19	2440
20	2442	21	2444	22	2446	23	2448
24	2450	25	2452	26	2454	27	2456
28	2458	29	2460	30	2462	31	2464
32	2466	33	2468	34	2470	35	2472
36	2474	37	2476	38	2478	39	2480

WIFI

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462	12	-

4.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
	BLE	1 Mbps	0/19/39	TX
Power Spectral Density	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
	BLE	1 Mbps	0/19/39	TX
Frequency Range	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	108 Mbps	1/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
	BLE	1 Mbps	0/19/39	TX
Transmitter Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
	BLE	1 Mbps	0/19/39	TX

Note :The EUT contain two different RF module. The test were performed between module 1 and module 2. Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product.

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions Test Site						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-15	2018-09-14
2.	LISN	R&S	ENV216	101215	2017-09-15	2018-09-14
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-15	2018-09-14
3m Semi-anechoic Chamber for Radiation Emissions Test site						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP30	100091	2018-04-20	2019-04-19
2	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-05-18	2019-05-17
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-07	2019-04-06
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	2018-04-07	2019-04-06
5	Spectrum Analyzer	R&S	FSP40	100501	2018-04-20	2019-04-19
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-04-20	2019-04-19
7	Microwave Broadband Preamplifier	SCHWARZBECK	BBV 9721	100472	2018-04-20	2019-04-19
8	Cable	Top	18GHz-40GHz	-	2018-04-20	2019-04-19
3m Semi-anechoic Chamber for Radiation Emissions Test site						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2018-04-20	2019-04-19
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-04-17	2019-04-16
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-04-19	2019-04-18
4	Amplifier	ANRITSU	MH648A	M43381	2018-04-20	2019-04-19
5	Cable	HUBER+SUHNER	CBL2	525178	2018-04-20	2019-04-19
6	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-04-20	2019-04-19
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	Agilent	N9020A	MY49100060	2018-04-20	2019-04-19
2.	Spectrum Analyzer	R&S	FSP40	100501	2018-04-17	2019-04-16
3.	Coaxial Cable	Top	10Hz-30GHz	-	2018-04-20	2019-04-19

4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2018-04-20	2019-04-19
5.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	2018-04-20	2019-04-19

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

6 Test Summary

Test Items	Test Requirement	Result
Spurious Radiated Emissions	15.247 15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Conducted Spurious Emissions	15.247	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

7 Conducted Emission

Test date	2018-09-05 to 2018-09-06
Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

7.1 E.U.T. Operation

Operating Environment :

Temperature: 21.5 °C
Humidity: 51.9 % RH

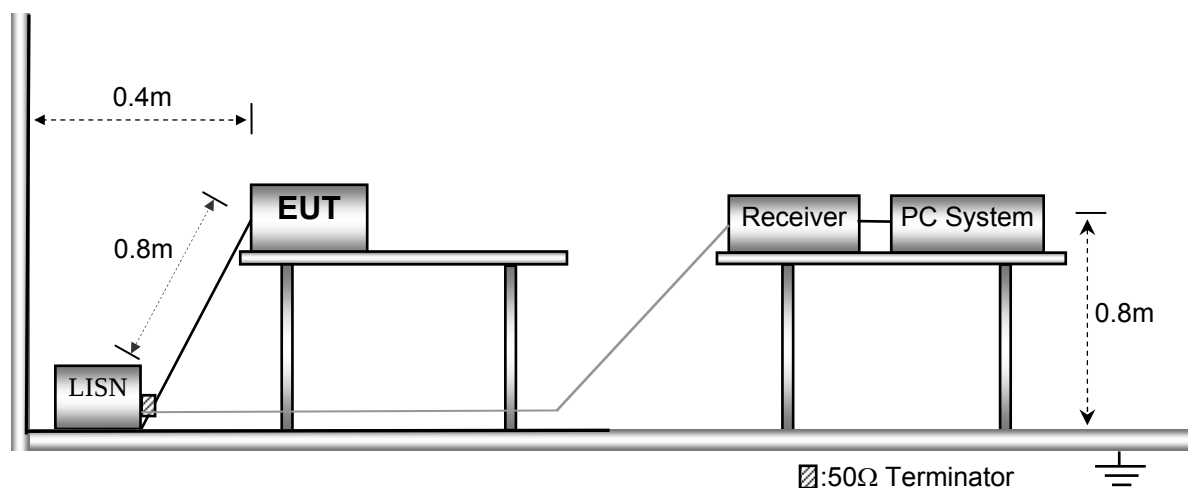
Atmospheric Pressure: 101.2kPa

EUT Operation : Refer to section 4.4.

The test was performed in Transmitting mode(For WIFI), Only the worst case 802.11b mode were record in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10.



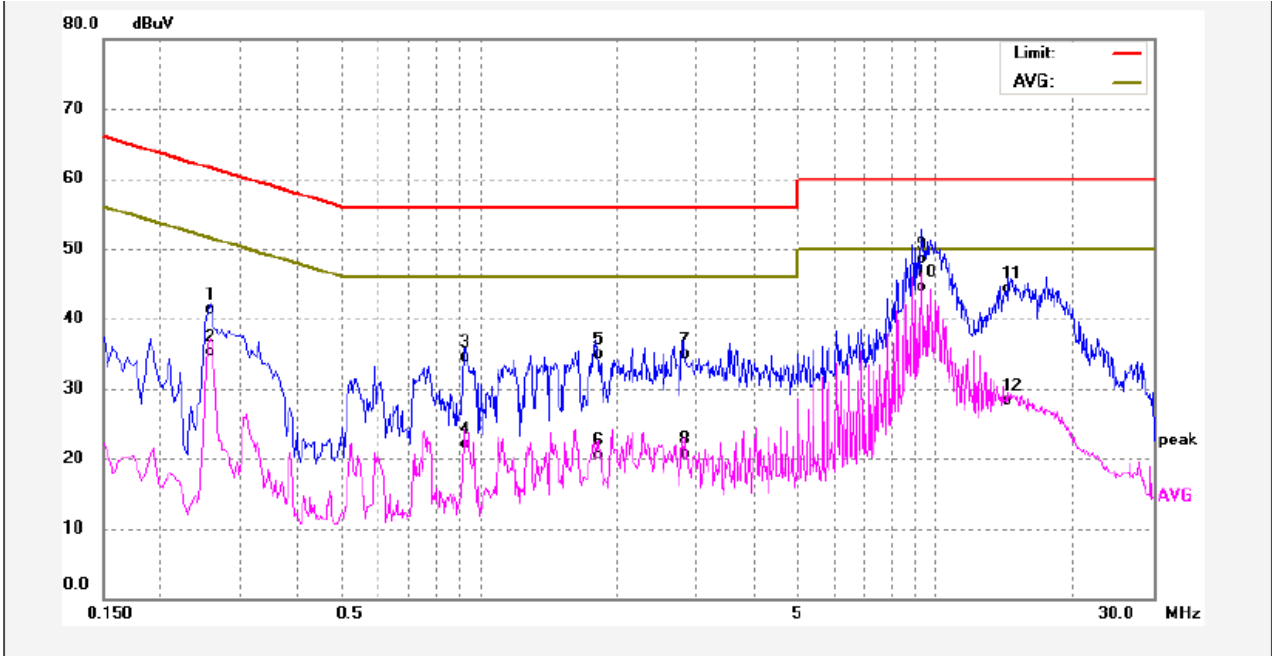
7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

7.4 Conducted Emission Test Result

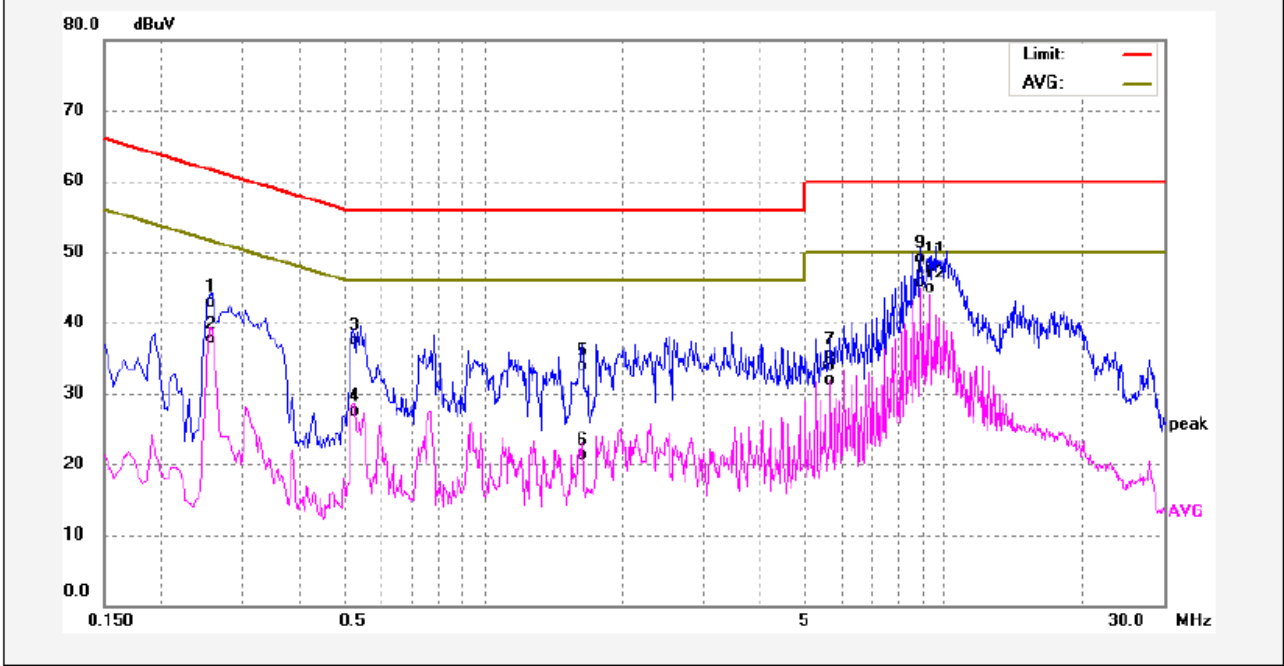
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2575	30.92	10.39	41.31	61.51	-20.20	QP	
2	0.2575	24.84	10.39	35.23	51.51	-16.28	AVG	
3	0.9282	24.15	10.44	34.59	56.00	-21.41	QP	
4	0.9282	11.63	10.44	22.07	46.00	-23.93	AVG	
5	1.8000	24.30	10.53	34.83	56.00	-21.17	QP	
6	1.8000	10.03	10.53	20.56	46.00	-25.44	AVG	
7	2.7942	24.16	10.68	34.84	56.00	-21.16	QP	
8	2.7942	9.96	10.68	20.64	46.00	-25.36	AVG	
9	9.3023	37.33	11.18	48.51	60.00	-11.49	QP	
10	9.3023	33.25	11.18	44.43	50.00	-5.57	AVG	
11	14.3640	33.44	10.92	44.36	60.00	-15.64	QP	
12	14.3640	17.29	10.92	28.21	50.00	-21.79	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2510	32.55	10.39	42.94	61.72	-18.78	QP	
2	0.2510	27.27	10.39	37.66	51.72	-14.06	AVG	
3	0.5237	27.07	10.44	37.51	56.00	-18.49	QP	
4	0.5237	17.07	10.44	27.51	46.00	-18.49	AVG	
5	1.6362	23.32	10.50	33.82	56.00	-22.18	QP	
6	1.6362	10.76	10.50	21.26	46.00	-24.74	AVG	
7	5.6700	24.70	10.88	35.58	60.00	-24.42	QP	
8	5.6700	21.12	10.88	32.00	50.00	-18.00	AVG	
9	8.9100	37.94	11.15	49.09	60.00	-10.91	QP	
10	8.9100	34.56	11.15	45.71	50.00	-4.29	AVG	
11	9.3139	37.07	11.18	48.25	60.00	-11.75	QP	
12	9.3139	33.73	11.18	44.91	50.00	-5.09	AVG	

8 Radiated Emissions

Test date: 2018-09-07 to 2018-09-11
 Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247
 Test Method: ANSI C63.10:2013
 Test Result: PASS
 Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C
 Humidity: 52.1 % RH
 Atmospheric Pressure: 101.2kPa

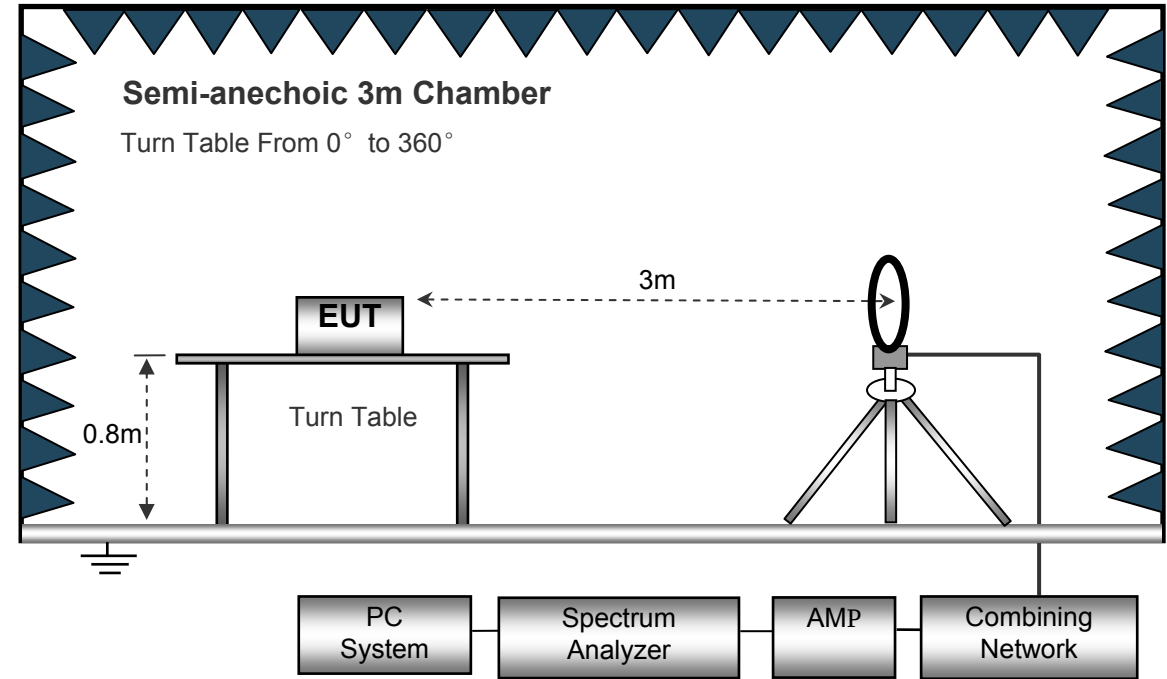
EUT Operation : Refer to section 4.4.

The test was performed in transmitting mode, the test data were shown in the report.

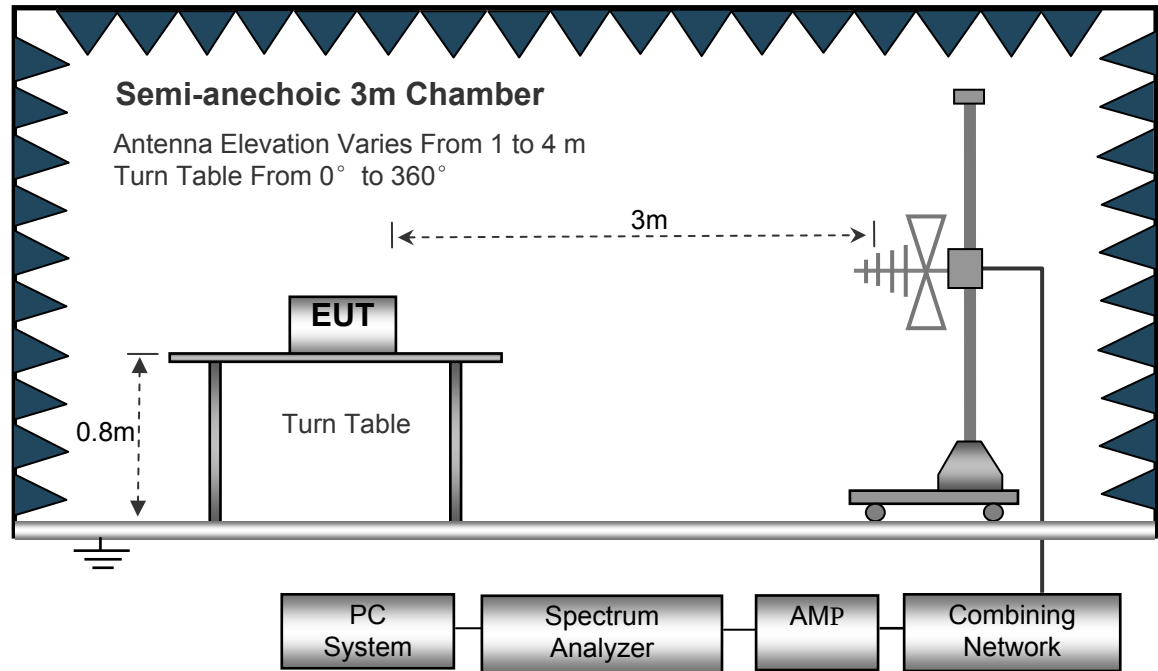
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

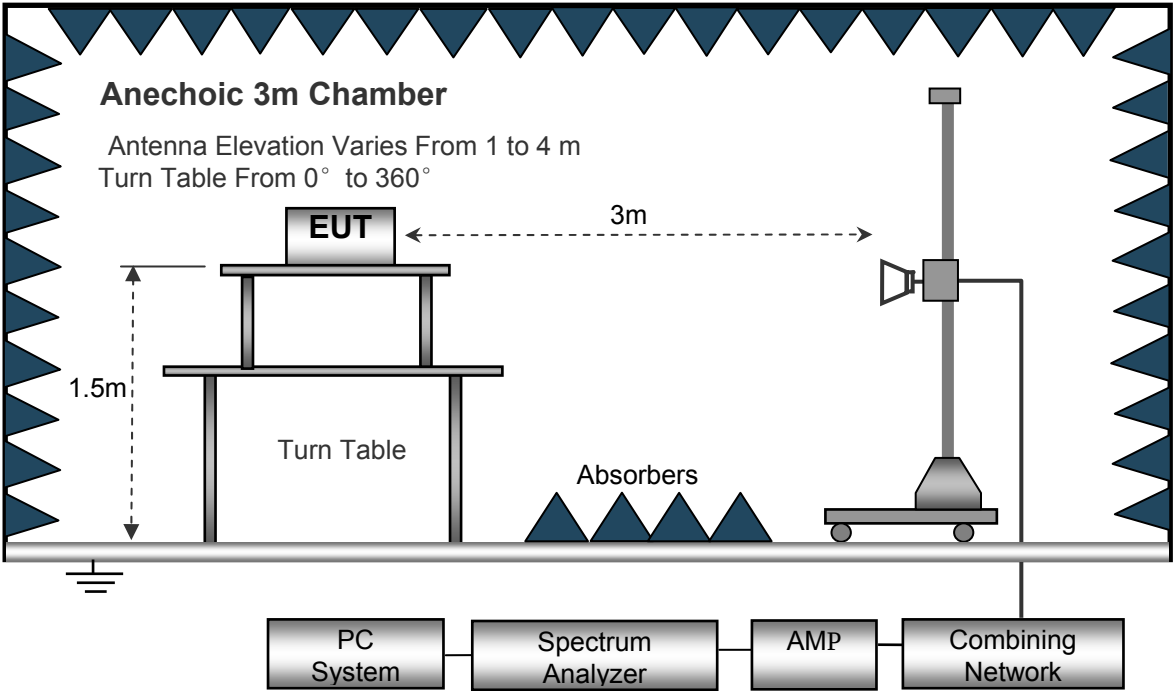
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed Auto
IF Bandwidth.....10kHz
Video Bandwidth.....10kHz
Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

Sweep Speed Auto
DetectorPK
Resolution Bandwidth.....100kHz
Video Bandwidth.....300kHz

Above 1GHz

Sweep Speed Auto
DetectorPK
Resolution Bandwidth.....1MHz
Video Bandwidth.....3MHz
DetectorAve.
Resolution Bandwidth.....1MHz
Video Bandwidth.....10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane;
For above 1GHz, the EUT is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

8.5 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

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 maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

8.6 Summary of Test Results

Test Frequency: 9kHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11b: Low Channel 2412MHz									
842.13	46.25	QP	124	1.8	H	-3.70	42.55	46.00	-3.45
842.13	37.38	QP	66	1.8	V	-3.70	33.68	46.00	-12.32
4824.00	54.25	PK	121	1.6	V	-1.05	53.20	74.00	-20.80
4824.00	40.88	Ave	121	1.6	V	-1.05	39.83	54.00	-14.17
7236.00	50.03	PK	265	1.4	H	1.34	51.37	74.00	-22.63
7236.00	36.64	Ave	265	1.4	H	1.34	37.98	54.00	-16.02
2333.04	46.89	PK	219	1.2	V	-13.19	33.70	74.00	-40.30
2333.04	39.06	Ave	219	1.2	V	-13.19	25.87	54.00	-28.13
2360.24	42.92	PK	227	1.0	H	-13.15	29.77	74.00	-44.23
2360.24	38.70	Ave	227	1.0	H	-13.15	25.55	54.00	-28.45
2493.79	42.41	PK	199	1.9	V	-13.08	29.33	74.00	-44.67
2493.79	37.46	Ave	199	1.9	V	-13.08	24.38	54.00	-29.62

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11b: Middle Channel 2437MHz									
842.13	45.96	QP	300	1.0	H	-3.70	42.26	46.00	-3.74
842.13	36.35	QP	62	1.4	V	-3.70	32.65	46.00	-13.35
4874.00	50.89	PK	159	1.9	V	-0.63	50.26	74.00	-23.74
4874.00	41.74	Ave	159	1.9	V	-0.63	41.11	54.00	-12.89
7311.00	41.81	PK	295	1.7	H	2.21	44.02	74.00	-29.98
7311.00	40.29	Ave	295	1.7	H	2.21	42.50	54.00	-11.50
2321.77	46.69	PK	109	1.4	V	-13.19	33.50	74.00	-40.50
2321.77	39.61	Ave	109	1.4	V	-13.19	26.42	54.00	-27.58
2388.97	42.18	PK	183	1.8	H	-13.14	29.04	74.00	-44.96
2388.97	38.38	Ave	183	1.8	H	-13.14	25.24	54.00	-28.76
2489.18	43.49	PK	258	1.5	V	-13.09	30.40	74.00	-43.60
2489.18	36.73	Ave	258	1.5	V	-13.09	23.64	54.00	-30.36

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11b: High Channel 2462MHz									
842.13	45.02	QP	22	1.9	H	-3.70	41.32	46.00	-4.68
842.13	36.19	QP	54	1.6	V	-3.70	32.49	46.00	-13.51
4924.00	47.93	PK	215	1.8	V	-0.25	47.68	74.00	-26.32
4924.00	43.48	Ave	215	1.8	V	-0.25	43.23	54.00	-10.77
7386.00	45.31	PK	100	1.3	H	2.85	48.16	74.00	-25.84
7386.00	41.93	Ave	100	1.3	H	2.85	44.78	54.00	-9.22
2330.16	45.69	PK	251	1.3	V	-13.19	32.50	74.00	-41.50
2330.16	39.47	Ave	251	1.3	V	-13.19	26.28	54.00	-27.72
2373.61	43.66	PK	99	1.3	H	-13.14	30.52	74.00	-43.48
2373.61	37.69	Ave	99	1.3	H	-13.14	24.55	54.00	-29.45
2491.05	42.46	PK	245	1.6	V	-13.09	29.37	74.00	-44.63
2491.05	38.35	Ave	245	1.6	V	-13.09	25.26	54.00	-28.74

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11g: Low Channel 2412MHz									
842.13	45.20	QP	179	1.8	H	-3.70	41.50	46.00	-4.50
842.13	36.76	QP	1	1.0	V	-3.70	33.06	46.00	-12.94
4824.00	46.30	PK	274	1.5	V	-1.06	45.24	74.00	-28.76
4824.00	42.50	Ave	274	1.5	V	-1.06	41.44	54.00	-12.56
7236.00	44.04	PK	120	1.4	H	1.35	45.39	74.00	-28.61
7236.00	39.47	Ave	120	1.4	H	1.35	40.82	54.00	-13.18
2329.19	45.47	PK	318	1.5	V	-13.19	32.28	74.00	-41.72
2329.19	37.84	Ave	318	1.5	V	-13.19	24.65	54.00	-29.35
2368.18	43.04	PK	104	1.6	H	-13.14	29.90	74.00	-44.10
2368.18	38.66	Ave	104	1.6	H	-13.14	25.52	54.00	-28.48
2494.55	44.43	PK	334	1.2	V	-13.08	31.35	74.00	-42.65
2494.55	38.45	Ave	334	1.2	V	-13.08	25.37	54.00	-28.63

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11g: Middle Channel 2437MHz									
842.13	46.25	QP	230	1.8	H	-3.70	42.55	46.00	-3.45
842.13	37.67	QP	340	1.8	V	-3.70	33.97	46.00	-12.03
4874.00	50.23	PK	235	1.5	V	-0.62	49.61	74.00	-24.39
4874.00	43.08	Ave	235	1.5	V	-0.62	42.46	54.00	-11.54
7311.00	47.95	PK	4	1.2	H	2.20	50.15	74.00	-23.85
7311.00	45.50	Ave	4	1.2	H	2.20	47.70	54.00	-6.30
2328.46	46.70	PK	131	1.4	V	-13.19	33.51	74.00	-40.49
2328.46	38.18	Ave	131	1.4	V	-13.19	24.99	54.00	-29.01
2353.19	44.80	PK	36	1.5	H	-13.15	31.65	74.00	-42.35
2353.19	36.38	Ave	36	1.5	H	-13.15	23.23	54.00	-30.77
2492.49	42.38	PK	193	1.1	V	-13.09	29.29	74.00	-44.71
2492.49	38.49	Ave	193	1.1	V	-13.09	25.40	54.00	-28.60

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
11g: High Channel 2462MHz									
842.13	46.08	QP	109	1.6	H	-3.70	42.38	46.00	-3.62
842.13	38.31	QP	45	1.8	V	-3.70	34.61	46.00	-11.39
4924.00	53.53	PK	229	1.9	V	-0.25	53.28	74.00	-20.72
4924.00	45.63	Ave	229	1.9	V	-0.25	45.38	54.00	-8.62
7386.00	46.39	PK	41	1.8	H	2.86	49.25	74.00	-24.75
7386.00	41.41	Ave	41	1.8	H	2.86	44.27	54.00	-9.73
2327.39	45.98	PK	182	1.5	V	-13.19	32.79	74.00	-41.21
2327.39	39.50	Ave	182	1.5	V	-13.19	26.31	54.00	-27.69
2381.60	43.31	PK	276	1.4	H	-13.14	30.17	74.00	-43.83
2381.60	37.73	Ave	276	1.4	H	-13.14	24.59	54.00	-29.41
2487.03	42.23	PK	215	1.1	V	-13.08	29.15	74.00	-44.85
2487.03	38.21	Ave	215	1.1	V	-13.08	25.13	54.00	-28.87

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
n20: Low Channel 2412MHz									
842.13	45.74	QP	87	1.8	H	-3.70	42.04	46.00	-3.96
842.13	38.16	QP	246	1.6	V	-3.70	34.46	46.00	-11.54
4824.00	46.26	PK	240	1.6	V	-1.06	45.20	74.00	-28.80
4824.00	40.05	Ave	240	1.6	V	-1.06	38.99	54.00	-15.01
7236.00	44.91	PK	84	1.9	H	1.34	46.25	74.00	-27.75
7236.00	40.16	Ave	84	1.9	H	1.34	41.50	54.00	-12.50
2344.22	46.24	PK	279	1.1	V	-13.19	33.05	74.00	-40.95
2344.22	39.40	Ave	279	1.1	V	-13.19	26.21	54.00	-27.79
2354.14	43.61	PK	167	1.9	H	-13.14	30.47	74.00	-43.53
2354.14	38.99	Ave	167	1.9	H	-13.14	25.85	54.00	-28.15
2499.27	42.73	PK	312	1.5	V	-13.08	29.65	74.00	-44.35
2499.27	36.47	Ave	312	1.5	V	-13.08	23.39	54.00	-30.61

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
n20: Middle Channel 2437MHz									
842.13	45.04	QP	271	1.7	H	-3.70	41.34	46.00	-4.66
842.13	37.08	QP	4	1.2	V	-3.70	33.38	46.00	-12.62
4874.00	50.54	PK	209	1.1	V	-0.61	49.93	74.00	-24.07
4874.00	41.31	Ave	209	1.1	V	-0.61	40.70	54.00	-13.30
7311.00	48.02	PK	51	1.1	H	2.21	50.23	74.00	-23.77
7311.00	38.50	Ave	51	1.1	H	2.21	40.71	54.00	-13.29
2321.56	45.39	PK	131	2.0	V	-13.19	32.20	74.00	-41.80
2321.56	38.92	Ave	131	2.0	V	-13.19	25.73	54.00	-28.27
2362.68	43.10	PK	178	1.1	H	-13.14	29.96	74.00	-44.04
2362.68	38.24	Ave	178	1.1	H	-13.14	25.10	54.00	-28.90
2496.42	43.88	PK	29	1.7	V	-13.09	30.79	74.00	-43.21
2496.42	36.71	Ave	29	1.7	V	-13.09	23.62	54.00	-30.38

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
n20: High Channel 2462MHz									
842.13	46.00	QP	94	1.8	H	-3.70	42.30	46.00	-3.70
842.13	38.74	QP	326	1.4	V	-3.70	35.04	46.00	-10.96
4924.00	50.94	PK	116	1.6	V	-0.24	50.70	74.00	-23.30
4924.00	41.26	Ave	116	1.6	V	-0.24	41.02	54.00	-12.98
7386.00	50.83	PK	96	1.1	H	2.83	53.66	74.00	-20.34
7386.00	46.46	Ave	96	1.1	H	2.83	49.29	54.00	-4.71
2330.45	46.60	PK	334	1.7	V	-13.19	33.41	74.00	-40.59
2330.45	39.33	Ave	334	1.7	V	-13.19	26.14	54.00	-27.86
2383.18	44.89	PK	145	1.9	H	-13.14	31.75	74.00	-42.25
2383.18	37.12	Ave	145	1.9	H	-13.14	23.98	54.00	-30.02
2497.23	44.98	PK	278	1.3	V	-13.08	31.90	74.00	-42.10
2497.23	36.99	Ave	278	1.3	V	-13.08	23.91	54.00	-30.09

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
n40: Low Channel 2422MHz									
842.13	46.07	QP	93	1.6	H	-3.70	42.37	46.00	-3.63
842.13	38.58	QP	37	1.3	V	-3.70	34.88	46.00	-11.12
4844.00	44.12	PK	116	1.7	V	-1.06	43.06	74.00	-30.94
4844.00	37.97	Ave	116	1.7	V	-1.06	36.91	54.00	-17.09
7266.00	43.45	PK	327	1.9	H	1.34	44.79	74.00	-29.21
7266.00	39.65	Ave	327	1.9	H	1.34	40.99	54.00	-13.01
2330.43	46.13	PK	100	1.7	V	-13.19	32.94	74.00	-41.06
2330.43	39.48	Ave	100	1.7	V	-13.19	26.29	54.00	-27.71
2371.35	42.79	PK	242	1.6	H	-13.14	29.65	74.00	-44.35
2371.35	38.43	Ave	242	1.6	H	-13.14	25.29	54.00	-28.71
2495.48	42.34	PK	212	1.1	V	-13.08	29.26	74.00	-44.74
2495.48	36.44	Ave	212	1.1	V	-13.08	23.36	54.00	-30.64

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
n40: Middle Channel 2437MHz									
842.13	46.49	QP	248	1.2	H	-3.70	42.79	46.00	-3.21
842.13	37.14	QP	159	1.6	V	-3.70	33.44	46.00	-12.56
4874.00	45.86	PK	254	1.4	V	-0.61	45.25	74.00	-28.75
4874.00	41.42	Ave	254	1.4	V	-0.61	40.81	54.00	-13.19
7311.00	37.63	PK	283	1.7	H	2.21	39.84	74.00	-34.16
7311.00	32.24	Ave	283	1.7	H	2.21	34.45	54.00	-19.55
2339.87	45.33	PK	133	1.9	V	-13.19	32.14	74.00	-41.86
2339.87	37.86	Ave	133	1.9	V	-13.19	24.67	54.00	-29.33
2352.95	44.55	PK	11	1.2	H	-13.14	31.41	74.00	-42.59
2352.95	37.84	Ave	11	1.2	H	-13.14	24.70	54.00	-29.30
2491.40	42.28	PK	344	1.0	V	-13.09	29.19	74.00	-44.81
2491.40	36.02	Ave	344	1.0	V	-13.09	22.93	54.00	-31.07

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
n40: High Channel 2452MHz									
842.13	46.57	QP	304	2.0	H	-3.70	42.87	46.00	-3.13
842.13	37.68	QP	70	1.3	V	-3.70	33.98	46.00	-12.02
4904.00	48.25	PK	303	1.2	V	-0.24	48.01	74.00	-25.99
4904.00	42.01	Ave	303	1.2	V	-0.24	41.77	54.00	-12.23
7356.00	36.91	PK	37	1.6	H	2.83	39.74	74.00	-34.26
7356.00	31.02	Ave	37	1.6	H	2.83	33.85	54.00	-20.15
2334.33	45.30	PK	205	1.3	V	-13.19	32.11	74.00	-41.89
2334.33	38.18	Ave	205	1.3	V	-13.19	24.99	54.00	-29.01
2367.40	44.18	PK	217	1.7	H	-13.14	31.04	74.00	-42.96
2367.40	37.08	Ave	217	1.7	H	-13.14	23.94	54.00	-30.06
2497.75	42.78	PK	202	1.3	V	-13.08	29.70	74.00	-44.30
2497.75	37.69	Ave	202	1.3	V	-13.08	24.61	54.00	-29.39

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
BLE-GFSK Low Channel 2402MHz									
842.13	45.60	QP	180	1.1	H	-3.70	41.90	46.00	-4.10
842.13	37.95	QP	63	1.8	V	-3.70	34.25	46.00	-11.75
4804.00	46.49	PK	66	1.2	V	-1.06	45.43	74.00	-28.57
4804.00	40.23	Ave	66	1.2	V	-1.06	39.17	54.00	-14.83
7206.00	39.65	PK	224	1.4	H	1.33	40.98	74.00	-33.02
7206.00	34.48	Ave	224	1.4	H	1.33	35.81	54.00	-18.19
2335.51	46.96	PK	293	1.7	V	-13.19	33.77	74.00	-40.23
2335.51	37.55	Ave	293	1.7	V	-13.19	24.36	54.00	-29.64
2358.19	44.14	PK	270	1.3	H	-13.14	31.00	74.00	-43.00
2358.19	37.25	Ave	270	1.3	H	-13.14	24.11	54.00	-29.89
2498.55	43.64	PK	288	1.4	V	-13.08	30.56	74.00	-43.44
2498.55	38.51	Ave	288	1.4	V	-13.08	25.43	54.00	-28.57

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
BLE-GFSK Middle Channel 2440MHz									
842.13	46.45	QP	168	1.1	H	-3.70	42.75	46.00	-3.25
842.13	37.62	QP	151	1.6	V	-3.70	33.92	46.00	-12.08
4880.00	47.35	PK	93	1.1	V	-0.62	46.73	74.00	-27.27
4880.00	43.76	Ave	93	1.1	V	-0.62	43.14	54.00	-10.86
7320.00	37.19	PK	90	1.7	H	2.21	39.40	74.00	-34.60
7320.00	34.27	Ave	90	1.7	H	2.21	36.48	54.00	-17.52
2310.21	45.92	PK	355	1.0	V	-13.19	32.73	74.00	-41.27
2310.21	37.09	Ave	355	1.0	V	-13.19	23.90	54.00	-30.10
2382.29	42.46	PK	180	1.3	H	-13.14	29.32	74.00	-44.68
2382.29	36.58	Ave	180	1.3	H	-13.14	23.44	54.00	-30.56
2499.14	43.79	PK	216	1.6	V	-13.08	30.71	74.00	-43.29
2499.14	36.37	Ave	216	1.6	V	-13.08	23.29	54.00	-30.71

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
BLE-GFSK High Channel 2480MHz									
842.13	45.81	QP	49	1.4	H	-3.70	42.11	46.00	-3.89
842.13	37.45	QP	115	1.7	V	-3.70	33.75	46.00	-12.25
4960.00	46.20	PK	41	1.2	V	-0.24	45.96	74.00	-28.04
4960.00	41.45	Ave	41	1.2	V	-0.24	41.21	54.00	-12.79
7440.00	37.62	PK	168	1.7	H	2.84	40.46	74.00	-33.54
7440.00	34.51	Ave	168	1.7	H	2.84	37.35	54.00	-16.65
2337.65	45.58	PK	188	1.8	V	-13.19	32.39	74.00	-41.61
2337.65	37.59	Ave	188	1.8	V	-13.19	24.40	54.00	-29.60
2362.42	44.13	PK	348	1.1	H	-13.14	30.99	74.00	-43.01
2362.42	36.13	Ave	348	1.1	H	-13.14	22.99	54.00	-31.01
2486.99	43.24	PK	280	1.9	V	-13.08	30.16	74.00	-43.84
2486.99	38.96	Ave	280	1.9	V	-13.08	25.88	54.00	-28.12

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not recorded.

9 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	558074 D01 15.247 Meas Guidance v05
Test Limit:	Regulation 15.247 (d), 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 Mode:	Transmitting

9.1 Test Produce

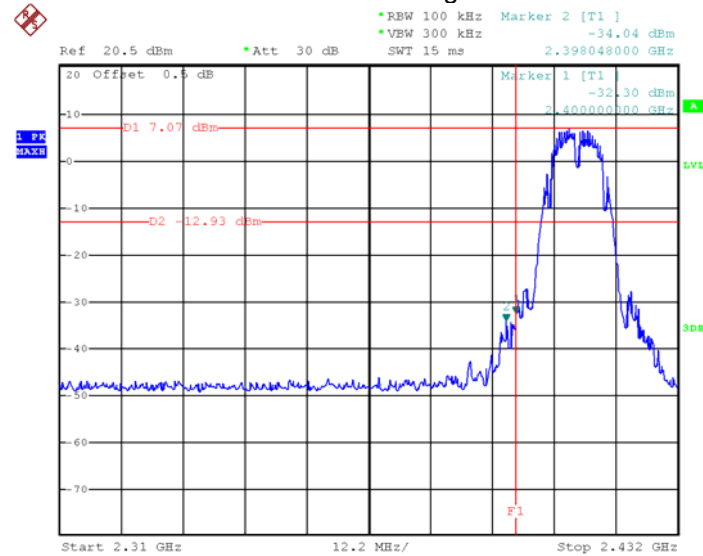
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.

9.2 Test Result

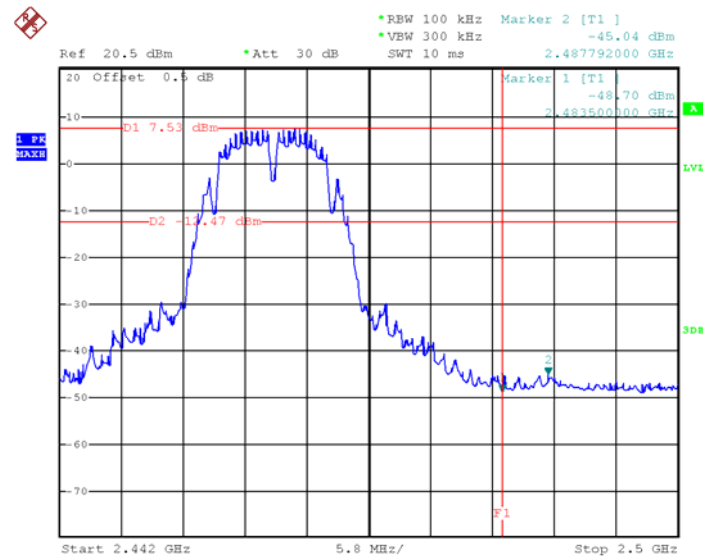
Test result plots shown as follows:

Module 1-ANT1:

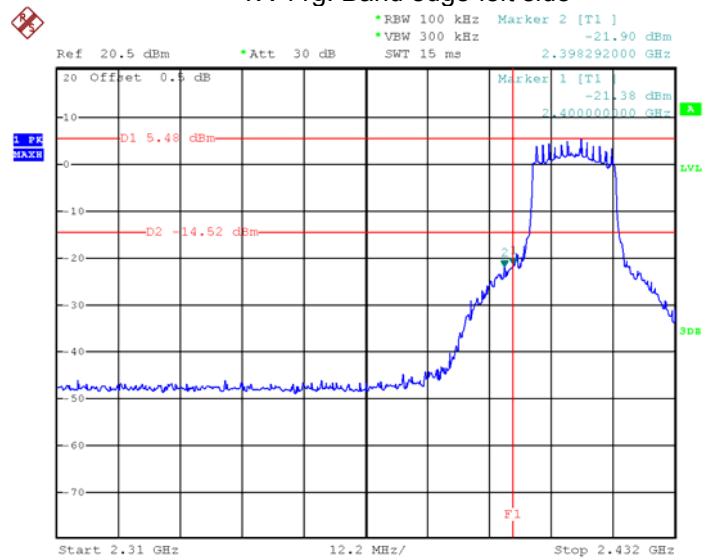
TX 11b: Band edge-left side



TX 11b: Band edge-right side

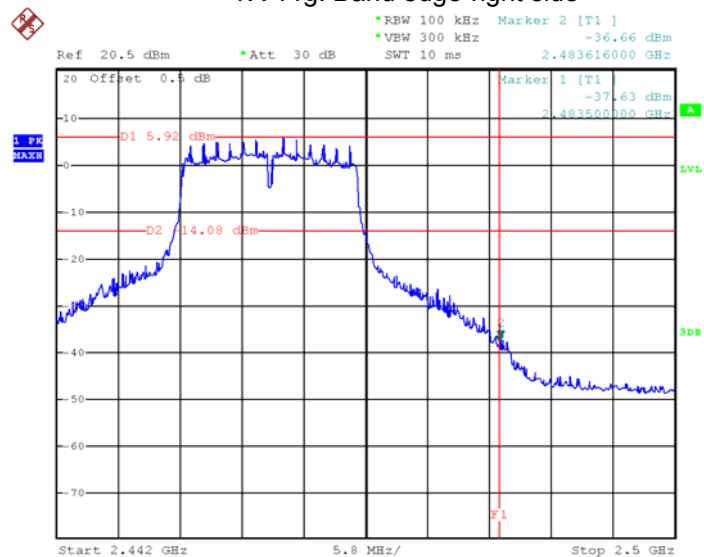


TX 11g: Band edge-left side



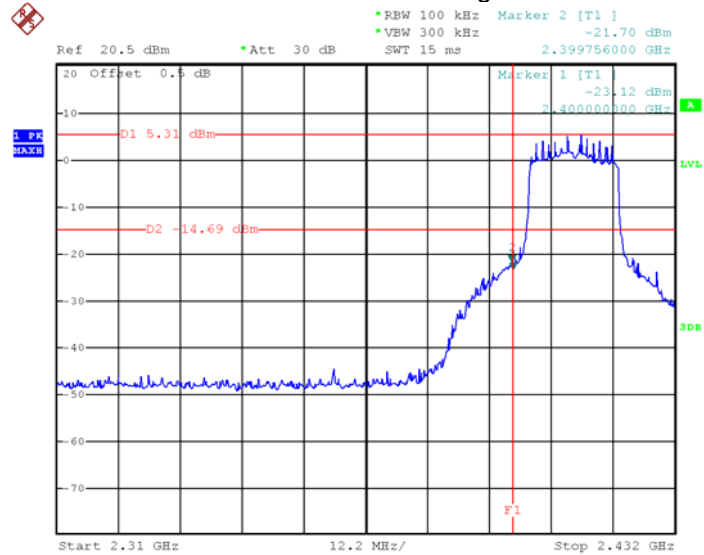
Date: 12.SEP.2018 03:26:10

TX 11g: Band edge-right side



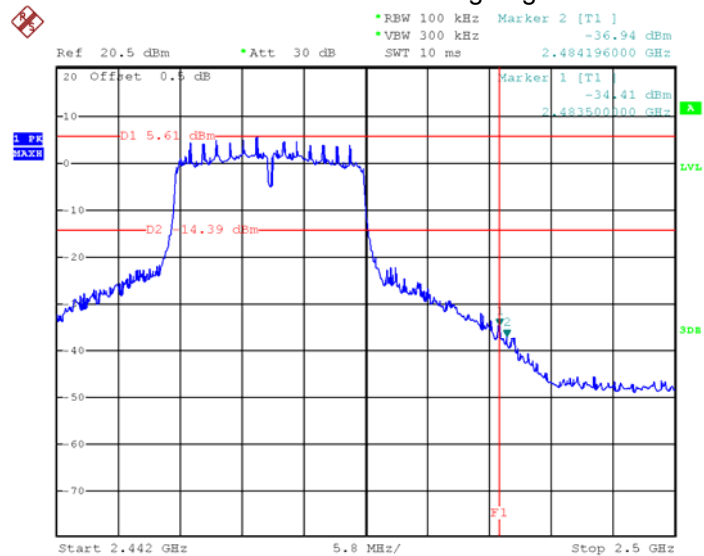
Date: 12.SEP.2018 03:16:44

TX 11n HT20: Band edge-left side



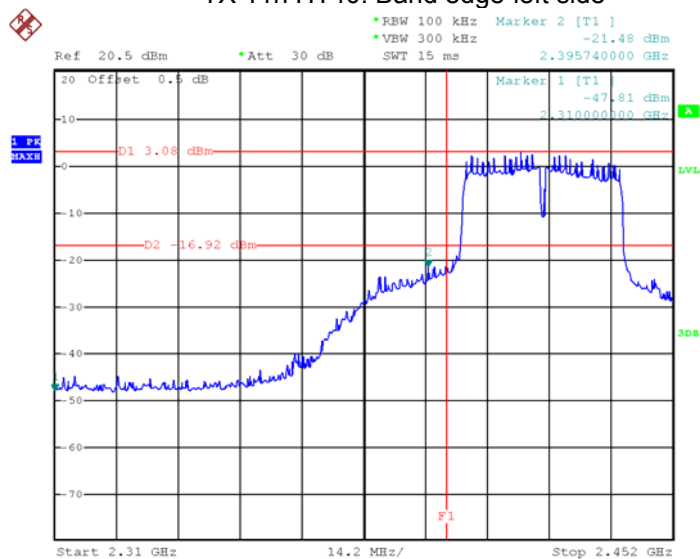
Date: 12.SEP.2018 03:24:56

TX 11n HT20: Band edge-right side



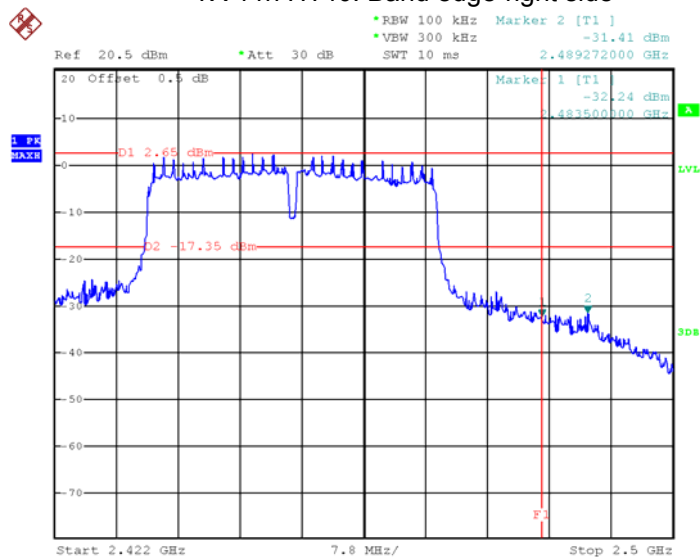
Date: 12.SEP.2018 03:17:51

TX 11n HT40: Band edge-left side



Date: 12.SEP.2018 03:29:15

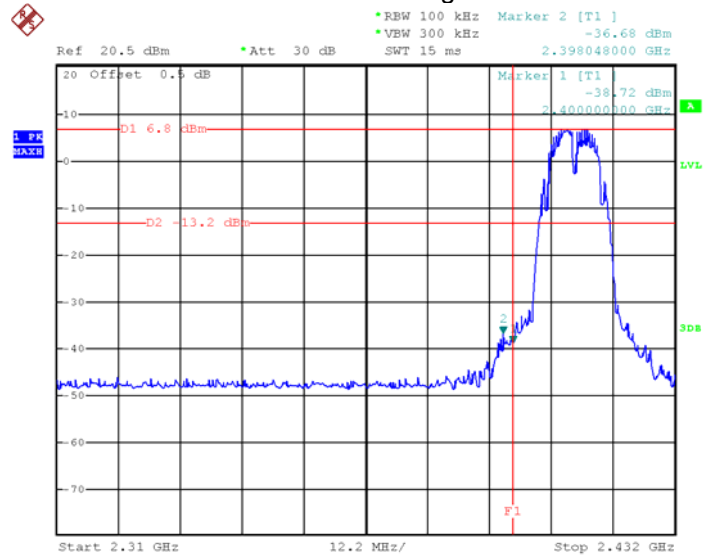
TX 11n HT40: Band edge-right side



Date: 12.SEP.2018 03:30:20

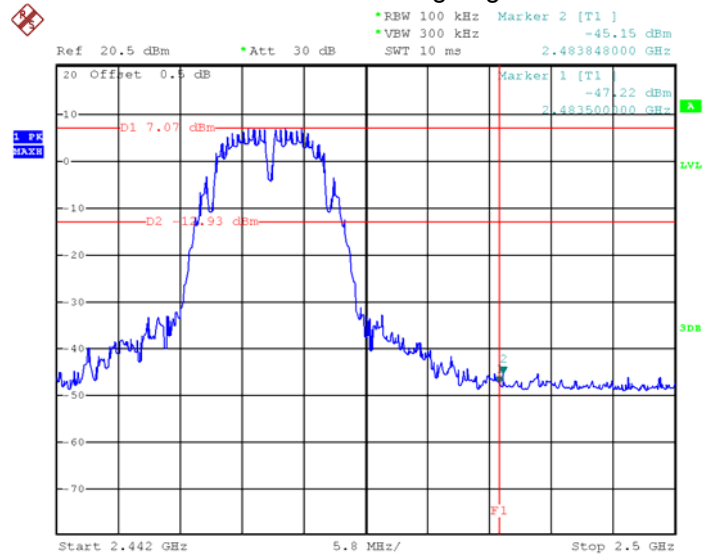
Module 1 -ANT2:

TX 11b: Band edge-left side



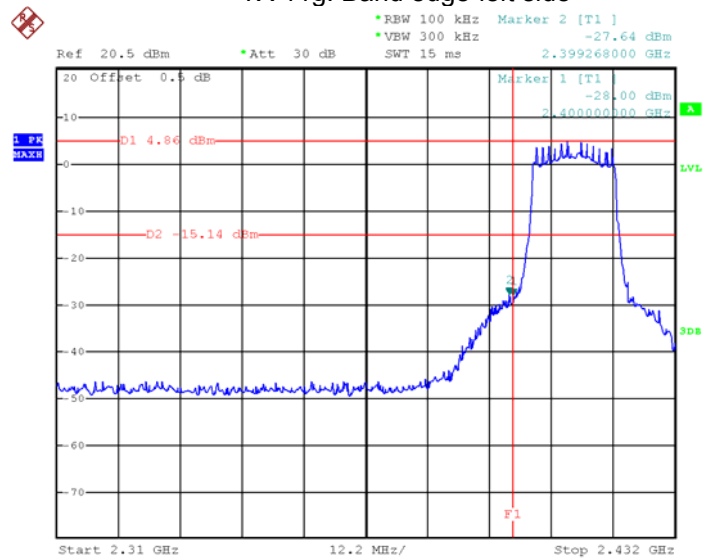
Date: 12.SEP.2018 02:56:17

TX 11b: Band edge-right side



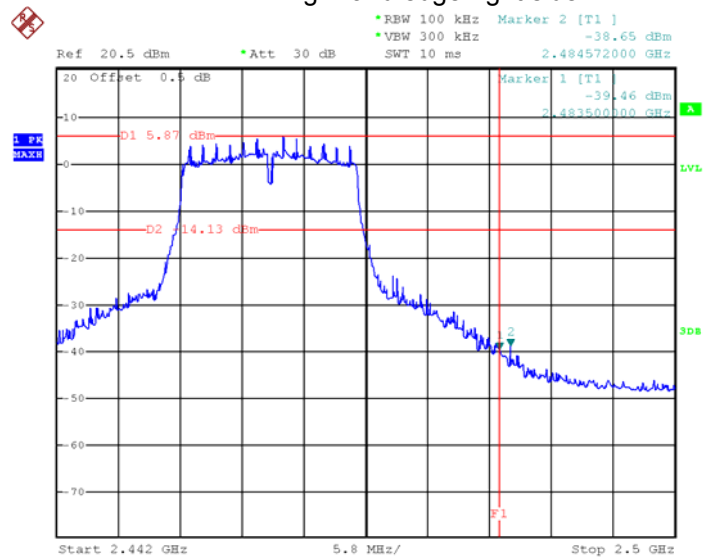
Date: 12.SEP.2018 03:03:52

TX 11g: Band edge-left side



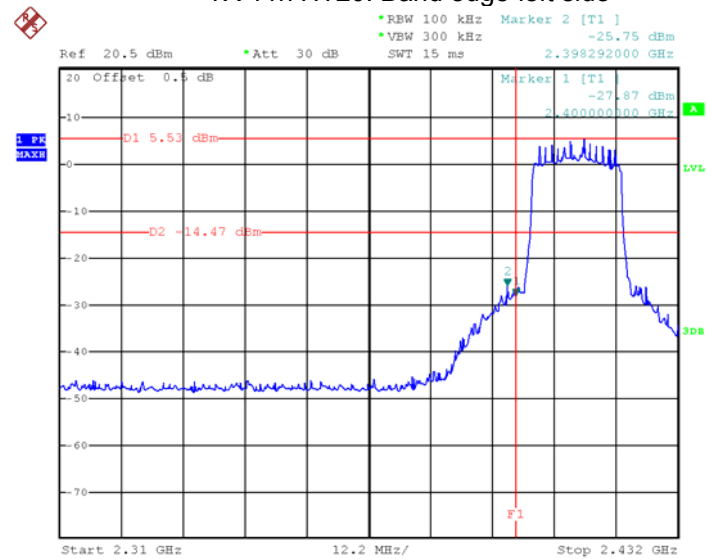
Date: 12.SEP.2018 02:57:28

TX 11g: Band edge-right side

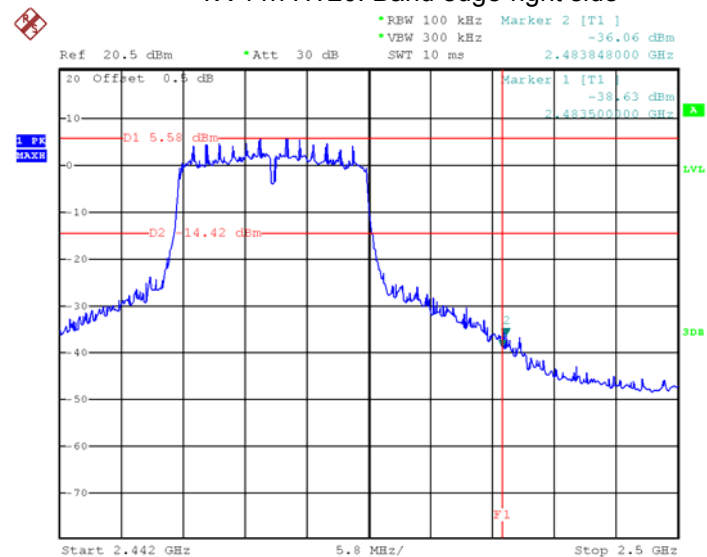


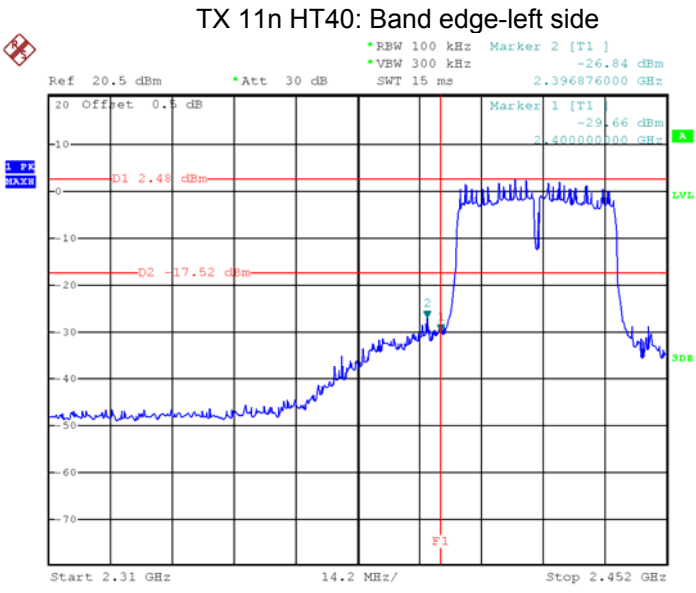
Date: 12.SEP.2018 03:02:34

TX 11n HT20: Band edge-left side

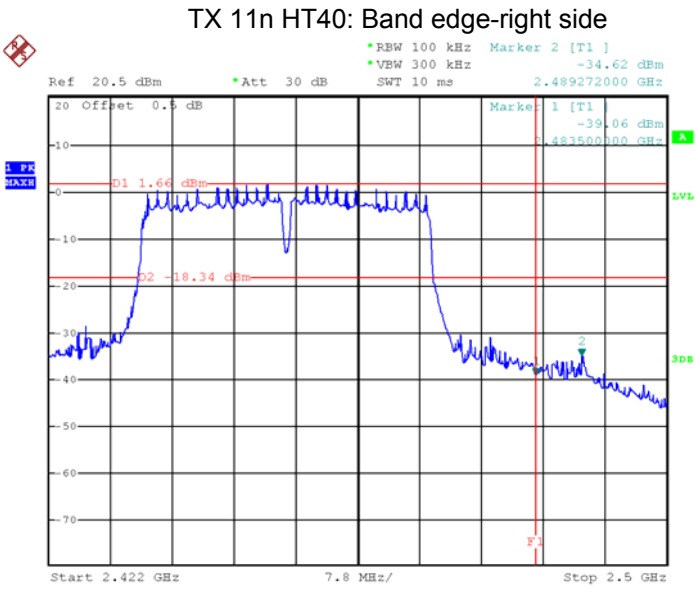


TX 11n HT20: Band edge-right side





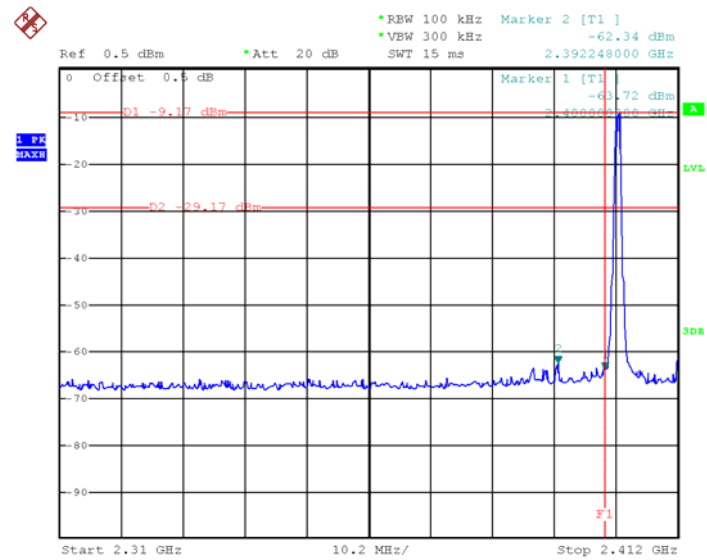
Date: 12.SEP.2018 02:48:08



Date: 12.SEP.2018 02:50:22

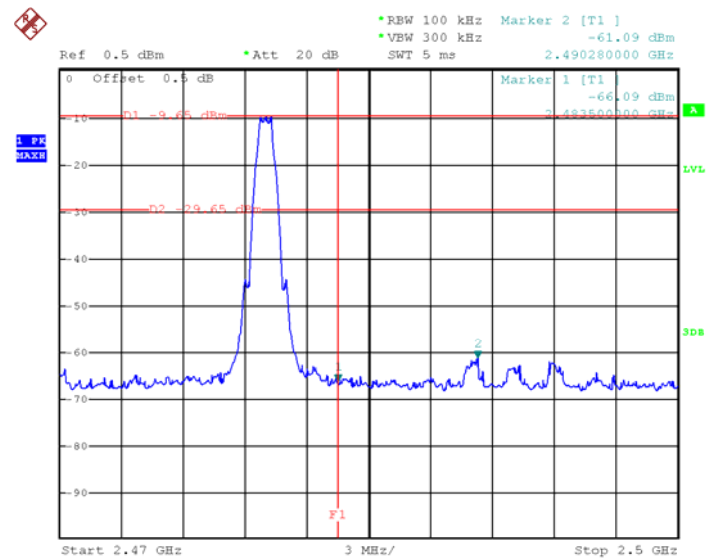
BLE :

Band edge-left side



Date: 12.SEP.2018 03:55:42

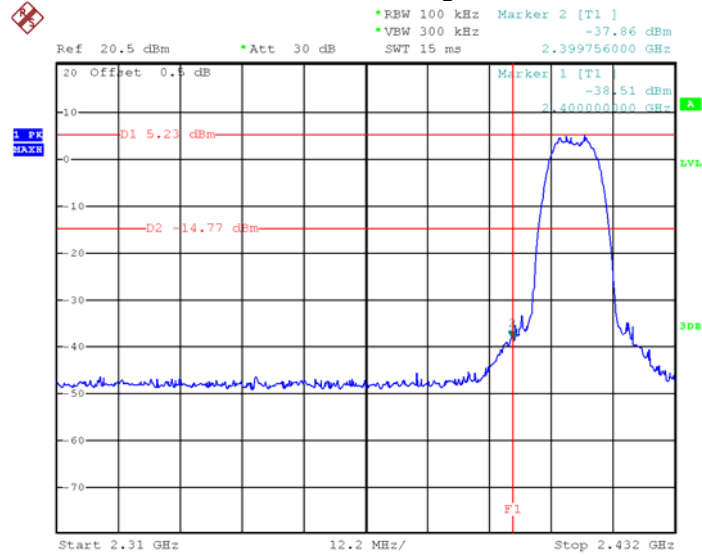
Band edge-right side



Date: 12.SEP.2018 03:56:55

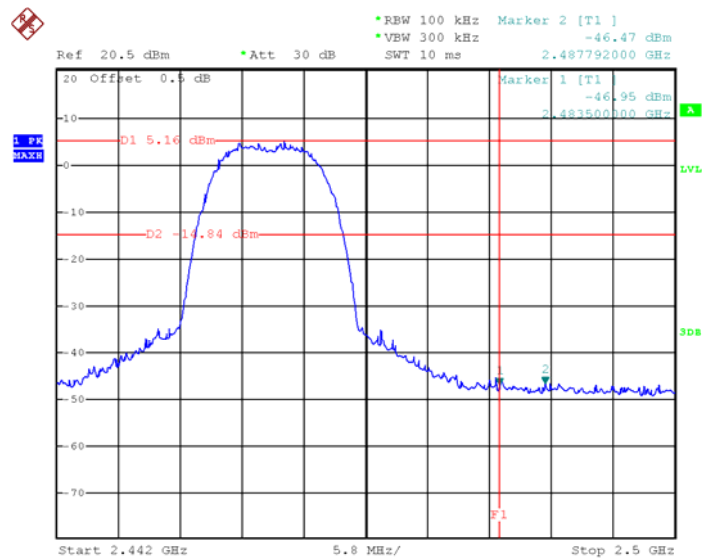
Module 2-ANT4:

TX 11b: Band edge-left side



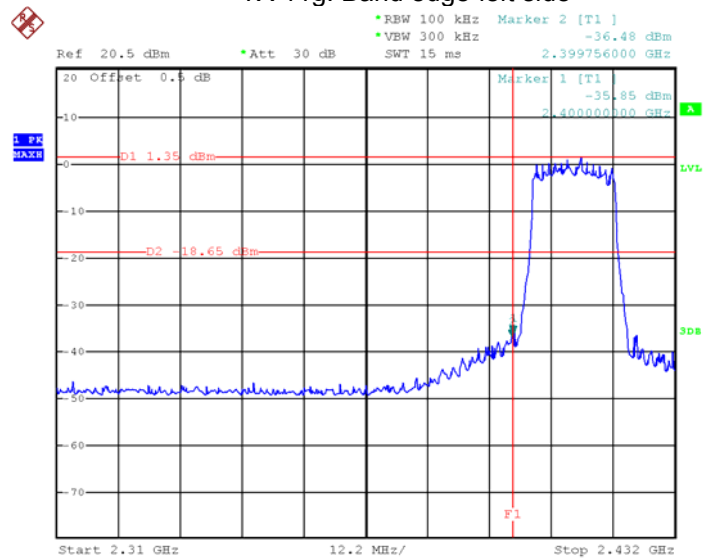
Date: 14.NOV.2018 22:08:34

TX 11b: Band edge-right side



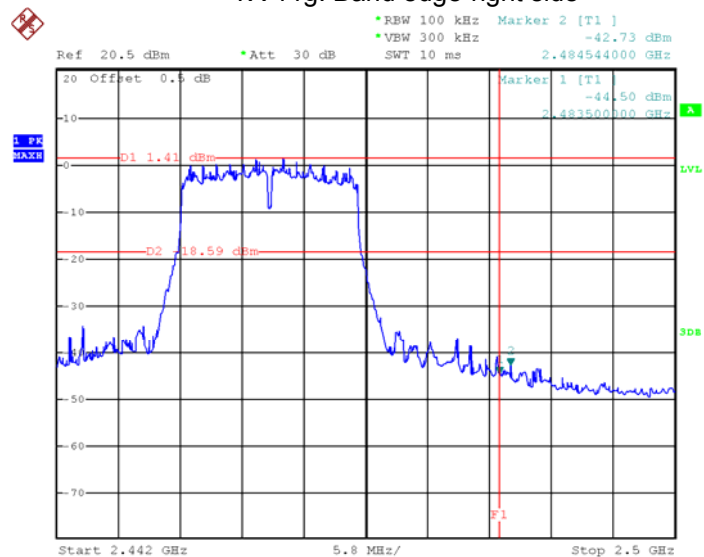
Date: 15.NOV.2018 00:11:35

TX 11g: Band edge-left side



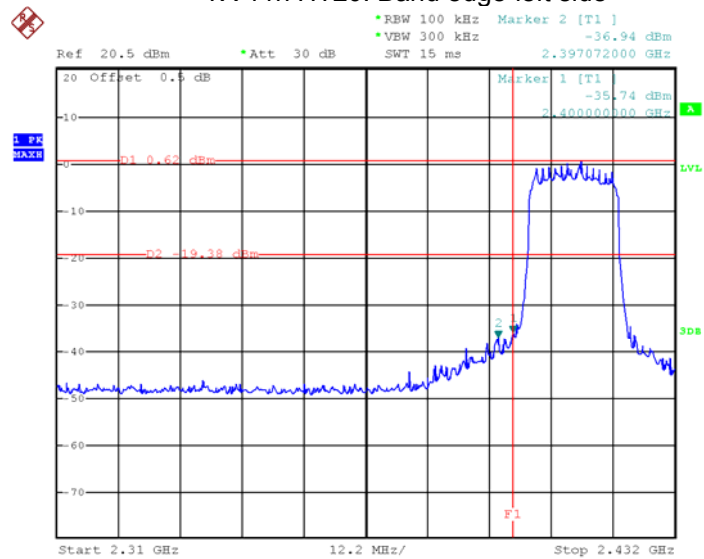
Date: 14.NOV.2018 23:47:38

TX 11g: Band edge-right side



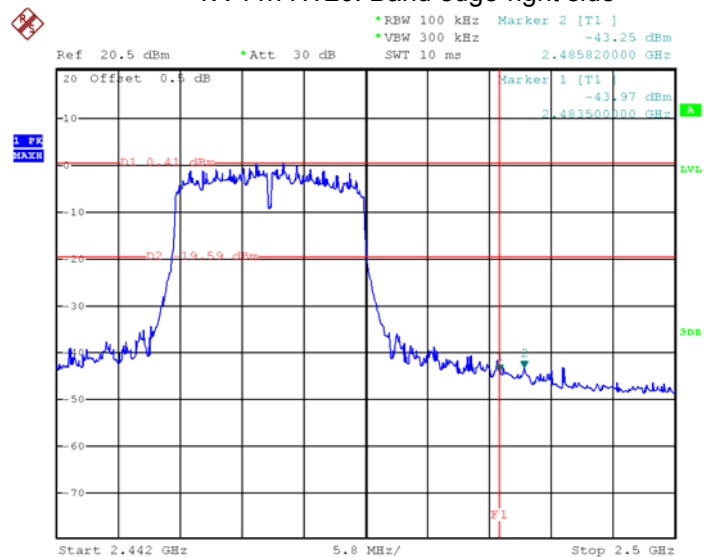
Date: 15.NOV.2018 00:09:03

TX 11n HT20: Band edge-left side



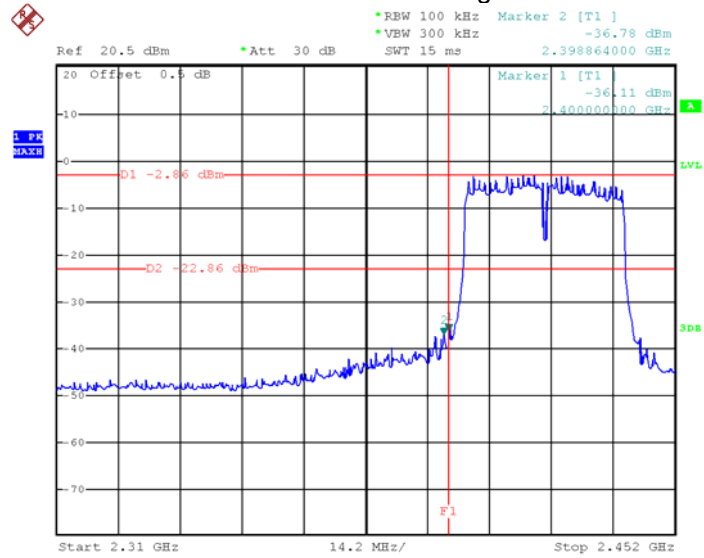
Date: 14.NOV.2018 23:50:25

TX 11n HT20: Band edge-right side



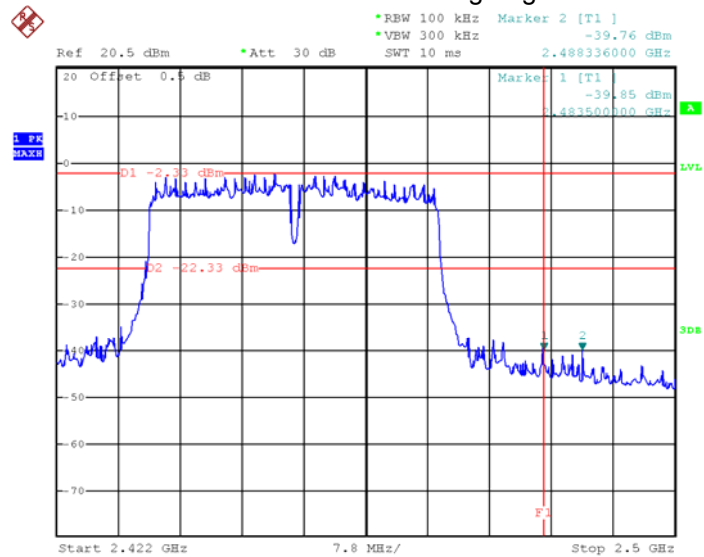
Date: 15.NOV.2018 00:06:20

TX 11n HT40: Band edge-left side



Date: 14.NOV.2018 23:53:35

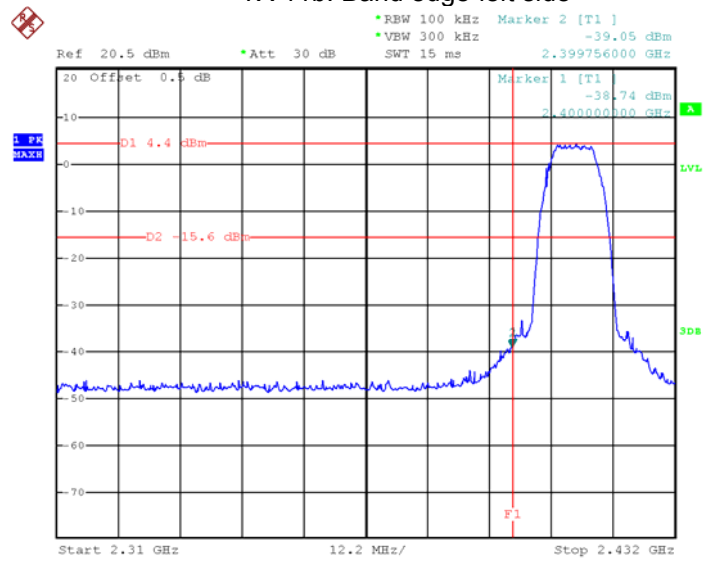
TX 11n HT40: Band edge-right side



Date: 15.NOV.2018 00:02:08

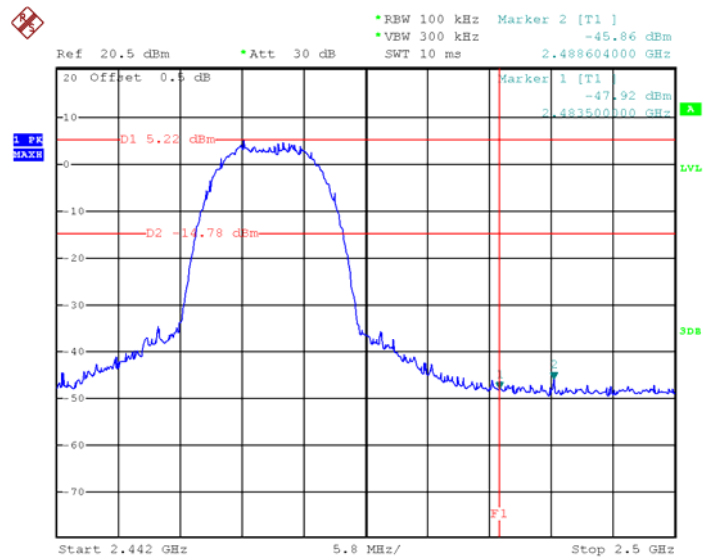
Module 2-ANT5:

TX 11b: Band edge-left side



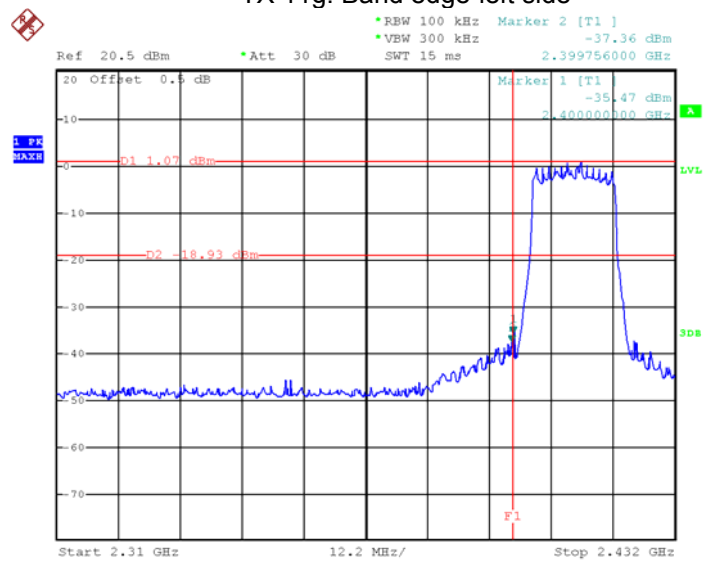
Date: 14.NOV.2018 23:46:29

TX 11b: Band edge-right side



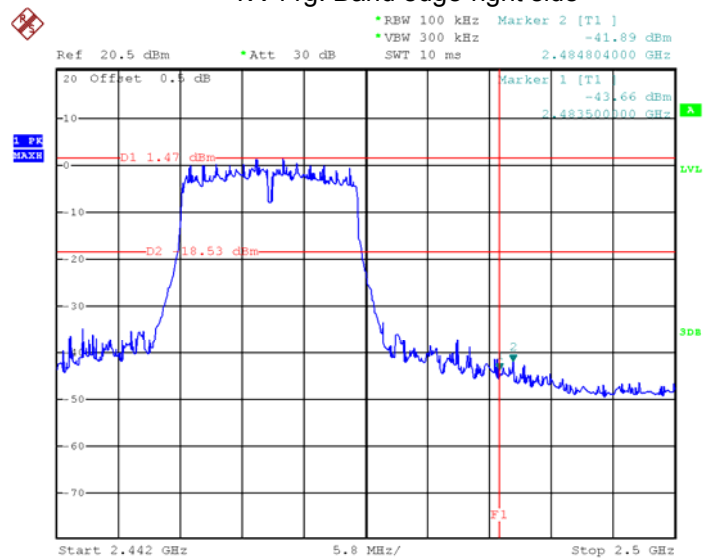
Date: 15.NOV.2018 00:12:26

TX 11g: Band edge-left side



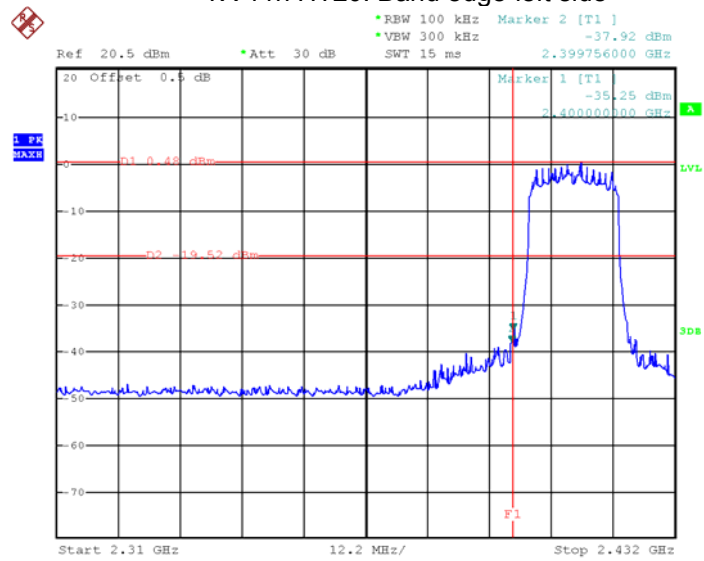
Date: 14.NOV.2018 23:48:28

TX 11g: Band edge-right side



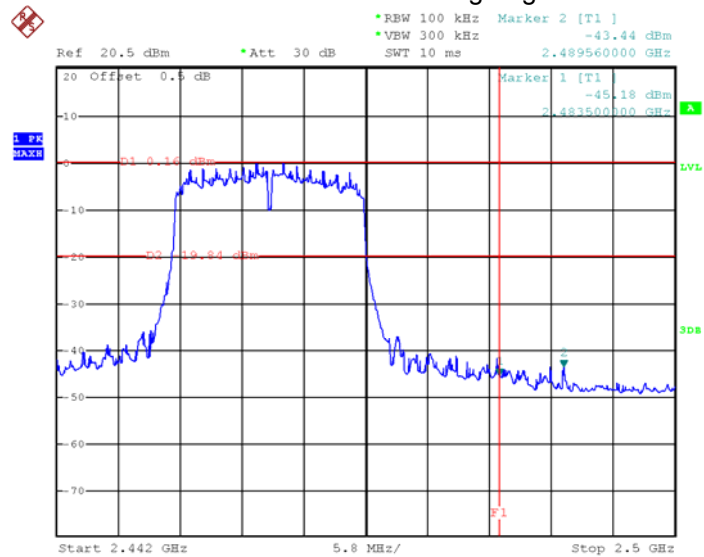
Date: 15.NOV.2018 00:10:00

TX 11n HT20: Band edge-left side



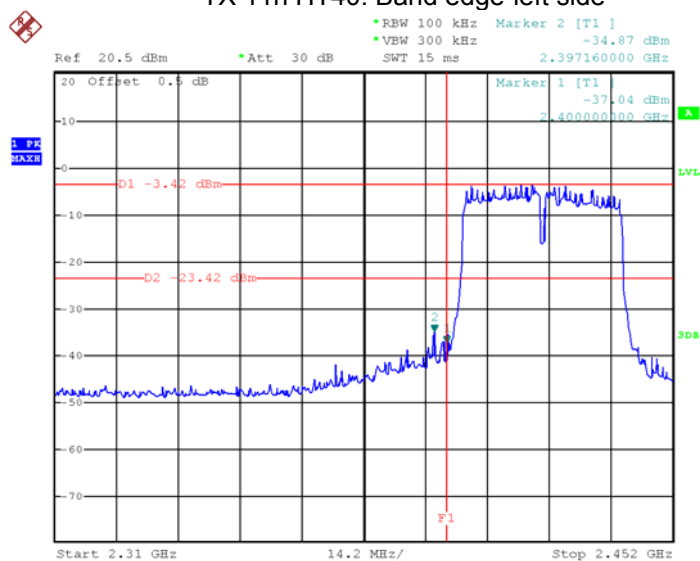
Date: 14.NOV.2018 23:51:18

TX 11n HT20: Band edge-right side



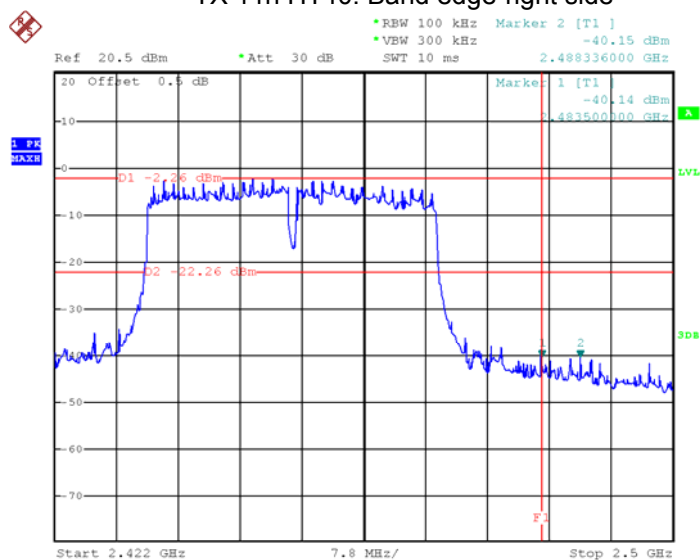
Date: 15.NOV.2018 00:07:37

TX 11n HT40: Band edge-left side



Date: 14.NOV.2018 23:55:34

TX 11n HT40: Band edge-right side



Date: 15.NOV.2018 00:03:23

10 Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

558074 D01 15.247 Meas Guidance v05

10.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

10.2 Test Result:

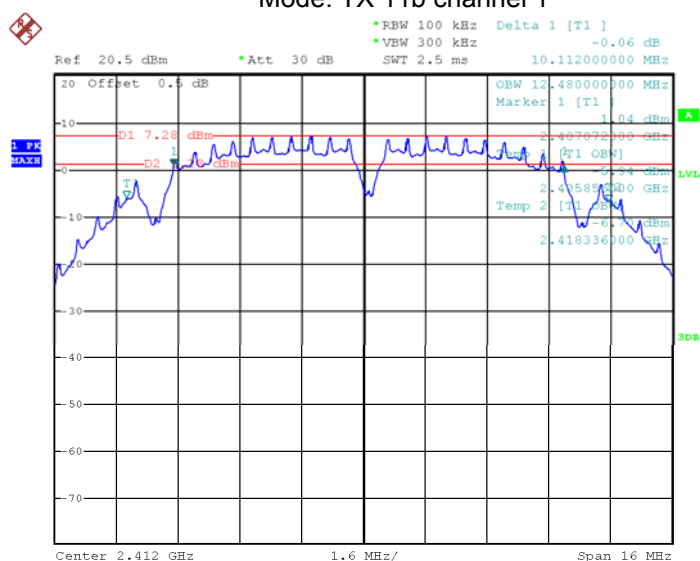
Module 1-ANT1						
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.112	10.112	10.112	12.480	12.352	12.288
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.350	16.300	16.350	16.550	16.500	16.550
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.322	17.334	17.550	17.658	17.658	17.658
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	35.640	35.640	35.610	36.190	36.080	36.080
Module 1-ANT2						
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.112	10.080	10.112	12.256	12.192	12.160
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.350	16.350	16.338	16.500	16.450	16.500
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.326	17.334	17.334	17.658	17.604	17.658
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	35.750	35.640	35.720	35.970	35.860	35.970

Module 1-BLE		
Operation mode	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low channel	0.720	1.062
Middle channel	0.720	1.062
High channel	0.720	1.062

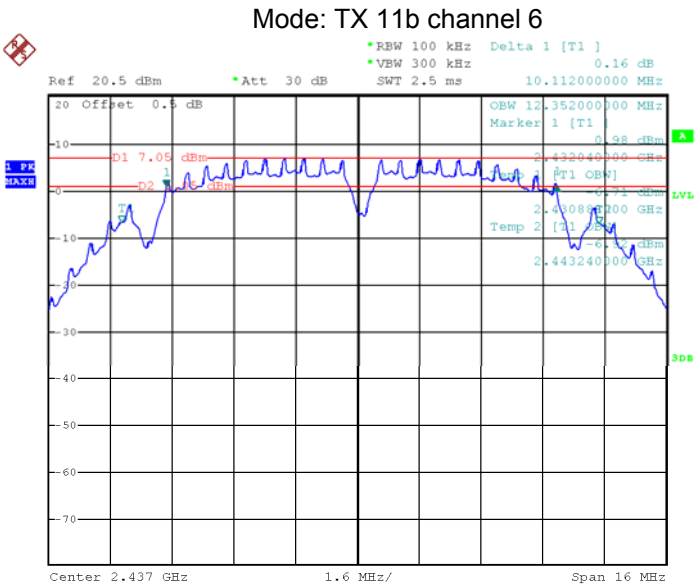
Module 2-ANT4						
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	9.760	10.088	10.270	12.064	12.096	12.032
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.450	16.500	16.400	16.400	16.400	16.400
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.334	17.280	17.334	17.550	17.496	17.496
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	35.970	36.040	36.000	35.970	36.080	35.970
Module 2-ANT5						
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.016	10.120	10.176	12.128	12.096	12.064
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.400	16.400	16.028	16.400	16.400	16.400
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.226	17.334	17.280	17.496	17.496	17.550
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	36.410	36.040	36.080	36.080	35.970	36.080

Module 1-ANT1

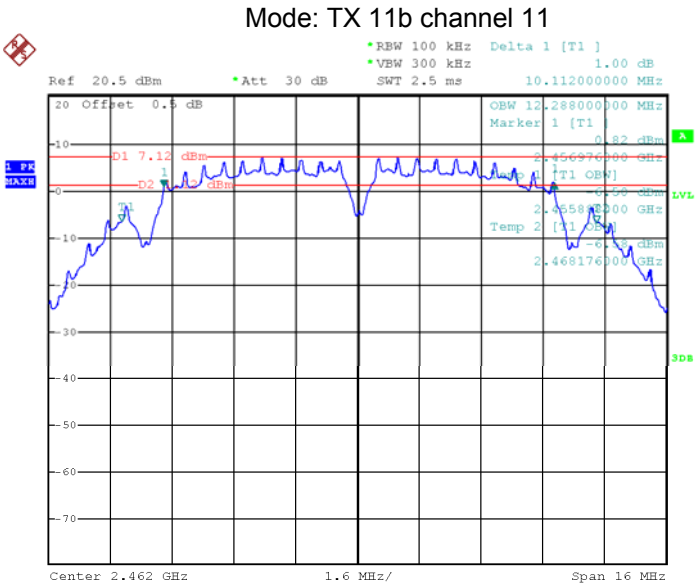
Mode: TX 11b channel 1



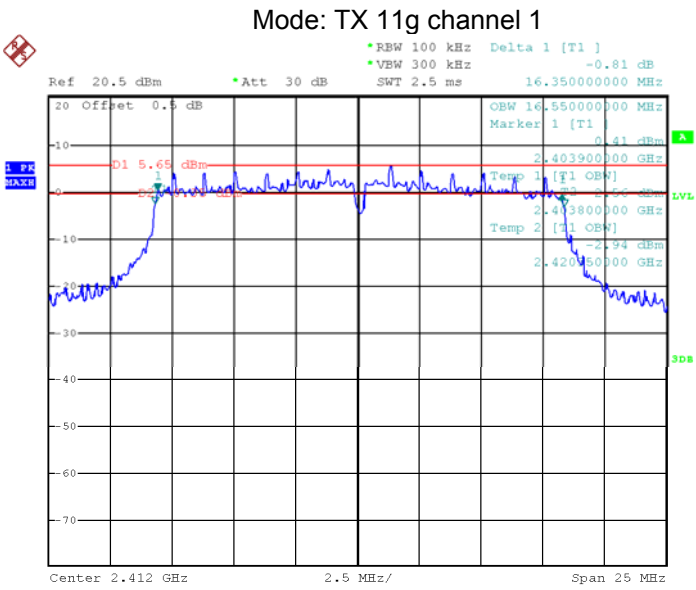
Date: 9.SEP.2018 20:30:01



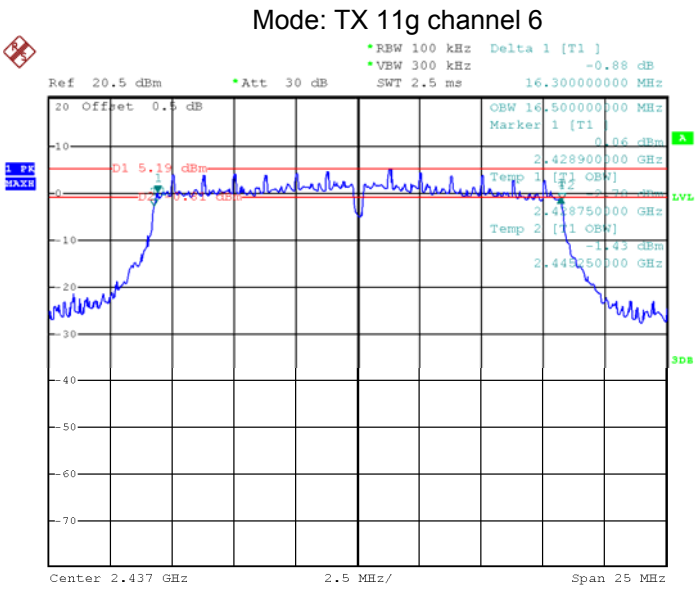
Date: 9.SEP.2018 20:34:42



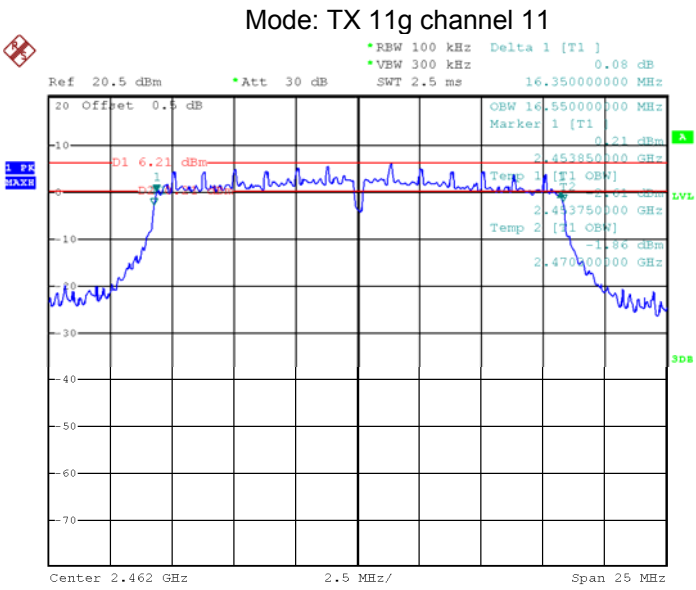
Date: 9.SEP.2018 20:36:47



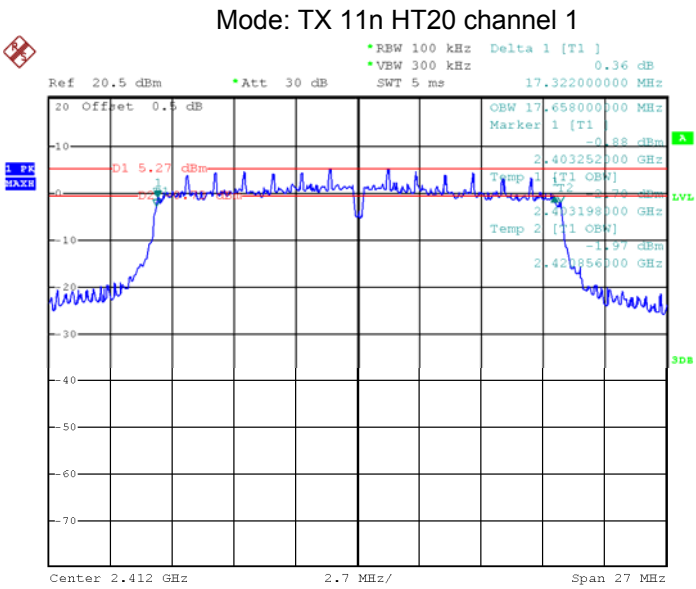
Date: 11.SEP.2018 21:39:56



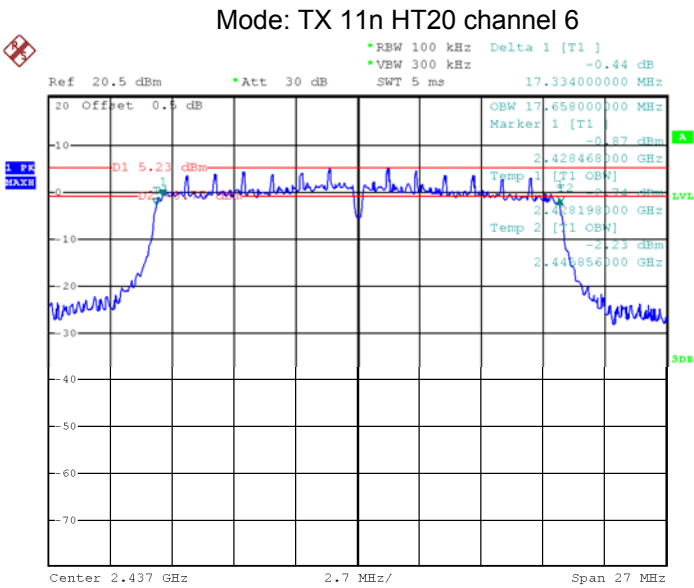
Date: 9.SEP.2018 20:45:09



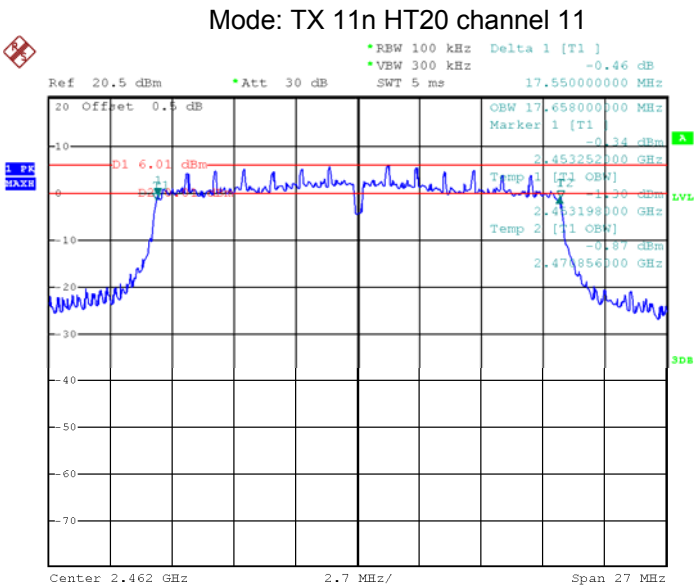
Date: 9.SEP.2018 20:42:05



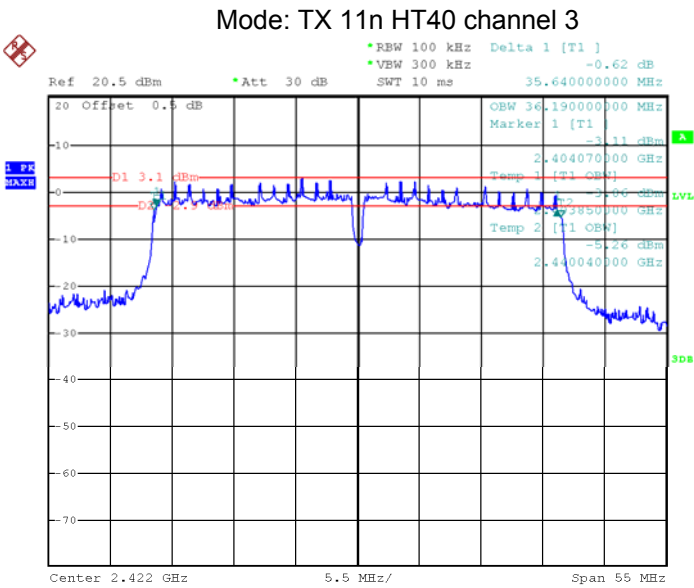
Date: 11.SEP.2018 21:43:01



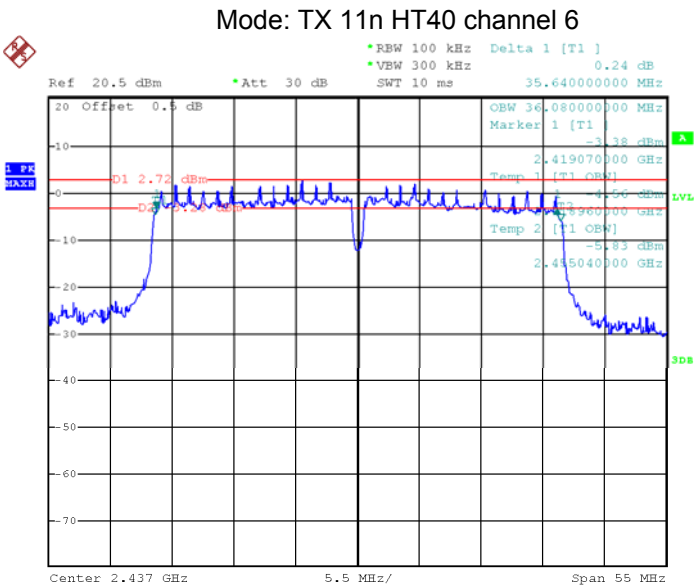
Date: 11.SEP.2018 21:44:52



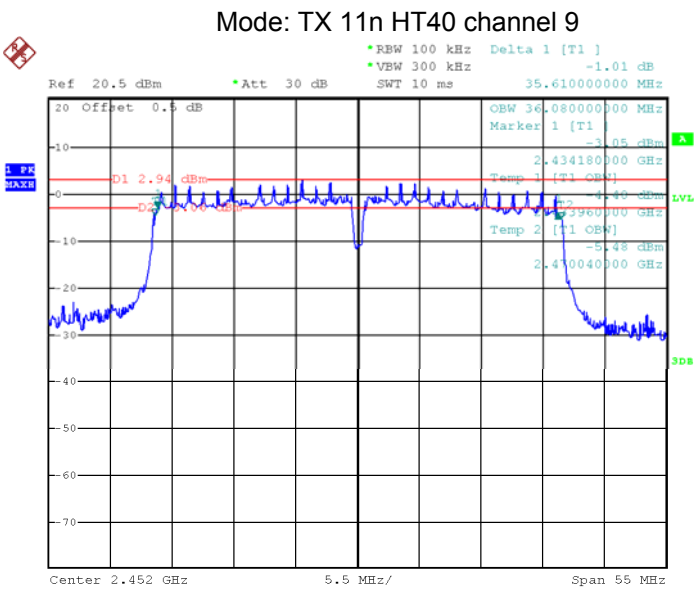
Date: 11.SEP.2018 21:47:47



Date: 11.SEP.2018 21:55:32



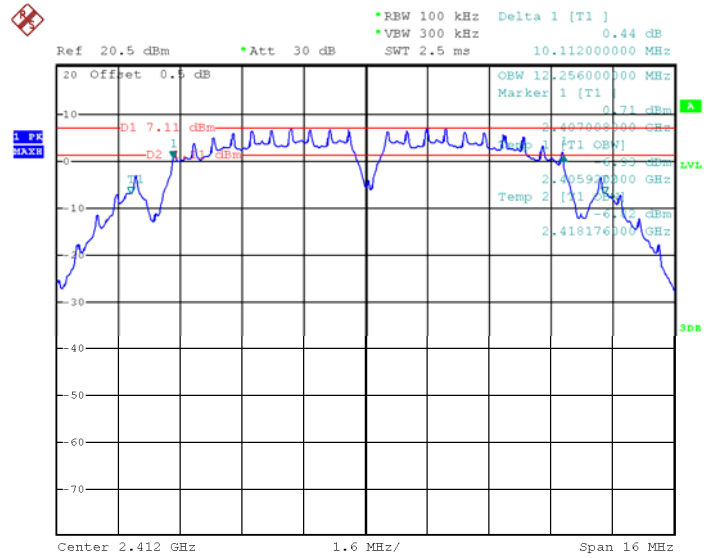
Date: 11.SEP.2018 21:53:31



Date: 11.SEP.2018 21:50:42

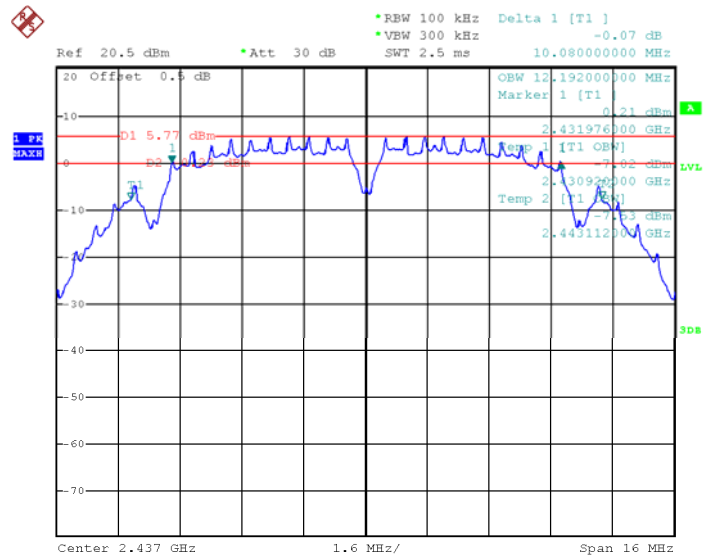
Module 1-ANT2

Mode: TX 11b channel 1

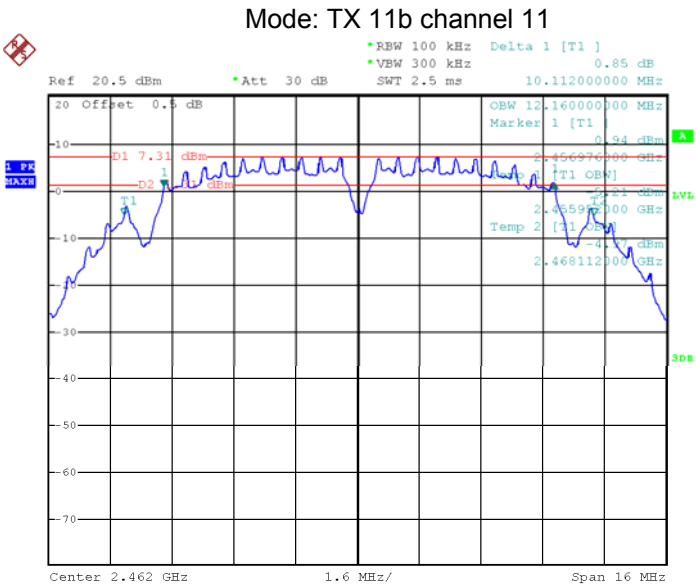


Date: 12.SEP.2018 01:33:57

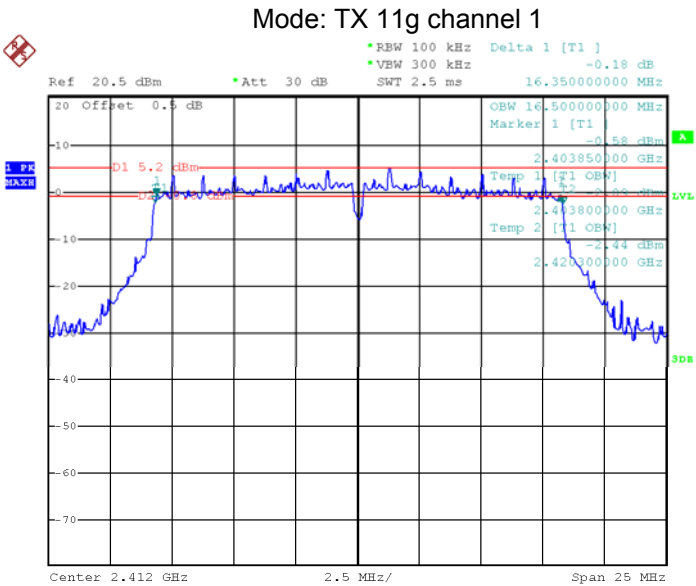
Mode: TX 11b channel 6



Date: 12.SEP.2018 01:35:24

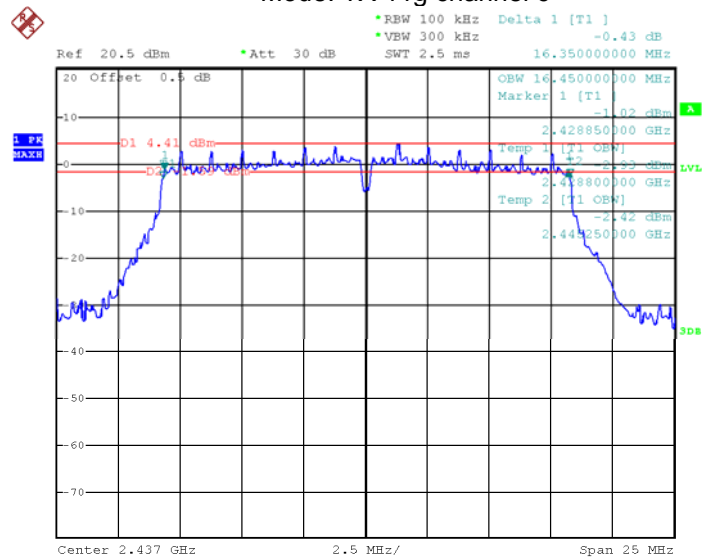


Date: 12.SEP.2018 01:37:36



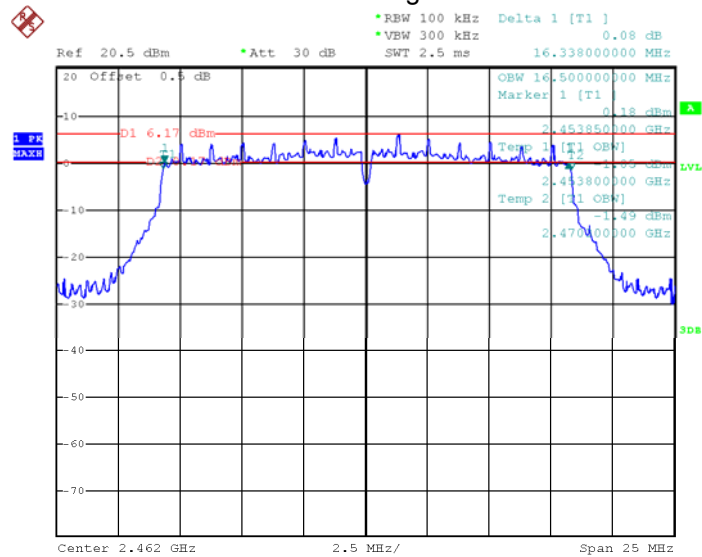
Date: 12.SEP.2018 01:44:23

Mode: TX 11g channel 6

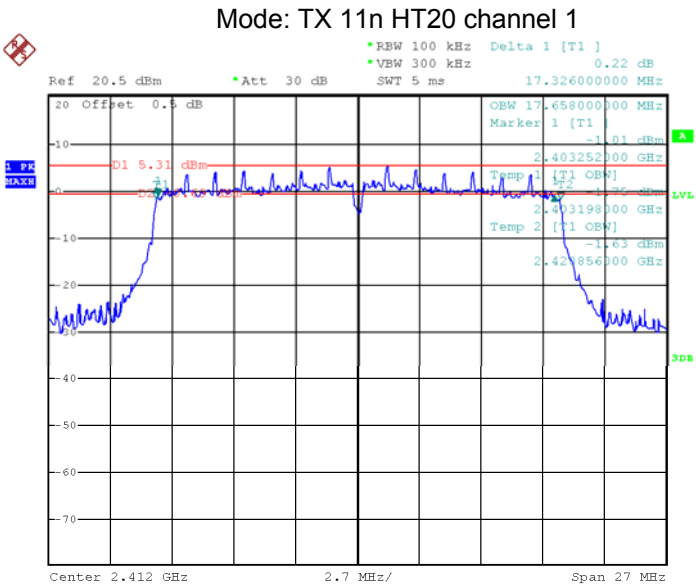


Date: 12.SEP.2018 01:42:18

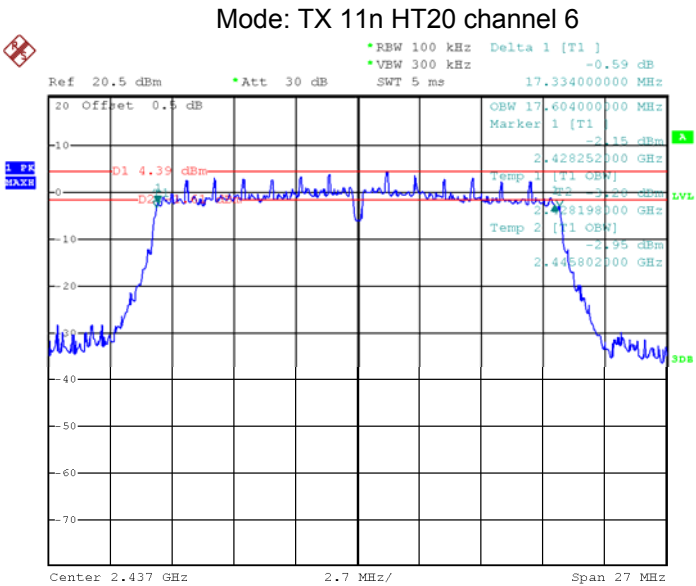
Mode: TX 11g channel 11



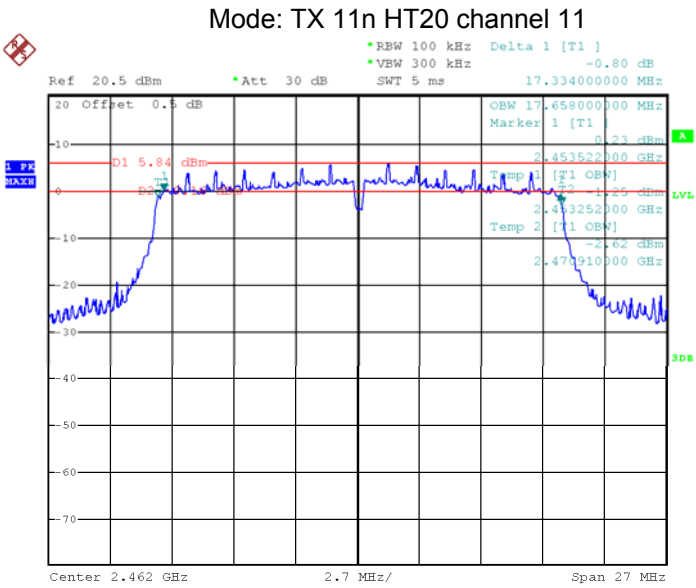
Date: 12.SEP.2018 01:39:58



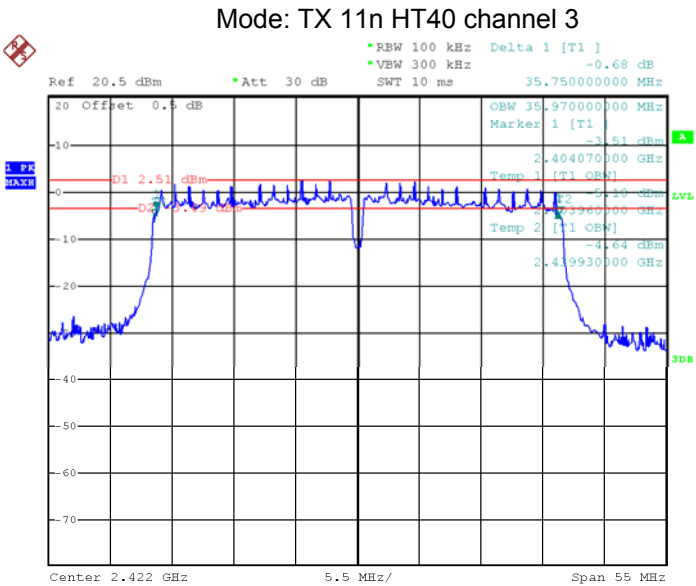
Date: 12.SEP.2018 01:48:01



Date: 12.SEP.2018 01:52:18

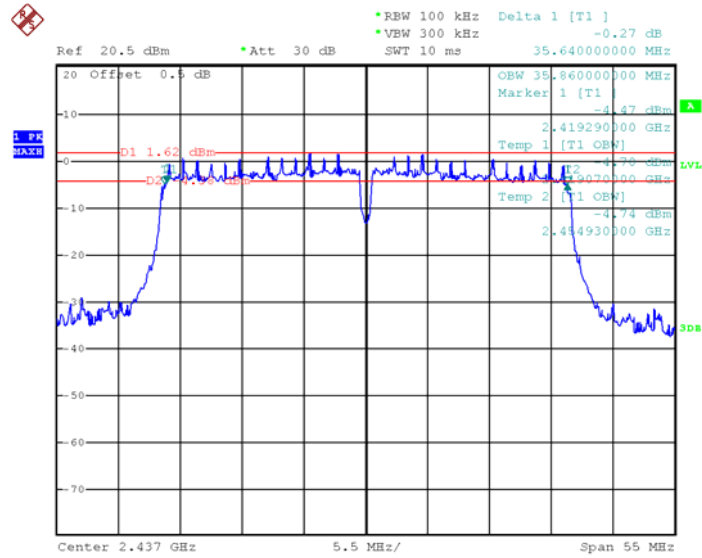


Date: 12.SEP.2018 02:05:03



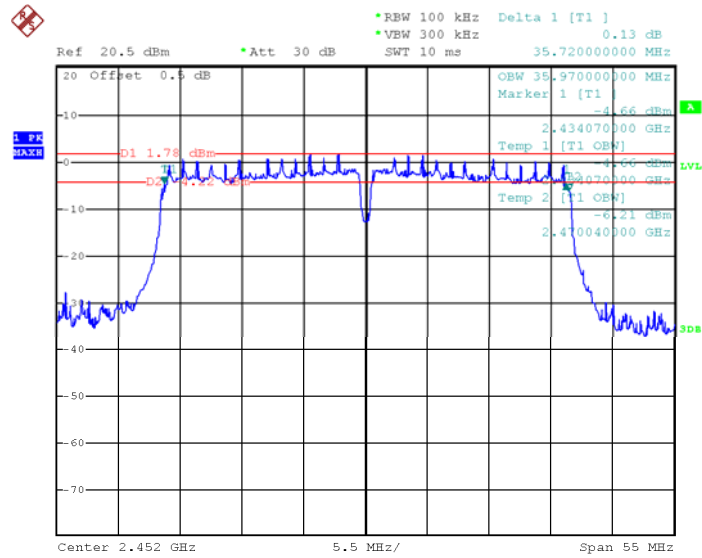
Date: 12.SEP.2018 02:12:58

Mode: TX 11n HT40 channel 6



Date: 12.SEP.2018 02:11:22

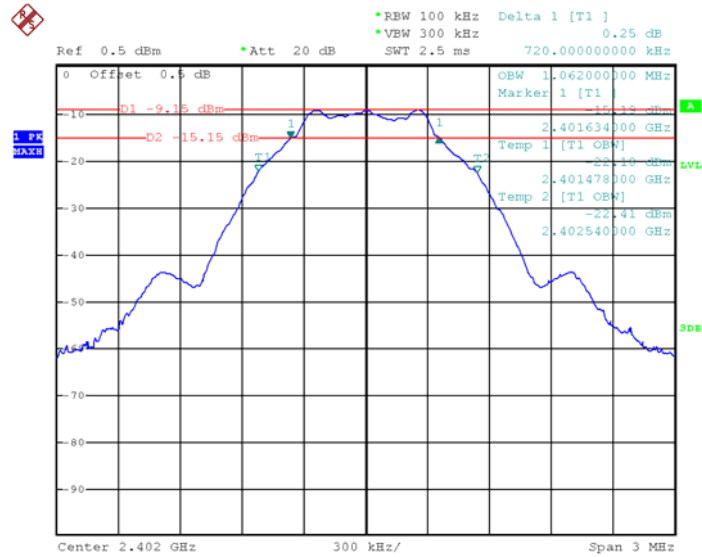
Mode: TX 11n HT40 channel 9



Date: 12.SEP.2018 02:07:37

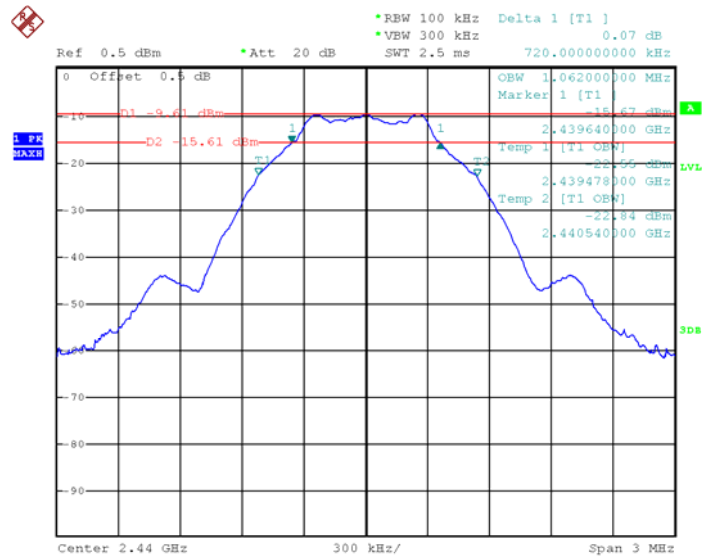
BLE:

Mode: Low channel



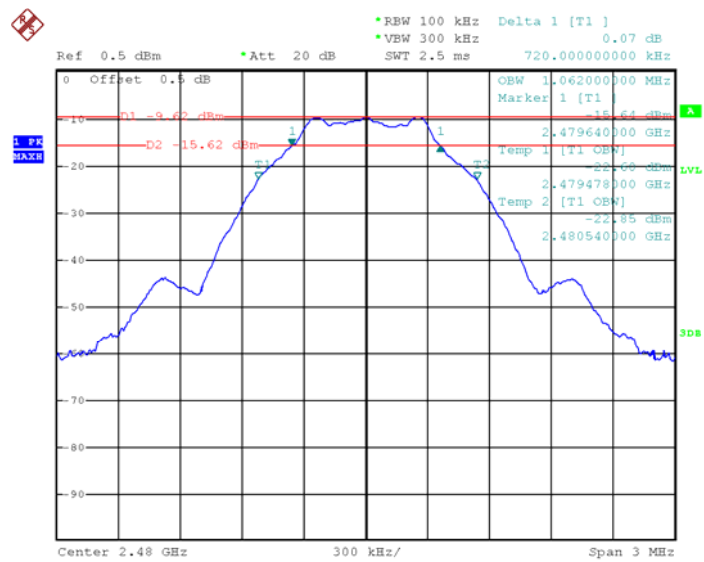
Date: 12.SEP.2018 04:07:00

Mode: Middle channel



Date: 12.SEP.2018 04:02:39

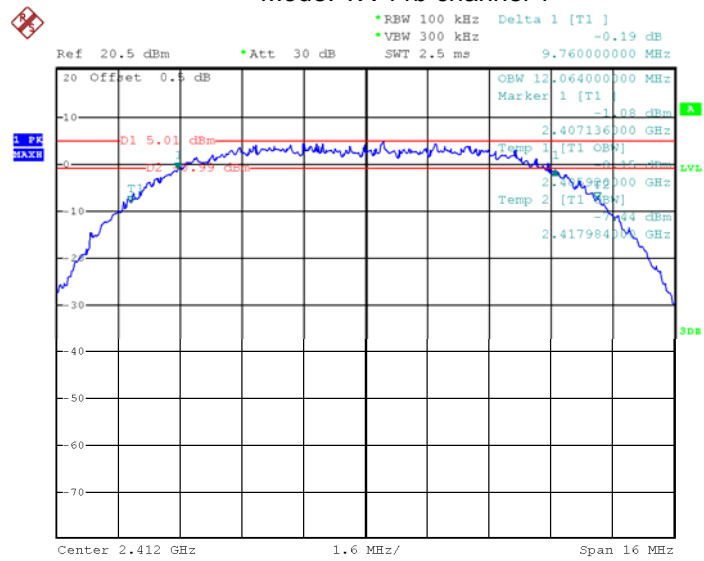
Mode: High channel



Date: 12.SEP.2018 04:00:51

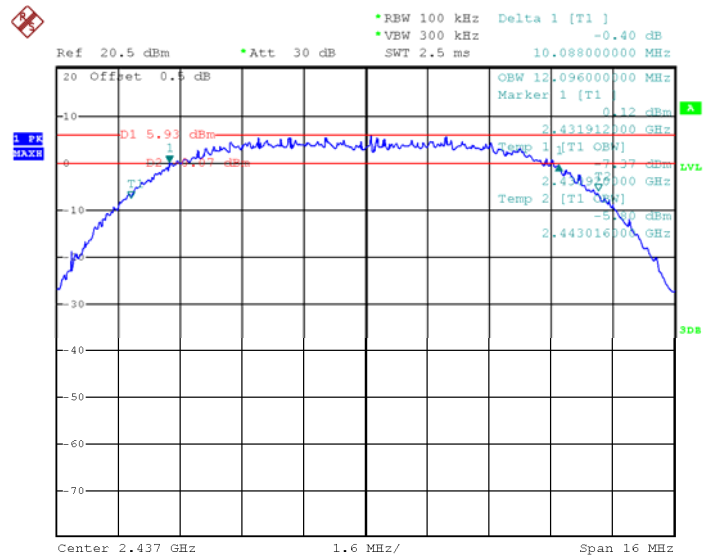
Module 2-ANT4

Mode: TX 11b channel 1

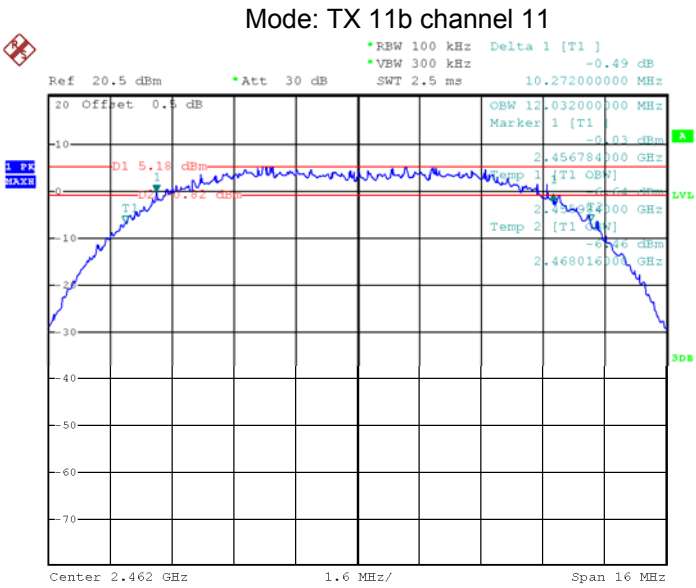


Date: 9.NOV.2018 00:24:37

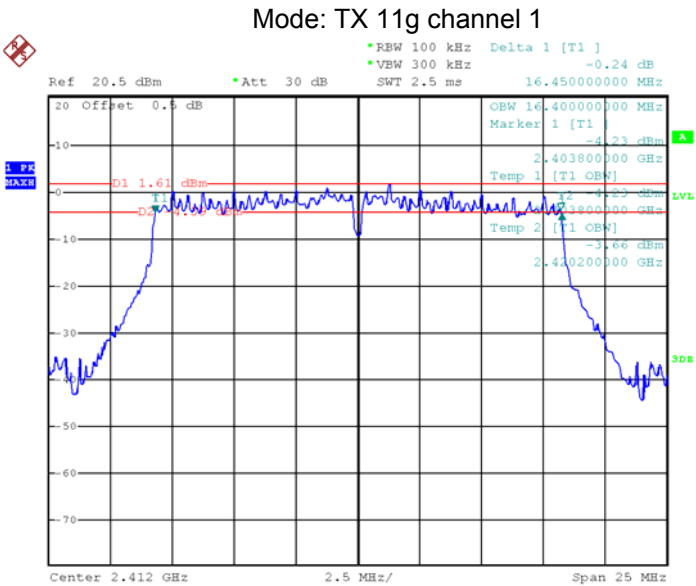
Mode: TX 11b channel 6



Date: 9.NOV.2018 00:19:43

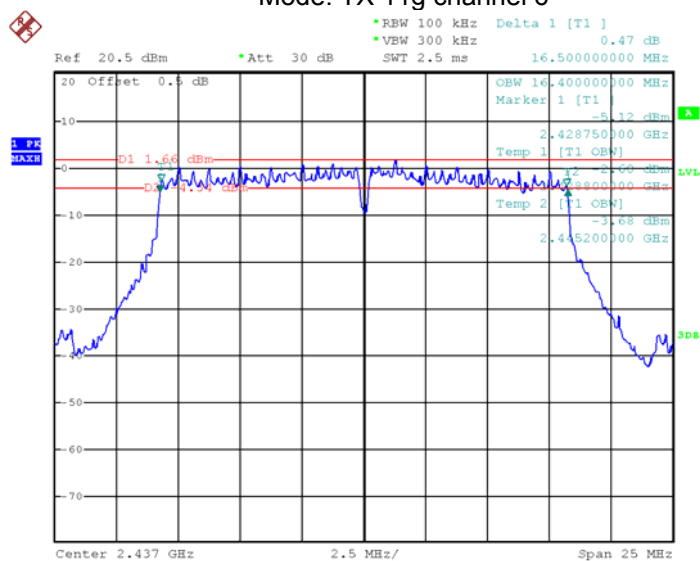


Date: 9.NOV.2018 00:26:13



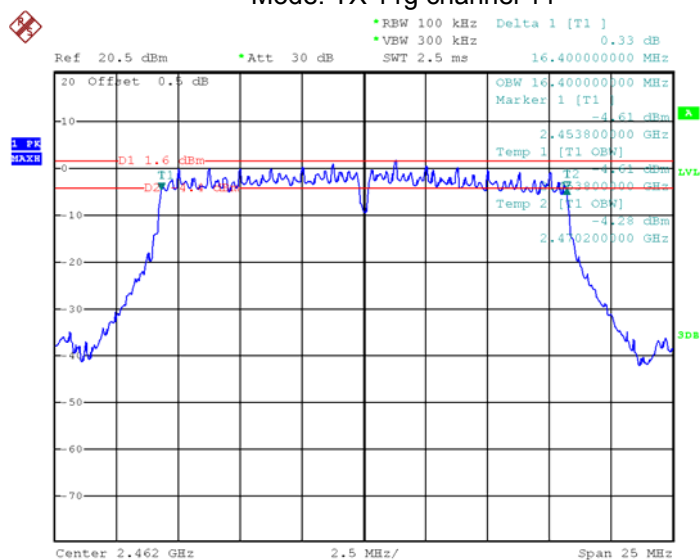
Date: 9.NOV.2018 00:32:11

Mode: TX 11g channel 6



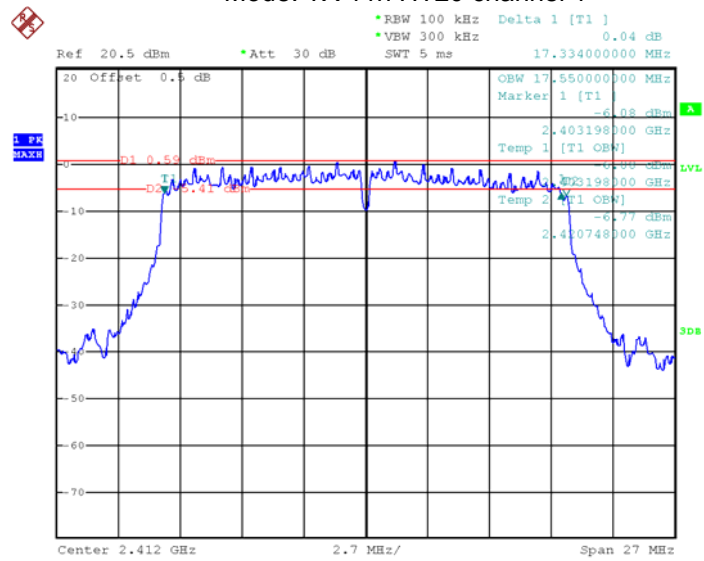
Date: 8.NOV.2018 23:59:14

Mode: TX 11g channel 11



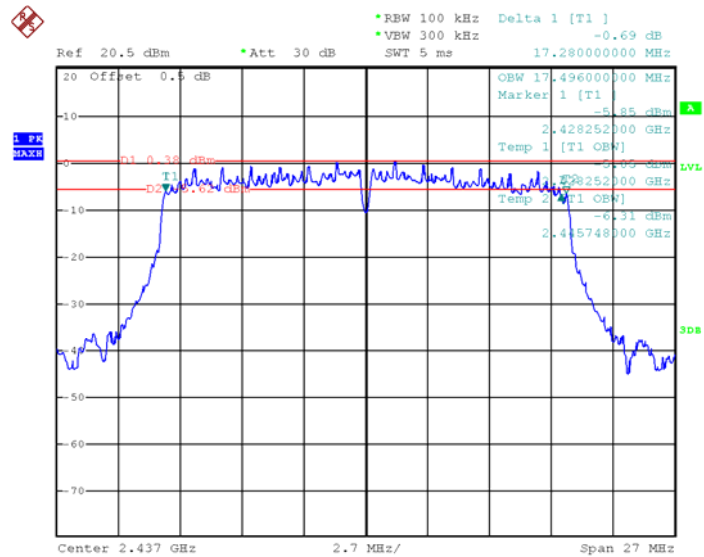
Date: 8.NOV.2018 23:57:28

Mode: TX 11n HT20 channel 1



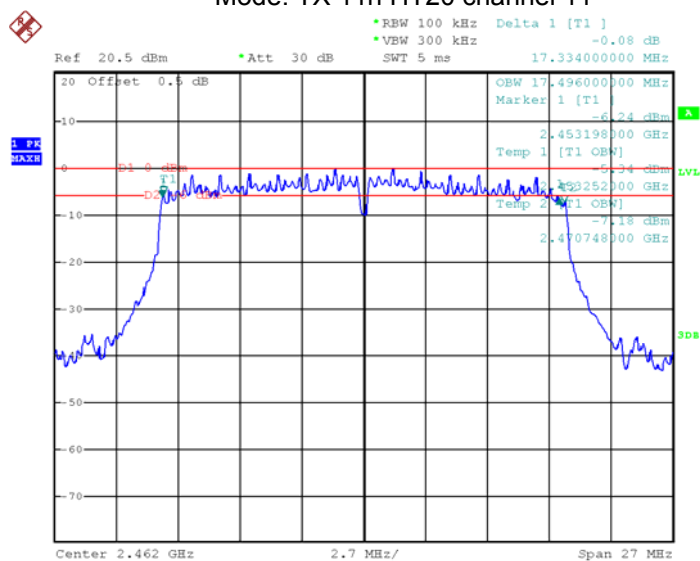
Date: 8.NOV.2018 23:46:46

Mode: TX 11n HT20 channel 6



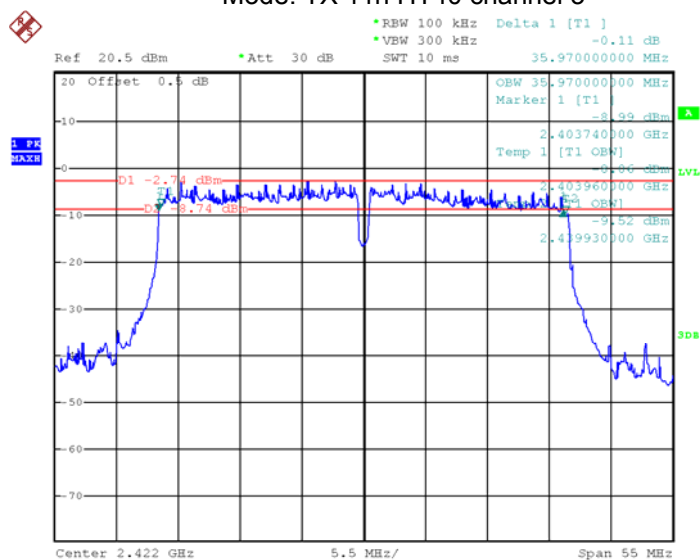
Date: 8.NOV.2018 23:51:34

Mode: TX 11n HT20 channel 11



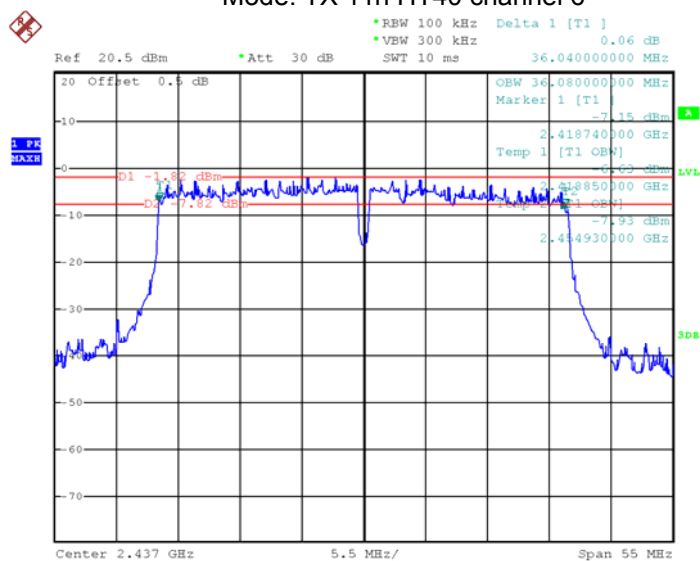
Date: 8.NOV.2018 23:53:10

Mode: TX 11n HT40 channel 3



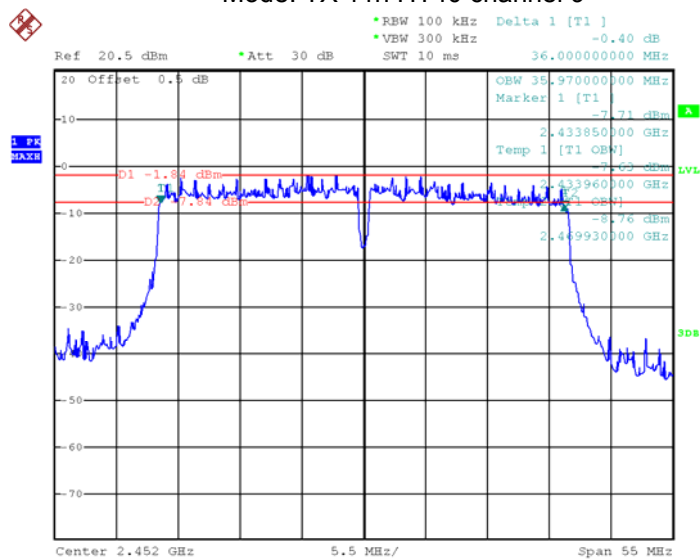
Date: 8.NOV.2018 21:49:48

Mode: TX 11n HT40 channel 6



Date: 8.NOV.2018 22:04:14

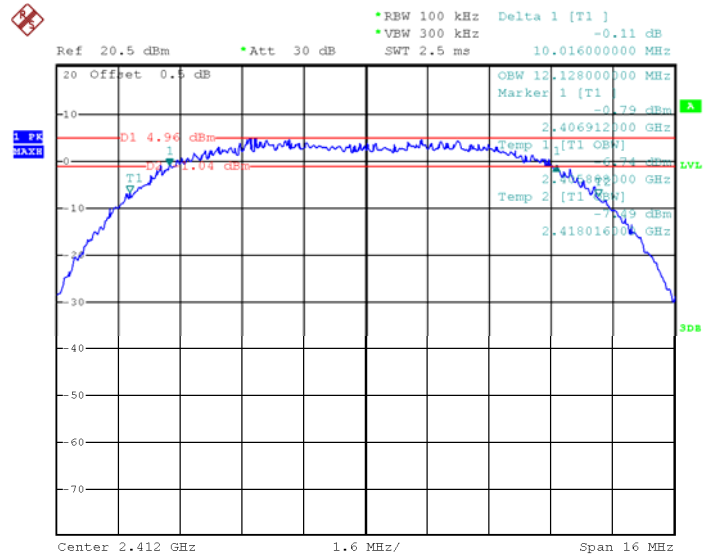
Mode: TX 11n HT40 channel 9



Date: 8.NOV.2018 22:07:23

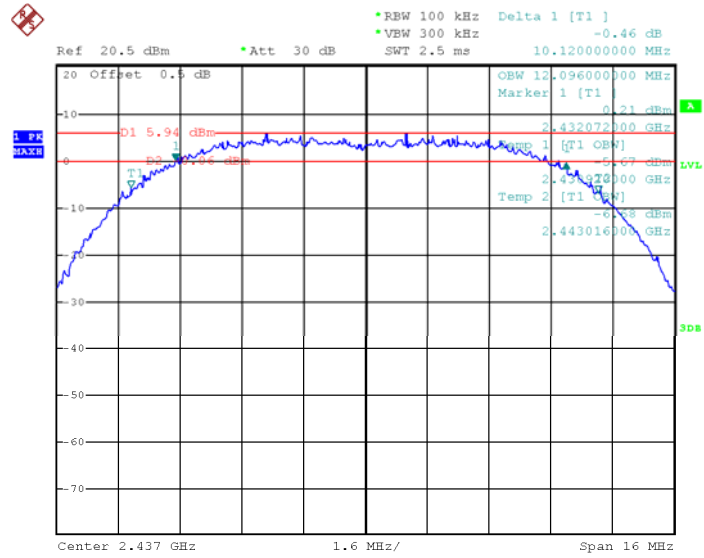
Module 2-ANT5

Mode: TX 11b channel 1

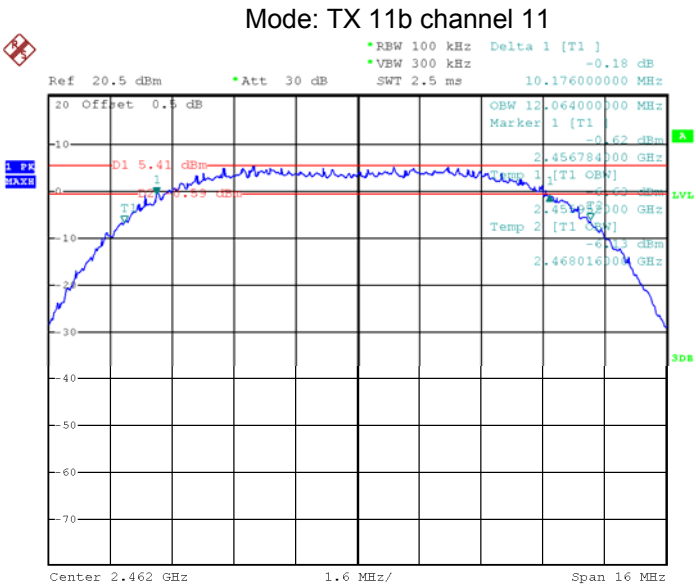


Date: 9.NOV.2018 00:22:40

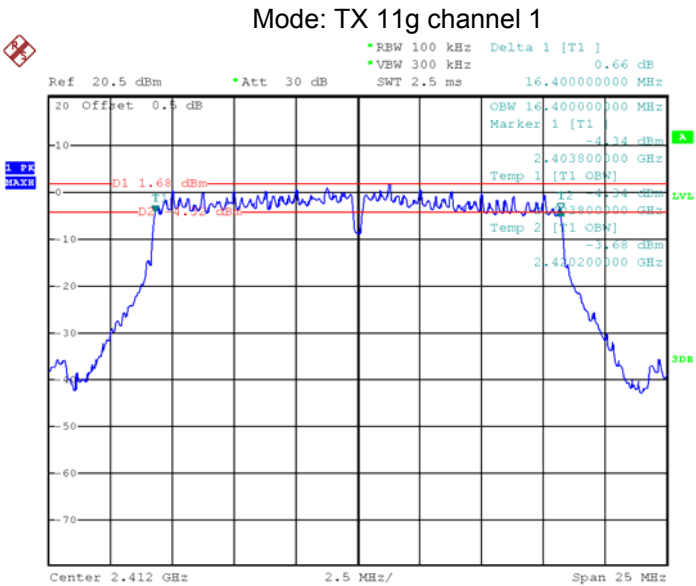
Mode: TX 11b channel 6



Date: 9.NOV.2018 00:20:50

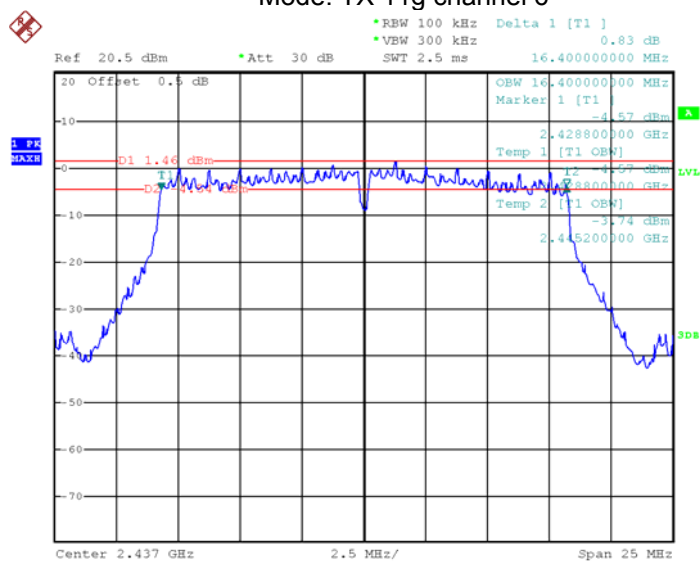


Date: 9.NOV.2018 00:27:24



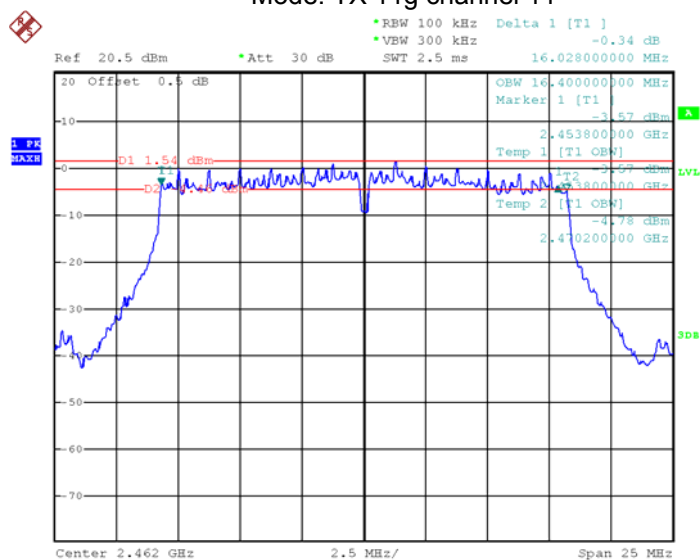
Date: 9.NOV.2018 00:33:29

Mode: TX 11g channel 6



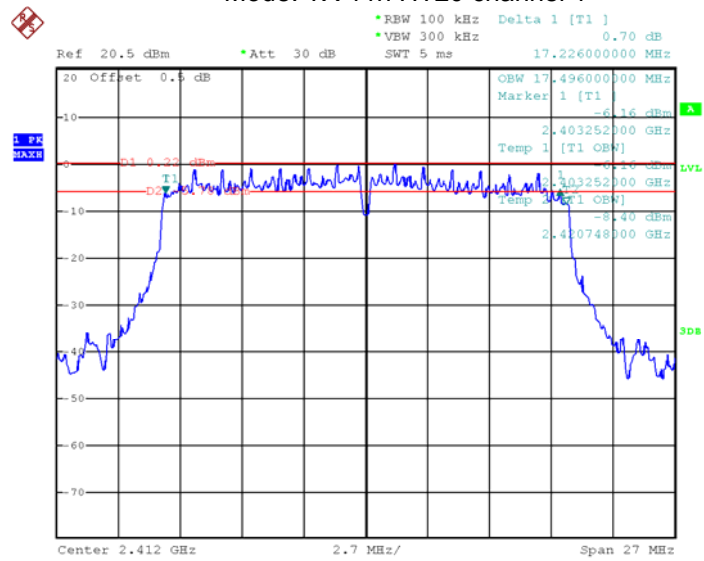
Date: 9.NOV.2018 00:00:52

Mode: TX 11g channel 11



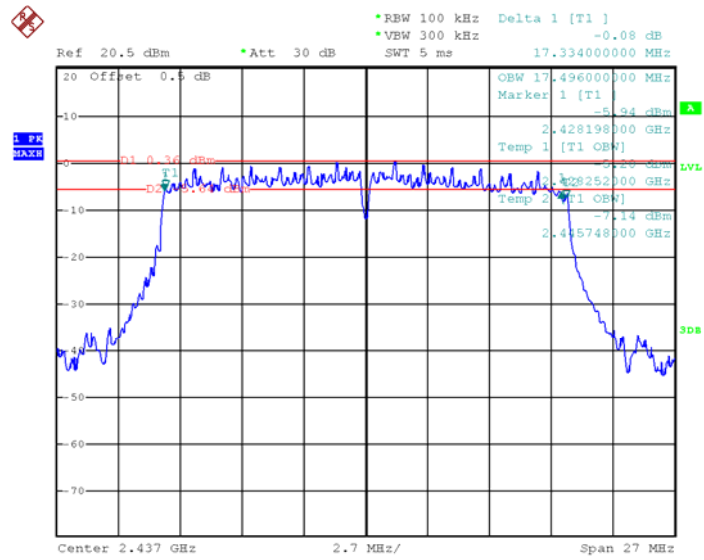
Date: 8.NOV.2018 23:56:09

Mode: TX 11n HT20 channel 1

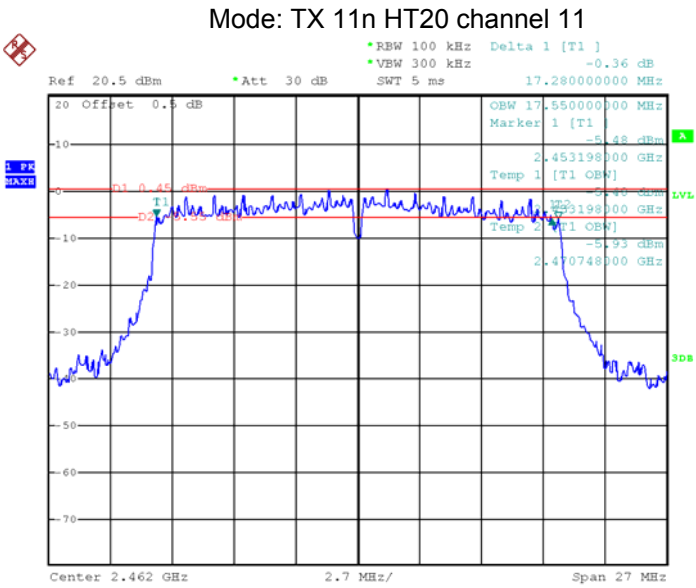


Date: 8.NOV.2018 23:47:50

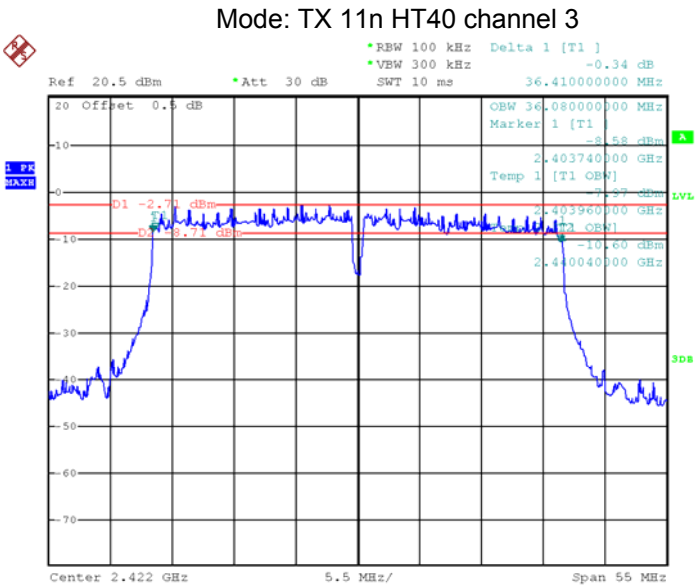
Mode: TX 11n HT20 channel 6



Date: 8.NOV.2018 23:50:04

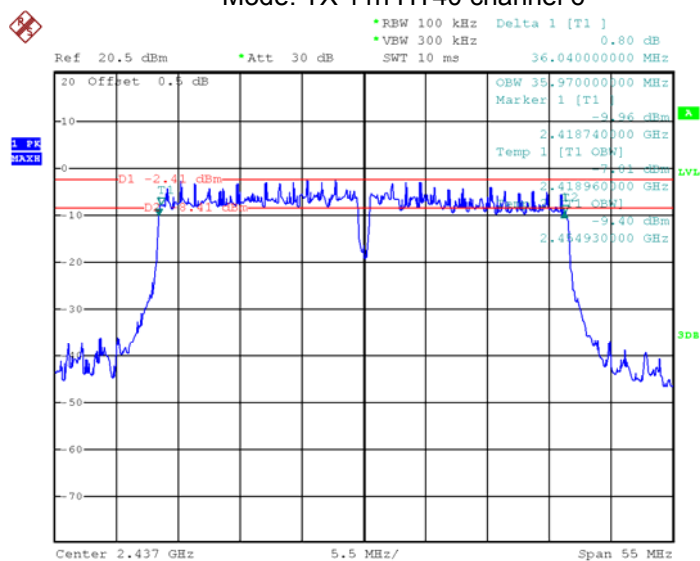


Date: 8.NOV.2018 23:54:29



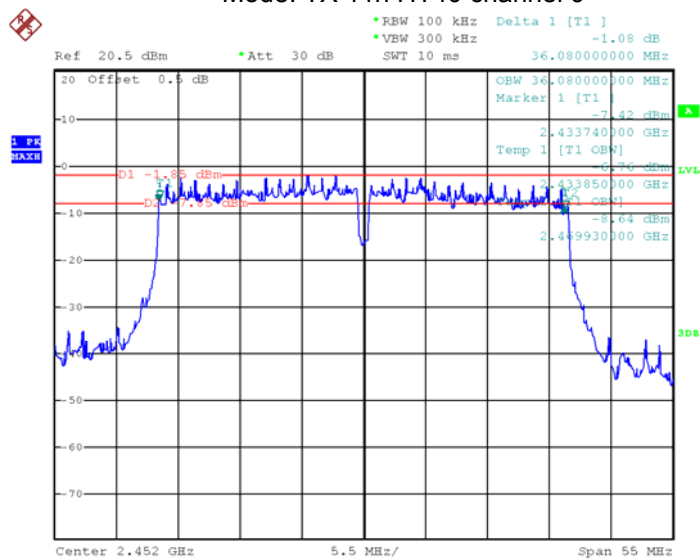
Date: 8.NOV.2018 21:59:11

Mode: TX 11n HT40 channel 6



Date: 8.NOV.2018 22:05:55

Mode: TX 11n HT40 channel 9



Date: 8.NOV.2018 22:08:27

11 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

558074 D01 15.247 Meas Guidance v05

11.1 Test Procedure:

558074 D01 15.247 Meas Guidance v05

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

11.2 Test Result:

Module 1-ANT1		
Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
15.48	15.48	15.82
Limit: 1W/30dBm		
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
14.38	14.65	14.58
Limit: 1W/30dBm		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
13.58	13.86	13.76
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
13.85	13.82	13.65
Limit: 1W/30dBm		

Module 1-ANT2		
Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
15.52	15.44	15.78
Limit: 1W/30dBm		
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
14.56	14.64	14.48
Limit: 1W/30dBm		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
13.84	13.76	13.90
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
13.75	13.63	13.81
Limit: 1W/30dBm		

Module 1-(ANT1+ANT2)		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
16.72	16.82	16.84
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
16.81	16.74	16.74
Limit: 1W/30dBm		

Module 1-BLE		
Maximum Peak Output Power (dBm)		
Low channel	Middle channel	High channel
-7.99	-8.51	-8.48
Limit: 1W/30dBm		

Module 2-ANT4		
Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
16.21	16.72	16.82
Limit: 1W/30dBm		
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
14.57	14.60	14.60
Limit: 1W/30dBm		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
13.26	13.65	13.55
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
13.58	13.89	13.85
Limit: 1W/30dBm		

Module 2-ANT5		
Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
15.99	16.20	16.32
Limit: 1W/30dBm		
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
14.52	14.43	14.58
Limit: 1W/30dBm		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
13.51	13.66	13.06
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
13.02	13.89	13.62
Limit: 1W/30dBm		

Module 2-(ANT4+ANT5)		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
16.40	16.67	16.32
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
16.32	16.90	16.75
Limit: 1W/30dBm		

12 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05

12.1 Test Procedure:

558074 D01 15.247 Meas Guidance v05

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section
Submit this plot.

12.2 Test Result:

Module 1-ANT1		
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-6.48	-6.33	-5.69
Limit: 8dBm per 3kHz		
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-8.97	-9.62	-8.22
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-9.11	-8.98	-8.19
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-11.81	-12.18	-9.87
Limit: 8dBm per 3kHz		

Module 1-ANT2		
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-6.79	-6.72	-6.17
Limit: 8dBm per 3kHz		
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-8.55	-9.87	-8.13
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-8.23	-9.70	-8.68
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-12.33	-12.13	-13.20
Limit: 8dBm per 3kHz		

Module 1-(ANT1+ANT2)		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-5.64	-6.31	-5.42
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-9.05	-9.14	-8.21
Limit: 8dBm per 3kHz		

Module 1-BLE		
Power Spectral (dBm per 3kHz)		
Low channel	Middle channel	High channel
-23.79	-24.20	-24.25
Limit: 8dBm per 3kHz		

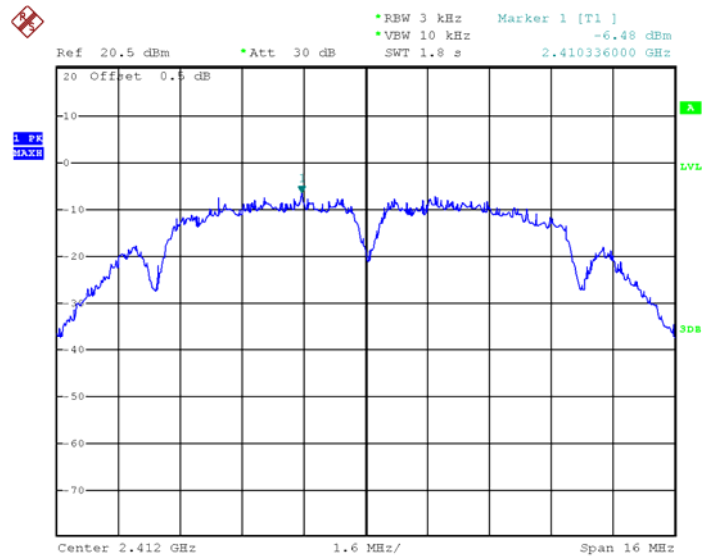
Module 2-ANT4		
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-9.33	-9.17	-7.49
Limit: 8dBm per 3kHz		
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-13.16	-13.07	-13.46
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-14.12	-15.43	-15.61
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-19.21	-18.57	-18.06
Limit: 8dBm per 3kHz		

Module 2-ANT5		
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-9.94	-9.31	-9.97
Limit: 8dBm per 3kHz		
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-14.67	-13.98	-14.91
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-14.78	-14.83	-16.35
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-20.78	-18.95	-19.69
Limit: 8dBm per 3kHz		

Module 2-(ANT4+ANT5)		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-11.43	-12.11	-12.95
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-16.91	-15.75	-15.79
Limit: 8dBm per 3kHz		

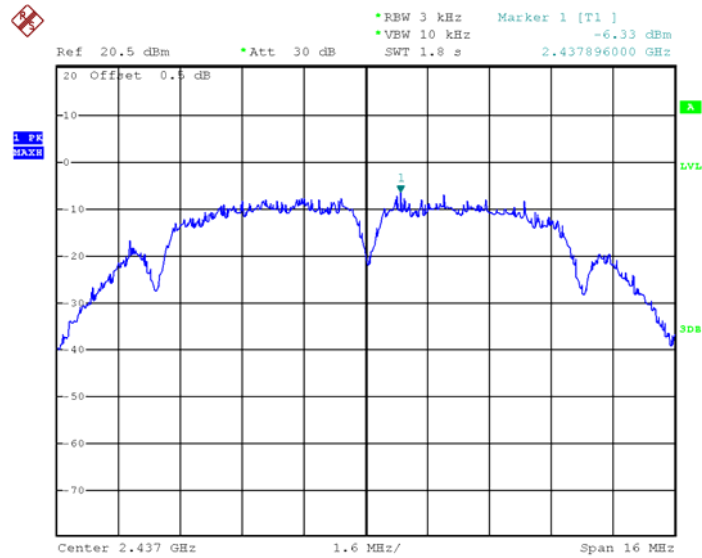
Module 1-ANT1:

Model: TX 11b Low Channel



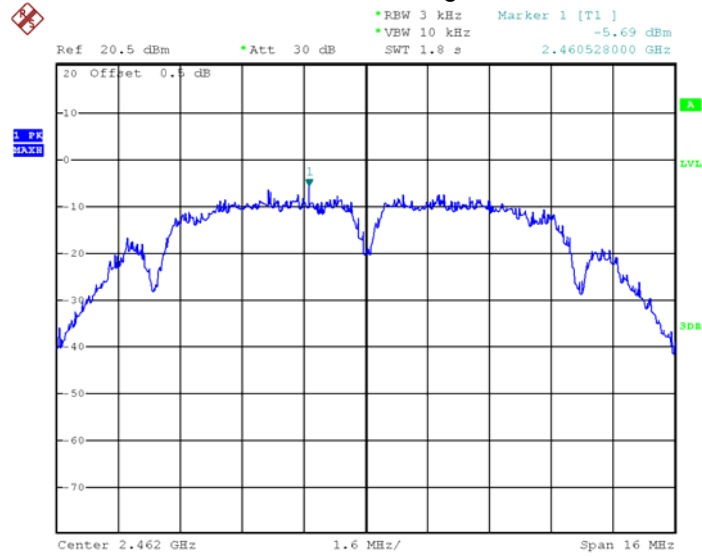
Date: 11.SEP.2018 22:58:12

Model: TX 11b Middle channel



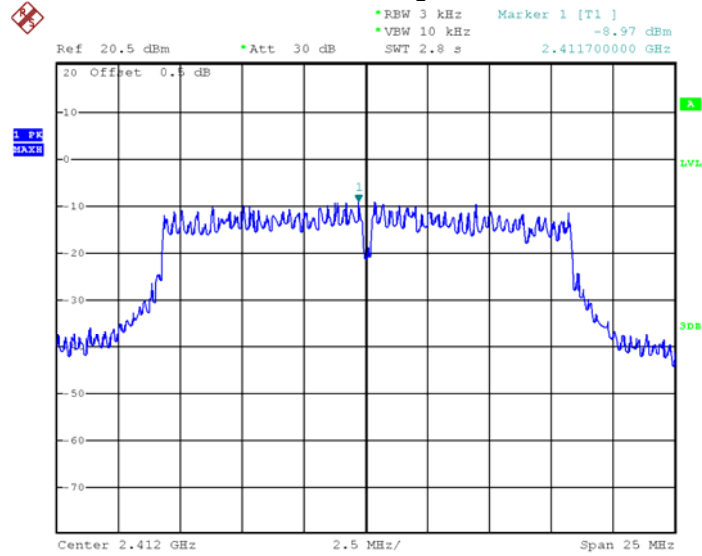
Date: 11.SEP.2018 22:58:55

Model: TX 11b High channel

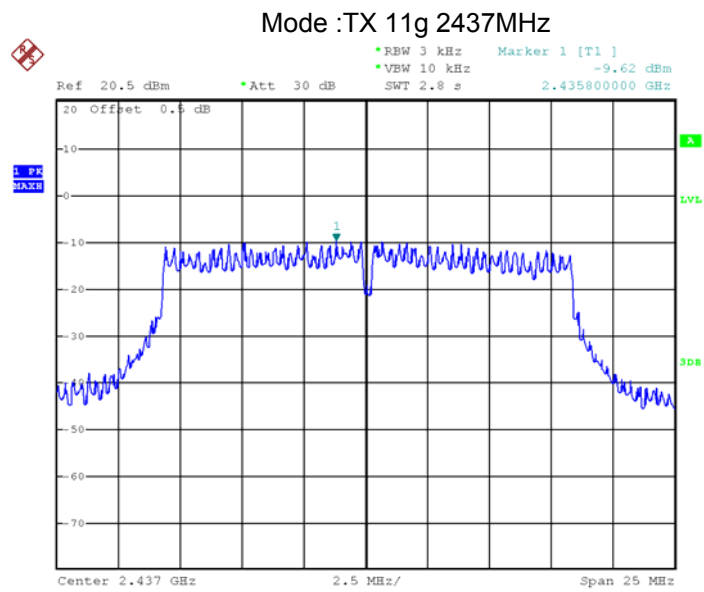


Date: 11.SEP.2018 22:57:16

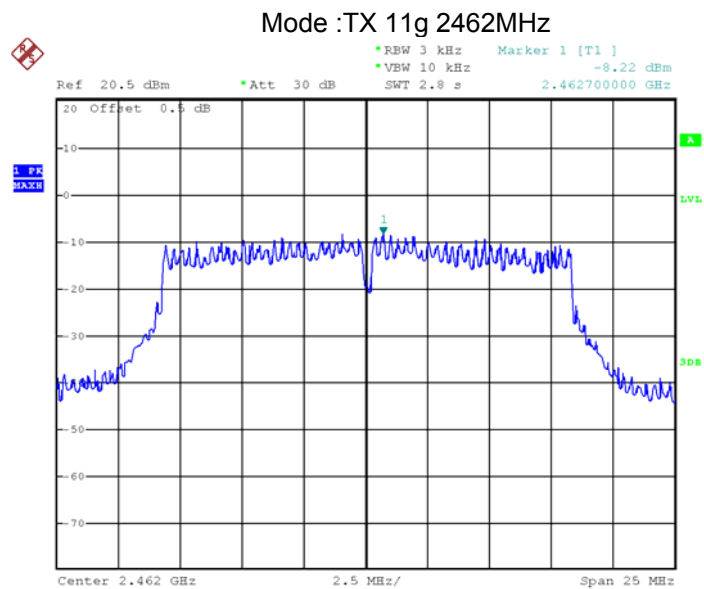
Mode :TX 11g 2412MHz



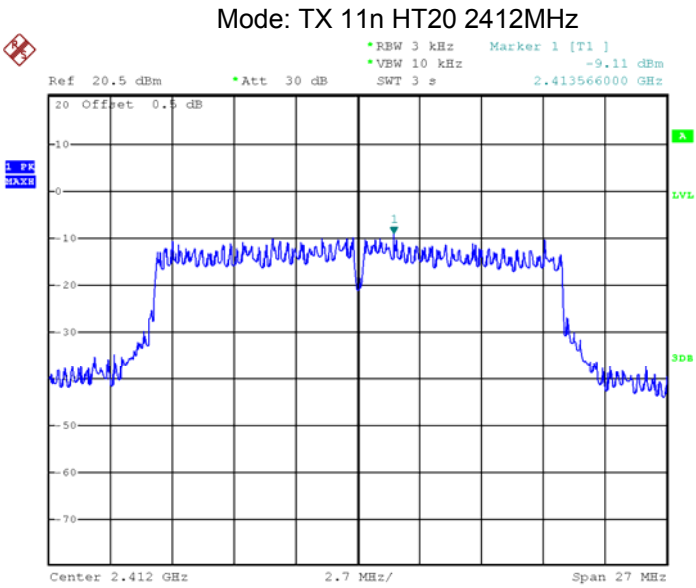
Date: 11.SEP.2018 22:51:42



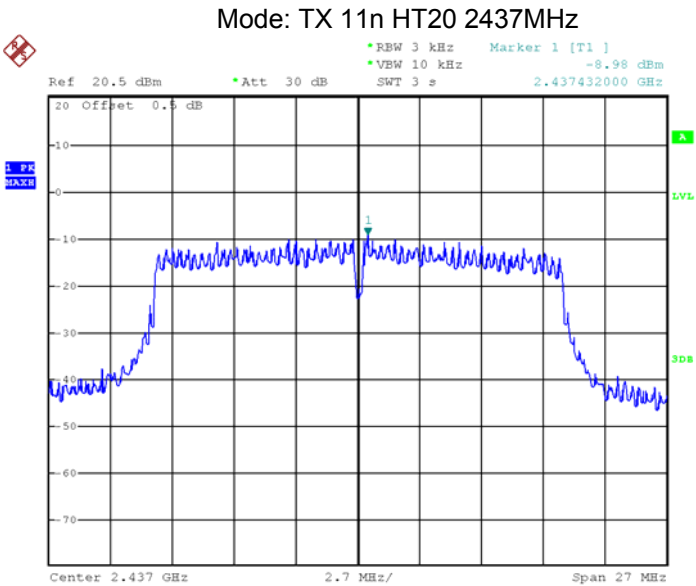
Date: 11.SEP.2018 22:50:55



Date: 11.SEP.2018 22:49:48

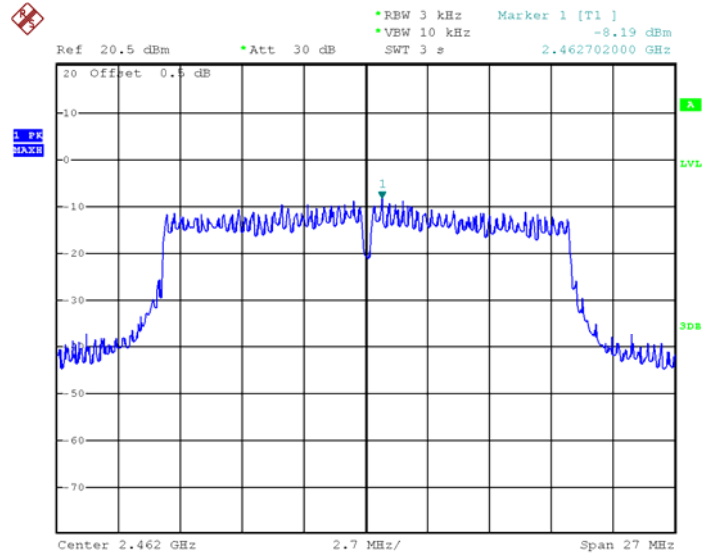


Date: 11.SEP.2018 22:47:00



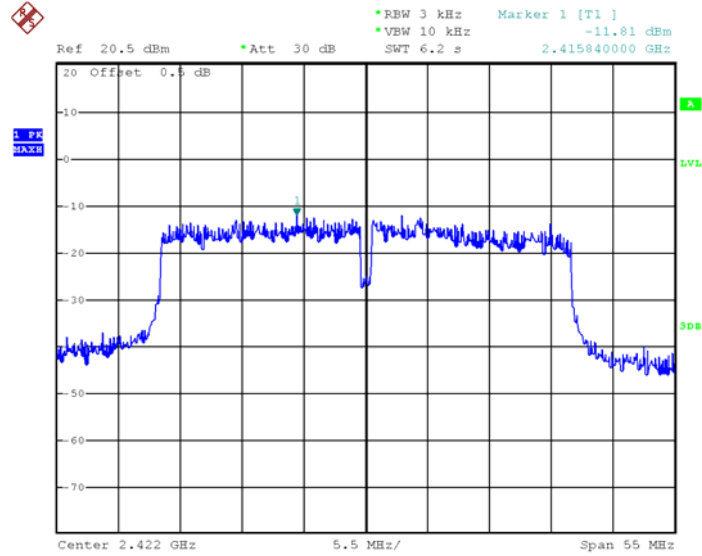
Date: 11.SEP.2018 22:47:50

Mode: TX 11n HT20 2462MHz

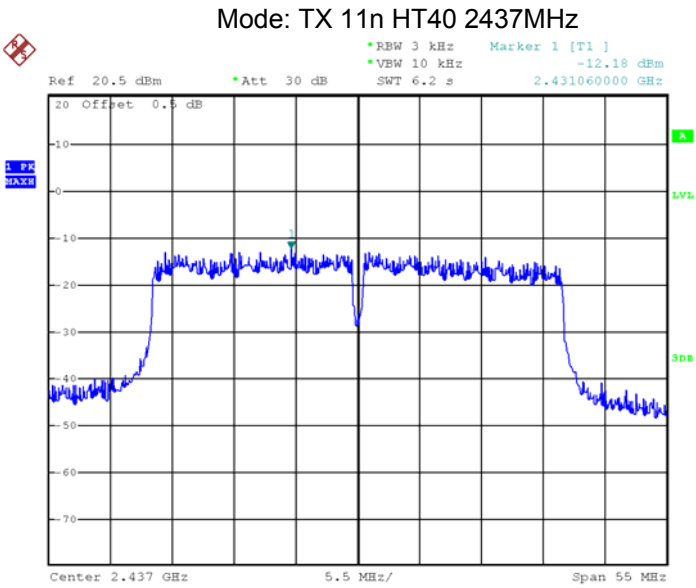


Date: 11.SEP.2018 22:48:39

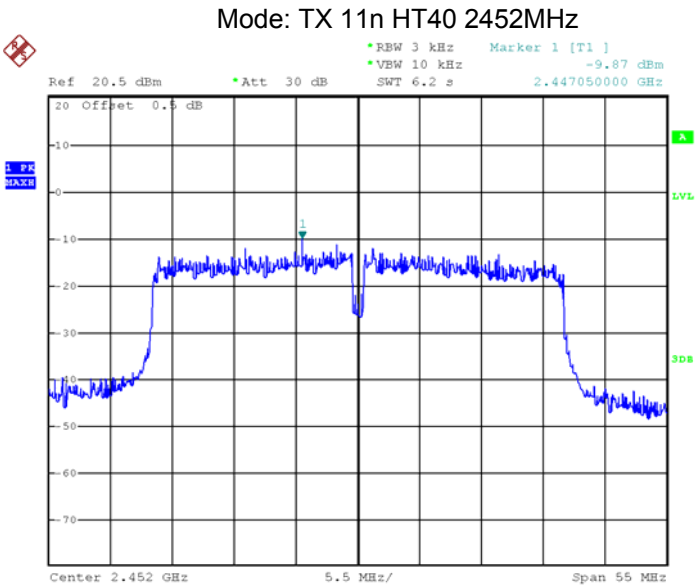
Mode: TX 11n HT40 2422MHz



Date: 11.SEP.2018 22:45:42



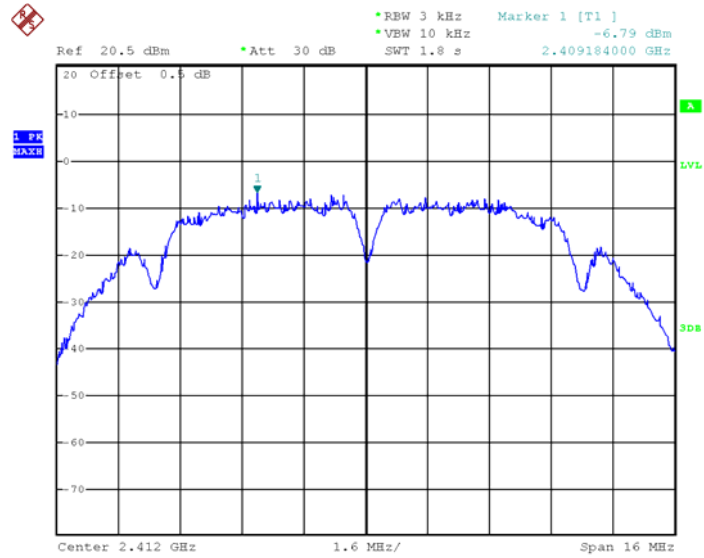
Date: 11.SEP.2018 22:44:48



Date: 11.SEP.2018 22:40:48

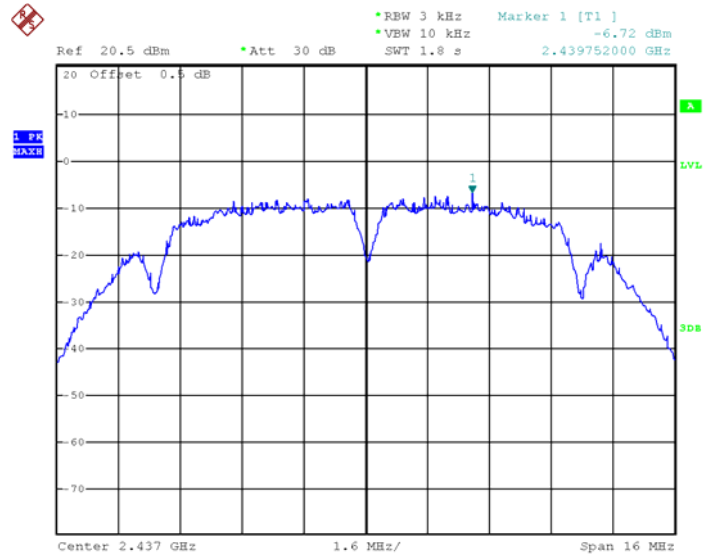
Module 1-ANT2:

Model: TX 11b Low Channel



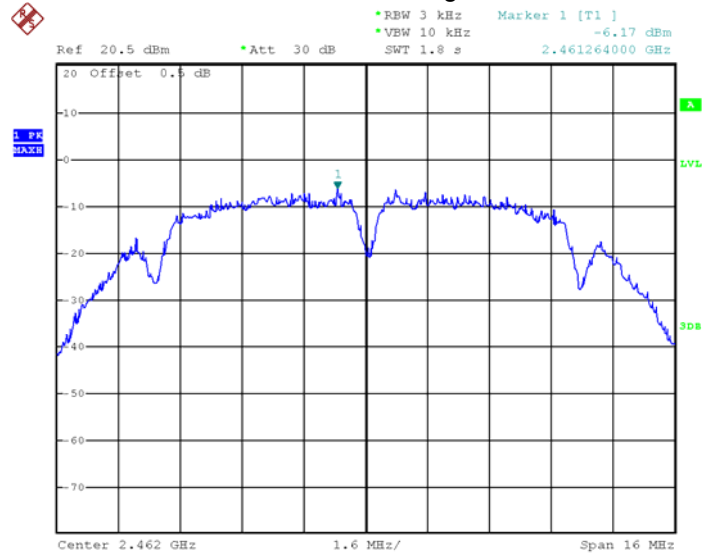
Date: 12.SEP.2018 02:26:59

Model: TX 11b Middle channel



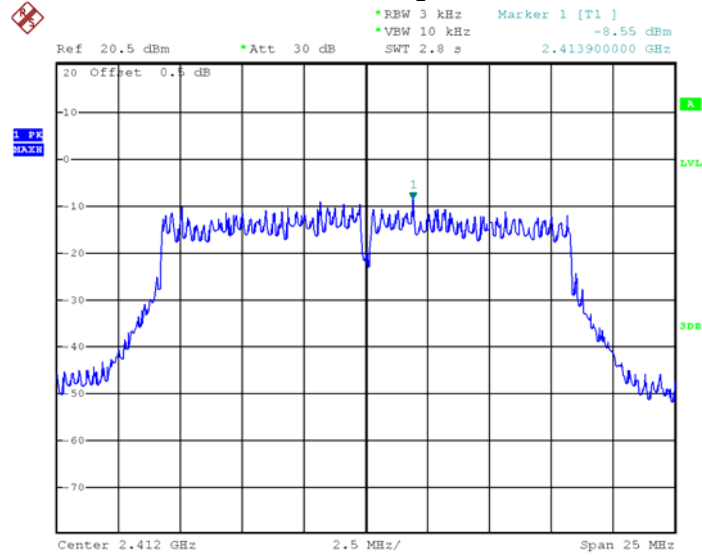
Date: 12.SEP.2018 02:28:57

Model: TX 11b High channel

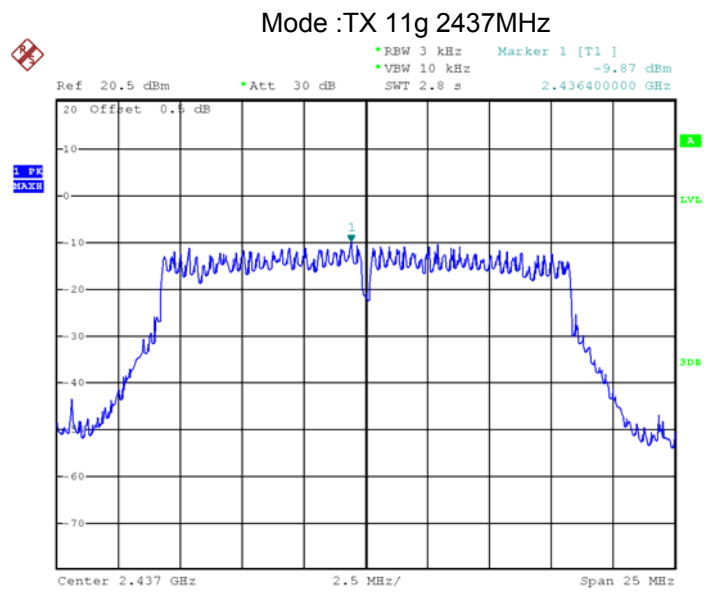


Date: 12.SEP.2018 02:30:09

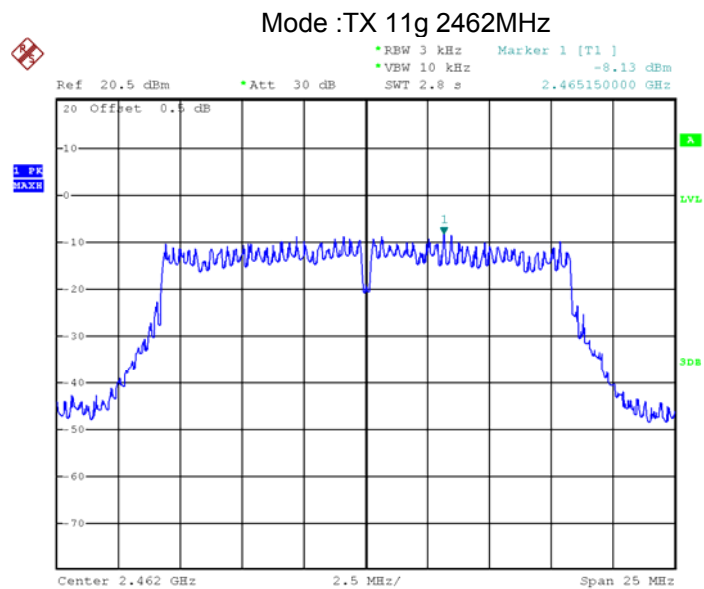
Mode :TX 11g 2412MHz



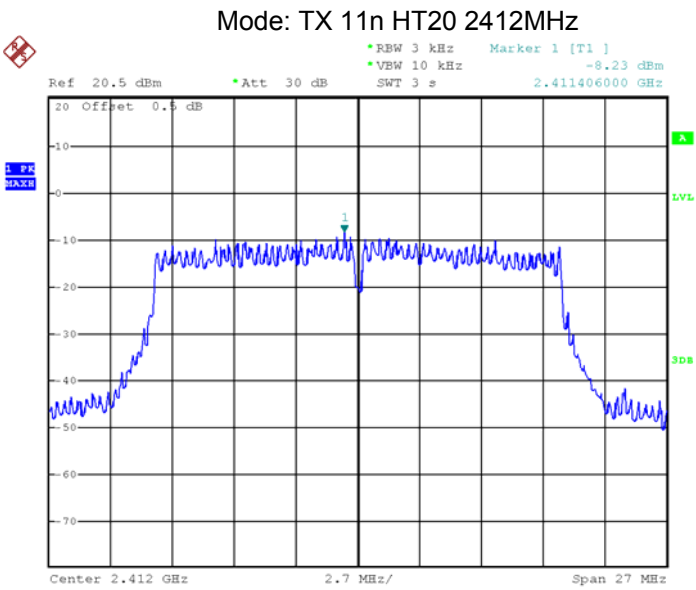
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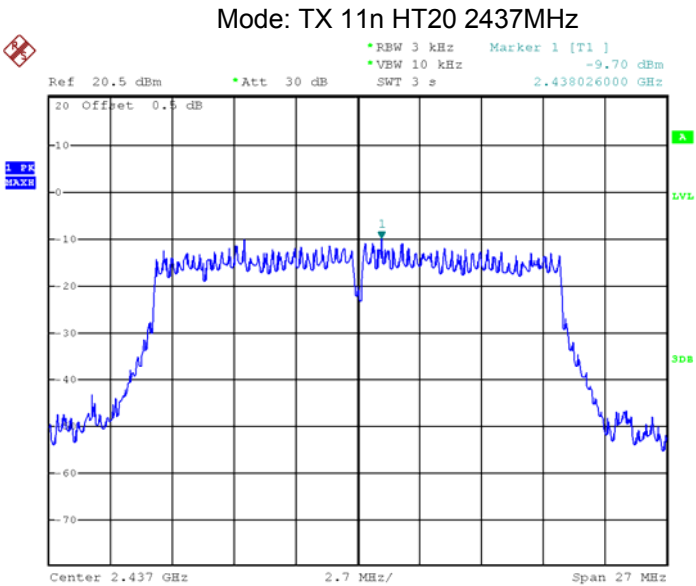
Date: 12.SEP.2018 02:33:31



Date: 12.SEP.2018 02:31:48

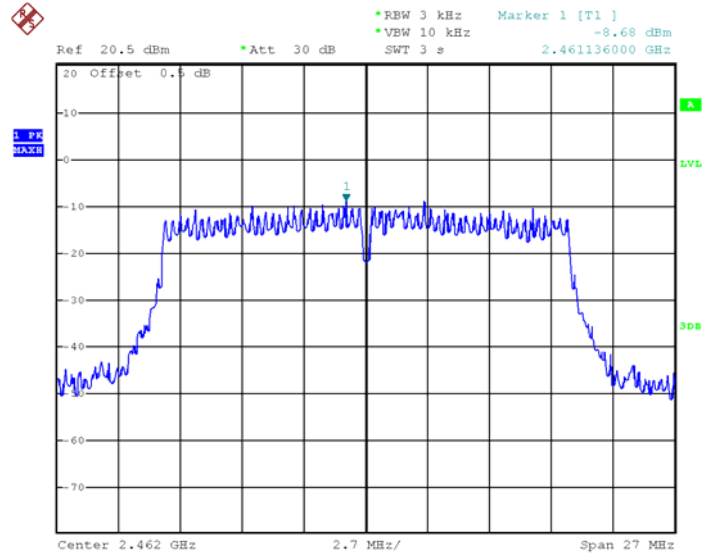


Date: 12.SEP.2018 02:35:57



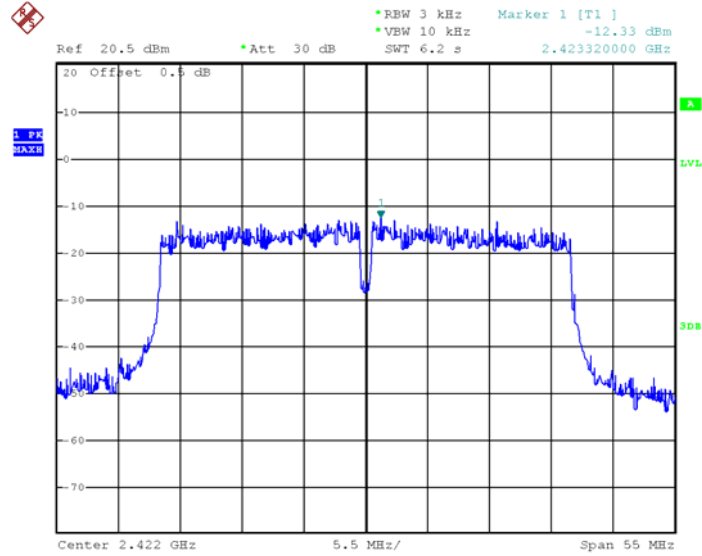
Date: 12.SEP.2018 02:36:50

Mode: TX 11n HT20 2462MHz

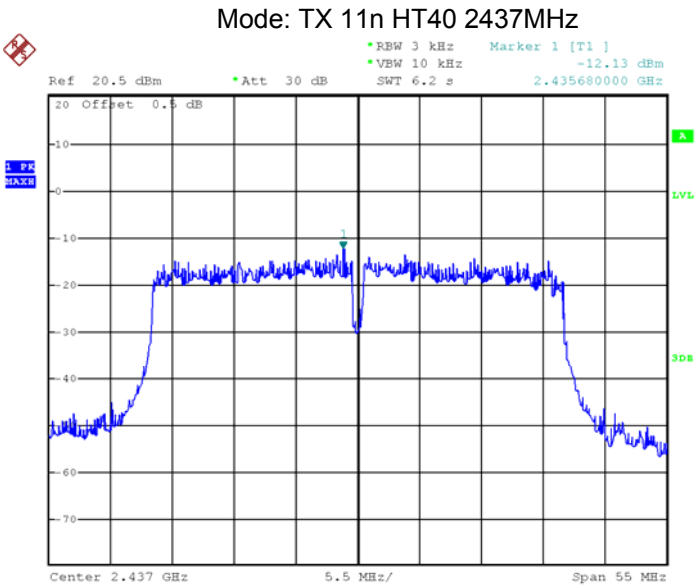


Date: 12.SEP.2018 02:38:13

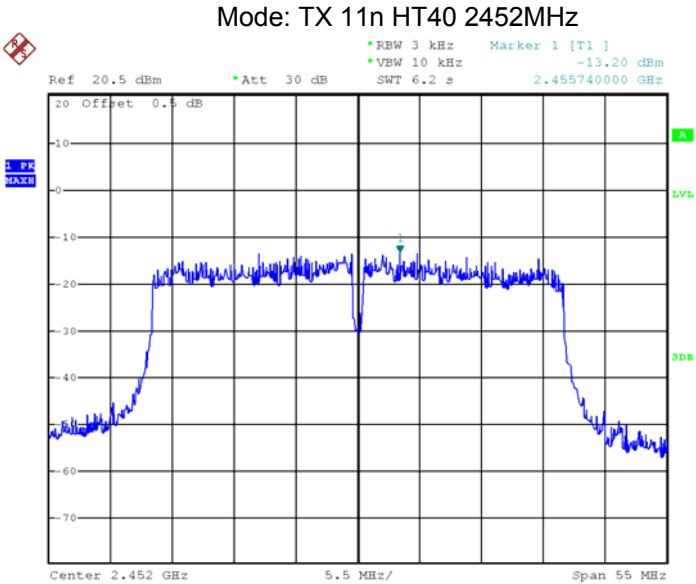
Mode: TX 11n HT40 2422MHz



Date: 12.SEP.2018 02:42:08



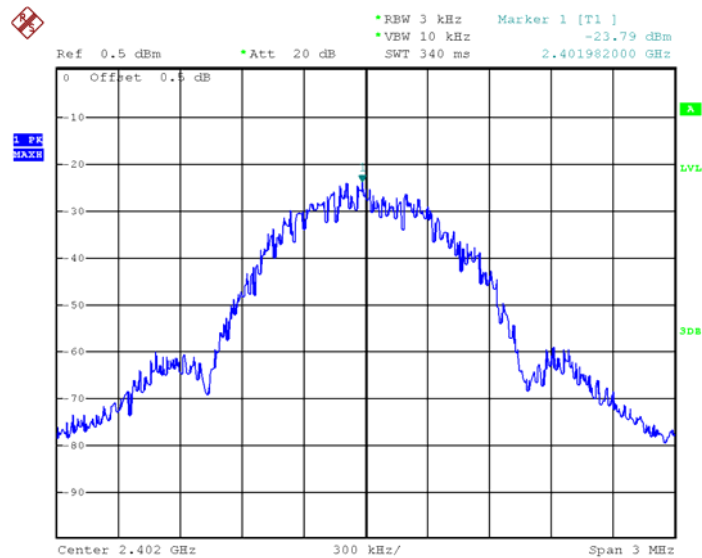
Date: 12.SEP.2018 02:40:28



Date: 12.SEP.2018 02:41:11

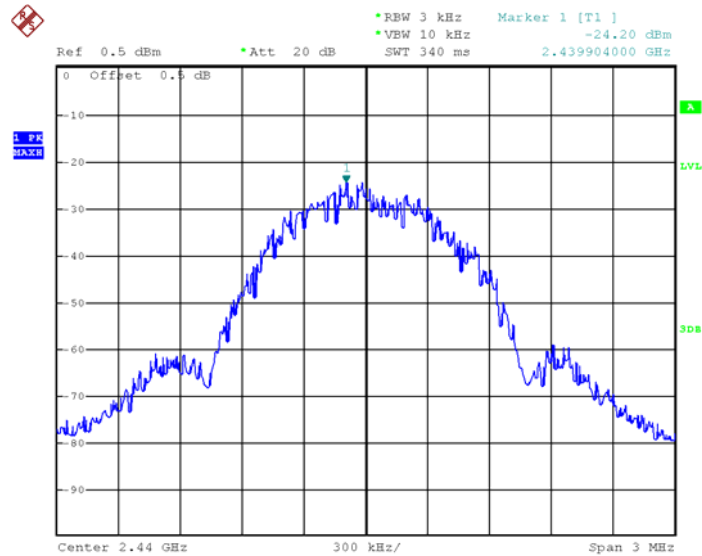
BLE

Test mode: Low channel

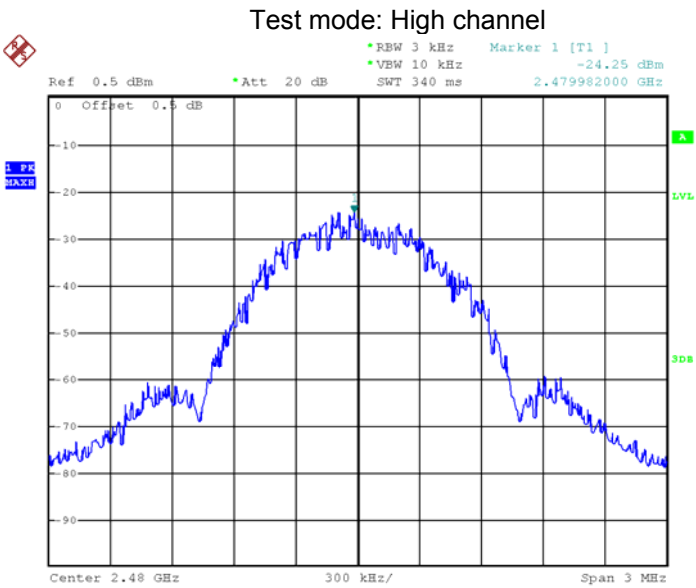


Date: 12.SEP.2018 03:53:50

Test mode: Middle channel



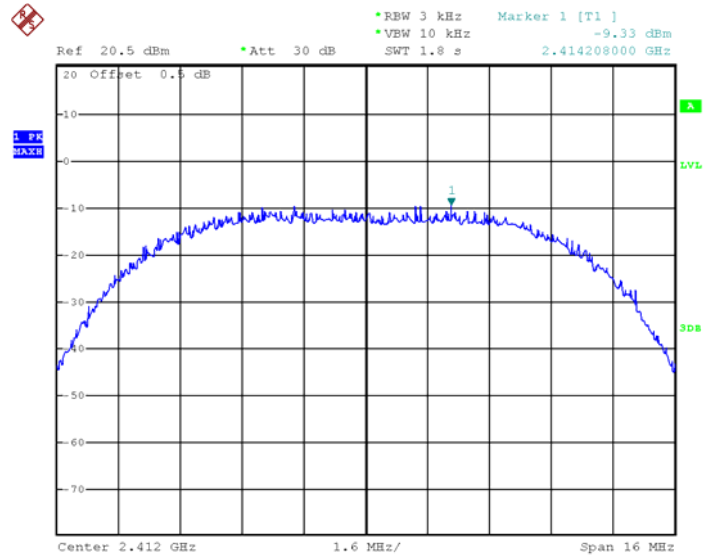
Date: 12.SEP.2018 03:53:18



Date: 12.SEP.2018 03:52:37

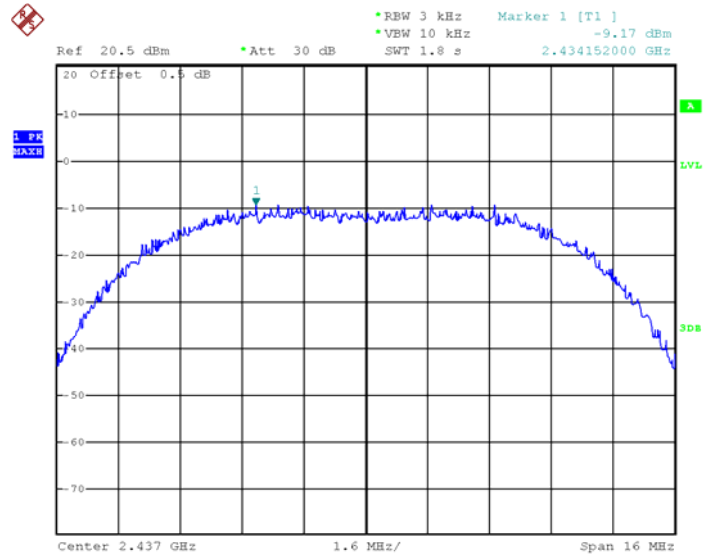
Module 2-ANT4:

Model: TX 11b Low Channel



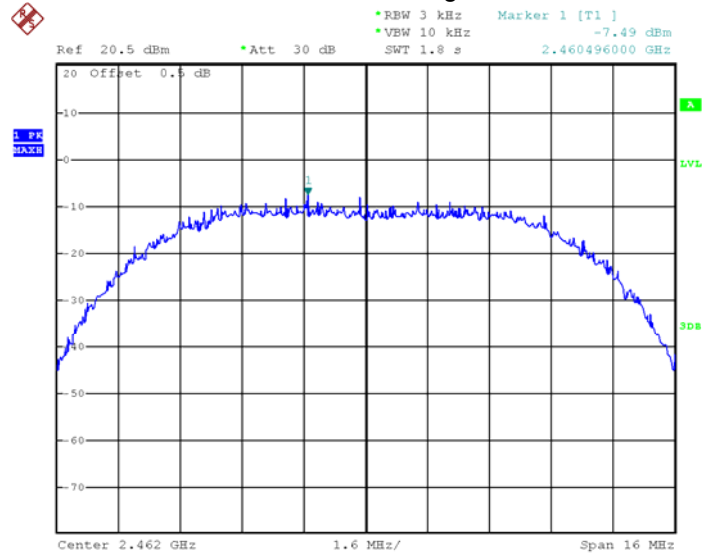
Date: 8.NOV.2018 18:58:19

Model: TX 11b Middle channel



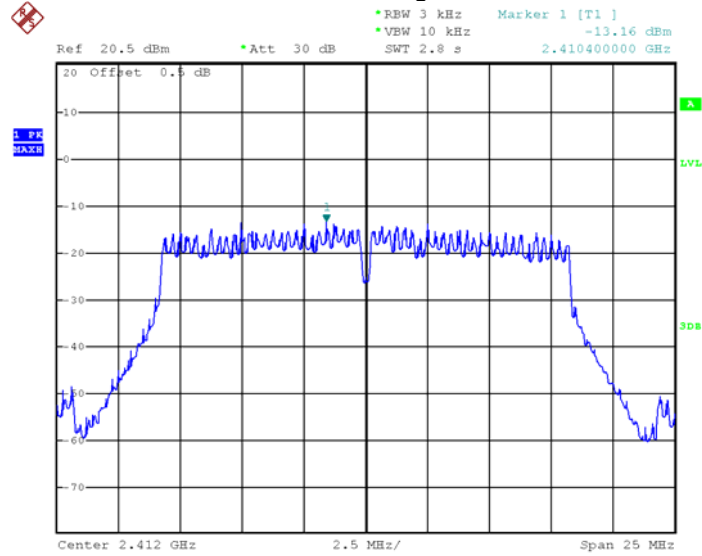
Date: 8.NOV.2018 19:00:27

Model: TX 11b High channel

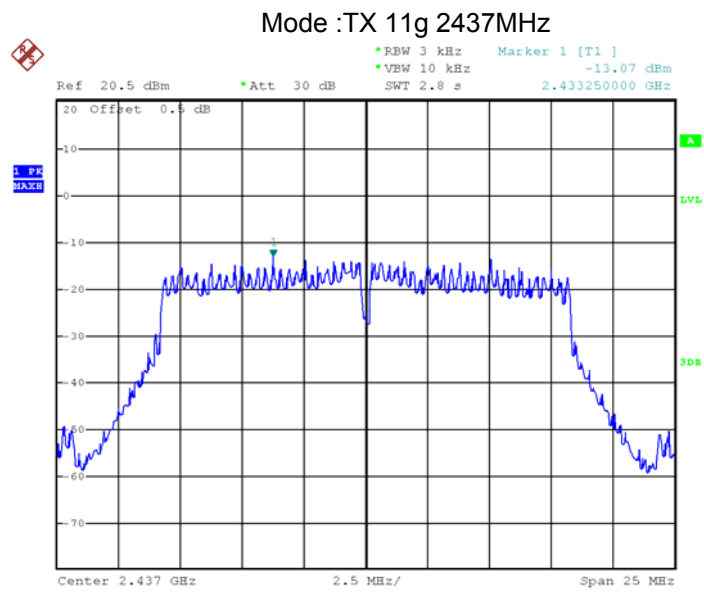


Date: 8.NOV.2018 19:01:36

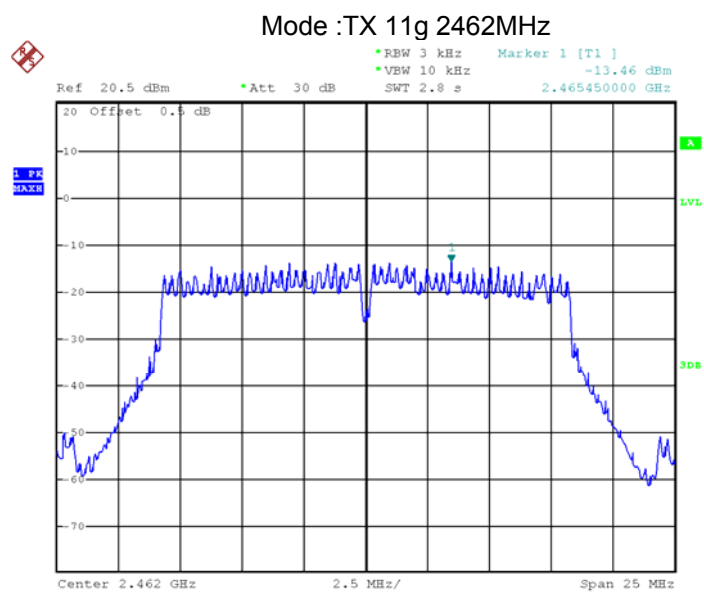
Mode :TX 11g 2412MHz



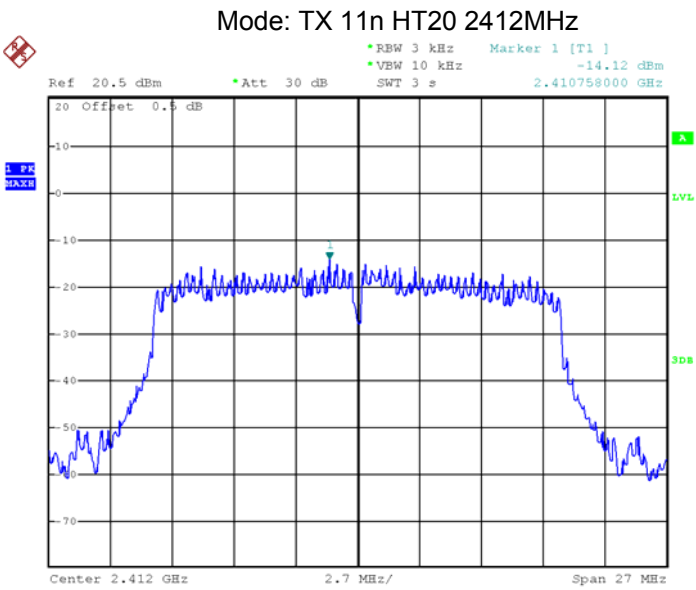
Date: 8.NOV.2018 19:10:18



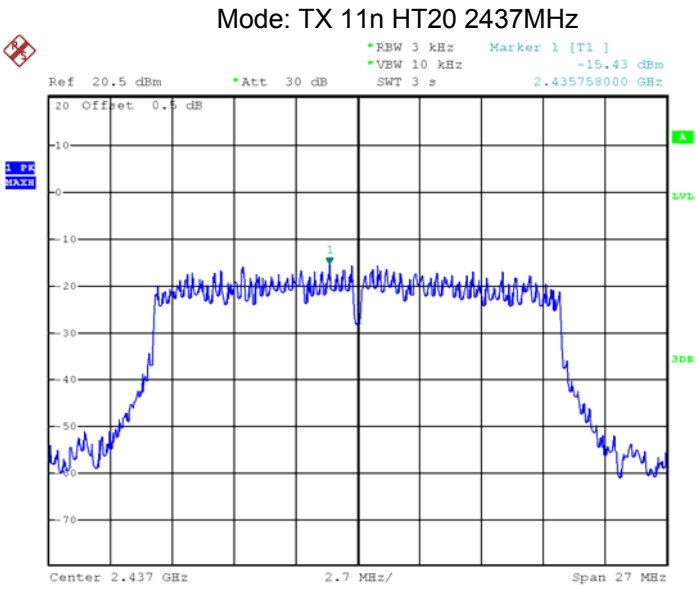
Date: 8.NOV.2018 19:07:00



Date: 8.NOV.2018 19:05:03

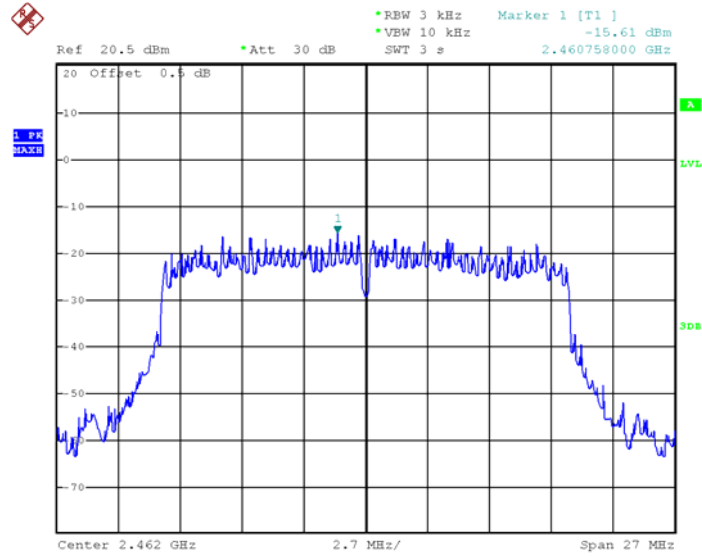


Date: 8.NOV.2018 19:15:34



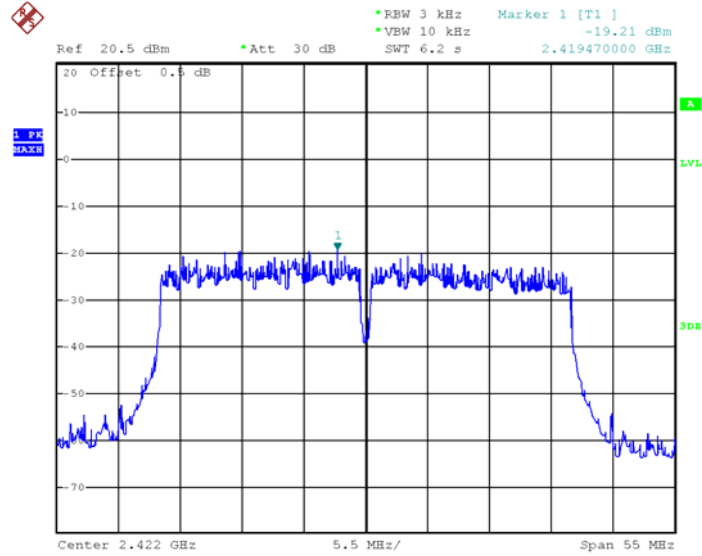
Date: 8.NOV.2018 19:16:50

Mode: TX 11n HT20 2462MHz

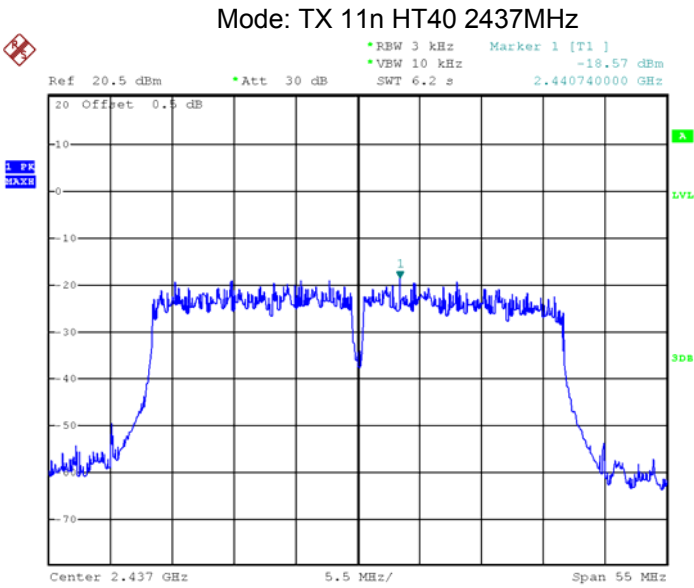


Date: 8.NOV.2018 19:17:40

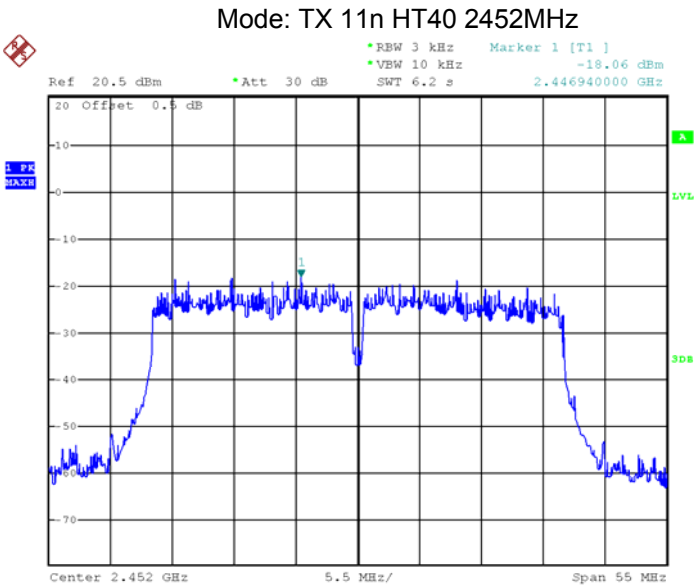
Mode: TX 11n HT40 2422MHz



Date: 8.NOV.2018 19:28:59



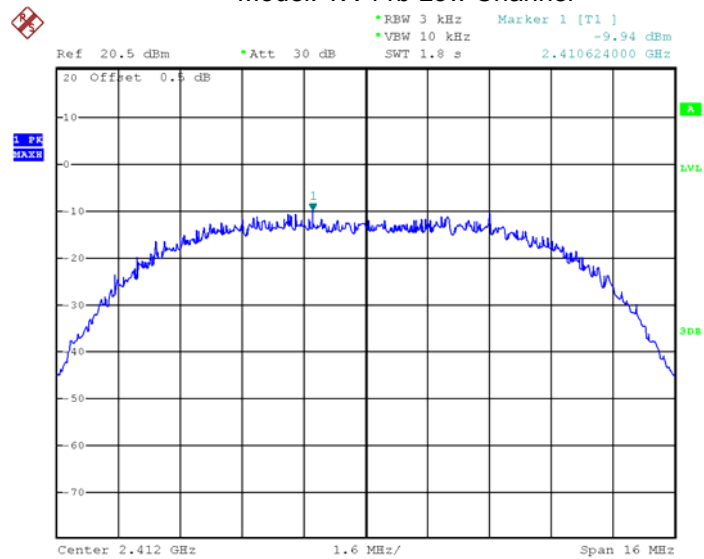
Date: 8.NOV.2018 19:24:14



Date: 8.NOV.2018 19:27:24

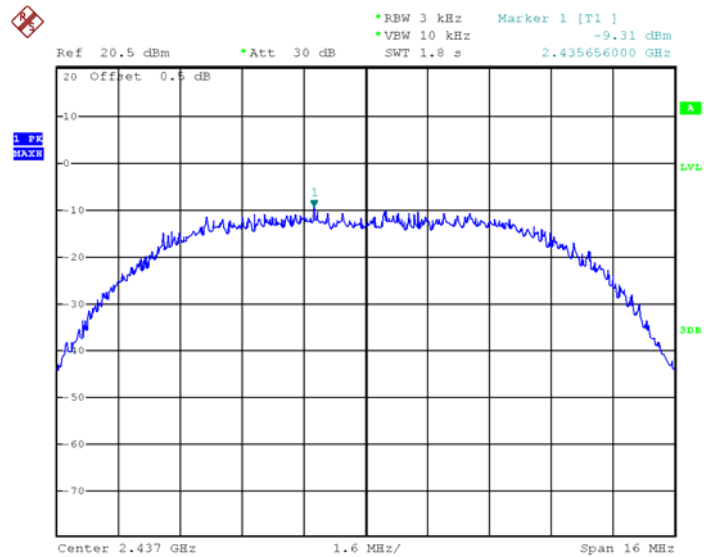
Module 2-ANT5:

Model: TX 11b Low Channel



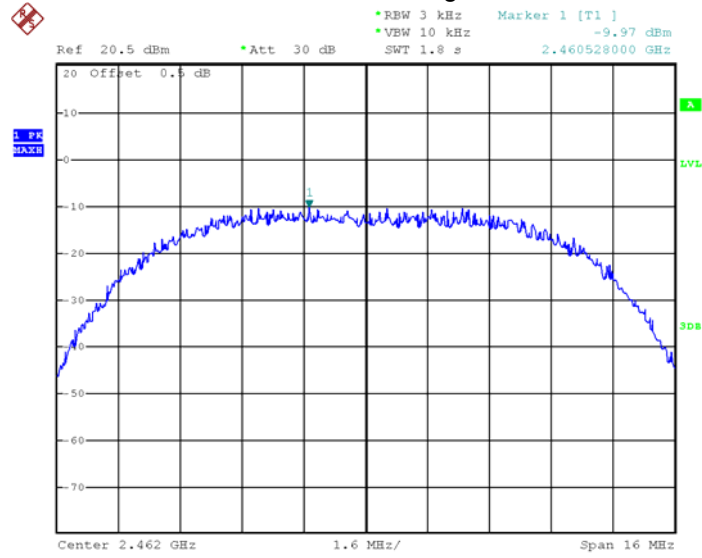
Date: 8.NOV.2018 20:00:06

Model: TX 11b Middle channel



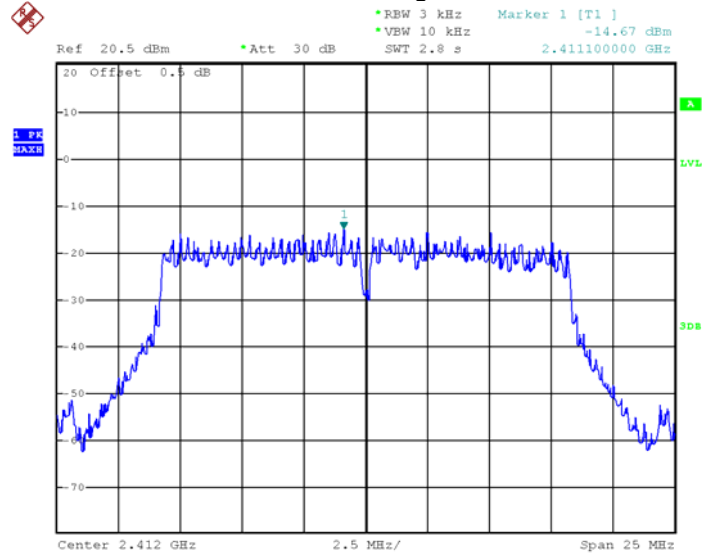
Date: 8.NOV.2018 19:59:35

Model: TX 11b High channel



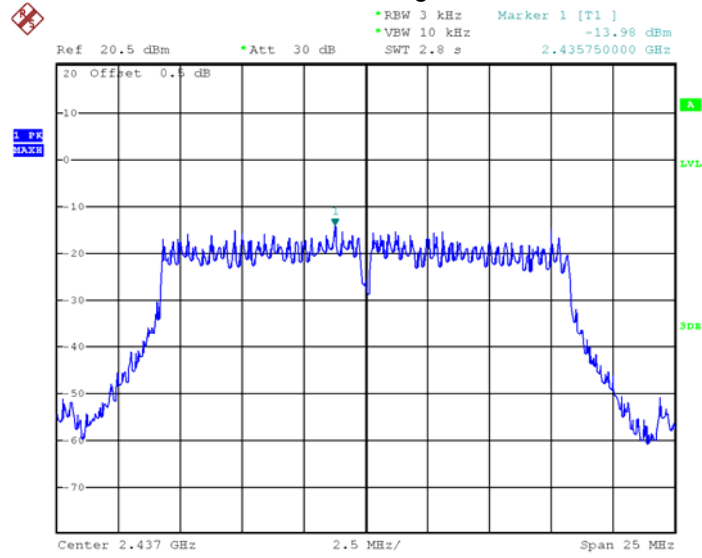
Date: 8.NOV.2018 19:58:38

Mode :TX 11g 2412MHz



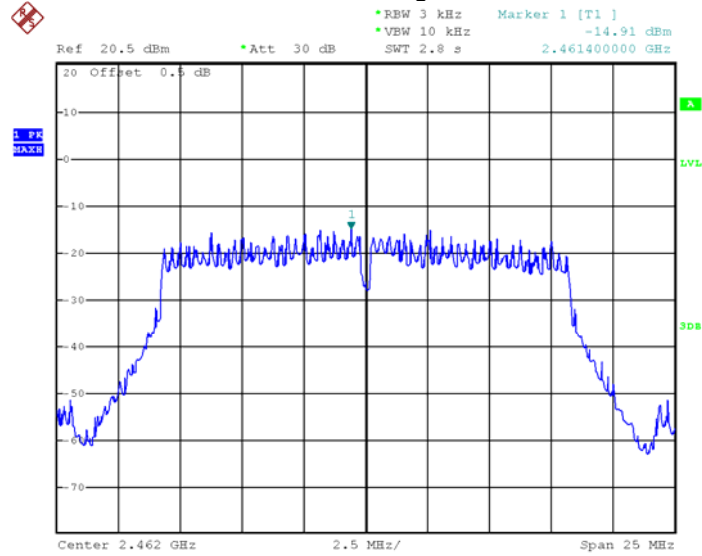
Date: 8.NOV.2018 20:00:49

Mode :TX 11g 2437MHz

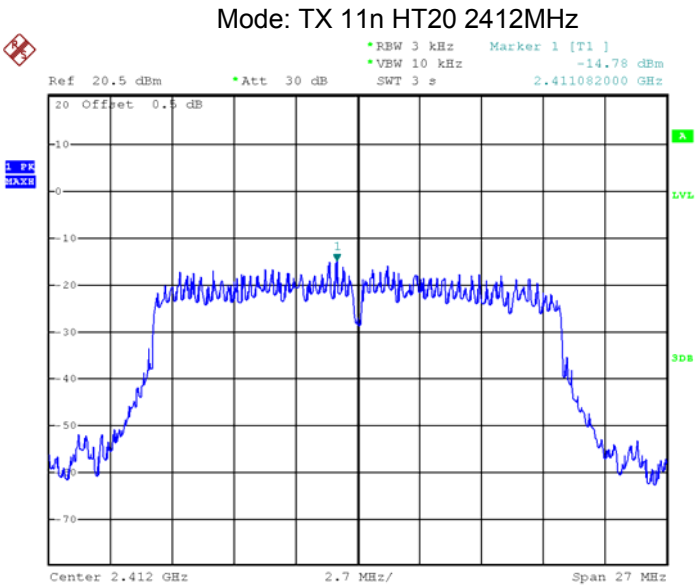


Date: 8.NOV.2018 20:17:01

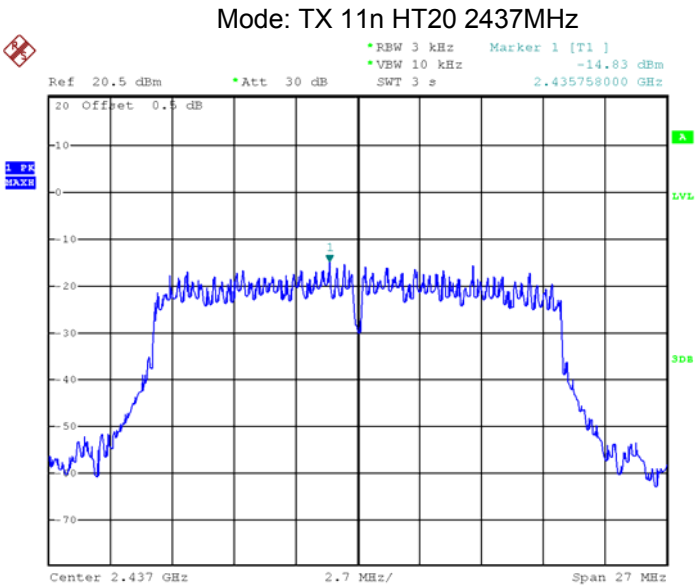
Mode :TX 11g 2462MHz



Date: 8.NOV.2018 20:18:00

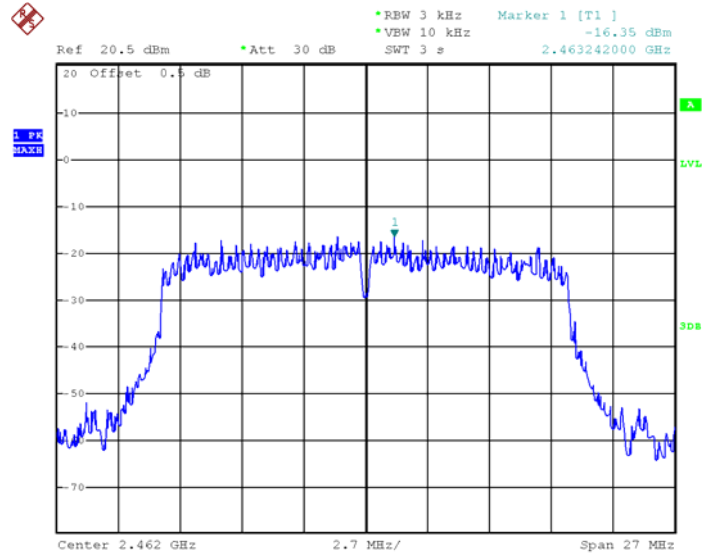


Date: 8.NOV.2018 20:21:23



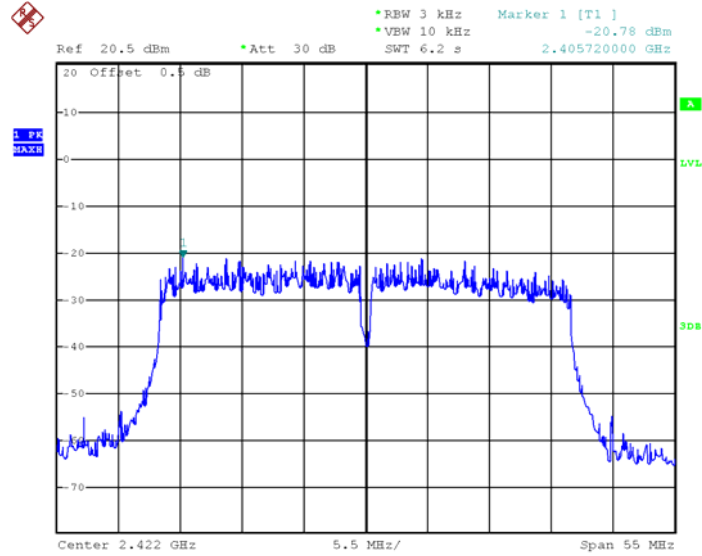
Date: 8.NOV.2018 20:20:37

Mode: TX 11n HT20 2462MHz

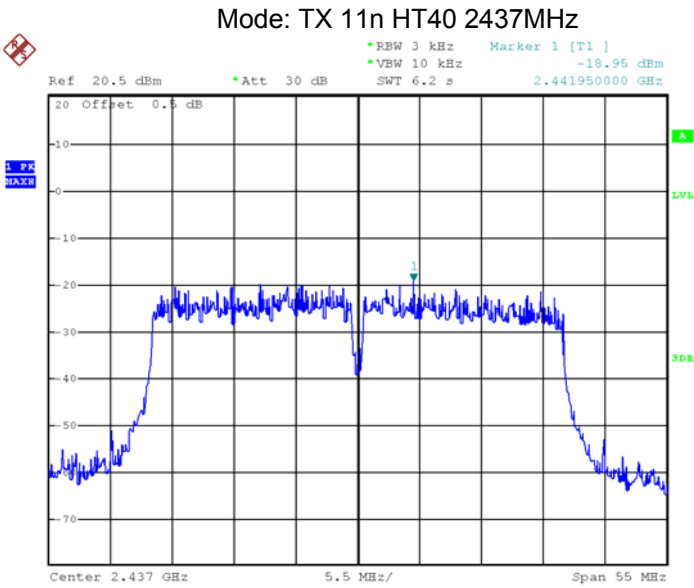


Date: 8.NOV.2018 20:19:41

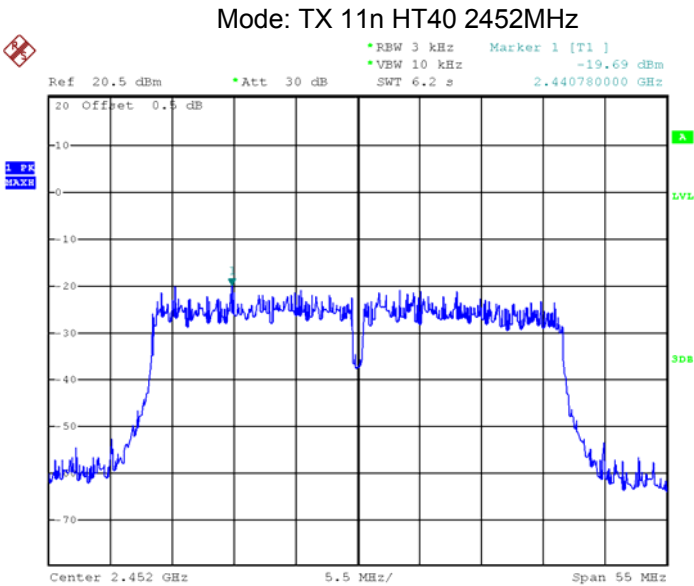
Mode: TX 11n HT40 2422MHz



Date: 8.NOV.2018 20:22:27



Date: 8.NOV.2018 20:23:34



Date: 8.NOV.2018 20:24:16

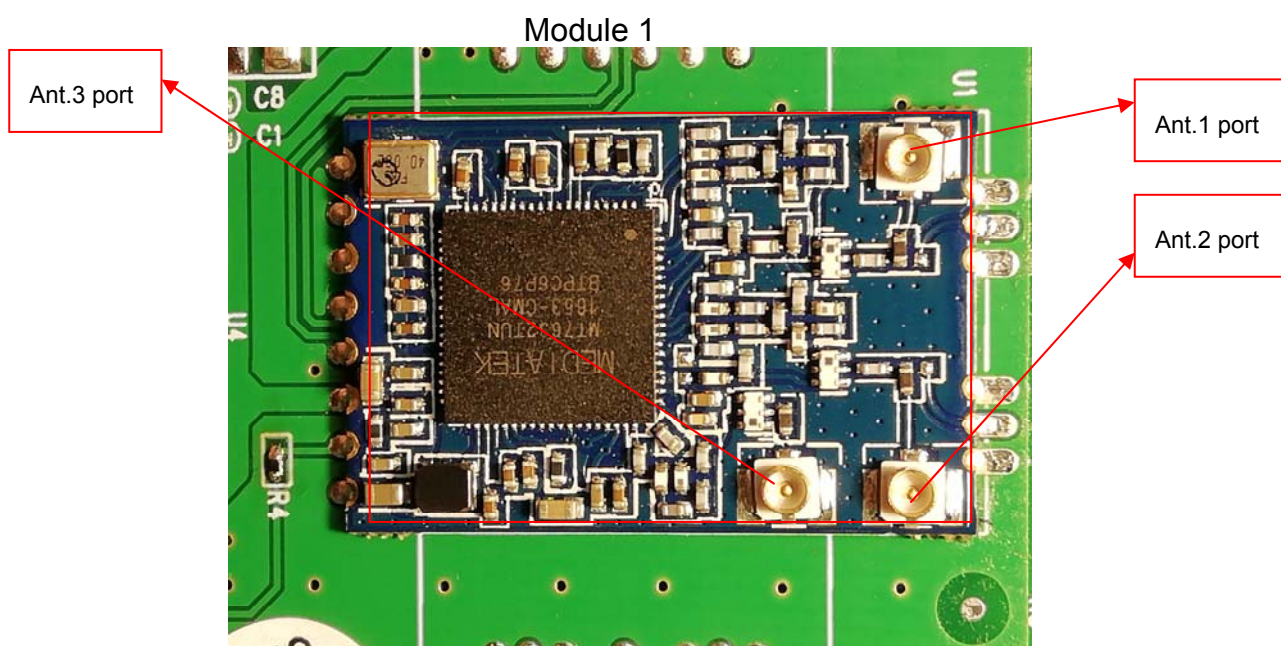
13 Antenna Requirement

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 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 use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

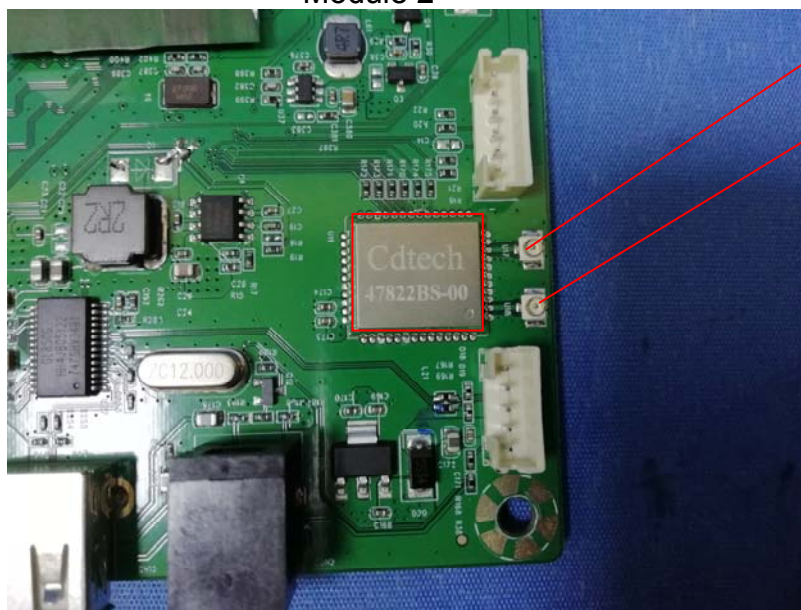
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Result:

The EUT have one Integrated Antenna for BLE and four Integrated Antenna four 2.4G WiFi, meets the requirements of FCC 15.203.



Module 2



14 FCC ID: 2AQ7Q-DB0355 RF Exposure Report

Note: Please refer to RF Exposure Report: WTS18S09122875-4W.

15 Photographs - Model DB0355 Test Setup Photos

Note: Please refer to Photos: WTS18S09122875-5W.

16 Photographs - Constructional Details

16.1 Model DB0355 - External Photos

Note: Please refer to Photos: WTS18S09122875-5W.

16.2 Model DB0355 - Internal Photos

Note: Please refer to Photos: WTS18S09122875-5W.

=====End of Report=====