

TEST REPORT

Reference No...... : WTD25D11316003W004
FCC ID : 2BTG5-SYBRAN-01
Applicant..... : Shenzhen Sybran Technology Co.,Ltd.
Address..... : 804, Bldg 5A, Block C, Chuangzhiyuncheng Phase II, Xingke 1st Rd,
Xili St Nanshan, Shenzhen, China
Manufacturer : Shenzhen Sybran Technology Co.,Ltd.
Address..... : 804, Bldg 5A, Block C, Chuangzhiyuncheng Phase II, Xingke 1st Rd,
Xili St Nanshan, Shenzhen, China
Product..... : CODE27 Companion Hub
Model(s) : SyBran-01
Standards..... : FCC 47CFR Part 15.247
Date of Receipt Sample : 2025-11-28
Date of Test : 2025-12-02 to 2026-03-18
Date of Issue..... : 2026-03-18
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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2 Contents

	Page
1 COVER PAGE	1
2 CONTENTS	2
3 REVISION HISTORY	4
4 GENERAL INFORMATION	5
4.1 General Description of E.U.T.	5
4.2 Details of E.U.T.	5
4.3 Channel List	6
4.4 Test Facility	6
4.5 Subcontracted	6
4.6 Abnormalities from Standard Conditions	6
4.7 Test Mode	7
5 TEST SUMMARY	8
6 EQUIPMENT USED DURING TEST	9
6.1 Equipments List	9
6.2 Description of Support Units	10
6.3 Measurement Uncertainty	10
6.4 Test Equipment Calibration	10
7 DUTY CYCLE	11
8 CONDUCTED EMISSION	14
8.1 E.U.T. Operation	14
8.2 EUT Setup	14
8.3 Measurement Description	15
8.4 Conducted Emission Test Result	15
9 RADIATED EMISSIONS	21
9.1 EUT Operation	21
9.2 Test Setup	22
9.3 Spectrum Analyzer Setup	23
9.4 Test Procedure	24
9.5 Corrected Amplitude & Margin Calculation	24
9.6 Summary of Test Results	25
10 CONDUCTED SPURIOUS EMISSIONS	37
10.1 Test Procedure	37
10.2 Test Result	38
11 BAND EDGE MEASUREMENT	61
11.1 Test Produce	61
11.2 Test Result	62
12 6 DB BANDWIDTH AND 99% BANDWIDTH MEASUREMENT	66
12.1 Test Procedure	66
12.2 Test Result	66
13 MAXIMUM CONDUCTED OUTPUT POWER	80
13.1 Test Procedure	80
13.2 Test Result	81
14 POWER SPECTRAL DENSITY	92

14.1 Test Procedure 92

14.2 Test Result..... 93

15 ANTENNA REQUIREMENT104

16 RF EXPOSURE104

17 PHOTOGRAPHS OF TEST SETUP AND EUT.....104

3 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD25D11316003W004	2025-11-28	2025-12-02 to 2026-01-19	2026-02-03	Original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	CODE27 Companion Hub
Model(s):	SyBran-01
Model Description:	1. There are two hardware configurations for this model: configuration A and configuration B, the only difference being the cable specifications. Differential testing will be conducted between these two configurations, covering Radiated Emission below 1G (RE), Conducted Emission (CE). 2. All tests were performed on adapter 1 and configuration A. 3. All adapters were tested with both configuration A and configuration B EUTs. Only worst-case test results were recorded for All adapters.
Test Sample No.:	1-1/1
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/ax HE20
Hardware Version:	YT-921 V_1.2
Software Version:	rk3588s_yt921-userdebug 12 SQ3A.220705.003.A1 eng.dj 20260119.111702

4.2 Details of E.U.T.

Operation Frequency:	802.11b/g/n(HT20)/ax(HE20), 2412-2462MHz 11CH
Max. RF output power:	Ant.1: 16.56dBm, Ant.2: 16.75dBm, Total: 19.25dBm Max.
Type of Modulation:	DSSS, OFDM
Antenna installation:	FPC Antenna
Antenna Gain:	2.56dBi
Ratings:	DC 20V
AC Adapter:	Adapter 1: Model: TEKA-PD2A65WUSC INPUT: 100-240V~ 50/60Hz 1.5A Max OUTPUT: 5V==3A 15W; 9V==3A 27W; 12V==3A 36W; 15V==3A 45W; 20V==3.25A 65W Manufacturer: GUANGDONG TEKA TECHNOLOGY CO.,LTD. Adapter 2: Model: TEKA-PC1AWUS INPUT: 100-240V~ 50/60Hz 1.2A Max OUTPUT: 5V==3A 15W; 9V==3A 27W; 12V==3A 36W; 15V==3A 45W; 20V==2.25A 45W Manufacturer: GUANGDONG TEKA TECHNOLOGY CO.,LTD. Adapter 3: Model: A849-200225C-US1 INPUT: 100-240V~ 50/60Hz 1.5A OUTPUT: 5V==3A; 9V==3A; 12V== 3A; 15V== 3A; 20V== 2.25A ; 3.3-16V==3A, 45W Max; 3.3-21V== 2.25A, 45W Max Manufacturer: Dongguan Aohai Technology Co., Ltd.

4.3 Channel List

Wi-Fi

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	-	-

4.4 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration number 523476, September 10, 2019.

4.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

4.6 Abnormalities from Standard Conditions

None.

4.7 Test Mode

Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Conducted Output Power	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11ax HE20	MCS0	1/6/11	TX
Power Spectral Density	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11ax HE20	MCS0	1/6/11	TX
6dB Bandwidth and 99% Bandwidth	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11ax HE20	MCS0	1/6/11	TX
Band Edge	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11ax HE20	MCS0	1/6/11	TX
Transmitter Spurious Emissions	802.11b	1 Mbps	1/6/11	TX
	802.11g	6 Mbps	1/6/11	TX
	802.11n HT20	MCS0	1/6/11	TX
	802.11ax HE20	MCS0	1/6/11	TX

Note 1: Parameters set by test software during channel & power tests, the software provided by the applicant was used to set the operating channels as well as the maximum 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.

Note 2: 802.11 ax HE20 only support full RUs, full RU was recorded in the report.

5 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.247(d) 15.205(a) 15.209(a)	PASS
Conducted Spurious Emissions	15.247(d)	PASS
Conducted Emissions	15.207(a)	PASS
6dB Bandwidth and 99% Bandwidth	15.247(a)(2)	PASS
Maximum Conducted Output Power	15.247(b)(3), (4)	PASS
Power Spectral Density	15.247(e)	PASS
Band Edge	15.247(d)	PASS
Antenna Requirement	15.203	PASS
RF Exposure	1.1307(b)(1)	PASS
Note: Pass=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	100947	2025-07-04	2026-07-03
2	LISN	R&S	ENV216	100115	2025-06-03	2026-06-02
3	Cable	Top	TYPE16(3.5M)	-	2025-06-03	2026-06-02
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP30	100091	2025-04-19	2026-04-18
2	Amplifier	Agilent	8447D	2944A10178	2025-07-04	2026-07-03
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2025-07-20	2026-07-19
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2025-04-19	2026-04-18
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1314	2025-08-09	2026-08-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2025-07-04	2026-07-03
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2025-07-04	2026-07-03
8	Coaxial Cable (above 1GHz)	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2025-04-19	2026-04-18
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2025-04-19	2026-04-18
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2025-07-05	2026-07-04
3	Active Loop Antenna	Com-Power Corp.	AL-130R	10160007	2025-04-21	2026-04-20
4	Amplifier	ANRITSU	MH648A	M43381	2025-04-19	2026-04-18
5	Cable	HUBER+SUHNER	CBL2	525178	2025-04-19	2026-04-18
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	R&S	FSP40	100501	2025-04-19	2026-04-18
2.	EXA Signal Analyzer	Malaysia Keysight	N9010A	MY50520207	2025-04-19	2026-04-18

Test Software:

Test Item	Software name	Software version
Conduction disturbance Radiated Emission(3m)	EZ-EMC	EZ-EMC(RA-03A1-1)

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

6.3 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64dB (AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08dB (Bilog antenna 30M~1000MHz)
	± 4.99 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10 ⁻⁷ Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval: 95%. Confidence factor: k=2	

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R. China.

7 Duty Cycle

ANT 1:

Type of Modulation	On time ms	Period ms	Duty Cycle linear	Duty Cycle %	Duty Cycle Factor(dB)	Average Factor(dB)
802.11b	8.40	8.52	0.99	98.59	0.06	-0.12
802.11g	1.40	1.50	0.93	93.33	0.30	-0.60
802.11n-HT20	1.91	1.94	0.98	98.45	0.07	-0.14
802.11ax-HE20	1.00	1.12	0.89	89.29	0.49	-0.98

ANT 2:

Type of Modulation	On time ms	Period ms	Duty Cycle linear	Duty Cycle %	Duty Cycle Factor(dB)	Average Factor(dB)
802.11b	8.44	8.52	0.99	99.06	0.04	-0.08
802.11g	1.40	1.50	0.93	93.33	0.30	-0.60
802.11n-HT20	1.92	1.94	0.99	98.97	0.05	-0.09
802.11ax-HE20	1.02	1.13	0.90	90.27	0.44	-0.89

Remark:

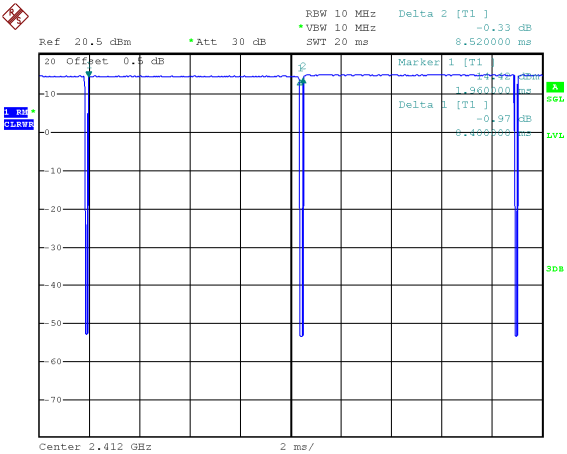
Duty cycle=On Time/period;

Duty cycle factor= $10 \cdot \log(1/\text{Duty cycle})$;

Average factor= $20 \log_{10} \text{Duty cycle}$

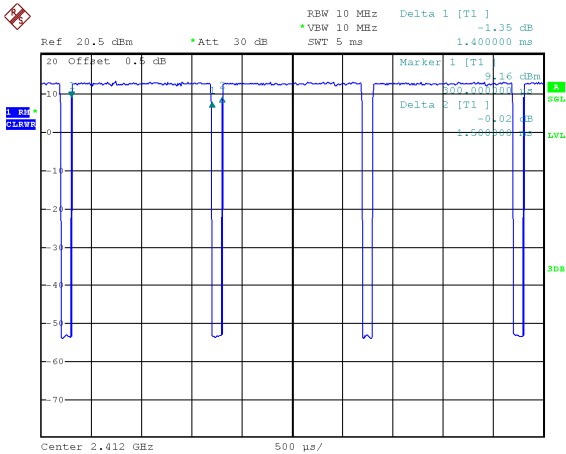
ANT 1:

Wi-Fi 802.11b



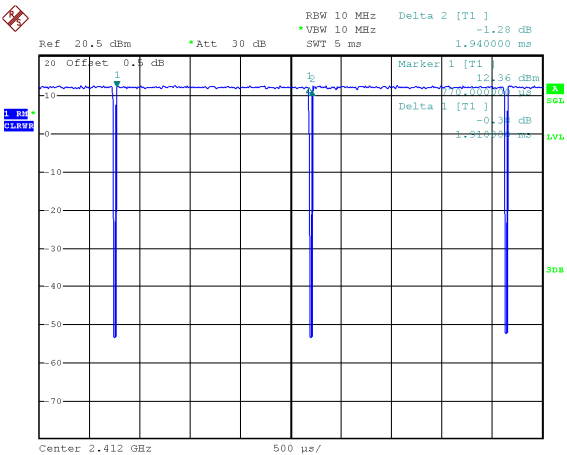
Date: 27.DEC.2025 17:00:36

Wi-Fi 802.11g



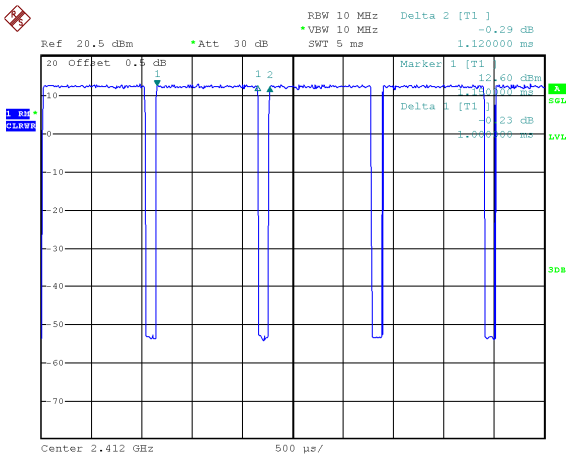
Date: 27.DEC.2025 17:02:08

Wi-Fi 802.11n-HT20



Date: 27.DEC.2025 17:03:07

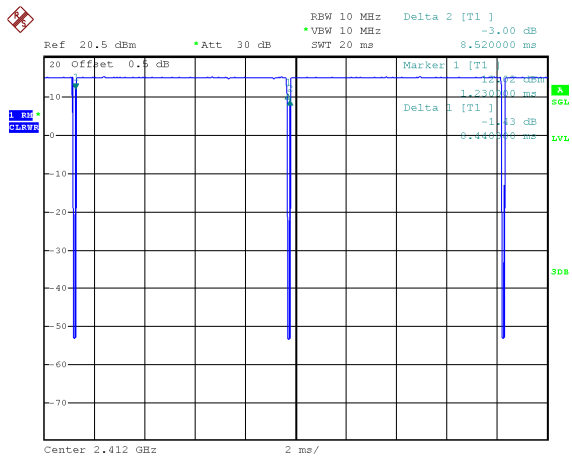
Wi-Fi 802.11ax-HE20



Date: 27.DEC.2025 17:03:50

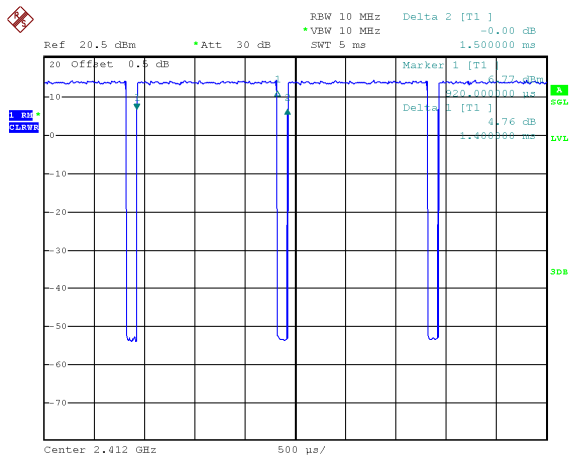
ANT 2:

Wi-Fi 802.11b



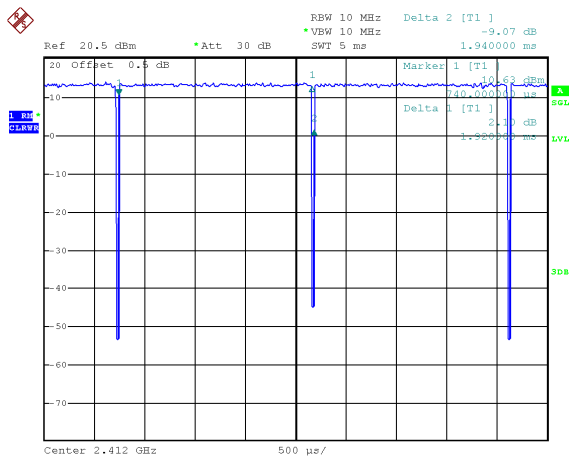
Date: 27.DEC.2025 17:05:16

Wi-Fi 802.11g



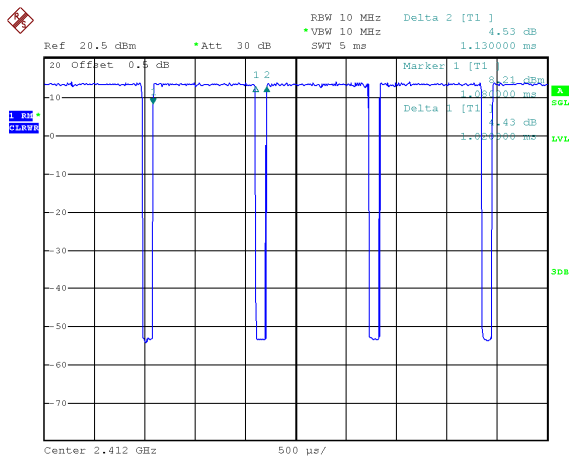
Date: 27.DEC.2025 17:06:08

Wi-Fi 802.11n-HT20



Date: 27.DEC.2025 17:06:46

Wi-Fi 802.11ax-HE20



Date: 27.DEC.2025 17:07:27

8 Conducted Emission

Test Requirement: 47CFR FCC Part15 Subpart C §15.207
Test Method: ANSI C63.10-2020
Test Result: PASS
Frequency Range: 150kHz to 30MHz
Limit:

Frequency (MHz)	Conducted Limit (dBμV)	
	Quasi peak	Average
0.15 o 0.5	66 to 56*	56 to 46 *
0.5 to 5	56	46
5 to 30	60	50
*Decreases with the logarithm of the frequency.		

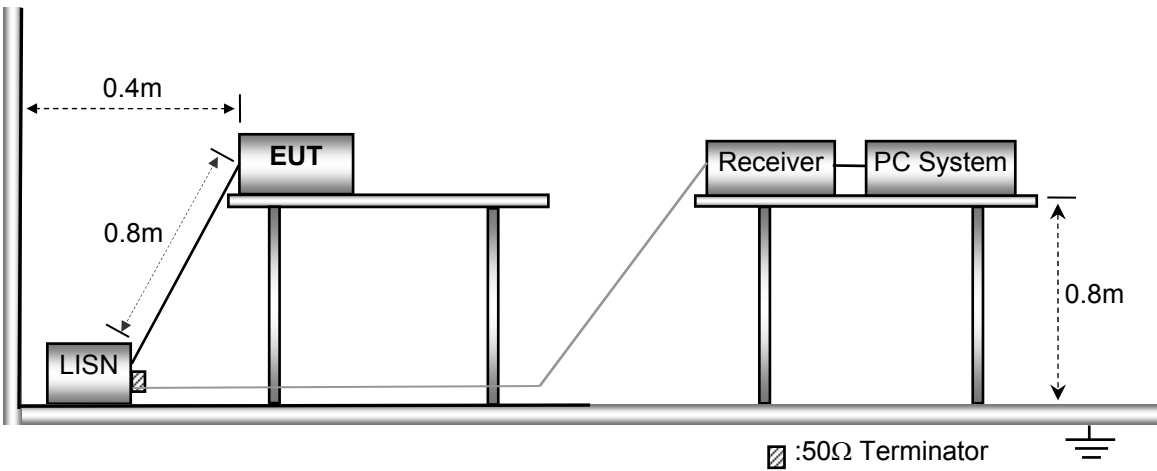
8.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5~25.1°C
Humidity: 40.1~46.8%RH
Atmospheric Pressure: 101.3~101.5kPa
EUT Operation:

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

8.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10-2020.



8.3 Measurement Description

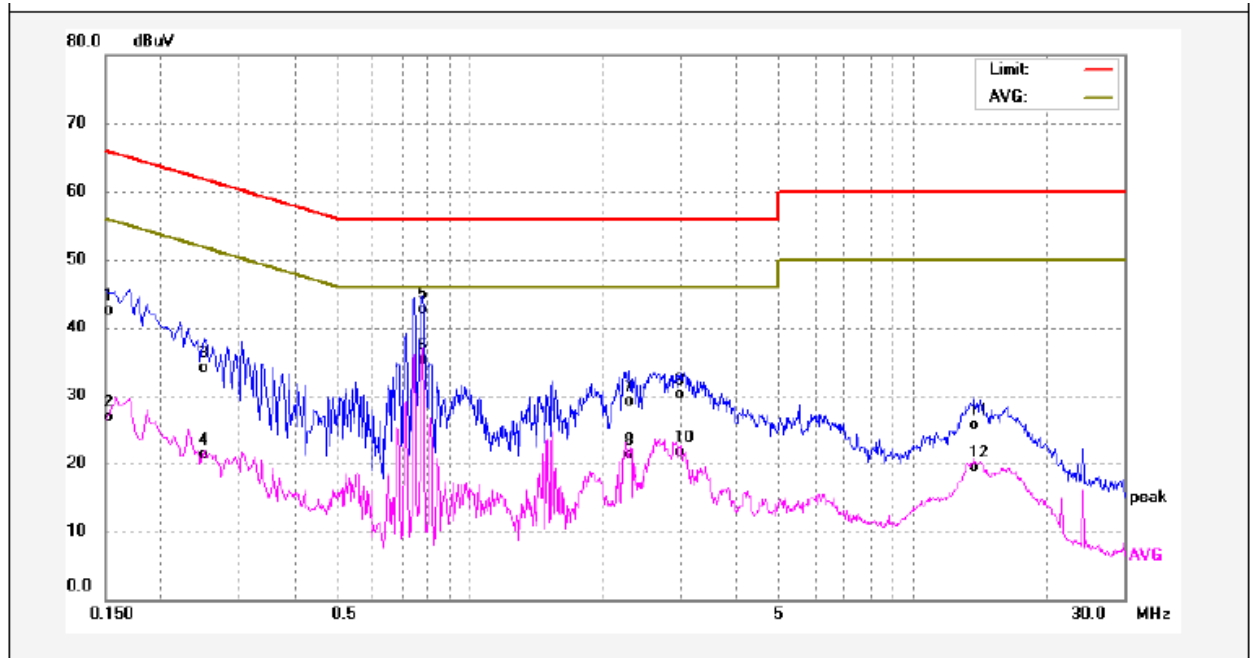
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

Remark: only the worst data were reported

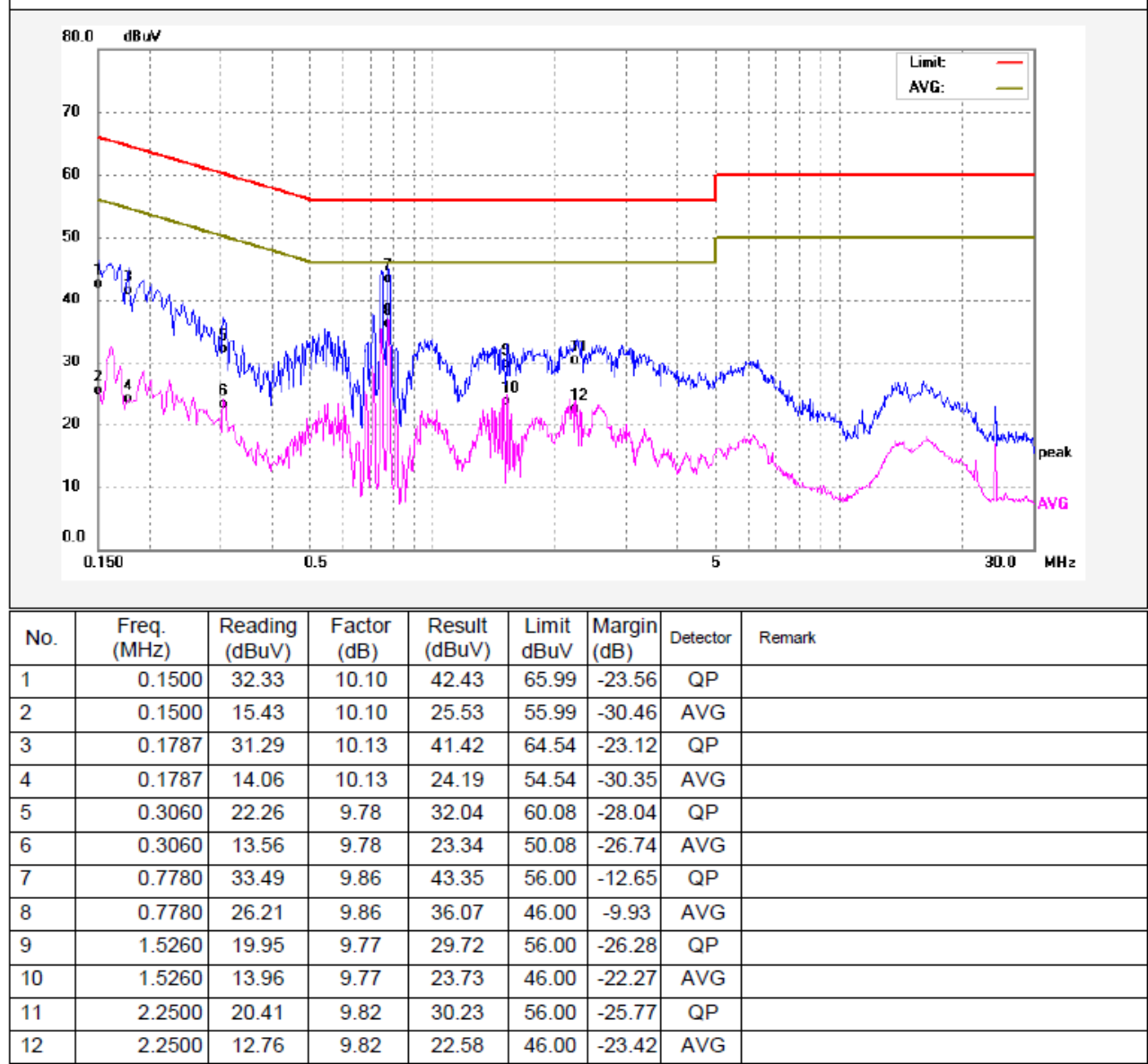
Mode: Adapter 1+configuration A_ Ant. 2_11b High channel

Live line:



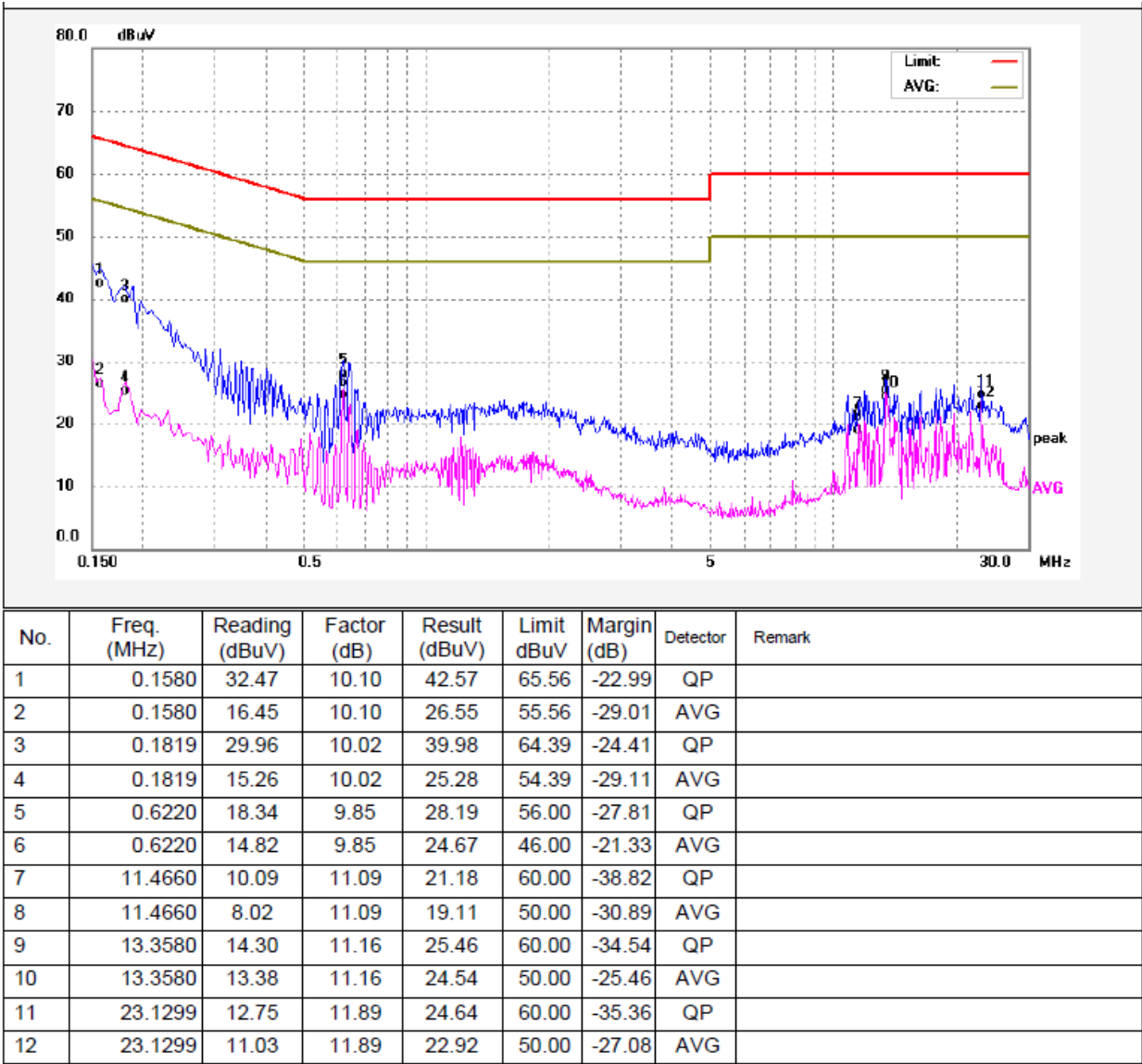
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	32.62	9.95	42.57	65.99	-23.42	QP	
2	0.1500	17.03	9.95	26.98	55.99	-29.01	AVG	
3	0.2521	24.27	9.92	34.19	61.68	-27.49	QP	
4	0.2521	11.42	9.92	21.34	51.68	-30.34	AVG	
5	0.7820	32.77	10.01	42.78	56.00	-13.22	QP	
6	0.7820	25.30	10.01	35.31	46.00	-10.69	AVG	
7	2.2860	19.33	9.81	29.14	56.00	-26.86	QP	
8	2.2860	11.55	9.81	21.36	46.00	-24.64	AVG	
9	2.9940	20.13	9.93	30.06	56.00	-25.94	QP	
10	2.9940	11.82	9.93	21.75	46.00	-24.25	AVG	
11	13.7660	15.61	10.14	25.75	60.00	-34.25	QP	
12	13.7660	9.36	10.14	19.50	50.00	-30.50	AVG	

Neutral line:

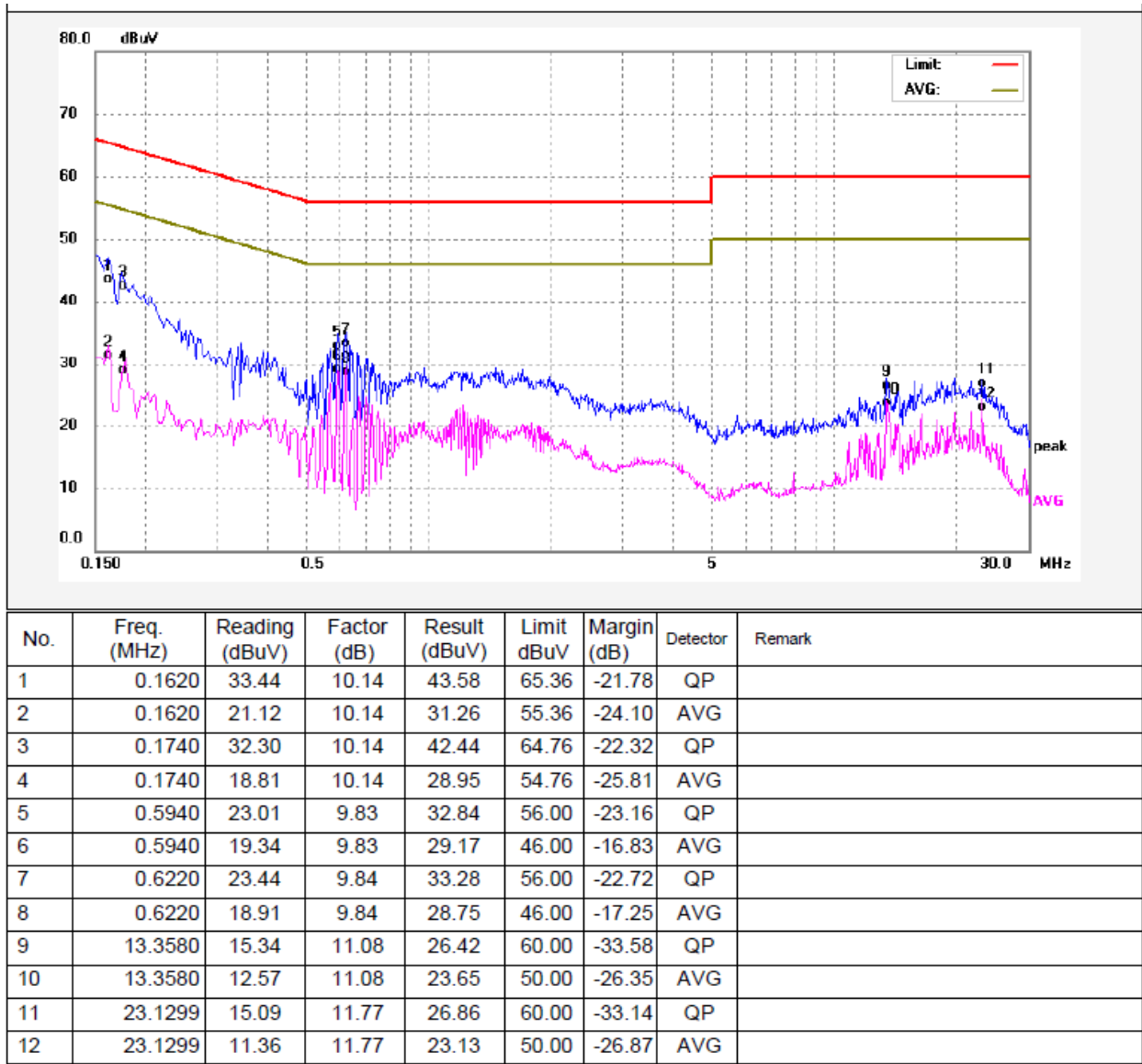


Mode: Adapter 2+configuration A_ Ant. 2_11b High channel

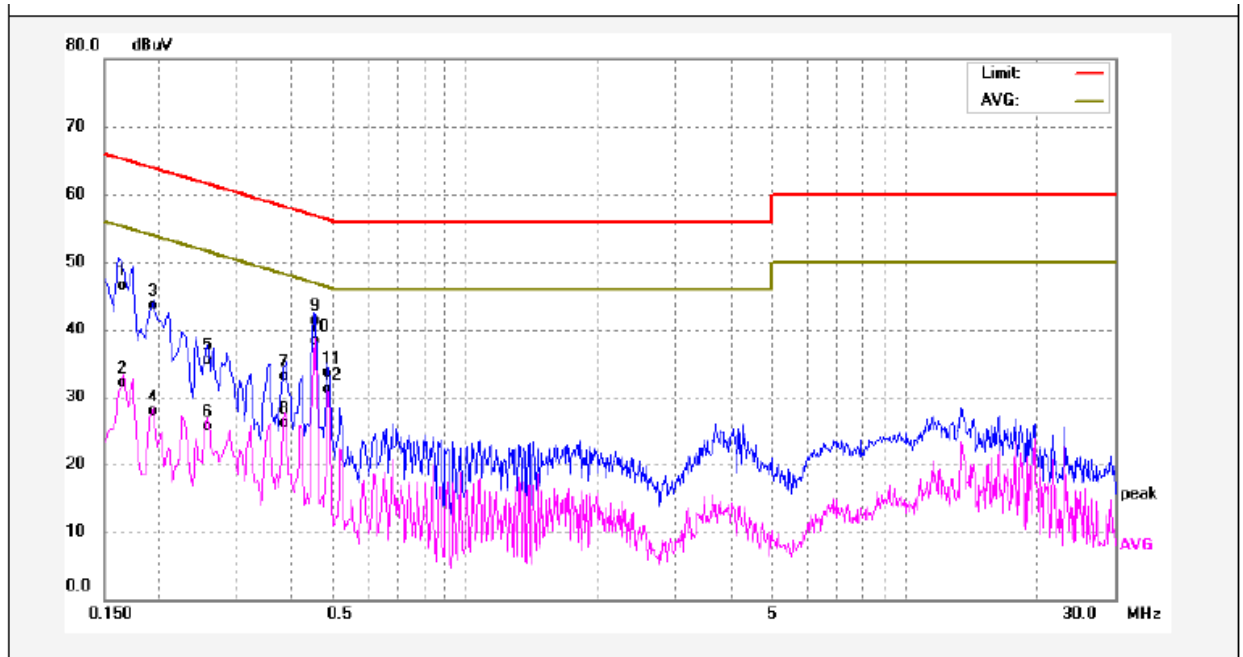
Live Line:



Neutral Line:

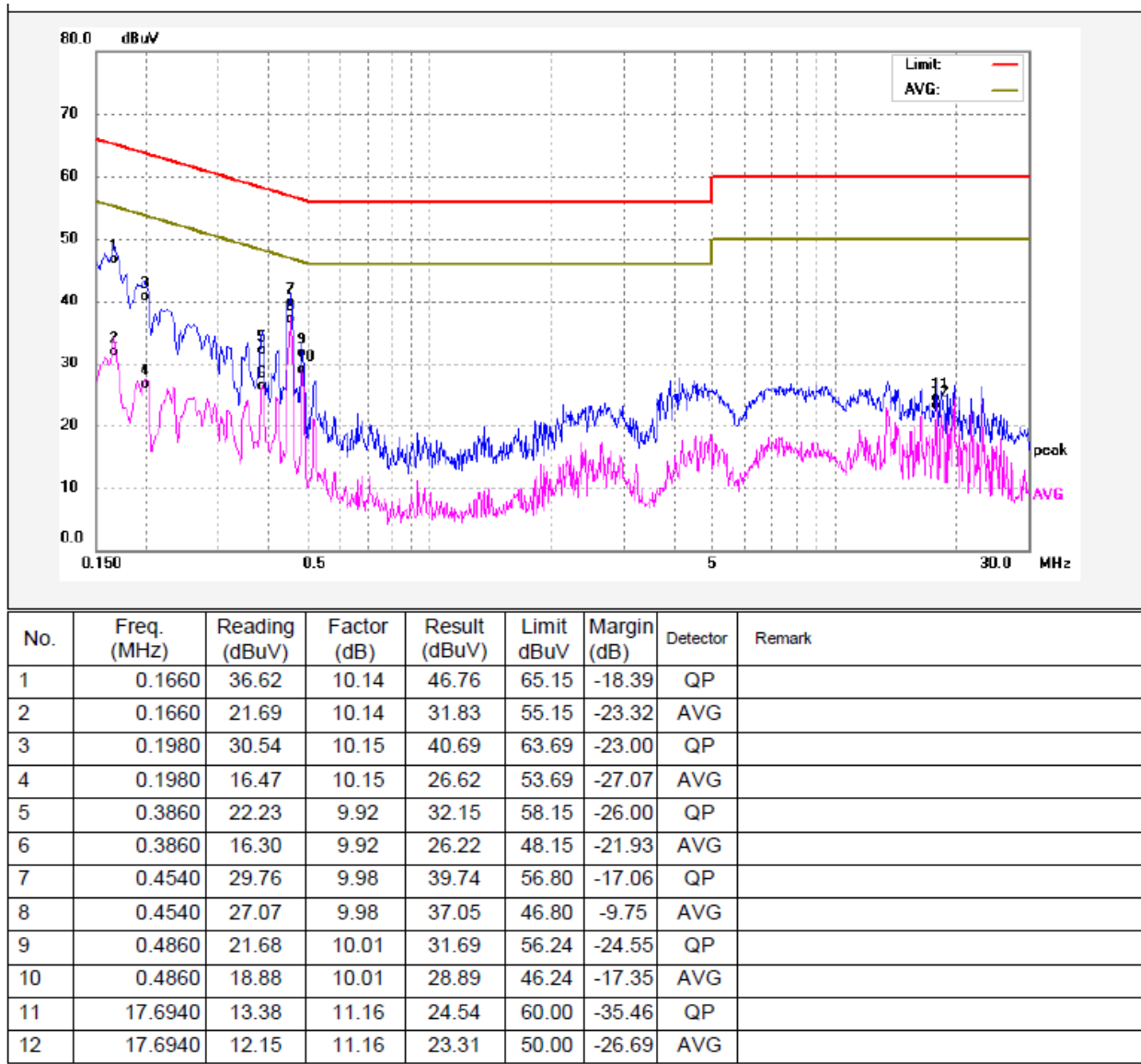


Mode: Adapter 3+configuration A_ Ant. 2_11b High channel
Live Line:



No.	Freq. (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit dBμV	Margin (dB)	Detector	Remark
1	0.1660	36.34	10.07	46.41	65.15	-18.74	QP	
2	0.1660	22.12	10.07	32.19	55.15	-22.96	AVG	
3	0.1940	33.48	9.99	43.47	63.86	-20.39	QP	
4	0.1940	17.88	9.99	27.87	53.86	-25.99	AVG	
5	0.2580	25.67	9.87	35.54	61.49	-25.95	QP	
6	0.2580	15.77	9.87	25.64	51.49	-25.85	AVG	
7	0.3860	23.12	9.89	33.01	58.15	-25.14	QP	
8	0.3860	16.23	9.89	26.12	48.15	-22.03	AVG	
9	0.4540	31.27	9.97	41.24	56.80	-15.56	QP	
10	0.4540	28.42	9.97	38.39	46.80	-8.41	AVG	
11	0.4860	23.45	10.00	33.45	56.24	-22.79	QP	
12	0.4860	21.08	10.00	31.08	46.24	-15.16	AVG	

Neutral Line:



9 Radiated Emissions

Test Requirement: 47CFR FCC Part15 Subpart C §15.209&15.247
KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019;
ANSI C63.10-2020

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(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
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	$20\log^{(500)}$

9.1 EUT Operation

Operating Environment:

Temperature: 22.4~25.1°C

Humidity: 38.8~46.7%RH

Atmospheric Pressure: 101.3~101.5kPa

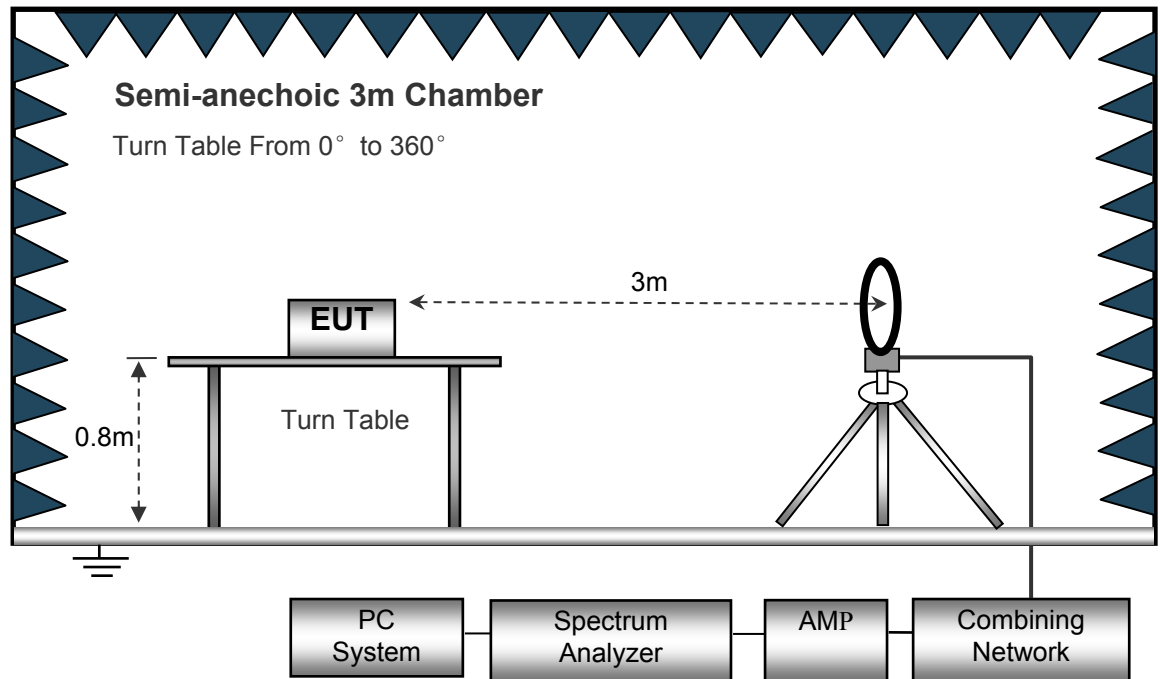
EUT Operation:

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

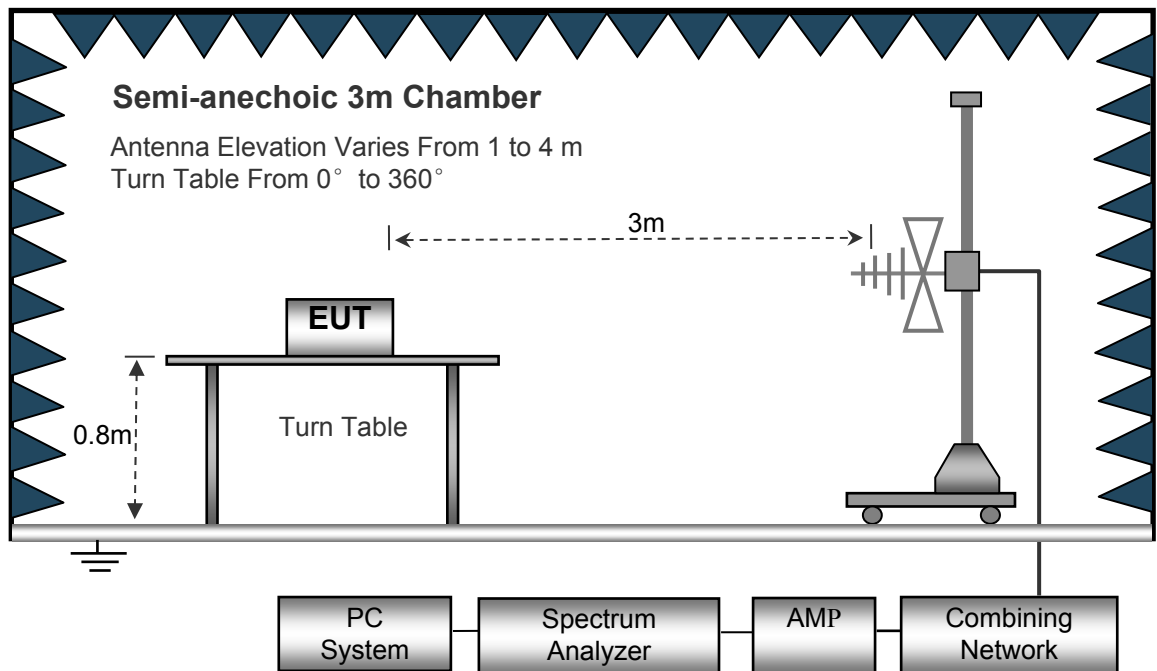
9.2 Test Setup

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

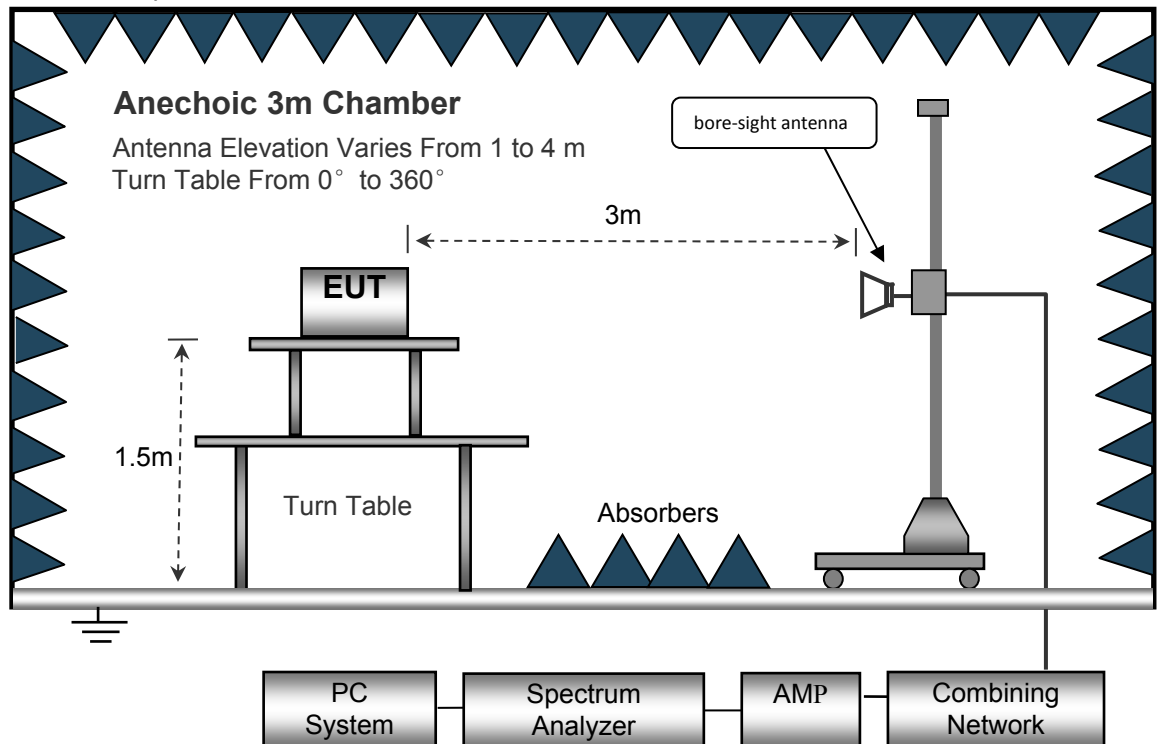
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



9.3 Spectrum Analyzer Setup

Below 30MHz

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

30MHz ~ 1GHz

Sweep Speed Auto
 Detector PK
 Resolution Bandwidth..... 100kHz
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed Auto
 Detector PK
 Resolution Bandwidth..... 1MHz
 Video Bandwidth..... 3MHz
 Detector Ave.
 Resolution Bandwidth..... 1MHz
 Video Bandwidth..... 10Hz

9.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
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 Z axis, so the worst data were shown as follow.
8. A 2.4GHz high -pass filter is used during radiated emissions above 1GHz measurement.

9.5 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:

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

9.6 Summary of Test Results

Remark: only the worst data were reported.

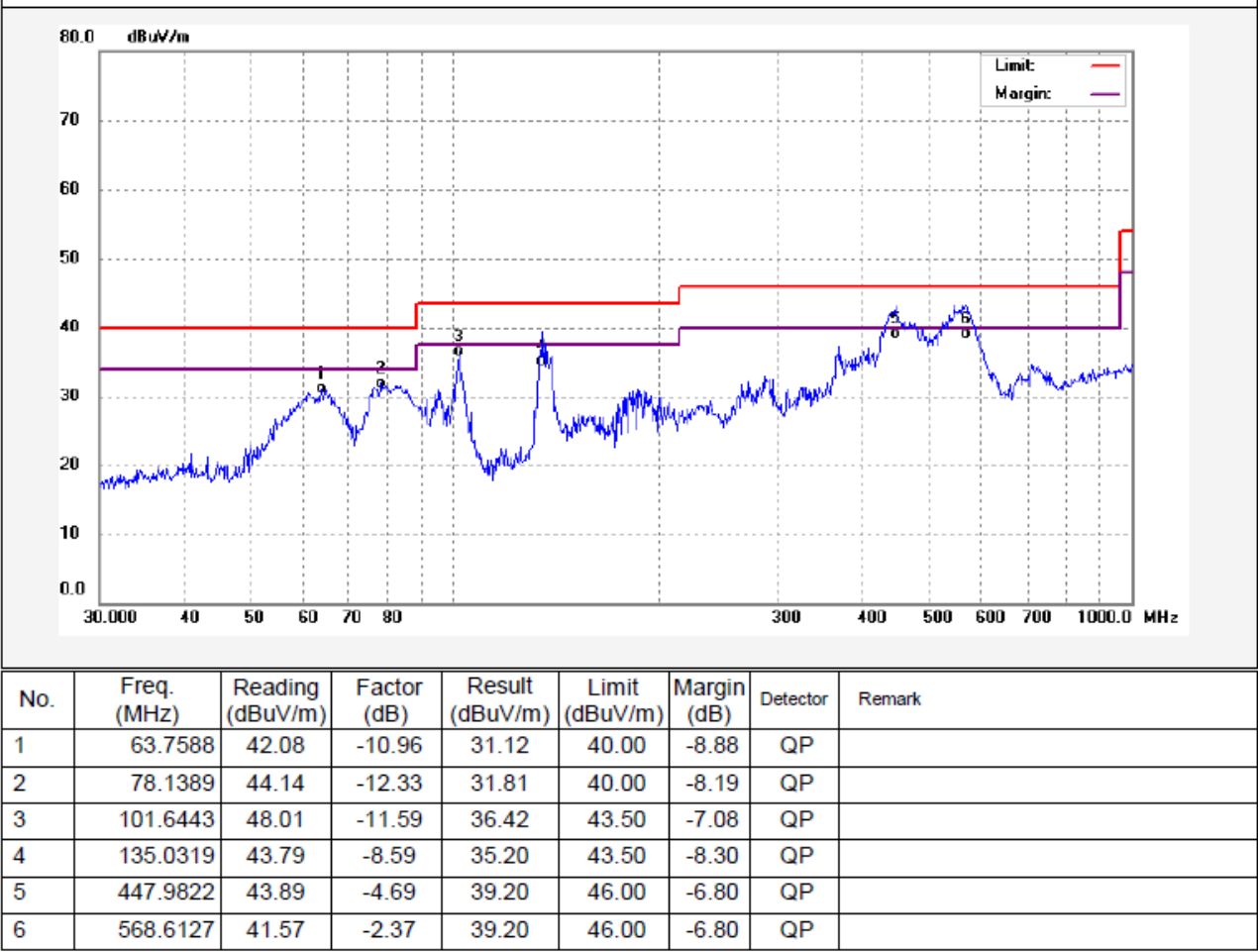
Test Frequency: 9kHz ~ 30MHz

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

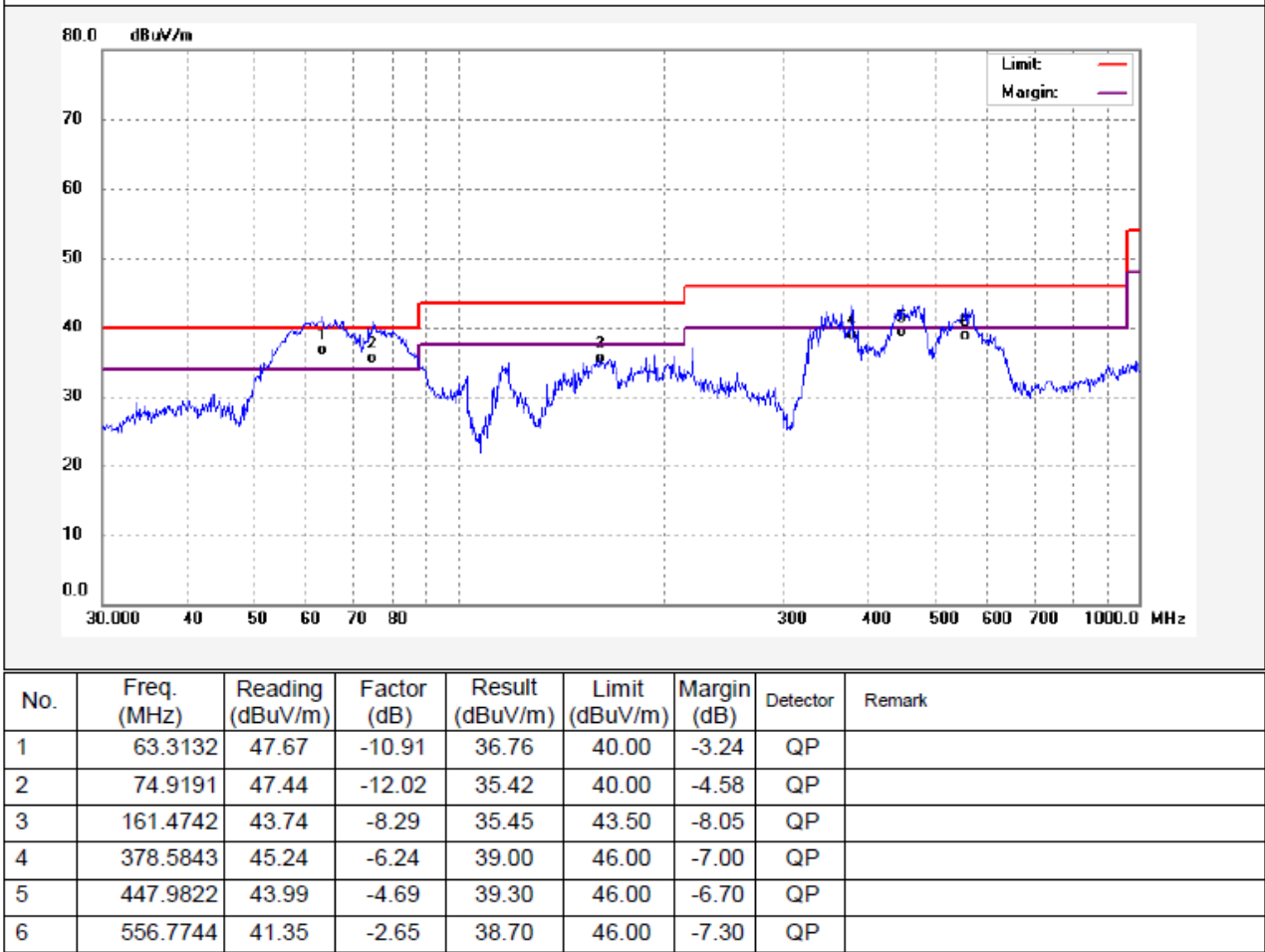
Test Frequency: 30MHz ~ 1GHz

Mode: Adapter 1+configuration A_ Ant. 1+ Ant. 2_11n20 High channel

Antenna Polarization: Horizontal

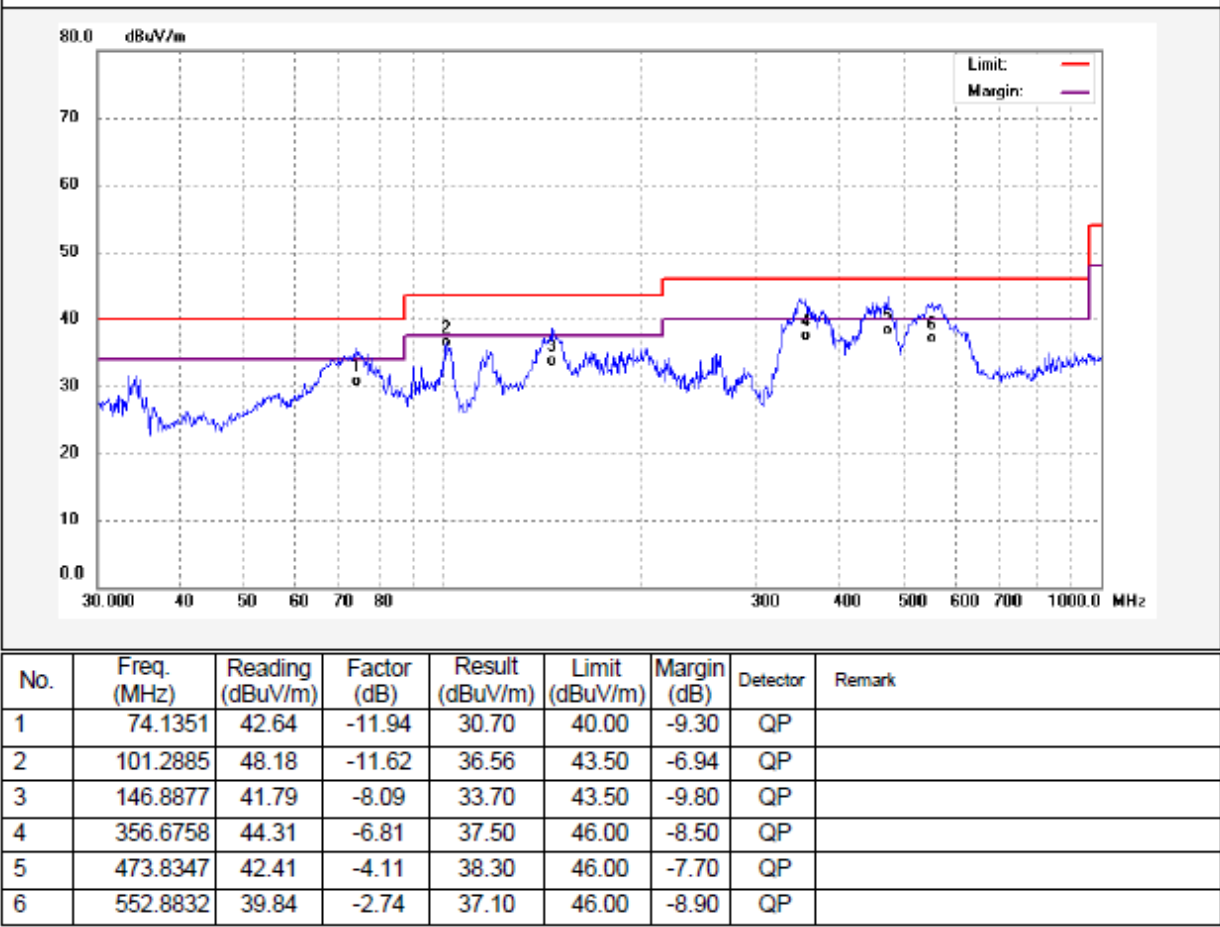


Antenna Polarization: Vertical

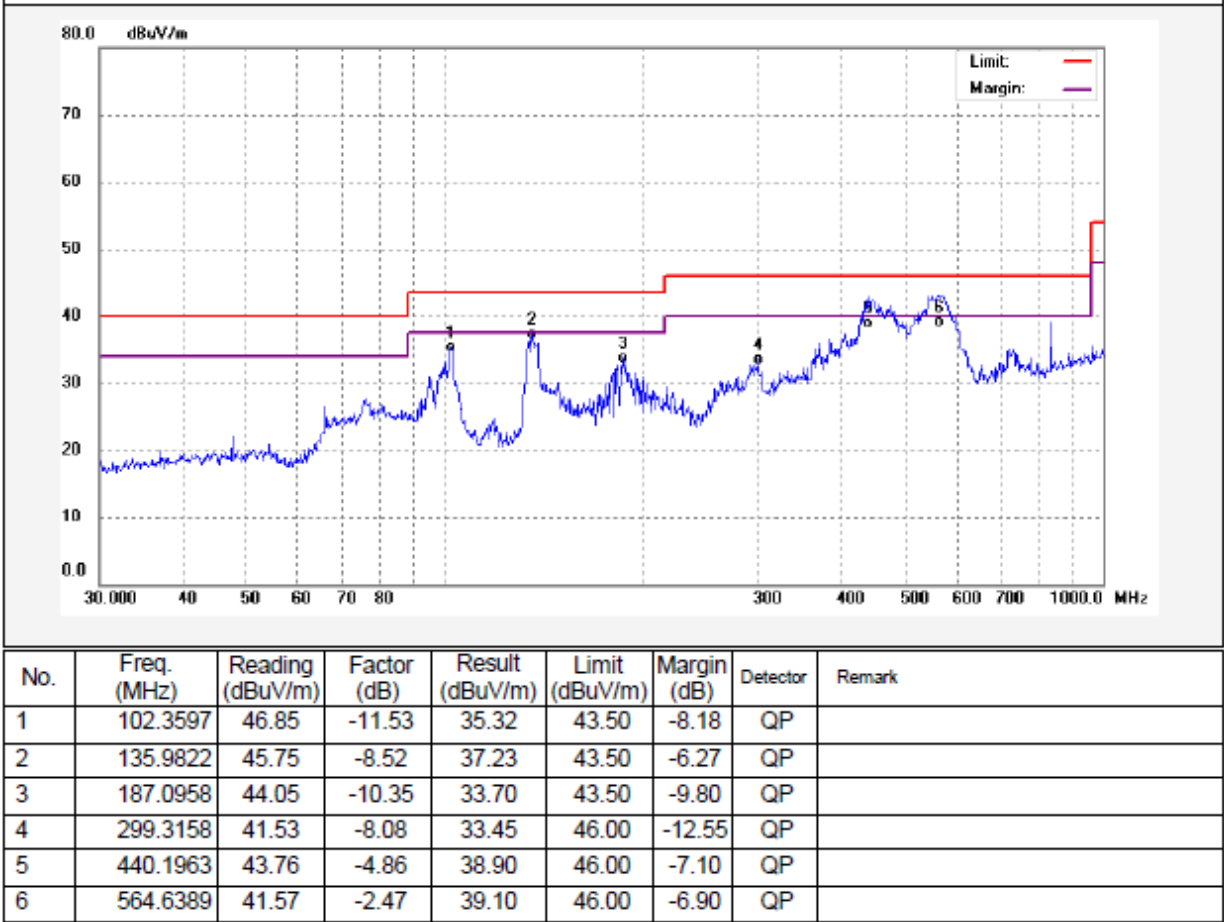


Mode: Adapter 2+configuration A_ Ant. 1+ Ant. 2_11n20 High channel

Antenna Polarization: Vertical



Antenna Polarization: Horizontal

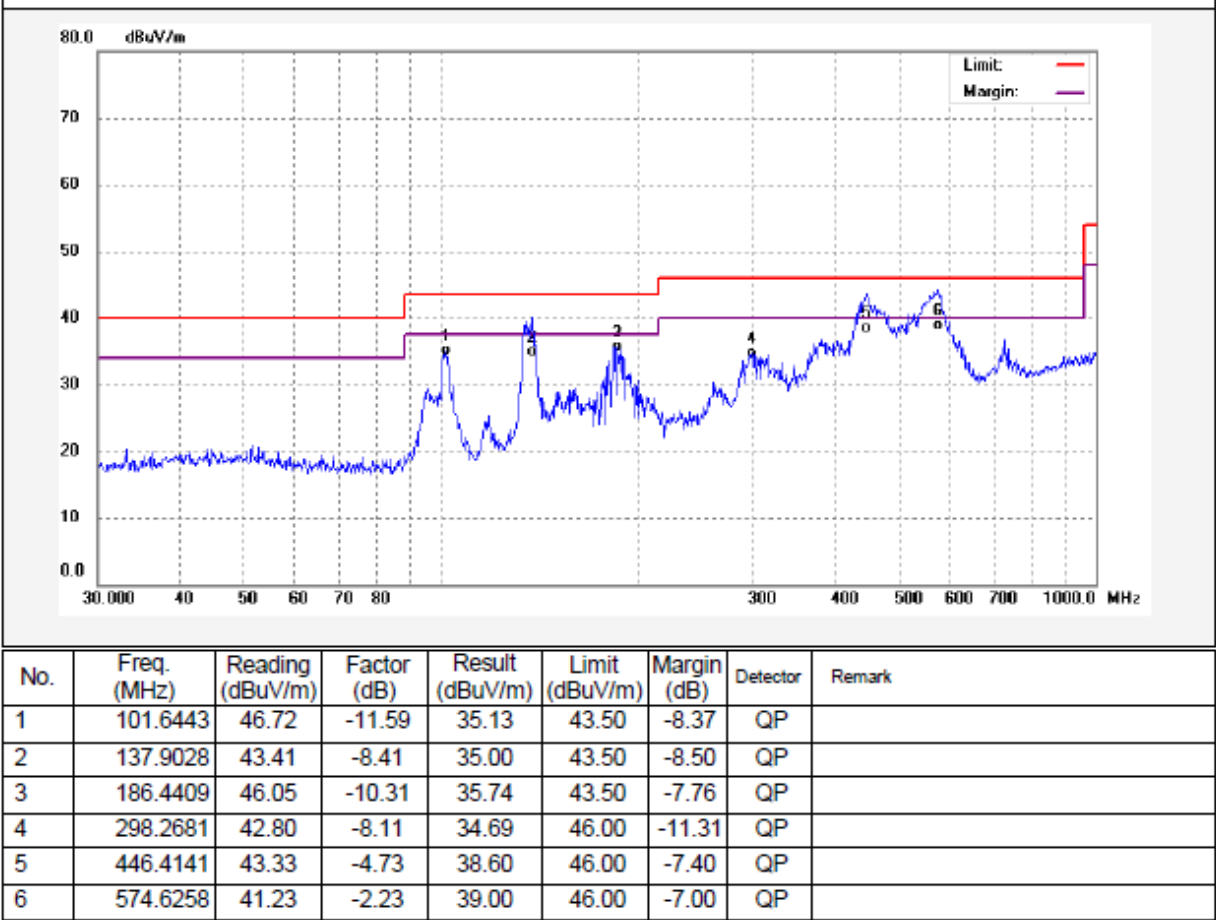


Mode: Adapter 3+configuration A_ Ant. 1+ Ant. 2_11n20 High channel

Antenna Polarization: Vertical

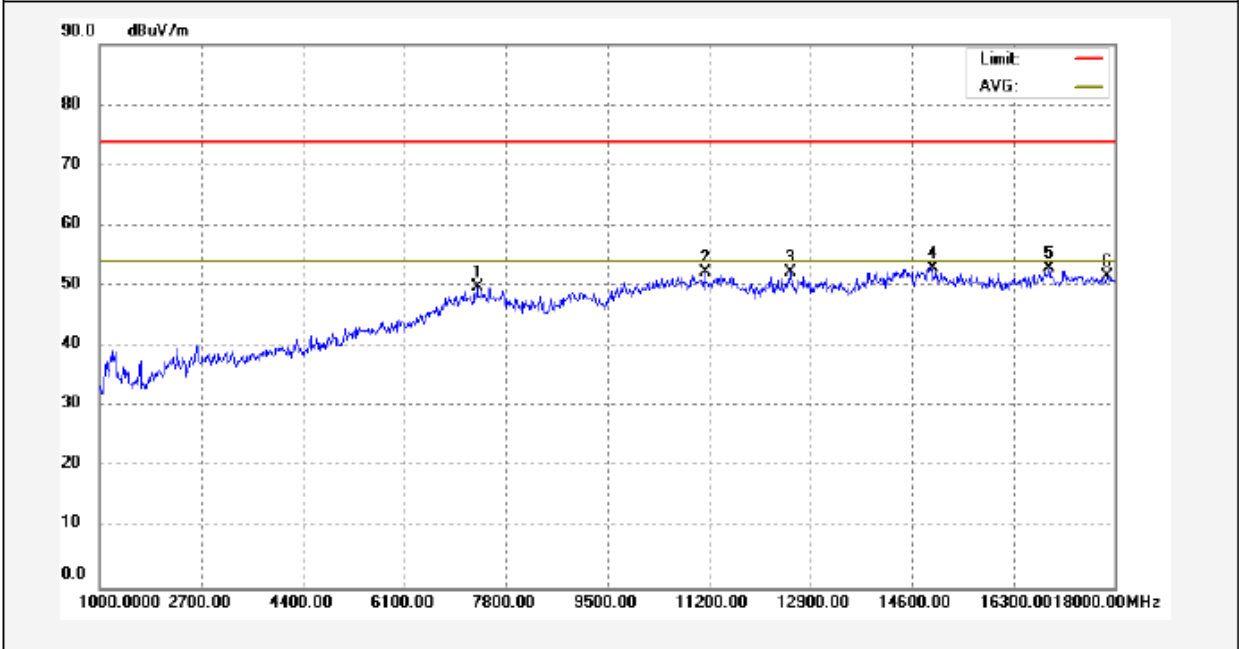


Antenna Polarization: Horizontal



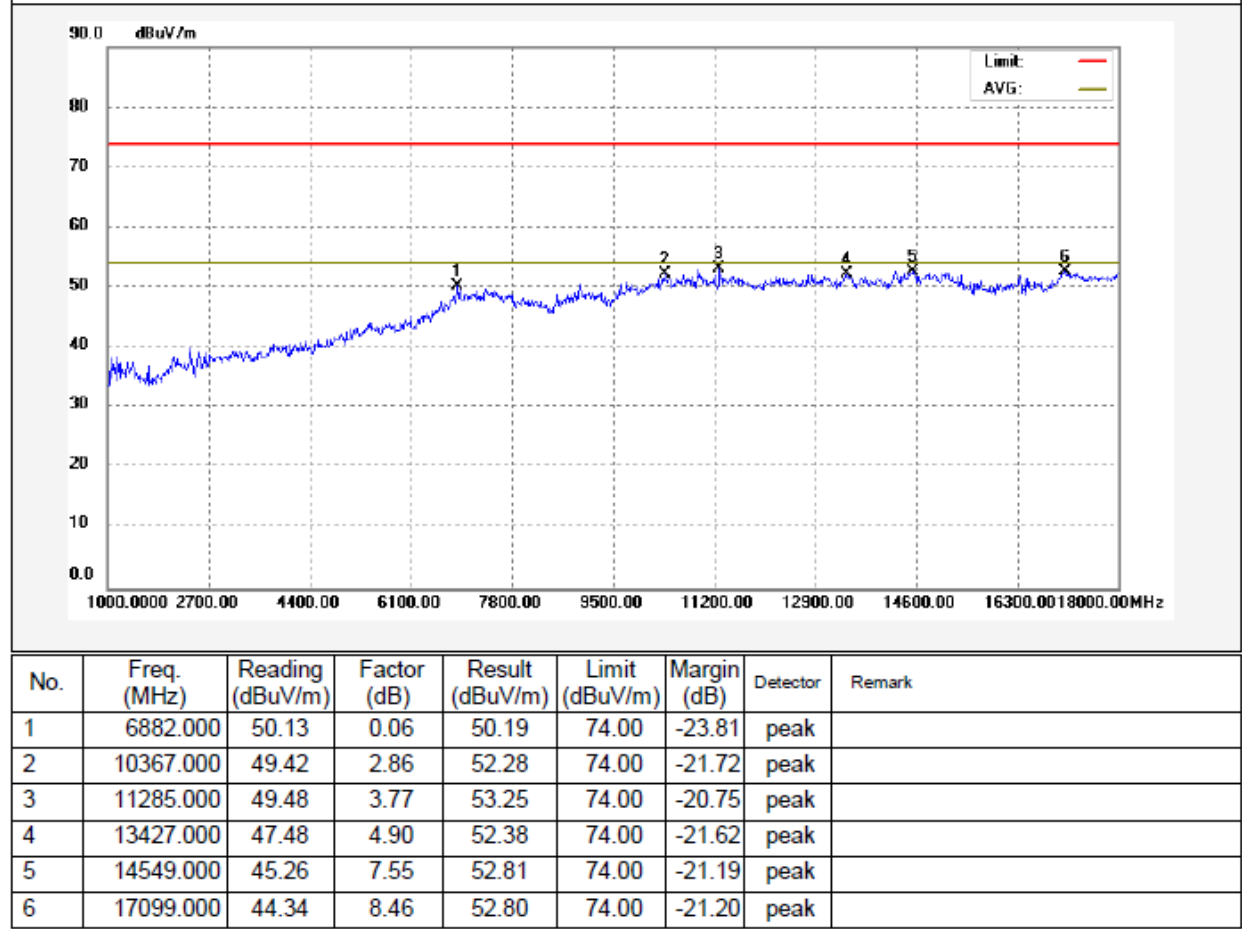
Test Frequency: 1GHz ~ 18GHz

Mode: Adapter 3+configuration A_ Ant. 1+ Ant. 2_11n20 High channel
Antenna Polarization: Vertical



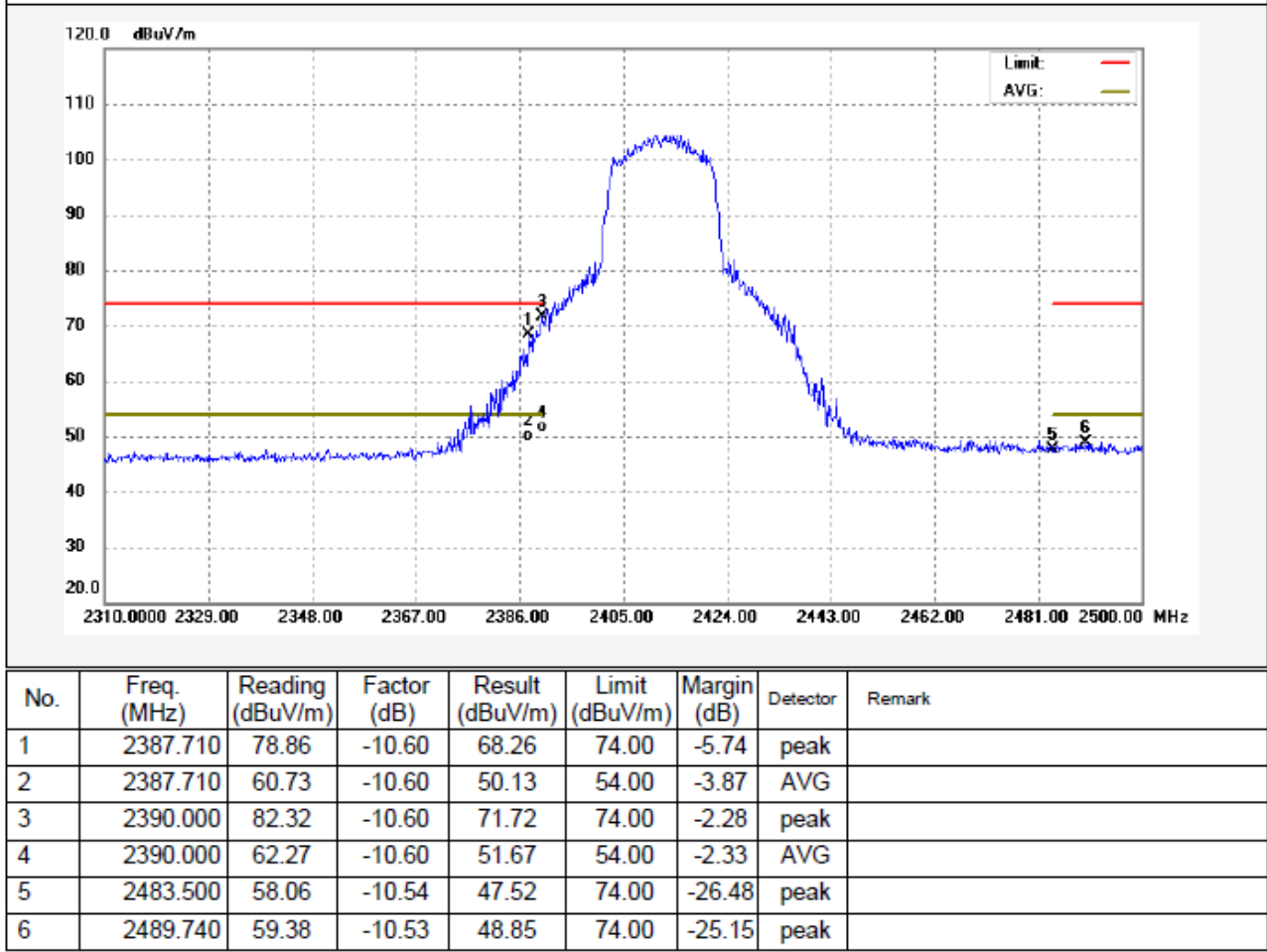
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	7324.000	49.05	0.75	49.80	74.00	-24.20	peak	
2	11132.000	48.41	3.83	52.24	74.00	-21.76	peak	
3	12577.000	49.19	3.02	52.21	74.00	-21.79	peak	
4	14940.000	46.25	6.82	53.07	74.00	-20.93	peak	
5	16895.000	45.26	7.64	52.90	74.00	-21.10	peak	
6	17881.000	39.29	12.27	51.56	74.00	-22.44	peak	

Antenna Polarization: Horizontal

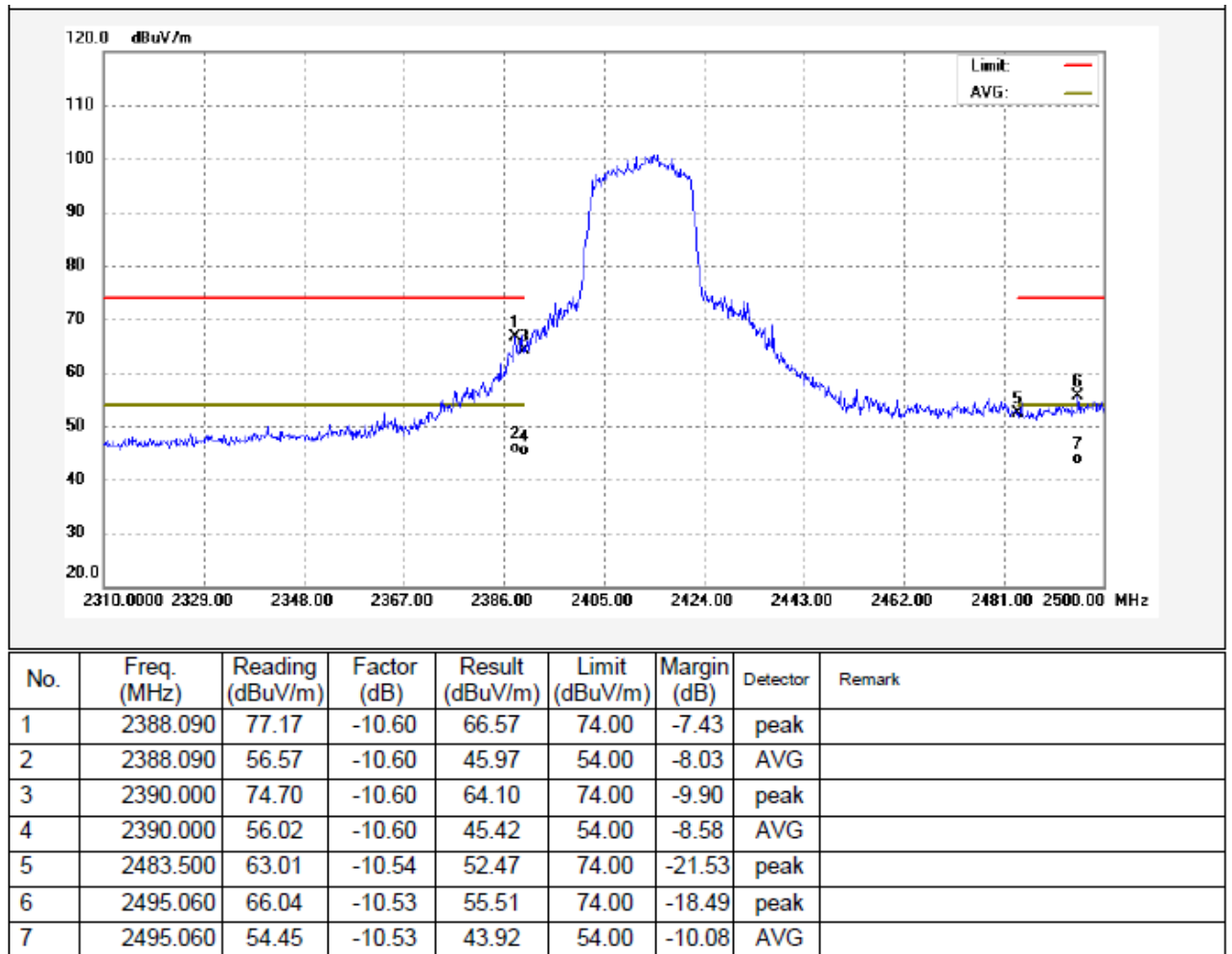


Radiated Restricted Band Emission

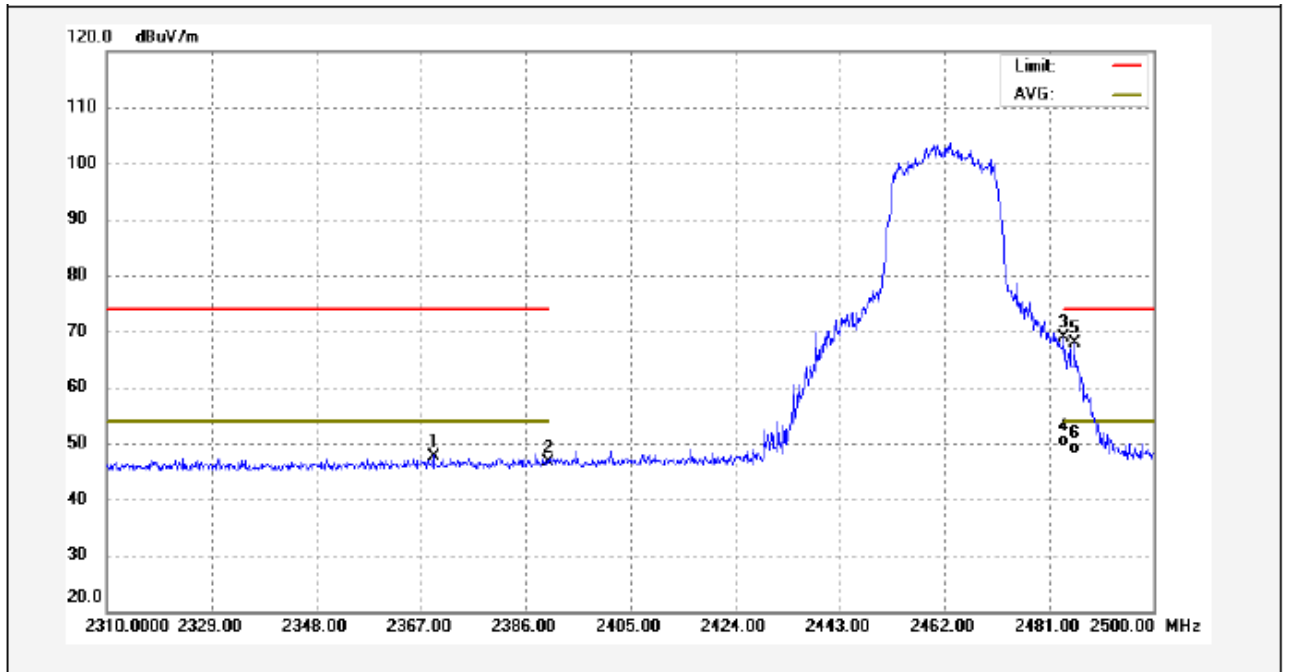
Mode: Adapter 3+configuration A_ Ant. 1+ Ant. 2_11ax20 Low channel
Antenna Polarization: Horizontal



Antenna Polarization: Vertical

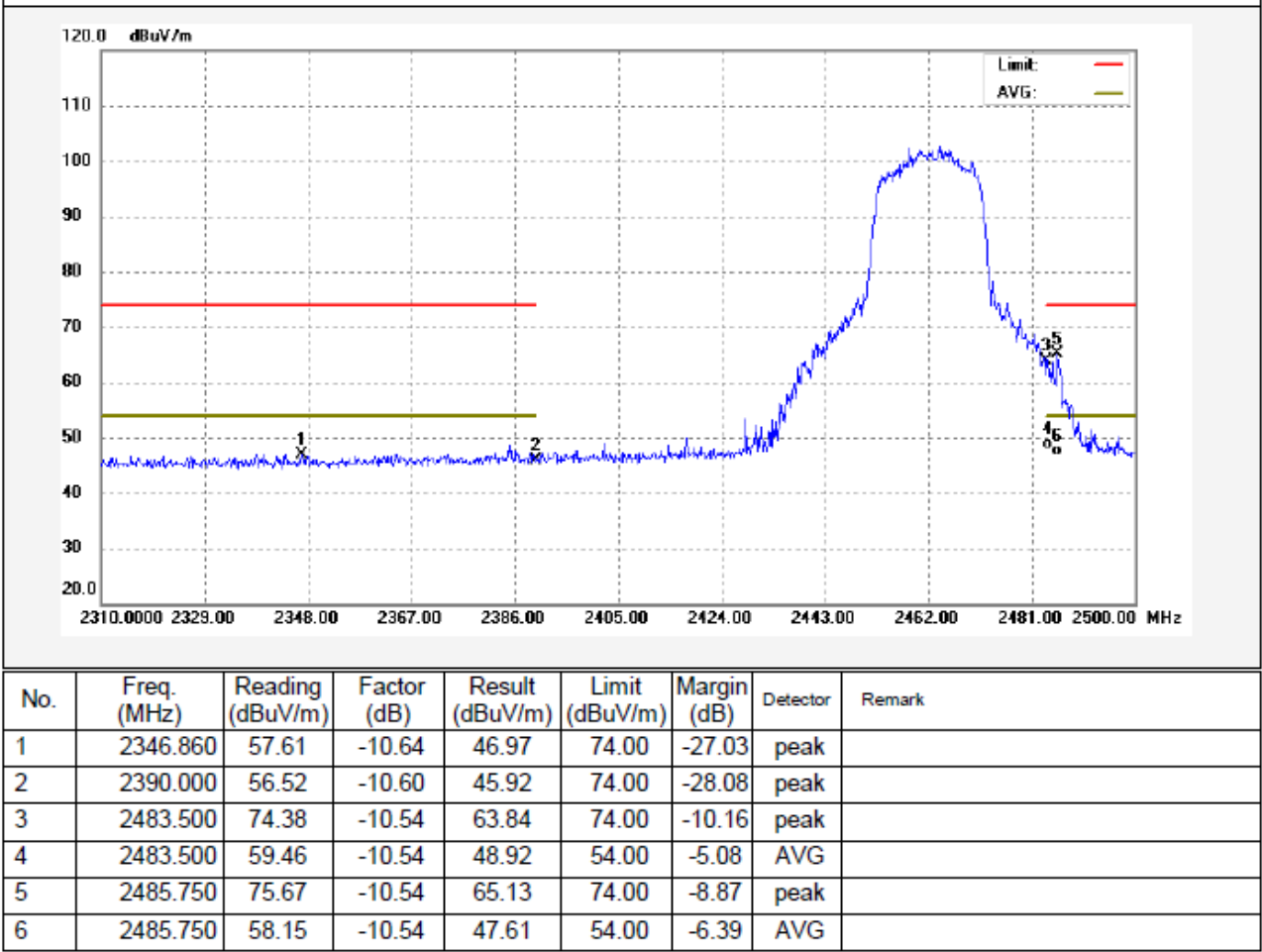


Mode: Adapter 3+configuration A_ Ant. 1+ Ant. 2_11ax20 High channel
Antenna Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2369.280	58.37	-10.62	47.75	74.00	-26.25	peak	
2	2390.000	57.19	-10.60	46.59	74.00	-27.41	peak	
3	2483.500	79.36	-10.54	68.82	74.00	-5.18	peak	
4	2483.500	60.88	-10.54	50.34	54.00	-3.66	AVG	
5	2485.560	78.42	-10.54	67.88	74.00	-6.12	peak	
6	2485.560	59.73	-10.54	49.19	54.00	-4.81	AVG	

Antenna Polarization: Vertical



Test Frequency: 18GHz~25GHz

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

10 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247
KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;
ANSI C63.10-2020
Test Result: PASS

Limit:

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

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:

Below 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

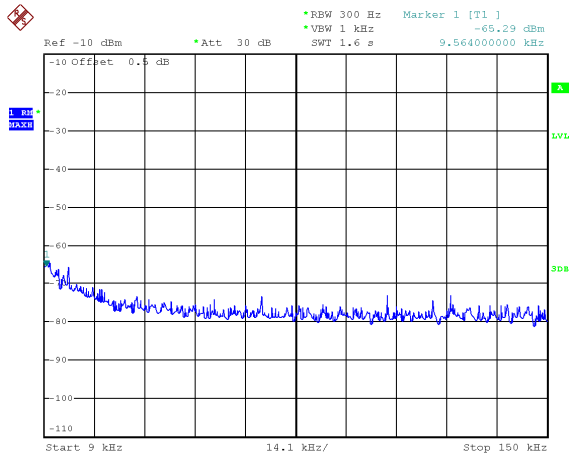
Detector function = peak, Trace = max hold

10.2 Test Result

ANT 1

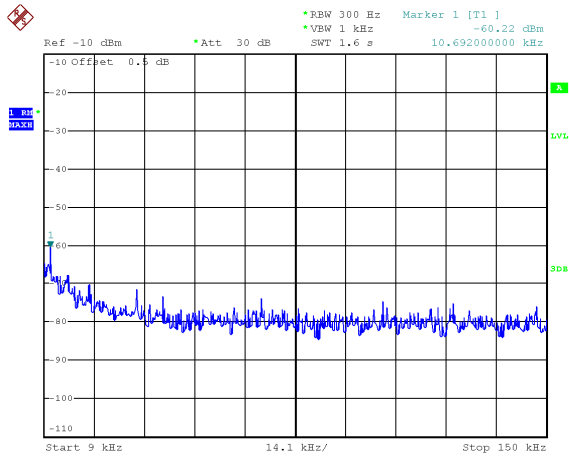
9KHz – 150KHz

Mode: TX 11b channel 1



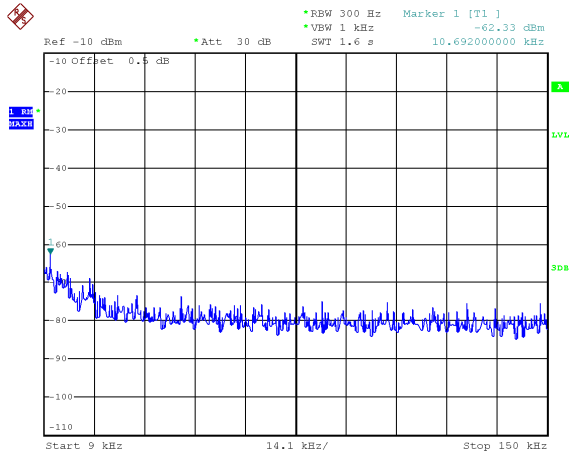
Date: 27.DEC.2025 17:22:28

Mode: TX 11b channel 6



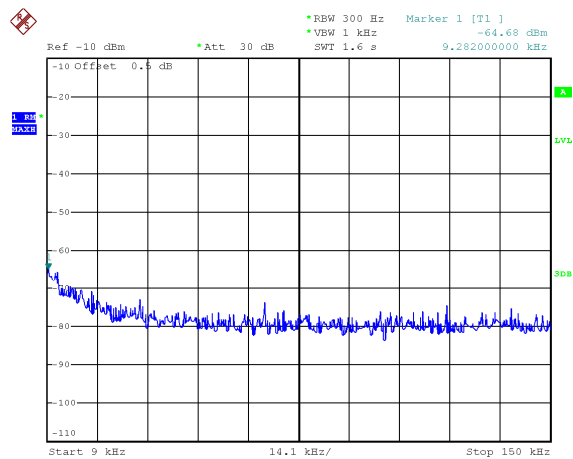
Date: 27.DEC.2025 17:22:46

Mode: TX 11b channel 11



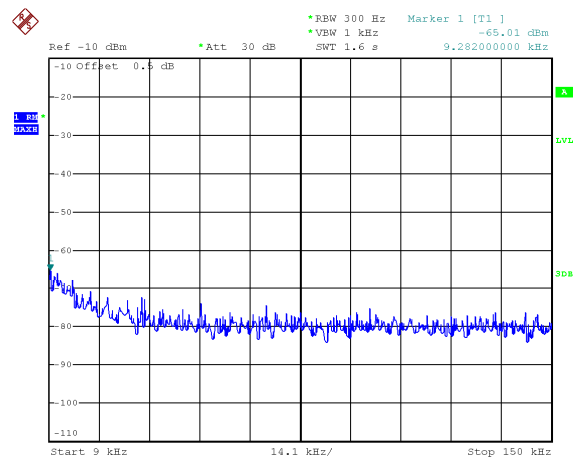
Date: 27.DEC.2025 17:23:03

Mode: TX 11g channel 1



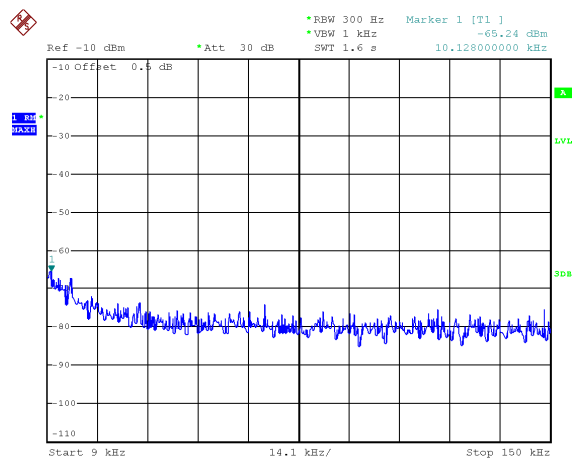
Date: 27.DEC.2025 17:24:22

Mode: TX 11g channel 6



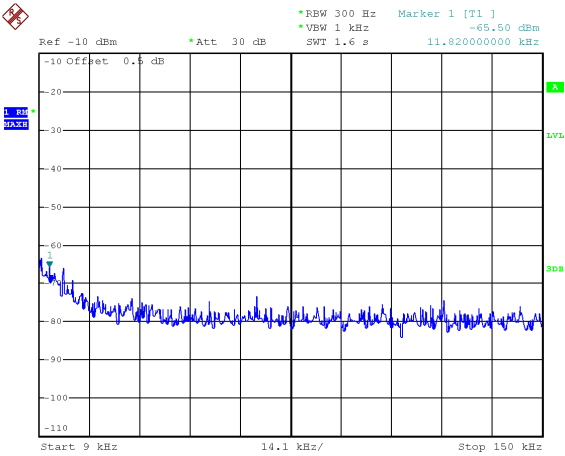
Date: 27.DEC.2025 17:24:42

Mode: TX 11g channel 11



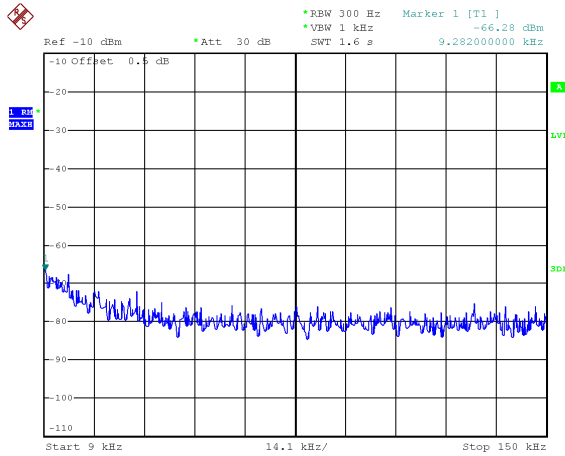
Date: 27.DEC.2025 17:25:01

Mode: TX 11n HT20 channel 1



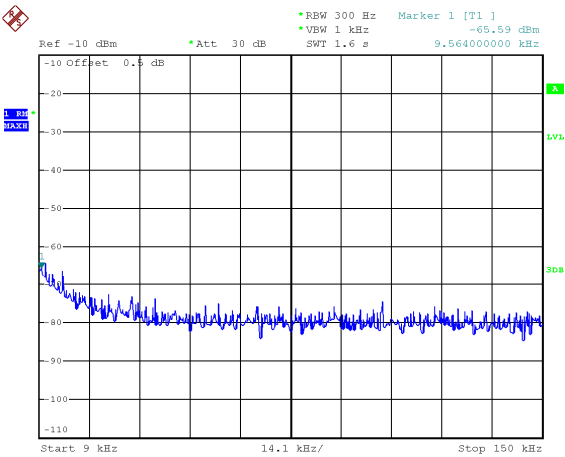
Date: 27.DEC.2025 17:25:27

Mode: TX 11 n HT20 channel 6



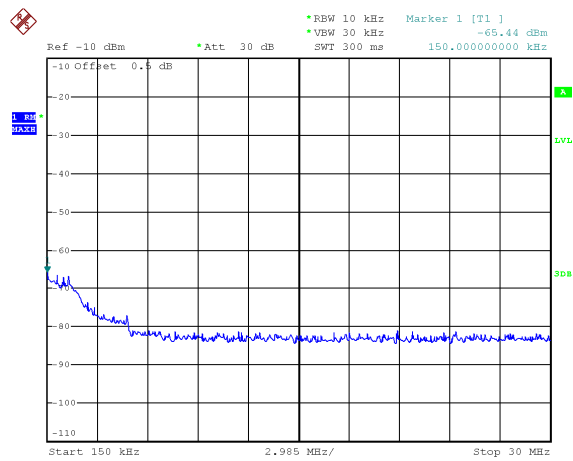
Date: 27.DEC.2025 17:25:44

Mode: TX 11 n HT20 channel 11



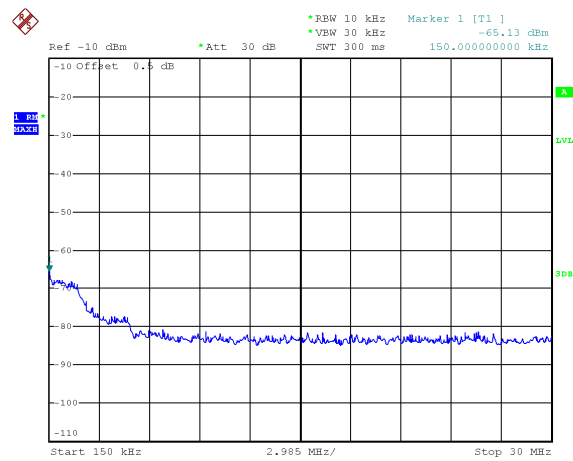
Date: 27.DEC.2025 17:26:05

Mode: TX 11ax HE20 channel 1



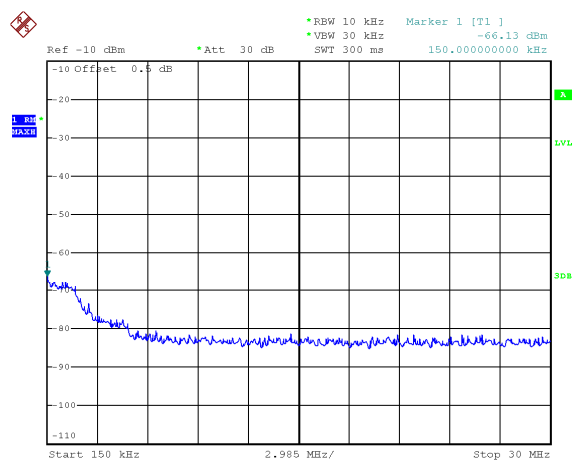
Date: 27.DEC.2025 17:35:35

Mode: TX 11ax HE20 channel 6



Date: 27.DEC.2025 17:35:51

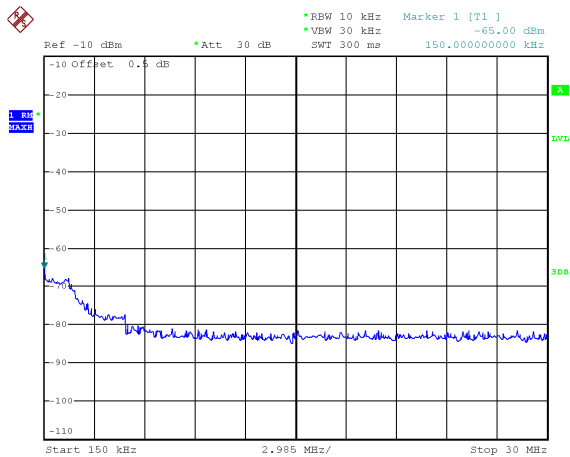
Mode: TX 11ax HE20 channel 11



Date: 27.DEC.2025 17:36:05

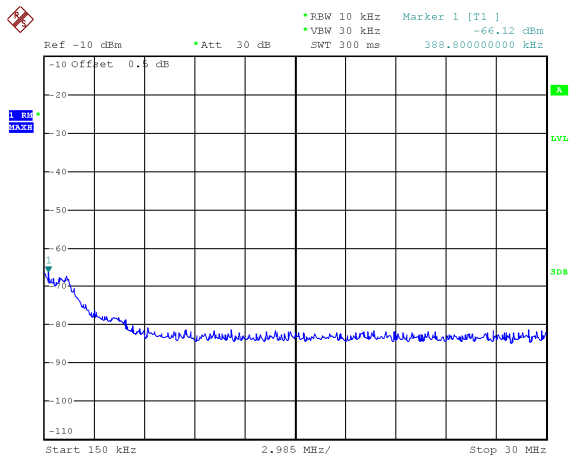
150kHz – 30MHz

Mode: TX 11b channel 1



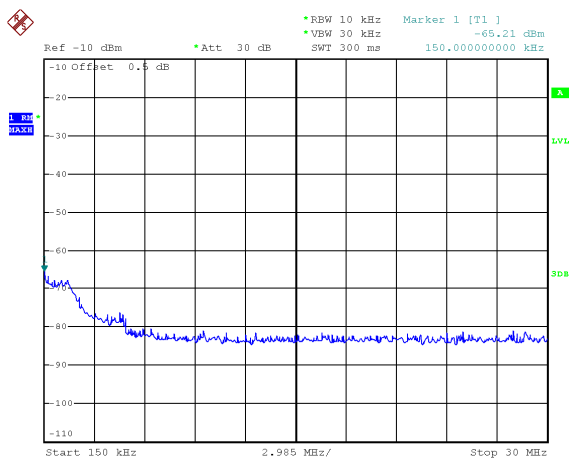
Date: 27.DEC.2025 17:32:21

Mode: TX 11b channel 6



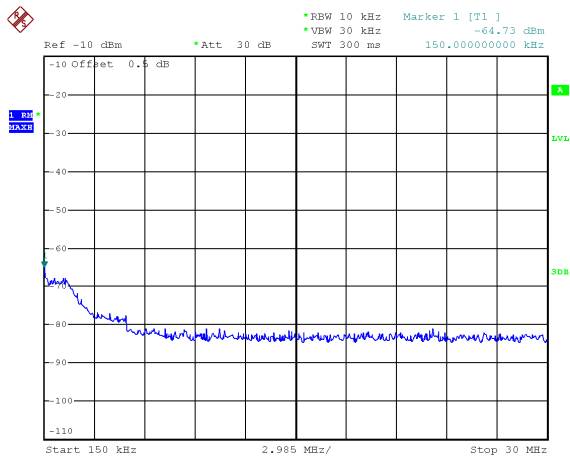
Date: 27.DEC.2025 17:32:39

Mode: TX 11b channel 11



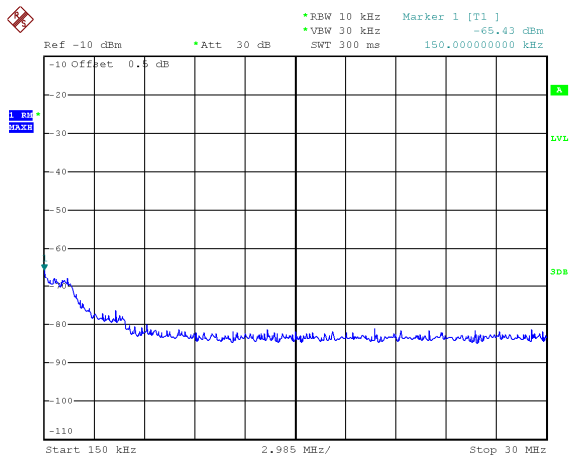
Date: 27.DEC.2025 17:33:48

Mode: TX 11g channel 1



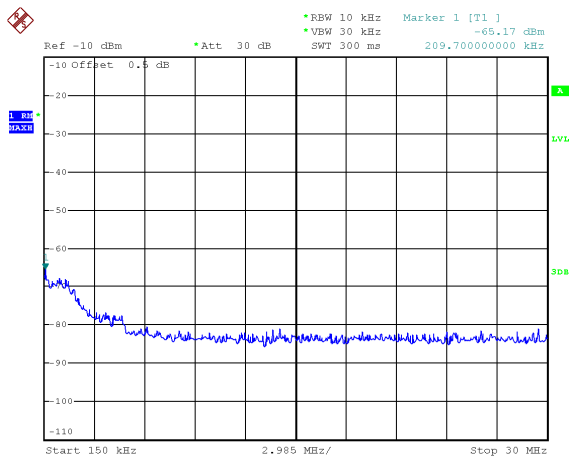
Date: 27.DEC.2025 17:34:03

Mode: TX 11g channel 6



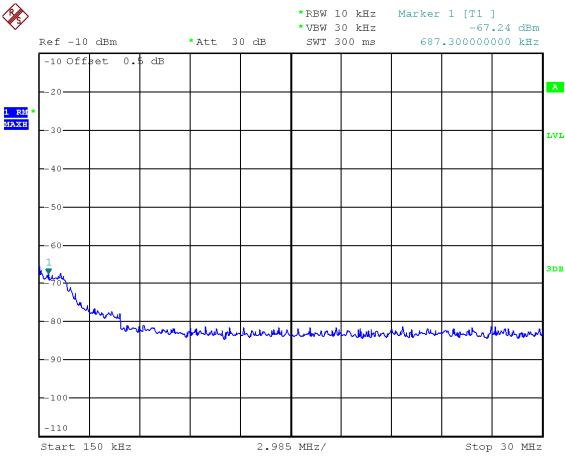
Date: 27.DEC.2025 17:34:17

Mode: TX 11g channel 11



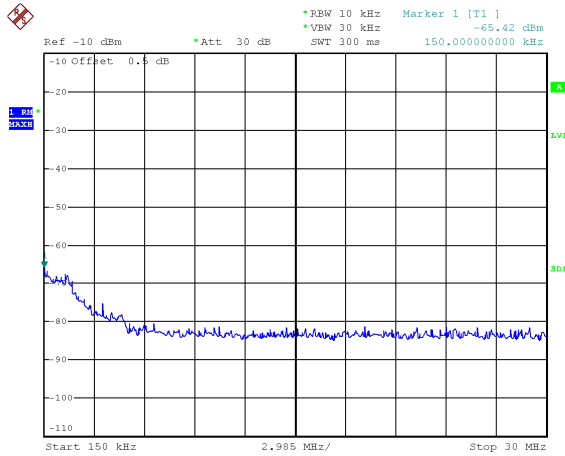
Date: 27.DEC.2025 17:34:29

Mode: TX 11n HT20 channel 1



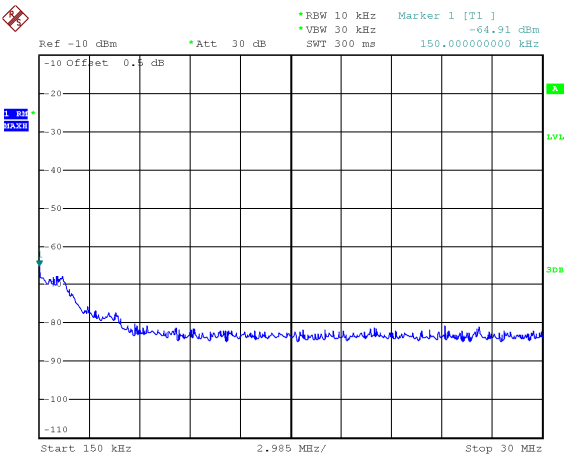
Date: 27.DEC.2025 17:34:48

Mode: TX 11 n HT20 channel 6



Date: 27.DEC.2025 17:35:02

Mode: TX 11 n HT20 channel 11



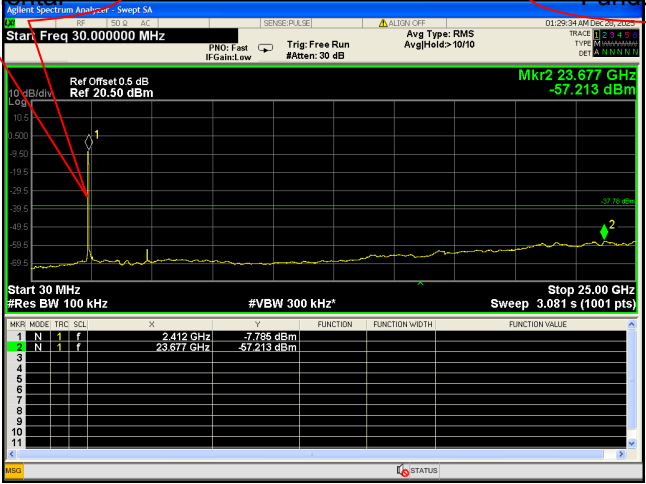
Date: 27.DEC.2025 17:35:15

Above 30MHz

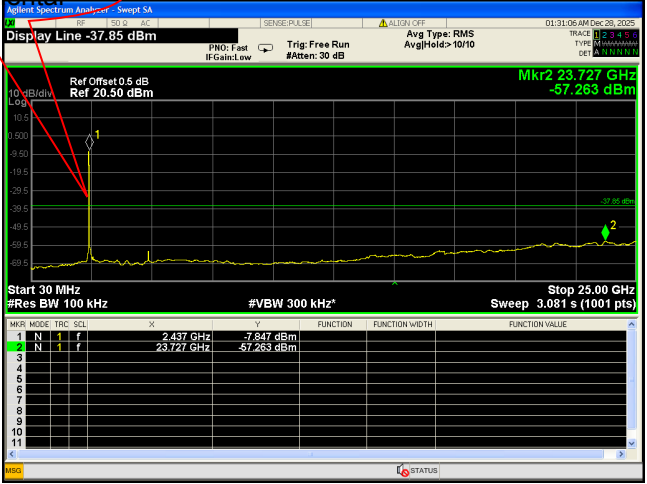
Mode: TX 11b channel 1

Mode: TX 11b channel 6

Fundamental

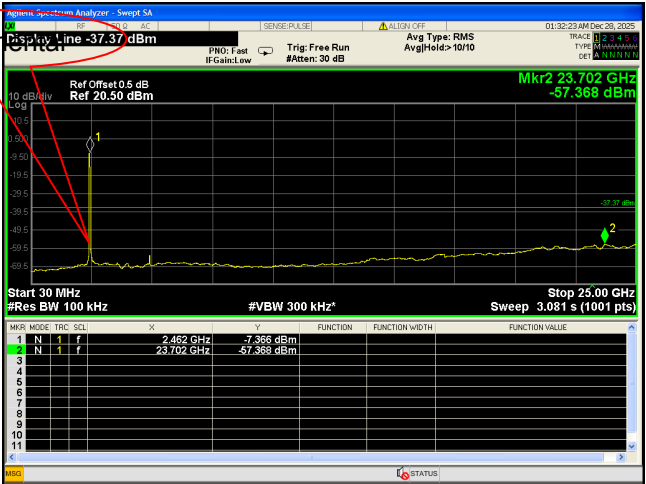


Fundamental



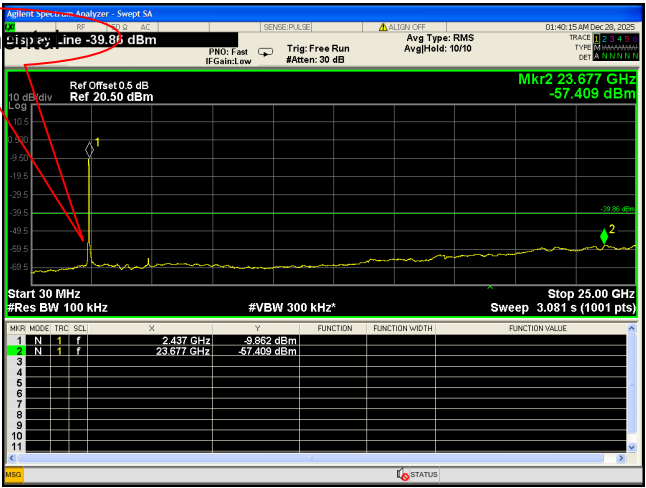
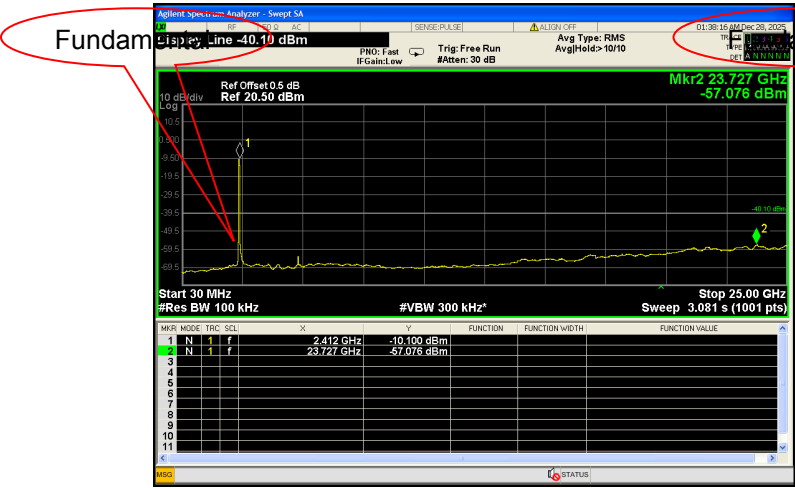
Mode: TX 11b channel 11

Fundamental

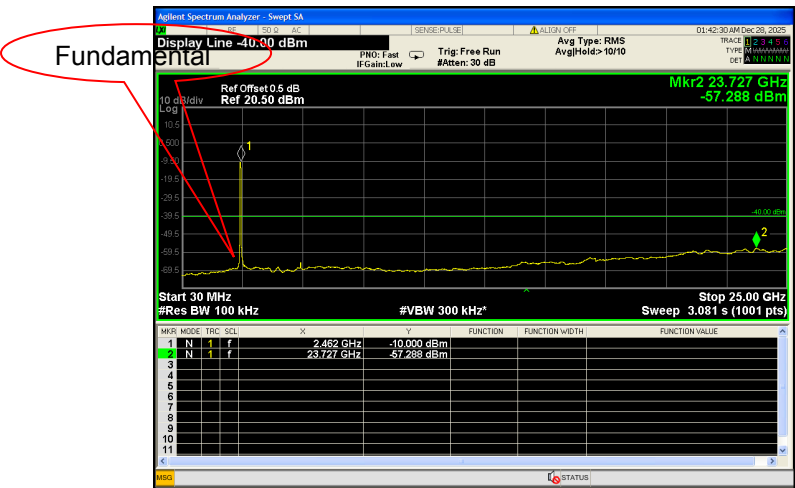


Mode: TX 11g channel 1

Mode: TX 11g channel 6

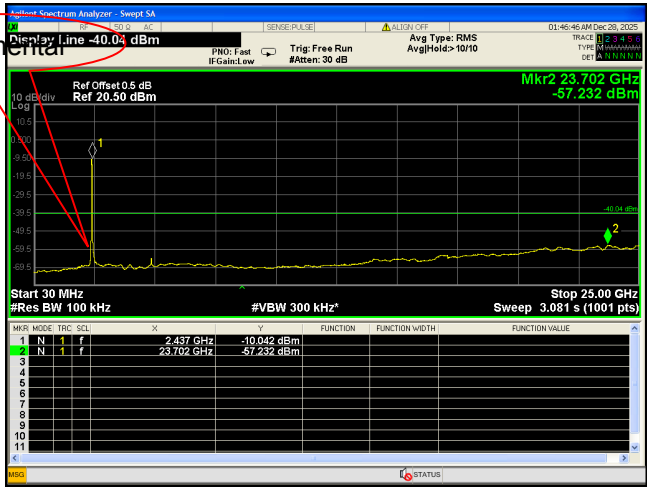
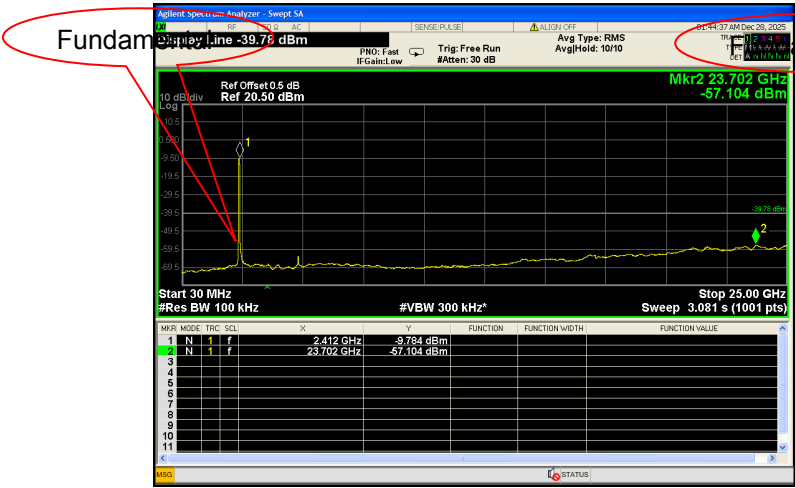


Mode: TX 11g channel 11

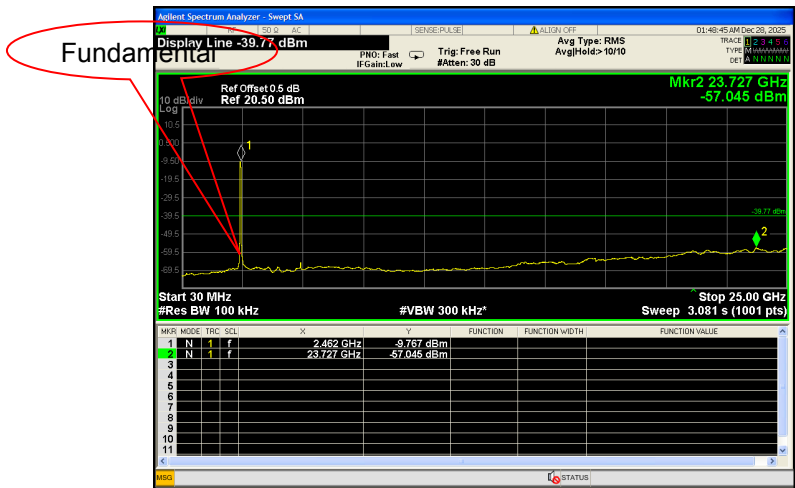


Mode: TX 11n HT20 channel 1

Mode: TX 11 n HT20 channel 6

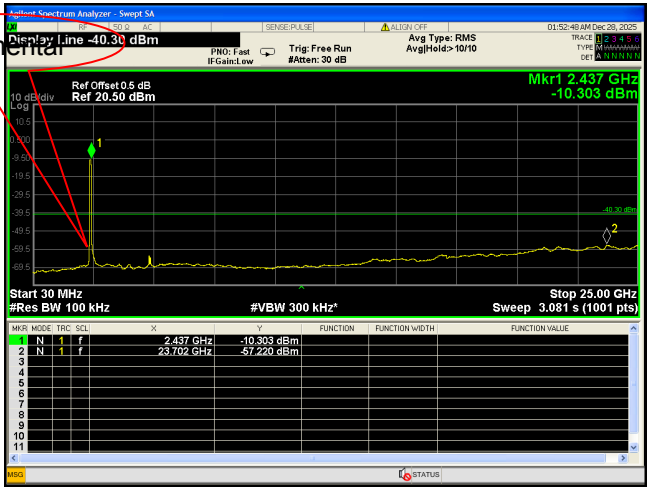
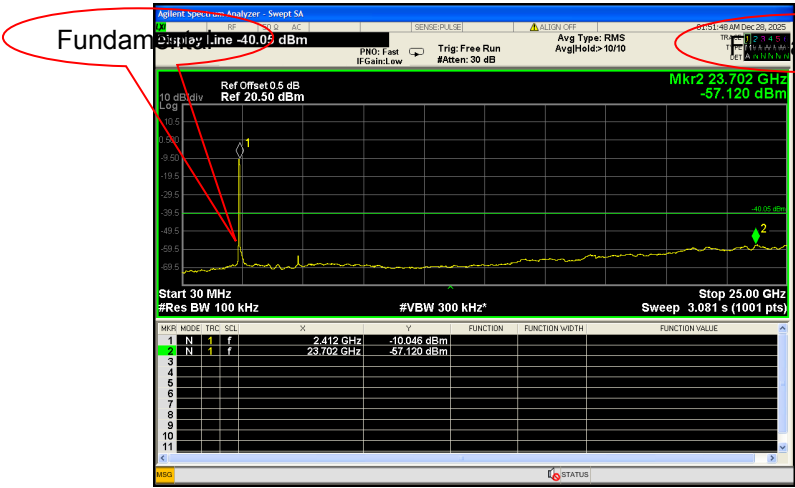


Mode: TX 11 n HT20 channel 11

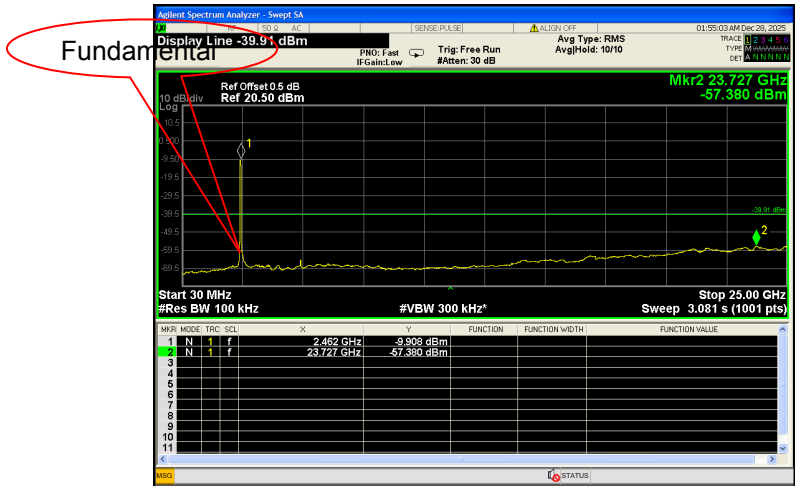


Mode: TX 11ax HE20 channel 1

Mode: TX 11ax HE20 channel 6

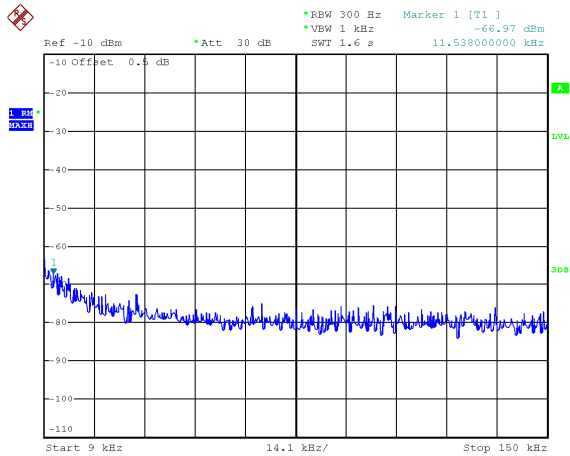


Mode: TX 11ax HE20 channel 11



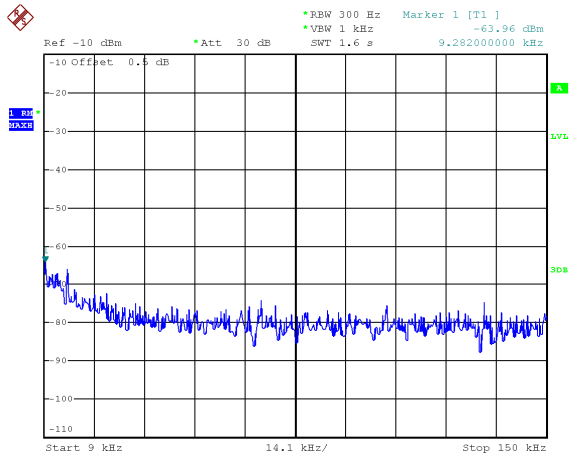
ANT 2
9KHz – 150kHz

Mode: TX 11b channel 1



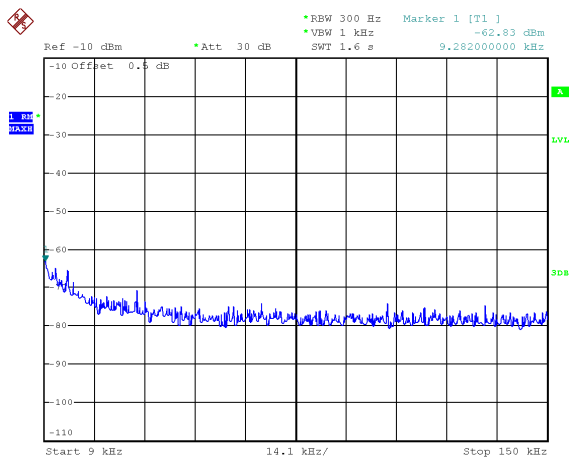
Date: 27.DEC.2025 17:27:56

Mode: TX 11b channel 6



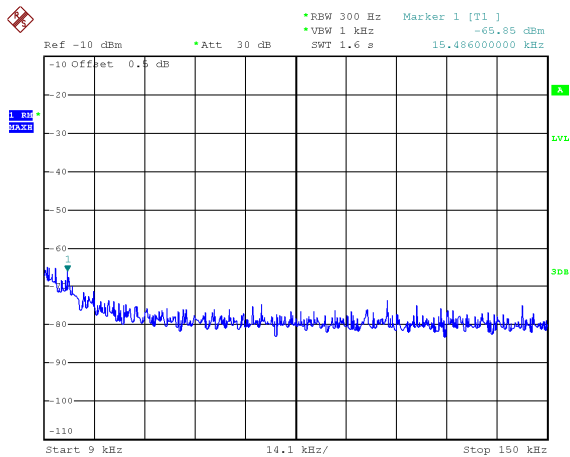
Date: 27.DEC.2025 17:28:12

Mode: TX 11b channel 11



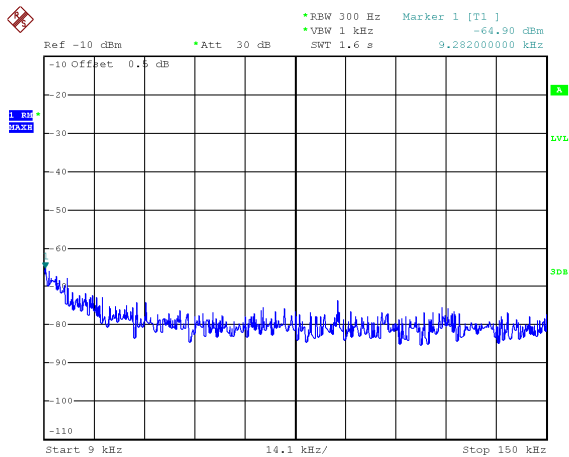
Date: 27.DEC.2025 17:28:59

Mode: TX 11g channel 1



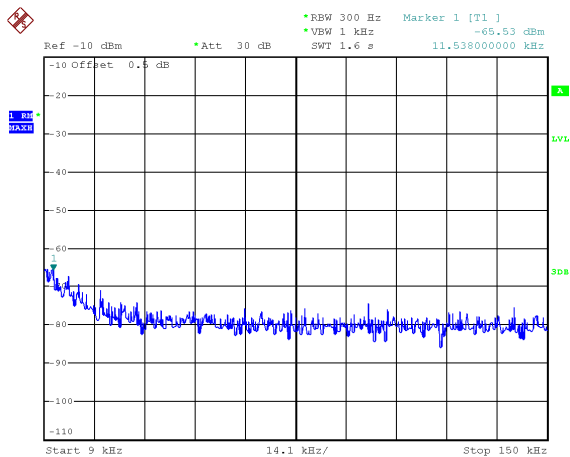
Date: 27.DEC.2025 17:29:26

Mode: TX 11g channel 6



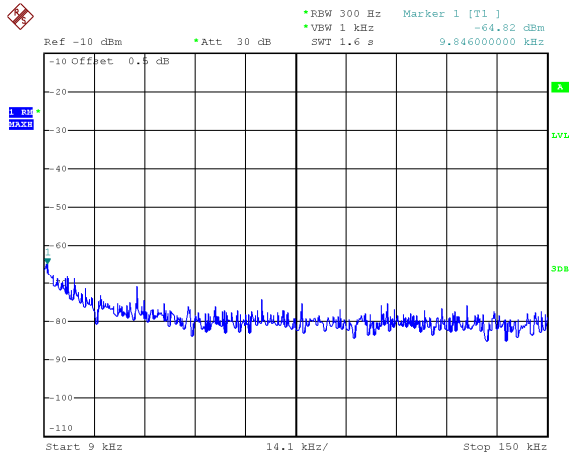
Date: 27.DEC.2025 17:29:43

Mode: TX 11g channel 11



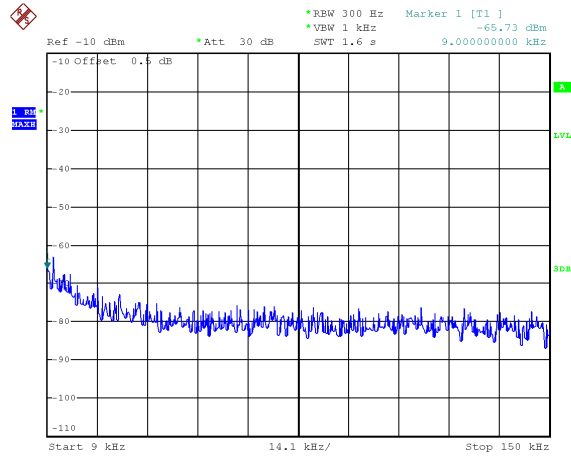
Date: 27.DEC.2025 17:30:01

Mode: TX 11n HT20 channel 1



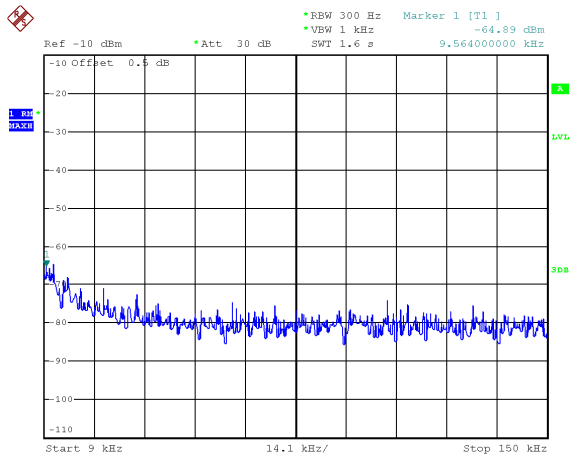
Date: 27.DEC.2025 17:30:19

Mode: TX 11 n HT20 channel 6



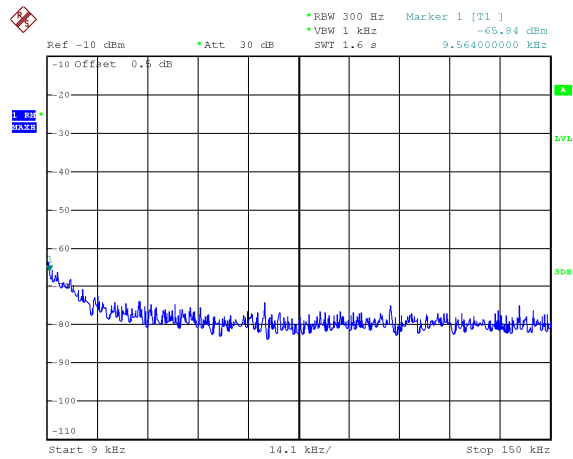
Date: 27.DEC.2025 17:30:35

Mode: TX 11 n HT20 channel 11



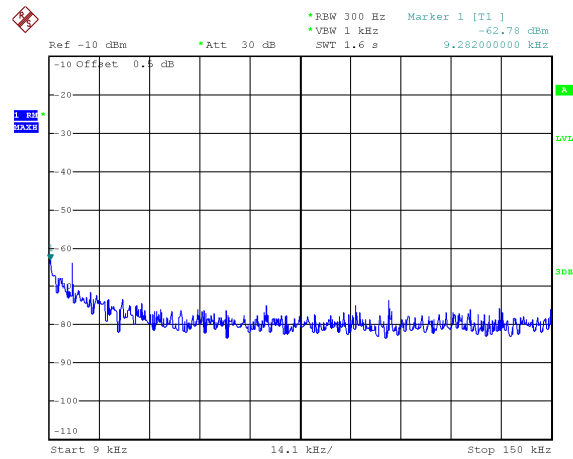
Date: 27.DEC.2025 17:30:48

Mode: TX 11ax HE20 channel 1



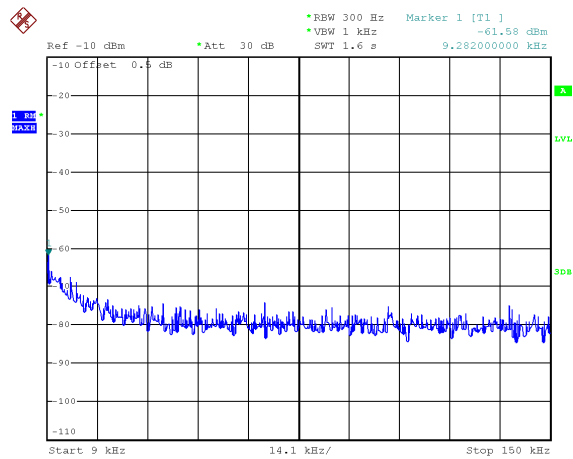
Date: 27.DEC.2025 17:31:13

Mode: TX 11ax HE20 channel 6



Date: 27.DEC.2025 17:31:34

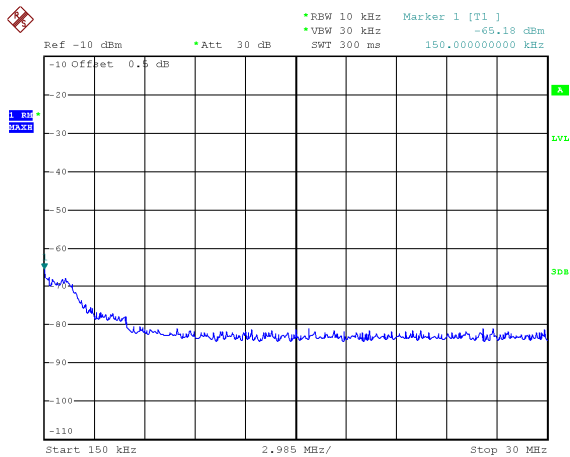
Mode: TX 11ax HE20 channel 11



Date: 27.DEC.2025 17:31:52

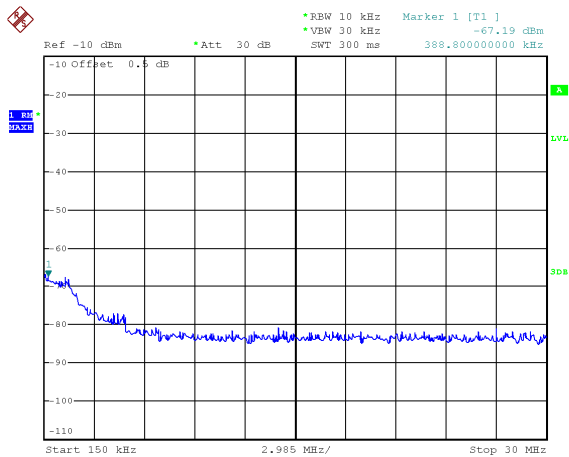
150KHz – 30mHz

Mode: TX 11b channel 1



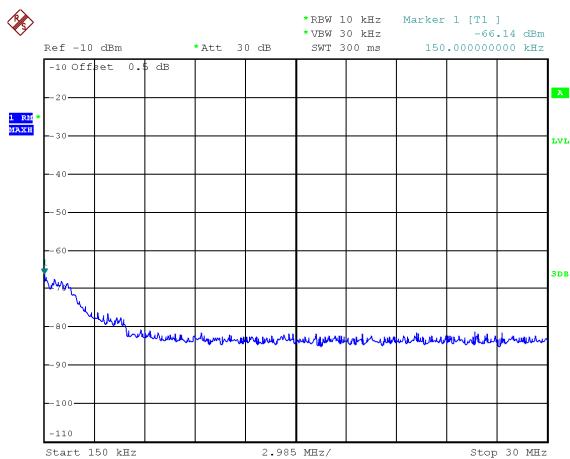
Date: 27.DEC.2025 17:36:26

Mode: TX 11b channel 6



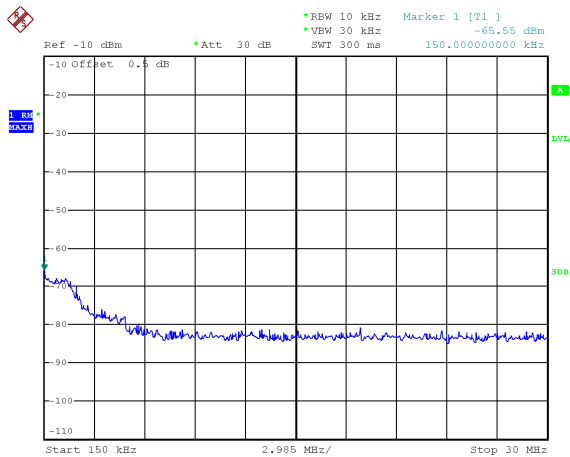
Date: 27.DEC.2025 17:36:40

Mode: TX 11b channel 11



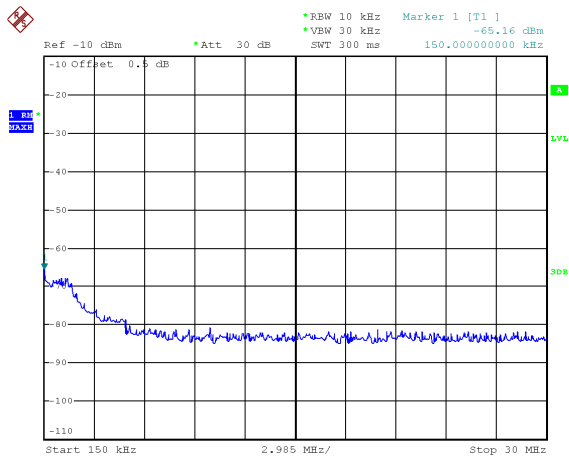
Date: 27.DEC.2025 17:36:54

Mode: TX 11g channel 1



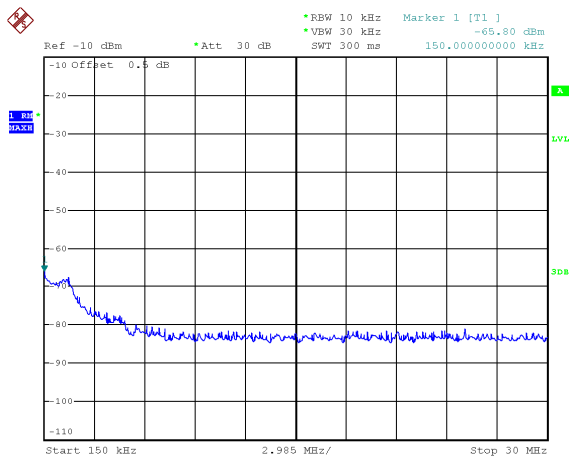
Date: 27.DEC.2025 17:37:11

Mode: TX 11g channel 6



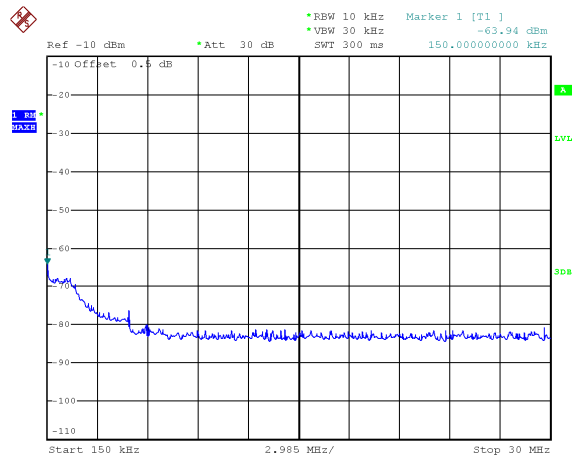
Date: 27.DEC.2025 17:37:26

Mode: TX 11g channel 11



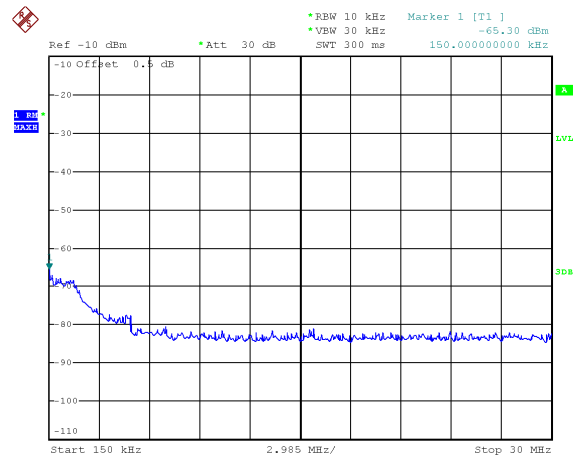
Date: 27.DEC.2025 17:37:40

Mode: TX 11n HT20 channel 1



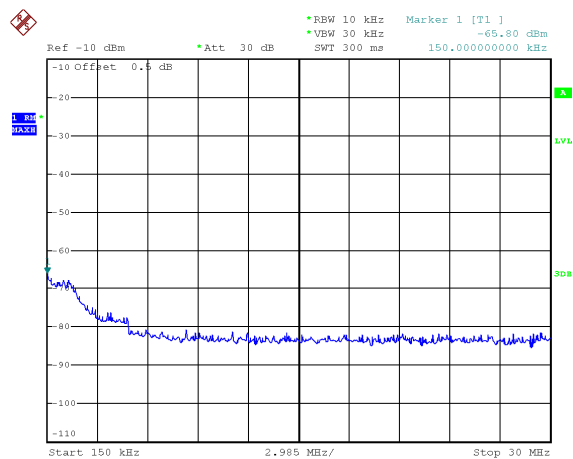
Date: 27.DEC.2025 17:38:00

Mode: TX 11 n HT20 channel 6



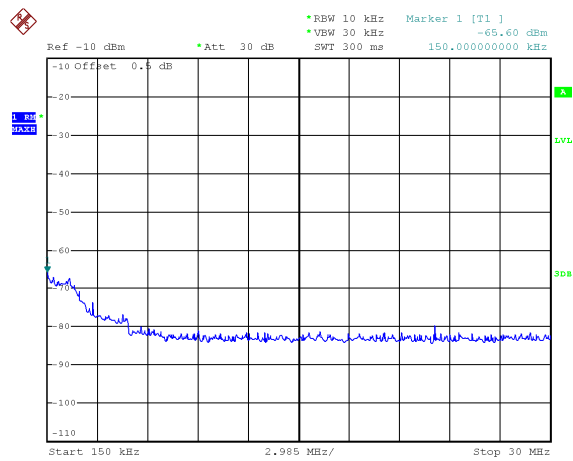
Date: 27.DEC.2025 17:38:17

Mode: TX 11 n HT20 channel 11



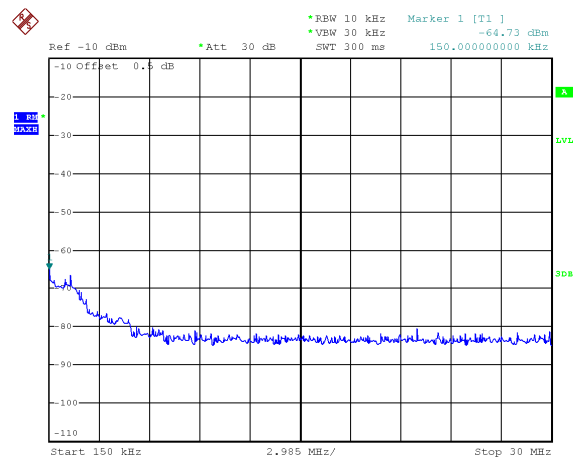
Date: 27.DEC.2025 17:38:31

Mode: TX 11ax HE20 channel 1



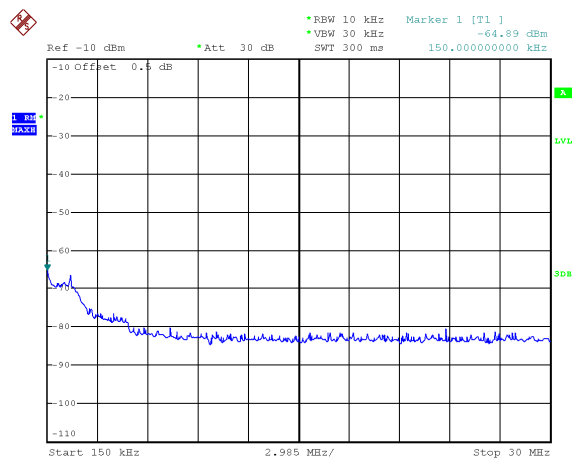
Date: 27.DEC.2025 17:38:53

Mode: TX 11ax HE20 channel 6



Date: 27.DEC.2025 17:39:08

Mode: TX 11ax HE20 channel 11



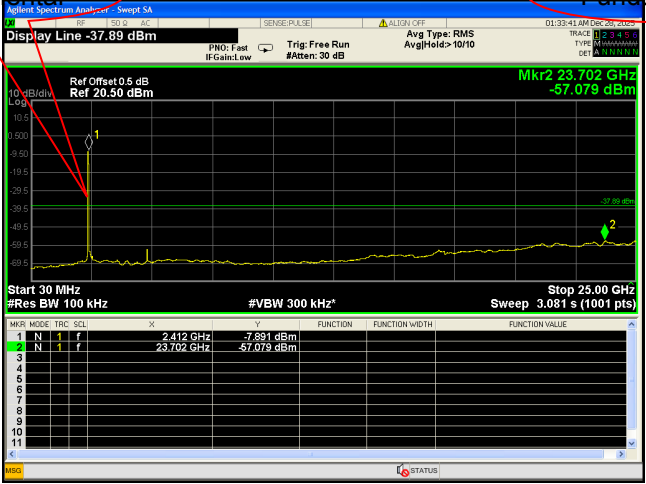
Date: 27.DEC.2025 17:39:29

Above 30MHz

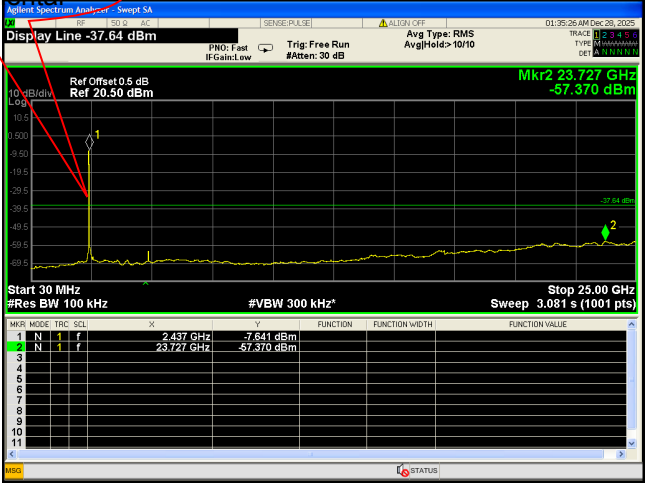
Mode: TX 11b channel 1

Mode: TX 11b channel 6

Fundamental

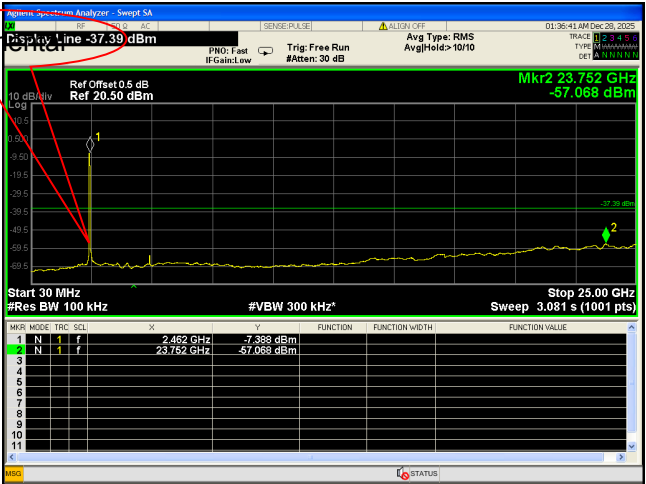


Fundamental



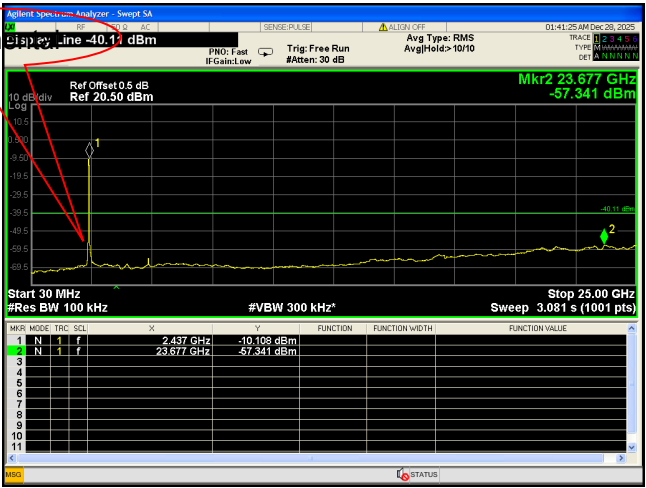
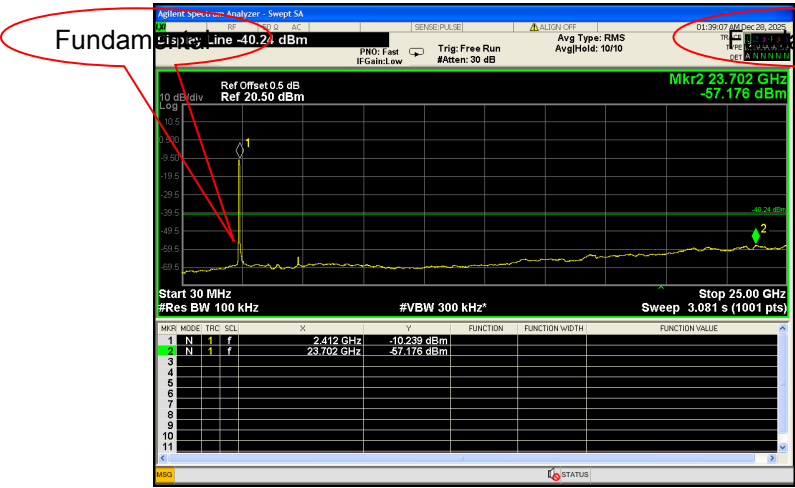
Mode: TX 11b channel 11

Fundamental

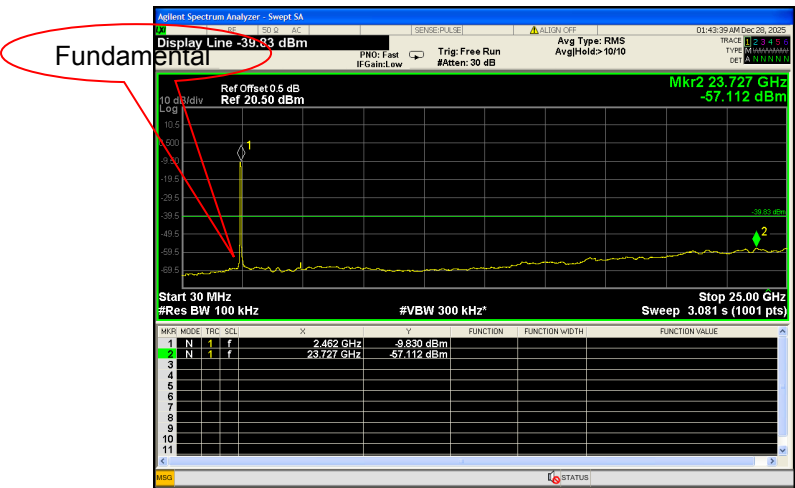


Mode: TX 11g channel 1

Mode: TX 11g channel 6

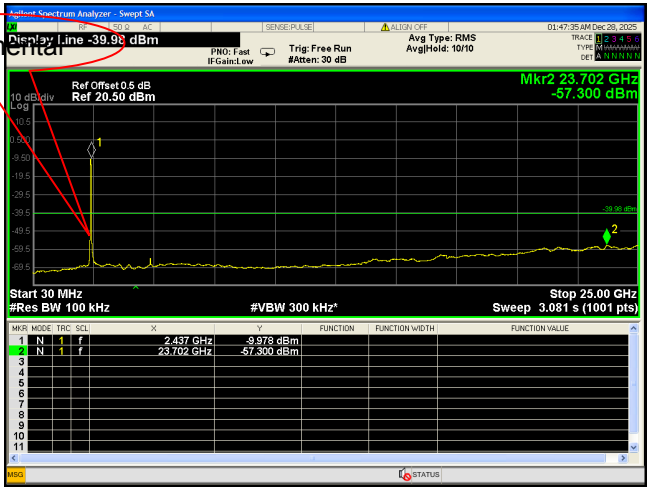
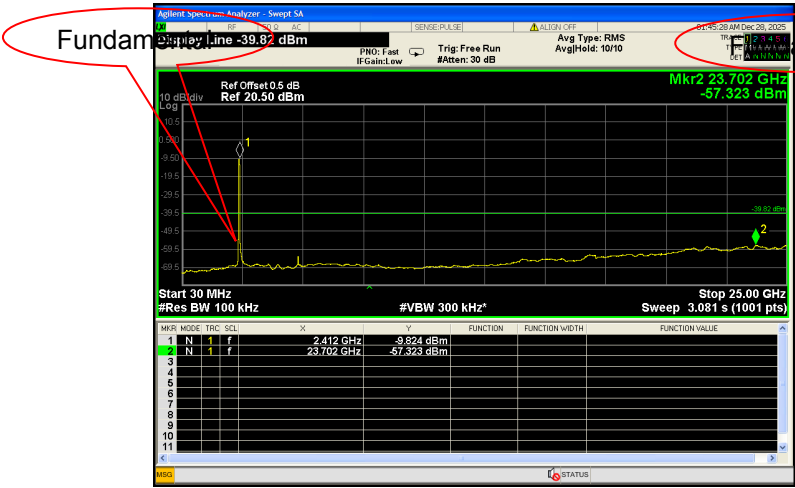


Mode: TX 11g channel 11

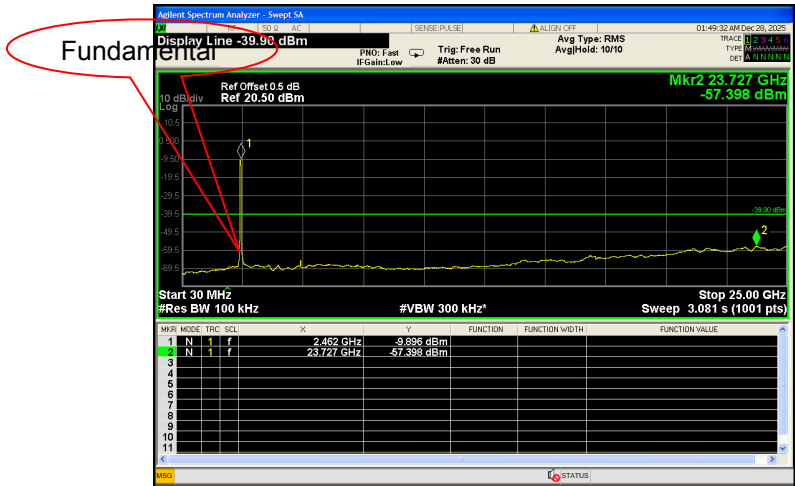


Mode: TX 11n HT20 channel 1

Mode: TX 11 n HT20 channel 6

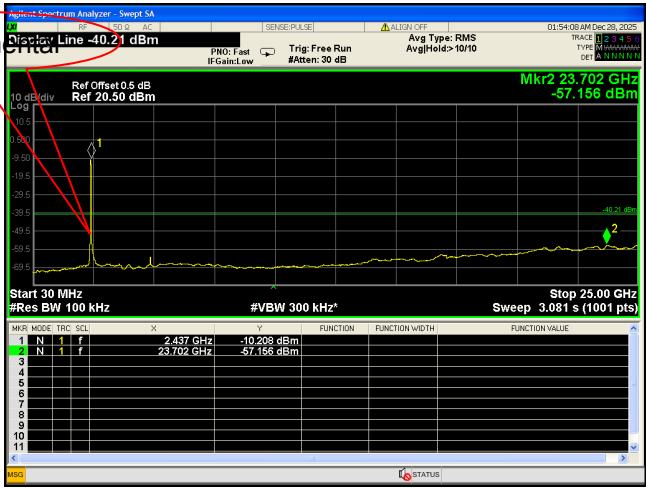
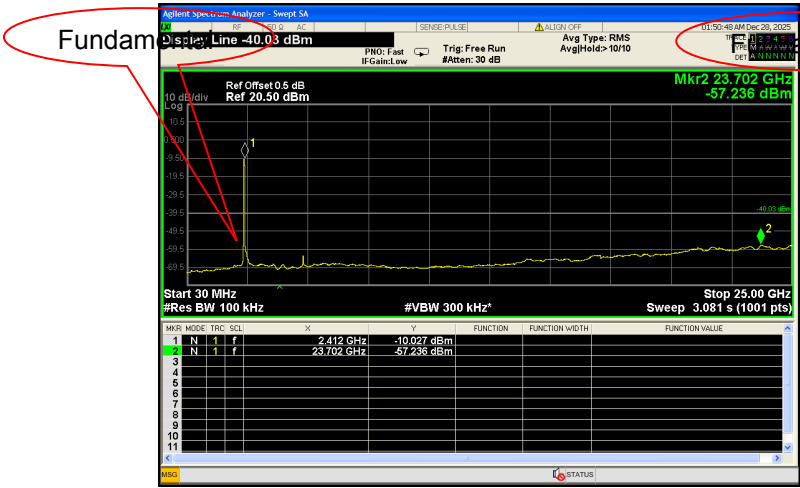


Mode: TX 11 n HT20 channel 11

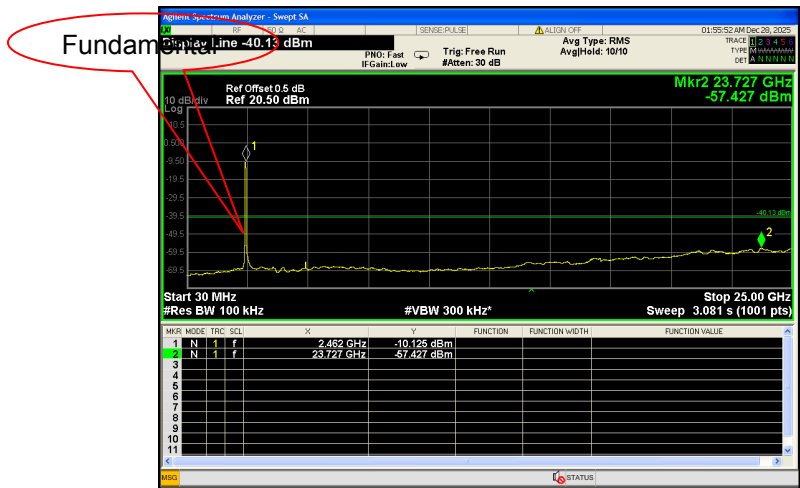


Mode: TX 11ax HE20 channel 1

Mode: TX 11ax HE20 channel 6



Mode: TX 11ax HE20 channel 11



11 Band Edge Measurement

Test Requirement:	47CFR FCC Part15 Subpart C §15.247 KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019 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 Limit:	
Test Mode:	Transmitting

11.1 Test Produce

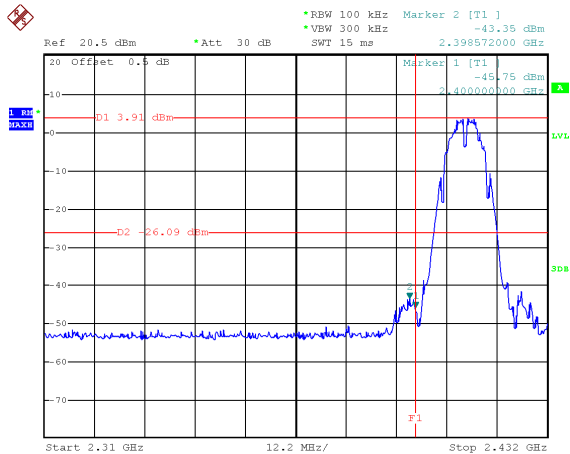
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

11.2 Test Result

Note: Both Ant. 1 and Ant. 2 have been tested separately, and the report only shows the worst case.
Test result plots shown as follows:

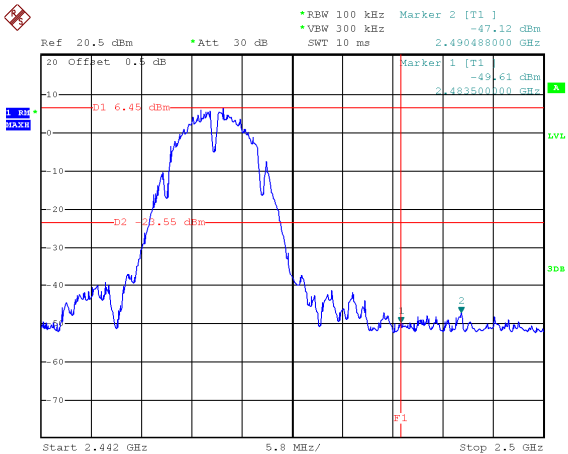
Ant. 1

TX 11b: Band edge-left side



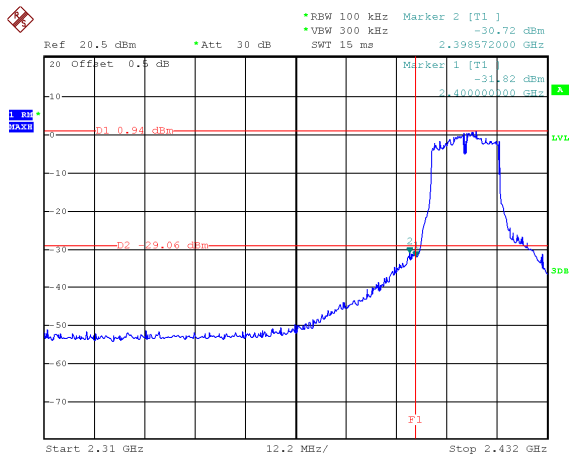
Date: 27.DEC.2025 16:31:02

TX 11b: Band edge-right side



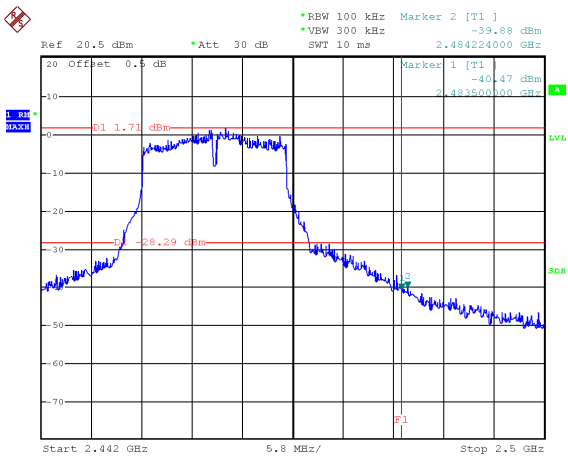
Date: 27.DEC.2025 16:52:05

TX 11g: Band edge-left side



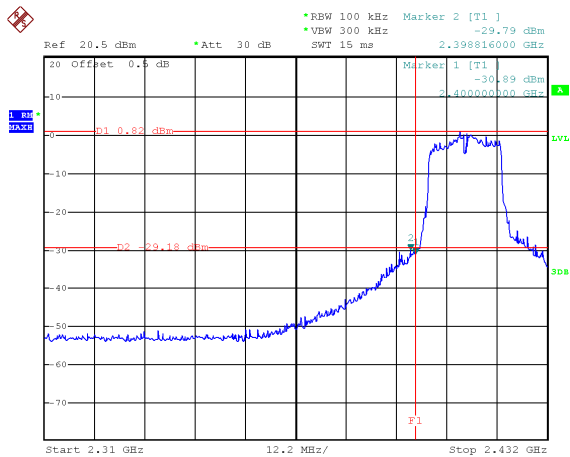
Date: 27.DEC.2025 16:32:27

TX 11g: Band edge-right side



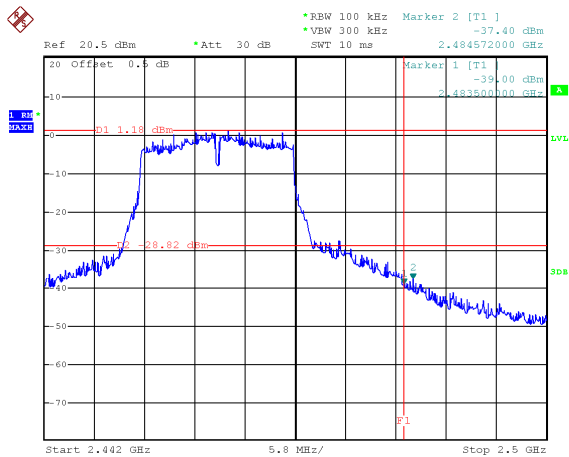
Date: 27.DEC.2025 16:53:53

TX 11n HT20: Band edge-left side



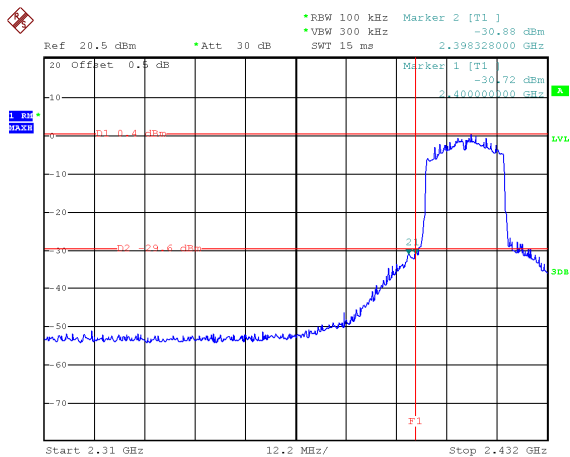
Date: 27.DEC.2025 16:33:56

TX 11n HT20: Band edge-right side



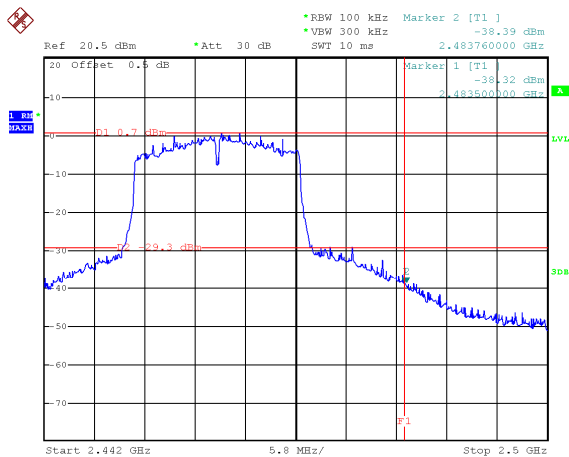
Date: 27.DEC.2025 16:55:17

TX 1ax HE20: Band edge-left side



Date: 27.DEC.2025 16:35:05

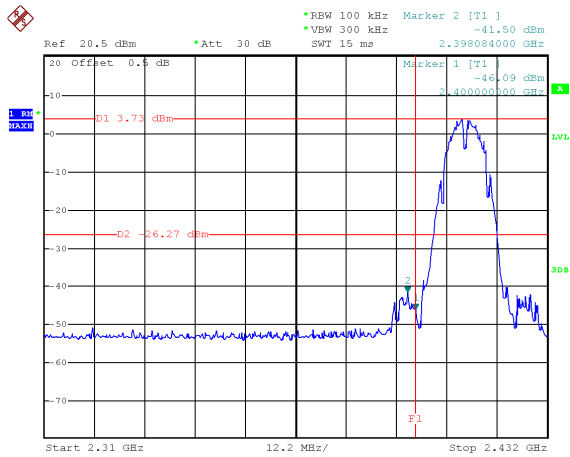
TX 11ax HE20: Band edge-right side



Date: 27.DEC.2025 16:56:24

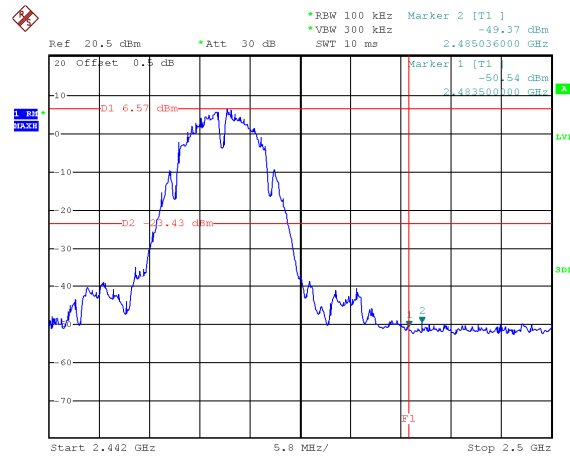
Ant. 2

TX 11b: Band edge-left side



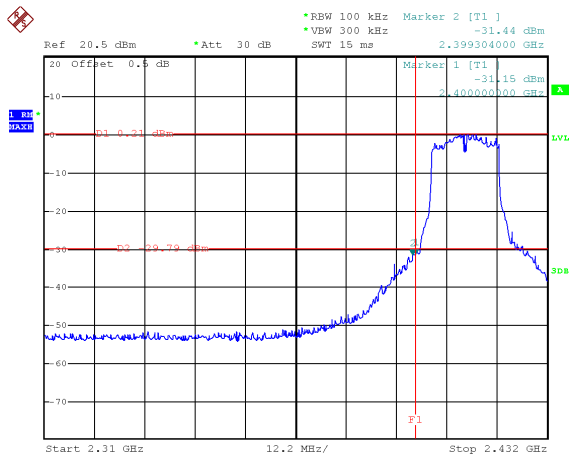
Date: 27.DEC.2025 16:36:53

TX 11b: Band edge-right side



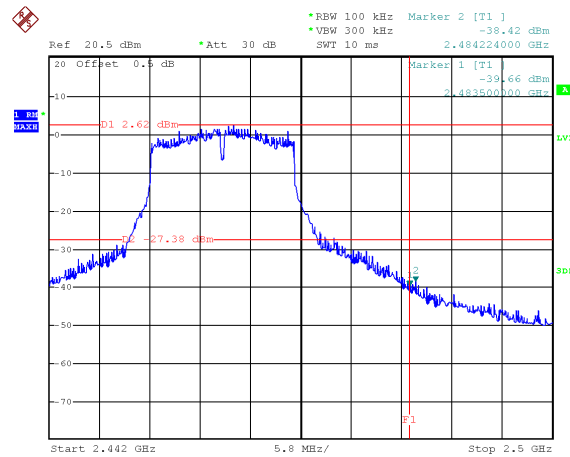
Date: 27.DEC.2025 16:45:53

TX 11g: Band edge-left side



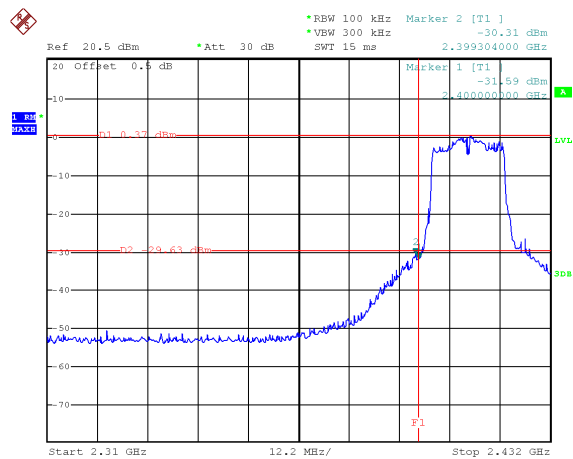
Date: 27.DEC.2025 16:39:09

TX 11g: Band edge-right side



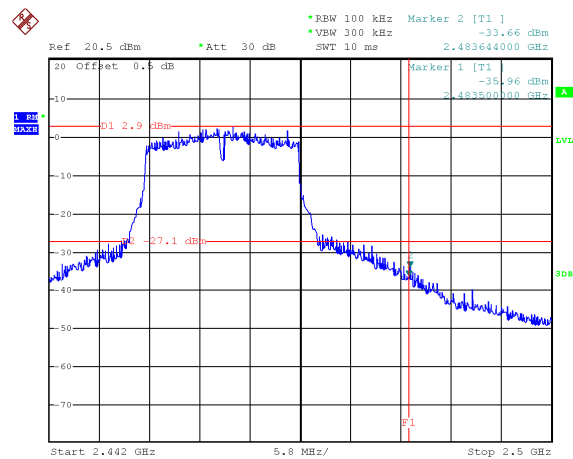
Date: 27.DEC.2025 16:46:56

TX 11n HT20: Band edge-left side



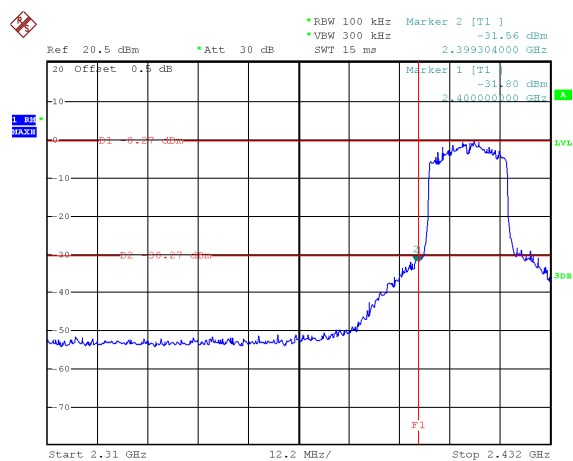
Date: 27.DEC.2025 16:41:08

TX 11n HT20: Band edge-right side



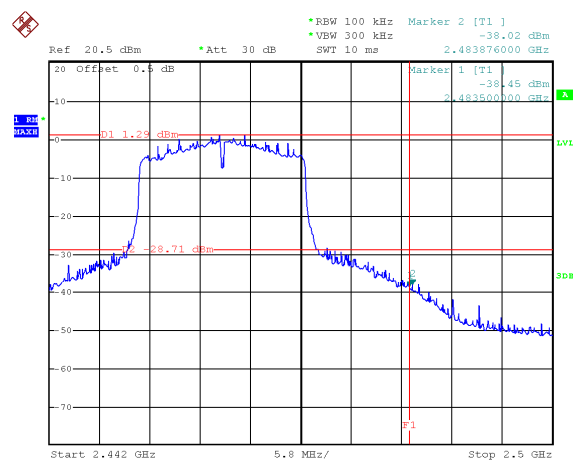
Date: 27.DEC.2025 16:48:04

TX 1ax HE20: Band edge-left side



Date: 27.DEC.2025 16:43:14

TX 11ax HE20: Band edge-right side



Date: 27.DEC.2025 16:49:28

12 6 dB Bandwidth and 99% Bandwidth Measurement

Test Requirement:	47CFR FCC Part15 Subpart C §15.247 KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method:	ANSI C63.10-2020 KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019
Test Limit:	§15.247(a)(2) 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 Mode:	Transmitting

12.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. 6dB Bandwidth Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz
99% Bandwidth Set the spectrum analyzer: 1~5% of the OBW, VBW = 3 times the RBW

12.2 Test Result

Ant. 1

Operation mode	Test Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
TX 11b	Channel 1	7.680	11.220
	Channel 6	7.680	11.280
	Channel 11	7.680	11.280
TX 11g	Channel 1	16.440	17.400
	Channel 6	16.380	17.580
	Channel 11	16.380	17.340
TX 11n HT20	Channel 1	17.640	18.540
	Channel 6	17.640	18.480
	Channel 11	17.700	18.480
TX 11ax HE20	Channel 1	18.900	19.020
	Channel 6	18.360	19.080
	Channel 11	18.900	19.080

Ant. 2

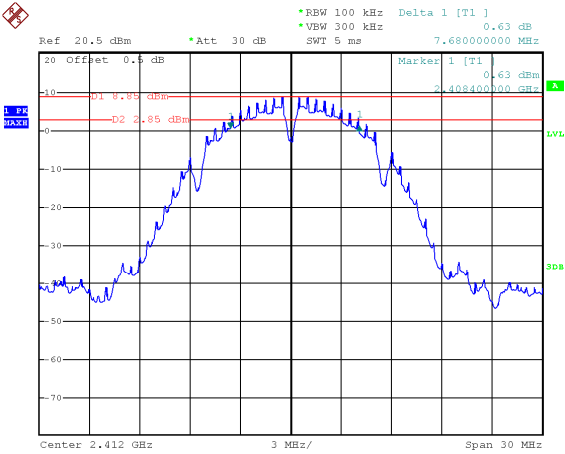
Operation mode	Test Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
TX 11b	Channel 1	7.980	11.520
	Channel 6	7.620	11.280
	Channel 11	8.040	11.220
TX 11g	Channel 1	16.440	17.580
	Channel 6	16.440	17.460
	Channel 11	16.380	17.640
TX 11n HT20	Channel 1	17.700	18.420
	Channel 6	17.700	18.360
	Channel 11	17.700	18.360
TX 11ax HE20	Channel 1	18.840	19.140
	Channel 6	18.660	19.080
	Channel 11	18.960	19.080

Test result plot:
Ant. 1

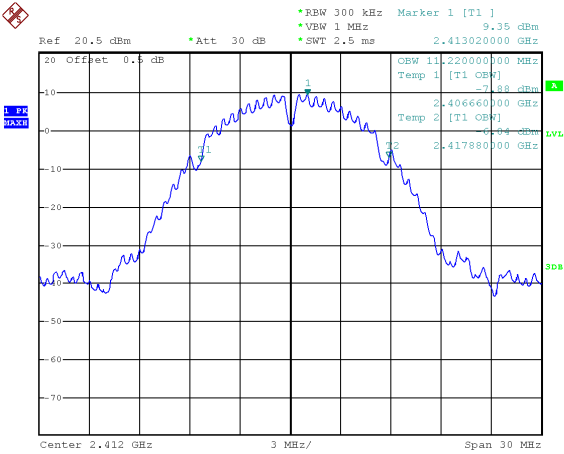
6 dB Bandwidth

99% Bandwidth

Mode: TX 11b channel 1

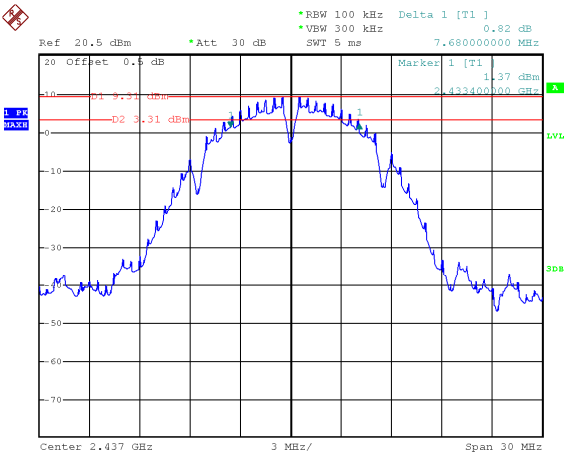


Date: 27.DEC.2025 16:06:04

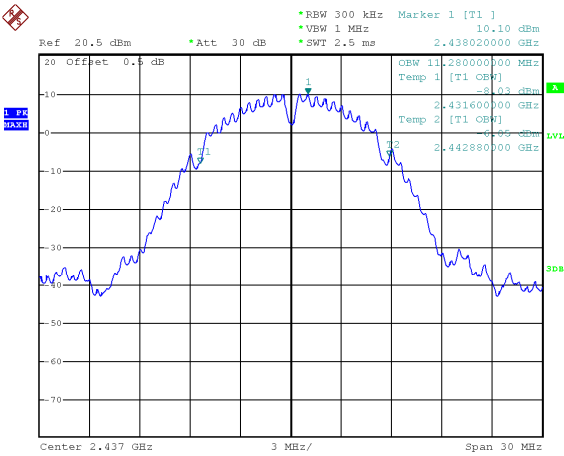


Date: 27.DEC.2025 15:12:54

Mode: TX 11b channel 6



Date: 27.DEC.2025 16:07:28

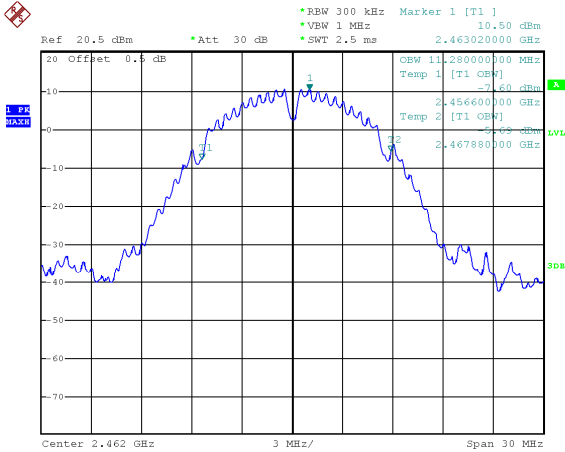
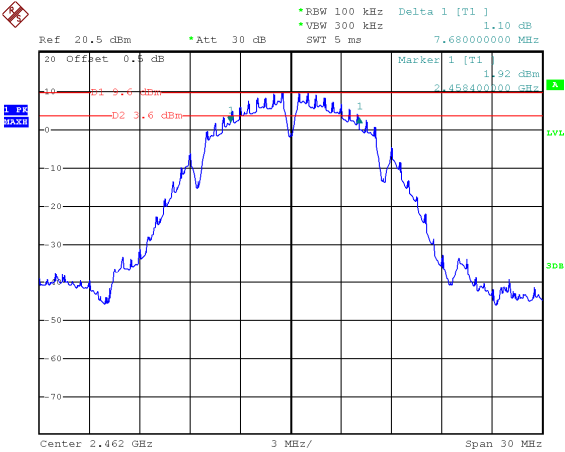


Date: 27.DEC.2025 15:13:43

6 dB Bandwidth

99% Bandwidth

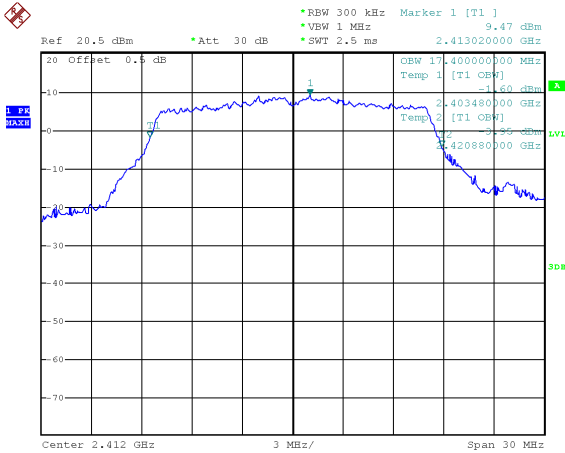
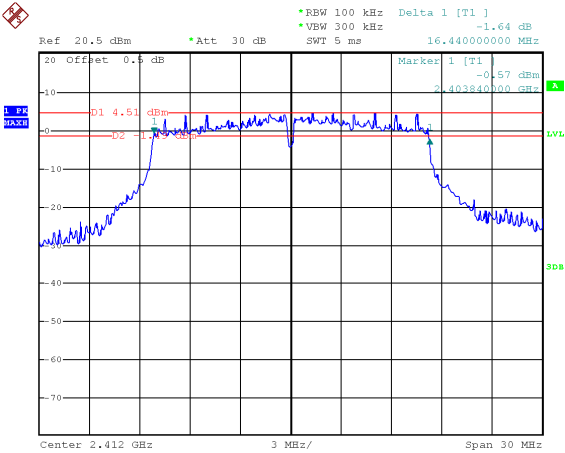
Mode: TX 11b channel 11



Date: 27.DEC.2025 16:08:23

Date: 27.DEC.2025 15:14:19

Mode: TX 11g channel 1



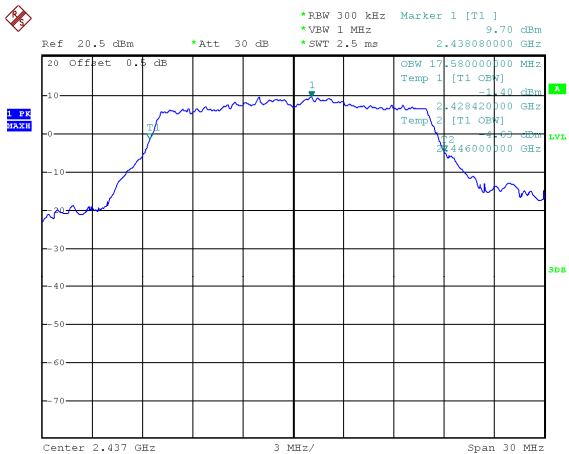
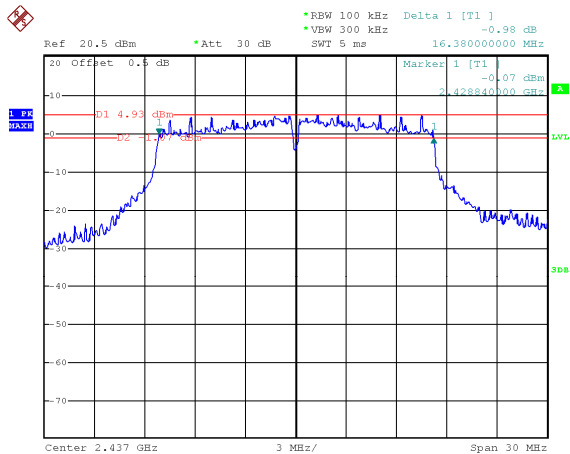
Date: 27.DEC.2025 16:09:38

Date: 27.DEC.2025 15:16:32

6 dB Bandwidth

99% Bandwidth

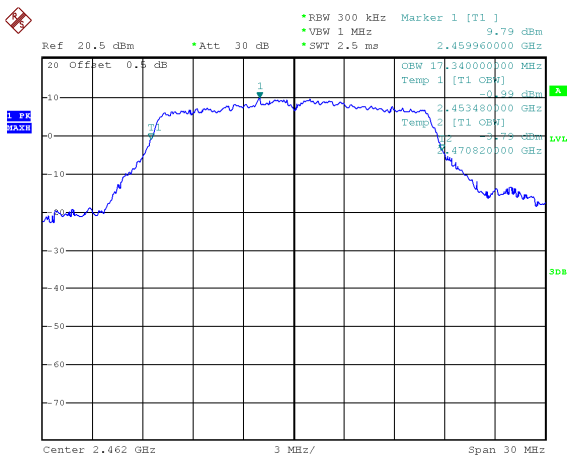
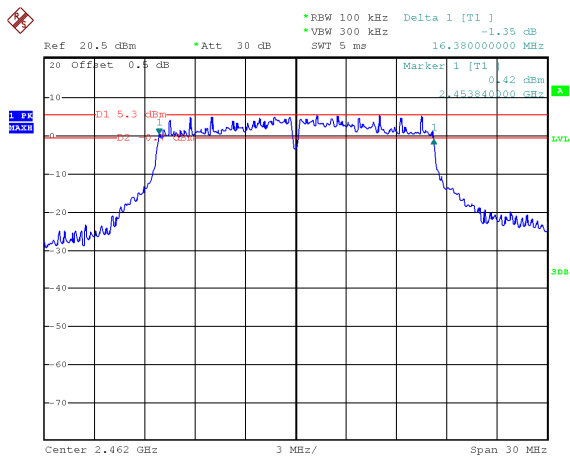
Mode: TX 11g channel 6



Date: 27.DEC.2025 16:10:33

Date: 27.DEC.2025 15:17:53

Mode: TX 11g channel 11



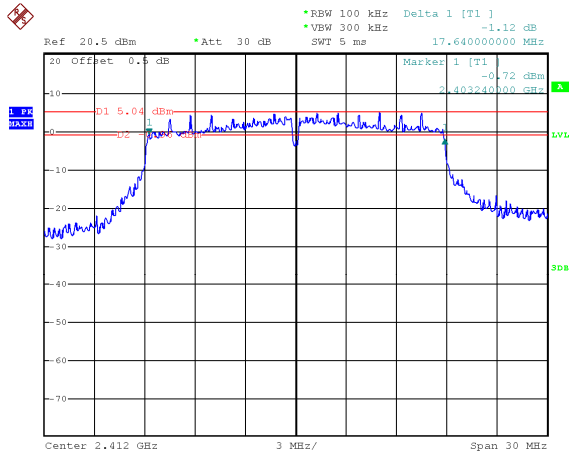
Date: 27.DEC.2025 16:11:43

Date: 27.DEC.2025 15:18:32

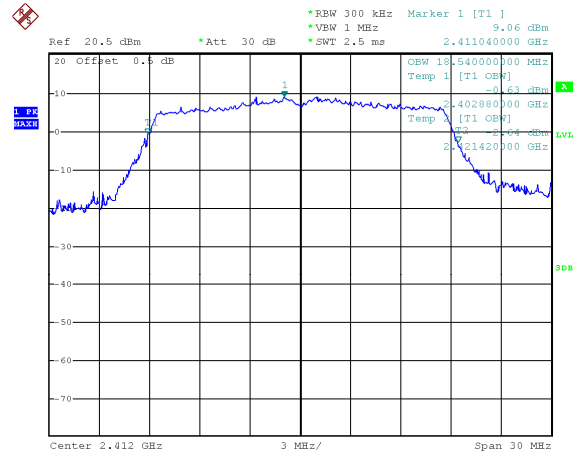
6 dB Bandwidth

99% Bandwidth

Mode: TX 11n HT20 channel 1

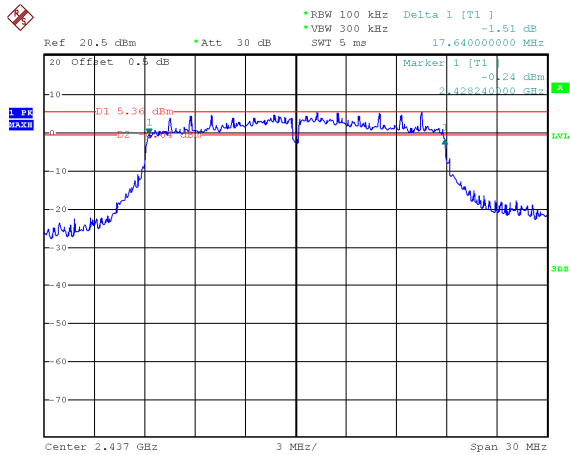


Date: 27.DEC.2025 16:13:53

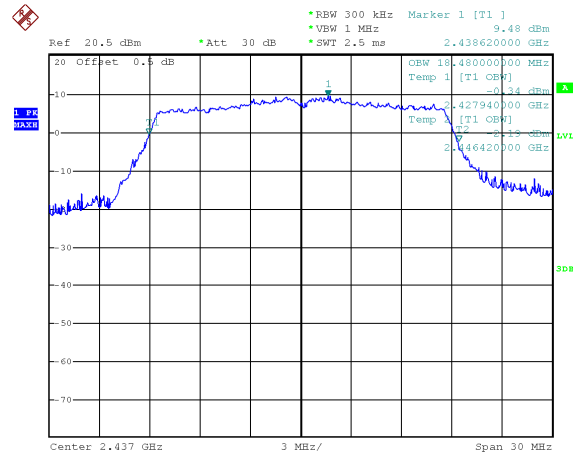


Date: 27.DEC.2025 15:19:49

Mode: TX 11n HT20 channel 6



Date: 27.DEC.2025 16:15:29

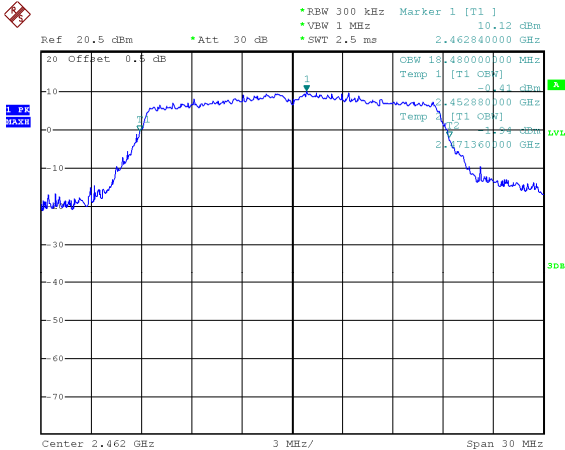
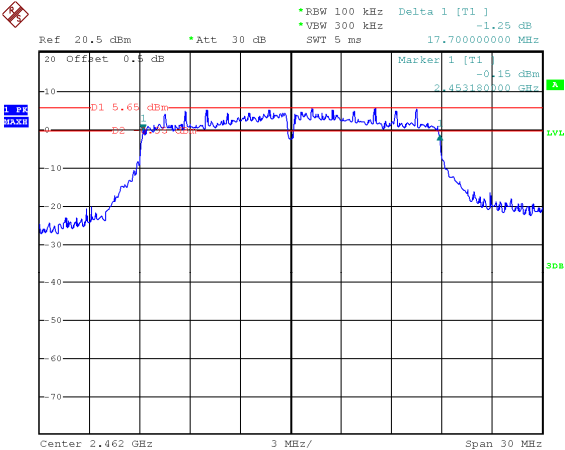


Date: 27.DEC.2025 15:20:37

6 dB Bandwidth

99% Bandwidth

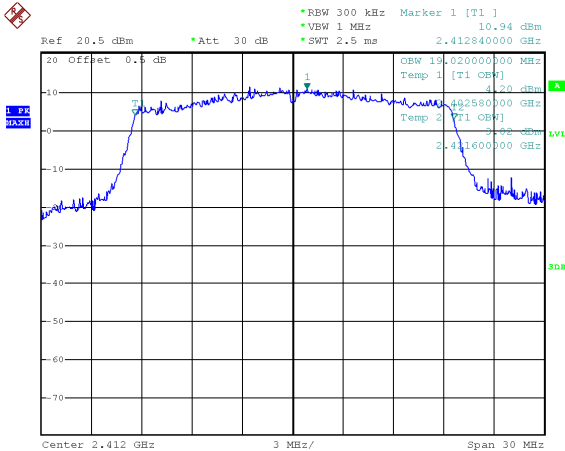
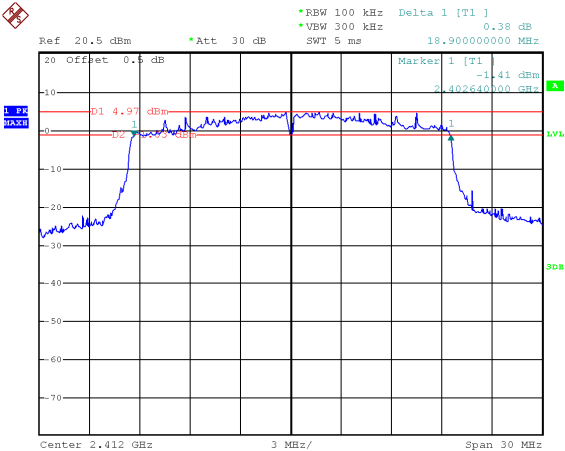
Mode: TX 11n HT20 channel 11



Date: 27.DEC.2025 16:16:36

Date: 27.DEC.2025 15:21:36

Mode: TX 11ax HE20 channel 1



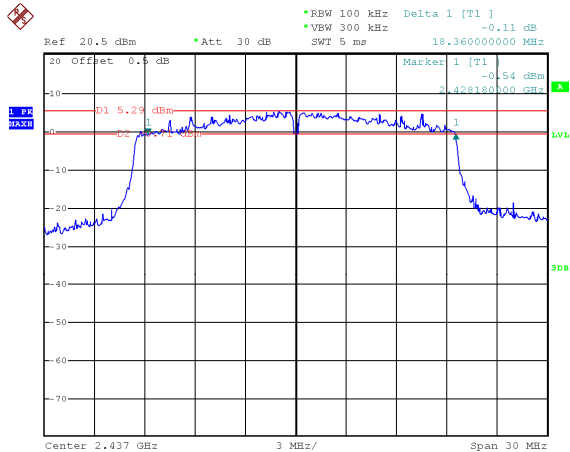
Date: 27.DEC.2025 16:19:30

Date: 27.DEC.2025 15:22:52

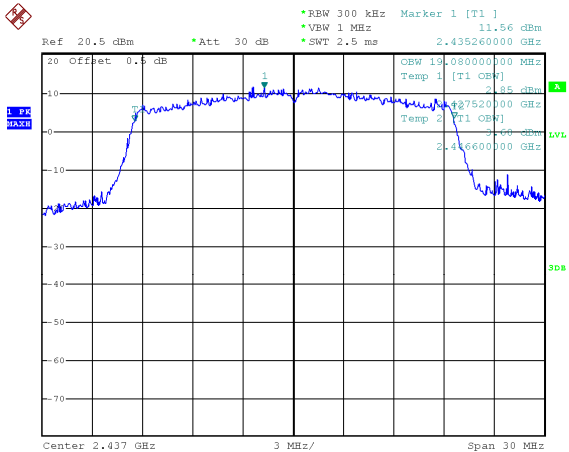
6 dB Bandwidth

99% Bandwidth

Mode: TX 11ax HE20 channel 6

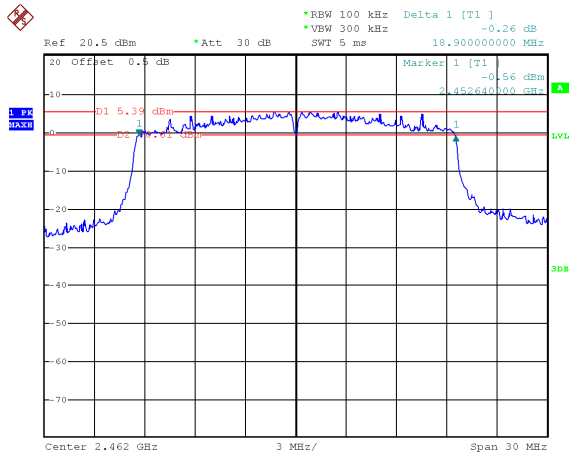


Date: 27.DEC.2025 16:20:53

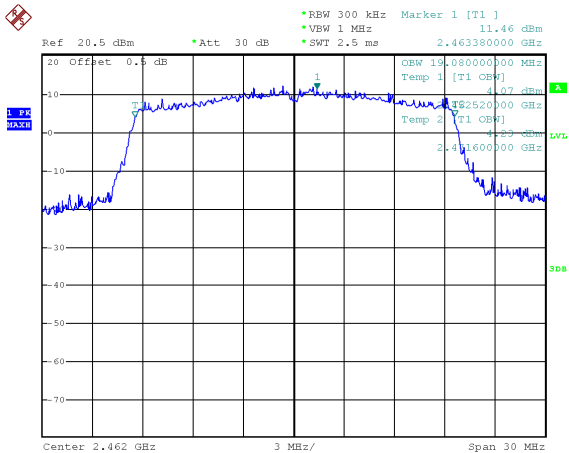


Date: 27.DEC.2025 15:23:56

Mode: TX 11ax HE20 channel 11



Date: 27.DEC.2025 16:22:02



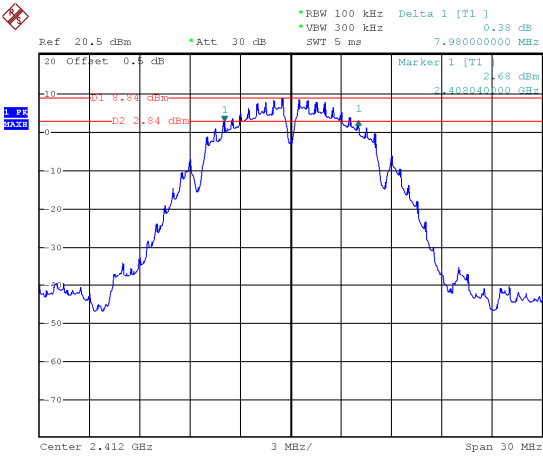
Date: 27.DEC.2025 15:24:39

Ant. 2

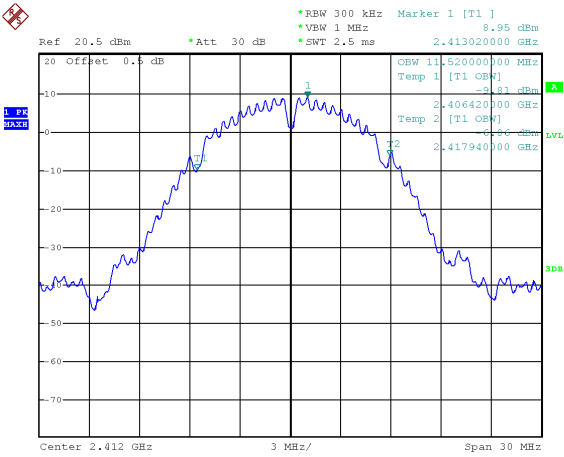
6 dB Bandwidth

99% Bandwidth

Mode: TX 11b channel 1

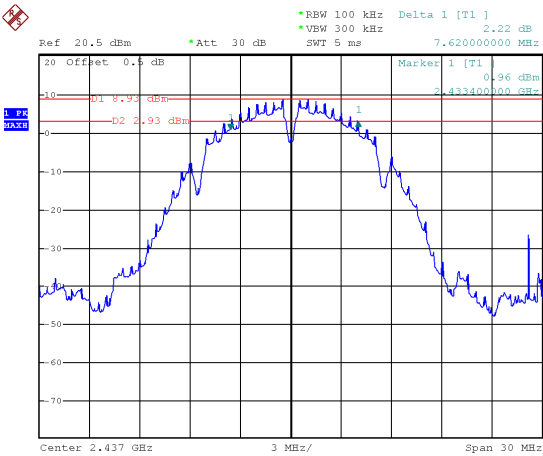


Date: 27.DEC.2025 15:45:05

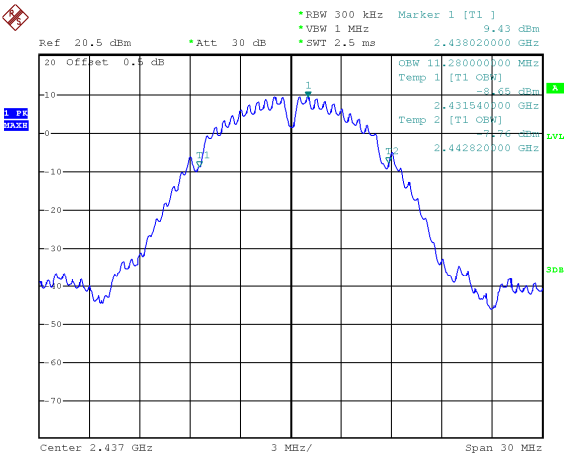


Date: 27.DEC.2025 15:29:57

Mode: TX 11b channel 6



Date: 27.DEC.2025 15:46:34

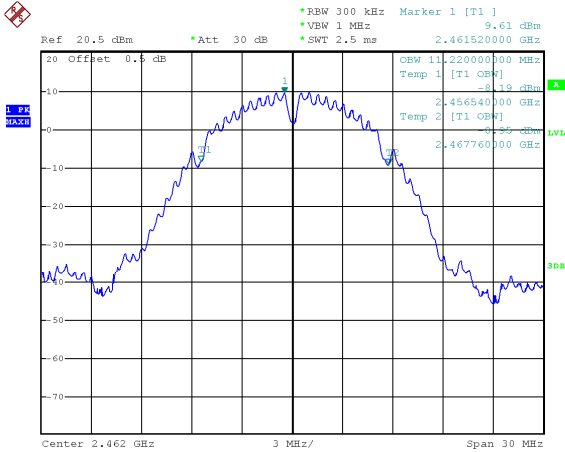
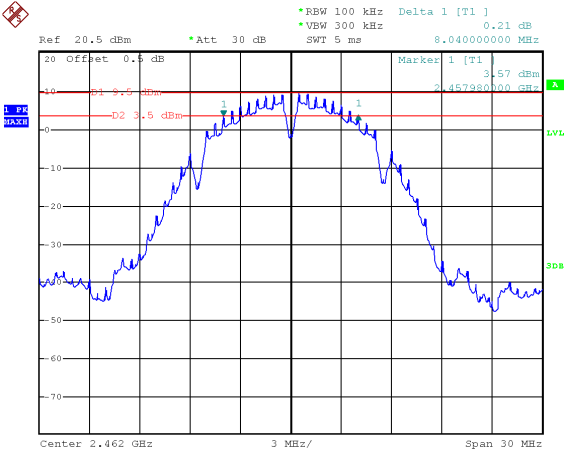


Date: 27.DEC.2025 15:29:29

6 dB Bandwidth

99% Bandwidth

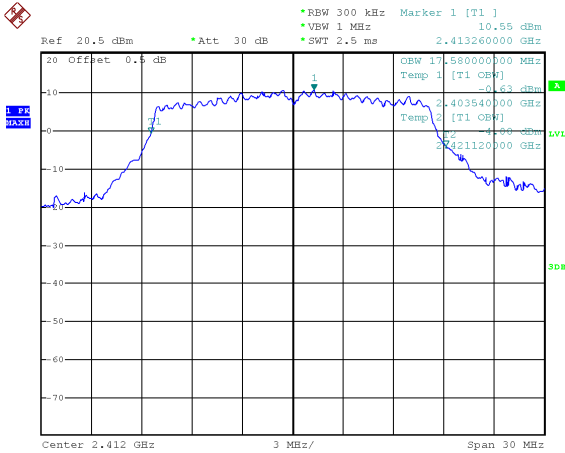
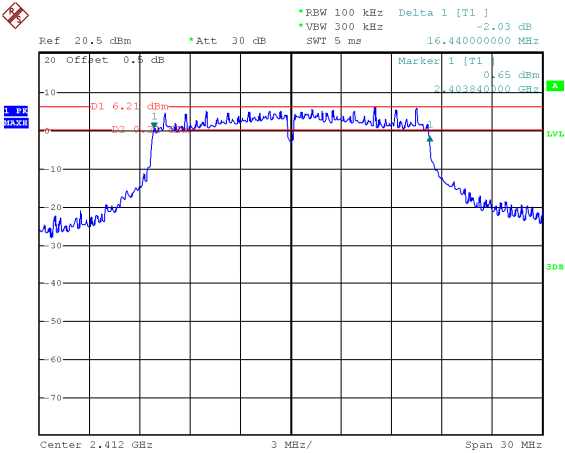
Mode: TX 11b channel 11



Date: 27.DEC.2025 15:47:22

Date: 27.DEC.2025 15:31:02

Mode: TX 11g channel 1



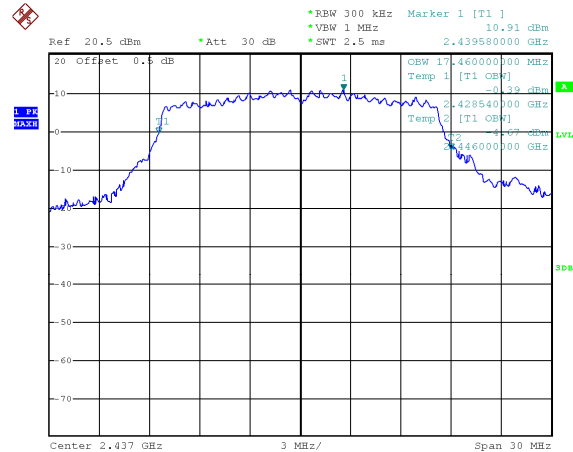
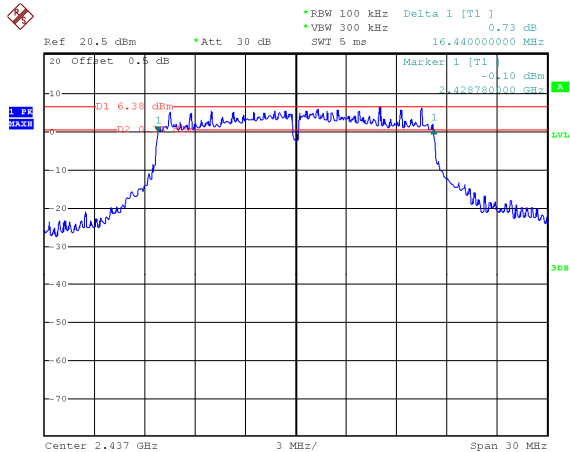
Date: 27.DEC.2025 15:48:46

Date: 27.DEC.2025 15:32:03

6 dB Bandwidth

99% Bandwidth

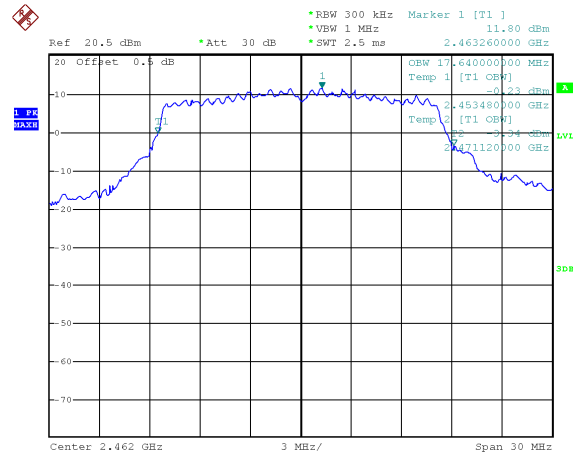
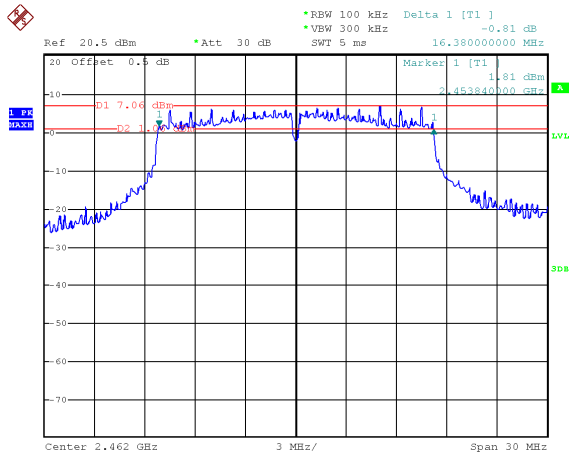
Mode: TX 11g channel 6



Date: 27.DEC.2025 15:50:50

Date: 27.DEC.2025 15:32:41

Mode: TX 11g channel 11



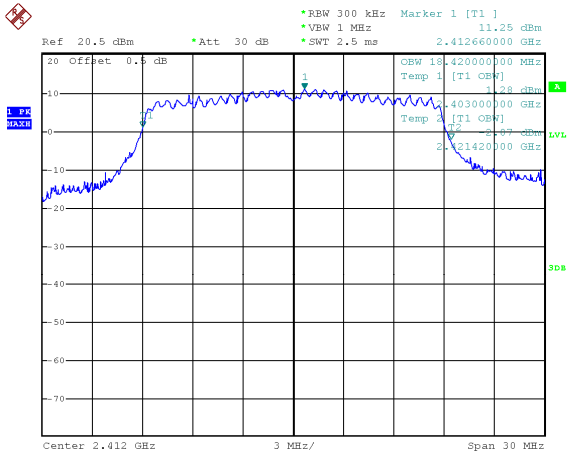
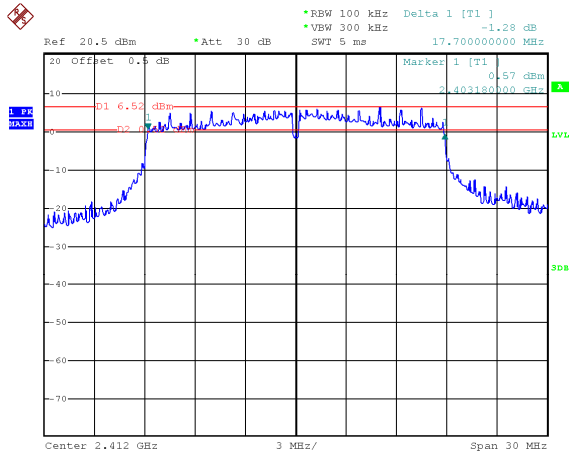
Date: 27.DEC.2025 15:52:25

Date: 27.DEC.2025 15:33:44

6 dB Bandwidth

99% Bandwidth

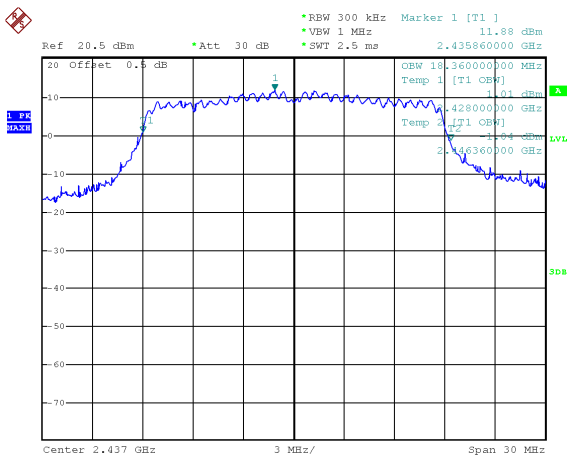
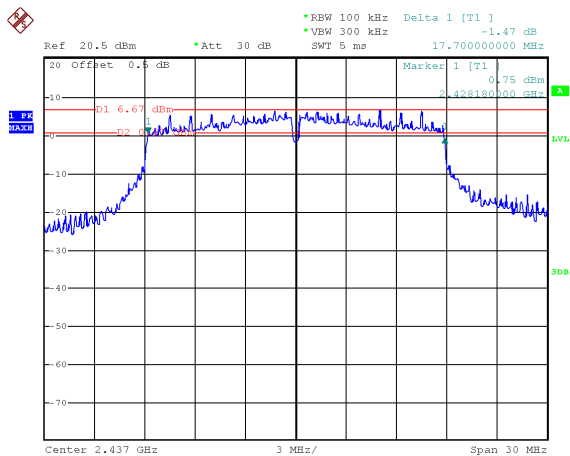
Mode: TX 11n HT20 channel 1



Date: 27.DEC.2025 15:53:20

Date: 27.DEC.2025 15:35:35

Mode: TX 11n HT20 channel 6



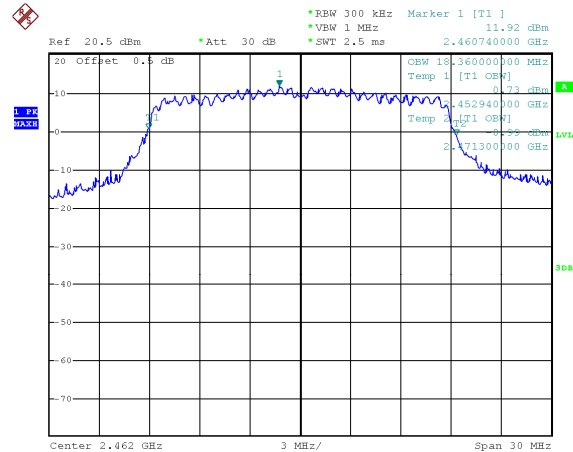
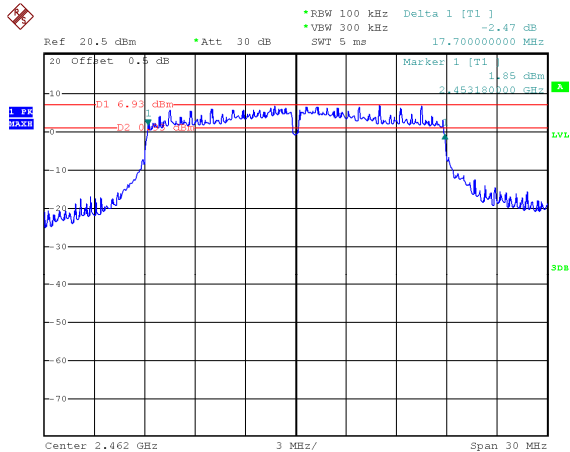
Date: 27.DEC.2025 15:54:34

Date: 27.DEC.2025 15:37:56

6 dB Bandwidth

99% Bandwidth

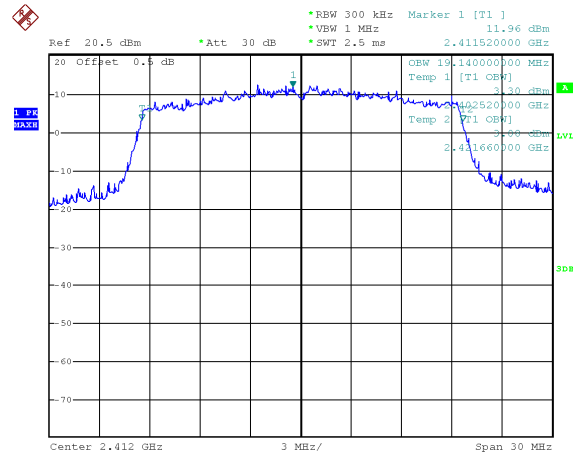
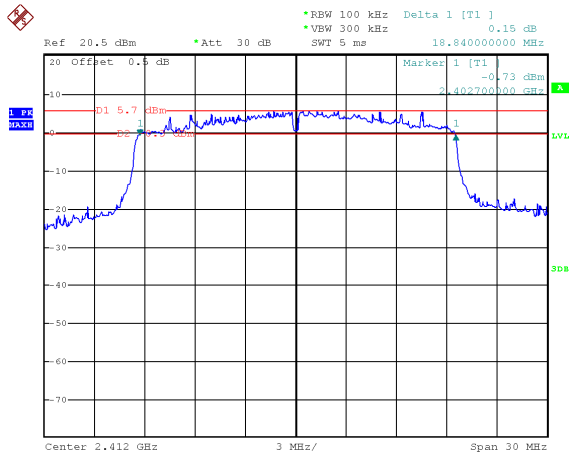
Mode: TX 11n HT20 channel 11



Date: 27.DEC.2025 15:56:02

Date: 27.DEC.2025 15:39:25

Mode: TX 11ax HE20 channel 1



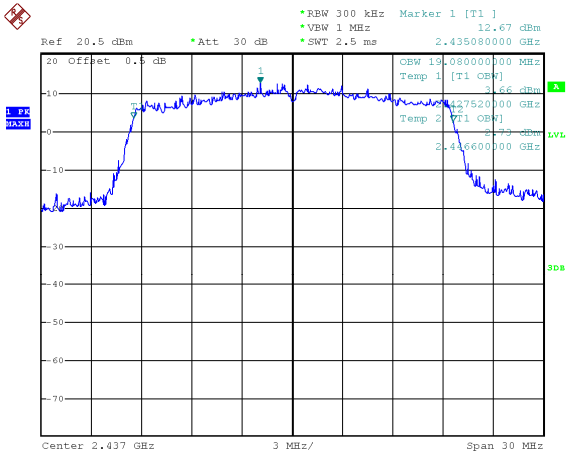
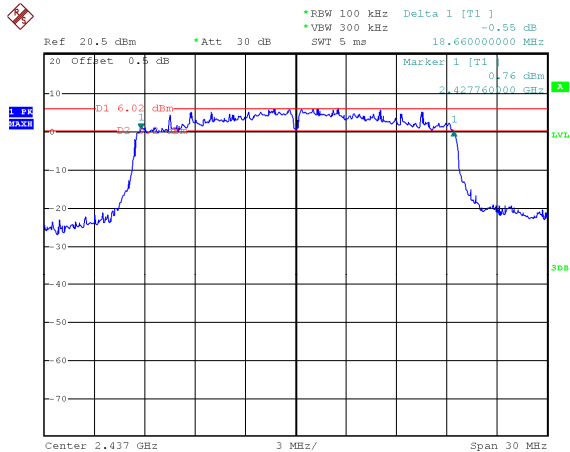
Date: 27.DEC.2025 15:57:47

Date: 27.DEC.2025 15:40:37

6 dB Bandwidth

99% Bandwidth

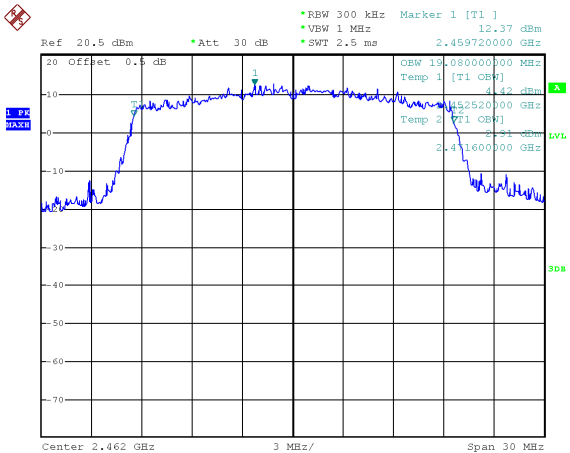
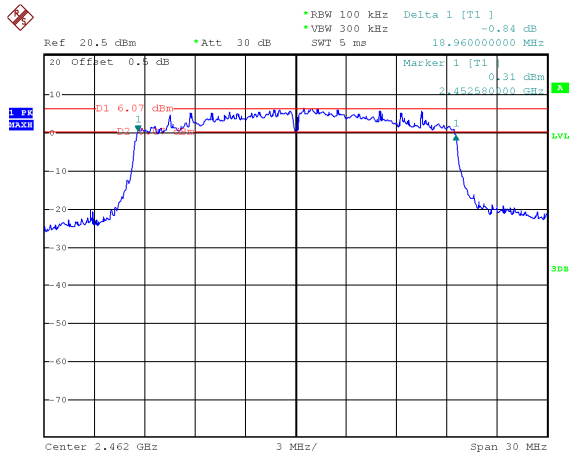
Mode: TX 11ax HE20 channel 6



Date: 27.DEC.2025 15:58:58

Date: 27.DEC.2025 15:41:16

Mode: TX 11ax HE20 channel 11



Date: 27.DEC.2025 16:00:10

Date: 27.DEC.2025 15:41:46

13 Maximum Conducted Output Power

Test Requirement:	47CFR FCC Part15 Subpart C §15.247 KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Method:	ANSI C63.10-2020 KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019
Test Limit:	§15.247(b) The maximum peak conducted output power of the intentional radiator shall not exceed 1W.
Test Mode:	Transmitting

13.1 Test Procedure

According to KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

Subclause 11.9.2.2.2: Method AVGSA-1 of ANSI C63.10 is applicable.

Method AVGSA-1 uses trace averaging with the EUT transmitting at full power throughout each sweep.

The procedure for this method is as follows:

- a) Set span to >1.5 times the OBW.
- b) Set RBW=1% to 5% of the OBW, but do not exceed 1 MHz.
- c) Set VBW $\geq [3 \times \text{RBW}]$.
- d) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
- e) Sweep time=auto.
- f) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
- g) If transmit duty cycle $< 98\%$, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
- h) Trace average at least 100 traces in power averaging (rms) mode.
- i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band-edges. If the instrument does not have a band-power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

13.2 Test Result

ANT 1:

Operation mode	Channel Frequency (MHz)	Conducted Output Power (dBm)
TX 11b	Low-2412	16.03
	Middle-2437	16.25
	High-2462	16.56
TX 11g	Low-2412	15.04
	Middle-2437	15.07
	High-2462	15.06
TX 11n HT20	Low-2412	15.21
	Middle-2437	15.26
	High-2462	15.23
TX 11ax HE20	Low-2412	15.22
	Middle-2437	15.27
	High-2462	15.42

ANT 2:

Operation mode	Channel Frequency (MHz)	Conducted Output Power (dBm)
TX 11b	Low-2412	16.17
	Middle-2437	16.26
	High-2462	16.75
TX 11g	Low-2412	15.97
	Middle-2437	16.20
	High-2462	16.67
TX 11n HT20	Low-2412	16.01
	Middle-2437	16.19
	High-2462	16.60
TX 11ax HE20	Low-2412	15.89
	Middle-2437	15.82
	High-2462	16.05

ANT 1 + ANT 2:

Operation mode	Channel Frequency (MHz)	Maximum Peak Output Power (dBm)			Limit
		ANT1	ANT2	SUM	
TX 11g	Low-2412	15.34	16.27	18.84	30dBm
	Middle-2437	15.37	16.50	18.98	
	High-2462	15.36	16.97	19.25	
TX 11n HT20	Low-2412	15.28	16.06	18.70	
	Middle-2437	15.33	16.24	18.82	
	High-2462	15.30	16.65	19.04	
TX 11n HT40	Low-2412	15.71	16.33	19.04	
	Middle-2437	15.76	16.26	19.03	
	High-2462	15.91	16.49	19.22	

Note:

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

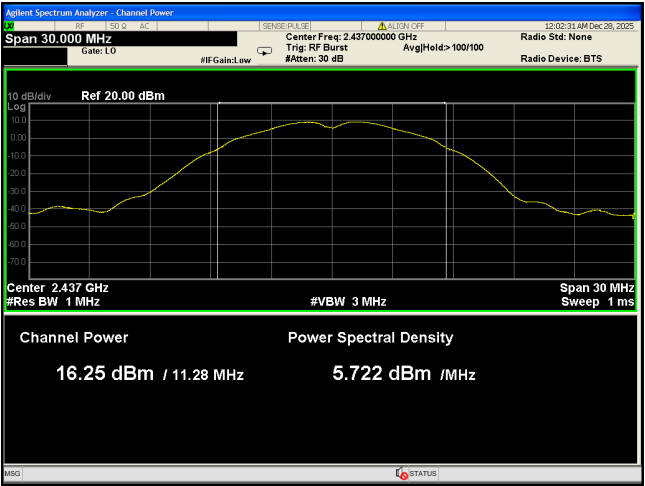
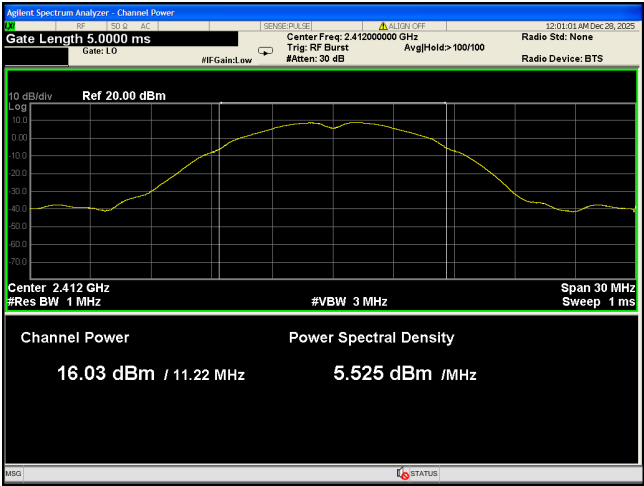
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

Test Plot:

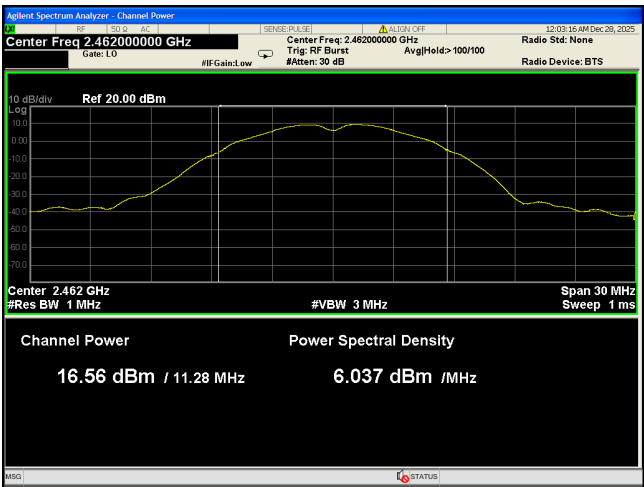
ANT 1:

Mode: TX 11b channel 1

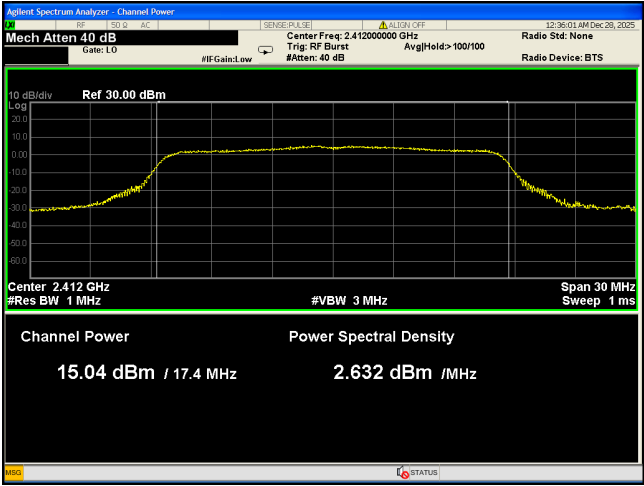
Mode: TX 11b channel 6



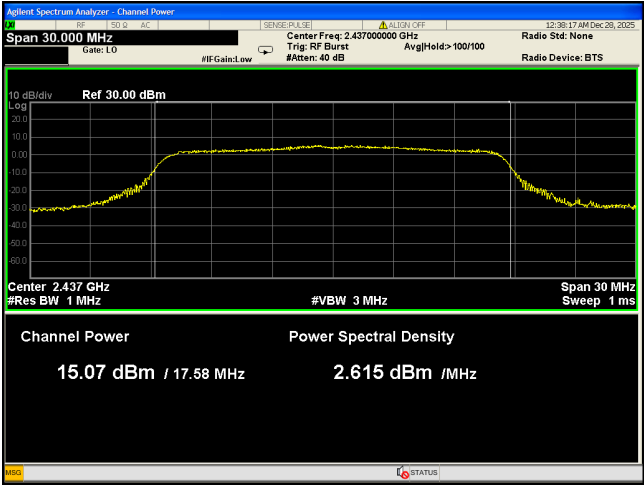
Mode: TX 11b channel 11



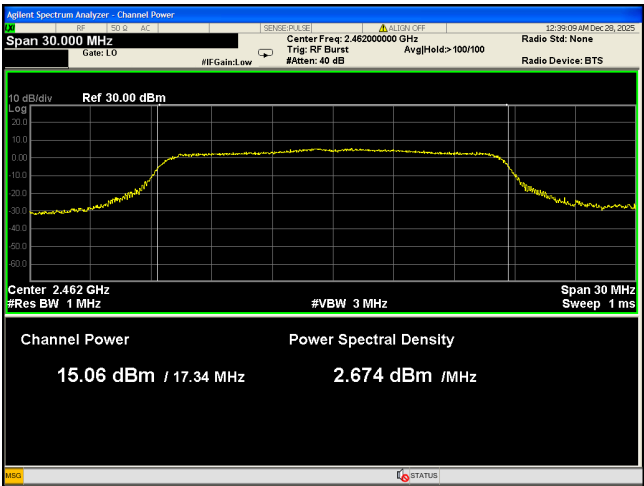
Mode: TX 11g channel 1



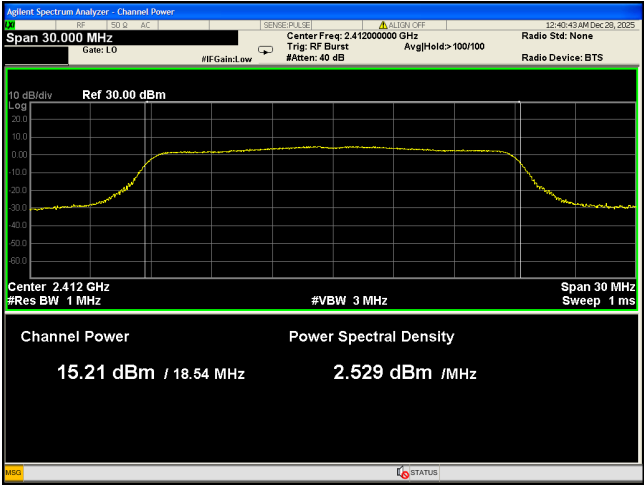
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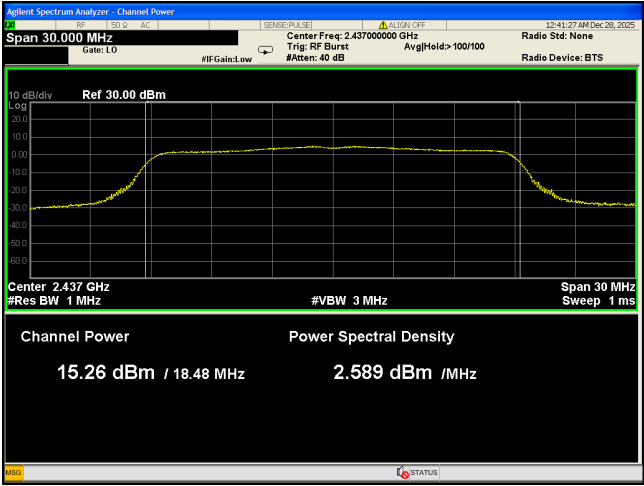
Mode: TX 11g channel 11



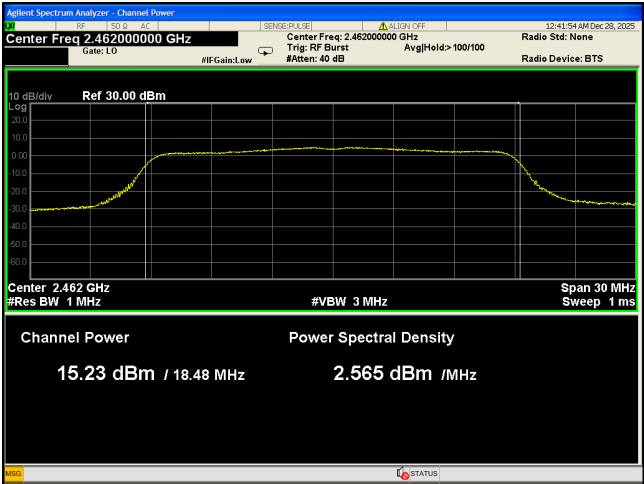
Mode: TX 11n HT20 channel 1



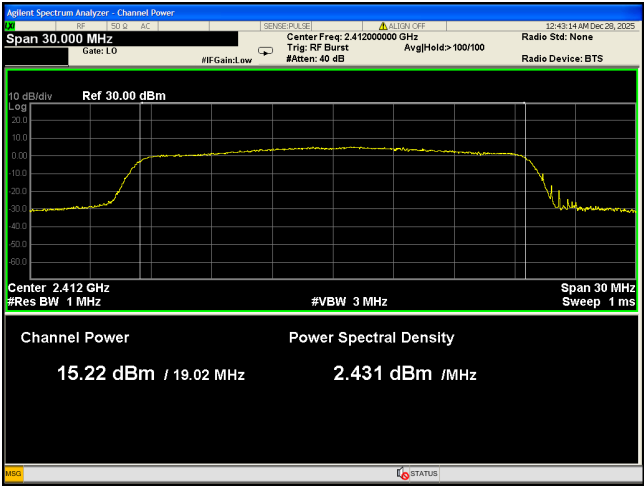
Mode: TX 11n HT20 channel 6



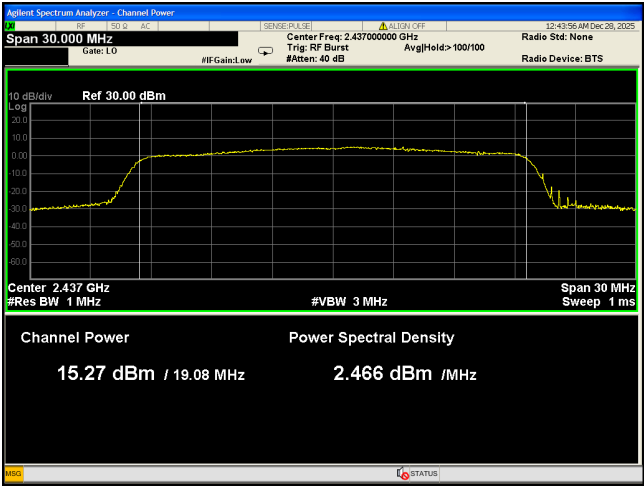
Mode: TX 11n HT20 channel 11



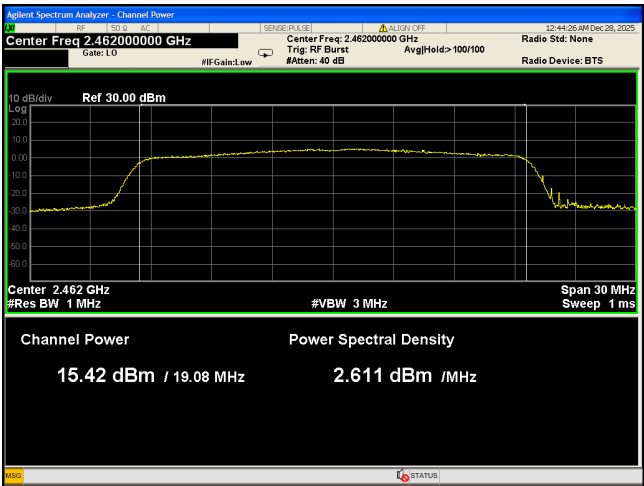
Mode: TX 11ax HE20 channel 1



Mode: TX 11ax HE20 channel 6

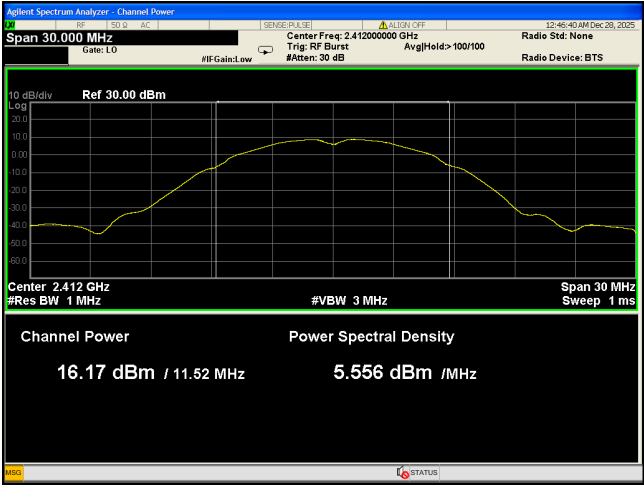


Mode: TX 11ax HE20 channel 11

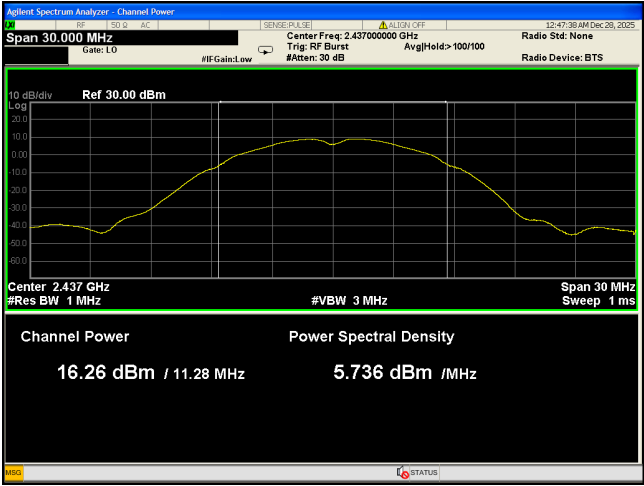


ANT 2:

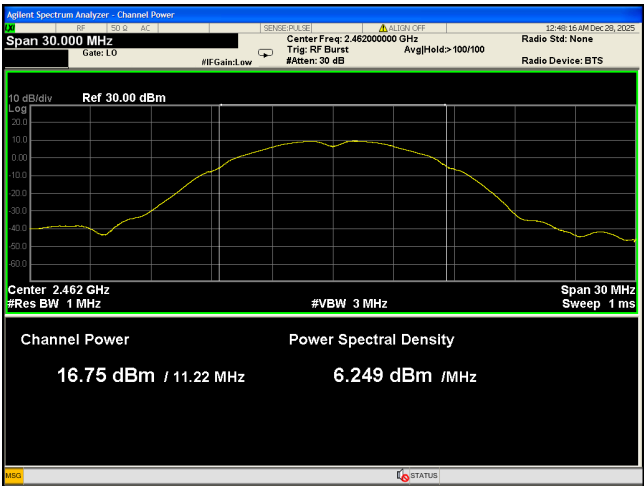
Mode: TX 11b channel 1



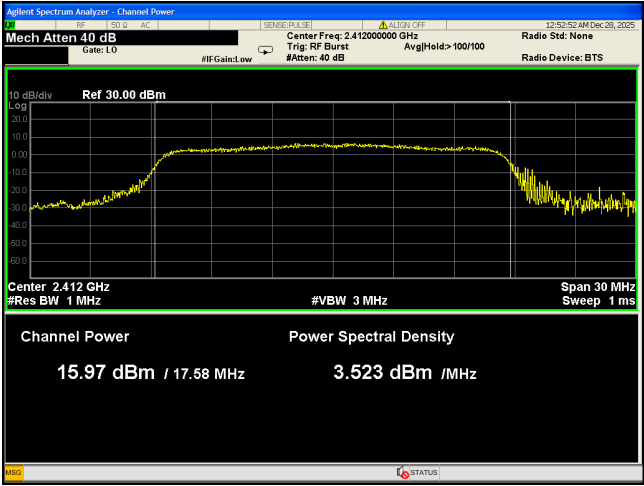
Mode: TX 11b channel 6



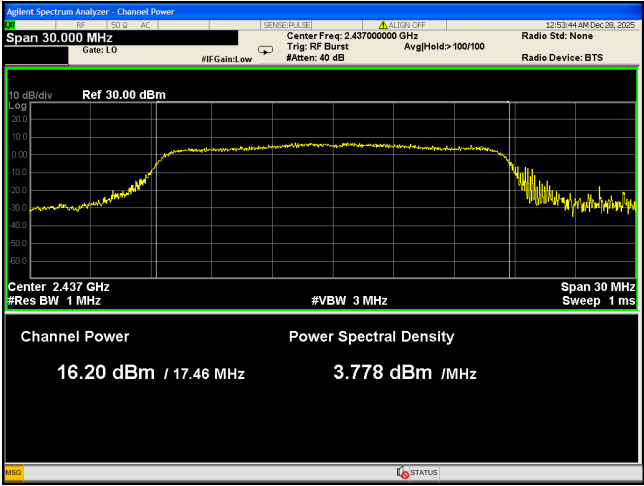
Mode: TX 11b channel 11



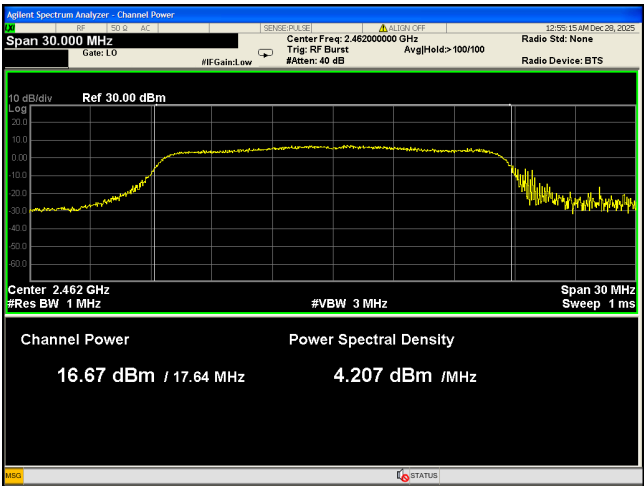
Mode: TX 11g channel 1



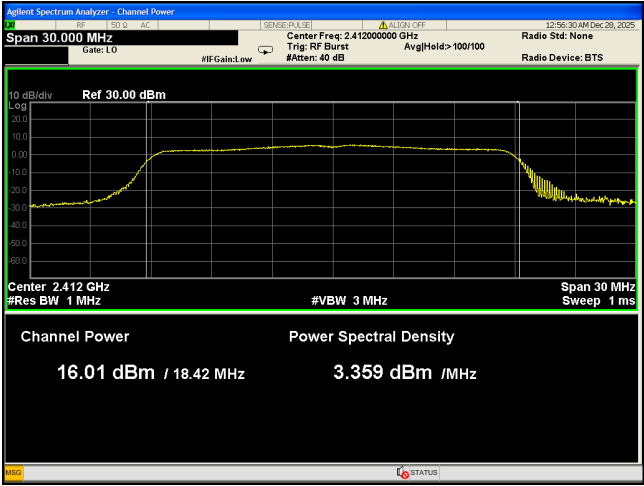
Mode: TX 11g channel 6



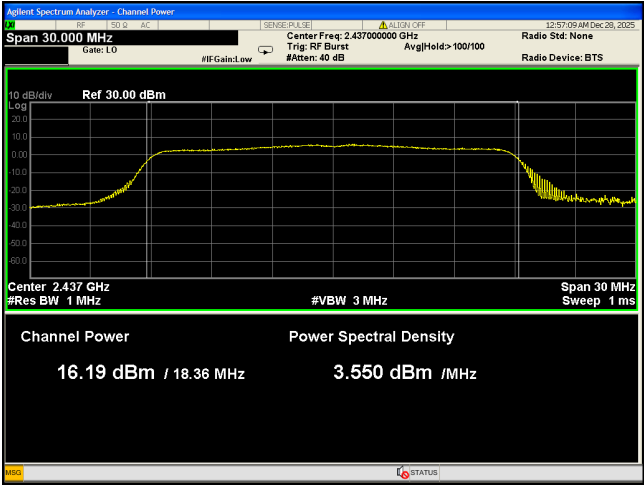
Mode: TX 11g channel 11



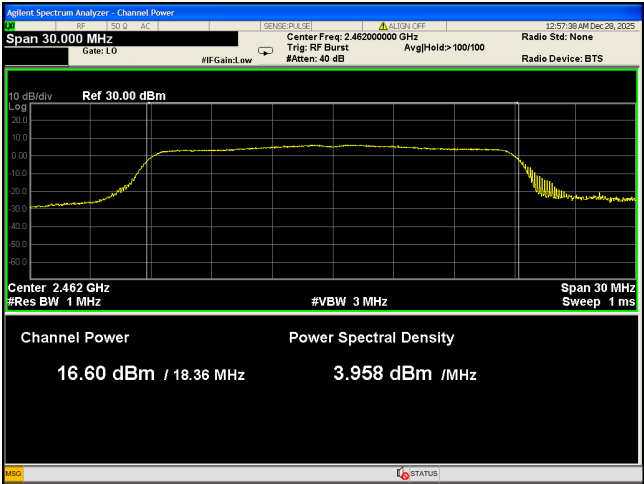
Mode: TX 11n HT20 channel 1



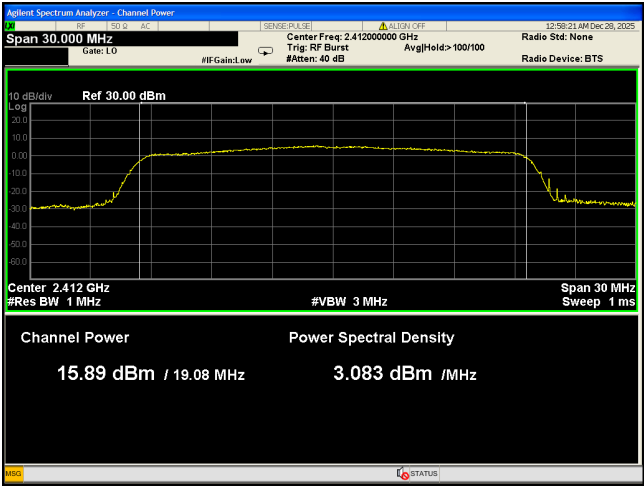
Mode: TX 11n HT20 channel 6



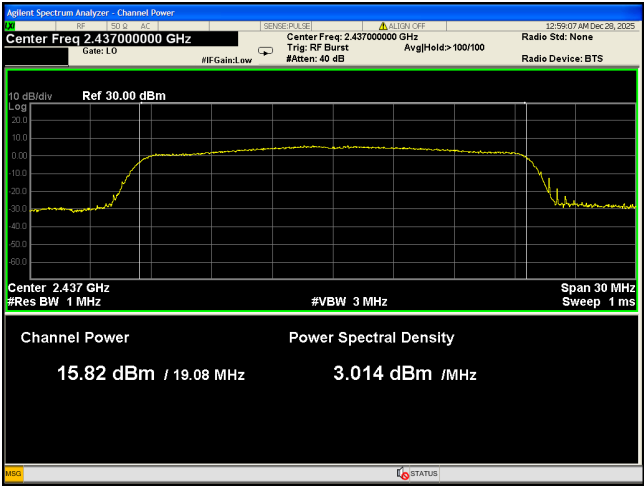
Mode: TX 11n HT20 channel 11



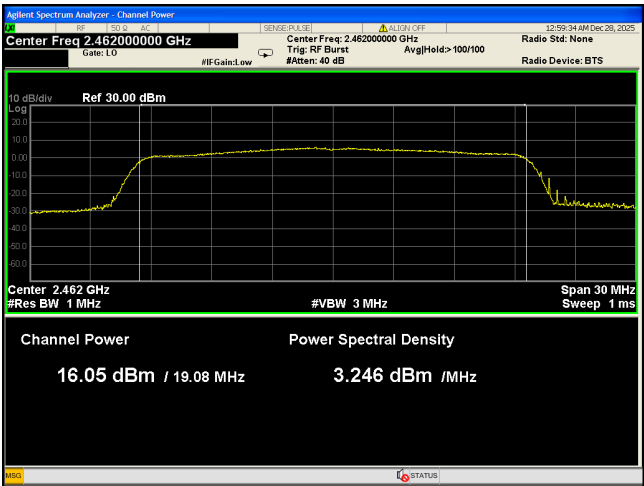
Mode: TX 11ax HE20 channel 1



Mode: TX 11ax HE20 channel 6



Mode: TX 11ax HE20 channel 11



14 Power Spectral Density

Test Requirement:	47CFR FCC Part15 Subpart C §15.247
Test Method:	ANSI C63.10-2020 KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019 KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013
Test Limit:	§15.247(e) 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.
Test Mode:	Transmitting

14.1 Test Procedure

According to KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019 section 8.4

Subclause 11.10.3: Method AVGPS-1 of ANSI C63.10 is applicable.

Method AVGPS-1 uses trace averaging with EUT transmitting at full power throughout each sweep. The following procedure may be used when the maximum (average) conducted output power was used to determine compliance to the fundamental output power limit. This is the baseline method for determining the maximum (average) conducted PSD level. If the instrument has a power averaging (rms) detector, then it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously ($D \geq 98\%$), or else sweep triggering/signal gating must be implemented to help ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter OFF time to be considered):

- Set instrument center frequency to DTS channel center frequency.
- Set span to > 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Detector = power averaging (rms) or sample detector (when rms not available).
- Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span}/\text{RBW}]$.
- Sweep time=auto couple.
- Employ trace averaging (rms) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this might require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

14.2 Test Result

ANT 1:

Operation mode	Channel Frequency (MHz)	Power Spectral density (dBm per 100kHz)	Limit ¹
TX 11b	Low-2412	-0.314	8dBm per 3kHz
	Middle-2437	-0.260	
	High-2462	0.221	
TX 11g	Low-2412	-3.104	
	Middle-2437	-2.548	
	High-2462	-2.818	
TX 11n HT20	Low-2412	-3.732	
	Middle-2437	-3.963	
	High-2462	-3.959	
TX 11n HT40	Low-2422	-3.483	
	Middle-2437	-3.576	
	High-2452	-3.291	

ANT 2:

Operation mode	Channel Frequency (MHz)	Power Spectral density (dBm per 100kHz)	Limit ¹
TX 11b	Low-2412	-0.092	8dBm per 3kHz
	Middle-2437	-0.082	
	High-2462	0.325	
TX 11g	Low-2412	-2.486	
	Middle-2437	-2.477	
	High-2462	-1.966	
TX 11n HT20	Low-2412	-3.163	
	Middle-2437	-3.276	
	High-2462	-1.846	
TX 11n HT40	Low-2422	-3.948	
	Middle-2437	-3.631	
	High-2452	-3.547	

ANT 1 + ANT 2:

Operation mode	Channel Frequency (MHz)	Power Spectral density (dBm)			Limit ¹
		ANT1	ANT2	SUM	
TX 11g	Low-2412	-2.804	-2.186	0.53	8dBm per 3kHz
	Middle-2437	-2.248	-2.177	0.80	
	High-2462	-2.518	-1.666	0.94	
TX 11n HT20	Low-2412	-3.662	-3.113	-0.37	
	Middle-2437	-3.893	-3.226	-0.54	
	High-2462	-3.889	-1.796	0.29	
TX 11n HT40	Low-2422	-2.993	-3.508	-0.23	
	Middle-2437	-3.086	-3.191	-0.13	
	High-2452	-2.801	-3.107	0.06	

Note:

¹If all antennas have the same gain, G_{ANT} , Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.

• For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

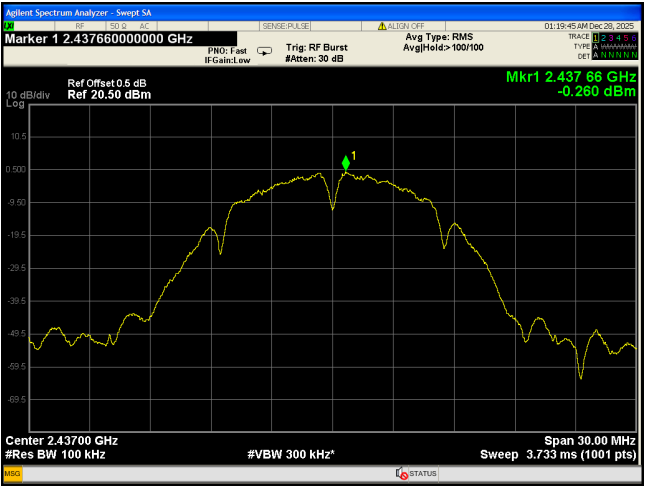
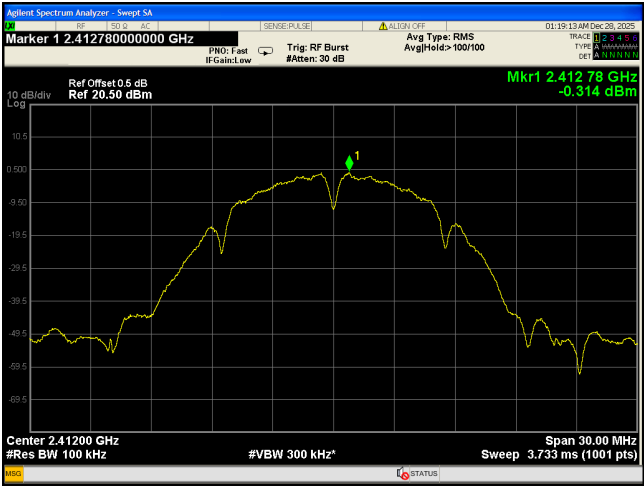
Directional gain = $2.56 + 10 * \log(2) = 5.57\text{dBi}$

Test Plot:

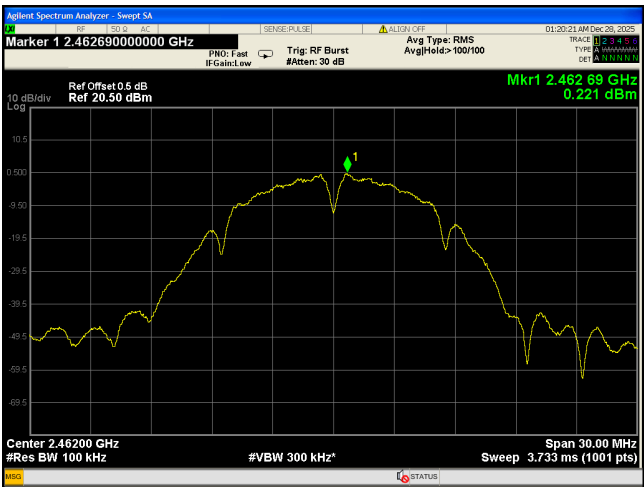
ANT 1:

Mode: TX 11b channel 1

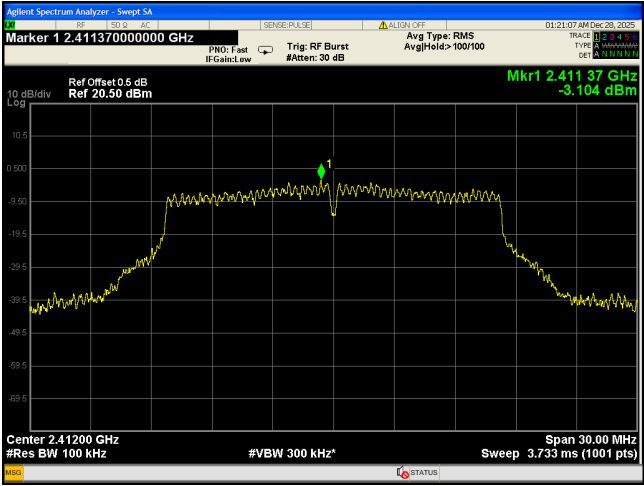
Mode: TX 11b channel 6



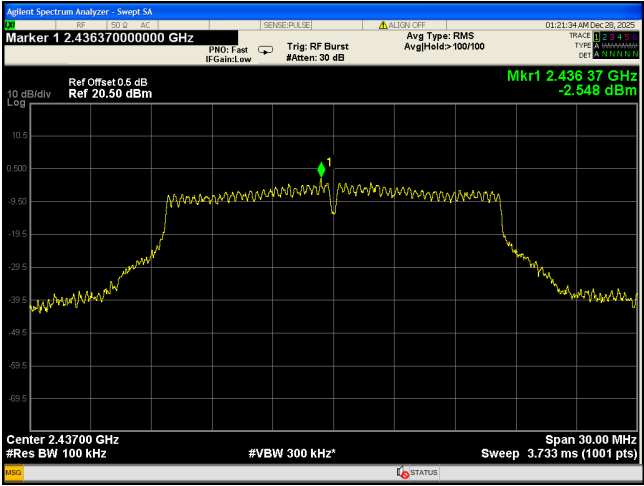
Mode: TX 11b channel 11



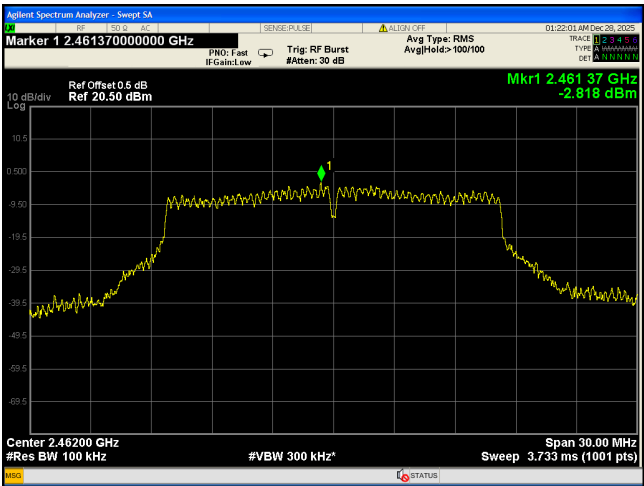
Mode: TX 11g channel 1



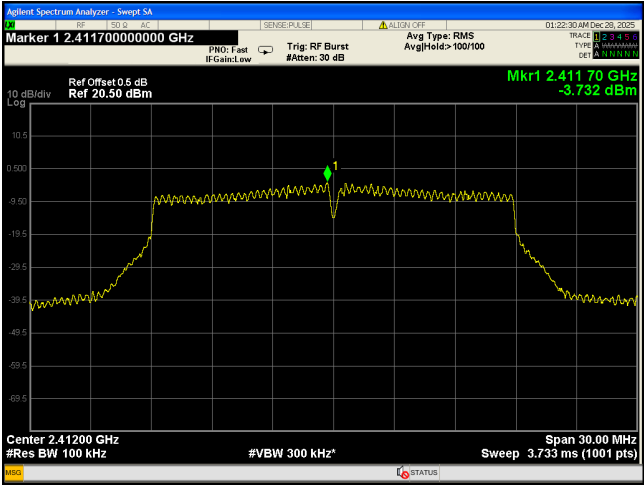
Mode: TX 11g channel 6



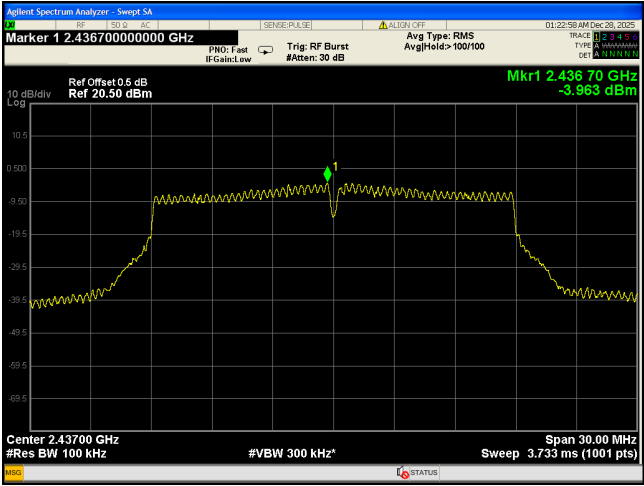
Mode: TX 11g channel 11



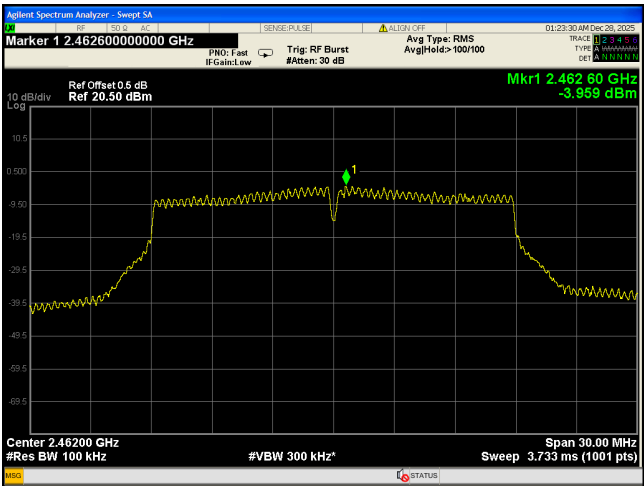
Mode: TX 11n HT20 channel 1



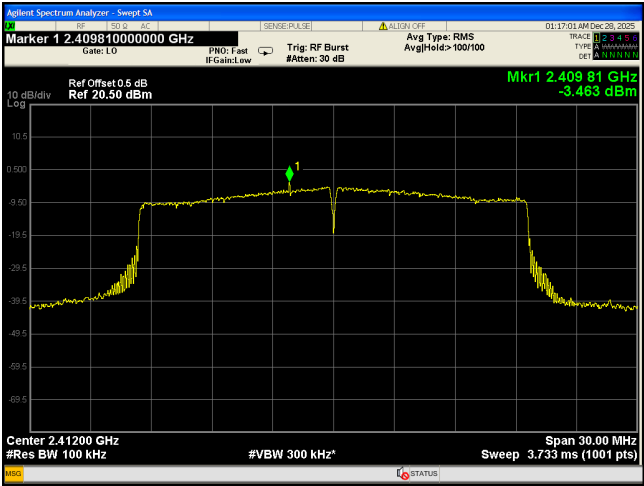
Mode: TX 11n HT20 channel 6



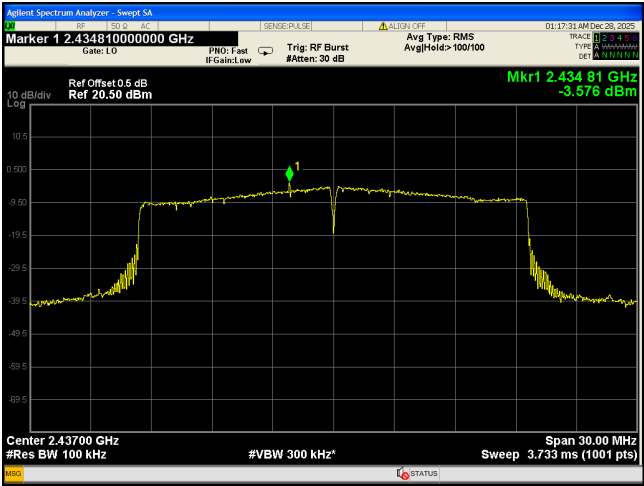
Mode: TX 11n HT20 channel 11



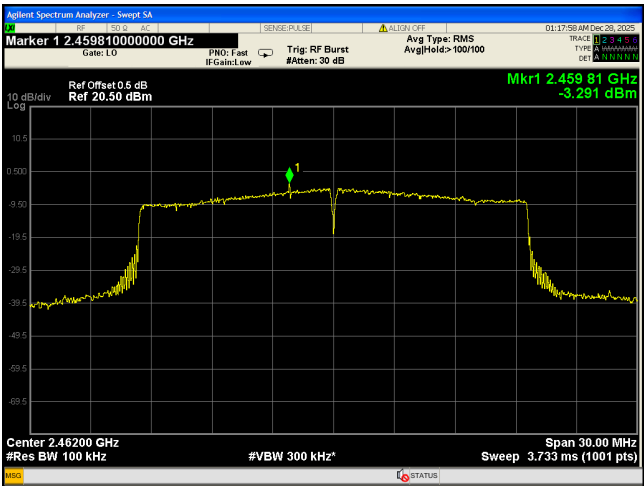
Mode: TX 11ax HE20 channel 1



Mode: TX 11ax HE20 channel 6

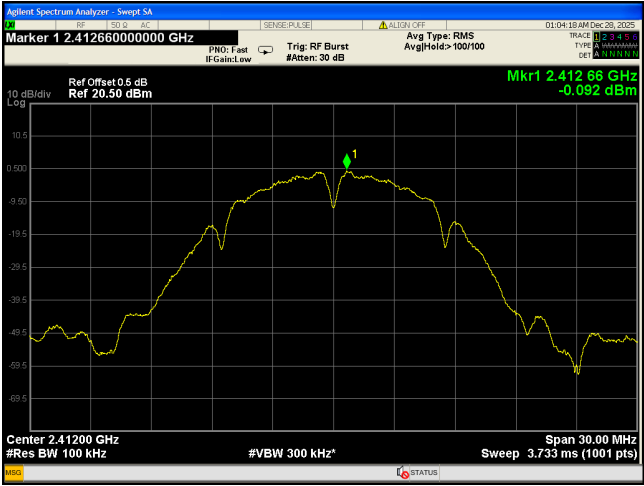


Mode: TX 11ax HE20 channel 11

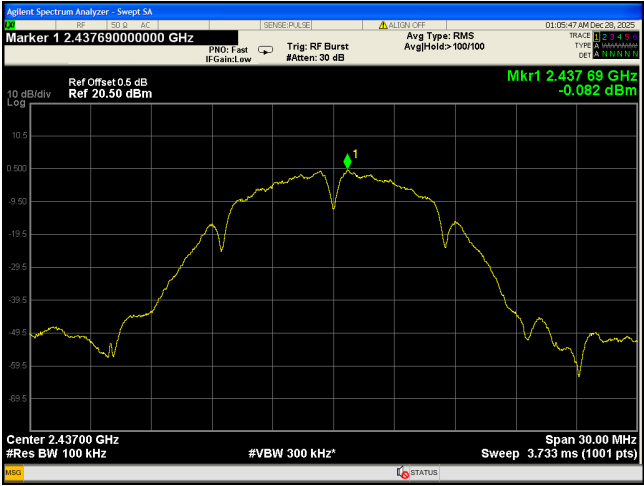


ANT 2:

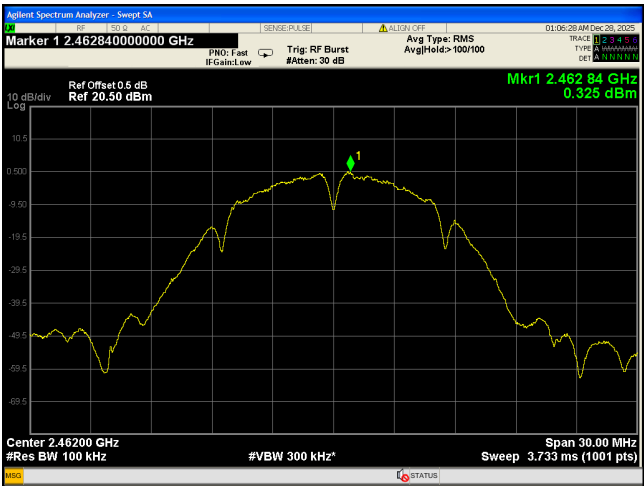
Mode: TX 11b channel 1



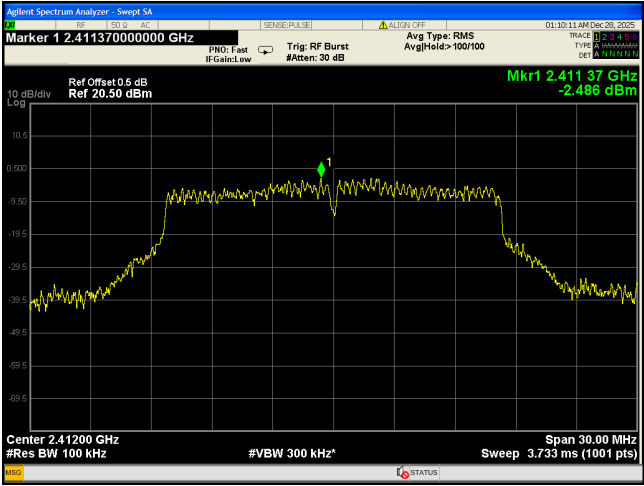
Mode: TX 11b channel 6



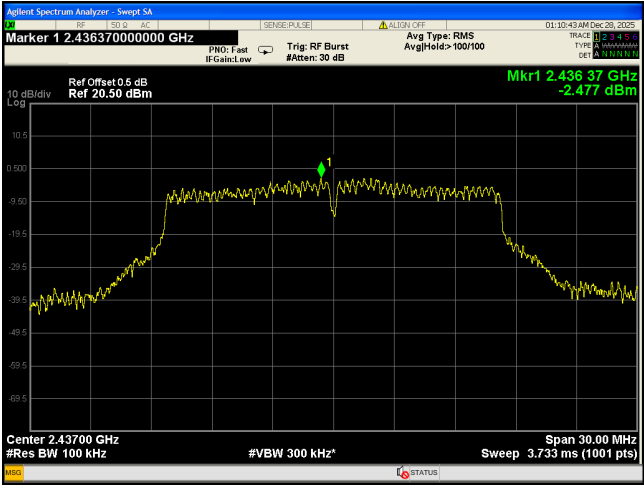
Mode: TX 11b channel 11



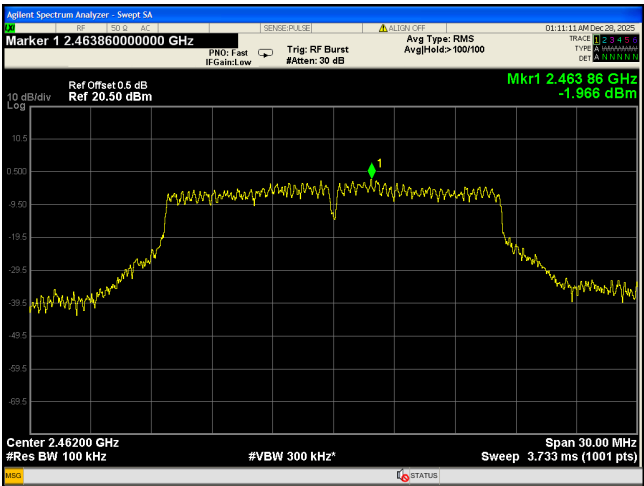
Mode: TX 11g channel 1



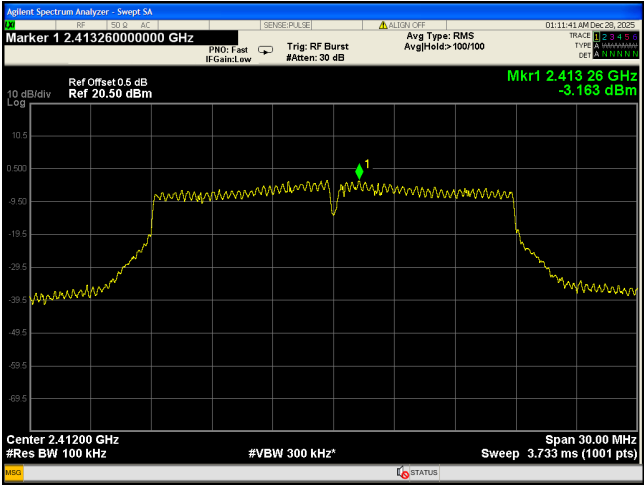
Mode: TX 11g channel 6



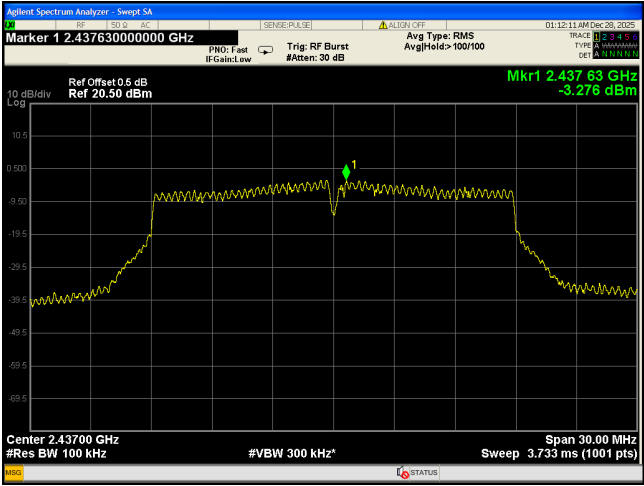
Mode: TX 11g channel 11



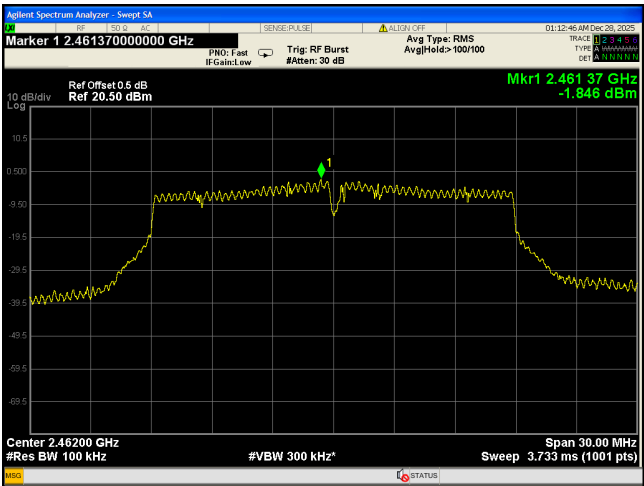
Mode: TX 11n HT20 channel 1



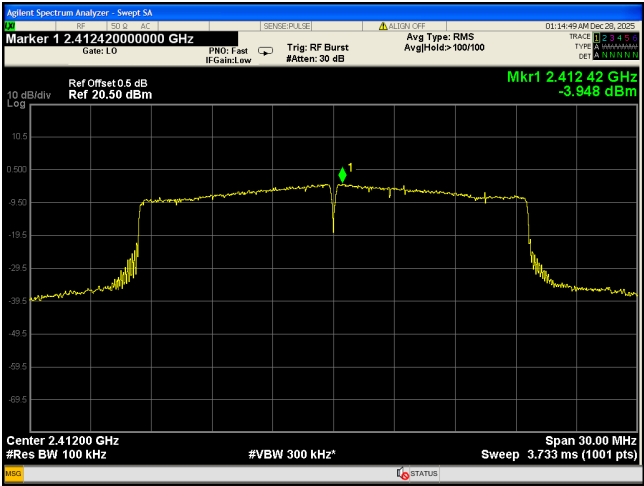
Mode: TX 11n HT20 channel 6



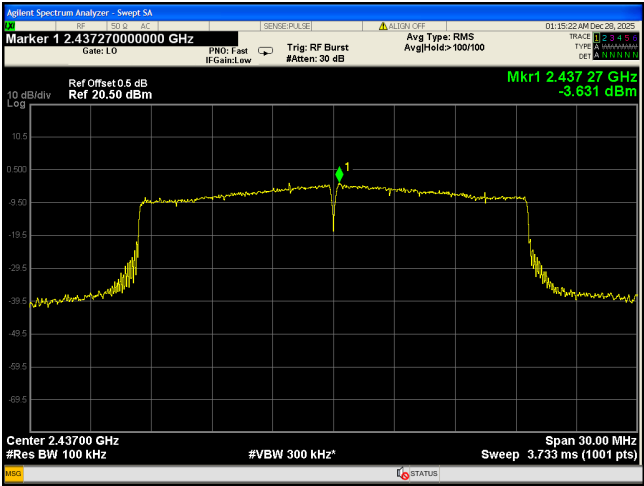
Mode: TX 11n HT20 channel 11



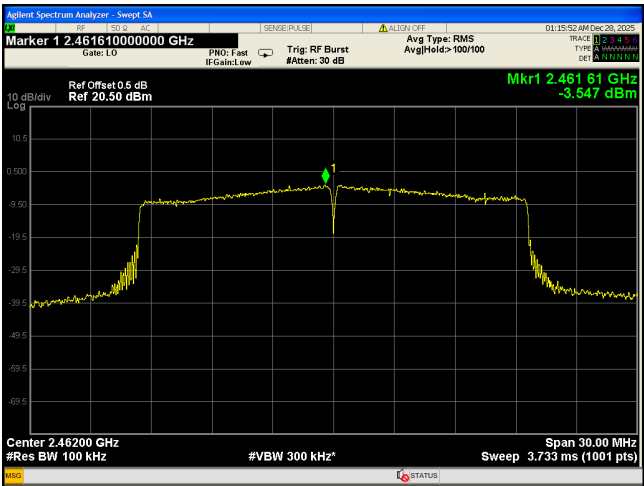
Mode: TX 11ax HE20 channel 1



Mode: TX 11ax HE20 channel 6



Mode: TX 11ax HE20 channel 11



15 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has two FPC printed antennas fulfil the requirement of this section.

Note: Please refer to EUT photos for more details.

16 RF Exposure

Note: Please refer to RF Exposure Report: WTD25D11316003W007.

17 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix-SyBran-01-Photos.

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