



Report No.:

TW2106134E

File reference No.:

2021-07-02

Applicant:

Nanjing Magewell Electronics CO., Ltd..

Product:

Video Encoder

Model No.:

Ultra Encode HDMI, Ultra Encode SDI, Ultra Encode AIO, Ultra Encode HDMI 4K, Ultra Encode SDI 4K, Ultra Encode AIO 4K

Trademark:

N/A

Test Standards:

FCC Part 15.247

Test result:

It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10, FCC Part 15.247 for the evaluation of electromagnetic compatibility

Approved By



Jack Chung

Manager

Dated:

July 02, 2021

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



Special Statement:

The testing quality ability of our laboratory meet with “Quality Law of People’s Republic of China” Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

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

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The 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 No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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Test Report Conclusion

Content

1.0	General Details	4
1.1	Test Lab Details	4
1.2	Applicant Details	4
1.3	Description of EUT	4
1.4	Submitted Sample	5
1.5	Test Duration	5
1.6	Test Uncertainty	5
1.7	Test By	5
2.0	List of Measurement Equipment	6
3.0	Technical Details	8
3.1	Summary of Test Results	8
3.2	Test Standards	8
4.0	EUT Modification	8
5.0	Power Line Conducted Emission Test	9
5.1	Schematics of the Test	9
5.2	Test Method and Test Procedure	9
5.3	Configuration of the EUT	9
5.4	EUT Operating Condition	10
5.5	Conducted Emission Limit	10
5.6	Test Result	10
6.0	Radiated Emission test	13
6.1	Test Method and Test Procedure	13
6.2	Configuration of the EUT	14
6.3	EUT Operation Condition	14
6.4	Radiated Emission Limit	14
7.0	6dB Bandwidth Measurement	24
8.0	Maximum Output Power	44
9.0	Power Spectral Density Measurement	47
10.0	Out of Band Measurement	65
11.0	Antenna Requirement	83
12.0	FCC ID Label	84
13.0	Photo of Test Setup and EUT View	85

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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.
Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China
Telephone: (755) 83448688
Fax: (755) 83442996
Site Listed with Federal Communications commission (FCC)
Registration Number: 744189
For 3m Anechoic Chamber
Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A
For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Nanjing Magewell Electronics CO., Ltd..
Address: 14th Floor, Building 3, No.89 Shengli Road, Jiangning Economic and Technological Development Zone, Nanjing, China.
Telephone: --
Fax: --

1.3 Description of EUT

Product: Video Encoder
Manufacturer: Nanjing Magewell Electronics CO., Ltd..
Address: 14th Floor, Building 3, No.89 Shengli Road, Jiangning Economic and Technological Development Zone, Nanjing, China.
Brand Name: N/A
Model Number: Ultra Encode HDMI
Additional Model Number: Ultra Encode SDI, Ultra Encode AIO, Ultra Encode HDMI 4K, Ultra Encode SDI 4K, Ultra Encode AIO 4K
Hardware Version: A
Software Version: 1.3.369
Serial No.: A30521030249
Type of Modulation IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)
IEEE 802.11g/n (HT20, HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency range IEEE 802.11b/g/n (HT20): 2412-2462MHz; 802.11n HT40: 2422-2452MHz
Channel Spacing 5MHz for IEEE 802.11b/g/n HT20, HT40
Air Data Rate IEEE 802.11b: 11, 5.5, 2, 1 Mbps
IEEE 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps

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IEEE 802.11n HT20/HT40: mcs0-mcs7

Frequency Selection By software

Channel Number IEEE 802.11b/g/n (HT20): 11 Channels; IEEE 802.11n (HT40): 7 Channels;

Antenna Connector: Reverse polarity SMA connector

Antenna: Dipole antennas used. The gain of the antennas is 2.5dBi. (Get from the antenna specification provided the applicant)

Input Voltage: DC5V, 3A

Power Adapter Model: PA1015-050SIB300; Input: 100-240V~, 50/60Hz, 0.4A; Output: DC5V, 3A

1.4 Submitted Sample: 1 Samples

1.5 Test Duration

2021-06-10 to 2021-07-02

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty =6.0dB

Occupied Channel Bandwidth Uncertainty =5%

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by



Print Name: Terry Tang

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2021-06-18	2022-06-17
LISN	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17
LISN	R&S	EZH3-Z5	100253	2021-06-18	2022-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2021-06-18	2022-06-17
Loop Antenna	EMCO	6507	00078608	2021-06-18	2024-06-17
Spectrum	R&S	FSIQ26	100292	2021-06-18	2022-06-17
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2021-06-18	2022-06-17
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-07-09	2021-07-08
Power meter	Anritsu	ML2487A	6K00003613	2021-06-18	2022-06-17
Power sensor	Anritsu	MA2491A	32263	2021-06-18	2022-06-17
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2021-07-03
9*6*6 Anechoic	--	--	N/A	2020-07-06	2021-07-05
EMI Test Receiver	RS	ESVB	826156/011	2021-06-18	2022-06-17
EMI Test Receiver	RS	ESH3	860904/006	2021-06-18	2022-06-17
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2021-06-18	2022-06-17
Spectrum	HP/Agilent	E4407B	MY50441392	2021-06-18	2022-06-17
Spectrum	RS	FSP	1164.4391.38	2021-01-15	2022-01-14
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2021-06-18	2022-06-17
RF Cable	Zhengdi	7m	--	2021-06-18	2022-06-17
RF Switch	EM	EMSW18	060391	2021-06-18	2022-06-17
Pre-Amplifier	Schwarebeck	BBV9743	#218	2021-06-18	2022-06-17
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2021-06-18	2022-06-17
LISN	SCHAFFNER	NNB42	00012	2021-01-06	2022-01-05

2.2 Automation Test Software

For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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3. DESCRIPTION OF TEST MODES

IEEE 802.11b, 802.11g, 802.11n (HT20) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps data rate (worst case) was chosen for full testing. IEEE 802.11g mode: 6Mbps data rate (worst case) was chosen for full testing. IEEE 802.11n (HT20) mode: mcs0 (worst case) were chosen for full testing

IEEE 802.11n (HT40) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11n (HT40) mode: mcs0 data rate (worst case) were chosen for full testing

Note: During the test, the duty cycle was set up to >98%



3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna Requirement	PASS	Complies
FCC Part 15, Paragraph 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm/3kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

3.2 Test Standards

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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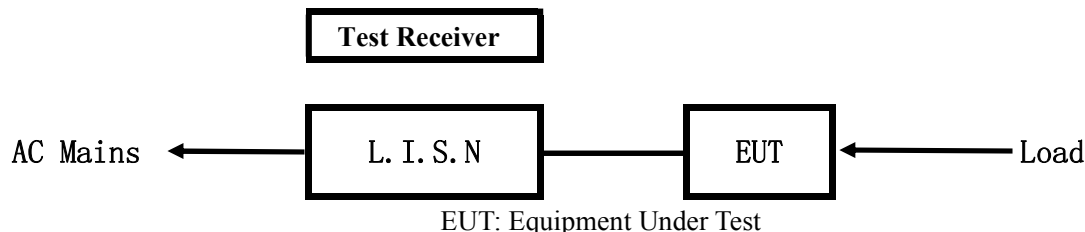
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5.0 Power Line Conducted Emission Test

5.1 Schematics of the test

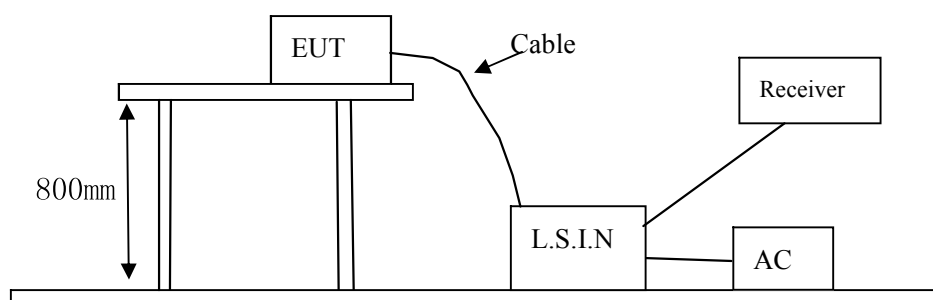


5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10 –2013.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of the EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
Video Encoder	Nanjing Magewell Electronics CO., Ltd..	Ultra Encode HDMI (see the page 4 for additional models)	2AP6W-ENCODER01

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
--	--	--	--	--

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5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0~56.0*	56.0~46. *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.0	60.0	50.0

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

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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A: Conducted Emission on Live Terminal (150kHz to 30MHz)

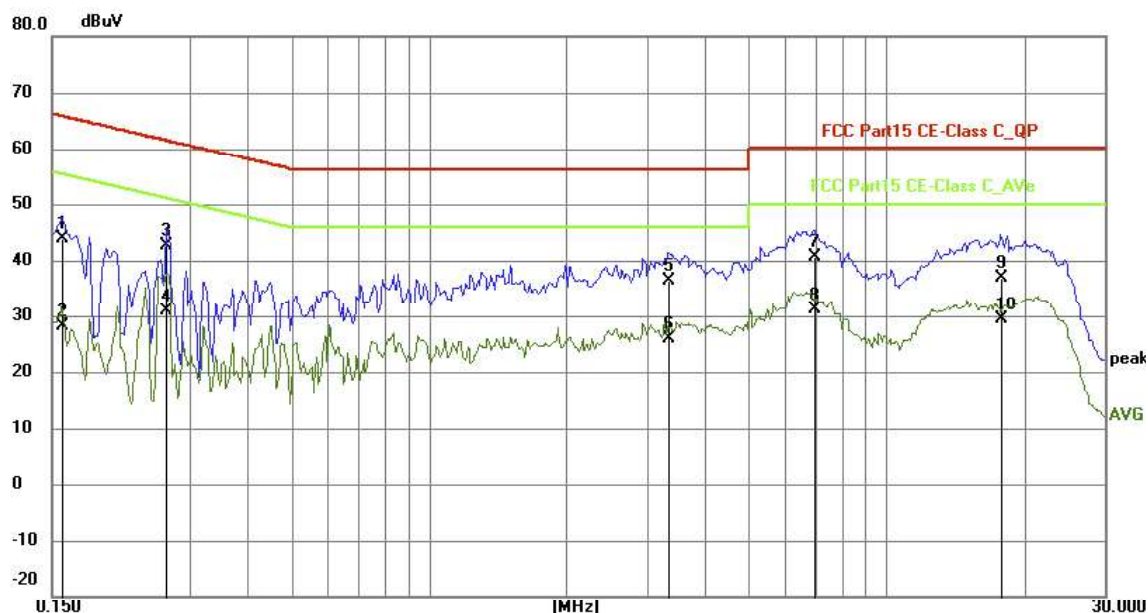
EUT Operating Environment

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keep WIFI Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1578	34.00	9.78	43.78	65.58	-21.80	QP	P
2	0.1578	18.41	9.78	28.19	55.58	-27.39	AVG	P
3	0.2670	32.97	9.75	42.72	61.21	-18.49	QP	P
4	0.2670	21.13	9.75	30.88	51.21	-20.33	AVG	P
5	3.3315	26.40	9.86	36.26	56.00	-19.74	QP	P
6	3.3315	15.99	9.86	25.85	46.00	-20.15	AVG	P
7	6.9507	30.58	10.01	40.59	60.00	-19.41	QP	P
8	6.9507	21.19	10.01	31.20	50.00	-18.80	AVG	P
9	17.7654	26.38	10.55	36.93	60.00	-23.07	QP	P
10	17.7654	18.95	10.55	29.50	50.00	-20.50	AVG	P

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

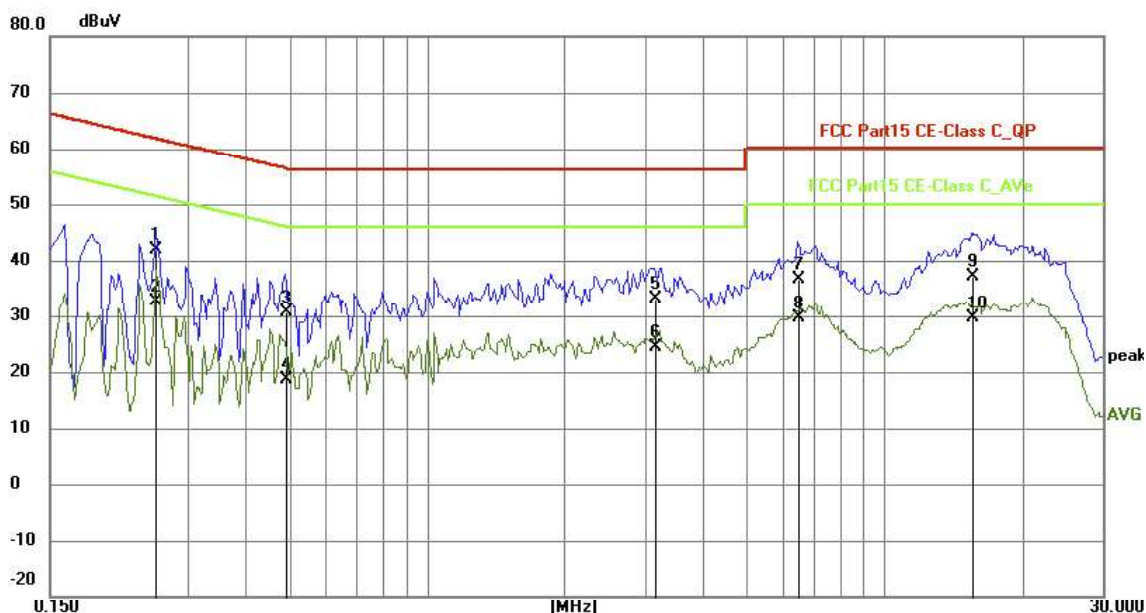
EUT Operating Environment

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keep WIFI Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2553	32.17	9.75	41.92	61.58	-19.66	QP	P
2	0.2553	22.81	9.75	32.56	51.58	-19.02	AVG	P
3	0.4893	20.76	9.77	30.53	56.18	-25.65	QP	P
4	0.4893	8.97	9.77	18.74	46.18	-27.44	AVG	P
5	3.1404	23.20	9.85	33.05	56.00	-22.95	QP	P
6	3.1404	14.46	9.85	24.31	46.00	-21.69	AVG	P
7	6.4554	26.67	9.99	36.66	60.00	-23.34	QP	P
8	6.4554	19.66	9.99	29.65	50.00	-20.35	AVG	P
9	15.5034	26.60	10.41	37.01	60.00	-22.99	QP	P
10	15.5034	19.32	10.41	29.73	50.00	-20.27	AVG	P

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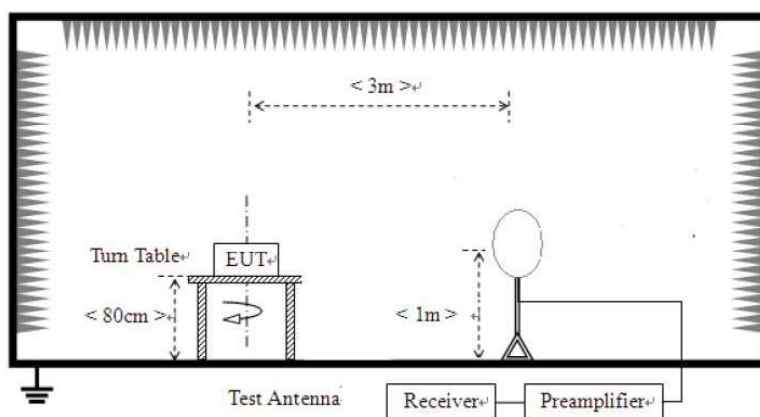
6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



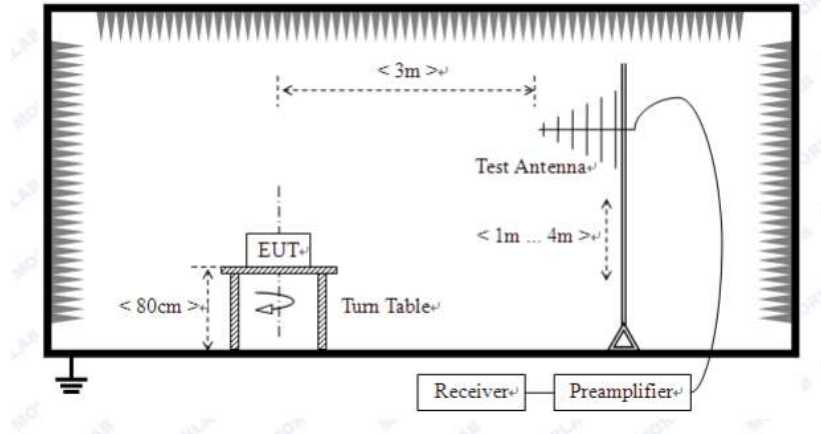
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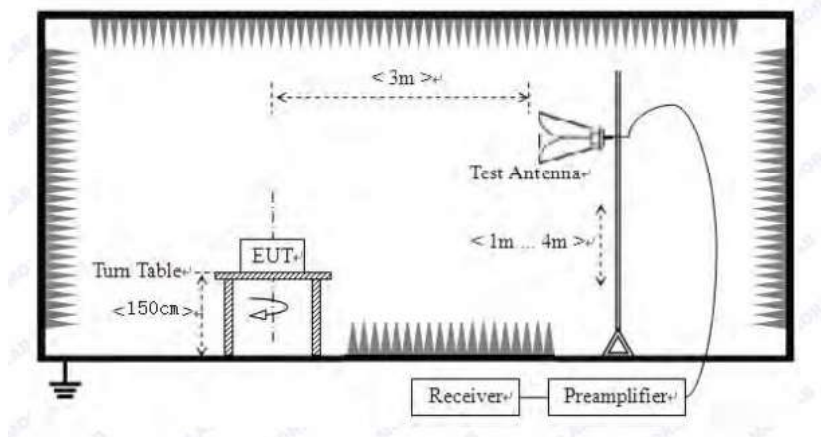
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For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

6.4 Radiated Emission Limit

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

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Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (μ V)
 2. In the Above Table, the higher limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
 4. **Worse case were recorded in the test report. 802.11g was the worst case.**

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Test result

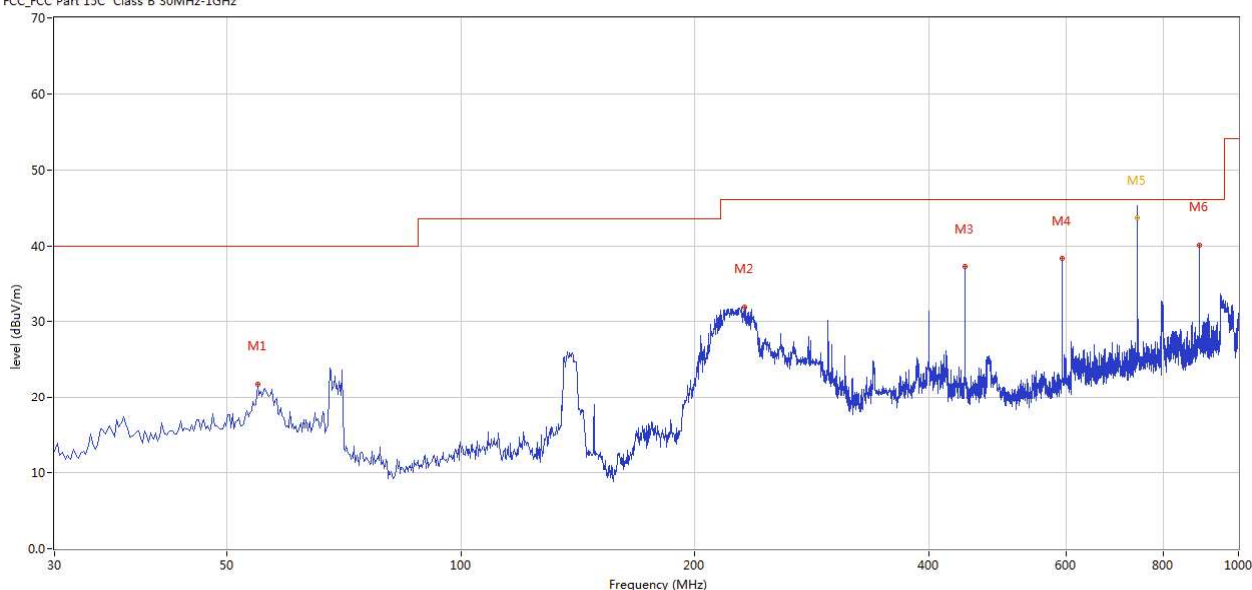
General Radiated Emission Data and Harmonics Radiated Emission Data

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

EUT set Condition: **Keep Transmitting**

Results: **Pass**

FCC_FCC Part 15C Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	54.729	21.81	-11.72	40.0	-18.19	Peak	177.00	100	Horizontal	Pass
2	230.740	31.83	-12.66	46.0	-14.27	Peak	164.00	100	Horizontal	Pass
3	445.056	38.20	-7.99	46.0	-7.80	Peak	330.00	100	Horizontal	Pass
4	593.429	38.30	-5.22	46.0	-7.70	Peak	307.00	100	Horizontal	Pass
5	741.765	45.72	-3.43	46.0	-0.28	Peak	152.00	100	Horizontal	N/A
5*	741.765	43.45	-3.43	46.0	-2.55	QP	152.00	100	Horizontal	Pass
6	890.175	40.14	-1.89	46.0	-5.86	Peak	347.00	100	Horizontal	Pass

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Test result

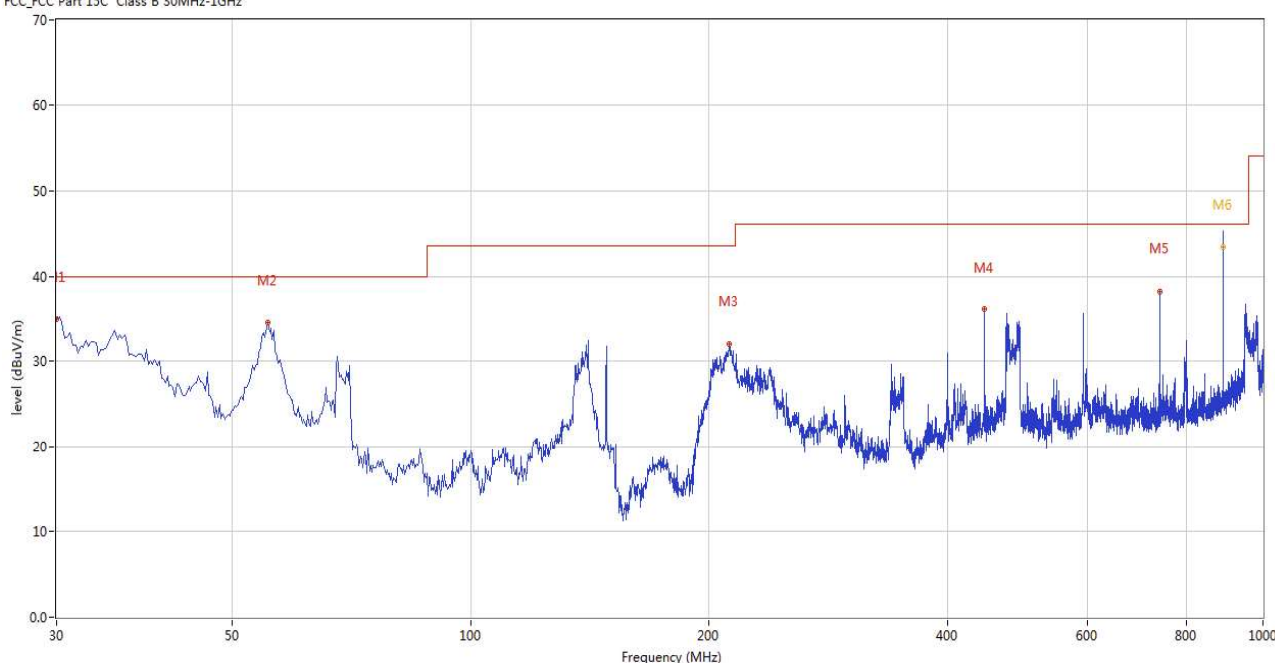
General Radiated Emission Data and Harmonics Radiated Emission Data

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

EUT set Condition: **Keep Transmitting**

Results: **Pass**

FCC_FCC Part 15C Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	30.000	34.94	-14.19	40.0	-5.06	Peak	232.00	100	Vertical	Pass
2	55.456	34.56	-11.89	40.0	-5.44	Peak	0.00	100	Vertical	Pass
3	212.072	32.02	-13.68	43.5	-11.48	Peak	320.00	100	Vertical	Pass
4	445.056	36.06	-7.99	46.0	-9.94	Peak	194.00	100	Vertical	Pass
5	741.802	38.18	-3.43	46.0	-7.82	Peak	157.00	100	Vertical	Pass
6	890.119	45.78	-1.89	46.0	-0.22	Peak	118.00	100	Vertical	N/A
6*	890.119	43.40	-1.89	46.0	-2.60	QP	118.00	100	Vertical	Pass

The report refers only to the sample tested and does not apply to the bulk.

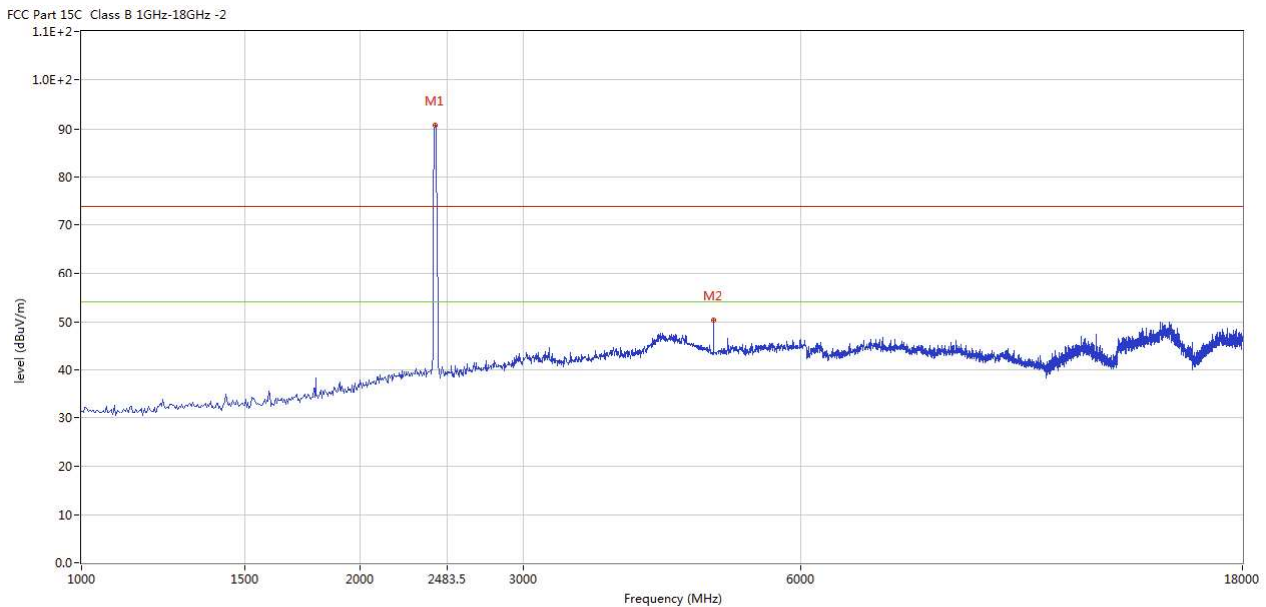
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Please refer to the following test plots for details:

CH01 for 11g at 6Mbps: Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4824.044	50.32	3.14	74.0	-23.68	Peak	165.00	100	Horizontal	Pass

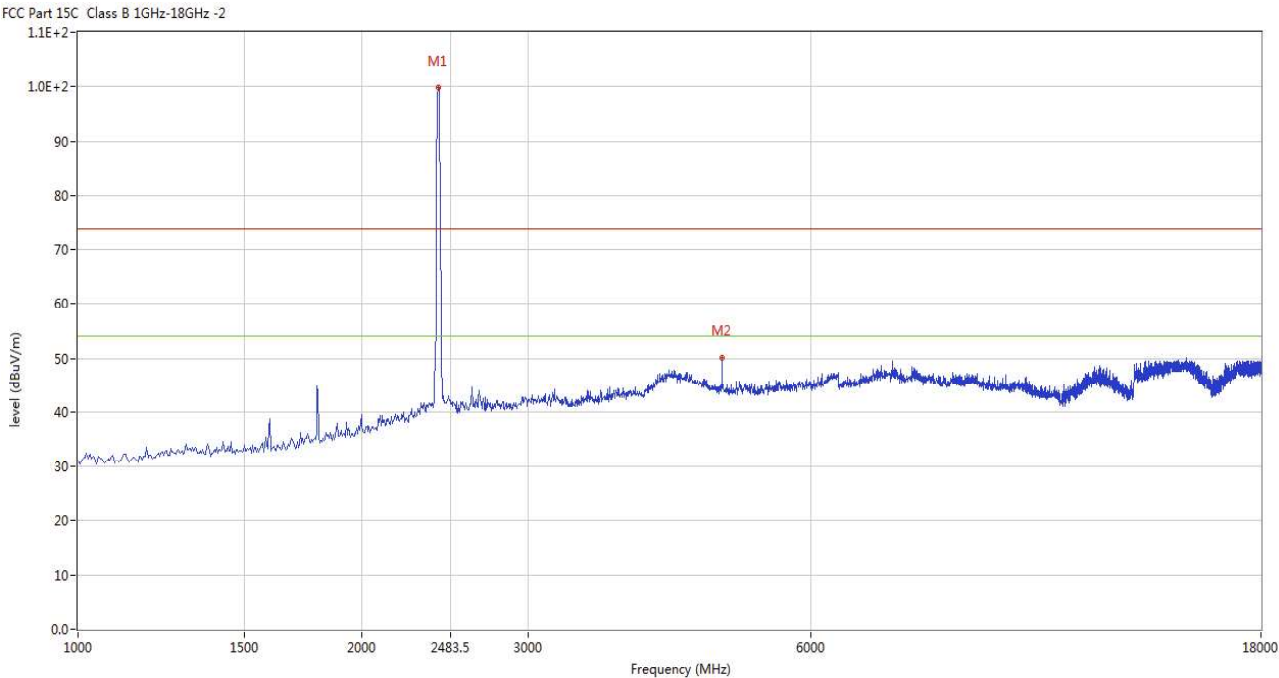
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CH01 for 11g at 6Mbps: Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4824.044	50.06	3.14	74.0	-23.94	Peak	201.00	100	Vertical	Pass

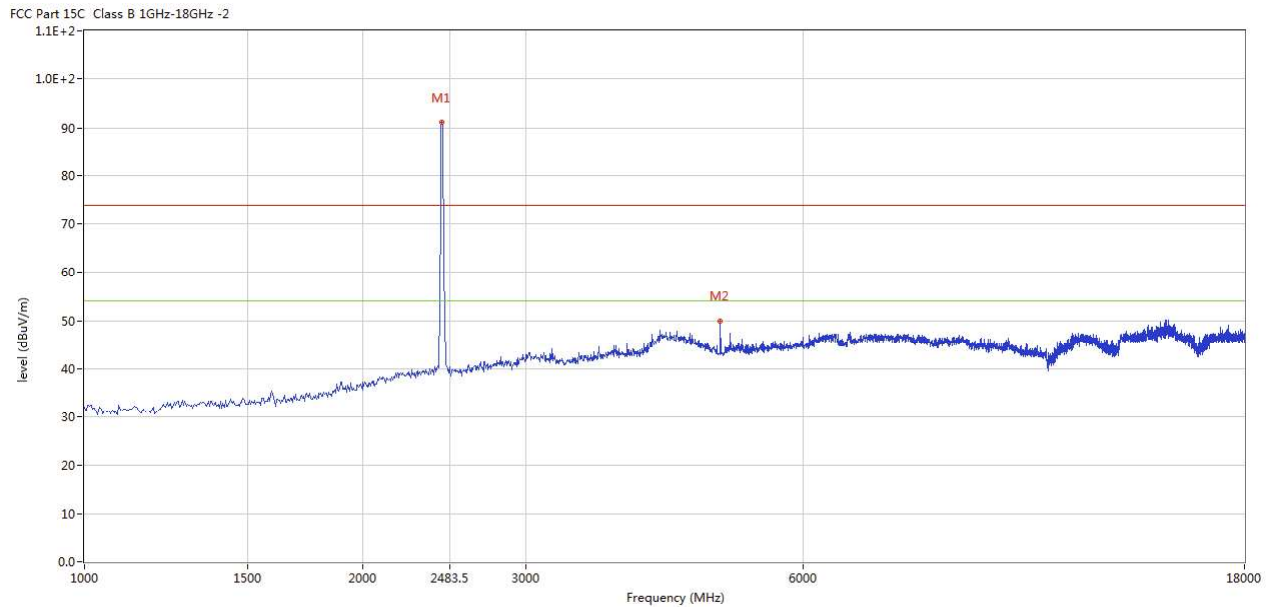
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CH06 for 11g at 6Mbps: Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4875.031	49.90	3.19	74.0	-24.10	Peak	164.00	100	Horizontal	Pass

The report refers only to the sample tested and does not apply to the bulk.

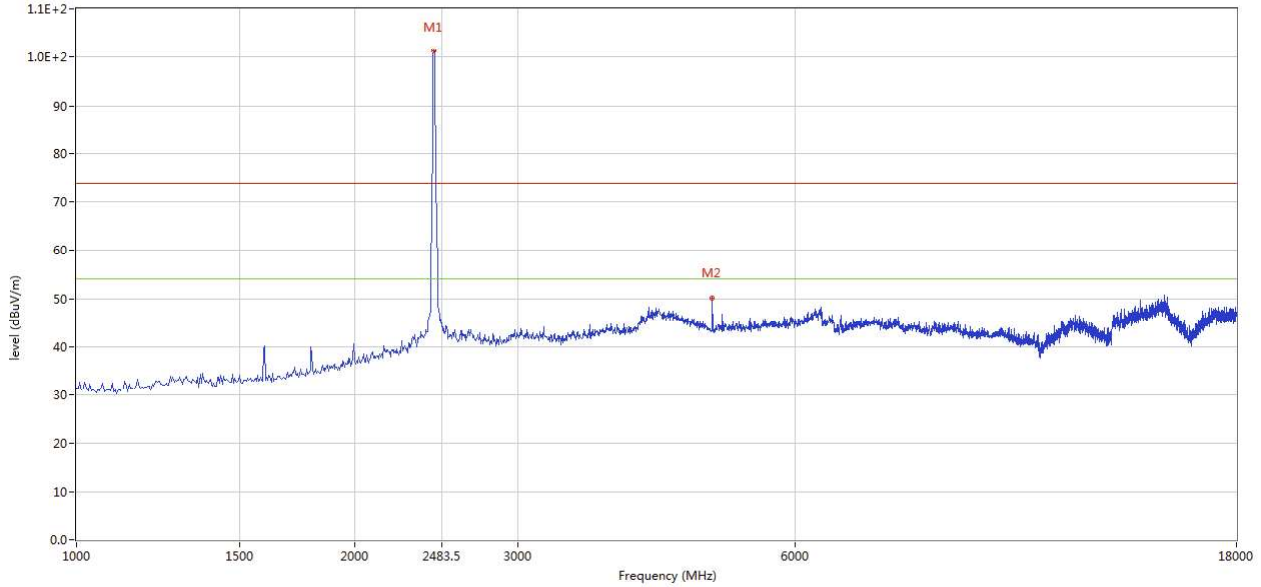
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CH06 for 11g at 6Mbps: Vertical

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4875.031	50.06	3.19	74.0	-23.94	Peak	263.00	100	Vertical	Pass

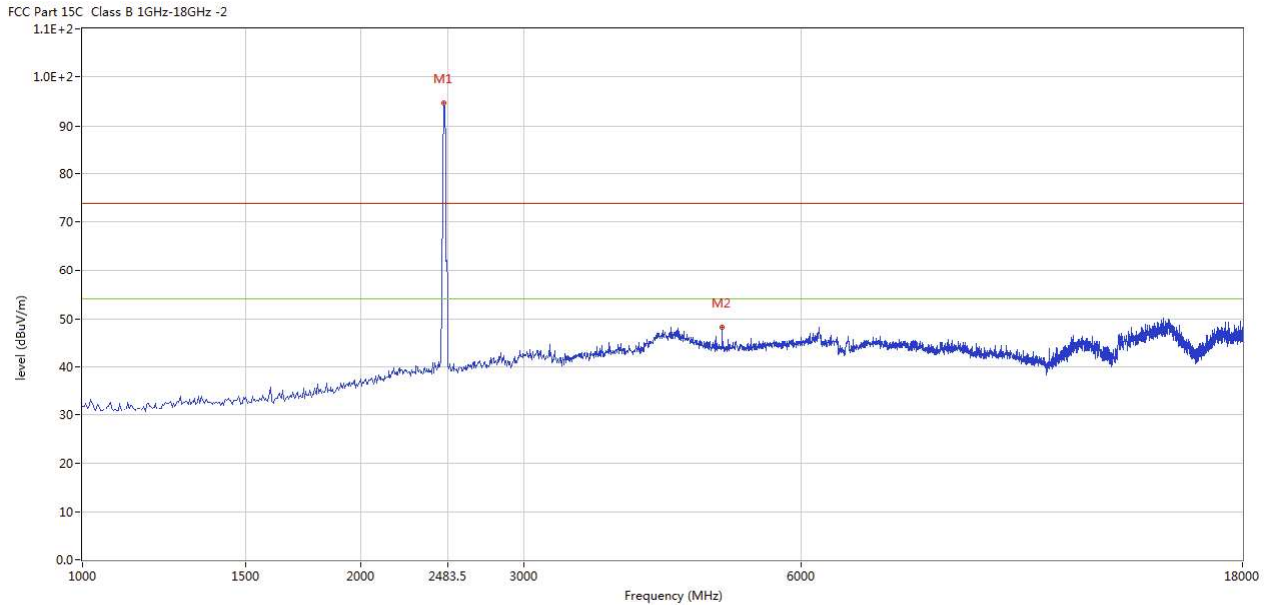
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CH11 for 11g at 6Mbps: Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4921.770	48.35	3.27	74.0	-25.65	Peak	205.00	100	Horizontal	Pass

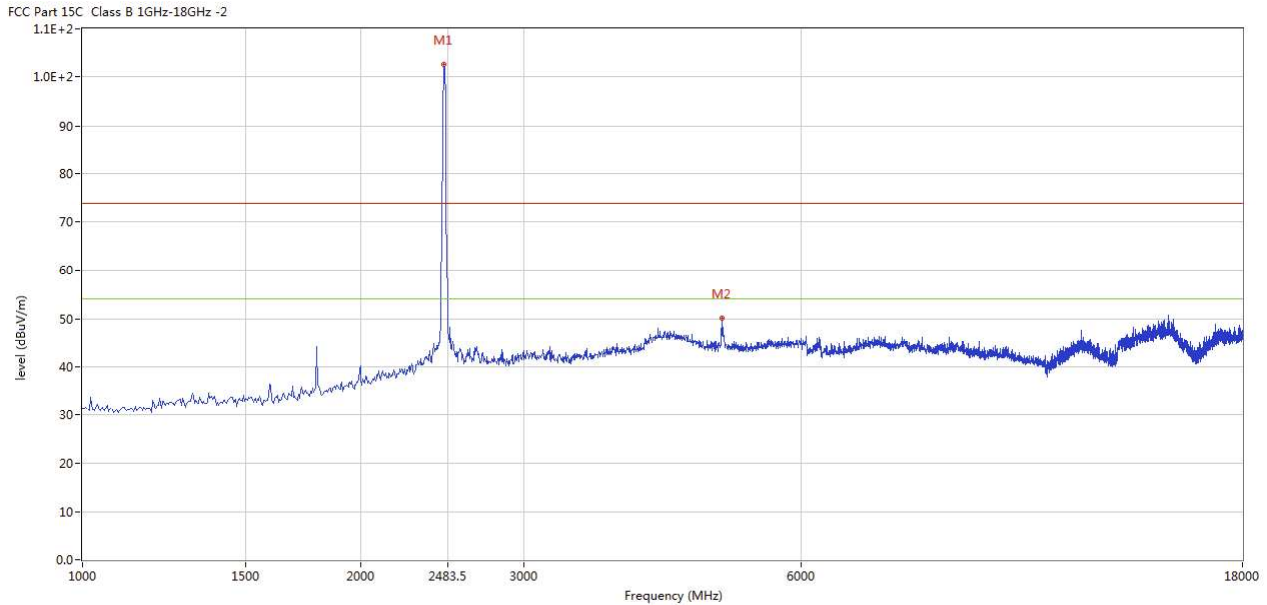
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CH11 for 11g at 6Mbps: Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4921.770	50.03	3.27	74.0	-23.97	Peak	103.00	100	Vertical	Pass

Note: 1. Result Level = Reading + Factor

2. Factor= AF + Cable Loss- Preamp

3. Margin = Result- Limit

4. For radiated Emissions from 18-25GHz and below 30MHz, it is only the floor noise.

5. The final peak measurement result less than the AV limit. No necessary to take down the final AV measurement result

The report refers only to the sample tested and does not apply to the bulk.

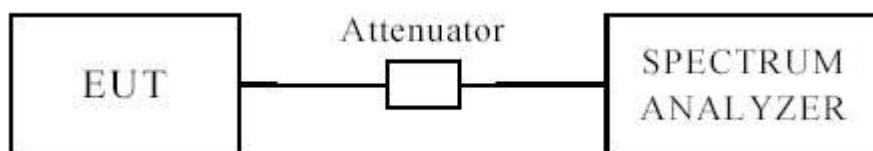
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7.0 6dB Bandwidth Measurement

7.1 Test Setup



7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

7.3 Test Procedure

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

7.4 Test Result

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6dB Occupied Bandwidth

EUT		Video Encoder		Model	Ultra Encode HDMI
Mode		802.11b		Test Voltage	120V~
Temperature		24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	1	10.04	0.5	Pass
6	2437	1	10.04	0.5	Pass
11	2462	1	10.04	0.5	Pass
1	2412	11	11.36	0.5	Pass
6	2437	11	11.42	0.5	Pass
11	2462	11	11.36	0.5	Pass

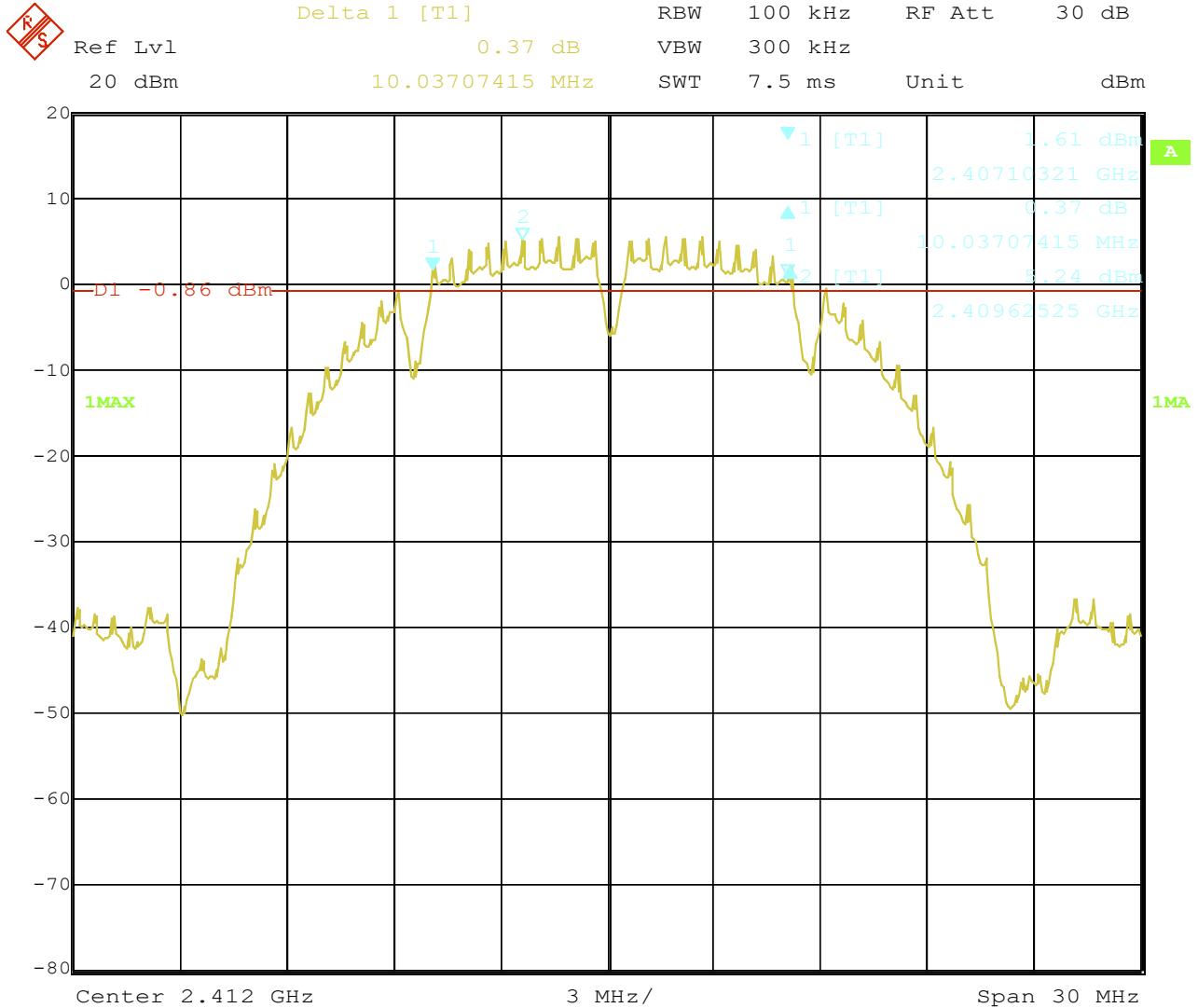
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1. 802.11b at 1Mbps of CH01



Date: 22.JUN.2021 10:31:27

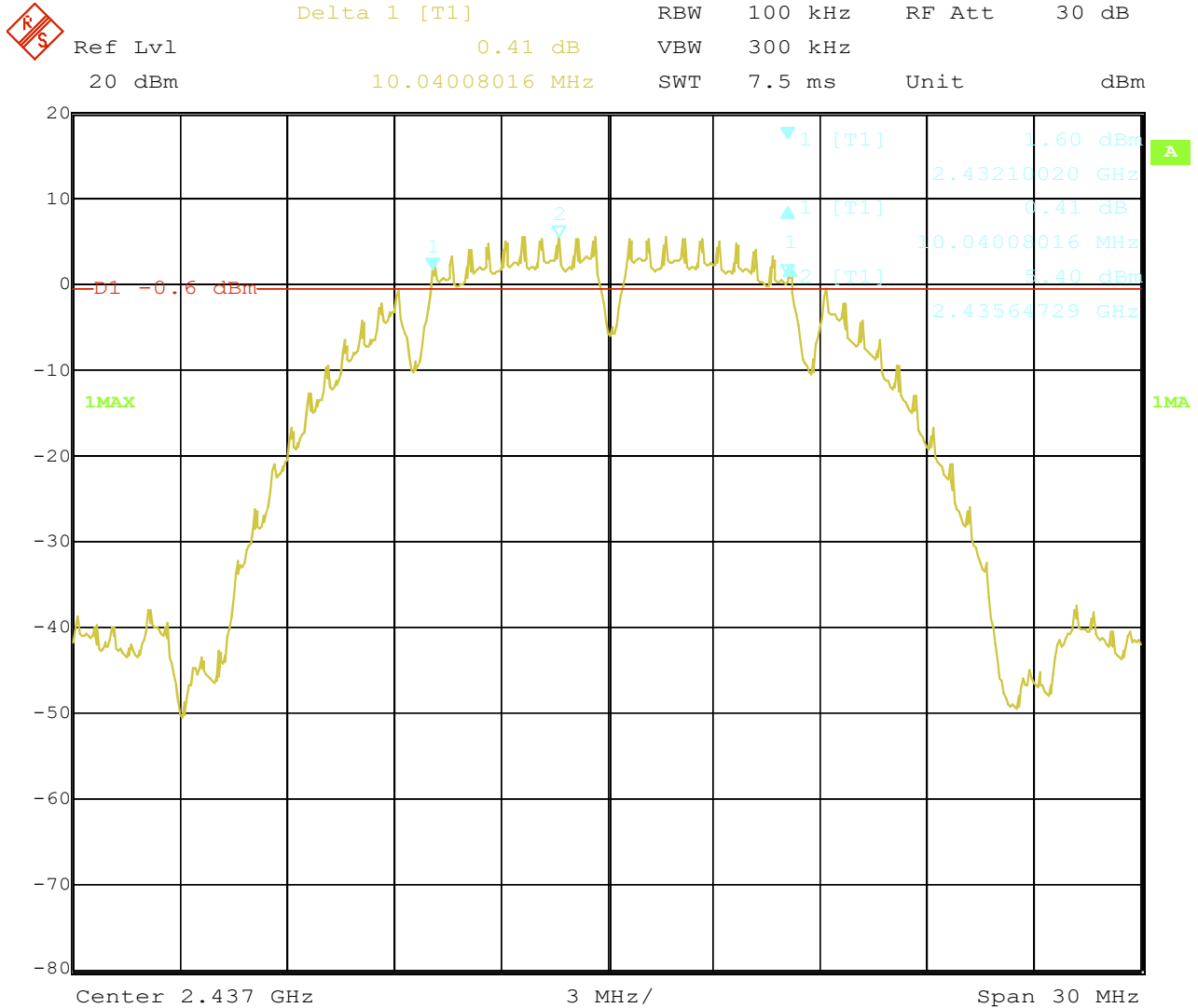
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2. 802.11b at 1Mbps of CH06



Date: 22.JUN.2021 10:42:23

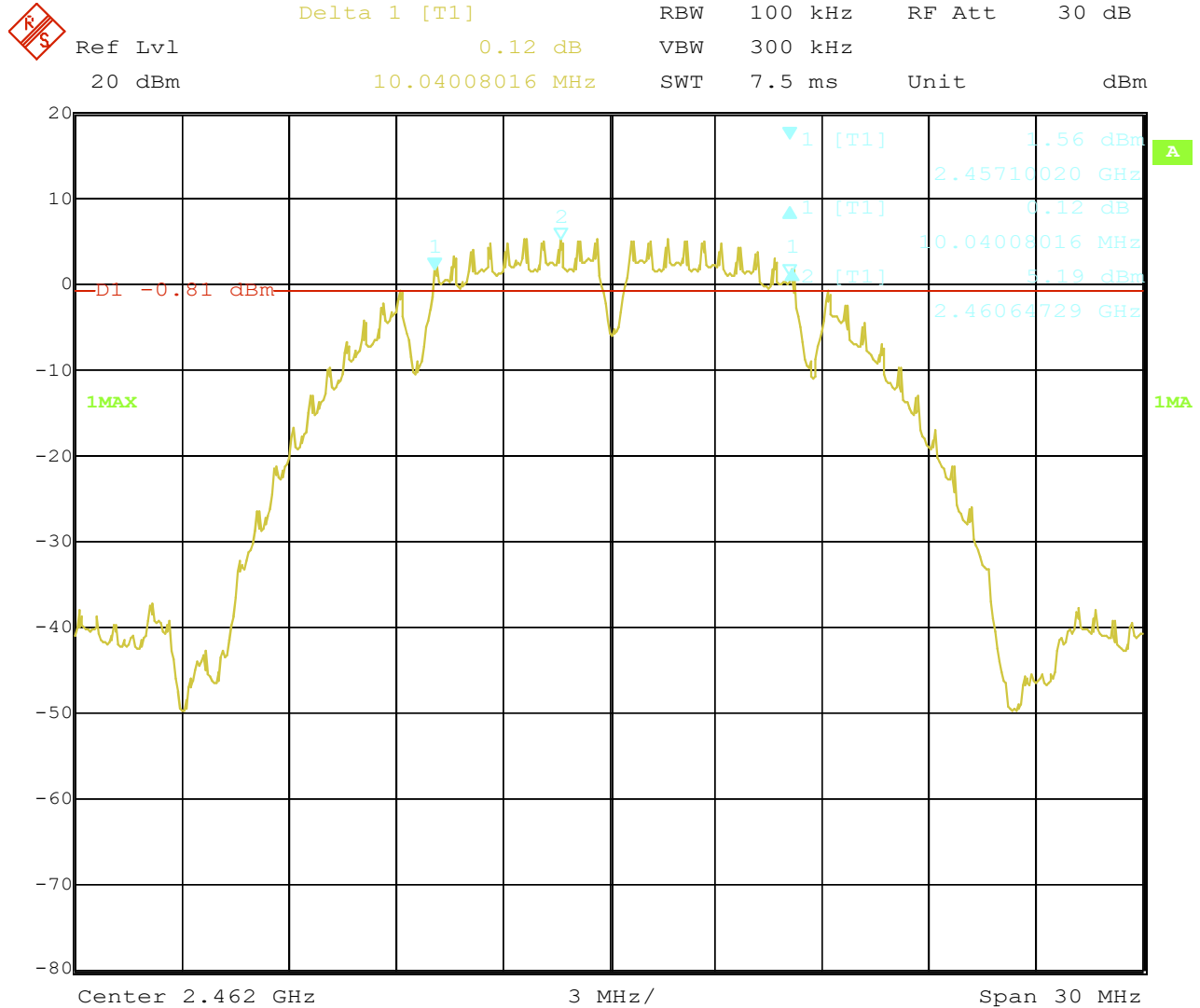
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3. 802.11b at 1Mbps of CH11



Date: 22.JUN.2021 11:08:50

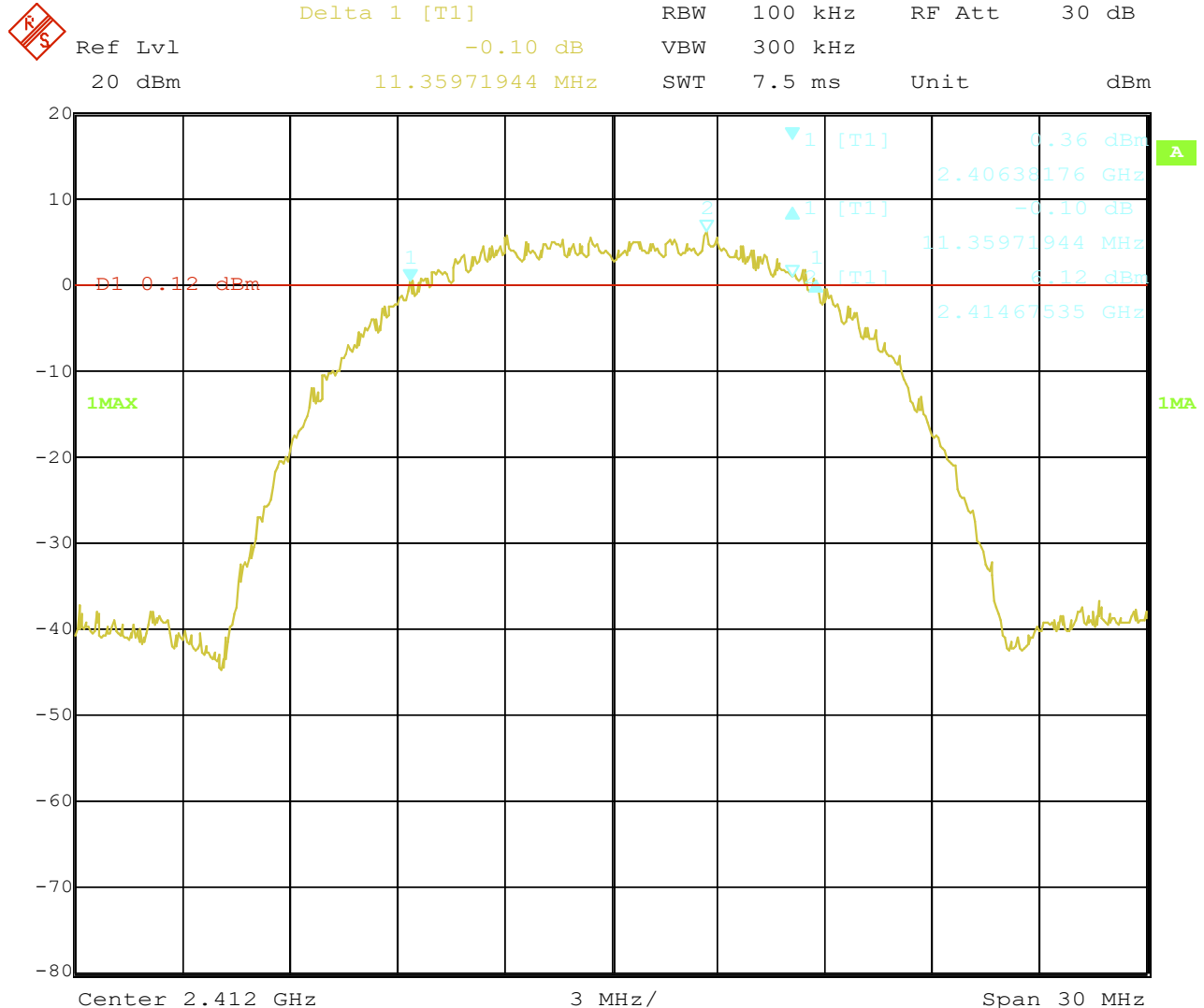
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4. 802.11b at 11Mbps of CH01



Date: 22.JUN.2021 10:33:30

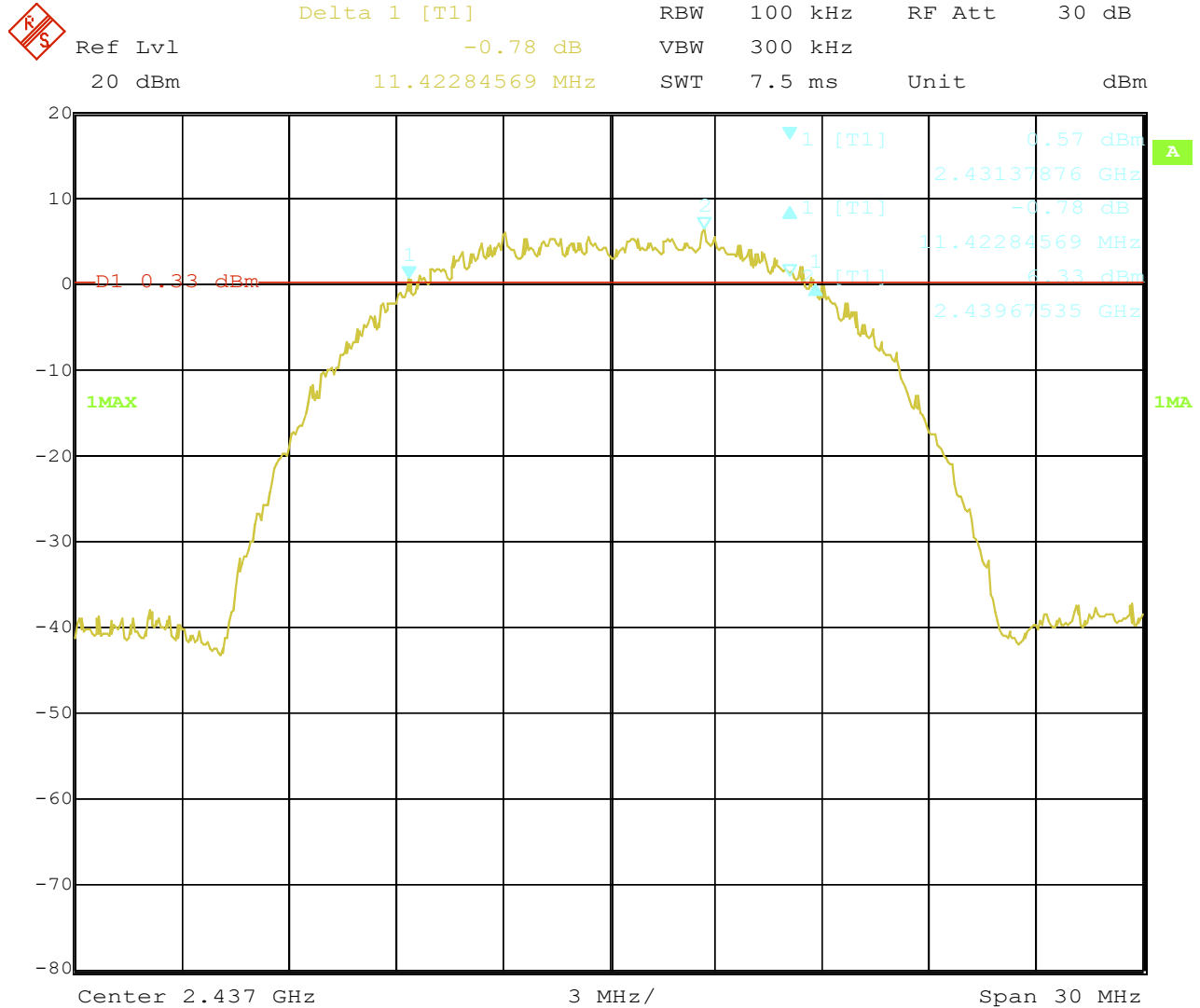
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5. 802.11b at 11Mbps of CH06



Date: 22.JUN.2021 10:59:52

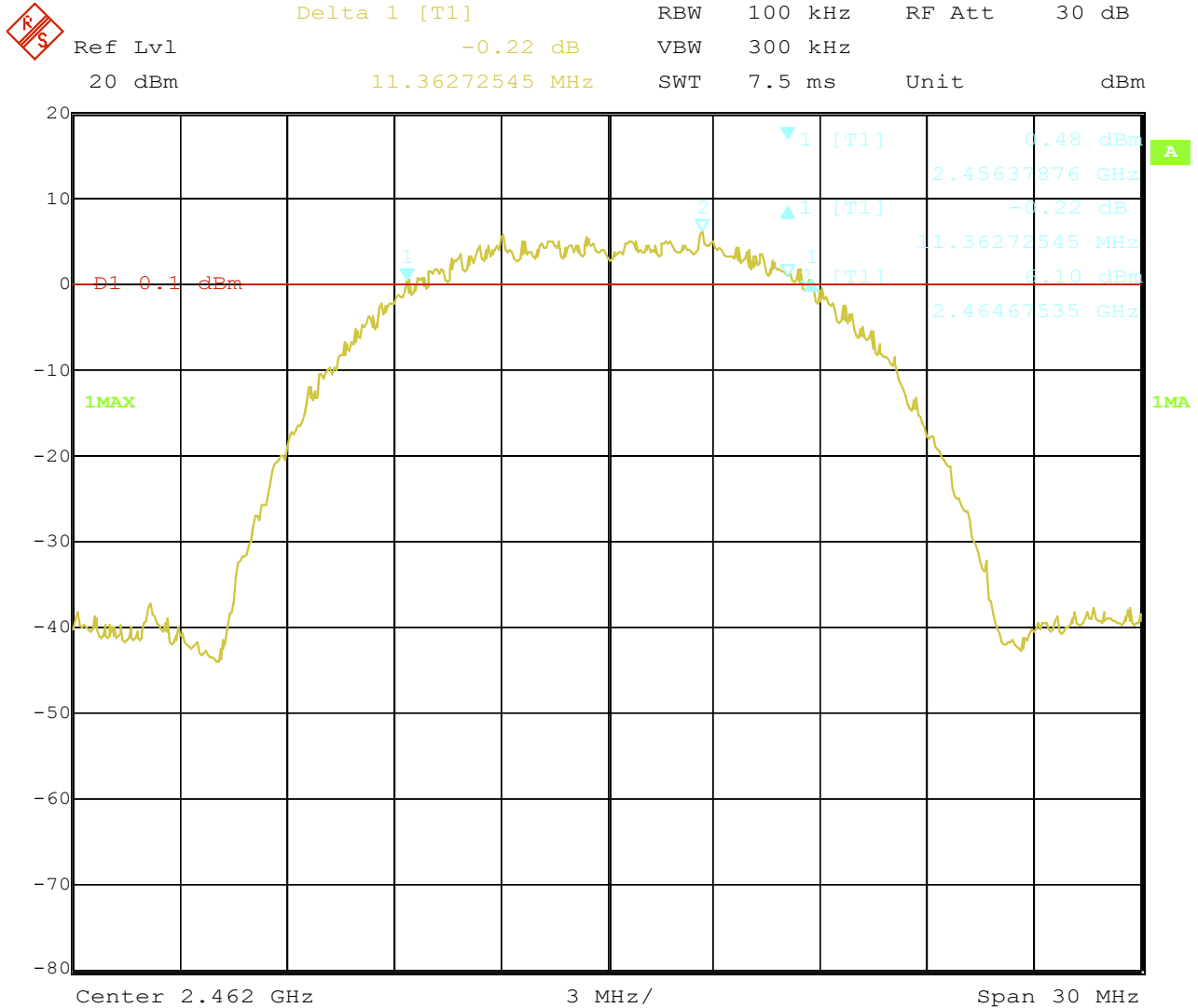
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6. 802.11b at 11Mbps of CH11



Date: 22.JUN.2021 11:05:25

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6dB Occupied Bandwidth

EUT		Video Encoder		Model	Ultra Encode HDMI
Mode		802.11g		Test Voltage	120V~
Temperature		24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	6	16.35	0.5	Pass
6	2437	6	16.35	0.5	Pass
11	2462	6	16.35	0.5	Pass

The report refers only to the sample tested and does not apply to the bulk.

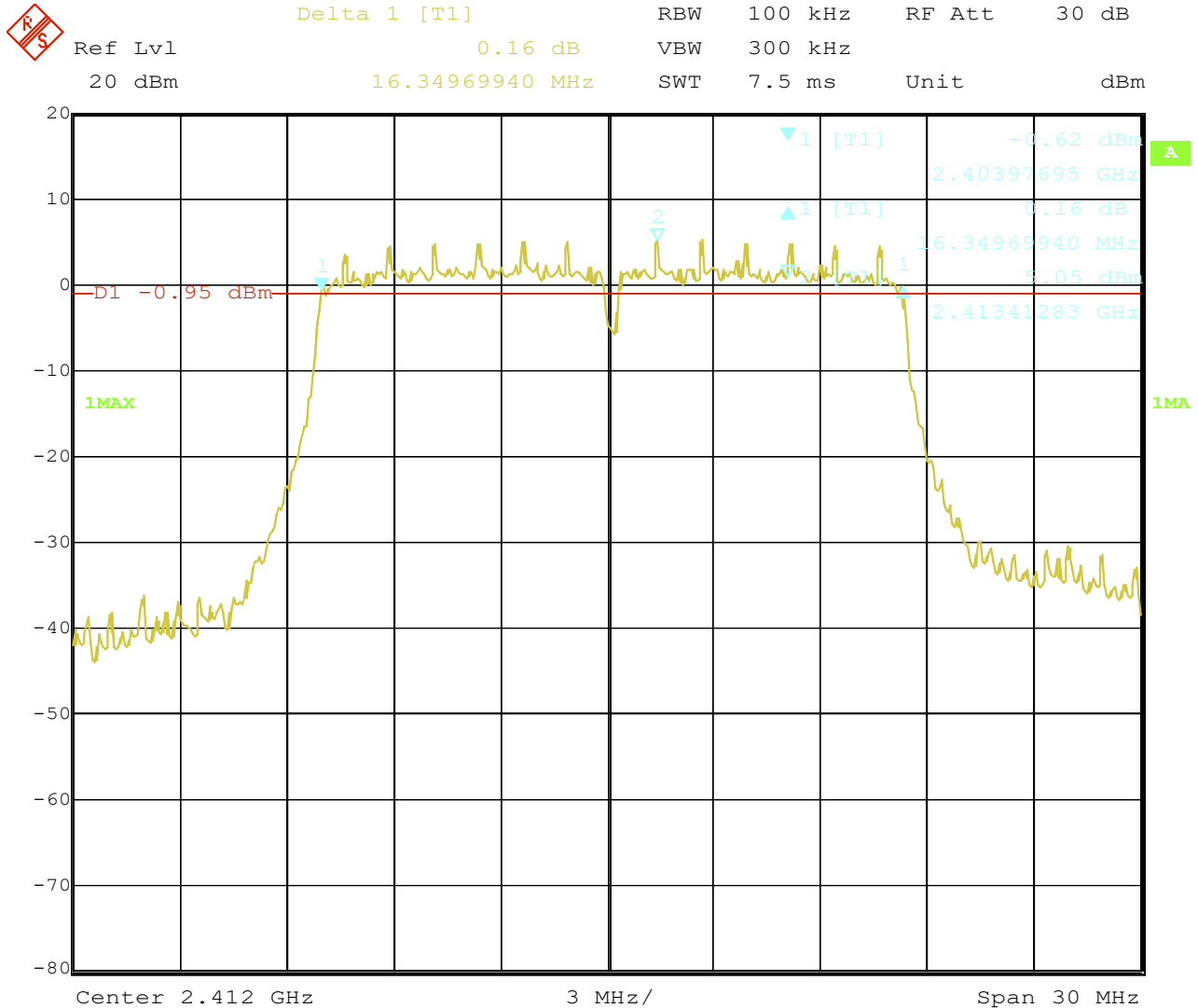
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Test Plots:

1. 802.11g at 6Mbps of CH01



Date: 22.JUN.2021 10:35:19

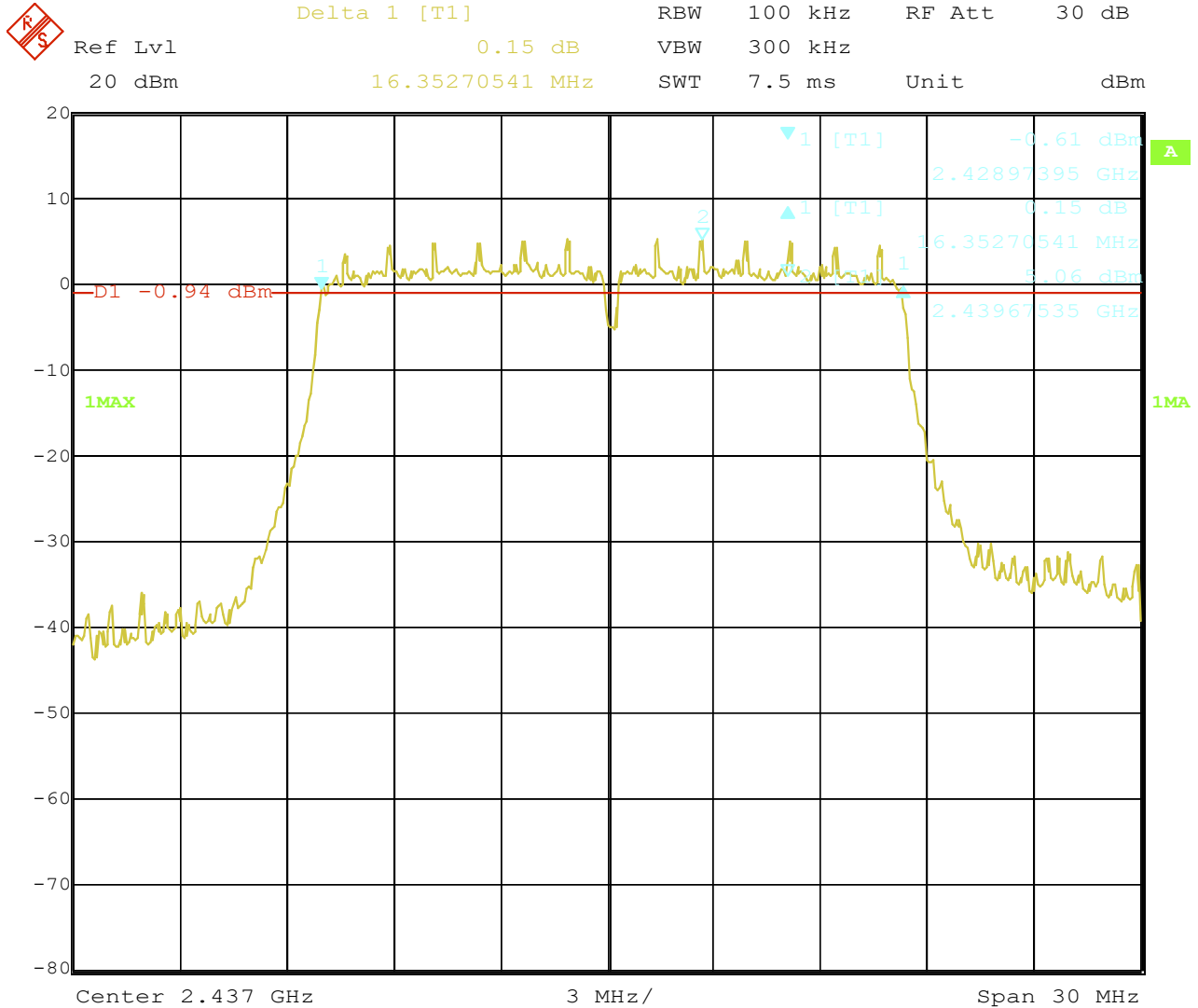
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2. 802.11g at 6Mbps of CH06



Date: 22.JUN.2021 10:39:27

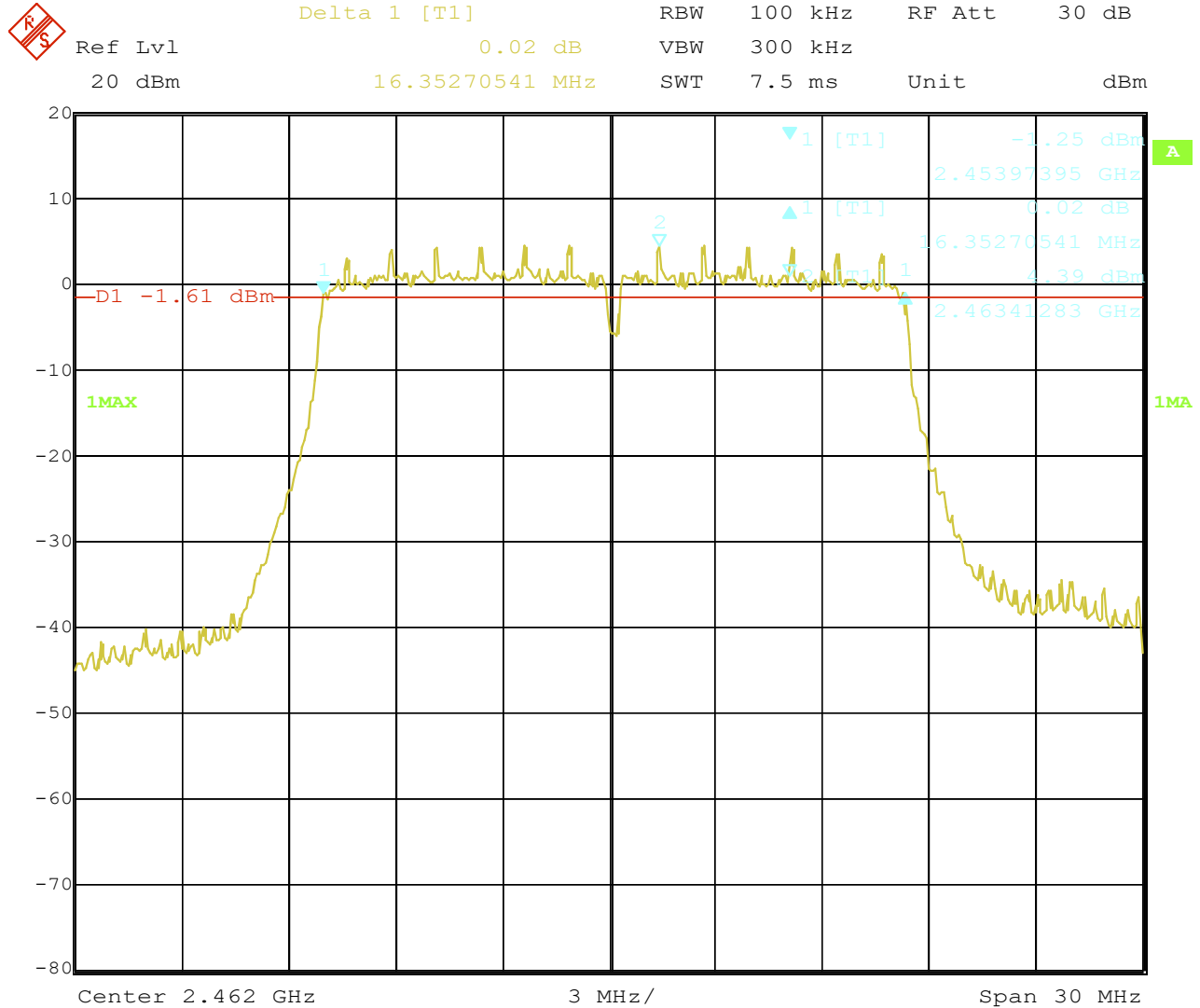
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3. 802.11g at 6Mbps of CH11



Date: 22.JUN.2021 11:12:29

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6dB Occupied Bandwidth

EUT	Video Encoder		Model	Ultra Encode HDMI	
Mode	802.11n HT20		Test Voltage	120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	mcs0	17.56	0.5	Pass
6	2437	mcs0	17.56	0.5	Pass
11	2462	mcs0	17.56	0.5	Pass

The report refers only to the sample tested and does not apply to the bulk.

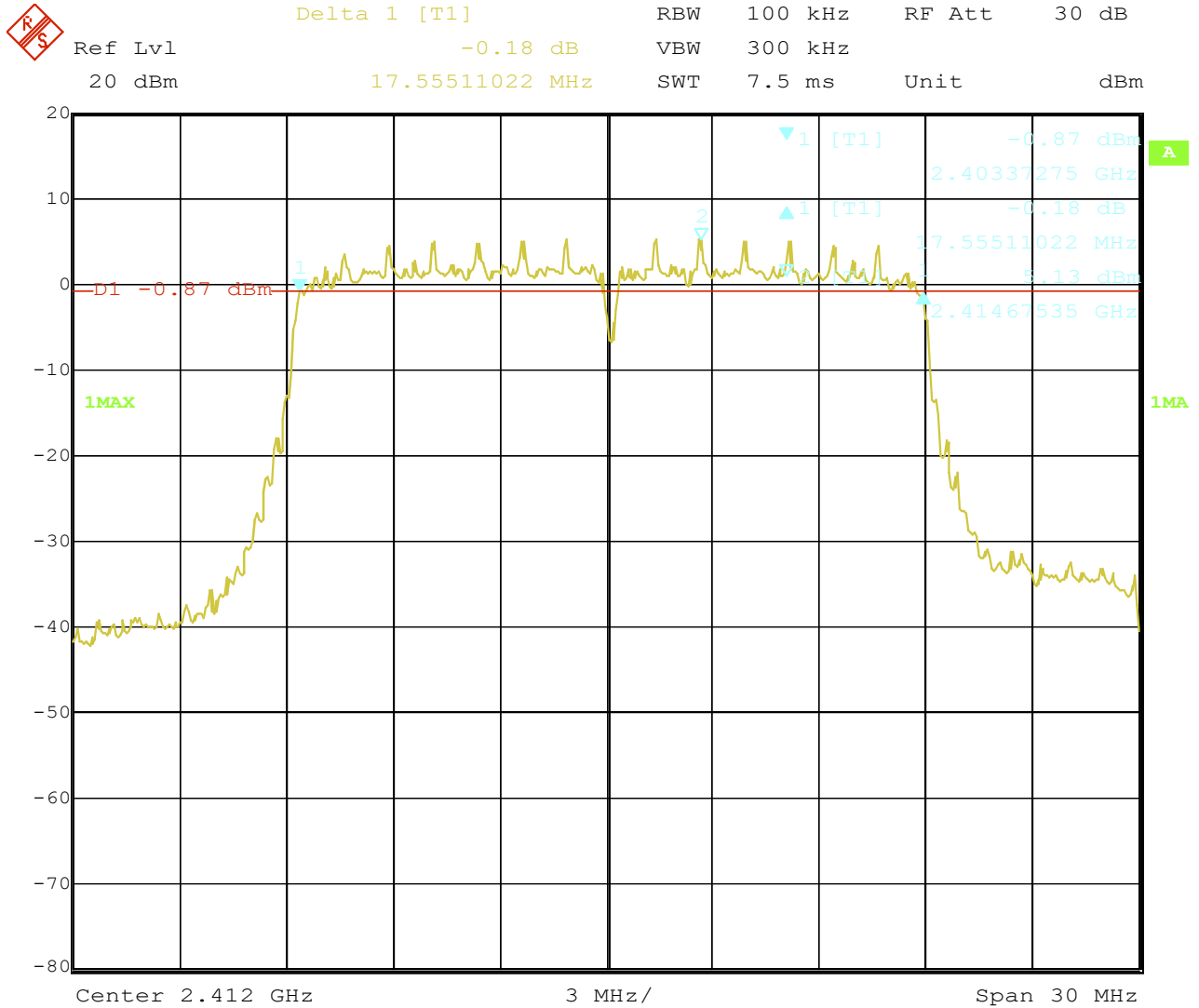
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Test Plots:

1. 802.11n at HT20 of CH01



Date: 22.JUN.2021 11:23:08

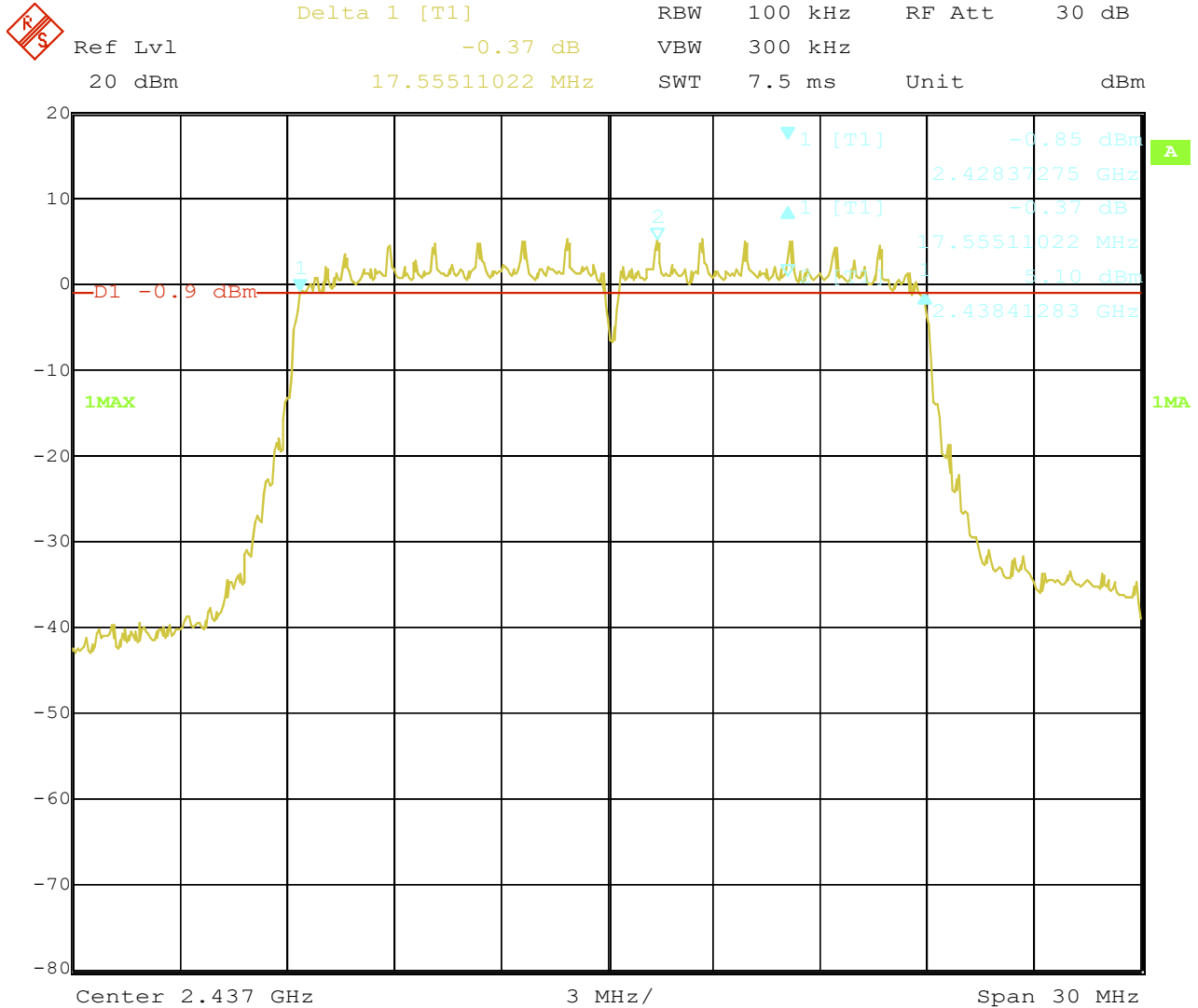
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2. 802.11n at HT20 of CH06



Date: 22.JUN.2021 11:19:17

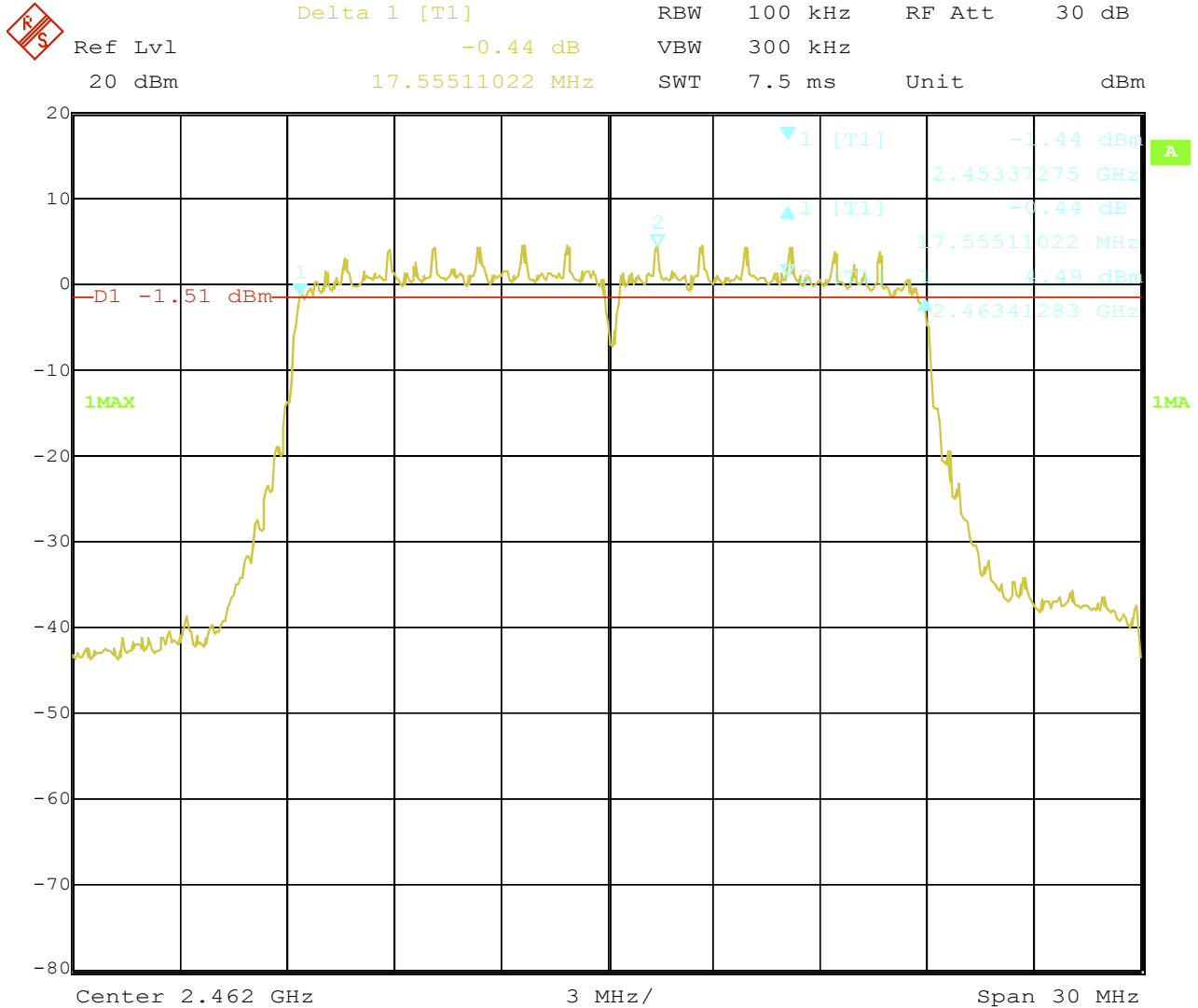
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3. 802.11n at HT20 of CH11



Date: 22.JUN.2021 11:17:19

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6dB Occupied Bandwidth

EUT	Video Encoder		Model	Ultra Encode HDMI	
Mode	802.11n HT40		Test Voltage	120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
3	2422	mcs0	36.17	0.5	Pass
6	2437	mcs0	36.08	0.5	Pass
9	2452	mcs0	36.11	0.5	Pass

The report refers only to the sample tested and does not apply to the bulk.

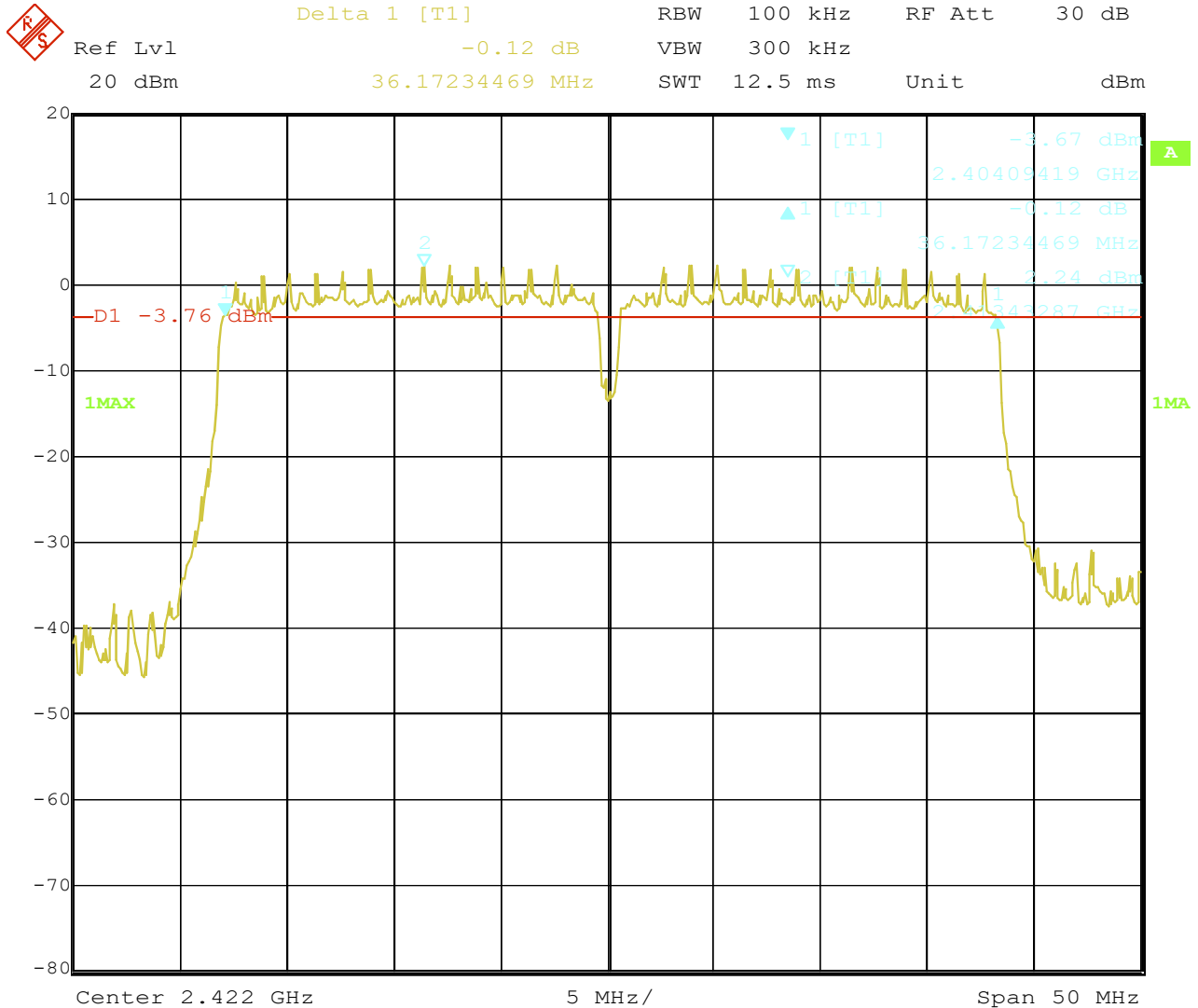
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Test Plots:

1. 802.11n at HT40 of CH03



Date: 22.JUN.2021 11:26:21

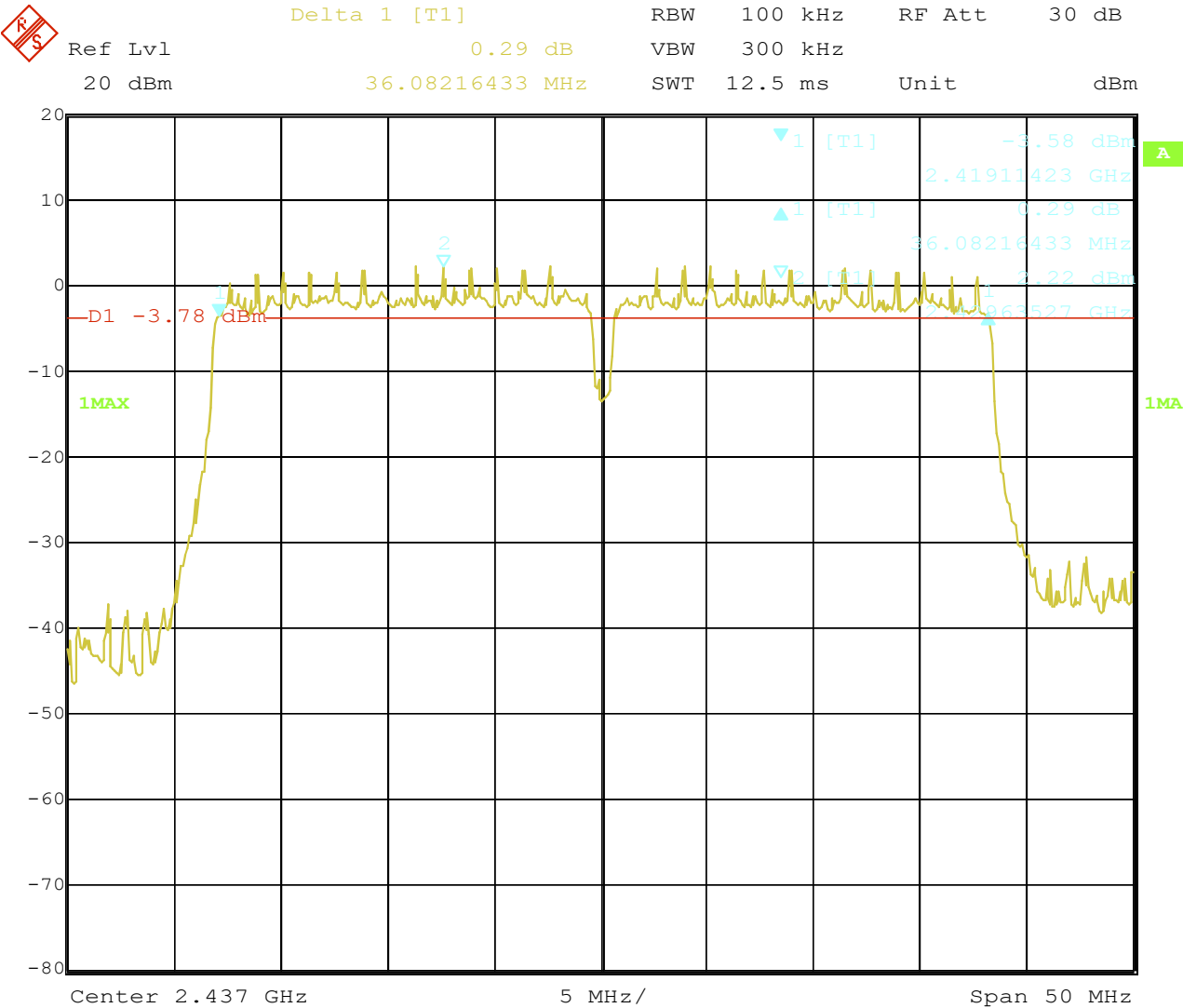
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2. 802.11n at HT40 of CH06

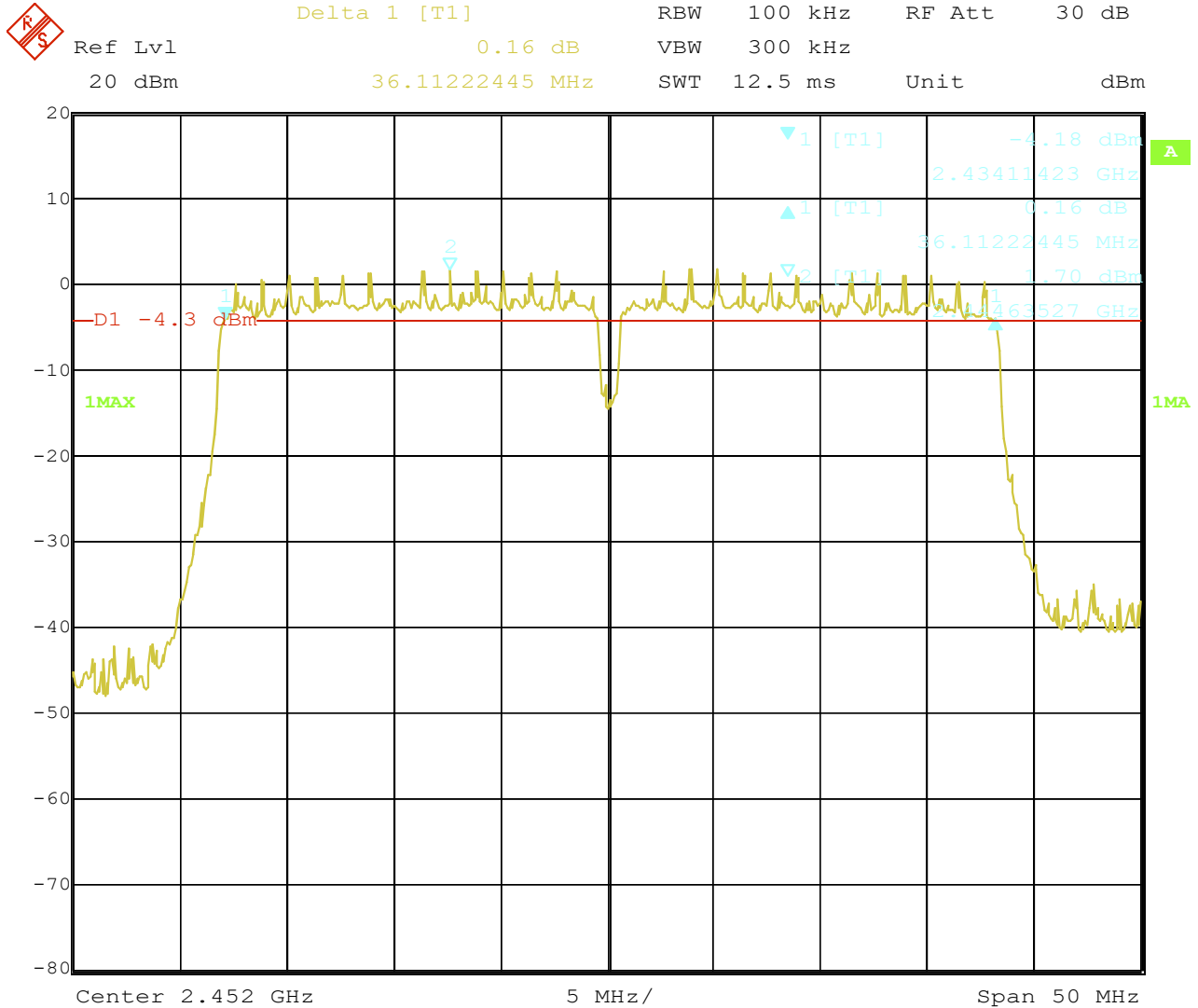


Date: 22.JUN.2021 11:27:30

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3. 802.11n at HT40 of CH09



Date: 22.JUN.2021 11:28:35

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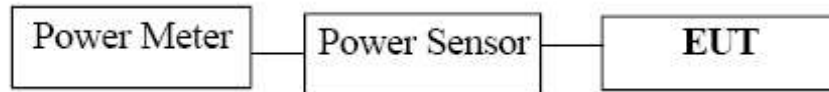
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8. Maximum Output Power

8.1 Test Setup



8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: The Peak power was measured

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8.4 Test Results

EUT		Video Encoder		Model		Ultra Encode HDMI	
Mode		802.11b		Test Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Frequency (MHz)	Max. Power Output (dBm)	Max. Power Output (mW)	Power Limit (dBm)	Pass/ Fail		
1	2412	21.64	145.88	30	Pass		
6	2437	21.63	145.55	30	Pass		
11	2462	21.41	138.36	30	Pass		

Note: 1. At final test to get the worst-case emission at 11Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

$$\text{Power Output} = \text{Power Reading} + \text{Cable loss} + \text{Attenuator}$$

3. The worse case was recorded

EUT		Video Encoder		Model		Ultra Encode HDMI	
Mode		802.11g		Test Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Frequency (MHz)	Max. Power Output (dBm)	Max. Power Output (mW)	Power Limit (dBm)	Pass/ Fail		
1	2412	24.26	266.69	30	Pass		
6	2437	24.29	268.53	30	Pass		
11	2462	23.64	231.21	30	Pass		

Note: 1. At final test to get the worst-case emission at 6Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

$$\text{Power Output} = \text{Power Reading} + \text{Cable loss} + \text{Attenuator}$$

3. The worse case was recorded

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EUT		Video Encoder		Model		Ultra Encode HDMI	
Mode		802.11n (HT20)		Test Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Frequency (MHz)	Max. Power Output (dBm)	Max. Power Output (mW)	Power Limit (dBm)	Pass/ Fail		
1	2412	24.57	286.42	30	Pass		
6	2437	24.48	280.54	30	Pass		
11	2462	23.84	242.10	30	Pass		

Note: 1. At final test to get the worst-case emission at mcs0 of 11n HT20 for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

Power Output = Power Reading + Cable loss + Attenuator

3. The worse case was recorded

EUT		Video Encoder		Model		Ultra Encode HDMI	
Mode		802.11n (HT40)		Test Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Frequency (MHz)	Max. Power Output (dBm)	Max. Power Output (mW)	Power Limit (dBm)	Pass/ Fail		
3	2422	24.83	304.09	30	Pass		
6	2437	24.84	304.79	30	Pass		
9	2452	24.25	266.07	30	Pass		

Note: 1. At final test to get the worst-case emission at msc0 of 11n HT40 for CH03, CH06 and CH09

2. The result basic equation calculation as follow:

Power Output = Power Reading + Cable loss + Attenuator

3. The worse case was recorded

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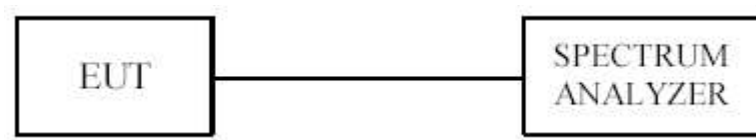
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9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3kHz.

9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 10 kHz.
3. Set the VBW \geq 30 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be \leq 8 dBm/3kHz.

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9.4 Test Result

EUT	Video Encoder	Model	Ultra Encode HDMI	
Mode	802.11b 11Mbps	Test Voltage	120V~	
Temperature	24 deg. C,	Humidity	56% RH	
Channel	Frequency (MHz)	Power Spectral Density (dBm/10kHz)	Limit (dBm/3kHz)	Pass/ Fail
1	2412	-2.96	8	Pass
6	2437	-3.00	8	Pass
11	2462	-3.14	8	Pass

EUT	Video Encoder	Model	Ultra Encode HDMI	
Mode	802.11b 1Mbps	Test Voltage	120V~	
Temperature	24 deg. C,	Humidity	56% RH	
Channel	Frequency (MHz)	Power Spectral Density (dBm/10kHz)	Limit (dBm/3kHz)	Pass/ Fail
1	2412	-4.24	8	Pass
6	2437	-4.28	8	Pass
11	2462	-4.46	8	Pass

EUT	Video Encoder	Model	Ultra Encode HDMI	
Mode	802.11g 6Mbps	Test Voltage	120V~	
Temperature	24 deg. C,	Humidity	56% RH	
Channel	Frequency (MHz)	Power Spectral Density (dBm/10kHz)	Limit (dBm/3kHz)	Pass/ Fail
1	2412	-4.18	8	Pass
6	2437	-4.18	8	Pass
11	2462	-4.98	8	Pass

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EUT		Video Encoder	Model	Ultra Encode HDMI	
Mode		802.11n HT20 mcs0	Test Voltage	120V~	
Temperature		24 deg. C,	Humidity	56% RH	
Channel	Frequency (MHz)	Power Spectral Density (dBm/10kHz)		Limit (dBm/3kHz)	Pass/ Fail
1	2412	-4.56		8	Pass
6	2437	-4.62		8	Pass
11	2462	-5.29		8	Pass

EUT		Video Encoder	Model	Ultra Encode HDMI	
Mode		802.11n HT40 mcs0	Test Voltage	120V~	
Temperature		24 deg. C,	Humidity	56% RH	
Channel	Frequency (MHz)	Power Spectral Density (dBm/10kHz)		Limit (dBm/3kHz)	Pass/ Fail
3	2422	-7.79		8	Pass
6	2437	-7.73		8	Pass
9	2452	-8.32		8	Pass

The report refers only to the sample tested and does not apply to the bulk.

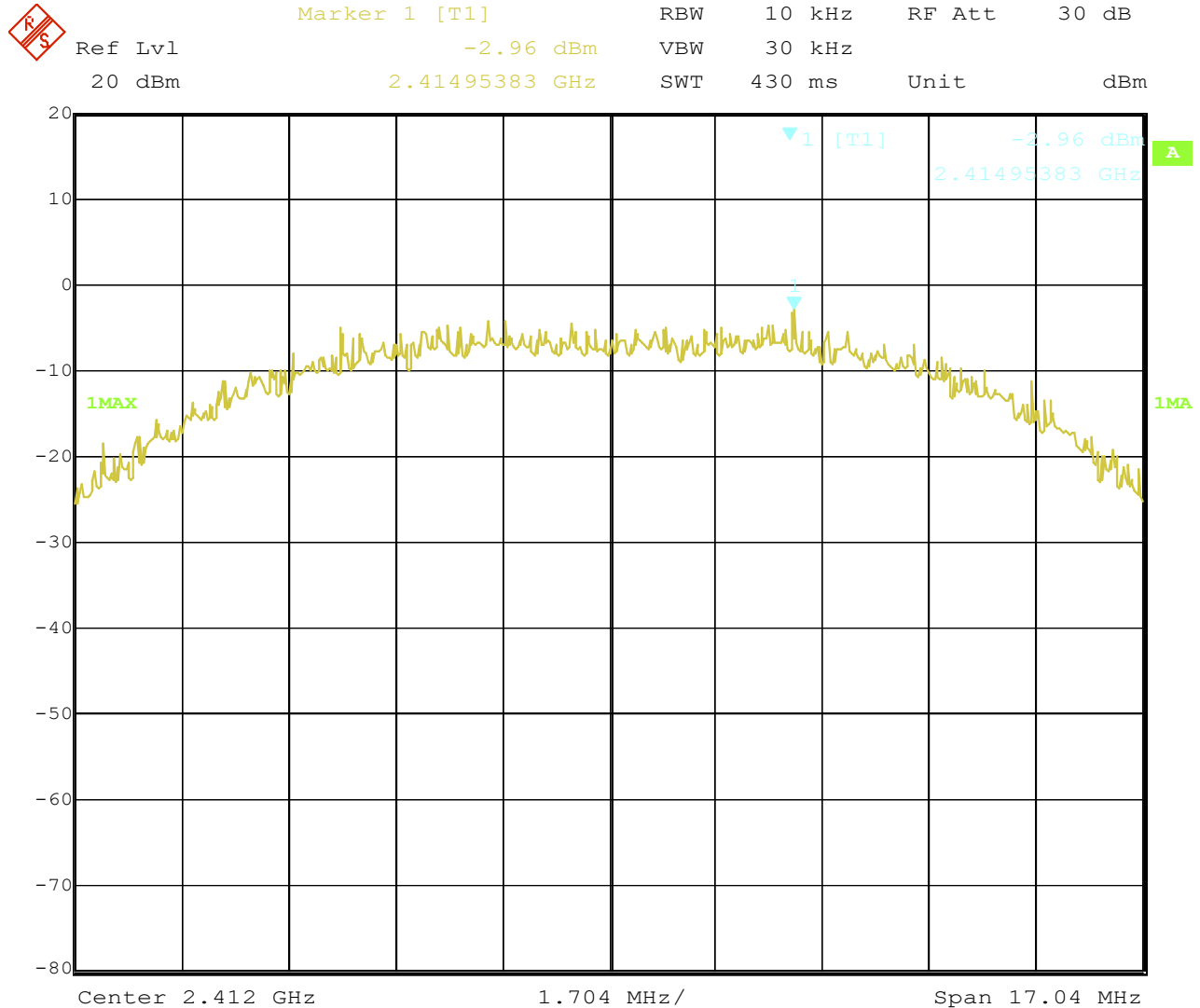
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9.5 Photo of Power Spectral Density Measurement

1.802.11b at 11Mbps of CH01



Date: 22.JUN.2021 14:33:23

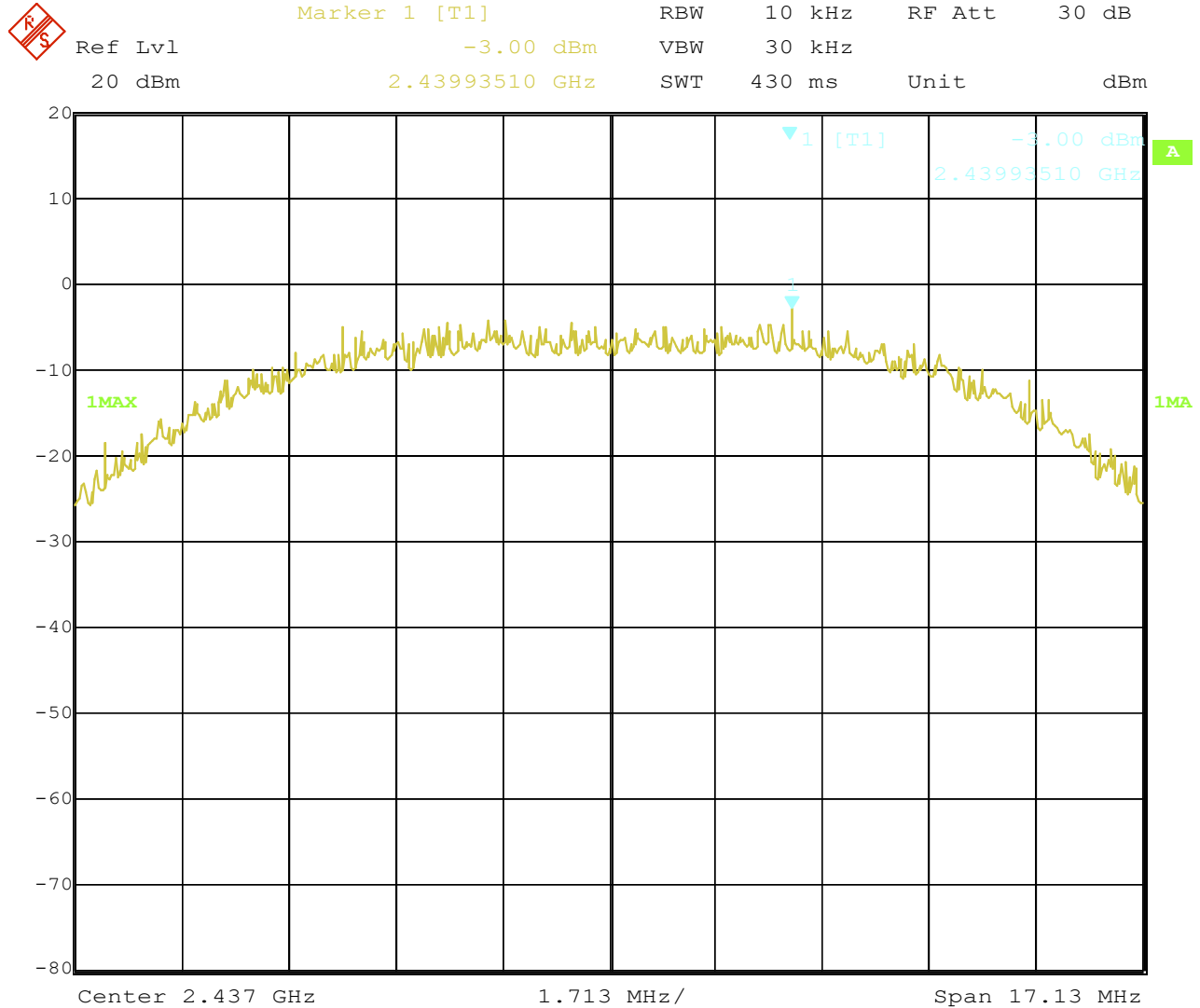
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2. 802.11b at 11Mbps at CH06

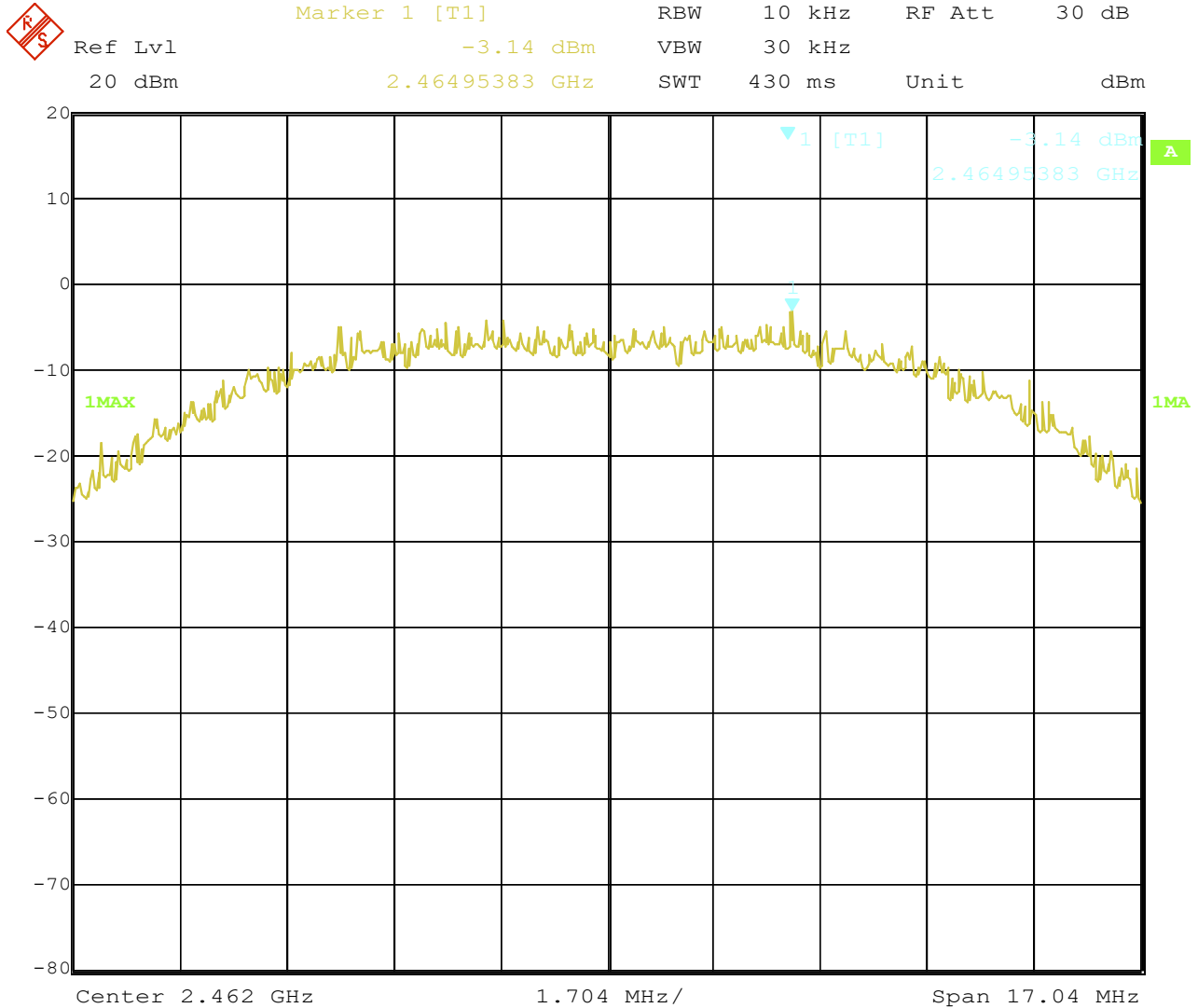


Date: 22.JUN.2021 14:35:11

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3. 802.11b at 11Mbps of CH11



Date: 22.JUN.2021 14:37:00

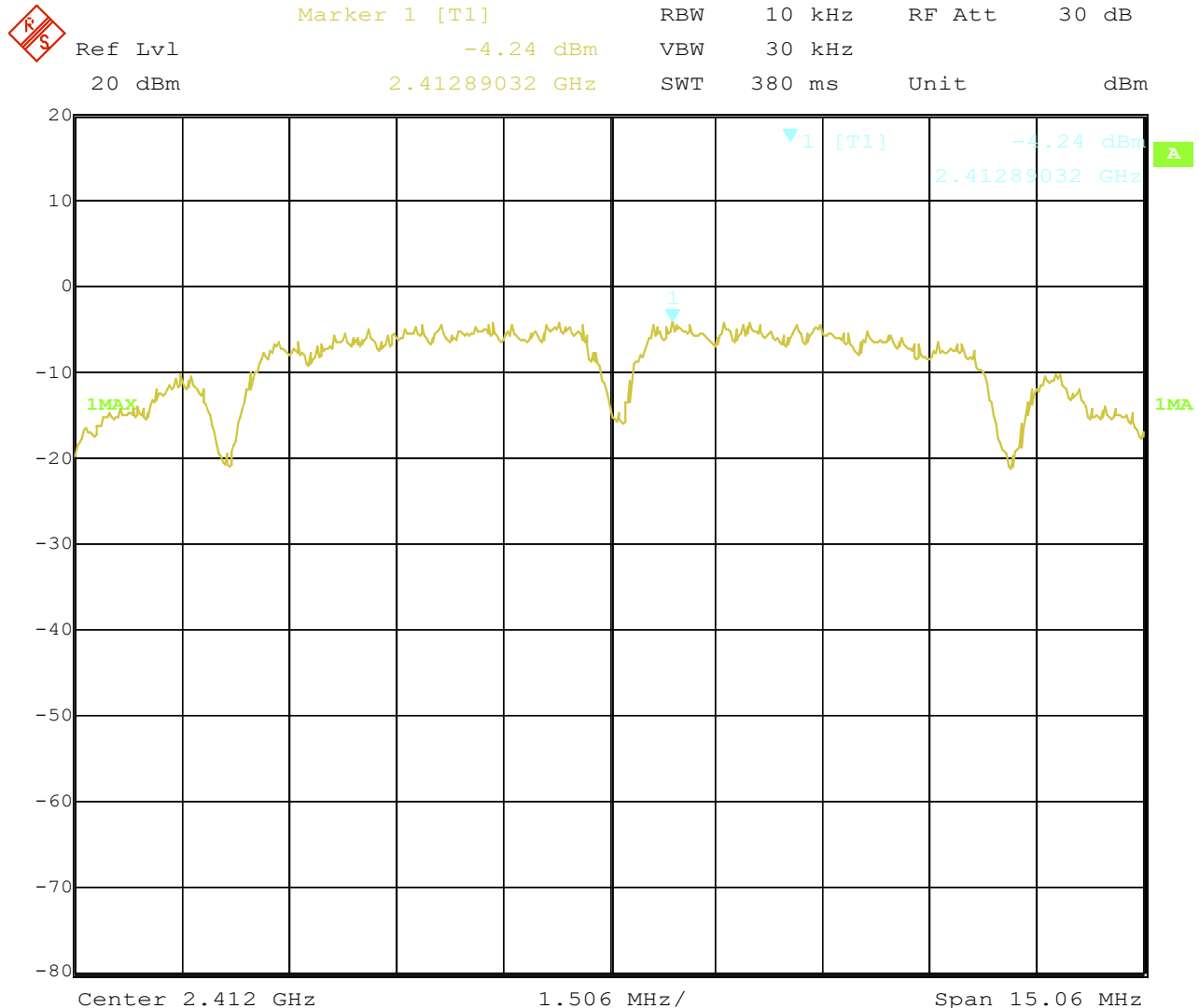
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4. 802.11b at 1Mbps of CH1



Date: 22.JUN.2021 14:32:10

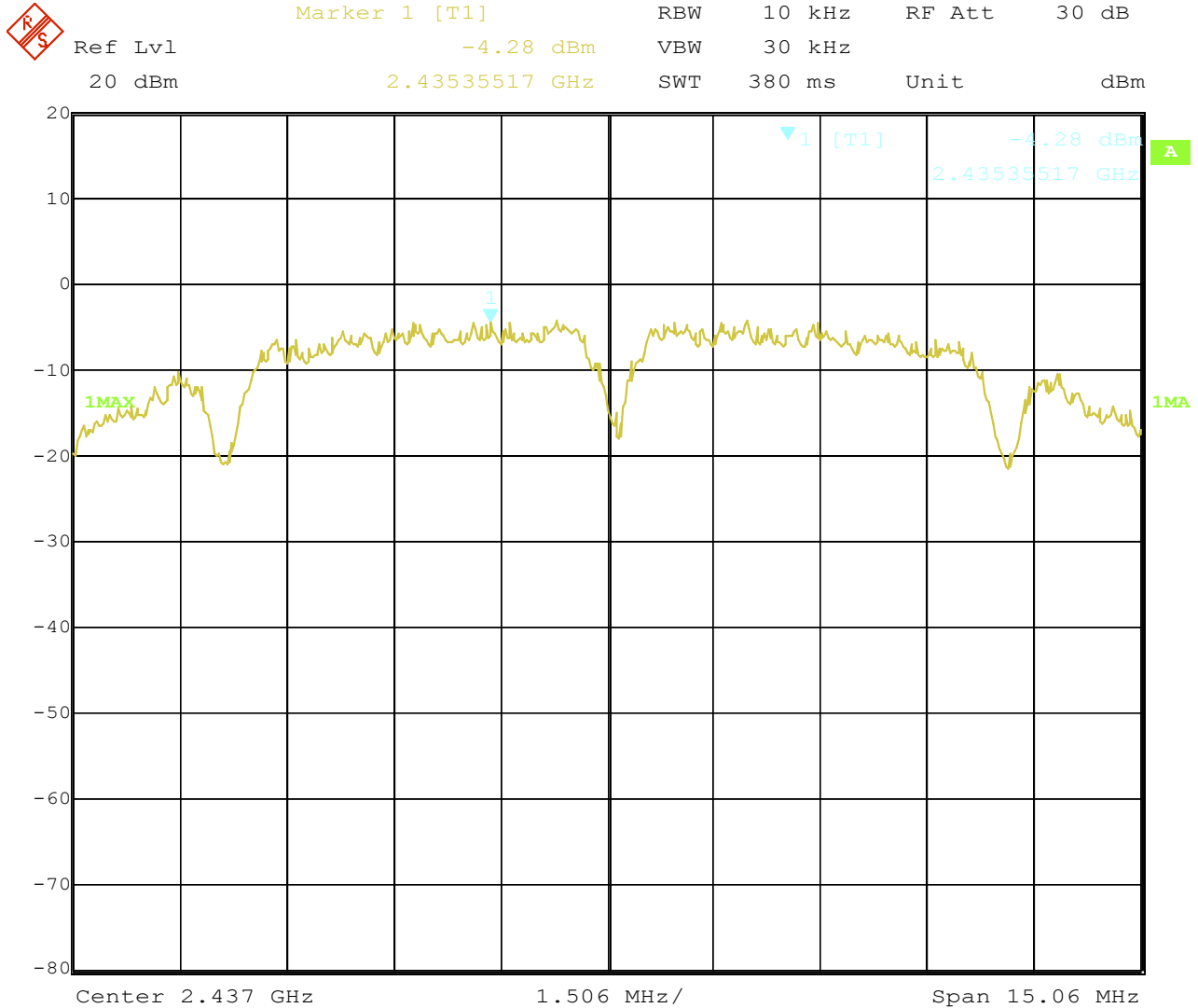
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5. 802.11b at 1Mbps of CH6



Date: 22.JUN.2021 14:28:58

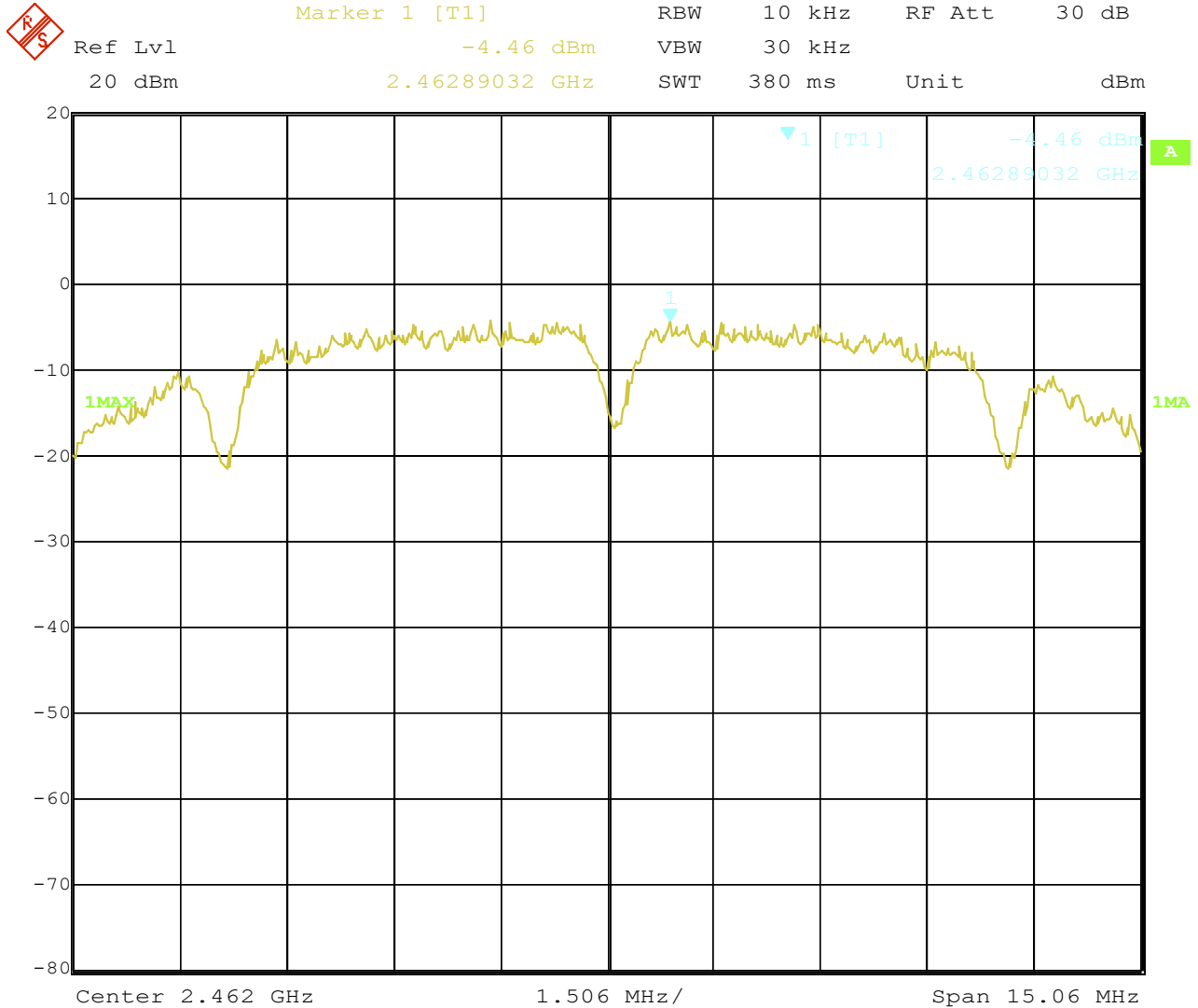
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6. 802.11b at 1Mbps of CH11



Date: 22.JUN.2021 14:27:01

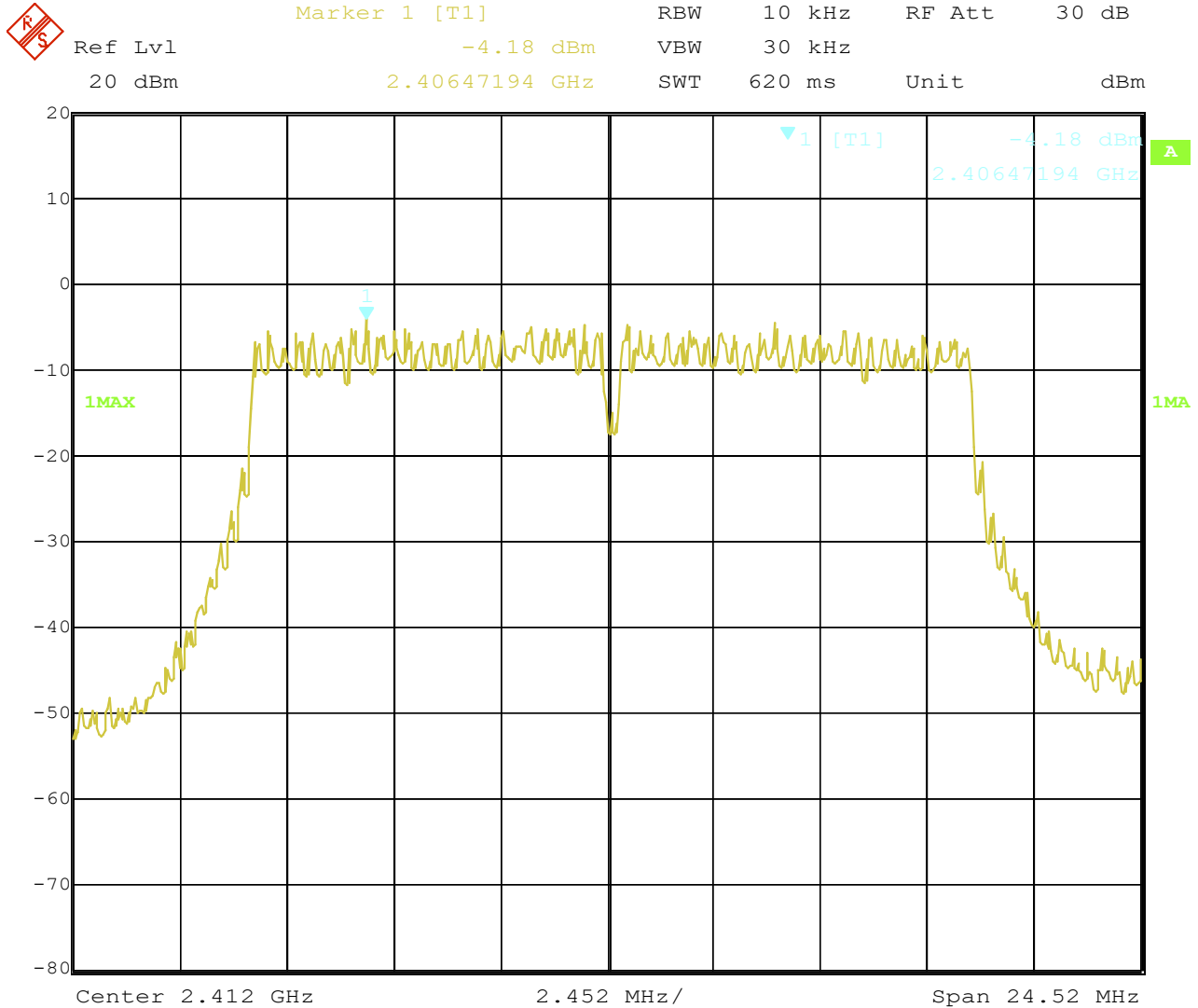
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7. 802.11g at 6Mbps of CH1



Date: 22.JUN.2021 14:23:00

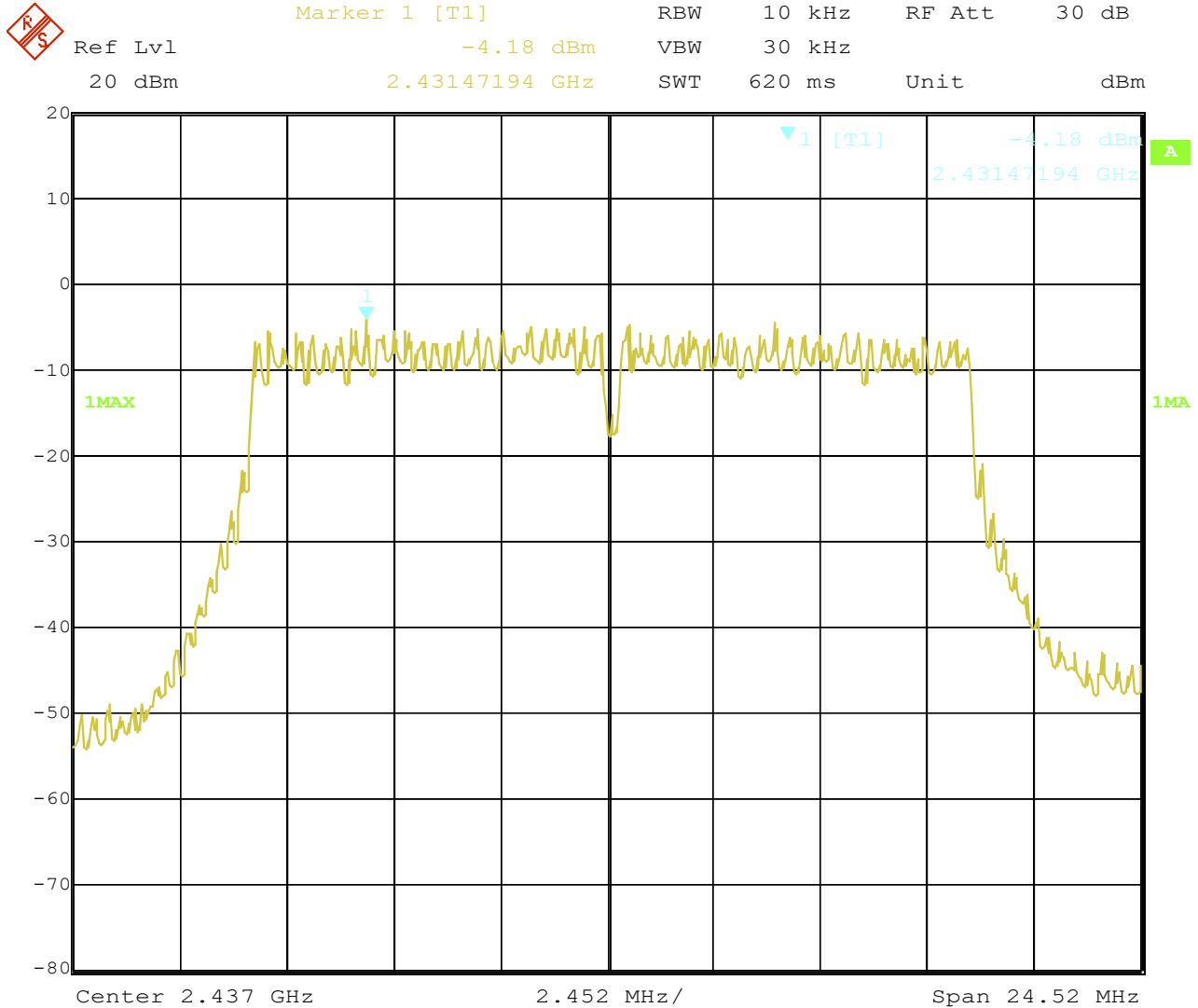
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8. 802.11g at 6Mbps of CH6

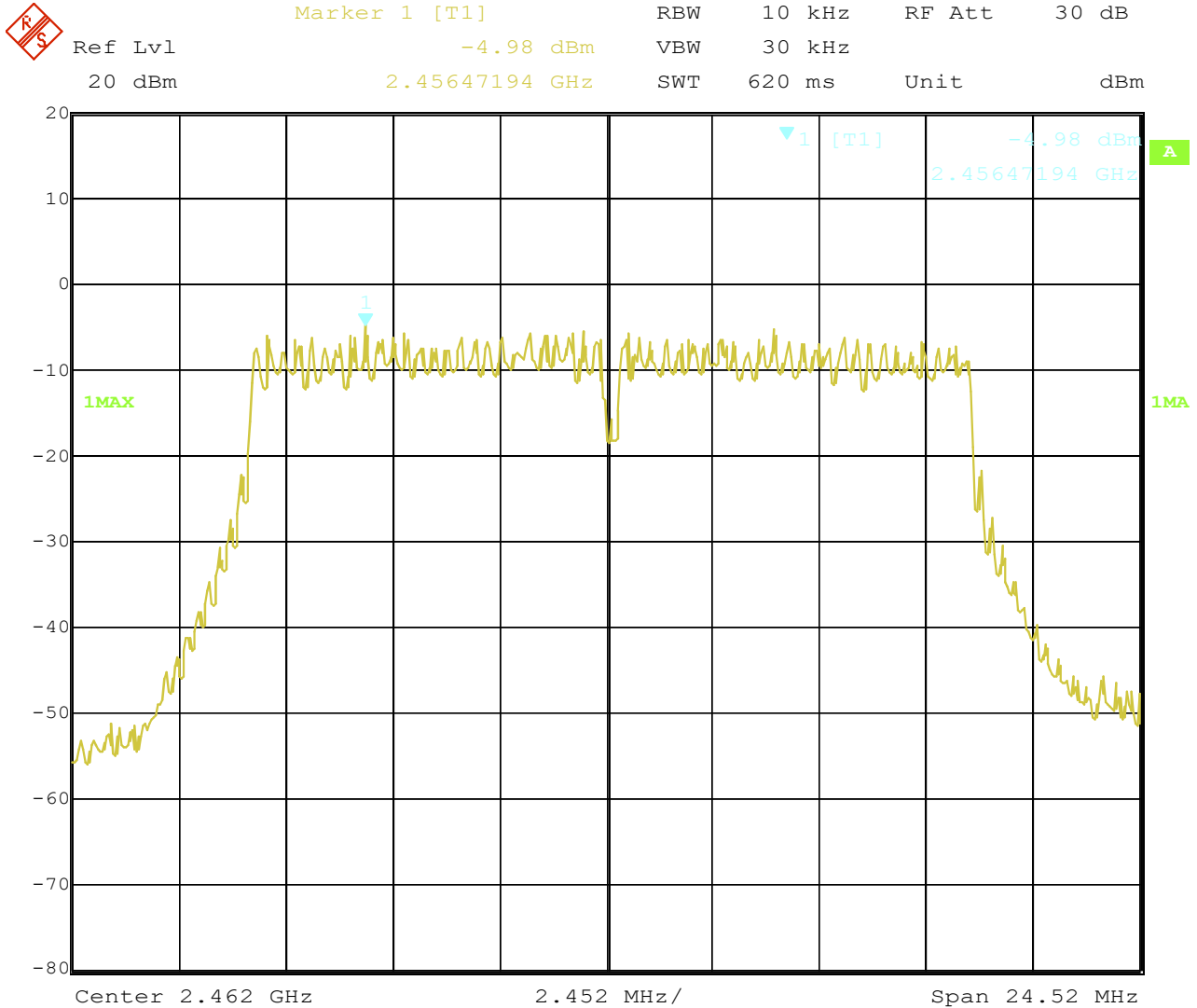


Date: 22.JUN.2021 14:24:18

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9. 802.11g at 6Mbps of CH11



Date: 22.JUN.2021 14:25:14

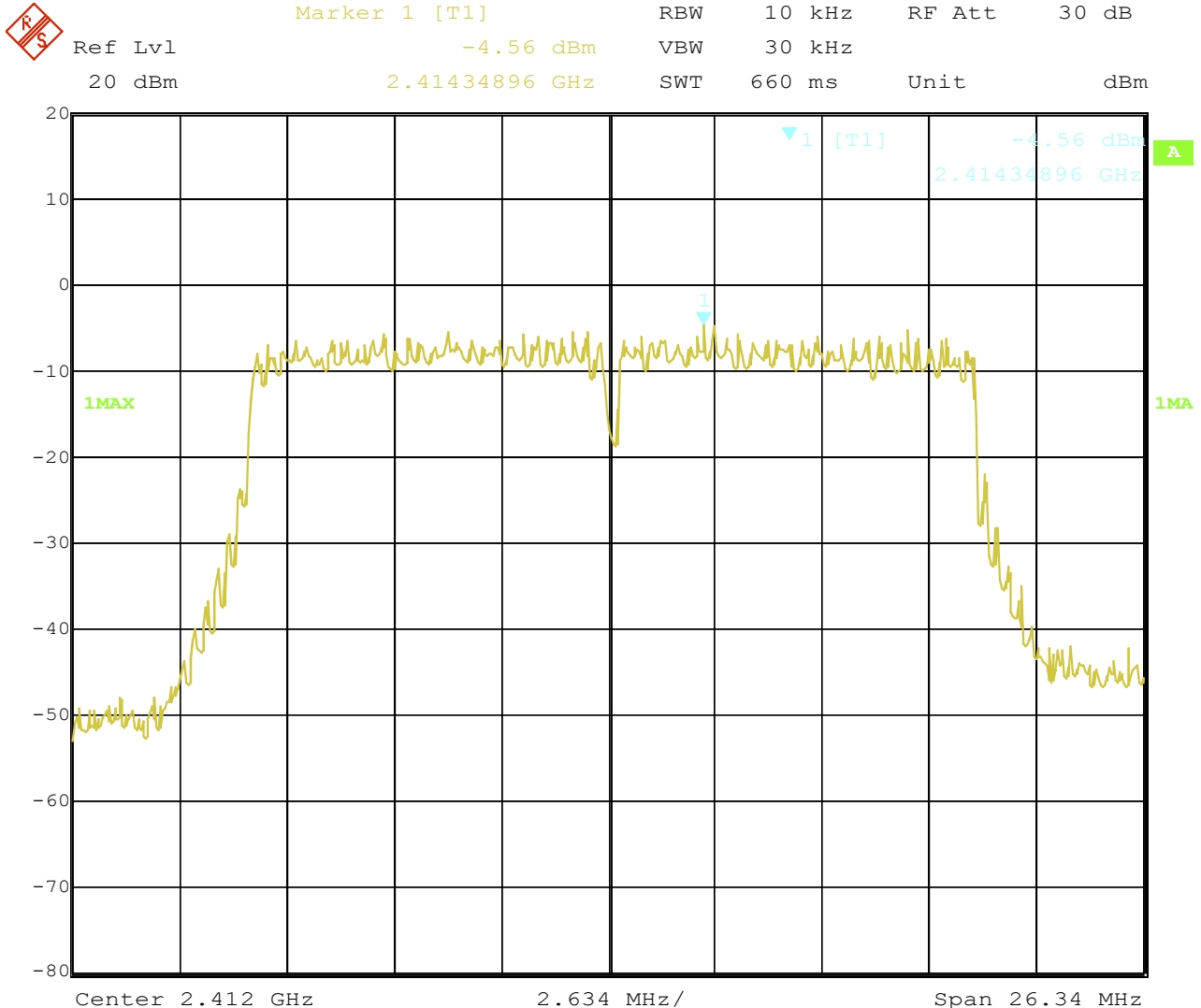
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10. 802.11n at HT20 of CH01



Date: 22.JUN.2021 14:44:27

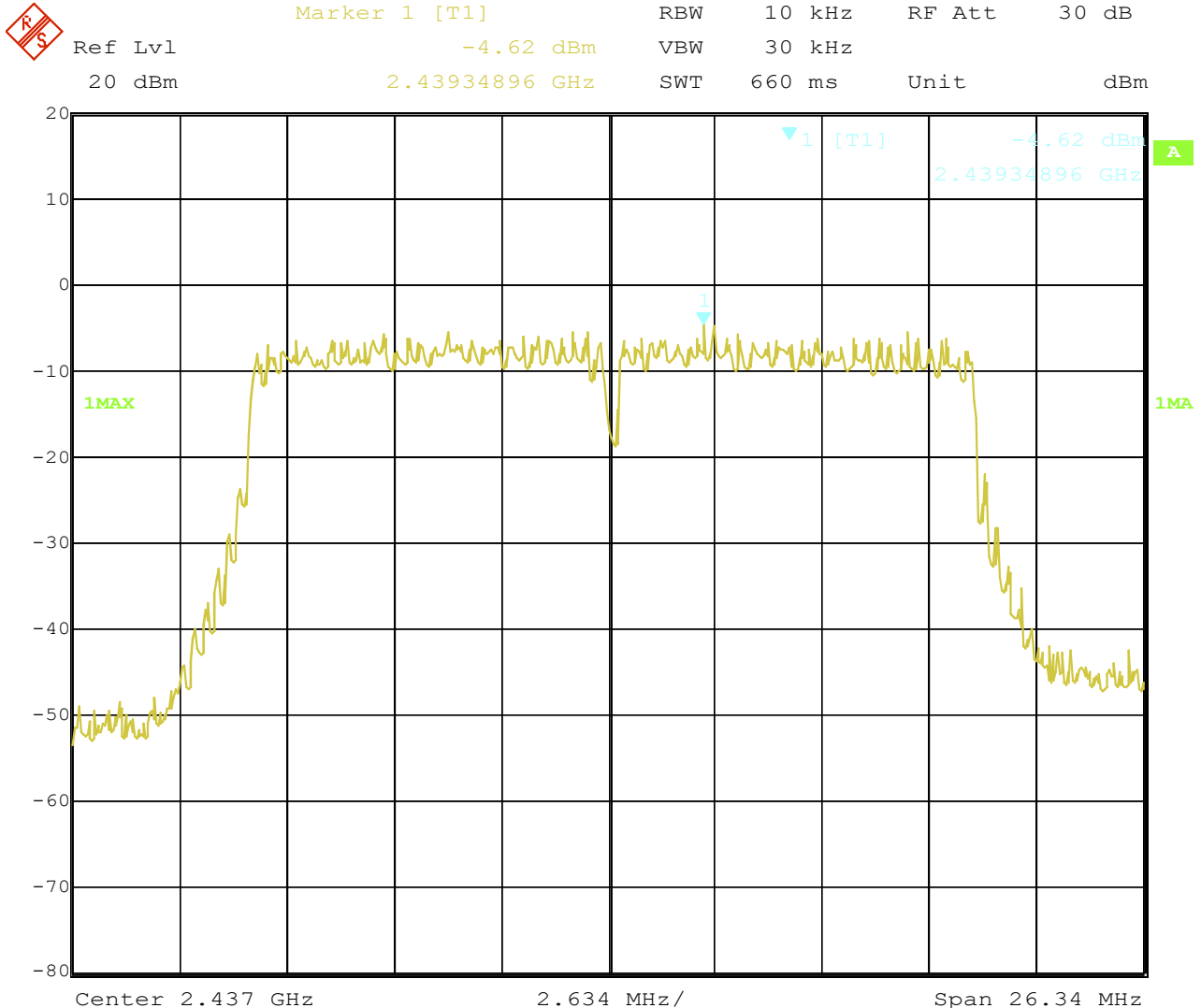
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11. 802.11n at HT20 of CH06

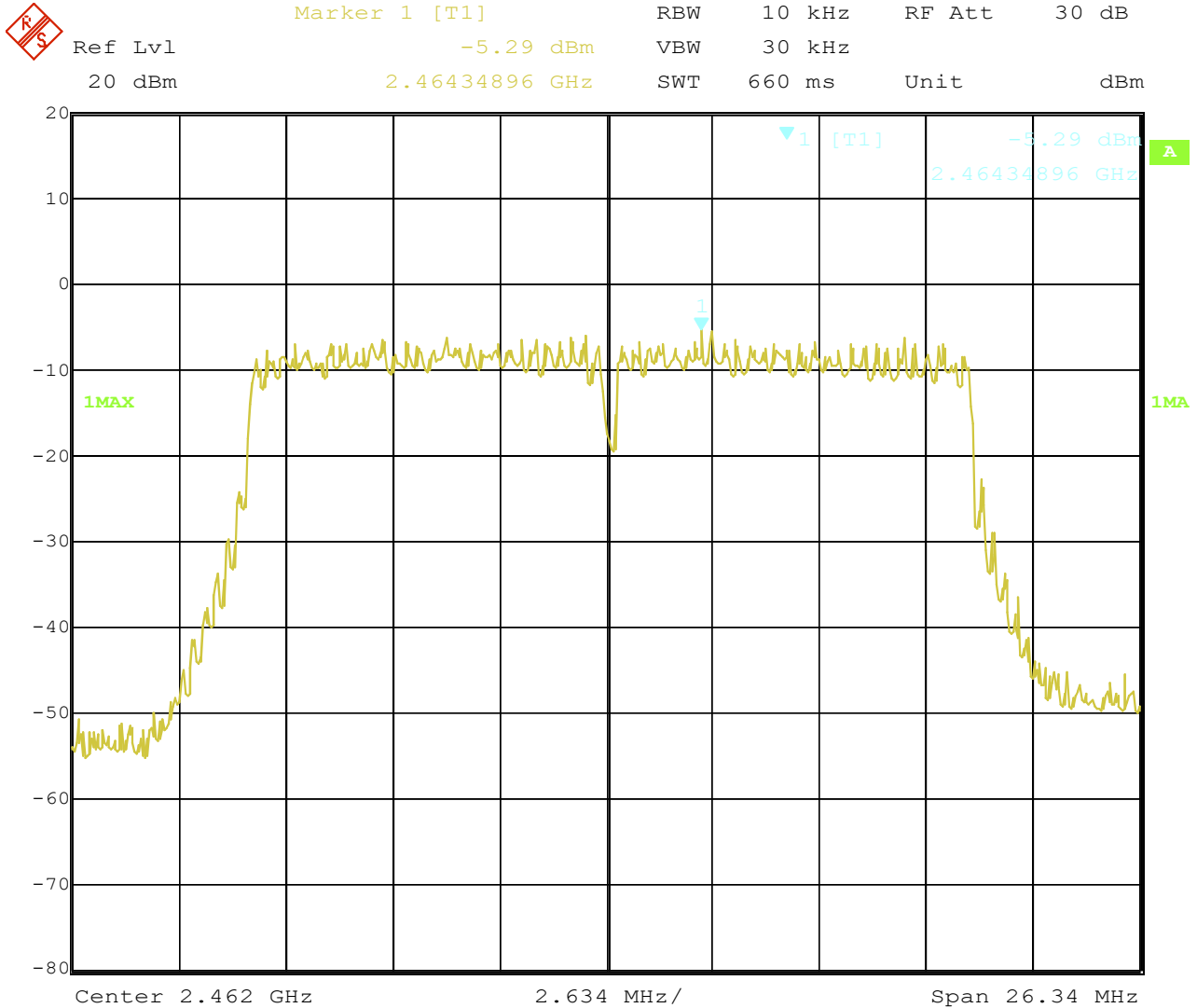


Date: 22.JUN.2021 14:42:14

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12. 802.11n at HT20 of CH11



Date: 22.JUN.2021 14:39:05

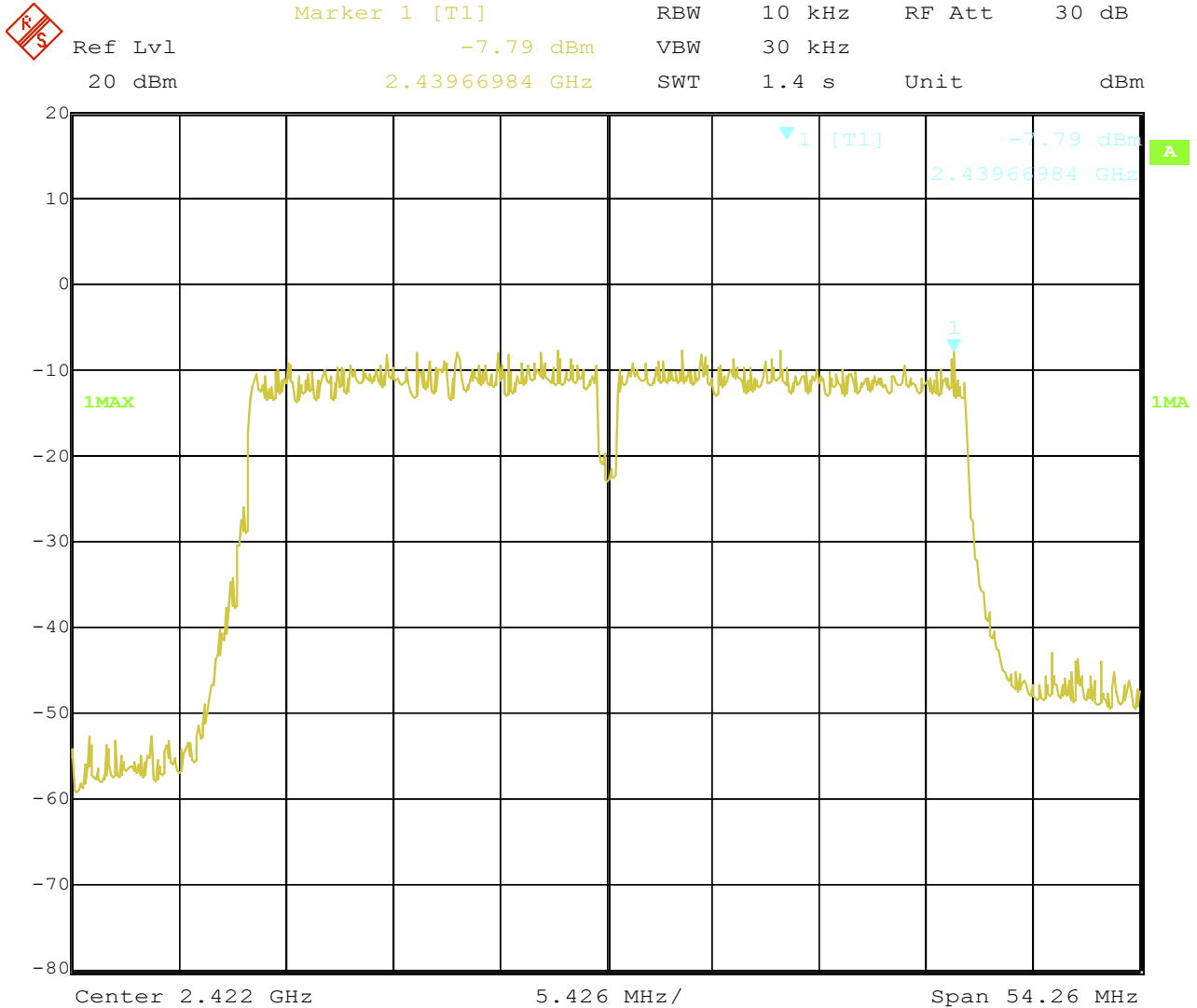
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13. 802.11n at HT40 of CH01



Date: 22.JUN.2021 14:46:59

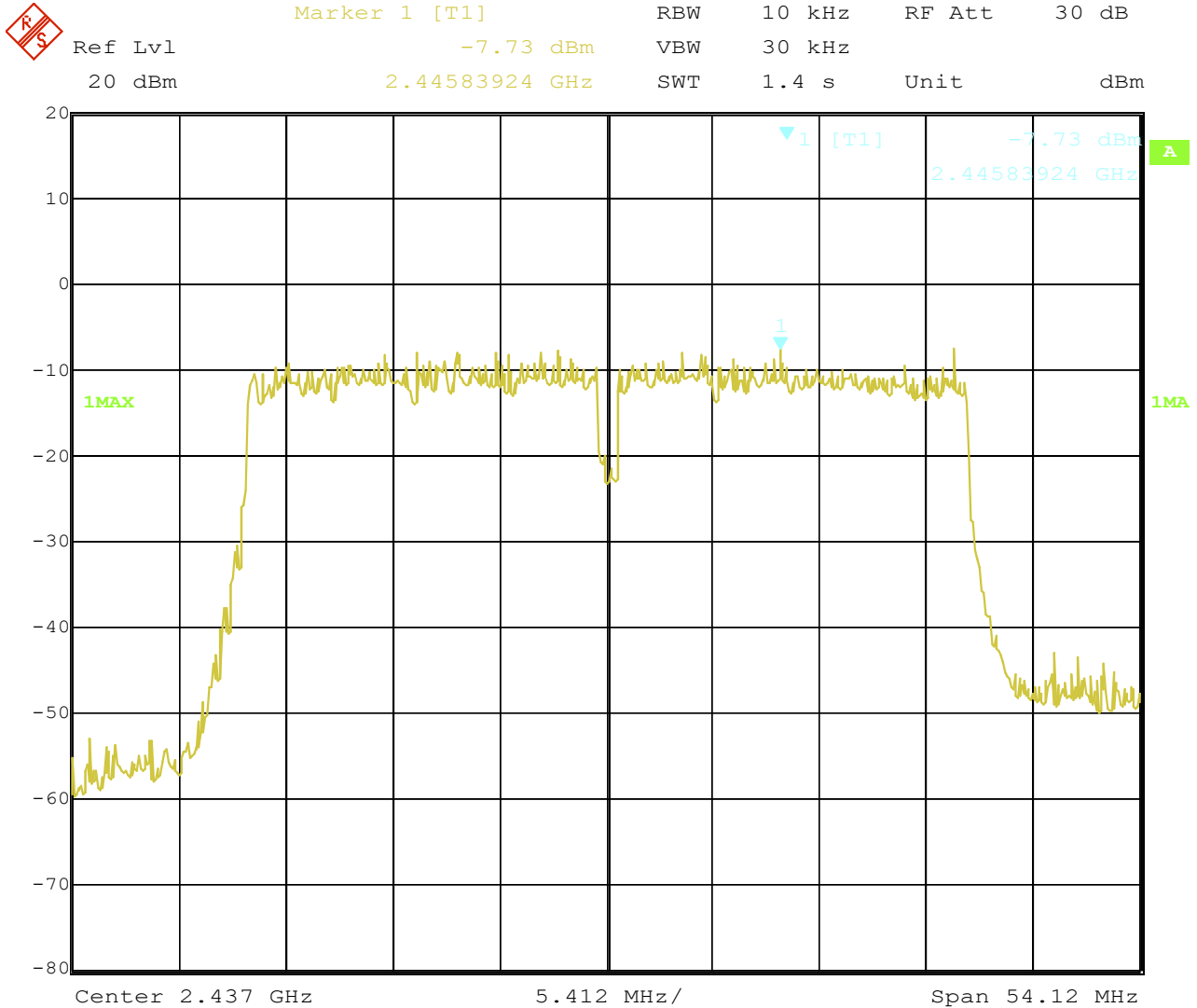
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14. 802.11n at HT40 of CH04



Date: 22.JUN.2021 14:49:10

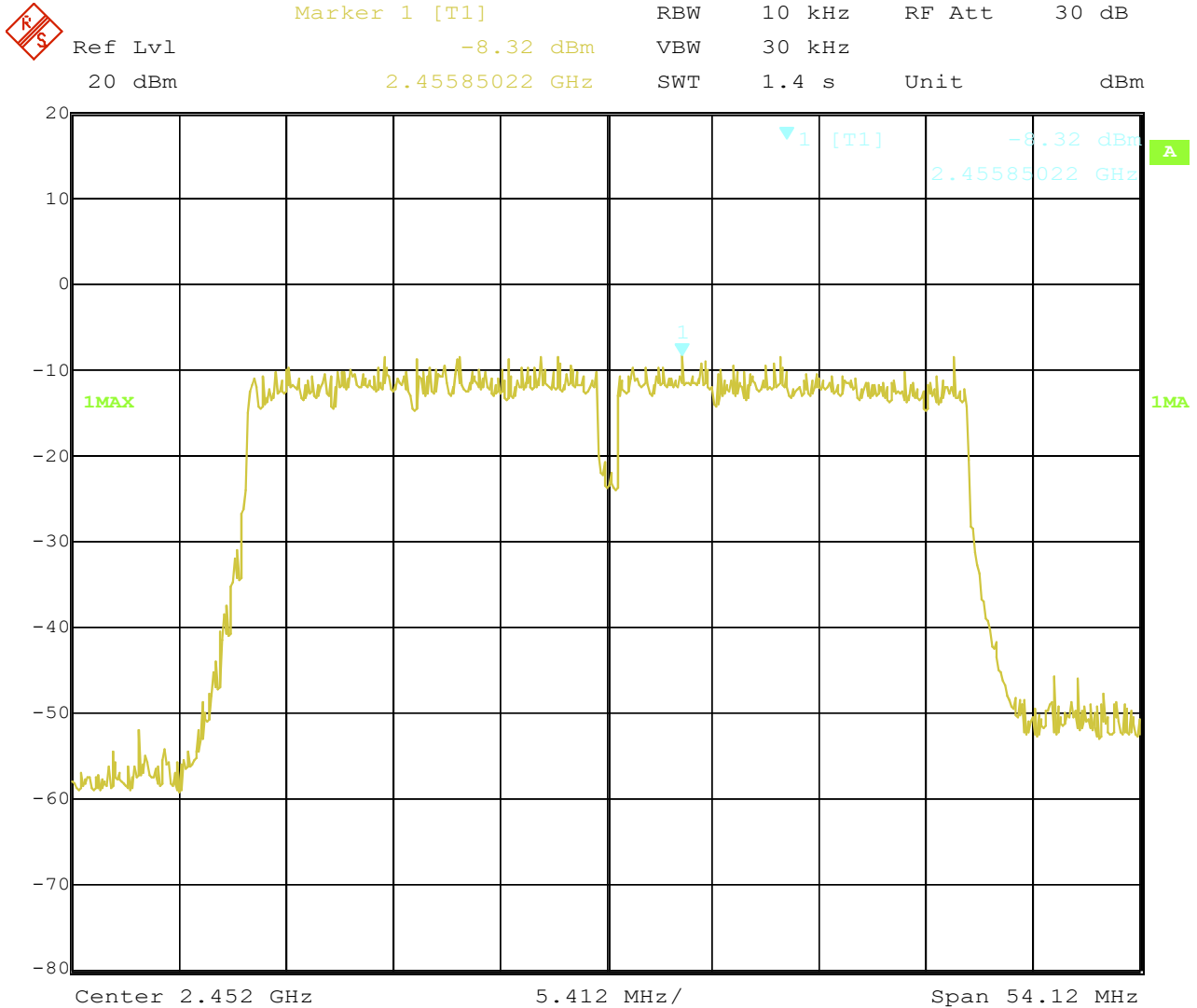
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15. 802.11n at HT40 of CH07



Date: 22.JUN.2021 14:50:27

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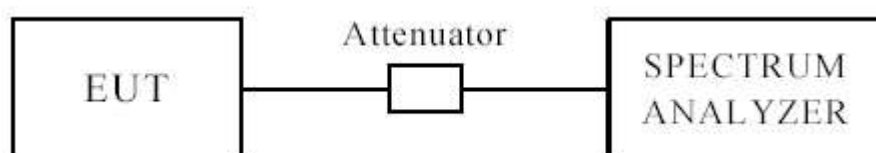
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10 Out of Band Measurement

10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 Limits of Out of Band Emissions Measurement

1. Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=100kHz, VBW=300 kHz. A conducted measurement used

10.4 Test Result

Please see next pages

Note: 1. for band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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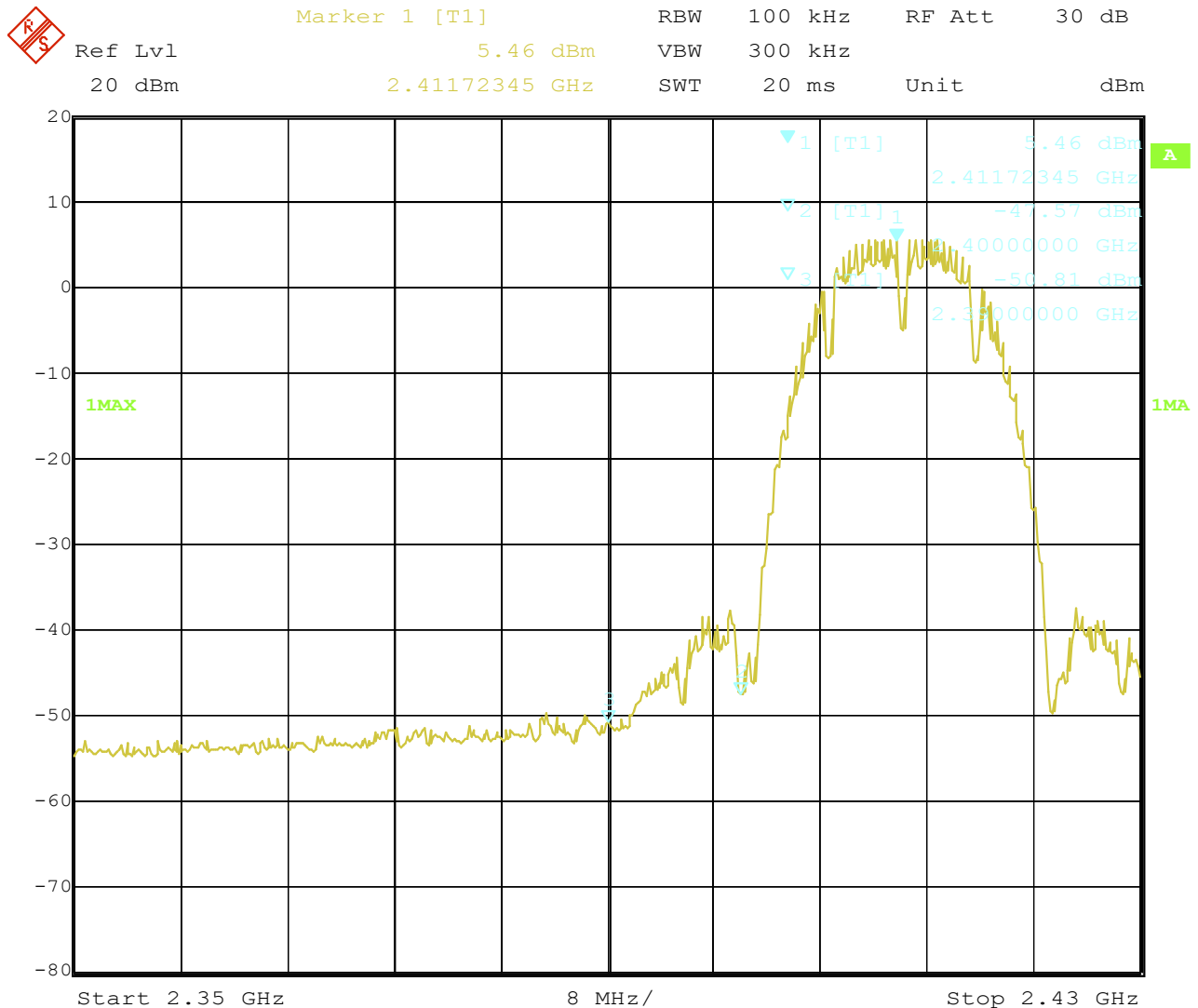
For 802.11b mode

CH01 at 1Mbps

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 14:55:42

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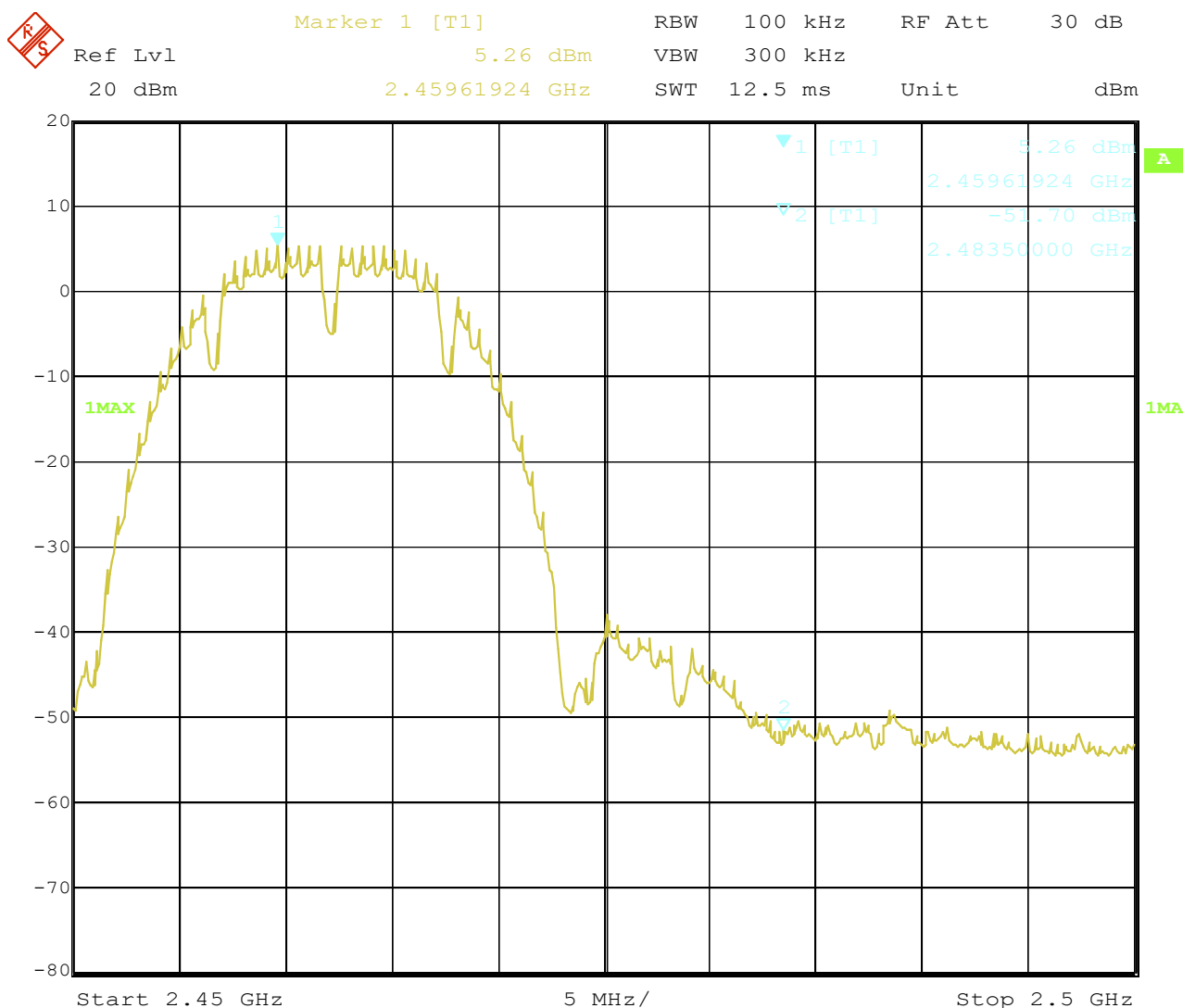


CH11 at 1Mbps

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 15:06:38

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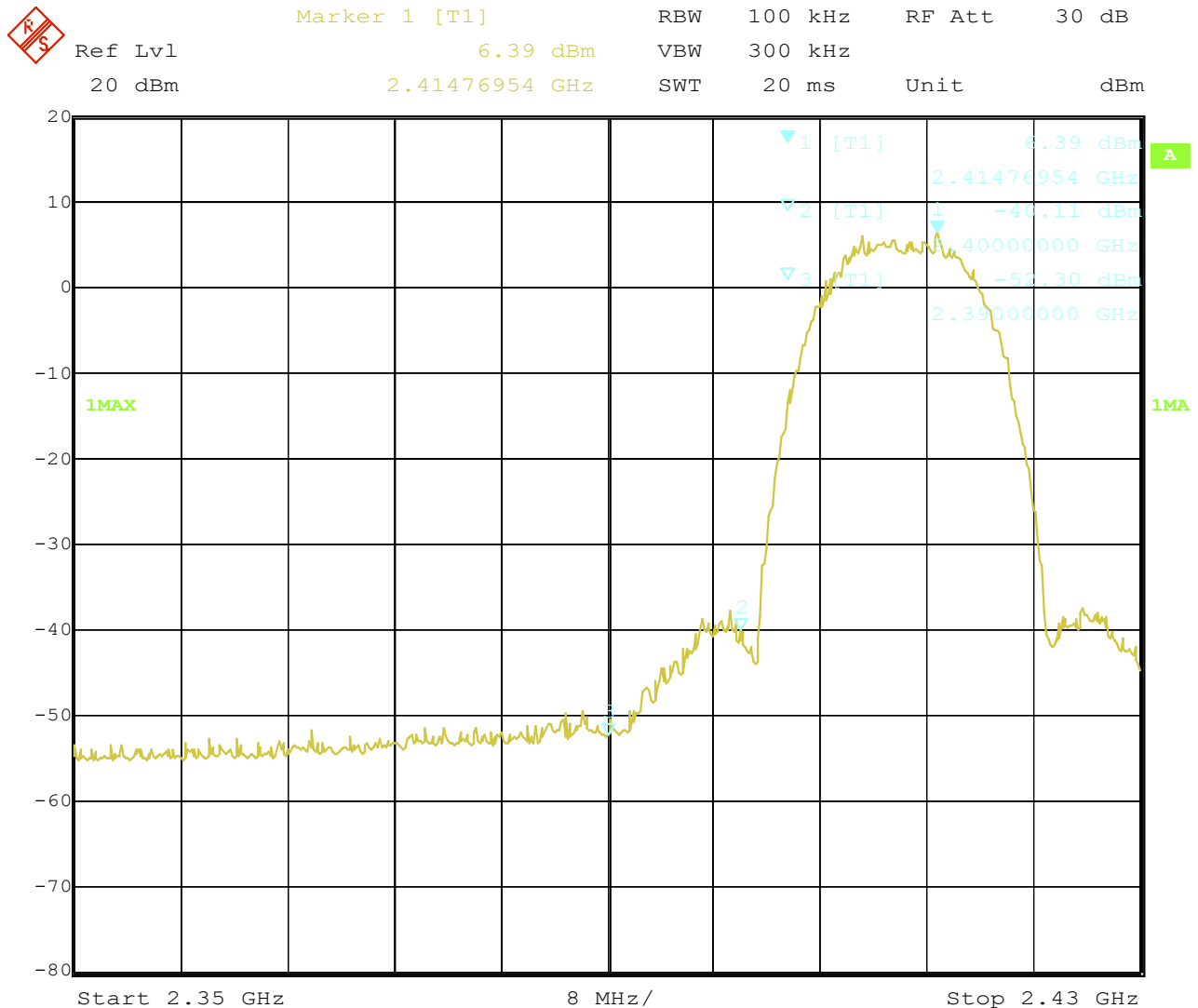
For 802.11b mode

CH01 at 11Mbps

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 14:57:19

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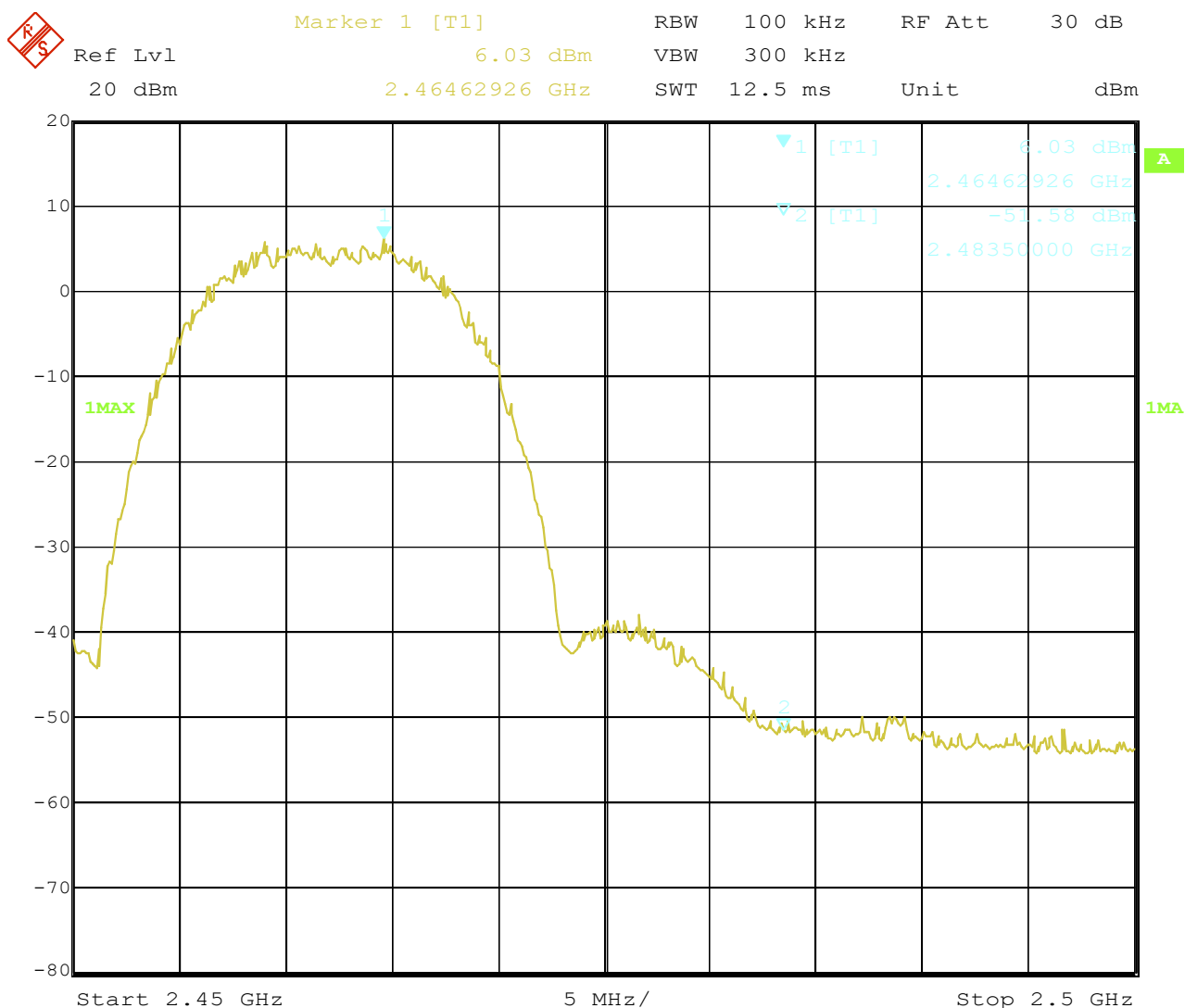


CH11 at 11Mbps

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 15:08:01

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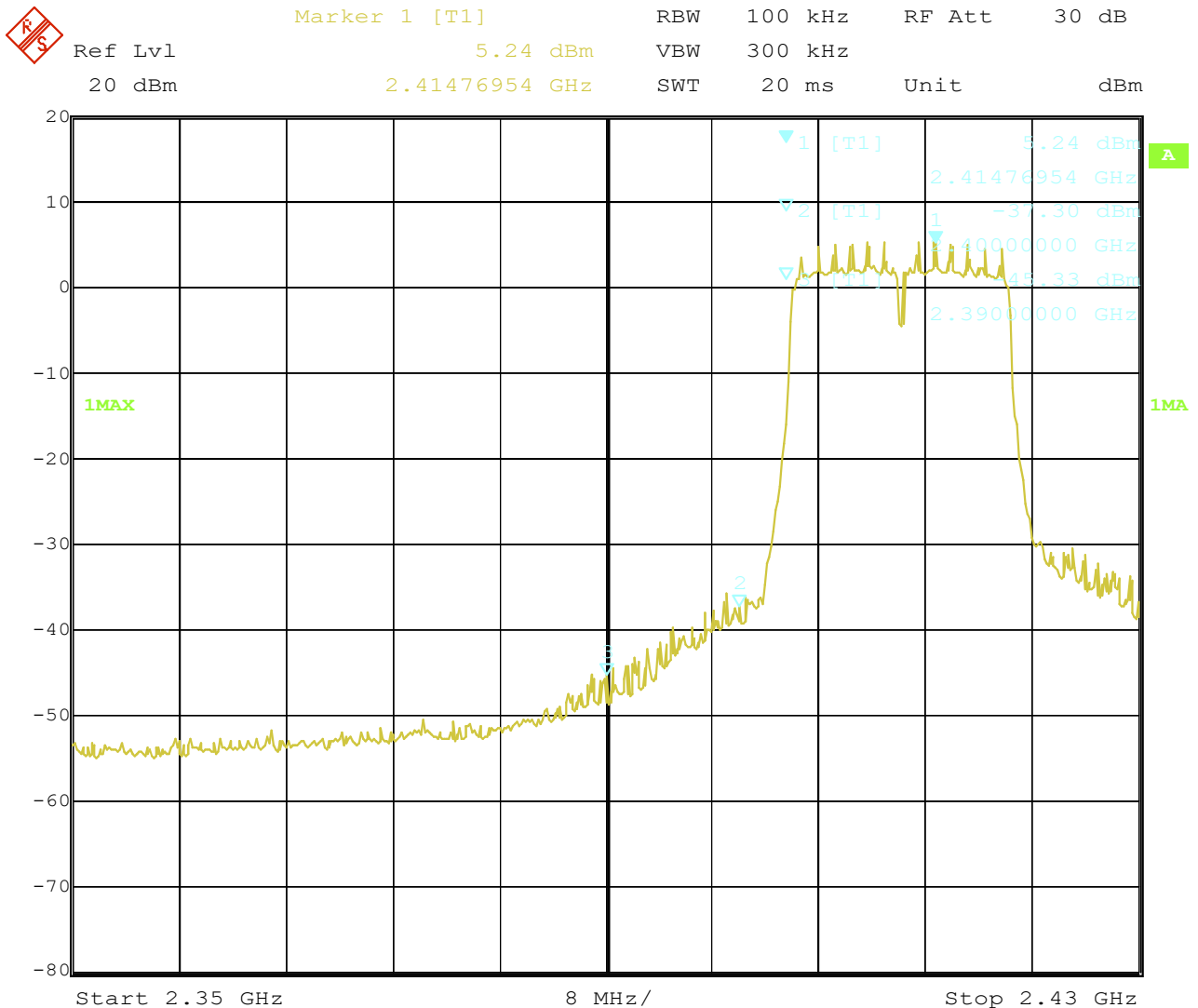
For 802.11g mode

CH01 at 6Mbps

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 14:59:57

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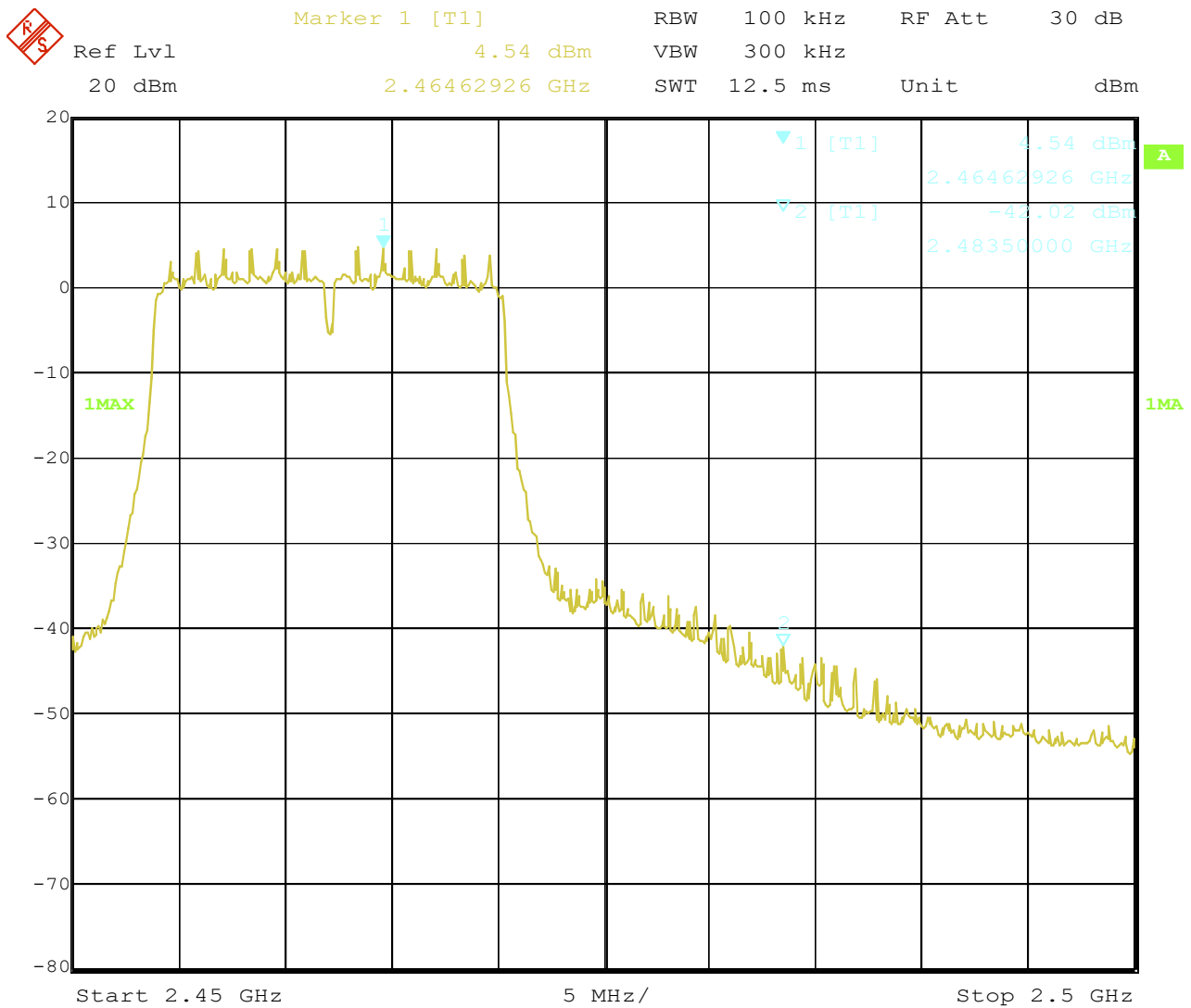


CH11 at 6Mbps

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 15:05:25

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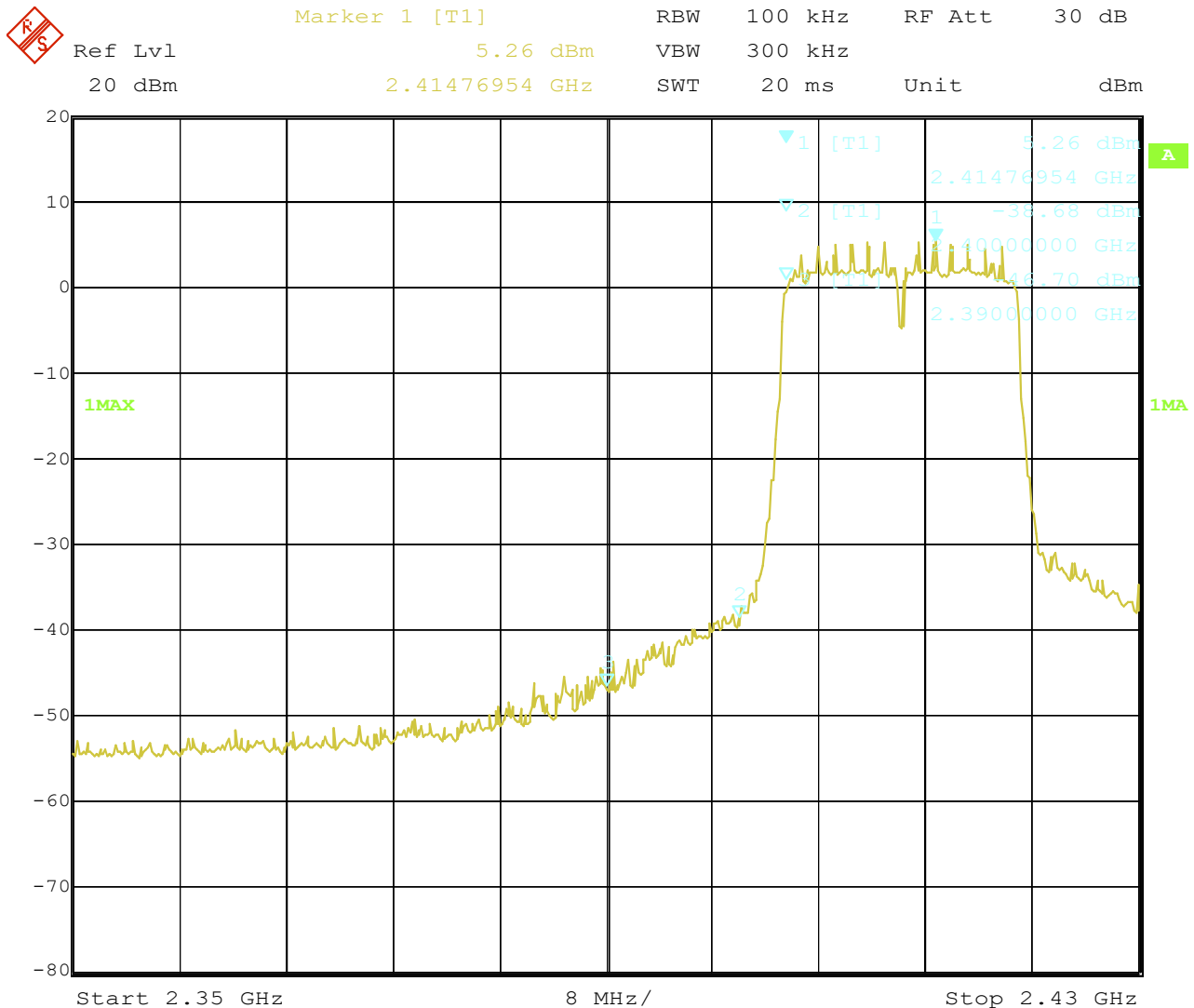
For 802.11n (HT20) mode

CH01 at mcs0

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 15:02:40

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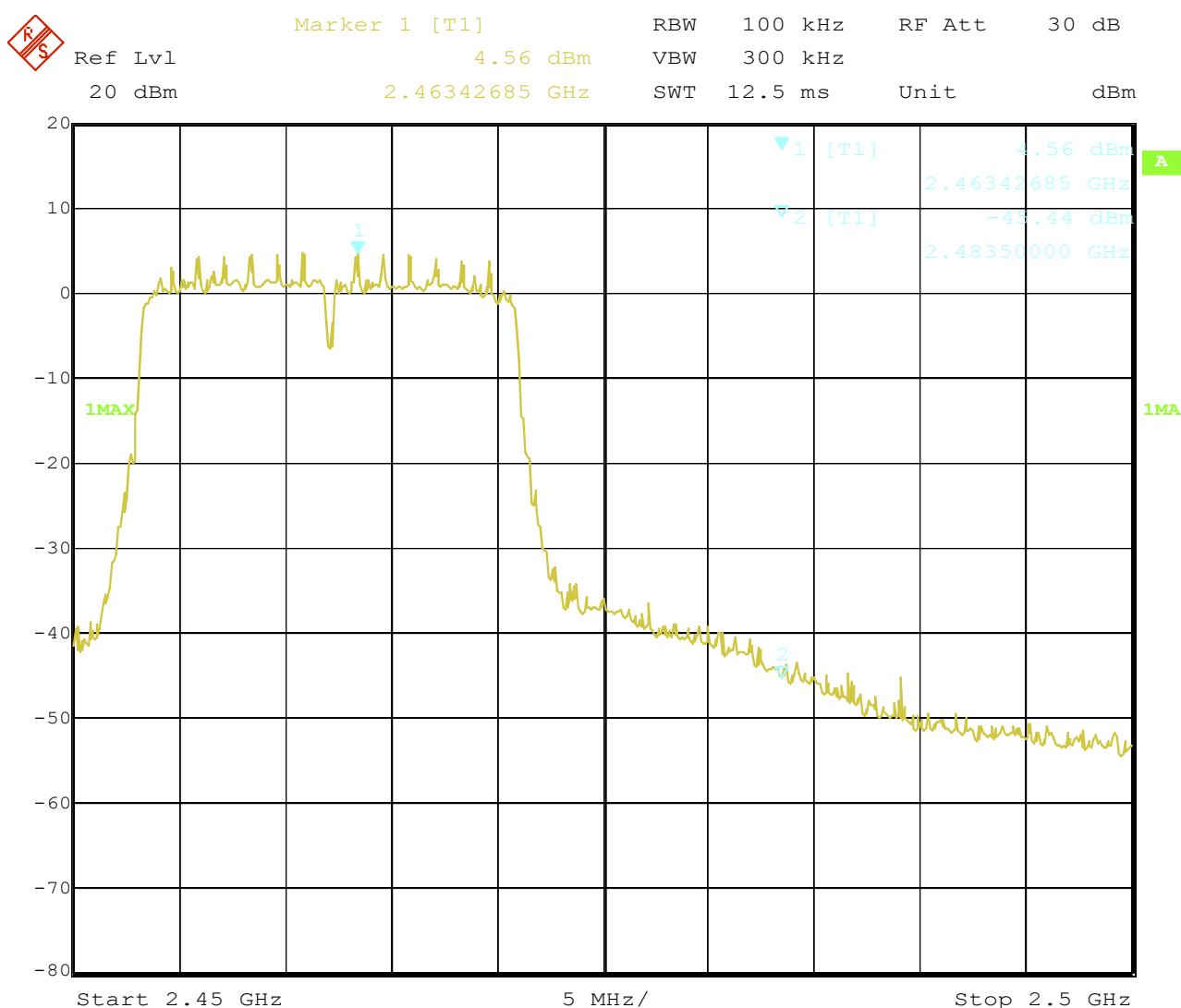


CH11 at mcs0

10.4 Band-edge Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 15:04:11

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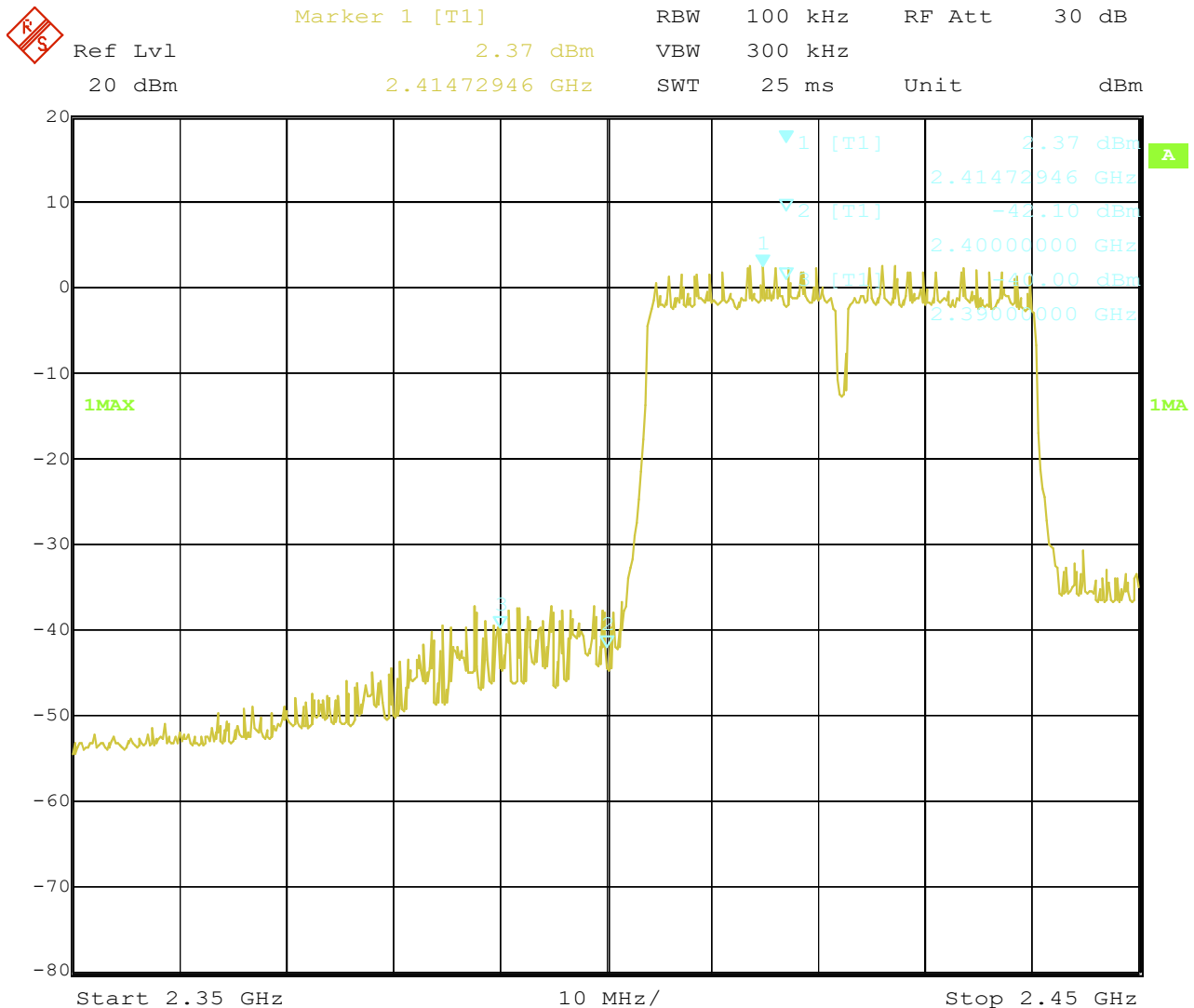
For 802.11n (HT40) mode

CH03 at msc0

10.4 Band-edge and Restricted band Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 22.JUN.2021 14:53:41

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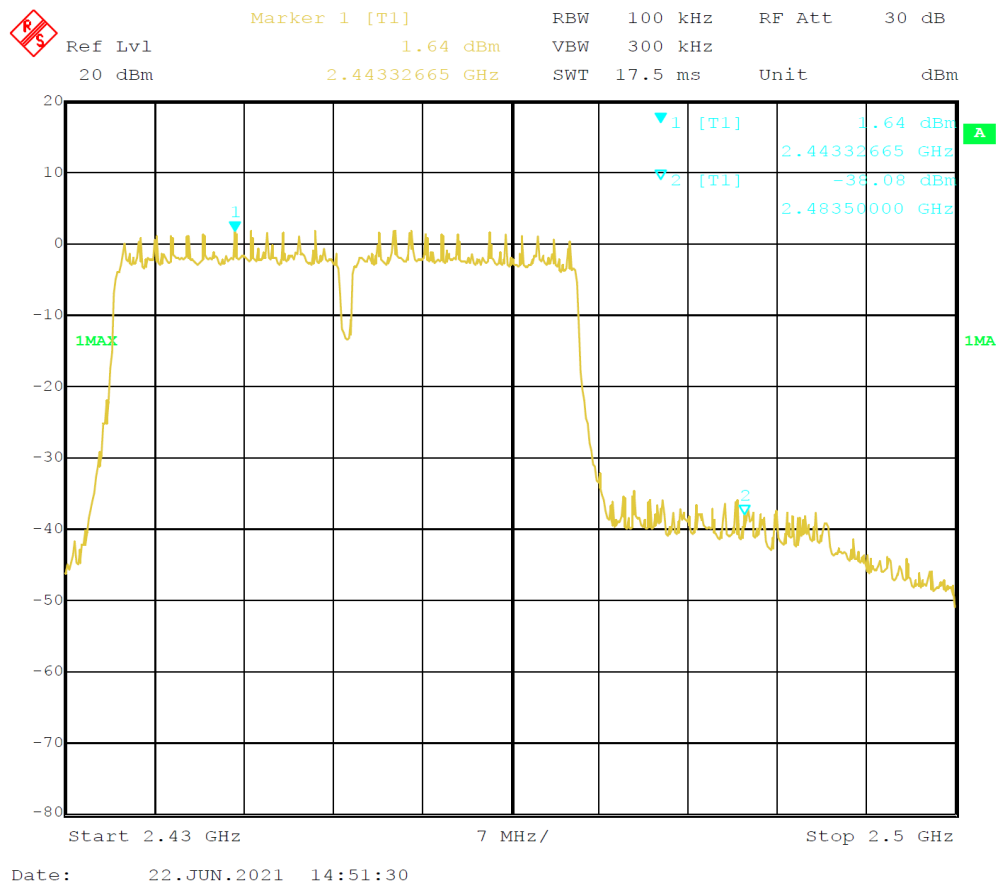


CH09 at msc0

10.4 Band-edge and Restricted band Measurement

EUT	Video Encoder	Model	Ultra Encode HDMI
Mode	Keeping Transmitting	Test Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz802.11b mode, Low Channel, Horizontal				
2390	PK (dBμV/m)	45.64	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
802.11b mode, Low Channel, Vertical				
2390	PK (dBμV/m)	52.61	Limit	74(dBμV/m)
	AV (dBμV/m)	44.72		54(dBμV/m)

10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz802.11b mode, High Channel, Horizontal				
2483.5	PK (dBμV/m)	48.56	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
802.11b mode, High Channel, Vertical				
2483.5	PK (dBμV/m)	56.38	Limit	74(dBμV/m)
	AV (dBμV/m)	46.17		54(dBμV/m)

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10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz802.11g mode, Low Channel, Horizontal				
2390	PK (dBμV/m)	50.25	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
802.11g mode, Low Channel, Vertical				
2390	PK (dBμV/m)	60.87	Limit	74(dBμV/m)
	AV (dBμV/m)	46.92		54(dBμV/m)

10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz802.11g mode, High Channel, Horizontal				
2483.5	PK (dBμV/m)	53.46	Limit	74(dBμV/m)
	AV (dBμV/m)	45.80		54(dBμV/m)
802.11g mode, High Channel, Vertical				
2483.5	PK (dBμV/m)	61.82	Limit	74(dBμV/m)
	AV (dBμV/m)	46.22		54(dBμV/m)

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10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz 802.11n HT20 mode, Low Channel, Horizontal				
2390	PK (dBμV/m)	50.39	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
802.11n HT20 mode, Low Channel, Vertical				
2390	PK (dBμV/m)	62.18	Limit	74(dBμV/m)
	AV (dBμV/m)	48.03		54(dBμV/m)

10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz 802.11n HT20 mode, High Channel, Horizontal				
2483.5	PK (dBμV/m)	54.61	Limit	74(dBμV/m)
	AV (dBμV/m)	46.02		54(dBμV/m)
802.11n HT20 mode, High Channel, Vertical				
2483.5	PK (dBμV/m)	63.22	Limit	74(dBμV/m)
	AV (dBμV/m)	47.08		54(dBμV/m)

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10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz802.11n HT40 mode, Low Channel, Horizontal				
2390	PK (dBμV/m)	47.75	Limit	74(dBμV/m)
	AV (dBμV/m)			54(dBμV/m)
802.11n HT40 mode, Low Channel Vertical				
2390	PK (dBμV/m)	65.23	Limit	74(dBμV/m)
	AV (dBμV/m)	48.34		54(dBμV/m)

Test Plots

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
3	2389.065	65.23	-3.53	74.0	-8.77	Peak	196.00	100	Vertical	Pass
3**	2389.065	48.34	-3.53	54.0	-5.66	AV	196.00	100	Vertical	Pass

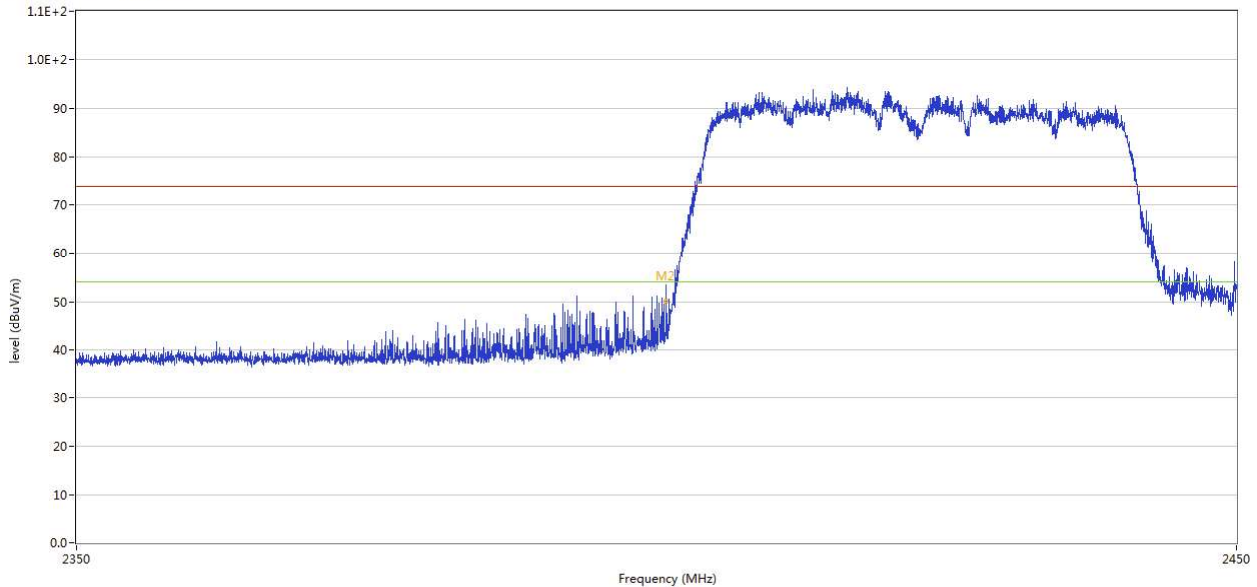
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FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2400.337	53.53	-3.57	74.0	-20.47	Peak	167.00	100	Horizontal	Pass
3	2390.665	47.75	-3.53	74.0	-26.25	Peak	139.00	100	Horizontal	Pass

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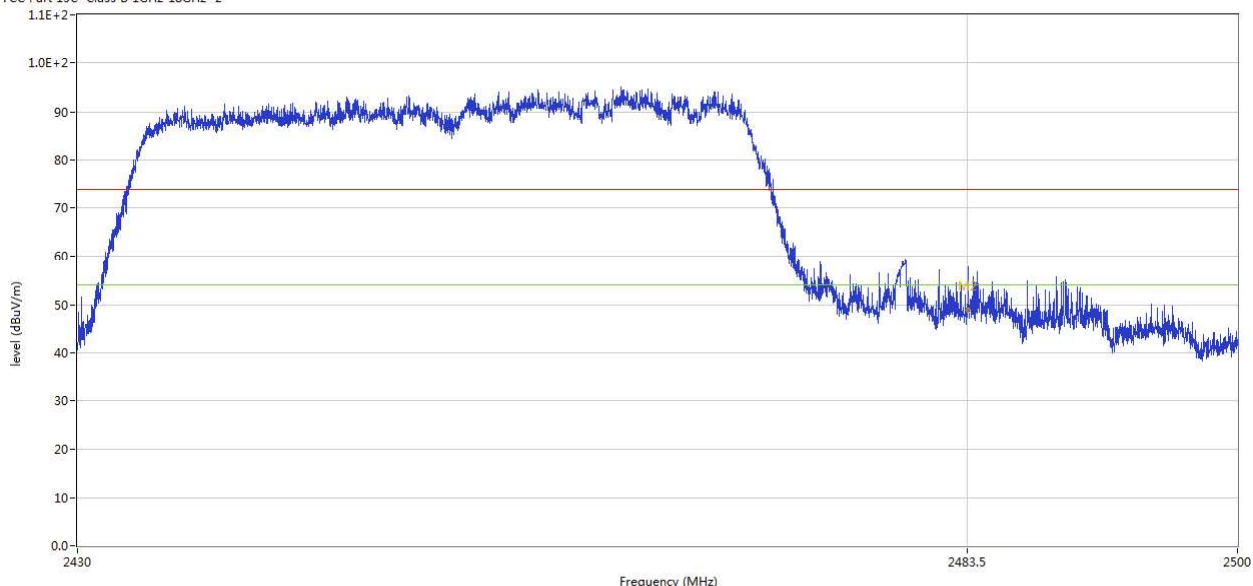
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10.5 Restricted band Measurement

EUT	Video Encoder		Model	Ultra Encode HDMI
Mode	Keeping Transmitting		Test Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
MHz802.11n HT40 mode, High Channel, Horizontal				
2483.5	PK (dBμV/m)	57.76	Limit	74(dBμV/m)
	AV (dBμV/m)	48.88		54(dBμV/m)
802.11n HT40 mode, High Channel, Vertical				
2483.5	PK (dBμV/m)	68.31	Limit	74(dBμV/m)
	AV (dBμV/m)	50.48		54(dBμV/m)

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2483.572	57.76	-3.57	74.0	-16.24	Peak	204.00	100	Horizontal	Pass
2**	2483.572	48.88	-3.57	54.0	-5.12	AV	204.00	100	Horizontal	Pass

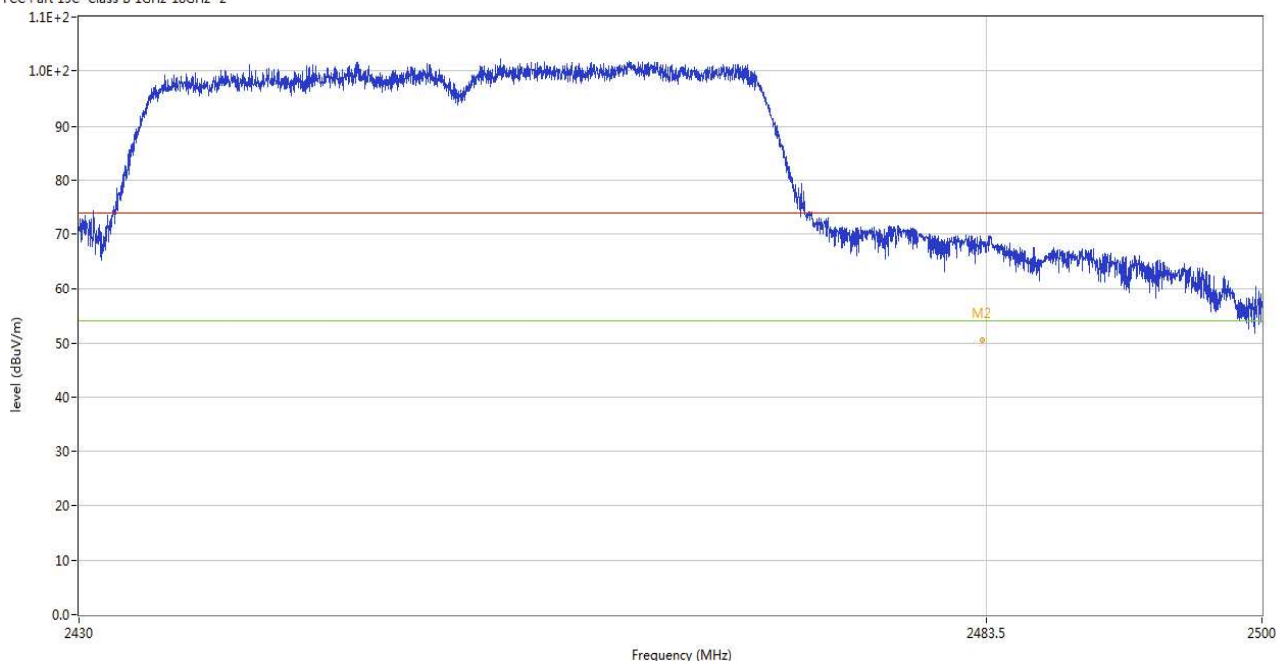
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FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2483.274	68.31	-3.57	74.0	-5.69	Peak	264.00	100	Vertical	Pass
2**	2483.274	50.48	-3.57	54.0	-3.52	AV	264.00	100	Vertical	Pass

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11.0 Antenna Requirement

11.1 Standard Applicable

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

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

Dipole antennas with reverse polarity antenna connector used. The gain of the antennas is 2.5dBi.

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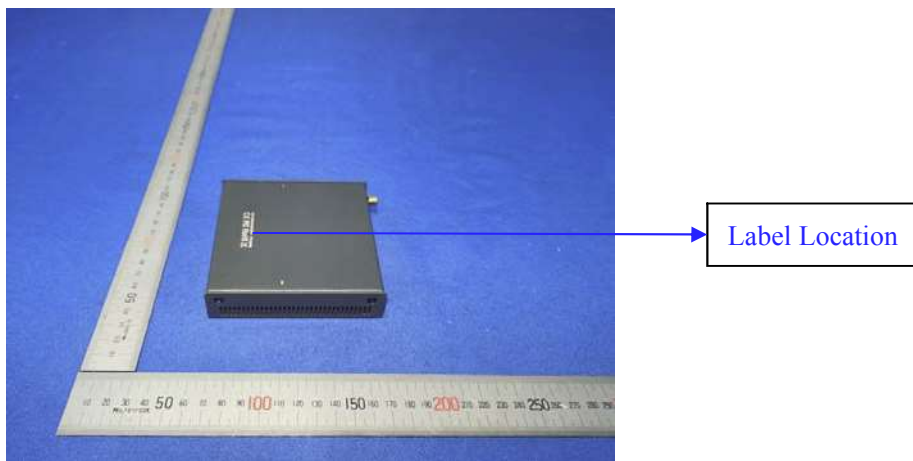


12.0 FCC ID Label

FCC ID: 2AP6W-ENCODER01

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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