TECHNICAL REPORT

Report No.: FCC 1910107-04
File Reference No.: 2019-11-16

Applicant: VisionLabs.B.V.

Product: Biometrical access control terminals VisionLabs LUNA ACE

Model No.: ACE-0001

Trademark: N/A

Test Standards: FCC Part 15 Subpart E, Paragraph 15.407

Test Result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10,FCC Part 15 Subpart C, Paragraph 15.247 for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: November 16, 2019

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:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 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

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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-02

For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: VisionLabs.B.V.

Address: Vijzelstraat 20,4th Floor,1017 HK,Amsterdam,The Netherlands

Telephone: +31 20 369 0493

Fax: --

1.3 Description of EUT

Product: Biometrical access control terminals VisionLabs LUNA ACE

Manufacturer: GLORY STAR TECHNICS (SHENZHEN) CO., LTD.

Address: 4/Floor,west block,Longzhu Road,Xin WuCun Industry Building,NanShan District,ShenZhen

Brand Name: N/A

Additional Brand Name: N/A

Model Number: ACE-0001

Additional Model Number: N/A

Type of Modulation IEEE 802.11a/n (HT20/HT40) : OFDM(64QAM, 16QAM, QPSK, BPSK);
IEEE 802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM

Frequency Band 1: 5180MHz-5240MHz

Channel Separation 802.11a/802.11n20:20MHz, 802.11n40:40MHz, 802.11ac : 80MHz

Air Data Rate IEEE 802.11a : 54, 48,36, 24, 18, 12, 9, 6 Mbps
IEEE 802.11n/HT20: mcs0: 6.5Mbps,mcs1:13Mbps,mcs2:19.5Mbps,mcs3:26Mbps, mcs4:39Mbps,mcs5:52Mbps,mcs6:58.5Mbps,mcs7:65Mbps
IEEE 802.11n/HT40: mcs0:15Mbps,mcs1:30Mbps,mcs2:45Mbps,mcs3:60Mbps, mcs4:90Mbps,mcs5:120Mbps,mcs6:135Mbps,mcs7:150Mbps
IEEE 802.11ac: Up to 433.3Mbps

Antenna: Two Integral antennas used.

Antenna Gain: Maximum 3.0dBi for each one

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Test Mode: During testing, EUT was set to 100% duty cycle. 6Mbps air data rate was the worst case for 802.11a mode; mcs0 air data rate was the worst case for 802.11n mode; 23.9Mbps air data rate was the worst case for 802.11ac mode.

Frequency Selection By software

Input Voltage: DC5V, 5A from power supply or POE 48V

Each Channel Operation Frequency

Band 1					
802.11a / 11n HT20 / 802.11ac VHT20		802.11n HT40 / 802.11acVHT40		802.11ac VHT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190 MHz	42	5210 MHz
40	5200 MHz	46	5230 MHz		
44	5220 MHz				
48	5240 MHz				

The selected test channels as follows:

Band 1					
802.11a / 11n HT20		802.11n HT40		802.11ac VHT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190 MHz	42	5210 MHz
40	5200 MHz	46	5230 MHz		
48	5240 MHz				

Note: 802.11ac VHT20/VHT40 is similar with 802.11n HT20/HT40.

1.4 Submitted Sample: 1 Samples

1.5 Test Duration
2019-10-17 to 2019-11-16

1.6 Test Uncertainty
Conducted Emissions Uncertainty =3.6dB
Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by Terry Tang

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	2019-06-21	2020-06-20
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2019-06-21	2020-06-20
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2019-06-21	2020-06-20
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2019-06-21	2020-06-20
Loop Antenna	EMCO	6507	00078608	2020-06-20	2020-06-20
Spectrum	R&S	FSIQ26	100292	2019-06-21	2020-06-20
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2019-06-21	2020-06-20
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-07-09	2021-07-08
Power meter	Anritsu	ML2487A	6K00003613	2019-08-22	2020-08-21
Power sensor	Anritsu	MA2491A	32263	2019-08-22	2020-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2021-07-03
9*6*6 Anechoic	--	--	N/A	2018-02-07	2021-02-06
EMI Test Receiver	RS	ESVB	826156/011	2019-06-21	2020-06-20
EMI Test Receiver	RS	ESH3	860904/006	2019-06-21	2020-06-20
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2019-06-21	2020-06-20
Spectrum	HP/Agilent	E4407B	MY50441392	2019-06-21	2020-06-20
Spectrum	RS	FSP	1164.4391.38	2019-01-20	2020-01-19
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2019-06-21	2020-06-20
RF Cable	Zhengdi	7m	--	2019-06-21	2020-06-20
RF Switch	EM	EMSW18	060391	2019-06-21	2020-06-20
Pre-Amplifier	Schwarebeck	BBV9743	#218	2019-06-21	2020-06-20
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2019-06-21	2020-06-20
LISN	SCHAFFNER	NNB42	00012	2019-01-08	2020-01-07

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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 15.107 & 15.407	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart E Paragraph 15.407 (b1/4/5/6/7), Part 15.205 and Part 15.209	Undesirable Emission and Restrict band	PASS	Complies
FCC Part 15, Paragraph 15.407 (a1/2/3)	Peak Transmit Power	PASS	Complies
FCC Part 15, Paragraph 15.407 (a)(6)	Peak Power Excursion	PASS	Complies
FCC Part 15, Paragraph 15.407 (a/1/2/3)	Peak Power Spectral Density	PASS	Complies
FCC Part 15, Paragraph 15.407(g)	Frequency Stability	PASS	Complies

3.2 Test Standards

FCC Part 15 Subpart & Subpart C, Paragraph 15.247, ANSI C63.10 :2013, ANSI C63.4 :2014
789033 D02 General UNII Test Procedures New Rules v01r04

4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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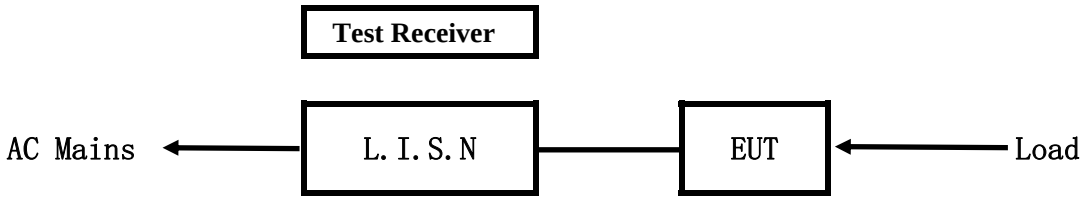
5. Power Line Conducted Emission Test

5.1 Schematics of the test



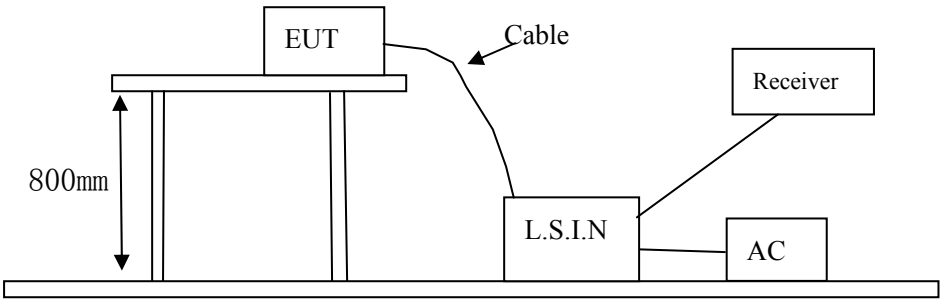
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009.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
Biometrical access control terminals VisionLabs LUNA ACE	GLORY STAR TECHNICS (SHENZHEN) CO., LTD.	ACE-0001	2AU6Z-ACE-0001RFID

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B. Internal Device

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply	FUJIA	FJ-SW528G0505000E	Input: 100-240V~, 50/60Hz, 1.5A; Output: DC5V, 5A

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 and 15.107

Frequency (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	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

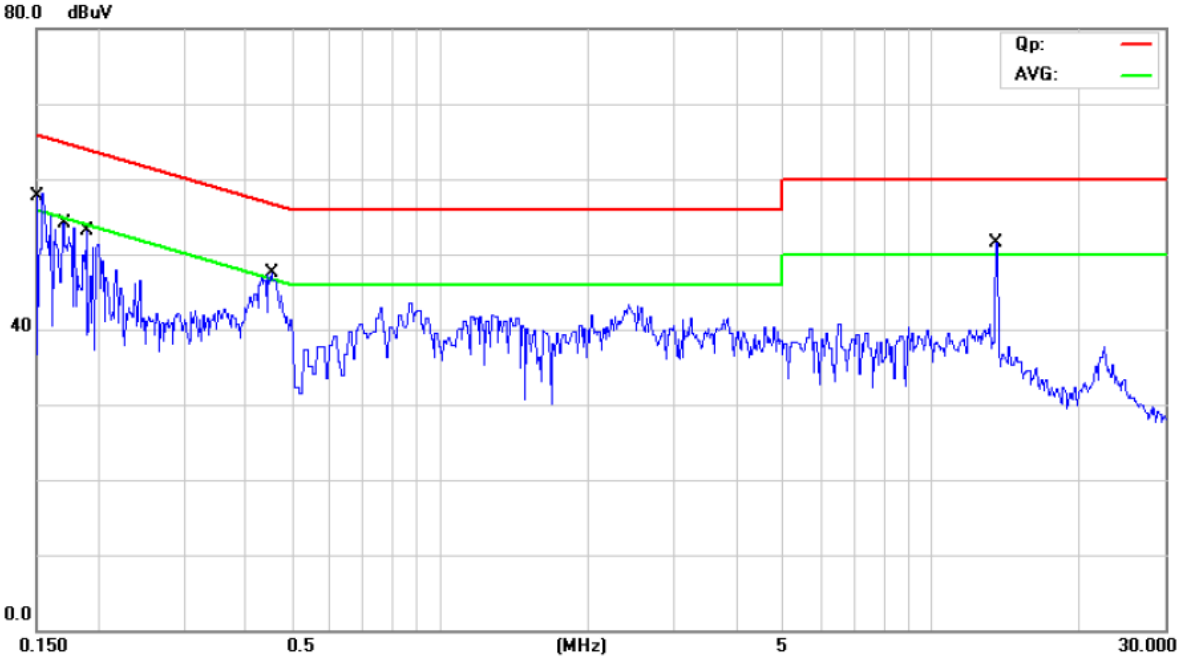
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keeping WIFI Transmitting

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1516	34.70	9.78	44.48	65.91	-21.43	QP	
2		0.1516	-1.50	9.78	8.28	55.91	-47.63	AVG	
3		0.1707	31.30	9.77	41.07	64.93	-23.86	QP	
4		0.1707	2.70	9.77	12.47	54.93	-42.46	AVG	
5		0.1884	26.70	9.76	36.46	64.11	-27.65	QP	
6		0.1884	12.10	9.76	21.86	54.11	-32.25	AVG	
7		0.4534	32.70	9.77	42.47	56.81	-14.34	QP	
8		0.4534	4.20	9.77	13.97	46.81	-32.84	AVG	
9	*	13.5620	36.40	10.32	46.72	60.00	-13.28	QP	
10		13.5620	6.70	10.32	17.02	50.00	-32.98	AVG	

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

EUT Operating Environment

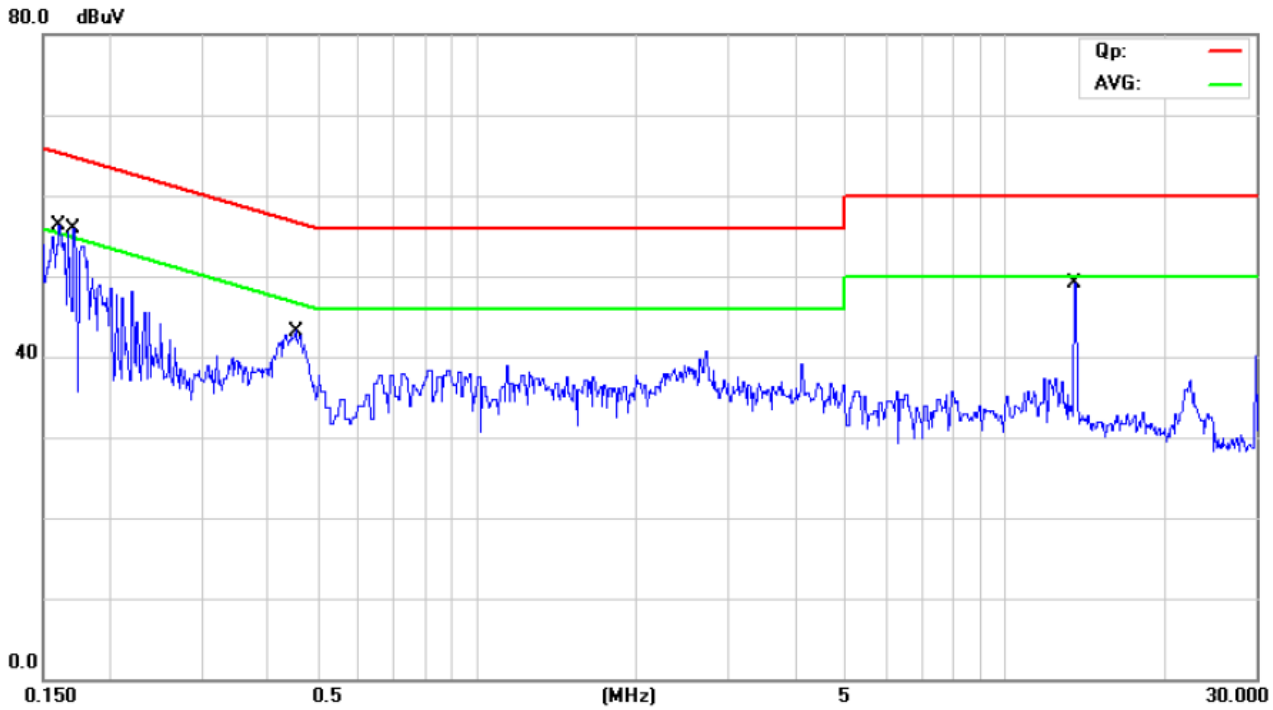
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keeping WIFI Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1610	33.20	9.78	42.98	65.41	-22.43	QP	
2		0.1610	4.40	9.78	14.18	55.41	-41.23	AVG	
3		0.1716	30.20	9.77	39.97	64.88	-24.91	QP	
4		0.1716	0.50	9.77	10.27	54.88	-44.61	AVG	
5		0.4482	27.60	9.77	37.37	56.91	-19.54	QP	
6		0.4482	12.90	9.77	22.67	46.91	-24.24	AVG	
7	*	13.5601	37.20	10.32	47.52	60.00	-12.48	QP	
8		13.5601	17.20	10.32	27.52	50.00	-22.48	AVG	

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6 Undesirable Emission and Restrict band

6.1 Test Method and test Procedure:

(1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at GTS EMC Laboratory. This site is on file with the IC laboratory division, Registration No.9079A-02

(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.

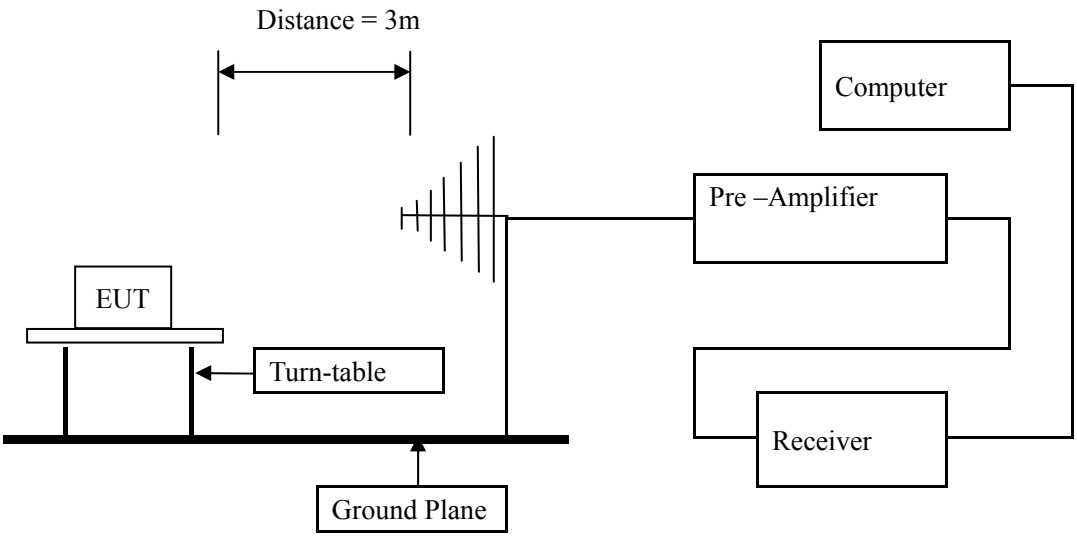
(3) The frequency spectrum from 30 MHz to 40 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz, VBW=3MHz and PK detector.
Measurements were made at 3 meters.

(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



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.

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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:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

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

(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm/MHz

(2) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz.

Note: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

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

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Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

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

EUT set Condition: **Keeping WIFI Transmitting**

Results: **Pass**

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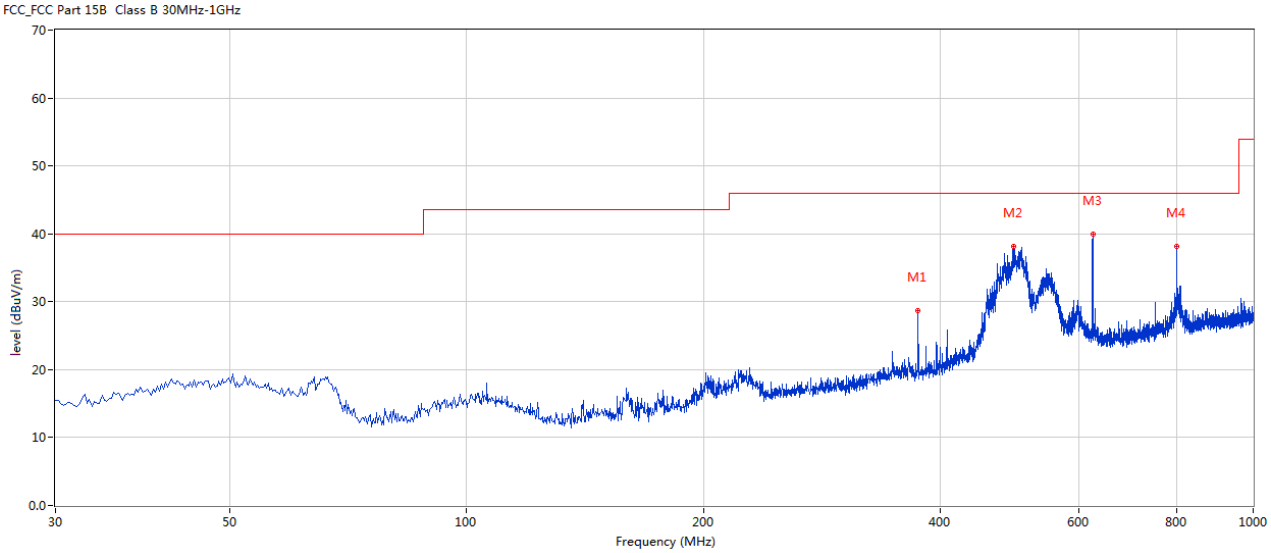
Test Figure:



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	374.991	28.68	-9.44	46.0	-17.32	Peak	63.00	100	H	Pass
2	496.453	38.11	-7.13	46.0	-7.89	Peak	49.00	200	H	Pass
3	625.189	39.92	-4.84	46.0	-6.08	Peak	0.00	200	H	Pass
4	799.988	38.10	-2.96	46.0	-7.90	Peak	0.00	200	H	Pass

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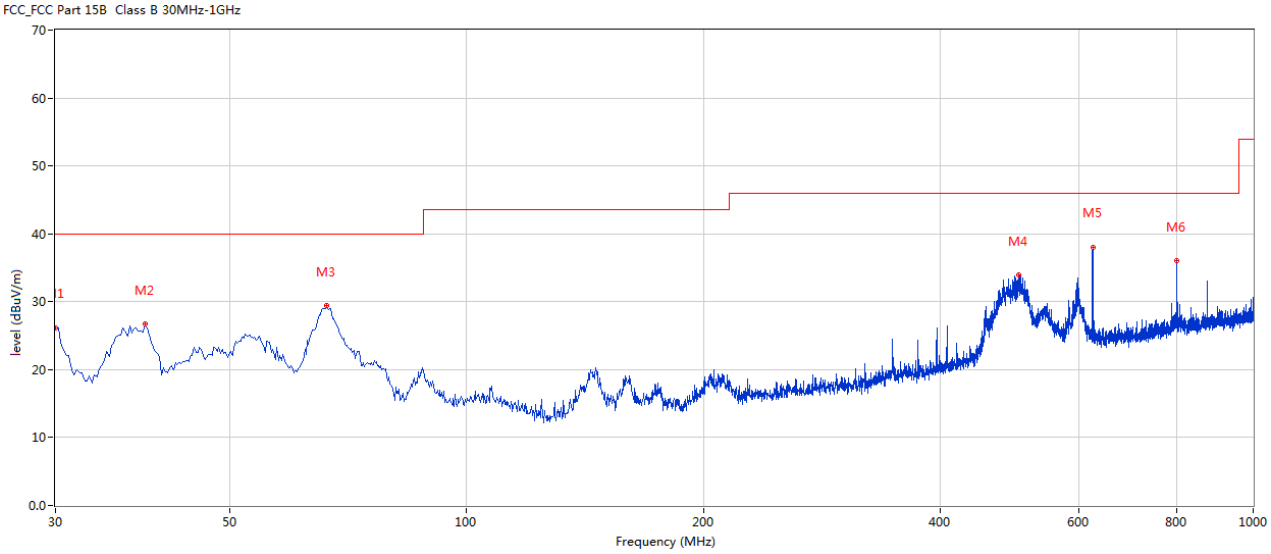
Test Figure:



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	30.000	26.18	-14.19	40.0	-13.82	Peak	121.00	100	V	Pass
2	38.970	26.73	-12.59	40.0	-13.27	Peak	220.00	100	V	Pass
3	66.366	29.38	-14.08	40.0	-10.62	Peak	19.00	100	V	Pass
4	503.484	33.94	-7.01	46.0	-12.06	Peak	348.00	200	V	Pass
5	625.189	38.05	-4.84	46.0	-7.95	Peak	360.00	100	V	Pass
6	799.988	35.98	-2.96	46.0	-10.02	Peak	66.00	200	V	Pass

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Operation Mode: Keeping Transmitting under CH36 for 11g at 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5180.00	50.94（PK）	H	Fundamental Frequency
5180.00	51.16（PK）	V	
10360	--	H	74(Peak)/ 54(AV)
15540	--	V	74(Peak)/ 54(AV)
20720	--	H/V	74(Peak)/ 54(AV)
25900	--	H/V	74(Peak)/ 54(AV)
31080	--	H/V	74(Peak)/ 54(AV)
36260	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

Operation Mode: Keeping Transmitting under CH40 for 11g at 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5200.00	50.30（PK）	H	Fundamental Frequency
5200.00	51.68（PK）	V	
10400	--	H	74(Peak)/ 54(AV)
15600	--	V	74(Peak)/ 54(AV)
20800	--	H/V	74(Peak)/ 54(AV)
26000	--	H/V	74(Peak)/ 54(AV)
31200	--	H/V	74(Peak)/ 54(AV)
36400	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

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Operation Mode: Keeping Transmitting under CH48 for 11g at 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
5240.00	50.31（PK）	H	Fundamental Frequency
5240.00	51.18（PK）	V	
10480	--	H	74(Peak)/ 54(AV)
15720	--	V	74(Peak)/ 54(AV)
20960	--	H/V	74(Peak)/ 54(AV)
26200	--	H/V	74(Peak)/ 54(AV)
31440	--	H/V	74(Peak)/ 54(AV)
36680	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

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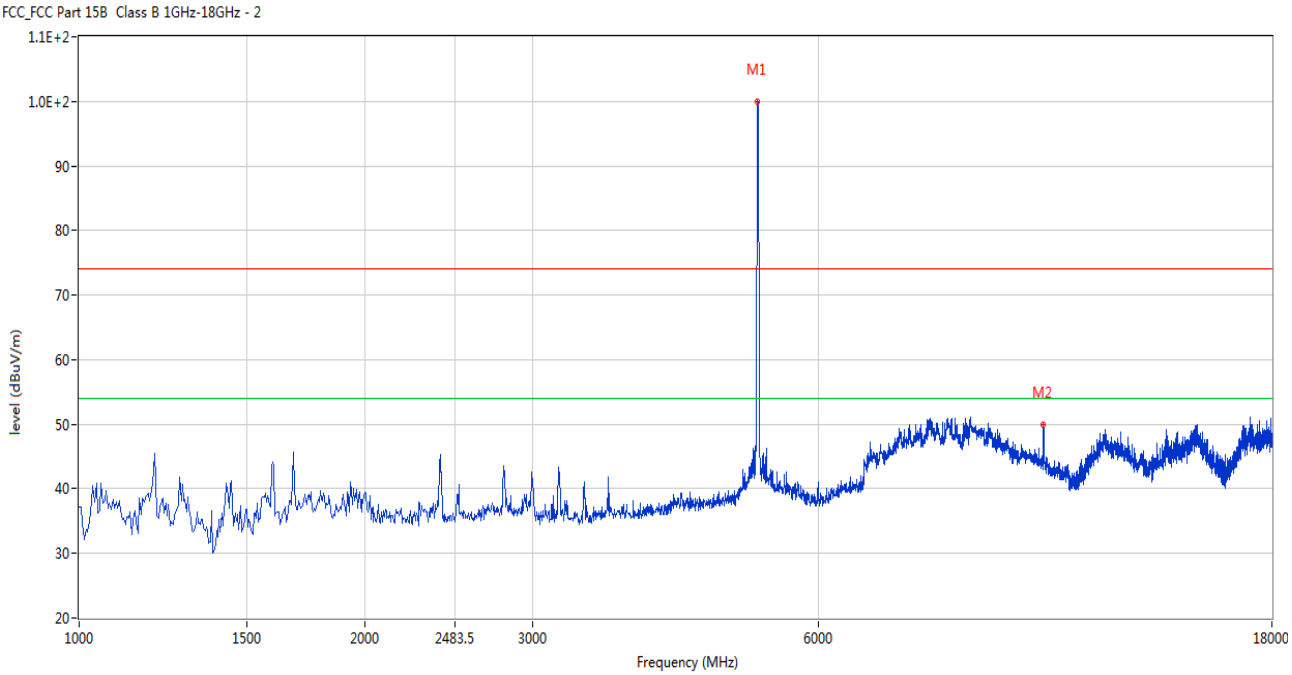
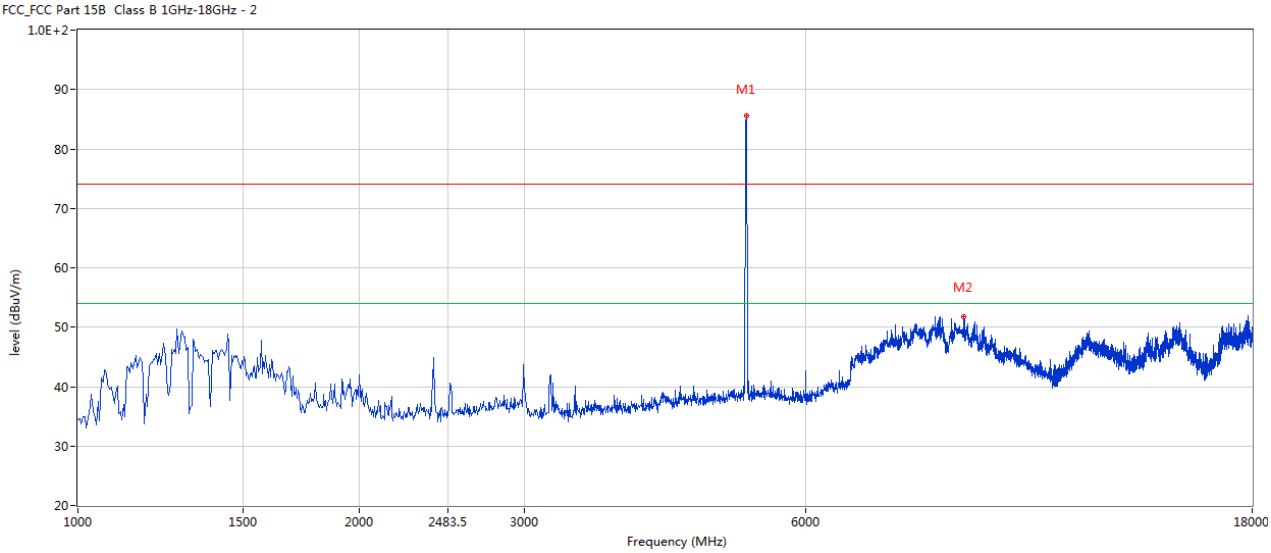
Please refer to the following test plots for details:

CH36 for 11a at 6Mbps: Horizontal



CH36 for 11a at 6Mbps: Vertical



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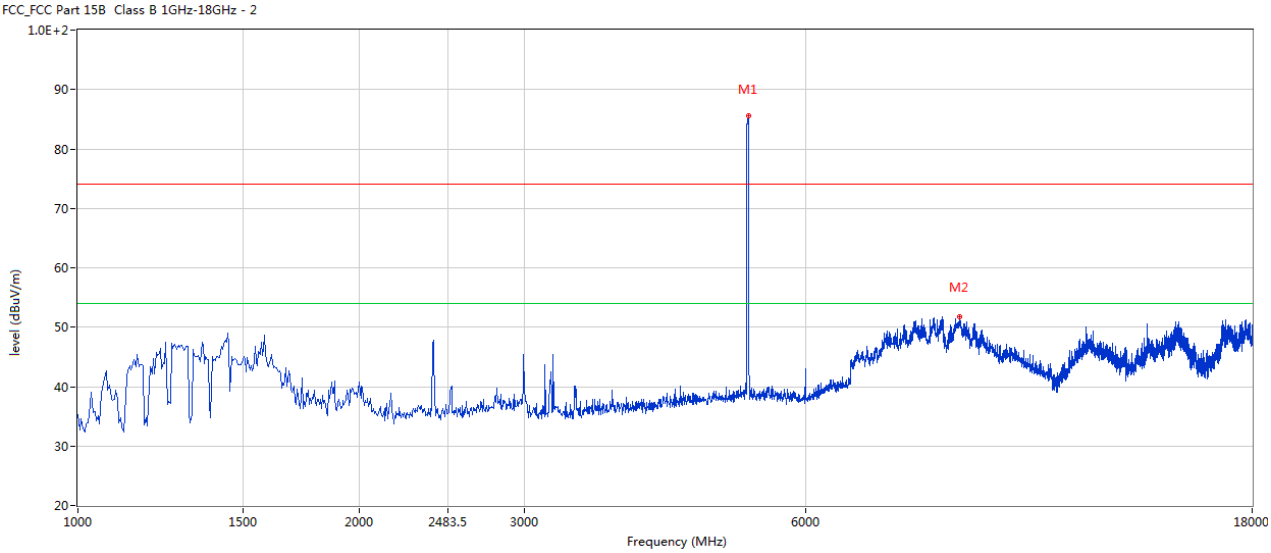
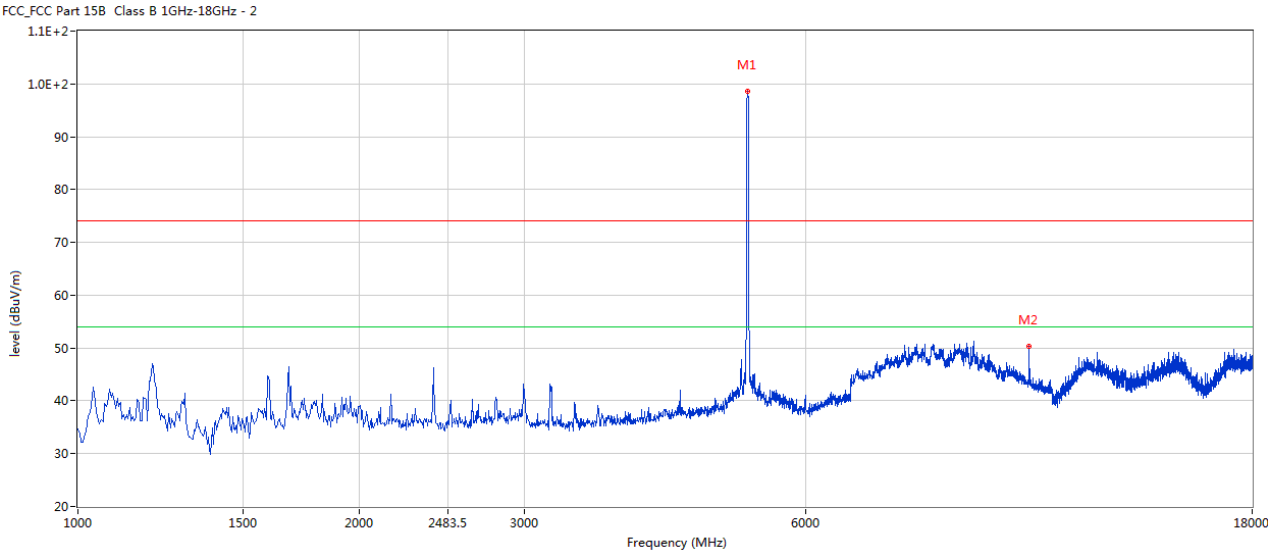
CH40 for 11a at 6Mbps: Vertical



CH40 for 11a at 6Mbps: Horizontal



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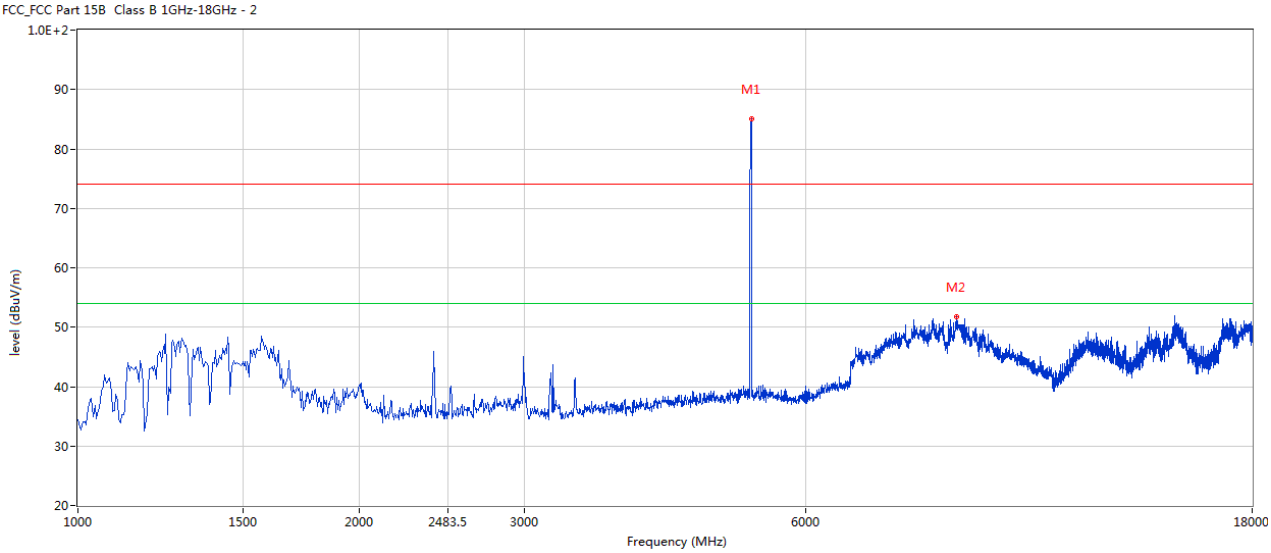
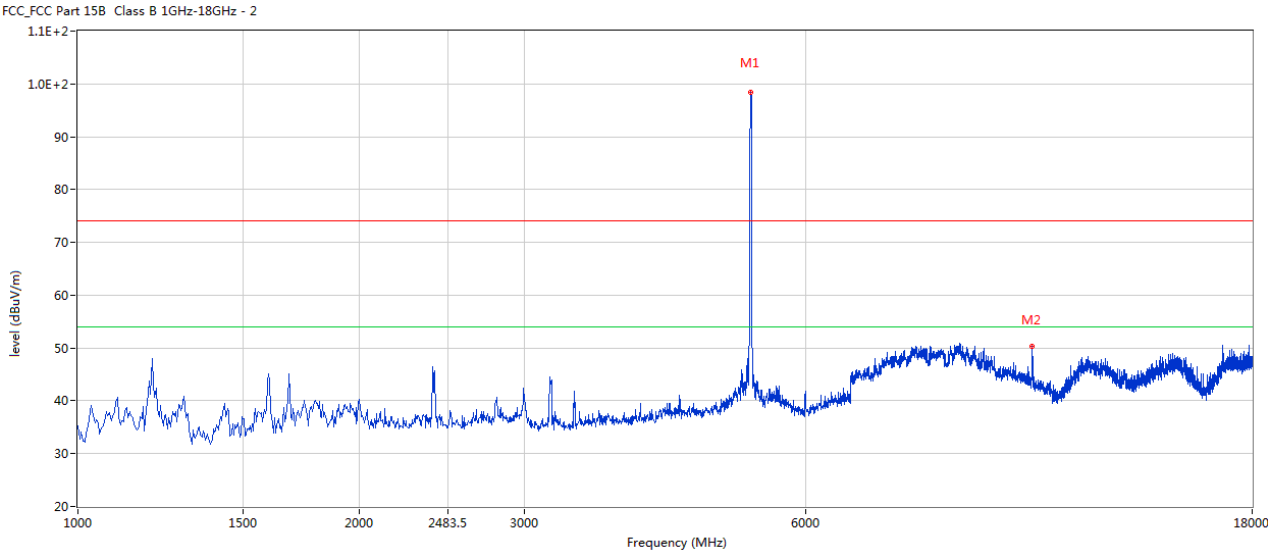
CH48 for 11a at 6Mbps: Vertical



CH48 for 11g at 6Mbps: Horizontal



Note: 1.For radiated Emissions from 18-40GHz, it is only the floor noise.

2. 802.11a is the worst case.

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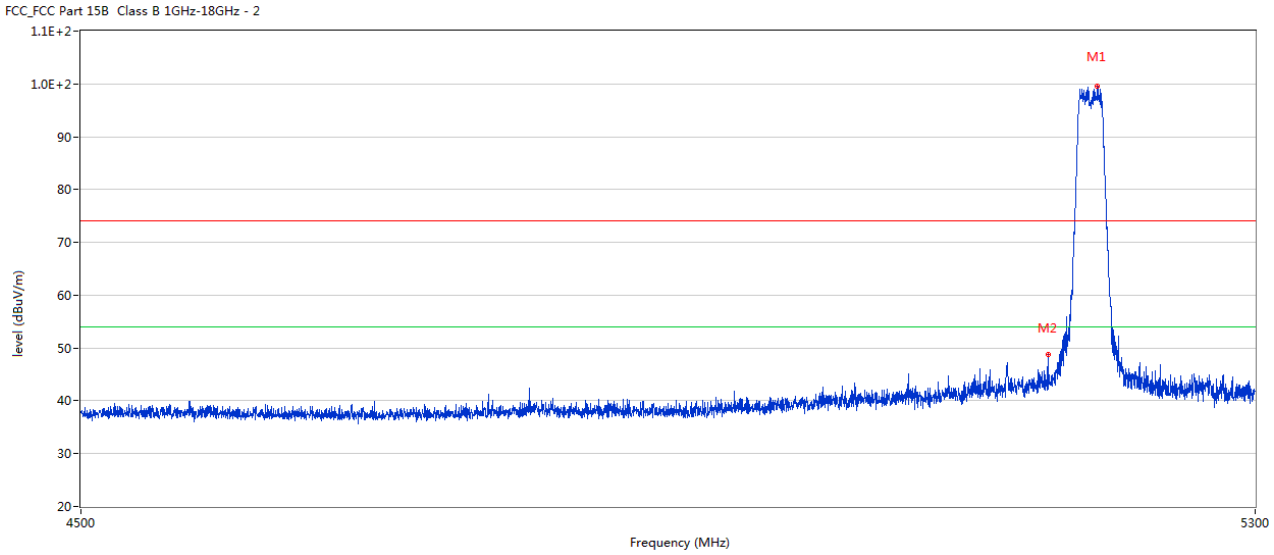
Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 36 (5180MHz)-11a
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	48.73 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-46.47		
Polarity	Horizontal		--	--
Test Figure				



Remark: 1. According to KDB 789033 v01r03 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]=48.73 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=48.73-95.2= -46.47dBm

2. RBW=1MHz, VBW=3MHz

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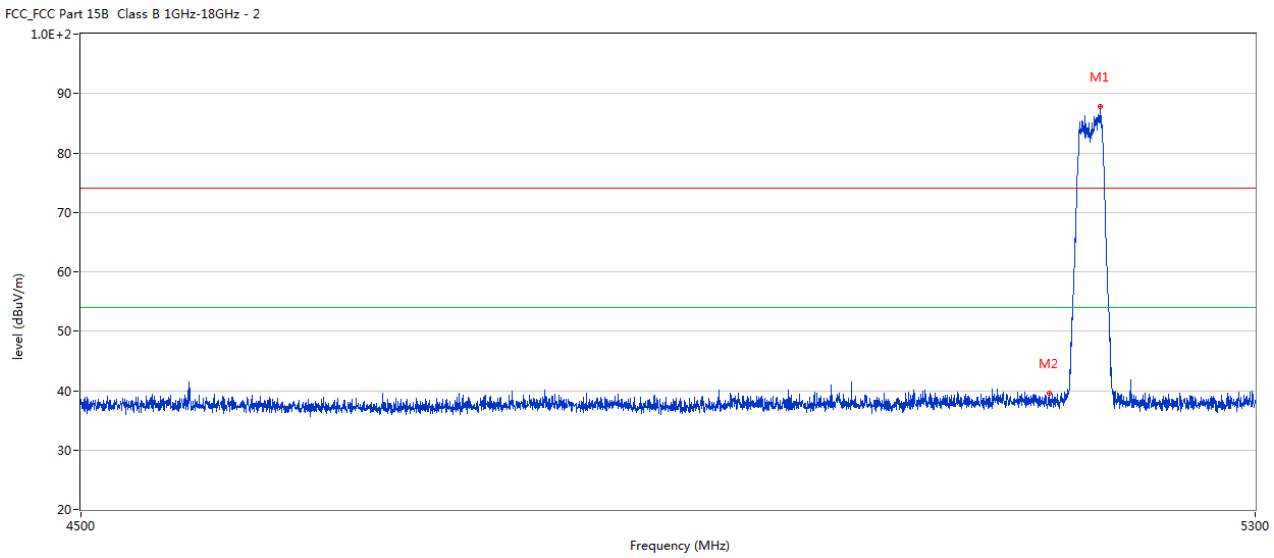
Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 36 (5180MHz)-11a
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	39.61 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-55.59		
Polarity	Vertical		--	--
Test Figure				



Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]=39.61 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=39.61-95.2= -55.59dBm

2. RBW=1MHz, VBW=3MHz

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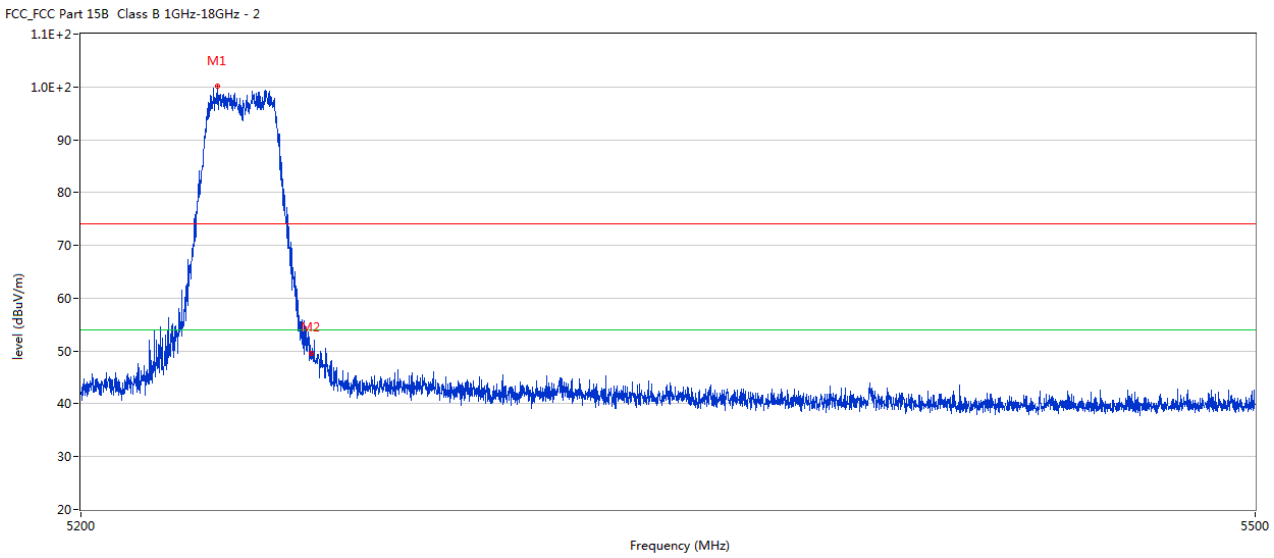
Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 48 (5240MHz)-11a
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5250	PK (dBμV/m)	50.29 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-44.91		
Polarity	Horizontal			
Test Figure				



Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]=50.29 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=50.29-95.2= -44.91dBm

2. RBW=1MHz, VBW=3MHz

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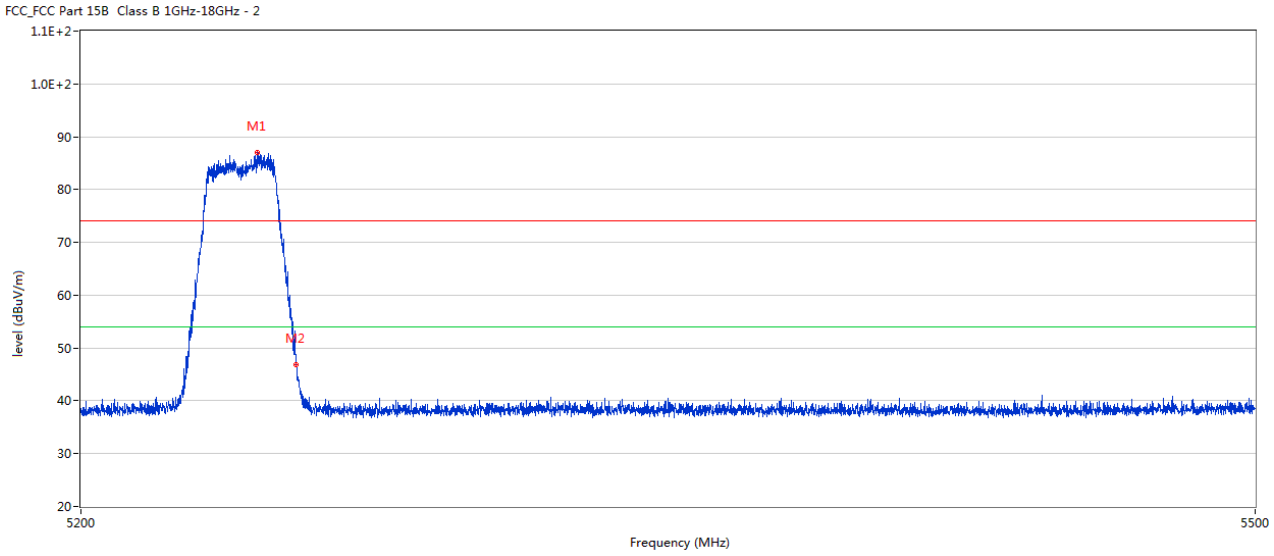
Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 48 (5240MHz)-11a
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5250	PK (dBμV/m)	46.90 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-48.30		
Polarity	Vertical		--	--
Test Figure				



Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]=46.90 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=46.90-95.2= -48.30dBm

2. RBW=1MHz, VBW=3MHz

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Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 36 (5180MHz)-11n/HT20
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	47.12 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-48.08		
Polarity	Horizontal		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 47.12 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=47.12-95.2= -48.08dBm
2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 36 (5180MHz)-11n/HT20
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	40.92 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-54.28		
Polarity	Vertical		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 40.92 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=40.92-95.2= -54.28dBm
2. RBW=1MHz, VBW=3MHz

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Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 48 (5240MHz)-11n/HT20
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5250	PK (dBμV/m)	49.16 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-46.04		
Polarity	Horizontal			

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 49.16 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=49.16-95.2= -46.04dBm
2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 48 (5240MHz)-11n/HT20
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5250	PK (dBμV/m)	44.32(PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-50.08		
Polarity	Vertical		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 44.32dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=44.32-95.2= -50.08 dBm
2. RBW=1MHz, VBW=3MHz

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Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 38 (5190MHz)-11n/HT40
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	46.91 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-48.29		
Polarity	Horizontal		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 46.91 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=46.91-95.2= -48.29 dBm
2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 38 (5190MHz)-11n/HT40
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	40.87 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-54.33		
Polarity	Vertical		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 40.87 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=40.87-95.2= -54.33dBm
2. RBW=1MHz, VBW=3MHz

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Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 46 (5230MHz)-11n/HT40
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5250	PK (dBμV/m)	47.69(PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-47.51		
Polarity	Horizontal			

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]=47.69 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=47.69-95.2= -47.51 dBm
2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 46 (5230MHz)-11n/HT40
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5250	PK (dBμV/m)	40.51 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-54.69		
Polarity	Vertical		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 40.51 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=40.51-95.2= -54.69dBm
2. RBW=1MHz, VBW=3MHz

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Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 42 (5210MHz)-11ac/VHT80
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	47.03 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-48.17		
Polarity	Horizontal		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 47.03 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=47.03-95.2= -48.17 dBm
2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	Biometrical access control terminals VisionLabs LUNA ACE		Test Mode:	Channel 42 (5210MHz)-11ac/VHT80
Mode	Keeping Transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
5150	PK (dBμV/m)	40.77 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-54.43		
Polarity	Vertical		--	--

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 40.77 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=40.77-95.2= -54.43 dBm
2. RBW=1MHz, VBW=3MHz

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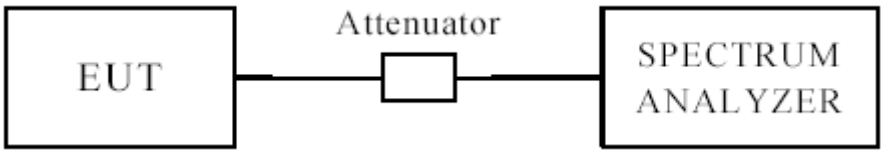
7.0 Emission Bandwidth

7.1 Test Setup



7.3 Test Procedure for Emission Bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set VBW> 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 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

7.4 Test Procedure for Minimum Bandwidth for the Band 5725-5850MHz

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

7.5 Test Procedure for 99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times OBW
3. Set RBW= 1% TO 5% of the OBW
4. Set VBW≥ 3 × RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Other, peak detection and max mode (until trace stabilizes) shall be used.
6. Use the 99% power bandwidth function of the instrument

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7.6 Test Result

EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11a	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
26dB Bandwidth					
36	5180	6	21.96	--	Pass
40	5200	6	22.04	--	Pass
48	5240	6	21.88	--	Pass
99% Bandwidth					
36	5180	6	17.15	--	Pass
40	5200	6	17.15	--	Pass
48	5240	6	16.99	--	Pass

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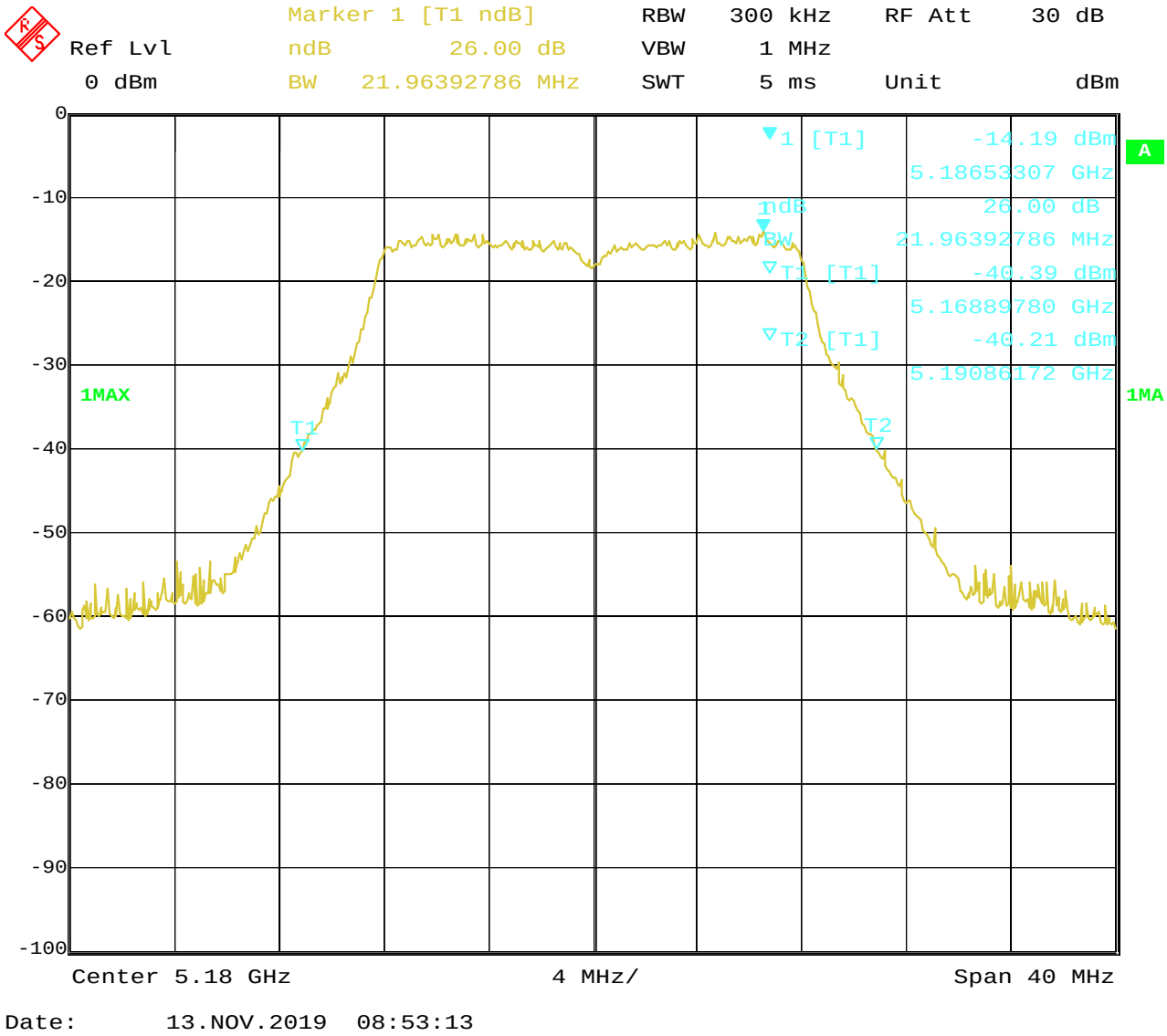
Test Figure:

26dB Bandwidth

Channel 36



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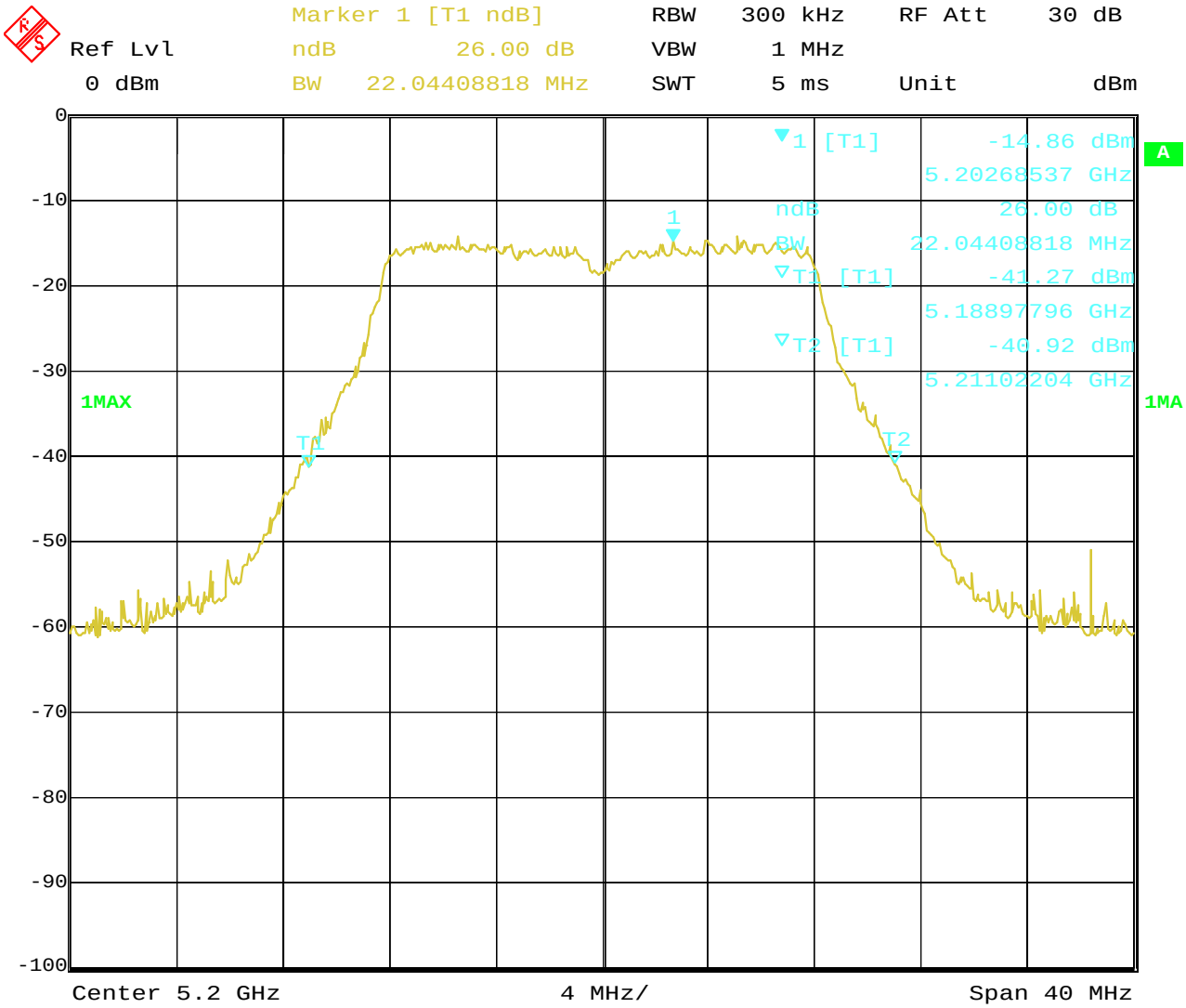
Channel 40



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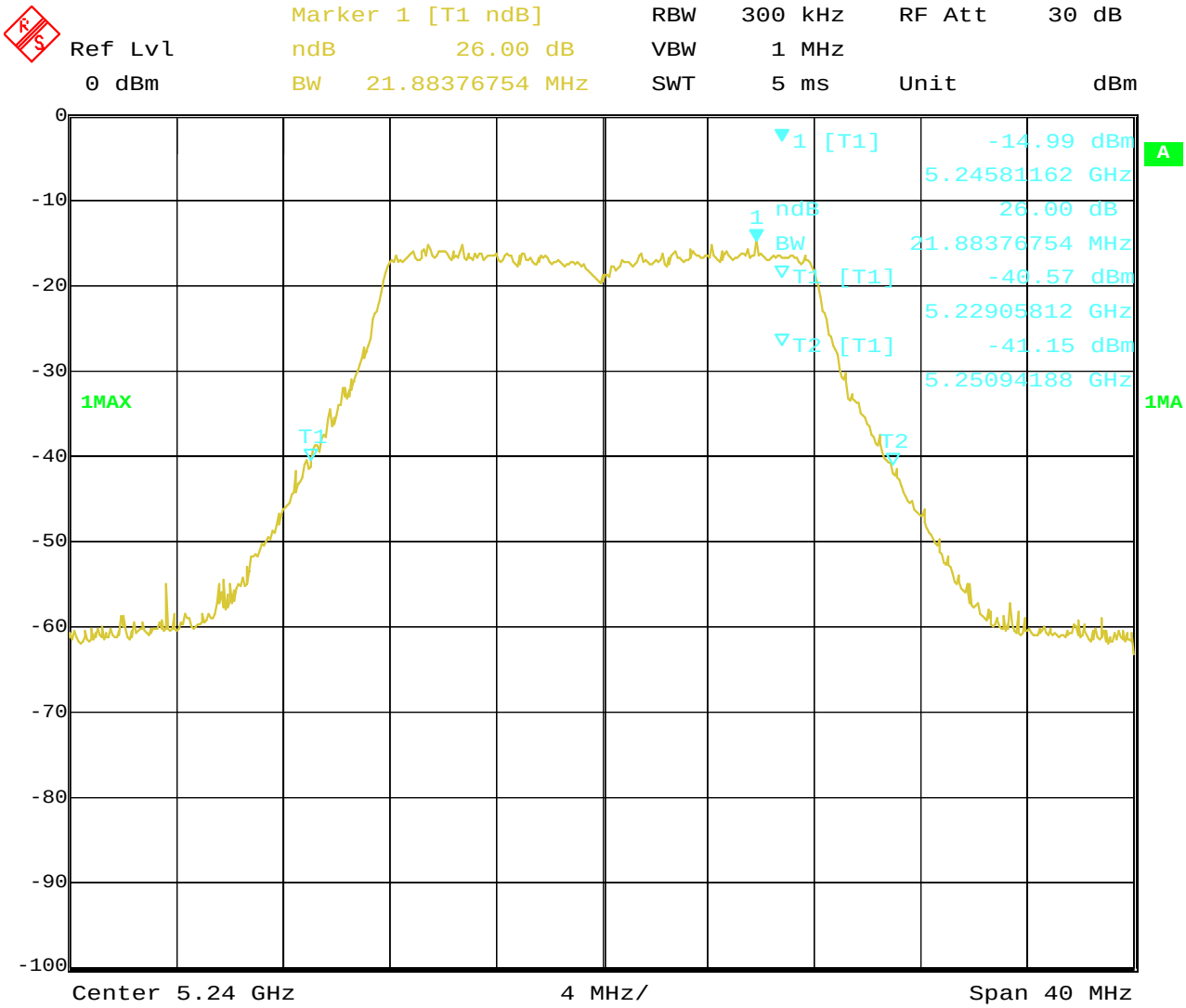
Channel 48



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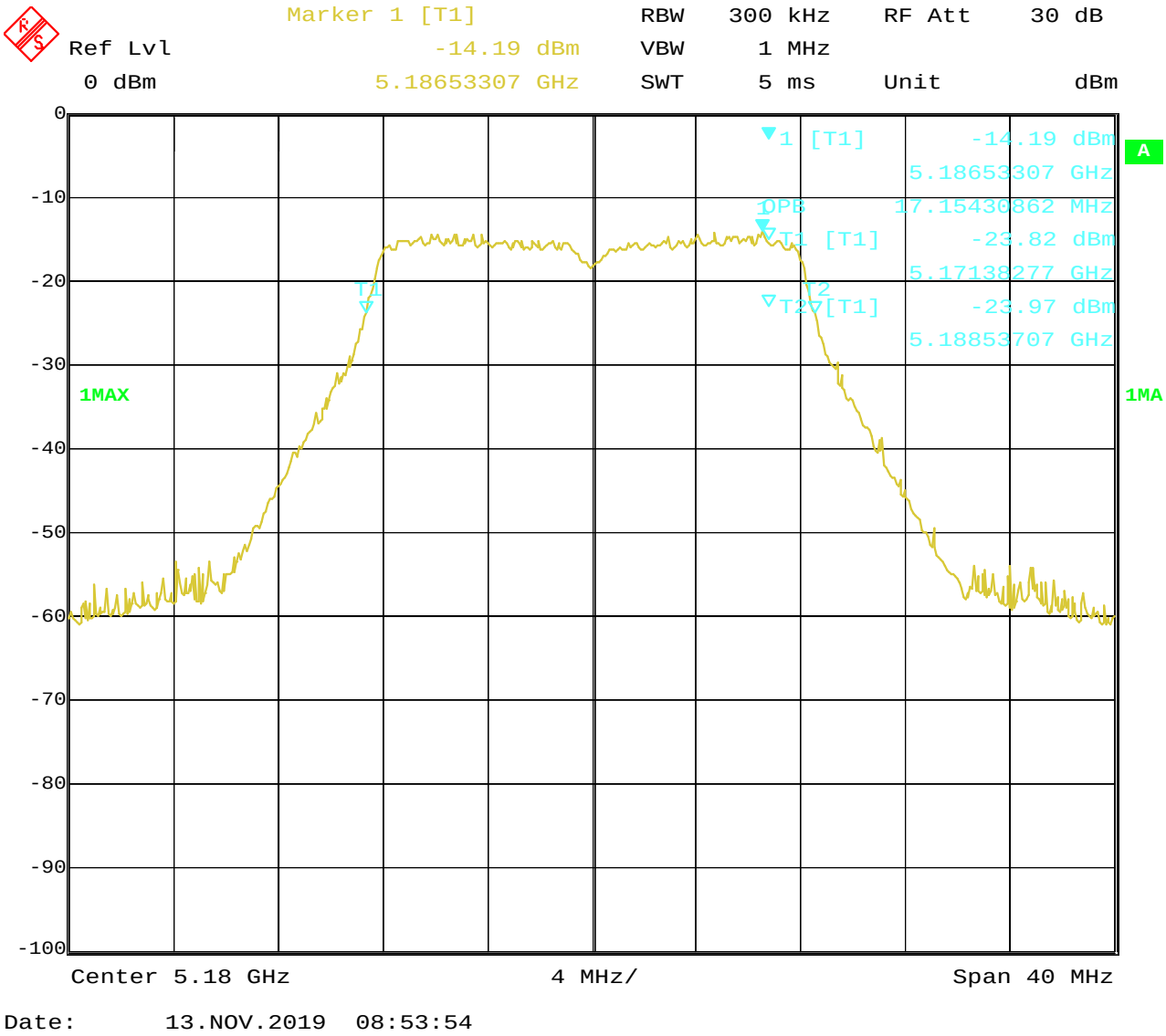
Test Figure:

99% Bandwidth

Channel 36



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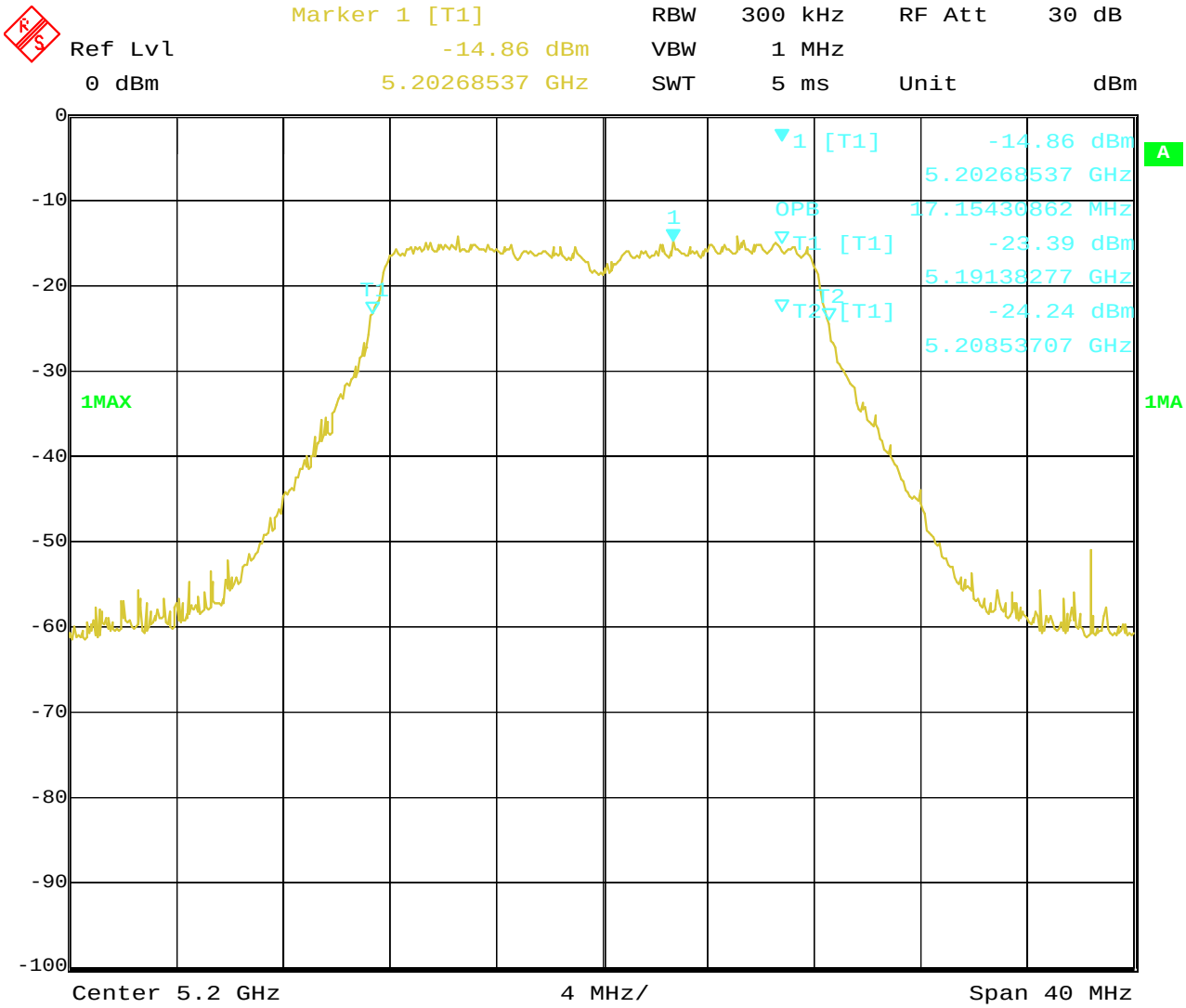
Channel 40



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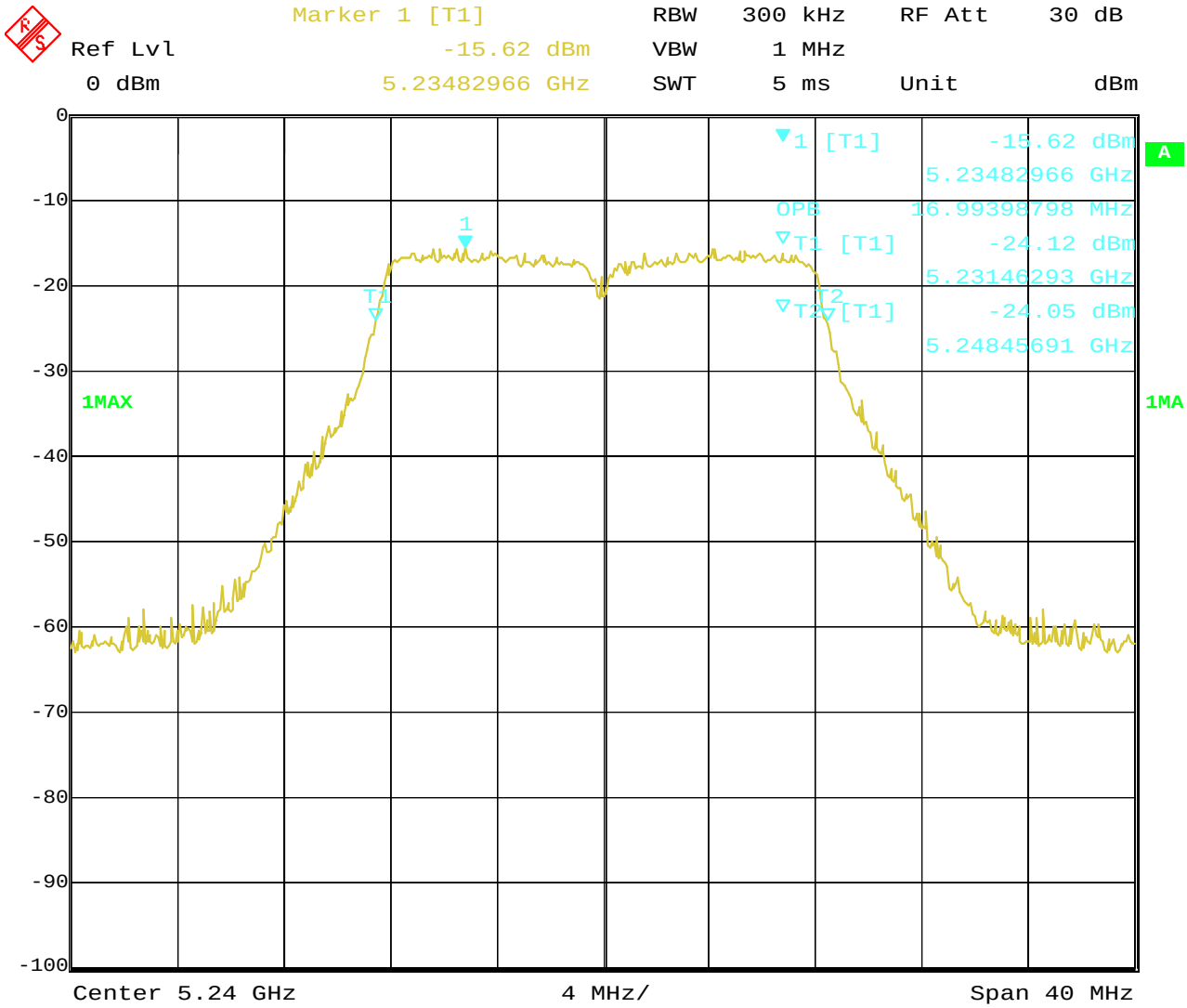
Channel 48



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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11n HT20	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
26dB Bandwidth					
36	5180	mcs0	22.12	--	Pass
40	5200	mcs0	22.28	--	Pass
48	5240	mcs0	22.44	--	Pass
99% Bandwidth					
36	5180	mcs0	18.04	--	Pass
40	5200	mcs0	18.04	--	Pass
48	5240	mcs0	18.12	--	Pass

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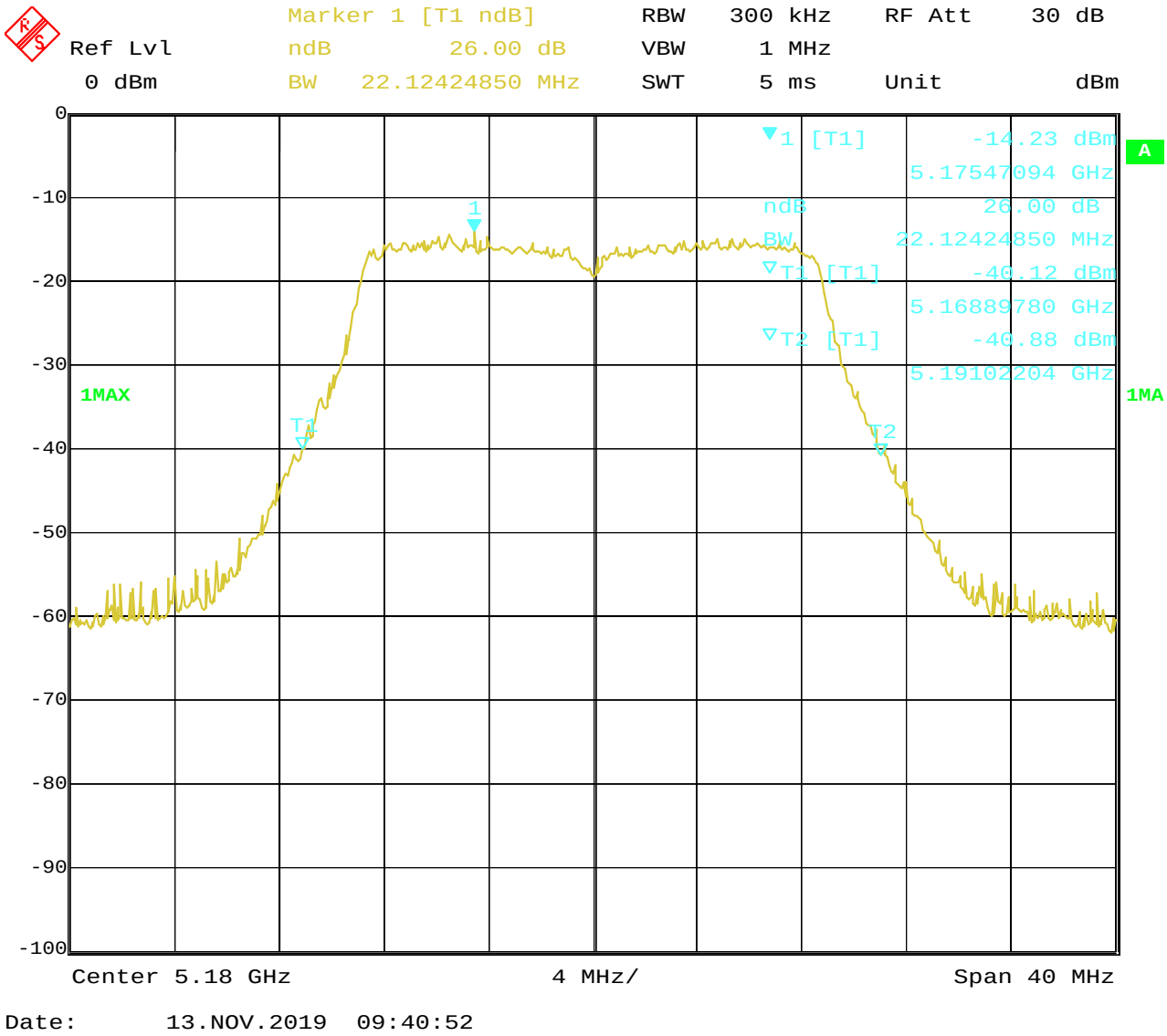
Test Configure

26dB Bandwidth

Channel 36



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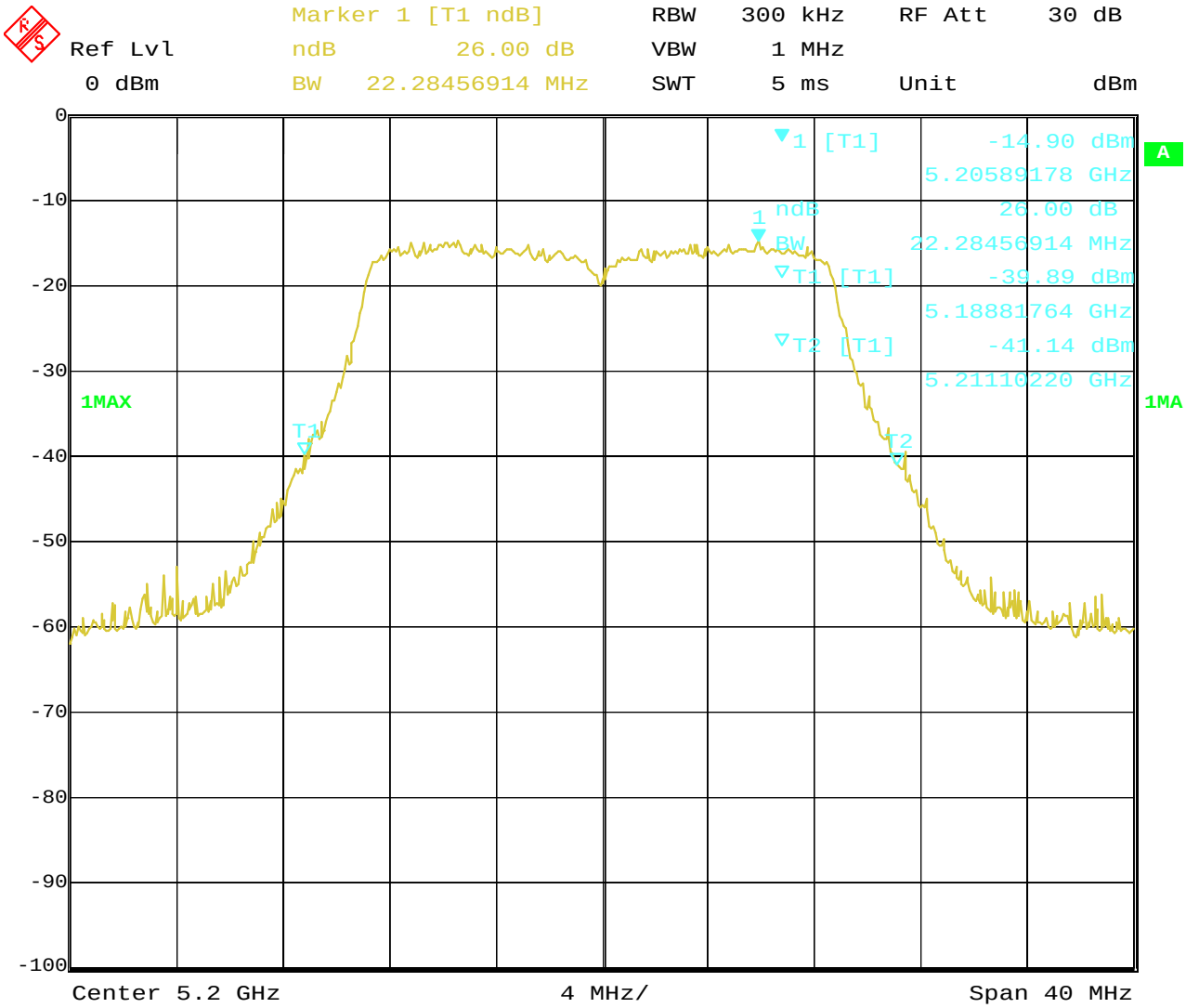
Channel 40



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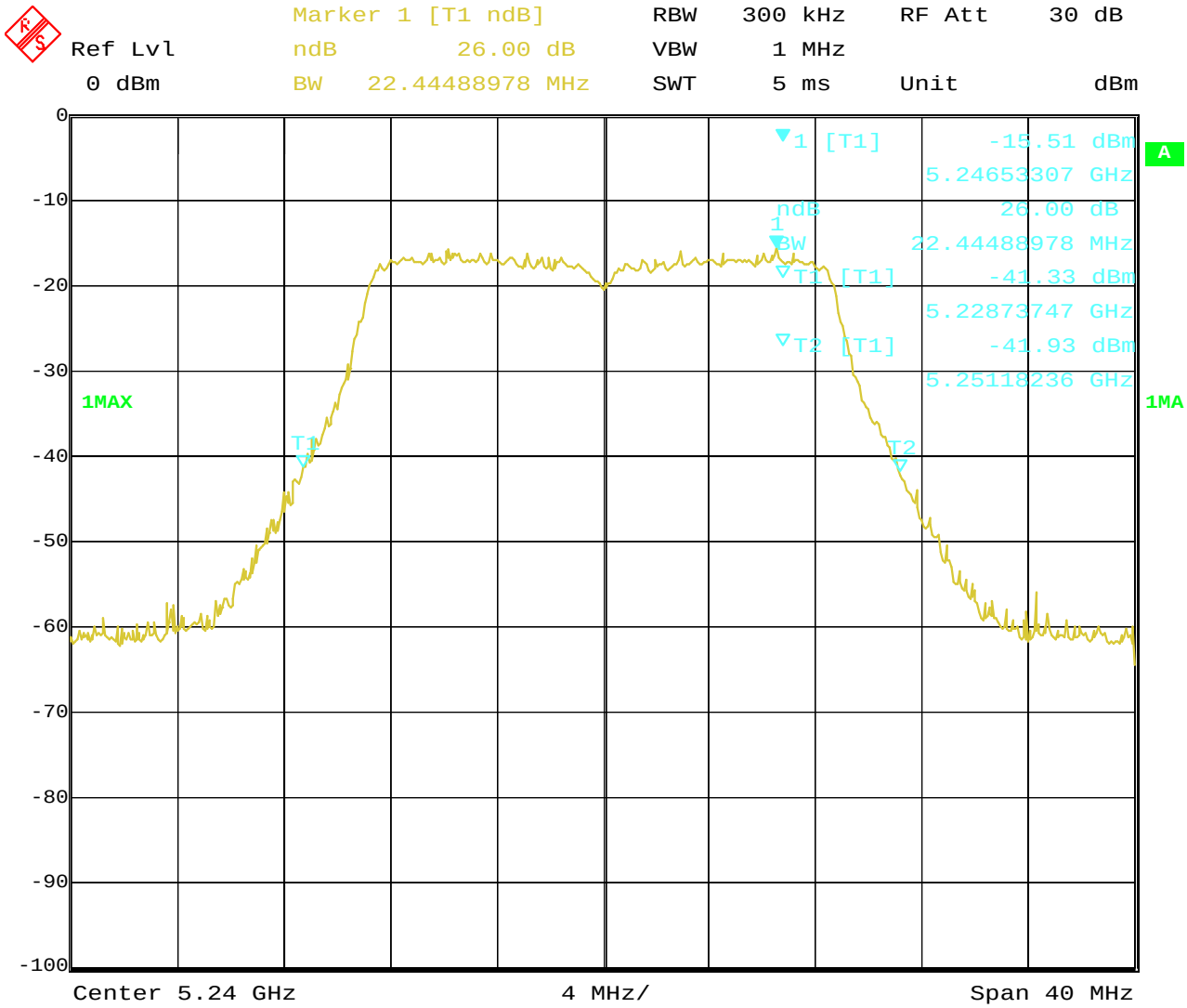
Channel 48



Date: 13.NOV.2019 09:38:40

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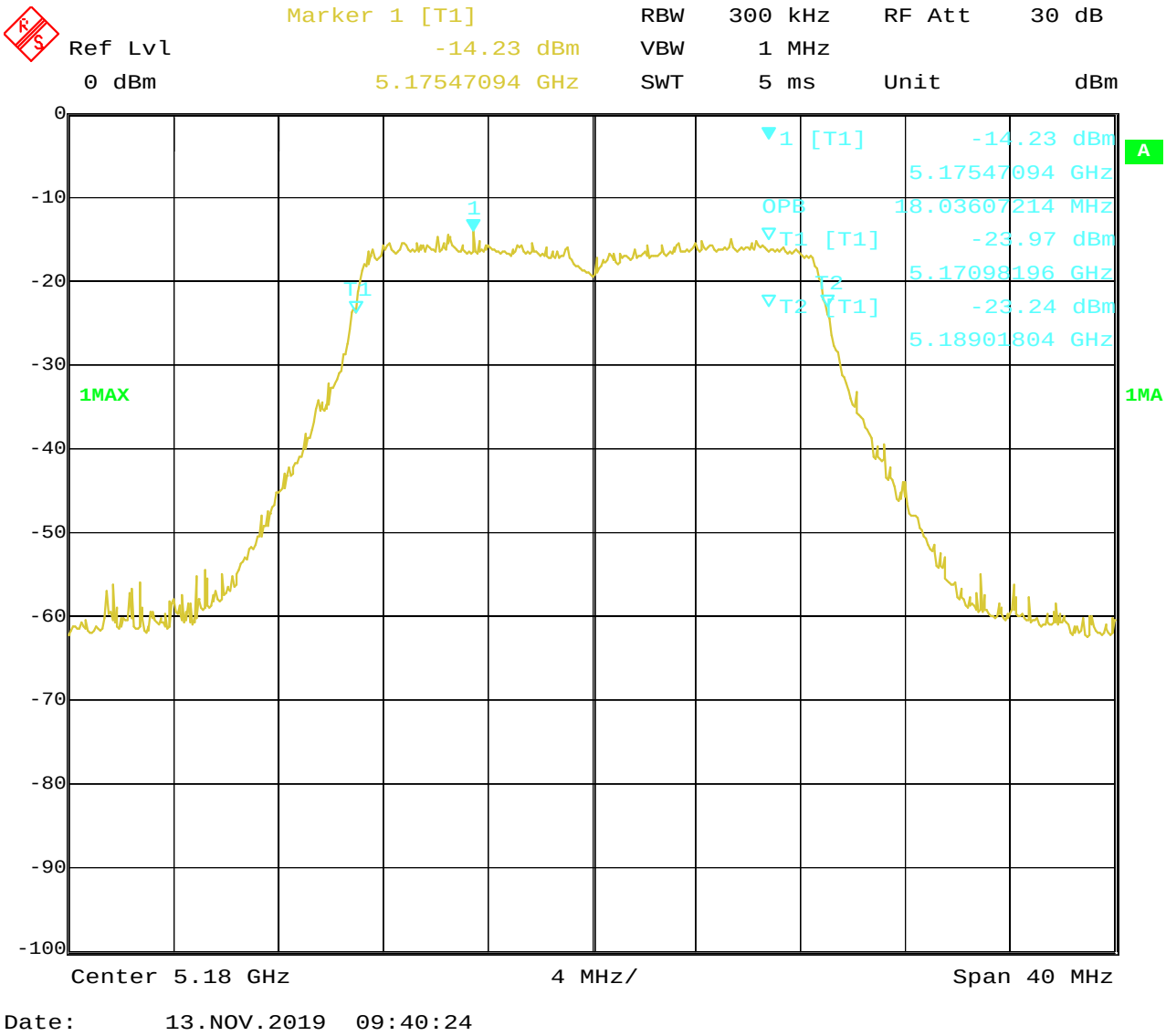
Test Configure

99% Bandwidth

Channel 36



Date: 13.NOV.2019 09:40:24

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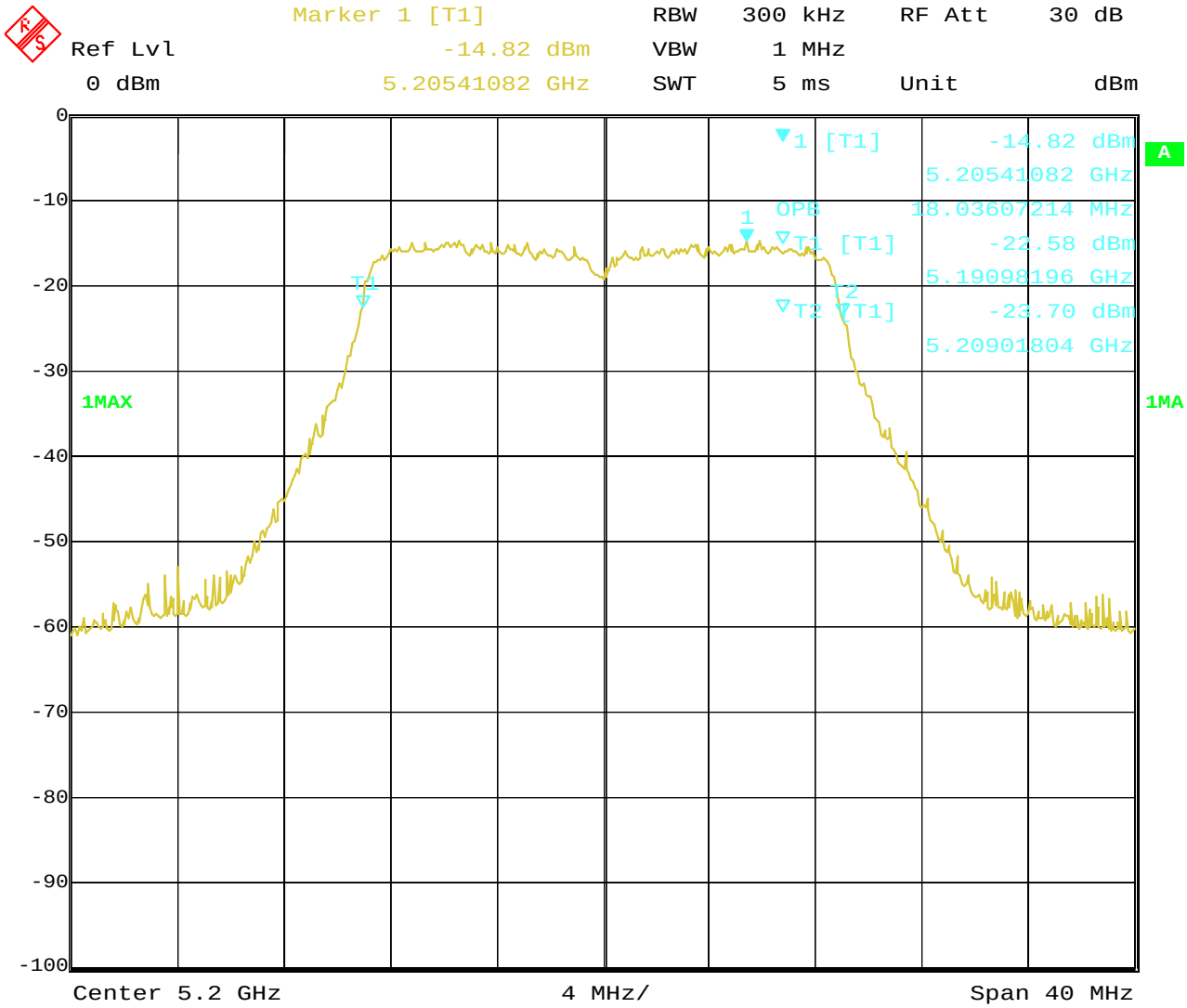
Channel 40



Date: 13.NOV.2019 09:39:43

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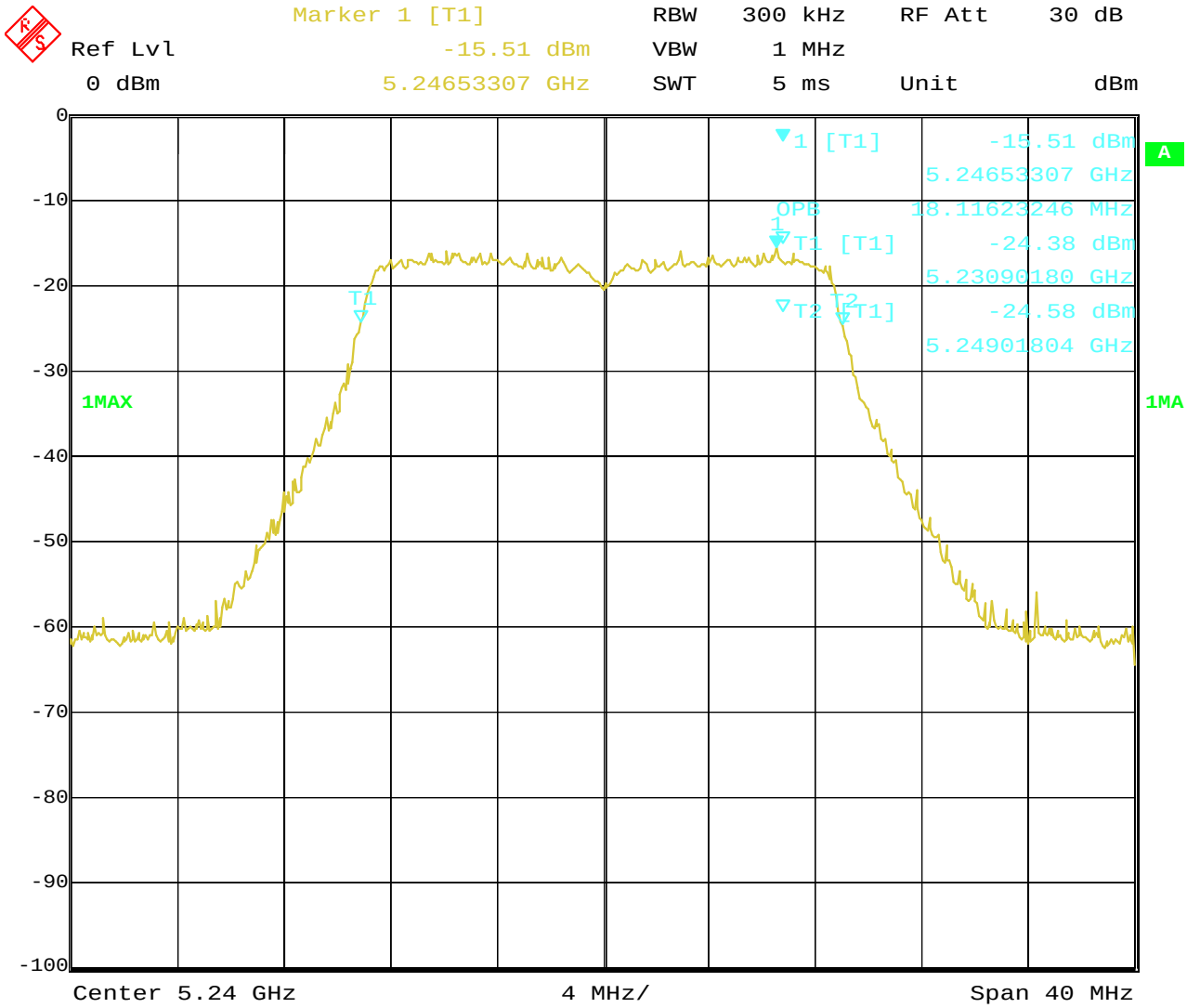
Channel 48



Date: 13.NOV.2019 09:38:25

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11n HT40	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
26dB Bandwidth					
38	5190	mcs0	42.97	--	Pass
46	5230	mcs0	43.77	--	Pass
99% Bandwidth					
38	5190	mcs0	36.39	--	Pass
46	5230	mcs0	36.39	--	Pass

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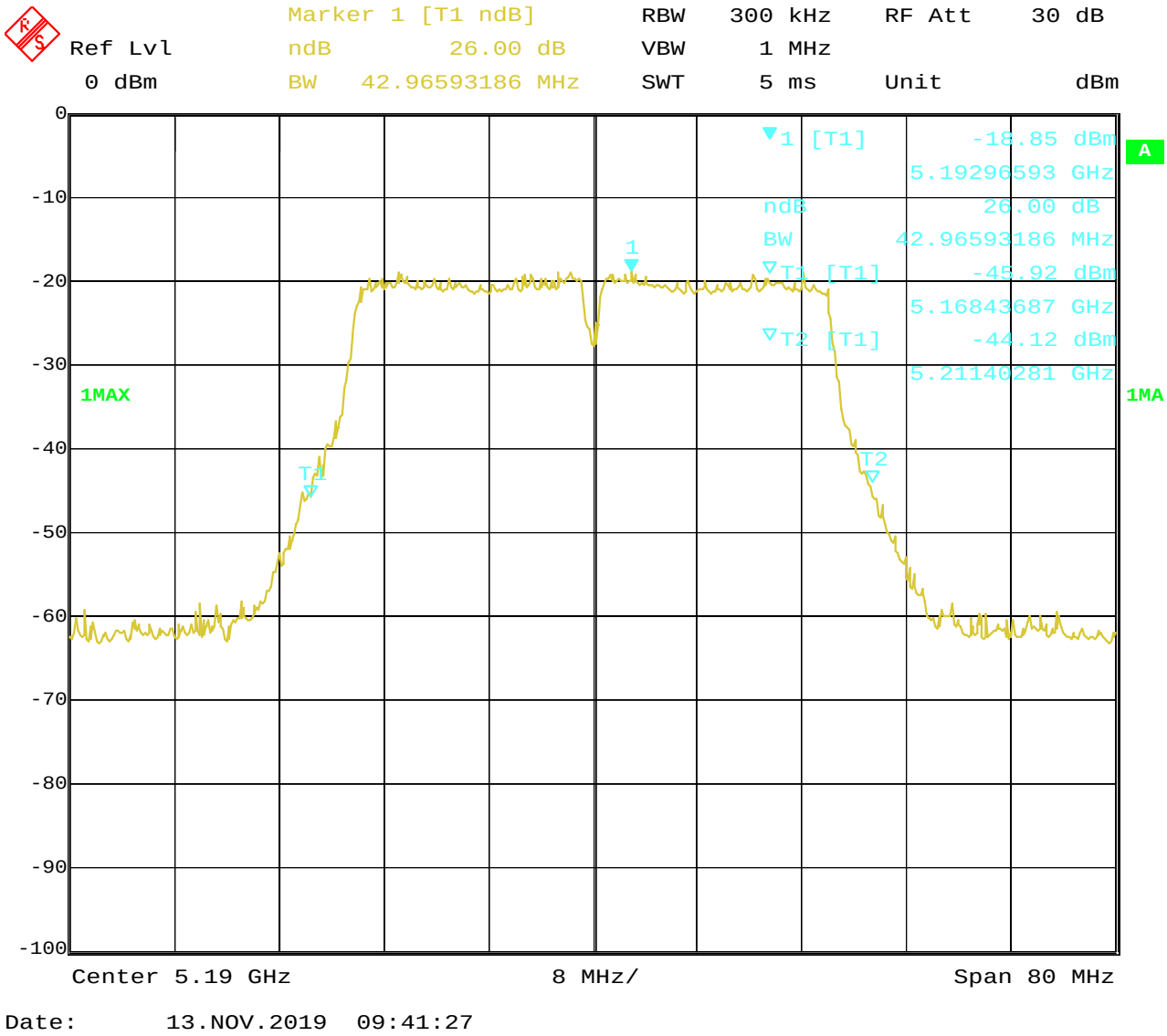
Test Configure

26dB Bandwidth

Channel 38



Date: 13.NOV.2019 09:41:27

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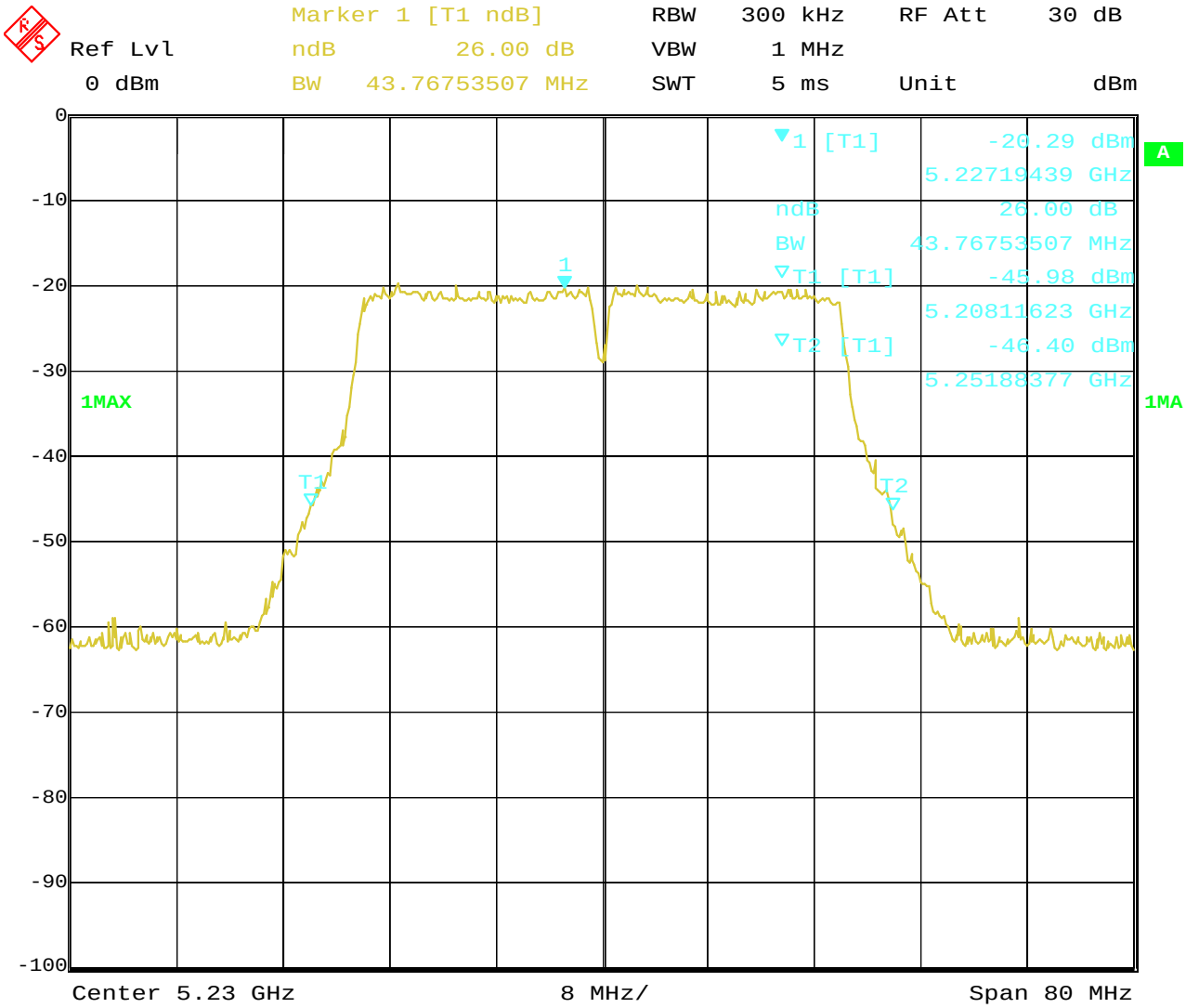
Channel 46



Date: 13.NOV.2019 09:42:43

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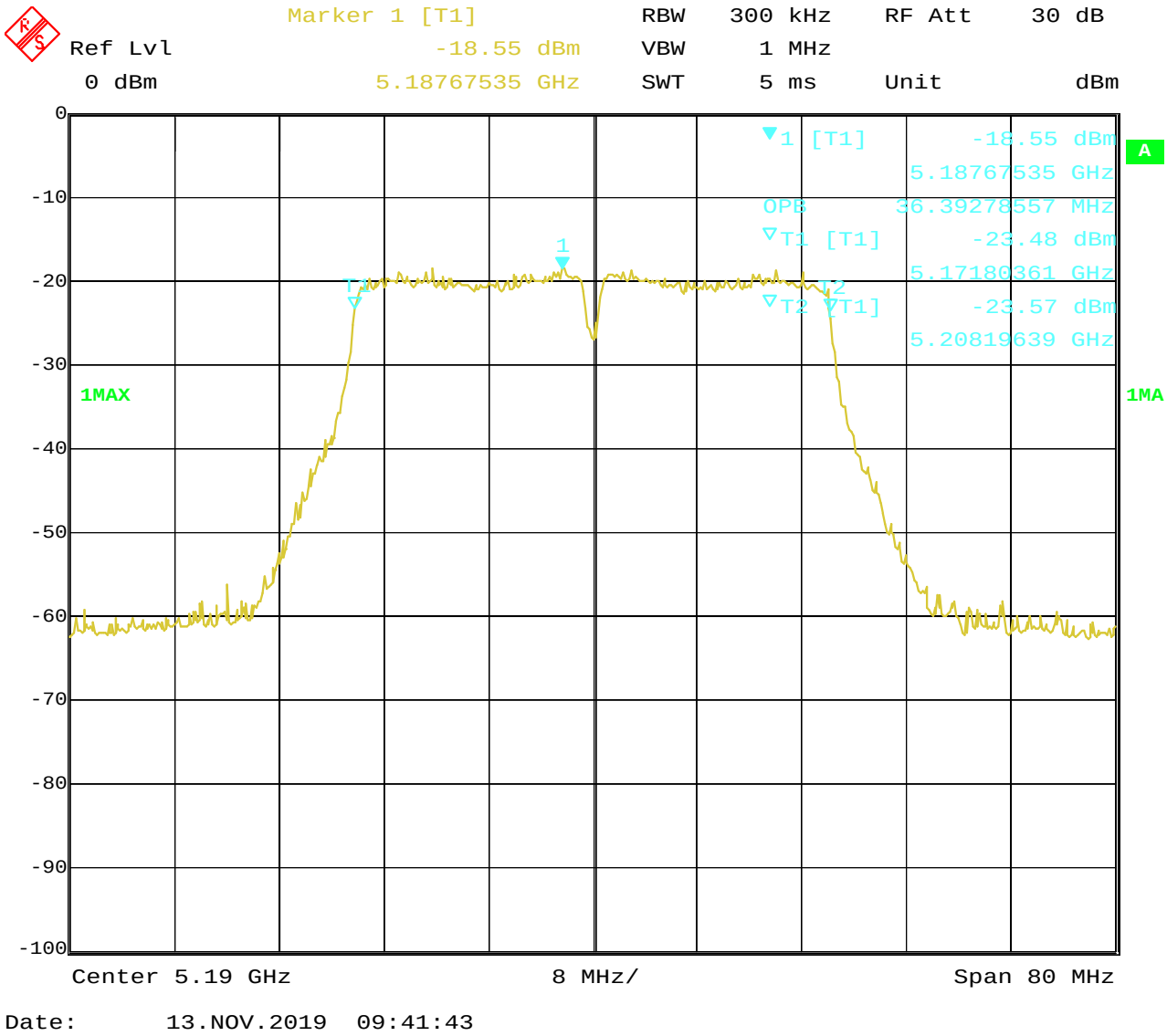
Test Configure

99% Bandwidth

Channel 38



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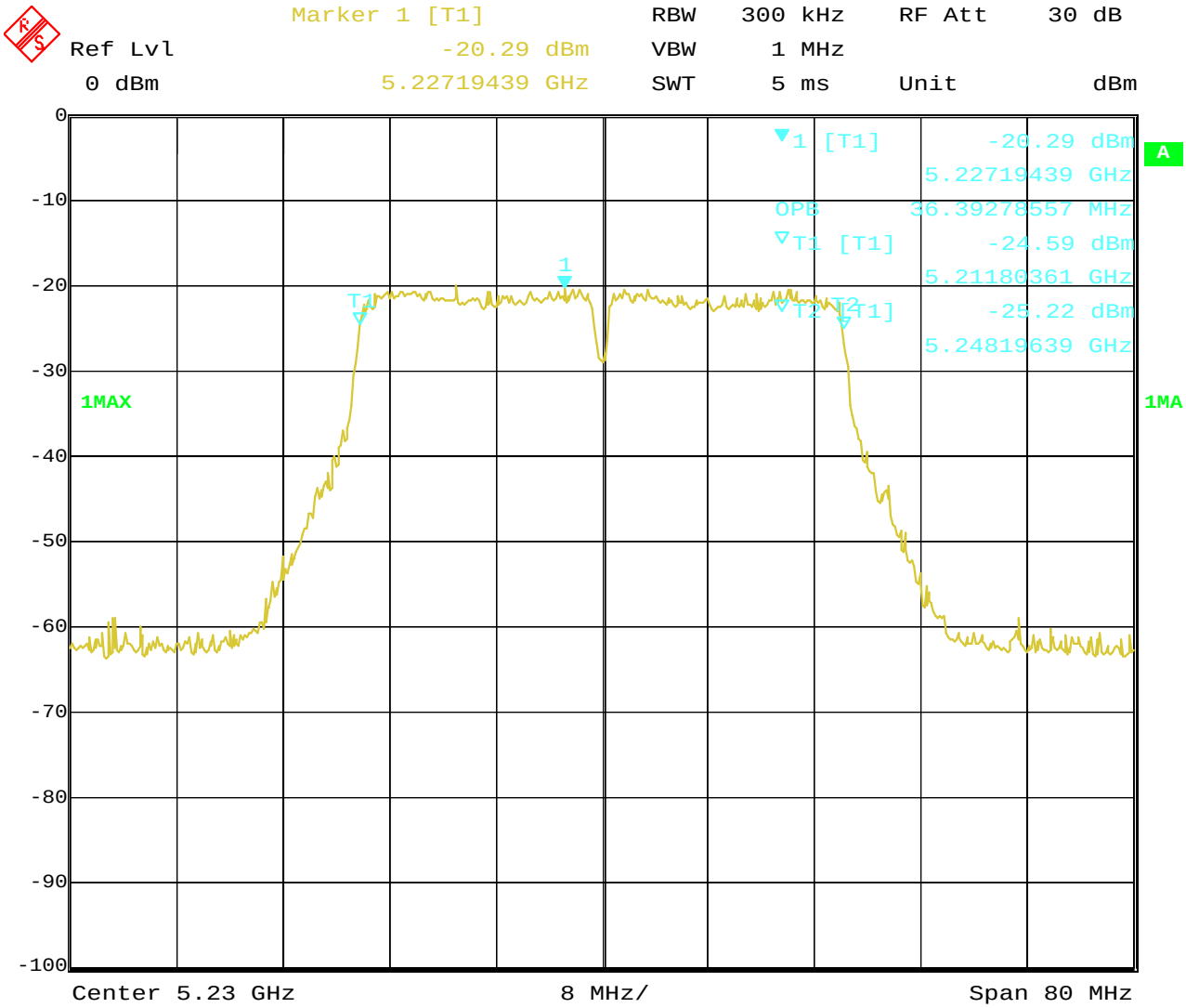
Channel 46



Date: 13.NOV.2019 09:42:24

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT20	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
26dB Bandwidth					
36	5180	mcs0	22.69	--	Pass
40	5200	mcs0	22.61	--	Pass
48	5240	mcs0	22.69	--	Pass
99% Bandwidth					
36	5180	mcs0	18.04	--	Pass
40	5200	mcs0	18.04	--	Pass
48	5240	mcs0	18.12	--	Pass

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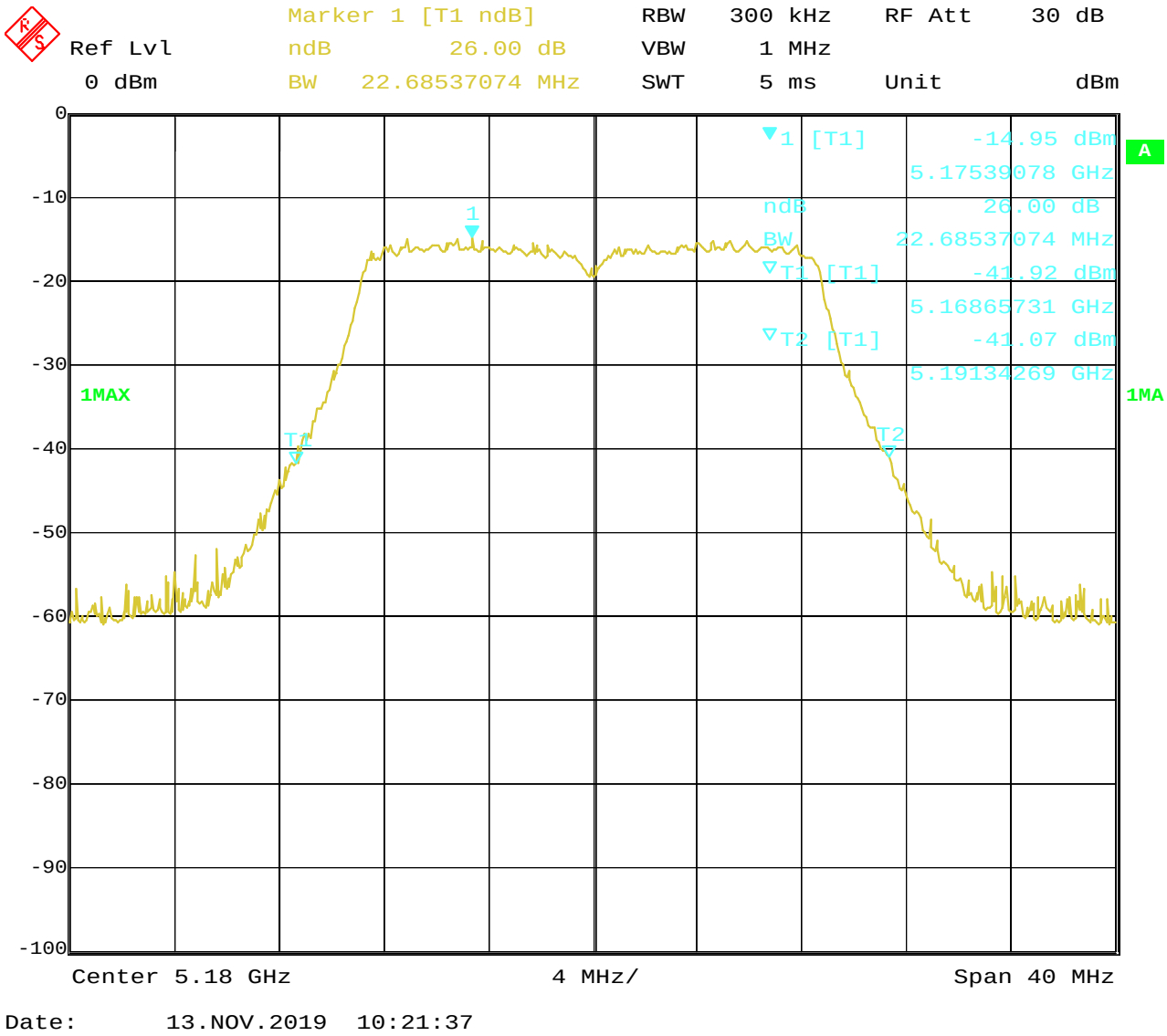
Test Configure

26dB Bandwidth

Channel 36



Date: 13.NOV.2019 10:21:37

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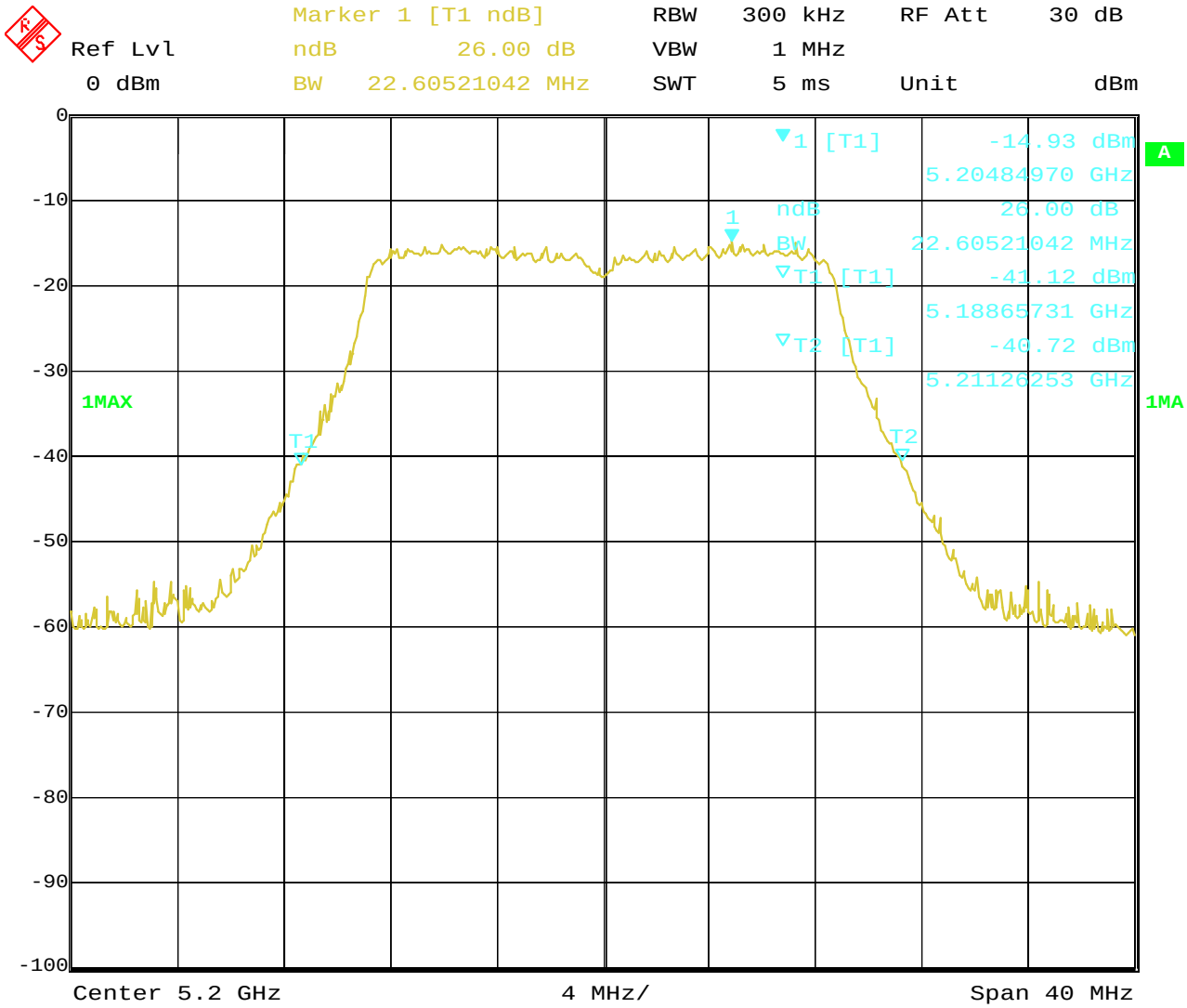
Channel 40



Date: 13.NOV.2019 10:18:18

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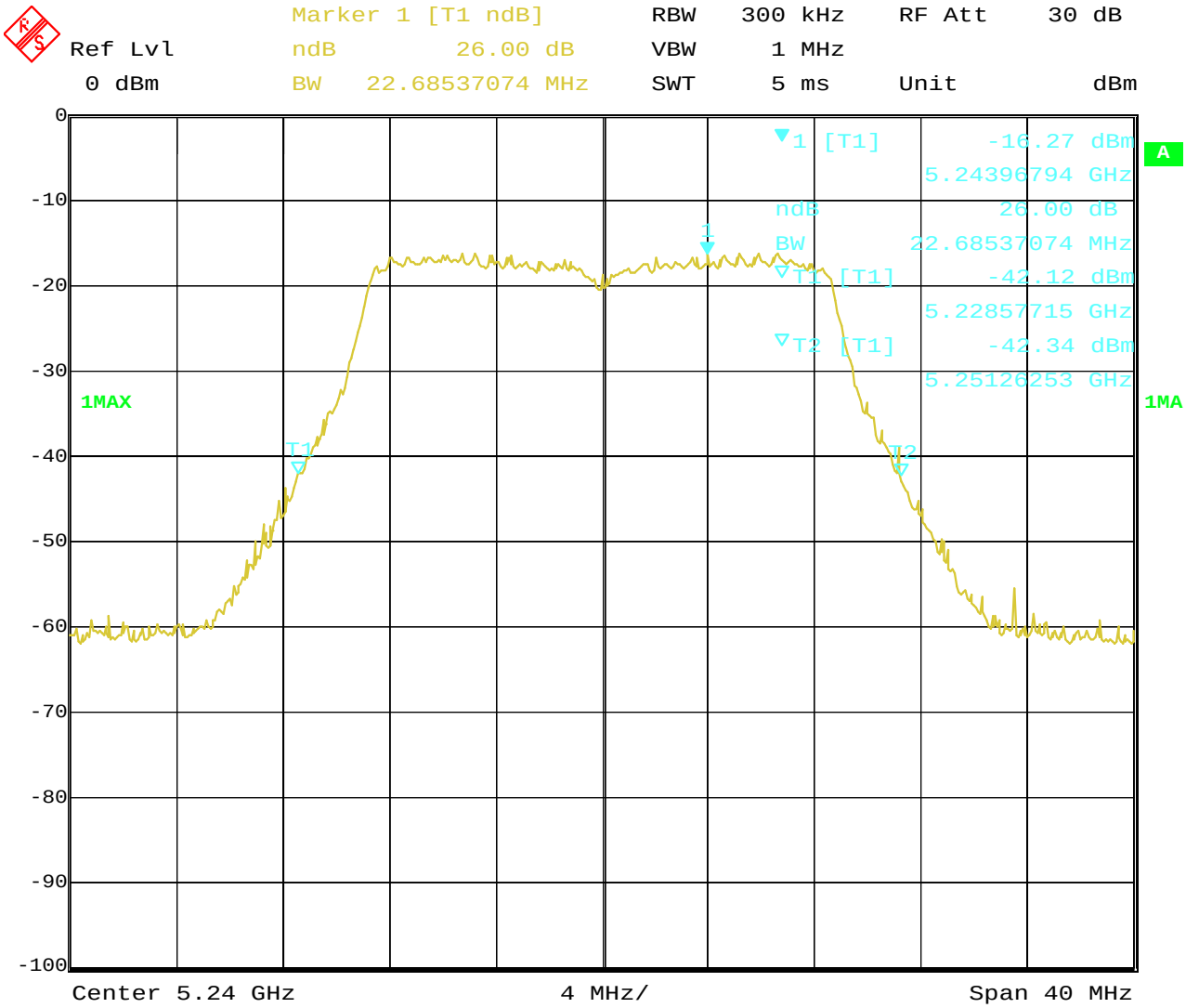
Channel 48



Date: 13.NOV.2019 10:16:11

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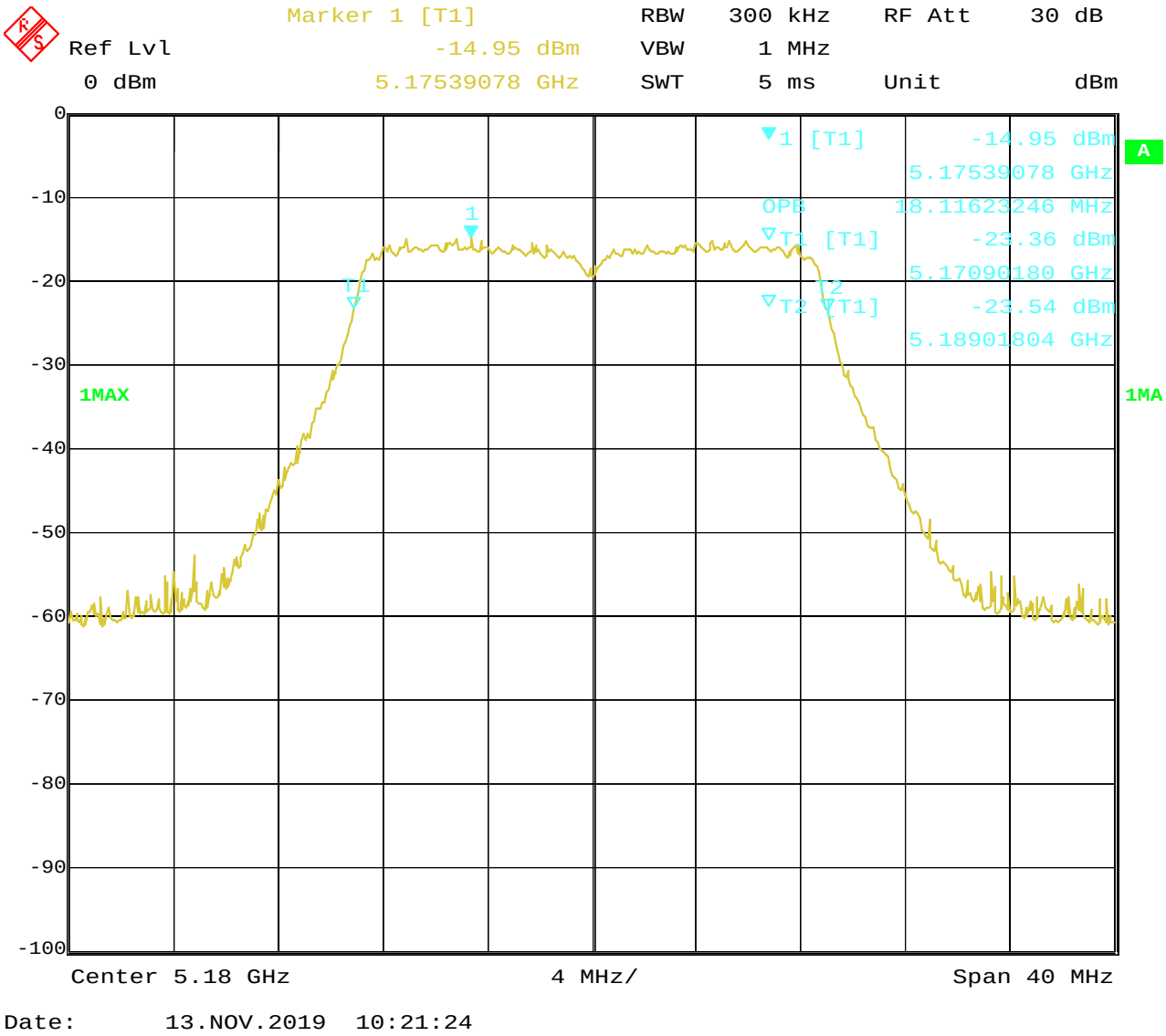
Test Configure

99% Bandwidth

Channel 36



Date: 13.NOV.2019 10:21:24

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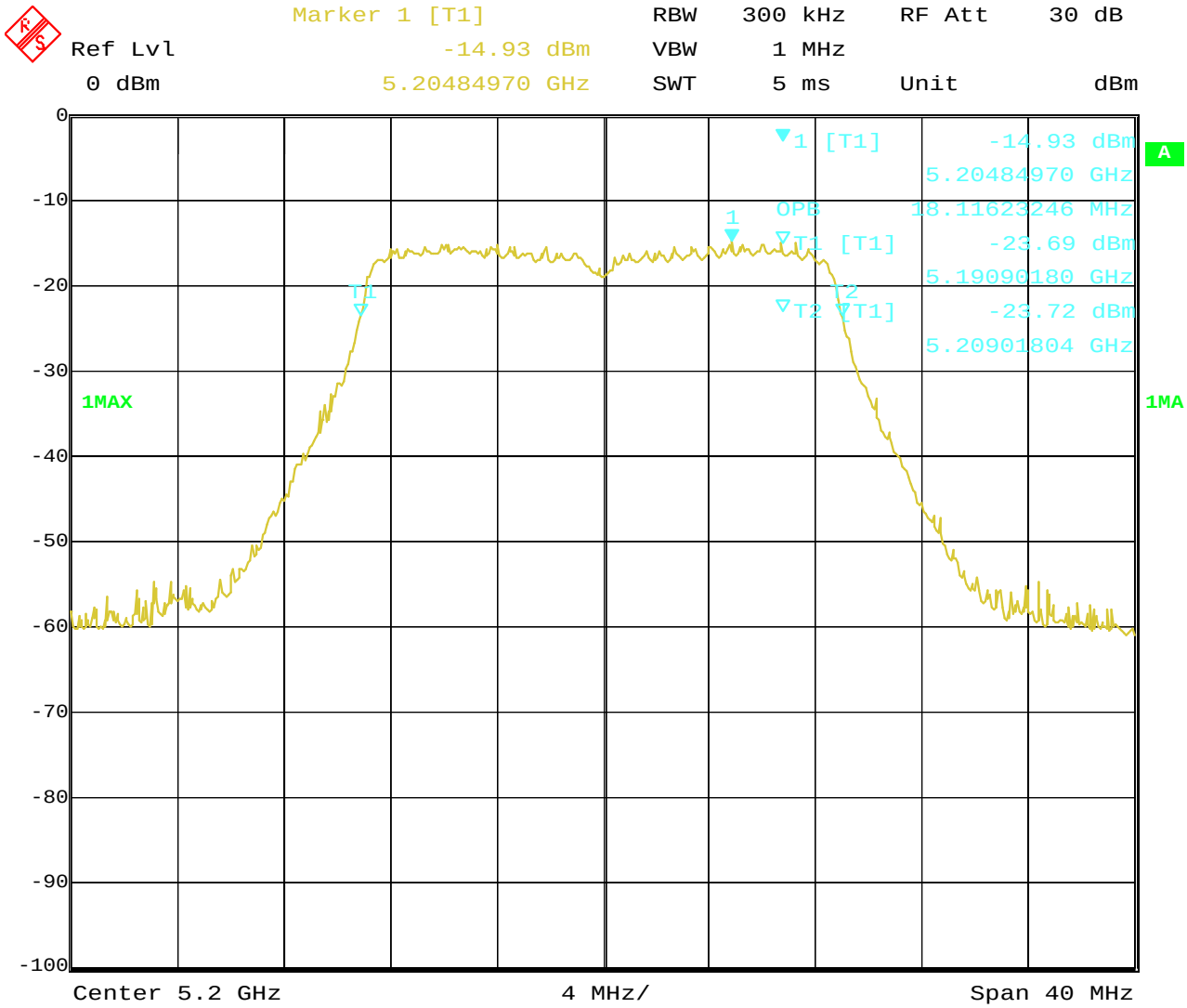
Channel 40



Date: 13.NOV.2019 10:18:34

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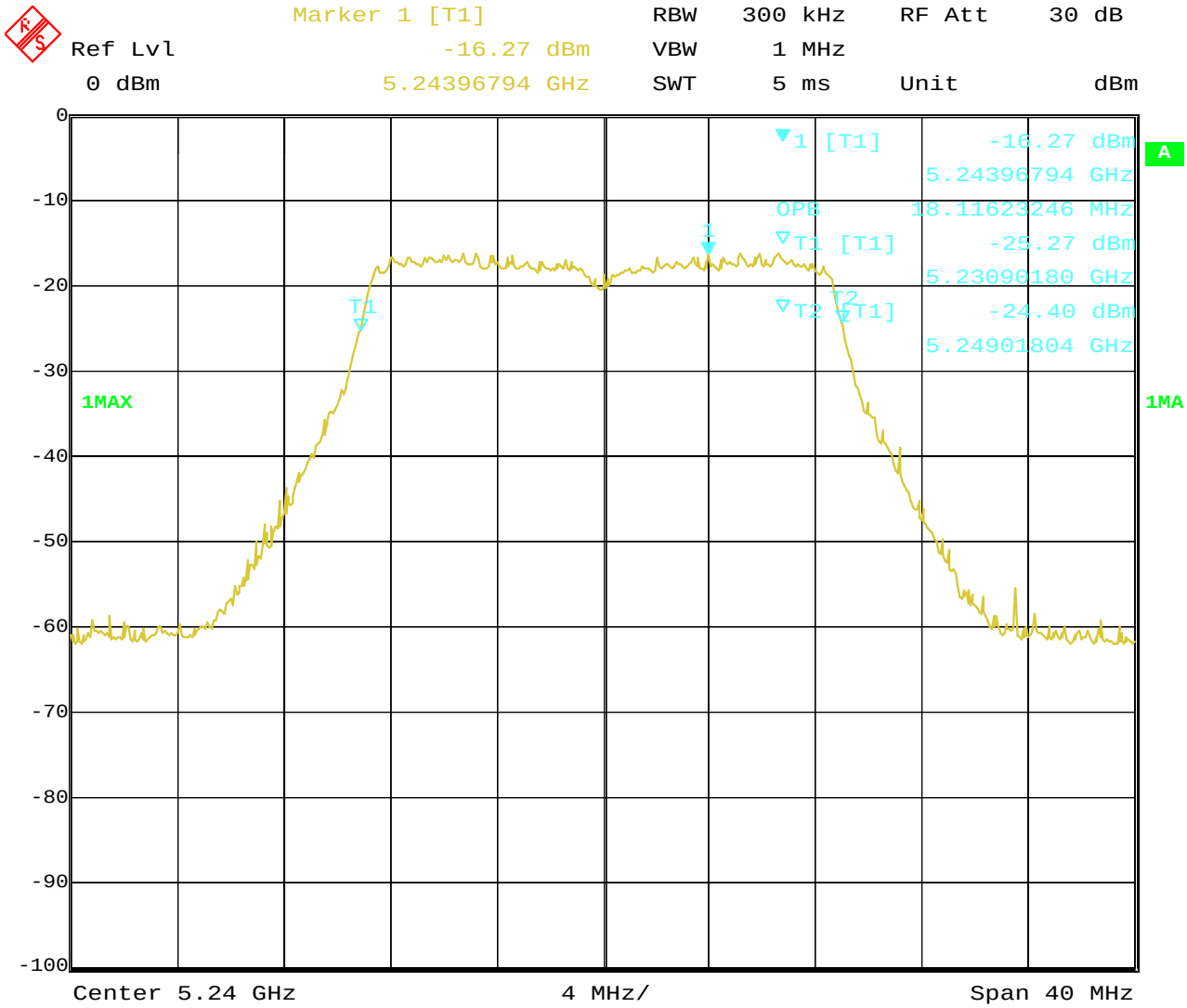
Channel 48



Date: 13.NOV.2019 10:15:58

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT40	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
26dB Bandwidth					
38	5190	mcs0	43.29	--	Pass
46	5230	mcs0	43.29	--	Pass
99% Bandwidth					
38	5190	mcs0	36.39	--	Pass
46	5230	mcs0	36.39	--	Pass

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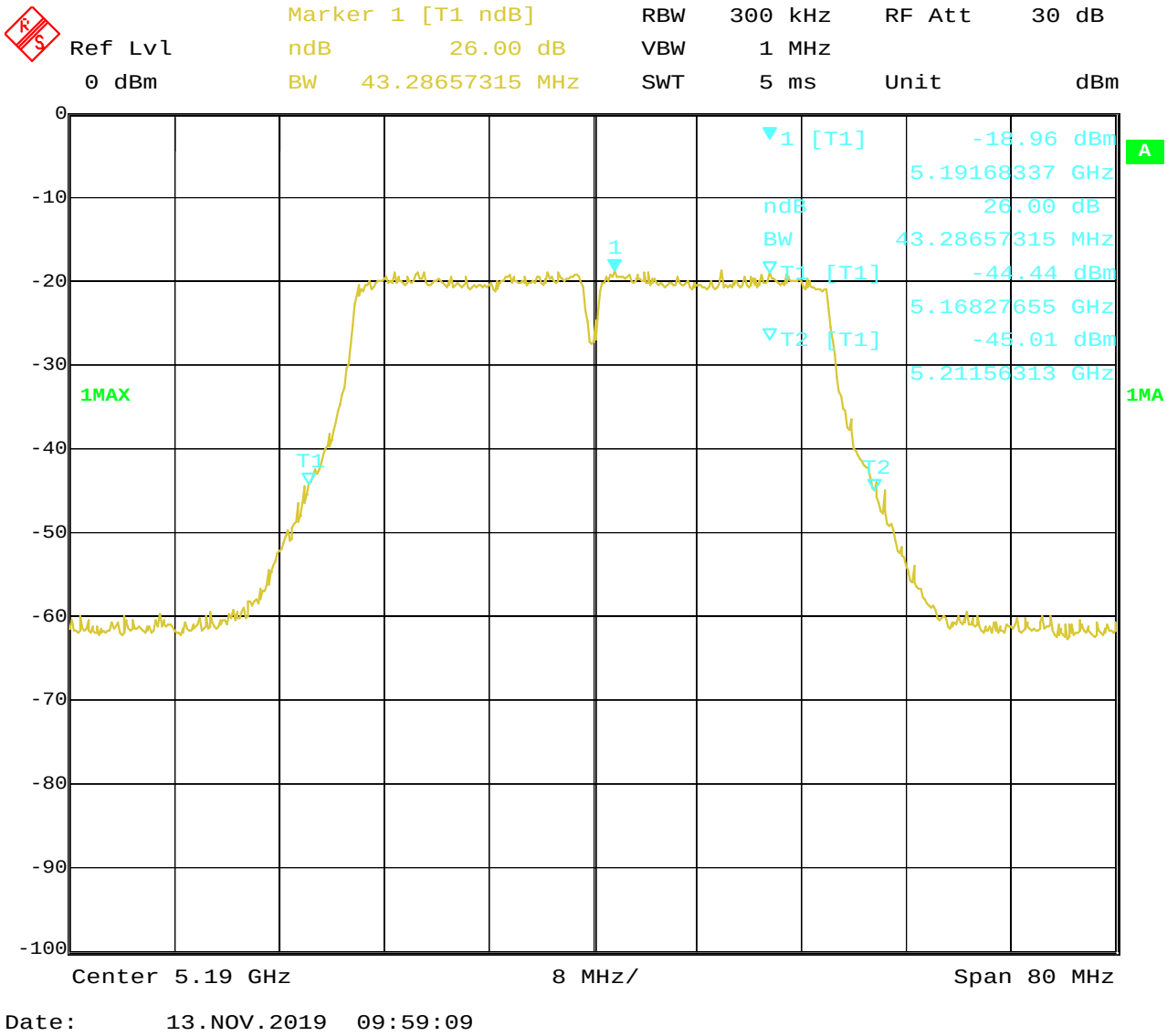
Test Configure

26dB Bandwidth

Channel 38



Date: 13.NOV.2019 09:59:09

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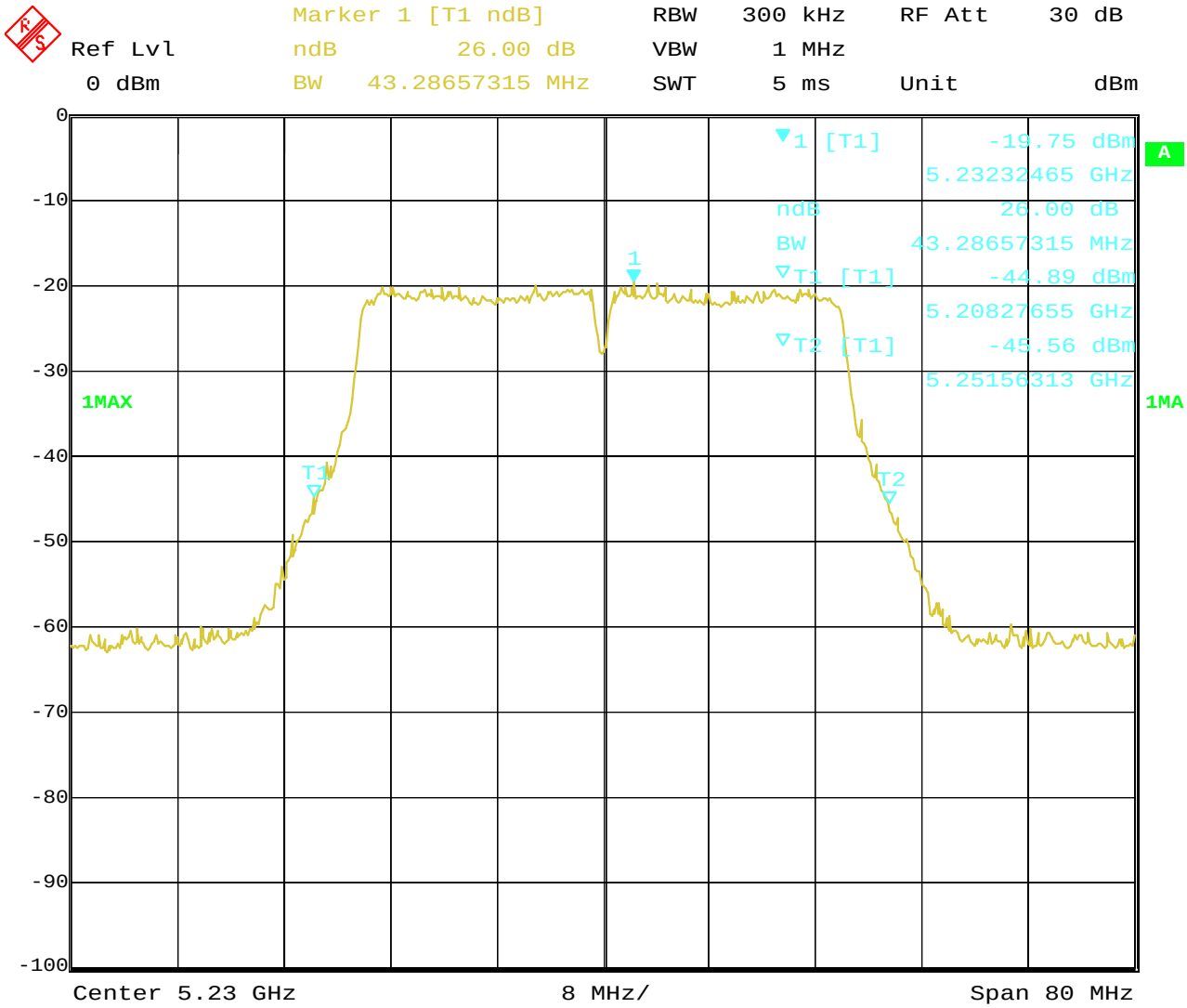
Channel 46



Date: 13.NOV.2019 09:59:47

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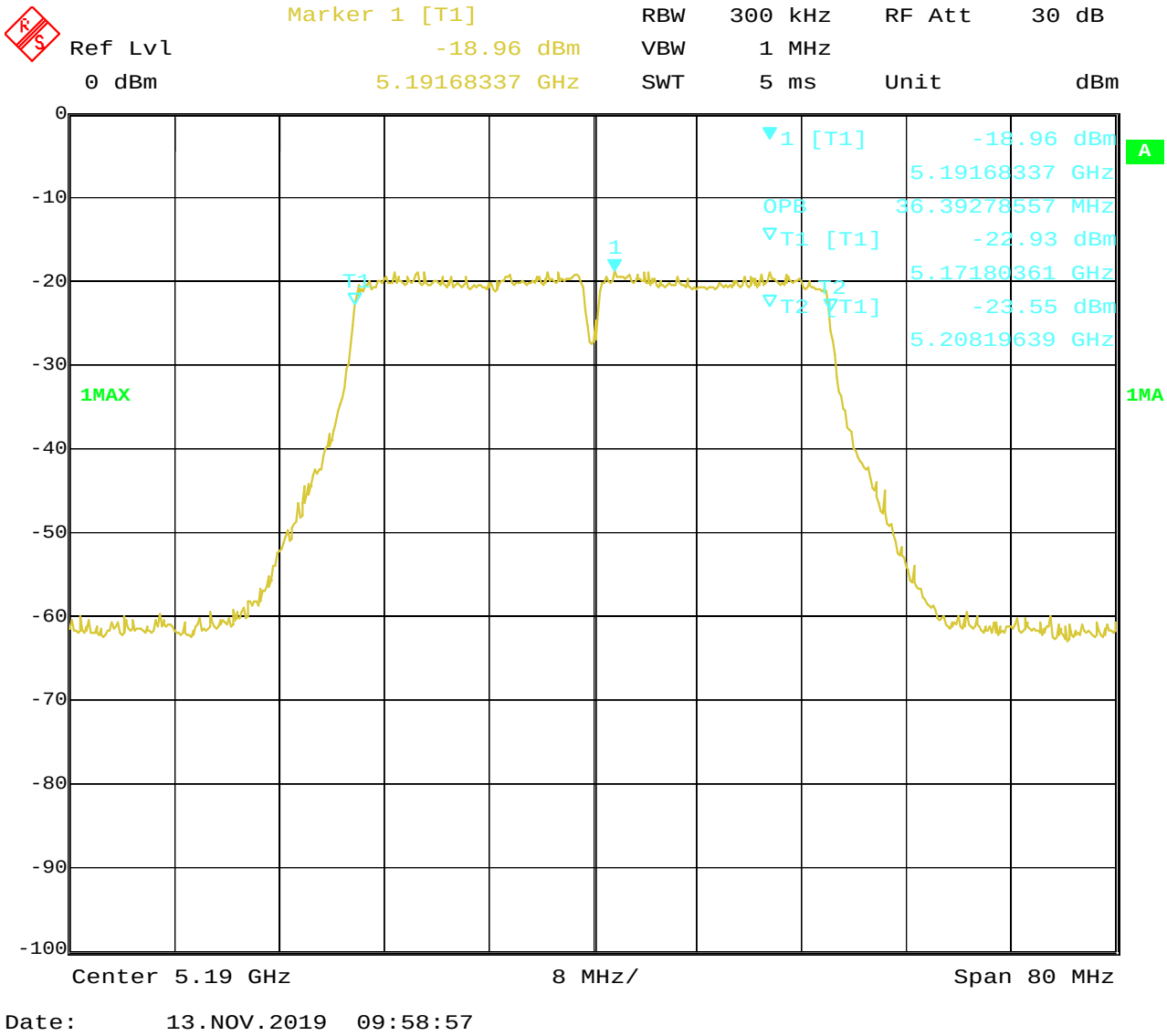
Test Configure

99% Bandwidth

Channel 38



Date: 13.NOV.2019 09:58:57

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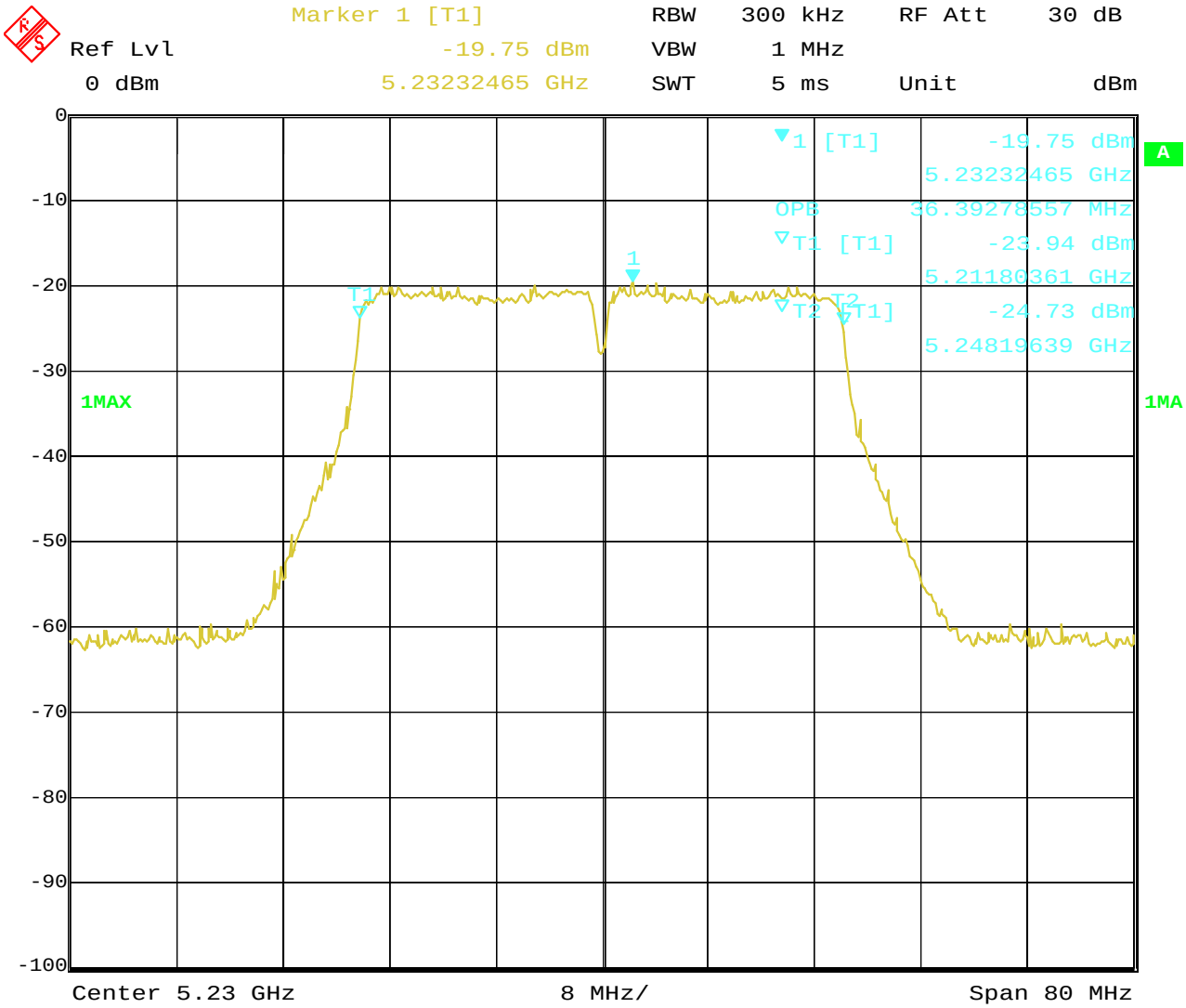
Channel 46



Date: 13.NOV.2019 10:00:00

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT80	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
26dB Bandwidth					
42	5210	23.9	82.97	--	Pass
99% Bandwidth					
42	5210	23.9	79.51	--	Pass

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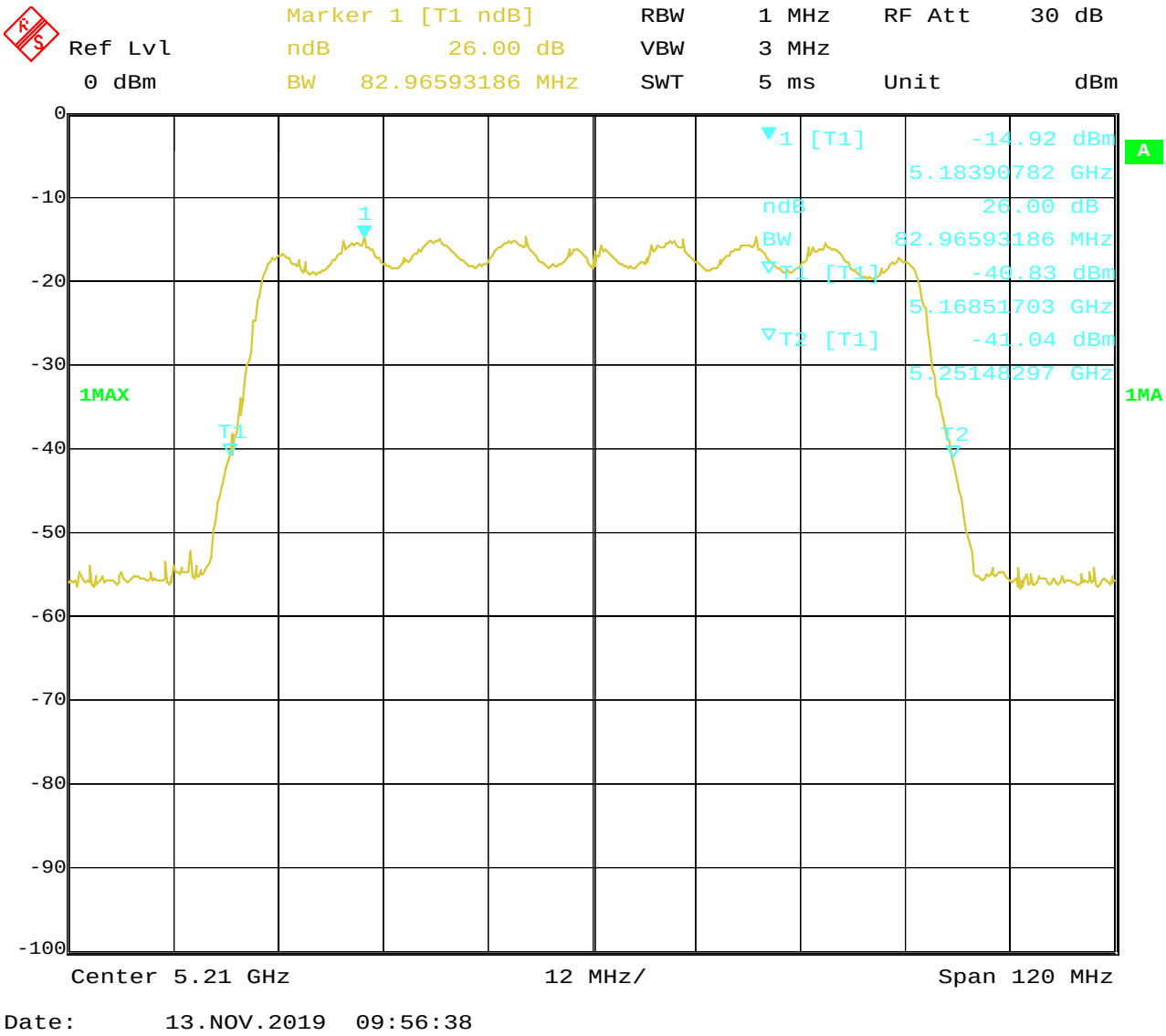
Test Configure

26dB Bandwidth

Channel 42



Date: 13.NOV.2019 09:56:38

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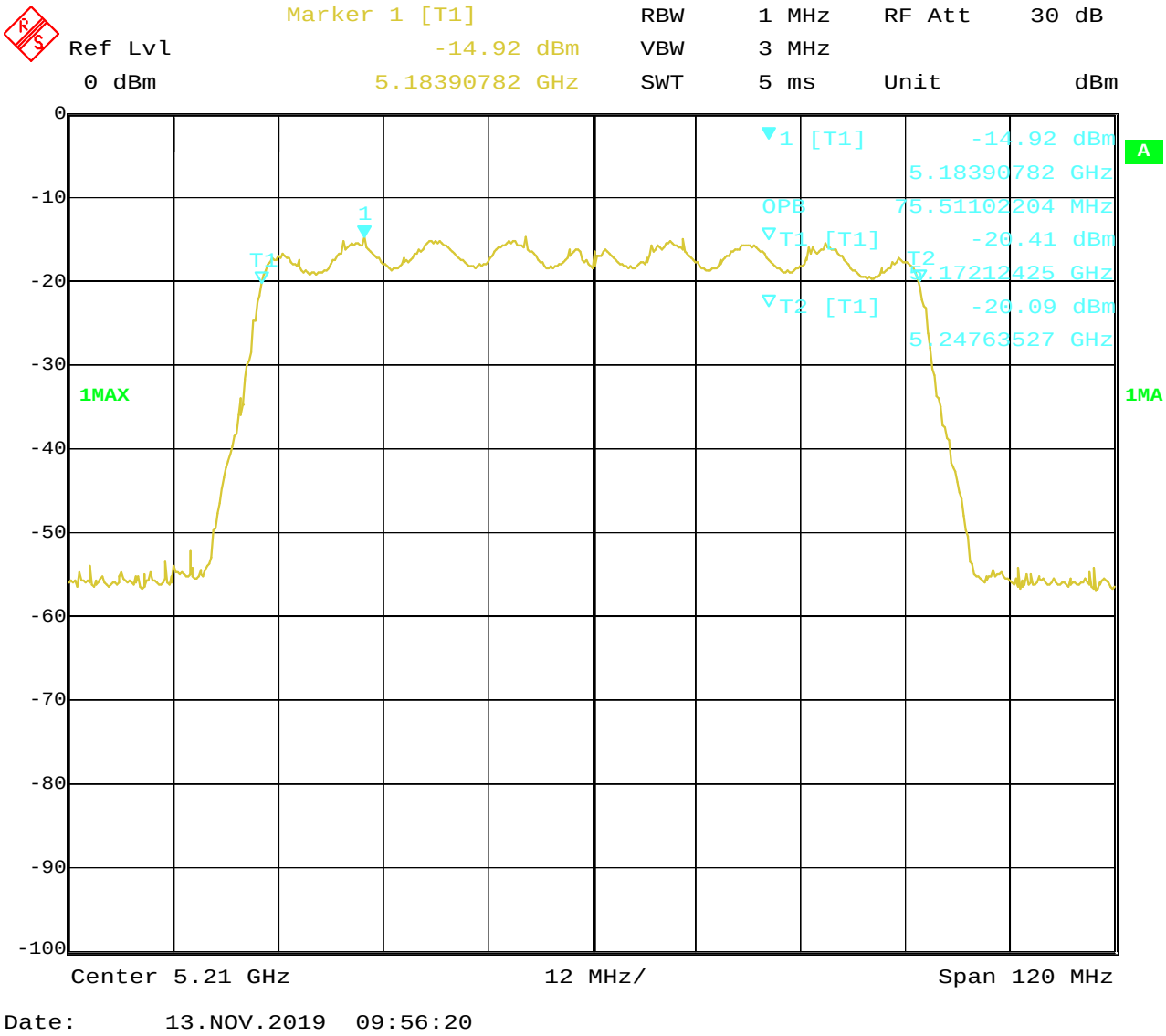
Test Configure

99% Bandwidth

Channel 42



Date: 13.NOV.2019 09:56:20

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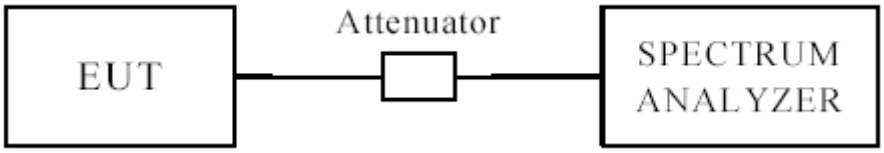
8.0 Peak Transmit Power Measurement

8.1 Test Setup



8.2 Limits of Peak Transmit Power Measurement

Operation Band	EUT Category	Limit
U-NII-2A		For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$ B*, dBm, whichever is less
	√	For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$ B*, dBm, whichever power is less

Note: 1.Where B is the 99% emission bandwidth in MHz.
2. EIRP was measured, EIRP=AV Power +Antenna Gain

U-NII-2A	--	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	--	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	--	1 Watt (30 dBm)

Note: 1. Where B is the 26dB emission bandwidth in MHz.
2. The average power was measured

8.3 Test Procedure

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

Note: the average power was measured

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8.4Test Results

EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11a	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Power		Ant 2 Power		Total Power (dBm)	Limit (dBm)	Pass/ Fail
		dBm	mW	dBm	mW			
36	5180	3.29	2.13	3.21	2.09	6.25	22.38	Pass
40	5200	2.97	1.98	2.92	1.96	5.95	22.38	Pass
48	5240	1.65	1.46	1.54	1.43	4.61	22.38	Pass

Note: 1. At finial test to get the worst-case emission at 6Mbps for CH36, CH40, CH48, CH149, CH153 and CH161

2. The result basic equation calculation as follow:

Average Power Output = AV Power Reading + Cable loss + Attenuator

3. The worse case was recorded
4. Total power = Ant 1 + Ant 2

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11n HT20	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Power		Ant 2 Power		Total Power (dBm)	Limit (dBm)	Pass/ Fail
		dBm	mW	dBm	mW			
36	5180	2.40	1.74	2.31	1.70	5.37	22.38	Pass
40	5200	2.28	1.69	2.16	1.64	5.22	22.38	Pass
48	5240	1.43	1.39	1.35	1.36	4.39	22.38	Pass

Note: 1. At finial test to get the worst-case emission at mcs0 (6.5Mbps) for CH36, CH40, CH48, CH149, CH153 and CH161

2. The result basic equation calculation as follow:

Average Power Output = AV Power Reading + Cable loss + Attenuator

3. The worse case was recorded

4. Total power = Ant 1 + Ant 2

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11n HT40	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Power		Ant 2 Power		Total Power (dBm)	Limit (dBm)	Pass/ Fail
		dBm	mW	dBm	mW			
38	5190	1.83	1.52	1.74	1.49	4.79	23.01	Pass
46	5230	0.29	1.07	0.23	1.05	3.26	23.01	Pass

Note: 1. At finial test to get the worst-case emission at mcs0 (13.5Mbps) for CH38, CH46, CH151 and CH159

2. The result basic equation calculation as follow:

Average Power Output = AV Power Reading + Cable loss + Attenuator

3. The worse case was recorded

4. Total power = Ant 1 + Ant 2

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT20	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Power		Ant 2 Power		Total Power (dBm)	Limit (dBm)	Pass/ Fail
		dBm	mW	dBm	mW			
36	5180	2.65	1.84	2.60	1.82	5.63	22.58	Pass
40	5200	1.90	1.55	1.78	1.51	4.86	22.58	Pass
48	5240	1.55	1.43	1.47	1.40	4.52	22.58	Pass

Note: 1. At finial test to get the worst-case emission at mcs0 (6.5Mbps) for CH36, CH40, CH48, CH149, CH153 and CH161

2. The result basic equation calculation as follow:

Average Power Output = AV Power Reading + Cable loss + Attenuator

3. The worse case was recorded

4. Total power = Ant 1 + Ant 2

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT40	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Power		Ant 2 Power		Total Power (dBm)	Limit (dBm)	Pass/ Fail
		dBm	mW	dBm	mW			
38	5190	1.36	1.37	1.28	1.34	4.33	23.01	Pass
46	5230	1.18	1.31	1.11	1.29	4.15	23.01	Pass

Note: 1. At finial test to get the worst-case emission at mcs0 (13.5Mbps) for CH38, CH46, CH151,and CH159
2. The result basic equation calculation as follow:
Average Power Output = AV Power Reading + Cable loss + Attenuator
3. The worse case was recorded
4. Total power = Ant 1 + Ant 2

EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT80	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Power		Ant 2 Power		Total Power (dBm)	Limit (dBm)	Pass/ Fail
		dBm	mW	dBm	mW			
42	5210	1.05	1.27	0.96	1.25	4.01	23.01	Pass

Note: 1. At finial test to get the worst-case emission at 23.9Mbps for CH42 and CH155
2. The result basic equation calculation as follow:
Average Power Output = AV Power Reading + Cable loss + Attenuator
3. The worse case was recorded
4. Total power = Ant 1 + Ant 2

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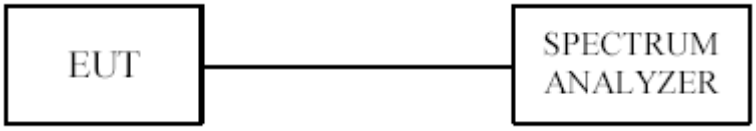
9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

Operation Band	Limit
U-NII-1	10dBm/MHz
U-NII-2A	11dBm/MHz
U-NII-2C	11dBm/MHz
U-NII-3	30dBm/500kHz

9.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer
2. Set the RBW = 1MHz.
3. Set the VBW =3MHz.
4. Set the span to encompass the entire emissions bandwidth (EBW) of the signal
5. Detector = RMS
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.

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9.4Test Result

EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11a 6Mbps	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	An1 Spectral Density	Factor	Total Spectral Density (dBm)	Limit (dBm)	Pass/ Fail
36	5180	-6.08	3.01	-3.07	10	Pass
40	5200	-7.21	3.01	-4.20	10	Pass
48	5240	-8.20	3.01	-5.19	10	Pass

Note: 1. Total Spectral Density = Ant1 Spectral Density + Factor

2. Factor=10log2=3.01

3. Ant1 and Ant 2 were tested and Ant 1 was the worst case

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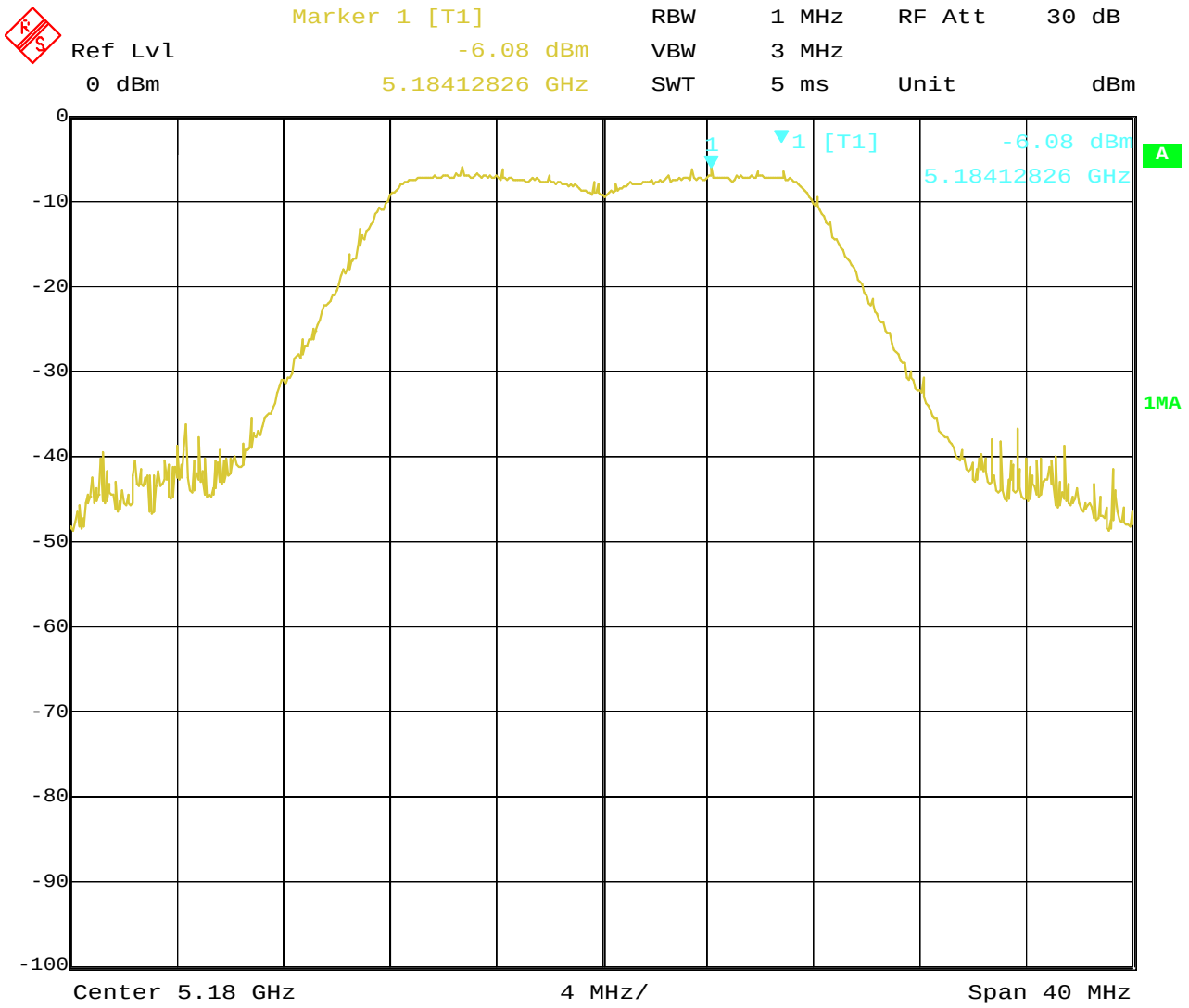
9.5 Plots of Power Spectral Density Measurement

1.802.11a at 6Mbps of CH36



Date: 13.NOV.2019 07:58:03

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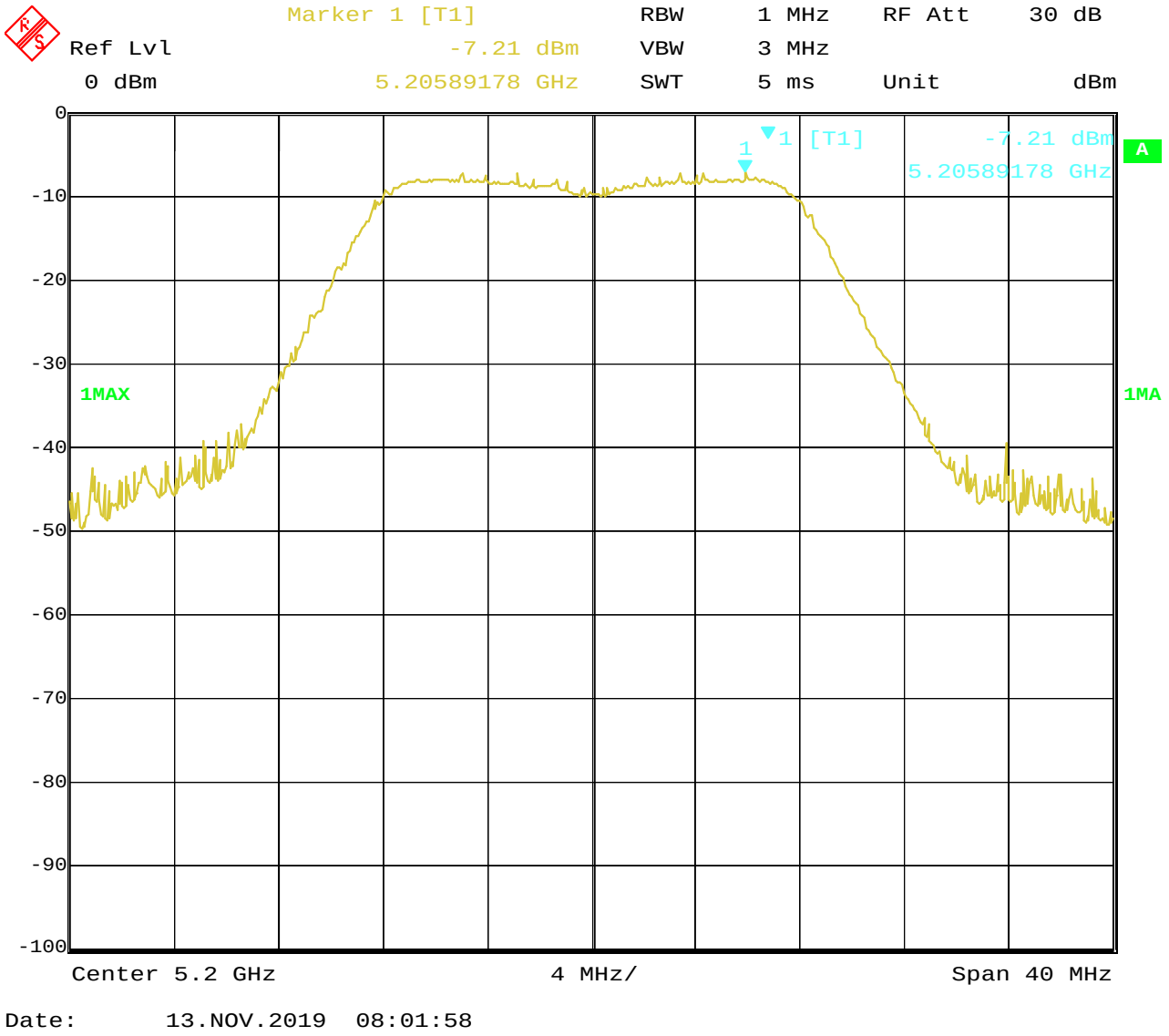
2.802.11a at 6Mbps of CH40



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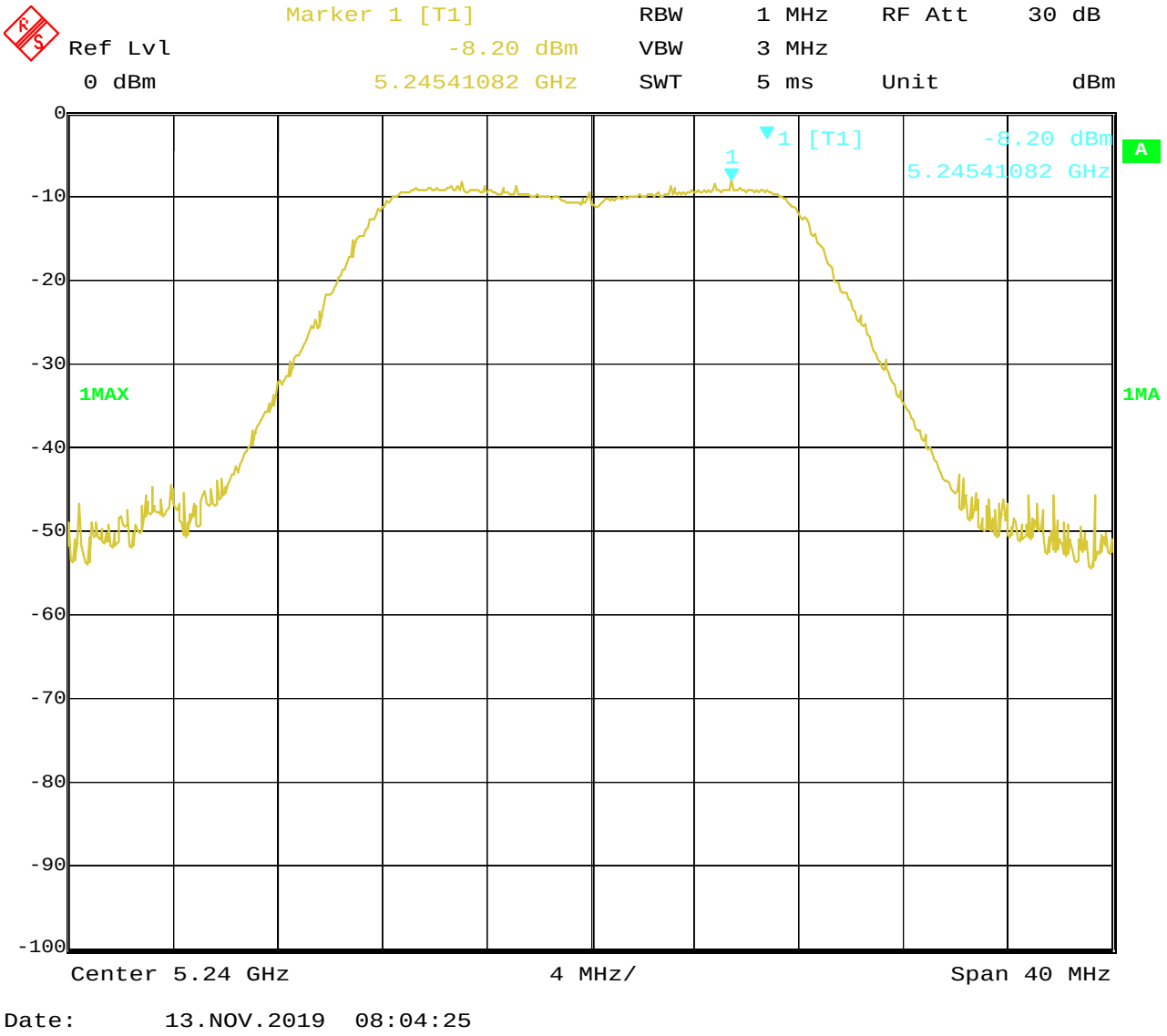
3.802.11a at 6Mbps of CH48



Date: 13.NOV.2019 08:04:25

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11n HT20 mcs0	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	An1 Spectral Density	Factor	Total Spectral Density (dBm)	Limit (dBm)	Pass/ Fail
36	5180	-7.78	3.01	-4.77	10	Pass
40	5200	-7.75	3.01	-4.74	10	Pass
48	5240	-8.59	3.01	-5.58	10	Pass

Note: 1. Total Spectral Density = Ant1 Spectral Density + Factor

2. Factor=10log2=3.01

3. Ant1 and Ant 2 were tested and Ant 1 was the worst case

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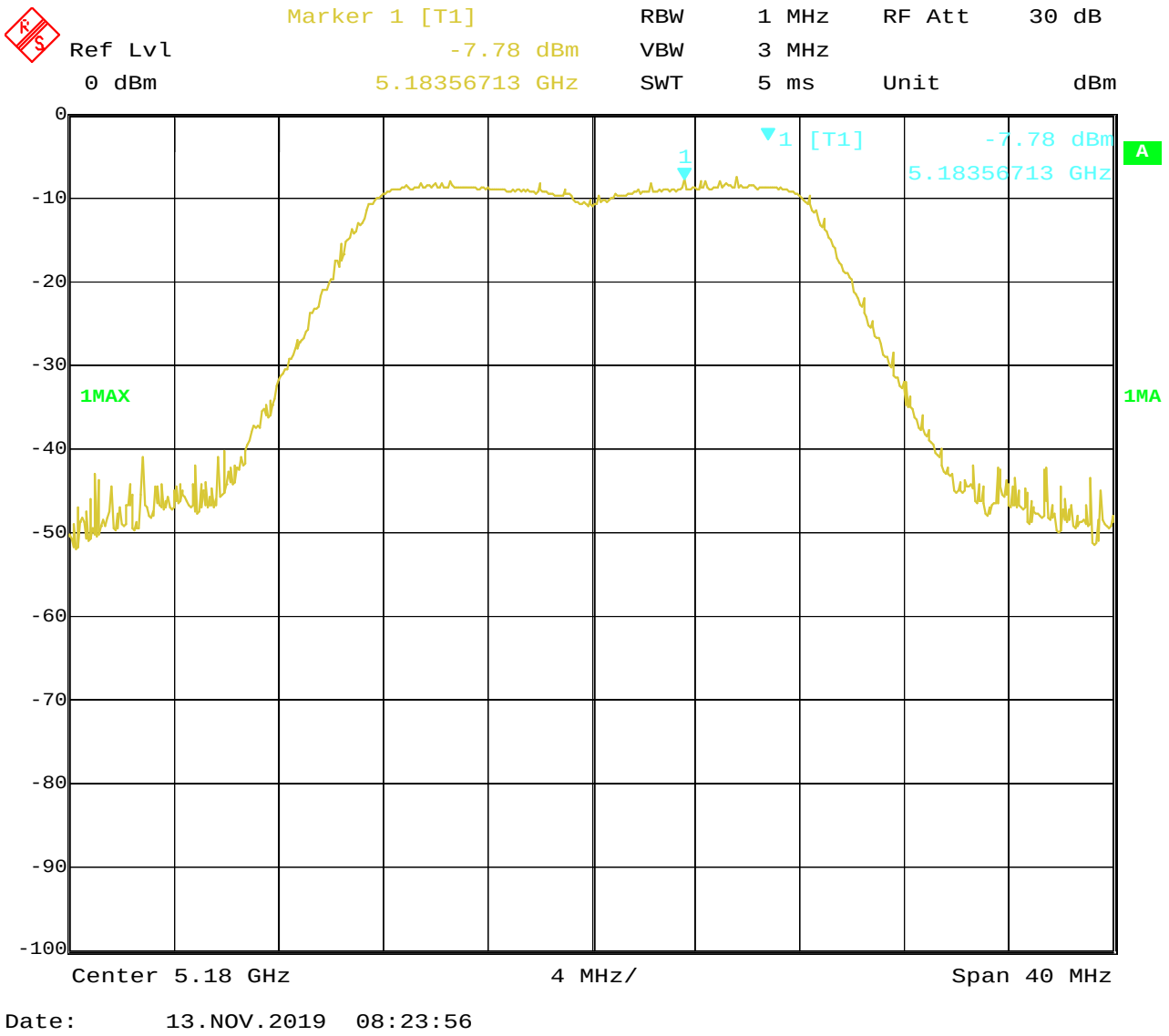
Test Plots

1.802.11n at mcs0 of CH36



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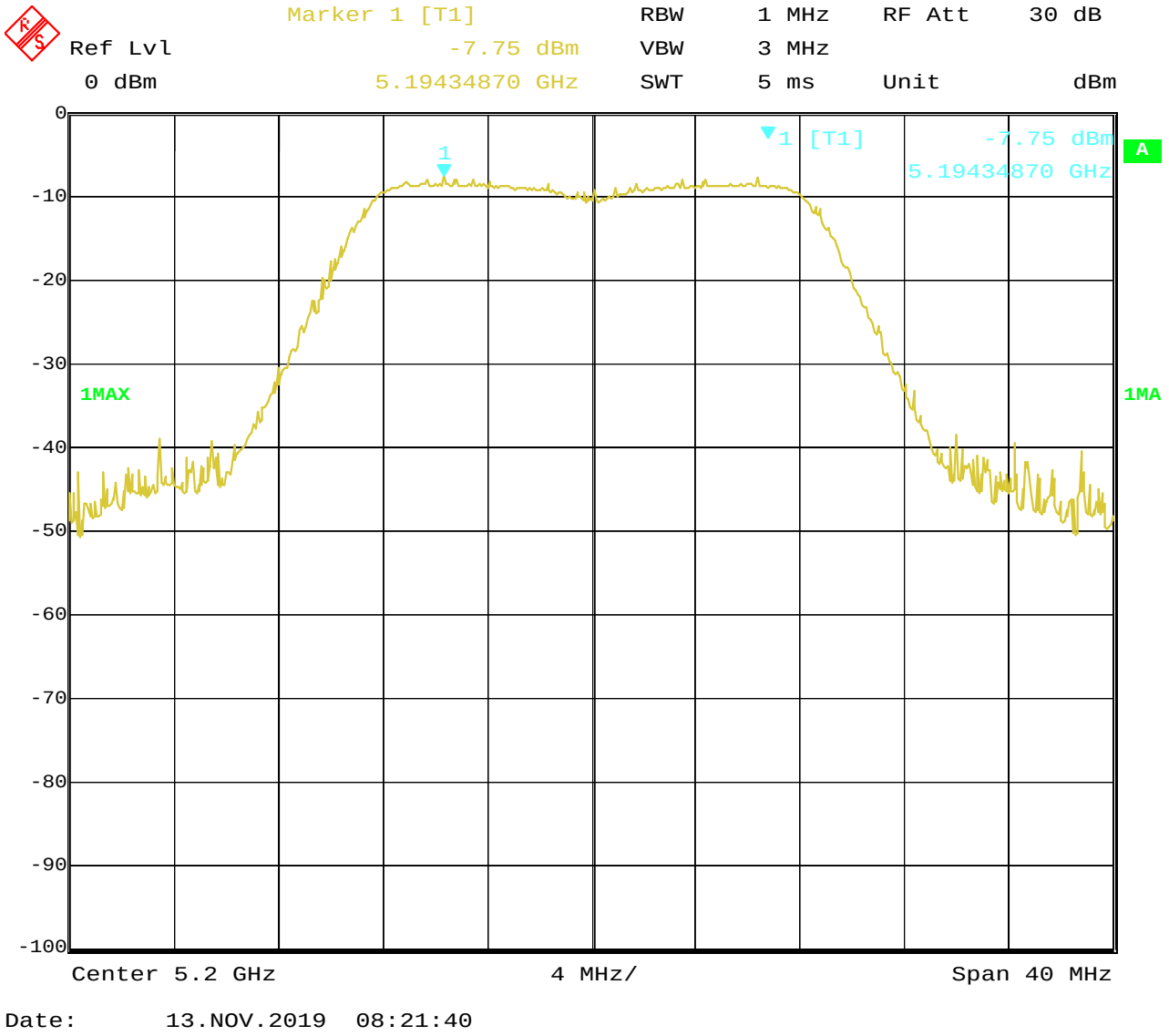
2.802.11n at mcs0 of CH40



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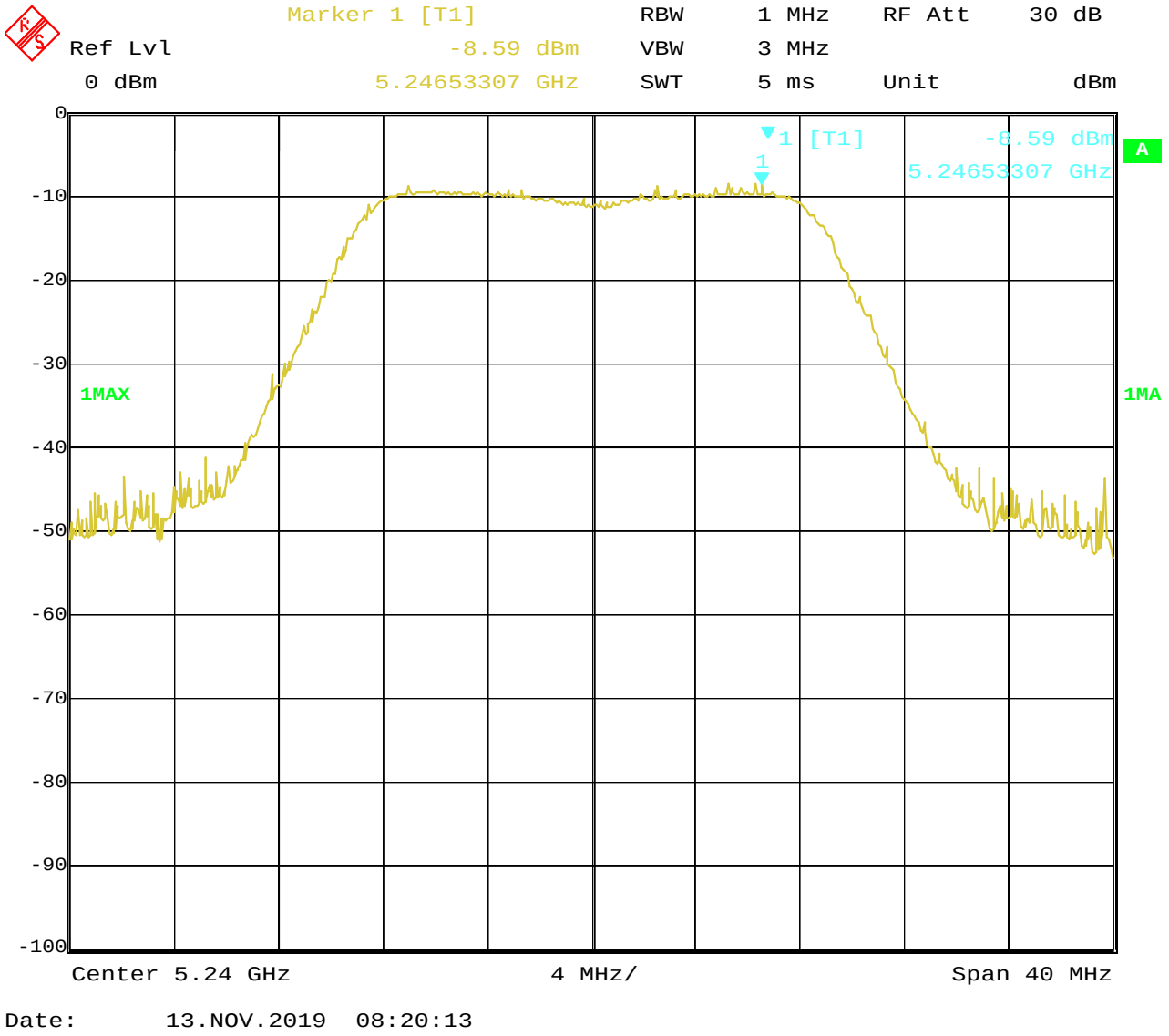
3.802.11n at mcs0 of CH48



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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11n HT40 mcs0	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	An1 Spectral Density	Factor	Total Spectral Density (dBm)	Limit (dBm)	Pass/ Fail
38	5190	-11.84	3.01	-8.83	10	Pass
46	5230	-12.83	3.01	-9.82	10	Pass

Note: 1. Total Spectral Density = Ant1 Spectral Density + Factor

2. Factor=10log2=3.01

3. Ant1 and Ant 2 were tested and Ant 1 was the worst case

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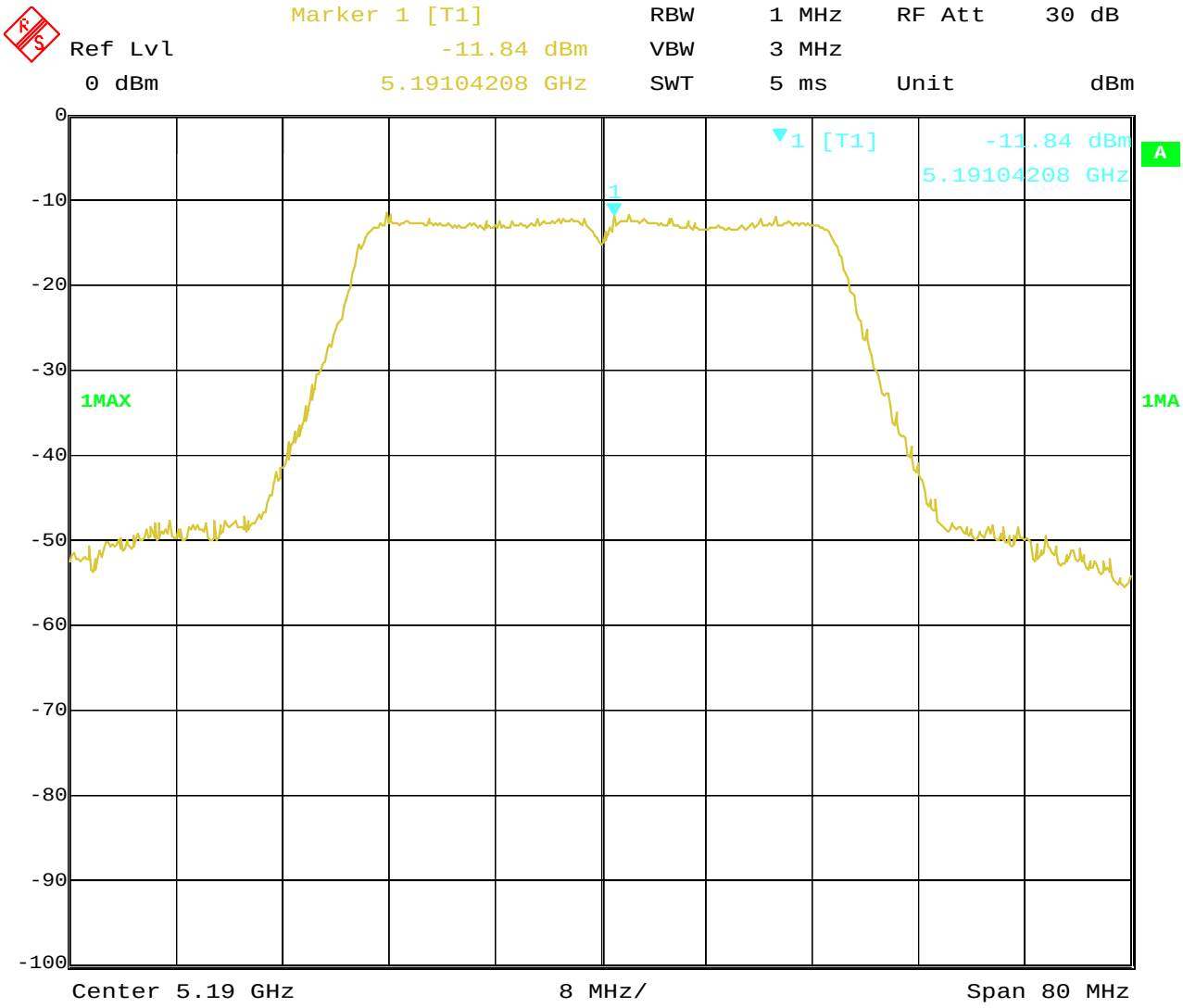
Test Plots

1.802.11n HT40 at mcs0 of CH38



Date: 13.NOV.2019 08:26:39

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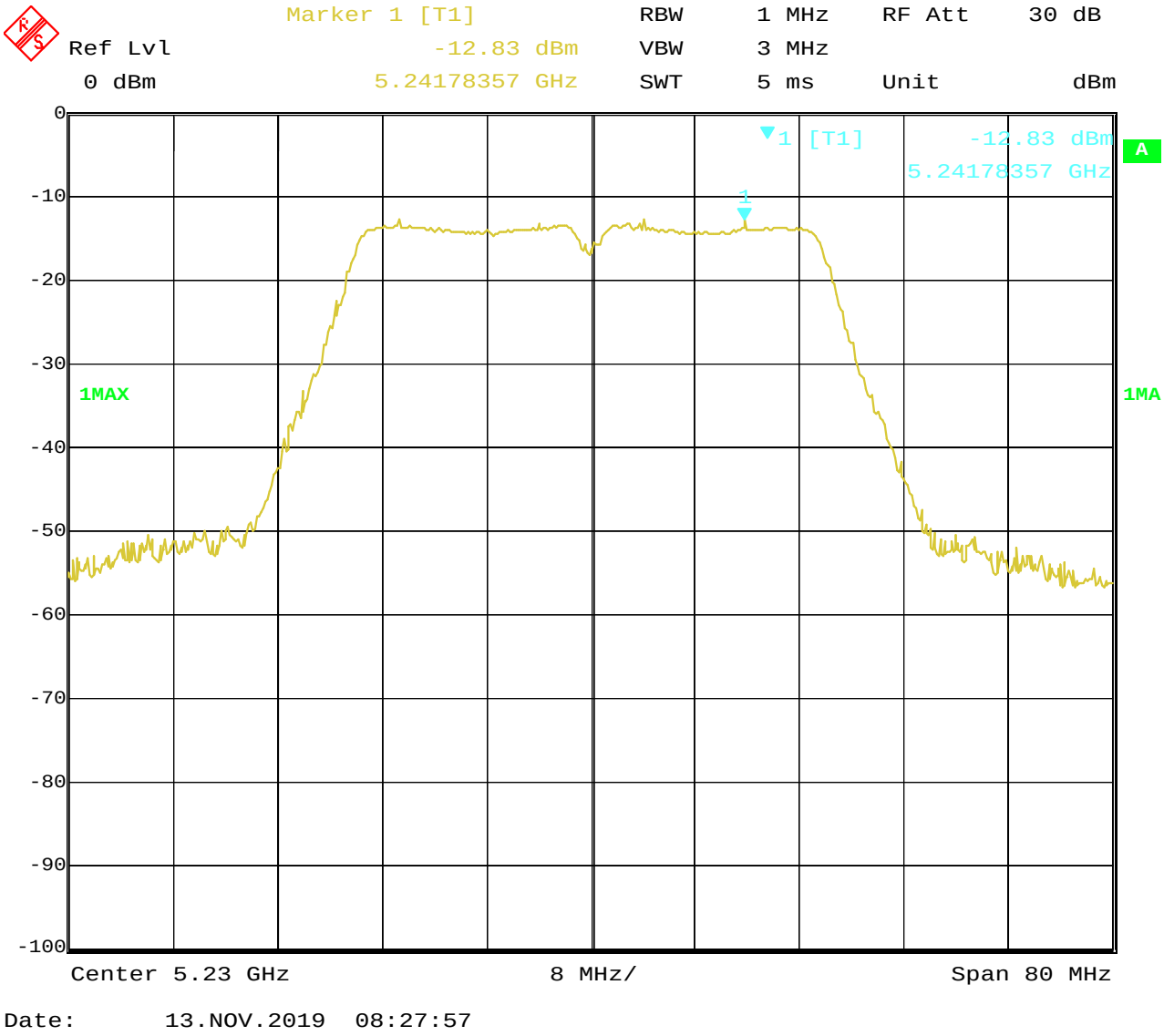
2.802.11n HT40 at mcs0 of CH46



Date: 13.NOV.2019 08:27:57

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT20	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	An1 Spectral Density	Factor	Total Spectral Density (dBm)	Limit (dBm)	Pass/ Fail
36	5180	-7.39	3.01	-4.38	10	Pass
40	5200	-8.17	3.01	-5.16	10	Pass
48	5240	-8.96	3.01	-5.95	10	Pass

Note: 1. Total Spectral Density = Ant1 Spectral Density + Factor

2. Factor=10log2=3.01

3. Ant1 and Ant 2 were tested and Ant 1 was the worst case

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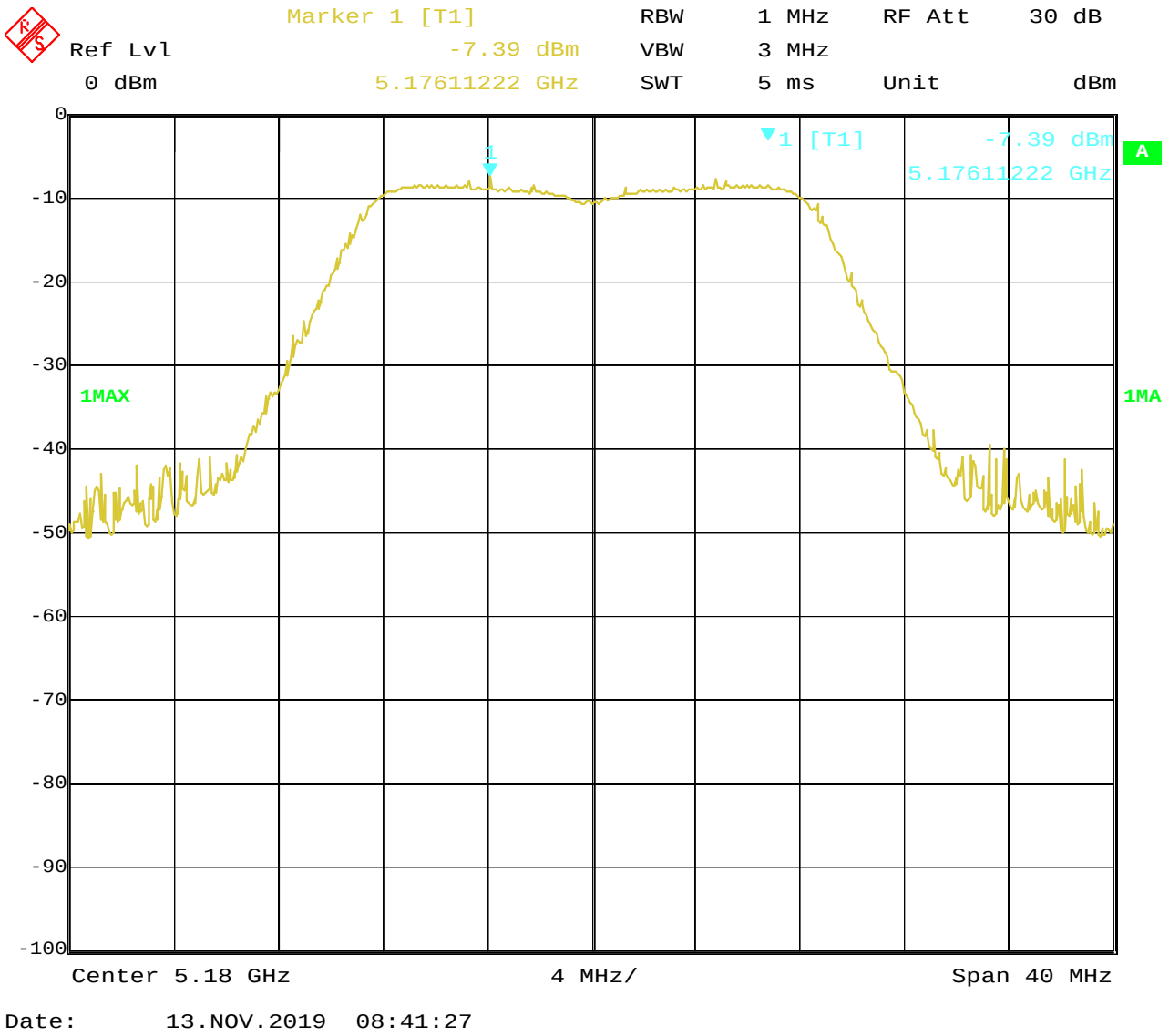
Test Plots

1.802.11ac at mcs0 of CH36



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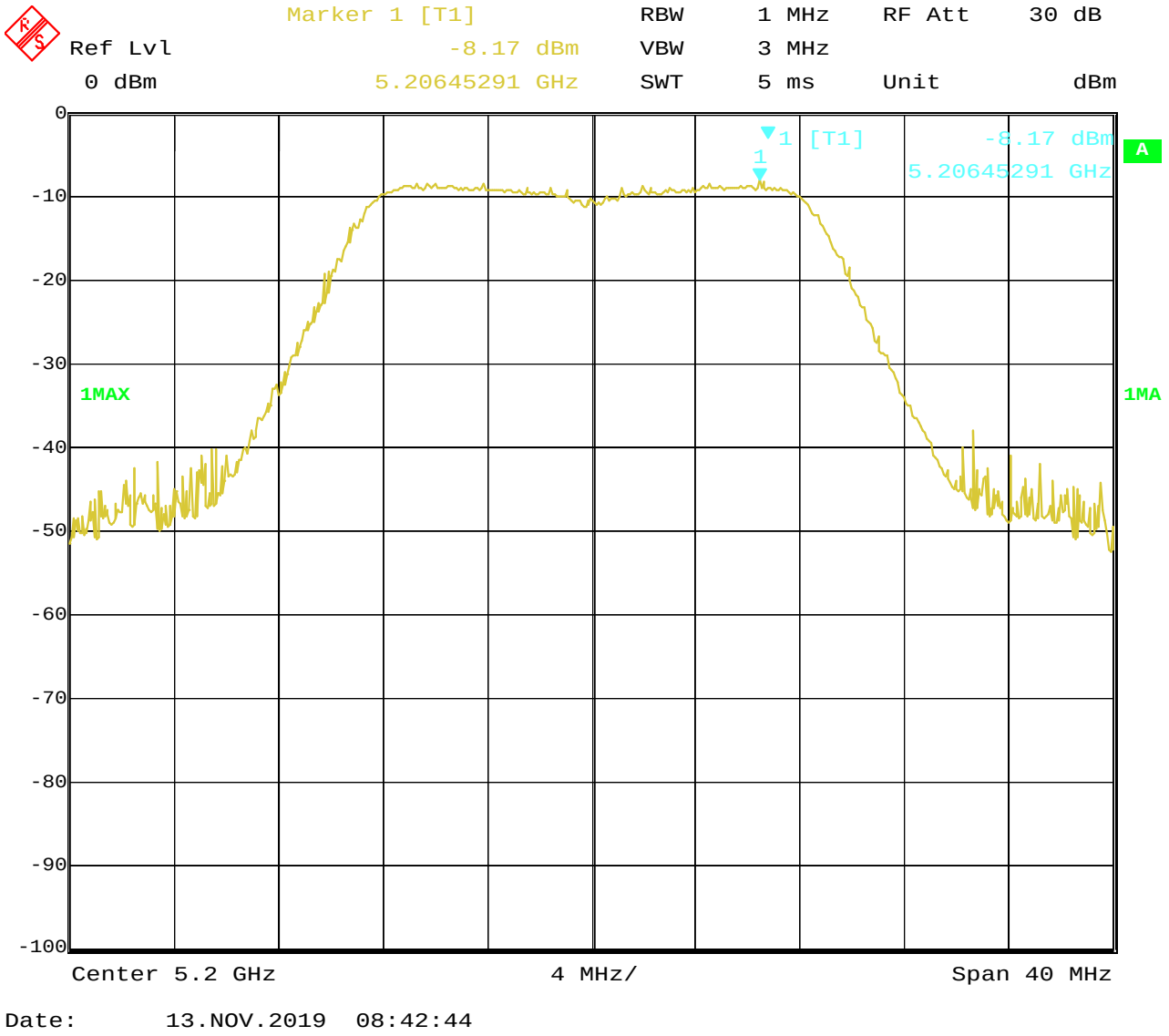
2.802.11ac at mcs0 of CH40



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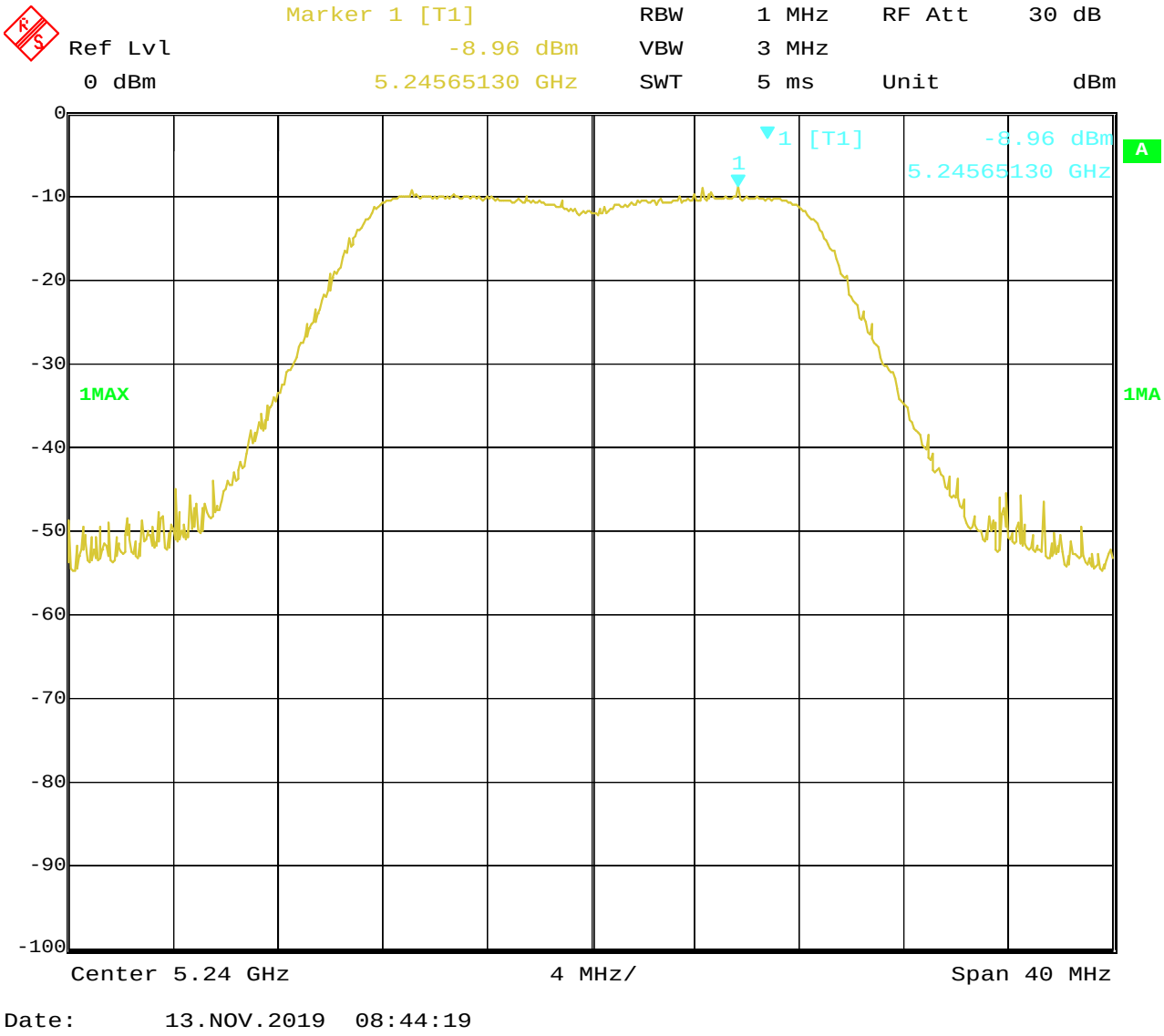
3.802.11ac at mcs0 of CH48



Date: 13.NOV.2019 08:44:19

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT40	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	An1 Spectral Density	Factor	Total Spectral Density (dBm)	Limit (dBm)	Pass/ Fail
38	5190	-12.00	3.01	-8.99	10	Pass
46	5230	-12.51	3.01	-9.50	10	Pass

Note: 1. Total Spectral Density = Ant1 Spectral Density + Factor

2. Factor=10log2=3.01

3. Ant1 and Ant 2 were tested and Ant 1 was the worst case

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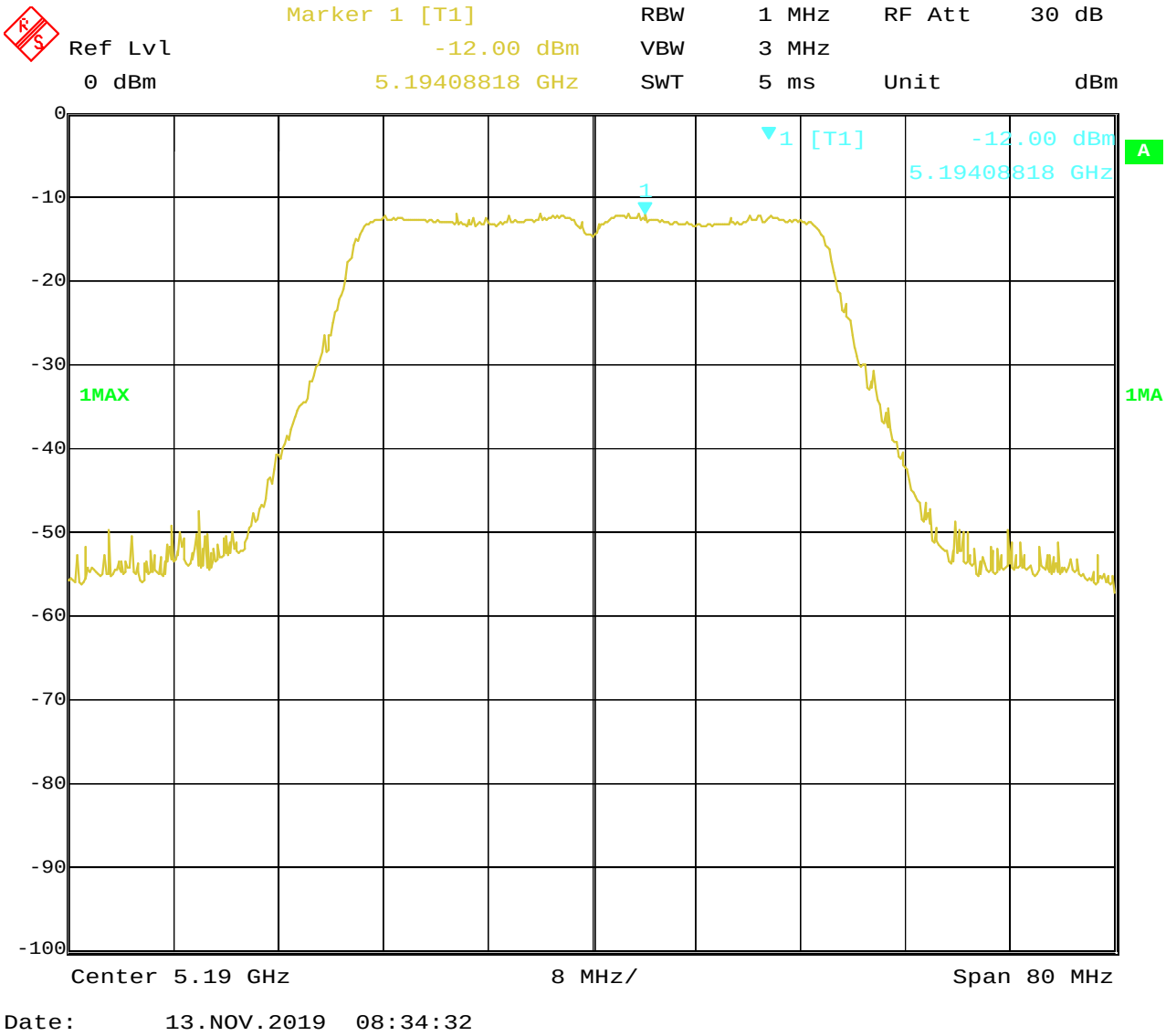
Test Plots

1.802.11ac at mcs0 of CH38



Date: 13.NOV.2019 08:34:32

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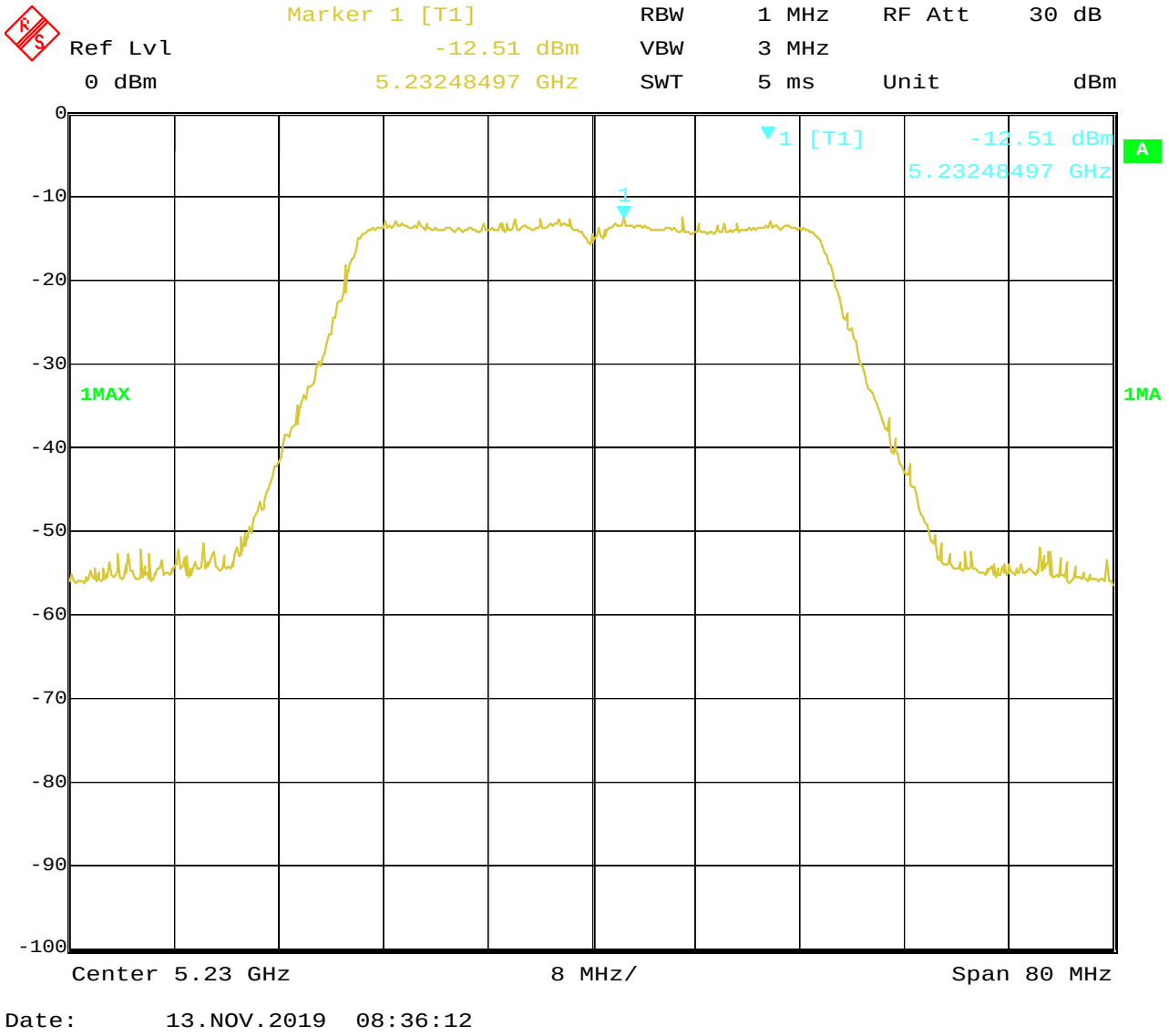
2.802.11ac at mcs0 of CH46



Date: 13.NOV.2019 08:36:12

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EUT	Biometrical access control terminals VisionLabs LUNA ACE	Model	ACE-0001
Mode	802.11ac VHT80 23.9Mbps	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH

Channel	Frequency (MHz)	Ant 1 Spectral Density (dBm)	Factor	Total Spectral Density (dBm)	Limit (dBm)	Pass/ Fail
42	5210	-14.21	3.01	-11.20	10	Pass

Note: 1. Total Spectral Density = Ant1 Spectral Density + Factor

2. Factor=10log2=3.01

3. Ant1 and Ant 2 were tested and Ant 1 was the worst case

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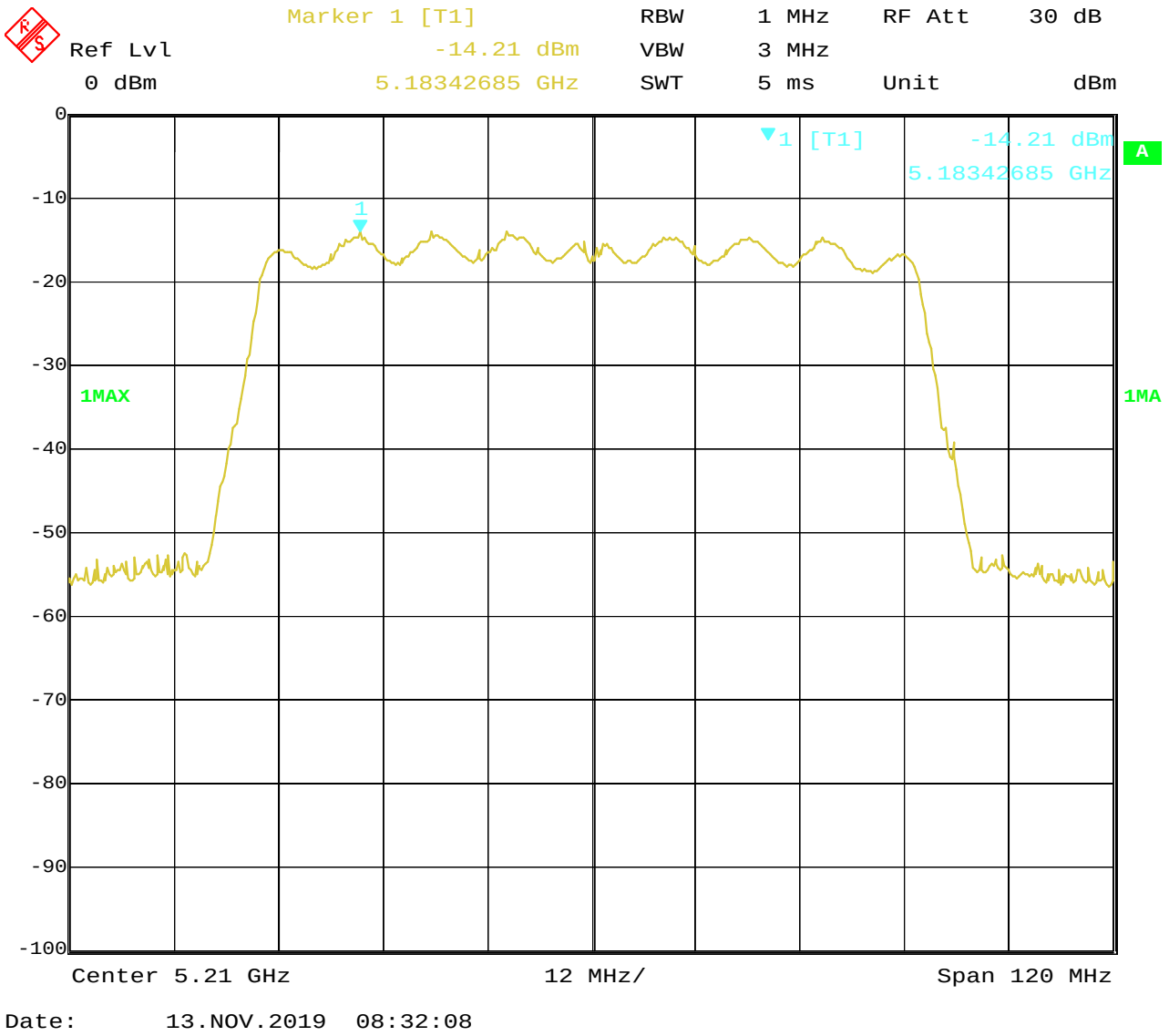
Test Plots

1.802.11ac at 23.9Mbps of CH42



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10.0 Frequency Stability

10.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees

10.2 Test Procedure

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

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10.3 Test Result

Channel 36 (5180MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5179.9816
120V	5179.9772
102V	5179.9808
Max. Deviation (MHz)	0.0228
Max. Deviation (ppm)	4.4

Rated working voltage: 120V~

Temperature vs. Frequency Stability

Temperature（℃）	Measurement Frequency (MHz)
-30	5179.9803
-20	5179.9783
-10	5179.9809
0	5179.9775
10	5179.9821
20	5179.9789
30	5179.9793
40	5179.9812
50	5179.9768
Max. Deviation (MHz)	0.0232
Max. Deviation (ppm)	4.5

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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 mount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

Two Integral antenna used. The maximum Gain of each antenna is 3.0 dBi for 5G band.

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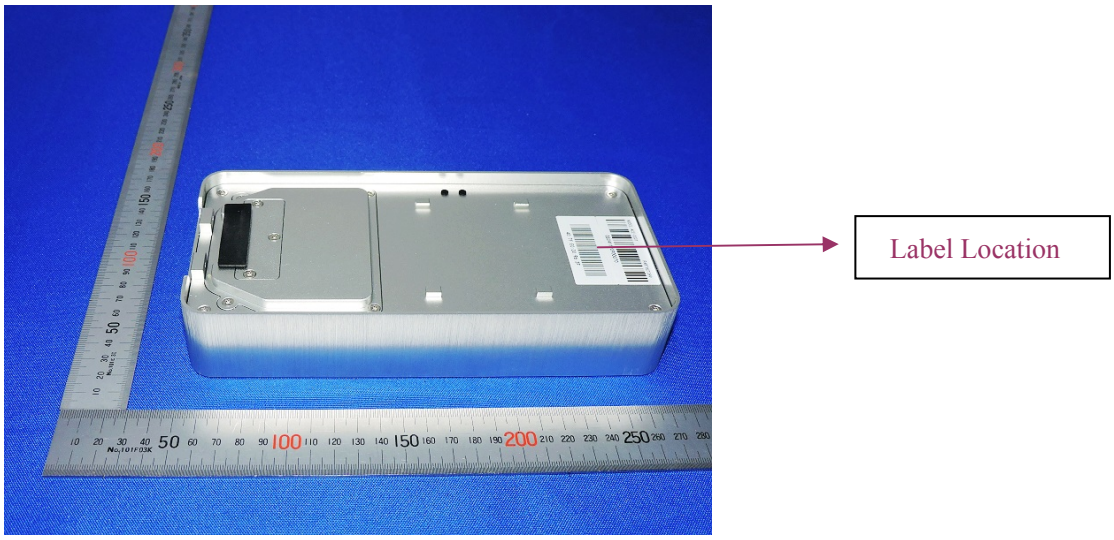
12.0 FCC Label

FCC ID: 2AU6Z-ACE-0001RFID

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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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13.0 Photo of testing

Conducted Emission Test Setup:

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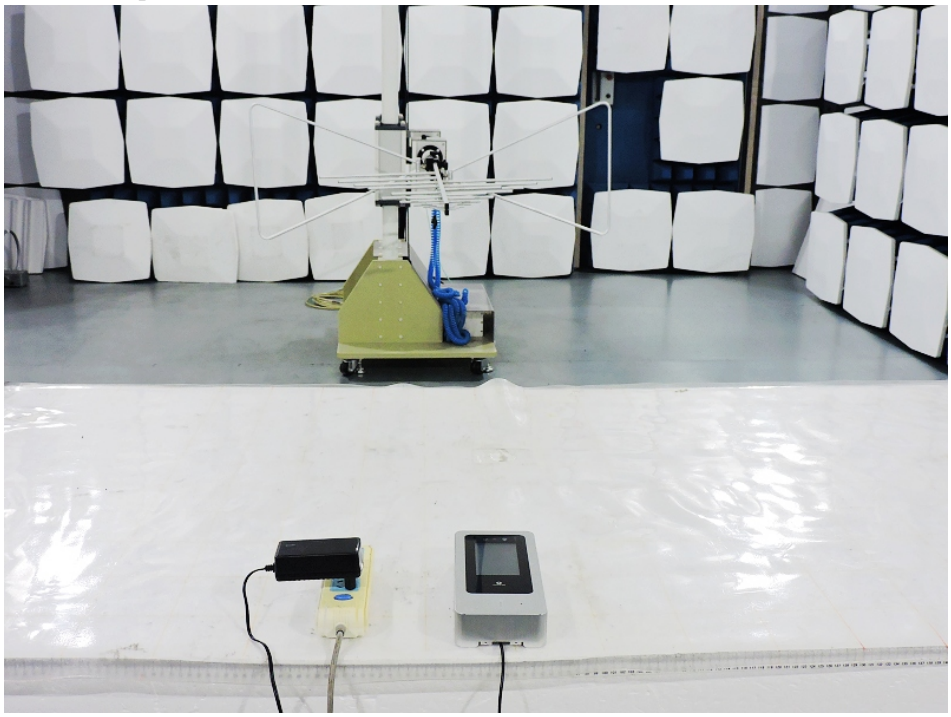
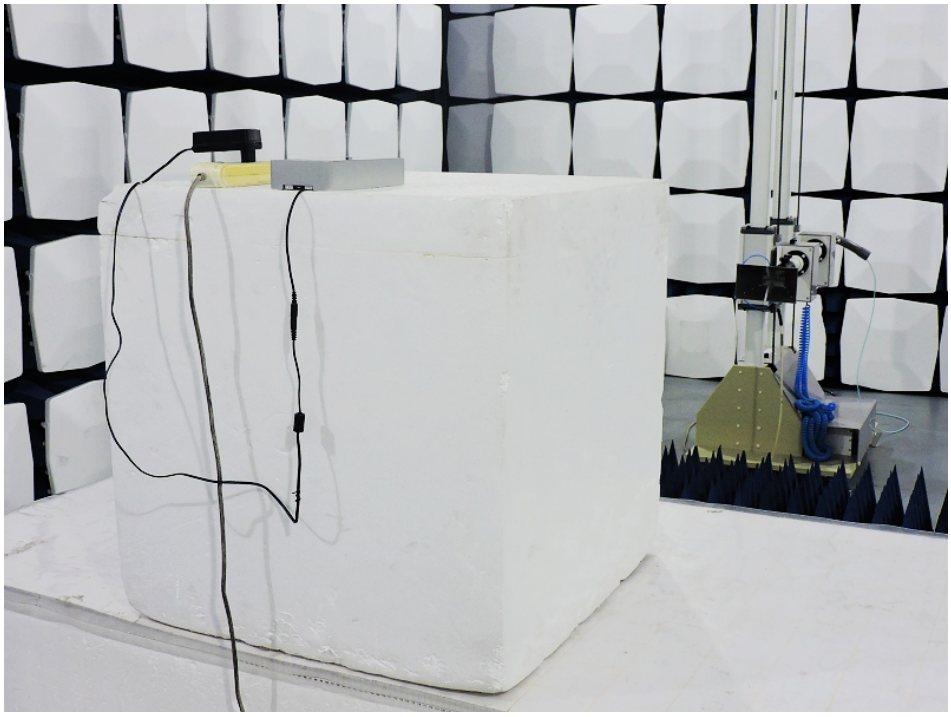
Radiated Emission Test Setup:





Photos of EUT

Please see test report FCC1910107-01

End of the report

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