



■ **Report No.:** DDT-R19080710-1E7

■ **Issued Date:** Dec. 06, 2019

FCC CERTIFICATION TEST REPORT

FOR

Applicant	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Wireless Multi-Channel Soundbar
Model No.	:	CITATION MULTIBEAM 700
Trade Mark	:	harman/kardon
FCC ID	:	APIHKMB700
Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park,
Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, **E-mail:** ddt@dgddt.com, <http://www.dgddt.com>

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TEST REPORT DECLARE

Applicant	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Wireless Multi-Channel Soundbar
Model No	:	CITATION MULTIBEAM 700
Trade Mark	:	harman/kardon
Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C.

Test procedure used: ANSI C63.10:2013, 789033 D02 General U-NII Test Procedures New Rules v02r01, 662911 D01 Multiple Transmitter Output v02r01

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	DDT-R19080710-1E7		
Date of Receipt:	Oct. 23, 2019	Date of Test:	Oct. 23, 2019 ~ Dec. 06, 2019

Prepared By:

Talent Zhang

Talent Zhang/Engineer

Approved By:



Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision history

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Dec. 06, 2019	

1. Summary of test results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
6/26db Bandwidth and 99% Bandwidth	FCC 15.407 (e)	PASS
Maximum Conducted Output Power	FCC 15.407 (a)	PASS
Power Spectral Density	FCC 15.407 (a)	PASS
Frequency Stability Measurement	FCC 15.407 (g)	PASS
Emissions in restricted frequency bands	FCC 15.407 (a) FCC 15.209 FCC 15.205	PASS
Band Edge Compliance	FCC 15.407 (a) FCC 15.209 FCC 15.205	PASS
Power Line Conducted Emission	FCC 15.207	PASS
Antenna requirement	FCC 15.203	PASS
Dynamic Frequency Selection	FCC 15.407 (h)	PASS

2. General test information

2.1. Description of EUT

EUT* Name	: Wireless Multi-Channel Soundbar
Model Number	: CITATION MULTIBEAM 700
EUT function description	: Please reference user manual of this device
Power supply	: AC 100-240V, 50/60Hz
Radio Technology	: IEEE 802.11a/n/ac
FCC Operation frequency	: IEEE 802.11a: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11n HT20: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11n HT40: 5190MHz-5230MHz, 5270MHz-5310MHz, 5510MHz-5670MHz, 5755MHz-5755MHz IEEE 802.11ac HT20: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11ac HT40: 5190MHz-5230MHz, 5270MHz-5310MHz, 5510MHz-5670MHz, 5755MHz-5755MHz IEEE 802.11ac HT80: 5210MHz, 5290MHz, 5530MHz, 5775MHz
Modulation	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 14.4, 28.9, 43.3, 57.8, 86.7, 115.6, 130.0, 144.4 Mbps IEEE 802.11n HT40: 30, 60, 90, 120, 180, 240, 270, 300 Mbps IEEE 802.11ac HT20: 14.4, 28.8, 43.4, 57.8, 86.6, 115.6, 130, 144.4, 173.4 Mbps IEEE 802.11ac HT40: 30, 60, 90, 120, 180, 240, 270, 300, 360, 400 Mbps IEEE 802.11ac HT80: 65, 130, 195, 260, 390, 520, 585, 650, 780, 866.6 Mbps
Antenna Type	: Antenna 1: Dedicated FPCB antenna, maximum PK gain: 3.24 dBi Antenna 2: Dedicated FPCB antenna, maximum PK gain: 3.68 dBi
Sample Type	: Series production

Note: EUT is the ab. of equipment under test.

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11a	3.24	3.68	/
IEEE 802.11n HT20	3.24	3.68	6.48
IEEE 802.11n HT40	3.24	3.68	6.48
IEEE 802.11ac VHT20	3.24	3.68	6.48
IEEE 802.11ac VHT40	3.24	3.68	6.48
IEEE 802.11ac VHT80	3.24	3.68	6.48

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
AC Cable	Harman	N/A	1.8 m long, unshielded, non-magnetic ring	N/A
Remote control	Harman	N/A	N/A	N/A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
Notebook	Lenovo Beijing Co. Ltd.	ThinkPad	FCC/CE	TP00015A
Wireless LAN Access Point	HUAWEI	AP6050	21500829352SC5000371	FCC ID: QISAP6050DN6150DN

2.4. Block diagram of EUT configuration for test



Run a special test software “SecureCRT.exe” provided by manufacturer to control EUT work in Continuous Tx mode, and select test channel, wireless mode and data rate.

Tested mode, channel, and data rate information				
Mode	Setting Tx Power	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
IEEE 802.11a	/	6	Low: CH36	5180
	/	6	Middle: CH40	5200
	/	6	High: CH48	5240
	/	6	Low: CH52	5260
	/	6	Middle: CH56	5280
	/	6	High: CH64	5320
	/	6	Low: CH100	5500
	/	6	Middle: CH116	5580
	/	6	High: CH140	5700
	/	6	Low: CH149	5745
	/	6	Middle: CH157	5785
IEEE 802.11n HT20	/	MCS 0	Low: CH36	5180
	/	MCS 0	Middle: CH40	5200
	/	MCS 0	High: CH48	5240
	/	MCS 0	Low: CH52	5260
	/	MCS 0	Middle: CH56	5280
	/	MCS 0	High: CH64	5320
	/	MCS 0	Low: CH100	5500
	/	MCS 0	Middle: CH116	5580
	/	MCS 0	High: CH140	5700
	/	MCS 0	Low: CH149	5745
	/	MCS 0	Middle: CH157	5785
IEEE 802.11n HT40	/	MCS 0	Low: CH38	5190
	/	MCS 0	Middle: CH46	5230
	/	MCS 0	High: CH54	5270
	/	MCS 0	Low: CH62	5310
	/	MCS 0	Middle: CH102	5510
	/	MCS 0	High: CH110	5550
	/	MCS 0	Low: CH134	5670
	/	MCS 0	Middle: CH151	5755
IEEE 802.11ac HT20	/	MCS 0	Low: CH36	5180
	/	MCS 0	Middle: CH40	5200
	/	MCS 0	High: CH48	5240
	/	MCS 0	Low: CH52	5260
	/	MCS 0	Middle: CH56	5280
	/	MCS 0	High: CH64	5320
	/	MCS 0	Low: CH100	5500
	/	MCS 0	Middle: CH116	5580
	/	MCS 0	High: CH140	5700
	/	MCS 0	Low: CH149	5745
	/	MCS 0	Middle: CH157	5785
	/	MCS 0	High: CH165	5825

IEEE 802.11ac HT40	/	MCS 0	Low: CH38	5190
	/	MCS 0	Middle: CH46	5230
	/	MCS 0	High: CH54	5270
	/	MCS 0	Low: CH62	5310
	/	MCS 0	Middle: CH102	5510
	/	MCS 0	High: CH110	5550
	/	MCS 0	Low: CH134	5670
	/	MCS 0	Middle: CH151	5755
	/	MCS 0	High: CH159	5795
IEEE 802.11ac HT80	/	MCS 0	CH42	5210
	/	MCS 0	CH58	5290
	/	MCS 0	CH106	5530
	/	MCS 0	CH155	5775

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

2.5. Deviations of test standard

No Deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106 kPa

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

Designation Number: CN1182; Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

2.8. Measurement uncertainty

Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6 GHz); 1.38 dB (3.6 GHz ≤ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz ≤ f < 3.6 GHz); 1.38 dB (3.6 GHz ≤ f < 8 GHz)
Frequencies Stability	6.7 × 10 ⁻⁸ (Antenna couple method) 5.5 × 10 ⁻⁸ (Conducted method)
Conducted spurious emissions	0.86 dB (10 MHz ≤ f < 3.6GHz); 1.40 dB (3.6 GHz ≤ f < 8 GHz) 1.66 dB (8 GHz ≤ f < 22 GHz)
Uncertainty for radio frequency (RBW<20kHz)	3×10 ⁻⁸
Temperature	0.4℃
Humidity	2%
Uncertainty for Radiation Emission test (30MHz-1GHz)	4.70 dB (Antenna Polarize: V) 4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz-40GHz)	4.10 dB (1-6 GHz) 4.40 dB (6 GHz-18 GHz) 3.54 dB (18 GHz-26 GHz) 4.30 dB (26 GHz-40 GHz)
Uncertainty for Power line conduction emission test	3.32 dB (150 kHz-30 MHz)

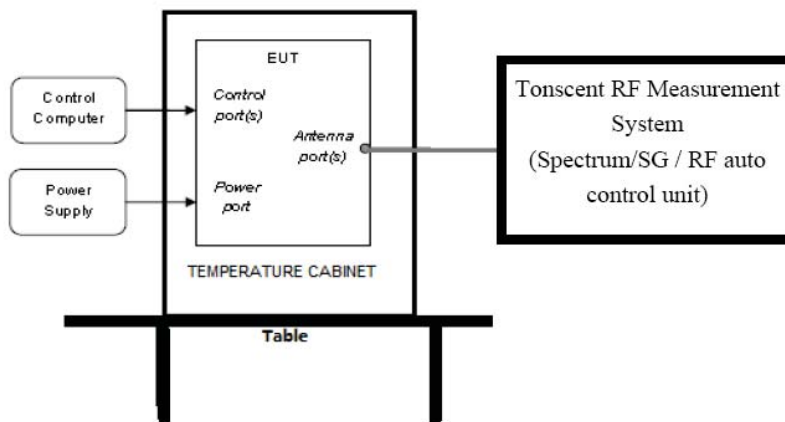
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Equipment used during test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test (Tonscend RF Measurement System)					
Spectrum analyzer	R&S	FSU26	200071	Sep. 29, 2019	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	Jun. 25, 2019	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Sep. 29, 2019	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jun. 25, 2019	1 Year
Power Sensor	Agilent	U2021XA	MY55150010	Jun. 28, 2019	1 Year
Power Sensor	Agilent	U2021XA	MY55150011	Jun. 28, 2019	1 Year
DC Power Source	MATRIS	MPS-3005L-3	D813058W	Jun. 25, 2019	1 Year
RF Cable	Micable	C10-01-01-1	100309	Sep. 29, 2019	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	Oct. 21, 2019	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.7	N/A	N/A
Radiation 1#chamber					
EMI Test Receiver	R&S	ESU8	100316	Sep. 29, 2019	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jun. 25, 2019	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Nov. 15, 2019	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Sep. 29, 2019	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Nov. 15, 2019	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	Sep. 29, 2019	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Sep. 29, 2019	1 Year
Pre-amplifier	TERA-MW	TRLA-0040 G35	101303	Sep. 29, 2019	1 Year
RF Cable	HUBSER	CP-X2+ CP-X1	W11.03+ W12.02	Sep. 29, 2019	1 Year
RF Cable	N/A	5m+6m+1m	06270619	Sep. 29, 2019	1 Year
MI Cable	HUBSER	C10-01-01-1 M	1091629	Sep. 29, 2019	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
Power Line Conducted Emissions Test					
EMI Test Receiver	R&S	ESU8	100316	Sep. 29, 2019	1 Year
LISN 1	R&S	ENV216	101109	Sep. 29, 2019	1 Year
LISN 2	R&S	ESH2-Z5	100309	Sep. 29, 2019	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Sep. 29, 2019	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Sep. 29, 2019	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A

4. 26dB Bandwidth, 6dB Bandwidth and 99% Bandwidth

4.1. Block diagram of test setup



4.2. Limits

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	5470-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

4.3. Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth: RBW=100 kHz For 26 dB Bandwidth: approximately 1% of the emission bandwidth.
VBW	For 6 dB Bandwidth: VBW=300 kHz For 26 dB Bandwidth: >3 RBW
Trace	Max hold
Sweep	Auto couple

(2) Allow the trace to stabilize, 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 26 dB and 6 dB relative to the maximum level measured in the fundamental emission.

4.4. Test Result

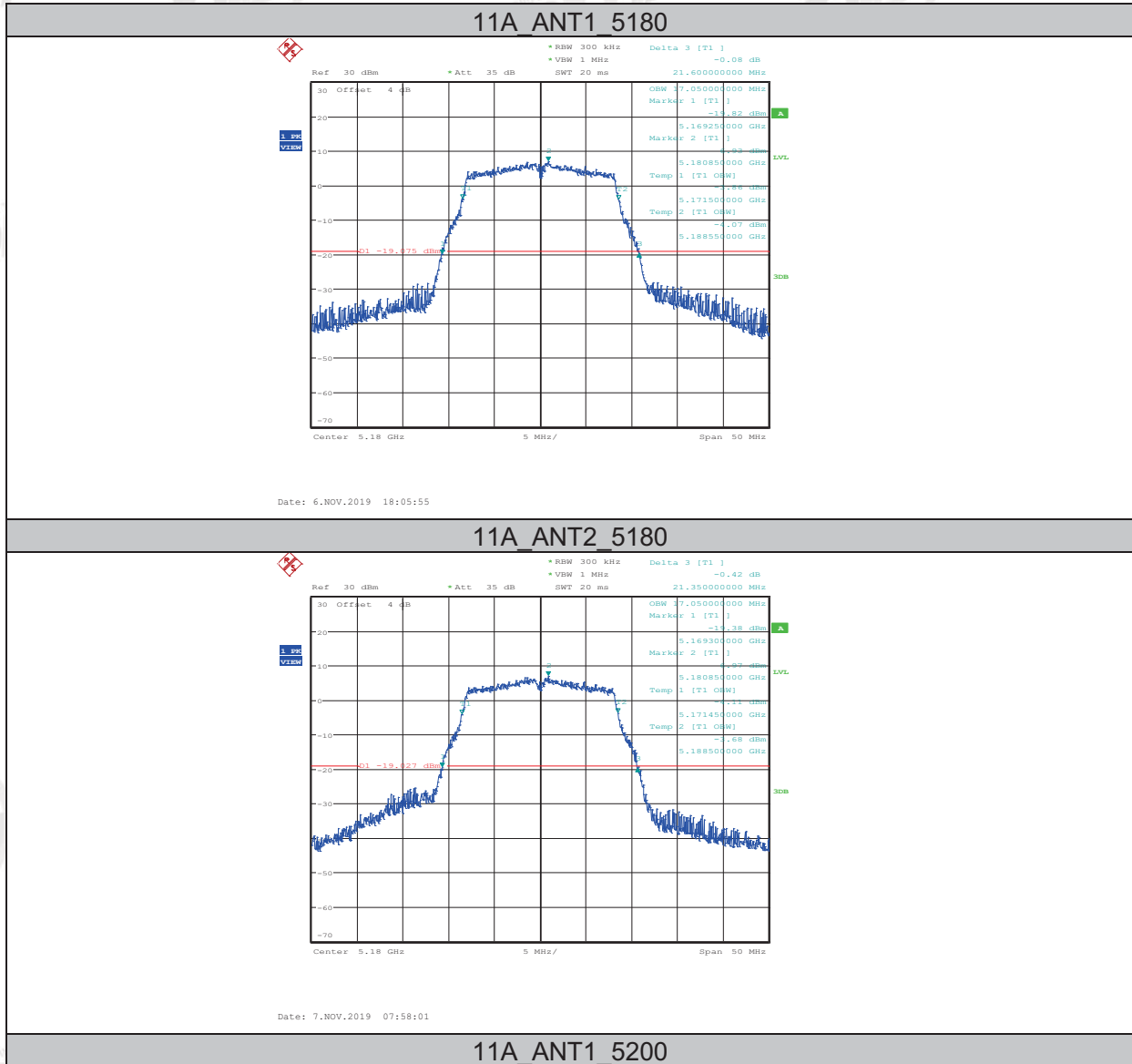
Test Mode	Antenna	Channel	99% BW[MHz]	EBW[MHz]	Limit [MHz]	Verdict
11A	ANT1	5180	17.05	21.60	---	PASS
11A	ANT2	5180	17.05	21.35	---	PASS
11A	ANT1	5200	17.00	21.70	---	PASS
11A	ANT2	5200	17.10	21.40	---	PASS
11A	ANT1	5240	17.10	21.40	---	PASS
11A	ANT2	5240	17.10	21.55	---	PASS
11A	ANT1	5260	17.15	21.65	---	PASS
11A	ANT2	5260	17.10	21.50	---	PASS
11A	ANT1	5280	17.20	21.35	---	PASS
11A	ANT2	5280	17.15	21.60	---	PASS
11A	ANT1	5320	17.10	21.50	---	PASS
11A	ANT2	5320	17.05	21.50	---	PASS
11A	ANT1	5500	17.05	21.65	---	PASS
11A	ANT2	5500	17.05	21.65	---	PASS
11A	ANT1	5580	17.05	21.65	---	PASS
11A	ANT2	5580	17.10	21.50	---	PASS
11A	ANT1	5700	17.10	21.65	---	PASS
11A	ANT2	5700	17.05	21.75	---	PASS
11A	ANT1	5745	17.05	16.45	0.5	PASS
11A	ANT2	5745	17.05	16.45	0.5	PASS
11A	ANT1	5785	17.05	16.40	0.5	PASS
11A	ANT2	5785	17.05	16.40	0.5	PASS
11A	ANT1	5825	17.10	16.40	0.5	PASS
11A	ANT2	5825	17.00	16.40	0.5	PASS
11N20MIMO	ANT1	5180	18.15	21.85	---	PASS
11N20MIMO	ANT2	5180	17.90	21.45	---	PASS
11N20MIMO	ANT1	5200	18.15	21.90	---	PASS
11N20MIMO	ANT2	5200	17.85	21.50	---	PASS
11N20MIMO	ANT1	5240	18.25	22.75	---	PASS
11N20MIMO	ANT2	5240	17.95	21.55	---	PASS
11N20MIMO	ANT1	5260	18.20	23.90	---	PASS
11N20MIMO	ANT2	5260	17.95	21.30	---	PASS
11N20MIMO	ANT1	5280	18.30	26.70	---	PASS
11N20MIMO	ANT2	5280	18.05	24.45	---	PASS
11N20MIMO	ANT1	5320	18.15	21.80	---	PASS
11N20MIMO	ANT2	5320	18.05	23.45	---	PASS

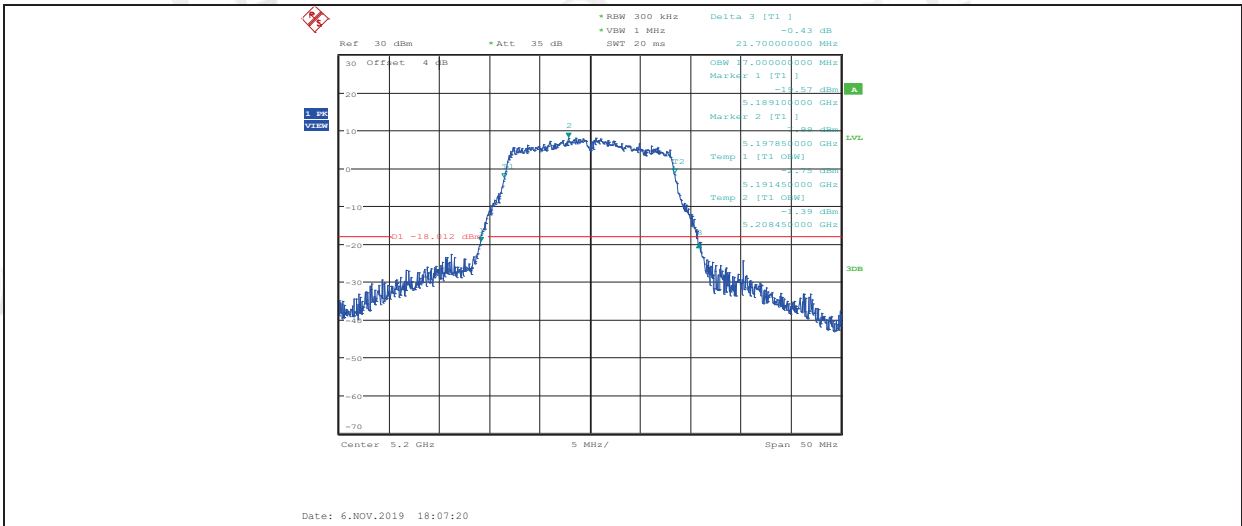
11N20MIMO	ANT1	5500	18.15	21.80	---	PASS
11N20MIMO	ANT2	5500	17.85	21.45	---	PASS
11N20MIMO	ANT1	5580	18.15	21.85	---	PASS
11N20MIMO	ANT2	5580	17.90	21.55	---	PASS
11N20MIMO	ANT1	5700	18.10	21.70	---	PASS
11N20MIMO	ANT2	5700	17.90	21.50	---	PASS
11N20MIMO	ANT1	5745	18.15	17.65	0.5	PASS
11N20MIMO	ANT2	5745	17.90	17.45	0.5	PASS
11N20MIMO	ANT1	5785	18.10	17.65	0.5	PASS
11N20MIMO	ANT2	5785	17.90	17.65	0.5	PASS
11N20MIMO	ANT1	5825	18.10	17.65	0.5	PASS
11N20MIMO	ANT2	5825	17.95	17.65	0.5	PASS
11N40MIMO	ANT1	5190	36.80	41.40	---	PASS
11N40MIMO	ANT2	5190	36.80	41.40	---	PASS
11N40MIMO	ANT1	5230	36.90	42.10	---	PASS
11N40MIMO	ANT2	5230	36.90	41.30	---	PASS
11N40MIMO	ANT1	5270	37.00	44.70	---	PASS
11N40MIMO	ANT2	5270	36.90	41.40	---	PASS
11N40MIMO	ANT1	5310	36.90	42.70	---	PASS
11N40MIMO	ANT2	5310	36.90	41.20	---	PASS
11N40MIMO	ANT1	5510	36.80	42.00	---	PASS
11N40MIMO	ANT2	5510	36.90	42.00	---	PASS
11N40MIMO	ANT1	5550	36.90	41.40	---	PASS
11N40MIMO	ANT2	5550	37.10	41.00	---	PASS
11N40MIMO	ANT1	5670	37.00	41.20	---	PASS
11N40MIMO	ANT2	5670	37.10	41.90	---	PASS
11N40MIMO	ANT1	5755	36.90	36.60	0.5	PASS
11N40MIMO	ANT2	5755	37.20	36.60	0.5	PASS
11N40MIMO	ANT1	5795	37.00	36.60	0.5	PASS
11N40MIMO	ANT2	5795	37.10	36.50	0.5	PASS
11AC20MIMO	ANT1	5180	18.10	21.70	---	PASS
11AC20MIMO	ANT2	5180	18.10	21.95	---	PASS
11AC20MIMO	ANT1	5200	18.15	21.85	---	PASS
11AC20MIMO	ANT2	5200	18.15	21.85	---	PASS
11AC20MIMO	ANT1	5240	18.15	21.75	---	PASS
11AC20MIMO	ANT2	5240	18.15	21.70	---	PASS
11AC20MIMO	ANT1	5260	18.15	21.95	---	PASS
11AC20MIMO	ANT2	5260	18.20	22.35	---	PASS
11AC20MIMO	ANT1	5280	18.20	21.80	---	PASS

11AC20MIMO	ANT2	5280	18.20	22.05	---	PASS
11AC20MIMO	ANT1	5320	18.10	21.60	---	PASS
11AC20MIMO	ANT2	5320	18.15	22.15	---	PASS
11AC20MIMO	ANT1	5500	18.10	21.75	---	PASS
11AC20MIMO	ANT2	5500	18.10	21.90	---	PASS
11AC20MIMO	ANT1	5580	18.05	21.50	---	PASS
11AC20MIMO	ANT2	5580	18.10	21.75	---	PASS
11AC20MIMO	ANT1	5700	18.15	21.80	---	PASS
11AC20MIMO	ANT2	5700	18.10	21.75	---	PASS
11AC20MIMO	ANT1	5745	18.10	17.75	0.5	PASS
11AC20MIMO	ANT2	5745	18.05	17.85	0.5	PASS
11AC20MIMO	ANT1	5785	18.15	17.85	0.5	PASS
11AC20MIMO	ANT2	5785	18.10	17.70	0.5	PASS
11AC20MIMO	ANT1	5825	18.10	17.75	0.5	PASS
11AC20MIMO	ANT2	5825	18.10	17.75	0.5	PASS
11AC40MIMO	ANT1	5190	36.90	41.20	---	PASS
11AC40MIMO	ANT2	5190	36.80	41.30	---	PASS
11AC40MIMO	ANT1	5230	37.20	50.60	---	PASS
11AC40MIMO	ANT2	5230	37.00	41.20	---	PASS
11AC40MIMO	ANT1	5270	36.90	42.00	---	PASS
11AC40MIMO	ANT2	5270	37.00	41.50	---	PASS
11AC40MIMO	ANT1	5310	37.00	43.20	---	PASS
11AC40MIMO	ANT2	5310	36.90	41.90	---	PASS
11AC40MIMO	ANT1	5510	36.80	41.60	---	PASS
11AC40MIMO	ANT2	5510	36.80	41.40	---	PASS
11AC40MIMO	ANT1	5550	37.00	42.50	---	PASS
11AC40MIMO	ANT2	5550	36.90	41.20	---	PASS
11AC40MIMO	ANT1	5670	37.00	41.50	---	PASS
11AC40MIMO	ANT2	5670	36.90	47.40	---	PASS
11AC40MIMO	ANT1	5755	37.00	36.60	0.5	PASS
11AC40MIMO	ANT2	5755	37.30	36.60	0.5	PASS
11AC40MIMO	ANT1	5795	36.90	36.40	0.5	PASS
11AC40MIMO	ANT2	5795	37.40	36.70	0.5	PASS
11AC80MIMO	ANT1	5210	76.60	85.20	---	PASS
11AC80MIMO	ANT2	5210	76.40	84.80	---	PASS
11AC80MIMO	ANT1	5290	76.80	86.40	---	PASS
11AC80MIMO	ANT2	5290	77.60	88.00	---	PASS
11AC80MIMO	ANT1	5530	76.40	85.80	---	PASS
11AC80MIMO	ANT2	5530	77.20	87.00	---	PASS

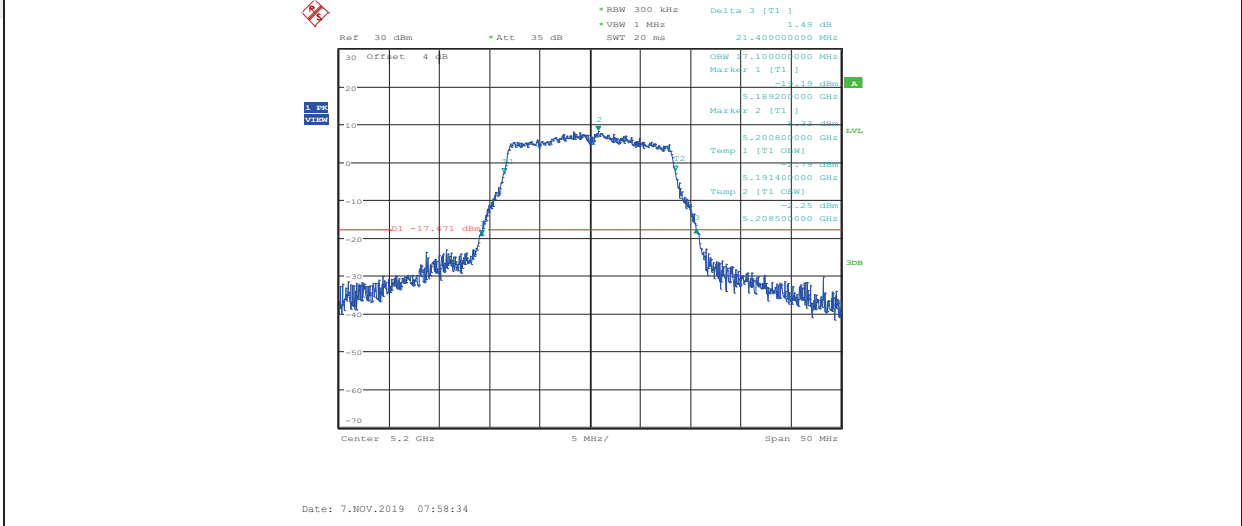
11AC80MIMO	ANT1	5610	77.00	91.00	---	PASS
11AC80MIMO	ANT2	5610	76.60	89.40	---	PASS
11AC80MIMO	ANT1	5775	76.40	75.60	0.5	PASS
11AC80MIMO	ANT2	5775	77.40	76.00	0.5	PASS

4.5. Original test data

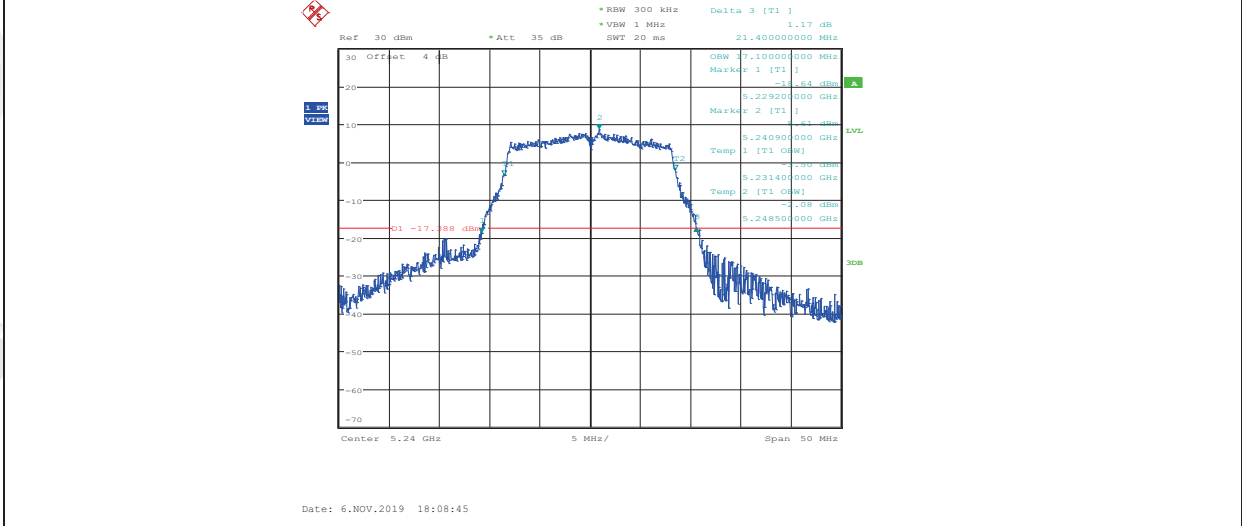




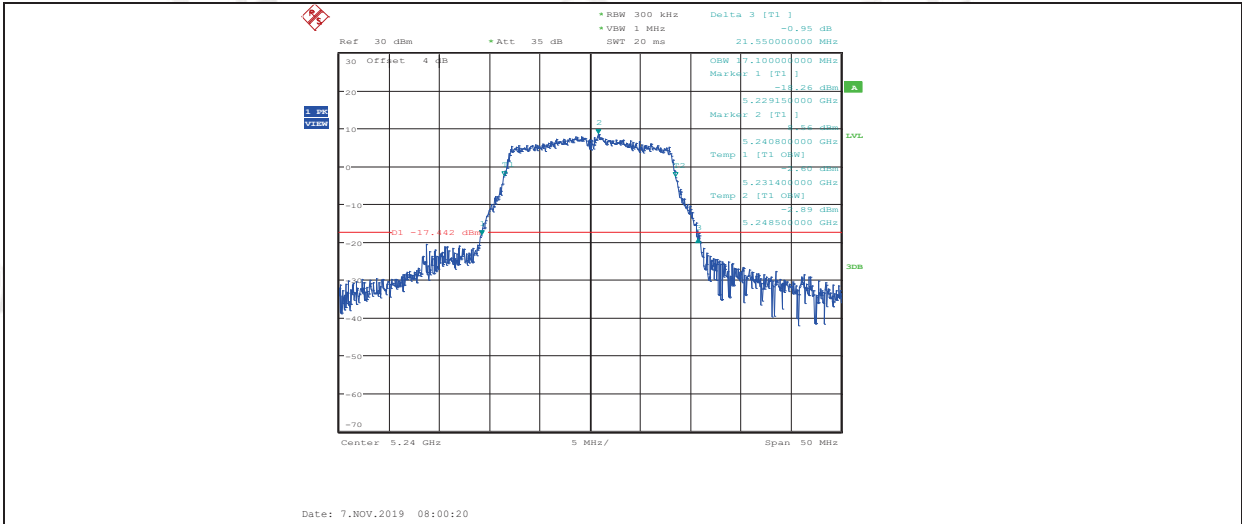
11A ANT2 5200



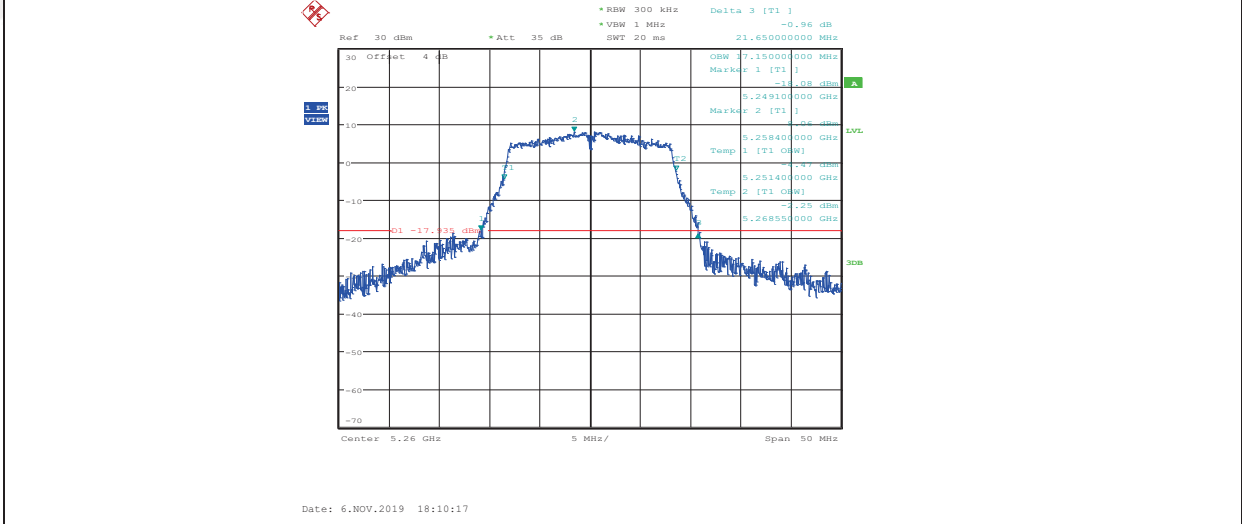
11A ANT1 5240



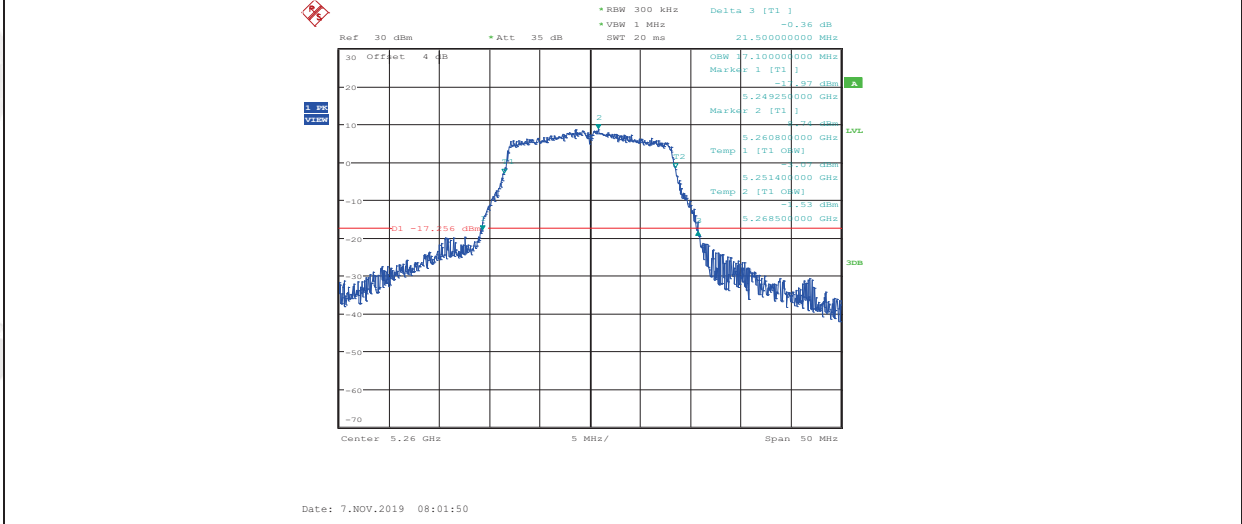
11A ANT2 5240



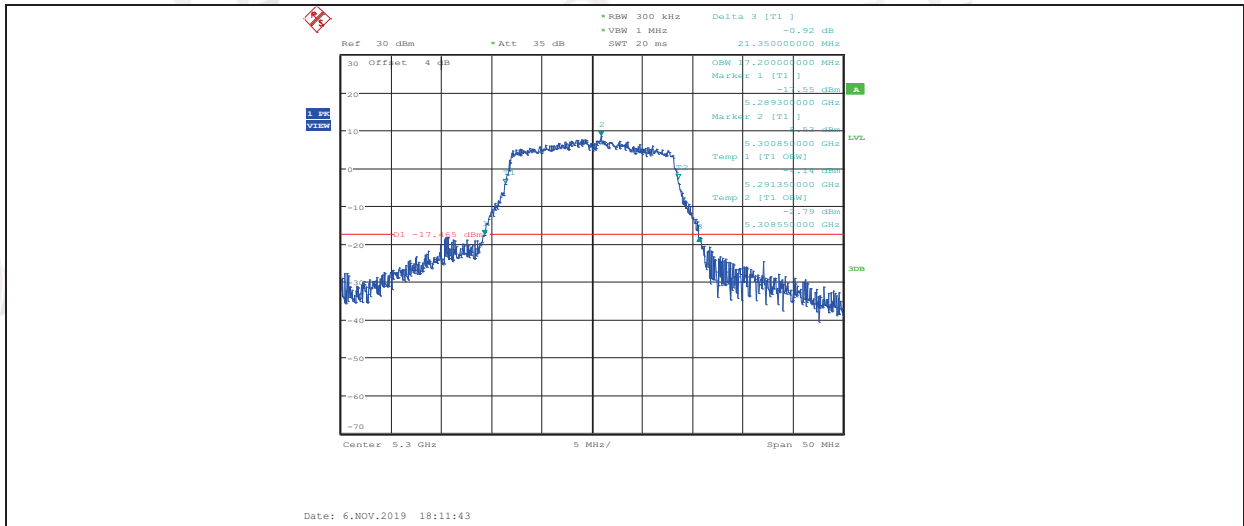
11A ANT1 5260



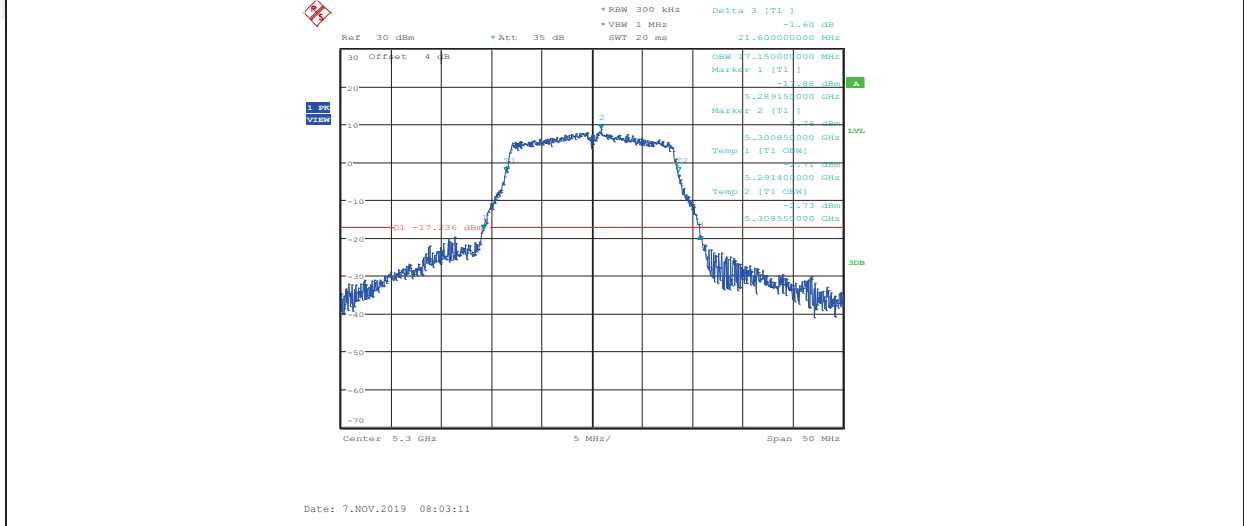
11A ANT2 5260



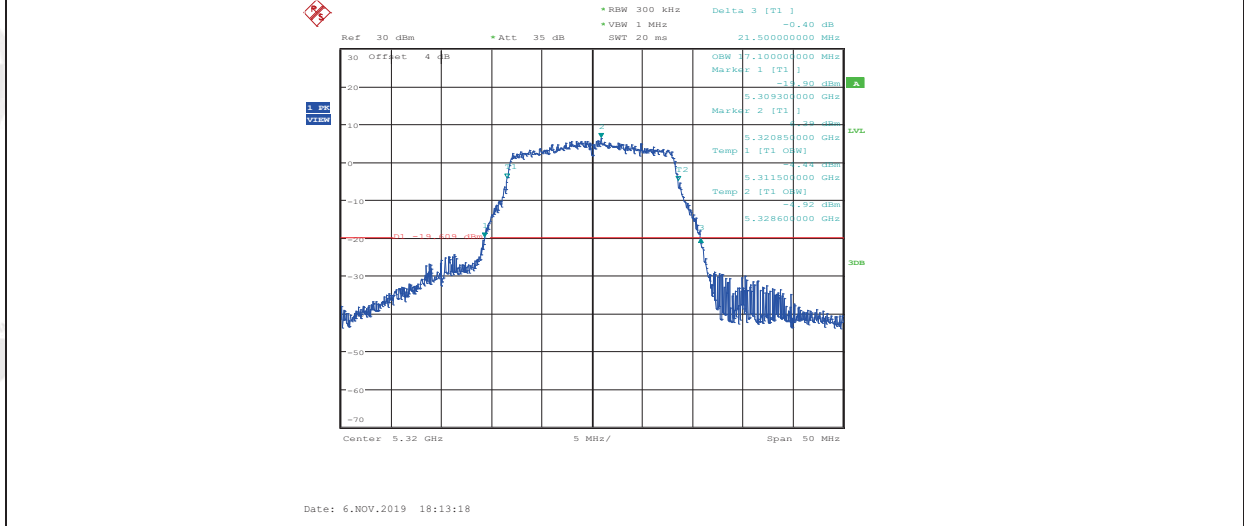
11A ANT1 5300



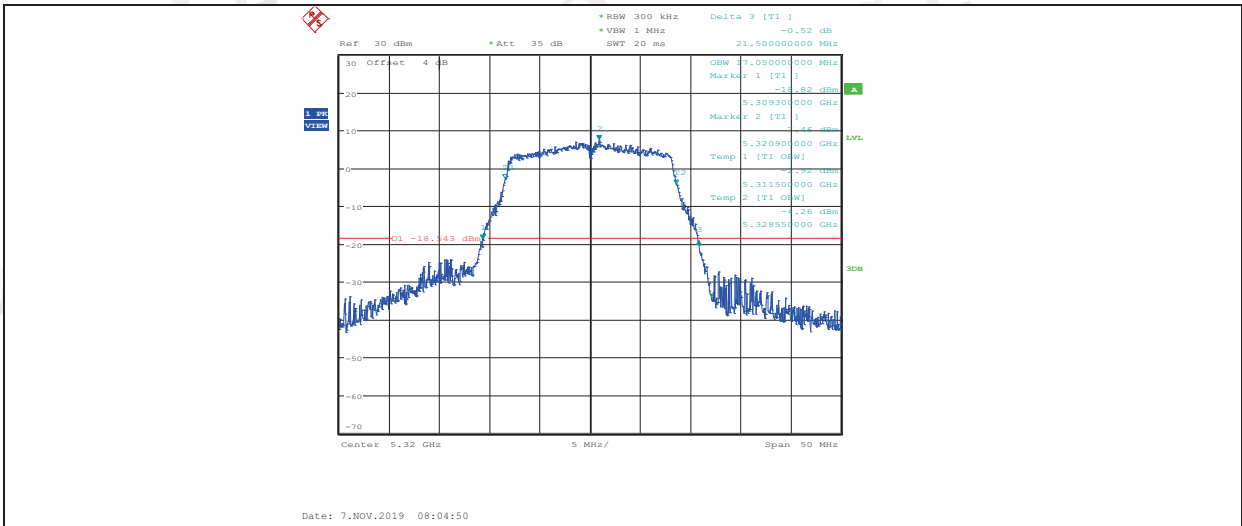
11A ANT2 5300



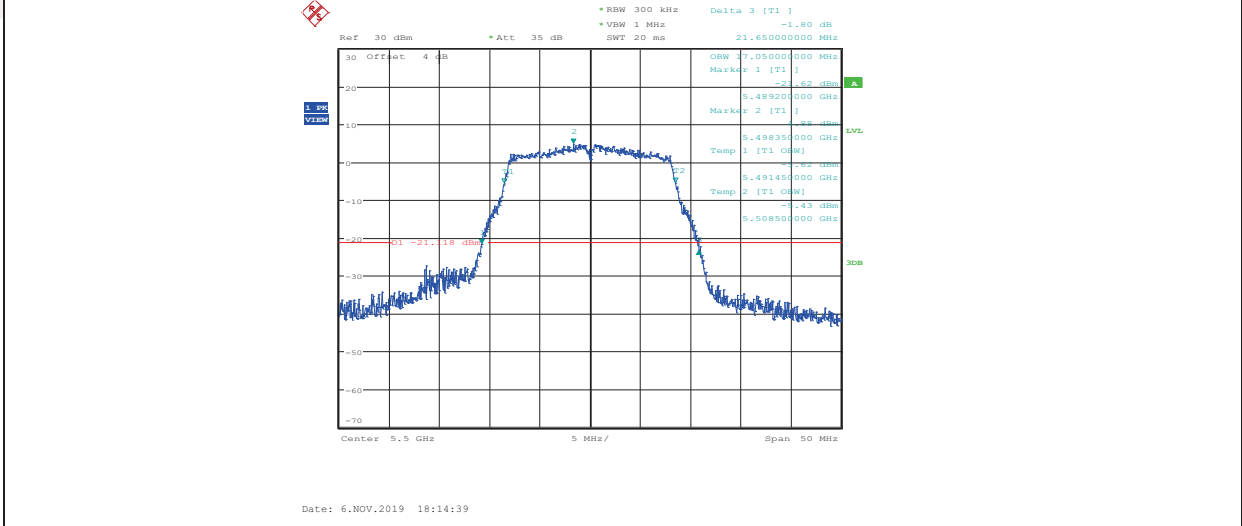
11A ANT1 5320



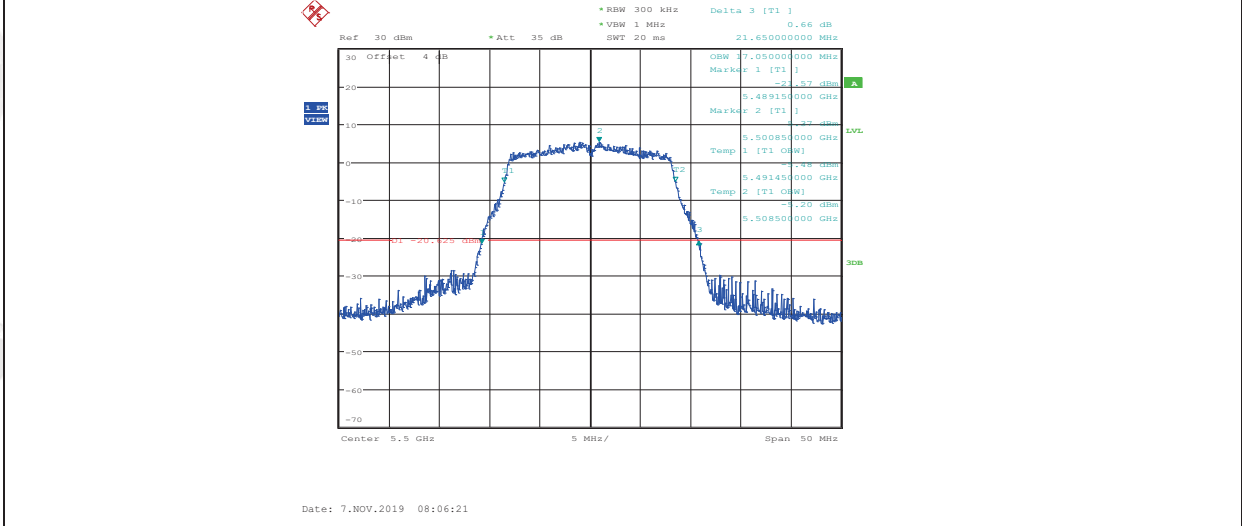
11A ANT2 5320



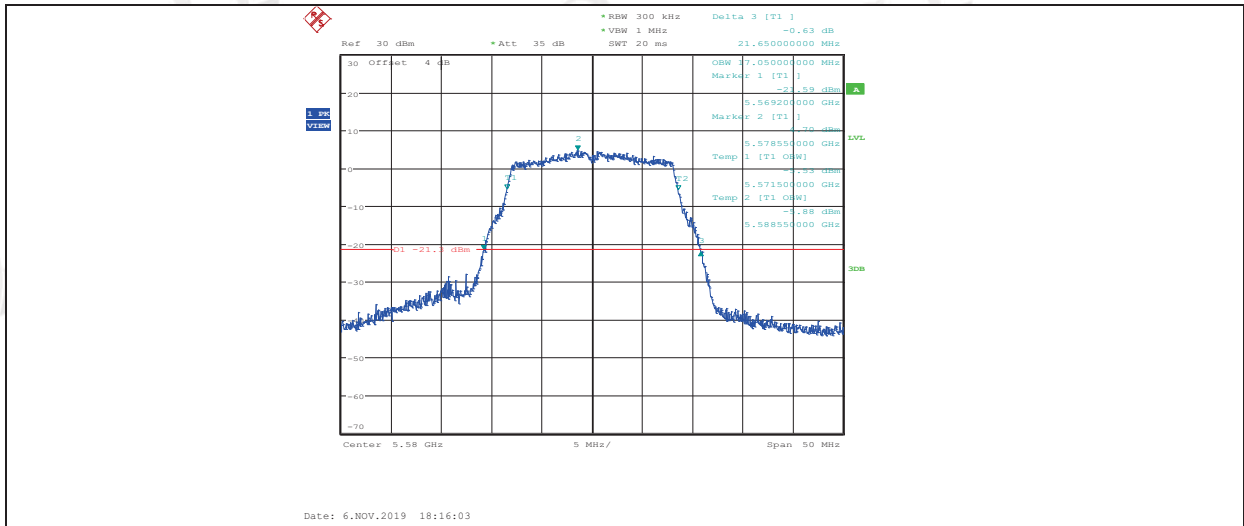
11A ANT1 5500



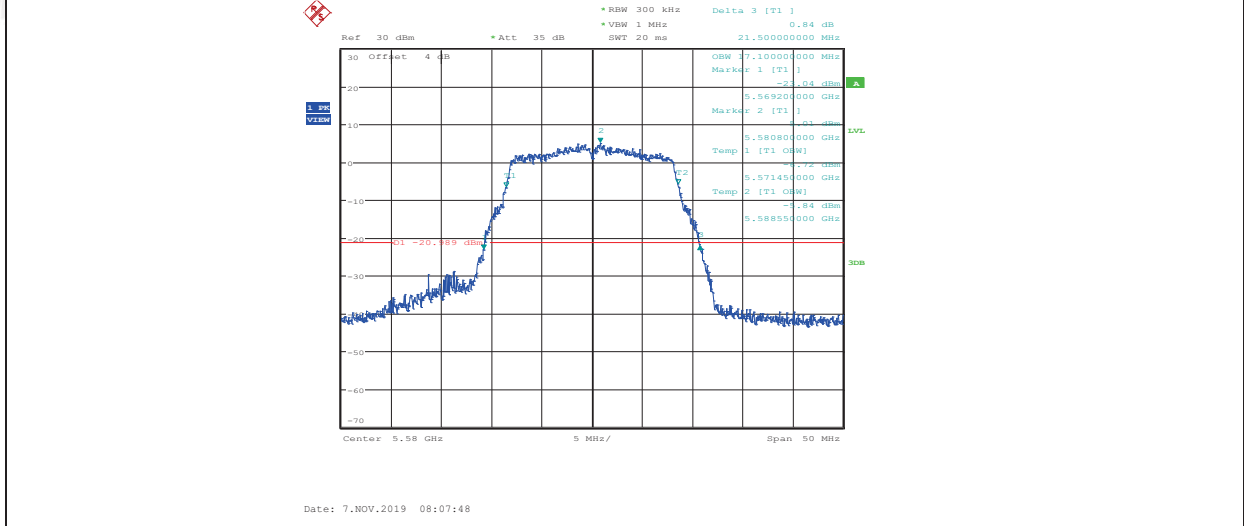
11A ANT2 5500



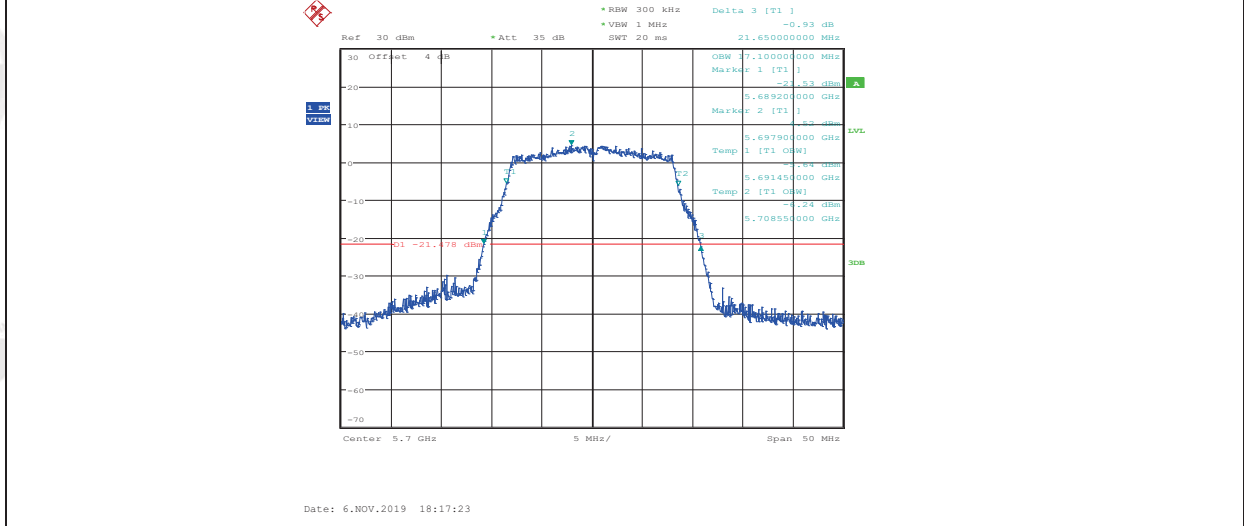
11A ANT1 5580



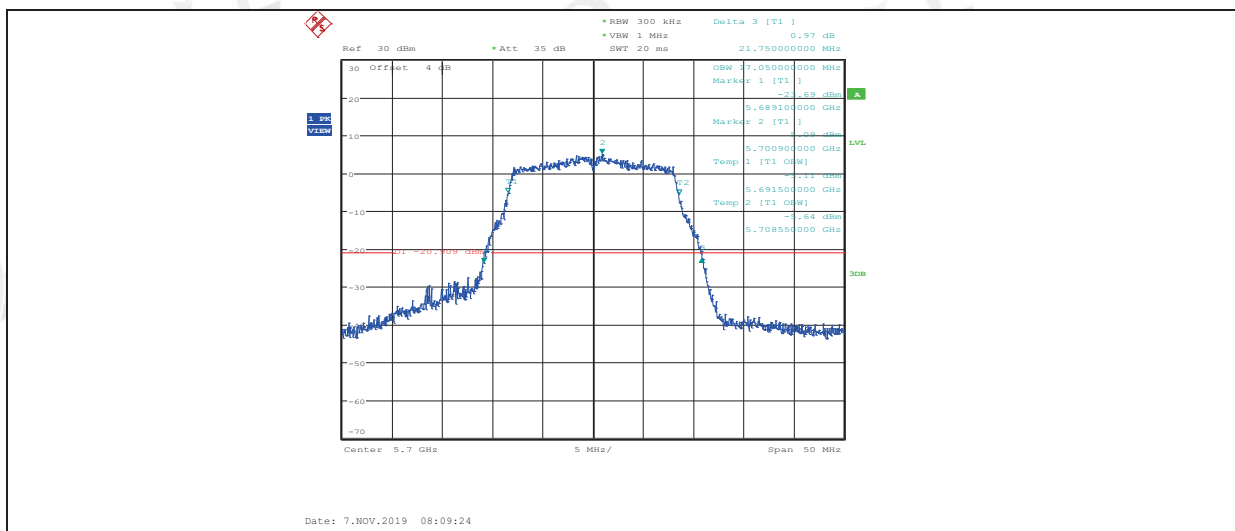
11A ANT2 5580



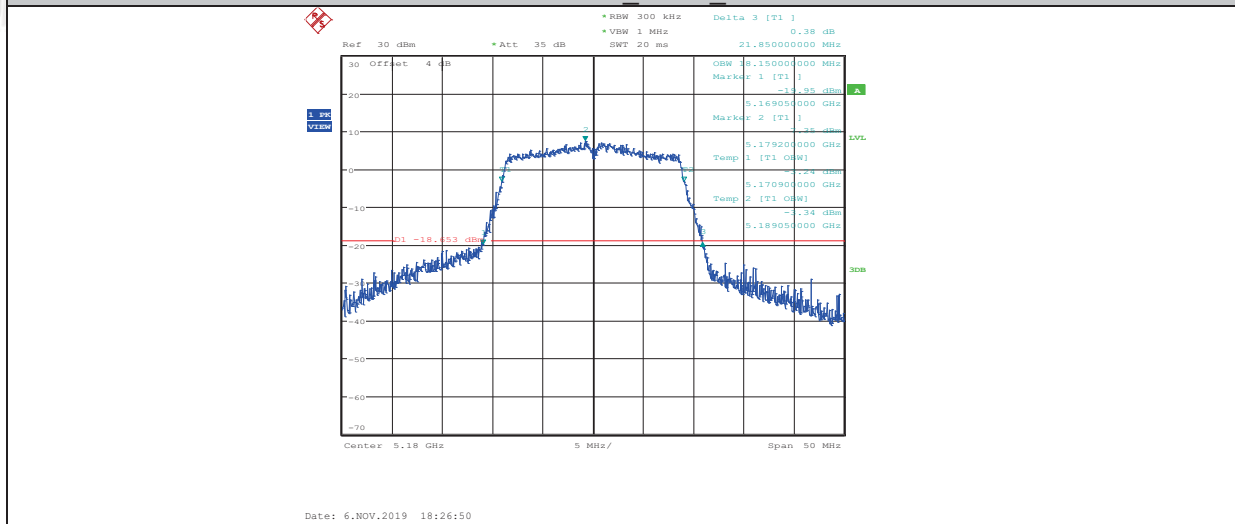
11A ANT1 5700



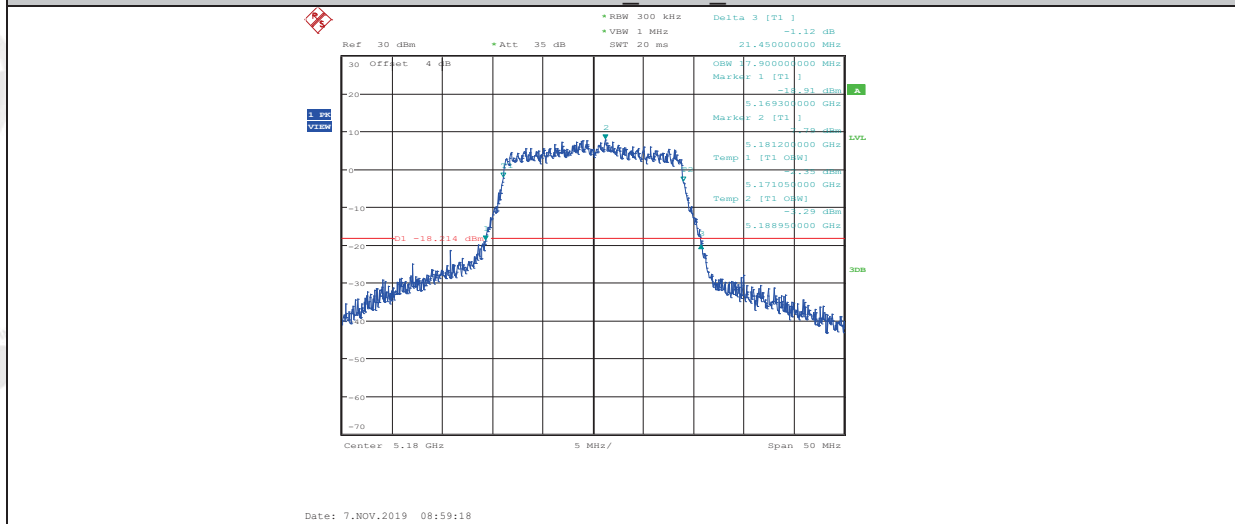
11A ANT2 5700



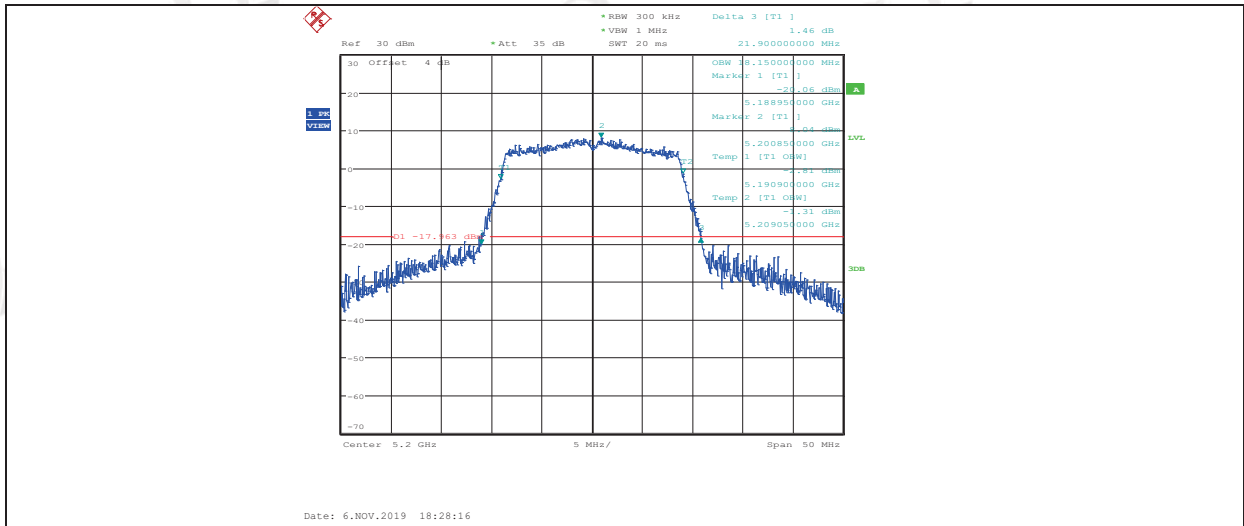
11N20MIMO ANT1 5180



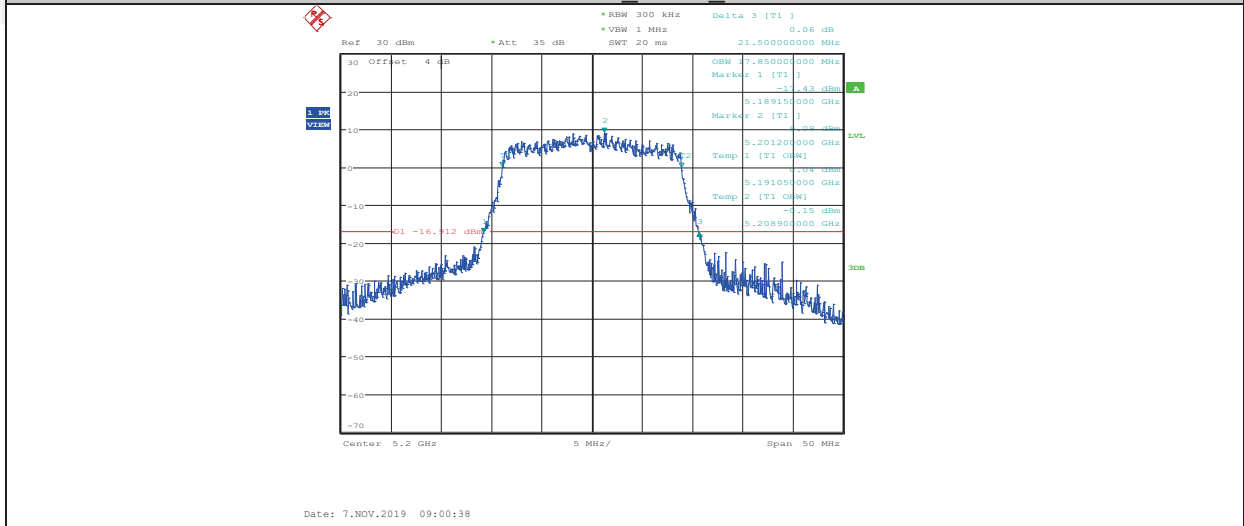
11N20MIMO ANT2 5180



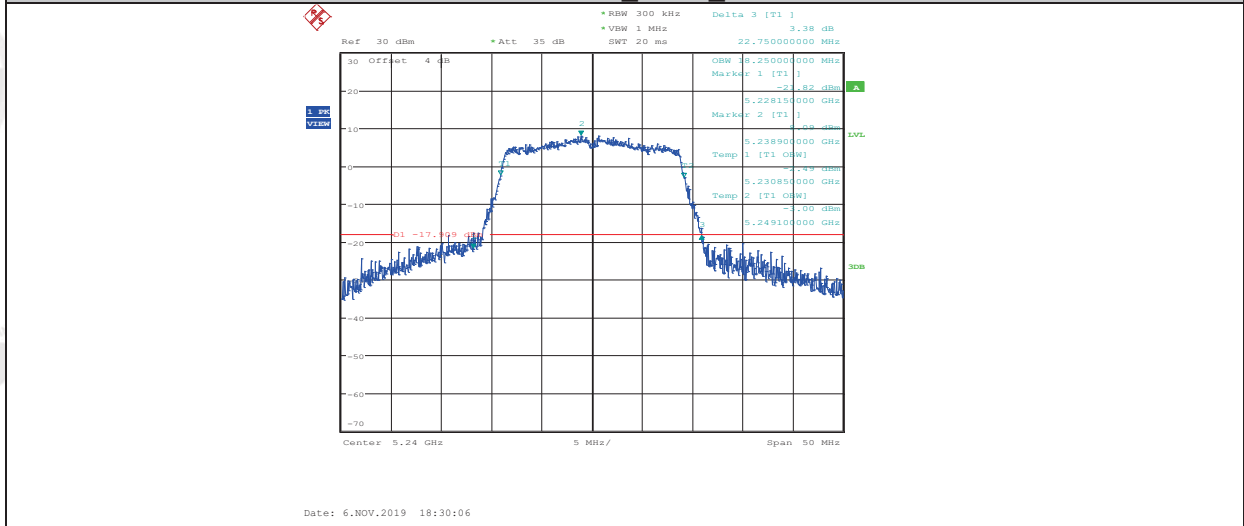
11N20MIMO ANT1 5200



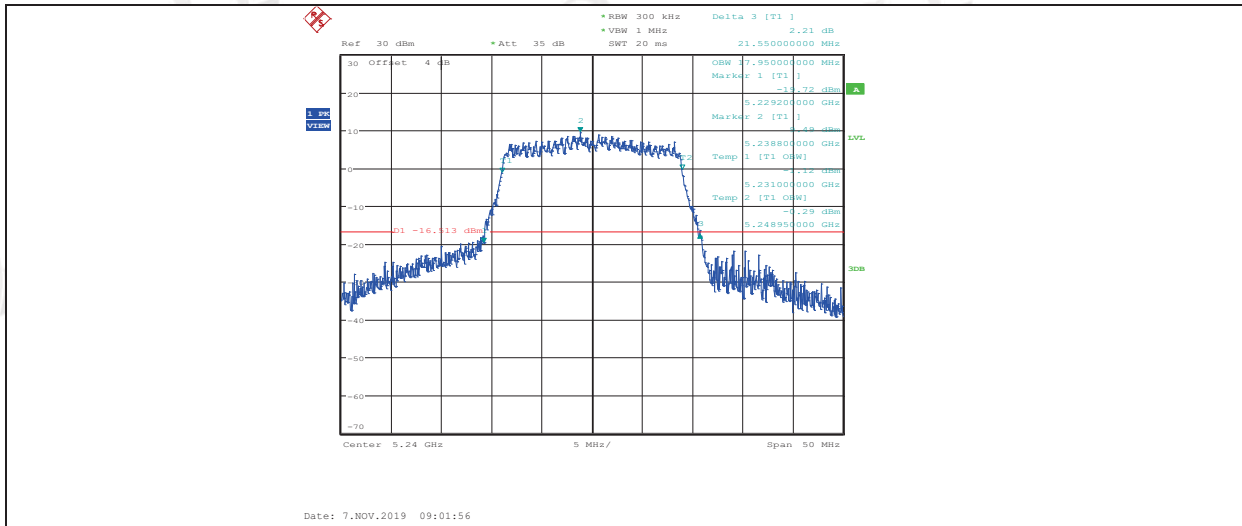
11N20MIMO_ANT2_5200



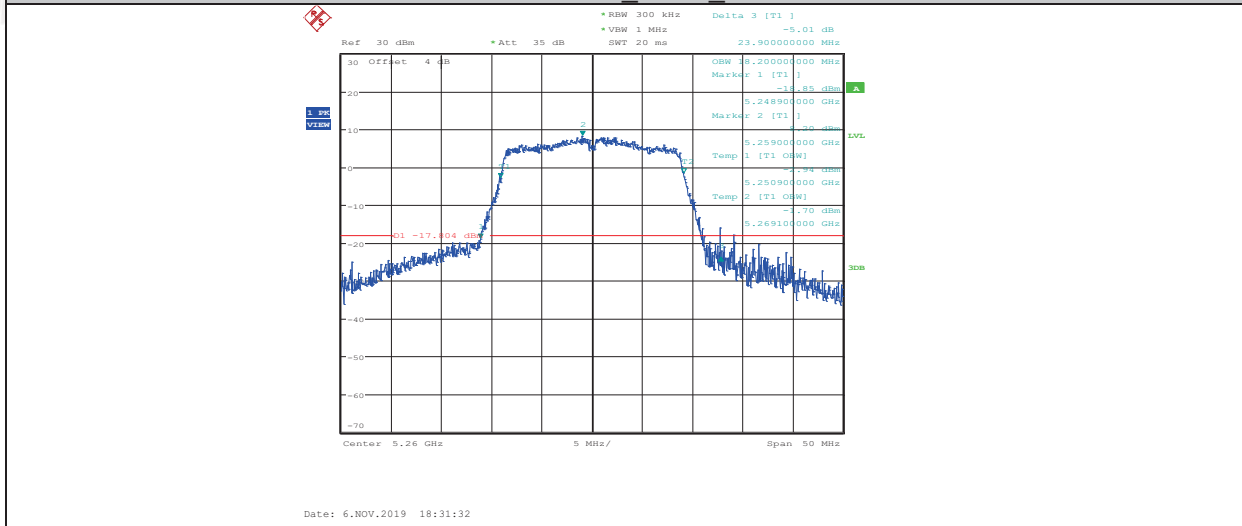
11N20MIMO_ANT1_5240



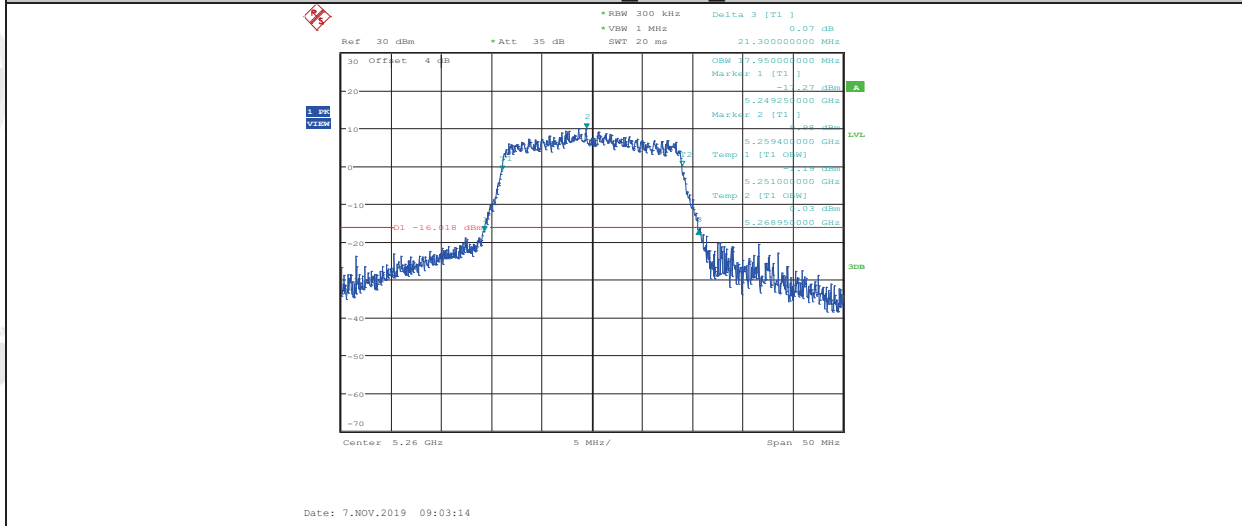
11N20MIMO_ANT2_5240



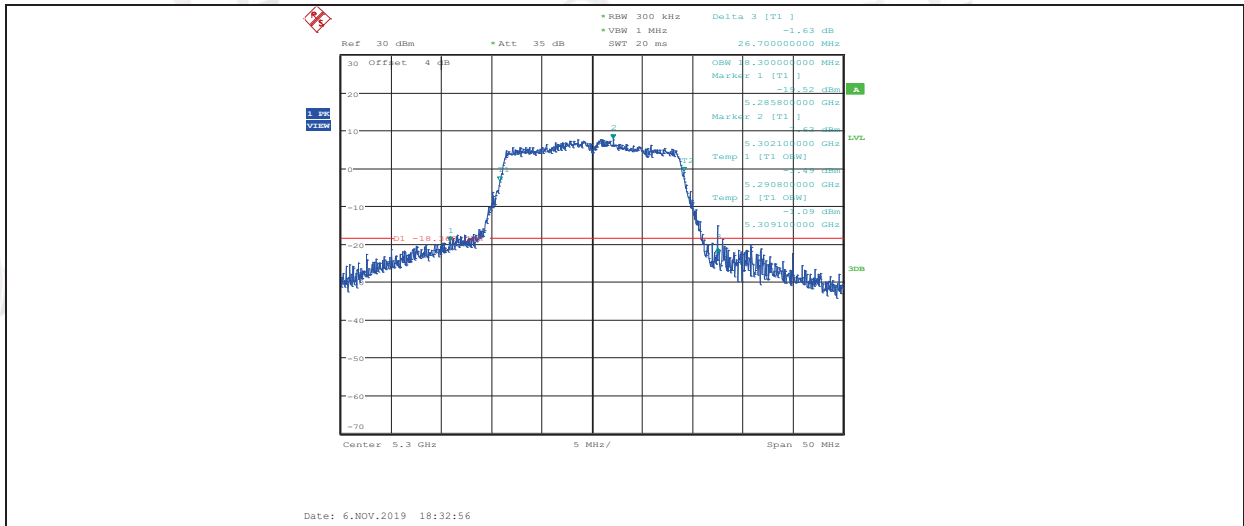
11N20MIMO ANT1 5260



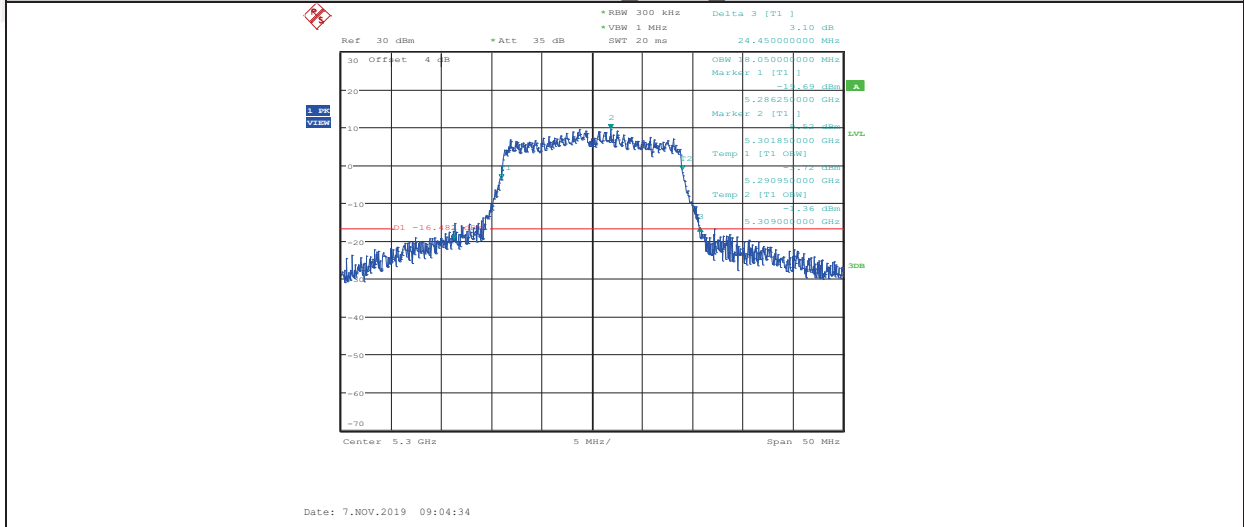
11N20MIMO ANT2 5260



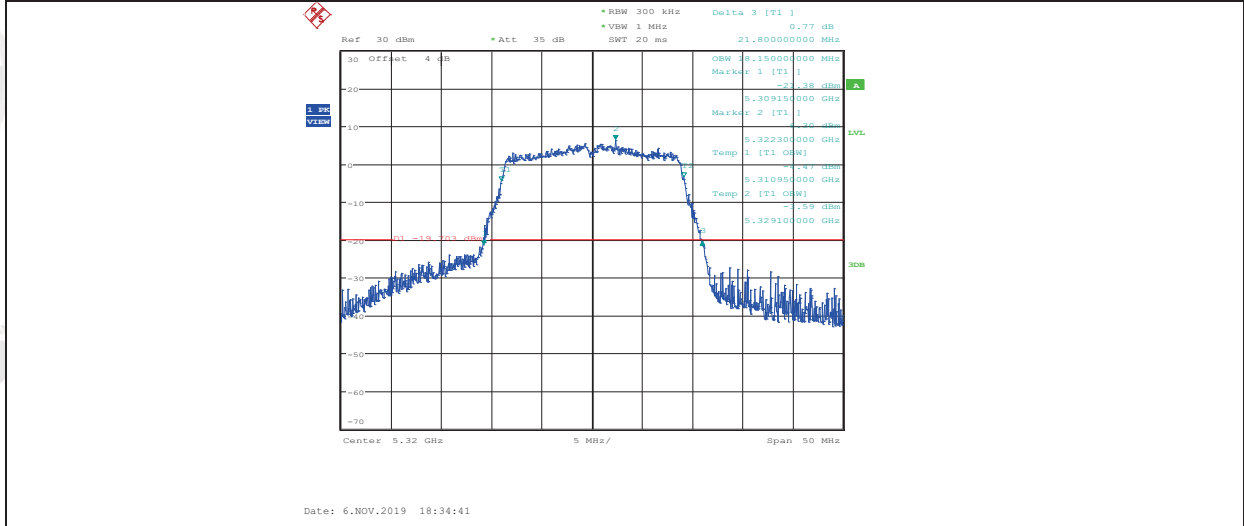
11N20MIMO ANT1 5300



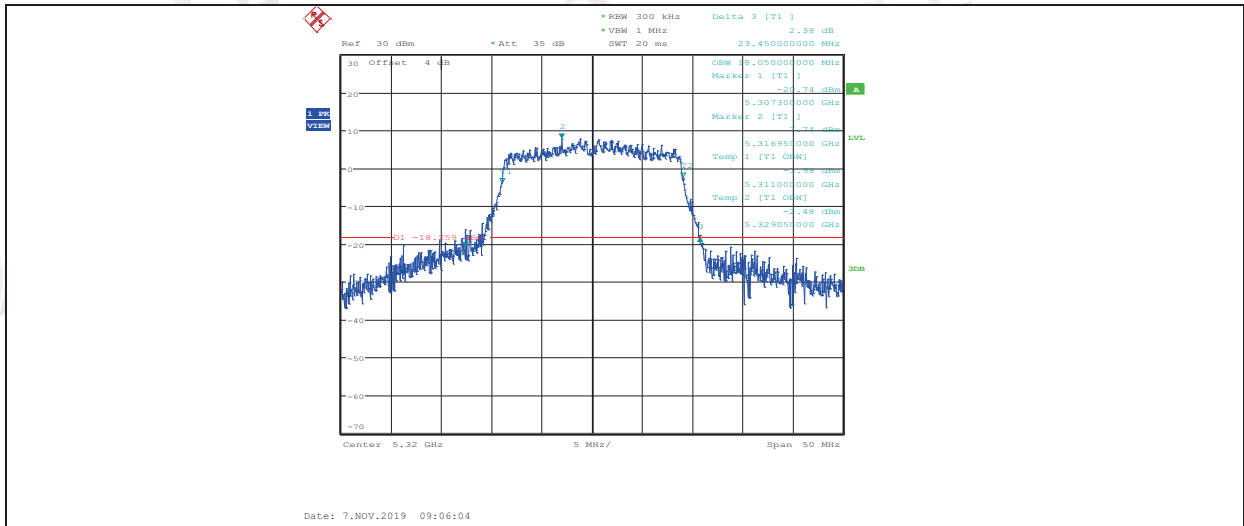
11N20MIMO_ANT2_5300



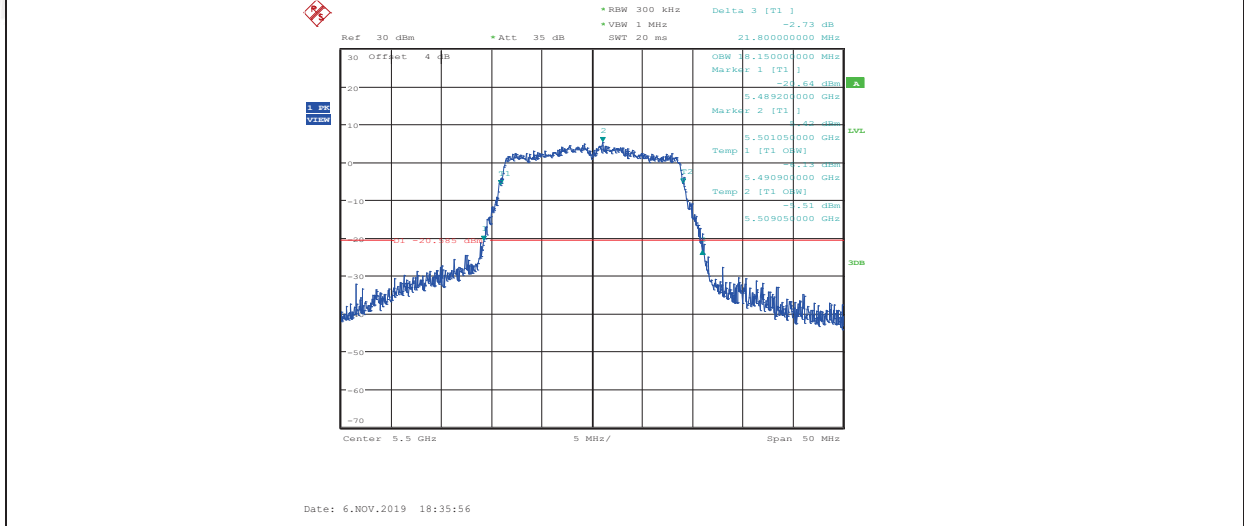
11N20MIMO_ANT1_5320



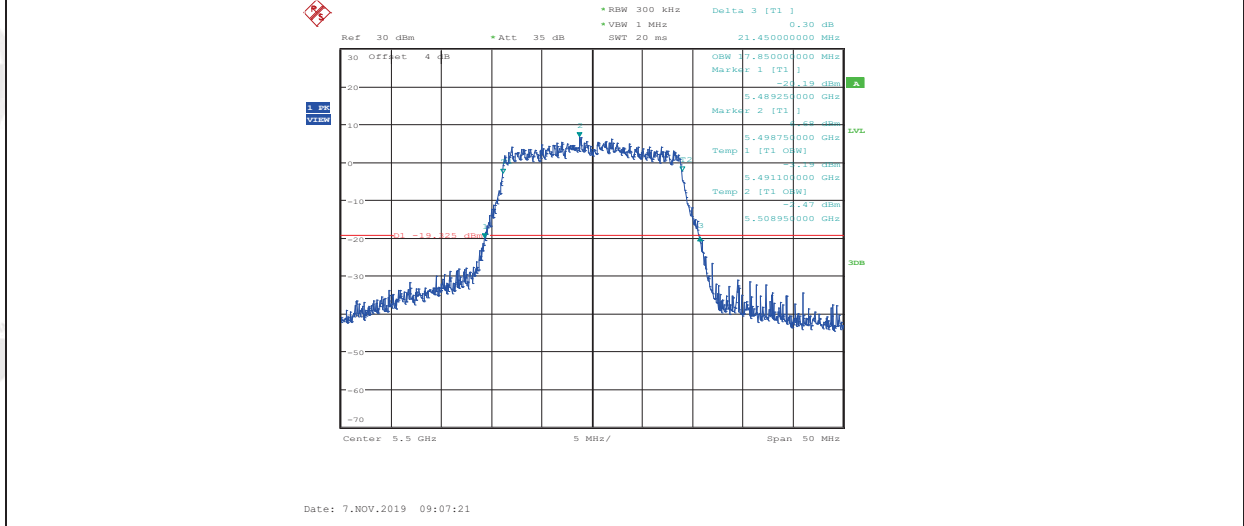
11N20MIMO_ANT2_5320



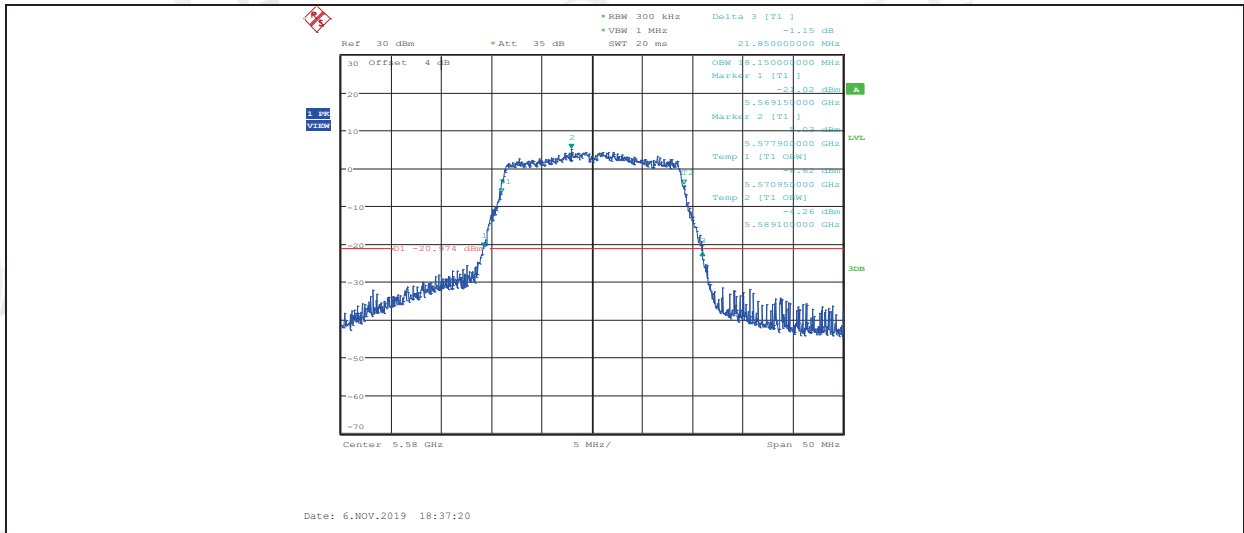
11N20MIMO ANT1 5500



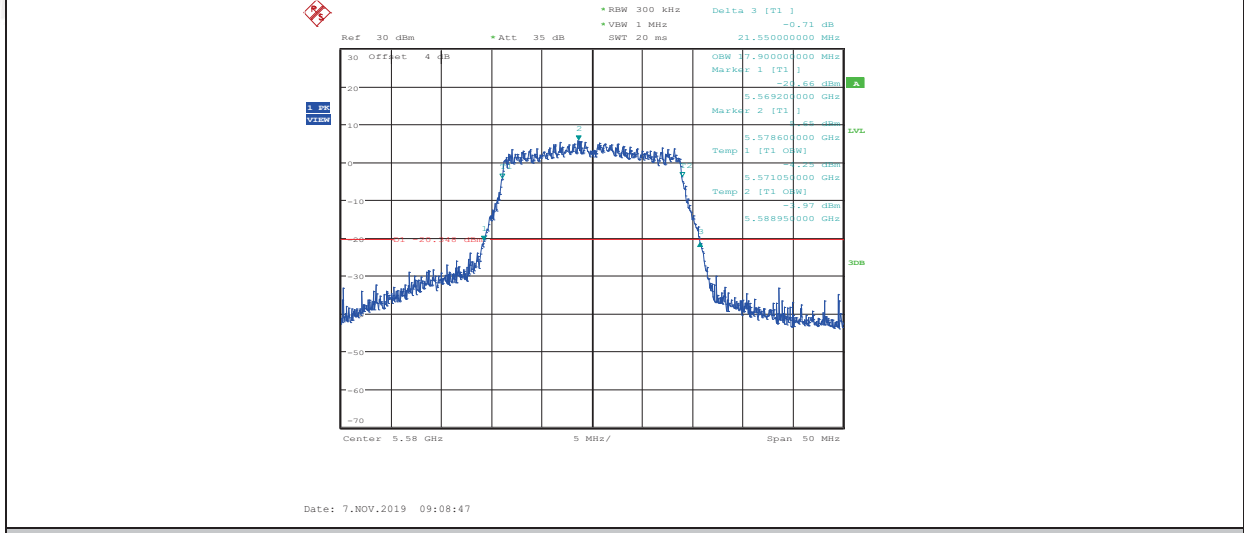
11N20MIMO ANT2 5500



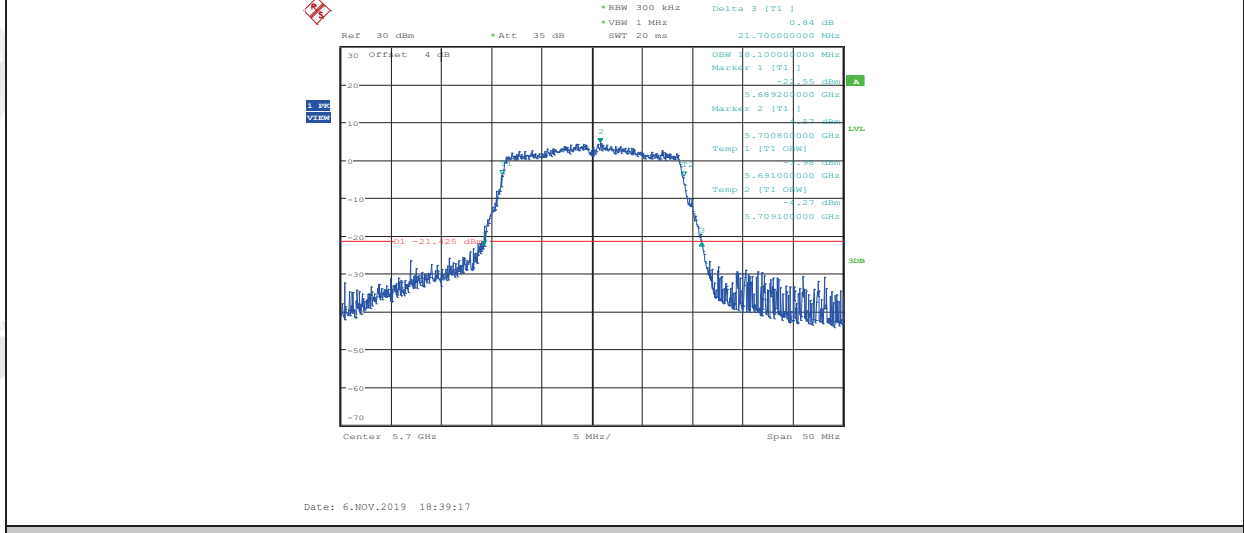
11N20MIMO ANT1 5580



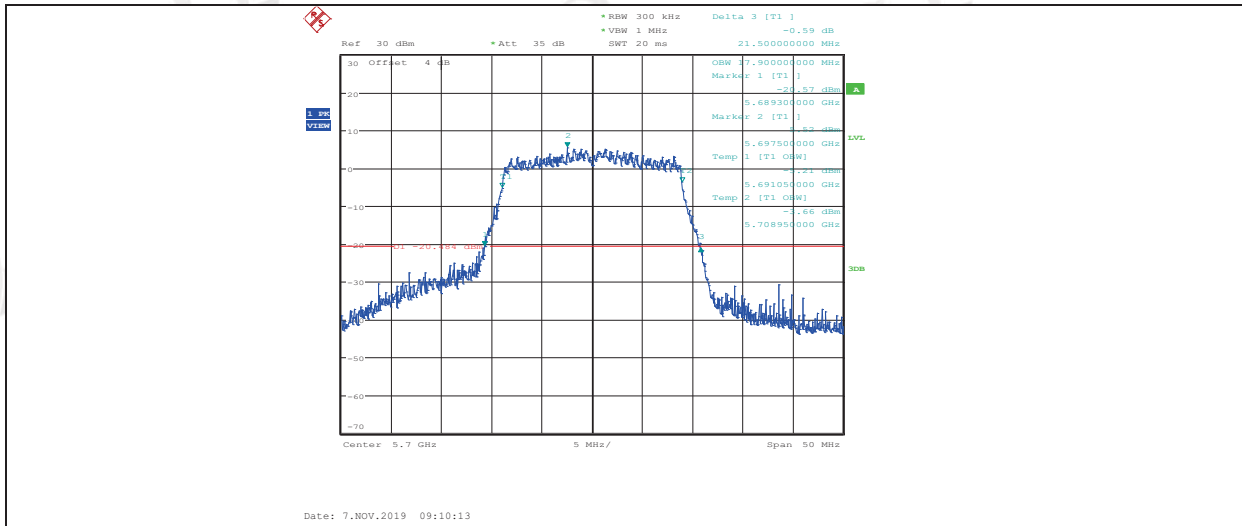
11N20MIMO_ANT2_5580



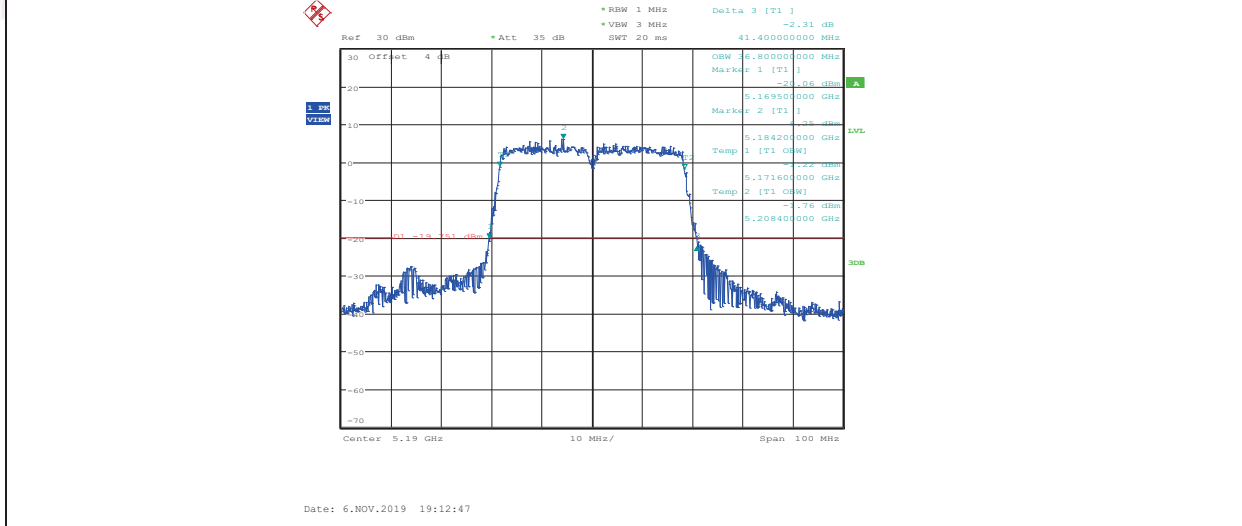
11N20MIMO_ANT1_5700



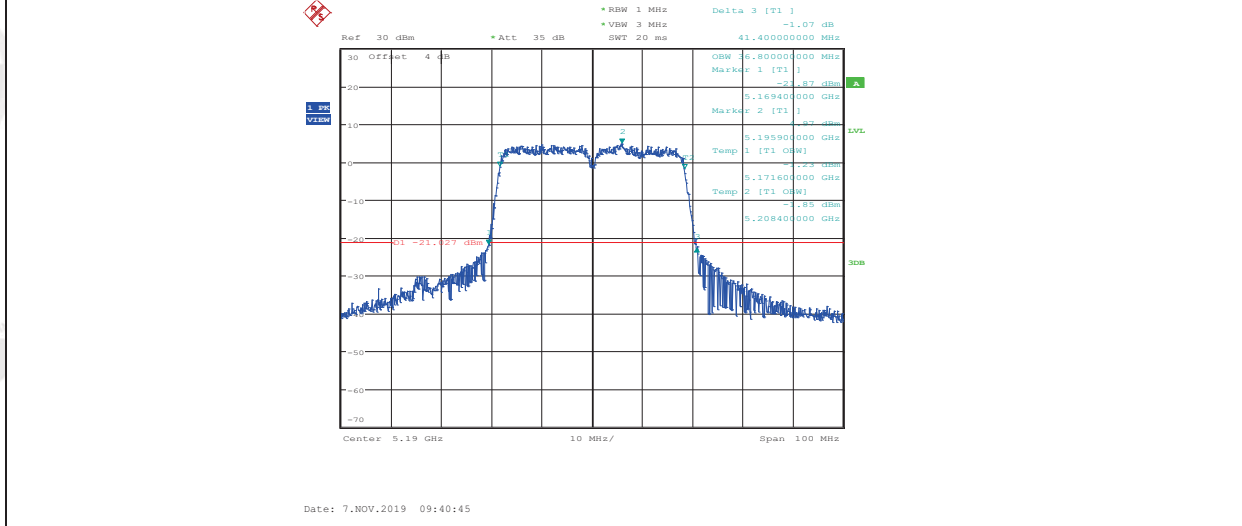
11N20MIMO_ANT2_5700



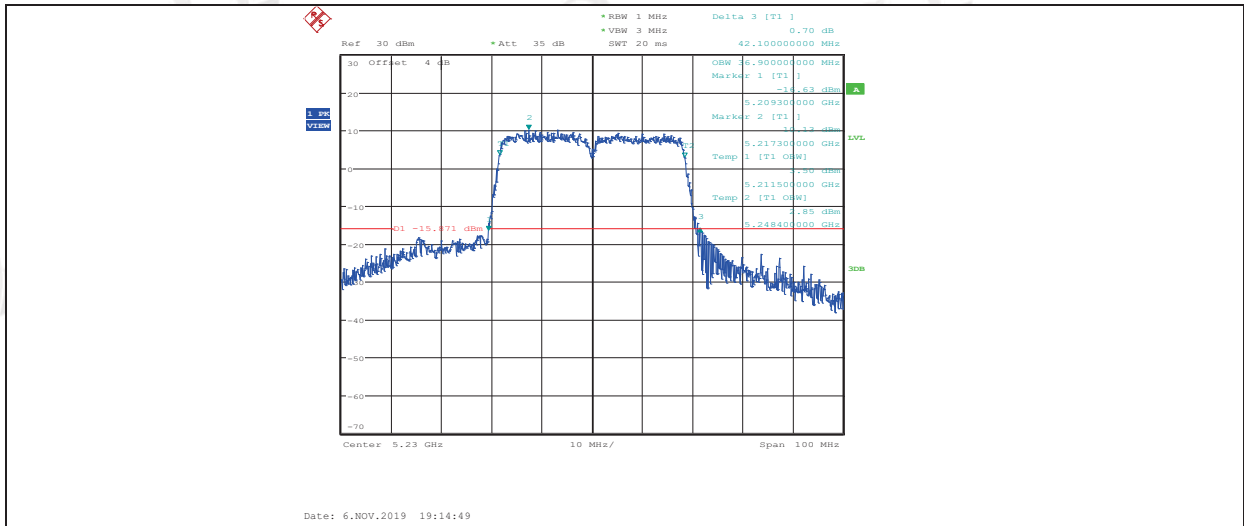
11N40MIMO_ANT1_5190



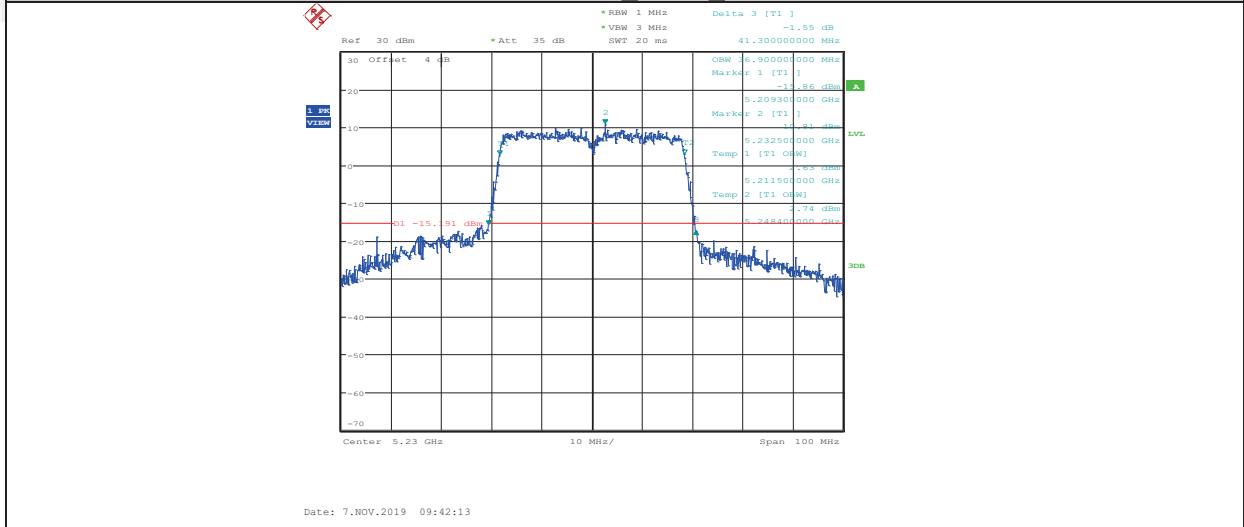
11N40MIMO_ANT2_5190



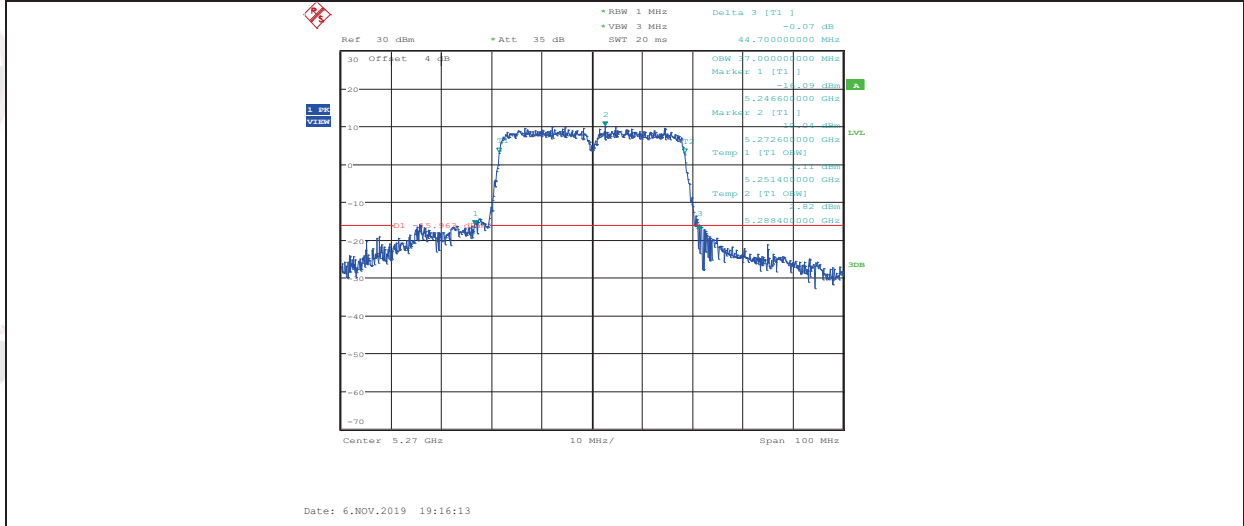
11N40MIMO_ANT1_5230



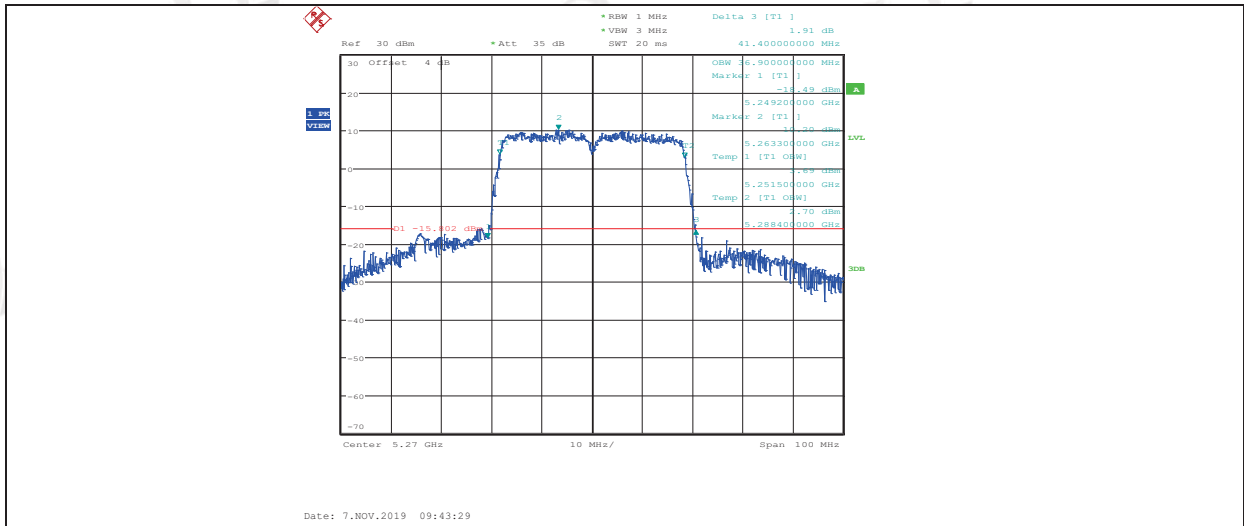
11N40MIMO_ANT2_5230



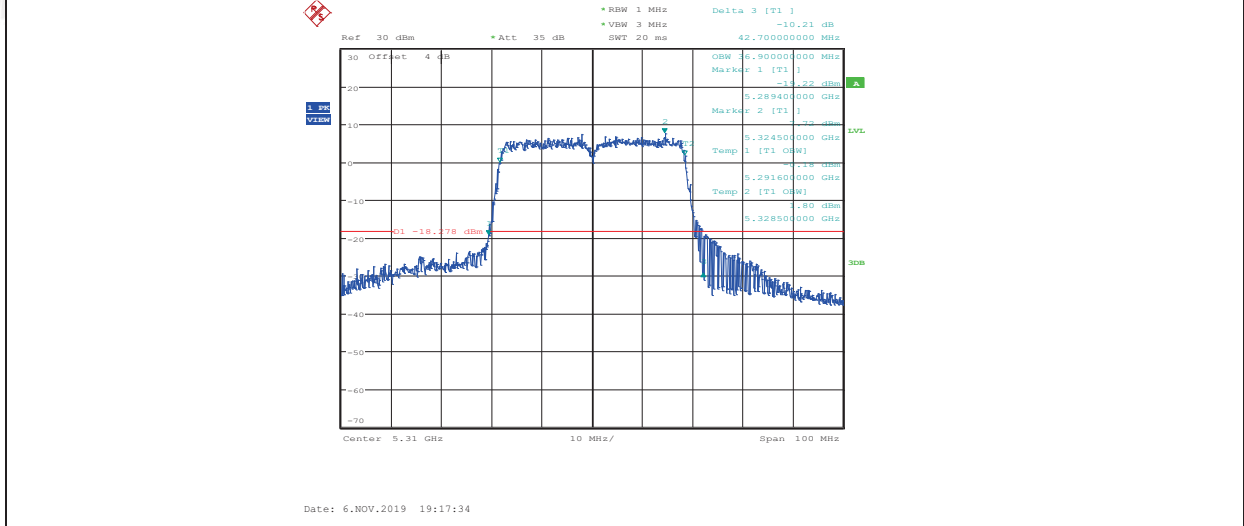
11N40MIMO_ANT1_5270



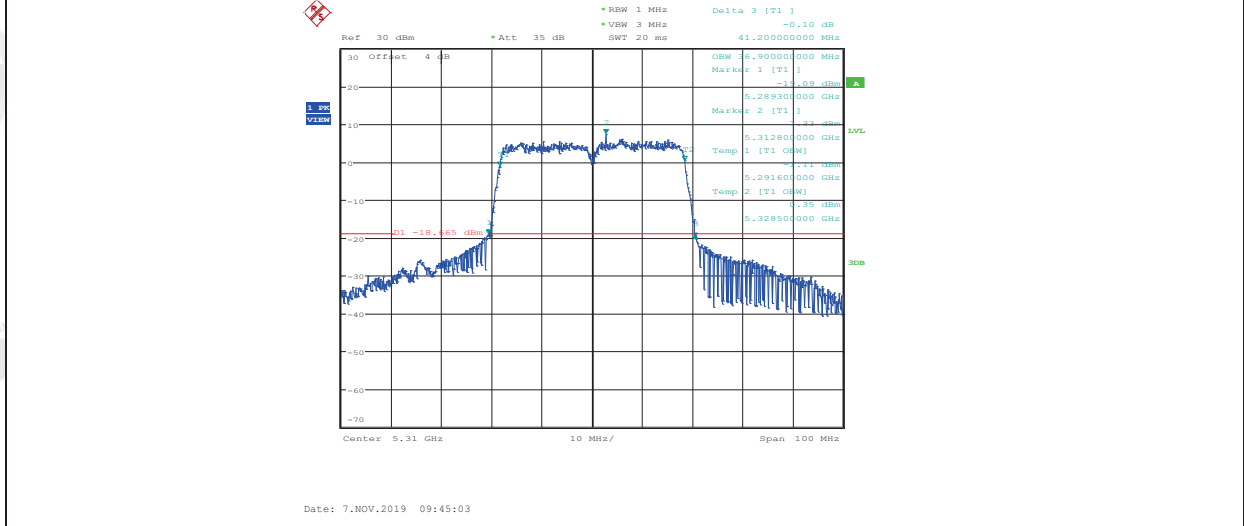
11N40MIMO_ANT2_5270



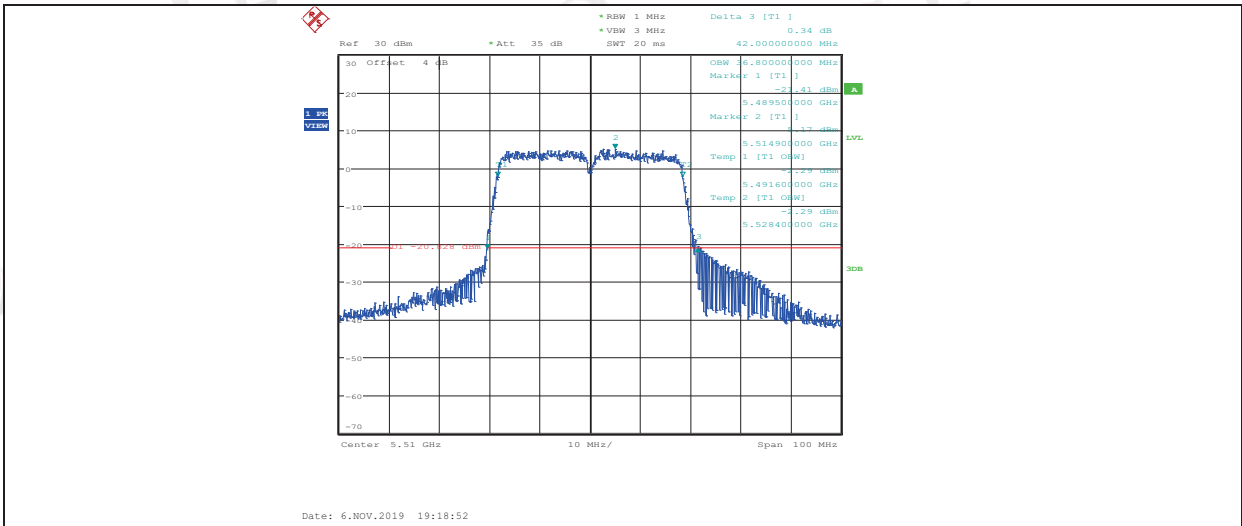
11N40MIMO_ANT1_5310



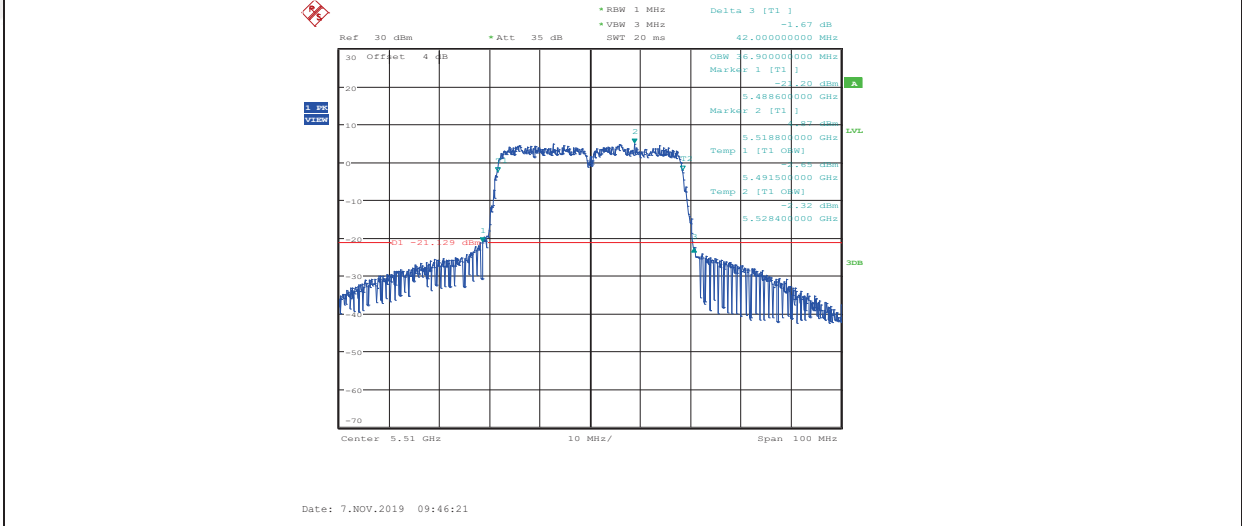
11N40MIMO_ANT2_5310



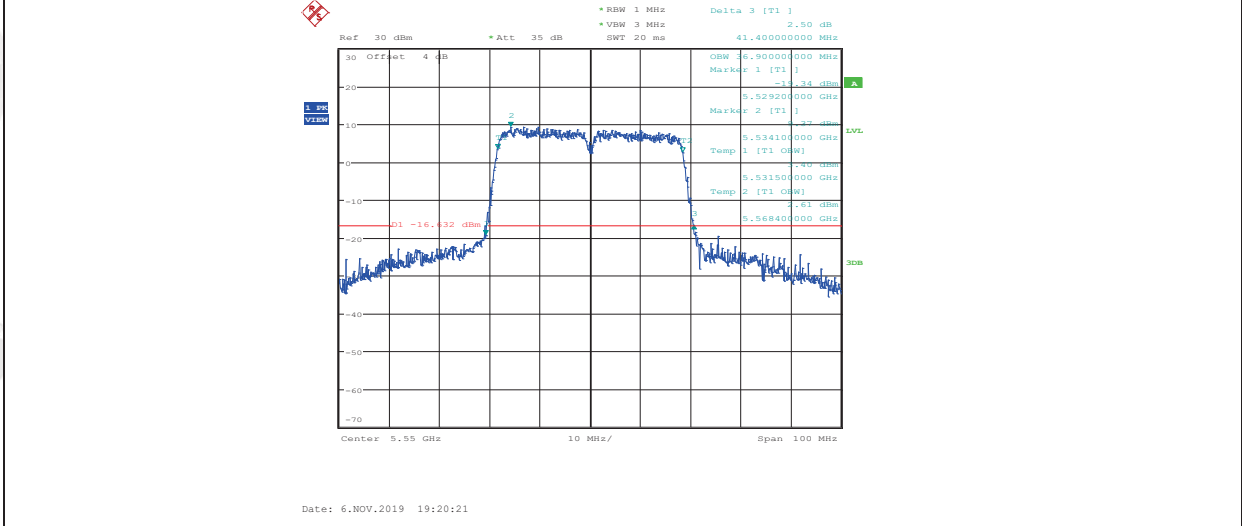
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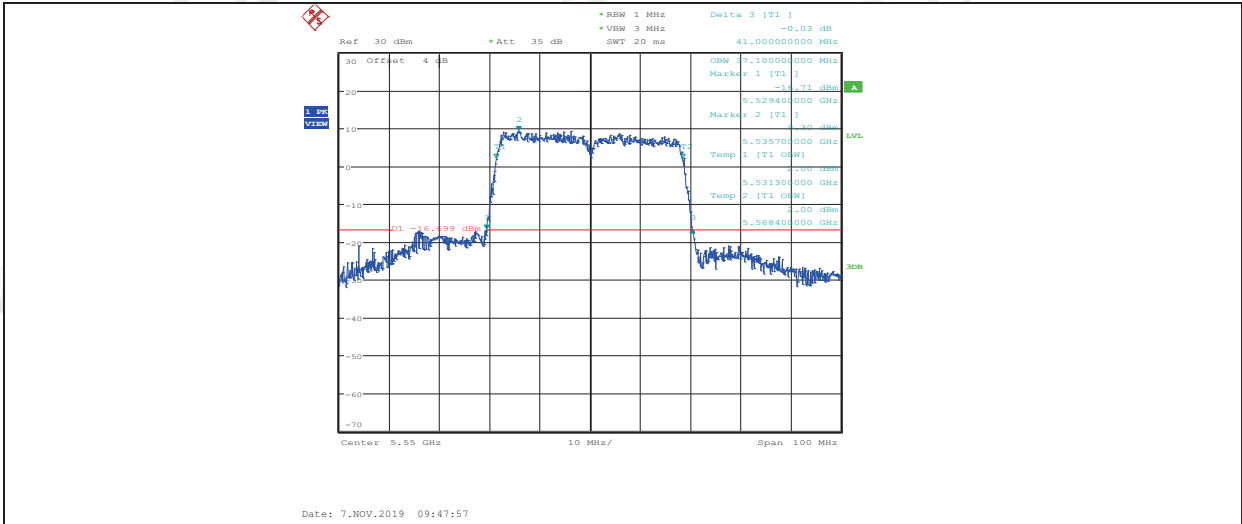
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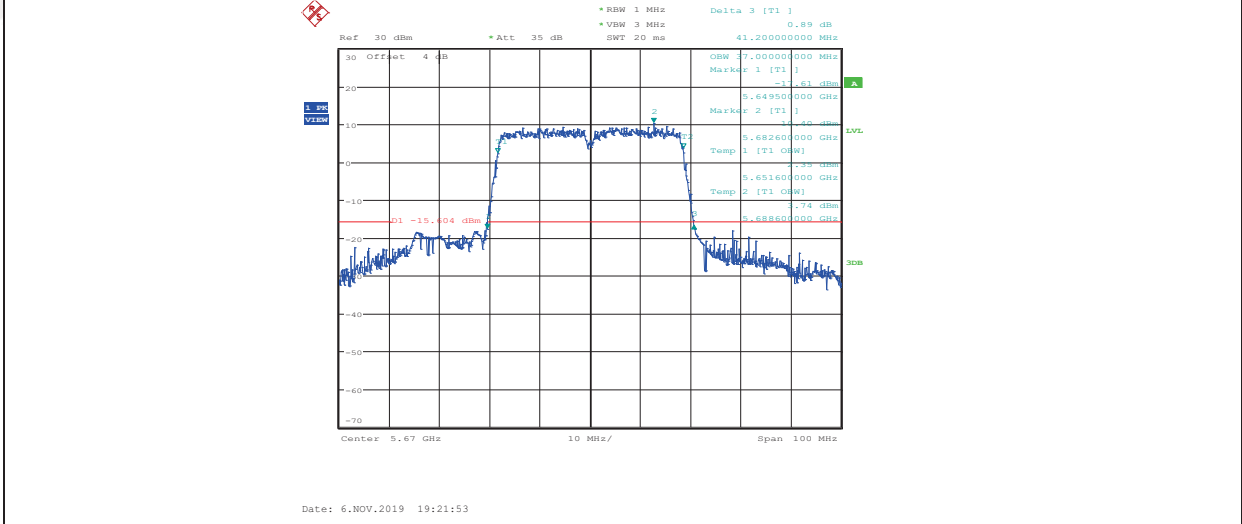
11N40MIMO_ANT1_5550



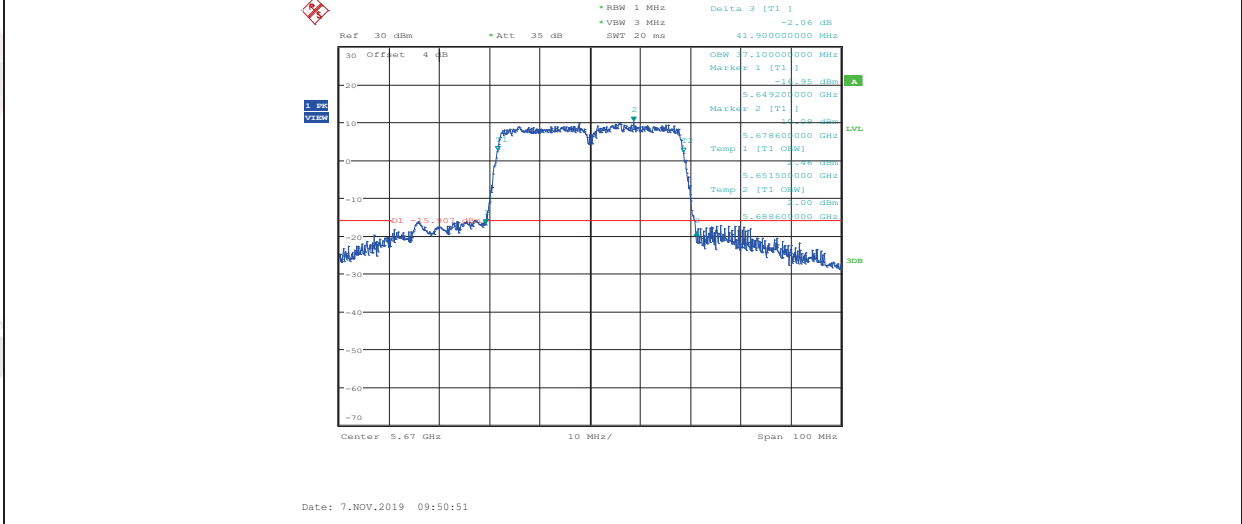
11N40MIMO_ANT2_5550



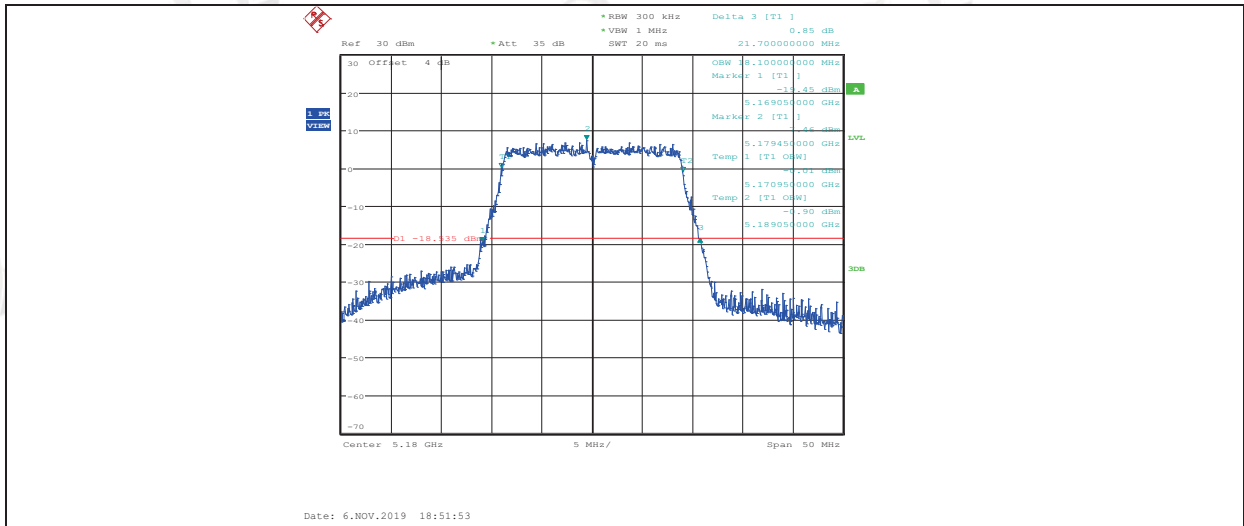
11N40MIMO ANT1 5670



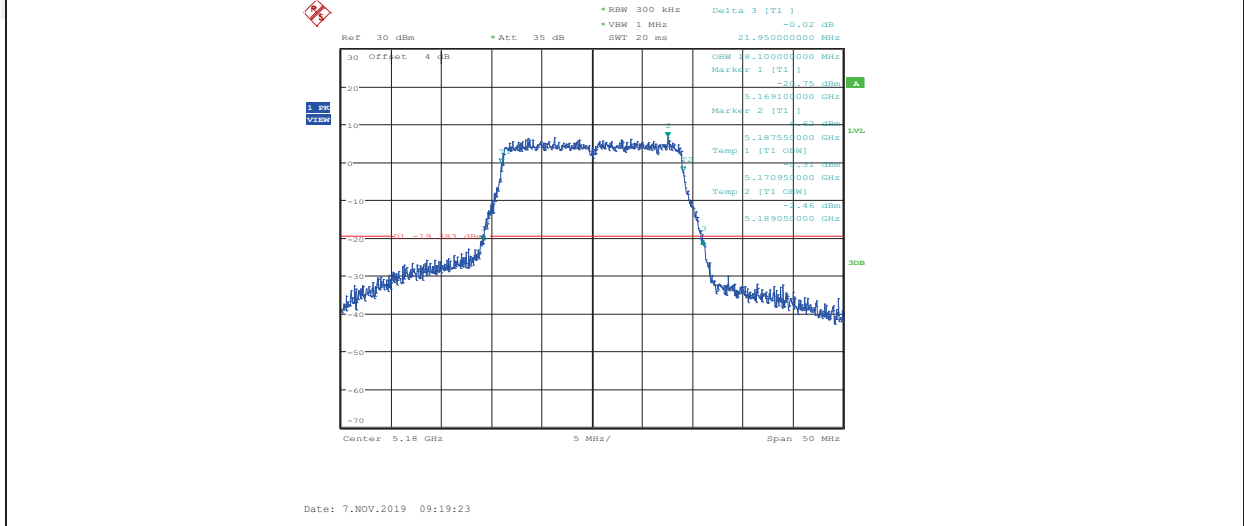
11N40MIMO ANT2 5670



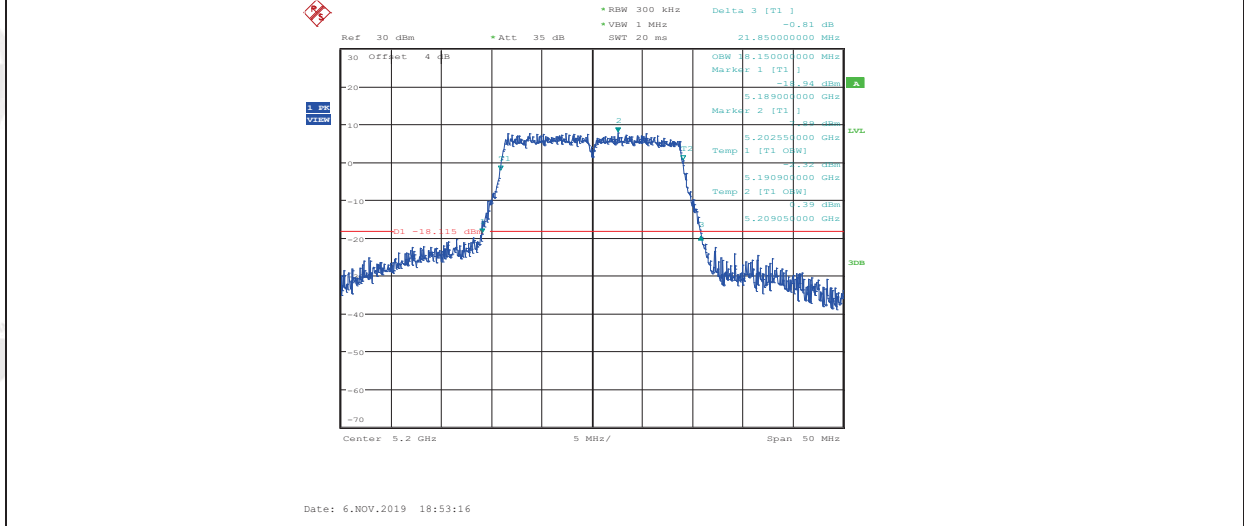
11AC20MIMO ANT1 5180



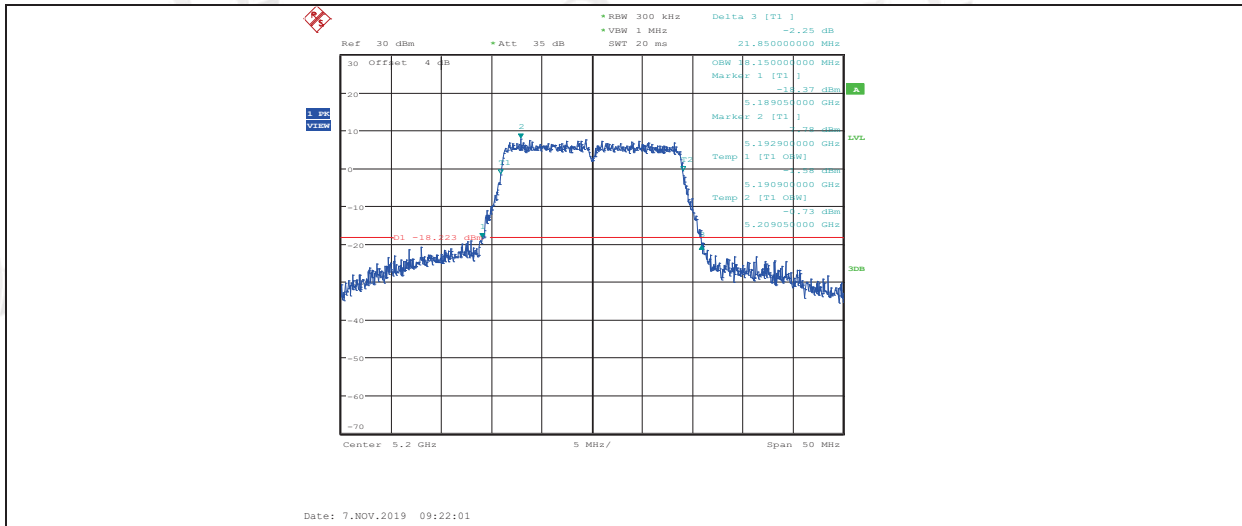
11AC20MIMO ANT2 5180



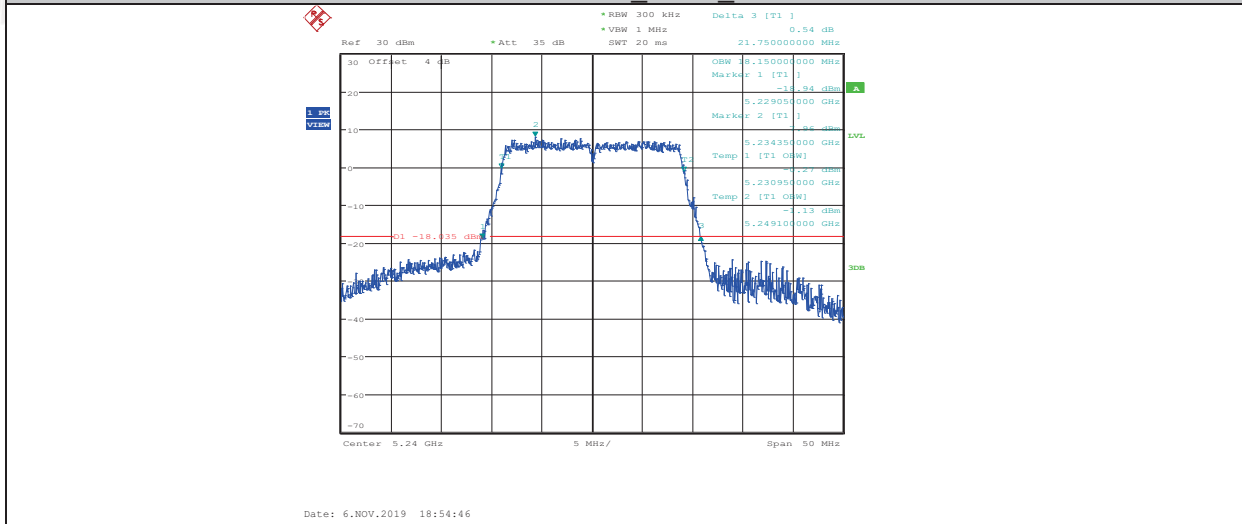
11AC20MIMO ANT1 5200



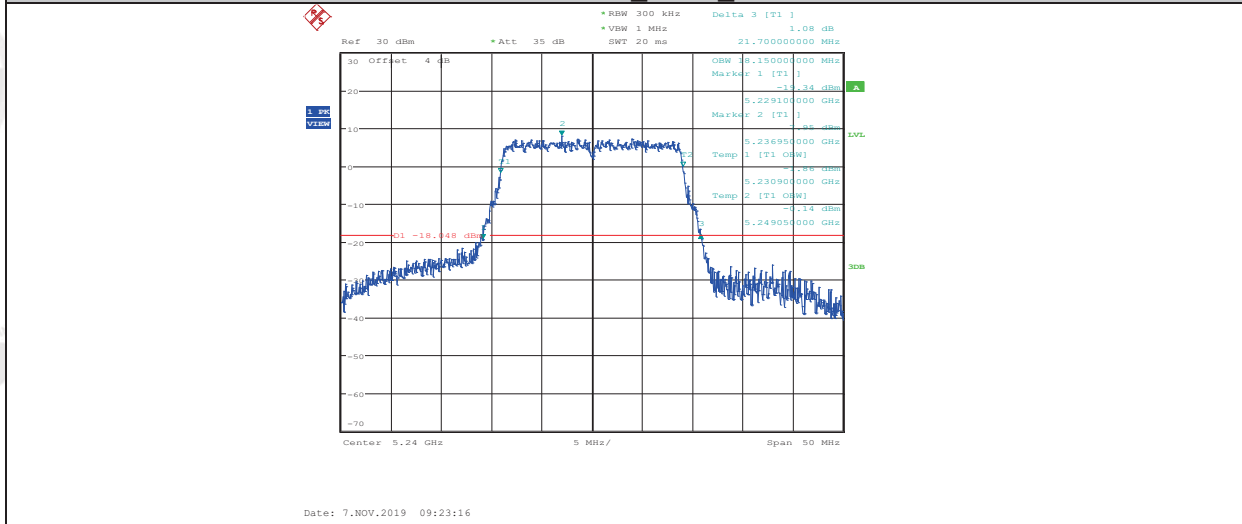
11AC20MIMO ANT2 5200



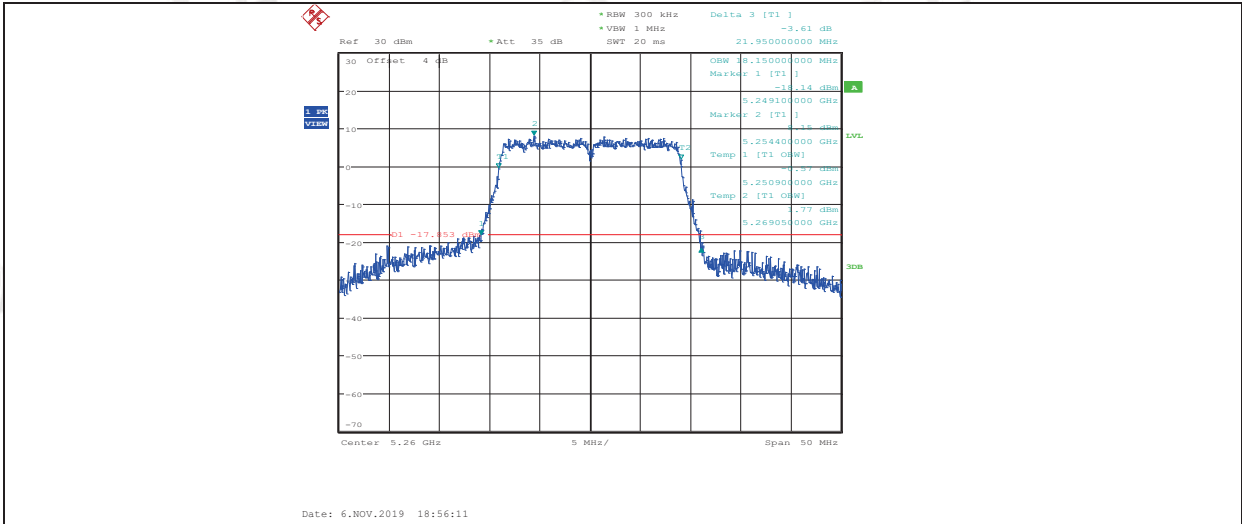
11AC20MIMO ANT1 5240



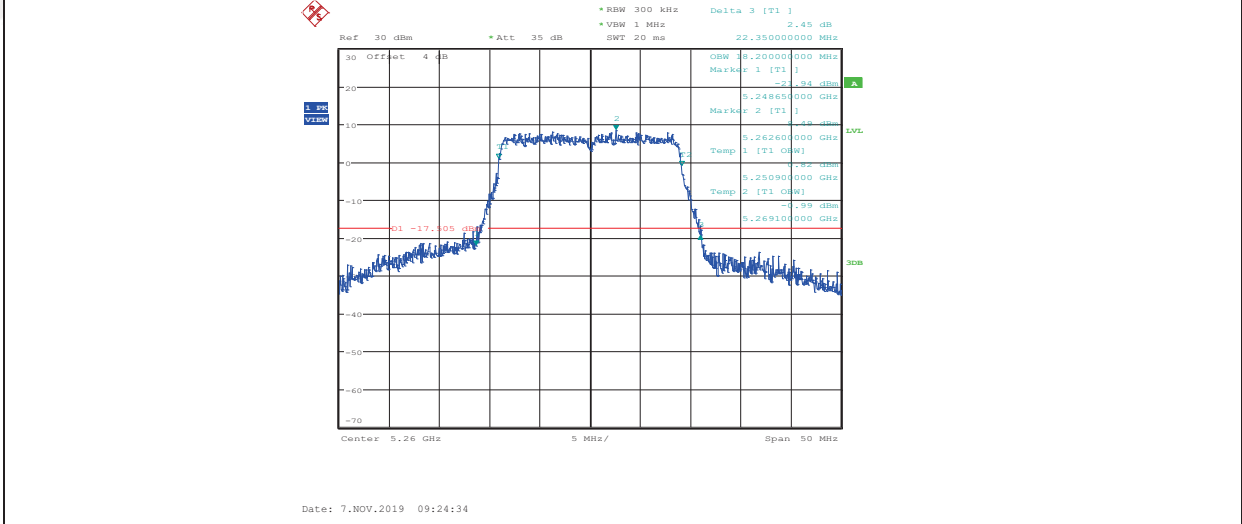
11AC20MIMO ANT2 5240



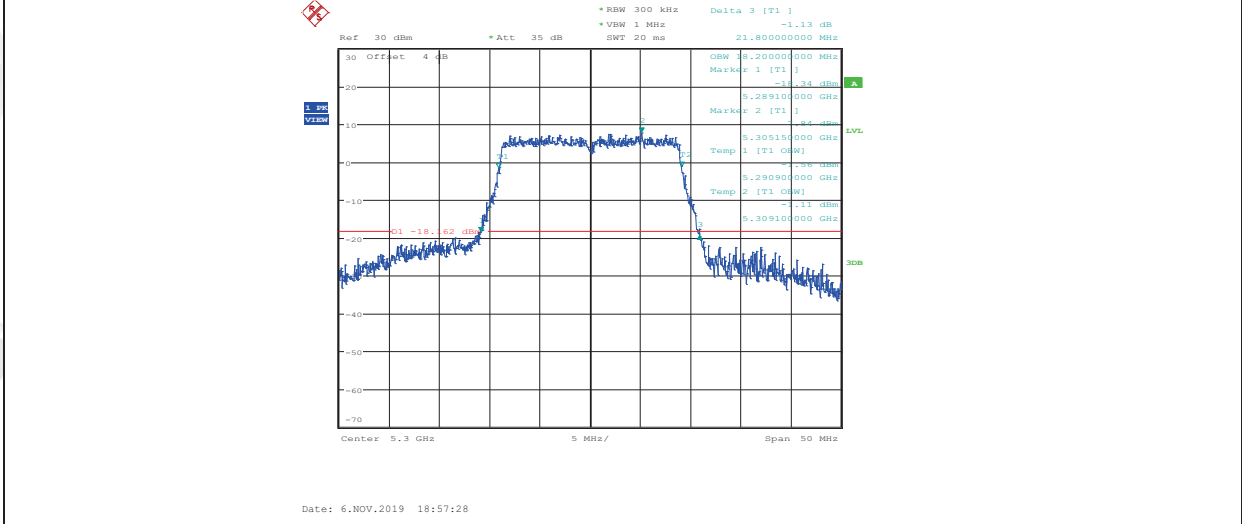
11AC20MIMO ANT1 5260



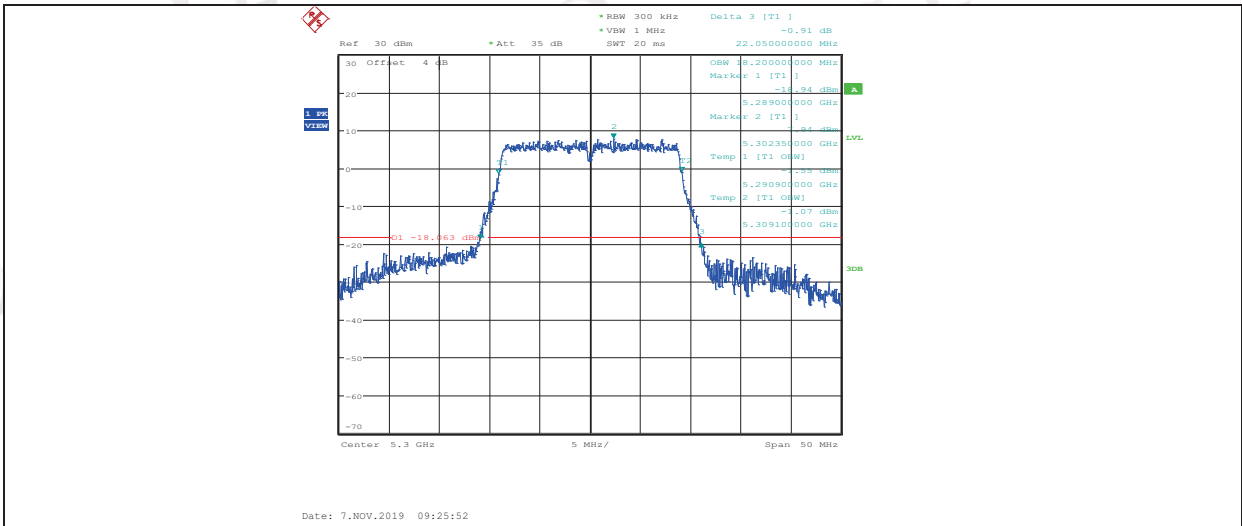
11AC20MIMO ANT2 5260



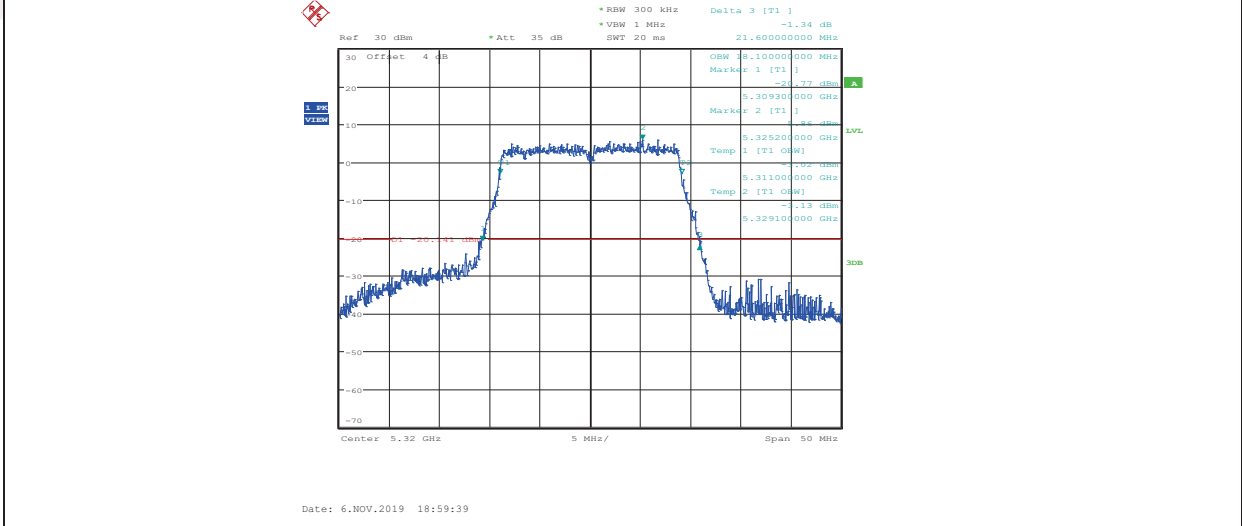
11AC20MIMO ANT1 5300



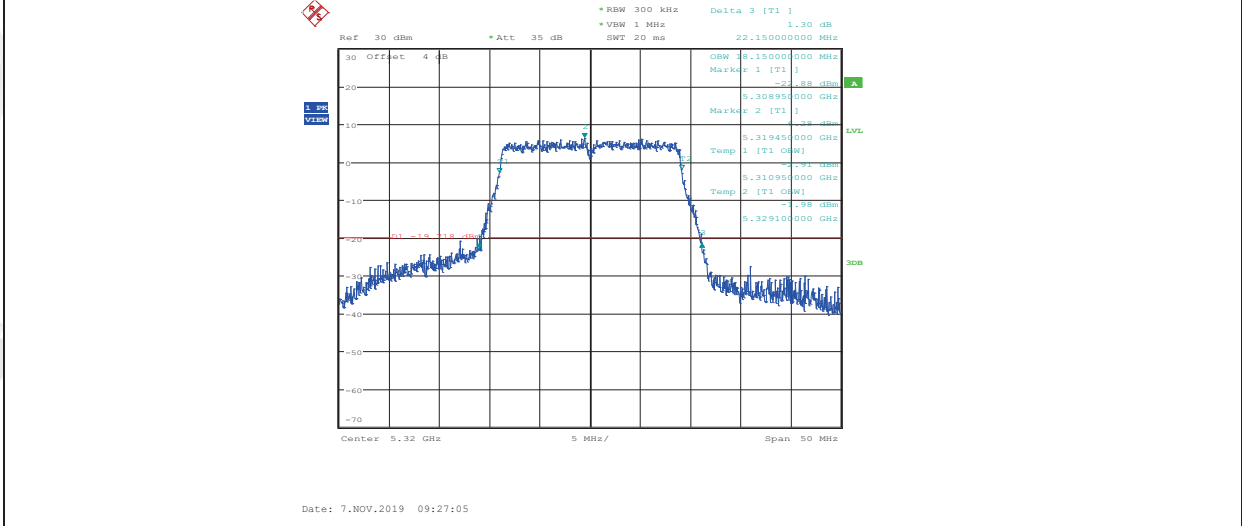
11AC20MIMO ANT2 5300



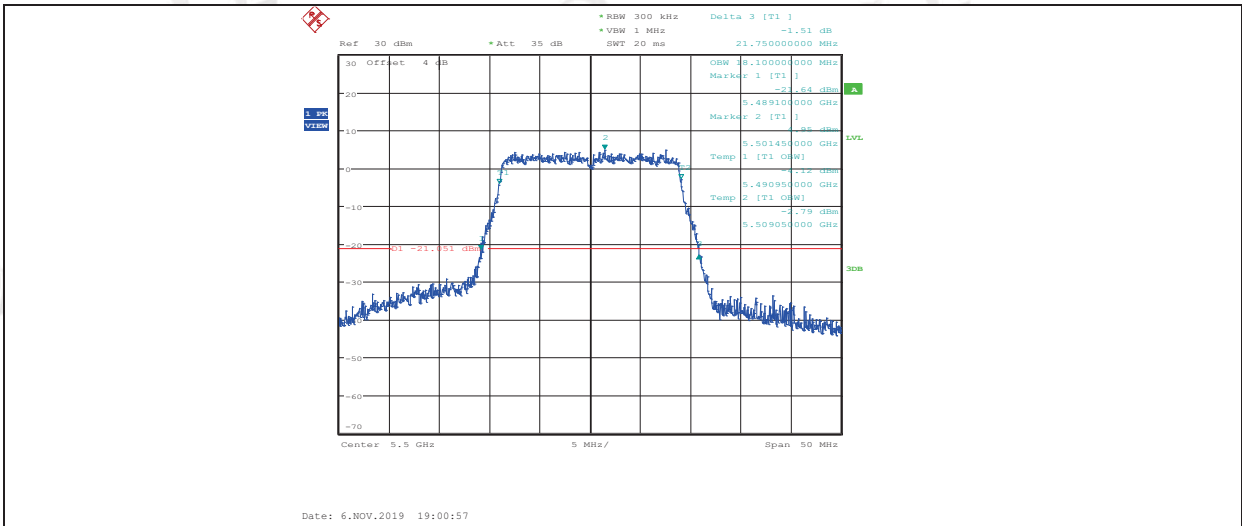
11AC20MIMO ANT1 5320



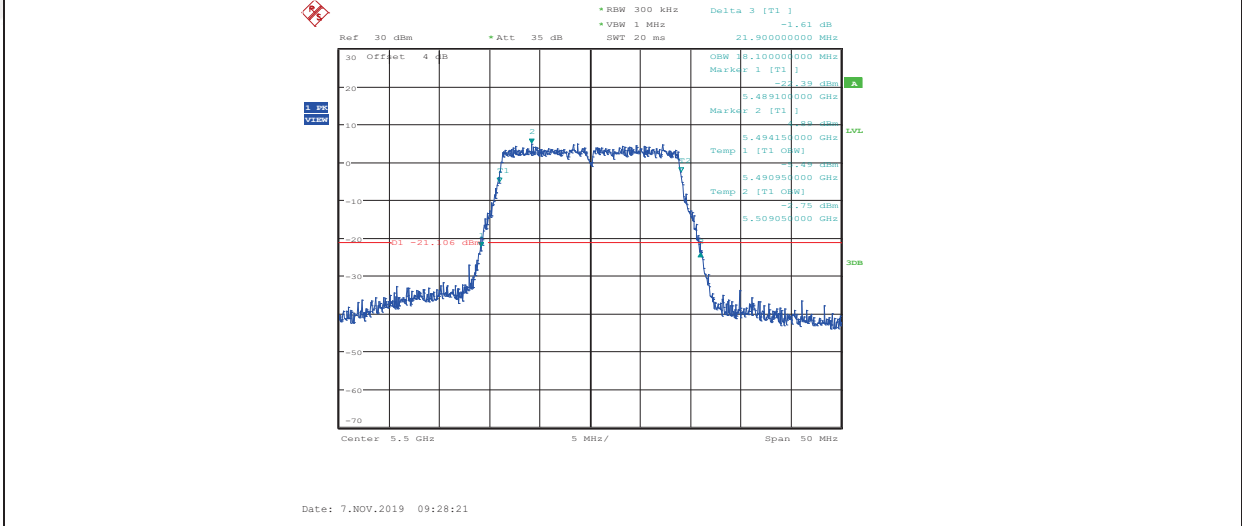
11AC20MIMO ANT2 5320



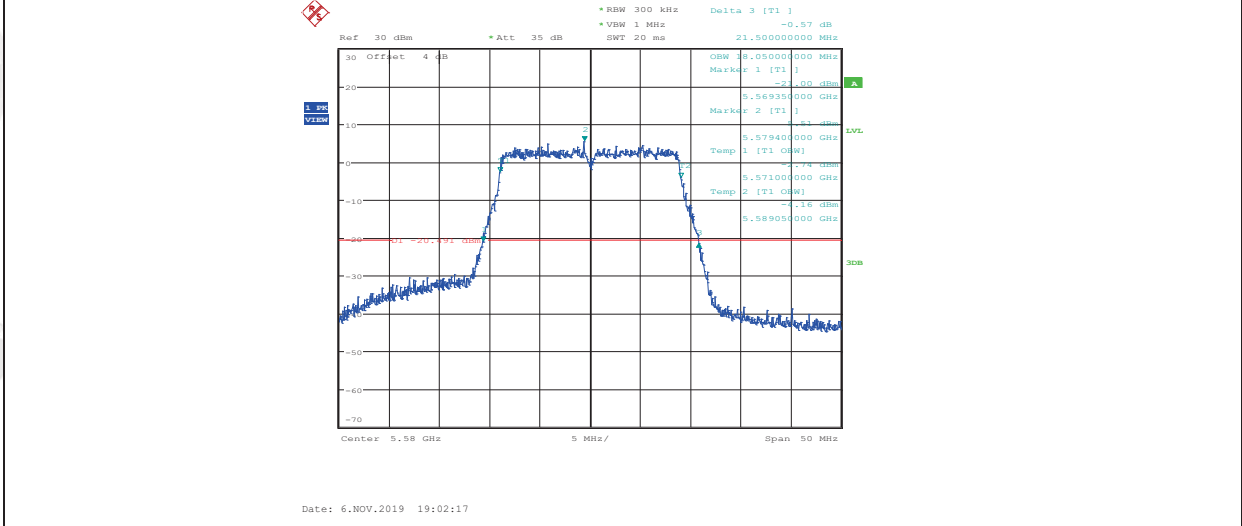
11AC20MIMO ANT1 5500



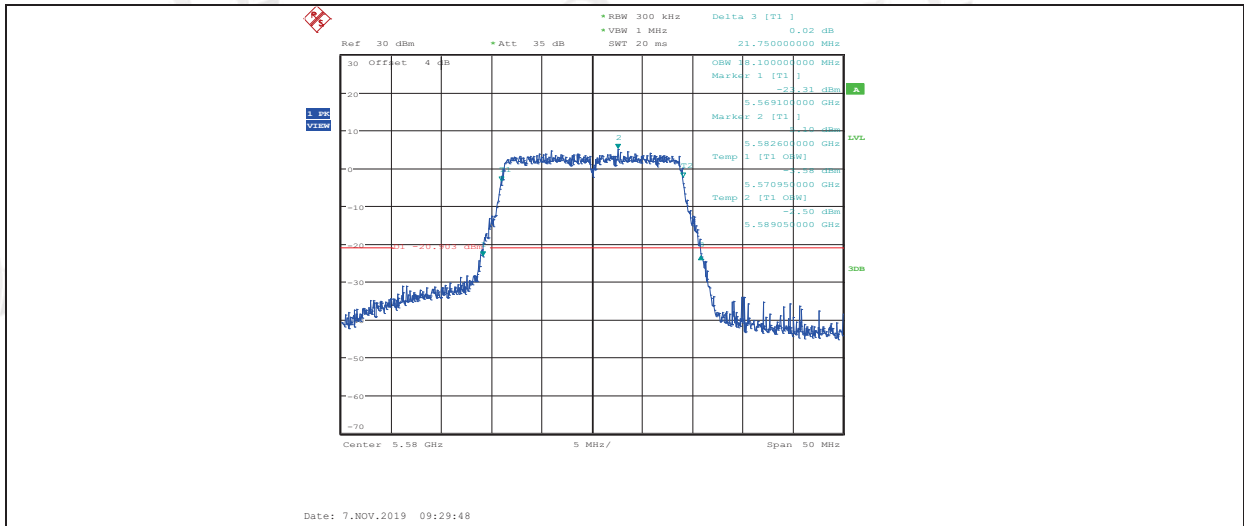
11AC20MIMO ANT2 5500



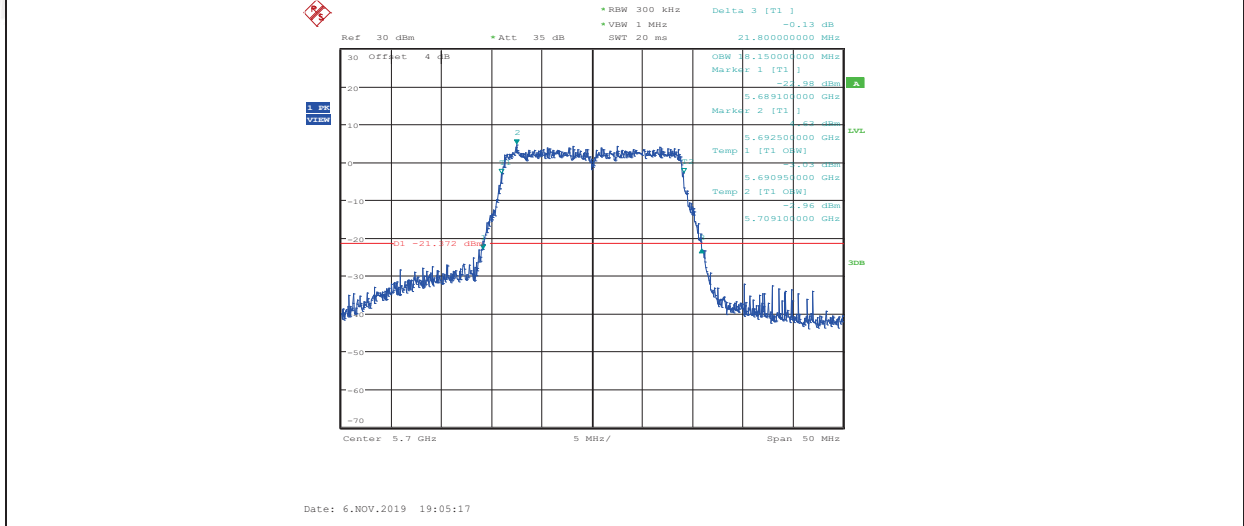
11AC20MIMO ANT1 5580



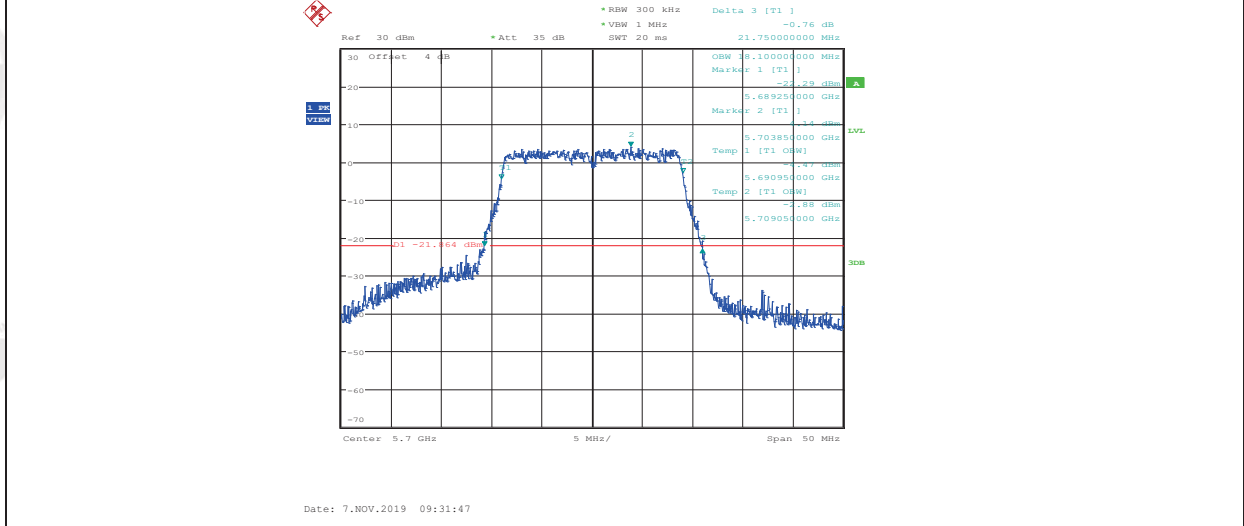
11AC20MIMO ANT2 5580



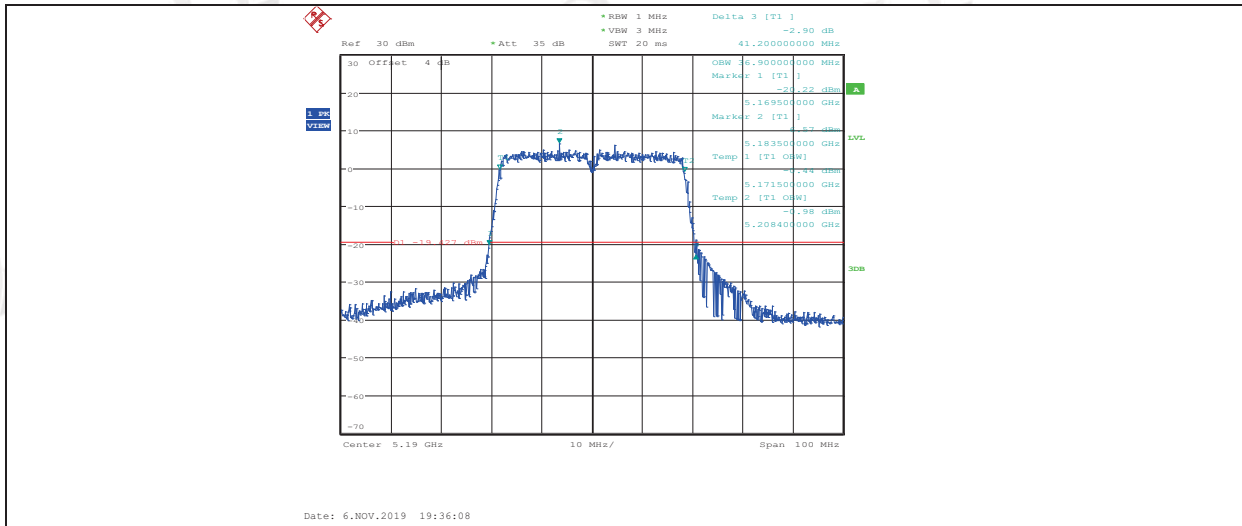
11AC20MIMO ANT1 5700



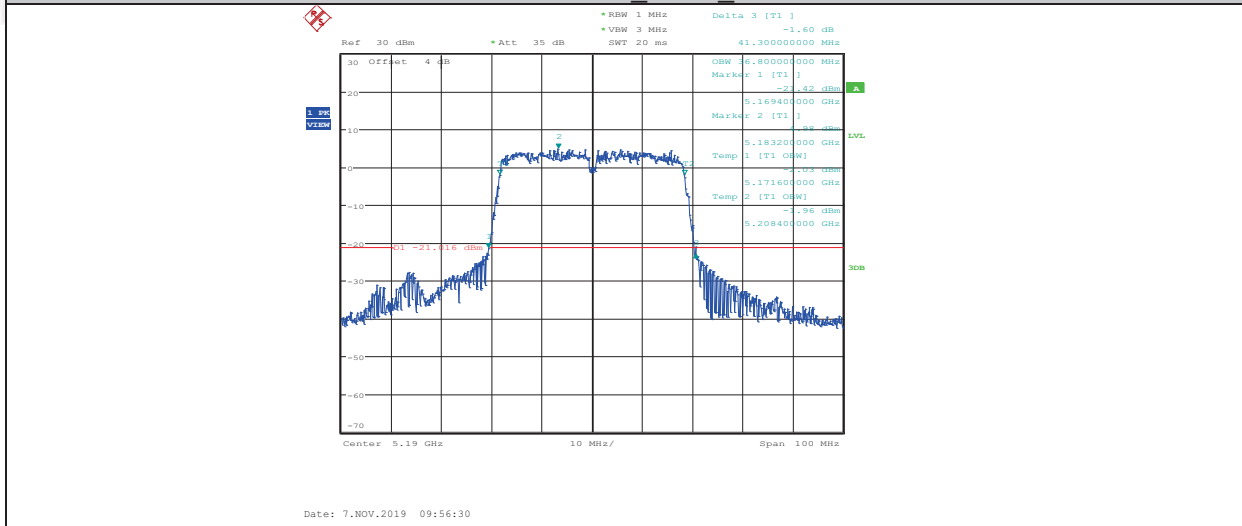
11AC20MIMO ANT2 5700



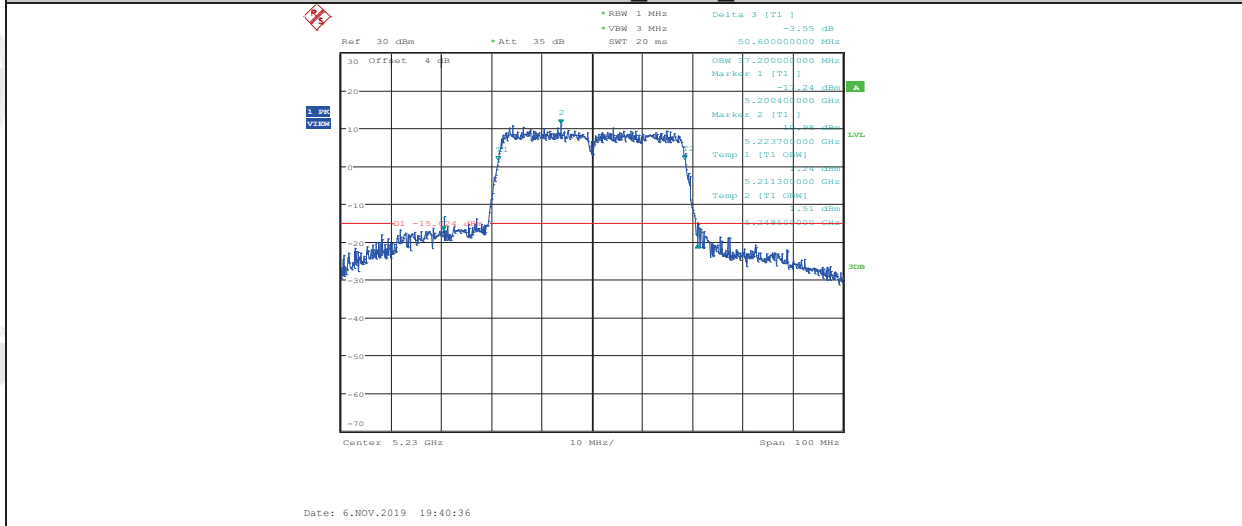
11AC40MIMO ANT1 5190



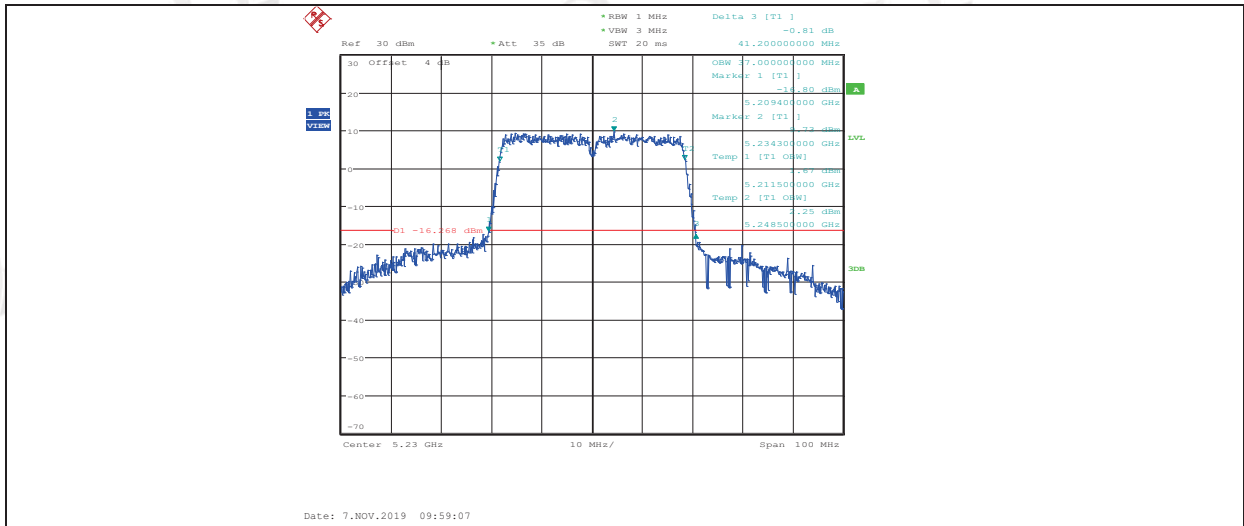
11AC40MIMO ANT2 5190



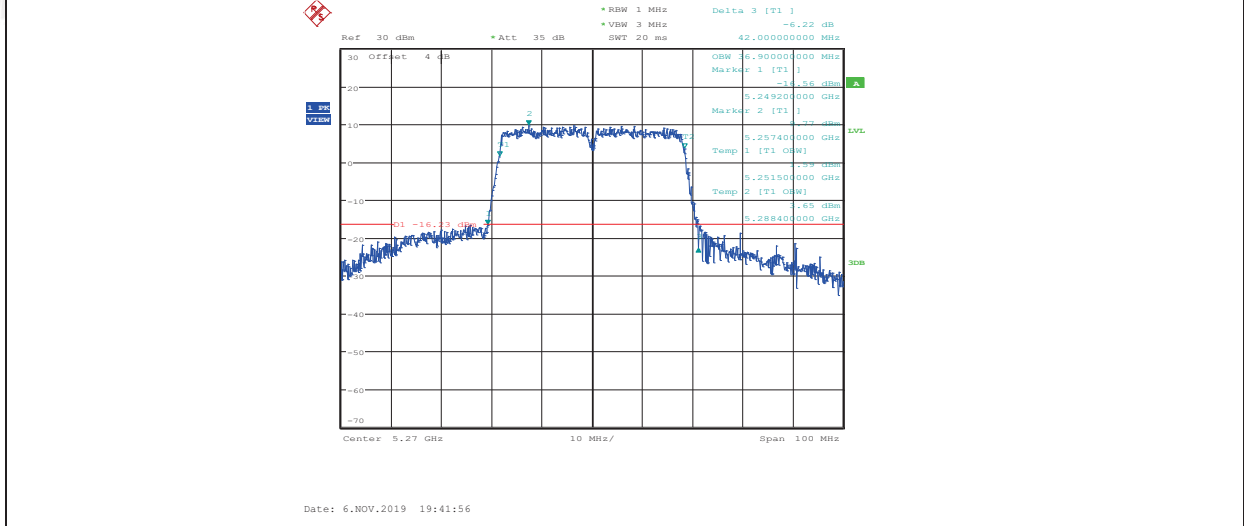
11AC40MIMO ANT1 5230



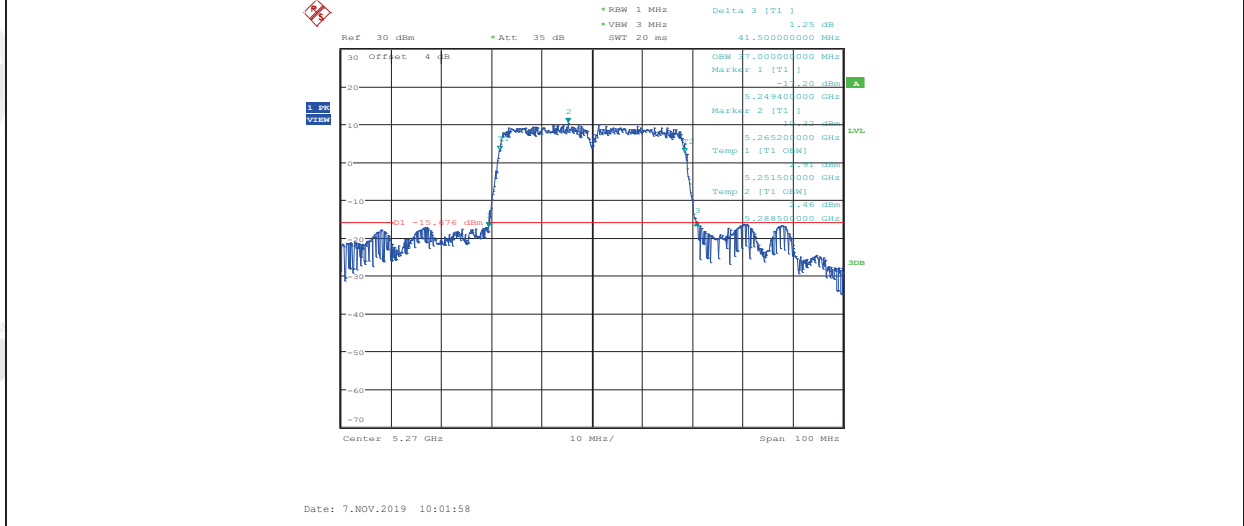
11AC40MIMO ANT2 5230



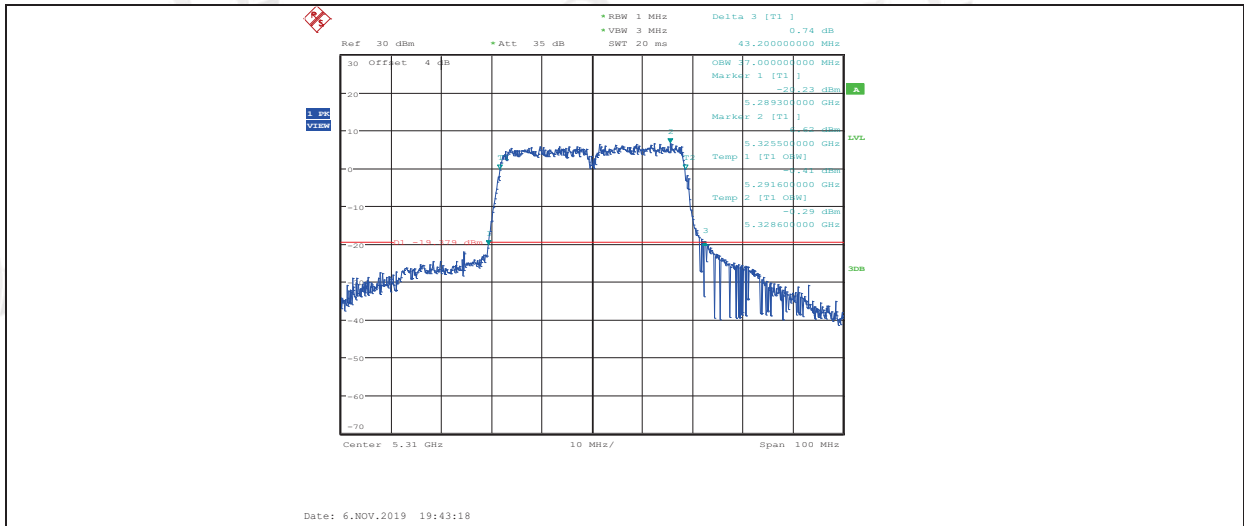
11AC40MIMO ANT1 5270



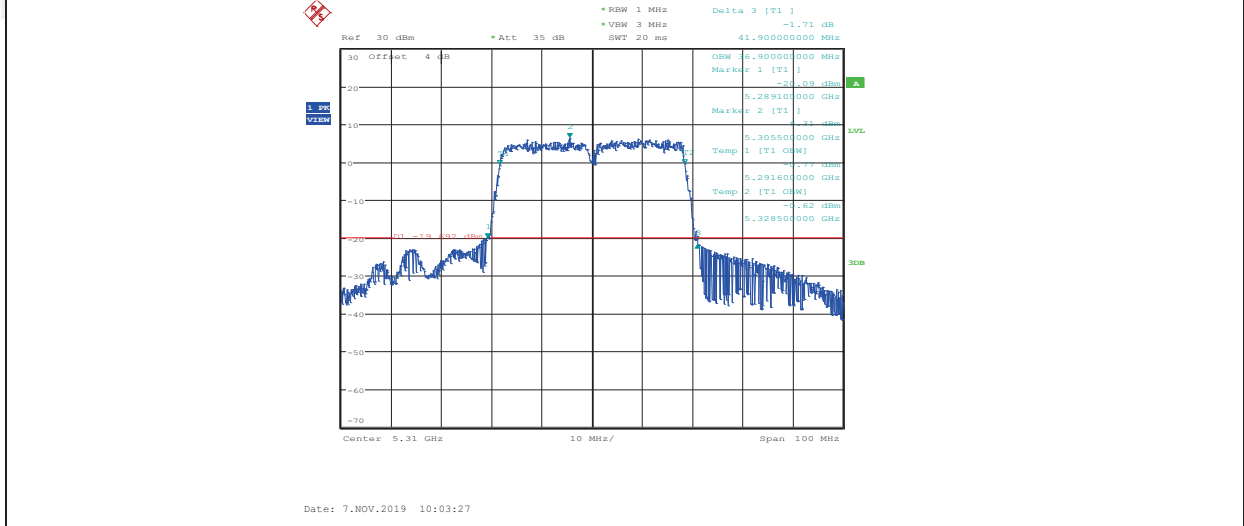
11AC40MIMO ANT2 5270



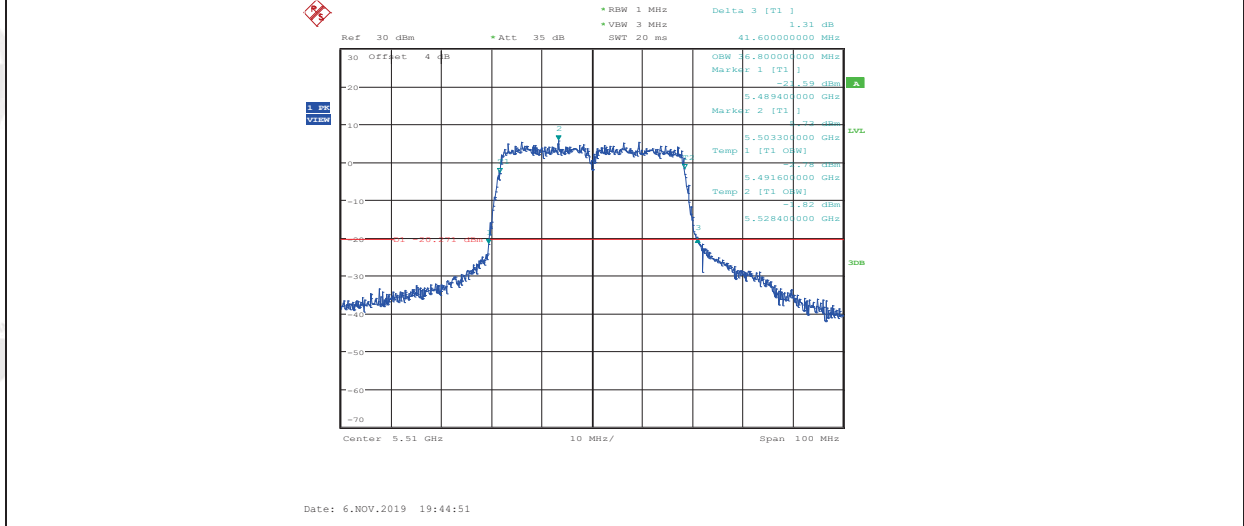
11AC40MIMO ANT1 5310



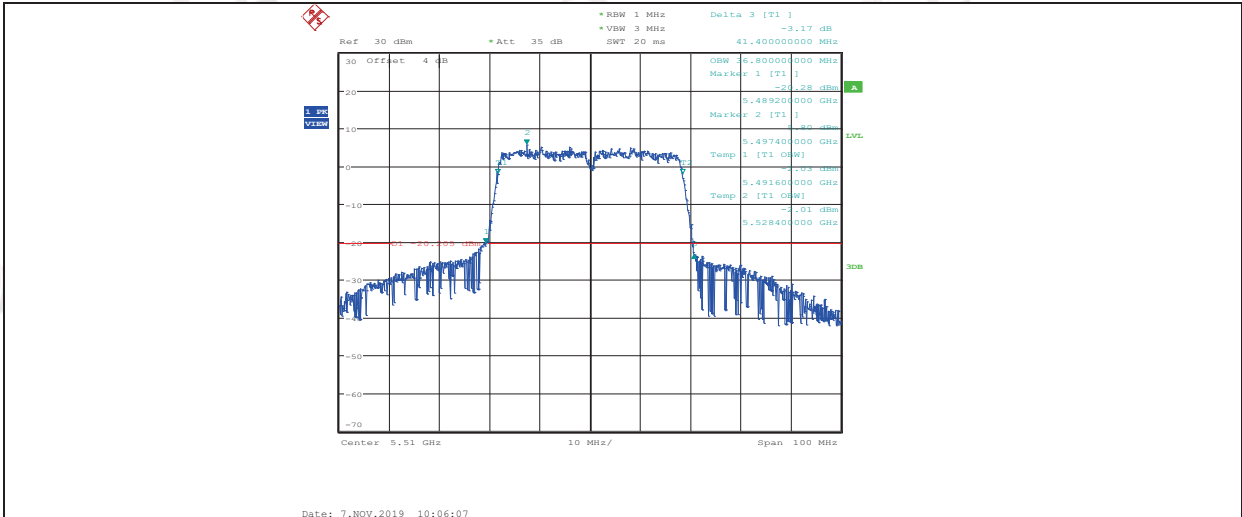
11AC40MIMO ANT2 5310



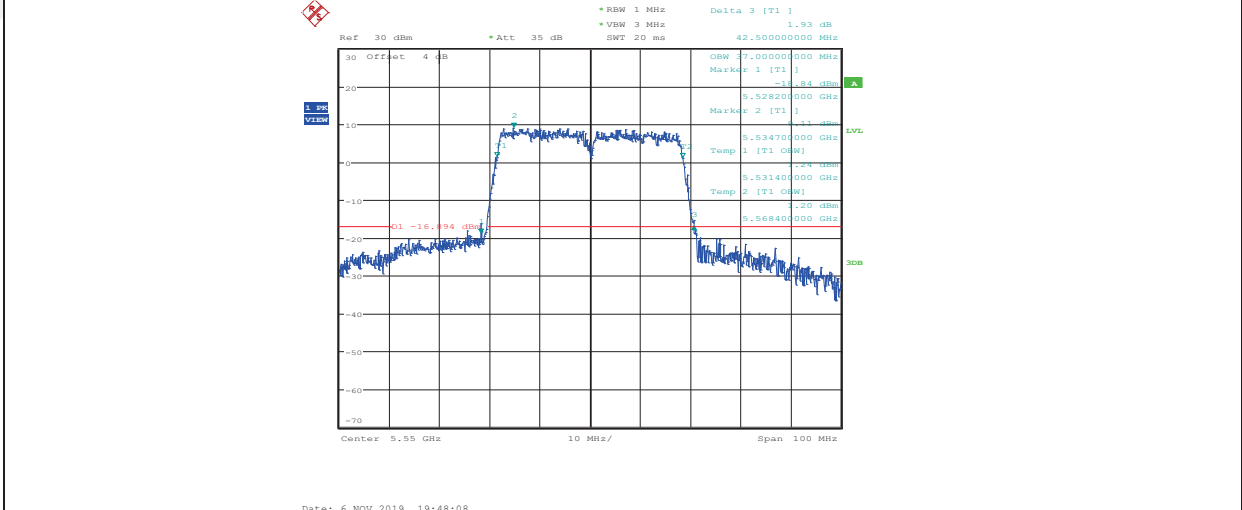
11AC40MIMO ANT1 5510



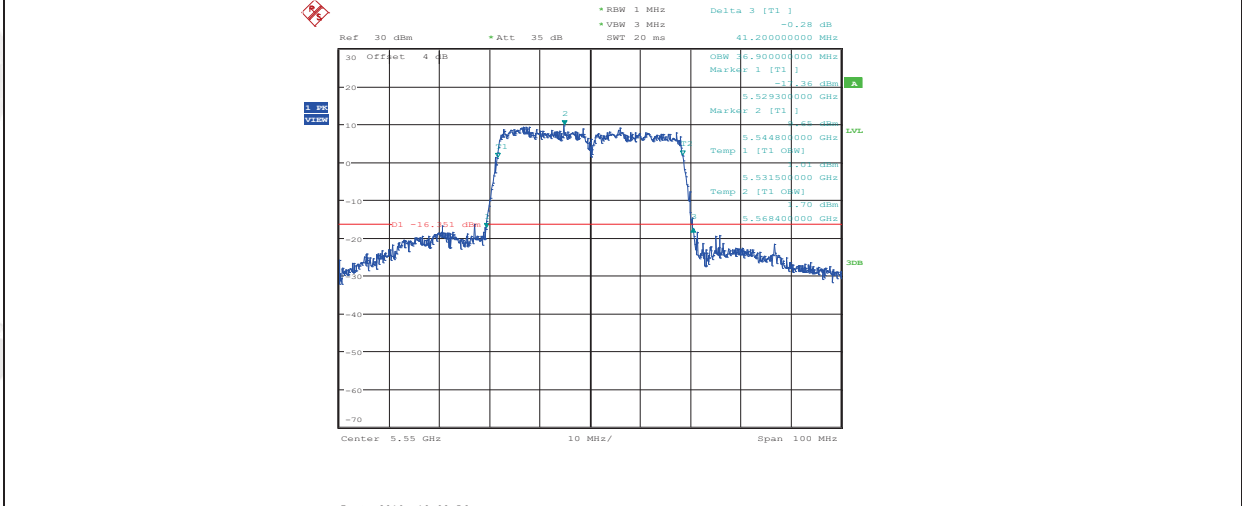
11AC40MIMO ANT2 5510



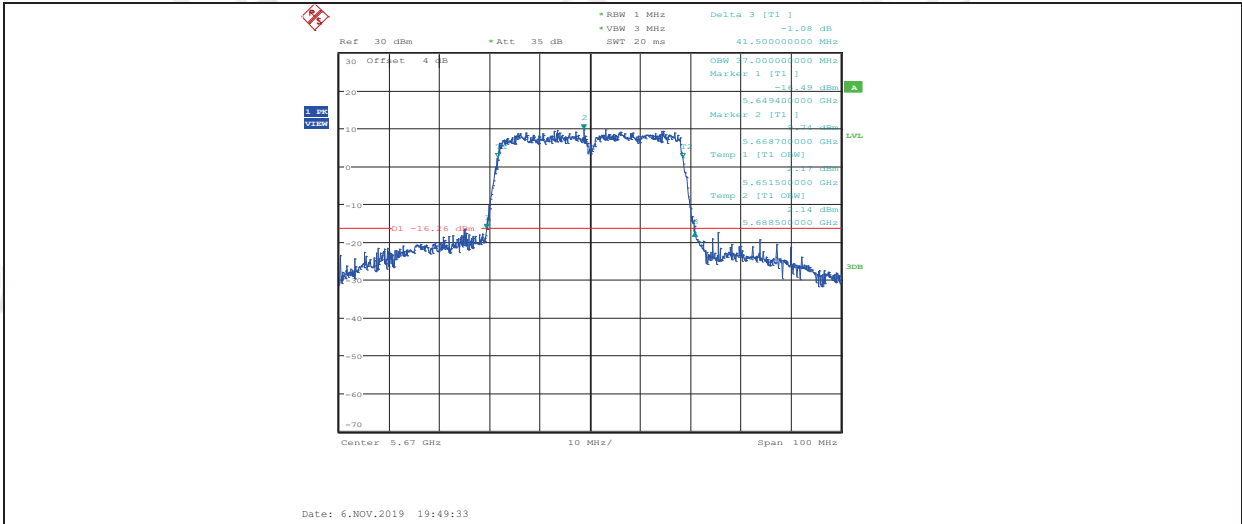
11AC40MIMO ANT1 5550



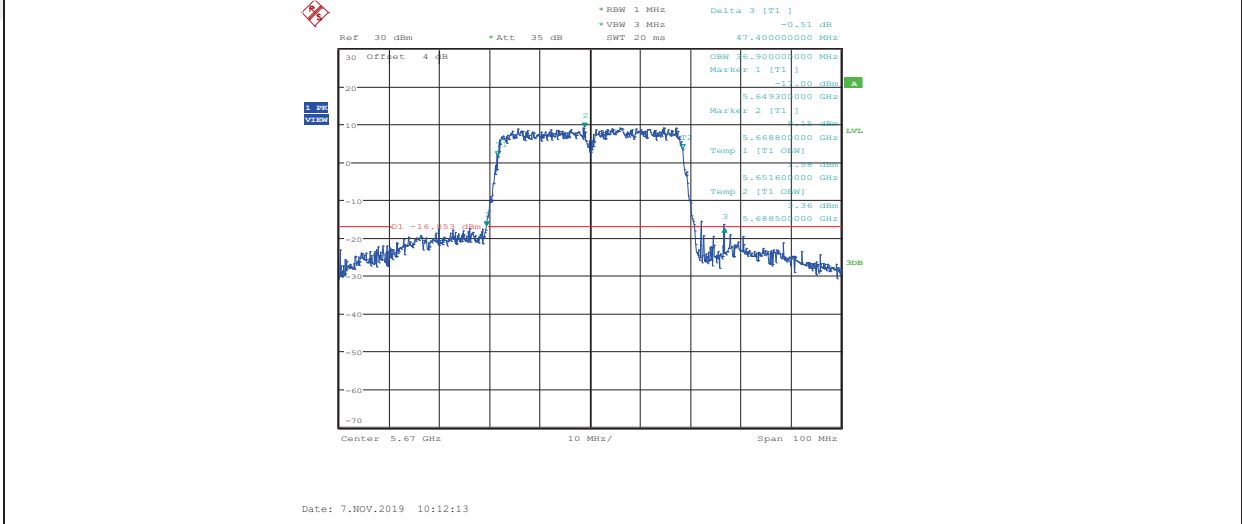
11AC40MIMO ANT2 5550



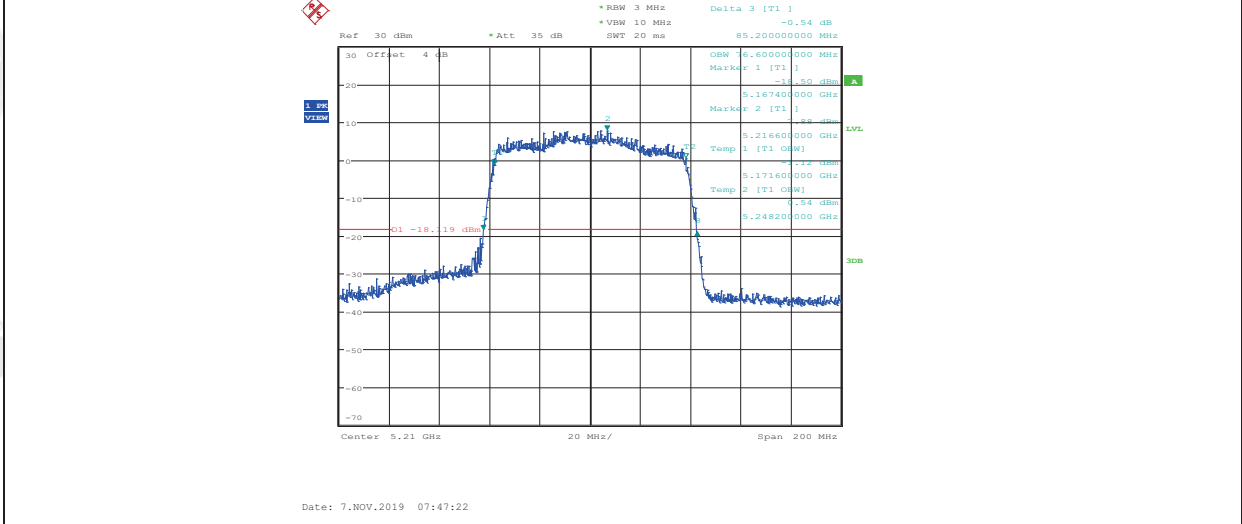
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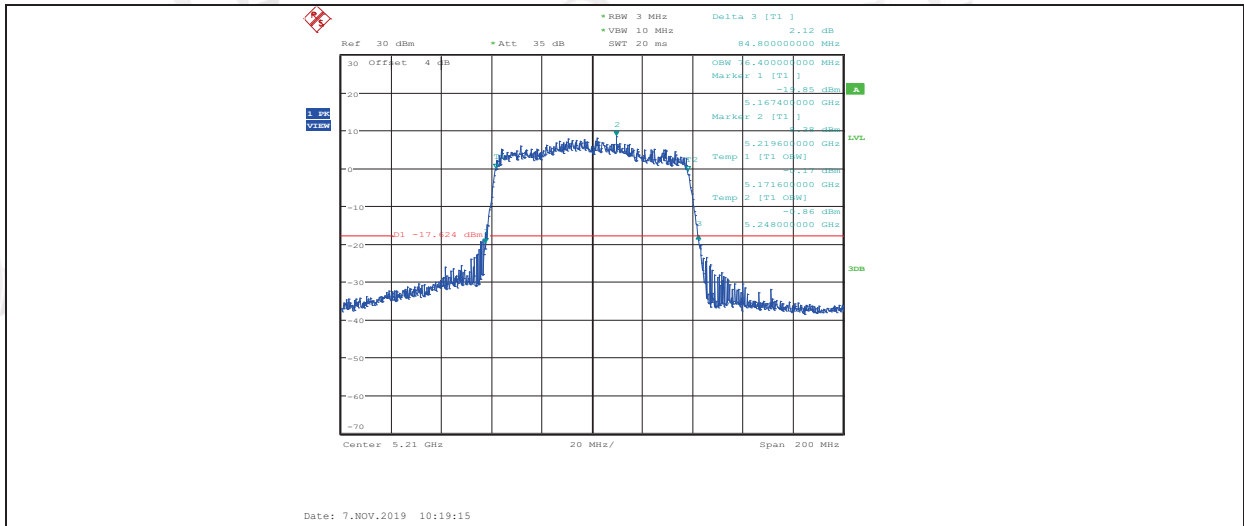
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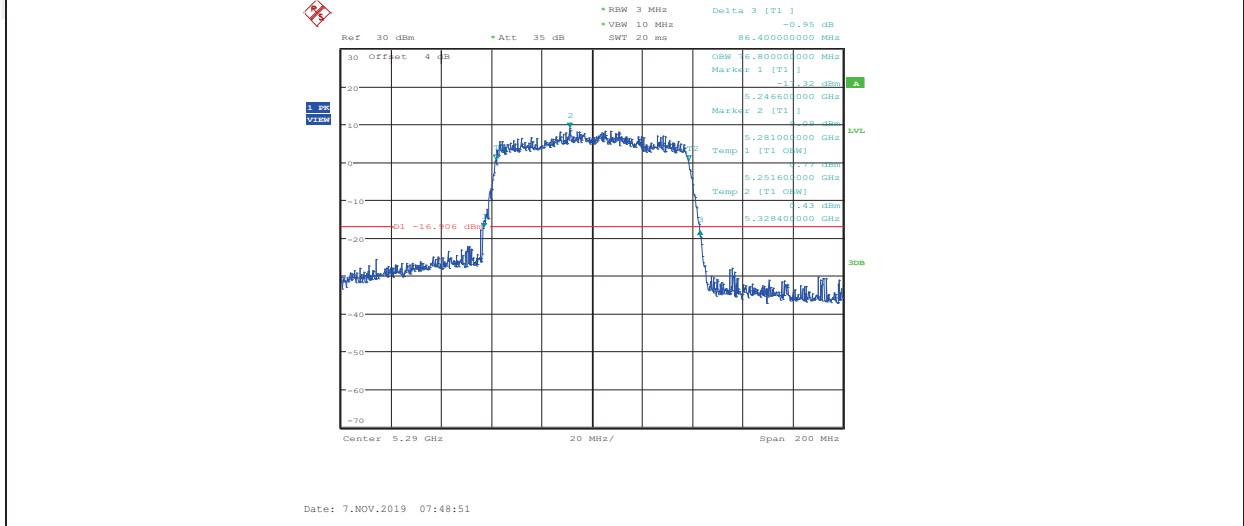
11AC80MIMO ANT1 5210



11AC80MIMO ANT2 5210



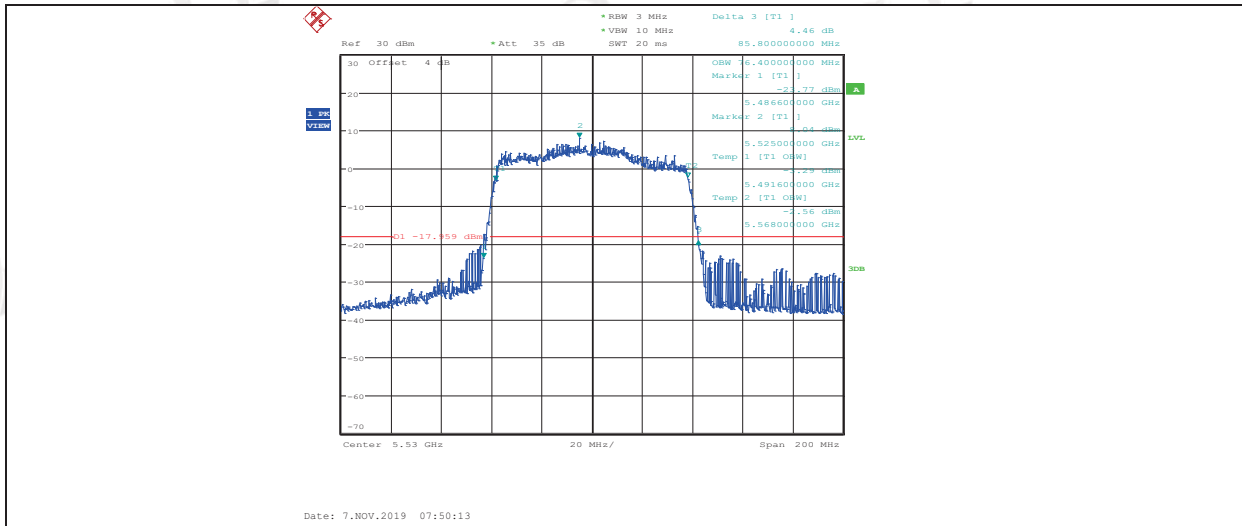
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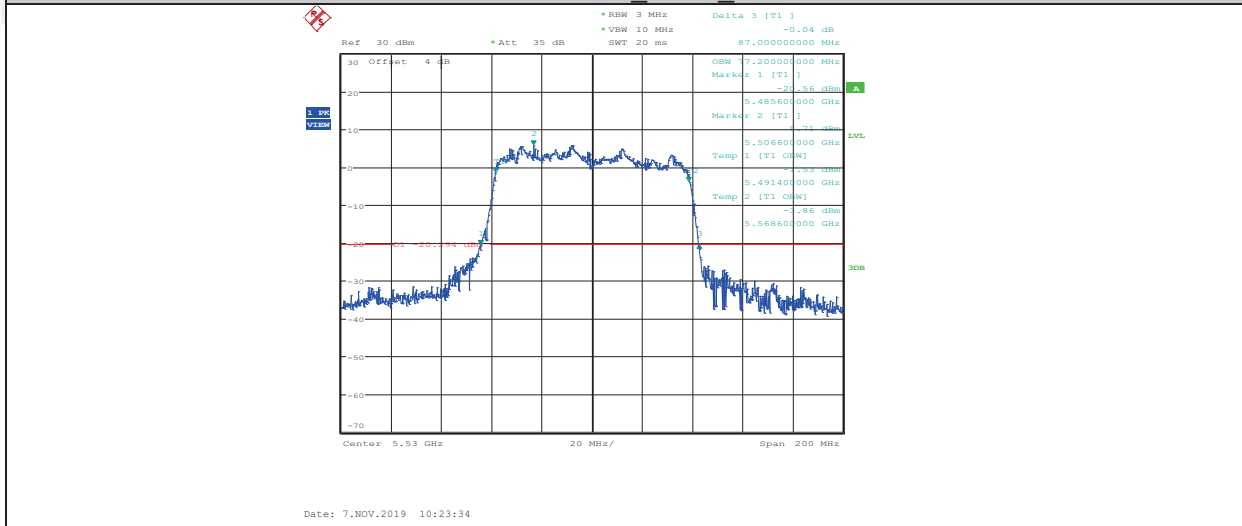
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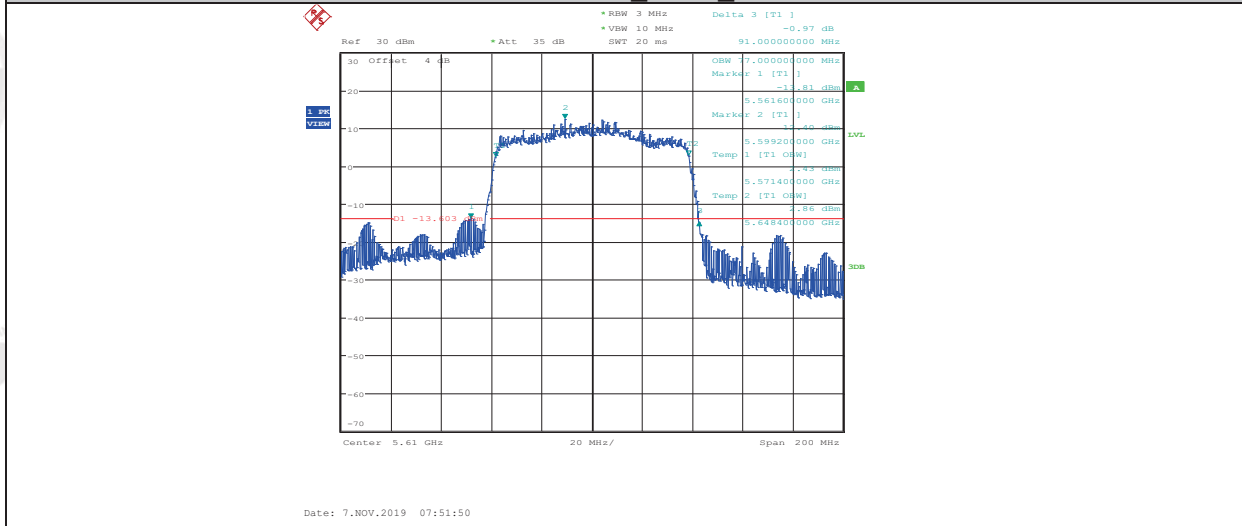
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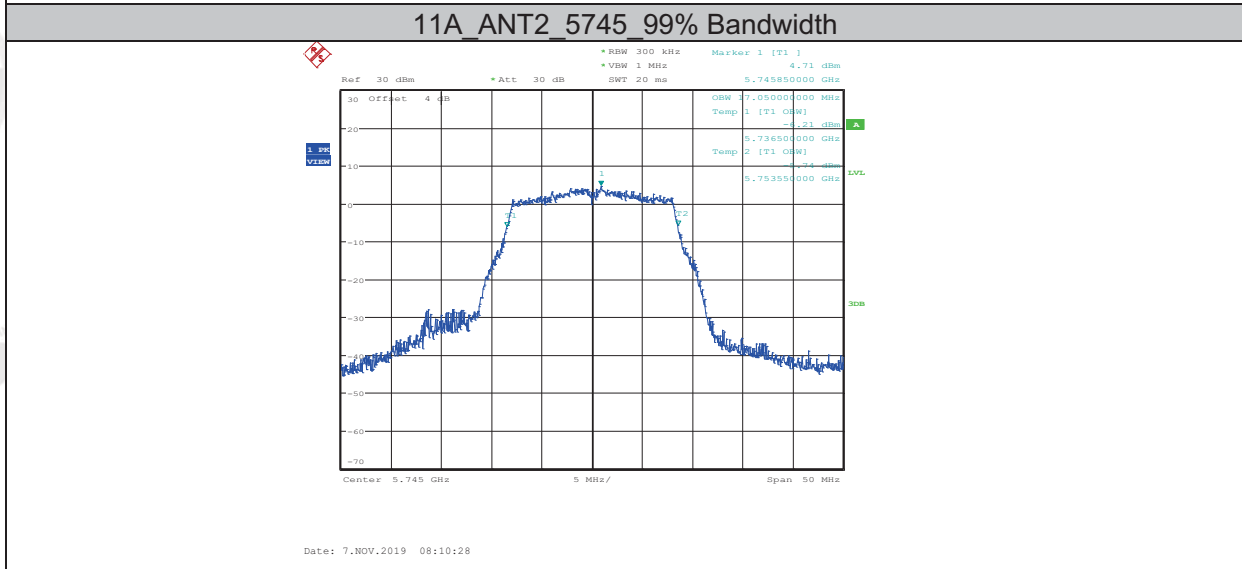
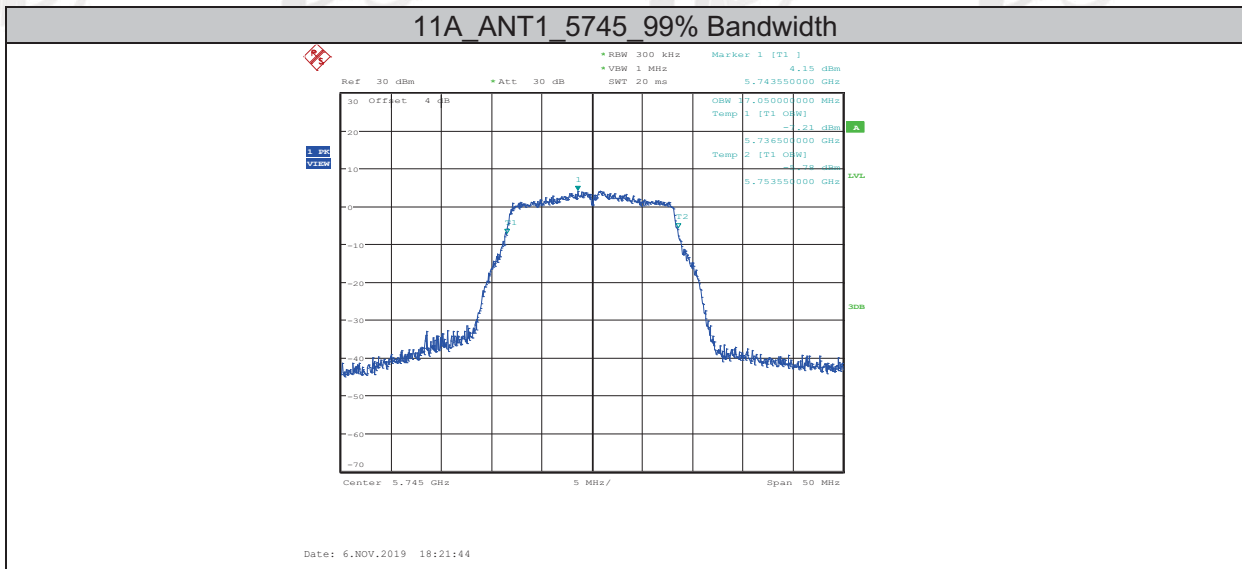
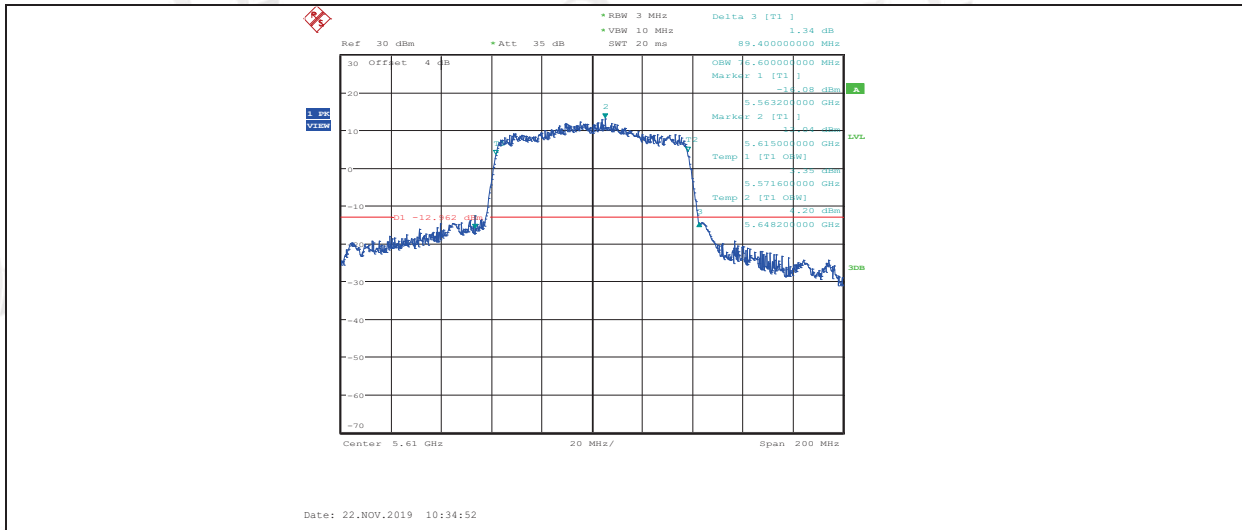
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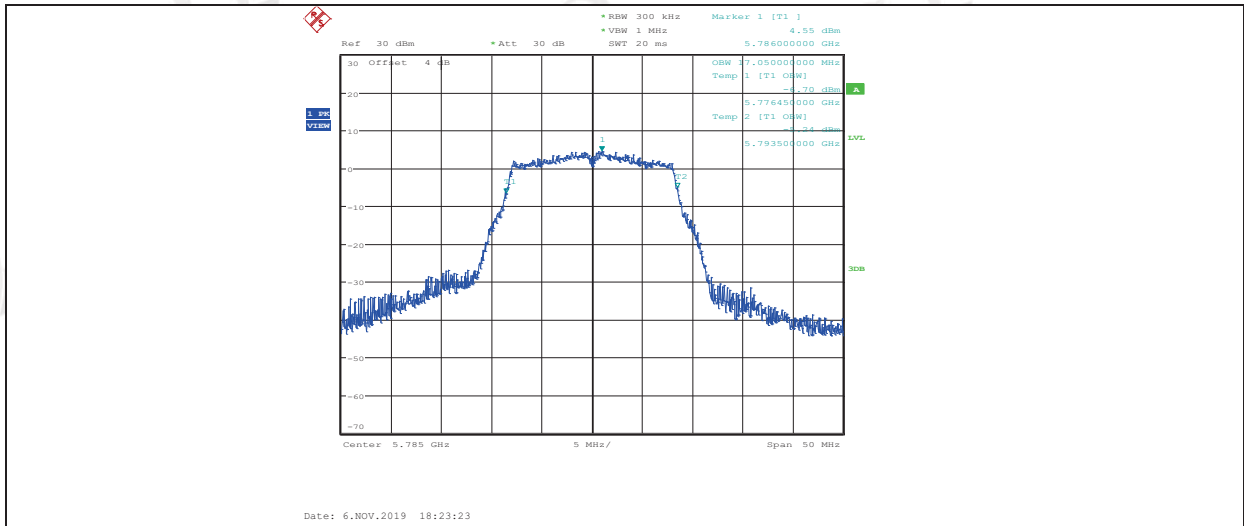
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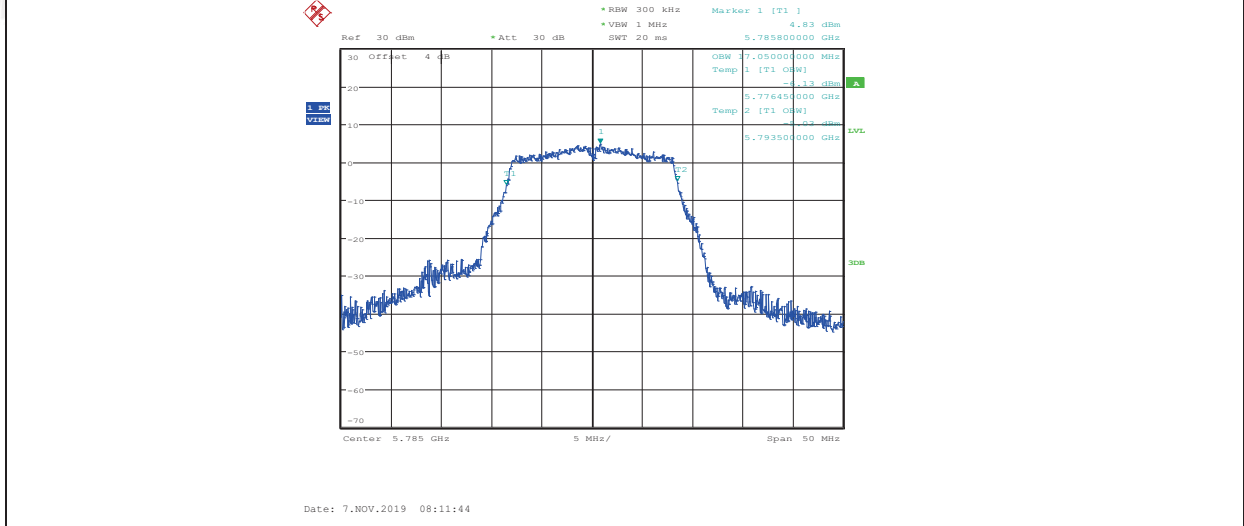
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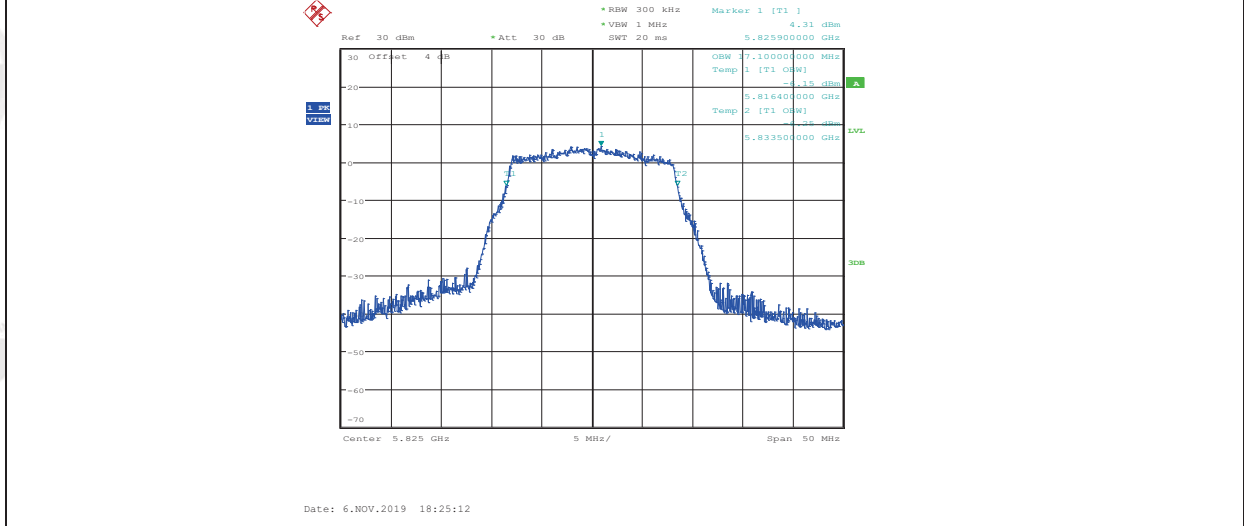
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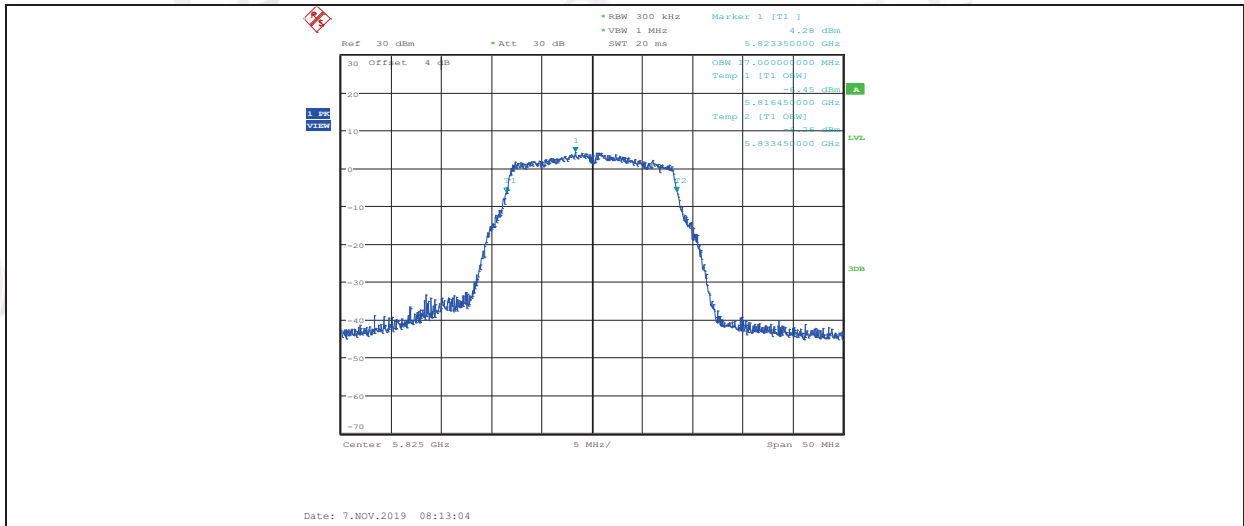
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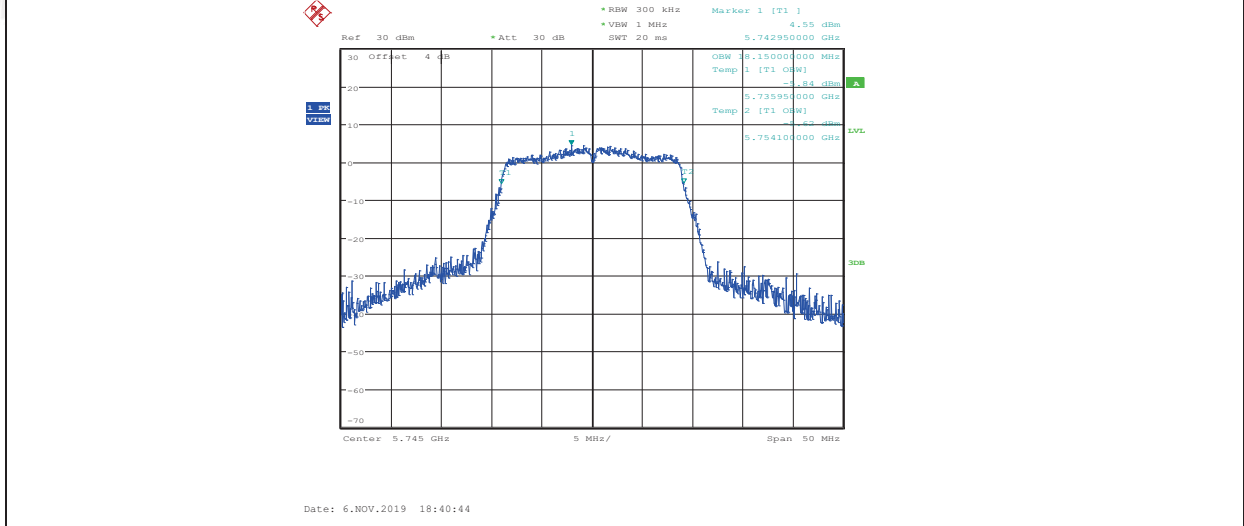
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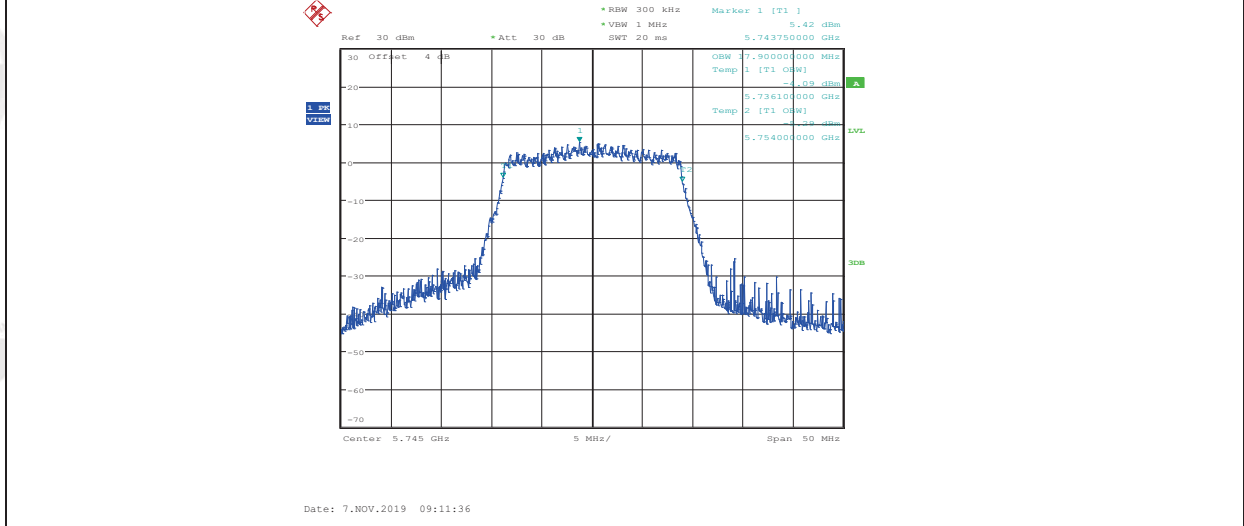
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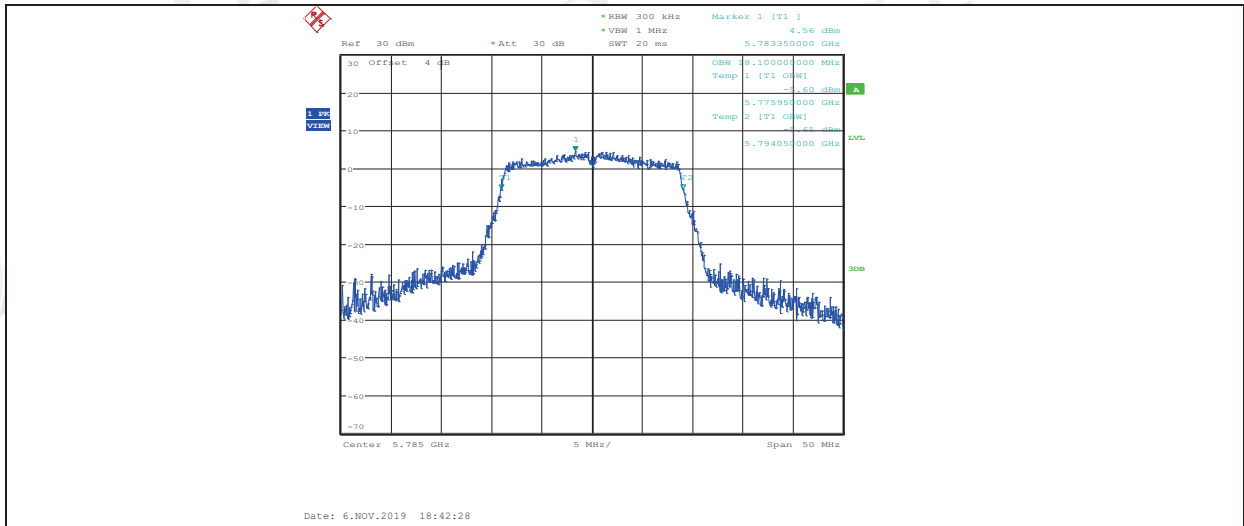
11N20MIMO ANT1 5745 99% Bandwidth



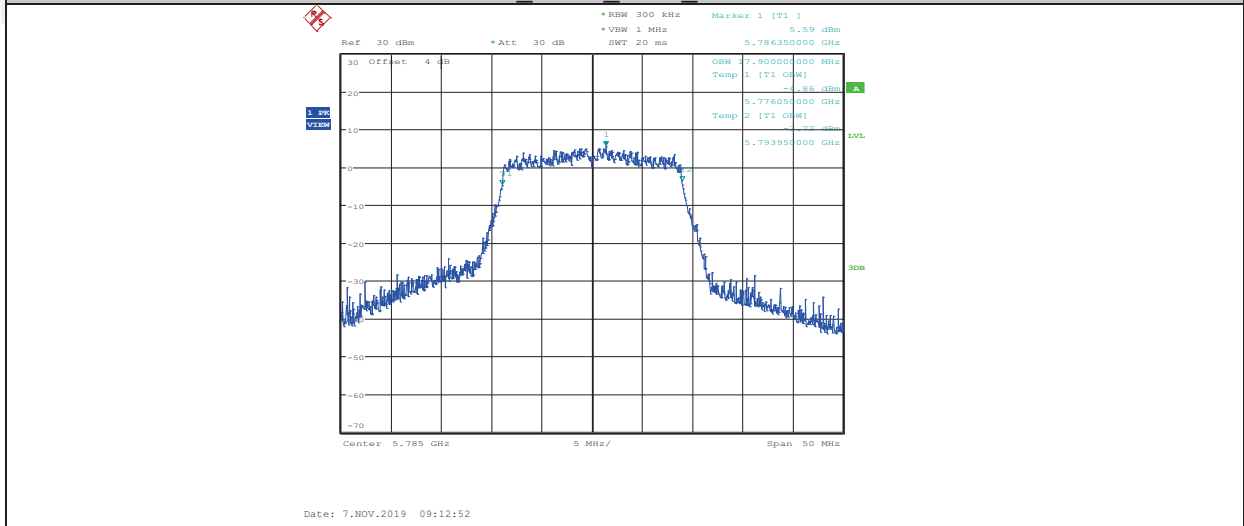
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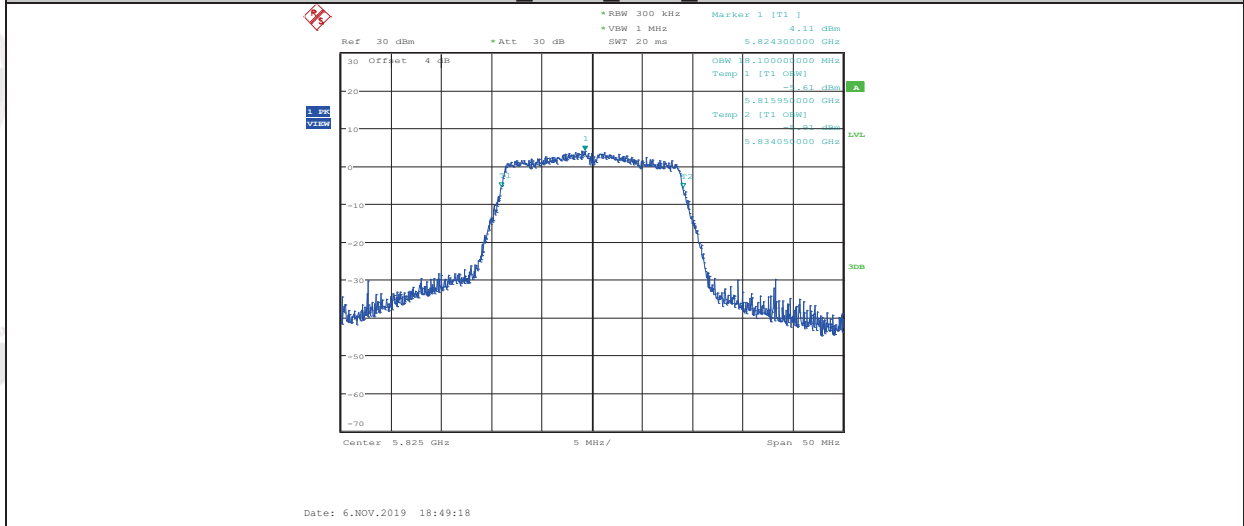
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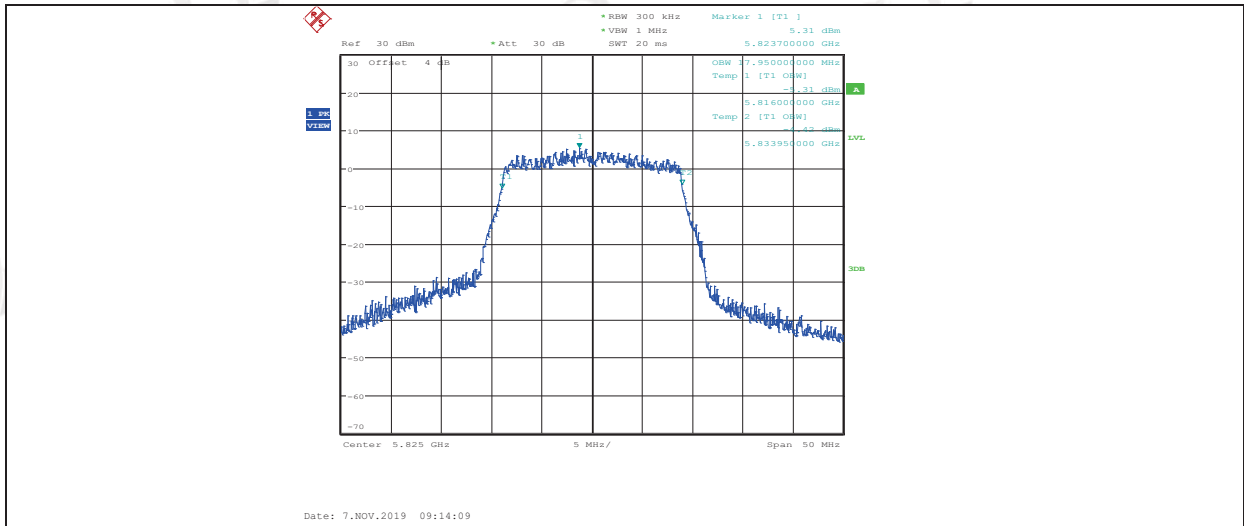
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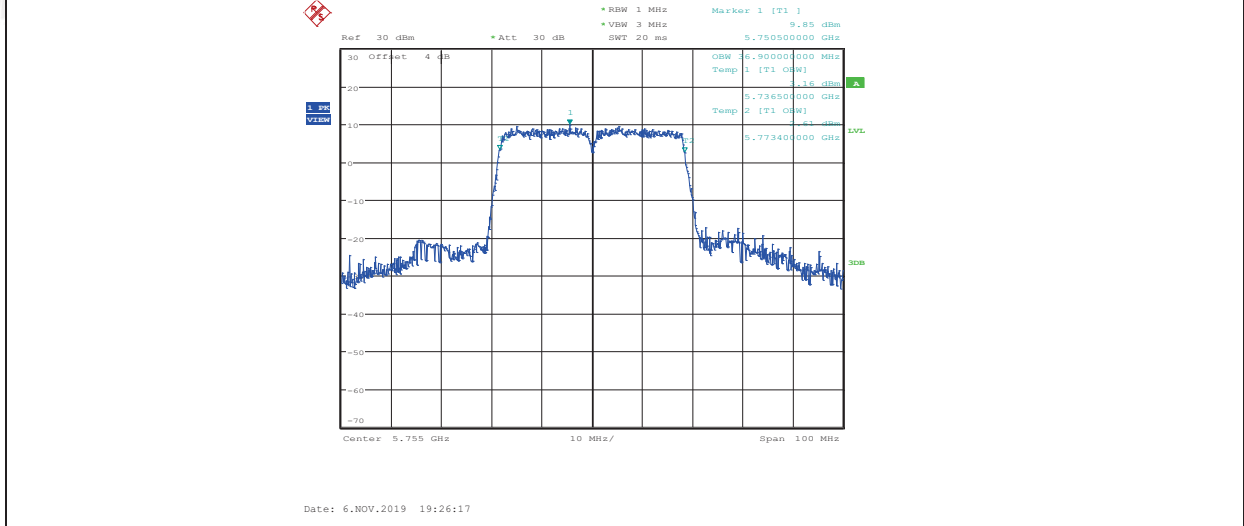
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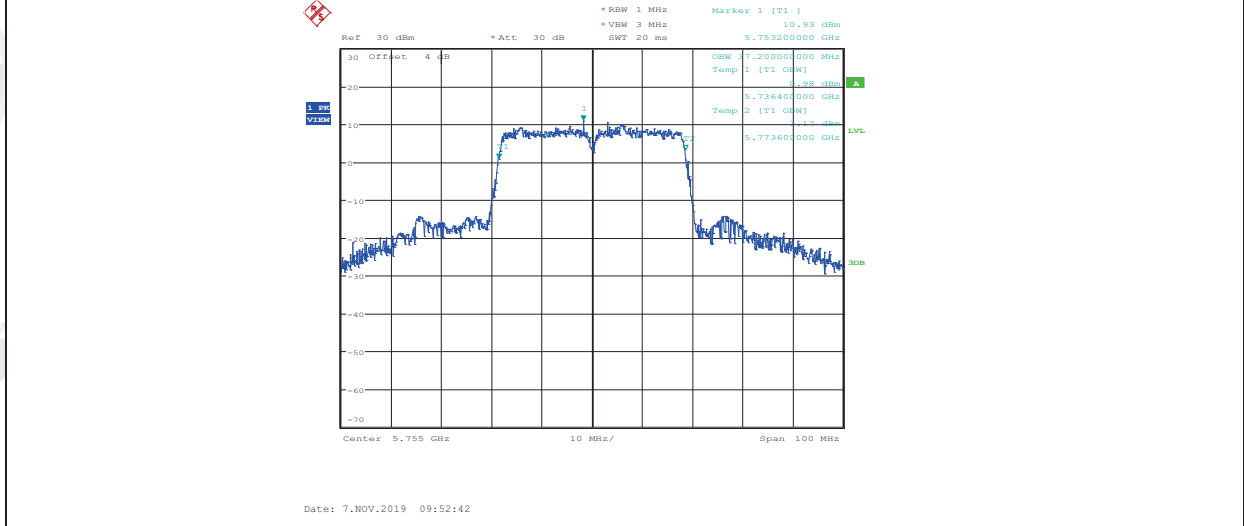
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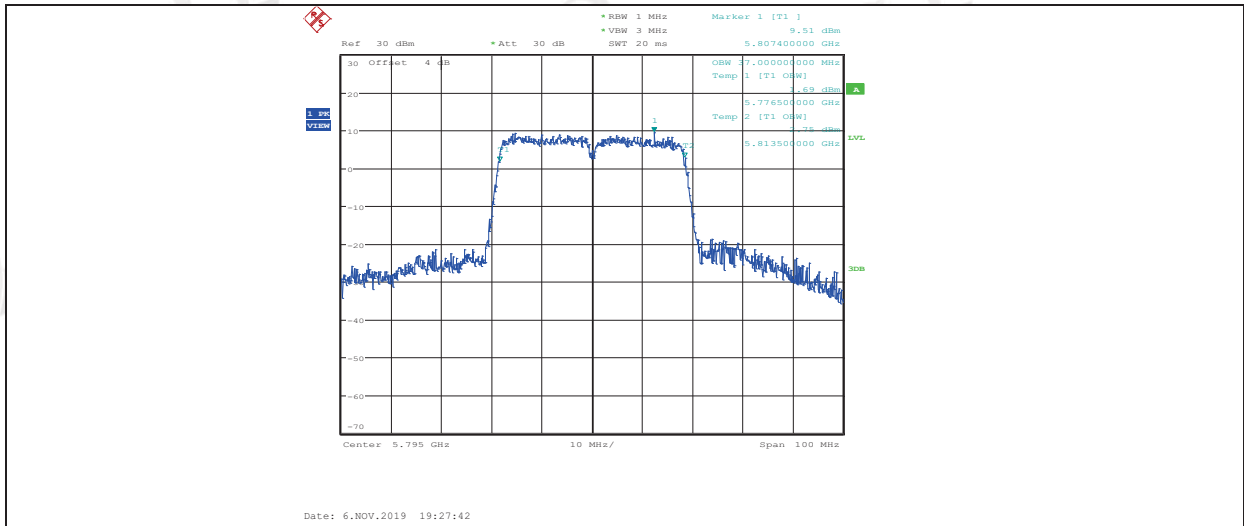
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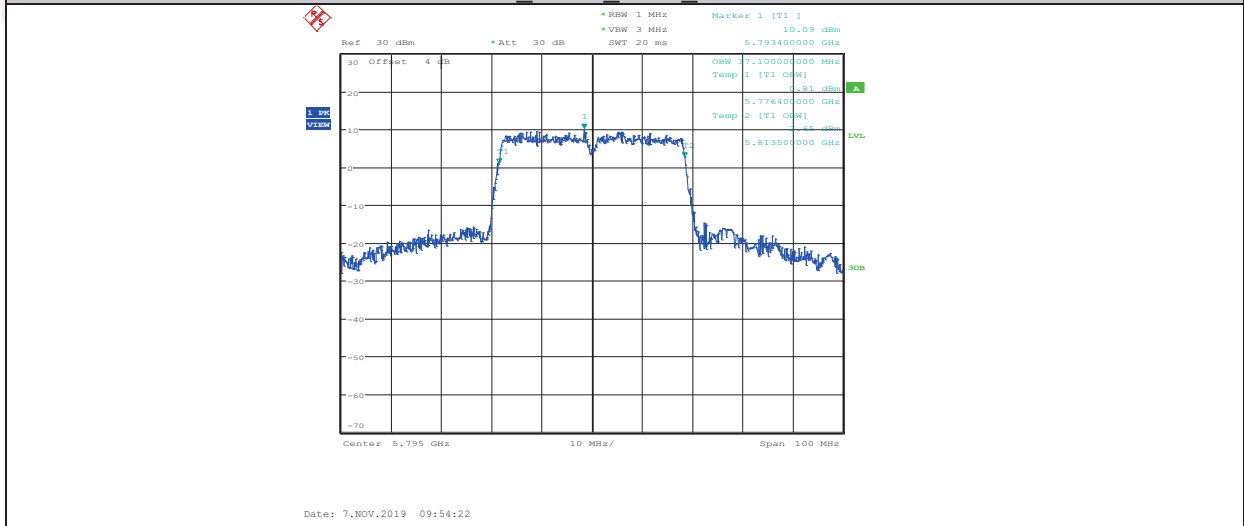
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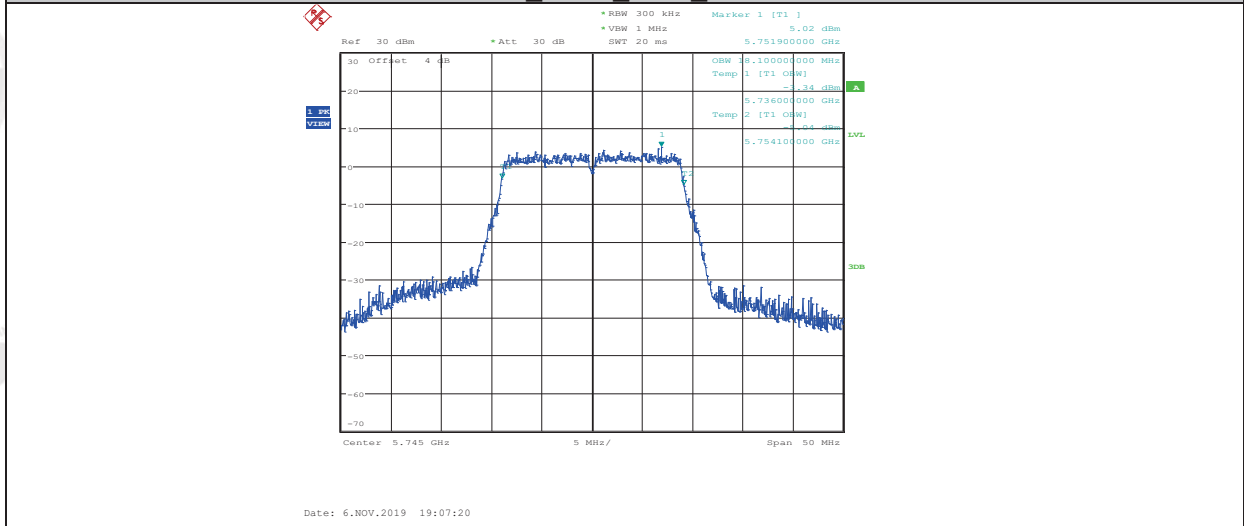
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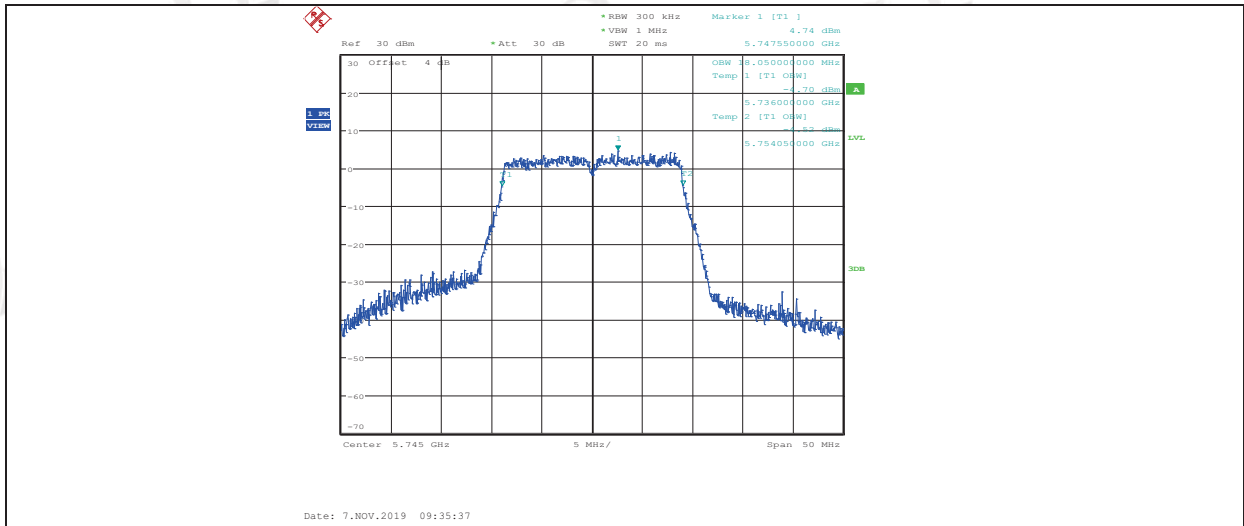
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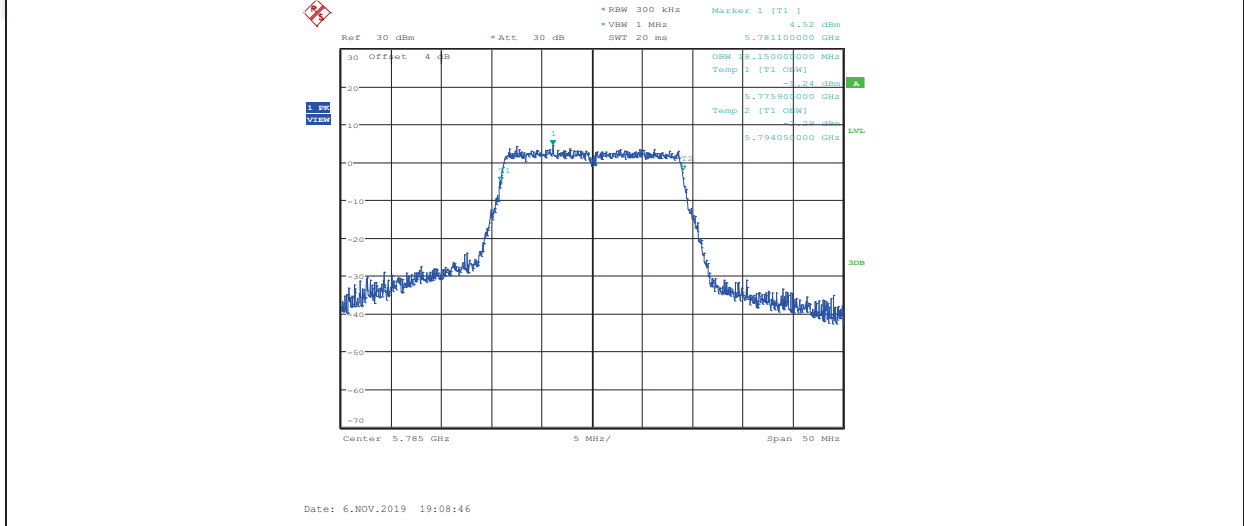
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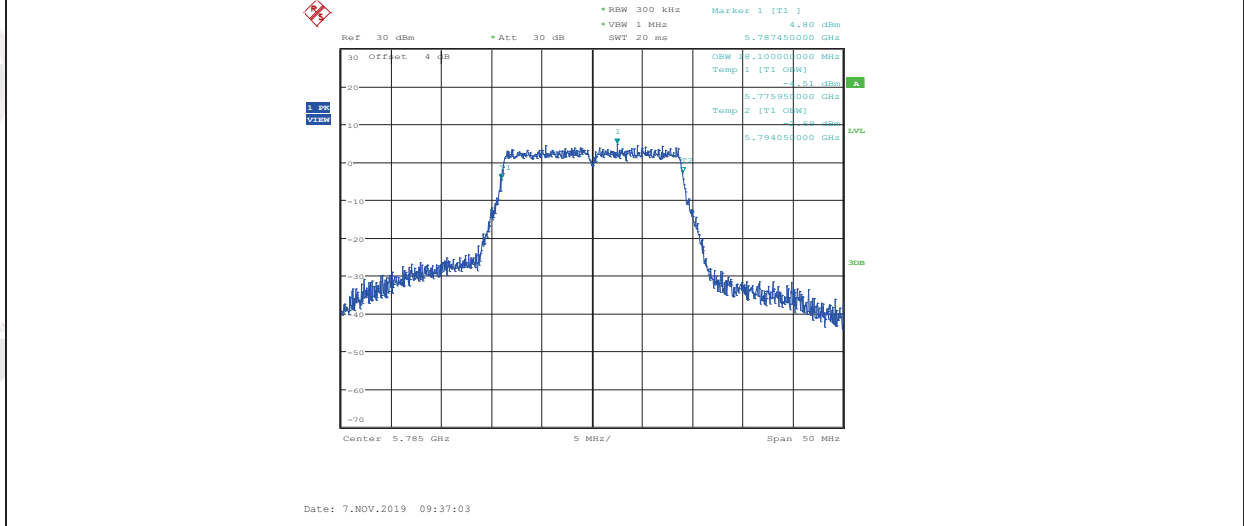
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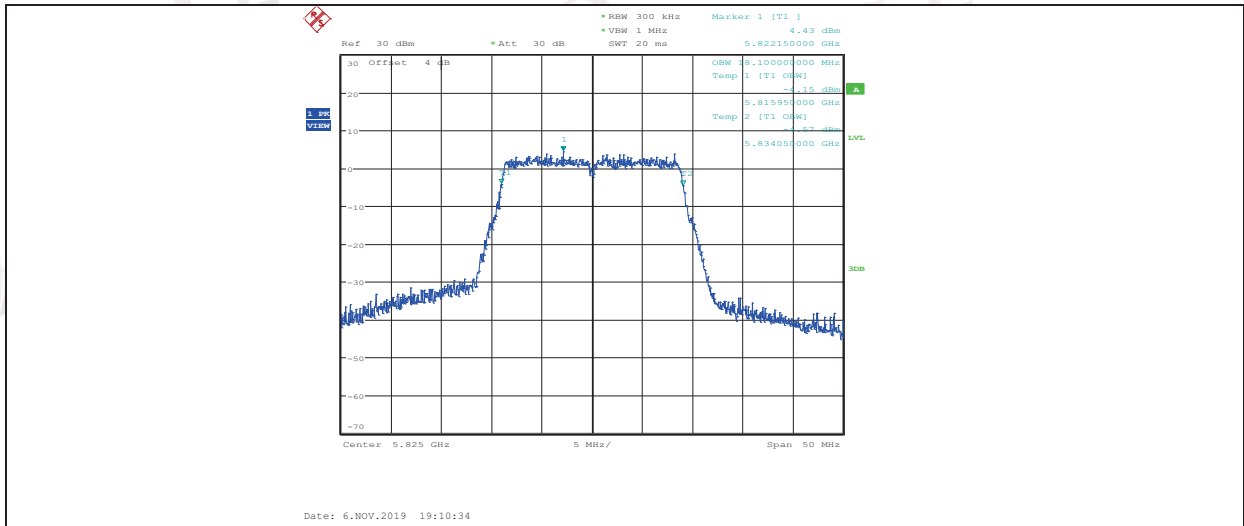
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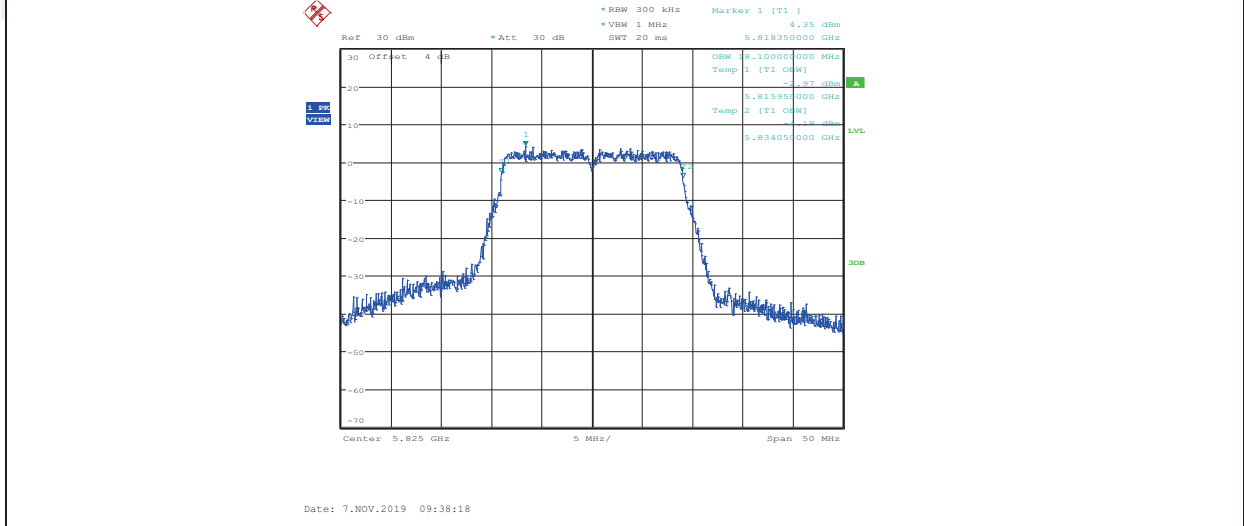
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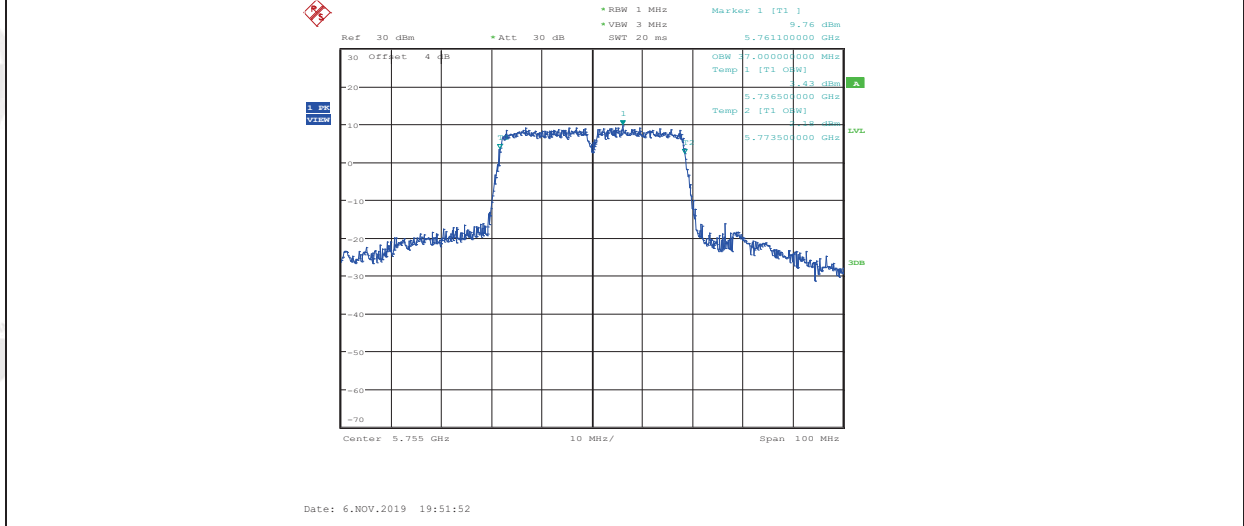
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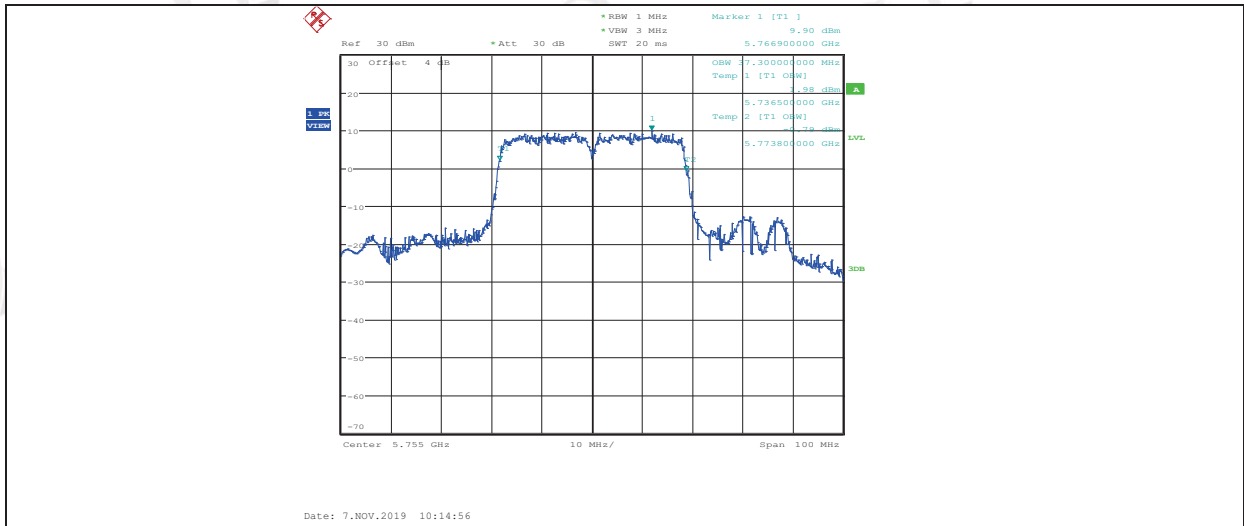
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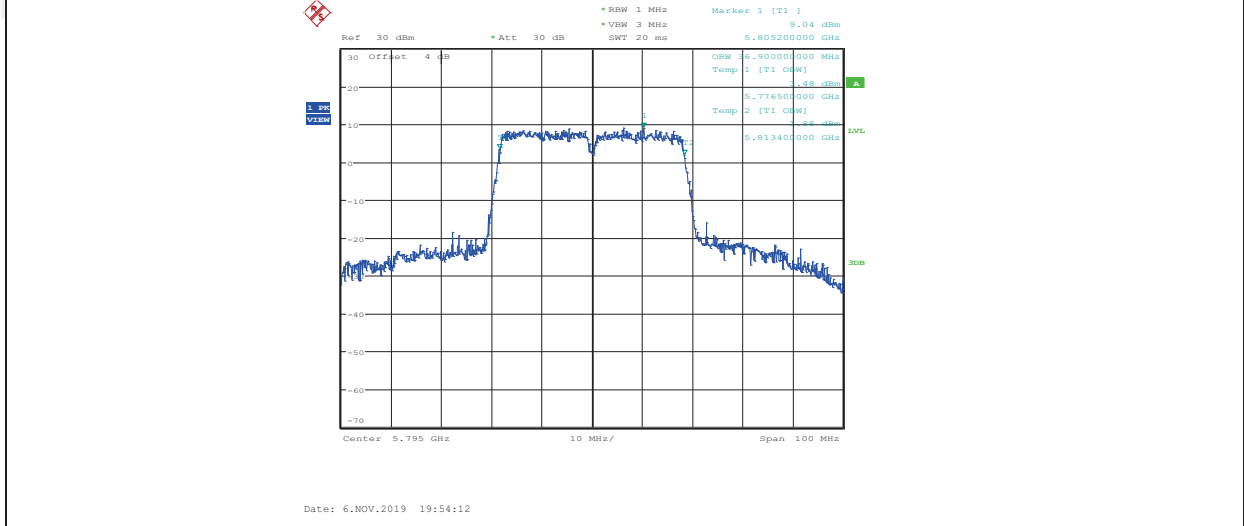
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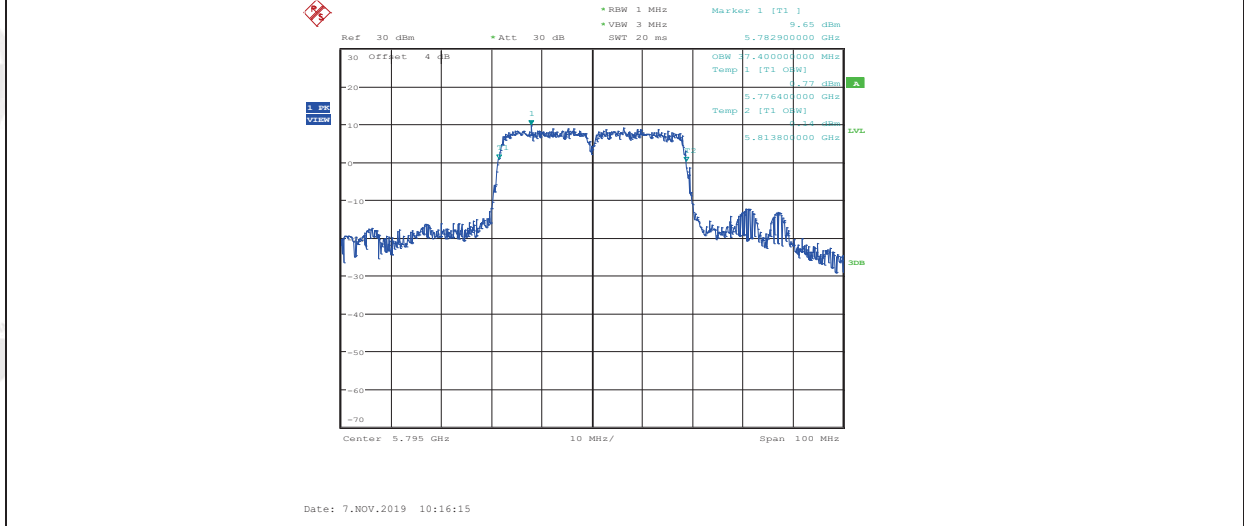
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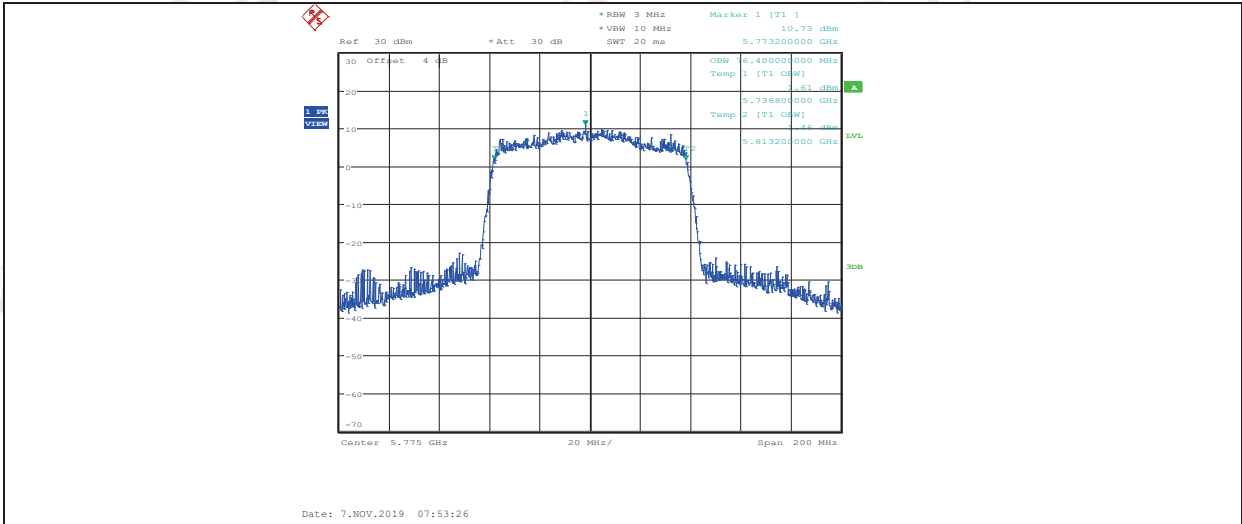
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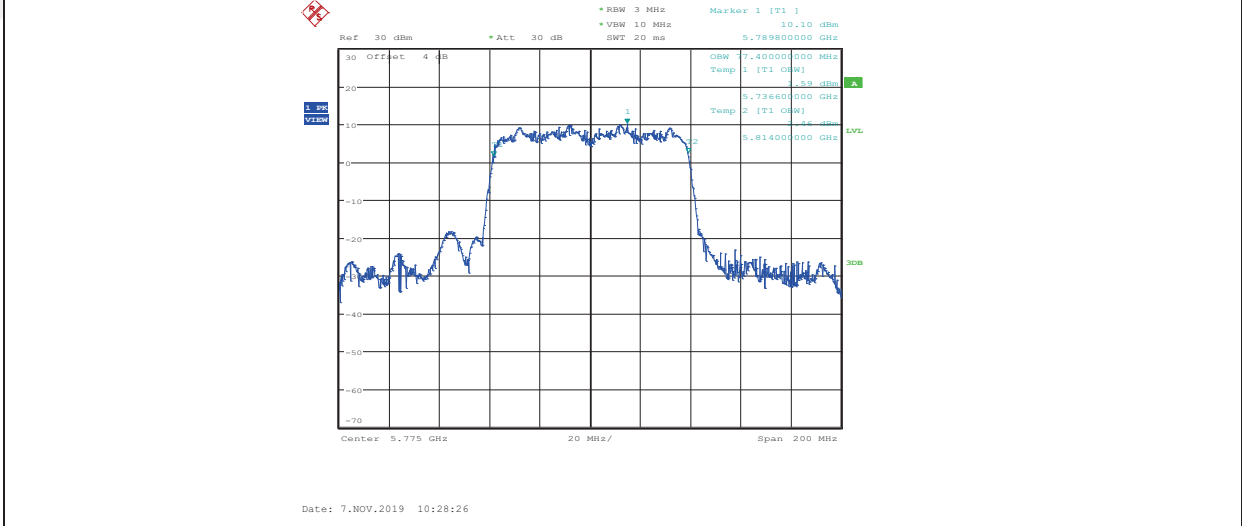
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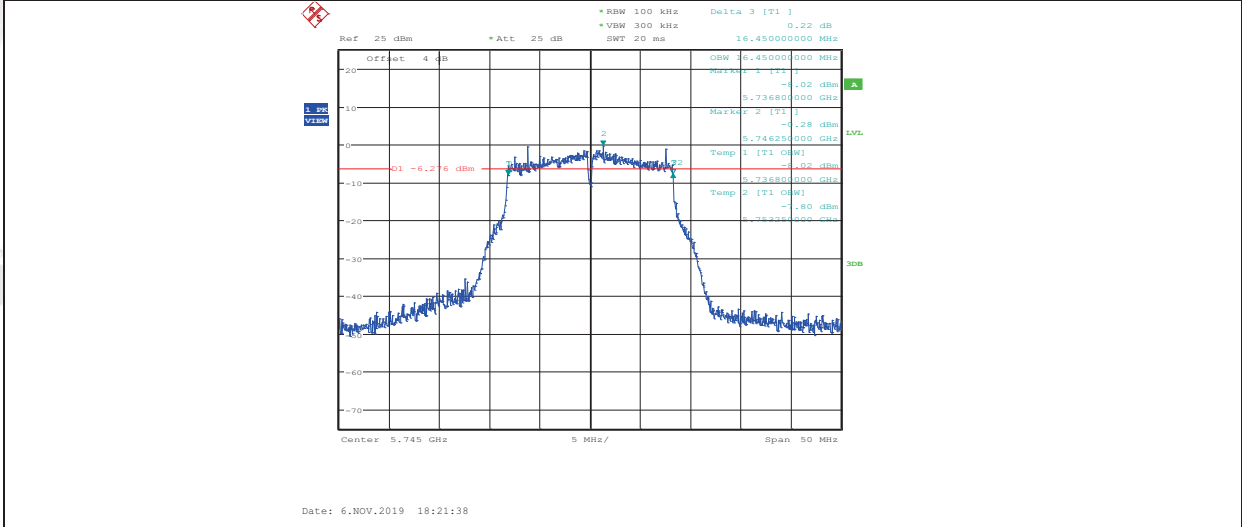
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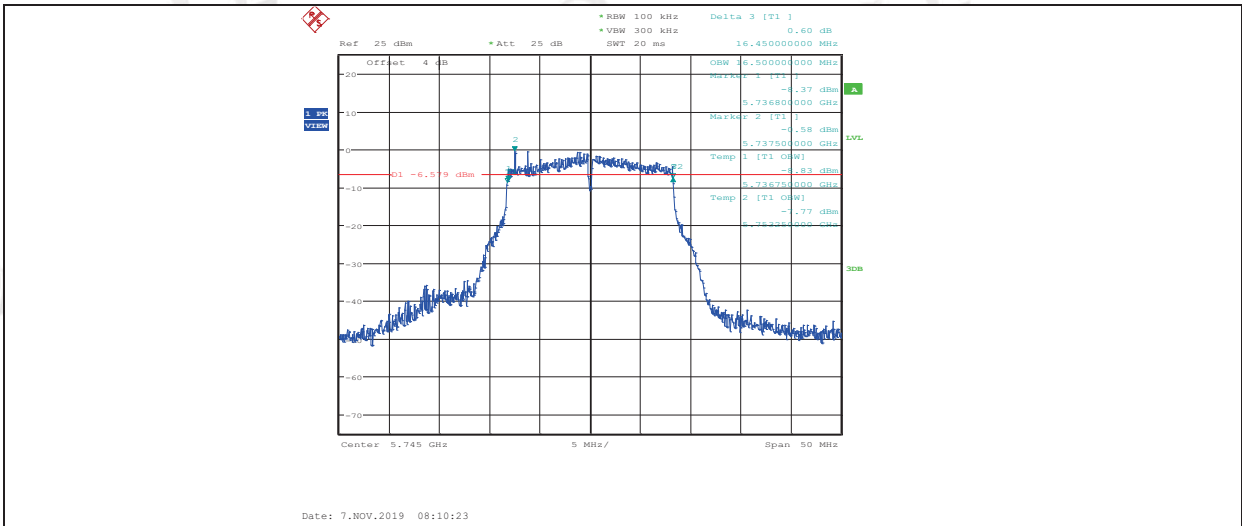
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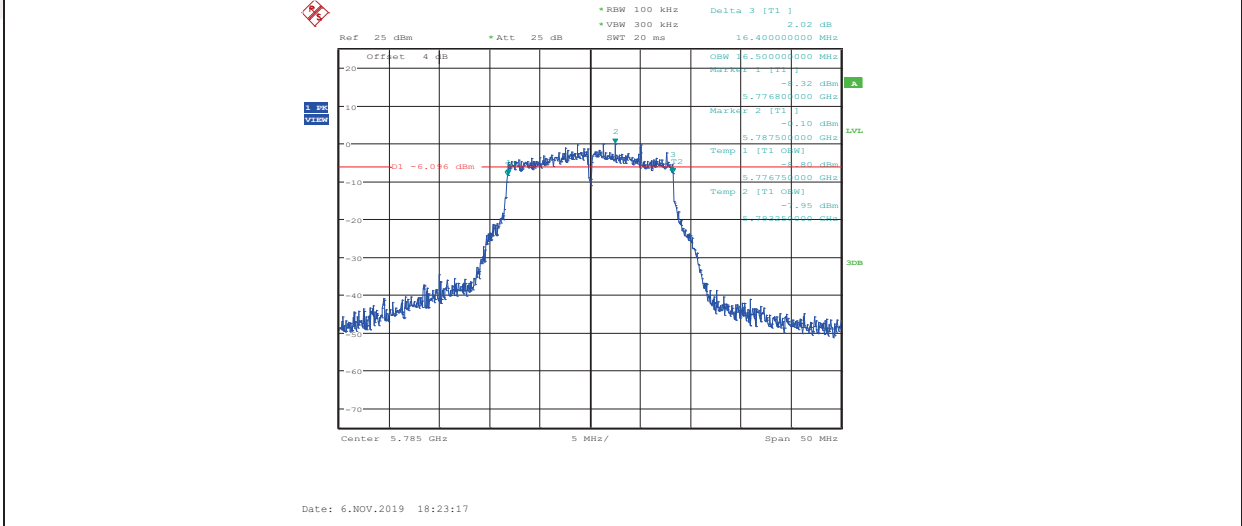
11A ANT1 5745 6dB Bandwidth



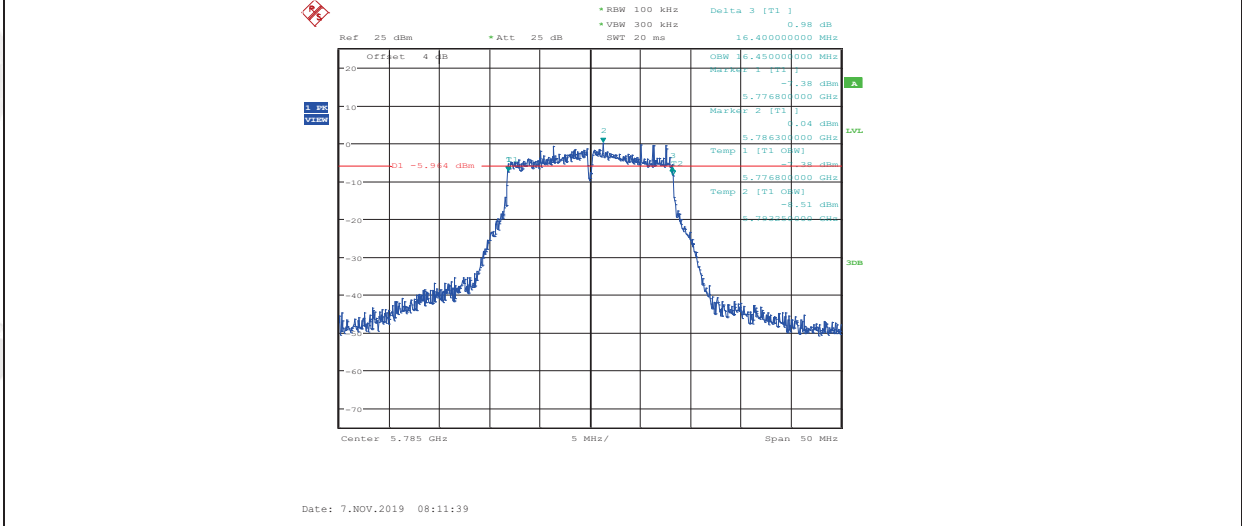
11A ANT2 5745 6dB Bandwidth



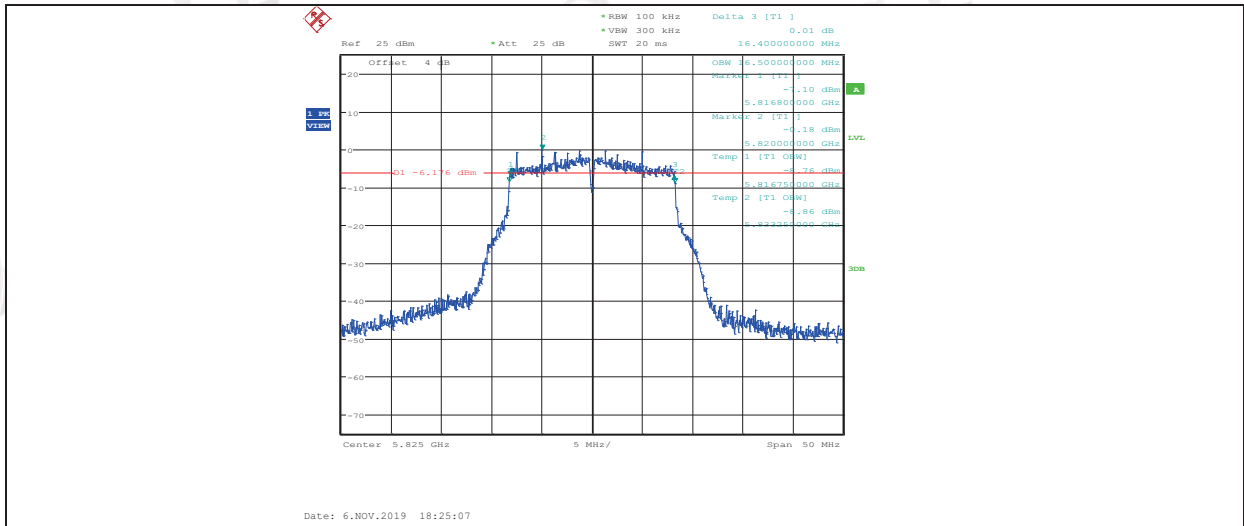
11A ANT1 5785 6dB Bandwidth



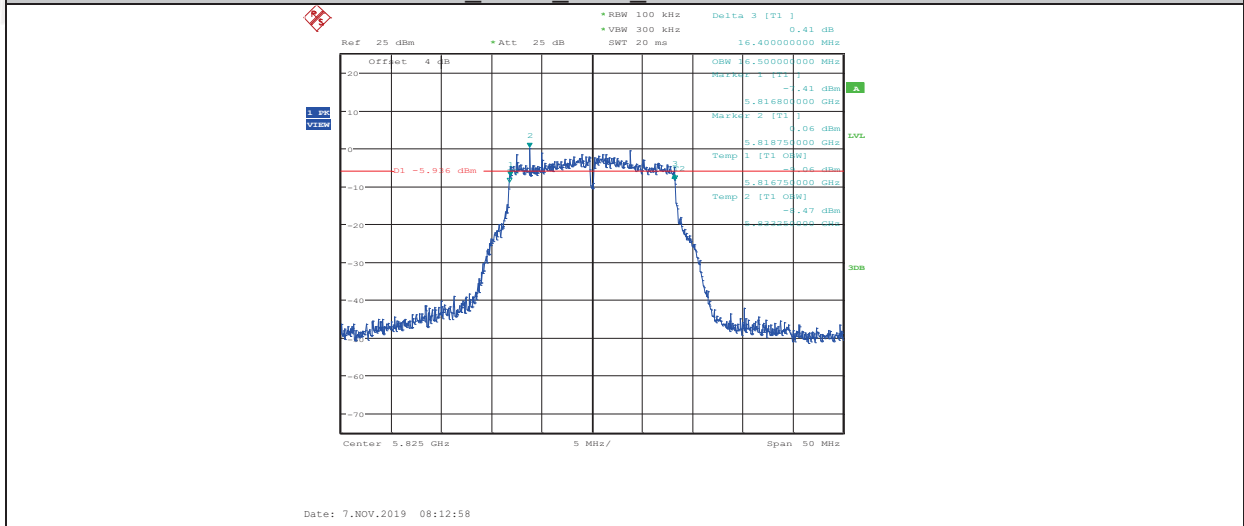
11A ANT2 5785 6dB Bandwidth



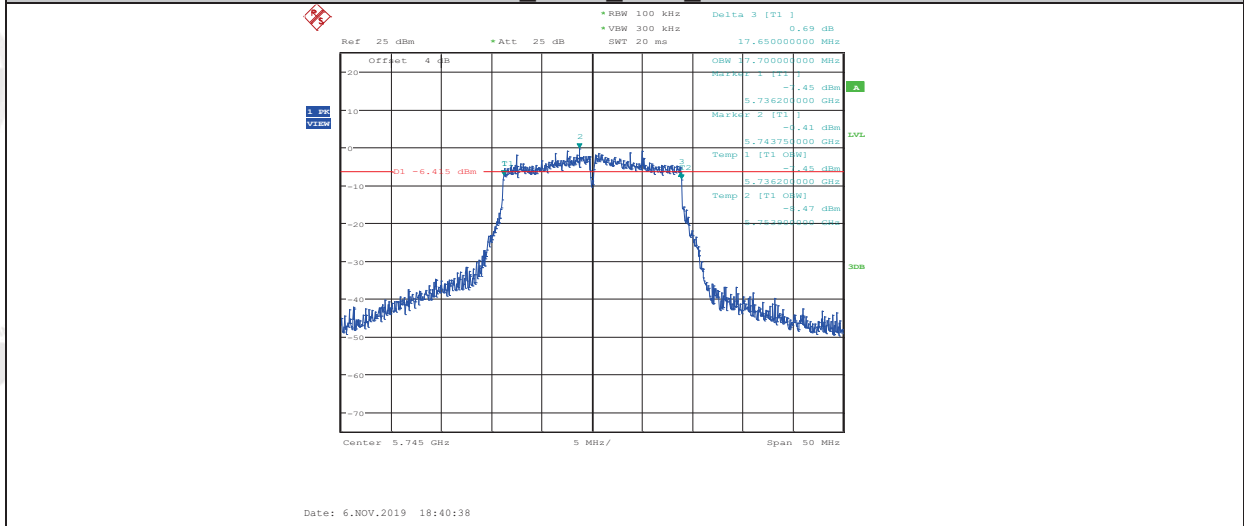
11A ANT1 5825 6dB Bandwidth



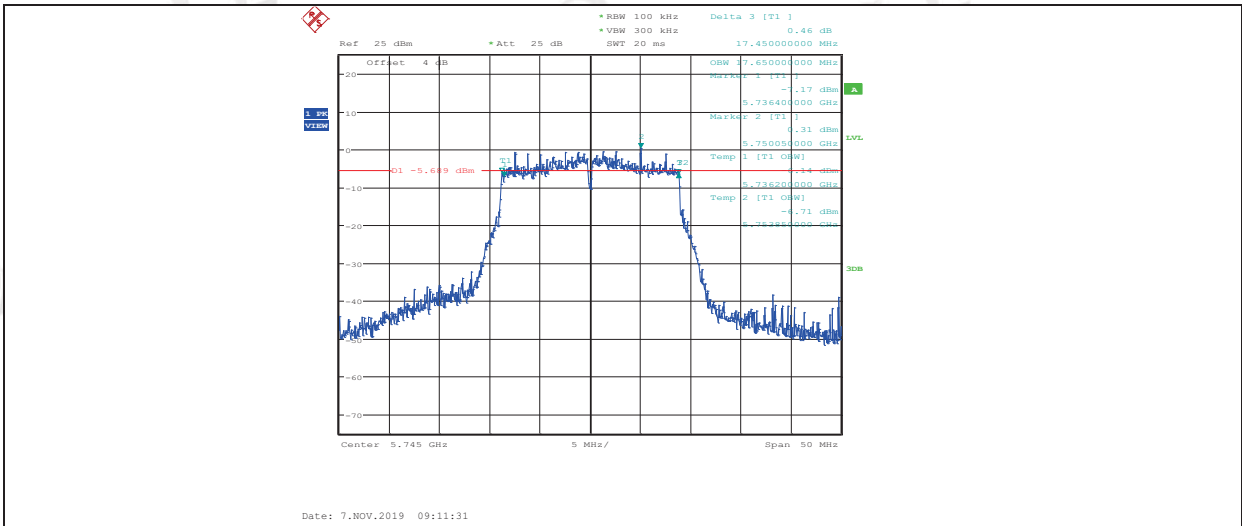
11A_ANT2_5825_6dB Bandwidth



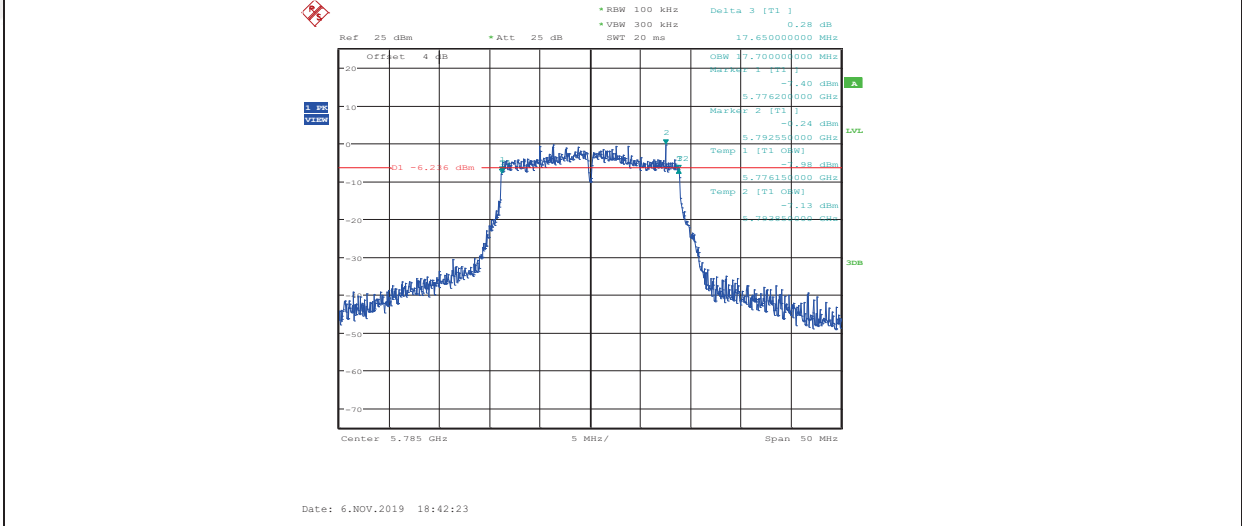
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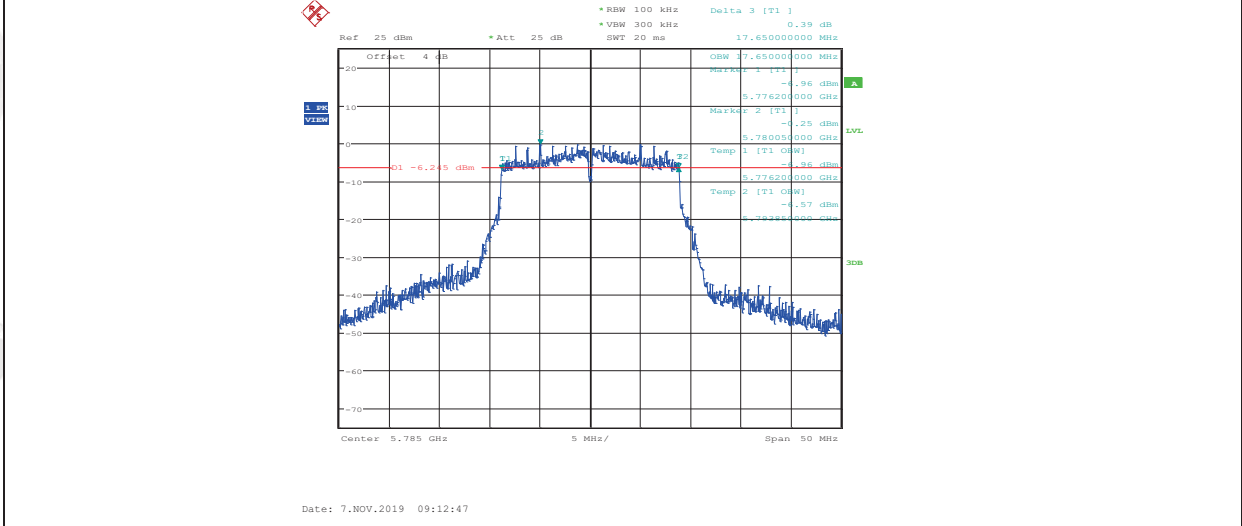
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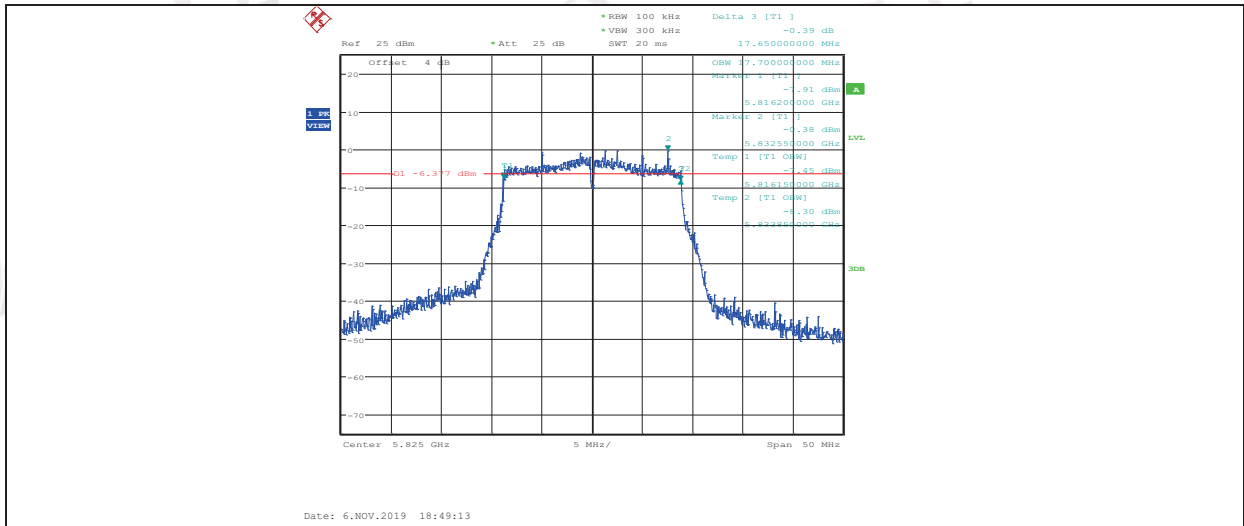
11N20MIMO ANT1 5785 6dB Bandwidth



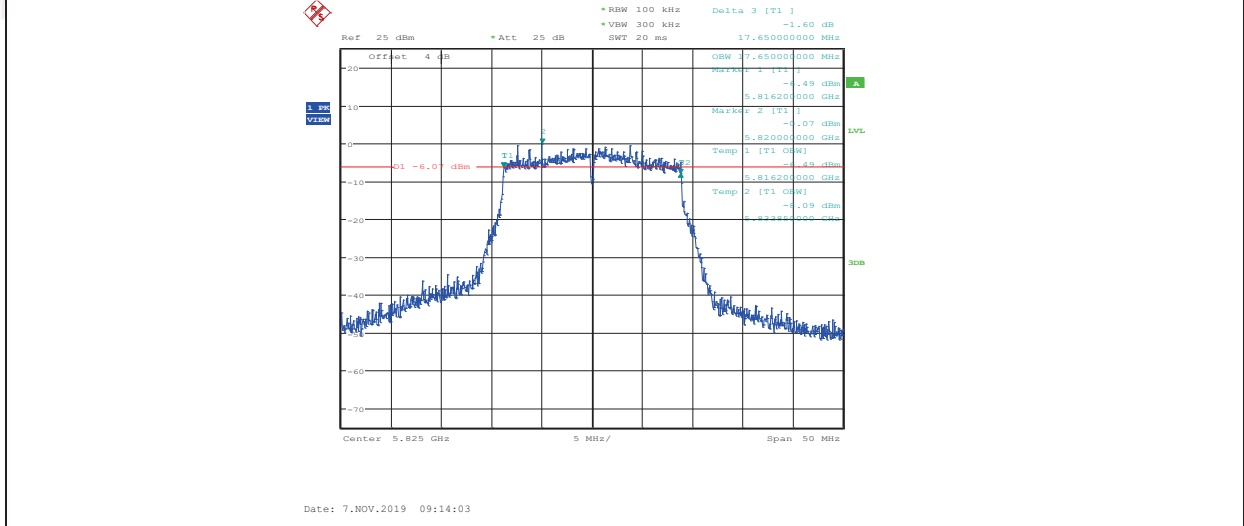
11N20MIMO ANT2 5785 6dB Bandwidth



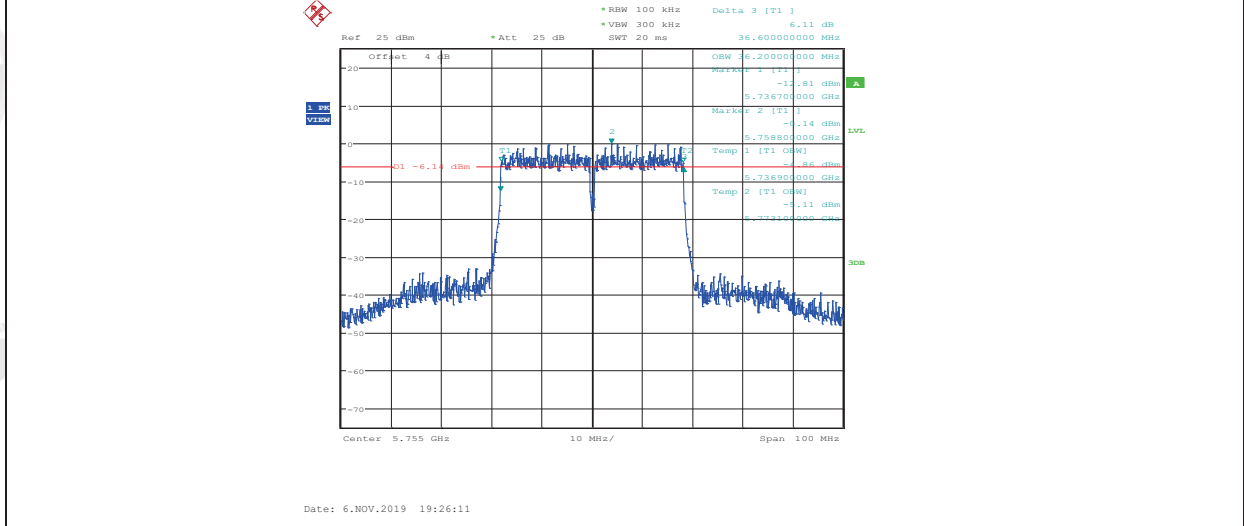
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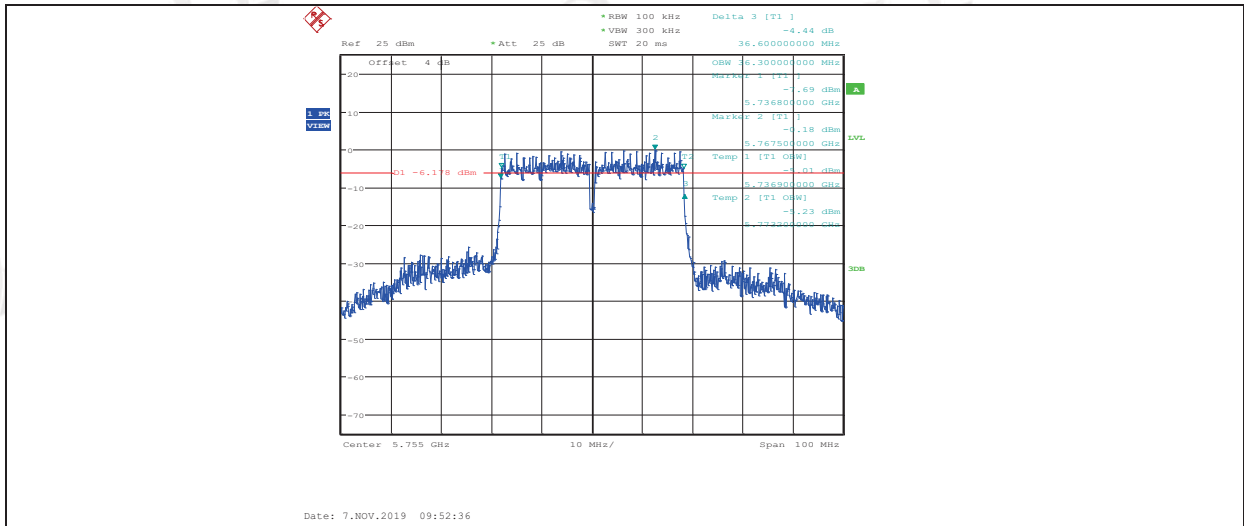
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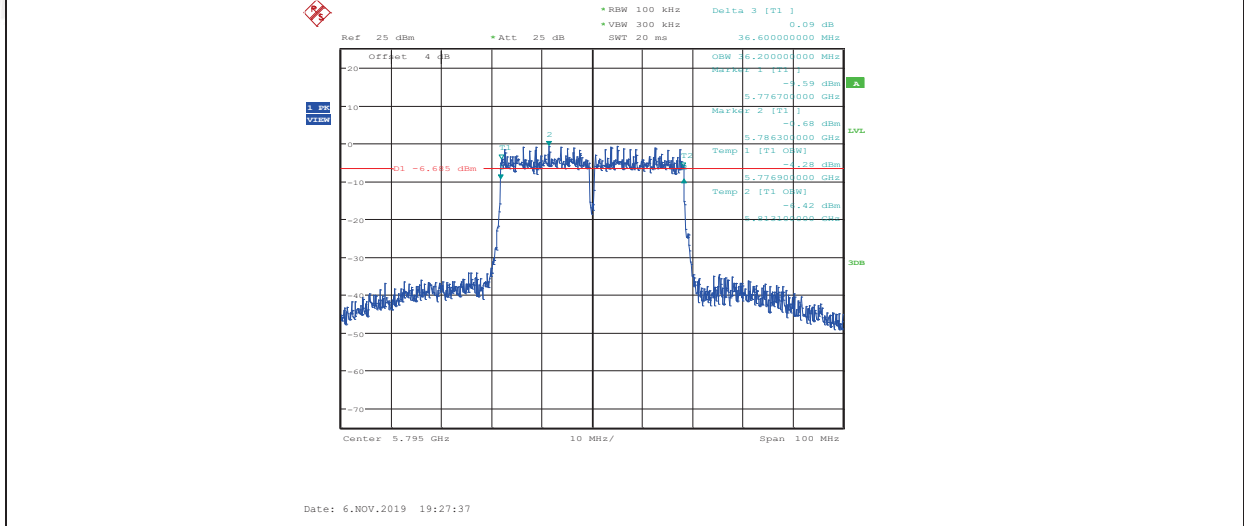
11N40MIMO ANT1 5755 6dB Bandwidth



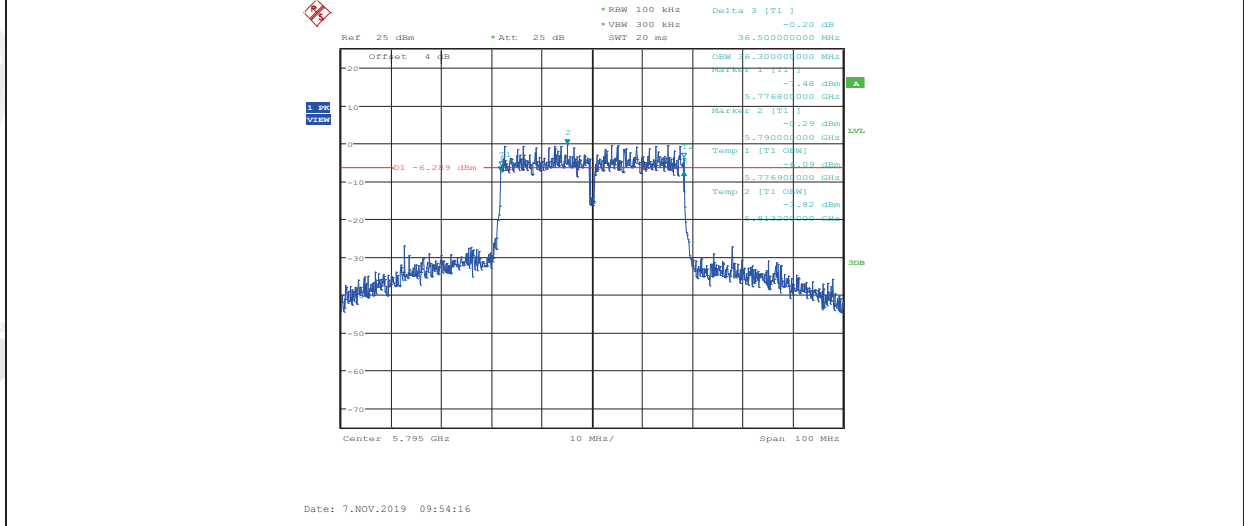
11N40MIMO ANT2 5755 6dB Bandwidth



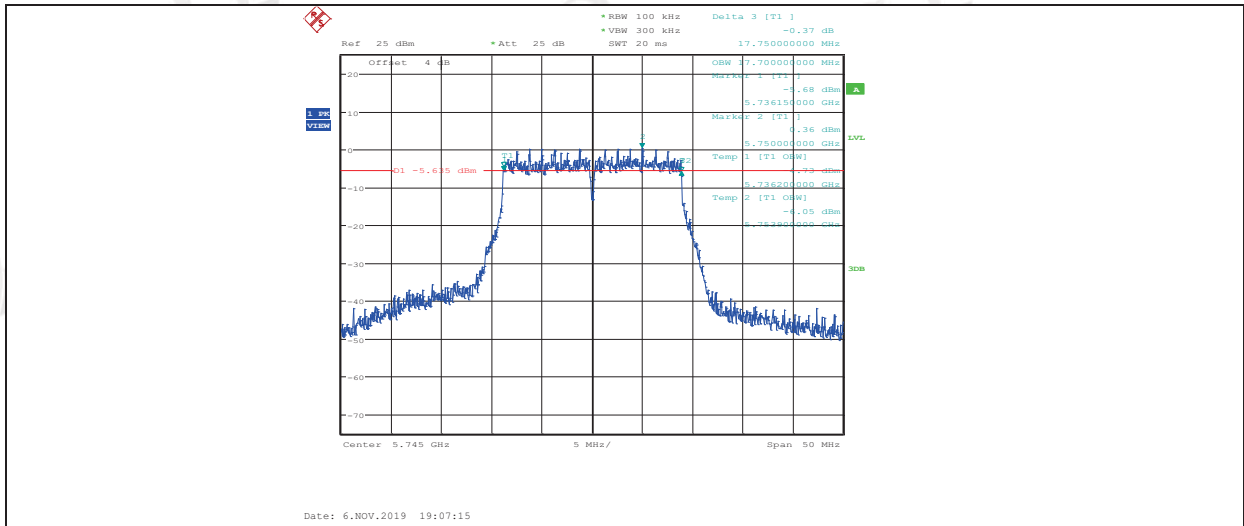
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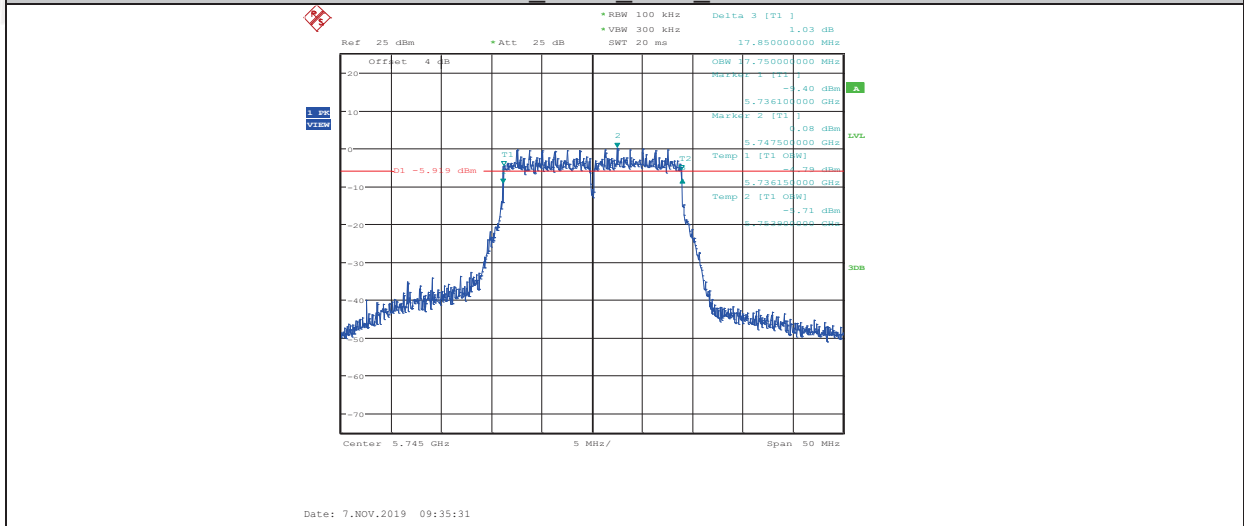
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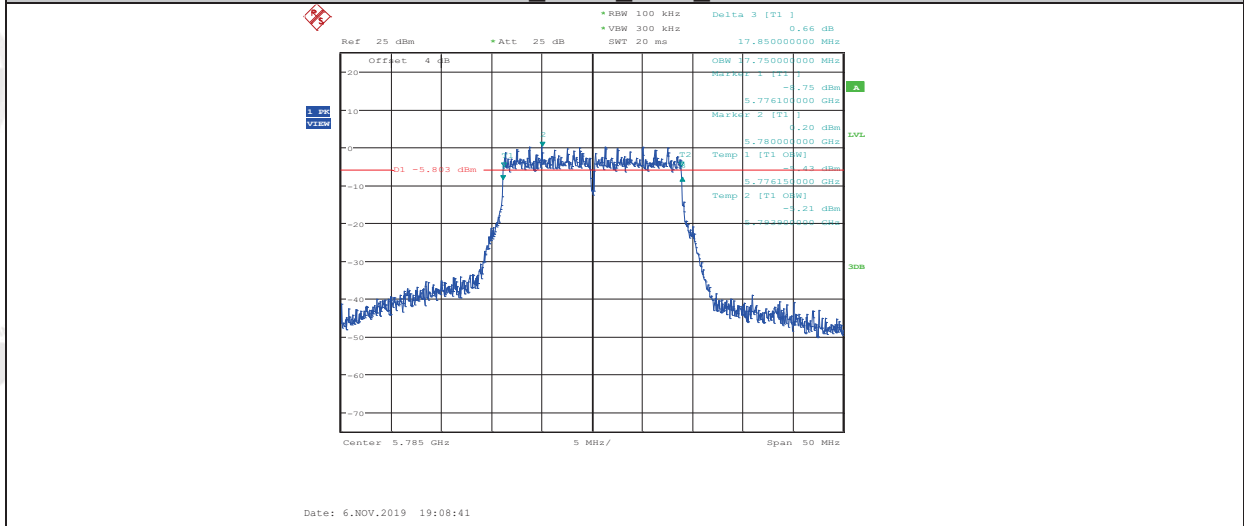
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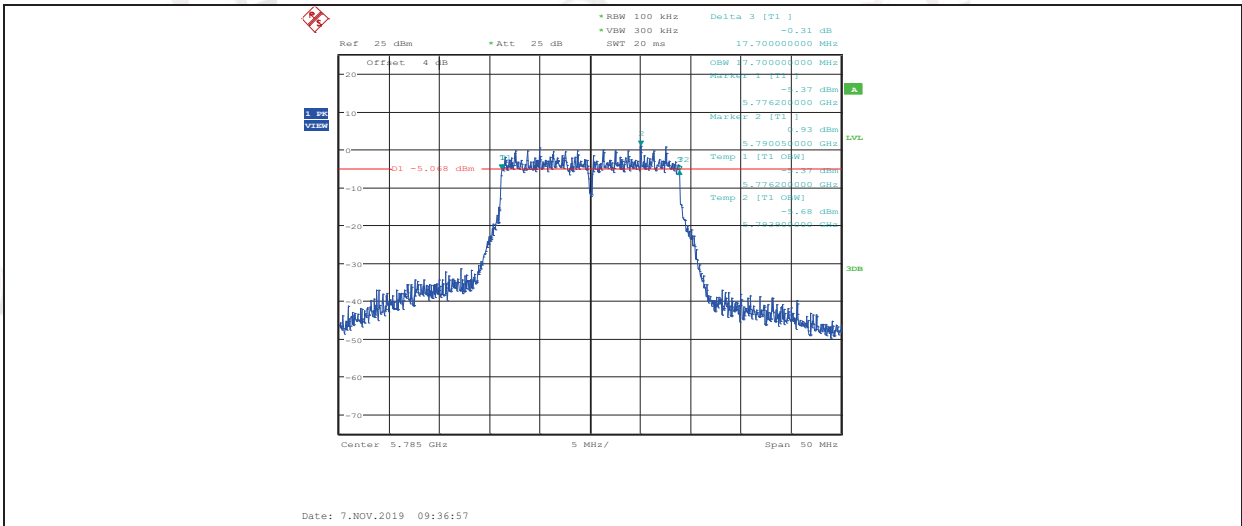
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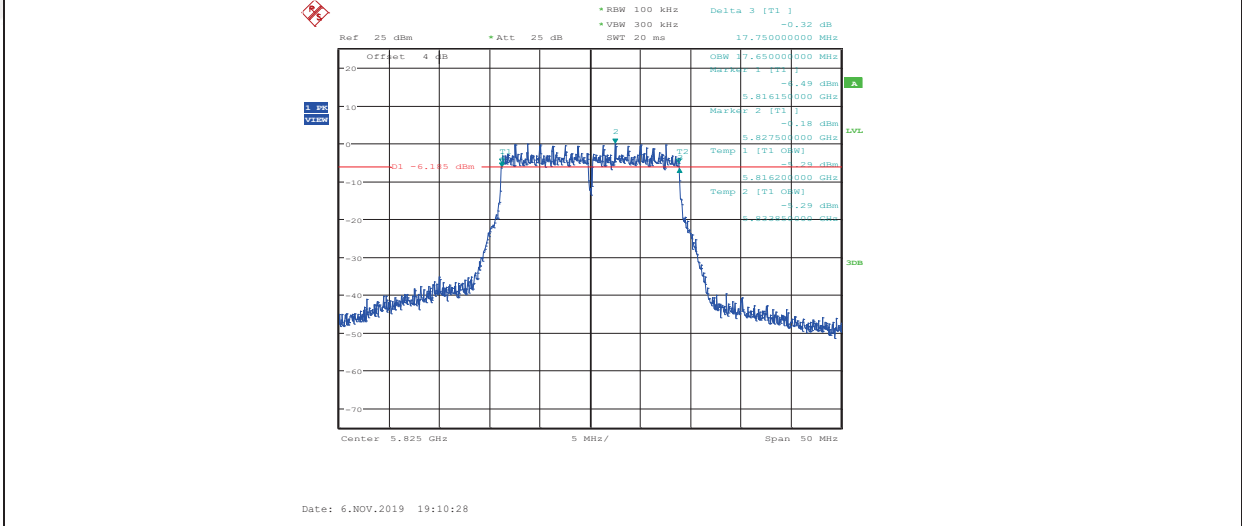
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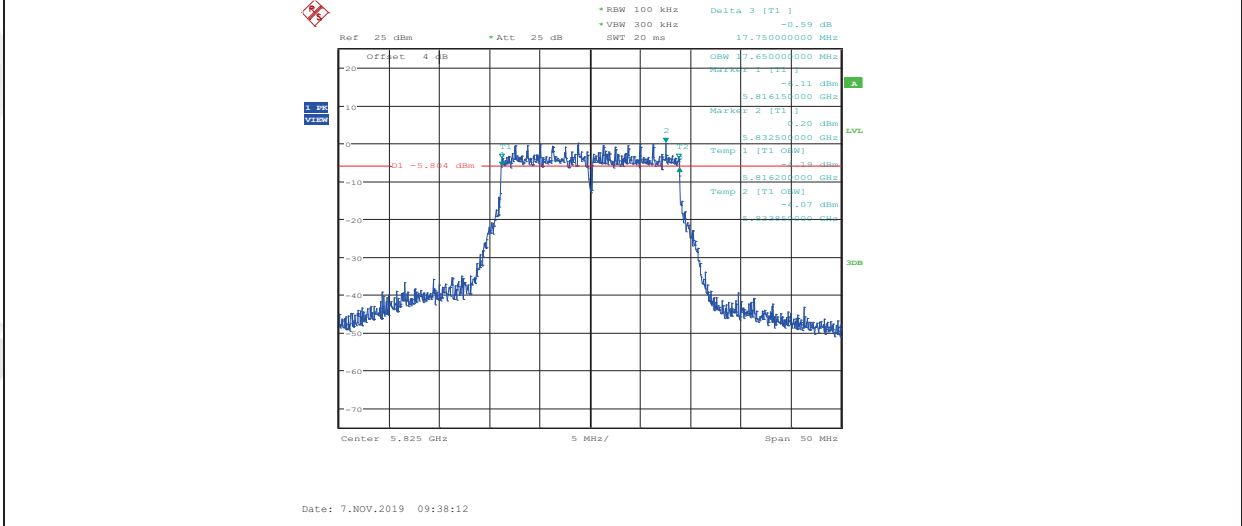
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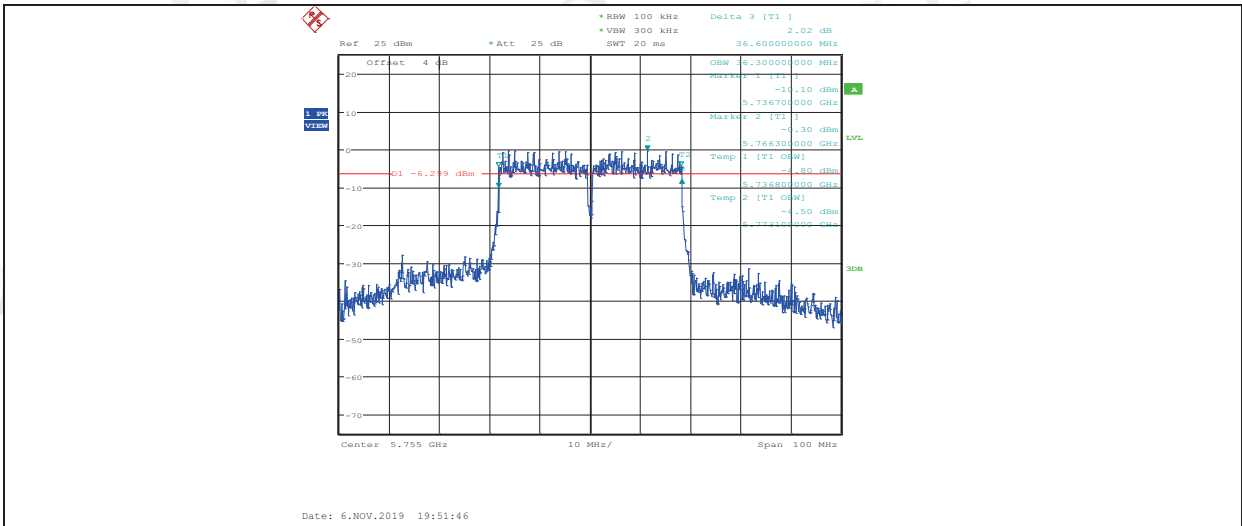
11AC20MIMO ANT1 5825 6dB Bandwidth



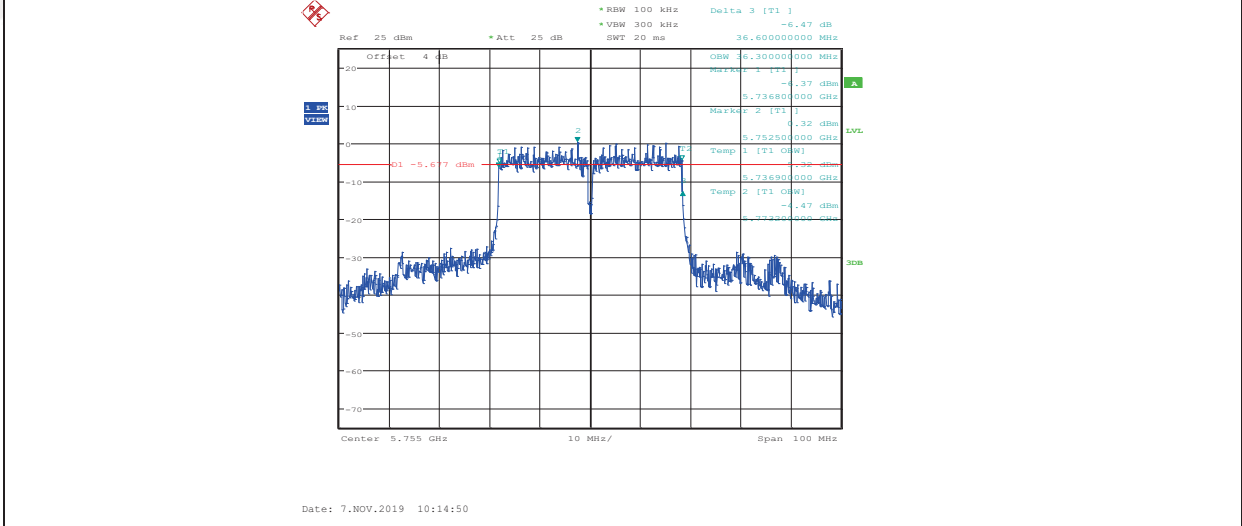
11AC20MIMO ANT2 5825 6dB Bandwidth



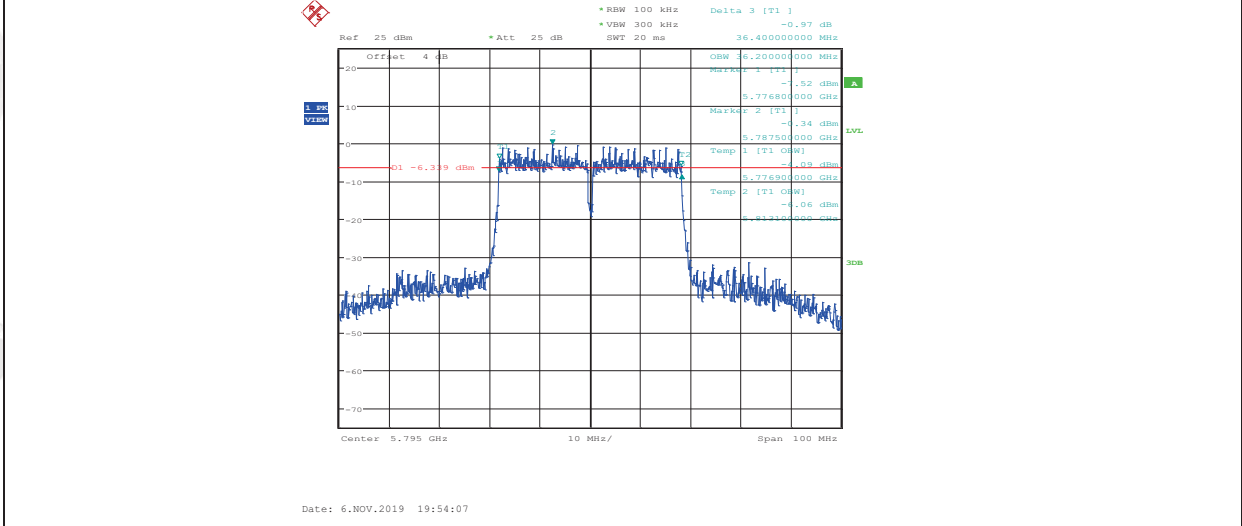
11AC40MIMO ANT1 5755 6dB Bandwidth



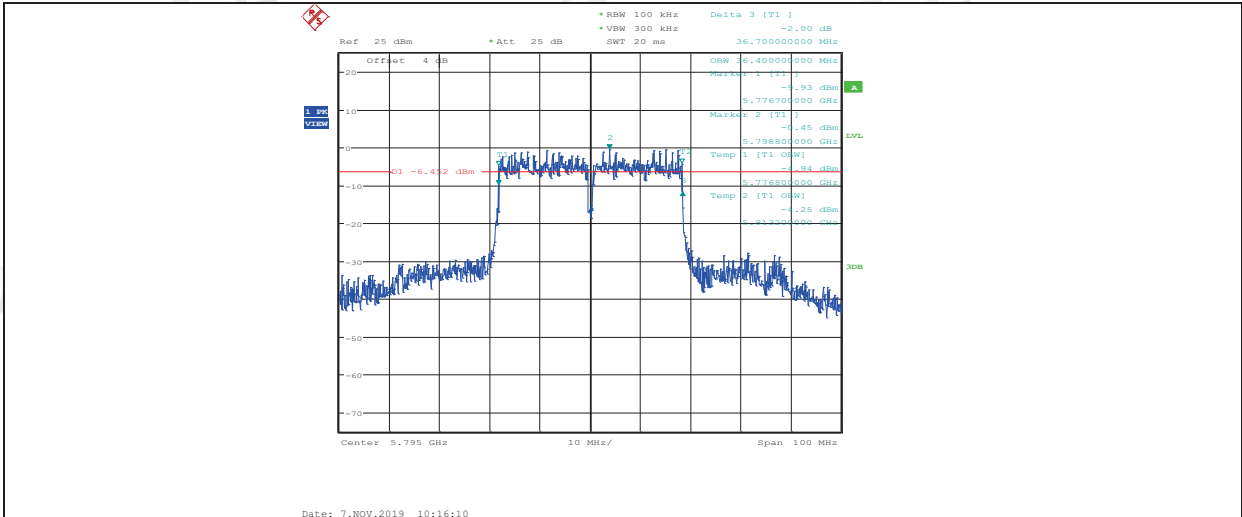
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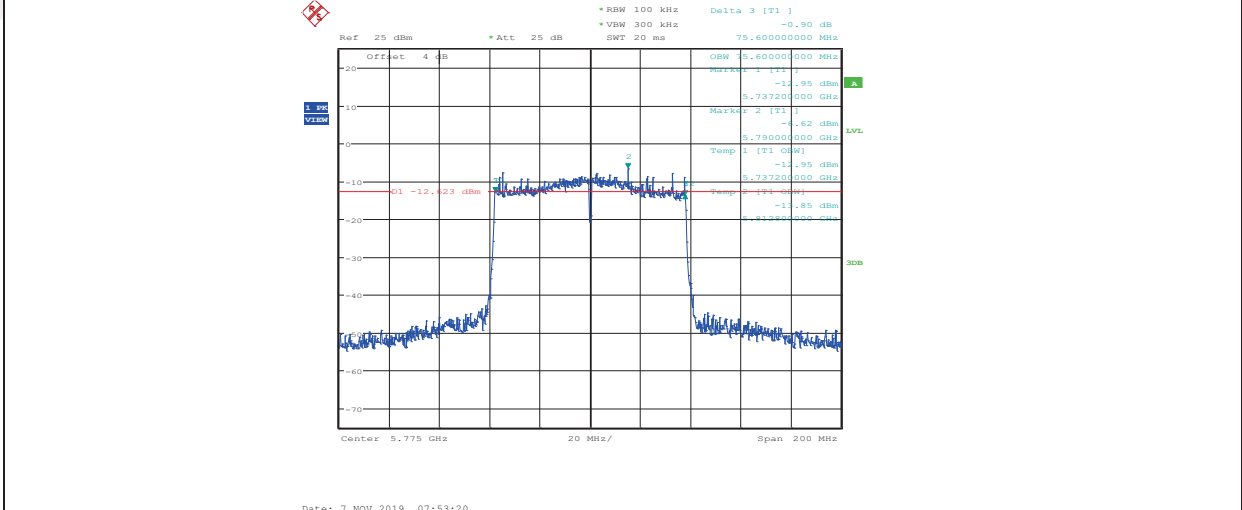
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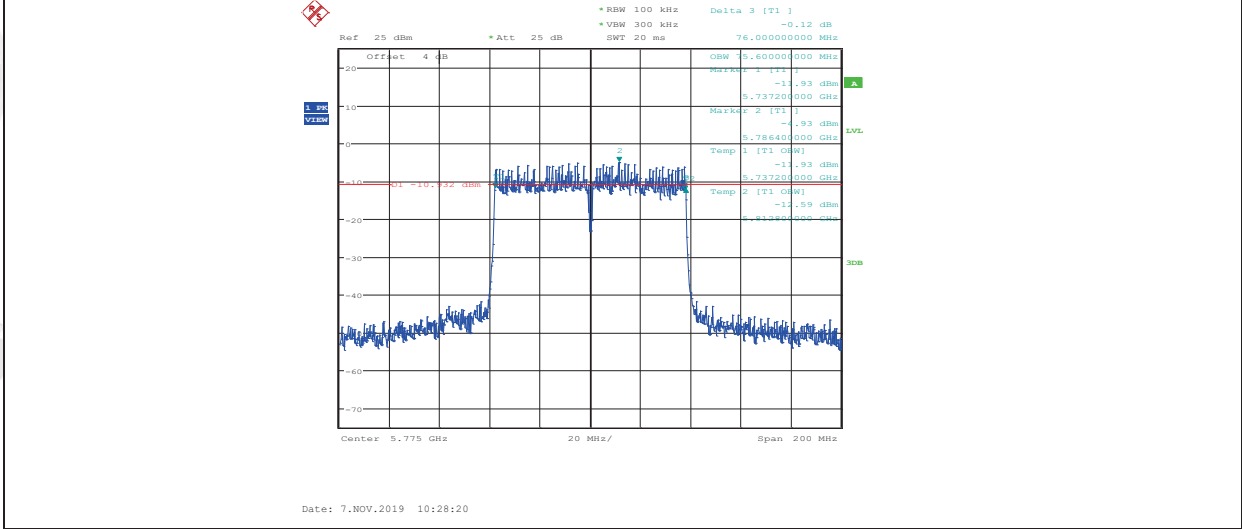
11AC40MIMO ANT2 5795 6dB Bandwidth



11AC80MIMO ANT1 5775 6dB Bandwidth



11AC80MIMO ANT2 5775 6dB Bandwidth



5. Maximum Output Power

5.1. Block diagram of test setup

Same as section 4.1

5.2. Limits

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For client devices: 250 mW (24 dBm)	5150-5250
	250 mW (24 dBm) or $11 + 10 \log_{10} B$	5250-5350
	250 mW (24 dBm) or $11 + 10 \log_{10} B$	5470-5725
	1 Watt (30 dBm)	5725-5850

Note 1: B=26 bandwidth;
 Note 2: For 802.11n and 802.11ac, the EUT incorporates a MIMO function. The Antenna directional gain is 6.48 dBi.
 The Output Power limit is the above limits-(6.48-6)

5.3. Test Procedure

- (1) Connect each EUT's antenna output to Spectrum Analyzer by RF cable and attenuator
- (2) Add each antenna port's results to get the total output power of EUT.

5.4. Test Result

(5150-5250)

Test Mode	Ant	Test Channel	Output Power [dBm]	LIMIT [dBm]
11A	ANT1	5180	14.34	24
11A	ANT2	5180	13.98	24
11A	ANT1	5200	15.48	24
11A	ANT2	5200	15.41	24
11A	ANT1	5240	15.53	24
11A	ANT2	5240	15.67	24
11N20MIMO	ANT1	5180	14.50	23.52
11N20MIMO	ANT2	5180	14.21	23.52
11N20MIMO	total	5180	17.37	23.52
11N20MIMO	ANT1	5200	15.70	23.52
11N20MIMO	ANT2	5200	15.57	23.52
11N20MIMO	total	5200	18.65	23.52
11N20MIMO	ANT1	5240	15.45	23.52

11N20MIMO	ANT2	5240	15.64	23.52
11N20MIMO	total	5240	18.56	23.52
11N40MIMO	ANT1	5190	10.96	23.52
11N40MIMO	ANT2	5190	10.34	23.52
11N40MIMO	total	5190	13.67	23.52
11N40MIMO	ANT1	5230	15.50	23.52
11N40MIMO	ANT2	5230	15.29	23.52
11N40MIMO	total	5230	18.41	23.52
11AC20MIMO	ANT1	5180	15.18	23.52
11AC20MIMO	ANT2	5180	14.83	23.52
11AC20MIMO	total	5180	18.02	23.52
11AC20MIMO	ANT1	5200	16.34	23.52
11AC20MIMO	ANT2	5200	16.08	23.52
11AC20MIMO	total	5200	19.22	23.52
11AC20MIMO	ANT1	5240	16.18	23.52
11AC20MIMO	ANT2	5240	16.24	23.52
11AC20MIMO	total	5240	19.22	23.52
11AC40MIMO	ANT1	5190	11.31	23.52
11AC40MIMO	ANT2	5190	10.51	23.52
11AC40MIMO	total	5190	13.94	23.52
11AC40MIMO	ANT1	5230	16.15	23.52
11AC40MIMO	ANT2	5230	15.21	23.52
11AC40MIMO	total	5230	18.72	23.52
11AC80MIMO	ANT1	5210	8.97	23.52
11AC80MIMO	ANT2	5210	9.08	23.52
11AC80MIMO	total	5210	12.04	23.52

(5250-5350)

Test Mode	Ant	Test Channel	Output Power [dBm]	LIMIT [dBm]
11A	ANT1	5260	15.70	24
11A	ANT2	5260	16.08	24
11A	ANT1	5300	15.31	24
11A	ANT2	5300	15.78	24
11A	ANT1	5320	13.39	24
11A	ANT2	5320	14.53	24
11N20MIMO	ANT1	5260	15.85	23.52
11N20MIMO	ANT2	5260	16.21	23.52
11N20MIMO	total	5260	19.04	23.52

11N20MIMO	ANT1	5300	15.25	23.52
11N20MIMO	ANT2	5300	15.69	23.52
11N20MIMO	total	5300	18.49	23.52
11N20MIMO	ANT1	5320	13.17	23.52
11N20MIMO	ANT2	5320	14.43	23.52
11N20MIMO	total	5320	16.86	23.52
11N40MIMO	ANT1	5270	15.35	23.52
11N40MIMO	ANT2	5270	15.61	23.52
11N40MIMO	total	5270	18.49	23.52
11N40MIMO	ANT1	5310	12.55	23.52
11N40MIMO	ANT2	5310	11.67	23.52
11N40MIMO	total	5310	15.14	23.52
11AC20MIMO	ANT1	5260	16.41	23.52
11AC20MIMO	ANT2	5260	16.70	23.52
11AC20MIMO	total	5260	19.57	23.52
11AC20MIMO	ANT1	5300	15.95	23.52
11AC20MIMO	ANT2	5300	16.36	23.52
11AC20MIMO	total	5300	19.17	23.52
11AC20MIMO	ANT1	5320	13.99	23.52
11AC20MIMO	ANT2	5320	14.96	23.52
11AC20MIMO	total	5320	17.51	23.52
11AC40MIMO	ANT1	5270	15.98	23.52
11AC40MIMO	ANT2	5270	15.79	23.52
11AC40MIMO	total	5270	18.90	23.52
11AC40MIMO	ANT1	5310	12.91	23.52
11AC40MIMO	ANT2	5310	11.97	23.52
11AC40MIMO	total	5310	15.48	23.52
11AC80MIMO	ANT1	5290	9.70	23.52
11AC80MIMO	ANT2	5290	12.30	23.52
11AC80MIMO	total	5290	14.20	23.52

(5470-5725)

Test Mode	Ant	Test Channel	Output Power [dBm]	LIMIT [dBm]
11A	ANT1	5500	12.41	24
11A	ANT2	5500	12.88	24
11A	ANT1	5580	12.49	24
11A	ANT2	5580	12.55	24
11A	ANT1	5700	12.19	24

11A	ANT2	5700	11.86	24
11N20MIMO	ANT1	5500	12.51	23.52
11N20MIMO	ANT2	5500	12.77	23.52
11N20MIMO	total	5500	15.65	23.52
11N20MIMO	ANT1	5580	12.23	23.52
11N20MIMO	ANT2	5580	12.32	23.52
11N20MIMO	total	5580	15.29	23.52
11N20MIMO	ANT1	5700	12.26	23.52
11N20MIMO	ANT2	5700	12.12	23.52
11N20MIMO	total	5700	15.20	23.52
11N40MIMO	ANT1	5510	11.02	23.52
11N40MIMO	ANT2	5510	10.45	23.52
11N40MIMO	total	5510	13.75	23.52
11N40MIMO	ANT1	5550	14.79	23.52
11N40MIMO	ANT2	5550	14.76	23.52
11N40MIMO	total	5550	17.79	23.52
11N40MIMO	ANT1	5670	15.38	23.52
11N40MIMO	ANT2	5670	15.07	23.52
11N40MIMO	total	5670	18.24	23.52
11AC20MIMO	ANT1	5500	12.97	23.52
11AC20MIMO	ANT2	5500	13.42	23.52
11AC20MIMO	total	5500	16.21	23.52
11AC20MIMO	ANT1	5580	13.15	23.52
11AC20MIMO	ANT2	5580	12.98	23.52
11AC20MIMO	total	5580	16.08	23.52
11AC20MIMO	ANT1	5700	12.95	23.52
11AC20MIMO	ANT2	5700	12.89	23.52
11AC20MIMO	total	5700	15.93	23.52
11AC40MIMO	ANT1	5510	11.32	23.52
11AC40MIMO	ANT2	5510	10.56	23.52
11AC40MIMO	total	5510	13.97	23.52
11AC40MIMO	ANT1	5550	15.45	23.52
11AC40MIMO	ANT2	5550	14.83	23.52
11AC40MIMO	total	5550	18.16	23.52
11AC40MIMO	ANT1	5670	15.64	23.52
11AC40MIMO	ANT2	5670	15.11	23.52
11AC40MIMO	total	5670	18.39	23.52
11AC80MIMO	ANT1	5530	7.74	23.52
11AC80MIMO	ANT2	5530	9.77	23.52

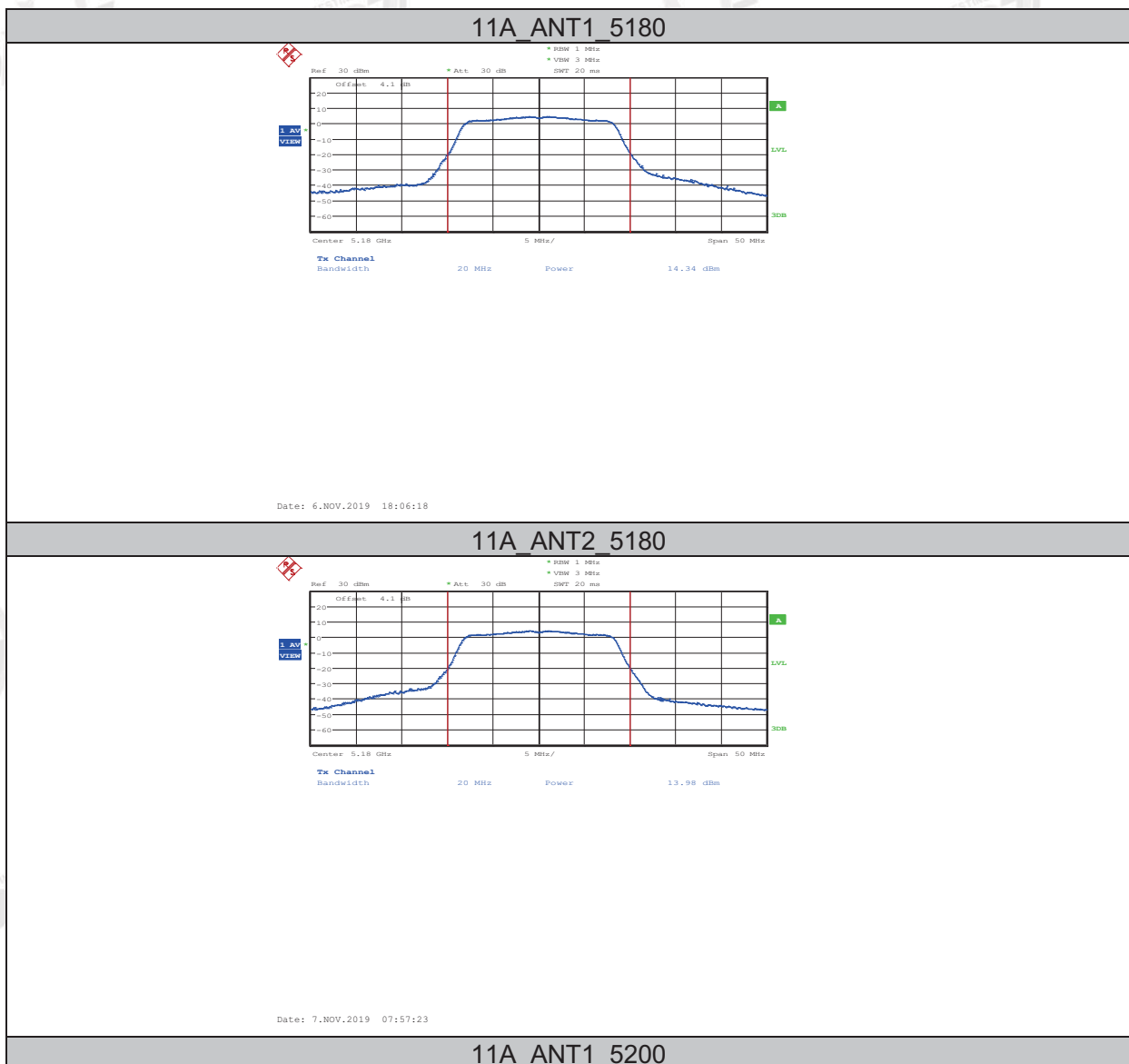
11AC80MIMO	total	5530	11.88	23.52
11AC80MIMO	ANT1	5610	12.54	23.52
11AC80MIMO	ANT2	5610	14.66	23.52
11AC80MIMO	total	5610	16.74	23.52

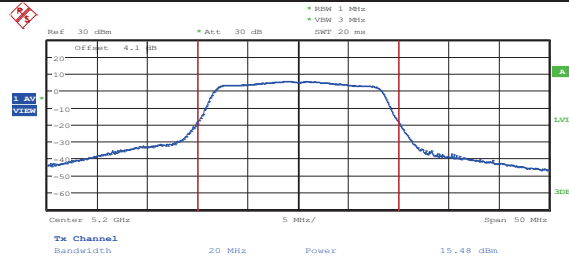
(5725-5850)

Test Mode	Ant	Test Channel	Output Power [dBm]	LIMIT [dBm]
11A	ANT1	5745	11.59	30
11A	ANT2	5745	11.75	30
11A	ANT1	5785	12.15	30
11A	ANT2	5785	12.03	30
11A	ANT1	5825	11.55	30
11A	ANT2	5825	11.78	30
11N20MIMO	ANT1	5745	11.85	29.52
11N20MIMO	ANT2	5745	11.78	29.52
11N20MIMO	total	5745	14.83	29.52
11N20MIMO	ANT1	5785	12.10	29.52
11N20MIMO	ANT2	5785	12.38	29.52
11N20MIMO	total	5785	15.25	29.52
11N20MIMO	ANT1	5825	11.57	29.52
11N20MIMO	ANT2	5825	11.75	29.52
11N20MIMO	total	5825	14.67	29.52
11N40MIMO	ANT1	5755	15.33	29.52
11N40MIMO	ANT2	5755	15.38	29.52
11N40MIMO	total	5755	18.37	29.52
11N40MIMO	ANT1	5795	14.71	29.52
11N40MIMO	ANT2	5795	15.00	29.52
11N40MIMO	total	5795	17.87	29.52
11AC20MIMO	ANT1	5745	12.77	29.52
11AC20MIMO	ANT2	5745	12.50	29.52
11AC20MIMO	total	5745	15.65	29.52
11AC20MIMO	ANT1	5785	12.75	29.52
11AC20MIMO	ANT2	5785	12.97	29.52
11AC20MIMO	total	5785	15.87	29.52
11AC20MIMO	ANT1	5825	12.16	29.52
11AC20MIMO	ANT2	5825	12.46	29.52
11AC20MIMO	total	5825	15.32	29.52
11AC40MIMO	ANT1	5755	15.89	29.52

11AC40MIMO	ANT2	5755	15.33	29.52
11AC40MIMO	total	5755	18.63	29.52
11AC40MIMO	ANT1	5795	15.32	29.52
11AC40MIMO	ANT2	5795	15.03	29.52
11AC40MIMO	total	5795	18.19	29.52
11AC80MIMO	ANT1	5775	11.39	29.52
11AC80MIMO	ANT2	5775	14.56	29.52
11AC80MIMO	total	5775	16.27	29.52

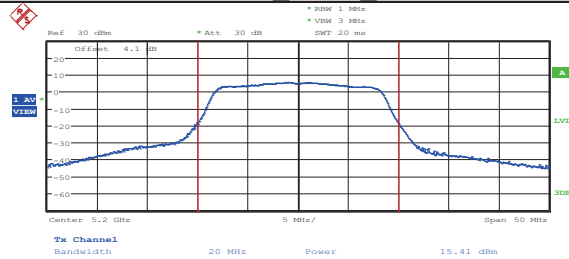
5.5. Original test data





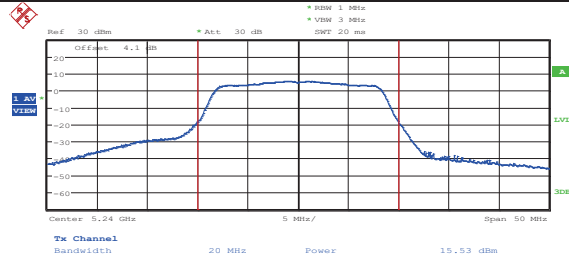
Date: 6.NOV.2019 18:07:43

11A ANT2 5200



Date: 7.NOV.2019 07:58:54

11A ANT1 5240



Date: 6.NOV.2019 18:09:05

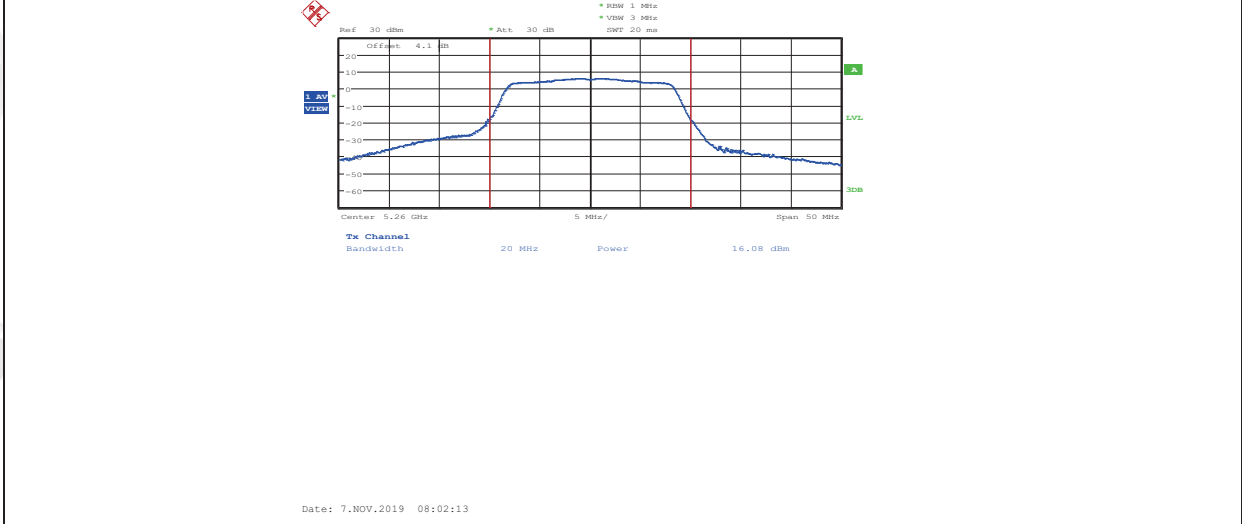
11A ANT2 5240



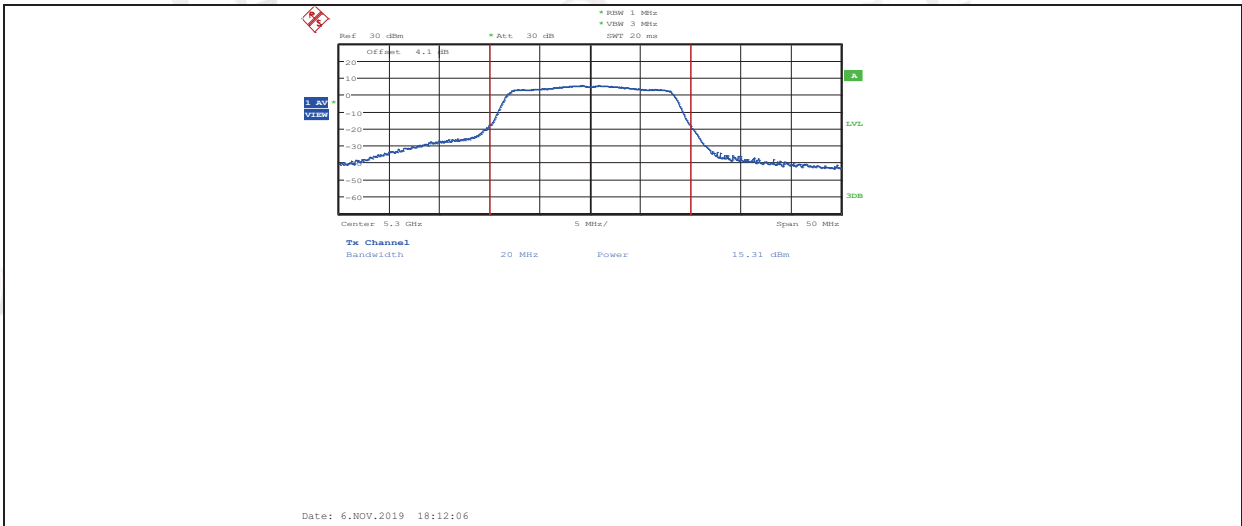
11A ANT1_5260



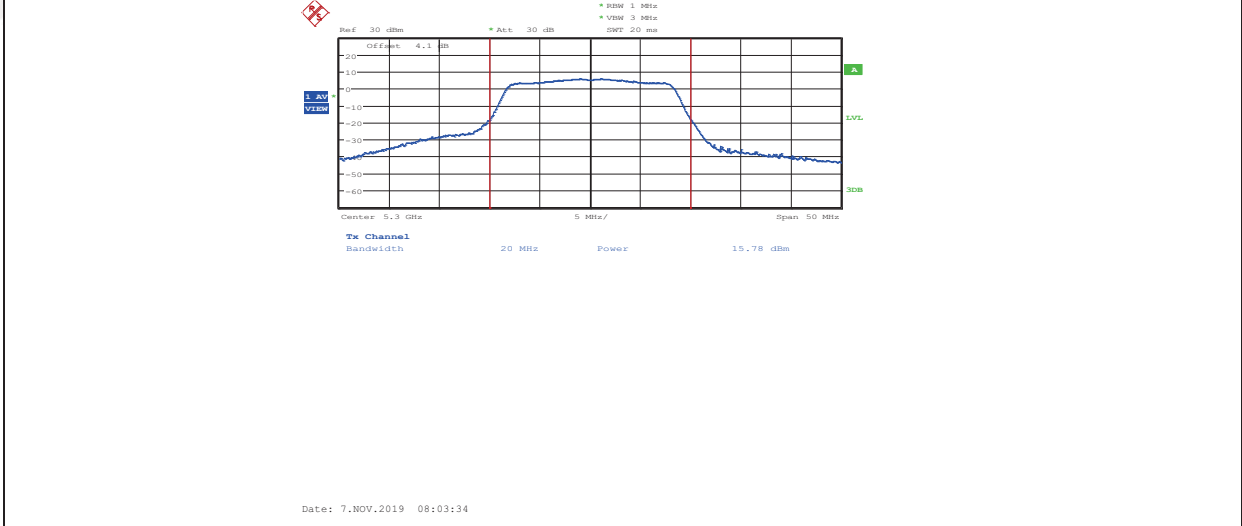
11A ANT2_5260



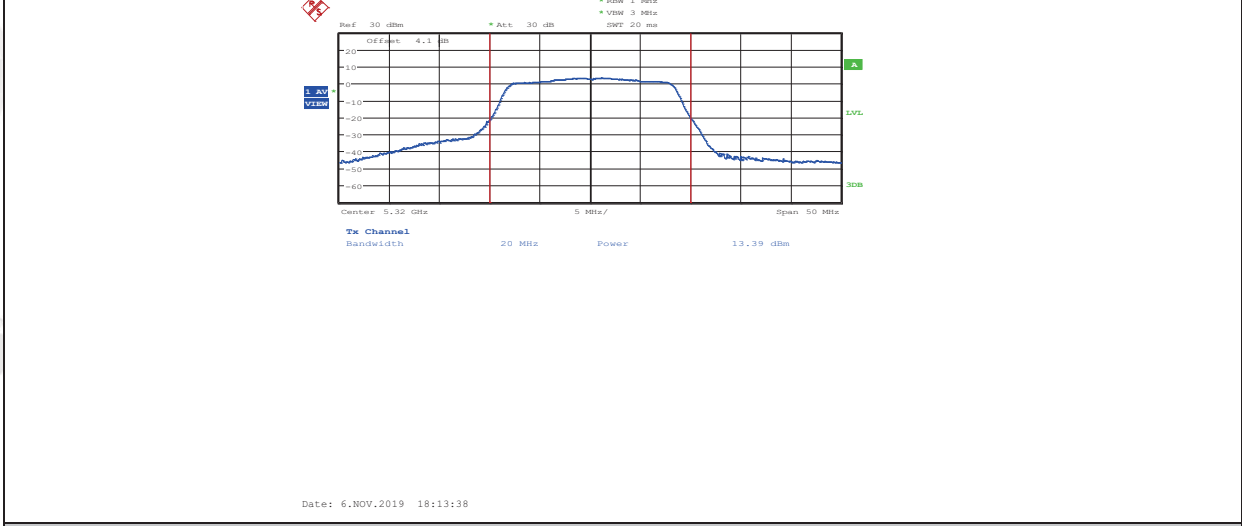
11A ANT1_5300



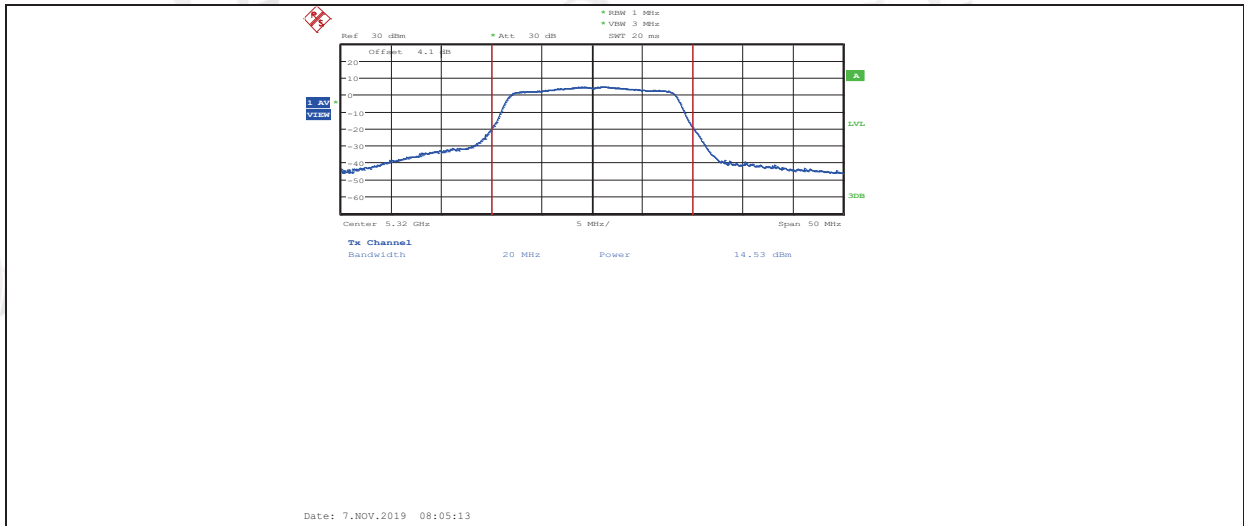
11A ANT2 5300



11A ANT1 5320



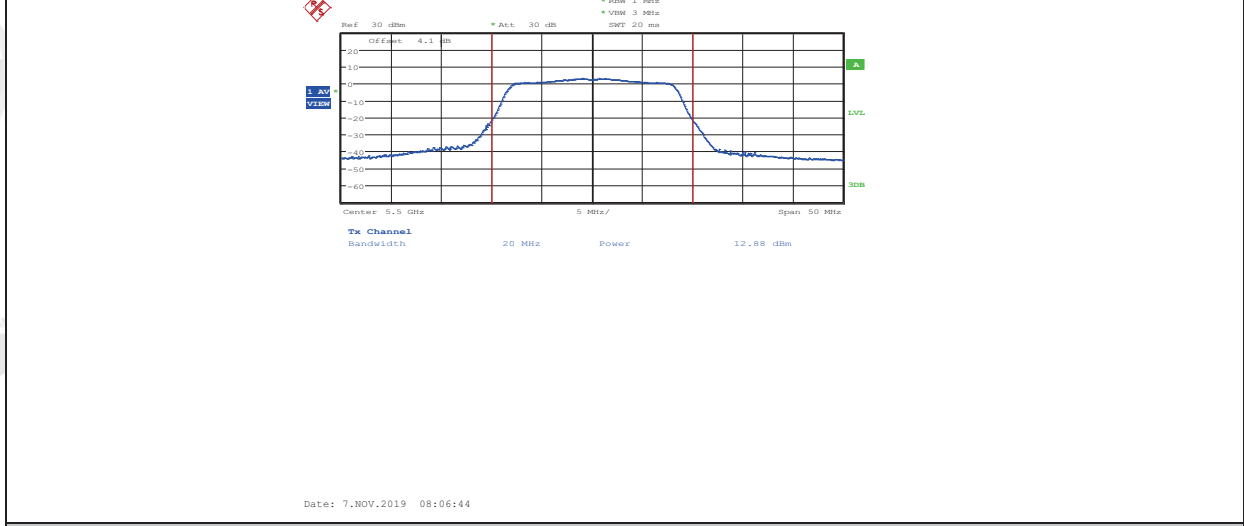
11A ANT2 5320



11A ANT1_5500



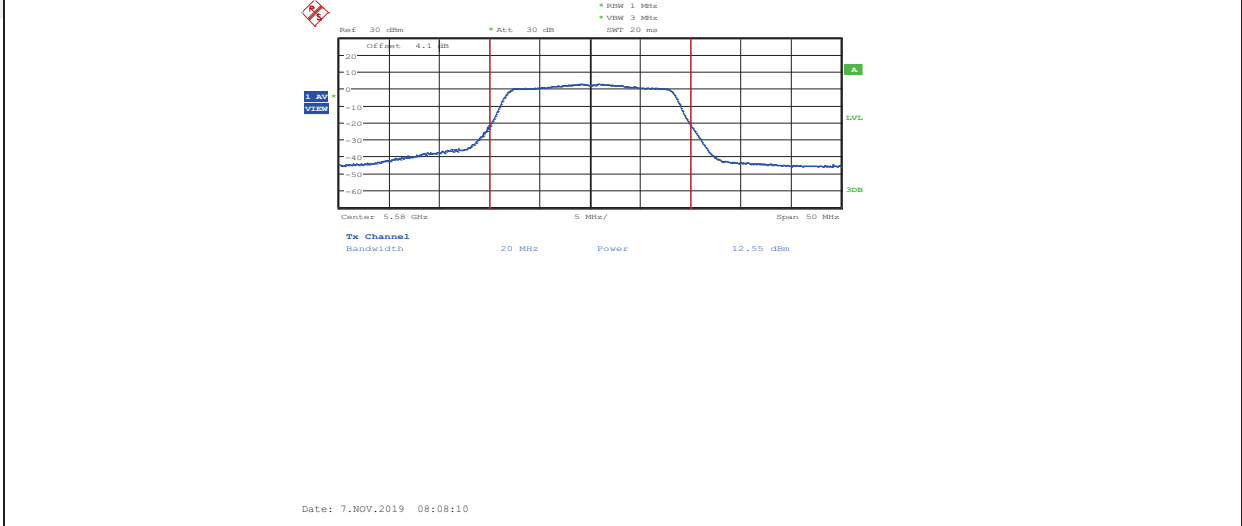
11A ANT2_5500



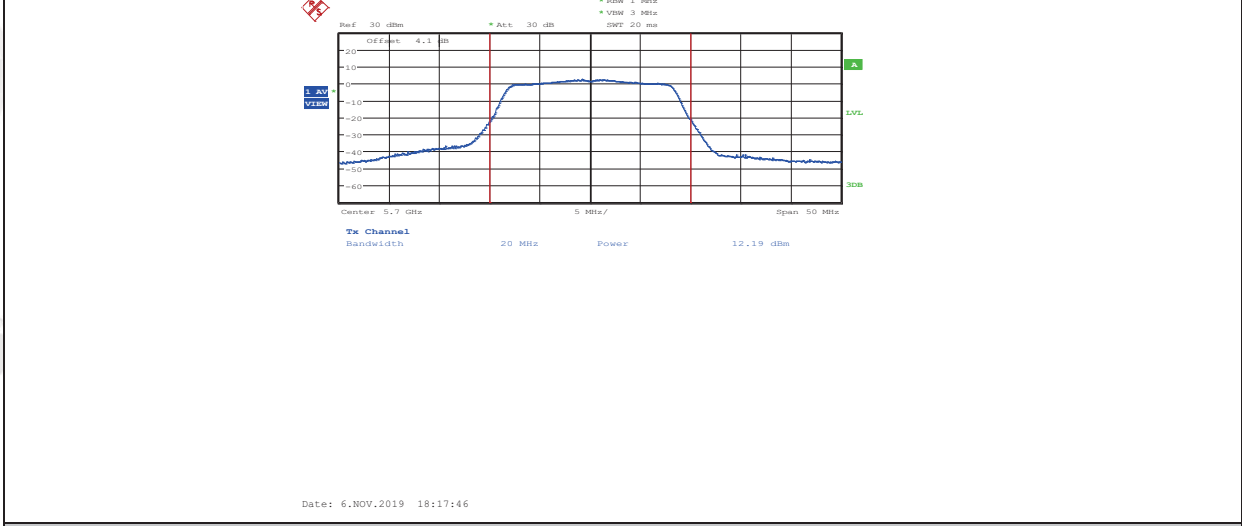
11A ANT1_5580



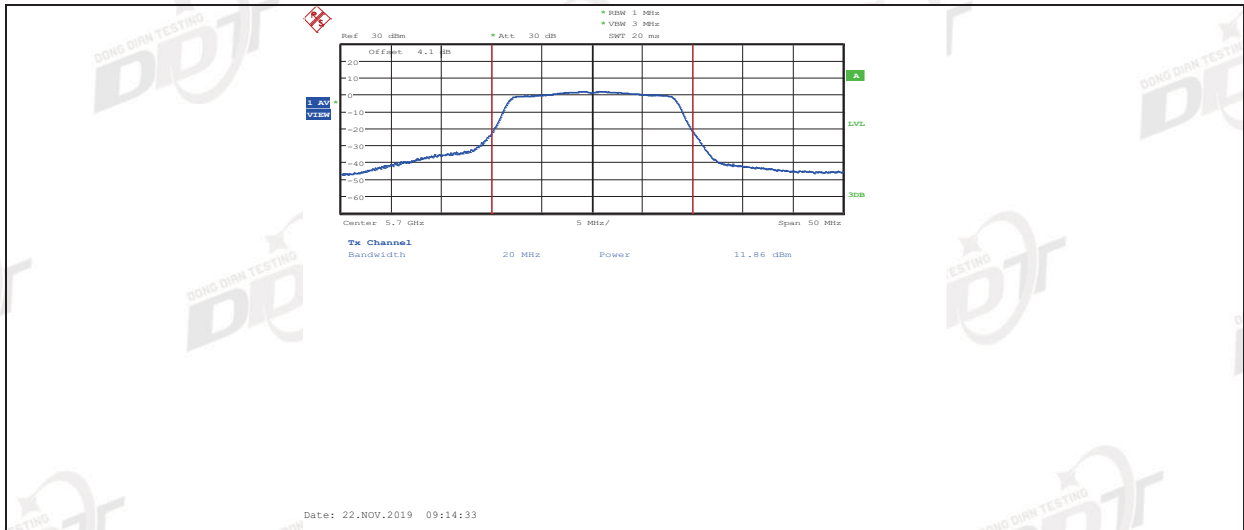
11A ANT2 5580



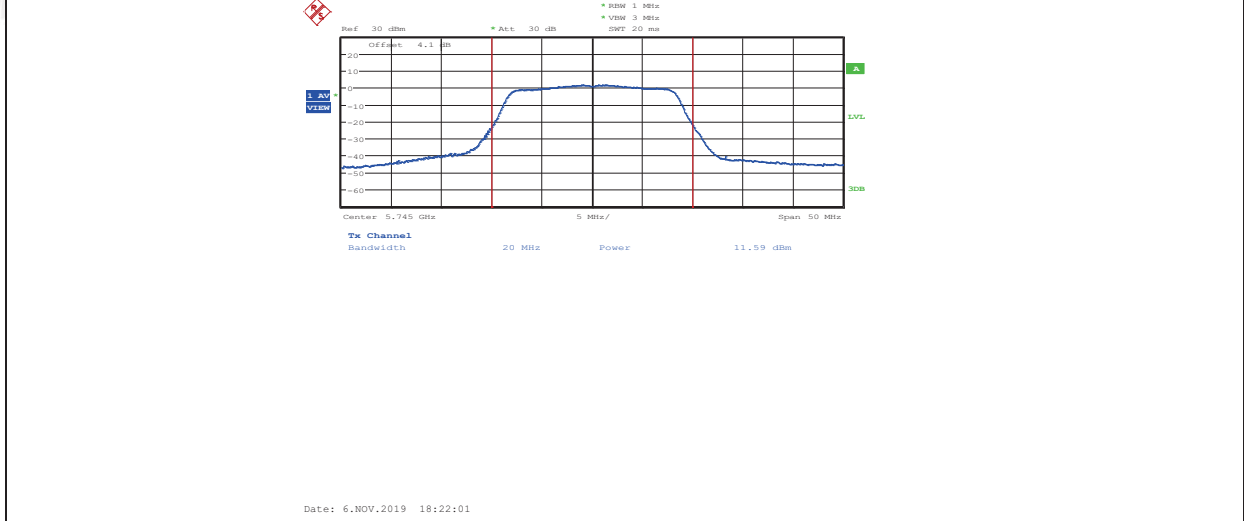
11A ANT1 5700



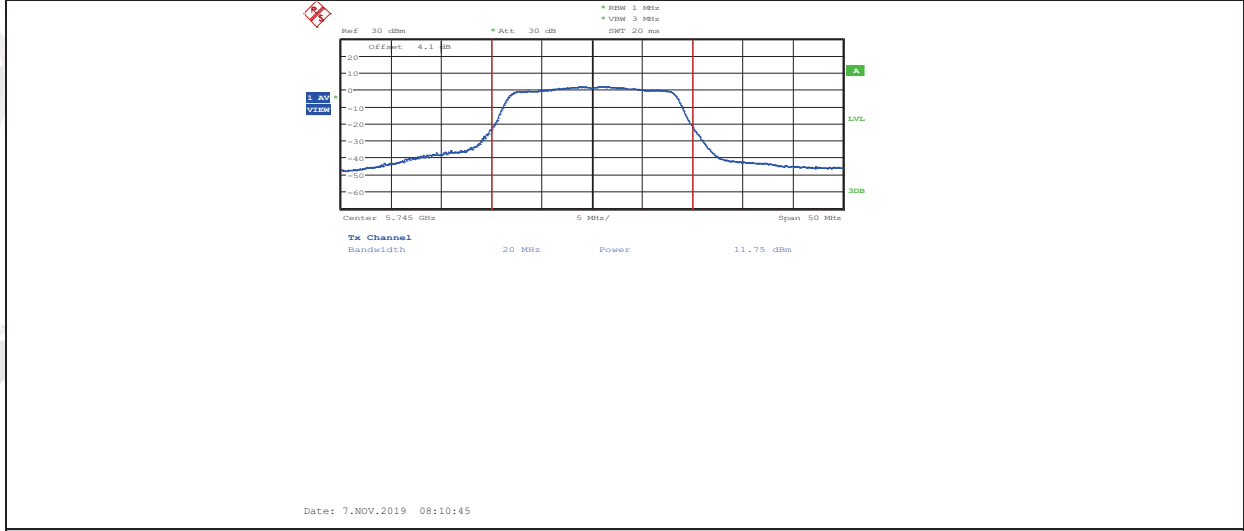
11A ANT2 5700



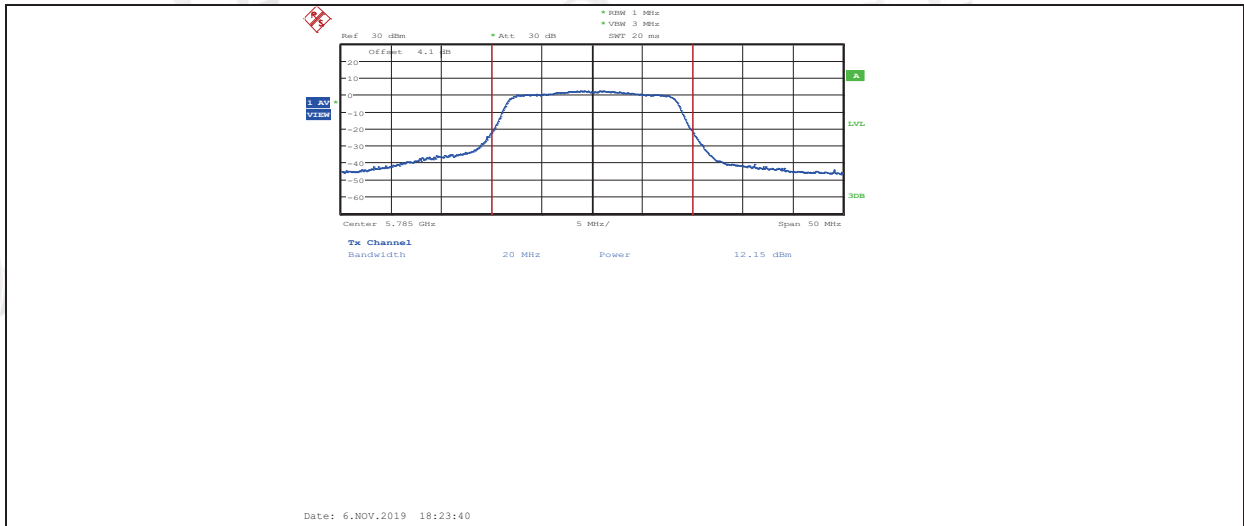
11A ANT1_5745



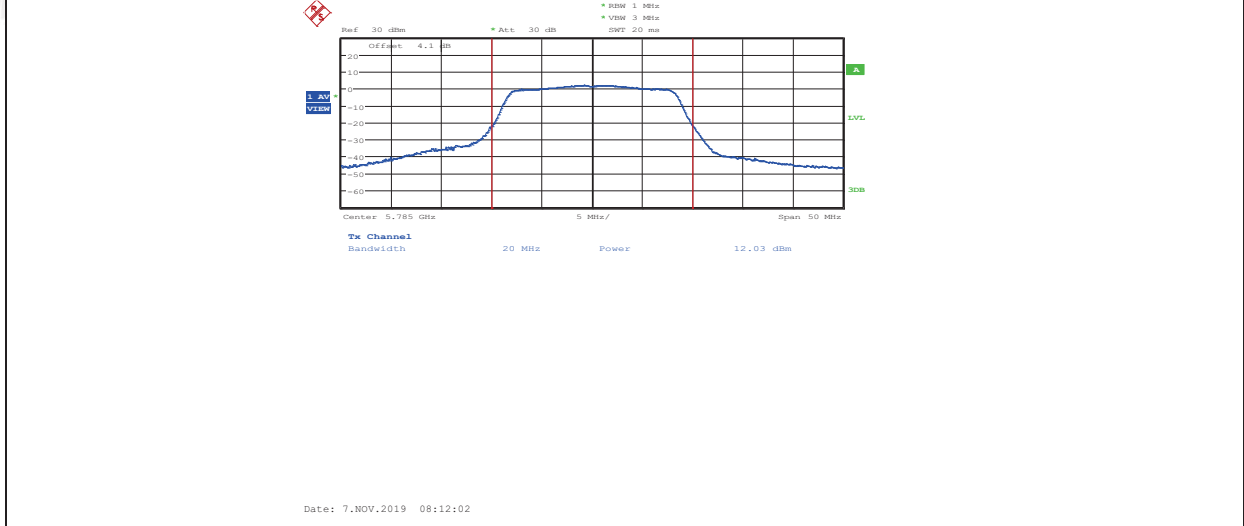
11A ANT2_5745



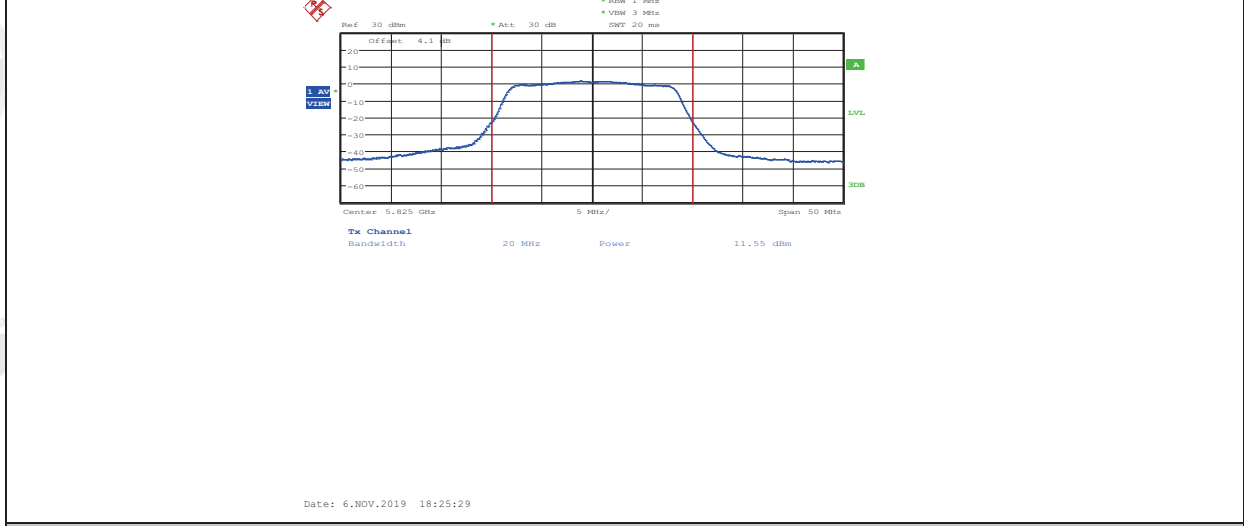
11A ANT1_5785



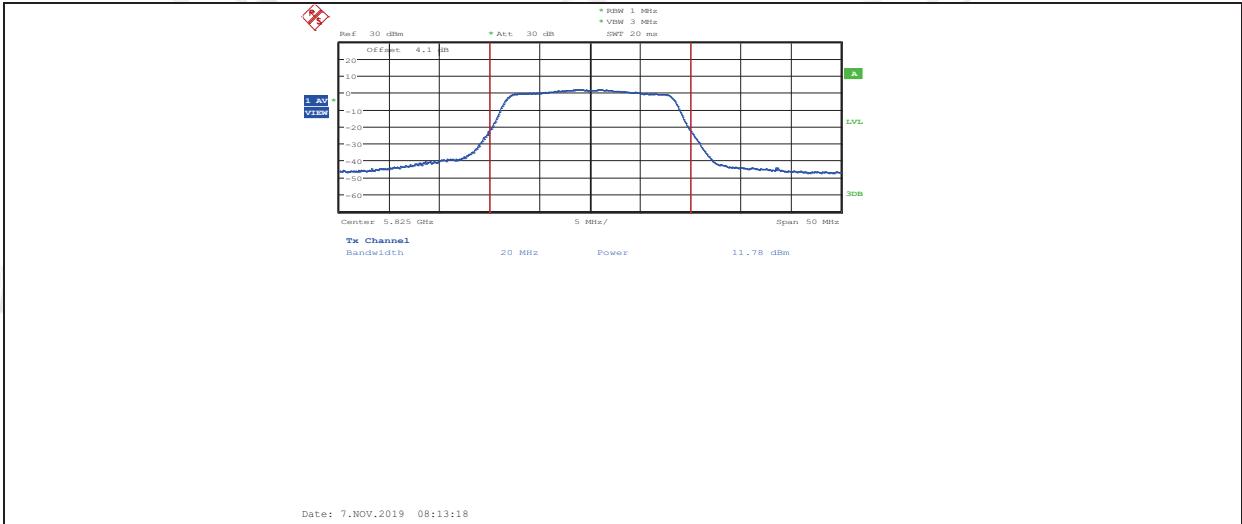
11A ANT2 5785



11A ANT1 5825



11A ANT2 5825



11N20MIMO_ANT1_5180



11N20MIMO_ANT2_5180



11N20MIMO_ANT1_5200



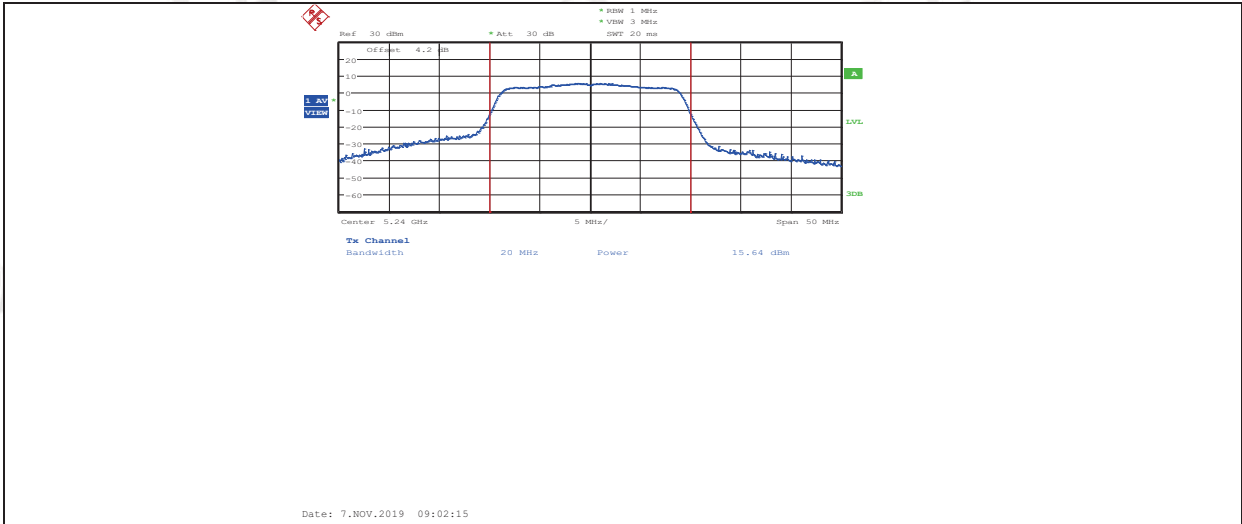
11N20MIMO_ANT2_5200



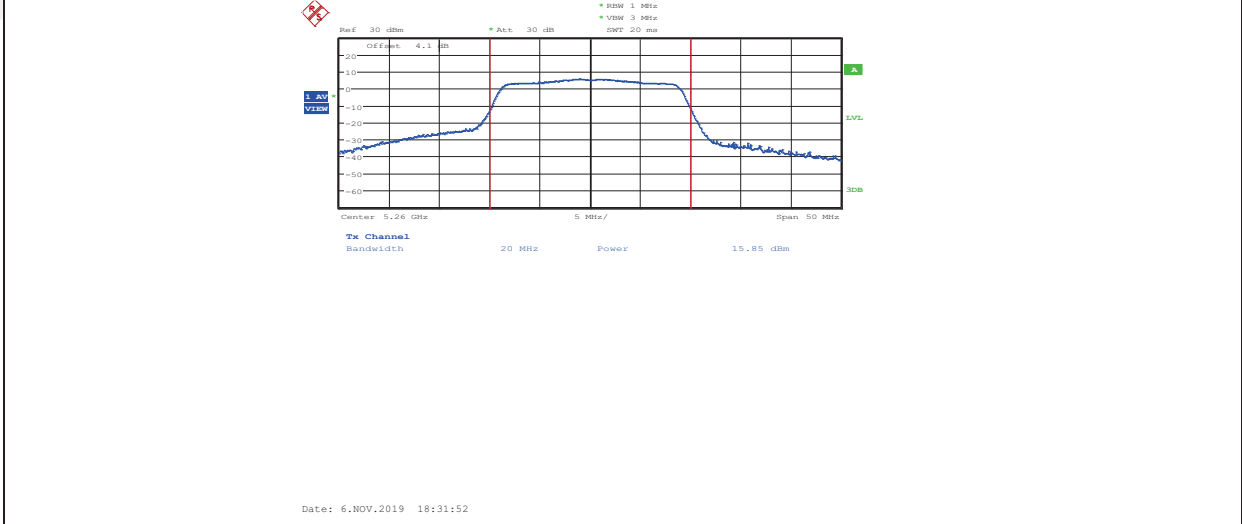
11N20MIMO_ANT1_5240



11N20MIMO_ANT2_5240



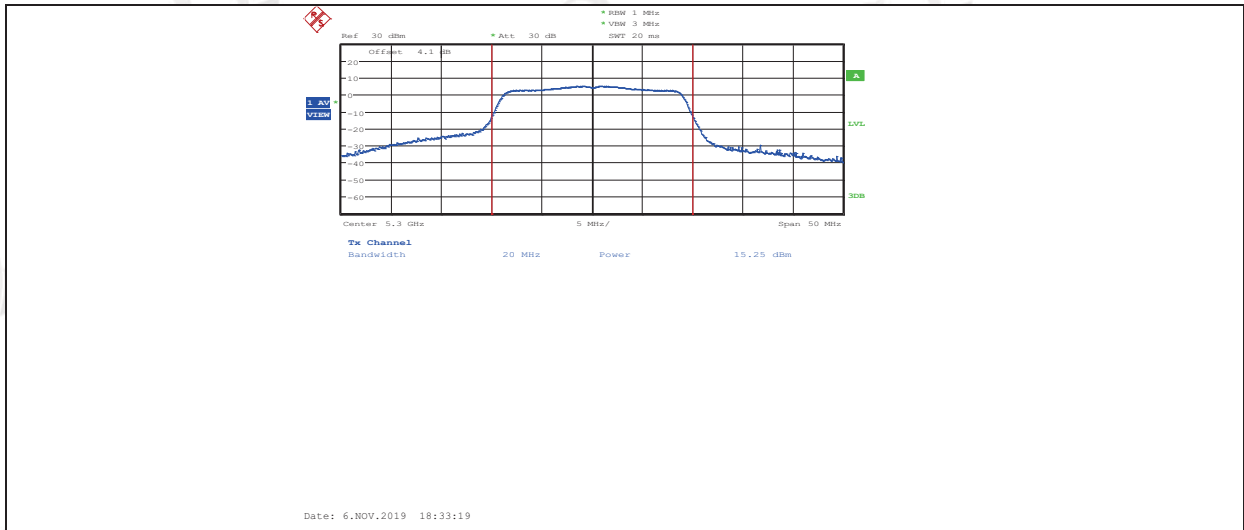
11N20MIMO_ANT1_5260



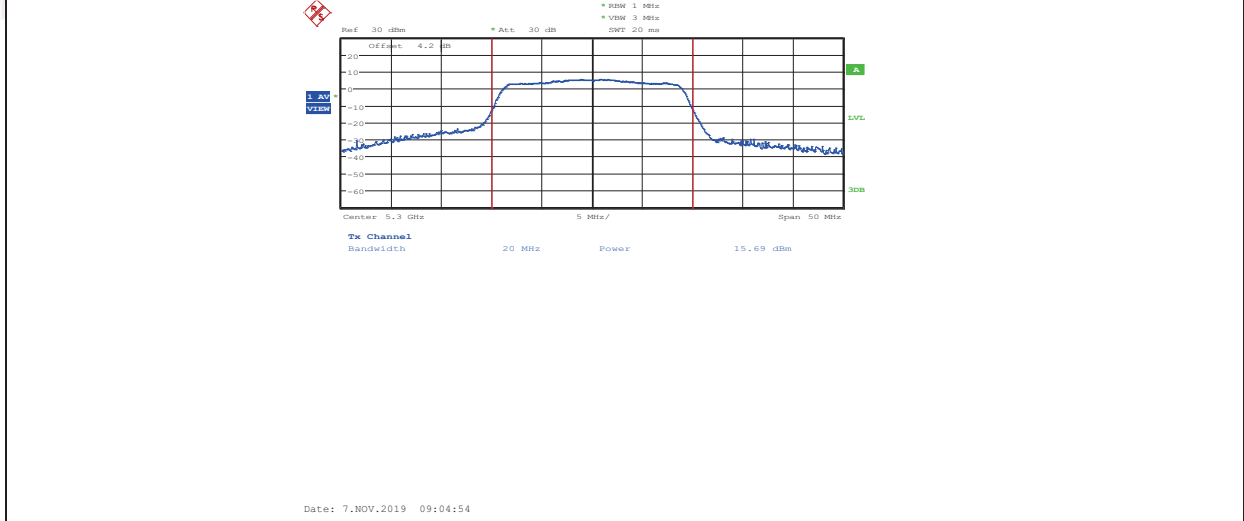
11N20MIMO_ANT2_5260



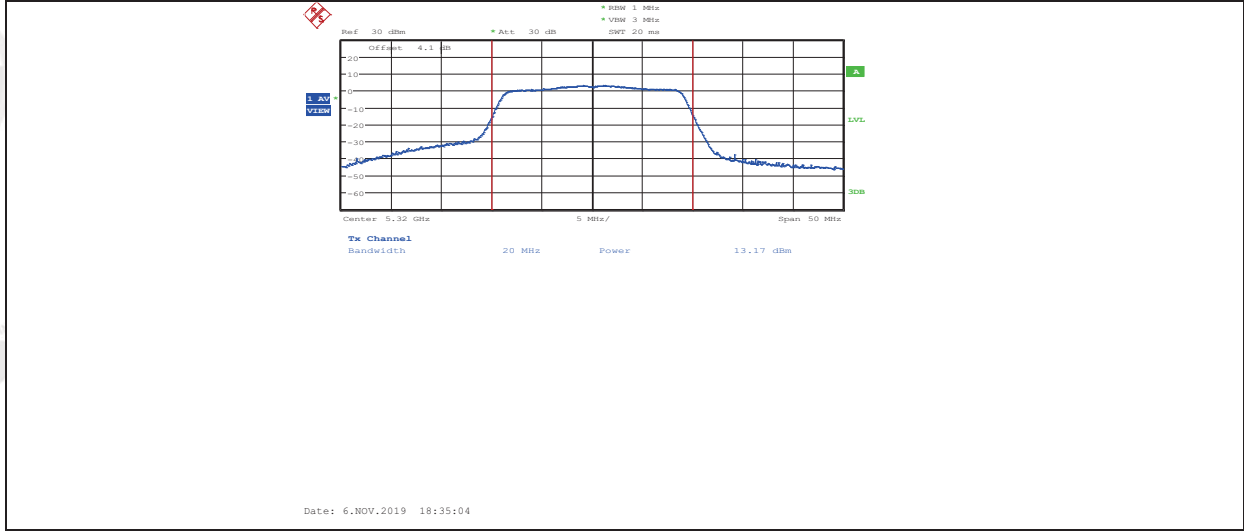
11N20MIMO_ANT1_5300



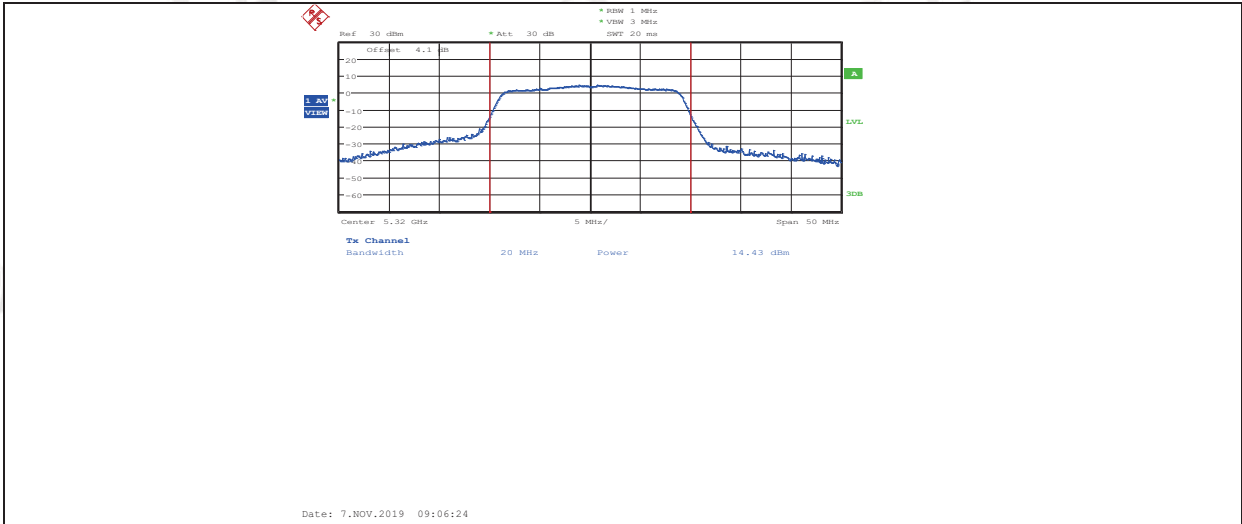
11N20MIMO_ANT2_5300



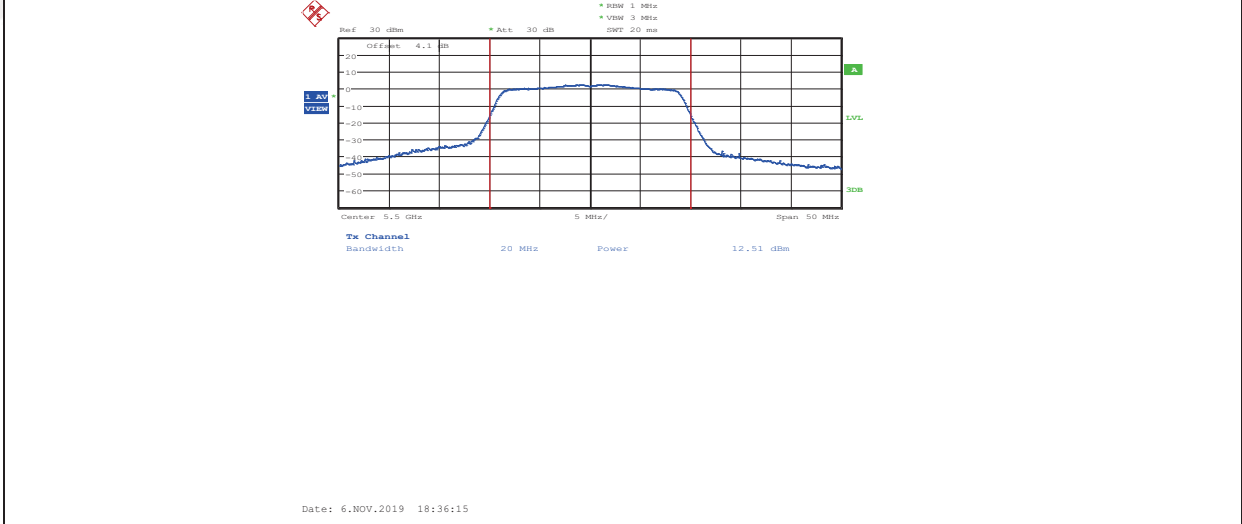
11N20MIMO_ANT1_5320



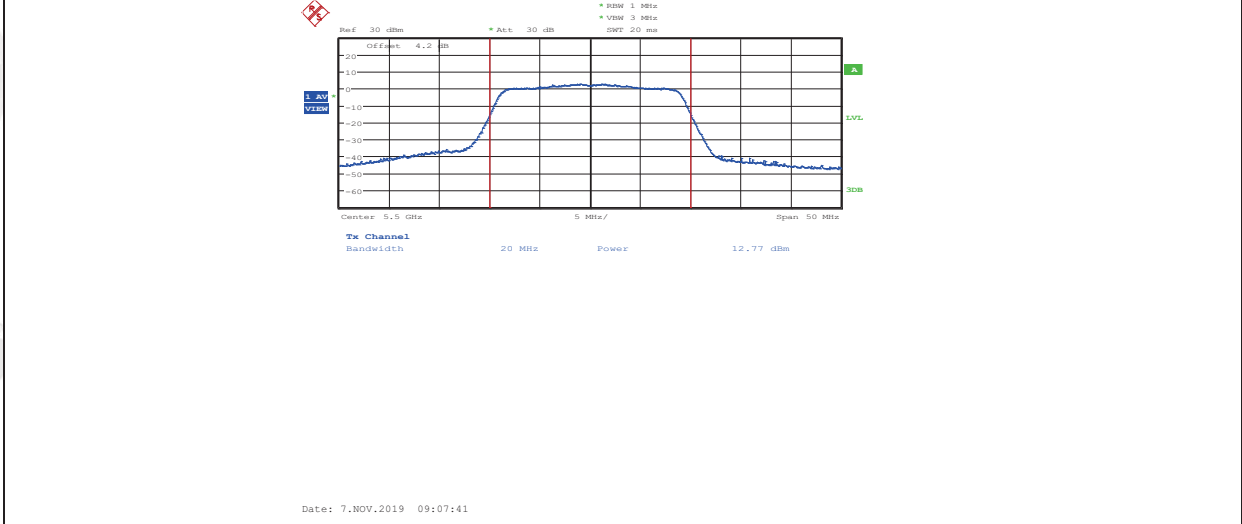
11N20MIMO_ANT2_5320



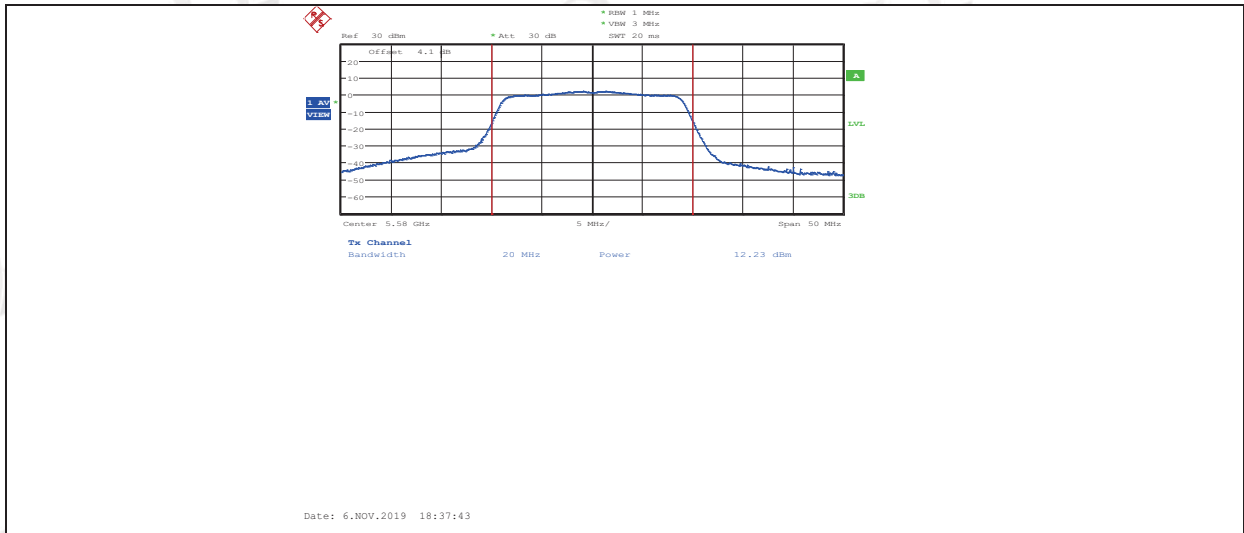
11N20MIMO_ANT1_5500



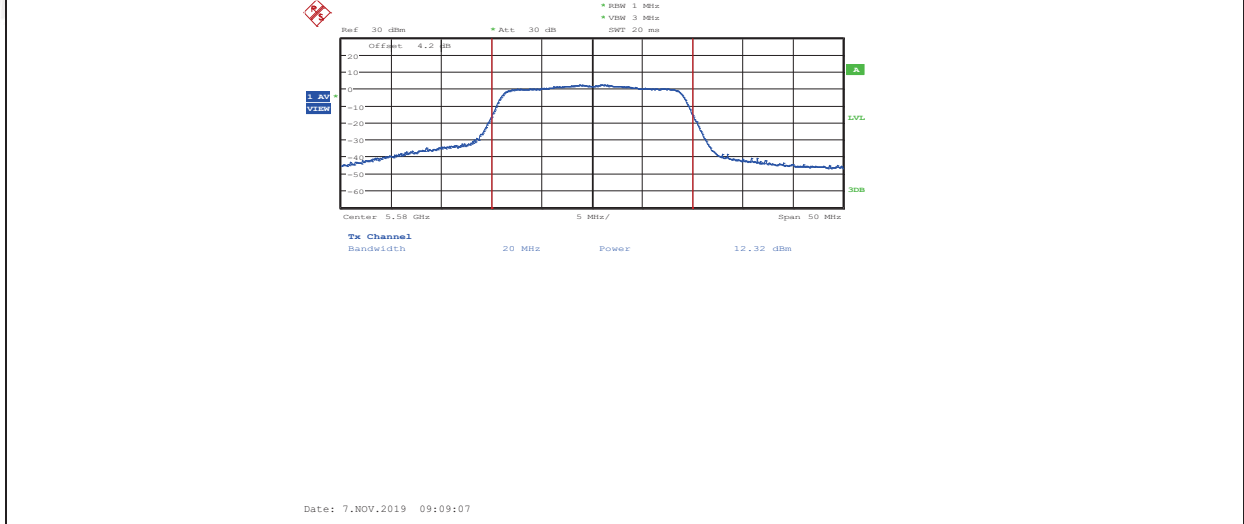
11N20MIMO_ANT2_5500



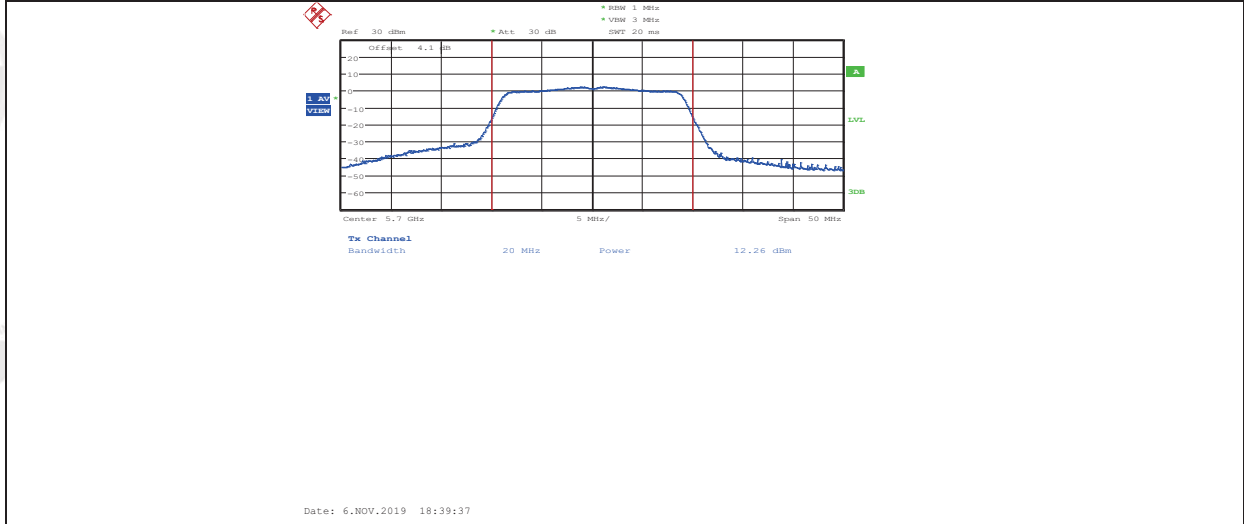
11N20MIMO_ANT1_5580



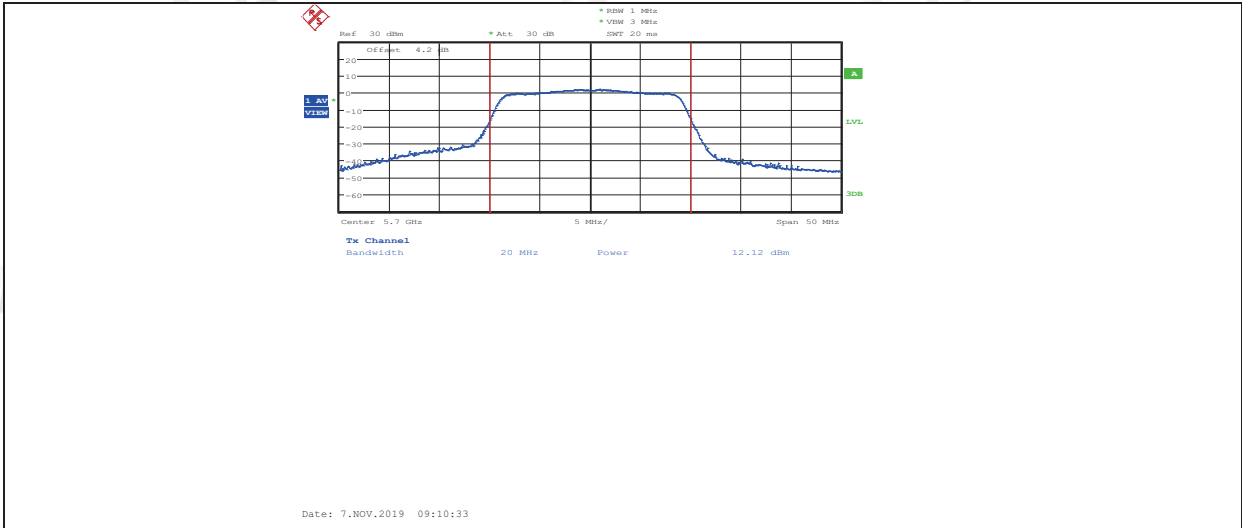
11N20MIMO_ANT2_5580



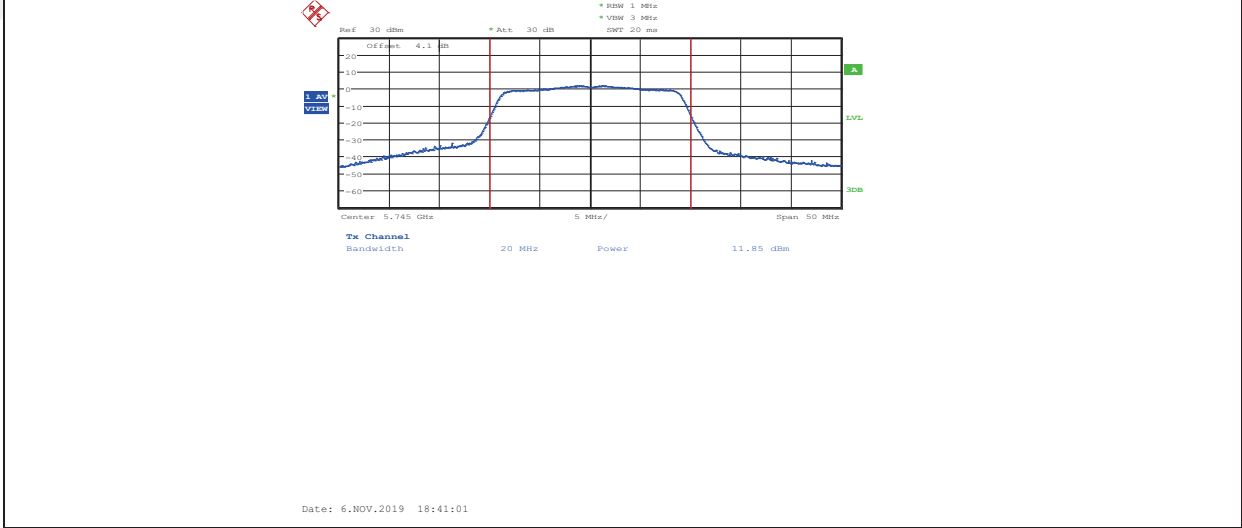
11N20MIMO_ANT1_5700



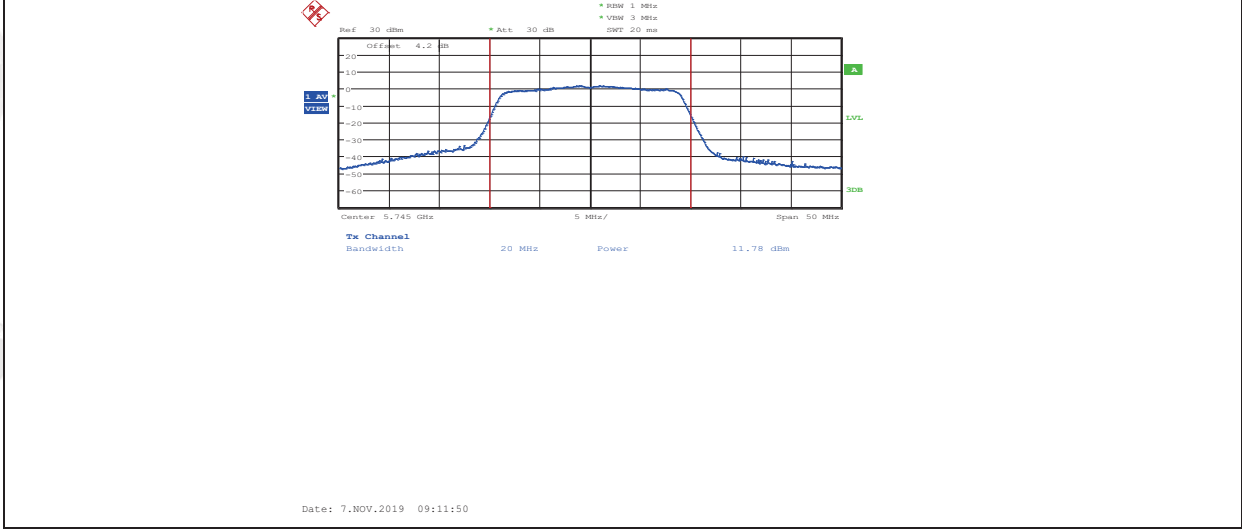
11N20MIMO_ANT2_5700



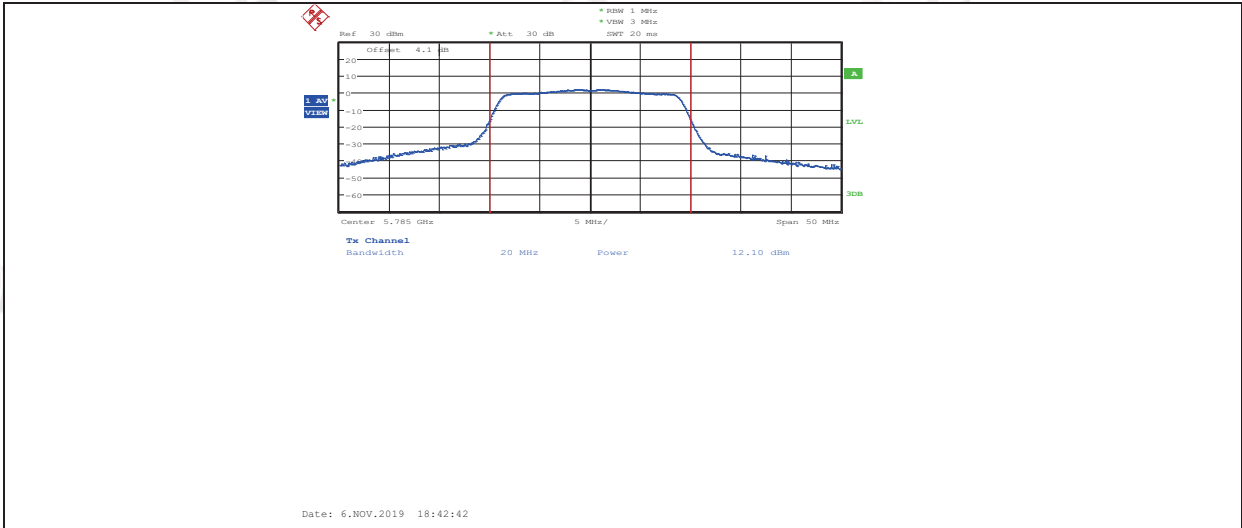
11N20MIMO_ANT1_5745



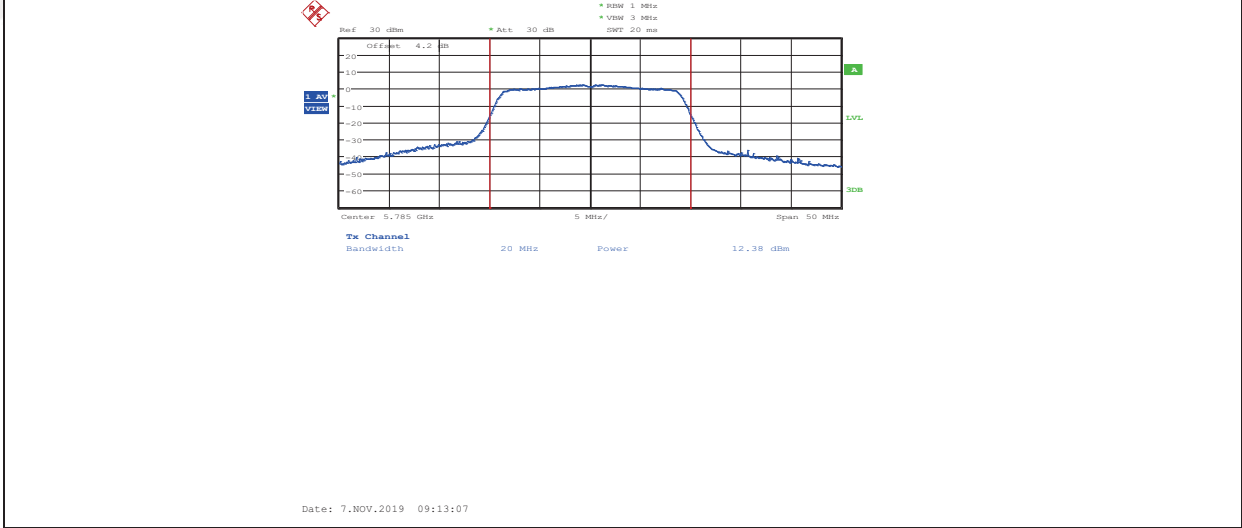
11N20MIMO_ANT2_5745



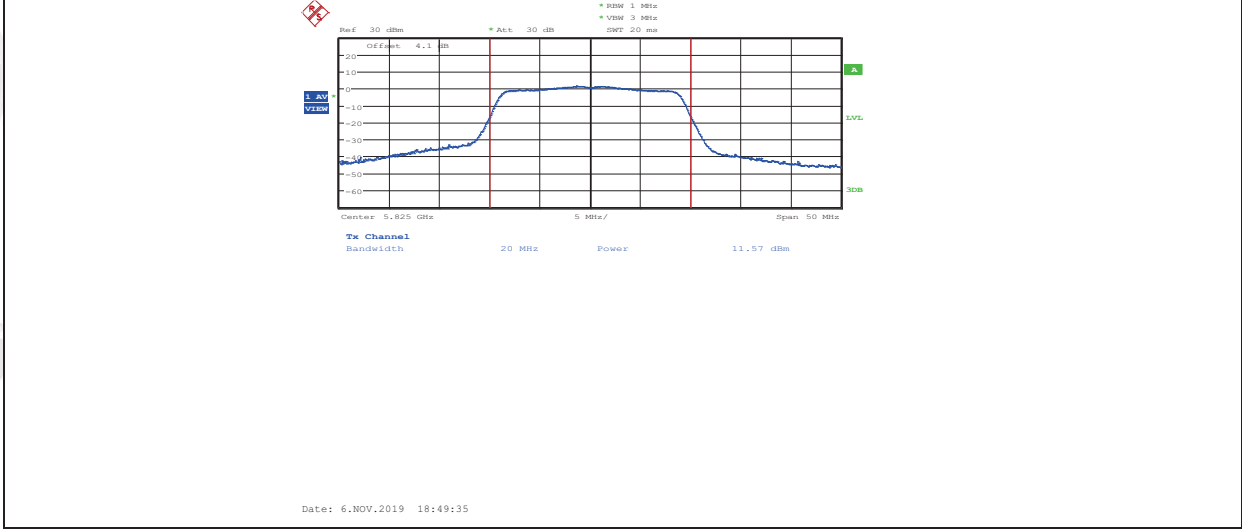
11N20MIMO_ANT1_5785



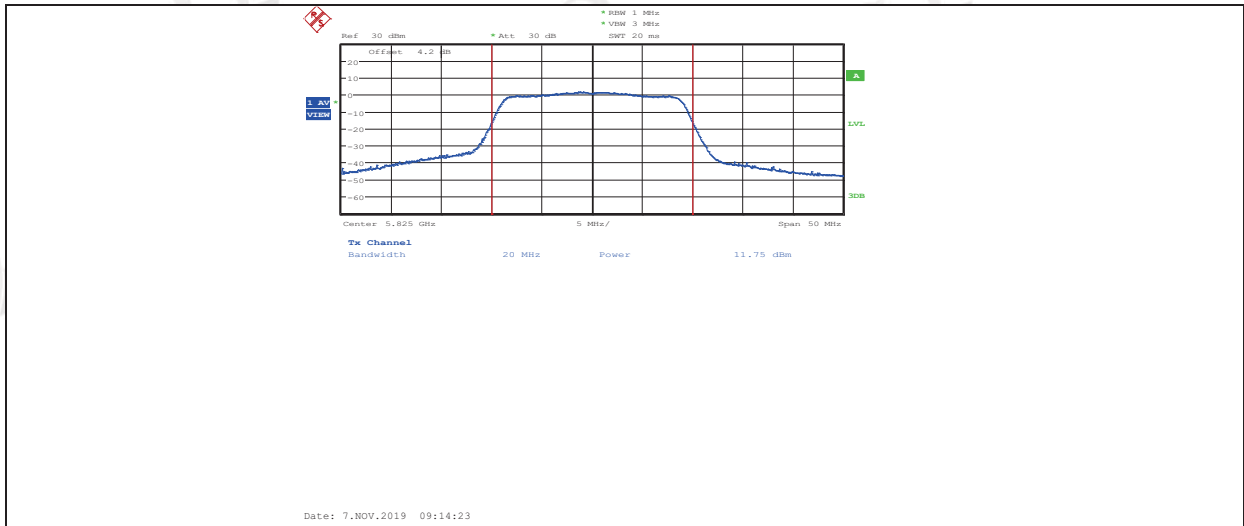
11N20MIMO_ANT2_5785



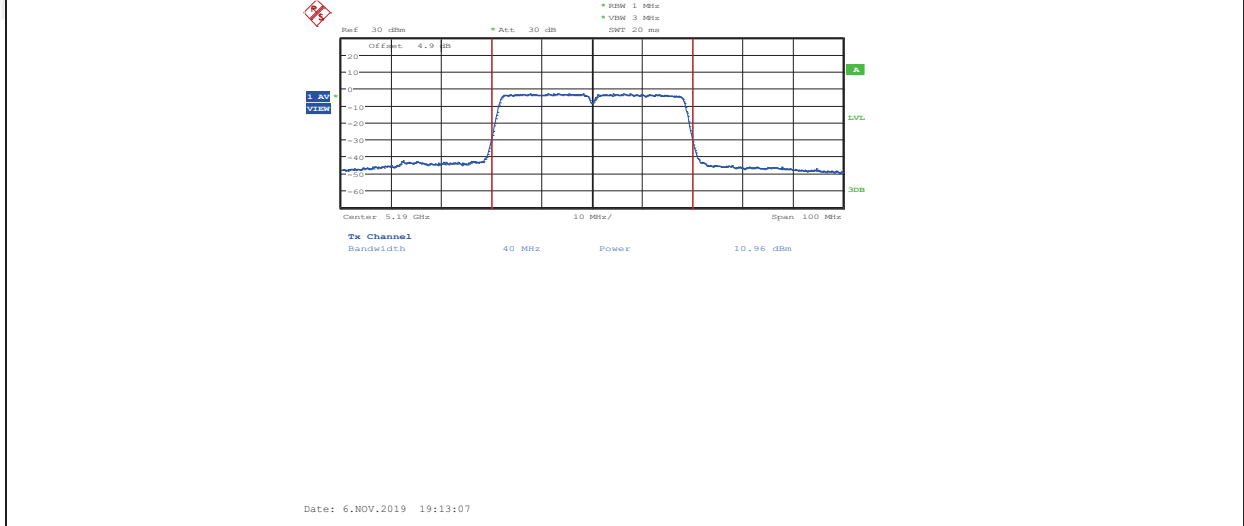
11N20MIMO_ANT1_5825



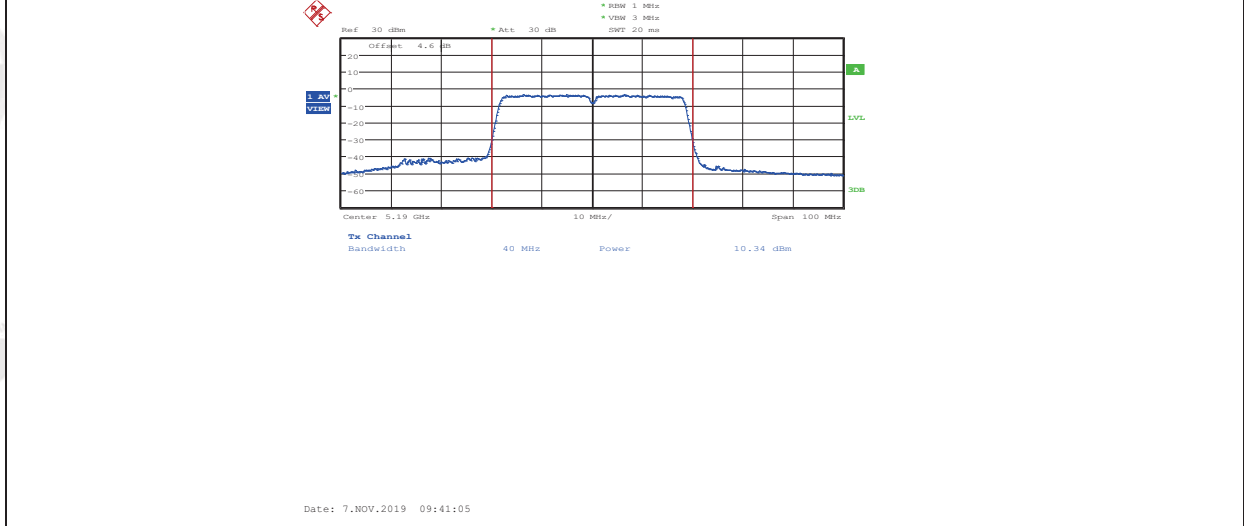
11N20MIMO_ANT2_5825



11N40MIMO_ANT1_5190



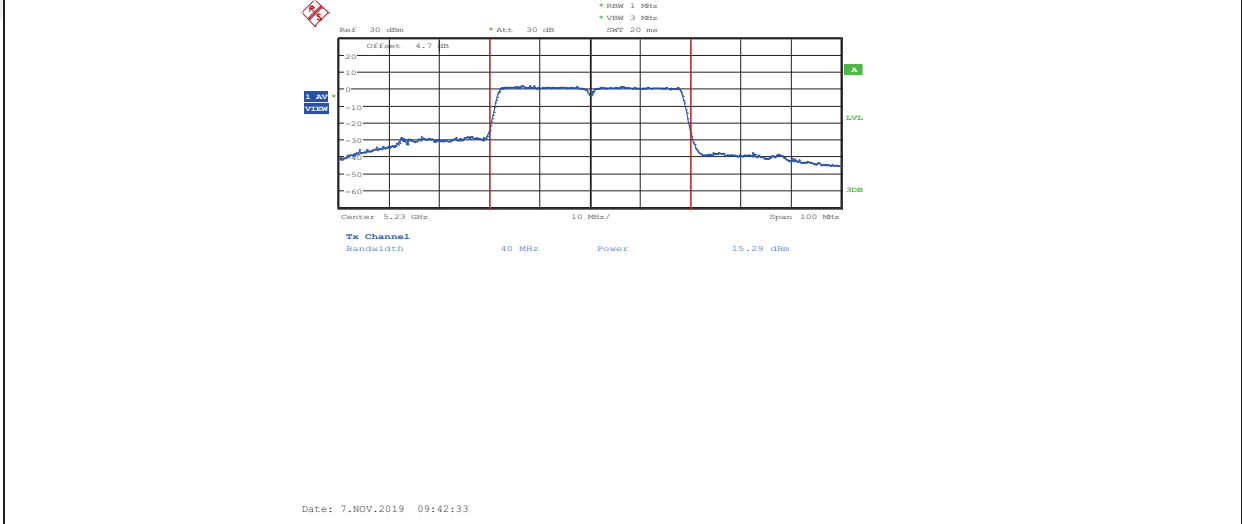
11N40MIMO_ANT2_5190



11N40MIMO_ANT1_5230



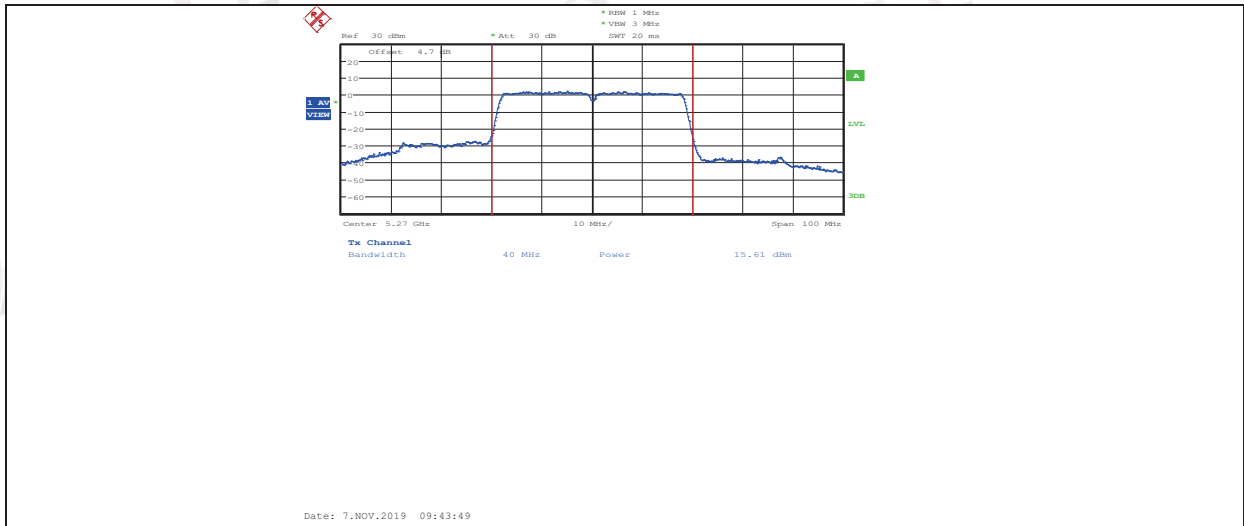
11N40MIMO_ANT2_5230



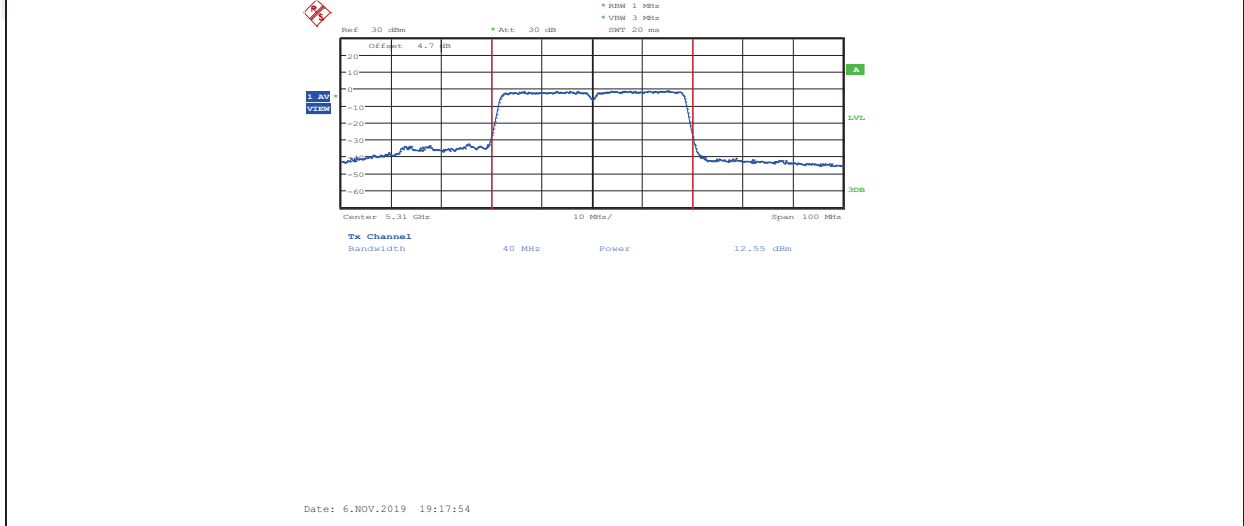
11N40MIMO_ANT1_5270



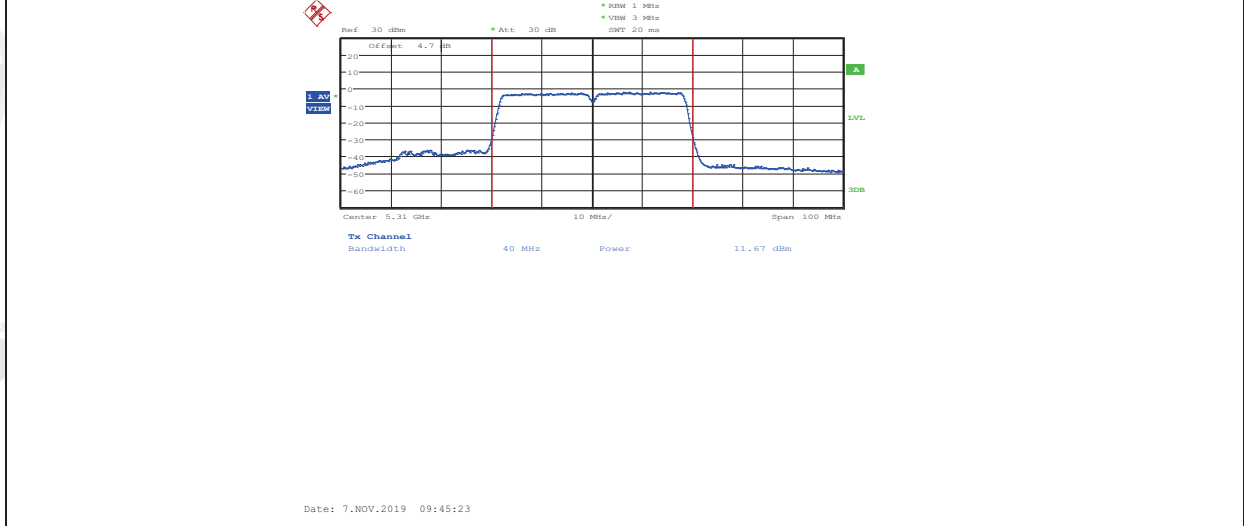
11N40MIMO_ANT2_5270



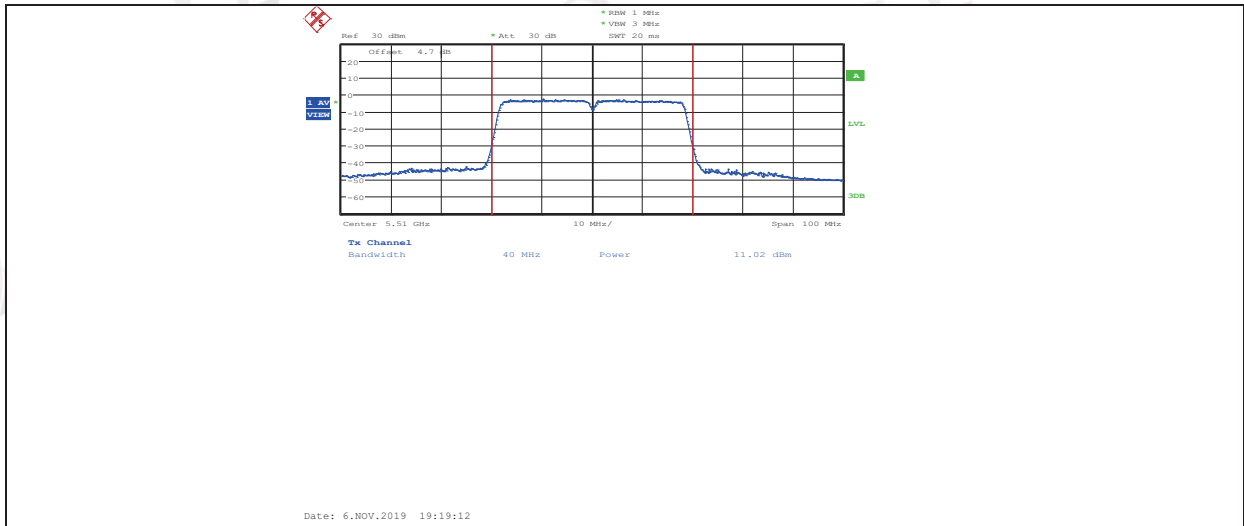
11N40MIMO_ANT1_5310



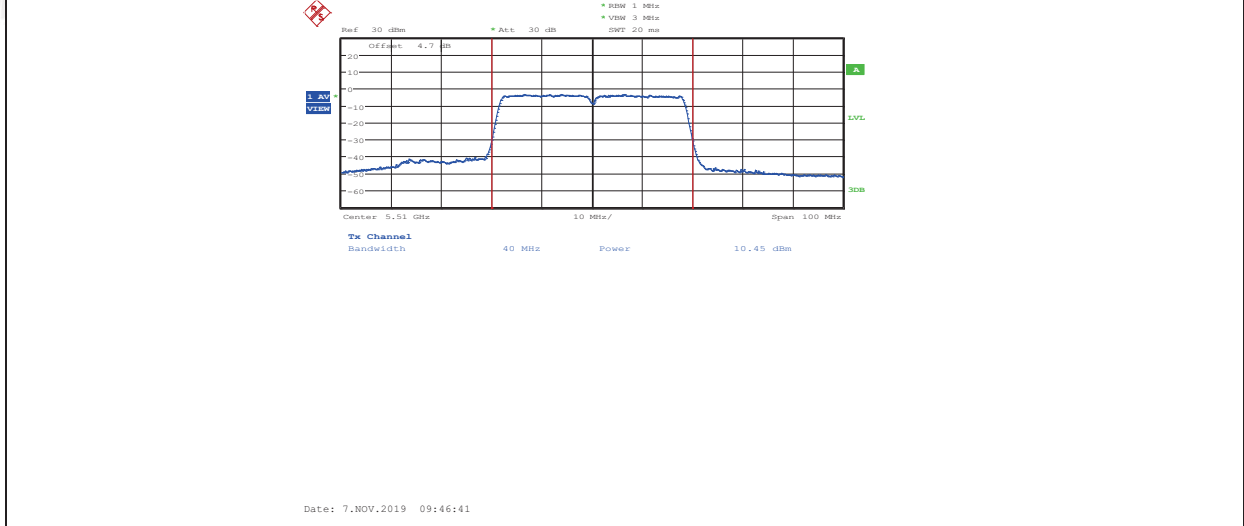
11N40MIMO_ANT2_5310



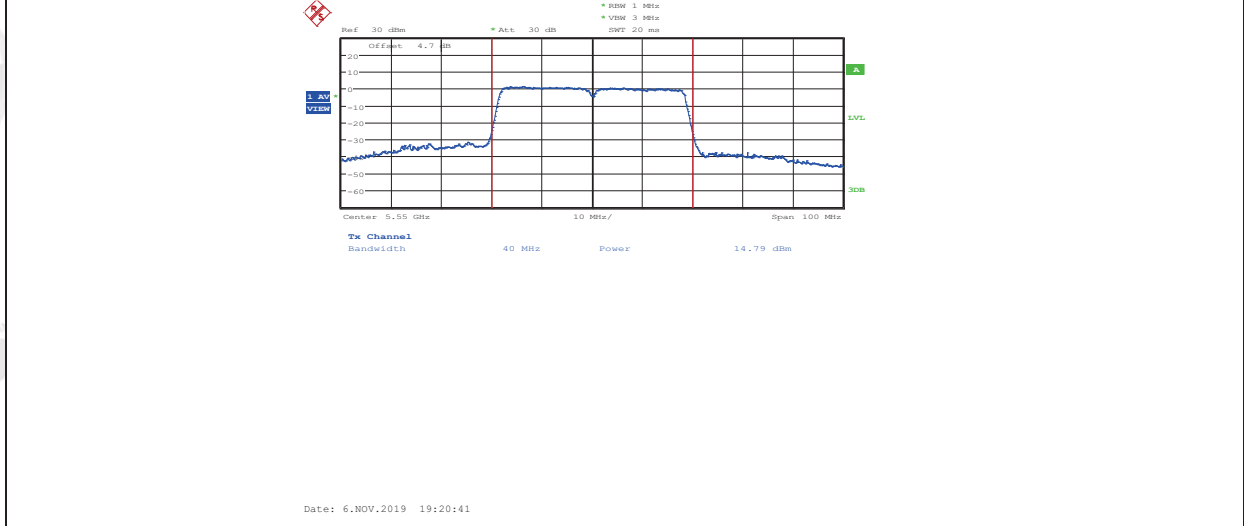
11N40MIMO_ANT1_5510



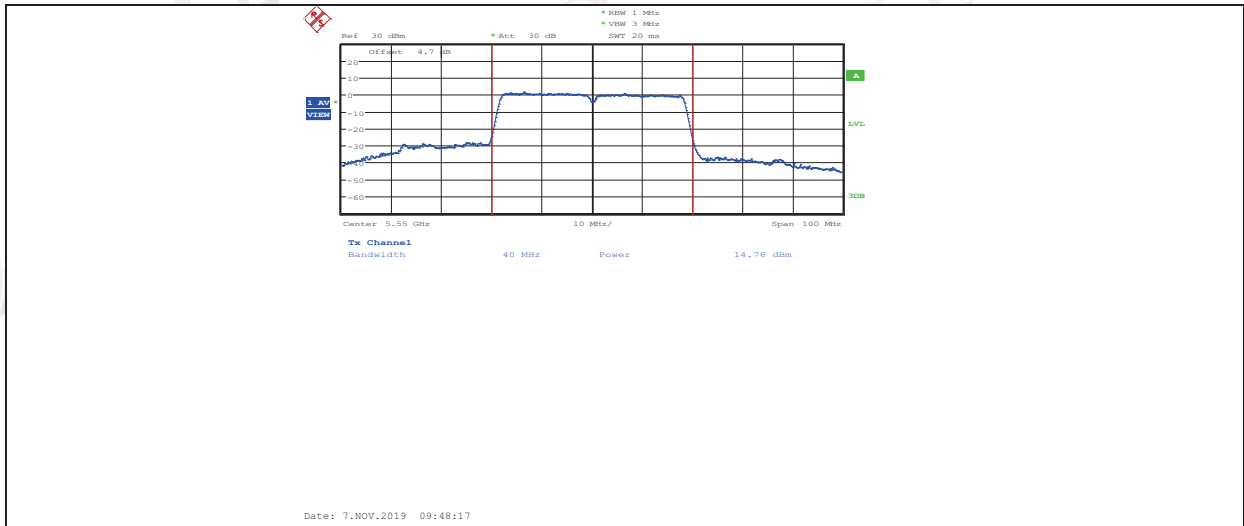
11N40MIMO_ANT2_5510



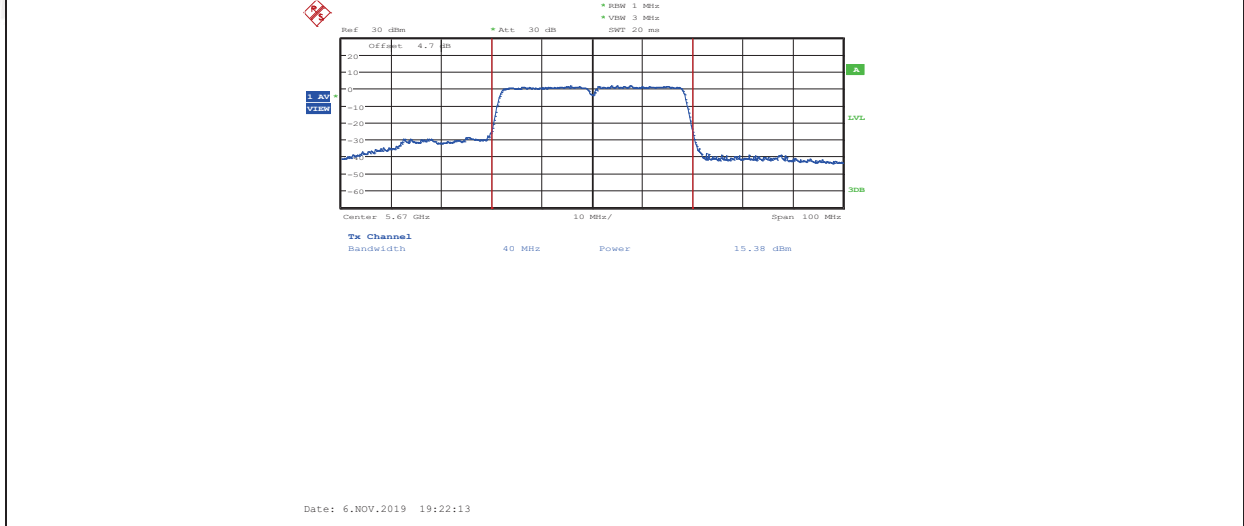
11N40MIMO_ANT1_5550



11N40MIMO_ANT2_5550



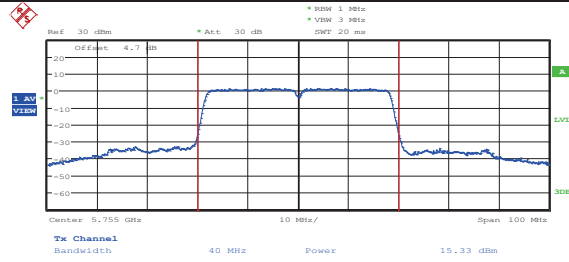
11N40MIMO_ANT1_5670



11N40MIMO_ANT2_5670

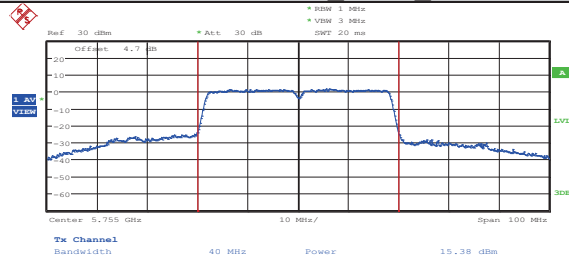


11N40MIMO_ANT1_5755



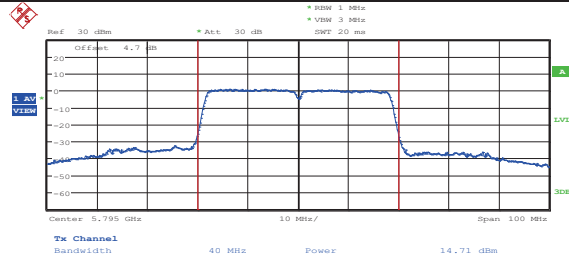
Date: 6.NOV.2019 19:26:31

11N40MIMO_ANT2_5755



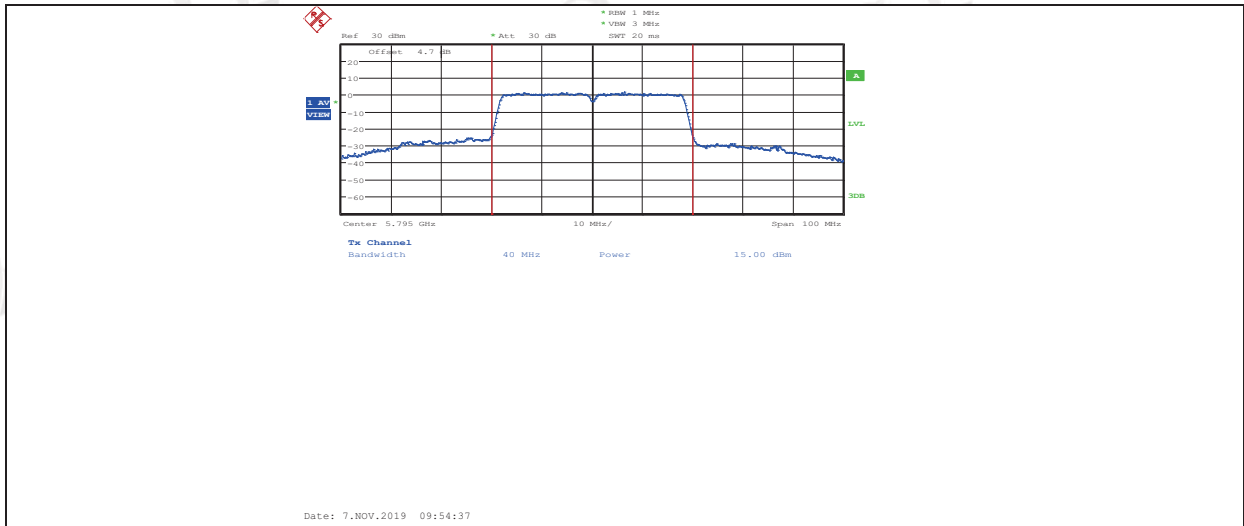
Date: 7.NOV.2019 09:52:57

11N40MIMO_ANT1_5795

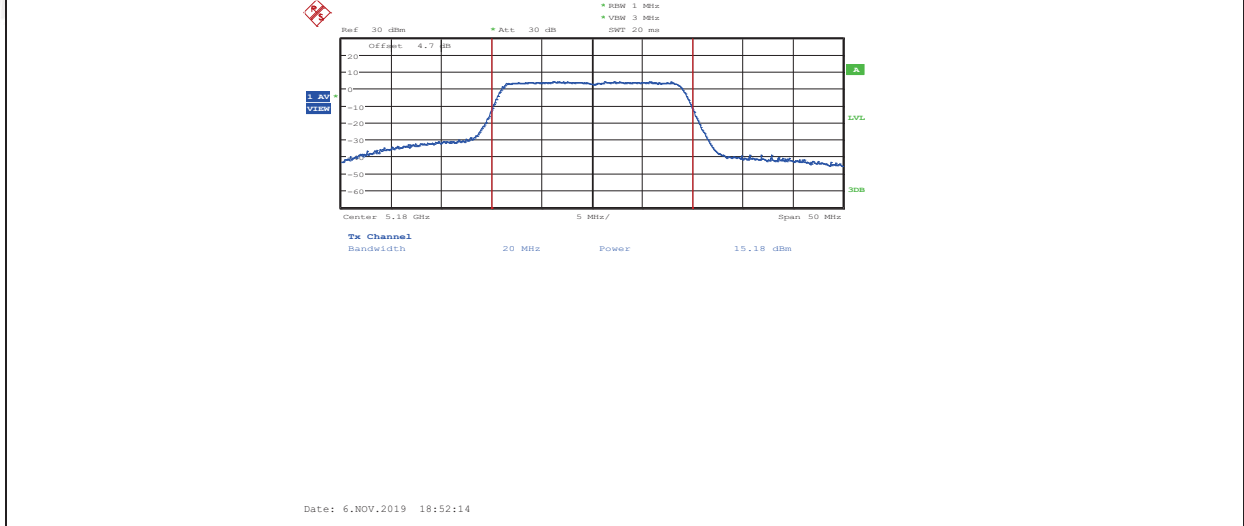


Date: 6.NOV.2019 19:27:57

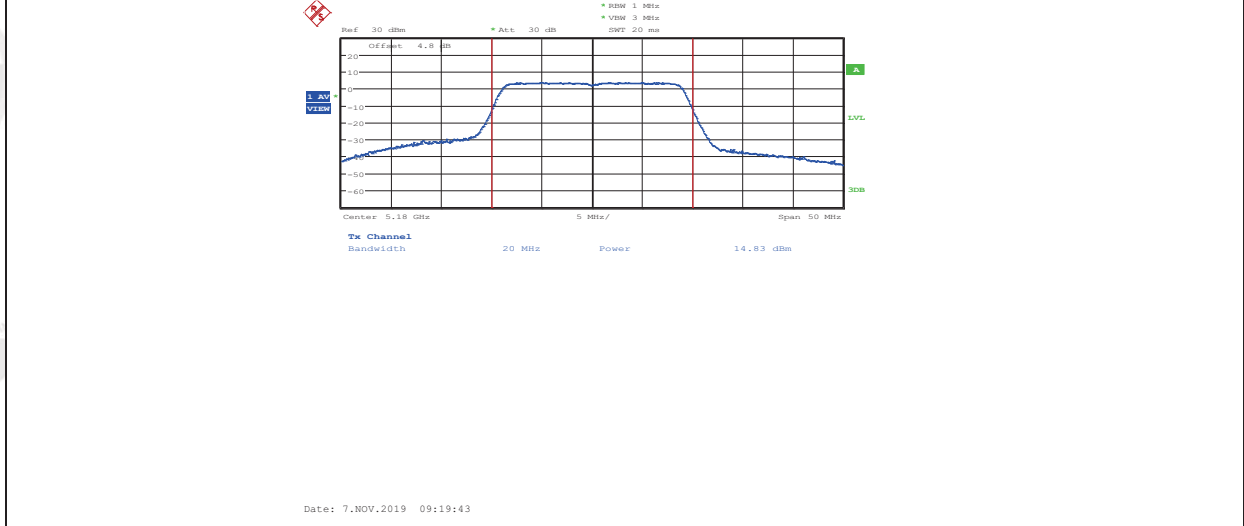
11N40MIMO_ANT2_5795



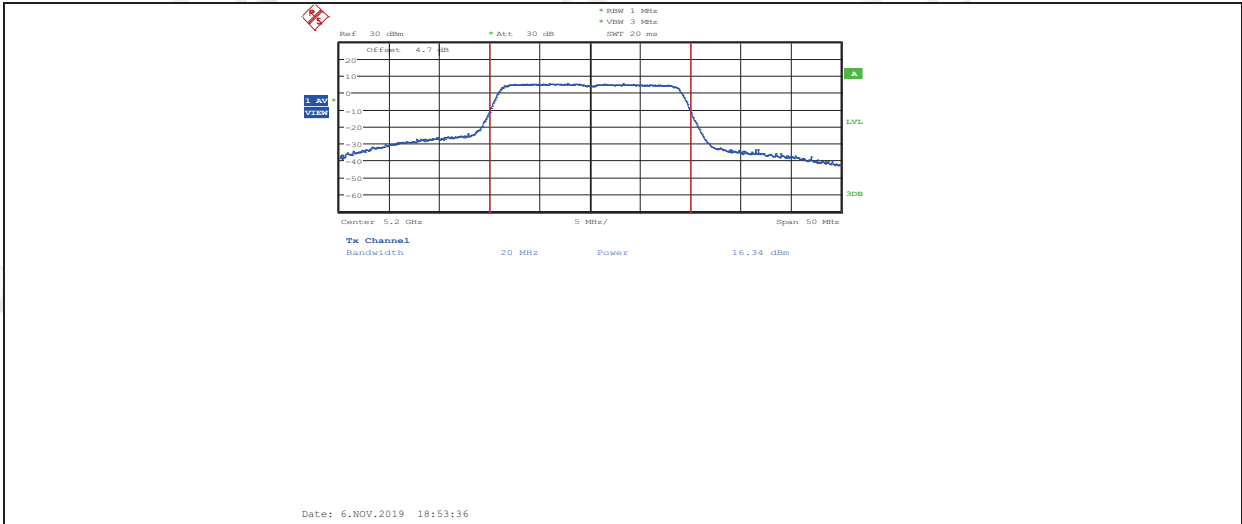
11AC20MIMO ANT1_5180



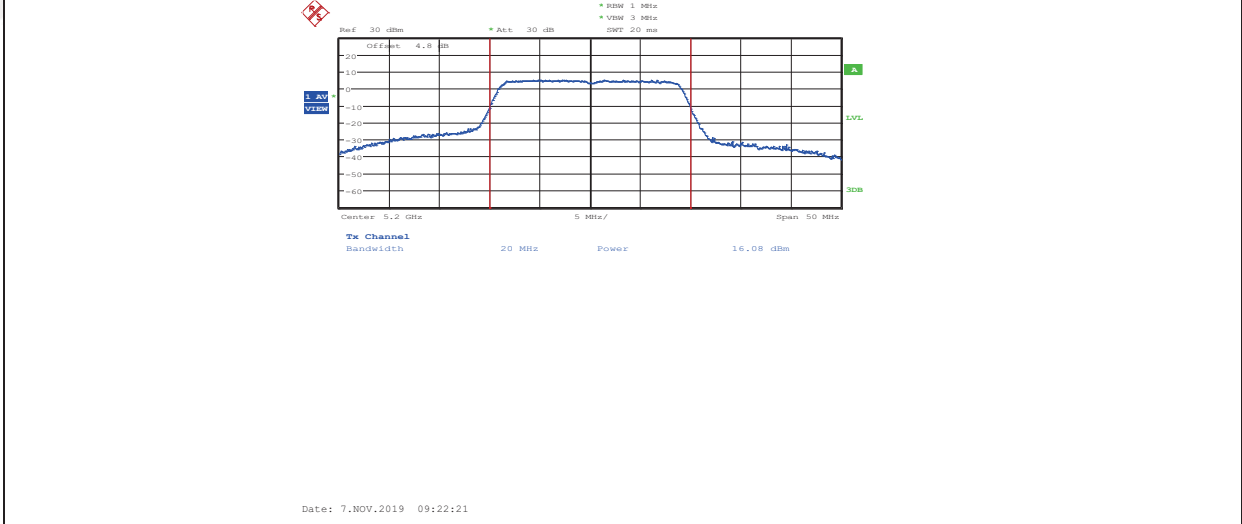
11AC20MIMO ANT2_5180



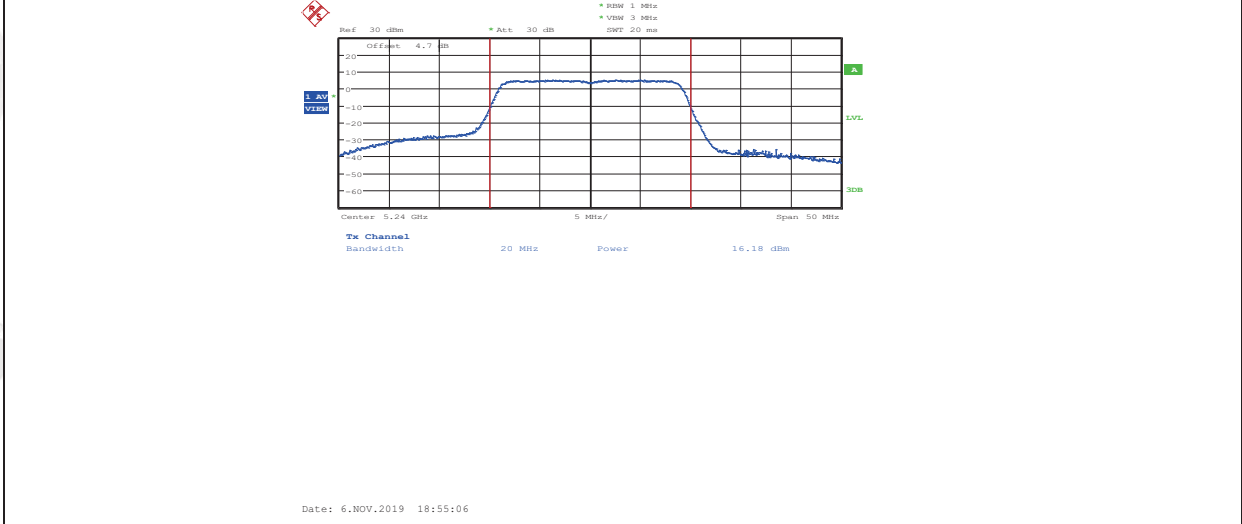
11AC20MIMO ANT1_5200



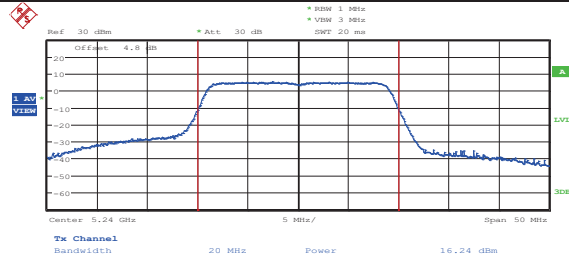
11AC20MIMO ANT2_5200



11AC20MIMO ANT1_5240

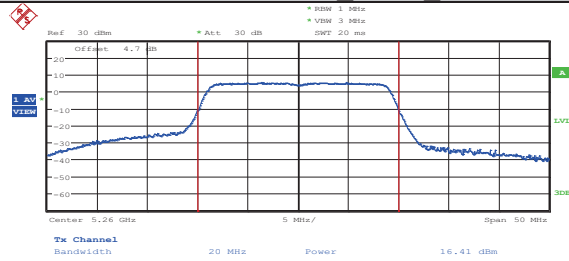


11AC20MIMO ANT2_5240



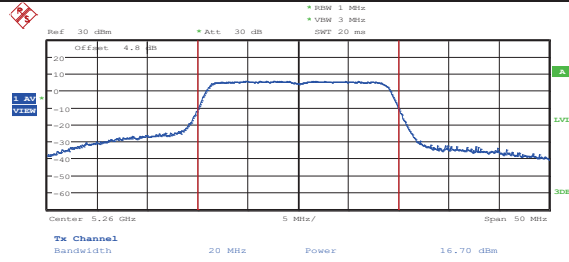
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11AC20MIMO ANT1_5260



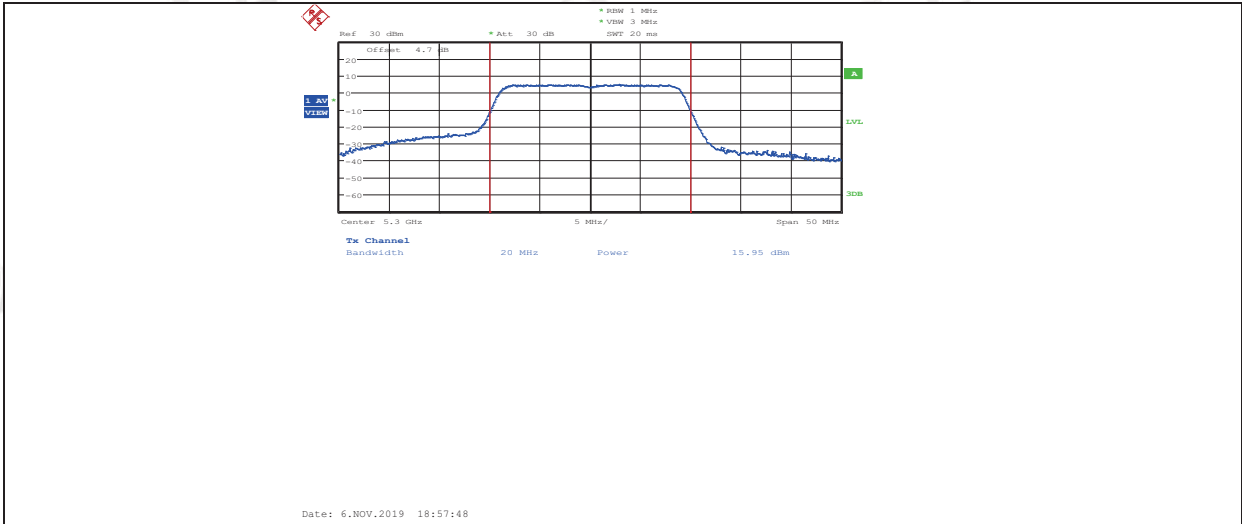
Date: 6.NOV.2019 18:56:31

11AC20MIMO ANT2_5260

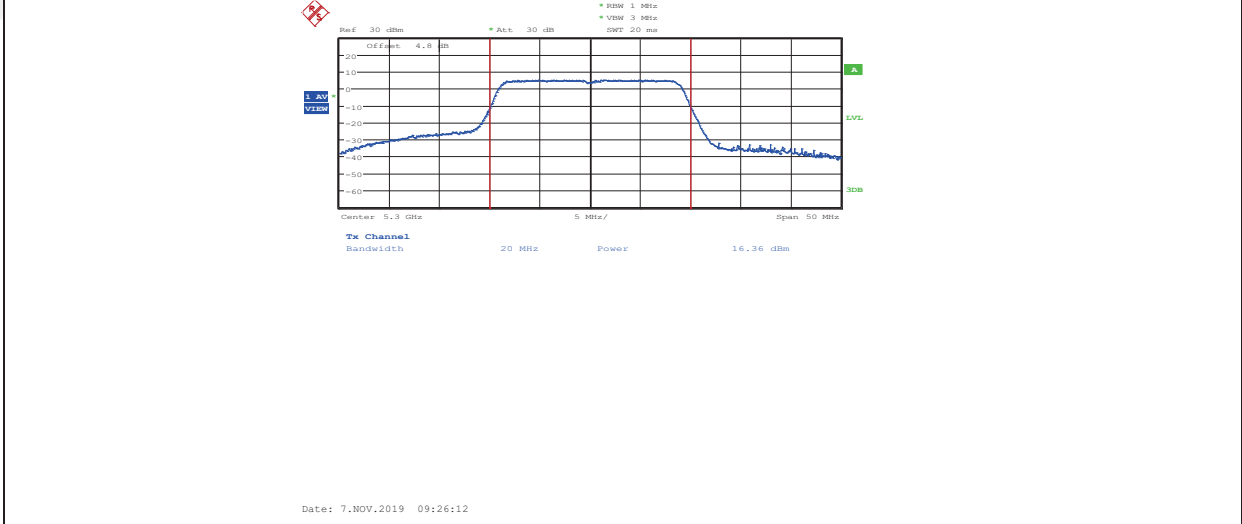


Date: 7.NOV.2019 09:24:54

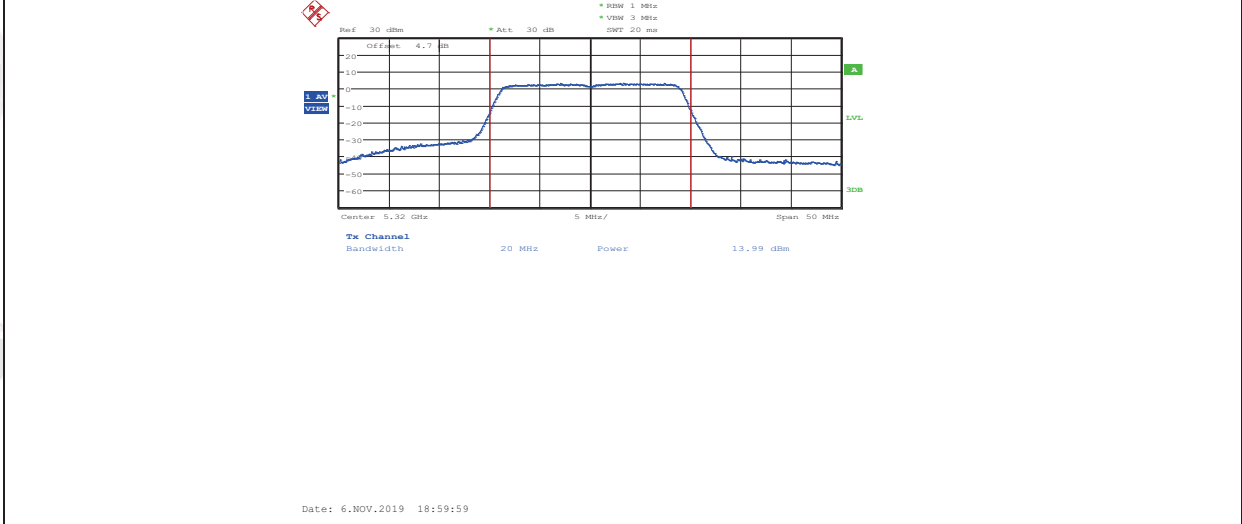
11AC20MIMO ANT1_5300



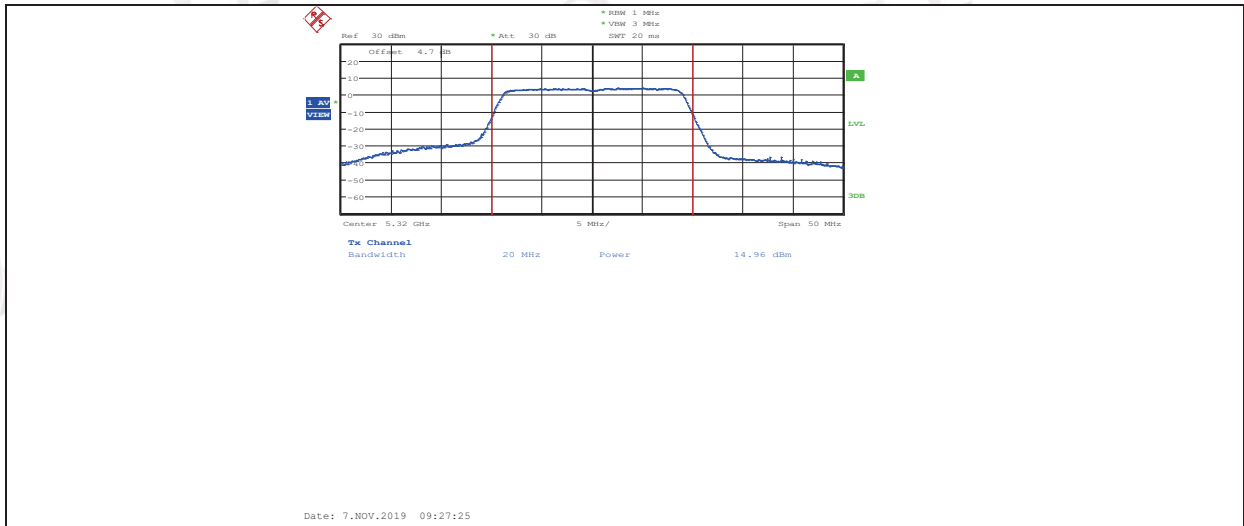
11AC20MIMO ANT2_5300



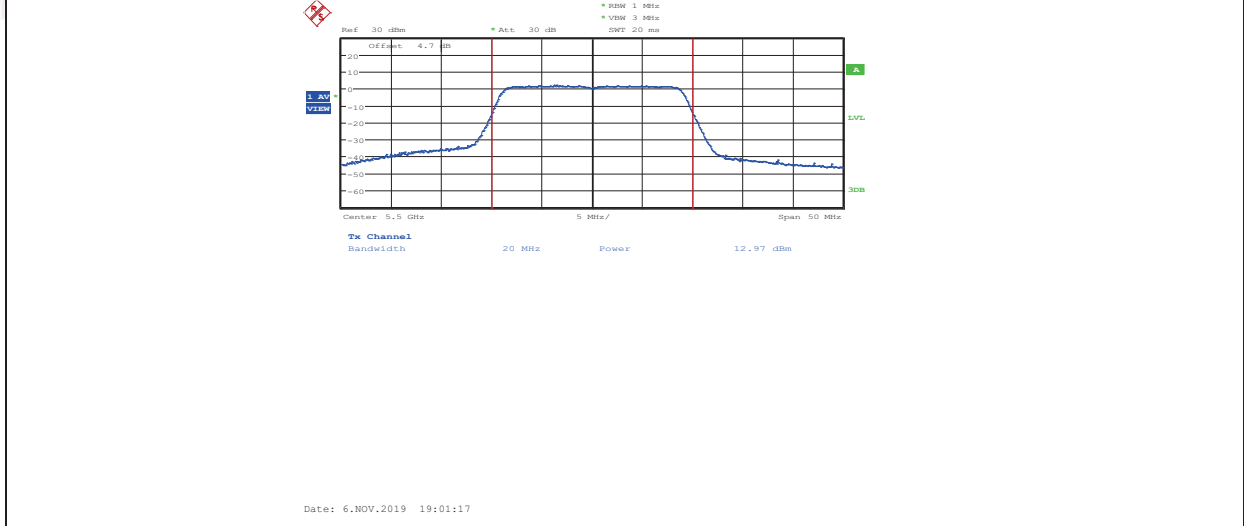
11AC20MIMO ANT1_5320



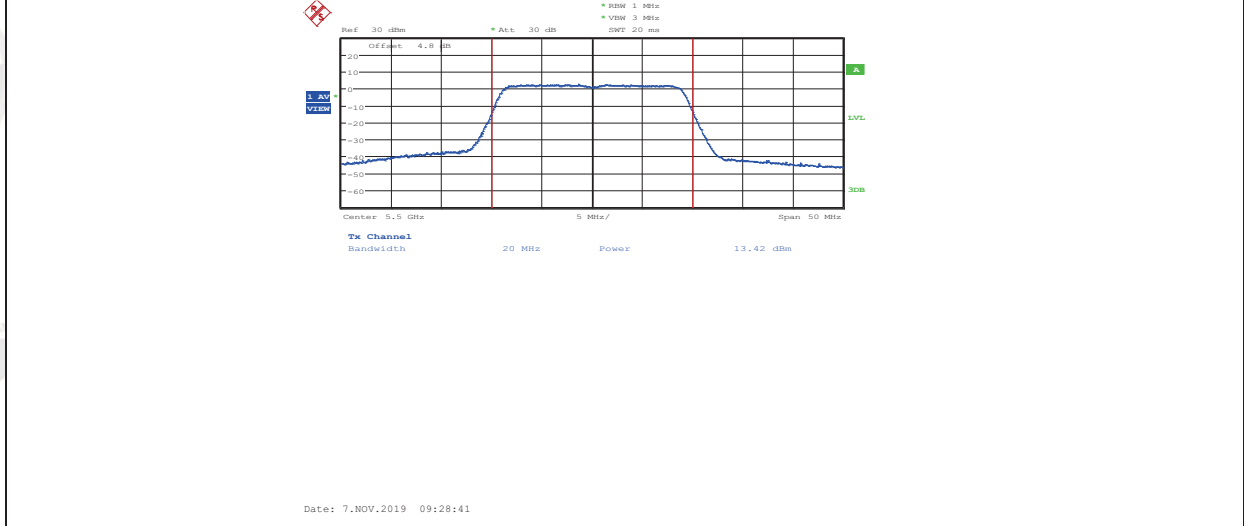
11AC20MIMO ANT2_5320



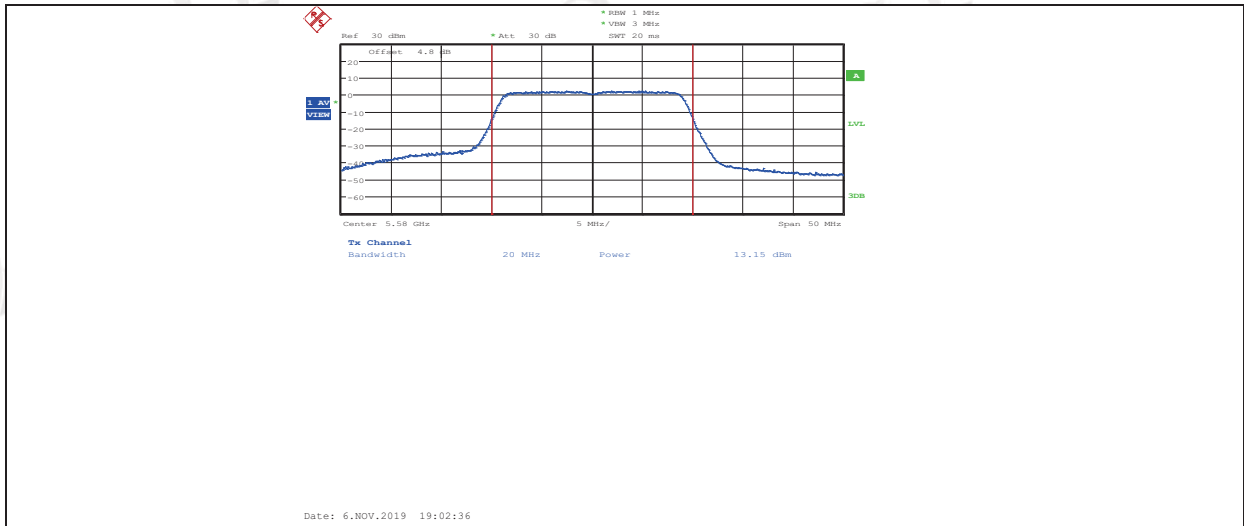
11AC20MIMO ANT1_5500



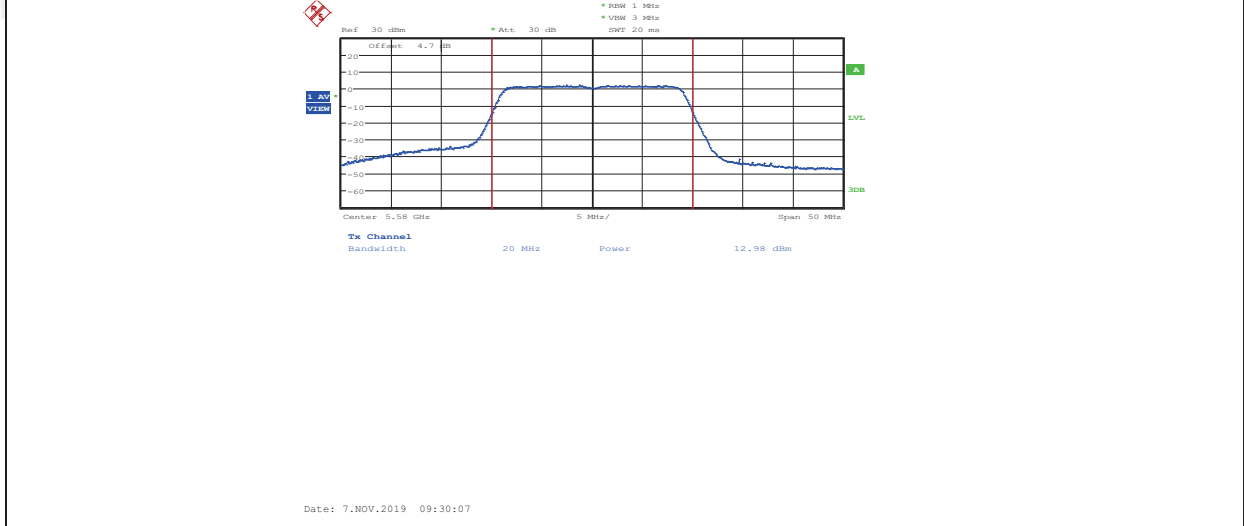
11AC20MIMO ANT2_5500



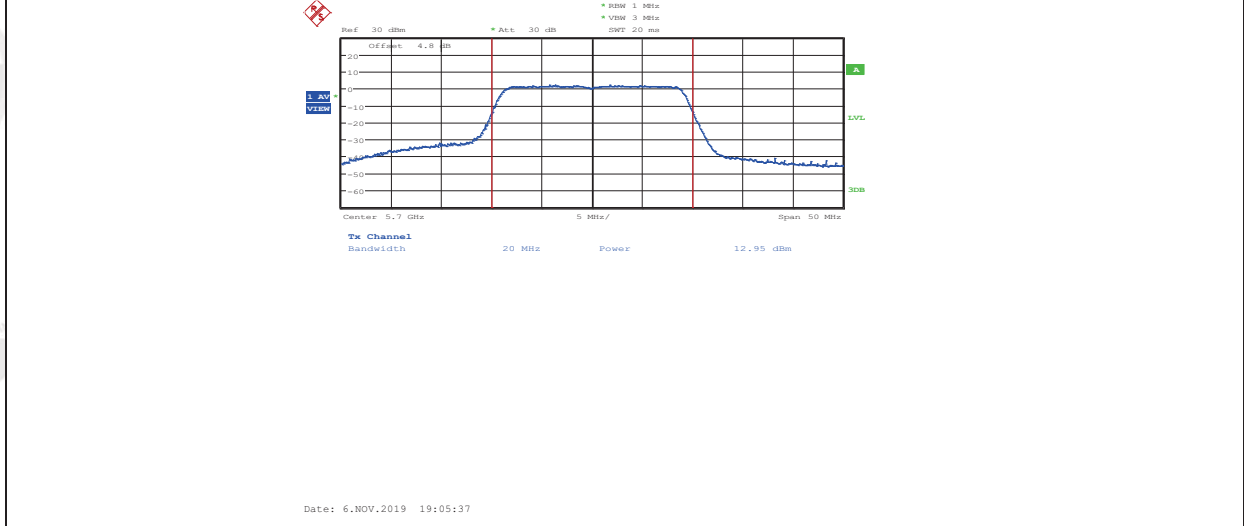
11AC20MIMO ANT1_5580



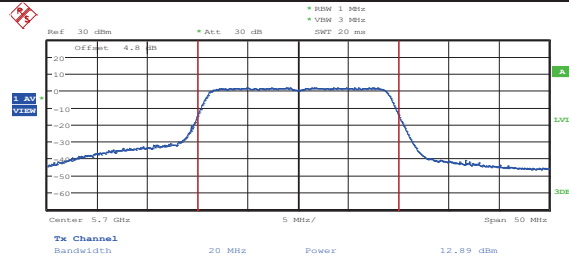
11AC20MIMO ANT2_5580



11AC20MIMO ANT1_5700

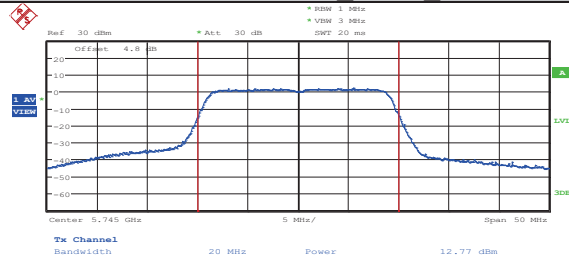


11AC20MIMO ANT2_5700



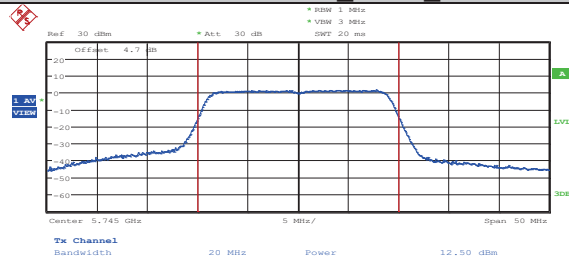
Date: 7.NOV.2019 09:32:07

11AC20MIMO ANT1_5745



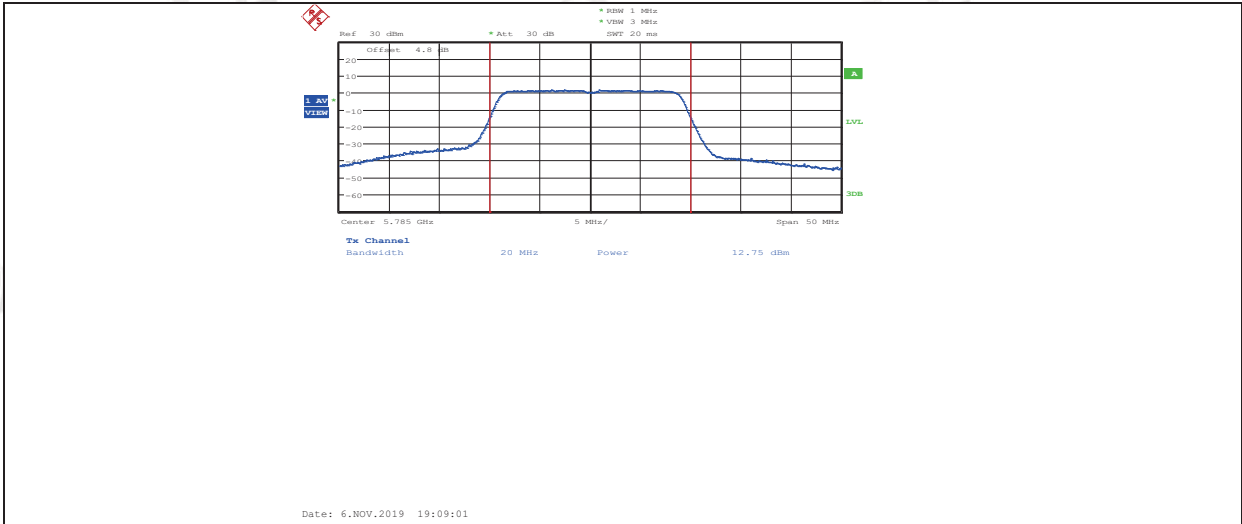
Date: 6.NOV.2019 19:07:34

11AC20MIMO ANT2_5745

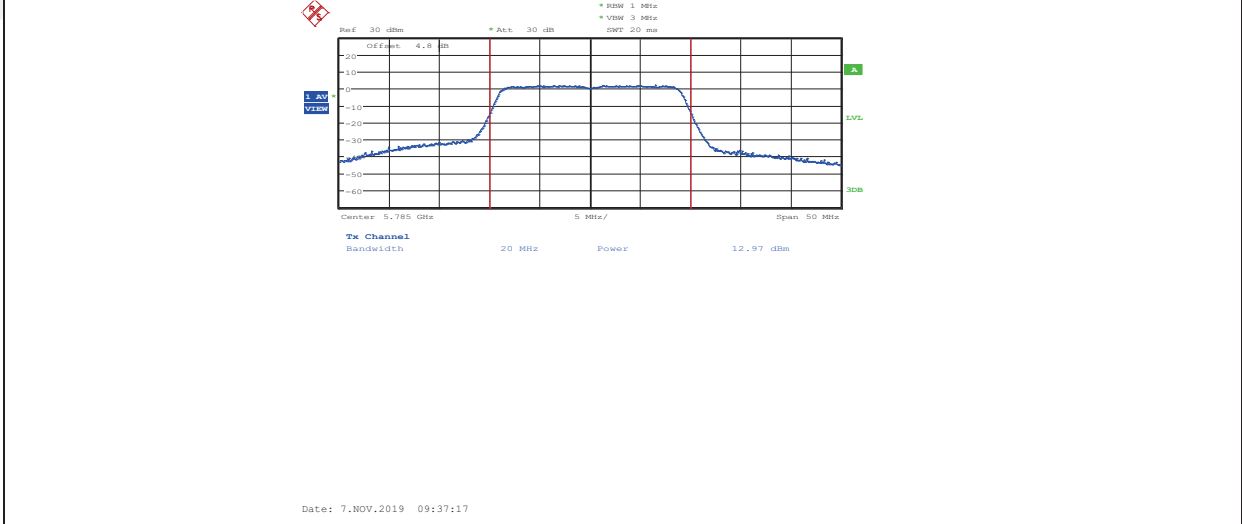


Date: 7.NOV.2019 09:35:51

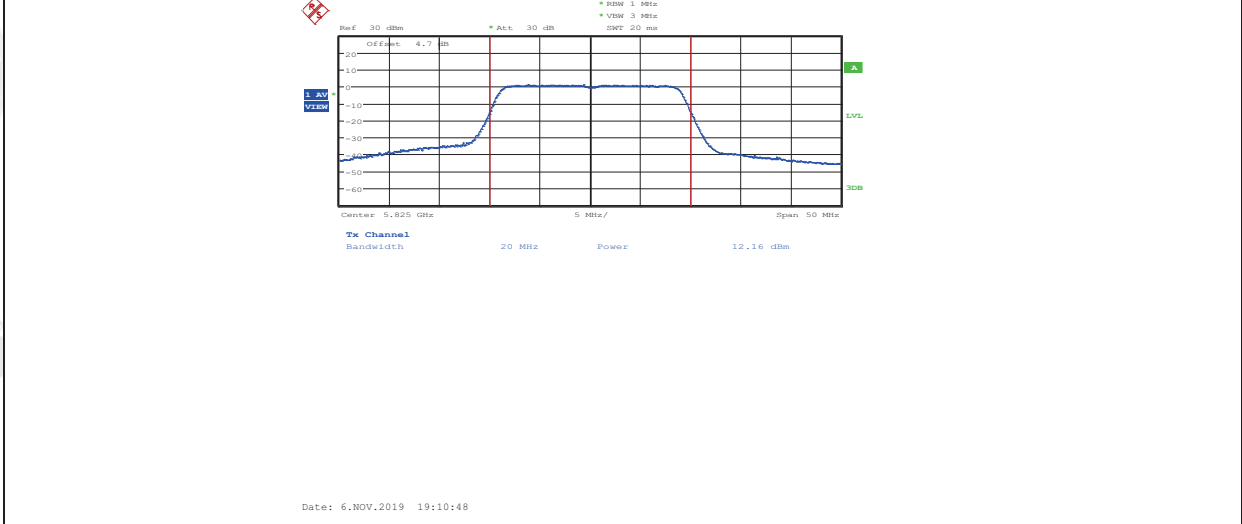
11AC20MIMO ANT1_5785



11AC20MIMO ANT2_5785



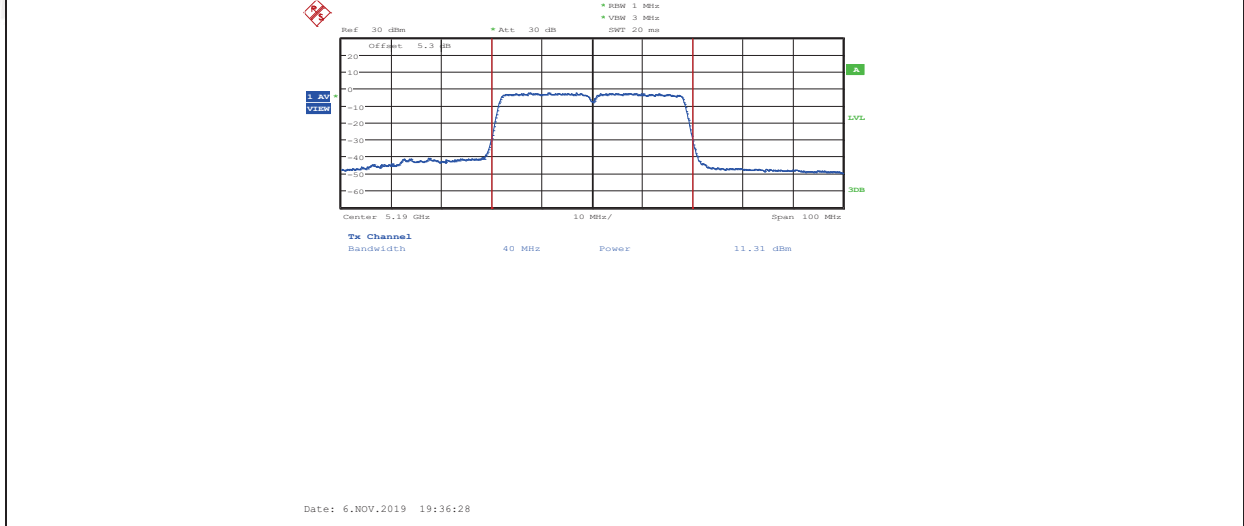
11AC20MIMO ANT1_5825



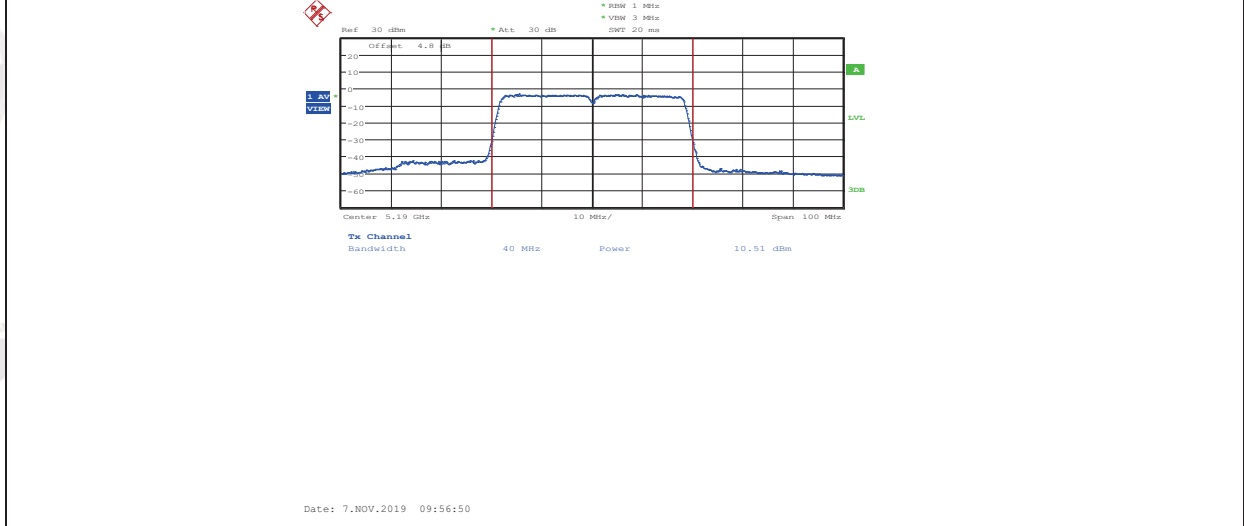
11AC20MIMO ANT2_5825



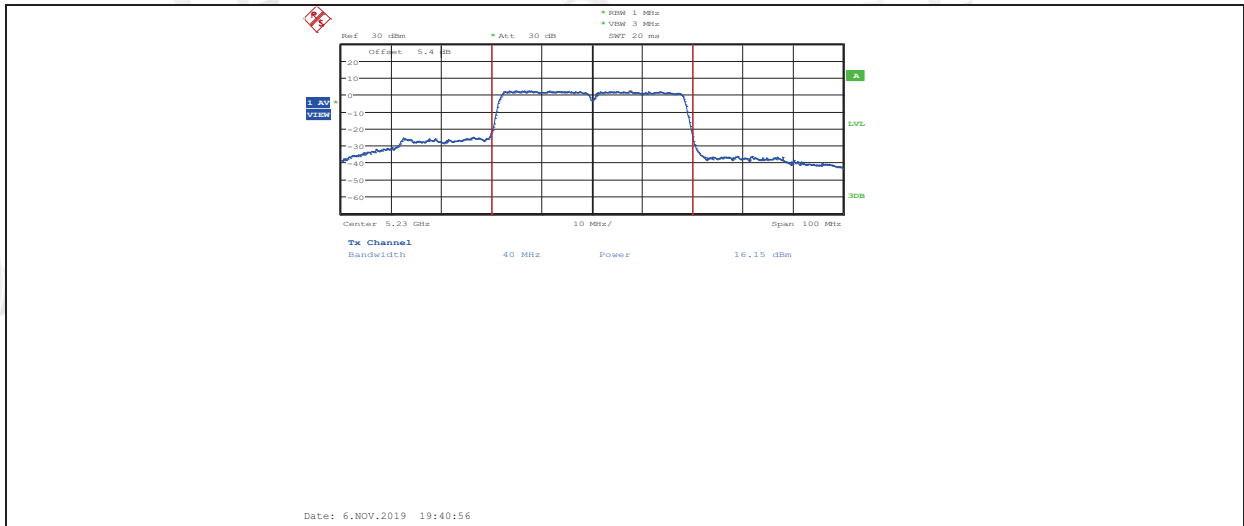
11AC40MIMO ANT1_5190



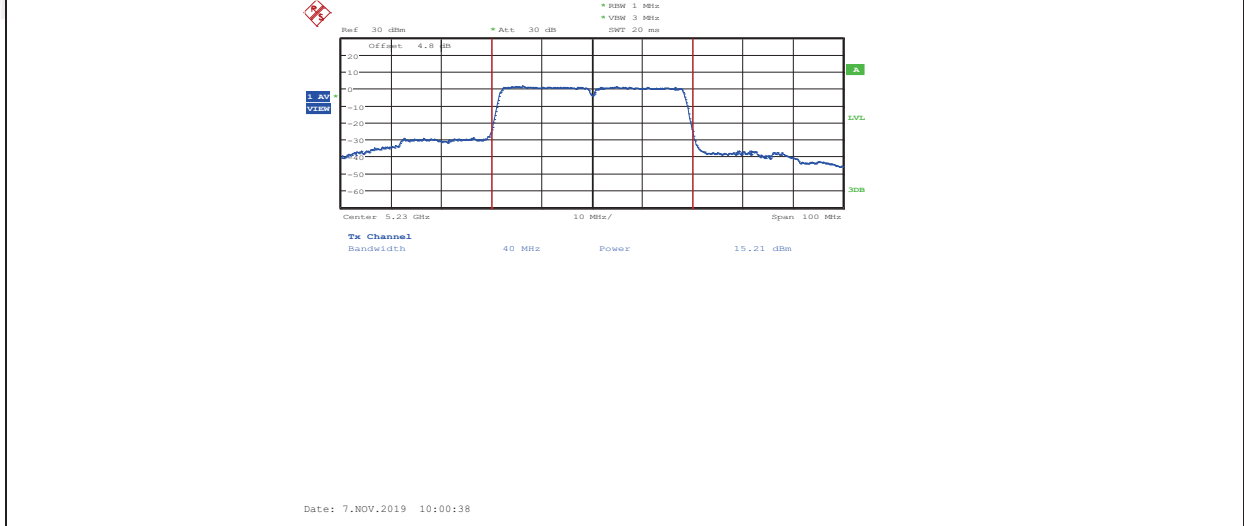
11AC40MIMO ANT2_5190



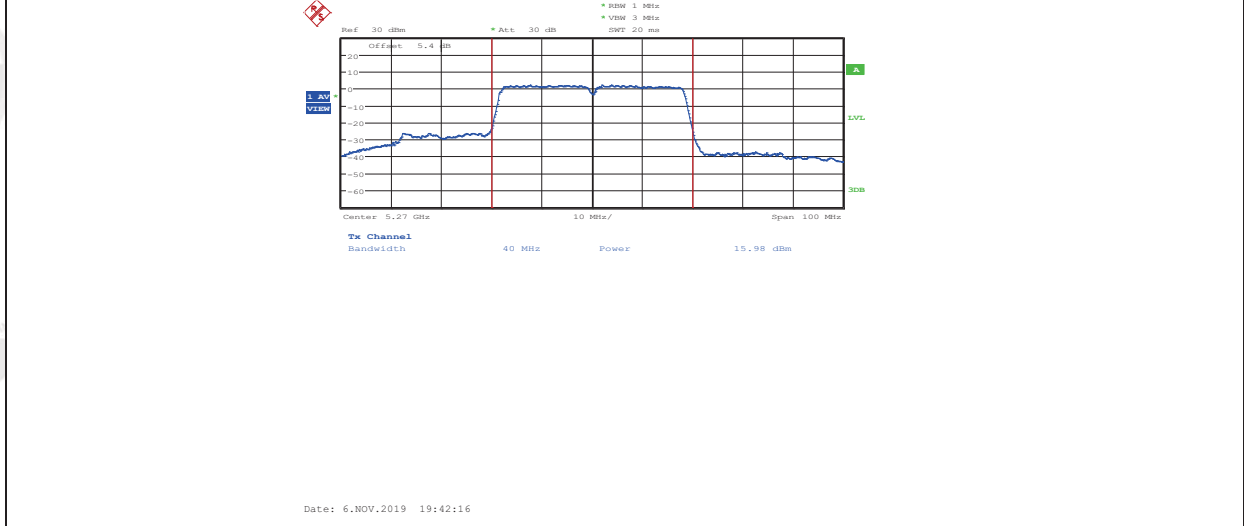
11AC40MIMO ANT1_5230



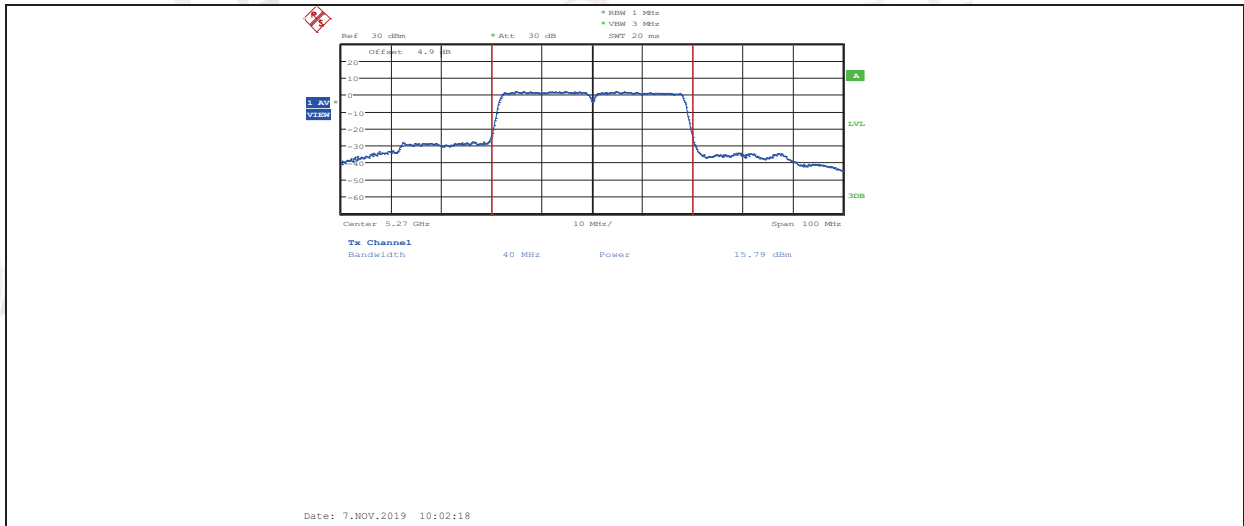
11AC40MIMO ANT2_5230



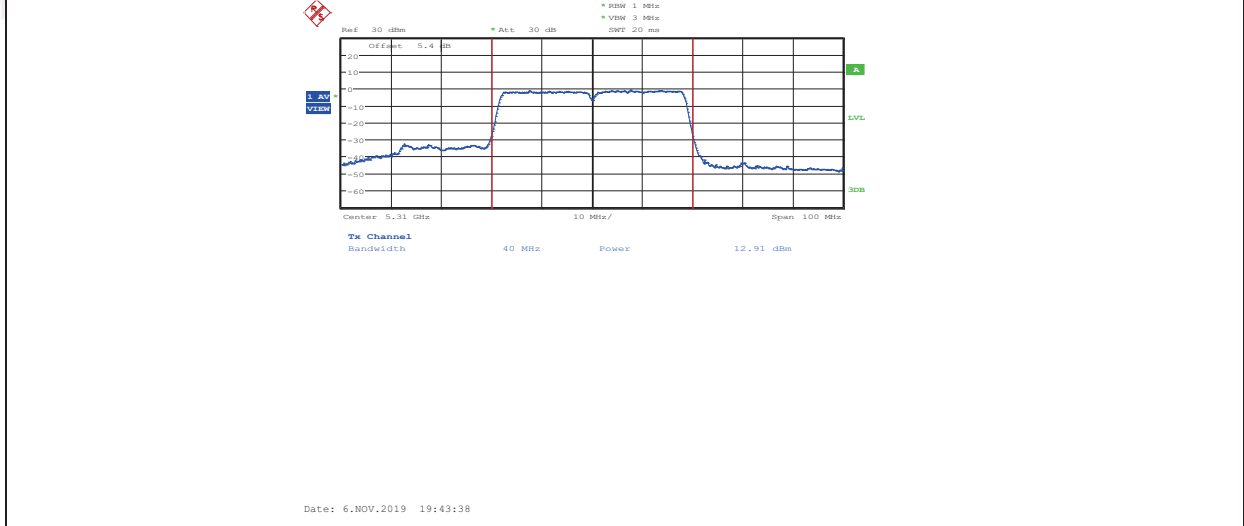
11AC40MIMO ANT1_5270



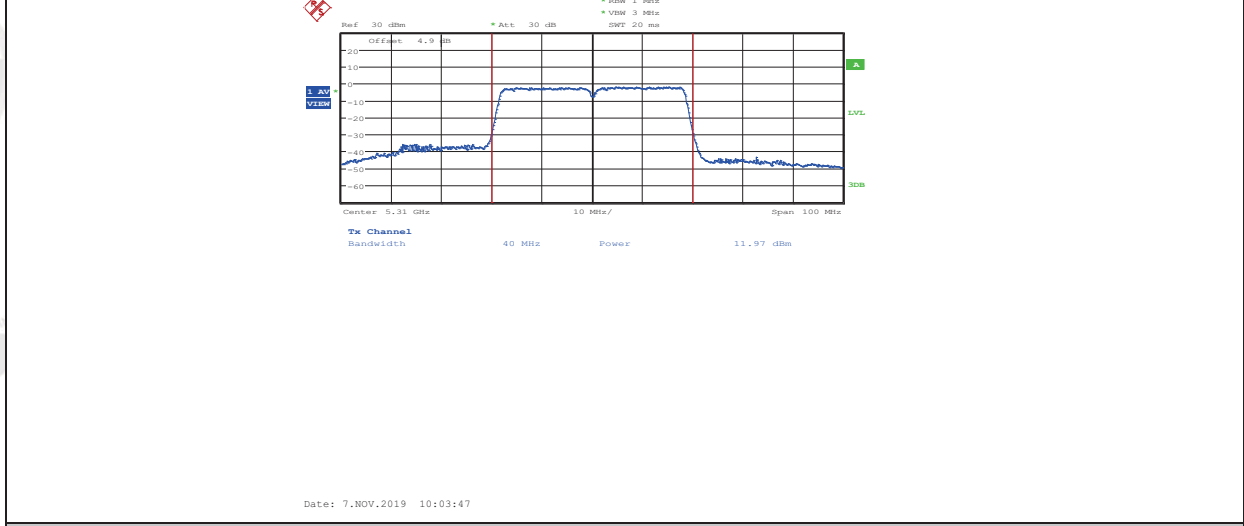
11AC40MIMO ANT2_5270



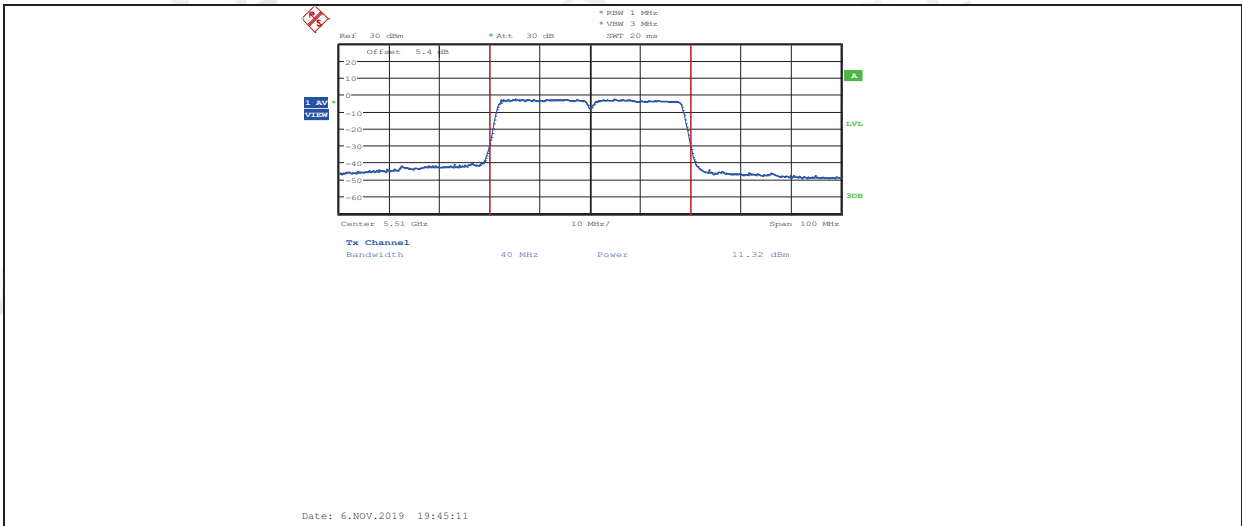
11AC40MIMO ANT1_5310



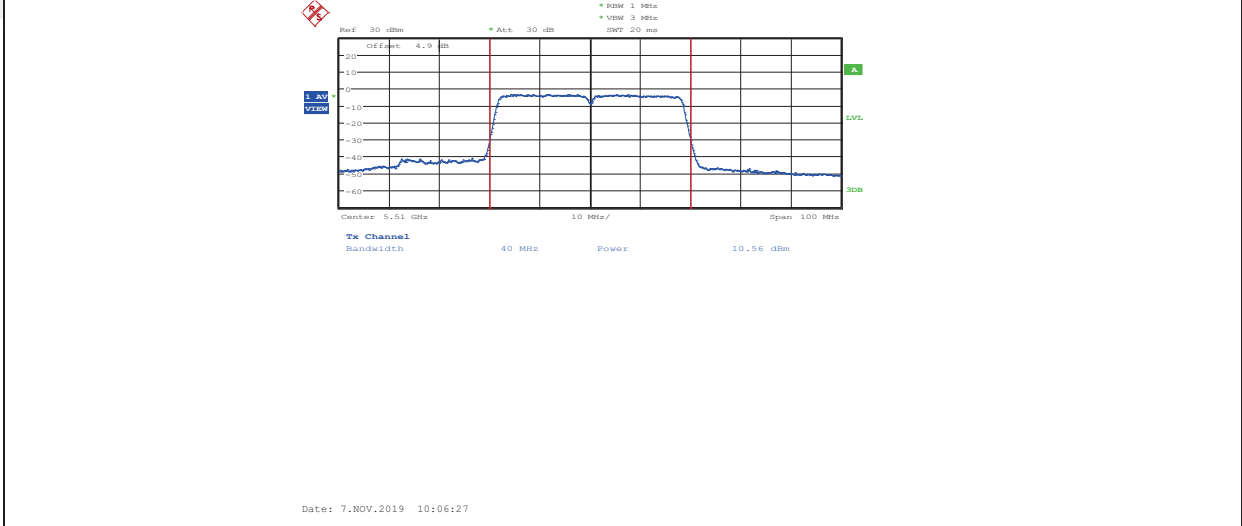
11AC40MIMO ANT2_5310



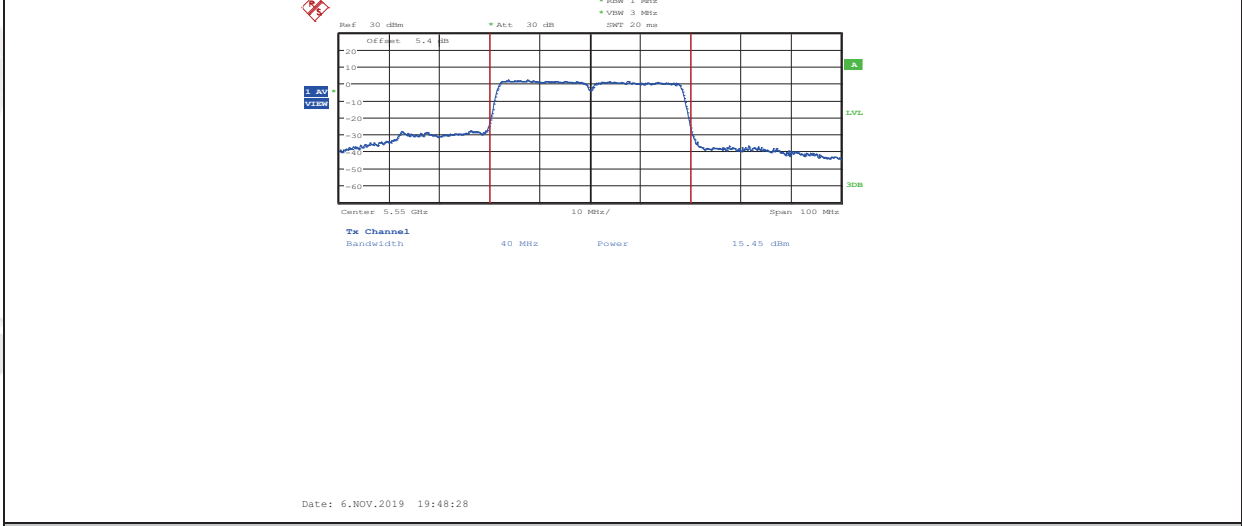
11AC40MIMO ANT1_5510



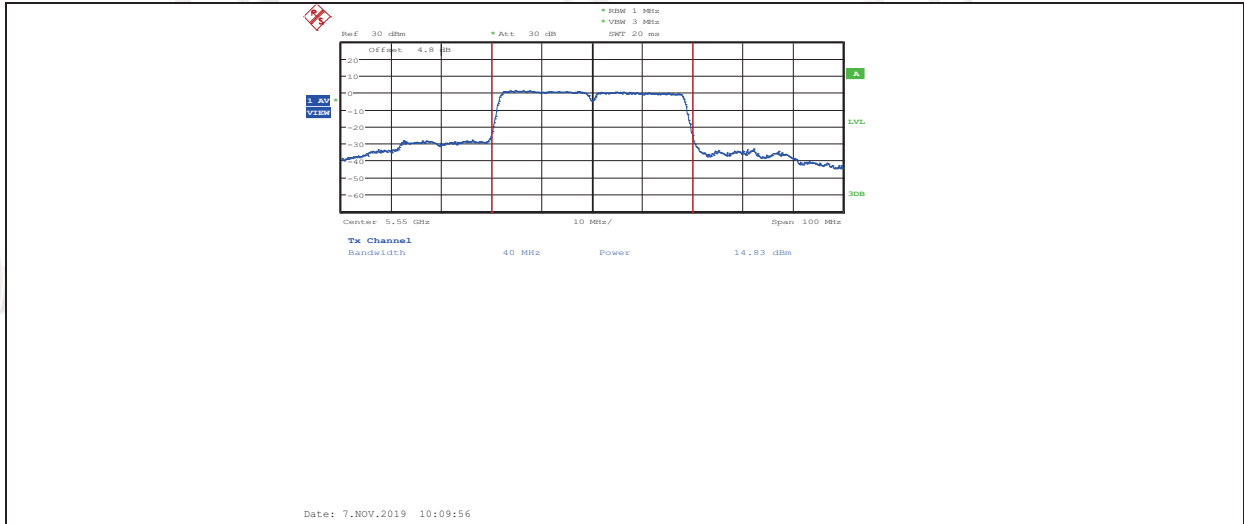
11AC40MIMO ANT2_5510



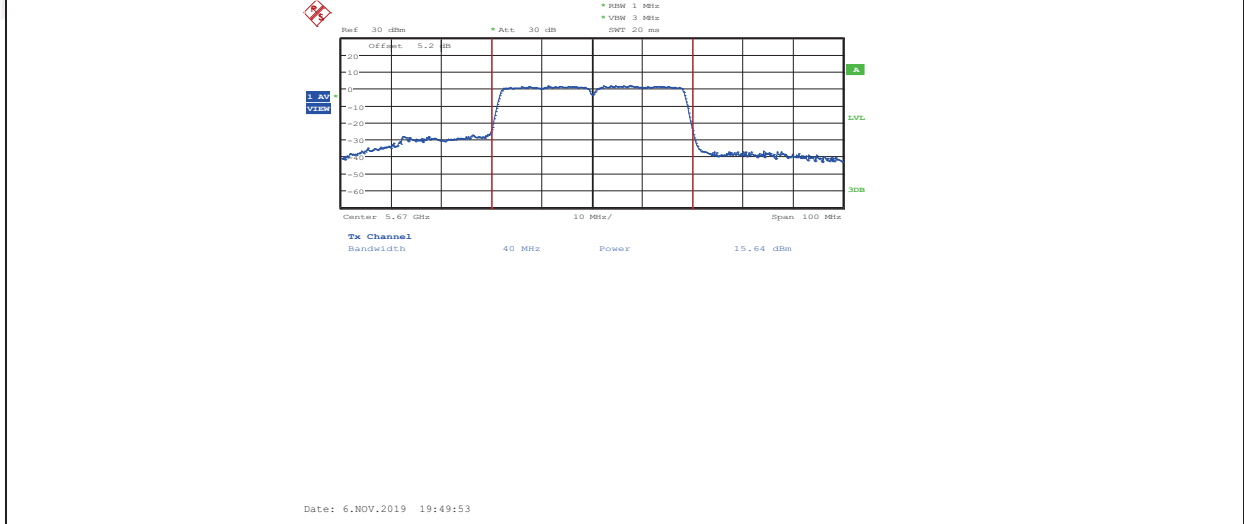
11AC40MIMO ANT1_5550



11AC40MIMO ANT2_5550



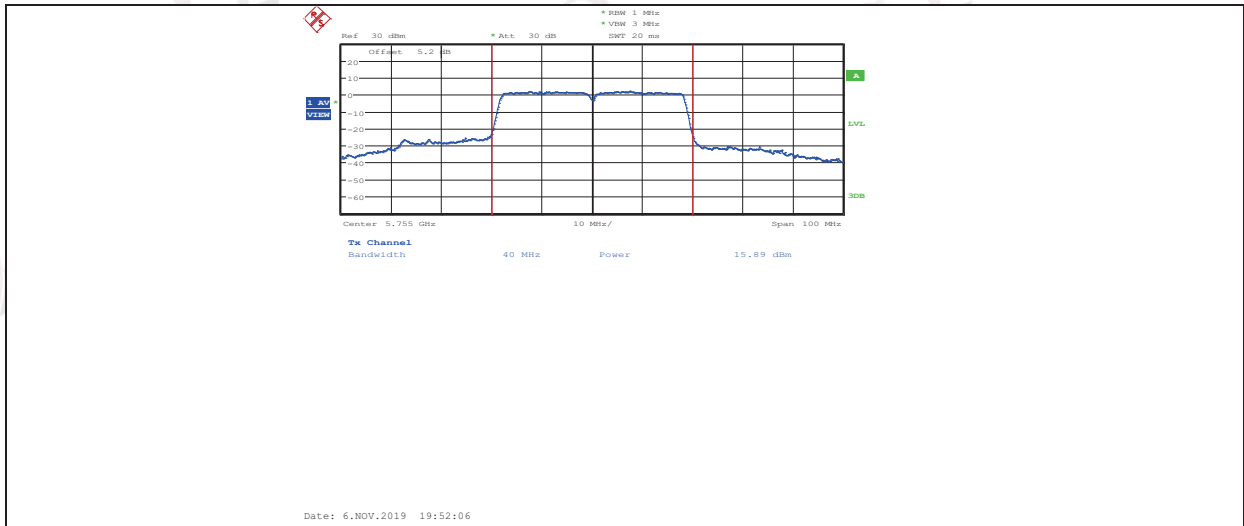
11AC40MIMO ANT1_5670



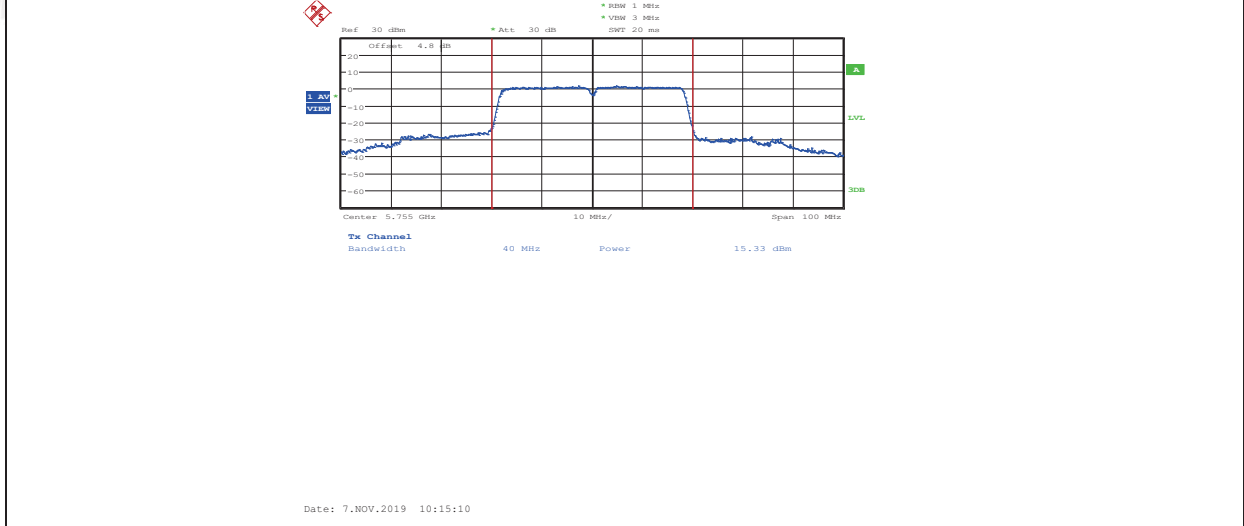
11AC40MIMO ANT2_5670



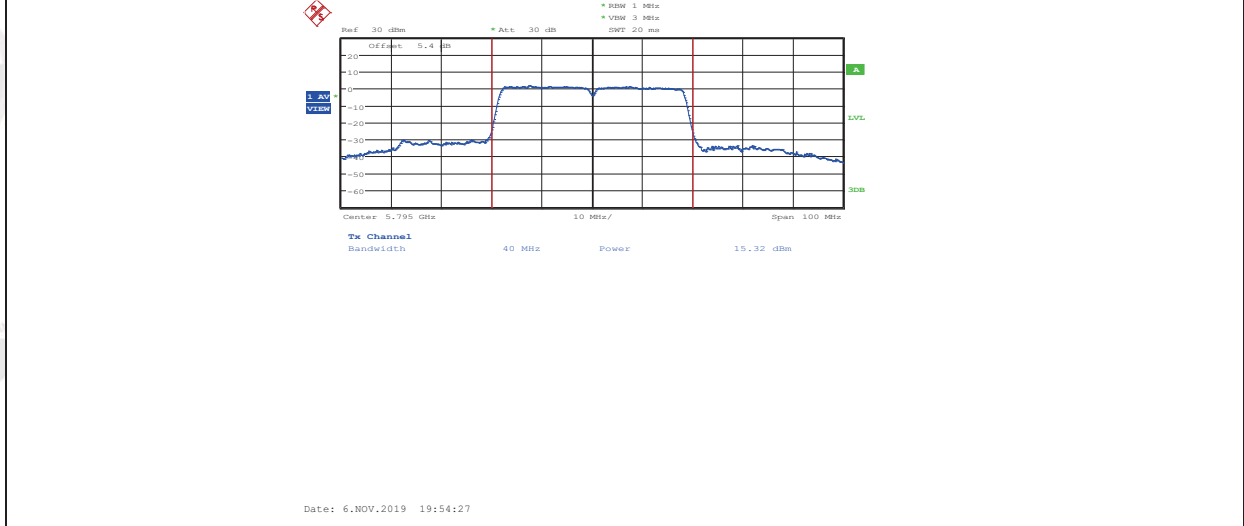
11AC40MIMO ANT1_5755



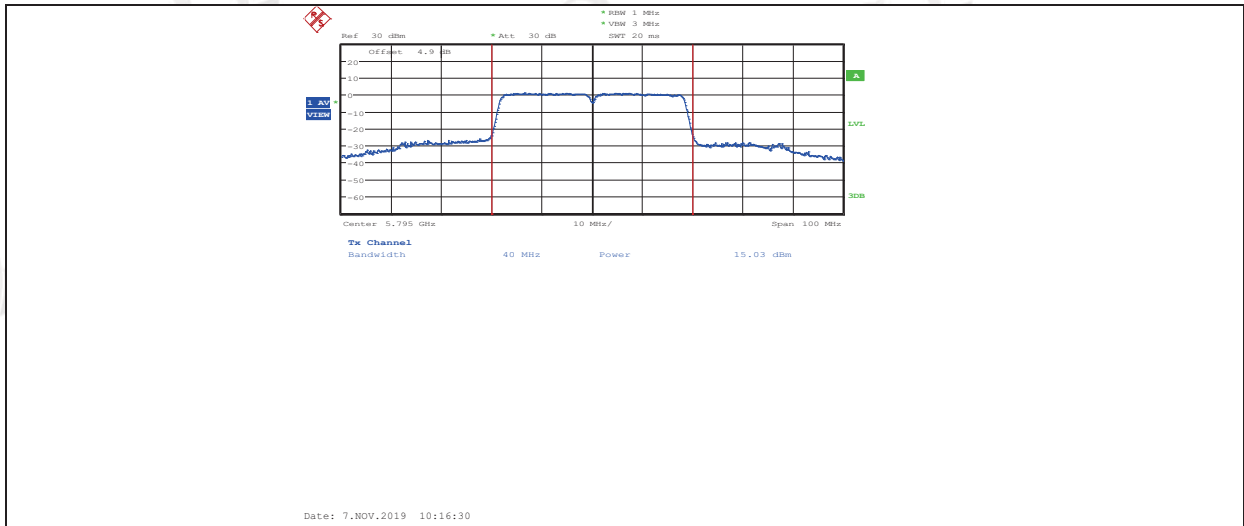
11AC40MIMO ANT2_5755



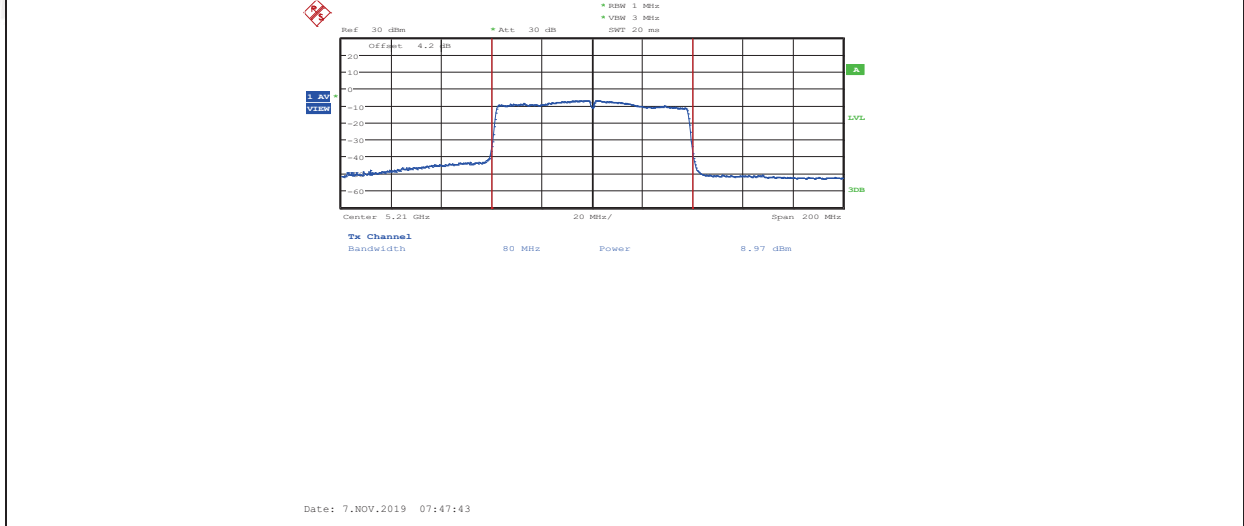
11AC40MIMO ANT1_5795



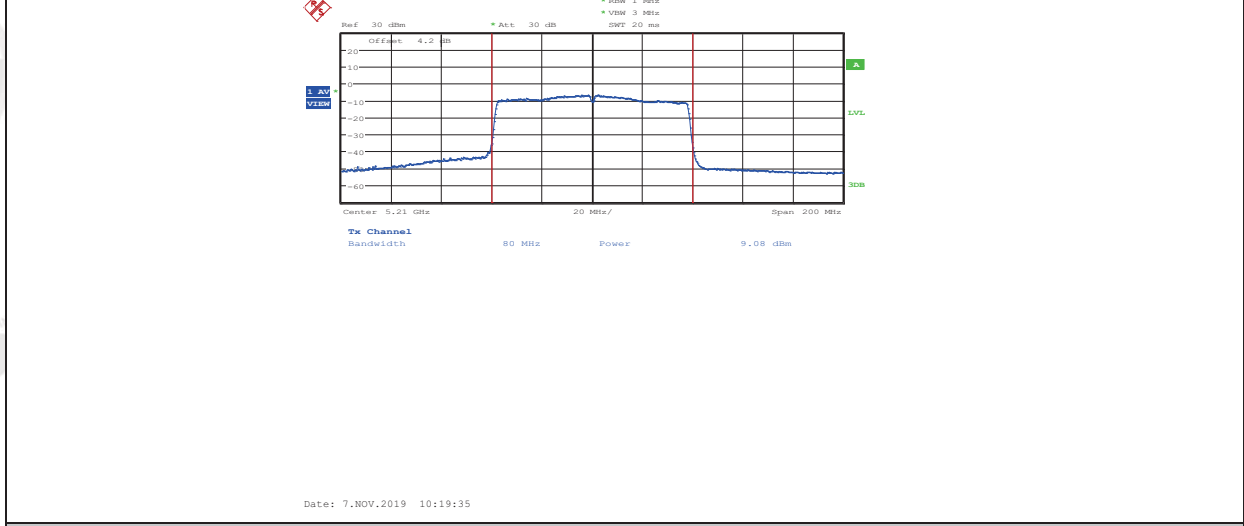
11AC40MIMO ANT2_5795



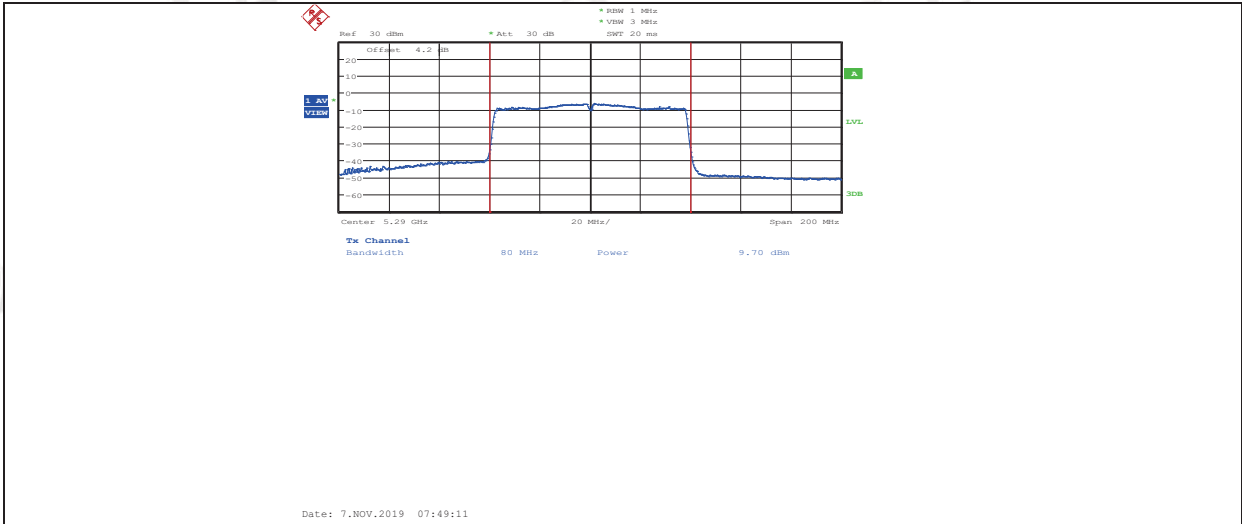
11AC80MIMO ANT1_5210



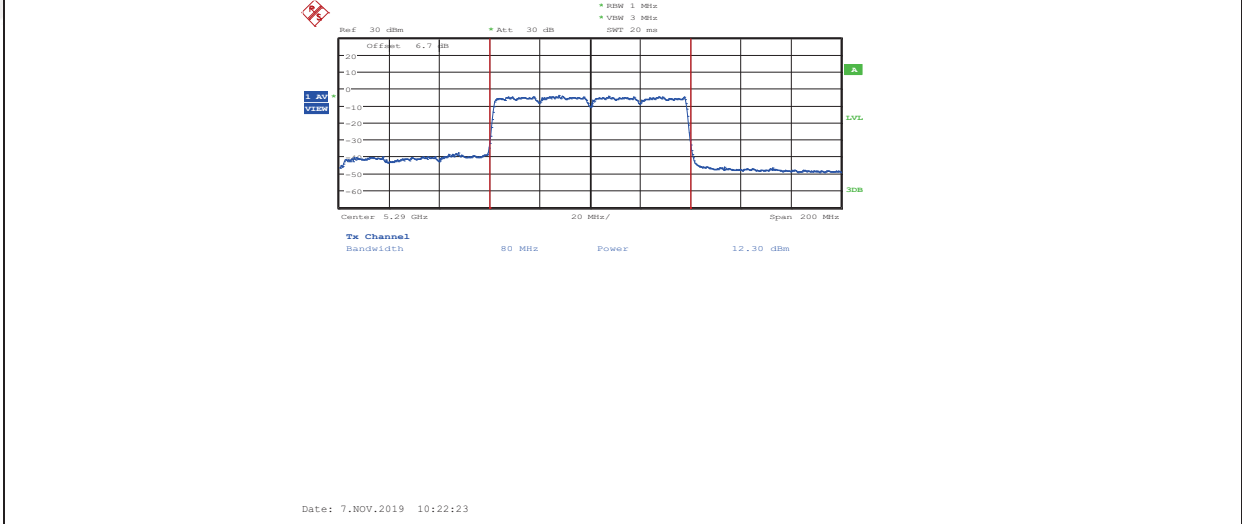
11AC80MIMO ANT2_5210



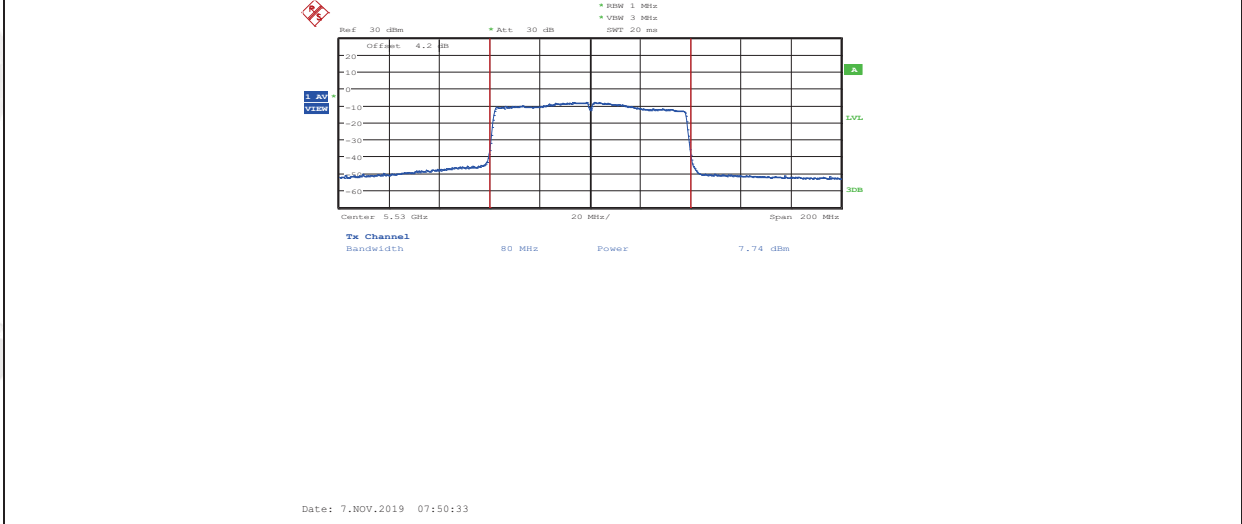
11AC80MIMO ANT1_5290



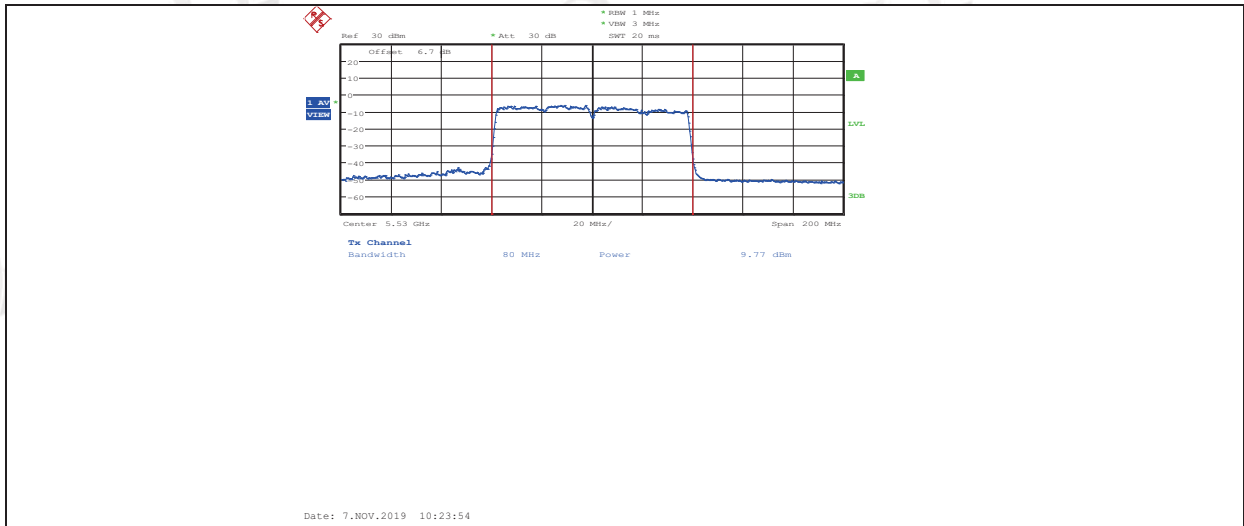
11AC80MIMO ANT2_5290



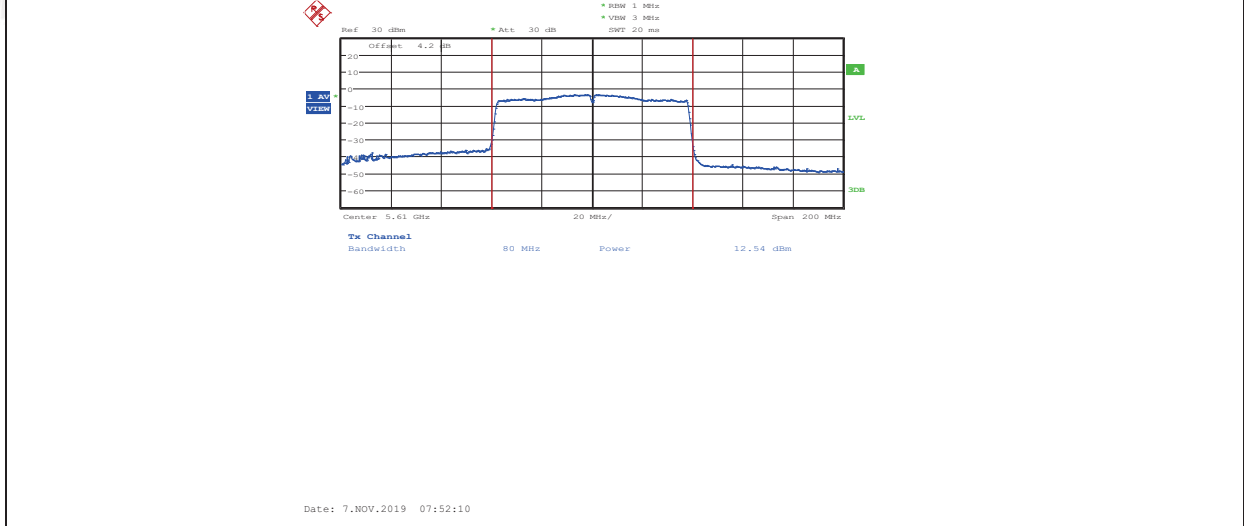
11AC80MIMO ANT1_5530



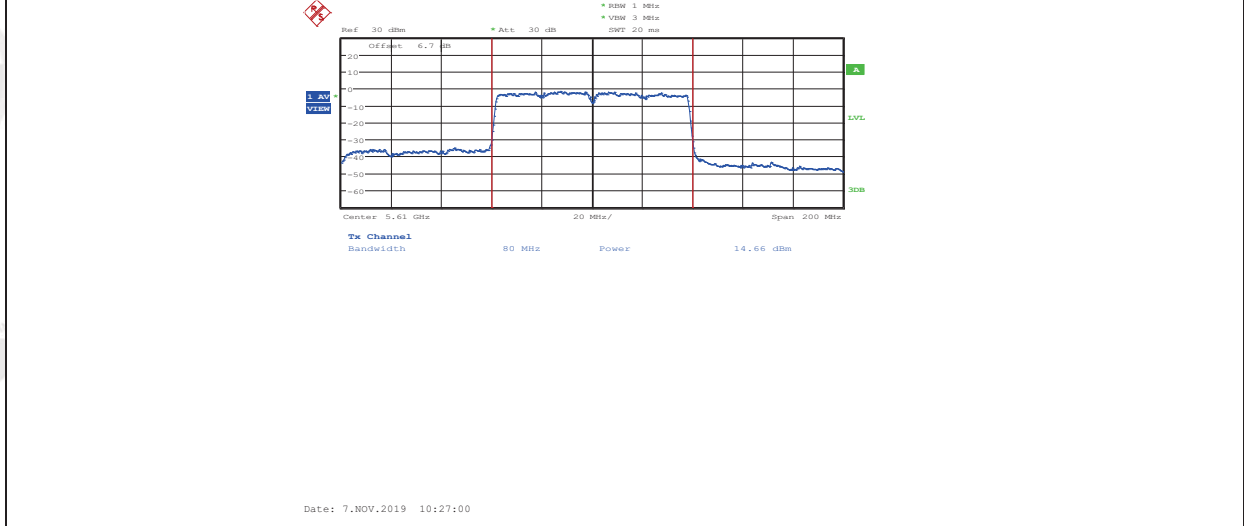
11AC80MIMO ANT2_5530



11AC80MIMO ANT1_5610



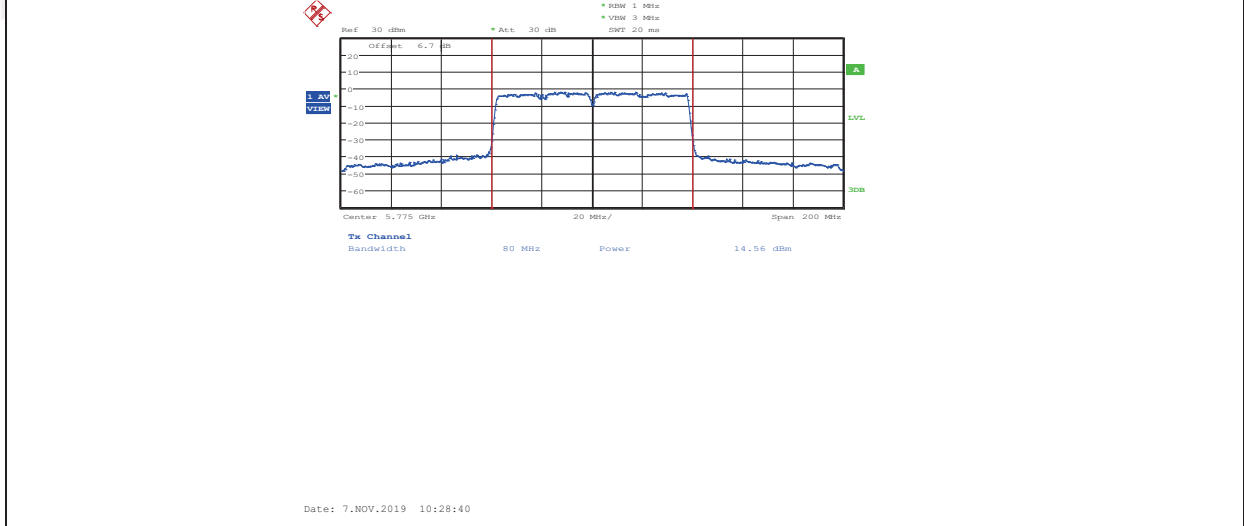
11AC80MIMO ANT2_5610



11AC80MIMO ANT1_5775



11AC80MIMO ANT2_5775



6. Power Spectral Density

6.1. Block diagram of test setup

Same with 4.1

6.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	Other than Mobile and portable:17 dBm/MHz Mobile and portable client devices:11 dBm/MHz	5150-5250
	11 dBm/MHz	5250-5350
	11 dBm/MHz	5470-5725
	30 dBm/500 kHz	5725-5850

Note: For 802.11n and 802.11ac, the EUT incorporates a MIMO function. The Antenna directional gain is 6.48 dBi.
The Power Spectral Density limit is the above limits-(6.48-6)

6.3. Test Procedure

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

Connect the UUT to the spectrum analyser and use the following settings:

5150 MHz~5250 MHz, 5250 MHz~5350 MHz, 5470 MHz~5725 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

5725 MHz-5850 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Note:

1. For UNII-3, according to KDB publication 789033 D02 General U-NII Test Procedures New

Rules v02r01, section II.F.5., it is acceptable to set RBW at 1 MHz and VBW at 3 MHz if the spectrum analyzer does not have 500 kHz RBW.

2. The value measured with RBW=1MHz is to be added with $10\log(500\text{kHz}/1\text{MHz})$ which is - 3dB. For example, if the measured value is +10 dBm using RBW=1 MHz (that is +10 dBm/MHz), then the converted value will be +7 dBm/500 kHz.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

6.4. Test Result

(5150-5250)

Test Mode	Ant	Test Channel	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	ANT1	5180	4.44	11	PASS
11A	ANT2	5180	4.15	11	PASS
11A	ANT1	5200	5.71	11	PASS
11A	ANT2	5200	5.54	11	PASS
11A	ANT1	5240	5.61	11	PASS
11A	ANT2	5240	5.84	11	PASS
11N20MIMO	ANT1	5180	4.60	10.52	PASS
11N20MIMO	ANT2	5180	4.35	10.52	PASS
11N20MIMO	total	5180	7.49	10.52	PASS
11N20MIMO	ANT1	5200	5.71	10.52	PASS
11N20MIMO	ANT2	5200	5.32	10.52	PASS
11N20MIMO	total	5200	8.53	10.52	PASS
11N20MIMO	ANT1	5240	5.32	10.52	PASS
11N20MIMO	ANT2	5240	5.57	10.52	PASS
11N20MIMO	total	5240	8.46	10.52	PASS
11N40MIMO	ANT1	5190	-5.05	10.52	PASS
11N40MIMO	ANT2	5190	-5.37	10.52	PASS
11N40MIMO	total	5190	-2.20	10.52	PASS
11N40MIMO	ANT1	5230	1.67	10.52	PASS
11N40MIMO	ANT2	5230	1.63	10.52	PASS
11N40MIMO	total	5230	4.66	10.52	PASS
11AC20MIMO	ANT1	5180	4.45	10.52	PASS
11AC20MIMO	ANT2	5180	4.12	10.52	PASS
11AC20MIMO	total	5180	7.30	10.52	PASS
11AC20MIMO	ANT1	5200	5.81	10.52	PASS
11AC20MIMO	ANT2	5200	5.09	10.52	PASS
11AC20MIMO	total	5200	8.48	10.52	PASS
11AC20MIMO	ANT1	5240	5.19	10.52	PASS
11AC20MIMO	ANT2	5240	5.08	10.52	PASS

11AC20MIMO	total	5240	8.15	10.52	PASS
11AC40MIMO	ANT1	5190	-2.35	10.52	PASS
11AC40MIMO	ANT2	5190	-3.18	10.52	PASS
11AC40MIMO	total	5190	0.27	10.52	PASS
11AC40MIMO	ANT1	5230	2.54	10.52	PASS
11AC40MIMO	ANT2	5230	1.70	10.52	PASS
11AC40MIMO	total	5230	5.15	10.52	PASS
11AC80MIMO	ANT1	5210	-6.97	10.52	PASS
11AC80MIMO	ANT2	5210	-6.60	10.52	PASS
11AC80MIMO	total	5210	-3.77	10.52	PASS

(5250-5350, 5470-5725)

Test Mode	Ant	Test Channel	PSD [dBm/MHz]	FCC Limit [dBm/MHz]	Verdict
11A	ANT1	5260	5.88	11	PASS
11A	ANT2	5260	6.12	11	PASS
11A	ANT1	5300	5.45	11	PASS
11A	ANT2	5300	5.75	11	PASS
11A	ANT1	5320	3.58	11	PASS
11A	ANT2	5320	4.70	11	PASS
11A	ANT1	5500	2.45	11	PASS
11A	ANT2	5500	3.03	11	PASS
11A	ANT1	5580	2.61	11	PASS
11A	ANT2	5580	2.62	11	PASS
11A	ANT1	5700	2.21	11	PASS
11A	ANT2	5700	2.16	11	PASS
11N20MIMO	ANT1	5260	5.73	10.52	PASS
11N20MIMO	ANT2	5260	6.16	10.52	PASS
11N20MIMO	total	5260	8.96	10.52	PASS
11N20MIMO	ANT1	5300	5.14	10.52	PASS
11N20MIMO	ANT2	5300	5.71	10.52	PASS
11N20MIMO	total	5300	8.44	10.52	PASS
11N20MIMO	ANT1	5320	3.14	10.52	PASS
11N20MIMO	ANT2	5320	4.47	10.52	PASS
11N20MIMO	total	5320	6.87	10.52	PASS
11N20MIMO	ANT1	5500	2.48	10.52	PASS
11N20MIMO	ANT2	5500	2.88	10.52	PASS
11N20MIMO	total	5500	5.69	10.52	PASS
11N20MIMO	ANT1	5580	2.05	10.52	PASS
11N20MIMO	ANT2	5580	2.4	10.52	PASS

11N20MIMO	total	5580	5.24	10.52	PASS
11N20MIMO	ANT1	5700	2.17	10.52	PASS
11N20MIMO	ANT2	5700	2.09	10.52	PASS
11N20MIMO	total	5700	5.14	10.52	PASS
11N40MIMO	ANT1	5270	-0.11	10.52	PASS
11N40MIMO	ANT2	5270	0.11	10.52	PASS
11N40MIMO	total	5270	3.01	10.52	PASS
11N40MIMO	ANT1	5310	-1.25	10.52	PASS
11N40MIMO	ANT2	5310	-1.85	10.52	PASS
11N40MIMO	total	5310	1.47	10.52	PASS
11N40MIMO	ANT1	5510	-2.81	10.52	PASS
11N40MIMO	ANT2	5510	-3.27	10.52	PASS
11N40MIMO	total	5510	-0.02	10.52	PASS
11N40MIMO	ANT1	5550	-0.84	10.52	PASS
11N40MIMO	ANT2	5550	-0.36	10.52	PASS
11N40MIMO	total	5550	2.42	10.52	PASS
11N40MIMO	ANT1	5670	1.71	10.52	PASS
11N40MIMO	ANT2	5670	1.48	10.52	PASS
11N40MIMO	total	5670	4.61	10.52	PASS
11AC20MIMO	ANT1	5260	5.5	10.52	PASS
11AC20MIMO	ANT2	5260	5.69	10.52	PASS
11AC20MIMO	total	5260	8.61	10.52	PASS
11AC20MIMO	ANT1	5300	5.07	10.52	PASS
11AC20MIMO	ANT2	5300	5.36	10.52	PASS
11AC20MIMO	total	5300	8.23	10.52	PASS
11AC20MIMO	ANT1	5320	3.06	10.52	PASS
11AC20MIMO	ANT2	5320	4.38	10.52	PASS
11AC20MIMO	total	5320	6.78	10.52	PASS
11AC20MIMO	ANT1	5500	2.23	10.52	PASS
11AC20MIMO	ANT2	5500	2.36	10.52	PASS
11AC20MIMO	total	5500	5.31	10.52	PASS
11AC20MIMO	ANT1	5580	2.17	10.52	PASS
11AC20MIMO	ANT2	5580	2.26	10.52	PASS
11AC20MIMO	total	5580	5.23	10.52	PASS
11AC20MIMO	ANT1	5700	2.02	10.52	PASS
11AC20MIMO	ANT2	5700	1.91	10.52	PASS
11AC20MIMO	total	5700	4.98	10.52	PASS
11AC40MIMO	ANT1	5270	0.15	10.52	PASS
11AC40MIMO	ANT2	5270	-0.19	10.52	PASS

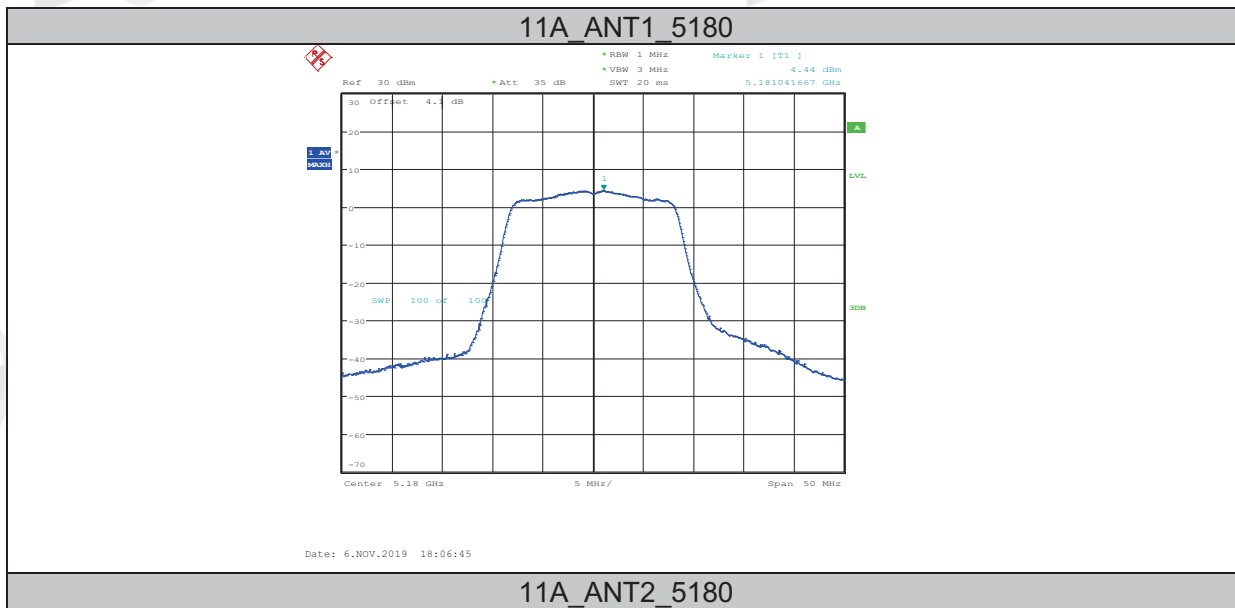
11AC40MIMO	total	5270	2.99	10.52	PASS
11AC40MIMO	ANT1	5310	-0.91	10.52	PASS
11AC40MIMO	ANT2	5310	-1.82	10.52	PASS
11AC40MIMO	total	5310	1.67	10.52	PASS
11AC40MIMO	ANT1	5510	-2.47	10.52	PASS
11AC40MIMO	ANT2	5510	-3	10.52	PASS
11AC40MIMO	total	5510	0.28	10.52	PASS
11AC40MIMO	ANT1	5550	-0.04	10.52	PASS
11AC40MIMO	ANT2	5550	-0.57	10.52	PASS
11AC40MIMO	total	5550	2.71	10.52	PASS
11AC40MIMO	ANT1	5670	2.27	10.52	PASS
11AC40MIMO	ANT2	5670	1.41	10.52	PASS
11AC40MIMO	total	5670	4.87	10.52	PASS
11AC80MIMO	ANT1	5290	-6.5	10.52	PASS
11AC80MIMO	ANT2	5290	-3.99	10.52	PASS
11AC80MIMO	total	5290	-2.06	10.52	PASS
11AC80MIMO	ANT1	5530	-8.02	10.52	PASS
11AC80MIMO	ANT2	5530	-5.84	10.52	PASS
11AC80MIMO	total	5530	-3.78	10.52	PASS
11AC80MIMO	ANT1	5610	-3.42	10.52	PASS
11AC80MIMO	ANT2	5610	-1.77	10.52	PASS
11AC80MIMO	total	5610	0.49	10.52	PASS

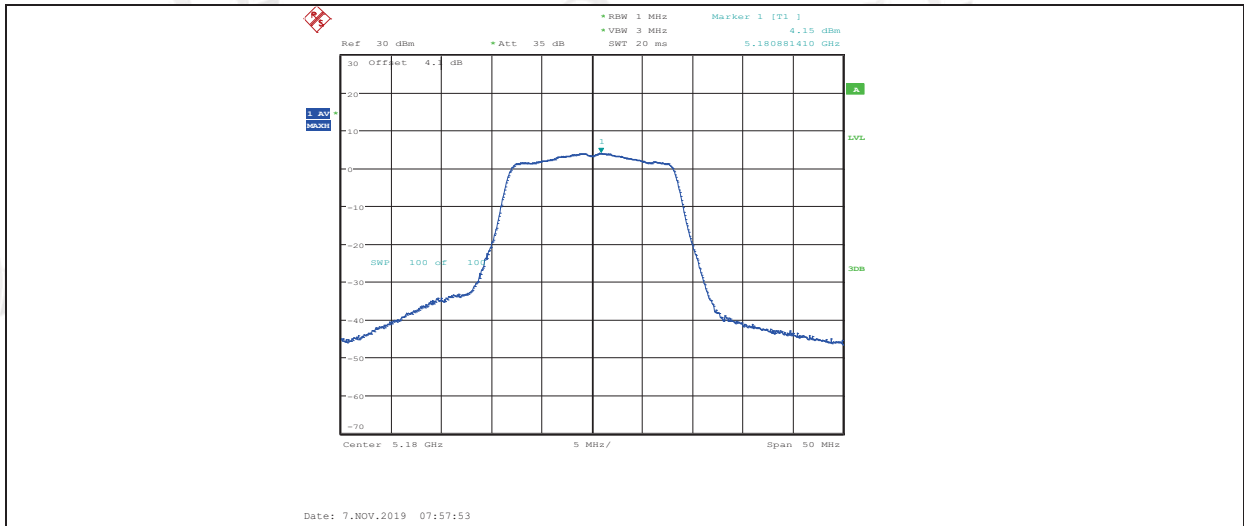
(5725-5850)

Test Mode	Test Channel	Ant	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
11A	ANT1	5745	-0.72	30	PASS
11A	ANT2	5745	-0.53	30	PASS
11A	ANT1	5785	-0.2	30	PASS
11A	ANT2	5785	-0.36	30	PASS
11A	ANT1	5825	-0.83	30	PASS
11A	ANT2	5825	-0.6	30	PASS
11N20MIMO	ANT1	5745	-0.25	29.52	PASS
11N20MIMO	ANT2	5745	-0.42	29.52	PASS
11N20MIMO	total	5745	2.68	29.52	PASS
11N20MIMO	ANT1	5785	-0.17	29.52	PASS
11N20MIMO	ANT2	5785	-0.18	29.52	PASS
11N20MIMO	total	5785	2.84	29.52	PASS
11N20MIMO	ANT1	5825	-0.6	29.52	PASS

11N20MIMO	ANT2	5825	-0.46	29.52	PASS
11N20MIMO	total	5825	2.48	29.52	PASS
11N40MIMO	ANT1	5755	-0.36	29.52	PASS
11N40MIMO	ANT2	5755	-0.37	29.52	PASS
11N40MIMO	total	5755	2.65	29.52	PASS
11N40MIMO	ANT1	5795	-0.97	29.52	PASS
11N40MIMO	ANT2	5795	-0.79	29.52	PASS
11N40MIMO	total	5795	2.13	29.52	PASS
11AC20MIMO	ANT1	5745	-0.4	29.52	PASS
11AC20MIMO	ANT2	5745	-0.46	29.52	PASS
11AC20MIMO	total	5745	2.58	29.52	PASS
11AC20MIMO	ANT1	5785	-0.58	29.52	PASS
11AC20MIMO	ANT2	5785	0.05	29.52	PASS
11AC20MIMO	total	5785	2.76	29.52	PASS
11AC20MIMO	ANT1	5825	-0.94	29.52	PASS

6.5. Original test data





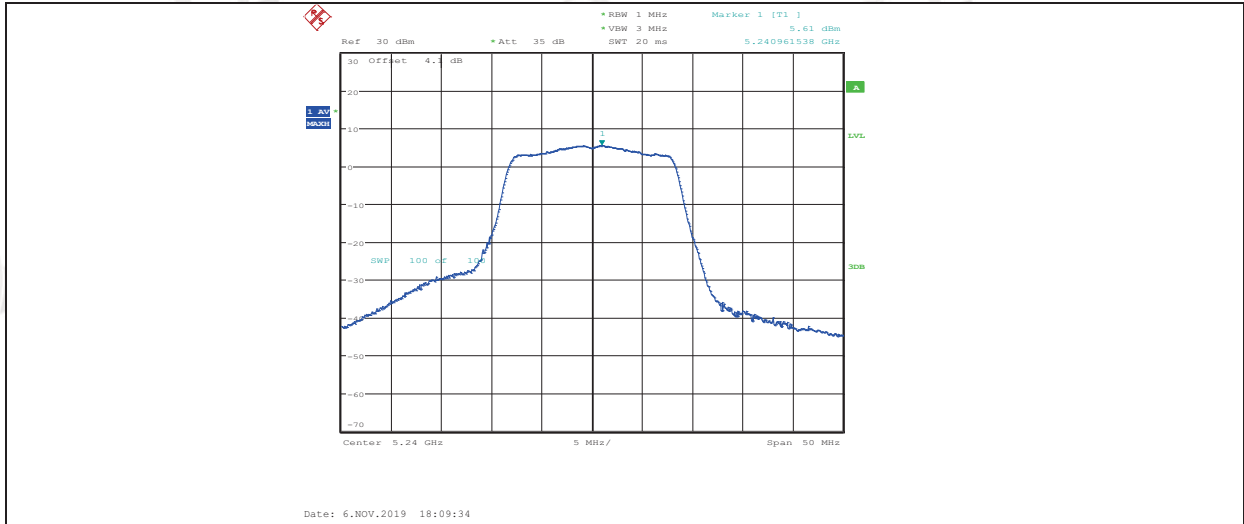
11A ANT1 5200



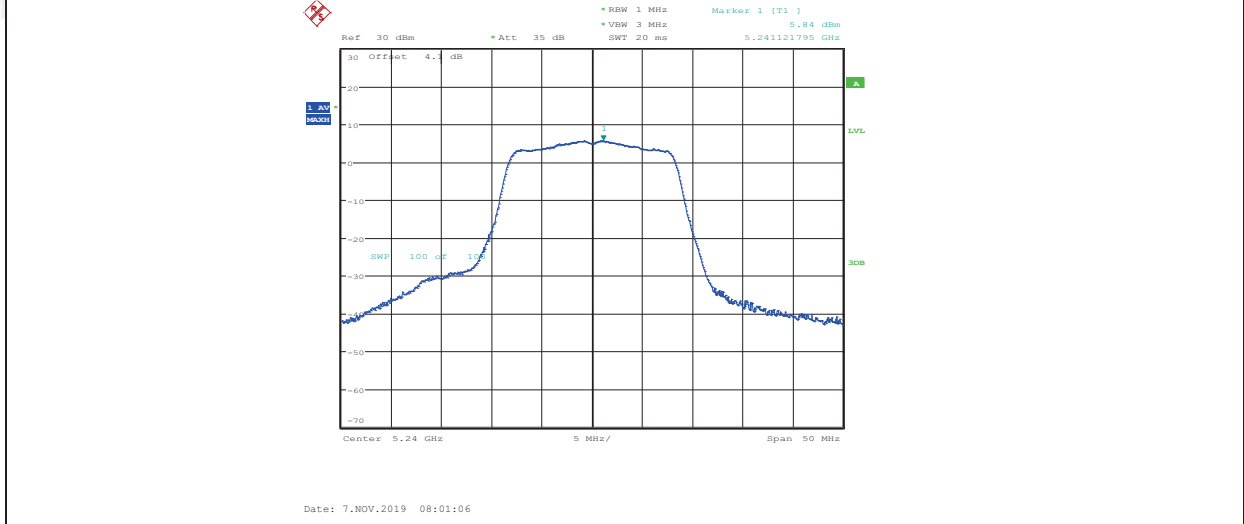
11A ANT2 5200



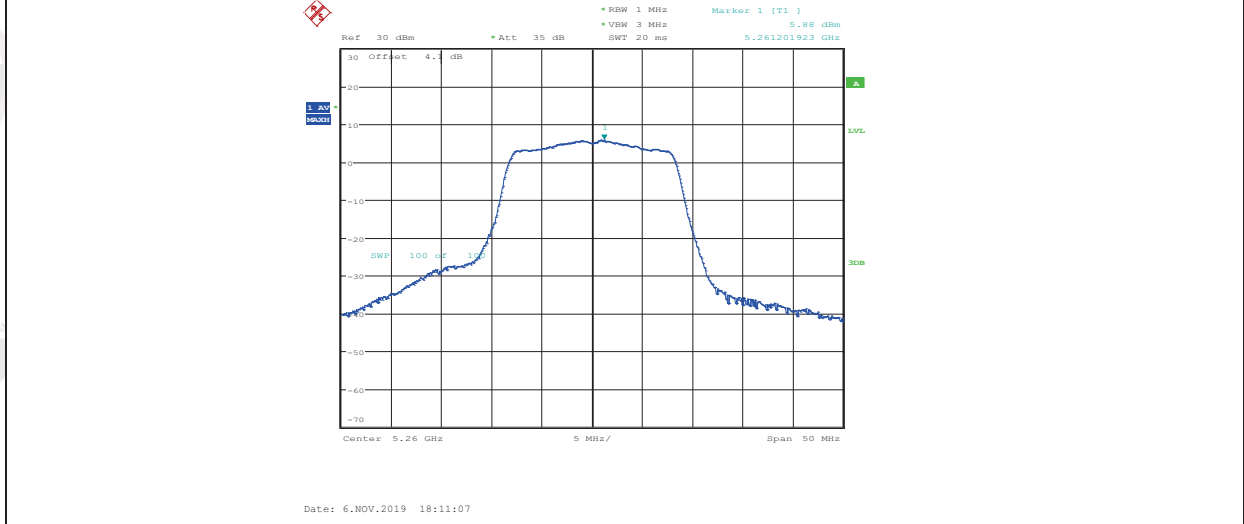
11A ANT1 5240



11A ANT2 5240



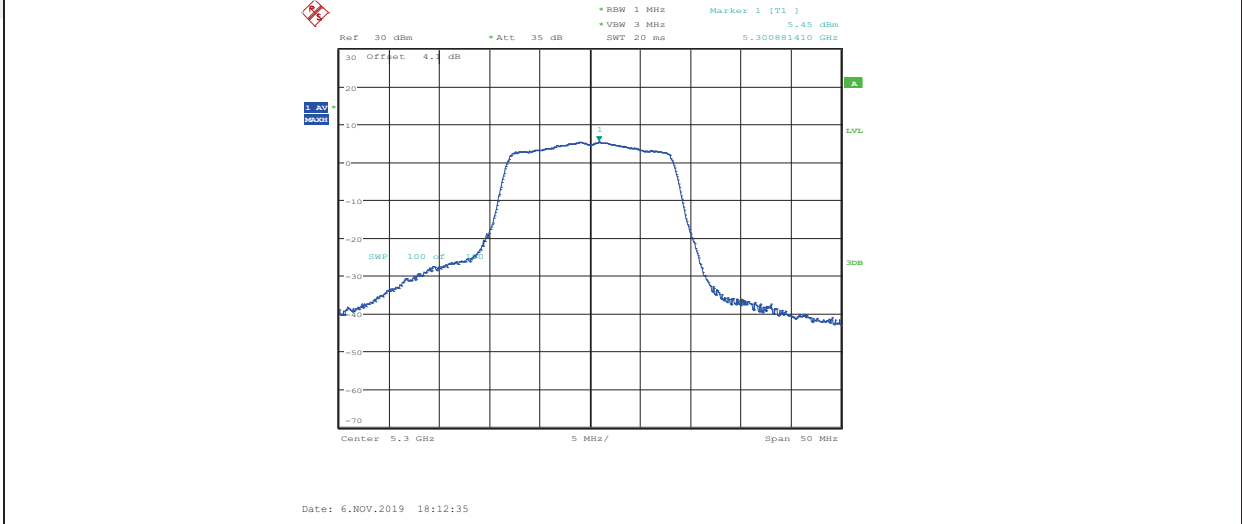
11A ANT1 5260



11A ANT2 5260



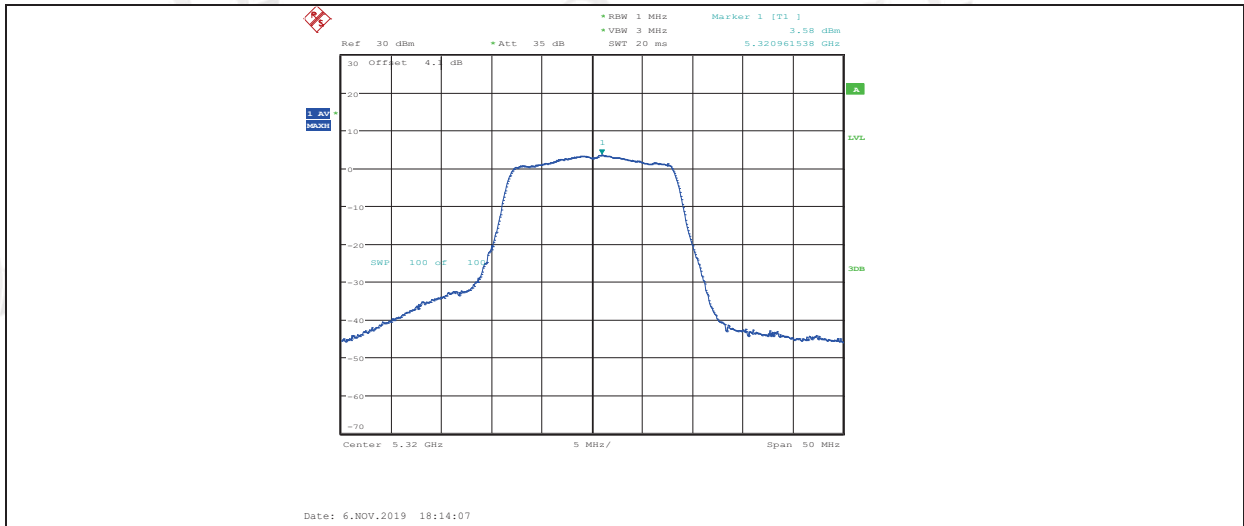
11A ANT1 5300



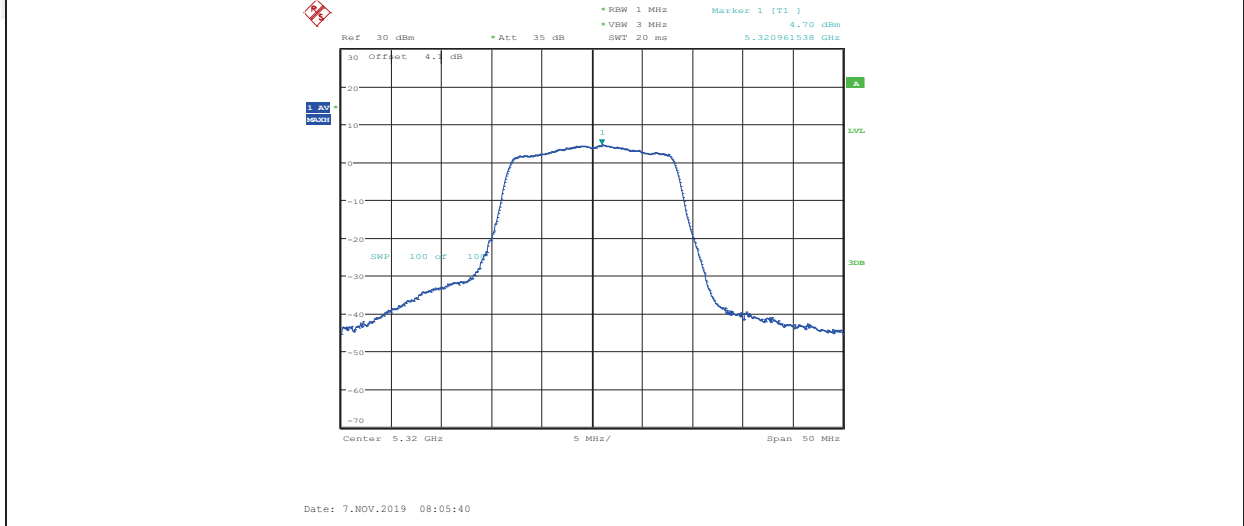
11A ANT2 5300



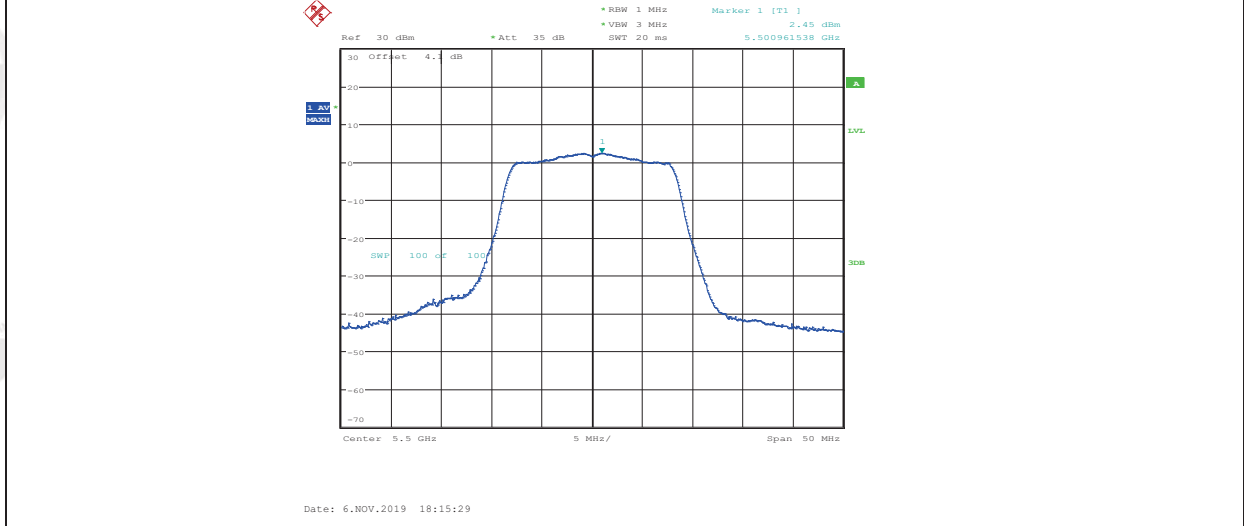
11A ANT1 5320



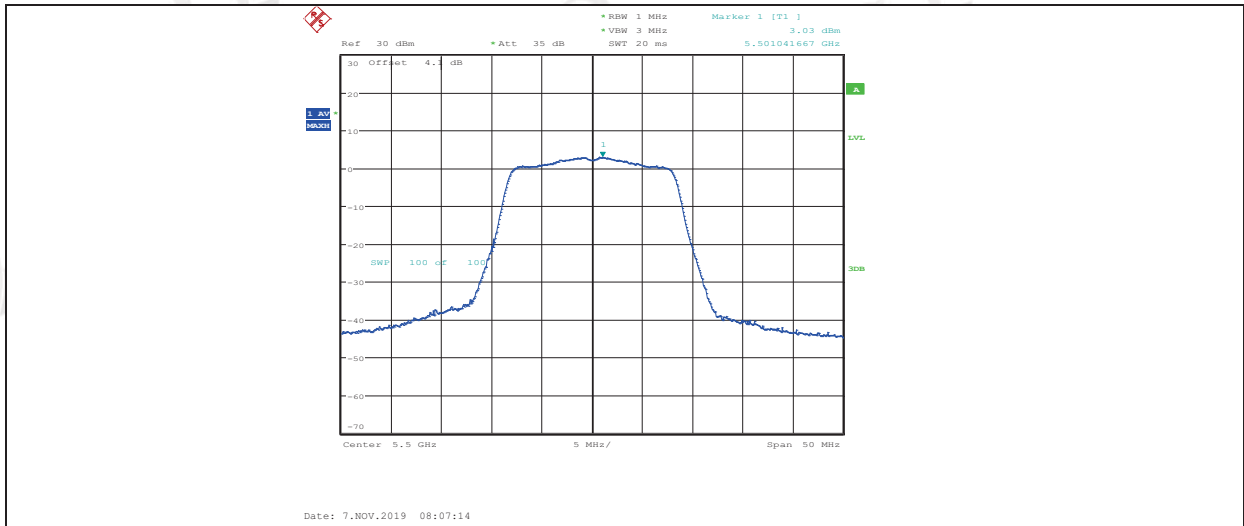
11A ANT2 5320



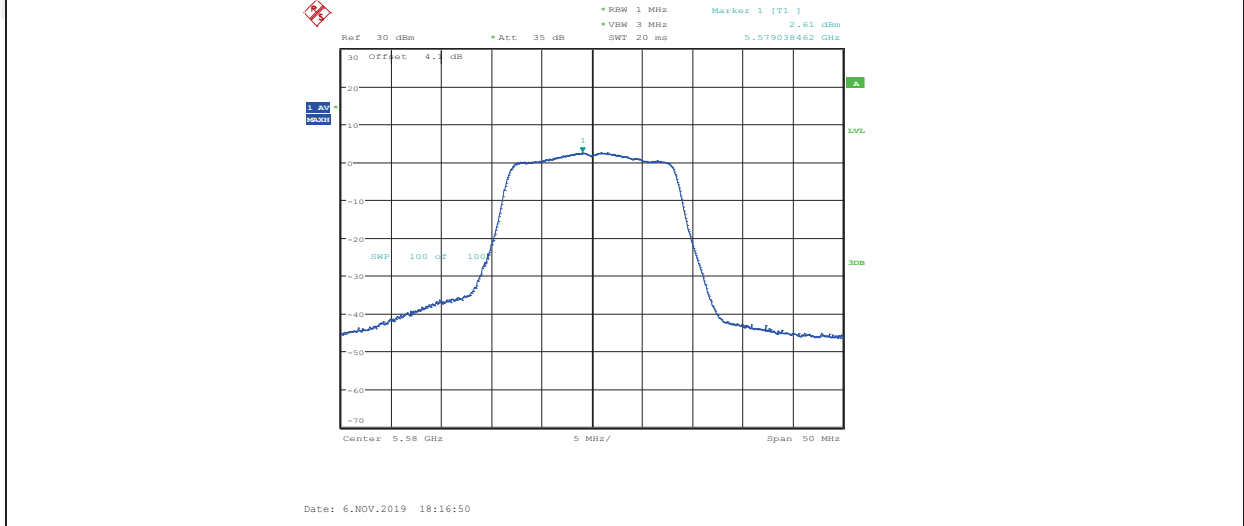
11A ANT1 5500



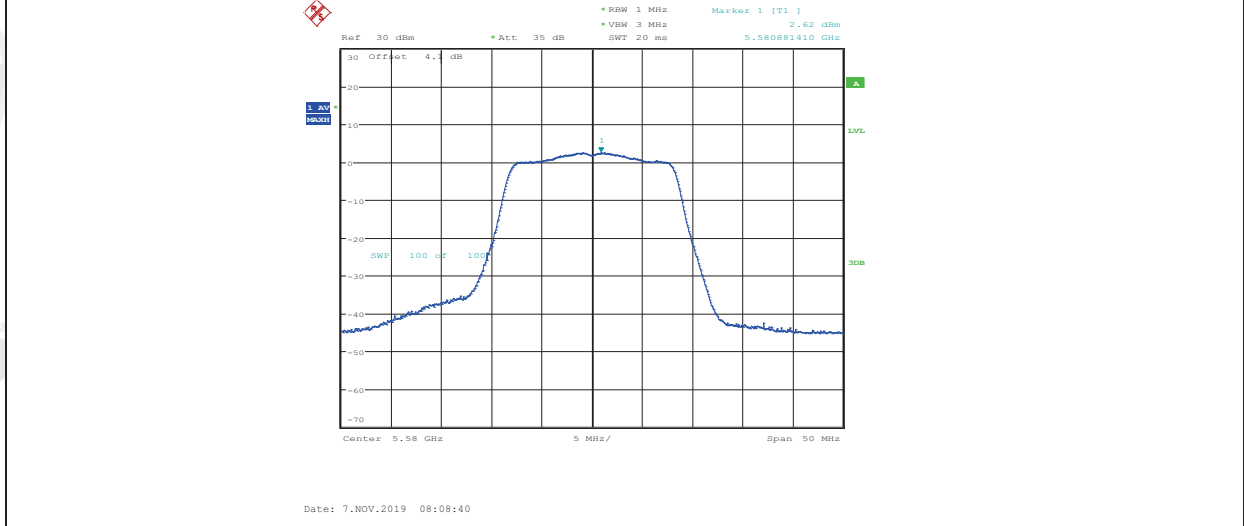
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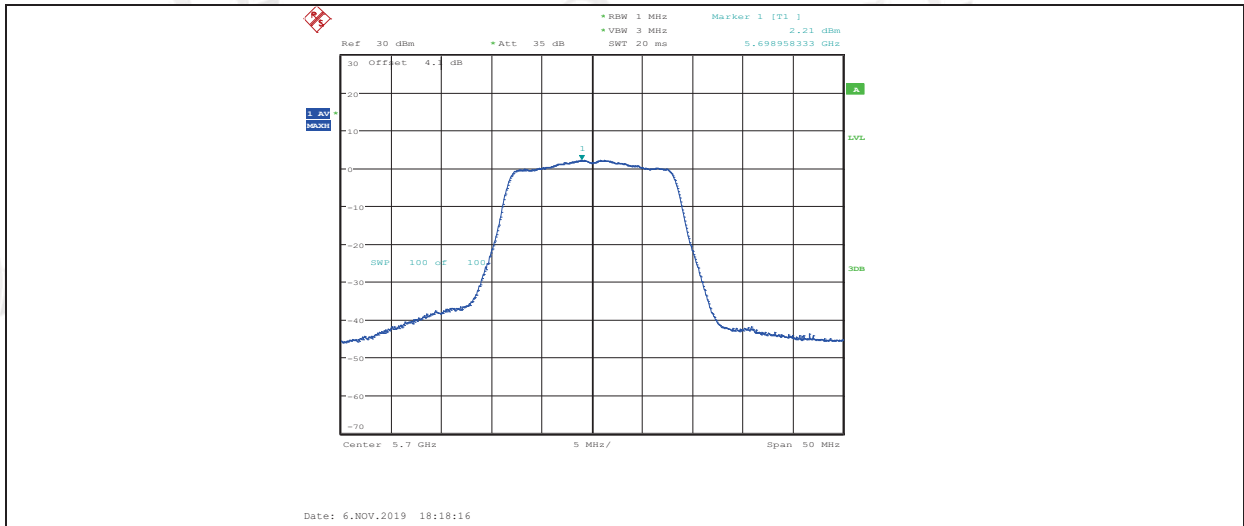
11A ANT1 5580



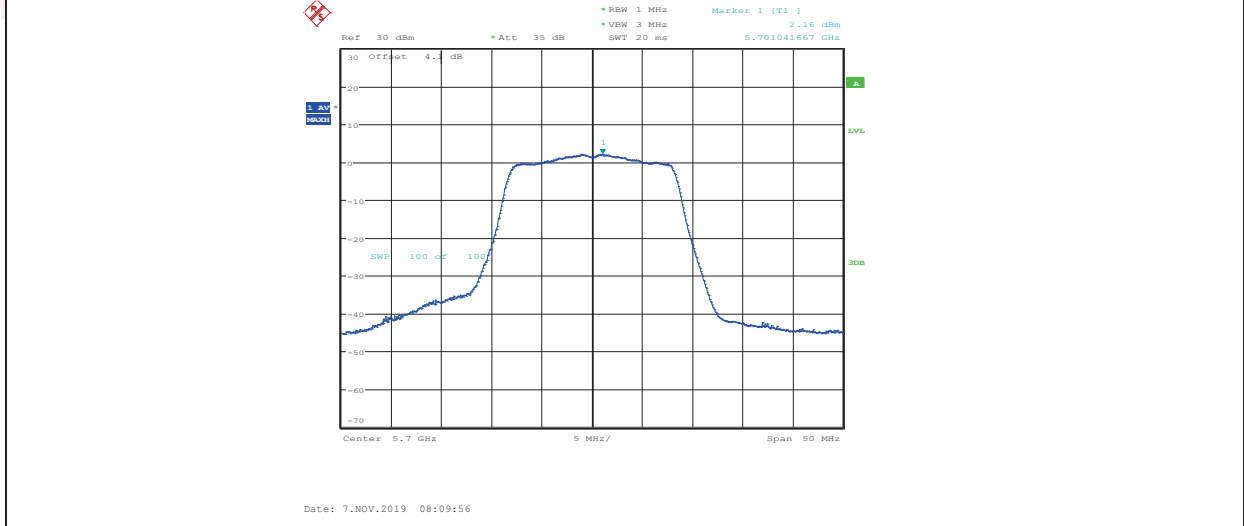
11A ANT2 5580



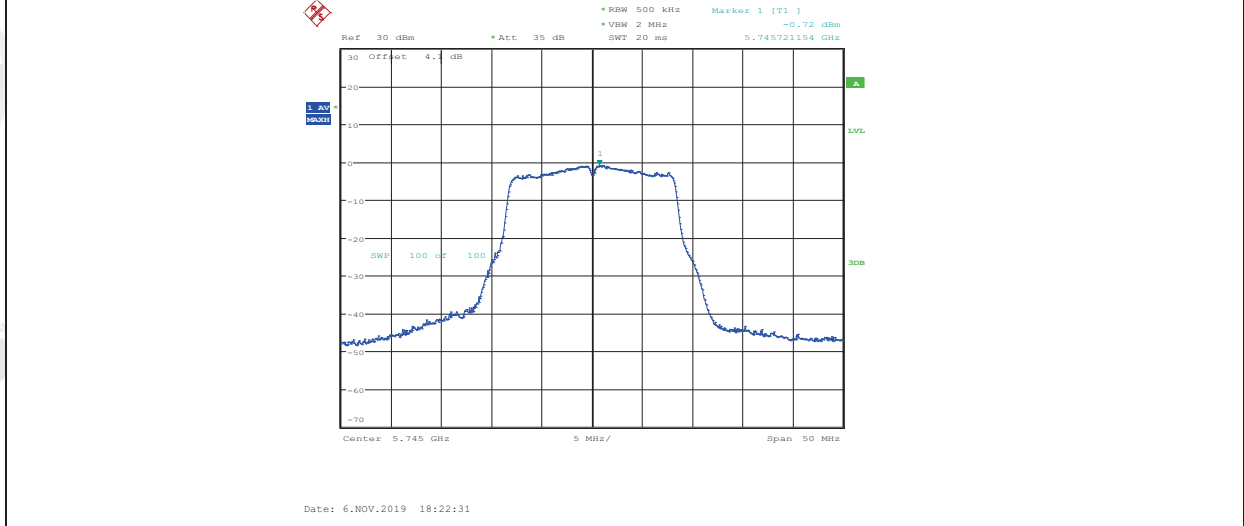
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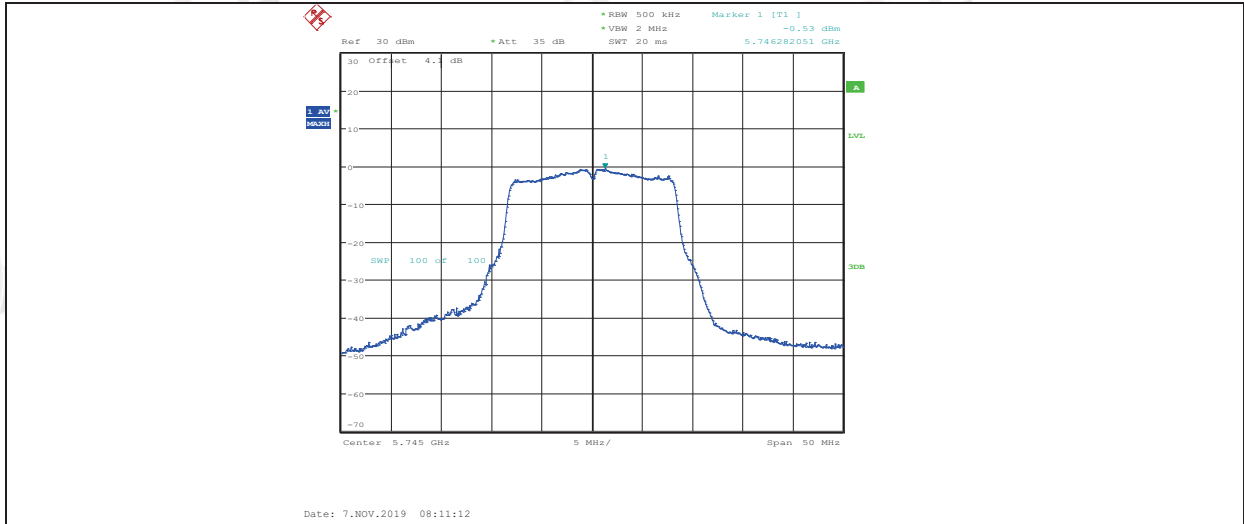
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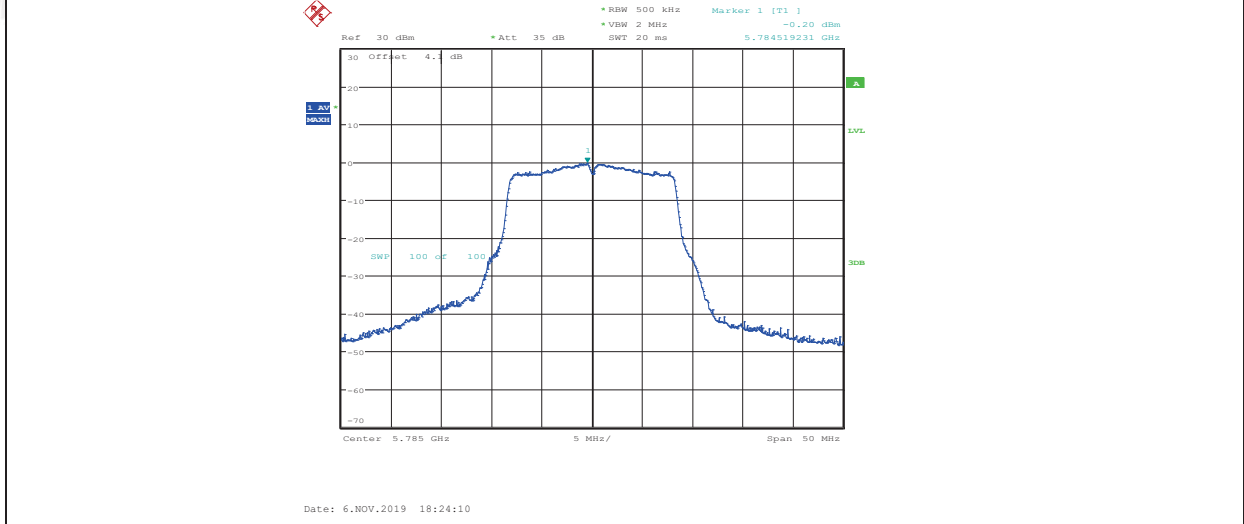
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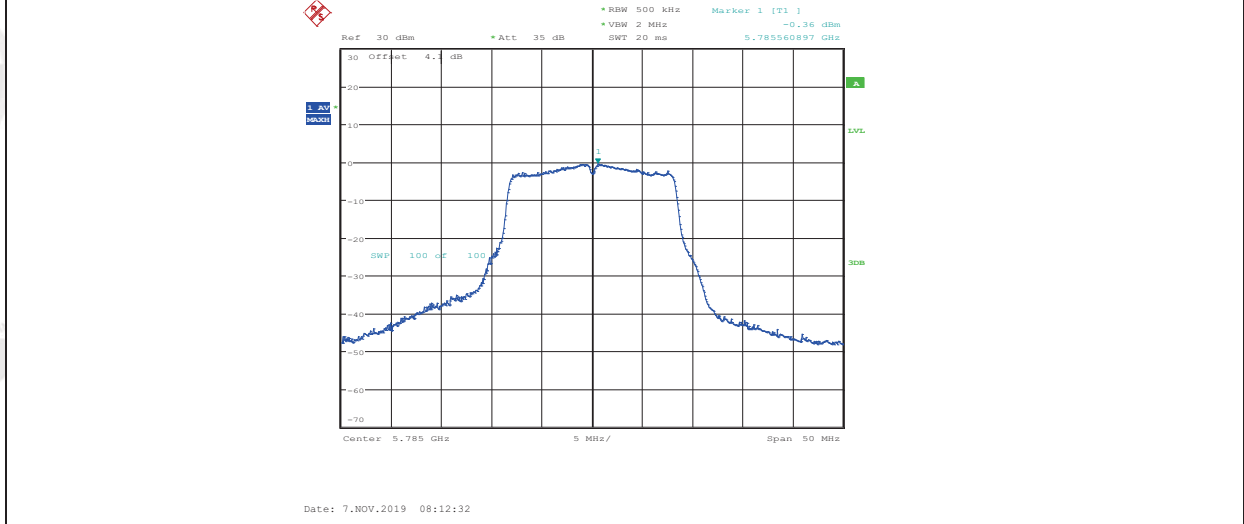
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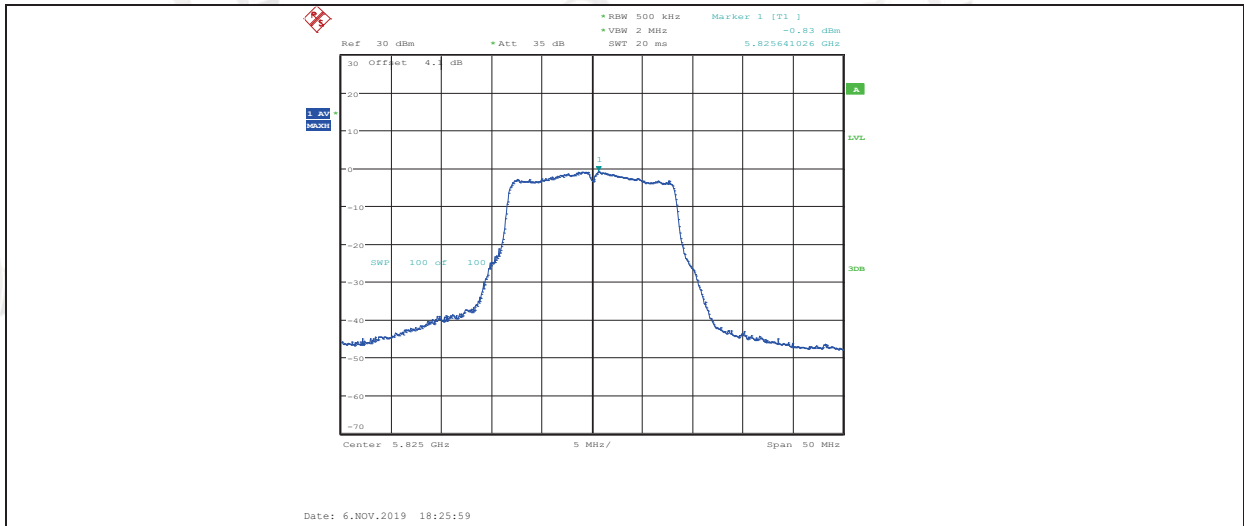
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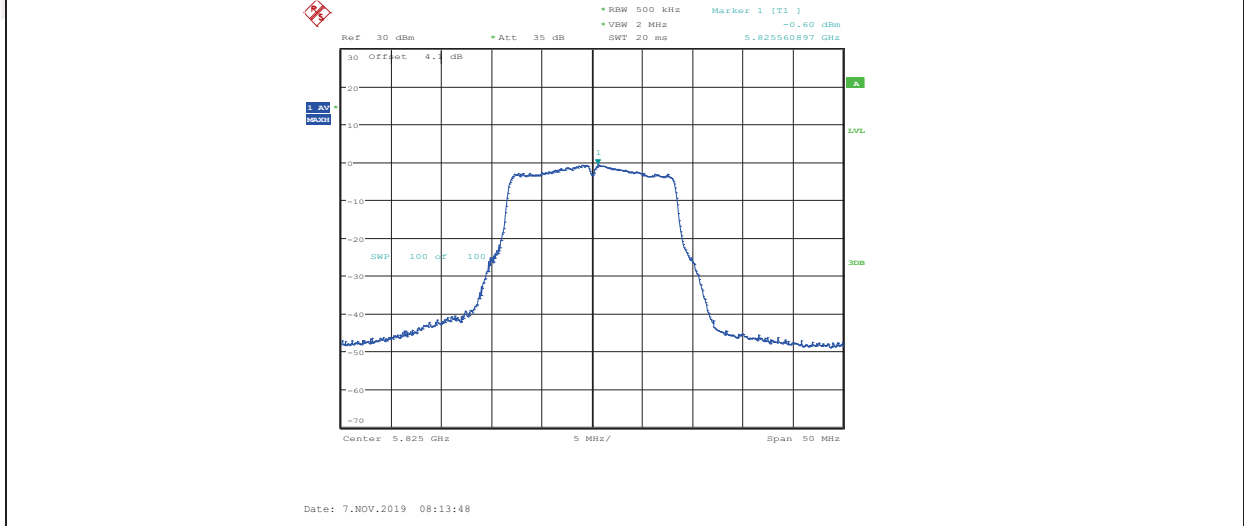
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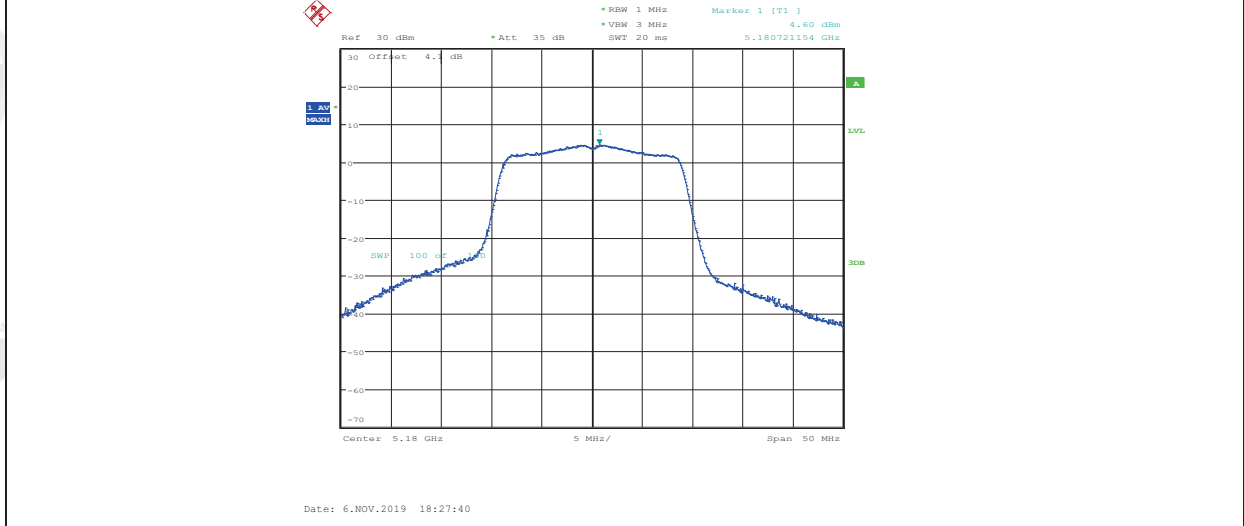
11A ANT1 5825



11A ANT2 5825



11N20MIMO ANT1 5180



11N20MIMO ANT2 5180