

## FCC AND IC CERTIFICATION TEST REPORT

### FOR

<b>Applicant</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
<b>Equipment under Test</b>	:	JBL Bar 5.1 Surround with wireless subwoofer
<b>Model No.</b>	:	BAR 5.1 CNTR
<b>Trade Mark</b>	:	JBL
<b>FCC ID</b>	:	APIBAR51CNTR
<b>IC</b>	:	6132A-BAR51CNTR
<b>Manufacturer</b>	:	Harman International Industries, Inc.
<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

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

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## TEST REPORT DECLARE

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<b>Address</b>	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

**Test Standard Used:** FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

**Test procedure used:** ANSI C63.10:2013, 789033 D02 General U-NII Test Procedures New Rules v02r01, RSS-Gen Issue 5, Apr. 2018, 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&IC standards.**

<b>Report No:</b>	DDT-R18112315-1E7		
<b>Date of Receipt:</b>	Apr. 23, 2019	<b>Date of Test:</b>	Apr. 23, 2019 ~ May 20, 2019

**Prepared By:**

*Sam Li*

**Sam Li/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	May 20, 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) RSS-247 Clause 6.2	PASS
Maximum Conducted Output Power	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
Power Spectral Density	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
Frequency Stability Measurement	FCC 15.407 (g)	PASS
Emissions in restricted frequency bands	FCC 15.407 (a) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	PASS
Band Edge Compliance	FCC 15.407 (a) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	PASS
Power Line Conducted Emission	FCC 15.207 RSS-GEN Clause 8.8	PASS
Antenna requirement	FCC 15.203 RSS-GEN Clause 8.3	PASS
Dynamic Frequency Selection	FCC 15.407 (h) RSS-247 Clause 6.3	PASS

## 2. General test information

### 2.1. Description of EUT

EUT* Name	: JBL Bar 5.1 Surround with wireless subwoofer
Model Number	: BAR 5.1 CNTR
EUT function description	: Please reference user manual of this device
Power supply	: 100-240V~, 50/60Hz, 175W
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: External FPC antenna, maximum PK gain: 3.32 dBi Antenna 2: External FPC 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	3.32	3.68	/
IEEE 802.11n HT20	3.32	3.68	6.51
IEEE 802.11n HT40	3.32	3.68	6.51
IEEE 802.11ac VHT20	3.32	3.68	6.51
IEEE 802.11ac VHT40	3.32	3.68	6.51
IEEE 802.11ac VHT80	3.32	3.68	6.51

## 2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Serial No.	Other
AC cable	Harman	N/A	N/A	Length: 1.5m, unshielded
HDMI cable	Harman	N/A	N/A	Length: 1.2m, shielded, two core

## 2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
Notebook	DELL	Latitude D610	FCC DOC	00045-534-136-300
Wireless LAN Access Point	HUAWEI	AP6050	21500829352SC5000371	FCC ID: QISAP6050DN6150DN

## 2.4. Block diagram of EUT configuration for test



EUT was connected to control to provide by manufacturer which has a standard LAN port connector to connect to Notebook, and the Notebook will run a special test software “adb.EXE” provided by manufacturer to control EUT work in Continuous Tx mode (>98% duty cycle), 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	13	54	Low: CH36	5180
	13	54	Middle: CH40	5200
	13	54	High: CH48	5240
	15	54	Low: CH52	5260
	15	54	Middle: CH56	5280
	15	54	High: CH64	5320
	15	54	Low: CH100	5500
	15	54	Middle: CH116	5580
	15	54	High: CH140	5700
	15	54	Low: CH149	5745
	15	54	Middle: CH157	5785
	15	54	High: CH165	5825
IEEE 802.11n HT20	12	MCS 7	Low: CH36	5180
	12	MCS 7	Middle: CH40	5200
	12	MCS 7	High: CH48	5240
	15	MCS 7	Low: CH52	5260
	15	MCS 7	Middle: CH56	5280
	15	MCS 7	High: CH64	5320
	15	MCS 7	Low: CH100	5500
	15	MCS 7	Middle: CH116	5580
	15	MCS 7	High: CH140	5700
	15	MCS 7	Low: CH149	5745
	15	MCS 7	Middle: CH157	5785
	15	MCS 7	High: CH165	5825
IEEE 802.11n HT40	13	MCS 7	Low: CH38	5190
	13	MCS 7	Middle: CH46	5230
	15	MCS 7	High: CH54	5270
	15	MCS 7	Low: CH62	5310
	15	MCS 7	Middle: CH102	5510
	15	MCS 7	High: CH110	5550
	15	MCS 7	Low: CH134	5670
	15	MCS 7	Middle: CH151	5755
	15	MCS 7	High: CH159	5795
IEEE 802.11ac HT20	10	MCS 8	Low: CH36	5180
	10	MCS 8	Middle: CH40	5200
	10	MCS 8	High: CH48	5240
	15	MCS 8	Low: CH52	5260
	15	MCS 8	Middle: CH56	5280
	15	MCS 8	High: CH64	5320
	15	MCS 8	Low: CH100	5500
	14	MCS 8	Middle: CH116	5580
	15	MCS 8	High: CH140	5700
	15	MCS 8	Low: CH149	5745
	15	MCS 8	Middle: CH157	5785
	15	MCS 8	High: CH165	5825

IEEE 802.11ac HT40	13	MCS 9	Low: CH38	5190
	13	MCS 9	Middle: CH46	5230
	15	MCS 9	High: CH54	5270
	15	MCS 9	Low: CH62	5310
	15	MCS 9	Middle: CH102	5510
	15	MCS 9	High: CH110	5550
	15	MCS 9	Low: CH134	5670
	15	MCS 9	Middle: CH151	5755
	15	MCS 9	High: CH159	5795
IEEE 802.11ac HT80	13	MCS 9	CH42	5210
	15	MCS 9	CH58	5290
	15	MCS 9	CH106	5530
	15	MCS 9	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,  
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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

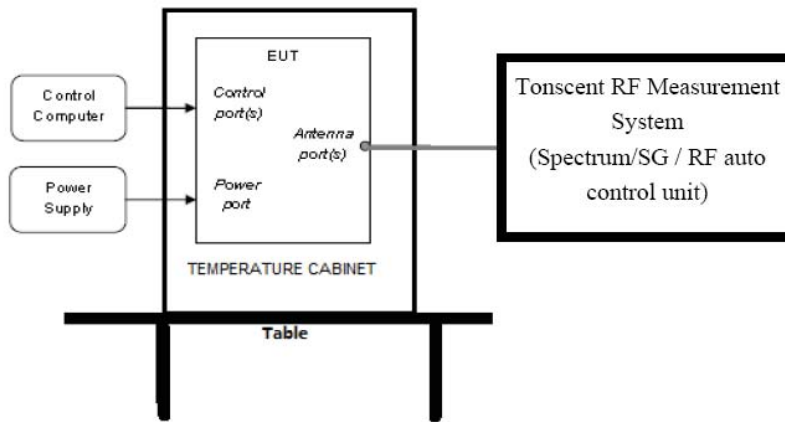
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB (10 MHz ≤ f < 3.6 GHz);
	1.38 dB (3.6 GHz ≤ f < 8 GHz)
Frequencies Stability	6.7 x 10 <sup>-8</sup> (Antenna couple method)
	5.5 x 10 <sup>-8</sup> (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 <sup>-8</sup>
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
<b>RF Connected Test (Tonscend RF Measurement System)</b>					
Spectrum analyzer	R&S	FSU26	200071	Oct. 12, 2018	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	Jun. 29, 2018	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Oct. 12, 2018	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jun. 29, 2018	1 Year
Power Sensor	Agilent	U2021XA	MY55150010	Oct. 21, 2018	1 Year
Power Sensor	Agilent	U2021XA	MY55150011	Oct. 23, 2018	1 Year
DC Power Source	MATRIS	MPS-3005L-3	D813058W	Aug. 18, 2018	1 Year
Attenuator	Mini-Circuits	BW-S10W2	101109	Aug. 18, 2018	1 Year
RF Cable	Micable	C10-01-01-1	100309	Oct. 21, 2018	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	Oct. 21, 2018	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.7	N/A	N/A
<b>Radiation 1#chamber</b>					
EMI Test Receiver	R&S	ESU8	100316	Oct. 12, 2018	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jun. 29, 2018	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Nov. 09, 2018	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Oct. 20, 2018	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Nov. 16, 2018	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	Oct. 25, 2018	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Oct. 12, 2018	1 Year
Pre-amplifier	TERA-MW	TRLA-0040 G35	101303	Oct. 12, 2018	1 Year
RF Cable	HUBSER	CP-X2+ CP-X1	W11.03+ W12.02	Oct. 21, 2018	1 Year
RF Cable	N/A	SMAJ-SMA J-1M+ 11M	17070133+17070131	Nov. 08, 2018	1 Year
MI Cable	HUBSER	C10-01-01-1 M	1091629	Oct. 21, 2018	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
<b>Power Line Conducted Emissions Test</b>					
EMI Test Receiver	R&S	ESU8	100316	Oct. 21, 2018	1 Year
LISN 1	R&S	ENV216	101109	Oct. 21, 2018	1 Year
LISN 2	R&S	ESH2-Z5	100309	Oct. 21, 2018	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Oct. 21, 2018	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Oct. 21, 2018	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/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	For FCC:5470-5725 For IC:5470-5600 5650-5725
	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	16.56	19.950	---	PASS
11A	ANT2	5180	16.59	19.470	---	PASS
11A	ANT1	5200	16.56	19.770	---	PASS
11A	ANT2	5200	16.56	19.950	---	PASS
11A	ANT1	5240	16.56	19.800	---	PASS
11A	ANT2	5240	16.53	19.830	---	PASS
11A	ANT1	5260	16.59	19.980	---	PASS
11A	ANT2	5260	16.56	19.740	---	PASS
11A	ANT1	5280	16.56	19.650	---	PASS
11A	ANT2	5280	16.56	19.890	---	PASS
11A	ANT1	5320	16.53	19.890	---	PASS
11A	ANT2	5320	16.56	19.800	---	PASS
11A	ANT1	5500	16.59	19.860	---	PASS
11A	ANT2	5500	16.56	19.830	---	PASS
11A	ANT1	5580	16.59	19.890	---	PASS
11A	ANT2	5580	16.56	19.740	---	PASS
11A	ANT1	5700	16.59	19.770	---	PASS
11A	ANT2	5700	16.50	19.740	---	PASS
11A	ANT1	5745	16.38	16.050	0.5	PASS
11A	ANT2	5745	16.32	15.180	0.5	PASS
11A	ANT1	5785	16.38	15.780	0.5	PASS
11A	ANT2	5785	16.35	15.210	0.5	PASS
11A	ANT1	5825	16.38	15.750	0.5	PASS
11A	ANT2	5825	16.38	16.410	0.5	PASS
11N20MIMO	ANT1	5180	17.67	20.460	---	PASS
11N20MIMO	ANT2	5180	17.55	20.070	---	PASS
11N20MIMO	ANT1	5200	17.73	20.460	---	PASS
11N20MIMO	ANT2	5200	17.55	20.790	---	PASS
11N20MIMO	ANT1	5240	17.73	20.430	---	PASS
11N20MIMO	ANT2	5240	17.55	20.550	---	PASS
11N20MIMO	ANT1	5260	17.76	20.430	---	PASS
11N20MIMO	ANT2	5260	17.58	20.580	---	PASS
11N20MIMO	ANT1	5280	17.73	20.430	---	PASS
11N20MIMO	ANT2	5280	17.58	20.700	---	PASS
11N20MIMO	ANT1	5320	17.73	20.640	---	PASS
11N20MIMO	ANT2	5320	17.58	20.550	---	PASS

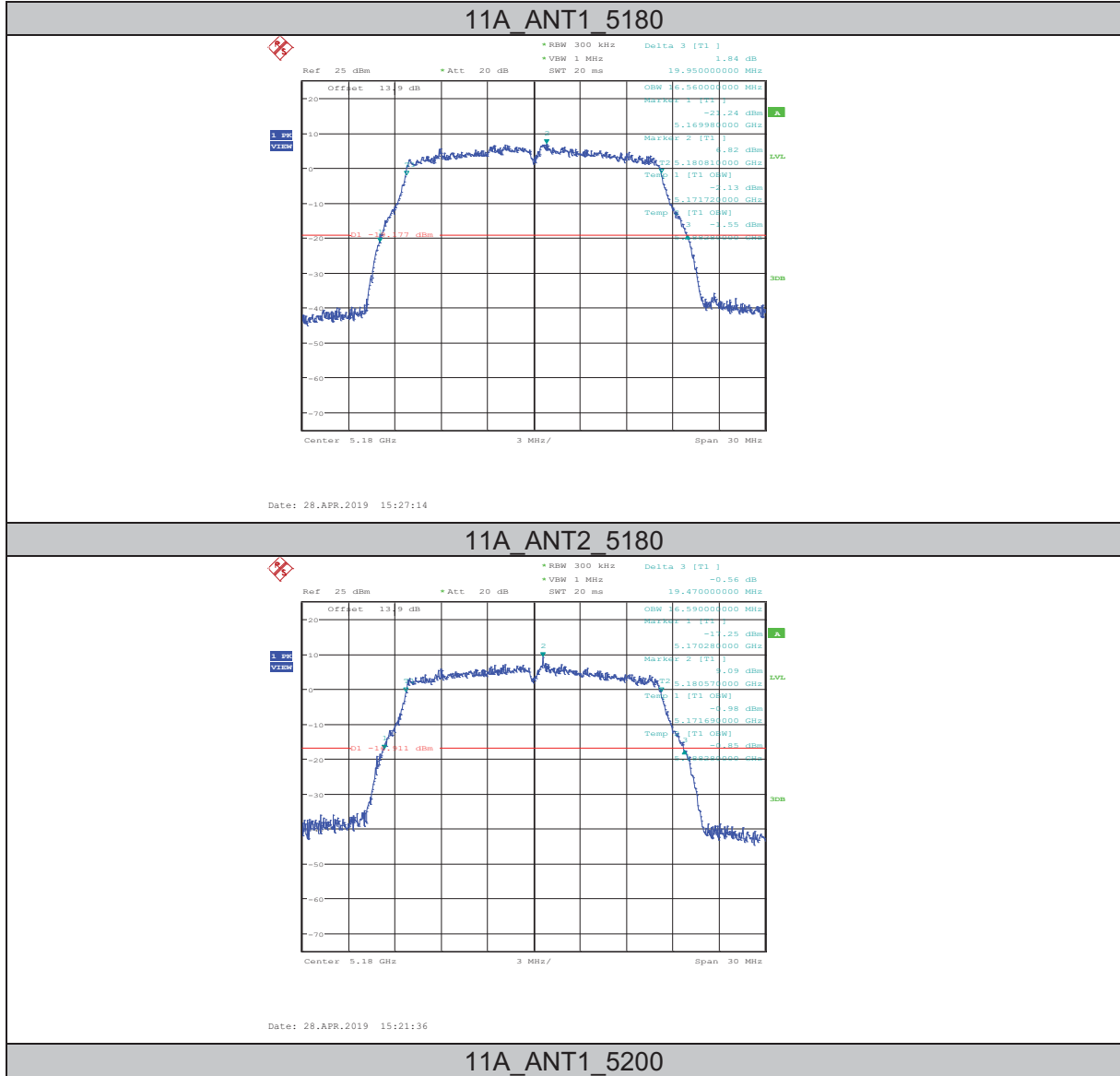
11N20MIMO	ANT1	5500	17.79	25.830	---	PASS
11N20MIMO	ANT2	5500	17.61	22.170	---	PASS
11N20MIMO	ANT1	5580	17.82	24.060	---	PASS
11N20MIMO	ANT2	5580	17.64	25.500	---	PASS
11N20MIMO	ANT1	5700	17.76	20.850	---	PASS
11N20MIMO	ANT2	5700	17.52	20.430	---	PASS
11N20MIMO	ANT1	5745	17.55	15.120	0.5	PASS
11N20MIMO	ANT2	5745	17.49	15.750	0.5	PASS
11N20MIMO	ANT1	5785	17.58	14.310	0.5	PASS
11N20MIMO	ANT2	5785	17.55	15.750	0.5	PASS
11N20MIMO	ANT1	5825	17.52	15.120	0.5	PASS
11N20MIMO	ANT2	5825	17.55	15.960	0.5	PASS
11N40MIMO	ANT1	5190	36.36	40.800	---	PASS
11N40MIMO	ANT2	5190	36.36	40.560	---	PASS
11N40MIMO	ANT1	5230	36.30	40.860	---	PASS
11N40MIMO	ANT2	5230	36.36	40.380	---	PASS
11N40MIMO	ANT1	5270	36.30	40.800	---	PASS
11N40MIMO	ANT2	5270	36.30	40.380	---	PASS
11N40MIMO	ANT1	5310	36.24	40.860	---	PASS
11N40MIMO	ANT2	5310	36.24	40.440	---	PASS
11N40MIMO	ANT1	5510	36.42	46.980	---	PASS
11N40MIMO	ANT2	5510	36.24	40.200	---	PASS
11N40MIMO	ANT1	5550	36.48	45.360	---	PASS
11N40MIMO	ANT2	5550	36.36	40.440	---	PASS
11N40MIMO	ANT1	5670	36.36	46.860	---	PASS
11N40MIMO	ANT2	5670	36.48	47.100	---	PASS
11N40MIMO	ANT1	5755	35.94	35.160	0.5	PASS
11N40MIMO	ANT2	5755	35.94	35.220	0.5	PASS
11N40MIMO	ANT1	5795	36.00	35.280	0.5	PASS
11N40MIMO	ANT2	5795	35.94	35.220	0.5	PASS
11AC20MIMO	ANT1	5180	17.64	20.100	---	PASS
11AC20MIMO	ANT2	5180	17.61	20.130	---	PASS
11AC20MIMO	ANT1	5200	17.64	20.070	---	PASS
11AC20MIMO	ANT2	5200	17.61	20.190	---	PASS
11AC20MIMO	ANT1	5240	17.58	20.070	---	PASS
11AC20MIMO	ANT2	5240	17.64	20.070	---	PASS
11AC20MIMO	ANT1	5260	17.67	20.130	---	PASS
11AC20MIMO	ANT2	5260	17.64	20.100	---	PASS
11AC20MIMO	ANT1	5280	17.64	20.160	---	PASS

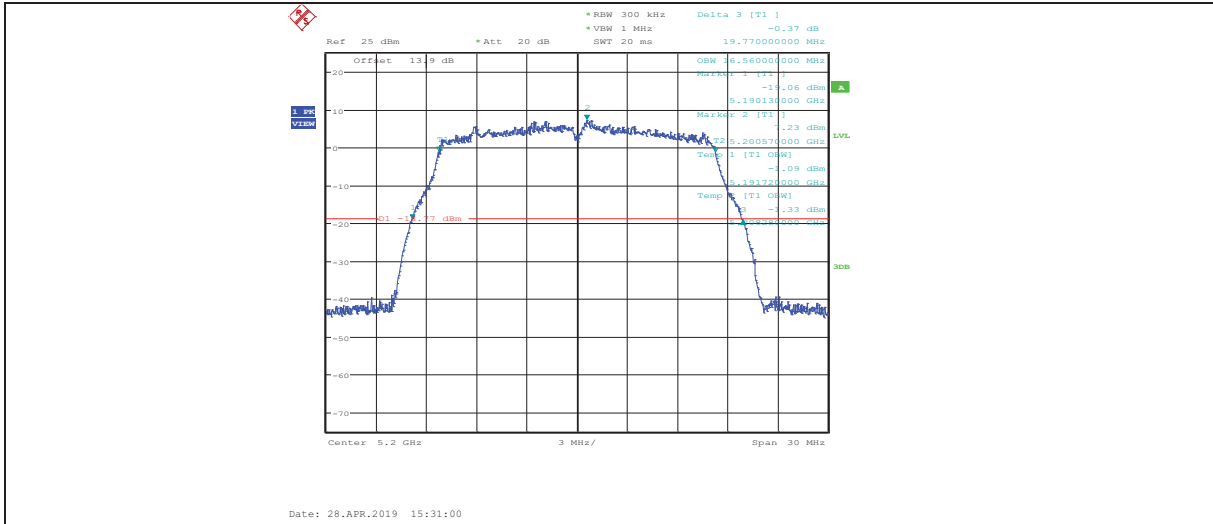
11AC20MIMO	ANT2	5280	17.64	20.130	---	PASS
11AC20MIMO	ANT1	5320	17.64	20.100	---	PASS
11AC20MIMO	ANT2	5320	17.61	20.130	---	PASS
11AC20MIMO	ANT1	5500	17.61	20.160	---	PASS
11AC20MIMO	ANT2	5500	17.61	20.190	---	PASS
11AC20MIMO	ANT1	5580	17.67	20.160	---	PASS
11AC20MIMO	ANT2	5580	17.64	20.070	---	PASS
11AC20MIMO	ANT1	5700	17.67	20.160	---	PASS
11AC20MIMO	ANT2	5700	17.61	20.040	---	PASS
11AC20MIMO	ANT1	5745	17.52	16.020	0.5	PASS
11AC20MIMO	ANT2	5745	17.52	15.150	0.5	PASS
11AC20MIMO	ANT1	5785	17.55	16.410	0.5	PASS
11AC20MIMO	ANT2	5785	17.52	16.080	0.5	PASS
11AC20MIMO	ANT1	5825	17.52	15.750	0.5	PASS
11AC20MIMO	ANT2	5825	17.55	16.410	0.5	PASS
11AC40MIMO	ANT1	5190	36.24	40.740	---	PASS
11AC40MIMO	ANT2	5190	36.18	40.620	---	PASS
11AC40MIMO	ANT1	5230	36.18	40.620	---	PASS
11AC40MIMO	ANT2	5230	36.24	40.680	---	PASS
11AC40MIMO	ANT1	5270	36.18	40.740	---	PASS
11AC40MIMO	ANT2	5270	36.12	40.620	---	PASS
11AC40MIMO	ANT1	5310	36.18	40.500	---	PASS
11AC40MIMO	ANT2	5310	36.18	40.500	---	PASS
11AC40MIMO	ANT1	5510	36.30	40.380	---	PASS
11AC40MIMO	ANT2	5510	36.06	40.560	---	PASS
11AC40MIMO	ANT1	5550	36.24	40.380	---	PASS
11AC40MIMO	ANT2	5550	36.18	40.200	---	PASS
11AC40MIMO	ANT1	5670	36.12	40.260	---	PASS
11AC40MIMO	ANT2	5670	36.30	40.560	---	PASS
11AC40MIMO	ANT1	5755	35.94	35.220	0.5	PASS
11AC40MIMO	ANT2	5755	35.88	35.220	0.5	PASS
11AC40MIMO	ANT1	5795	35.94	35.760	0.5	PASS
11AC40MIMO	ANT2	5795	35.88	35.280	0.5	PASS
11AC80MIMO	ANT1	5210	76.08	81.960	---	PASS
11AC80MIMO	ANT2	5210	76.08	81.000	---	PASS
11AC80MIMO	ANT1	5290	75.96	81.720	---	PASS
11AC80MIMO	ANT2	5290	75.84	81.120	---	PASS
11AC80MIMO	ANT1	5530	76.08	81.960	---	PASS
11AC80MIMO	ANT2	5530	76.08	81.480	---	PASS



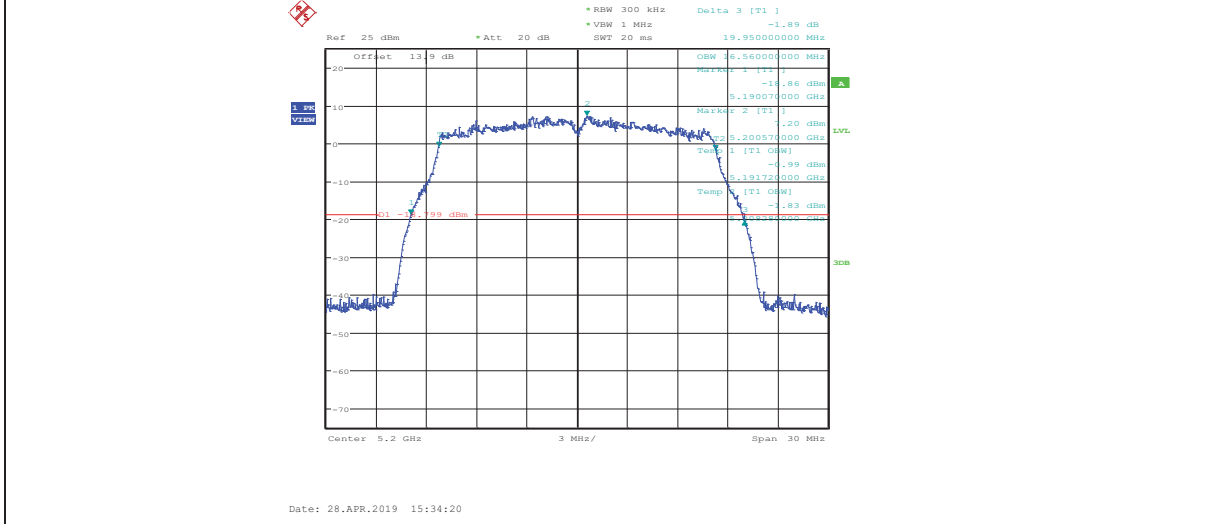
11AC80MIMO	ANT1	5775	75.48	75.720	0.5	PASS
11AC80MIMO	ANT2	5775	75.60	76.080	0.5	PASS

4.5. Original test data

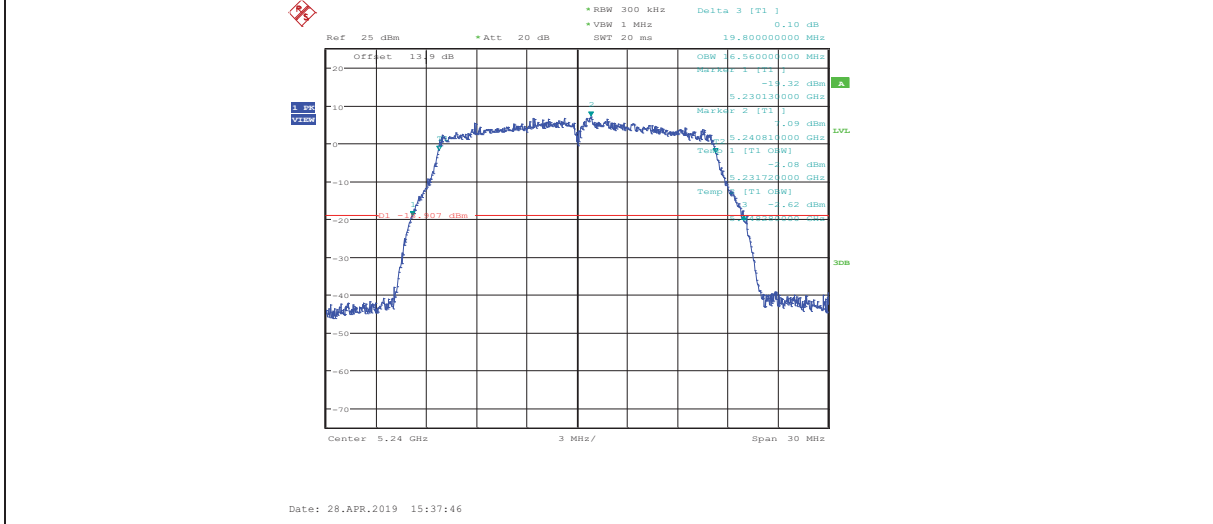




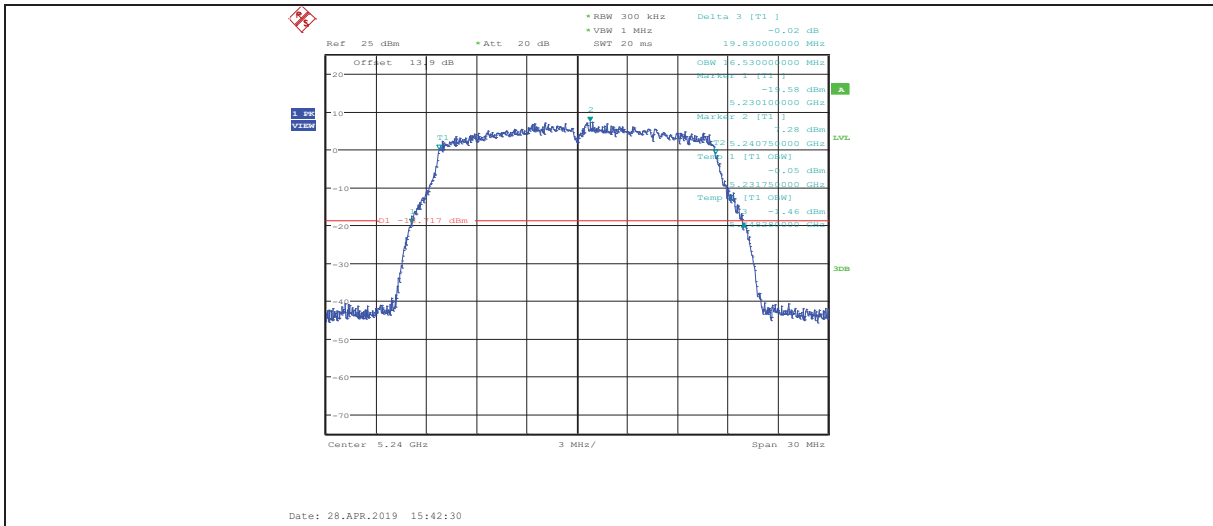
11A ANT2 5200



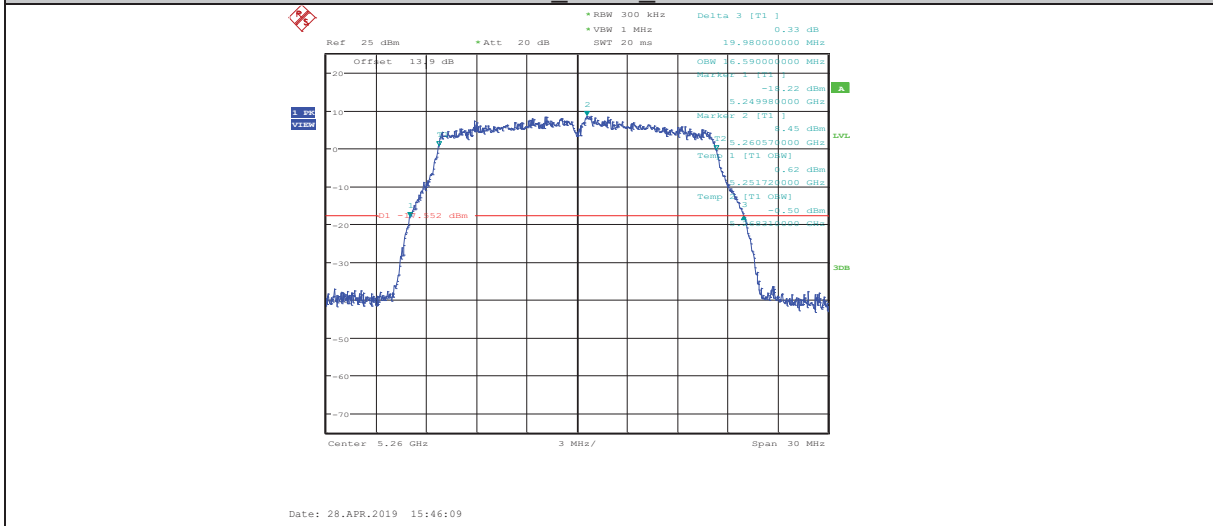
11A ANT1 5240



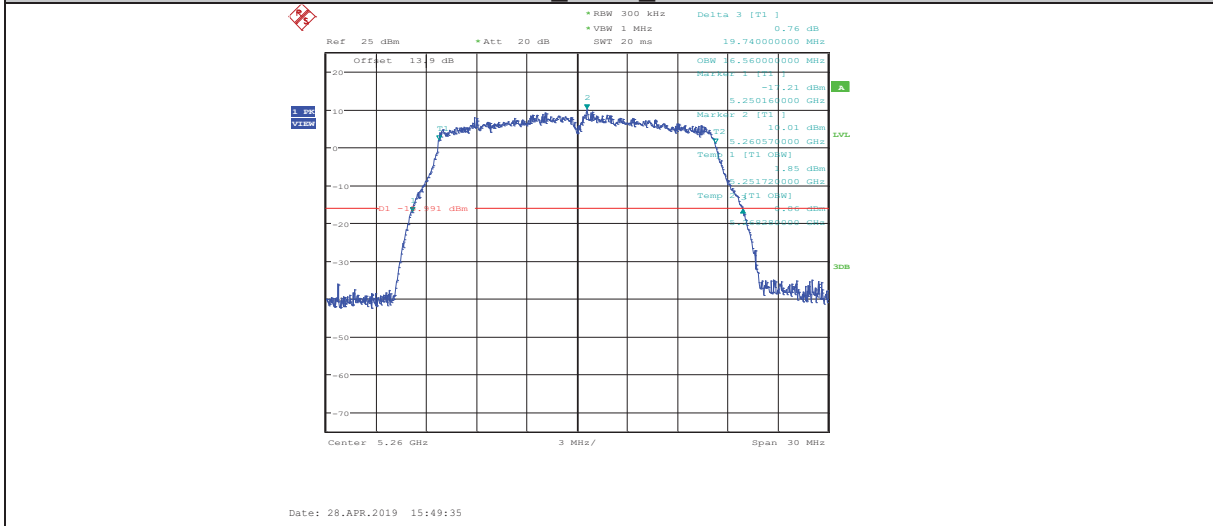
11A ANT2 5240



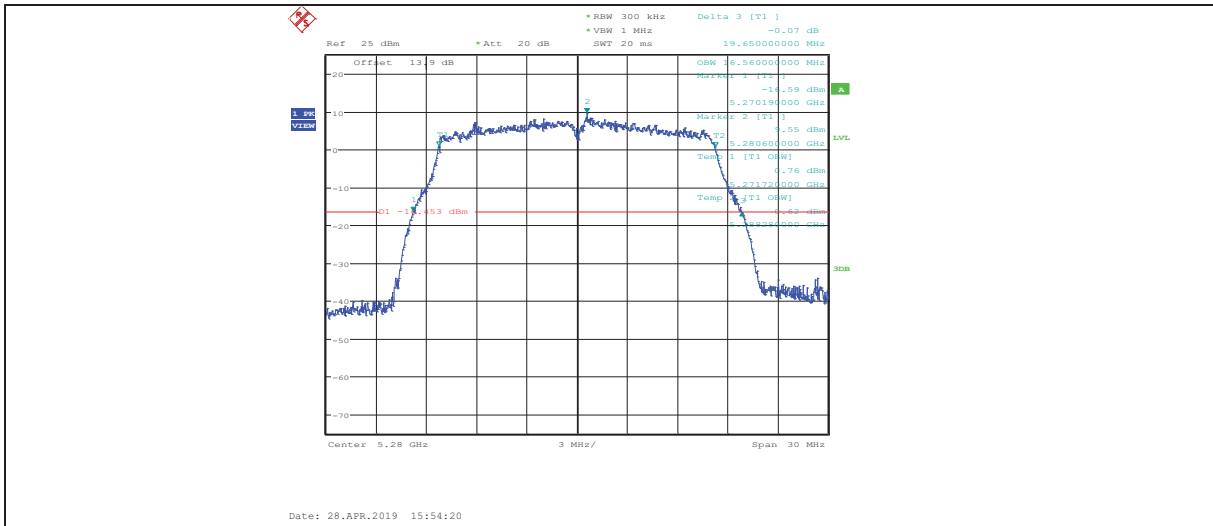
11A ANT1 5260



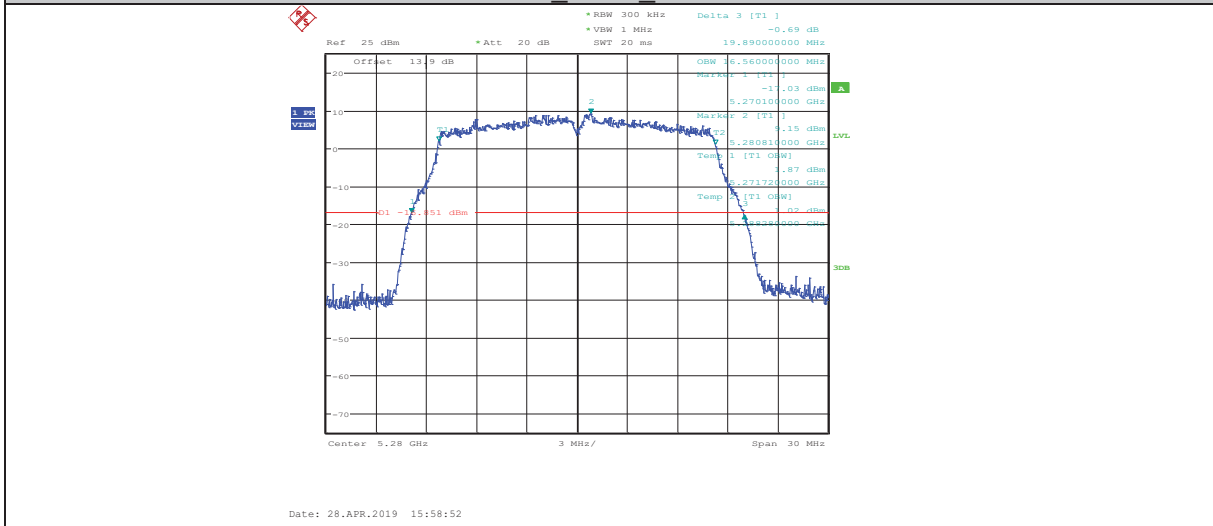
11A ANT2 5260



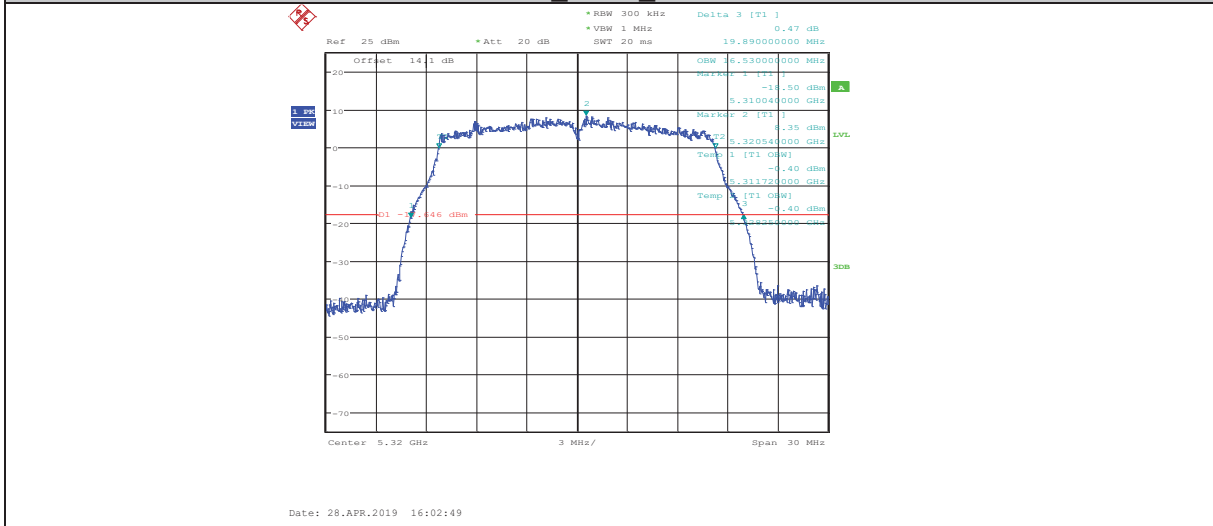
11A ANT1 5280



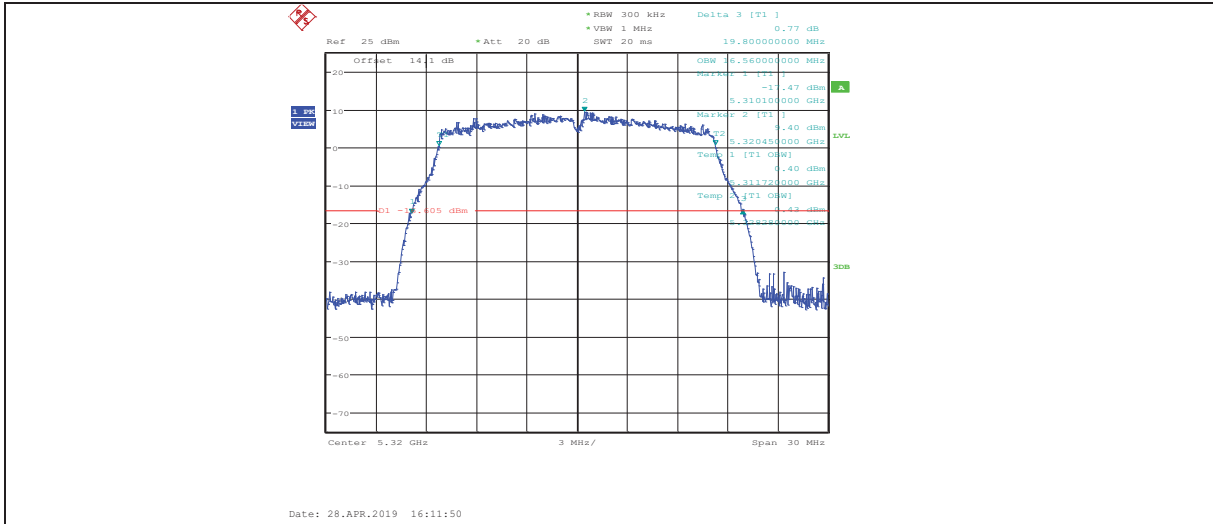
11A ANT2 5280



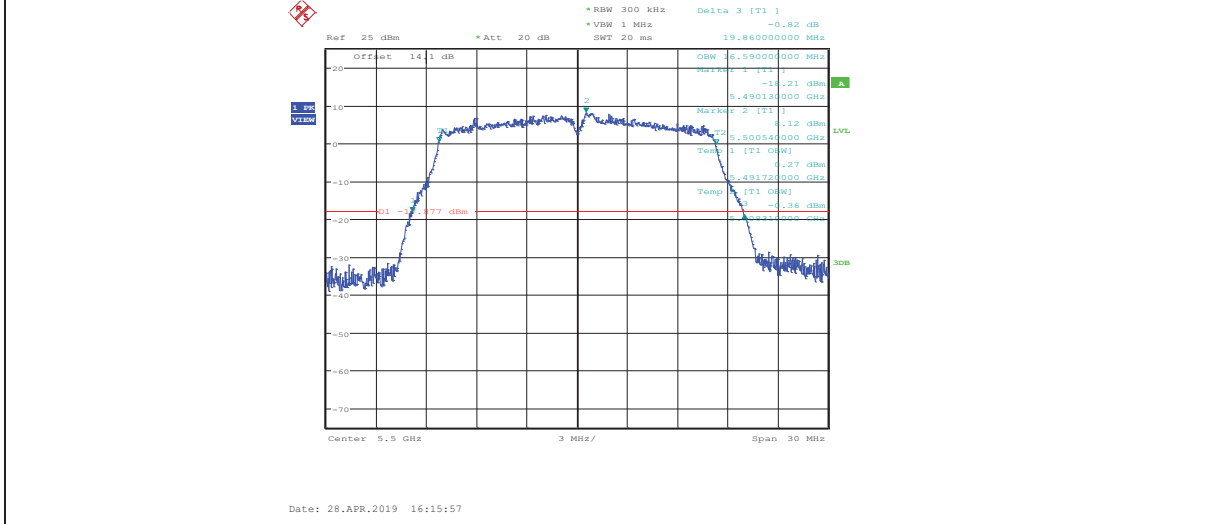
11A ANT1 5320



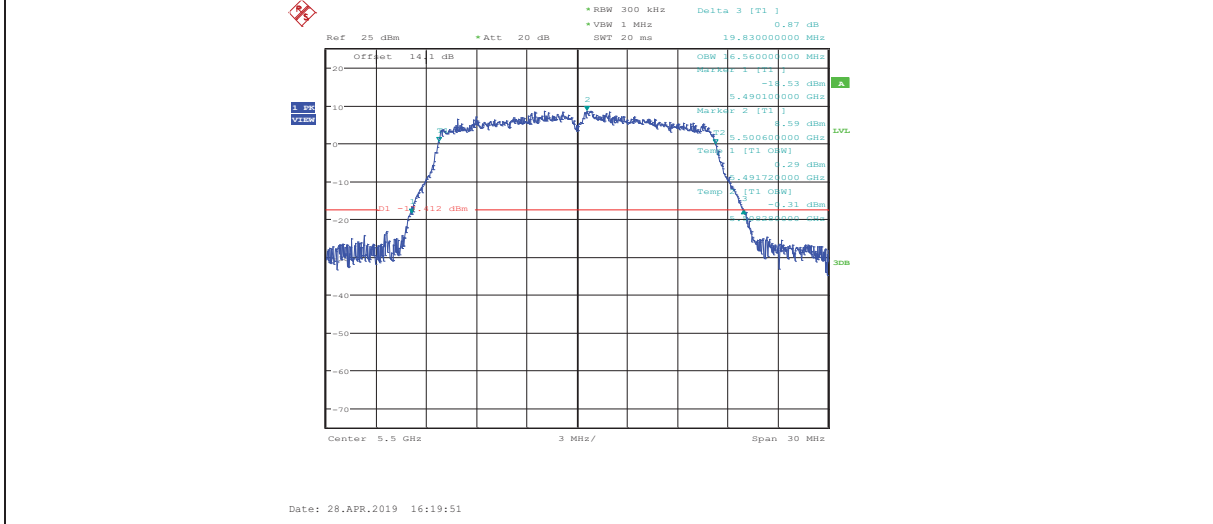
11A ANT2 5320



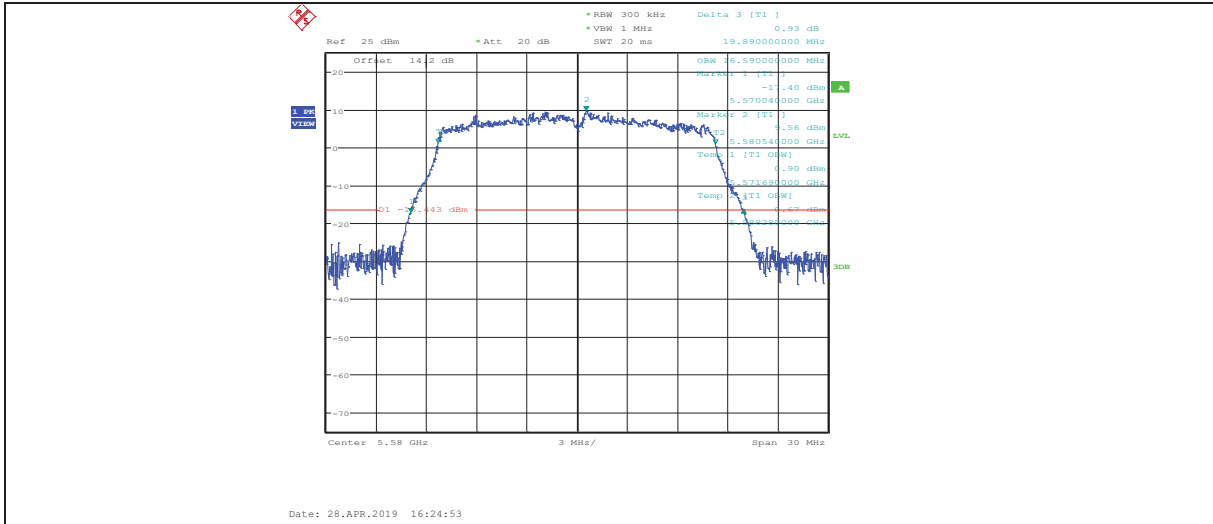
11A ANT1 5500



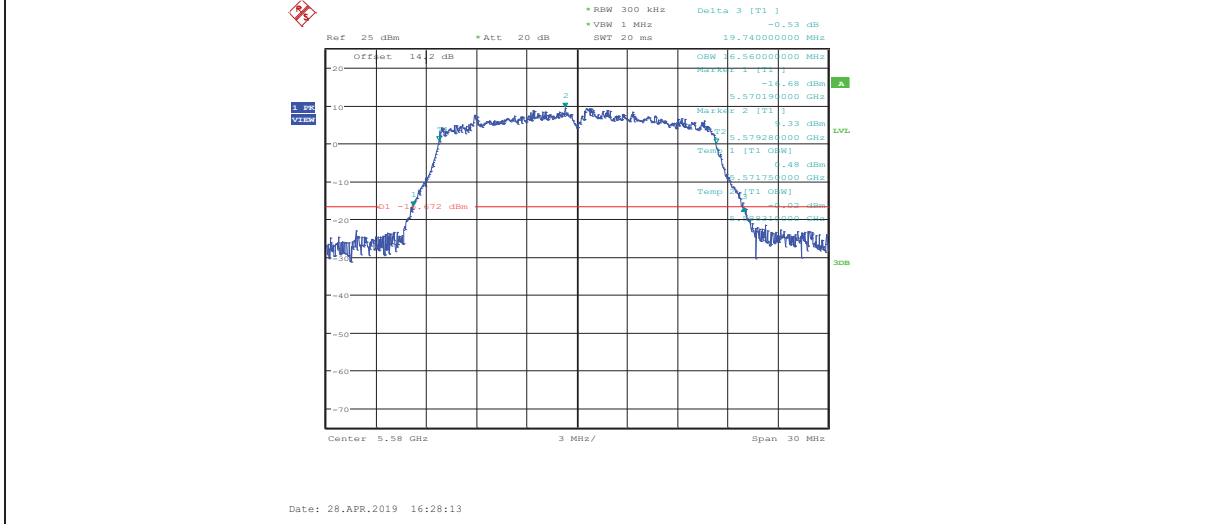
11A ANT2 5500



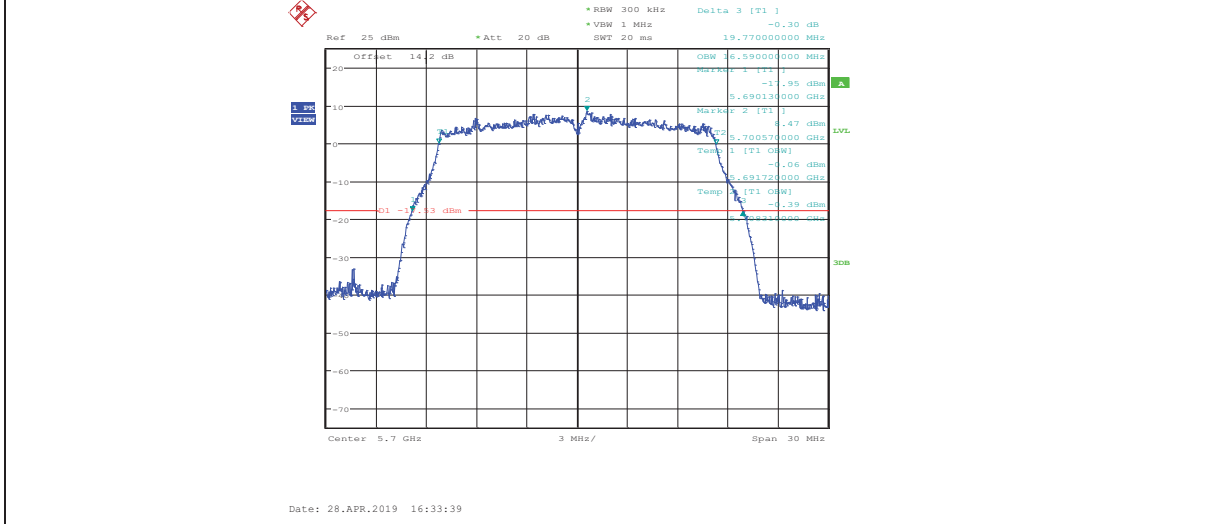
11A ANT1 5580



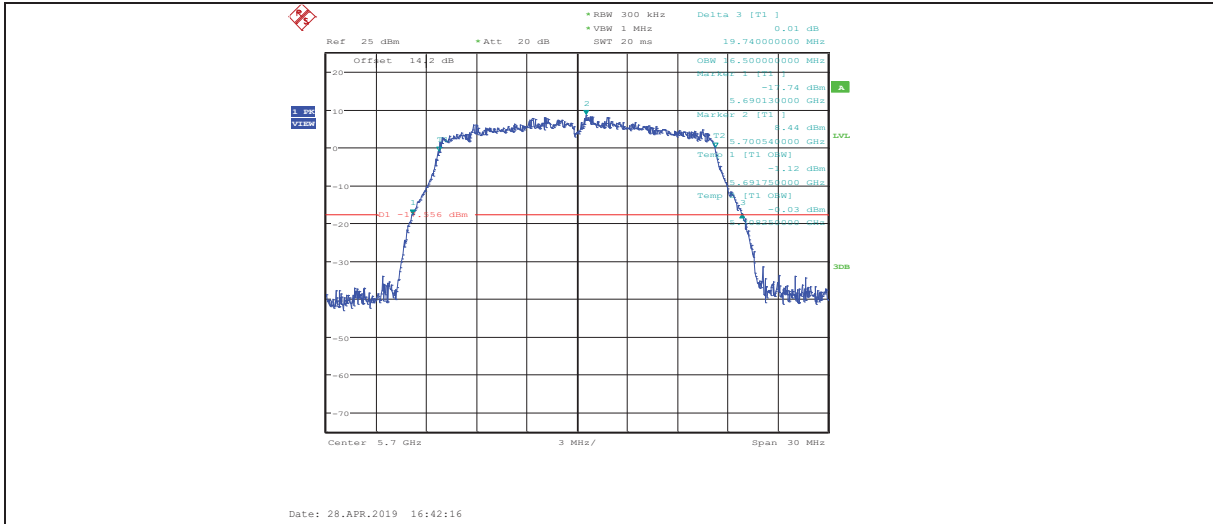
11A ANT2 5580



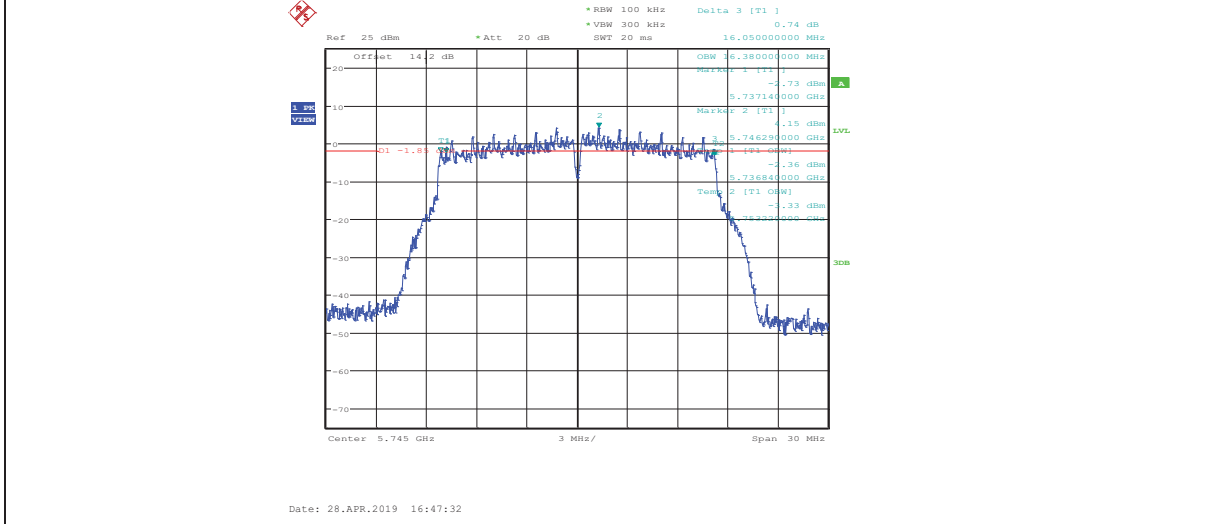
11A ANT1 5700



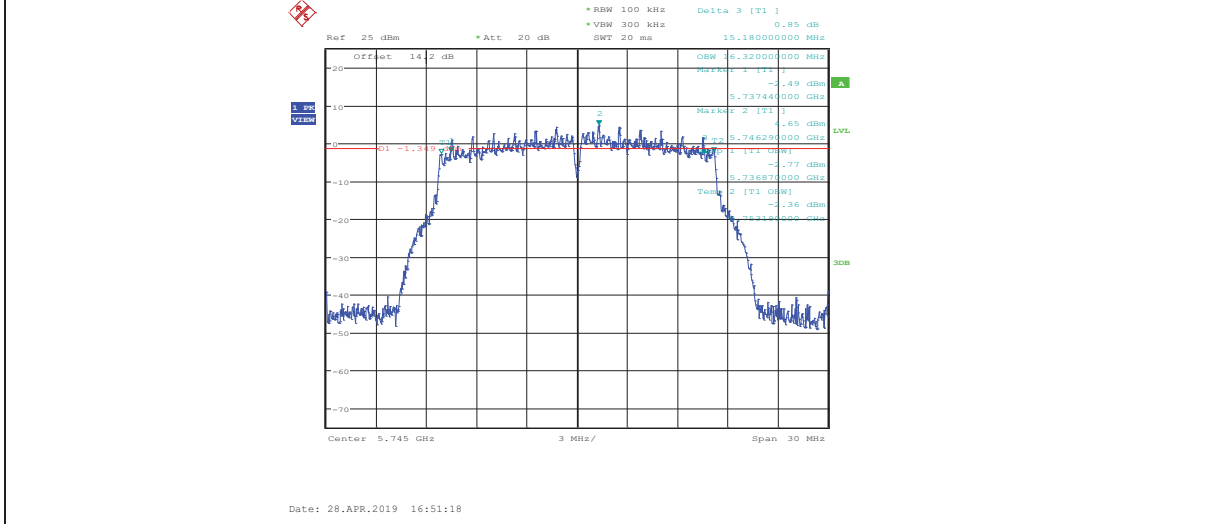
11A ANT2 5700



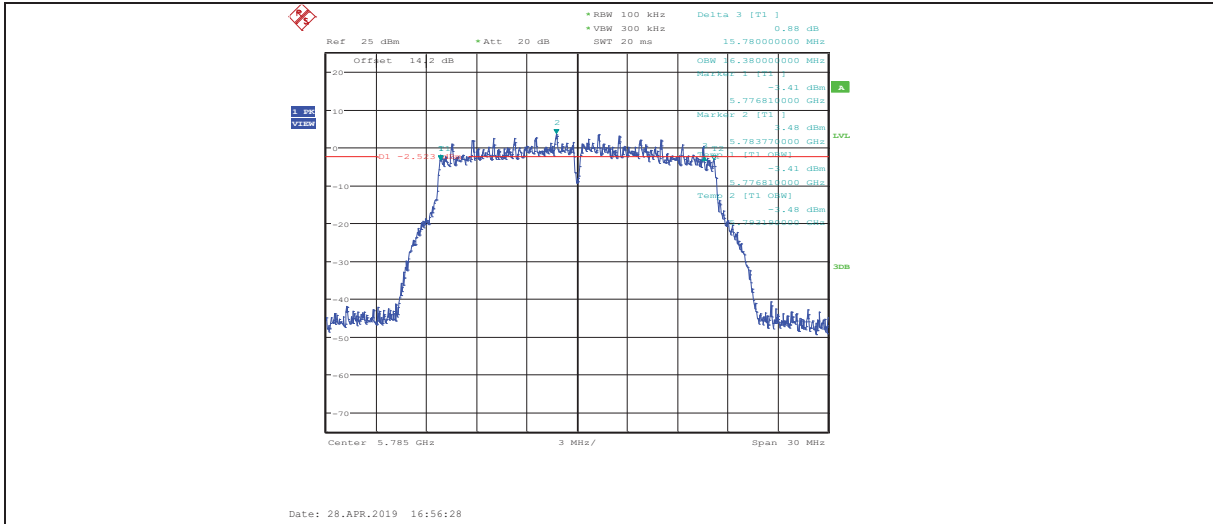
11A ANT1\_5745



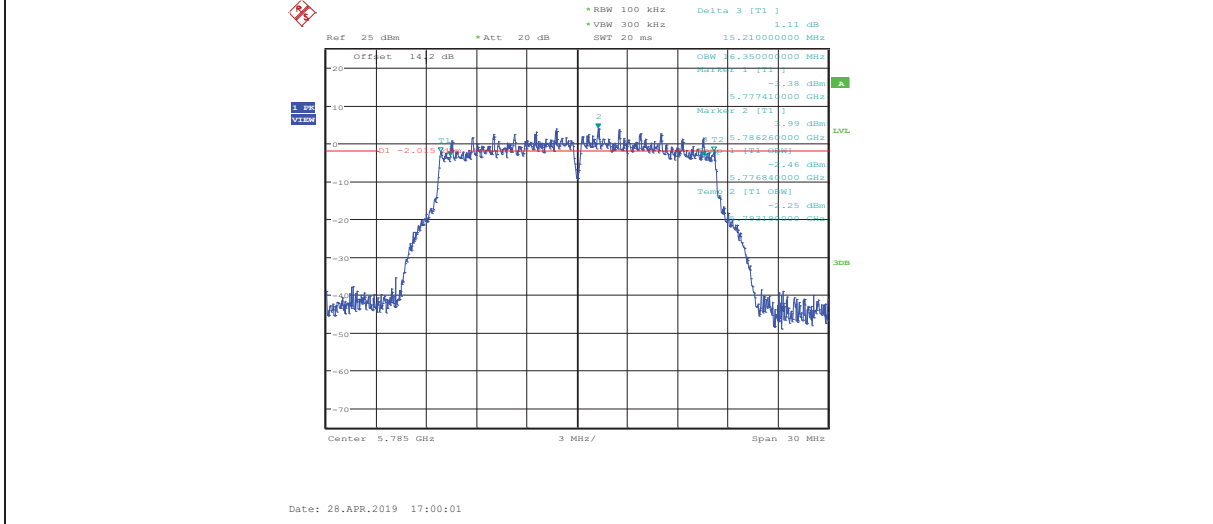
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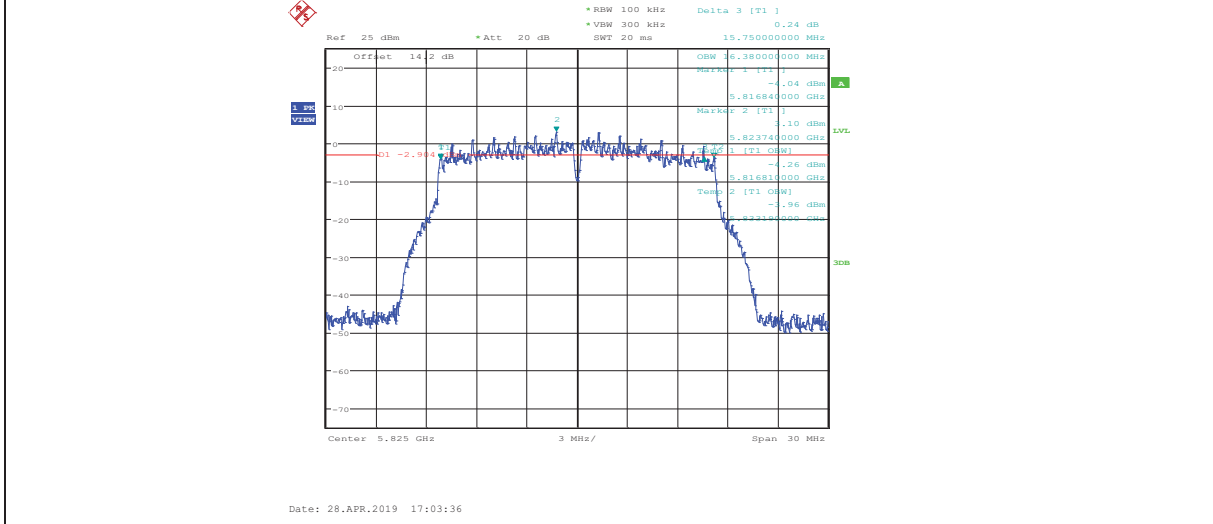
11A ANT1\_5785



11A ANT2 5785

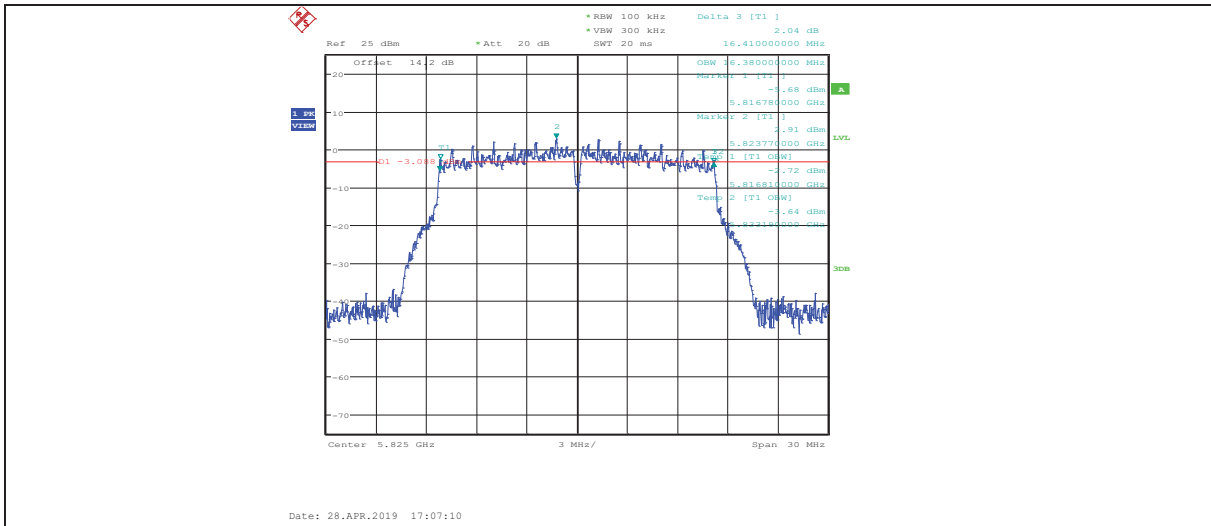


11A ANT1 5825

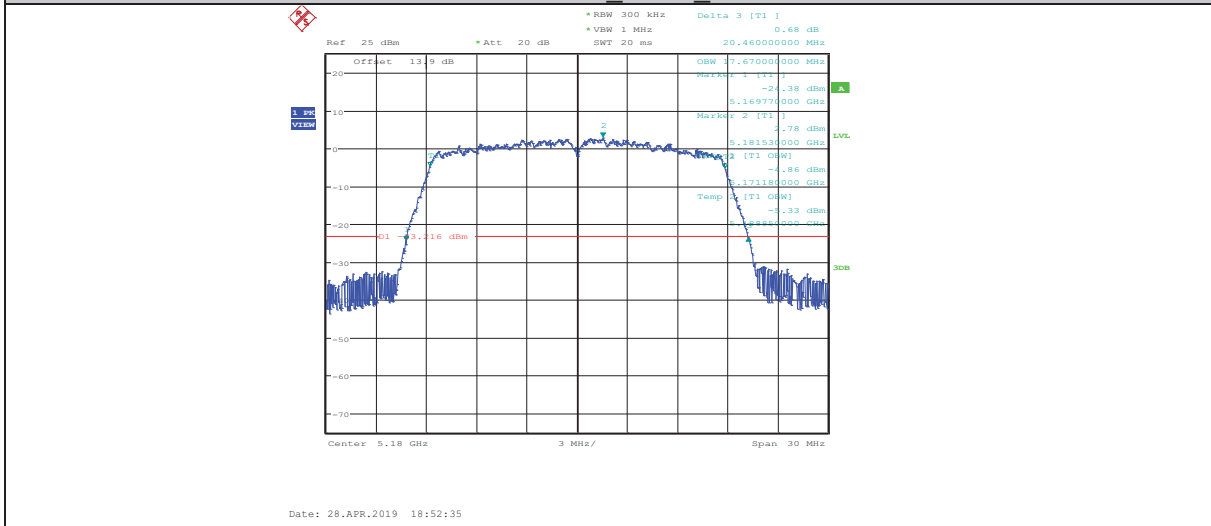


11A ANT2 5825

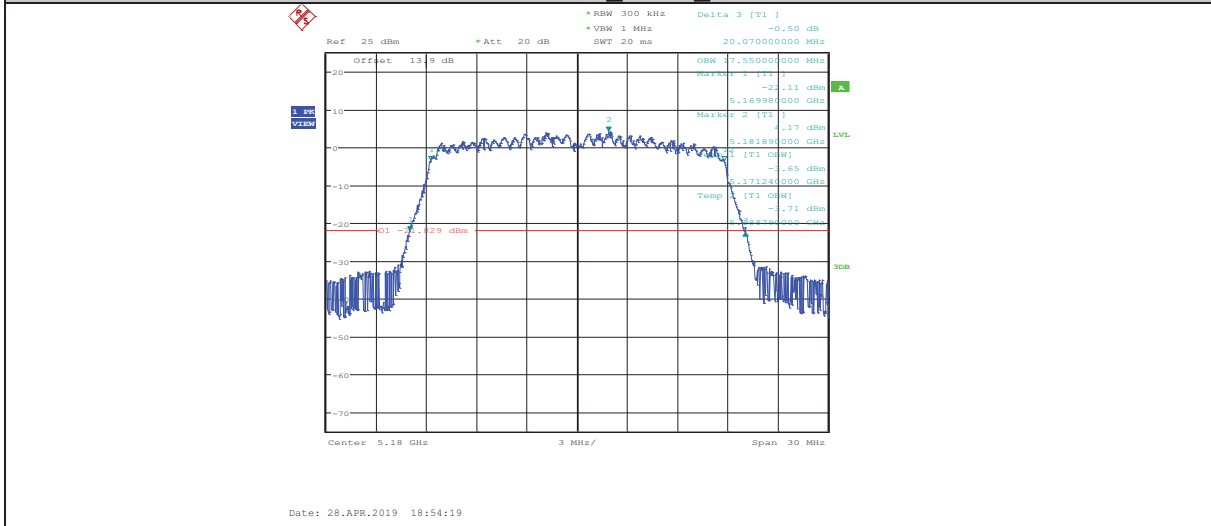




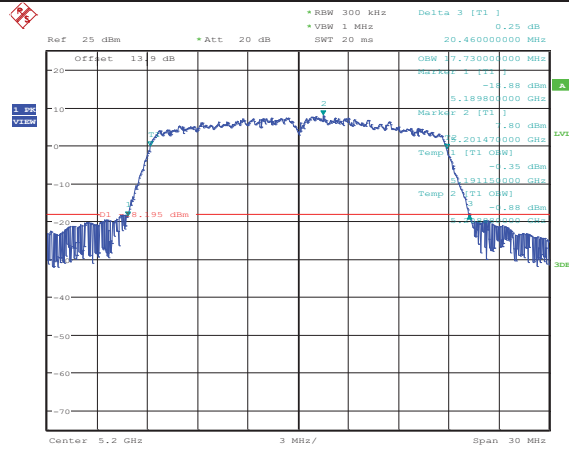
### 11N20MIMO ANT1 5180



### 11N20MIMO ANT2 5180

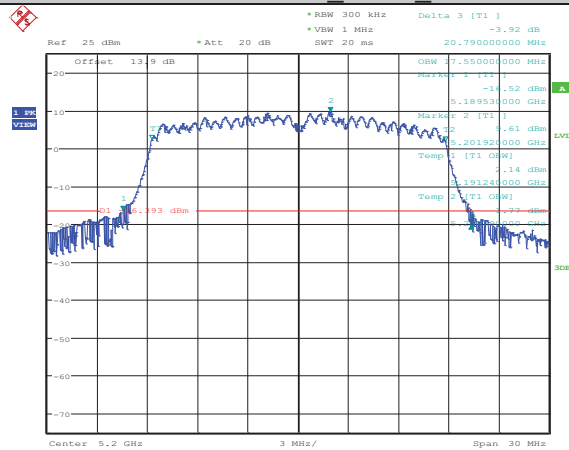


### 11N20MIMO ANT1 5200



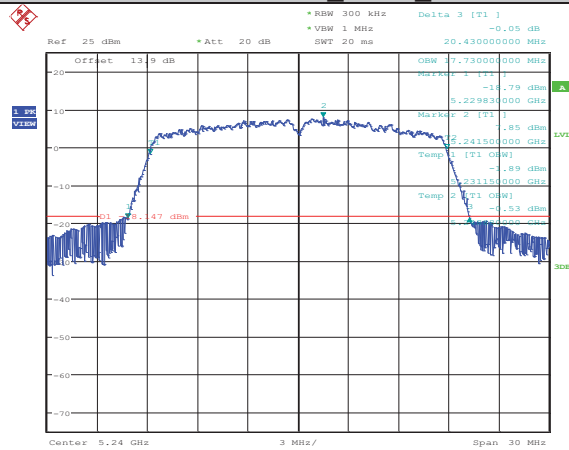
Date: 28.APR.2019 17:44:34

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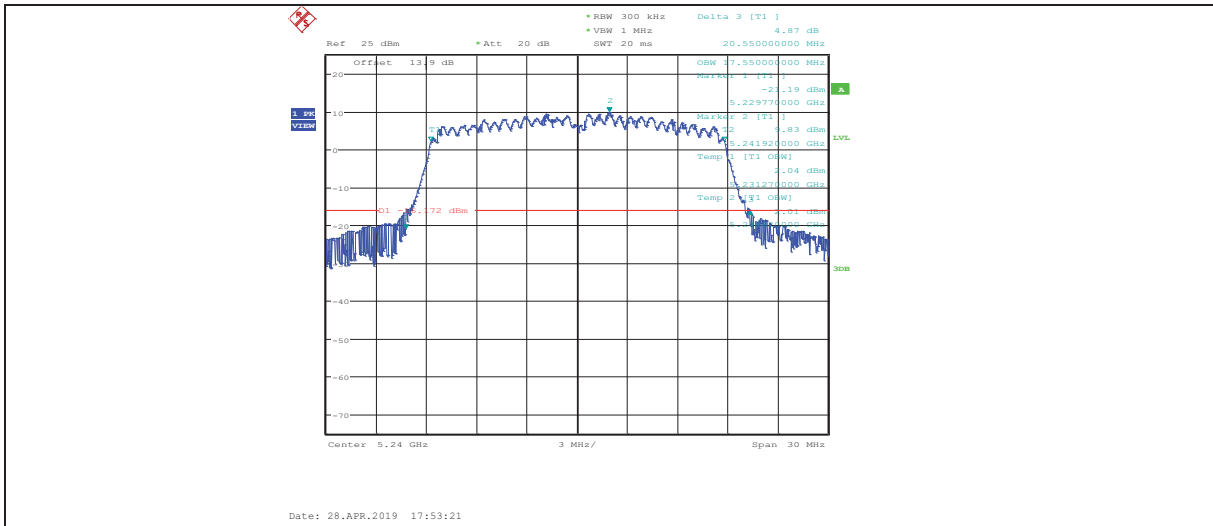
Date: 28.APR.2019 17:47:22

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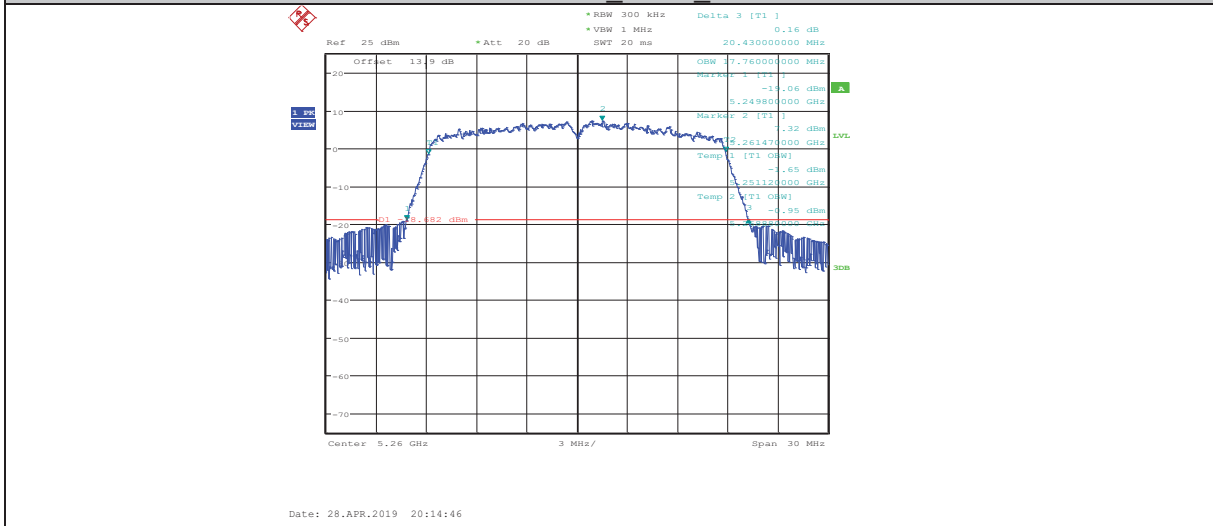


Date: 28.APR.2019 17:50:01

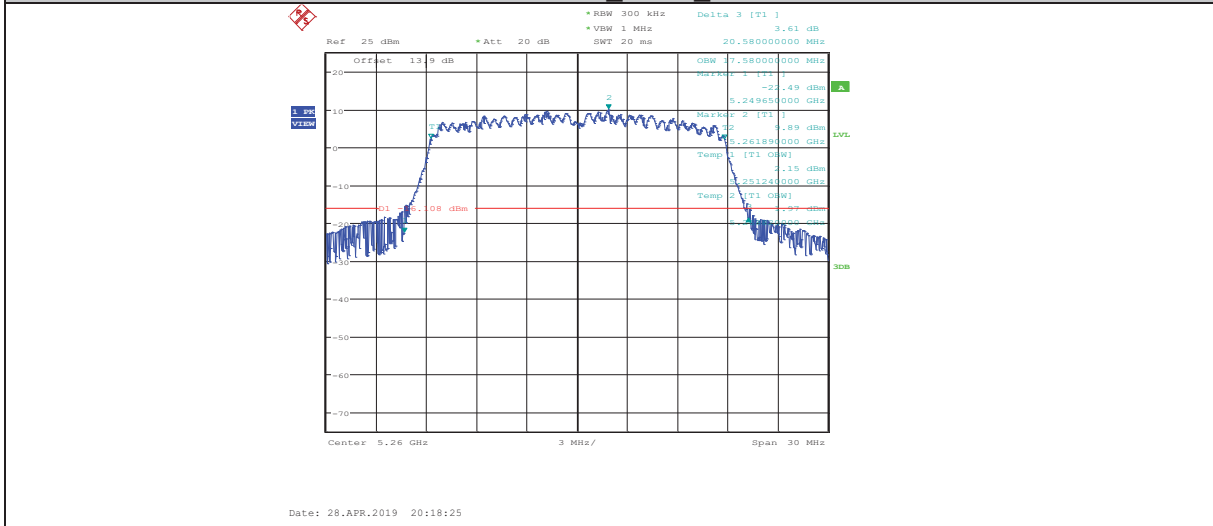
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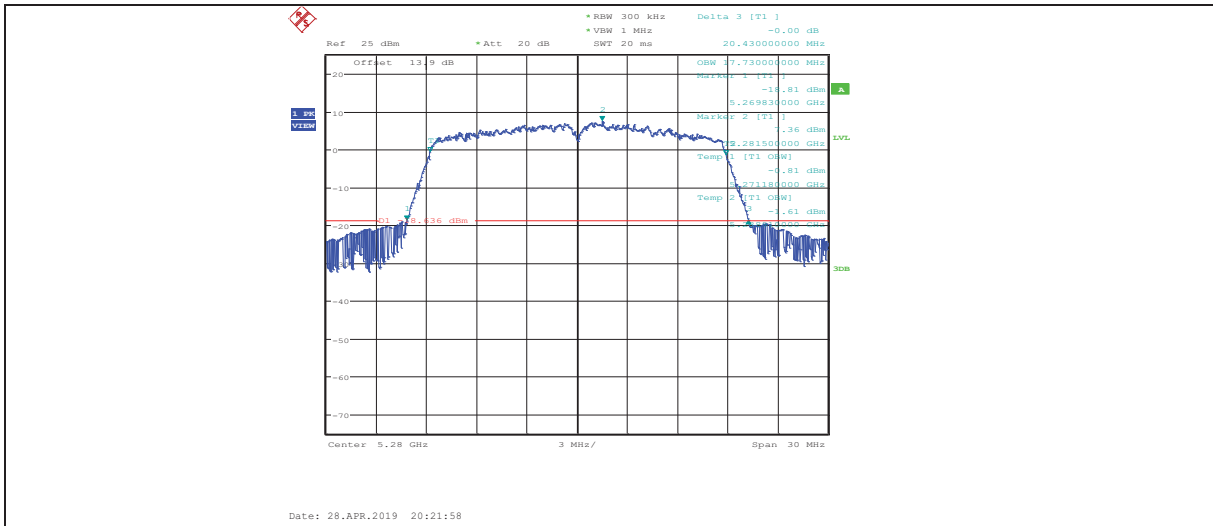
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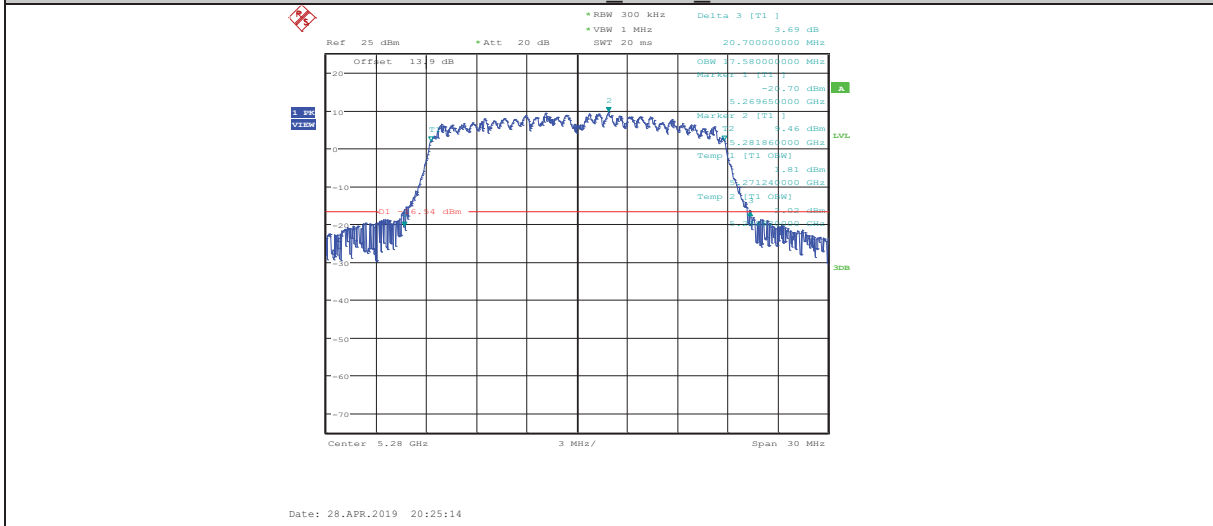
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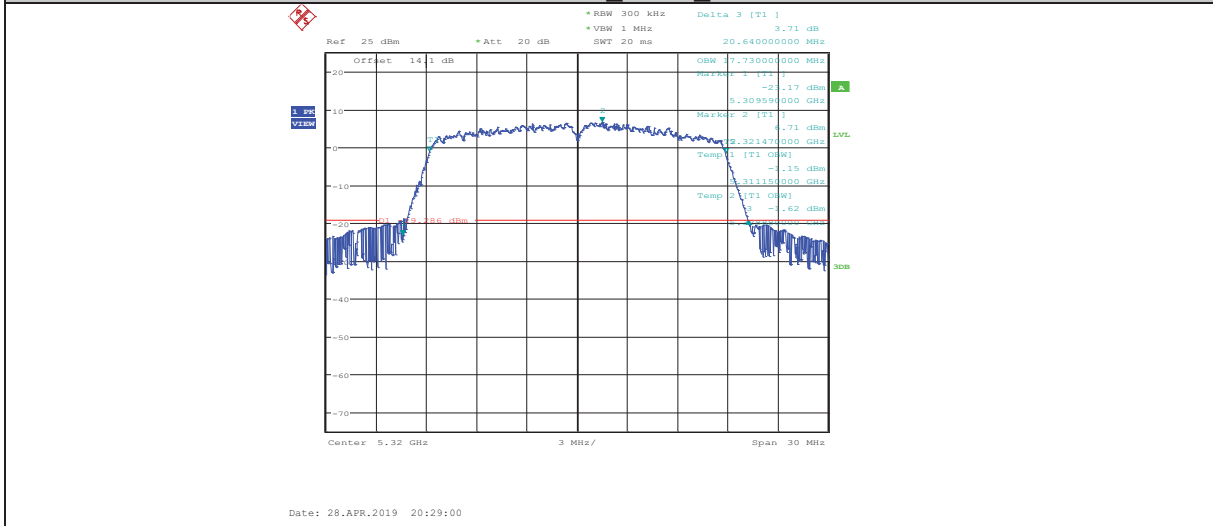
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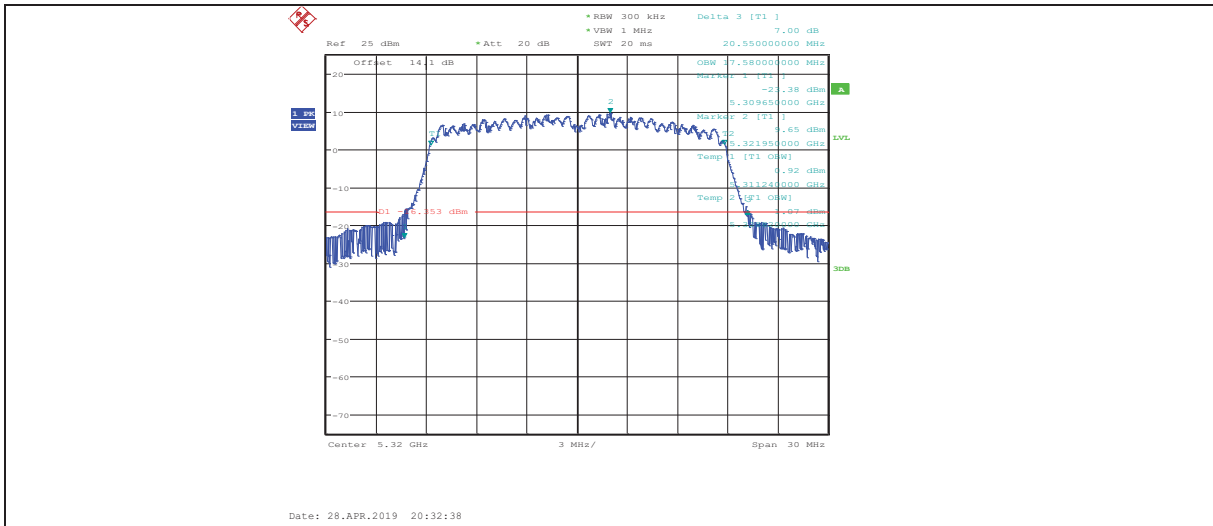
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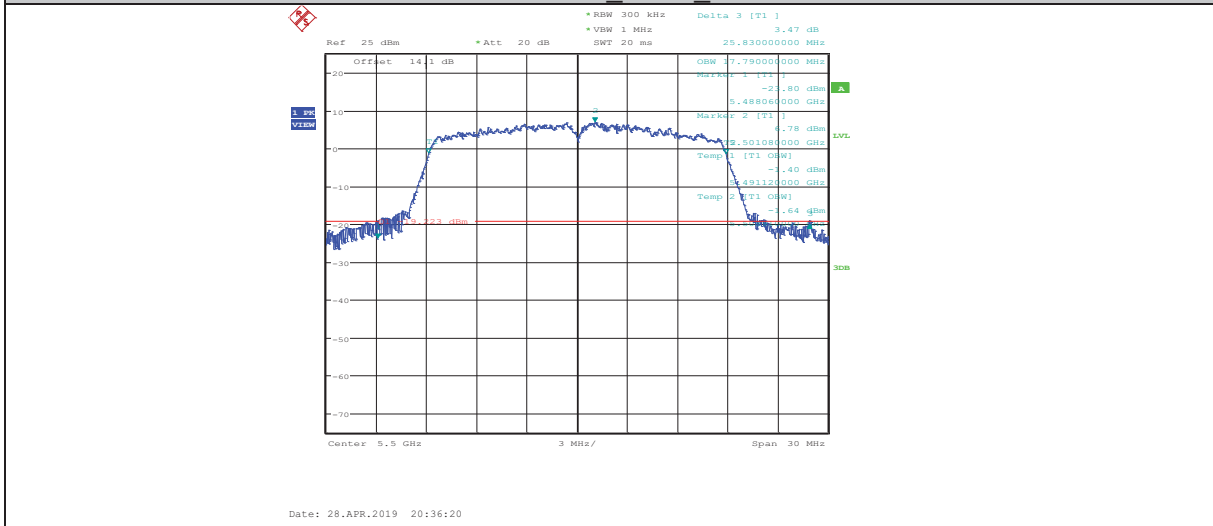
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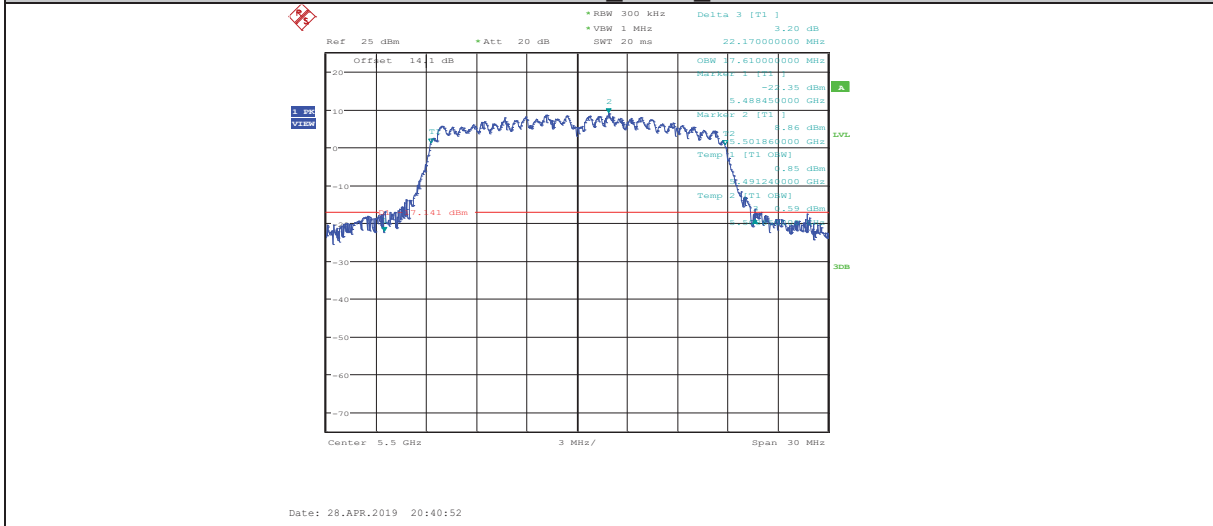
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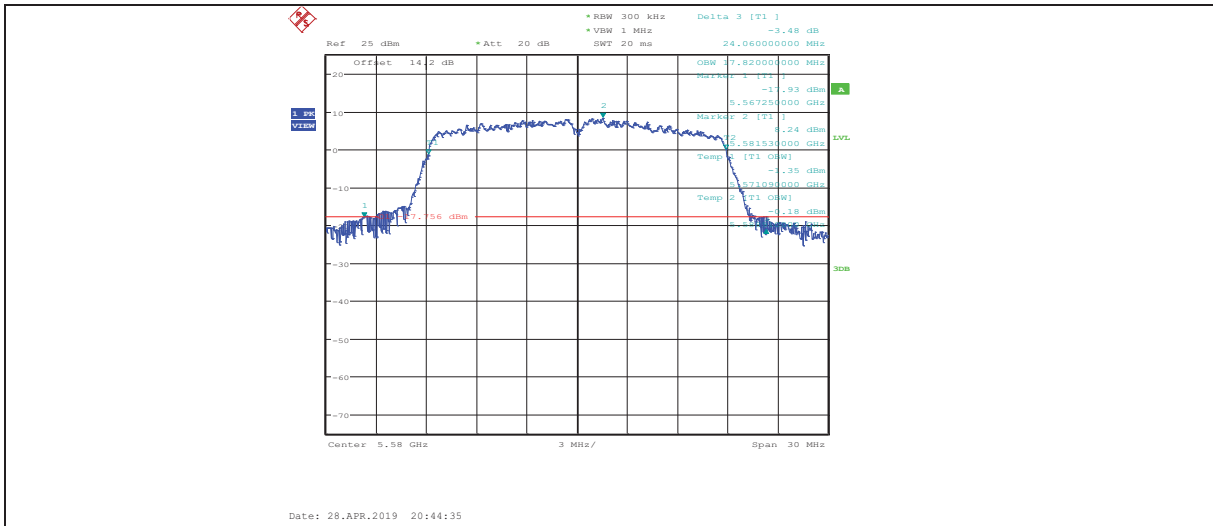
11N20MIMO\_ANT1\_5500



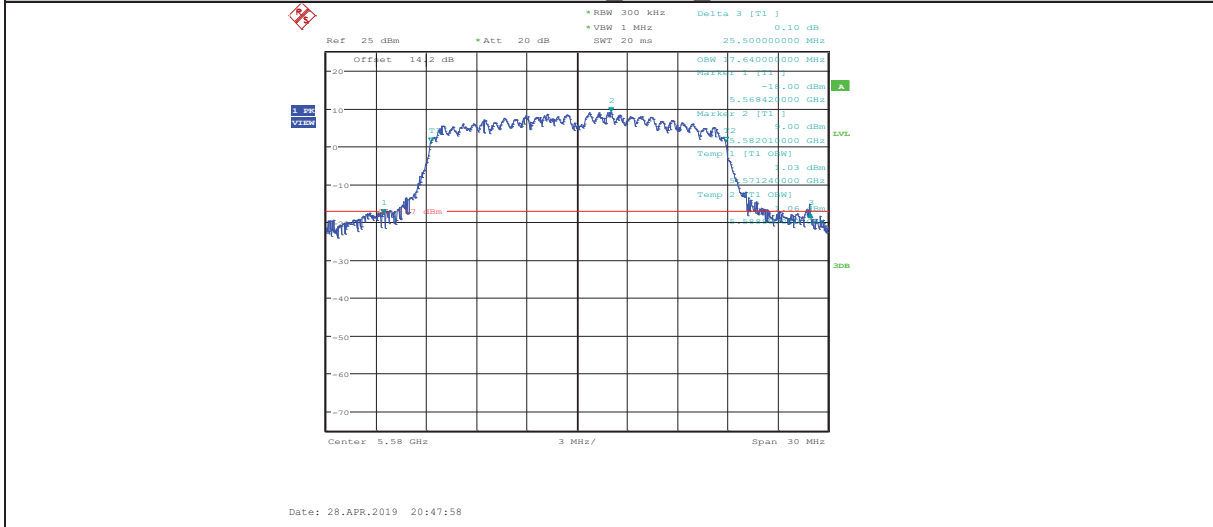
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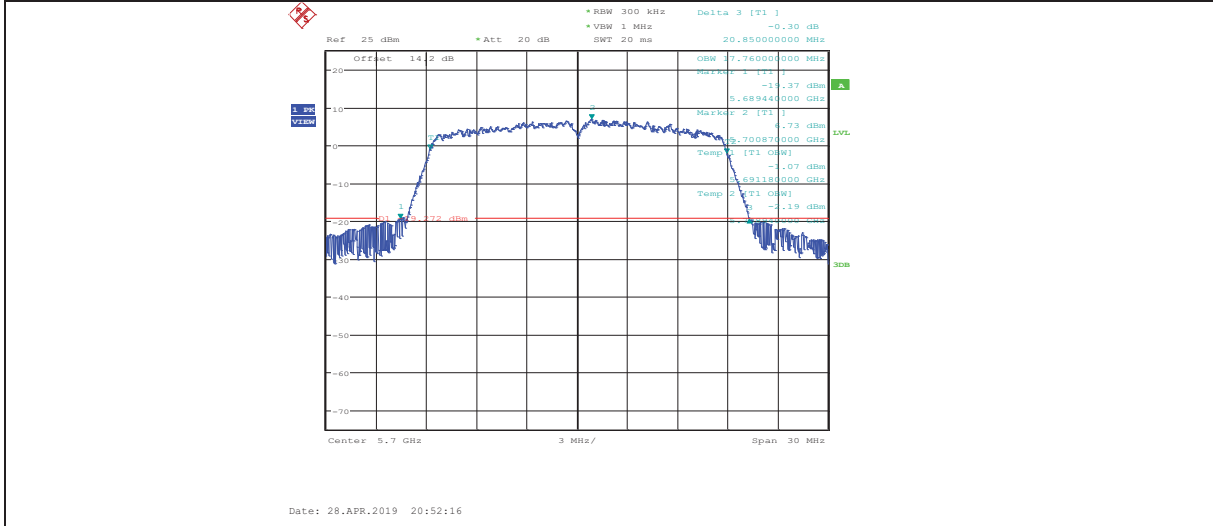
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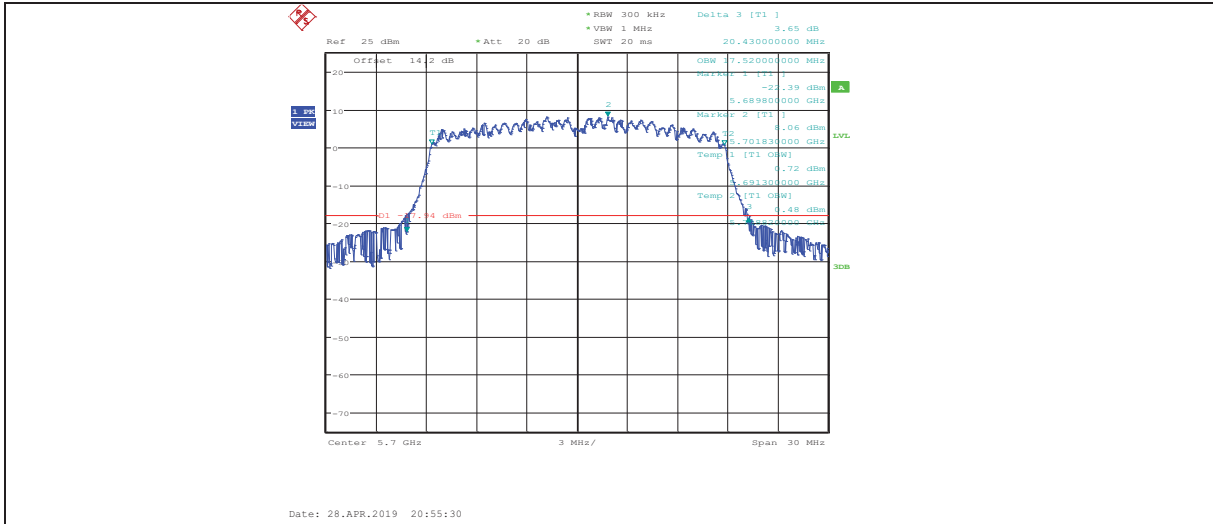
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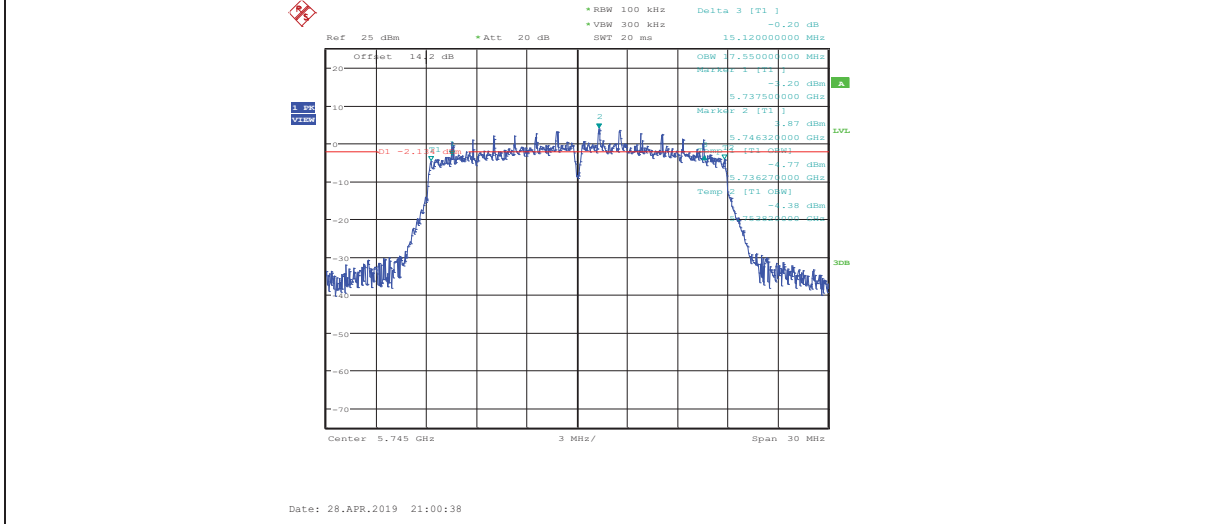
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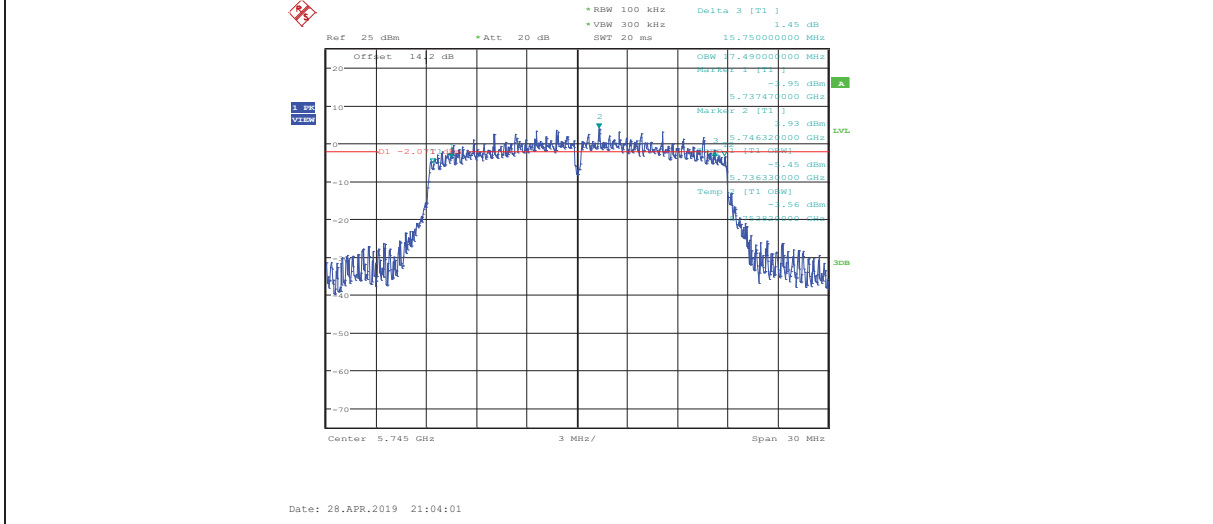
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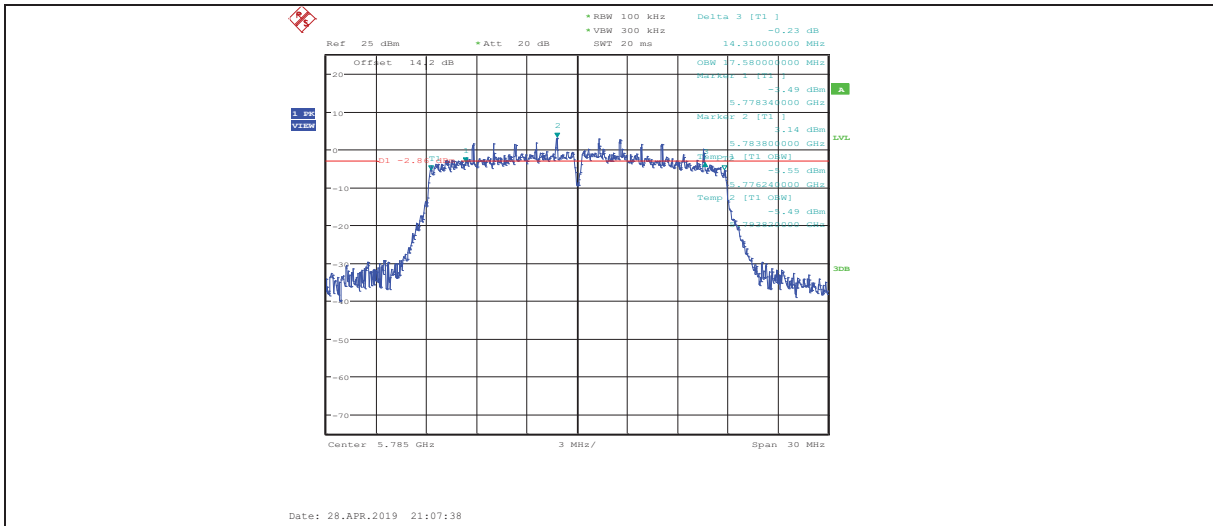
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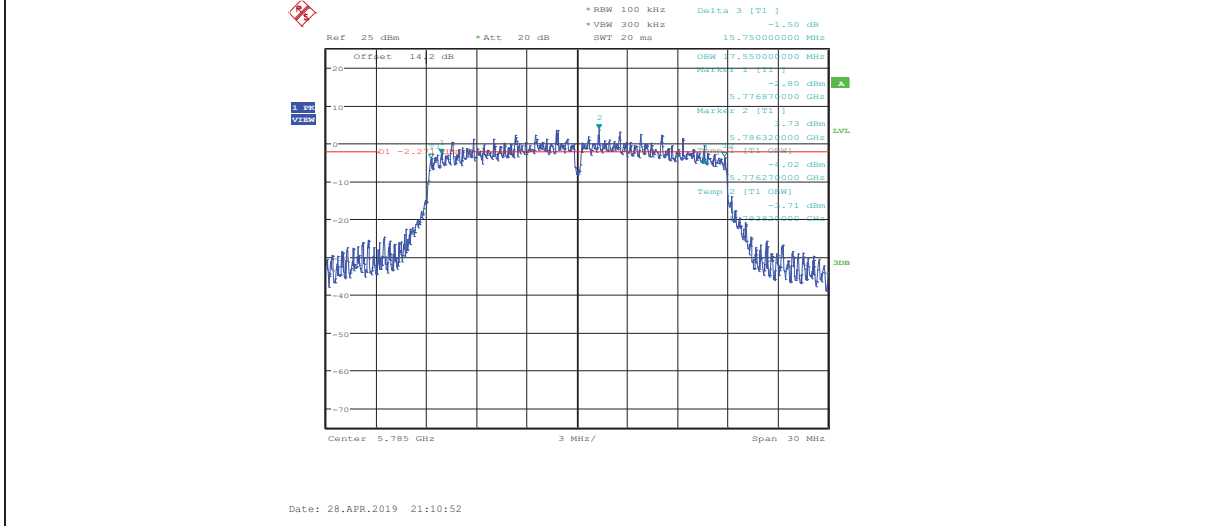
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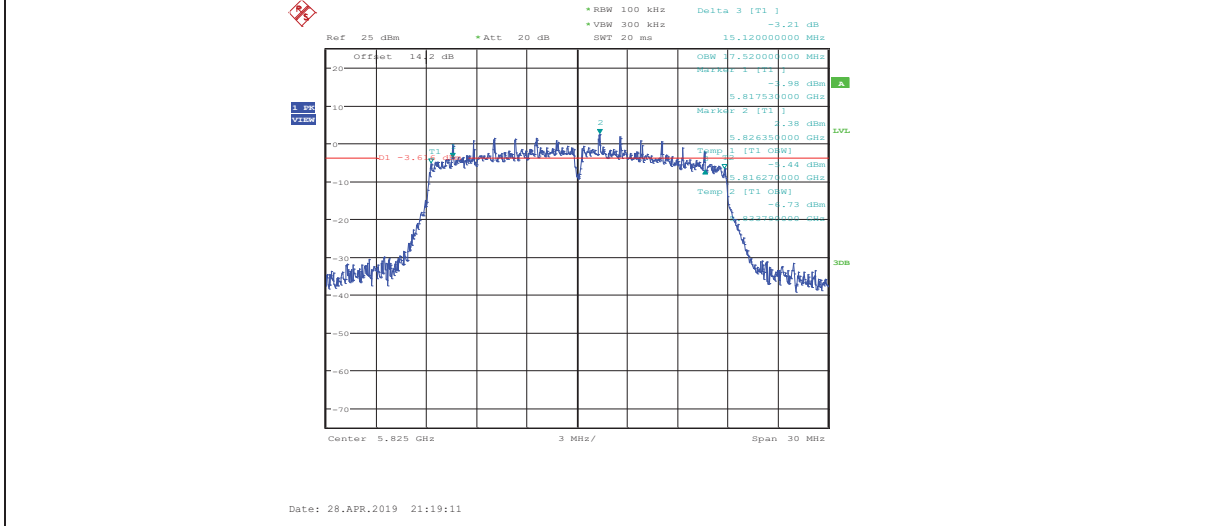
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11N20MIMO ANT2 5785

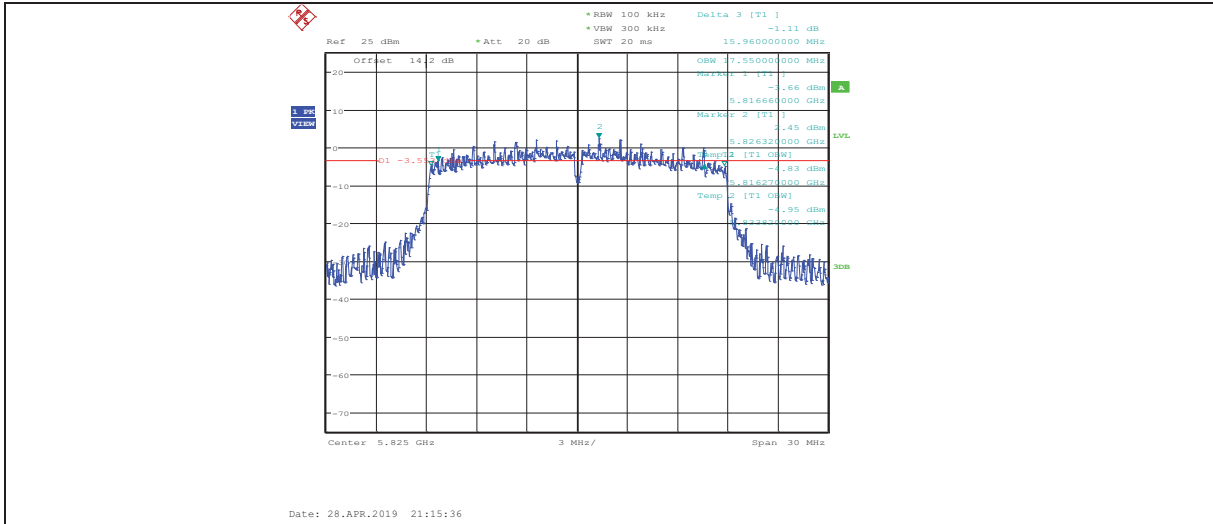


11N20MIMO ANT1 5825

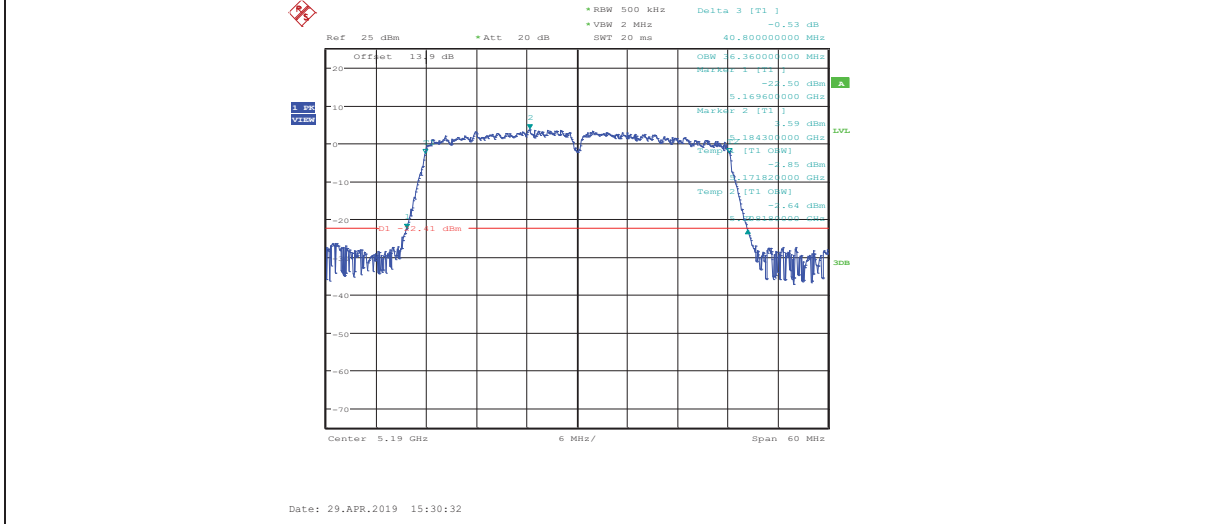


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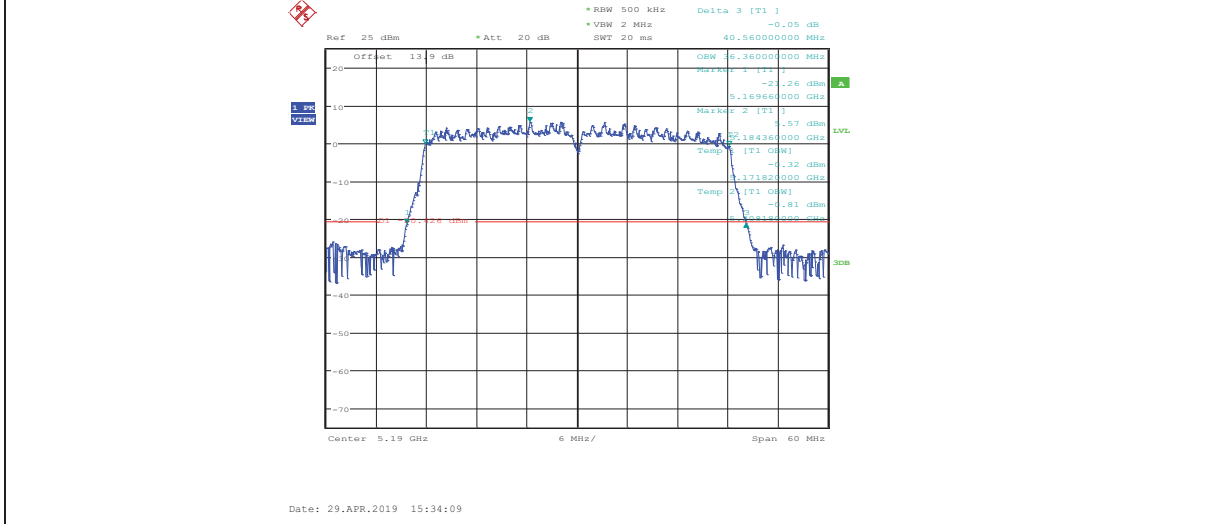




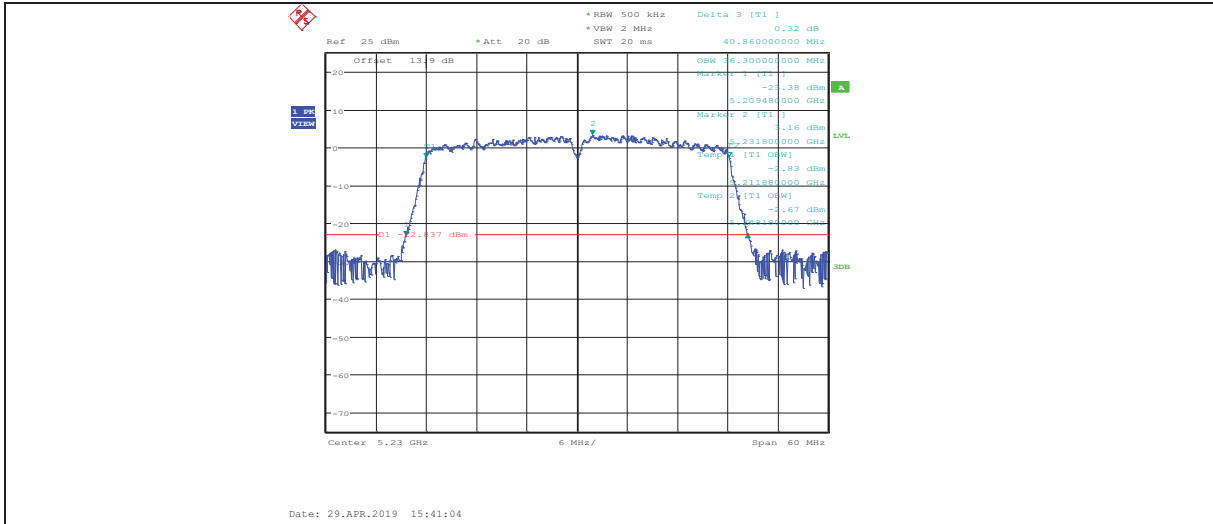
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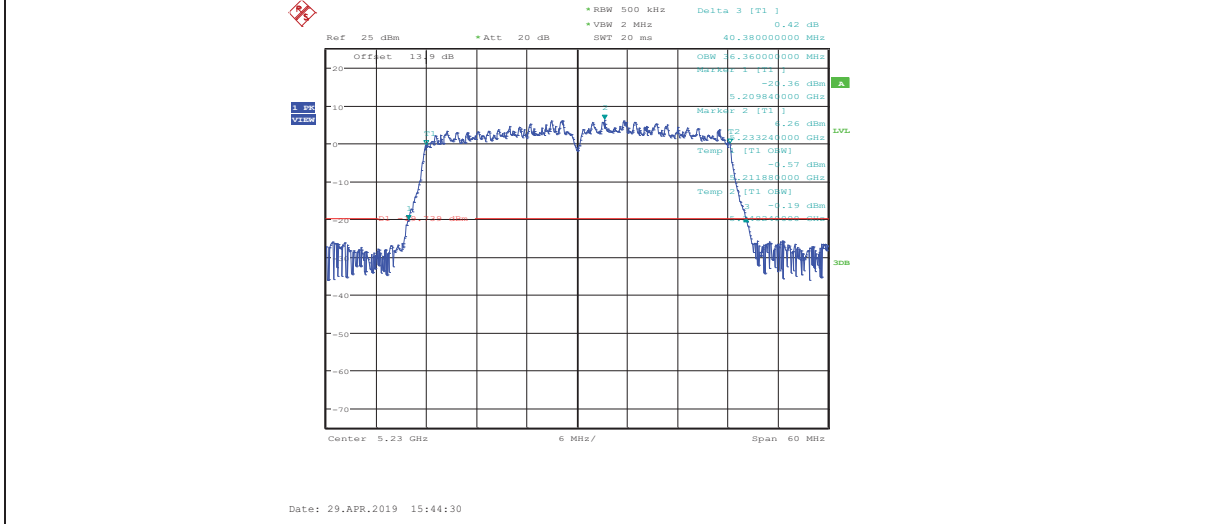
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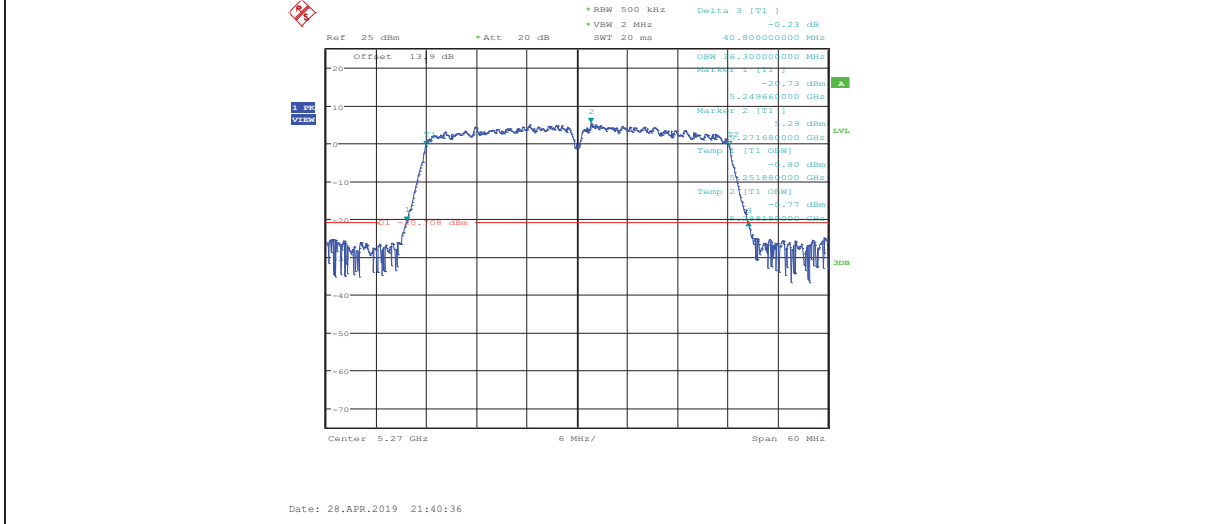
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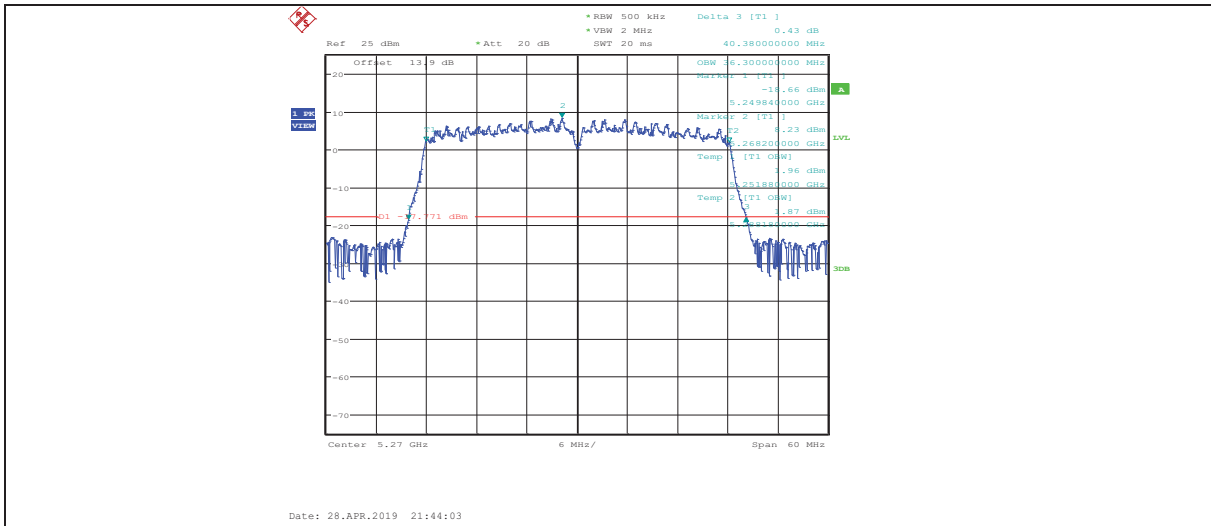
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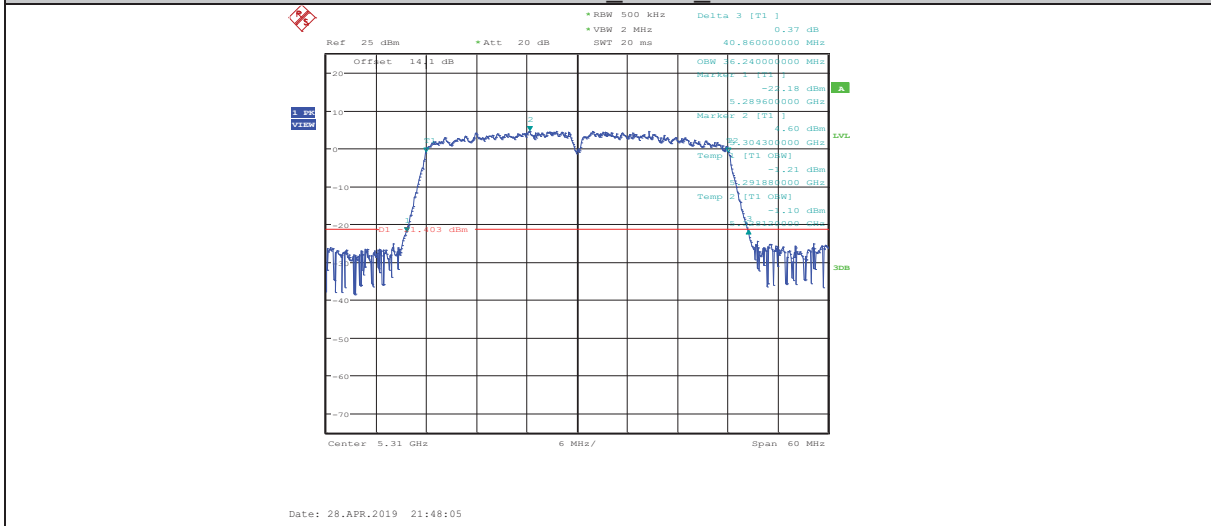
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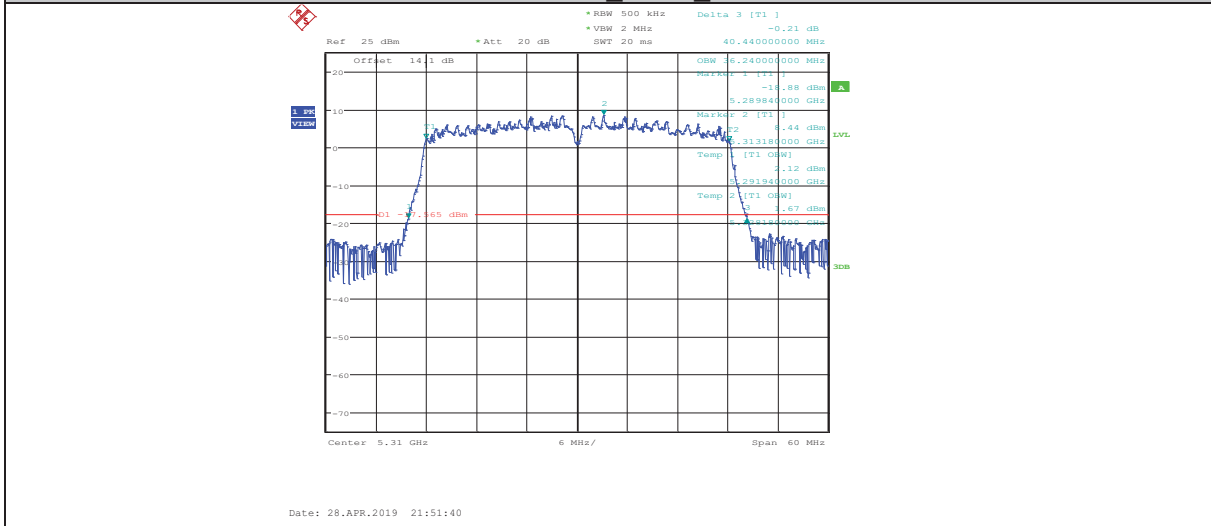
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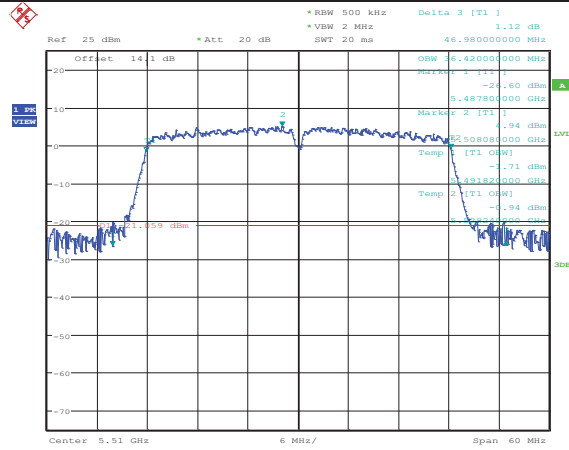
11N40MIMO ANT1 5310



11N40MIMO ANT2 5310

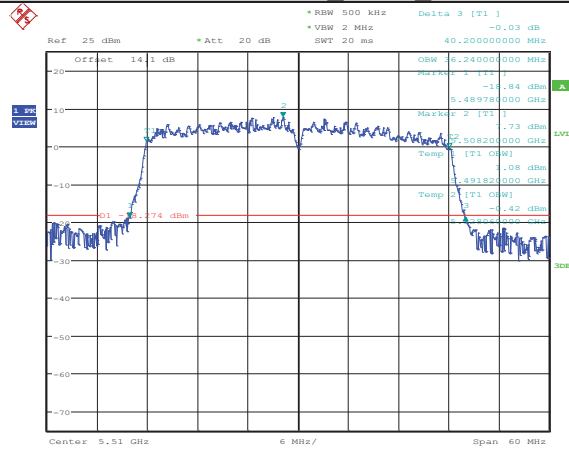


11N40MIMO ANT1 5510



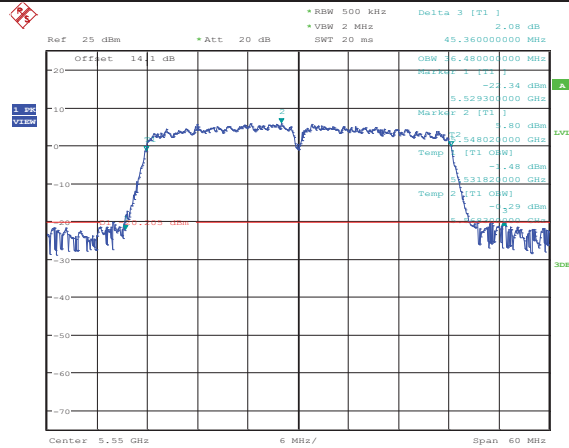
Date: 28.APR.2019 21:55:46

### 11N40MIMO ANT2 5510



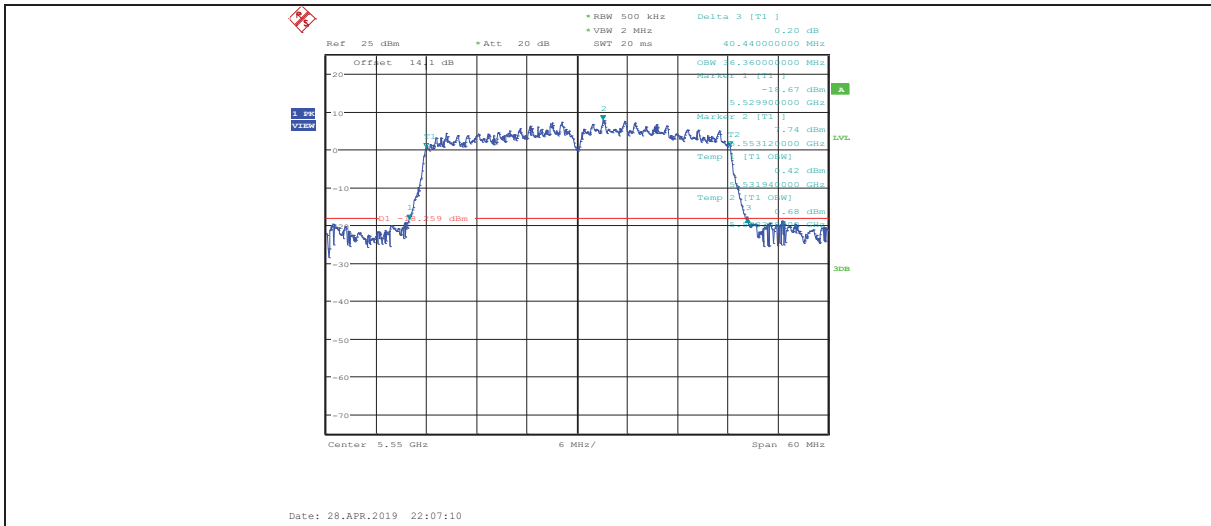
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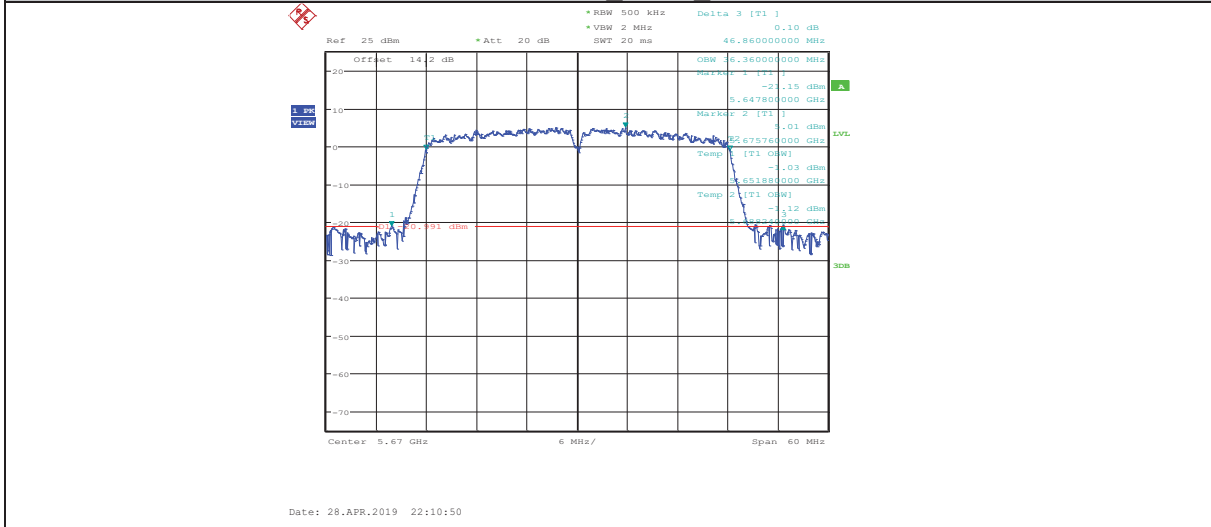


Date: 28.APR.2019 22:03:39

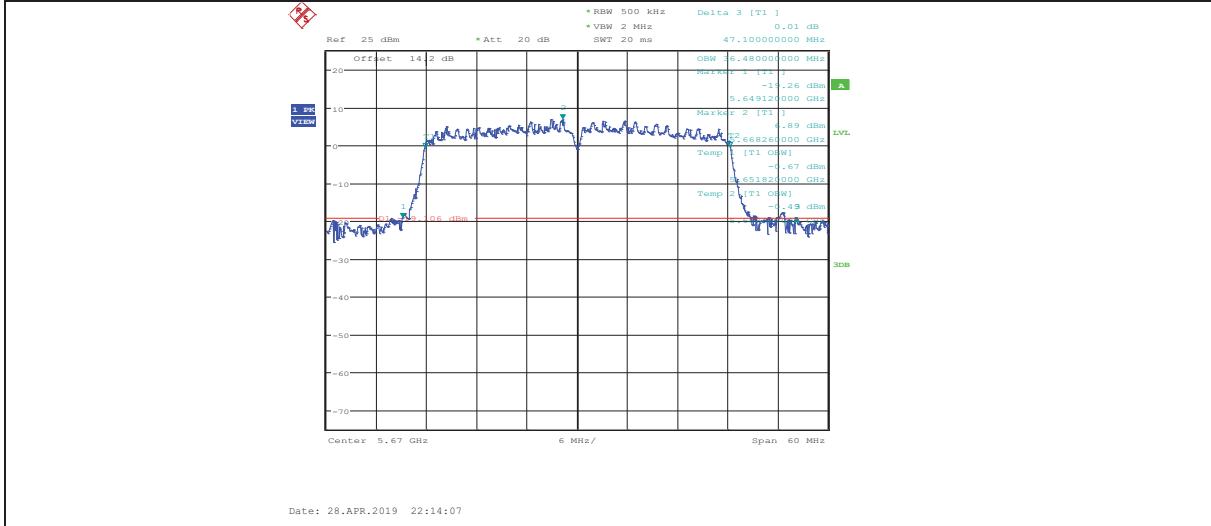
### 11N40MIMO ANT2 5550



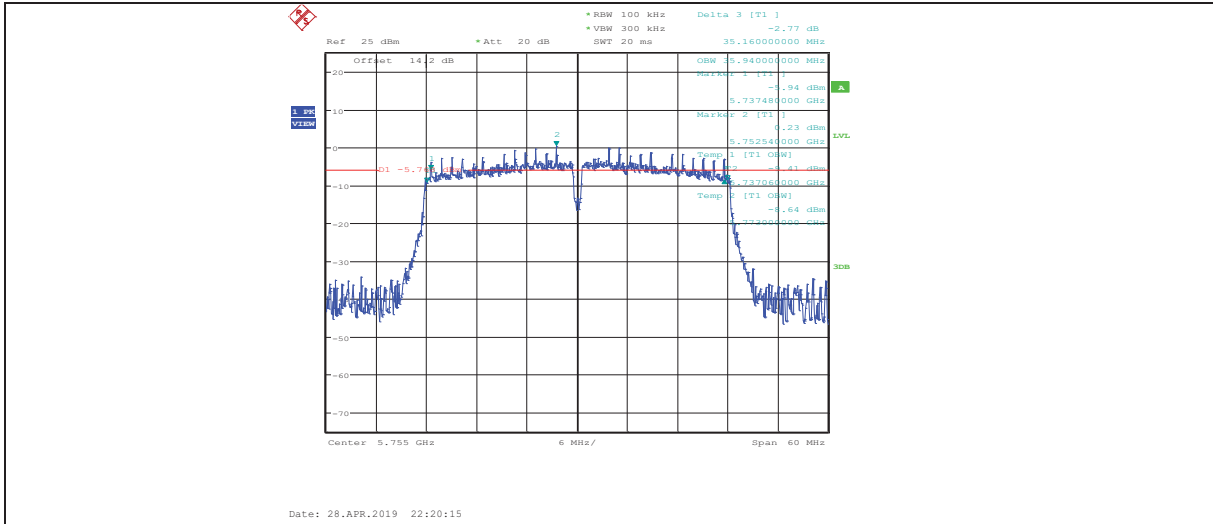
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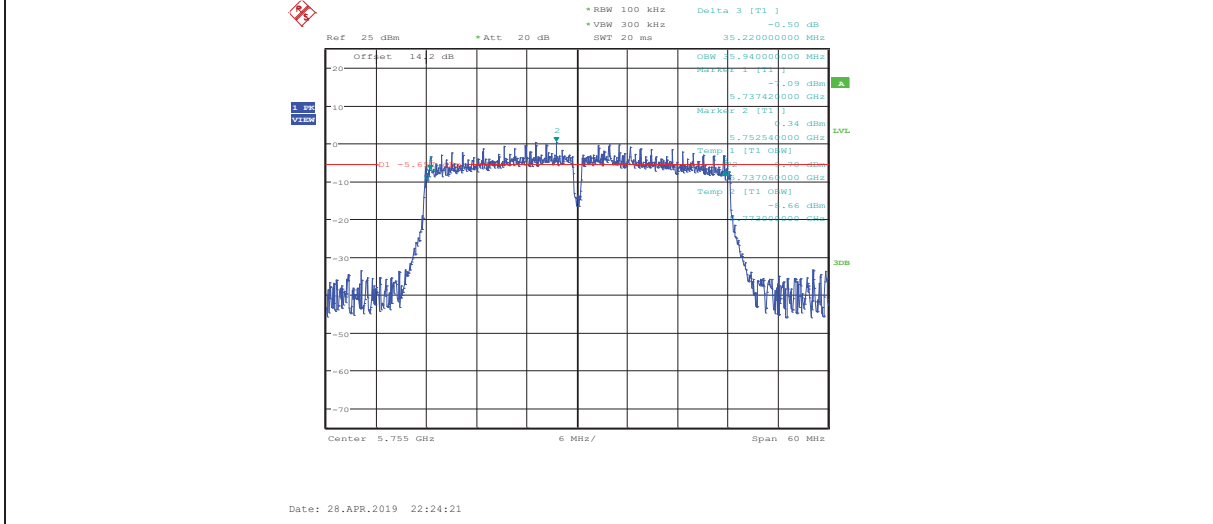
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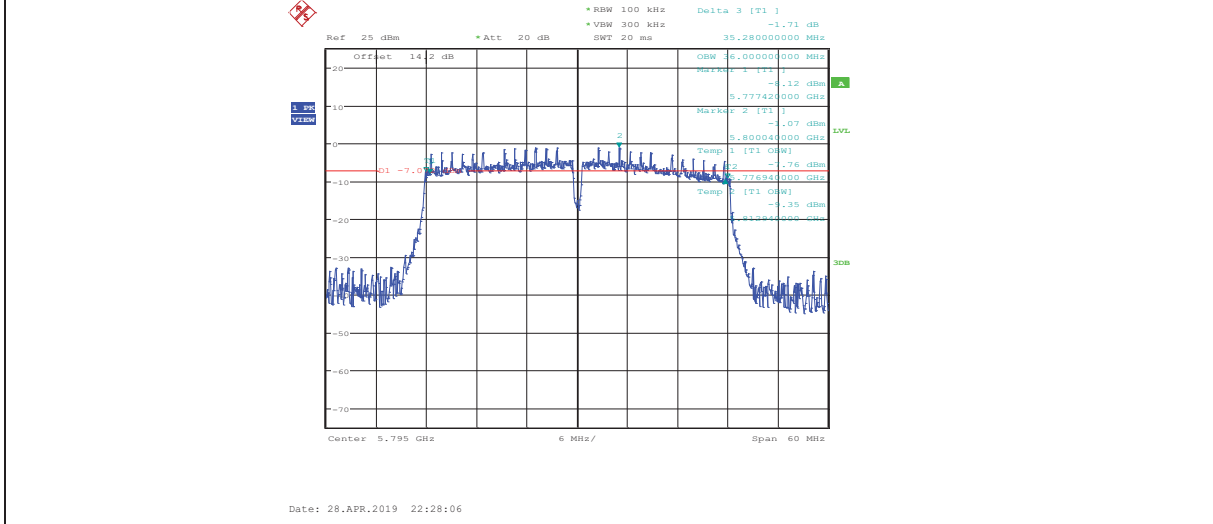
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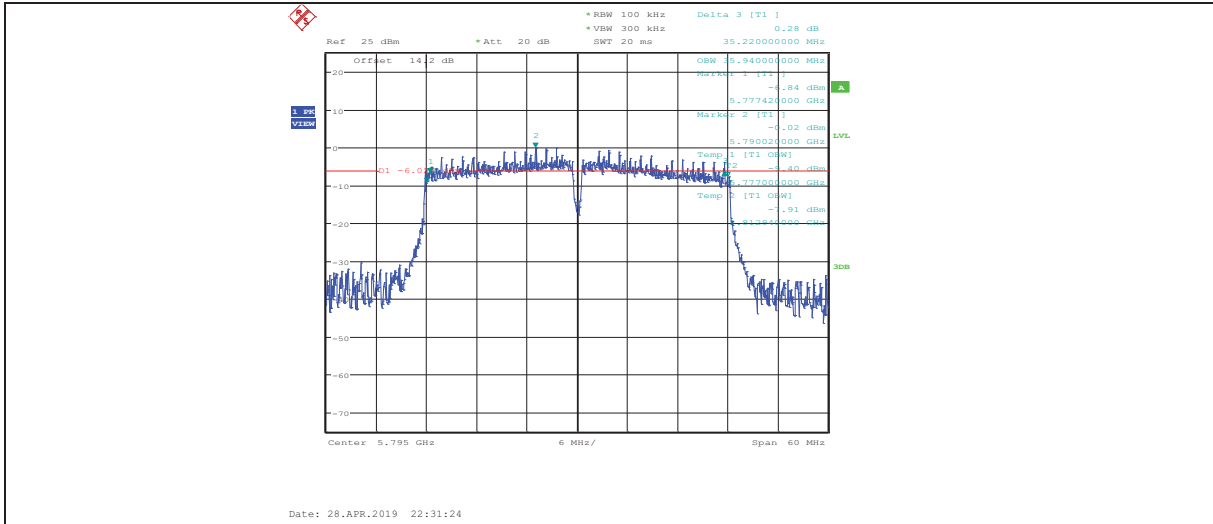
11N40MIMO\_ANT2\_5755



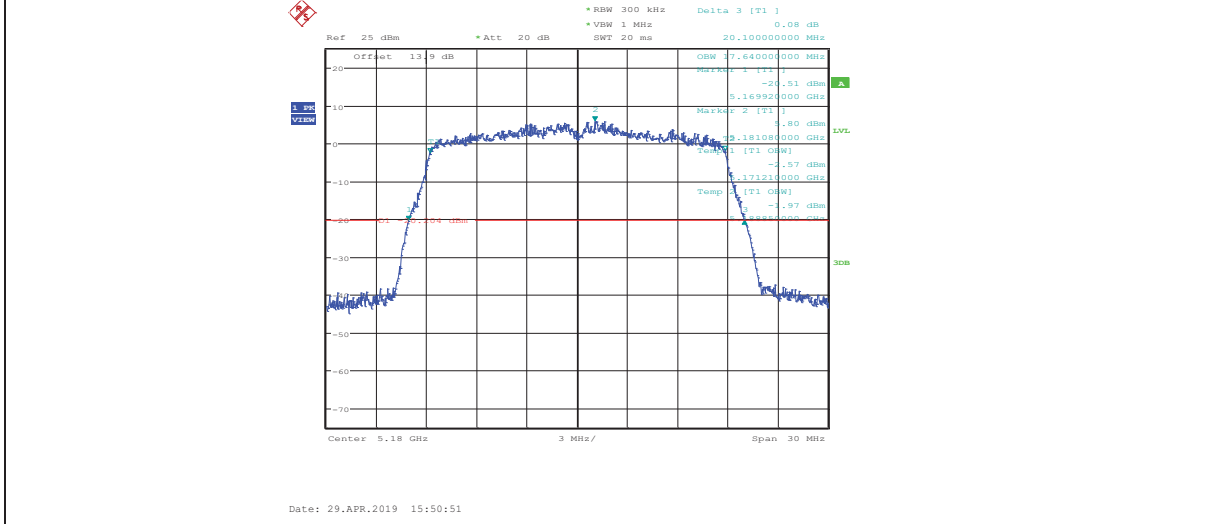
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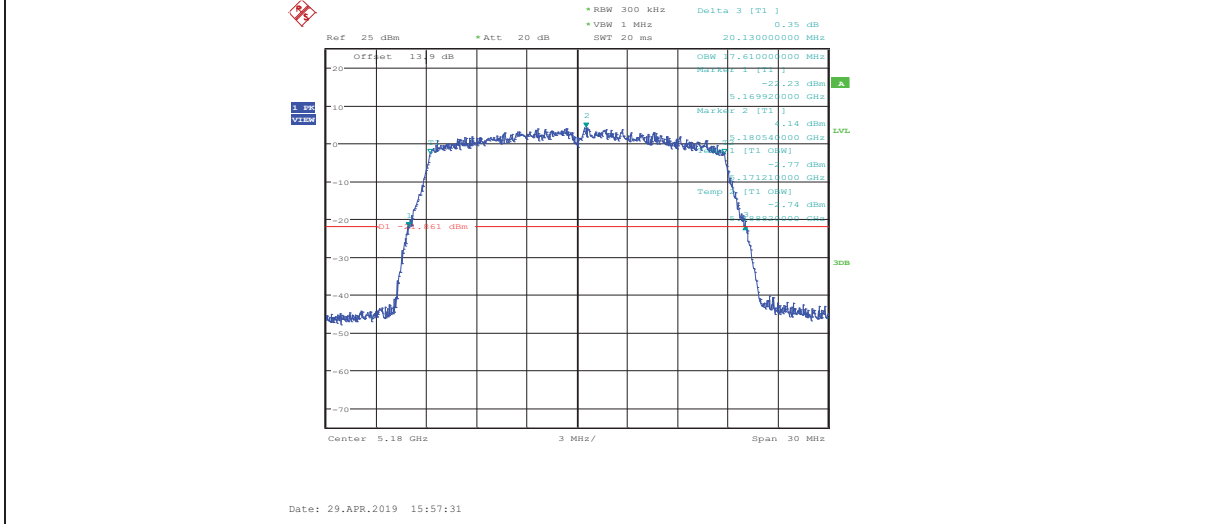
11N40MIMO\_ANT2\_5795



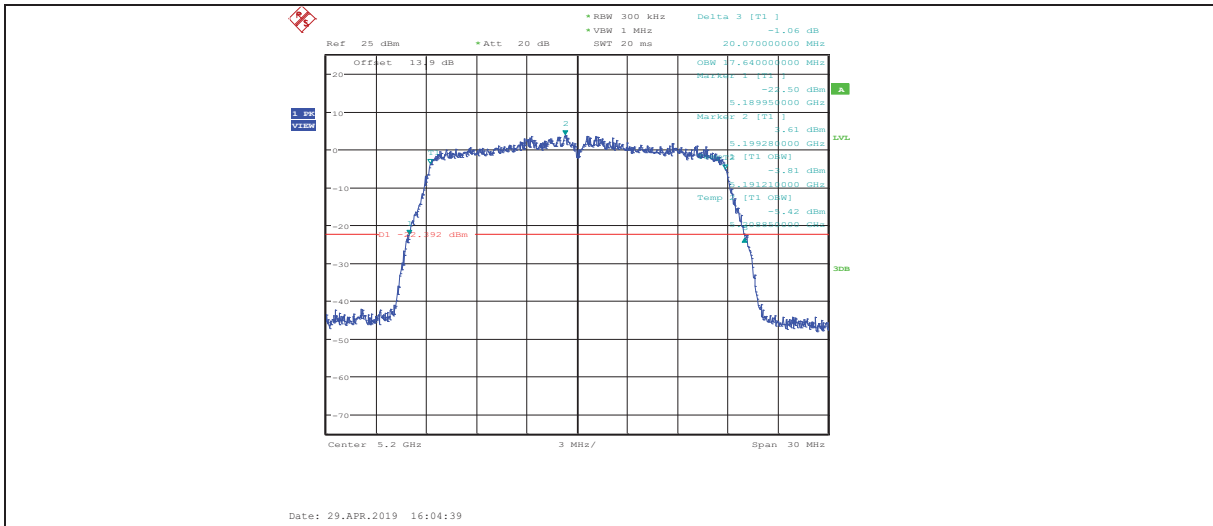
11AC20MIMO ANT1 5180



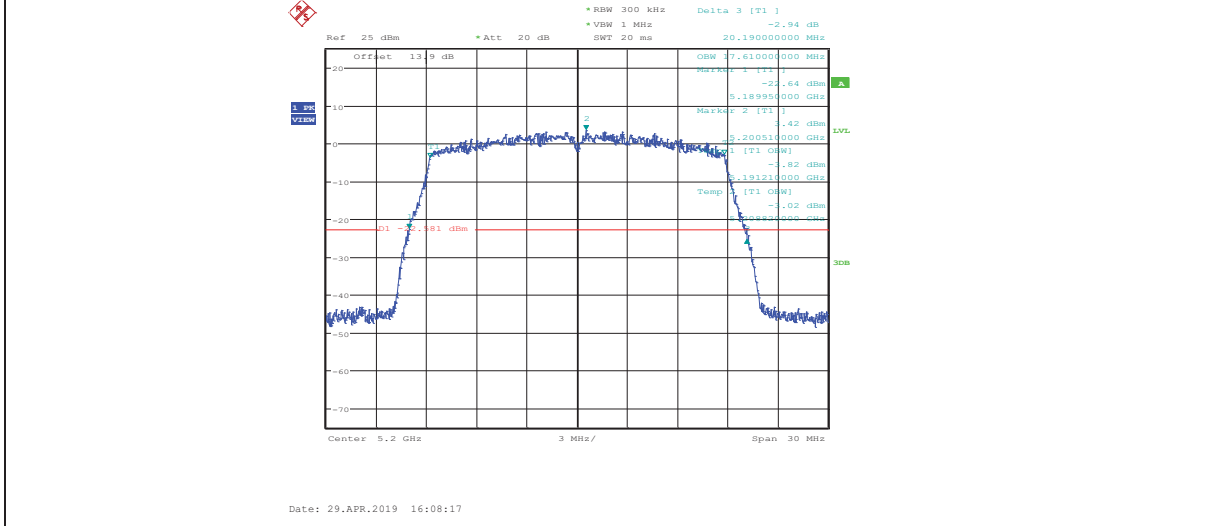
11AC20MIMO ANT2 5180



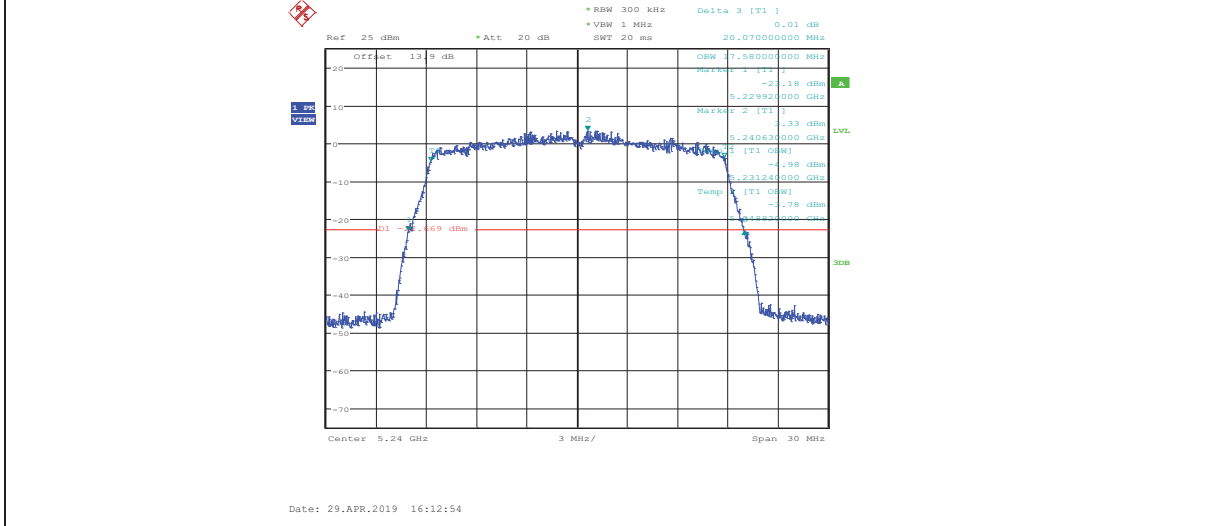
11AC20MIMO ANT1 5200



11AC20MIMO ANT2 5200

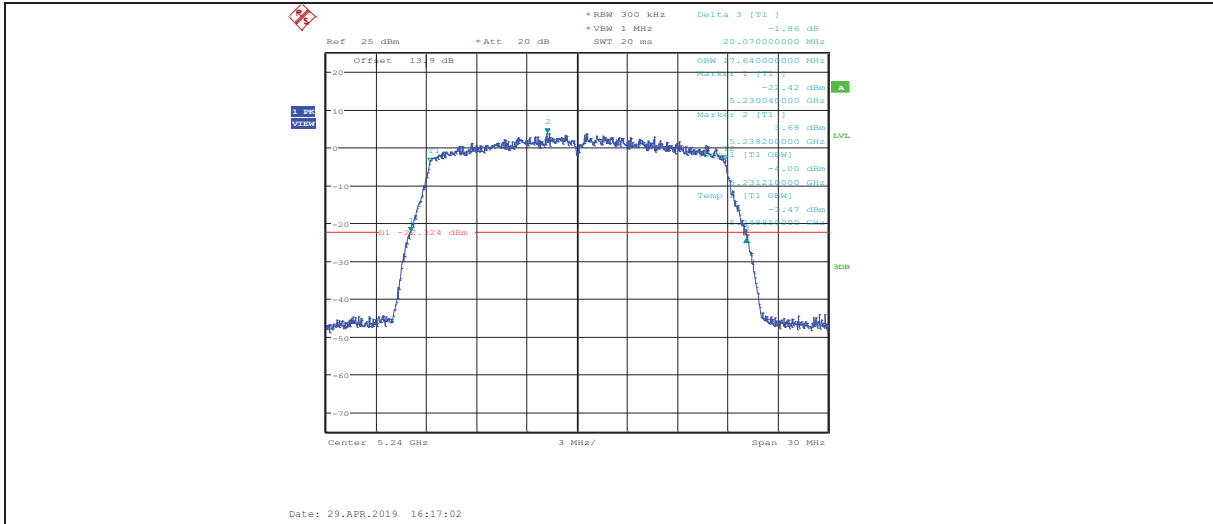


11AC20MIMO ANT1 5240

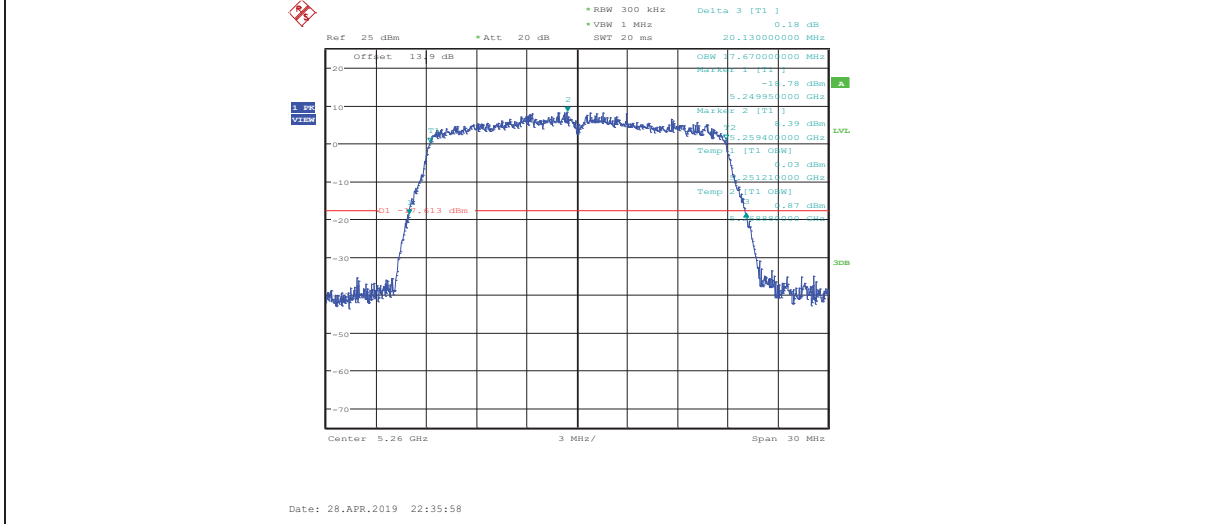


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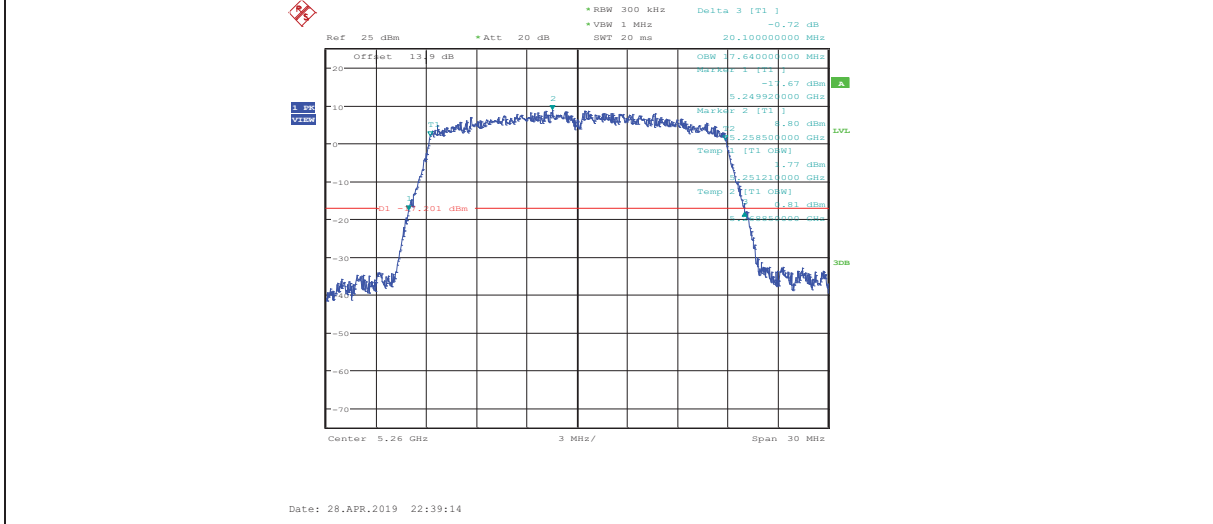




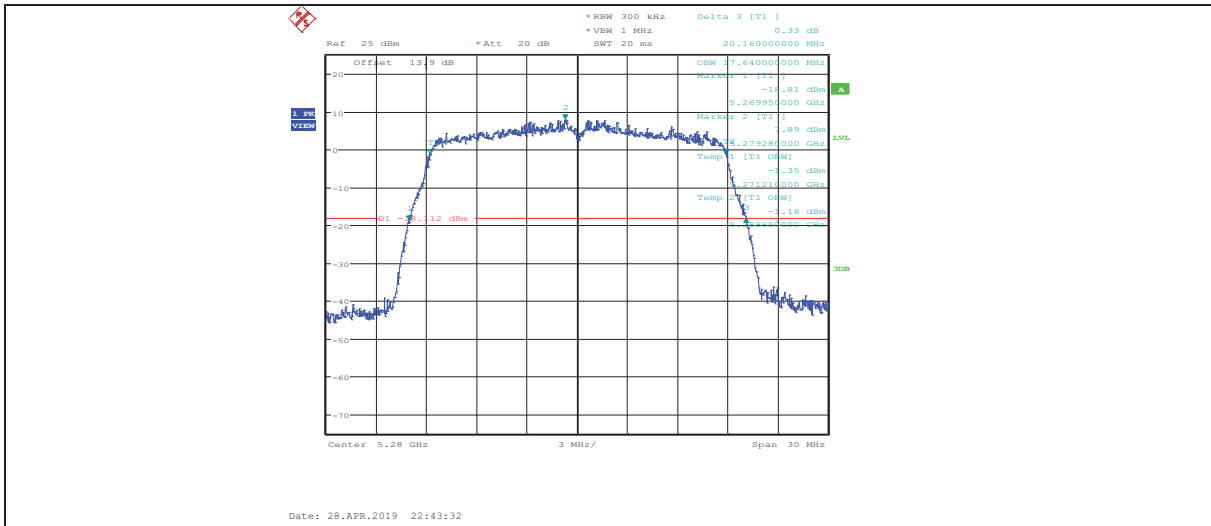
11AC20MIMO ANT1 5260



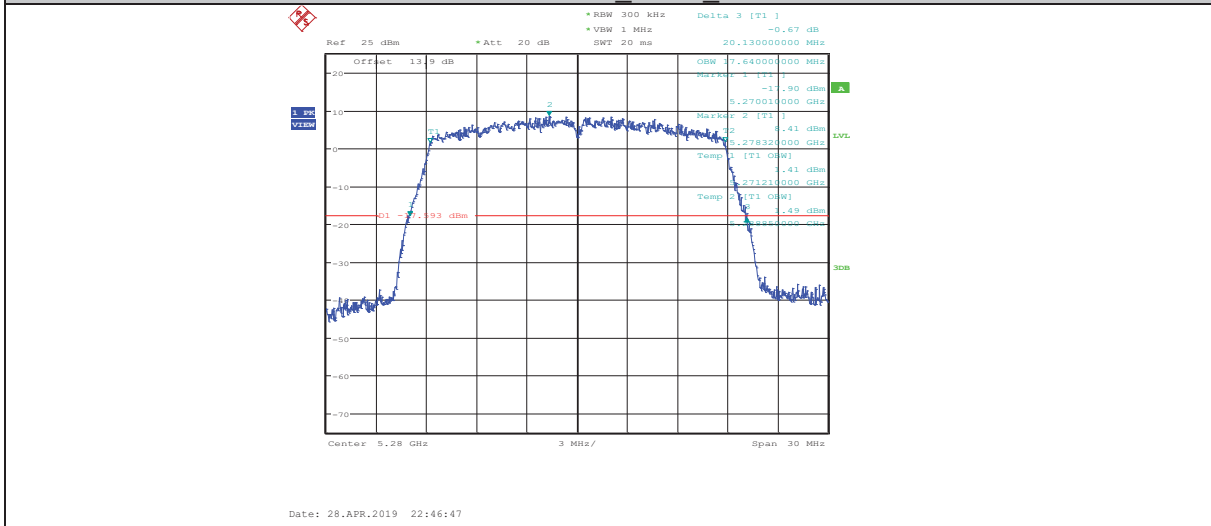
11AC20MIMO ANT2 5260



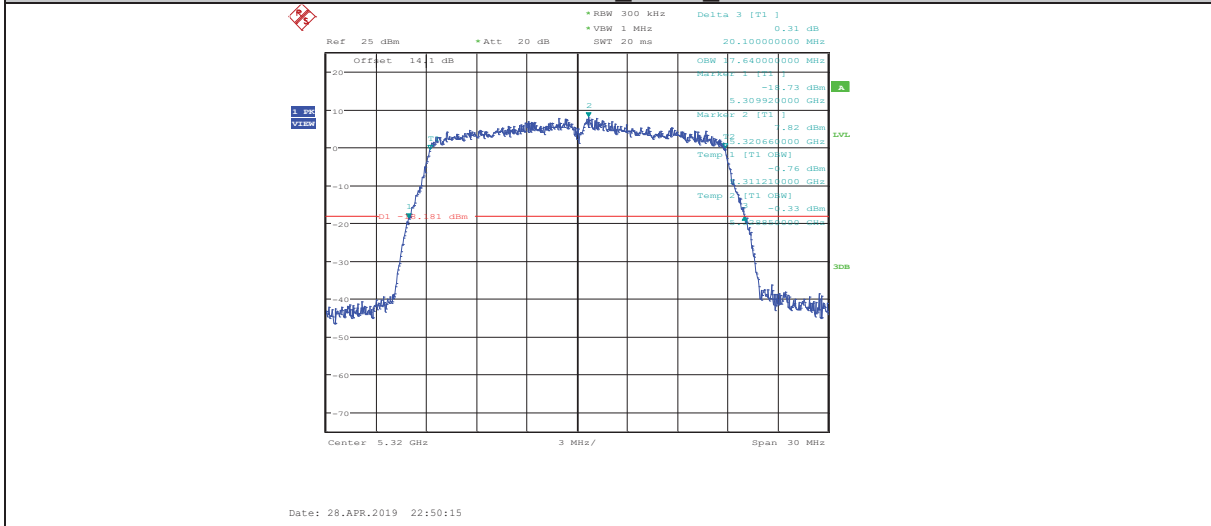
11AC20MIMO ANT1 5280



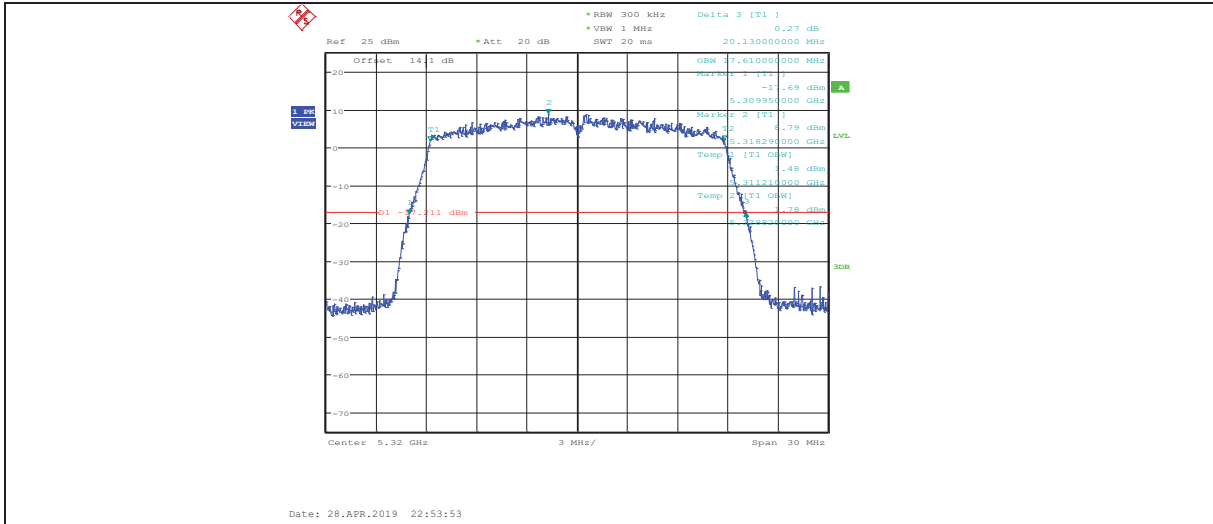
11AC20MIMO ANT2 5280



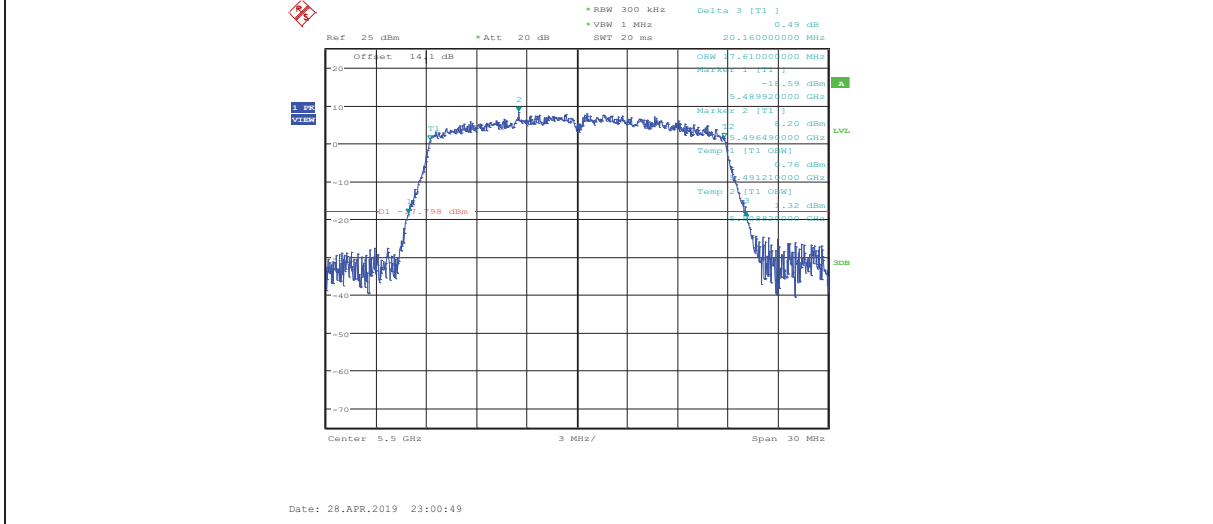
11AC20MIMO ANT1 5320



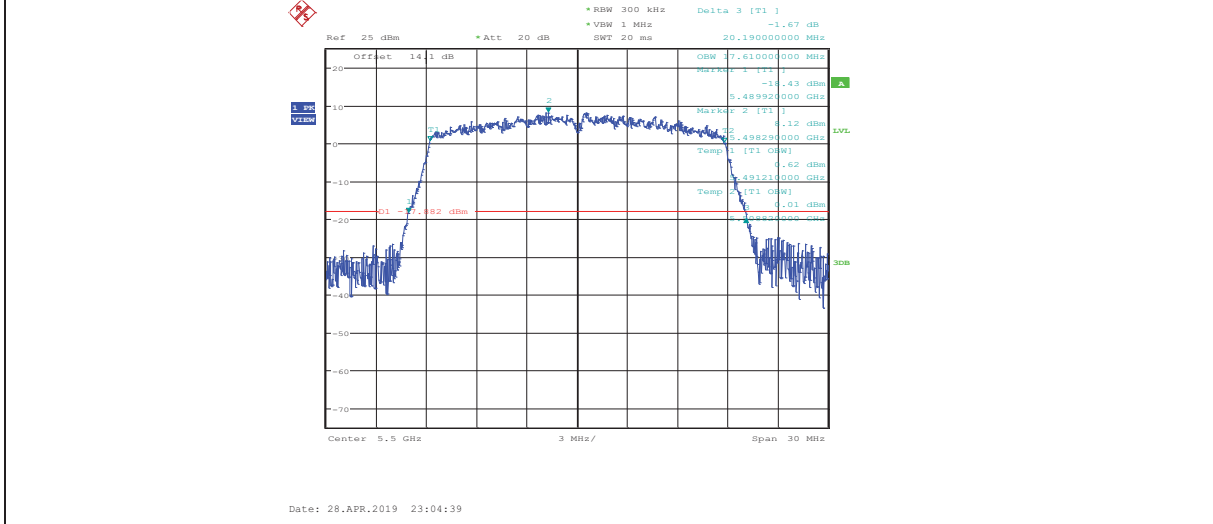
11AC20MIMO ANT2 5320



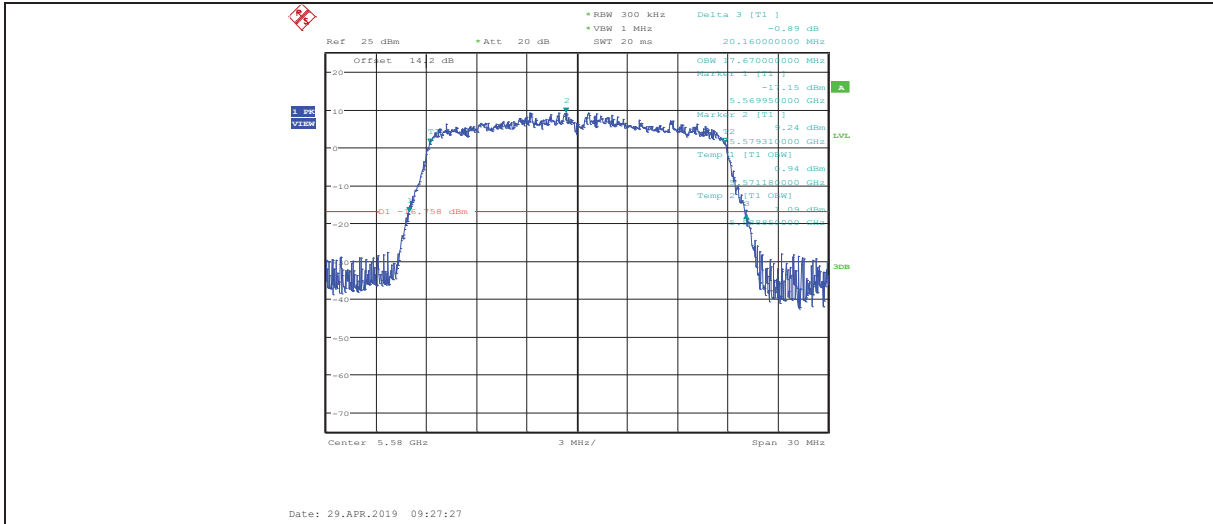
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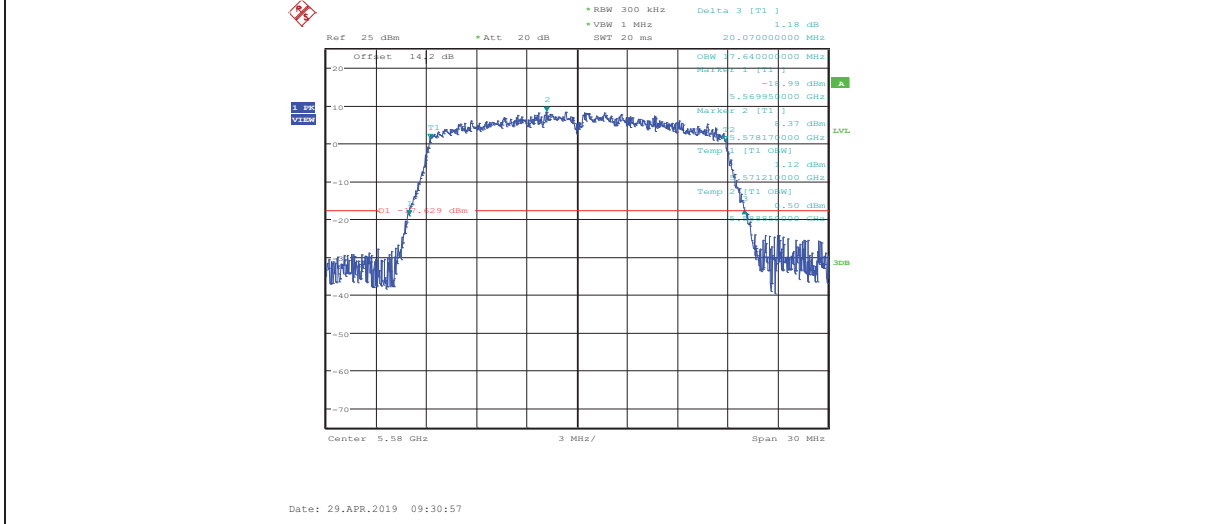
11AC20MIMO ANT2 5500



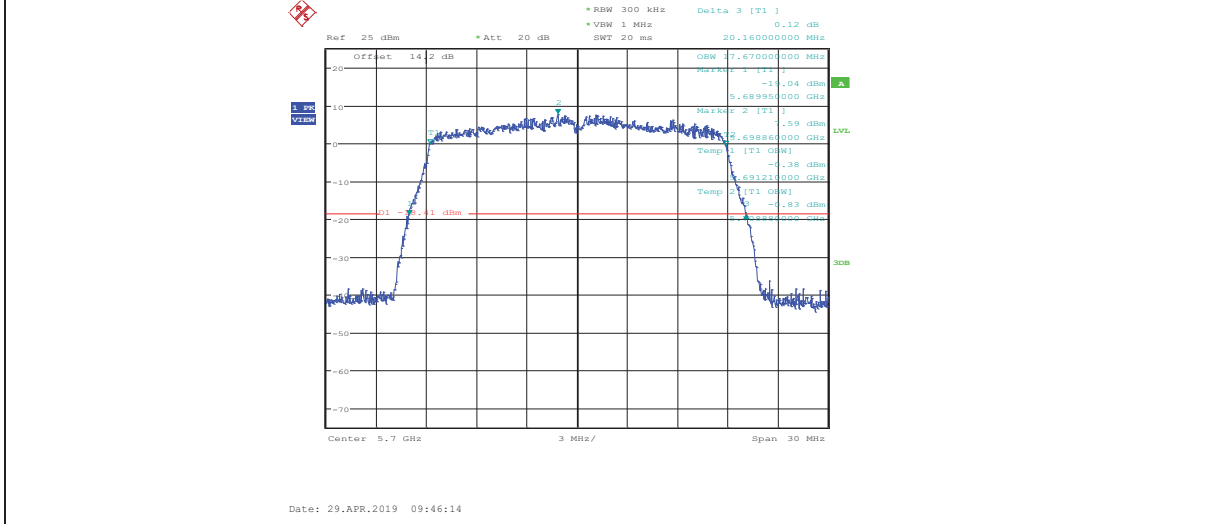
11AC20MIMO ANT1 5580



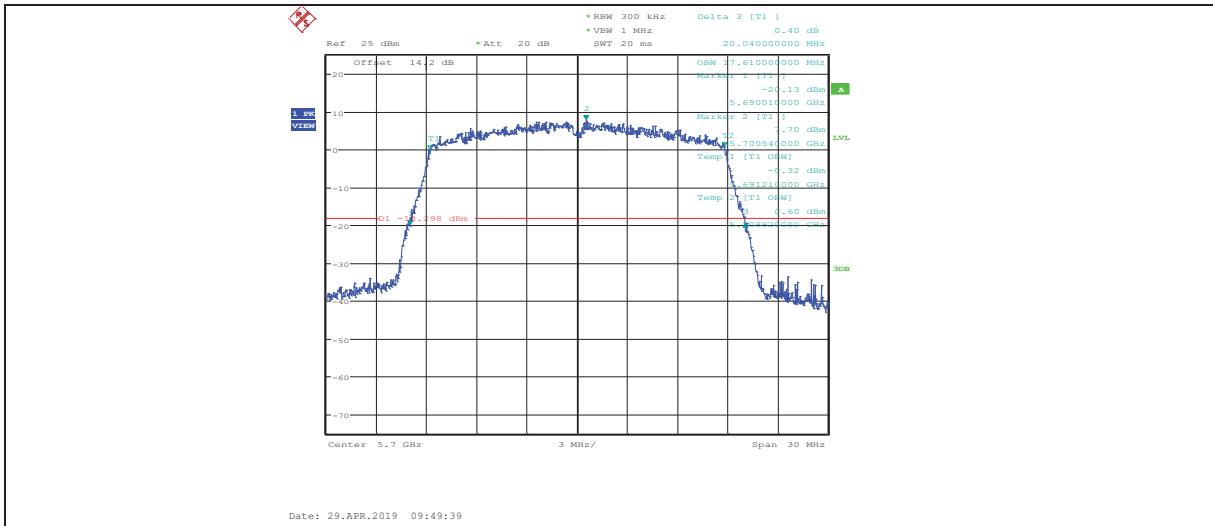
11AC20MIMO ANT2 5580



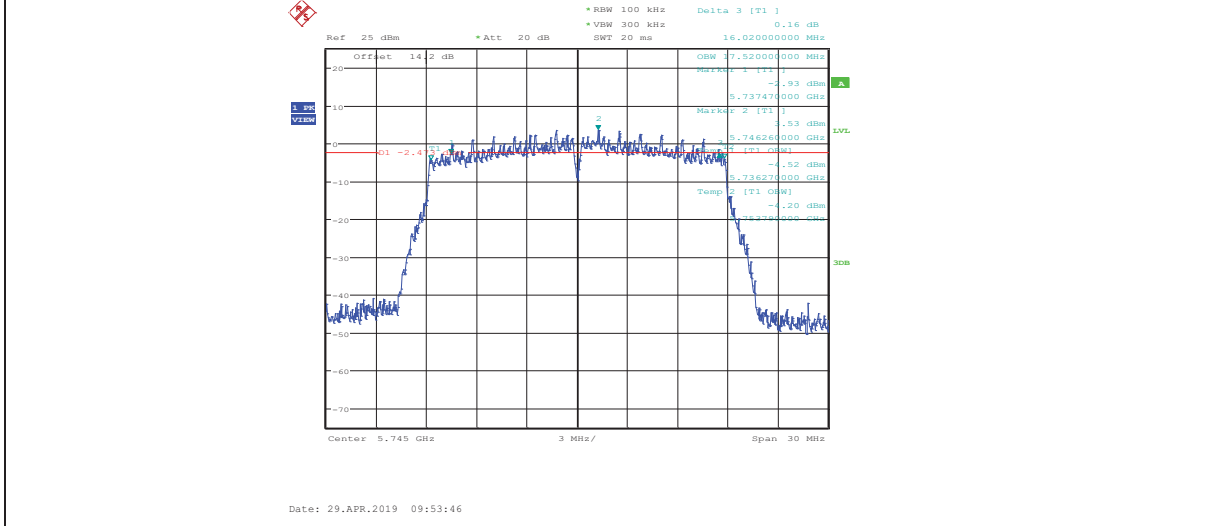
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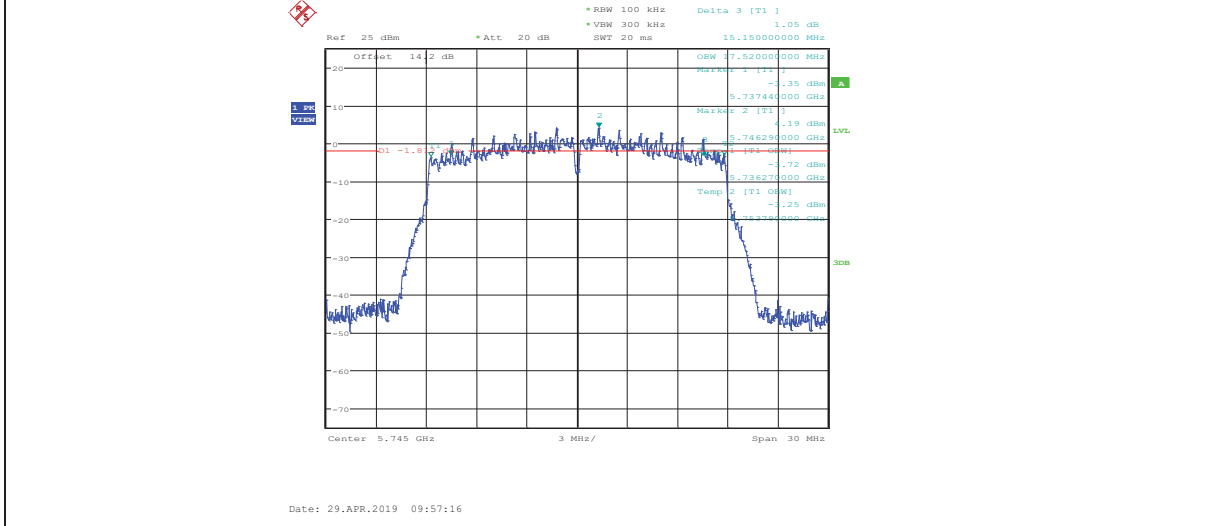
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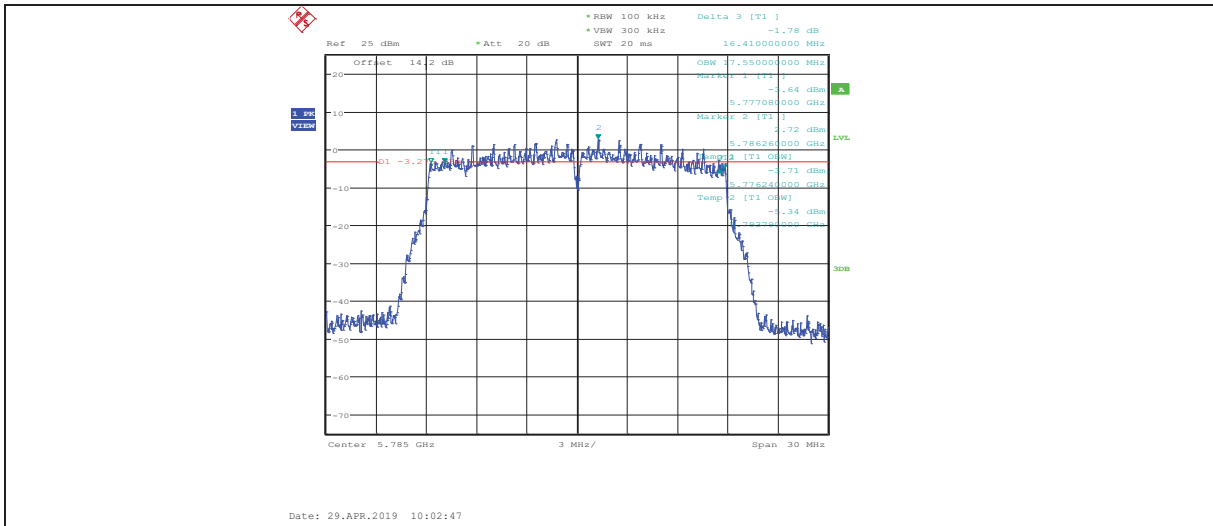
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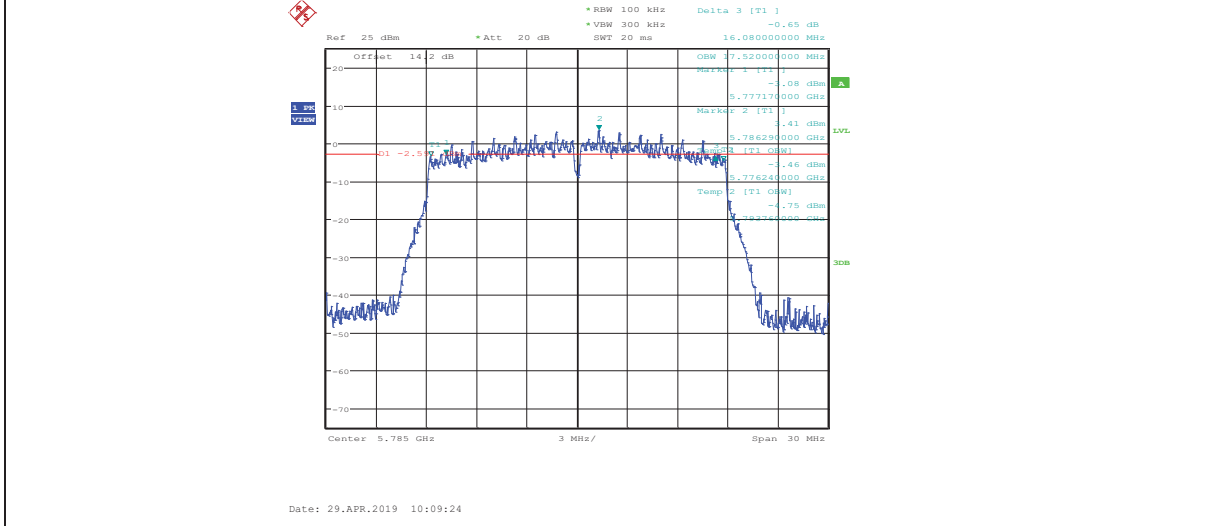
11AC20MIMO ANT2 5745



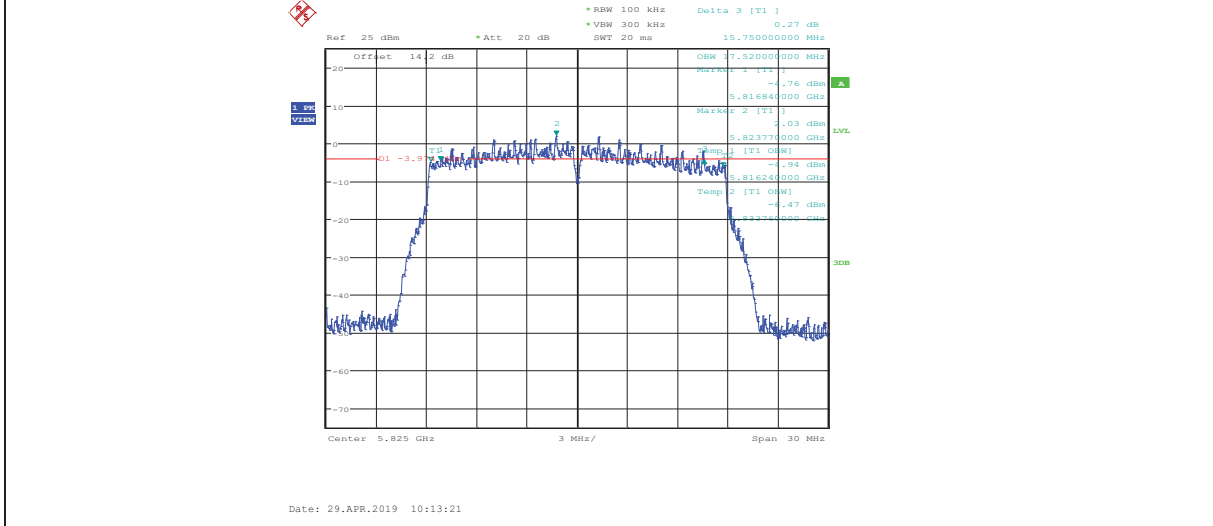
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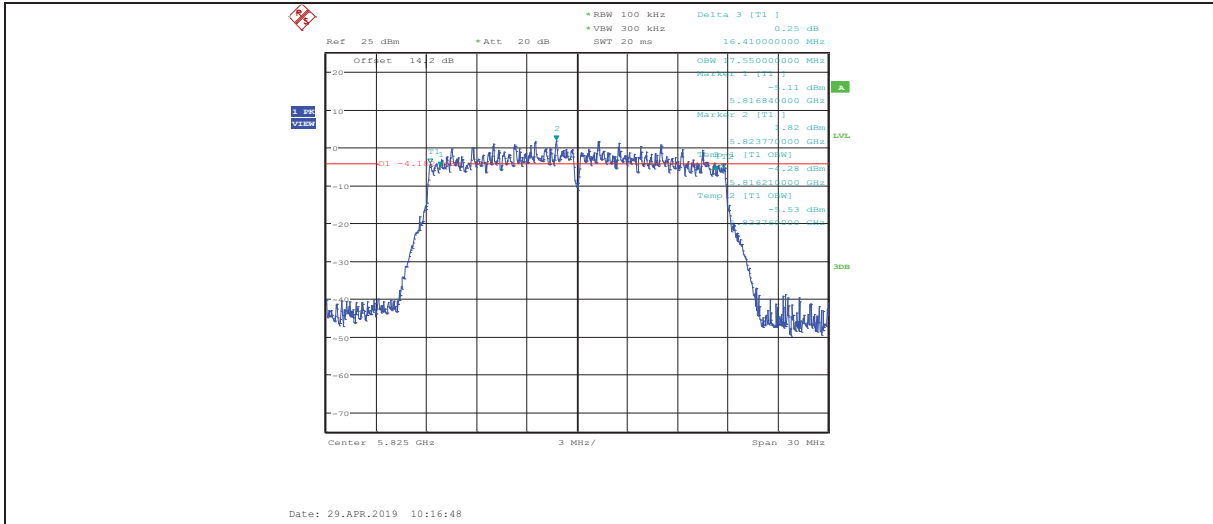
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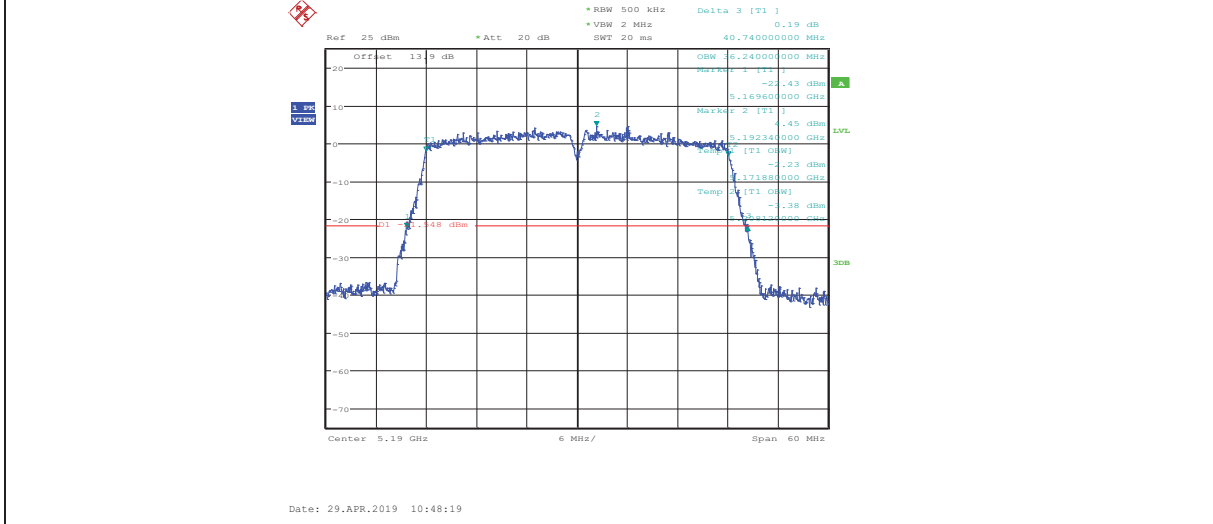
11AC20MIMO ANT1 5825



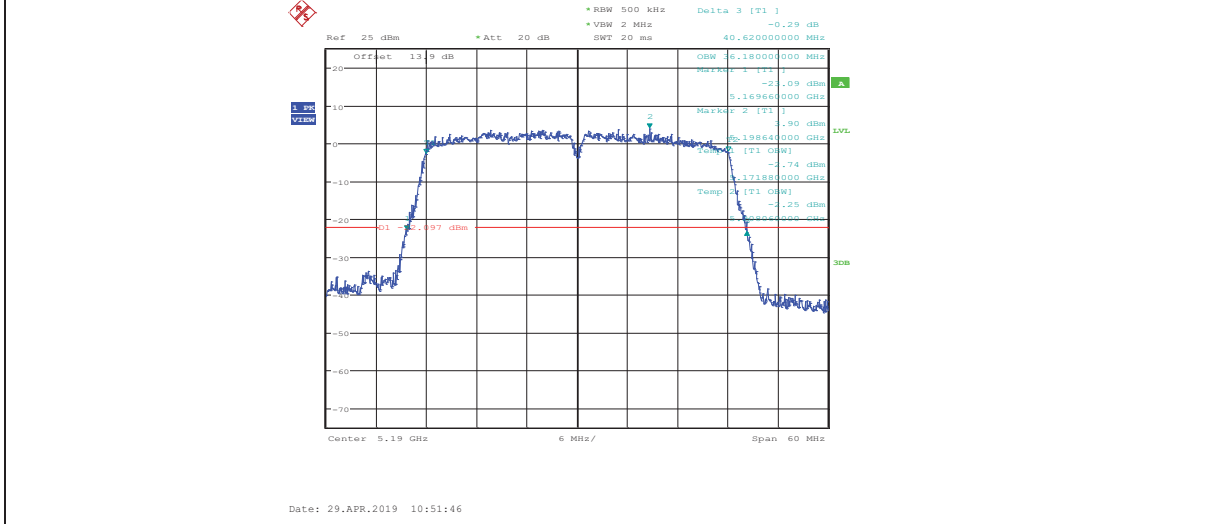
11AC20MIMO ANT2 5825



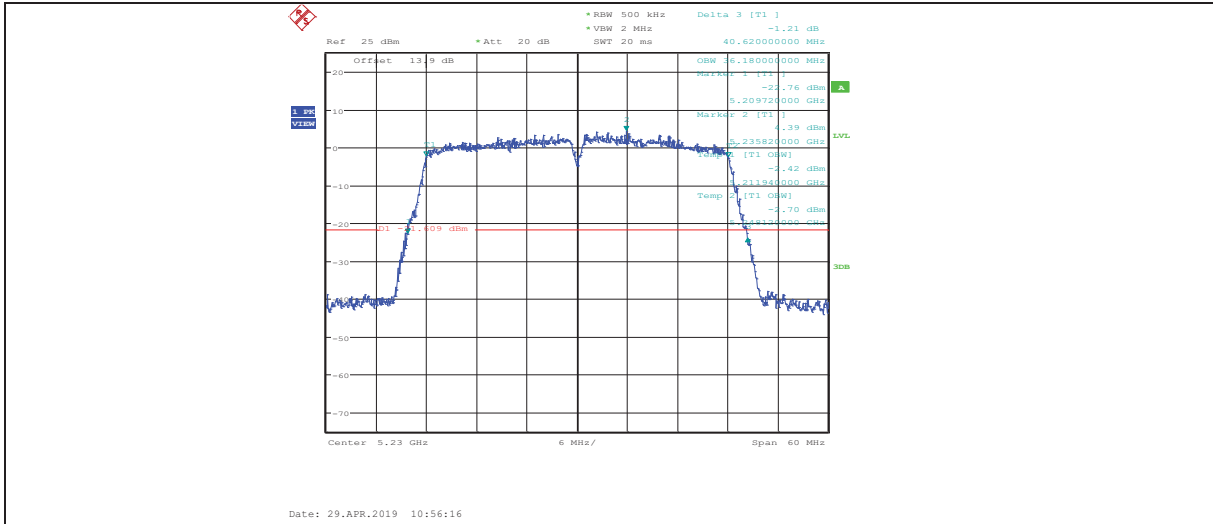
11AC40MIMO ANT1 5190



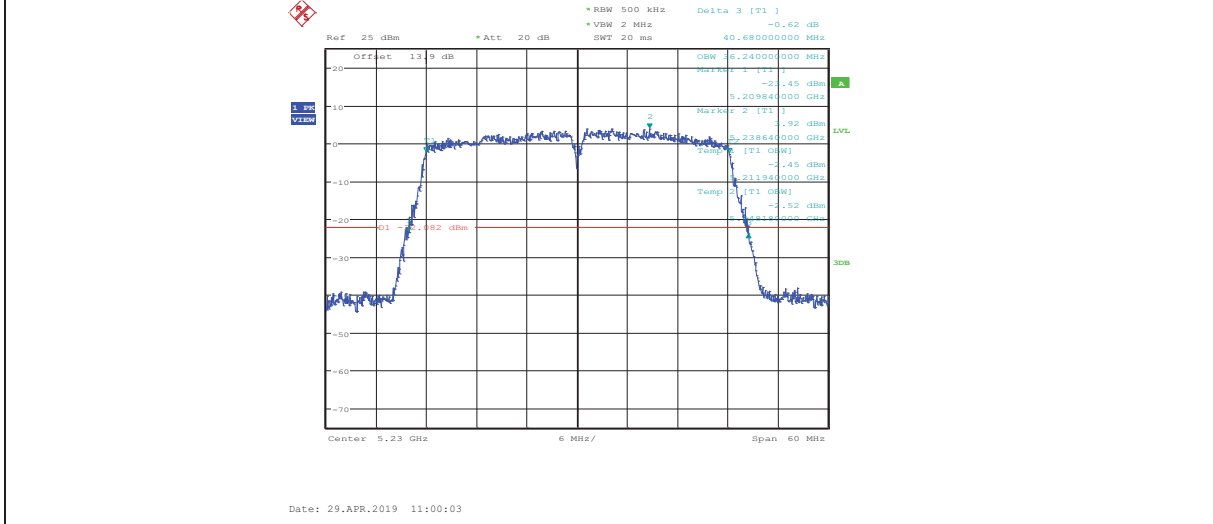
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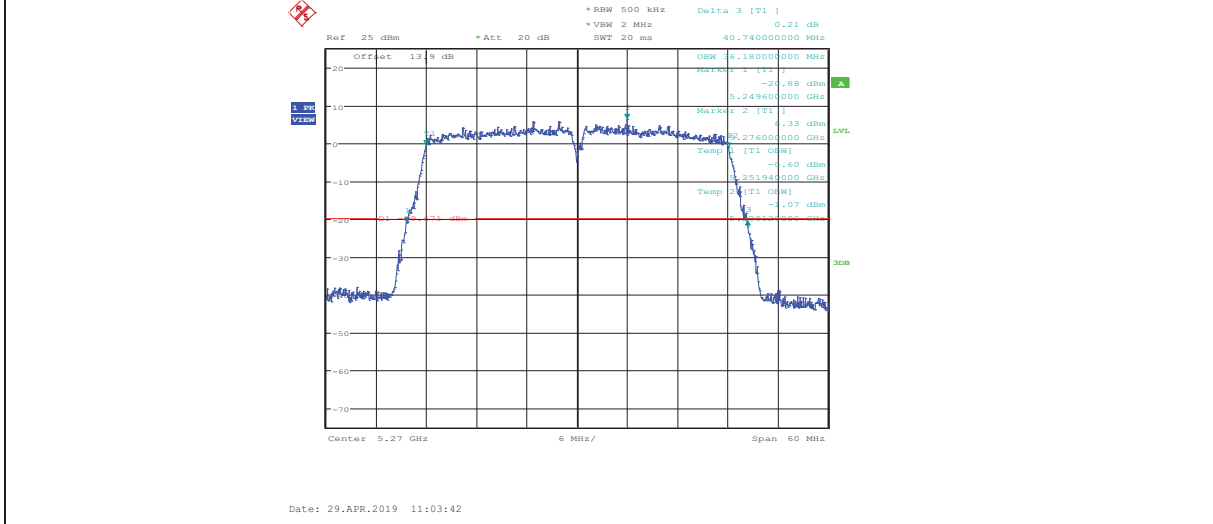
11AC40MIMO ANT1 5230



11AC40MIMO ANT2 5230

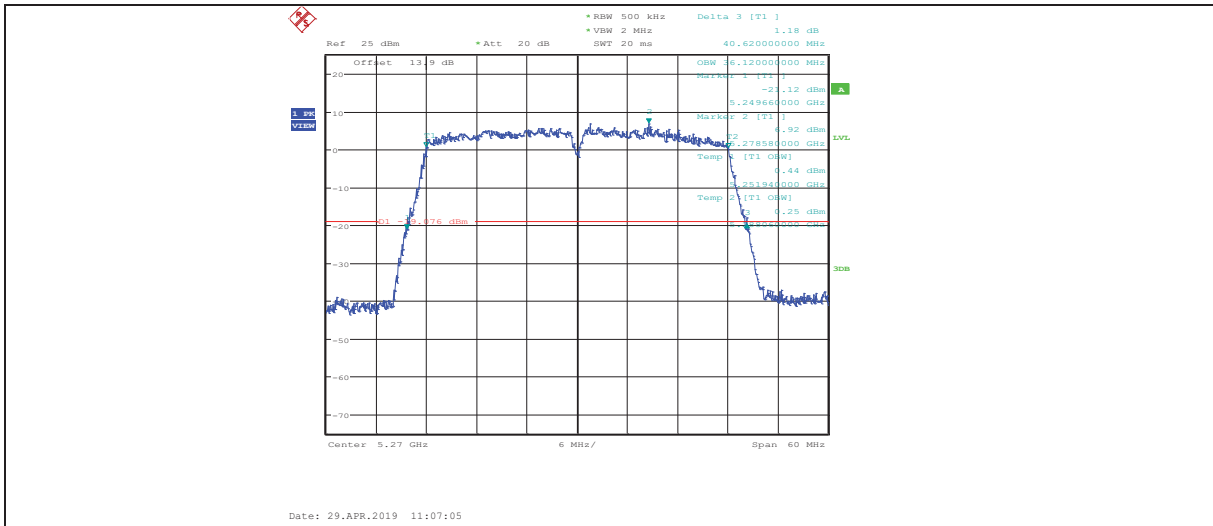


11AC40MIMO ANT1 5270

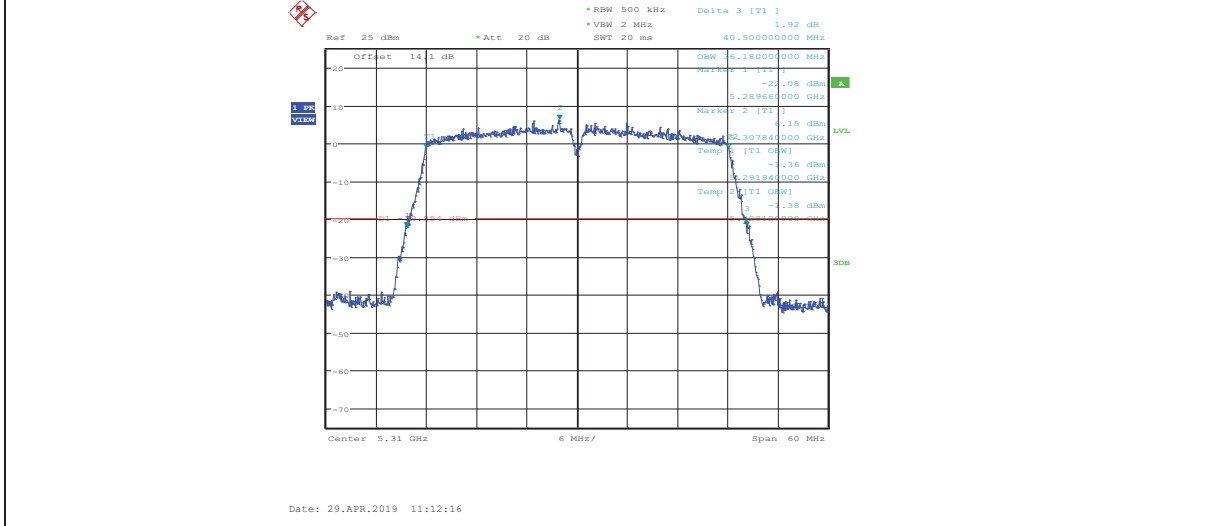


11AC40MIMO ANT2 5270

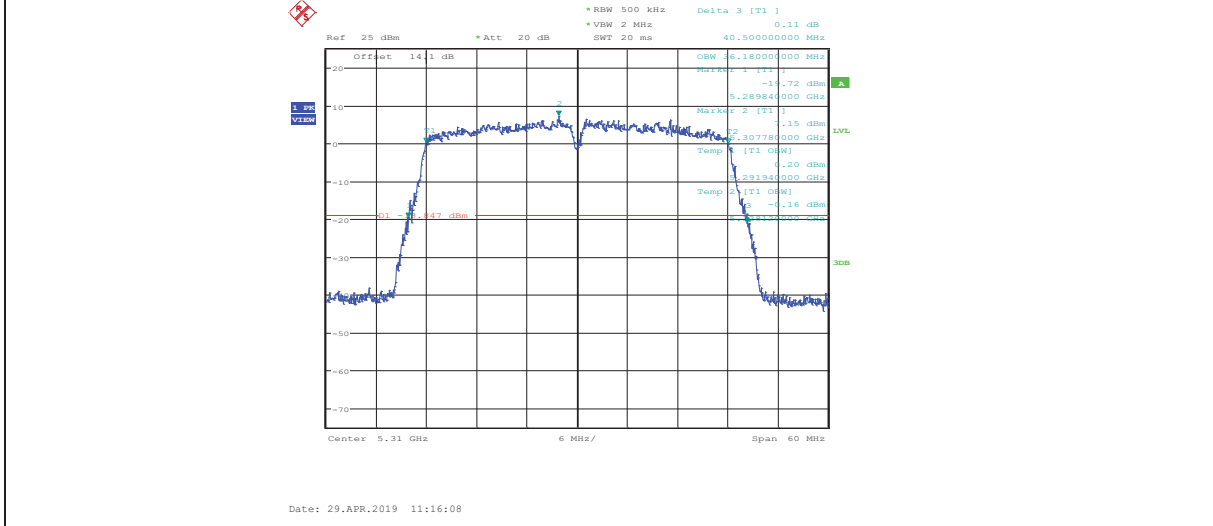




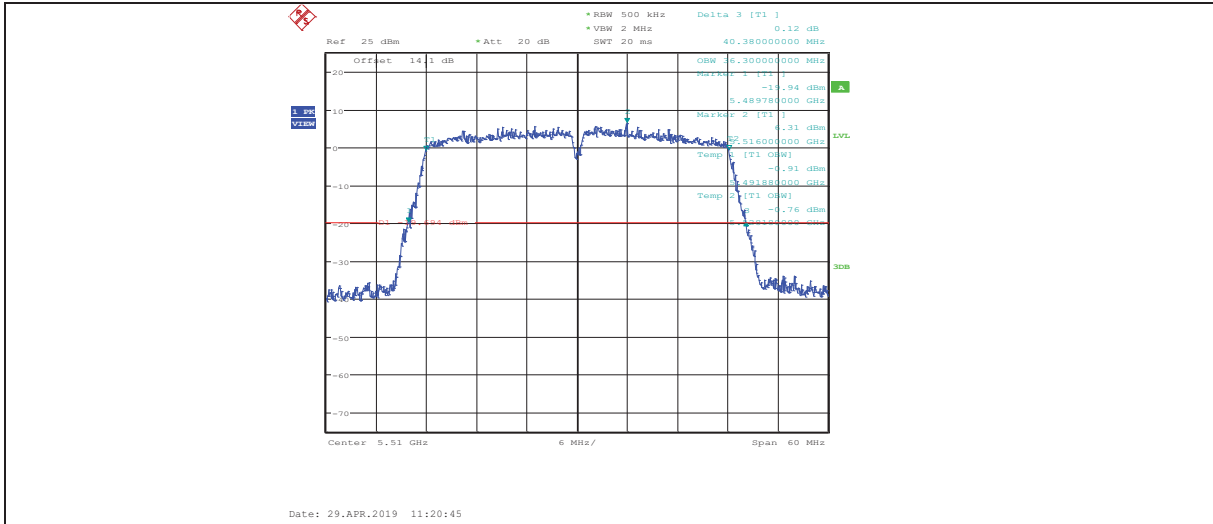
11AC40MIMO ANT1 5310



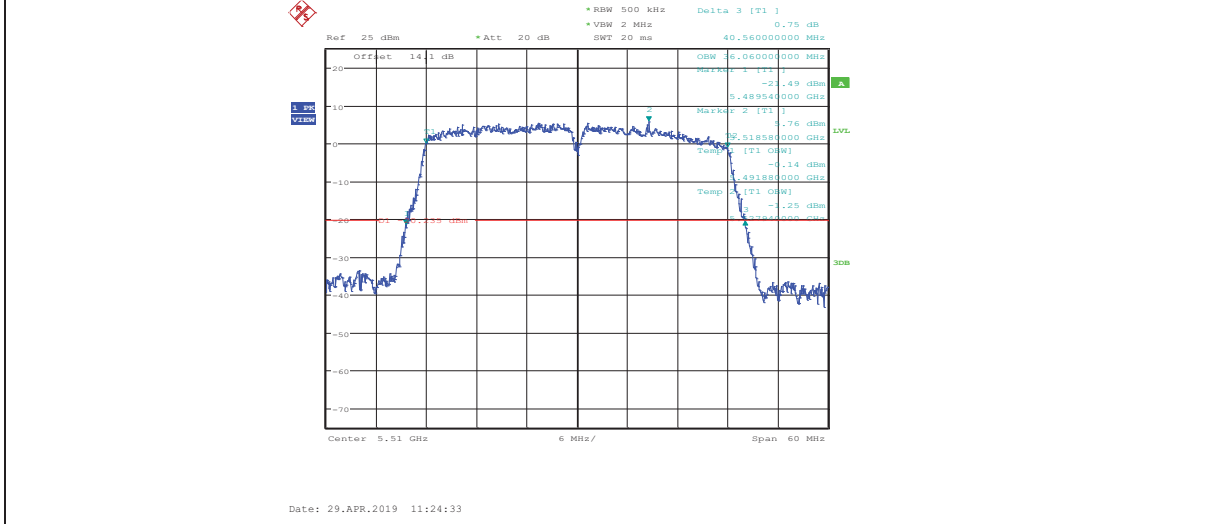
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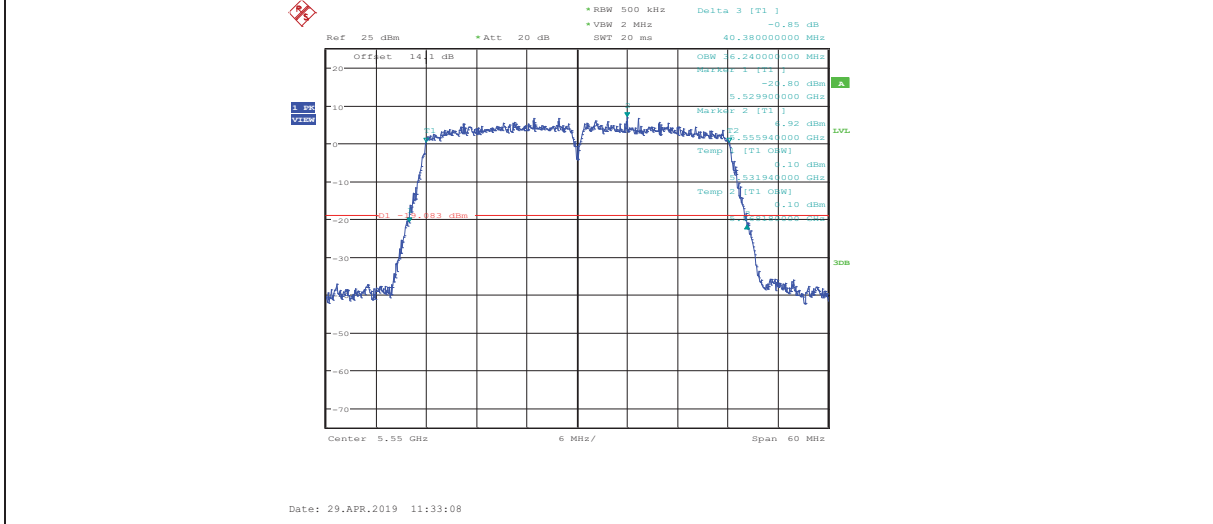
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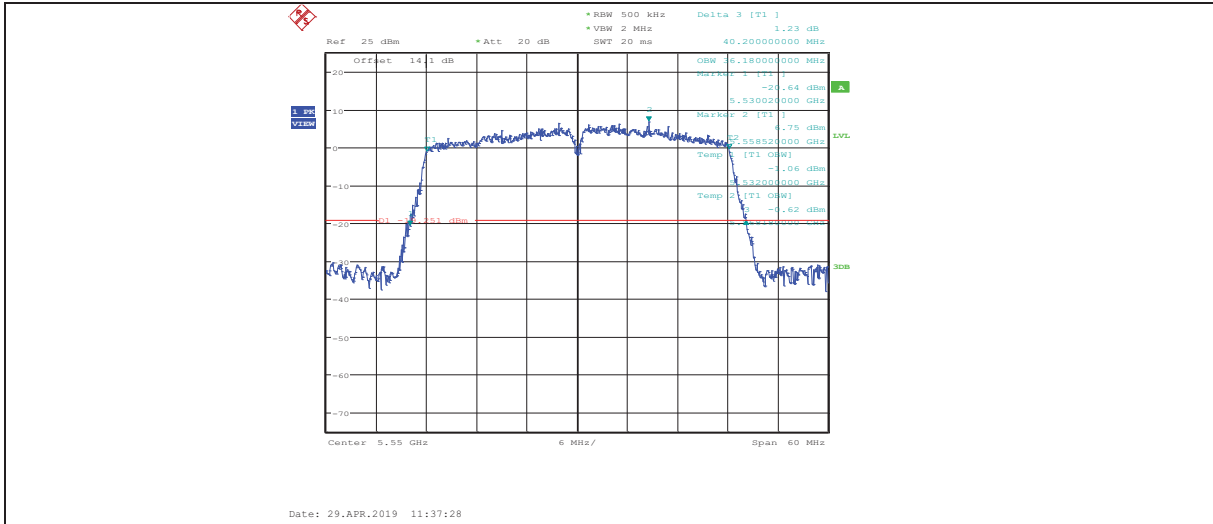
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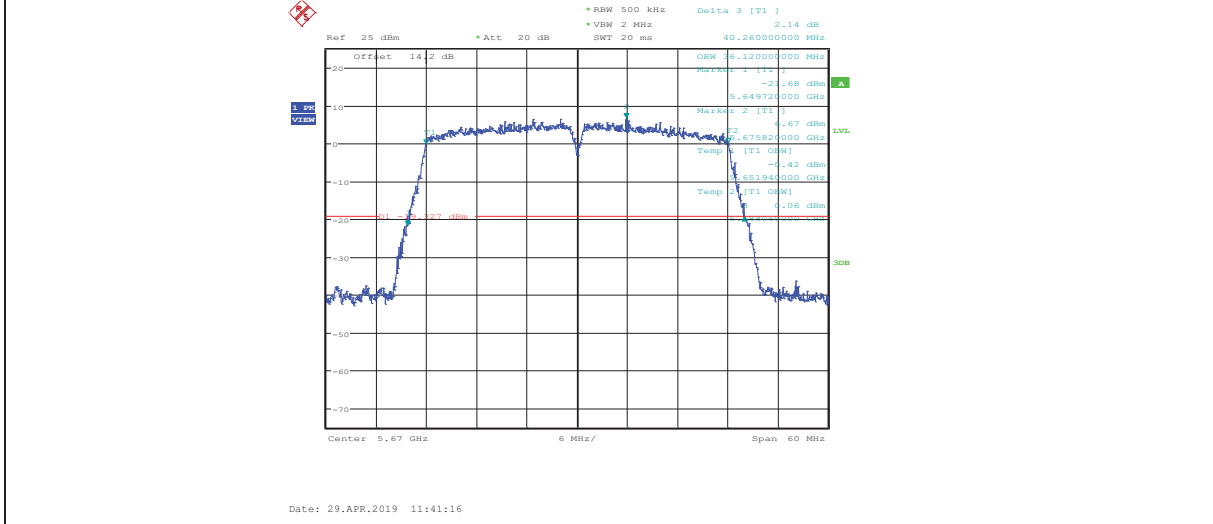
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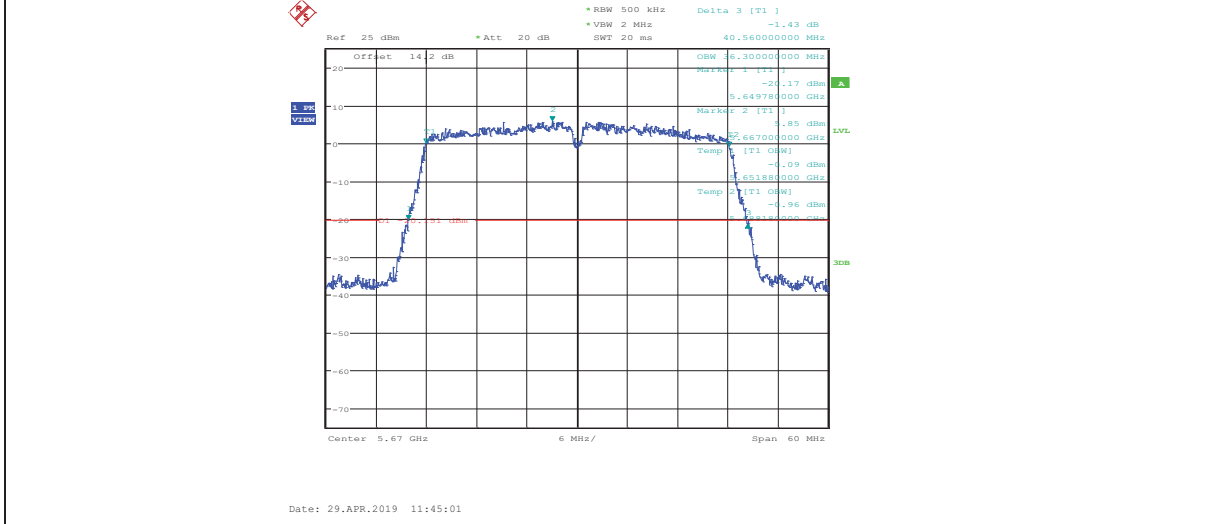
11AC40MIMO ANT2 5550



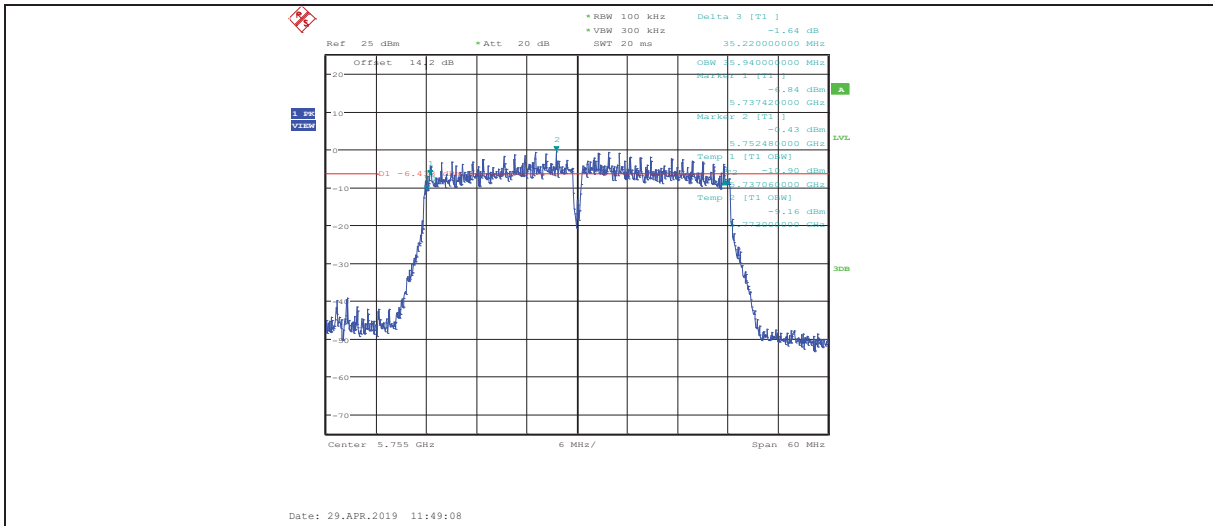
11AC40MIMO ANT1\_5670



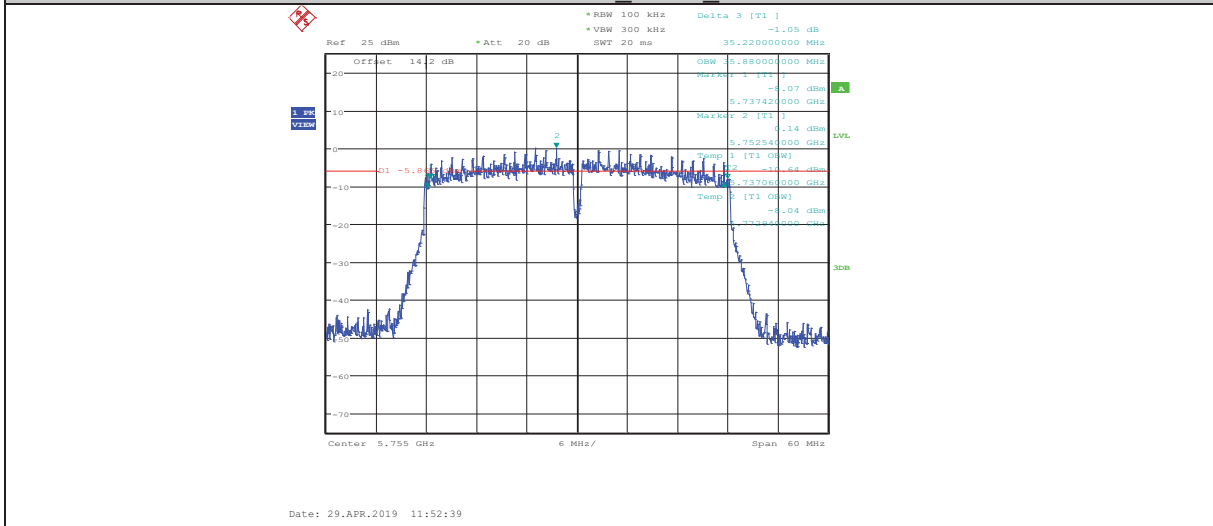
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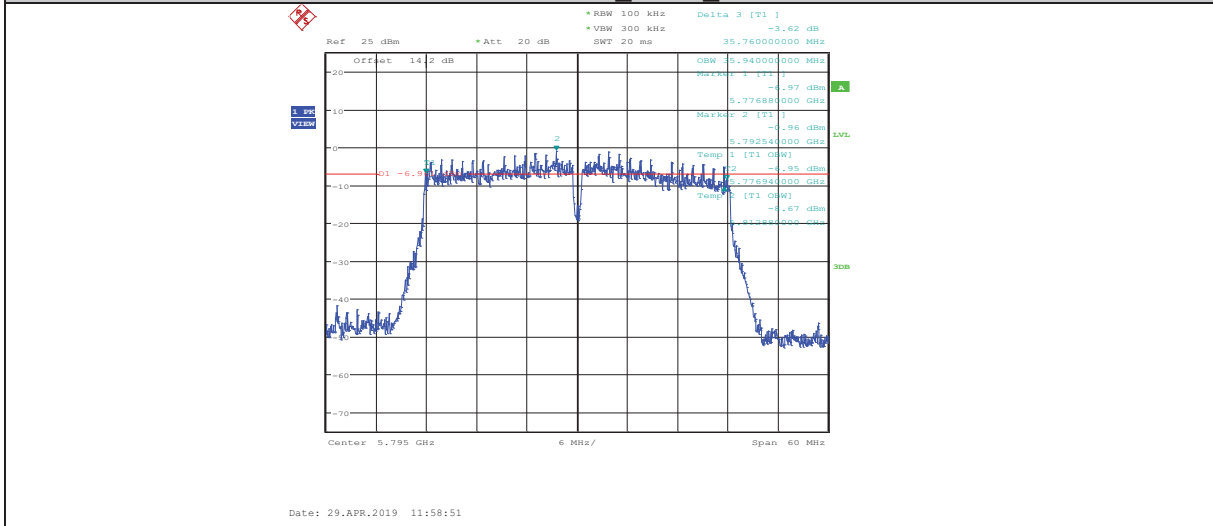
11AC40MIMO ANT1\_5755



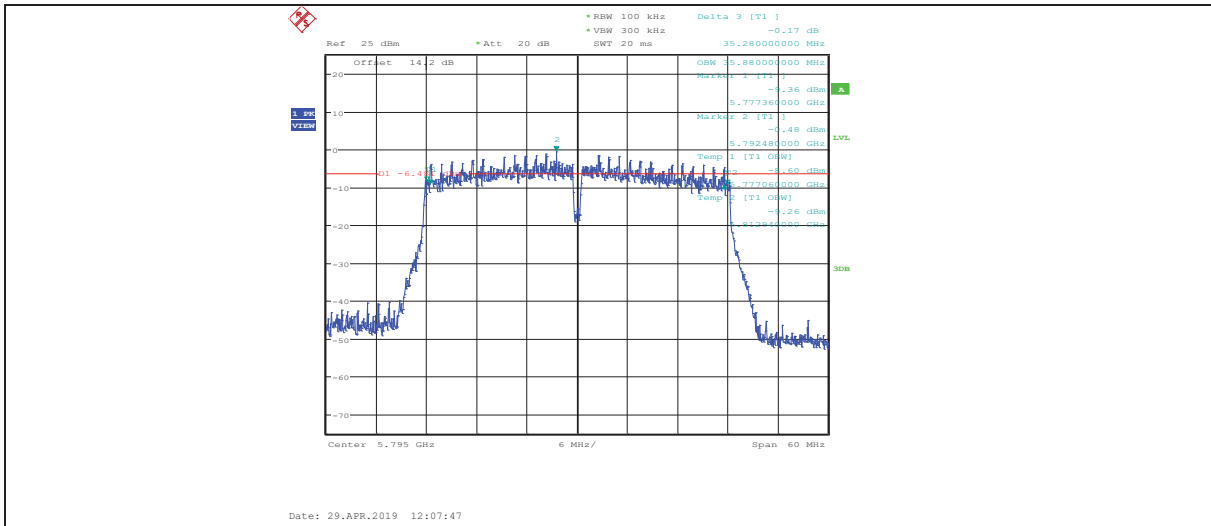
11AC40MIMO ANT2 5755



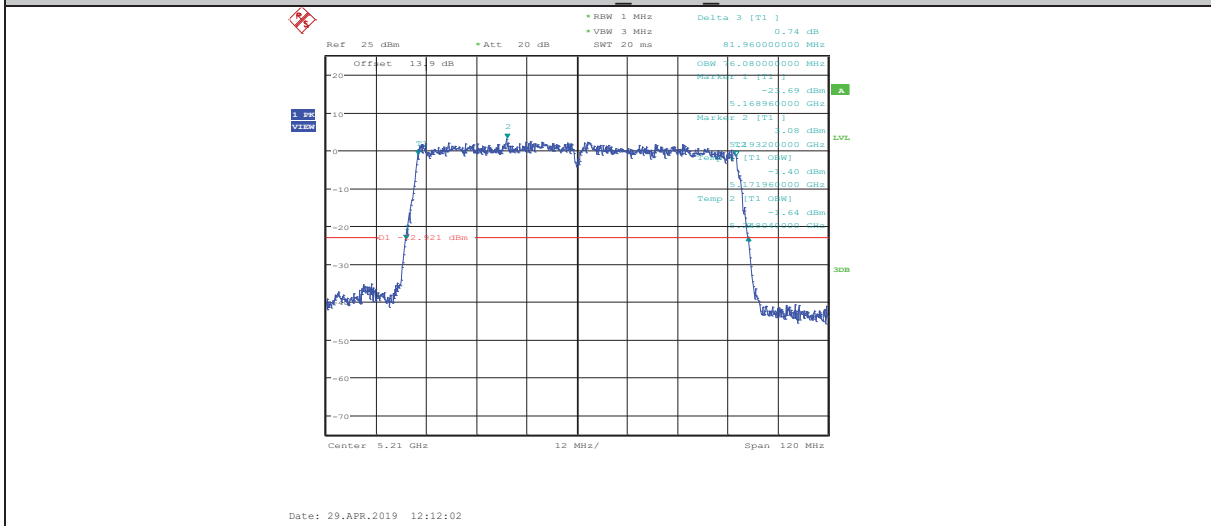
11AC40MIMO ANT1 5795



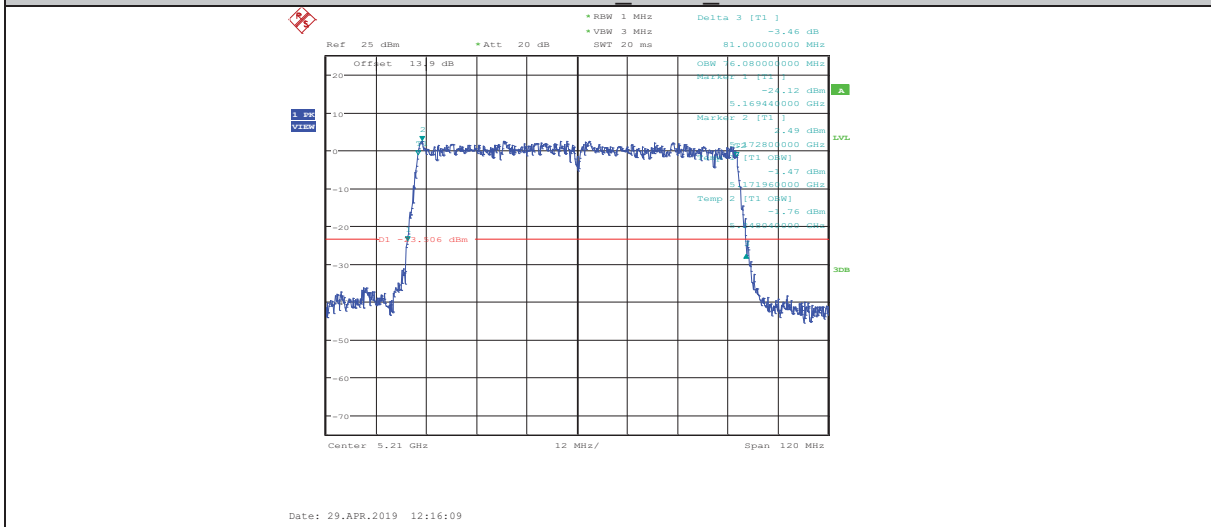
11AC40MIMO ANT2 5795



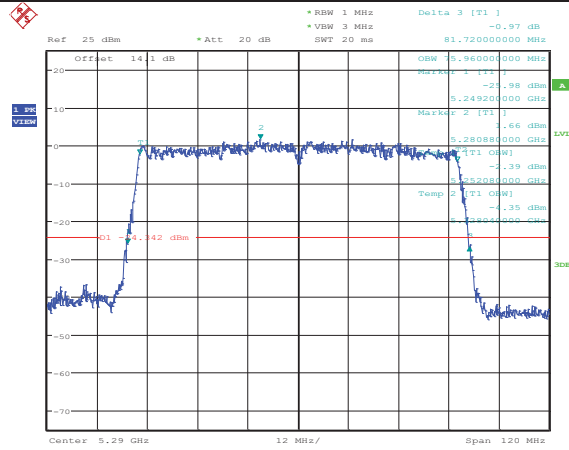
11AC80MIMO ANT1 5210



11AC80MIMO ANT2 5210

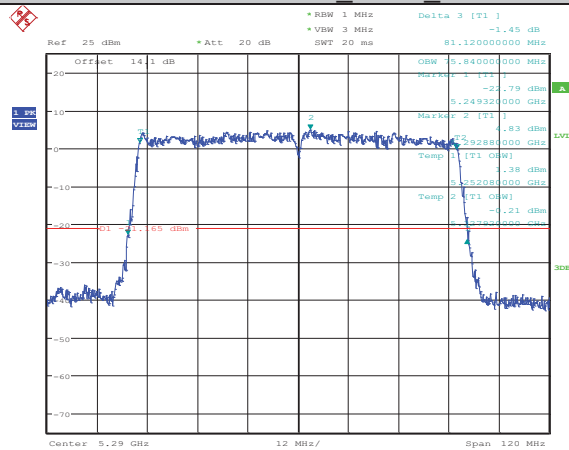


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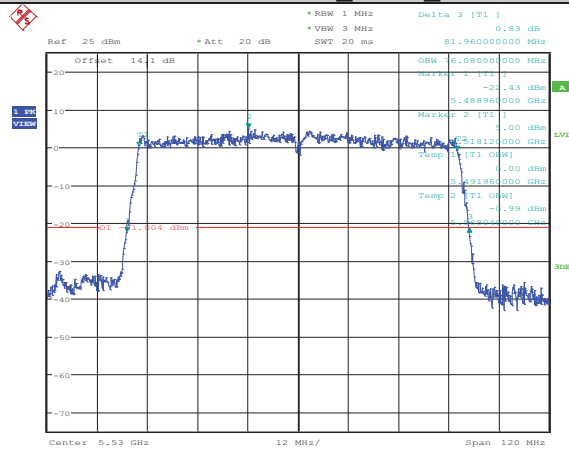
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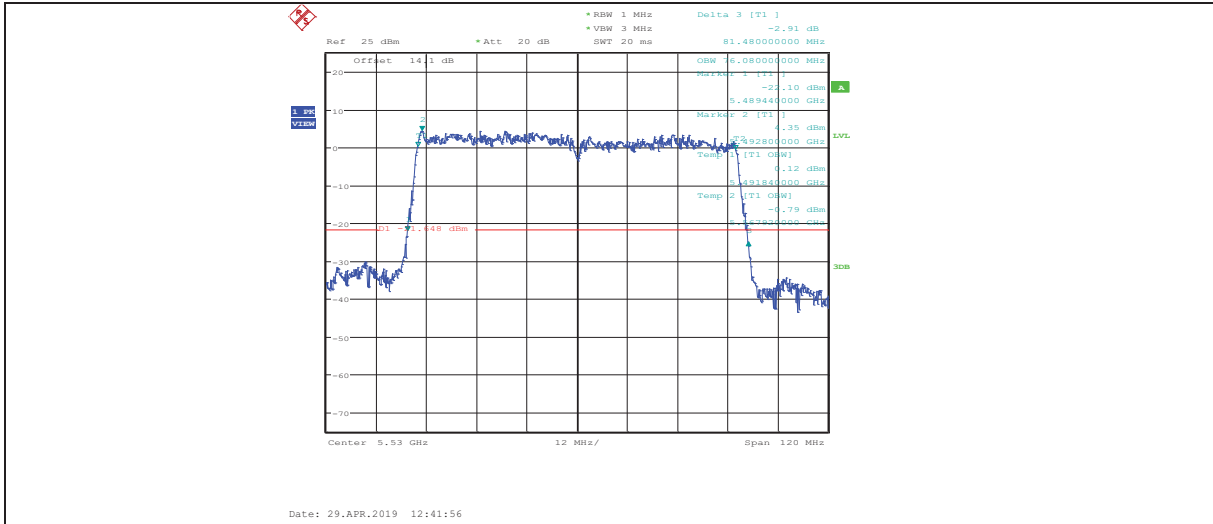
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11AC80MIMO ANT1 5530

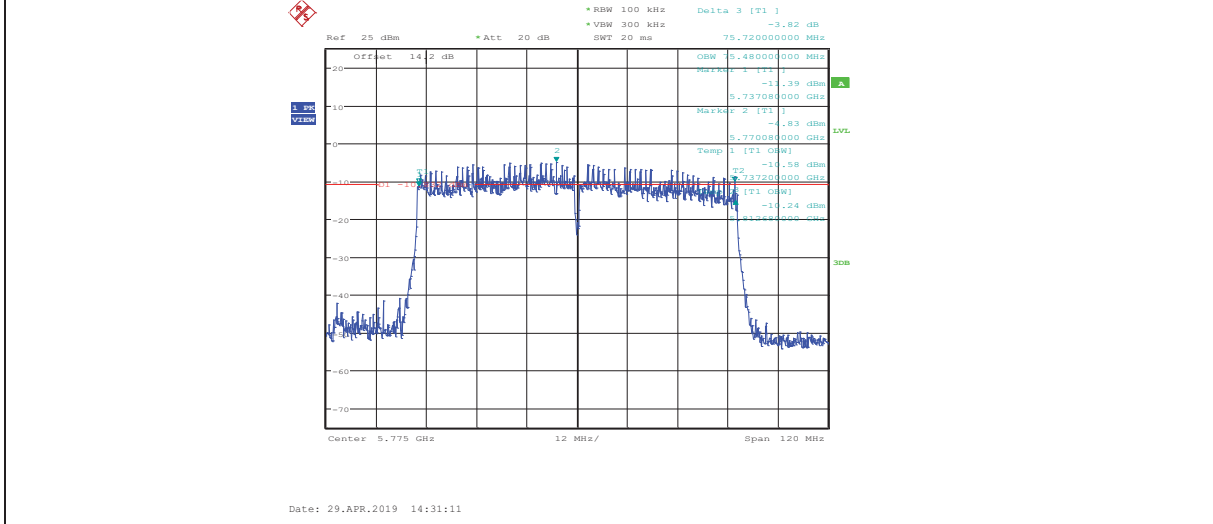


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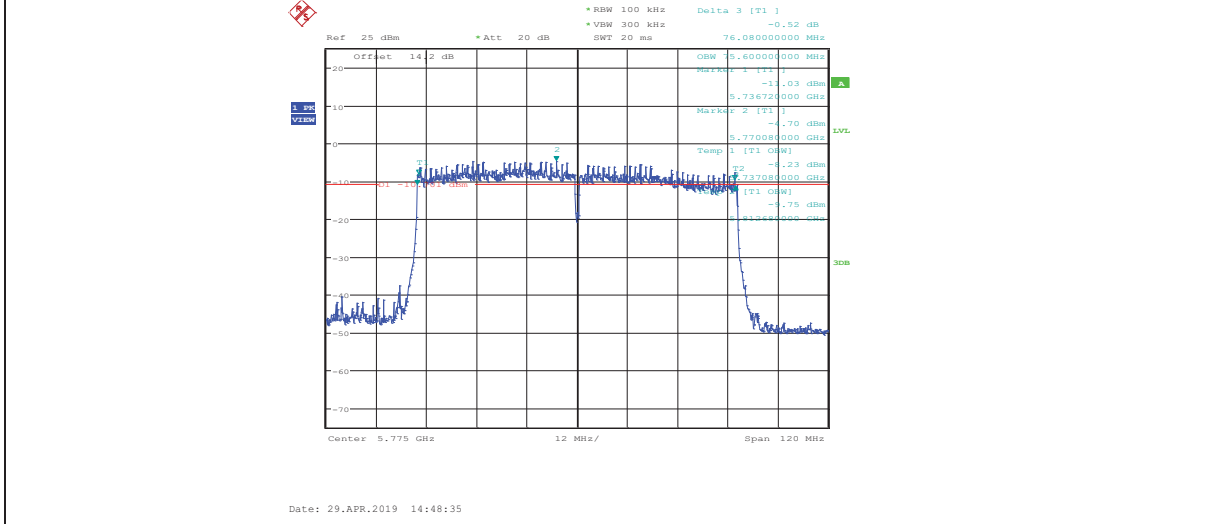
11AC80MIMO ANT2 5530



11AC80MIMO ANT1 5775



11AC80MIMO ANT2 5775



## 5. Maximum Output Power

### 5.1. Block diagram of test setup

Same as section 4.1

### 5.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices: 250 mW (24 dBm)	5150-5250
	For RSS: e.i.r.p. power: not exceed 200 mW (23 dBm) or $10 + 10 \log_{10} B$	
	For FCC: 250 mW (24 dBm) or $11 + 10 \log_{10} B$	5250-5350
	For RSS: e.i.r.p. power: not exceed 1.0 W (30 dBm) or $17 + 10 \log_{10} B$	
	For FCC: 250 mW (24 dBm) or $11 + 10 \log_{10} B$	For FCC:5470-5725 For IC:5470-5600 5650-5725
	For RSS: e.i.r.p. power: not exceed 1.0 W (30 dBm) or $17 + 10 \log_{10} B$	
	1 Watt (30 dBm)	5725-5850
<p>Note: 1. For FCC: B=26 bandwidth; For ISCED: B=99% bandwidth.            2. For 802.11n and 802.11ac, the EUT incorporates a MIMO function. The Antenna directional gain is 6.51 dBi.            The Output Power limit is the above limits-(6.51-6)            (For ISCED e.i.r.p. power only for 5725-5850 Band)</p>		

### 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

Test Mode	Ant	Test Channel	Output Power [dBm]	EIRP [dBm]	FCC LIMIT	ISED LIMIT
11A	ANT1	5180	15.69	19.01	24	22.18
11A	ANT2	5180	15.80	19.48	24	22.18
11A	ANT1	5200	15.80	19.12	24	22.18
11A	ANT2	5200	15.91	19.59	24	22.18
11A	ANT1	5240	15.56	18.88	24	22.18
11A	ANT2	5240	15.98	19.66	24	22.18
11A	ANT1	5260	17.20	20.52	23.95	29.18
11A	ANT2	5260	18.00	21.68	23.95	29.18
11A	ANT1	5280	17.04	20.36	23.95	29.18



11A	ANT2	5280	17.92	21.60	23.95	29.18
11A	ANT1	5320	16.88	20.20	23.95	29.18
11A	ANT2	5320	17.81	21.49	23.95	29.18
11A	ANT1	5500	16.79	20.11	23.95	29.18
11A	ANT2	5500	17.31	20.99	23.95	29.18
11A	ANT1	5580	18.20	21.52	23.95	29.18
11A	ANT2	5580	17.76	21.44	23.95	29.18
11A	ANT1	5700	16.74	20.06	23.95	29.18
11A	ANT2	5700	16.69	20.37	23.95	29.18
11A	ANT1	5745	16.28	19.60	30	30
11A	ANT2	5745	16.61	20.29	30	30
11A	ANT1	5785	15.87	19.19	30	30
11A	ANT2	5785	16.33	20.01	30	30
11A	ANT1	5825	14.98	18.30	30	30
11A	ANT2	5825	15.25	18.93	30	30
11N20MIMO	ANT1	5180	12.80	16.12	23.49	22.45
11N20MIMO	ANT2	5180	12.54	16.22	23.49	22.45
11N20MIMO	total	5180	15.68	19.18	23.49	22.45
11N20MIMO	ANT1	5200	12.25	15.57	23.49	22.45
11N20MIMO	ANT2	5200	12.74	16.42	23.49	22.45
11N20MIMO	total	5200	15.51	19.03	23.49	22.45
11N20MIMO	ANT1	5240	12.28	15.60	23.49	22.45
11N20MIMO	ANT2	5240	12.99	16.67	23.49	22.45
11N20MIMO	total	5240	15.66	19.18	23.49	22.45
11N20MIMO	ANT1	5260	15.18	18.50	23.49	29.45
11N20MIMO	ANT2	5260	16.33	20.01	23.49	29.45
11N20MIMO	total	5260	18.80	22.33	23.49	29.45
11N20MIMO	ANT1	5280	14.94	18.26	23.49	29.45
11N20MIMO	ANT2	5280	16.00	19.68	23.49	29.45
11N20MIMO	total	5280	18.51	22.04	23.49	29.45
11N20MIMO	ANT1	5320	14.50	17.82	23.49	29.45
11N20MIMO	ANT2	5320	15.99	19.67	23.49	29.45
11N20MIMO	total	5320	18.32	21.85	23.49	29.45
11N20MIMO	ANT1	5500	14.74	18.06	23.49	29.45
11N20MIMO	ANT2	5500	15.39	19.07	23.49	29.45
11N20MIMO	total	5500	18.09	21.60	23.49	29.45
11N20MIMO	ANT1	5580	16.24	19.56	23.49	29.45
11N20MIMO	ANT2	5580	15.67	19.35	23.49	29.45

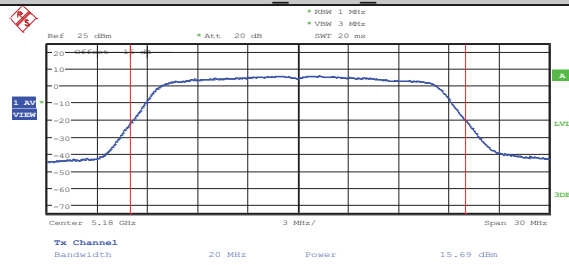
11N20MIMO	total	5580	18.97	22.47	23.49	29.45
11N20MIMO	ANT1	5700	14.56	17.88	23.49	29.45
11N20MIMO	ANT2	5700	14.61	18.29	23.49	29.45
11N20MIMO	total	5700	17.60	21.10	23.49	29.45
11N20MIMO	ANT1	5745	14.35	17.67	29.49	29.49
11N20MIMO	ANT2	5745	14.64	18.32	29.49	29.49
11N20MIMO	total	5745	17.51	21.02	29.49	29.49
11N20MIMO	ANT1	5785	13.58	16.90	29.49	29.49
11N20MIMO	ANT2	5785	14.20	17.88	29.49	29.49
11N20MIMO	total	5785	16.91	20.43	29.49	29.49
11N20MIMO	ANT1	5825	12.85	16.17	29.49	29.49
11N20MIMO	ANT2	5825	13.25	16.93	29.49	29.49
11N20MIMO	total	5825	16.06	19.58	29.49	29.49
11N40MIMO	ANT1	5190	13.17	16.49	23.49	23
11N40MIMO	ANT2	5190	13.04	16.72	23.49	23
11N40MIMO	total	5190	16.12	19.62	23.49	23
11N40MIMO	ANT1	5230	12.71	16.03	23.49	23
11N40MIMO	ANT2	5230	13.27	16.95	23.49	23
11N40MIMO	total	5230	16.01	19.52	23.49	23
11N40MIMO	ANT1	5270	14.64	17.96	23.49	30
11N40MIMO	ANT2	5270	15.41	19.09	23.49	30
11N40MIMO	total	5270	18.05	21.57	23.49	30
11N40MIMO	ANT1	5310	14.24	17.56	23.49	30
11N40MIMO	ANT2	5310	15.55	19.23	23.49	30
11N40MIMO	total	5310	17.95	21.49	23.49	30
11N40MIMO	ANT1	5510	14.65	17.97	23.49	30
11N40MIMO	ANT2	5510	14.53	18.21	23.49	30
11N40MIMO	total	5510	17.60	21.10	23.49	30
11N40MIMO	ANT1	5550	15.29	18.61	23.49	30
11N40MIMO	ANT2	5550	14.41	18.09	23.49	30
11N40MIMO	total	5550	17.88	21.37	23.49	30
11N40MIMO	ANT1	5670	14.48	17.80	23.49	30
11N40MIMO	ANT2	5670	14.10	17.78	23.49	30
11N40MIMO	total	5670	17.30	20.80	23.49	30
11N40MIMO	ANT1	5755	13.78	17.10	29.49	29.49
11N40MIMO	ANT2	5755	13.99	17.67	29.49	29.49
11N40MIMO	total	5755	16.90	20.40	29.49	29.49
11N40MIMO	ANT1	5795	13.05	16.37	29.49	29.49

11N40MIMO	ANT2	5795	13.44	17.12	29.49	29.49
11N40MIMO	total	5795	16.26	19.77	29.49	29.49
11AC20MIMO	ANT1	5180	12.45	15.77	23.49	22.45
11AC20MIMO	ANT2	5180	12.33	16.01	23.49	22.45
11AC20MIMO	total	5180	15.40	18.90	23.49	22.45
11AC20MIMO	ANT1	5200	12.44	15.76	23.49	22.45
11AC20MIMO	ANT2	5200	12.47	16.15	23.49	22.45
11AC20MIMO	total	5200	15.47	18.97	23.49	22.45
11AC20MIMO	ANT1	5240	12.08	15.40	23.49	29.45
11AC20MIMO	ANT2	5240	12.73	16.41	23.49	29.45
11AC20MIMO	total	5240	15.43	18.94	23.49	29.45
11AC20MIMO	ANT1	5260	16.88	20.20	23.49	29.45
11AC20MIMO	ANT2	5260	18.07	21.75	23.49	29.45
11AC20MIMO	total	5260	20.53	24.05	23.49	29.45
11AC20MIMO	ANT1	5280	16.40	19.72	23.49	29.45
11AC20MIMO	ANT2	5280	17.72	21.40	23.49	29.45
11AC20MIMO	total	5280	20.12	23.65	23.49	29.45
11AC20MIMO	ANT1	5320	16.26	19.58	23.49	29.45
11AC20MIMO	ANT2	5320	17.61	21.29	23.49	29.45
11AC20MIMO	total	5320	20.00	23.53	23.49	29.45
11AC20MIMO	ANT1	5500	16.44	19.76	23.49	29.45
11AC20MIMO	ANT2	5500	17.09	20.77	23.49	29.45
11AC20MIMO	total	5500	19.79	23.30	23.49	29.45
11AC20MIMO	ANT1	5580	16.79	20.11	23.49	29.45
11AC20MIMO	ANT2	5580	16.41	20.09	23.49	29.45
11AC20MIMO	total	5580	19.61	23.11	23.49	29.45
11AC20MIMO	ANT1	5700	16.60	19.92	23.49	29.45
11AC20MIMO	ANT2	5700	16.60	20.28	23.49	29.45
11AC20MIMO	total	5700	19.61	23.11	23.49	29.45
11AC20MIMO	ANT1	5745	16.10	19.42	29.49	29.49
11AC20MIMO	ANT2	5745	16.55	20.23	29.49	29.49
11AC20MIMO	total	5745	19.34	22.85	29.49	29.49
11AC20MIMO	ANT1	5785	15.49	18.81	29.49	29.49
11AC20MIMO	ANT2	5785	16.02	19.70	29.49	29.49
11AC20MIMO	total	5785	18.77	22.29	29.49	29.49
11AC20MIMO	ANT1	5825	14.45	17.77	29.49	29.49
11AC20MIMO	ANT2	5825	14.84	18.52	29.49	29.49
11AC20MIMO	total	5825	17.66	21.17	29.49	29.49

11AC40MIMO	ANT1	5190	16.10	19.42	23.49	23
11AC40MIMO	ANT2	5190	15.84	19.52	23.49	23
11AC40MIMO	total	5190	18.98	22.48	23.49	23
11AC40MIMO	ANT1	5230	15.73	19.05	23.49	23
11AC40MIMO	ANT2	5230	16.07	19.75	23.49	23
11AC40MIMO	total	5230	18.91	22.42	23.49	23
11AC40MIMO	ANT1	5270	17.31	20.63	23.49	30
11AC40MIMO	ANT2	5270	18.29	21.97	23.49	30
11AC40MIMO	total	5270	20.84	24.36	23.49	30
11AC40MIMO	ANT1	5310	17.15	20.47	23.49	30
11AC40MIMO	ANT2	5310	18.33	22.01	23.49	30
11AC40MIMO	total	5310	20.79	24.32	23.49	30
11AC40MIMO	ANT1	5510	17.49	20.81	23.49	30
11AC40MIMO	ANT2	5510	17.79	21.47	23.49	30
11AC40MIMO	total	5510	20.65	24.16	23.49	30
11AC40MIMO	ANT1	5550	18.19	21.51	23.49	30
11AC40MIMO	ANT2	5550	17.83	21.51	23.49	30
11AC40MIMO	total	5550	21.02	24.52	23.49	30
11AC40MIMO	ANT1	5670	18.21	21.53	23.49	30
11AC40MIMO	ANT2	5670	17.87	21.55	23.49	30
11AC40MIMO	total	5670	21.05	24.55	23.49	30
11AC40MIMO	ANT1	5755	16.66	19.98	29.49	29.49
11AC40MIMO	ANT2	5755	17.37	21.05	29.49	29.49
11AC40MIMO	total	5755	20.04	23.56	29.49	29.49
11AC40MIMO	ANT1	5795	16.08	19.40	29.49	29.49
11AC40MIMO	ANT2	5795	16.56	20.24	29.49	29.49
11AC40MIMO	total	5795	19.34	22.85	29.49	29.49
11AC80MIMO	ANT1	5210	16.54	19.86	23.49	23
11AC80MIMO	ANT2	5210	16.81	20.49	23.49	23
11AC80MIMO	total	5210	19.69	23.20	23.49	23
11AC80MIMO	ANT1	5290	17.74	21.06	23.49	30
11AC80MIMO	ANT2	5290	18.84	22.52	23.49	30
11AC80MIMO	total	5290	21.34	24.86	23.49	30
11AC80MIMO	ANT1	5530	18.29	21.61	23.49	30
11AC80MIMO	ANT2	5530	17.95	21.63	23.49	30
11AC80MIMO	total	5530	21.13	24.63	23.49	30
11AC80MIMO	ANT1	5775	17.04	20.36	29.49	29.49
11AC80MIMO	ANT2	5775	17.64	21.32	29.49	29.49

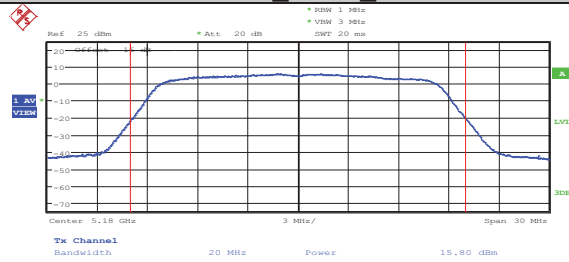
11AC80MIMO	total	5775	20.36	23.88	29.49	29.49
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11A ANT1 5180



Date: 28.APR.2019 15:28:17

11A ANT2 5180



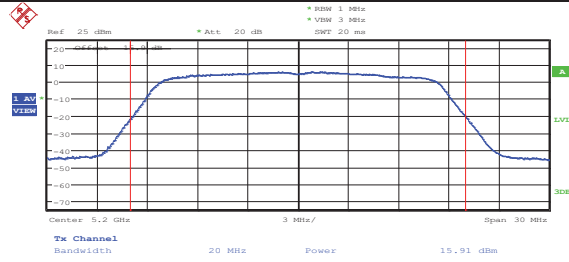
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11A ANT1 5200



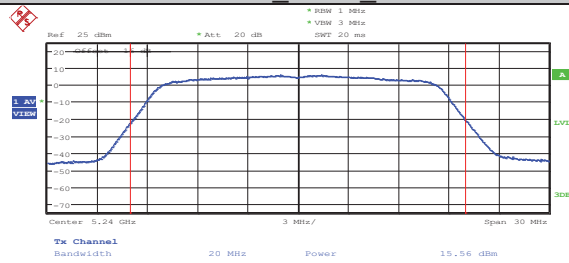
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11A ANT2 5200



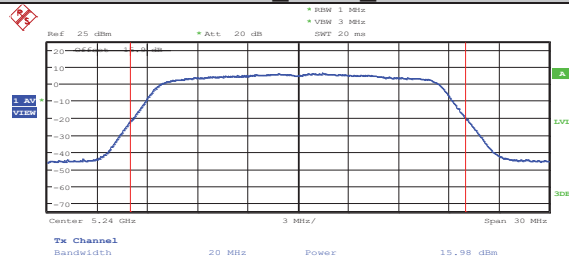
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11A ANT1\_5240



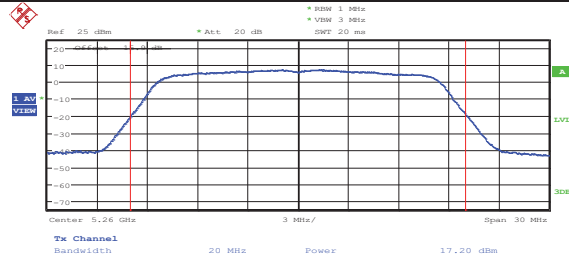
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11A ANT2\_5240



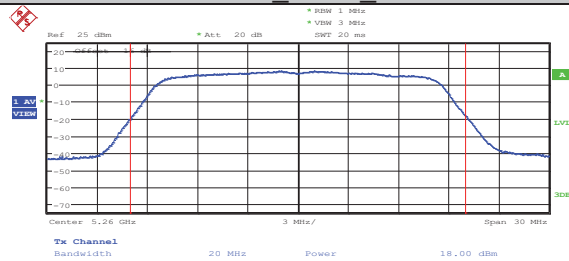
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11A ANT1\_5260



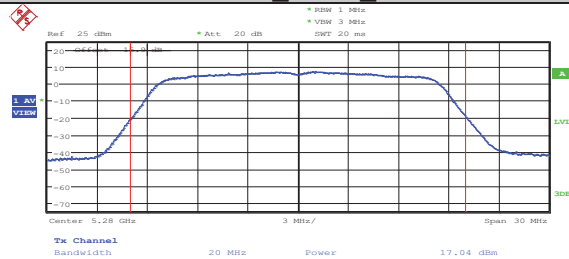
Date: 28.APR.2019 15:47:12

11A ANT2 5260



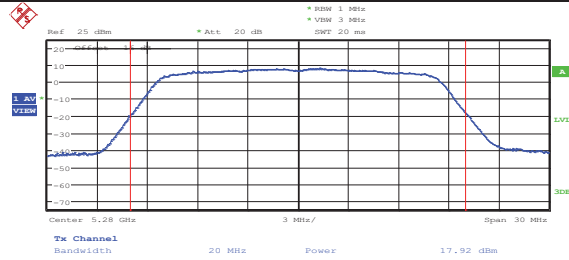
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11A ANT1 5280



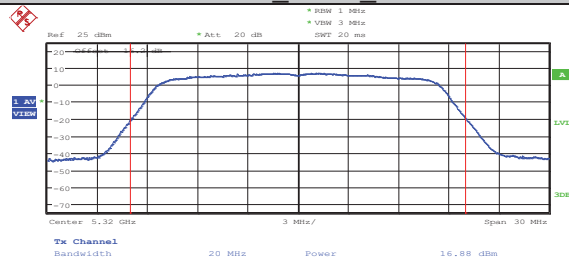
Date: 28.APR.2019 15:55:23

11A ANT2 5280



Date: 28.APR.2019 15:59:56

11A ANT1 5320



Date: 28.APR.2019 16:03:52

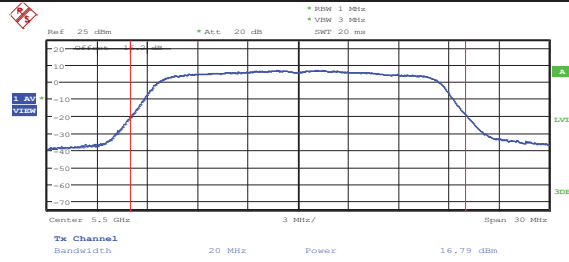
11A ANT2 5320



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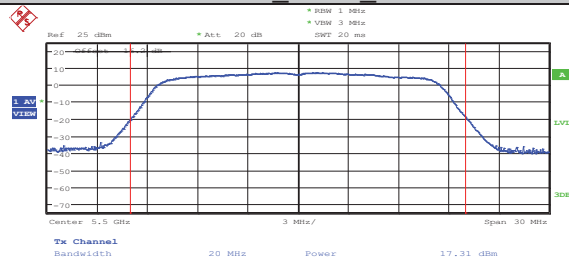
11A ANT1 5500





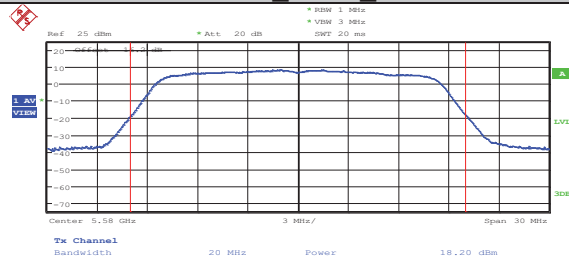
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11A ANT2 5500



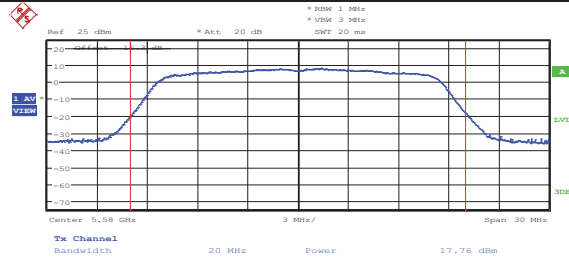
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11A ANT1 5580



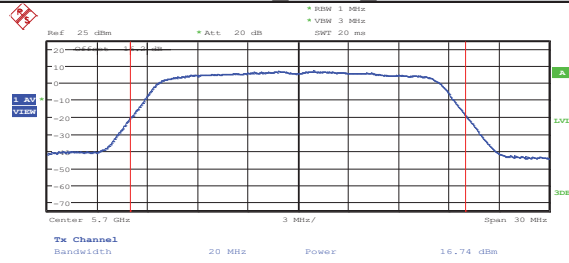
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11A ANT2 5580



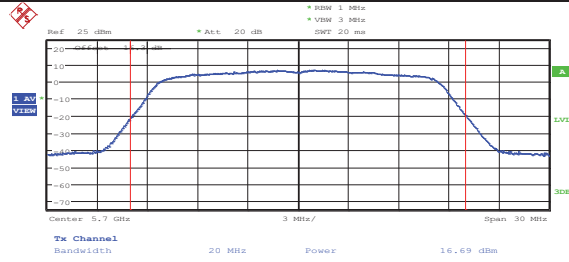
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11A ANT1 5700



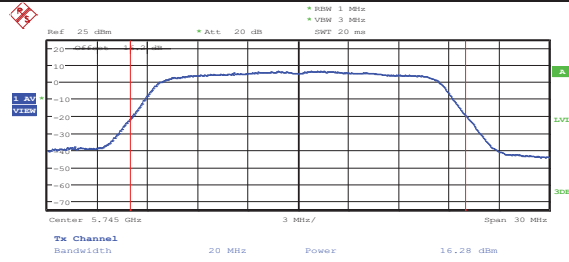
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11A ANT2 5700



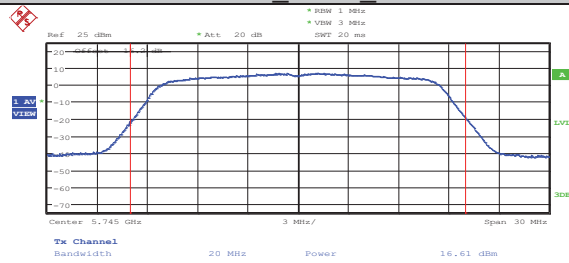
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11A ANT1 5745



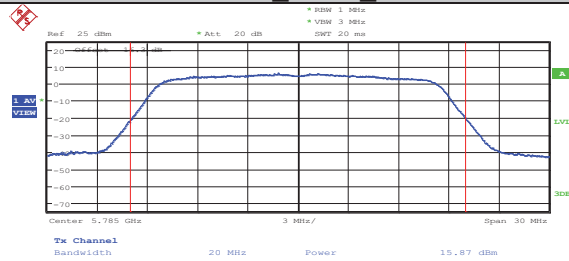
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11A ANT2 5745



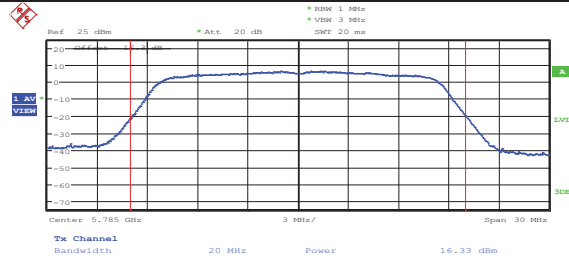
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11A ANT1 5785



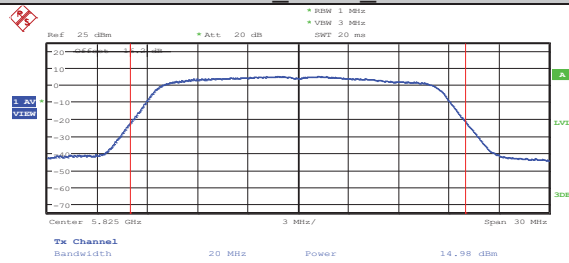
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11A ANT2 5785



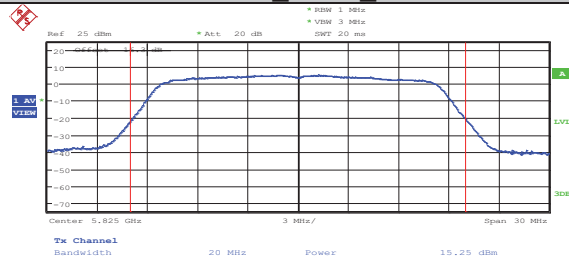
Date: 28.APR.2019 17:00:43

11A ANT1 5825



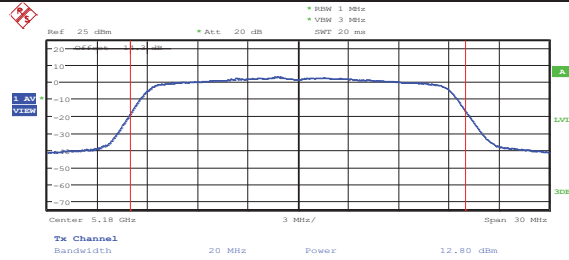
Date: 28.APR.2019 17:04:19

11A ANT2 5825



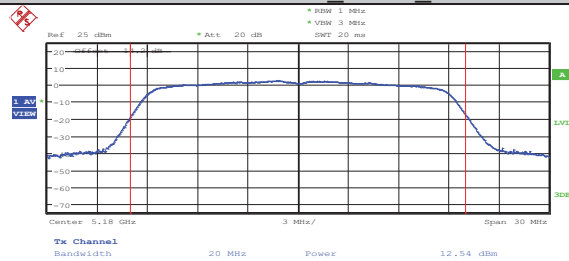
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11N20MIMO ANT1 5180



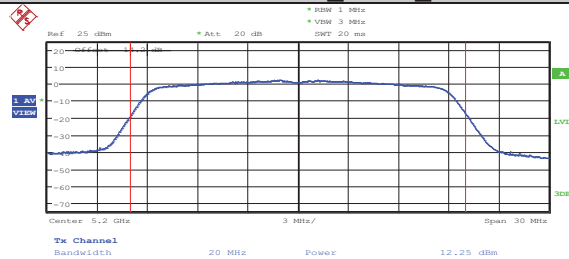
Date: 28.APR.2019 20:12:49

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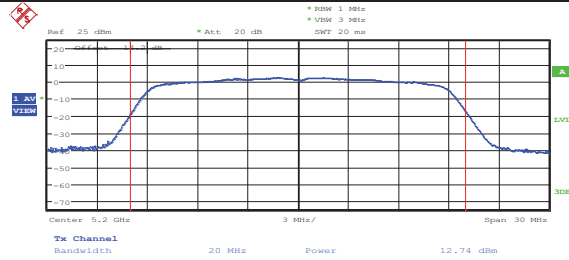
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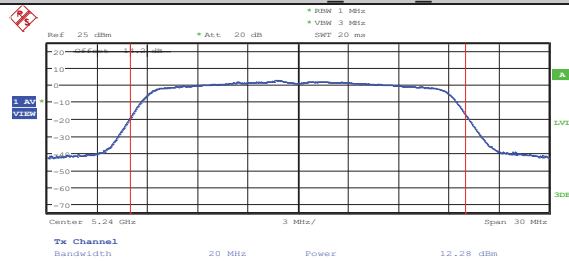
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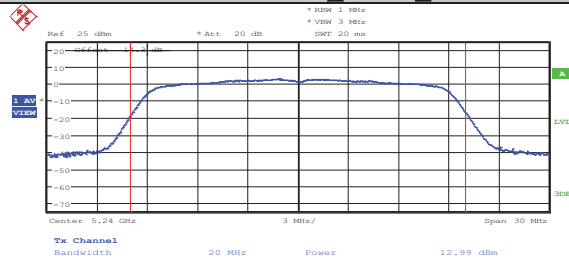
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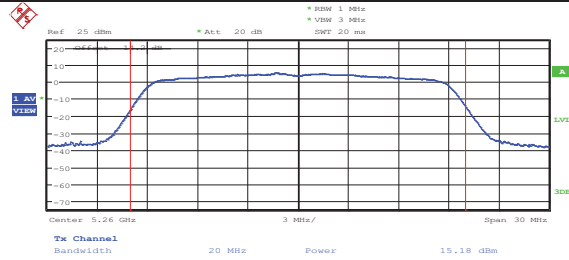
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11N20MIMO\_ANT2\_5240



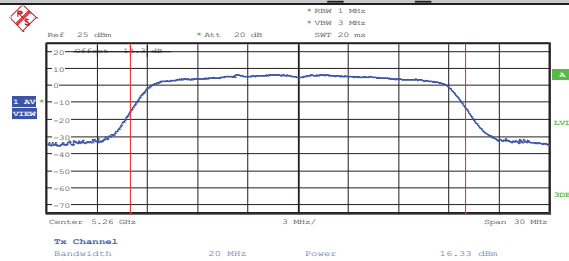
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11N20MIMO\_ANT1\_5260



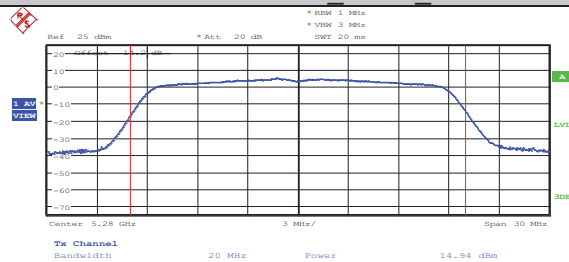
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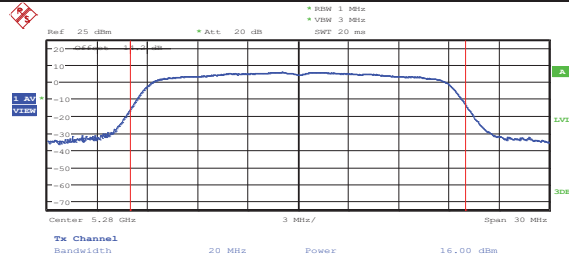
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11N20MIMO\_ANT1\_5280



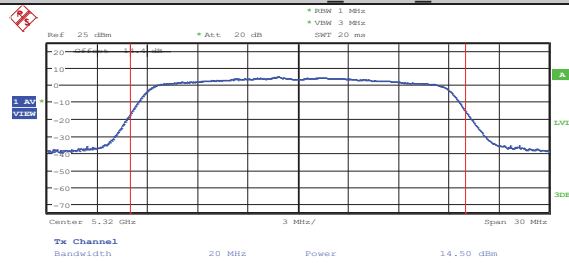
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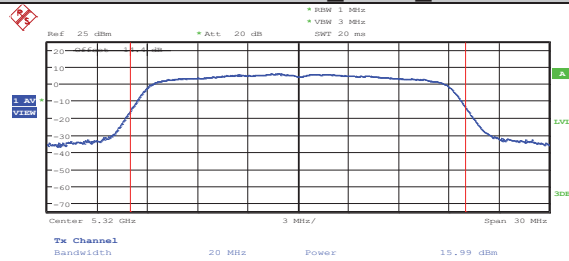
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Date: 28.APR.2019 20:29:58

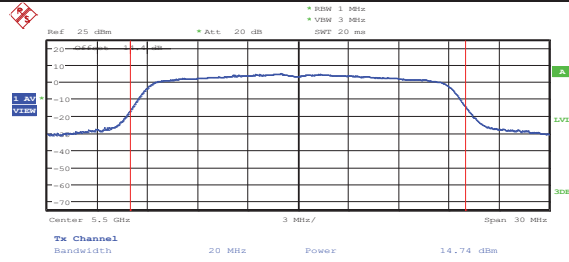
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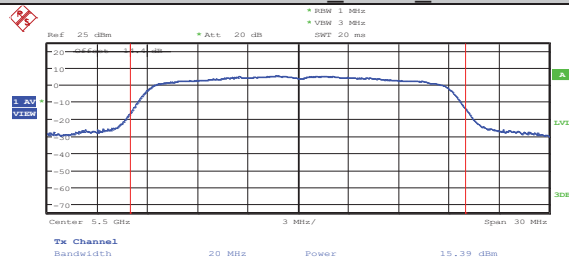
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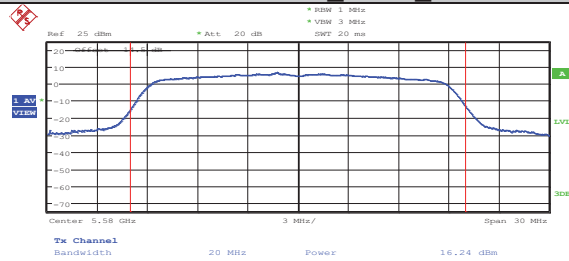
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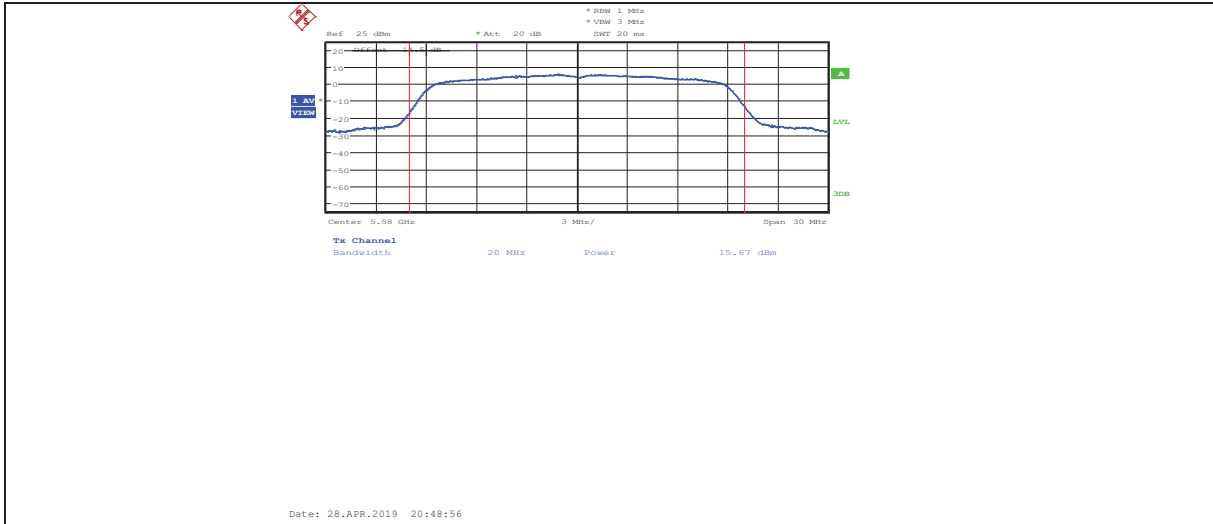
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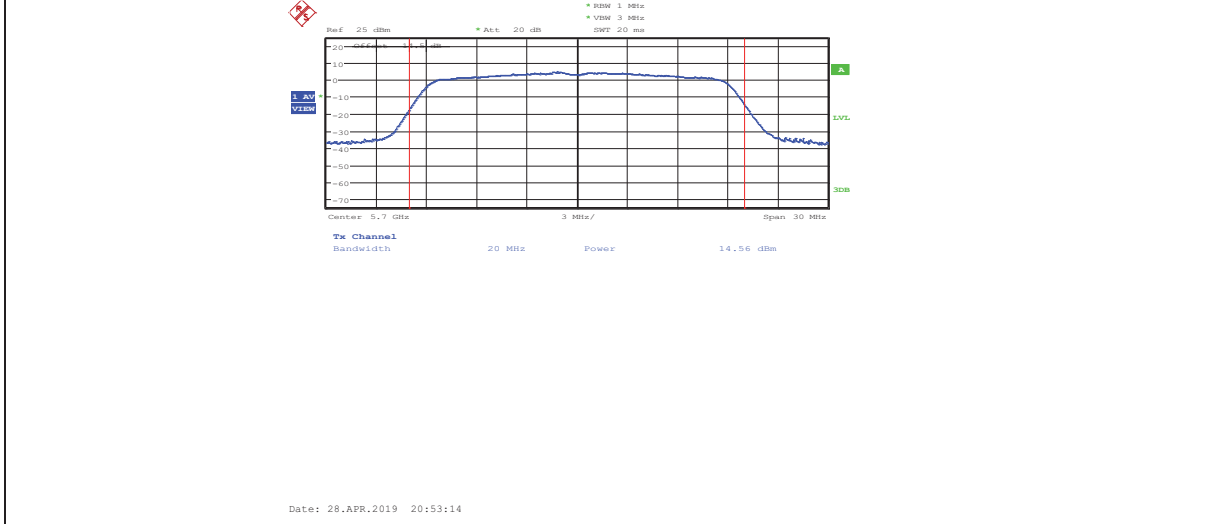


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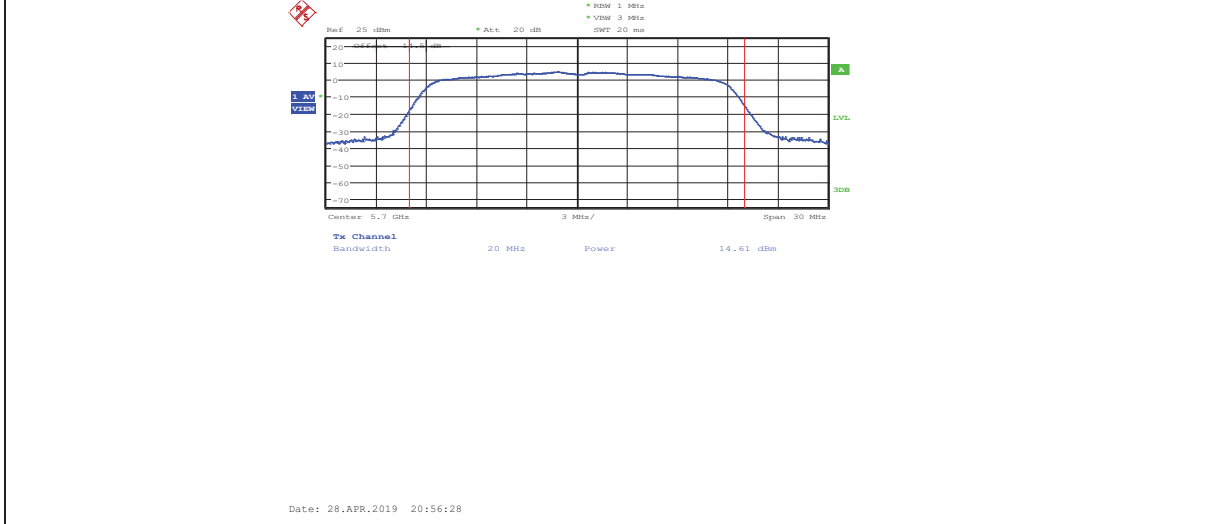
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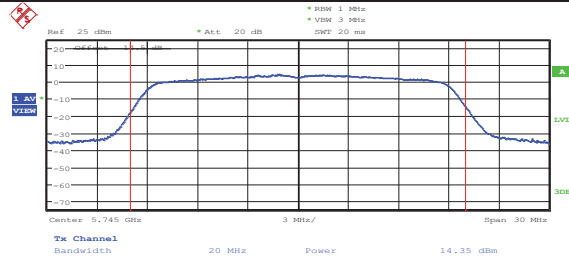
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11N20MIMO\_ANT2\_5700

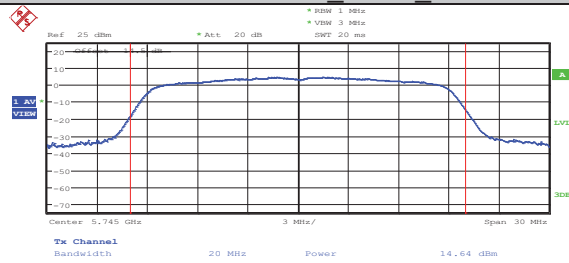


11N20MIMO\_ANT1\_5745



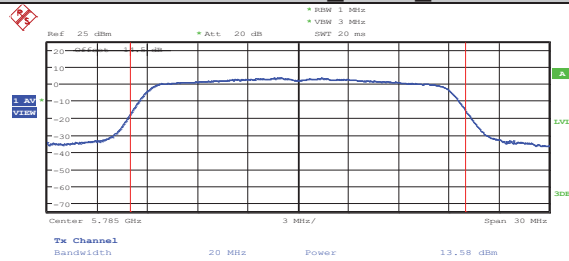
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11N20MIMO\_ANT2\_5745



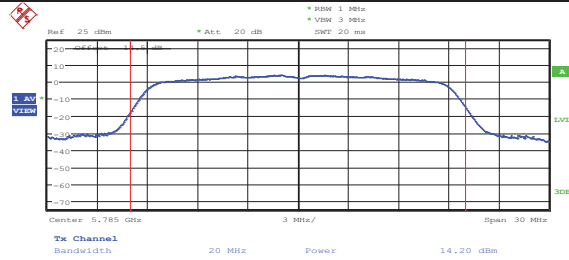
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11N20MIMO\_ANT1\_5785



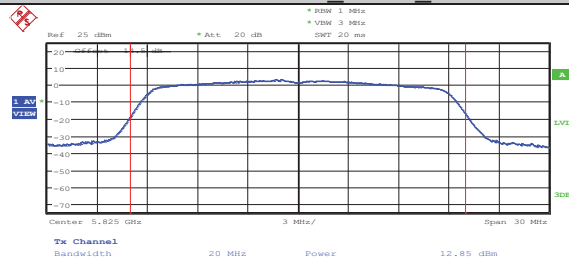
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11N20MIMO\_ANT2\_5785



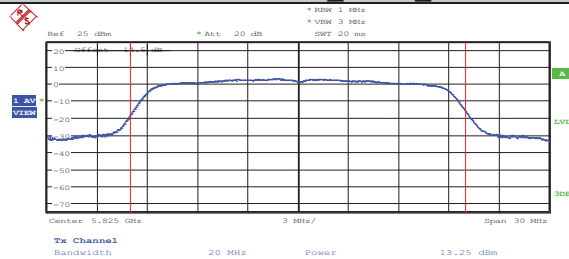
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### 11N20MIMO\_ANT1\_5825



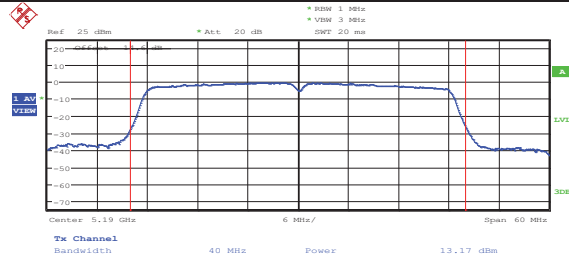
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### 11N20MIMO\_ANT2\_5825



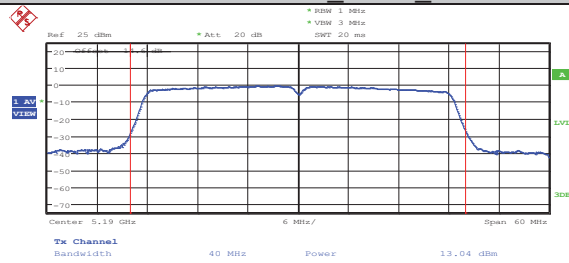
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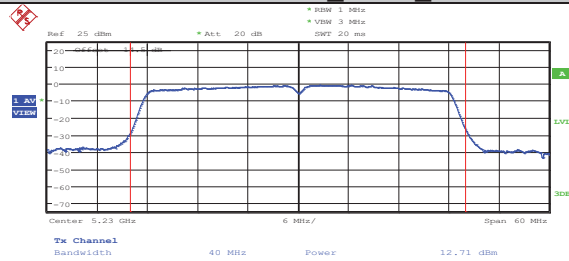
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### 11N40MIMO\_ANT2\_5190



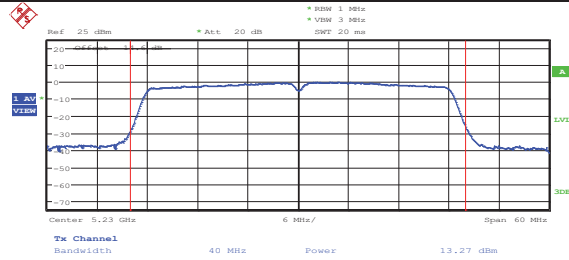
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### 11N40MIMO\_ANT1\_5230



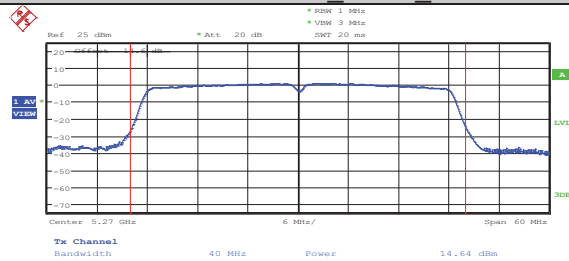
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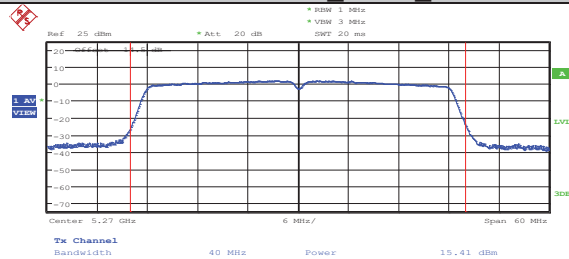
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11N40MIMO ANT1\_5270



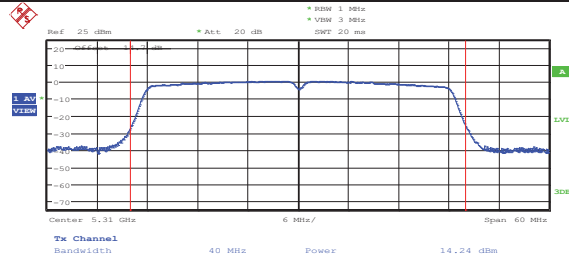
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11N40MIMO ANT2\_5270



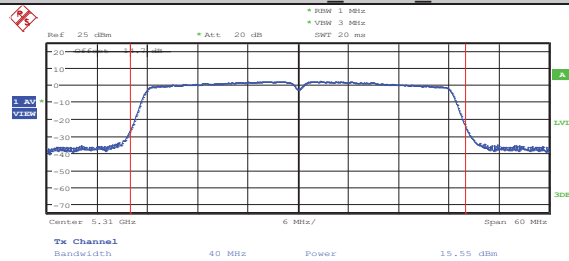
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11N40MIMO ANT1\_5310



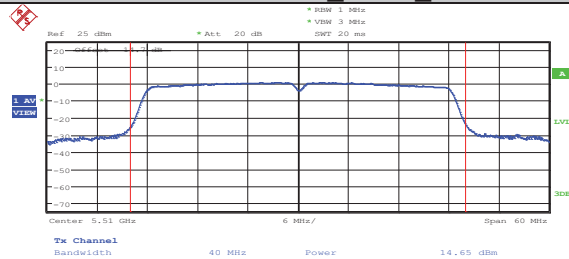
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11N40MIMO\_ANT2\_5310



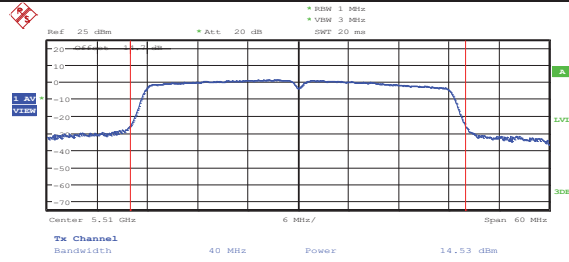
Date: 28.APR.2019 21:52:38

11N40MIMO\_ANT1\_5510



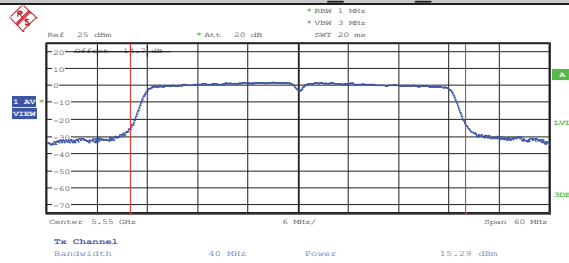
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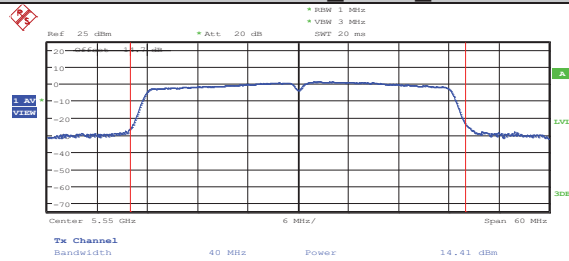
Date: 28.APR.2019 22:00:22

11N40MIMO ANT1\_5550



Date: 28.APR.2019 22:04:37

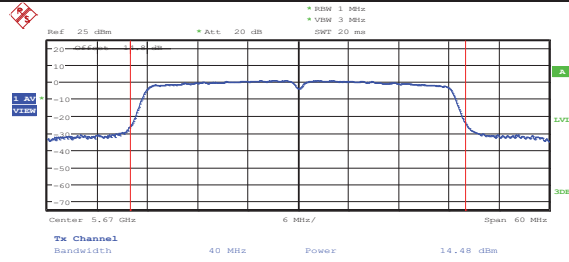
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Date: 28.APR.2019 22:08:09

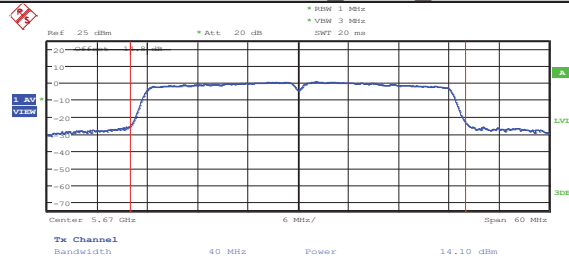
11N40MIMO ANT1\_5670





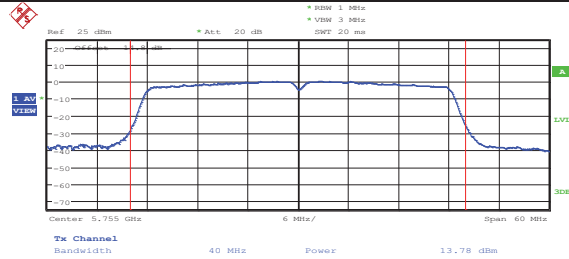
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11N40MIMO\_ANT2\_5670



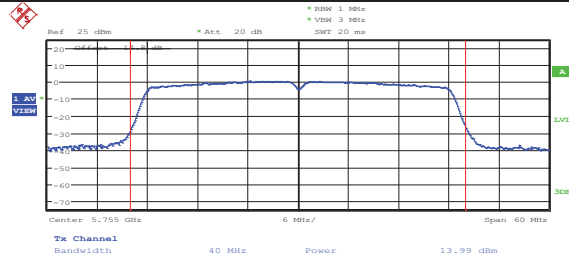
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11N40MIMO\_ANT1\_5755



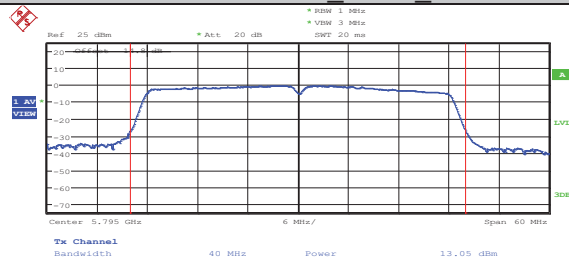
Date: 28.APR.2019 22:20:54

11N40MIMO\_ANT2\_5755



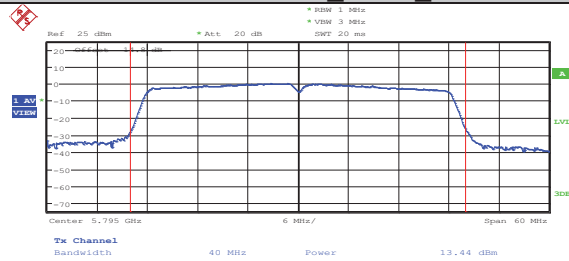
Date: 28.APR.2019 22:25:00

11N40MIMO\_ANT1\_5795



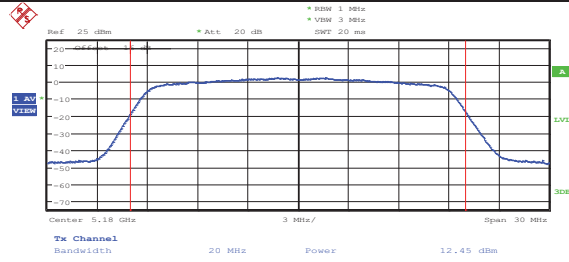
Date: 28.APR.2019 22:28:45

11N40MIMO\_ANT2\_5795



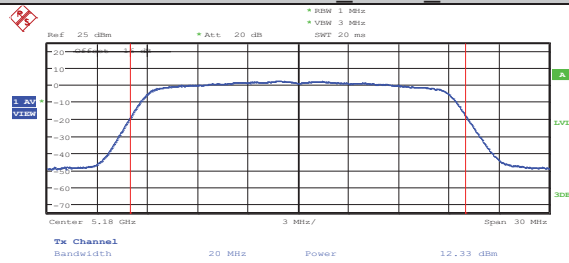
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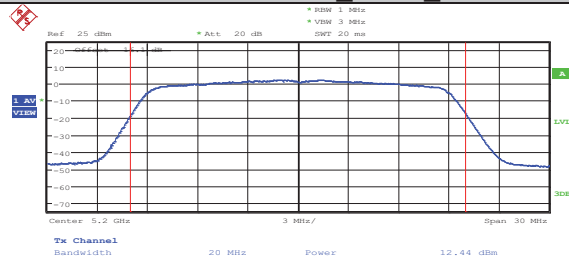
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11AC20MIMO ANT2\_5180



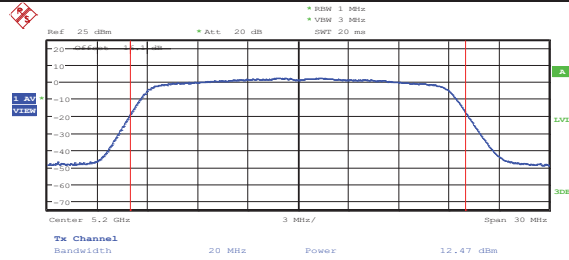
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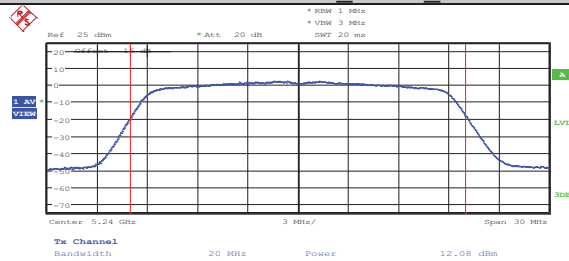
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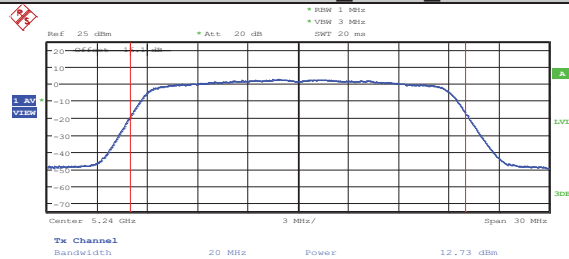
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11AC20MIMO ANT1\_5240



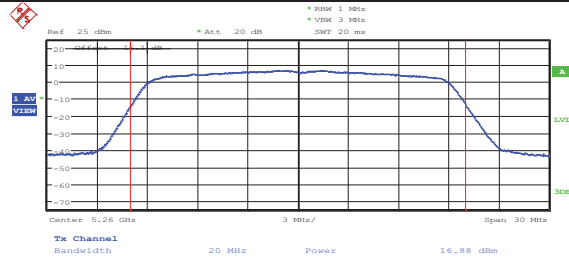
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11AC20MIMO ANT2\_5240



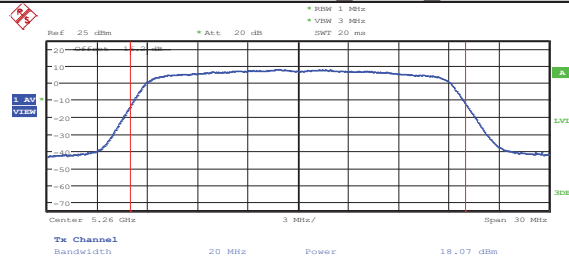
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11AC20MIMO ANT1\_5260



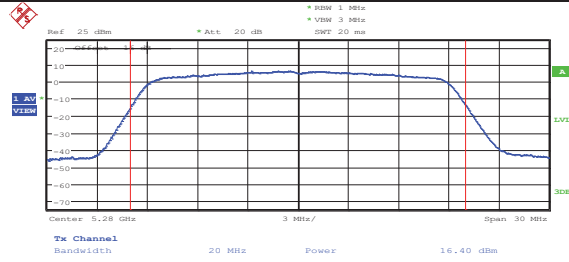
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11AC20MIMO ANT2\_5260



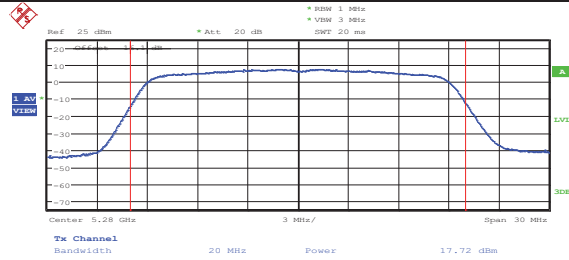
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11AC20MIMO ANT1\_5280



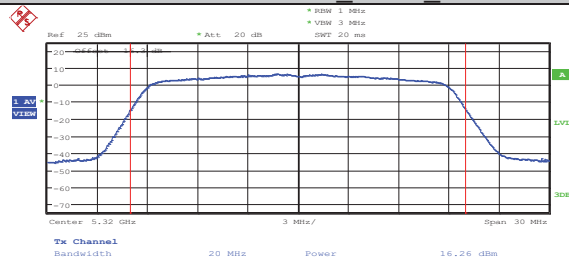
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11AC20MIMO ANT2\_5280



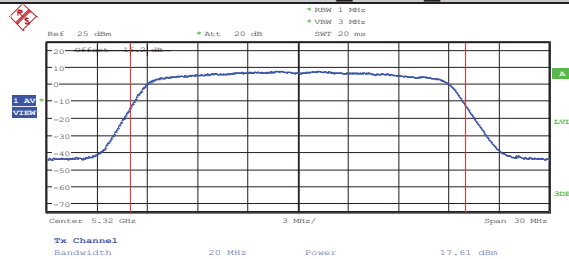
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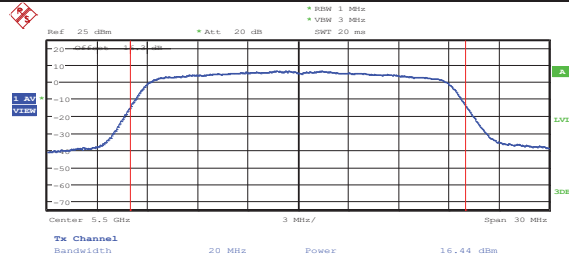
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### 11AC20MIMO ANT2\_5320



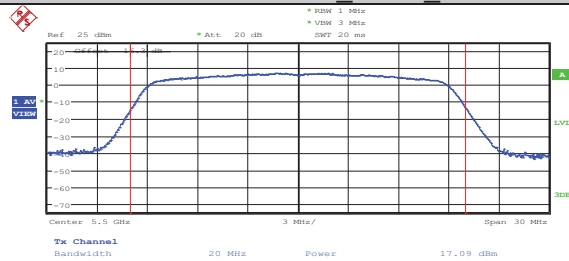
Date: 28.APR.2019 22:54:51

### 11AC20MIMO ANT1\_5500



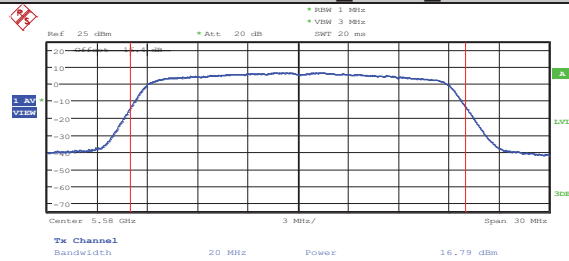
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11AC20MIMO ANT2\_5500



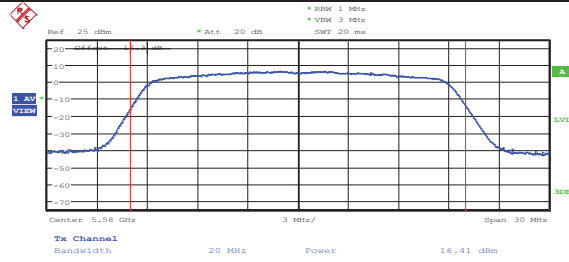
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11AC20MIMO ANT1\_5580



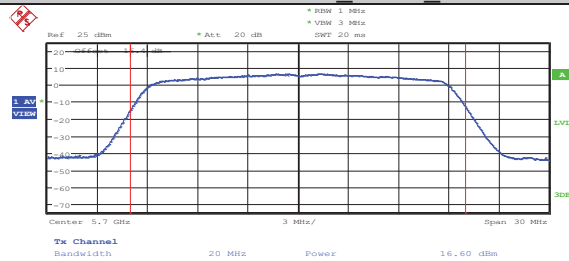
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11AC20MIMO ANT2\_5580



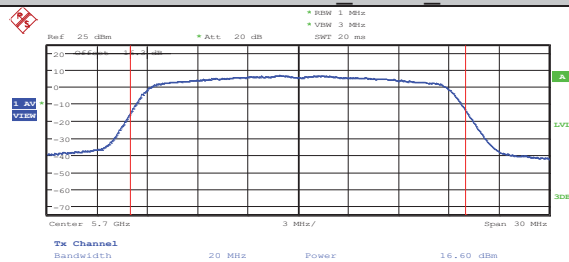
Date: 29.APR.2019 09:36:19

11AC20MIMO ANT1\_5700



Date: 29.APR.2019 09:47:18

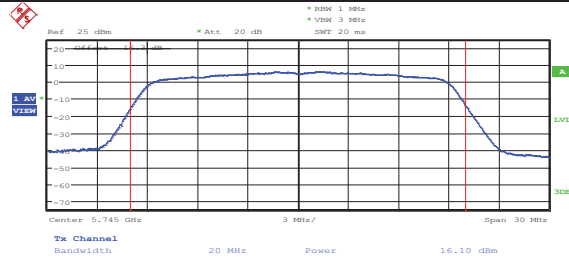
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Date: 29.APR.2019 09:50:42

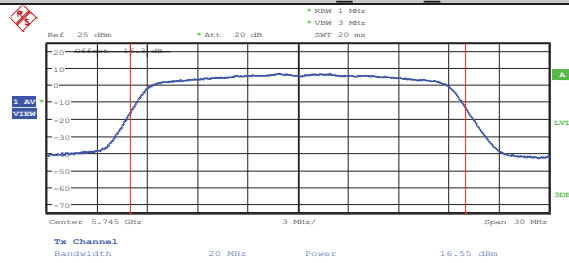
11AC20MIMO ANT1\_5745





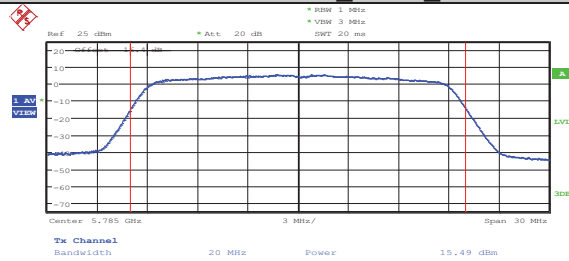
Date: 29.APR.2019 09:54:28

11AC20MIMO ANT2\_5745



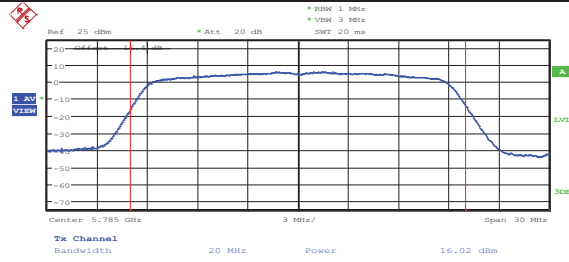
Date: 29.APR.2019 09:57:59

11AC20MIMO ANT1\_5785



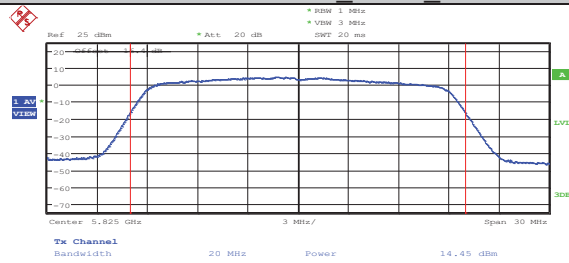
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11AC20MIMO ANT2\_5785



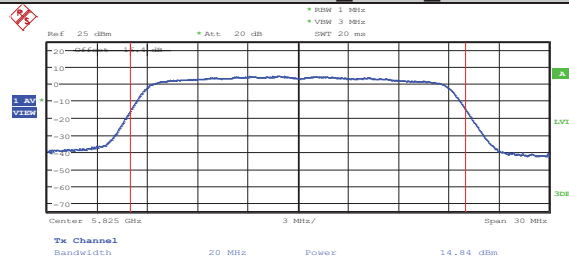
Date: 29.APR.2019 10:10:06

11AC20MIMO ANT1\_5825



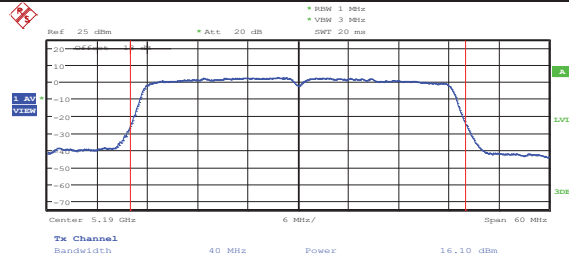
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11AC20MIMO ANT2\_5825



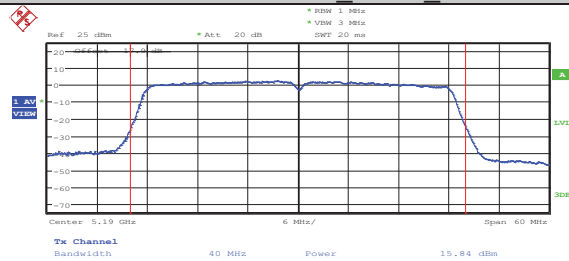
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11AC40MIMO ANT1\_5190



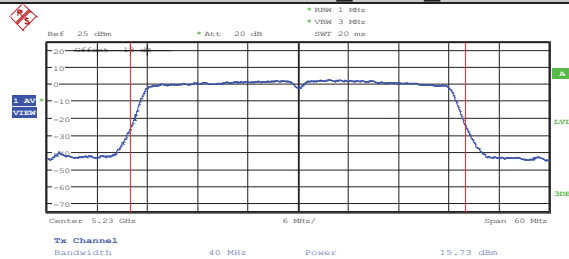
Date: 29.APR.2019 10:49:23

11AC40MIMO ANT2\_5190



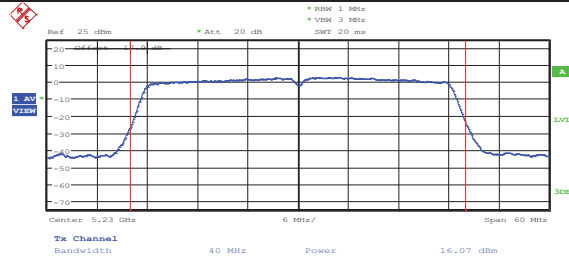
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11AC40MIMO ANT1\_5230



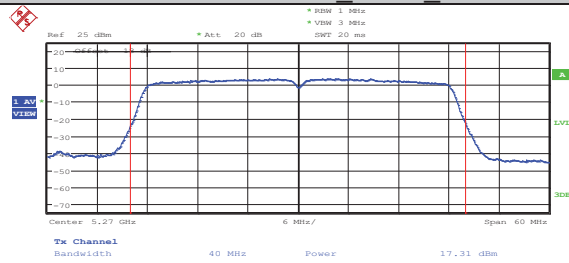
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11AC40MIMO ANT2\_5230



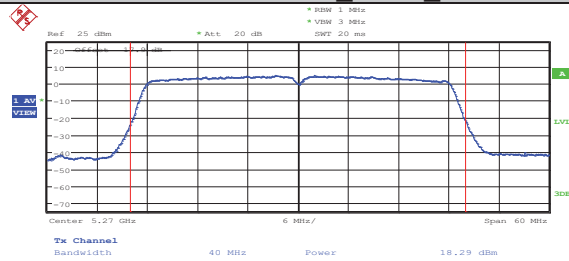
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11AC40MIMO ANT1\_5270



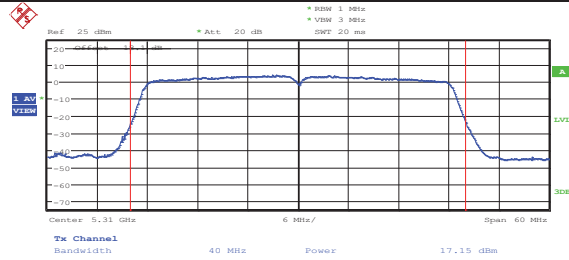
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11AC40MIMO ANT2\_5270



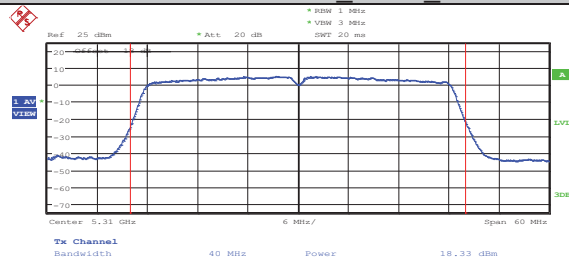
Date: 29.APR.2019 11:09:38

11AC40MIMO ANT1\_5310



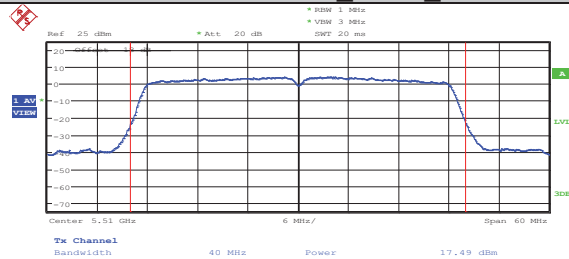
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11AC40MIMO ANT2\_5310



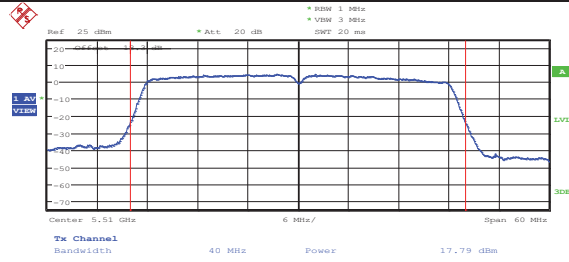
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11AC40MIMO ANT1\_5510



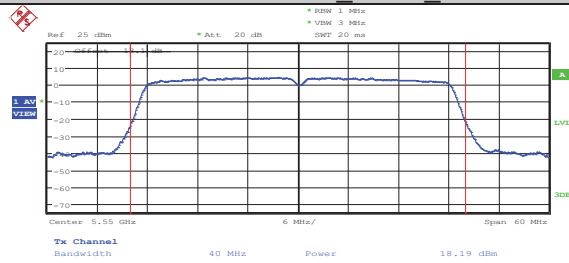
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11AC40MIMO ANT2\_5510



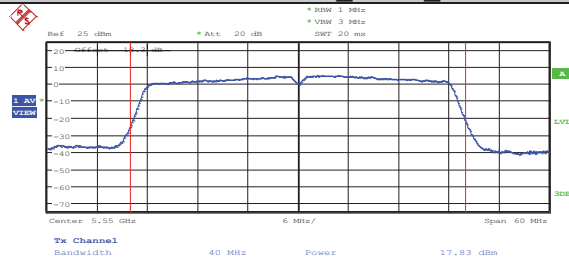
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11AC40MIMO ANT1\_5550



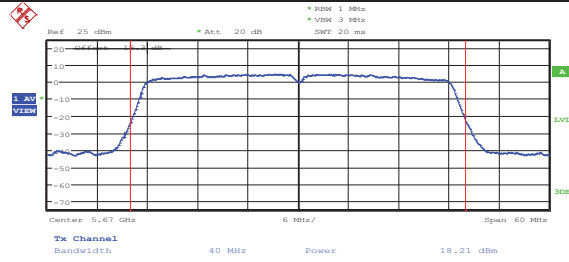
Date: 29.APR.2019 11:34:12

11AC40MIMO ANT2\_5550



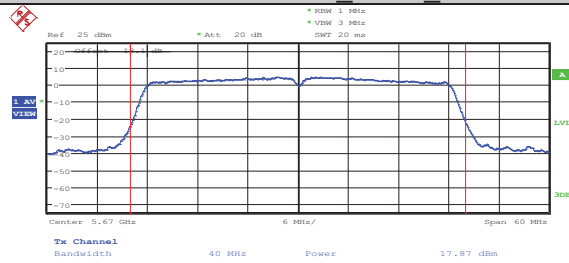
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11AC40MIMO ANT1\_5670



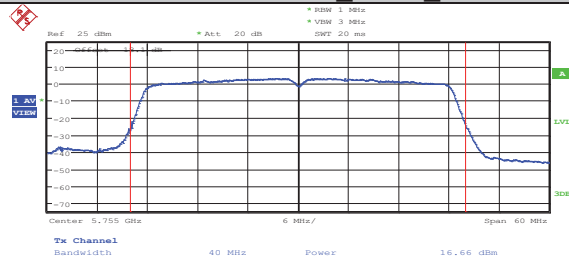
Date: 29.APR.2019 11:42:20

11AC40MIMO ANT2\_5670



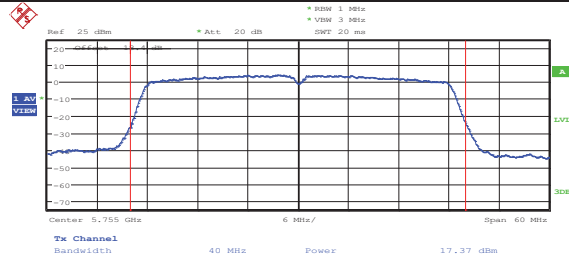
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11AC40MIMO ANT1\_5755



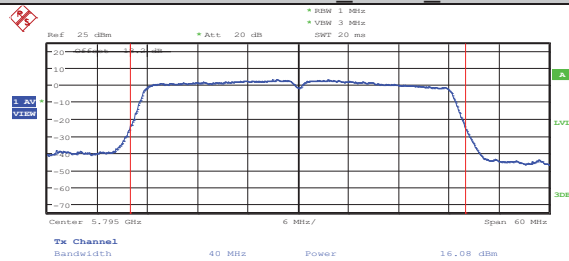
Date: 29.APR.2019 11:49:51

11AC40MIMO ANT2\_5755



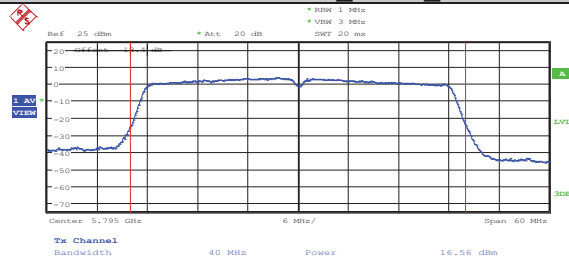
Date: 29.APR.2019 11:53:22

11AC40MIMO ANT1\_5795



Date: 29.APR.2019 11:59:34

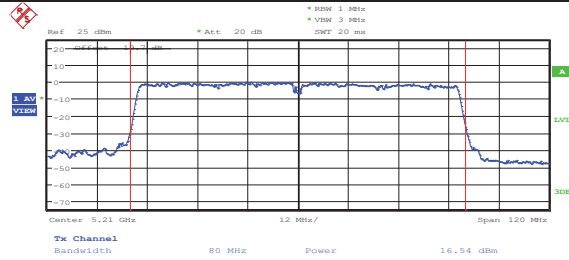
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Date: 29.APR.2019 12:08:30

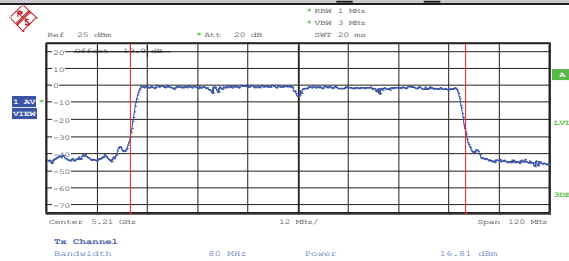
11AC80MIMO ANT1\_5210





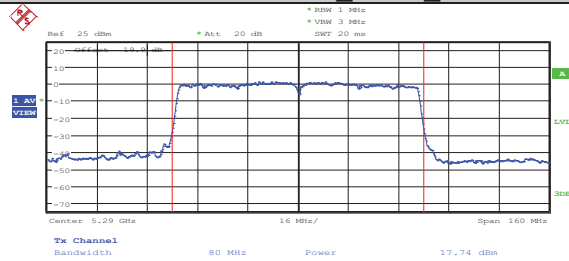
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11AC80MIMO ANT2\_5210



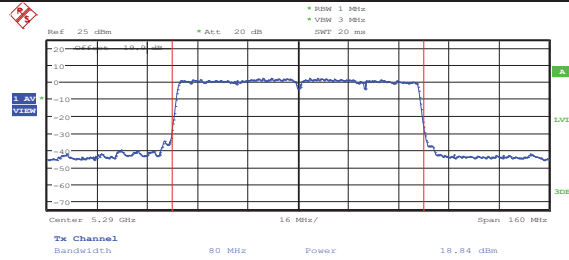
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11AC80MIMO ANT1\_5290



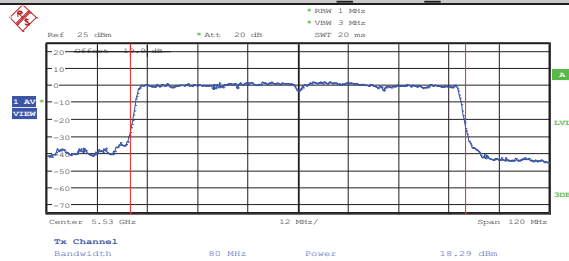
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11AC80MIMO ANT2\_5290



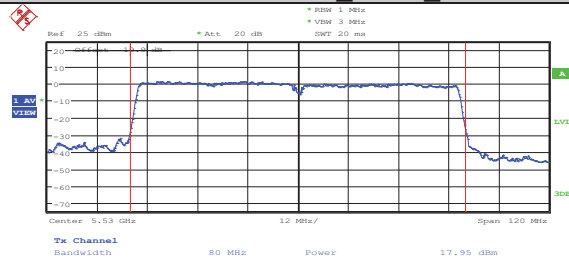
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11AC80MIMO ANT1\_5530



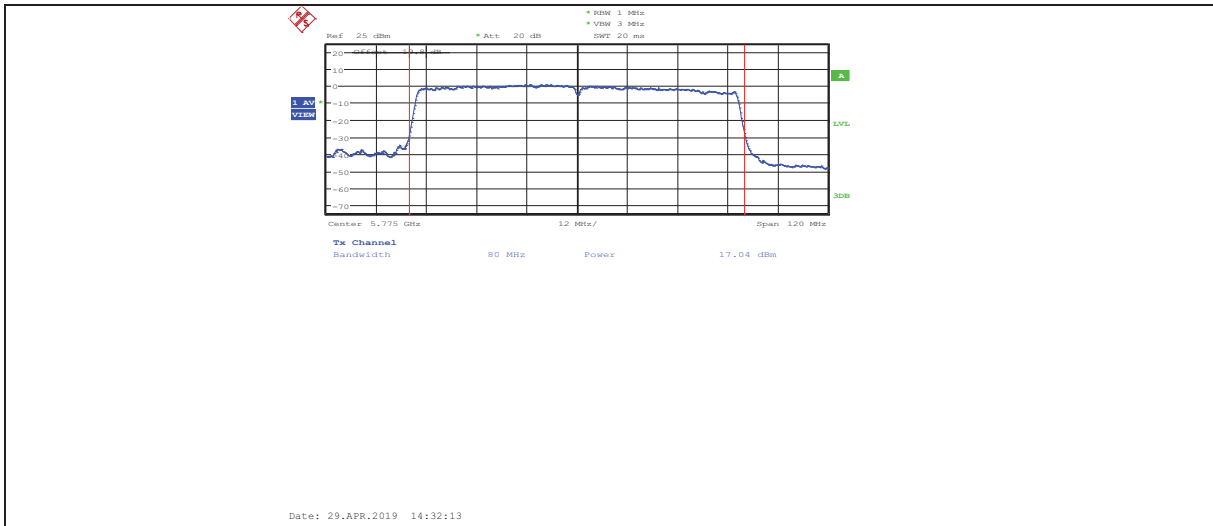
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11AC80MIMO ANT2\_5530

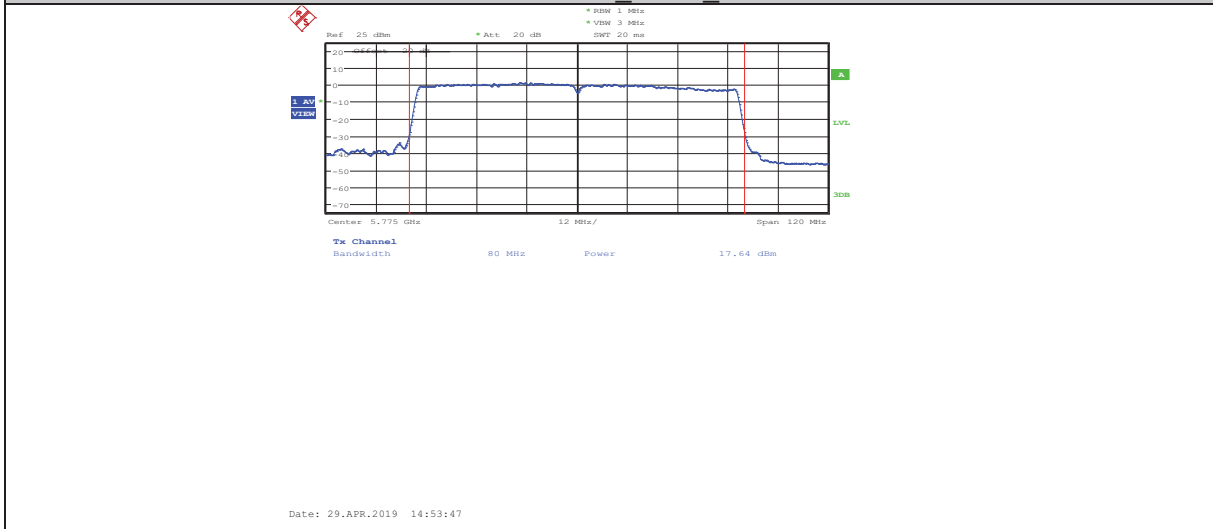


Date: 29.APR.2019 12:43:27

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	For FCC: Other than Mobile and portable:17 dBm/MHz Mobile and portable client devices:11 dBm/MHz	5150-5250
	For RSS eirp:10 dBm/MHz	
	11 dBm/MHz	5250-5350
	11 dBm/MHz	For FCC:5470-5725 For IC:5470-5600 5650-5725
	30 dBm/500 kHz	5725-5850
Note: For 802.11n and 802.11ac, the EUT incorporates a MIMO function. The Antenna directional gain is 6.51 dBi. The Power Spectral Density limit is the above limits-(6.51-6)		

### 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]	PSD eirp [dBm/MHz]	FCC Limit [dBm/MHz]	ISED Limit [dBm/MHz]
11A	ANT1	5180	5.84	9.16	11	10
11A	ANT2	5180	5.89	9.57	11	10
11A	ANT1	5200	5.71	9.03	11	10
11A	ANT2	5200	5.93	9.61	11	10
11A	ANT1	5240	5.55	8.87	11	10
11A	ANT2	5240	6.26	9.94	11	10
11N20MIMO	ANT1	5180	3.08	6.40	10.49	10
11N20MIMO	ANT2	5180	2.44	6.12	10.49	10
11N20MIMO	total	5180	5.78	9.27	10.49	10
11N20MIMO	ANT1	5200	2.55	5.87	10.49	10
11N20MIMO	ANT2	5200	2.49	6.17	10.49	10
11N20MIMO	total	5200	5.53	9.03	10.49	10
11N20MIMO	ANT1	5240	2.47	5.79	10.49	10
11N20MIMO	ANT2	5240	3.07	6.75	10.49	10
11N20MIMO	total	5240	5.79	9.31	10.49	10
11N40MIMO	ANT1	5190	-0.47	2.85	10.49	10
11N40MIMO	ANT2	5190	-0.60	3.08	10.49	10
11N40MIMO	total	5190	2.48	5.98	10.49	10
11N40MIMO	ANT1	5230	-0.66	2.66	10.49	10
11N40MIMO	ANT2	5230	-0.12	3.56	10.49	10
11N40MIMO	total	5230	2.63	6.14	10.49	10
11AC20MIMO	ANT1	5180	2.39	5.71	10.49	10
11AC20MIMO	ANT2	5180	2.29	5.97	10.49	10
11AC20MIMO	total	5180	5.35	8.85	10.49	10
11AC20MIMO	ANT1	5200	2.44	5.76	10.49	10
11AC20MIMO	ANT2	5200	2.17	5.85	10.49	10
11AC20MIMO	total	5200	5.32	8.82	10.49	10

11AC20MIMO	ANT1	5240	1.95	5.27	10.49	10
11AC20MIMO	ANT2	5240	2.62	6.30	10.49	10
11AC20MIMO	total	5240	5.31	8.83	10.49	10
11AC40MIMO	ANT1	5190	2.46	5.78	10.49	10
11AC40MIMO	ANT2	5190	2.42	6.10	10.49	10
11AC40MIMO	total	5190	5.45	8.95	10.49	10
11AC40MIMO	ANT1	5230	2.23	5.55	10.49	10
11AC40MIMO	ANT2	5230	2.72	6.40	10.49	10
11AC40MIMO	total	5230	5.49	9.01	10.49	10
11AC80MIMO	ANT1	5210	-0.18	3.14	10.49	10
11AC80MIMO	ANT2	5210	-0.21	3.47	10.49	10
11AC80MIMO	total	5210	2.82	6.32	10.49	10

**(5250-5350, 5470-5725)**

Test Mode	Ant	Test Channel	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	ANT1	5260	7.27	11	PASS
11A	ANT2	5260	8.23	11	PASS
11A	ANT1	5280	7.42	11	PASS
11A	ANT2	5280	7.84	11	PASS
11A	ANT1	5320	6.68	11	PASS
11A	ANT2	5320	7.84	11	PASS
11A	ANT1	5500	7.14	11	PASS
11A	ANT2	5500	7.58	11	PASS
11A	ANT1	5580	8.30	11	PASS
11A	ANT2	5580	7.91	11	PASS
11A	ANT1	5700	6.76	11	PASS
11A	ANT2	5700	6.88	11	PASS
11N20MIMO	ANT1	5260	5.37	10.49	PASS
11N20MIMO	ANT2	5260	6.16	10.49	PASS
11N20MIMO	total	5260	8.79	10.49	PASS
11N20MIMO	ANT1	5280	5.18	10.49	PASS
11N20MIMO	ANT2	5280	5.99	10.49	PASS
11N20MIMO	total	5280	8.61	10.49	PASS
11N20MIMO	ANT1	5320	4.80	10.49	PASS
11N20MIMO	ANT2	5320	6.11	10.49	PASS
11N20MIMO	total	5320	8.51	10.49	PASS
11N20MIMO	ANT1	5500	5.12	10.49	PASS
11N20MIMO	ANT2	5500	5.43	10.49	PASS

11N20MIMO	total	5500	8.29	10.49	PASS
11N20MIMO	ANT1	5580	6.35	10.49	PASS
11N20MIMO	ANT2	5580	5.54	10.49	PASS
11N20MIMO	total	5580	8.97	10.49	PASS
11N20MIMO	ANT1	5700	4.89	10.49	PASS
11N20MIMO	ANT2	5700	4.71	10.49	PASS
11N20MIMO	total	5700	7.81	10.49	PASS
11N40MIMO	ANT1	5270	1.00	10.49	PASS
11N40MIMO	ANT2	5270	1.78	10.49	PASS
11N40MIMO	total	5270	4.42	10.49	PASS
11N40MIMO	ANT1	5310	0.47	10.49	PASS
11N40MIMO	ANT2	5310	1.93	10.49	PASS
11N40MIMO	total	5310	4.27	10.49	PASS
11N40MIMO	ANT1	5510	0.89	10.49	PASS
11N40MIMO	ANT2	5510	1.20	10.49	PASS
11N40MIMO	total	5510	4.06	10.49	PASS
11N40MIMO	ANT1	5550	1.53	10.49	PASS
11N40MIMO	ANT2	5550	1.23	10.49	PASS
11N40MIMO	total	5550	4.39	10.49	PASS
11N40MIMO	ANT1	5670	0.75	10.49	PASS
11N40MIMO	ANT2	5670	0.46	10.49	PASS
11N40MIMO	total	5670	3.62	10.49	PASS
11AC20MIMO	ANT1	5260	6.72	10.49	PASS
11AC20MIMO	ANT2	5260	7.70	10.49	PASS
11AC20MIMO	total	5260	10.25	10.49	PASS
11AC20MIMO	ANT1	5280	6.44	10.49	PASS
11AC20MIMO	ANT2	5280	7.61	10.49	PASS
11AC20MIMO	total	5280	10.07	10.49	PASS
11AC20MIMO	ANT1	5320	6.29	10.49	PASS
11AC20MIMO	ANT2	5320	7.95	10.49	PASS
11AC20MIMO	total	5320	10.21	10.49	PASS
11AC20MIMO	ANT1	5500	6.43	10.49	PASS
11AC20MIMO	ANT2	5500	6.90	10.49	PASS
11AC20MIMO	total	5500	9.68	10.49	PASS
11AC20MIMO	ANT1	5580	6.67	10.49	PASS
11AC20MIMO	ANT2	5580	6.47	10.49	PASS
11AC20MIMO	total	5580	9.58	10.49	PASS
11AC20MIMO	ANT1	5700	6.42	10.49	PASS

11AC20MIMO	ANT2	5700	6.71	10.49	PASS
11AC20MIMO	total	5700	9.58	10.49	PASS
11AC40MIMO	ANT1	5270	3.41	10.49	PASS
11AC40MIMO	ANT2	5270	4.95	10.49	PASS
11AC40MIMO	total	5270	7.26	10.49	PASS
11AC40MIMO	ANT1	5310	3.69	10.49	PASS
11AC40MIMO	ANT2	5310	5.23	10.49	PASS
11AC40MIMO	total	5310	7.54	10.49	PASS
11AC40MIMO	ANT1	5510	4.10	10.49	PASS
11AC40MIMO	ANT2	5510	4.19	10.49	PASS
11AC40MIMO	total	5510	7.16	10.49	PASS
11AC40MIMO	ANT1	5550	4.51	10.49	PASS
11AC40MIMO	ANT2	5550	4.82	10.49	PASS
11AC40MIMO	total	5550	7.68	10.49	PASS
11AC40MIMO	ANT1	5670	4.57	10.49	PASS
11AC40MIMO	ANT2	5670	5.03	10.49	PASS
11AC40MIMO	total	5670	7.82	10.49	PASS
11AC80MIMO	ANT1	5290	1.29	10.49	PASS
11AC80MIMO	ANT2	5290	2.13	10.49	PASS
11AC80MIMO	total	5290	4.74	10.49	PASS
11AC80MIMO	ANT1	5530	2.08	10.49	PASS
11AC80MIMO	ANT2	5530	1.53	10.49	PASS
11AC80MIMO	total	5530	4.82	10.49	PASS

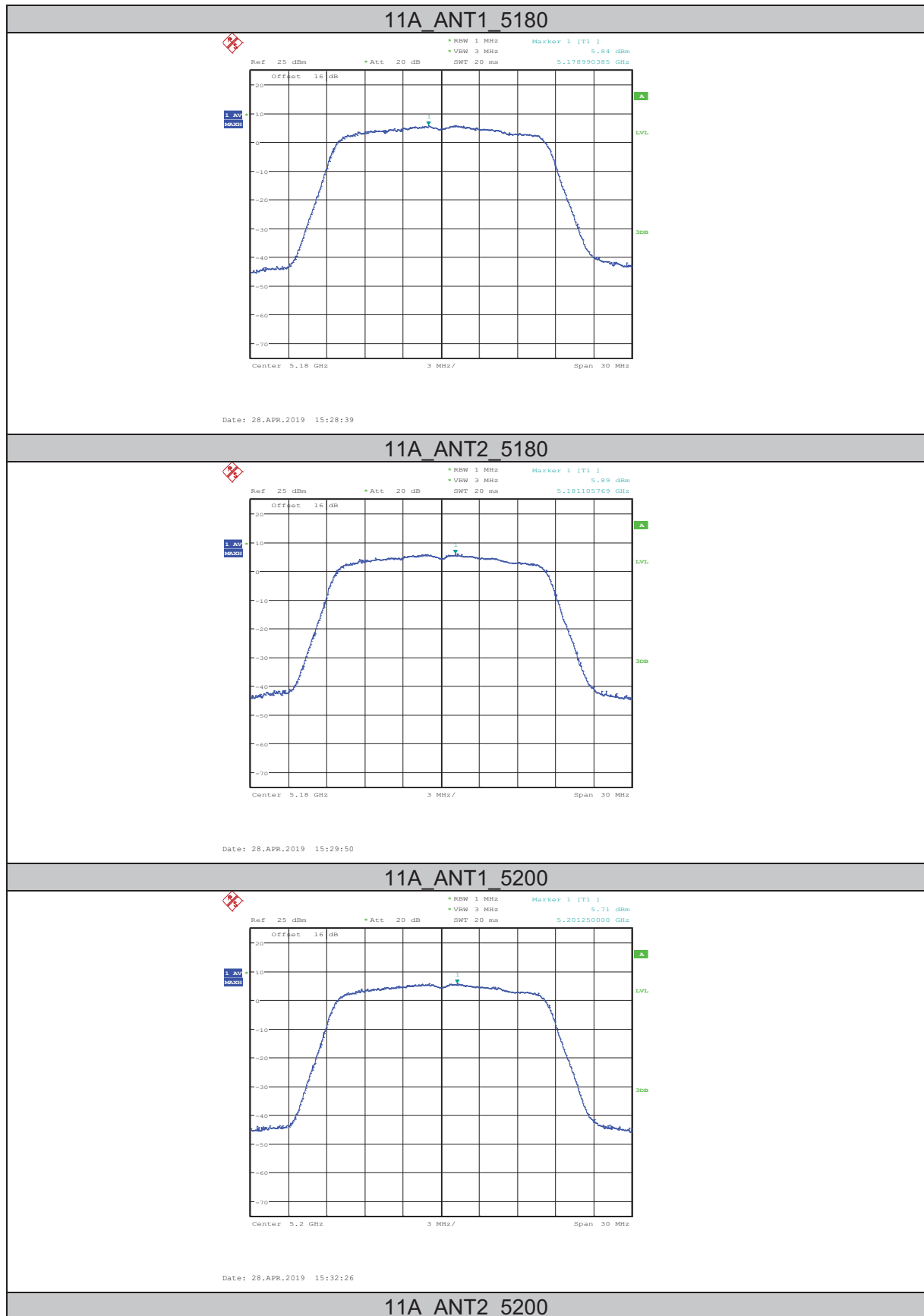
**(5725-5850)**

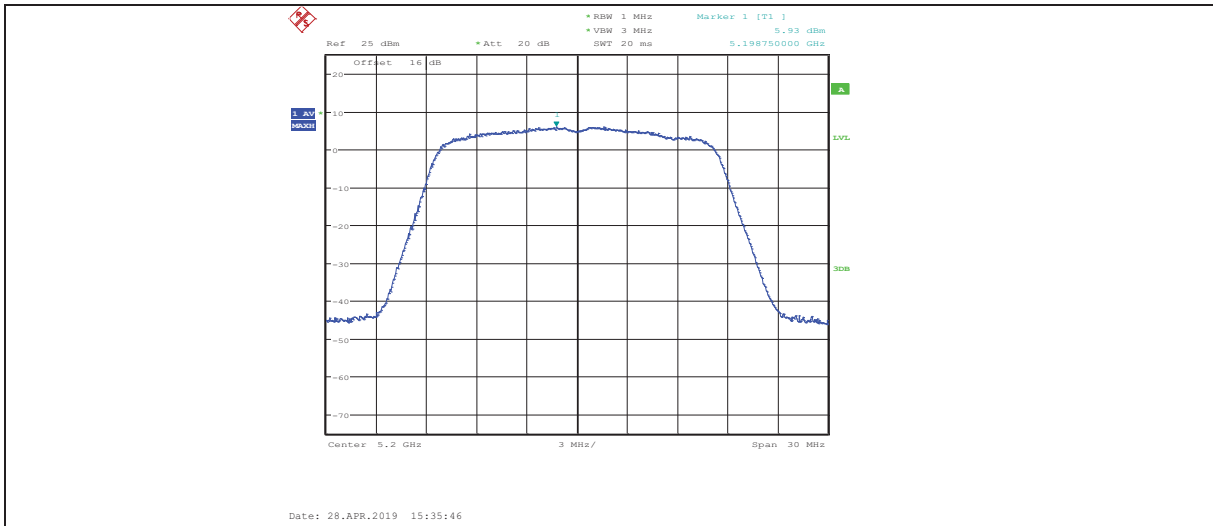
Test Mode	Test Channel	Ant	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
11A	ANT1	5745	4.25	30	PASS
11A	ANT2	5745	4.73	30	PASS
11A	ANT1	5785	3.57	30	PASS
11A	ANT2	5785	4.42	30	PASS
11A	ANT1	5825	2.92	30	PASS
11A	ANT2	5825	2.93	30	PASS
11N20MIMO	ANT1	5745	1.78	29.49	PASS
11N20MIMO	ANT2	5745	2.34	29.49	PASS
11N20MIMO	total	5745	5.08	29.49	PASS
11N20MIMO	ANT1	5785	1.27	29.49	PASS
11N20MIMO	ANT2	5785	1.76	29.49	PASS



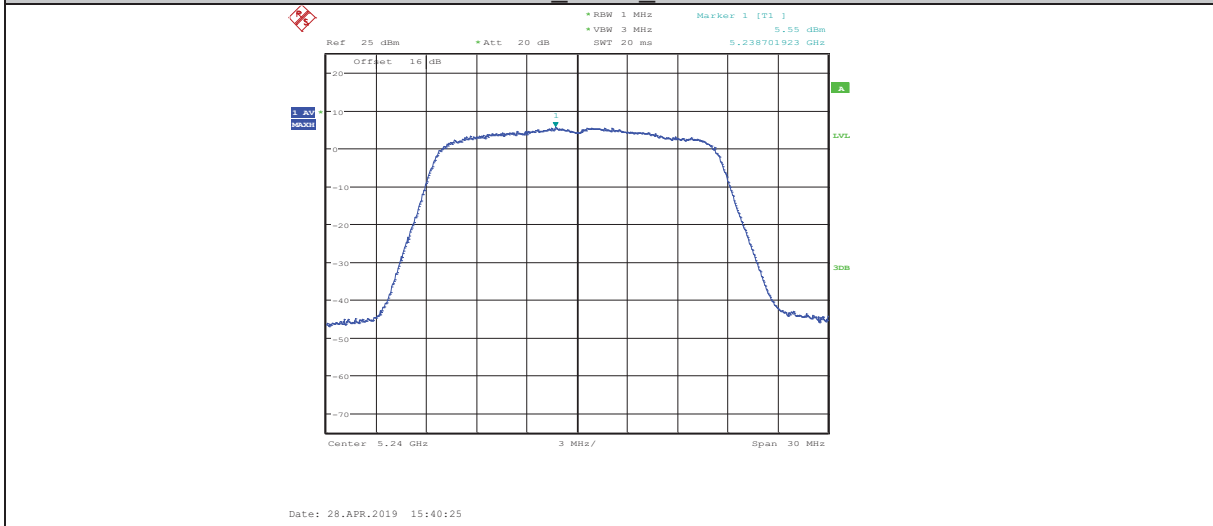
11N20MIMO	total	5785	4.53	29.49	PASS
11N20MIMO	ANT1	5825	1.58	29.49	PASS
11N20MIMO	ANT2	5825	1.41	29.49	PASS
11N20MIMO	total	5825	4.51	29.49	PASS
11N40MIMO	ANT1	5755	-1.42	29.49	PASS
11N40MIMO	ANT2	5755	-1.30	29.49	PASS
11N40MIMO	total	5755	1.65	29.49	PASS
11N40MIMO	ANT1	5795	-2.01	29.49	PASS
11N40MIMO	ANT2	5795	-1.16	29.49	PASS
11N40MIMO	total	5795	1.45	29.49	PASS
11AC20MIMO	ANT1	5745	4.33	29.49	PASS
11AC20MIMO	ANT2	5745	4.52	29.49	PASS
11AC20MIMO	total	5745	7.44	29.49	PASS
11AC20MIMO	ANT1	5785	3.28	29.49	PASS
11AC20MIMO	ANT2	5785	3.86	29.49	PASS
11AC20MIMO	total	5785	6.59	29.49	PASS
11AC20MIMO	ANT1	5825	2.43	29.49	PASS
11AC20MIMO	ANT2	5825	2.65	29.49	PASS
11AC20MIMO	total	5825	5.55	29.49	PASS
11AC40MIMO	ANT1	5755	1.65	29.49	PASS
11AC40MIMO	ANT2	5755	1.83	29.49	PASS
11AC40MIMO	total	5755	4.75	29.49	PASS
11AC40MIMO	ANT1	5795	0.79	29.49	PASS
11AC40MIMO	ANT2	5795	1.95	29.49	PASS
11AC40MIMO	total	5795	4.42	29.49	PASS
11AC80MIMO	ANT1	5775	0.84	29.49	PASS
11AC80MIMO	ANT2	5775	1.29	29.49	PASS
11AC80MIMO	total	5775	4.08	29.49	PASS

### 6.5. Original test data

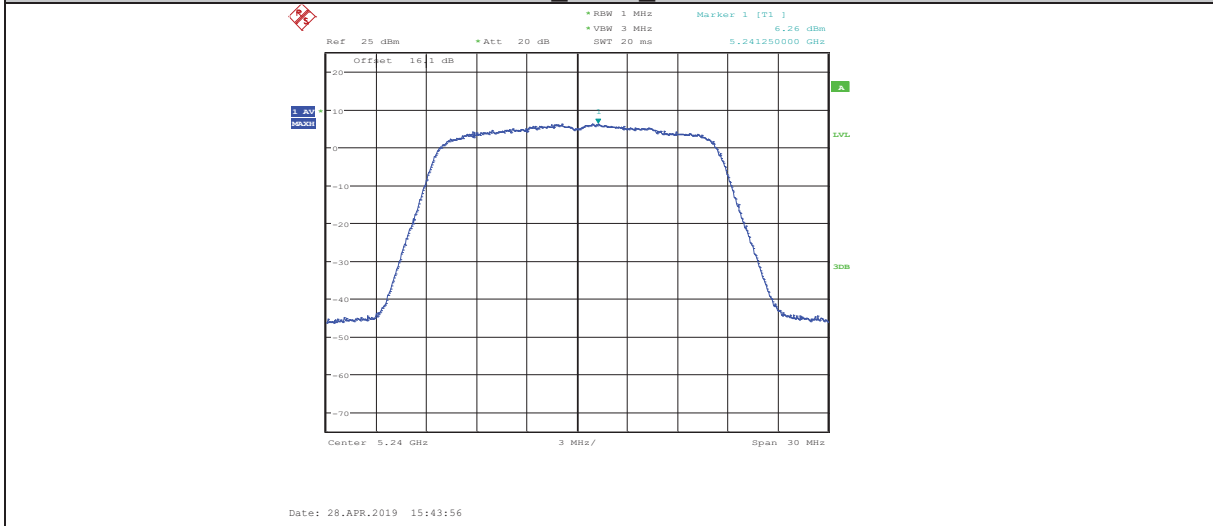




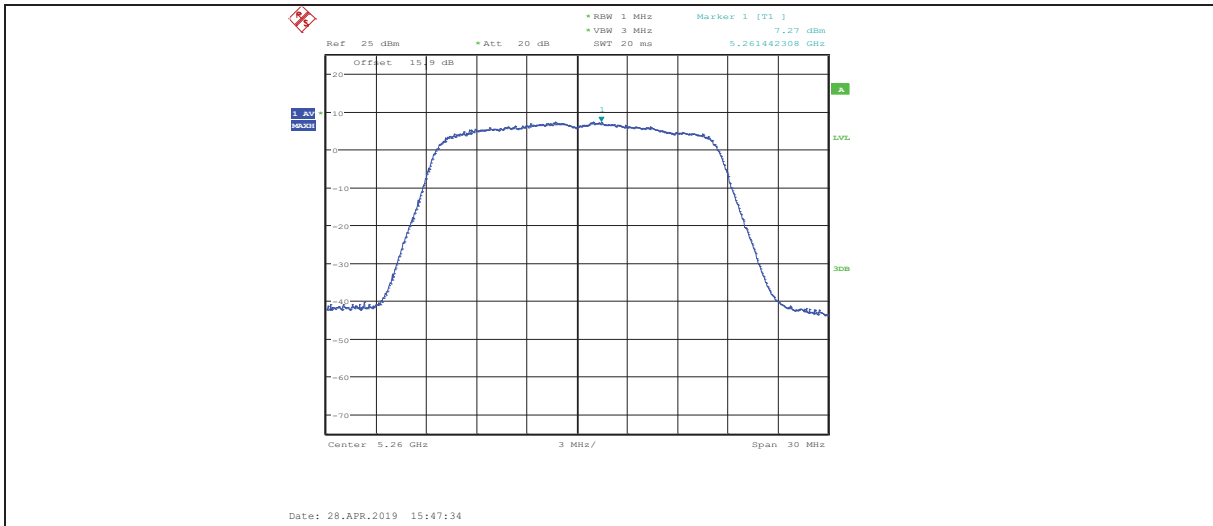
11A ANT1 5240



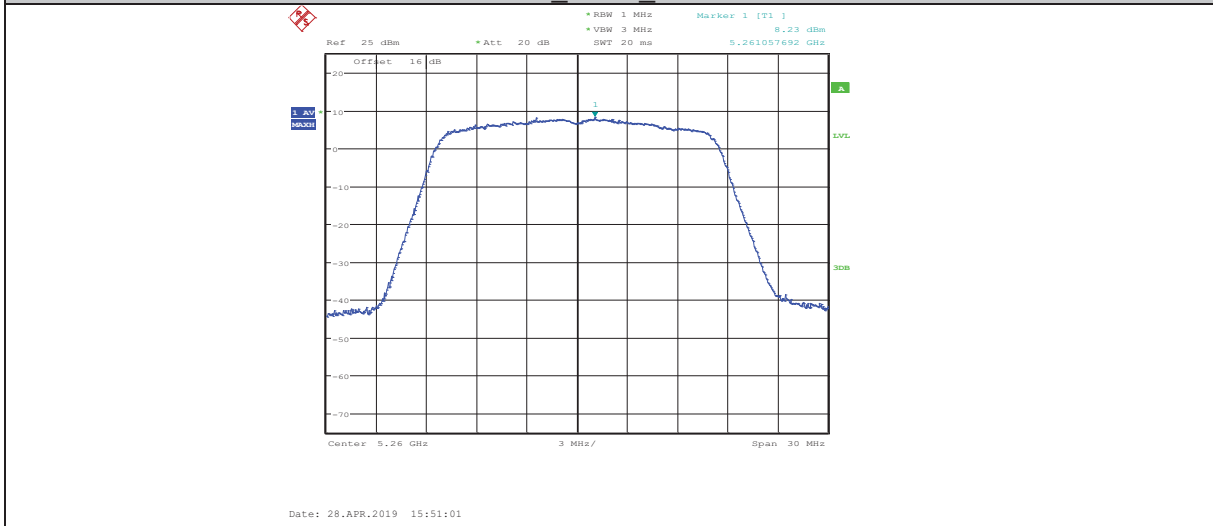
11A ANT2 5240



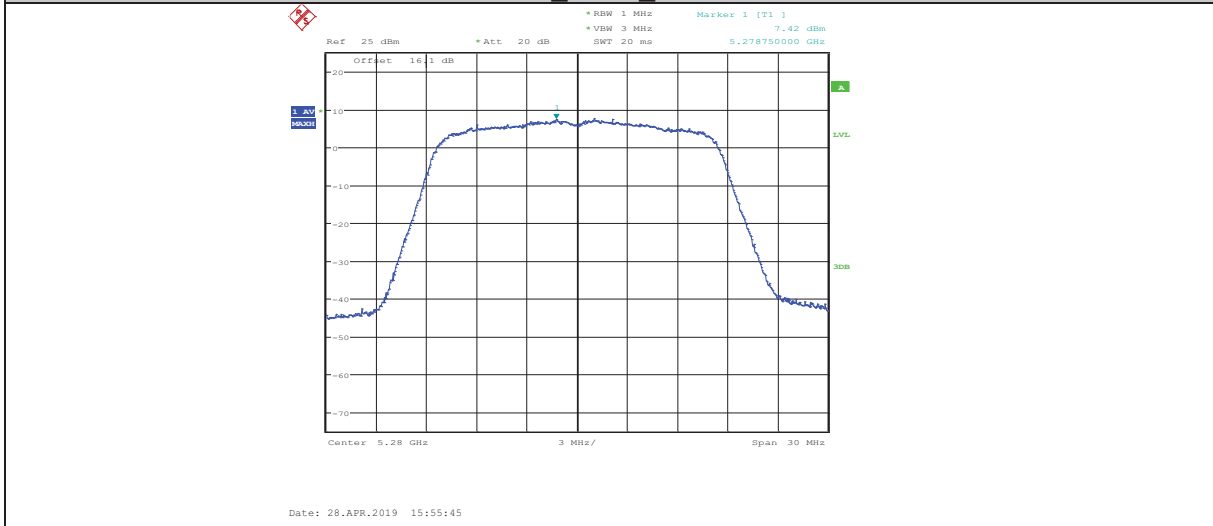
11A ANT1 5260



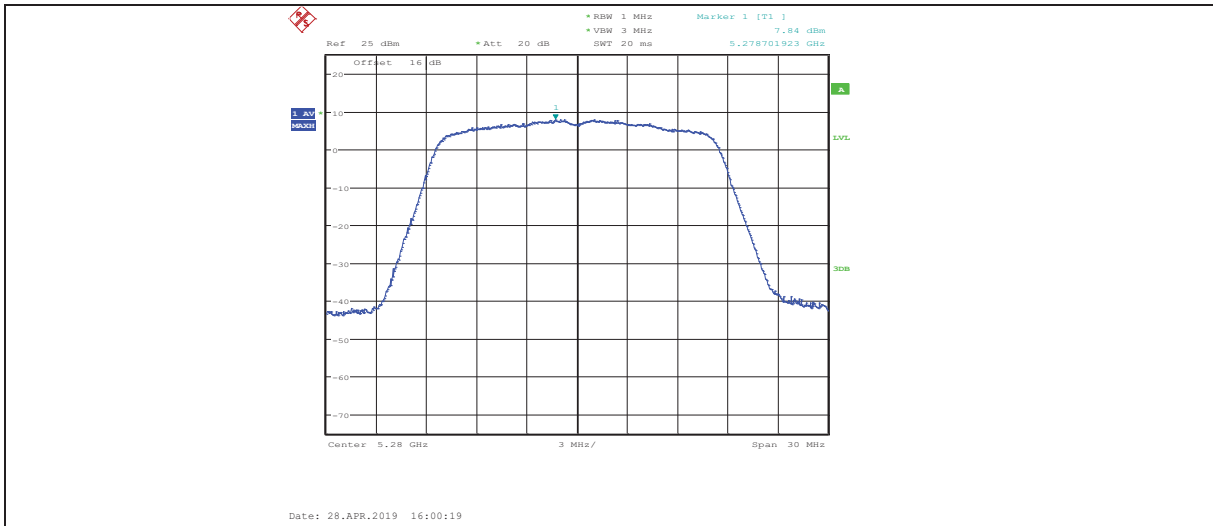
11A ANT2 5260



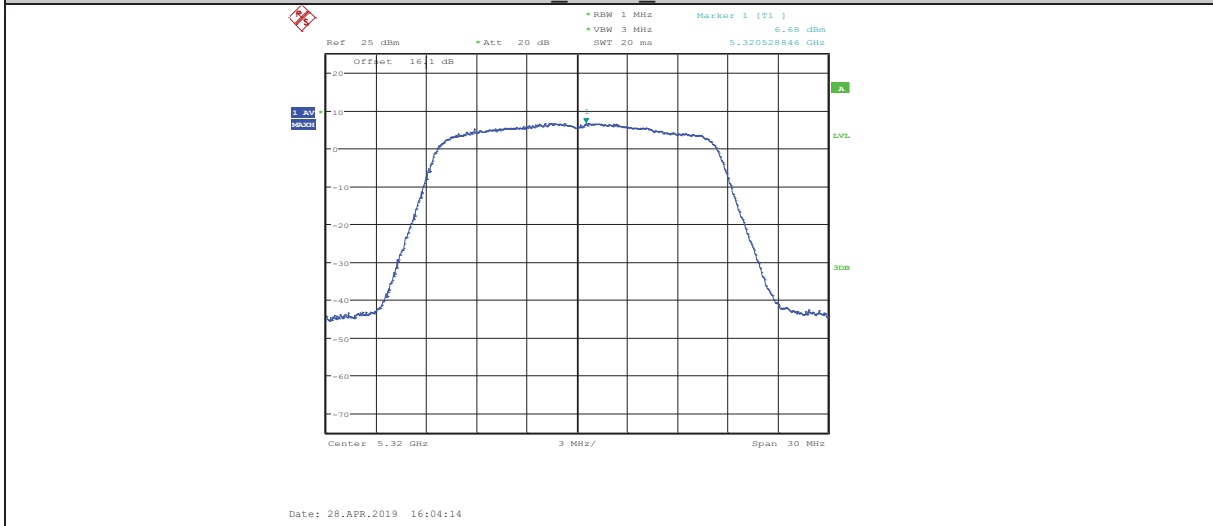
11A ANT1 5280



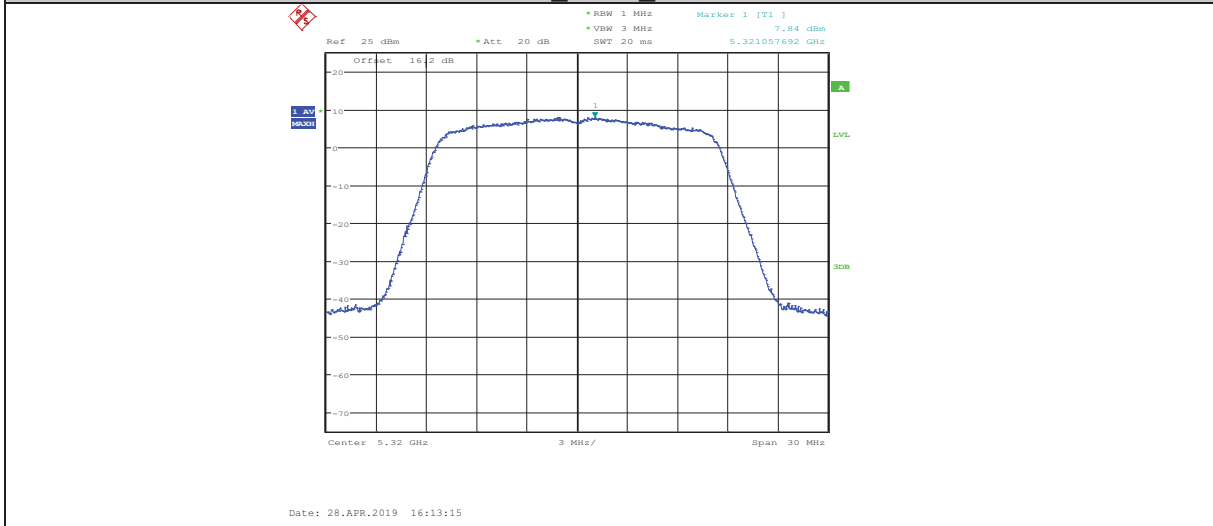
11A ANT2 5280



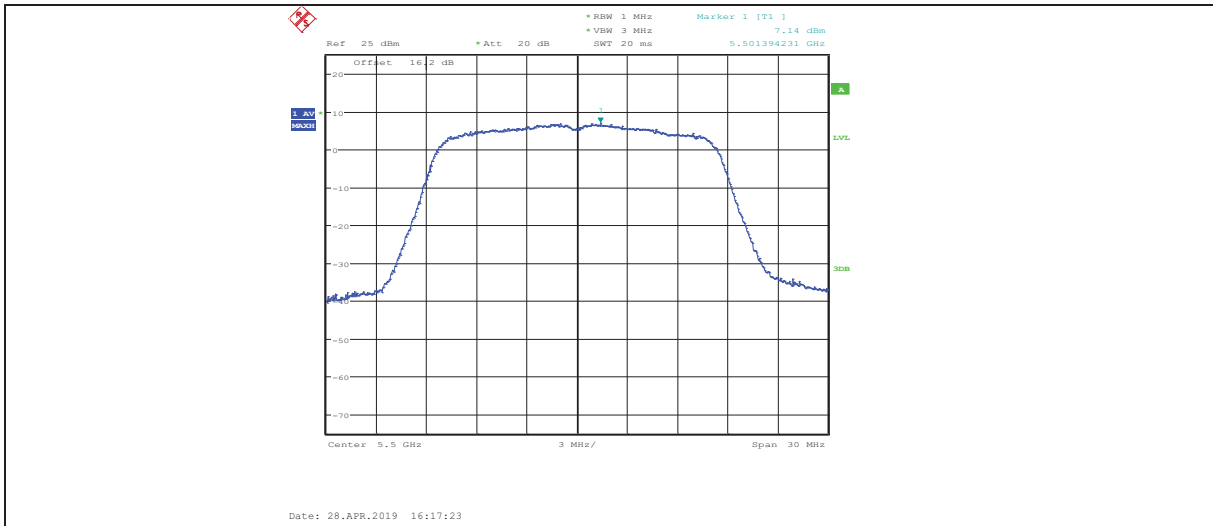
11A ANT1 5320



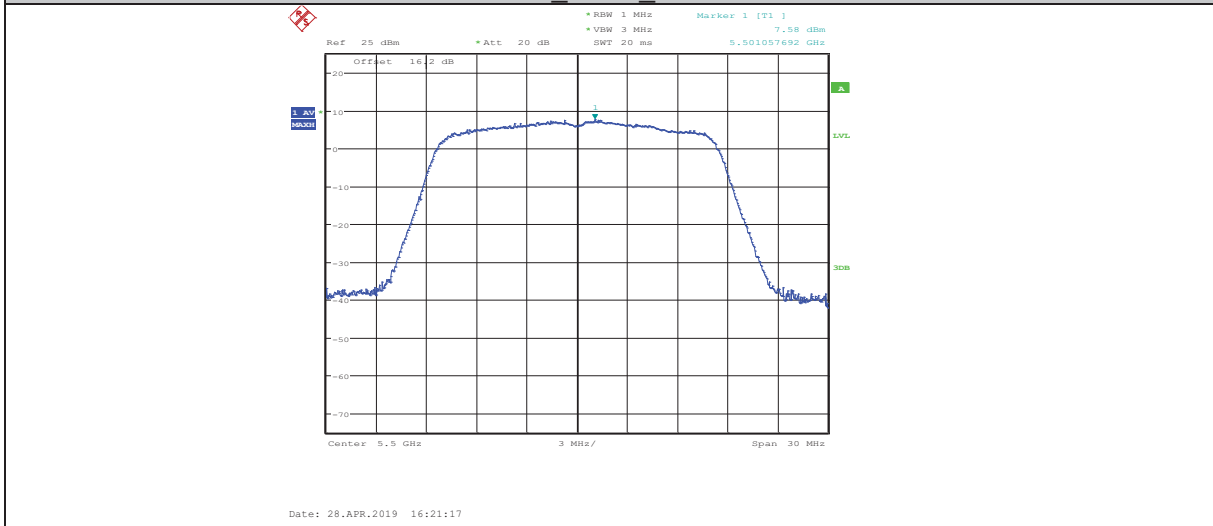
11A ANT2 5320



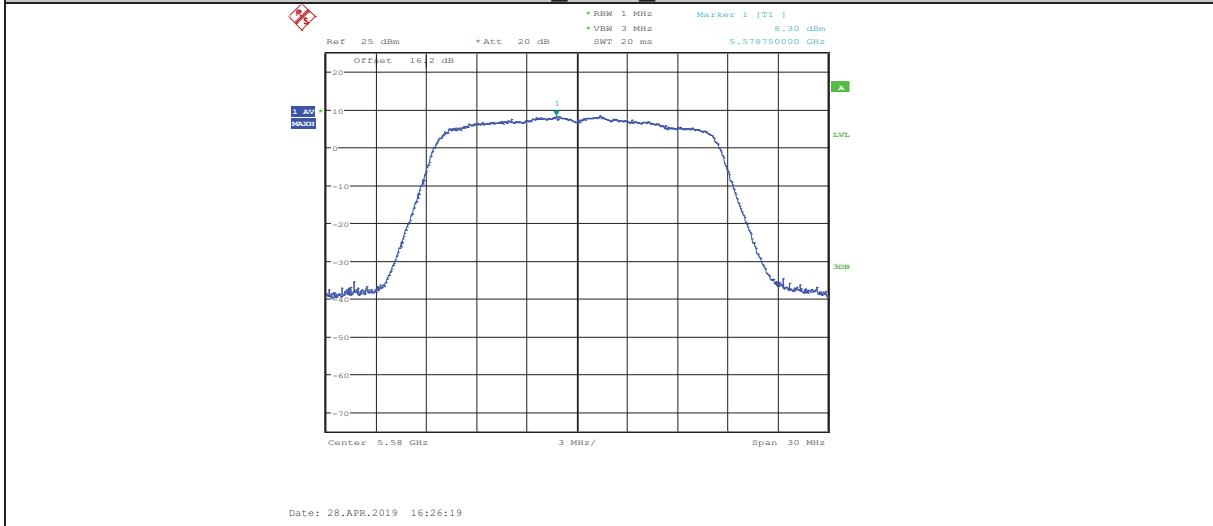
11A ANT1 5500



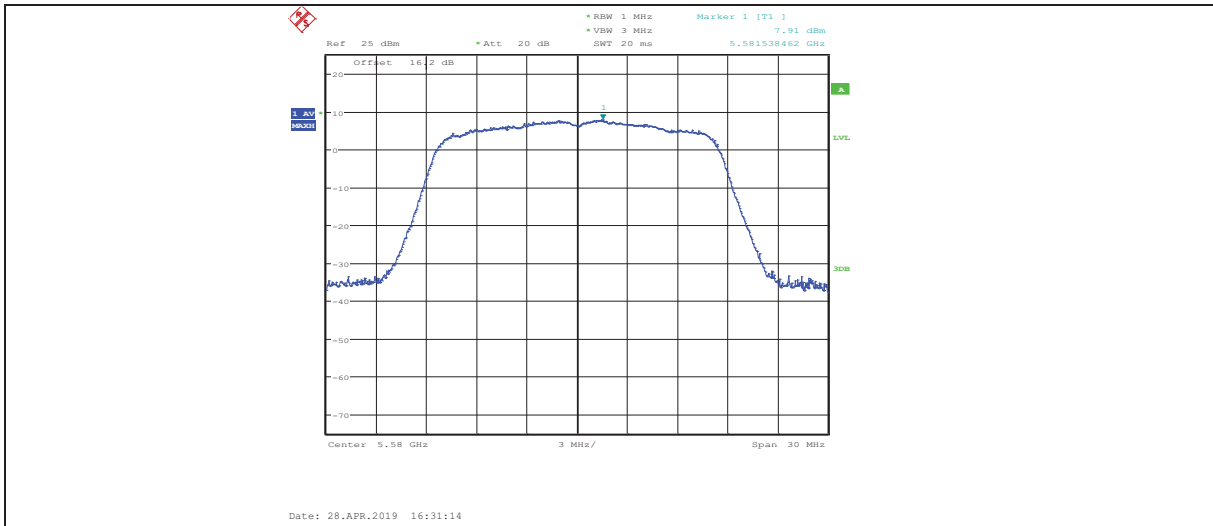
11A ANT2 5500



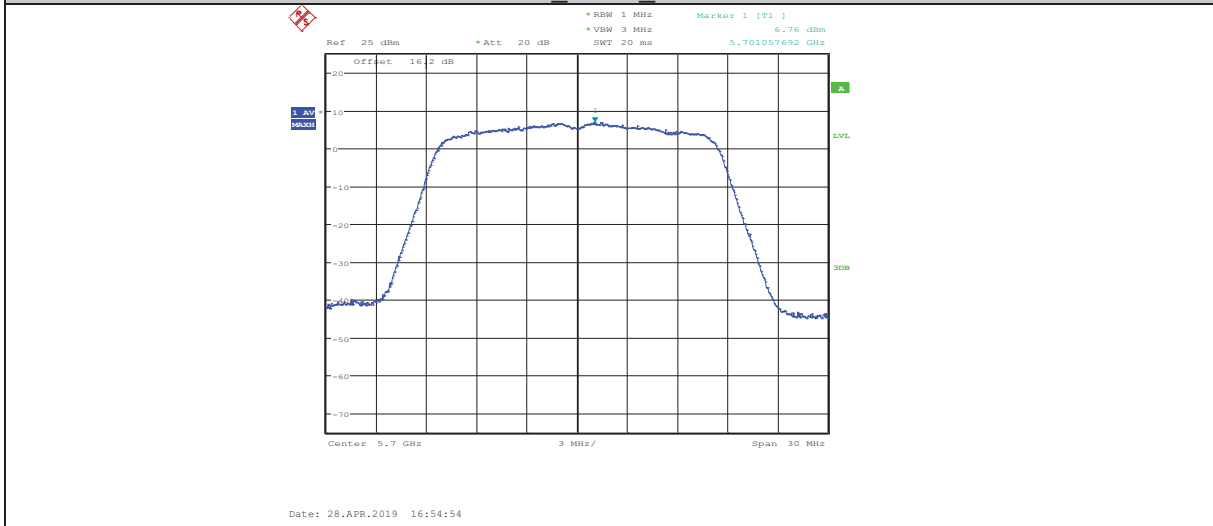
11A ANT1 5580



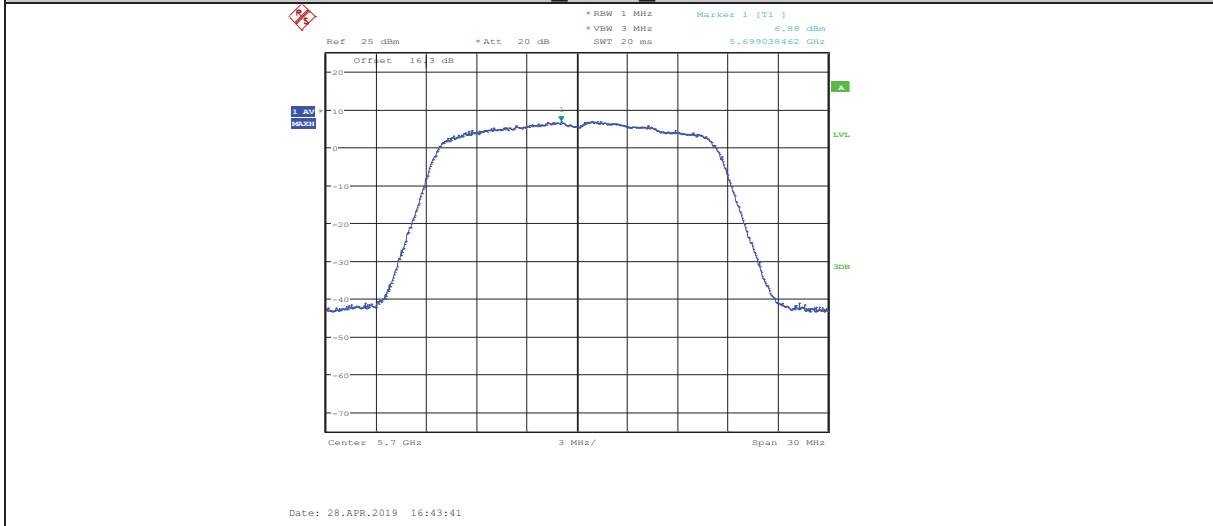
11A ANT2 5580



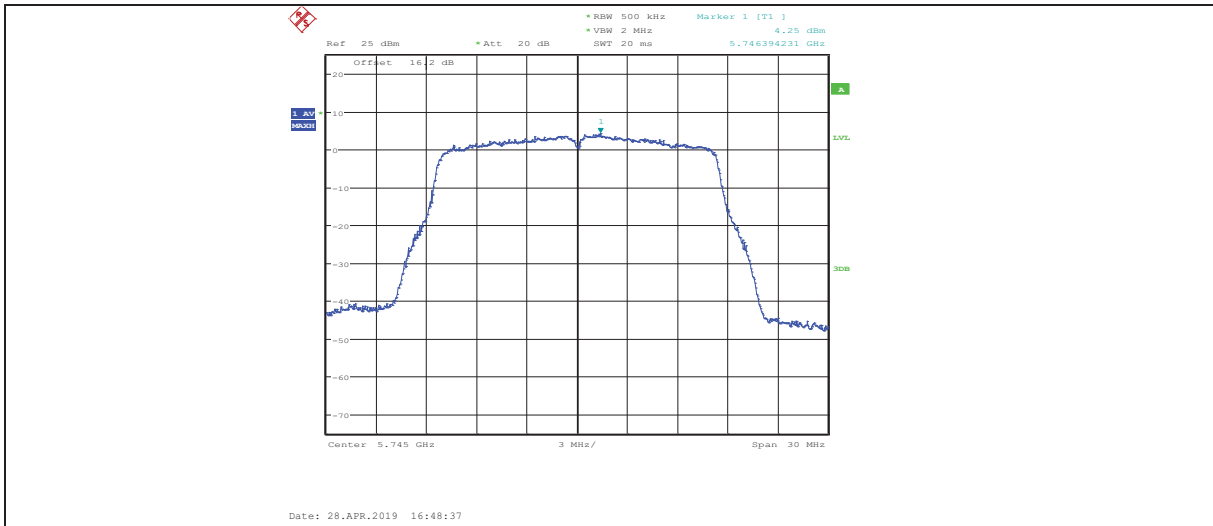
11A ANT1 5700



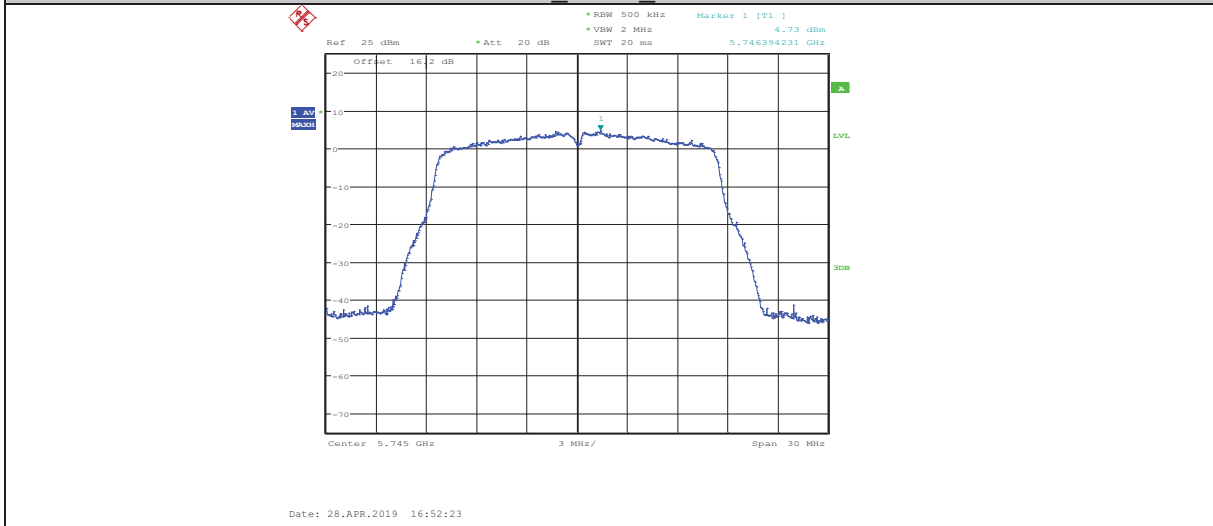
11A ANT2 5700



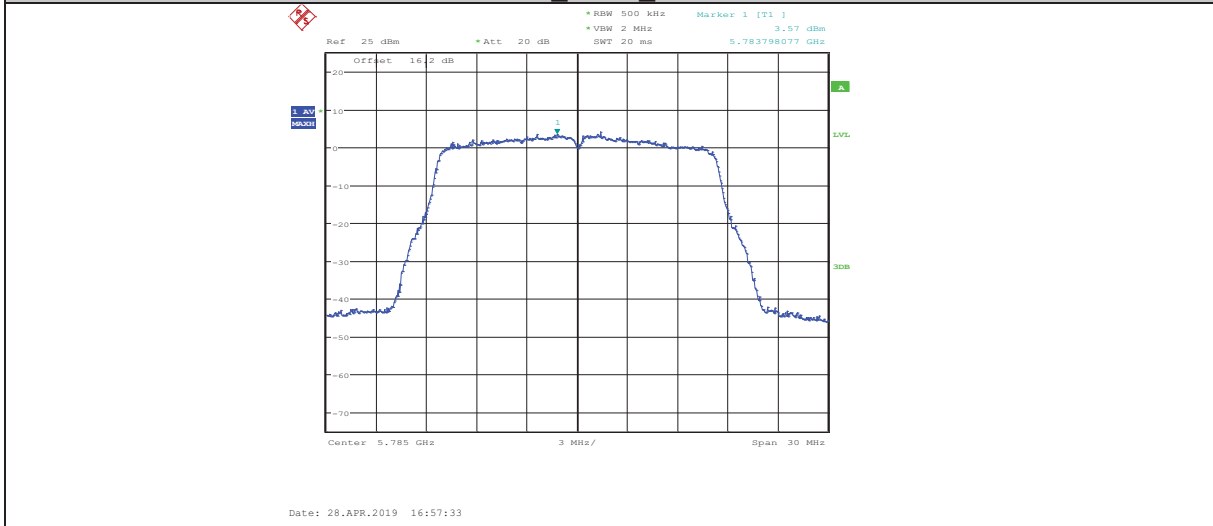
11A ANT1 5745



11A ANT2 5745

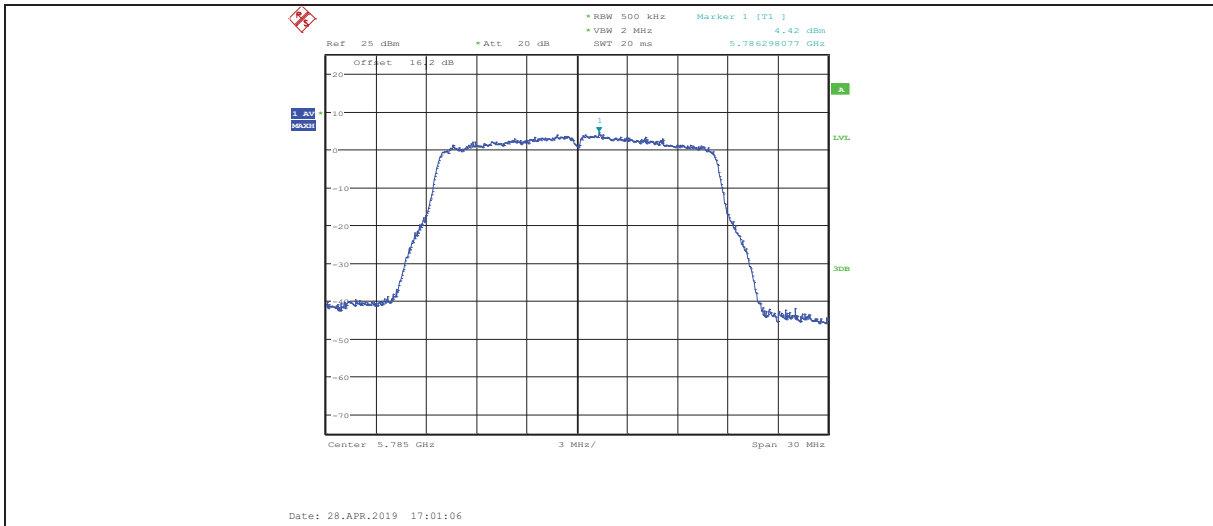


11A ANT1 5785

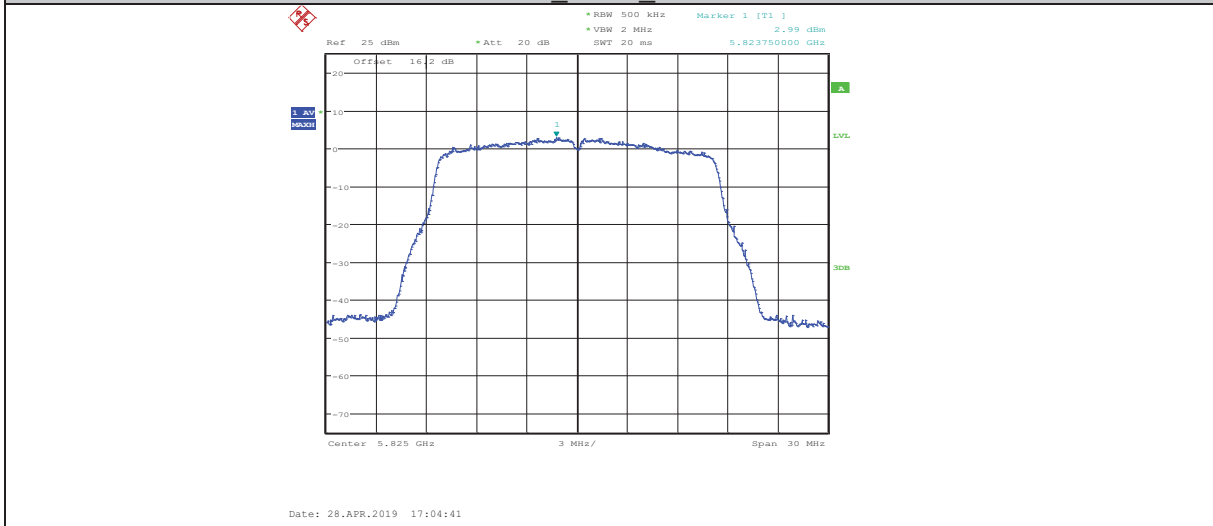


11A ANT2 5785

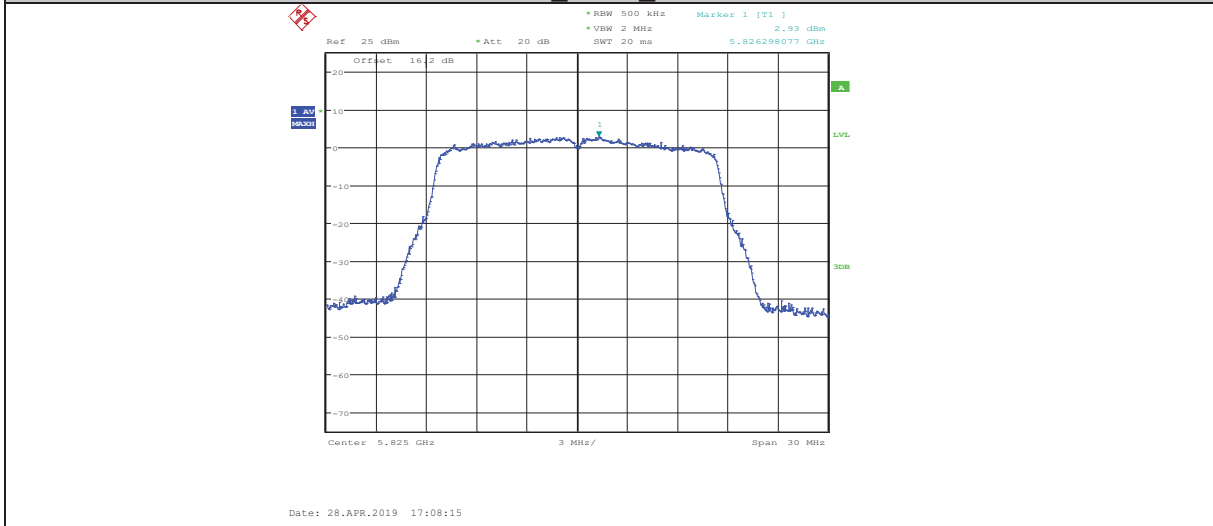




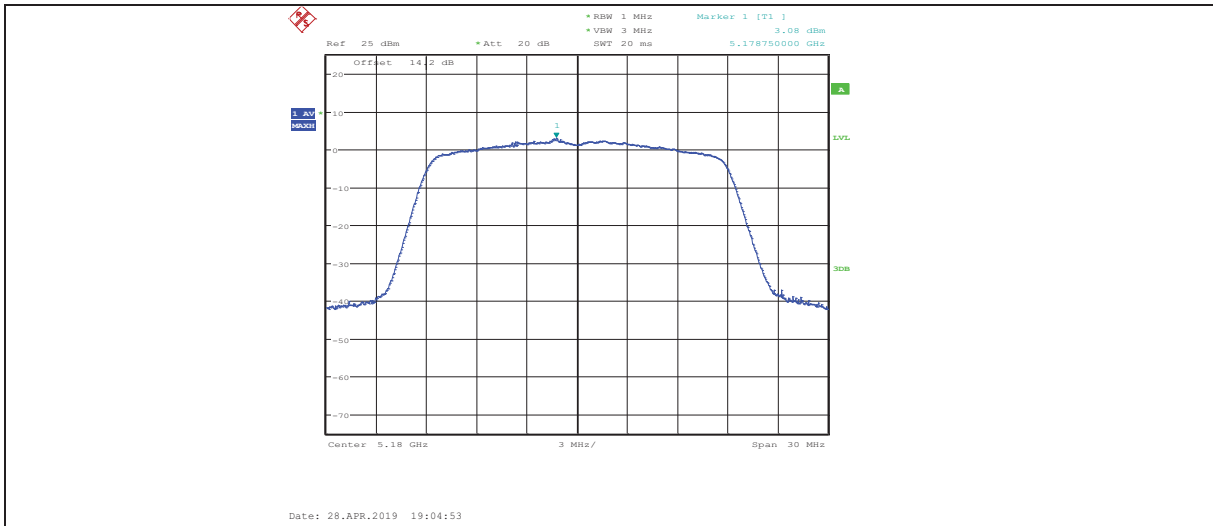
11A ANT1\_5825



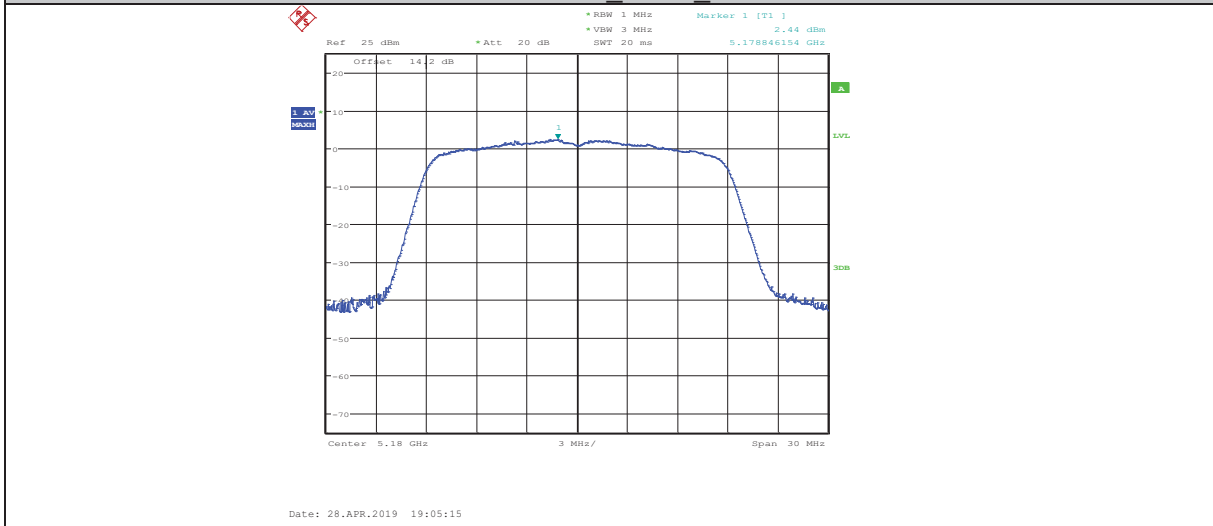
11A ANT2\_5825



11N20MIMO\_ANT1\_5180



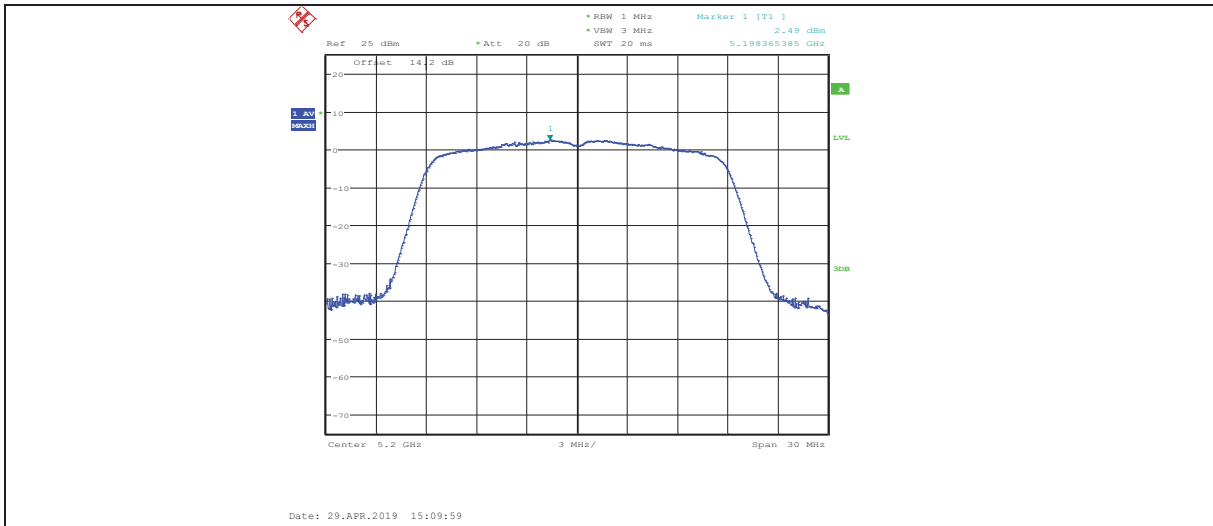
11N20MIMO ANT2 5180



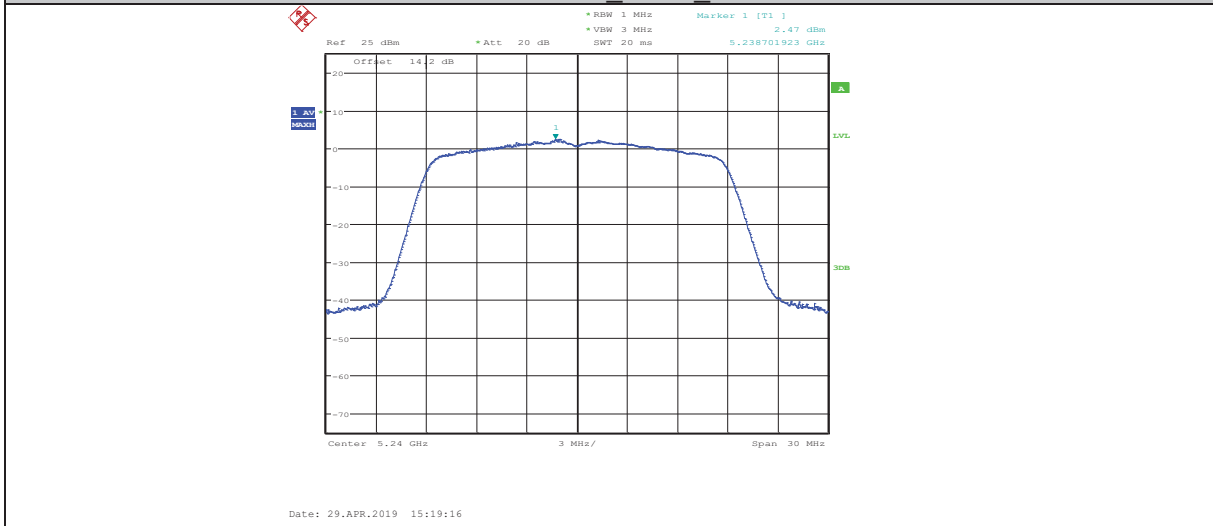
11N20MIMO ANT1 5200



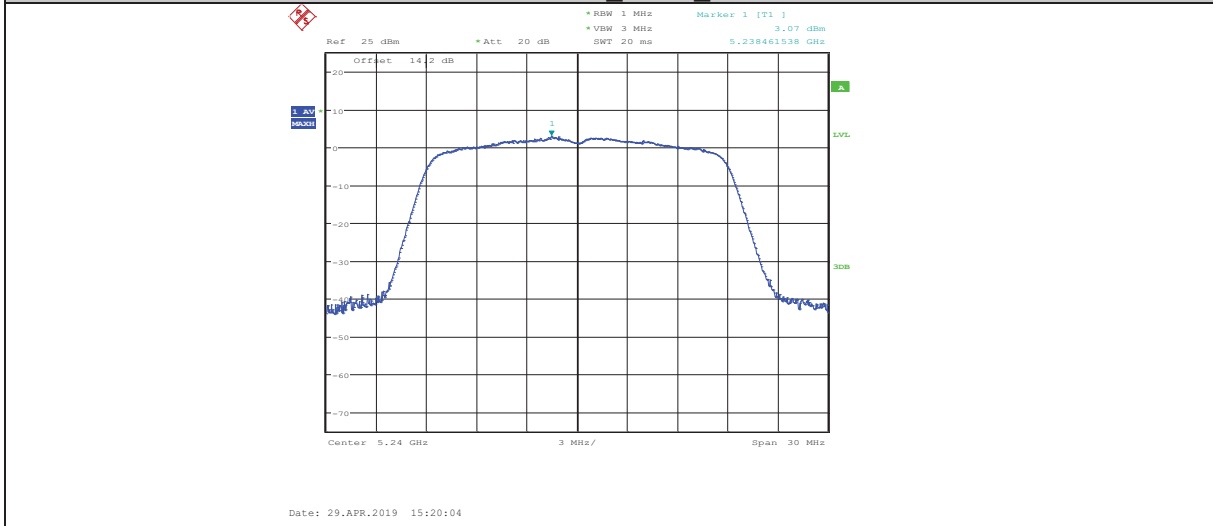
11N20MIMO ANT2 5200



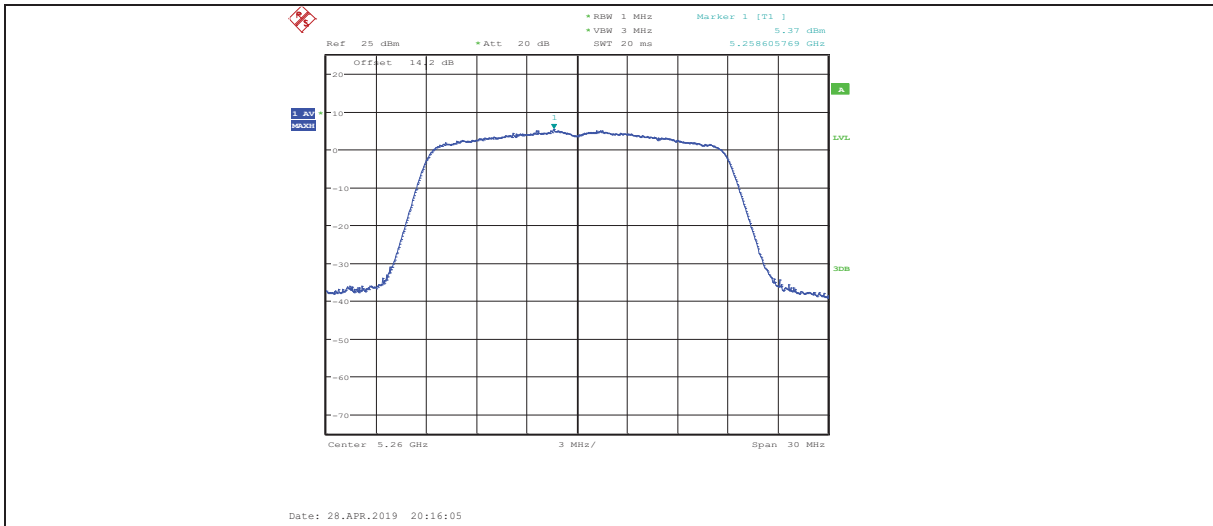
11N20MIMO ANT1 5240



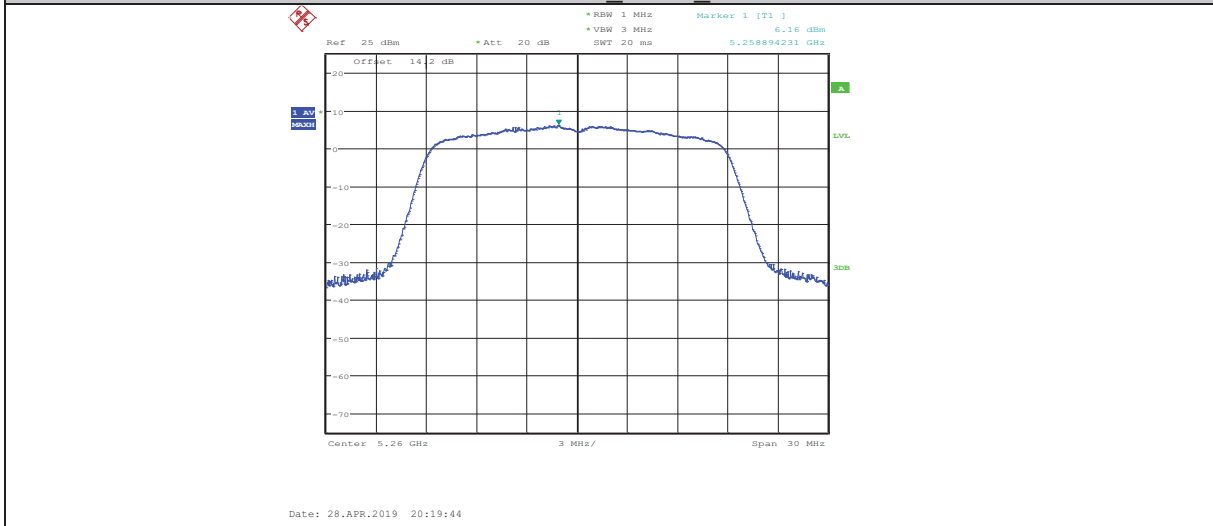
11N20MIMO ANT2 5240



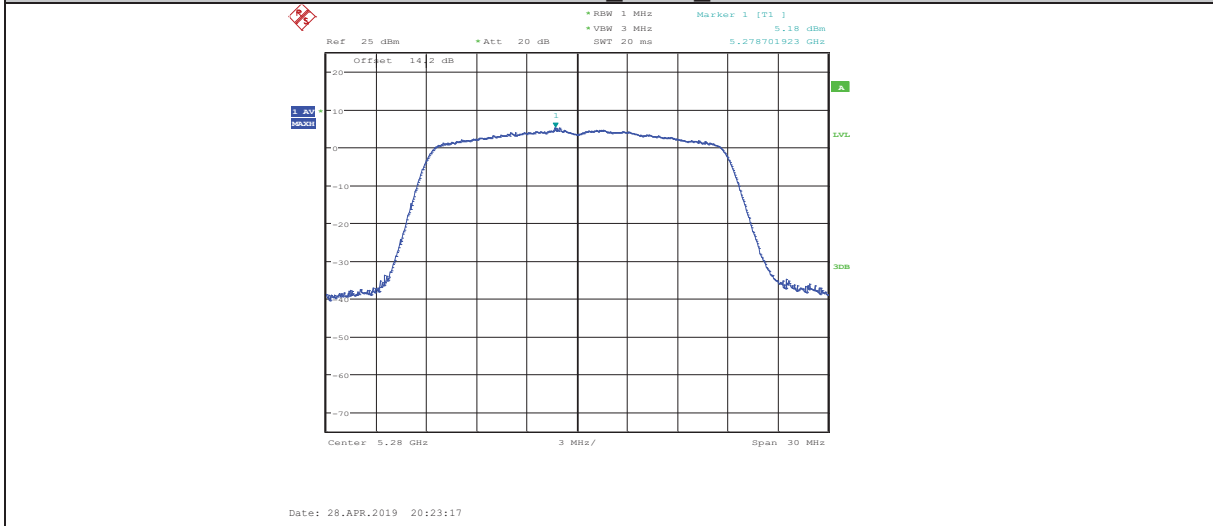
11N20MIMO ANT1 5260



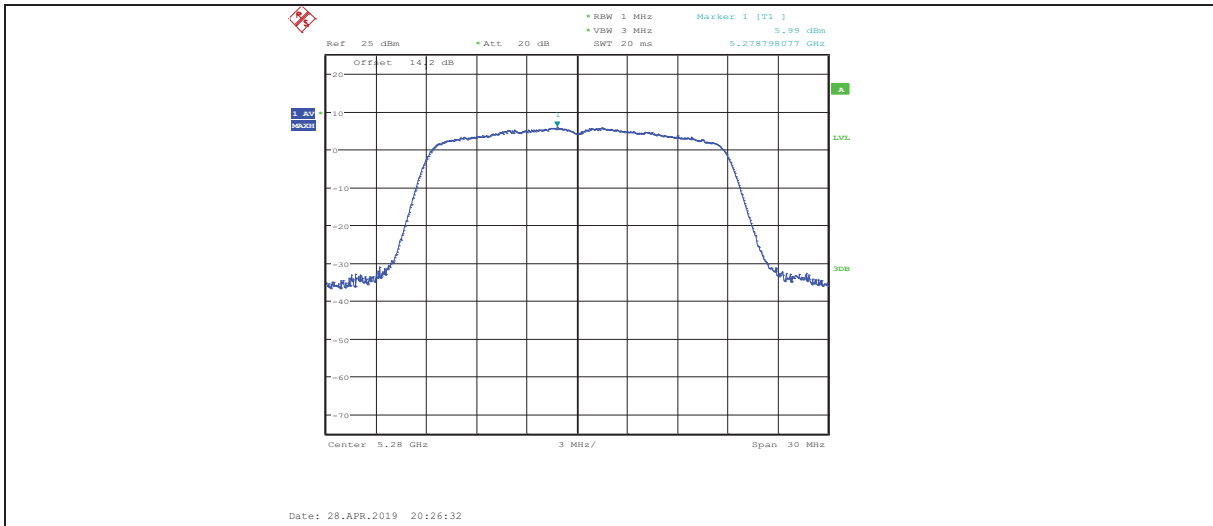
11N20MIMO\_ANT2\_5260



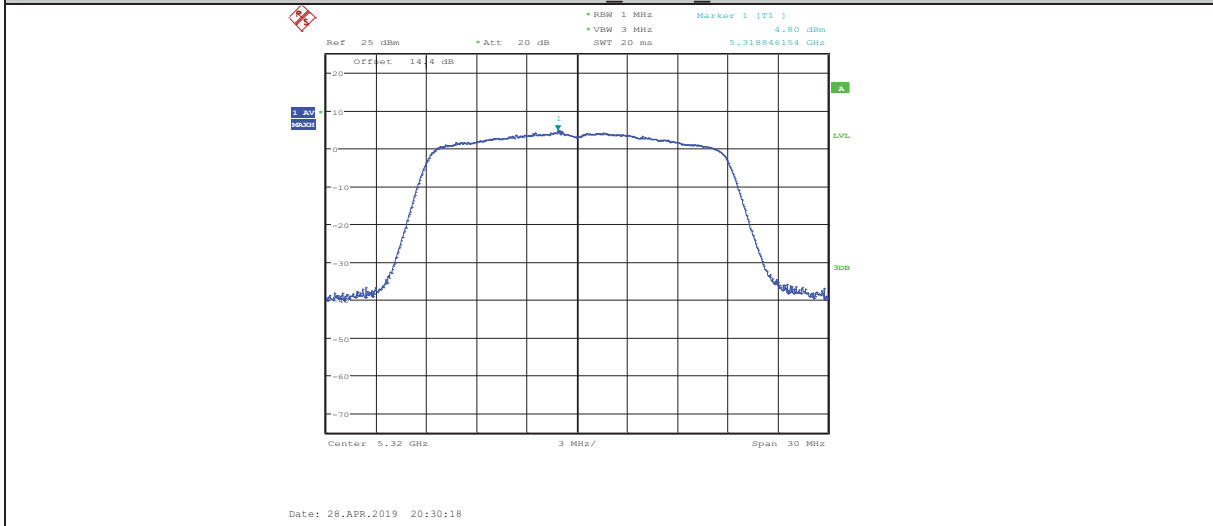
11N20MIMO\_ANT1\_5280



11N20MIMO\_ANT2\_5280



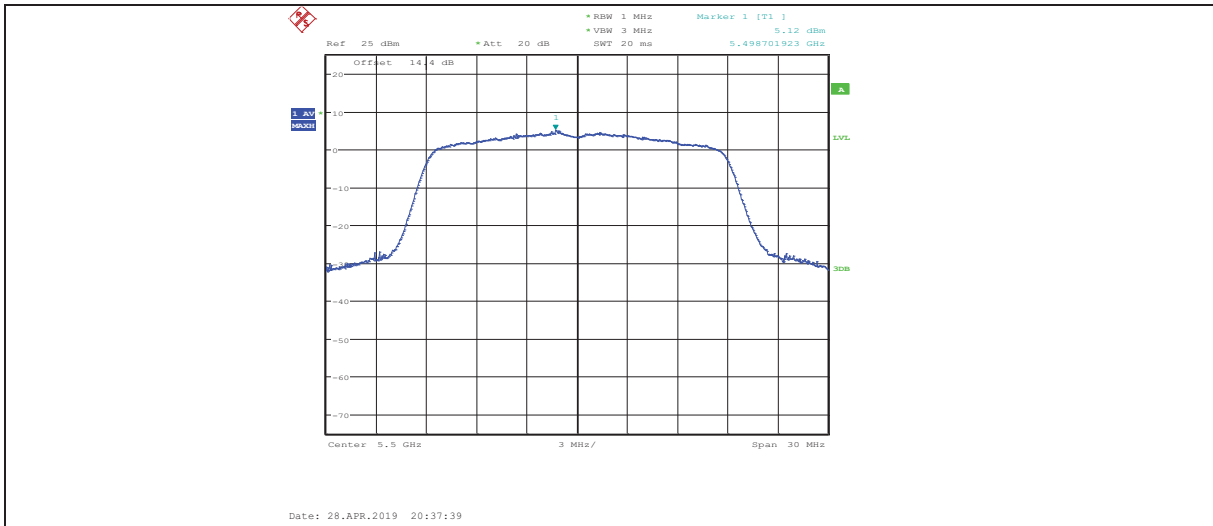
11N20MIMO ANT1 5320



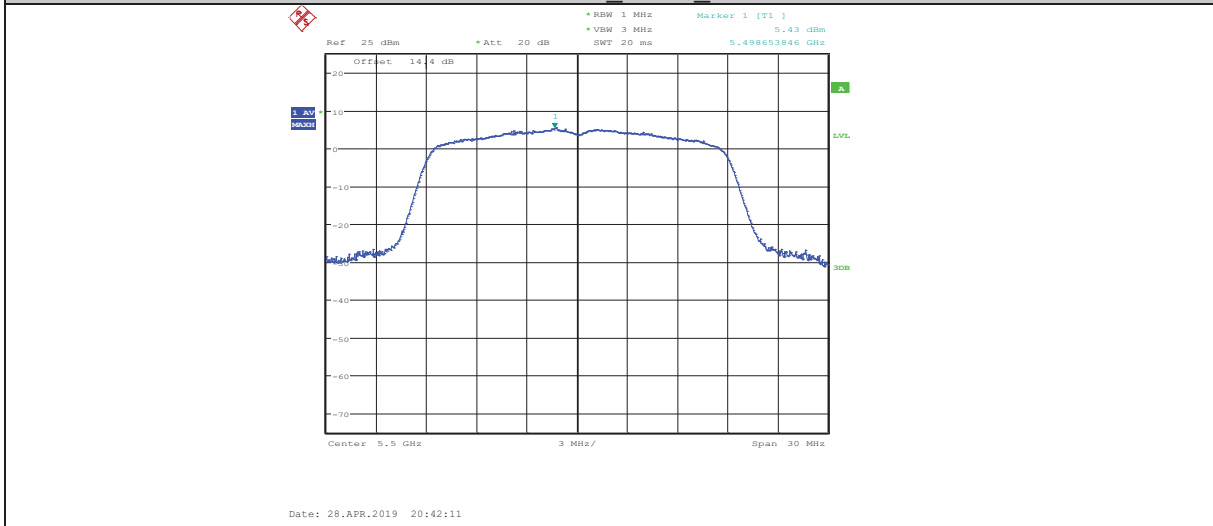
11N20MIMO ANT2 5320



11N20MIMO ANT1 5500



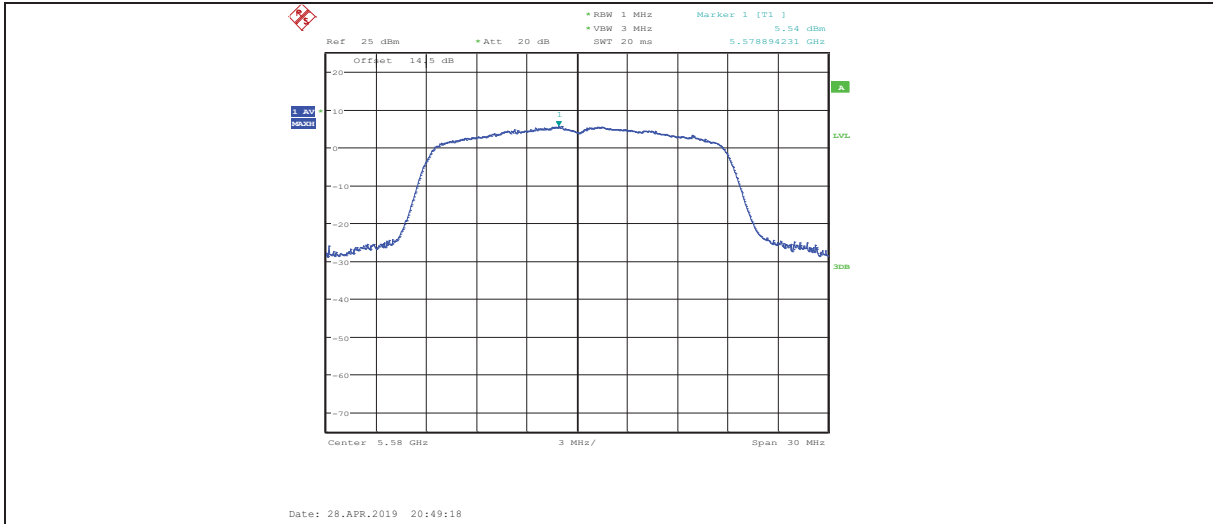
11N20MIMO ANT2 5500



11N20MIMO ANT1 5580



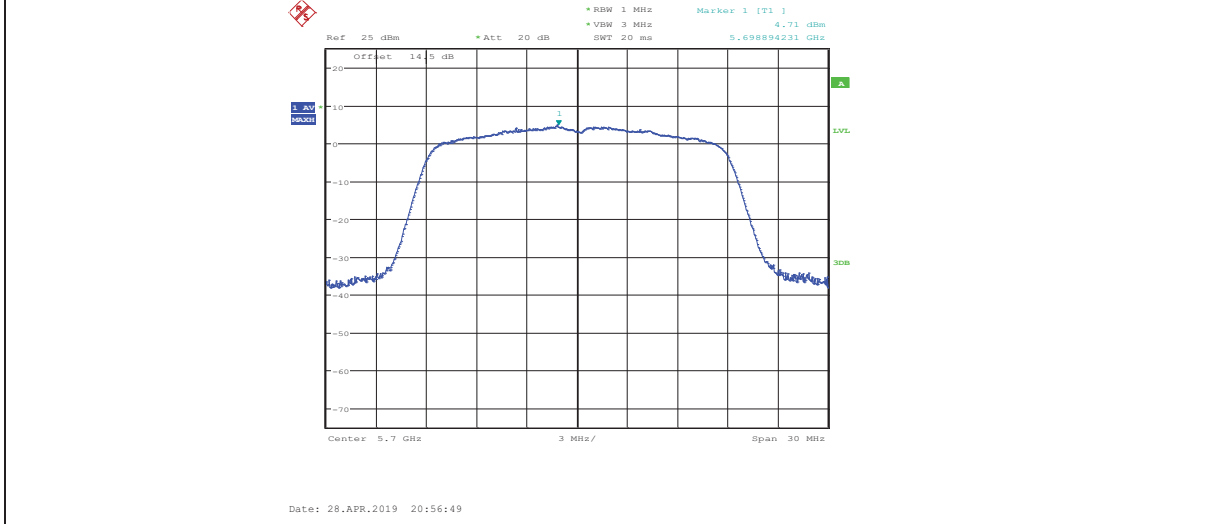
11N20MIMO ANT2 5580



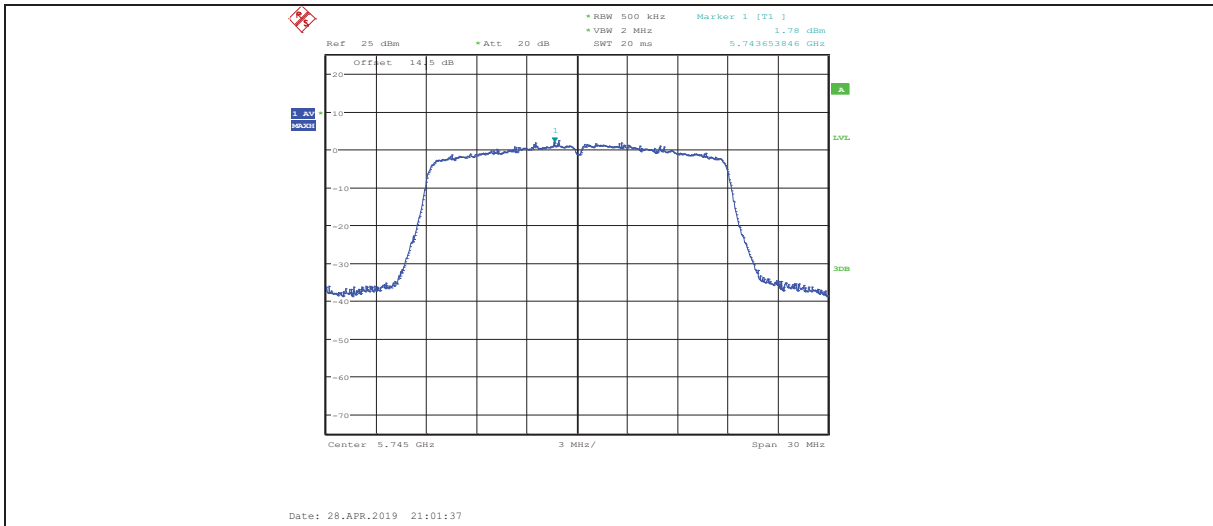
11N20MIMO ANT1 5700



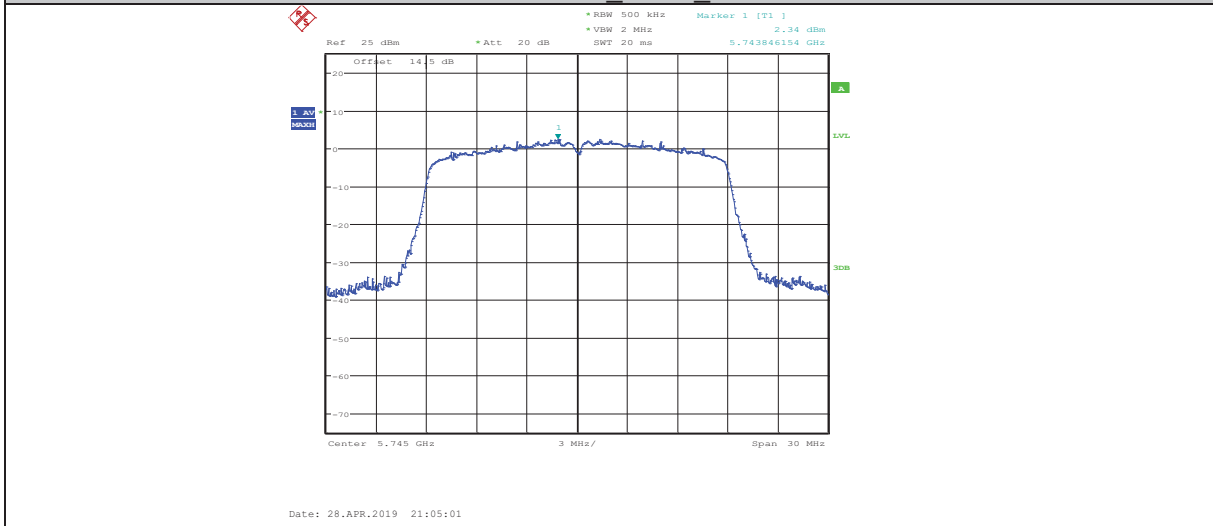
11N20MIMO ANT2 5700



11N20MIMO ANT1 5745



11N20MIMO ANT2 5745

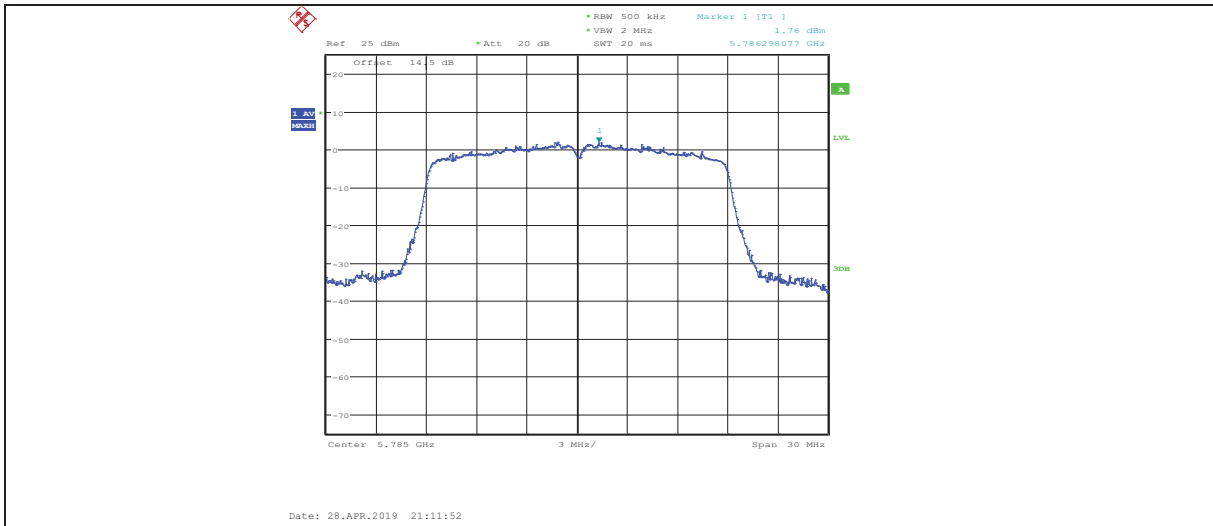


11N20MIMO ANT1 5785



11N20MIMO ANT2 5785





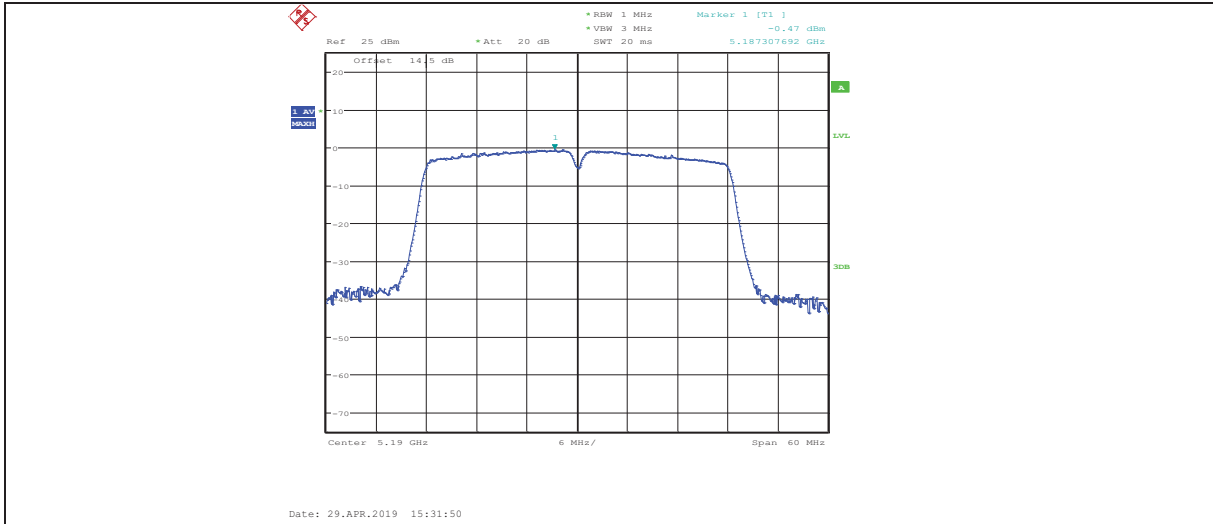
11N20MIMO ANT1 5825



11N20MIMO ANT2 5825



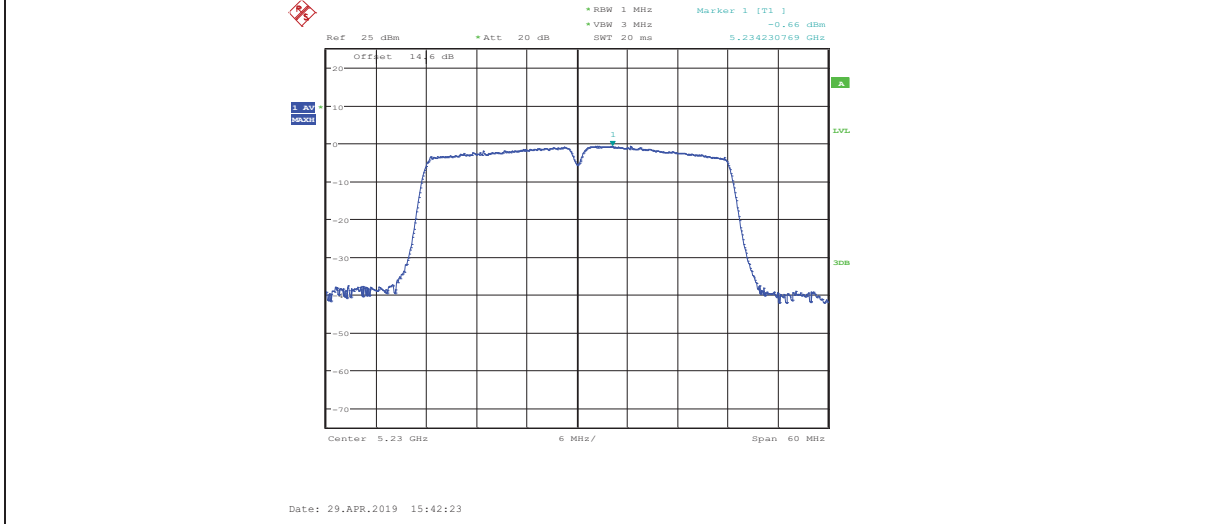
11N40MIMO ANT1 5190



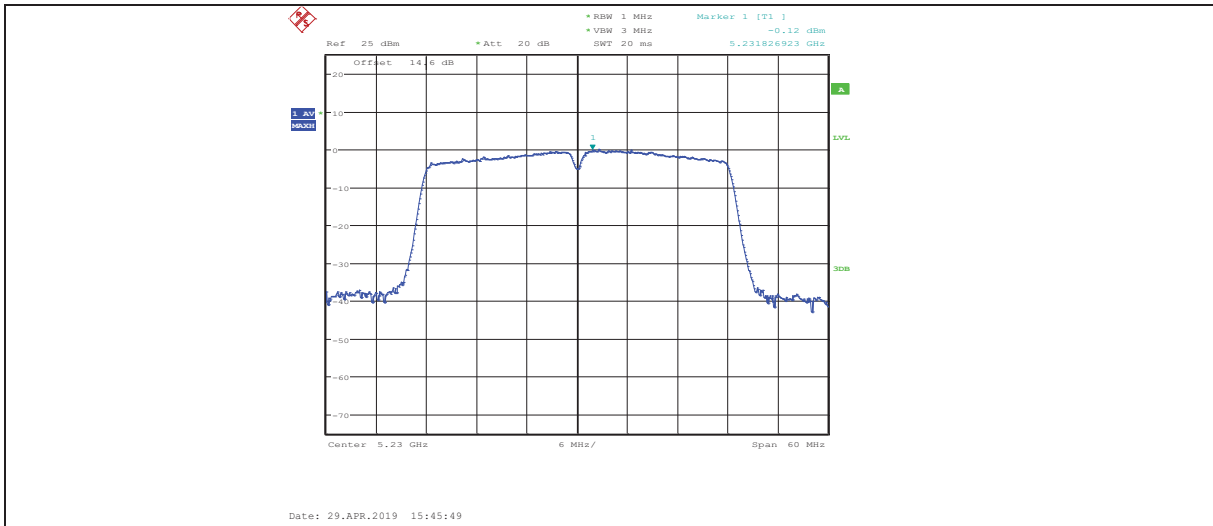
11N40MIMO ANT2 5190



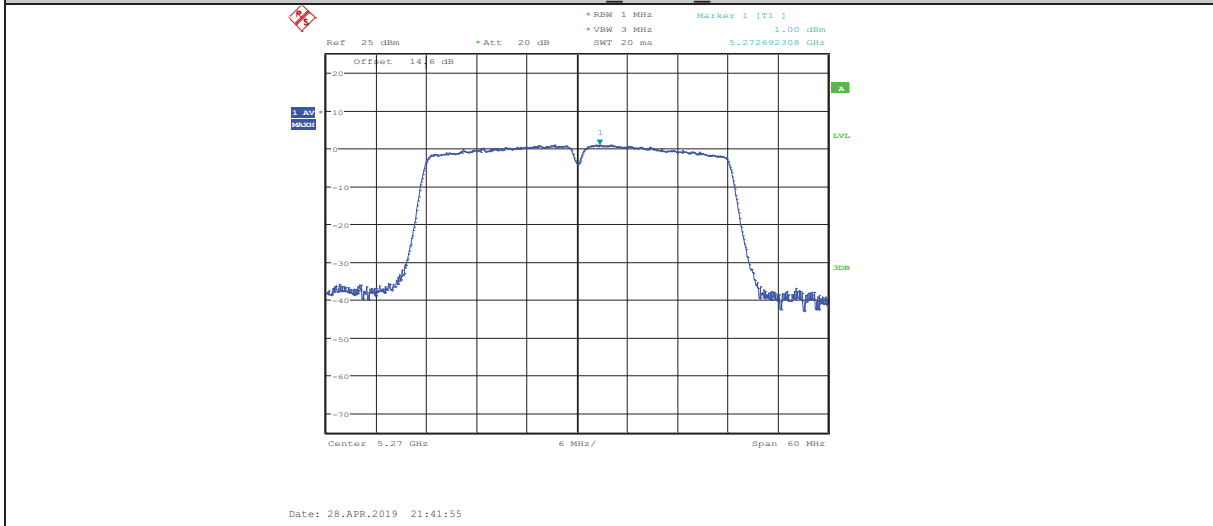
11N40MIMO ANT1 5230



11N40MIMO ANT2 5230



11N40MIMO ANT1 5270



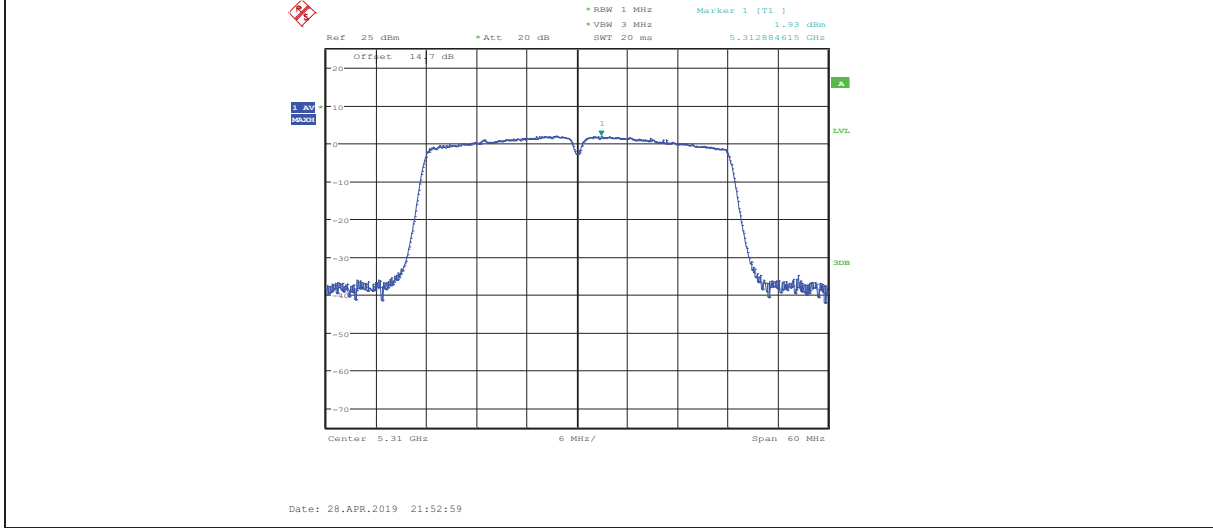
11N40MIMO ANT2 5270



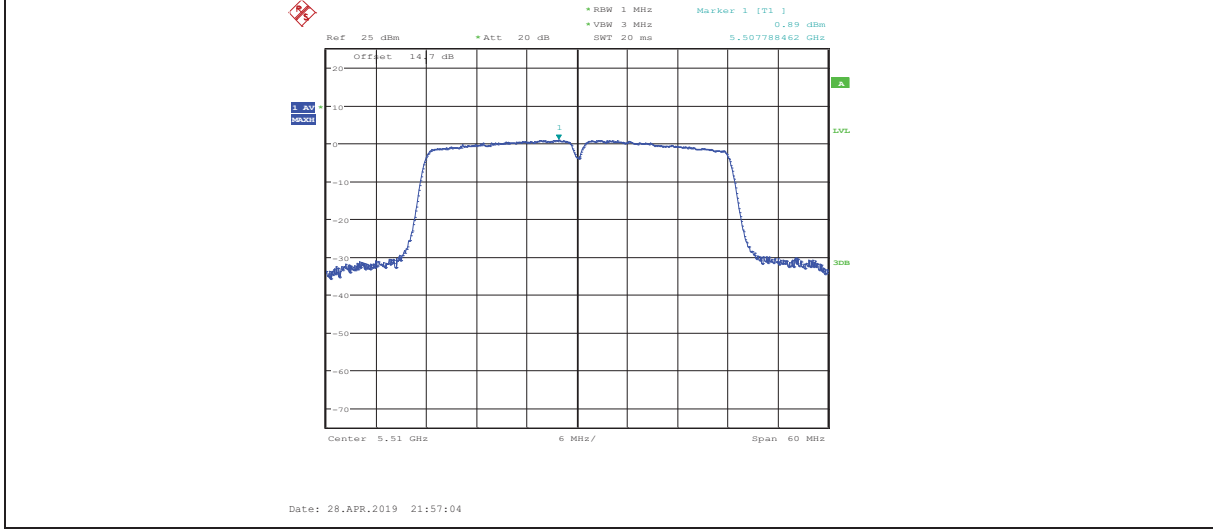
11N40MIMO ANT1 5310



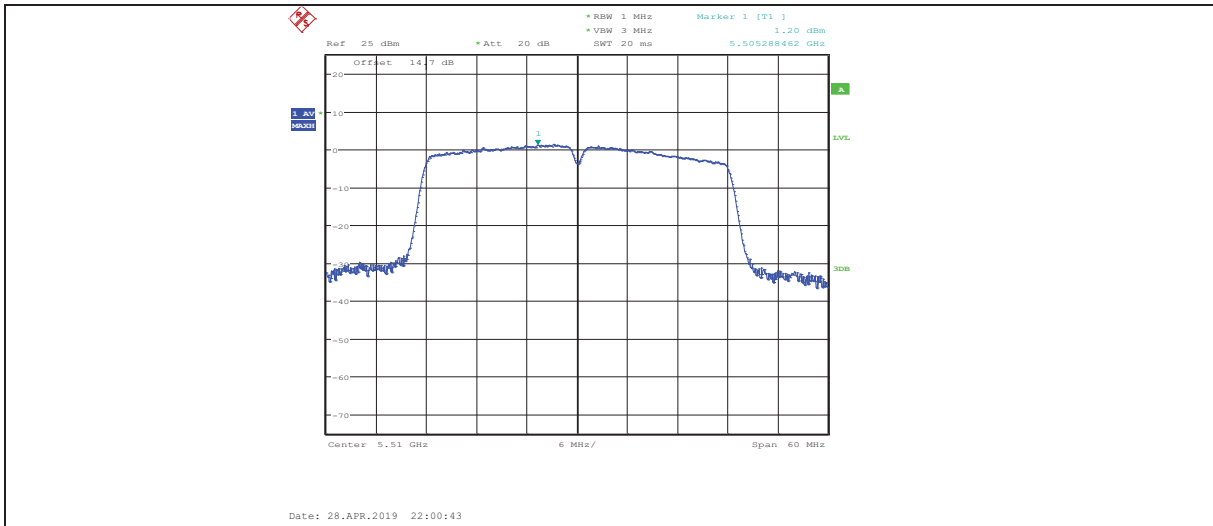
11N40MIMO ANT2 5310



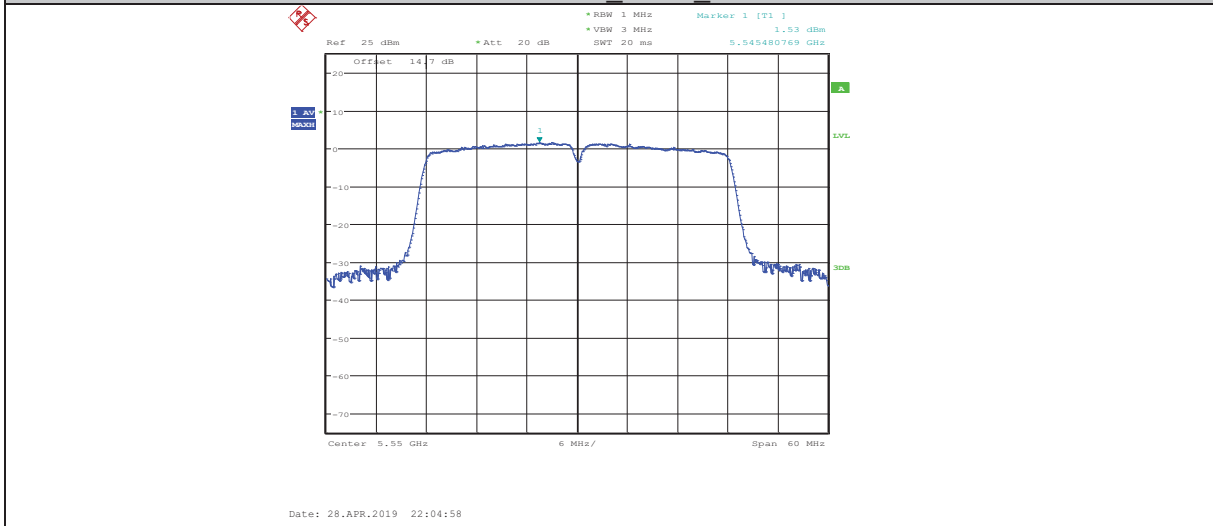
11N40MIMO ANT1 5510



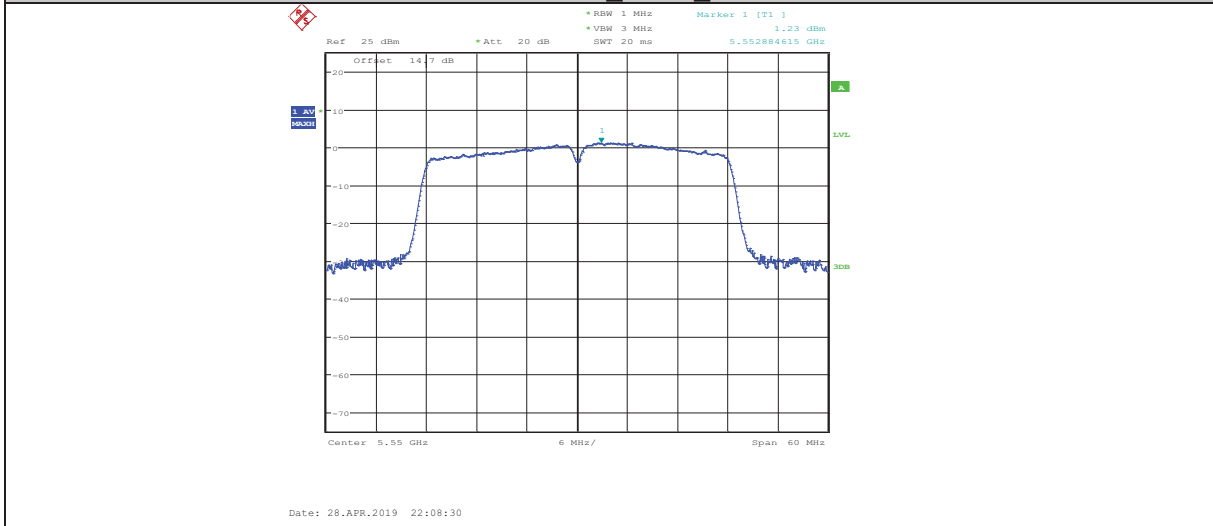
11N40MIMO ANT2 5510



11N40MIMO ANT1 5550



11N40MIMO ANT2 5550



11N40MIMO ANT1 5670