

FCC TEST REPORT

Test report No.: EMC- FCC- R0193
FCC ID: WQT- VM1510
Type of equipment: STB
Model Name: VM1510
Applicant: KAONMEDIA CO.,LTD.
Max.RF Output Power: 17.64 dBm
FCC Rule Part(s): FCC Part 15 Subpart C 15.407
Frequency Range: 5 150 MHz ~ 5 250 MHz
5 250 MHz ~ 5 350 MHz
5 470 MHz ~ 5 650 MHz
5 725 MHz ~ 5 825 MHz
Test result: Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

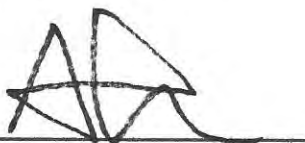
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of receipt: 2013. 09. 04

Date of test: 2014. 10. 13 ~ 10. 20

Issued date: 2014. 11. 20

Tested by:



AHN, BYUNG WOO

Approved by:



YU, SANG HOON

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1. Client information

Applicant: KAONMEDIA CO.,LTD.
Address: KAONMEDIA Building, 884-3, Seongnam-daero, Bundang-Gu,
Sunghnam-City, Kyonggi-Do, 463-839 Korea
Telephone number: +82-31-724-8666
Facsimile number: +82-31-724-8999
Contact person: Gu, Gyo Jun / peter.gu@kaonmedia.com

Manufacturer: KAONMEDIA CO.,LTD.
Address: KAONMEDIA Building, 884-3, Seongnam-daero, Bundang-Gu,
Sunghnam-City, Kyonggi-Do, 463-839 Korea

2. Laboratory information

Address

EMC compliance Ltd.

480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-390, Korea
Telephone Number: 82-31-336-9919 Facsimile Number: 82-505-299-8311

Certificate

KOLAS No.: 231

FCC Site Designation No: KR0040

FCC Site Registration No: 687132

VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849

IC Site Registration No.:8035A-2

SITE MAP



3. Description of E.U.T.

3.1 Basic description

Applicant:	KAONMEDIA CO.,LTD.
Address of Applicant	KAONMEDIA Building, 884-3, Seongnam-daero, Bundang-Gu, Sungnam-City, Kyonggi-Do, 463-839 Korea
Manufacturer#1	KAONMEDIA CO.,LTD.
Address of Manufacturer	KAONMEDIA Building, 884-3, Seongnam-daero, Bundang-Gu, Sungnam-City, Kyonggi-Do, 463-839 Korea
Type of equipment	STB
Basic Model	VM1510
Serial number	N/A

3.2 General description

Frequency Range	2 412 MHz ~ 2 462 MHz (802.11b/g/n_HT20)_MIMO 2 422 MHz ~ 2 452 MHz (802.11n_HT40)_MIMO 5 180 MHz ~ 5 240 MHz (802.11a/an_HT20)_Non DFS_MIMO 5 190 MHz ~ 5 230 MHz (802.11an_HT40)_Non DFS_MIMO 5 260 MHz ~ 5 320 MHz (802.11a/an_HT20)_DFS_MIMO 5 270 MHz ~ 5 310 MHz (802.11an_HT40)_DFS_MIMO 5 500 MHz ~ 5 700 MHz (802.11a/an_HT20)_DFS_MIMO 5 510 MHz ~ 5 670 MHz (802.11an_HT40)_DFS_MIMO 5 745 MHz ~ 5 825 MHz (802.11a/an_HT20)_Non DFS_MIMO 5 755 MHz ~ 5 795 MHz (802.11an_HT40)_Non DFS_MIMO
Communication	IEEE 802.11a/b/g/n_HT20, HT40
Type of Modulation	CCK, OFDM
Number of Channels	2.0 GHz: 11 ch (802.11b/g/n_HT20), 9 ch (802.11n_HT40) 5.0 GHz: 4 ch (11a/an_HT20): 5 150 MHz Band 2 ch (802.11an_HT40): 5 150 MHz Band 4 ch (11a/an_HT20): 5 250 MHz Band 2 ch (802.11an_HT40): 5 250 MHz Band, 4 ch (11a/an_HT40): 5 470 MHz Band 8 ch (11a/an_HT20): 5 470 MHz Band 5 ch (11a/an_HT20): 5 725 MHz Band 2 ch (802.11an_HT40): 5 725 MHz Band,
Type of Antenna	FIPA Antenna
Antenna Gain	2 GHz: 2.93 dBi 5 GHz: 5 150 MHz Band: 2.96 dBi 5 250 MHz Band: 2.99 dBi 5 470 MHz Band: 2.98 dBi 5 725 MHz Band: 2.91 dBi
Transmit Power	17.64 dBm
Power supply	DC 12 V (AC Adaptor: S024WM1200200)

3.3 Available channel list and frequency

5.0 GHz Band

* 802.11a/n_HT20

	Frequency			
Low frequency	5 180 MHz	5 260 MHz	5 500 MHz	5 745 MHz
Middle frequency	5 200 MHz	5 280 MHz	5 580 MHz	5 785 MHz
High frequency	5 240 MHz	5 320 MHz	5 700 MHz	5 825 MHz

* 802.11n_HT40

	Frequency			
Low frequency	5 190 MHz	5 270 MHz	5 510 MHz	5 755 MHz
Middle frequency	5 230 MHz	5 310 MHz	5 590 MHz	5 795 MHz
High frequency			5 670 MHz	

3.4 Test Voltage

mode	Voltage
Norminal voltage	DC 12 V

4. Summary of test results

4.1 Standards & results

FCC Rule	IC Rule (RSS-GEN)	Parameter	Report Section	Test Result
15.203 15.407(a)(1)(2)(3)	N/A	Antenna Requirement	5.1	C
15.403(i), 15.407(e)	4.6	Bandwidth Measurement	5.2	C
15.407(a)(1)(2)	4.8	Maximum Conducted Output Power	5.3	C
15.407(a)(1)(2)(5)	N/A	Peak Power Spectral Density	5.4	C
15.205(a), 15.209(a), 15.407(b)(1), 15.407(b)(2), 15.407(b)(3)	4.9	Spurious Emission, Band Edge and Restricted bands	5.6	C
15.407(g)	4.7	Frequency Stability	5.7	C
15.207(a)	N/A	Conducted Emissions	5.8	C
15.407(h)	N/A	Dynamic Frequency Selection	5.9	C
Note: C = complies NC = Not complies NT = Not tested NA = Not Applicable				

4.2 Uncertainty

Measurement Item	Expanded Uncertainty $U = KU_c$ ($K = 2$)	
Conducted RF power	± 1.36 dB	
Conducted Spurious Emissions	± 1.52 dB	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
Conducted Emissions	1 GHz ~ 40 GHz:	+ 6.03 dB, - 6.05 dB
	9 kHz ~ 150 kHz:	± 3.75 dB
	150 kHz ~ 30 MHz:	± 3.36 dB

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.407(a)(1)(2)(3), If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2 Result

-Complied

The transmitter has an integral PCB antenna.

The total directional peak gain of the antenna does not exceed 6.0 dBi

	5 150 MHz Band	5 250 MHz Band	5 470 MHz Band	5 725 MHz Band
ANT Gain	2.96 dBi	2.99 dBi	2.98 dBi	2.91 dBi

According to KDB 662911 D01 Multiple Transmitter Output v02r01

- Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.

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

Array Gain = $10 \log(NANT/NSS)$ dB.

5 150 MHz Band : Total gain = 5.97 dBi (individual gain(2.96 dBi) + Array gain(3.01 dBi))

5 250 MHz Band : Total gain = 6.00 dBi (individual gain(2.99 dBi) + Array gain(3.01 dBi))

5 470 MHz Band : Total gain = 5.99 dBi (individual gain(2.98 dBi) + Array gain(3.01 dBi))

5 725 MHz Band : Total gain = 5.92 dBi (individual gain(2.91 dBi) + Array gain(3.01 dBi))

For power measurements on IEEE 802.11 devices

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

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

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices:

Array Gain = $10 \log(NANT/NSS)$ dB.

5 150 MHz Band : Total gain = 2.96 dBi (individual gain(2.96 dBi) + Array gain(0 dBi))

5 250 MHz Band : Total gain = 2.99 dBi (individual gain(2.99 dBi) + Array gain(0 dBi))

5 470 MHz Band : Total gain = 2.98 dBi (individual gain(2.98 dBi) + Array gain(0 dBi))

5 725 MHz Band : Total gain = 2.91 dBi (individual gain(2.91 dBi) + Array gain(0 dBi))

5.2 Maximum Conducted Output Power

5.2.1 Regulation

According to §15.407(a) (1) (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2.2 Measurement Procedure

These test measurement settings are specified in section C of 789033 D02 General UNII Test Procedures.

5.2.2.1 Method PM (Measurement using an RF average power meter):

- (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
 - The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
 - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
 - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.
- (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- (iv) Adjust the measurement in dBm by adding $10 \log(1/x)$ where x is the duty cycle (e.g., $10 \log(1/0.25)$ if the duty cycle is 25 percent).

5.2.4 Test Result

-Complied

*802.11a

5 150 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 180	14.18	0.21	14.39	24.00	9.61
5 200	14.30	0.21	14.51	24.00	9.49
5 240	14.40	0.21	14.61	24.00	9.39

5 250 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 260	14.37	0.21	14.58	23.98	9.40
5 280	14.47	0.21	14.68	23.98	9.30
5 320	14.62	0.21	14.83	23.98	9.15

5 470 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 500	14.92	0.21	15.13	23.98	8.85
5 580	14.62	0.21	14.83	23.98	9.15
5 700	15.01	0.21	15.22	23.98	8.76

5 725 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 745	14.85	0.21	15.06	30.00	14.94
5 785	14.87	0.21	15.08	30.00	14.92
5 825	14.75	0.21	14.96	30.00	15.04

*802.11an HT20

5 150 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 180	13.34	0.22	13.56	24.00	10.44
5 200	13.40	0.22	13.62	24.00	10.38
5 240	13.59	0.22	13.81	24.00	10.19

5 250 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 260	13.47	0.22	13.69	23.98	10.29
5 280	13.80	0.22	14.02	23.98	9.96
5 320	13.87	0.22	14.09	23.98	9.89

5 470 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 500	14.68	0.22	14.90	23.98	9.08
5 580	14.34	0.22	14.56	23.98	9.42
5 700	14.50	0.22	14.72	23.98	9.26

5 725 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 745	14.35	0.22	14.57	30.00	15.43
5 785	14.44	0.22	14.66	30.00	15.34
5 825	14.31	0.22	14.53	30.00	15.47

*802.11an HT20_MIMO (ANT 1+2)

5 150 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 180	13.82	13.31	0.22	16.80	24.00	7.20
5 200	13.45	13.29	0.22	16.60	24.00	7.40
5 240	13.54	13.06	0.22	16.54	24.00	7.46

5 250 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 260	13.75	12.55	0.22	16.42	23.98	7.56
5 280	13.95	12.30	0.22	16.43	23.98	7.55
5 320	13.73	12.48	0.22	16.38	23.98	7.60

5 470 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 500	14.42	13.22	0.22	17.09	23.98	6.89
5 580	14.28	13.52	0.22	17.15	23.98	6.83
5 700	14.57	13.99	0.22	17.52	23.98	6.46

5 725 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 745	14.60	14.20	0.22	17.64	30.00	12.36
5 785	14.63	14.08	0.22	17.59	30.00	12.41
5 825	14.64	14.06	0.22	17.59	30.00	12.41

*802.11an HT40

5 150 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 190	12.86	0.42	13.28	24.00	10.72
5 230	13.08	0.42	13.50	24.00	10.50

5 250 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 270	13.07	0.42	13.28	30.00	16.72
5 310	12.65	0.42	13.50	30.00	16.50

5 470 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 510	13.64	0.42	14.06	23.98	9.92
5 590	12.64	0.42	13.06	23.98	10.92
5 670	11.33	0.42	11.75	23.98	12.23

5 725 Band

Frequency [MHz]	Average Power (dBm)	Duty Factor	Result	Limit (dBm)	Margin (dBm)
5 755	10.95	0.42	11.37	30.00	18.63
5 795	11.09	0.42	11.51	30.00	18.49

*802.11an HT40_MIMO (ANT 1+2)

5 150 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 190	12.67	12.92	0.42	16.23	24.00	7.77
5 230	12.67	12.71	0.42	16.12	24.00	7.88

5 250 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 270	12.81	12.37	0.42	16.03	23.98	7.95
5 310	12.68	12.22	0.42	15.89	23.98	8.09

5 470 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 510	13.64	12.76	0.42	16.66	23.98	7.32
5 590	12.35	13.47	0.42	16.38	23.98	7.60
5 670	11.25	13.84	0.42	16.17	23.98	7.81

5 725 Band

Frequency [MHz]	Average Power (dBm)		Duty Factor	Result	Limit (dBm)	Margin (dBm)
	ANT 1	ANT 2				
5 755	10.63	13.47	0.42	15.71	30.00	14.29
5 795	10.60	13.44	0.42	15.68	30.00	14.32

-NOTE:

1. Total power calculation = $10 \log(10^{(Ant1 \text{ power}/10)} + 10^{(Ant2 \text{ power}/10)})$.
2. 802.11a: 5 825 MHz : Duty cycle = 0.952 1, Duty cycle factor = $10 \log(1/\text{duty cycle}) = 10 \log(1/0.952 \text{ 1}) = 0.21 \text{ dB}$.
802.11an HT20 : 5 200 MHz : Duty cycle = 0.950 5, Duty cycle factor = $10 \log(1/\text{duty cycle}) = 10 \log(1/0.950 \text{ 5}) = 0.22 \text{ dB}$.
802.11an HT40 : 5 795 MHz : Duty cycle = 0.906 9, Duty cycle factor = $10 \log(1/\text{duty cycle}) = 10 \log(1/0.906 \text{ 9}) = 0.42 \text{ dB}$.
4. Result = Total power calculation + Duty Factor

5.3 Bandwidth Measurement

5.3.1 Regulation

According to §15.403,(i) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

According to §15.407,(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.3.2 Measurement Procedure

1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725 - 5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.715-5.85 GHz.

The following procedure shall be used for measuring this bandwidth:

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

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

5.3.3 Test Result

-Complied

*802.11a

5 150 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 180	19.62	16.50
5 200	19.74	16.44
5 240	19.68	16.38

5 250 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 260	19.22	16.50
5 280	19.22	16.44
5 320	19.33	16.50

5 470 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 500	19.86	16.44
5 580	19.74	16.56
5 700	19.22	16.61

5 725 Band

Frequency	6 dB Bandwidth	OBW
	ANT 1	ANT 1
5 745	15.75	16.50
5 785	15.57	16.44
5 825	15.57	16.44

*802.11an HT20

5 150 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 180	19.62	17.54
5 200	19.57	17.54
5 240	19.51	17.54

5 250 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 260	19.51	17.54
5 280	19.68	17.66
5 320	19.51	17.60

5 470 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 500	19.51	17.60
5 580	19.57	17.54
5 700	19.57	17.60

5 725 Band

Frequency	6 dB Bandwidth	OBW
	ANT 1	ANT 1
5 745	15.75	17.60
5 785	15.22	17.54
5 825	15.40	17.60

*802.11an HT20_MIMO(ANT 1+2)

5 150 Band

Frequency	26 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 180	19.57	20.20	17.54	17.77
5 200	19.74	19.51	17.54	17.54
5 240	19.45	19.51	17.60	17.77

5 250 Band

Frequency	26 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 260	19.57	19.62	17.54	17.54
5 280	19.57	19.51	17.60	17.60
5 320	19.57	19.51	17.60	17.66

5 470 Band

Frequency	26 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 500	19.62	19.51	17.60	17.60
5 580	19.91	19.51	17.66	17.54
5 700	19.57	19.51	17.66	17.66

5 725 Band

Frequency	6 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 745	15.92	15.98	17.77	17.66
5 785	16.15	16.44	17.60	17.60
5 825	15.57	17.71	17.60	17.60

*802.11an HT40

5 150 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 190	40.03	36.56
5 230	39.77	36.56

5 250 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 270	40.12	36.56
5 310	39.68	36.38

5 470 Band

Frequency	26 dB Bandwidth	OBW
	ANT 1	ANT 1
5 510	39.68	36.47
5 590	39.77	36.73
5 670	39.51	36.56

5 725 Band

Frequency	6 dB Bandwidth	OBW
	ANT 1	ANT 1
5 755	35.75	36.47
5 795	35.86	36.56

*802.11an HT40_MIMO (ANT 1+2)

5 150 Band

Frequency	26 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 190	39.86	39.16	36.56	36.47
5 230	39.68	39.33	36.47	36.38

5 250 Band

Frequency	26 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 270	40.03	39.07	36.47	36.38
5 310	40.12	39.86	36.47	36.30

5 470 Band

Frequency	26 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 510	39.94	39.60	36.64	36.30
5 590	40.12	39.16	36.47	36.38
5 670	39.60	39.51	36.47	36.38

5 725 Band

Frequency	6 dB Bandwidth		OBW	
	ANT 1	ANT 2	ANT 1	ANT 2
5 755	35.46	36.47	36.64	36.38
5 795	36.21	36.47	36.56	36.38

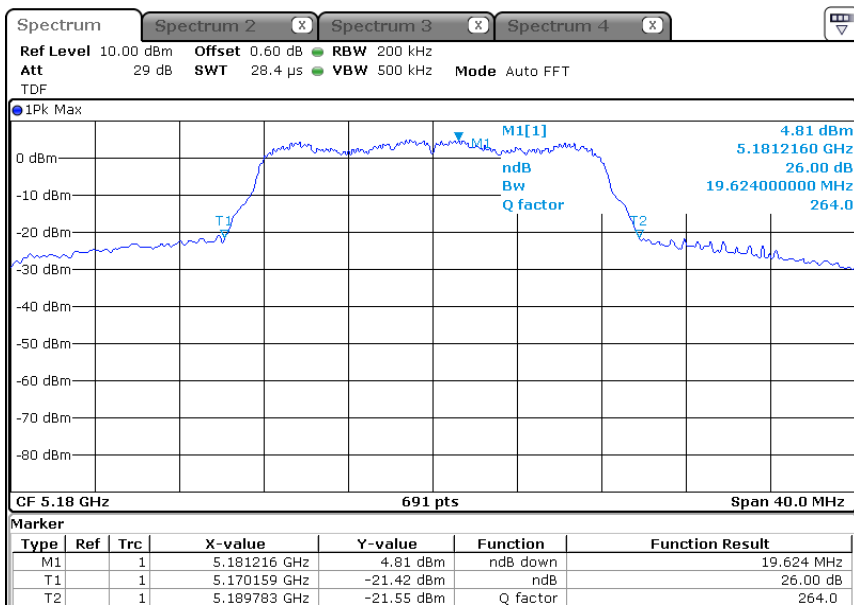
5.3.4 Test Plot

Figure 1. Plot of Bandwidth Measurement

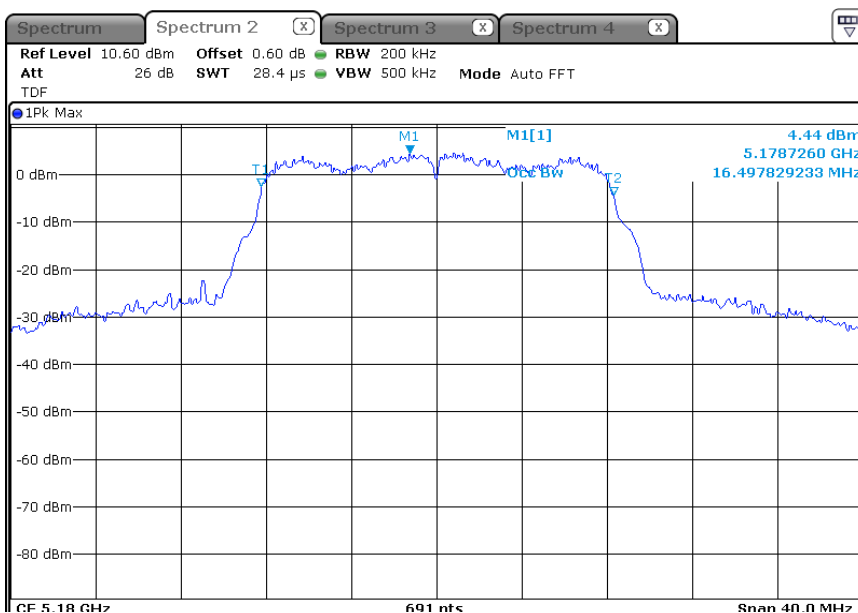
* 802.11a_5 150 Band (26 dB Bandwidth)

-5 180 MHz

ANT 1(EBW)

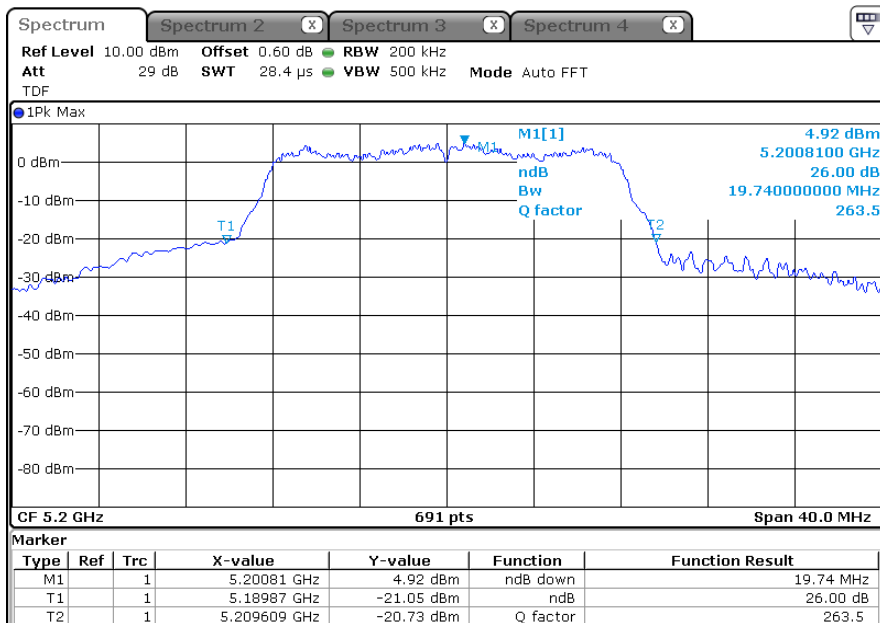


ANT 1(OBW)

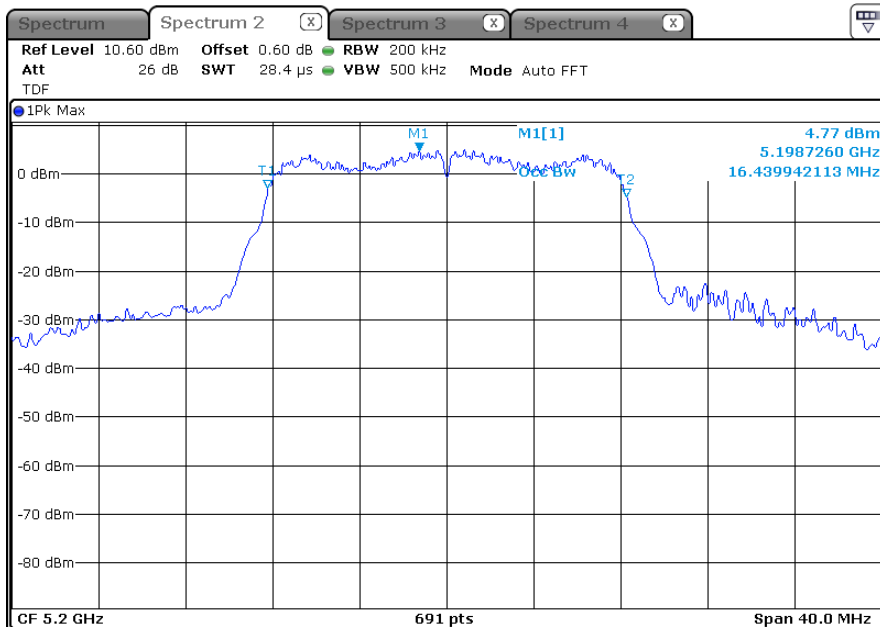


-5 200 MHz

ANT 1(EBW)

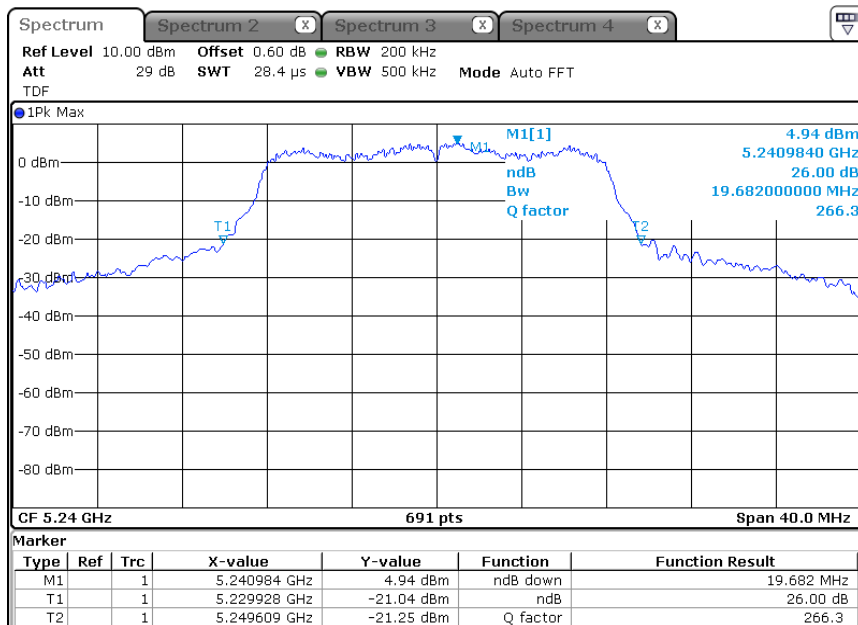


ANT 1(OBW)

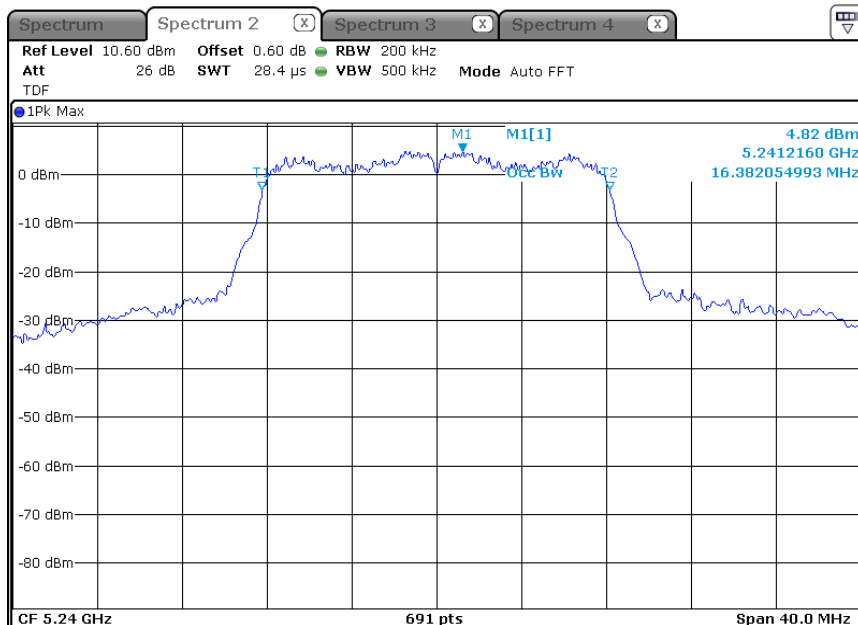


-5 240 MHz

ANT 1(EBW)



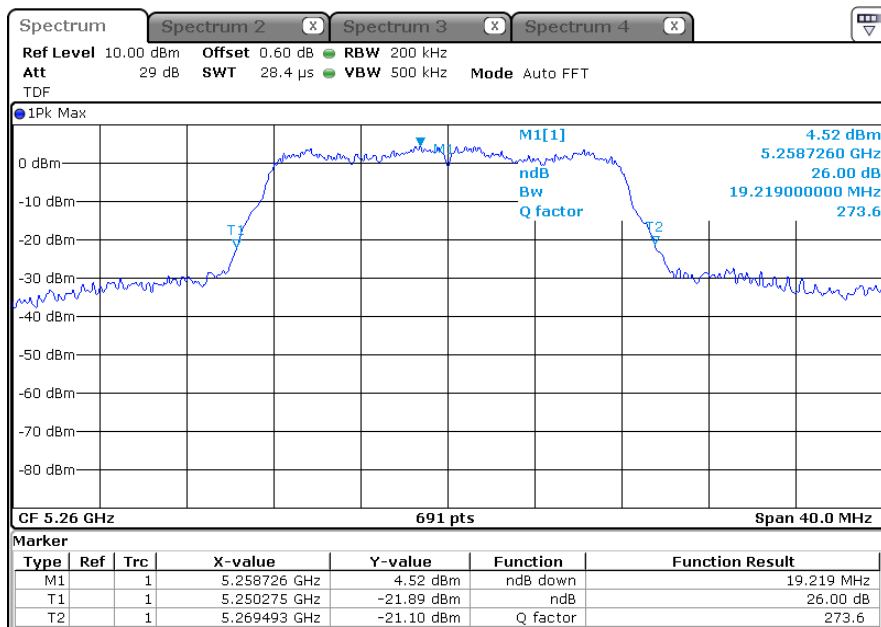
ANT 1(OBW)



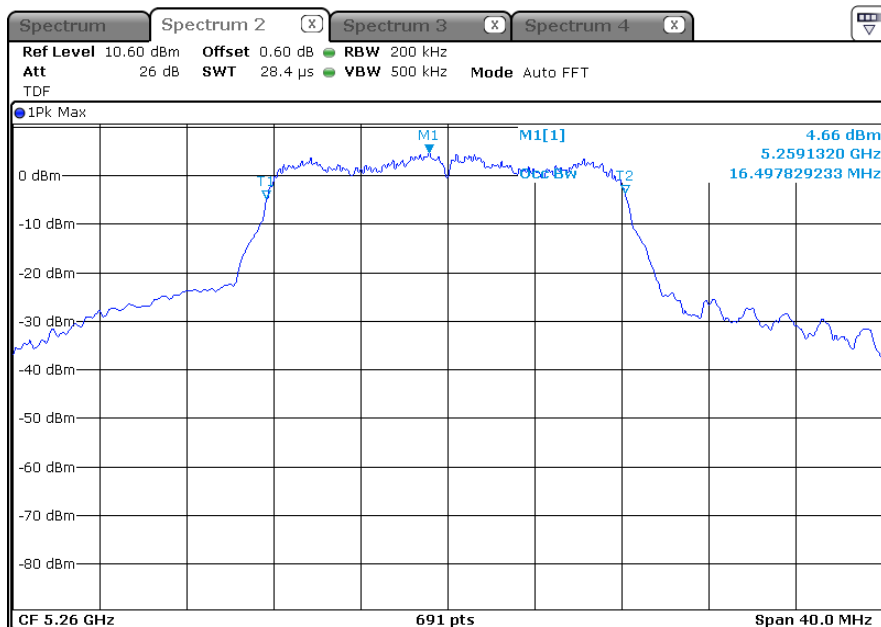
* 802.11a_5 250 Band (26 dB Bandwidth)

-5 260 MHz

ANT 1(EBW)

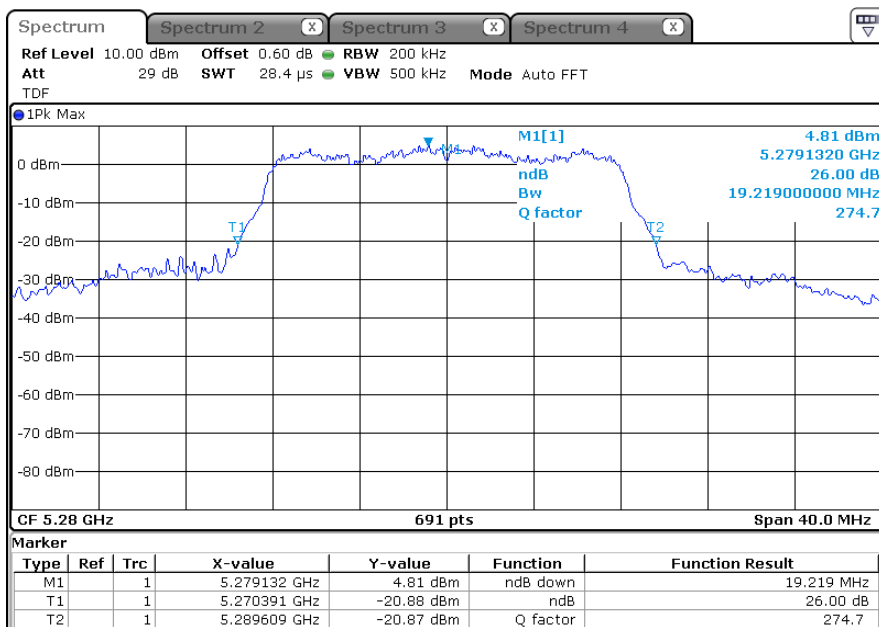


ANT 1(OBW)

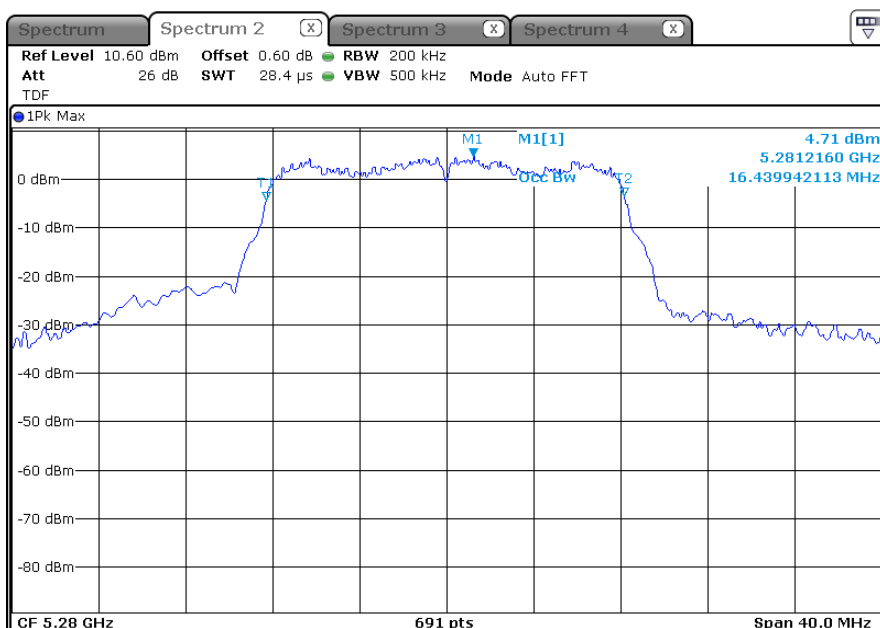


-5 280 MHz

ANT 1(EBW)

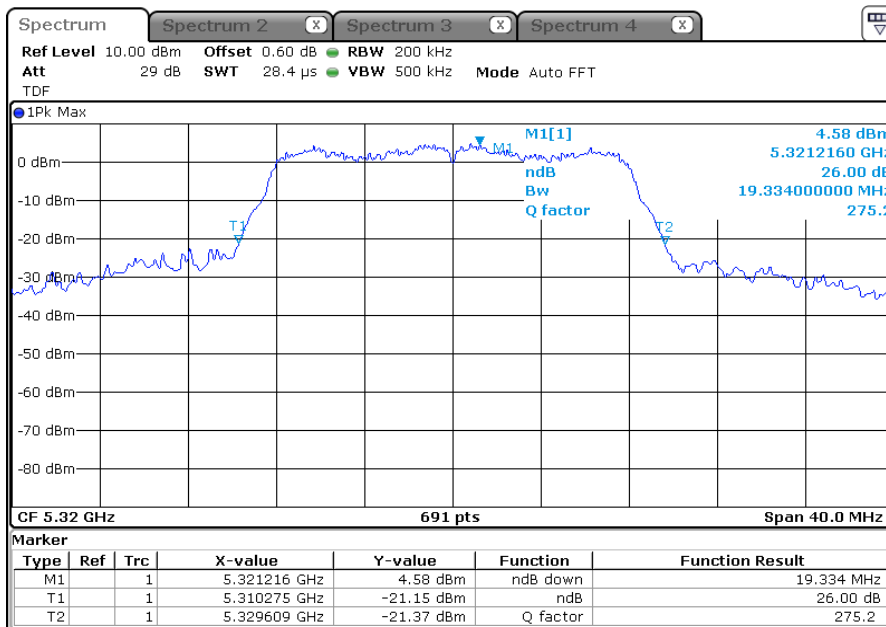


ANT 1(OBW)

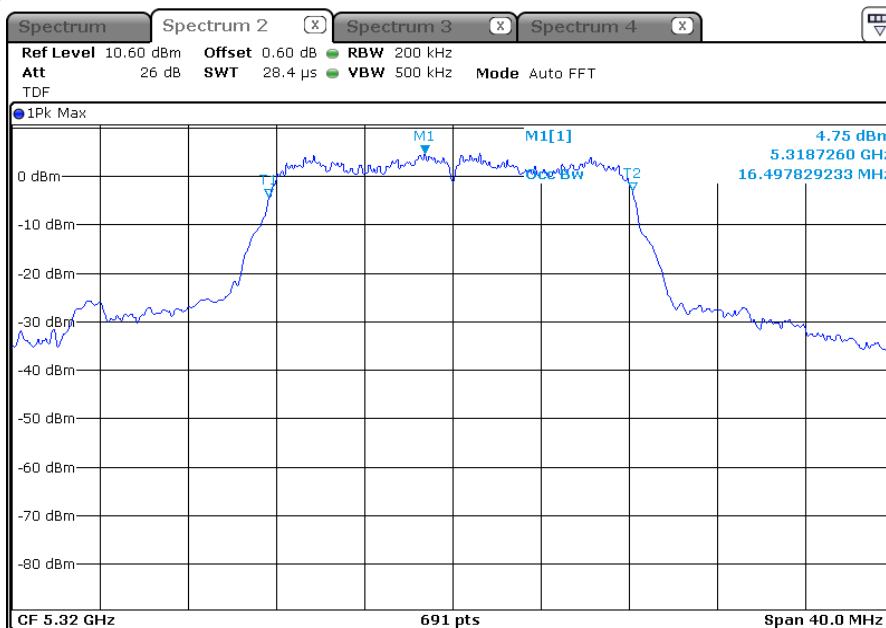


-5 320 MHz

ANT 1(EBW)



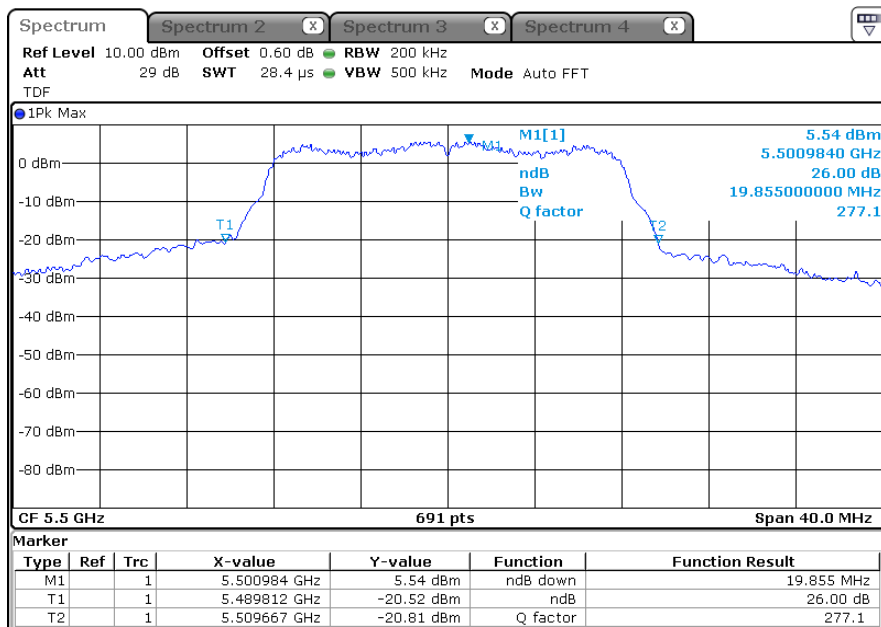
ANT 1(OBW)



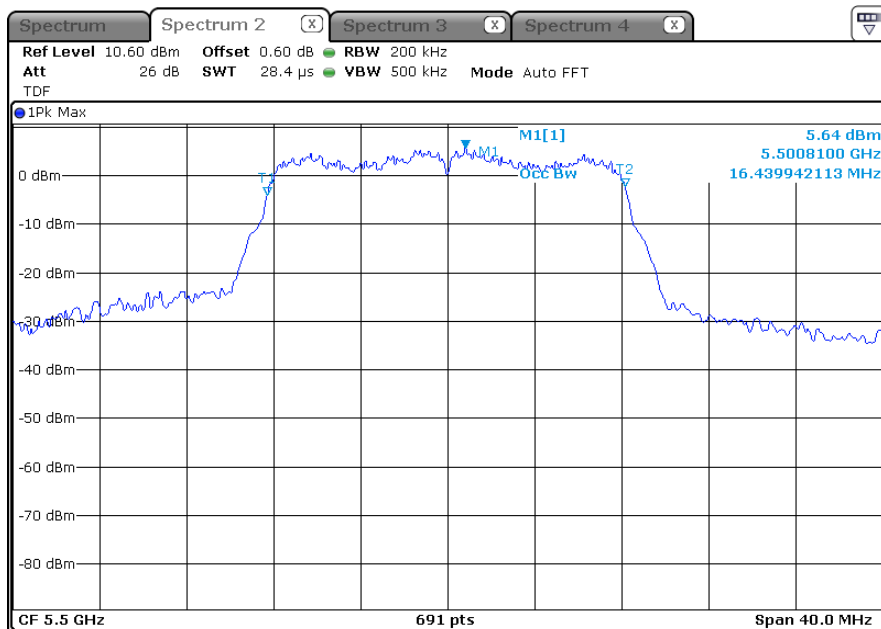
* 802.11a _5 470 Band (26 dB Bandwidth)

-5 500 MHz

ANT 1(EBW)

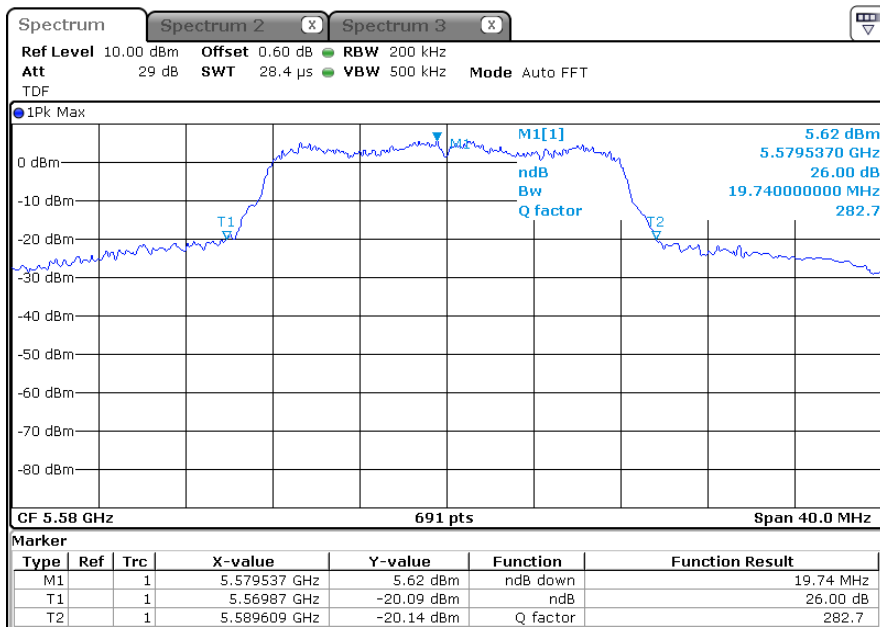


ANT 1(OBW)

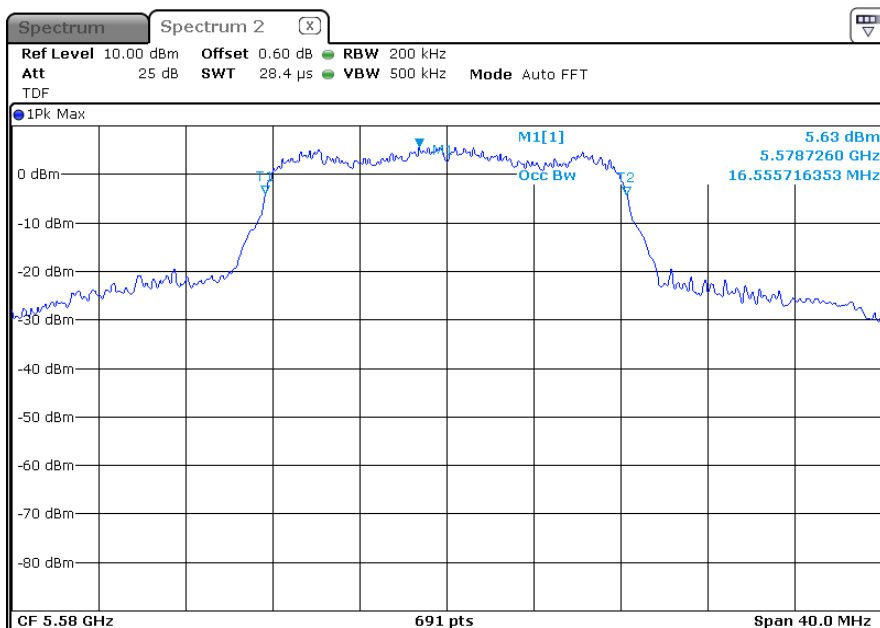


-5 580 MHz

ANT 1(EBW)

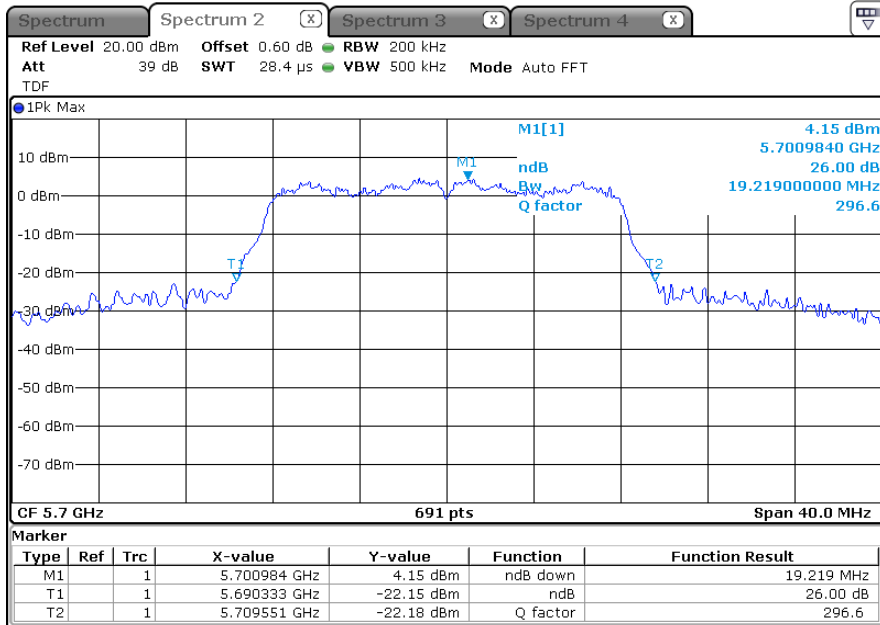


ANT 1(OBW)

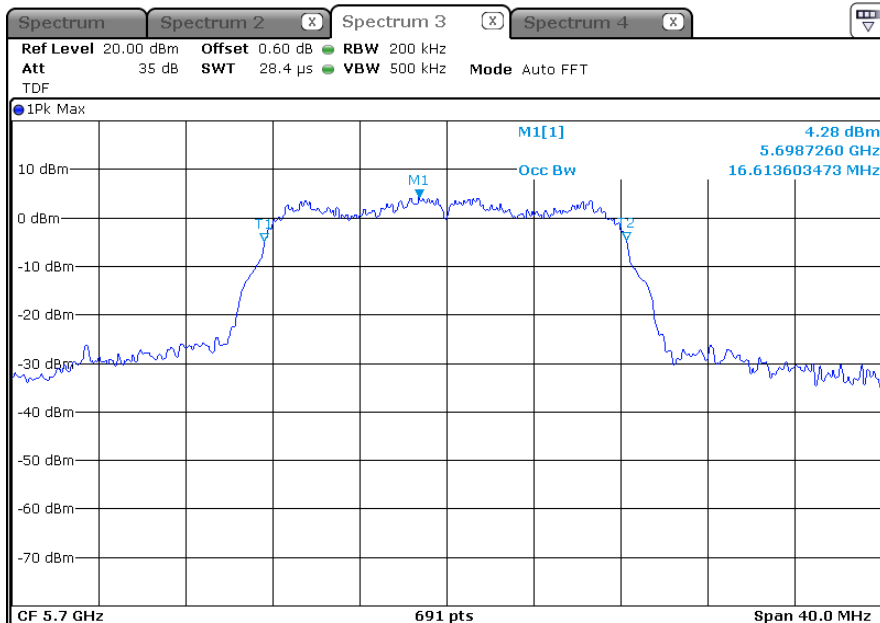


-5 700 MHz

ANT 1(EBW)



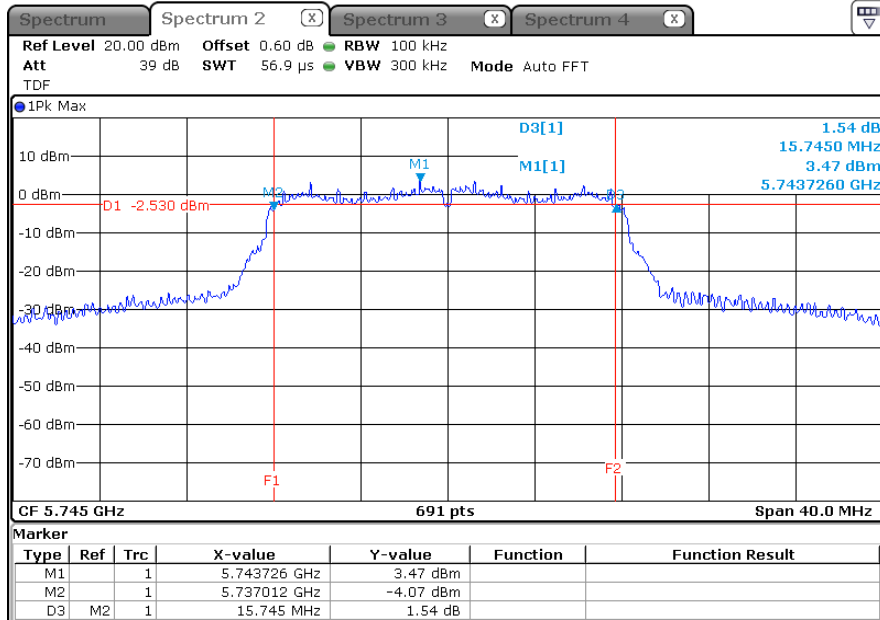
ANT 1(OBW)



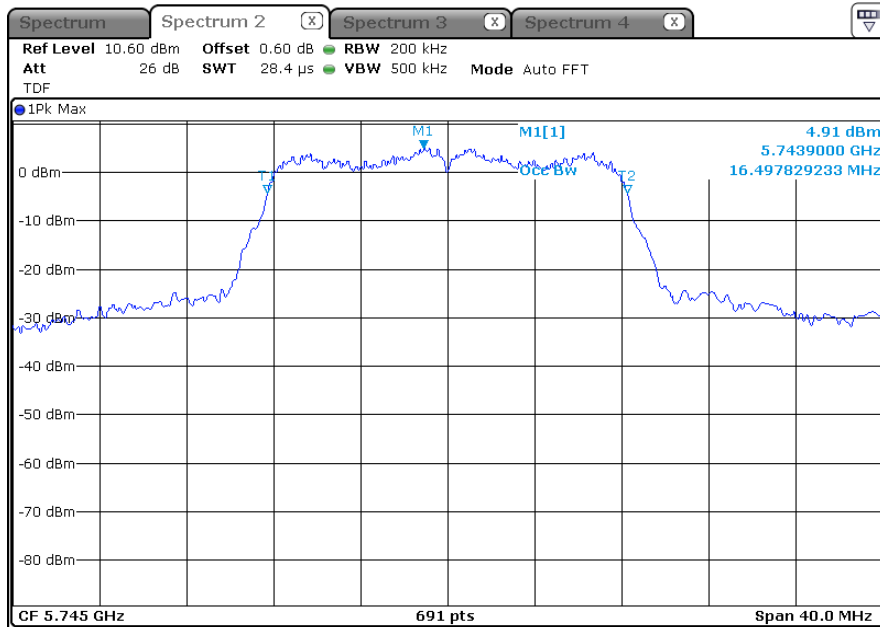
* 802.11a_5 725 Band (6 dB Bandwidth)

-5 745 MHz

ANT 1(6 dB Bandwidth)

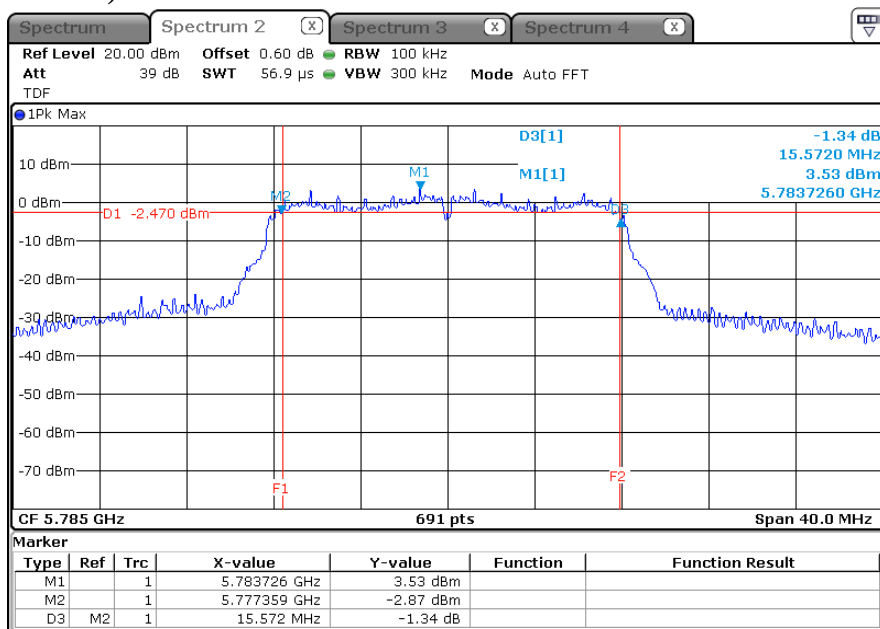


ANT 1(OBW)

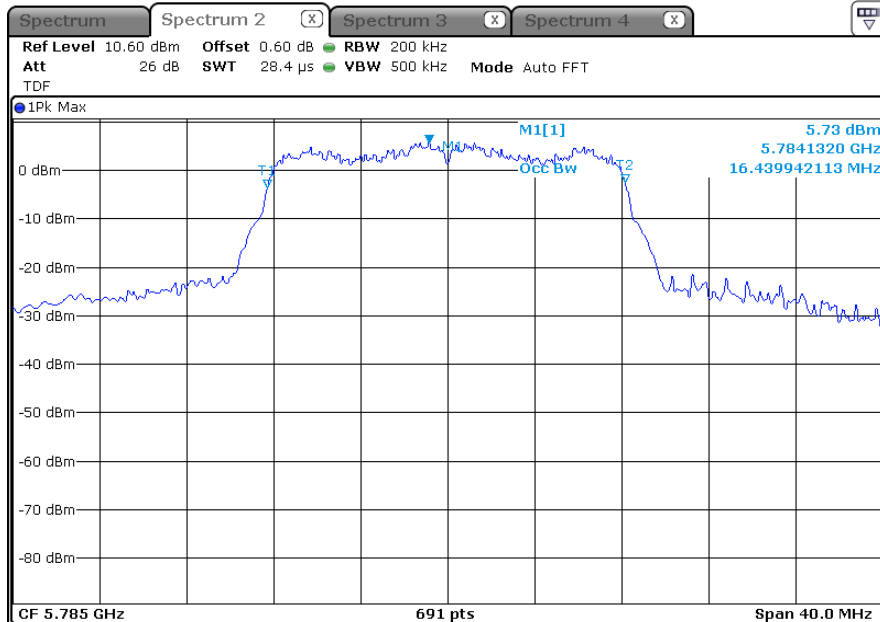


-5 785 MHz

ANT 1(6 dB Bandwidth)

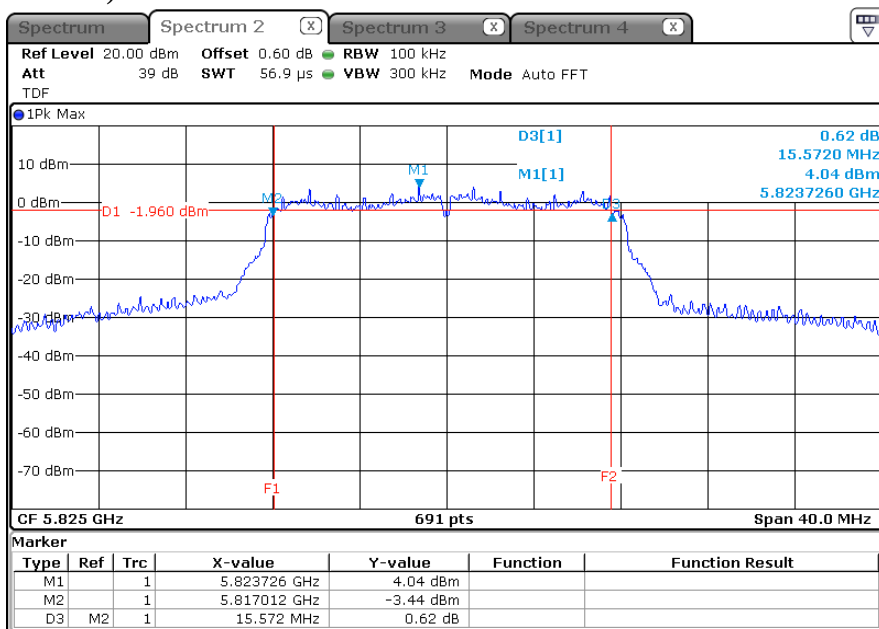


ANT 1(OBW)

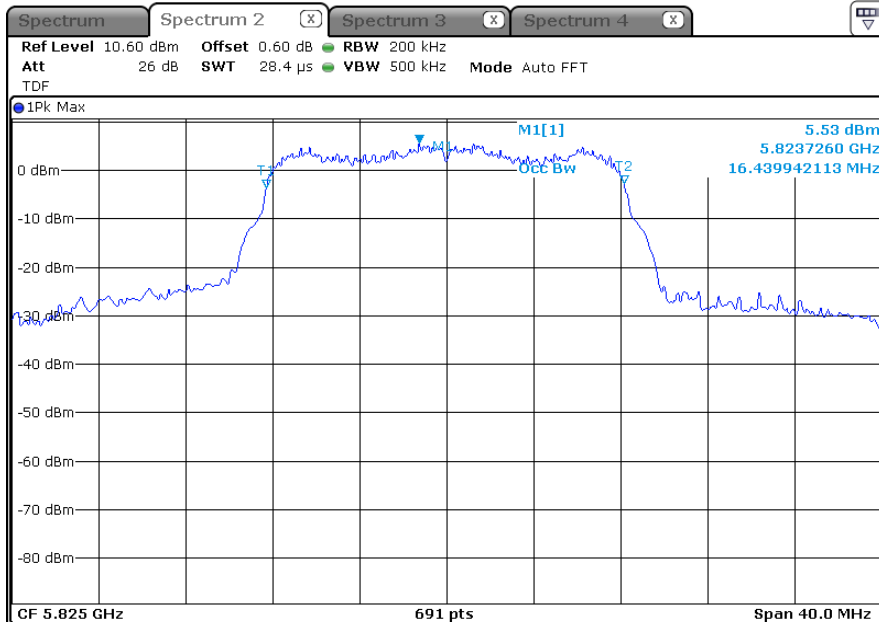


-5 825 MHz

ANT 1(6 dB Bandwidth)



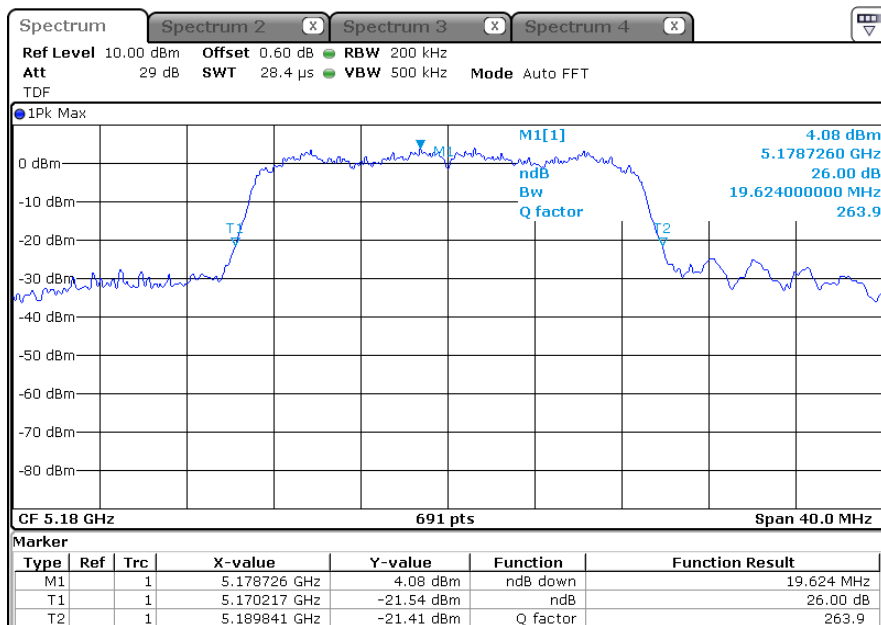
ANT 1(OBW)



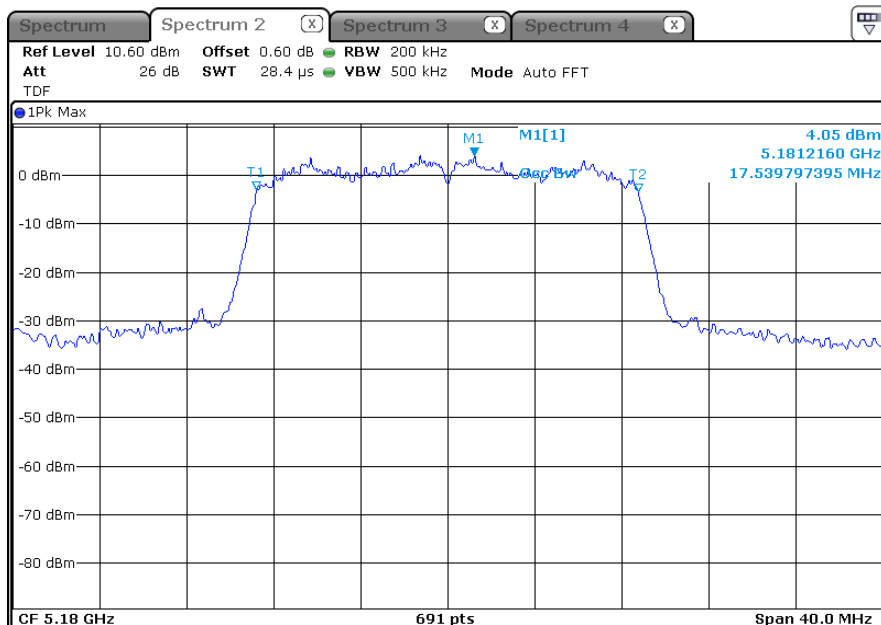
* 802.11an HT20_5 150 Band (26 dB Bandwidth)

-5 180 MHz

ANT 1(EBW)

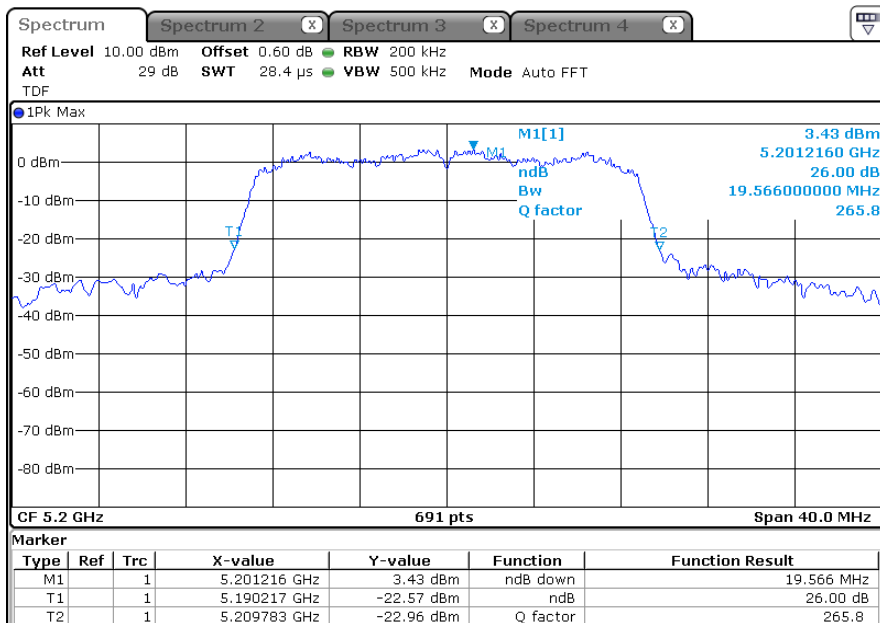


ANT 1(OBW)

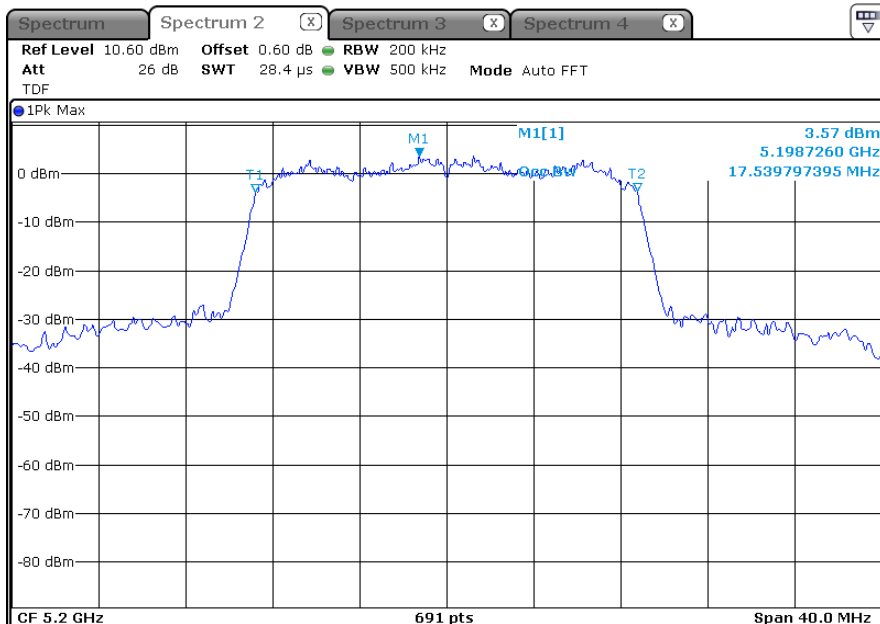


-5 200 MHz

ANT 1(EBW)

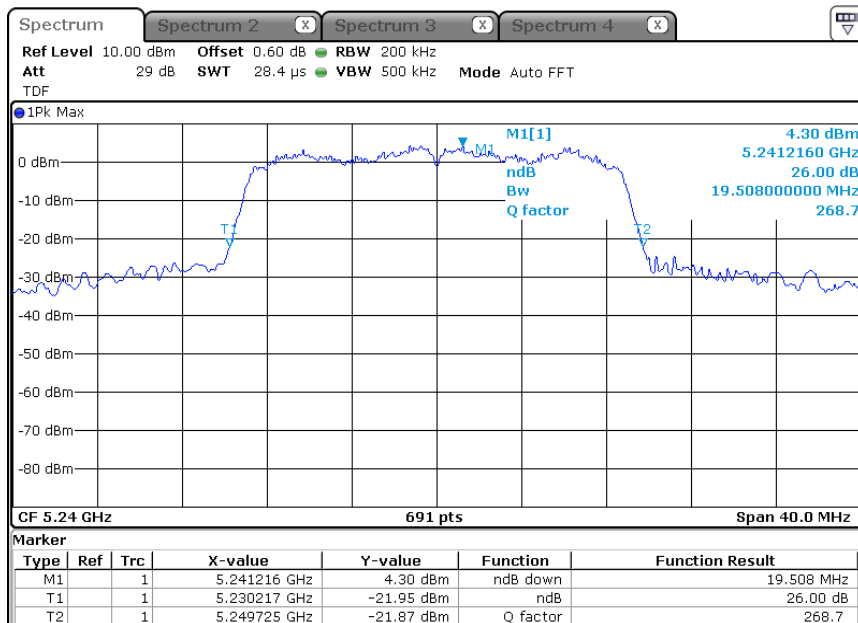


ANT 1(OBW)

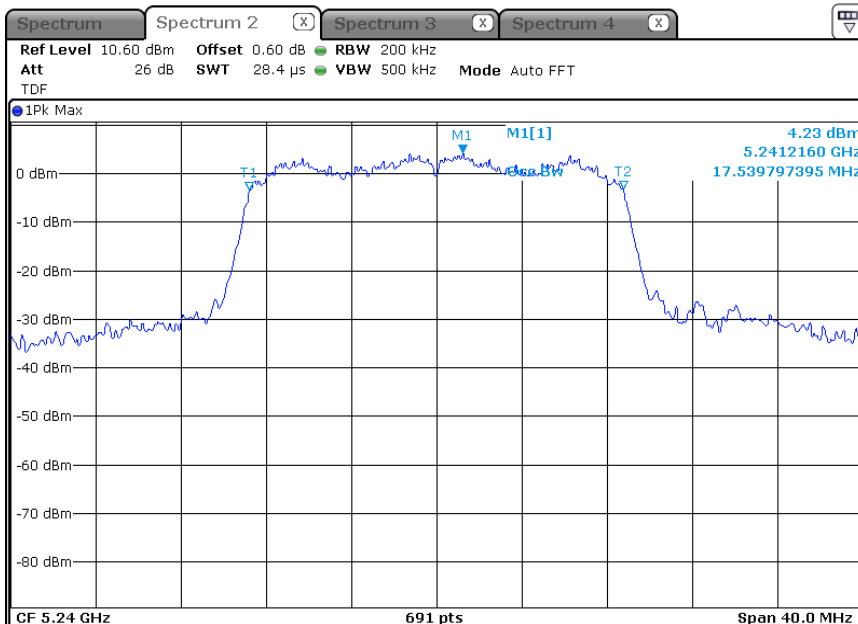


-5 240 MHz

ANT 1(EBW)



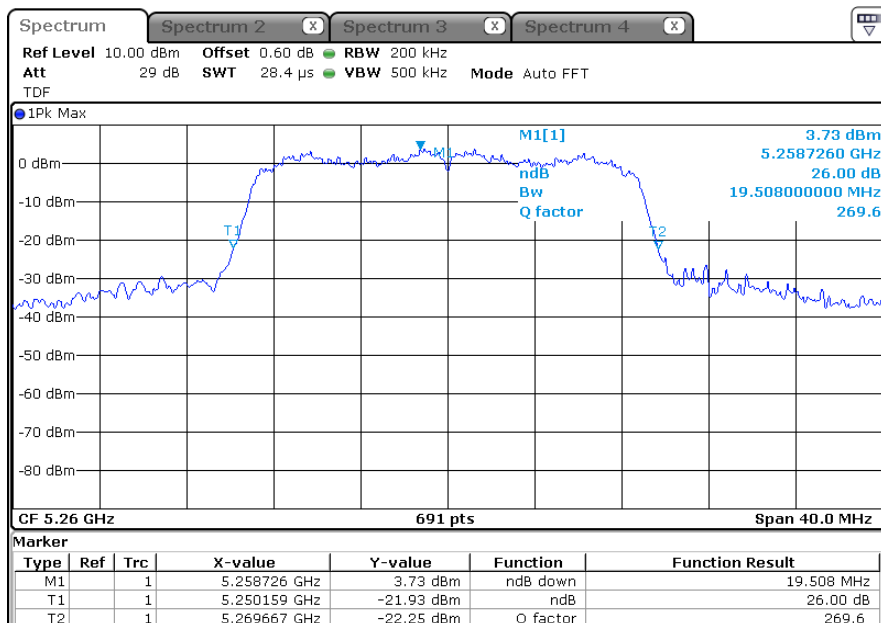
ANT 1(OBW)



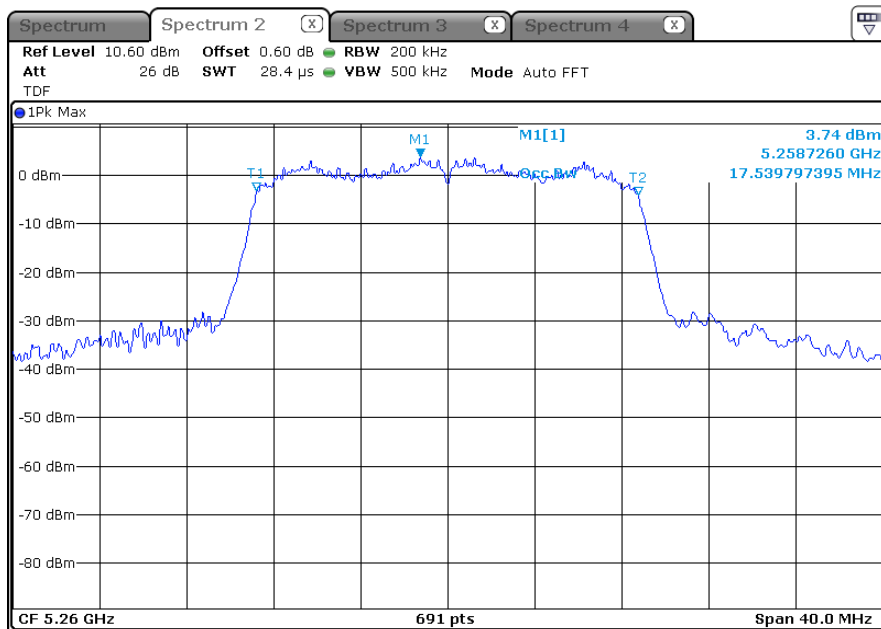
* 802.11an HT20_5 250 Band (26 dB Bandwidth)

-5 260 MHz

ANT 1(EBW)

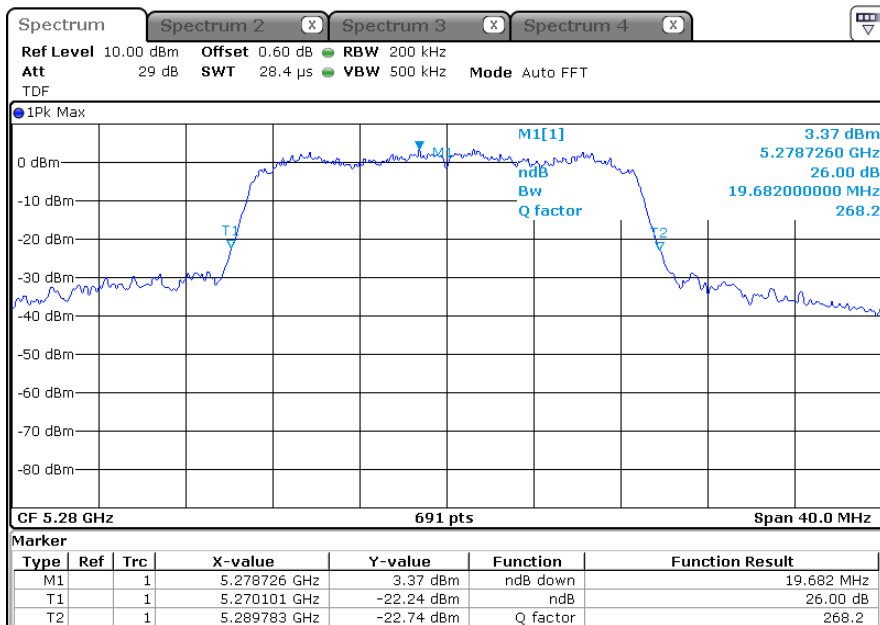


ANT 1(OBW)

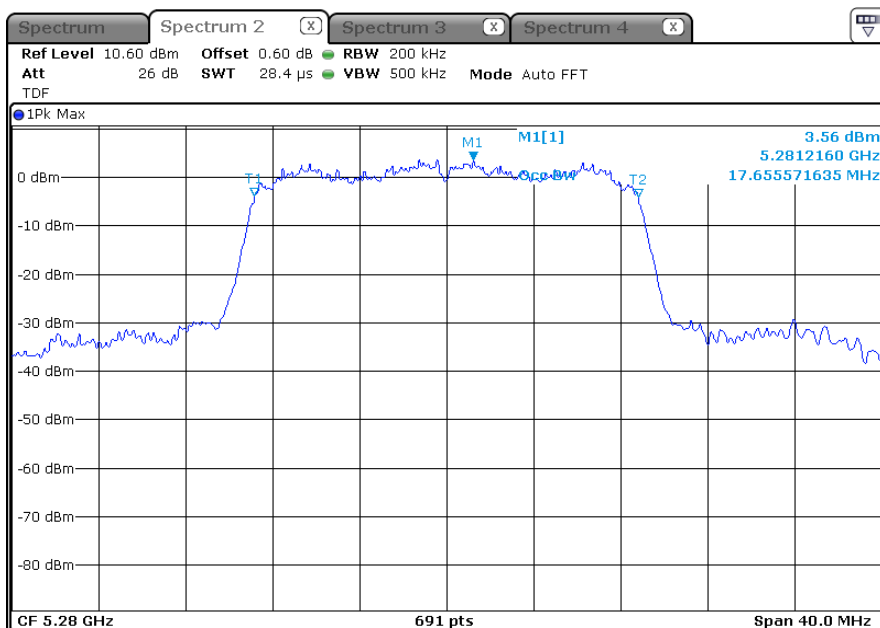


-5 280 MHz

ANT 1(EBW)

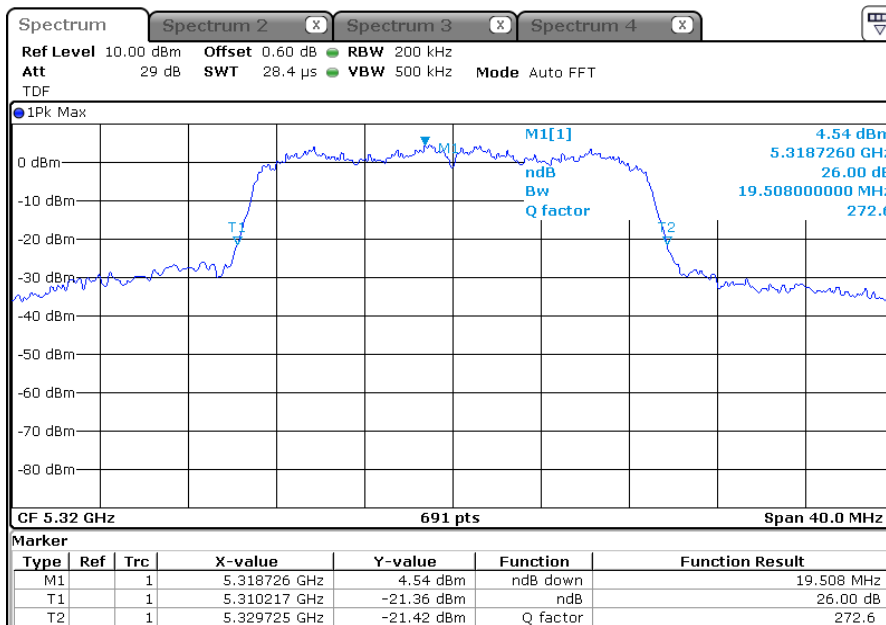


ANT 1(OBW)

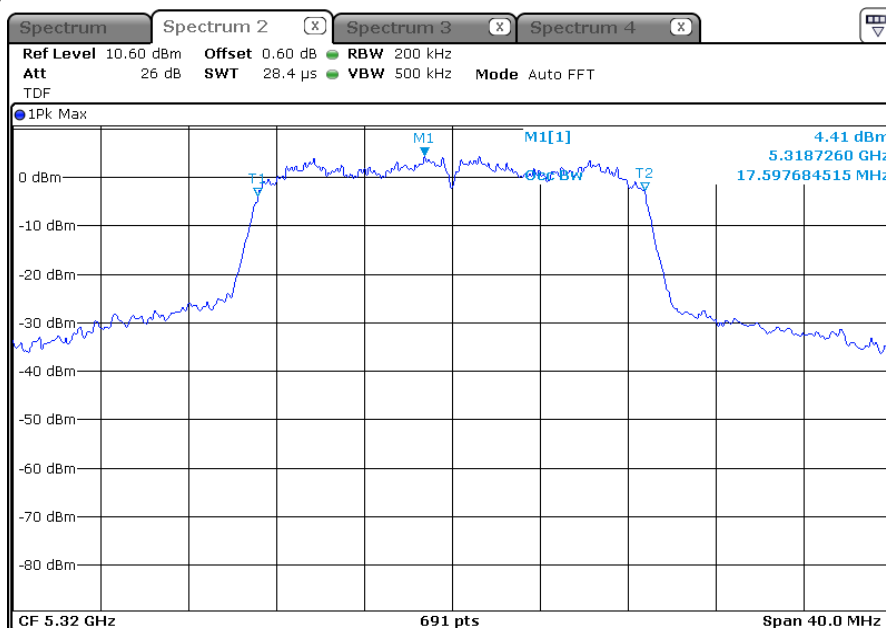


-5 320 MHz

ANT 1(EBW)



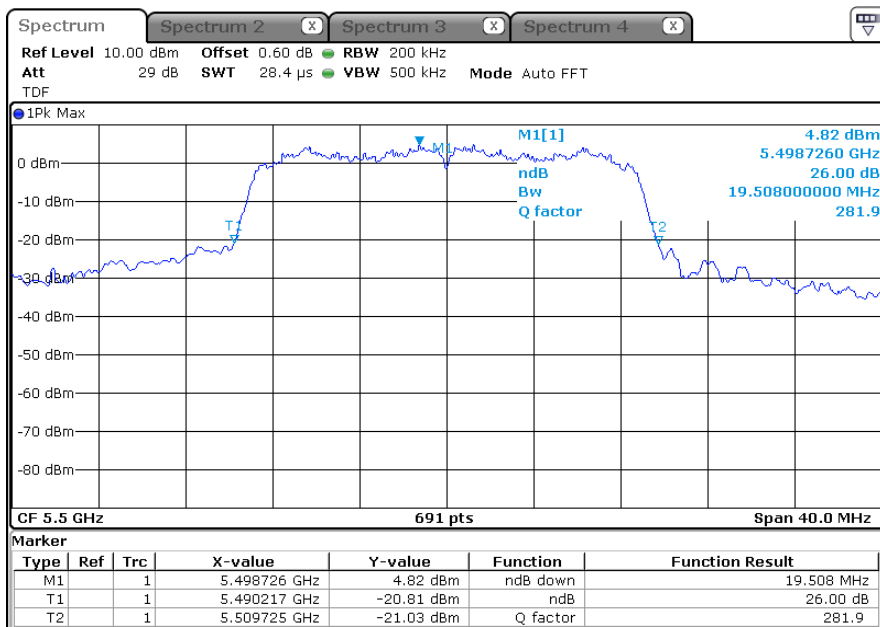
ANT 1(OBW)



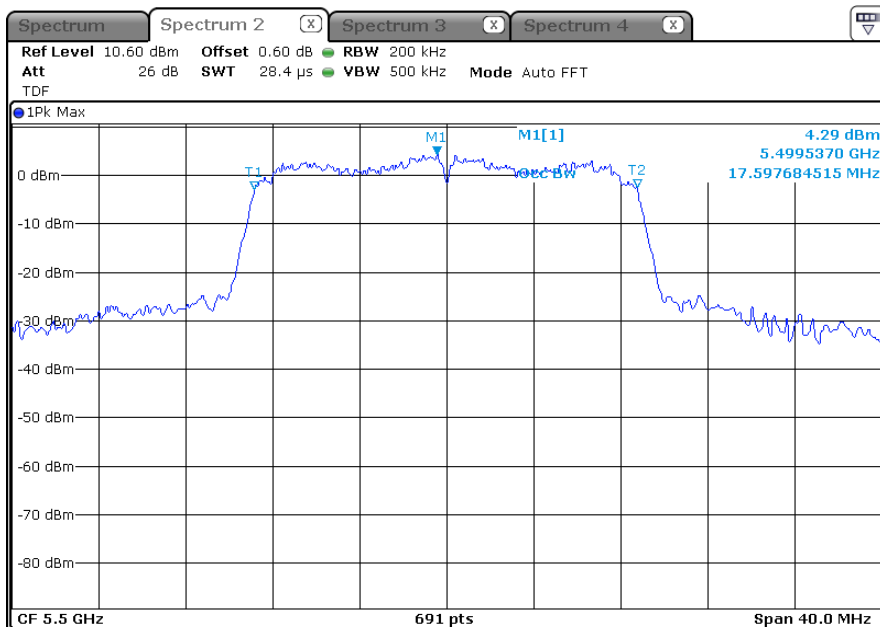
* 802.11an HT20_5 470 Band (26 dB Bandwidth)

-5500 MHz

ANT 1(EBW)

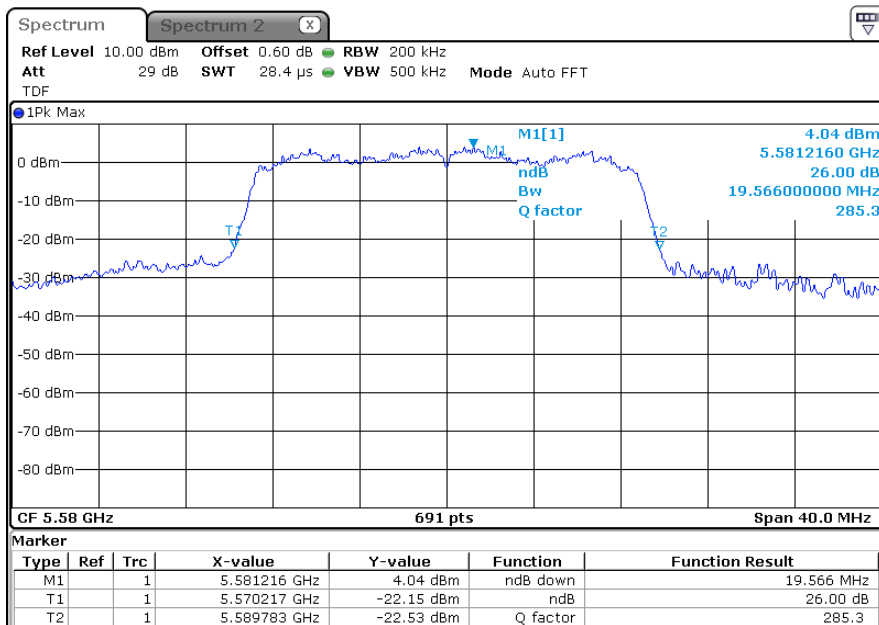


ANT 1(OBW)

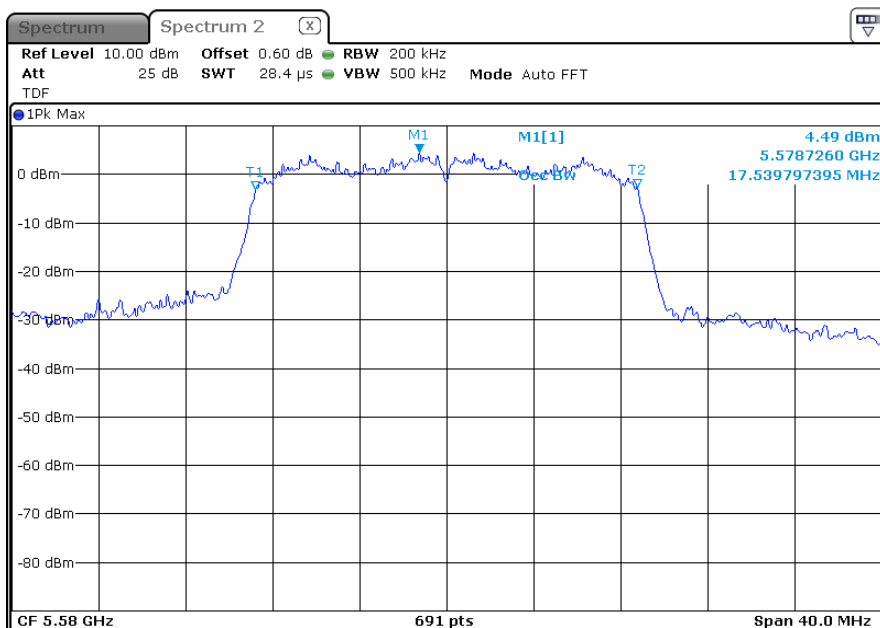


-5 580 MHz

ANT 1(EBW)

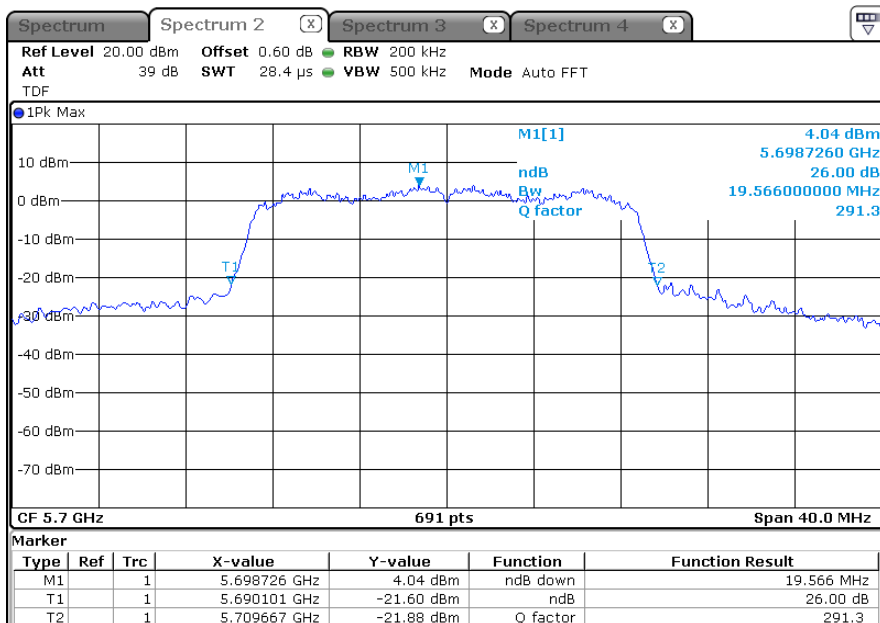


ANT 1(OBW)

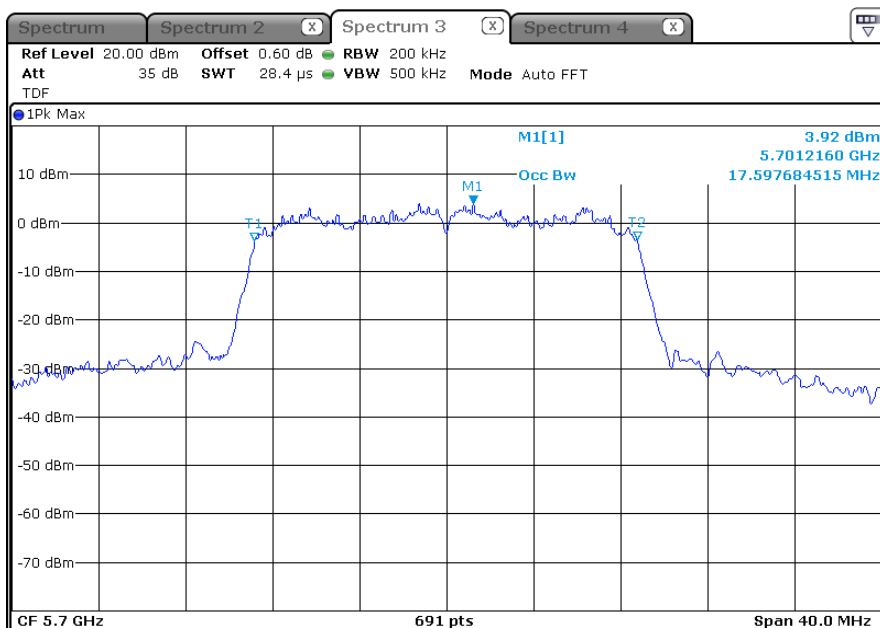


-5 700 MHz

ANT 1(EBW)



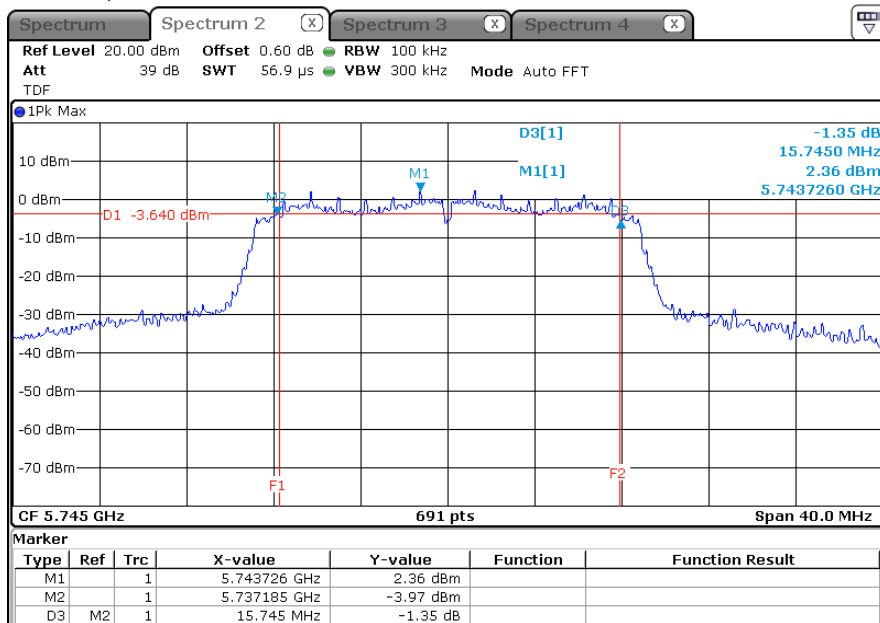
ANT 1(OBW)



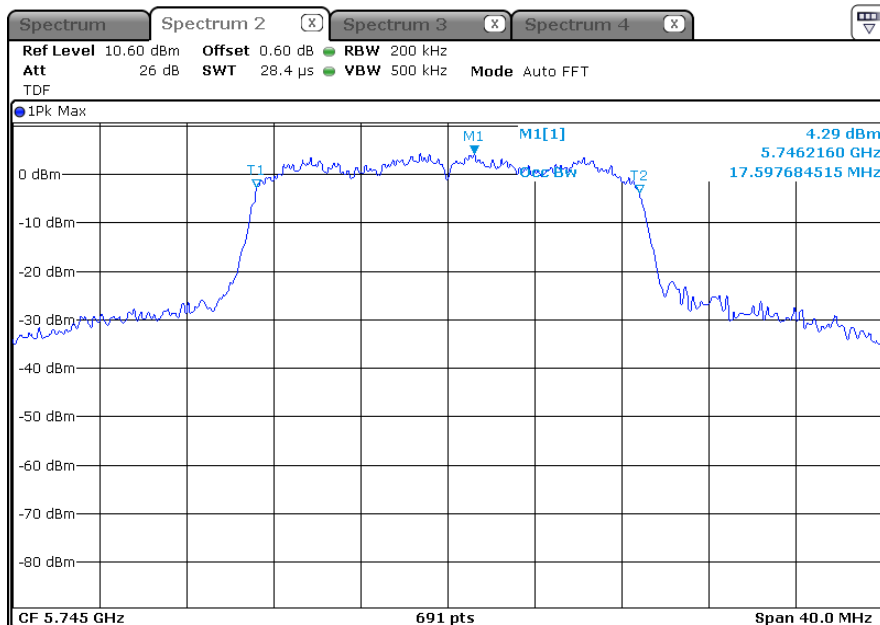
* 802.11an HT20_5 725 Band (6 dB Bandwidth)

-5 745 MHz

ANT 1(6 dB Bandwidth)

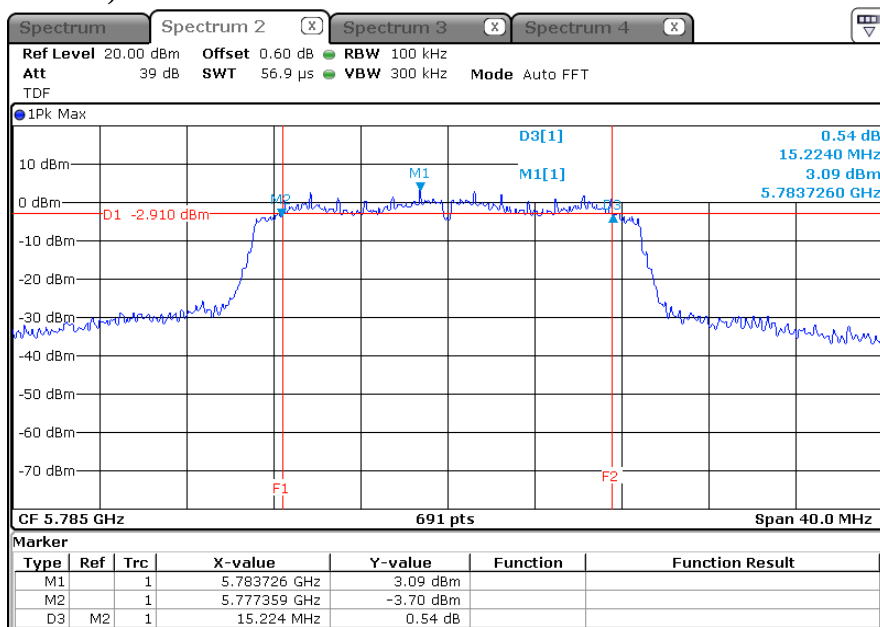


ANT 1(OBW)

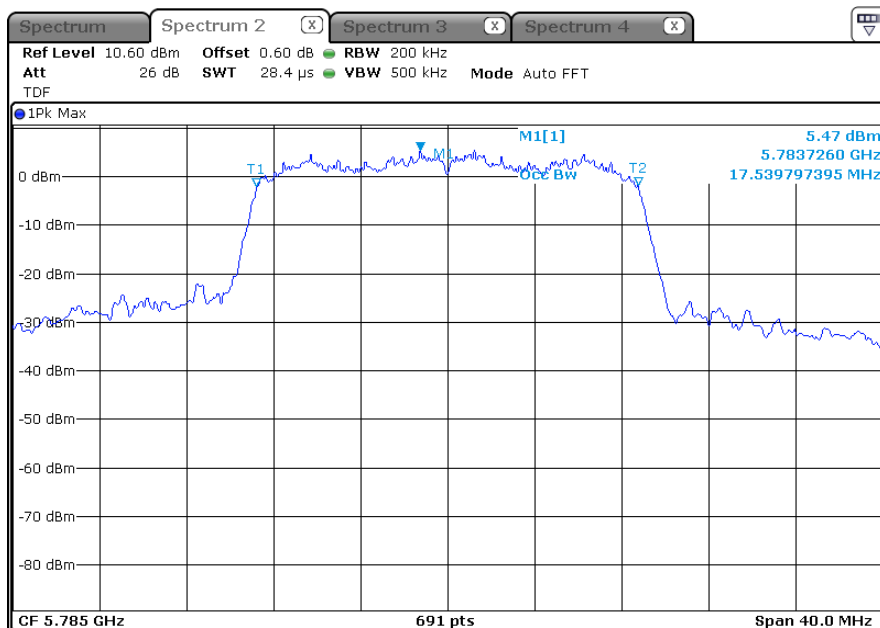


-5 785 MHz

ANT 1(6 dB Bandwidth)

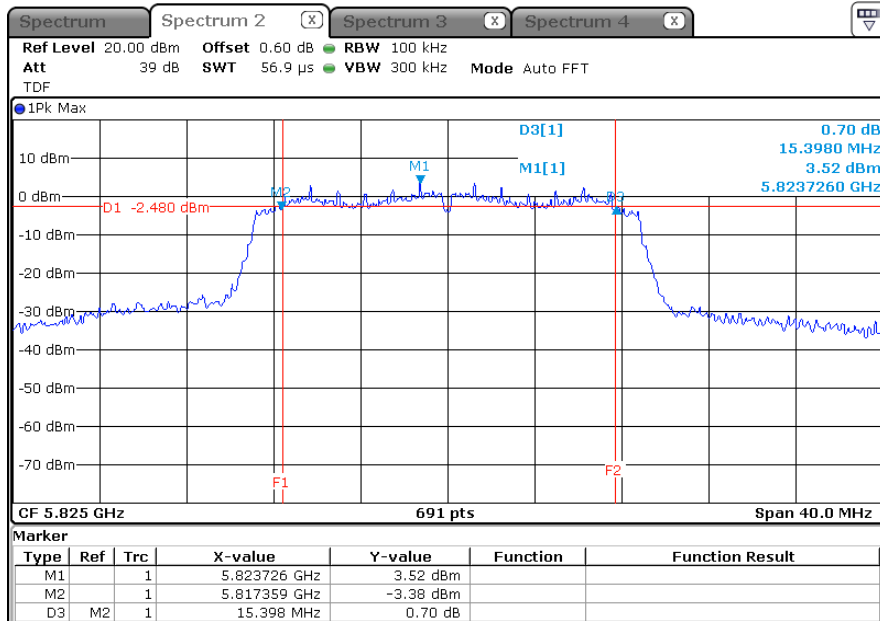


ANT 1(OBW)

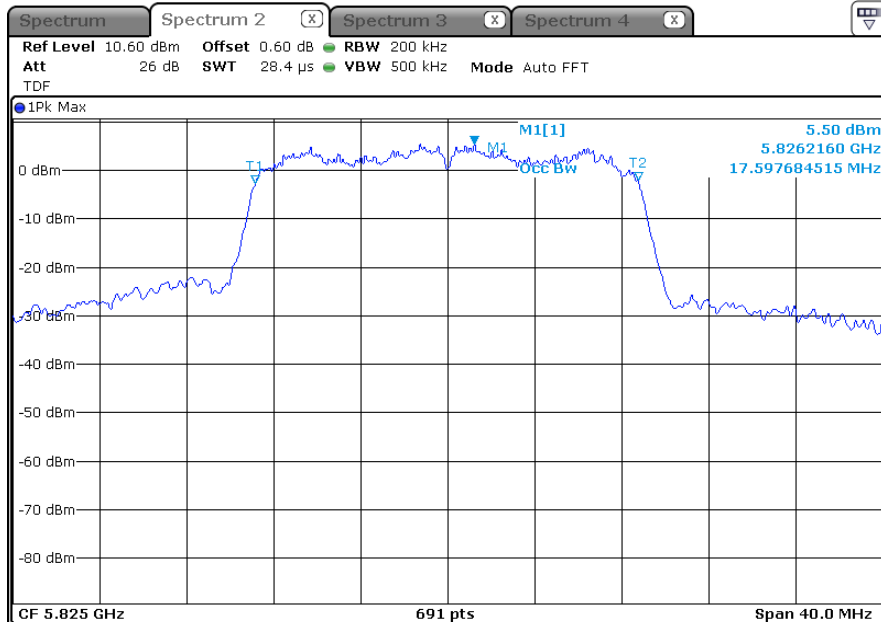


-5 825 MHz

ANT 1(6 dB Bandwidth)



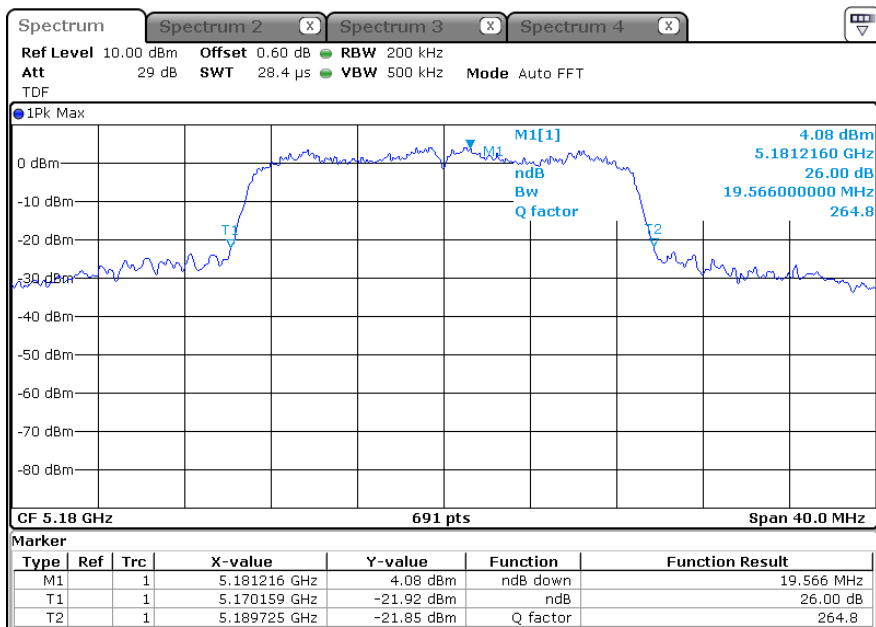
ANT 1(OBW)



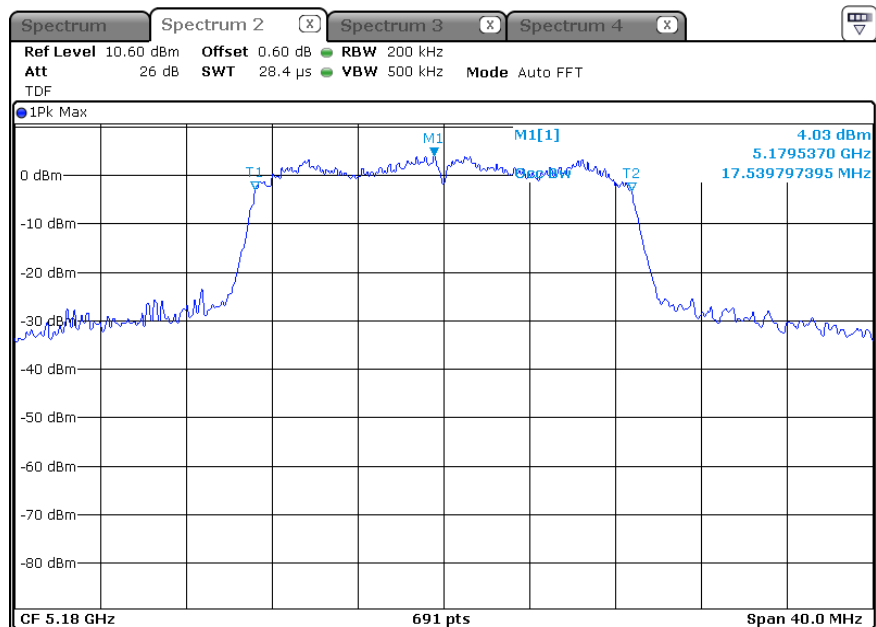
* 802.11an HT20_MIMO(ANT 1+2)_5 150 Band (26 dB Bandwidth)

-5 180 MHz

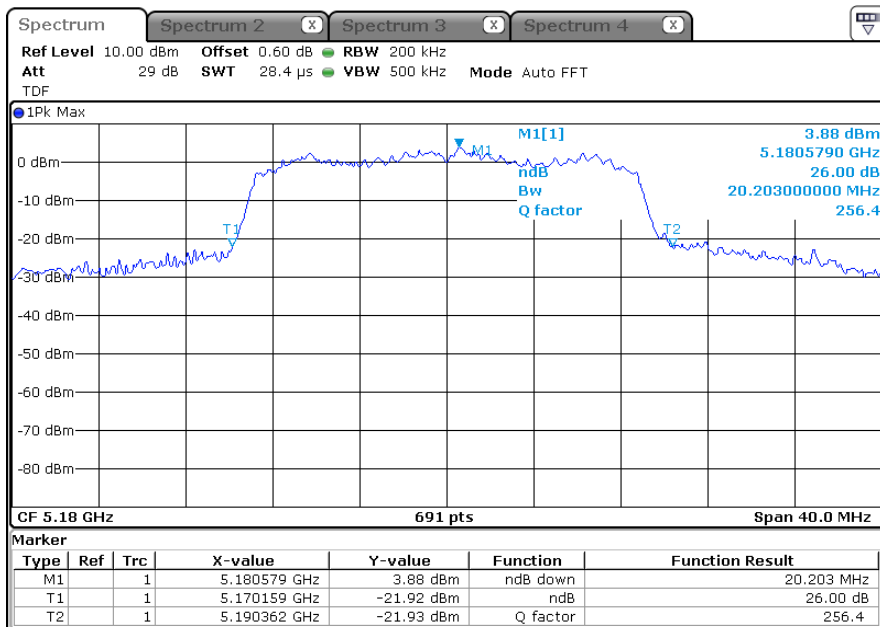
ANT 1(EBW)



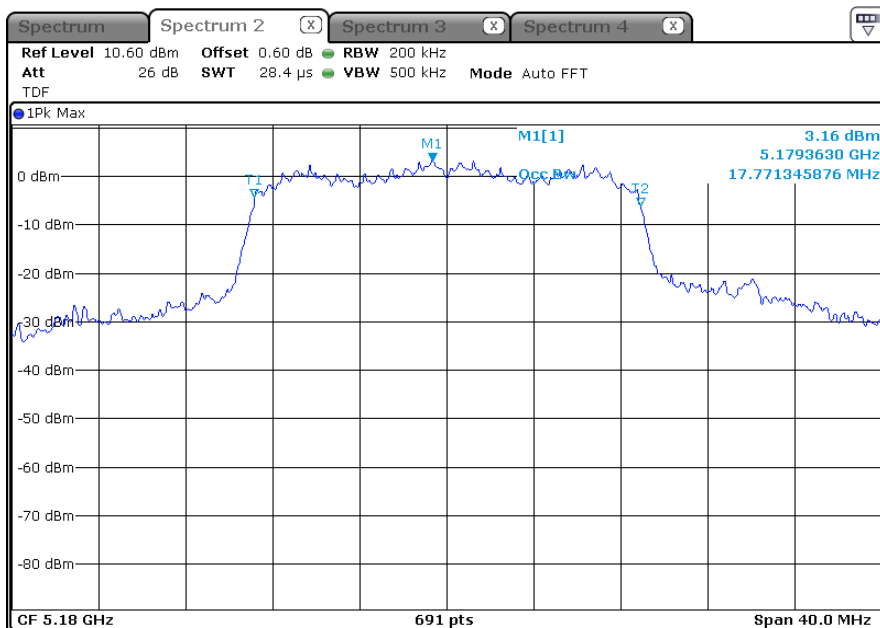
ANT 1(OBW)



ANT 2(EBW)

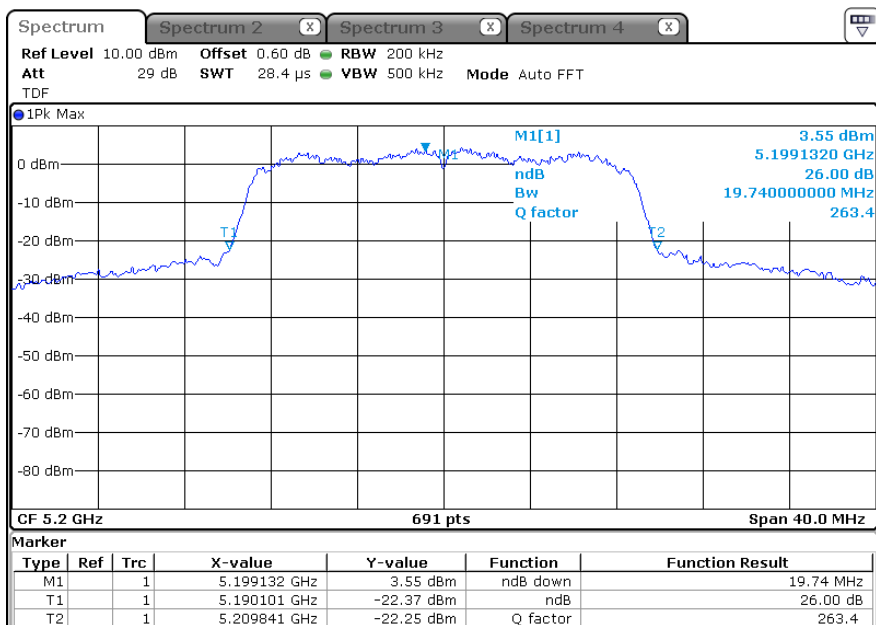


ANT 2(OBW)

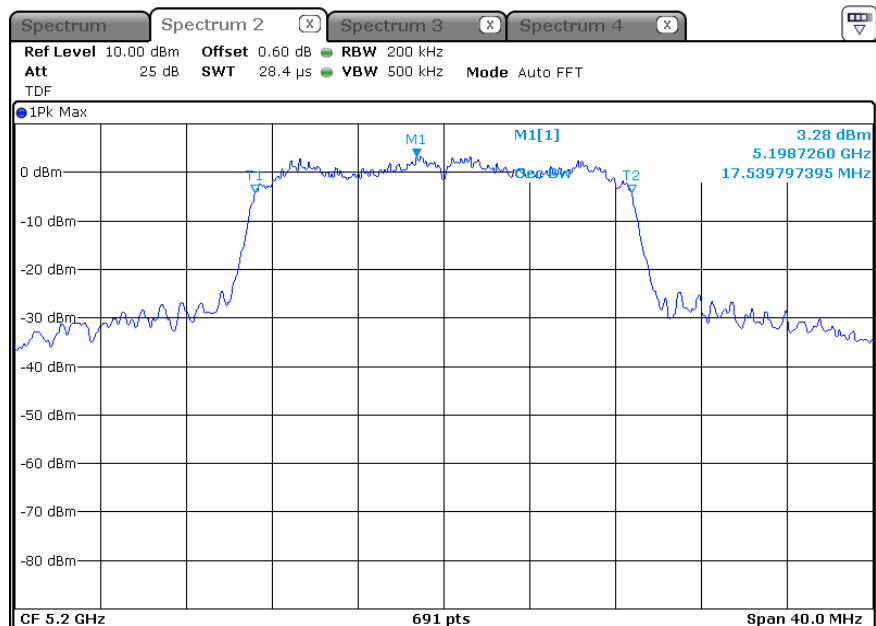


-5 200 MHz

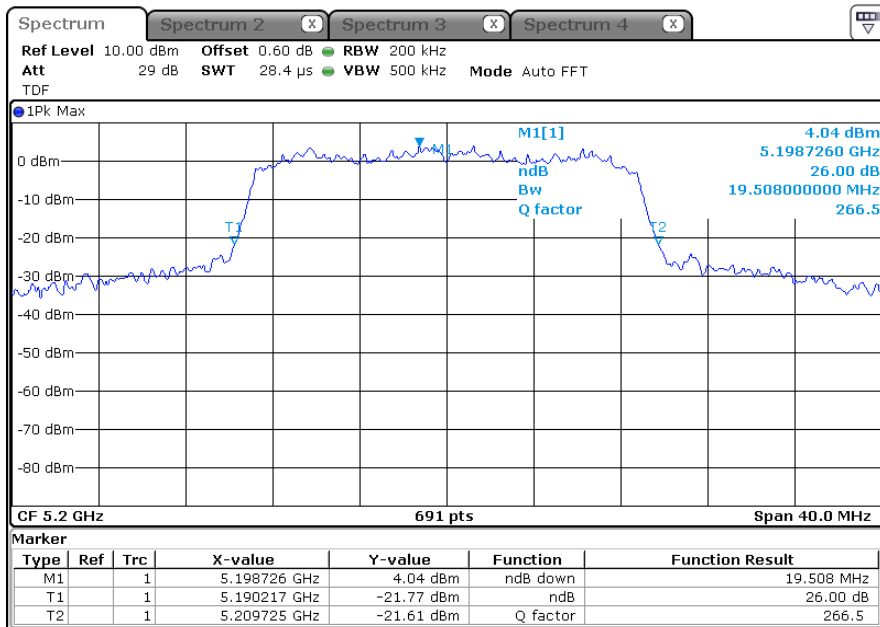
ANT 1(EBW)



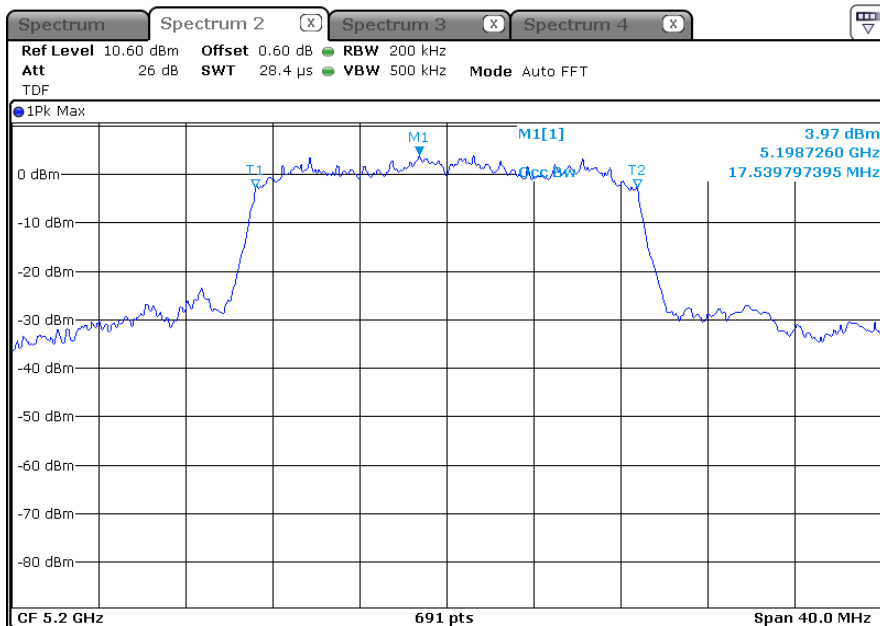
ANT 1(OBW)



ANT 2(EBW)

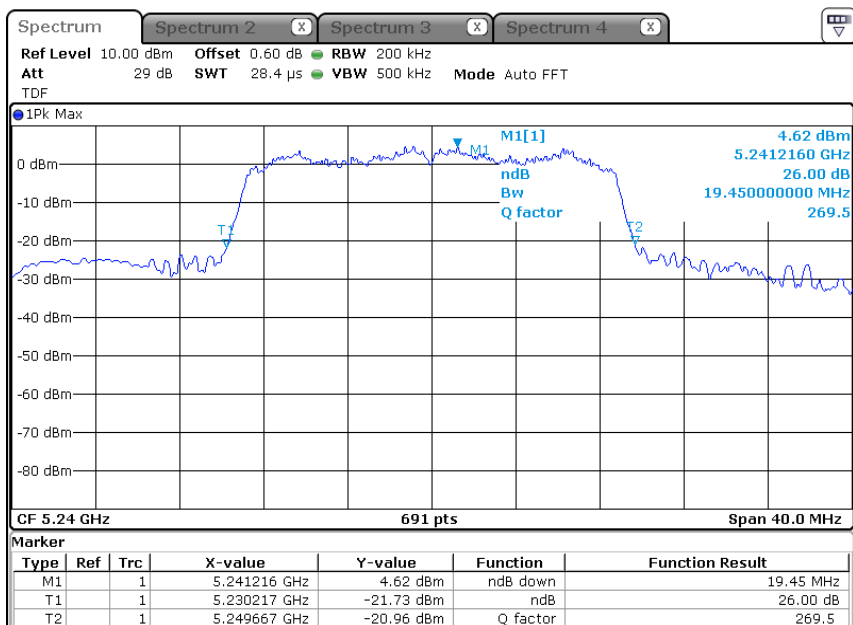


ANT 2(OBW)

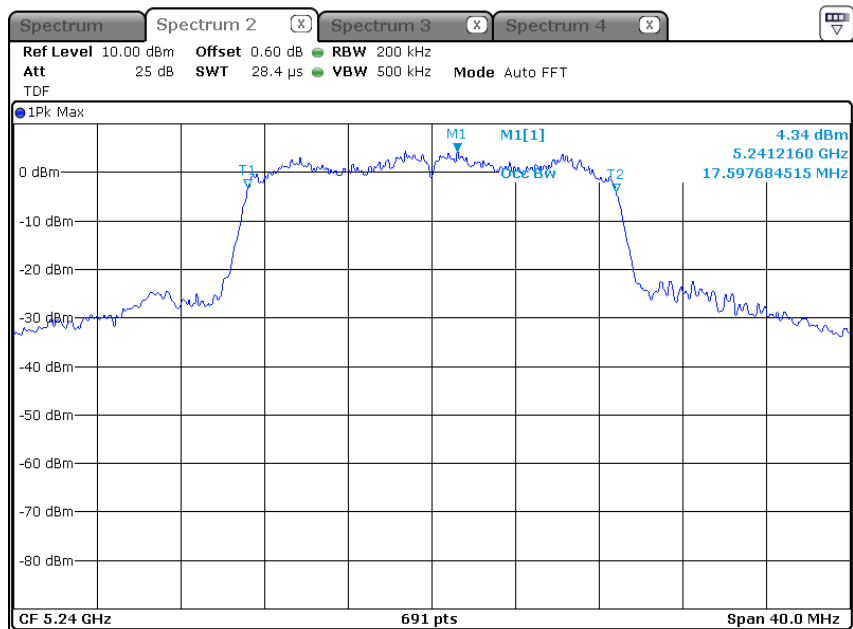


-5 240 MHz

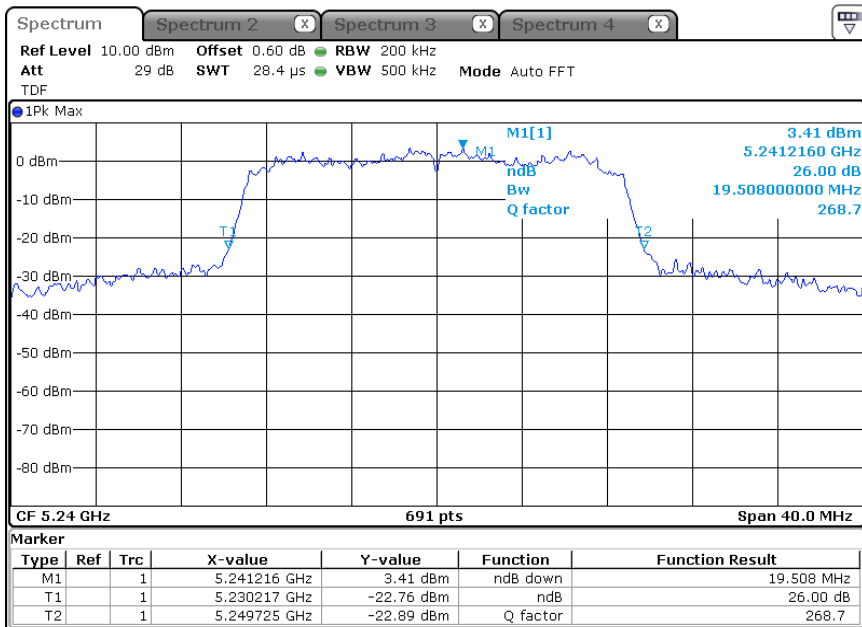
ANT 1(EBW)



ANT 1(OBW)



ANT 2(EBW)



ANT 2(OBW)

