

12.5 Power spectral density

Description:

Measurement of the power spectral density of a digital modulated system. The measurement is repeated at the lowest, middle and highest channel.

Measurement:

Measurement parameter	
According to: KDB789033 D02, F.	
Detector:	RMS
Sweep time:	$\geq 10 \cdot (\text{swp points}) \cdot (\text{total on/off time})$
Resolution bandwidth:	1 MHz (500 kHz for 5.8 GHz band)
Video bandwidth:	$\geq 3 \cdot \text{RBW}$
Span:	$> \text{EBW}$
Trace-Mode:	Max hold
Used test setup:	see chapter 7.4 – A
Measurement uncertainty:	see chapter 9

Limits:

Power Spectral Density
FCC power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5150 – 5250 MHz)* $\rightarrow$ 5dBm power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5250 – 5350 MHz)* $\rightarrow$ 5dBm power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz)* $\rightarrow$ 5dBm power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)* $\rightarrow$ 24dBm IC power spectral density e.i.r.p. ≤ 10 dBm in any 1 MHz band (band 5150 – 5250 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5250 – 5350 MHz)* $\rightarrow$ 5dBm power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz)* $\rightarrow$ 5dBm power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)* $\rightarrow$ 24dBm

*limit shall be reduced by 6 dB because of the 12dBi effective antenna gain.

Results plots are shown in sub chapter 12.4.

Result: antenna port 1

OFDM / a – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-8.6	-8.2	-1.2	-1.1
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		-0.4	-2.6	-4.5	-/-
Channel		5745 MHz	5785 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-5.0	-5.5	-5.8	-6.4

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-7.5	-7.7	-0.8	-0.8
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		-1.3	-0.3	-1.1	-/-
Channel		5745 MHz	5785 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-1.4	-0.8	-4.2	-2.6

OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-9.1	-9.0	-3.5	-7.4
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-4.9	-2.3	-2.2	-2.6
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		-1.8	-1.4	-/-	-/-

Result: antenna port 2

OFDM / a – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-8.2	-8.3	-1.3	-1.4
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		-0.8	-2.3	-3.5	-/-
Channel		5745 MHz	5785 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-4.4	-5.6	-5.0	-6.2

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-7.6	-7.2	-0.4	-0.5
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		-1.1	-0.3	-0.7	-/-
Channel		5745 MHz	5785 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-0.2	-0.6	-3.3	-2.6

OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-8.9	-8.9	-2.7	-7.1
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-4.9	-2.7	-2.5	-2.4
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		-0.3	-1.6	-/-	-/-

Result: antenna port 1 + antenna port 2

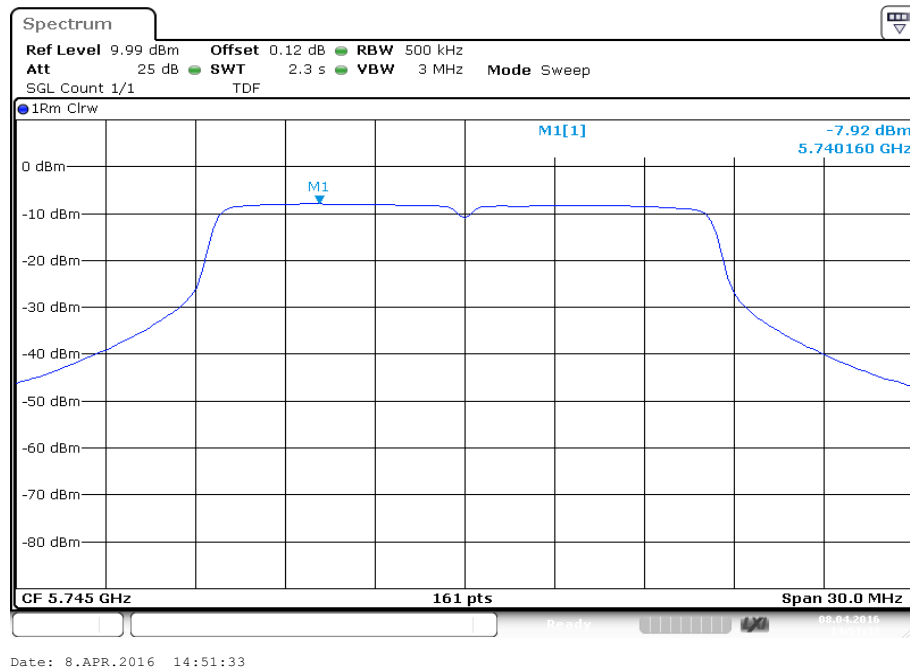
OFDM / a – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-5.4	-5.2	1.8	1.8
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		2.4	0.6	-1.0	-/-
Channel		5745 MHz	5785 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-1.7	-2.5	-2.4	-3.3

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-4.5	-4.4	2.4	2.4
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		1.8	2.7	2.1	-/-
Channel		5745 MHz	5785 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		2.3	2.3	-0.7	0.4

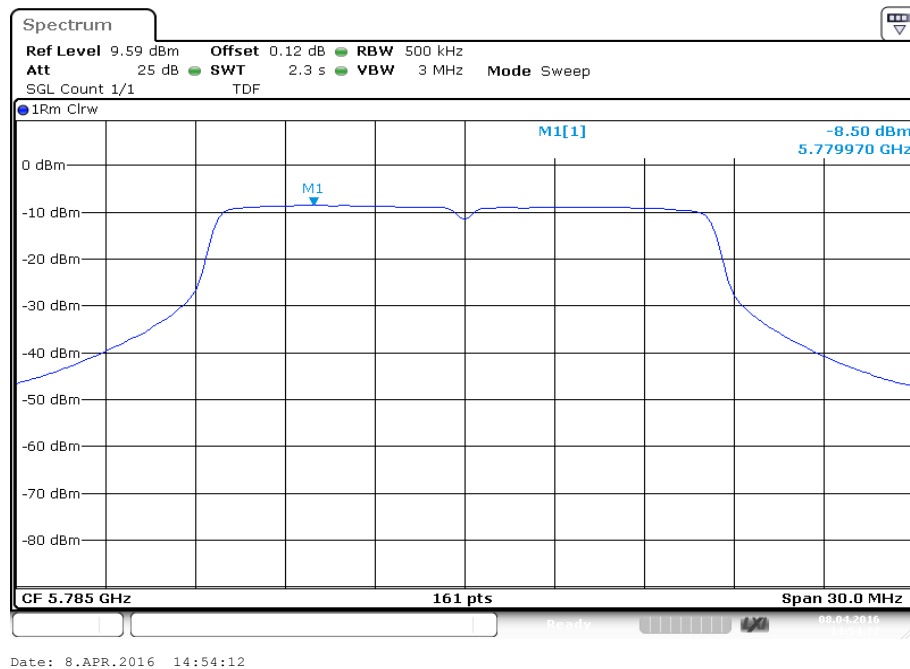
OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5210 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-6.0	-5.9	-0.1	-4.2
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-1.9	0.5	0.7	0.5
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		2.0	1.5	-/-	-/-

Plots: OFDM / a – mode; antenna port 1

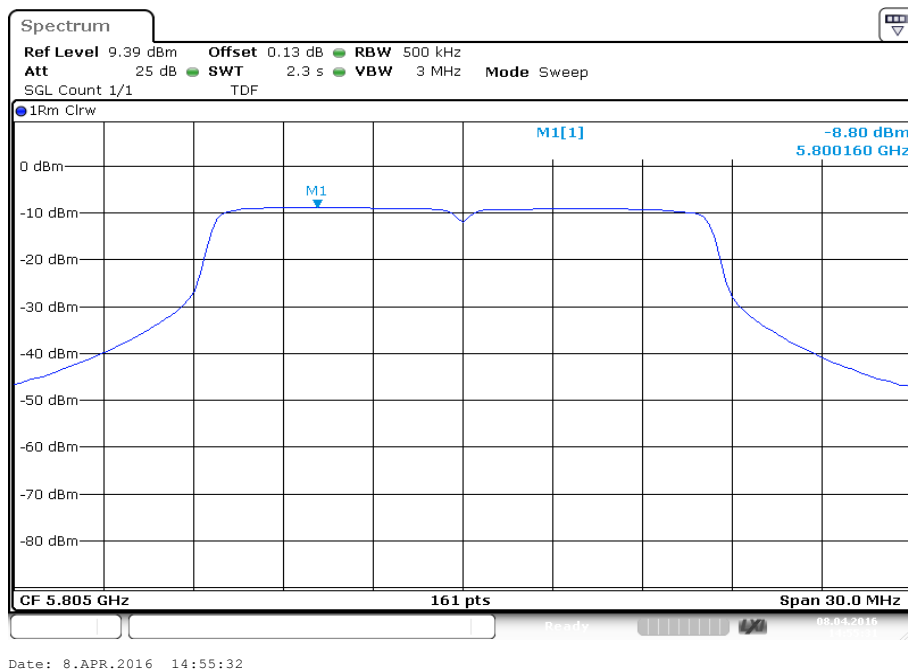
Plot 1: 5745 MHz



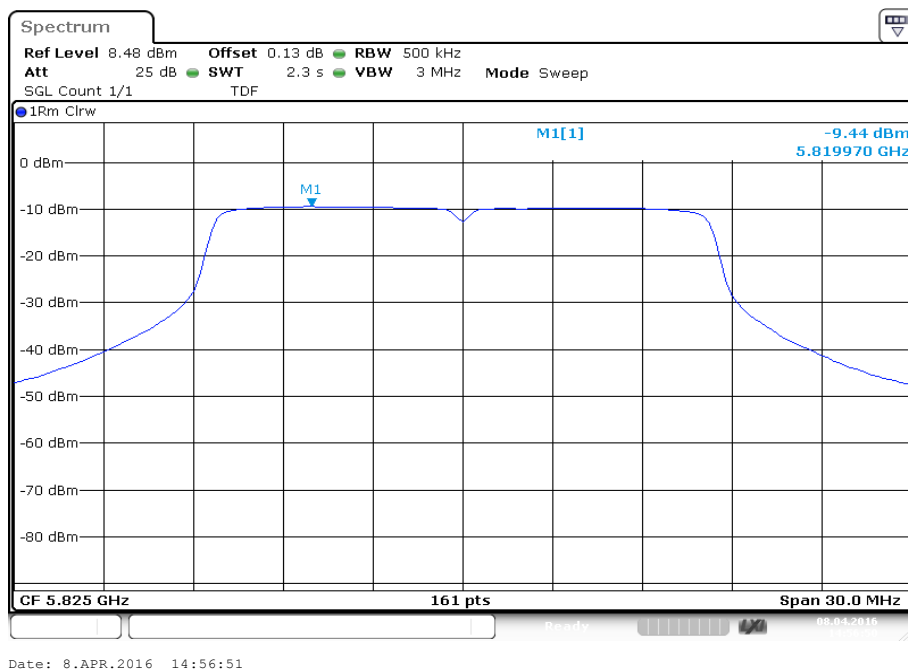
Plot 2: 5785 MHz



Plot 3: 5805 MHz

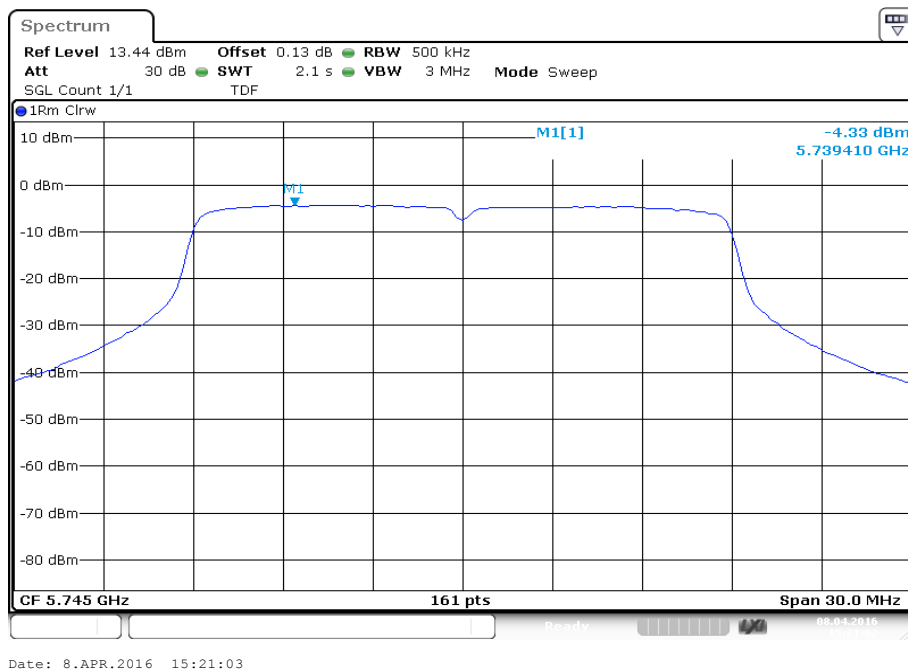


Plot 4: 5825 MHz

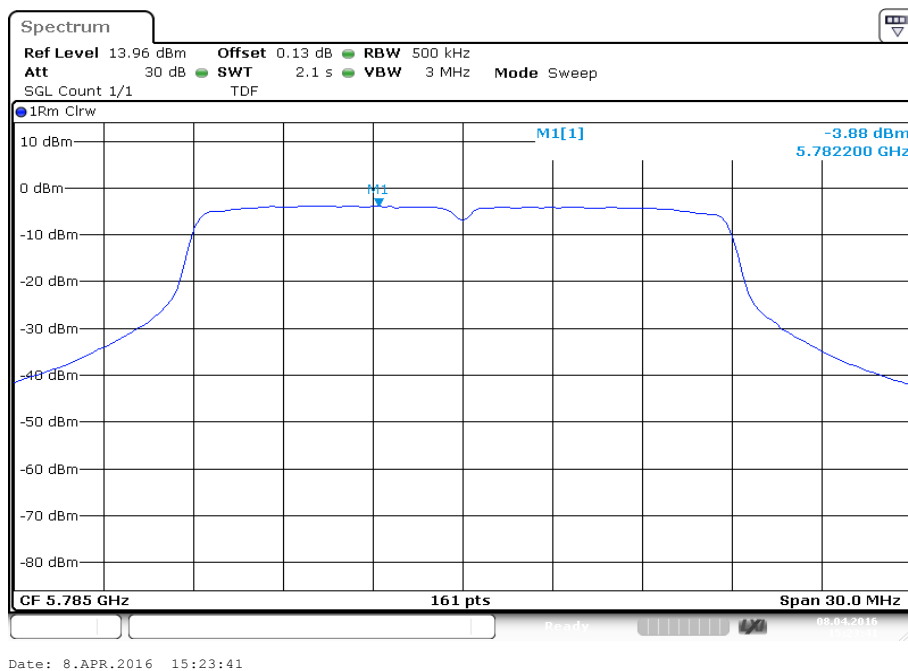


Plots: OFDM / n HT20 – mode; antenna port 1

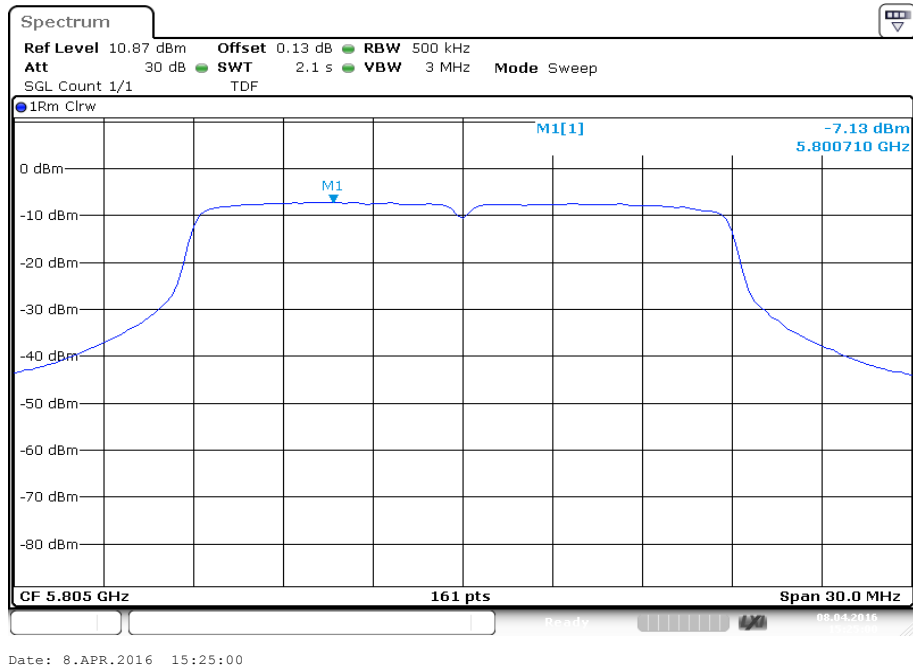
Plot 1: 5745 MHz



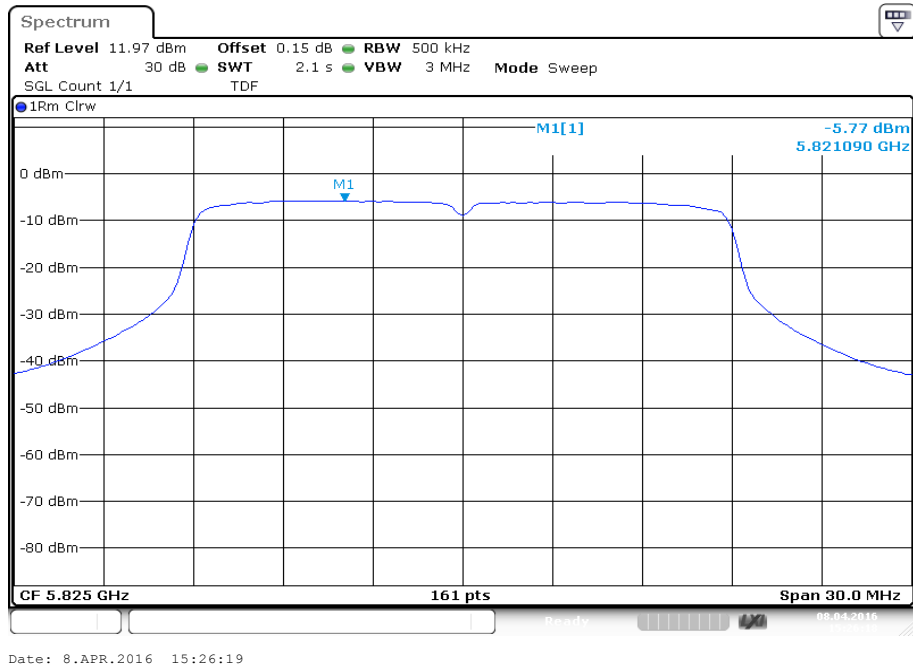
Plot 2: 5785 MHz



Plot 3: 5805 MHz

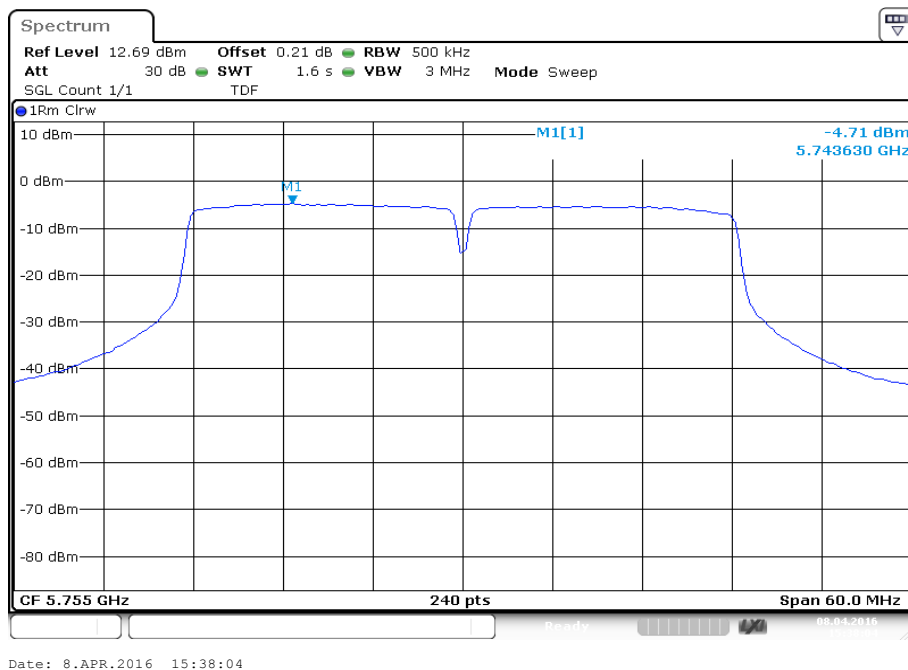


Plot 4: 5825 MHz

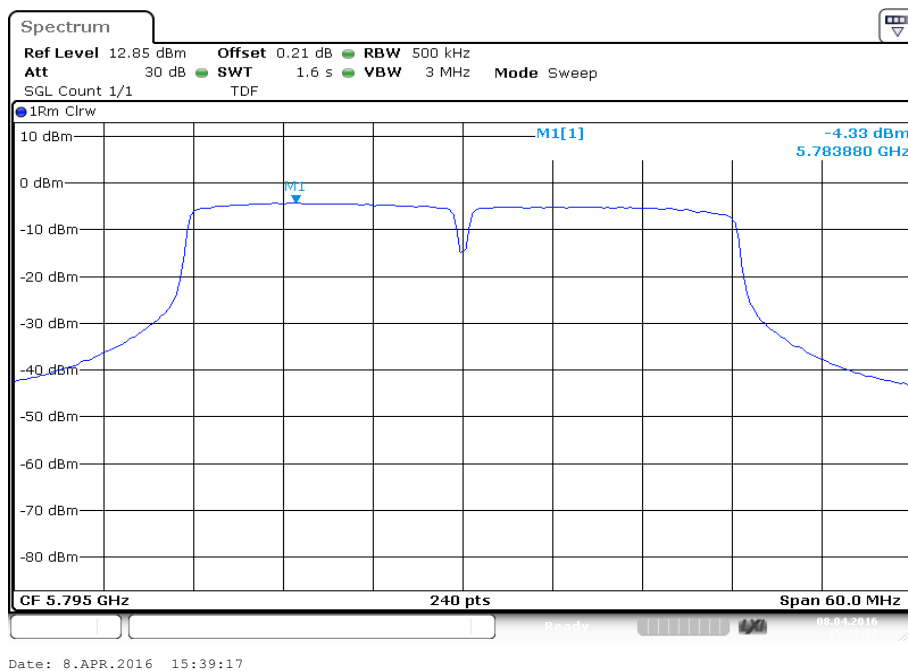


Plots: OFDM / n HT40 – mode; antenna port 1

Plot 1: 5755 MHz

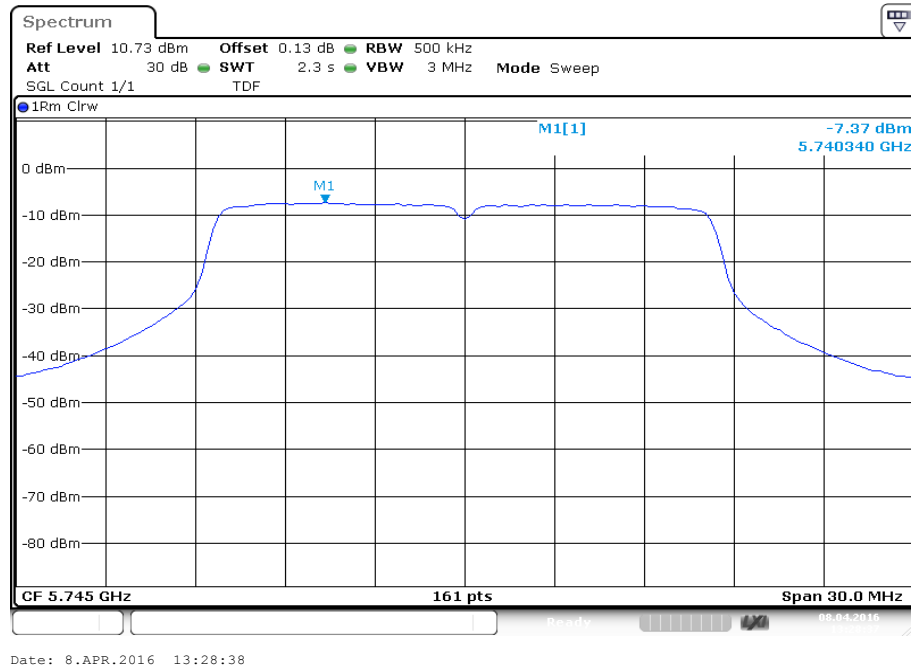


Plot 2: 5795 MHz

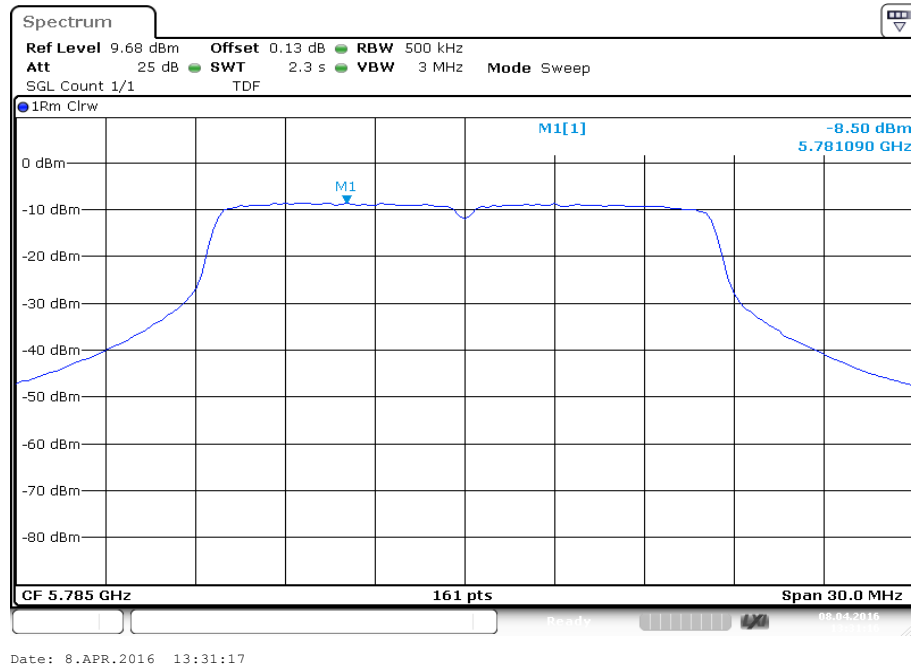


Plots: OFDM / a – mode; antenna port 2

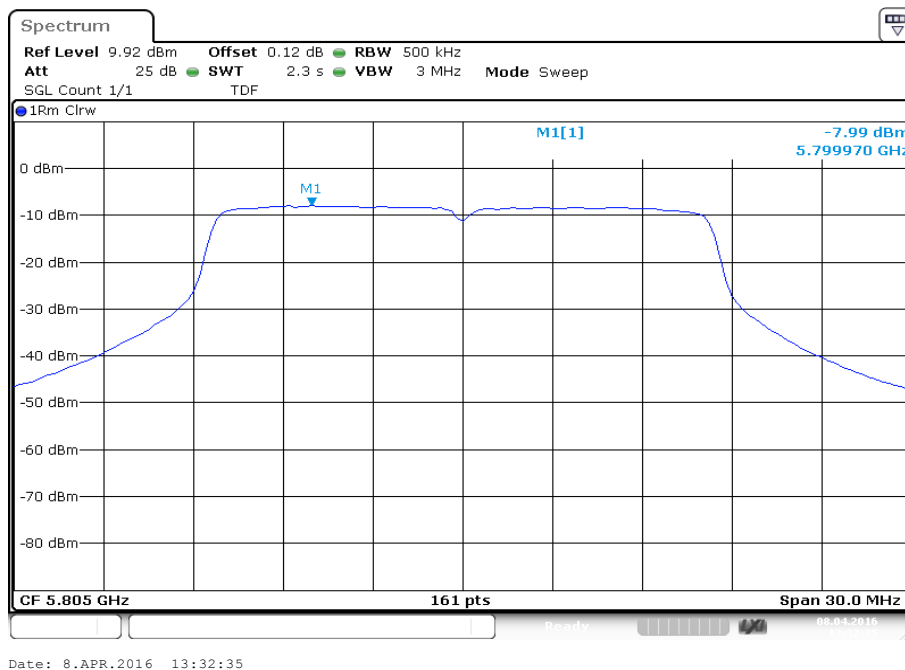
Plot 1: 5745 MHz



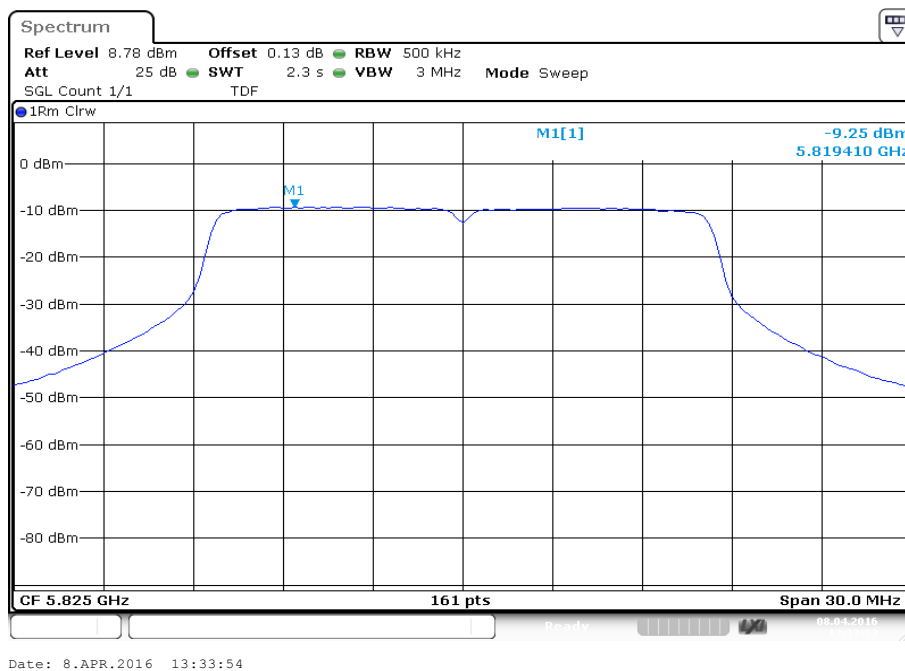
Plot 2: 5785 MHz



Plot 3: 5805 MHz

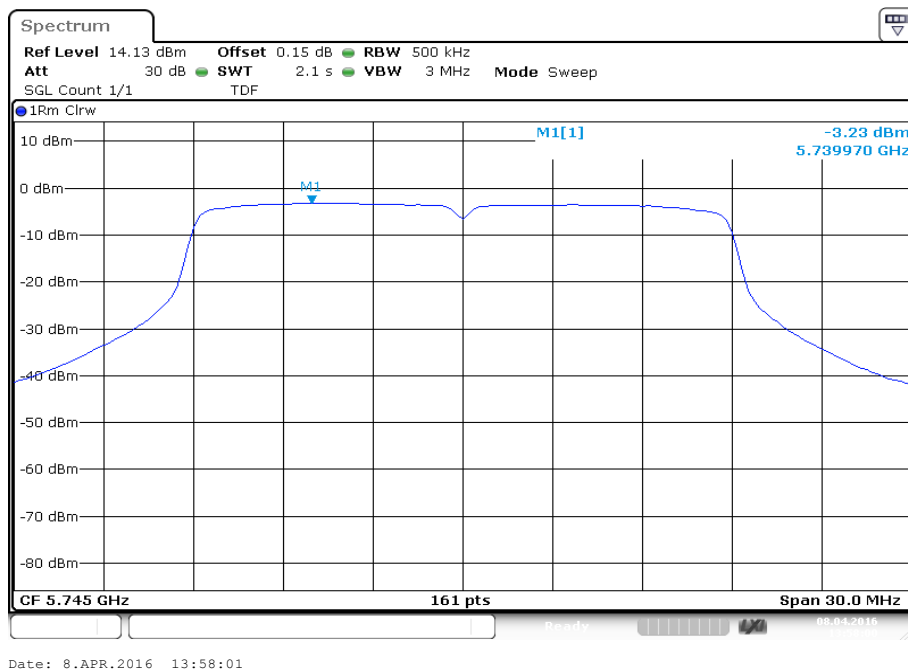


Plot 4: 5825 MHz

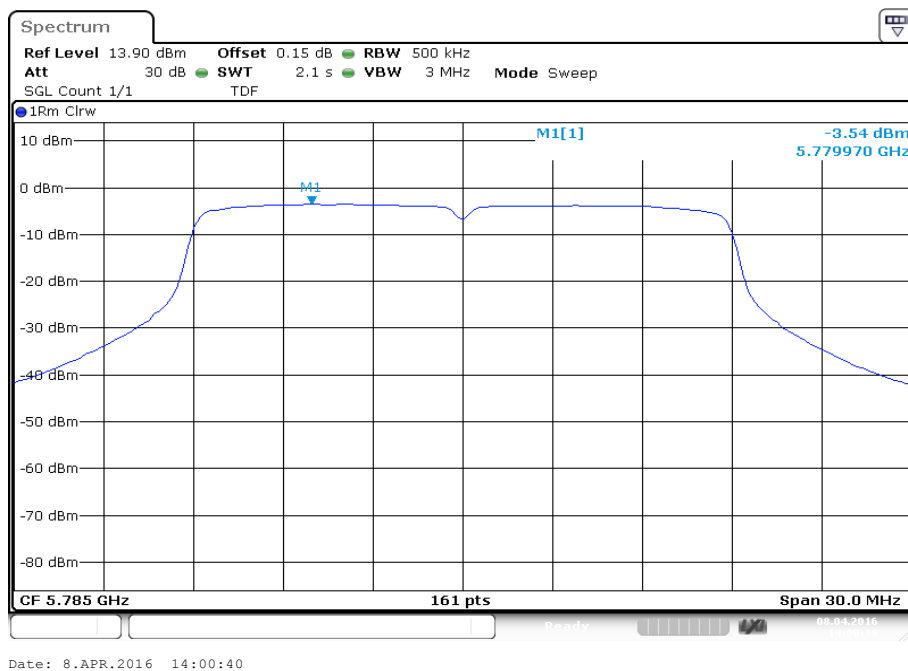


Plots: OFDM / n HT20 – mode; antenna port 2

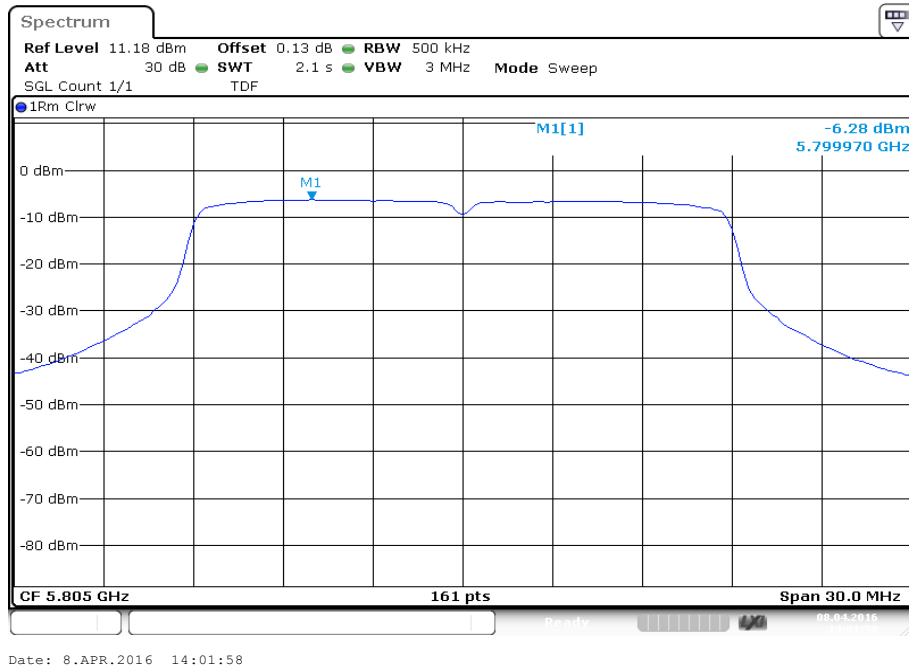
Plot 1: 5745 MHz



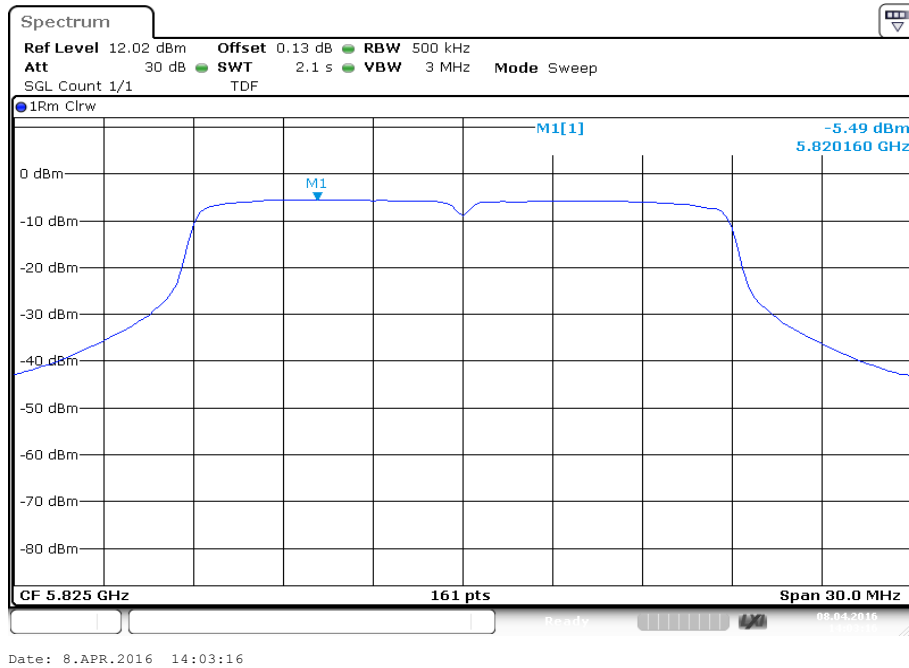
Plot 2: 5785 MHz



Plot 3: 5805 MHz

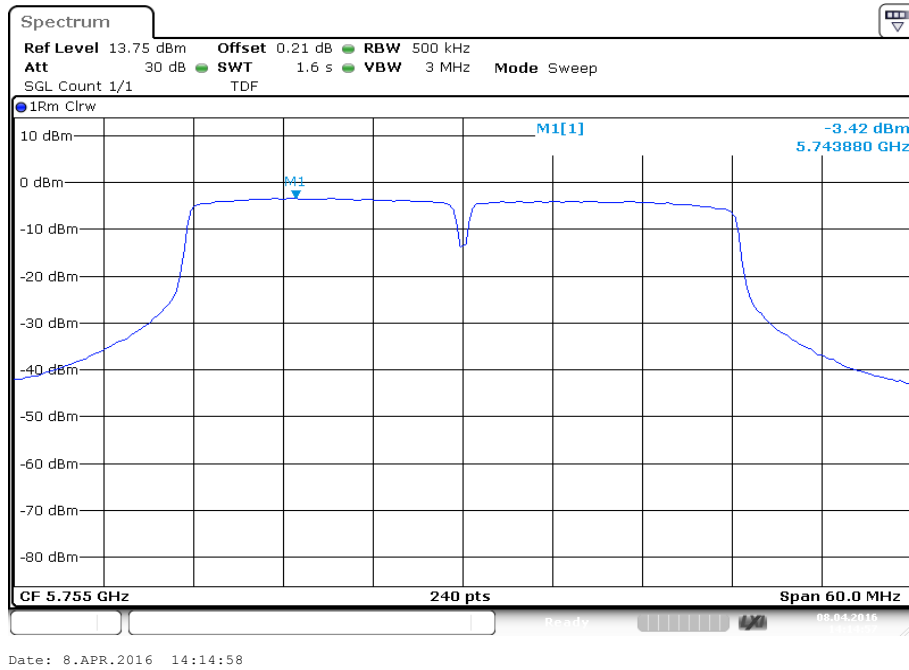


Plot 4: 5825 MHz

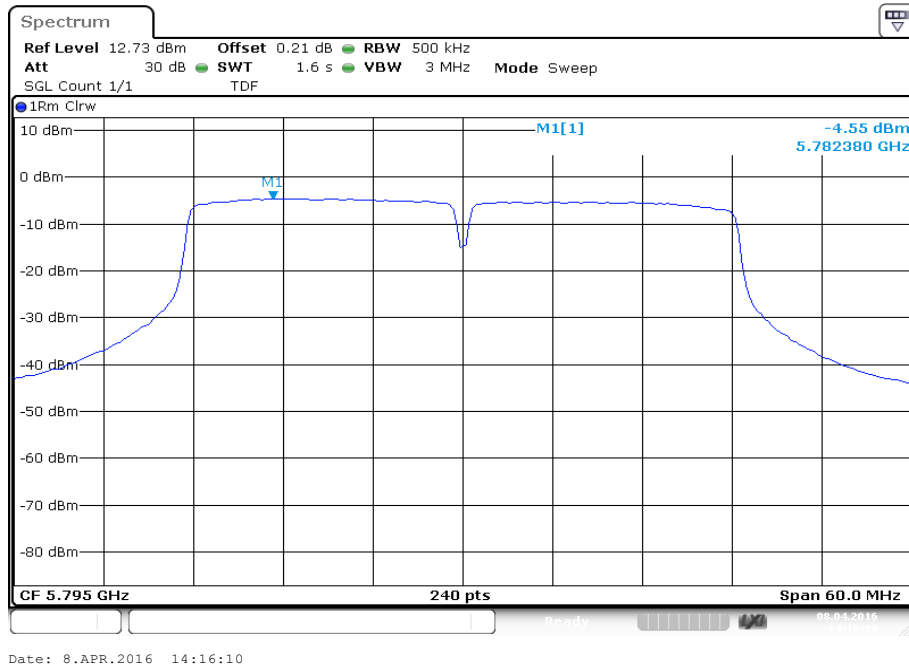


Plots: OFDM / n HT40 – mode; antenna port 2

Plot 1: 5755 MHz



Plot 2: 5795 MHz



12.6 Minimum emission bandwidth for the band 5.725-5.85 GHz**Description:**

Measurement of the 6 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
According to: KDB789033 D02, C.2.	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Span:	40 MHz
Measurement procedure:	Using marker to find -6dBc frequencies
Trace-Mode:	Max hold (allow trace to stabilize)
Used test setup:	see chapter 7.4 -A
Measurement uncertainty:	see chapter 9

Limits:

FCC	IC
Minimum Emission Bandwidth for the band 5.725-5.85 GHz	
The minimum 6 dB bandwidth shall be at least 500 kHz.	

Result: antenna port 1

OFDM / a – mode Channel	6 dB bandwidth [MHz]			
	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	16.39	16.39	16.39	16.39

OFDM / n HT20 – mode Channel	6 dB bandwidth [MHz]			
	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	17.41	17.35	17.62	17.59

OFDM / n HT40 – mode Channel	6 dB bandwidth [MHz]	
	5755 MHz	5795 MHz
	36.14	36.02

Result: antenna port 2

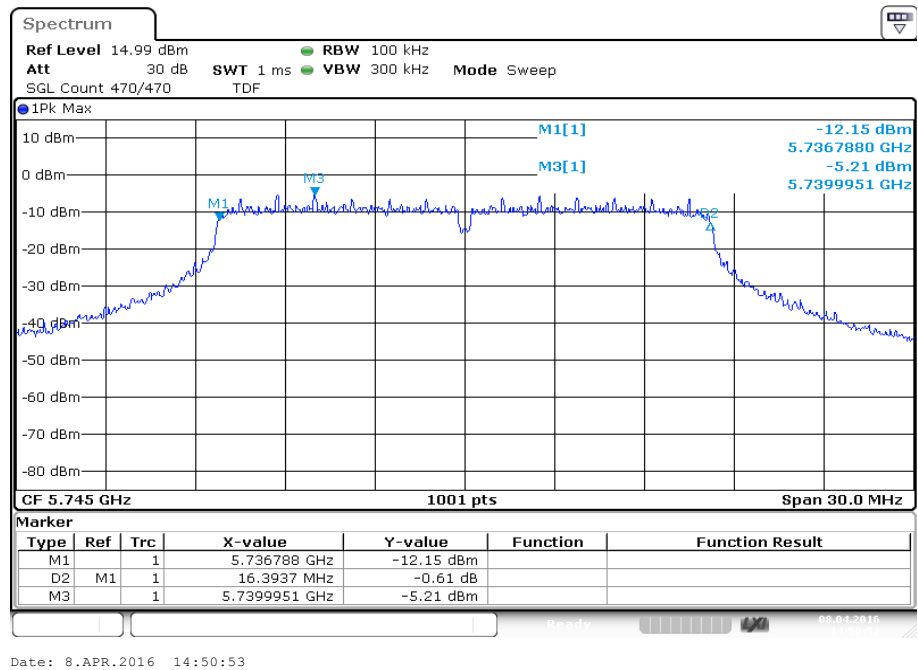
OFDM / a – mode Channel	6 dB bandwidth [MHz]			
	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	16.33	16.33	16.36	16.39

OFDM / n HT20 – mode Channel	6 dB bandwidth [MHz]			
	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	17.56	17.56	17.59	17.35

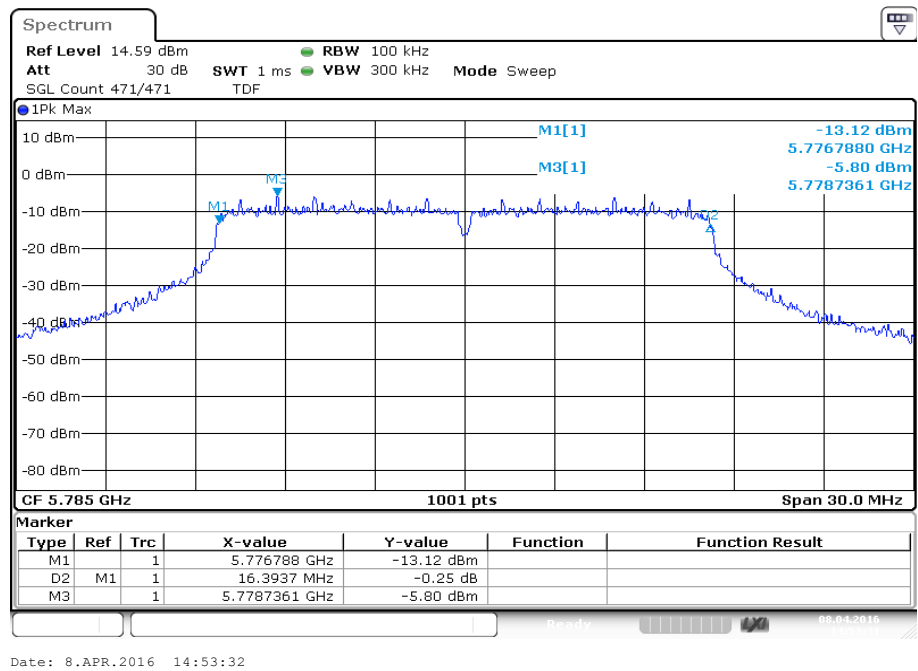
OFDM / n HT40 – mode Channel	6 dB bandwidth [MHz]	
	5755 MHz	5795 MHz
	36.14	35.90

Plots: OFDM / a – mode; antenna port 1

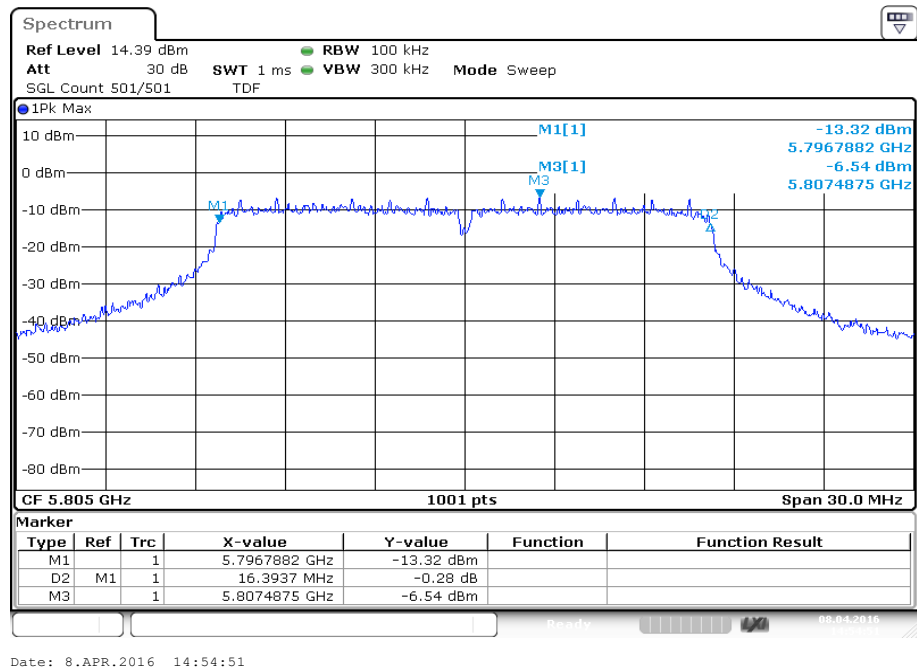
Plot 1: 5745 MHz



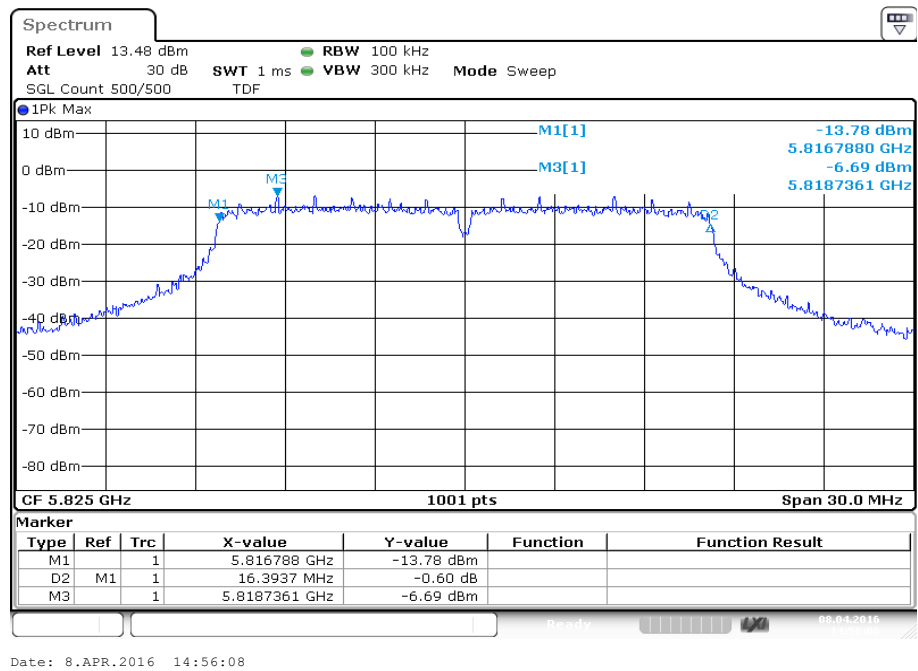
Plot 2: 5785 MHz



Plot 3: 5805 MHz

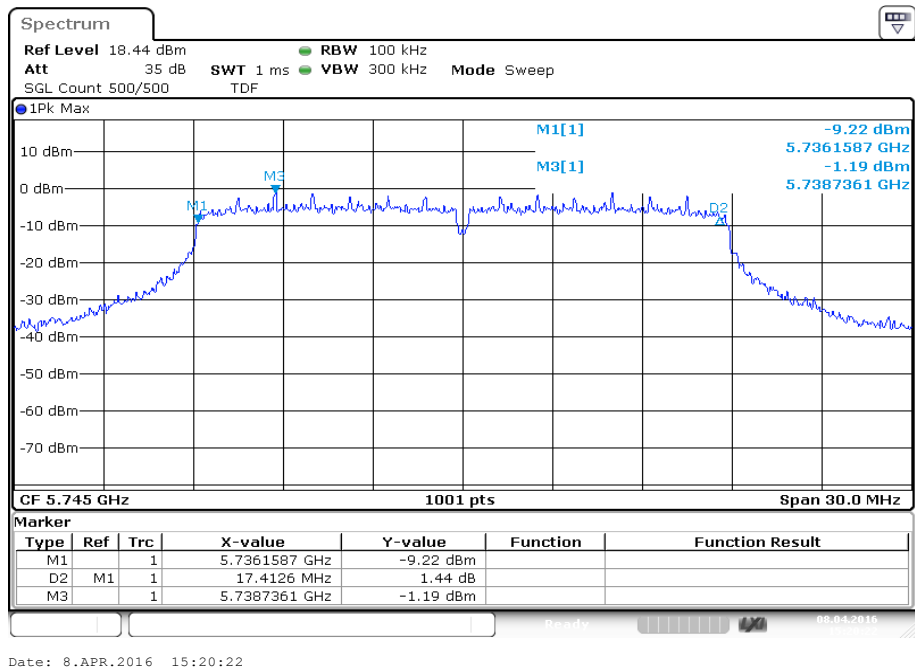


Plot 4: 5825 MHz

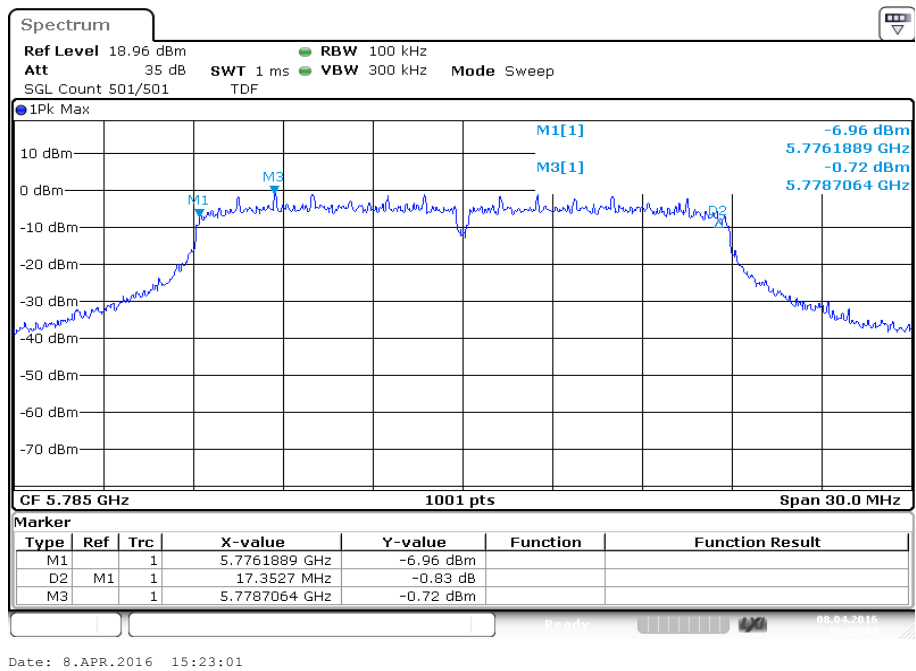


Plots: OFDM / n HT20 – mode; antenna port 1

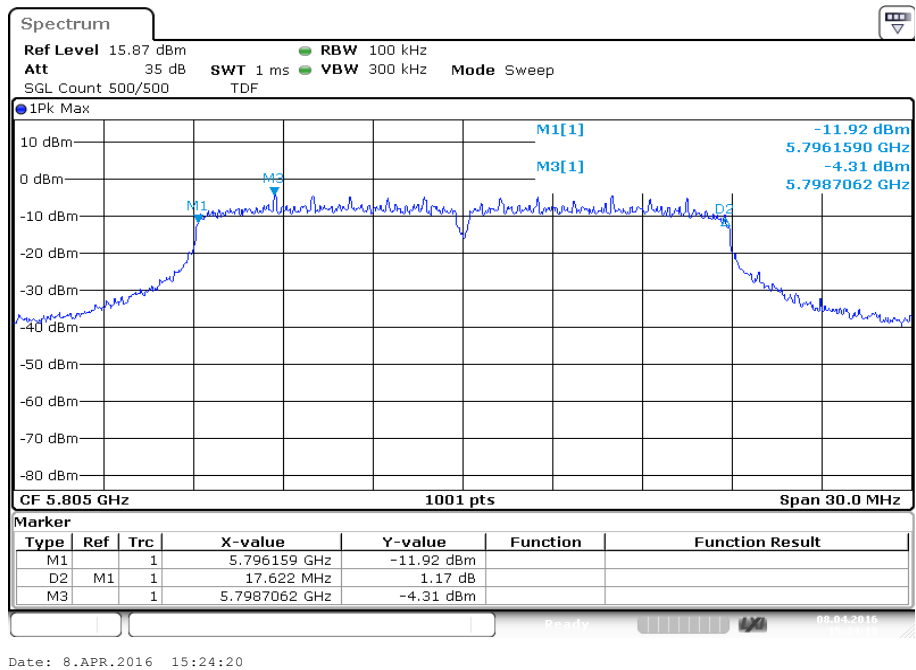
Plot 1: 5745 MHz



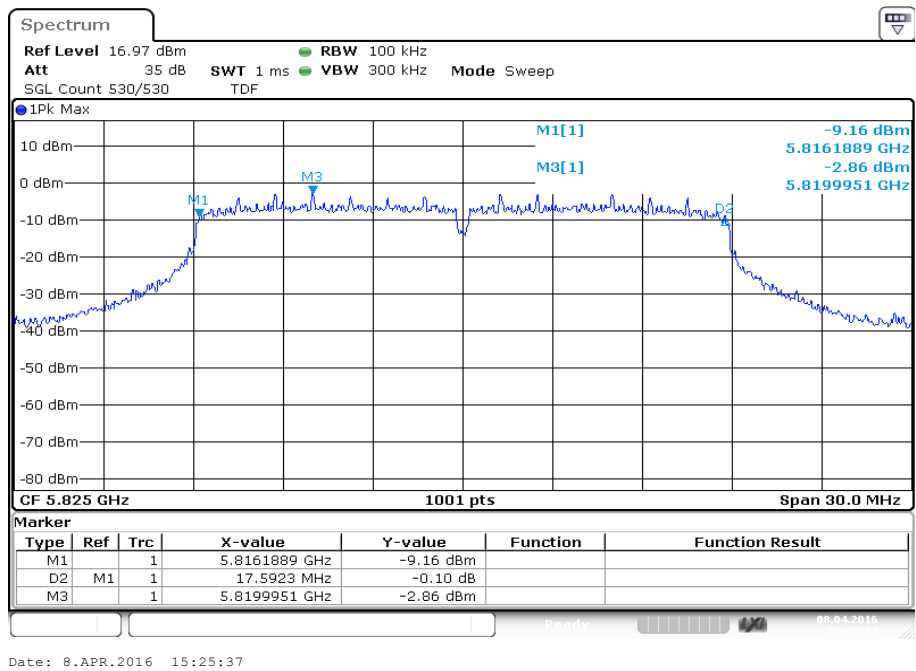
Plot 2: 5785 MHz



Plot 3: 5805 MHz

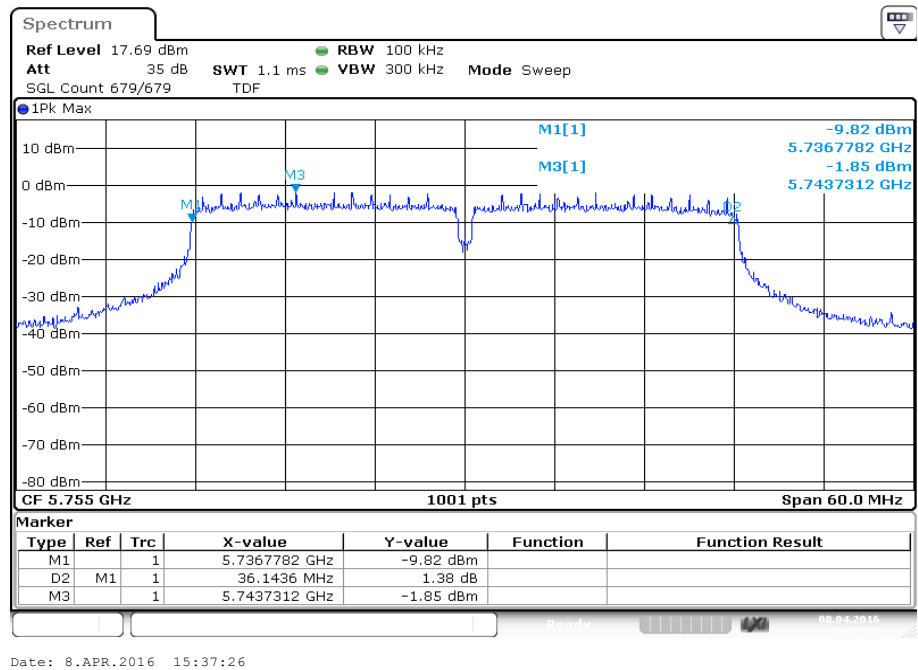


Plot 4: 5825 MHz

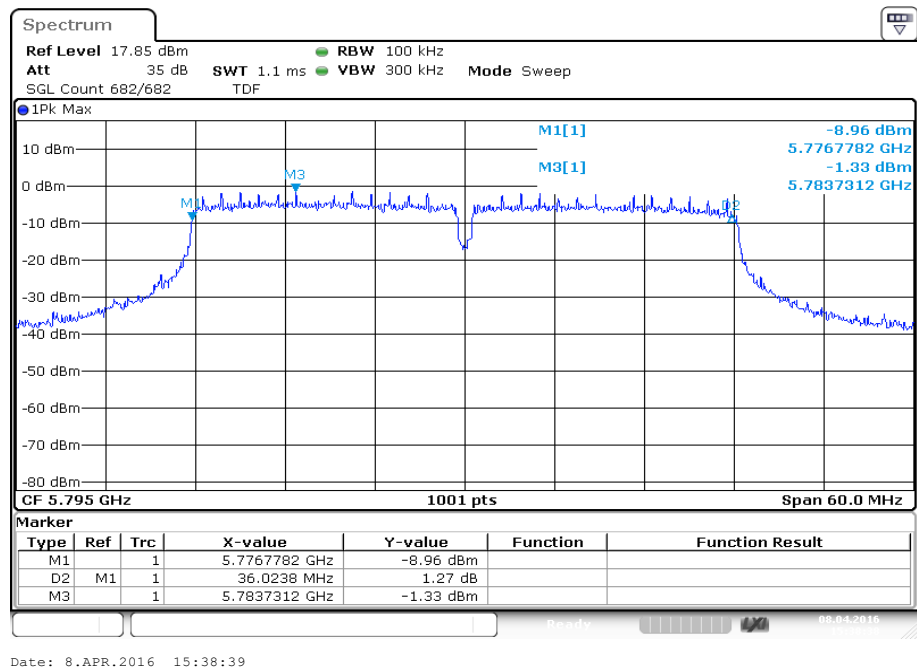


Plots: OFDM / n HT40 – mode; antenna port 1

Plot 1: 5755 MHz

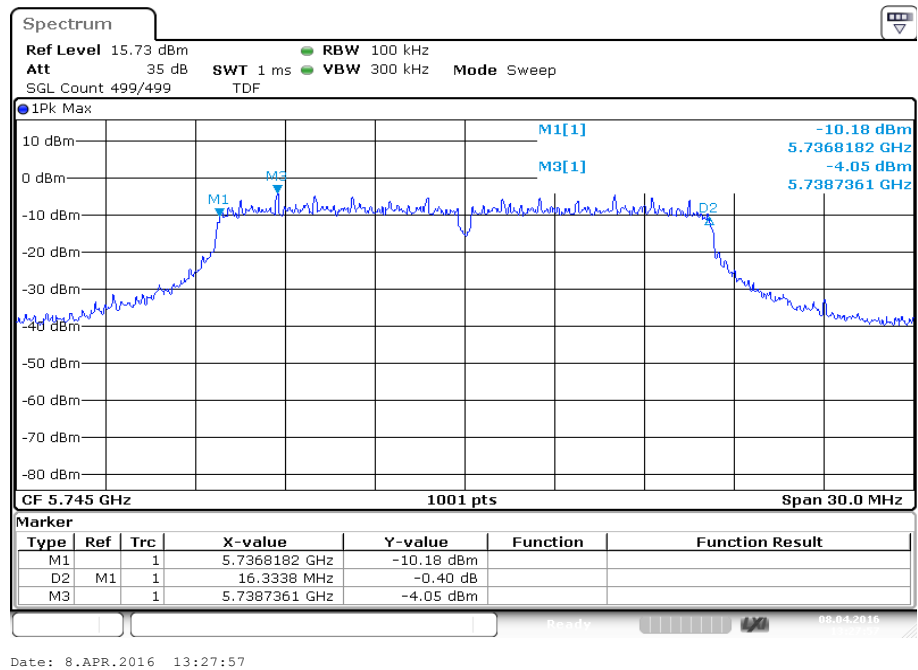


Plot 2: 5795 MHz

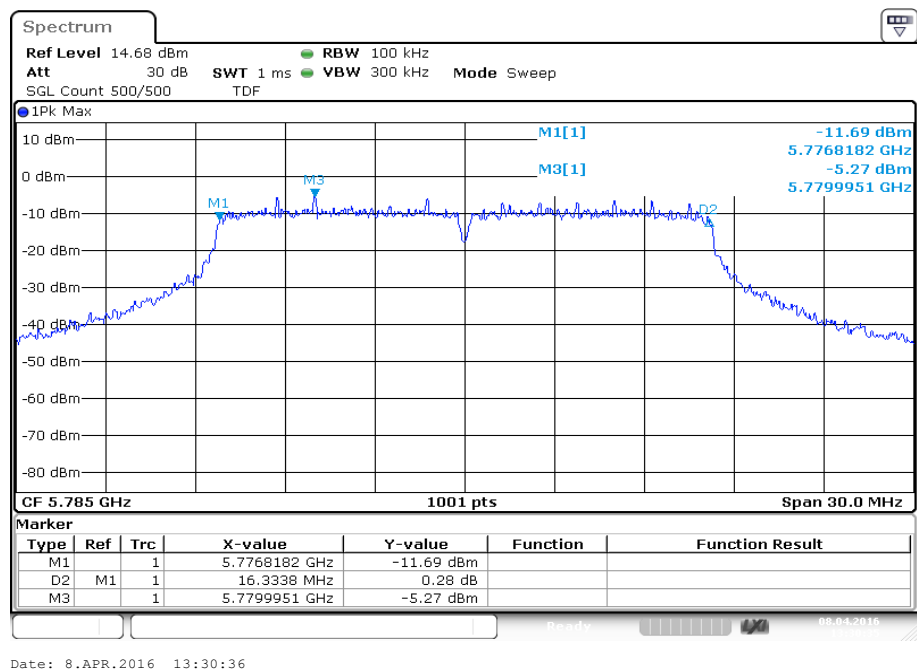


Plots: OFDM / a – mode; antenna port 2

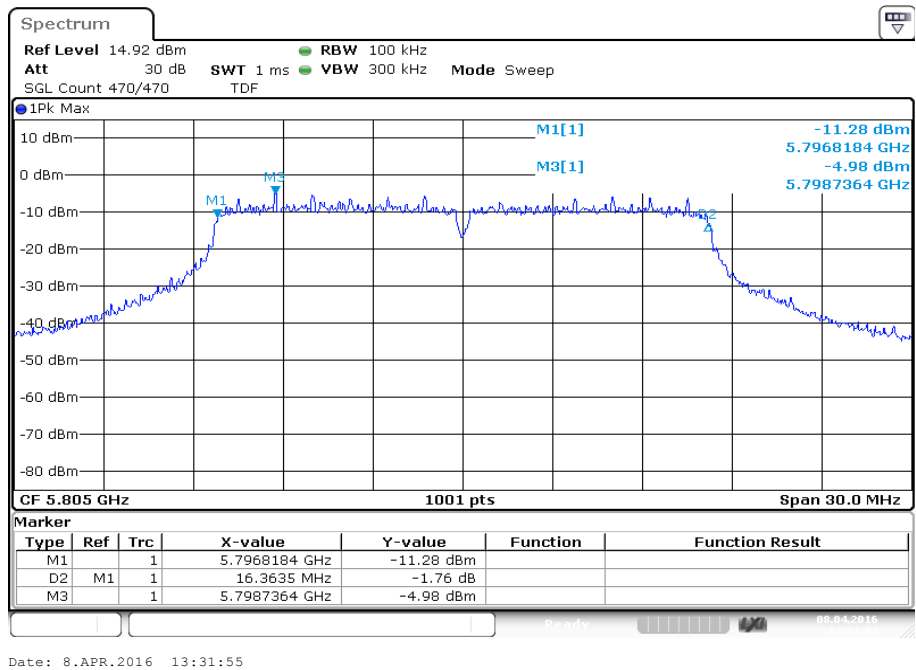
Plot 1: 5745 MHz



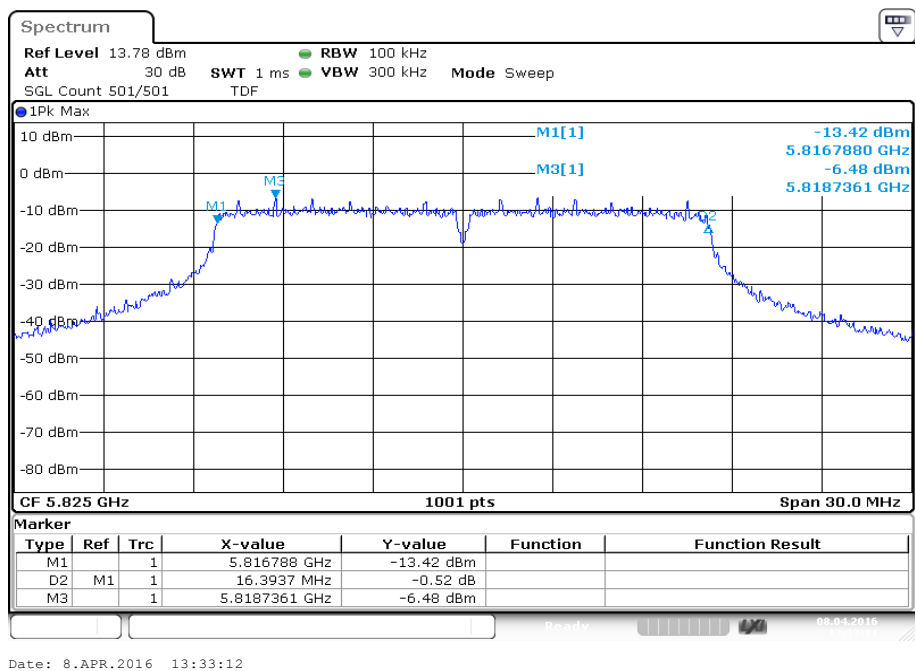
Plot 2: 5785 MHz



Plot 3: 5805 MHz

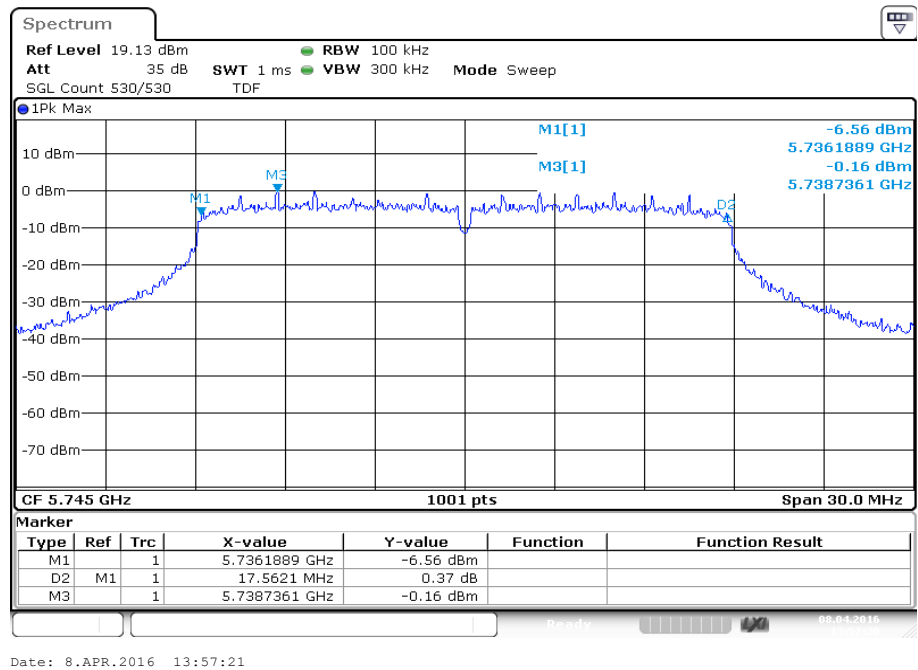


Plot 4: 5825 MHz

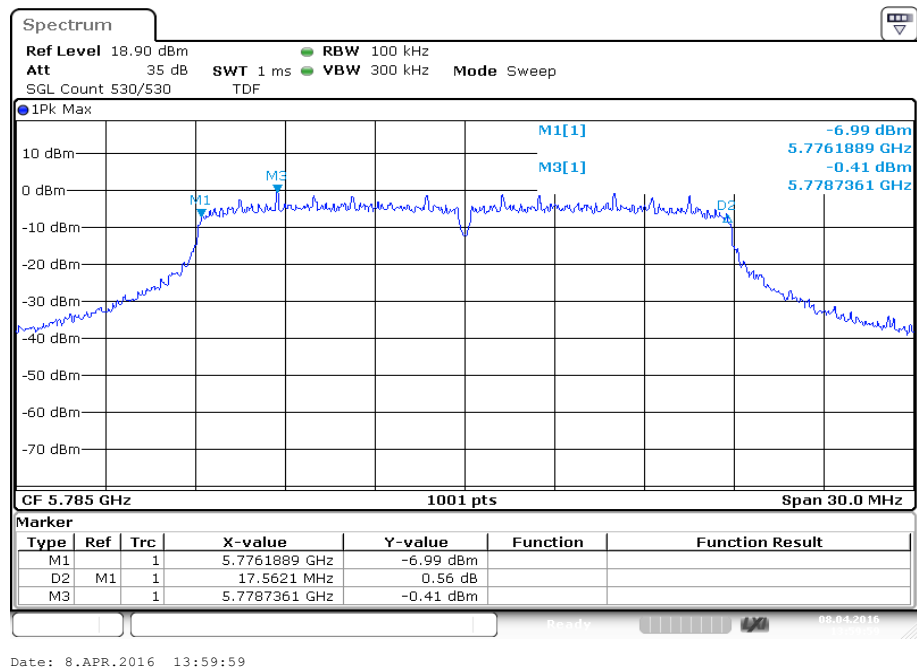


Plots: OFDM / n HT20 – mode; antenna port 2

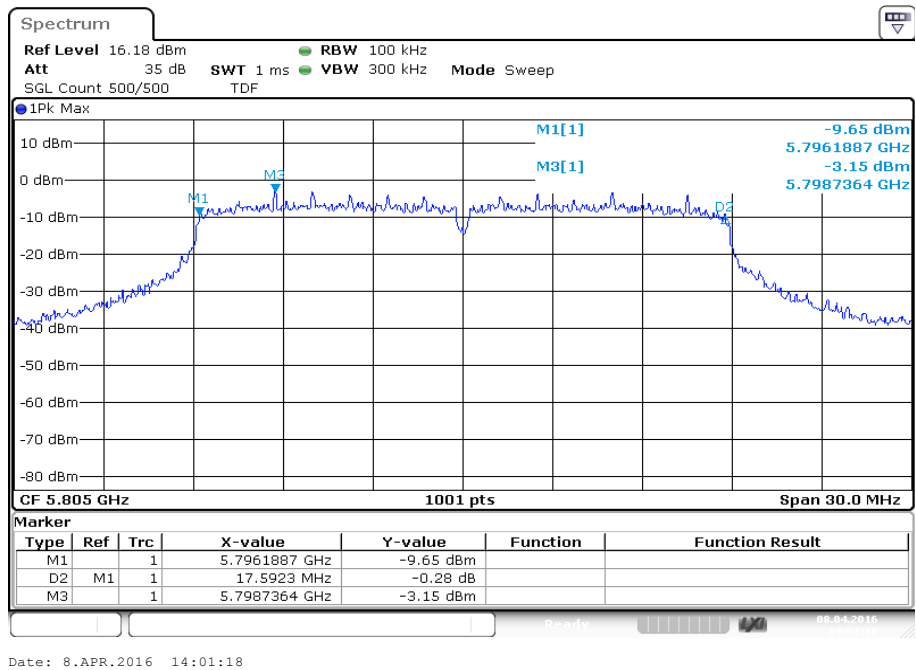
Plot 1: 5745 MHz



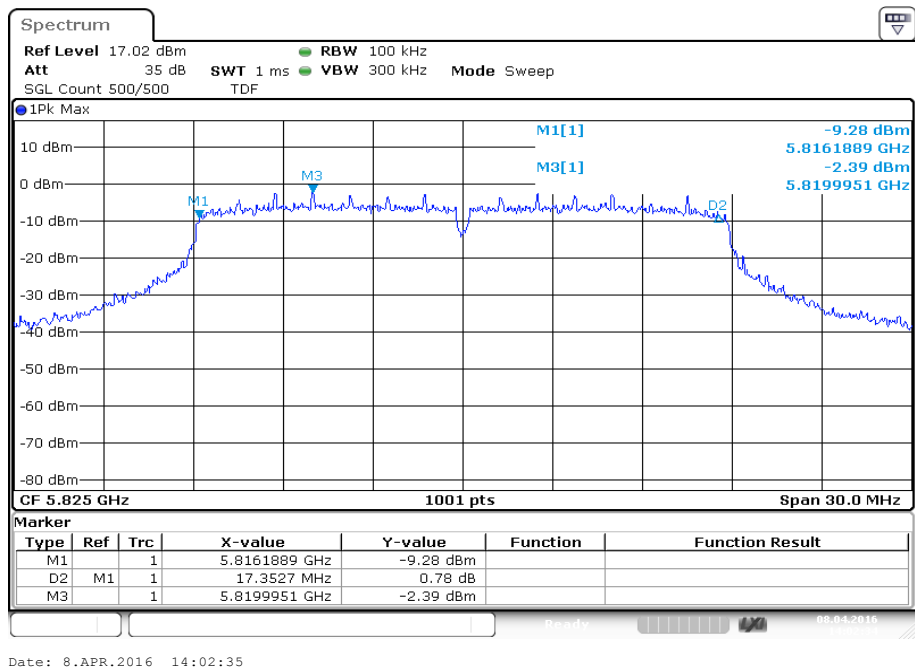
Plot 2: 5785 MHz



Plot 3: 5805 MHz

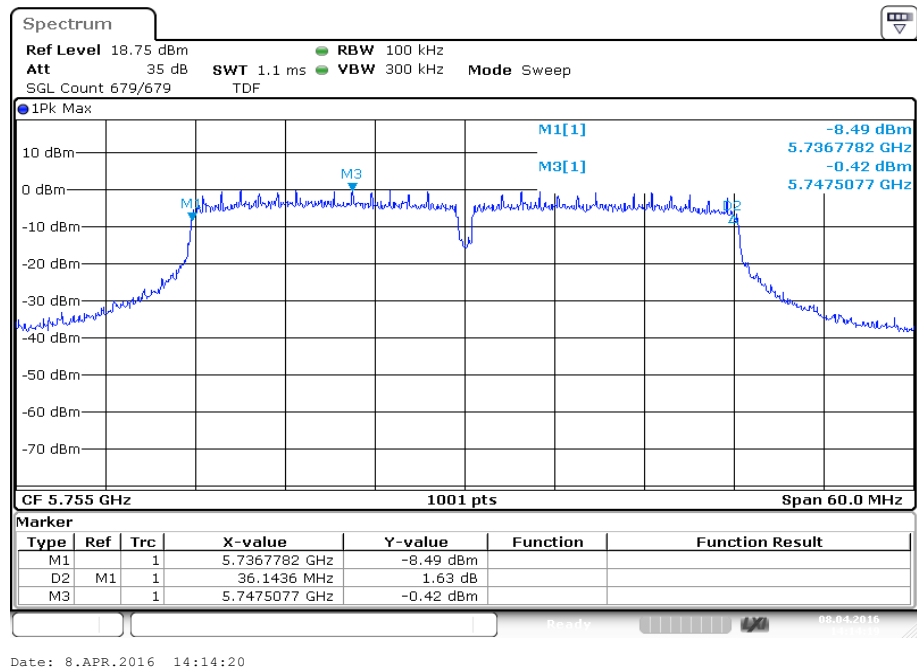


Plot 4: 5825 MHz

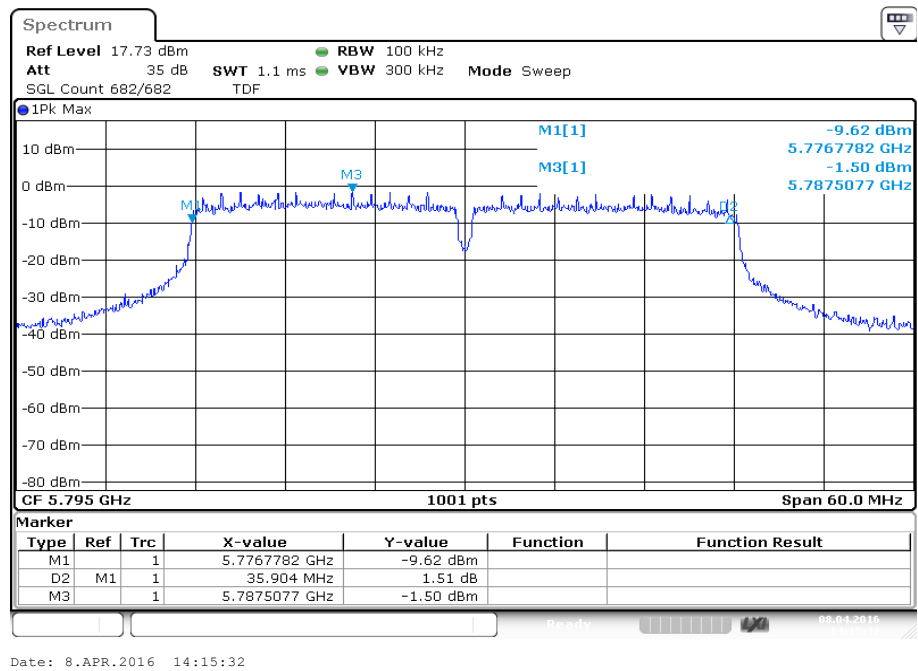


Plots: OFDM / n HT40 – mode; antenna port 2

Plot 1: 5755 MHz



Plot 2: 5795 MHz



12.7 Spectrum bandwidth – 26 dB bandwidth**Description:**

Measurement of the 26 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
According to: KDB789033 D02, C.1.	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1% EBW
Video bandwidth:	≥ RBW
Span:	> complete signal!
Trace-Mode:	Max hold
Used test setup:	see chapter 7.4 – A
Measurement uncertainty:	see chapter 9

Limits:

Spectrum Bandwidth – 26 dB Bandwidth
-/-

Result: antenna port 1

OFDM / a – mode Channel	26 dB bandwidth [MHz]			
	5180 MHz	5200 MHz	5300 MHz	5320 MHz
	22.98	23.23	23.33	23.23
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	23.23	23.23	23.68	-/-
Channel	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	23.18	23.03	22.83	23.33

OFDM / n HT20 – mode Channel	26 dB bandwidth [MHz]			
	5180 MHz	5200 MHz	5300 MHz	5320 MHz
	24.13	24.03	23.23	23.53
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	23.93	23.78	24.68	-/-
Channel	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	23.53	23.48	24.18	23.58

OFDM / n HT40 – mode Channel	26 dB bandwidth [MHz]			
	5190 MHz	5230 MHz	5270 MHz	5310 MHz
	47.05	47.45	47.55	47.95
Channel	5510 MHz	5550 MHz	5630 MHz	5670 MHz
	46.65	47.05	47.55	48.15
Channel	5755 MHz	5795 MHz	-/-	-/-
	48.35	47.55	-/-	-/-

Result: antenna port 2

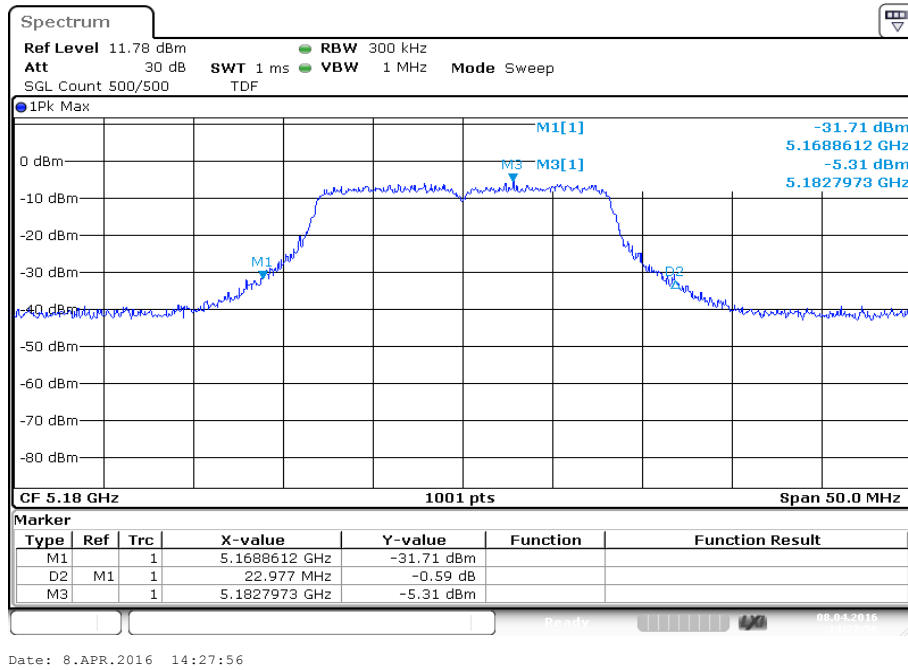
OFDM / a – mode Channel	26 dB bandwidth [MHz]			
	5180 MHz	5200 MHz	5300 MHz	5320 MHz
	22.28	23.68	23.08	22.93
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	22.88	22.83	23.18	-/-
Channel	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	23.38	22.63	22.83	23.23

OFDM / n HT20 – mode Channel	26 dB bandwidth [MHz]			
	5180 MHz	5200 MHz	5300 MHz	5320 MHz
	23.68	23.43	23.03	23.28
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	24.33	24.18	24.23	-/-
Channel	5745 MHz	5785 MHz	5805 MHz	5825 MHz
	23.58	23.88	23.73	23.78

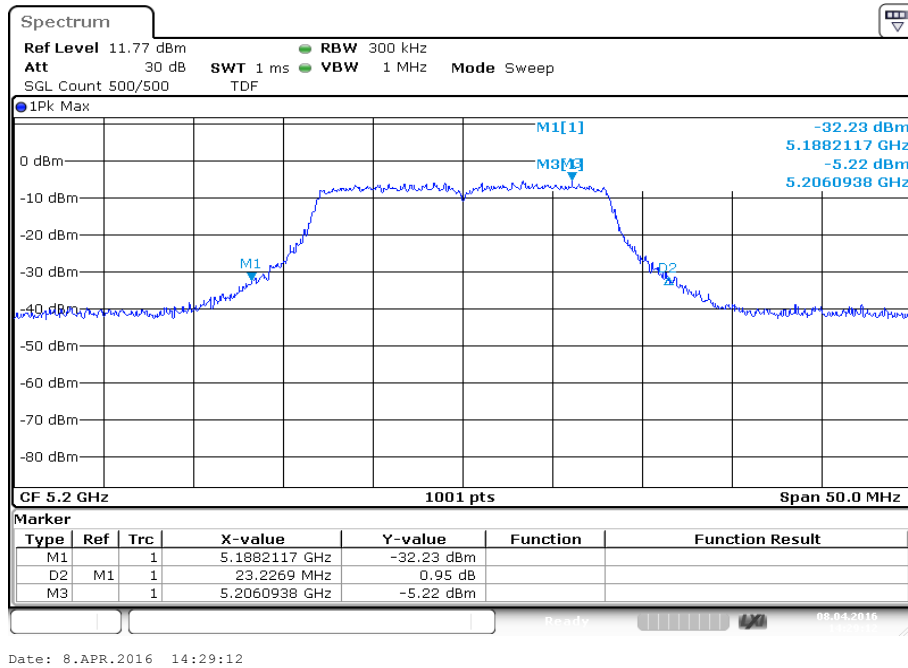
OFDM / n HT40 – mode Channel	26 dB bandwidth [MHz]			
	5190 MHz	5230 MHz	5270 MHz	5310 MHz
	47.65	48.75	47.65	48.15
Channel	5510 MHz	5550 MHz	5630 MHz	5670 MHz
	48.05	47.65	46.75	47.85
Channel	5755 MHz	5795 MHz	-/-	-/-
	47.65	47.25	-/-	-/-

Plots: OFDM / a – mode, antenna port 1

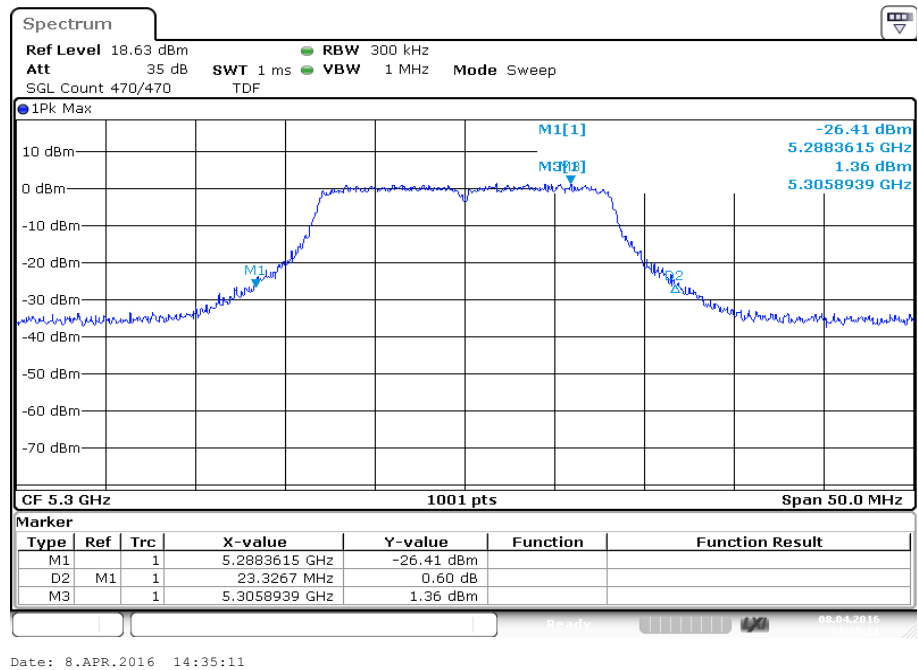
Plot 1: 5180 MHz



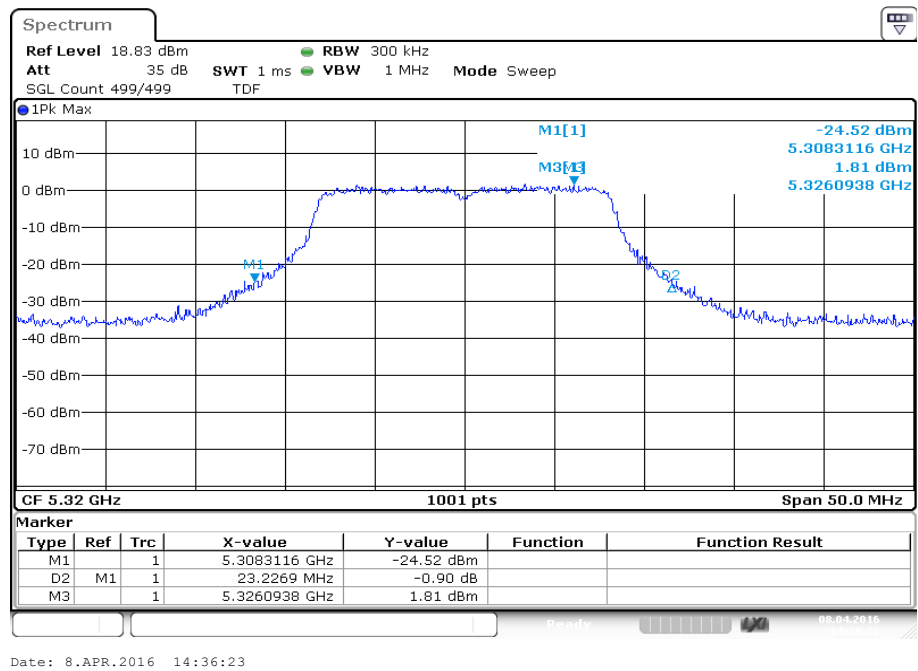
Plot 2: 5200 MHz



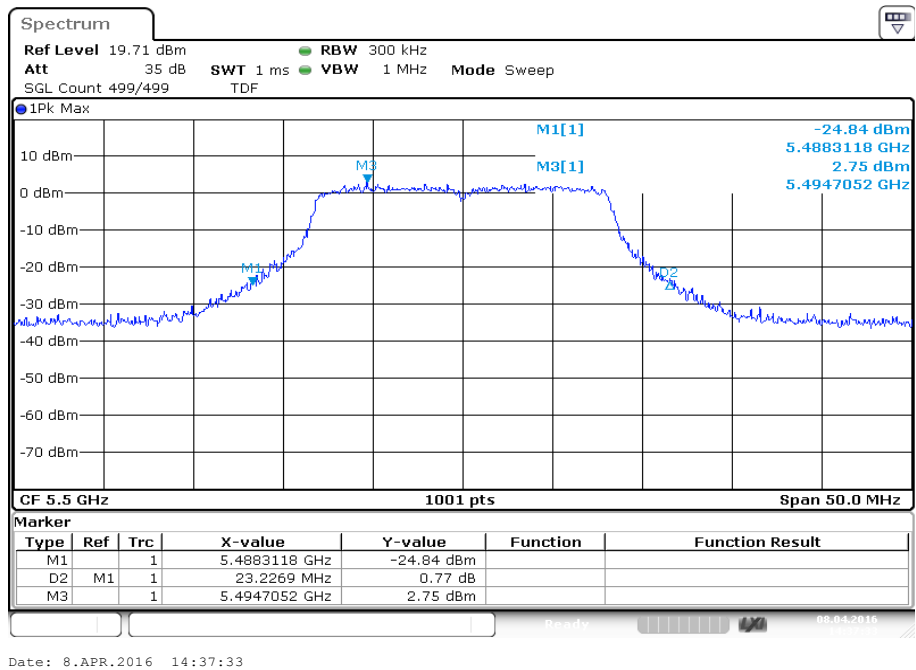
Plot 3: 5300 MHz



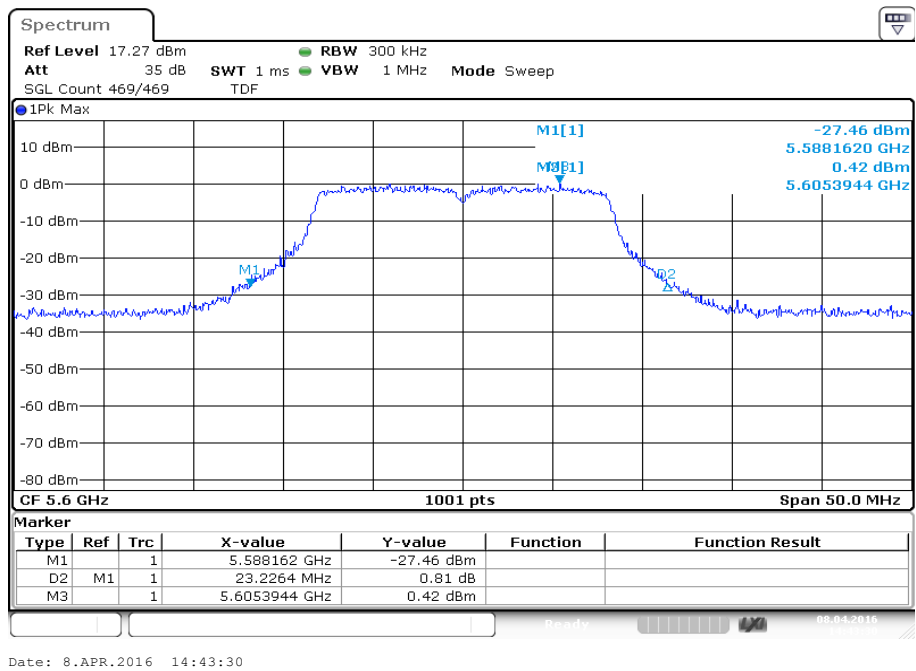
Plot 4: 5320 MHz



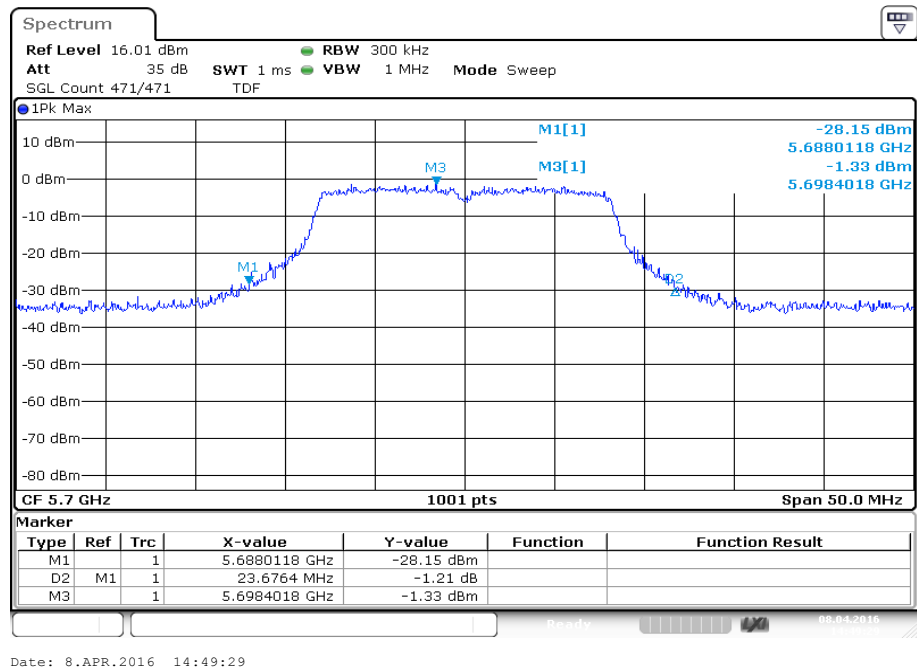
Plot 5: 5500 MHz



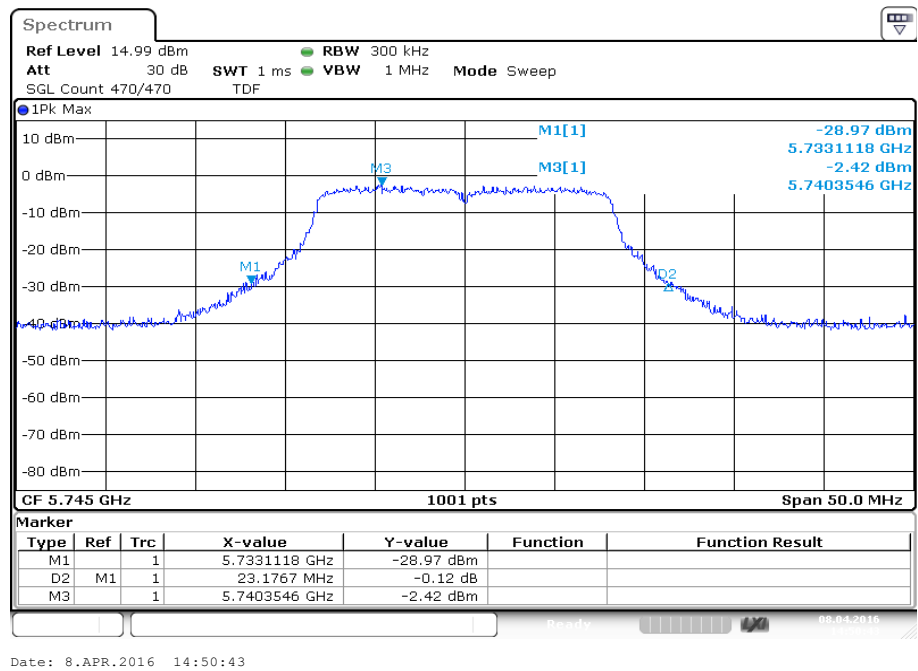
Plot 6: 5600 MHz



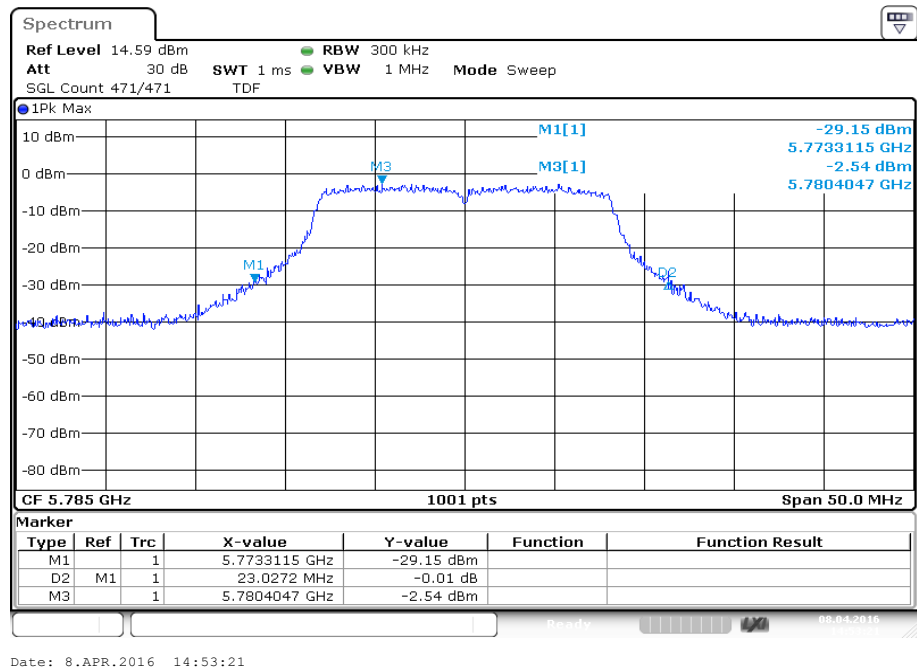
Plot 7: 5700 MHz



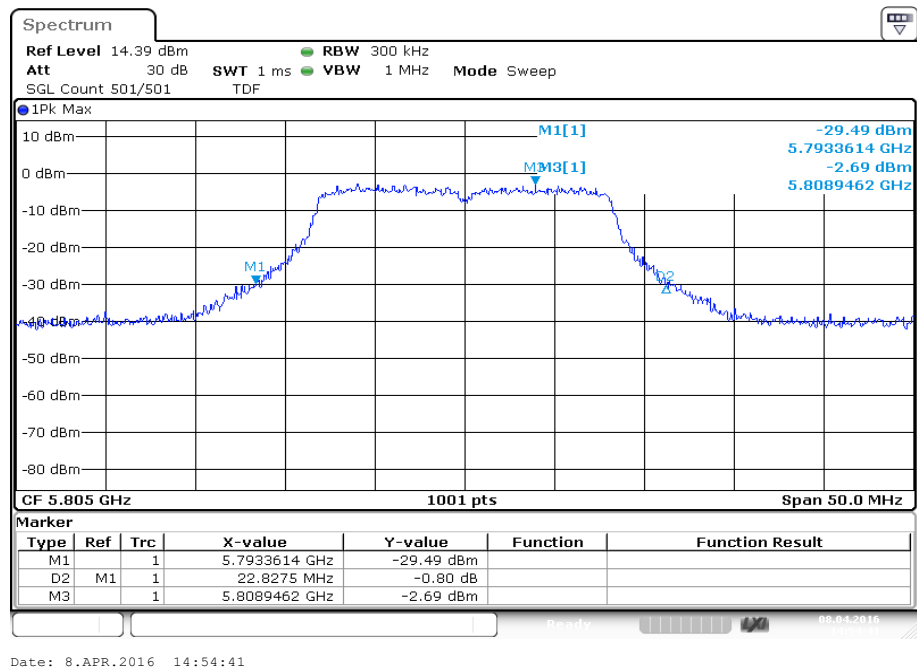
Plot 8: 5745 MHz



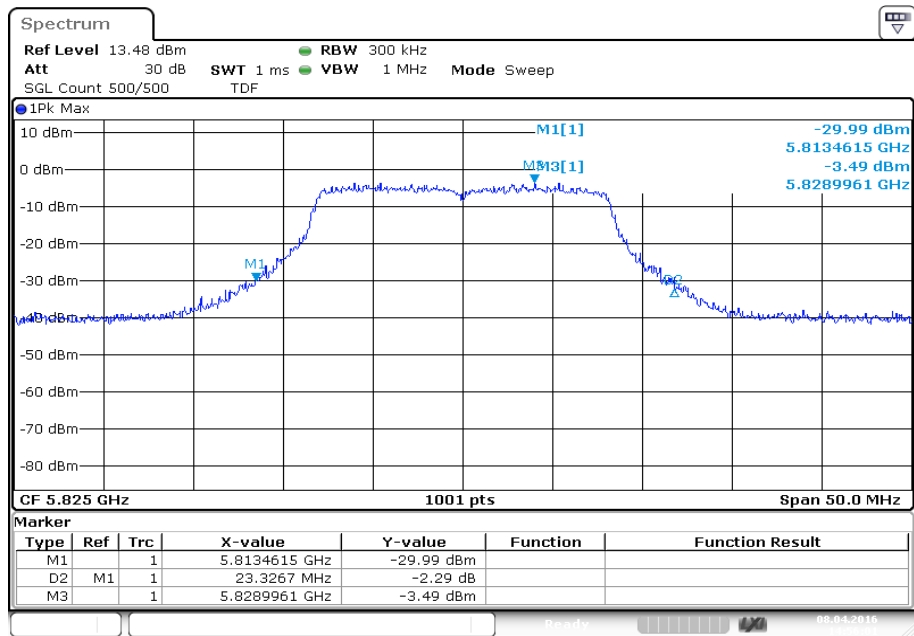
Plot 9: 5785 MHz



Plot 10: 5805 MHz



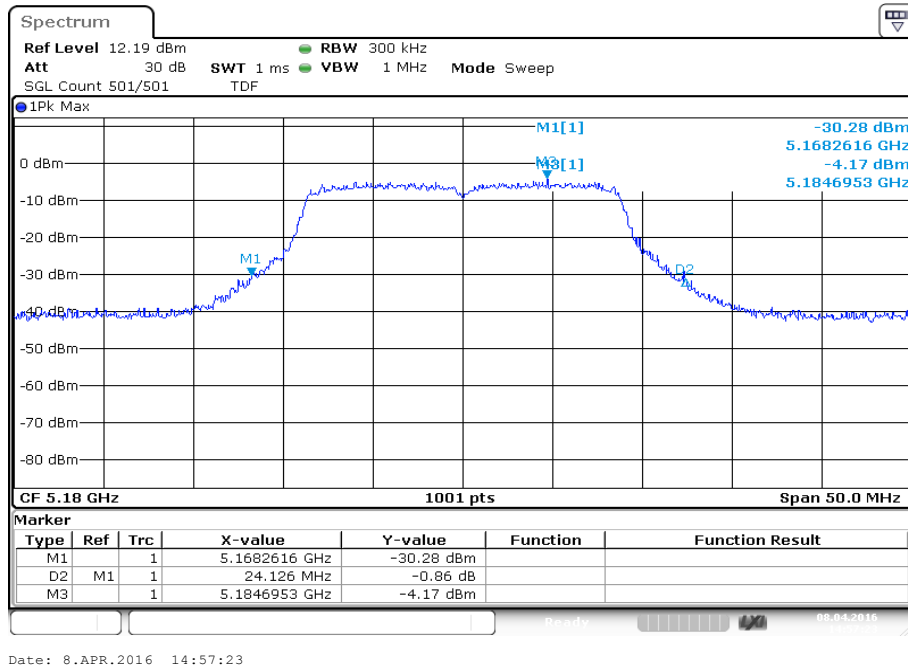
Plot 11: 5825 MHz



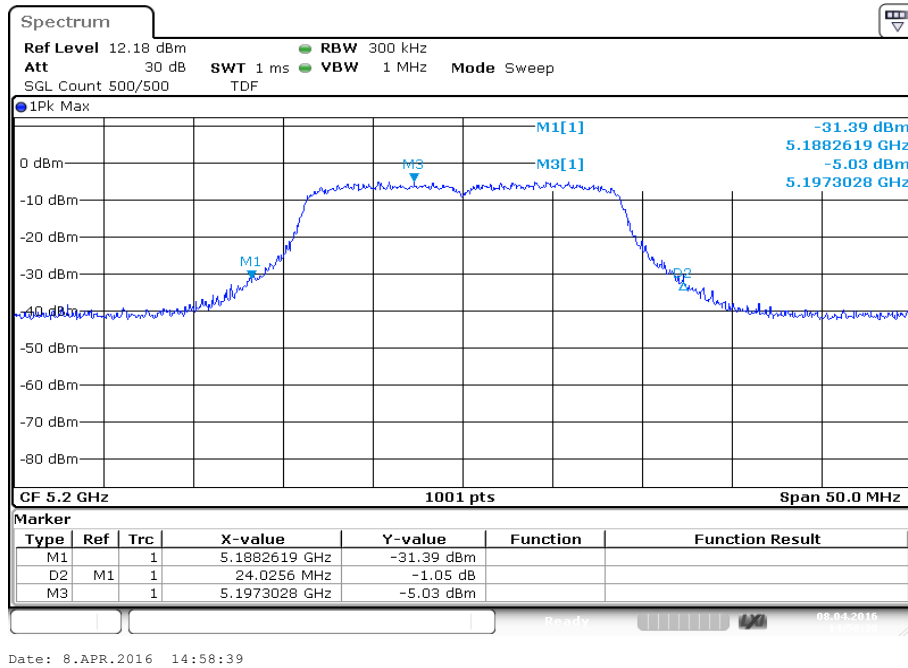
Date: 8.APR.2016 14:56:02

Plots: OFDM / n HT20 – mode, antenna port 1

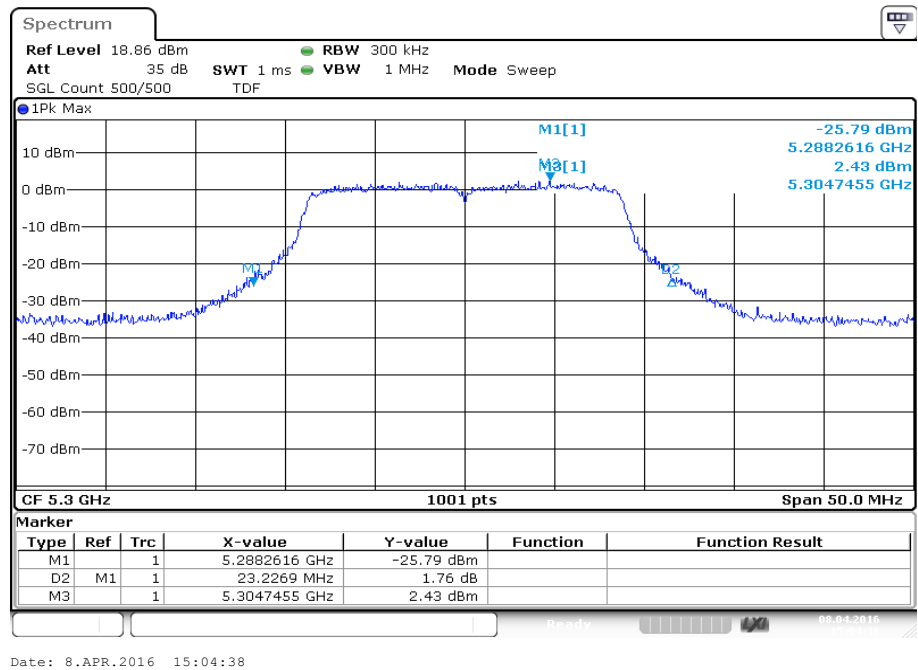
Plot 1: 5180 MHz



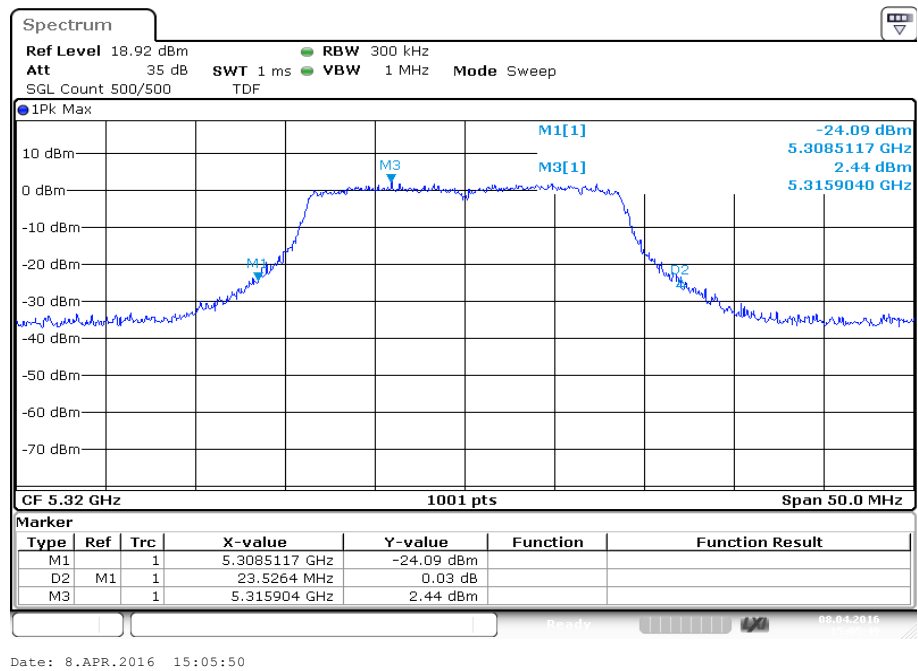
Plot 2: 5200 MHz



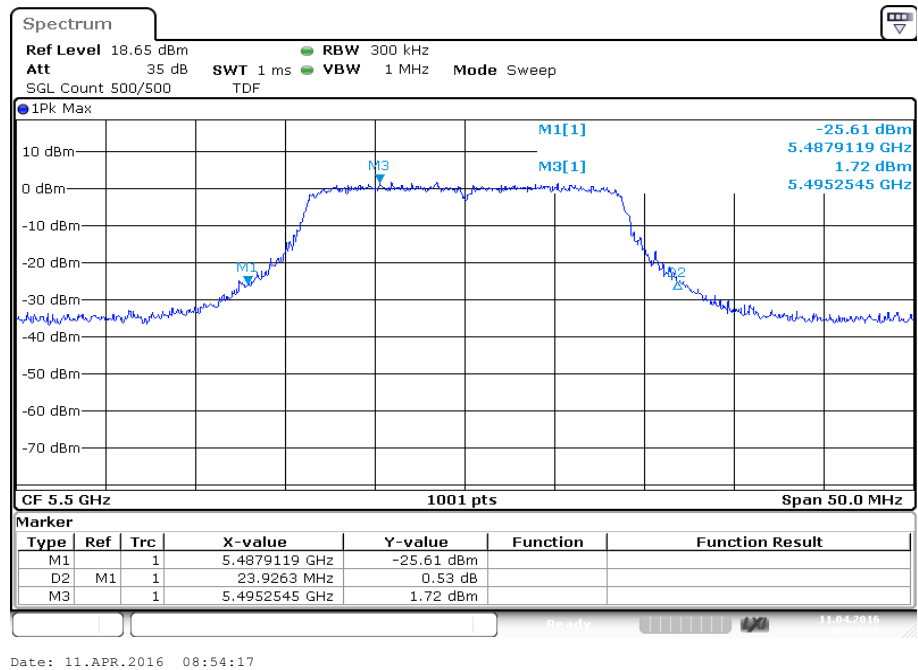
Plot 3: 5300 MHz



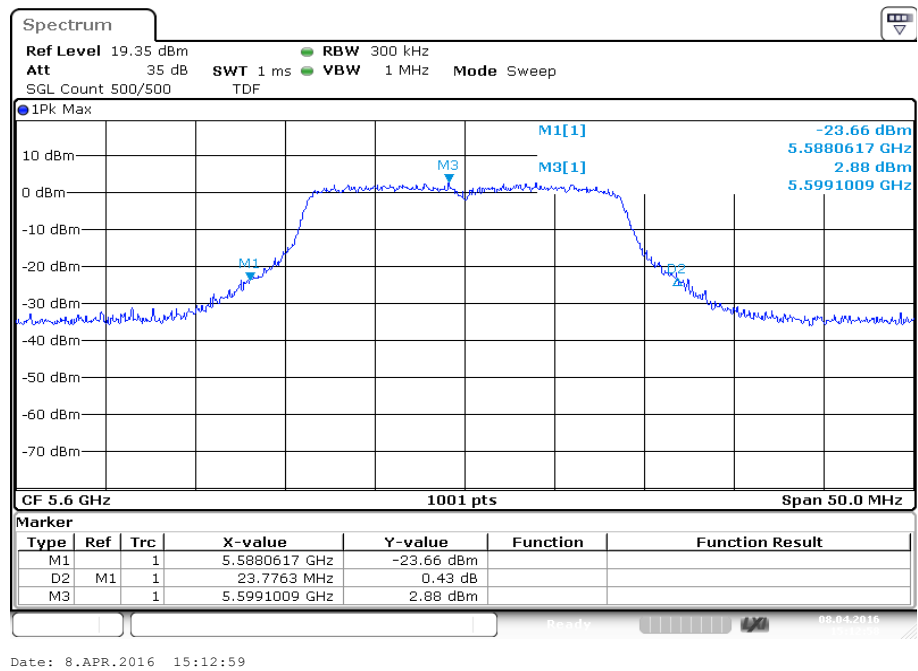
Plot 4: 5320 MHz



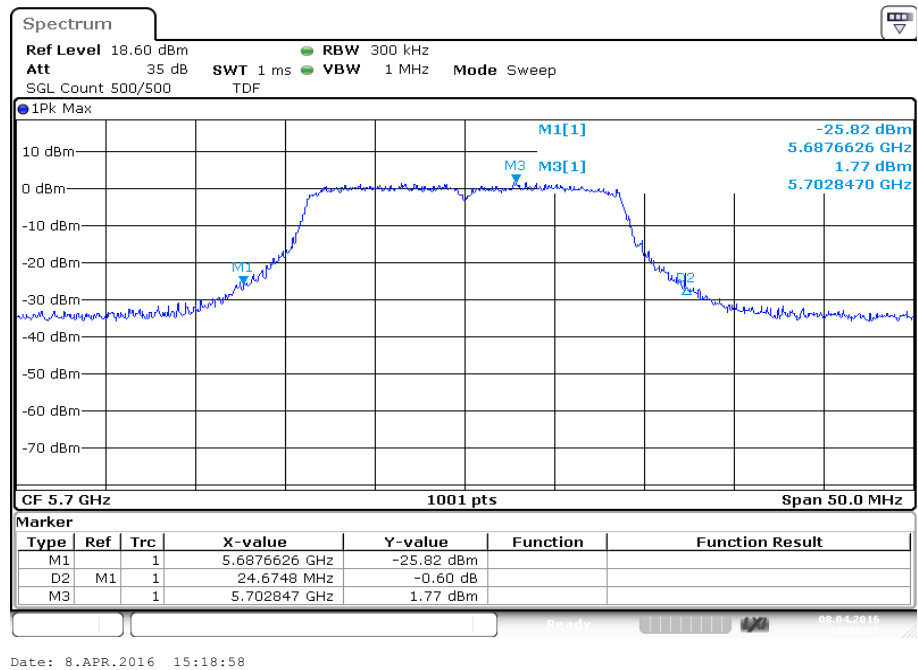
Plot 5: 5500 MHz



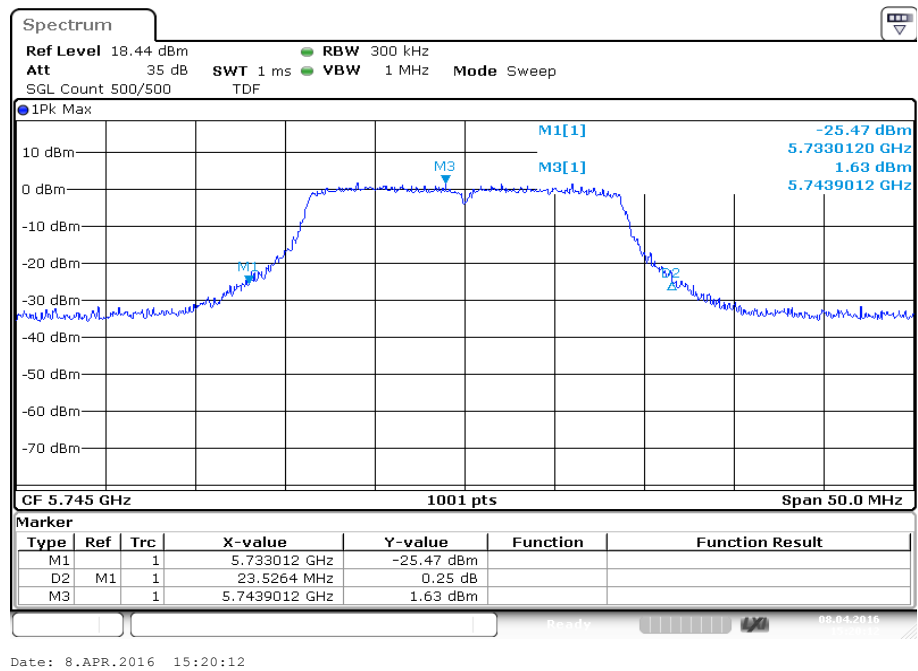
Plot 6: 5600 MHz



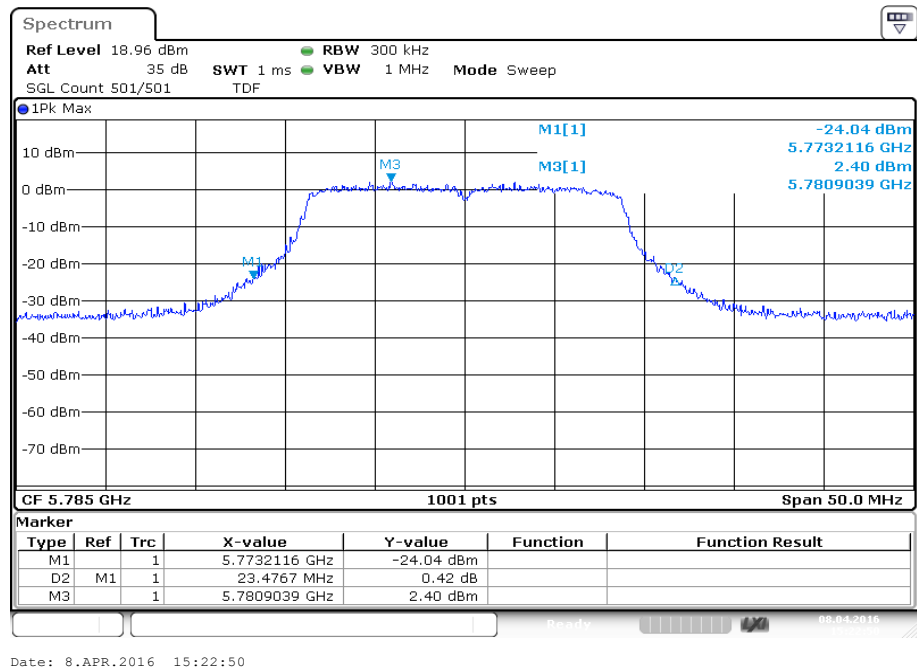
Plot 7: 5700 MHz



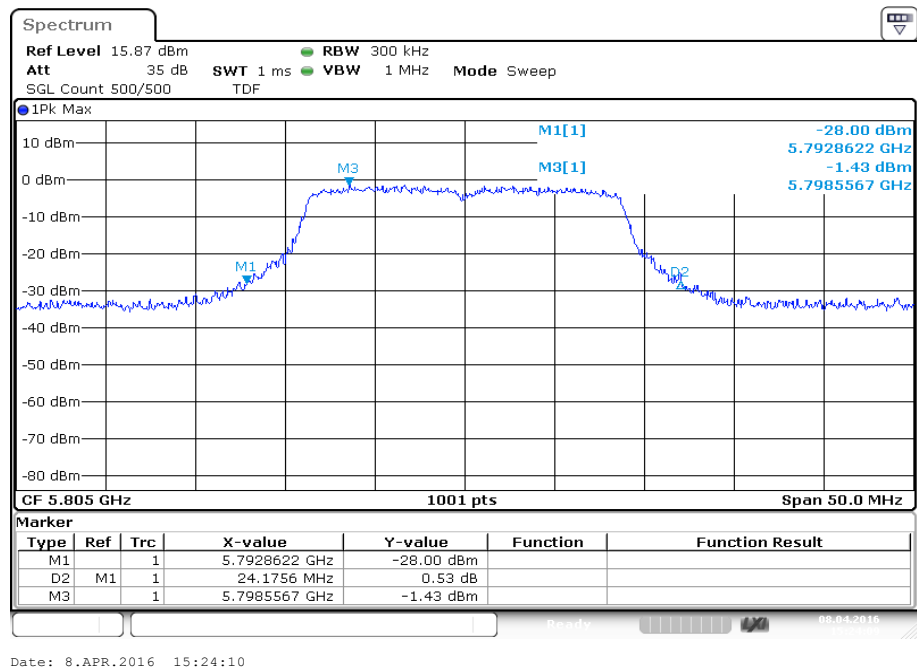
Plot 8: 5745 MHz



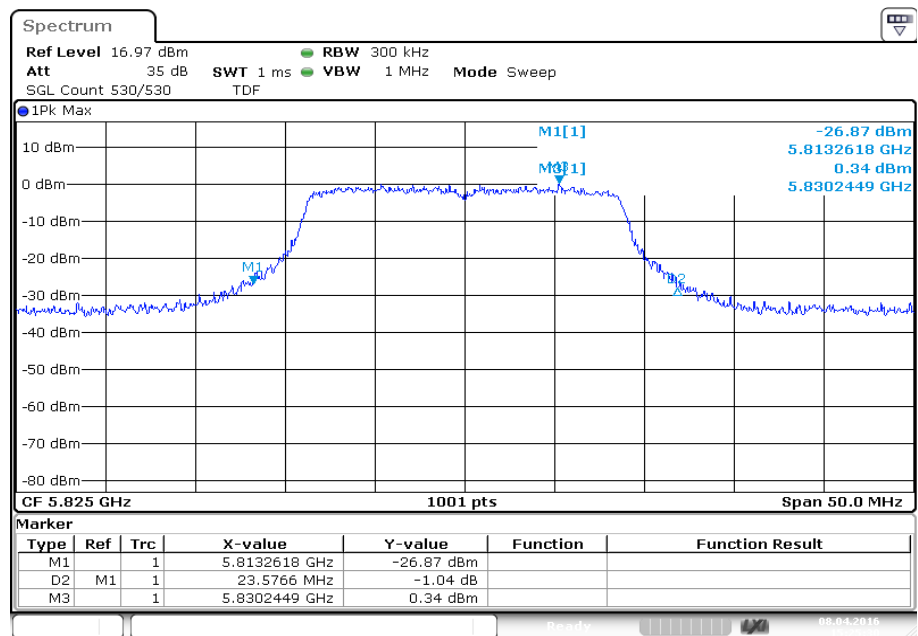
Plot 9: 5785 MHz



Plot 10: 5805 MHz



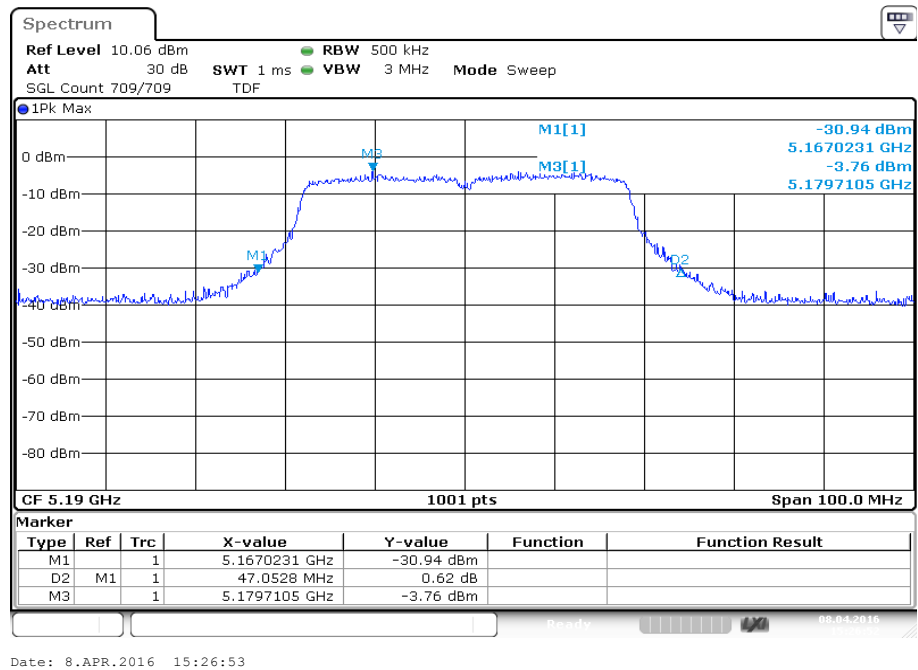
Plot 11: 5825 MHz



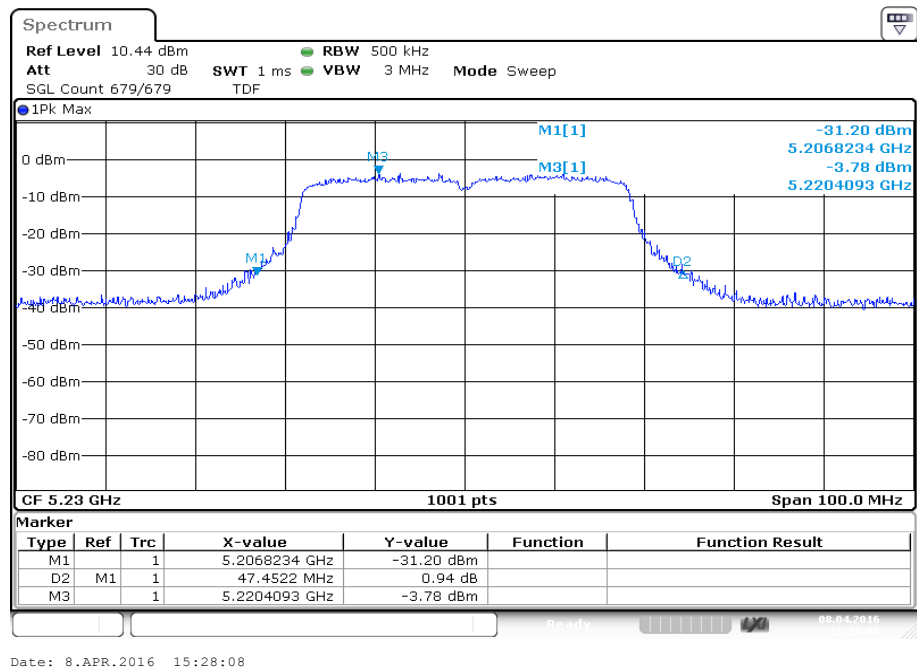
Date: 8.APR.2016 15:25:30

Plots: OFDM / n HT40 – mode, antenna port 1

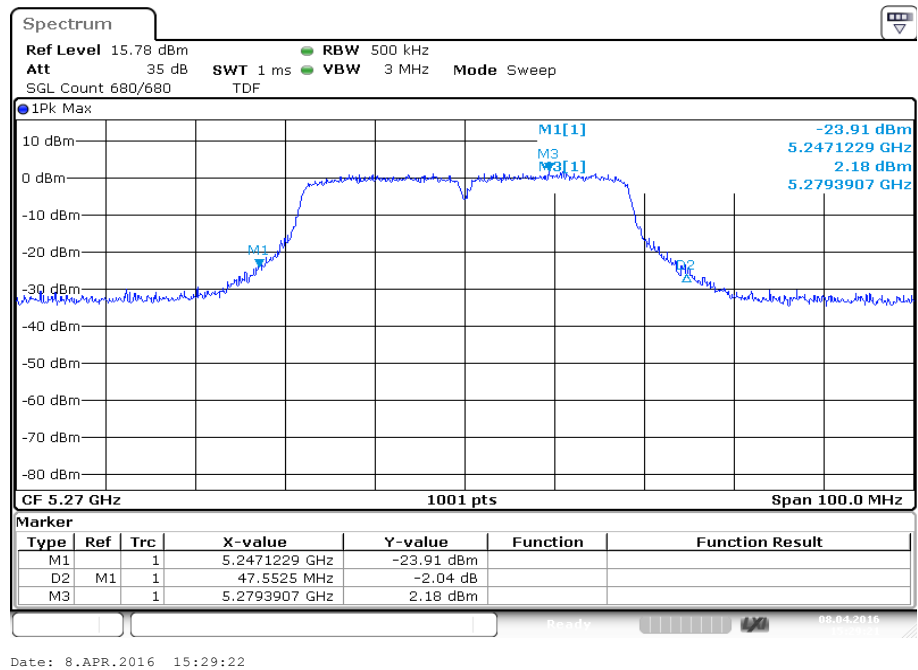
Plot 1: 5190 MHz



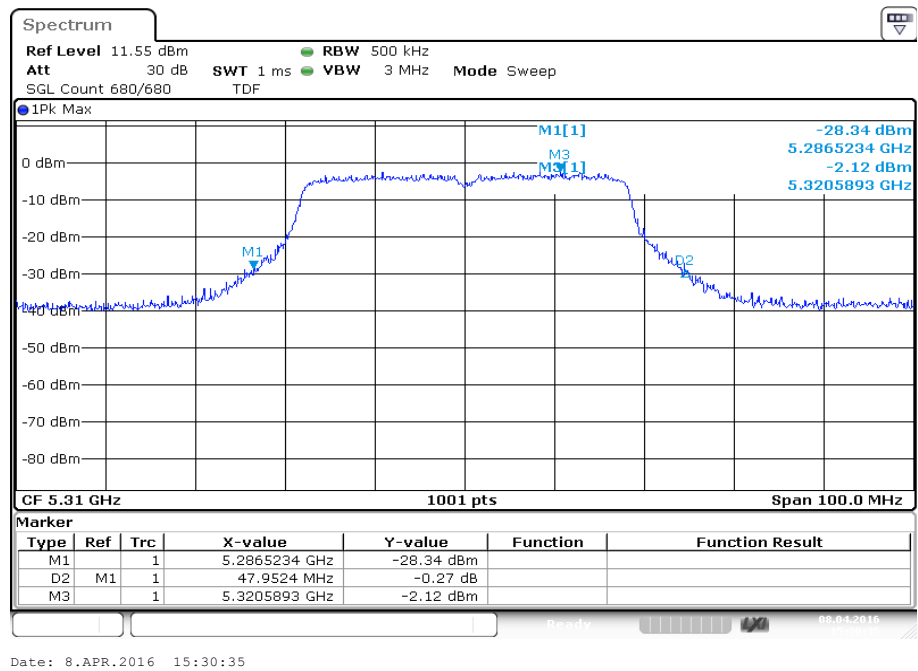
Plot 2: 5230 MHz



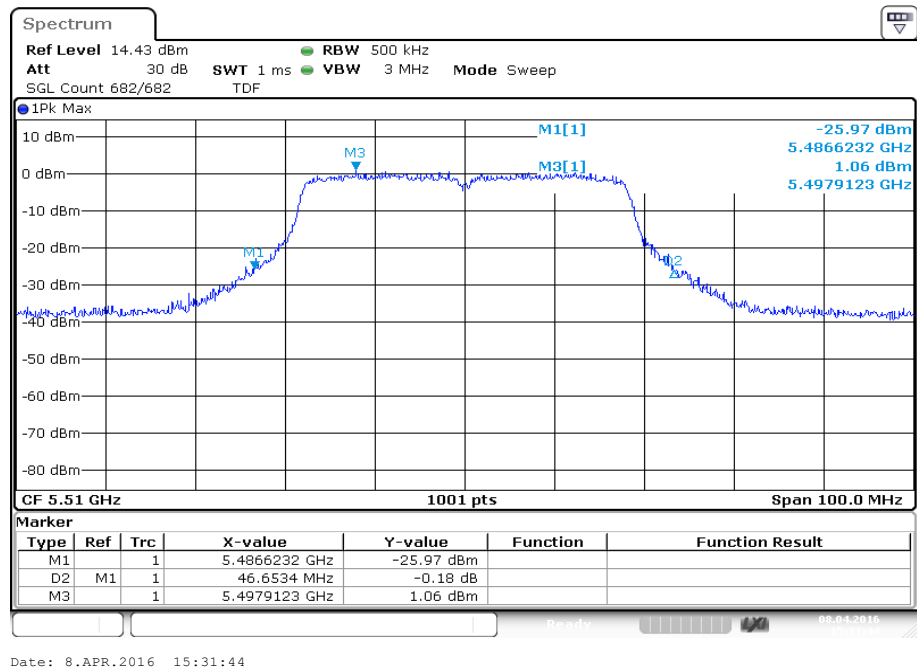
Plot 3: 5270 MHz



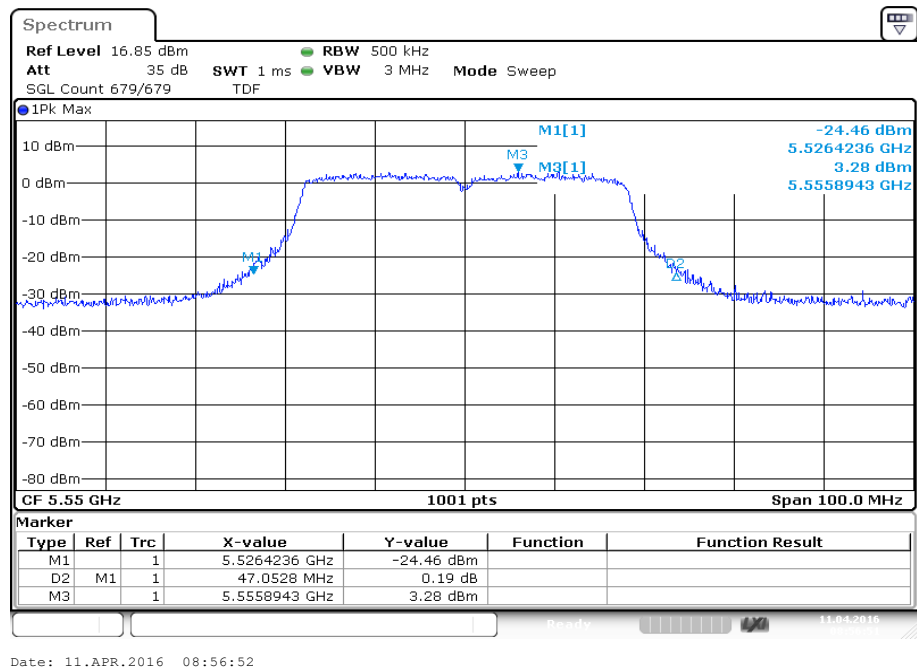
Plot 4: 5310 MHz



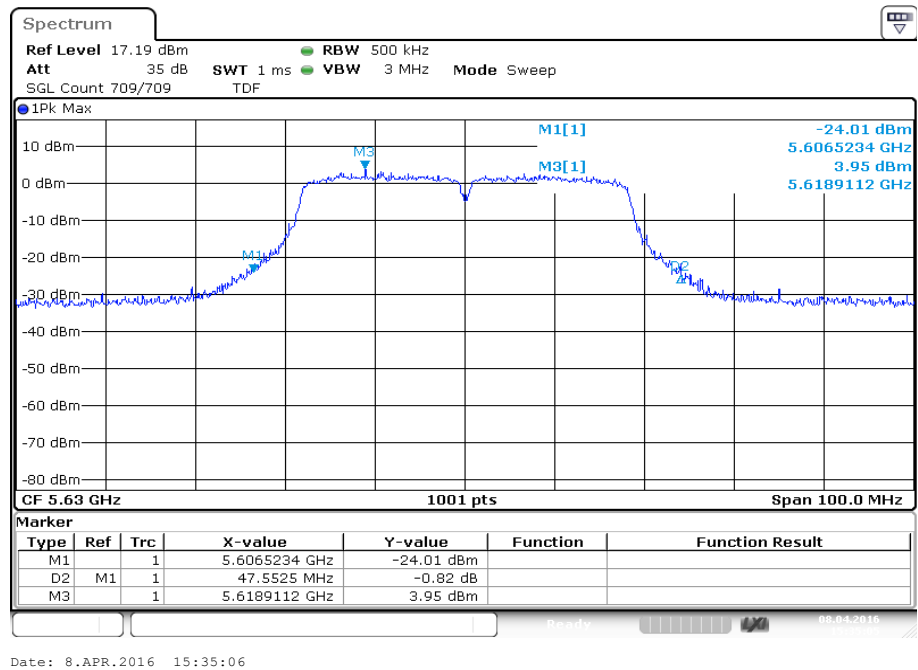
Plot 5: 5510 MHz



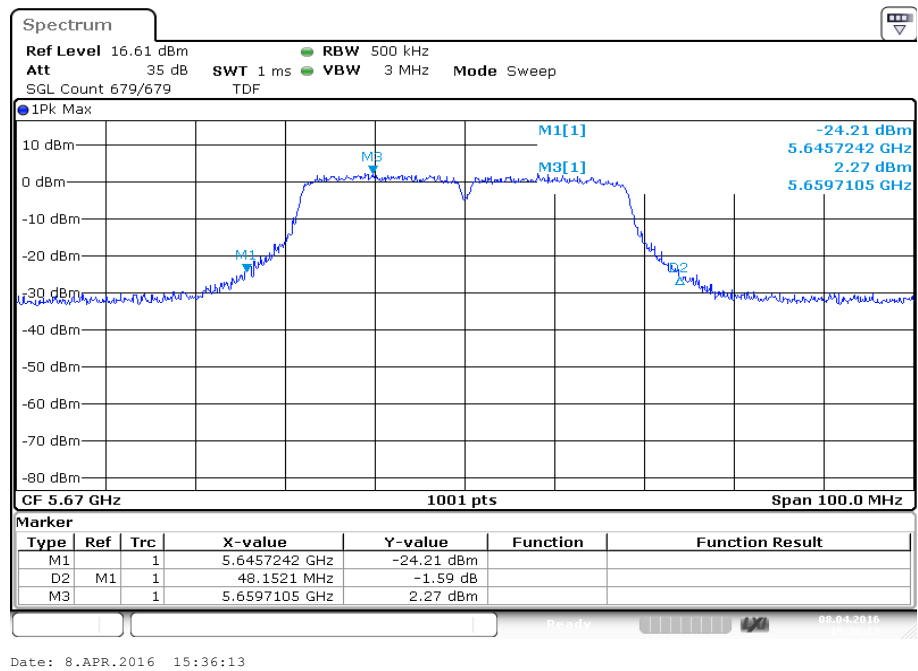
Plot 6: 5550 MHz



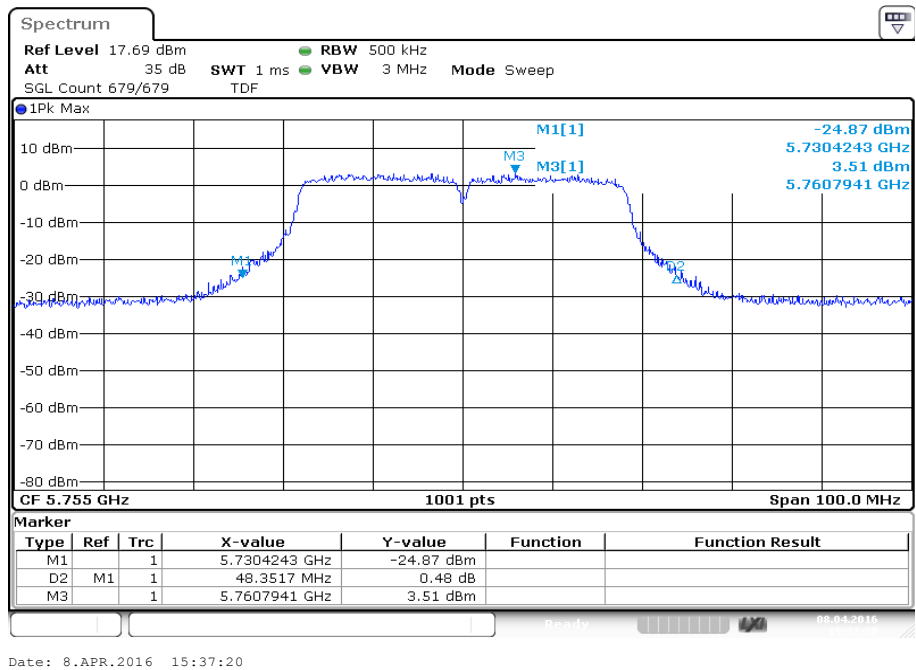
Plot 7: 5630 MHz



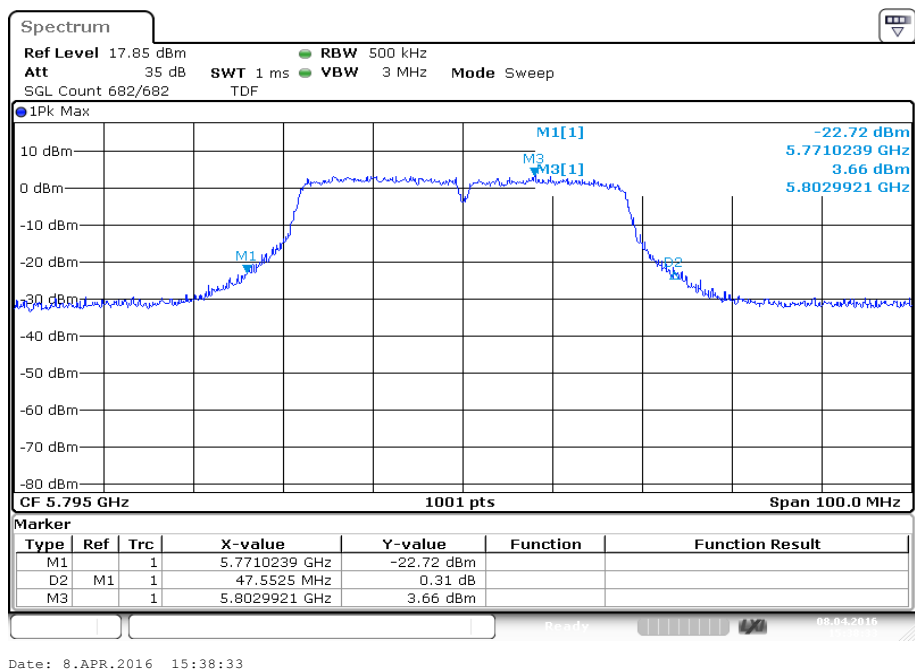
Plot 8: 5670 MHz



Plot 9: 5755 MHz

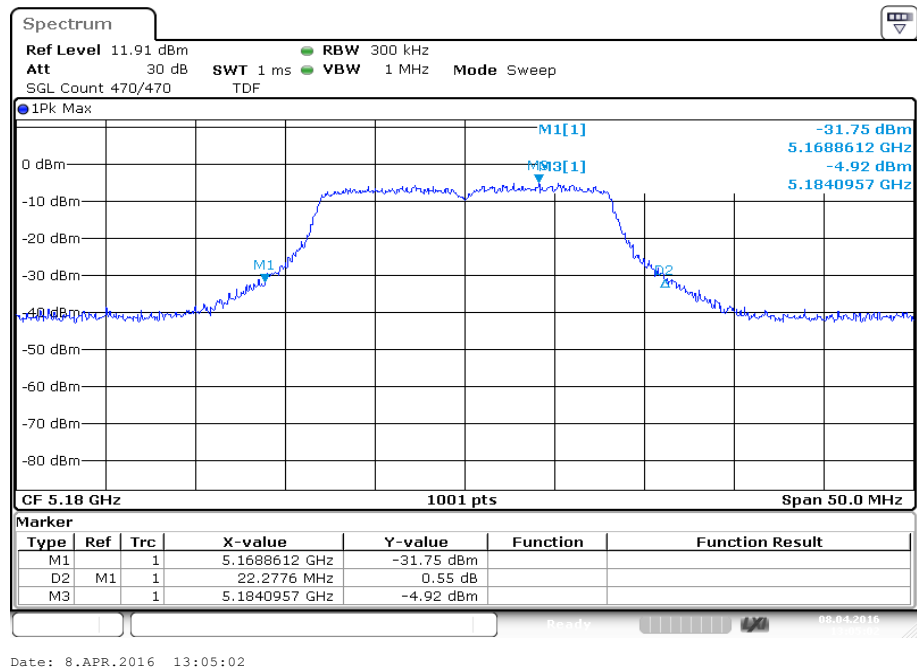


Plot 10: 5795 MHz

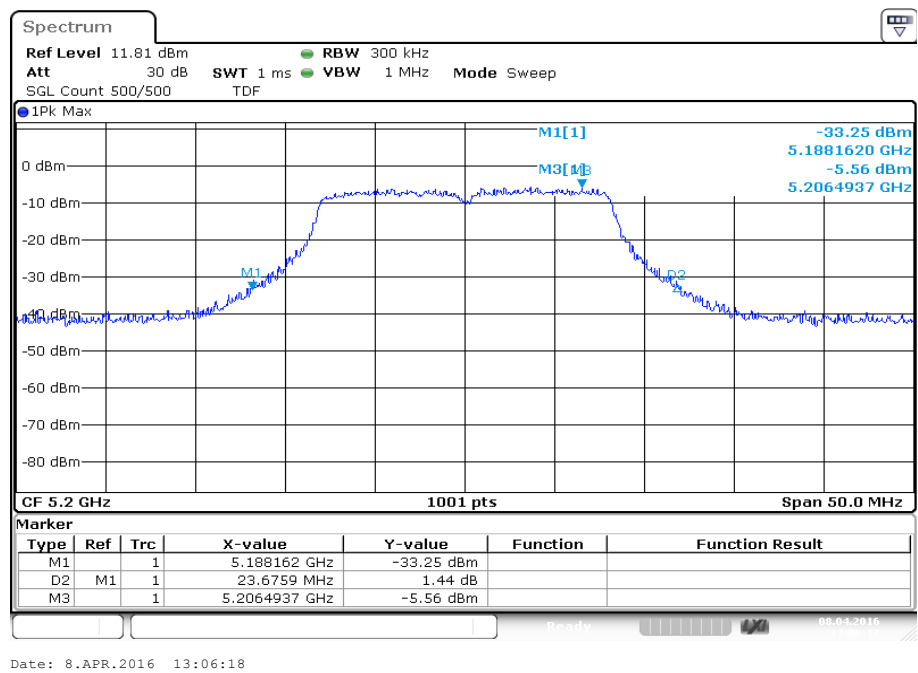


Plots: OFDM / a – mode, antenna port 2

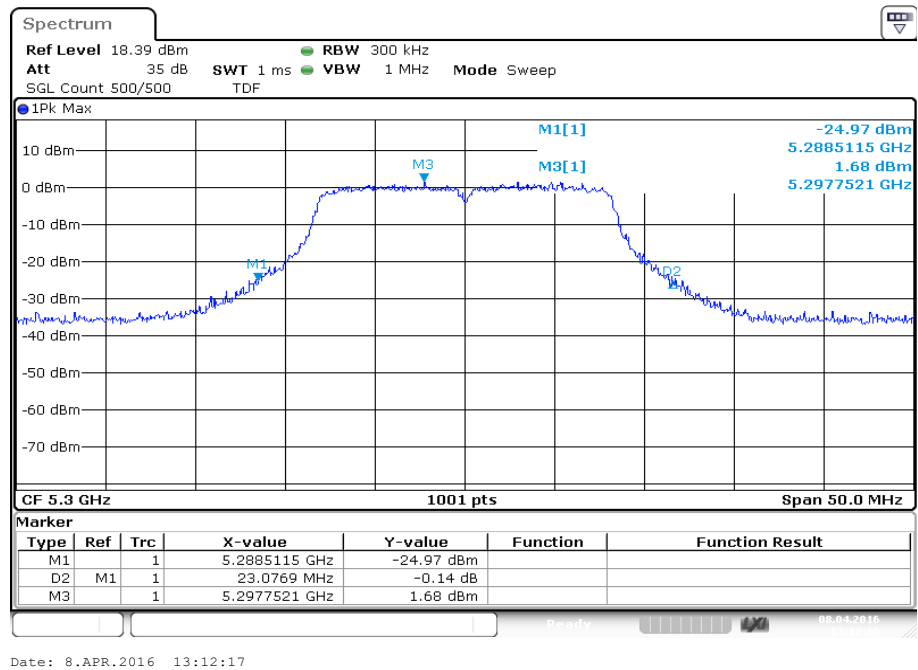
Plot 12: 5180 MHz



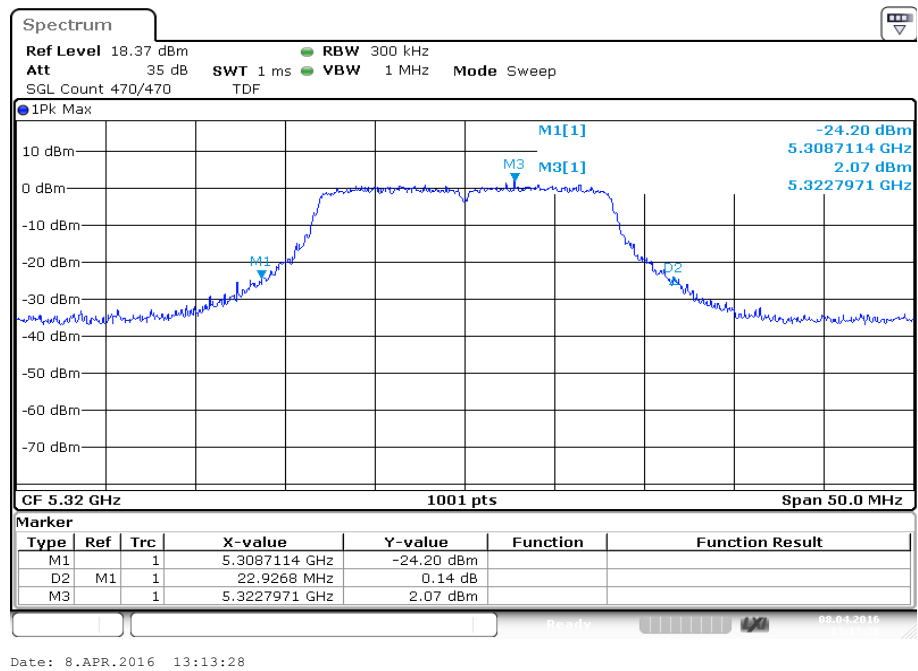
Plot 13: 5200 MHz



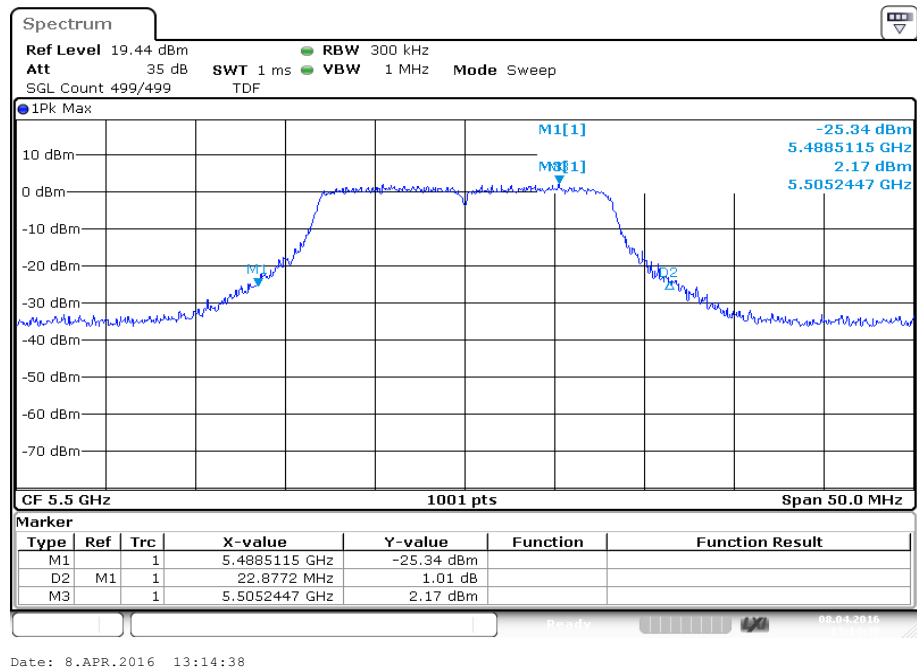
Plot 14: 5300 MHz



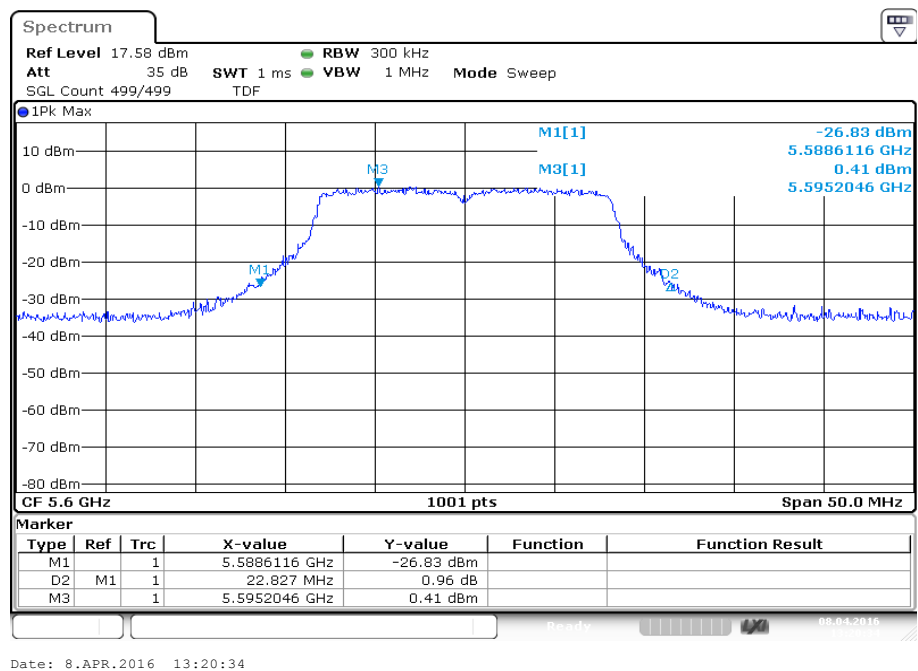
Plot 15: 5320 MHz



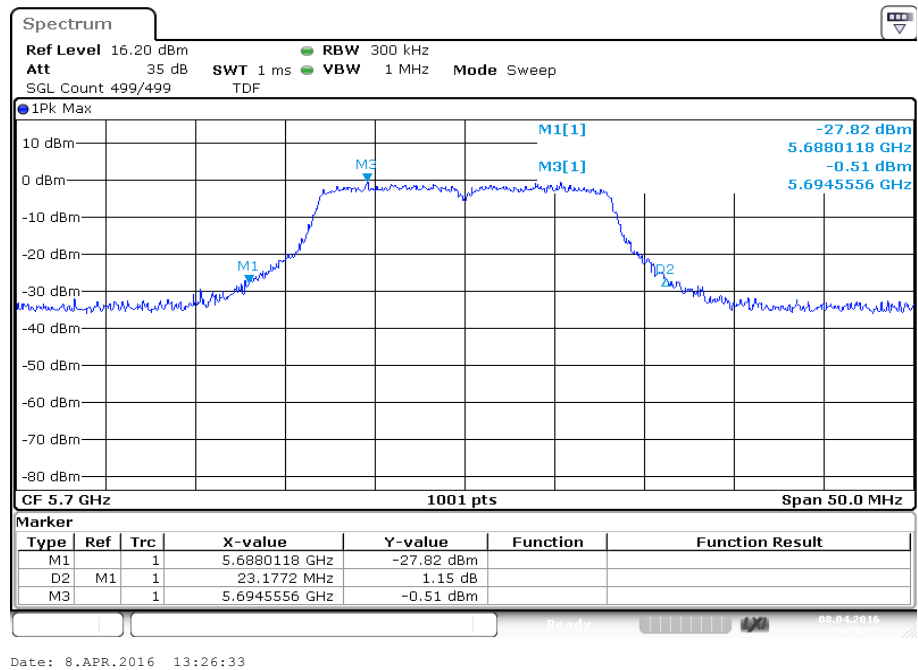
Plot 16: 5500 MHz



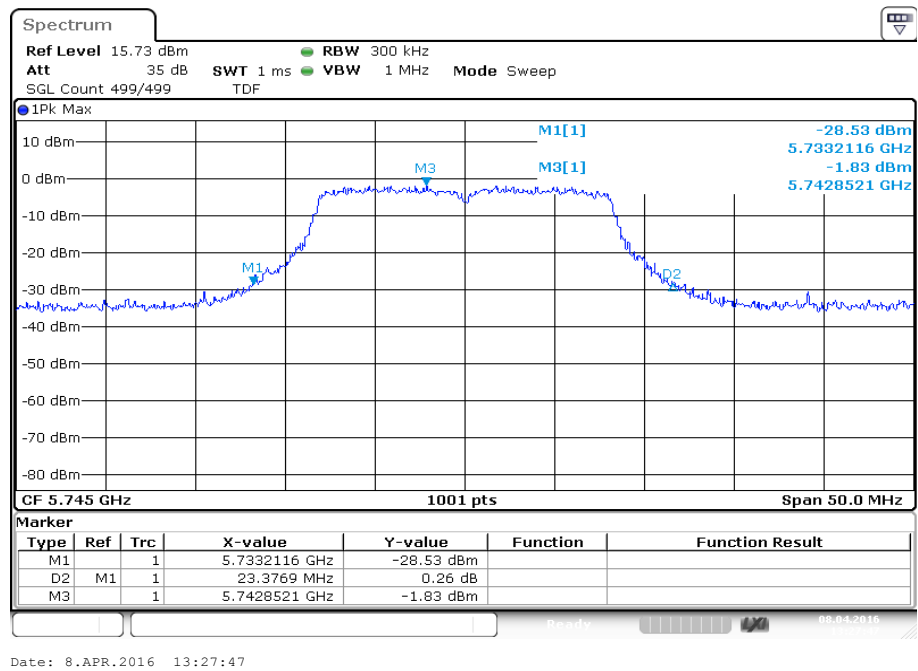
Plot 17: 5600 MHz



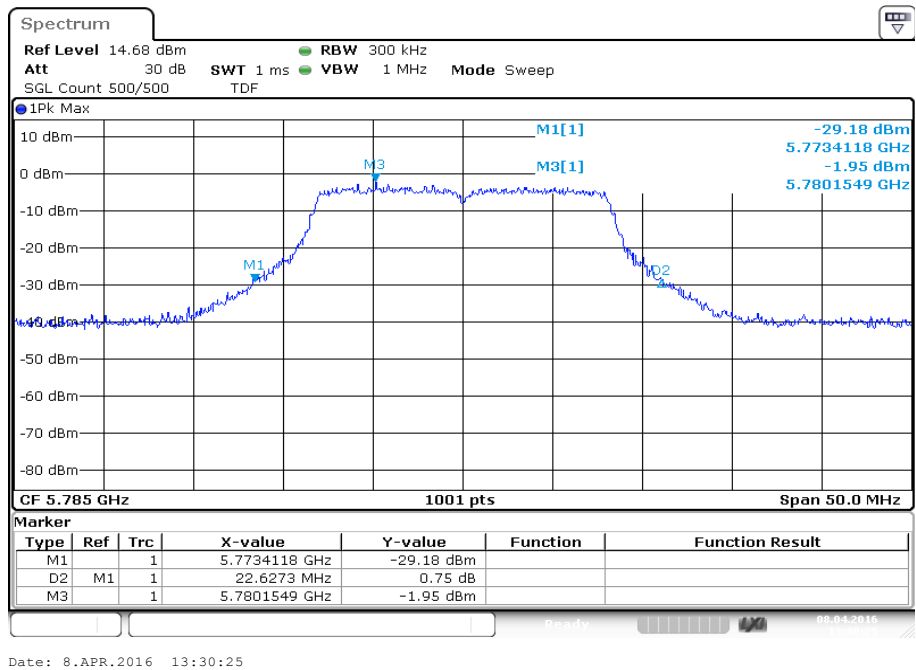
Plot 18: 5700 MHz



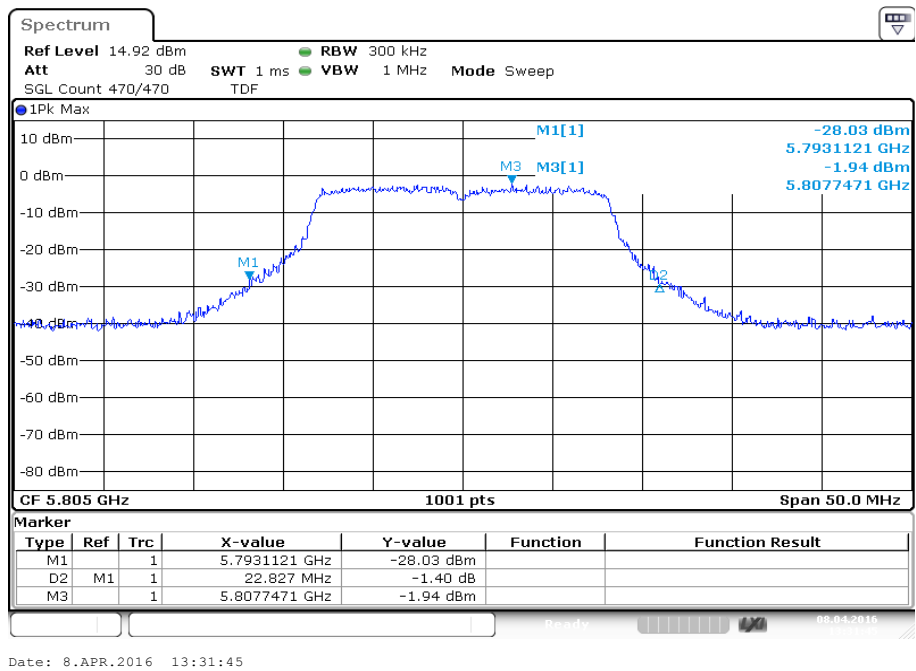
Plot 19: 5745 MHz



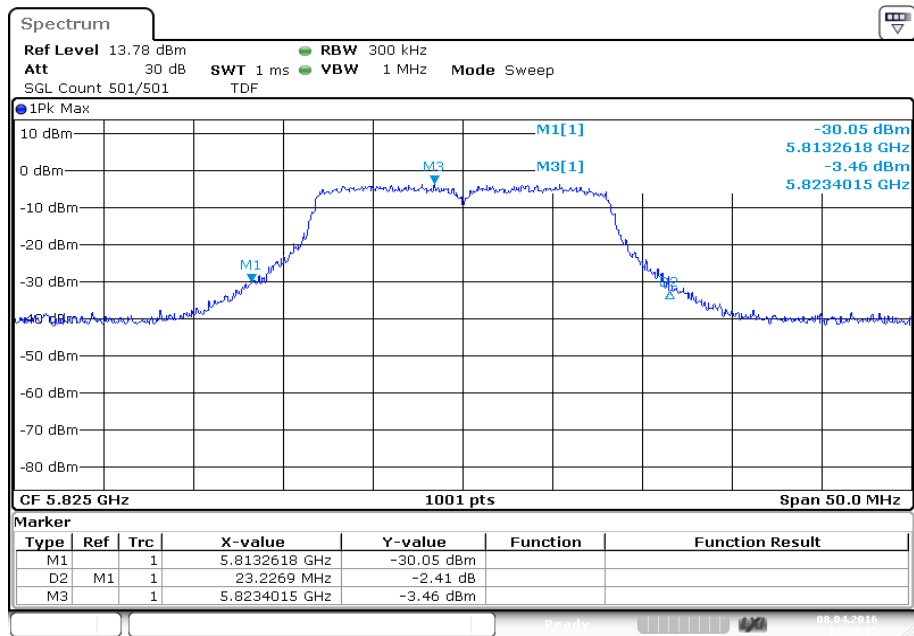
Plot 20: 5785 MHz



Plot 21: 5805 MHz



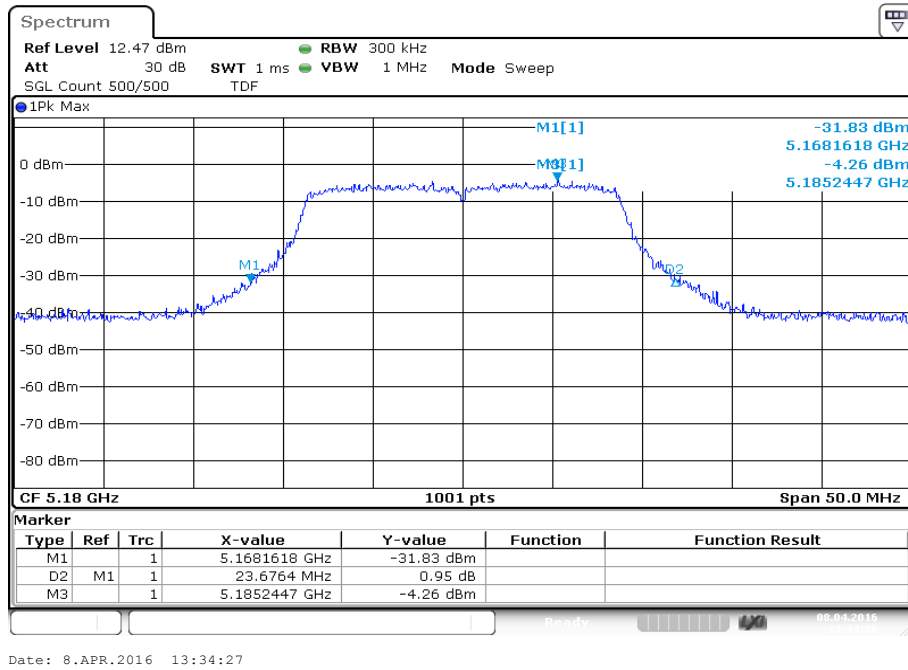
Plot 22: 5825 MHz



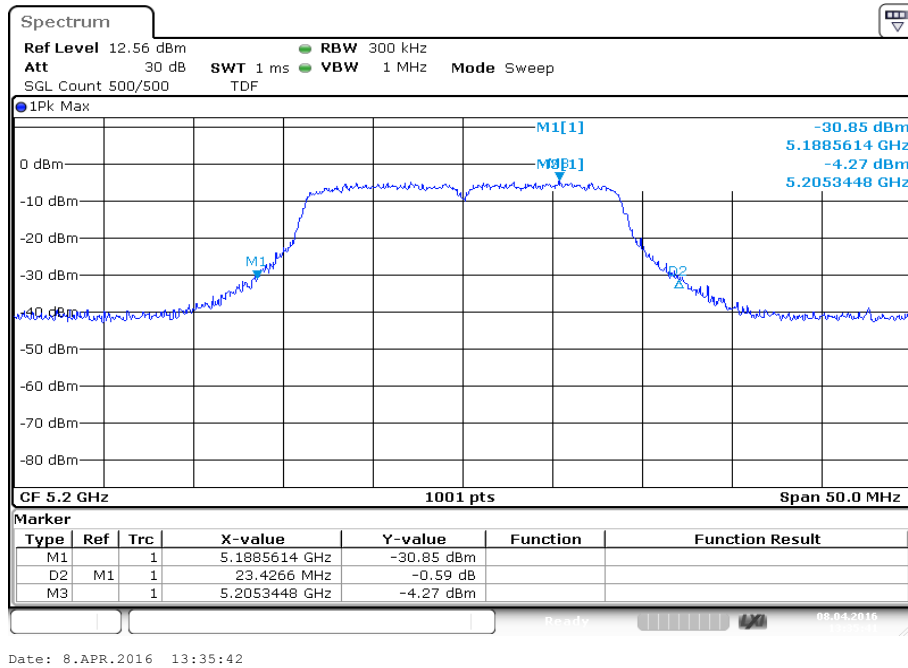
Date: 8.APR.2016 13:33:05

Plots: OFDM / n HT20 – mode, antenna port 2

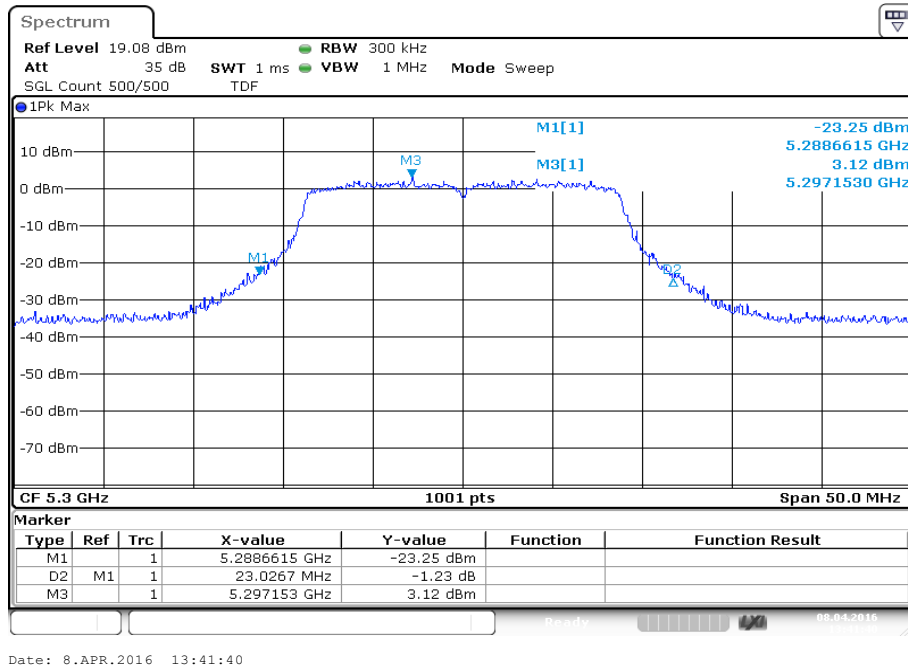
Plot 12: 5180 MHz



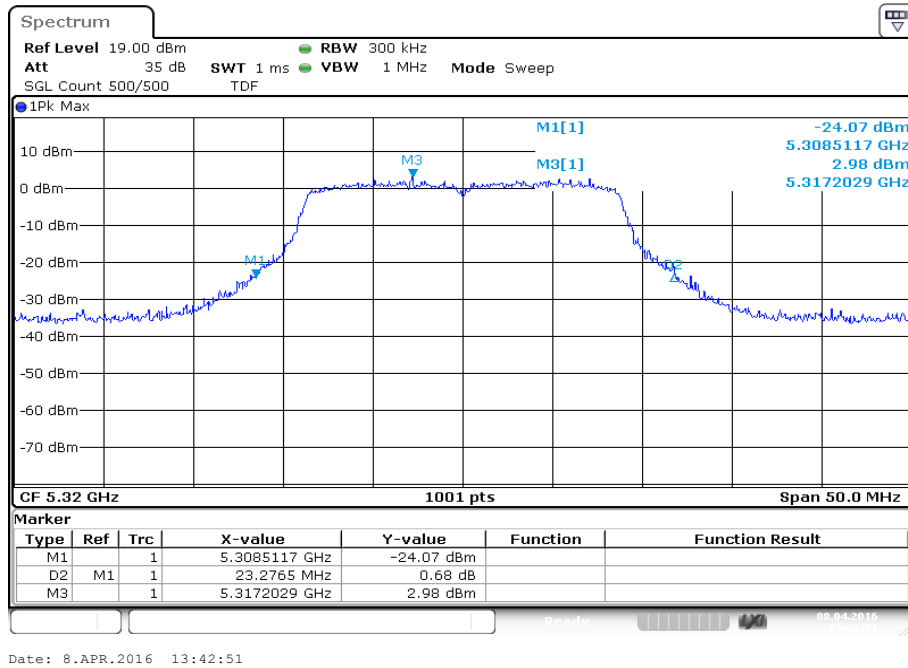
Plot 13: 5200 MHz



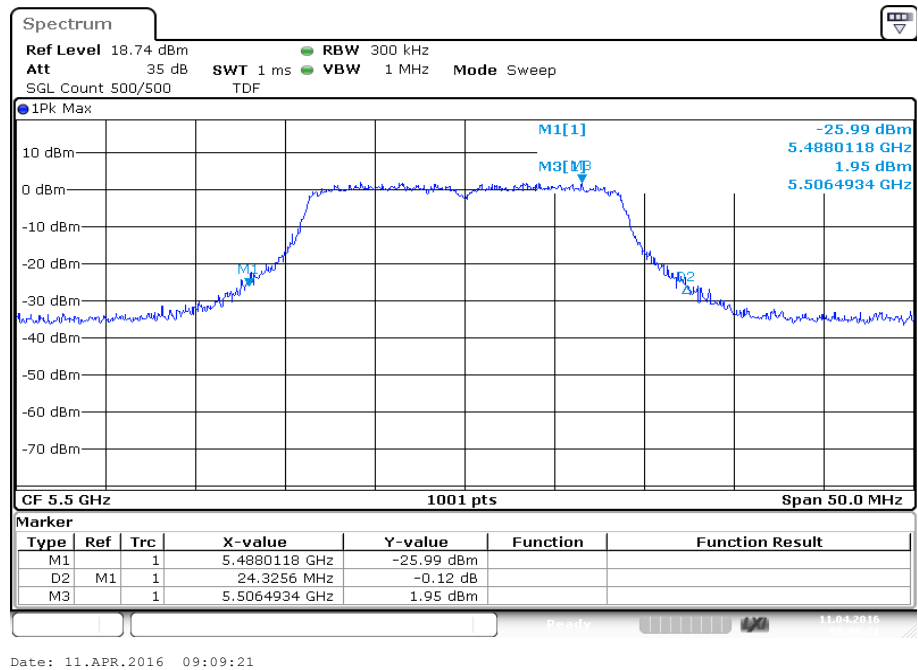
Plot 14: 5300 MHz



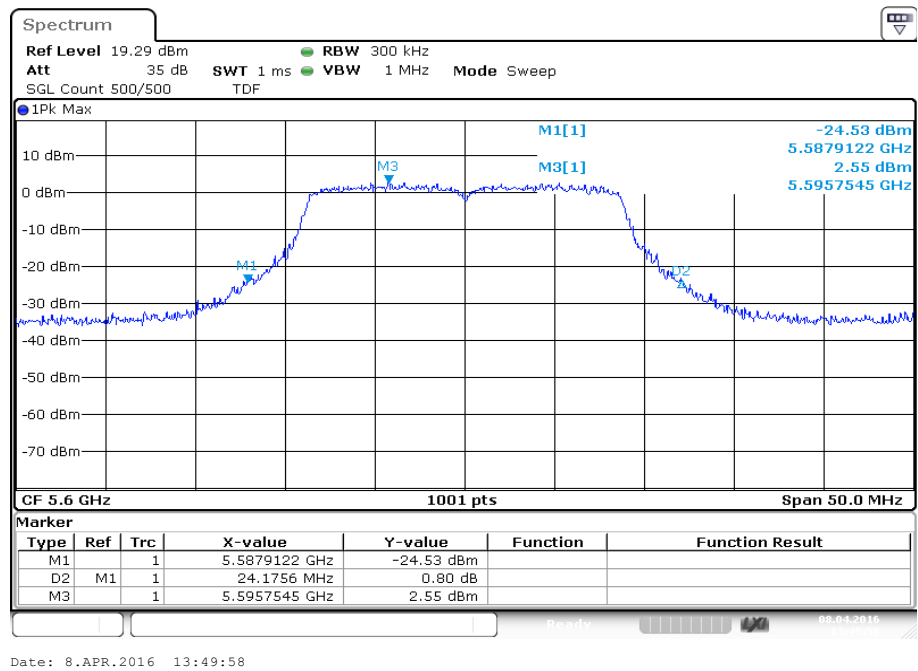
Plot 15: 5320 MHz



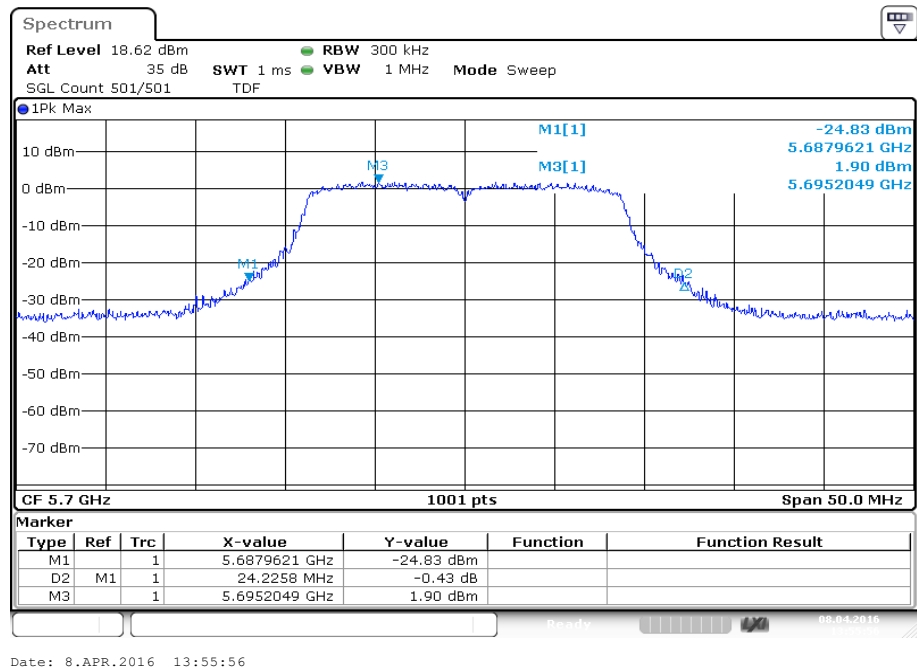
Plot 16: 5500 MHz



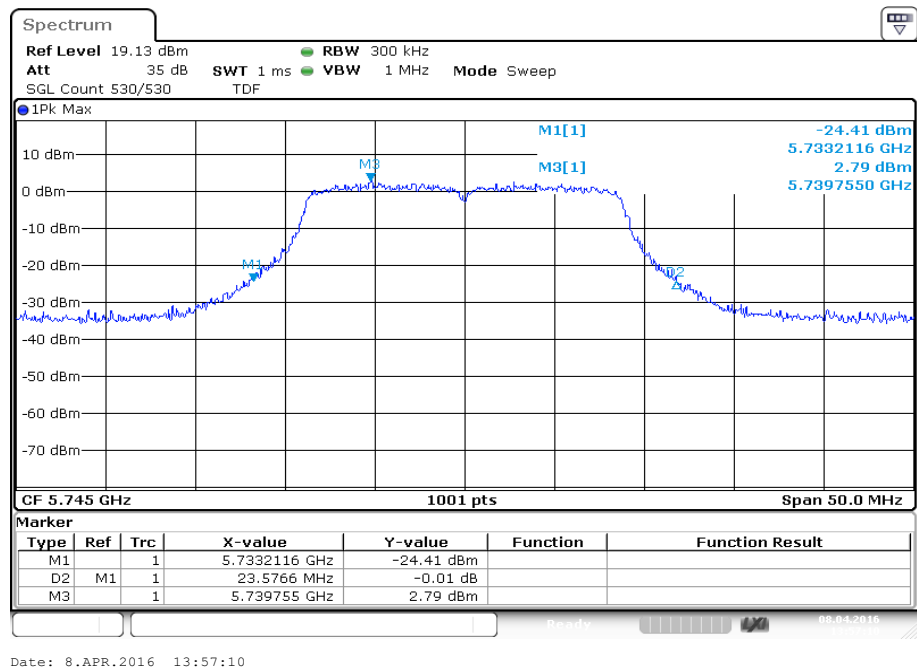
Plot 17: 5600 MHz



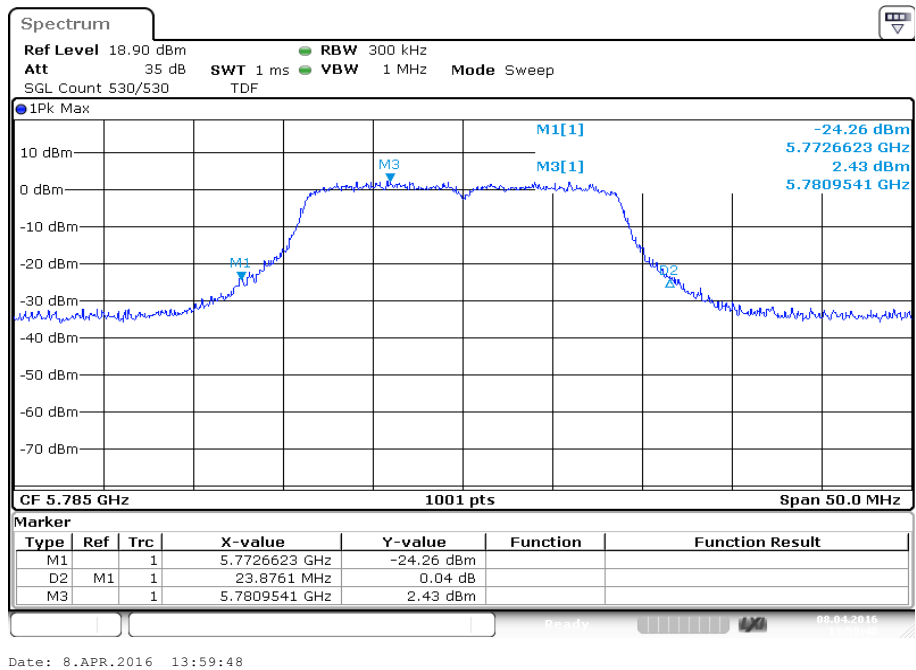
Plot 18: 5700 MHz



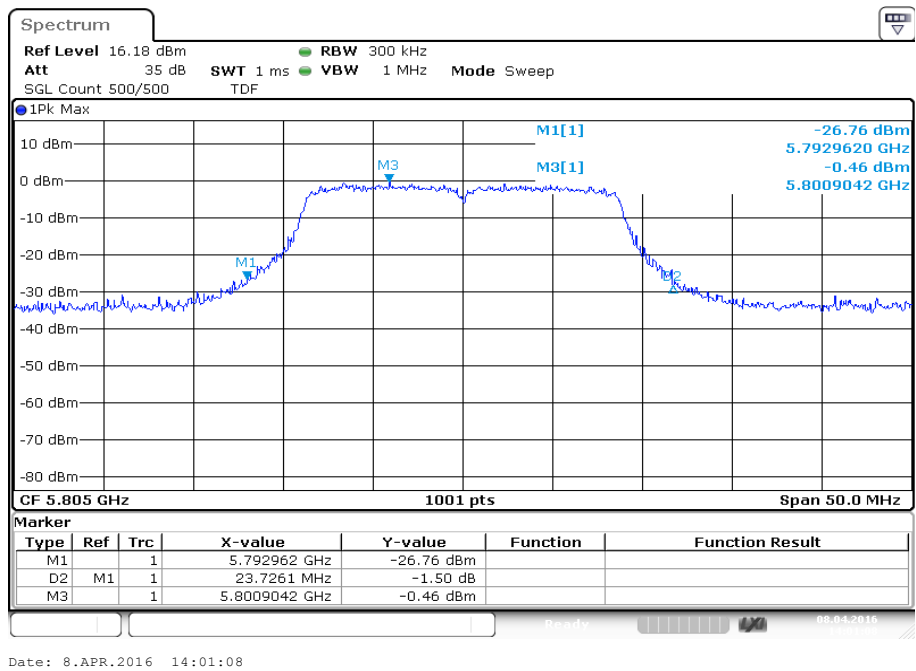
Plot 19: 5745 MHz



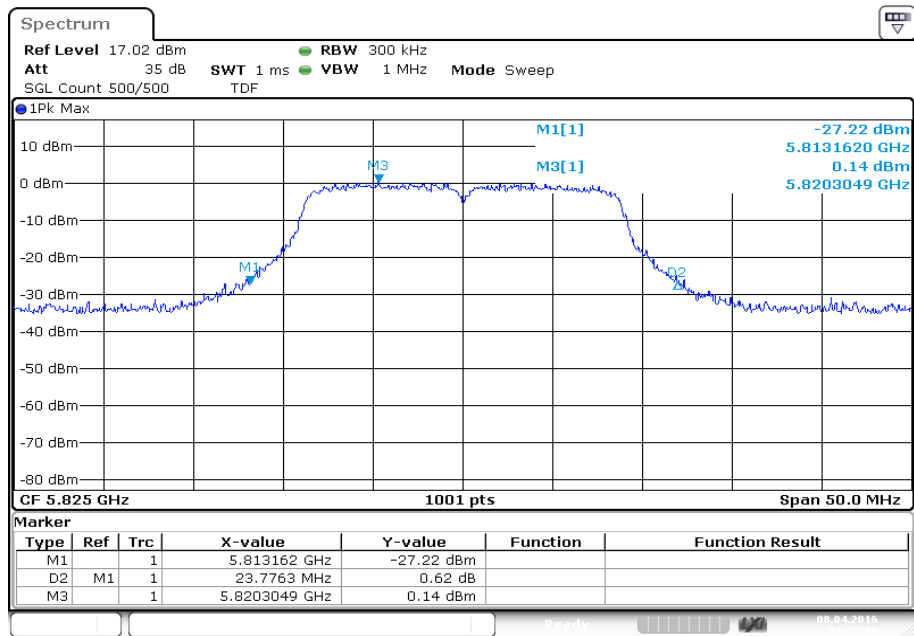
Plot 20: 5785 MHz



Plot 21: 5805 MHz



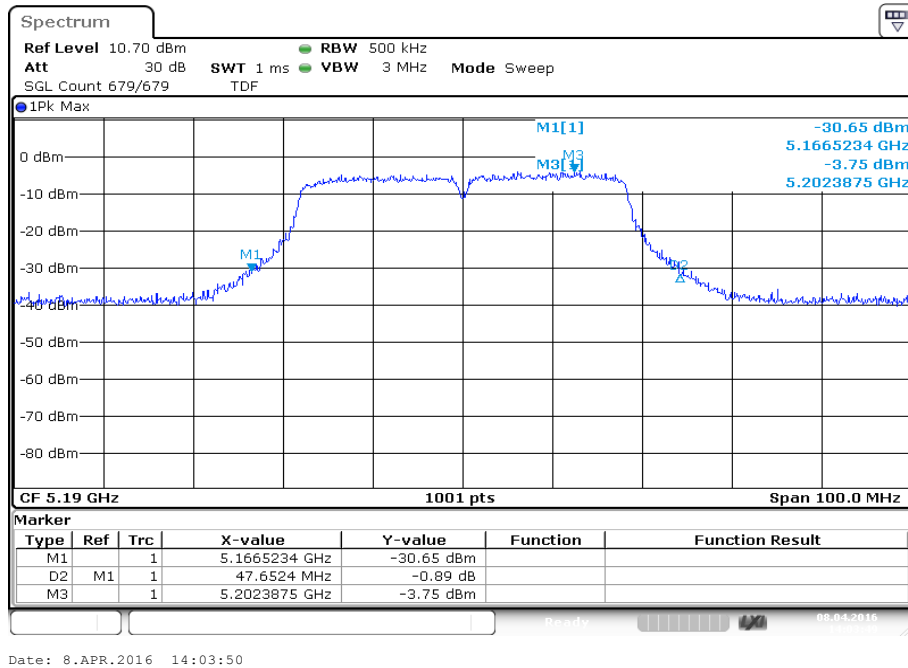
Plot 22: 5825 MHz



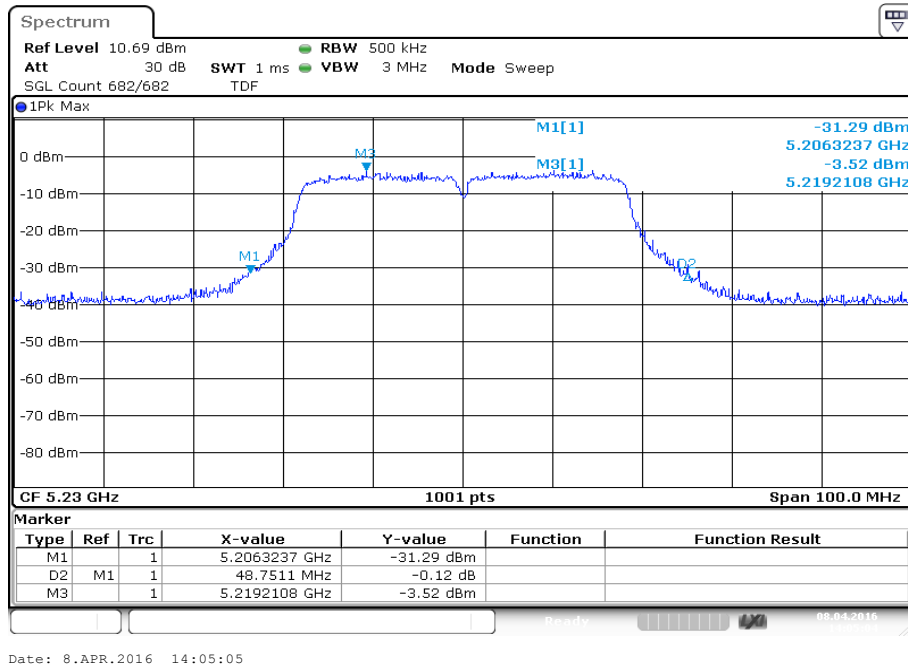
Date: 8.APR.2016 14:02:28

Plots: OFDM / n HT40 – mode, antenna port 2

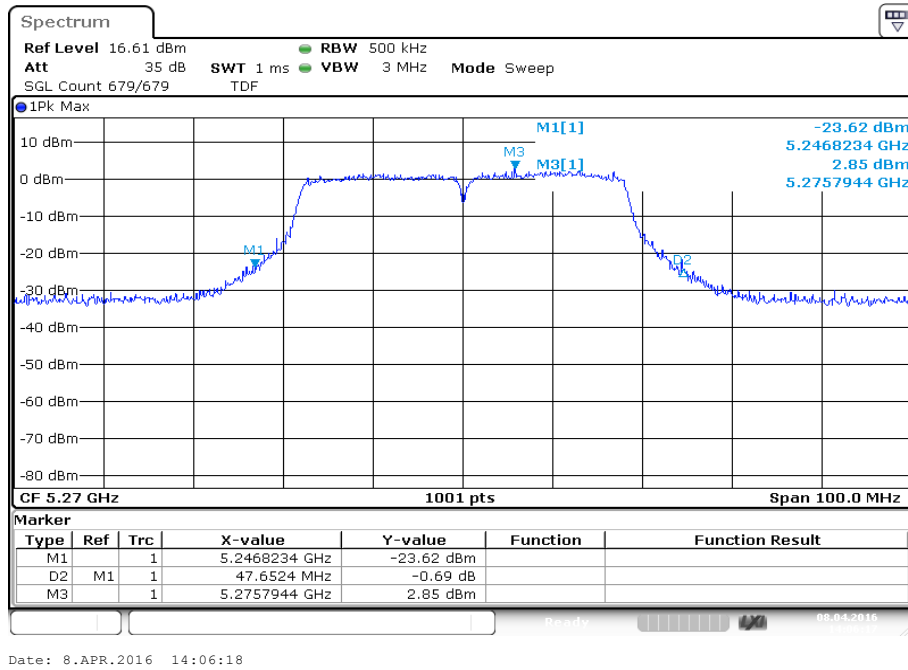
Plot 11: 5190 MHz



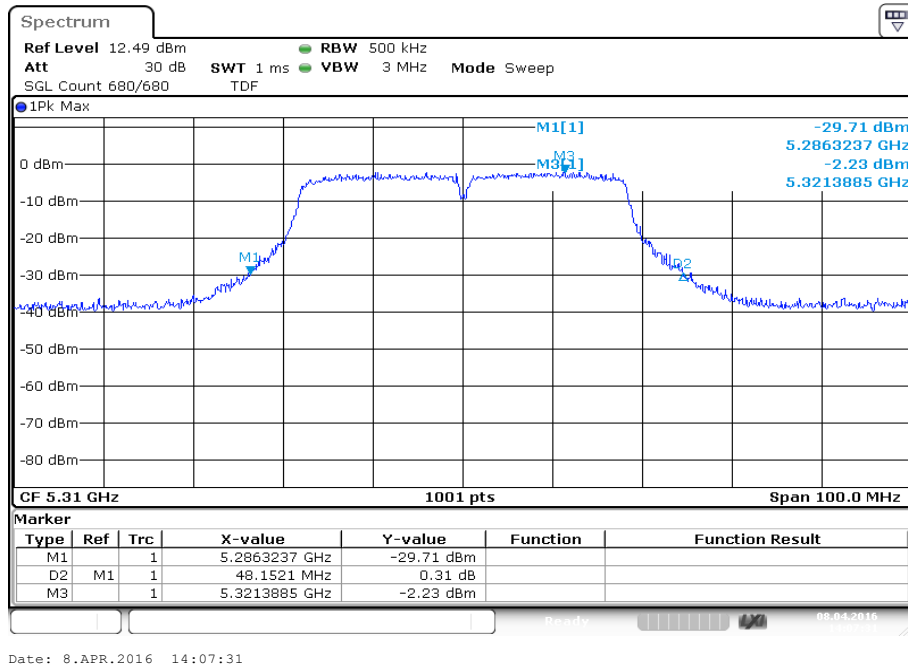
Plot 12: 5230 MHz



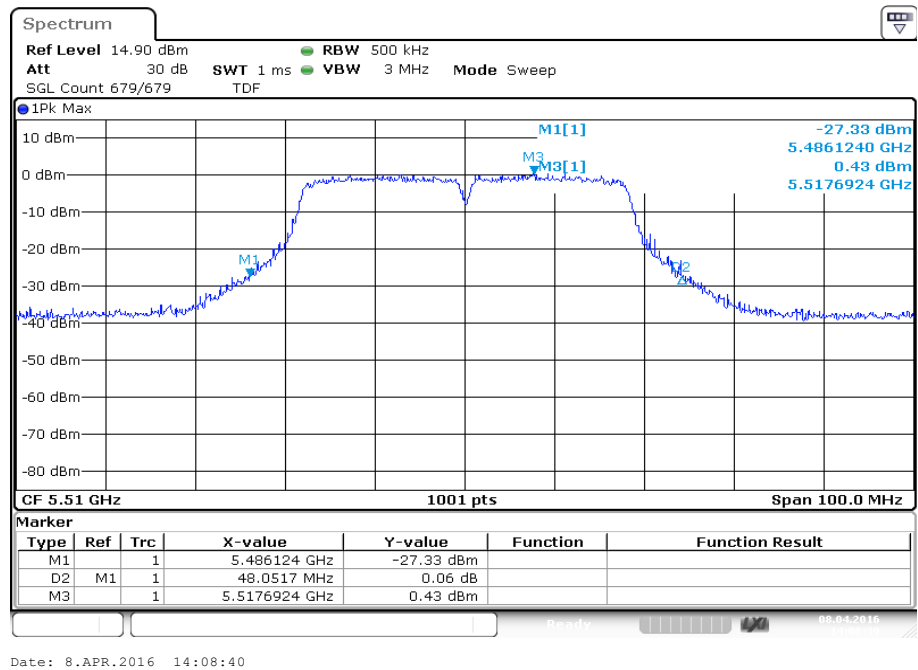
Plot 13: 5270 MHz



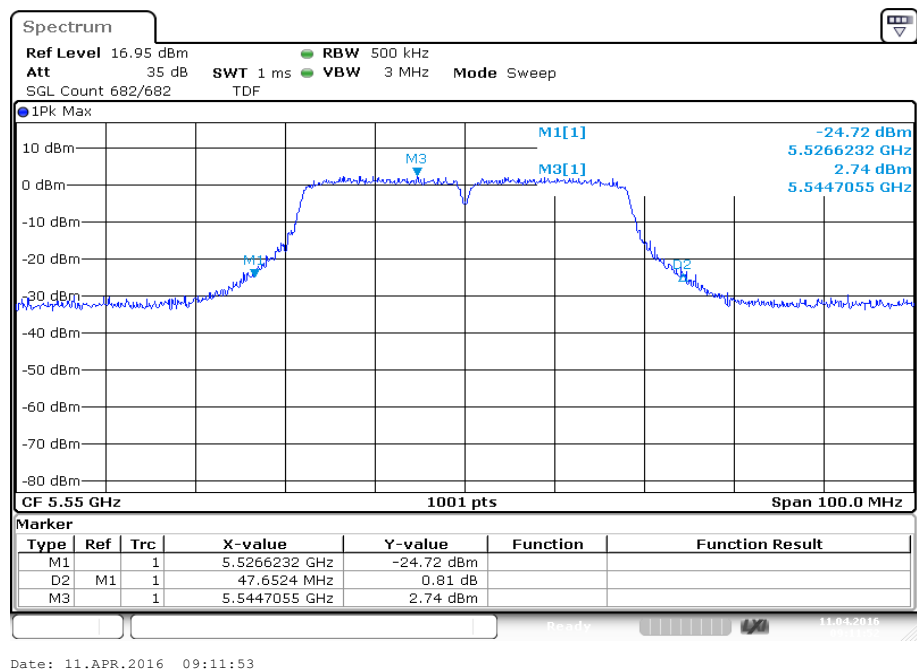
Plot 14: 5310 MHz



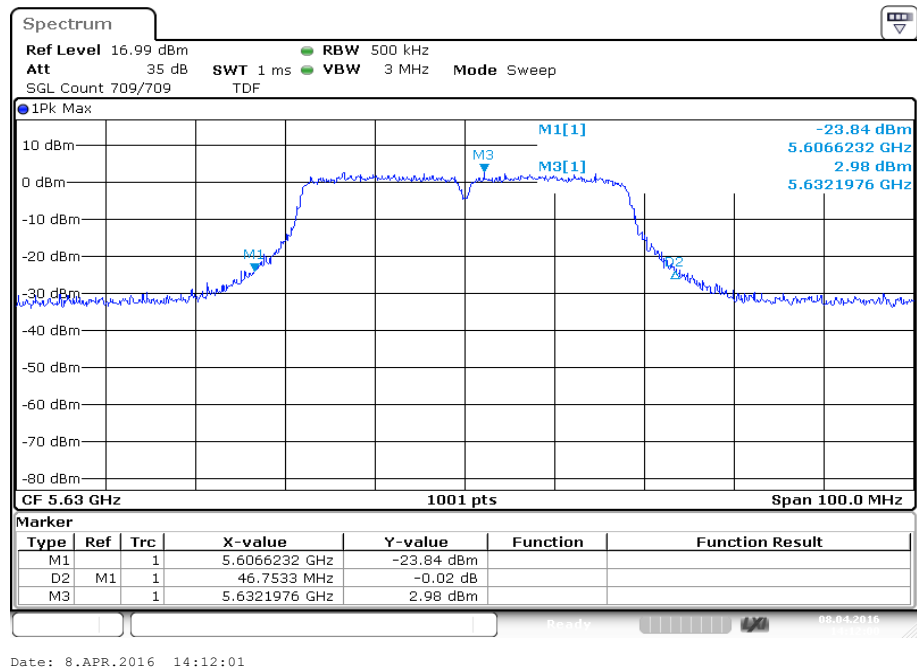
Plot 15: 5510 MHz



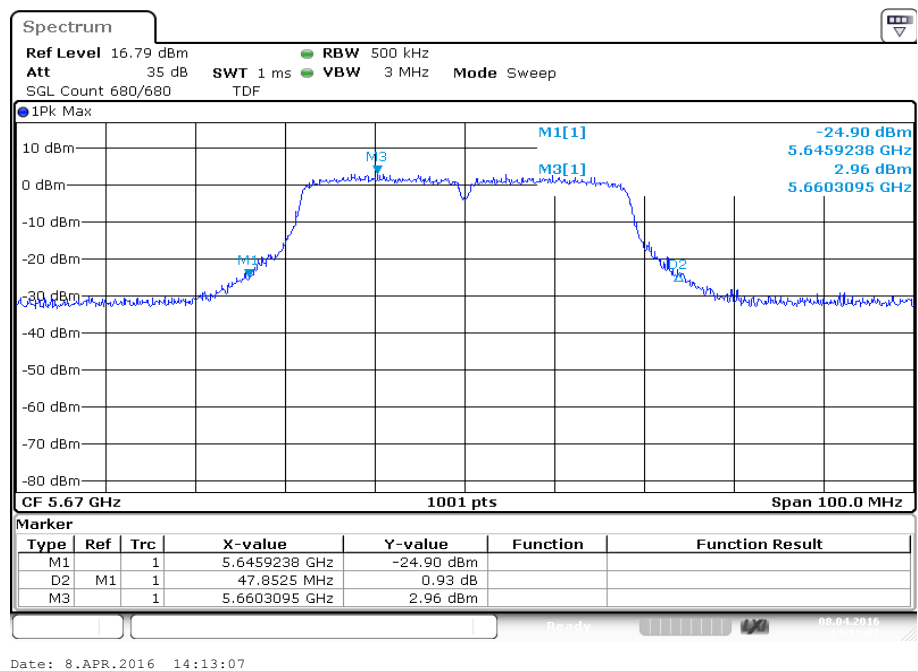
Plot 16: 5550 MHz



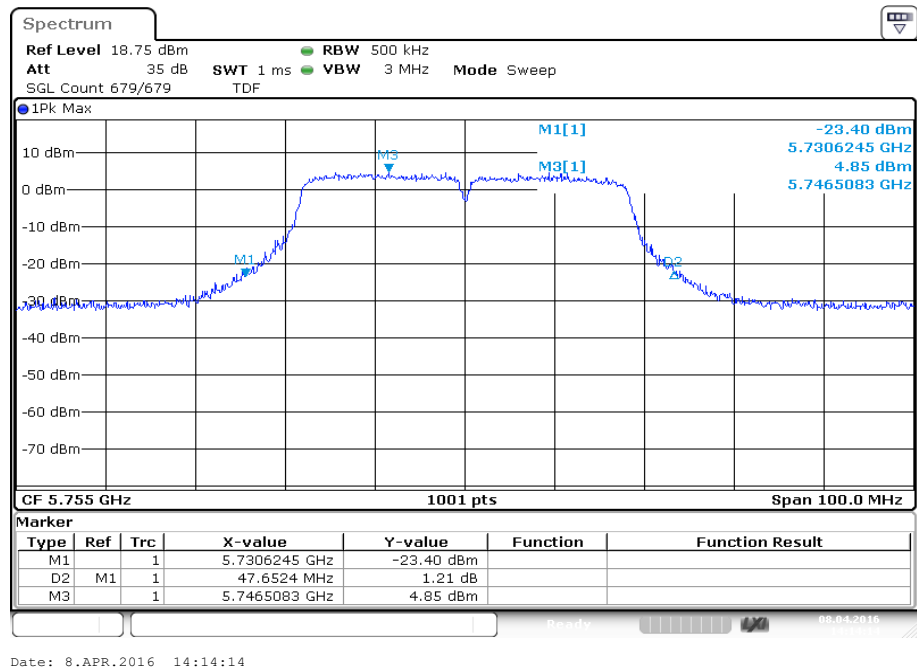
Plot 17: 5630 MHz



Plot 18: 5670 MHz



Plot 19: 5755 MHz



Plot 20: 5795 MHz

