

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)* → 10dBm power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5250 – 5350 MHz)* → 10dBm power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz)* → 10dBm power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)* → 29dBm 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)* → 10dBm power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz)* → 10dBm power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)* → 29dBm

*limit shall be reduced by 1 dB because of the 7dBi antenna gain.

Results plots for 5150 MHz to 5725 MHz 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		-2.87	-3.03	4.03	2.17
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		4.60	3.83	4.52	-/-
Channel		5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-0.73	-7.78	-8.98	-3.32

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		-3.02	-2.51	3.51	1.81
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		4.11	3.63	4.28	-/-
Channel		5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-1.07	-11.39	-11.61	-3.54

OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-4.89	-2.46	-1.91	-1.81
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-5.77	-2.95	-2.96	-12.22
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		-12.43	-10.78	-/-	-/-

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		-2.99	-2.99	3.65	1.87
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		4.17	3.69	4.95	-/-
Channel		5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		-0.10	-7.41	-8.12	-3.61

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]			
Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor	-3.50	-2.62	3.39	1.66
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	3.69	3.64	4.61	-/-
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor	-0.38	-11.01	-10.78	-3.86

OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-5.08	-2.97	-1.54	-2.16
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-6.44	-4.00	-4.04	-12.62
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		-11.93	-10.87	-/-	-/-

Result: antenna port 3

OFDM / a – mode Channel	Power spectral density [dBm/MHz]			
	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor	-2.12	-2.53	4.59	2.45
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	4.83	4.66	4.80	-/-
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor	0.12	-6.78	-8.26	-2.41

OFDM / n HT20 – mode Channel	Power spectral density [dBm/MHz]			
	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor	-2.79	-2.06	4.52	2.44
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	4.35	4.38	4.54	-/-
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor	-0.25	-10.72	-10.80	-2.67

OFDM / n HT40 – mode Channel	Power spectral density [dBm/MHz]			
	5190 MHz	5210 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor	-6.28	-2.08	-0.98	-5.25
Channel	5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor	-4.92	-2.69	-2.18	-11.02
Channel	5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor	-12.12	-13.82	-/-	-/-

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		0.08	0.00	6.85	5.03
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		7.40	6.77	7.75	-/-
Channel		5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		2.61	-4.58	-5.52	-0.45

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]			
Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor	-0.24	0.45	6.46	4.75
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	6.92	6.65	7.46	-/-
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor	2.30	-8.19	-8.16	-0.69

OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-1.97	0.30	1.29	1.03
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-3.08	-0.43	-0.46	-9.41
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		-9.16	-7.81	-/-	-/-

Result: antenna port 1 + antenna port 2 + antenna port 3

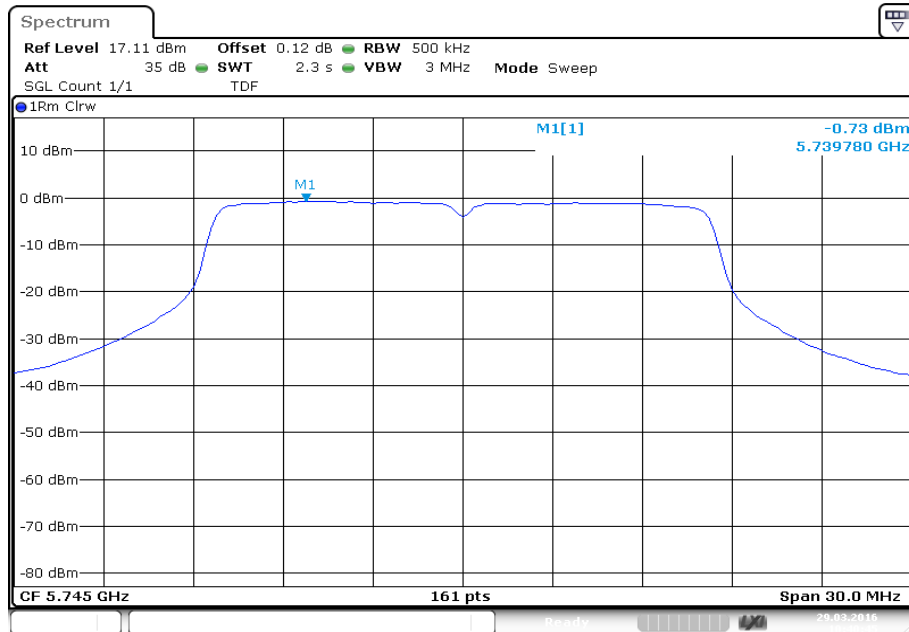
OFDM / a – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		2.13	1.93	8.88	6.94
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		9.31	8.85	9.53	-/-
Channel		5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		4.55	-2.53	-3.67	1.69

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]				
	Channel	5180 MHz	5200 MHz	5300 MHz	5320 MHz
Including duty cycle correction factor		1.68	2.38	8.61	6.75
Channel		5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor		8.83	8.67	9.25	-/-
Channel		5745 MHz	5765 MHz	5805 MHz	5825 MHz
Including duty cycle correction factor		4.22	-6.26	-6.28	1.44

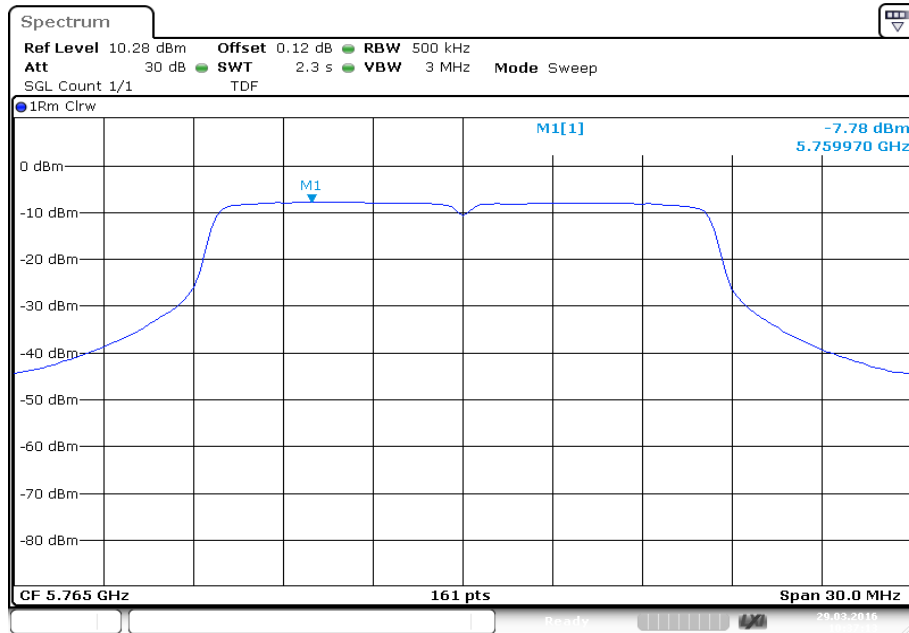
OFDM / n HT40 – mode	Power spectral density [dBm/MHz]				
	Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor		-0.60	2.28	3.31	1.95
Channel		5510 MHz	5550 MHz	5630 MHz	5670 MHz
Including duty cycle correction factor		-0.89	1.59	1.78	-7.13
Channel		5755 MHz	5795 MHz	-/-	-/-
Including duty cycle correction factor		-7.38	-6.84	-/-	-/-

Plots: OFDM / a – mode, antenna port 1

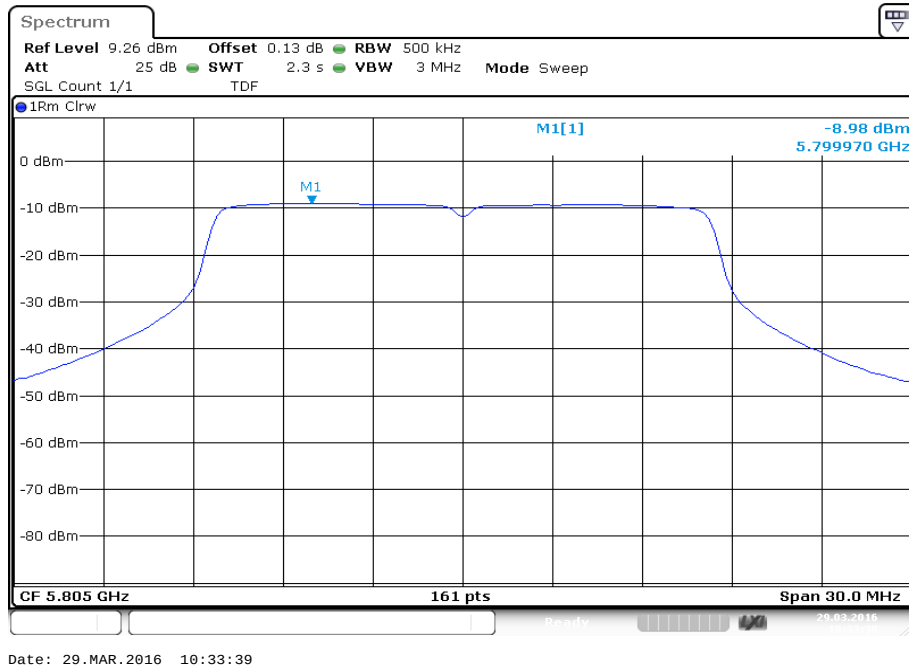
Plot 1: 5745 MHz



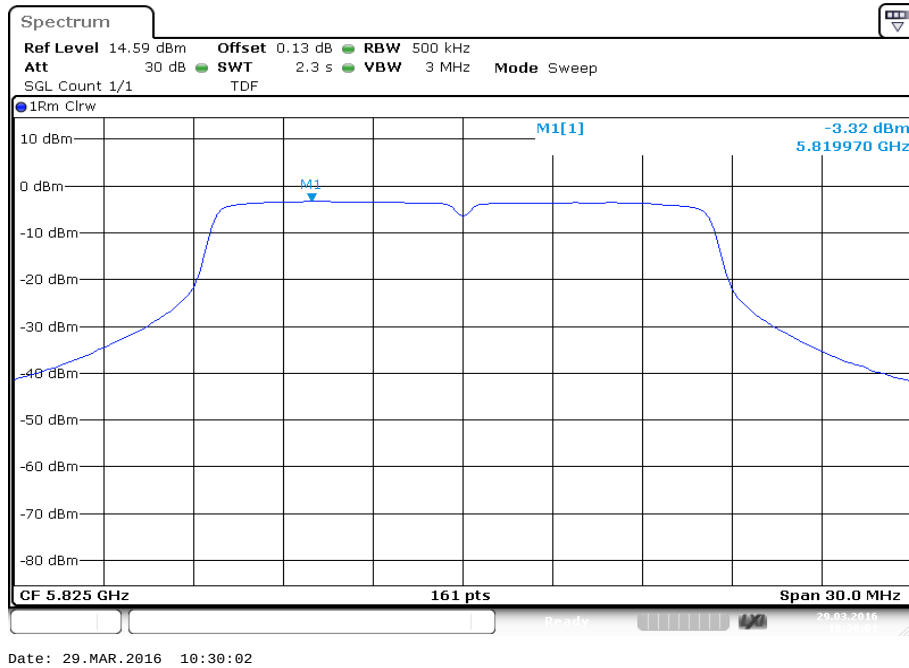
Plot 2: 5765 MHz



Plot 3: 5805 MHz

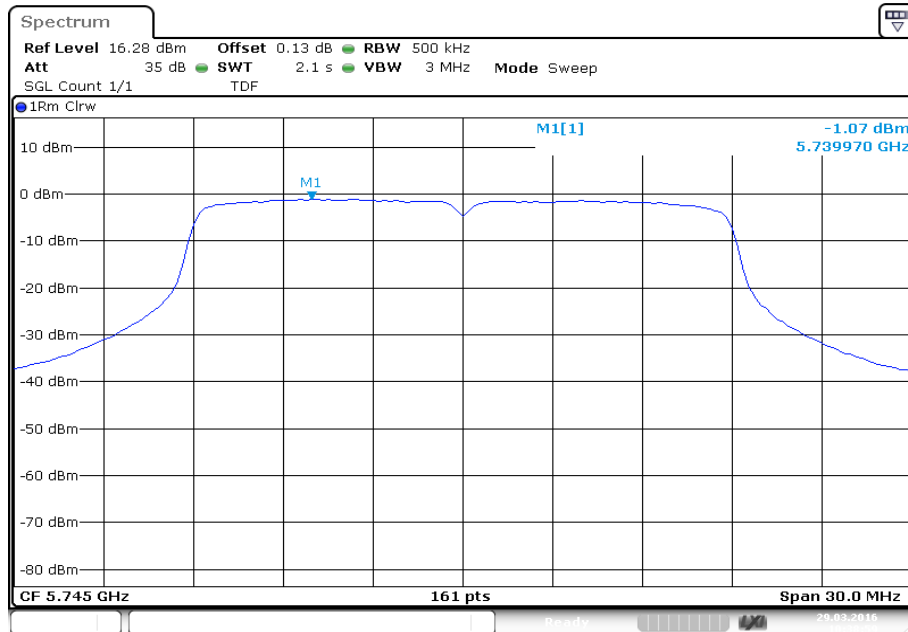


Plot 4: 5825 MHz



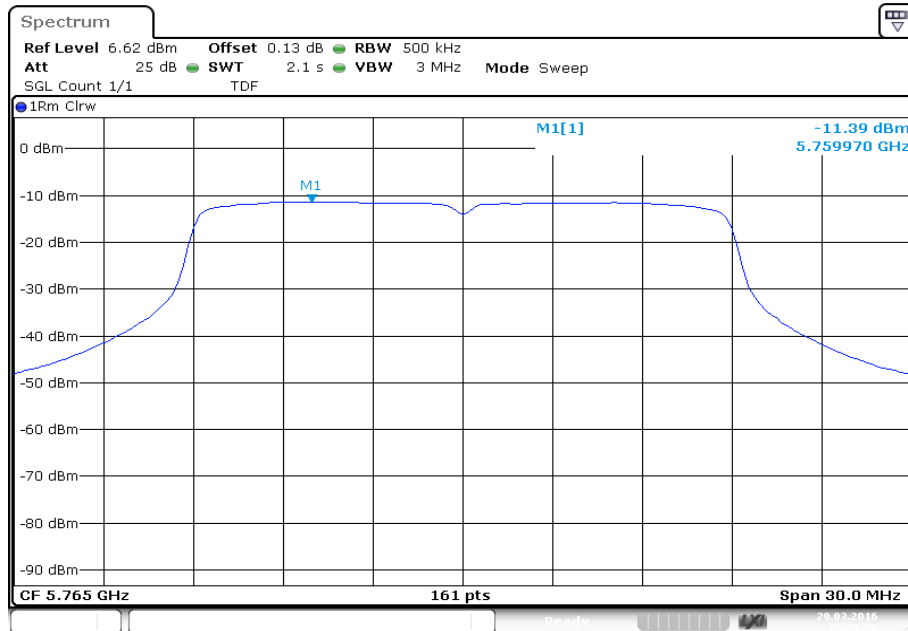
Plots: OFDM / n – mode, antenna port 1

Plot 1: 5745 MHz



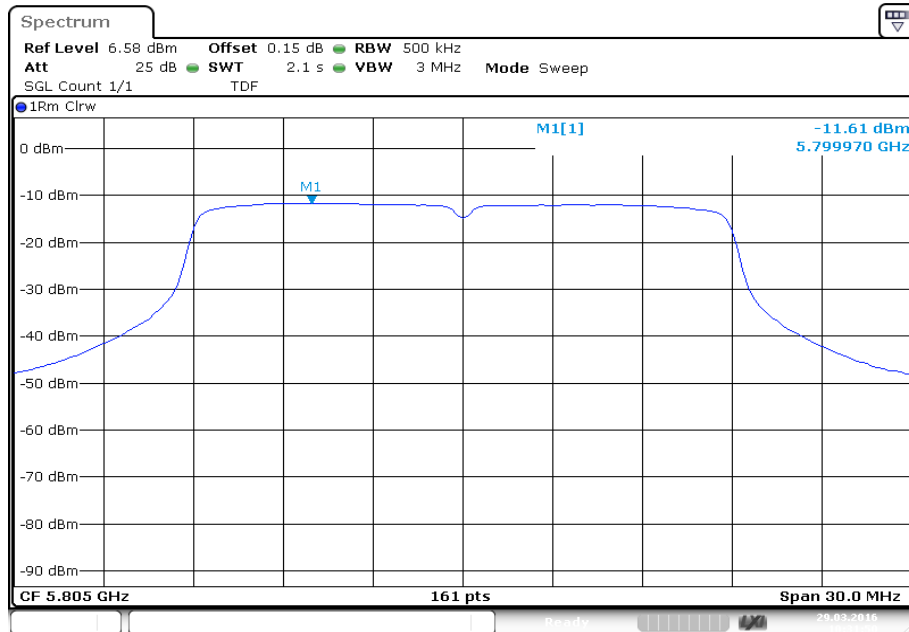
Date: 29.MAR.2016 10:39:00

Plot 2: 5765 MHz

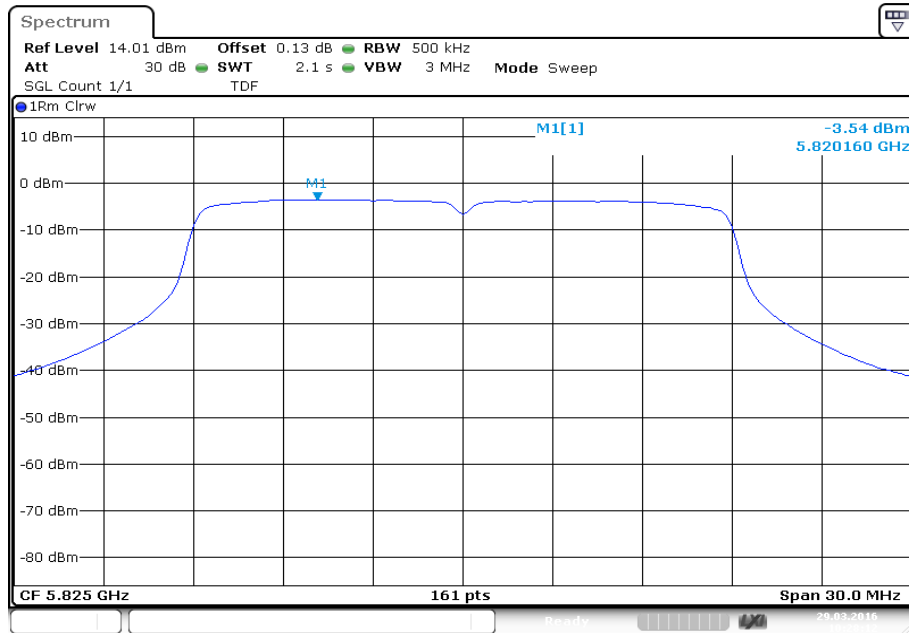


Date: 29.MAR.2016 10:35:27

Plot 3: 5805 MHz

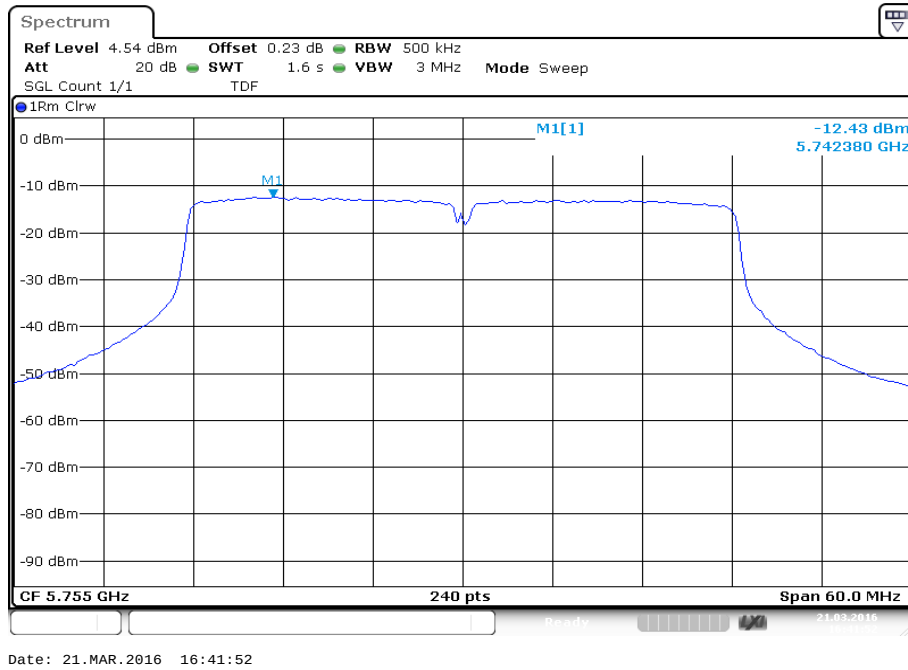


Plot 4: 5825 MHz

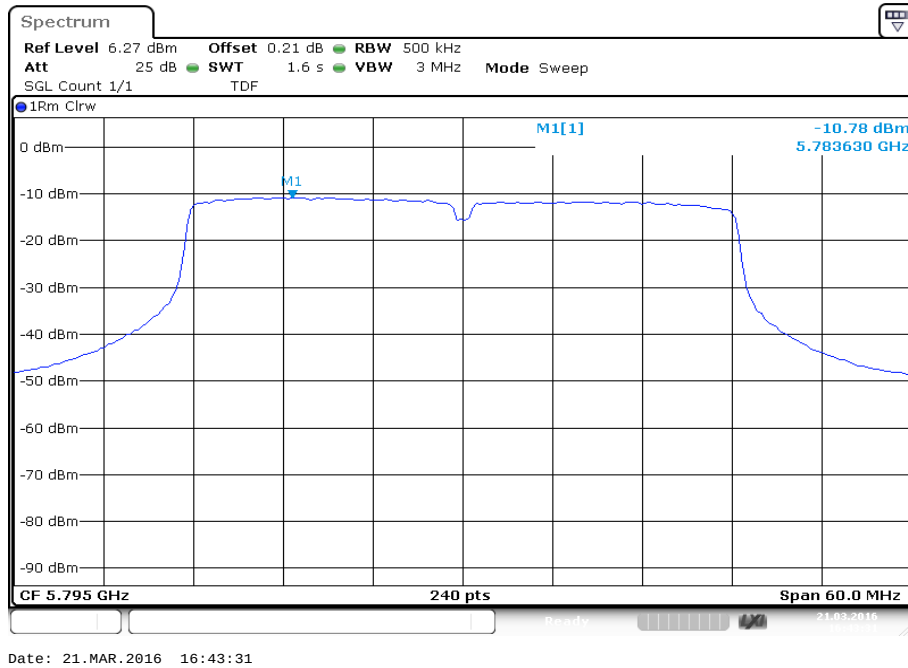


Plots: OFDM / n40 – mode, antenna port 1

Plot 1: 5755 MHz

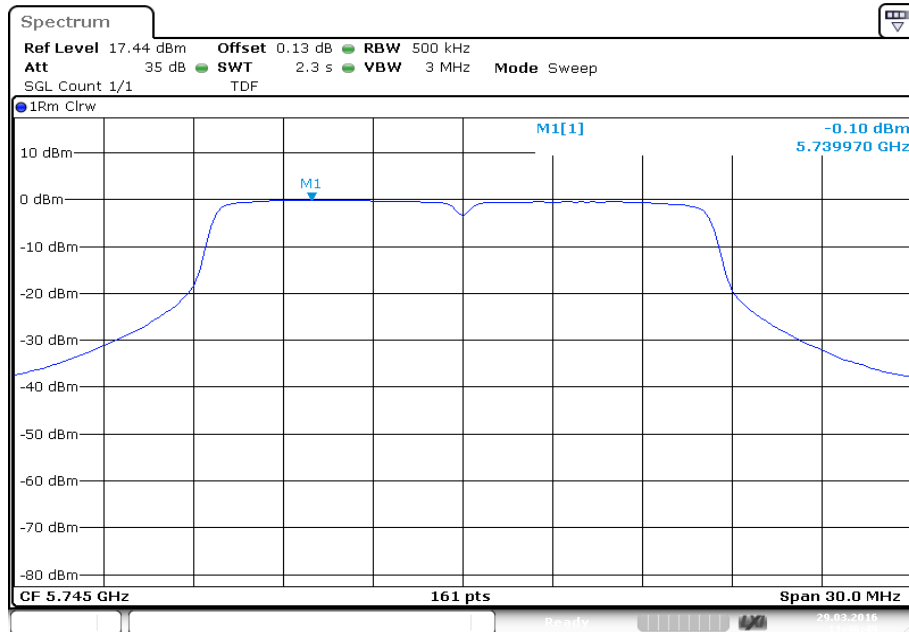


Plot 2: 5795 MHz

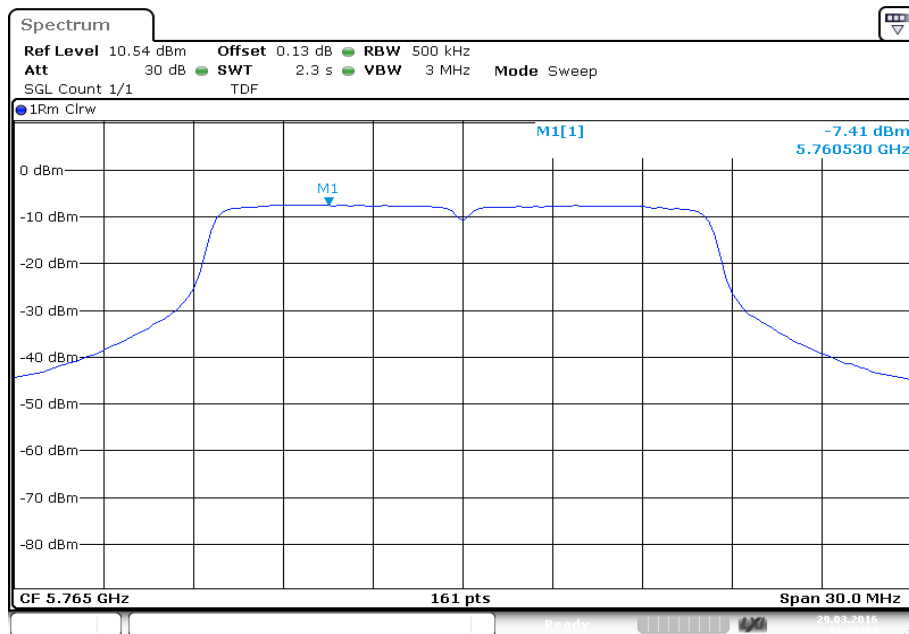


Plots: OFDM / a – mode, antenna port 2

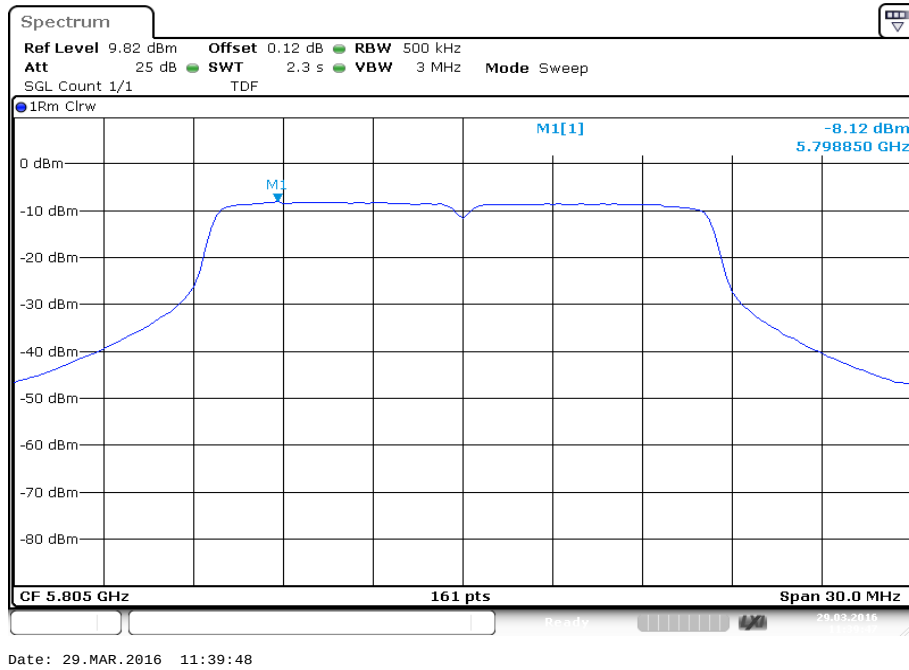
Plot 1: 5745 MHz



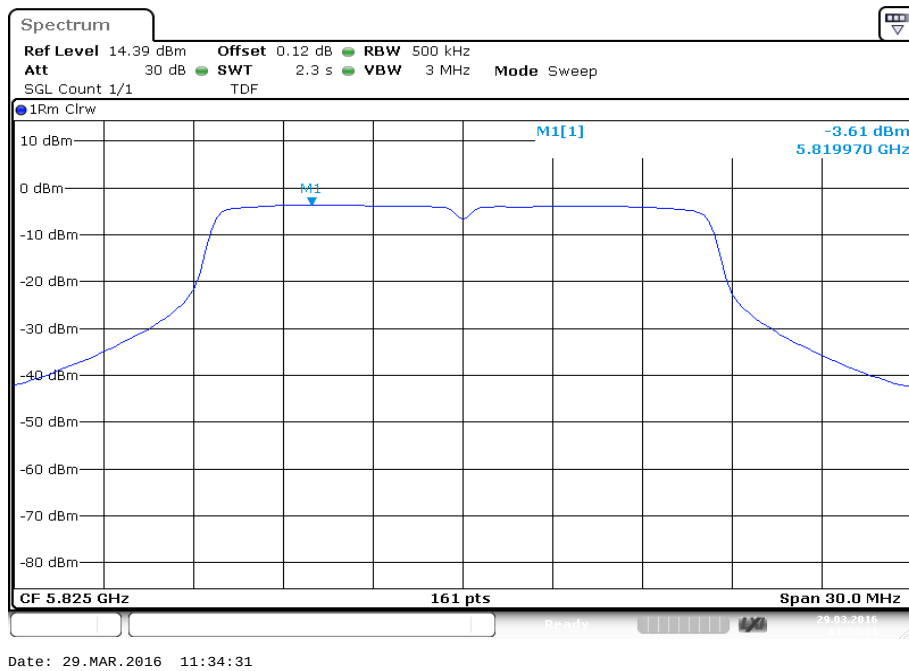
Plot 2: 5765 MHz



Plot 3: 5805 MHz

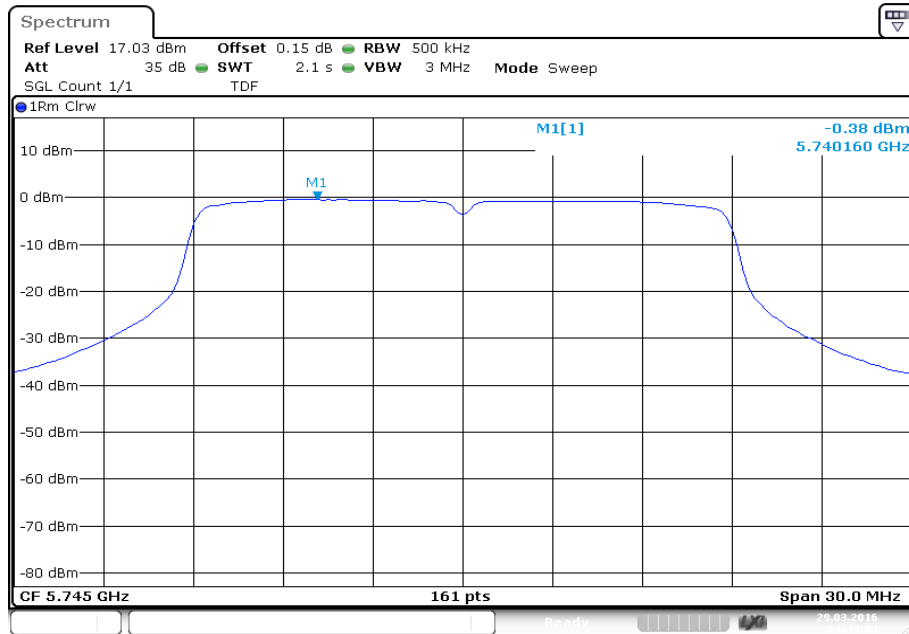


Plot 4: 5825 MHz



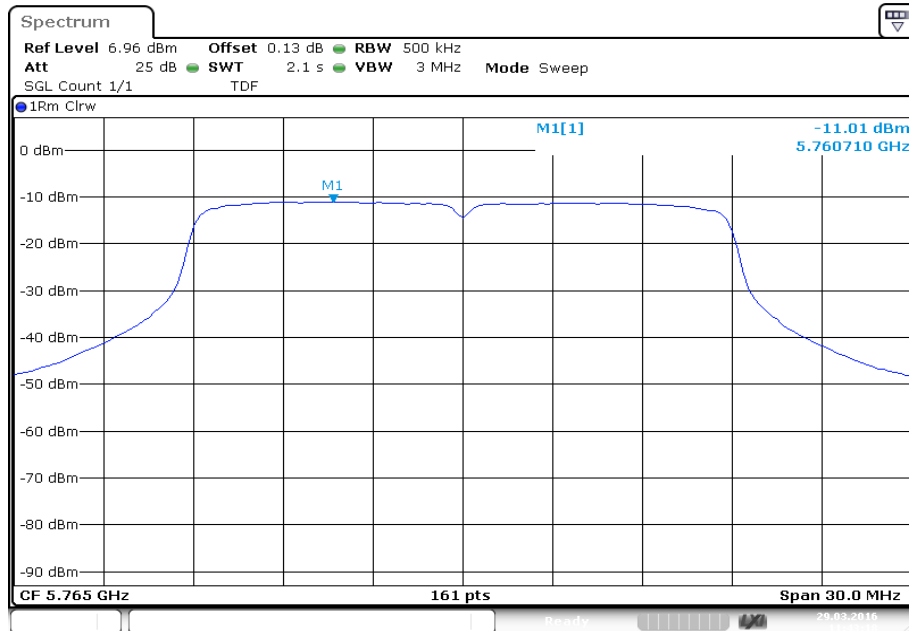
Plots: OFDM / n – mode, antenna port 2

Plot 1: 5745 MHz



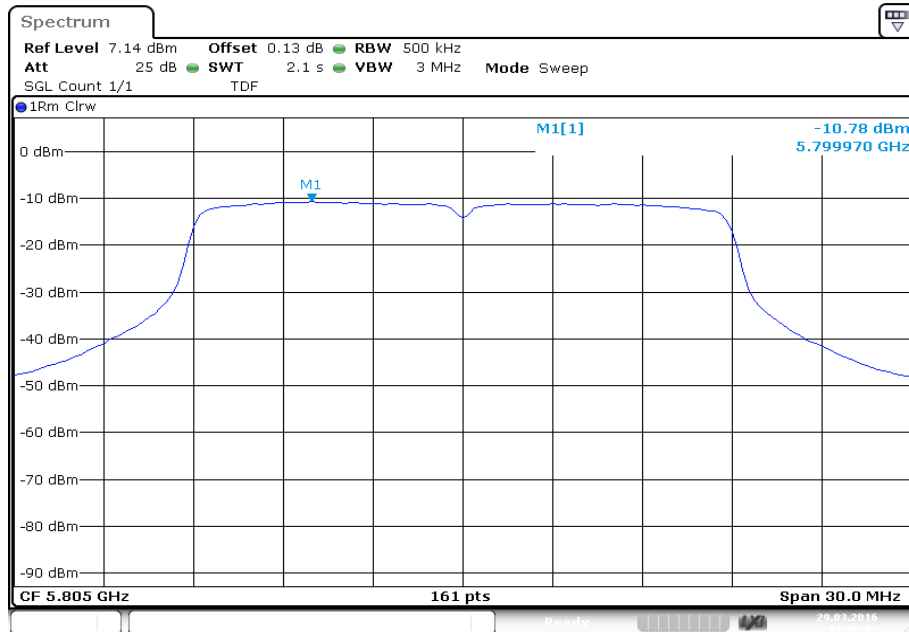
Date: 29.MAR.2016 11:45:05

Plot 2: 5765 MHz



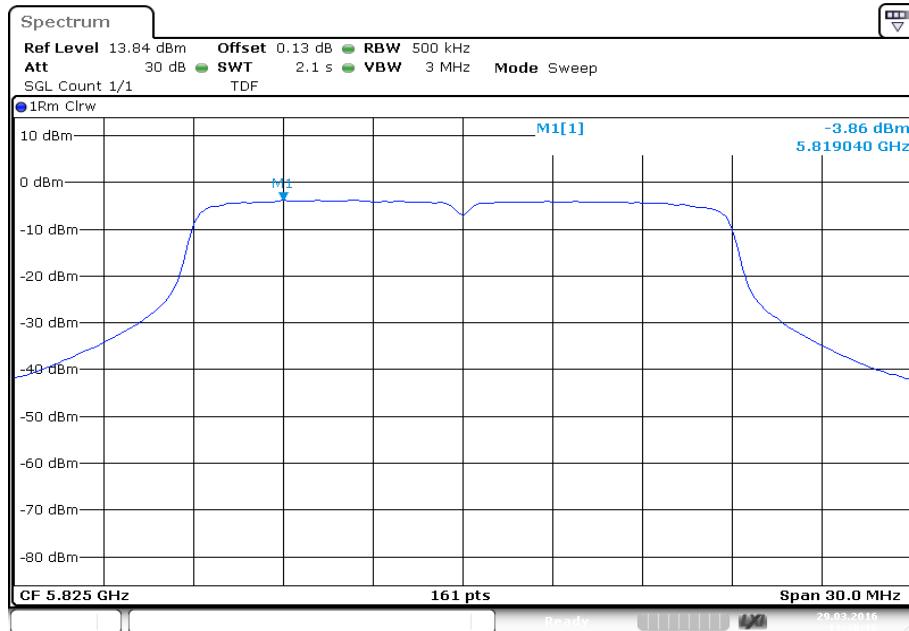
Date: 29.MAR.2016 11:43:19

Plot 3: 5805 MHz



Date: 29.MAR.2016 11:38:03

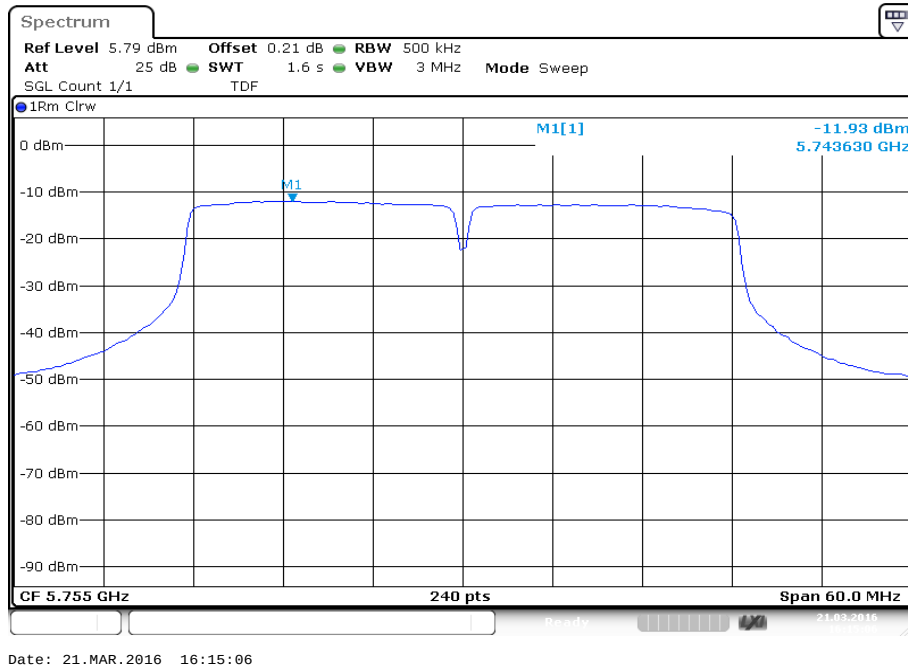
Plot 4: 5825 MHz



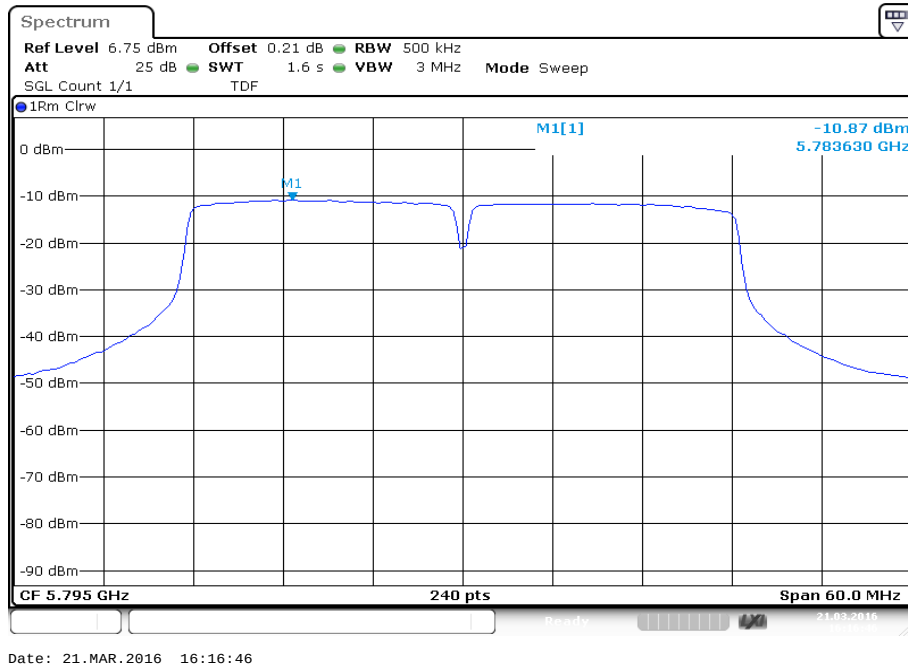
Date: 29.MAR.2016 11:36:17

Plots: OFDM / n40 – mode, antenna port 2

Plot 1: 5755 MHz

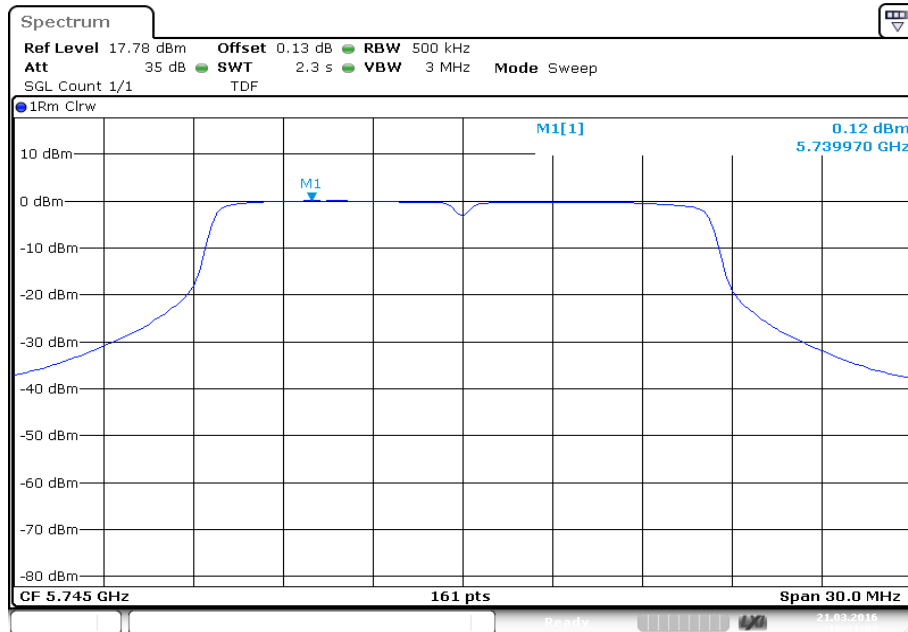


Plot 2: 5795 MHz

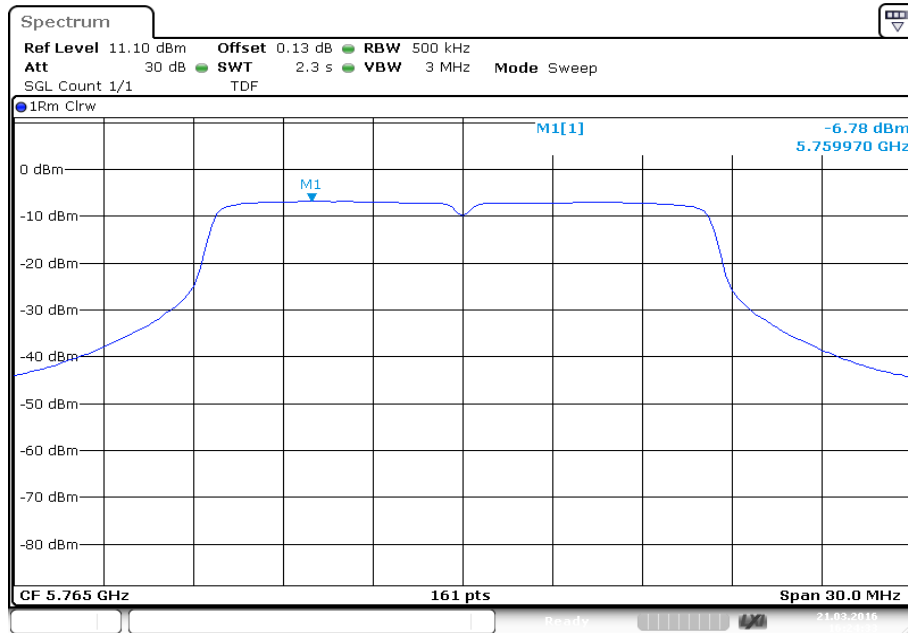


Plots: OFDM / a – mode, antenna port 3

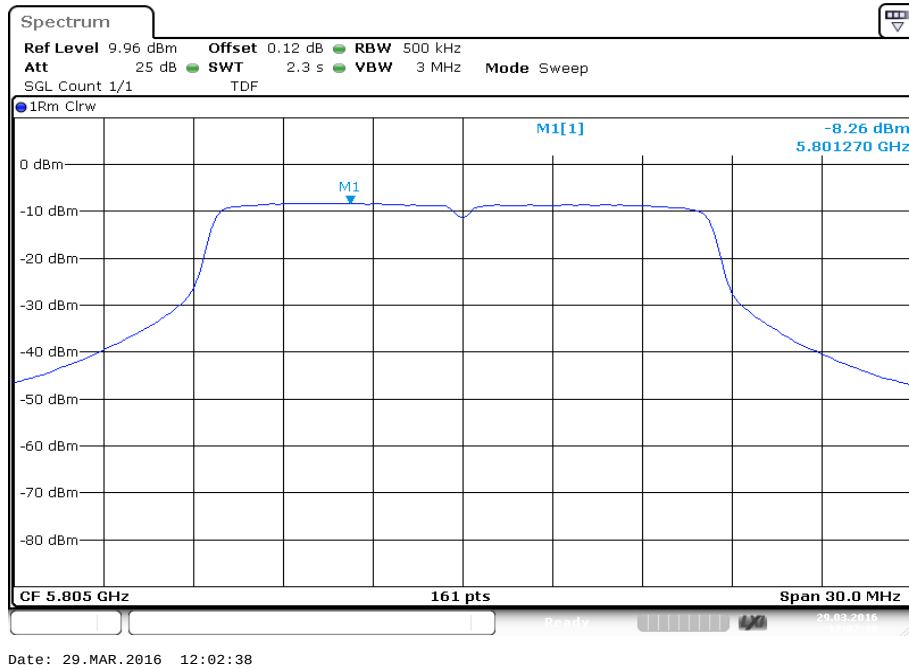
Plot 1: 5745 MHz



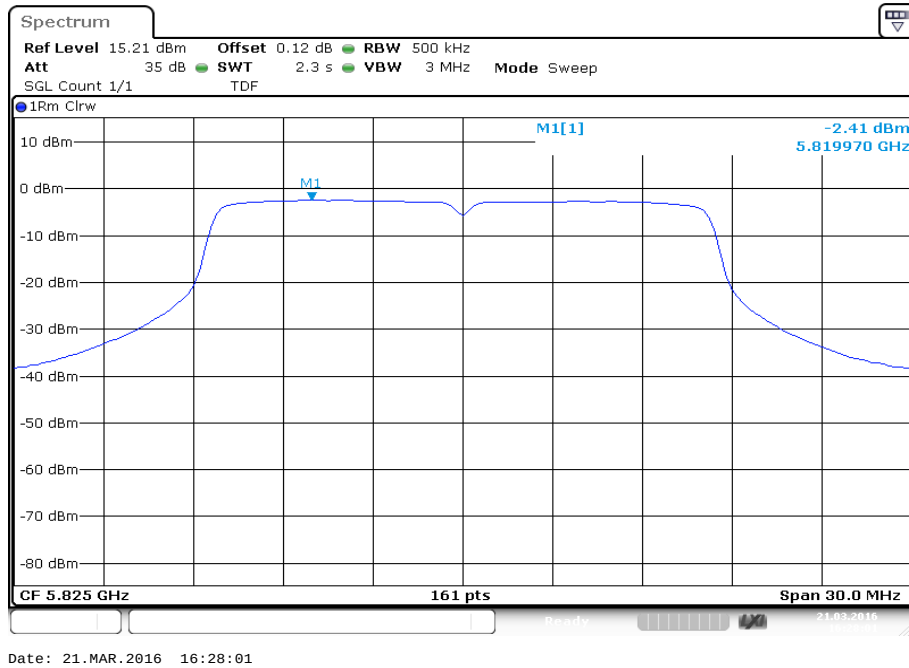
Plot 2: 5765 MHz



Plot 3: 5805 MHz

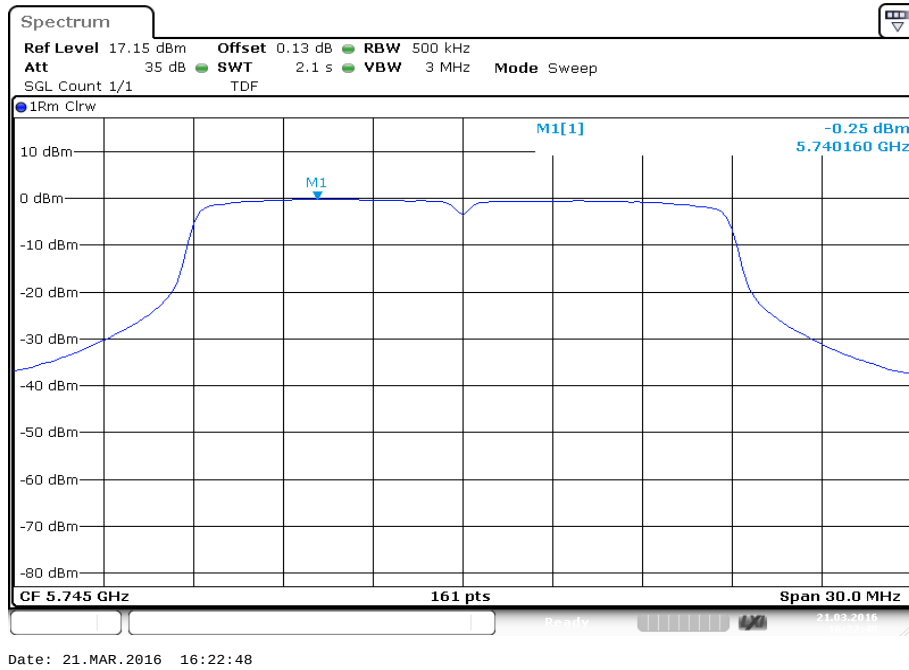


Plot 4: 5825 MHz

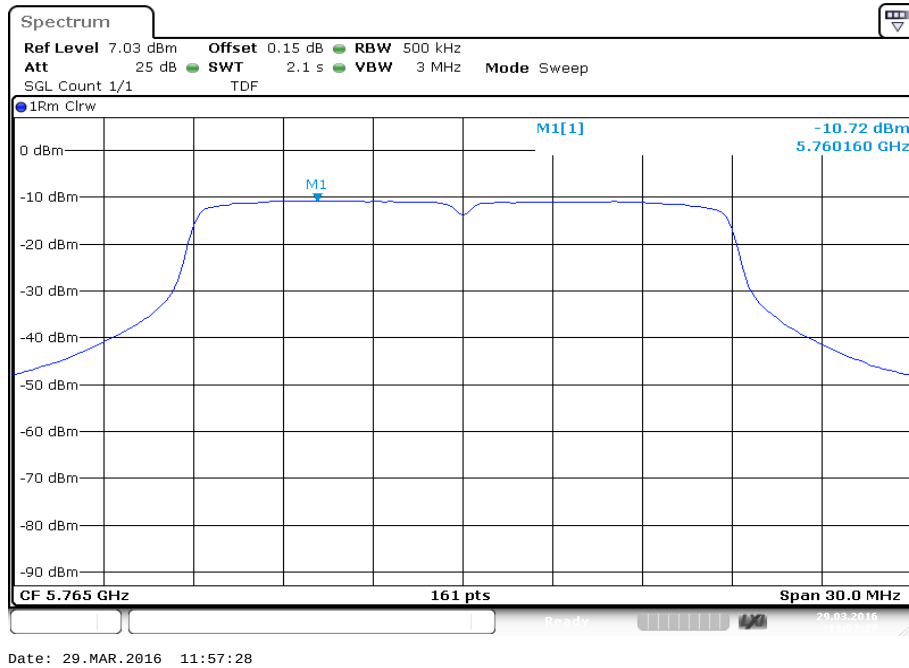


Plots: OFDM / n – mode, antenna port 3

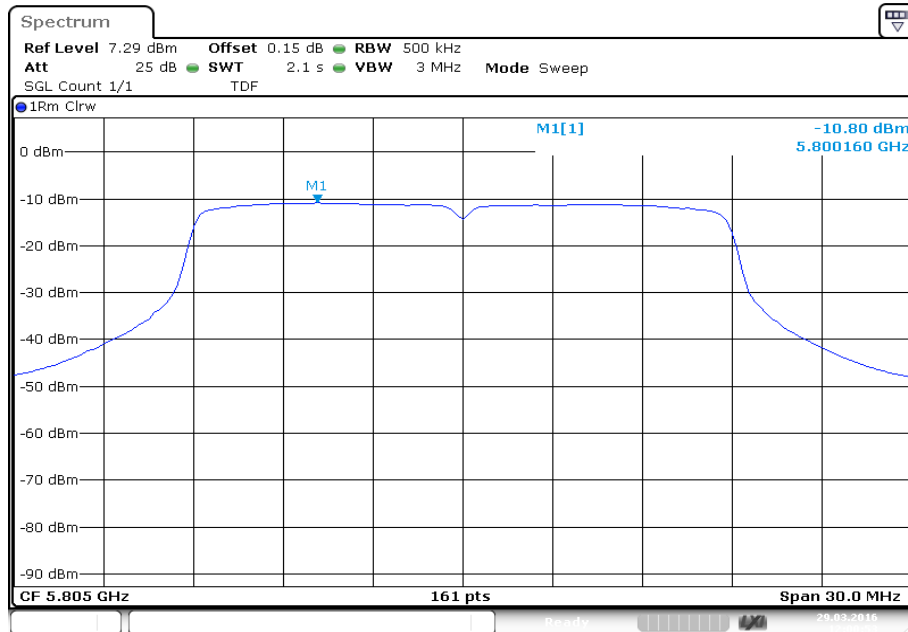
Plot 1: 5745 MHz



Plot 2: 5765 MHz

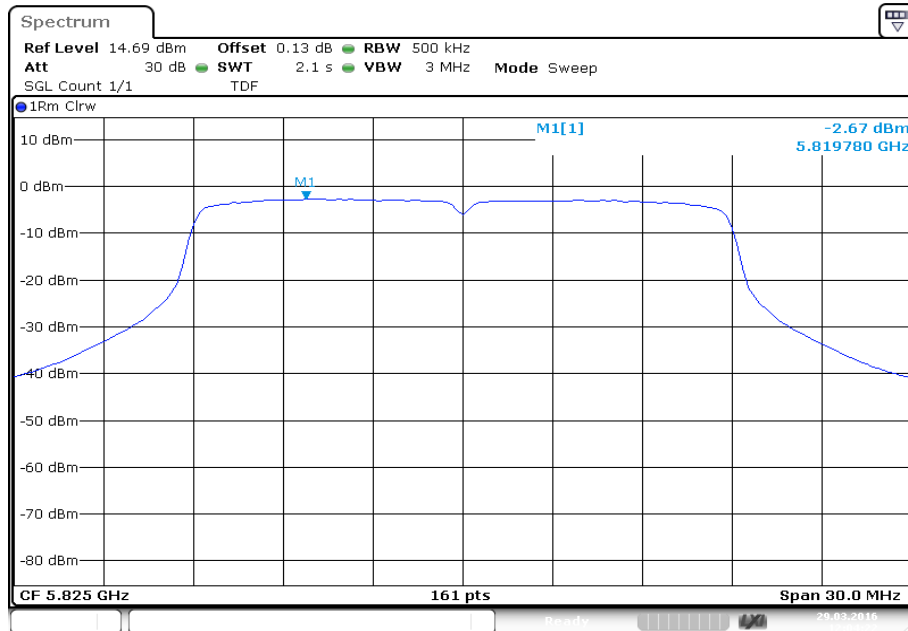


Plot 3: 5805 MHz



Date: 29.MAR.2016 12:00:54

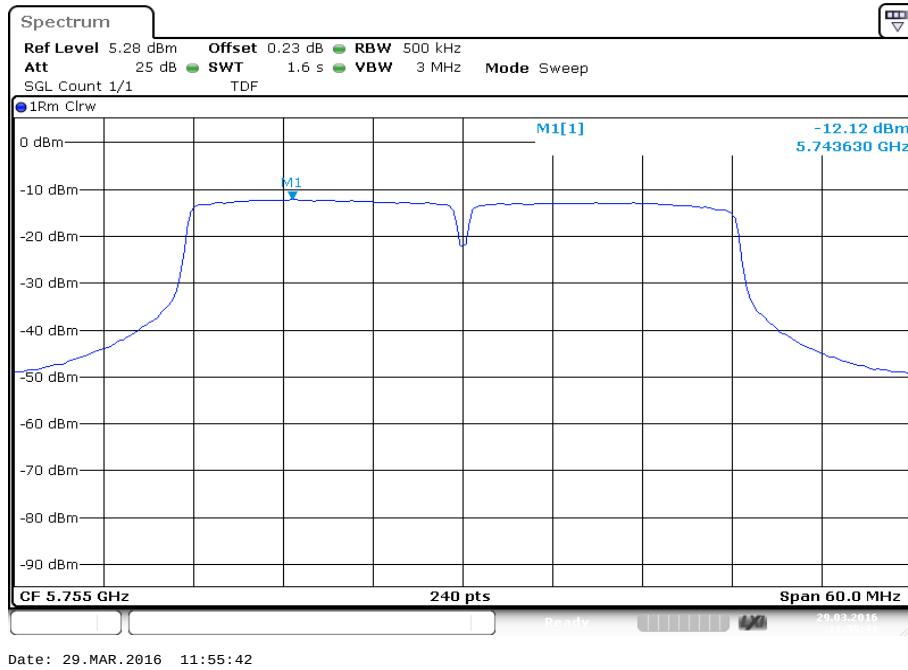
Plot 4: 5825 MHz



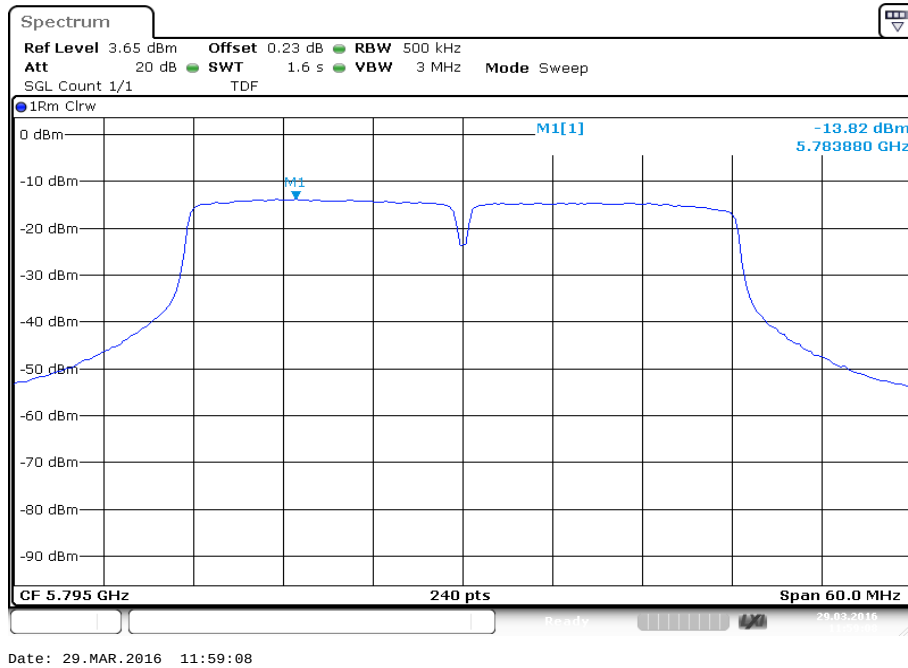
Date: 29.MAR.2016 12:04:23

Plots: OFDM / n40 – mode, antenna port 3

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 7.5
Measurement uncertainty:	see chapter 8

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	6 dB bandwidth [MHz]			
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
	16.39	16.36	16.39	16.36

OFDM / n HT20 – mode	6 dB bandwidth [MHz]			
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
	17.62	17.62	17.56	17.38

OFDM / n HT40 – mode	6 dB bandwidth [MHz]	
Channel	5755 MHz	5795 MHz
	36.14	35.84

Result: antenna port 2

OFDM / a – mode	6 dB bandwidth [MHz]			
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
	16.39	16.36	16.33	16.36

OFDM / n HT20 – mode	6 dB bandwidth [MHz]			
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
	17.32	17.59	17.59	17.05

OFDM / n HT40 – mode	6 dB bandwidth [MHz]	
Channel	5755 MHz	5795 MHz
	35.84	36.02

Result: antenna port 3

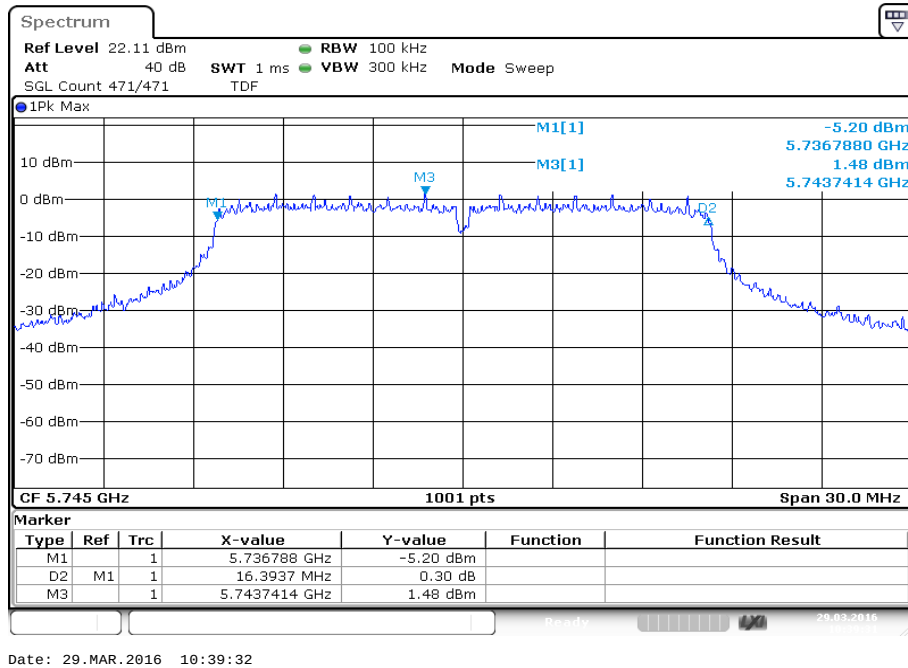
OFDM / a – mode	6 dB bandwidth [MHz]			
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
	16.39	16.36	16.39	16.39

OFDM / n HT20 – mode	6 dB bandwidth [MHz]			
Channel	5745 MHz	5765 MHz	5805 MHz	5825 MHz
	17.41	17.59	17.35	17.59

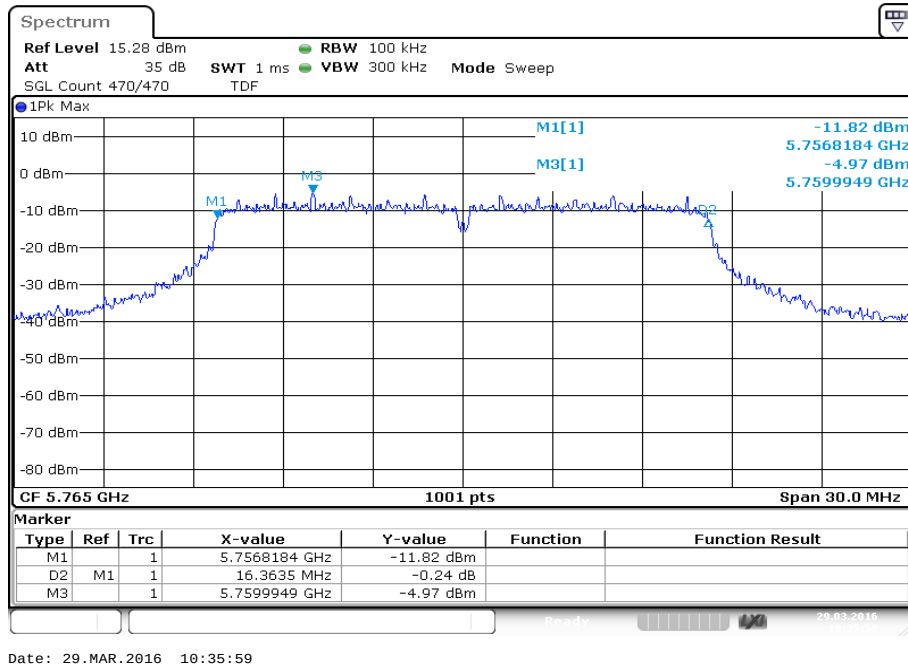
OFDM / n HT40 – mode	6 dB bandwidth [MHz]	
Channel	5755 MHz	5795 MHz
	36.14	36.02

Plots: OFDM / a – mode; antenna port 1

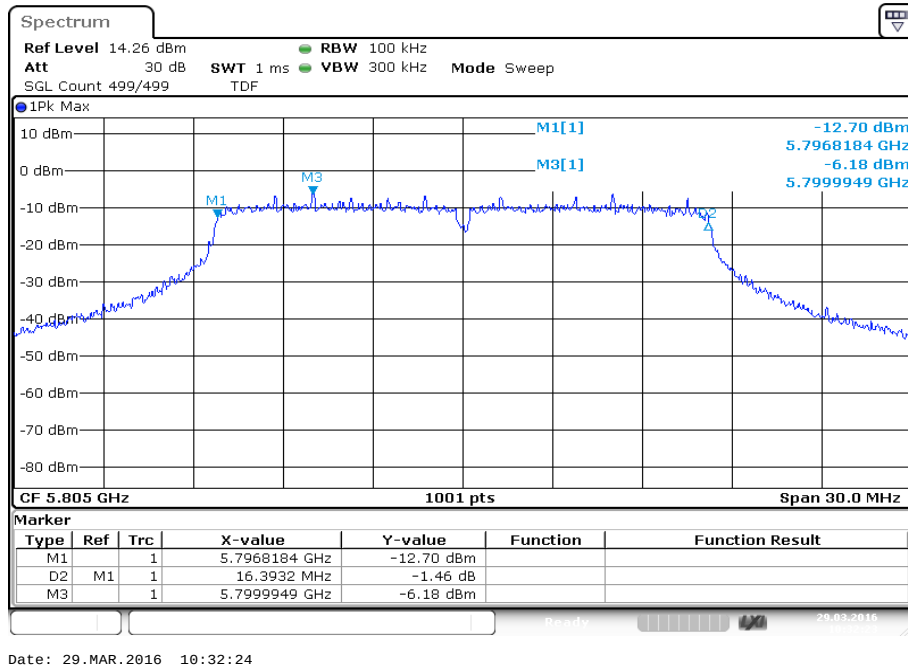
Plot 1: 5745 MHz



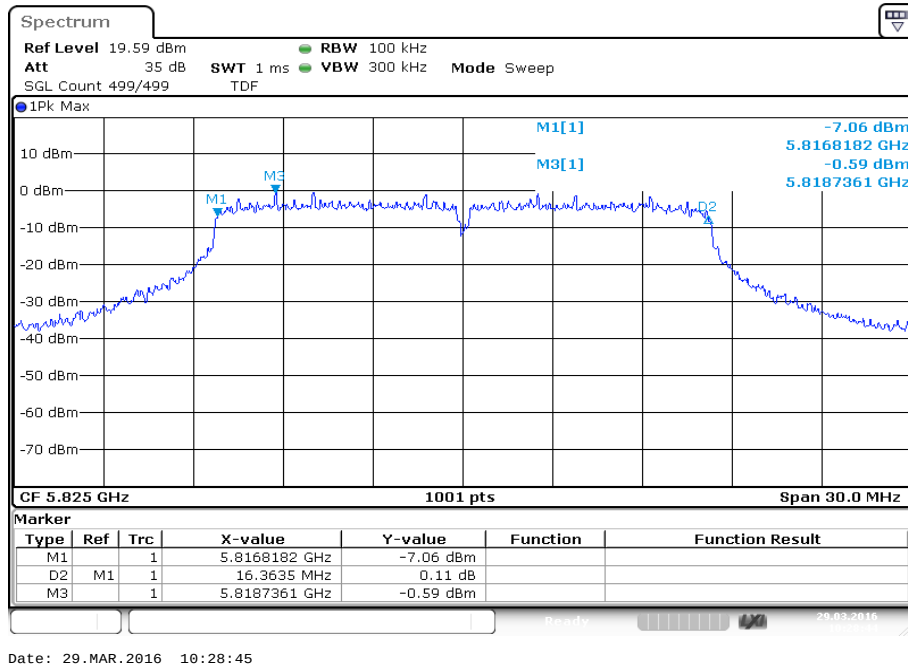
Plot 2: 5765 MHz



Plot 3: 5805 MHz

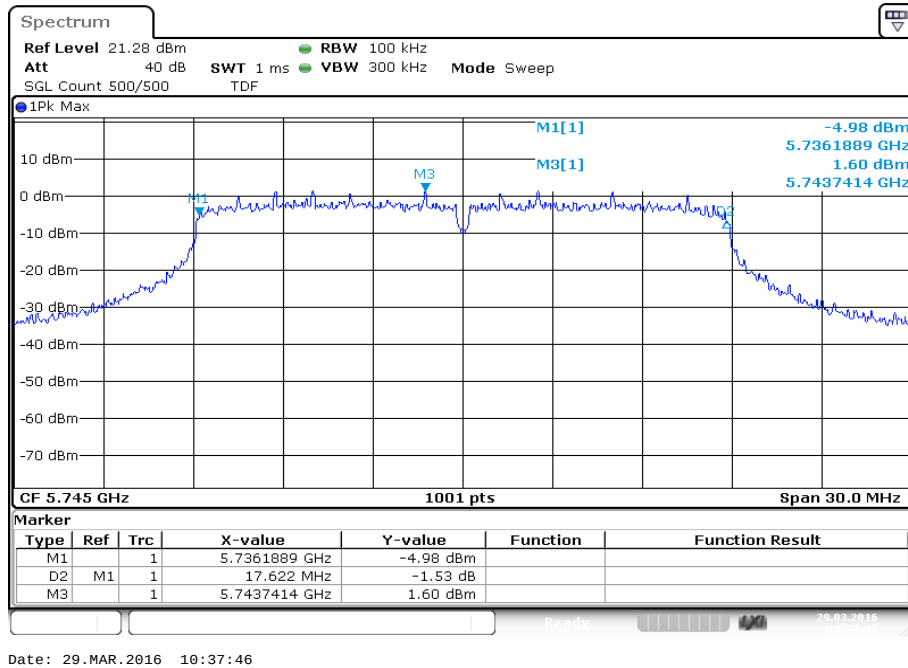


Plot 4: 5825 MHz

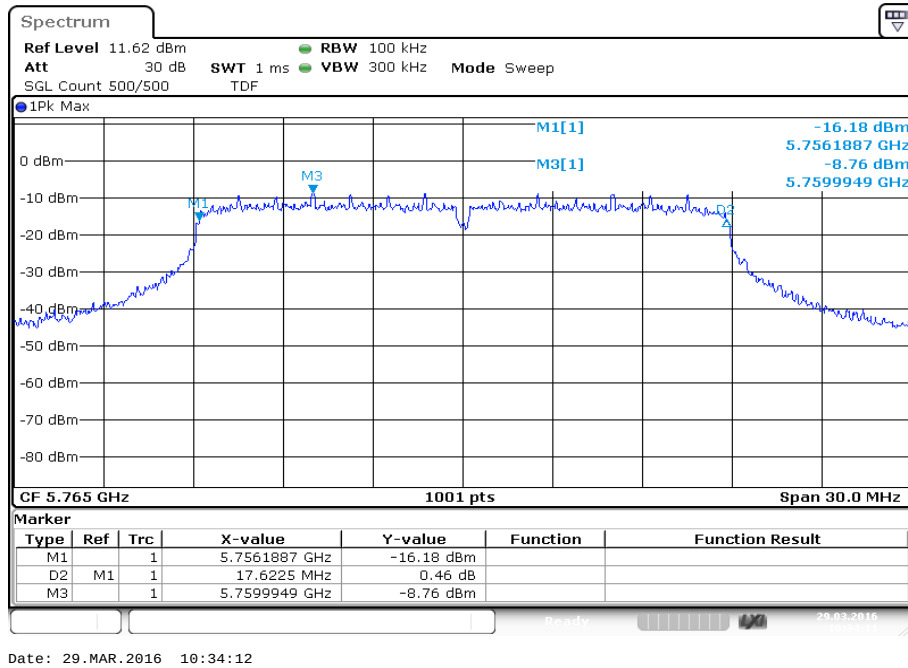


Plots: OFDM / n HT20 – mode; antenna port 1

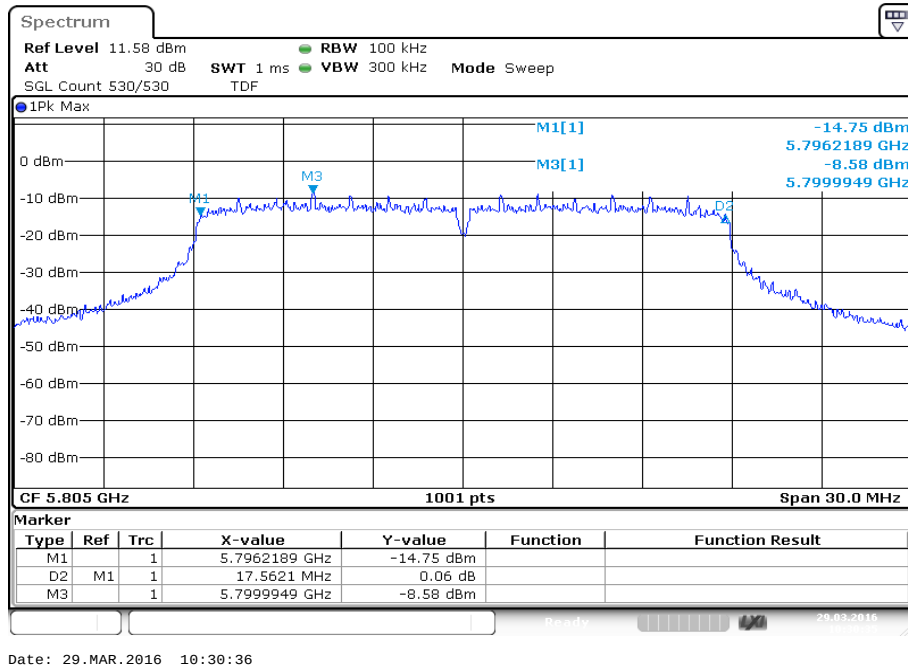
Plot 1: 5745 MHz



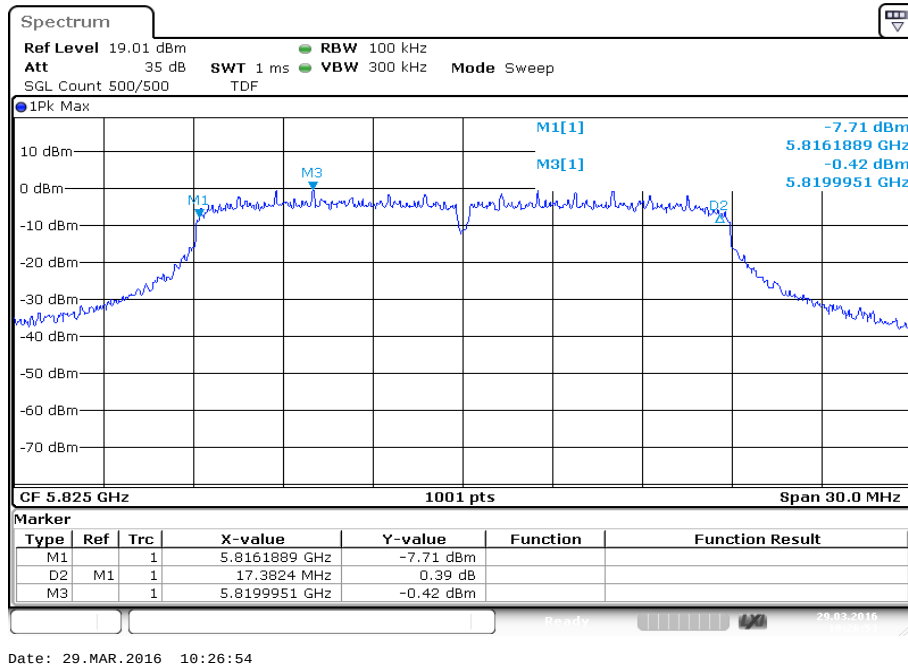
Plot 2: 5765 MHz



Plot 3: 5805 MHz

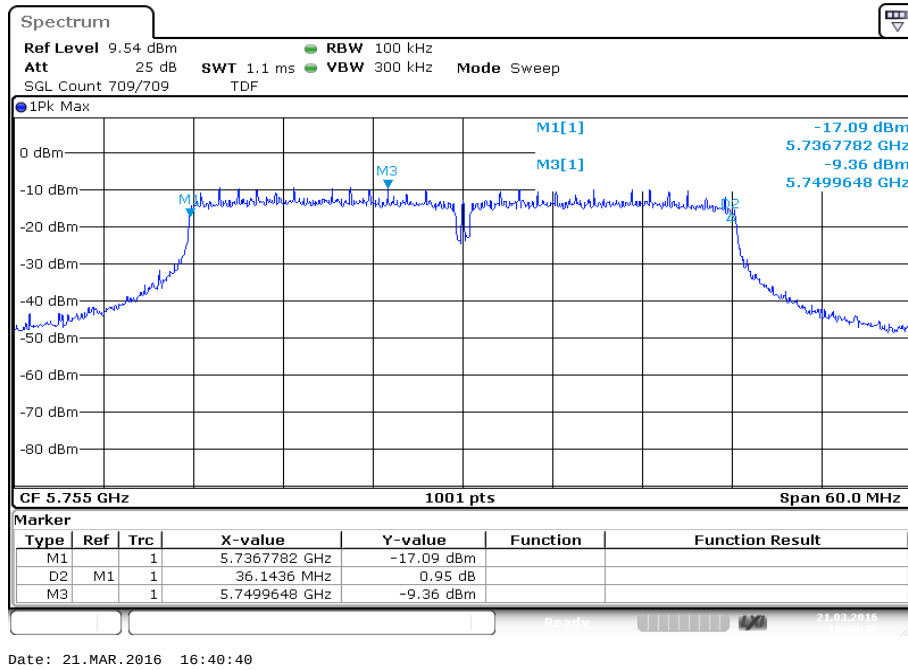


Plot 4: 5825 MHz

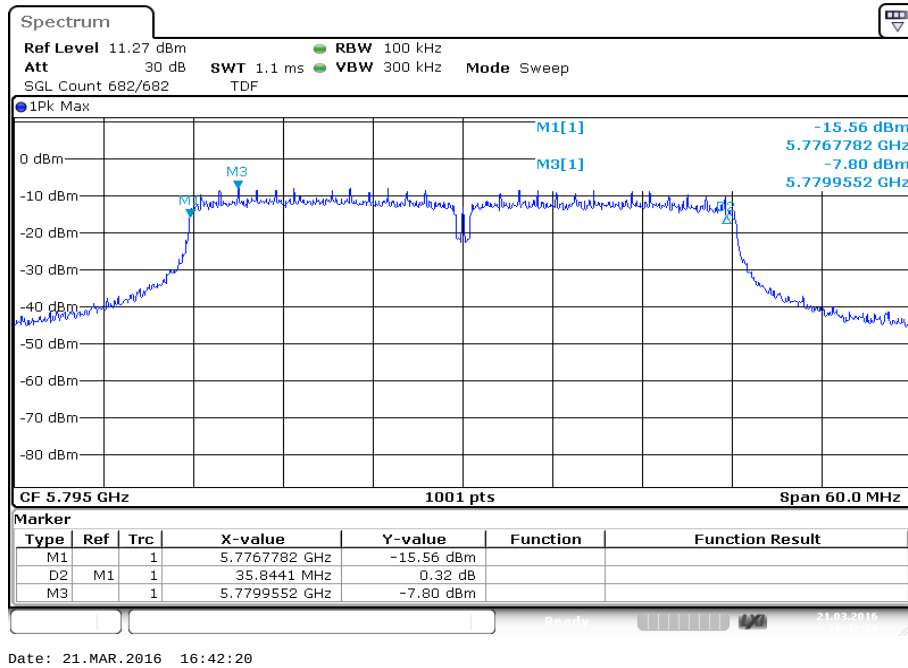


Plots: OFDM / n HT40 – mode; antenna port 1

Plot 1: 5755 MHz

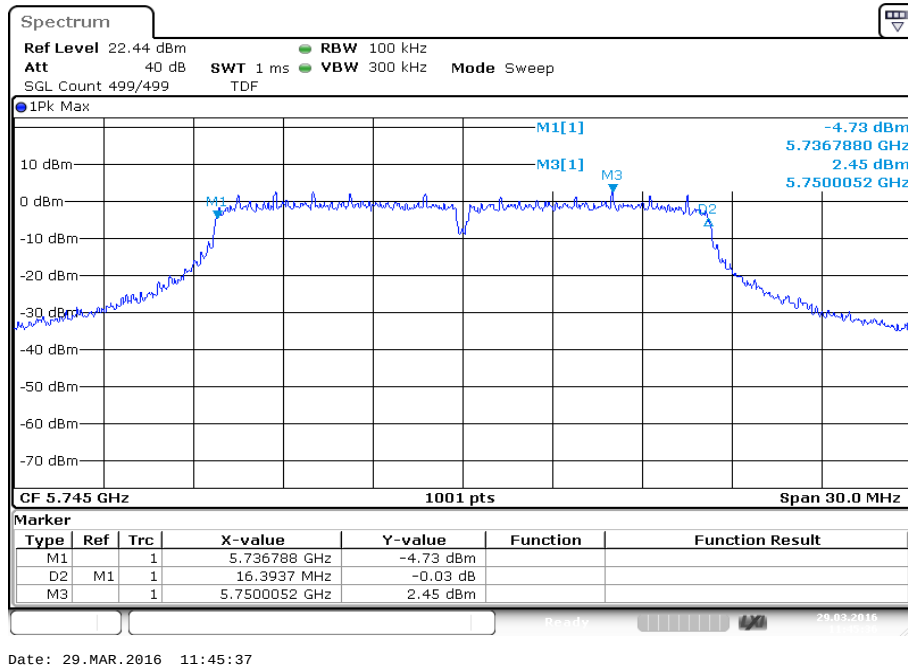


Plot 2: 5795 MHz

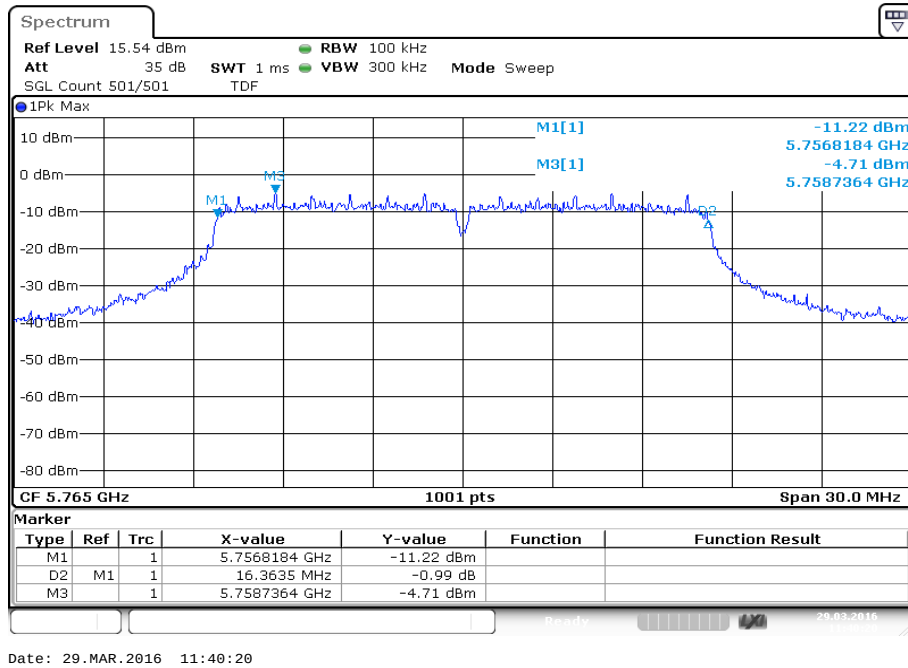


Plots: OFDM / a – mode; antenna port 2

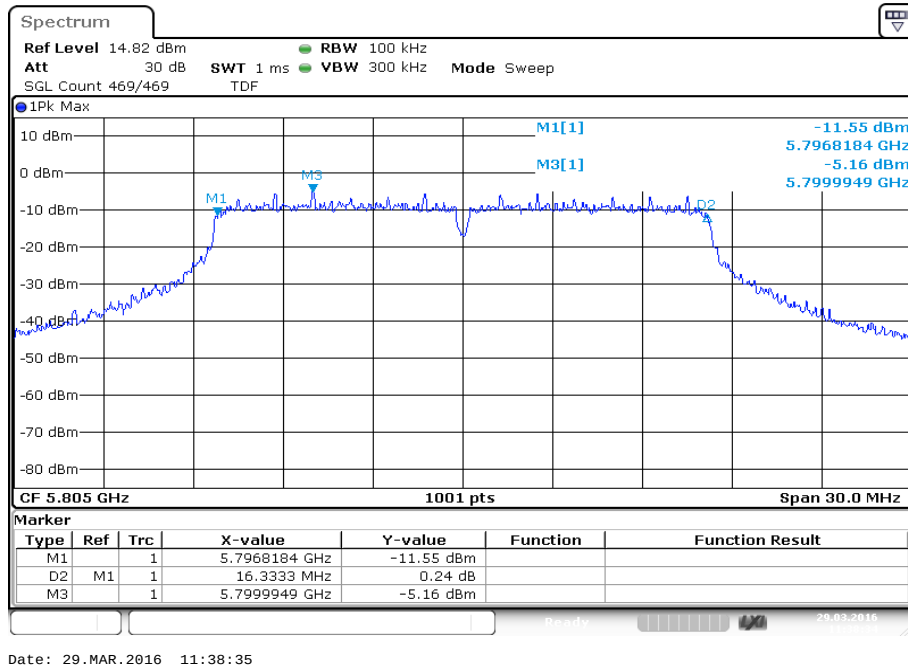
Plot 1: 5745 MHz



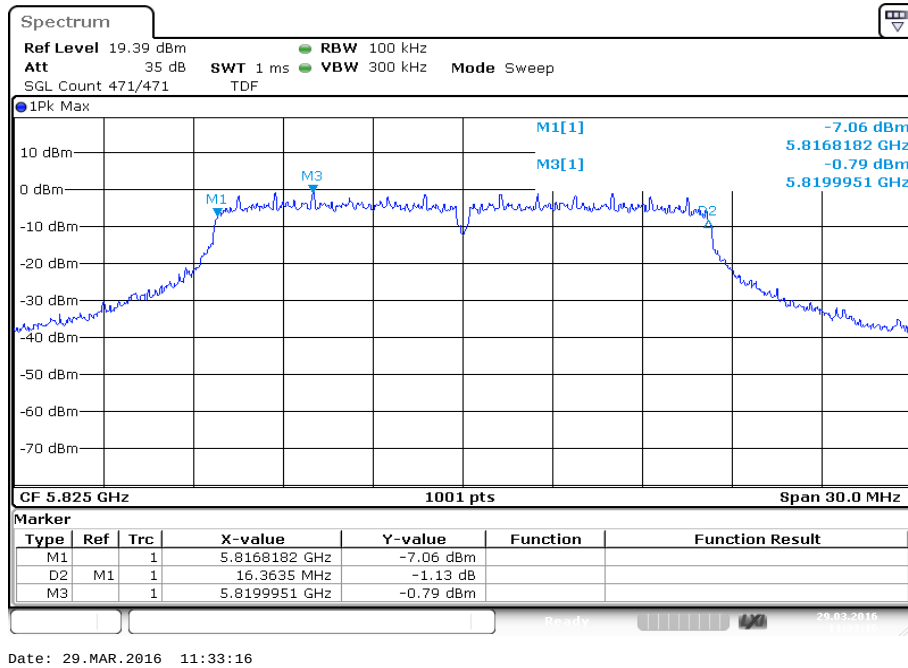
Plot 2: 5765 MHz



Plot 3: 5805 MHz

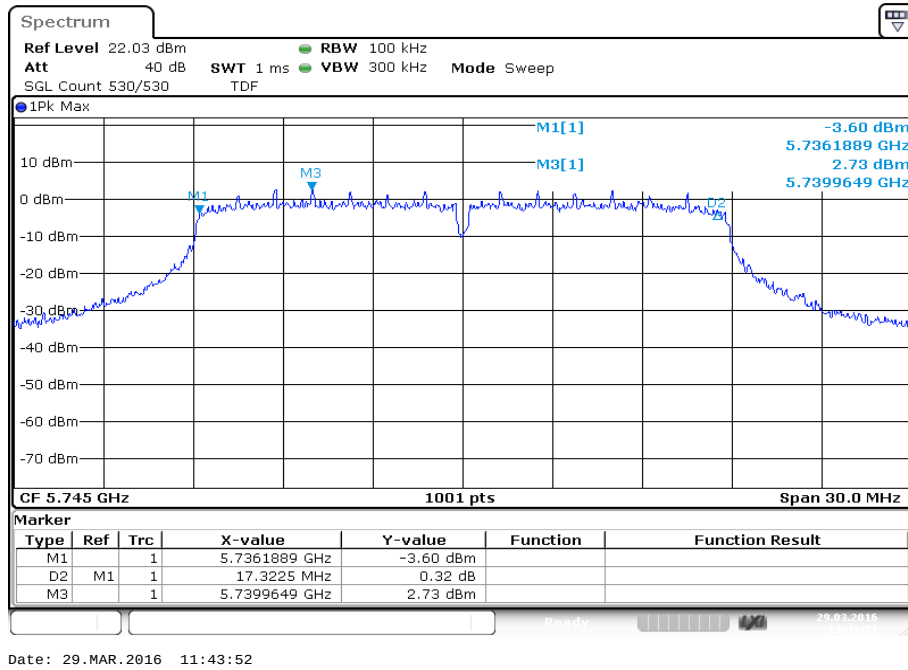


Plot 4: 5825 MHz

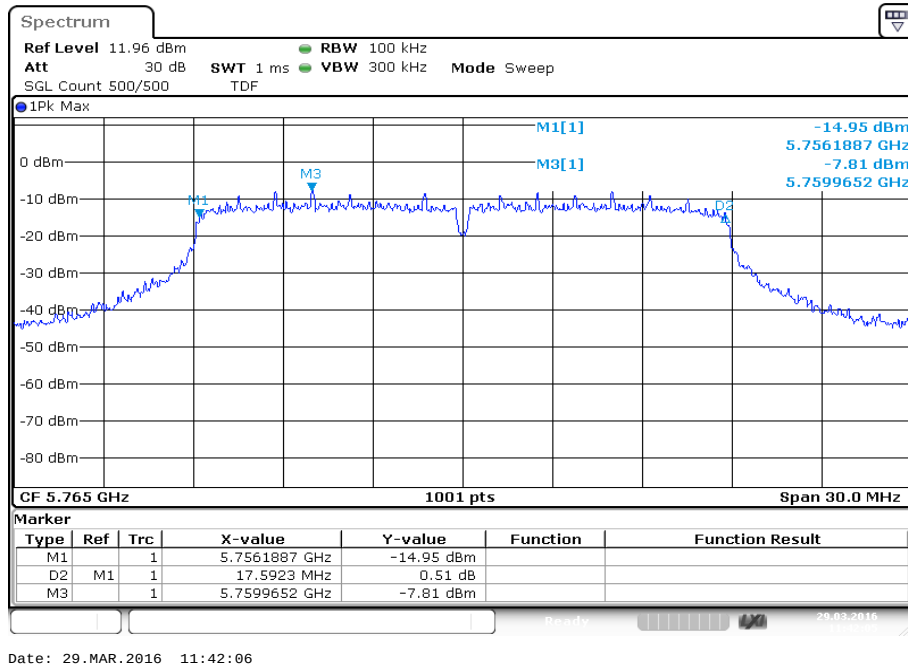


Plots: OFDM / n HT20 – mode; antenna port 2

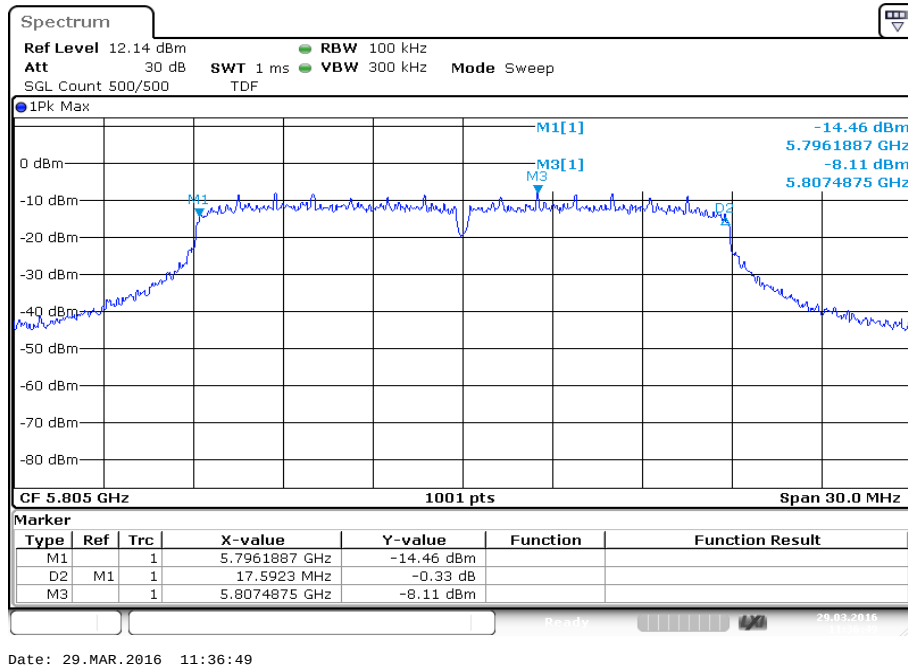
Plot 1: 5745 MHz



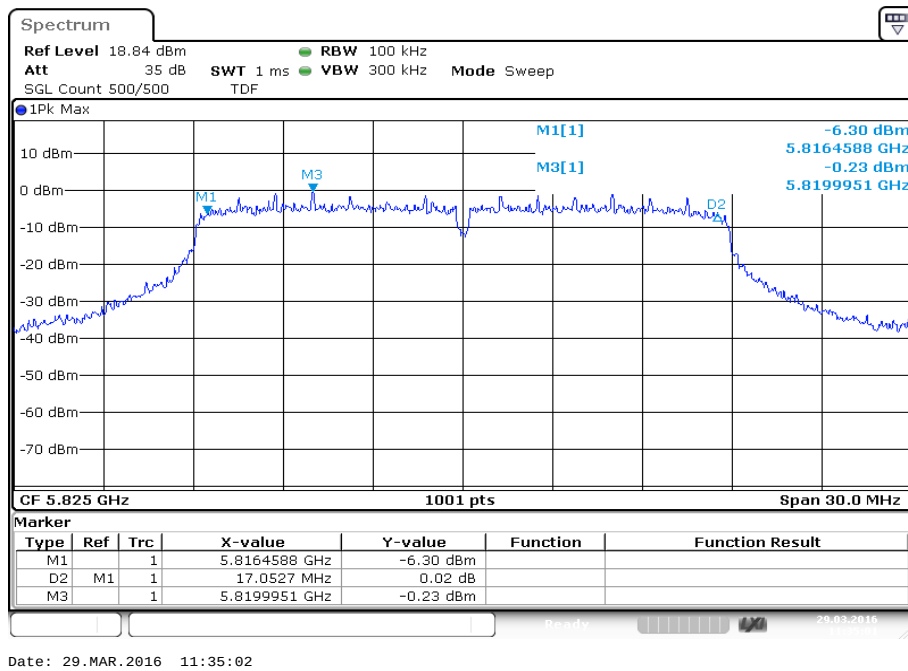
Plot 2: 5765 MHz



Plot 3: 5805 MHz

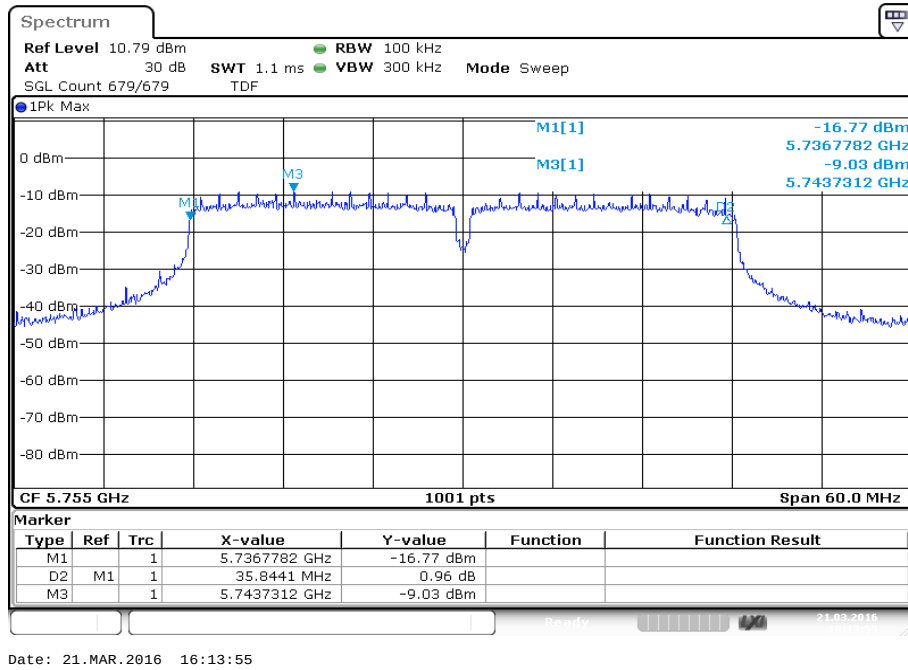


Plot 4: 5825 MHz

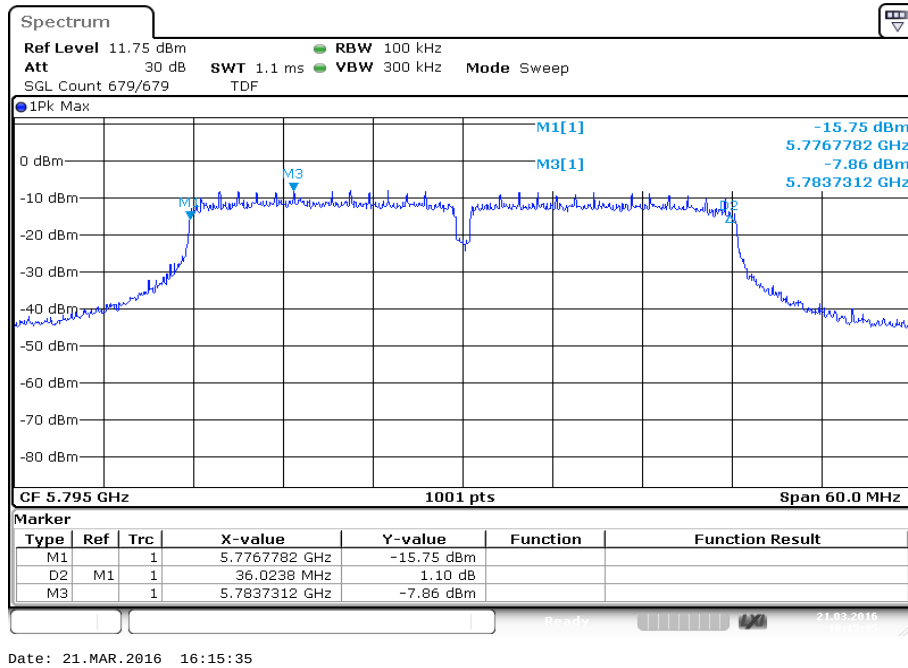


Plots: OFDM / n HT40 – mode; antenna port 2

Plot 1: 5755 MHz

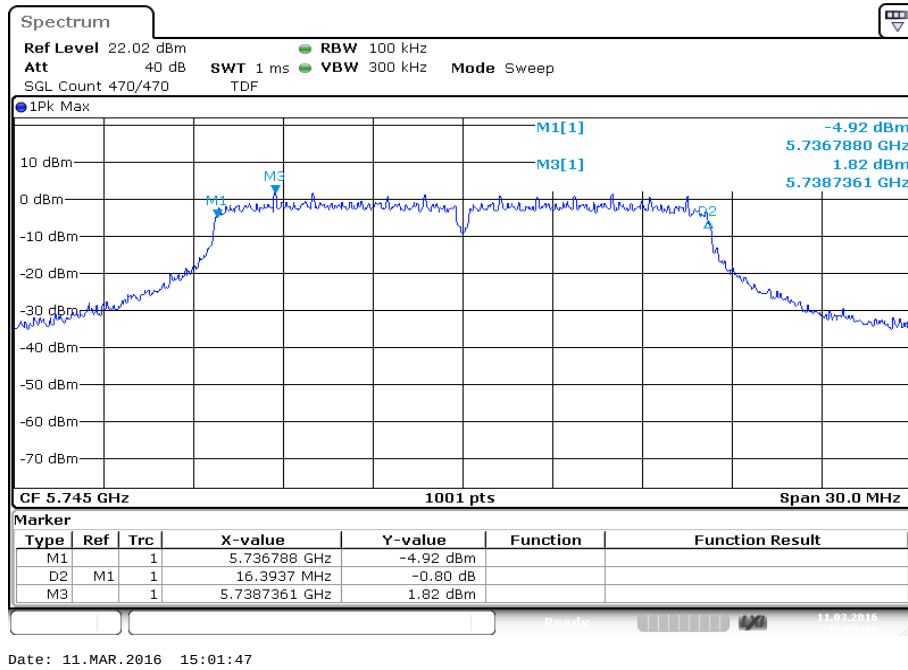


Plot 2: 5795 MHz

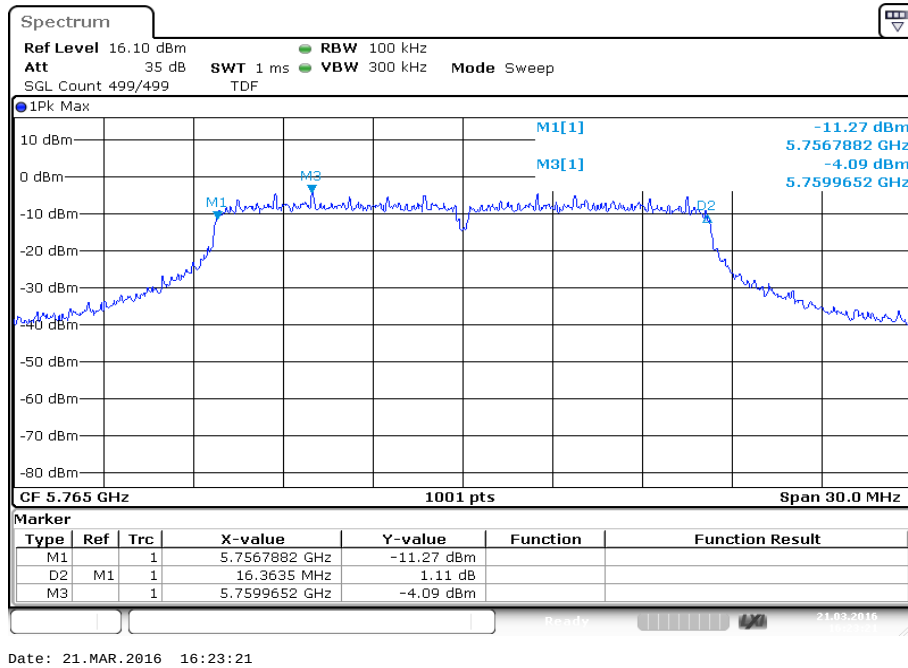


Plots: OFDM / a – mode; antenna port 3

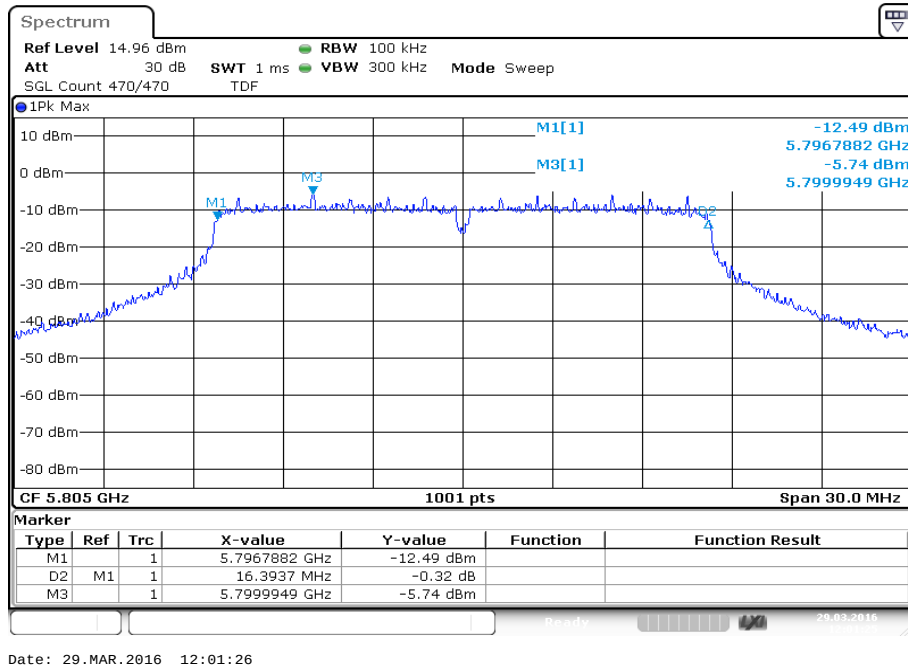
Plot 1: 5745 MHz



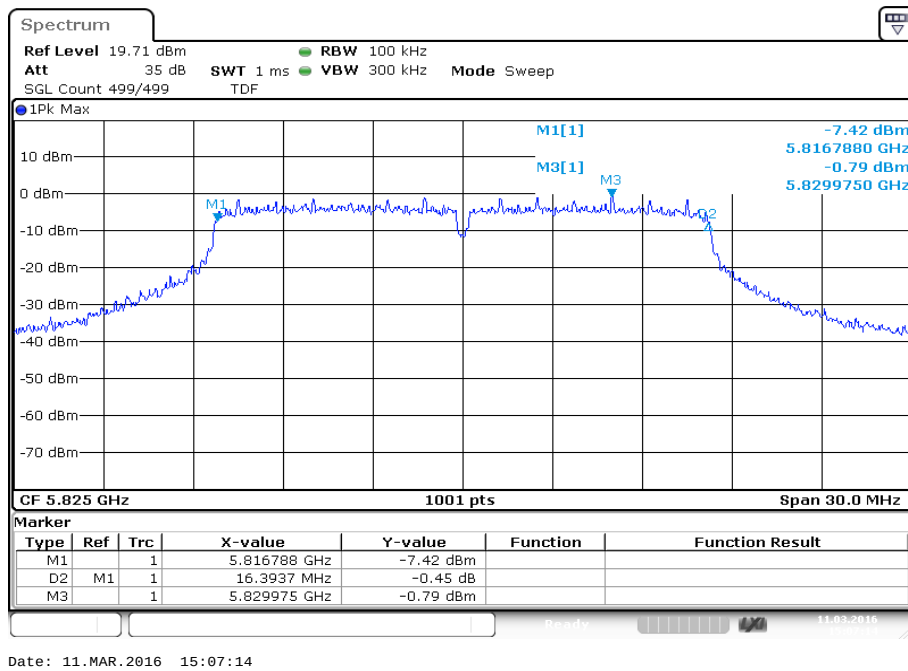
Plot 2: 5765 MHz



Plot 3: 5805 MHz

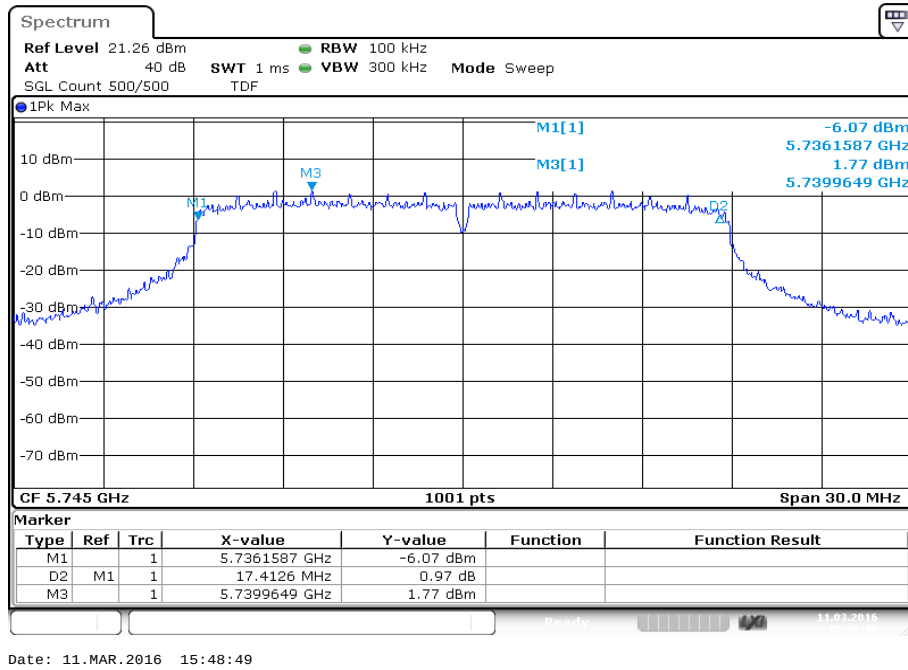


Plot 4: 5825 MHz

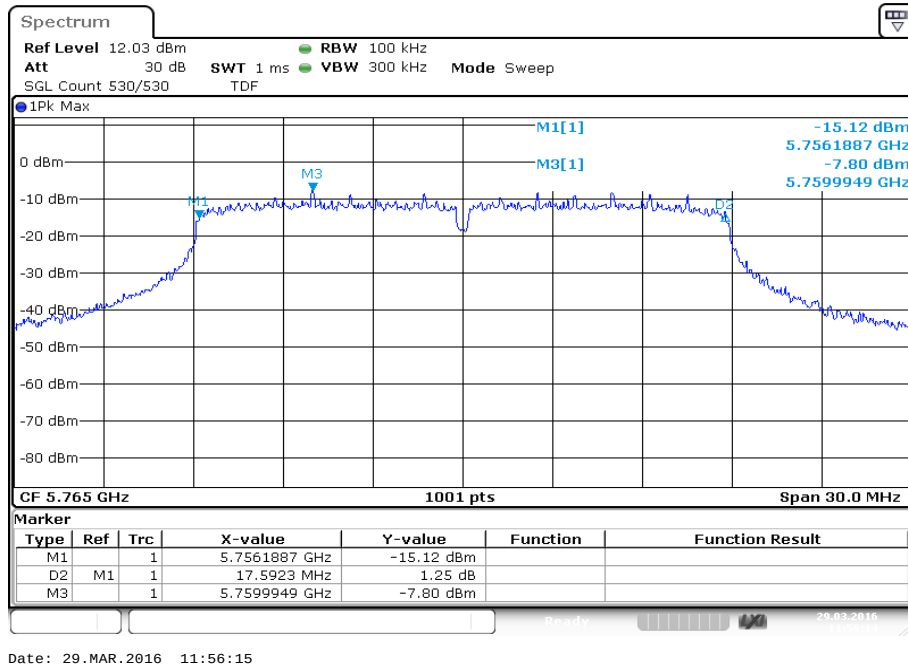


Plots: OFDM / n HT20 – mode; antenna port 3

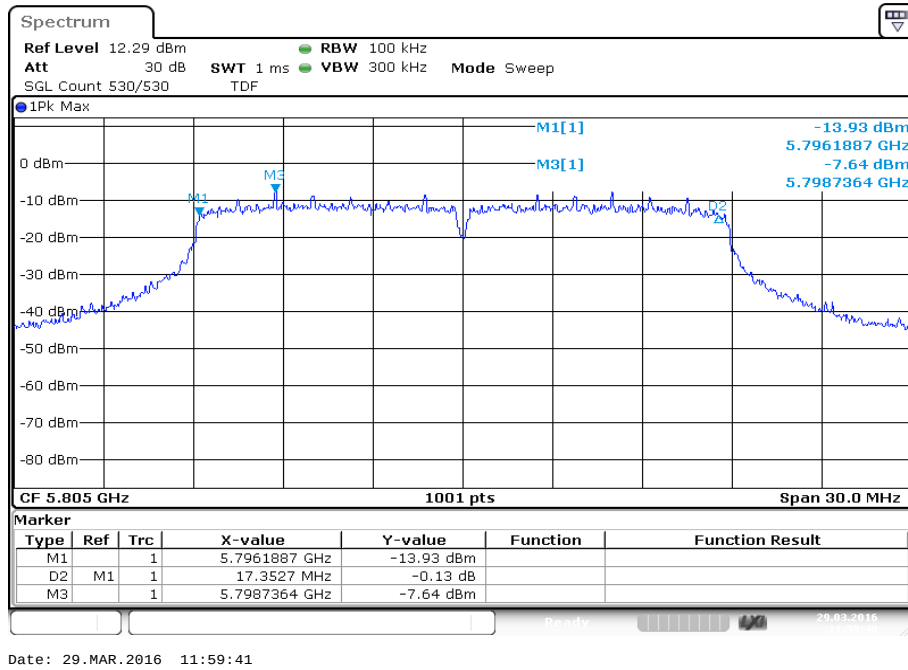
Plot 1: 5745 MHz



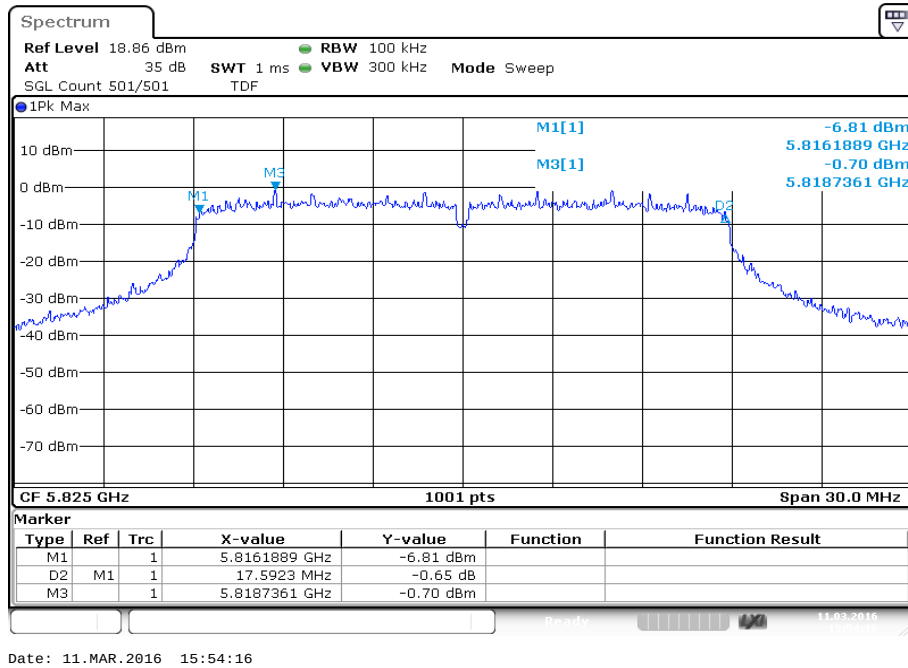
Plot 2: 5765 MHz



Plot 3: 5805 MHz

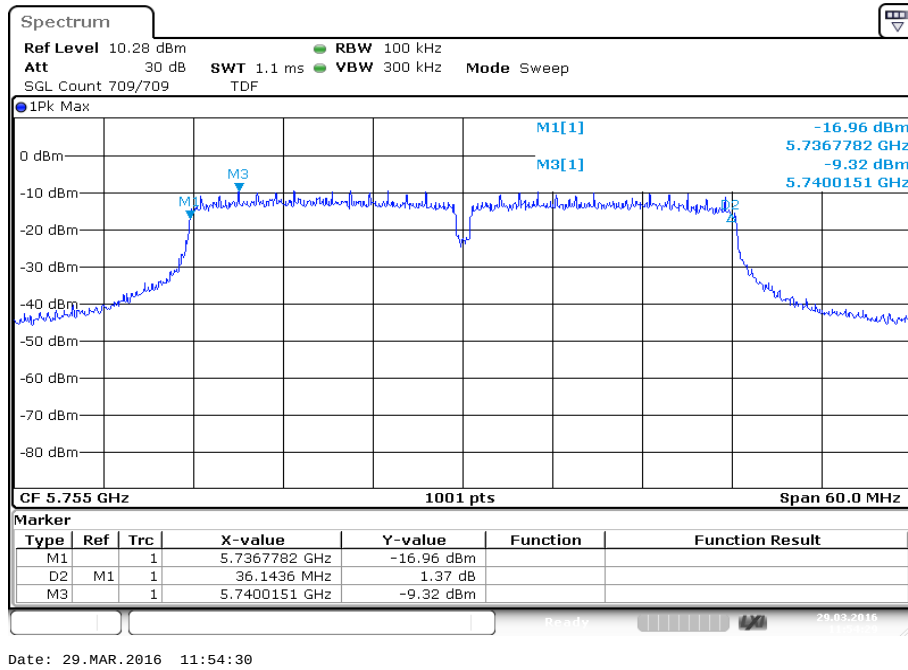


Plot 4: 5825 MHz



Plots: OFDM / n HT40 – mode; antenna port 3

Plot 1: 5755 MHz



Plot 2: 5795 MHz

