
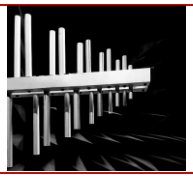
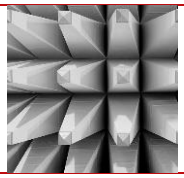

CETECOM™
CETECOM ICT Services
consulting - testing - certification ➤➤➤

TEST REPORT

Test report no.: 1-1294/16-01-05

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-00

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
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Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-00

Applicant

Ingenico Group
9 Avenue de la Gare Rovaltain
26958 Valence Cedex 9 / FRANCE
Phone: -/-
Fax: -/-
Contact: Jean-Baptiste Palisse
e-mail: jean-baptiste.palisse@ingenico.com
Phone: +33 4 75 84 21 74

Manufacturer

Ingenico Group
9 Avenue de la Gare Rovaltain
26958 Valence Cedex 9 / FRANCE

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 247 Issue 1	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE-LAN) Devices
RSS - Gen Issue 4	Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**Smart Terminal**
Model name:	**iSMPv4**
FCC ID:	**XKB-ISMP4CLWIBT**
IC:	**2586D-ISMP4CLWIBT**
Frequency:	UNII bands 5150 MHz to 5250 MHz; 5250 MHz to 5350 MHz; 5470 MHz to 5725 MHz and 5725 MHz to 5850 MHz
Technology tested:	(WLAN (OFDM/a-; n HT20- & n HT40-mode)
Antenna:	Integrated antenna
Power supply:	3.80 V DC by Li-ion battery (Type: 296196699) 110 V AC by mains adapter (Type: PSM10R-050)
Temperature range:	0°C to +40°C

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-150828, email=marco.bertolino@cetecom.com, c=DE
2016.04.30 13:08:40 +02'00'

Marco Bertolino
Lab Manager
Radio Communications & EMC

Test performed:

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2016.04.30 13:04:14 +02'00'

Andreas Luckenbill
Lab Manager
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2016-04-06
Date of receipt of test item:	2016-04-11
Start of test:	2016-04-11
End of test:	2016-04-29
Person(s) present during the test:	-/-

3 Test standard/s and references

Test standard	Date	Description
47 CFR Part 15	-/-	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 247 Issue 1	May 2015	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE-LAN) Devices
RSS - Gen Issue 4	November 2014	Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus

Guidance	Version	Description
UNII: KDB 789033 D02	v01r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E
UNII: KDB 905462 D02	v01r02	Compliance measurement procedures for unlicensed - national information infrastructure devices operating in the 5250 - 5350 MHz and 5470 - 5725 MHz bands incorporating dynamic frequency selection
ANSI C63.4-2014	-/-	American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
ANSI C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+23 °C during room temperature tests No tests under extreme conditions required. No tests under extreme conditions required.
Relative humidity content	:		42 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	V_{nom} V_{max} V_{min}	3.80 V DC by Li-ion battery (Type: 296196699) 110 V AC by mains adapter (Type: PSM10R-050) No tests under extreme conditions required. No tests under extreme conditions required.

5 Test item

5.1 General description

Kind of test item	:	Smart Terminal
Type identification	:	iSMPv4
HMN	:	-/-
PMN	:	ISMP4
HVIN	:	ISMP4 CL/Wifi/BT
FVIN	:	Based on SDK9.29
S/N serial number	:	Conducted unit: 16082PP00008731 Radiated unit: 16084PP00008776
HW hardware status	:	-/-
SW software status	:	-/-
Frequency band	:	UNII bands 5150 MHz to 5250 MHz; 5250 MHz to 5350 MHz; 5470 MHz to 5725 MHz and 5725 MHz to 5850 MHz (lowest channel 5180 MHz; highest channel 5825 MHz)
Type of radio transmission Use of frequency spectrum	: :	OFDM
Type of modulation	:	BPSK, QPSK, 16 – QAM, 64 – QAM
Number of channels	:	20 MHz channels: 19 40 MHz channels: 8
Antenna	:	Integrated antenna
Power supply	:	3.8 V DC by Li-ion battery (Type: 296196699) 110 V AC by mains adapter (Type: PSM10R-050)
Temperature range	:	0°C to +40°C

5.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-1294/16-01-20_AnnexA
1-1294/16-01-20_AnnexB
1-1294/16-01-20_AnnexD

6 Test laboratories sub-contracted

None

7 Description of the test setup

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

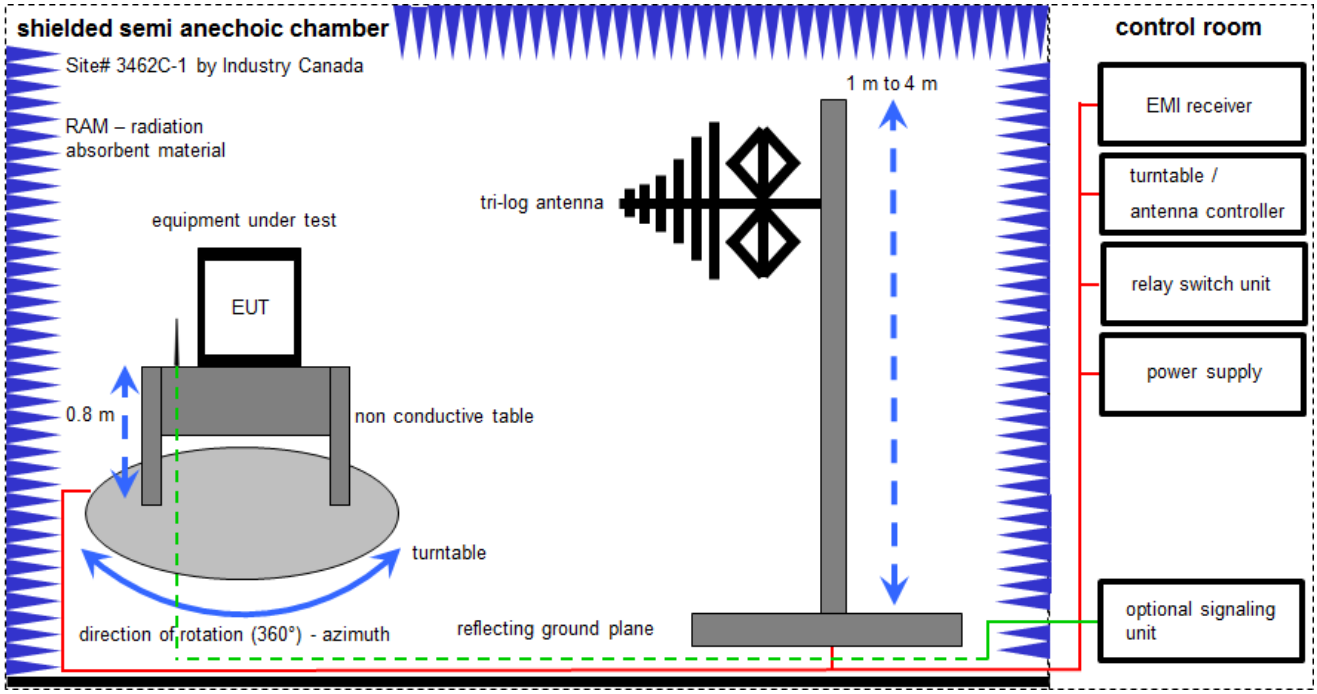
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Measurement distance: tri-log antenna 10 meter

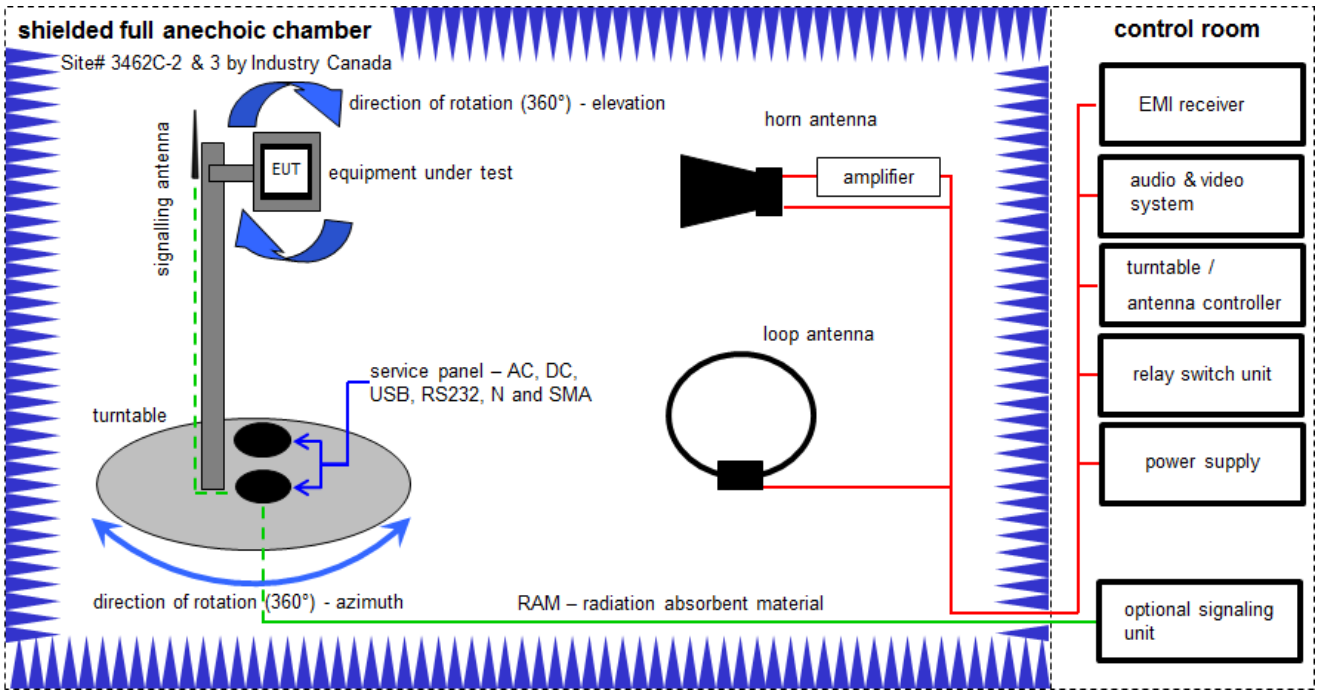
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 12.35 [dBµV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	26.01.2016	27.01.2017
2	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	Ve	02.02.2016	02.02.2018
3	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
4	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
5	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
6	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016

7.2 Shielded fully anechoic chamber



Measurement distance: horn antenna 3 meter / 1 meter; loop antenna 3 meter

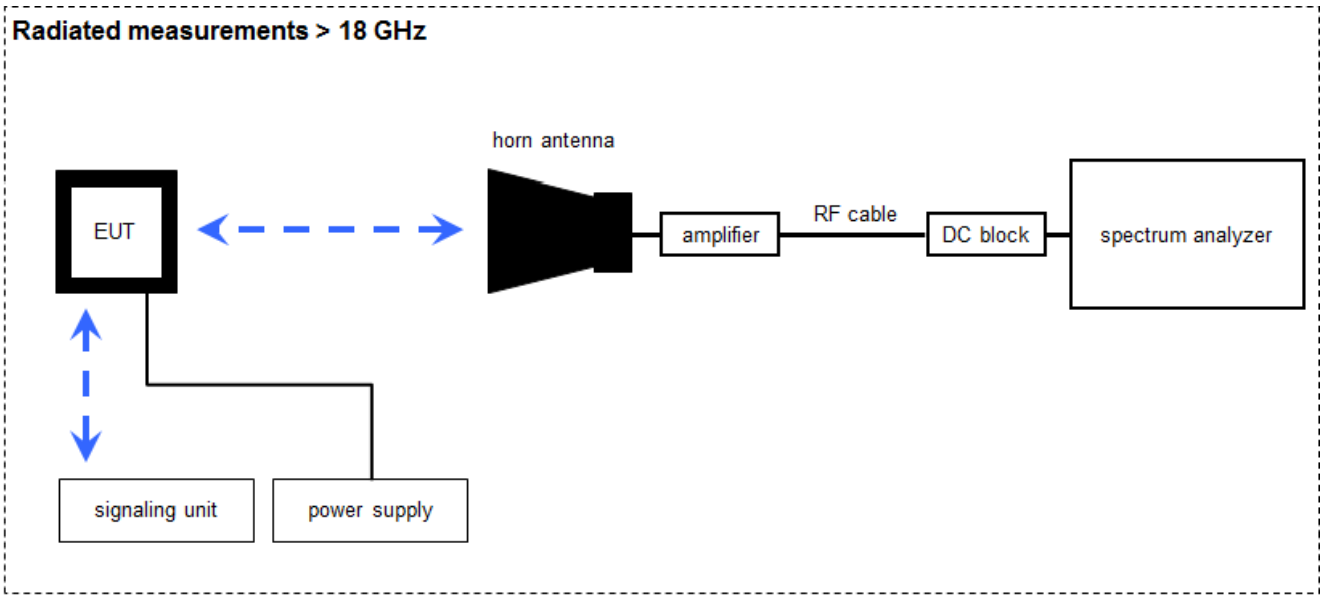
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A, B	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	20.05.2015	20.05.2017
2	A, B, C	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
3	A, B, C	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
4	B, C	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO/2	8905-2342	300000256	k	24.06.2015	24.06.2017
5	A, B	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne	-/-	-/-
6	B	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne	-/-	-/-
7	A, B	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
8	A, B, C	EMI Test Receiver 9kHz-26,5GHz	ESR26	R&S	101376	300005063	k	04.09.2015	04.09.2016

7.3 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

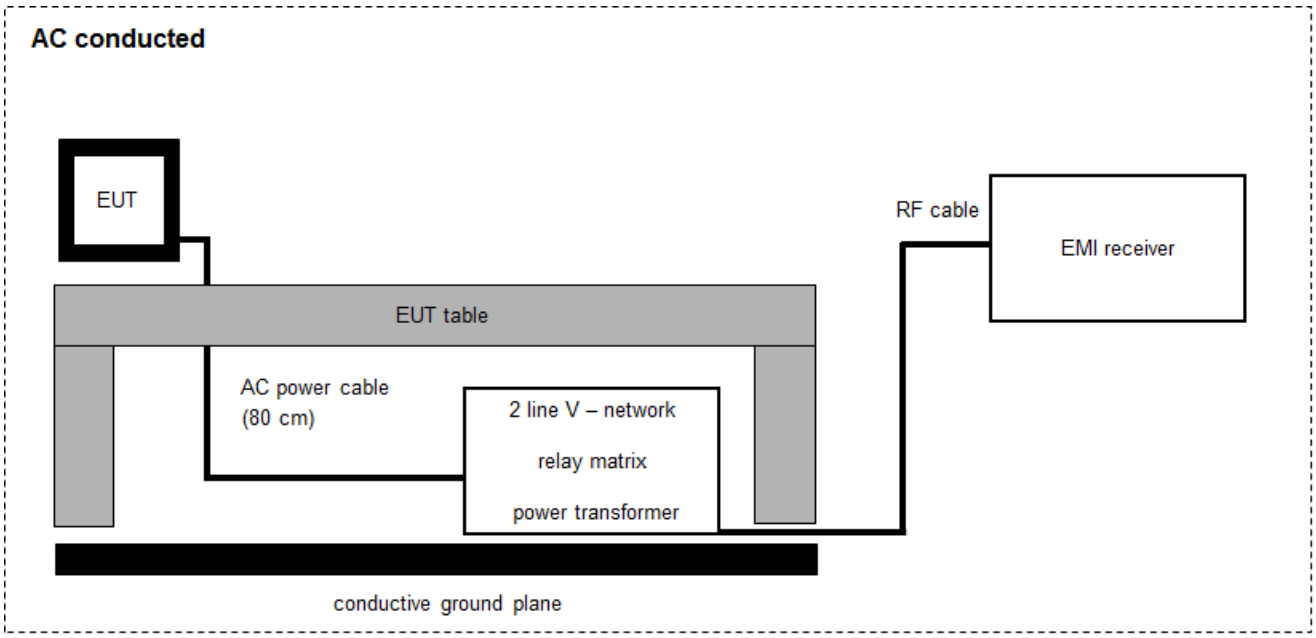
FS = U_R + CA + AF
(FS-field strength; U_R-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-60.1) [dB] + 36.74 [dB/m] = 16.64 [dBµV/m] (6.79 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	21.01.2016	21.01.2017
2	A	Amplifier 2-40 GHz	JS32-02004000-57-5P	MITEQ	1777200	300004541	ev	-/-	-/-
3	A	RF-Cable	ST18/SMAm/SMAm/48	Huber & Suhner	Batch no. 600918	400001182	ev	-/-	-/-
4	A	RF-Cable	ST18/SMAm/SMm/48	Huber & Suhner	Batch no. 127377	400001183	ev	-/-	-/-
5	A	DC-Blocker 0.1-40 GHz	8141A	Inmet	Batch no. 606844	400001185	ev	-/-	-/-
6	A	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8402	300000486	k	10.09.2015	10.09.2017
7	A	Std. Gain Horn Antenna 26.5 to 40.0 GHz	V637	Narda	82-16	300000510	k	14.08.2015	14.08.2017

7.4 AC conducted



FS = UR + CF + VC
(FS-field strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

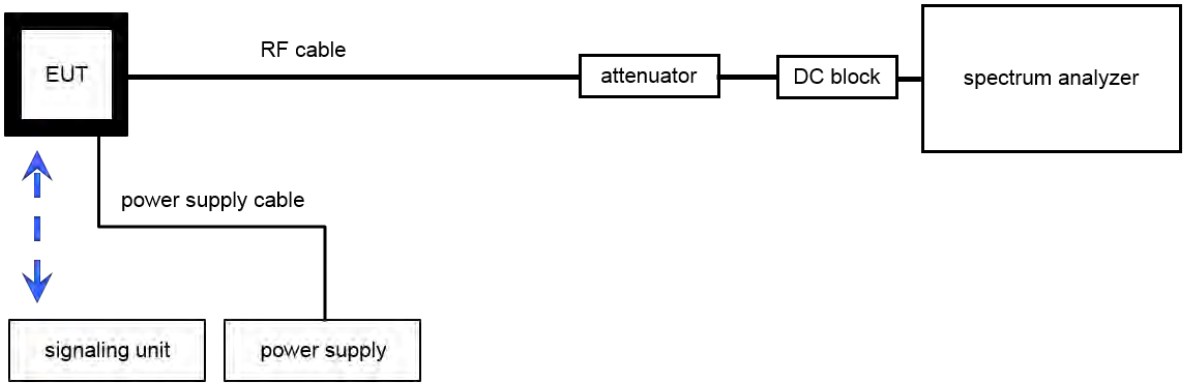
Example calculation:
FS [dBµV/m] = 37.62 [dBµV/m] + 9.90 [dB] + 0.23 [dB] = 47.75 [dBµV/m] (244.06 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Two-line V-Network (LISN) 9 kHz to 30 MHz	ESH3-Z5	R&S	892475/017	300002209	k	17.06.2014	17.06.2016
2	A	MXE EMI Receiver 20 Hz to 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	06.03.2015	06.03.2016
3	A	AC main	SPS_PHE 1.4f	Spitzenberger & Spiess	B5981; 5D1081;B5979	300000210	ne	-/-	-/-

7.5 Conducted measurements

Conducted measurements normal conditions



OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A, B	PC-WLAN Tester	Intel Core i3 3220/3,3 GHz, Prozessor	-/-	2V2403033A4523	300004589	ne	-/-	-/-
2	A, B	Teststand	Teststand Custom Sequence Editor	National Instruments GmbH	2V2403033A4523	300004590	ne	-/-	-/-
3	A, B	RF-Cable	ST18/SMAm/SMAm/60	Huber & Suhner	Batch no. 606844	400001181	ev	-/-	-/-
4	A, B	DC-Blocker 0.1-40 GHz	8141A	Inmet	Batch no. 606844	400001185	ev	-/-	-/-
5	B	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	21.01.2016	21.01.2017
6	A	NRP Power meter Display and control unit AC sup	NRP	R&S	100212	300003780	vlKl!	25.01.2016	24.01.2017
7	A, B	Coax Attenuator 10 dB 2W 0-40 GHz	MCL BW-K10-2W44+	Mini Circuits	Batch no. 127377	400001186	ev	-/-	-/-
8	A, B	Switch / Control Unit	3488A	HP	2719A15013	300000151	ne	-/-	-/-

8 Sequence of testing

8.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.5 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the premeasurement are maximized by the software by rotating the turntable from 0° to 360°. In case of the 2-axis positioner is used the elevation axis is also rotated from 0° to 360°.
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

8.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.4 Sequence of testing radiated spurious above 18 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet.
- The measurement distance is as appropriate (e.g. 0.5 m).
- The EUT is set into operation.

Premeasurement

- The test antenna is handheld and moved carefully over the EUT to cover the EUT's whole sphere and different polarizations of the antenna.

Final measurement

- The final measurement is performed at the position and antenna orientation causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement and the limit is stored.

9 Measurement uncertainty

Measurement uncertainty	
Test case	**Uncertainty**
Antenna gain	± 3 dB
Power spectral density	± 1.5 dB
DTS bandwidth	± 100 kHz (depends on the used RBW)
Occupied bandwidth	± 100 kHz (depends on the used RBW)
Maximum output power	± 1.5 dB
Detailed spurious emissions @ the band edge - conducted	± 1.5 dB
Band edge compliance radiated	± 3 dB
Spurious emissions conducted	± 3 dB
Spurious emissions radiated below 30 MHz	± 3 dB
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB
Spurious emissions radiated above 12.75 GHz	± 4.5 dB
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB

10 Summary of measurement results

☒	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☐	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 247, Issue 1	see table	2016-04-30	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	C	NC	NA	NP	Remark
-/-	Output power verification (conducted)	Nominal	Nominal	-/-				-/-
-/-	Gain	Nominal	Nominal	-/-				Declared
U-NII Part 15	Duty cycle	Nominal	Nominal	-/-				-/-
§15.407(a) RSS - 247 (6.2.1) (1) RSS - 247 (6.2.2) (1) RSS - 247 (6.2.3) (1) RSS - 247 (6.2.4) (1)	Maximum output power (conducted & radiated)	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.407(a) RSS - 247 (6.2.1) (1) RSS - 247 (6.2.2) (1) RSS - 247 (6.2.3) (1) RSS - 247 (6.2.4) (1)	Power spectral density	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.407(a)	Spectrum bandwidth 26dB bandwidth	Nominal	Nominal	☒	☐	☐	☐	-/-
RSS Gen clause 6.6	Spectrum bandwidth 99% bandwidth	Nominal	Nominal	-/-				-/-
§15.407(a)	Peak excursion measurements	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.205 RSS - 247 (6.2.1) (2) RSS - 247 (6.2.2) (2) RSS - 247 (6.2.3) (2) RSS - 247 (6.2.4) (2)	Band edge compliance radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.407(b) RSS - 247 (6.2.1) (2) RSS - 247 (6.2.2) (2) RSS - 247 (6.2.3) (2) RSS - 247 (6.2.4) (2)	TX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.109 RSS-Gen	RX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.209(a) RSS-Gen	Spurious emissions radiated < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.107(a) §15.207	Spurious emissions conducted emissions < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	-/-

Note: C = Compliant; NC = Not Compliant; NA = Not Applicable; NP = Not Performed

11 Additional comments

Reference documents: Customer Questionnaire _CETECOM_ISMP4

Instructions for RTTT

RTTT_WLAN_RF_Real_Time_Tuning_Tool_Rev_0_3

Special test descriptions: None

Configuration descriptions: EUT settings:

a – mode:	2048 byte, 20 µs, 6 M OFDM
n HT20 – mode:	2048 byte, 20 µs, MCS0
n HT40 – mode:	2048 byte, 20 µs, MCS0

Test mode:

☐ No test mode available.
Iperf was used to ping another device with the largest support packet size

☒ Special software is used.
EUT is transmitting pseudo random data by itself

Antennas and transmit operating modes:

☒ Operating mode 1 (single antenna)

- *Equipment with 1 antenna,*
- *Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,*
- *Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)*

☐ Operating mode 2 (multiple antennas, no beamforming)

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.*

☐ Operating mode 3 (multiple antennas, with beamforming)

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.*
  In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.

12 Measurement results

12.1 Identify worst case datarate

Measurement:

All modes of the module will be measured with an average power meter to identify the maximum transmission power on low, mid and high channel. In the case that only one or two channels are available, only these will be measured.

In further tests only the identified worst case modulation scheme or bandwidth will be measured.
Additional the band edge compliance test will be performed in the lowest and highest modulation scheme.

Measurement:

Measurement parameter	
power meter	
Test setup:	See sub clause 7.5 – A
Measurement uncertainty:	See sub clause 9

Results:

Modulation	Modulation scheme / bandwidth					
Frequency	5180 MHz	5320 MHz	5500 MH	5700 MHz	5745 MHz	5825 MHz
OFDM / a – mode	6 Mbit/s	6 Mbit/s	6 Mbit/s	6 Mbit/s	6 Mbit/s	6 Mbit/s
OFDM / n/ac – mode HT20	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0
Frequency	5190 MHz	5310 MHz	5510 MHz	5670 MHz	5755 MHz	5815 MHz
OFDM / n/ac – mode HT40	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0

12.2 Gain

Limits:

Antenna Gain
Maximum 6 dBi

Result:

UNII band 5150 to 5250 MHz	
Gain Declared by the manufacturer	0.0 dBi
UNII band 5250 to 5350 MHz	
Gain Declared by the manufacturer	0.0 dBi
UNII band 5470 to 5725 MHz	
Gain Declared by the manufacturer	0.0 dBi
UNII band 5725 to 5850 MHz	
Gain Declared by the manufacturer	0.0 dBi

12.3 Duty cycle

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 MHz
Video bandwidth:	10 MHz
Span:	Zero
Trace mode:	Video trigger / view / single sweep
Test setup:	See sub clause 7.5 – B
Measurement uncertainty:	See sub clause 9

Results:

Duty cycle and correction factor: example for the lowest channel

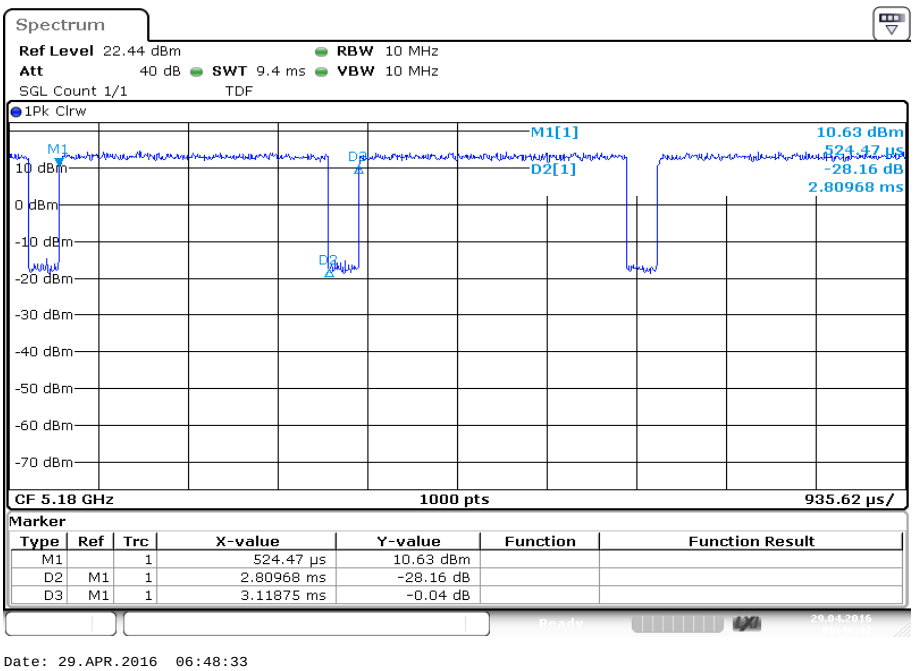
OFDM / a – mode: 90.09 % duty cycle => 0.45 dB

OFDM / n – mode HT20: 89.19 % duty cycle => 0.50 dB

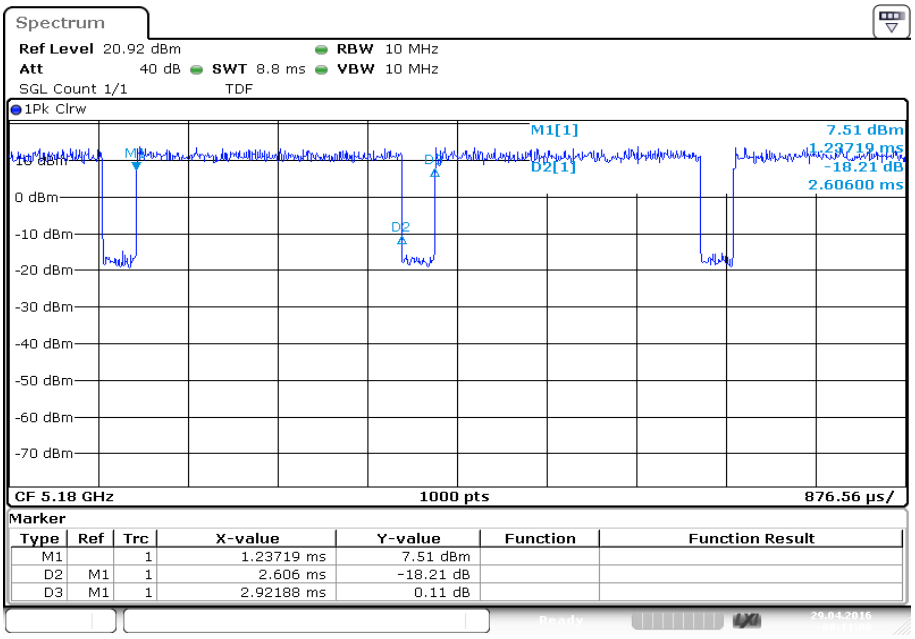
OFDM / n – mode HT40: 80.18 % duty cycle => 0.96 dB

Plots:

Plot 1: duty cycle of the transmitter – OFDM / a – mode



Plot 2: duty cycle of the transmitter – OFDM / n – mode HT20



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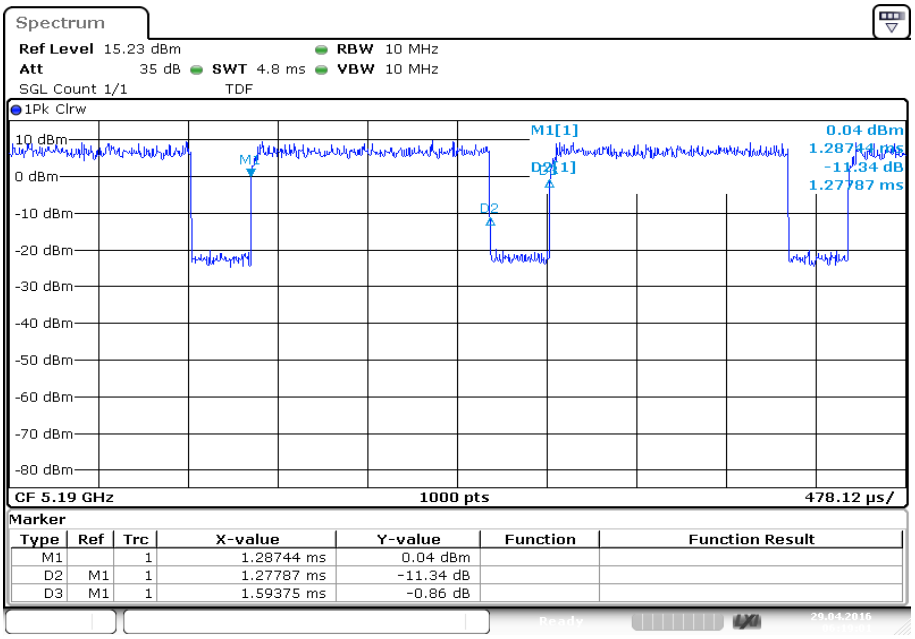
Plot 3: duty cycle of the transmitter – OFDM / n – mode HT40



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12.4 Maximum output power conducted

Description:

Measurement of the maximum output power conduced

Measurement:

Measurement parameter	
Detector:	RMS
Sweep time:	≥10*(swp points)*(total on/off time)
Resolution bandwidth:	1 MHz
Video bandwidth:	≥ 3 MHz
Span:	> EBW
Trace-Mode:	Max hold
Analyzer function	Band power / channel power Interval ≥ 26 dB EBW (FCC) Interval ≥ 99 % OBW (IC)
Test setup:	See sub clause 7.5 – B
Measurement uncertainty:	See sub clause 9

Limits:

Radiated output power	Conducted output power for mobile equipment
Conducted power + 6dBi antenna gain	250mW 5.150-5.250 GHz (FCC) The lesser one of 200 mW or 10 dBm + 10 log Bandwidth 5.150-5.250 GHz (IC) 250mW or 11 dBm + 10 log Bandwidth 5.250-5.350 GHz 250mW or 11 dBm + 10 log Bandwidth 5.470-5.725 GHz 1W 5.725-5.825 GHz (IC) (where Bandwidth is the 26dB Bandwidth [MHz]) 1W 5.725-5.85 GHz (FCC)

12.4.1 Maximum output power conducted for FCC requirement

Result: a – mode; FCC requirement

OFDM / a – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
Including duty cycle correction factor	8.84	6.25	11.26	5.97
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	8.07	1.62	3.19	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
Including duty cycle correction factor	4.05	3.05	3.26	-/-

Result: n HT20 – mode; FCC requirement

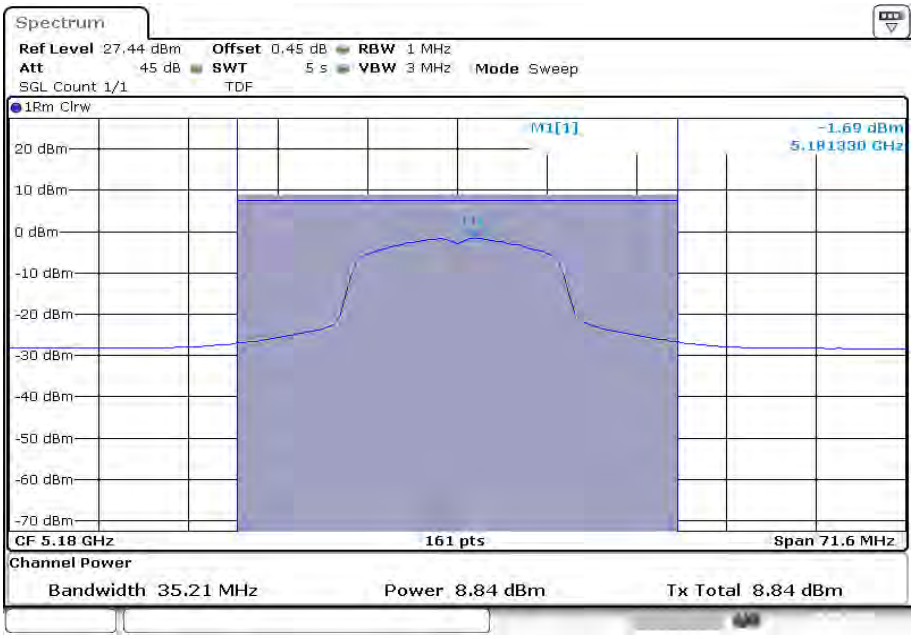
OFDM / n HT20 – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
Including duty cycle correction factor	5.83	6.99	11.32	8.86
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	9.15	4.39	3.61	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
Including duty cycle correction factor	3.44	3.55	3.43	-/-

Result: n HT40 – mode; FCC requirement

OFDM / n HT40 – mode	**Maximum output power conducted [dBm]**			
Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor	4.32	5.34	4.98	2.40
Channel	5510 MHz	5590 MHz	5670 MHz	-/-
Including duty cycle correction factor	-1.96	-2.63	-2.55	-/-
Channel	5755 MHz	5815 MHz	-/-	-/-
Including duty cycle correction factor	-3.25	0.43	-/-	-/-

Plots: OFDM / a – mode, FCC requirement

Plot 1: 5180 MHz

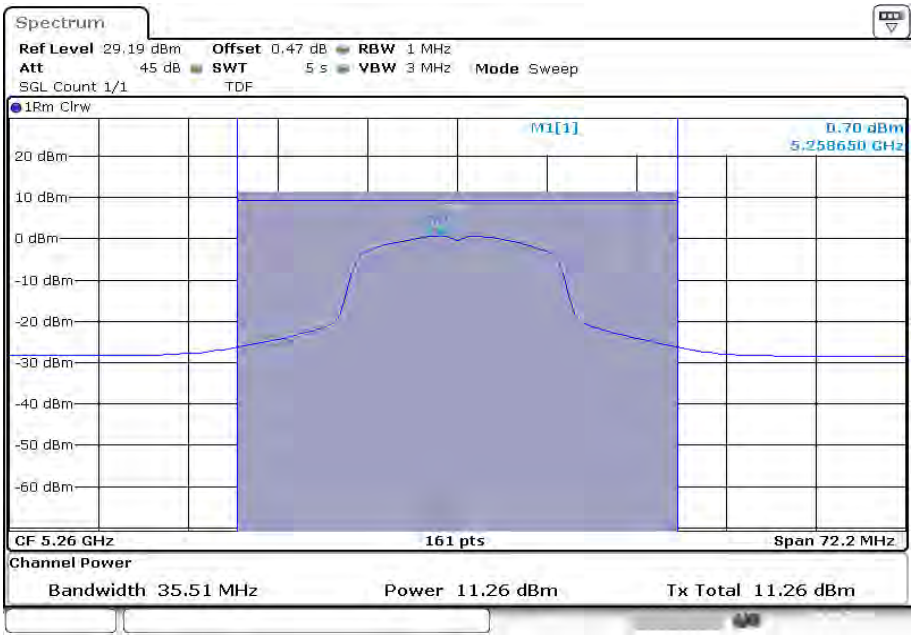


Date: 29.APR.2016 06:49:22

Plot 2: 5240 MHz

Date: 29.APR.2016 06:51:48

Plot 3: 5260 MHz



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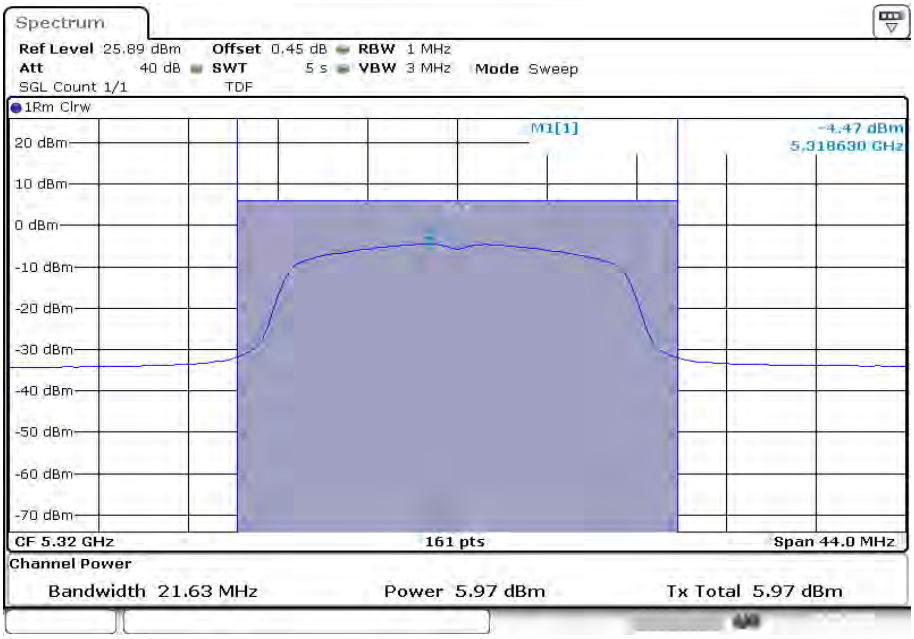
Plot 4: 5320 MHz



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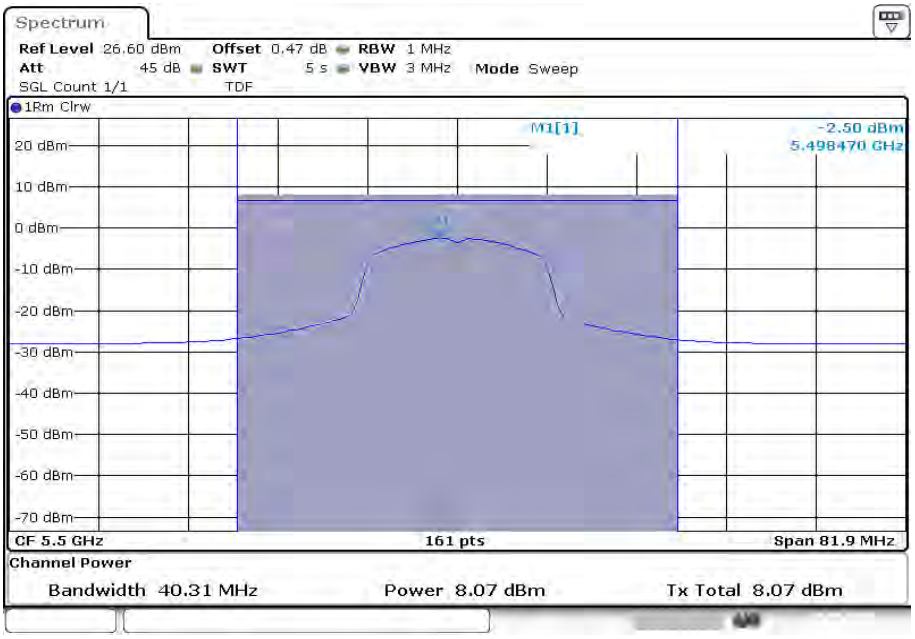
Plot 5: 5500 MHz



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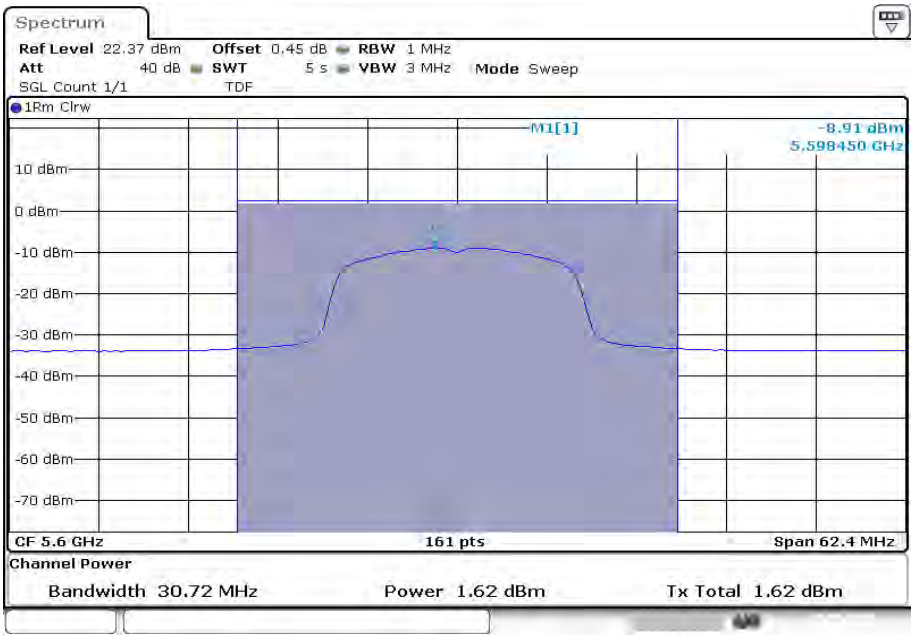
Plot 6: 5600 MHz



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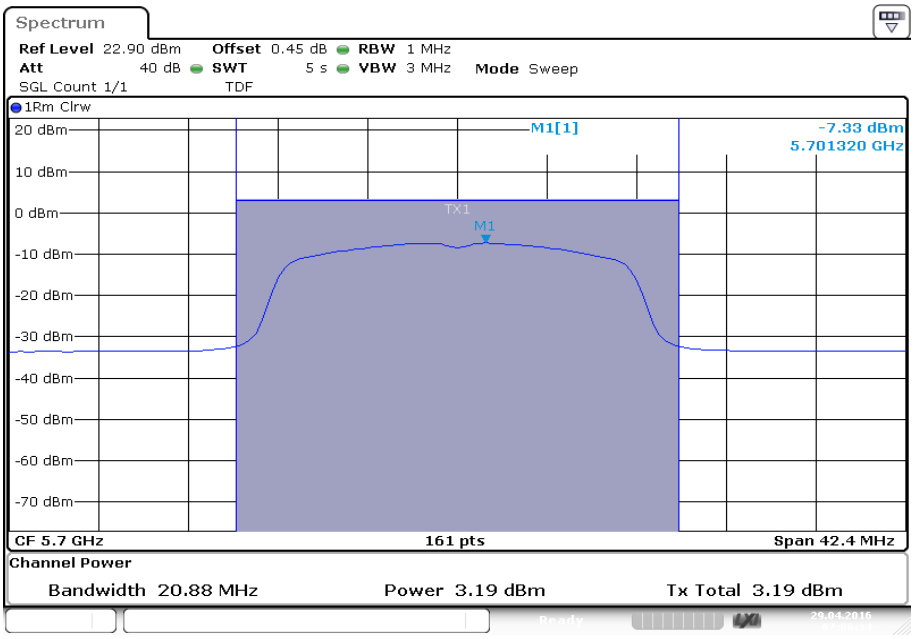
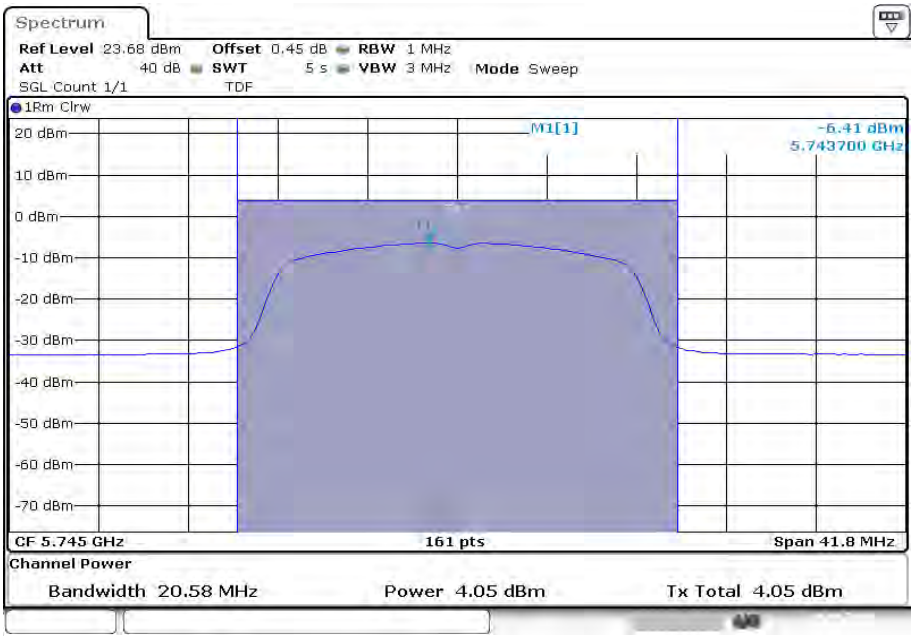
Plot 7: 5700 MHz



Date: 29.APR.2016 07:06:35

Plot 8: 5745 MHz



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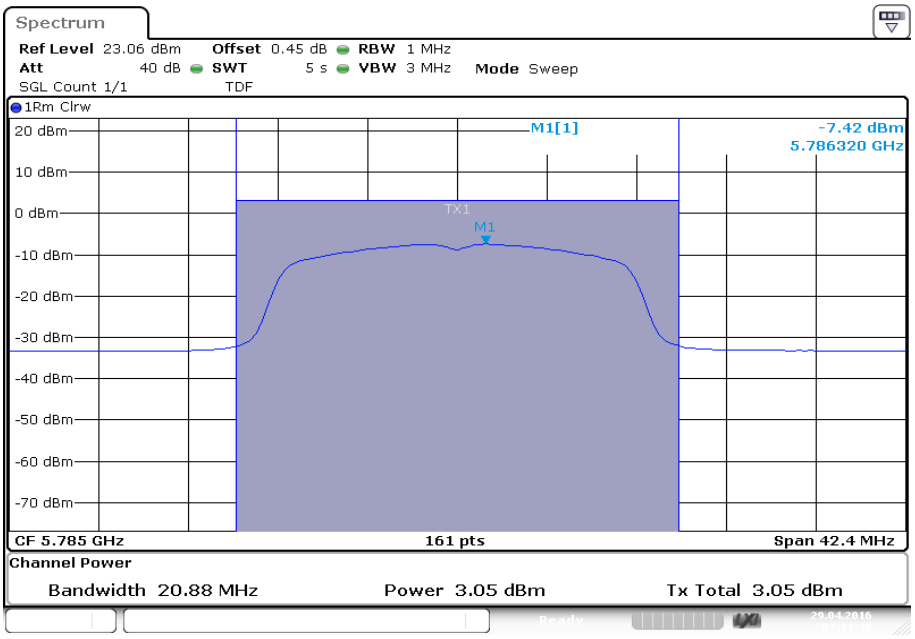
Plot 9: 5785 MHz



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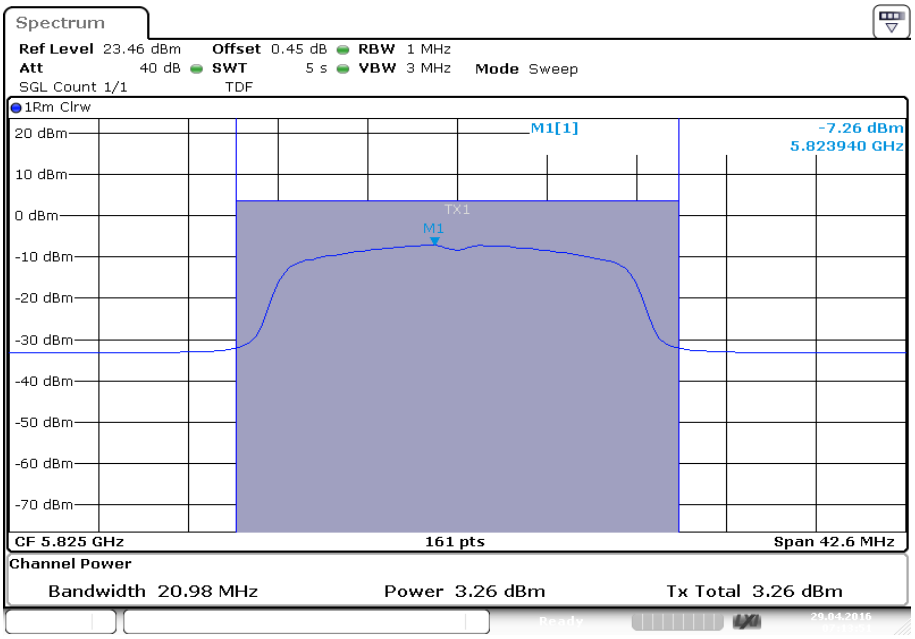
Plot 10: 5825 MHz



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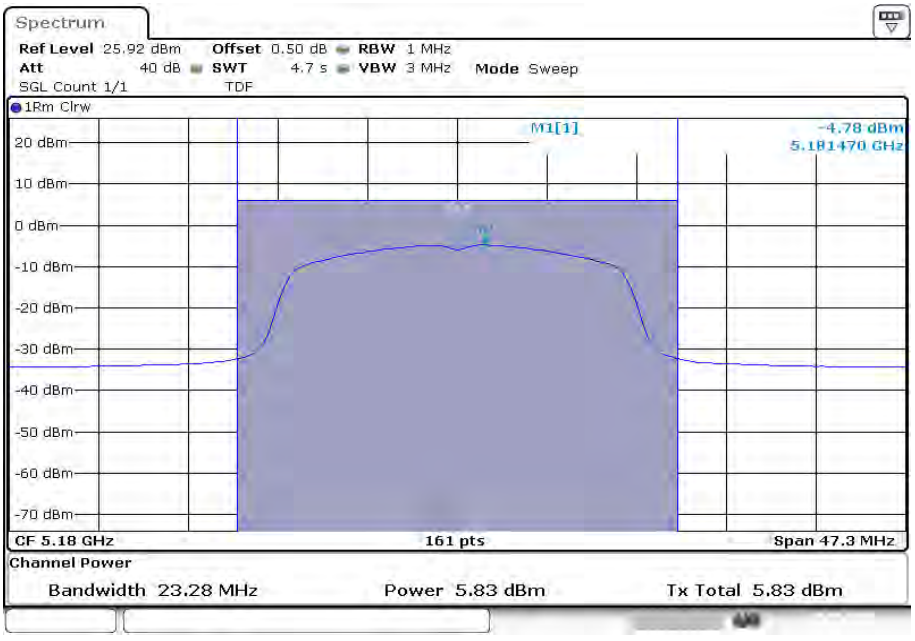
Plots: OFDM / n HT20 – mode, FCC requirement

Plot 1: 5180 MHz



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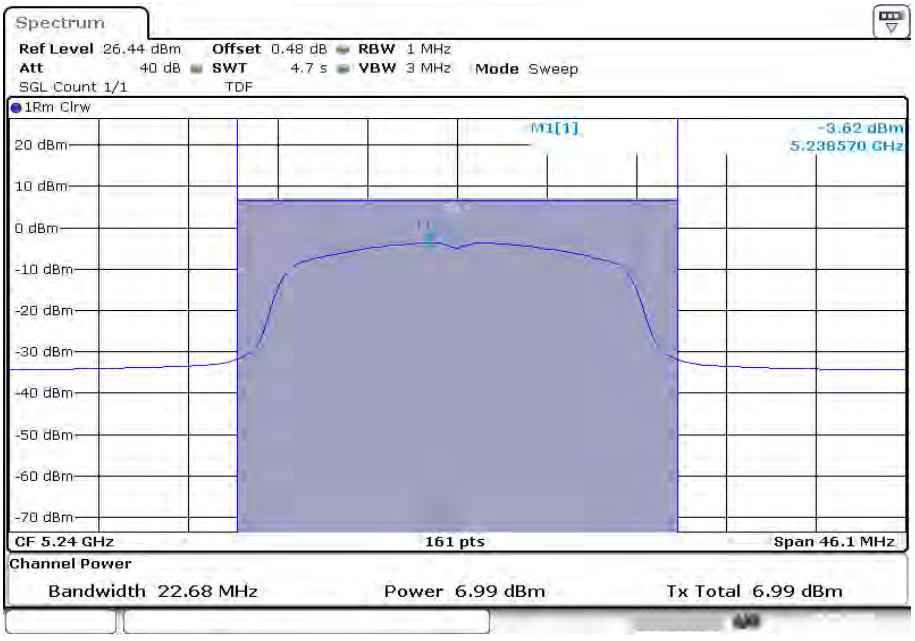
Plot 2: 5240 MHz



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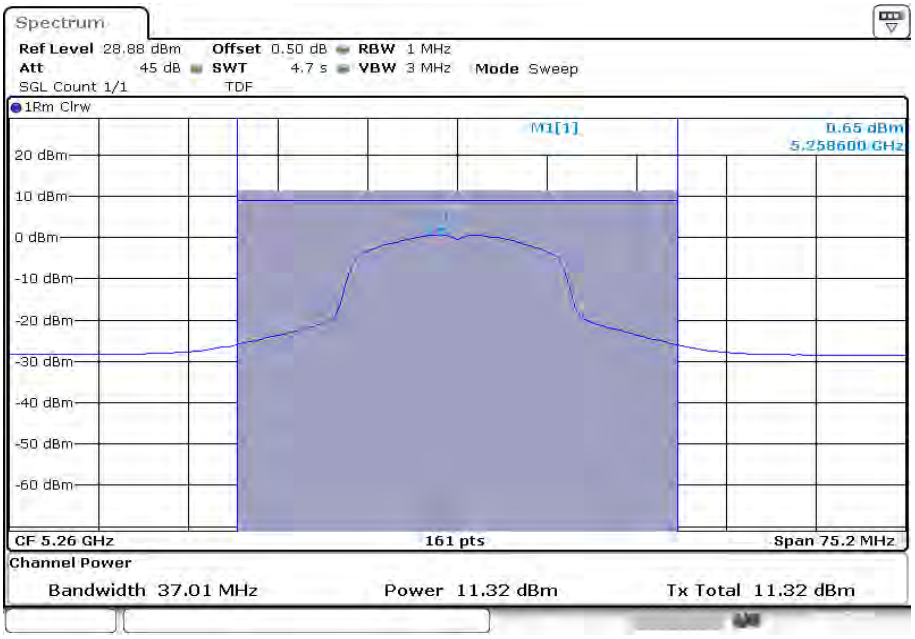
Plot 3: 5260 MHz



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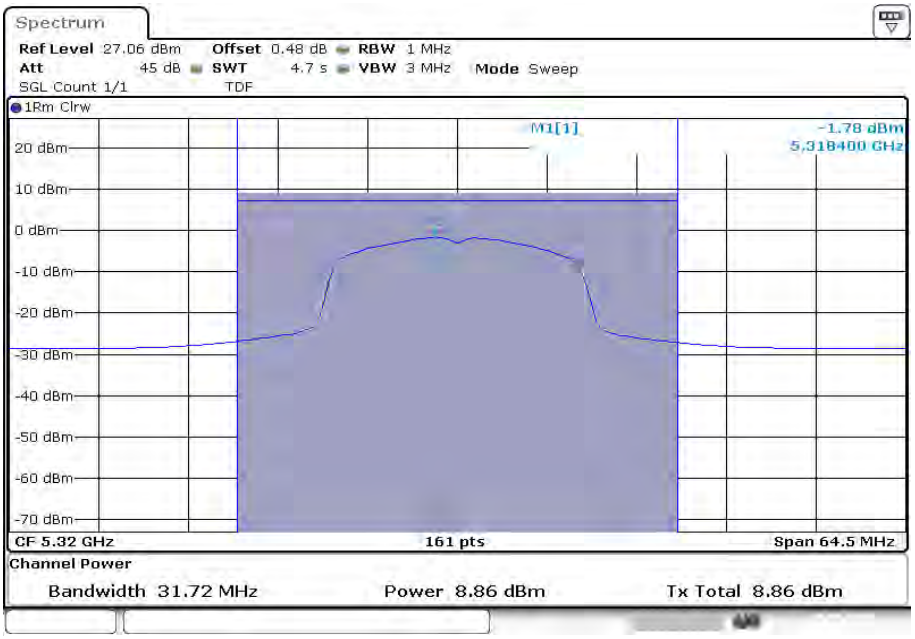
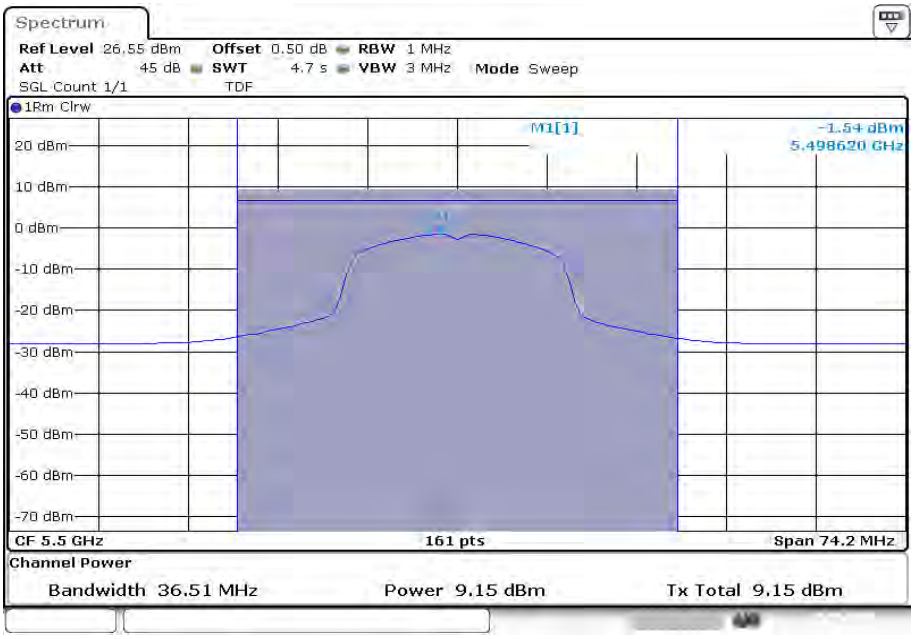
Plot 4: 5320 MHz



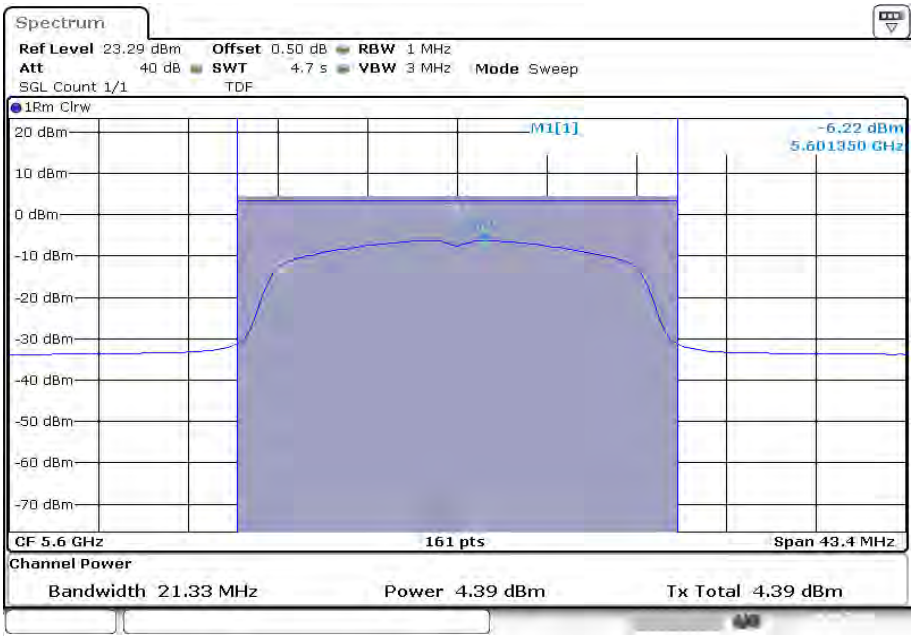
Date: 29.APR.2016 07:54:13

Plot 5: 5500 MHz



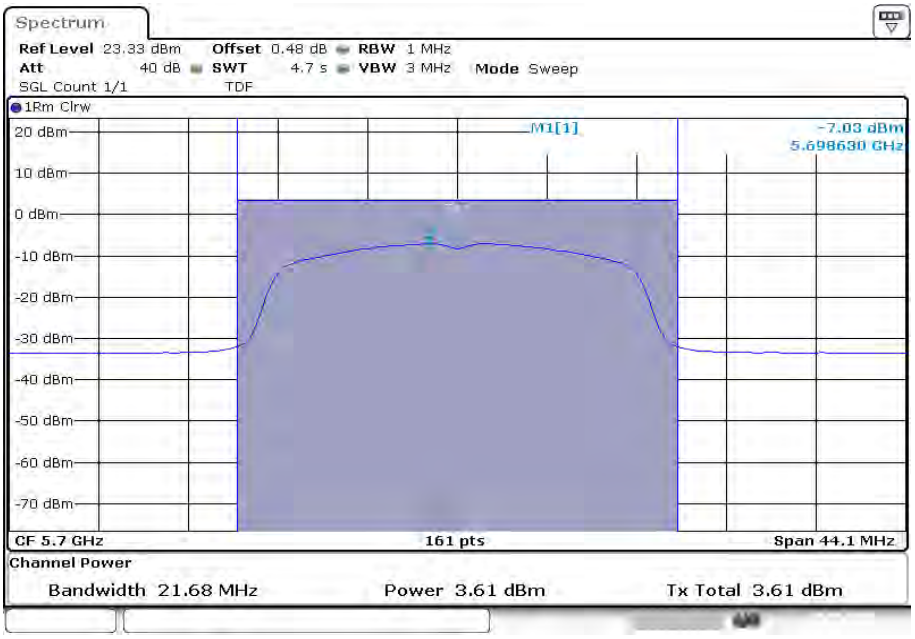
Date: 29.APR.2016 07:35:31

Plot 6: 5600 MHz



Date: 29.APR.2016 07:31:02

Plot 7: 5700 MHz



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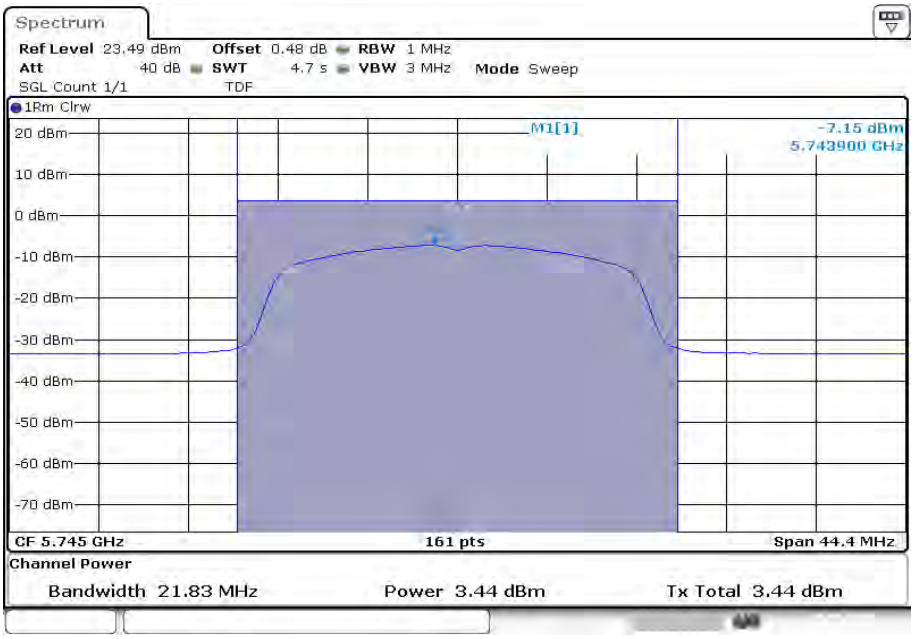
Plot 8: 5745 MHz



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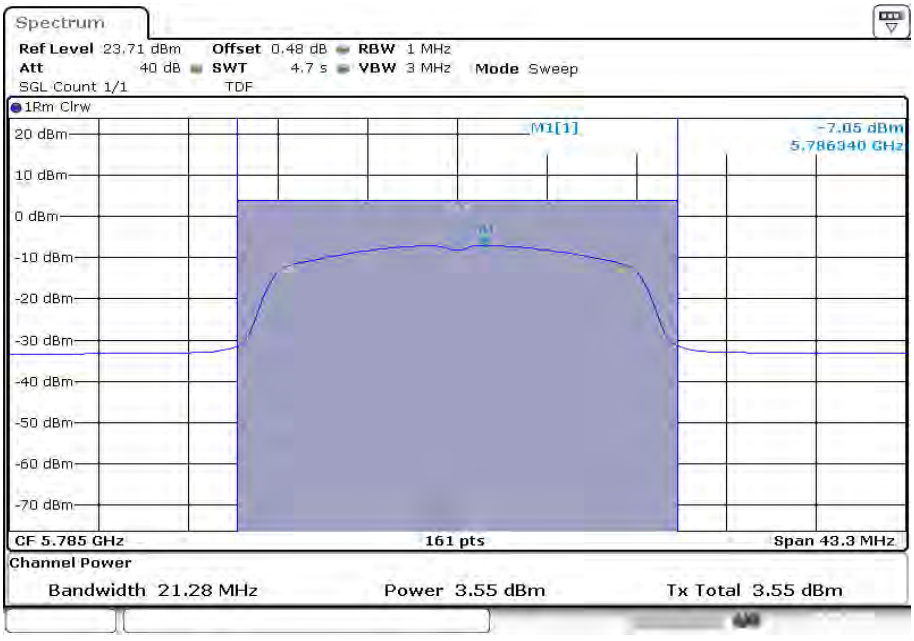
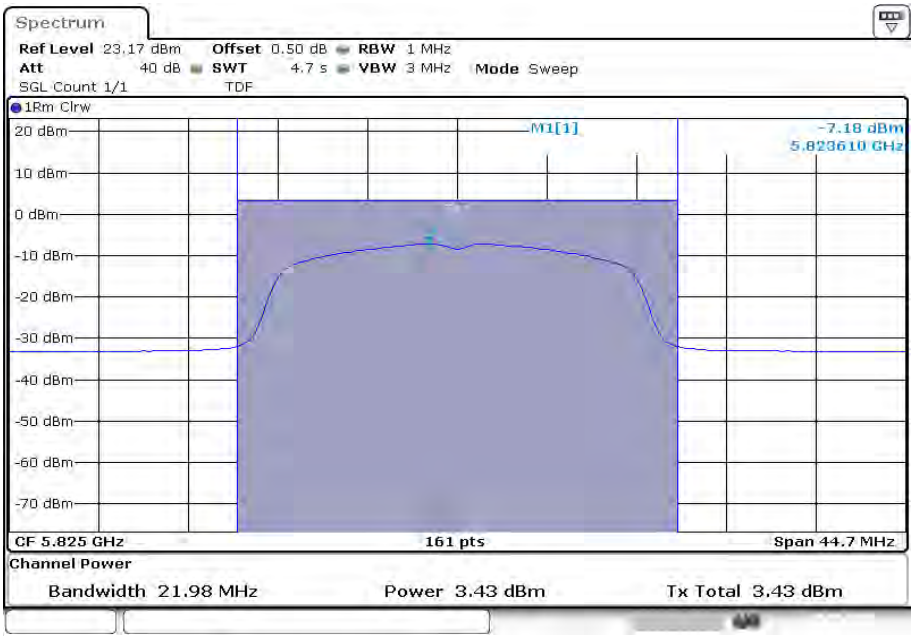
Plot 9: 5785 MHz



Date: 29.APR.2016 07:19:31

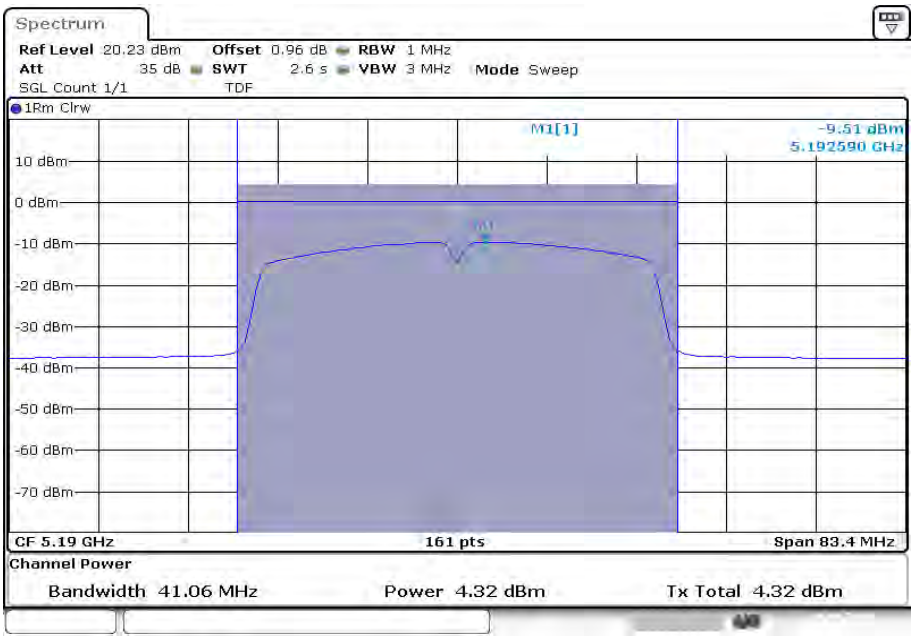
Plot 10: 5825 MHz



Date: 29.APR.2016 07:16:40

Plots: OFDM / n HT40 – mode, FCC requirement

Plot 1: 5190 MHz

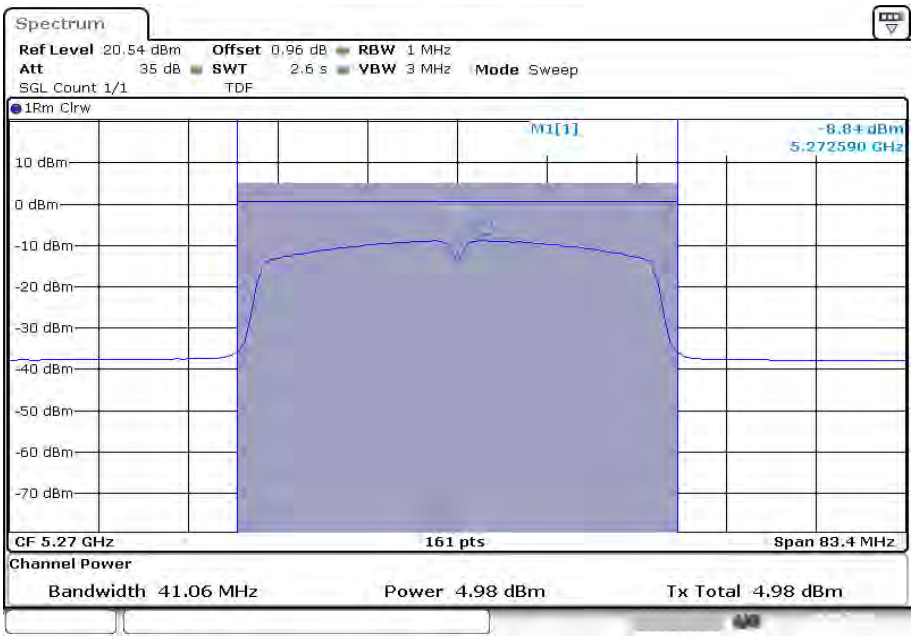


Date: 29.APR.2016 06:19:58

Plot 2: 5230 MHz

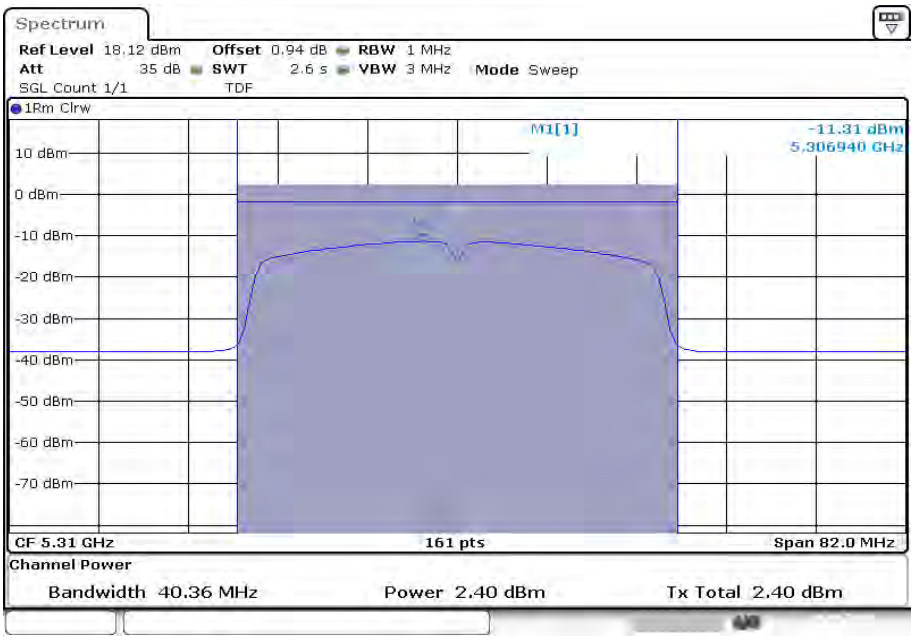
Date: 29.APR.2016 06:22:46

Plot 3: 5270 MHz



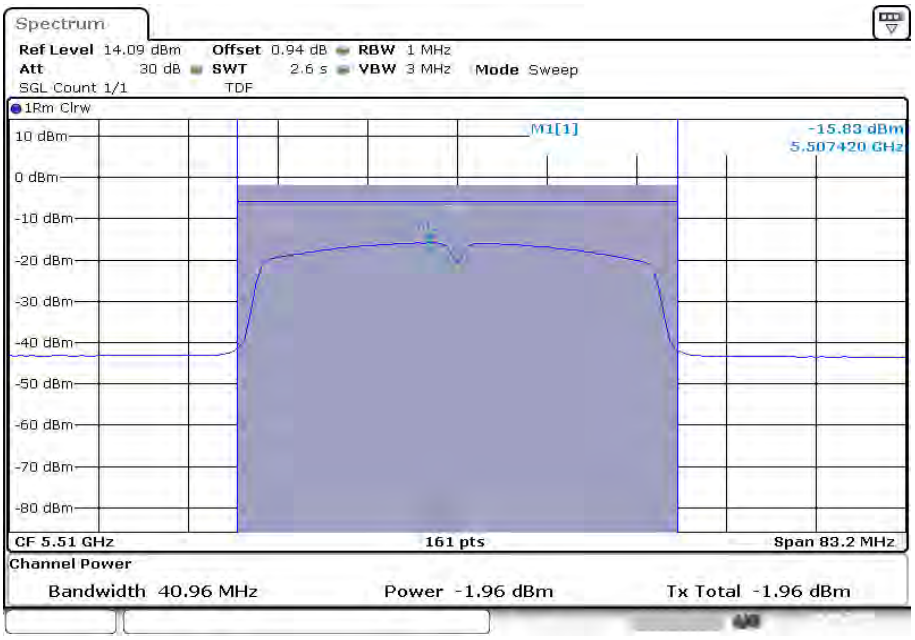
Date: 29.APR.2016 06:26:20

Plot 4: 5310 MHz



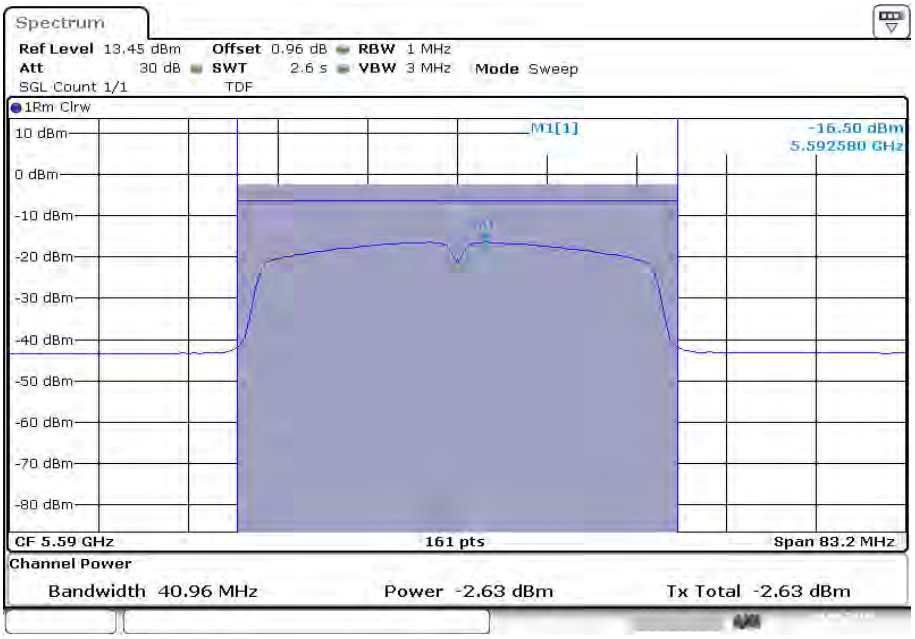
Date: 29.APR.2016 06:28:57

Plot 5: 5510 MHz



Date: 29.APR.2016 06:31:46

Plot 6: 5590 MHz



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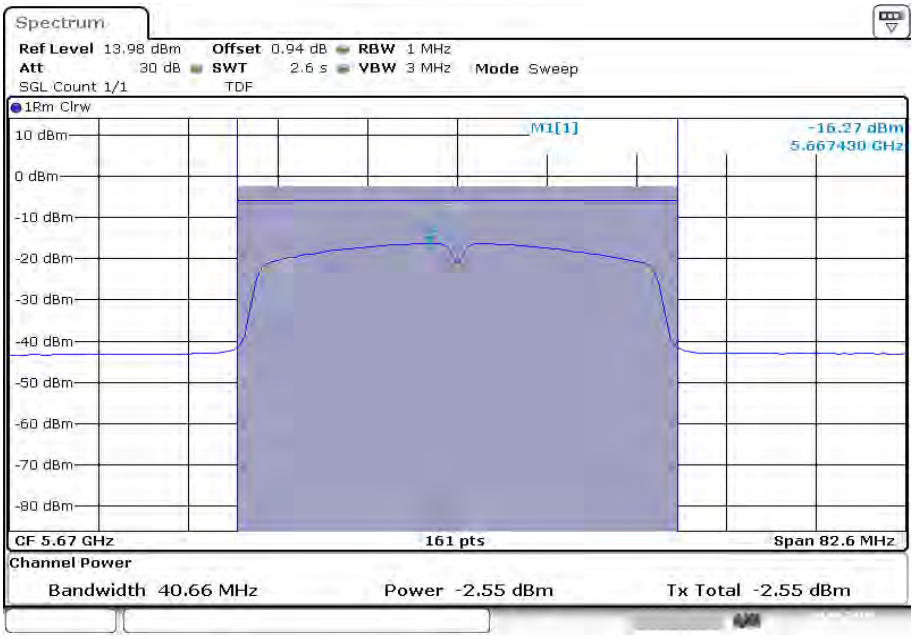
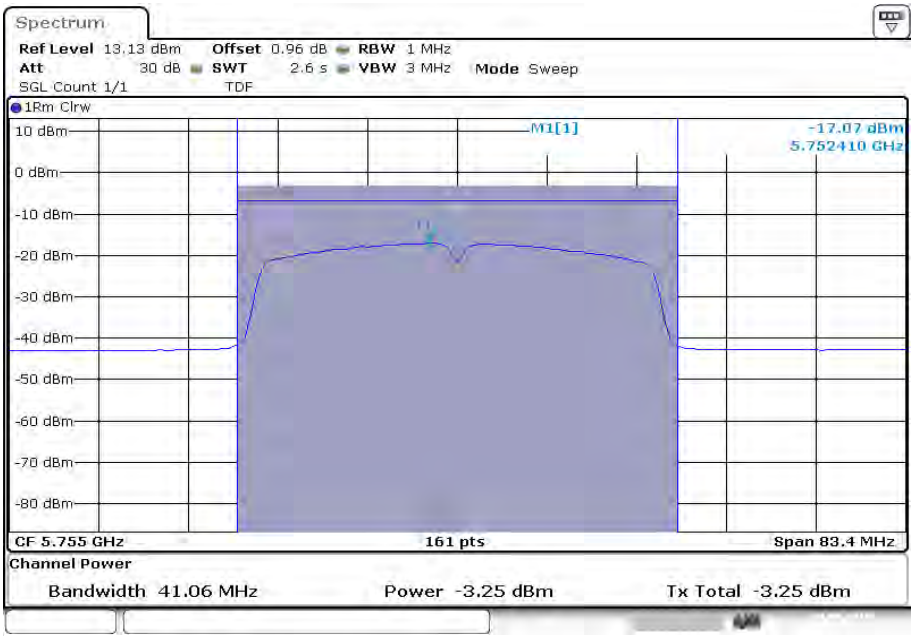
Plot 7: 5670 MHz



Date: 29.APR.2016 06:37:07

Plot 8: 5755 MHz



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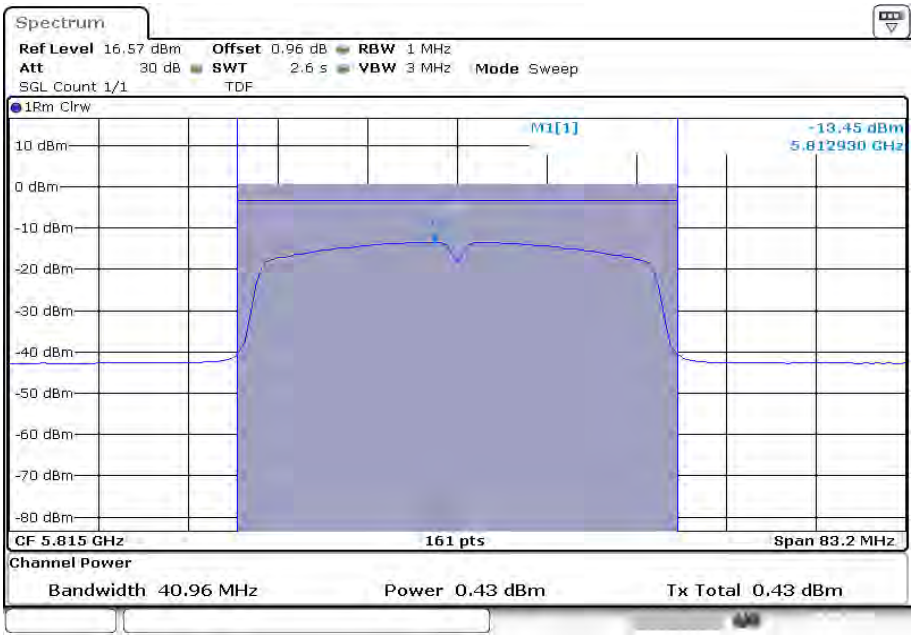
Plot 9: 5815 MHz



Date: 29.APR.2016 06:44:00

12.4.2 Maximum output power conducted for IC requirement

Result: a – mode; IC requirement

OFDM / a – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
Including duty cycle correction factor	8.78	6.19	11.23	5.91
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	8.03	1.57	3.13	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
Including duty cycle correction factor	3.99	3.00	3.20	-/-

Result: n HT20 – mode; IC requirement

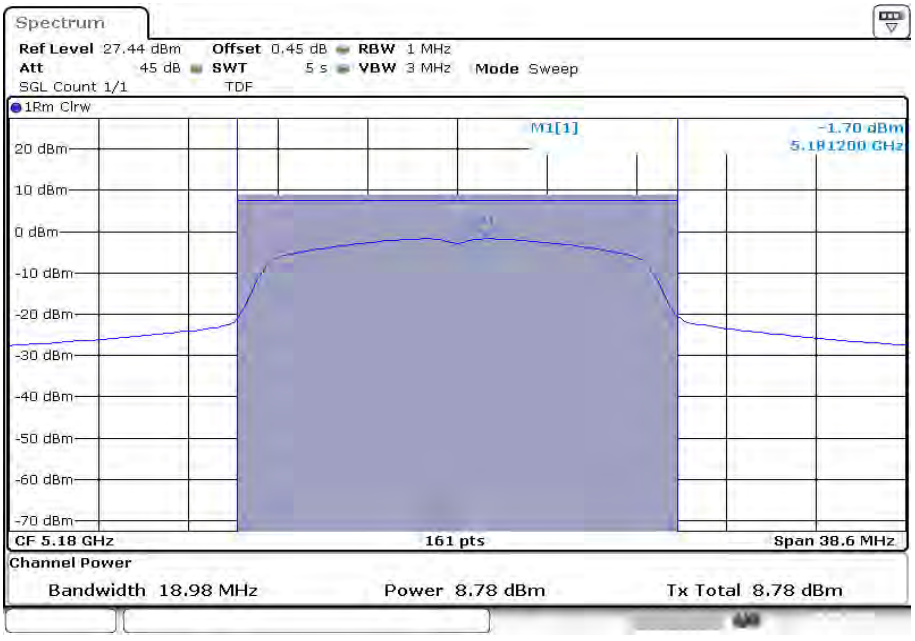
OFDM / n HT20 – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
Including duty cycle correction factor	5.77	6.93	11.37	8.81
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
Including duty cycle correction factor	9.12	4.32	3.55	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
Including duty cycle correction factor	3.38	3.50	3.37	-/-

Result: n HT40 – mode; IC requirement

OFDM / n HT40 – mode	**Maximum output power conducted [dBm]**			
Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor	4.25	5.30	4.93	2.36
Channel	5510 MHz	5590 MHz	5670 MHz	-/-
Including duty cycle correction factor	-2.00	-2.68	-2.60	-/-
Channel	5755 MHz	5815 MHz	-/-	-/-
Including duty cycle correction factor	-3.28	0.39	-/-	-/-

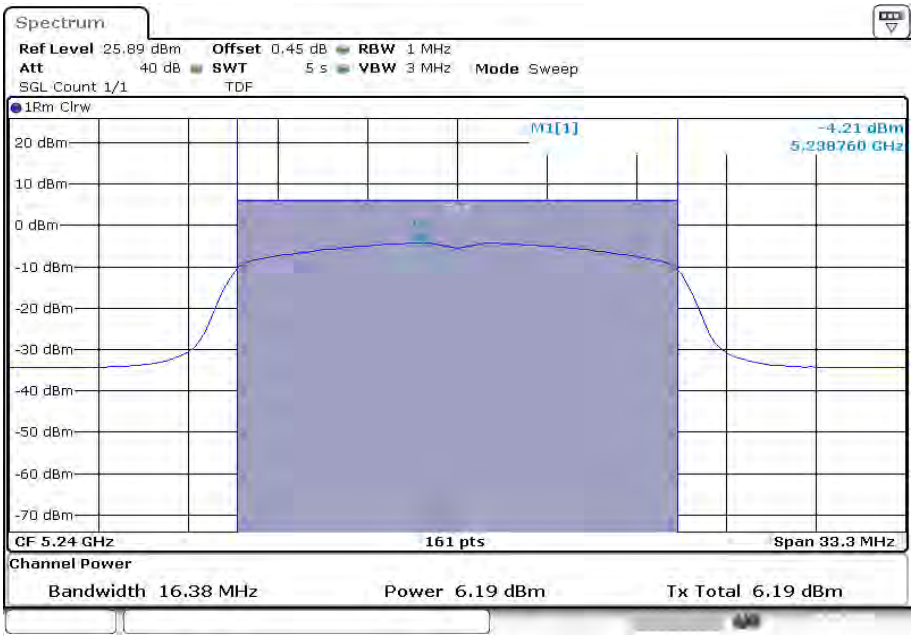
Plots: OFDM / a – mode, IC requirement

Plot 1: 5180 MHz



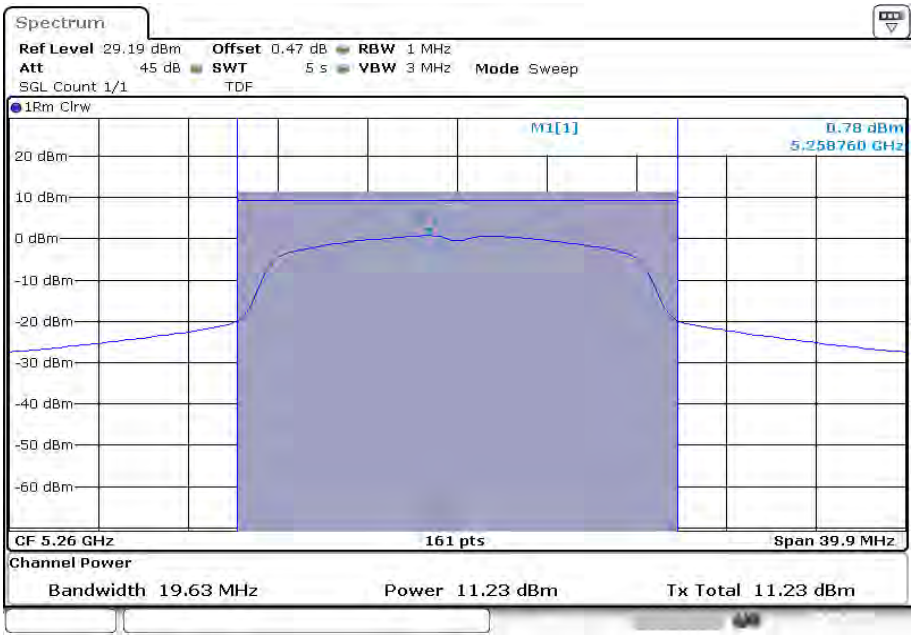
Date: 29.APR.2016 06:49:32

Plot 2: 5240 MHz



Date: 29.APR.2016 06:51:58

Plot 3: 5260 MHz

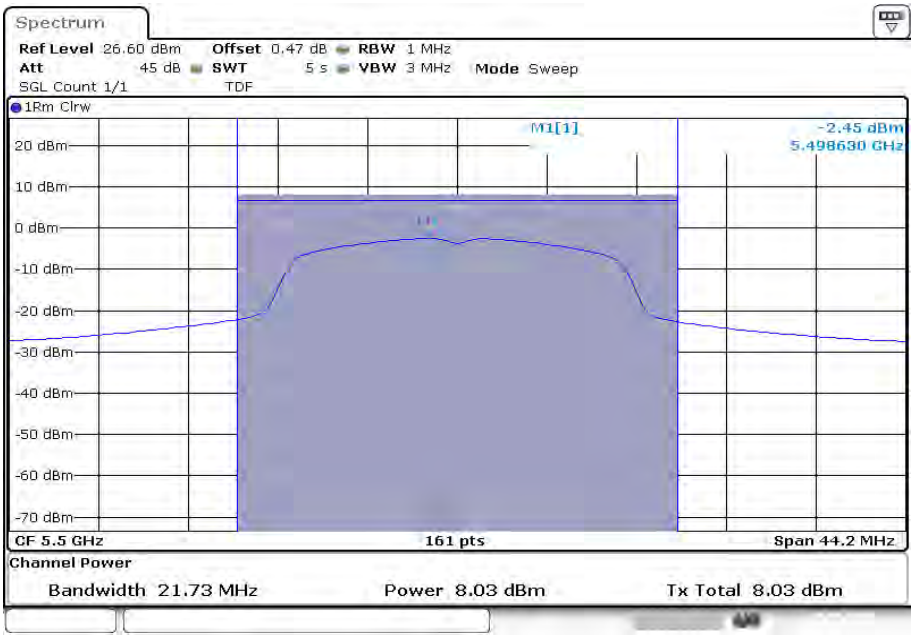


Date: 29.APR.2016 06:55:33

Plot 4: 5320 MHz

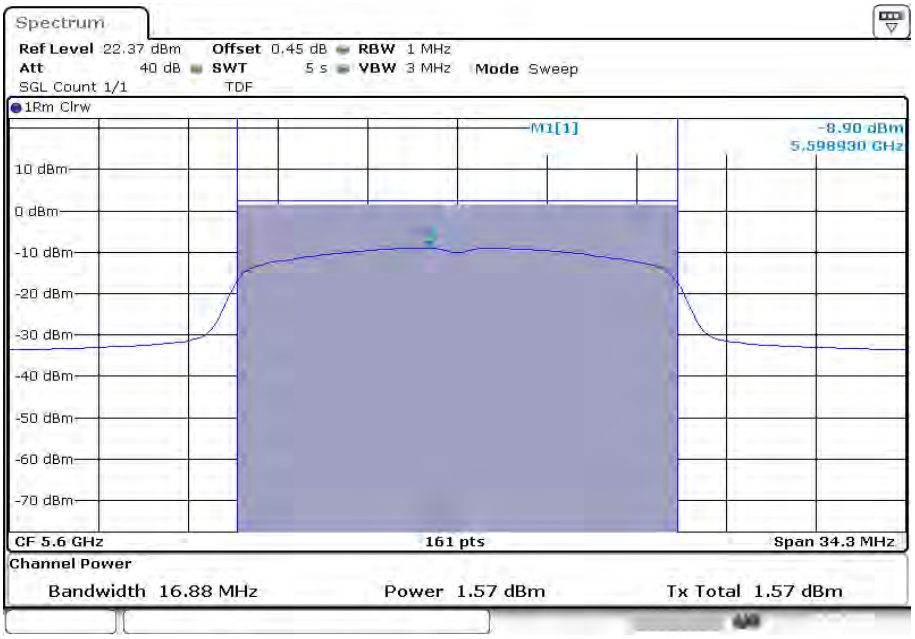
Date: 29.APR.2016 06:57:39

Plot 5: 5500 MHz



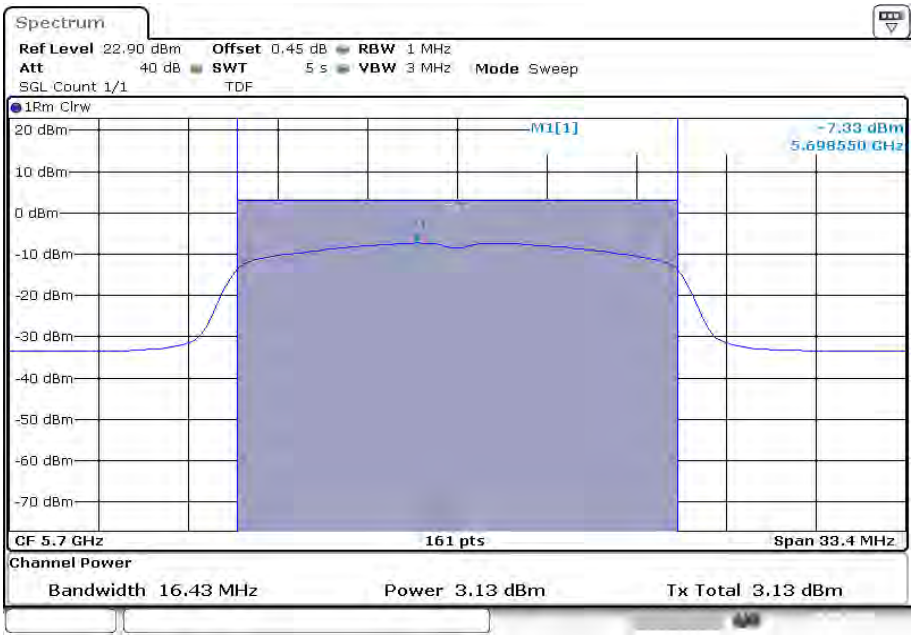
Date: 29.APR.2016 07:01:45

Plot 6: 5600 MHz



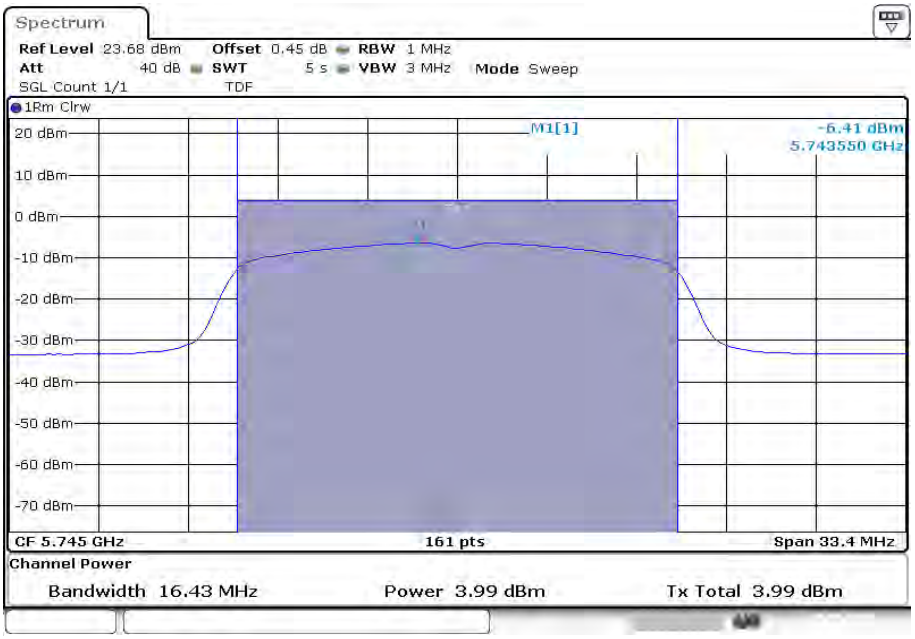
Date: 29.APR.2016 07:04:05

Plot 7: 5700 MHz



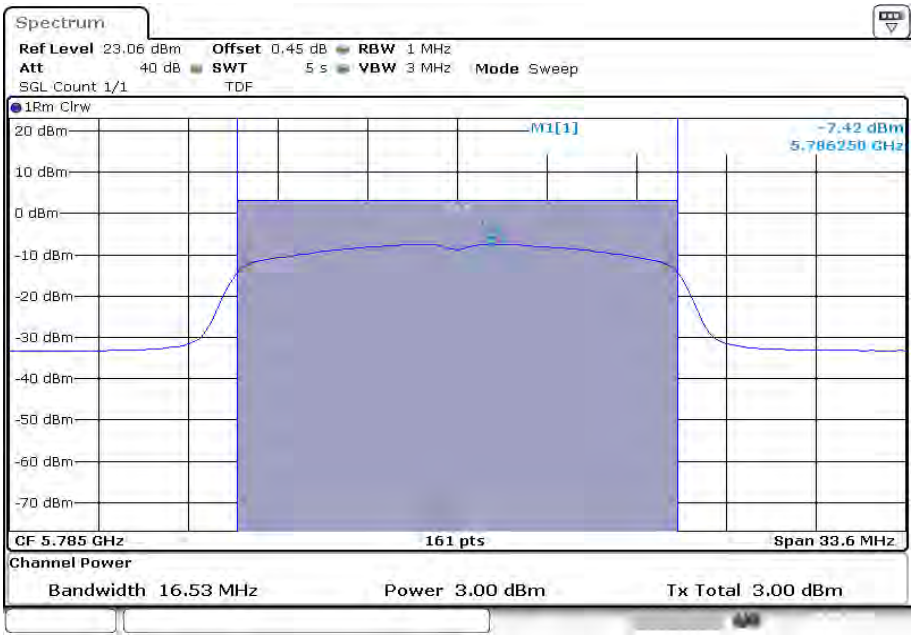
Date: 29.APR.2016 07:06:45

Plot 8: 5745 MHz



Date: 29.APR.2016 07:09:08

Plot 9: 5785 MHz



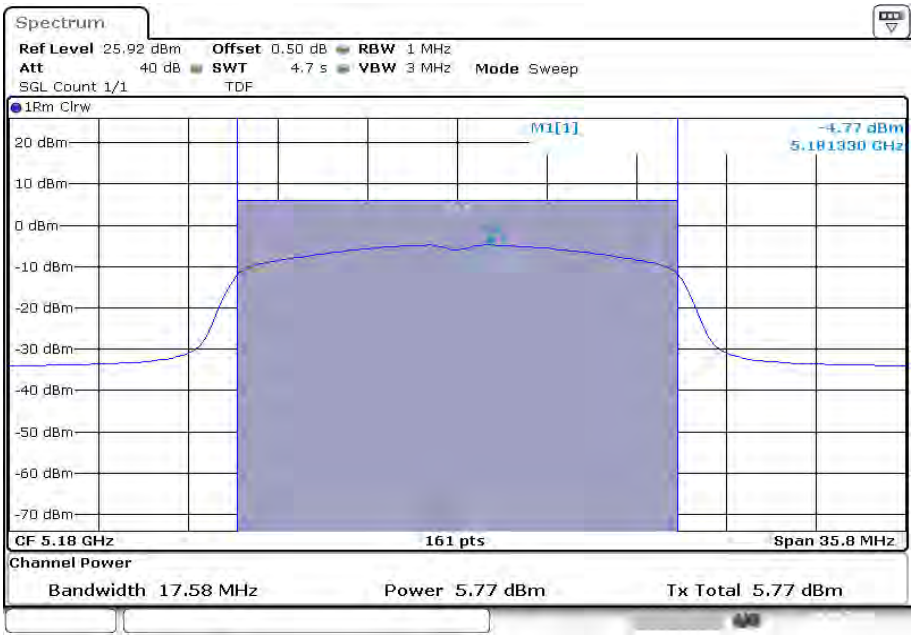
Date: 29.APR.2016 07:11:41

Plot 10: 5825 MHz

Date: 29.APR.2016 07:14:01

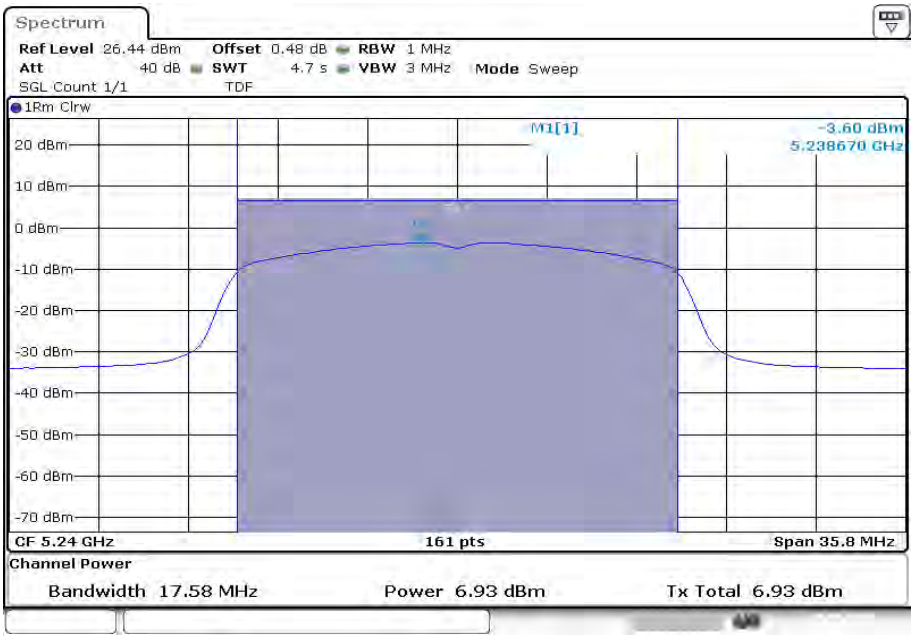
Plots: OFDM / n HT20 – mode, IC requirement

Plot 1: 5180 MHz



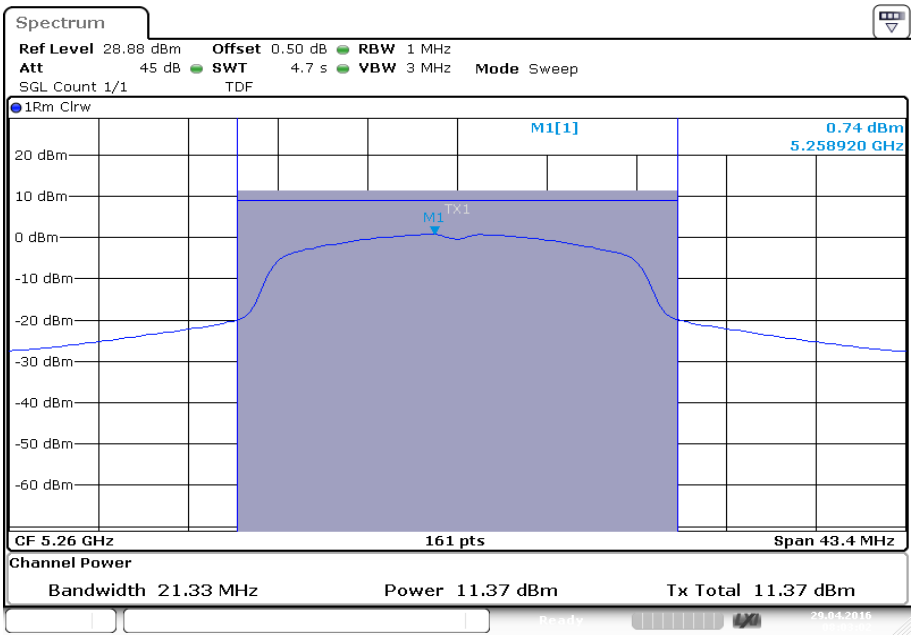
Date: 29.APR.2016 08:12:08

Plot 2: 5240 MHz



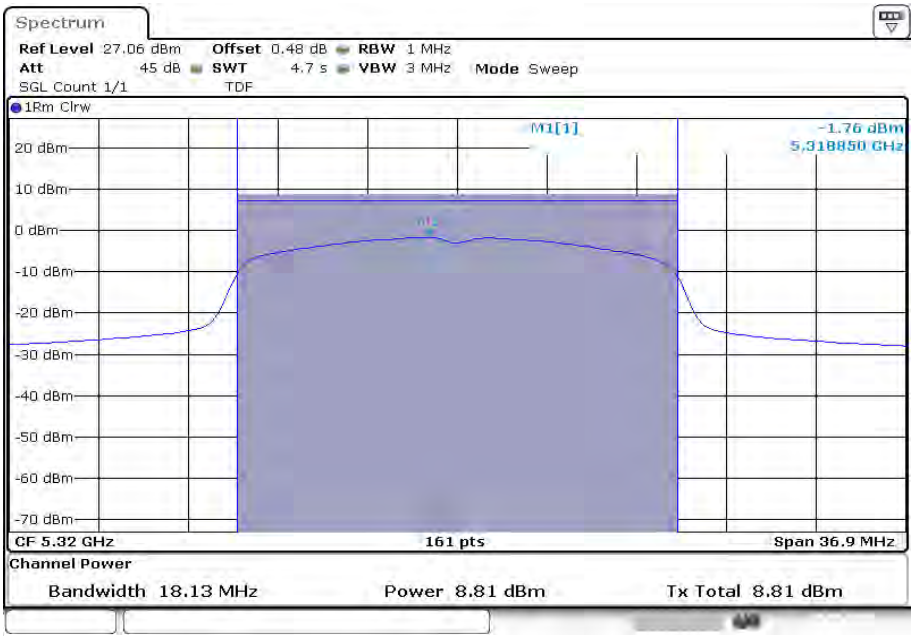
Date: 29.APR.2016 08:06:08

Plot 3: 5260 MHz



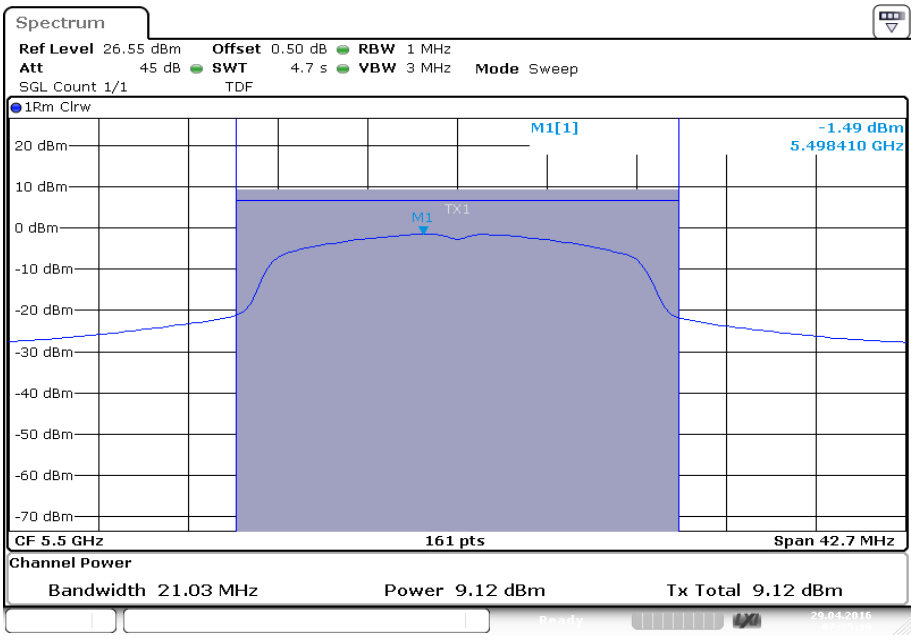
Date: 29.APR.2016 08:03:03

Plot 4: 5320 MHz



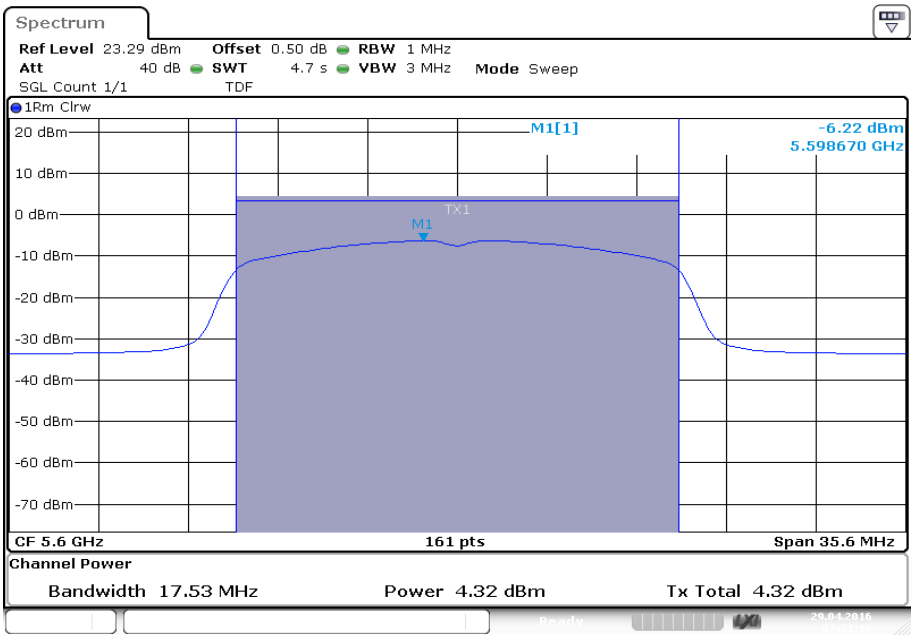
Date: 29.APR.2016 07:54:22

Plot 5: 5500 MHz



Date: 29.APR.2016 07:35:40

Plot 6: 5600 MHz

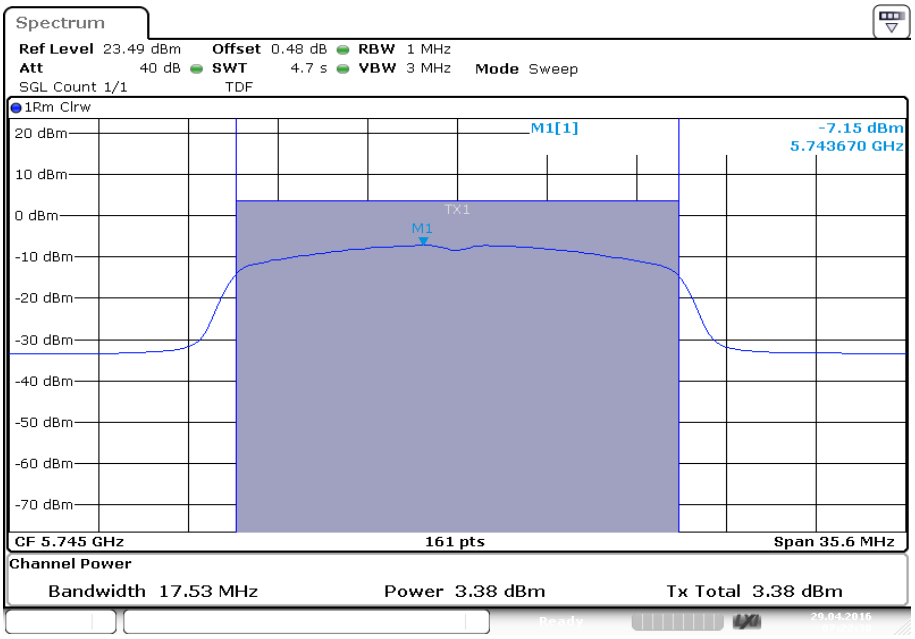


Date: 29.APR.2016 07:31:11

Plot 7: 5700 MHz

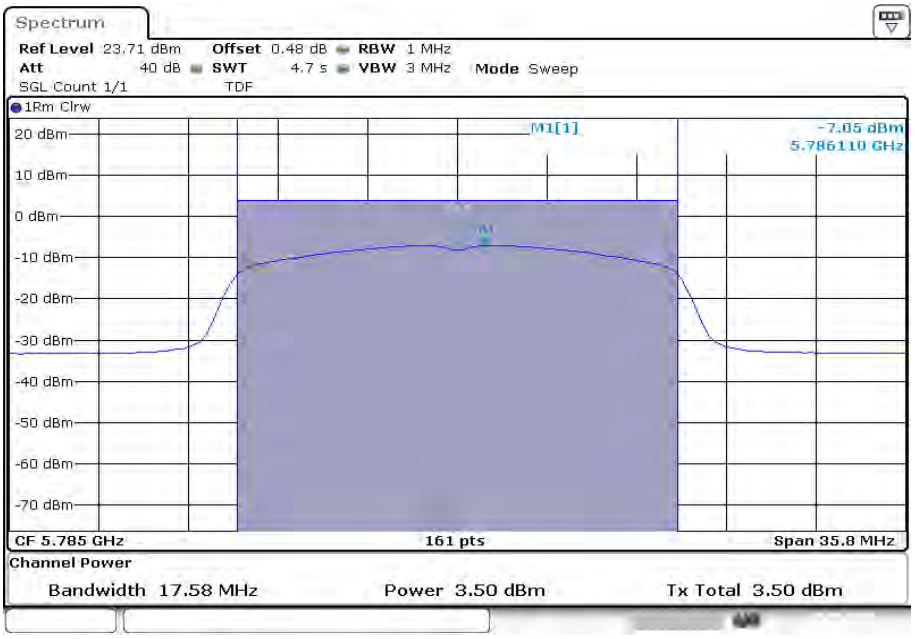
Date: 29.APR.2016 07:28:36

Plot 8: 5745 MHz



Date: 29.APR.2016 07:22:30

Plot 9: 5785 MHz



Date: 29.APR.2016 07:19:41

Plot 10: 5825 MHz

Date: 29.APR.2016 07:16:49

Plots: OFDM / n HT40 – mode, IC requirement

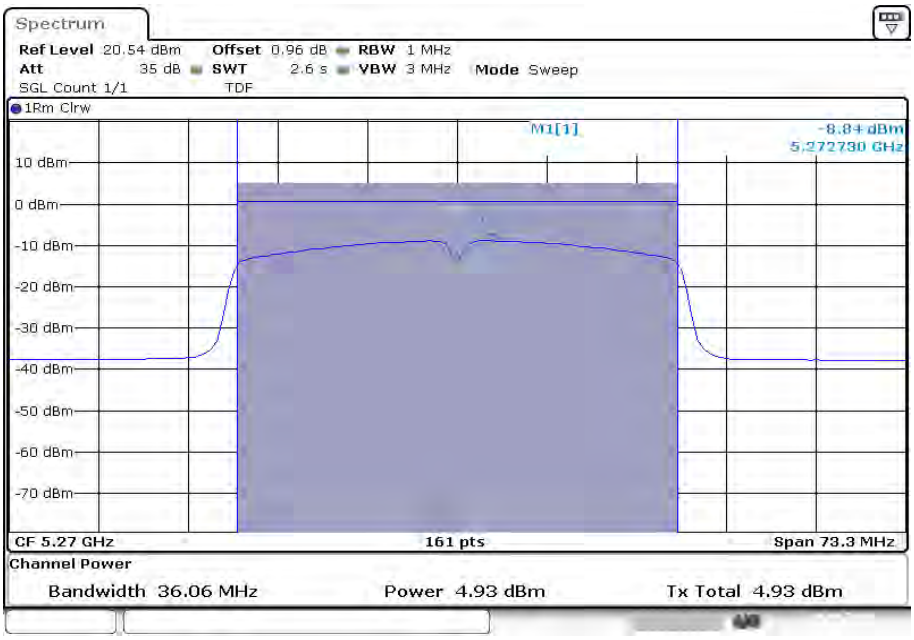
Plot 1: 5190 MHz

Date: 29.APR.2016 06:20:06

Plot 2: 5230 MHz

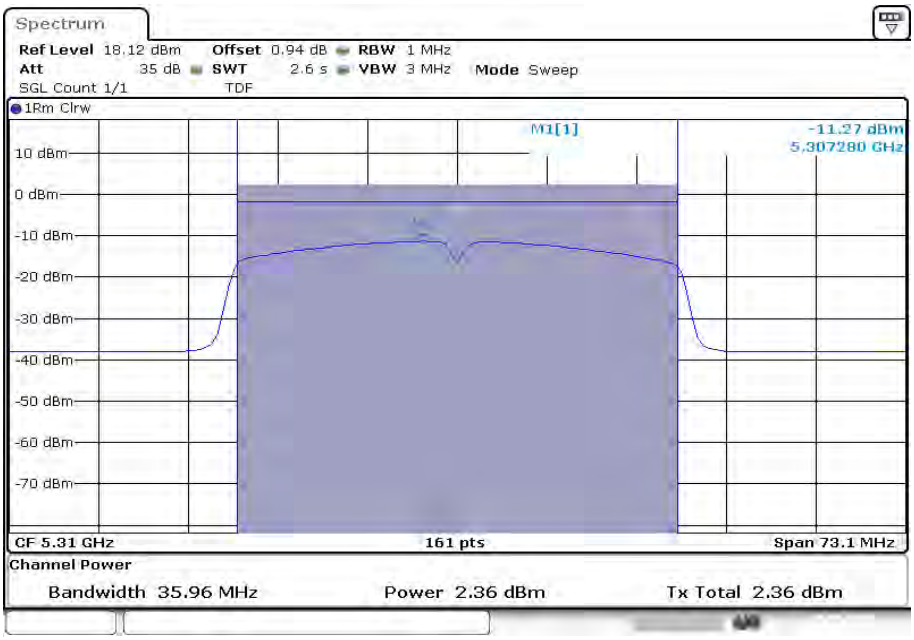
Date: 29.APR.2016 06:22:53

Plot 3: 5270 MHz



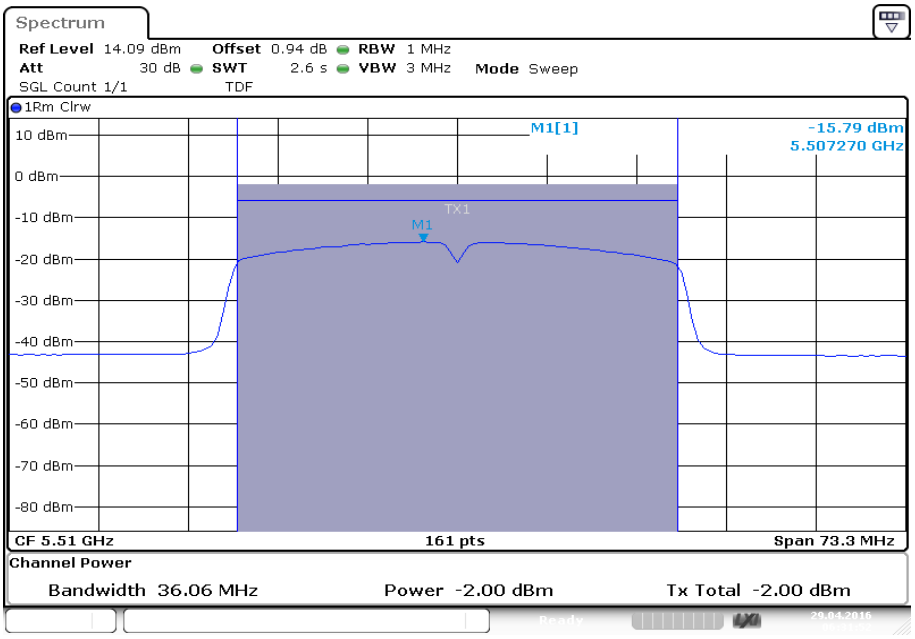
Date: 29.APR.2016 06:26:28

Plot 4: 5310 MHz



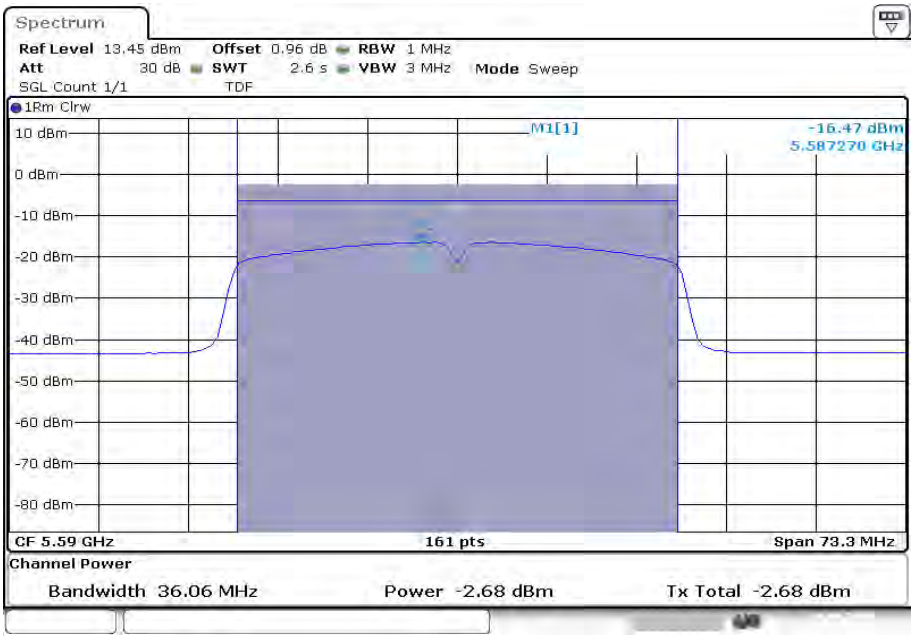
Date: 29.APR.2016 06:29:05

Plot 5: 5510 MHz



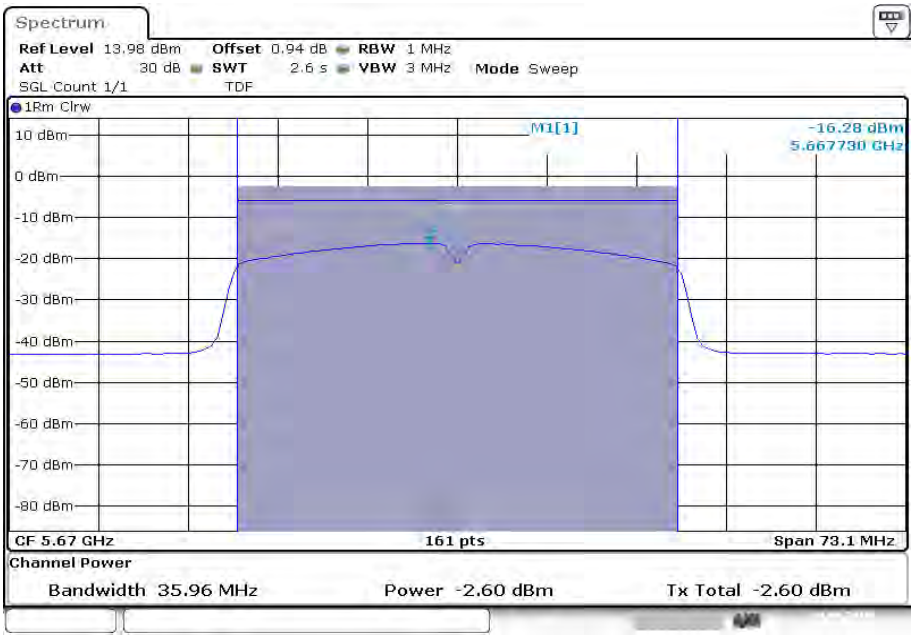
Date: 29.APR.2016 06:31:53

Plot 6: 5590 MHz



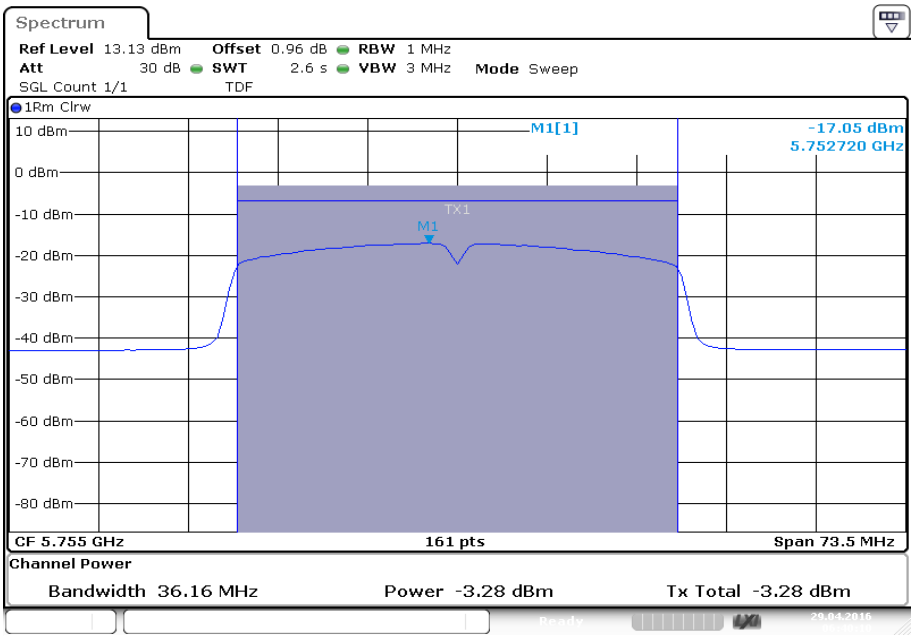
Date: 29.APR.2016 06:34:37

Plot 7: 5670 MHz



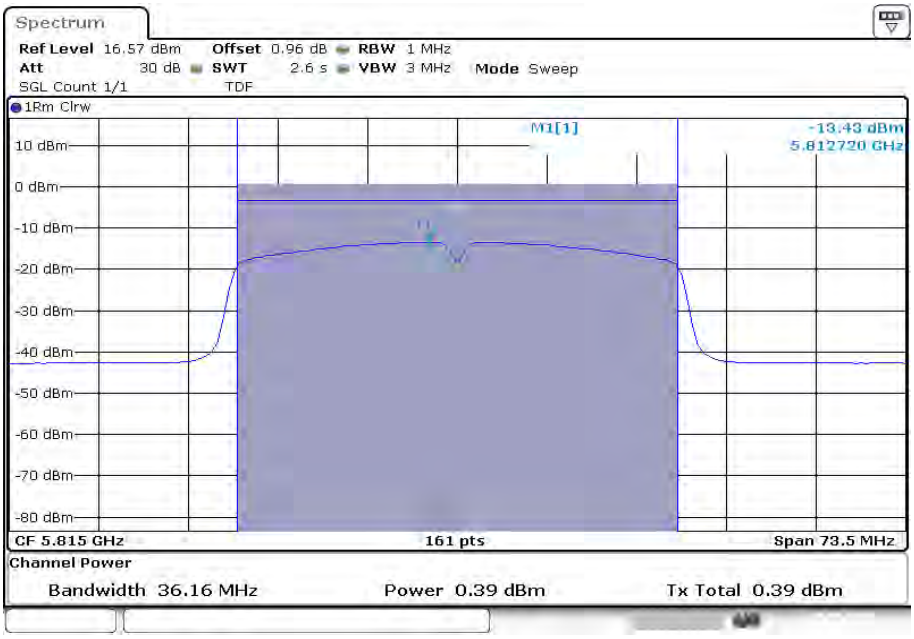
Date: 29.APR.2016 06:37:14

Plot 8: 5755 MHz



Date: 29.APR.2016 06:40:11

Plot 9: 5815 MHz



Date: 29.APR.2016 06:44:07

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	
Detector:	RMS
Sweep time:	≥10*(swp points)*(total on/off time)
Resolution bandwidth:	1 MHz (500 kHz for 5.8 GHz band)
Video bandwidth:	≥ 3xRBW
Span:	> EBW
Trace mode:	Max hold
Test setup:	See sub clause 7.5 – B
Measurement uncertainty:	See sub clause 9

Limits:

Power Spectral Density
FCC power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5150 – 5250 MHz) power spectral density conducted ≤ 17 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) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz) power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz) **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) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz) power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)

12.5.1 Power spectral density for FCC requirement

Result: a – mode; FCC requirement

OFDM / a – mode	Power spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
	-1.69	-4.22	0.70	-4.47
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	-2.50	-8.91	-7.33	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	-9.31	-10.36	-10.19	-/-

Result: n HT20 – mode; FCC requirement

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
	-4.78	-3.62	0.65	-1.78
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	-1.54	-6.22	-7.03	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	-10.04	-9.99	-10.14	-/-

Result: n HT40 – mode; FCC requirement

OFDM / n HT40 – mode	**Power spectral density [dBm/MHz]**			
Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
	-9.51	-8.39	-8.84	-11.31
Channel	5510 MHz	5590 MHz	5670 MHz	-/-
	-15.83	-16.50	-16.27	-/-
Channel	5755 MHz	5815 MHz	-/-	-/-
	-20.01	-16.43	-/-	-/-

12.5.2 Power spectral density for IC requirement

Result: a – mode; IC requirement

OFDM / a – mode	Power spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
Including duty cycle correction factor	-1.70	-4.21	0.78	-4.47
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	-2.45	-8.90	-7.33	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	-9.31	-10.36	-10.19	-/-

Result: n HT20 – mode; IC requirement

OFDM / n HT20 – mode	Power spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
Including duty cycle correction factor	-4.77	-3.60	0.74	-1.76
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	-1.49	-6.22	-7.03	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	-10.04	-9.99	-10.14	-/-

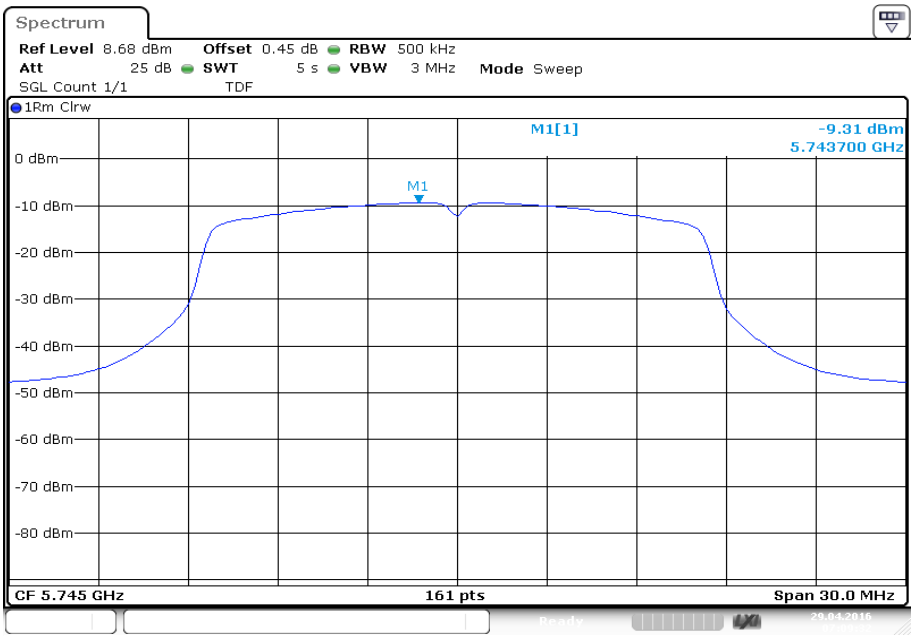
Result: n HT40 – mode; IC requirement

OFDM / n HT40 – mode	Power spectral density [dBm/MHz]			
Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
Including duty cycle correction factor	-9.51	-8.40	-8.84	-11.27
Channel	5510 MHz	5590 MHz	5670 MHz	-/-
	-15.79	-16.47	-16.28	-/-
Channel	5755 MHz	5815 MHz	-/-	-/-
	-20.01	-16.43	-/-	-/-

12.5.3 Power spectral density plots for 5.8 GHz band

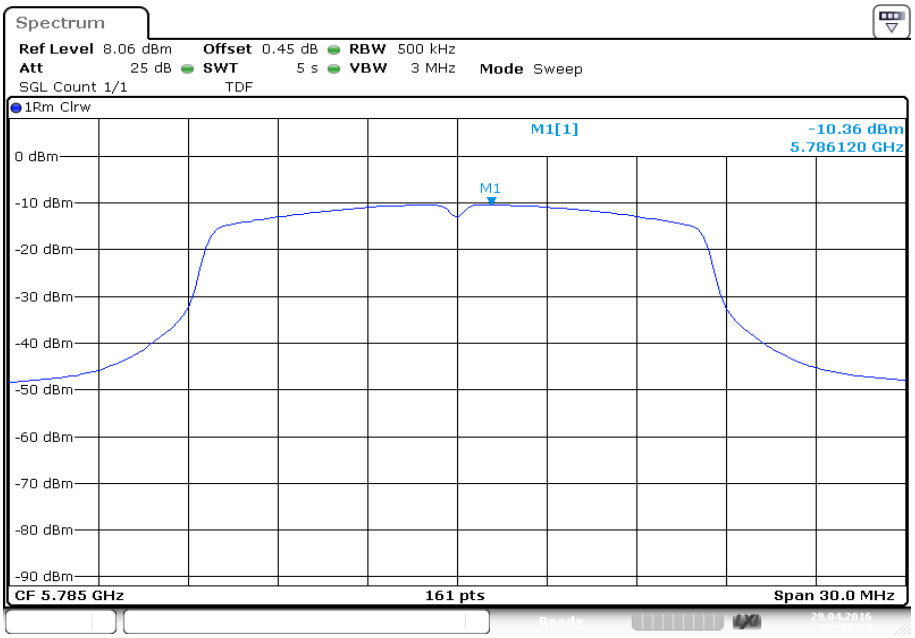
Plots: OFDM / a – mode

Plot 1: 5745 MHz



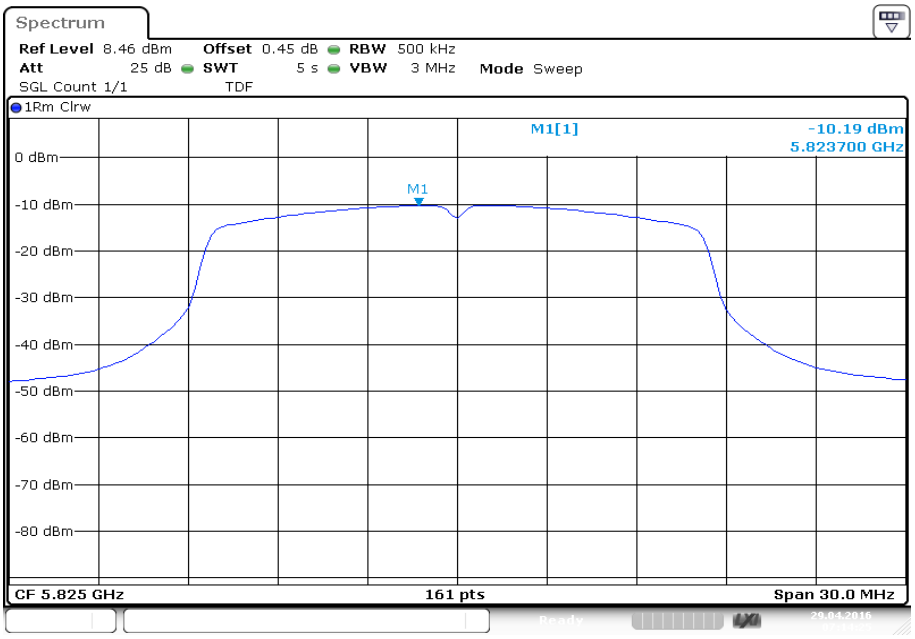
Date: 29.APR.2016 07:09:32

Plot 2: 5785 MHz



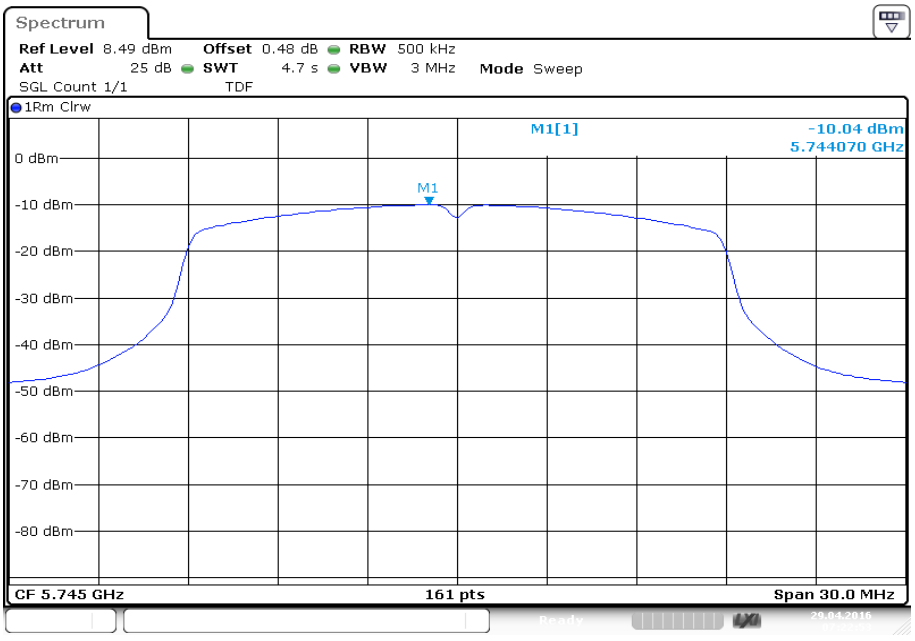
Date: 29.APR.2016 07:12:05

Plot 3: 5825 MHz



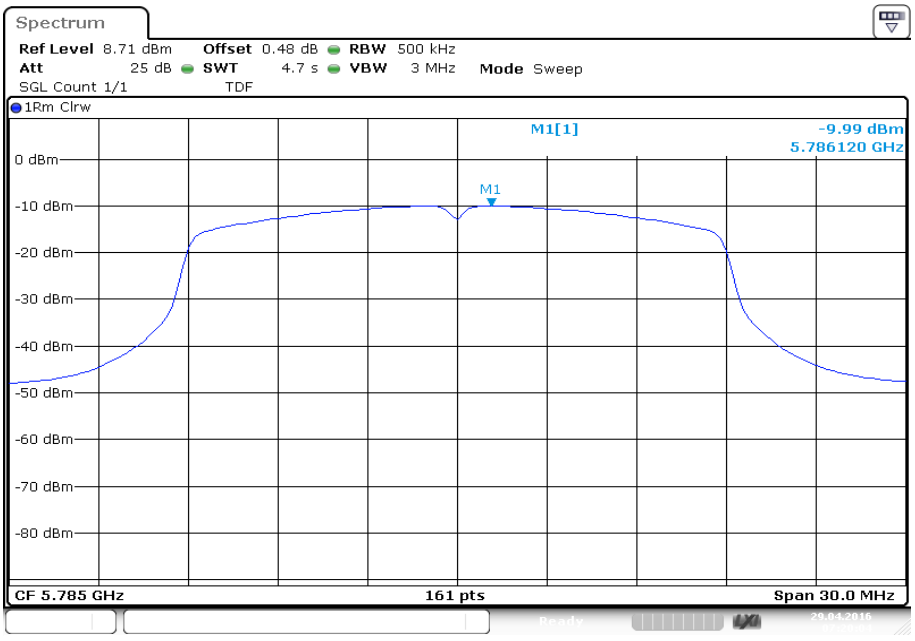
Plots: OFDM / n HT20 – mode

Plot 1: 5745 MHz



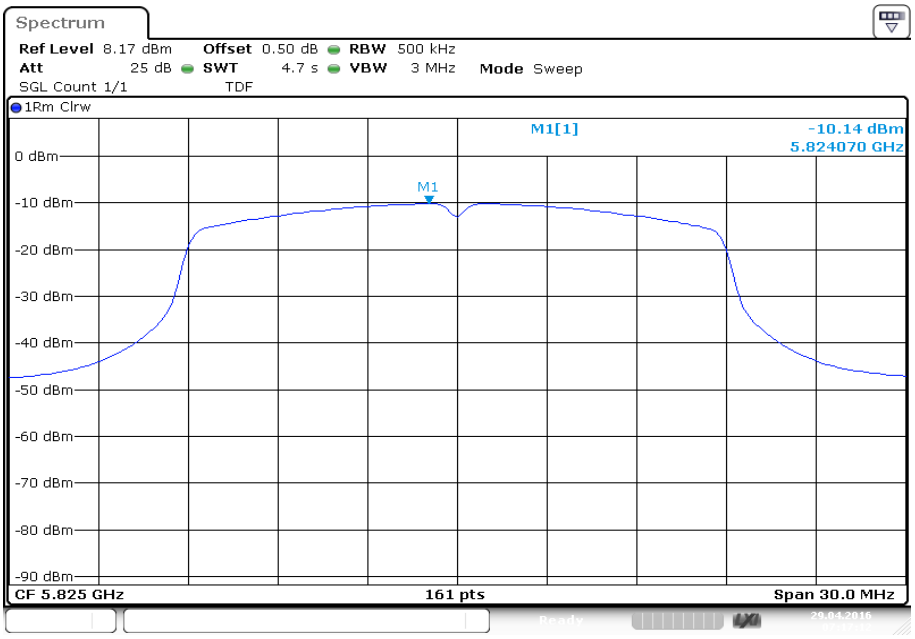
Date: 29.APR.2016 07:22:54

Plot 2: 5785 MHz



Date: 29.APR.2016 07:20:04

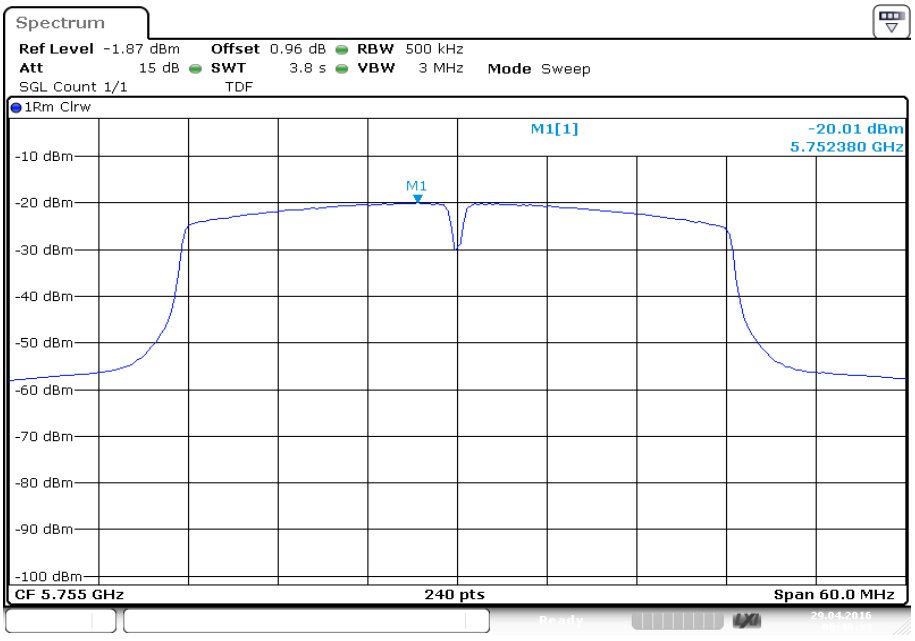
Plot 3: 5825 MHz



Date: 29.APR.2016 07:17:12

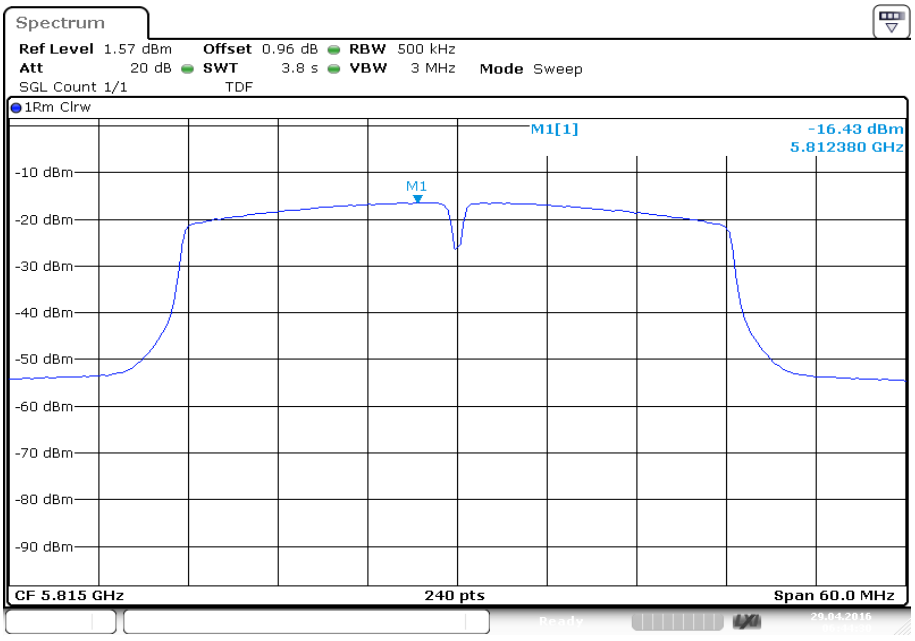
Plots: OFDM / n HT40 – mode

Plot 1: 5755 MHz



Date: 29.APR.2016 06:40:34

Plot 2: 5815 MHz



Date: 29.APR.2016 06:44:30

12.6 Spectrum bandwidth – 26 dB bandwidth

Description:

Measurement of the 26 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1% EBW
Video bandwidth:	≥ RBW
Span:	> complete signal!
Trace – mode:	Max hold
Test setup:	See sub clause 7.5 – B
Measurement uncertainty:	See sub clause 9

Limits:

Spectrum Bandwidth – 26 dB Bandwidth
-/-

Result:

OFDM / a – mode	26 dB bandwidth [MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
	35.2	20.7*	35.5	21.6
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	40.3	30.7	20.9	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	20.6	20.9	21.0	-/-

*20 dB bandwidth 19.2 MHz

Result:

OFDM / n HT20 – mode	26 dB bandwidth [MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
	23.3	22.7*	37.0	31.7
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	36.5	21.3	21.7	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	21.8	21.3	22.0	-/-

*20 dB bandwidth 19.5 MHz

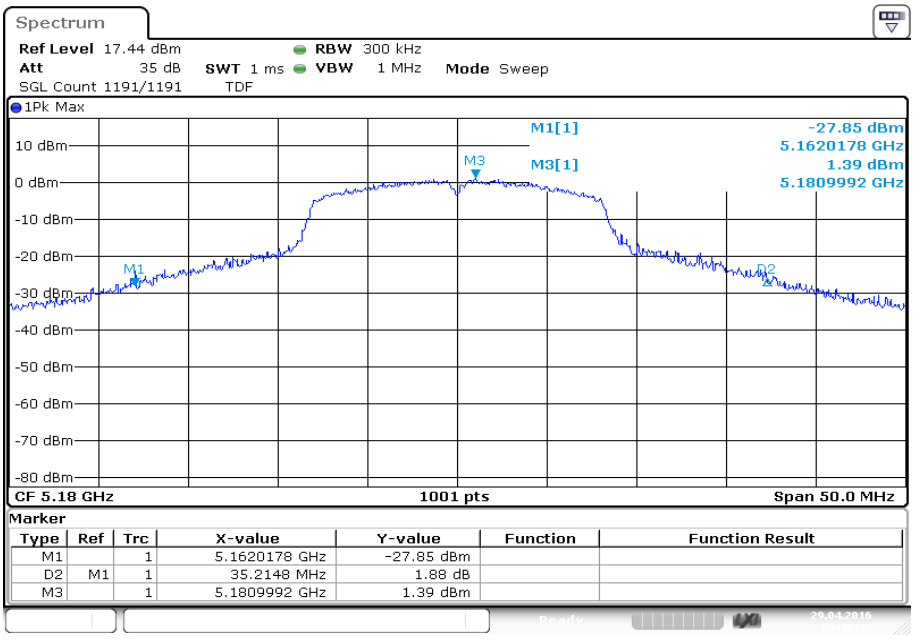
Result:

OFDM / n HT40 – mode	26 dB bandwidth [MHz]			
Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
	41.1	41.1	41.1	40.4
Channel	5510 MHz	5590 MHz	5670 MHz	-/-
	41.0	41.0	40.7	-/-
Channel	5755 MHz	5815 MHz	-/-	-/-
	41.1	41.0	-/-	-/-

*20 dB bandwidth 39.0 MHz

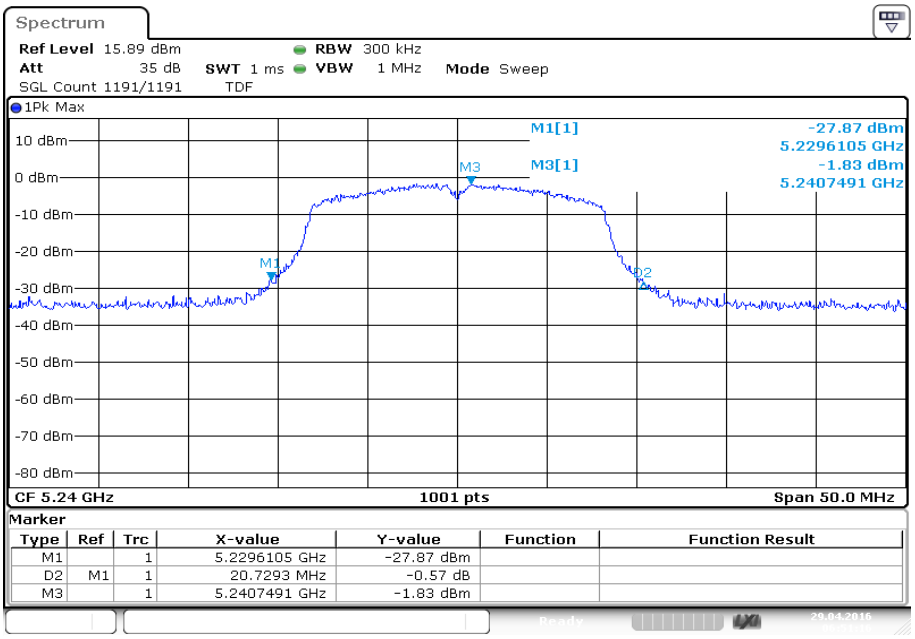
Plots: OFDM / a – mode

Plot 1: 5180 MHz



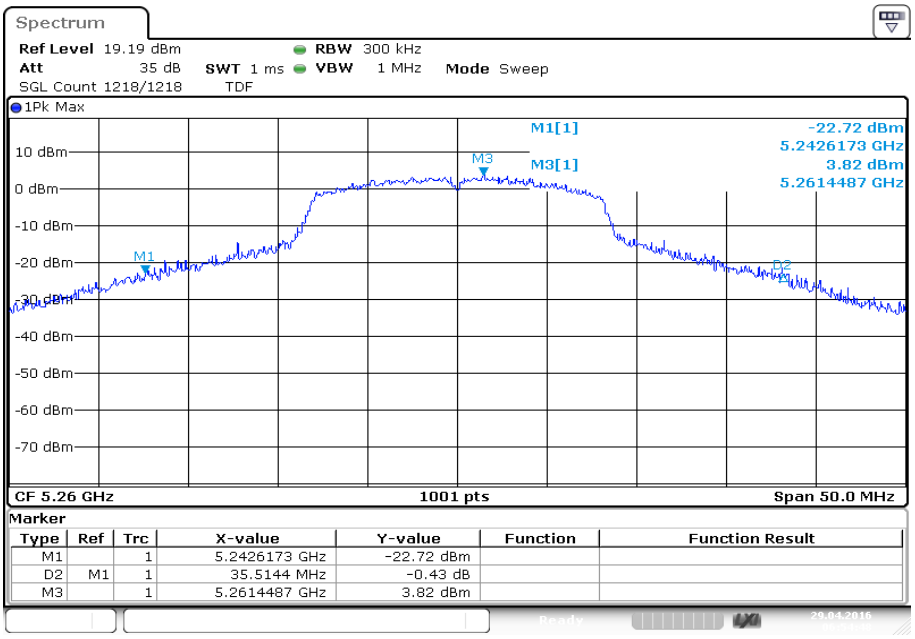
Date: 29.APR.2016 06:48:43

Plot 2: 5240 MHz



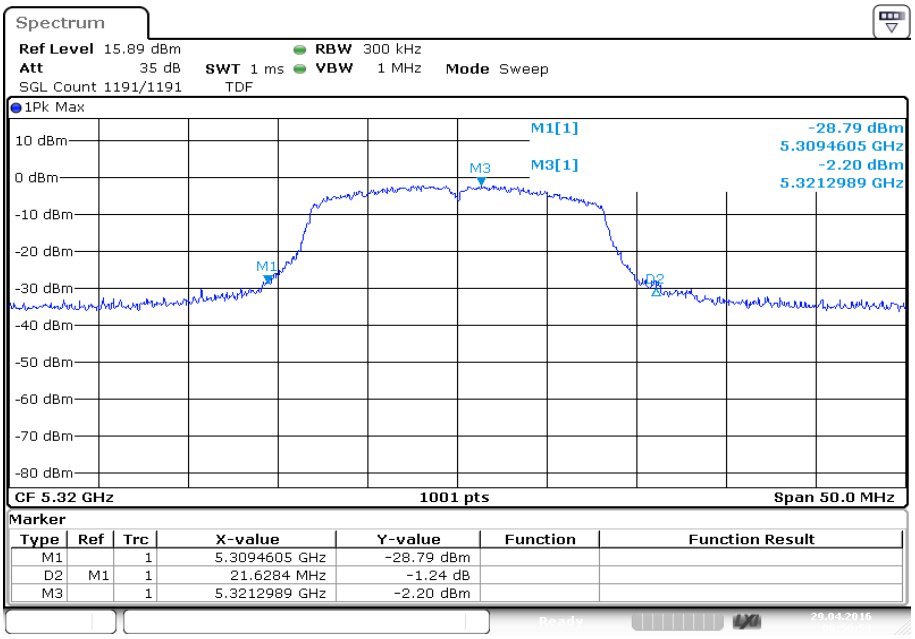
Date: 29.APR.2016 06:51:16

Plot 3: 5260 MHz



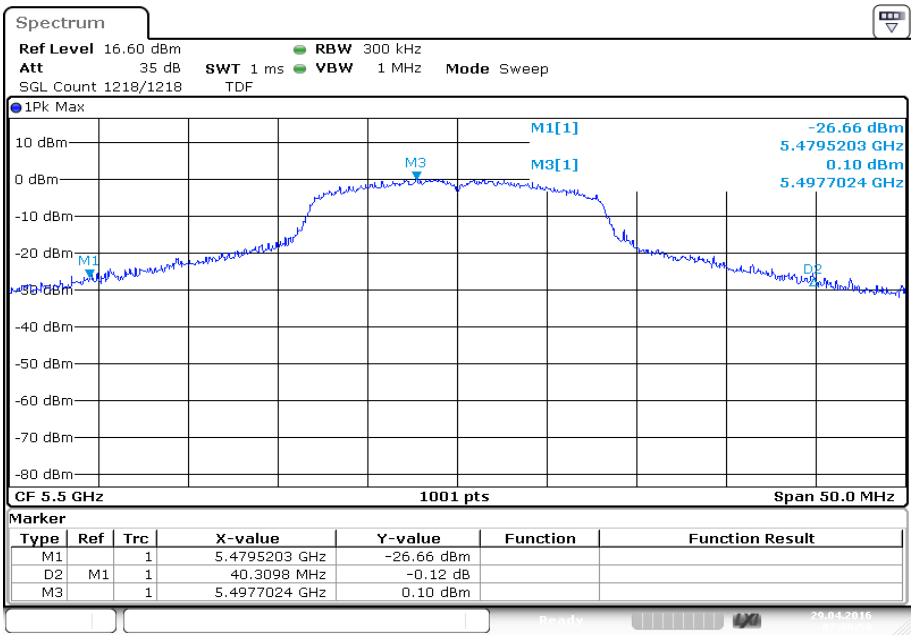
Date: 29.APR.2016 06:54:49

Plot 4: 5320 MHz



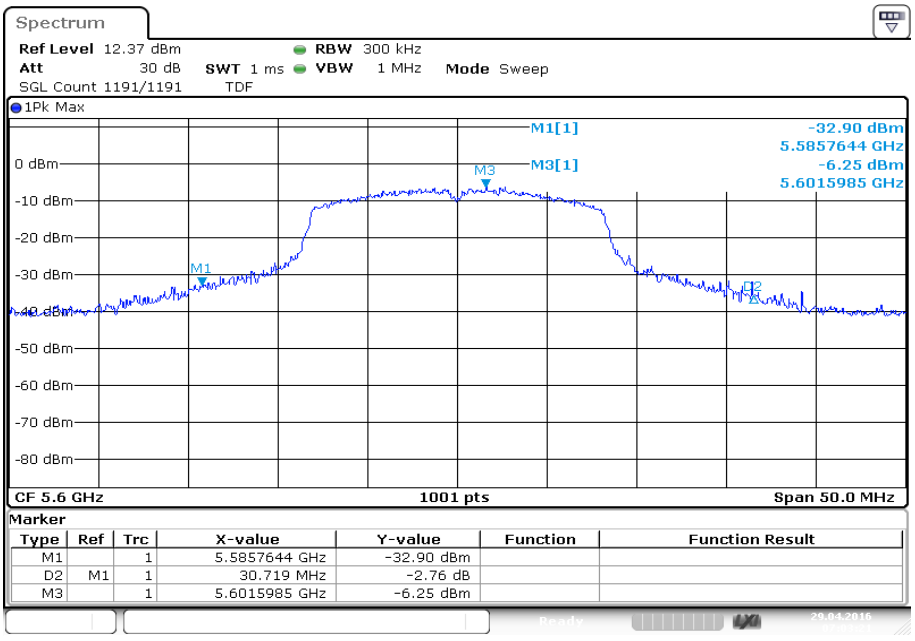
Date: 29.APR.2016 06:56:59

Plot 5: 5500 MHz



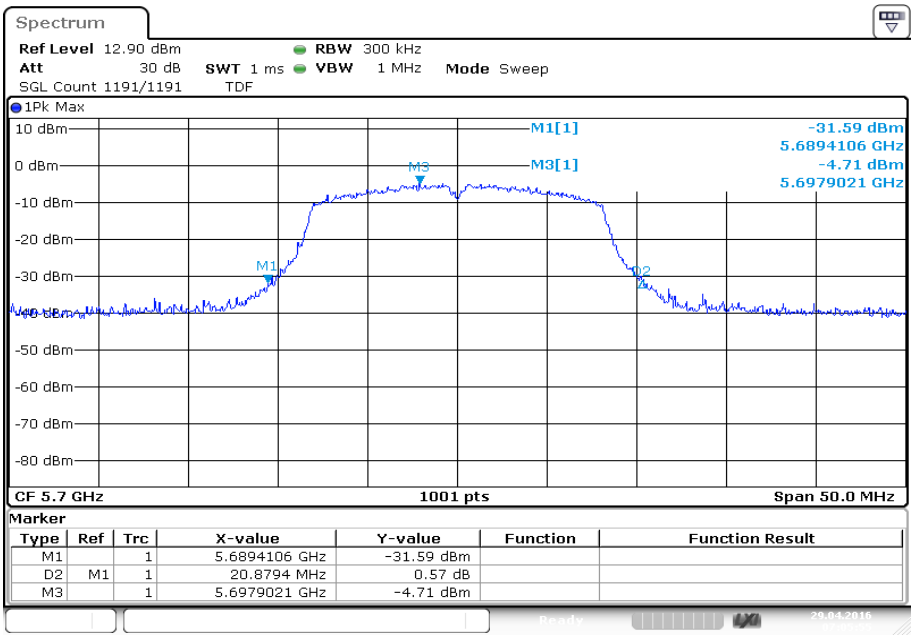
Date: 29.APR.2016 07:00:59

Plot 6: 5600 MHz



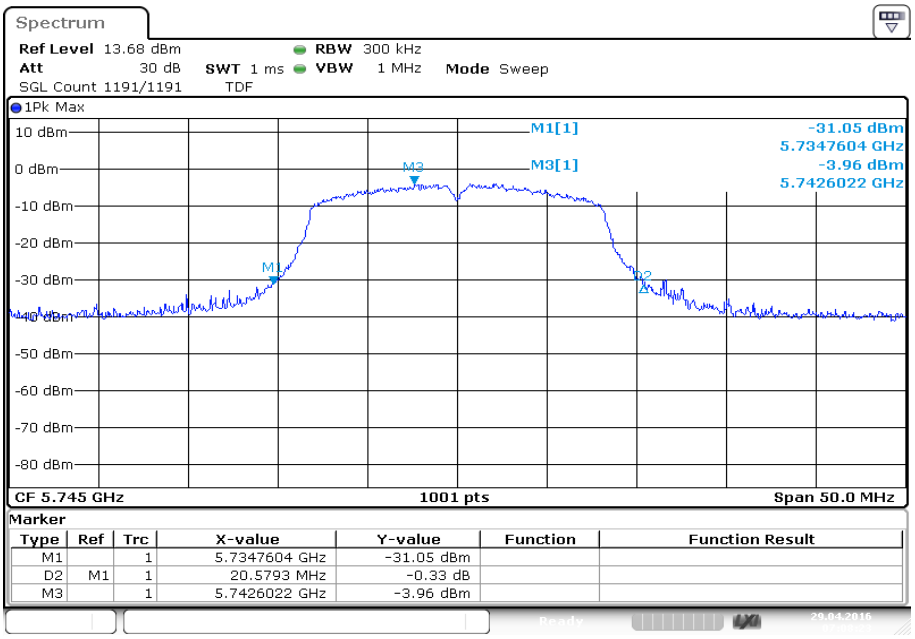
Date: 29.APR.2016 07:03:21

Plot 7: 5700 MHz



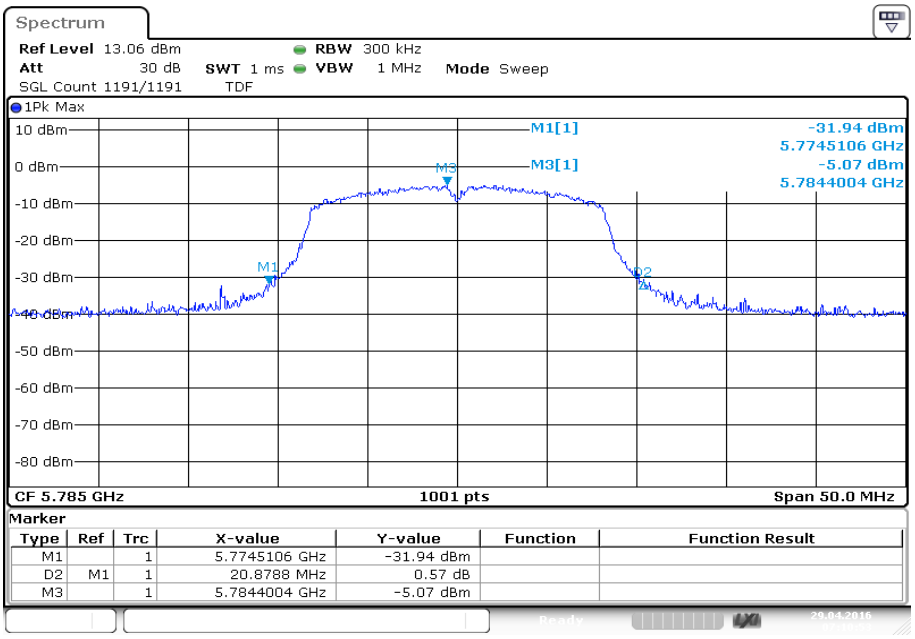
Date: 29.APR.2016 07:05:56

Plot 8: 5745 MHz



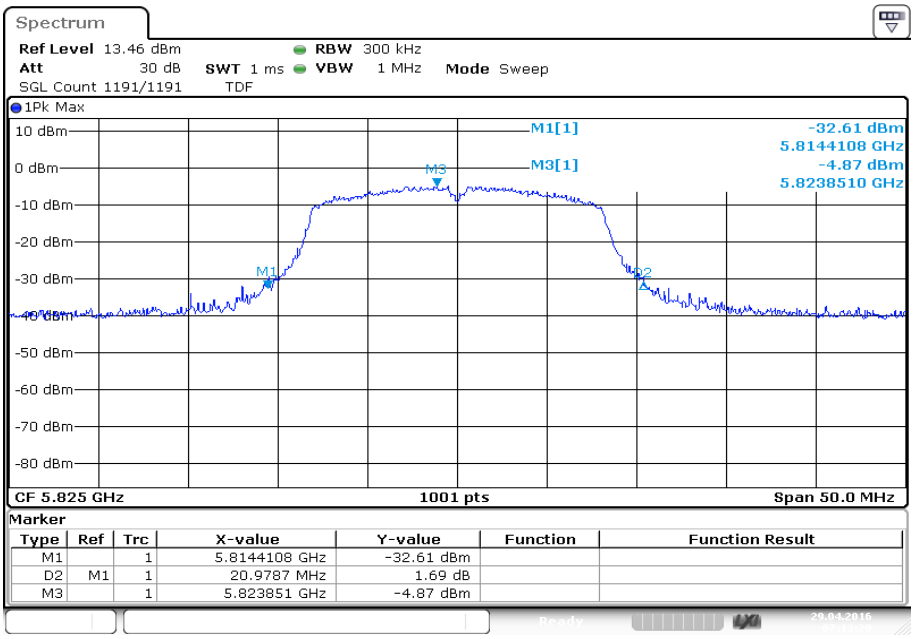
Date: 29.APR.2016 07:08:23

Plot 9: 5785 MHz



Date: 29.APR.2016 07:10:54

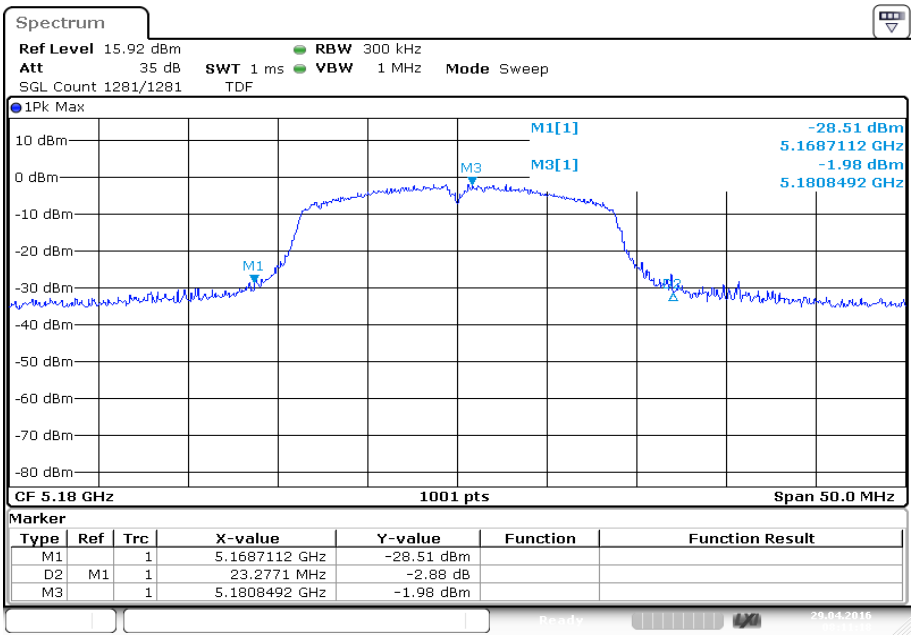
Plot 10: 5825 MHz



Date: 29.APR.2016 07:13:21

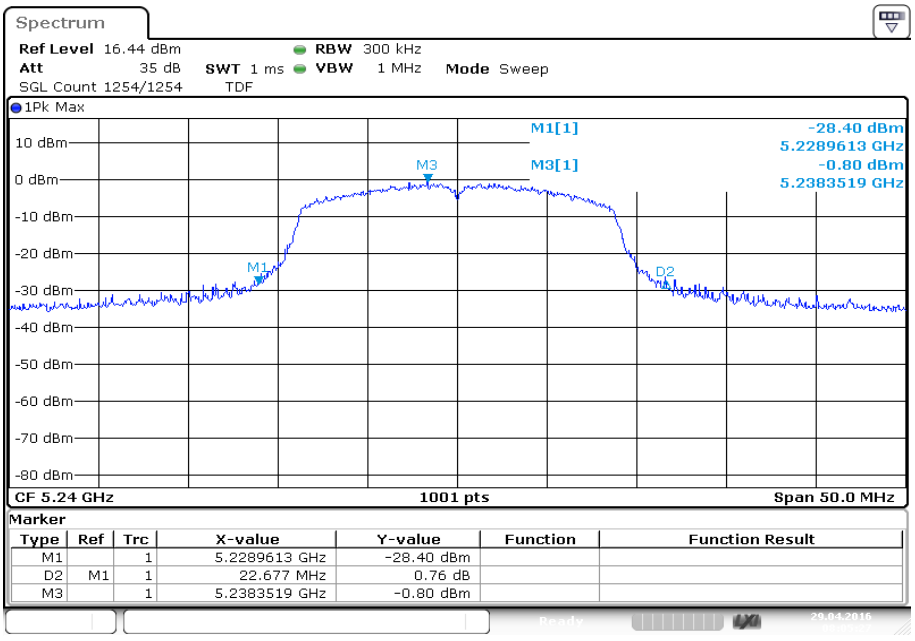
Plots: OFDM / n HT20 – mode

Plot 1: 5180 MHz



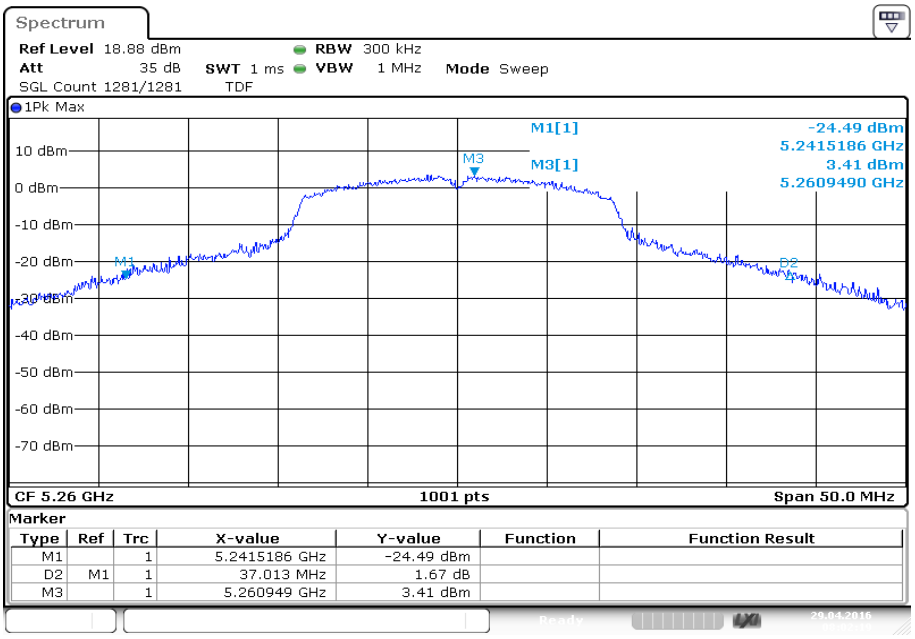
Date: 29.APR.2016 08:11:19

Plot 2: 5240 MHz



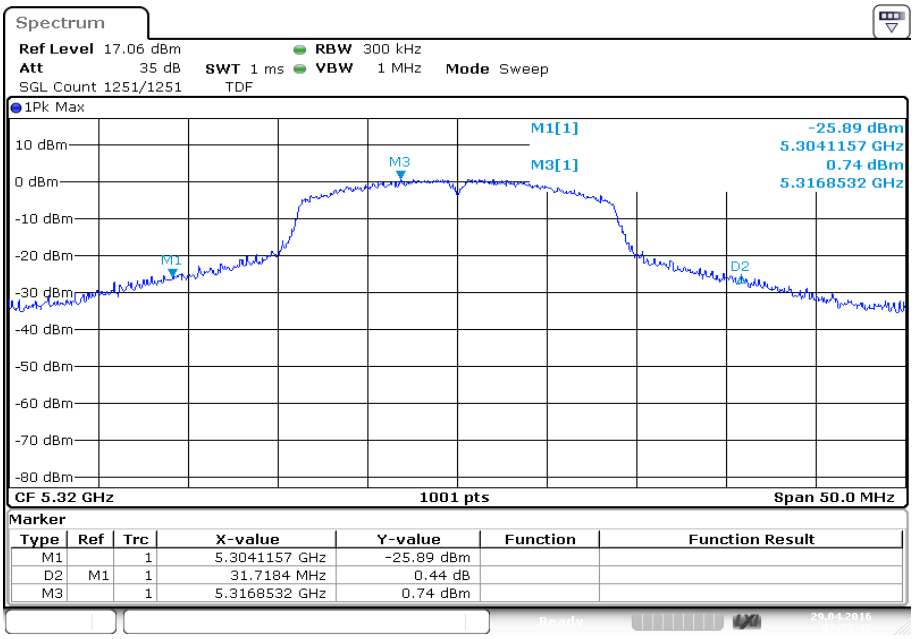
Date: 29.APR.2016 08:05:27

Plot 3: 5260 MHz



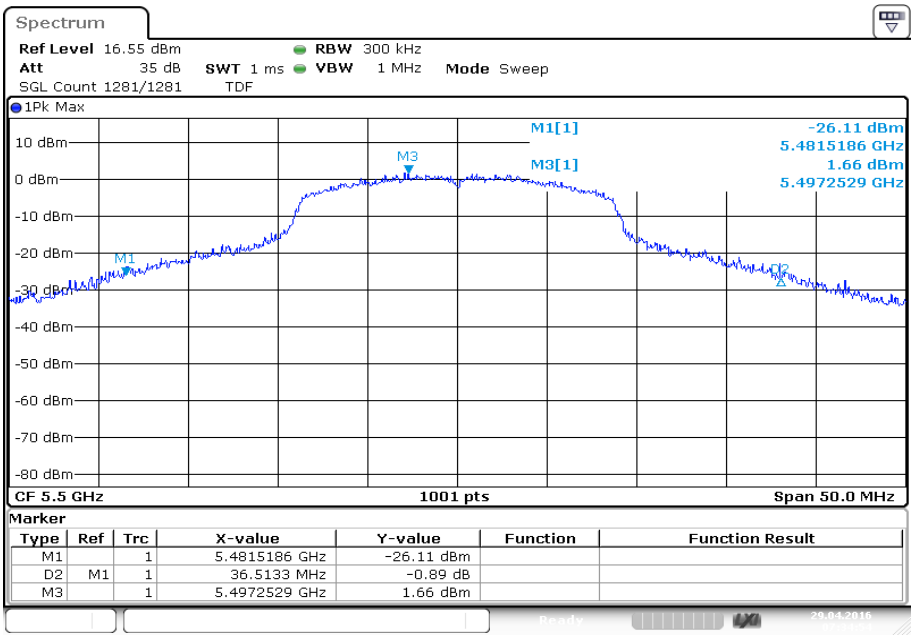
Date: 29.APR.2016 08:02:20

Plot 4: 5320 MHz



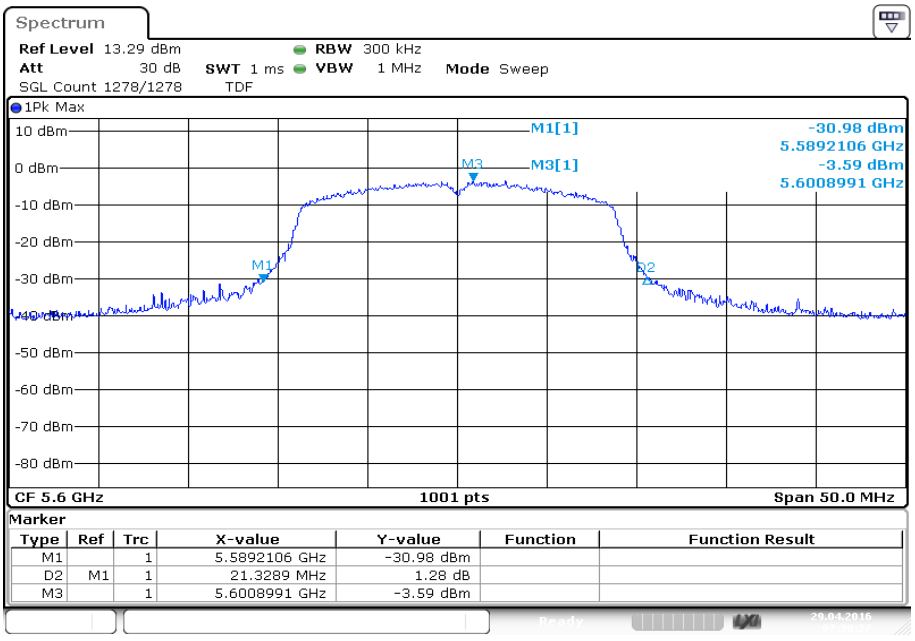
Date: 29.APR.2016 07:53:43

Plot 5: 5500 MHz



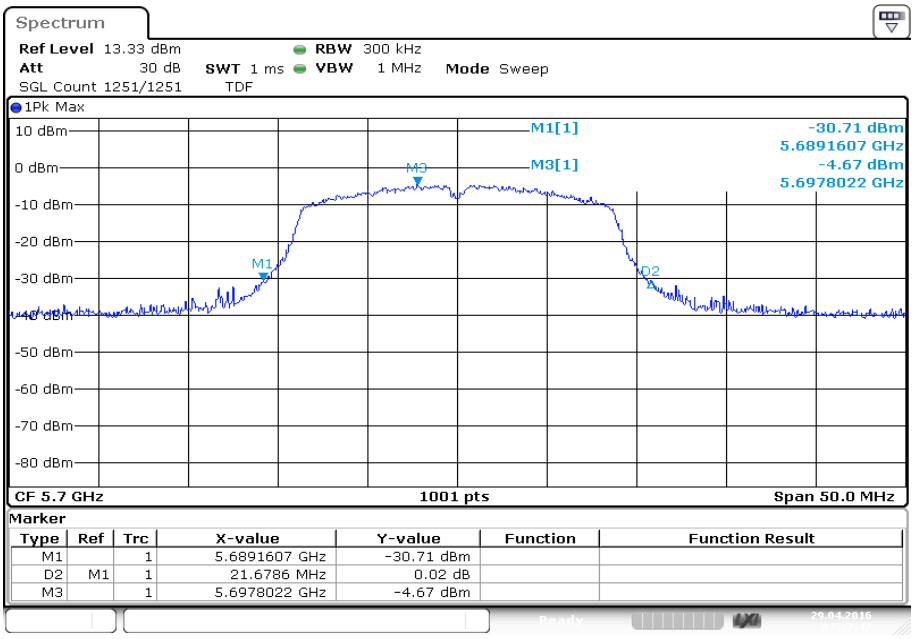
Date: 29.APR.2016 07:34:55

Plot 6: 5600 MHz



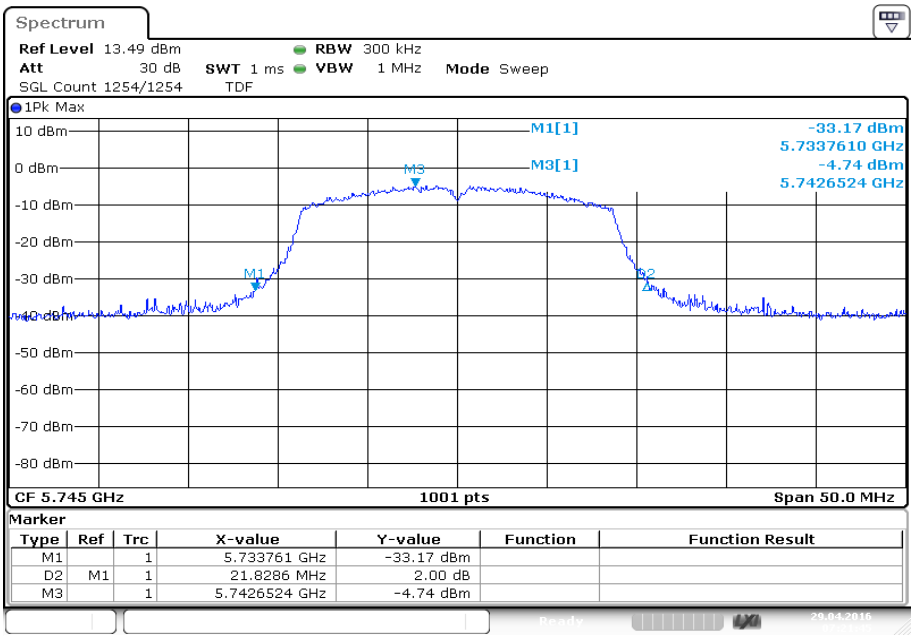
Date: 29.APR.2016 07:30:28

Plot 7: 5700 MHz



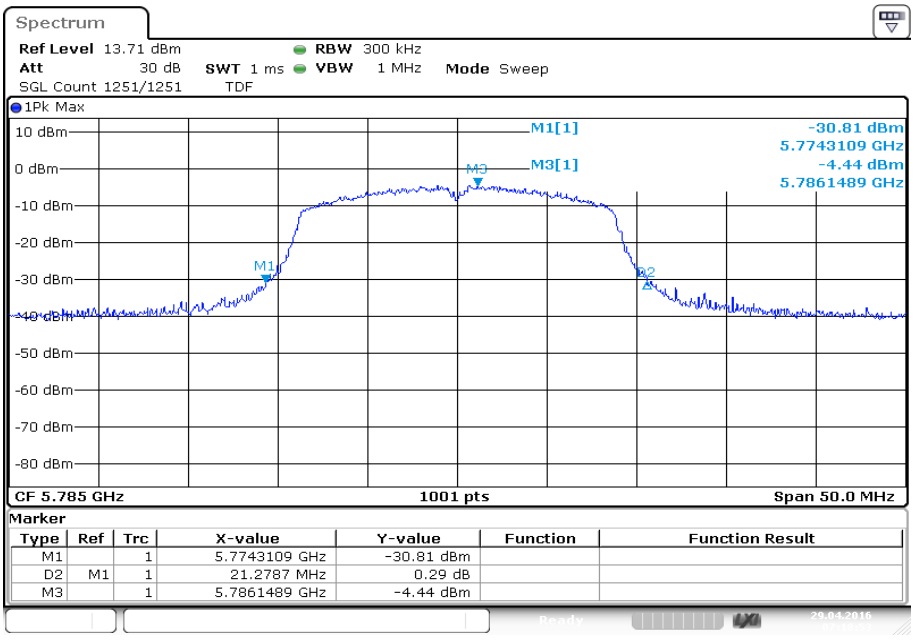
Date: 29.APR.2016 07:27:48

Plot 8: 5745 MHz



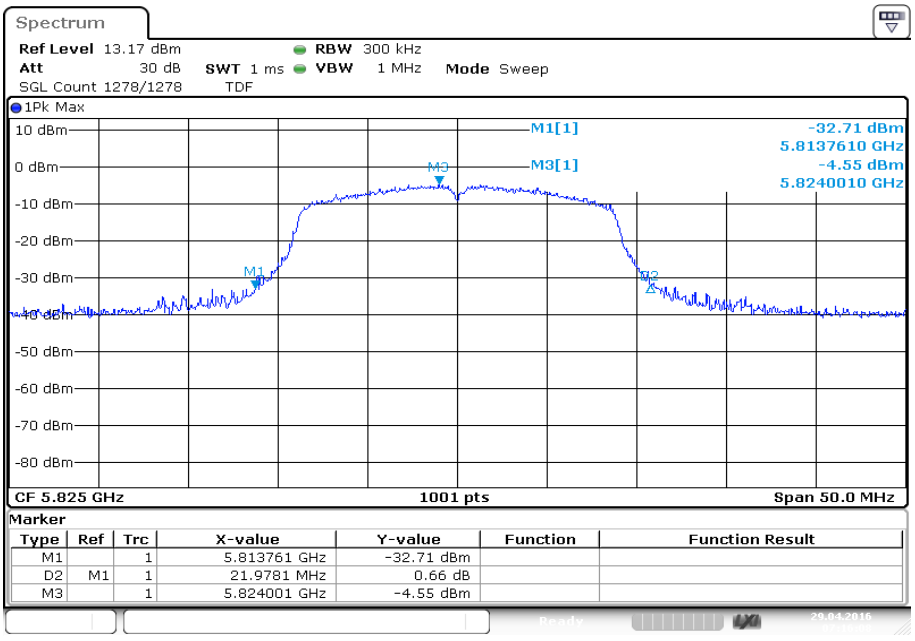
Date: 29.APR.2016 07:21:46

Plot 9: 5785 MHz



Date: 29.APR.2016 07:18:54

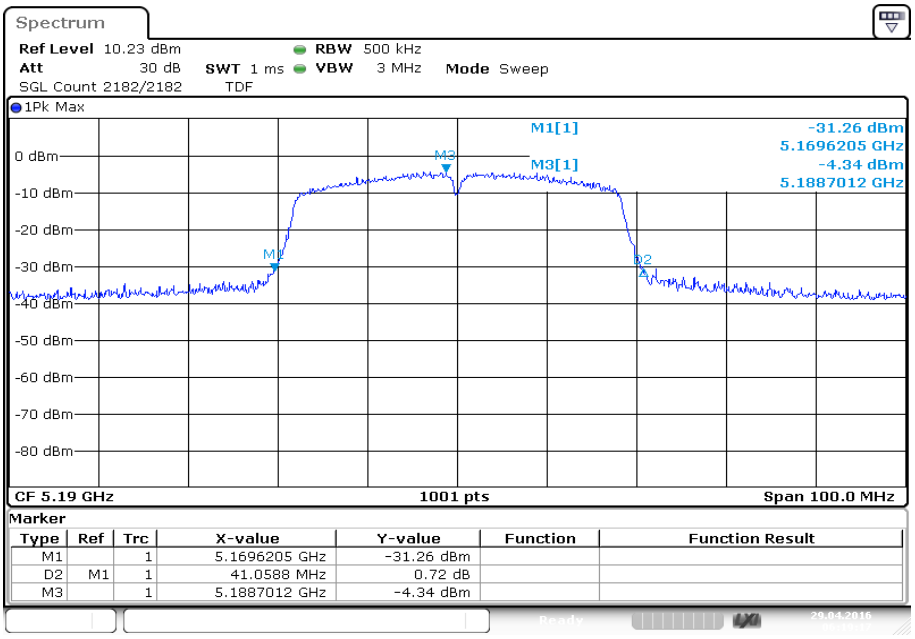
Plot 10: 5825 MHz



Date: 29.APR.2016 07:16:08

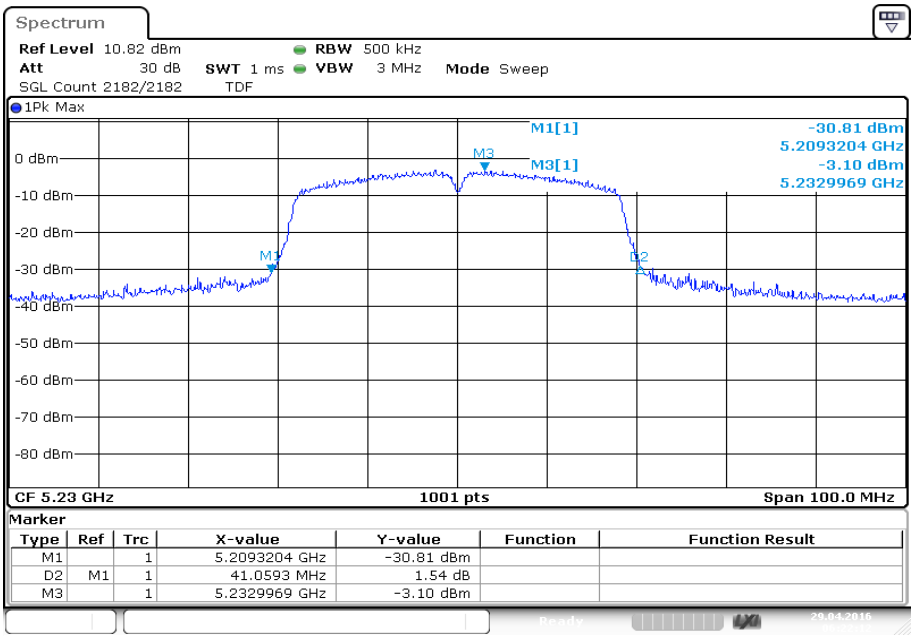
Plots: OFDM / n HT40 – mode

Plot 1: 5190 MHz



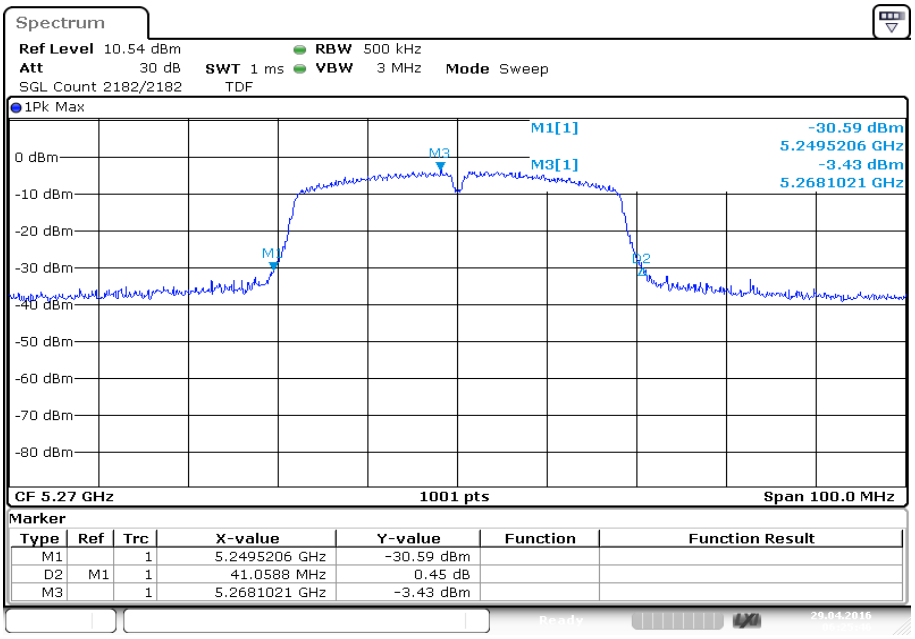
Date: 29.APR.2016 06:19:17

Plot 2: 5230 MHz



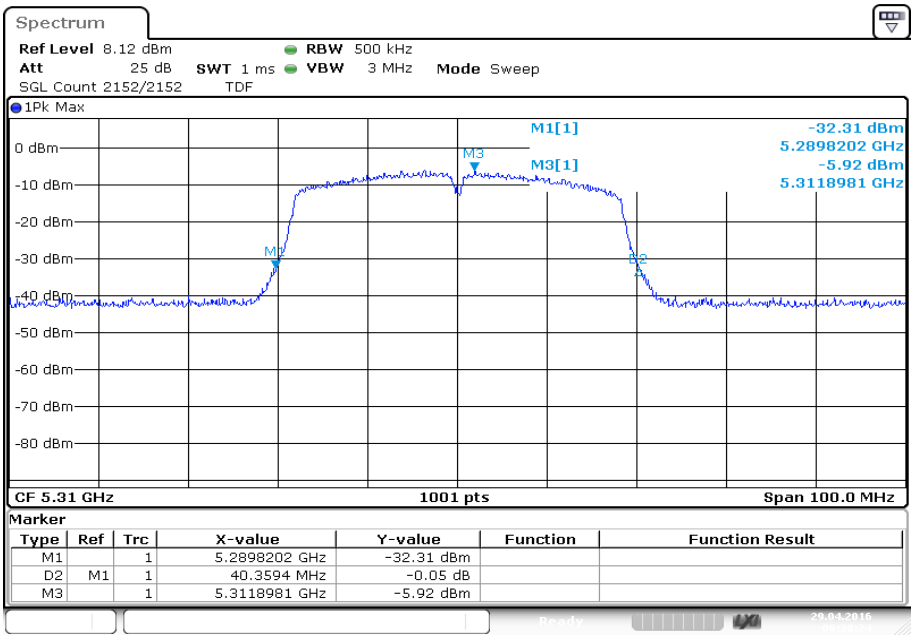
Date: 29.APR.2016 06:22:12

Plot 3: 5270 MHz



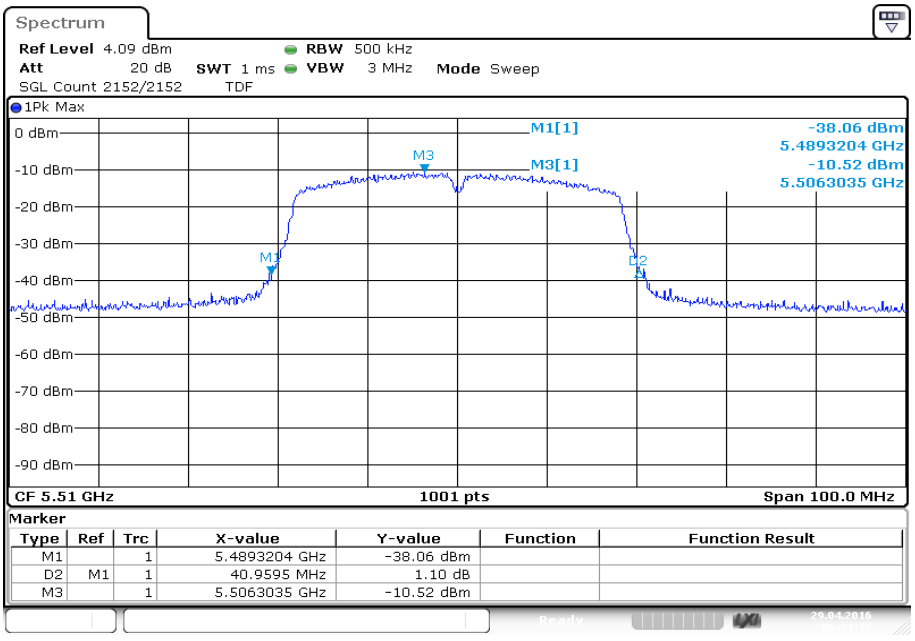
Date: 29.APR.2016 06:25:47

Plot 4: 5310 MHz



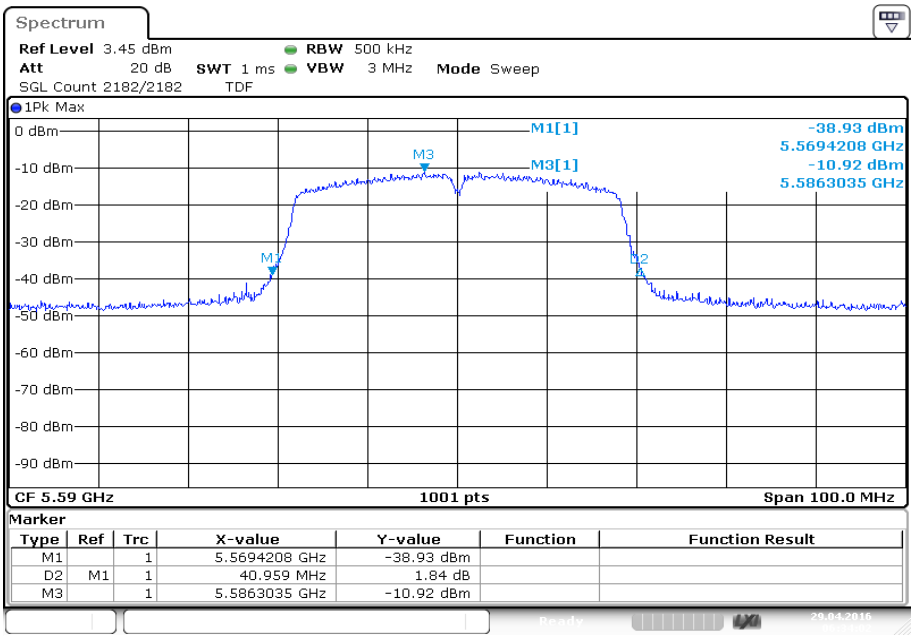
Date: 29.APR.2016 06:28:24

Plot 5: 5510 MHz



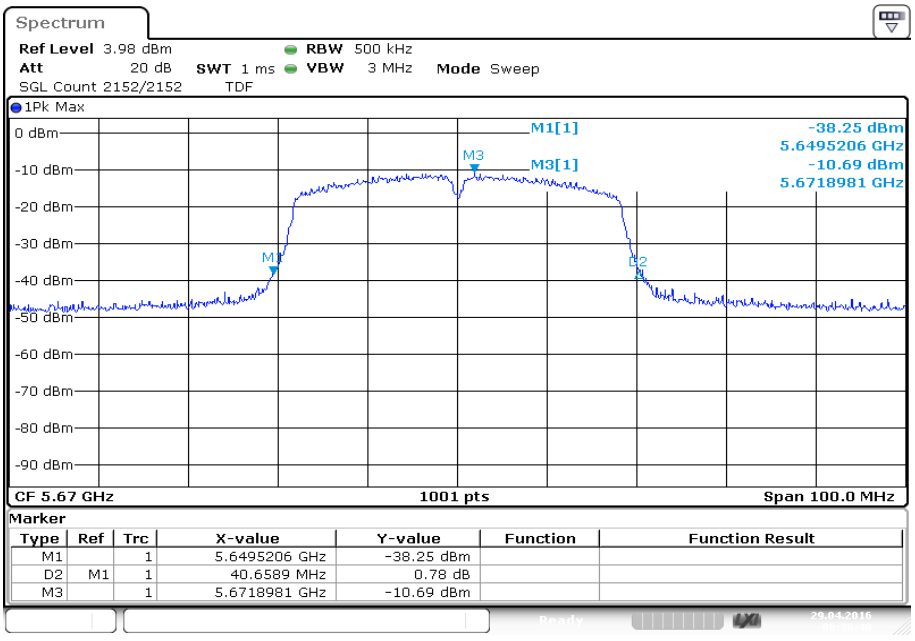
Date: 29.APR.2016 06:31:19

Plot 6: 5590 MHz



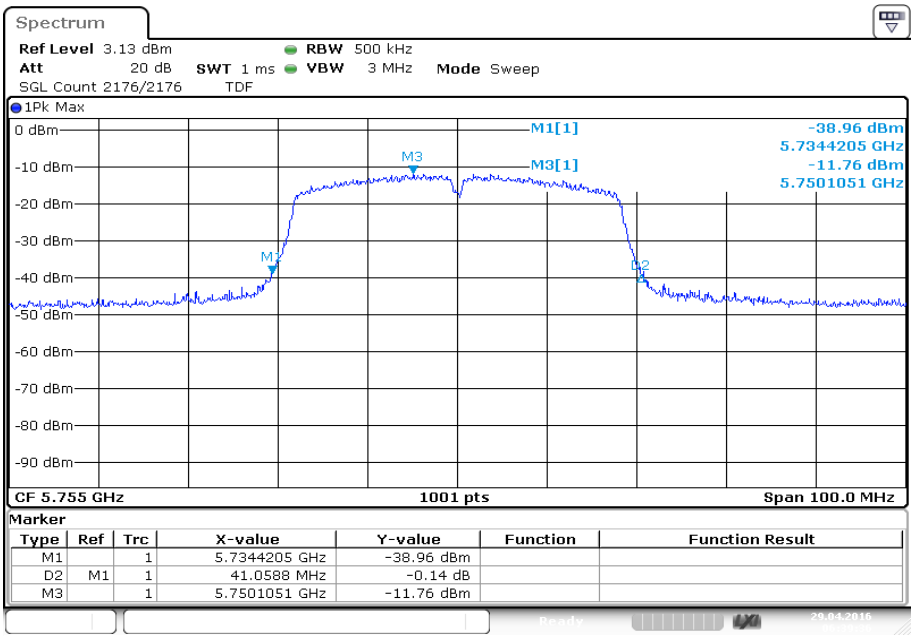
Date: 29.APR.2016 06:34:02

Plot 7: 5670 MHz



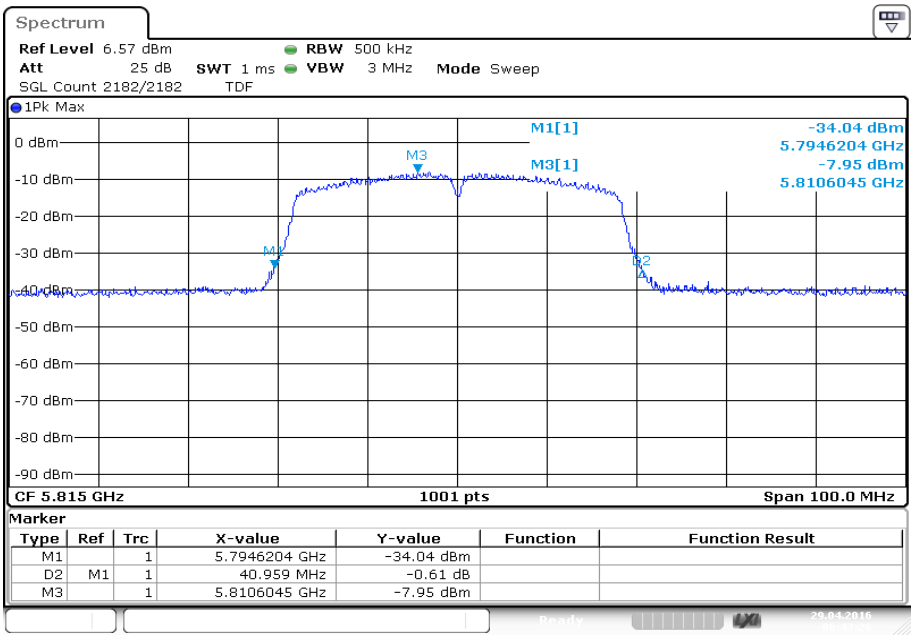
Date: 29.APR.2016 06:36:40

Plot 8: 5755 MHz



Date: 29.APR.2016 06:39:36

Plot 9: 5815 MHz



12.7 Occupied bandwidth – 99% emission bandwidth

Description:

Measurement of the 99% bandwidth of the modulated signal acc. RSS-GEN.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	300 kHz / 500 kHz
Video bandwidth:	1 MHz / 3 MHz
Span:	50 MHz / 100 MHz
Measurement procedure:	Measurement of the 99% bandwidth using the integration function of the analyzer
Trace – mode:	Max hold (allow trace to stabilize)
Test setup:	See sub clause 7.5 – B
Measurement uncertainty:	See sub clause 9

Usage:

-/-	IC
Occupied Bandwidth – 99% emission bandwidth	
OBW is necessary for Emission Designator	

Result:

OFDM / a – mode	99% bandwidth [MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
	19.0	16.4	19.6	16.4
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	21.7	16.9	16.4	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	16.4	16.5	16.5	-/-

Result:

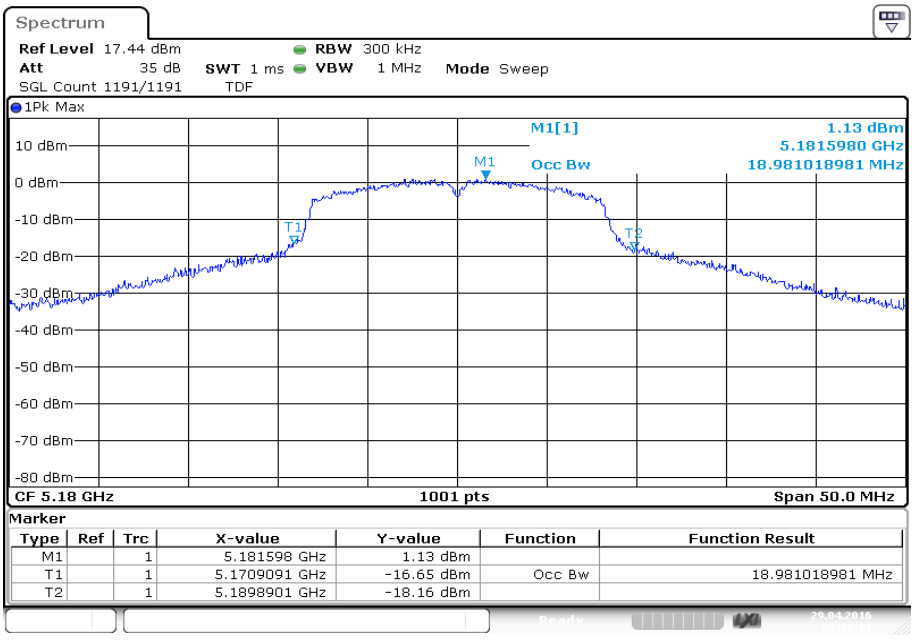
OFDM / n HT20 – mode	99% bandwidth [MHz]			
Channel	5180 MHz	5240 MHz	5260 MHz	5320 MHz
	17.6	17.6	21.3	18.1
Channel	5500 MHz	5600 MHz	5700 MHz	-/-
	21.0	17.5	17.6	-/-
Channel	5745 MHz	5785 MHz	5825 MHz	-/-
	17.5	17.6	17.6	-/-

Result:

OFDM / n HT40 – mode	99% bandwidth [MHz]			
Channel	5190 MHz	5230 MHz	5270 MHz	5310 MHz
	36.0	36.1	36.1	36.0
Channel	5510 MHz	5590 MHz	5670 MHz	-/-
	36.1	36.1	36.0	-/-
Channel	5755 MHz	5815 MHz	-/-	-/-
	36.2	36.2	-/-	-/-

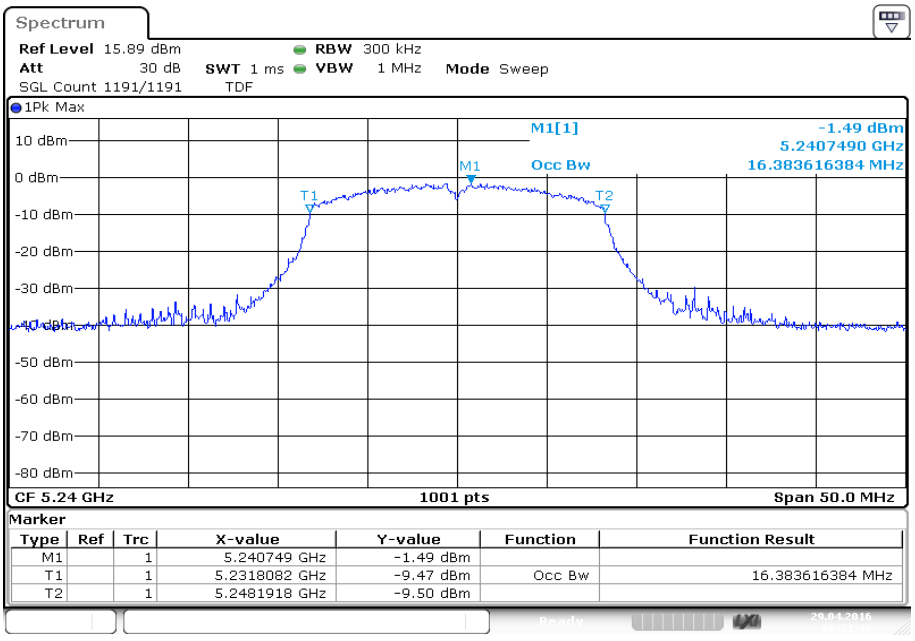
Plots: OFDM / a – mode

Plot 1: 5180 MHz



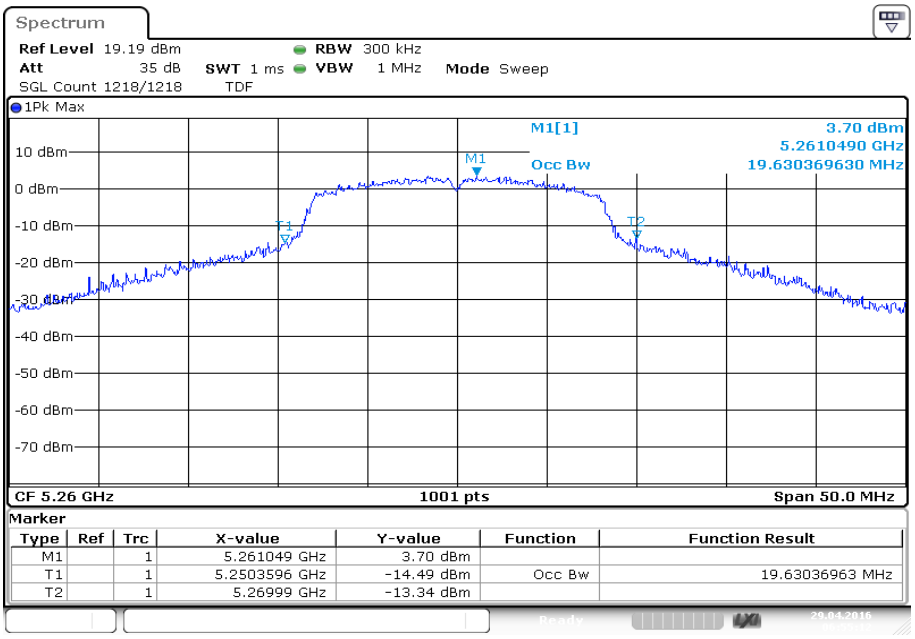
Date: 29.APR.2016 06:49:12

Plot 2: 5240 MHz



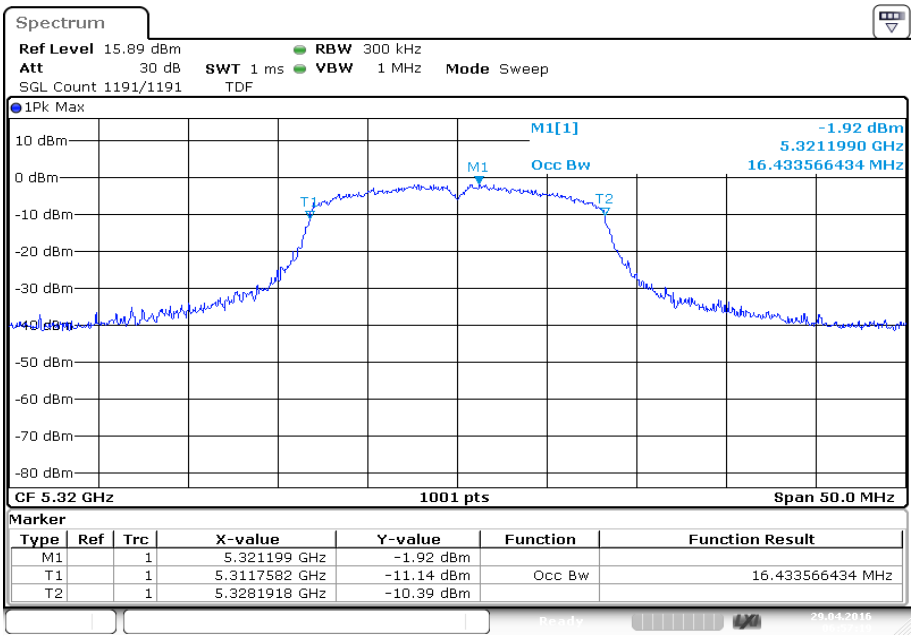
Date: 29.APR.2016 06:51:38

Plot 3: 5260 MHz



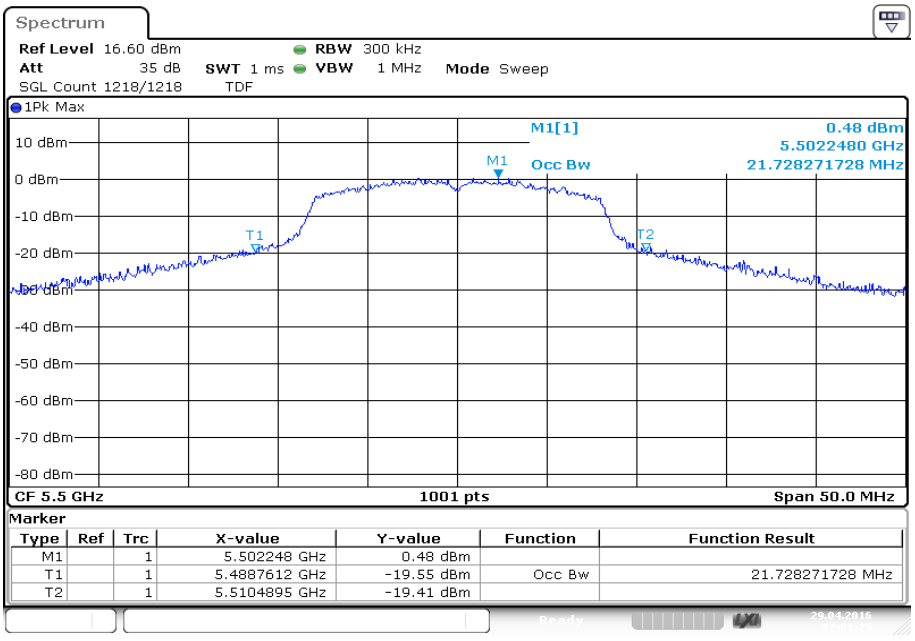
Date: 29.APR.2016 06:55:13

Plot 4: 5320 MHz



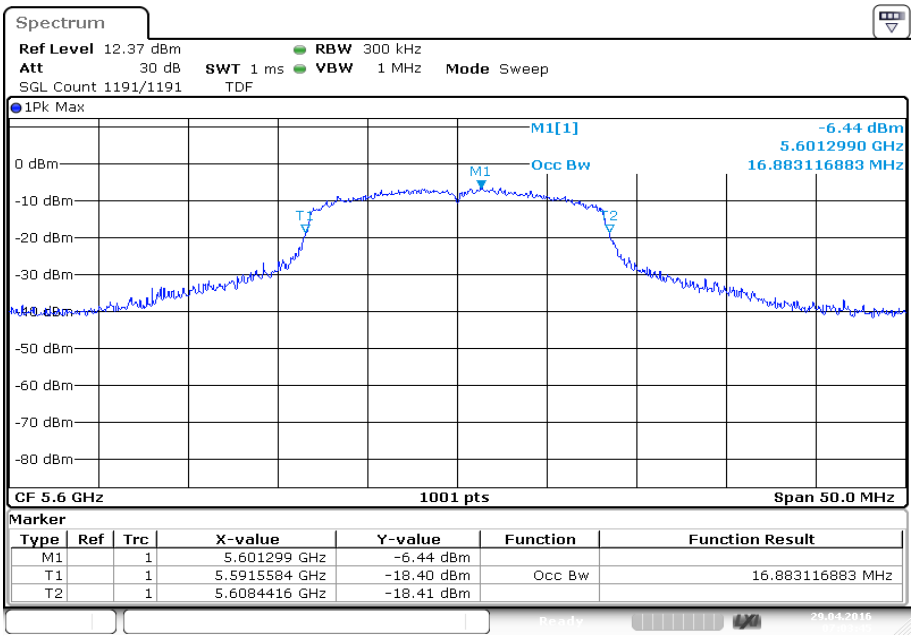
Date: 29.APR.2016 06:57:19

Plot 5: 5500 MHz



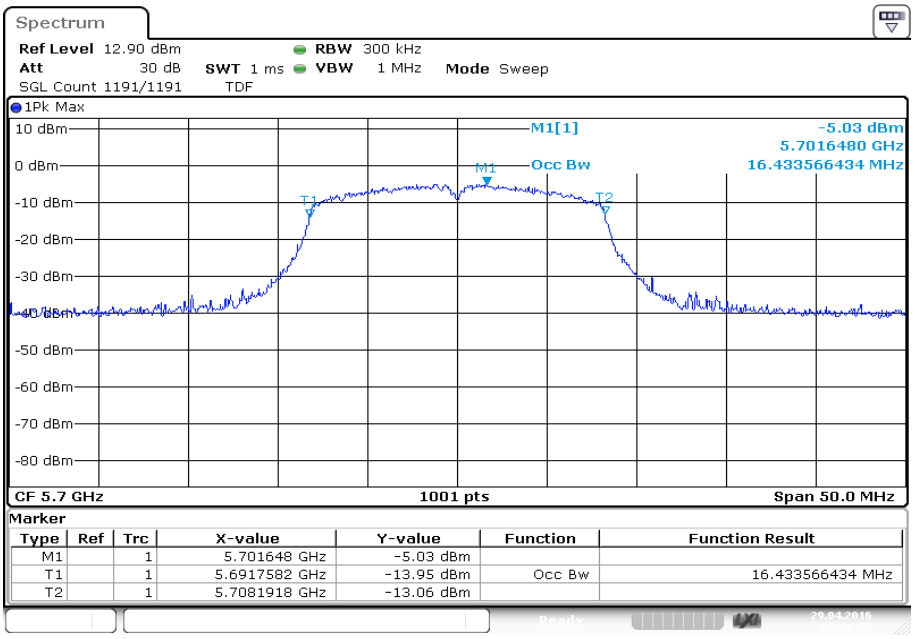
Date: 29.APR.2016 07:01:25

Plot 6: 5600 MHz



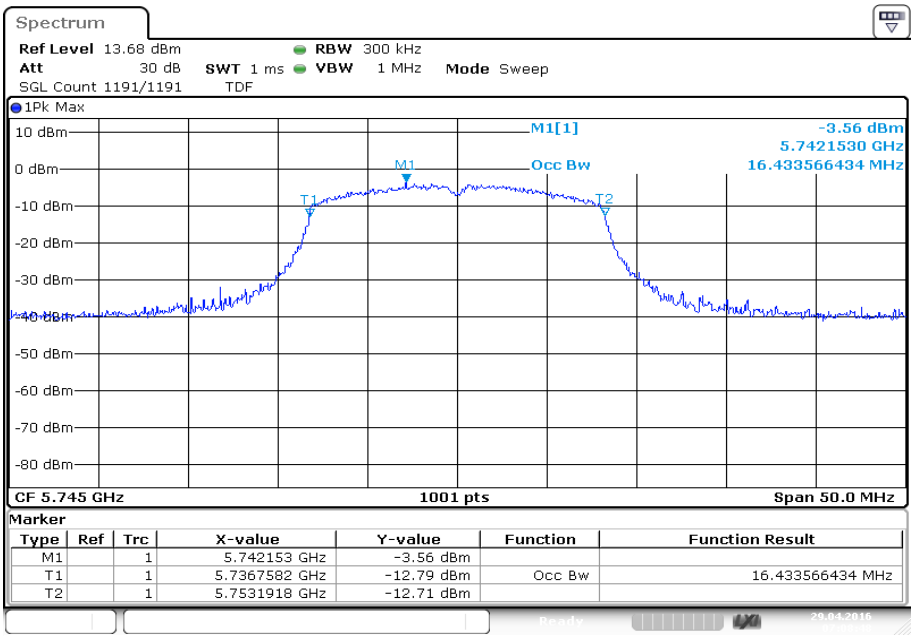
Date: 29.APR.2016 07:03:45

Plot 7: 5700 MHz



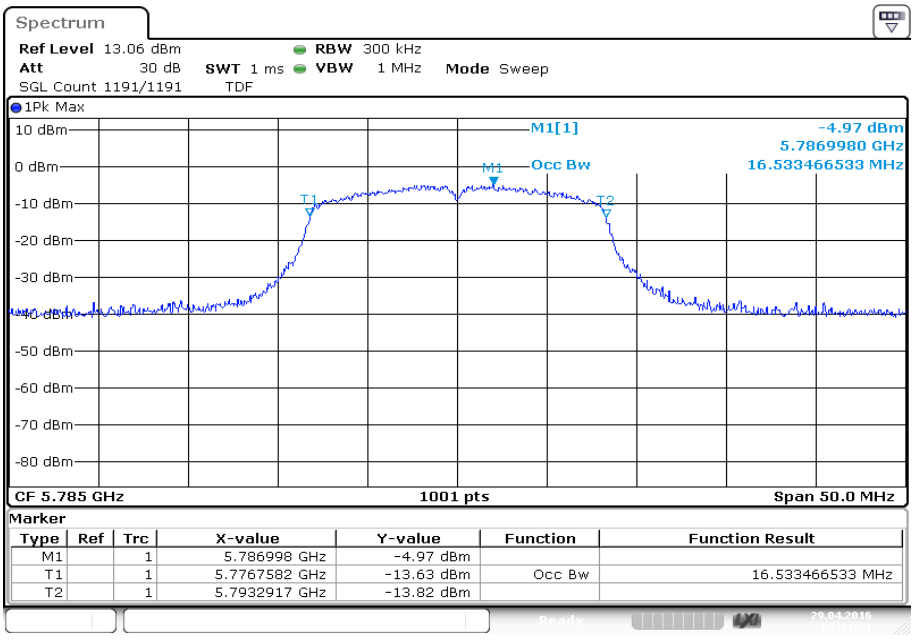
Date: 29.APR.2016 07:06:25

Plot 8: 5745 MHz



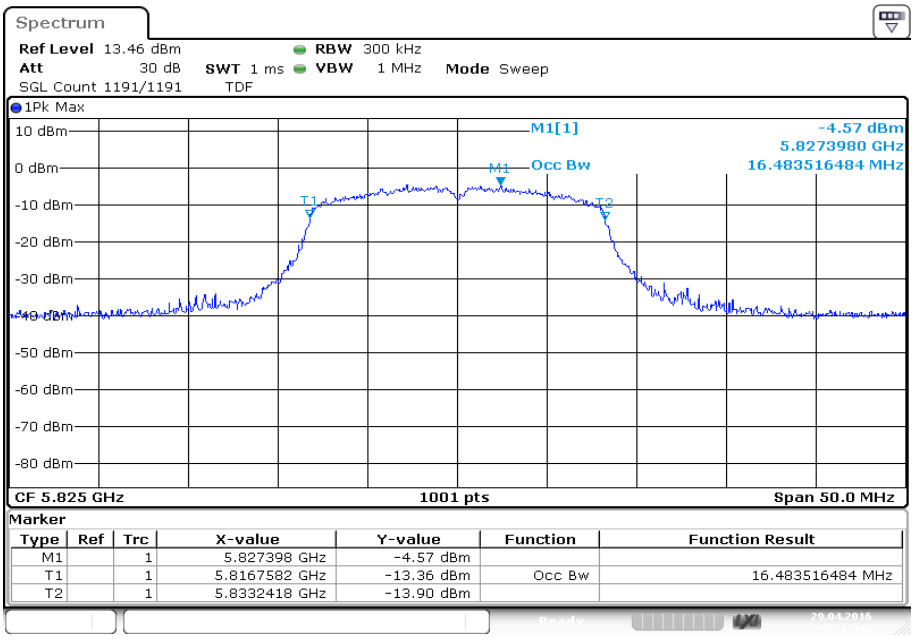
Date: 29.APR.2016 07:08:49

Plot 9: 5785 MHz



Date: 29.APR.2016 07:11:21

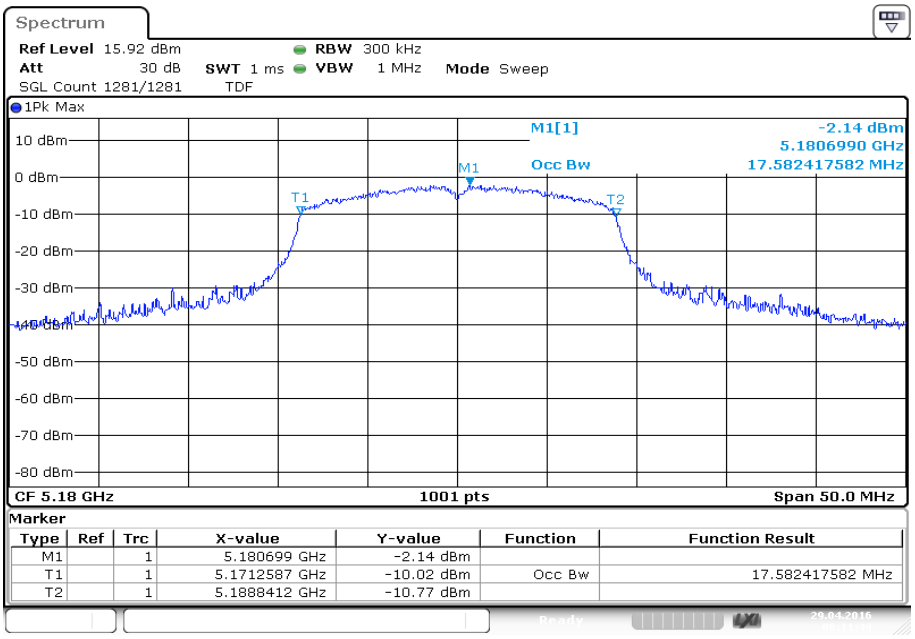
Plot 10: 5825 MHz



Date: 29.APR.2016 07:13:42

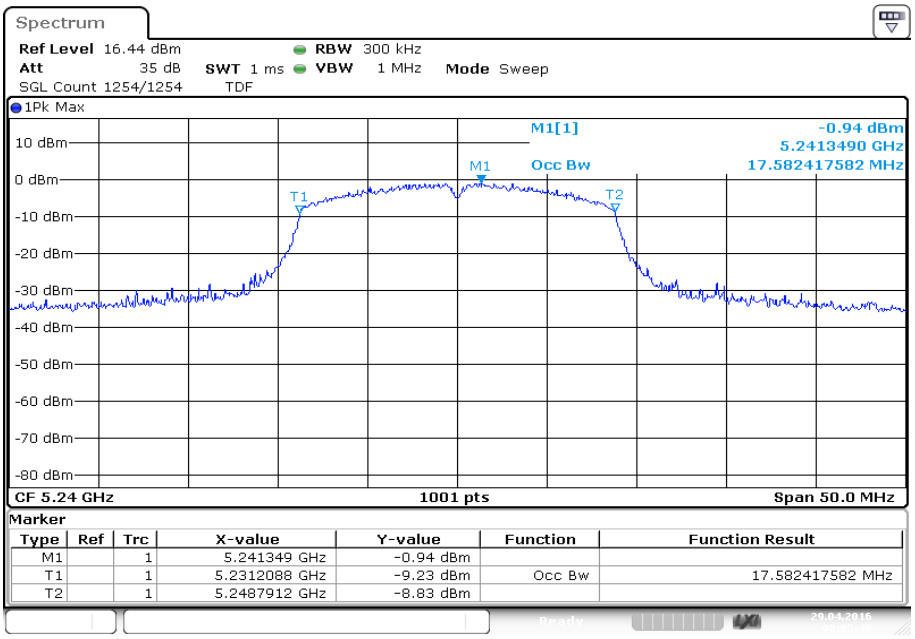
Plots: OFDM / n HT20 – mode

Plot 1: 5180 MHz



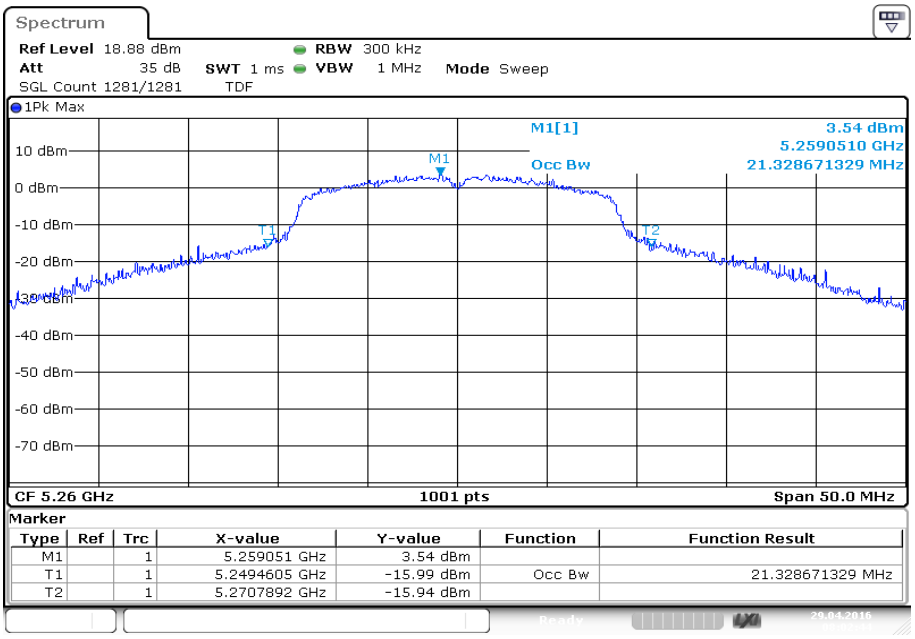
Date: 29.APR.2016 08:11:49

Plot 2: 5240 MHz



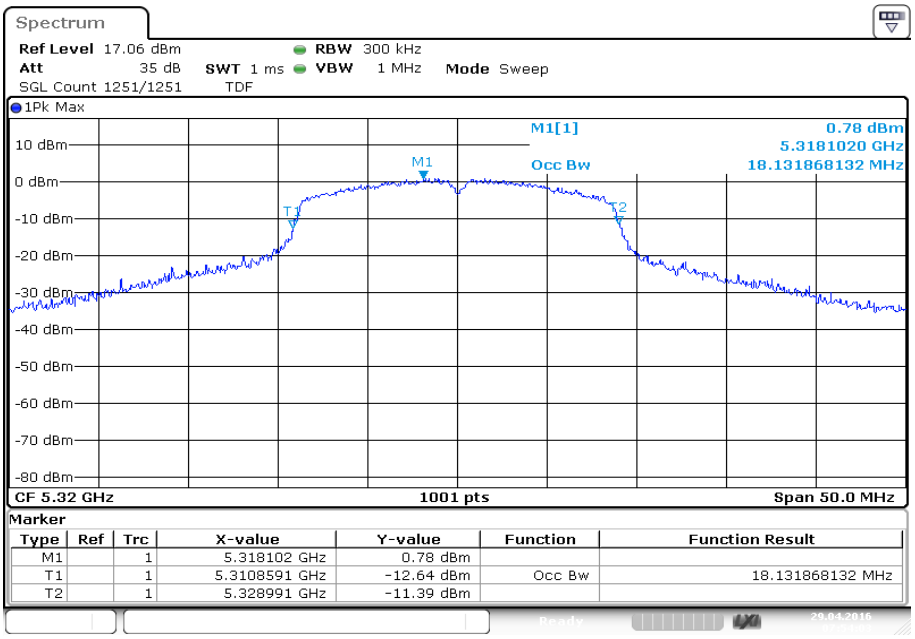
Date: 29.APR.2016 08:05:50

Plot 3: 5260 MHz



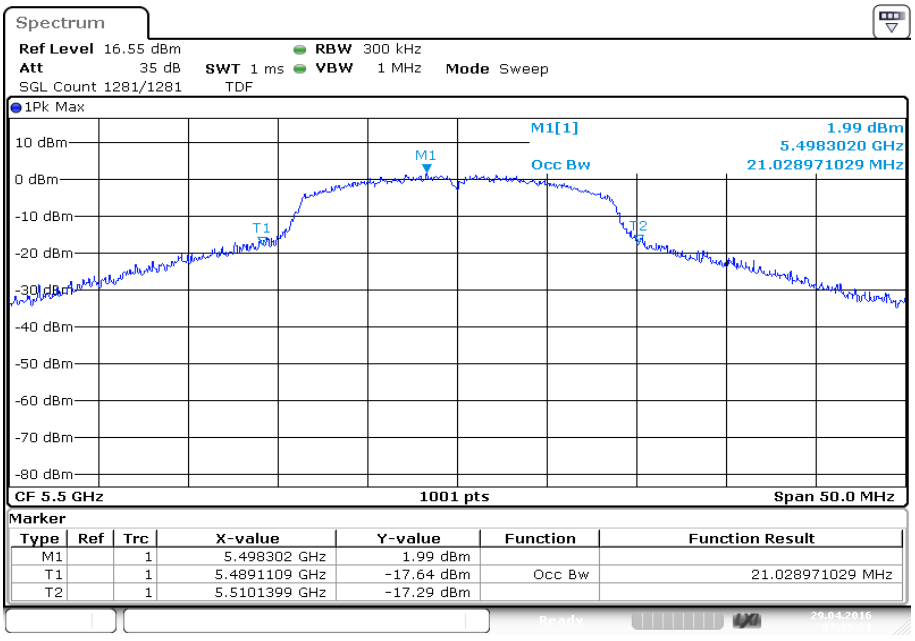
Date: 29.APR.2016 08:02:45

Plot 4: 5320 MHz

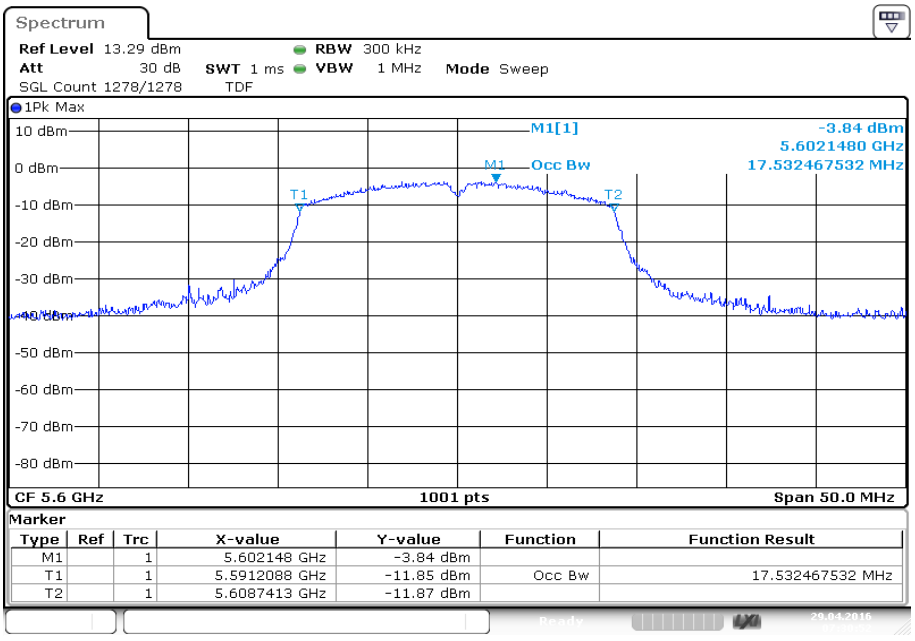


Date: 29.APR.2016 07:54:03

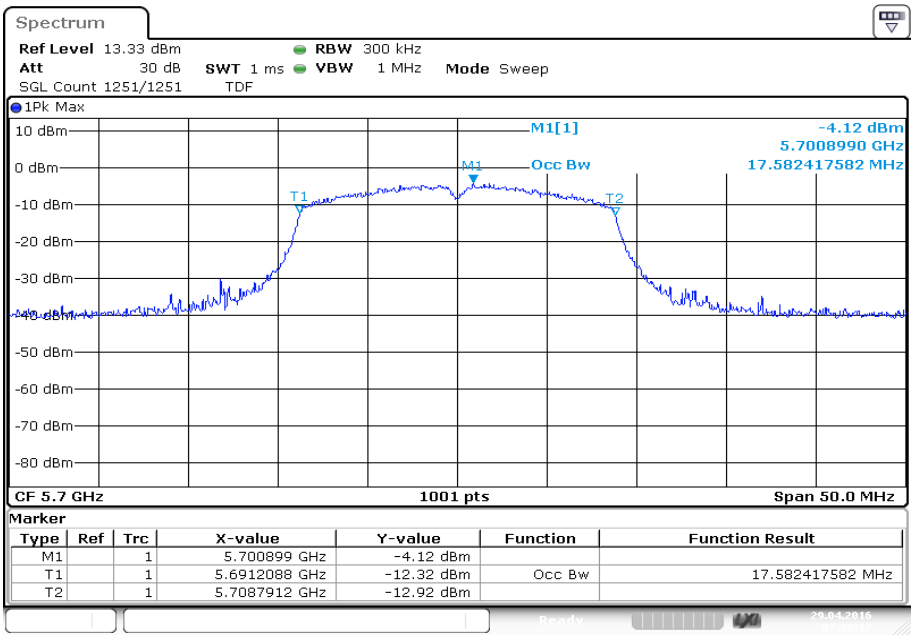
Plot 5: 5500 MHz



Plot 6: 5600 MHz

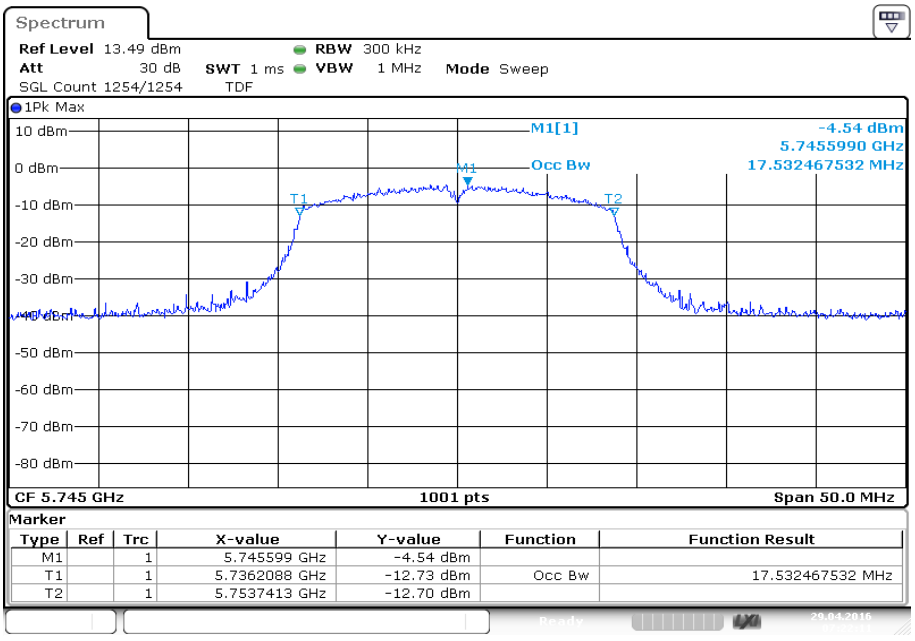


Plot 7: 5700 MHz



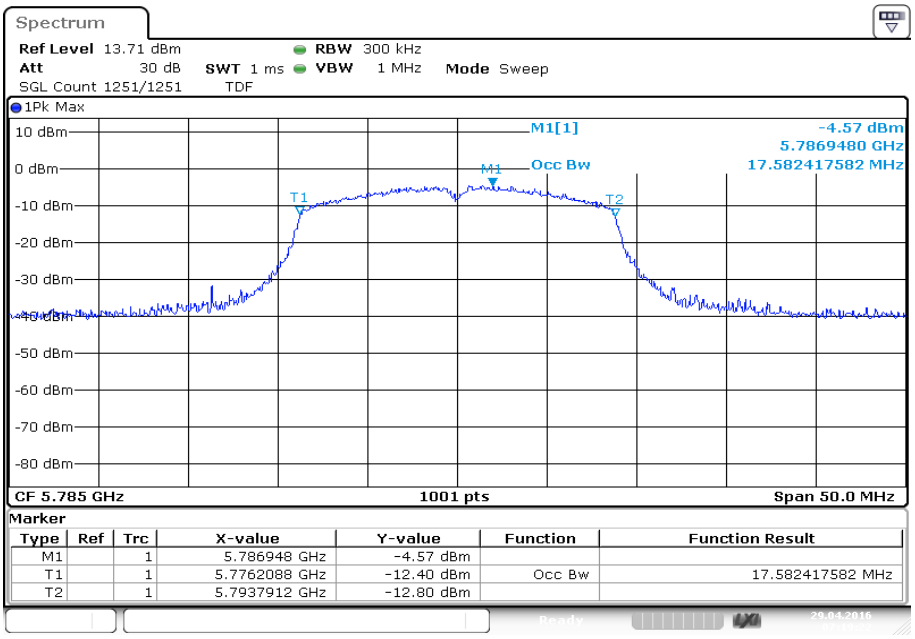
Date: 29.APR.2016 07:28:18

Plot 8: 5745 MHz



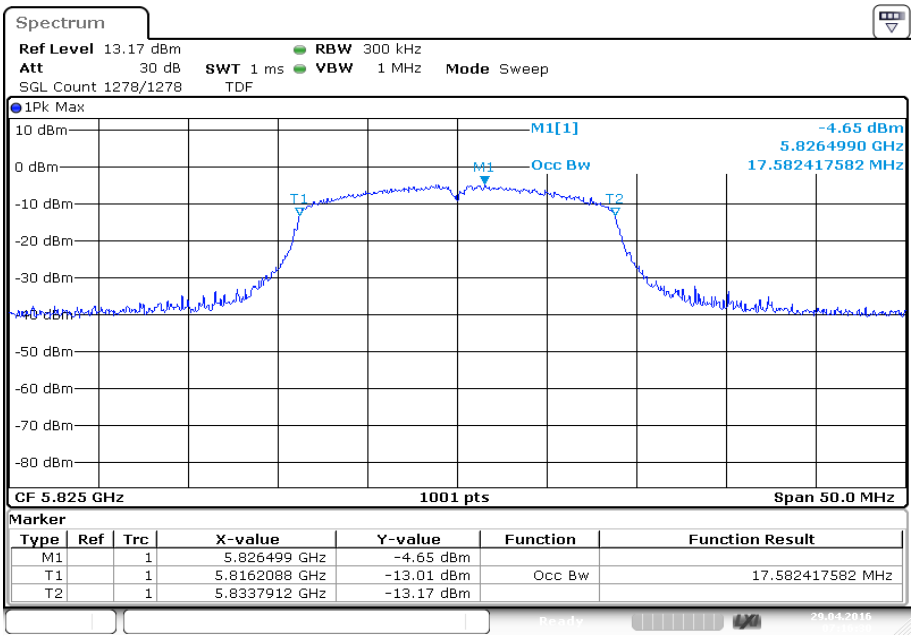
Date: 29.APR.2016 07:22:12

Plot 9: 5785 MHz



Date: 29.APR.2016 07:19:22

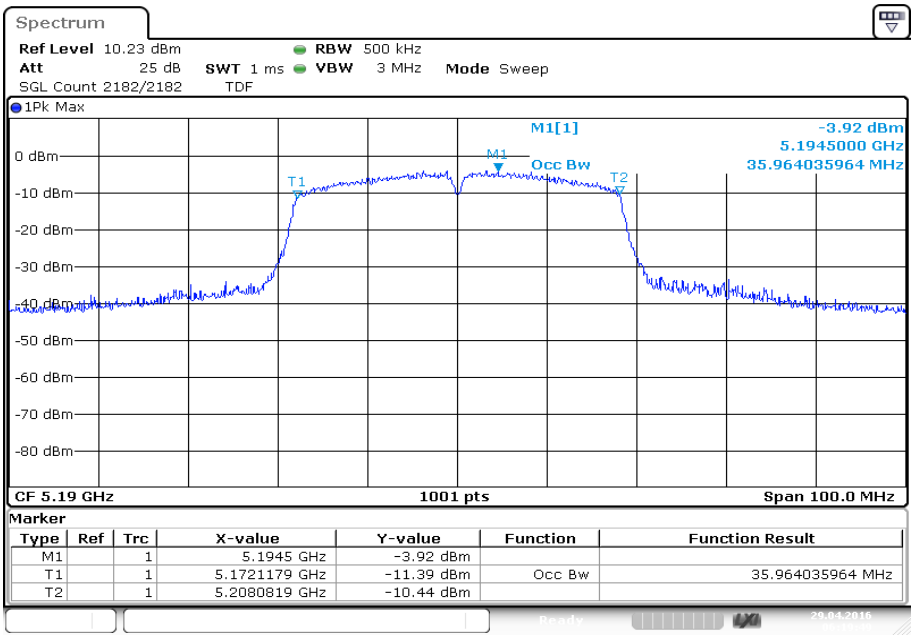
Plot 10: 5825 MHz



Date: 29.APR.2016 07:16:30

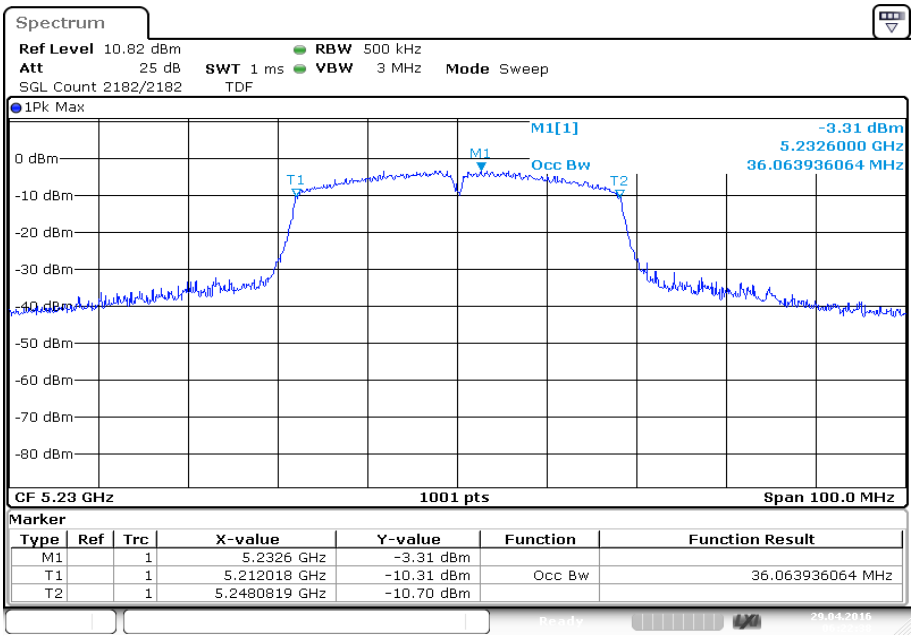
Plots: OFDM / n HT40 – mode HT40

Plot 1: 5190 MHz



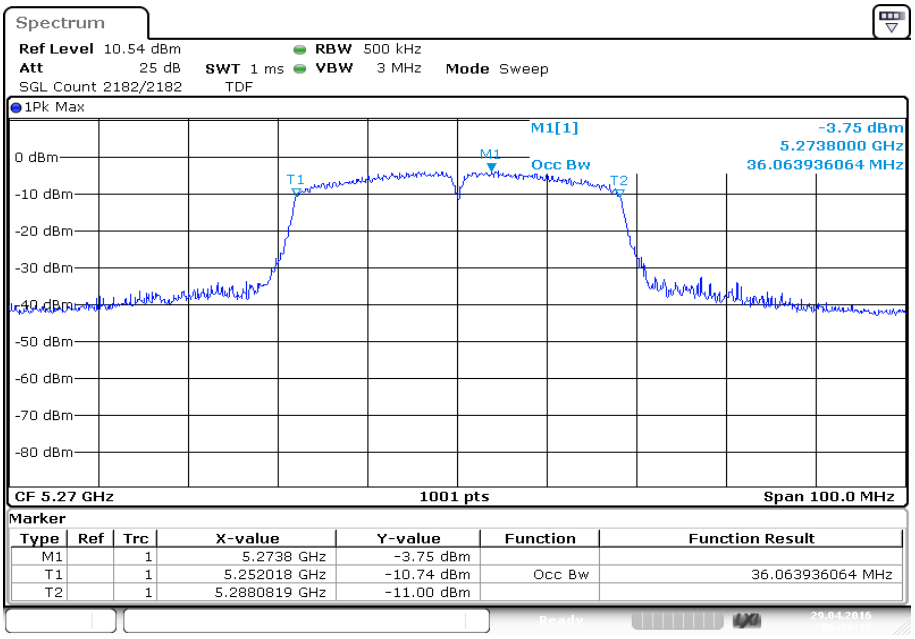
Date: 29.APR.2016 06:19:50

Plot 2: 5230 MHz

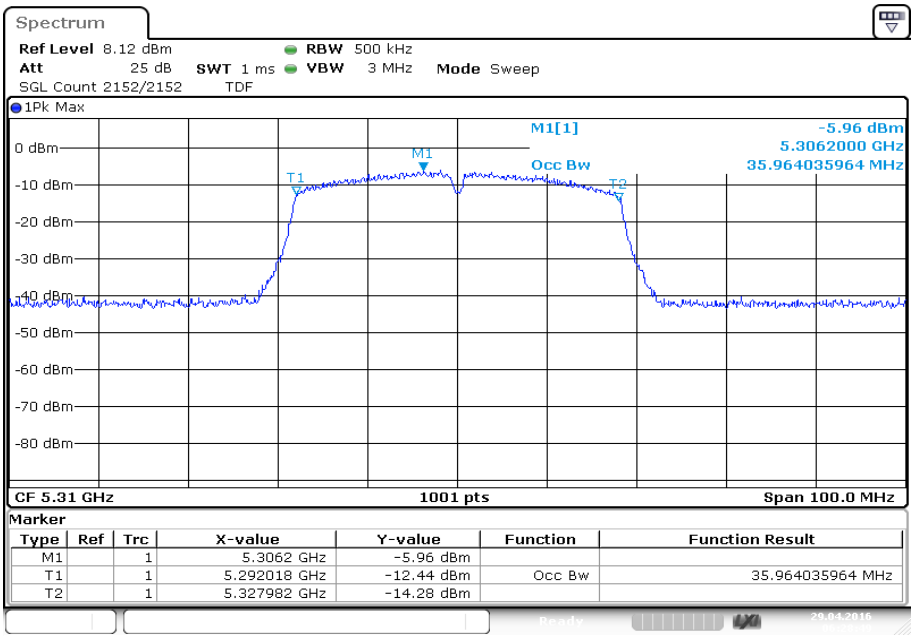


Date: 29.APR.2016 06:22:38

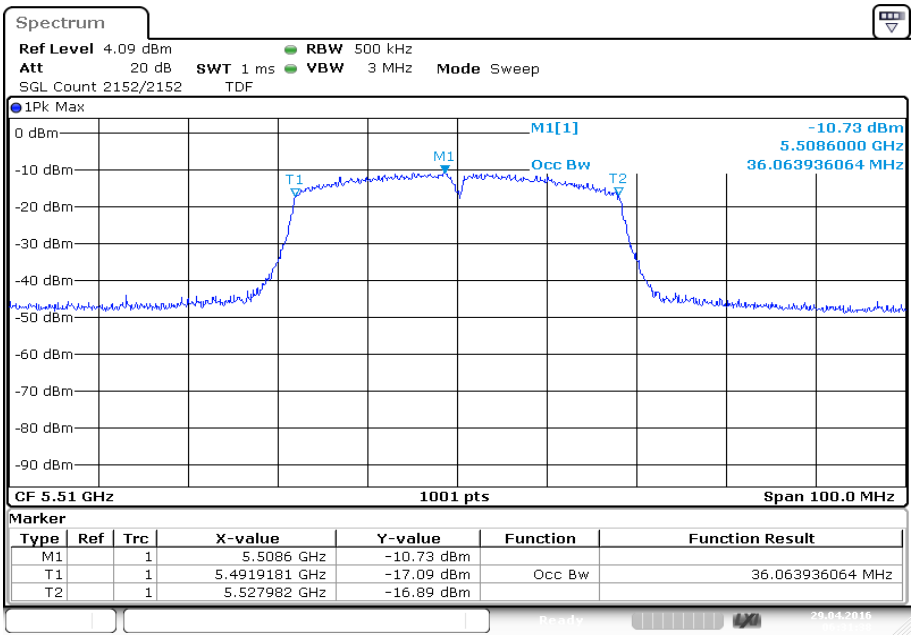
Plot 3: 5270 MHz



Plot 4: 5310 MHz

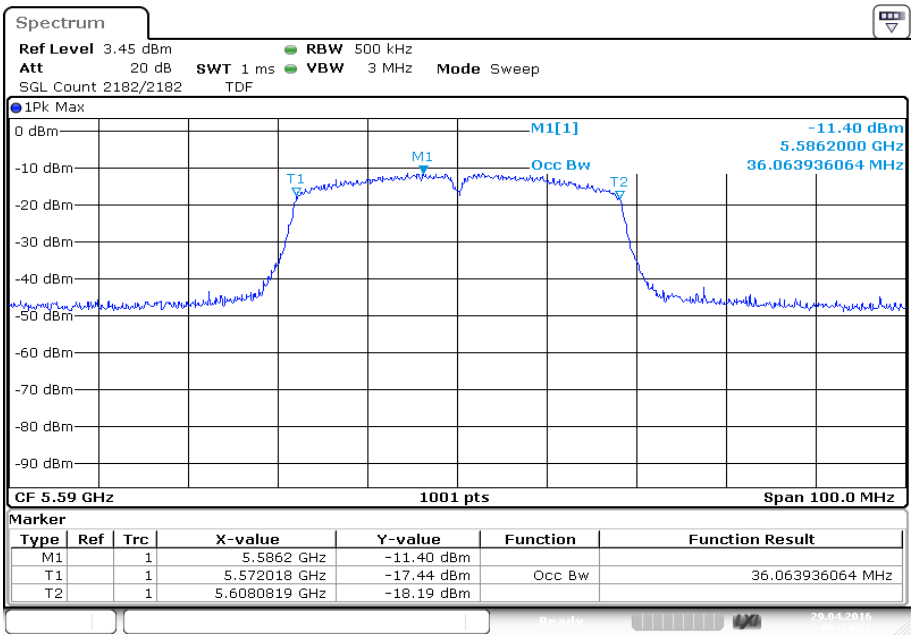


Plot 5: 5510 MHz



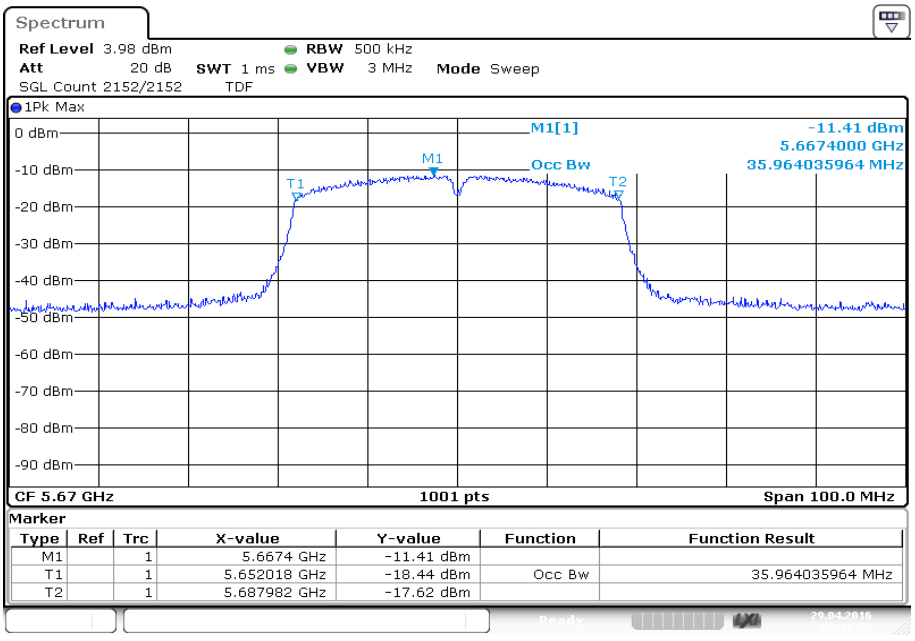
Date: 29.APR.2016 06:31:38

Plot 6: 5590 MHz



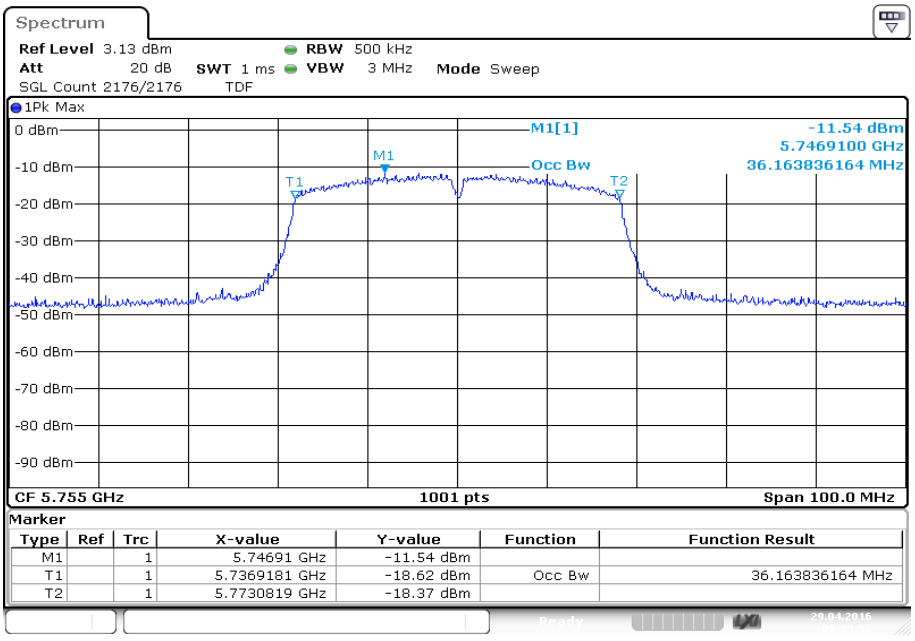
Date: 29.APR.2016 06:34:22

Plot 7: 5670 MHz



Date: 29.APR.2016 06:37:00

Plot 8: 5755 MHz



Date: 29.APR.2016 06:39:56

Plot 9: 5815 MHz