
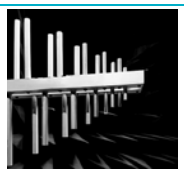
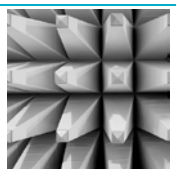

CTC advanced
member of RWTÜV group

TEST REPORT

Test report no.: 1-4293/17-01-03-C

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing laboratory

CTC advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
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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-12076-01-01

Applicant

Philips Innovation Services
High Tech Campus 37
5656 AE Eindhoven / NETHERLANDS
Phone: -/-
Fax: +31 4 02 74 22 24
Contact: Karel Rysman
e-mail: karel.rysman@philips.com

Manufacturer

Philips Innovation Services
High Tech Campus 37
5656 AE Eindhoven / NETHERLANDS

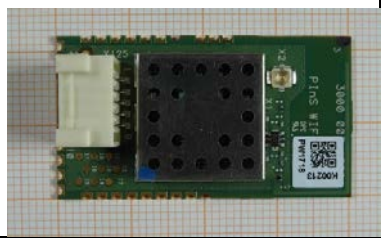
Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 247 Issue 2	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:	**Philips WIFI reference design**
Model name:	**Philips WIFI reference design**
FCC ID:	**2AALC-0031357**
IC:	**22799-0031357**
Frequency:	DTS band 2400 MHz to 2483.5 MHz
Technology tested:	WLAN
Antenna:	Integrated PCB antenna & UFL connector for external antenna
Power supply:	3.3 V DC by external power supply
Temperature range:	-20°C to +70°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=CTC advanced GmbH, ou=BTL-161128, email=Marco.Bertolino@ctcadvanced.com, c=DE
2017.08.09 13:39:08 +02'00'

Marco Bertolino
Lab Manager
Radio Communications & EMC

Test performed:

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2017.08.09 11:15:20 +02'00'

Andreas Luckenbill
Lab Manager
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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This test report replaces the test report with the number 1-4293/17-01-03-B and dated 2017-07-28.

2.2 Application details

Date of receipt of order:	2017-05-03
Date of receipt of test item:	2017-05-22
Start of test:	2017-05-22
End of test:	2017-07-13
Person(s) present during the test:	-/-

2.3 Test laboratories sub-contracted

None

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 2	February 2017	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
DTS: KDB 558074 D01	V04	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
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}	+22 °C during room temperature tests +70 °C during high temperature tests -20 °C during low temperature tests
Relative humidity content	:		55 %
Barometric pressure	:		1021 hpa
Power supply	:	V_{nom} V_{max} V_{min}	3.3 V DC by external power supply No tests under extreme voltage conditions required No tests under extreme voltage conditions required

5 Test item

5.1 General description

Kind of test item	:	Philips WIFI reference design
Type identification	:	Philips WIFI reference design
HMN	:	-/-
PMN	:	300000313592, 300000313682, 300000313612, 300000313722 300000313742, 300000313762, 300000313782, 300000313802 300000313822, 300000313842, 300000313862, 300000313882
HVIN	:	300000313592, 300000313682, 300000313612, 300000313722 300000313742, 300000313762, 300000313782, 300000313802 300000313822, 300000313842, 300000313862, 300000313882
FVIN	:	-/-
S/N serial number	:	Rad. K00213, K00076 Cond. K00046
HW hardware status	:	0031357
SW software status	:	wl0: Dec 19 2016 19:29:37 version 7.15.168.78 (r663126) FWID 01-8ba7c839
Frequency band	:	DTS band 2400 MHz to 2483.5 MHz lowest channel: 2412 MHz; highest channel: 2462 MHz
Type of radio transmission Use of frequency spectrum	: :	DSSS,OFDM
Type of modulation	:	(D)BPSK, (D)QPSK, 16 – QAM, 64 – QAM
Number of channels	:	11
Antenna	:	Integrated PCB antenna & UFL connector for external antenna
Power supply	:	3.3 V DC by external power supply
Temperature range	:	-20°C to +70°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: 1-4293/17-01-01_AnnexA
1-4293/17-01-01_AnnexB
1-4293/17-01-01_AnnexD

6 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).

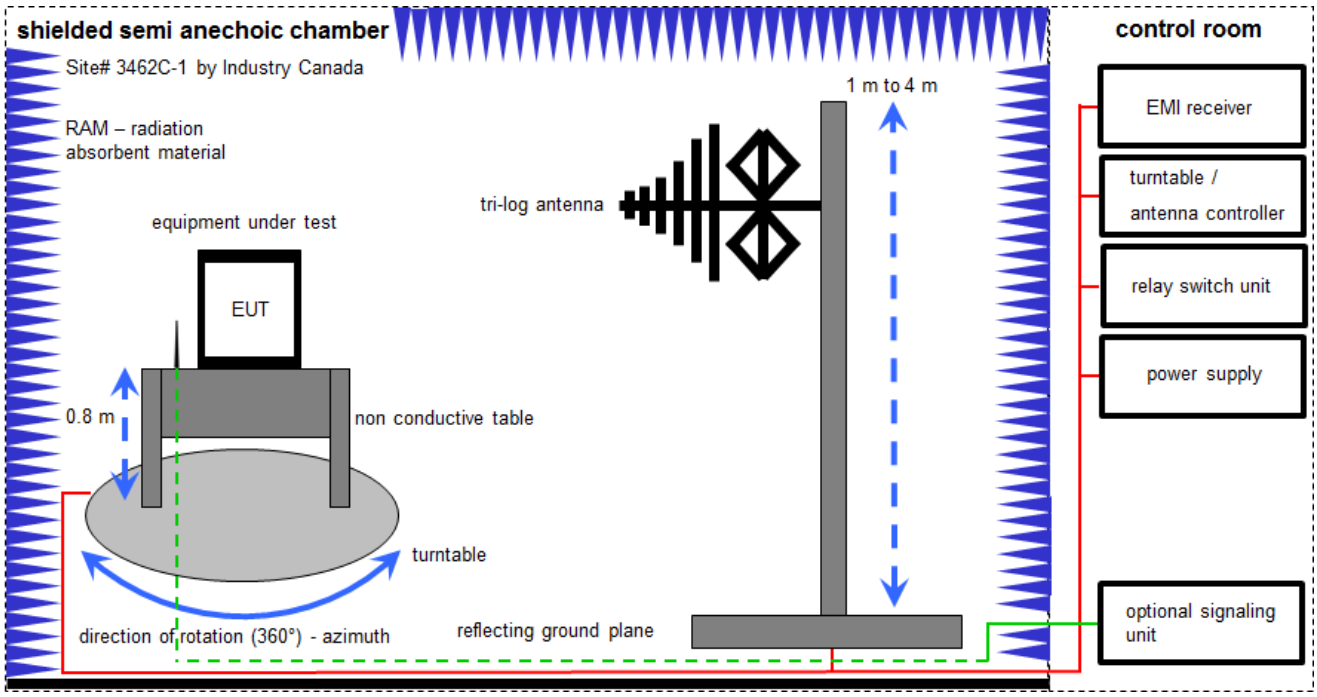
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

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

6.1 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 conform to 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

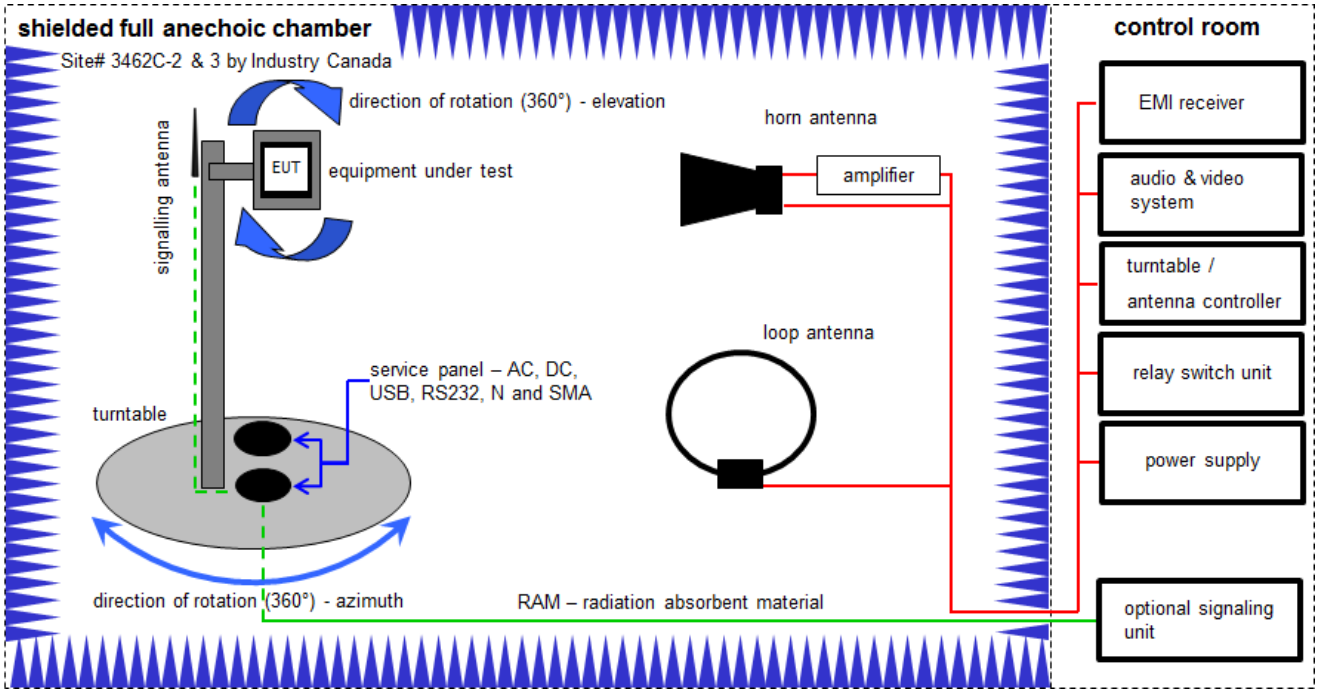
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

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.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2920A04466	300000580	ne	-/-	-/-
3	A	Meßkabine 1	HF-Absorberhalle	MWB AG 300023	-/-	300000551	ne	-/-	-/-
4	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	01.02.2017	31.01.2018
5	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
6	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
7	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
8	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	25.04.2016	25.04.2018

6.2 Shielded fully anechoic chamber



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

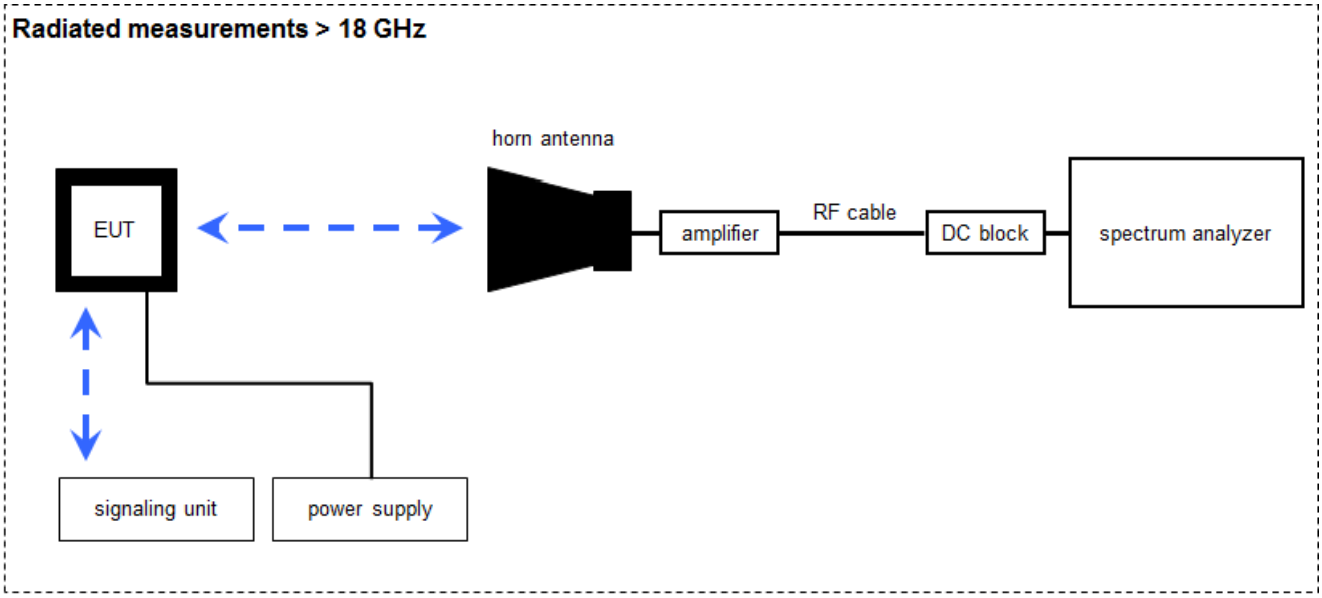
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

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.	Kind of Calibration	Last Calibration	Next Calibration
1	A, B	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2818A03450	300001040	Ve	20.01.2015	20.01.2018
2	A, B	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
3	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9107-3697	300001605	vlKl!	14.02.2017	13.02.2019
4	A, B	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
5	B	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO/2	8905-2342	300000256	k	24.06.2015	24.06.2017
6	A	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev	-/-	-/-
7	A	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev	-/-	-/-
8	A, B	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	31.01.2017	30.01.2018
9	A	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev	-/-	-/-
10	A	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	19	300003790	ne	-/-	-/-
11	A	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22049	300004481	ev	-/-	-/-
12	A, B	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
13	A, B	NEXIO EMV-Software	BAT EMC V3.16.0.49	EMCO	-/-	300004682	ne	-/-	-/-
14	A, B	PC	ExOne	F+W	-/-	300004703	ne	-/-	-/-
15	A	Highpass Filter (Chebyshev)	WHKX10-4432.5-4925-18000-40SS	Wainwright	1	300005028	ev	-/-	-/-
16	A	RF-Amplifier	AMF-6F06001800-30-10P-R	NARDA-MITEQ Inc	2011572	300005241	ev	-/-	-/-

6.3 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

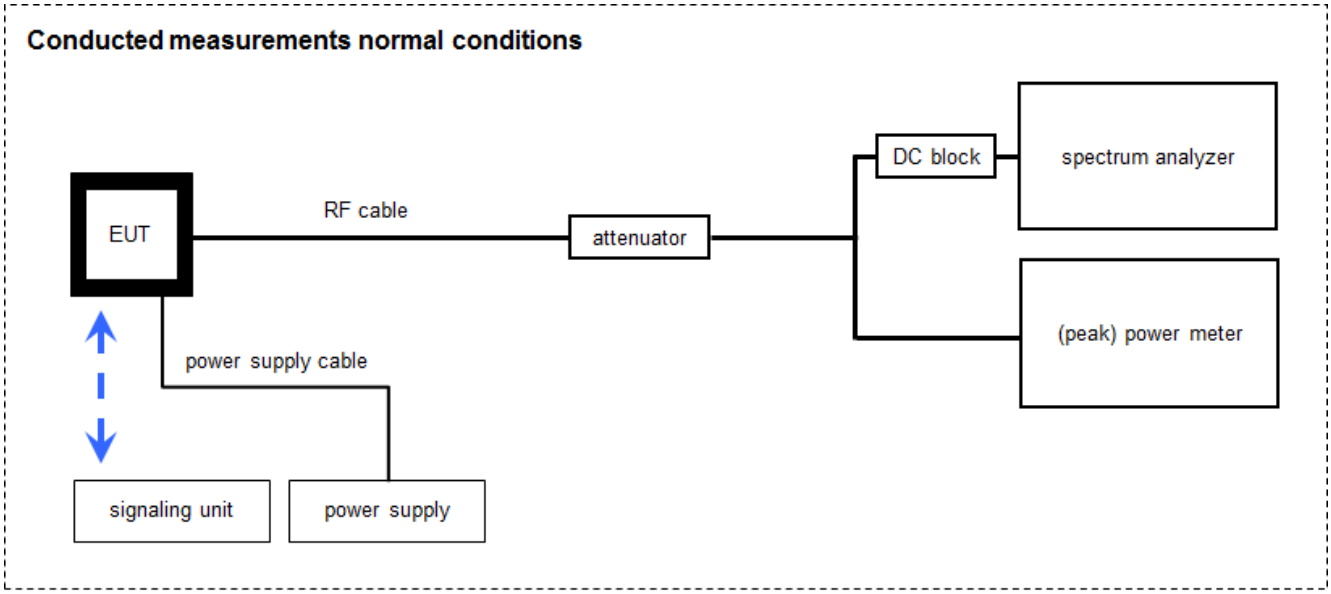
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

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.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP	00419	300002268	ev	-/-	-/-
2	A	Std. Gain Horn Antenna 18.0-26.5 GHz	638	Narda	-/-	300000486	k	10.09.2015	10.09.2017
3	A	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	25.01.2017	24.01.2018
4	A	RF-Cable	ST18/SMAm/SMAm/48	Huber & Suhner	Batch no. 600918	400001182	ev	-/-	-/-
5	A	RF-Cable	ST18/SMAm/SMAm/48	Huber & Suhner	Batch no. 127377	400001183	ev	-/-	-/-
6	A	DC-Blocker 0.1-40 GHz	8141A	Inmet	-/-	400001185	ev	-/-	-/-
7	A	Power Supply 0-20V, 0-5A	6632B	Agilent Technologies	GB42110541	400000562	vlKI!	26.01.2016	26.01.2019

6.4 Conducted measurements with peak power meter & spectrum analyzer



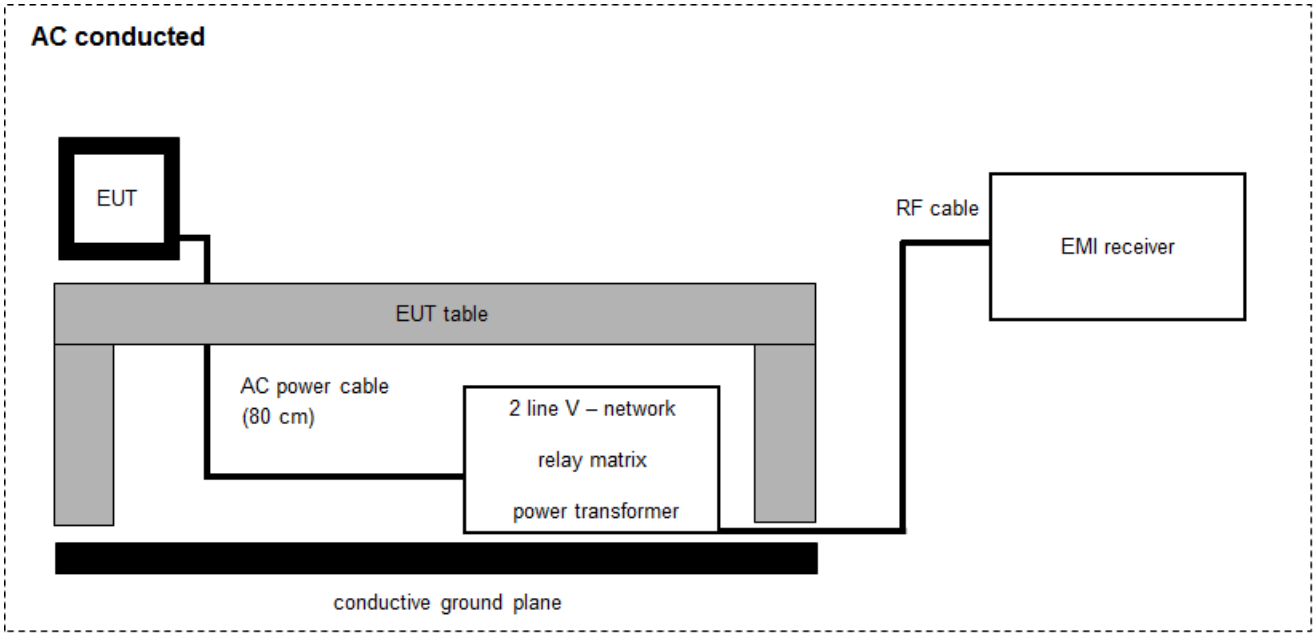
OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

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.	Kind of Calibration	Last Calibration	Next Calibration
1	A, B	Hygro-Thermometer	-/-, 5-45C, 20-100rF	-/-	-/-	400000108	ev	07.09.2015	07.09.2017
2	B	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	25.01.2017	24.01.2018
3	A, B	Power Supply 0-20V, 0-5A	6632B	Agilent Technologies	GB42110541	400000562	vIKI!	26.01.2016	26.01.2019
4	A, B	PC-WLAN Tester	Intel Core i3 3220/3,3 GHz, Prozessor	-/-	2V2403033A4523	300004589	ne	-/-	-/-
5	A, B	Teststand	Teststand Custom Sequence Editor	National Instruments GmbH	-/-	300004590	ne	-/-	-/-
6	A	Power Sensor	NRP-Z81	R&S	100010	300003780	k	26.01.2017	25.01.2019
7	A, B	RF-Cable	ST18/SMAm/SMAm/60	Huber & Suhner	Batch no. 606844	400001181	ev	-/-	-/-
8	B	DC-Blocker 0.1-40 GHz	8141A	Inmet	-/-	400001185	ev	-/-	-/-
9	A, B	Coax Attenuator 10 dB 2W 0-40 GHz	MCL BW-K10-2W44+	Mini Circuits	-/-	400001186	ev	-/-	-/-
10	A, B	Synchron Power Meter	SPM-4	CTC	1	400001294	ev	-/-	-/-

6.5 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.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Two-line V-Network (LISN) 9 kHz to 30 MHz	ESH3-Z5	R&S	893045/004	300000584	k	31.01.2017	30.01.2018
2	A	RF-Filter-section	85420E	HP	3427A00162	300002214	k	27.11.2006	-/-
3	A	AC-Spannungsquelle variabel	MV2616-V	EM-Test	0397-12	300003259	k	11.12.2015	11.12.2017
4	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	Ve	02.02.2016	02.02.2018
5	A	Hochpass 150 kHz	EZ-25	R&S	100010	300003798	ev	08.04.2008	-/-
6	A	Power Supply	NGSM 32/10	R&S	3939	400000192	vlKl!	31.01.2017	30.01.2020
7	A	MXE EMI Receiver 20 Hz to 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	16.08.2016	16.08.2017

Auxiliary equipment:

Philips Development board V2.0
Huawei 115 V AC to USB 5V DC power supply, Model: HW-050200U3W

7 Sequence of testing

7.1 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.

7.2 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.

7.3 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.

7.4 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.

8 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

9 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 2	See table!	2017-08-09	-/-

Test specification clause	Test case	Guideline	Temperature conditions	Power source voltages	Mode	C	NC	NA	NP	Remark
§15.247(b)(4) RSS - 247 / 5.4 (f)(ii)	Antenna gain	-/-	Nominal	Nominal	DSSS	-/-				-/-
	Duty cycle	-/-	Nominal	Nominal	DSSS OFDM	-/-				-/-
§15.247(e) RSS - 247 / 5.2 (b)	Power spectral density	KDB 558074 DTS clause: 10.2	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.247(a)(2) RSS - 247 / 5.2 (a)	DTS bandwidth	KDB 558074 DTS clause: 8.1	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
RSS Gen clause 4.6.1	Occupied bandwidth	-/-	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.247(b)(3) RSS - 247 / 5.4 (d)	Maximum output power	KDB 558074 DTS clause: 9.1.3	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5	Detailed spurious emissions @ the band edge - conducted	-/-	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.205 RSS - 247 / 5.5 RSS - Gen	Band edge compliance conducted and radiated	KDB 558074 DTS clause: 13.3.2 and clause 12.2.2	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5	TX spurious emissions conducted	KDB 558074 DTS clause: 11.1 & 11.2 11.3	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.209(a) RSS-Gen	TX spurious emissions radiated below 30 MHz	-/-	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5 RSS-Gen	TX spurious emissions radiated 30 MHz to 1 GHz	-/-	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5 RSS-Gen	TX spurious emissions radiated above 1 GHz	-/-	Nominal	Nominal	DSSS OFDM	☒	☐	☐	☐	-/-
§15.109 RSS-Gen	RX spurious emissions radiated 30 MHz to 1 GHz	-/-	Nominal	Nominal	RX / idle	☒	☐	☐	☐	-/-
§15.109 RSS-Gen	RX spurious emissions radiated above 1 GHz	-/-	Nominal	Nominal	RX / idle	☒	☐	☐	☐	-/-
§15.107(a) §15.207	Conducted emissions < 30 MHz	-/-	Nominal	Nominal	DSSS OFDM	☐	☐	☒	☐	-/-

Note: C = Compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

10 Additional comments

Reference documents: PINS_REF_WiFi_AMP_NicDijk_20170213-1V10.pdf
雅士电子 VR一体机 WIFI 规格书.pdf

Special test descriptions: used country code in test software: XX/17

Configuration descriptions:

Variant	RF switch	U.FL connector	0 Ω resistor RF path internal	0 Ω resistor RF path external	0 Ω resistors interfaces	X125 connector
1	Assembled	Assembled	Not assemb.	Not assemb.	Not assemb.	Not assemb.
2	Assembled	Assembled	Not assemb.	Not assemb.	Assembled	Not assemb.
3	Assembled	Assembled	Not assemb.	Not assemb.	Not assemb.	Assembled
4	Assembled	Assembled	Not assemb.	Not assemb.	Assembled	Assembled
5	Not assemb.	Not assemb.	Assembled	Not assemb.	Not assemb.	Not assemb.
6	Not assemb.	Not assemb.	Assembled	Not assemb.	Assembled	Not assemb.
7	Not assemb.	Not assemb.	Assembled	Not assemb.	Not assemb.	Assembled
8	Not assemb.	Not assemb.	Assembled	Not assemb.	Assembled	Assembled
9	Not assemb.	Assembled	Not assemb.	Assembled	Not assemb.	Not assemb.
10	Not assemb.	Assembled	Not assemb.	Assembled	Assembled	Not assemb.
11	Not assemb.	Assembled	Not assemb.	Assembled	Not assemb.	Assembled
12	Not assemb.	Assembled	Not assemb.	Assembled	Assembled	Assembled

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.

11 Measurement results

11.1 Antenna gain

Result: Declared by applicant

Antenna port	gain
ANT0	1.9 dBi
ANT1 – TE2118309-X Rev E	2.5 dBi
ANT1 – N12-3071-R0A	low: 2.4 dBi / mid: 3.2 dBi / high: 3.0 dBi

11.2 Identify worst case data rate

Measurement:

All modes of the module will be measured with an average power meter or spectrum analyzer to identify the maximum transmission power.

In further tests only the identified worst case modulation scheme or bandwidth will be measured and this mode is used as representative mode for all other modulation schemes.

Additional the band edge compliance test will be performed in the lowest and highest modulation scheme.

Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 MHz
Video bandwidth:	3 MHz
Trace mode:	Max hold
Test setup:	See sub clause 6.4 – A
Measurement uncertainty:	-/-

Results:

Modulation	Modulation scheme / bandwidth
DSSS / b – mode	1 Mbit/s
OFDM / g – mode	6 Mbit/s
OFDM / n HT20 – mode	MCS0

11.3 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. The measurements are performed using the data rate producing the highest conducted output power.

Measurement:

Measurement parameter	
According to DTS clause: 9.1.3	
Peak power meter	
Test setup:	See sub clause 6.4 – A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Conducted: 1.0 W – Antenna gain with max. 6 dBi	

Results: ANT0

Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Output power conducted DSSS / b – mode	14.5	14.2	14.3
Output power conducted OFDM / g – mode	12.7	12.2	12.7
Output power conducted OFDM / n HT20 – mode	12.1	11.9	11.4

Results: ANT1

Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Output power conducted DSSS / b – mode	15.0	14.6	14.3
Output power conducted OFDM / g – mode	12.8	12.6	11.9
Output power conducted OFDM / n HT20 – mode	12.1	12.0	11.6

11.4 Duty cycle

Measurement:

Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Depends on the signal see plot
Resolution bandwidth:	10 MHz
Video bandwidth:	10 MHz
Trace mode:	Max hold
Test setup:	See sub clause 7.5 – A
Measurement uncertainty:	See sub clause 8

Limits:

FCC	IC
-/-	

Results: ANT0

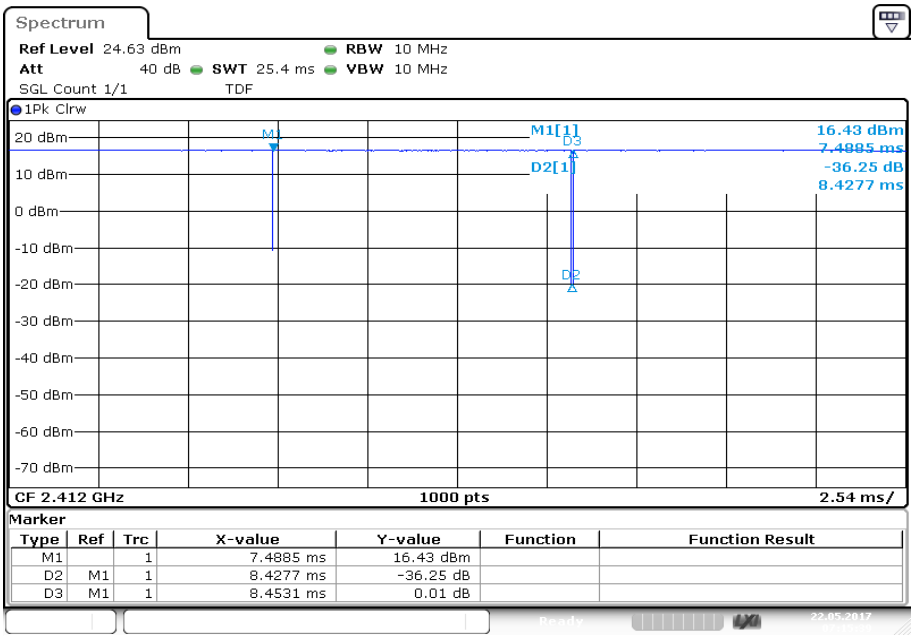
T_{nom}	V_{nom}	lowest channel 2412 MHz	middle channel 2437 MHz	highest channel 2462 MHz
DSSS / b – mode		99.7 % / 0.01 dB	100 % / 0.0 dB	100 % / 0.0 dB
OFDM / g – mode		97.3 % / 0.12 dB	97.6% / 0.11 dB	97.3 % / 0.12 dB
OFDM / n HT20 – mode		97.3 % / 0.12 dB	97.0 % / 0.13 dB	97.3 % / 0.12 dB

Results: ANT1

T_{nom}	V_{nom}	lowest channel 2412 MHz	middle channel 2437 MHz	highest channel 2462 MHz
DSSS / b – mode		100 % / 0.0 dB	100 % / 0.0 dB	100 % / 0.0 dB
OFDM / g – mode		97.3 % / 0.12 dB	97.3 % / 0.12 dB	97.3 % / 0.12 dB
OFDM / n HT20 – mode		97.3 % / 0.12 dB	97.0 % / 0.13 dB	97.0 % / 0.13 dB

Plots: DSSS / b – mode - ANT0

Plot 1: Lowest channel



Date: 22.MAY.2017 07:15:39

Plot 2: Middle channel

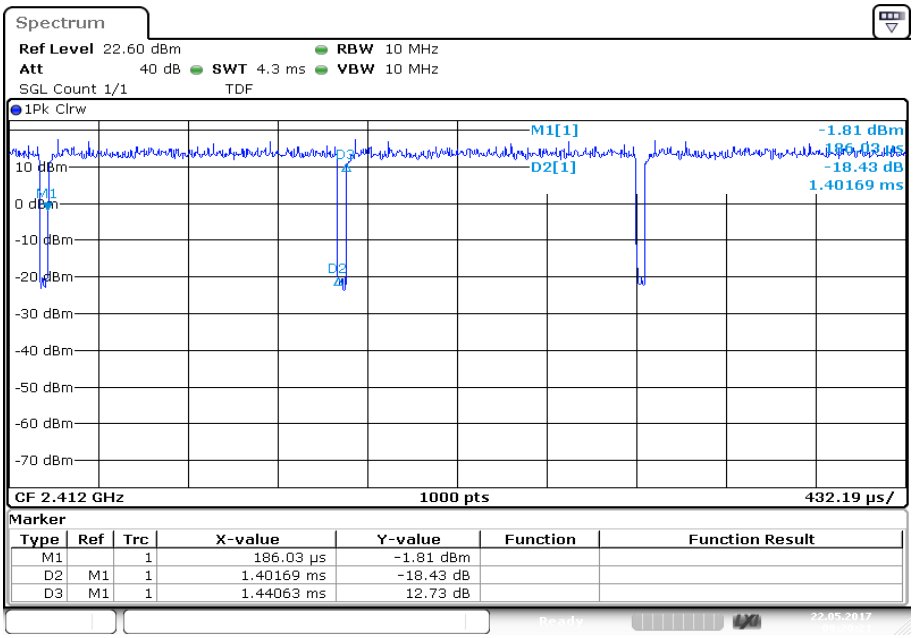
100 % - no plot available

Plot 3: Highest channel

100 % - no plot available

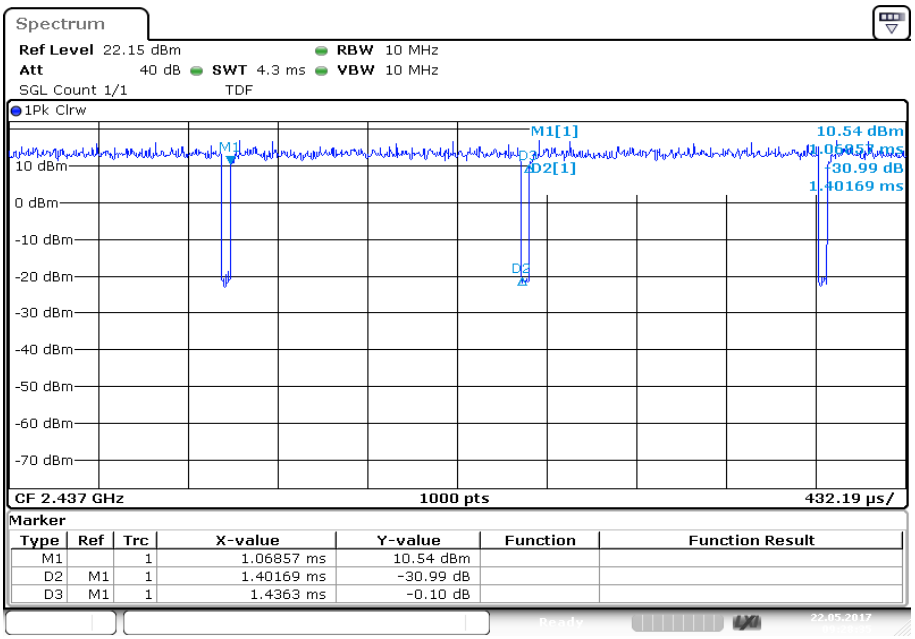
Plots: OFDM / g – mode – ANT0

Plot 1: Lowest channel



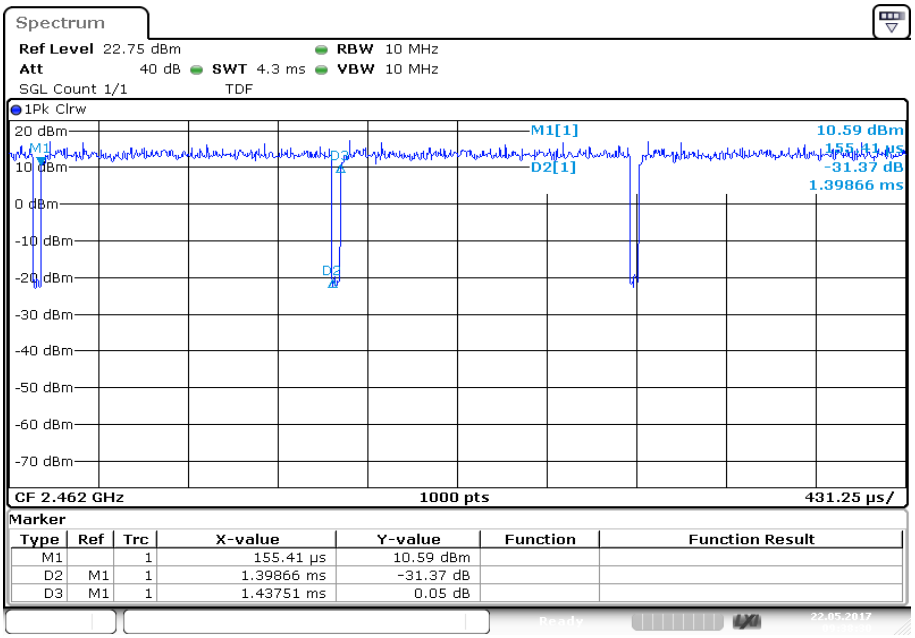
Date: 22.MAY.2017 09:20:21

Plot 2: Middle channel



Date: 22.MAY.2017 09:28:35

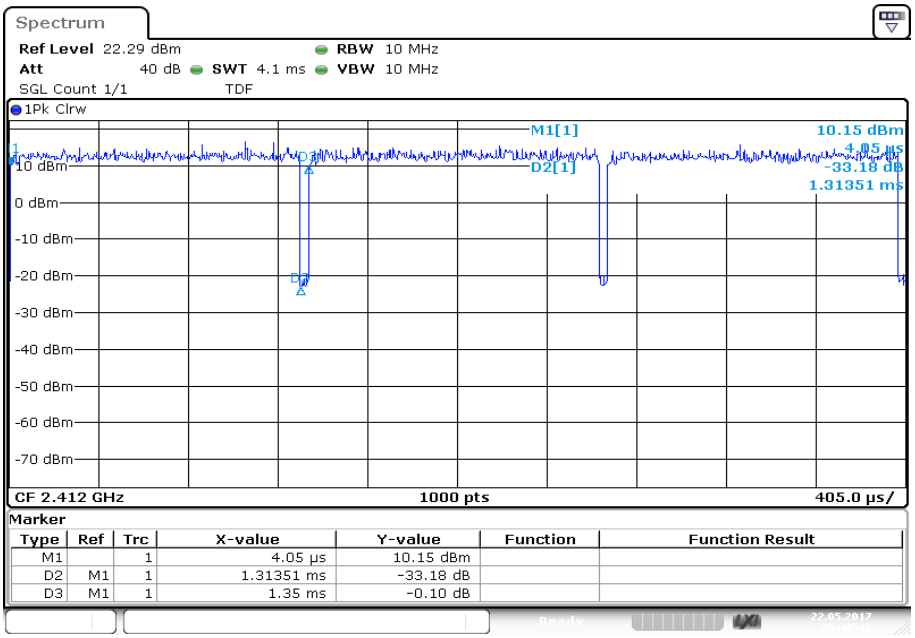
Plot 3: Highest channel



Date: 22.MAY.2017 09:38:30

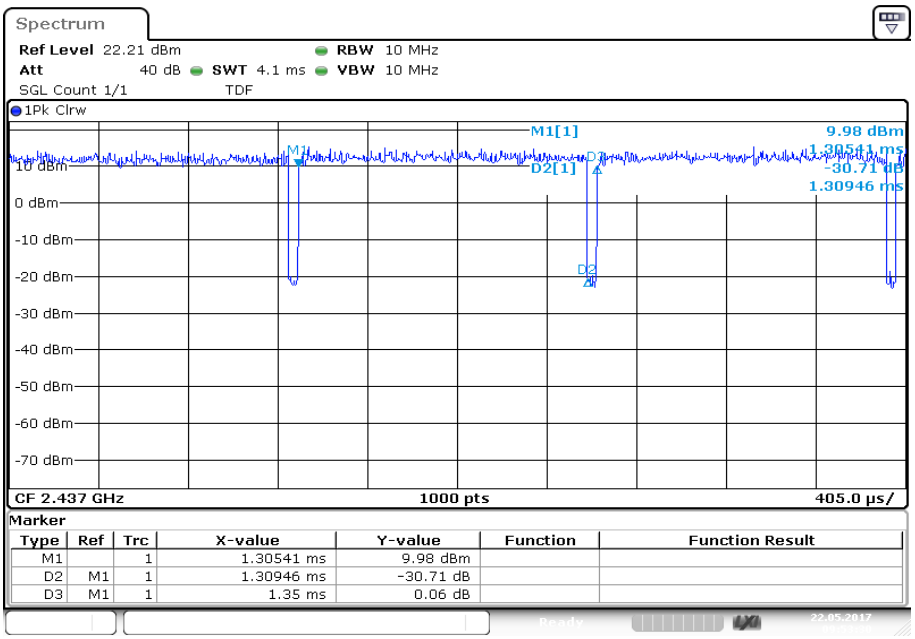
Plots: OFDM / n HT20 – mode – ANT0

Plot 1: Lowest channel



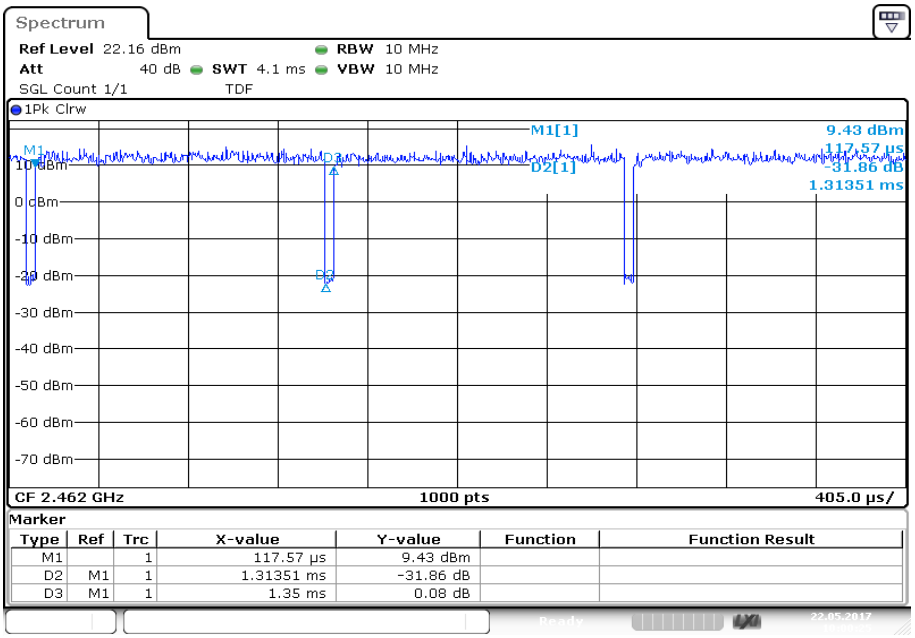
Date: 22.MAY.2017 09:45:48

Plot 2: Middle channel



Date: 22.MAY.2017 09:53:30

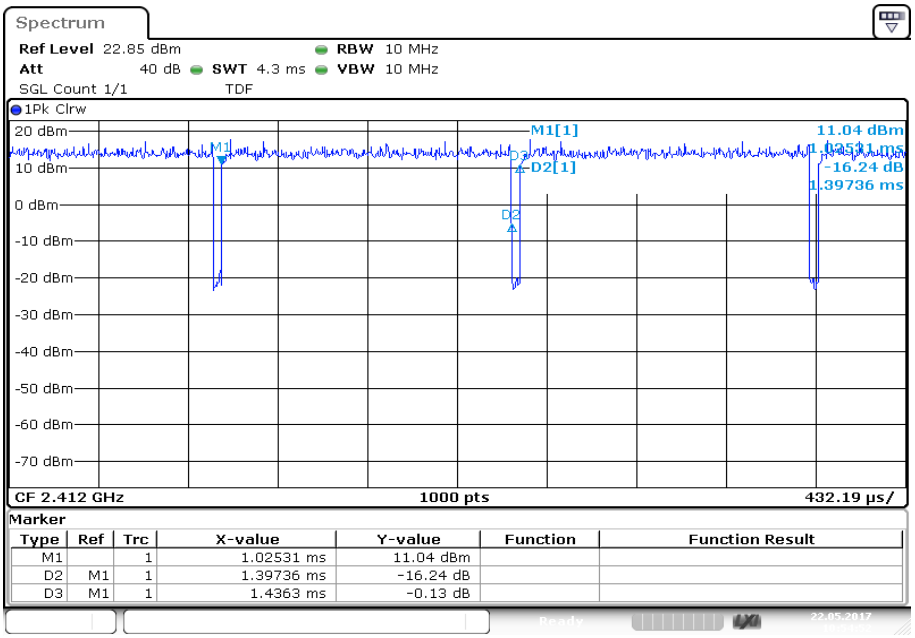
Plot 3: Highest channel



Date: 22.MAY.2017 10:00:25

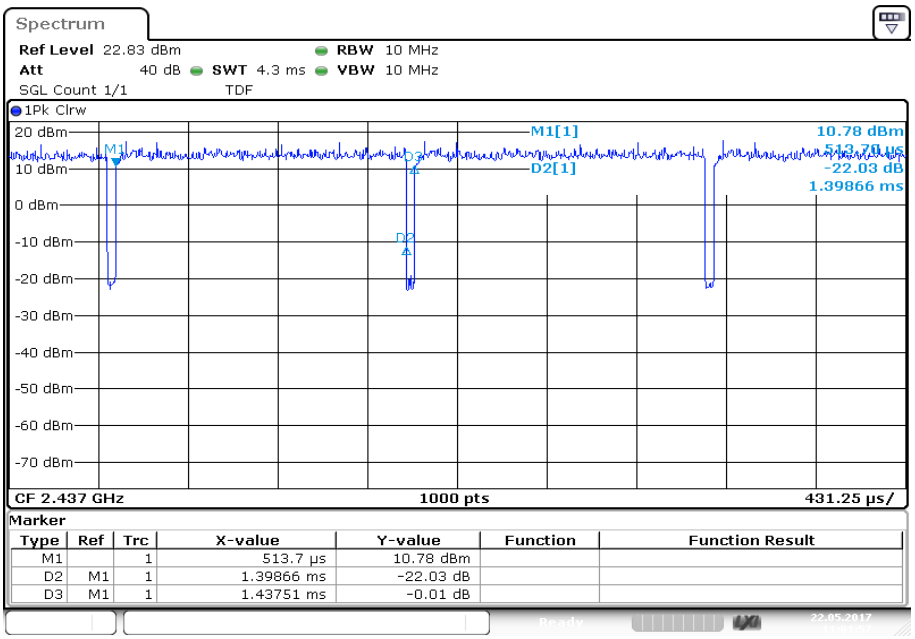
Plots: OFDM / g – mode – ANT1

Plot 1: Lowest channel



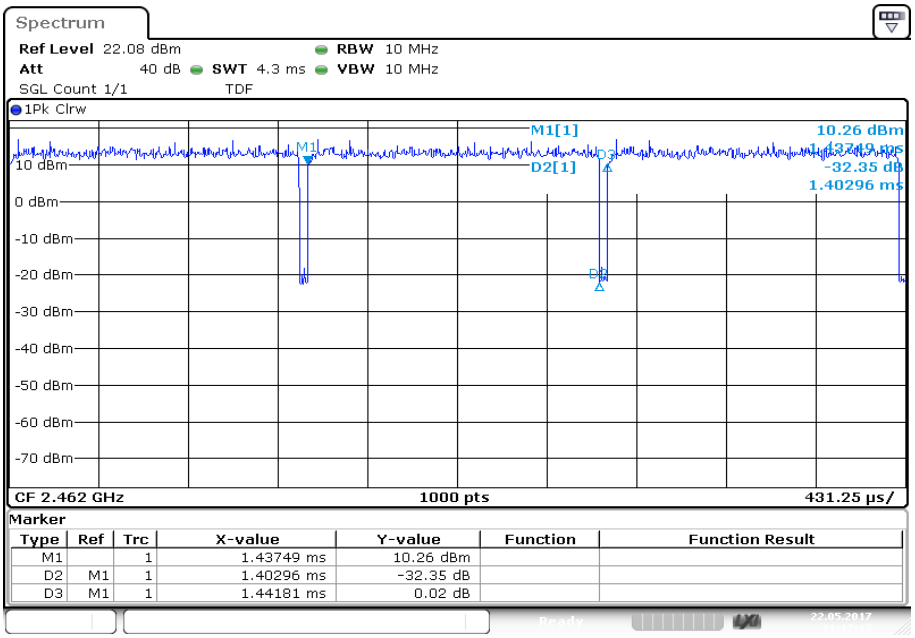
Date: 22.MAY.2017 10:54:52

Plot 2: Middle channel



Date: 22.MAY.2017 11:01:58

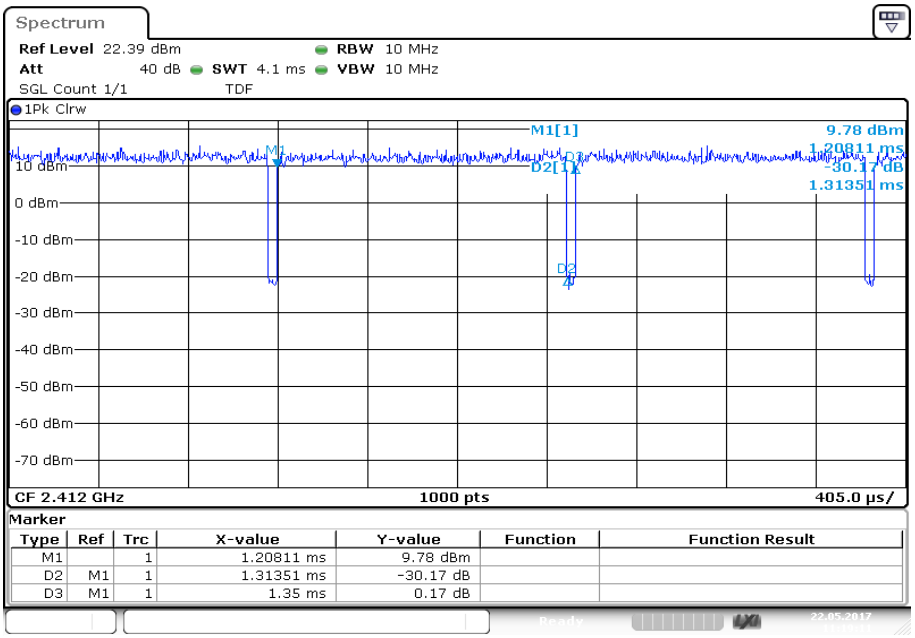
Plot 3: Highest channel



Date: 22.MAY.2017 11:12:15

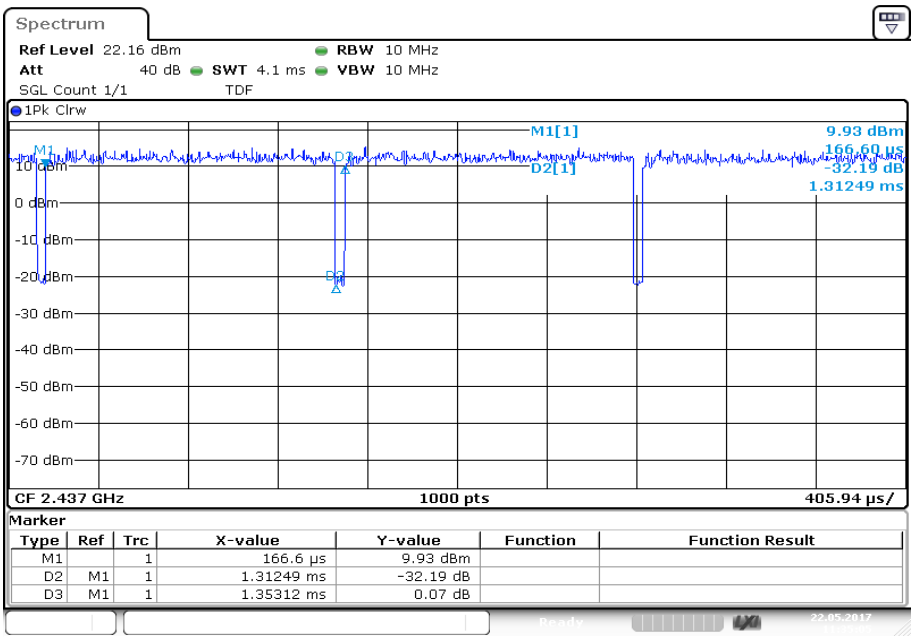
Plots: OFDM / n HT20 – mode – ANT1

Plot 1: Lowest channel



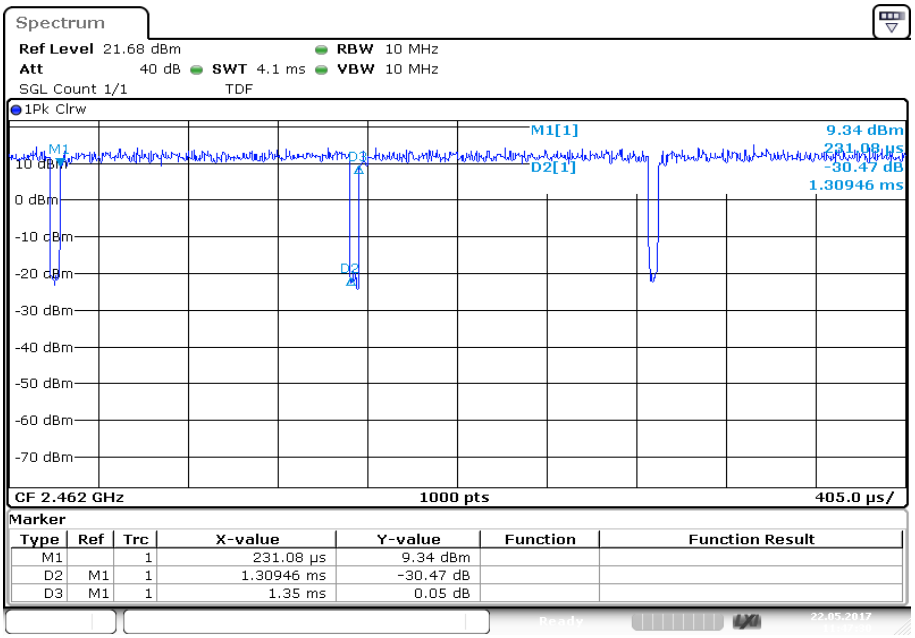
Date: 22.MAY.2017 11:19:11

Plot 2: Middle channel



Date: 22.MAY.2017 11:35:05

Plot 3: Highest channel



Date: 22.MAY.2017 11:47:31

11.5 Peak power spectral density

Description:

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

Measurement:

Measurement parameter	
According to DTS clause: 10.2	
Detector:	Positive Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Span:	30 MHz
Trace mode:	Max hold (allow trace to fully stabilize)
Test setup:	See sub clause 6.4 – B
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
8 dBm / 3 kHz (conducted)	

Results: ANT0

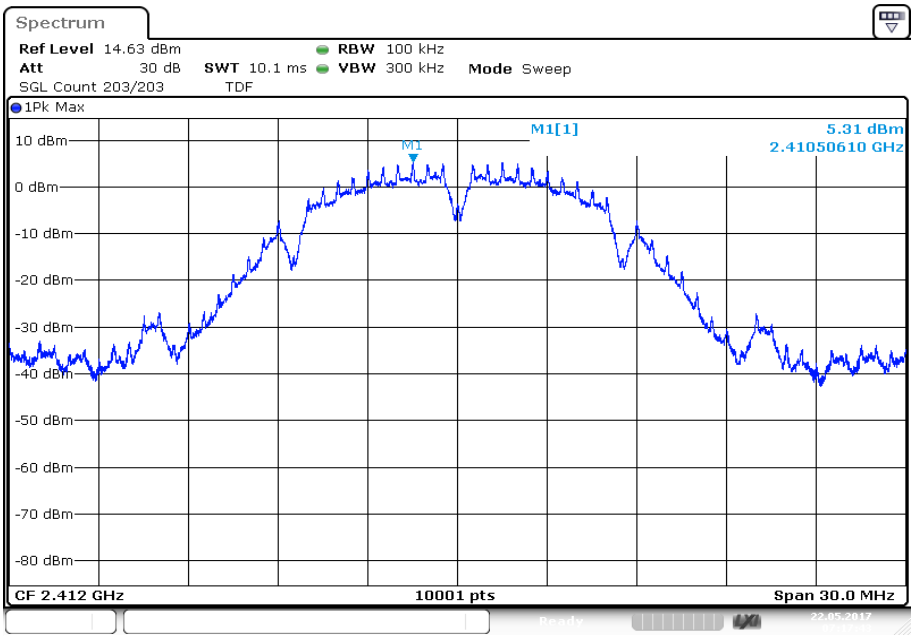
Modulation	Peak power spectral density [dBm @ 100kHz]		
Frequency	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	5.31	4.64	4.80
OFDM / g – mode	-1.82	-2.10	-2.14
OFDM / n HT20 – mode	-2.91	-2.92	-3.00

Results: ANT1

Modulation	Peak power spectral density [dBm @ 100kHz]		
Frequency	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	5.37	4.82	4.86
OFDM / g – mode	-1.91	-2.23	-2.68
OFDM / n HT20 – mode	-2.81	-2.96	-3.59

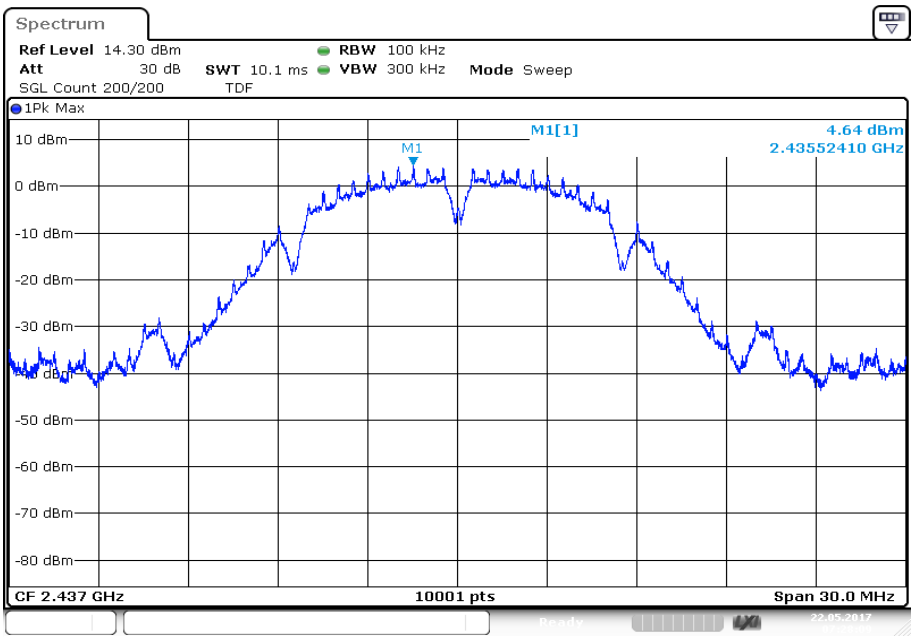
Plots: ANT 0, DSSS / b – mode

Plot 1: Lowest channel



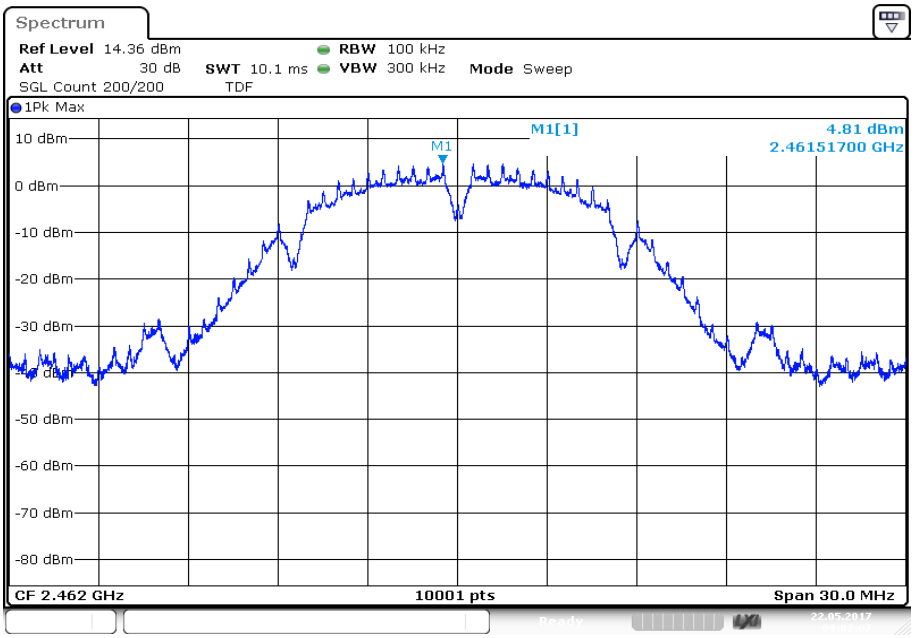
Date: 22.MAY.2017 07:17:44

Plot 2: Middle channel



Date: 22.MAY.2017 07:28:09

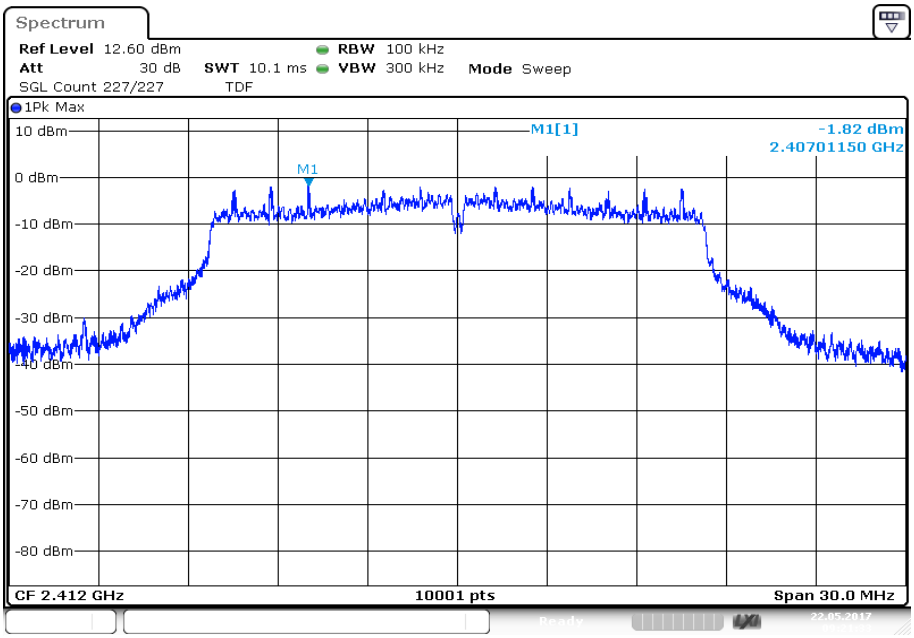
Plot 3: Highest channel



Date: 22.MAY.2017 09:02:08

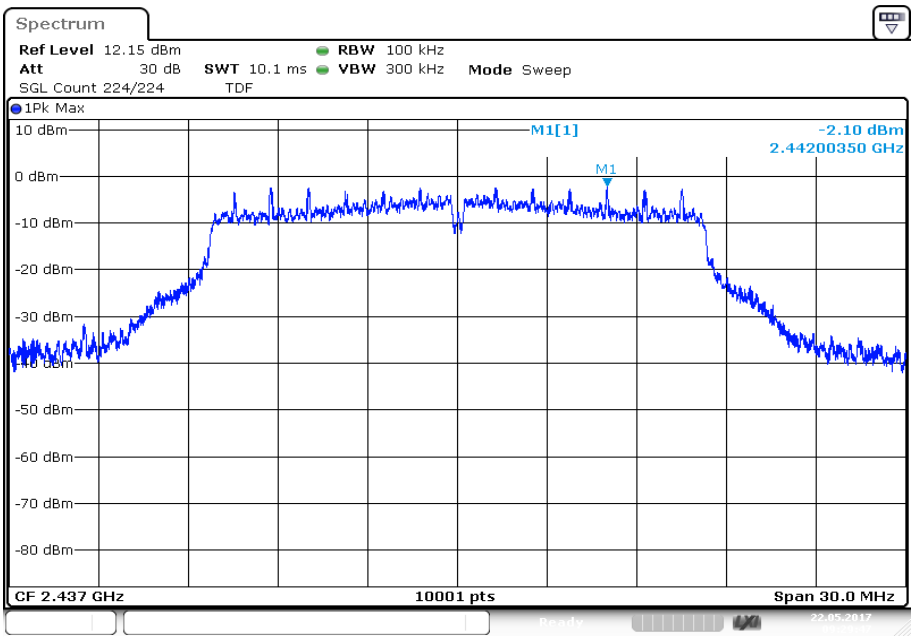
Plots: ANT 0, OFDM / g – mode

Plot 1: Lowest channel



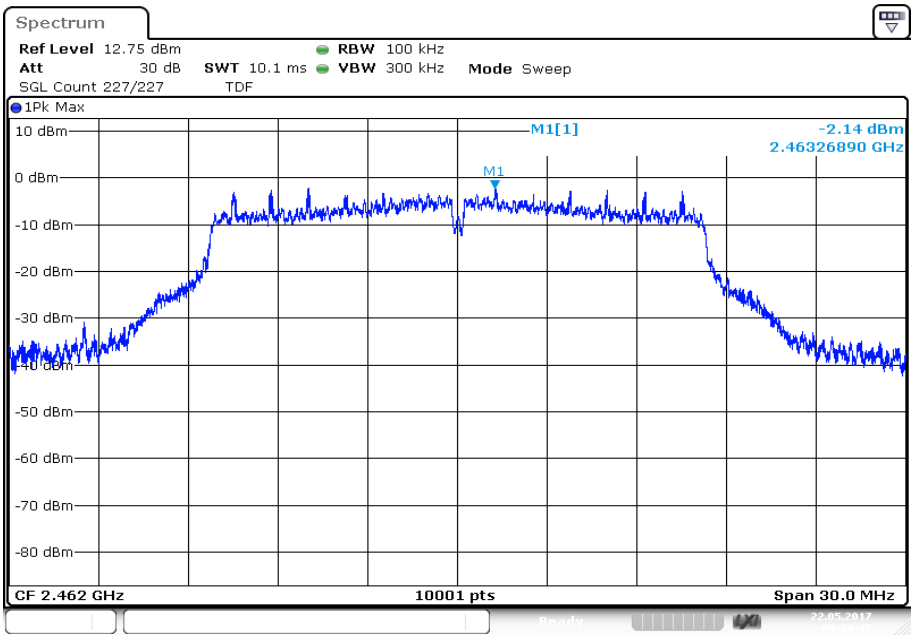
Date: 22.MAY.2017 09:21:33

Plot 2: Middle channel



Date: 22.MAY.2017 09:29:48

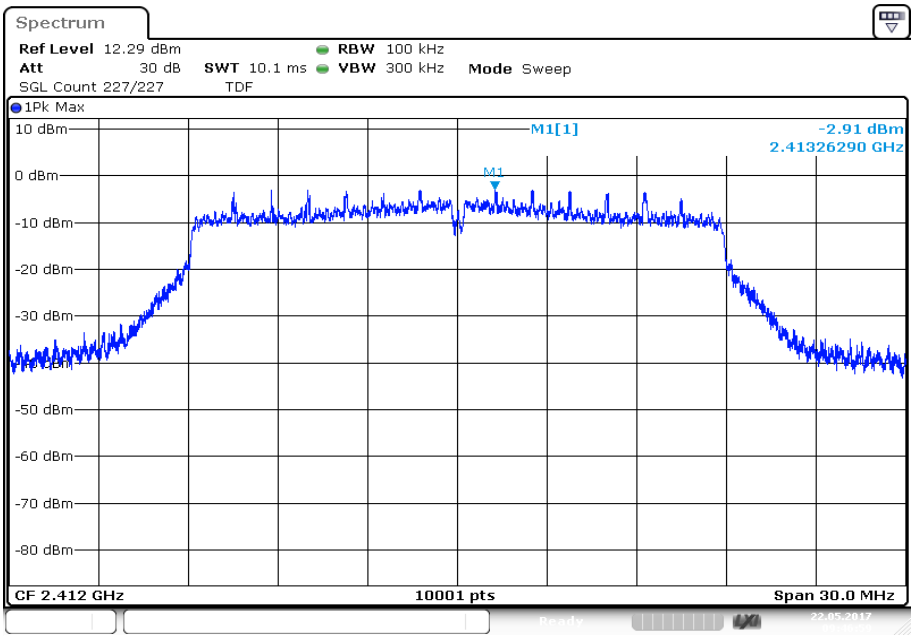
Plot 3: Highest channel



Date: 22.MAY.2017 09:39:48

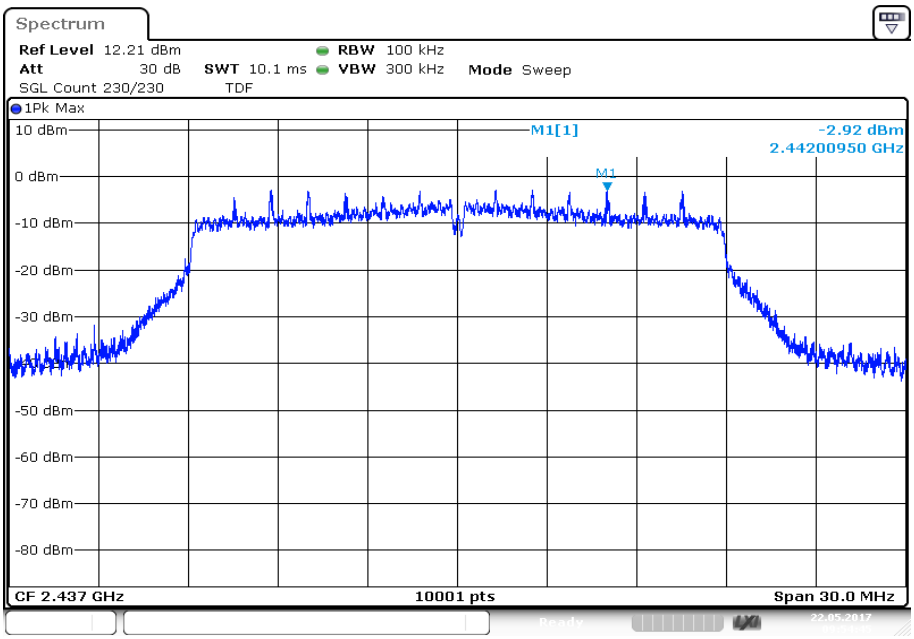
Plots: ANT 0, OFDM / n HT20 – mode

Plot 1: Lowest channel



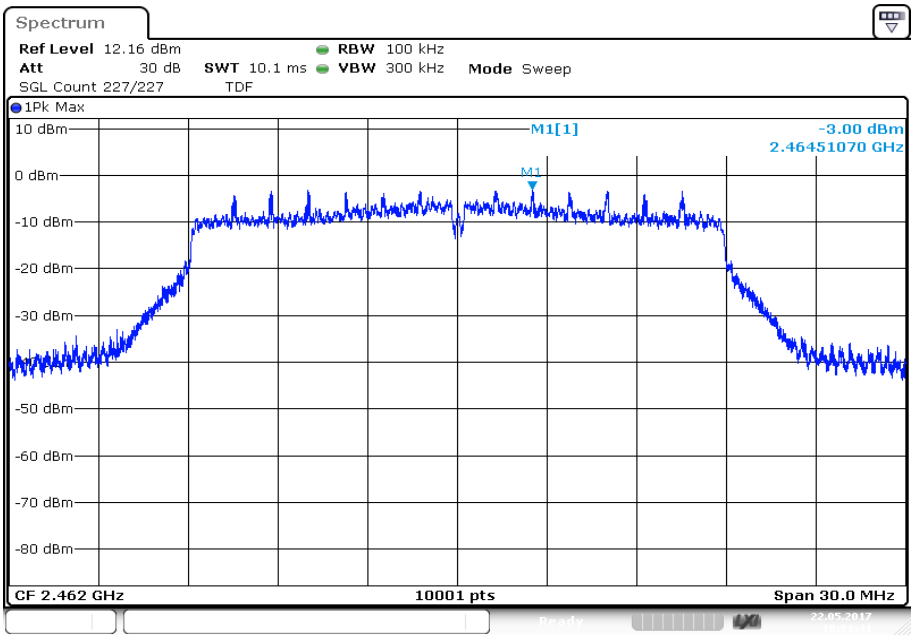
Date: 22.MAY.2017 09:47:00

Plot 2: Middle channel



Date: 22.MAY.2017 09:54:45

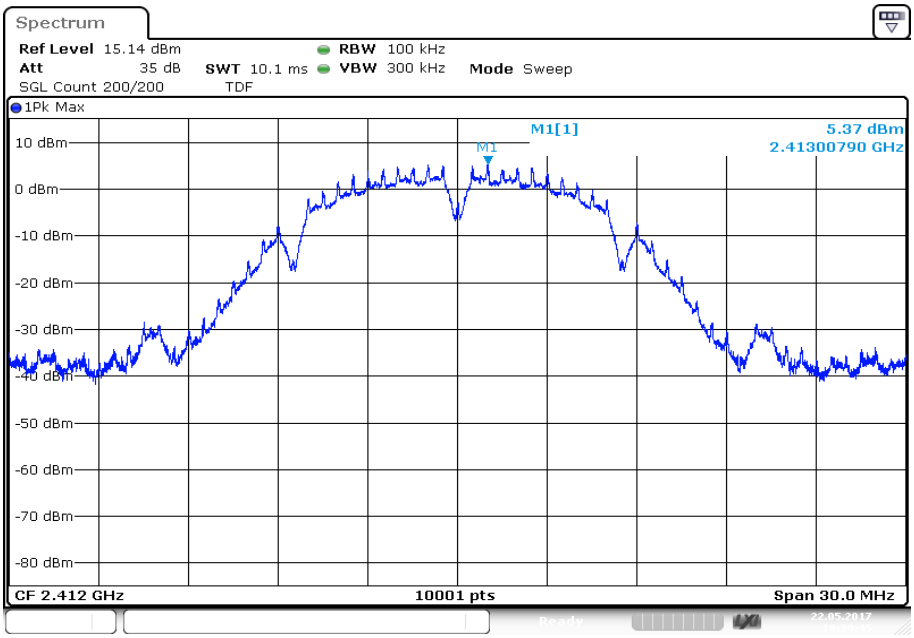
Plot 3: Highest channel



Date: 22.MAY.2017 10:01:42

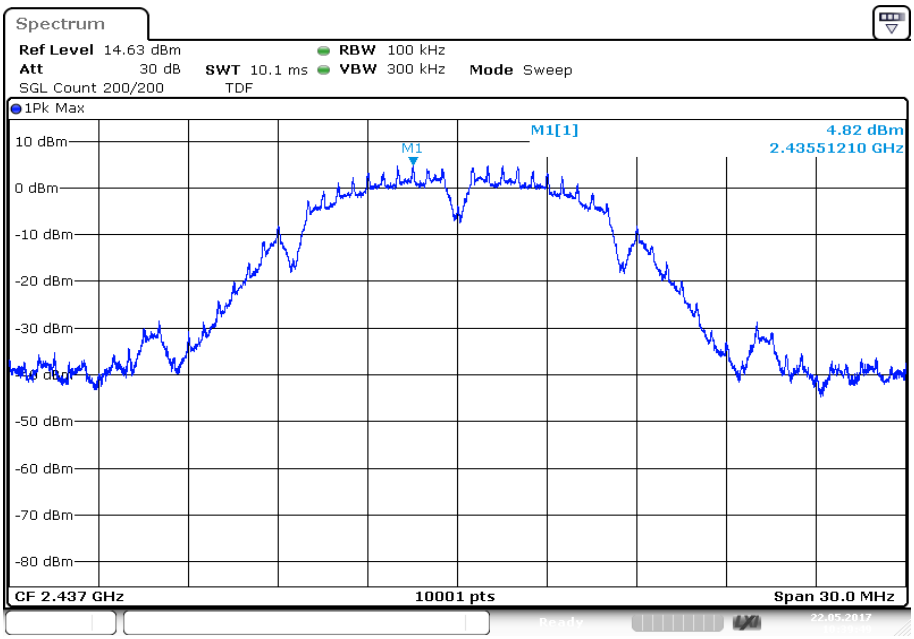
Plots: ANT 1, DSSS / b – mode

Plot 1: Lowest channel



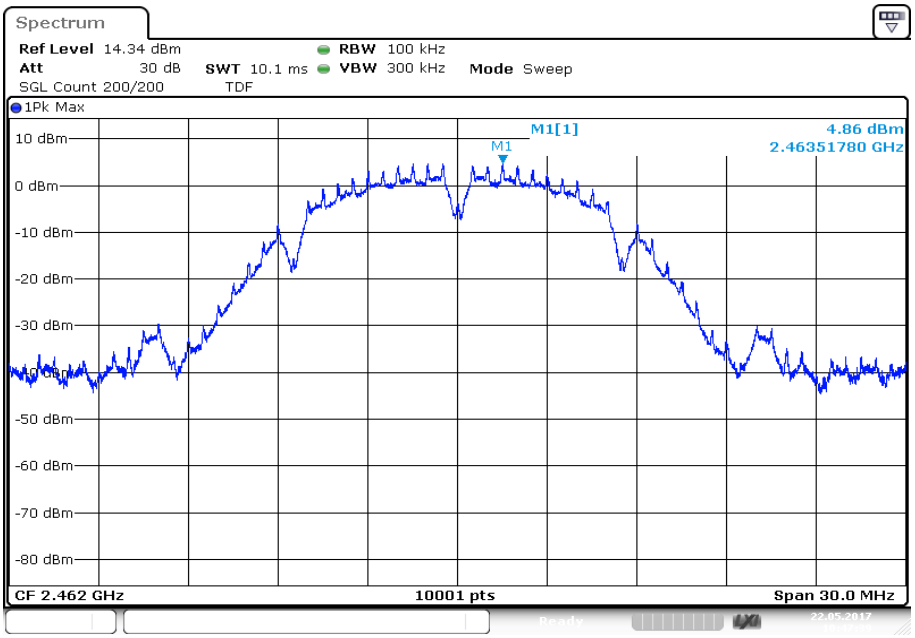
Date: 22.MAY.2017 10:30:46

Plot 2: Middle channel



Date: 22.MAY.2017 10:39:49

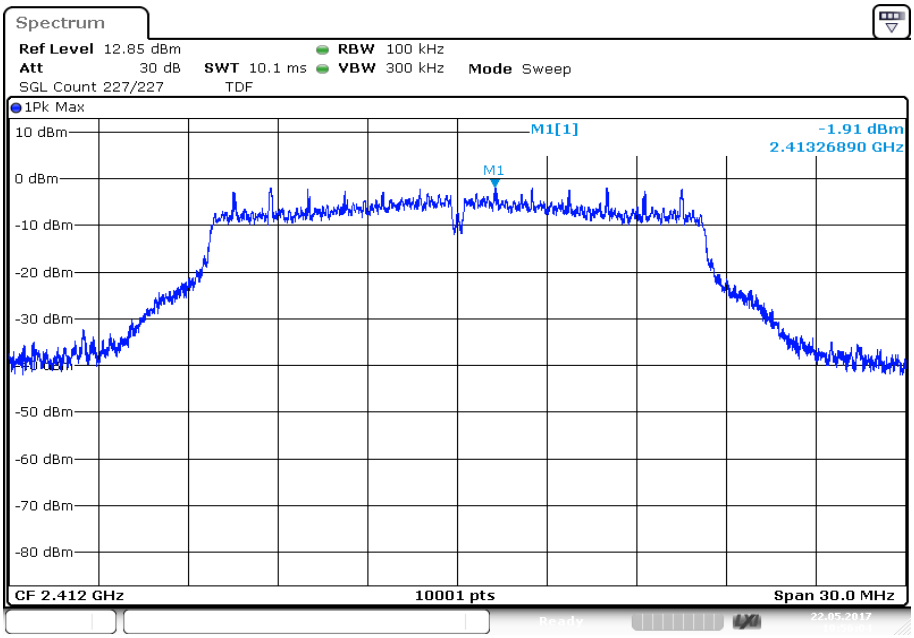
Plot 3: Highest channel



Date: 22.MAY.2017 10:47:39

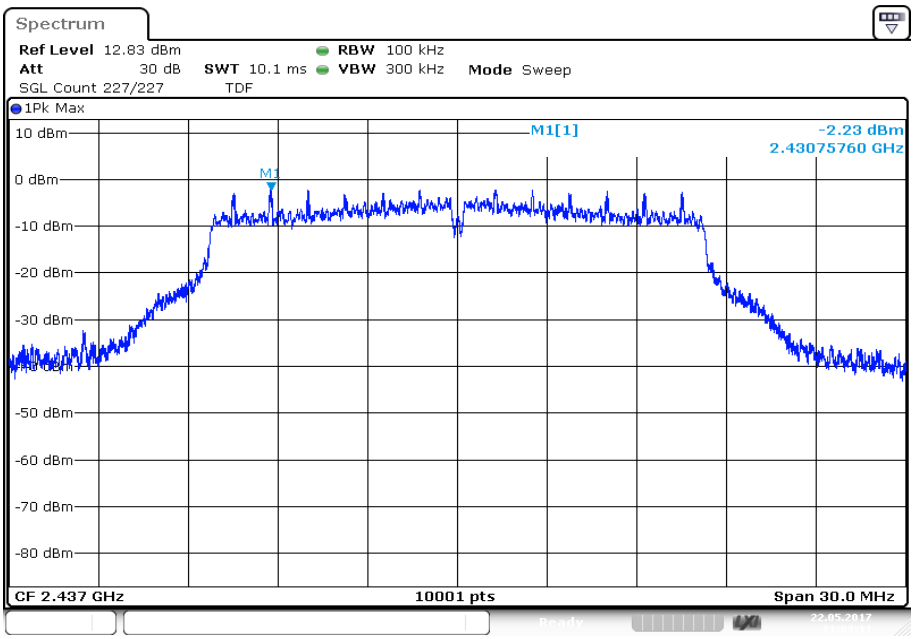
Plots: ANT 1, OFDM / g – mode

Plot 1: Lowest channel



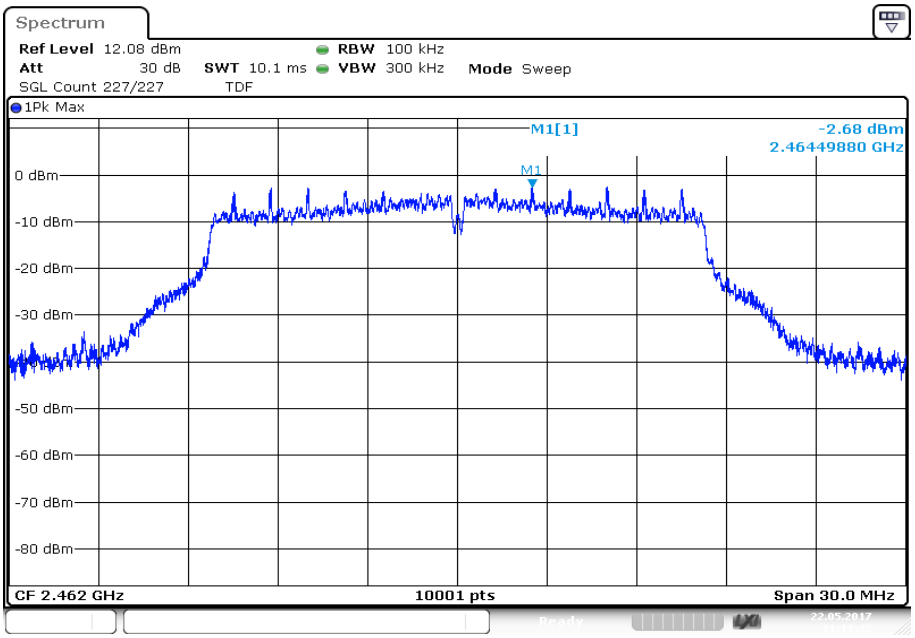
Date: 22.MAY.2017 10:56:04

Plot 2: Middle channel



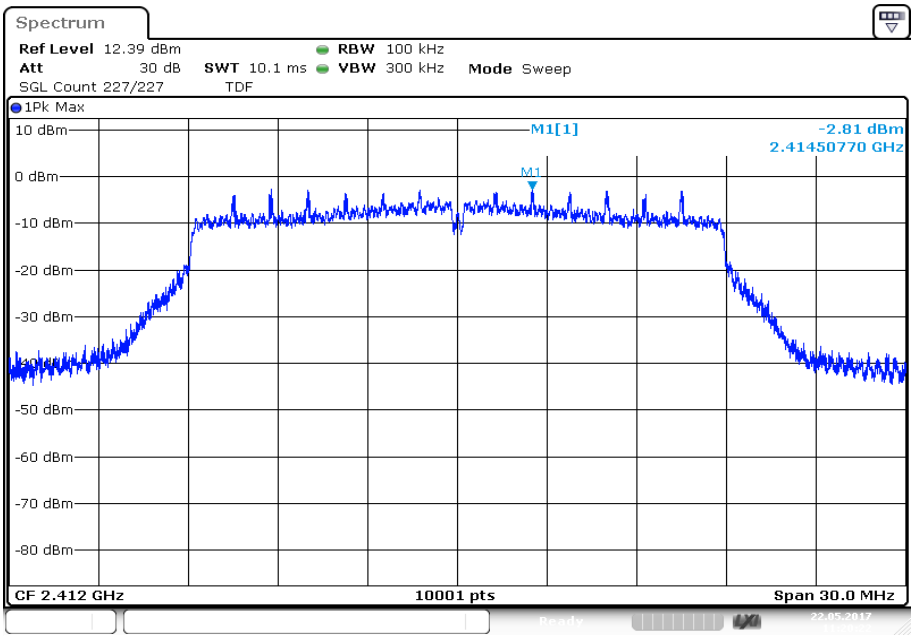
Date: 22.MAY.2017 11:03:11

Plot 3: Highest channel



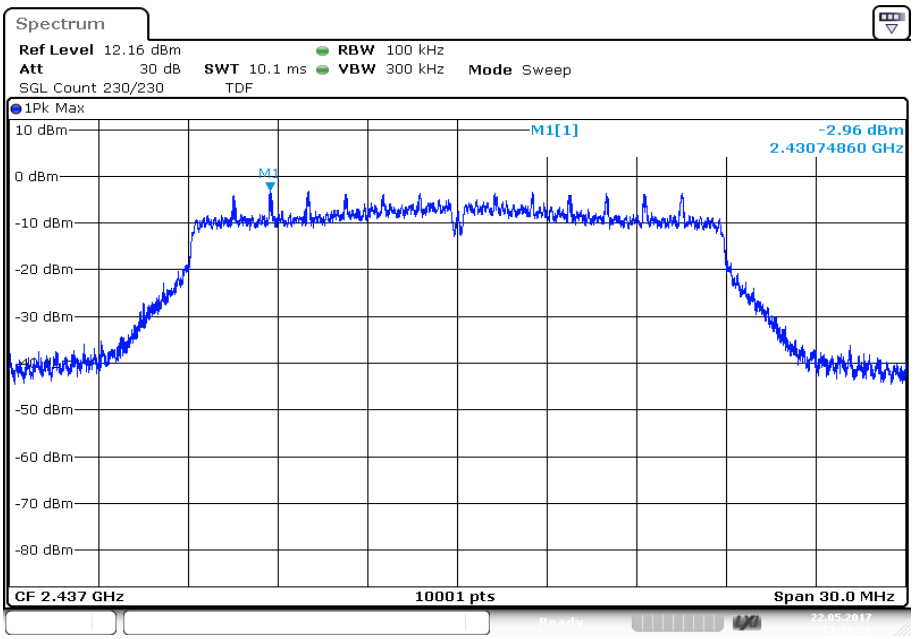
Plots: ANT 1, OFDM / n HT20 – mode

Plot 1: Lowest channel



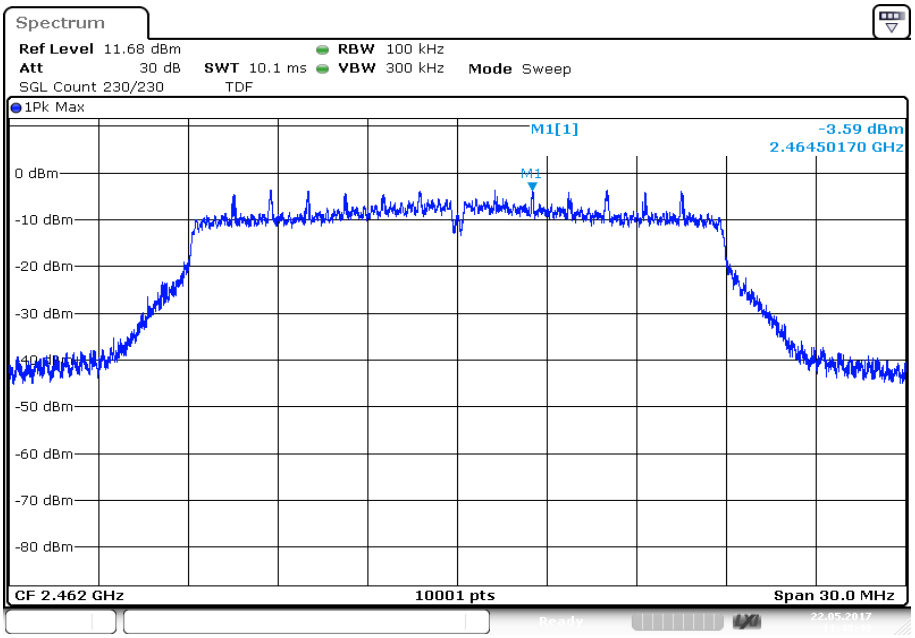
Date: 22.MAY.2017 11:20:22

Plot 2: Middle channel



Date: 22.MAY.2017 11:36:20

Plot 3: Highest channel



Date: 22.MAY.2017 11:48:49

11.6 6 dB DTS bandwidth

Description:

Measurement of the 6 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
According to DTS clause: 8.1	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	500 kHz
Span:	30 MHz / 50 MHz
Trace mode:	Single count with 200 counts
Test setup:	See sub clause 6.4 – B
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.	

Results: ANT0

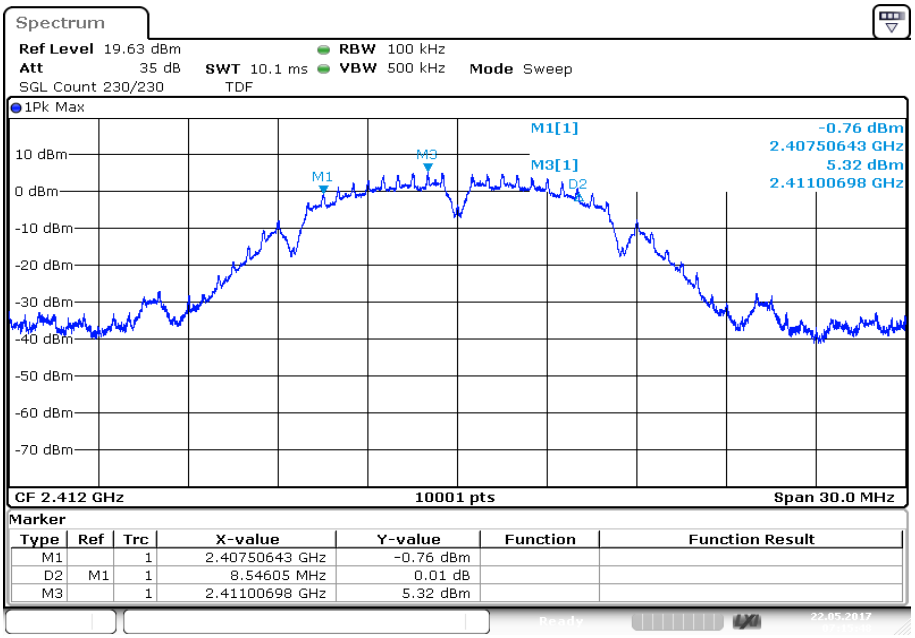
Frequency	6 dB DTS bandwidth [kHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	8546	8573	8561
OFDM / g – mode	16288	16300	16303
OFDM / n HT20 – mode	17044	17263	17260

Results: ANT1

Frequency	6 dB DTS bandwidth [kHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	8078	8564	9008
OFDM / g – mode	16297	16297	16300
OFDM / n HT40 – mode	17036	17014	17287

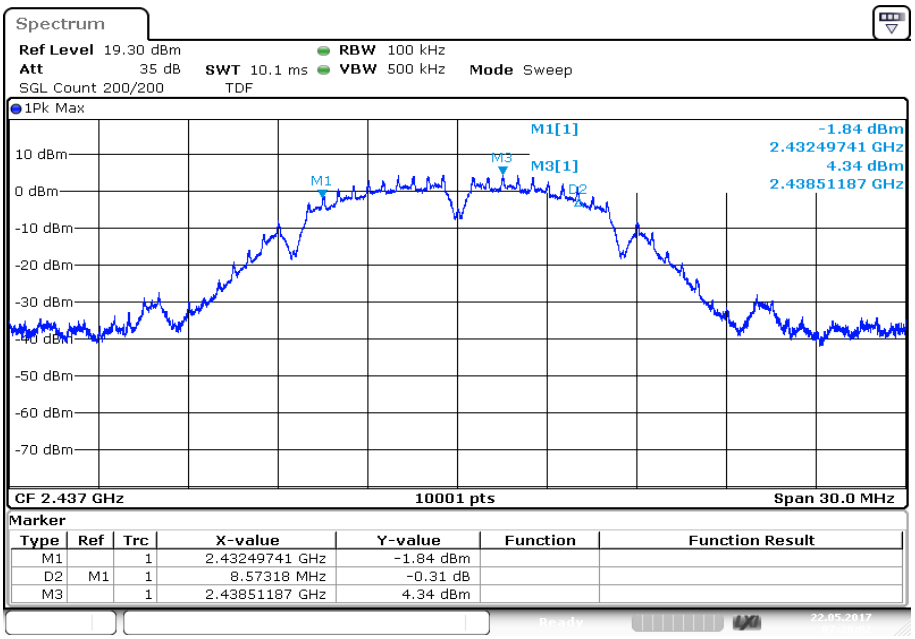
Plots: ANT 0, DSSS / b – mode

Plot 1: Lowest channel



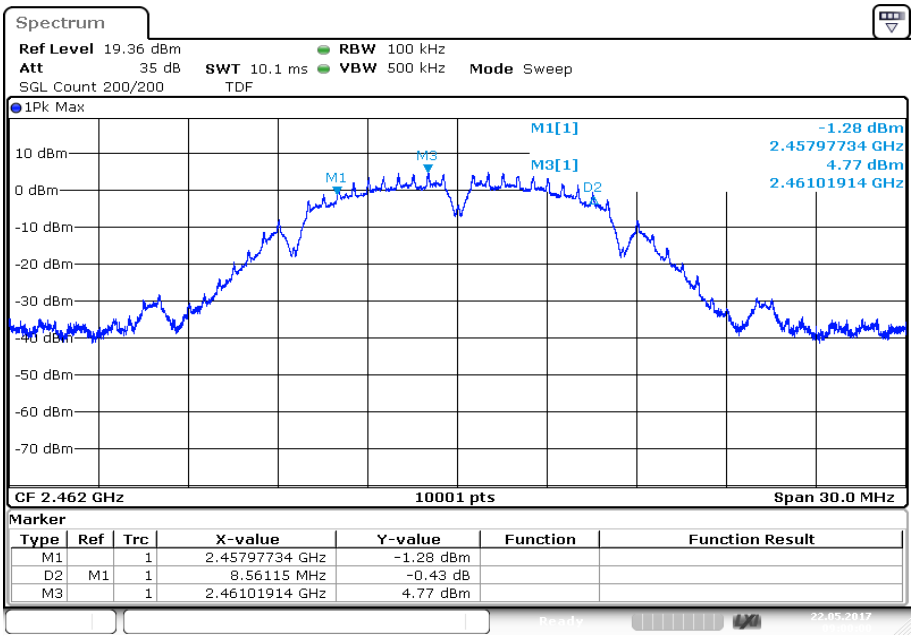
Date: 22.MAY.2017 07:15:48

Plot 2: Middle channel



Date: 22.MAY.2017 07:26:03

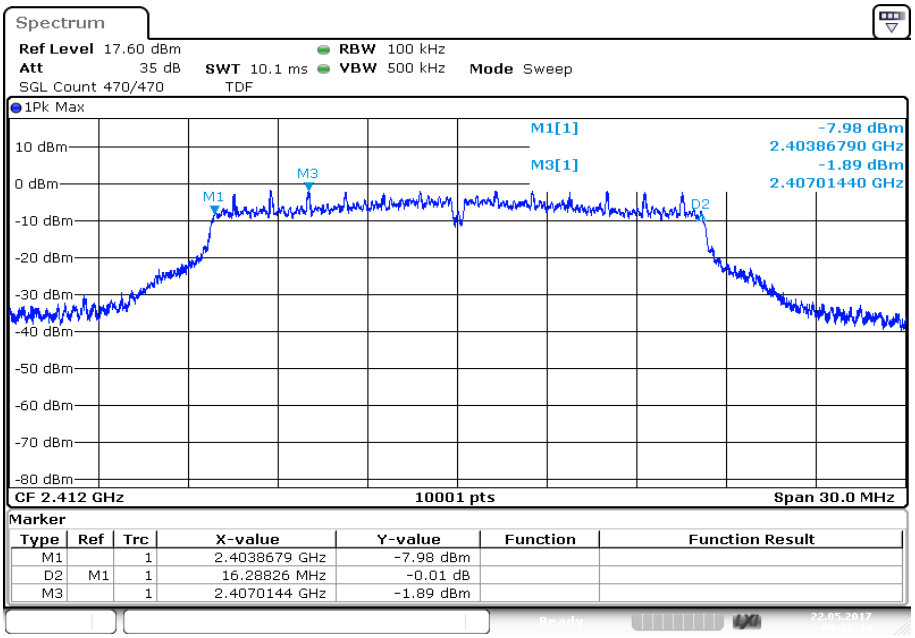
Plot 3: Highest channel



Date: 22.MAY.2017 09:00:00

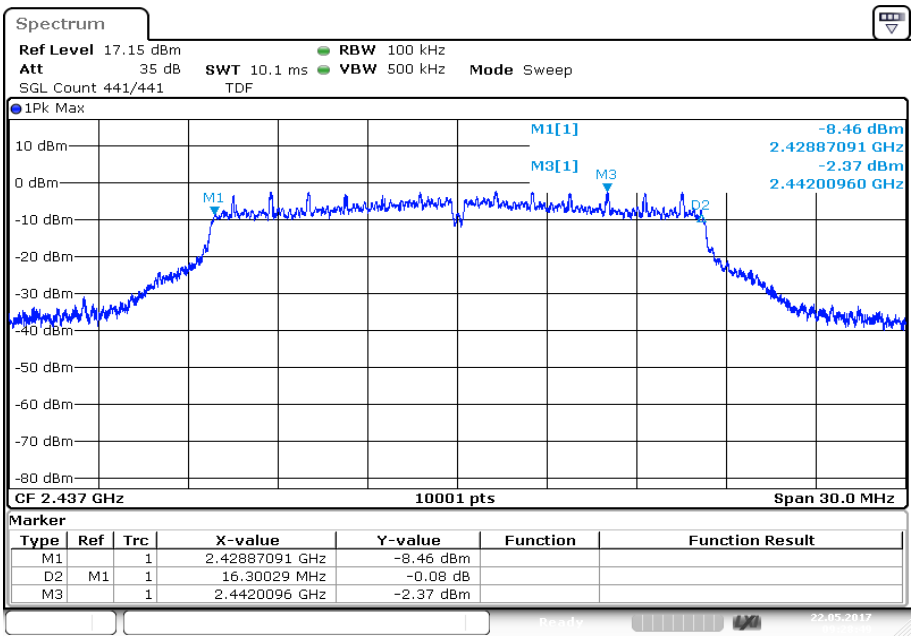
Plots: ANT 0, OFDM / g – mode

Plot 1: Lowest channel



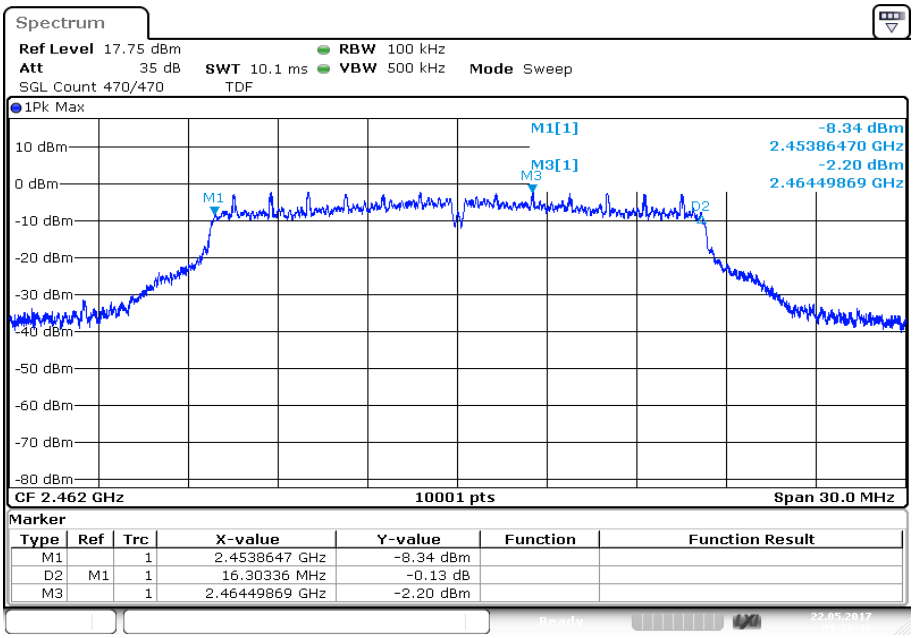
Date: 22.MAY.2017 09:20:35

Plot 2: Middle channel



Date: 22.MAY.2017 09:28:49

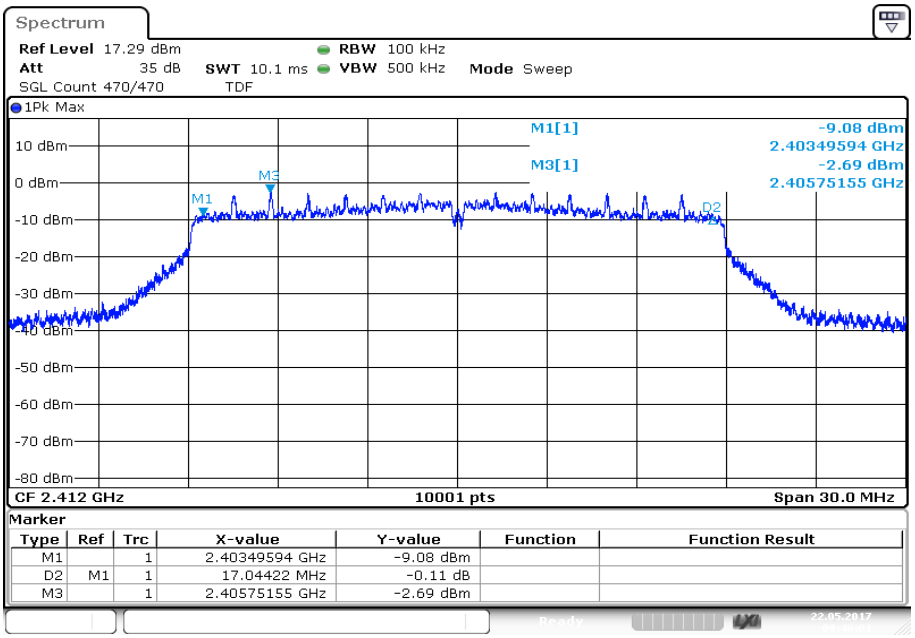
Plot 3: Highest channel



Date: 22.MAY.2017 09:38:46

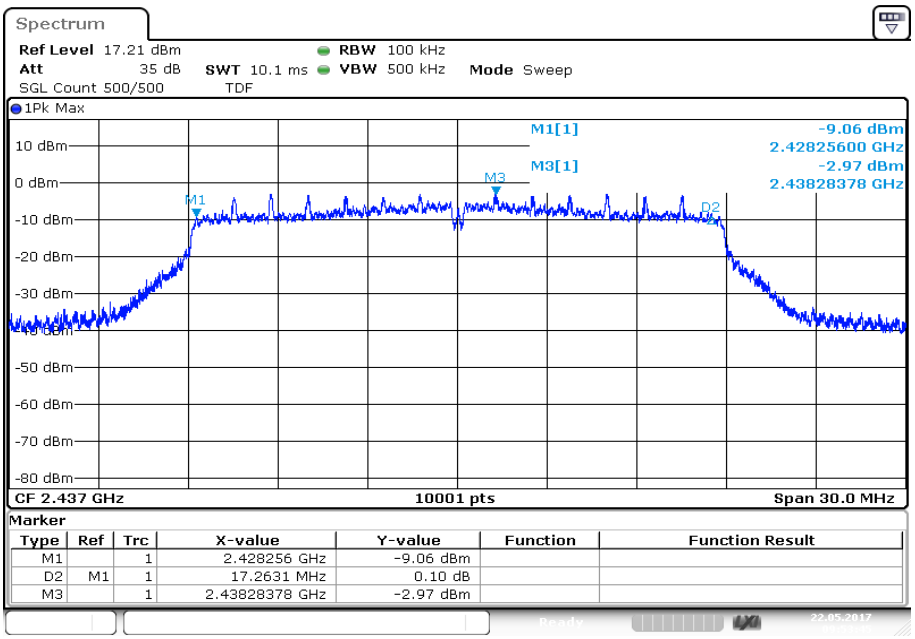
Plots: ANT 0, OFDM / n HT20 – mode

Plot 1: Lowest channel



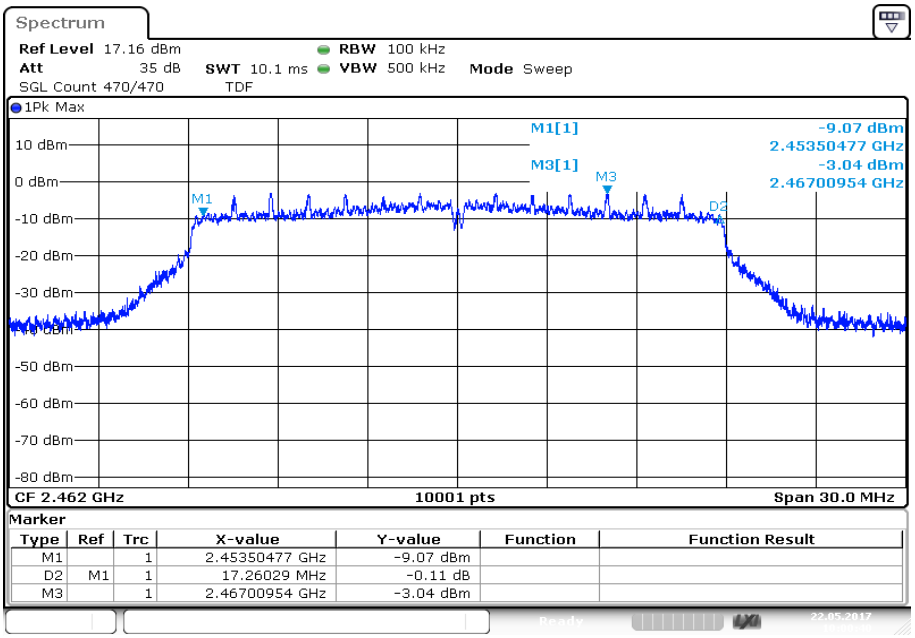
Date: 22.MAY.2017 09:46:02

Plot 2: Middle channel



Date: 22.MAY.2017 09:53:45

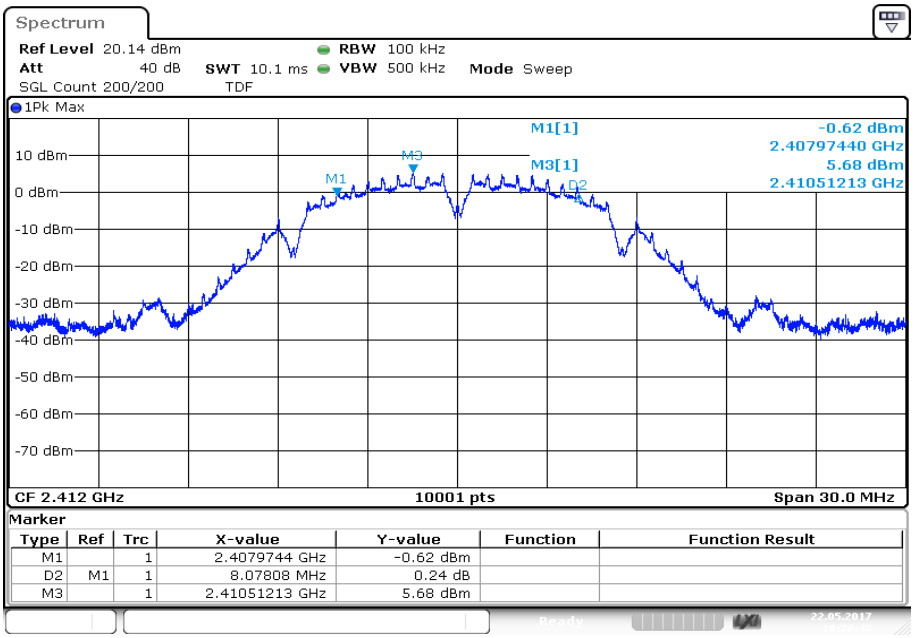
Plot 3: Highest channel



Date: 22.MAY.2017 10:00:41

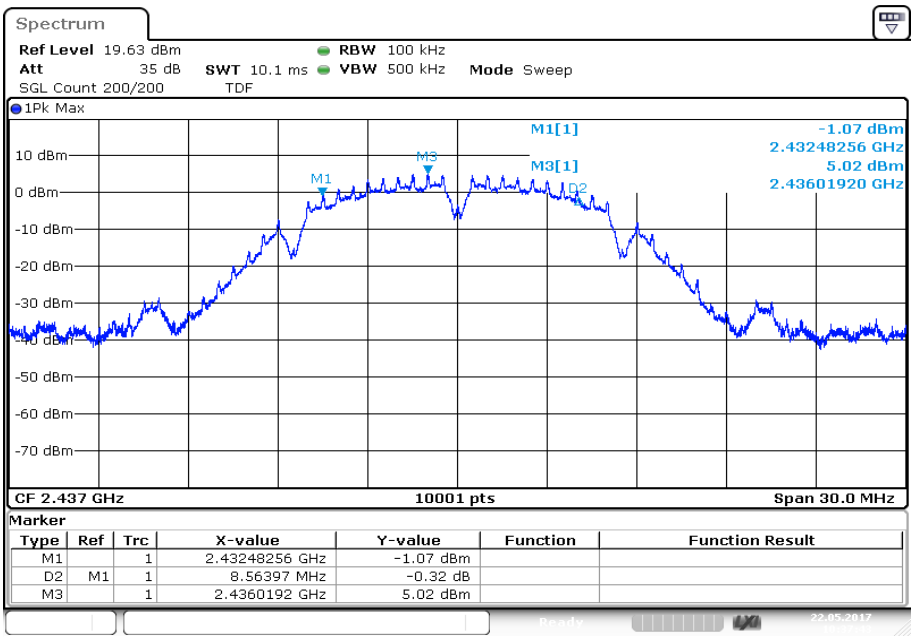
Plots: ANT 1, DSSS / b – mode

Plot 1: Lowest channel



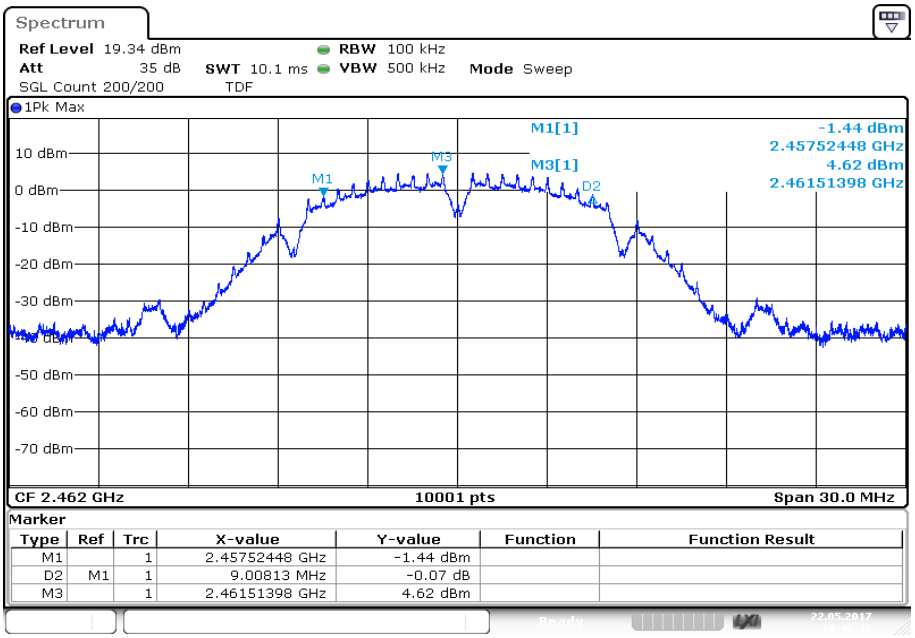
Date: 22.MAY.2017 10:28:40

Plot 2: Middle channel



Date: 22.MAY.2017 10:37:43

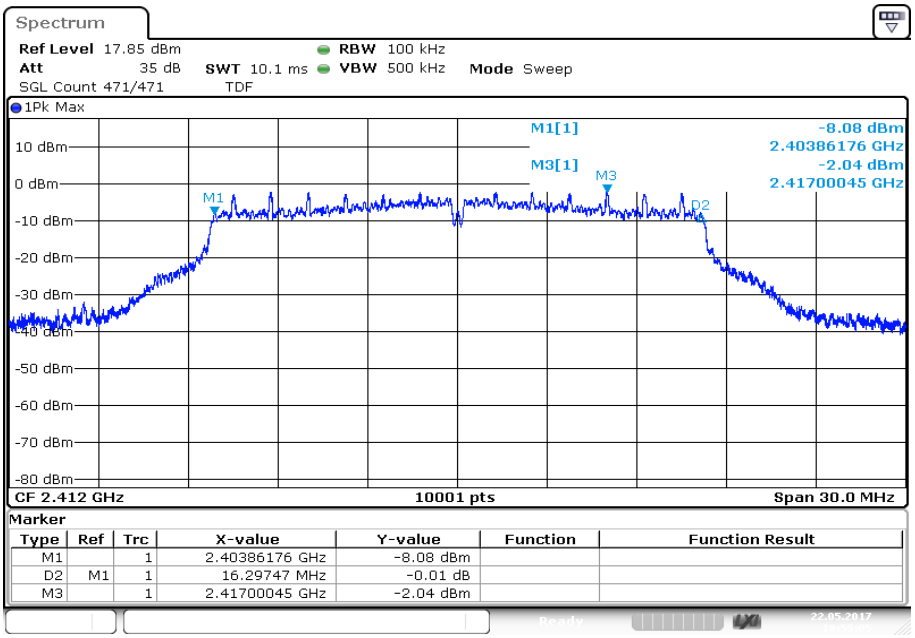
Plot 3: Highest channel



Date: 22.MAY.2017 10:45:32

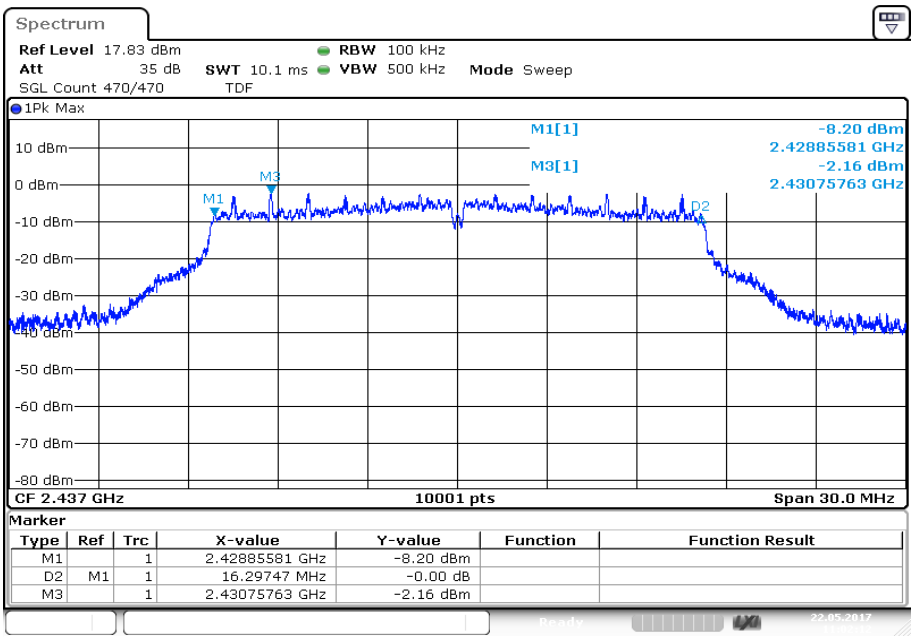
Plots: ANT 1, OFDM / g – mode

Plot 1: Lowest channel



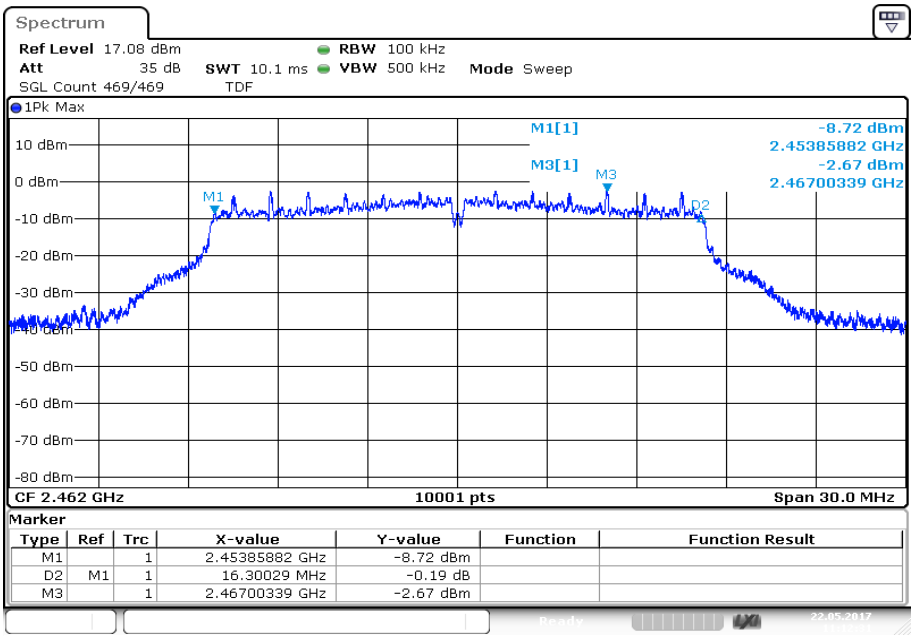
Date: 22.MAY.2017 10:55:06

Plot 2: Middle channel



Date: 22.MAY.2017 11:02:12

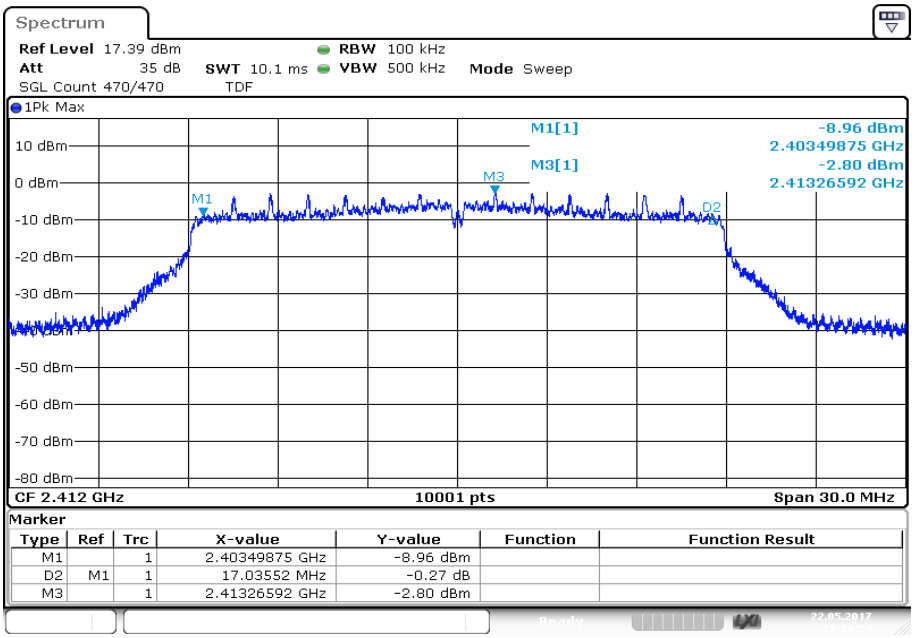
Plot 3: Highest channel



Date: 22.MAY.2017 11:12:31

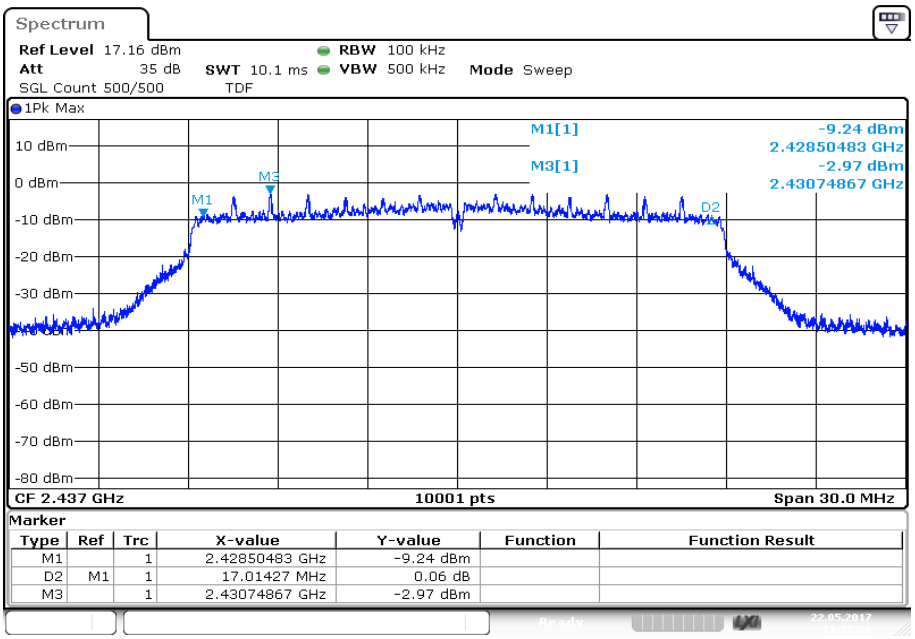
Plots: ANT1, OFDM / n HT20 – mode

Plot 1: Lowest channel



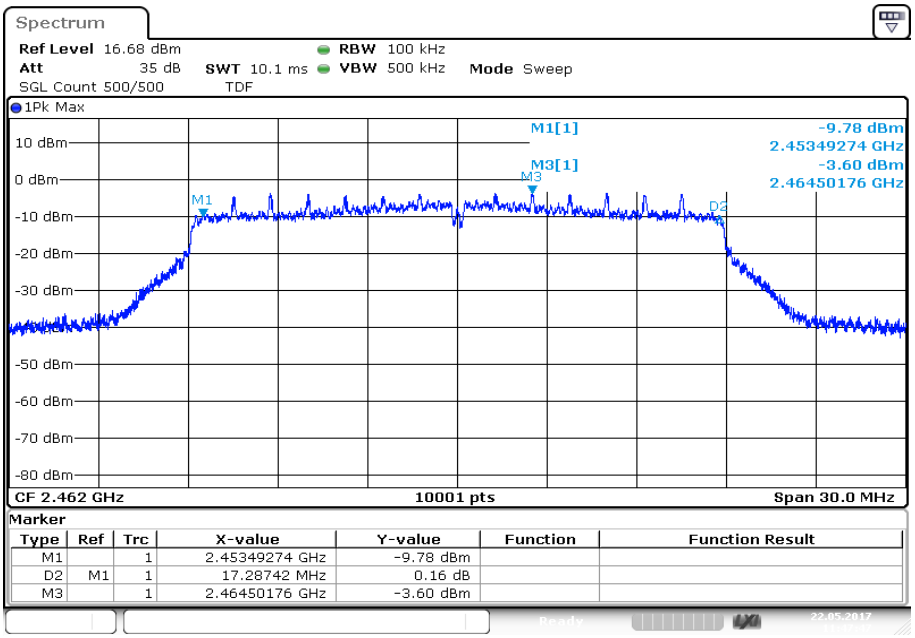
Date: 22.MAY.2017 11:19:25

Plot 2: Middle channel



Date: 22.MAY.2017 11:35:20

Plot 3: Highest channel



Date: 22.MAY.2017 11:47:47

11.7 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
Video bandwidth:	1 MHz
Span:	30 MHz / 50 MHz
Measurement procedure:	Measurement of the 99% bandwidth using the integration function of the analyzer
Trace mode:	Single count with 200 counts
Test setup:	See sub clause 6.4 – B
Measurement uncertainty	See sub clause 8

Usage:

-/-	IC
OBW is necessary for Emission Designator	

Results: ANT0

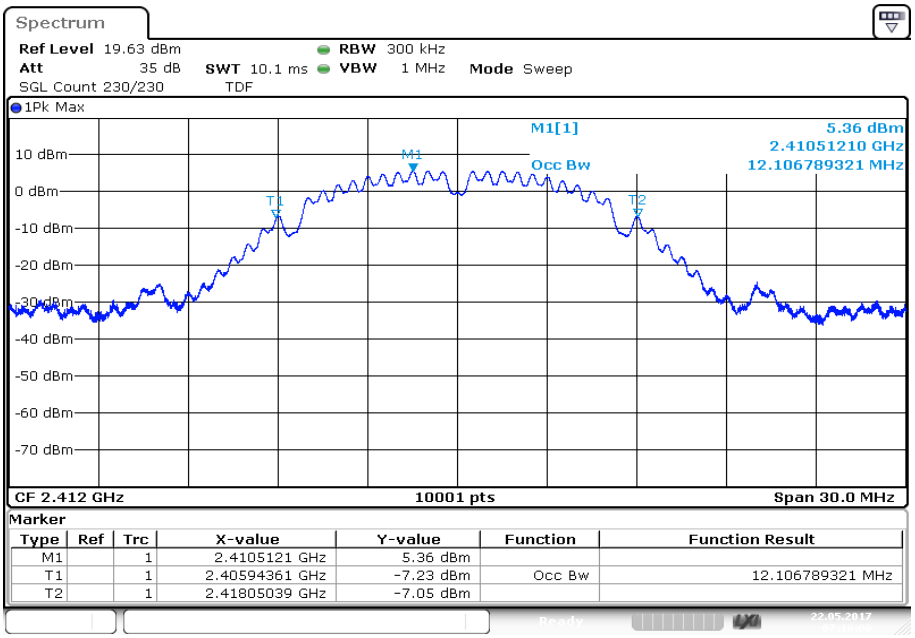
Modulation / Frequency	99% bandwidth [kHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	12107	12071	12056
OFDM / g – mode	16987	16978	16966
OFDM / n HT20 – mode	18010	18001	18004

Results: ANT1

Modulation / Frequency	99% bandwidth [kHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	12032	12011	11990
OFDM / g – mode	16951	16966	16954
OFDM / n HT20 – mode	17986	18010	18004

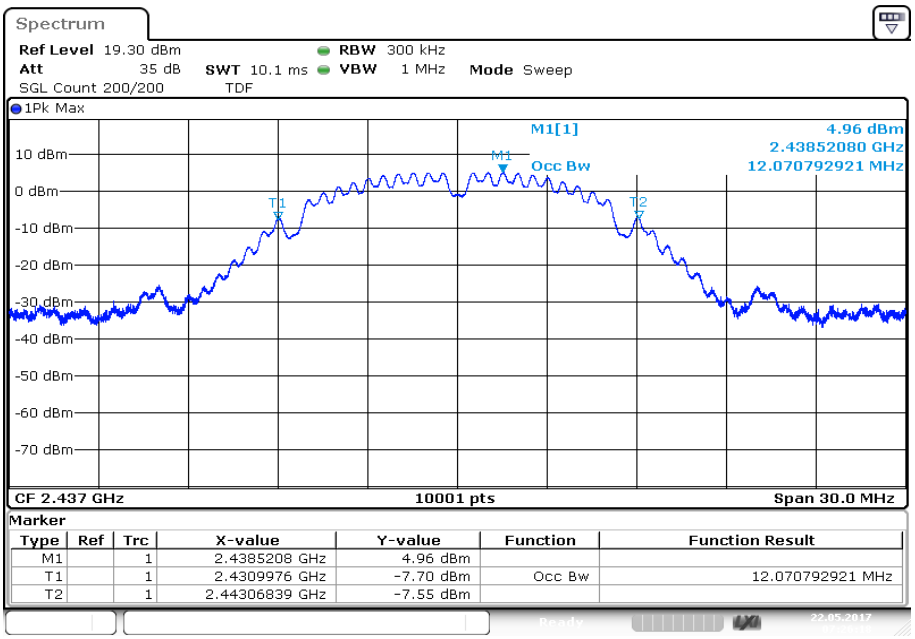
Plots: ANT 0, DSSS / b – mode

Plot 1: Lowest channel



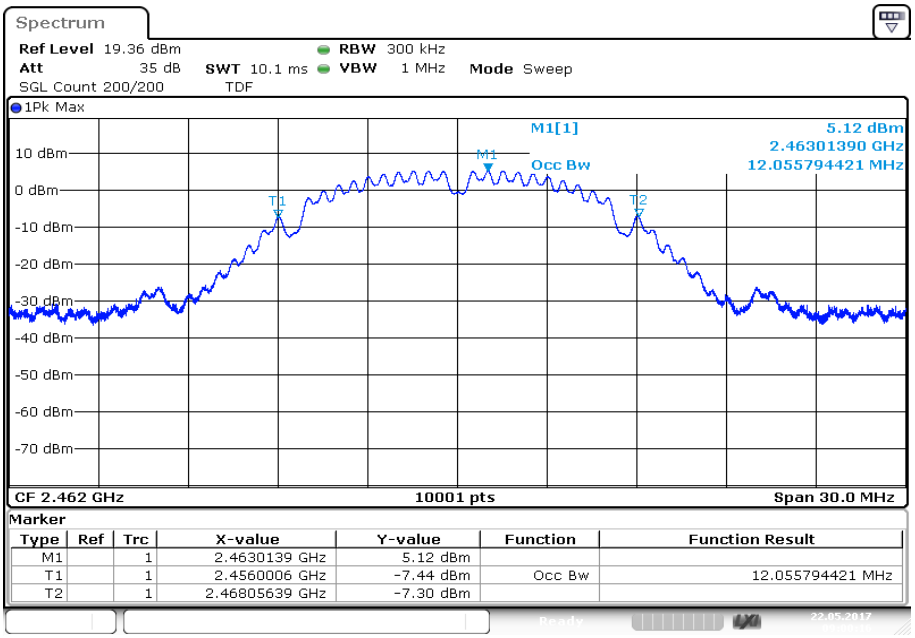
Date: 22.MAY.2017 07:16:06

Plot 2: Middle channel



Date: 22.MAY.2017 07:26:19

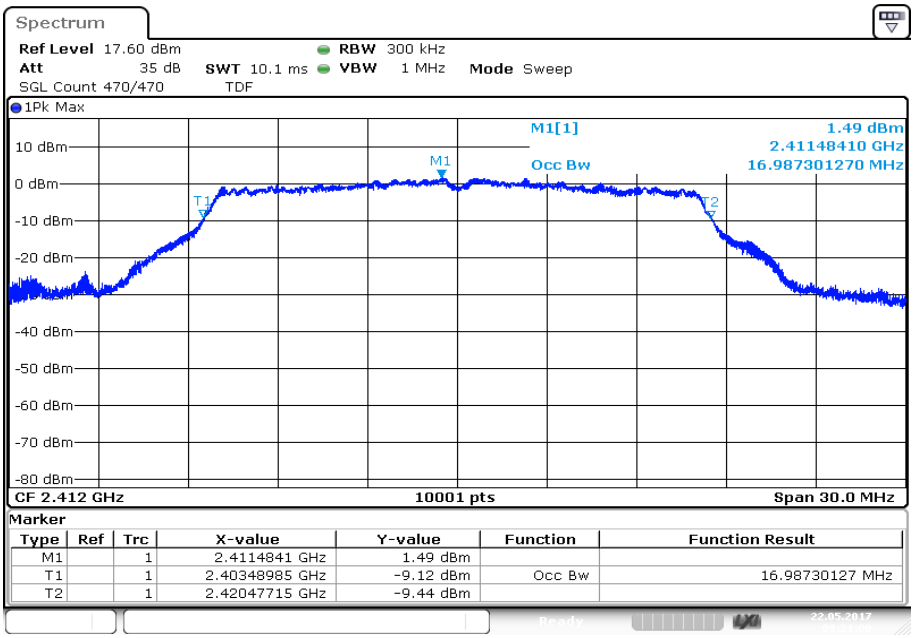
Plot 3: Highest channel



Date: 22.MAY.2017 09:00:17

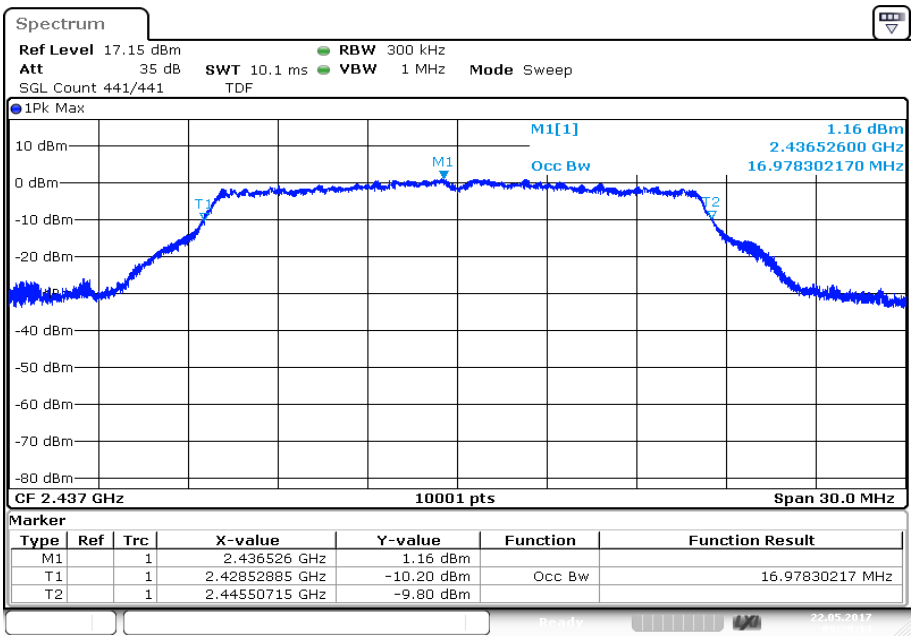
Plots: ANT 0, OFDM / g – mode

Plot 1: Lowest channel



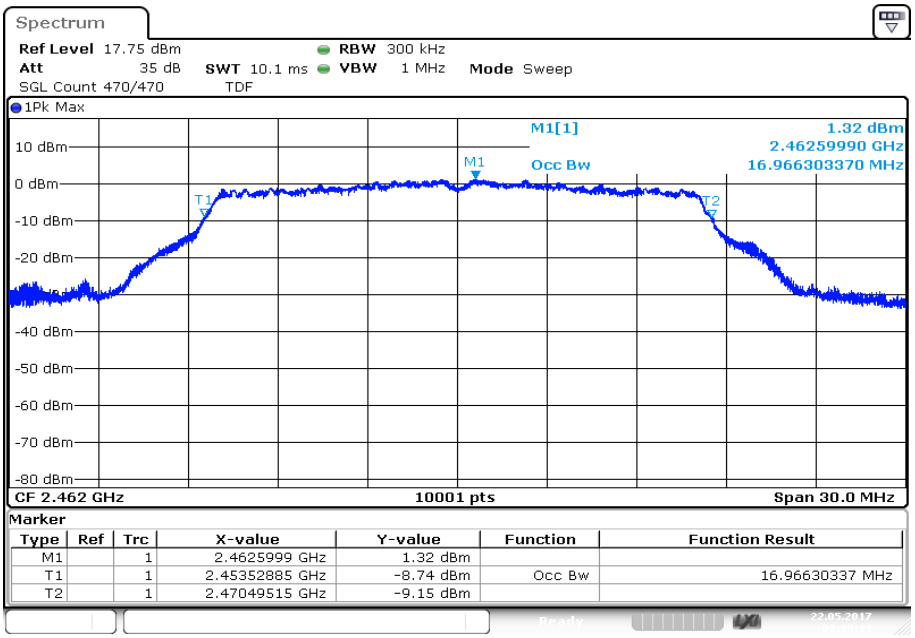
Date: 22.MAY.2017 09:21:01

Plot 2: Middle channel



Date: 22.MAY.2017 09:29:15

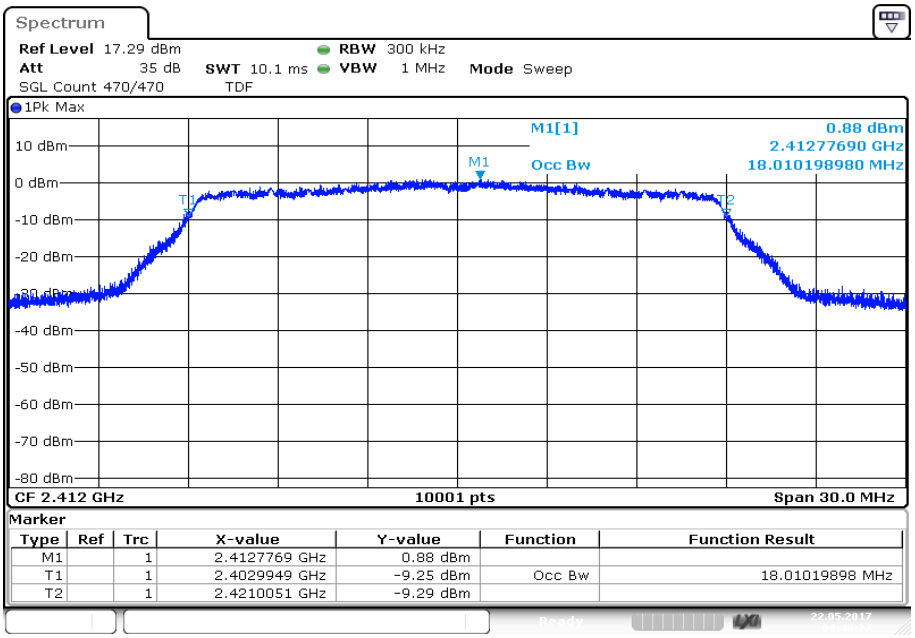
Plot 3: Highest channel



Date: 22.MAY.2017 09:39:14

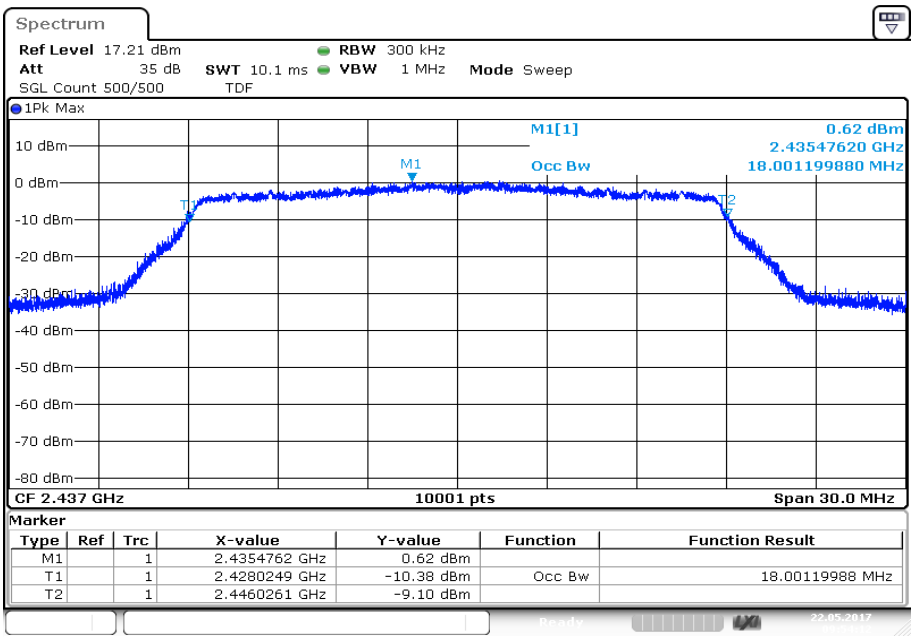
Plots: ANT 0, OFDM / n HT20 – mode

Plot 1: Lowest channel



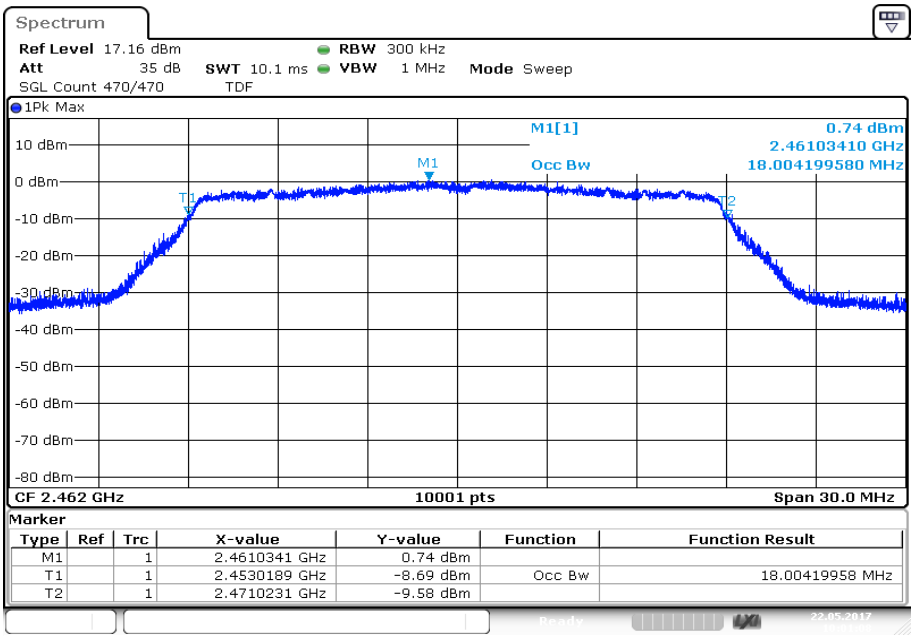
Date: 22.MAY.2017 09:46:28

Plot 2: Middle channel



Date: 22.MAY.2017 09:54:13

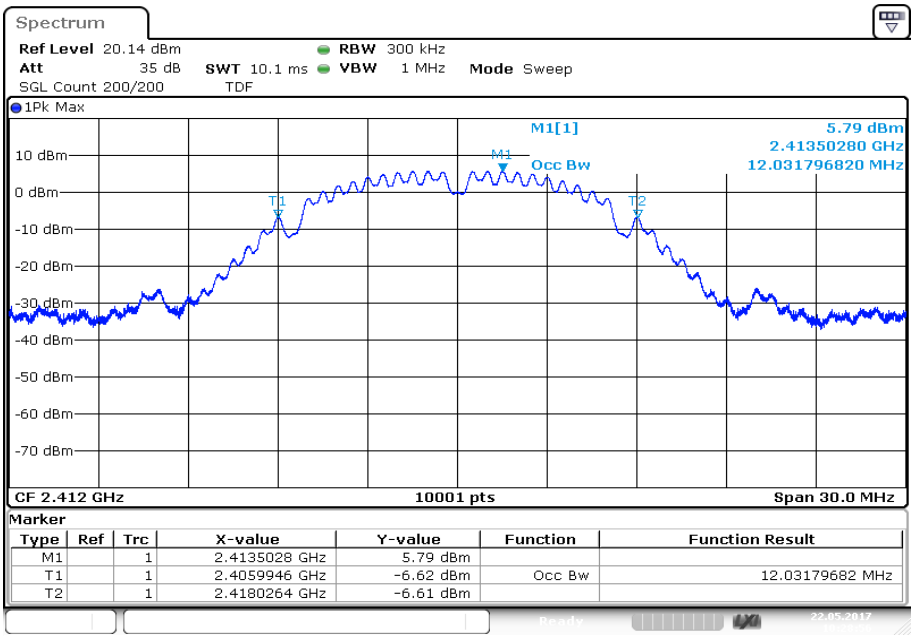
Plot 3: Highest channel



Date: 22.MAY.2017 10:01:09

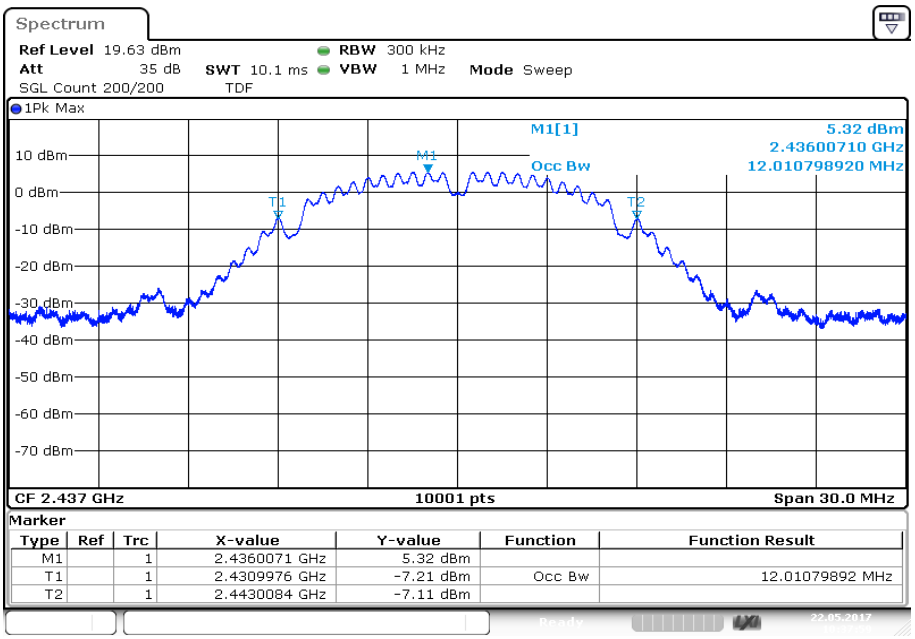
Plots: ANT 1, DSSS / b – mode

Plot 1: Lowest channel



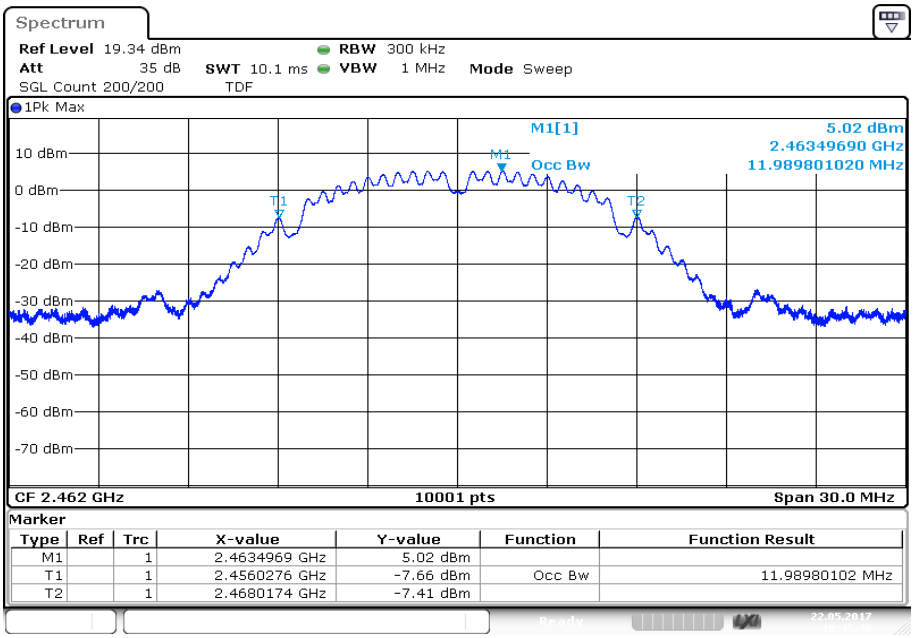
Date: 22.MAY.2017 10:28:56

Plot 2: Middle channel



Date: 22.MAY.2017 10:37:59

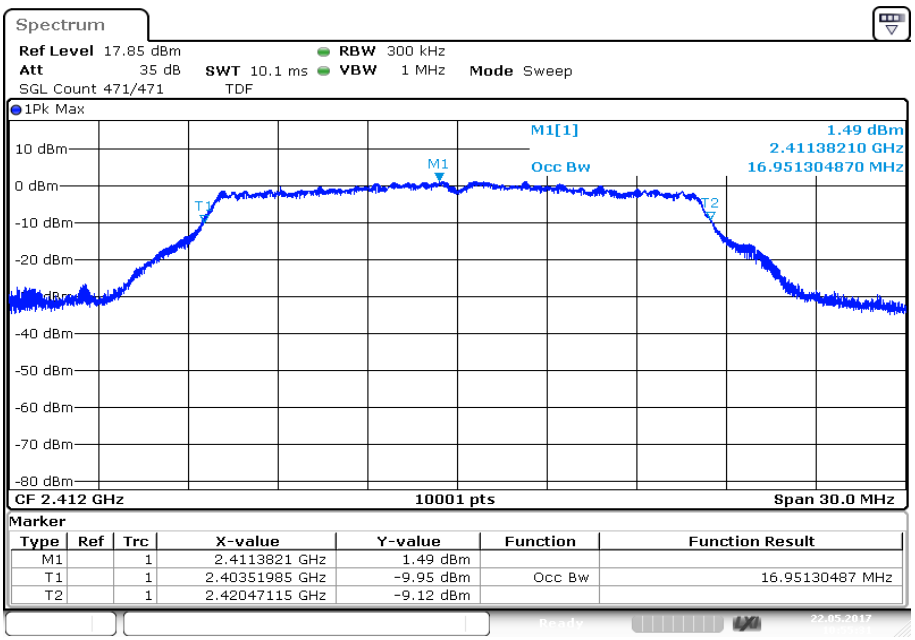
Plot 3: Highest channel



Date: 22.MAY.2017 10:45:49

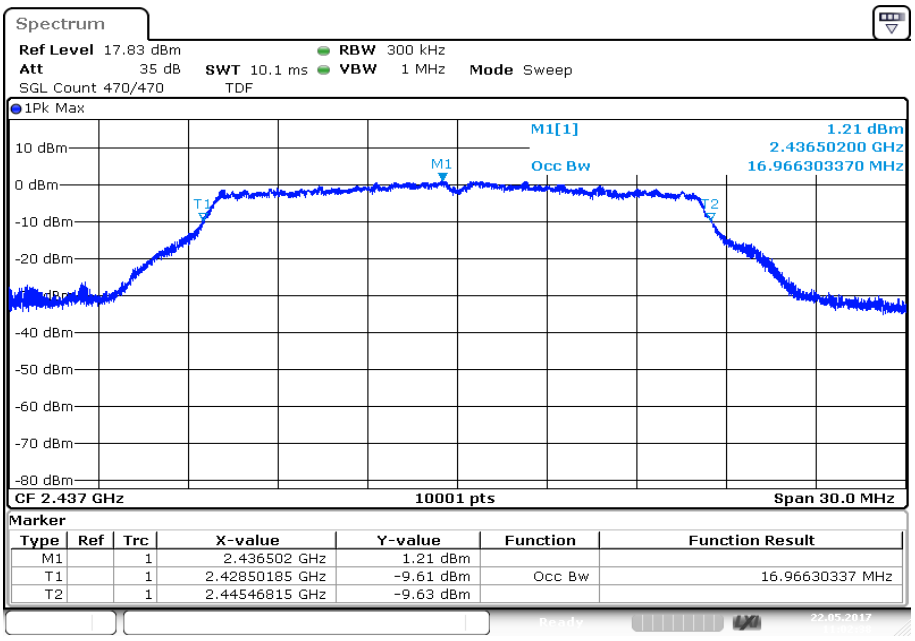
Plots: ANT 1, OFDM / g – mode

Plot 1: Lowest channel



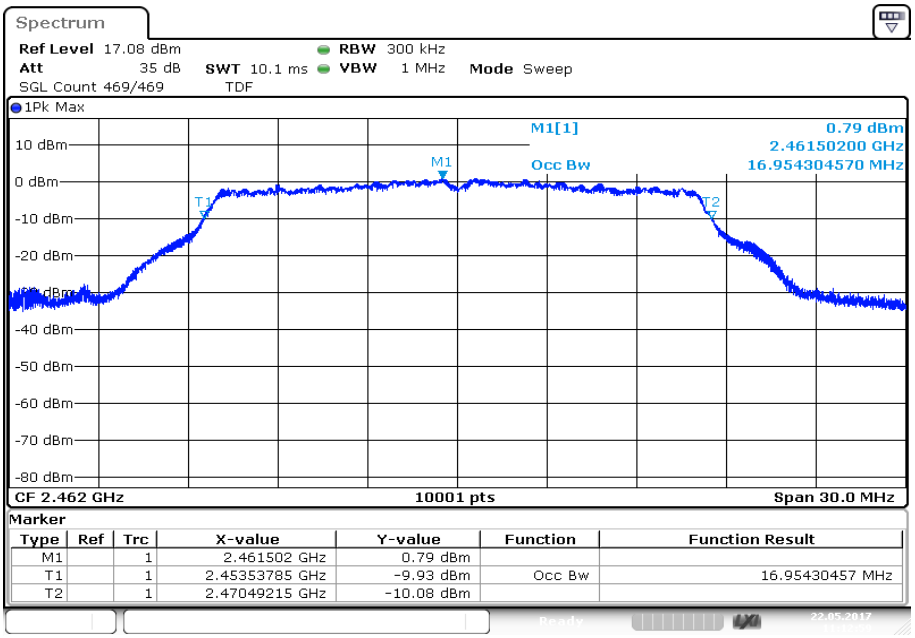
Date: 22.MAY.2017 10:55:32

Plot 2: Middle channel



Date: 22.MAY.2017 11:02:38

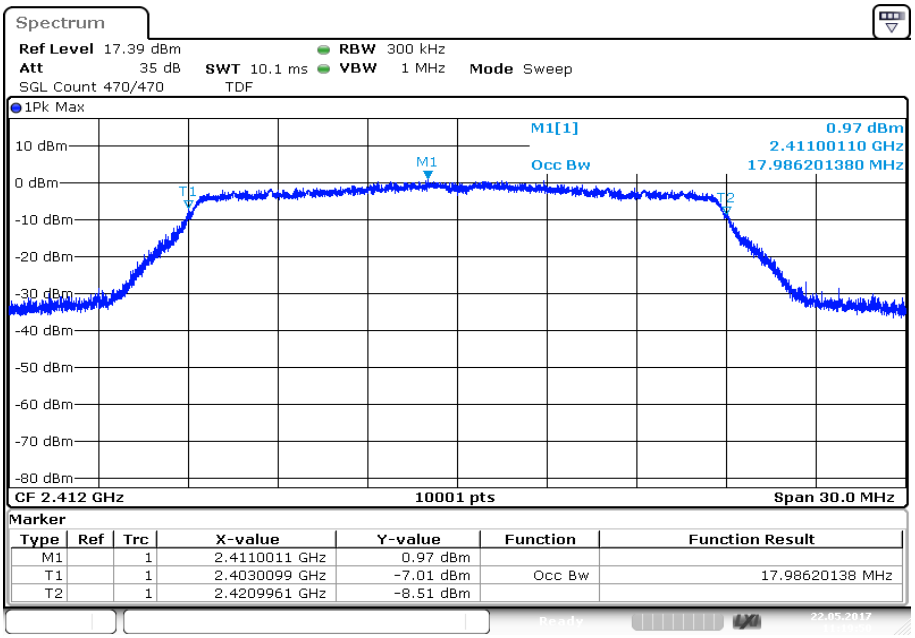
Plot 3: Highest channel



Date: 22.MAY.2017 11:12:59

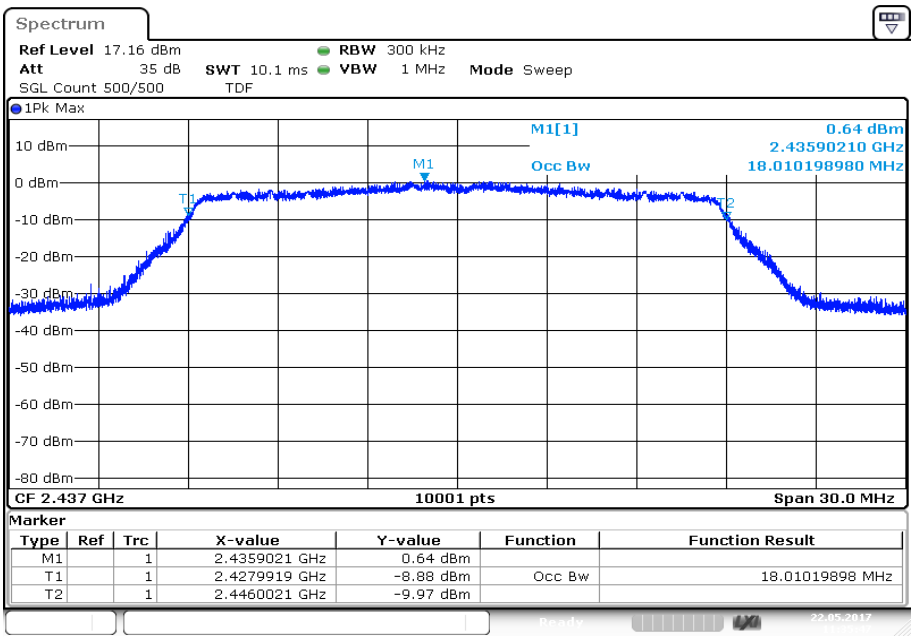
Plots: ANT 1, OFDM / n HT20 – mode

Plot 1: Lowest channel



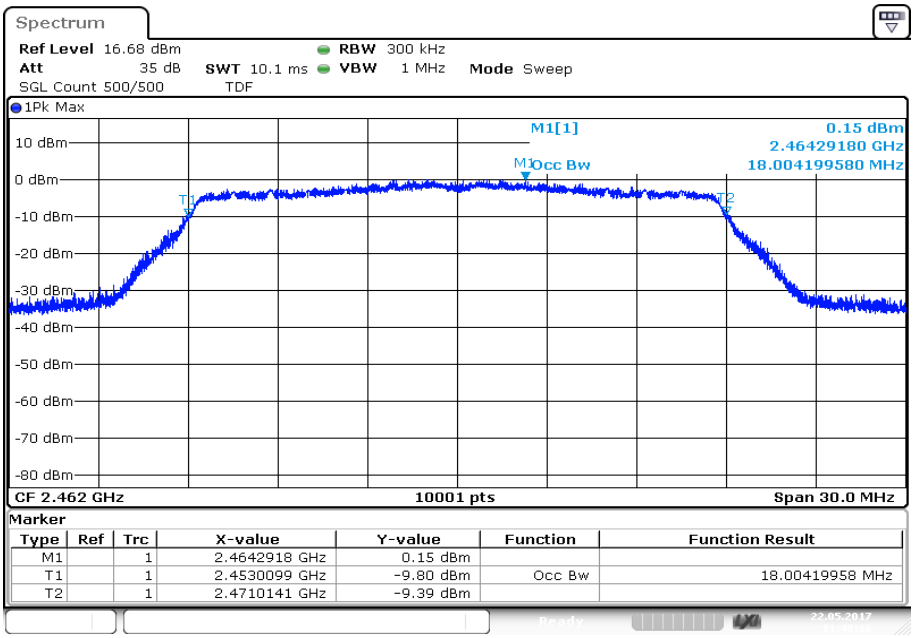
Date: 22.MAY.2017 11:19:50

Plot 2: Middle channel



Date: 22.MAY.2017 11:35:48

Plot 3: Highest channel



Date: 22.MAY.2017 11:48:17

11.8 Occupied bandwidth – 20 dB bandwidth

Description:

Measurement of the 20 dB bandwidth of the modulated carrier.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	500 kHz
Span:	30 MHz / 50 MHz
Trace mode:	Single count with min. 200 counts
Test setup:	See sub clause 6.4 – B
Measurement uncertainty	See sub clause 8

Usage:

-/-	IC
Within the used band!	

Results: ANT0

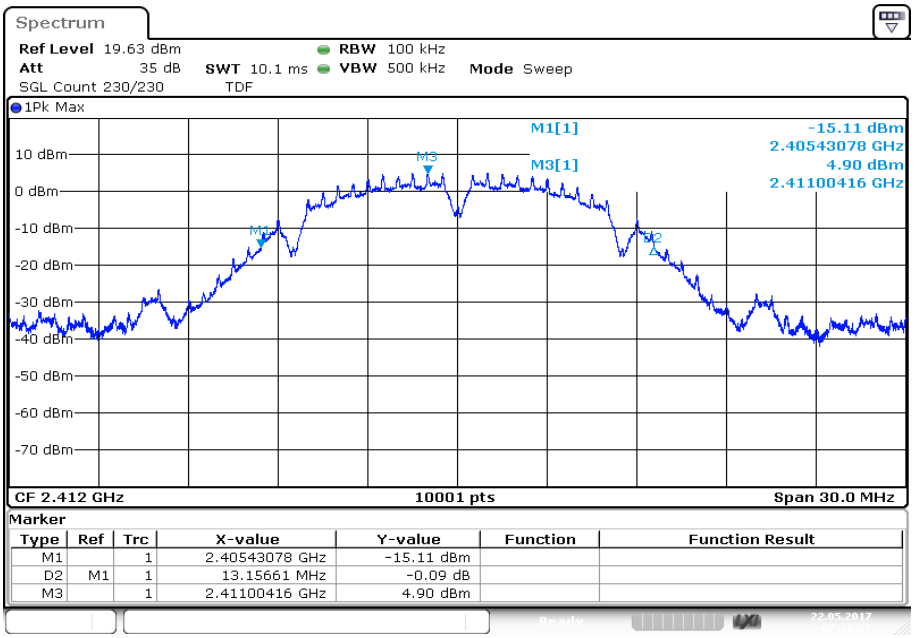
Modulation / Frequency	99% bandwidth [kHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	13157	13136	13127
OFDM / g – mode	18031	18052	18046
OFDM / n HT20 – mode	19321	19486	19126

Results: ANT1

Modulation / Frequency	99% bandwidth [kHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	13133	13124	13121
OFDM / g – mode	18157	18157	18046
OFDM / n HT20 – mode	19474	19237	19495

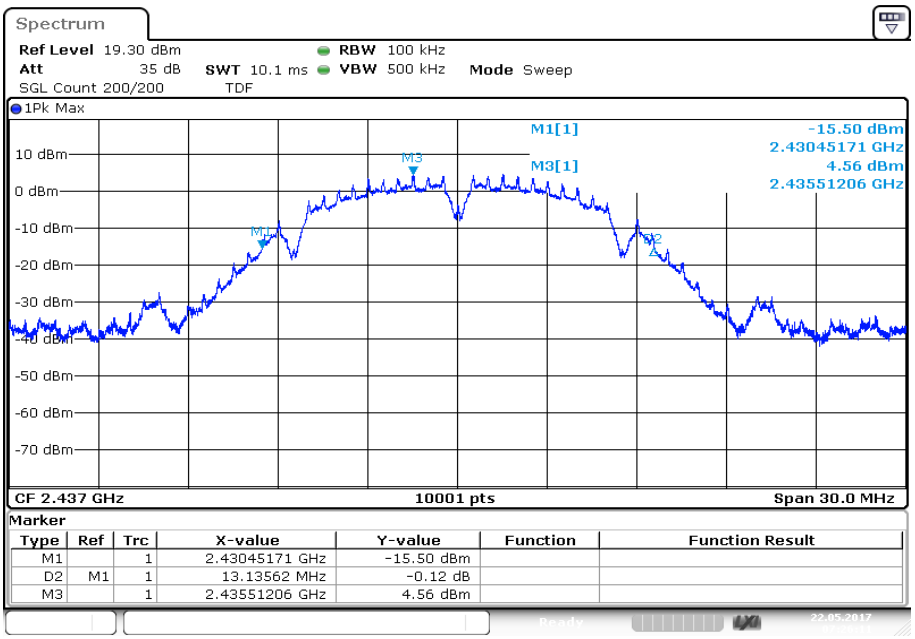
Plots: ANT 0, DSSS / b – mode

Plot 1: Lowest channel



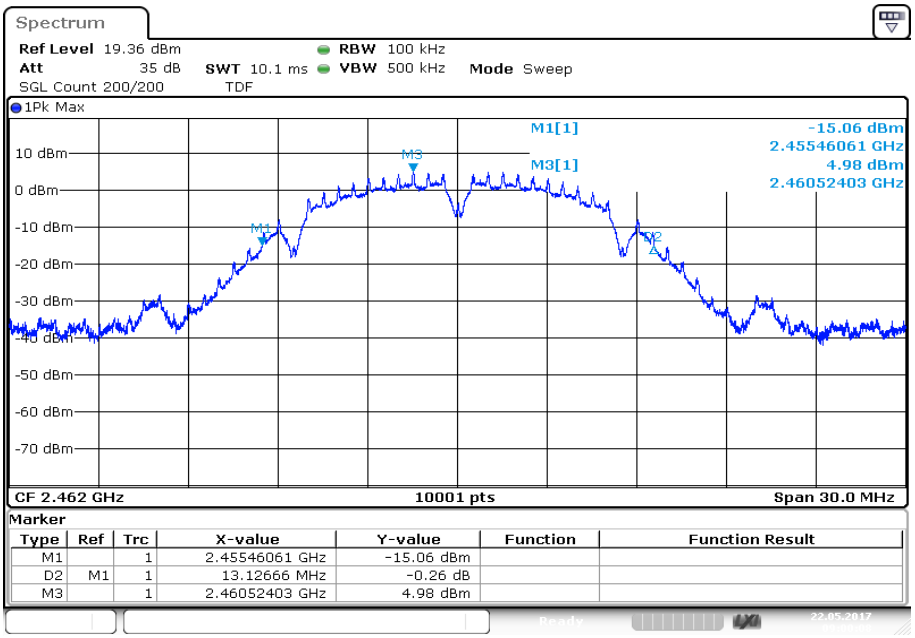
Date: 22.MAY.2017 07:15:57

Plot 2: Middle channel



Date: 22.MAY.2017 07:26:11

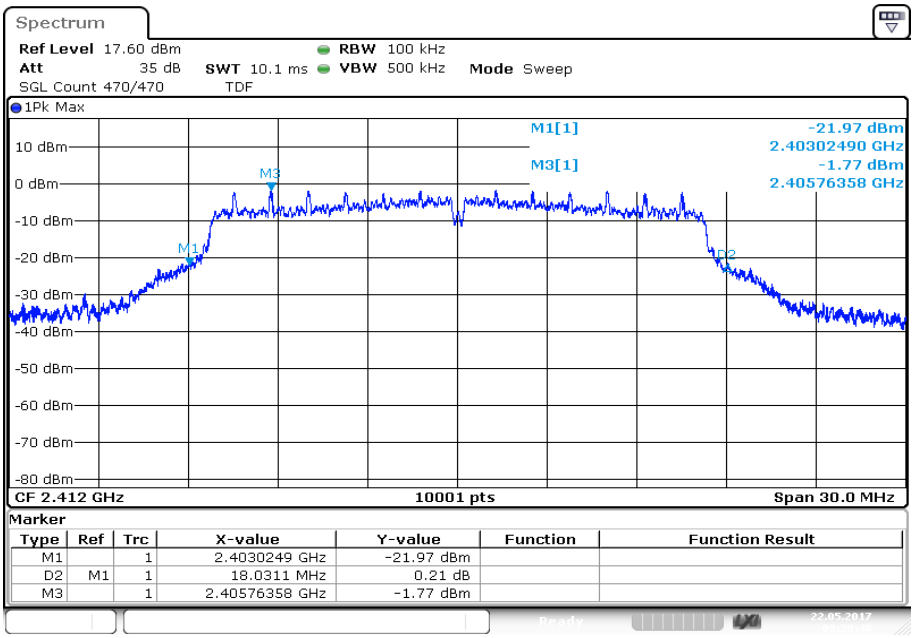
Plot 3: Highest channel



Date: 22.MAY.2017 09:00:09

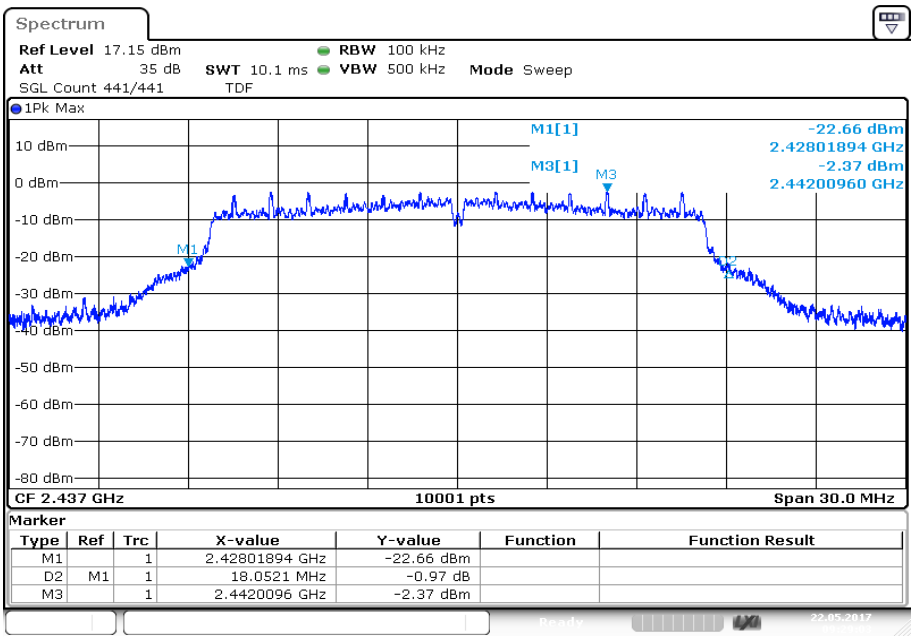
Plots: ANT 0, OFDM / g – mode

Plot 1: Lowest channel



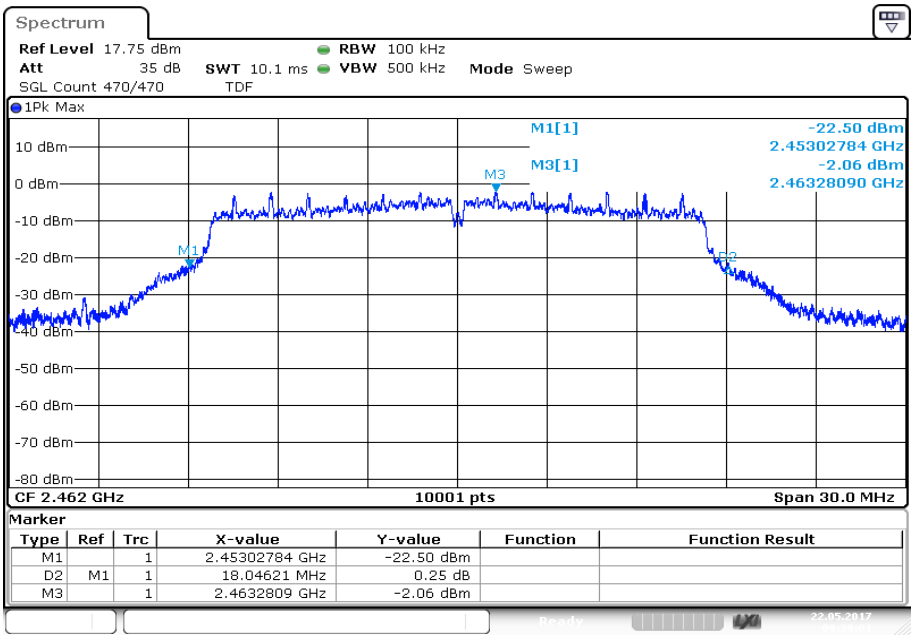
Date: 22.MAY.2017 09:20:48

Plot 2: Middle channel



Date: 22.MAY.2017 09:29:03

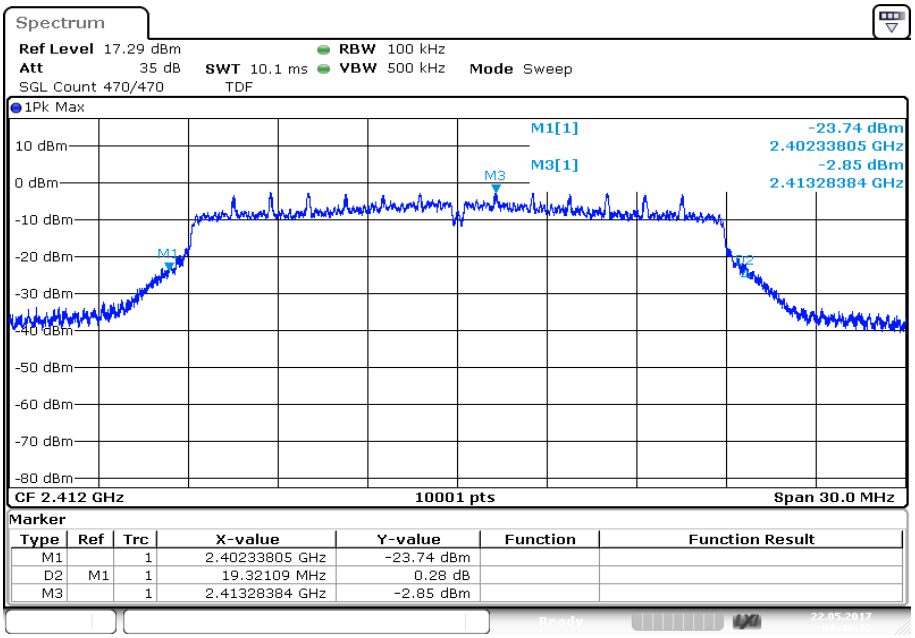
Plot 3: Highest channel



Date: 22.MAY.2017 09:39:02

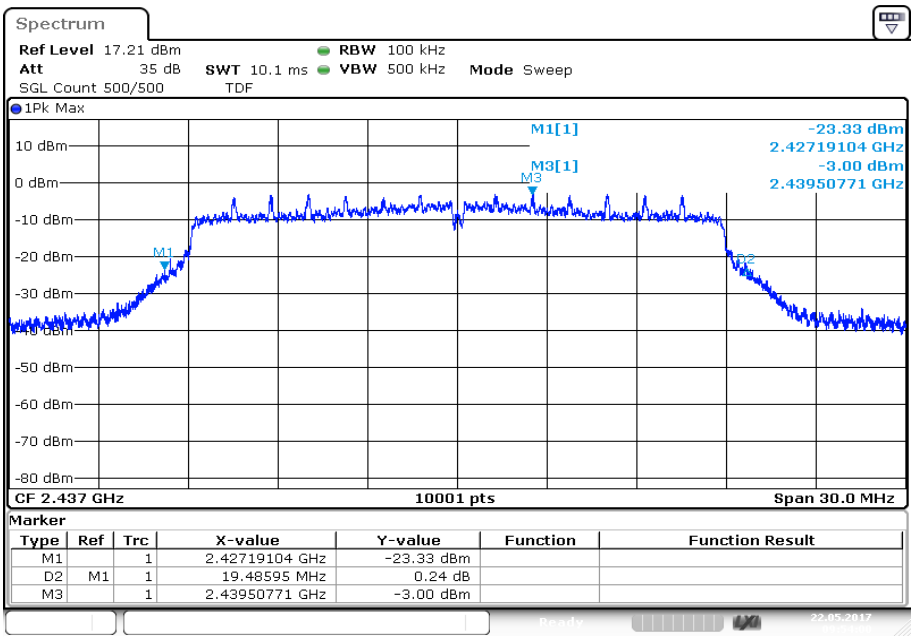
Plots: ANT 0, OFDM / n HT20 – mode

Plot 1: Lowest channel



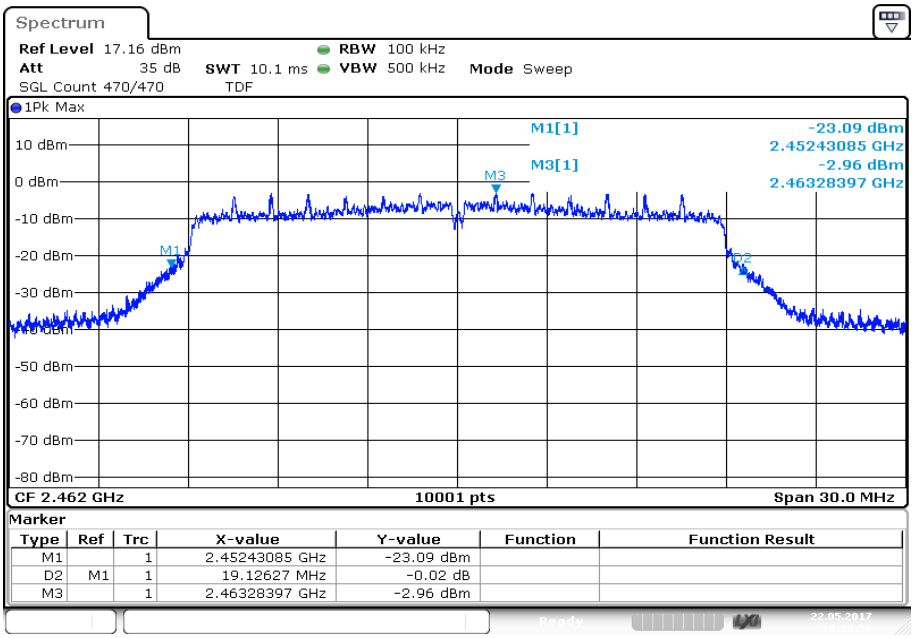
Date: 22.MAY.2017 09:46:15

Plot 2: Middle channel



Date: 22.MAY.2017 09:54:00

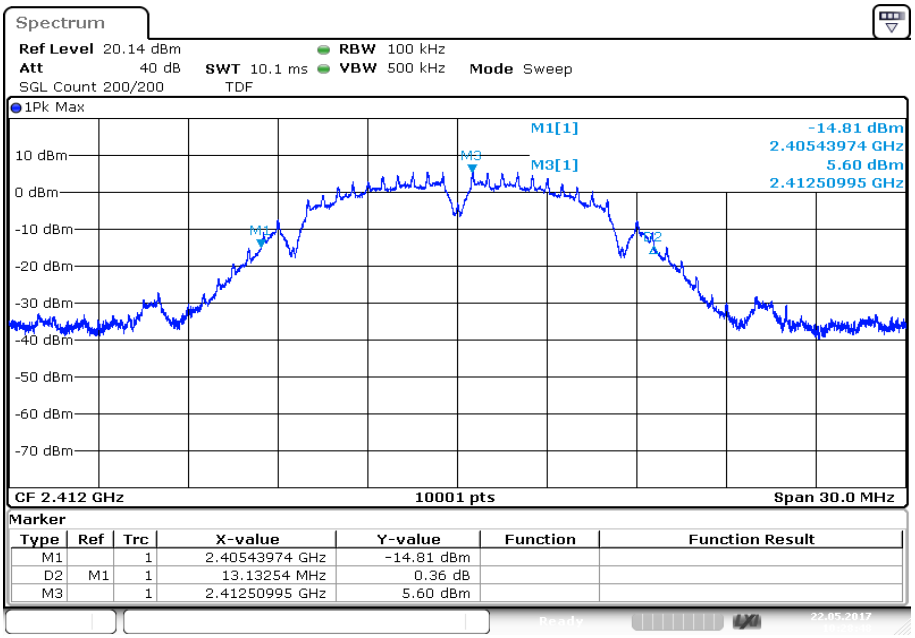
Plot 3: Highest channel



Date: 22.MAY.2017 10:00:57

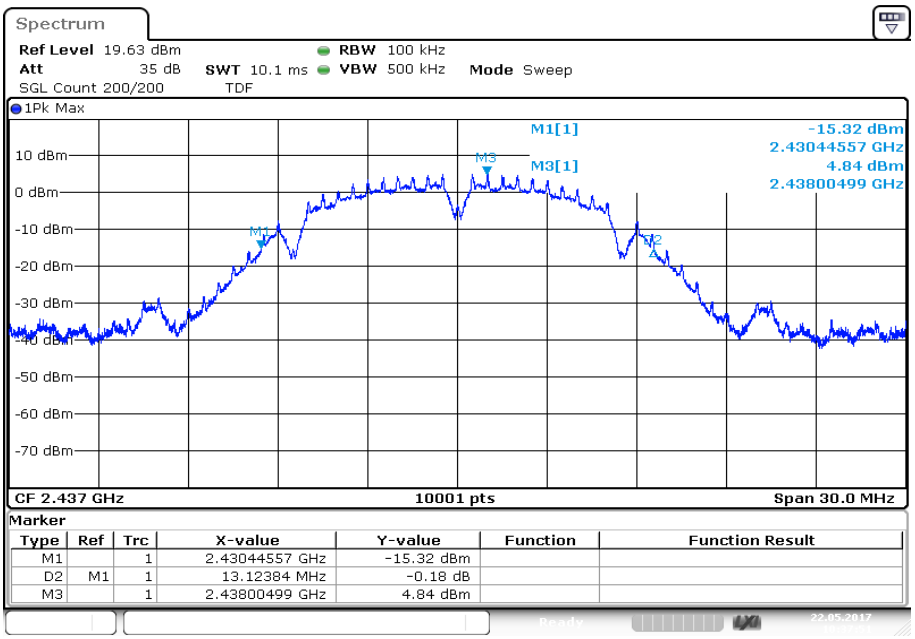
Plots: ANT 1, DSSS / b – mode

Plot 1: Lowest channel



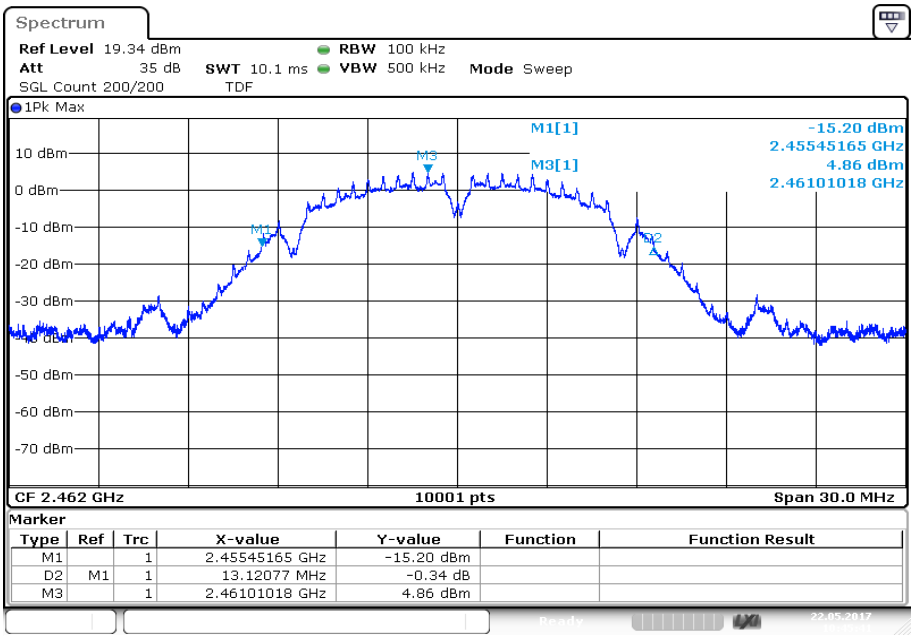
Date: 22.MAY.2017 10:28:48

Plot 2: Middle channel



Date: 22.MAY.2017 10:37:51

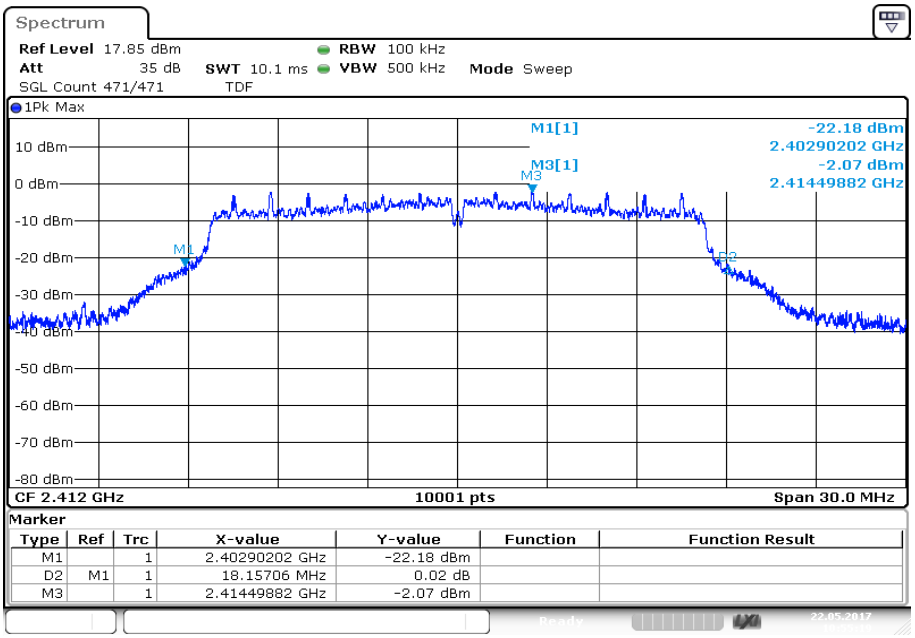
Plot 3: Highest channel



Date: 22.MAY.2017 10:45:41

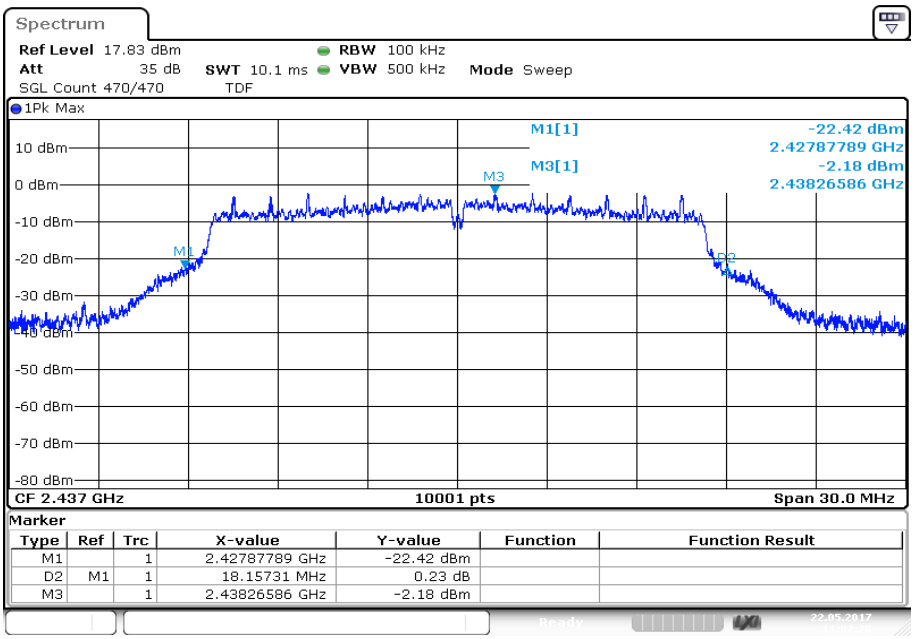
Plots: ANT 1, OFDM / g – mode

Plot 1: Lowest channel



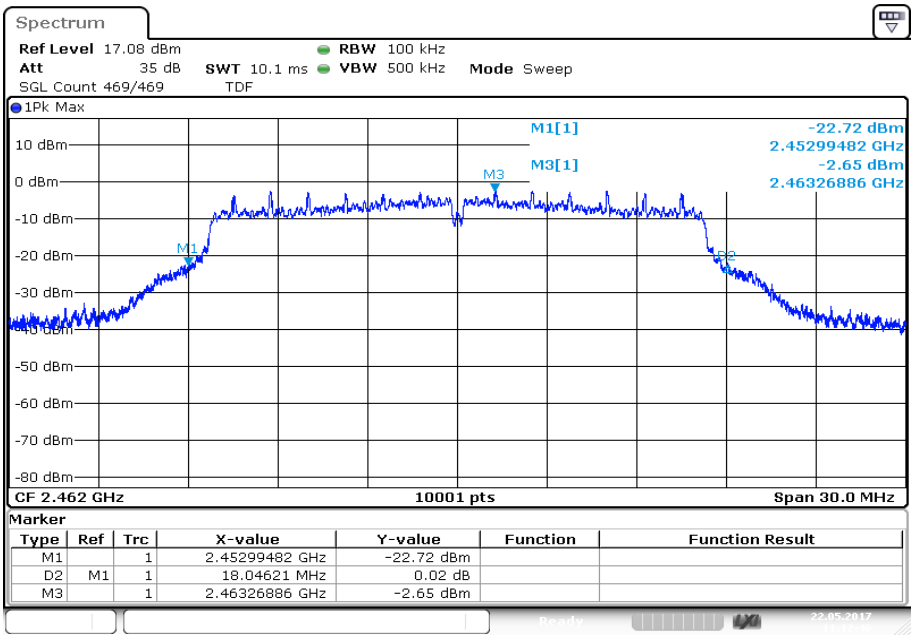
Date: 22.MAY.2017 10:55:19

Plot 2: Middle channel



Date: 22.MAY.2017 11:02:26

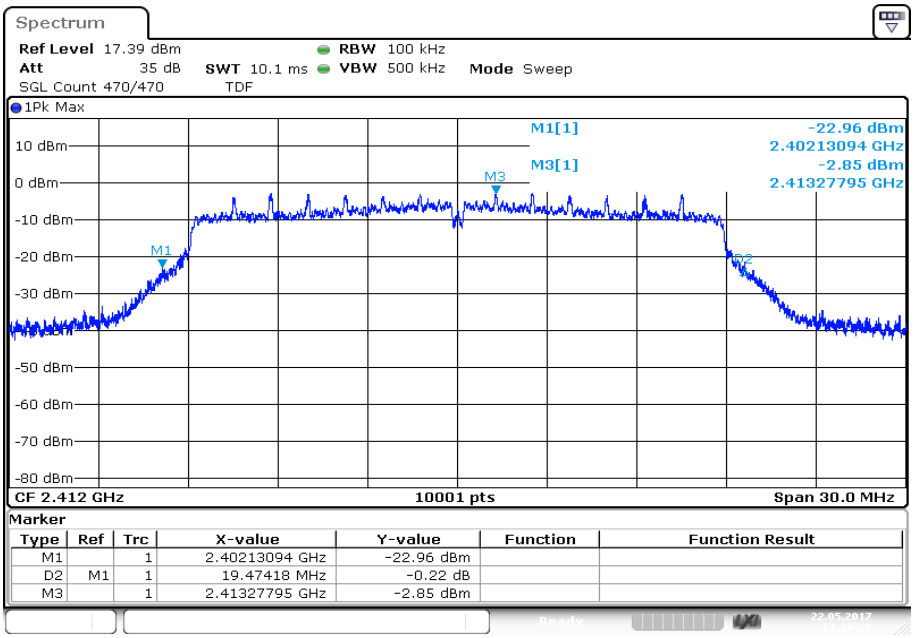
Plot 3: Highest channel



Date: 22.MAY.2017 11:12:47

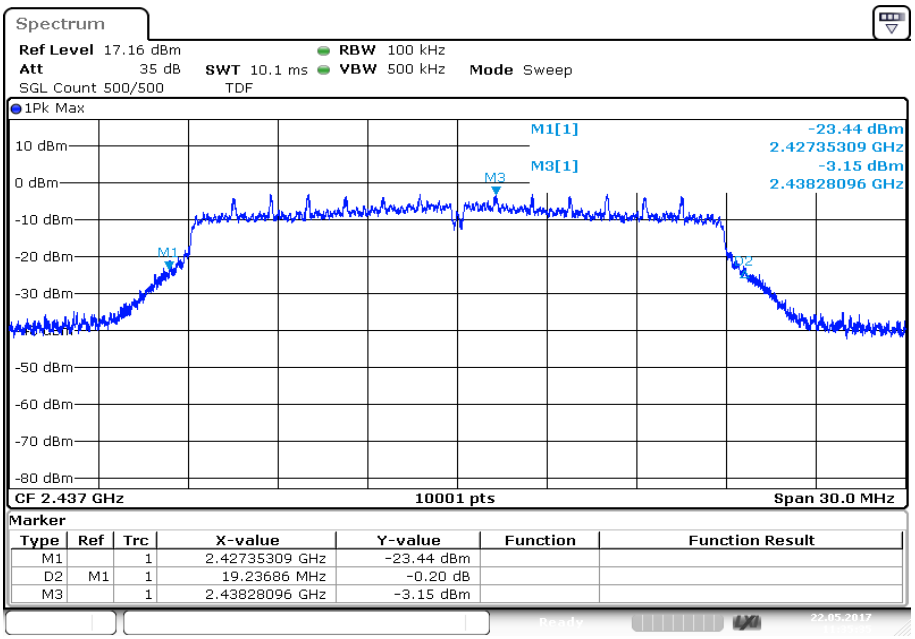
Plots: ANT 1, OFDM / n HT20 – mode

Plot 1: Lowest channel



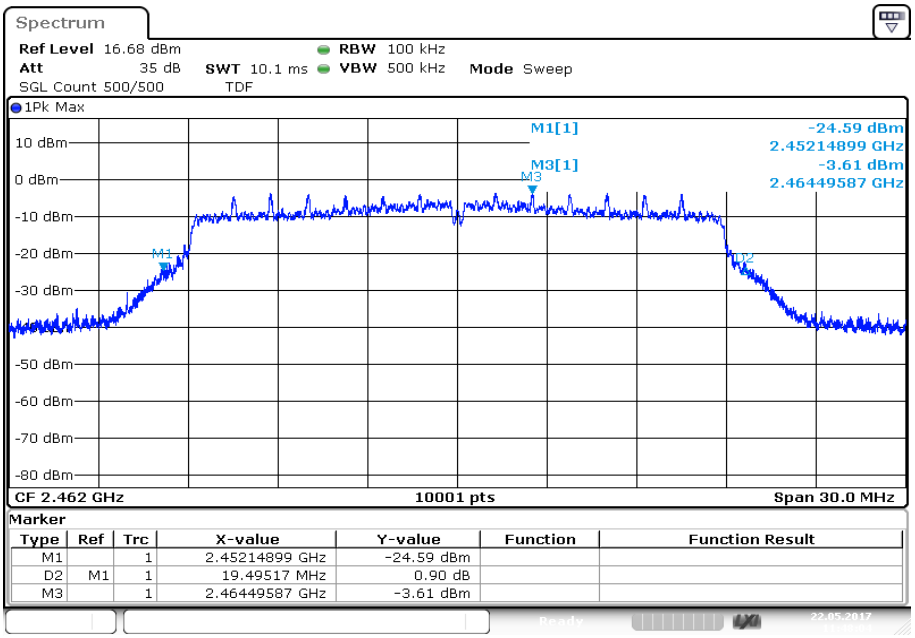
Date: 22.MAY.2017 11:19:38

Plot 2: Middle channel



Date: 22.MAY.2017 11:35:35

Plot 3: Highest channel



Date: 22.MAY.2017 11:48:04

11.9 Band edge compliance conducted

Description:

Measurement of the radiated band edge compliance with a conducted test setup.

Measurement:

Measurement parameter for measurements	
According to DTS clause: 13.3.2 and clause 12.2.2	
Detector:	RMS
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Span:	Lower band edge: 2388 MHz to 2390 MHz (2 MHz) Upper band edge: 2483.5 MHz to 2485.5 MHz (2 MHz)
Trace mode:	Trace average with 200 counts
Test setup:	See sub clause 6.4 – B
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
-41.26 dBm	

Results: ANT0

Scenario Modulation	Band edge compliance [dBm]		
	DSSS / b – mode	OFDM / g – mode	OFDM / n HT20 – mode
Max. lower band edge power conducted	-56.8	-50.1	-49.5
Antenna gain	1.9		
Max. lower band edge power radiated	-54.9	-48.2	-47.6
Max. upper band edge power conducted	-57.4	-50.2	-48.9
Antenna gain	1.9		
Max. upper band edge power radiated	-55.5	-48.3	-47.0

Results: ANT1 – TE2118309-X Rev E

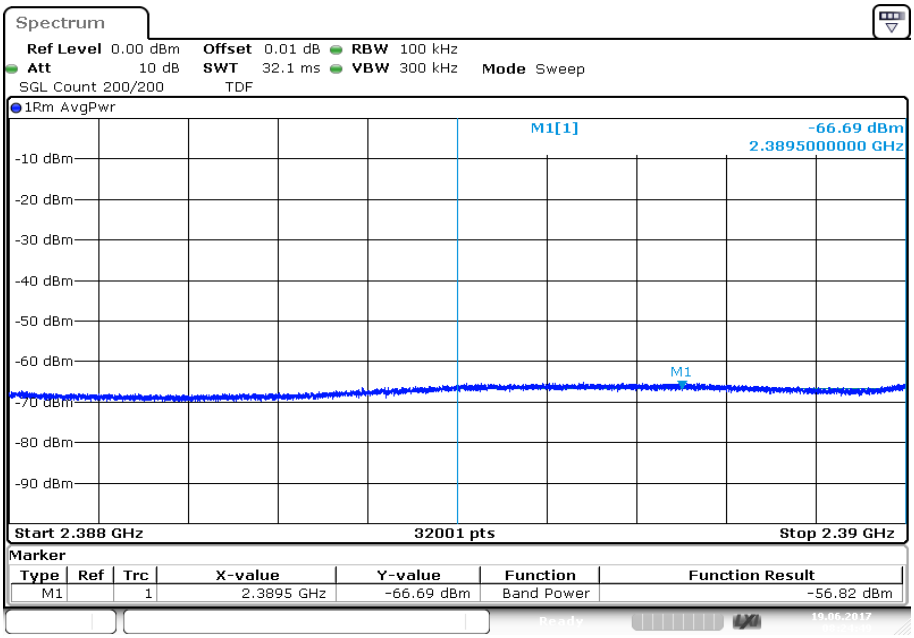
Scenario Modulation	Band edge compliance [dBm]		
	DSSS / b – mode	OFDM / g – mode	OFDM / n HT20 – mode
Max. lower band edge power conducted	-57.0	-51.9	-51.6
Antenna gain	2.5		
Max. lower band edge power radiated	-54.5	-49.4	-49.1
Max. upper band edge power conducted	-57.1	-51.3	-51.4
Antenna gain	2.5		
Max. upper band edge power radiated	-54.6	-48.8	-48.9

Results: ANT1 – N12-3071-R0A

Scenario Modulation	Band edge compliance [dBm]		
	DSSS / b – mode	OFDM / g – mode	OFDM / n HT20 – mode
Max. lower band edge power conducted	-57.0	-51.9	-51.6
Antenna gain	2.4		
Max. lower band edge power radiated	-54.6	-49.5	-49.2
Max. upper band edge power conducted	-57.1	-51.3	-51.4
Antenna gain	3.0		
Max. upper band edge power radiated	-54.1	-48.3	-48.4

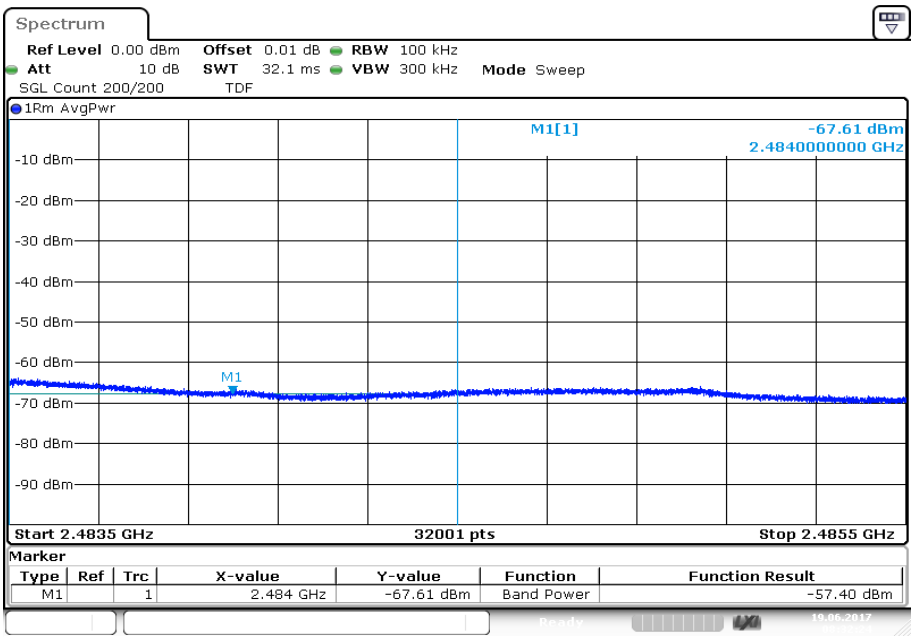
Plots: ANT 0, DSSS / b – mode

Plot 1: Lower band edge



Date: 19.JUN.2017 08:24:50

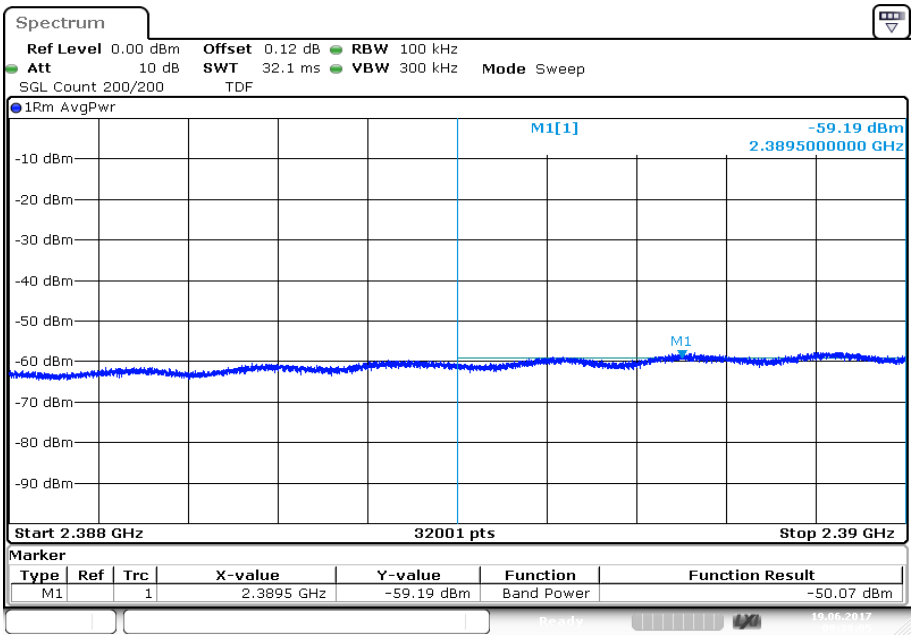
Plot 2: Upper band edge



Date: 19.JUN.2017 08:32:25

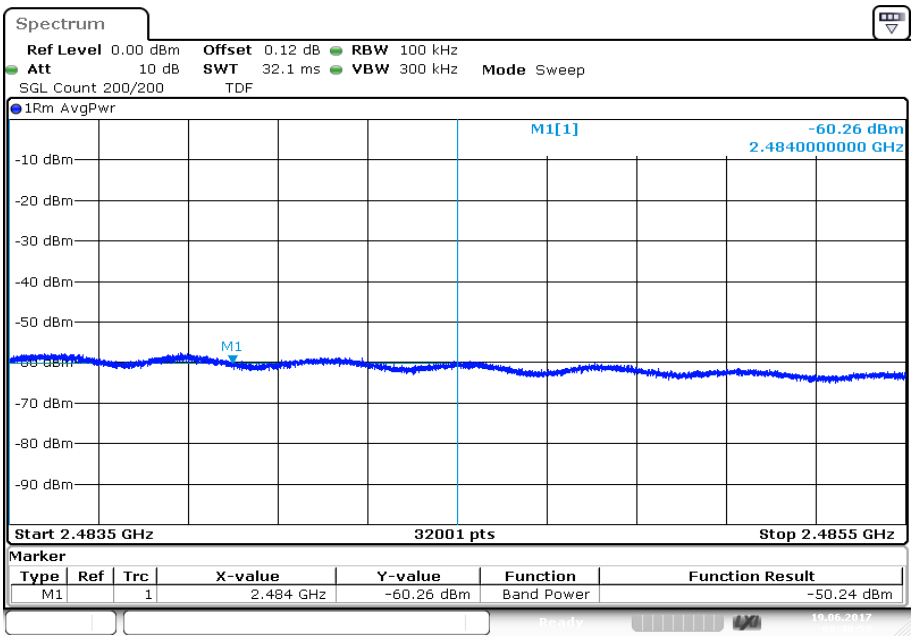
Plots: ANT 0, OFDM / g – mode

Plot 1: Lower band edge



Date: 19.JUN.2017 08:38:06

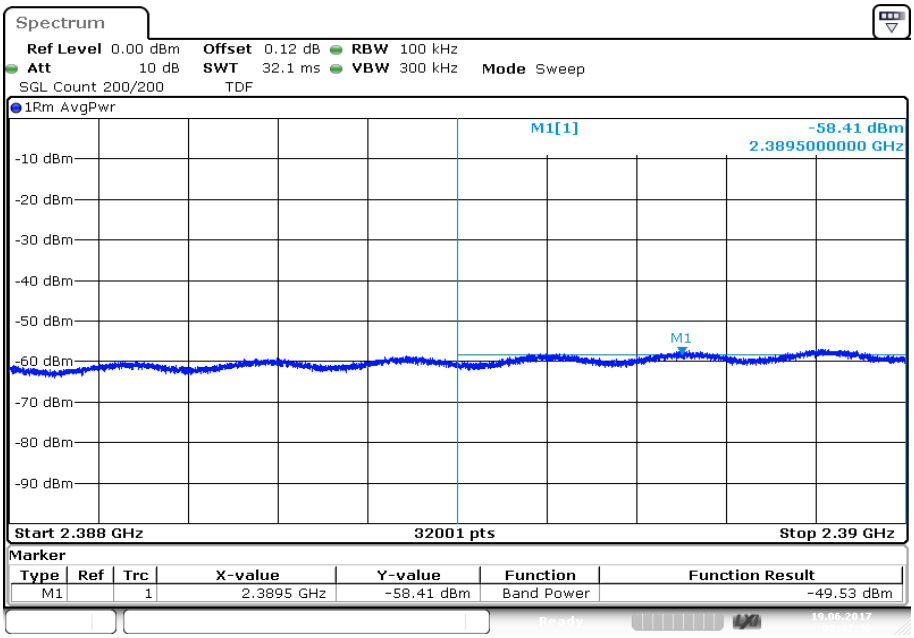
Plot 2: Upper band edge



Date: 19.JUN.2017 08:41:00

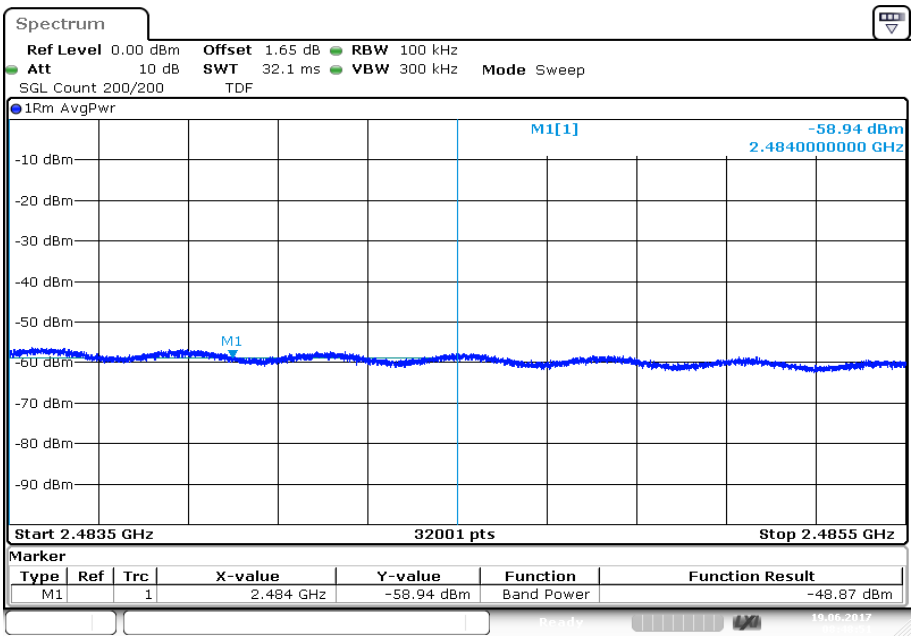
Plots: ANT 0, OFDM / n HT20 – mode

Plot 1: Lower band edge



Date: 19.JUN.2017 08:42:47

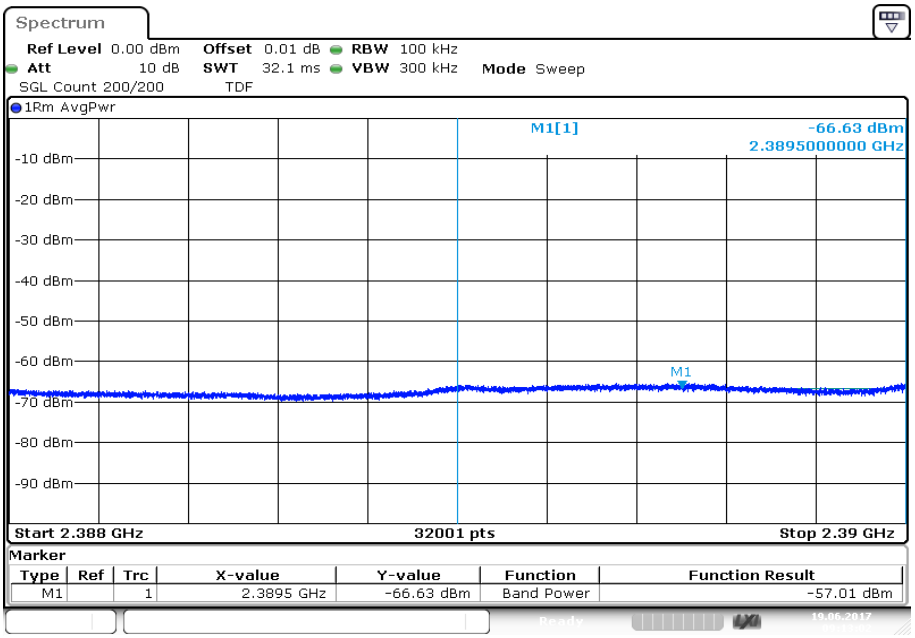
Plot 2: Upper band edge



Date: 19.JUN.2017 08:48:52

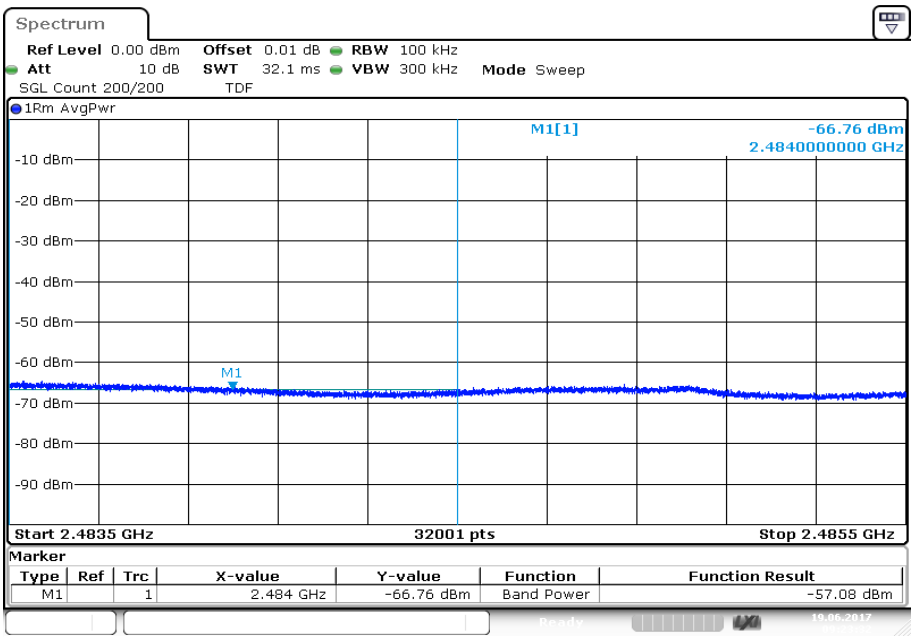
Plots: ANT 1, DSSS / b – mode

Plot 1: Lower band edge



Date: 19.JUN.2017 09:13:03

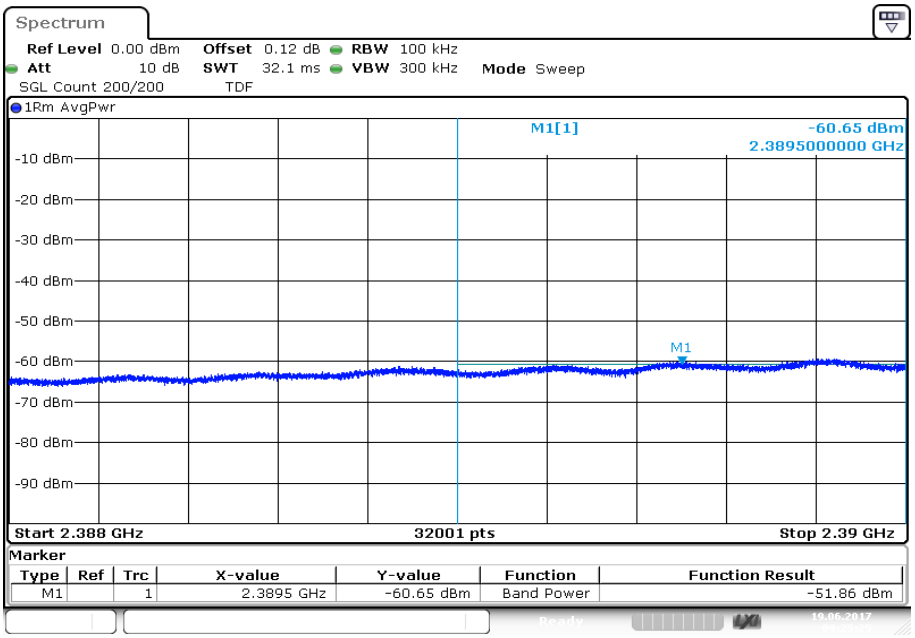
Plot 2: Upper band edge



Date: 19.JUN.2017 09:23:33

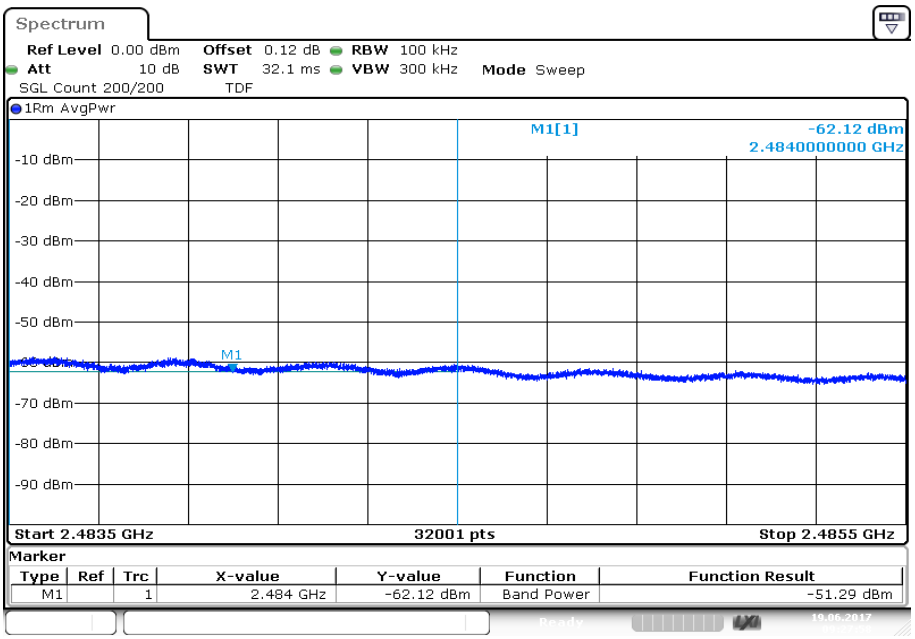
Plots: ANT 1, OFDM / g – mode

Plot 1: Lower band edge



Date: 19.JUN.2017 09:25:26

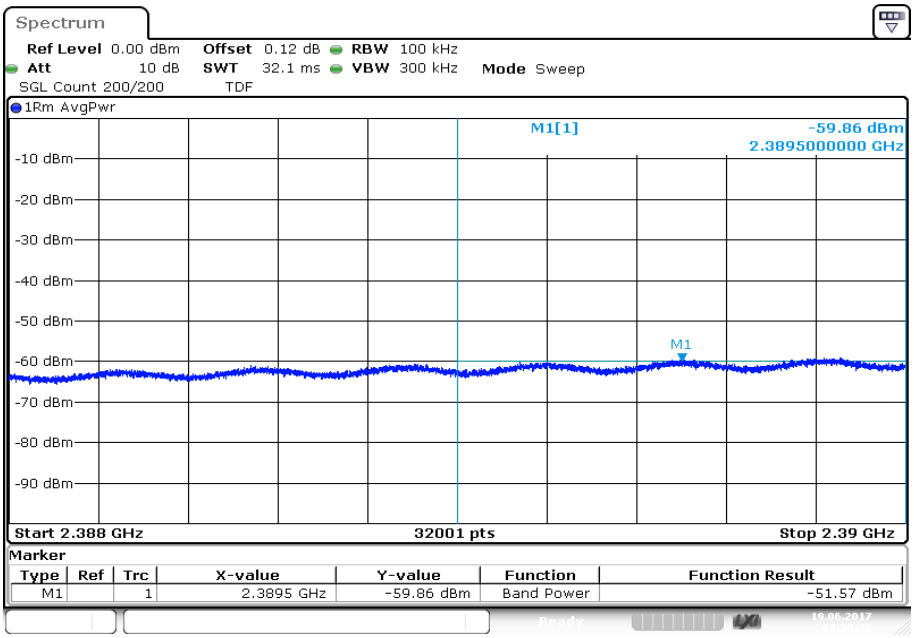
Plot 2: Upper band edge



Date: 19.JUN.2017 09:27:59

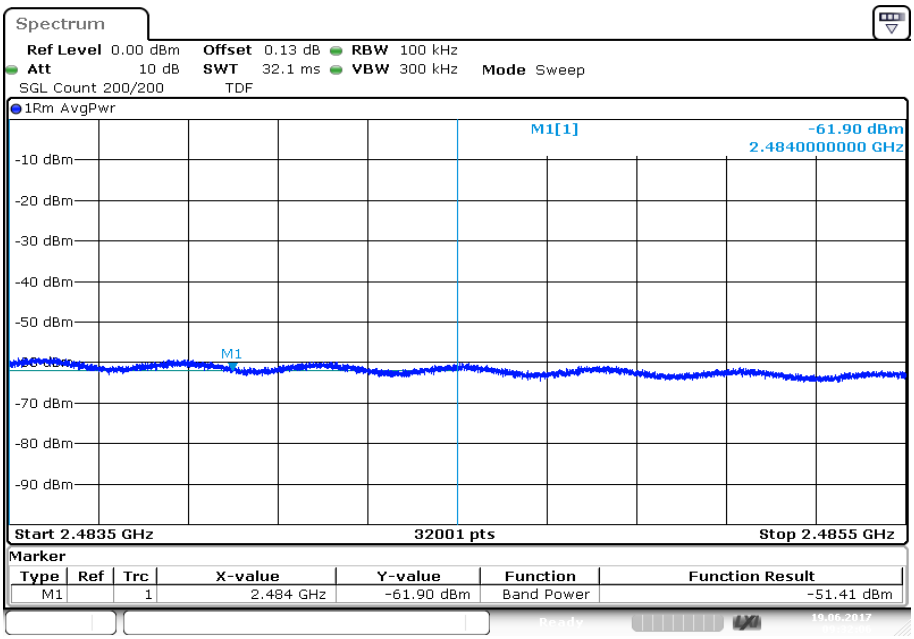
Plots: ANT 1, OFDM / n HT20 – mode

Plot 1: Lower band edge



Date: 19.JUN.2017 09:29:50

Plot 2: Upper band edge



Date: 19.JUN.2017 09:32:07

11.10 Spurious emissions conducted

Description:

Measurement of the conducted spurious emissions in transmit mode. The measurement is performed at channel 1, 6 and 11. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	500 kHz
Span:	9 kHz to 25 GHz
Trace mode:	Max Hold
Test setup:	See sub clause 6.4 – B
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required	

ANT0:

Results: DSSS / b – mode

TX Spurious Emissions Conducted					
DSSS / b – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		4.08	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2437		3.85	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2462		4.70	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant

Results: OFDM / g – mode

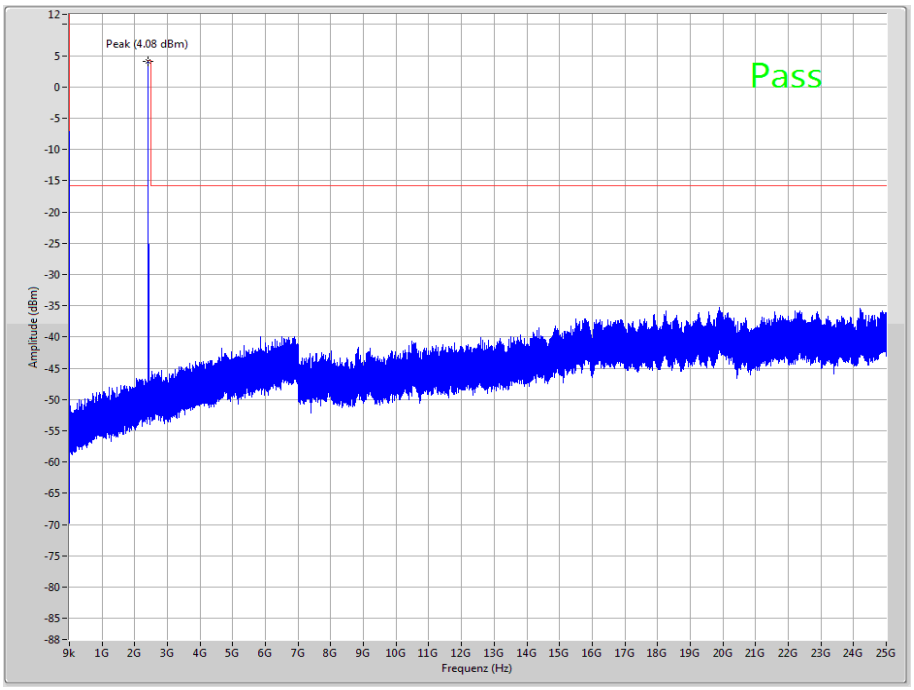
TX Spurious Emissions Conducted					
OFDM / g – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-2.36	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2437		-3.06	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2462		-2.62	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant

Results: OFDM / n HT20 – mode

TX Spurious Emissions Conducted					
OFDM / n HT20 – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-2.99	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2437		-3.53	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2462		-2.87	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant

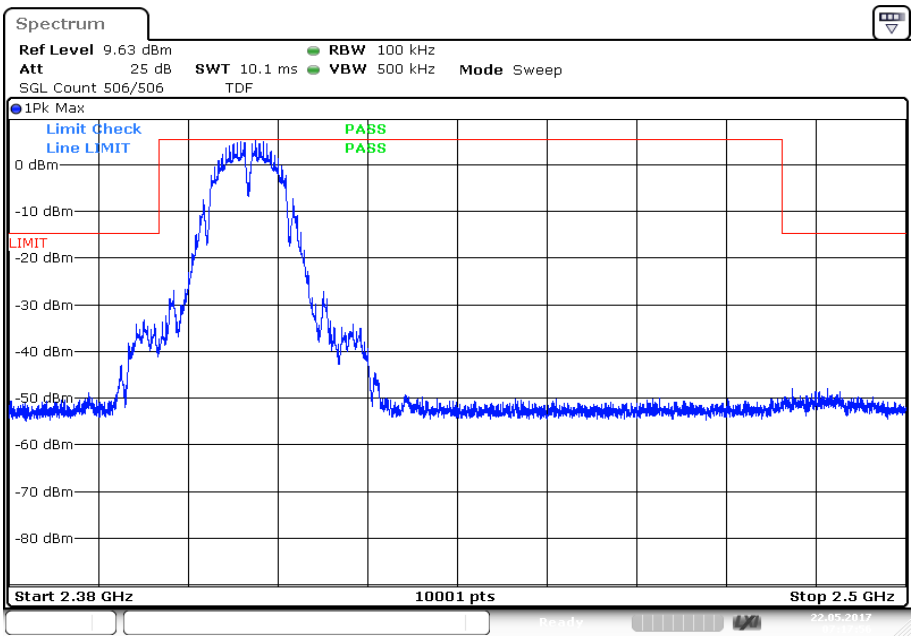
Plots: ANT 0, DSSS / b – mode

Plot 1: Lowest channel, up to 25 GHz



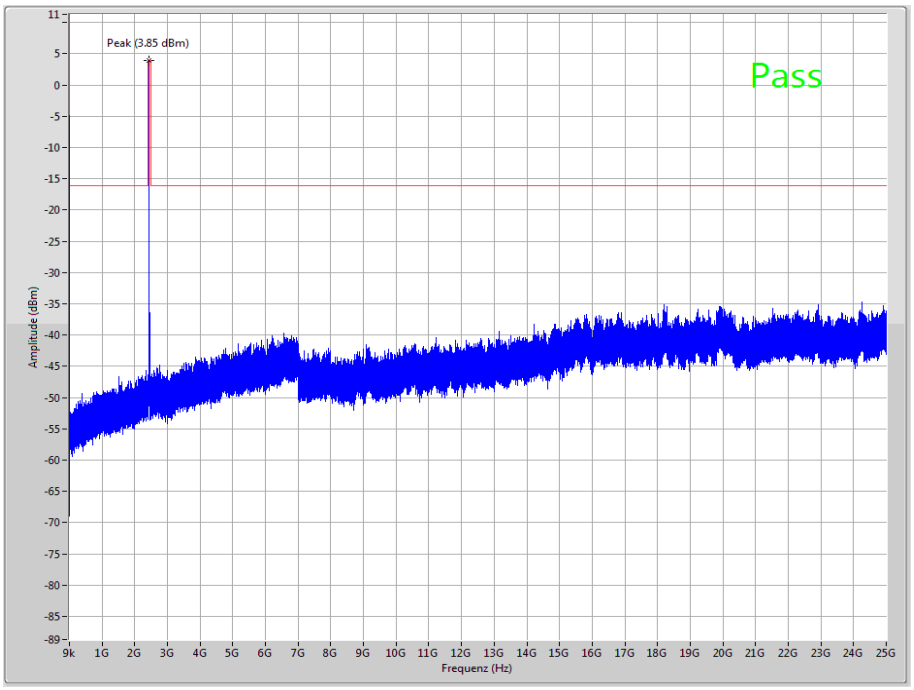
The peak at the beginning of the plot is the LO from the SA.

Plot 2: Lowest channel, zoomed carrier



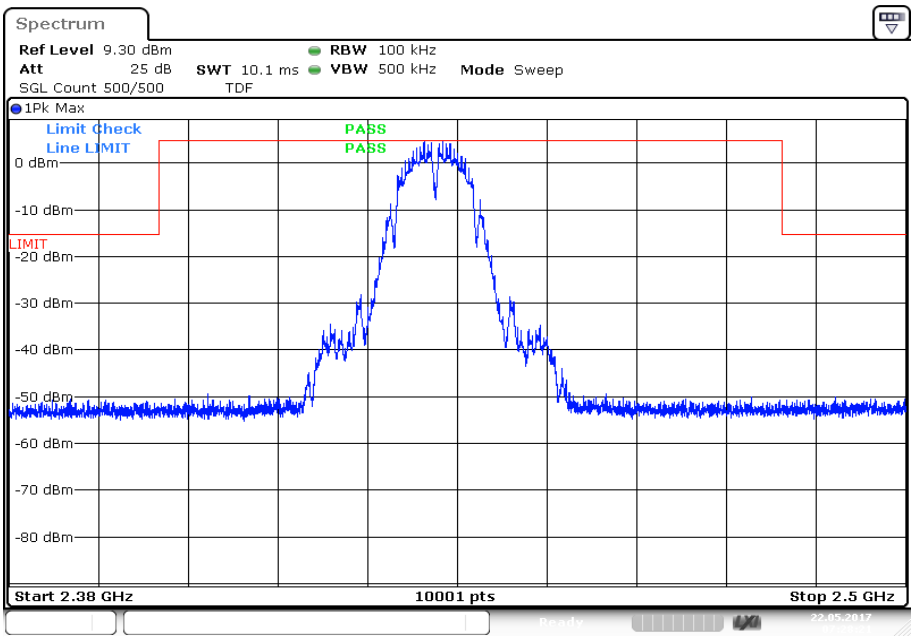
Date: 22.MAY.2017 07:17:56

Plot 3: Middle channel, up to 25 GHz



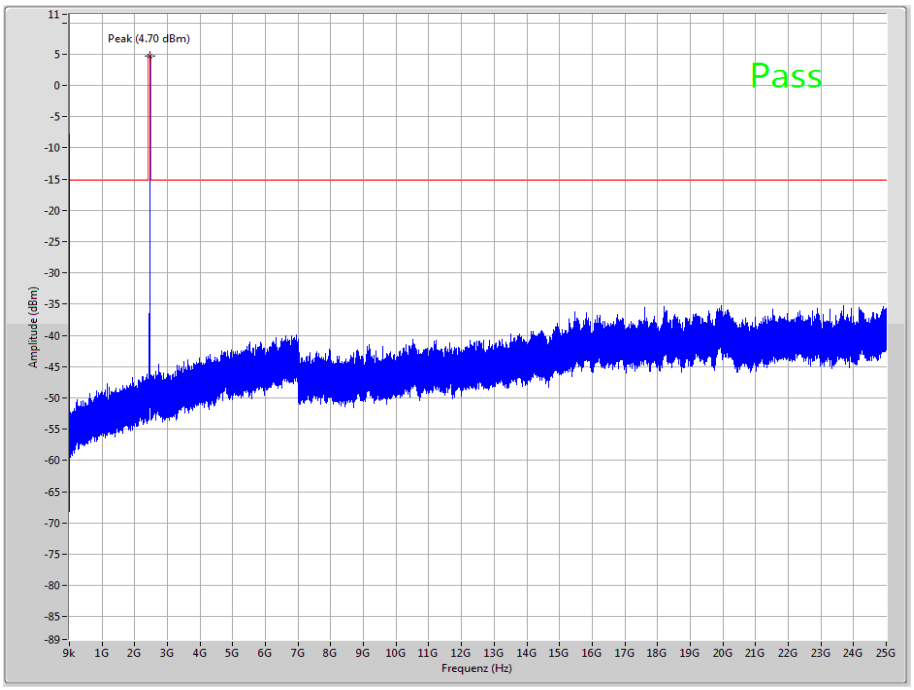
The peak at the beginning of the plot is the LO from the SA.

Plot 4: Middle channel, zoomed carrier



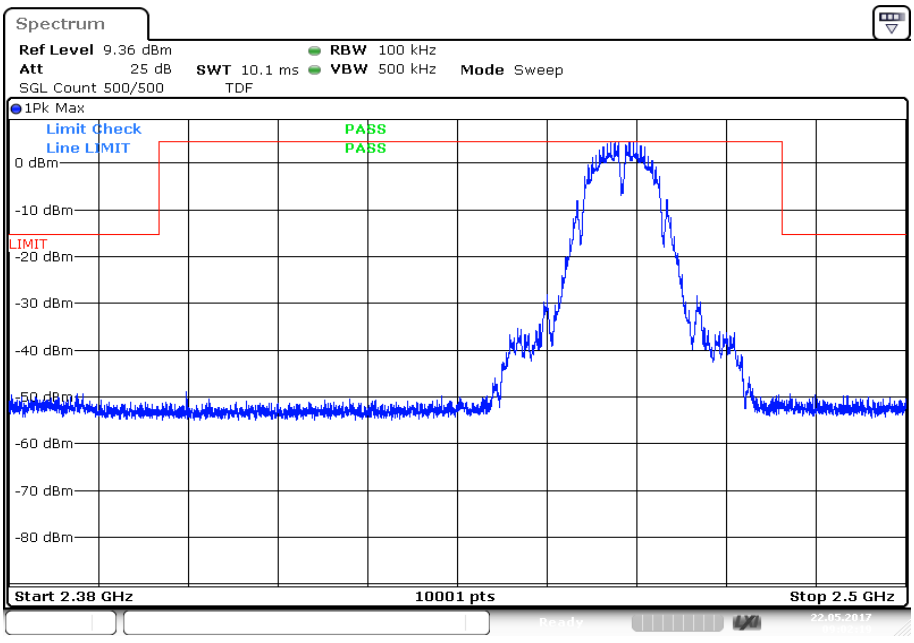
Date: 22.MAY.2017 07:28:21

Plot 5: Highest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

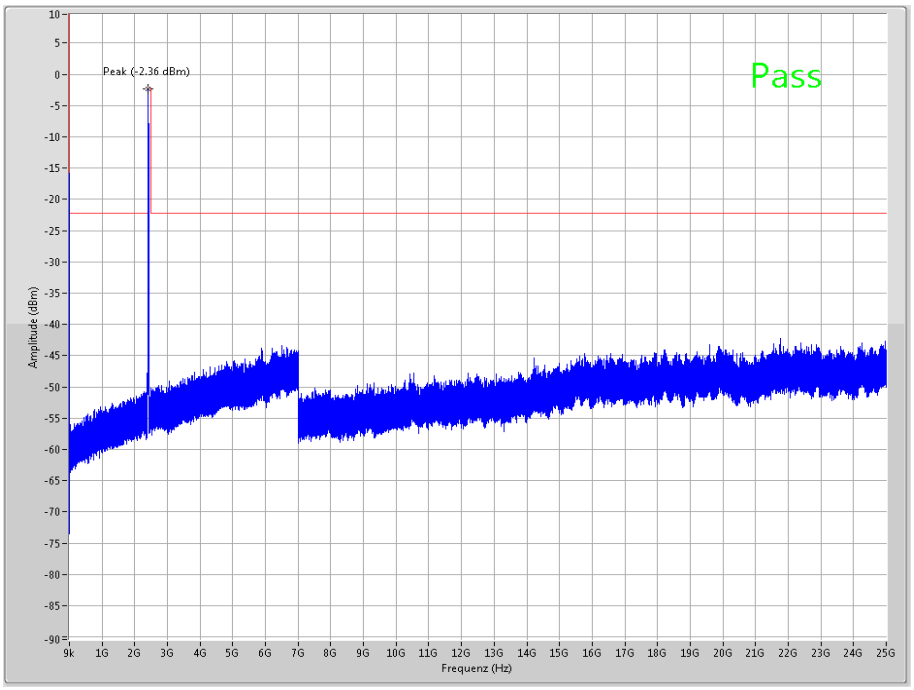
Plot 6: Highest channel, zoomed carrier



Date: 22.MAY.2017 09:02:19

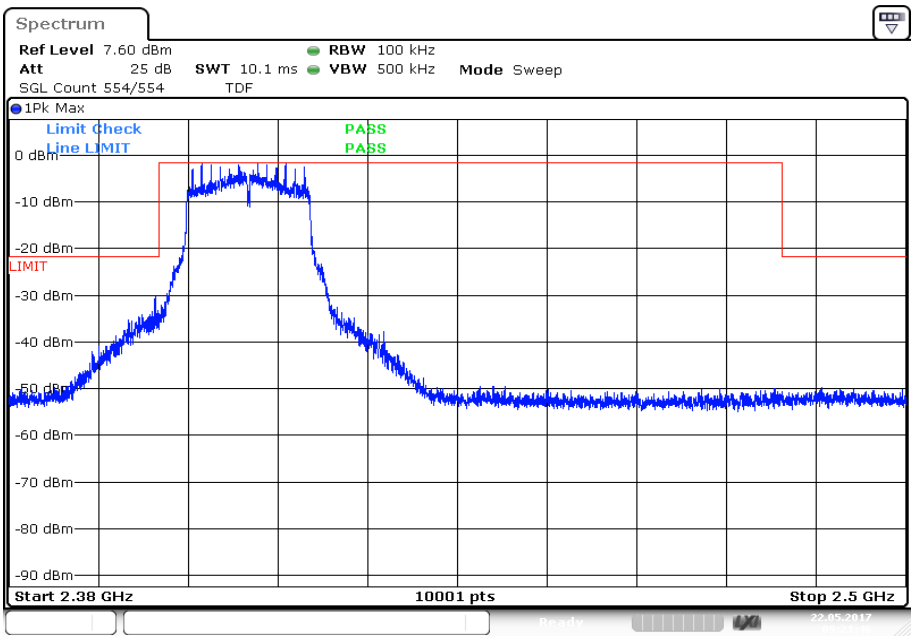
Plots: ANT 0, OFDM / g – mode

Plot 1: Lowest channel, up to 25 GHz



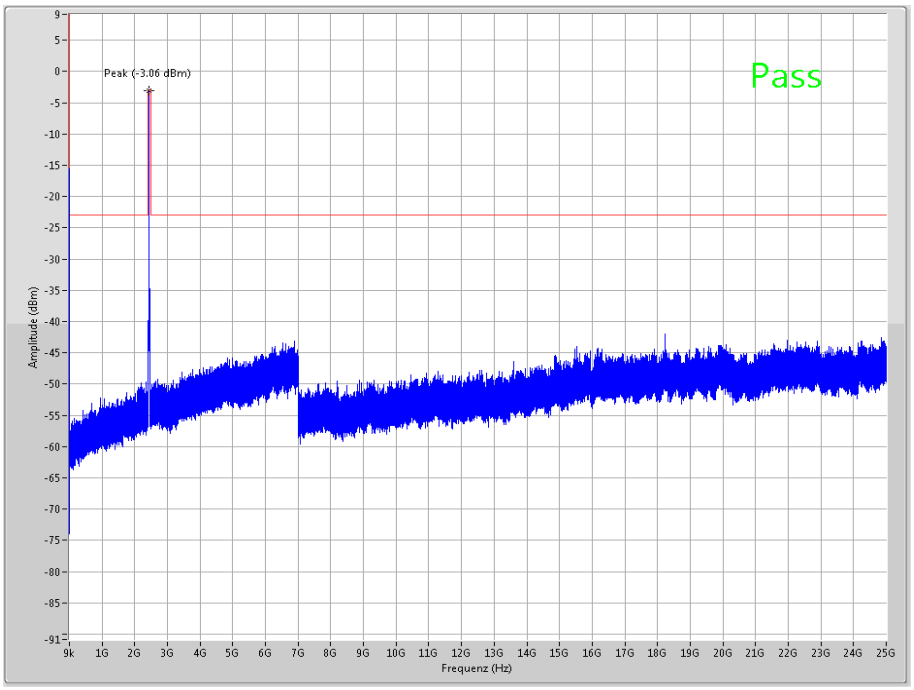
The peak at the beginning of the plot is the LO from the SA.

Plot 2: Lowest channel, zoomed carrier



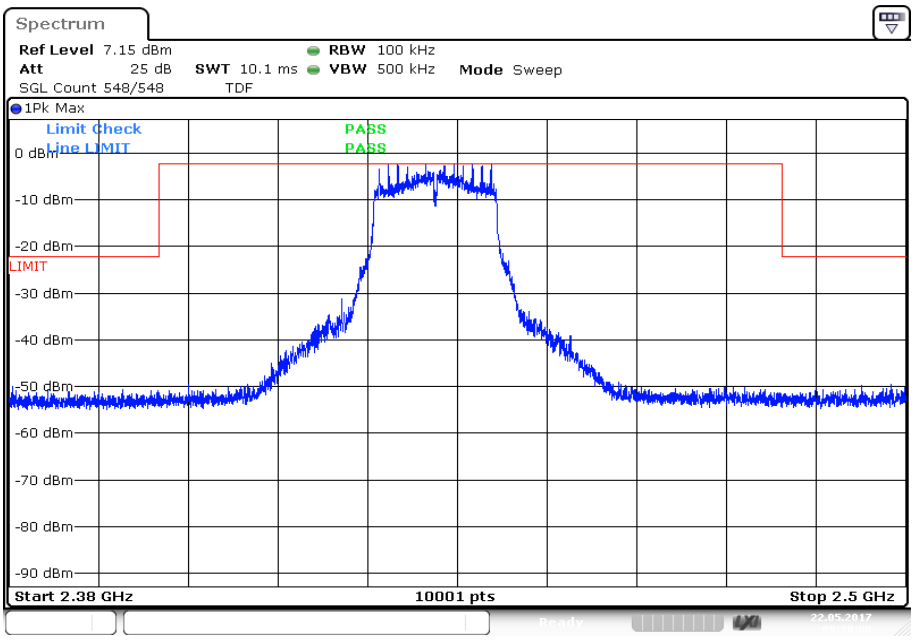
Date: 22.MAY.2017 09:21:46

Plot 3: Middle channel, up to 25 GHz



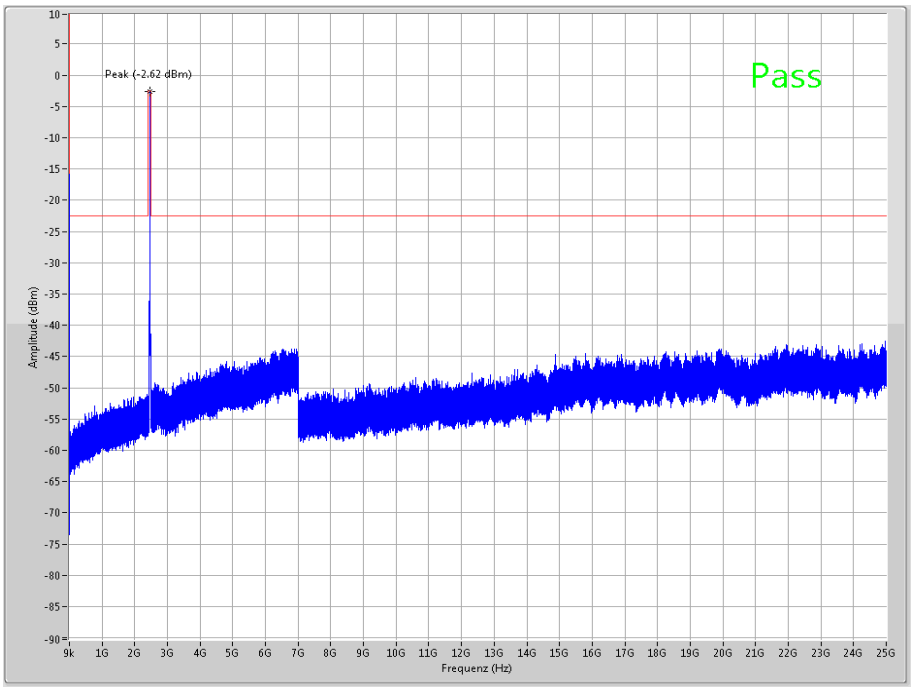
The peak at the beginning of the plot is the LO from the SA.

Plot 4: Middle channel, zoomed carrier



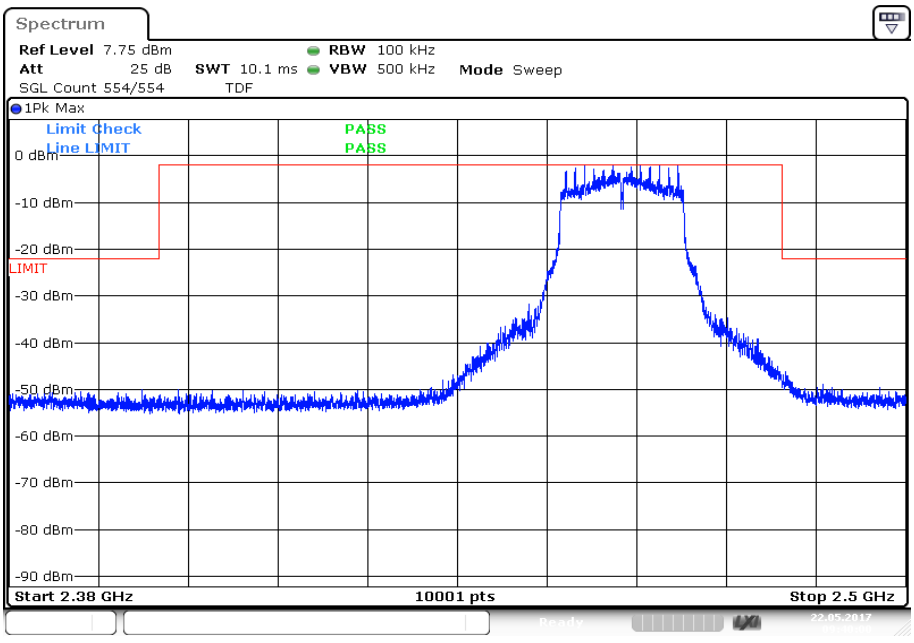
Date: 22.MAY.2017 09:30:00

Plot 5: Highest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

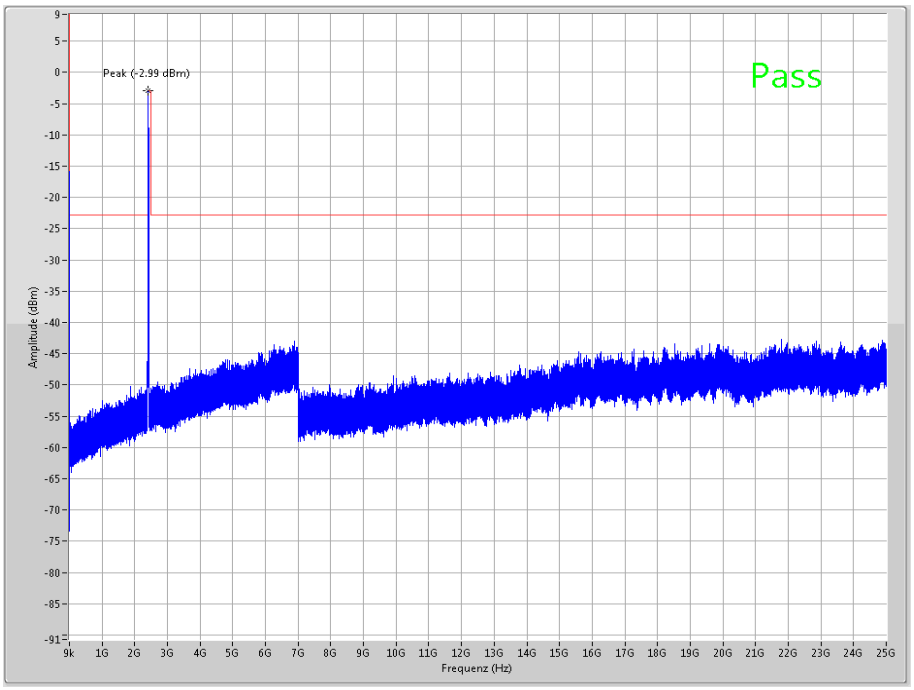
Plot 6: Highest channel, zoomed carrier



Date: 22.MAY.2017 09:40:00

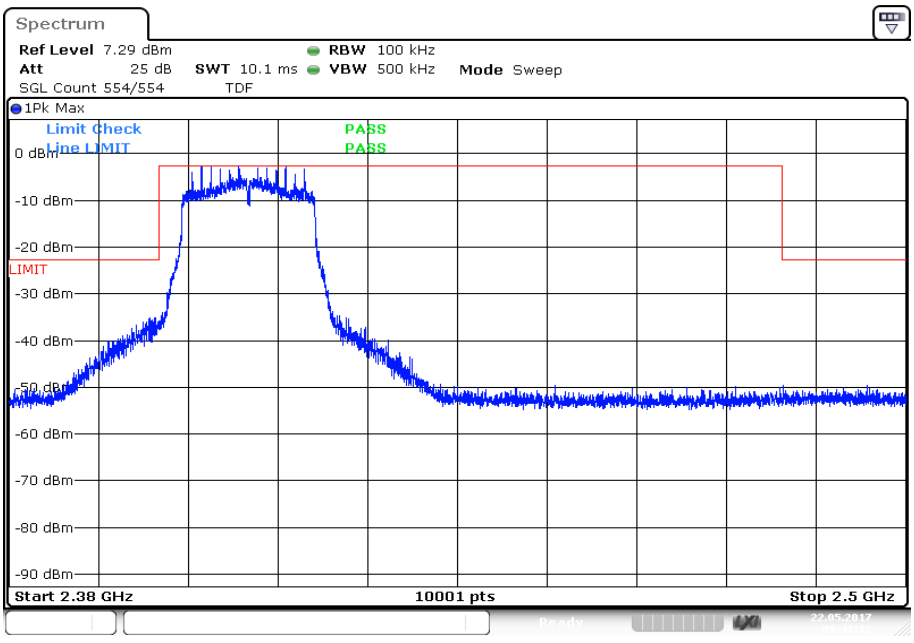
Plots: ANT 0, OFDM / n HT 20 – mode

Plot 1: Lowest channel, up to 25 GHz



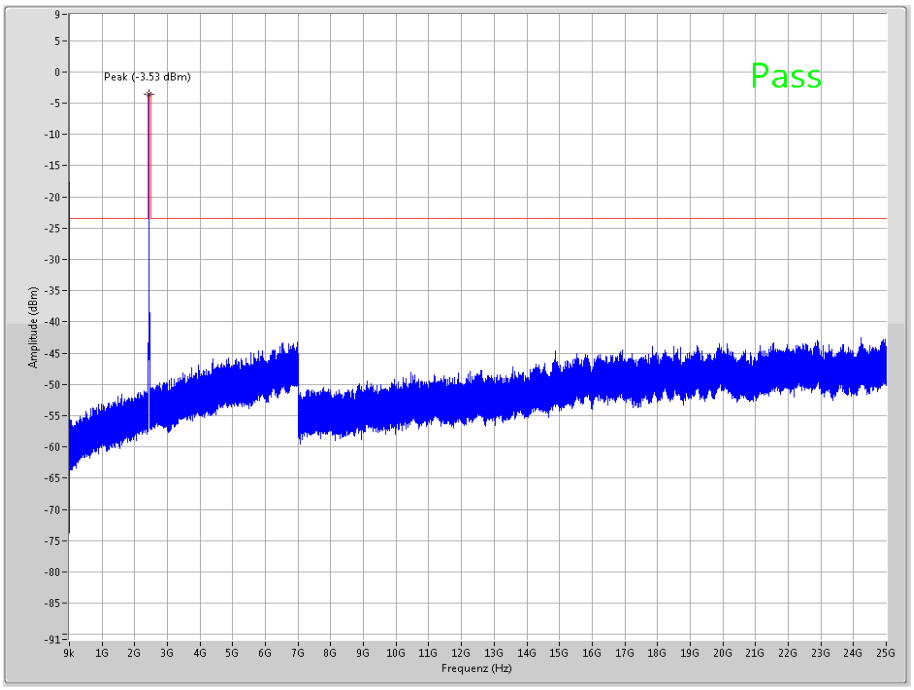
The peak at the beginning of the plot is the LO from the SA.

Plot 2: Lowest channel, zoomed carrier



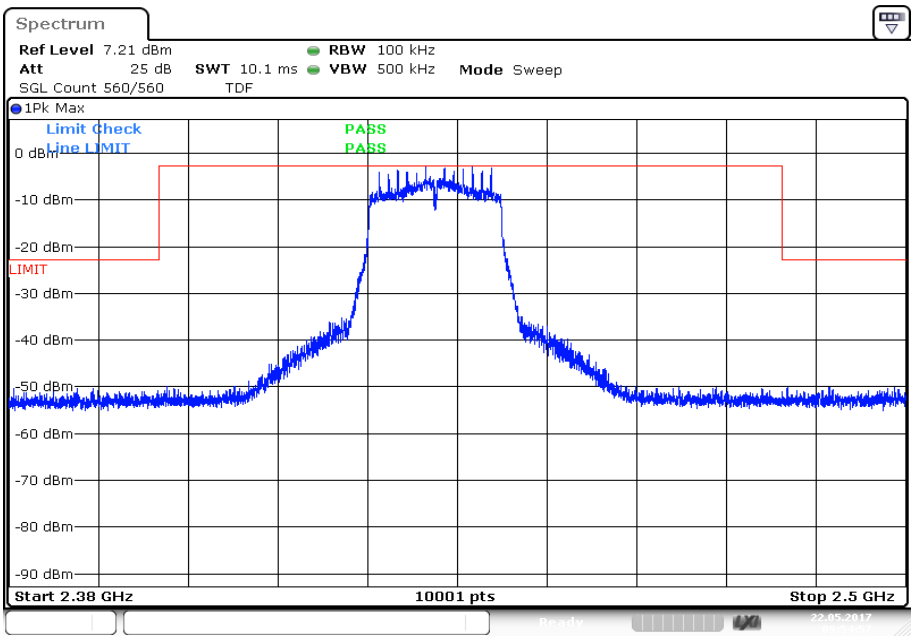
Date: 22.MAY.2017 09:47:13

Plot 3: Middle channel, up to 25 GHz



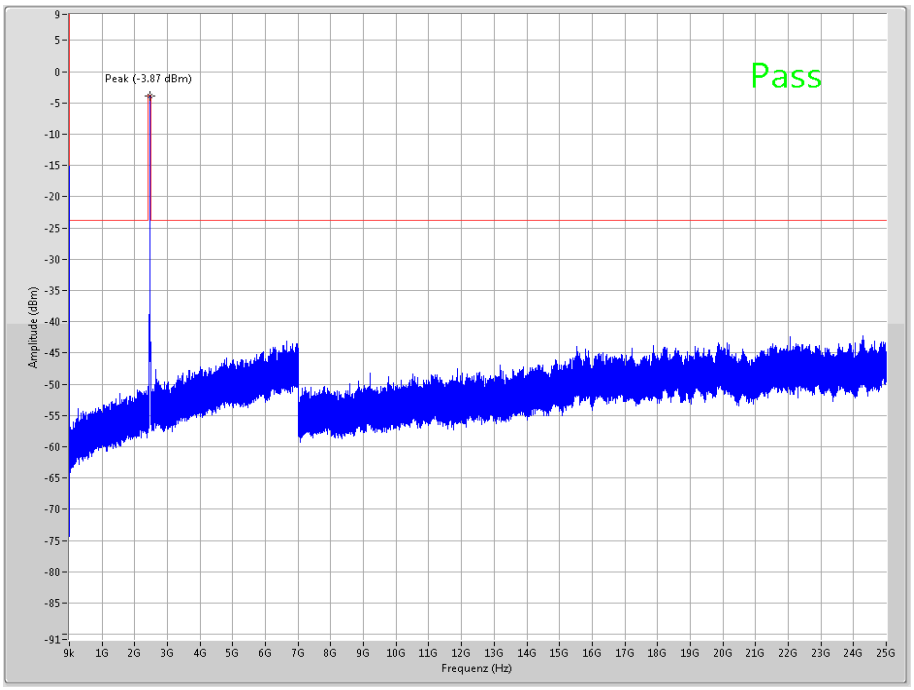
The peak at the beginning of the plot is the LO from the SA.

Plot 4: Middle channel, zoomed carrier



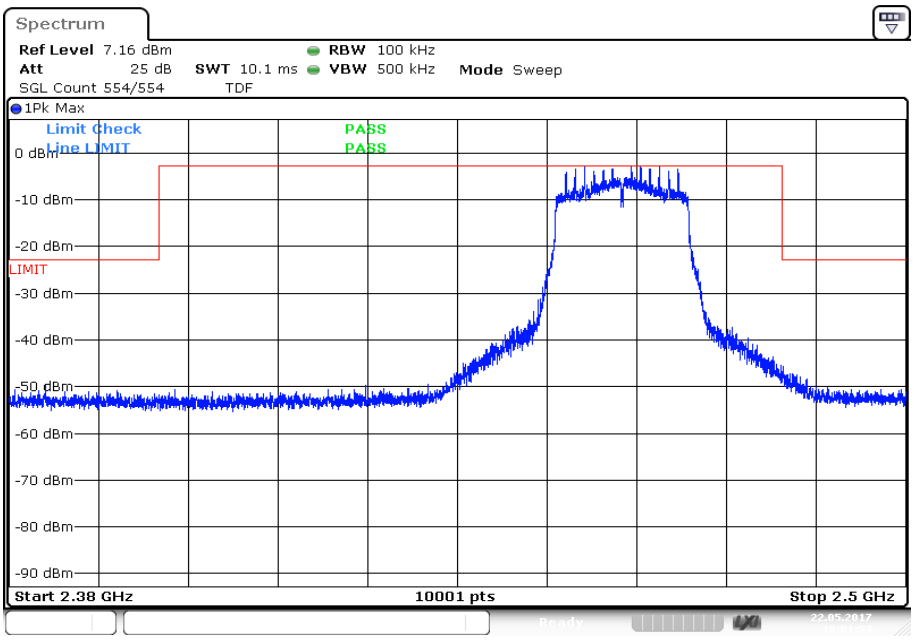
Date: 22.MAY.2017 09:54:58

Plot 5: Highest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

Plot 6: Highest channel, zoomed carrier



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ANT1:

Results: DSSS / b – mode

TX Spurious Emissions Conducted					
DSSS / b – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		5.47	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2437		4.03	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2462		4.47	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant

Results: OFDM / g – mode

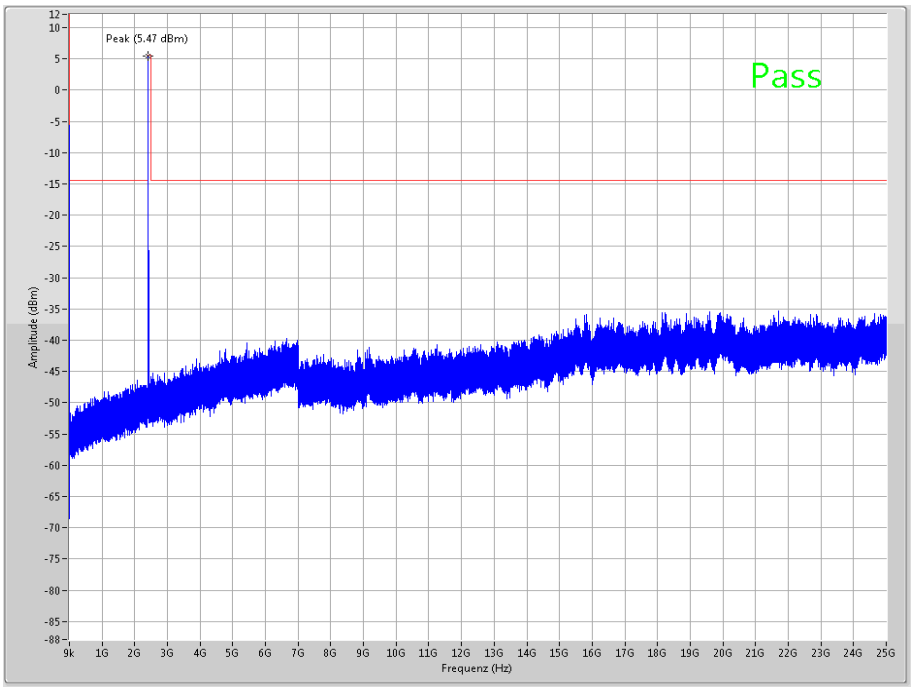
TX Spurious Emissions Conducted					
OFDM / g – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-2.69	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2437		-2.48	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2462		-3.30	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant

Results: OFDM / n HT20 – mode

TX Spurious Emissions Conducted					
OFDM / n HT20 – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-3.88	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2437		-3.56	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant
2462		-5.91	30 dBm		Operating frequency
No peaks detected			-20 dBc (peak) -30 dBc (average)		compliant

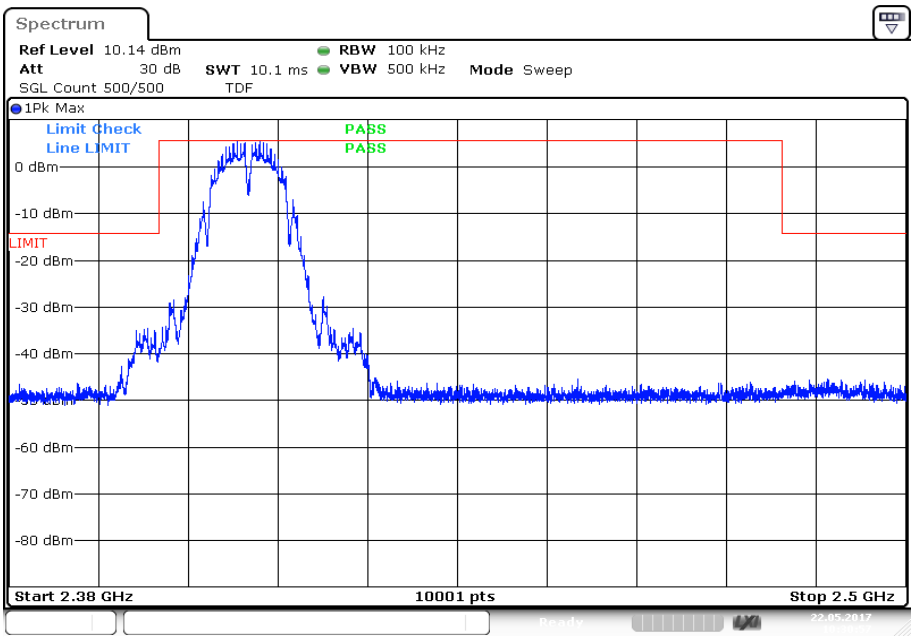
Plots: ANT 1, DSSS / b – mode

Plot 1: Lowest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

Plot 2: Lowest channel, zoomed carrier



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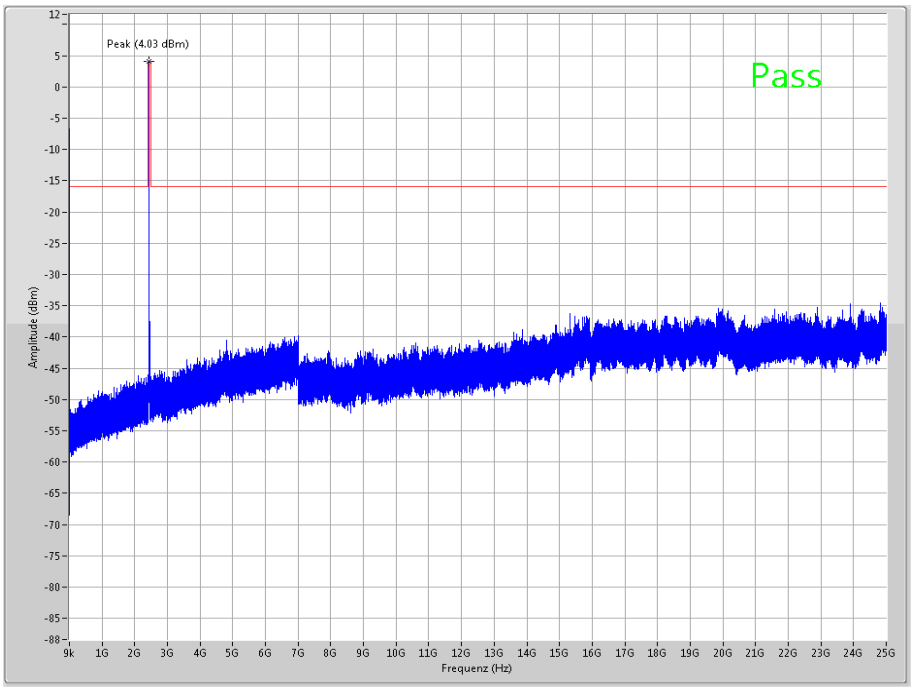
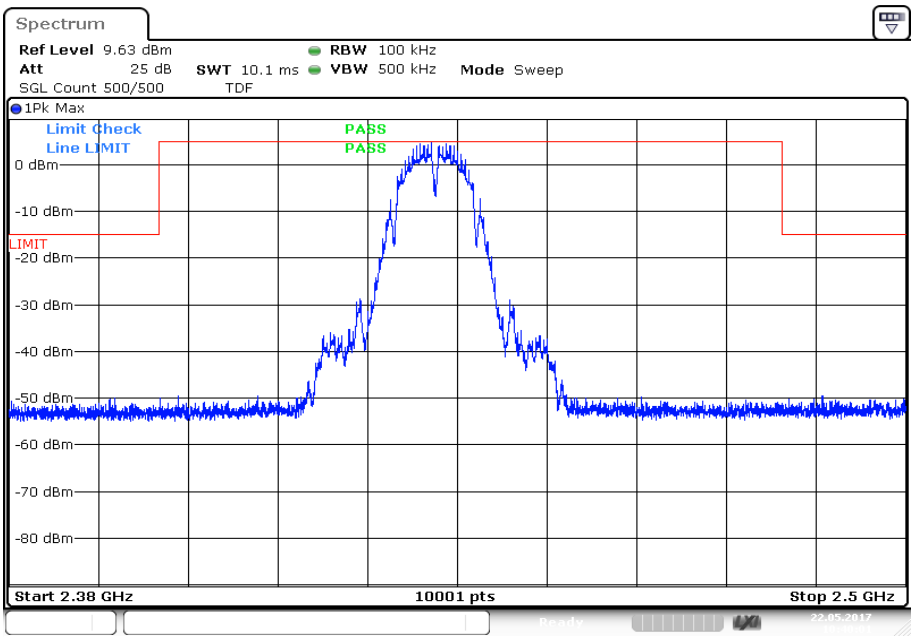
Plot 3: Middle channel, up to 25 GHz



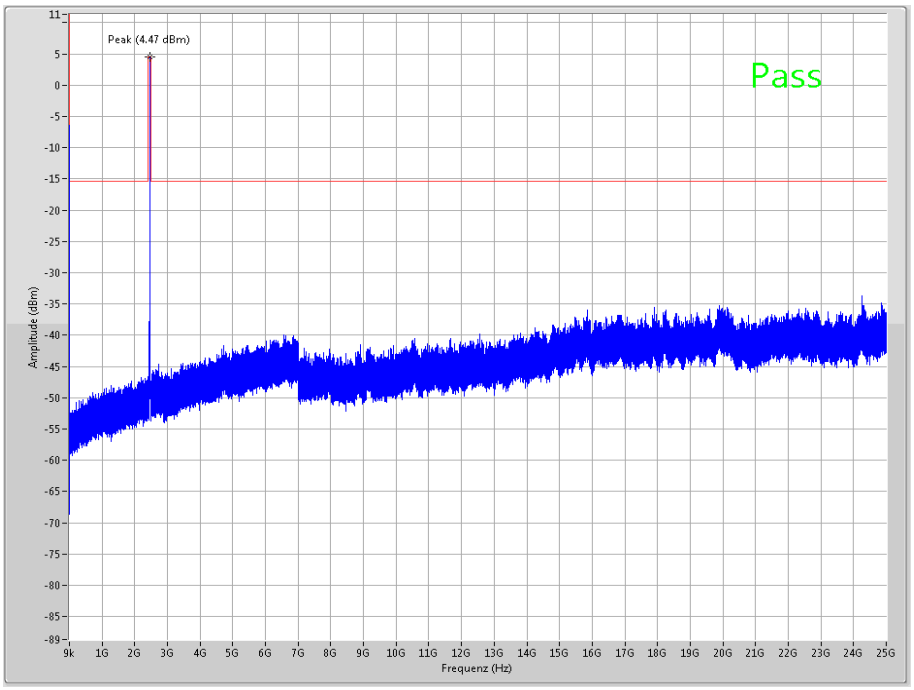
The peak at the beginning of the plot is the LO from the SA.

Plot 4: Middle channel, zoomed carrier



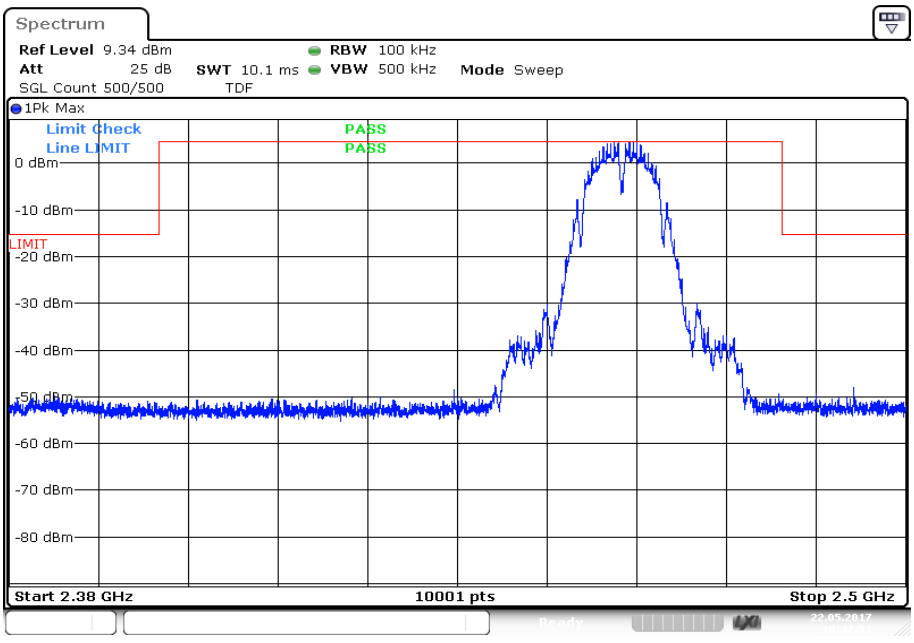
Date: 22.MAY.2017 10:40:01

Plot 5: Highest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

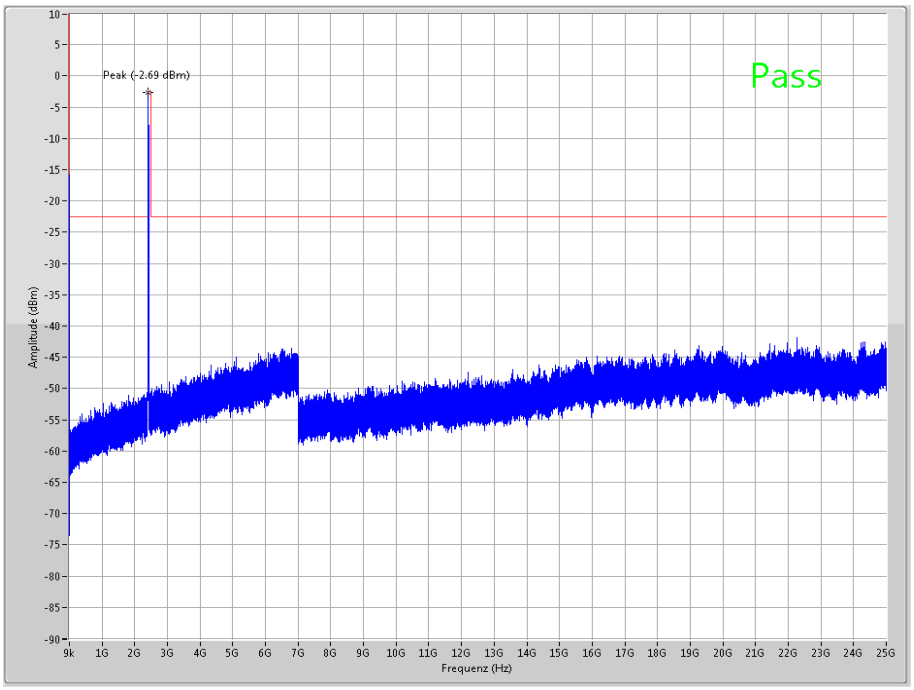
Plot 6: Highest channel, zoomed carrier



Date: 22.MAY.2017 10:47:51

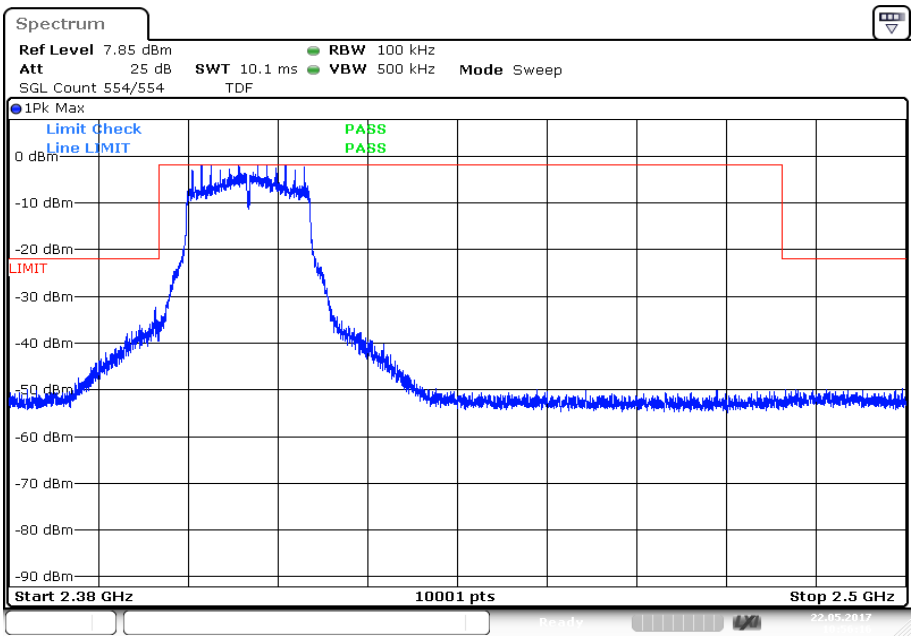
Plots: ANT 1, OFDM / g – mode

Plot 1: Lowest channel, up to 25 GHz



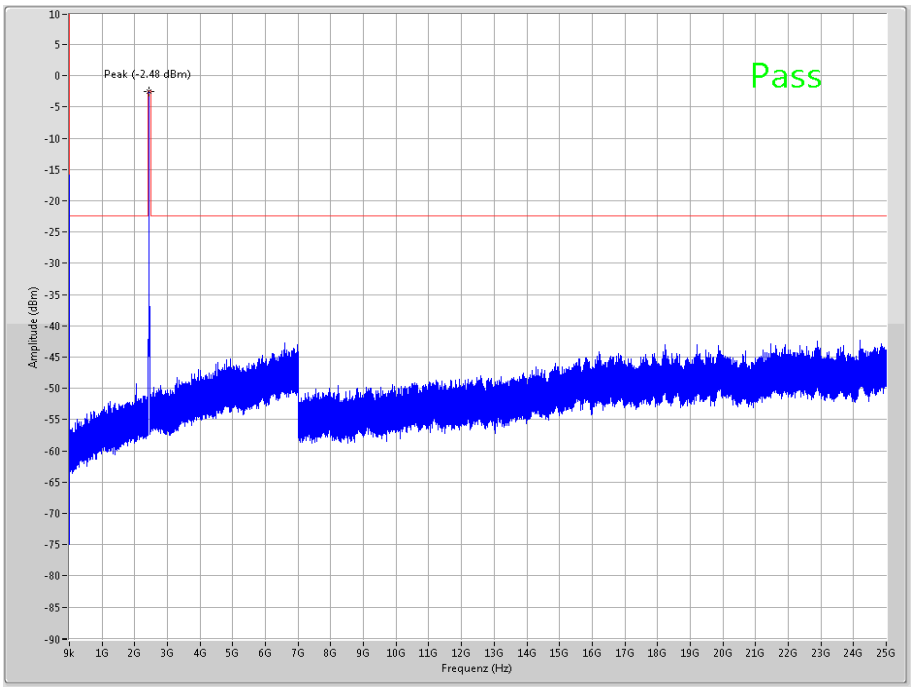
The peak at the beginning of the plot is the LO from the SA.

Plot 2: Lowest channel, zoomed carrier



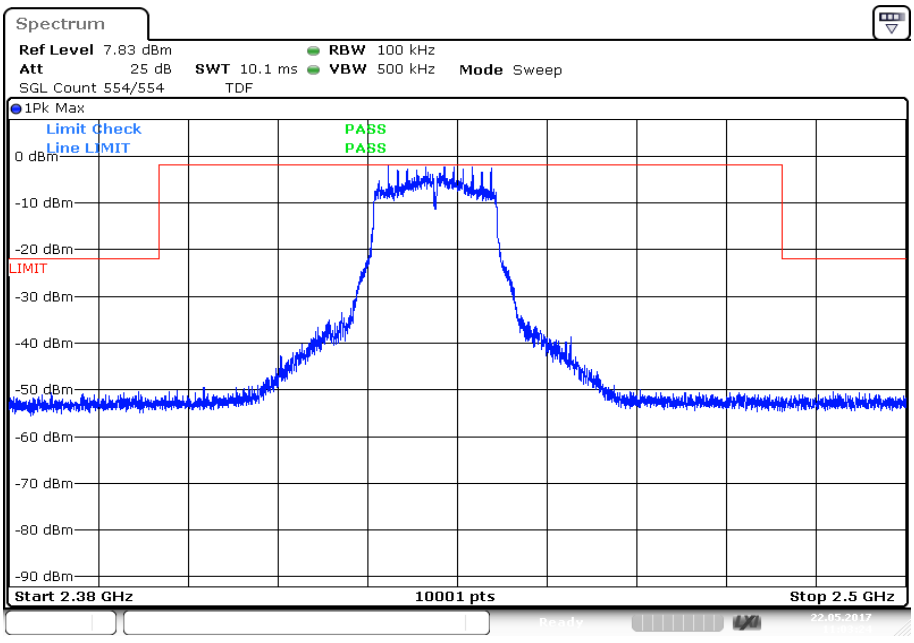
Date: 22.MAY.2017 10:56:16

Plot 3: Middle channel, up to 25 GHz



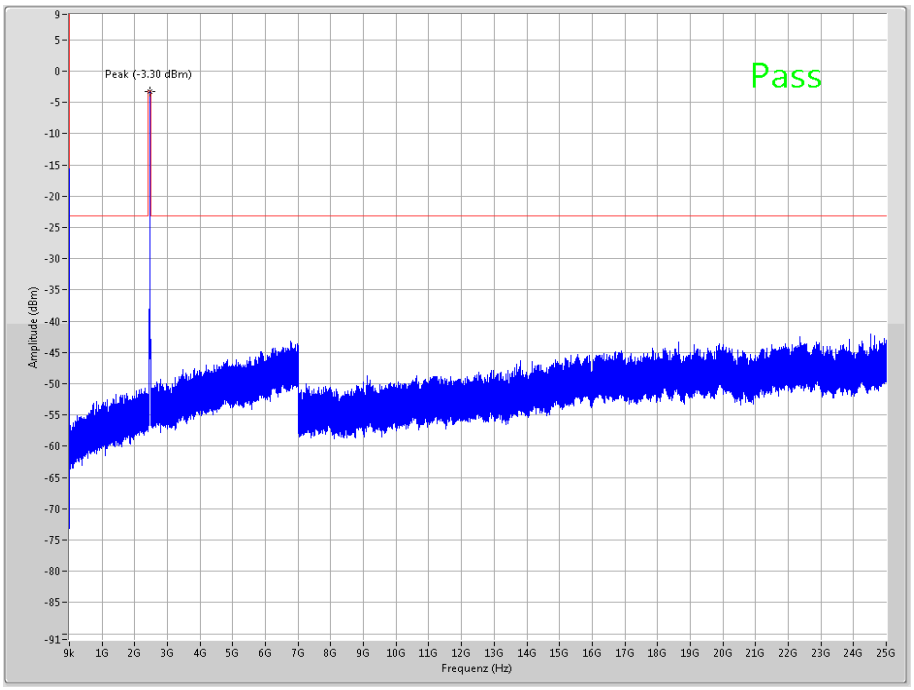
The peak at the beginning of the plot is the LO from the SA.

Plot 4: Middle channel, zoomed carrier



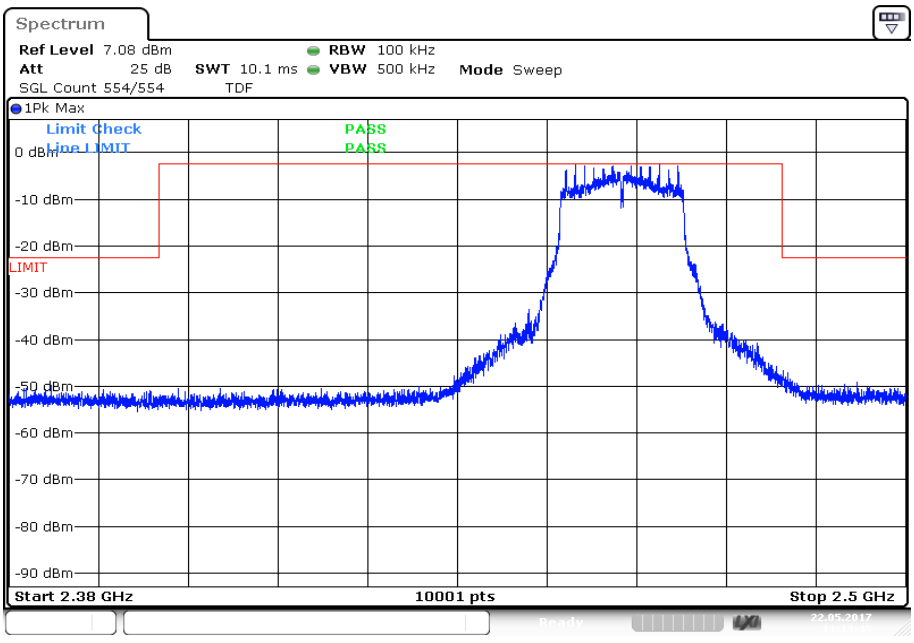
Date: 22.MAY.2017 11:03:24

Plot 5: Highest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

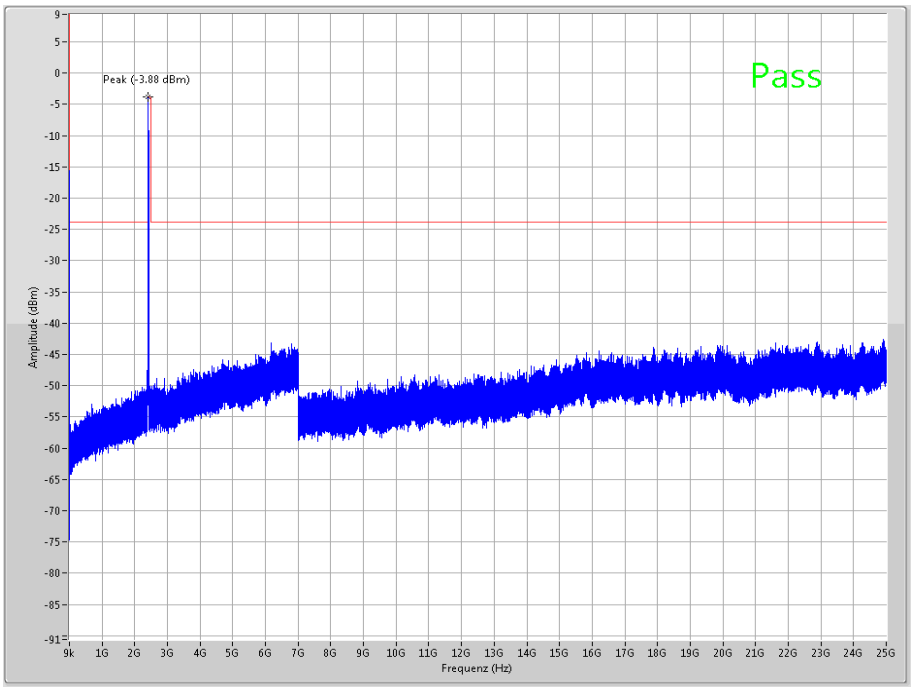
Plot 6: Highest channel, zoomed carrier



Date: 22.MAY.2017 11:13:45

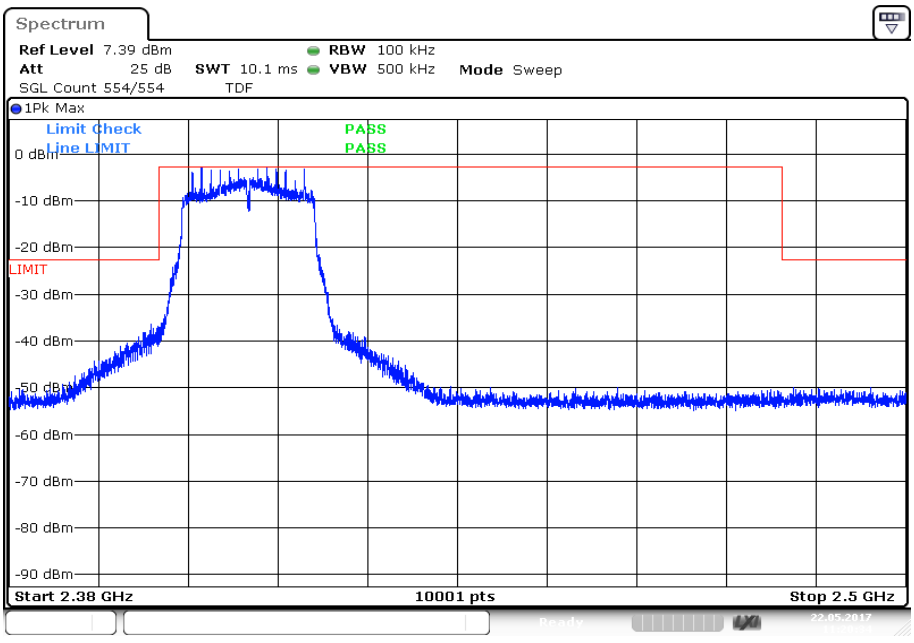
Plots: ANT 1, OFDM / n HT 20 – mode

Plot 1: Lowest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

Plot 2: Lowest channel, zoomed carrier



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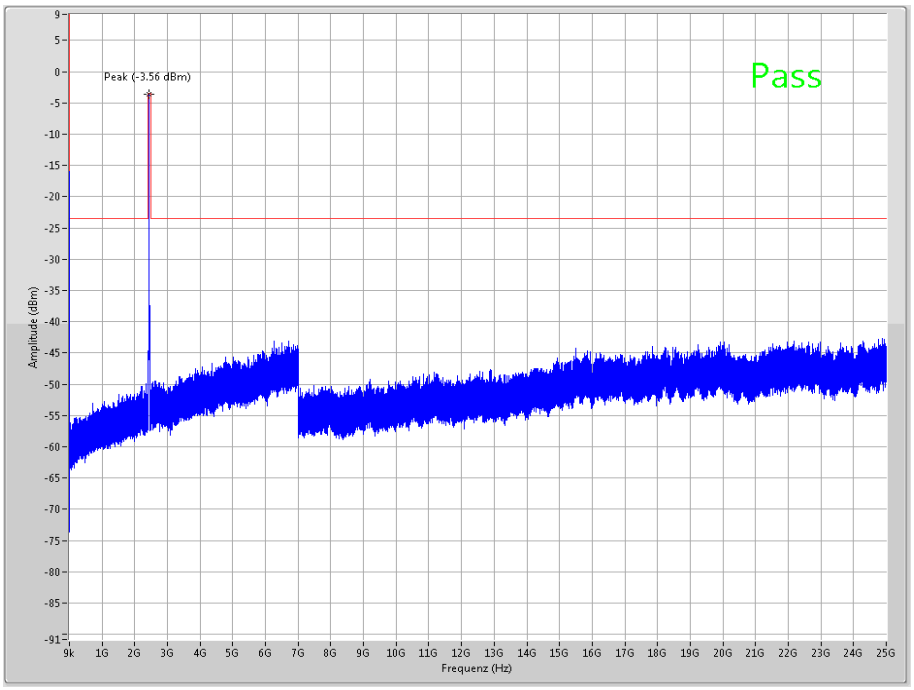
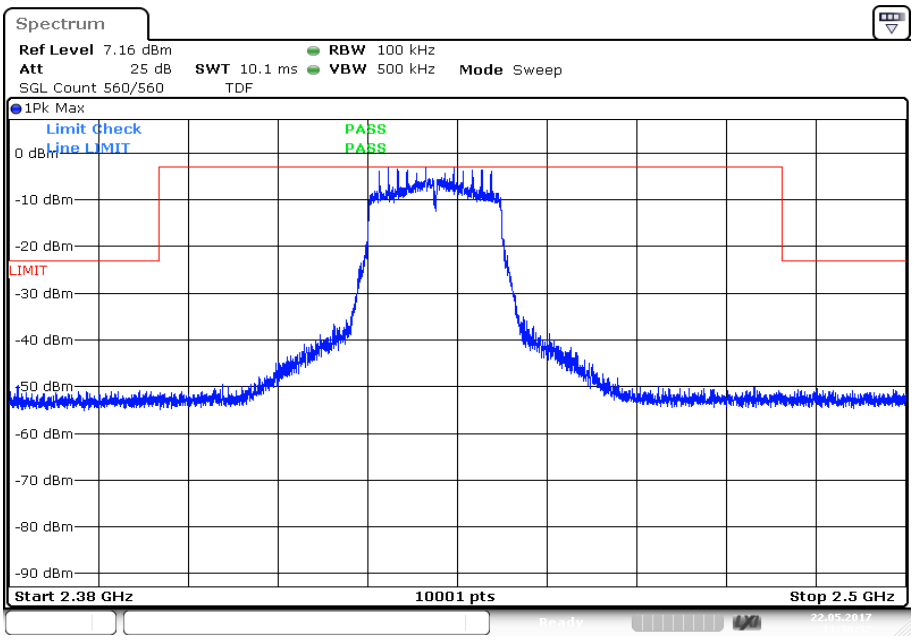
Plot 3: Middle channel, up to 25 GHz



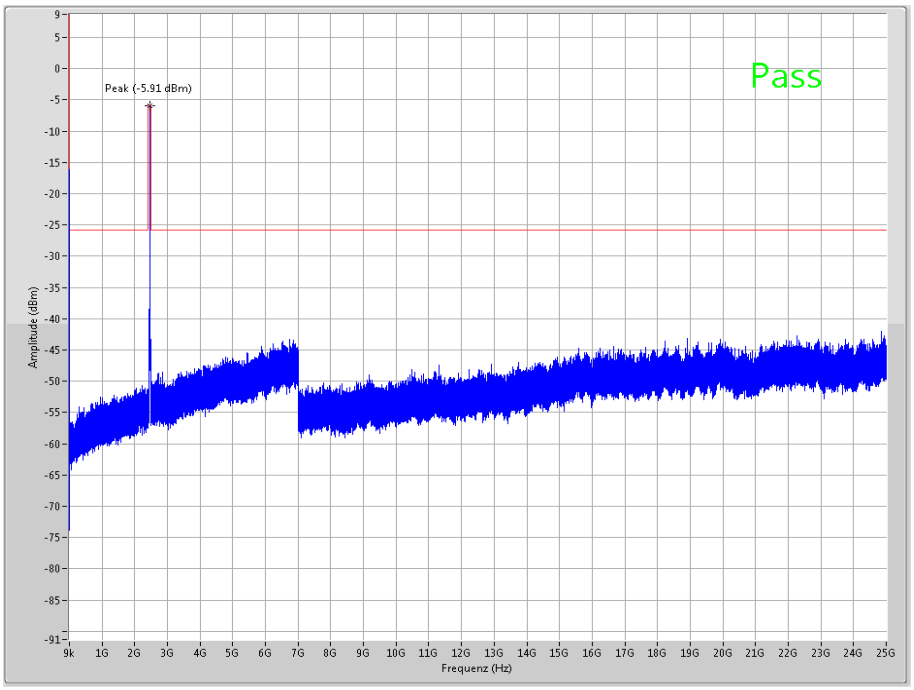
The peak at the beginning of the plot is the LO from the SA.

Plot 4: Middle channel, zoomed carrier



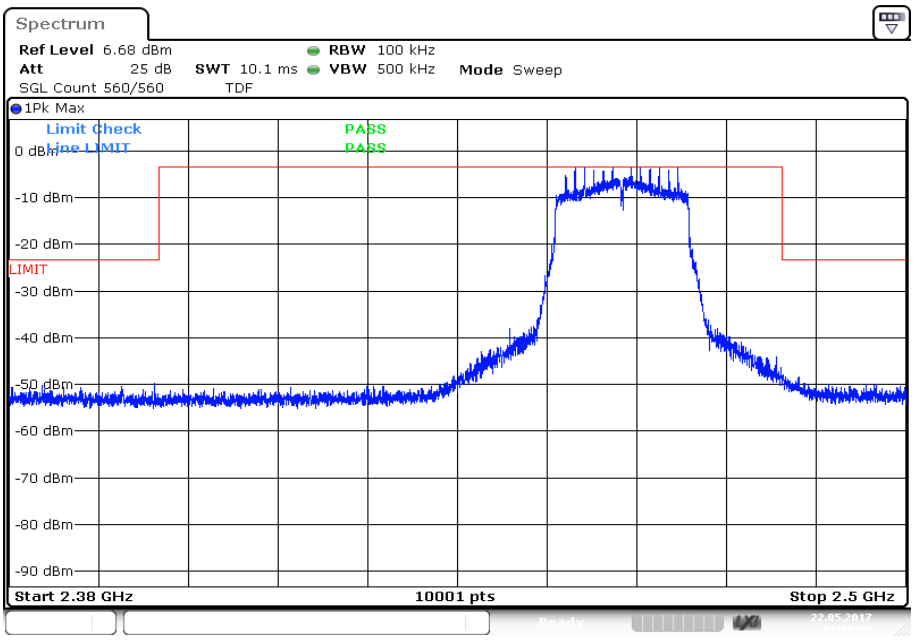
Date: 22.MAY.2017 11:36:33

Plot 5: Highest channel, up to 25 GHz



The peak at the beginning of the plot is the LO from the SA.

Plot 6: Highest channel, zoomed carrier



Date: 22.MAY.2017 11:49:02