

A RADIO TEST REPORT
FOR
Axell Wireless Limited
ON
Digital Fibre Fed Band Selective Repeater
MBF-40 Americas HP V4.1
DOCUMENT NO. TRA-026963-47-00-G

Element Wireless Test Report: TRA-026963-47-00-G

Applicant : Axell Wireless Limited

Apparatus : MBF-40 Americas HP43 v4.1

Specification(s) : CFR47 Part 90,27,22,24E

Purpose of Test : Certification

FCCID : NEOMBF4103SERIES

Authorised by :

: Radio Product Manager

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Introduction

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on samples submitted to the Laboratory.

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1.2 Tests Requested By

This testing in this report was requested by:

Axell Wireless
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1.3 Manufacturer

Axell Wireless
Aerial House
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1.4 Apparatus Assessed

The following apparatus was assessed between the 18th August 2015 and 7th January 2016

MBF-40 Americas HP43 is a Digital Fibre Fed Repeater

For the purposes of testing, the device was operating in following bands.

Downlink

728-757MHz

862-869MHz
869-894MHz
1930-1995MHz
2110-2155MHz

Uplink

698-716MHz
776-787MHz
817-824MHz
824-849MHz
1850-1915MHz
1710-1755MHz

The MBF - Multi-Band Fibre optic fed system encapsulates solutions for both indoor and outdoor environments for single or multi-operator use. It offers seamless coverage in any indoor environment such as tunnels, metros and larger buildings.

Note: In the 2110-2155MHz /1710-1755MHz band, the Narrow band testing was omitted, as only wideband modulation scheme used (AWGN testing only performed). See appendix D.

1.5 Test Result Summary

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

The statements relating to compliance with the standards below apply ONLY as qualified in the notes and deviations stated in sections 1.6 to 1.7 of this test report.

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

Test Type	FCC KDB935210 D05 June 5 th 2015	Appendix in Report	Result
Downlink AGC Threshold	3.2	A1	Pass
Downlink EUT out-of-band rejection	3.3	A2	Pass
Downlink EUT input-versus-output signal comparison	3.4	A3	Pass
Downlink EUT mean output power and amplifier gain	3.5	A4	Pass
Downlink EUT out-of-band/block emissions	3.6.2	A5	Pass
Downlink EUT out-of-band/block emissions	3.6.3	A6	Pass
Downlink EUT Radiated spurious emissions	3.8	A7	Pass
Uplink AGC Threshold	3.2	B1	Pass
Uplink EUT out-of-band rejection	3.3	B2	Pass
Uplink EUT input-versus-output signal comparison	3.4	B3	Pass
Uplink EUT mean output power and amplifier gain	3.5	B4	Pass
Uplink EUT out-of-band/block emissions	3.6.2	B5	Pass
Uplink EUT out-of-band/block emissions	3.6.3	B6	Pass
Uplink EUT Radiated spurious emissions	3.8	B7	Pass

Downlink Part 90 additional testing	Part 90.614 Part 90.635 Part 90.691 47CFR20.20(c)	A8	Pass
Downlink Part 90 additional testing	Part 90.614 Part 90.635 Part 90.691 47CFR20.20(c)	B8	Pass

1.6 Equipment Test Conditions

Product class:	Uplink	Class A [] Class B [X]
	Downlink	Class A [] Class B [X]
Product Use:	Commercial Mobile Radio Service	
Supply Voltages:	Vnom	110Vac
Note: Vnom voltages are as stated above unless otherwise shown on the test report page		
Equipment Category:	Single channel	[]
	Two channel	[]
	Multi-channel	[X]
Test Location	Element	
	Skelmersdale	[X]
	Hull	[]
	Other	[] Please Specify

1.7 Standard References

47 CFR 90	Code of Federal Regulations, Title 47 Part 90S
47 CFR 2	Code of Federal Regulations, Title 47, Part 2, "Frequency allocations and Radio Telemetry Matters; General Rules and Regulations"
47 CFR 27	Code of Federal Regulations, Title 47 Part 27
47 CFR 22	Code of Federal Regulations, Title 47 Part 22
47 CFR 24E	Code of Federal Regulations, Title 47 Part 24E
TIA EIA-603-D	Land Mobile FM or PM Communications Equipment Measurement and Performance Standard
KDB935210 D05 Measurement Guidance for Industrial boosters and non-consumer signal Booster, Repeater, and Amplifier devices.	

1.8 Notes Relating To Assessment

With regard to this assessment, the following points should be noted:

The results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where modified in Section 1.7 of this test report (Deviations from Test Standards).

For emissions testing, throughout this test report, "Pass" indicates that the results for the sample as tested were below the specified limit (refer also to Section 2, Measurement Uncertainty).

Where relevant, the apparatus was only assessed using the monitoring methods and susceptibility criteria defined in this report.

All testing with the exception of testing at the Open Area Test Site was performed under the following environmental conditions:

Temperature	: 17 to 23 °C
Humidity	: 45 to 75 %
Barometric Pressure	: 86 to 106 kPa

All dates used in this report are in the format dd/mm/yy.

This assessment has been performed in accordance with the requirements of ISO/IEC 17025.

1.9 Deviations from Test Standards

There were no deviations from the standards tested to.

1.10 Test Site

Location	Chamber Number	Site Type	Used For testing
Pendle Place	EMC Chamber 1	ATS	
	EMC Chamber 2	ATS	
	REF 940 Radio	ATS	X

OATS – Open area test site
ATS - Alternative Test Site

2.1 Measurement Uncertainty Values

For the test data recorded the following measurement uncertainty was calculated:

Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

Uncertainty in test result (Power Meter) = **1.08dB**

Uncertainty in test result (Spectrum Analyser) = **2.48dB**

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

Uncertainty in test result (Frequency Counter) = **0.113ppm**

Uncertainty in test result (Spectrum Analyser) = **0.265ppm**

[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**,

Uncertainty in test result (30MHz – 1GHz) = **4.6dB**,

Uncertainty in test result (1GHz – 18GHz) = **4.7dB**

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

Uncertainty in test result – Up to 8.1GHz = **3.31dB**

Uncertainty in test result – 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result – 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result – Up to 26GHz = **3.14dB**

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

Uncertainty in overall test level = **2.1dB**,
Uncertainty in time measurement = **0.59%**,
Uncertainty in Amplitude measurement = **0.82%**

[12] Power Line Conduction

Uncertainty in test result = **3.4dB**

[13] Spectrum Mask Measurements

Uncertainty in test result = **2.59% (frequency)**
Uncertainty in test result = **1.32dB (amplitude)**

[14] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[15] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[16] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[17] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[18] Receiver Threshold

Uncertainty in test result = **3.23dB**

[19] Transmission Time Measurement

Uncertainty in test result = **7.98%**

Section 3:

Modifications

3.1 Modifications Performed During Assessment

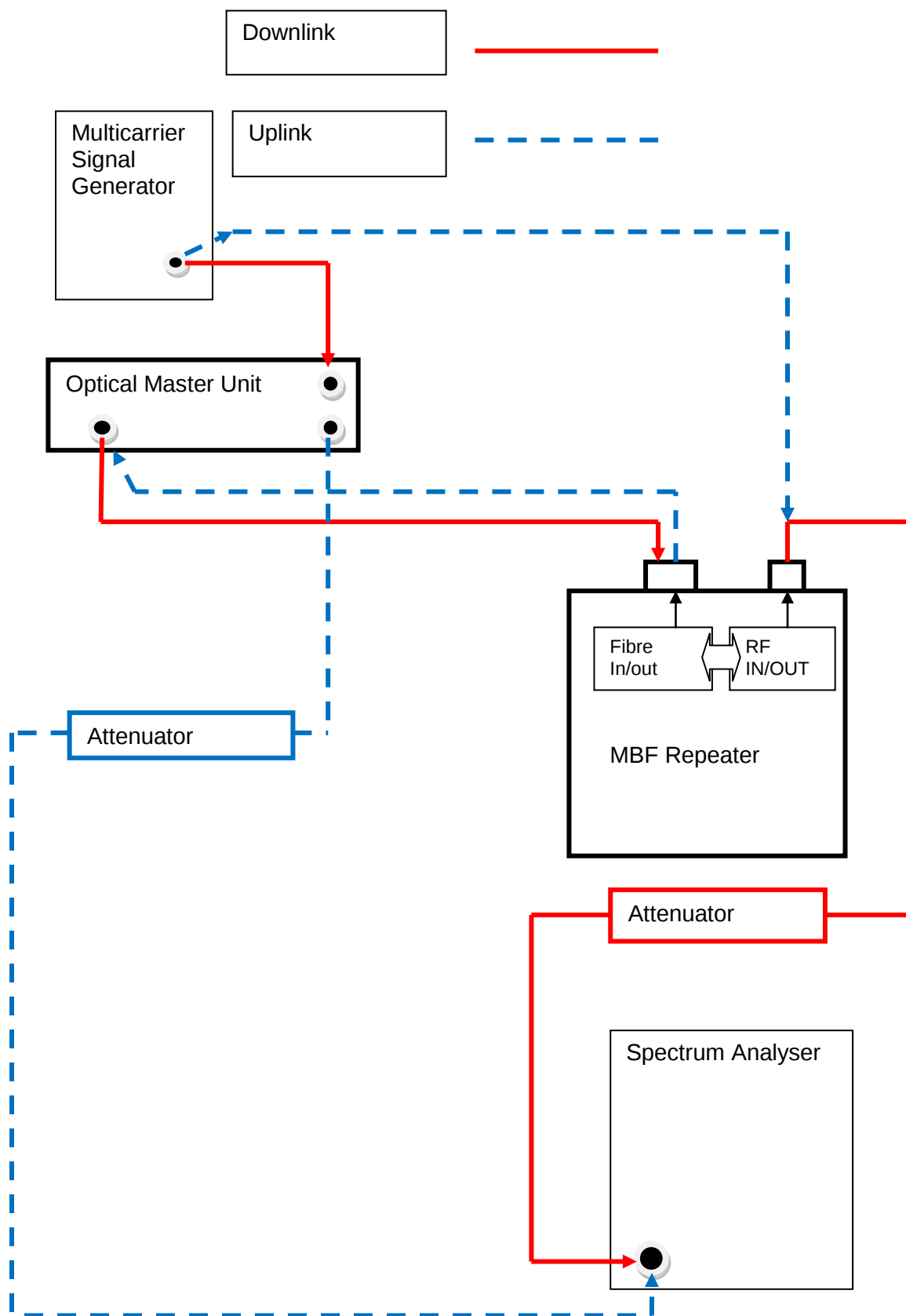
No modifications were performed during the assessment

Appendix A:

Downlink Formal Emission Test Results

Abbreviations used in the tables in this appendix:

Spec	: Specification	ALSR	: Absorber Lined Screened Room
Mod	: Modification	OATS	: Open Area Test Site
EUT	: Equipment Under Test	ATS	: Alternative Test Site
SE	: Support Equipment	Ref	: Reference
L	: Live Power Line	Freq	: Frequency
N	: Neutral Power Line	MD	: Measurement Distance
E	: Earth Power Line	SD	: Spec Distance
Pk	: Peak Detector	Pol	: Polarisation
QP	: Quasi-Peak Detector	H	: Horizontal Polarisation
Av	: Average Detector	V	: Vertical Polarisation
CDN	: Coupling & decoupling network		



Conducted measurement test setup

A1 AGC Threshold conducted

Test Details:	
Measurement standard	KDB935210 D05 Clause 3.2 Part 2.1046
EUT sample number	S01
Modification state	0
SE in test environment	S02
SE isolated from EUT	None
EUT set up	Refer to Appendix C

728-757MHz

Downlink @ AGC Threshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
742.500	MSK	-0.69	0.38	-3.50	46.40	43.97	42.90
742.500	AGWN	-0.20	0.38	-2.20	46.40	44.78	44.20

869-894MHz

Downlink @ AGC Threshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
878.00	MSK	-1.00	0.45	-7.30	46.40	39.24	39.10
878.00	AGWN	-0.80	0.45	-6.50	46.40	40.45	39.90

1930-1995MHz

Downlink @ AGC Threshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
1962.5	MSK	6.20	0.73	-3.60	46.2	37.13	42.60
1962.5	AGWN	4.80	0.73	-2.60	46.2	39.53	43.60

2110-2155MHz

Downlink @ AGC Threshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
2132.5	AGWN	4.50	0.90	-1.70	46.4	41.10	44.70

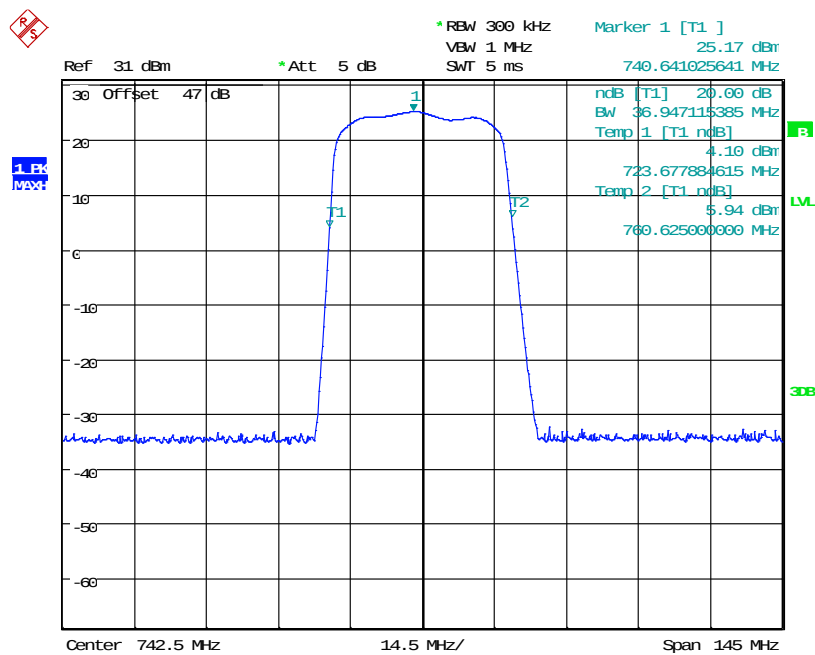
.Test method used KDB935210 D05 clause 3.2

A2 EUT out-of-band rejection conducted

Test Details:	
Measurement standard	KDB935210 D05 Clause 3.3
EUT sample number	S01
Modification state	0
SE in test environment	S02
SE isolated from EUT	None
EUT set up	Refer to Appendix C

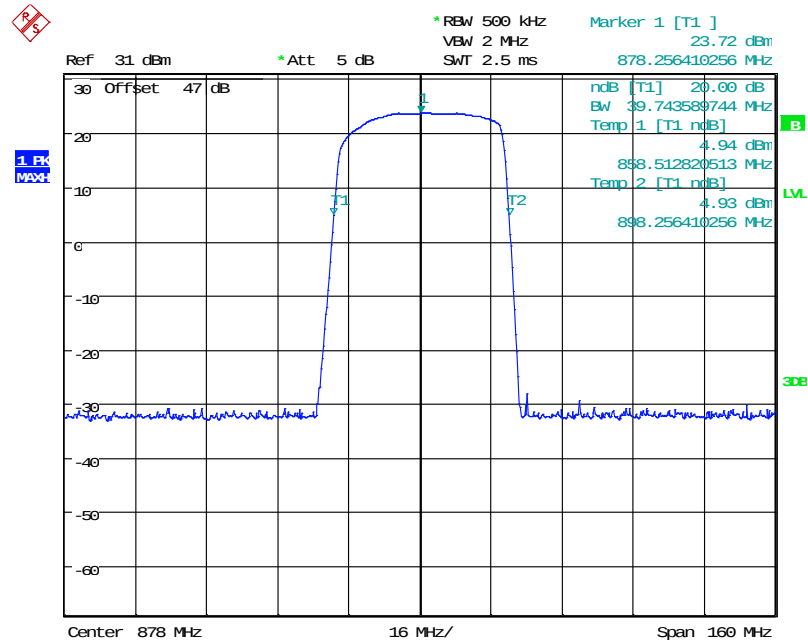
Frequency MHz	F0	FI MHz	Fh MHz	20 dB Bandwidth
742.50	740.641025	723.677884	760.625000	36.947MHz
878.00	878.256410	858.512820	898.256410	39.743MHz
1962.50	1967.708333	1925.520833	2007.291667	81.770MHz
2132.50	2118.437500	2099.326923	2166.754808	67.427MHz

20dB bandwidth 728-757MHz



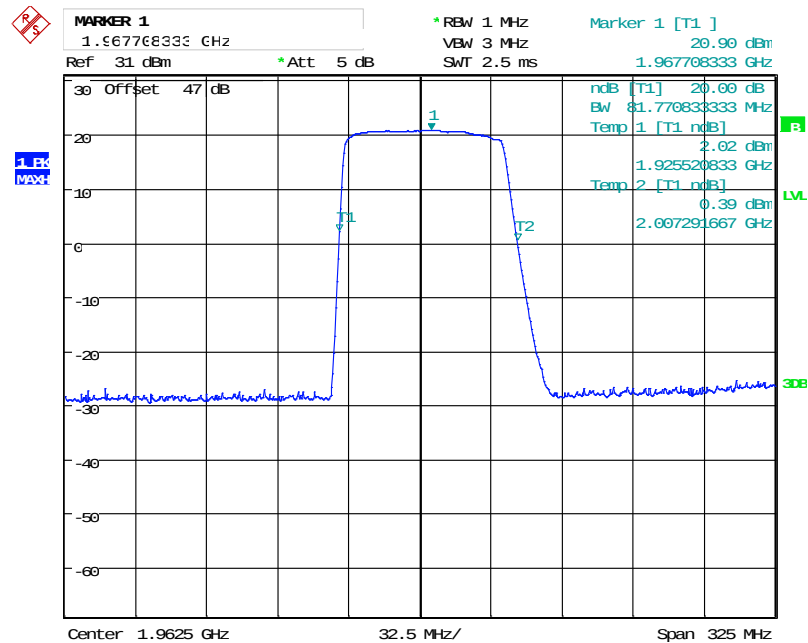
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20dB bandwidth 862-894MHz



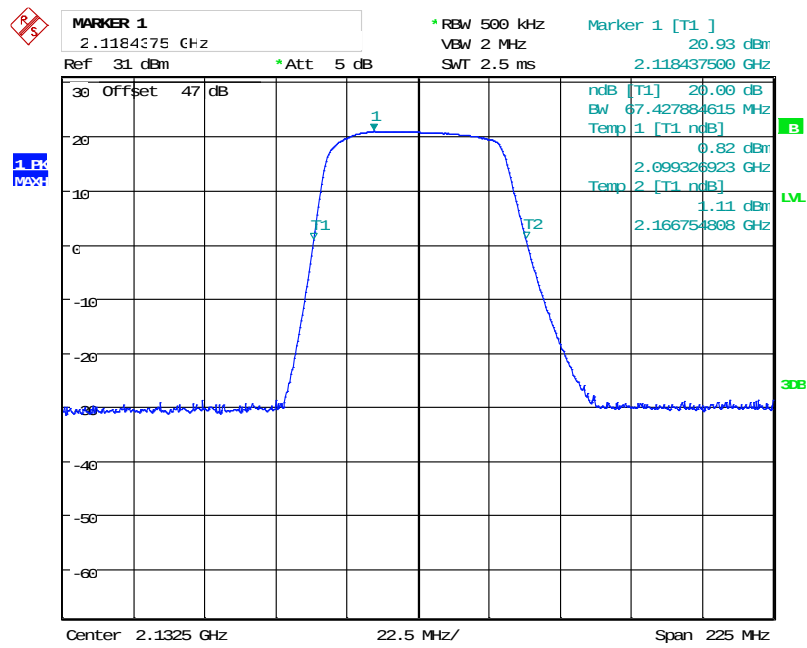
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20dB bandwidth 1930-1995MHz



Date: 14.AUG.2015 11:55:58

20dB bandwidth 2110-2155MHz

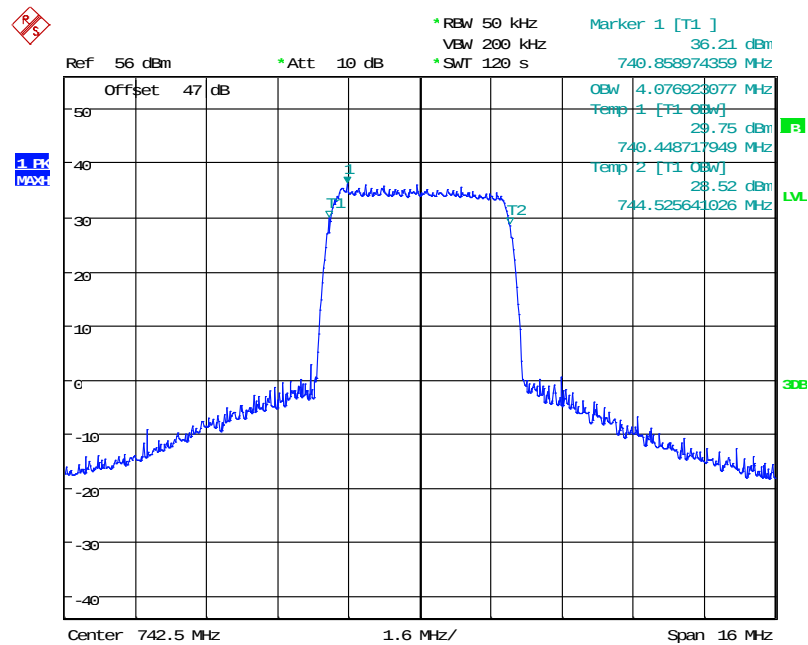


Date: 14.AUG.2015 12:05:49

A3 EUT input-versus-output signal comparison conducted

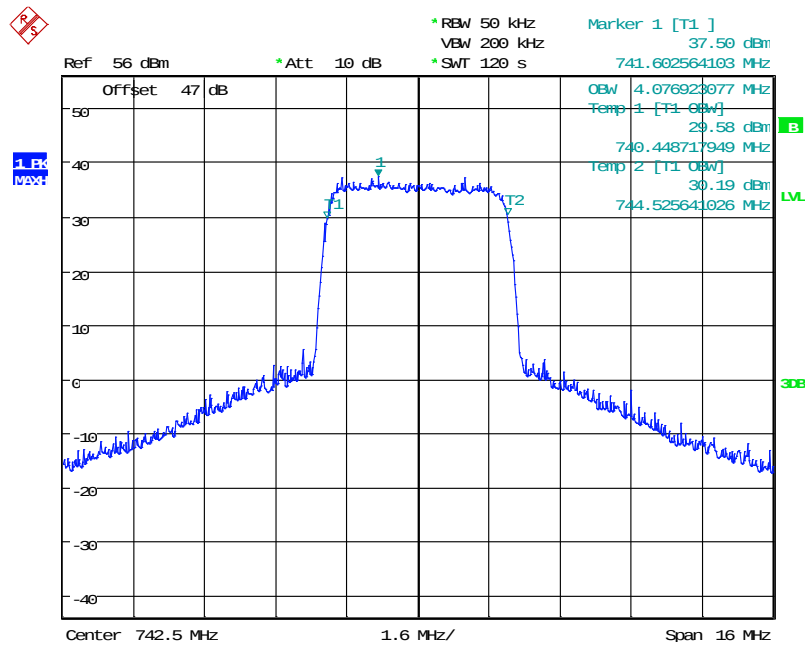
Test Details:	
Measurement standard	KDB935210 D05 Clause 3.4 Part 2.1047 2.1049
EUT sample number	S01
Modification state	0
SE in test environment	S02
SE isolated from EUT	None
EUT set up	Refer to Appendix C

728-746MHz AWGN $\leq$ AGC



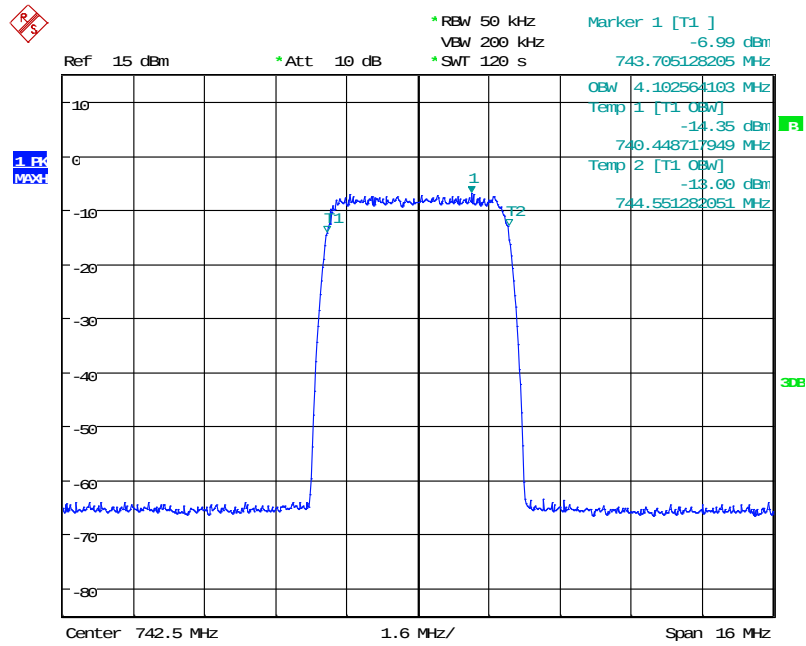
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728-746MHz AWGN 3dB above AGC



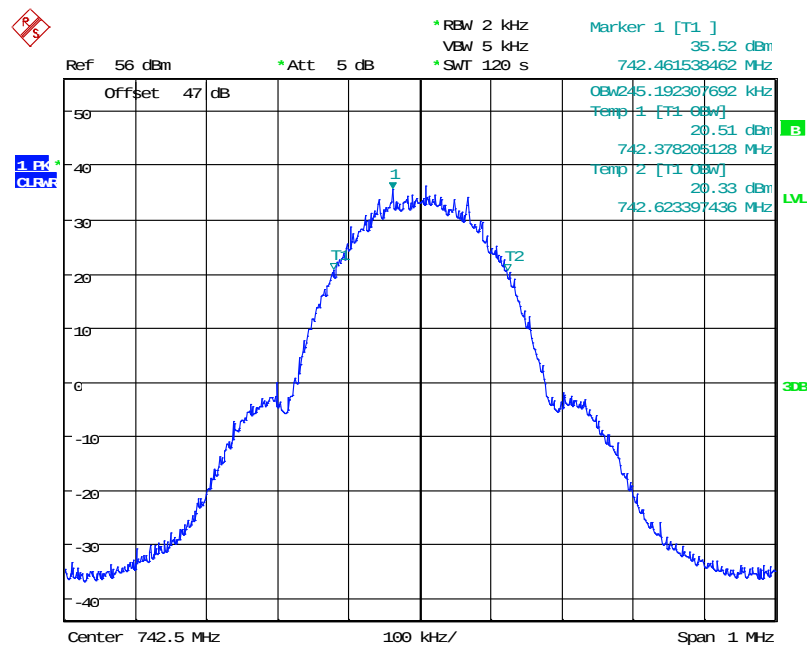
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728-746MHz AWGN Signal Generator only



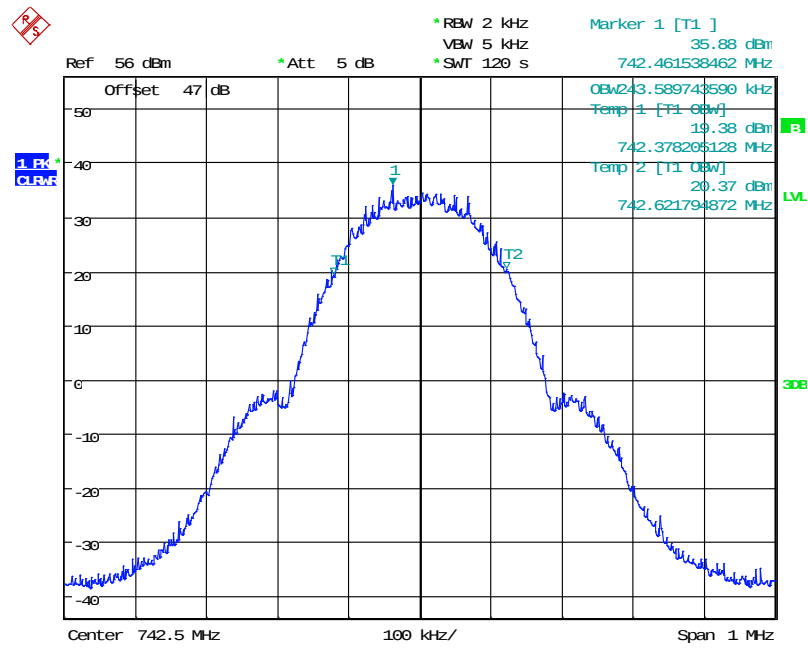
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728-746MHz MSK ≤ AGC



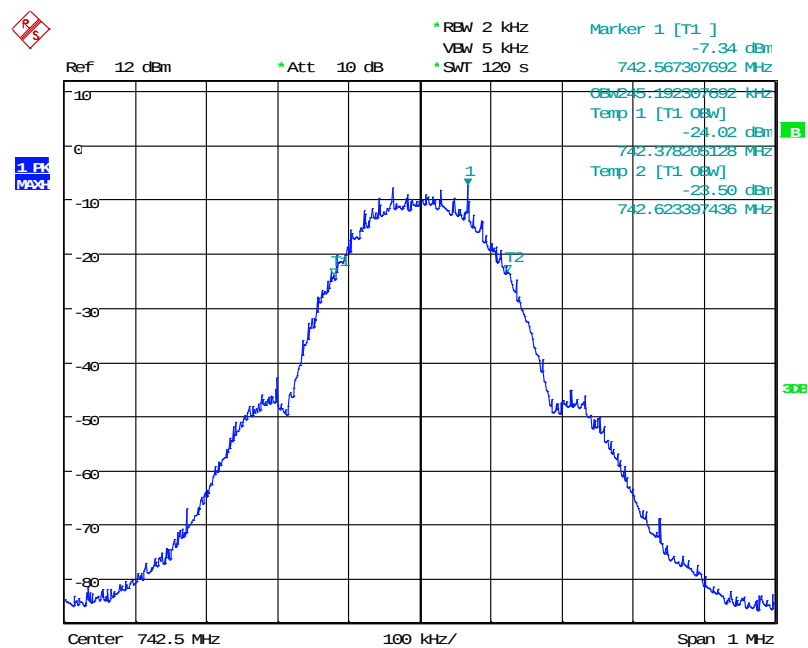
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728-746MHz MSK 3dB above AGC



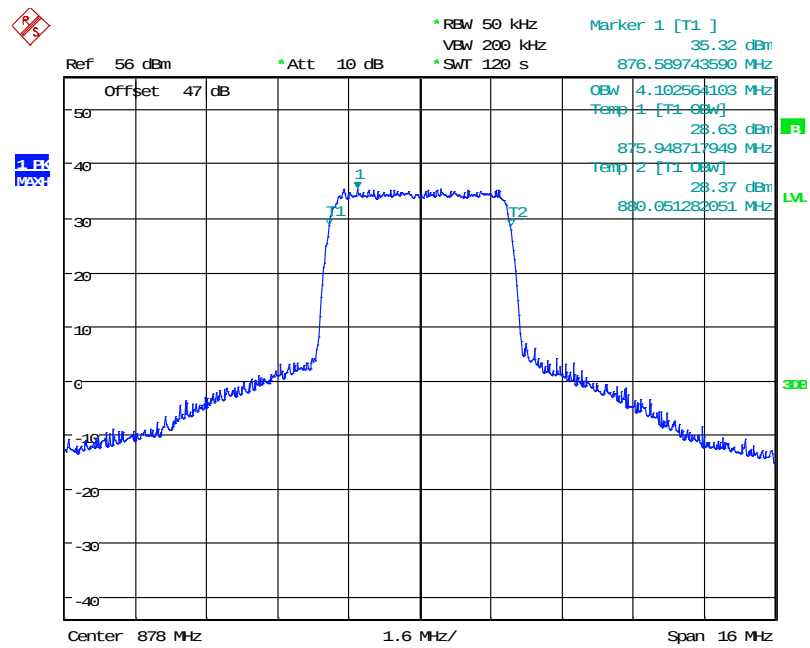
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728-746MHz MSK Signal Generator only



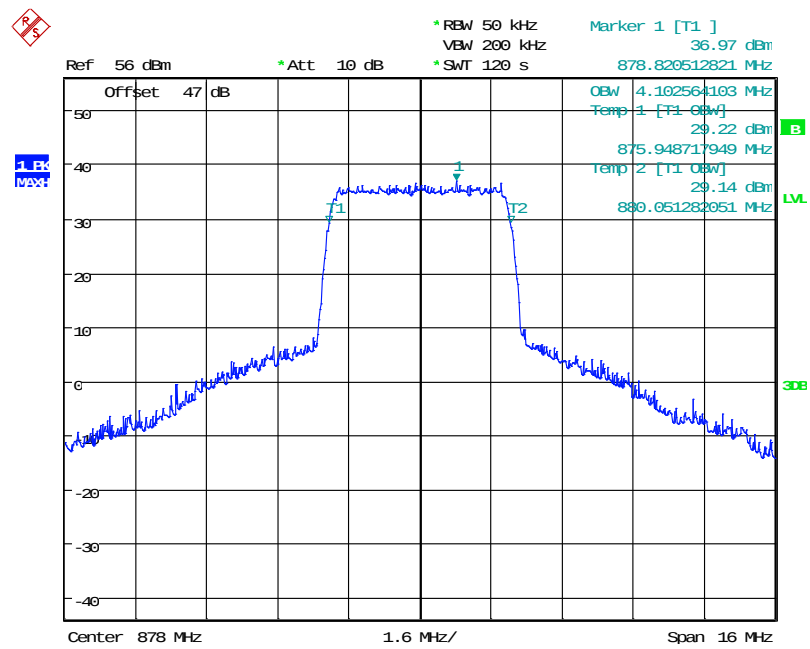
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869-894MHz AWGN ≤ AGC



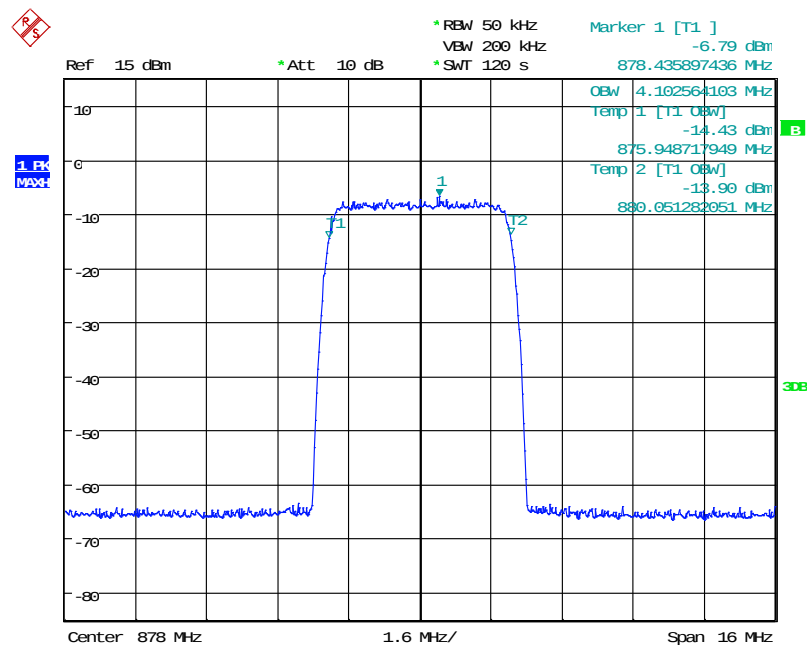
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869-894MHz AWGN 3dB above AGC



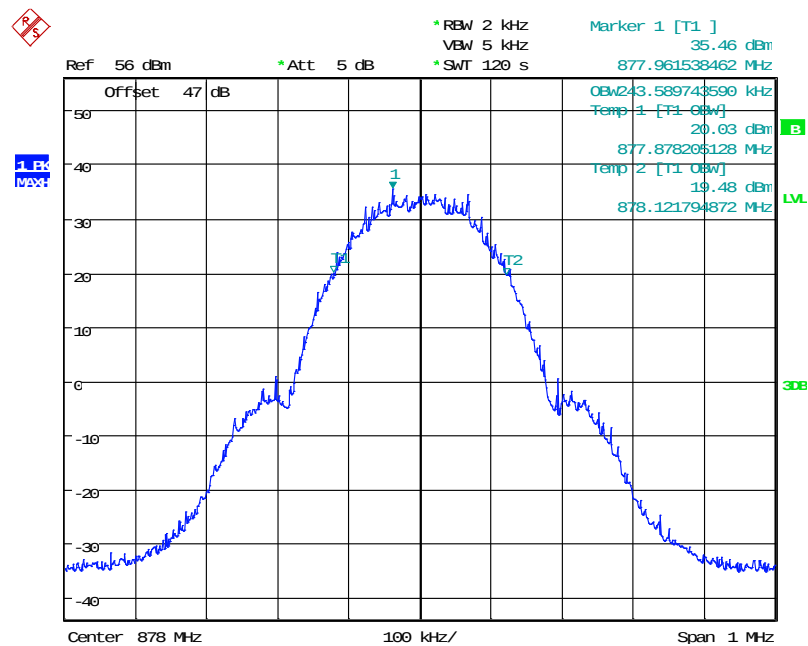
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869-894MHz AWGN Signal Generator only



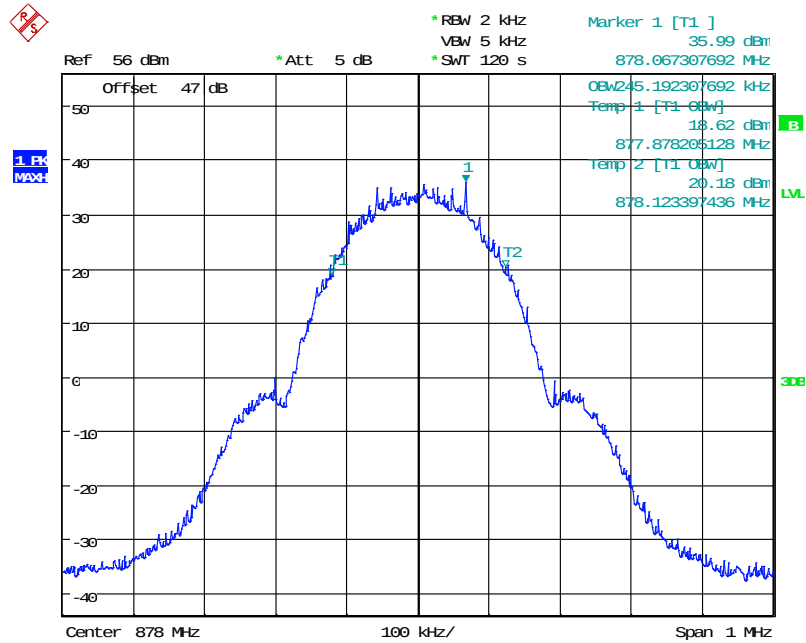
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869-894MHz MSK ≤ AGC



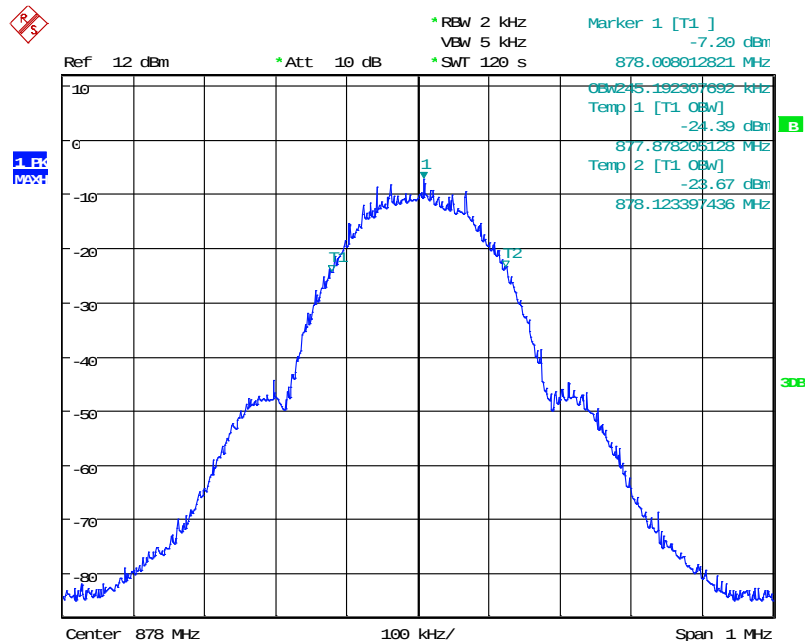
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869-894MHz MSK 3dB above AGC

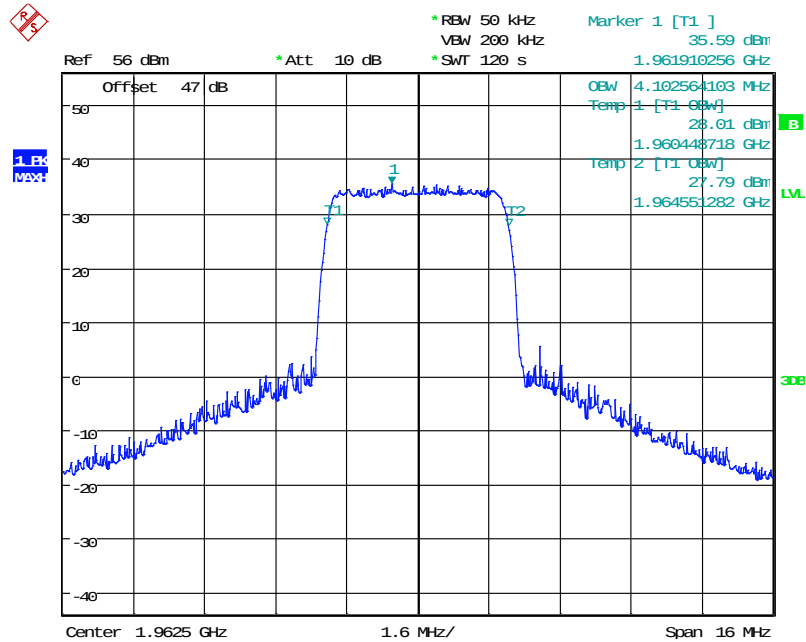


Date: 2.OCT.2015 12:22:24

869-894MHz MSK Signal Generator only

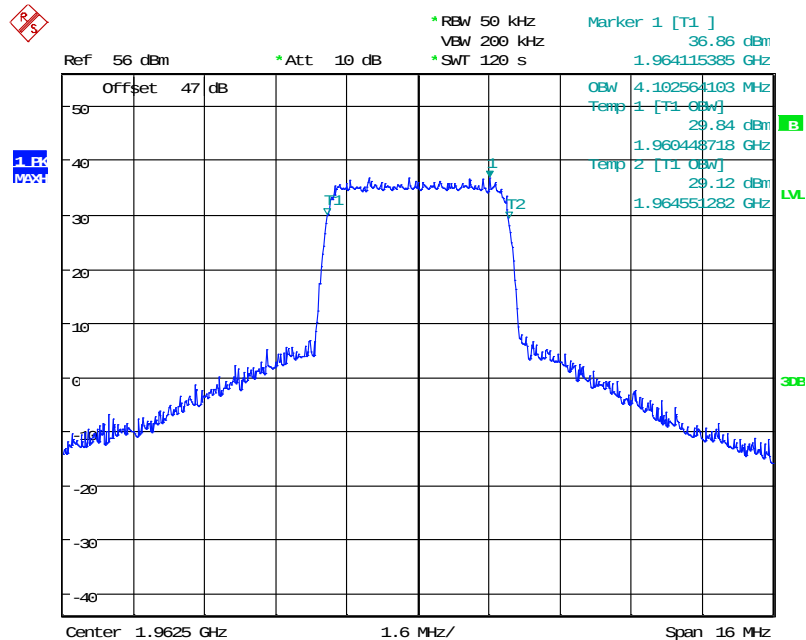


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1930-1995MHz AWGN $\leq$ AGC

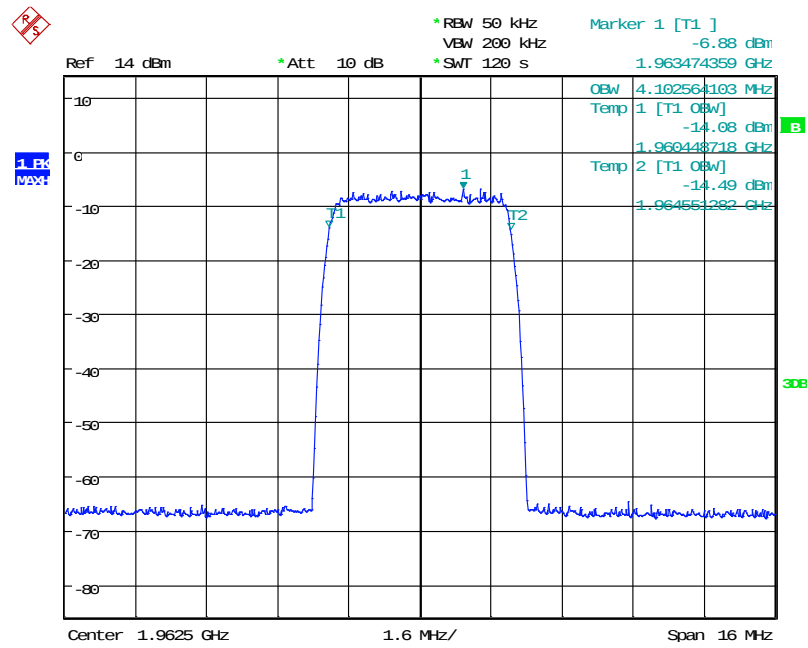
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1930-1955MHz AWGN 3dB above AGC



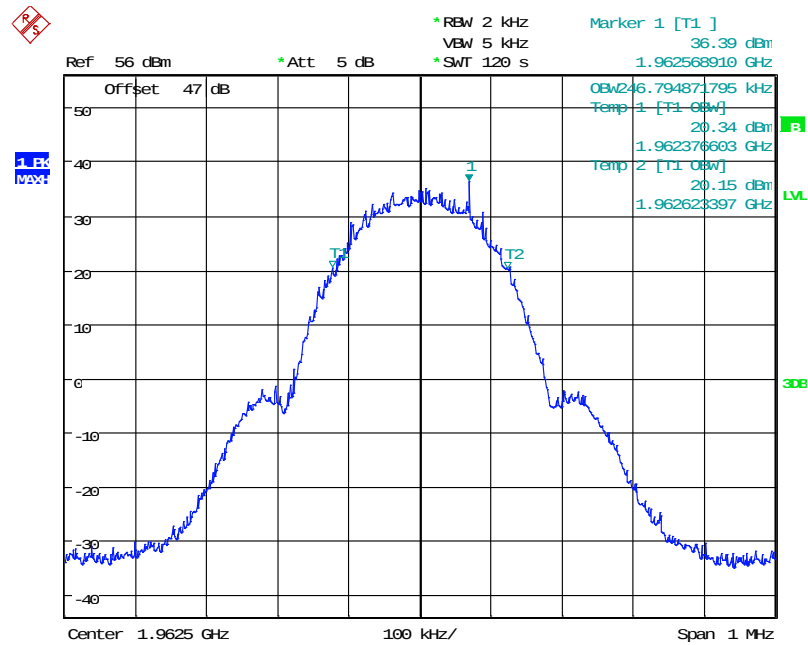
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1939-1955MHz AWGN Signal Generator only



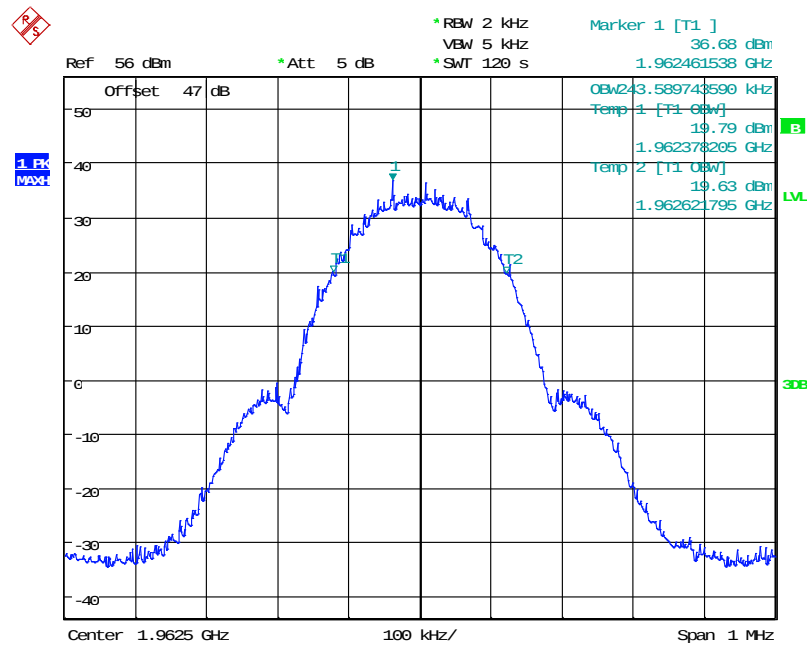
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1930-1955MHz MSK ≤ AGC



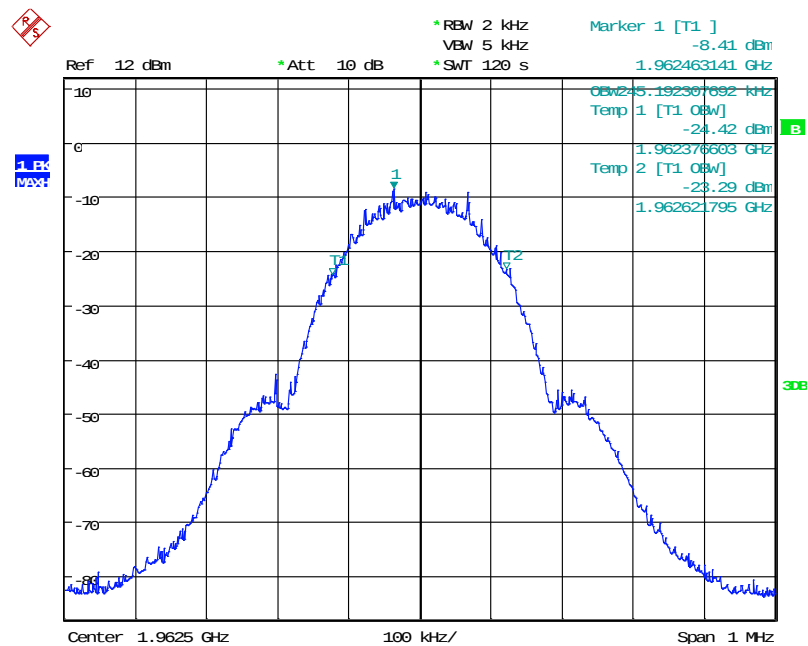
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1930-1955MHz MSK 3dB above AGC



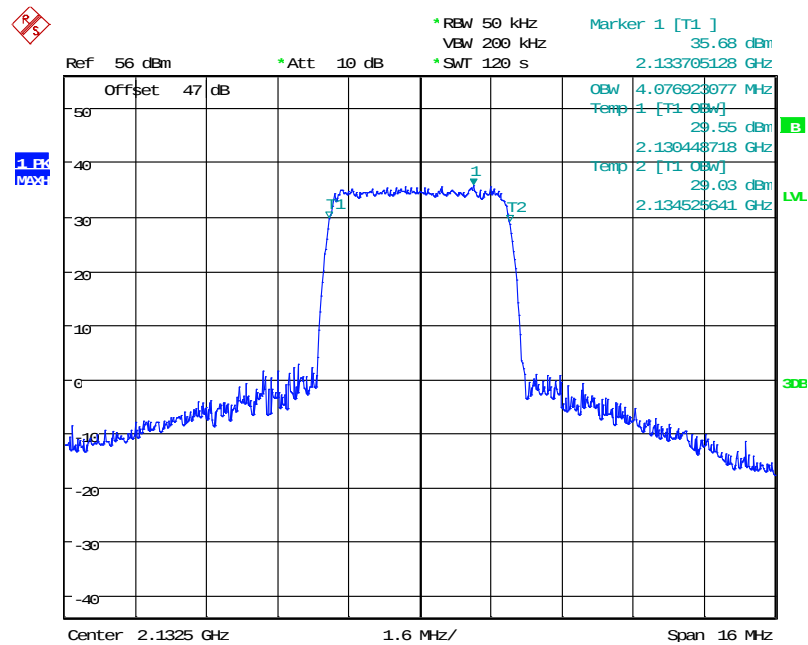
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1930-1955MHz MSK Signal Generator only



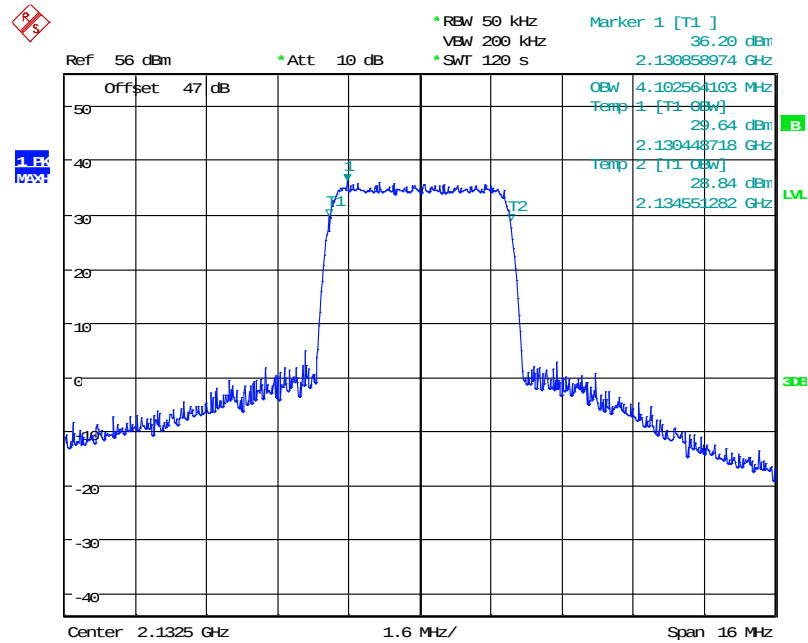
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2110-2155MHz AWGN ≤ AGC



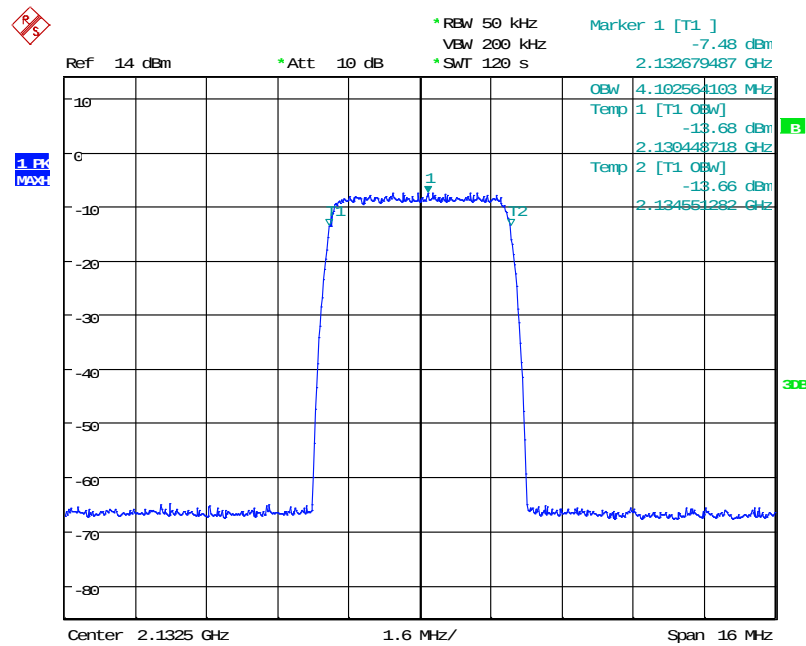
Date: 5.OCT.2015 13:04:46

2110-2155MHz AWGN 3dB above AGC



Date: 5.OCT.2015 13:07:15

2110-2155MHz AWGN Signal Generator only



Date: 5.OCT.2015 12:54:56

Bandwidth comparison results

Frequency Band MHz	Equipment under test or Signal Generator	Signal type	Bandwidth
728-746	Equipment	AWGN	4.076923MHz
728-746	Signal Generator	AWGN	4.102564MHz
728-746	Equipment	MSK	245.192307kHz
728-746	Signal Generator	MSK	245.192307kHz
869-894	Equipment	AWGN	4.102564MHz
869-894	Signal Generator	AWGN	4.102564MHz
869-894	Equipment	MSK	245.192307kHz
869-894	Signal Generator	MSK	245.192307kHz
1930-1995	Equipment	AWGN	4.102564MHz
1930-1995	Signal Generator	AWGN	4.102564MHz
1930-1995	Equipment	MSK	246.794871kHz
1930-1995	Signal Generator	MSK	245.192307kHz
2110-2155	Equipment	AWGN	4.102564MHz
2110-2155	Signal Generator	AWGN	4.102564MHz

A4 Mean output power and amplifier gain conducted

Test Details:	
Measurement standard	KDB935210 D05 Clause 3.5 Part 2.1046
EUT sample number	S01
Modification state	0
SE in test environment	S02
SE isolated from EUT	None
EUT set up	Refer to Appendix C

728-757MHz

Downlink @ AGC Threshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
742.500	MSK	-1.60	0.38	-3.60	46.4	44.78	42.80
742.500	AGWN	-1.70	0.38	-2.50	46.4	45.98	43.90

728-757MHz

Downlink @ AGC + 3dBThreshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
742.500	MSK	1.40	0.38	-3.20	46.40	42.18	43.20
742.500	AGWN	1.30	0.38	-2.20	46.40	43.28	44.20

869-894MHz

Downlink @ AGC Threshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
878.00	MSK	-0.90	0.45	-7.70	46.4	40.05	38.70
878.00	AGWN	-0.20	0.45	-6.60	46.4	40.45	39.80

869-894MHz

Downlink @ AGC + 3dBThreshold							
Channel Centre Frequency (MHz)	Modulation	Signal Generator output Level (dBm)	Input Cable Loss (dB)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator Loss (dB)	Gain (dB)	Conducted Output Power (dBm)
878.00	MSK	2.10	0.45	-7.30	46.40	37.45	39.10
878.00	AGWN	2.80	0.45	-6.30	46.40	37.75	40.10

1930-1995MHz

<i>Downlink @ AGC Threshold</i>							
<i>Channel Centre Frequency (MHz)</i>	<i>Modulation</i>	<i>Signal Generator output Level (dBm)</i>	<i>Input Cable Loss (dB)</i>	<i>Level at Spectrum Analyser (dBm)</i>	<i>Output Cable & Attenuator Loss (dB)</i>	<i>Gain (dB)</i>	<i>Conducted Output Power (dBm)</i>
1962.5	MSK	3.90	0.73	-3.80	46.2	39.23	42.40
1962.5	AGWN	4.80	0.73	-2.50	46.2	39.63	43.70

<i>Downlink @ AGC +3dB Threshold</i>							
<i>Channel Centre Frequency (MHz)</i>	<i>Modulation</i>	<i>Signal Generator output Level (dBm)</i>	<i>Input Cable Loss (dB)</i>	<i>Level at Spectrum Analyser (dBm)</i>	<i>Output Cable & Attenuator Loss (dB)</i>	<i>Gain (dB)</i>	<i>Conducted Output Power (dBm)</i>
1962.5	MSK	6.90	0.73	-3.60	46.20	36.43	42.60
1962.5	AGWN	7.80	0.73	-2.70	46.20	36.43	43.50

2110-2155MHz

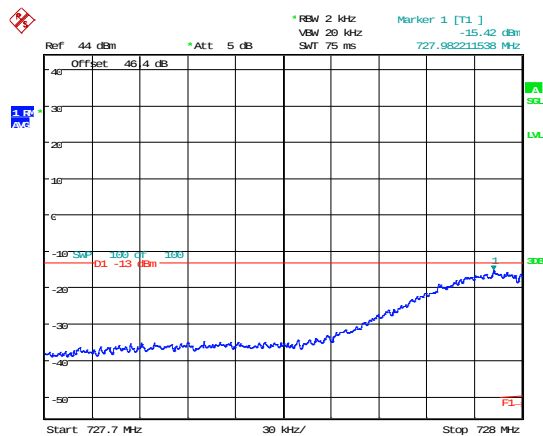
<i>Downlink @ AGC Threshold</i>							
<i>Channel Centre Frequency (MHz)</i>	<i>Modulation</i>	<i>Signal Generator output Level (dBm)</i>	<i>Input Cable Loss (dB)</i>	<i>Level at Spectrum Analyser (dBm)</i>	<i>Output Cable & Attenuator Loss (dB)</i>	<i>Gain (dB)</i>	<i>Conducted Output Power (dBm)</i>
2132.5	AGWN	3.50	0.90	-2.00	46.4	41.80	44.40

<i>Downlink @ AGC+3dB Threshold</i>							
<i>Channel Centre Frequency (MHz)</i>	<i>Modulation</i>	<i>Signal Generator output Level (dBm)</i>	<i>Input Cable Loss (dB)</i>	<i>Level at Spectrum Analyser (dBm)</i>	<i>Output Cable & Attenuator Loss (dB)</i>	<i>Gain (dB)</i>	<i>Conducted Output Power (dBm)</i>
2132.5	AGWN	6.50	0.90	-1.70	46.40	39.10	44.70

A5 EUT out-of-band/block emissions conducted

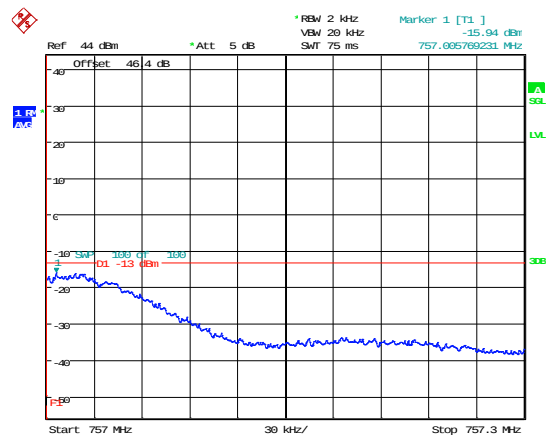
Test Details:	
Measurement standard	KDB935210 D05 Clause 3.6.2 Part2.1051
EUT sample number	S01
Modification state	0
SE in test environment	S02
SE isolated from EUT	None
EUT set up	Refer to Appendix C

728-757MHz 2 x MSK $\leq$ AGC lower



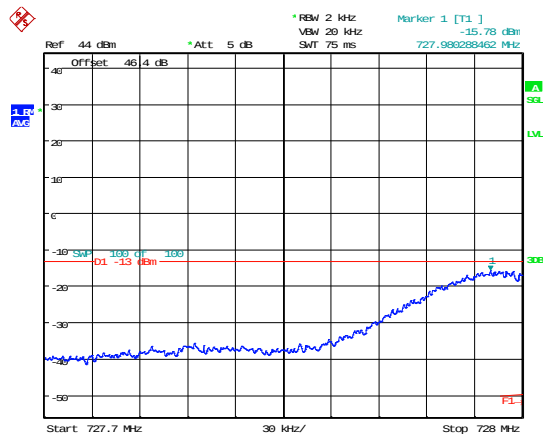
Date: 5.JAN.2016 16:17:11

728-757MHz 2 x MSK $\leq$ AGC Upper



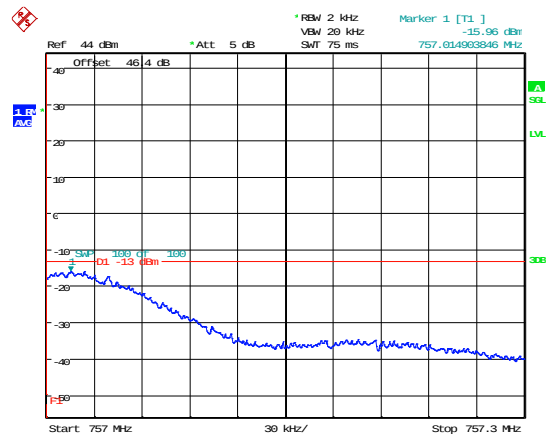
Date: 5.JAN.2016 16:28:57

728-757MHz 2 x MSK AGC +3dB lower



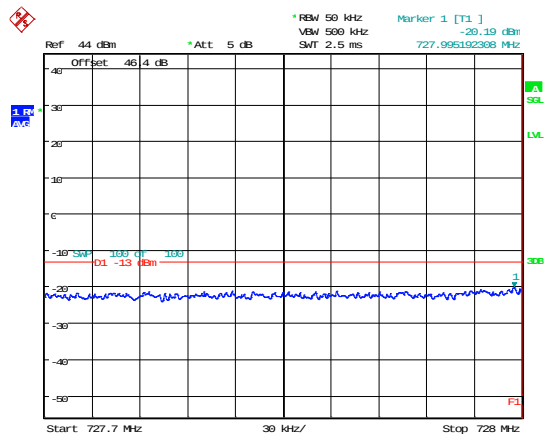
Date: 5.JAN.2016 16:17:46

728-757MHz 2 x MSK AGC +3dB upper



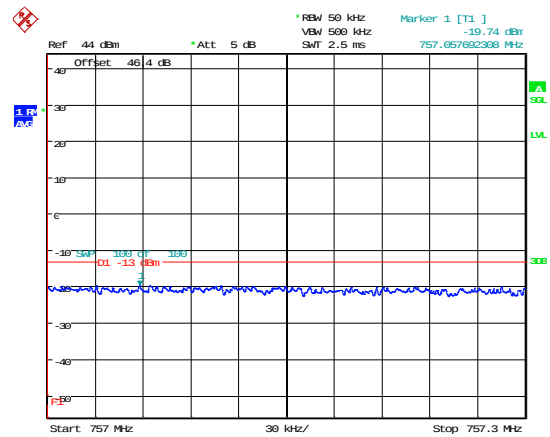
Date: 5.JAN.2016 16:29:31

728-757MHz 2 x AWGN $\leq$ AGC lower



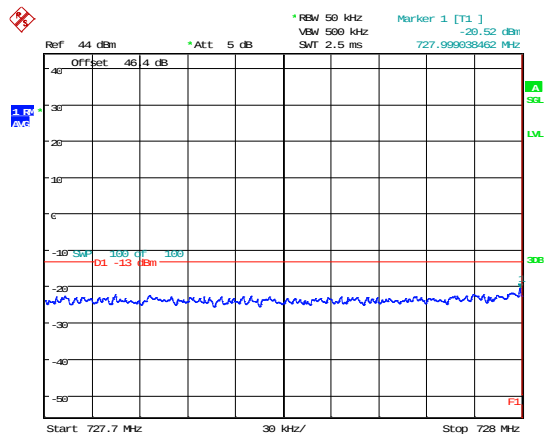
Date: 5. JAN. 2016 15:52:29

728-757MHz 2 x AWGN $\leq$ AGC Upper



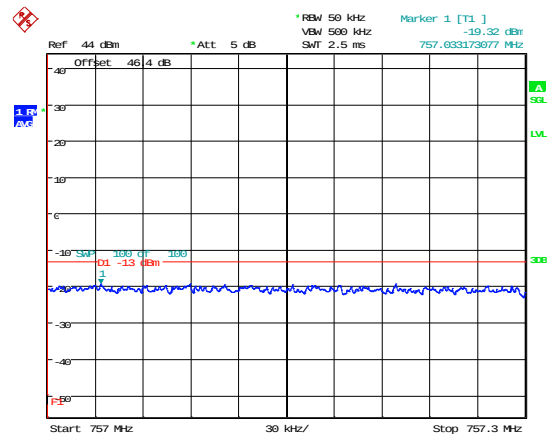
Date: 5. JAN. 2016 15:59:12

728-757MHz 2 x MSK AGC +3dB lower



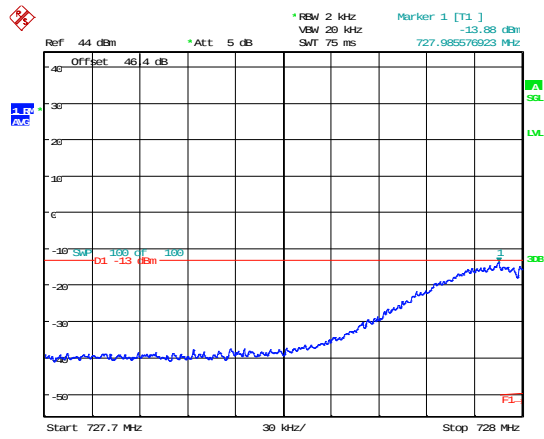
Date: 5. JAN. 2016 15:53:02

728-757MHz 2 x MSK AGC +3dB upper



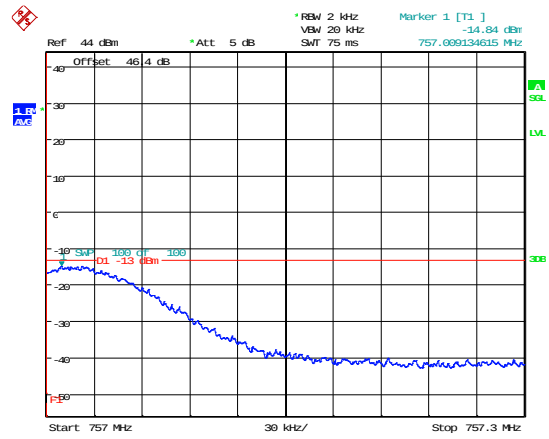
Date: 5. JAN. 2016 15:59:55

728-757MHz 1 x MSK ≤ AGC lower



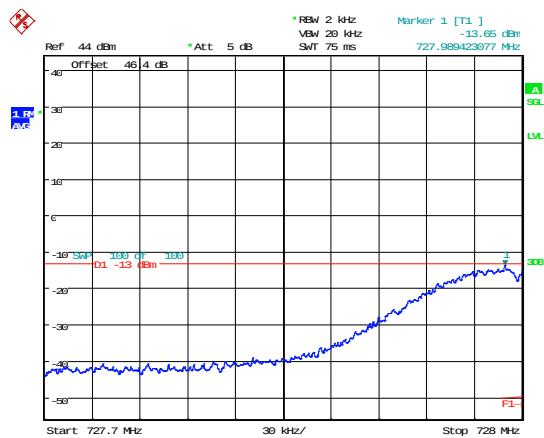
Date: 5.JAN.2016 16:23:46

728-757MHz 1 x MSK ≤ AGC Upper



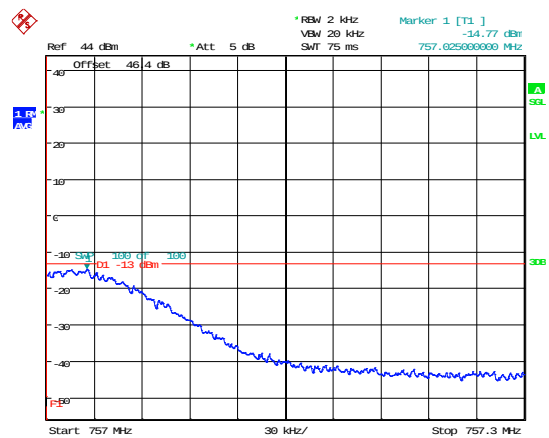
Date: 5.JAN.2016 16:34:56

728-757MHz 1 x MSK AGC +3dB lower



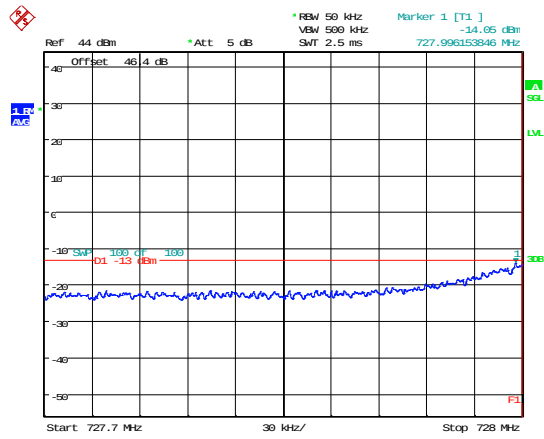
Date: 5.JAN.2016 16:24:20

728-757MHz 1 x MSK AGC +3dB upper



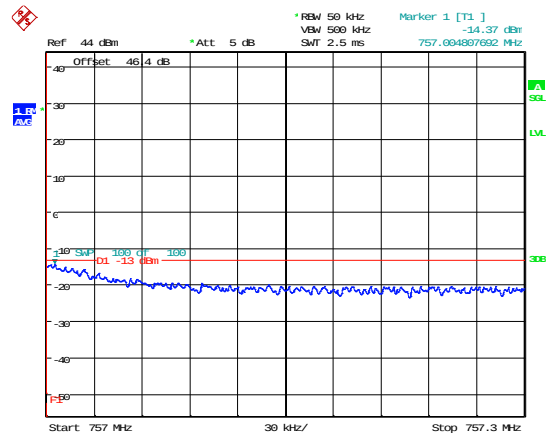
Date: 5.JAN.2016 16:35:28

728-757MHz 1 x AWGN $\leq$ AGC lower



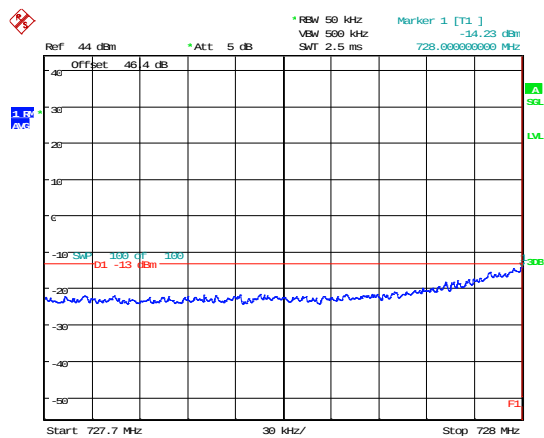
Date: 5.JAN.2016 15:55:25

728-757MHz 1 x AWGN $\leq$ AGC Upper



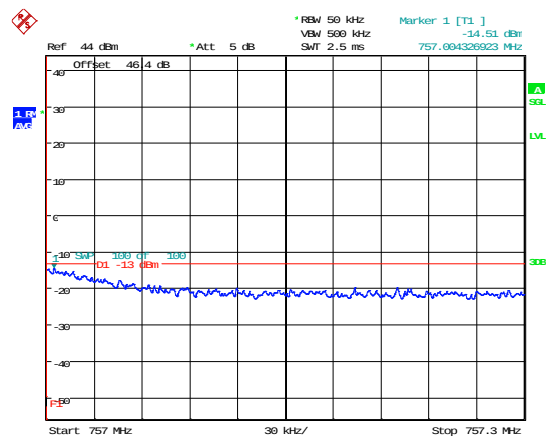
Date: 5.JAN.2016 16:04:02

728-757MHz 1 x AWGN AGC +3dB lower

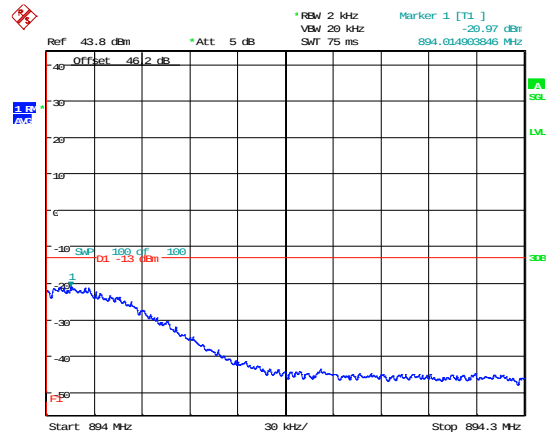


Date: 5.JAN.2016 15:55:52

728-757MHz 1 x AWGN AGC +3dB upper

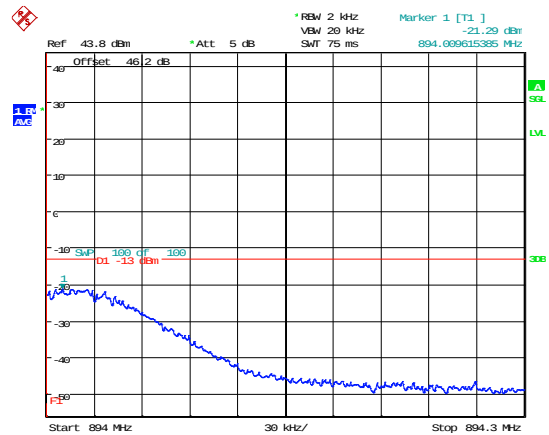


Date: 5.JAN.2016 16:04:24

862-894MHz 2 x MSK $\leq$ AGC Upper

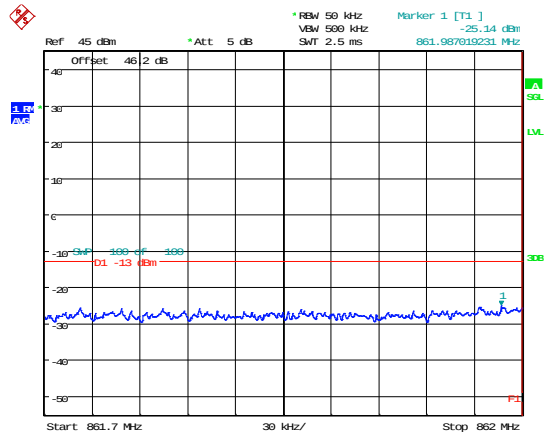
Date: 6.JAN.2016 09:14:56

862-894MHz 2 x MSK AGC +3dB upper



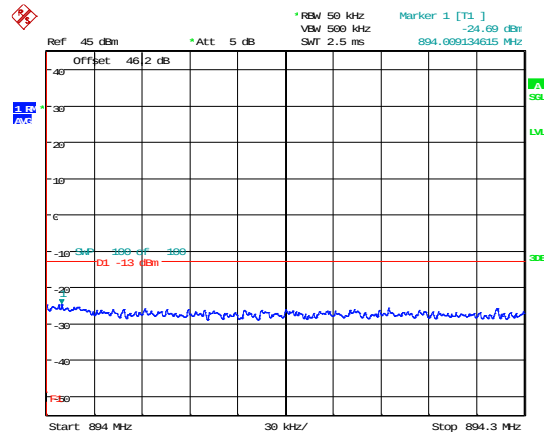
Date: 6.JAN.2016 09:15:33

862-894MHz 2 x AWGN $\leq$ AGC lower



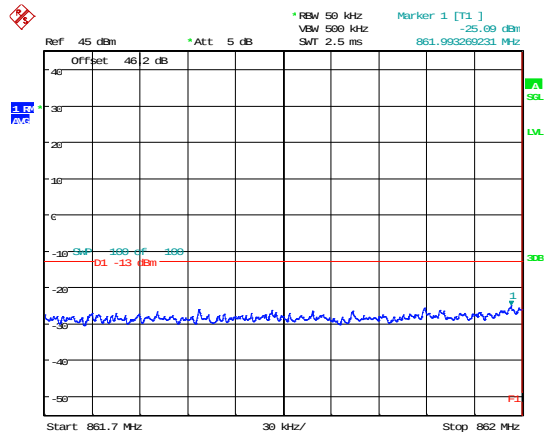
Date: 5.JAN.2016 15:02:10

862-894MHz 2 x AWGN $\leq$ AGC Upper



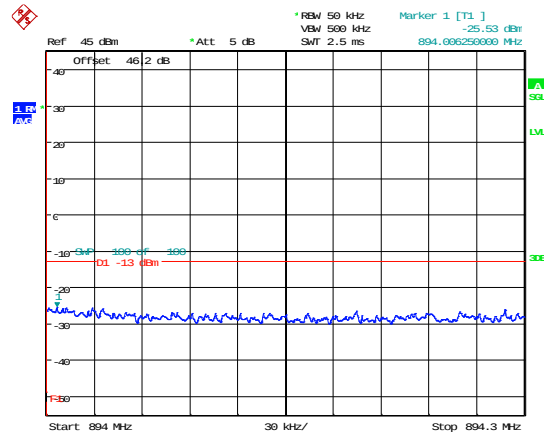
Date: 5.JAN.2016 15:07:48

862-894MHz 2 x AWGN AGC +3dB lower



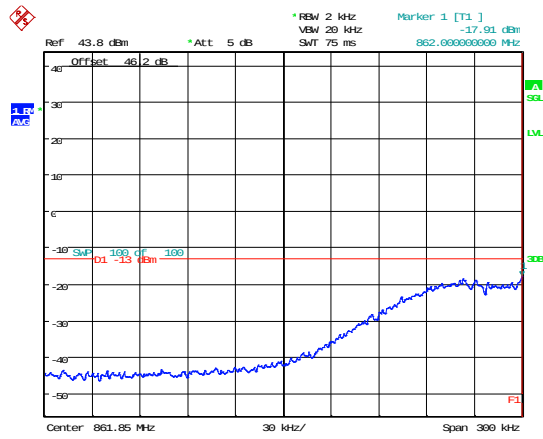
Date: 5.JAN.2016 15:02:43

862-894MHz 2 x MSK AGC +3dB upper



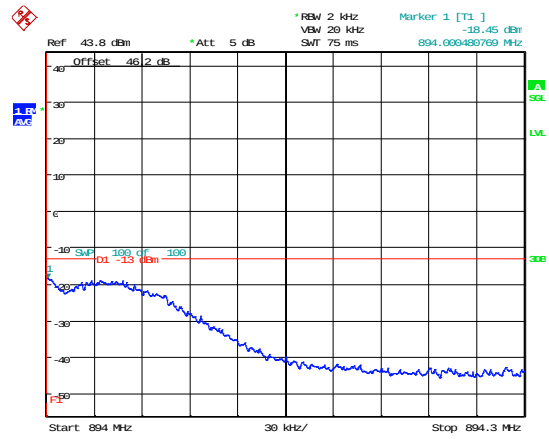
Date: 5.JAN.2016 15:08:22

862-894MHz 1 x MSK $\leq$ AGC lower



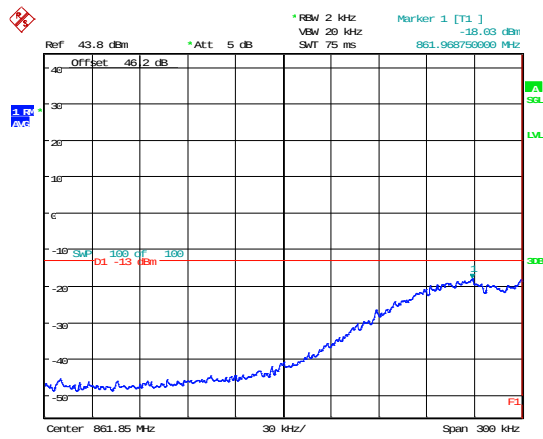
Date: 6.JAN.2016 09:07:53

862-894MHz 1 x MSK $\leq$ AGC Upper



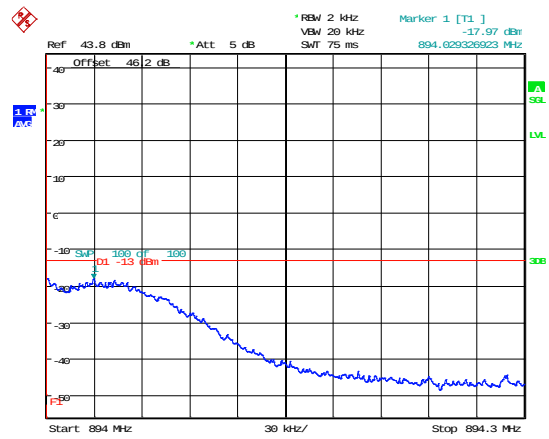
Date: 6.JAN.2016 09:19:41

862-894MHz 1 x MSK AGC+3dB lower



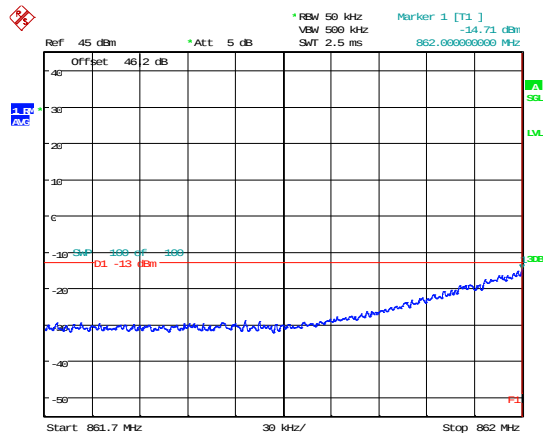
Date: 6.JAN.2016 09:08:29

862-894MHz 1 x MSK AGC+3dB upper



Date: 6.JAN.2016 09:19:14

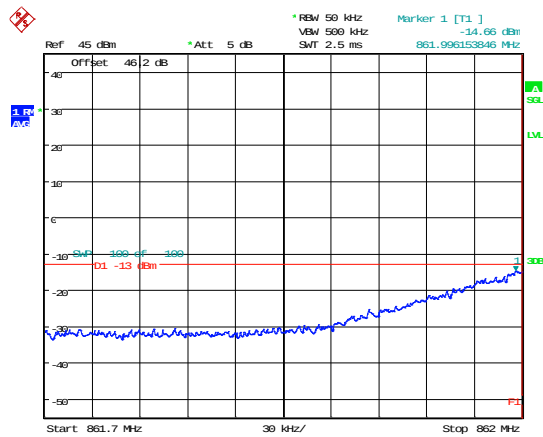
862-894MHz 1 x AWGN $\leq$ AGC Upper



Date: 5.JAN.2016 15:03:52

Date: 5.JAN.2016 15:10:31

862-894MHz 1 x AWGN AGC+3dB upper

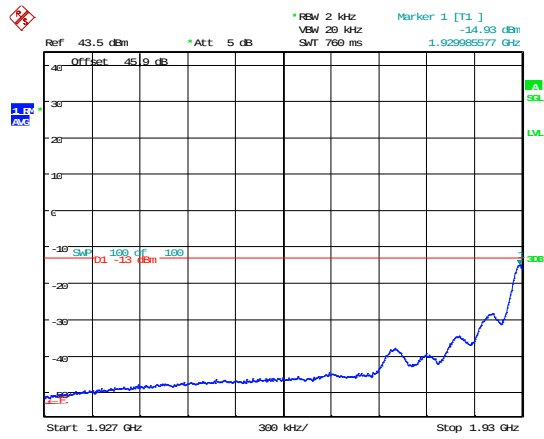


Date: 5.JAN.2016 15:04:17

[illegible]

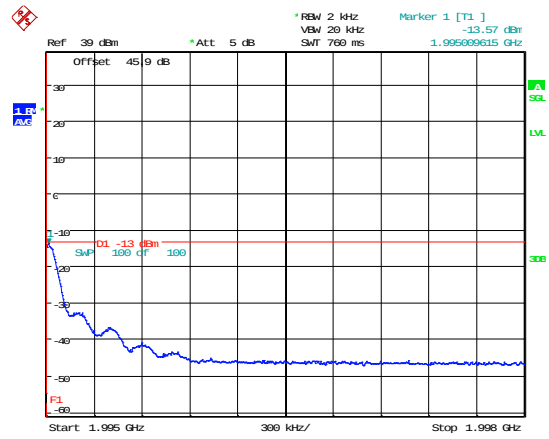
Date: 5.JAN.2016 15:10:52

1930-1995MHz 2 x MSK ≤ AGC lower



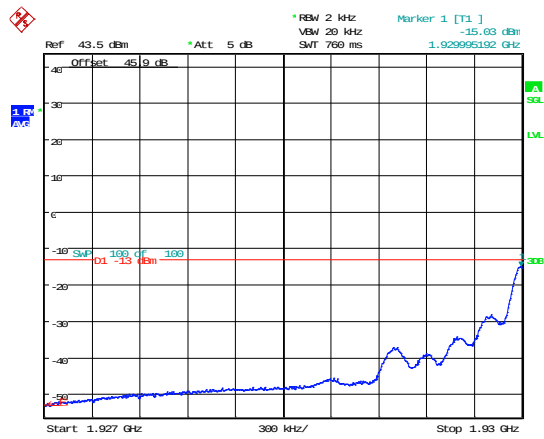
Date: 6.JAN.2016 09:36:29

1930-1995MHz 2 x MSK ≤ AGC Upper



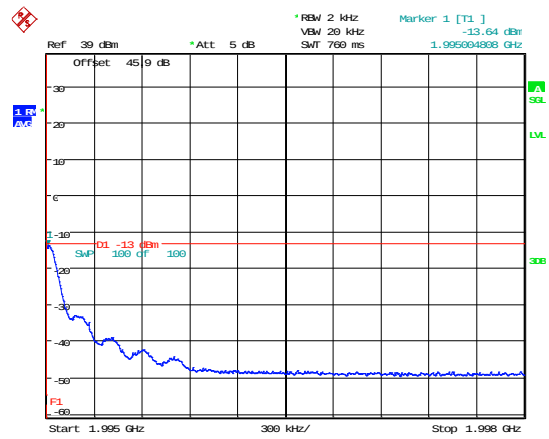
Date: 6.JAN.2016 09:58:18

1930-1995MHz 2 x MSK AGC +3dB lower



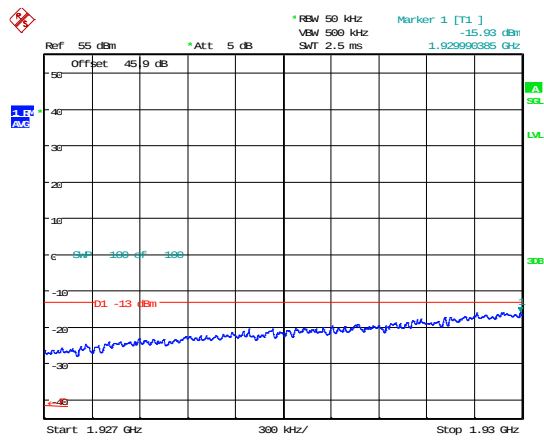
Date: 6.JAN.2016 09:38:22

1930-1995MHz 2 x MSK AGC +3dB upper



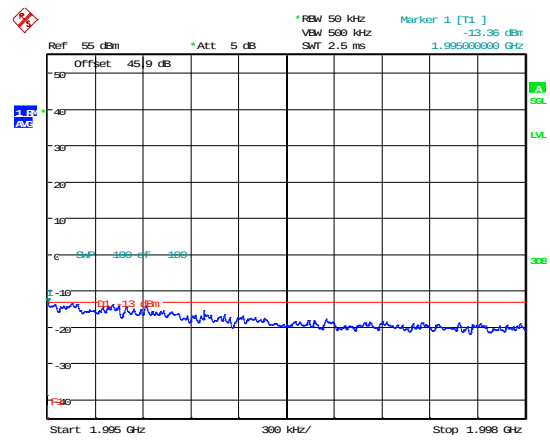
Date: 6.JAN.2016 10:00:06

1930-1995MHz 2 x AWGN $\leq$ AGC lower



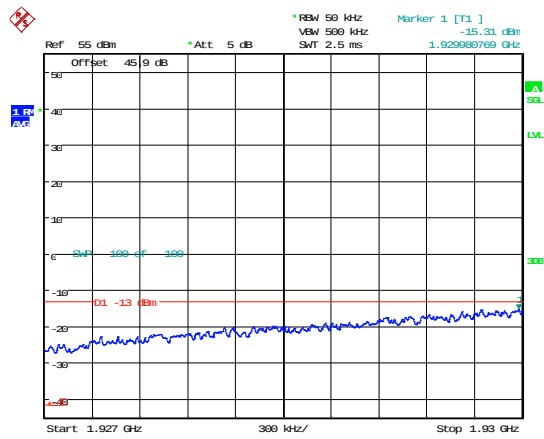
Date: 5. JAN. 2016 12:00:58

1930-1995MHz 2 x AWGN $\leq$ AGC Upper



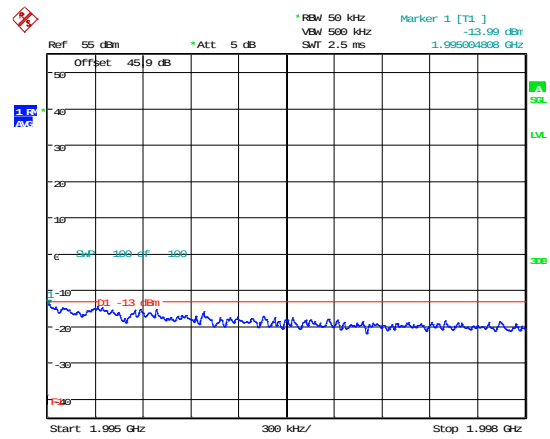
Date: 5. JAN. 2016 12:17:06

1930-1995MHz 2 x AWGN AGC +3dB lower



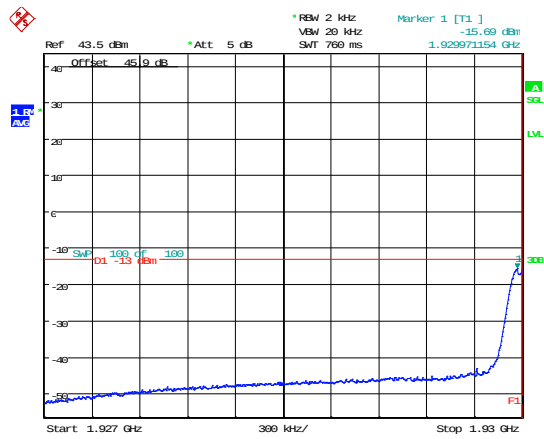
Date: 5. JAN. 2016 12:01:37

1930-1995MHz 2 x AWGN AGC +3dB upper



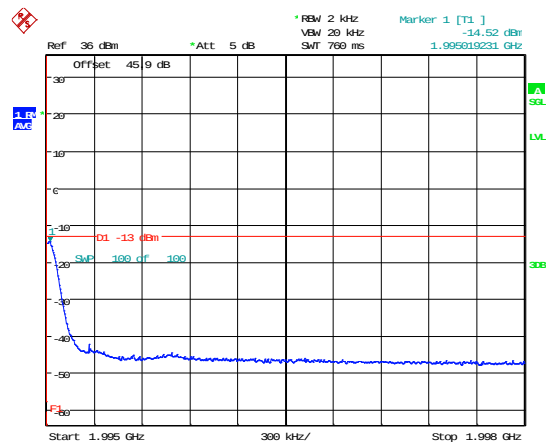
Date: 5. JAN. 2016 12:18:05

1930-1995MHz 1 x MSK $\leq$ AGC lower



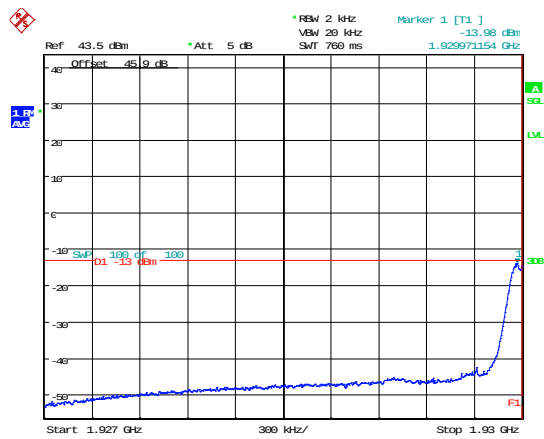
Date: 6.JAN.2016 09:44:37

1930-1995MHz 1 x MSK $\leq$ AGC Upper



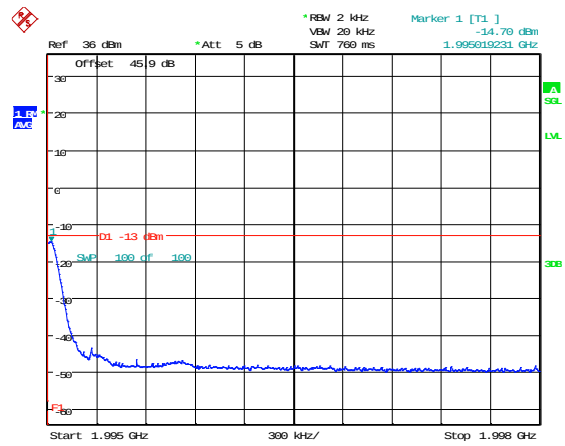
Date: 6.JAN.2016 10:06:13

1930-1995MHz 1 x MSK AGC +3dB lower



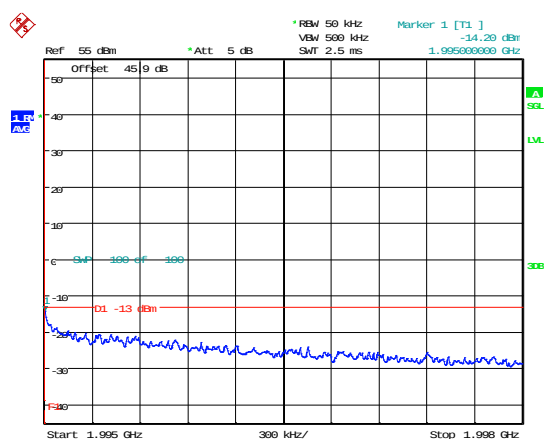
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1930-1995MHz 1 x MSK AGC +3dB upper



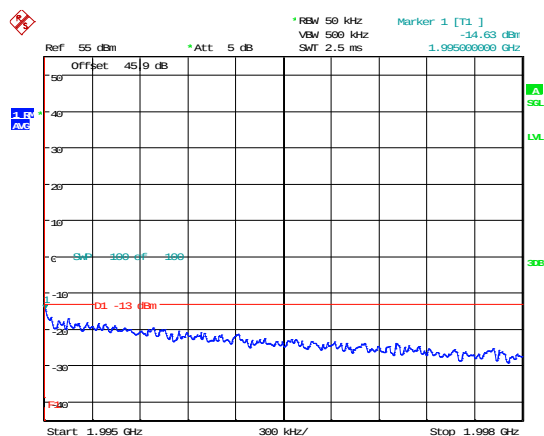
Date: 6.JAN.2016 10:08:40

1930-1995MHz 1 x AWGN $\leq$ AGC Upper



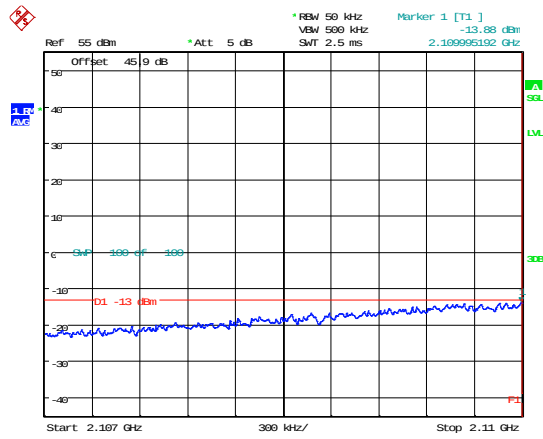
Date: 5.JAN.2016 13:09:55

1930-1995MHz 1 x AWGN AGC +3dB upper



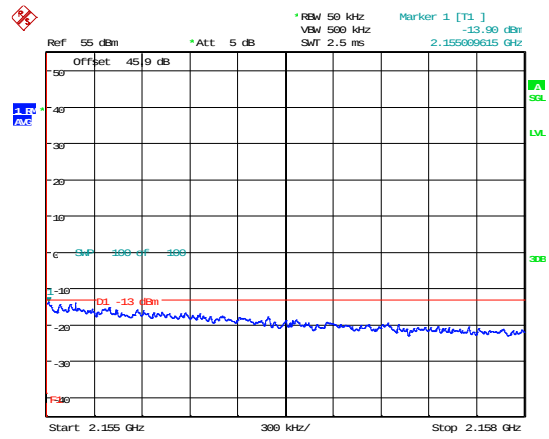
Date: 5.JAN.2016 13:10:17

2110-2155MHz 2 x AWGN $\leq$ AGC lower



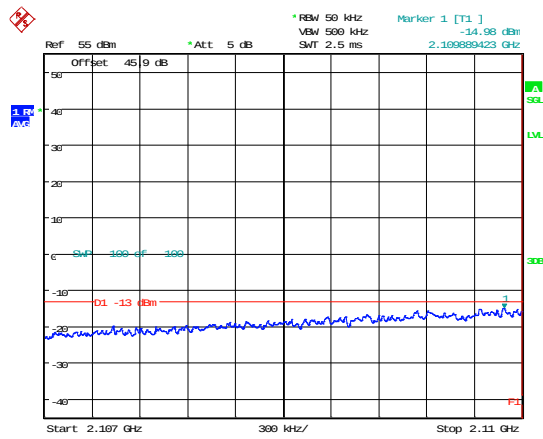
Date: 5. JAN. 2016 13:28:17

2110-2155MHz 2 x AWGN $\leq$ AGC Upper



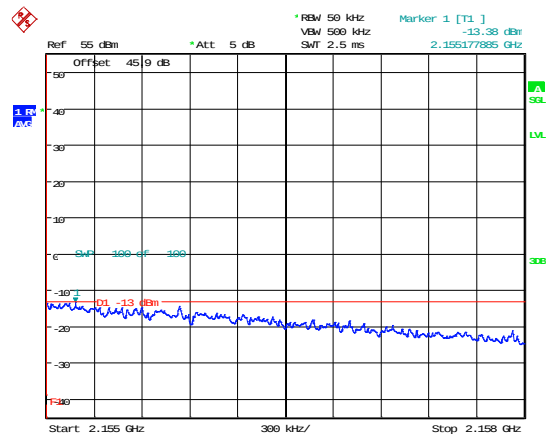
Date: 5. JAN. 2016 13:45:56

2110-2155MHz 2 x AWGN AGC +3dB lower



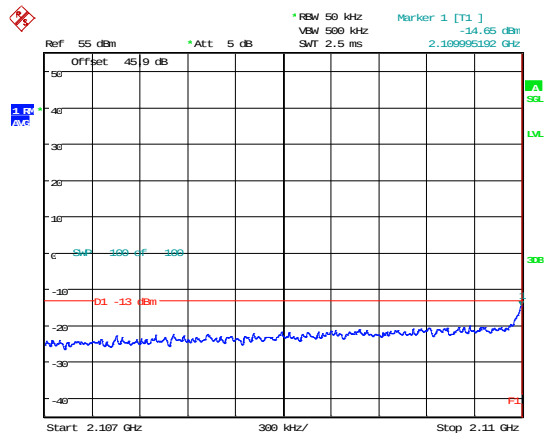
Date: 5. JAN. 2016 13:28:48

2110-2155MHz 2 x AWGN AGC +3dB upper



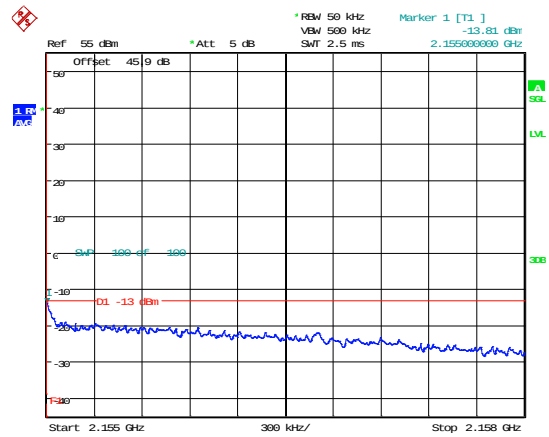
Date: 5. JAN. 2016 13:48:00

2110-2155MHz 1 x AWGN $\leq$ AGC lower



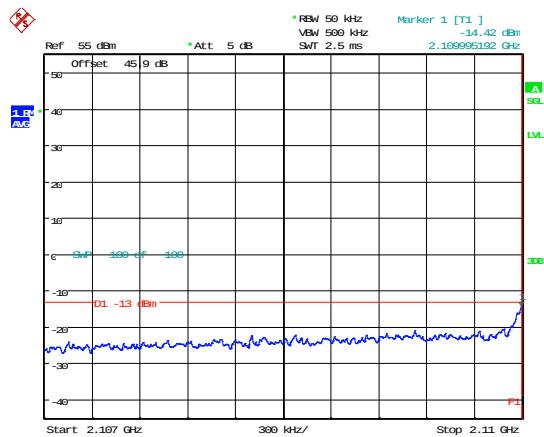
Date: 5.JAN.2016 13:32:15

2110-2155MHz 1 x AWGN $\leq$ AGC Upper



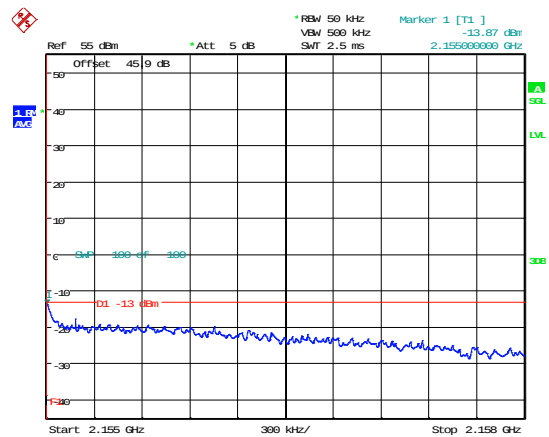
Date: 5.JAN.2016 13:52:37

2110-2155MHz 1 x AWGN AGC +3dB lower



Date: 5.JAN.2016 13:32:37

2110-2155MHz 1 x AWGN AGC +3dB upper



Date: 5.JAN.2016 13:53:00

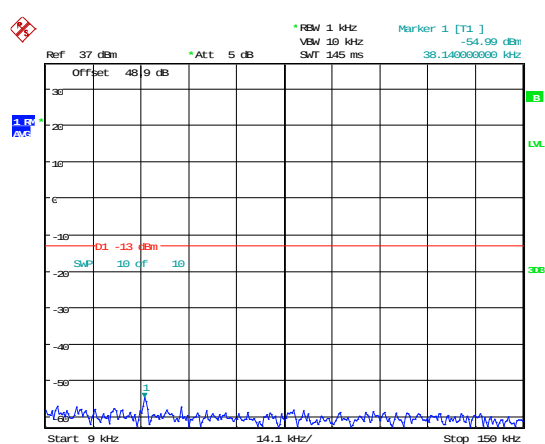
A6 EUT spurious emissions conducted

Test Details:	
Measurement standard	KDB935210 D05 Clause 3.6.3 Part 2.1051
EUT sample number	S01
Modification state	0
SE in test environment	S02
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Note: # = For reduced RBW see FCC KDB response to tracking number 472337 Appendix D

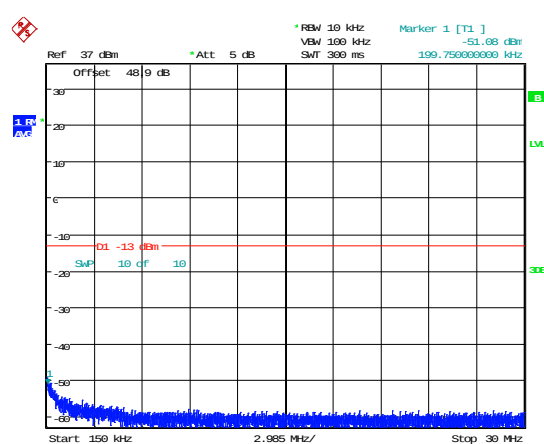
* = pre scan plot only, notch filter removed, see table A for results.

728-757MHz bottom MSK 9-150 kHz



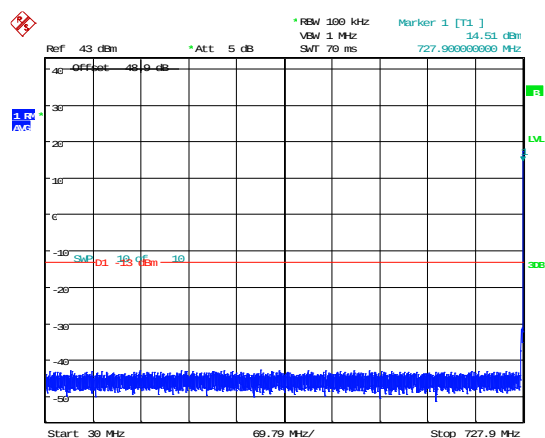
Date: 18-AUG-2015 16:28:09

728-757MHz bottom MSK 150 kHz-30MHz



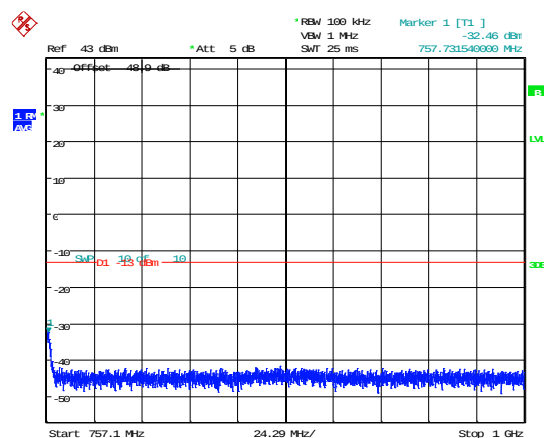
Date: 18.AUG.2015 16:28:53

728-757MHz bottom MSK 30MHz – 727.9MHz



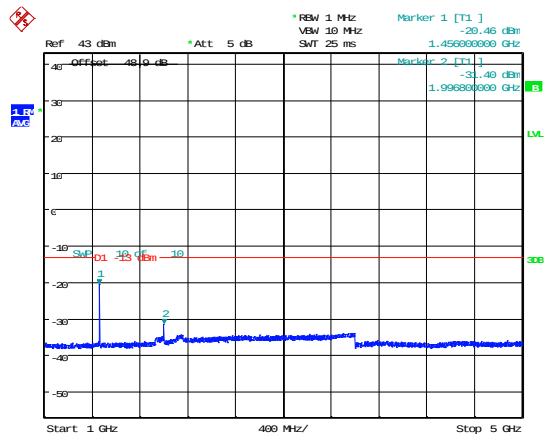
Date: 18.AUG.2015 16:30:59

728-757MHz bottom MSK 757.1MHz-1GHz



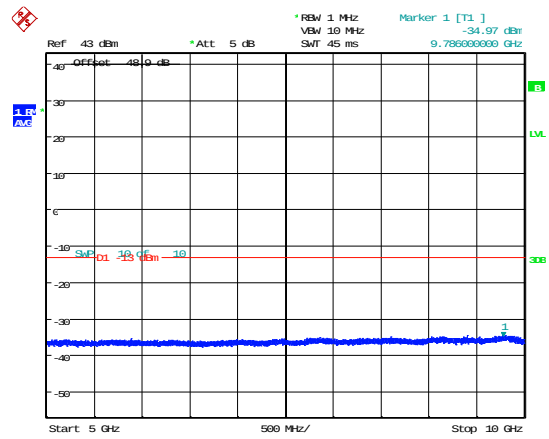
Date: 18.AUG.2015 16:31:44

728-757MHz bottom MSK 1GHz -5GHz *



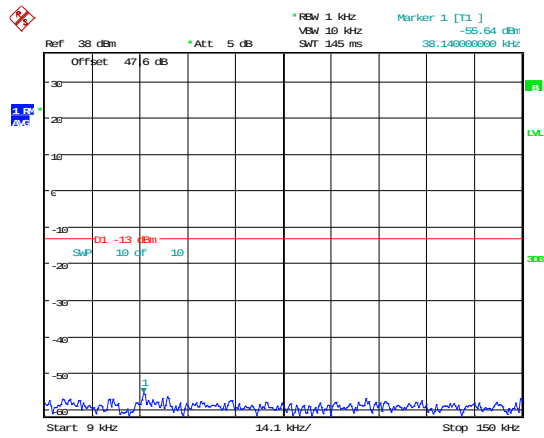
Date: 18.AUG.2015 16:32:24

728-757MHz bottom MSK 5GHz-10GHz



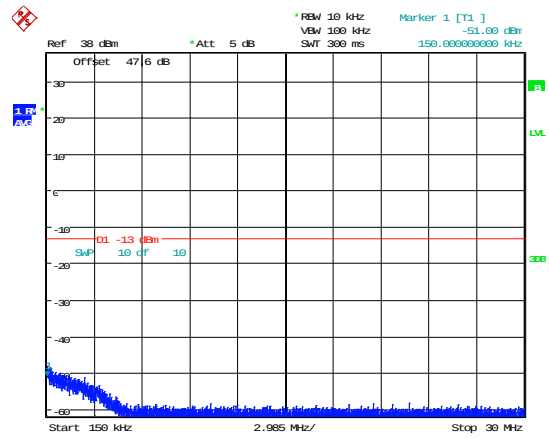
Date: 18.AUG.2015 16:32:54

728-757MHz bottom AWGN 9-150 kHz



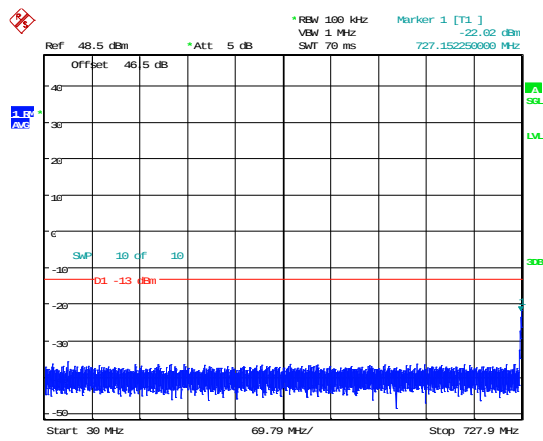
Date: 18.AUG.2015 11:46:22

728-757MHz bottom AWGN150 kHz-30MHz



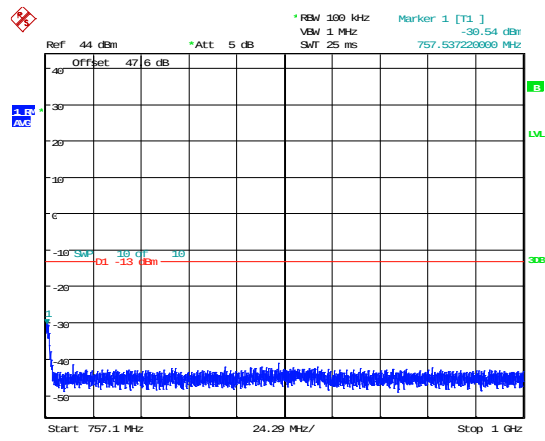
Date: 18.AUG.2015 11:47:03

728-757MHz bottom AWGN 30MHz – 727.9MHz



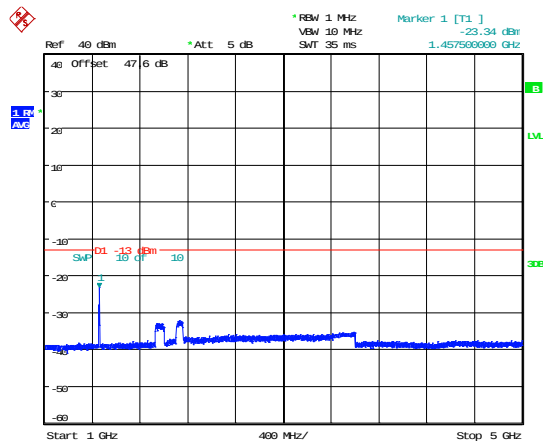
Date: 15.APR.2016 10:21:38

728-757MHz bottom AWGN 757.1MHz-1GHz



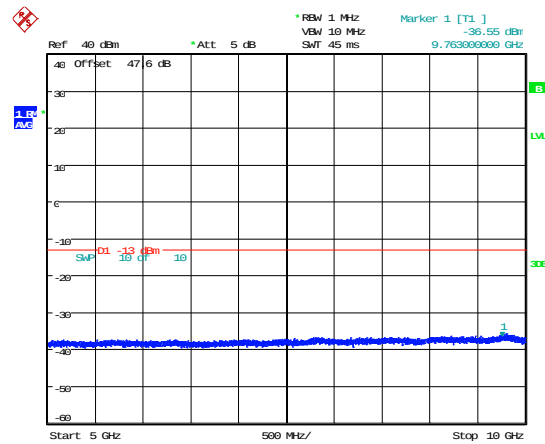
Date: 18.AUG.2015 11:50:19

728-757MHz bottom AWGN 1GHz -5GHz*



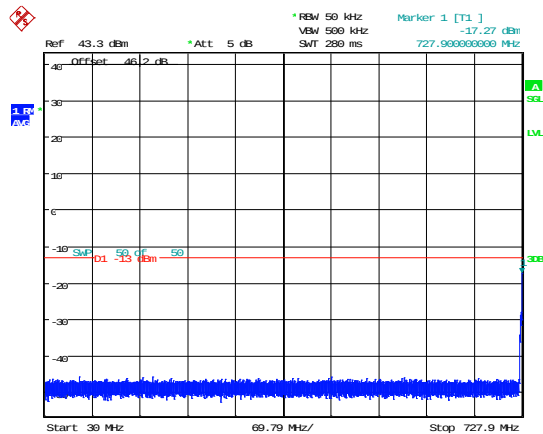
Date: 18.AUG.2015 11:51:28

728-757MHz bottom AWGN 5GHz-10GHz



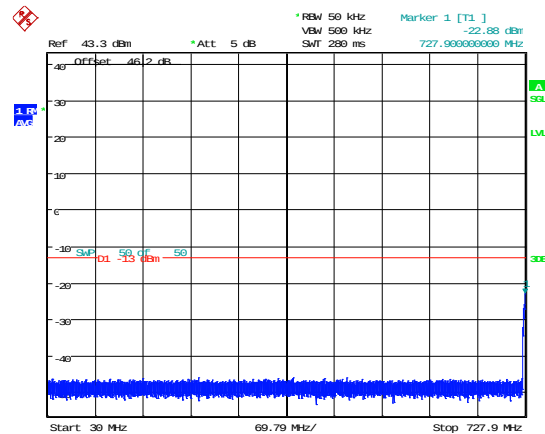
Date: 18.AUG.2015 11:52:01

728-757MHz bottom MSK 30MHz – 727.9MHz #



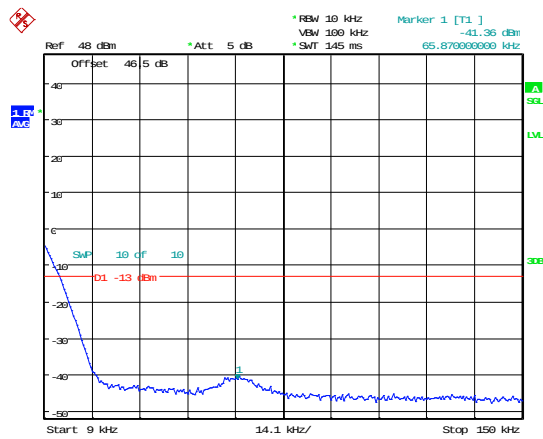
Date: 7.JAN.2016 10:59:15

728-757MHz bottom AWGN 30MHz – 727.9MHz#



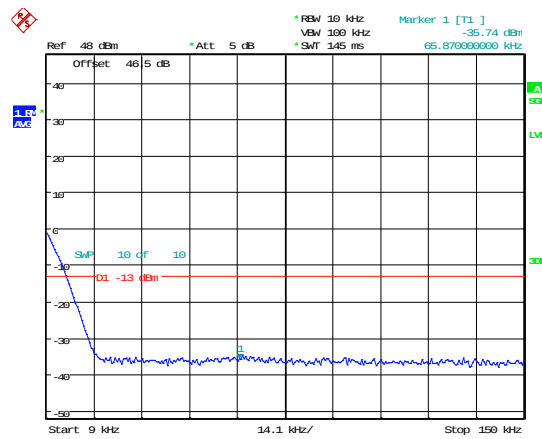
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728-757MHz bottom MSK 9-150 kHz



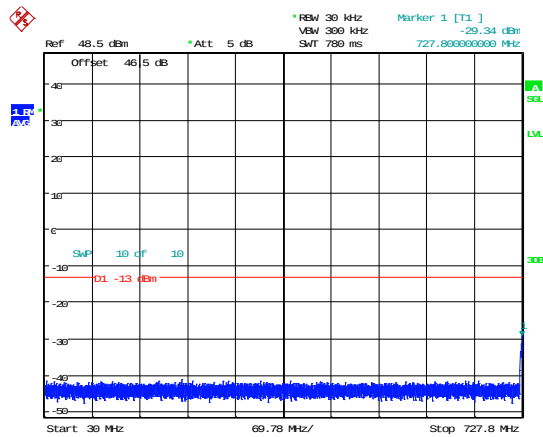
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728-757MHz bottom AWGN 9-150 kHz



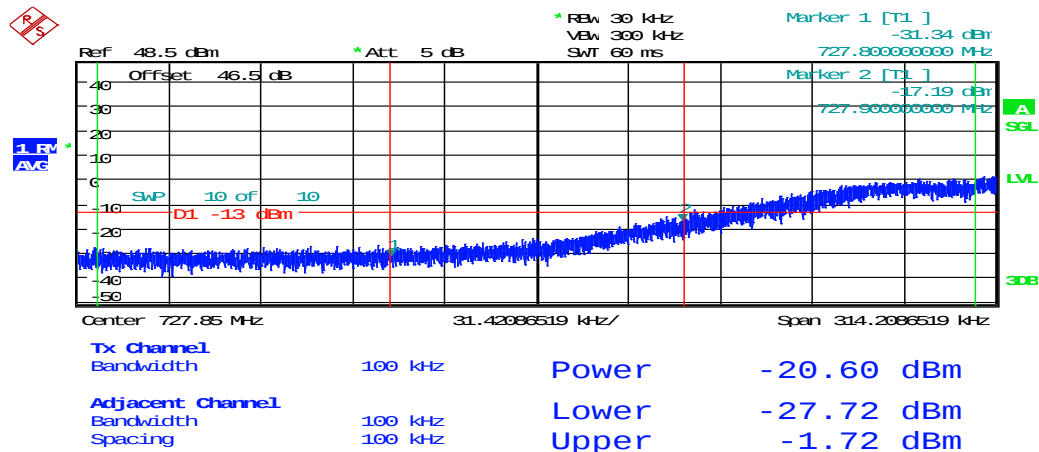
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728-757 Bottom MSK

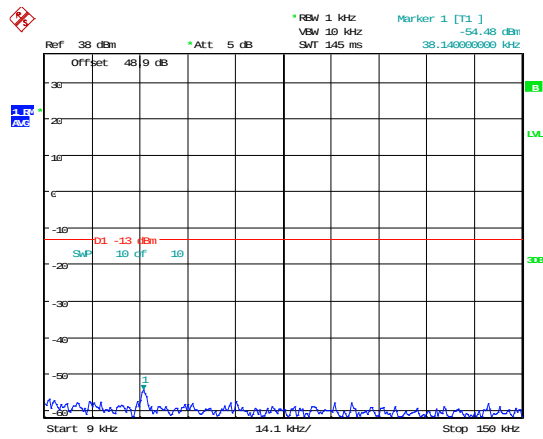


Date: 15.APR.2016 11:22:55

728-757 Bottom MSK ACP

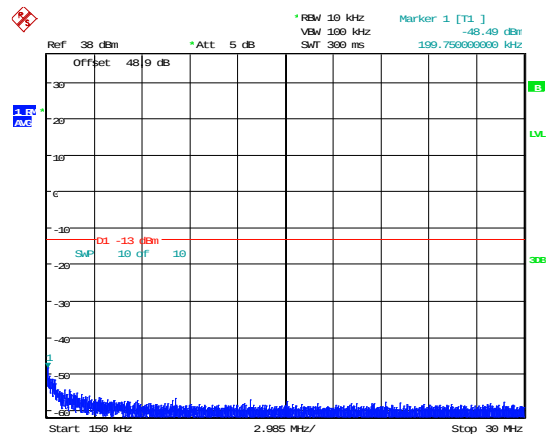


728-757MHz Mid MSK 9-150 kHz



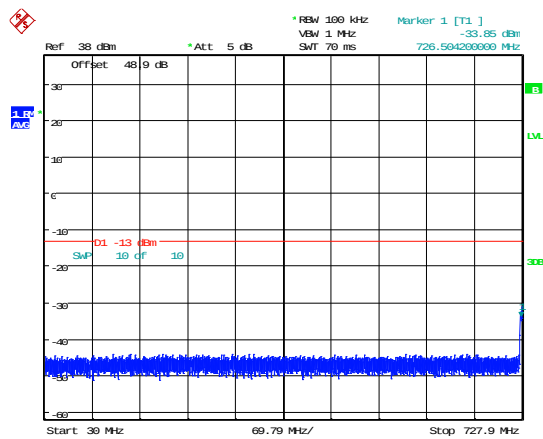
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728-757MHz Mid MSK 150 kHz-30MHz



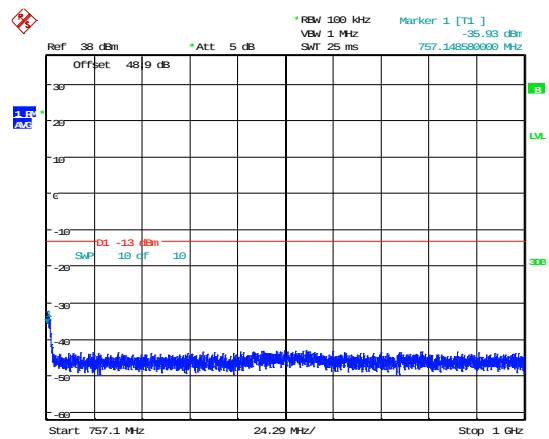
Date: 18.AUG.2015 16:37:28

728-757MHz Mid MSK 30MHz-727.9MHz



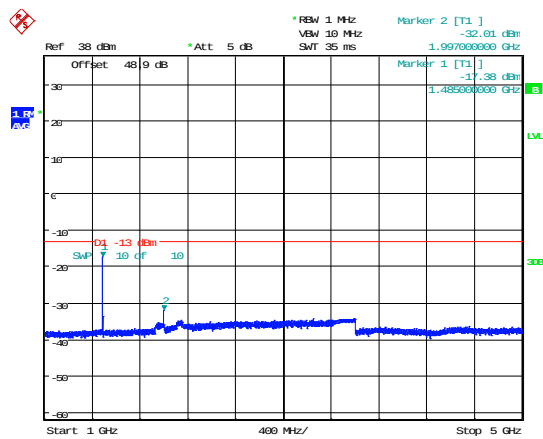
Date: 18.AUG.2015 16:38:20

728-757MHz Mid MSK 757.1MHz-1GHz



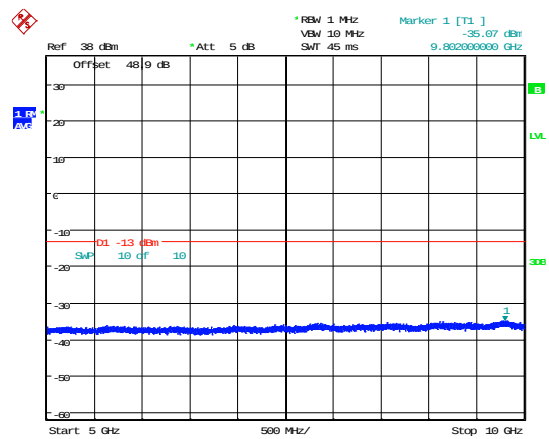
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728-757MHz Mid MSK 1GHz -5GHz*



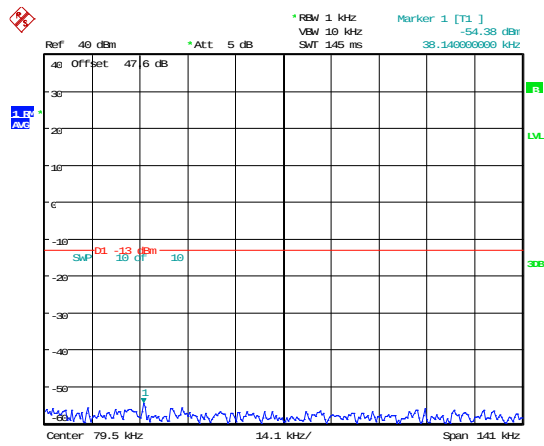
Date: 18.AUG.2015 16:39:51

728-757MHz Mid MSK 5GHz-10GHz



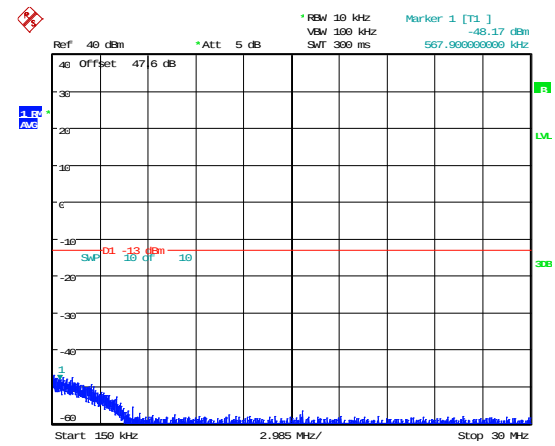
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728-757MHz Mid AWGN 9-150 kHz



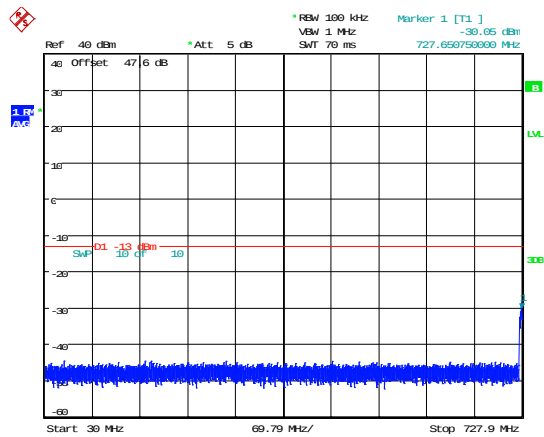
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728-757MHz Mid AWGN 150 kHz-30MHz



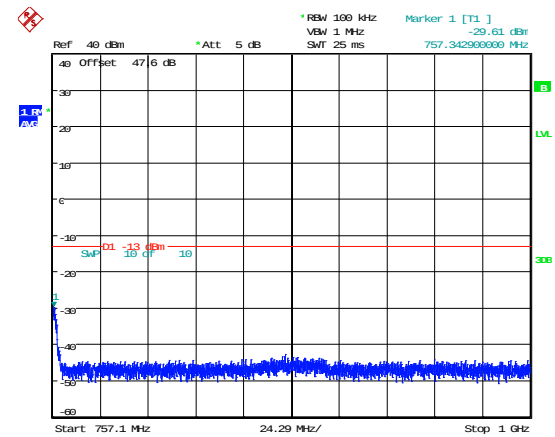
Date: 18.AUG.2015 11:57:45

728-757MHz Mid AWGN 30MHz-727.9MHz



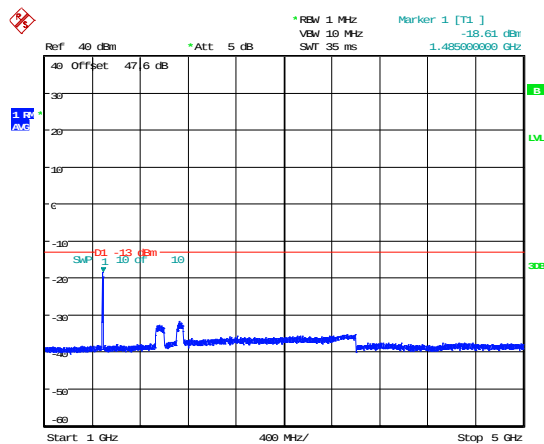
Date: 18.AUG.2015 11:59:48

728-757MHz Mid AWGN 757.1MHz-1GHz



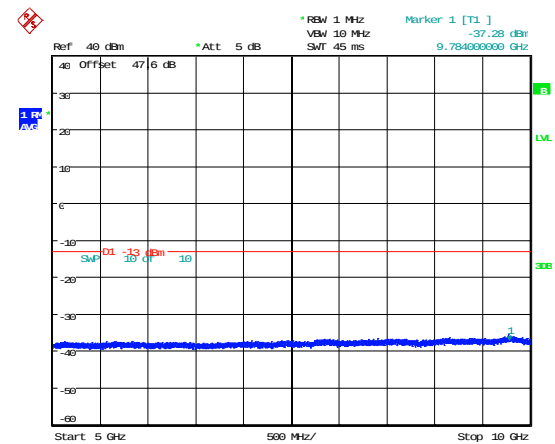
Date: 18.AUG.2015 12:00:33

728-757MHz Mid AWGN 1GHz -5GHz *



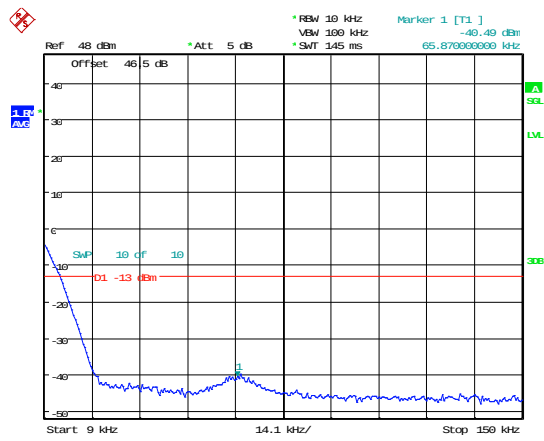
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728-757MHz Mid AWGN 5GHz-10GHz



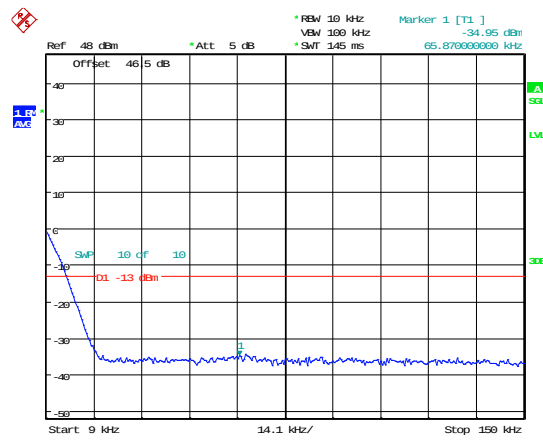
Date: 18.AUG.2015 12:01:47

728-757MHz Mid MSK 9-150 kHz



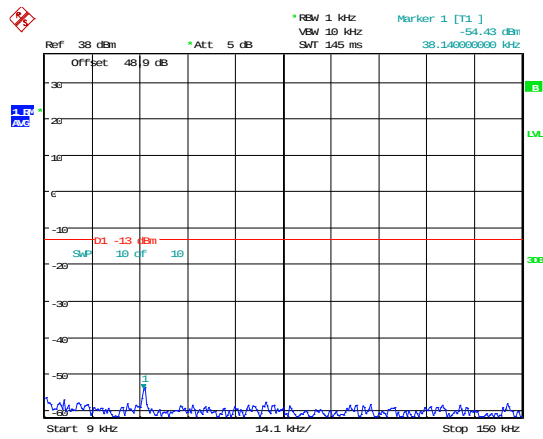
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728-757MHz Mid AWGN 9-150 kHz



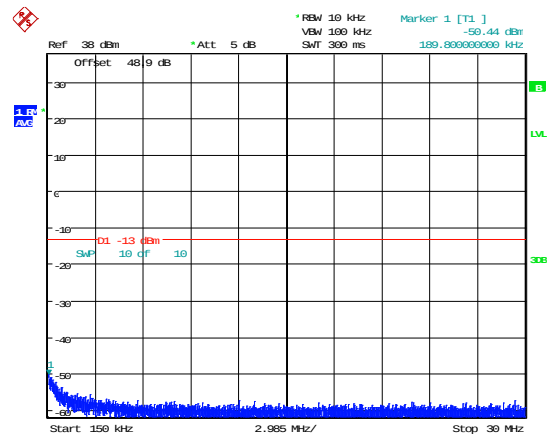
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728-757MHz Top MSK 9-150 kHz



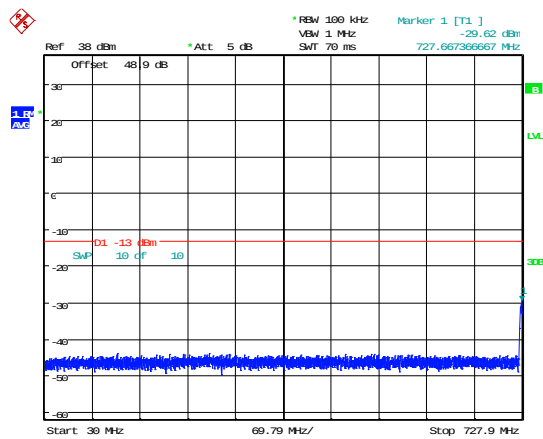
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728-757MHz Top MSK 150 kHz-30MHz



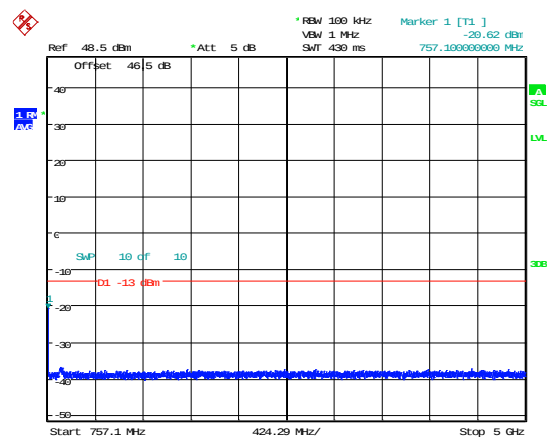
Date: 18.AUG.2015 16:43:44

728-757MHz Top MSK 30MHz-727.9MHz



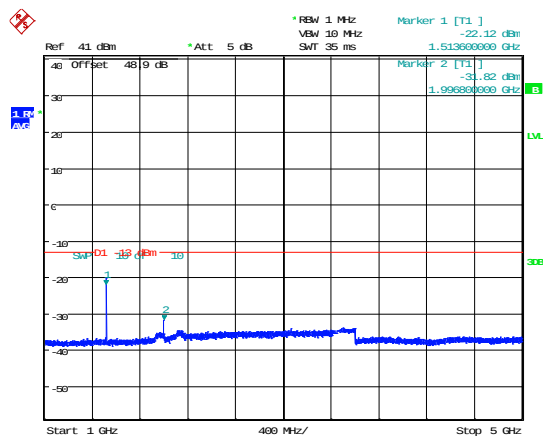
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728-757MHz Top MSK 757.1MHz-1GHz



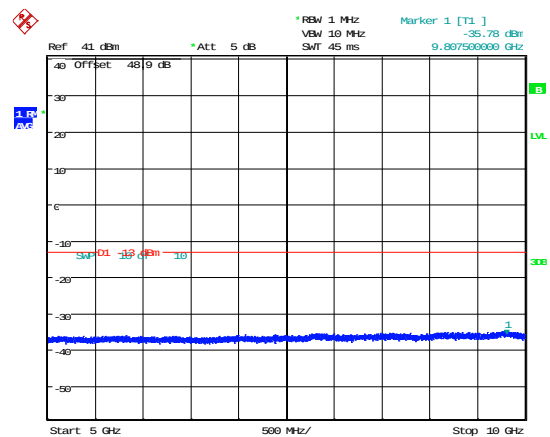
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728-757MHz Top MSK 1GHz -5GHz *



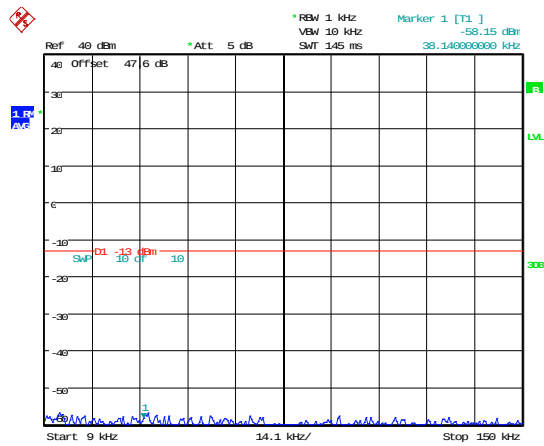
Date: 18.AUG.2015 16:46:18

728-757MHz Top MSK 5GHz-10GHz



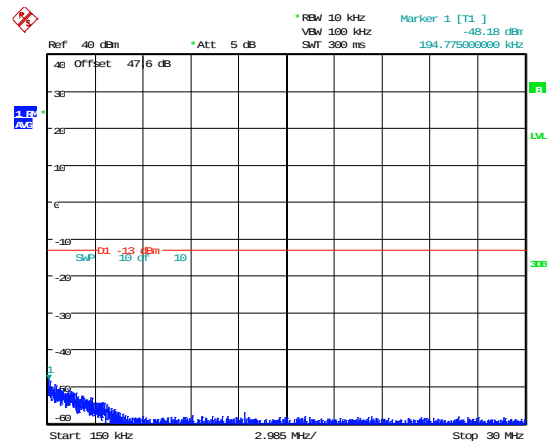
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728-757MHz Top AWGN 9-150 kHz



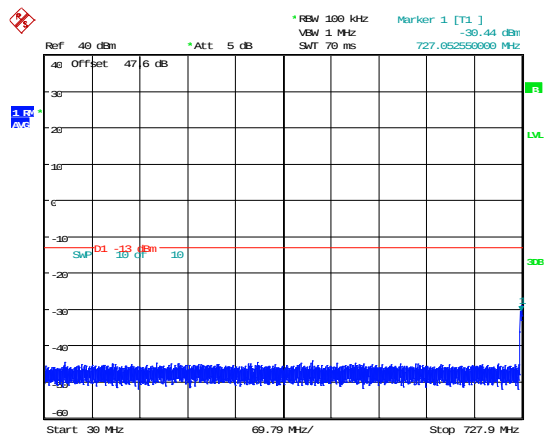
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728-757MHz Top AWGN 150 kHz-30MHz



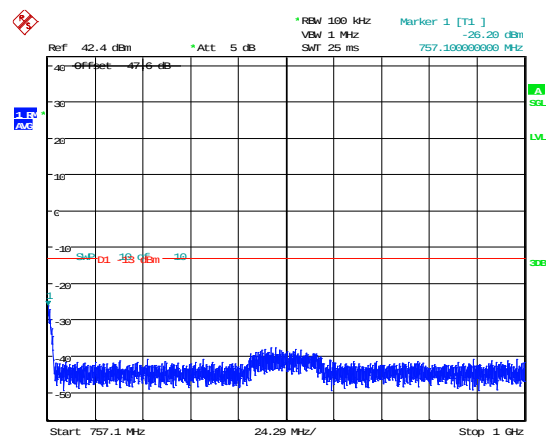
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728-757MHz Top AWGN 30MHz-727.9MHz



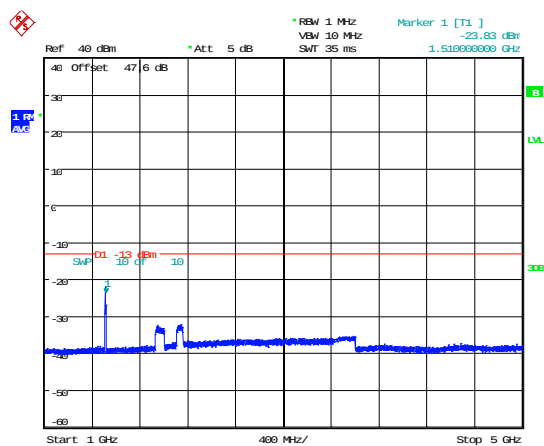
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728-757MHz Top AWGN 757.1MHz-1GHz



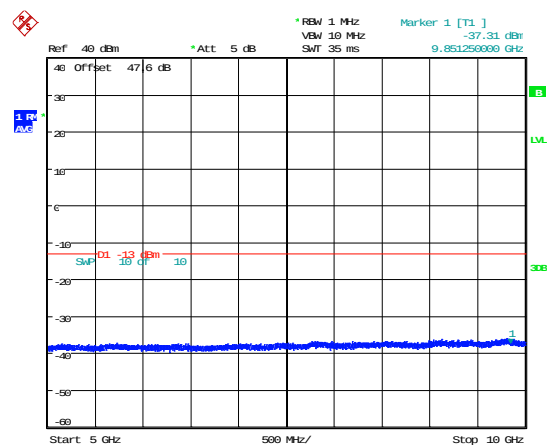
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728-757MHz Top AWGN 1GHz -5GHz *



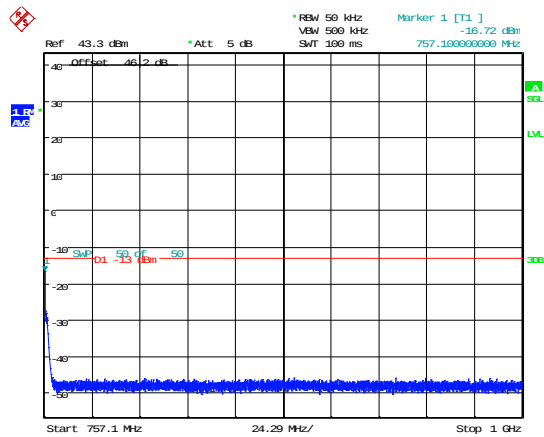
Date: 18.AUG.2015 12:07:32

728-757MHz Top AWGN 5GHz-10GHz



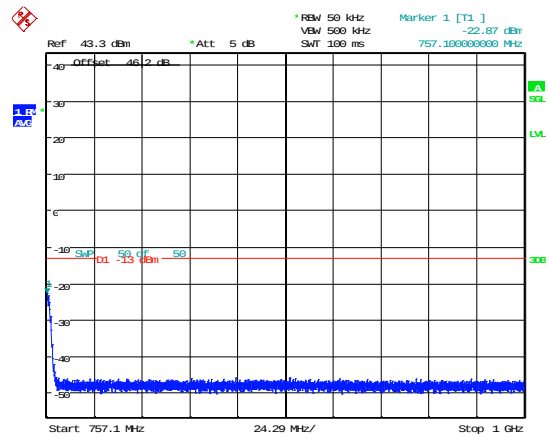
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728-757MHz Top MSK 757.1MHz-1GHz #



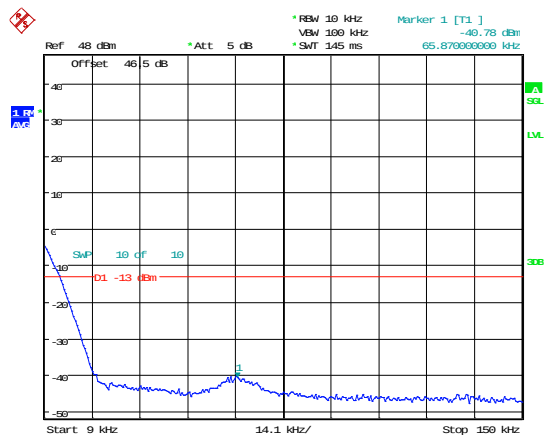
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728-757MHz Top AWGN 757.1MHz-1GHz #



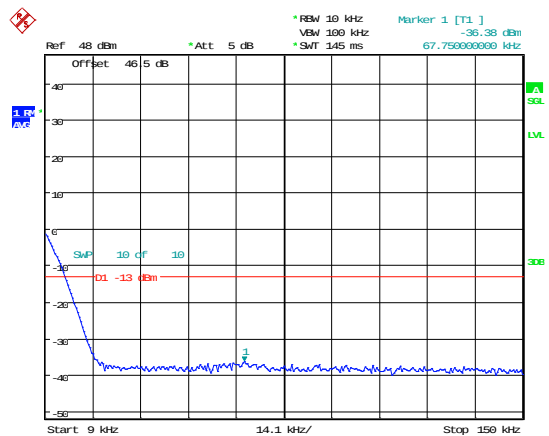
Date: 7.JAN.2016 10:57:18

728-757MHz Top MSK 9-150 kHz



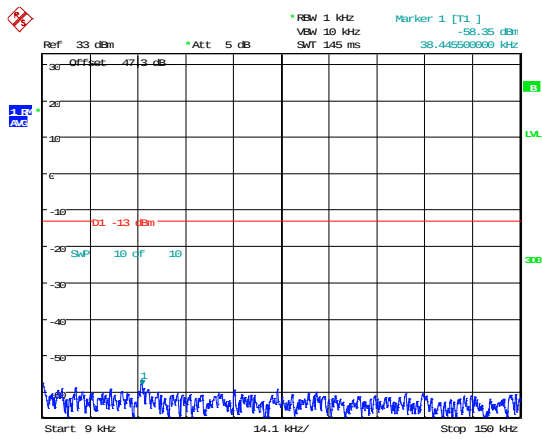
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728-757MHz Top MSK 9-150 kHz



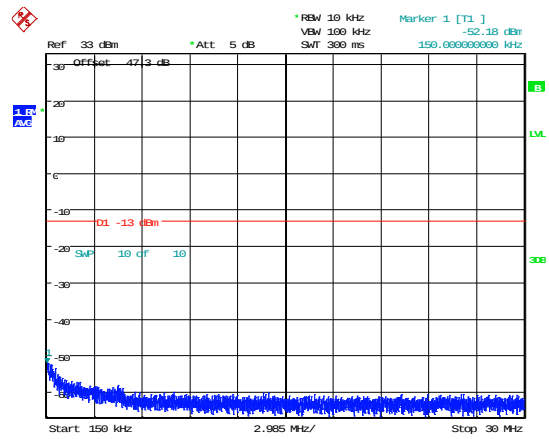
Date: 24.MAR.2016 09:49:30

862-894MHz bottom MSK 9-150 kHz



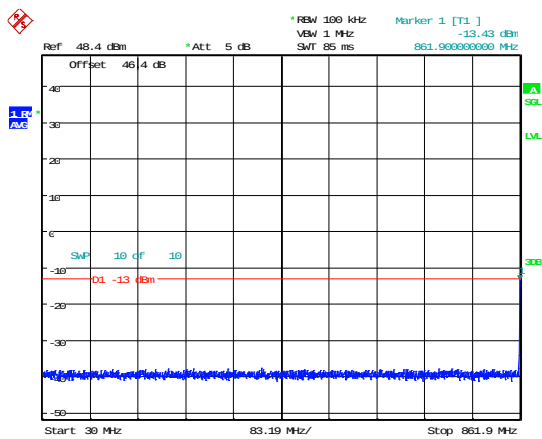
Date: 18.AUG.2015 15:58:09

862-894MHz bottom MSK 150 kHz-30MHz



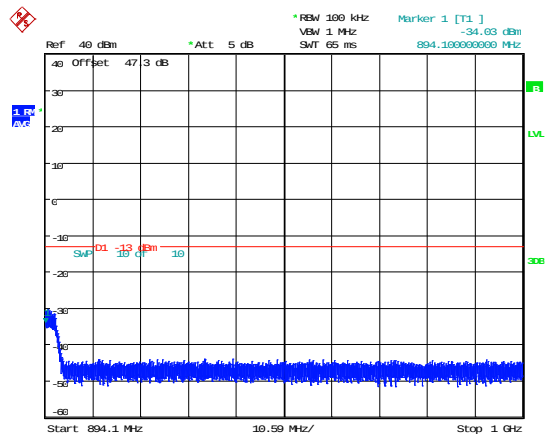
Date: 18.AUG.2015 15:59:06

862-894MHz bottom MSK 30MHz-861.9MHz



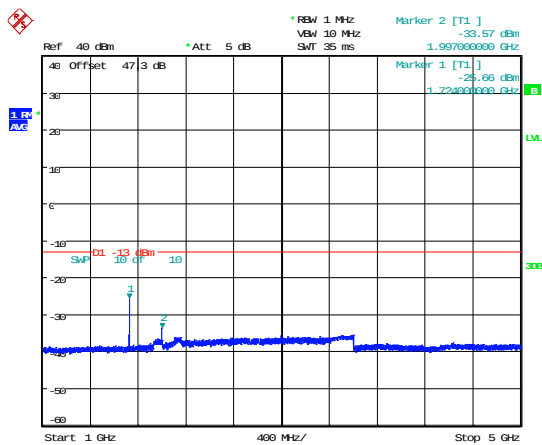
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862-894MHz bottom MSK 894.1MHz-1GHz



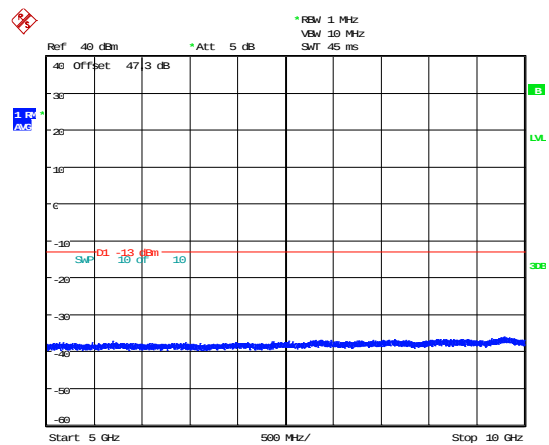
Date: 18.AUG.2015 16:01:12

862-894MHz bottom MSK 1-5GHz*



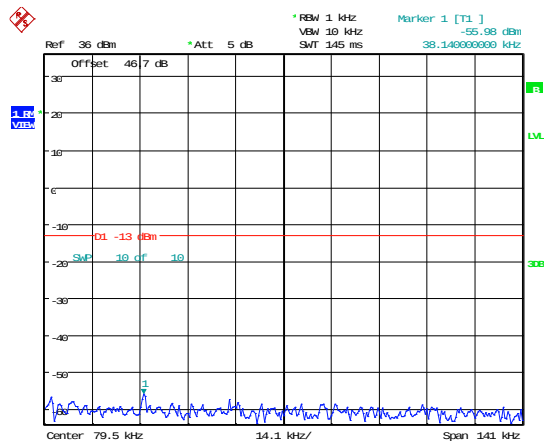
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862-894MHz bottom MSK 5-10GHz



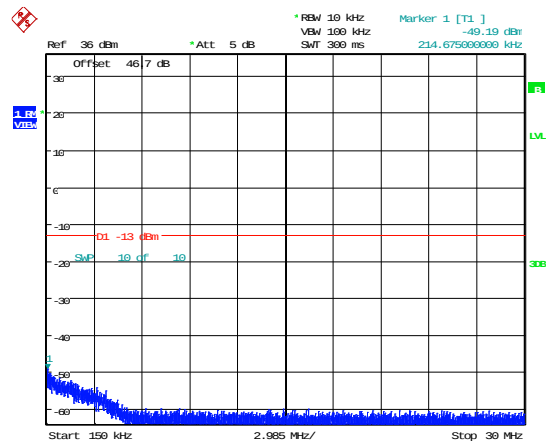
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862-894MHz bottom AWGN 9-150 kHz



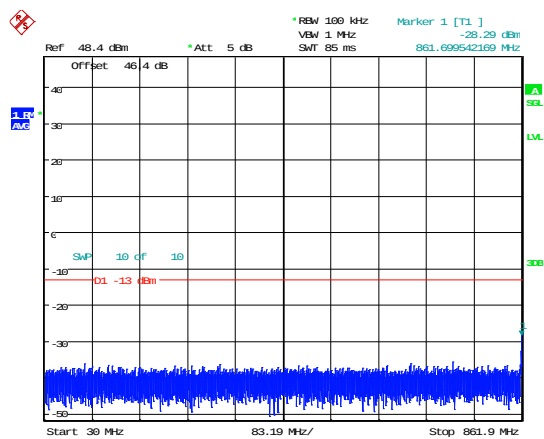
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862-894MHz bottom AWGN 150 kHz-30MHz



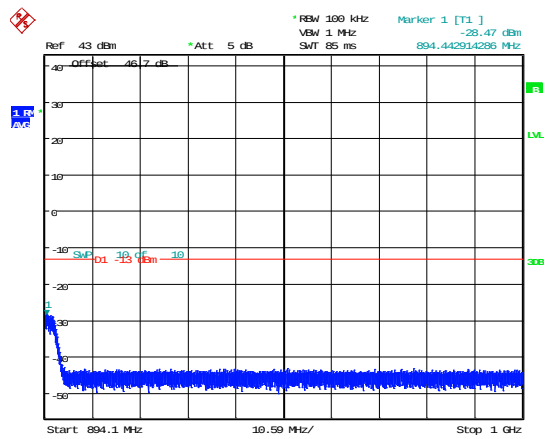
Date: 18.AUG.2015 11:08:51

862-894MHz bottom AWGN 30MHz-861.9MHz



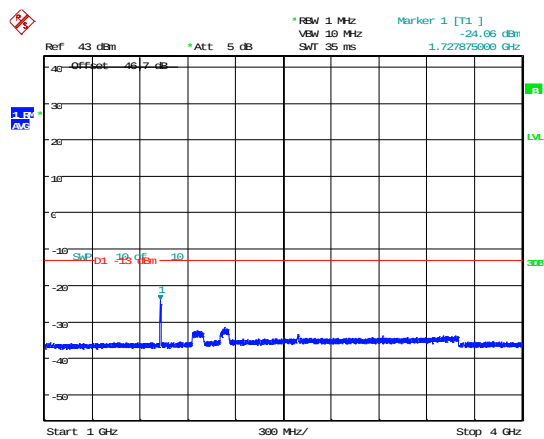
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862-894MHz bottom AWGN 894.1MHz-1GHz



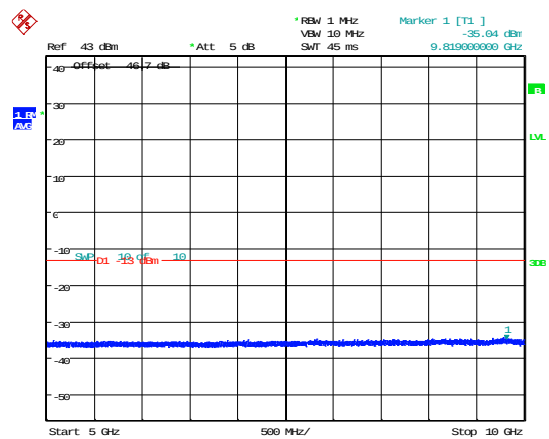
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862-894MHz bottom AWGN 1-5GHz*



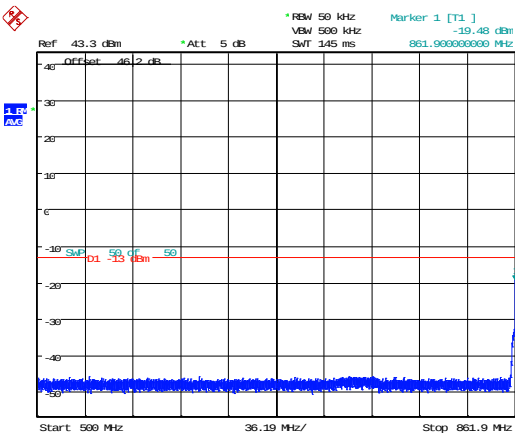
Date: 18.AUG.2015 11:12:47

862-894MHz bottom AWGN 5-10GHz

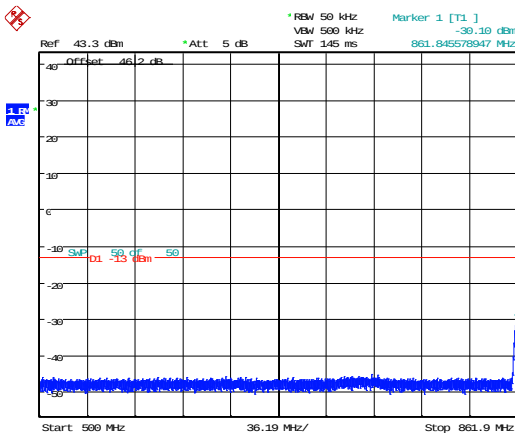


Date: 18.AUG.2015 11:13:25

862-894MHz bottom MSK 500MHz-861.9MHz # 862-894MHz bottom AWGN 500MHz-861.9MHz #

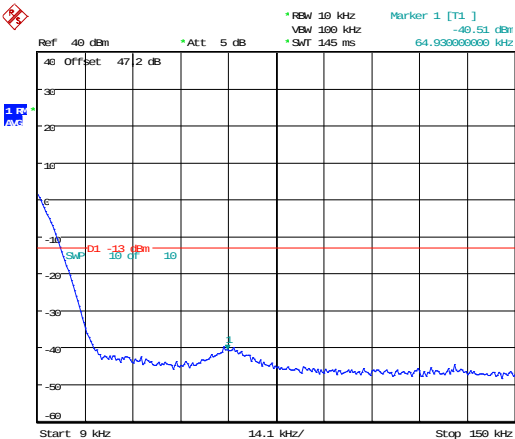


Date: 7.JAN.2016 11:05:58



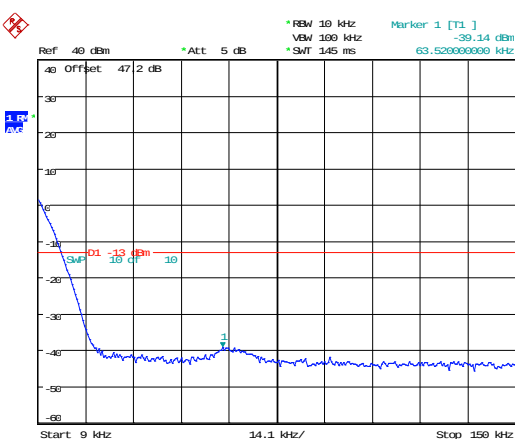
Date: 7.JAN.2016 11:08:22

862-894MHz bottom MSK 9-150 kHz



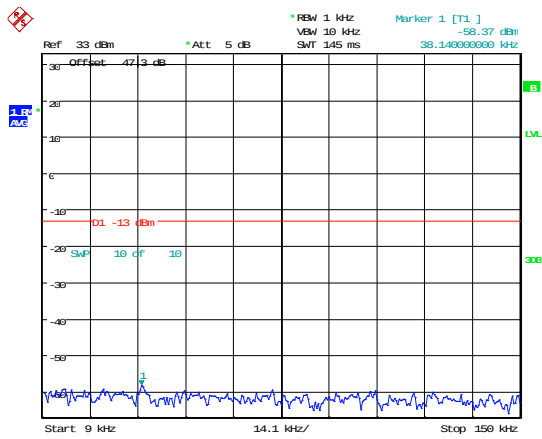
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862-894MHz bottom MSK 9-150 kHz



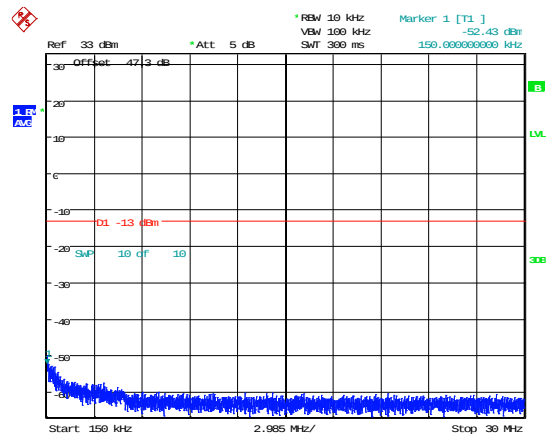
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862-894MHz Mid MSK 9-150 kHz



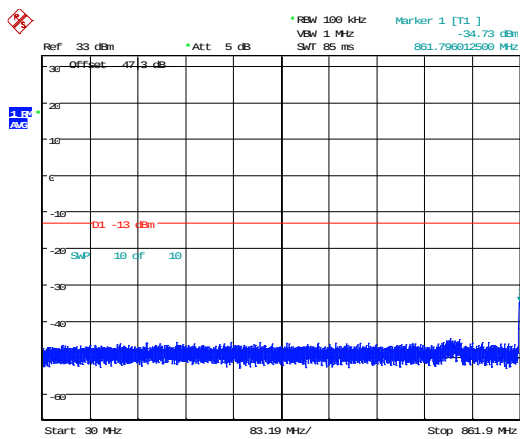
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862-894MHz Mid MSK 150 kHz-30MHz



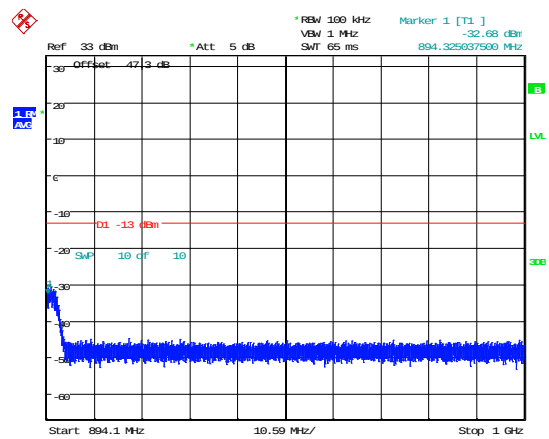
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862-894MHz Mid MSK 30MHz-861.9MHz



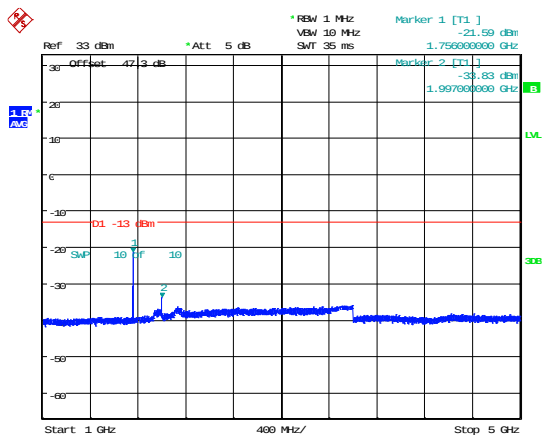
Date: 18.AUG.2015 16:08:48

862-894MHz Mid MSK 894.1MHz-1GHz



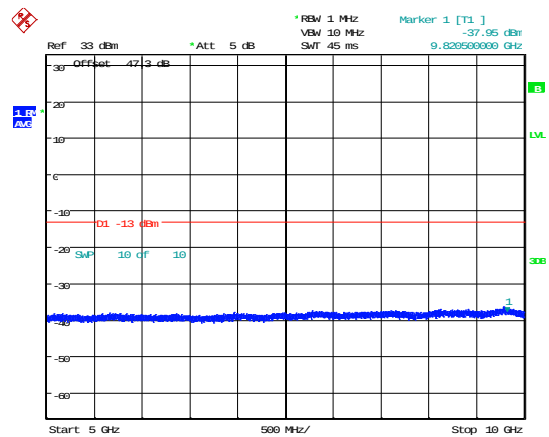
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862-894MHz Mid MSK 1-5GHz*



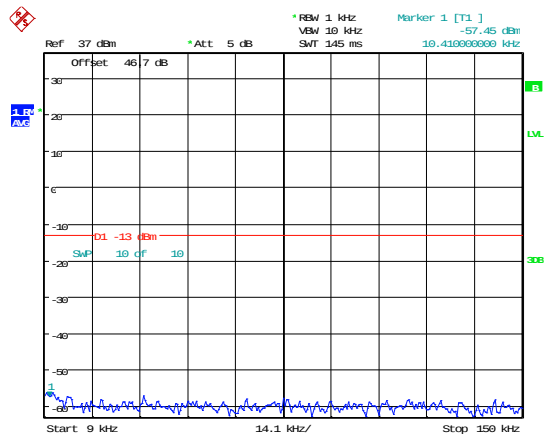
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862-894MHz Mid MSK 5-10GHz



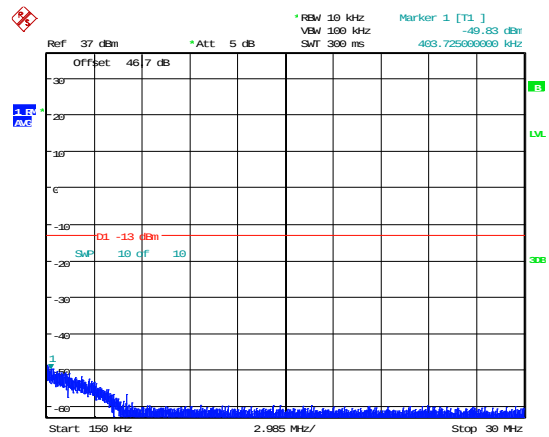
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862-894MHz Mid AWGN 9-150 kHz



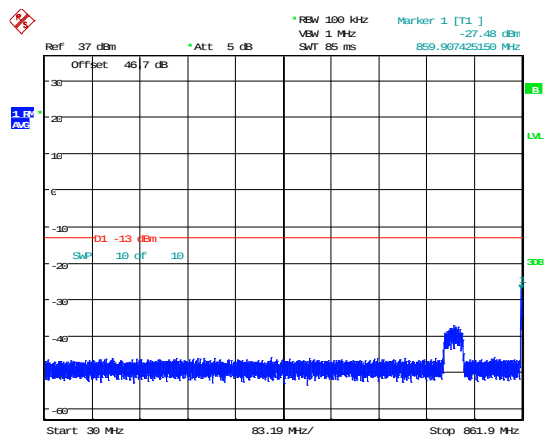
Date: 18.AUG.2015 11:16:13

862-894MHz Mid AWGN 150 kHz-30MHz



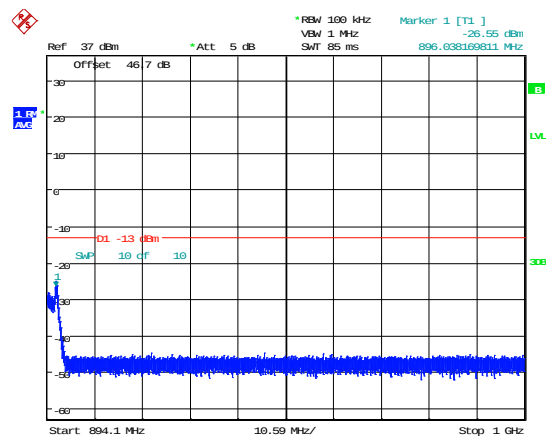
Date: 18.AUG.2015 11:16:59

862-894MHz Mid AWGN 30MHz-861.9MHz



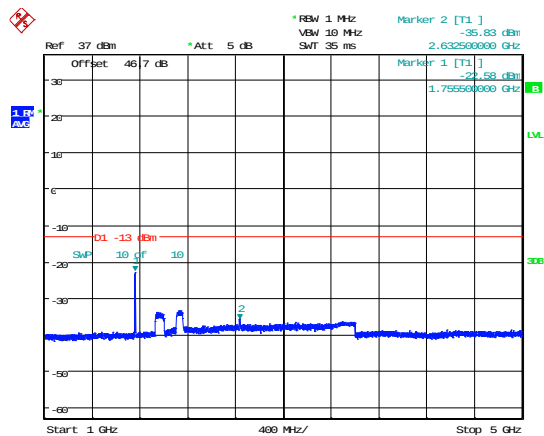
Date: 18.AUG.2015 11:18:33

862-894MHz Mid AWGN 894.1MHz-1GHz



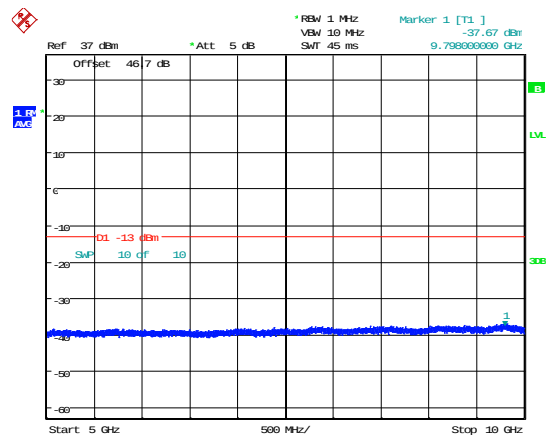
Date: 18.AUG.2015 11:19:33

862-894MHz Mid AWGN 1-5GHz *



Date: 18.AUG.2015 11:20:39

862-894MHz Mid AWGN 5-10GHz



Date: 18.AUG.2015 11:21:13

[illegible]

The screenshot shows a spectrum analyzer interface. At the top, there are several status indicators: a red 'X' icon, 'Ref 33 dBm', 'Att 5 dB', 'RBW 1 kHz', 'VMW 10 kHz', 'SWT 145 ms', 'Marker 1 [T1.]', '-57.55 dBm', and '38.610000000 kHz'. The main display area is a grid with a vertical axis from -50 to -30 dBm and a horizontal axis from 9 kHz to 150 kHz. A red horizontal line is drawn at -13 dBm, labeled 'D1 -13 dBm'. A blue trace shows a noise floor around -50 dBm, with a small peak labeled '1' at approximately 14.1 kHz. The bottom of the screen shows 'Start 9 kHz', '14.1 kHz/', and 'Stop 150 kHz'.

Ref 33 dBm *Att 5 dB RBW 10 kHz Marker 1 [T1] -51.27 dBm
 VBW 100 kHz SWF 300 ms 150,000,000.000 kHz

Offset 47.3 dB

10 dB/div

01 -130 dBm

SWF 10 dB 10

Start 150 kHz 2.985 MHz/ Stop 30 MHz

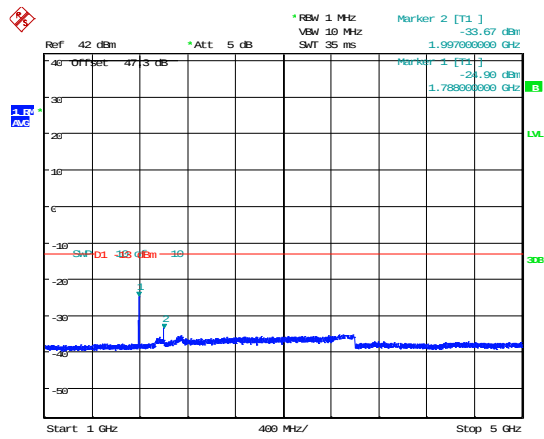
Ref: 42 dBm Att: 5 dB

* Res/ 100 KHz Marker 1 [T1.]
 VSW: 1 MHz -34.10 dBm
 SWT: 85 ms 861.900000000 MHz

Start: 30 MHz 83.19 MHz/ Stop: 861.9 MHz

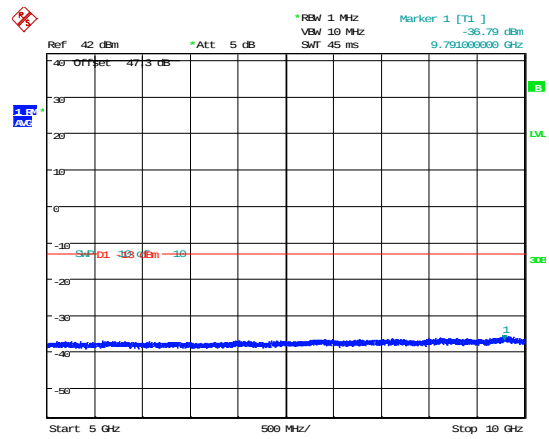
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862-894MHz Top MSK 1-5GHz *



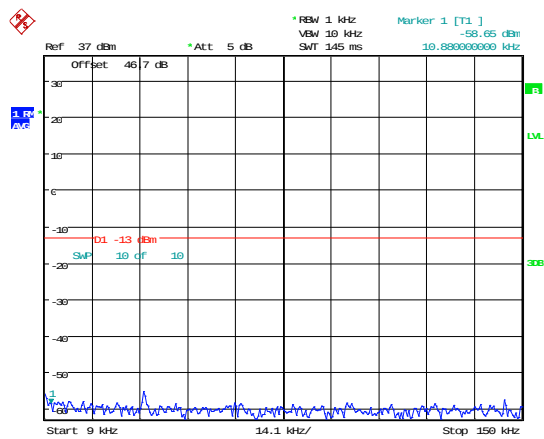
Date: 18.AUG.2015 16:19:06

862-894MHz Top MSK 5-10GHz



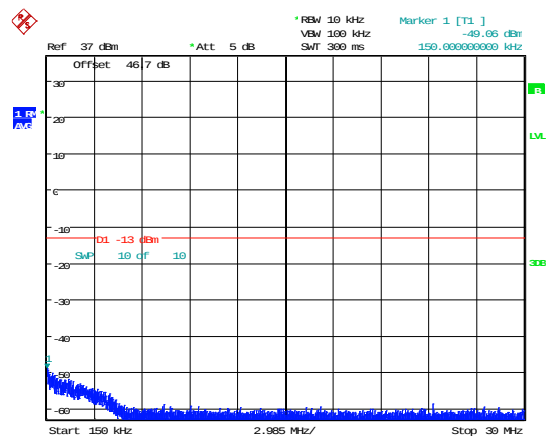
Date: 18.AUG.2015 16:19:43

862-894MHz Top AWGN 9-150 kHz



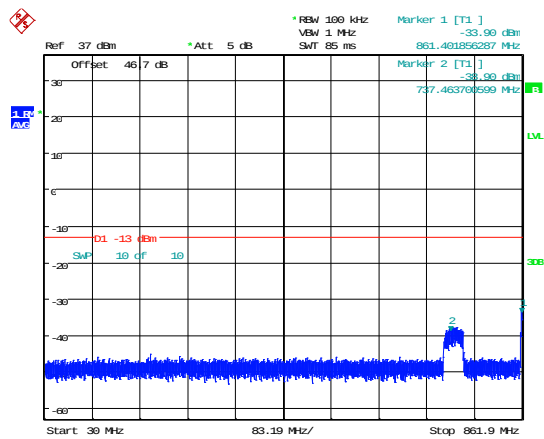
Date: 18.AUG.2015 11:24:37

862-894MHz AWGN Top 150 kHz-30MHz



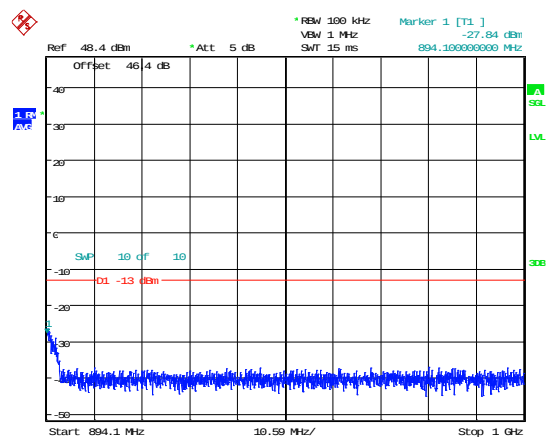
Date: 18.AUG.2015 11:25:33

862-894MHz Top AWGN 30MHz-861.9MHz



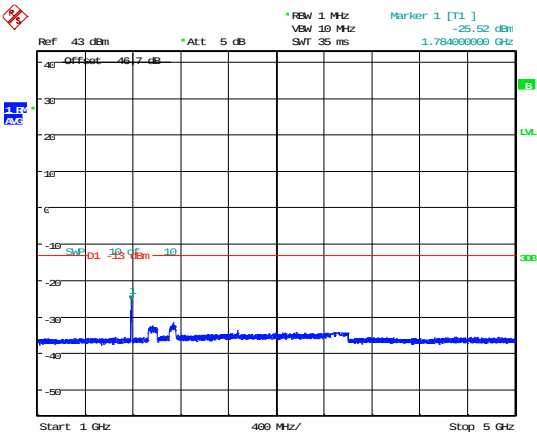
Date: 18.AUG.2015 11:26:29

862-894MHz Top AWGN 894.1MHz-1GHz



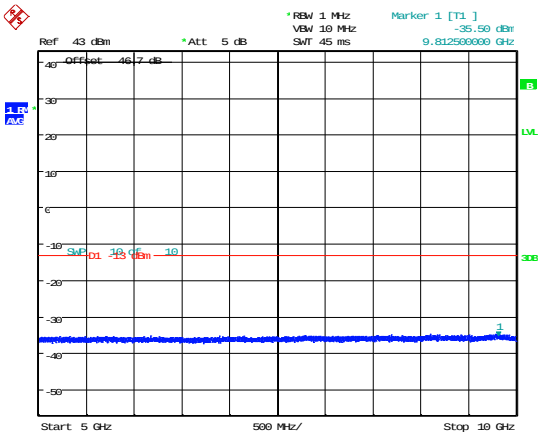
Date: 15.APR.2016 12:16:38

862-894MHz Top AWGN 1-5GHz *



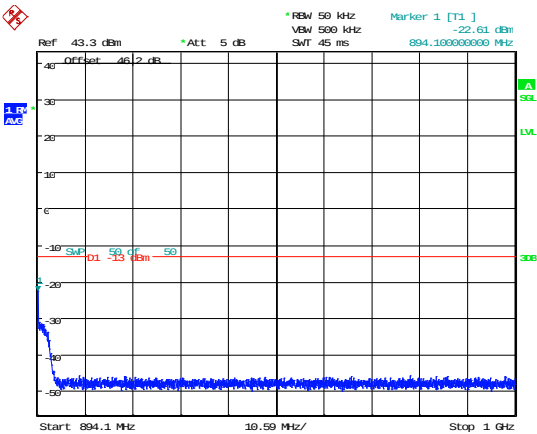
Date: 18.AUG.2015 11:28:22

862-894MHz Top AWGN 5-10GHz



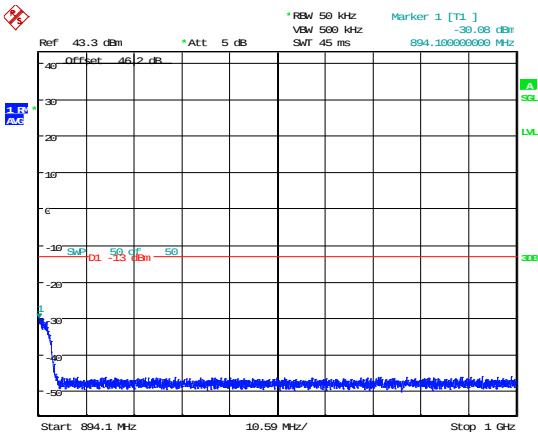
Date: 18.AUG.2015 11:28:57

862-894MHz Top MSK 894.1MHz-1GHz #



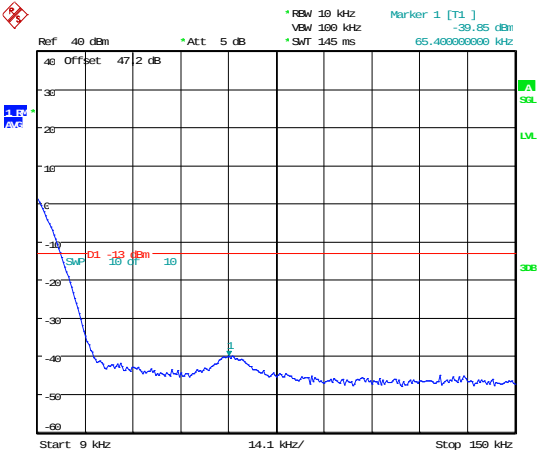
Date: 7.JAN.2016 11:13:21

862-894MHz Top AWGN 894.1MHz-1GHz #



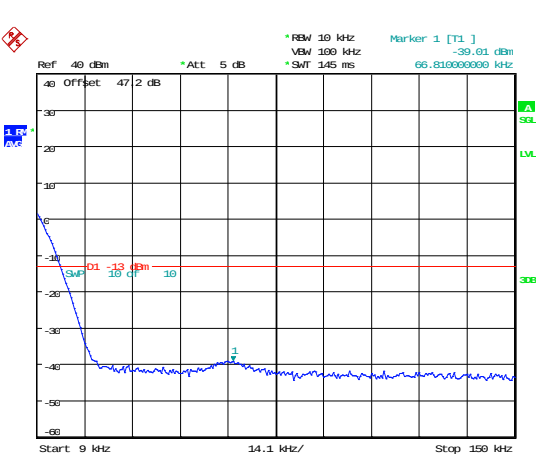
Date: 7.JAN.2016 11:14:48

862-894MHz Top MSK 9-150 kHz



Date: 24.MAR.2016 10:29:43

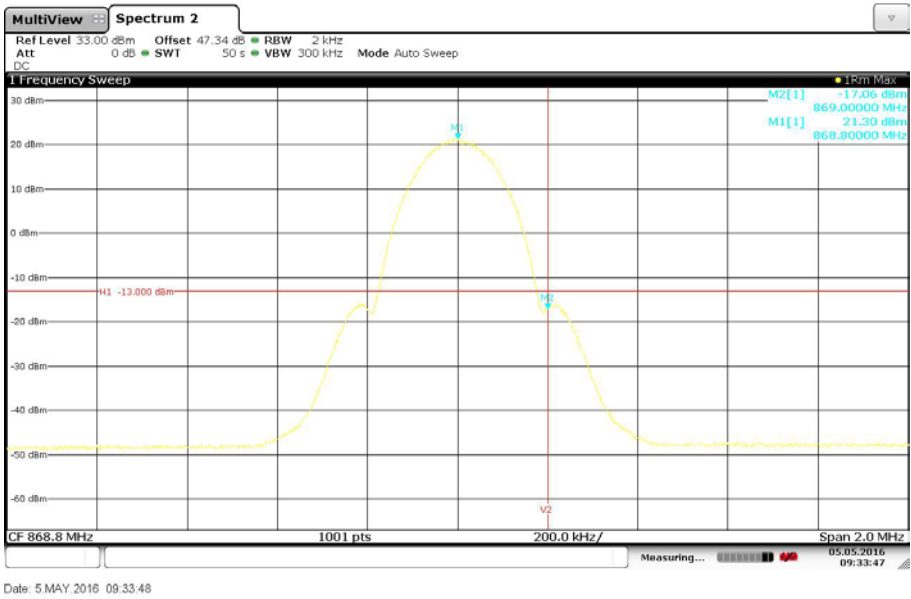
862-894MHz Top AWGN 9-150 kHz



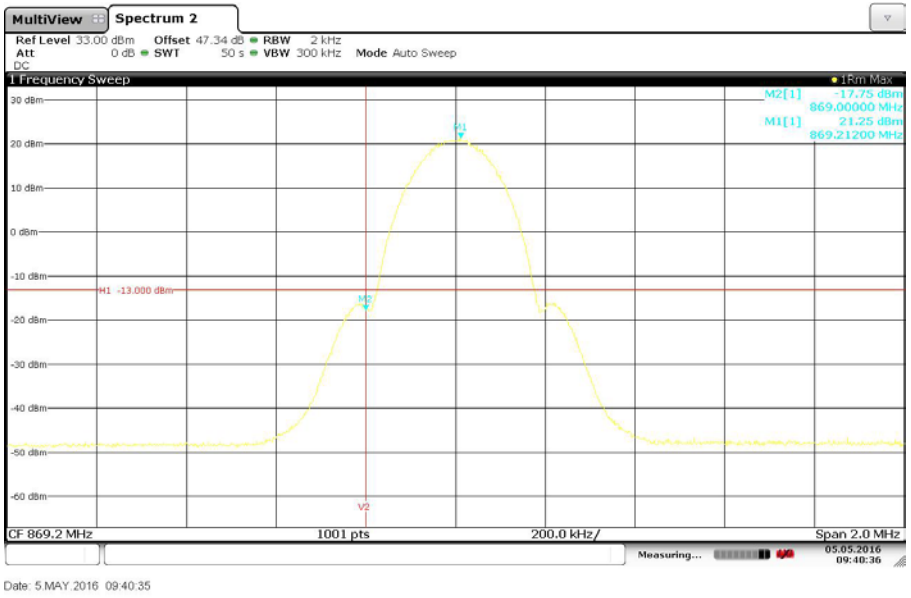
Date: 24.MAR.2016 10:31:30

862-869-894MHz Bandedge

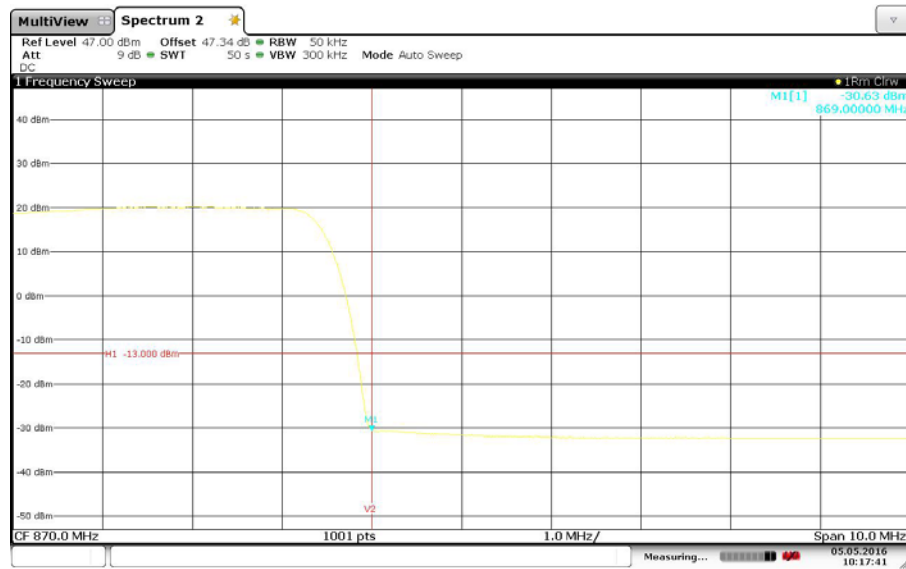
MSK



MSK

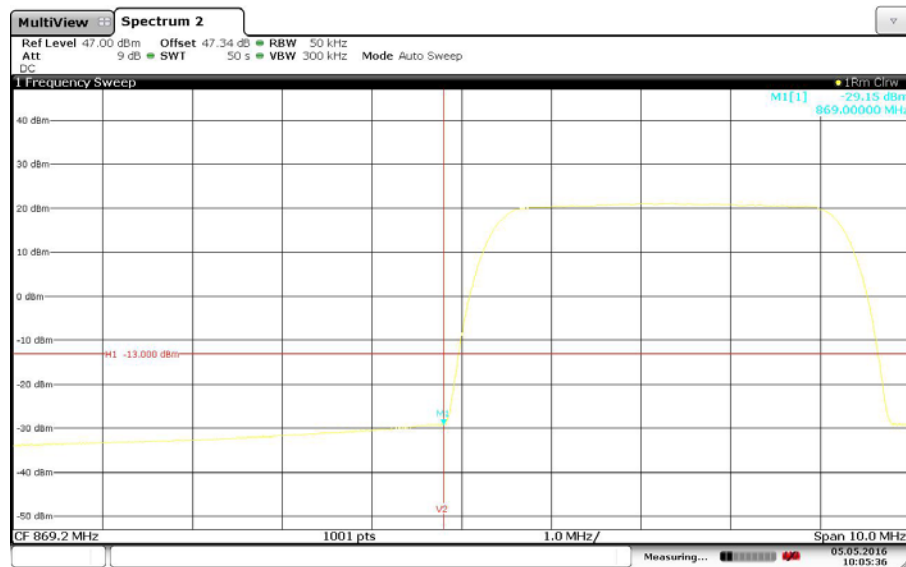


AWGN



Date: 5 MAY 2016 10:17:41

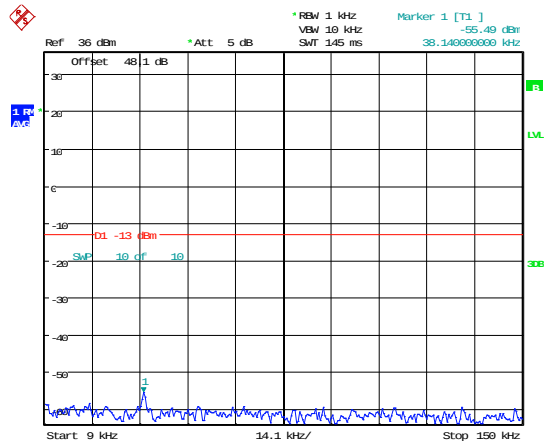
AWGN



Date: 5 MAY 2016 10:05:36

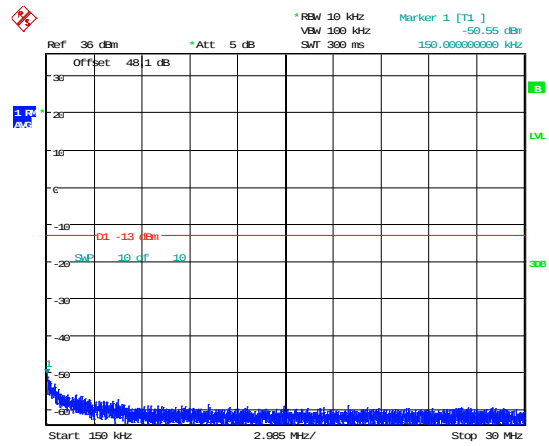
Modulation type	Frequency (MHz)	Measured Level (dBm)	Limit dBm
MSK	868.8000	-17.06	-13
MSK	869.2000	-17.75	-13
AWGN	866.5000	-30.63	-13
AWGN	871.5000	-29.15	-13

1930-1995MHz bottom MSK 9-150 kHz



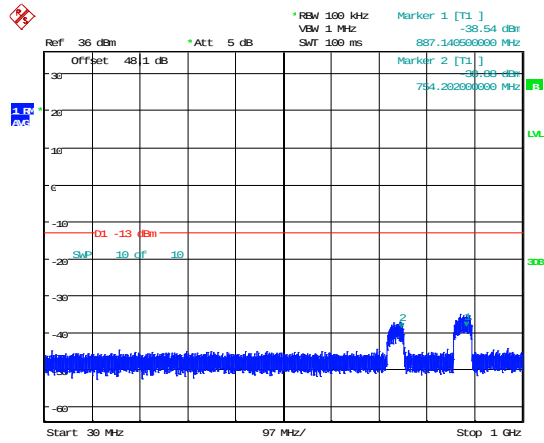
Date: 19.AUG.2015 12:03:40

1930-1995MHz bottom MSK 150 kHz-30MHz



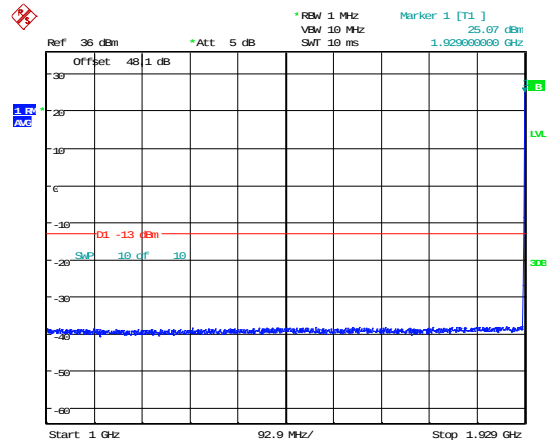
Date: 19.AUG.2015 12:04:19

1930-1995MHz bottom MSK 30-1MHz



Date: 19.AUG.2015 12:05:18

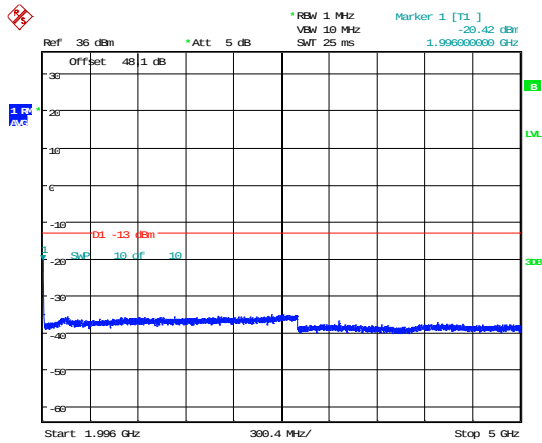
1930-1995MHz bottom MSK 1-1.929GHz



Date: 19.AUG.2015 12:06:14

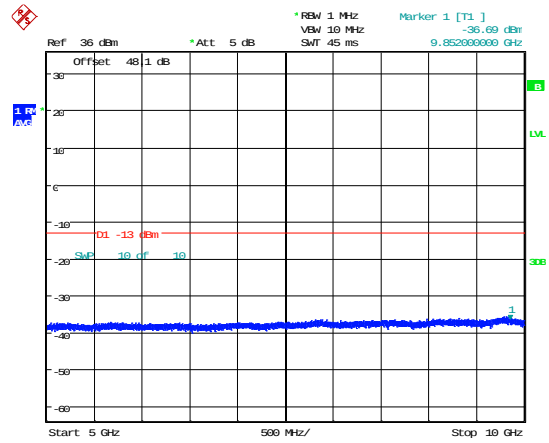
1930-1995MHz bottom MSK 1.996-5GHz

1930-1995MHz bottom MSK 5-10GHz



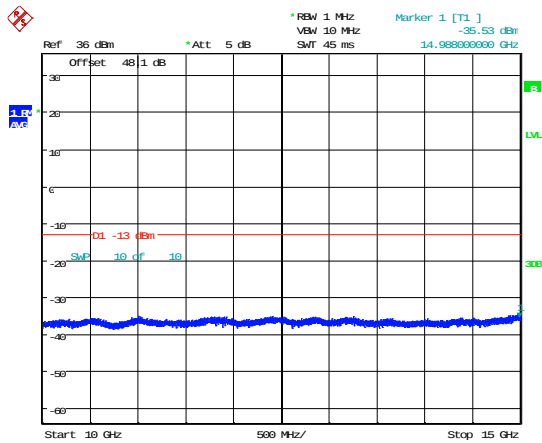
Date: 19.AUG.2015 12:07:01

1930-1995MHz bottom MSK 10-15GHz



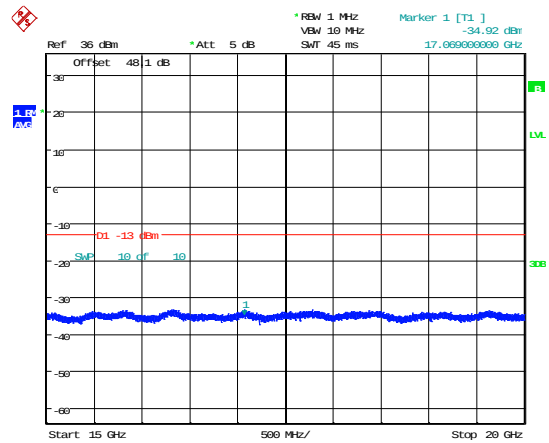
Date: 19.AUG.2015 12:07:35

1930-1995MHz bottom MSK 15-20GHz



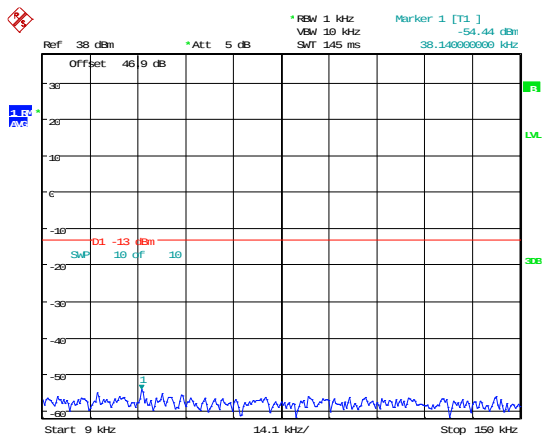
Date: 19.AUG.2015 12:07:58

1930-1995MHz bottom AWGN 9-150 kHz



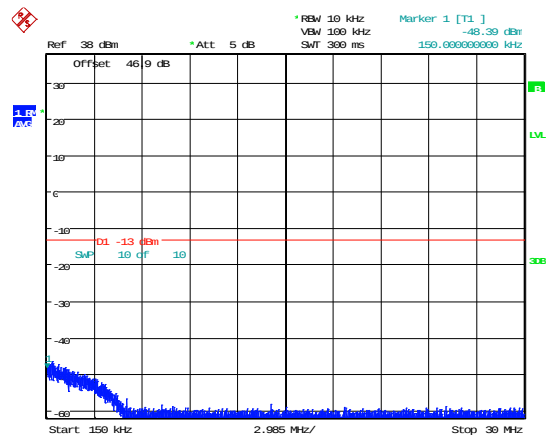
Date: 19.AUG.2015 12:08:23

1930-1995MHz bottom AWGN 150 kHz-30MHz



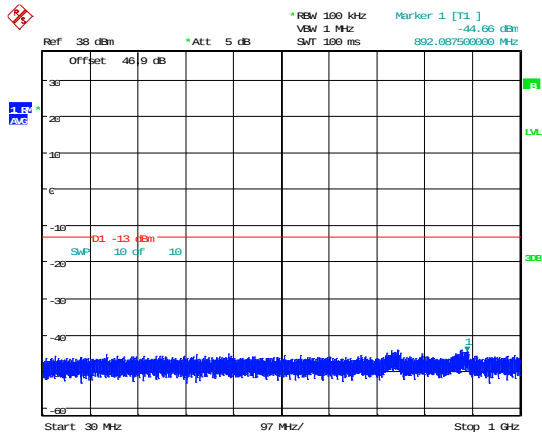
Date: 18.AUG.2015 12:27:26

1930-1995MHz bottom AWGN 30-1MHz

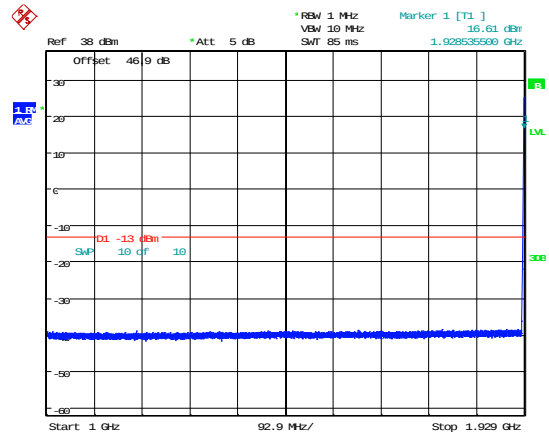


Date: 18.AUG.2015 12:28:08

1930-1995MHz bottom AWGN 1-1.929GHz

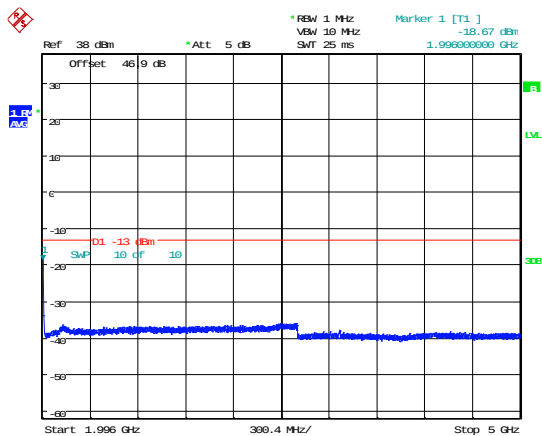


Date: 18.AUG.2015 12:28:55



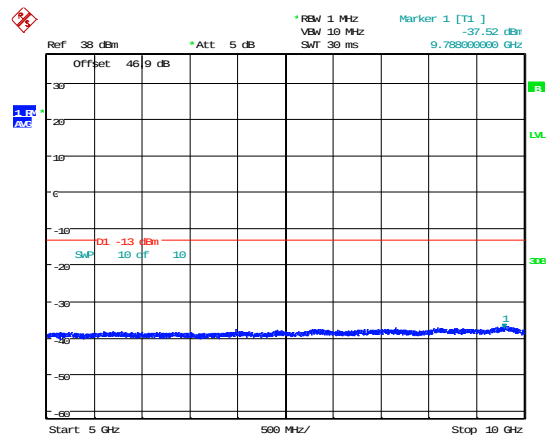
Date: 18.AUG.2015 12:30:43

1930-1995MHz bottom AWGN 1.996-5GHz



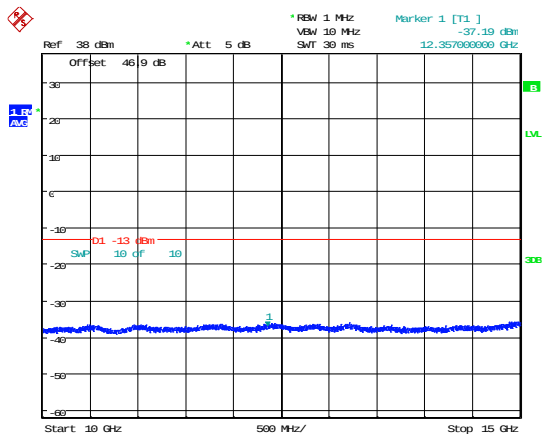
Date: 18.AUG.2015 12:31:33

1930-1995MHz AWGN MSK 5-10GHz



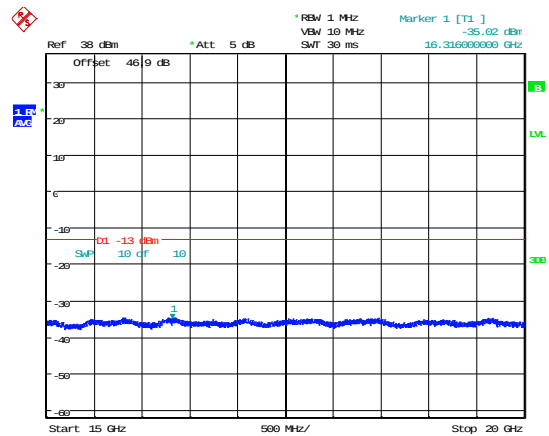
Date: 18.AUG.2015 12:32:06

1930-1995MHz bottom AWGN 10-15GHz



Date: 18.AUG.2015 12:32:32

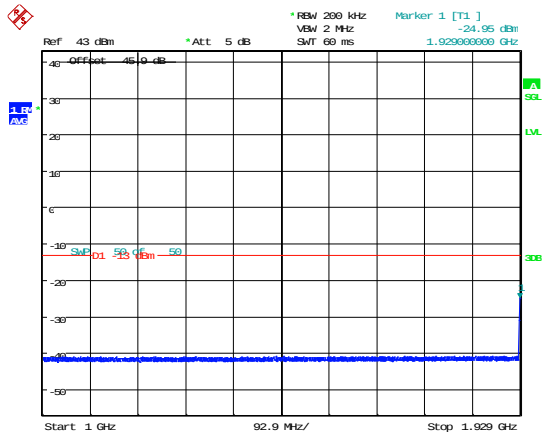
1930-1995MHz bottom AWGN 15-20GHz



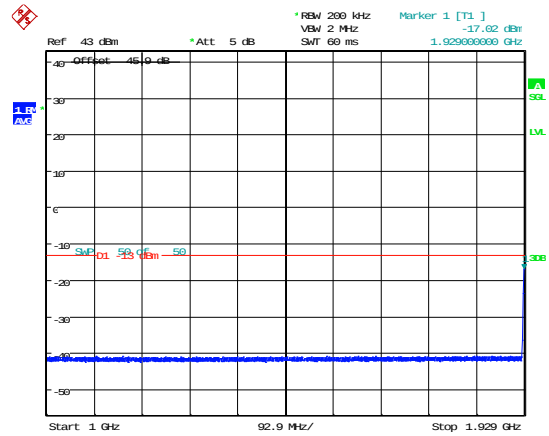
Date: 18.AUG.2015 12:32:54

1930-1995MHz bottom MSK 1-1.929GHz#

1930-1995MHz bottom AWGN 1-1.929GHz#



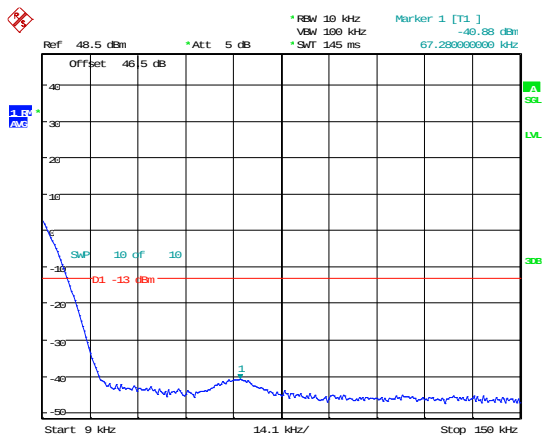
Date: 7.JAN.2016 09:30:37



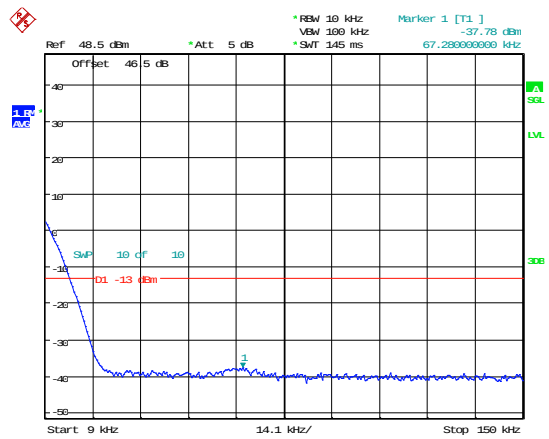
Date: 7.JAN.2016 09:32:47

1930-1995MHz bottom MSK 9-150 kHz

1930-1995MHz bottom AWGN 9-150 kHz



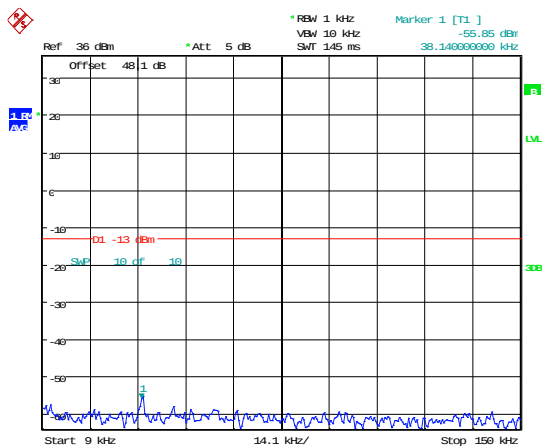
Date: 24.MAR.2016 11:01:58



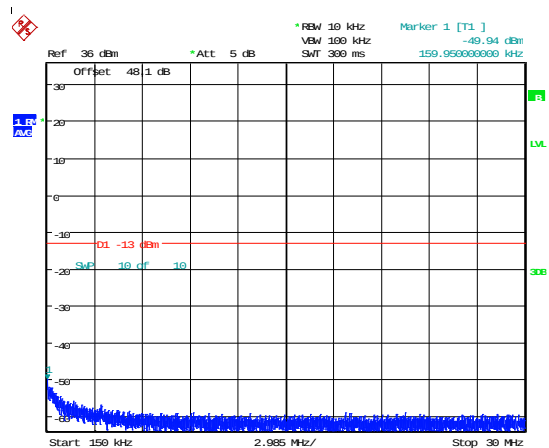
Date: 24.MAR.2016 11:03:42

1930-1995MHz Mid MSK 9-150 kHz

1930-1995MHz Mid MSK 150 kHz-30MHz

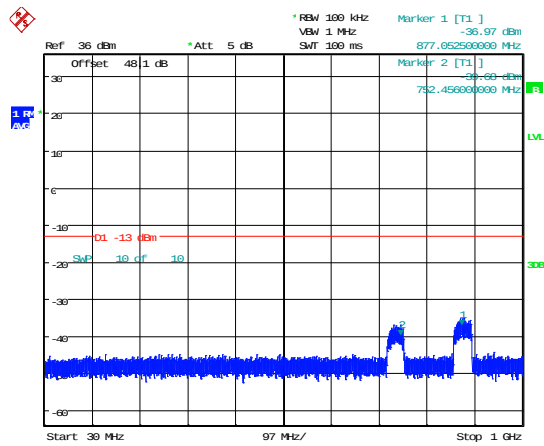


Date: 19.AUG.2015 12:12:33



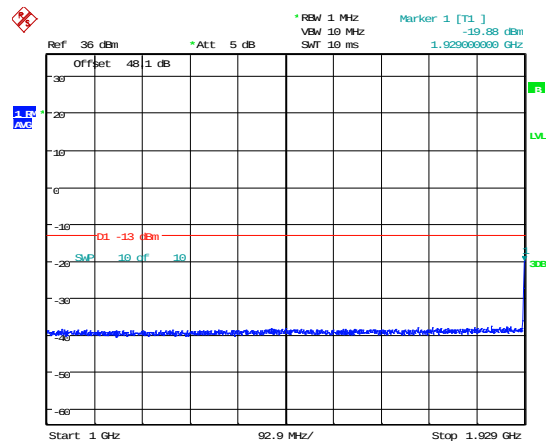
Date: 19.AUG.2015 12:13:07

1930-1995MHz Mid MSK 30-1MHz



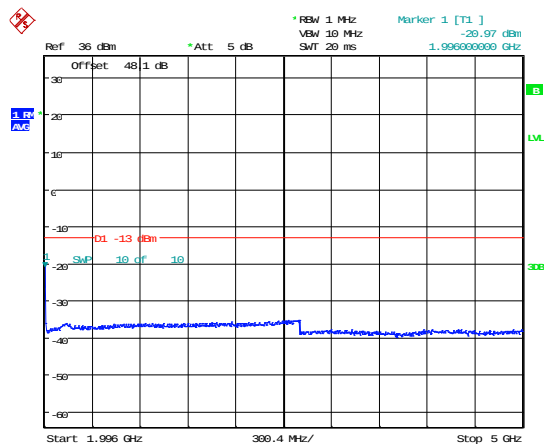
Date: 19.AUG.2015 12:14:08

1930-1995MHz Mid MSK 1-1.929GHz



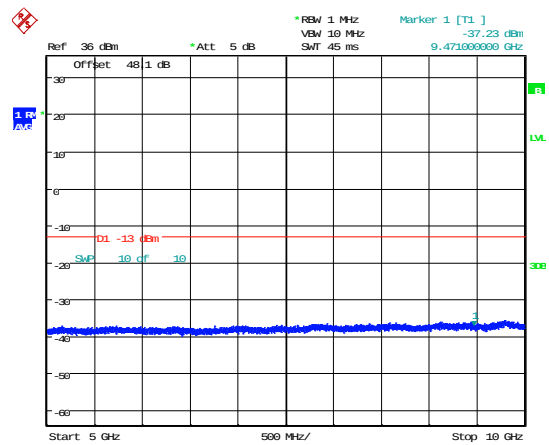
Date: 19.AUG.2015 12:15:05

1930-1995MHz Mid MSK 1.996-5GHz



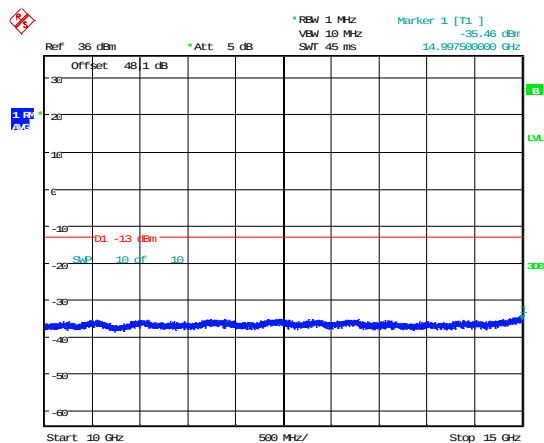
Date: 19.AUG.2015 12:16:01

1930-1995MHz Mid MSK 5-10GHz



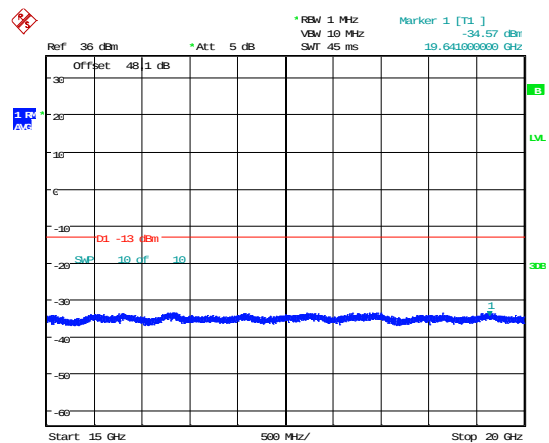
Date: 19.AUG.2015 12:16:26

1930-1995MHz Mid MSK 10-15GHz



Date: 19.AUG.2015 12:16:50

1930-1995MHz Mid MSK 15-20GHz



Date: 19.AUG.2015 12:17:13