



A RADIO TEST REPORT
FOR
AXELL WIRELESS LIMITED
ON
MBF-7-8-17-19/GB
DOCUMENT NO. TRA-020407-47-00-D

HULL

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TRaC Wireless Test Report : TRA-020407-47-01-D

Applicant : Axell Wireless Limited

Apparatus : MBF-7-8-17-19/GB

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

Purpose of Test : Certification

FCCID : NEOMBF4005SERIES

Authorised by :



: Radio Product Manager

Issue Date : 20th November 2014

Authorised Copy Number : PDF

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Section 1:**Introduction****1.1 General**

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 :

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Asheridge Road
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HP5 1TU

1.3 Manufacturer

Axell Wireless Limited
Aerial House
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1.4 Apparatus Assessed

The following apparatus was assessed between and 16th July and 12th August 2014

Fibre Optic (F/O) Remote Unit

The Multi-Band Fibre Optic system is composed of two building blocks: OMU (Optical Master unit) and MBF-40 series (Fibre Distributed Antenna System) Remote Unit. This is an indoor solution for single or multi operator use.

Technical specifications			
Frequency Range	Uplink	Downlink	CFR 47 Rule Part
700 MHz	Lower band 698 - 716 MHz and Upper band 776 - 787 MHz	Lower band 728 - 746 MHz and Upper band 746 - 757 MHz	27, Subpart A
850 MHz (cellular)	824 - 849 MHz	869 - 894 MHz	22, Subpart C
SMR 800 (Sprint)	817 - 824MHz	862 - 869 MHz	90, Subpart S
1900 MHz (PCS)	1850 - 1910 MHz	1930 - 1990 MHz	24, Subpart E
1700 MHz (AWS)	1710 - 1755 MHz	2110 - 2155 MHz	27, Subpart A

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 Part 2	CFR 47 Part 22 Subpart H	CFR 47 Part 24 Subpart E	CFR 47 Part 27 Subpart A	CFR 47 Part 90 Subpart S	Appendix in Report
RF Power Output	2.1046	22.913(a)	24.232(a)	27.50 (a)	90.205(k)	A1 & B1
Intermodulation Spurious Emissions	2.1051	22.917(a)	24.238(a)	27.53(c) & (g)	90.691(a)(1) & (2)	A2 & B2
Occupied Bandwidth & Modulation	2.1049 *KDB 935210	N/A	N/A	N/A	N/A	A3 & B3
Spurious Emissions at Antenna Terminals Less than 1 MHz	2.1051	22.917(a)	24.238(a)	27.53(c) & (g)	90.691(a)(1) & (2)	A4 & B4
Spurious Emissions at Antenna Terminals Greater than 1MHz	2.1051	22.917(a)	24.238(a)	27.53(c) & (g)	90.691(a)(1) & (2)	A5 & B5
Field Strength of Spurious Emissions	2.1053	22.917(a)	24.238(a)	27.53(c),(f) & (g)	90.691(a)(1) & (2)	A6 & B6
Passband Gain & 20dB bandwidth	*KDB 935210	N/A	N/A	N/A	N/A	A7 & B7
Frequency Stability	2.1055	22.355	24.135	27.54	90.213	N/A(note 1)
Transient behaviour	2.1055	N/A	N/A	N/A	N/A	N/A(note 2)
Audio Frequency Response (a)	TIA EIA-603.3.2.6	N/A	N/A	N/A	N/A	N/A
Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A	N/A	N/A	N/A
Signal Booster Labelling Requirements	20.21(f)(1)(ii)	N/A	N/A	N/A	N/A	N/A

Notes:

1 The EUT does not contain modulation circuitry; therefore the test was not performed.

2 The EUT is not a keyed carrier system; therefore the test was not performed.

Abbreviations used in the above table:

CFR : Code of Federal Regulations
 REFE : Radiated Electric Field Emissions
 A Uplink Results Appendix

ANSI : American National Standards Institution
 PLCE : Power Line Conducted Emissions
 B Downlink Results Appendix

1.6 Equipment Test Conditions

Product class:	Uplink	Class A <input type="checkbox"/> Class B <input checked="" type="checkbox"/>
	Downlink	Class A <input type="checkbox"/> Class B <input checked="" type="checkbox"/>
Product Use:	Private Land Mobile Repeater	
Emission Designator(s):		
Supply Voltages:	Vnom	+230Vac/110Vac
Note: Vnom voltages are as stated above unless otherwise shown on the test report page		
Equipment Category:	Single channel	<input type="checkbox"/>
	Two channel	<input type="checkbox"/>
	Multi-channel	<input checked="" type="checkbox"/>
Channel spacing:	Wideband	Uplink
	Wideband	Downlink
Test Location	TRaC Global	
	Skelmersdale	<input checked="" type="checkbox"/>
	Hull	<input type="checkbox"/>
	Other	<input type="checkbox"/> Please Specify

1.7 Standard References

47 CFR 2	Code of Federal Regulations, Title 47, Part 2, "Frequency allocations and Radio Telemetry Matters; General Rules and Regulations"
47 CFR 22	Code of Federal Regulations, Title 47, Part 22," Public Mobile Services"
47 CFR 24	Code of Federal Regulations, Title 47, Part 24," Personal Communications Services"
47 CFR 27	Code of Federal Regulations, Title 47, Part 27," Miscellaneous Wireless Communications Services"
47 CFR 90	Code of Federal Regulations, Title 47, Part 90,"Land Mobile Radio Service"
47 CFR 15	Code of Federal Regulations, Title 47, Part 15,"Radio Frequency Devices" Subpart B, "Unintentional Radiators"
C63.4-2003	American National Standards Institute (ANSI), "Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range 9 kHz to 40 GHz"
KDB 935210 D01	Booster Definitions v02
KDB 935210 D02	Certification Requirements v02
KDB 935210 D03	Signal Booster Measurements v02

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 identified 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.

Section 2:**Measurement Uncertainty****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:**Uplink 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		

A1 RF Gain and Output Power

Test Details:	
Measurement standard	Part 2.1046, 22.913(a), 24.232(a), 27.50(a), 90.205 (k)
EUT sample number	S01 & S02
Modification state	0
SE in test environment	None
SE isolated from EUT	None
Temperature	22°C
Humidity	47%
EUT set up	Refer to Appendix C

Frequency (MHz)	Signal Generator input level (dBm)	Input Cable Loss (dB)	Input Level (dBm)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator loss (dB)	Gain (dB)	Conducted Output Power (dBm)	Gain after 10dB input level increase (dB)
700MHz (Lower)								
698.000	-58.14	0.50	-58.64	-15.07	0.4	43.97	-14.67	34.07
707.000	-59.44	0.50	-59.94	-15.22	0.5	45.22	-14.72	35.34
716.000	-59.56	0.40	-59.96	-14.80	0.5	45.66	-14.30	35.76
700MHz (Upper)								
776.000	-59.26	0.50	-59.76	-16.33	0.5	43.93	-15.83	34.04
781.500	-61.40	0.50	-61.90	-16.74	0.4	45.56	-16.34	35.67
787.000	-60.10	0.50	-60.60	-16.72	0.4	44.28	-16.32	34.37
850 MHz								
817.000	-61.24	0.40	-61.64	-15.52	0.4	46.52	-15.12	36.52
833.000	-61.97	0.50	-62.47	-14.90	0.5	48.07	-14.40	38.07
849.000	-60.36	0.50	-60.86	-15.52	0.5	45.84	-15.02	35.29

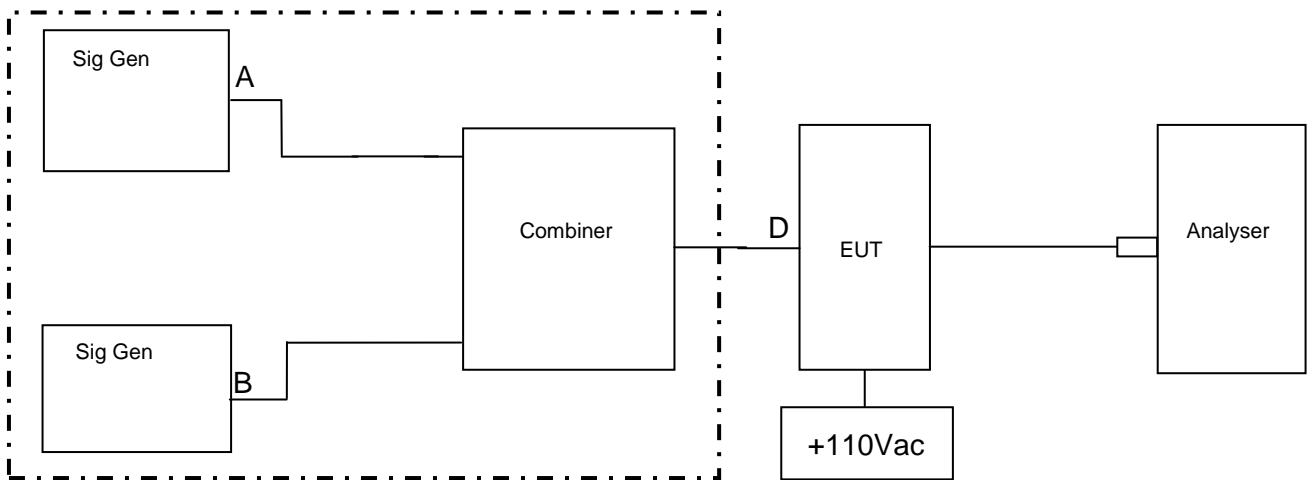
Notes: 1.The signal generator input was increased by 10dBs and the level of the output signal remeasured.

Frequency (MHz)	Signal Generator input level (dBm)	Input Cable Loss (dB)	Input Level (dBm)	Level at Spectrum Analyser (dBm)	Output Cable & Attenuator loss (dB)	Gain (dB)	Conducted Output Power (dBm)	Gain after 10dB input level increase (dB)
1800 MHz								
1850.000	-61.42	0.70	-62.12	-14.80	0.8	48.12	-14.00	38.27
1882.500	-62.78	0.70	-63.48	-14.62	0.7	49.56	-13.92	39.73
1915.000	-59.78	0.80	-60.58	-14.63	0.7	46.65	-13.93	36.82
1700 MHz								
1710.000	-61.42	0.70	-62.12	-14.48	0.7	48.34	-13.78	38.38
1732.500	-62.06	0.70	-62.76	-14.66	0.6	48.70	-14.06	38.74
1755.000	-60.34	0.70	-61.04	-14.97	0.6	46.67	-14.37	36.72

Notes: 1.The signal generator input was increased by 10dBs and the level of the output signal remeasured.

A2 Amplifier Intermodulation Spurious Emissions

Test Details:	
Measurement standard	Part 2.1053, 22.917(a), 24.238(a), 27.53(c) & (g), 90.691(a)(1) & (2)
EUT sample number	S01 & S02
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C



2 Signals at	Frequency (MHz)	Level (dBm)	Limit (dBm)
700MHz (Lower)			
No Emissions Within 10 dB of the limit			-13
700MHz (Upper)			
No Emissions Within 10 dB of the limit			-13
850 MHz			
No Emissions Within 10 dB of the limit			-13
1800 MHz			
No Emissions Within 10 dB of the limit			-13
1700 MHz			
No Emissions Within 10 dB of the limit			-13

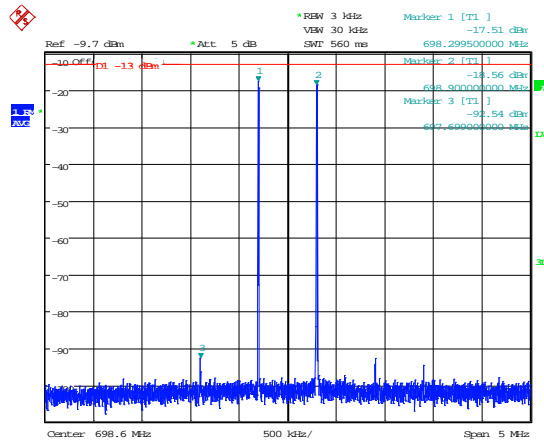
Sweep data is shown on the next page:

Results

The EUT was found to comply with the limits

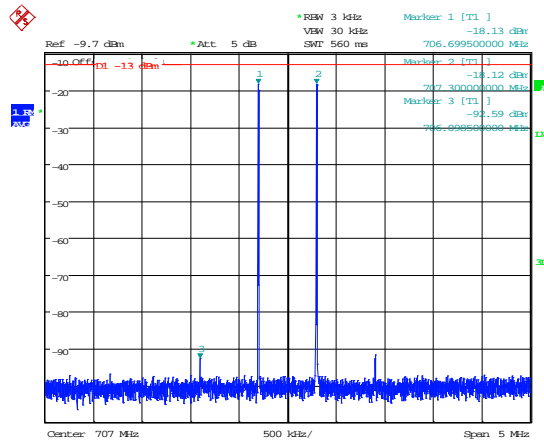
See plots below

700 MHz (Lower) Intermodulation close View



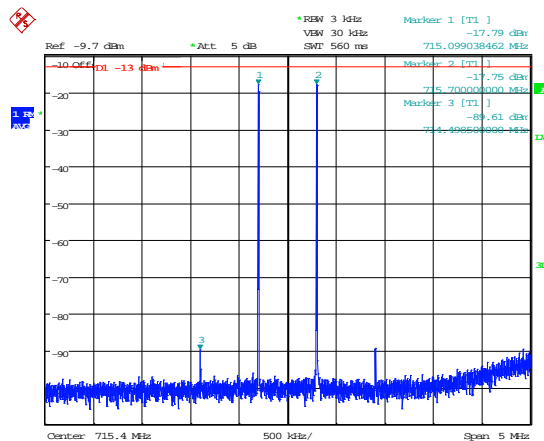
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2 Signals at bottom end of band



Date: 13.AUG.2014 15:08:43

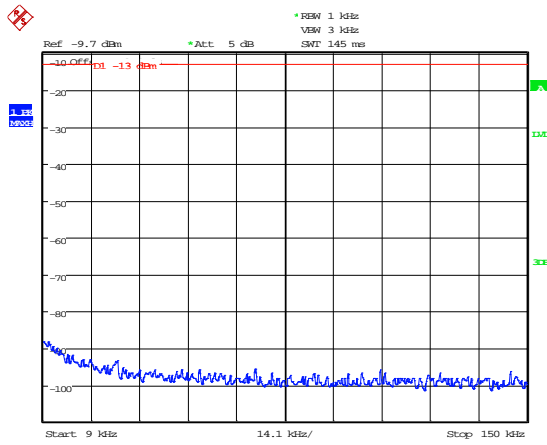
2 Signals at bottom end of band



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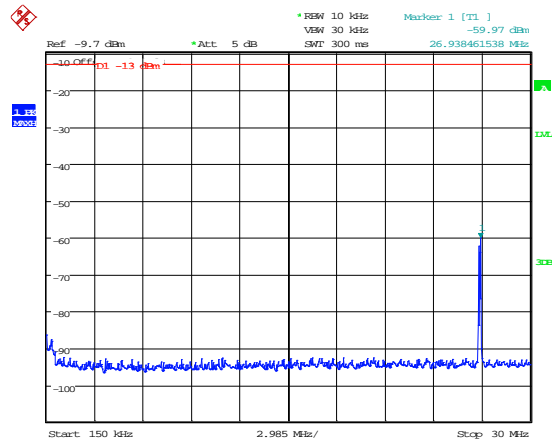
2 Signals at bottom end of band

700 MHz (Lower) Intermodulation close View



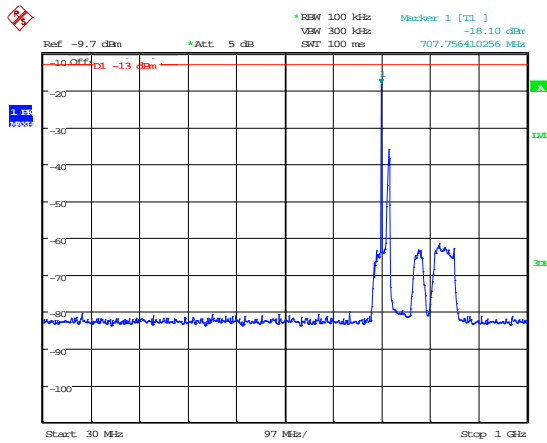
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9 – 150kHz



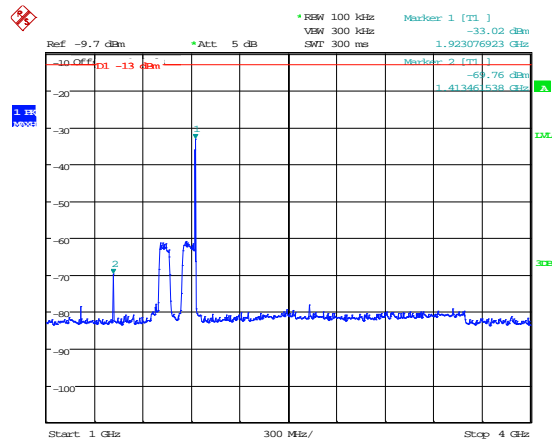
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150kHz – 30MHz



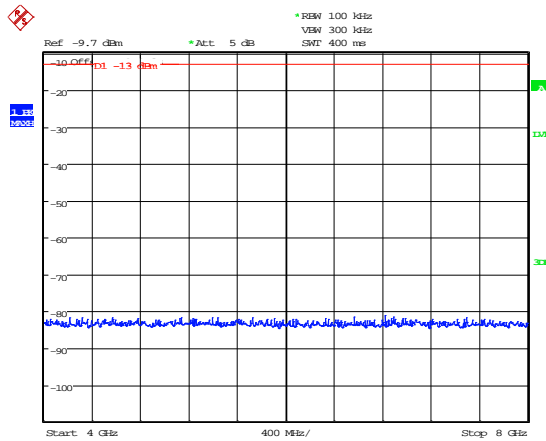
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30MHz – 1GHz



Date: 13.AUG.2014 15:20:21

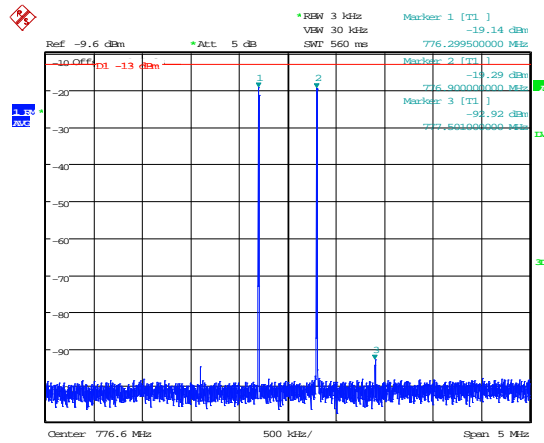
1GHz – 4GHz



Date: 13.AUG.2014 15:20:48

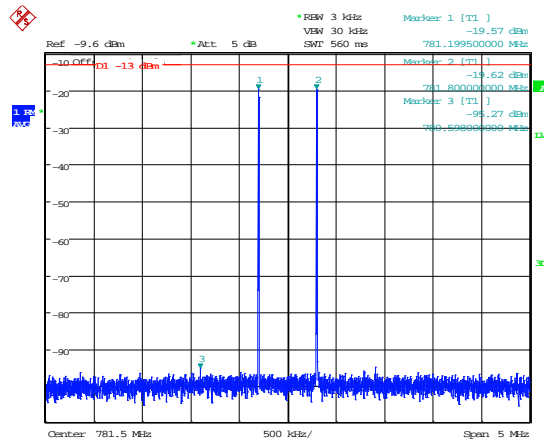
4GHz – 8GHz

700 MHz (Upper) Intermodulation close View



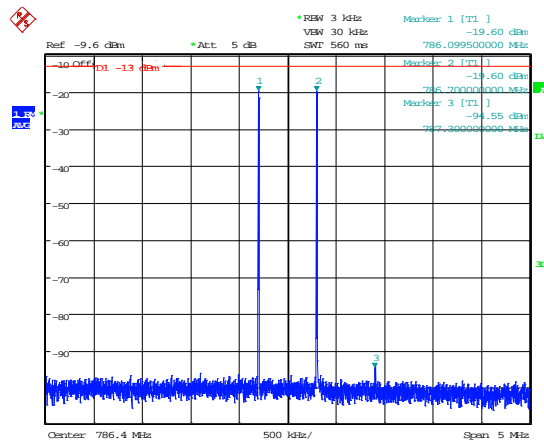
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2 Signals at bottom end of band



Date: 13.AUG.2014 15:45:08

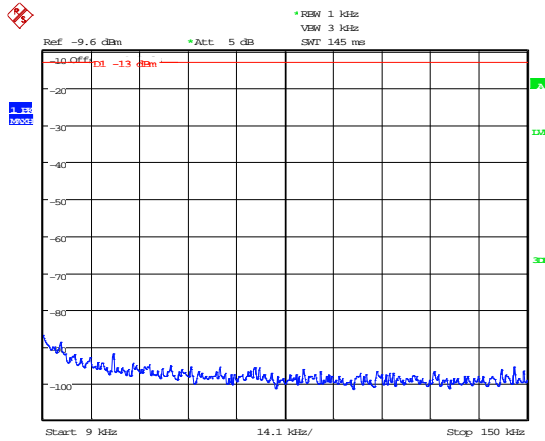
2 Signals at bottom end of band



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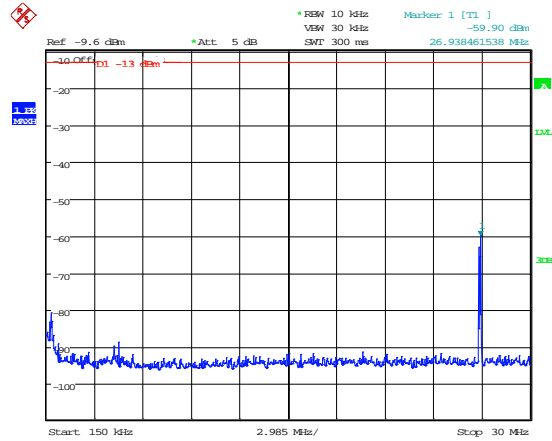
2 Signals at bottom end of band

700 MHz (Upper) Intermodulation close View



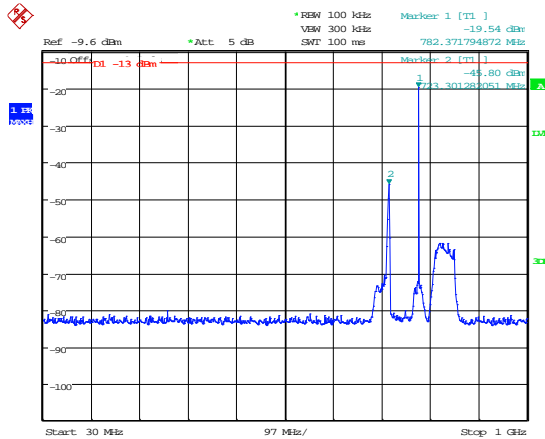
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9 – 150kHz



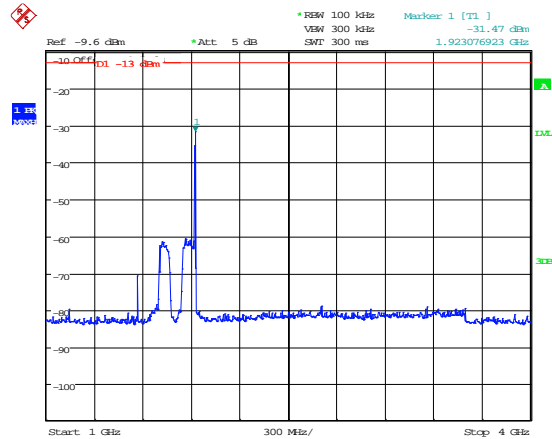
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150kHz – 30MHz



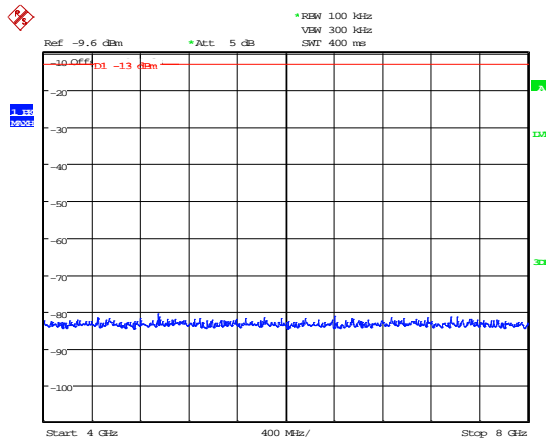
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30MHz – 1GHz



Date: 13.AUG.2014 15:48:28

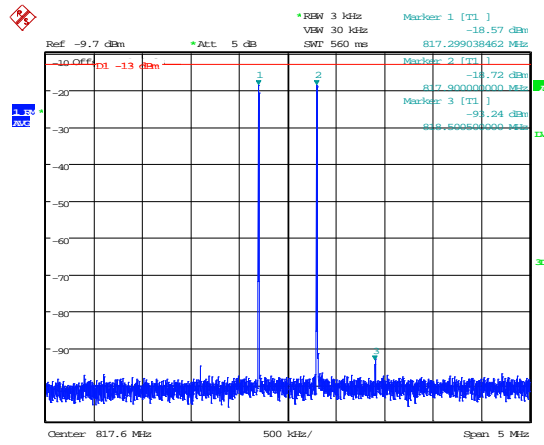
1GHz – 4GHz



Date: 13.AUG.2014 15:48:47

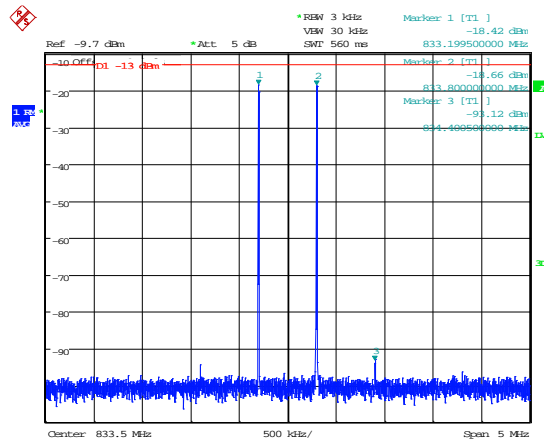
4GHz – 8GHz

850 MHz Intermodulation close View



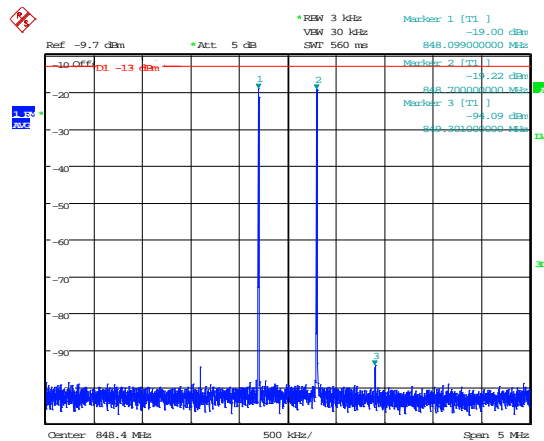
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2 Signals at bottom end of band



Date: 13.AUG.2014 16:10:13

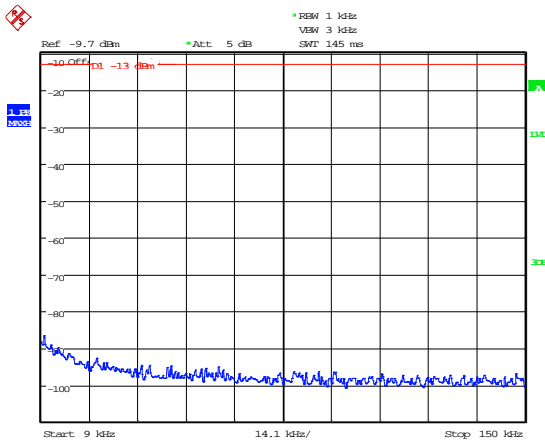
2 Signals at bottom end of band



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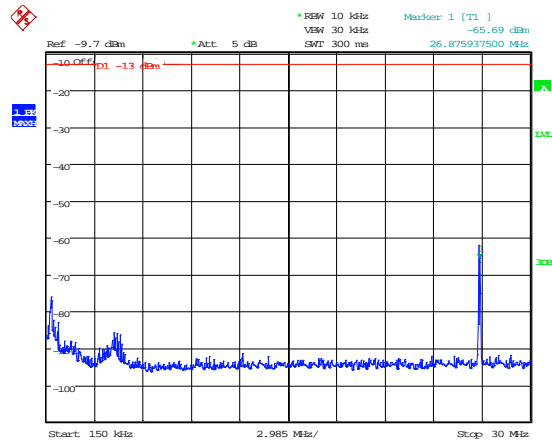
2 Signals at bottom end of band

850 MHz Intermodulation close View



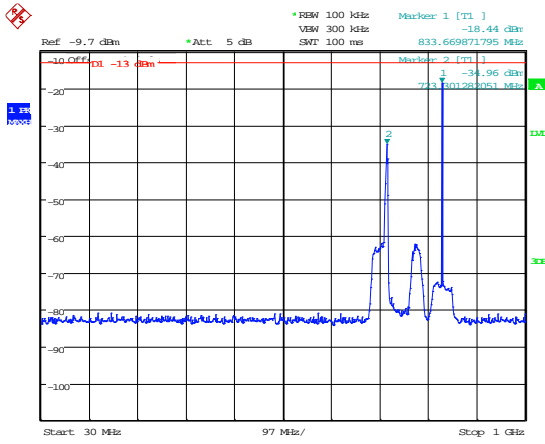
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9 – 150kHz



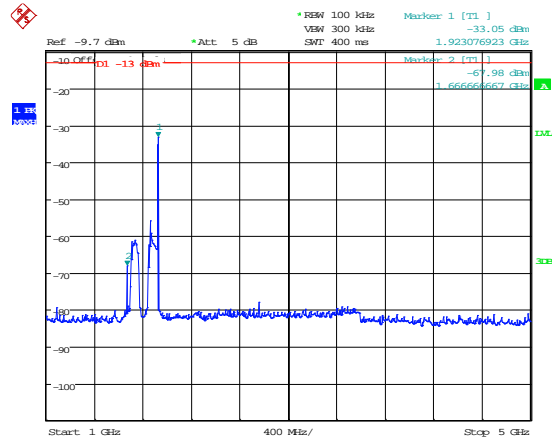
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150kHz – 30MHz



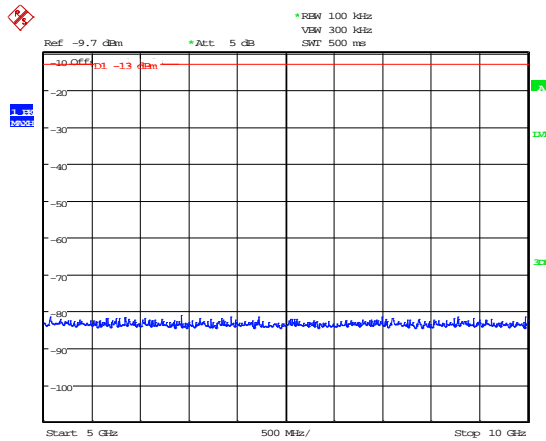
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30MHz – 1GHz



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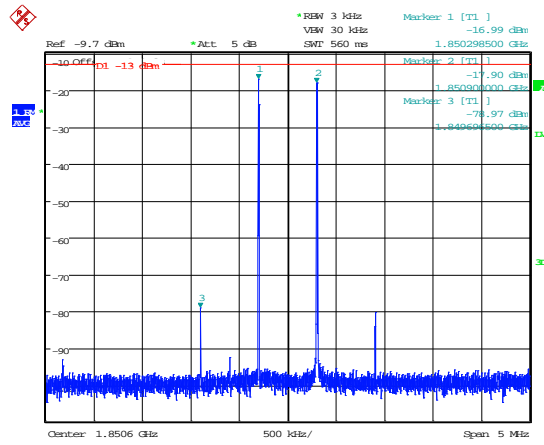
1GHz – 5GHz



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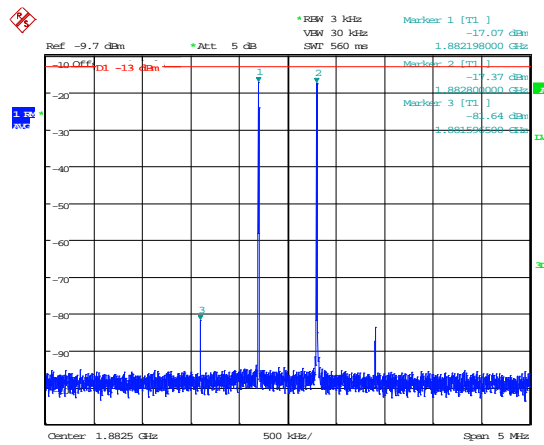
5GHz – 10GHz

1880 MHz Intermodulation close View



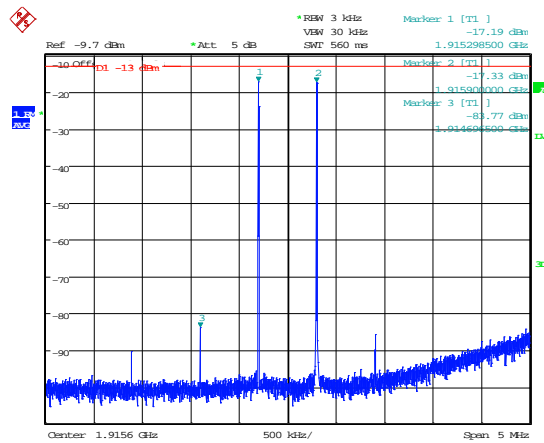
Date: 13.AUG.2014 16:33:07

2 Signals at bottom end of band



Date: 13.AUG.2014 16:37:51

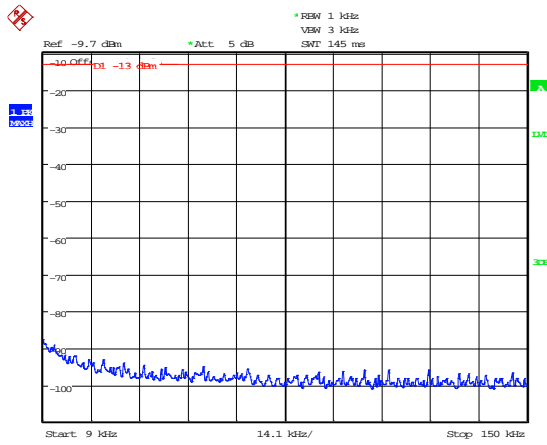
2 Signals at bottom end of band



Date: 13.AUG.2014 16:48:29

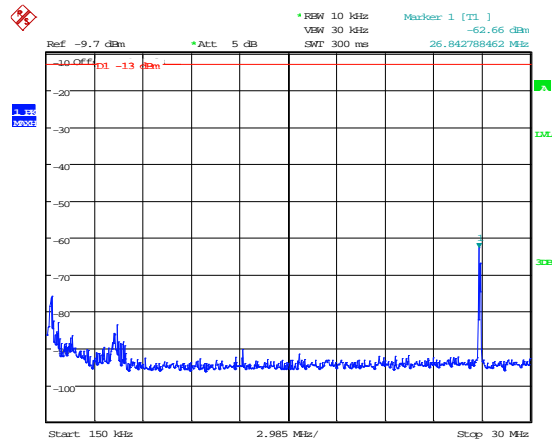
2 Signals at bottom end of band

1880 MHz Intermodulation close View



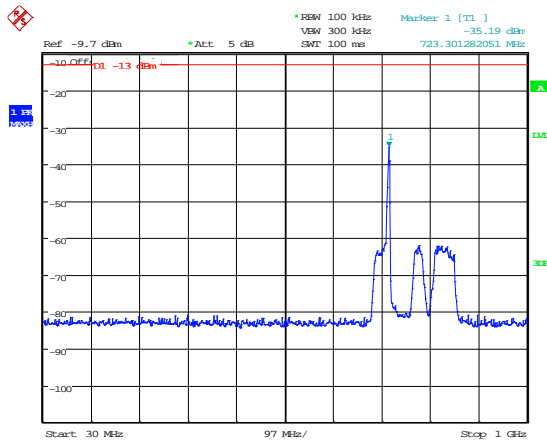
Date: 13.AUG.2014 16:40:23

9 – 150kHz



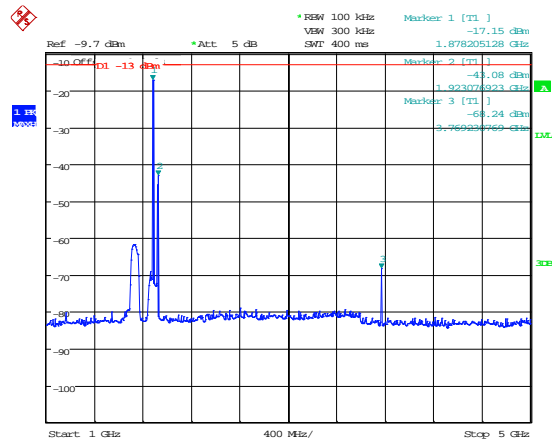
Date: 13.AUG.2014 16:41:02

150kHz – 30MHz



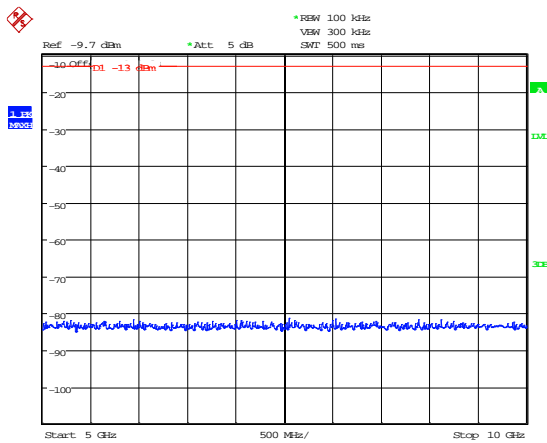
Date: 13.AUG.2014 16:38:42

30MHz – 1GHz



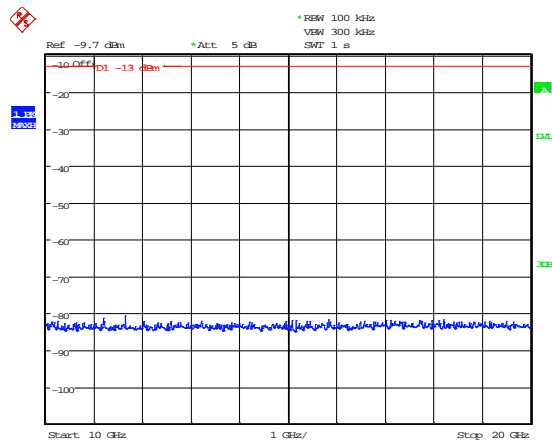
Date: 13.AUG.2014 16:39:21

1GHz – 5GHz



Date: 13.AUG.2014 16:39:41

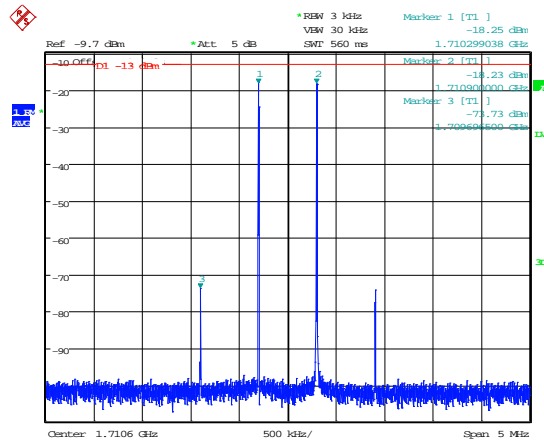
5GHz – 10GHz



Date: 13.AUG.2014 16:39:59

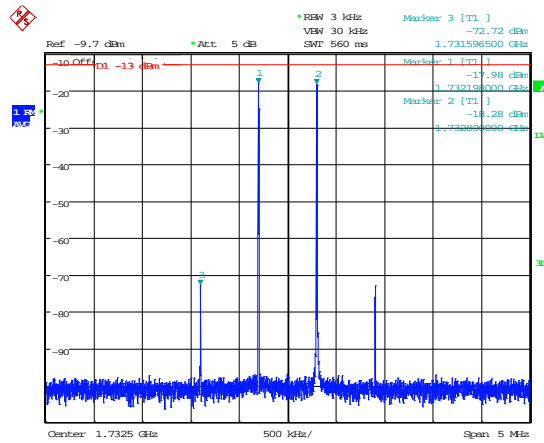
10GHz – 20GHz

1710 MHz Intermodulation close View



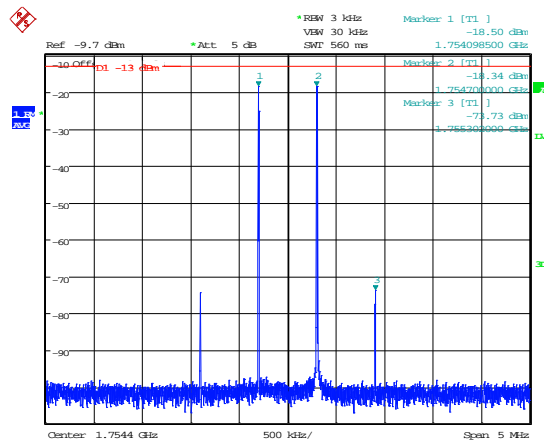
Date: 14.AUG.2014 08:45:16

2 Signals at bottom end of band



Date: 14.AUG.2014 08:50:31

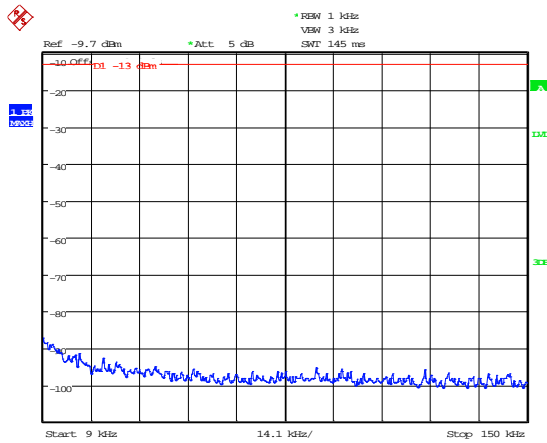
2 Signals at bottom end of band



Date: 14.AUG.2014 09:02:58

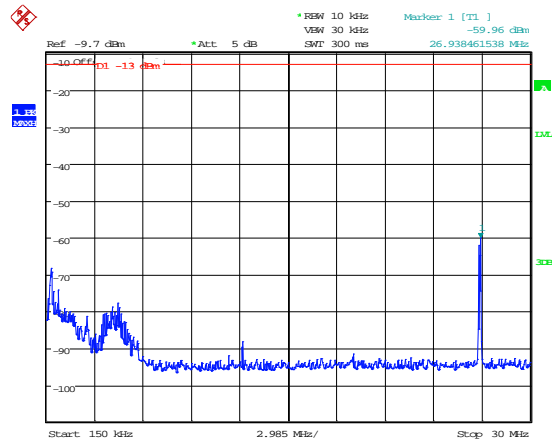
2 Signals at bottom end of band

1710 MHz Intermodulation close View



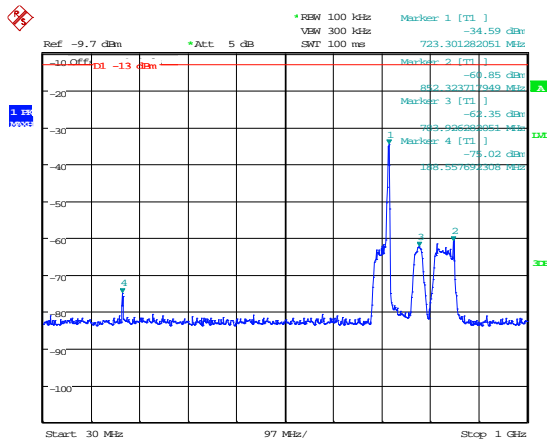
Date: 14.AUG.2014 08:52:20

9 – 150kHz



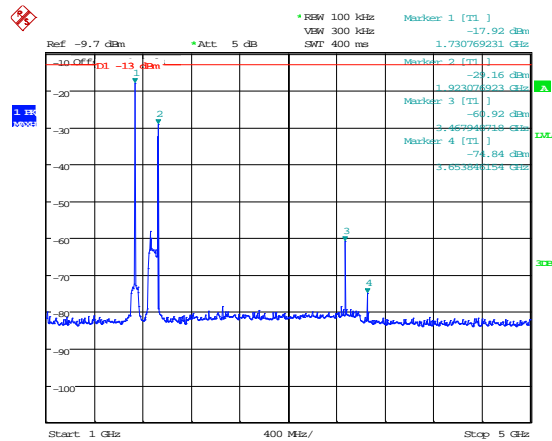
Date: 14.AUG.2014 08:52:59

150kHz – 30MHz



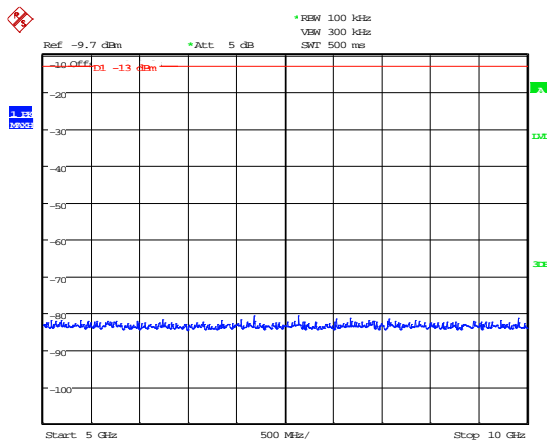
Date: 14.AUG.2014 08:51:47

30MHz – 1GHz



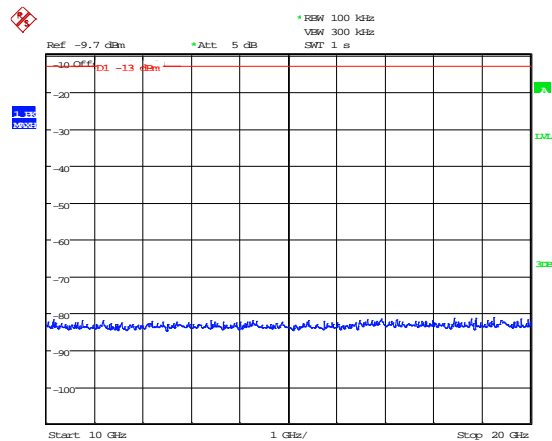
Date: 14.AUG.2014 08:53:49

1GHz – 5GHz



Date: 14.AUG.2014 08:54:29

5GHz – 10GHz



Date: 14.AUG.2014 08:54:56

10GHz – 20GHz

A3 Amplifier Modulated Channel Test

Test Details:	
Measurement standard	D.3 Policies + Procedures (j) of KDB 935210 D02 Signal Boosters Certification v02
EUT sample number	S01 & S02
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C

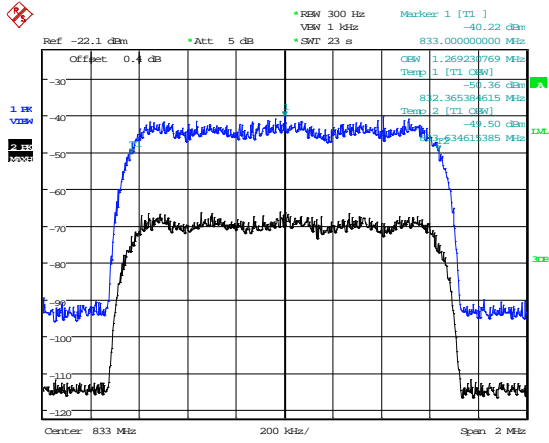
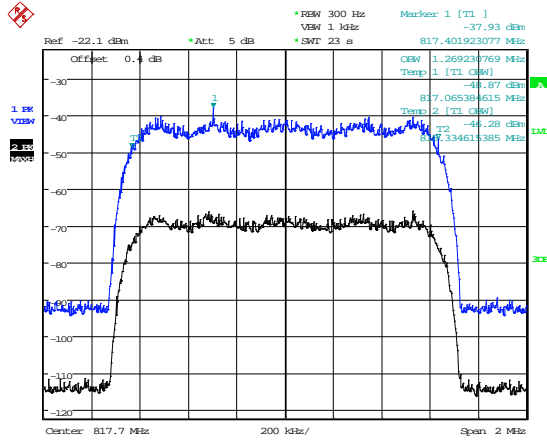
Frequency Of Operation Channel	Modulation Type				
	CDMA	GSM	WCDMA	LTE 1.4 MHz	LTE 20.0 MHz
698.0 MHz	N/A	N/A	N/A	1.089MHz	N/A
707.0 MHz	N/A	N/A	N/A	1.089MHz	17.87MHz
716.0 MHz	N/A	N/A	N/A	1.089MHz	N/A
777.0 MHz	N/A	N/A	N/A	1.089MHz	N/A
782.5 MHz	N/A	N/A	N/A	1.089MHz	8.93MHz
787.0 MHz	N/A	N/A	N/A	1.089MHz	N/A
817.0 MHz	1.269MHz	245.192kHz	4.182MHz	1.089MHz	17.82MHz
833.0 MHz	1.269MHz	245.192kHz	4.182MHz	1.089MHz	17.86MHz
849.0 MHz	1.272MHz	245.192kHz	4.163MHz	1.089MHz	17.78MHz
1880.0 MHz	1.266MHz	248.397kHz	4.163MHz	1.089MHz	17.82MHz
1897.5 MHz	1.272MHz	246.794kHz	4.173MHz	1.089MHz	17.82MHz
1915.0 MHz	1.272MHz	250.000kHz	4.163MHz	1.089MHz	17.82MHz
1710.0 MHz	N/A	N/A	4.182MHz	1.089MHz	17.82MHz
1732.5 MHz	N/A	N/A	4.173MHz	1.089MHz	17.82MHz
1755.0 MHz	N/A	N/A	4.163MHz	1.089MHz	17.78MHz

Waveforms applied to selected bands as requested.

698.0 – 716.0 MHz < 20MHz therefore waveform centred around centre frequency only applied.

777.0 – 787.0 MHz = 10 MHz wide therefore only a 10 MHz wide waveform is applied.

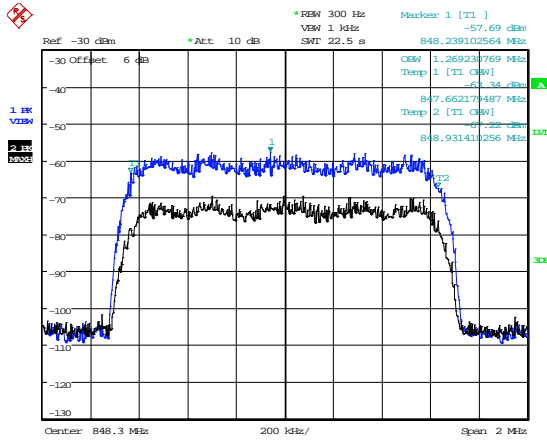
CDMA Modulation



Date: 31.JUL.2014 16:04:56

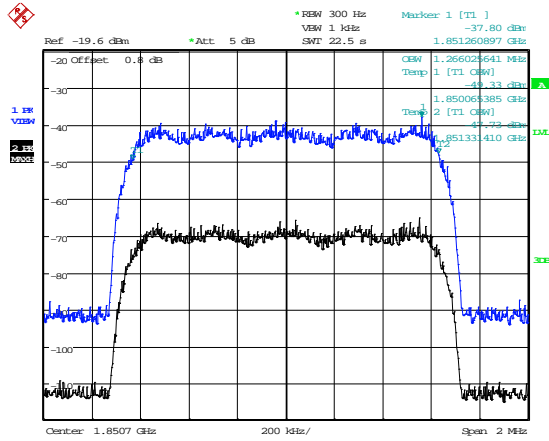
Date: 31.JUL.2014 16:10:22

817.0 MHz



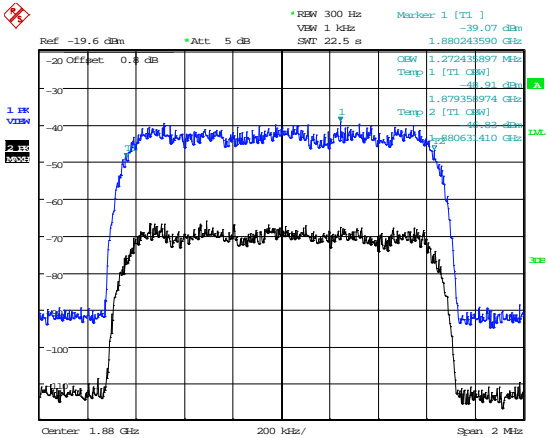
Date: 24.OCT.2013 16:43:46

833.0 MHz



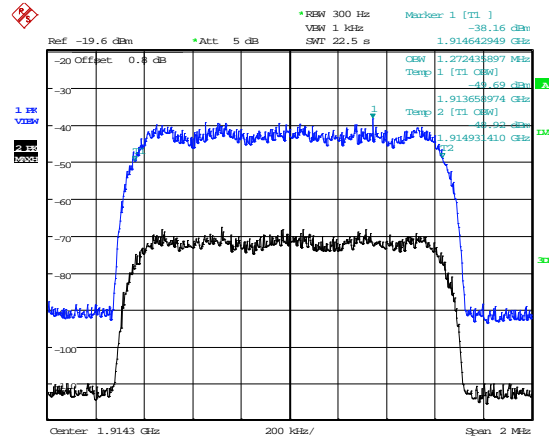
Date: 1.AUG.2014 13:03:51

849.0 MHz



Date: 1.AUG.2014 13:06:47

1850.0 MHz



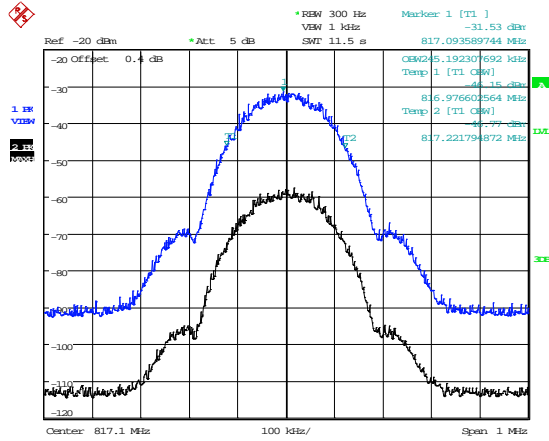
Date: 1.AUG.2014 13:12:31

1880 MHz

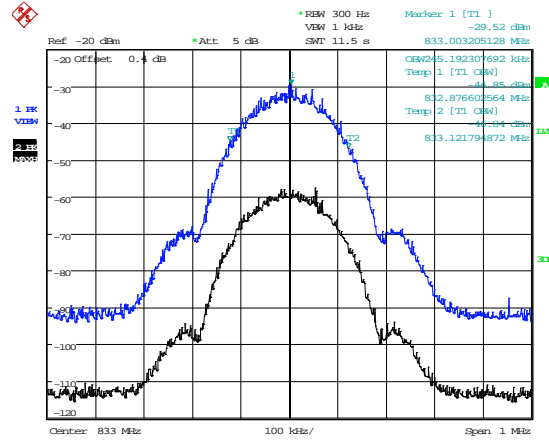
1915.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

GSM Modulation

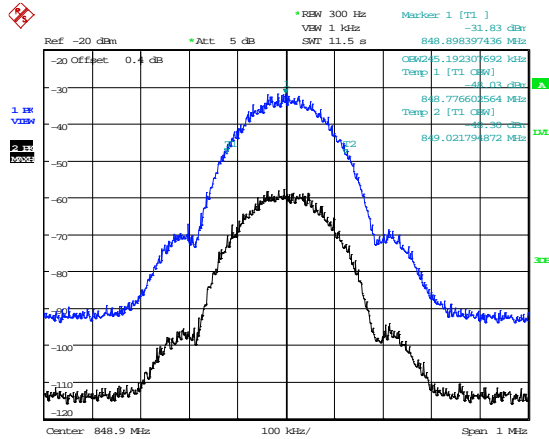


Date: 1.AUG.2014 08:58:53



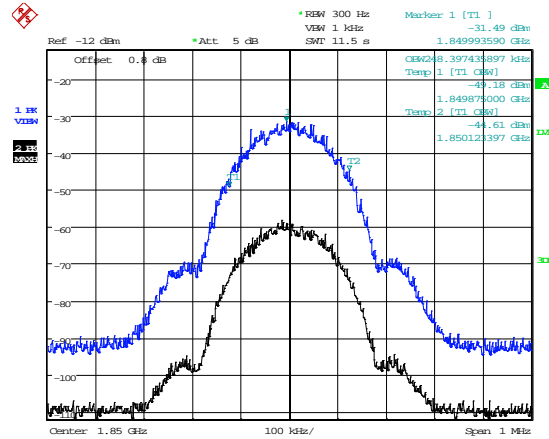
Date: 1.AUG.2014 09:08:11

817.0 MHz



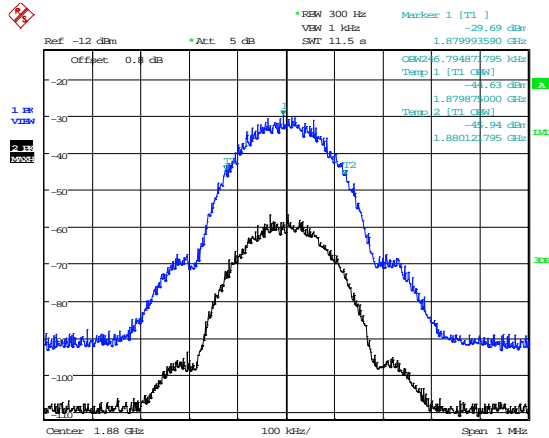
Date: 1.AUG.2014 09:18:59

833.0 MHz



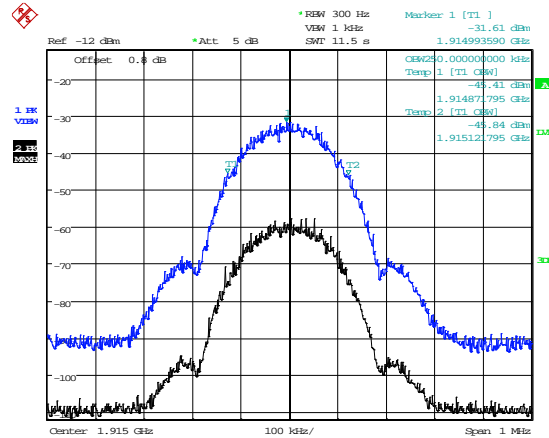
Date: 1.AUG.2014 14:01:19

849.0 MHz



Date: 1.AUG.2014 14:06:12

1850.0 MHz



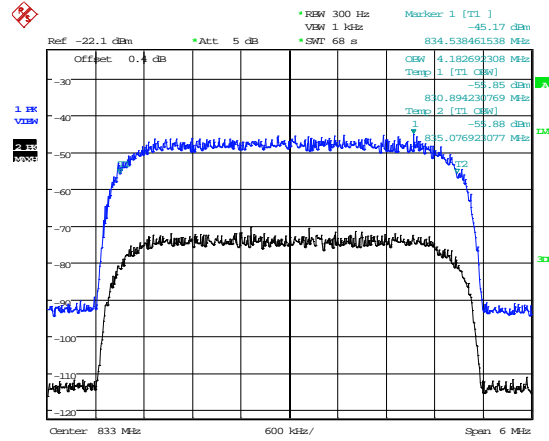
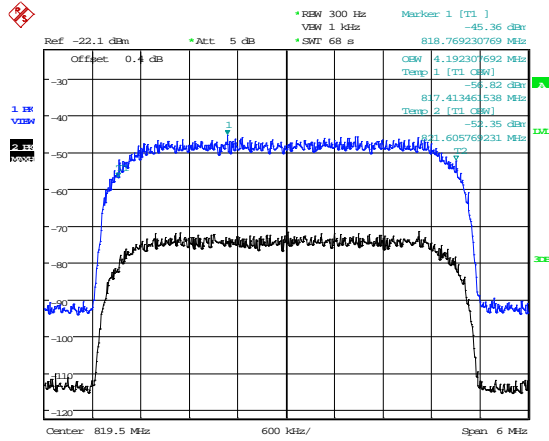
Date: 1.AUG.2014 14:10:14

1880MHz

1915.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

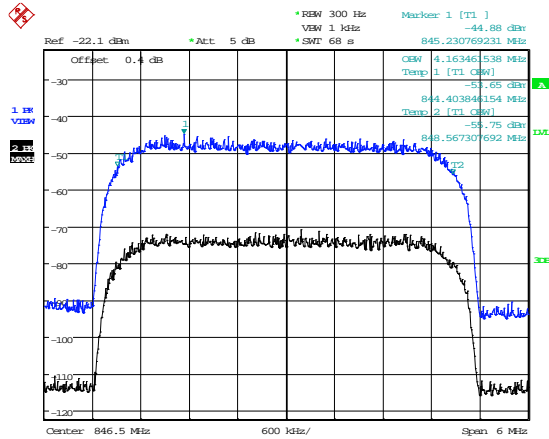
WCDMA Modulation



Date: 31.JUL.2014 16:26:32

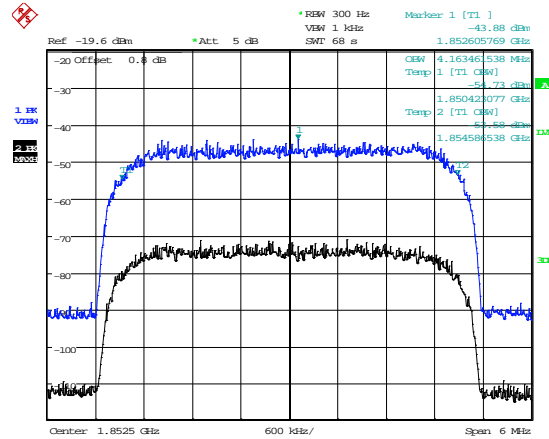
Date: 31.JUL.2014 16:33:26

817.0 MHz



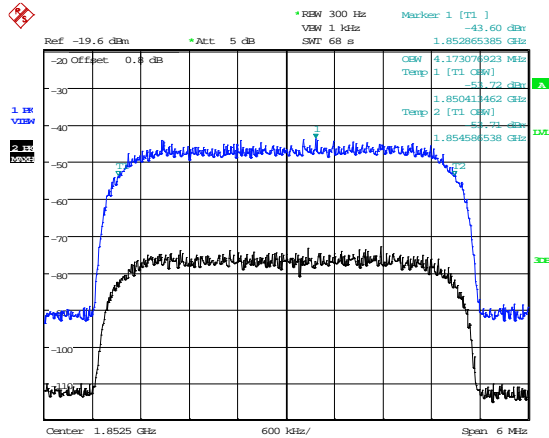
Date: 31.JUL.2014 16:41:59

833.0 MHz



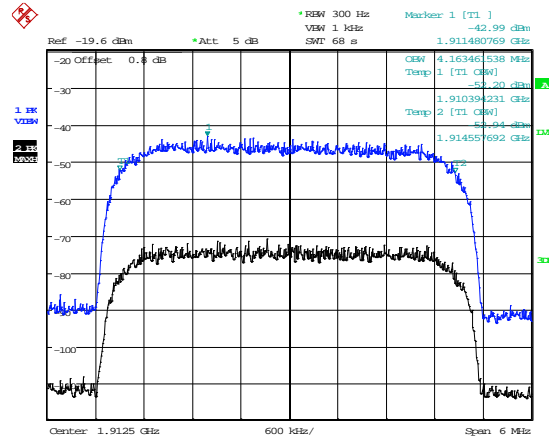
Date: 1.AUG.2014 13:21:28

849.0 MHz



Date: 1.AUG.2014 13:47:12

1850.0 MHz



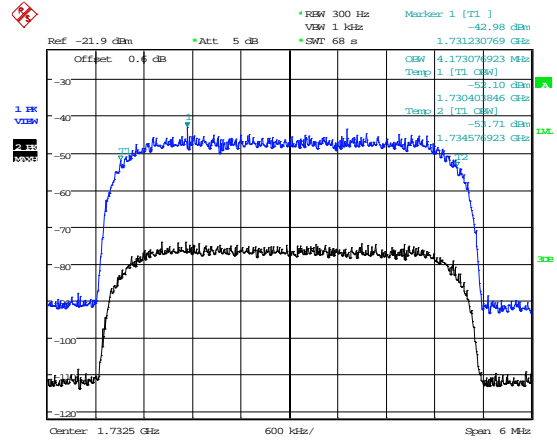
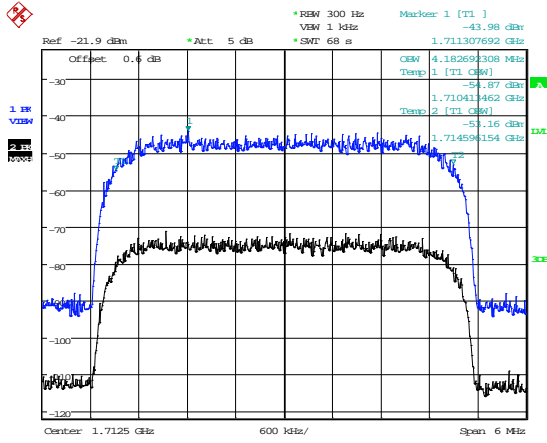
Date: 1.AUG.2014 13:54:42

1880MHz

1915.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

WCDMA Modulation

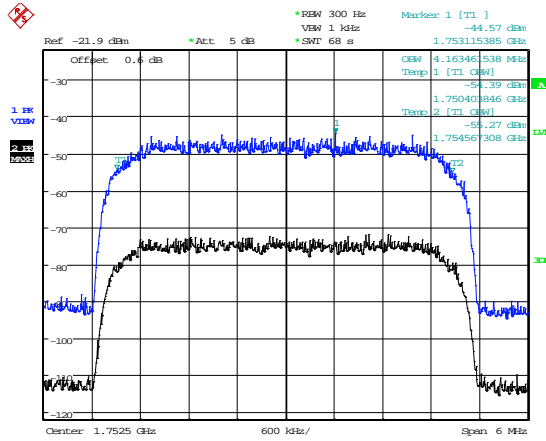


Date: 31.JUL.2014 15:33:48

Date: 31.JUL.2014 15:29:27

1710.0 MHz

1732.5 MHz

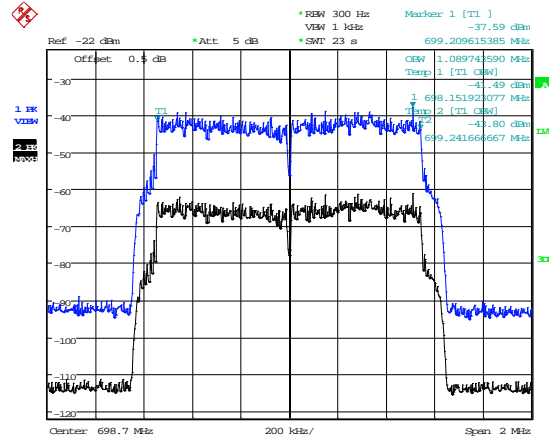
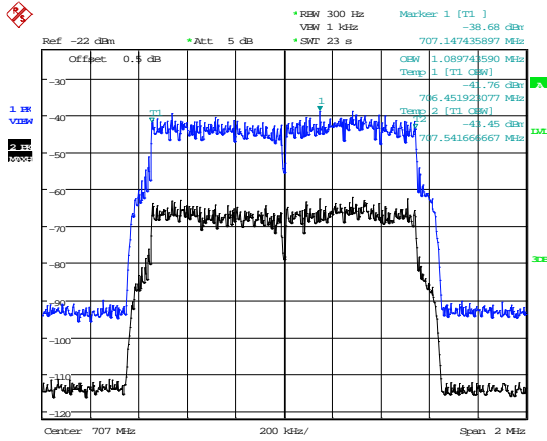


Date: 31.JUL.2014 15:39:16

1755.0 MHz

The above plots depicting the output wavelshape show no measurable distortion visible when compared to the input signal.

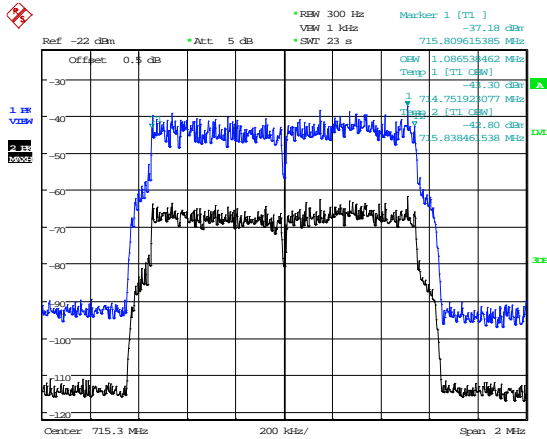
1.4 MHz LTE Modulation



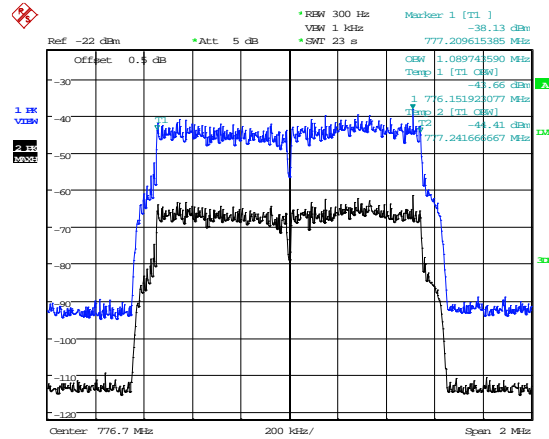
Date: 31.JUL.2014 11:09:23

Date: 31.JUL.2014 11:04:19

698.0 MHz



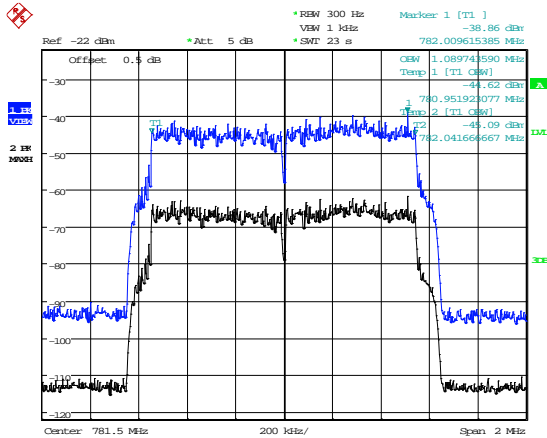
707.0 MHz



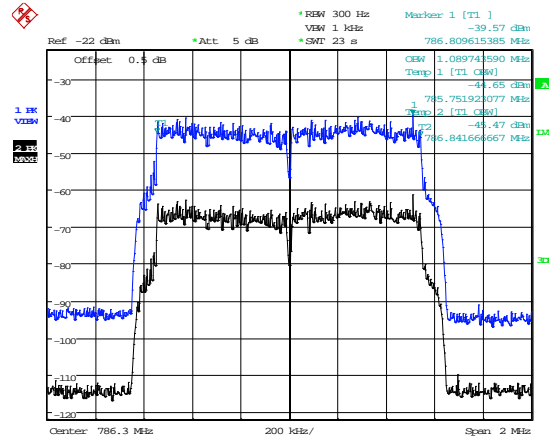
Date: 31.JUL.2014 11:14:28

Date: 31.JUL.2014 11:54:08

716.0 MHz



777.0 MHz



Date: 31.JUL.2014 12:00:35

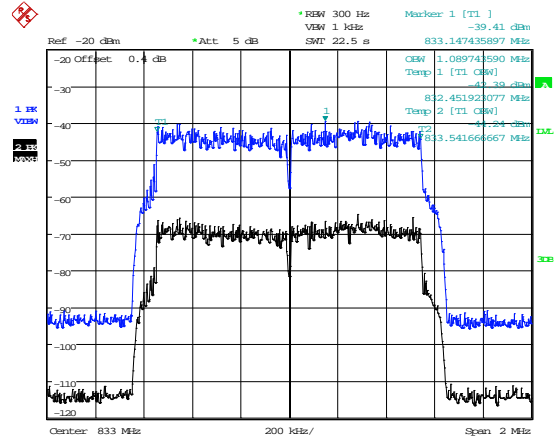
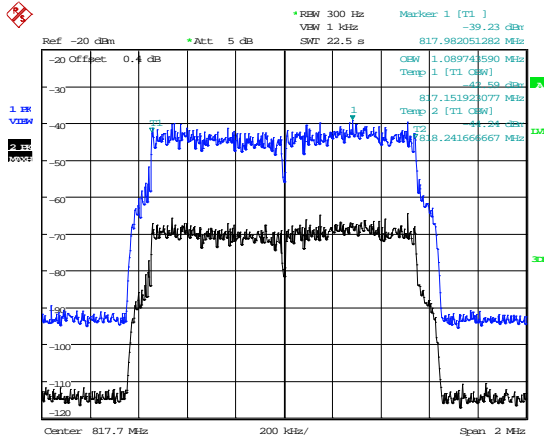
Date: 31.JUL.2014 12:06:36

781.5 MHz

787.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

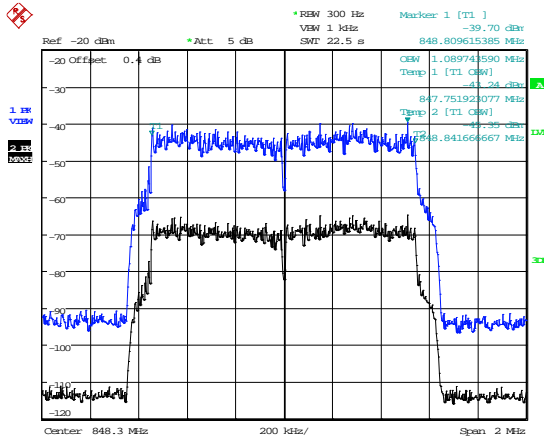
1.4 MHz LTE Modulation



Date: 1.AUG.2014 09:39:00

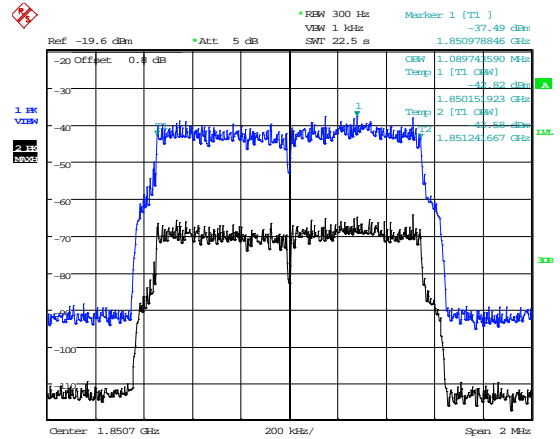
Date: 1.AUG.2014 09:42:43

817.0 MHz



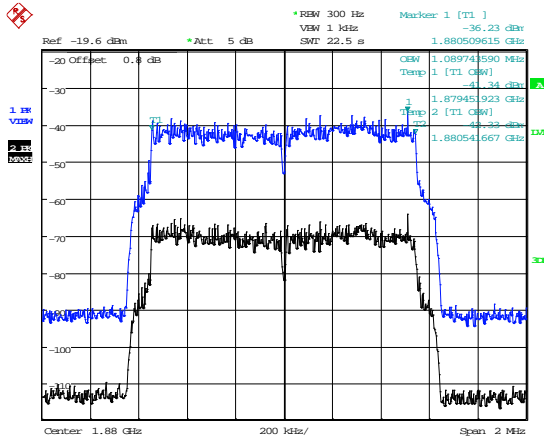
Date: 1.AUG.2014 09:58:40

833.0 MHz



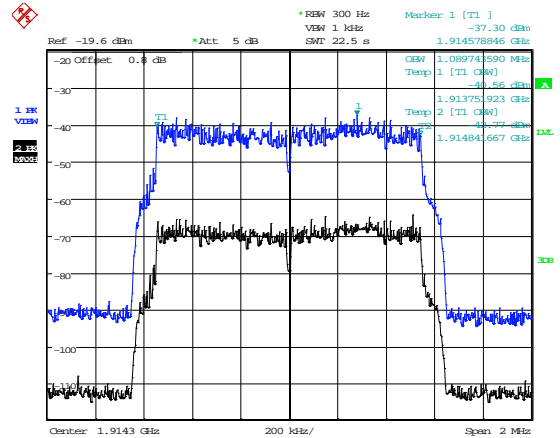
Date: 1.AUG.2014 11:14:35

849.0 MHz



Date: 1.AUG.2014 11:17:31

1850.0 MHz



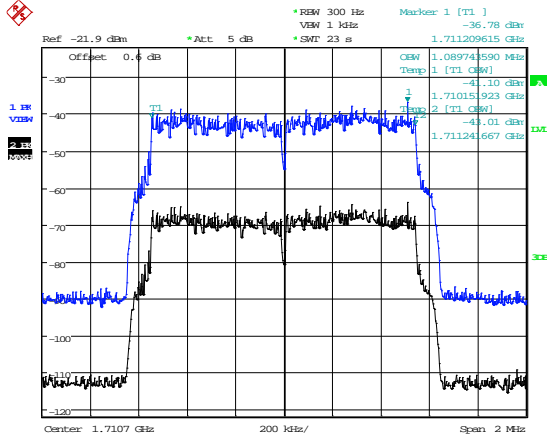
Date: 1.AUG.2014 11:20:49

1880 MHz

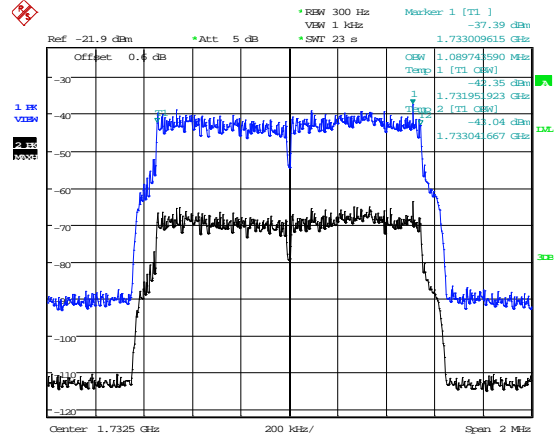
1915.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

1.4 MHz LTE Modulation

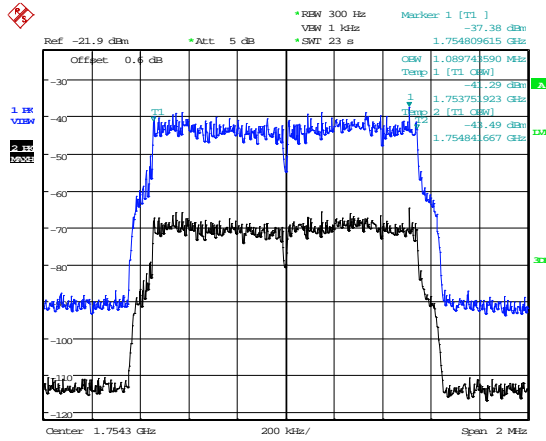


Date: 31.JUL.2014 13:38:13



Date: 31.JUL.2014 13:42:51

1710.0 MHz



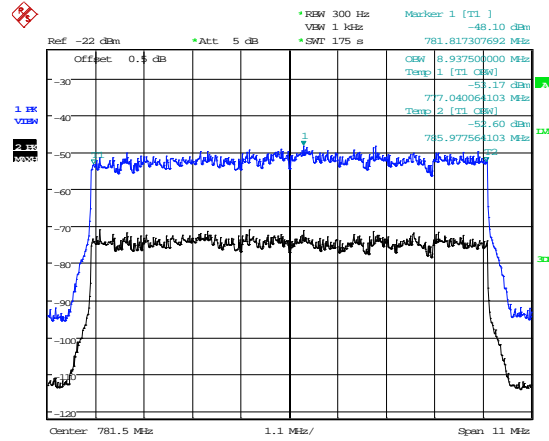
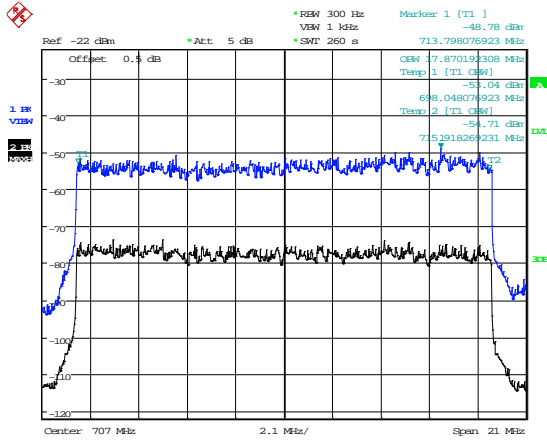
Date: 31.JUL.2014 13:52:50

1732.5 MHz

1755.0 MHz

The above plots depicting the output wavelshape show no measurable distortion visible when compared to the input signal.

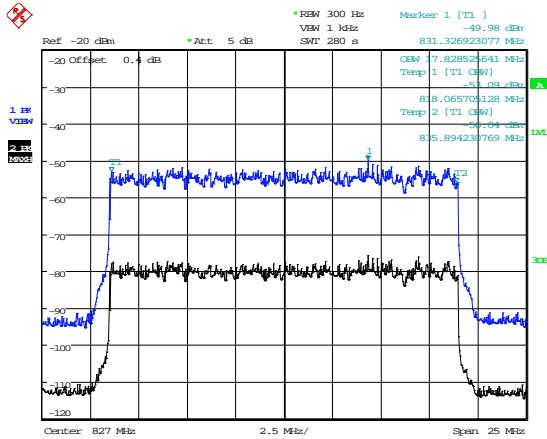
20 MHz LTE Modulation



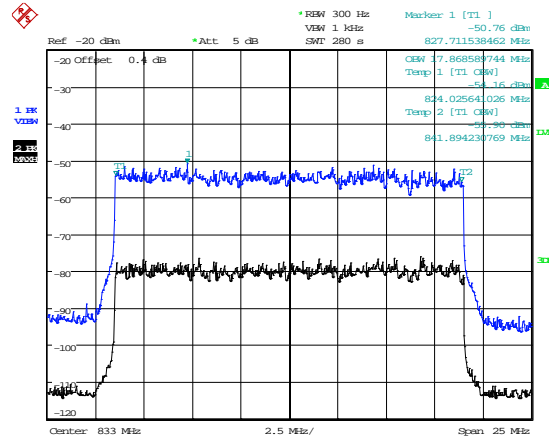
Date: 31.JUL.2014 11:42:41

Date: 31.JUL.2014 12:26:43

707.0 MHz



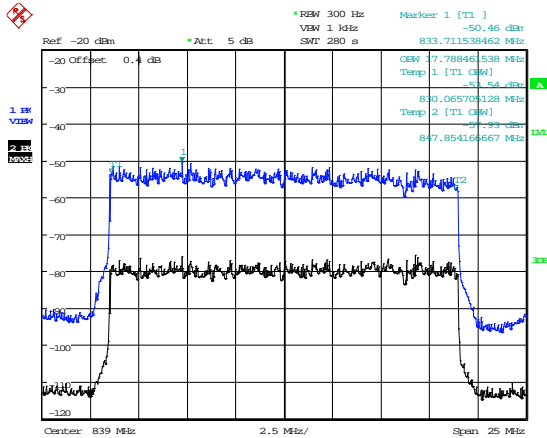
781.5 MHz



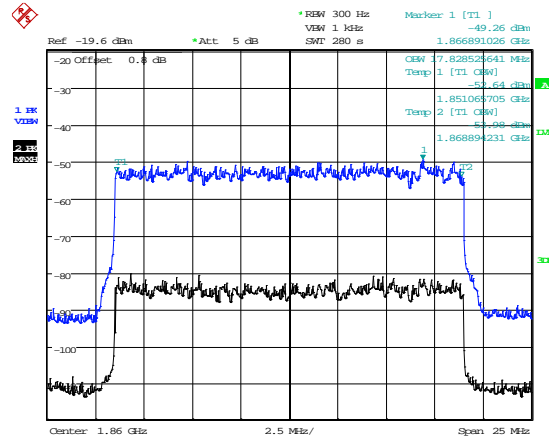
Date: 1.AUG.2014 10:30:07

Date: 1.AUG.2014 10:54:31

827.0 MHz



833.0 MHz



Date: 1.AUG.2014 11:05:33

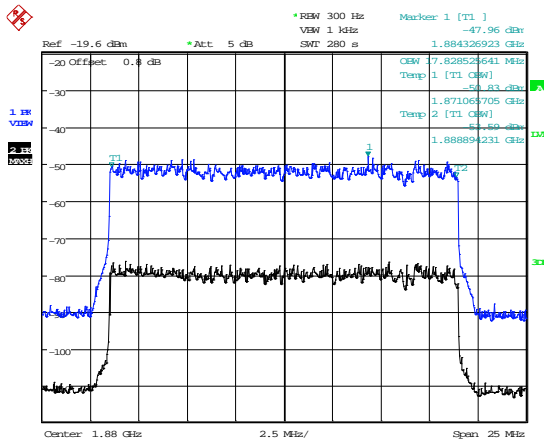
Date: 1.AUG.2014 11:33:20

839.0 MHz

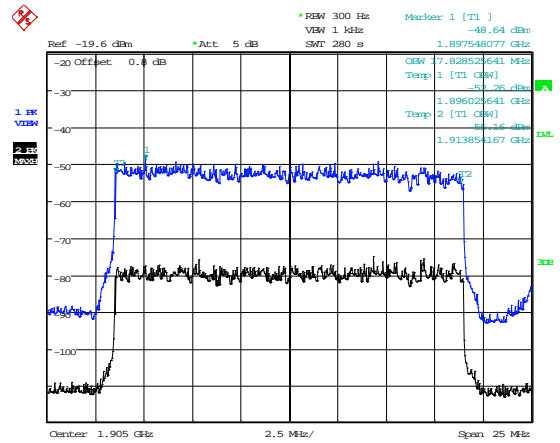
1850.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

20 MHz LTE Modulation

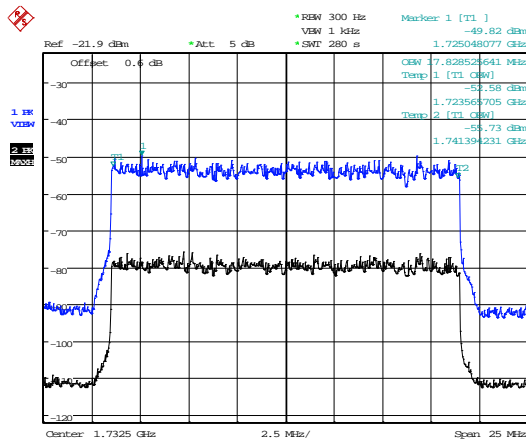


Date: 1.AUG.2014 11:53:25



Date: 1.AUG.2014 12:05:03

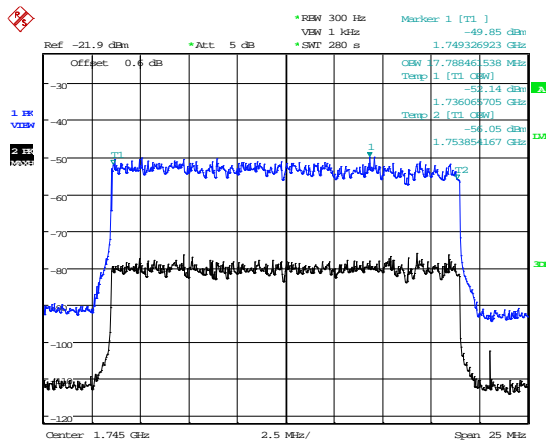
1880 MHz



Date: 31.JUL.2014 14:25:56

1905.0 MHz

1720.0 MHz



Date: 31.JUL.2014 14:57:14

1732.5 MHz

1745.0 MHz

The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal

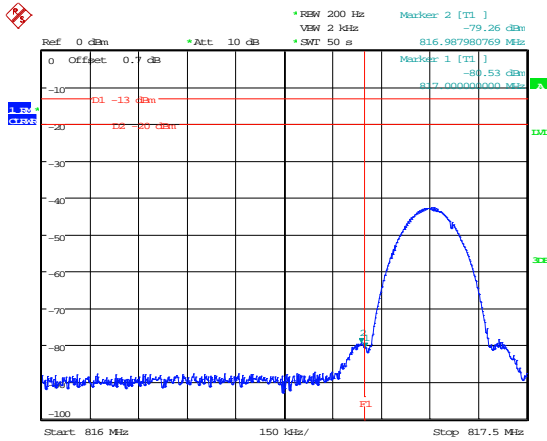
A4 Spurious Emissions at Antenna Terminals Less than 1MHz

Test Details:	
Measurement standard	Part 2.1053, 22.917(a), 24.238(a), 27.53(c) & (g), 90.691(a)(1) & (2)
EUT sample number	S01 & S02
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Modulation Type	Bandedge	Carrier Frequency (MHz)	Max Level @ bandedge (dBm)
GSM	Lower	817.20	-79.26
	Upper	823.80	-78.72
CDMA	Lower	817.75	-70.22
	Upper	823.25	-72.49
WCDMA	Lower	819.50	-65.63
	Upper	821.50	-68.37
LTE 1.4 MHz	Lower	817.70	-64.78
	Upper	823.70	-64.20
LTE 5 MHz	Lower	819.50	-70.47
	Upper	821.50	-69.37

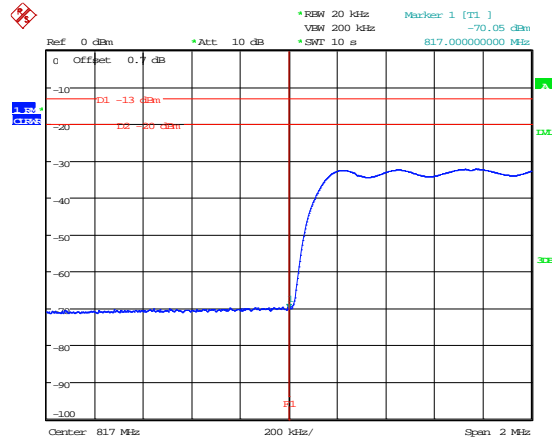
90.691(a)(1) applicable as EUT transmits above the spurious limit defined. EUT transit below spurious limit defined in other applicable
5 MHz LTE to fit into 817 -824 MHz band

Lower band edge, Part 90, Subpart S; SMR 800 (Sprint)



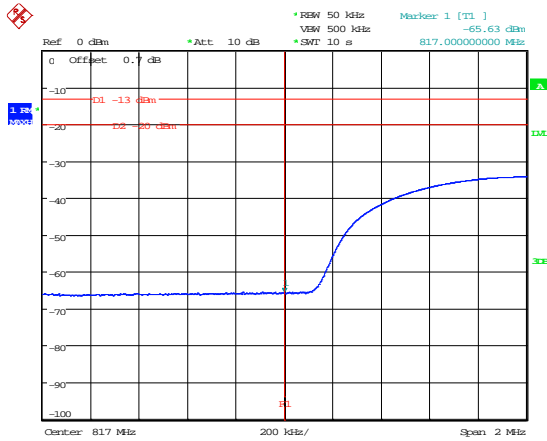
Date: 20.NOV.2014 10:11:39

GSM



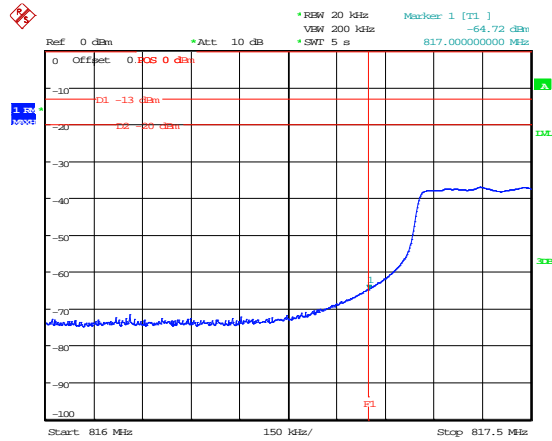
Date: 20.NOV.2014 10:09:50

CDMA



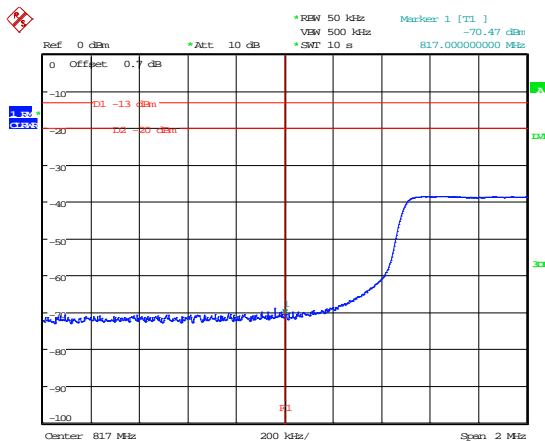
Date: 20.NOV.2014 10:08:05

WCDMA



Date: 20.NOV.2014 10:04:05

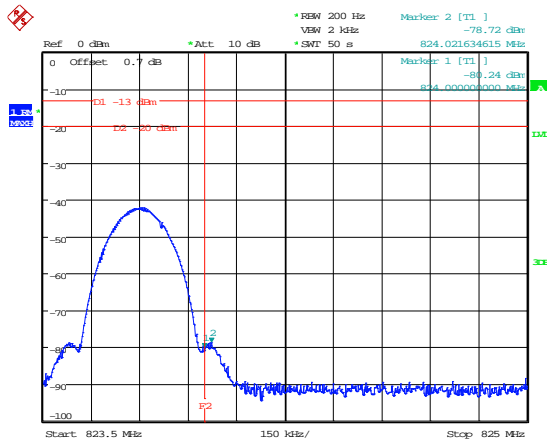
LTE 1.4 MHz



Date: 20.NOV.2014 10:46:21

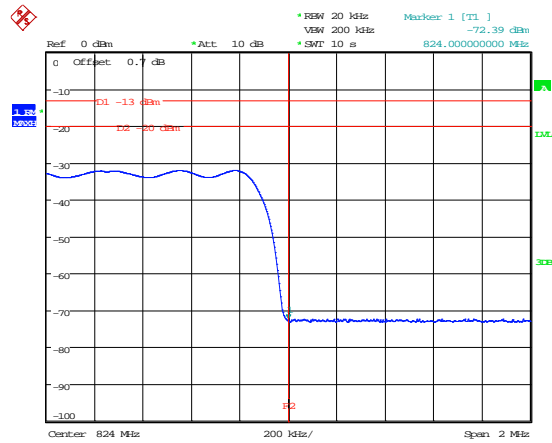
LTE 5 MHz

Upper band edge, Part 90, Subpart S; SMR 800 (Sprint)



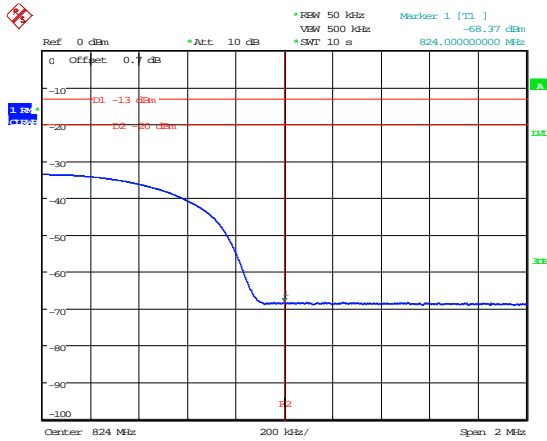
Date: 20.NOV.2014 10:52:57

GSM



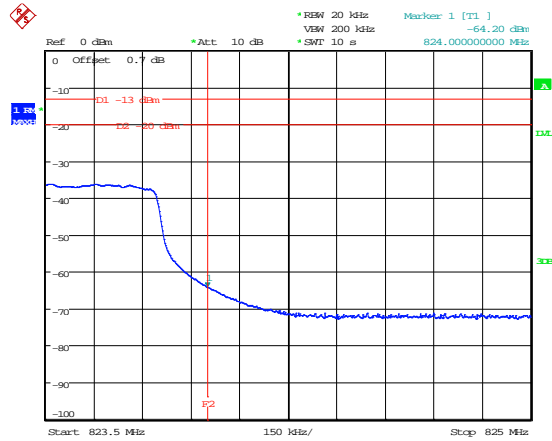
Date: 20.NOV.2014 10:58:06

CDMA



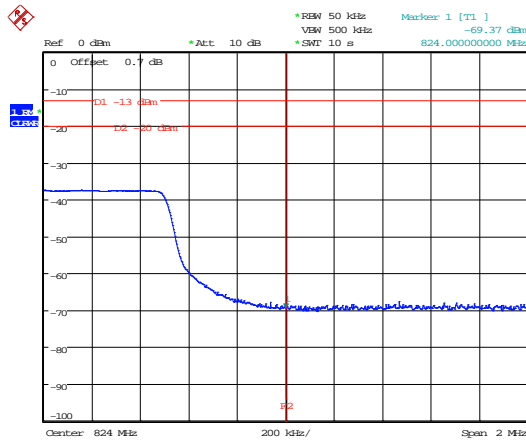
Date: 20.NOV.2014 10:59:07

WCDMA



Date: 20.NOV.2014 10:51:04

LTE 1.4 MHz



Date: 20.NOV.2014 10:49:01

LTE 5 MHz

A5 Spurious Emissions at Antenna Terminals Greater than 1 MHz

Test Details:	
Measurement standard	Part 2.1053, 22.917(a), 24.238(a), 27.53(c) & (g), 90.691(a)(1) & (2)
EUT sample number	S01 & S02
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Frequency (MHz)	Frequency Range (MHz)	Freq. of Emission (MHz)	Measured Level (dBm)	Attenuator & Cable Losses (dB)	Spurious Emission Level (dBm)	Limit (dBm)
700MHz (Lower)						
698.000			No Significant Emissions Within 20 dB of limit			-13
707.000						-13
716.000						-13
700MHz (Upper)						
776.000			No Significant Emissions Within 20 dB of limit			-13
782.000						-13
787.000						-13
850 MHz						
817.000			No Significant Emissions Within 20 dB of limit			-13
833.000						-13
849.000						-13
1800 MHz						
1850.000			No Significant Emissions Within 20 dB of limit			-13
1882.500						-13
1915.000						-13
1700 MHz						
1710.000			No Significant Emissions Within 20 dB of limit			-13
1732.500						-13
1755.000						-13

Limit is determined by the outermost step of the emissions mask and is calculated as follows:

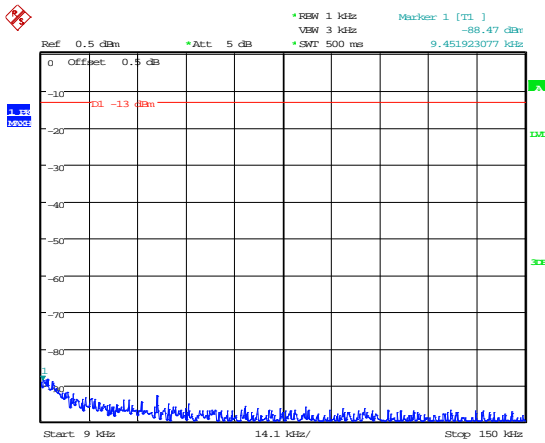
At least $43 + 10 \log P$ dB

$$(10 \log P_{\text{watts}}) - (43 + 10 \log (P_{\text{watts}} * 1000)) = \text{LIMIT} = -13 \text{ dBm}$$

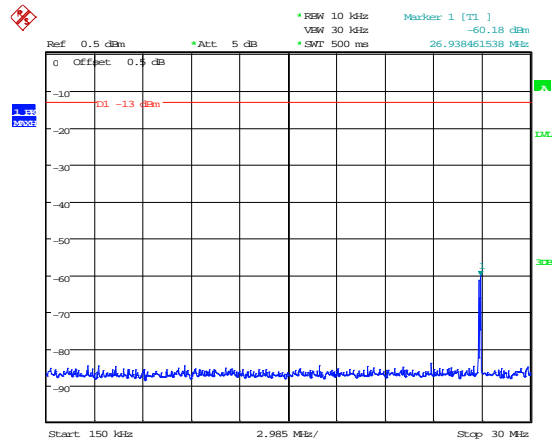
Result

The EUT was found to comply with the limits

700 MHz (Lower) – 698.0 MHz



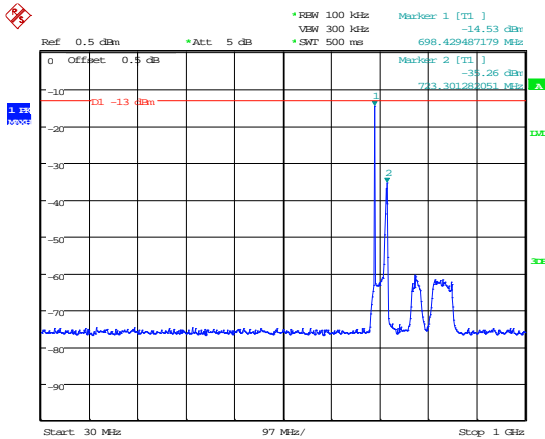
Date: 16.JUL.2014 15:19:53



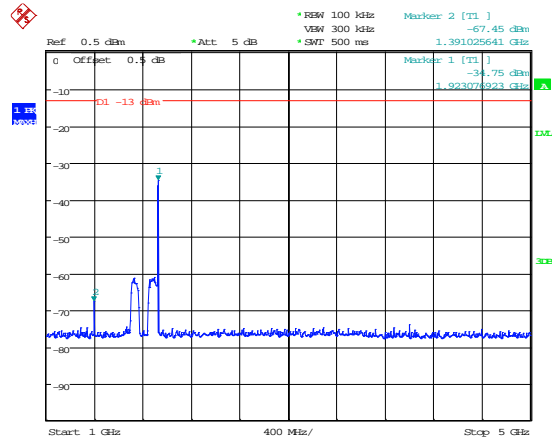
Date: 16.JUL.2014 15:20:44

9kHz - 150kHz

150kHz – 30MHz



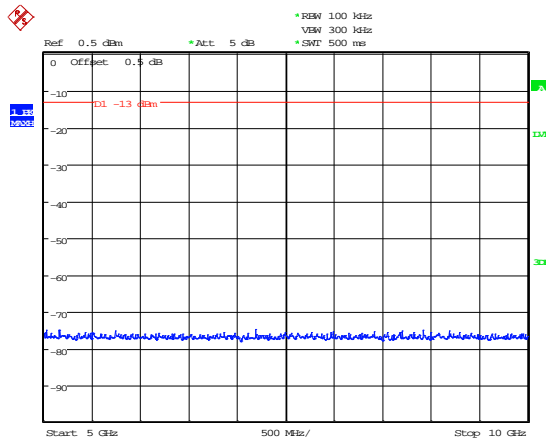
Date: 16.JUL.2014 15:18:29



Date: 16.JUL.2014 15:19:07

30MHz – 1GHz

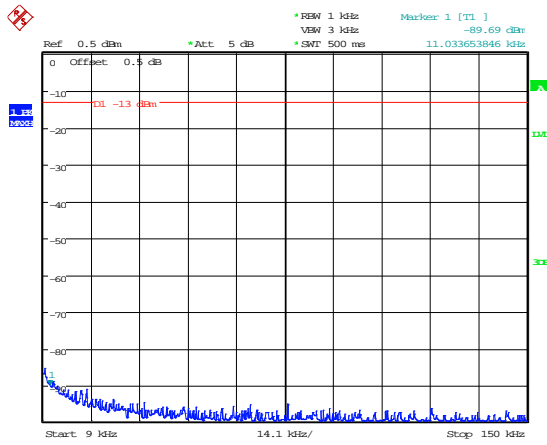
1GHz – 5GHz



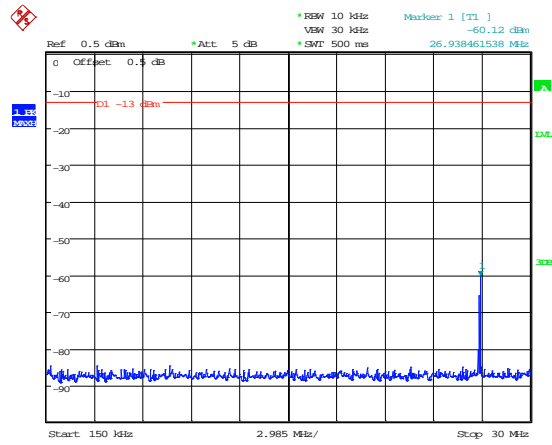
Date: 16.JUL.2014 15:23:14

5GHz – 10GHz

700 MHz (Lower) – 707.0 MHz



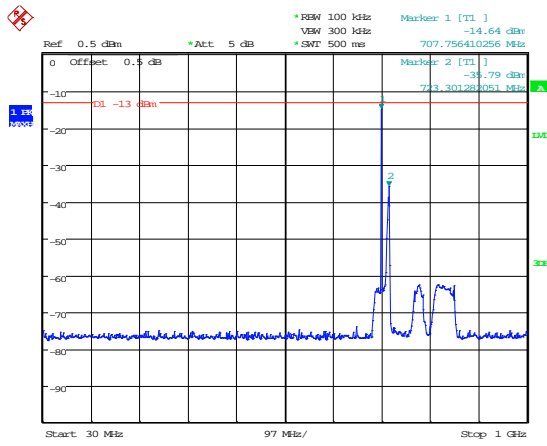
Date: 16.JUL.2014 15:23:44



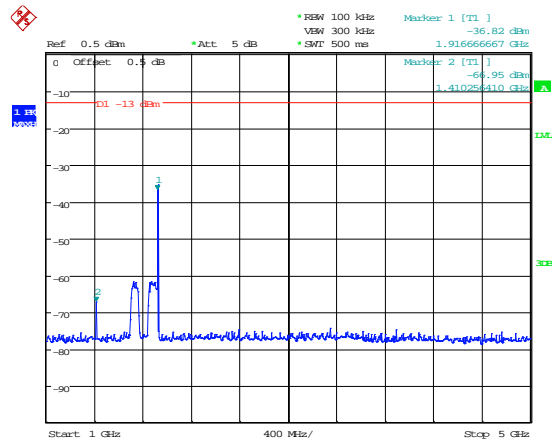
Date: 16.JUL.2014 15:24:12

9kHz - 150kHz

150kHz – 30MHz



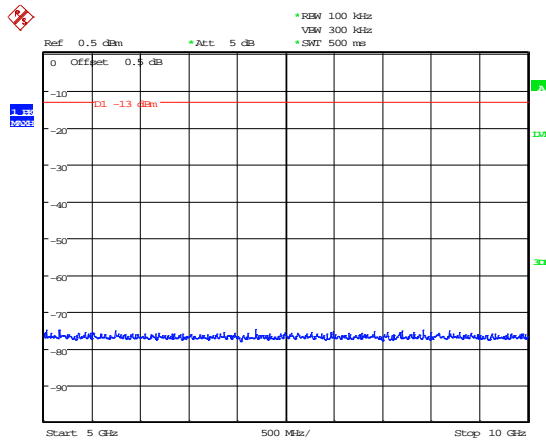
Date: 16.JUL.2014 15:21:36



Date: 16.JUL.2014 15:22:24

30MHz – 1GHz

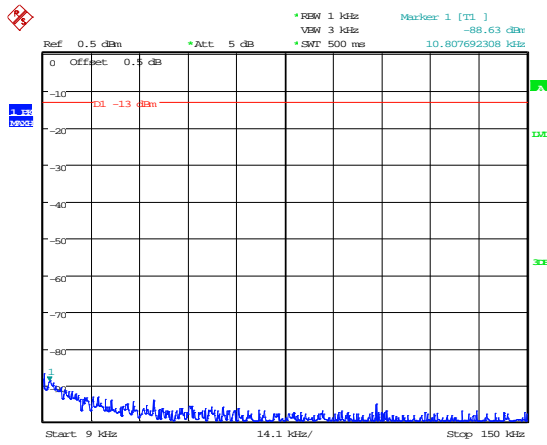
1GHz – 5GHz



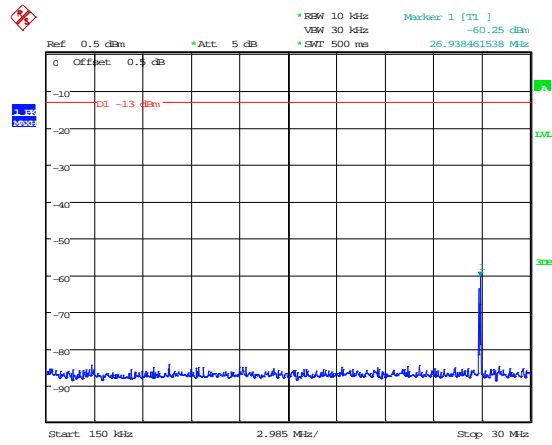
Date: 16.JUL.2014 15:23:14

5GHz – 10GHz

700 MHz (Lower) – 716.0 MHz



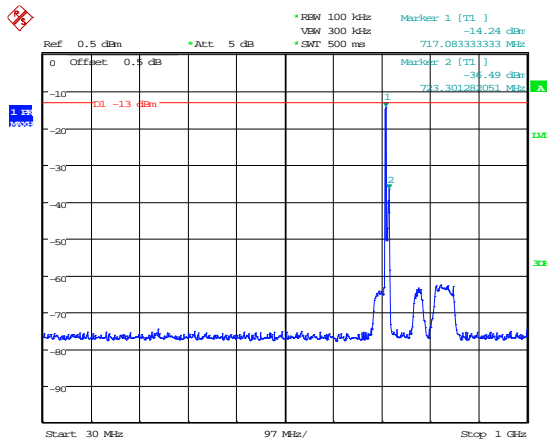
Date: 16.JUL.2014 15:26:25



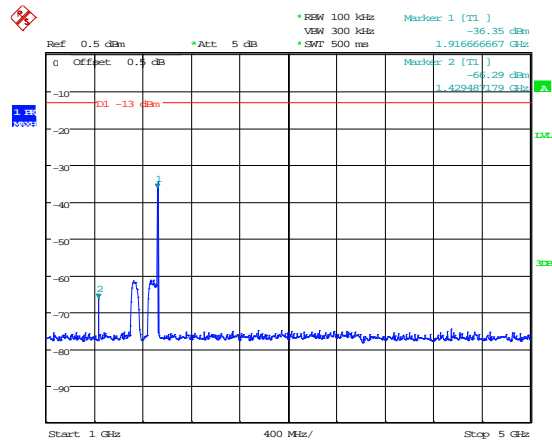
Date: 16.JUL.2014 15:27:02

9kHz - 150kHz

150kHz – 30MHz



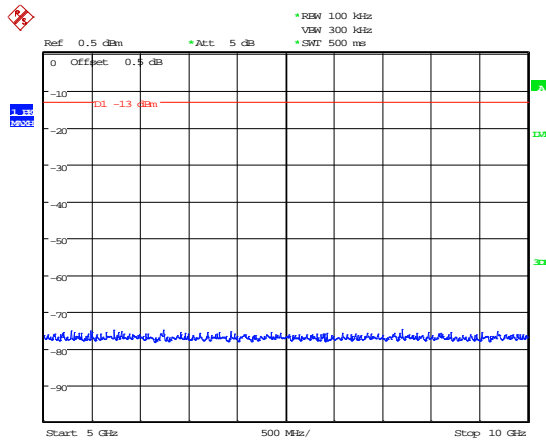
Date: 16.JUL.2014 15:25:03



Date: 16.JUL.2014 15:25:29

30MHz – 1GHz

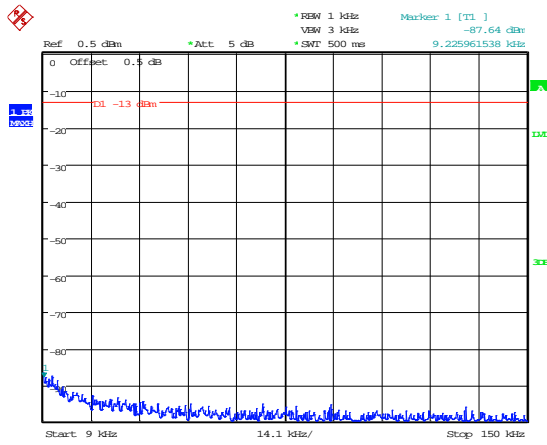
1GHz – 5GHz



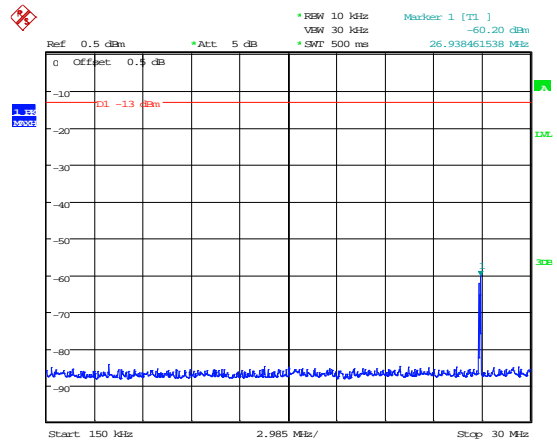
Date: 16.JUL.2014 15:25:56

5GHz – 10GHz

700 MHz (Upper) – 777.0 MHz



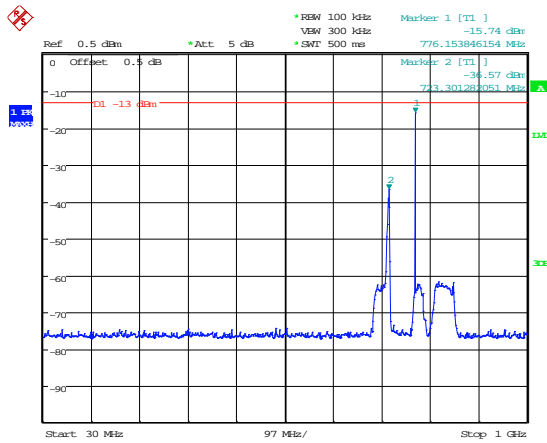
Date: 16.JUL.2014 15:05:01



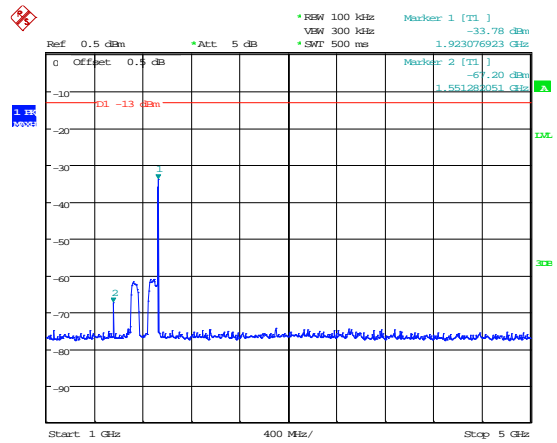
Date: 16.JUL.2014 15:05:46

9kHz - 150kHz

150kHz – 30MHz



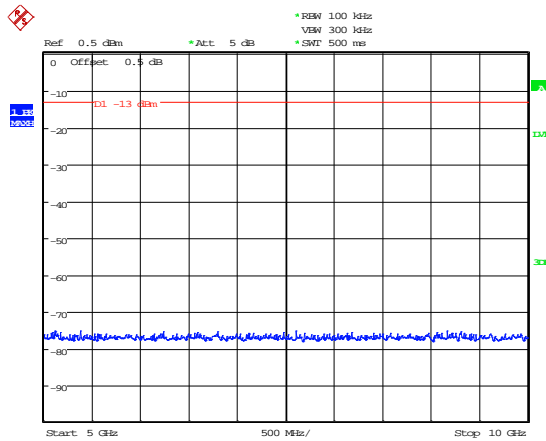
Date: 16.JUL.2014 15:03:06



Date: 16.JUL.2014 15:03:42

30MHz – 1GHz

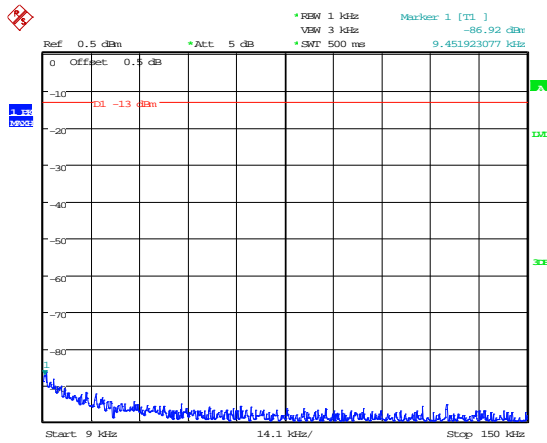
1GHz – 5GHz



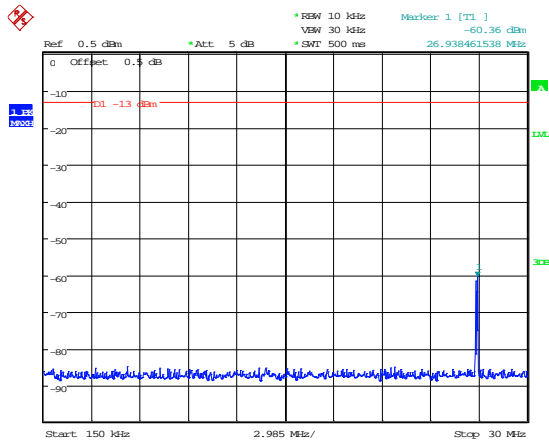
Date: 16.JUL.2014 15:04:19

5GHz – 10GHz

700 MHz (Upper) – 782.0 MHz



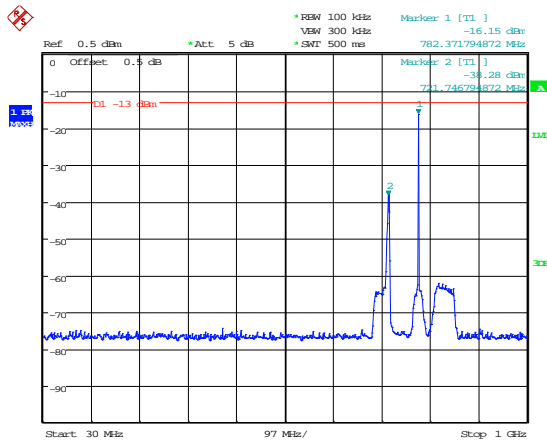
Date: 16.JUL.2014 15:09:06



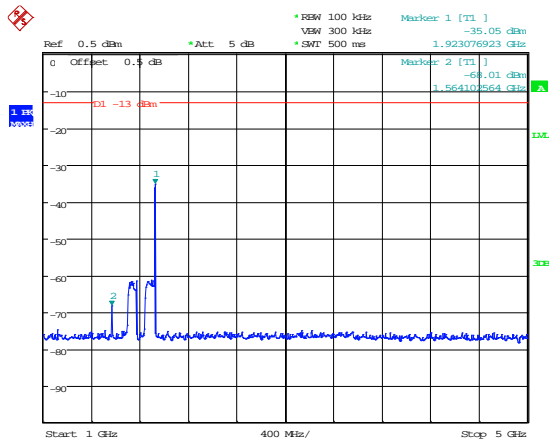
Date: 16.JUL.2014 15:09:38

9kHz - 150kHz

150kHz – 30MHz



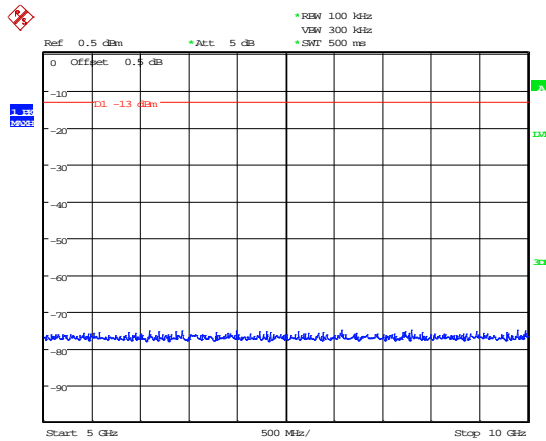
Date: 16.JUL.2014 15:07:20



Date: 16.JUL.2014 15:07:51

30MHz – 1GHz

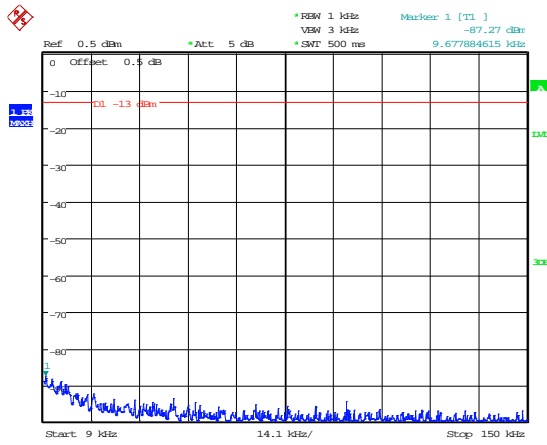
1GHz – 5GHz



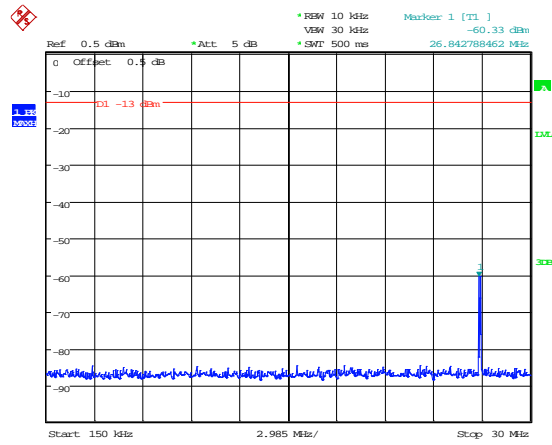
Date: 16.JUL.2014 15:08:24

5GHz – 10GHz

700 MHz (Upper) – 787.0 MHz



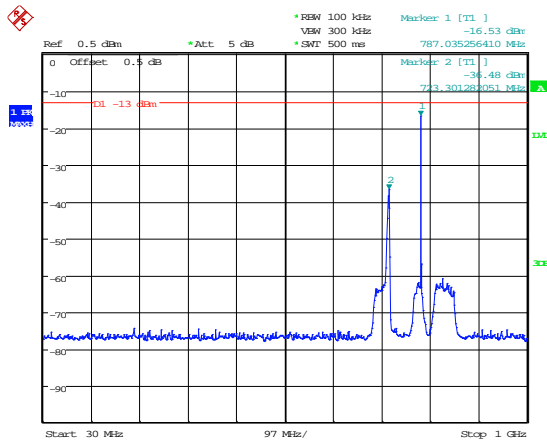
Date: 16.JUL.2014 15:12:16



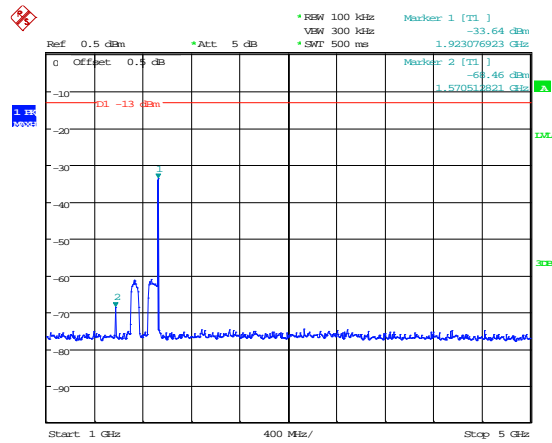
Date: 16.JUL.2014 15:13:06

9kHz - 150kHz

150kHz – 30MHz



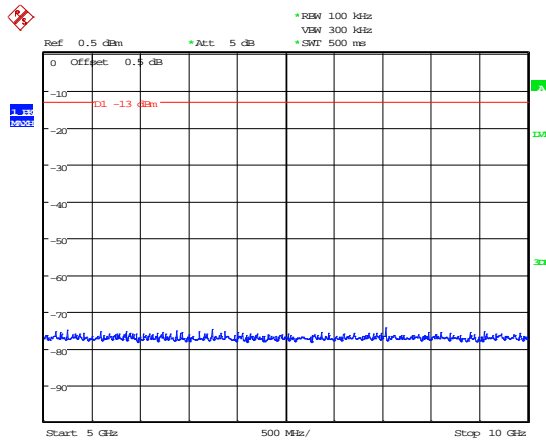
Date: 16.JUL.2014 15:10:40



Date: 16.JUL.2014 15:11:19

30MHz – 1GHz

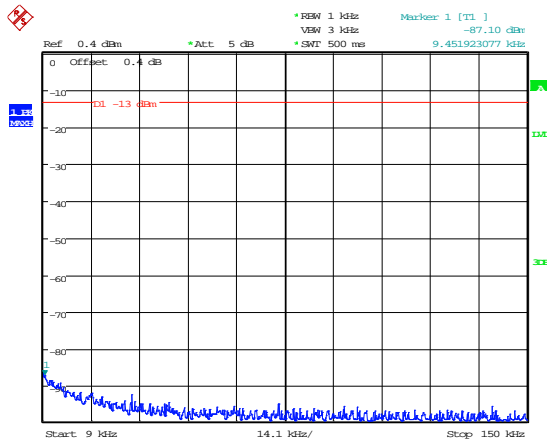
1GHz – 5GHz



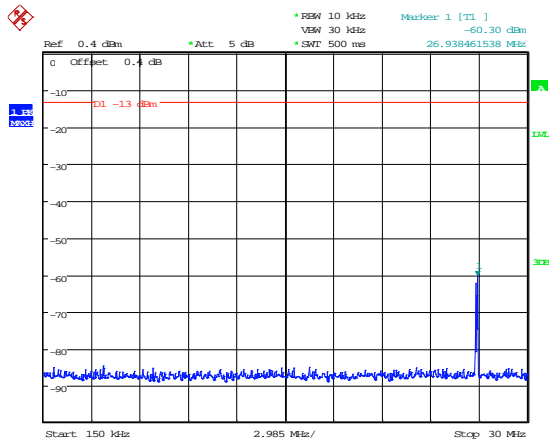
Date: 16.JUL.2014 15:11:45

5GHz – 10GHz

850 MHz – 817.0 MHz



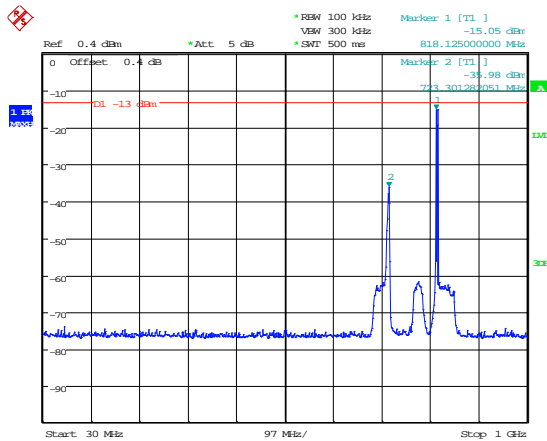
Date: 16.JUL.2014 16:07:16



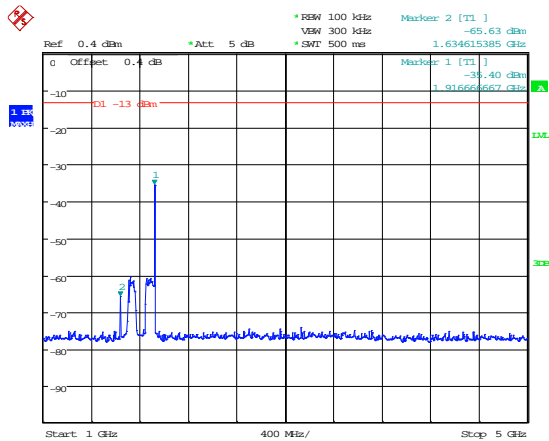
Date: 16.JUL.2014 16:07:49

9kHz - 150kHz

150kHz – 30MHz



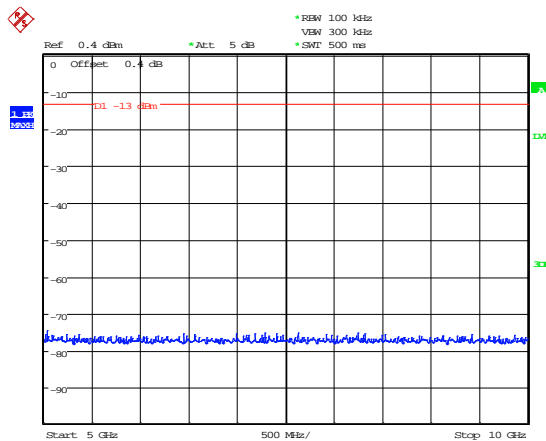
Date: 16.JUL.2014 16:05:33



Date: 16.JUL.2014 16:06:00

30MHz – 1GHz

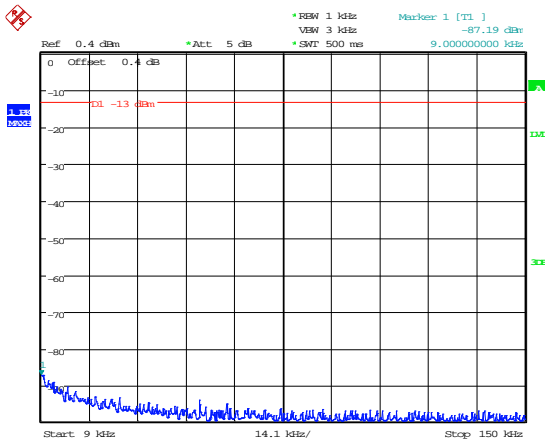
1GHz – 5GHz



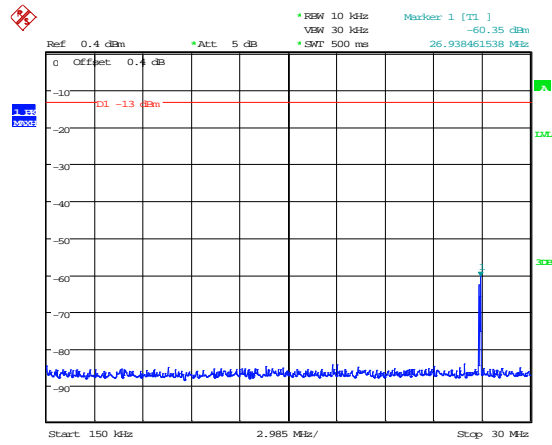
Date: 16.JUL.2014 16:06:23

5GHz – 10GHz

850 MHz – 833.0 MHz



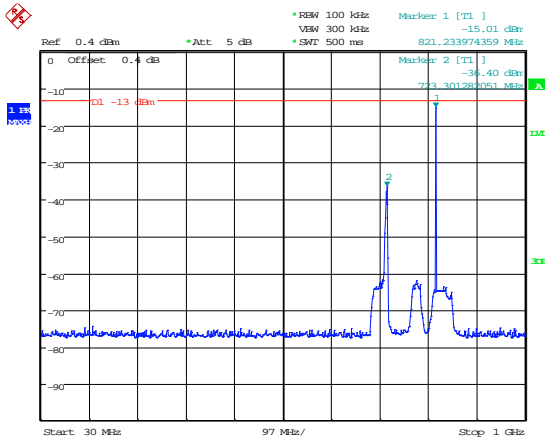
Date: 16.JUL.2014 16:10:42



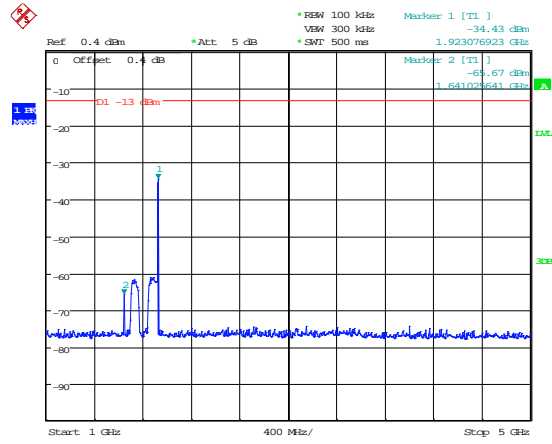
Date: 16.JUL.2014 16:11:27

9kHz - 150kHz

150kHz – 30MHz



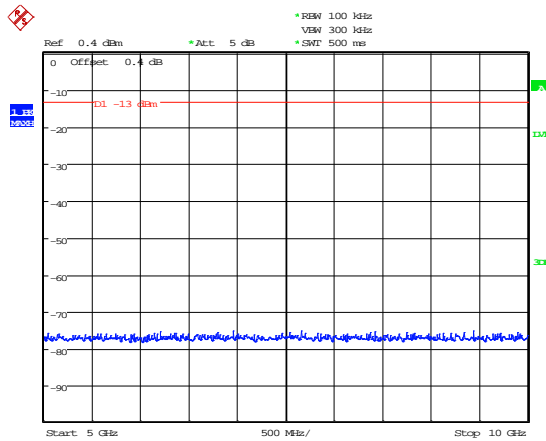
Date: 16.JUL.2014 16:08:55



Date: 16.JUL.2014 16:09:32

30MHz – 1GHz

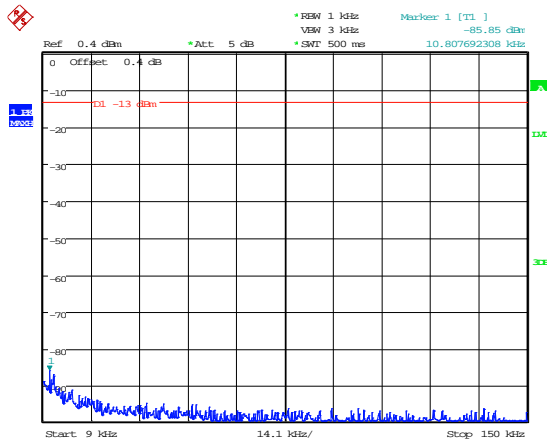
1GHz – 5GHz



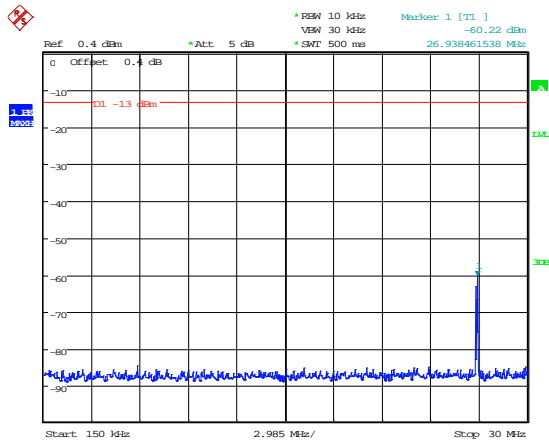
Date: 16.JUL.2014 16:10:01

5GHz – 10GHz

850 MHz – 849.0 MHz



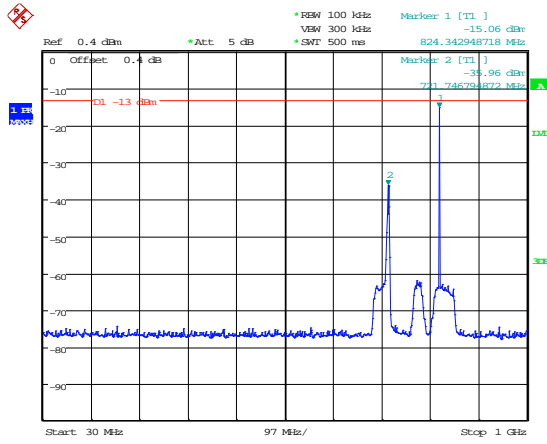
Date: 16.JUL.2014 16:14:18



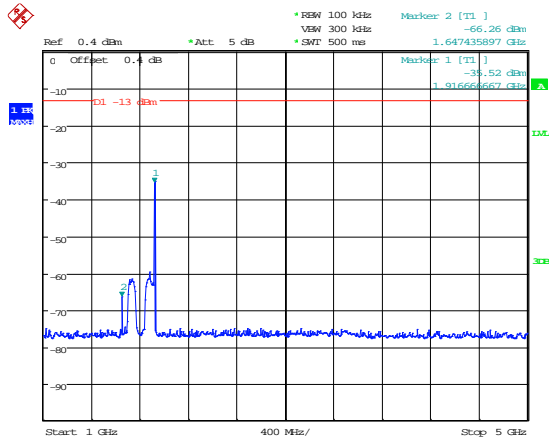
Date: 16.JUL.2014 16:14:47

9kHz - 150kHz

150kHz – 30MHz



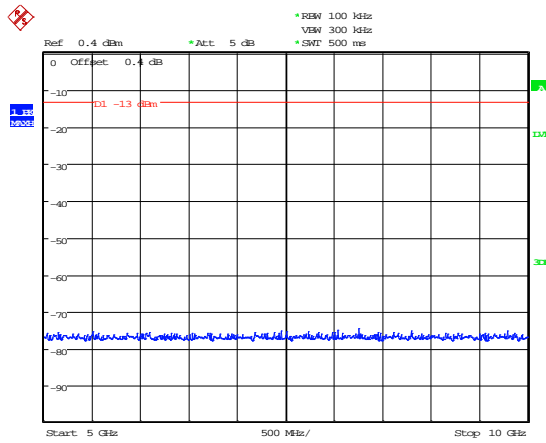
Date: 16.JUL.2014 16:12:36



Date: 16.JUL.2014 16:13:12

30MHz – 1GHz

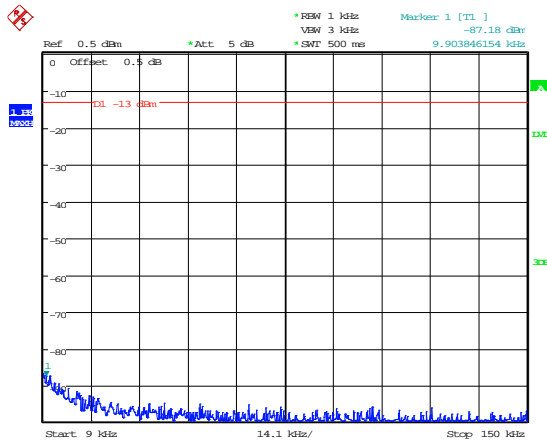
1GHz – 5GHz



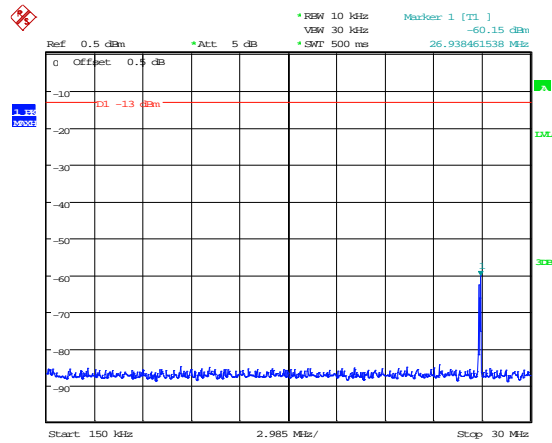
Date: 16.JUL.2014 16:13:48

5GHz – 10GHz

1800 MHz – 1880.0 MHz



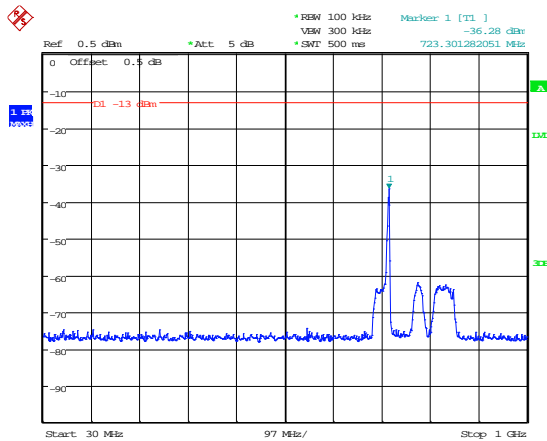
Date: 16.JUL.2014 14:43:01



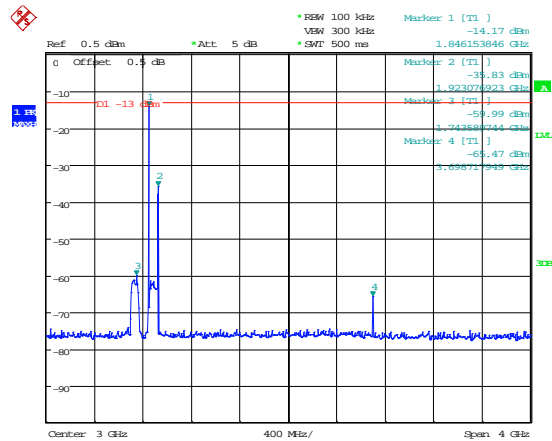
Date: 16.JUL.2014 14:43:40

9kHz - 150kHz

150kHz – 30MHz



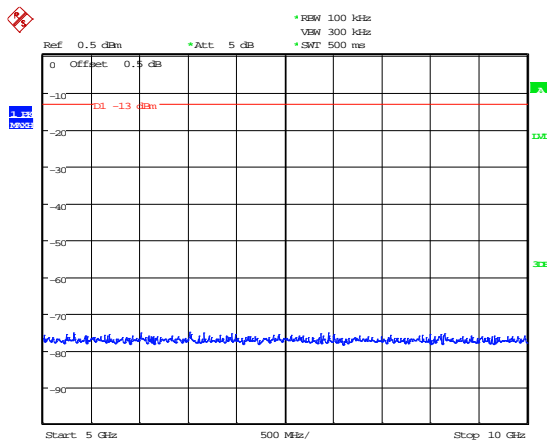
Date: 16.JUL.2014 14:44:09



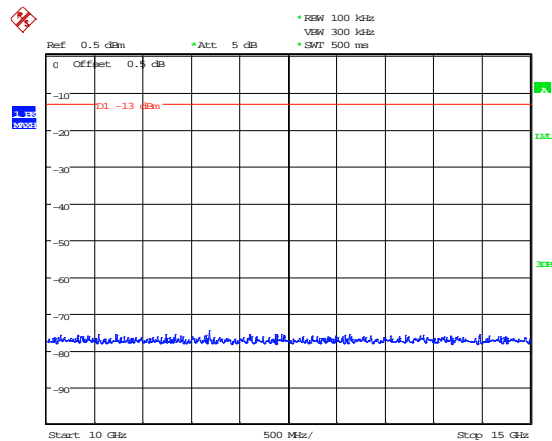
Date: 16.JUL.2014 14:39:58

30MHz – 1GHz

1GHz – 5GHz



Date: 16.JUL.2014 14:41:45

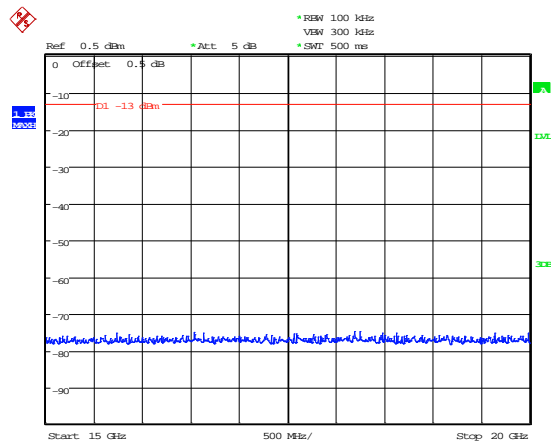


Date: 16.JUL.2014 14:42:07

5GHz – 10GHz

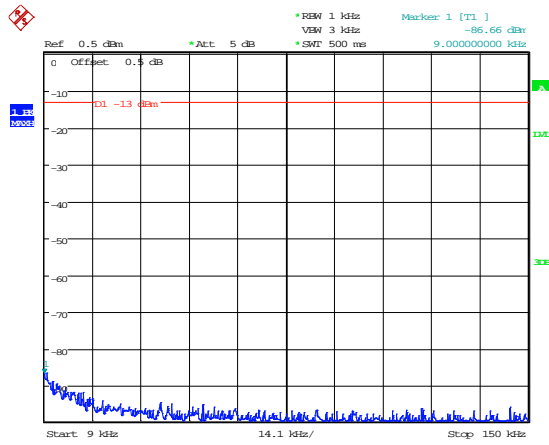
10GHz – 15GHz

15GHz – 20GHz

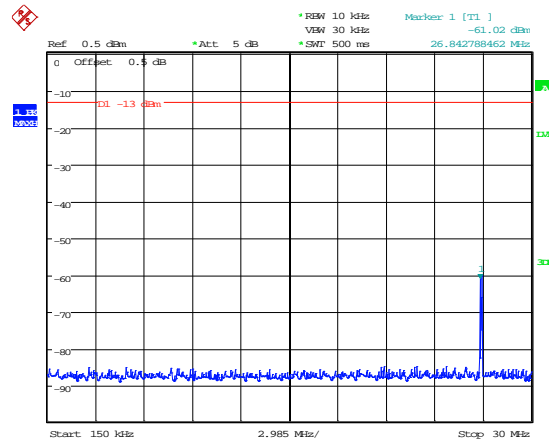


Date: 16.JUL.2014 14:42:31

1800 MHz – 1897.5 MHz



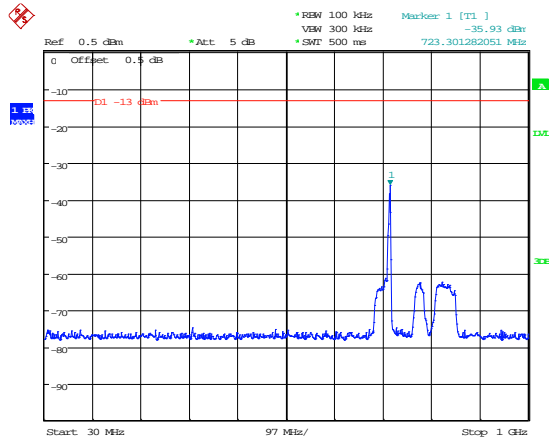
Date: 16.JUL.2014 14:47:33



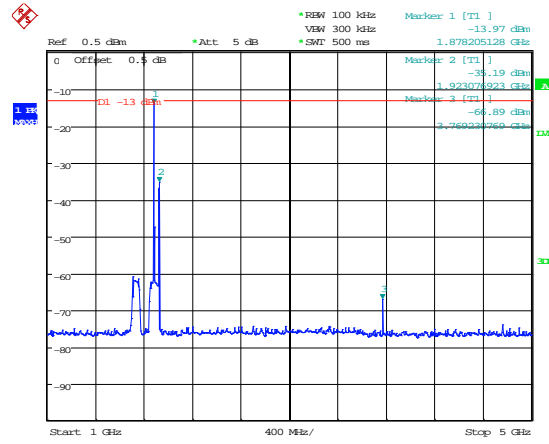
Date: 16.JUL.2014 14:48:02

9kHz - 150kHz

150kHz – 30MHz



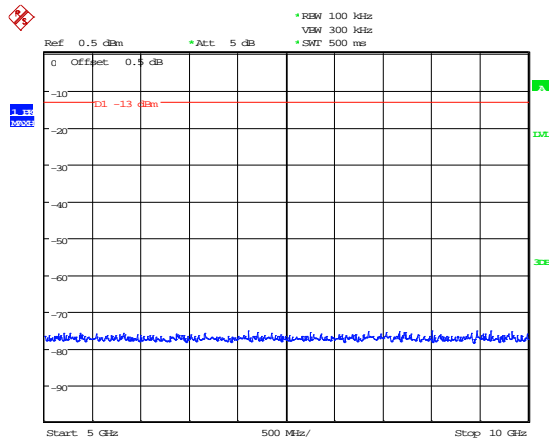
Date: 16.JUL.2014 14:48:22



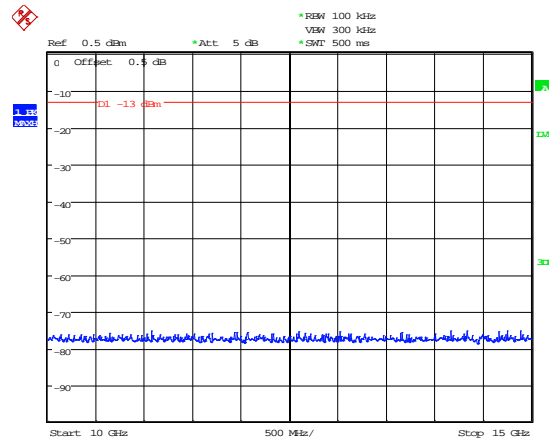
Date: 16.JUL.2014 14:46:02

30MHz – 1GHz

1GHz – 5GHz



Date: 16.JUL.2014 14:46:22

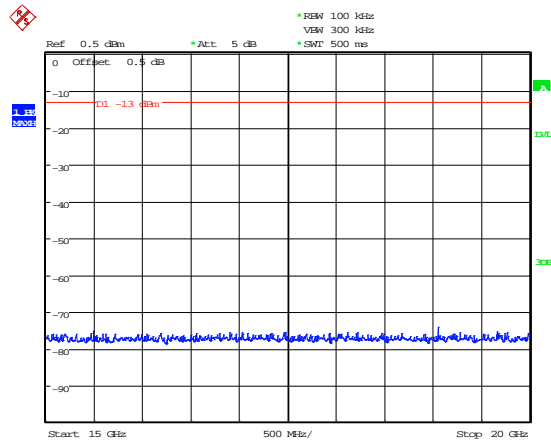


Date: 16.JUL.2014 14:46:44

5GHz – 10GHz

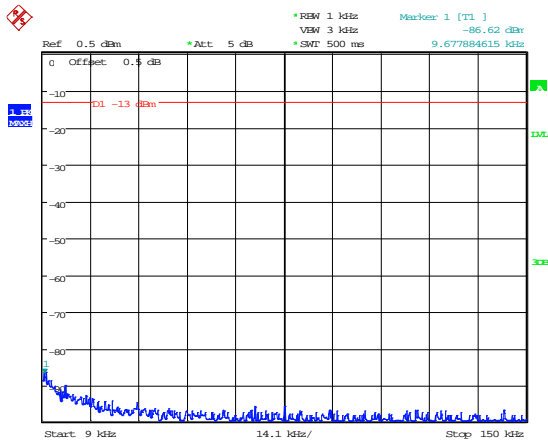
10GHz – 15GHz

15GHz – 20GHz

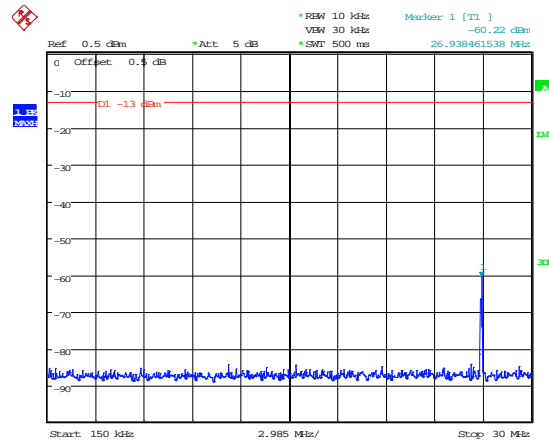


Date: 16.JUL.2014 14:47:04

1800 MHz – 1915.0 MHz



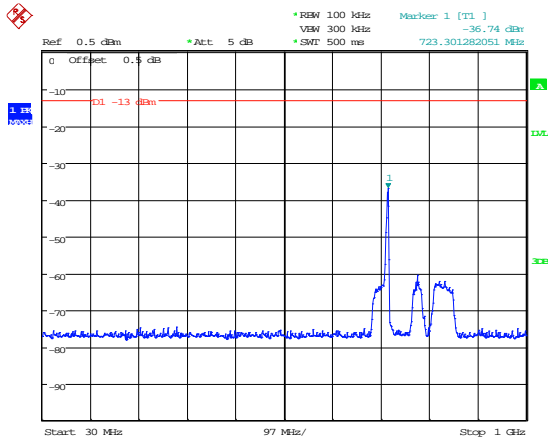
Date: 16.JUL.2014 14:50:43



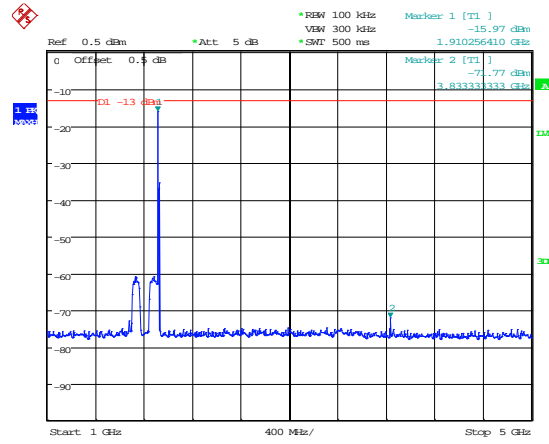
Date: 16.JUL.2014 14:51:18

9kHz - 150kHz

150kHz – 30MHz



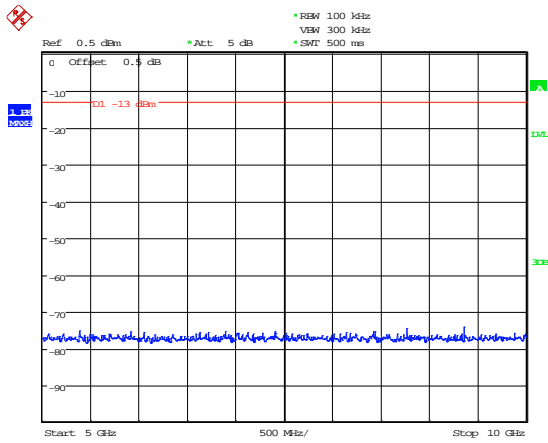
Date: 16.JUL.2014 14:51:49



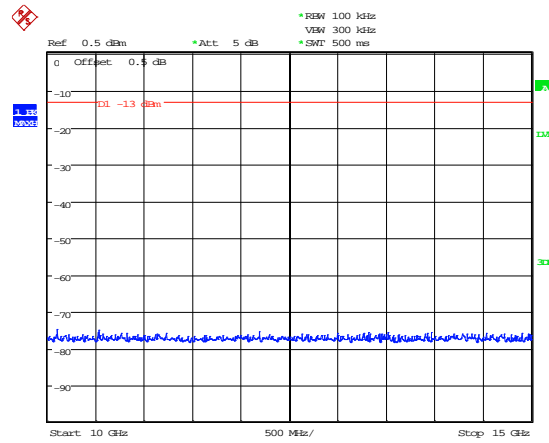
Date: 16.JUL.2014 14:49:09

30MHz – 1GHz

1GHz – 5GHz



Date: 16.JUL.2014 14:49:31

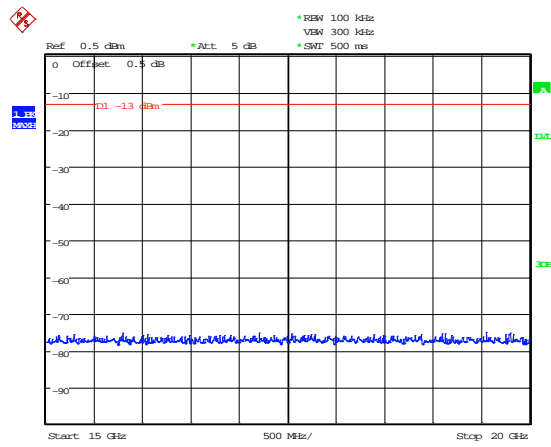


Date: 16.JUL.2014 14:49:53

5GHz – 10GHz

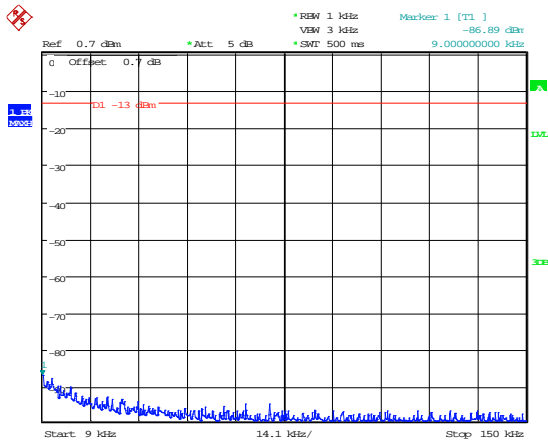
10GHz – 15GHz

15GHz – 20GHz

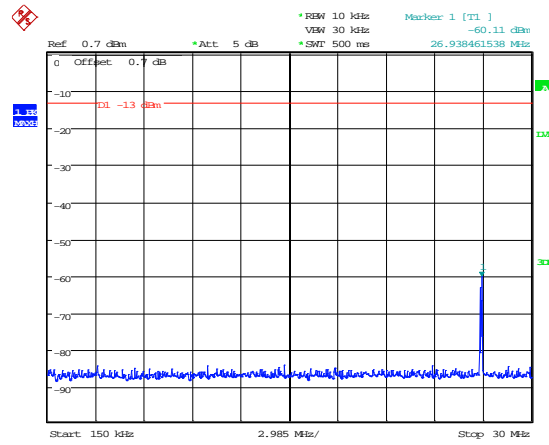


Date: 16.JUL.2014 14:50:13

1700 MHz – 1710.0 MHz



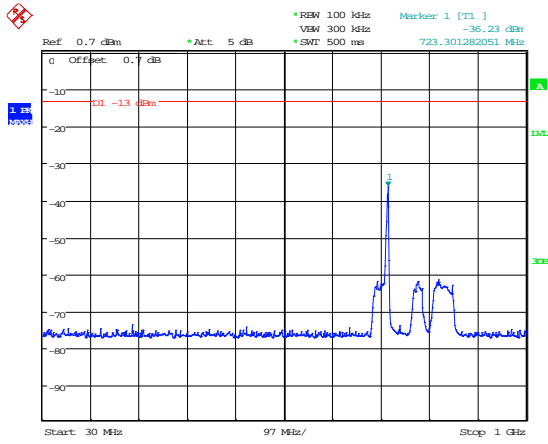
Date: 16.JUL.2014 15:34:12



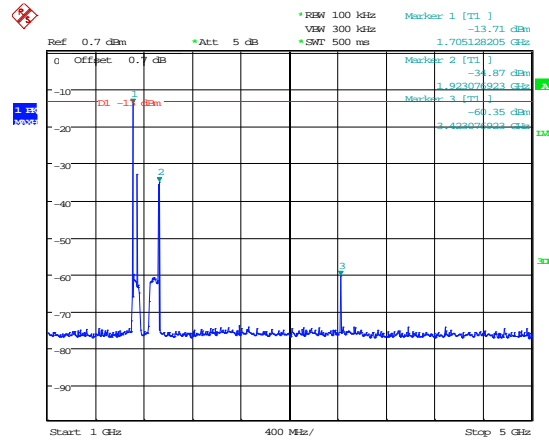
Date: 16.JUL.2014 15:34:51

9kHz - 150kHz

150kHz – 30MHz



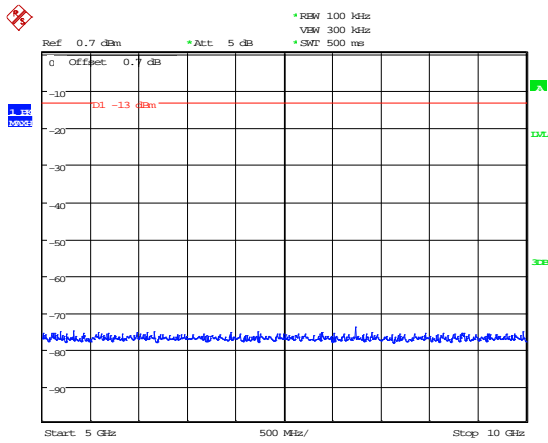
Date: 16.JUL.2014 15:35:33



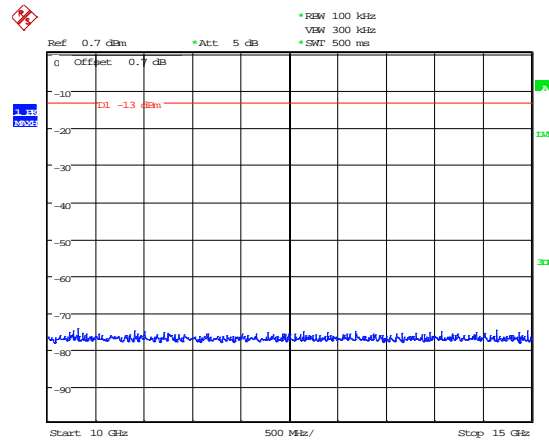
Date: 16.JUL.2014 15:32:35

30MHz – 1GHz

1GHz – 5GHz



Date: 16.JUL.2014 15:33:00

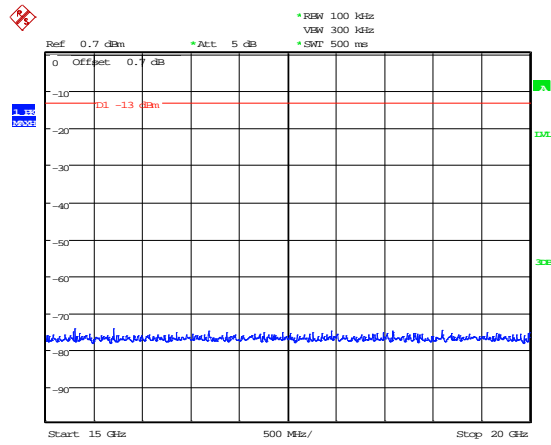


Date: 16.JUL.2014 15:33:22

5GHz – 10GHz

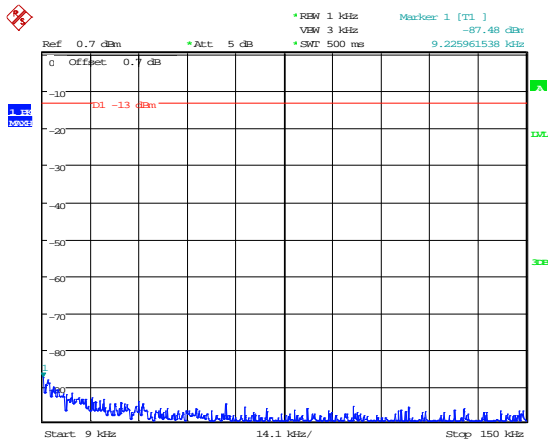
10GHz – 15GHz

15GHz – 20GHz

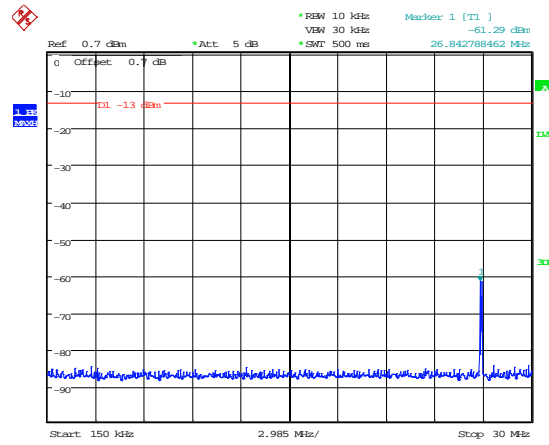


Date: 16.JUL.2014 15:33:41

1700 MHz – 1732.5 MHz

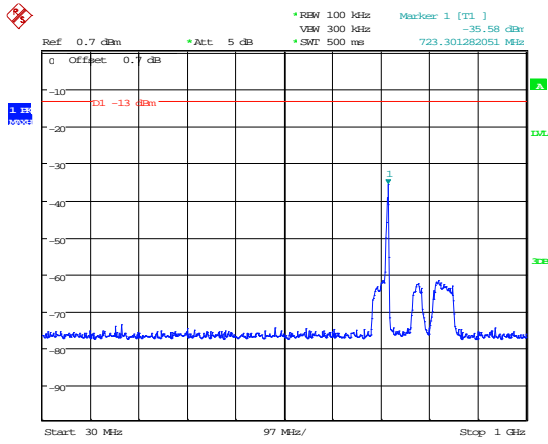


Date: 16.JUL.2014 15:37:53



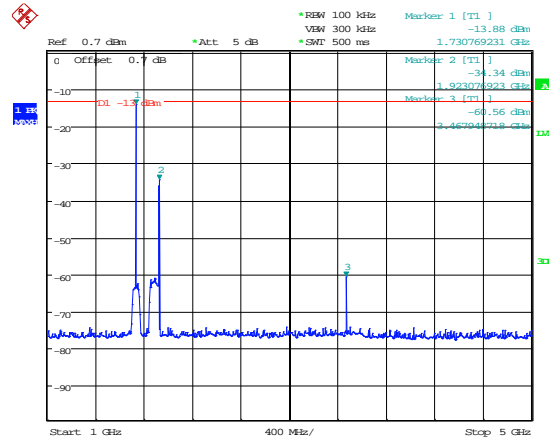
Date: 16.JUL.2014 15:38:27

9kHz - 150kHz



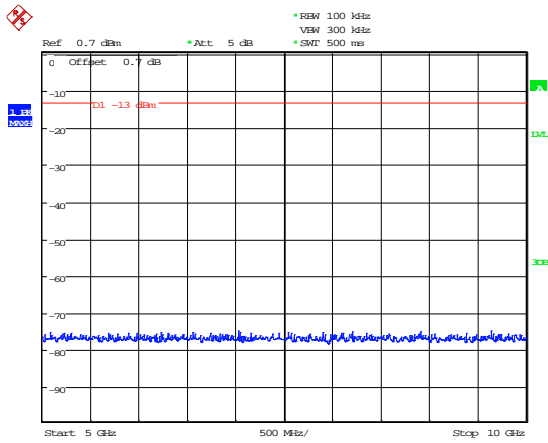
Date: 16.JUL.2014 15:38:54

150kHz – 30MHz



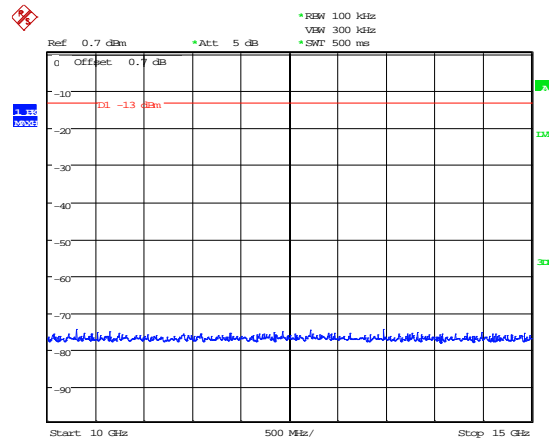
Date: 16.JUL.2014 15:36:21

30MHz – 1GHz



Date: 16.JUL.2014 15:36:44

1GHz – 5GHz

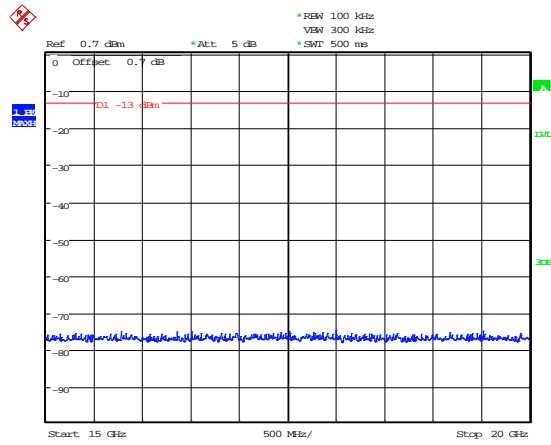


Date: 16.JUL.2014 15:37:07

5GHz – 10GHz

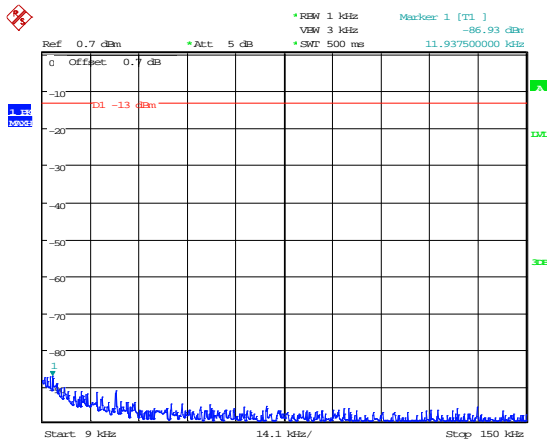
10GHz – 15GHz

15GHz – 20GHz

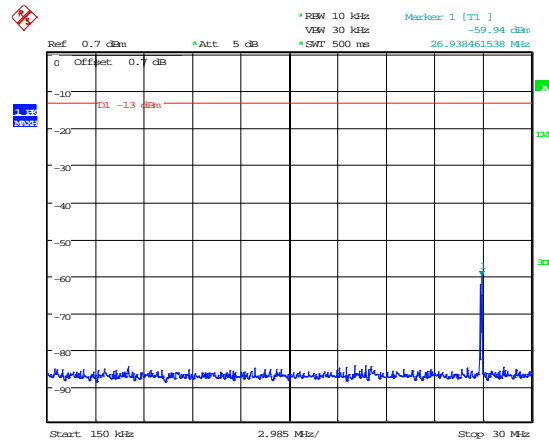


Date: 16.JUL.2014 15:37:30

1700 MHz – 1755.0 MHz



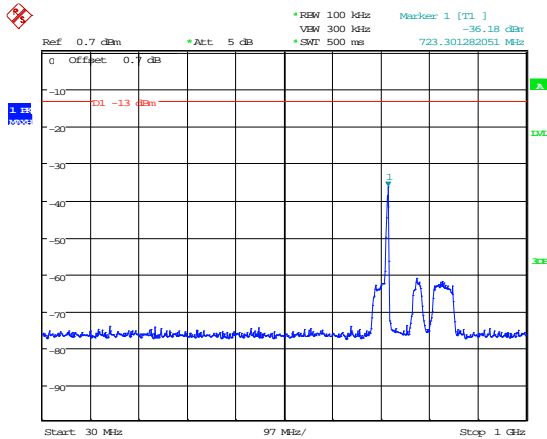
Date: 16.JUL.2014 15:41:28



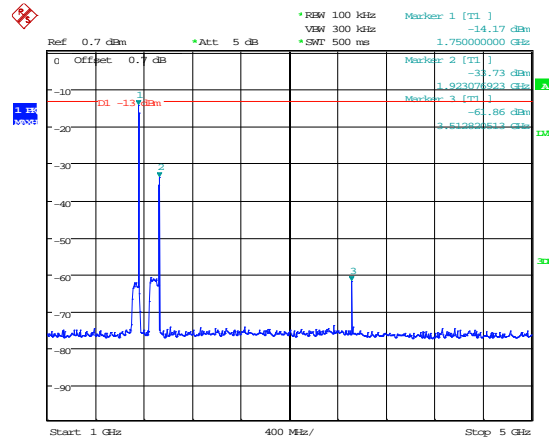
Date: 16.JUL.2014 15:41:59

9kHz - 150kHz

150kHz – 30MHz



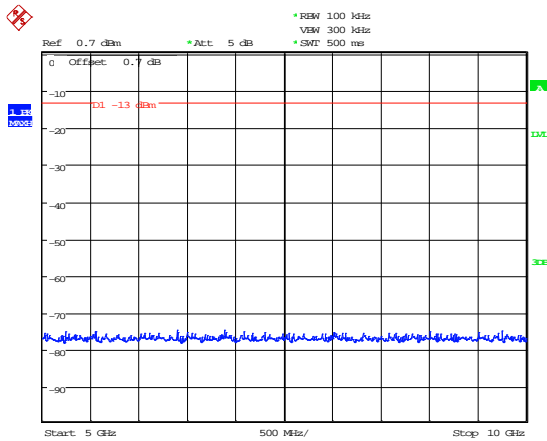
Date: 16.JUL.2014 15:42:34



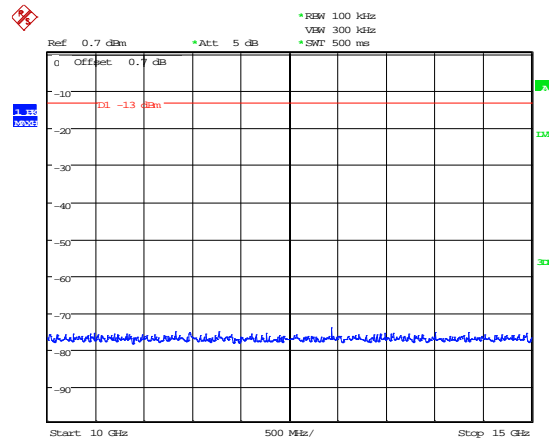
Date: 16.JUL.2014 15:39:58

30MHz – 1GHz

1GHz – 5GHz



Date: 16.JUL.2014 15:40:19

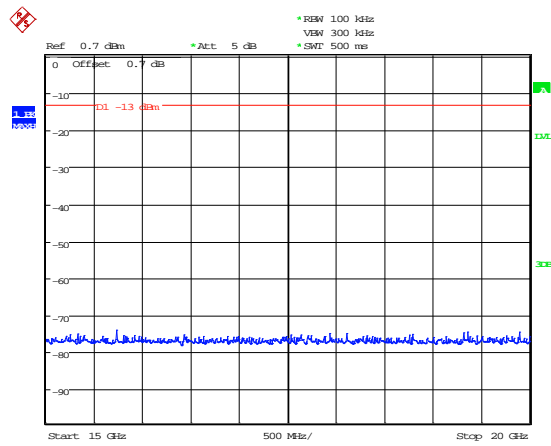


Date: 16.JUL.2014 15:40:38

5GHz – 10GHz

10GHz – 15GHz

15GHz – 20GHz



Date: 16.JUL.2014 15:41:00

A6 Radiated Electric Field Emissions

Preliminary scans were performed using a peak detector with the RBW = 100kHz. The radiated electric field emission test applies to all spurious and harmonic emissions. The EUT was set to transmit as required.

The following test site was used for final measurements as specified by the standard tested to:

3m open area test site : 3m alternative test site :

The effect of the EUT set-up on the measurements is summarised in note (c) below.

Test Details:	
Measurement standard	Part 2.1053, 22.917(a), 24.238(a), 27.53(c) & (g), 90.691(a)(1) & (2)
Frequency range	30 MHz – 22 GHz
EUT sample number	S01 & S02
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Photographs	Appendix F

Frequency (MHz)	Freq. of Emission (MHz)	ERP/EIRP (dBm)	Limit (dBm)
700MHz (Lower)			
698.000	No Significant Emissions Within		-13
707.000			-13
716.000			-13
700MHz (Upper)			
777.000	No Significant Emissions Within		-13
782.000			-13
787.000			-13
850 MHz			
817.000	No Significant Emissions Within		-13
833.000			-13
849.000			-13

Frequency (MHz)	Freq. of Emission (MHz)	ERP/EIRP (dBm)	Limit (dBm)
1800 MHz			
1880.000	No Significant Emissions Within		-13
1897.500			-13
1915.000			-13
1700 MHz			
1710.000	No Significant Emissions Within		-13
1732.500			-13
1755.000			-13

Result

The EUT was found to comply with the limits

Notes:

1. Emissions Checked up to 10 times Fc.
2. The unit was mounted on a turntable and rotated through 360° and in 3 orthogonal planes to find the worst case emission.
3. For Frequencies below 1 GHz, RBW = 120 kHz, testing was performed with CISPR16 compliant test receiver with QP detector. Above 1 GHz tests were performed using a spectrum analyser using the following settings:

Peak Detector RBW = 1MHz; VBW = ≥RBW

4. Limit is determined as the outermost step of the emissions mask and is calculated as follows.

At least 43 + 10 log P dB

$$(10\log P_{\text{watts}}) - (43 + 10\log (P_{\text{watts}} * 1000)) = \text{LIMIT } = -13 \text{ dBm}$$

The upper and lower frequency of the measurement range was decided according to 47 CFR Part 2.1057.

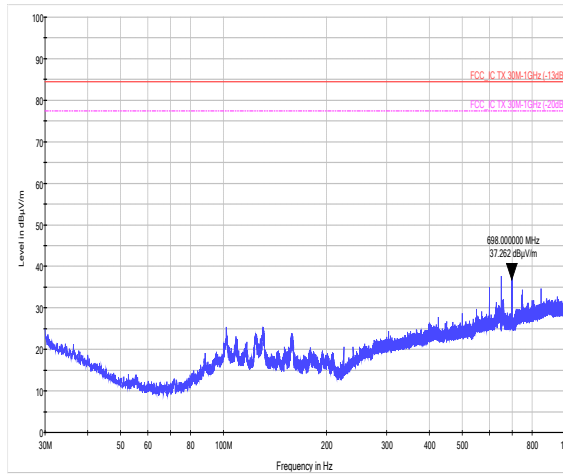
- (a) Where results have been measured at one distance, and a signal level displayed at another, the results have been extrapolated using the following formula:

$$\text{Extrapolation (dB)} = 20 \log_{10} \left(\frac{\text{measurement distance}}{\text{specification distance}} \right)$$

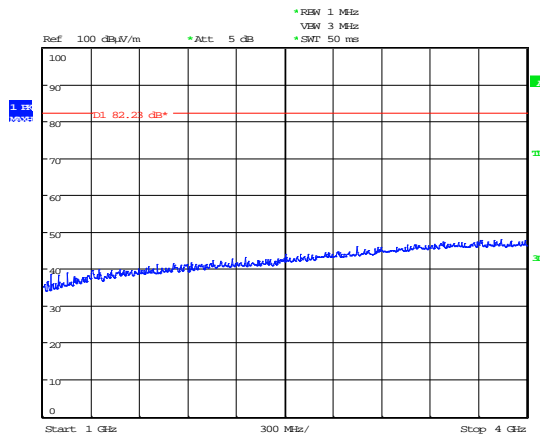
- (b) The levels may have been rounded for display purposes.
- (c) The following table summarises the effect of the EUT operating mode, internal configuration and arrangement of cables / samples on the measured emission levels :

	See (i)	See (ii)	See (iii)	See (iv)
Effect of EUT operating mode on emission levels	✓			
Effect of EUT internal configuration on emission levels	✓			
Effect of Position of EUT cables & samples on emission levels			✓	
(i) Parameter defined by standard and / or single possible, refer to Appendix D (ii) Parameter defined by client and / or single possible, refer to Appendix D (iii) Parameter had a negligible effect on emission levels, refer to Appendix D (iv) Worst case determined by initial measurement, refer to Appendix D				

700 MHz (Lower) – 698.0 MHz

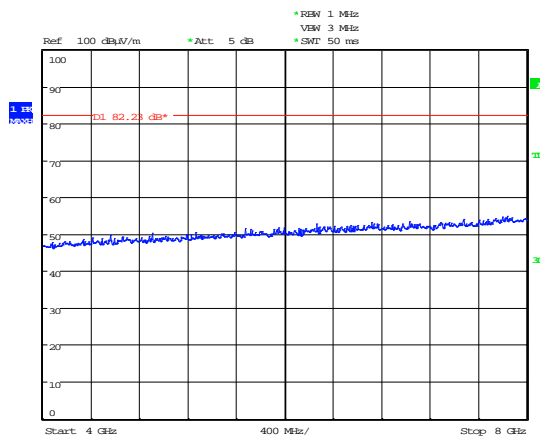


30MHz – 1GHz



Date: 8.AUG.2014 15:58:21

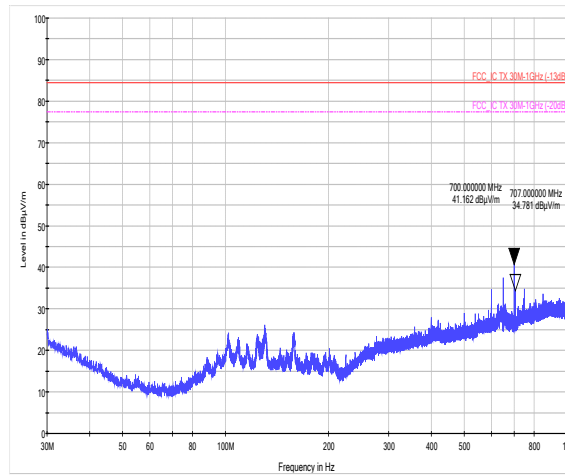
1GHz – 4GHz



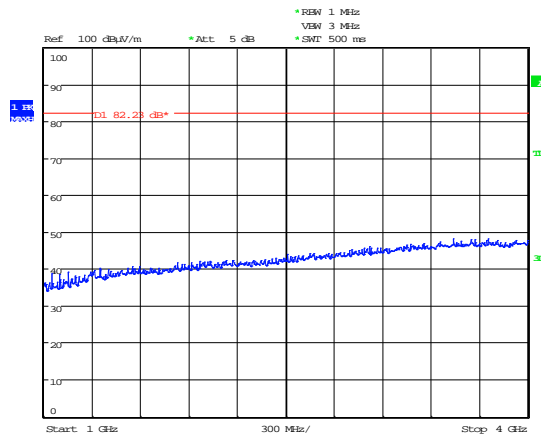
Date: 8.AUG.2014 15:58:48

4GHz – 8GHz

700 MHz (Lower) – 707.0 MHz

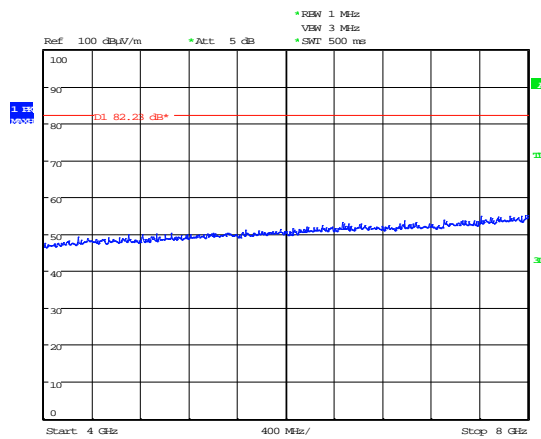


30MHz – 1GHz



Date: 8.AUG.2014 16:05:45

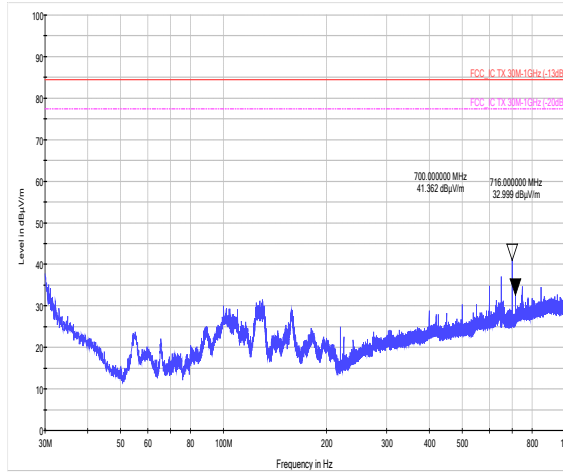
1GHz – 4GHz



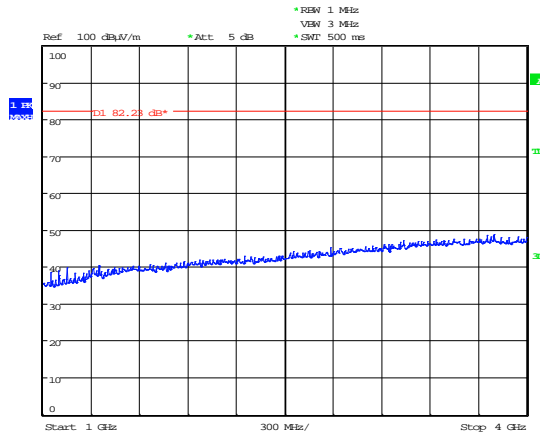
Date: 8.AUG.2014 16:06:10

4GHz – 8GHz

700 MHz (Lower) – 716.0 MHz

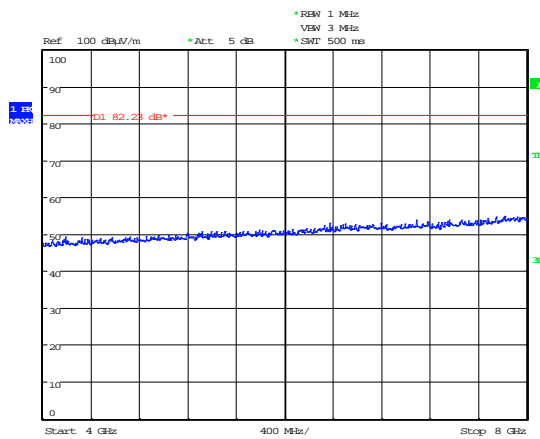


30MHz – 1GHz



Date: 8.AUG.2014 16:07:15

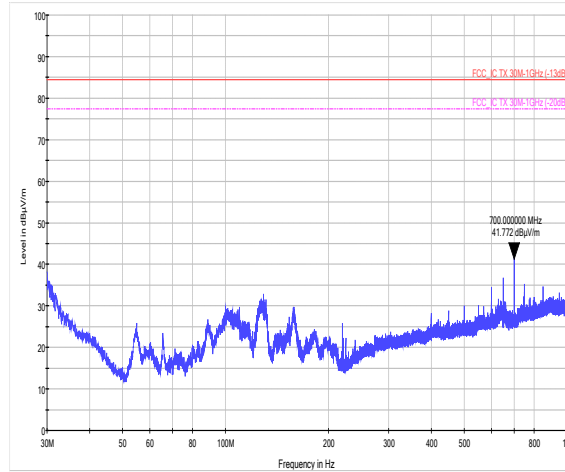
1GHz – 4GHz



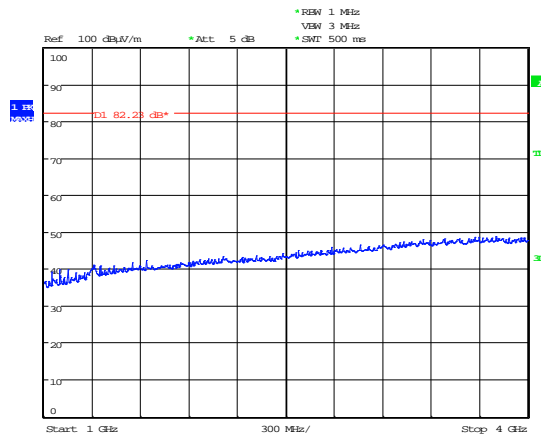
Date: 8.AUG.2014 16:07:40

4GHz – 8GHz

700 MHz (Upper) – 777.0 MHz

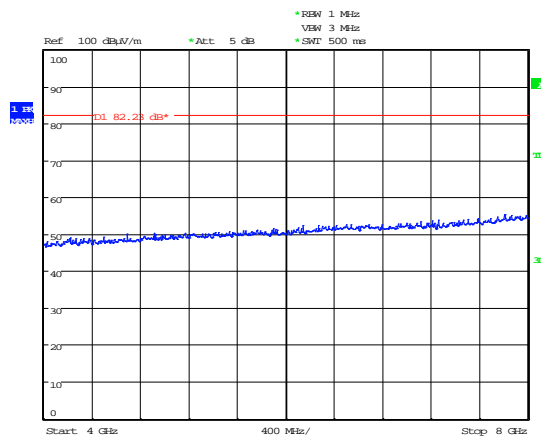


30MHz – 1GHz



Date: 11.AUG.2014 10:03:57

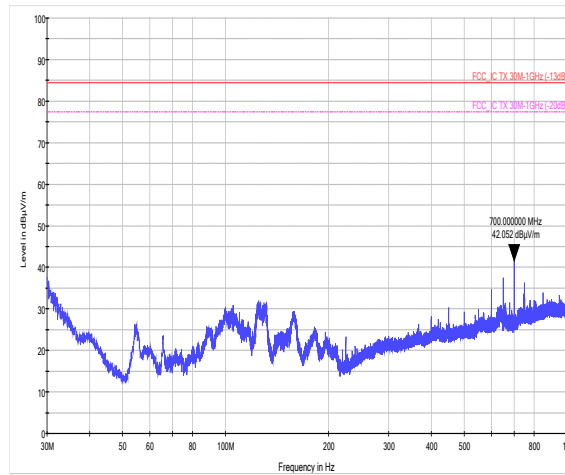
1GHz – 4GHz



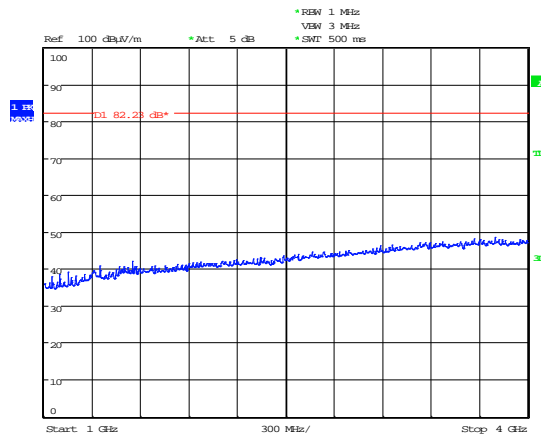
Date: 11.AUG.2014 10:04:34

4GHz – 8GHz

700 MHz (Upper) – 782.0 MHz

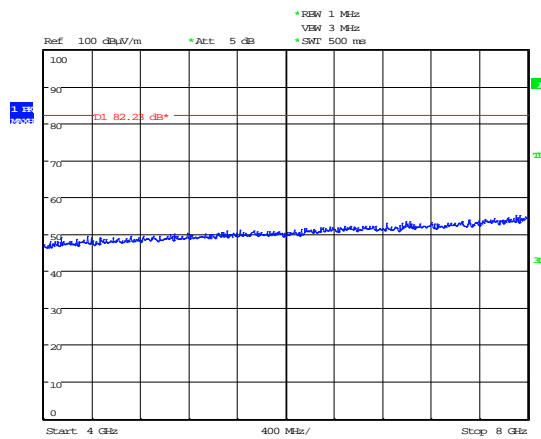


30MHz – 1GHz



Date: 11.AUG.2014 10:14:31

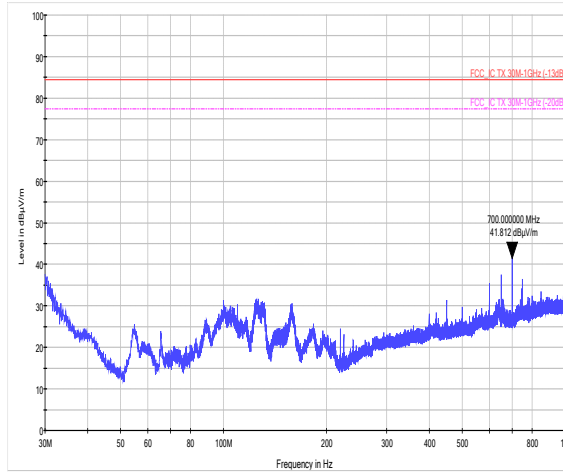
1GHz – 4GHz



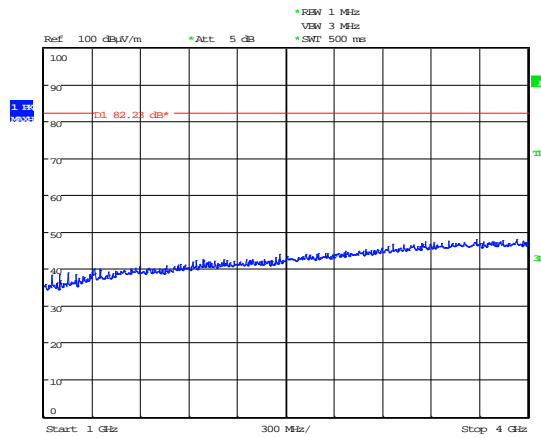
Date: 11.AUG.2014 10:14:53

4GHz – 8GHz

700 MHz (Upper) – 787.0 MHz

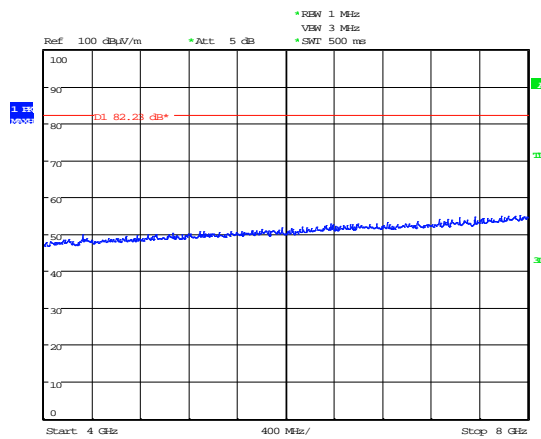


30MHz – 1GHz



Date: 11.AUG.2014 10:17:56

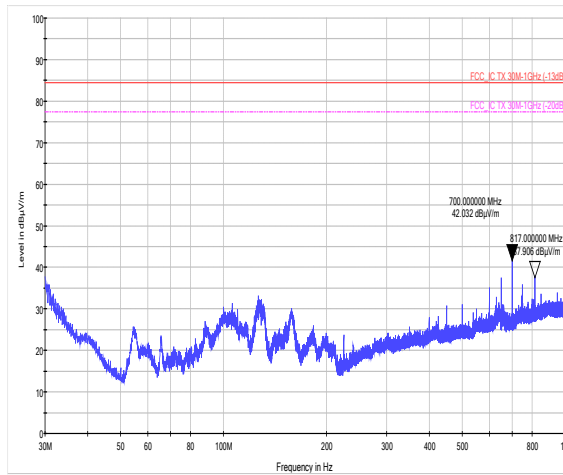
1GHz – 4GHz



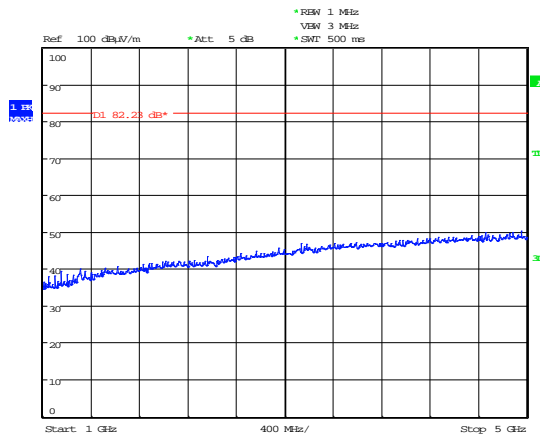
Date: 11.AUG.2014 10:18:33

4GHz – 8GHz

850 MHz – 817.0 MHz

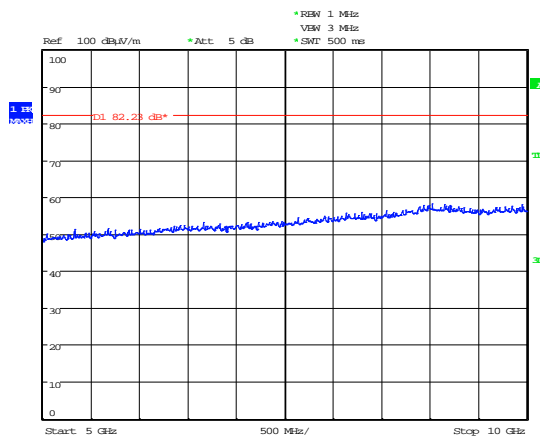


30MHz – 1GHz



Date: 11.AUG.2014 10:25:17

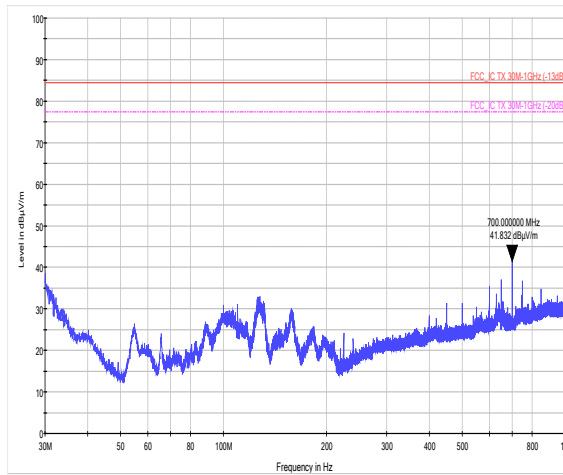
1GHz – 5GHz



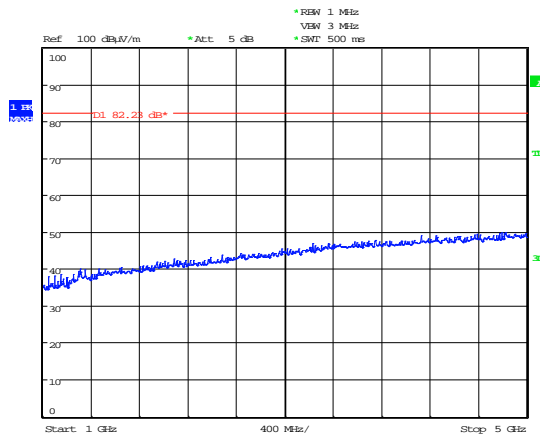
Date: 11.AUG.2014 10:24:52

5GHz – 10GHz

850 MHz – 833.0 MHz

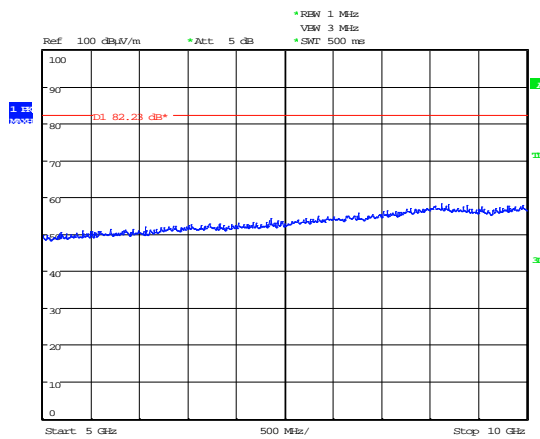


30MHz – 1GHz



Date: 11.AUG.2014 10:25:54

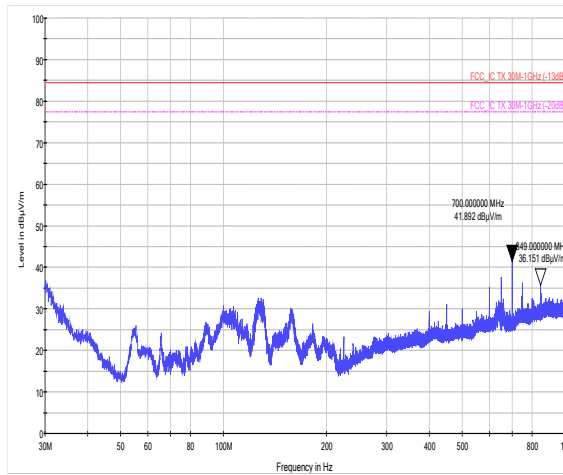
1GHz – 5GHz



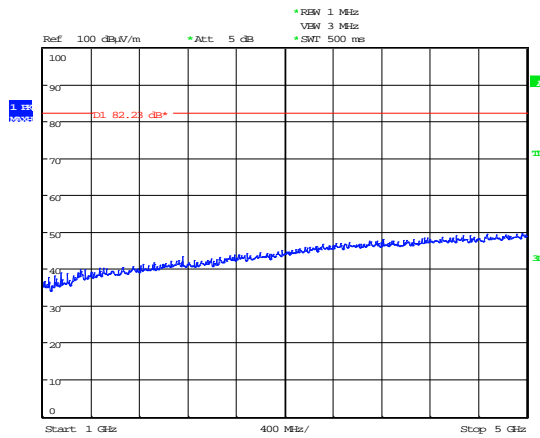
Date: 11.AUG.2014 10:26:41

5GHz – 10GHz

850 MHz – 849.0 MHz

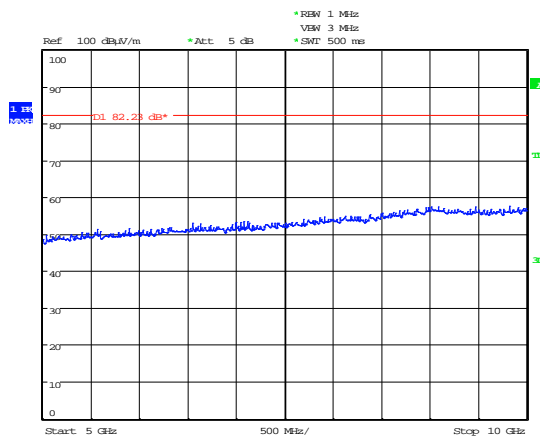


30MHz – 1GHz



Date: 11.AUG.2014 10:31:19

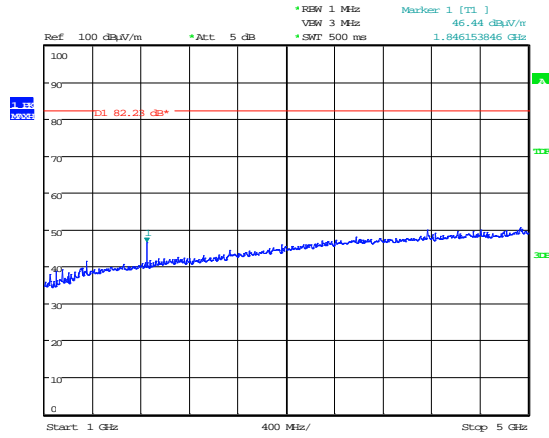
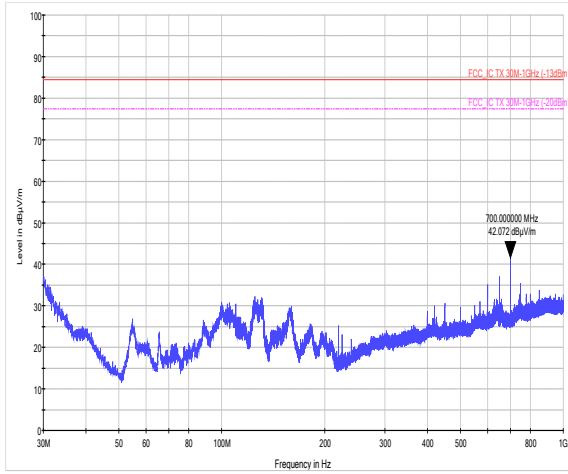
1GHz – 5GHz



Date: 11.AUG.2014 10:30:51

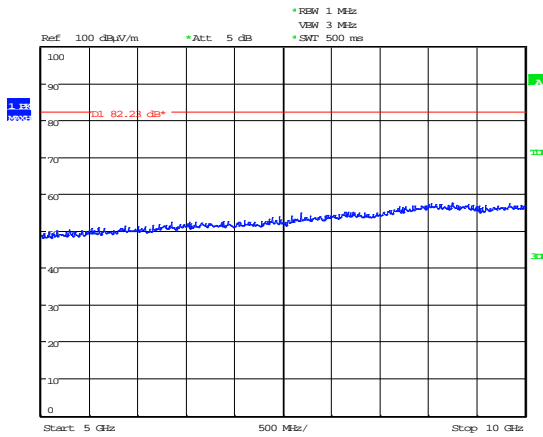
5GHz – 10GHz

1800 MHz – 1880.0 MHz



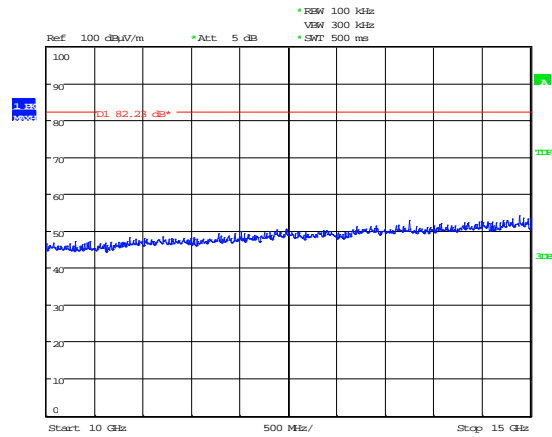
Date: 11.AUG.2014 10:59:27

30MHz – 1GHz



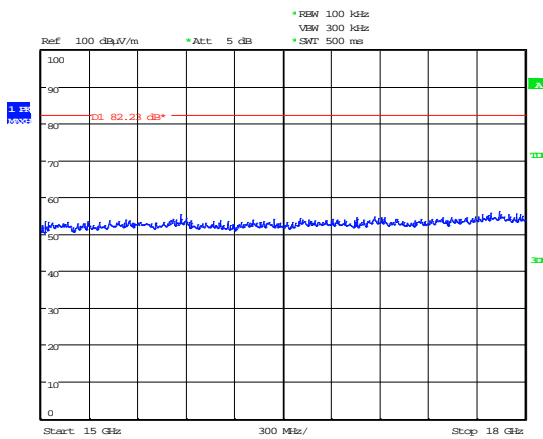
Date: 11.AUG.2014 10:59:52

1GHz – 5GHz



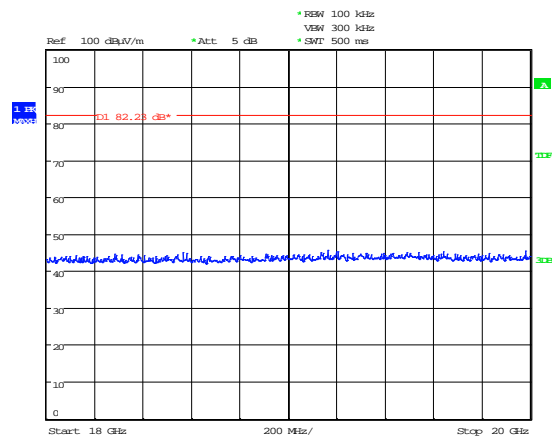
Date: 11.AUG.2014 11:00:29

5GHz – 10GHz



Date: 11.AUG.2014 11:00:56

10GHz – 15GHz

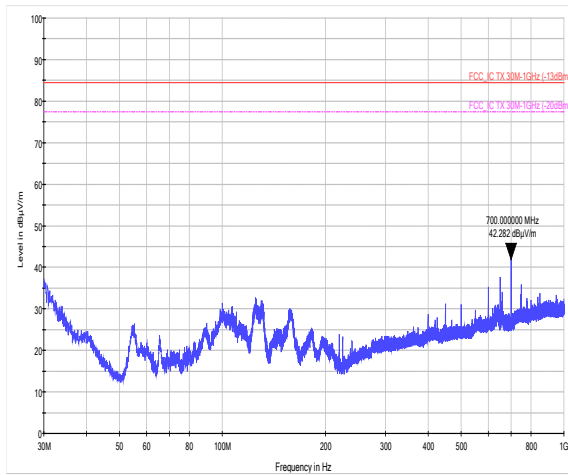


Date: 11.AUG.2014 11:19:14

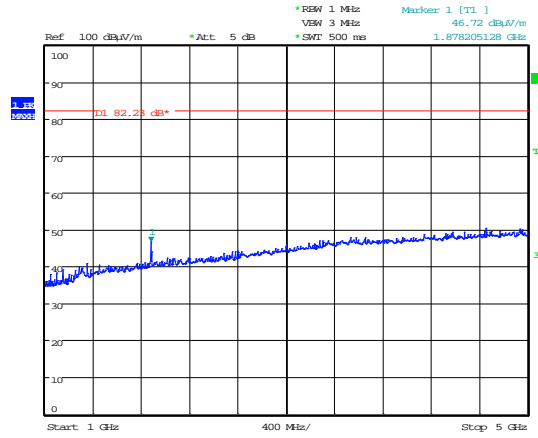
15GHz – 18GHz

18GHz – 22GHz

1800 MHz – 1897.5 MHz

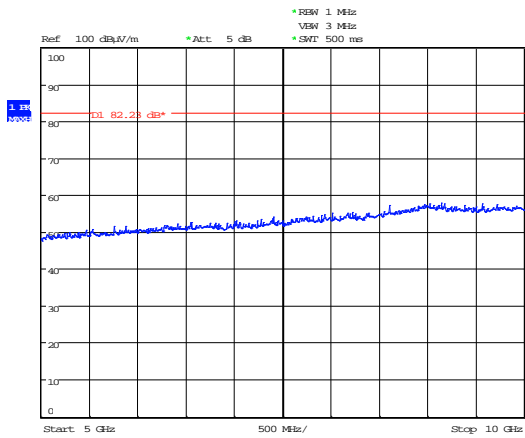


30MHz – 1GHz



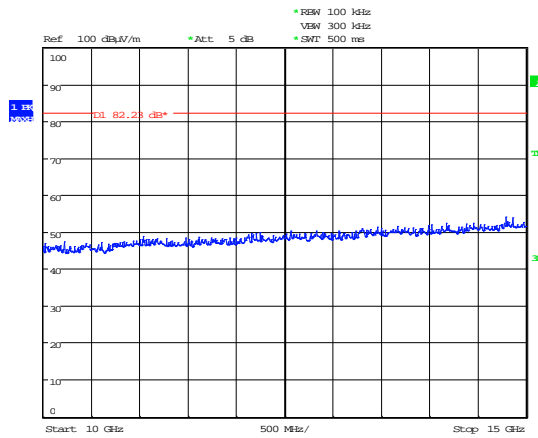
1GHz – 5GHz

Date: 11.AUG.2014 11:04:55



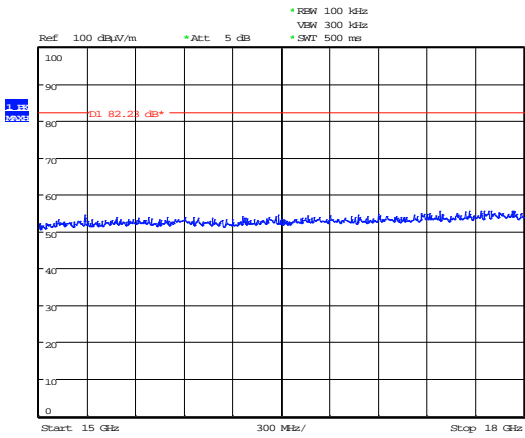
5GHz – 10GHz

Date: 11.AUG.2014 11:05:23



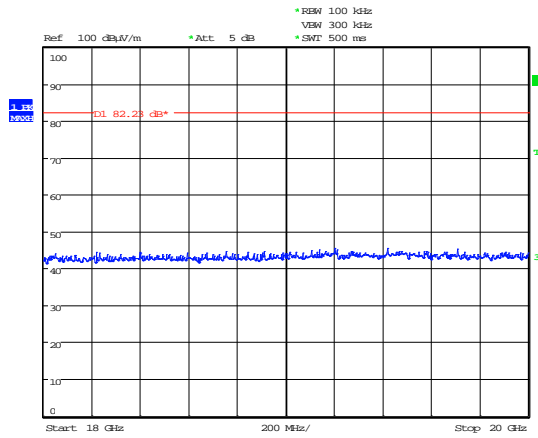
10GHz – 15GHz

Date: 11.AUG.2014 11:05:57



15GHz – 18GHz

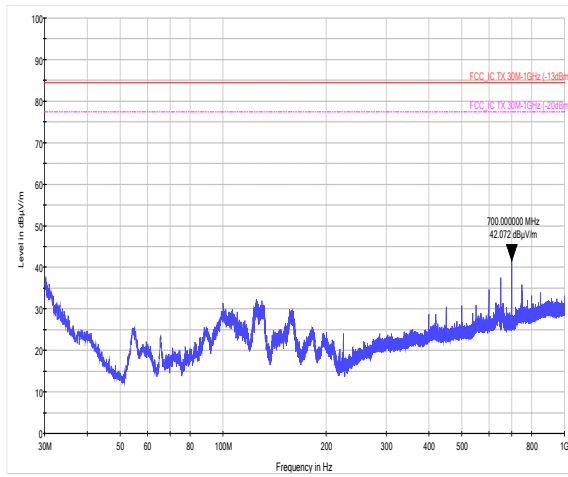
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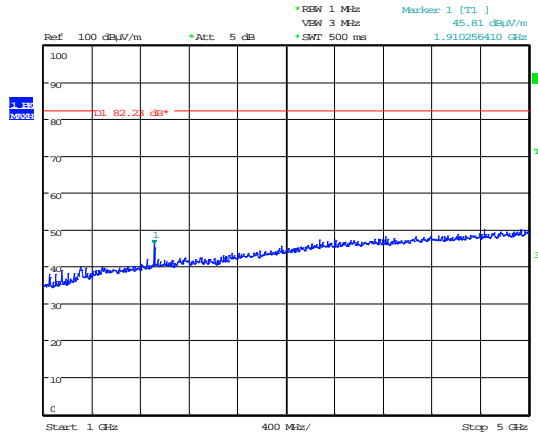
18GHz – 22GHz

Date: 11.AUG.2014 11:20:54

1800 MHz – 1915.0 MHz

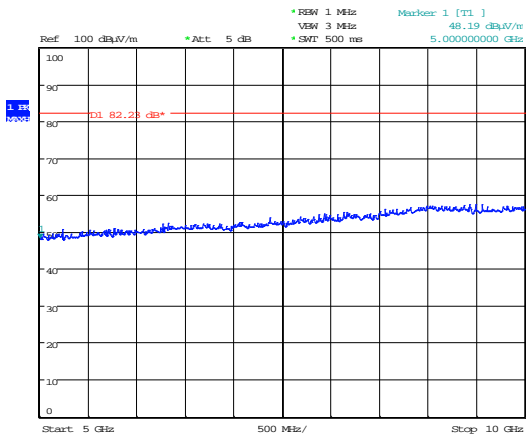


30MHz – 1GHz



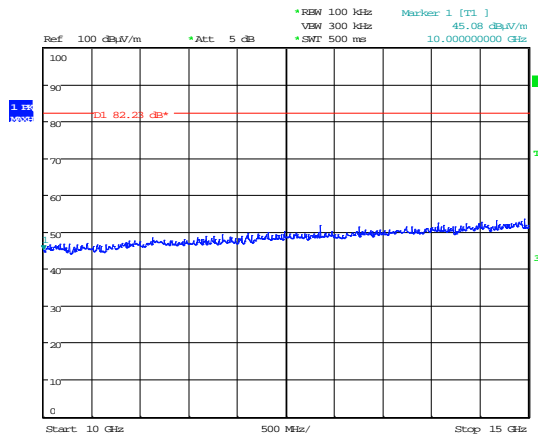
1GHz – 5GHz

Date: 11.AUG.2014 11:13:35



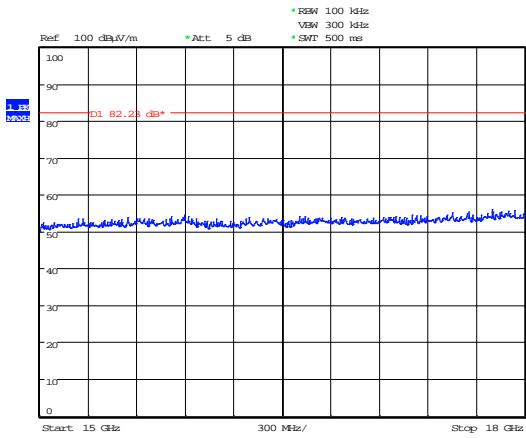
5GHz – 10GHz

Date: 11.AUG.2014 11:13:58



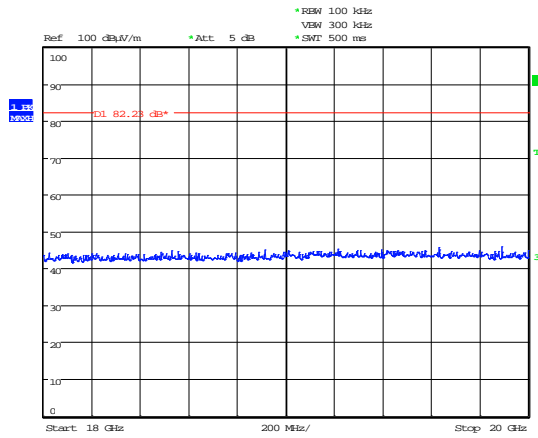
10GHz – 15GHz

Date: 11.AUG.2014 11:14:31



15GHz – 18GHz

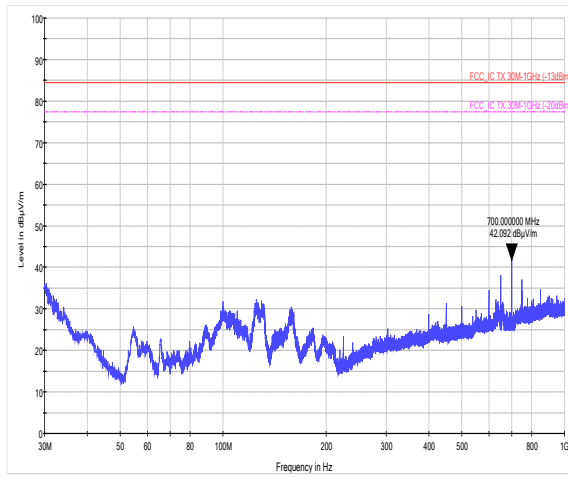
Date: 11.AUG.2014 11:15:04



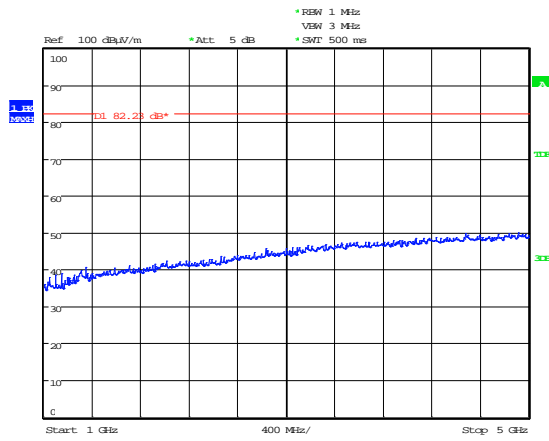
18GHz – 22GHz

Date: 11.AUG.2014 11:21:35

1700 MHz – 1710.0 MHz

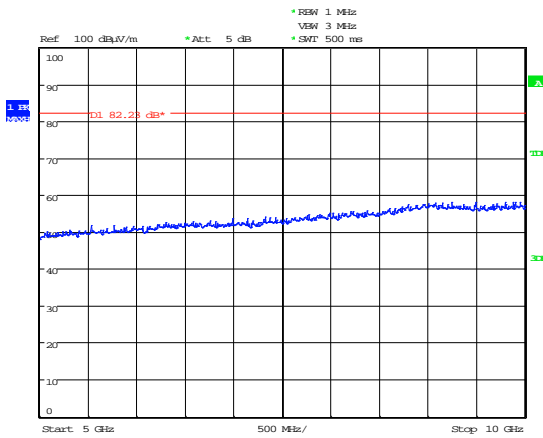


30MHz – 1GHz



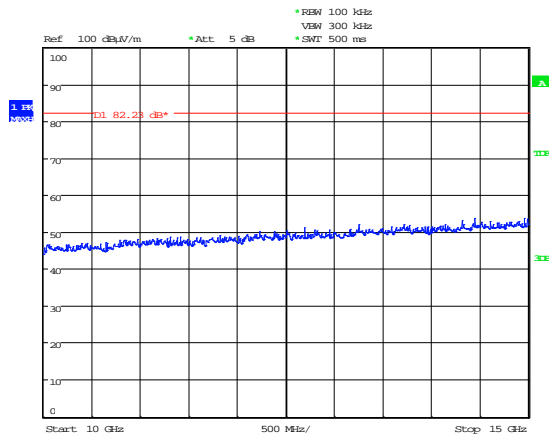
1GHz – 5GHz

Date: 11.AUG.2014 10:38:05



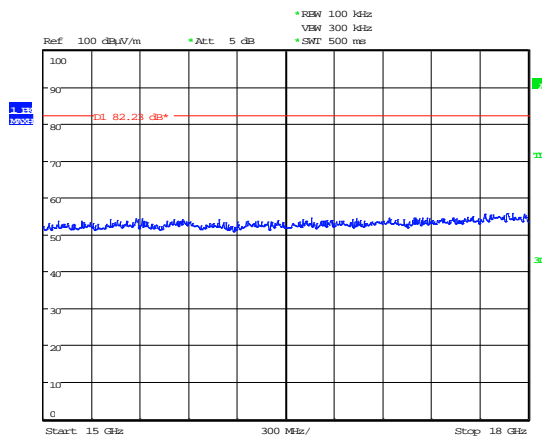
5GHz – 10GHz

Date: 11.AUG.2014 10:38:50



10GHz – 15GHz

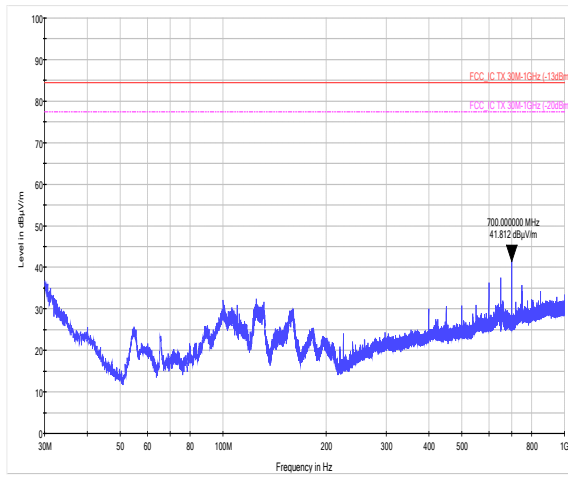
Date: 11.AUG.2014 10:39:36



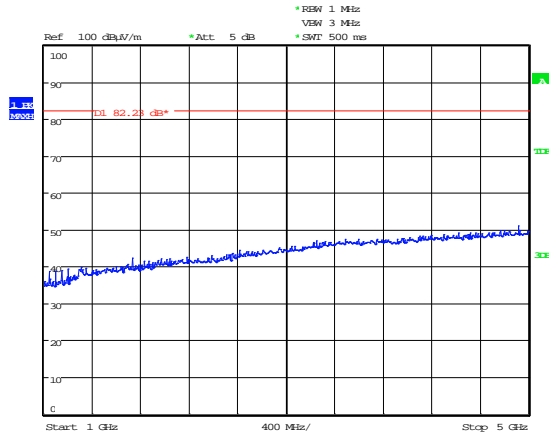
15GHz – 18GHz

Date: 11.AUG.2014 10:40:01

1700 MHz – 1732.5 MHz

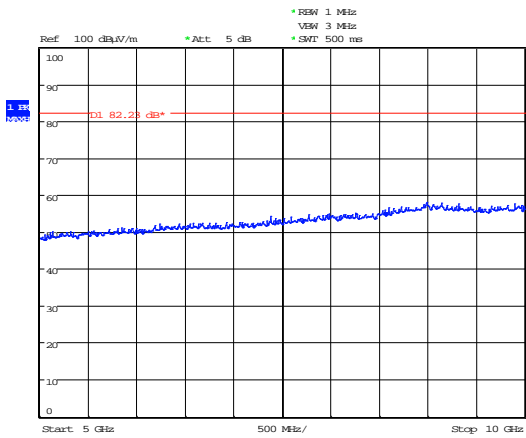


30MHz – 1GHz



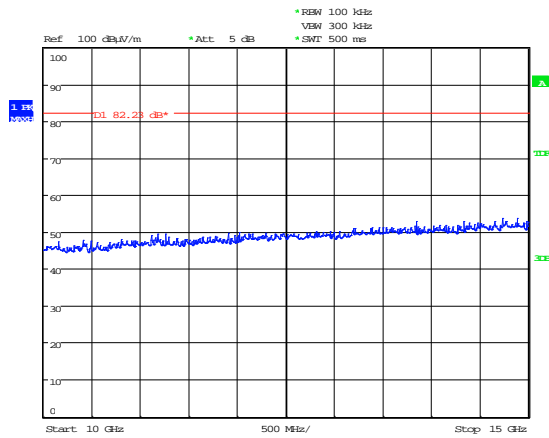
1GHz – 5GHz

Date: 11.AUG.2014 10:45:53



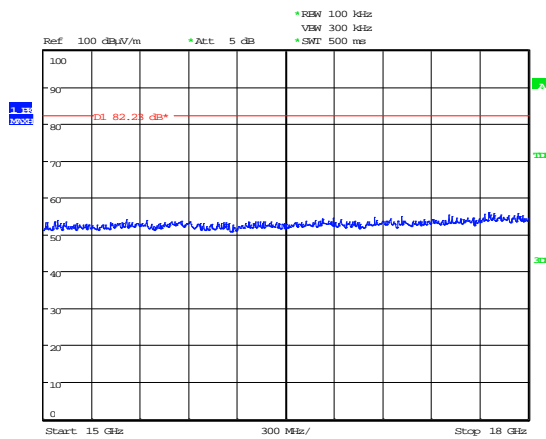
5GHz – 10GHz

Date: 11.AUG.2014 10:46:17



10GHz – 15GHz

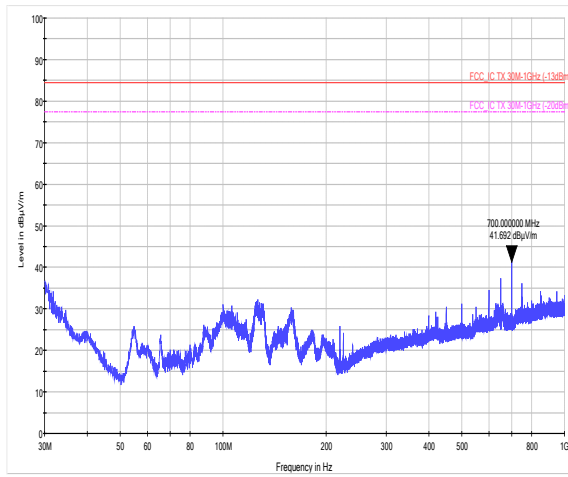
Date: 11.AUG.2014 10:46:46



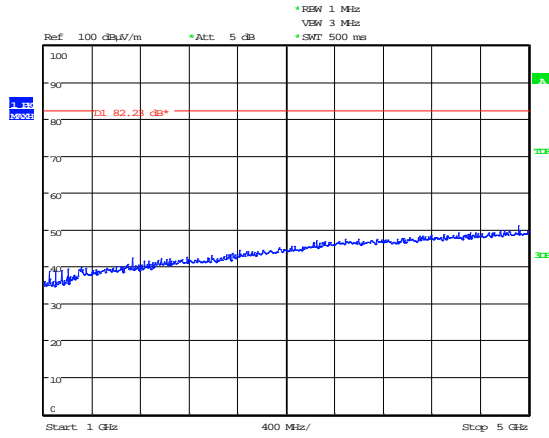
15GHz – 18GHz

Date: 11.AUG.2014 10:47:14

1700 MHz – 1755.0 MHz

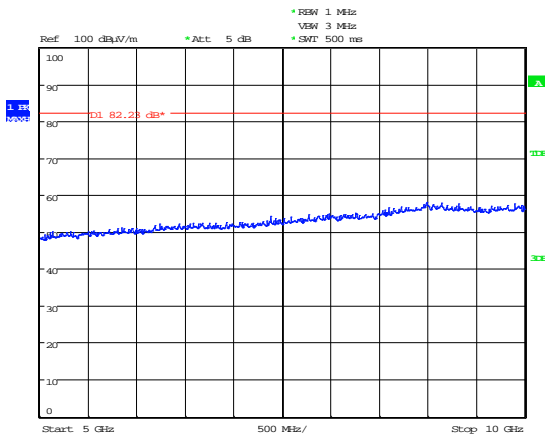


30MHz – 1GHz

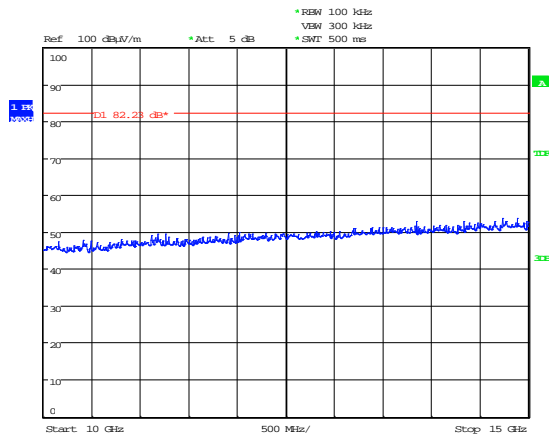


1GHz – 5GHz

Date: 11.AUG.2014 10:45:53



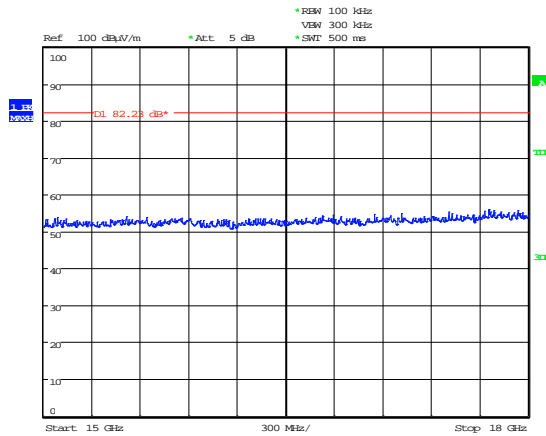
5GHz – 10GHz



10GHz – 15GHz

Date: 11.AUG.2014 10:46:17

Date: 11.AUG.2014 10:46:46



15GHz – 18GHz

Date: 11.AUG.2014 10:47:14

A7 Passband Gain & Bandwidth

Test Details:	
Measurement standard	D.3 Policies + Procedures (k) of KDB 935210 D02 Signal Boosters Certification v02
EUT sample number	S03
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C

BAND	Frequency MHz	fl	fh	20 dB Bandwidth
700 MHz Lower Band	698 – 716 MHz	693.426 MHz	721.278 MHz	27.852 MHz
700 MHz Upper Band	776 – 787 MHz	772.128 MHz	793.105 MHz	20.977 MHz
850 MHz	824 - 849 MHz	812.487 MHz	853.512 MHz	41.025 MHz
SMR 800 (Sprint)	817 – 824 MHz			
1900 MHz (PCS)	1850 – 1910 MHz	1840.243 MHz	1922.115 MHz	81.872 MHz
1700 MHz (AWS)	1710 - 1755 MHz	1698.605 MHz	1770.000 MHz	71.395 MHz

See below for plots showing passband gain & bandwidth

With the aid of a CW Swept signal generator and spectrum analyser, the bandwidth and frequency response of the open channel (i.e. at the point where the gain has fallen by 20 dB) is measured. This measurement shows the gain-versus-frequency response of the open channel from the midband frequency f_0 of the channel up to at least $f_0 + 250\%$ of the 20 dB bandwidth.