

Test Site:
 FCC Test Site No.: 96997
 IC OATS No.: 3475A-1

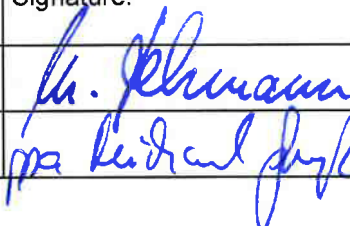


ECL-EMC Test Report No.: 10-033

Equipment under test: MR1718/1718/1718
FCC ID: XS5-MR171717
IC ID: 2237E- MR171717
Type of test: **FCC 47 CFR Part 27 Subpart C:2009**
 Miscellaneous Wireless Communication Services
IC RSS-139:2009
 Advanced Wireless Services Equipment Operating in
 the Bands 1710-1755 MHz and 2110-2155 MHz

Measurement Procedures: 47 CFR Parts 2:2009 (*Frequency Allocations and Radio Treaty Matters; General Rules and Regulations*),
 Part 27:2009 (*Miscellaneous Wireless Communication Services*),
 ANSI/TIA-603-C:2004, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*
 IC-GEN:2007 General Requirements and Information for the Certification of Radiocommunication Equipment

Test result: **Passed**

Date of issue:	30.03.10			Signature:
Issue-No.:	01	Author:	M. Lehmann Test engineer	
Date of delivery:	03.03.10	Checked:	M. Grytz Operational manager	
Test dates:	03.03. – 03.03.09			
Pages:	67			

EMC Test Report No.: 10-033

FCC ID: XS5-MR171717

IC ID: 2237E- MR171717



Manufacturer: ANDREW Wireless Systems GmbH
Industriering 10

D-86675 Buchdorf

Tel.: +49 (0)9099 69 0

Fax: +49 (0)9099 69 140

Test Location: HERBERG Service Plus GmbH
European Compliance Laboratory (ECL)

Thurn-und Taxis-Straße 18

D-90411 Nürnberg

Tel.: +49 (0)911 59835 0

Fax: +49 (0)911 59835 90

General:

The purpose of this report is to show compliance to the FCC regulations for devices operating under Part 27 of the Code of Federal Regulations title 47.

This report informs about the results of the EMC tests, it only refers to the equipment under test. No part of this report may be reproduced in any form, without written permission.



Table of contents

1	TEST RESULTS SUMMARY	5
2	EQUIPMENT UNDER TEST (E.U.T.)	6
2.1	DESCRIPTION	6
2.1.1	DOWNLINK	6
2.1.2	UPLINK	6
2.1.3	DESCRIPTION OF EUT	6
2.1.4	SYSTEM DIAGRAMS	7
2.1.5	BLOCK DIAGRAM OF MEASUREMENT REFERENCE POINTS	8
3	TEST SITE	9
3.1	TEST ENVIRONMENT	9
3.2	TEST EQUIPMENT	9
3.3	INPUT AND OUTPUT LOSSES	9
3.4	MEASUREMENT UNCERTAINTY	9
4	TEST SITE (HERBERG)	10
5	RF POWER OUT: §27.50, §2.1046; RSS-139, RSS-GEN	11
5.1	LIMIT	11
5.1.1	FCC CFR47	11
5.2	TEST METHOD	11
5.2.1	FCC CFR47	11
5.3	TEST RESULTS	12
5.3.1	DOWNLINK	12
5.3.1.1	CDMA	13
5.3.1.2	W-CDMA	14
5.3.2	UPLINK	16
5.3.2.1	CDMA	16
5.3.2.2	W-CDMA	18
5.4	SUMMARY TEST RESULT	19
6	OCCUPIED BANDWIDTH: §2.1049; RSS-GEN	20
6.1	LIMIT	20
6.2	TEST METHOD	20
6.2.1	FCC CFR47	20
6.2.2	IC RSS-GEN	20
6.3	TEST RESULTS	21
6.3.1	DOWNLINK	22
6.3.1.1	CDMA	22
6.3.1.2	W-CDMA	23
6.3.2	UPLINK	24
6.3.2.1	CDMA	24
6.3.2.2	W-CDMA	25



6.4	SUMMARY TEST RESULT	26
7	SPURIOUS EMISSIONS AT ANTENNA TERMINALS: §27.53, §2.1051; RSS-131, RSS-GEN.....	27
7.1	LIMIT	27
7.1.1	FCC CFR47.....	27
7.2	TEST METHOD	27
7.2.1	FCC CFR47.....	27
7.2.2	IC RSS-GEN	28
7.3	TEST RESULTS	28
7.3.1	DOWNLINK	30
7.3.1.1	CDMA < 1MHz to band edge.....	30
7.3.1.2	W-CDMA < 1MHz to band edge	31
7.3.1.3	CDMA > 1MHz to band edge.....	32
7.3.1.4	W-CDMA > 1MHz to band edge	35
7.3.2	UPLINK	38
7.3.2.1	CDMA < 1MHz to band edge.....	38
7.3.2.2	W-CDMA < 1MHz to band edge	39
7.3.2.3	CDMA > 1MHz to band edge.....	40
7.3.2.4	W-CDMA > 1MHz to band edge	43
7.4	SUMMARY TEST RESULT	46
8	FIELD STRENGTH OF SPURIOUS EMISSIONS: §27.53, §2.1053, RSS-139, RSS-GEN.....	47
8.1	LIMIT §27.53 (H).....	51
8.2	TEST METHOD §27.53 (H) ANSI/TIA/EA-603-C	51
8.3	CLIMATIC VALUES IN THE LAB.....	52
8.4	TEST RESULTS	53
8.4.1	PREMEASUREMENTS	53
8.4.1.1	30 MHz to 1 GHz Downlink (<u>B</u> ottom – <u>M</u> iddle – <u>T</u> op).....	53
8.4.1.2	30 MHz to 1 GHz Uplink (<u>B</u> ottom – <u>M</u> iddle – <u>T</u> op)	57
8.4.1.3	20 GHz to 23 GHz Downlink (<u>B</u> ottom – <u>M</u> iddle – <u>T</u> op)	60
8.4.1.4	20 GHz to 23 GHz Uplink (<u>B</u> ottom – <u>M</u> iddle – <u>T</u> op)	61
8.4.2	FINAL MEASUREMENT	63
8.4.2.1	30 MHz to 1 GHz	63
8.4.2.2	0,8 GHz to 20GHz Downlink.....	63
8.4.2.3	0,8 GHz to 20GHz Uplink	65
8.4.2.4	20GHz to 23GHz	66
8.5	SUMMARY TEST RESULT	66
9	HISTORY.....	67

1 Test Results Summary

Name of Test	FCC Para. No.	FCC Method	FCC Spec.	Result
RF Power Output	27.50(d)	2.1046	1640 Watts/MHz	Complies
Occupied Bandwidth	2.1049	2.1049	Input/Output	Complies
Spurious Emissions at Antenna Terminals	27.53(h)	2.1051	-13dBm	Complies
Field Strength of Spurious Emissions	27.53(m)	2.1053 TIA/EA-603	-13dBm E.I.R.P	Complies
Frequency Stability	27.54	2.1055	Must stay in band	NA

Name of Test	IC Para. No.	IC Method	Result
RF Power Output	RSS-139 6.4	RSS-GEN 4.8	Complies
Occupied Bandwidth	RSS-Gen 4.6	RSS-GEN 4.6.1	Complies
Spurious Emissions at Antenna Terminals	RSS-139 6.5	RSS-GEN 4.9	Complies
Field Strength of Spurious Emissions	RSS-139 6.5	RSS-GEN 4.9 SRSP-513	Complies
Frequency Stability	RSS-139 6.3	RSS-GEN 4.7	NA

Frequency stability is not applicable because the device uses a common oscillator to up convert and down convert the RF signal. The EUT does not contain modulation circuitry, or frequency generation, therefore the test was not performed.

2 Equipment under test (E.U.T.)

2.1 Description

Kind of equipment	MR1718/1718/1718 Repeater
Andrew Ident. Number	Id.No. 7613707
Serial no.(SN)	10
Revision	00
Software version and ID	V 2.1.0.3 Id.No.7612208-01
Type of modulation and Designator	CDMA (F9W) <input checked="" type="checkbox"/> W-CDMA (F9W) <input checked="" type="checkbox"/>
Frequency Translation	F1-F1 <input checked="" type="checkbox"/> F1-F2 <input type="checkbox"/> N/A <input type="checkbox"/>
Band Selection	Software <input checked="" type="checkbox"/> Duplexer <input type="checkbox"/> Fullband <input type="checkbox"/>

2.1.1 Downlink

Pass band	2110 MHz – 2155 MHz
Max. composite output power based on one carrier(rated)	22,0 dBm = 158.5 mW
Gain max.	78dB

2.1.2 Uplink

Pass band	1710 MHz – 1755 MHz
Max. composite output power based on one carrier(rated)	22,0 dBm = 158.5 mW
Gain max.	78dB

2.1.3 Description of EUT

Andrew MR1718/1718/1718 is a mini repeater for indoor coverage in small areas.

2.1.4 System diagrams

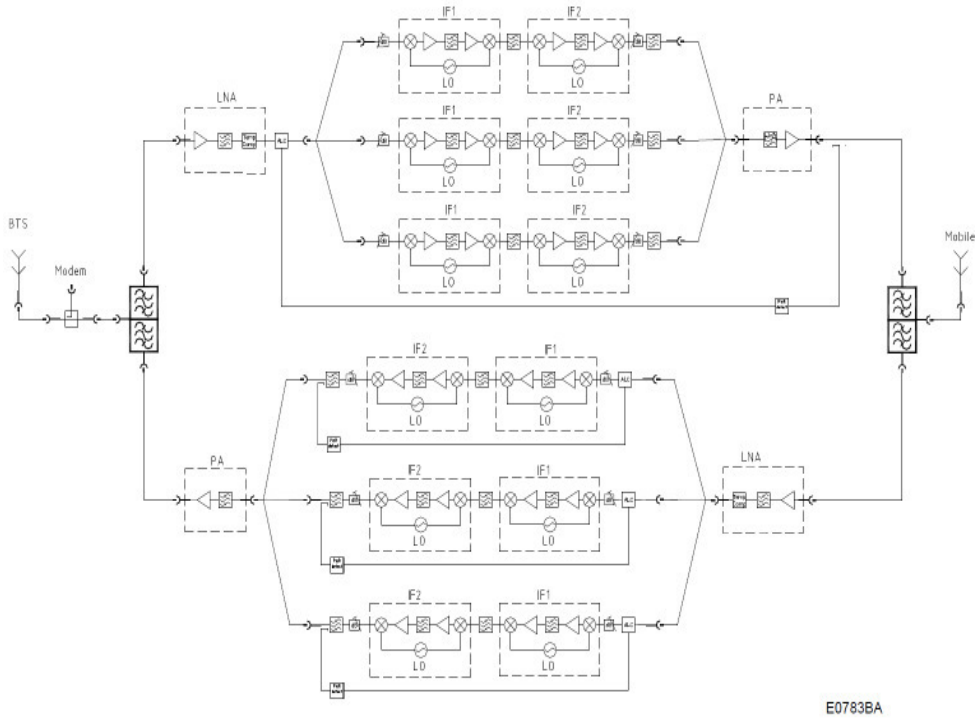


figure 2.1.4-#1 System diagrams: MR1718/1718/1718

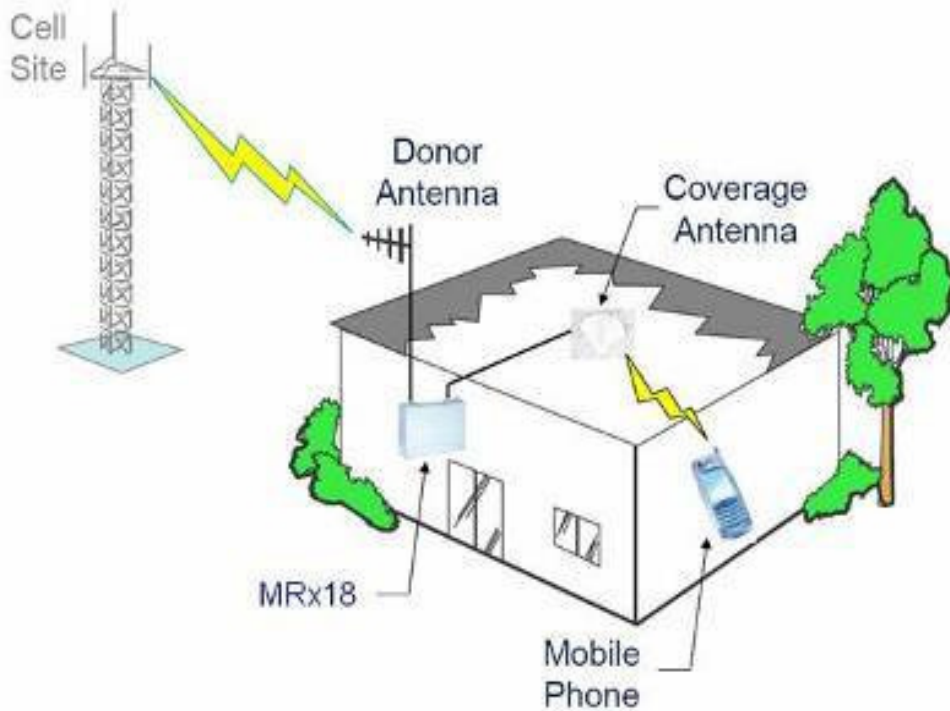


figure 2.1.4-#2 System diagrams: Application example

2.1.5 Block diagram of measurement reference points

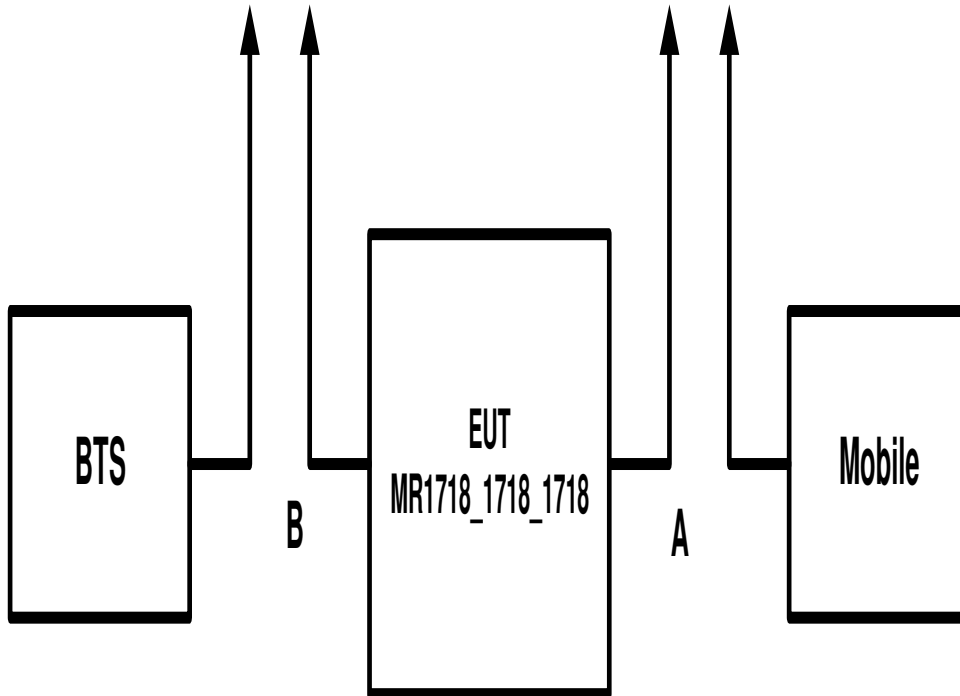


figure 2.1.5-#1 Block diagram of measurement reference points

Reference point A, Mobile: Repeater DL output, UL input
Reference point B, BTS: Repeater UL output, DL input

3 Test site

3.1 Test environment

All tests were performed under the following environmental conditions:

Condition	Minimum value	Maximum value
Barometric pressure	86 kPa	106 kPa
Temperature	15°C	30°C
Relative Humidity	20 %	75 %
Power supply range	±5% of rated voltages	

3.2 Test equipment

ANDREW Inv. No.	Test equipment	Type	Manufacturer	Serial No.	Calibration
8893	Network Analyzer	ZVB8	R&S	100201	06/10
8961	Spectrum Analyzer	FSP13	R&S	100147	10/10
8736	Spectrum Analyzer	FSIQ26	R&S	100290	04/10
8984	Signal Generator	E4438C	Agilent	MY45094089	11/10
8972	Signal Generator	SMIQ03B	R&S	837747/023	07/10
8686	Power Meter	E4418B	Agilent	MY41293484	09/10
8687	Power Sensor	E9300H	Agilent	MY41090294	09/10
7370	Automatic Box	Basic Part	Andrew	--	01/10
7119	Divider	2way	Mikom	3512	CIU
7323	Circulator	E10-1FFF	AEROTEK	25357	CIU
7315	Circulator	E10-1FFF	AEROTEK	25344	CIU
7363	RF-Cable	2,0m; N-N	Huber & Suhner	28439/4PEA	CIU
7295	RF-Cable	2,5m; N-N	Huber & Suhner	28964/4PEA	CIU
7299	RF-Cable	2,5m; N-N	Huber & Suhner	28964/4PEA	CIU
7364	RF-Cable	1,0m; SMA	Huber & Suhner	36309/4P	CIU
7365	RF-Cable	1,0m; SMA	Huber & Suhner	36292/4P	CIU
7366	RF-Cable	2,0m; SMA	Huber & Suhner	36183/4P	CIU
7367	RF-Cable	2,0m; SMA	Huber & Suhner	36158/4P	CIU
7373	RF-Cable	Multiflex141 0,6m	Andrew	---	CIU
7374	RF-Cable	Multiflex141 0,6m	Andrew	---	CIU

CIU = Calibrate in use

3.3 Input and output losses

All recorded power levels should be referenced to the input and output connectors of the repeater, unless explicitly stated otherwise.

The test equipment used in this test has to be calibrated, so that the functionality is also checked.

All cables, attenuators, splitter, isolator, circulator and combiner etc. must be measured before testing and used for compensation during testing.

3.4 Measurement uncertainty

The extended measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k=2$. The true value is located in the corresponding interval with a probability of 95 %.

EMC Test Report No.: 10-033

FCC ID: XS5-MR171717

IC ID: 2237E- MR171717



4 Test site (Herberg)

FCC Test site: 96997
IC OATS: IC3475A-1

See relevant dates under section 8 of this test report.

5 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN

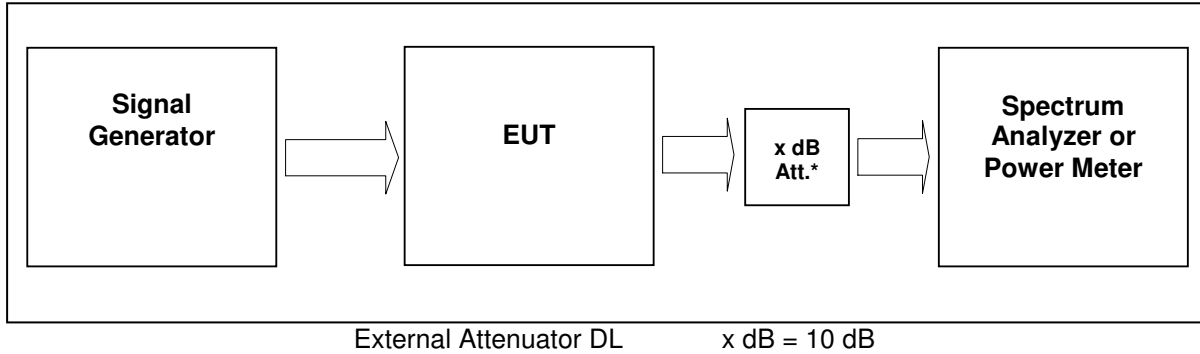


figure 3.4-#1 Test setup: RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN

Measurement uncertainty	± 0,38 dB
Test equipment used	8984,8686,8687,8961,7370

5.1 Limit

5.1.1 FCC CFR47

Minimum standard:

Para. No.27.50(d)(2)(B)

(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands:

(2) The power of each fixed or base station transmitting in the 2110–2155 MHz band and situated in any geographic location other than that described in paragraph (d)(1) is limited to:

(B) an EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

5.2 Test method

5.2.1 FCC CFR47

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations



5.3 Test results

Detector RMS.

Test signal CDMA2000:

Signal waveform according to table 6.2-1 of standard specification 3GPP2 C.p0051-0 v1.0

16.February 2006 pilot, sync, paging, 37 traffics, which is equal to the table 6.5.2.1 of 3GPP2 C.S0010-C v2.0 24.February 2006.

Test signal WCDMA:

Signal waveform according to Test Model 1 clause 6.1.1.1 of standard specification 3GPP TS25.141 v8.8.0 (2009-09). Signal modulated with a combination of PCCPCH, SCCPCH and Dedicated Physical Channels specified as test model 1 64 DPCH.

According to ANSI C63.4 section 13.1 Table 5 for operating frequencies more then 10MHz: The test shall be performed at Bottom, Middle, Top frequencies.

5.3.1 Downlink

Modulation	Measured at		RBW VBW Span	RF Power (dBm)	RF Power (W)	Plot -
CDMA	Bottom	2110,625 MHz	3MHz	22.1	0.162	4.3.1.1 #1
	Middle	2132,50 MHz	10MHz	22.0	0.158	#2
	Top	2154,375 MHz	15MHz	22.1	0.162	#3
WCDMA	Bottom	2112,4 MHz	10MHz	18.0	0.063	4.3.1.2 #1
	Middle	2132,4 MHz	10MHz	18.0	0.063	#2
	Top	2152,4 MHz	50MHz	18.1	0.065	#3
Maximum output power = 22 dBm -> 0.159 W						
Limit Maximum output power = 1640 W / MHz -> 62.1 dBm / MHz; 63.1 dBm / 1,25 MHz; 69,14 dBm/ 5MHz						

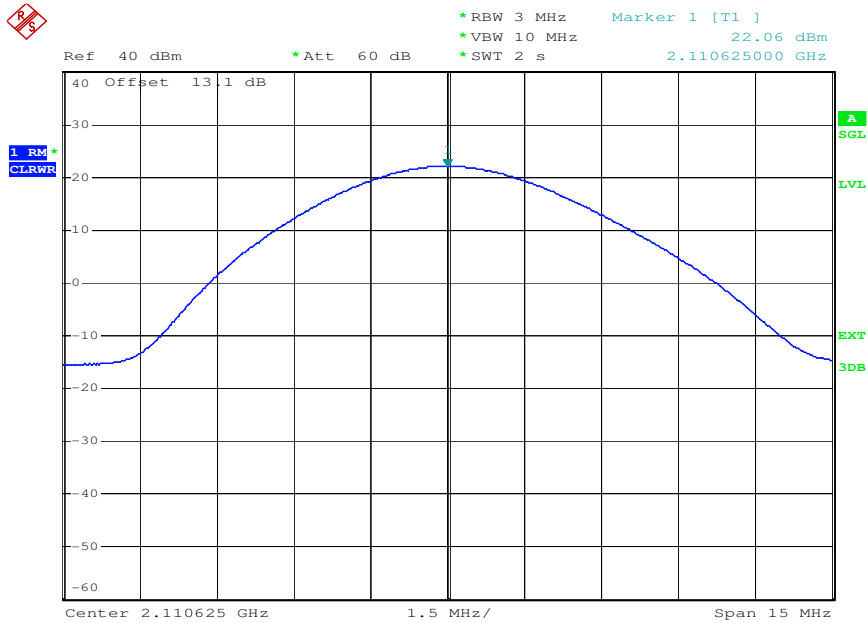
table 5.3.1-#1 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN Test results Downlink

Modulation	Pin / dBm (Ref. point B)
CDMA	-56
WCDMA	-60

table 5.3.1-#2 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN Test results Downlink Input power

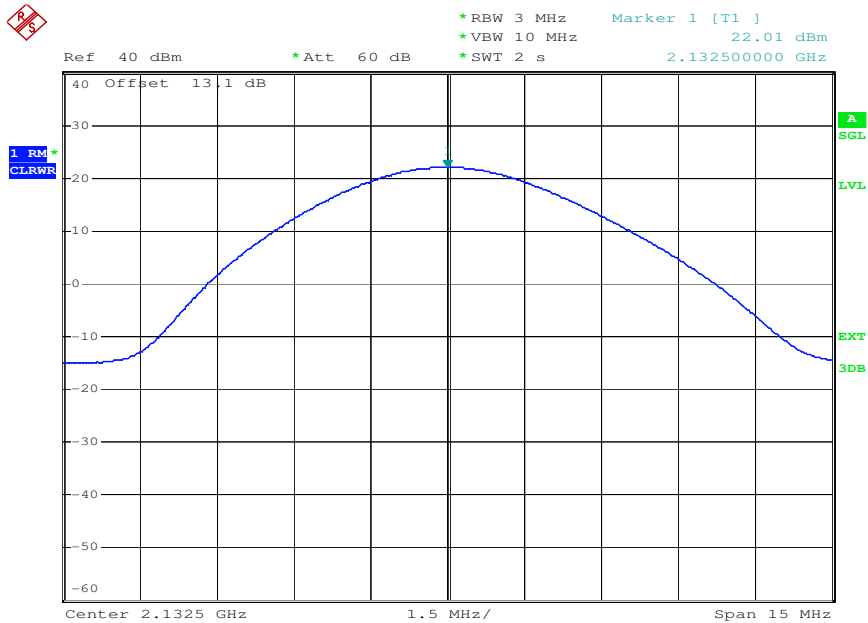


5.3.1.1 CDMA



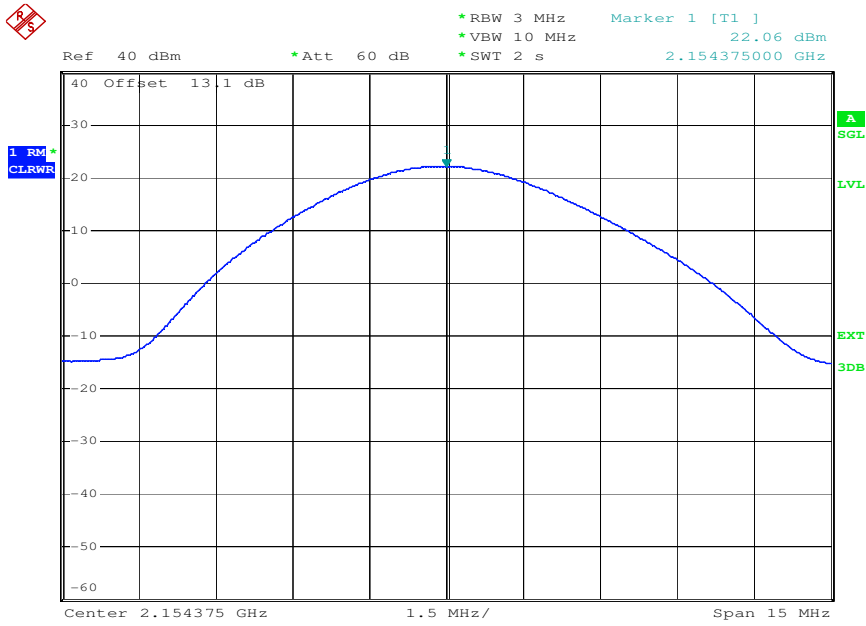
Date: 19.FEB.2010 11:40:53

plot 5.3.1.1-#1 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Downlink; CDMA Bottom



Date: 19.FEB.2010 11:41:22

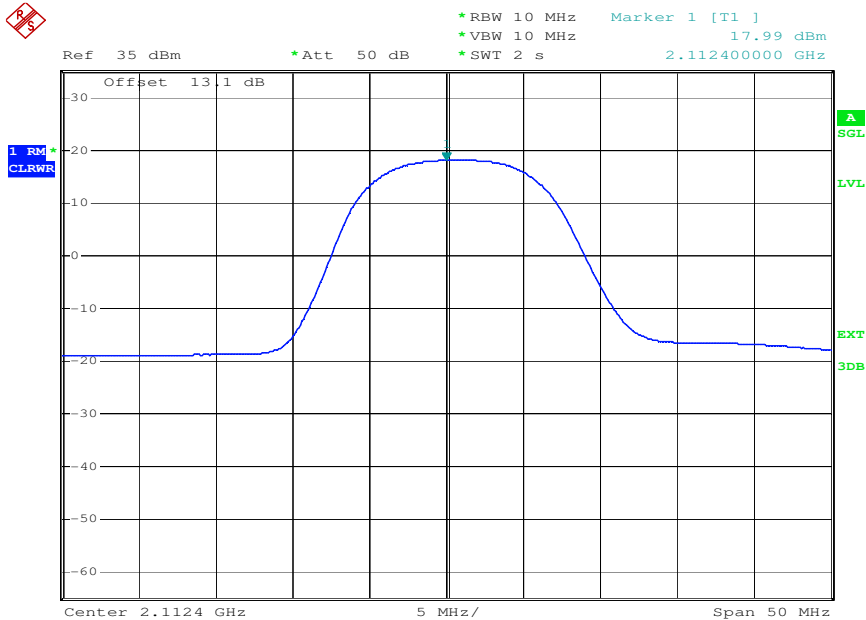
plot 5.3.1.1-#2 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Downlink; CDMA Middle



Date: 19.FEB.2010 11:41:51

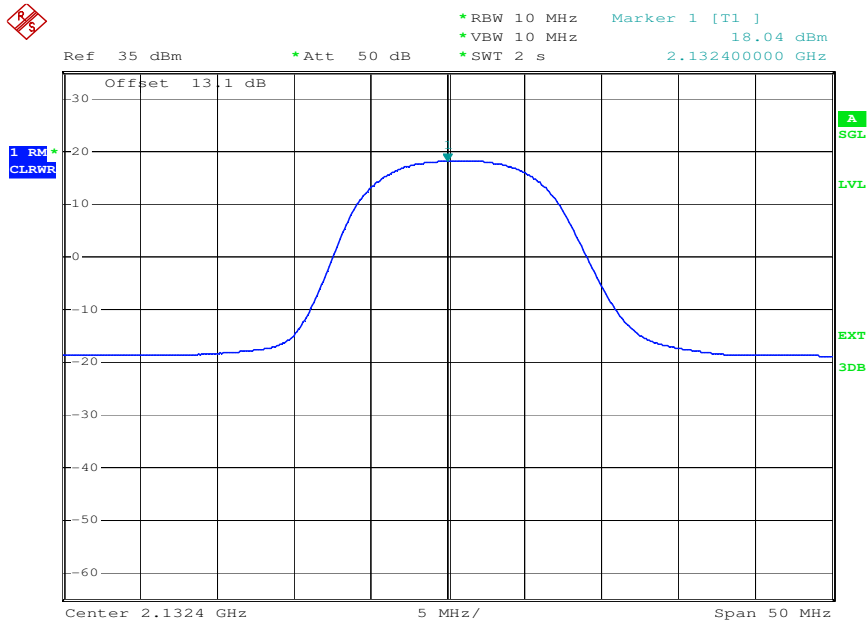
plot 5.3.1.1-#3 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Downlink; CDMA Top

5.3.1.2 W-CDMA



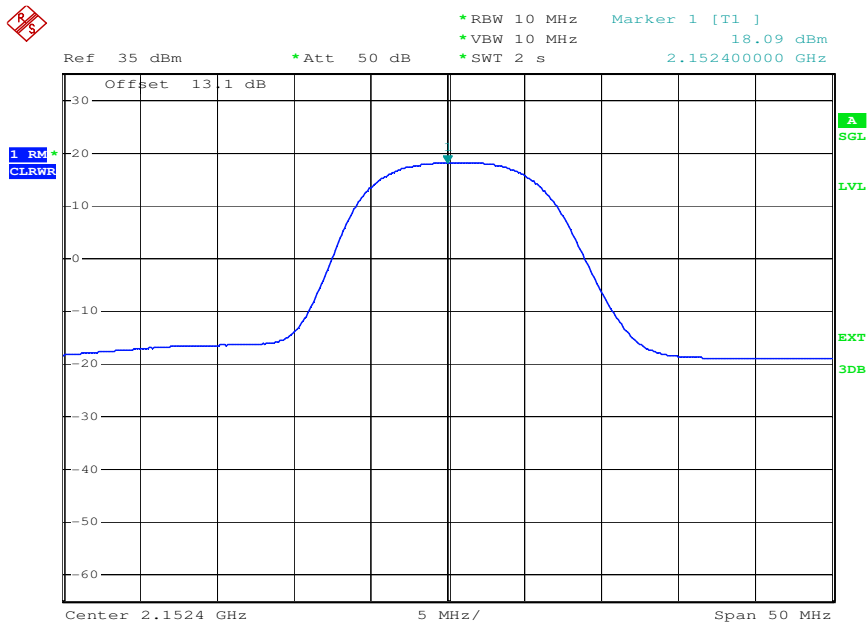
Date: 19.FEB.2010 12:53:23

plot 5.3.1.2-#1 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Downlink; W-CDMA Bottom



Date: 19.FEB.2010 12:53:49

plot 5.3.1.2-#2 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Downlink; W-CDMA Middle



Date: 19.FEB.2010 12:54:15

plot 5.3.1.2-#3 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Downlink; W-CDMA Top



5.3.2 Uplink

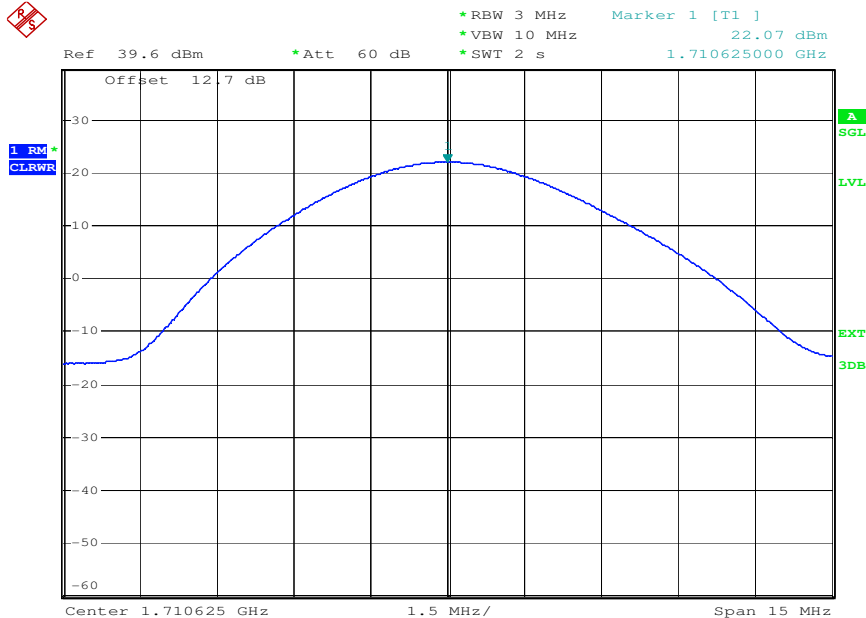
Modulation	Measured at		RBW VBW Span	RF Power (dBm)	RF Power (W)	Plot -
CDMA	Bottom	1710,625 MHz	3MHz	22.1	0.151	4.3.2.1 #1
	Middle	1732,50 MHz	10MHz	22.0	0.151	#2
	Top	1754,375 MHz	15MHz	21.9	0.151	#3
WCDMA	Bottom	1712,4 MHz	10MHz	18.0	0.063	4.3.2.2 #1
	Middle	1732,4 MHz	10MHz	18.0	0.063	#2
	Top	1752,4 MHz	50MHz	18.0	0.063	#3
Maximum output power = 22 dBm -> 0.159 W						
Limit Maximum output power = 1640 W / MHz -> 62.1 dBm / MHz; 63.1 dBm / 1,25 MHz; 69,14 dBm/ 5MHz						

table 5.3.2-#3 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN Test results Uplink

Modulation	Pin / dBm (Ref. point A)
CDMA	-56
WCDMA	-60

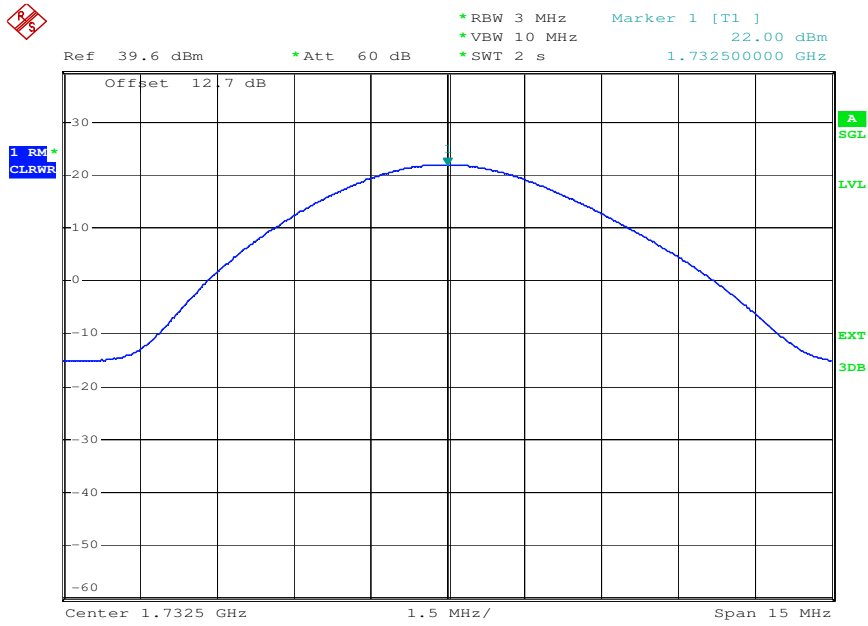
table 5.3.2-#4 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN Test results Uplink Input power

5.3.2.1 CDMA



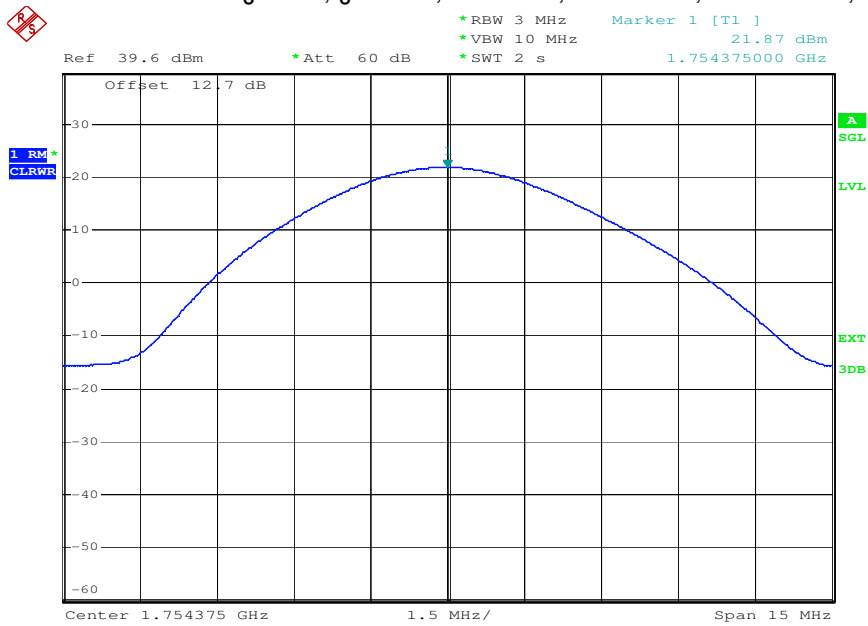
Date: 19.FEB.2010 11:42:20

plot 5.3.2.1-#1 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Uplink; CDMA Bottom



Date: 19.FEB.2010 11:42:49

plot 5.3.2.1-#2 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Uplink; CDMA Middle

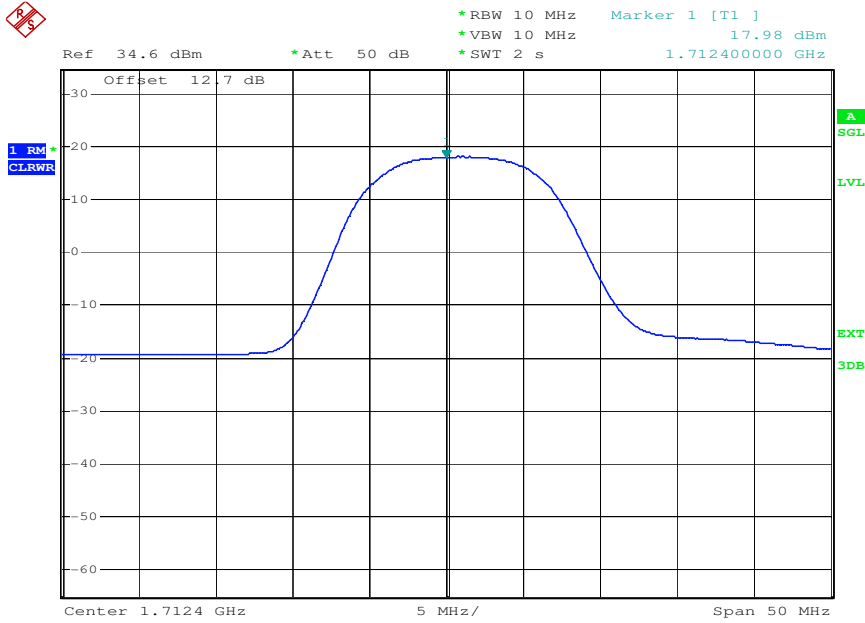


Date: 19.FEB.2010 11:43:18

plot 5.3.2.1-#3 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Uplink; CDMA Top

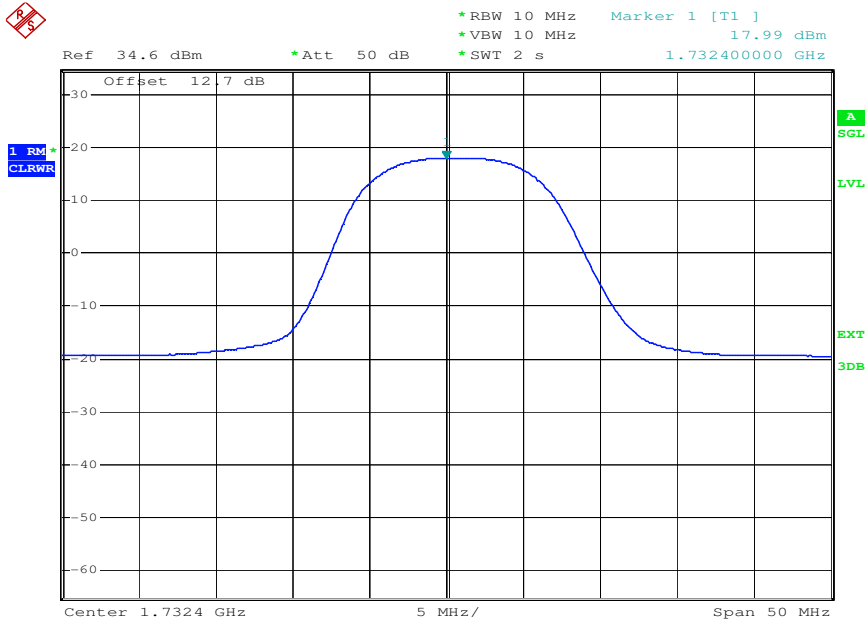


5.3.2.2 W-CDMA



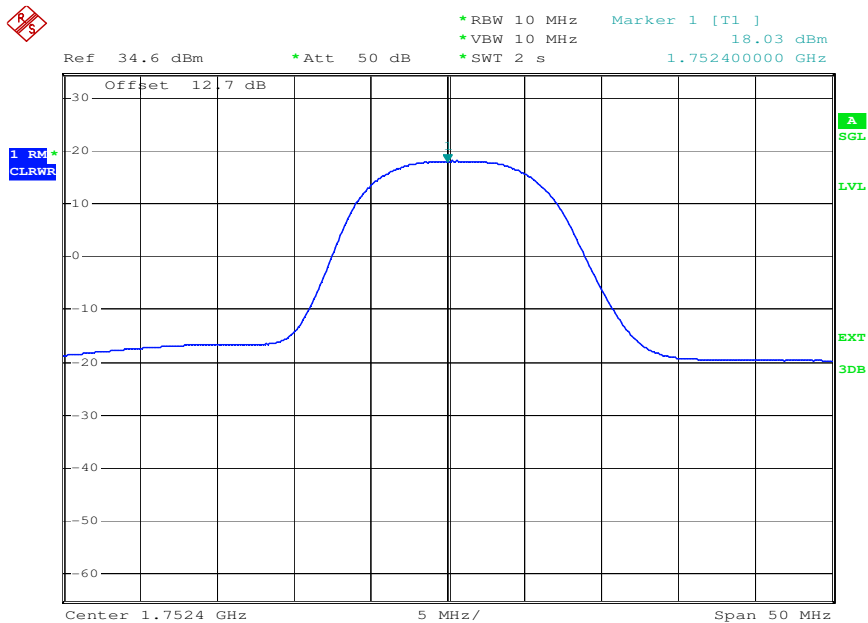
Date: 19.FEB.2010 12:54:41

plot 5.3.2.2-#1 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Uplink; W-CDMA Bottom



Date: 19.FEB.2010 12:55:07

plot 5.3.2.2-#2 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Uplink; W-CDMA Middle



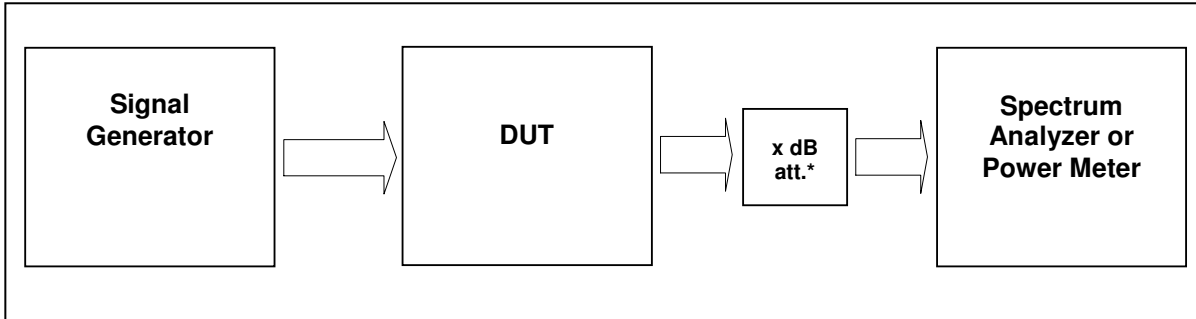
Date: 19.FEB.2010 12:55:33

plot 5.3.2.2-#3 RF Power Out: §27.50, §2.1046; RSS-139, RSS-GEN; Test results; Uplink; W-CDMA Top

5.4 Summary test result

Test result	complies, according the plots above
Tested by:	Roland Macho
Date:	19.02.2010

6 Occupied Bandwidth: §2.1049; RSS-GEN



External Attenuator DL x dB = 10 dB
figure 5.4-#1 Test setup: Occupied Bandwidth: §2.1049; RSS-GEN

Measurement uncertainty	± 0,38 dB
Test equipment used	8984,8686,8687,8961,7370

6.1 Limit

The spectral shape of the output should look similar to input for all modulations.

6.2 Test method

6.2.1 FCC CFR47

Para. No.2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

6.2.2 IC RSS-GEN

4.6.1 Occupied Bandwidth

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.



6.3 Test results

Detector RMS.

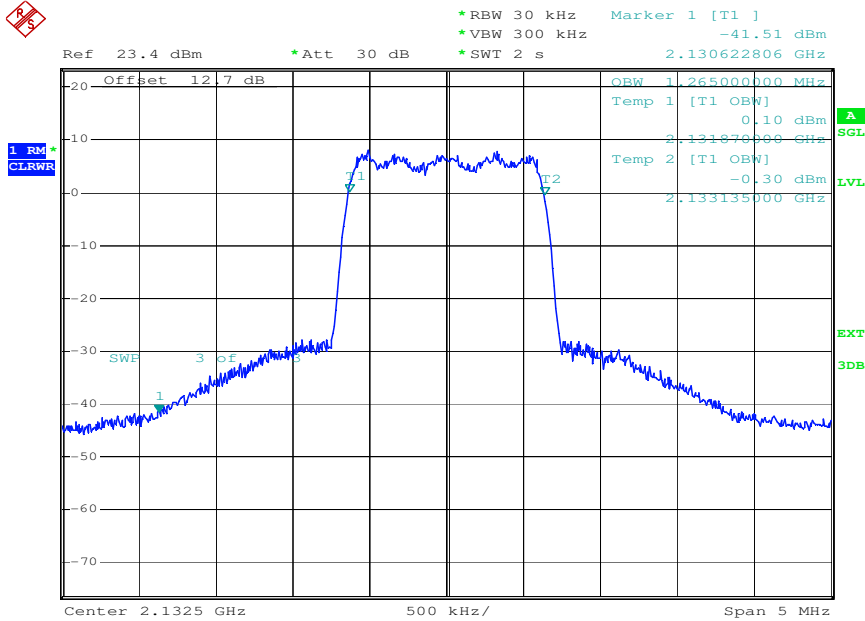
Modulation	Link	Measured at		RBW VBW Span	Occupied Bandwidth / MHz	Plot #
CDMA	Downlink	Middle	2132,5 MHz	30kHz 300kHz 5MHz	1.265	6.3.1.1 #1, #2
WCDMA	Downlink	Middle	2132,4 MHz	100kHz 1MHz 10MHz	4.180	6.3.1.2 #1, #2
CDMA	Uplink	Middle	1732,5 MHz	30kHz 300kHz 5MHz	1.270	6.3.1.1 #1, #2
WCDMA	Uplink	Middle	1732,4 MHz	100kHz 1MHz 10MHz	4.180	6.3.1.2 #1, #2

table 6.3-#1 Occupied Bandwidth: §2.1049; RSS-GEN Test results



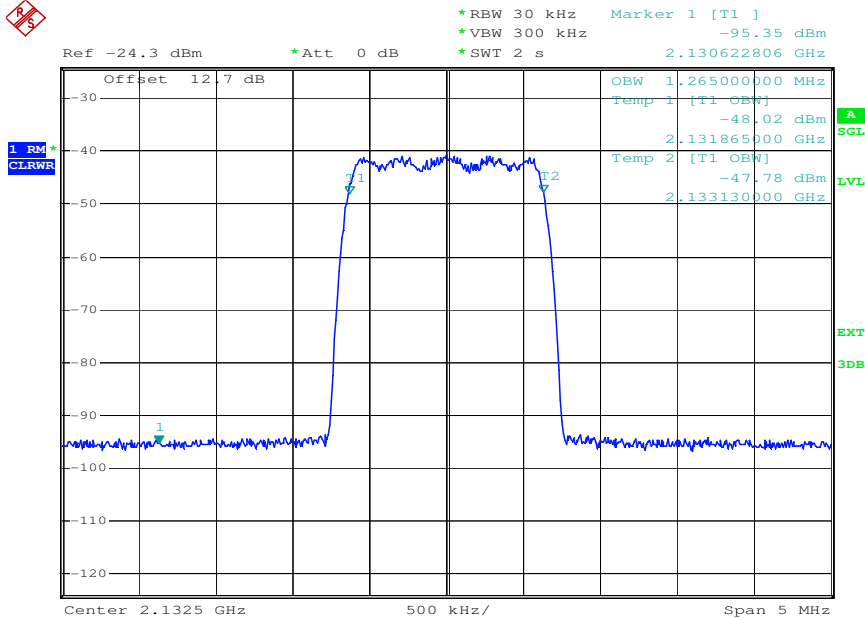
6.3.1 Downlink

6.3.1.1 CDMA



Date: 12.MAR.2010 11:29:02

plot 6.3.1.1-#1 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Downlink; CDMA Output

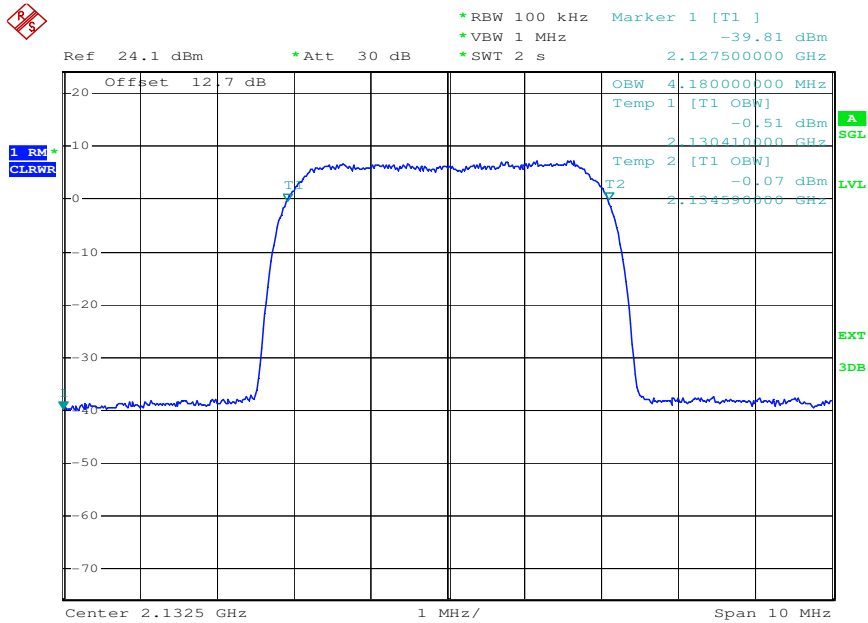


Date: 12.MAR.2010 11:51:50

plot 6.3.1.1-#2 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Downlink; CDMA Input

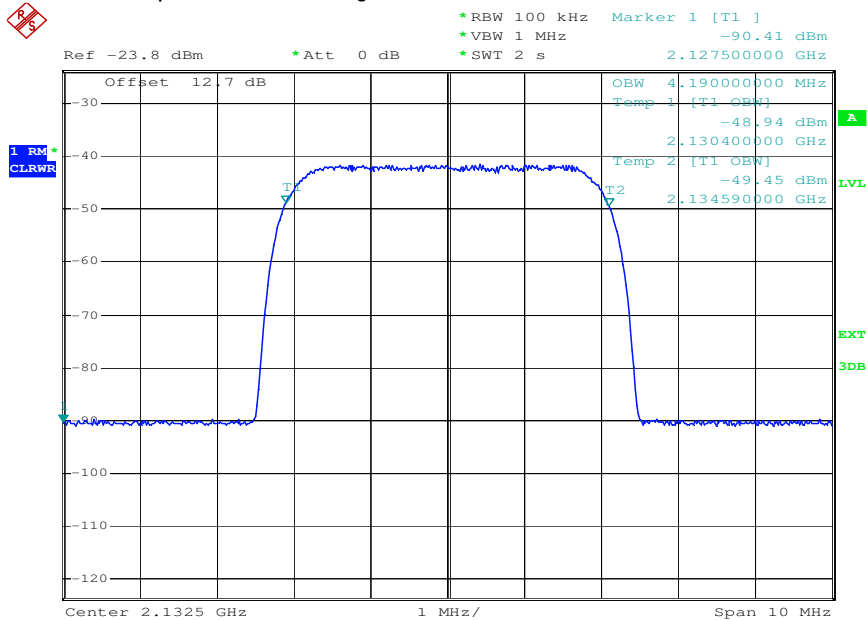


6.3.1.2 W-CDMA



Date: 12.MAR.2010 13:19:12

plot 6.3.1.2-#1 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Downlink; W-CDMA Output



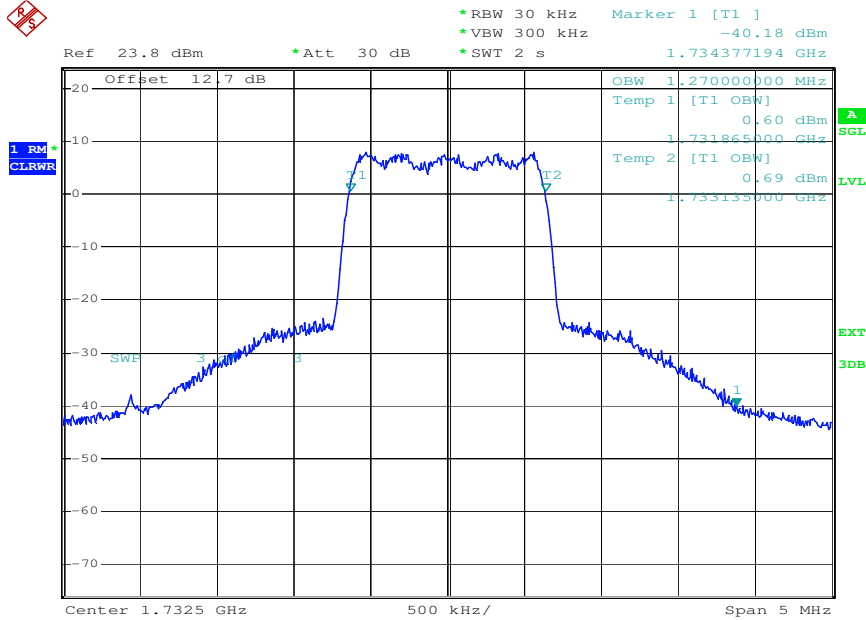
Date: 12.MAR.2010 13:15:52

plot 6.3.1.2-#2 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Downlink; W-CDMA Input



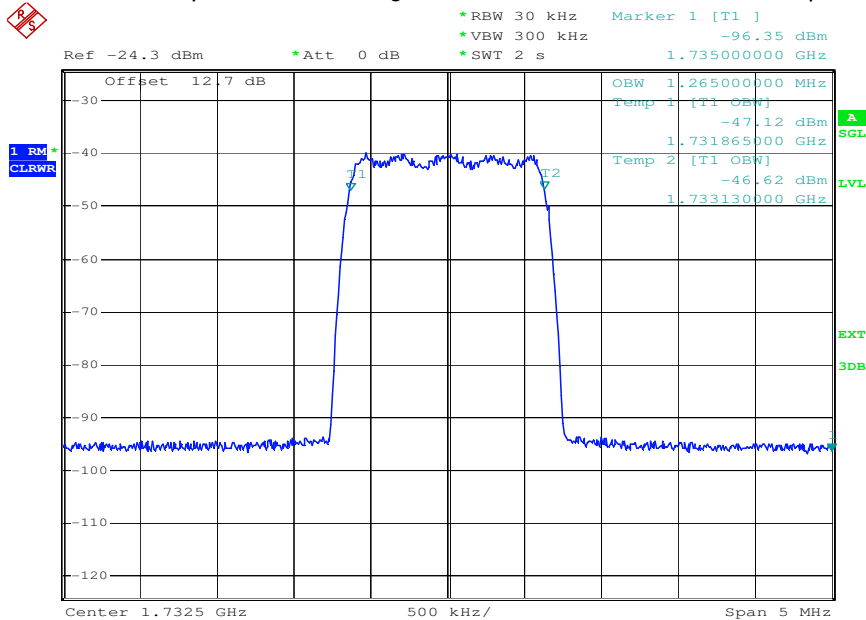
6.3.2 Uplink

6.3.2.1 CDMA



Date: 12.MAR.2010 11:30:29

plot 6.3.2.1-#1 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Uplink; CDMA Output

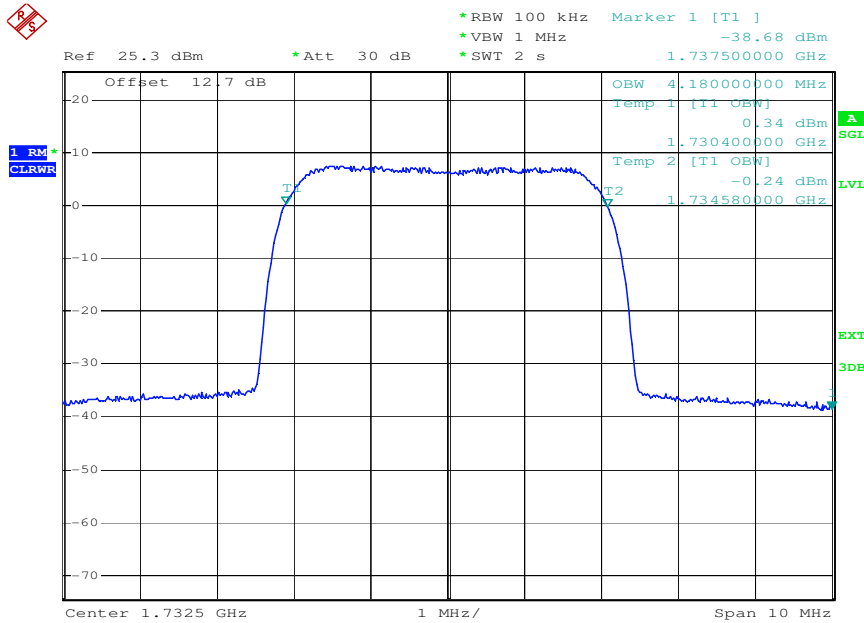


Date: 12.MAR.2010 11:53:04

plot 6.3.2.1-#2 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Uplink; CDMA Input

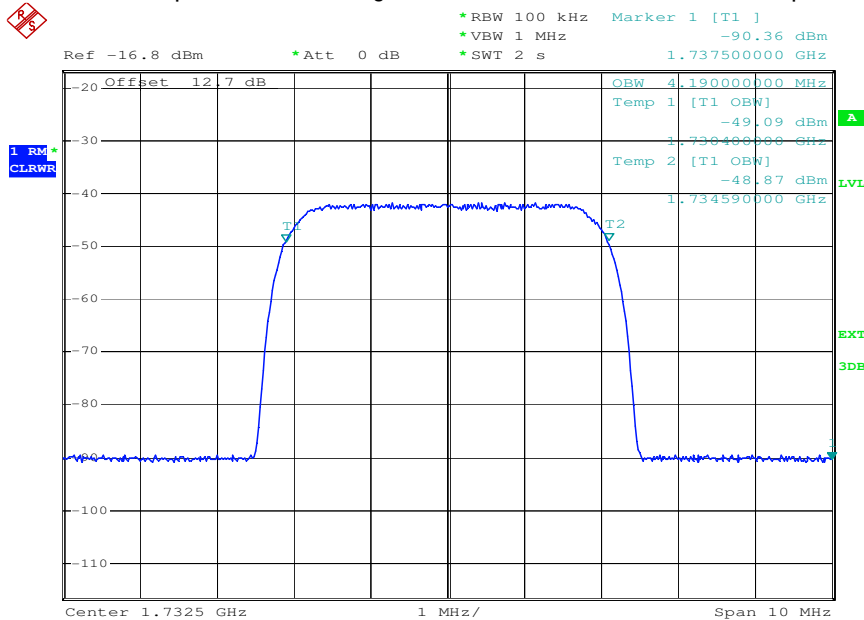


6.3.2.2 W-CDMA



Date: 12.MAR.2010 13:19:50

plot 6.3.2.2-#1 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Uplink; W-CDMA Output



Date: 12.MAR.2010 13:23:11

plot 6.3.2.2-#2 Occupied Bandwidth: §2.1049; RSS-GEN; Test results; Uplink; W-CDMA Input

EMC Test Report No.: 10-033

FCC ID: XS5-MR171717

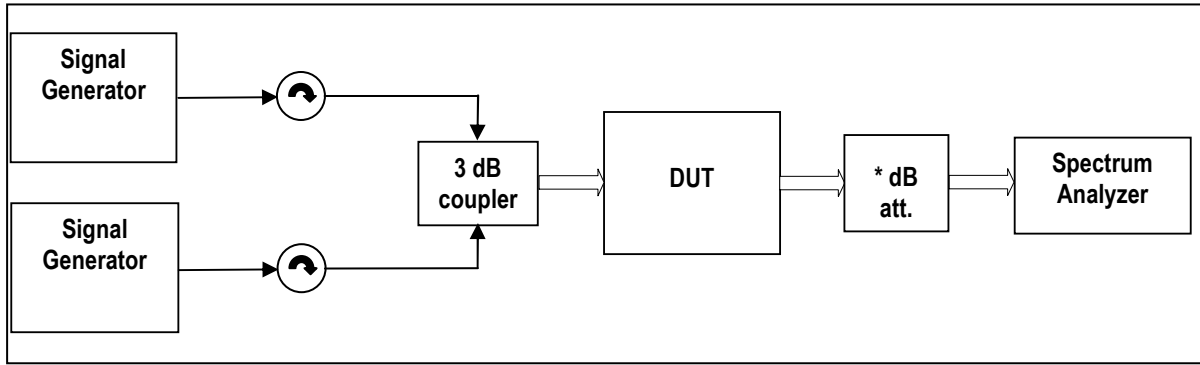
IC ID: 2237E- MR171717



6.4 Summary test result

Test result	complies, according the plots above
Tested by:	Roland Macho
Date:	18.01.2010

7 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN



Multisignal-Generator used, External Attenuator DL x dB = 10 dB
 figure 6.4-#1 Test setup: Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN

Measurement uncertainty	± 0,54 dB ± 1,2 dB ± 1,5 dB	9 kHz to 3 GHz 3 GHz to 7 GHz 7 GHz to 26 GHz
Test equipment used	8984,8686,8687,8961,7370	

7.1 Limit

7.1.1 FCC CFR47

Minimum standard:

Para. No.27.53(h)

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee’s frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee’s frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee’s frequency block edges, both upper and lower, as the design permits.

(3) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

7.2 Test method

7.2.1 FCC CFR47

Para. No 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

[39 FR 5919, Feb. 15, 1974. Redesignated and amended at 63 FR 36599, July 7, 1998]

7.2.2 IC RSS-GEN

4.9 Transmitter Unwanted Emissions

The measurement method shall be described in the test report. The same parameter, peak power or average power, used for the transmitter output power measurement shall be used for unwanted emission measurements.

The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate or carrier frequency), or from 30 MHz, whichever is the lower, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

Unless otherwise specified, compliance with the emission limits shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth for emissions below 1000 MHz and, an average detector with a minimum resolution bandwidth of 1 MHz for emissions above 1 GHz.

7.3 Test results

<1MHz from Band Edge

Detector: RMS.

Modulation	Link	Measured at Band Edge	Carriers	RBW VBW Span	Max. level (dBm)	Plot -
CDMA	Downlink	Lower Edge	2110,75 MHz	30kHz	-28,3	7.3.1.1 #1
		Upper Edge	2112,0 MHz 2153,0 MHz 2154,25 MHz	300kHz 6MHz	-25,1	#2
WCDMA	Downlink	Lower Edge	2112,4 MHz	30kHz	-31,9	7.3.1.2 #1
		Upper Edge	2117,4 MHz 2147,6 MHz 2152,6 MHz	300kHz 15MHz	-34,2	#2
CDMA	Uplink	Lower Edge	1710,75 MHz	30kHz	-22,5	7.3.1.1 #1
		Upper Edge	1712,0 MHz 1753,0 MHz 1754,25 MHz	300kHz 6MHz	-28,7	#2
WCDMA	Uplink	Lower Edge	1712,4 MHz	30kHz	-33,7	7.3.1.2 #1
		Upper Edge	1717,4 MHz 1747,6 MHz 1752,6 MHz	300kHz 15MHz	-33,3	#2

table 7.3-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN Test results <1MHz from Band Edge

>1MHz from Band Edge

Detector: RMS.

Modulation	Measured at		Max. level (dBm)	Frequency range	Plot -
CDMA DL	Bottom	2111,25 MHz	-53,2	30MHz – 1GHz	7.3.1.3 #1
	Bottom	2112,5 MHz	-43,7	1GHz – 22GHz	#2
	Middle	2131,875 MHz	-53,0	30MHz – 1GHz	#3
	Middle	2133,125 MHz	-43,7	1GHz – 22GHz	#4
	Top	2153,125 MHz	-53,0	30MHz – 1GHz	#5
	Top	2154,375 MHz	-43,7	1GHz – 22GHz	#6
WCDMA DL	Bottom	2112,4 MHz	-65,3	30MHz – 1GHz	7.3.1.4 #1
	Bottom	2117,4 MHz	-55,6	1GHz – 22GHz	#2
	Middle	2127,4 MHz	-65,4	30MHz – 1GHz	#3
	Middle	2132,4 MHz	-55,6	1GHz – 22GHz	#4
	Top	2147,6 MHz	-64,9	30MHz – 1GHz	#5
	Top	2152,6 MHz	-55,8	1GHz – 22GHz	#6
CDMA UL	Bottom	1711,25 MHz	-36,7	30MHz – 1GHz	7.3.1.3 #1
	Bottom	1712,5 MHz	-42,5	1GHz – 22GHz	#2
	Middle	1731,875 MHz	-53,0	30MHz – 1GHz	#3
	Middle	1733,125 MHz	-44,3	1GHz – 22GHz	#4
	Top	1753,125 MHz	-53,3	30MHz – 1GHz	#5
	Top	1754,375 MHz	-43,0	1GHz – 22GHz	#6
WCDMA UL	Bottom	1712,4 MHz	-65,7	30MHz – 1GHz	7.3.1.4 #1
	Bottom	1717,4 MHz	-56,4	1GHz – 22GHz	#2
	Middle	1727,4 MHz	-65,8	30MHz – 1GHz	#3
	Middle	1732,4 MHz	-55,7	1GHz – 22GHz	#4
	Top	1747,6 MHz	-65,7	30MHz – 1GHz	#5
	Top	1752,6 MHz	-56,1	1GHz – 22GHz	#6

table 7.3-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN Test results

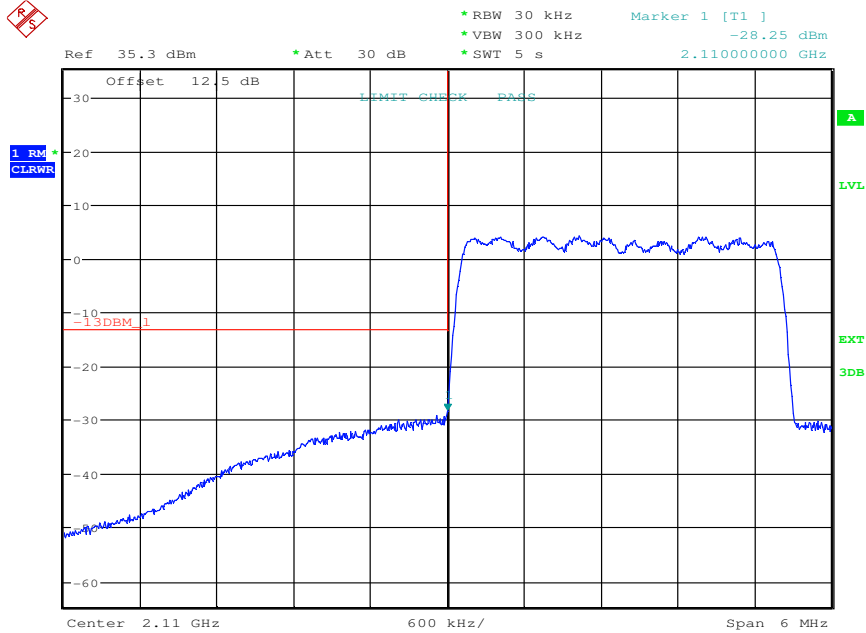
Start	Stop	RBW	VBW
30MHz	1GHz	100kHz	300kHz
1GHz	22GHz	1MHz	3MHz

table 7.3-#3 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN Test results RBW, VBW Table



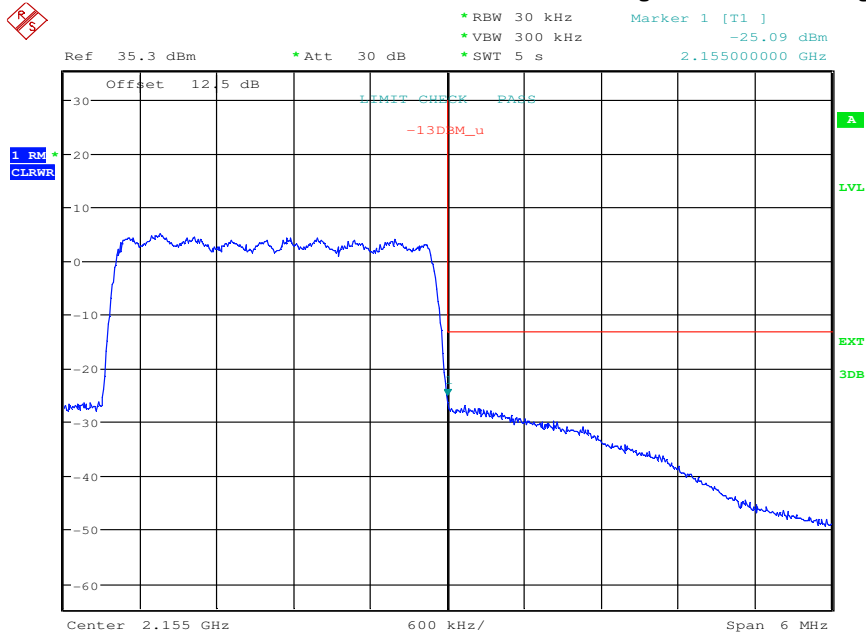
7.3.1 Downlink

7.3.1.1 CDMA < 1MHz to band edge



Date: 19.JAN.2010 18:35:41

plot 7.3.1.1-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA < 1MHz to band edge Lower Band Edge

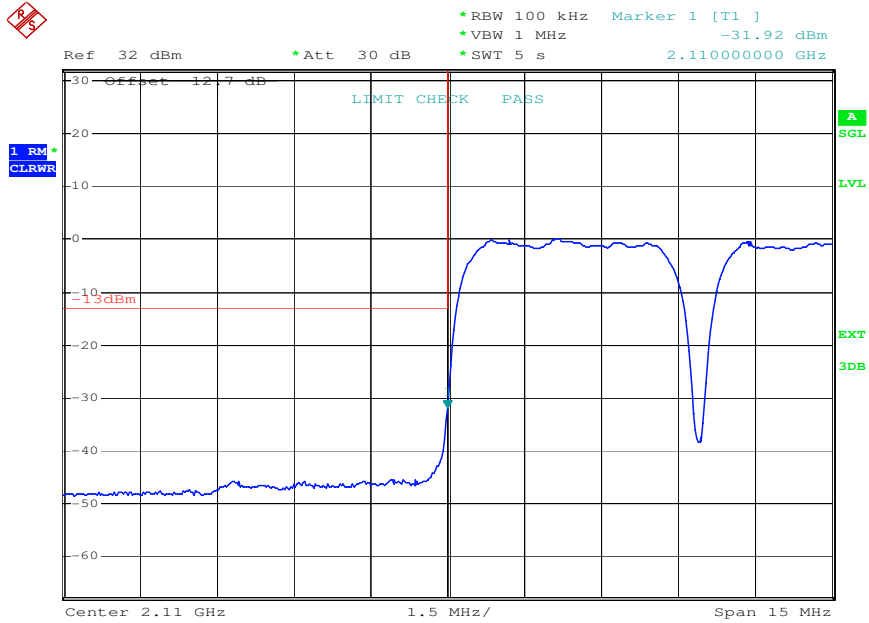


Date: 19.JAN.2010 18:31:41

plot 7.3.1.1-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA < 1MHz to band edge Upper Band Edge

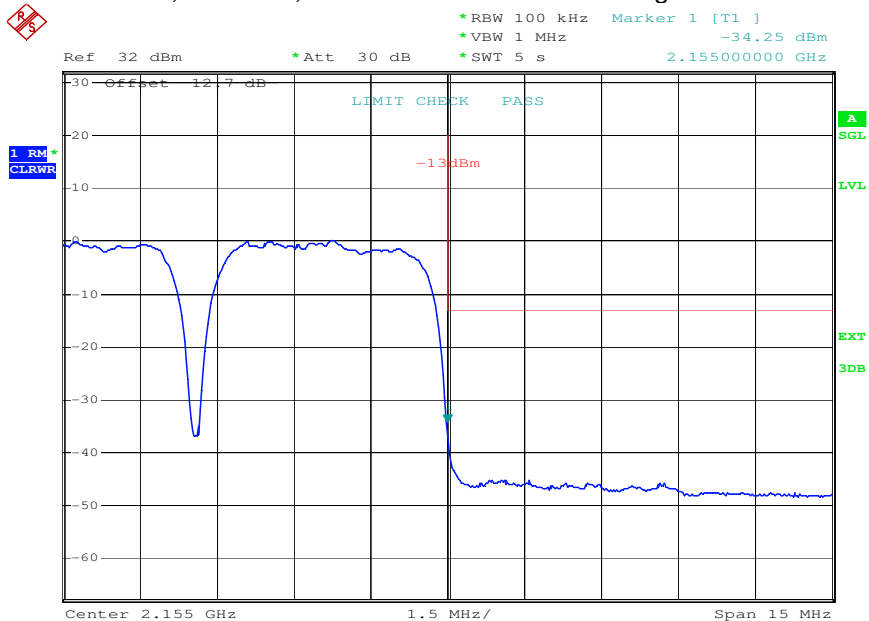


7.3.1.2 W-CDMA < 1MHz to band edge



Date: 11.MAR.2010 17:42:40

plot 7.3.1.2-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA < 1MHz to band edge Lower Band Edge

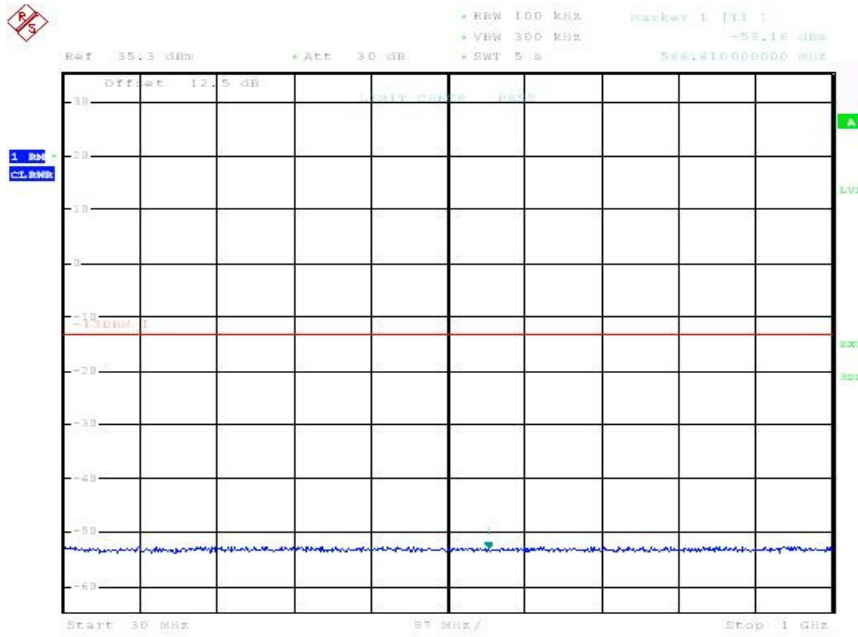


Date: 11.MAR.2010 17:43:08

plot 7.3.1.2-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA < 1MHz to band edge Upper Band Edge

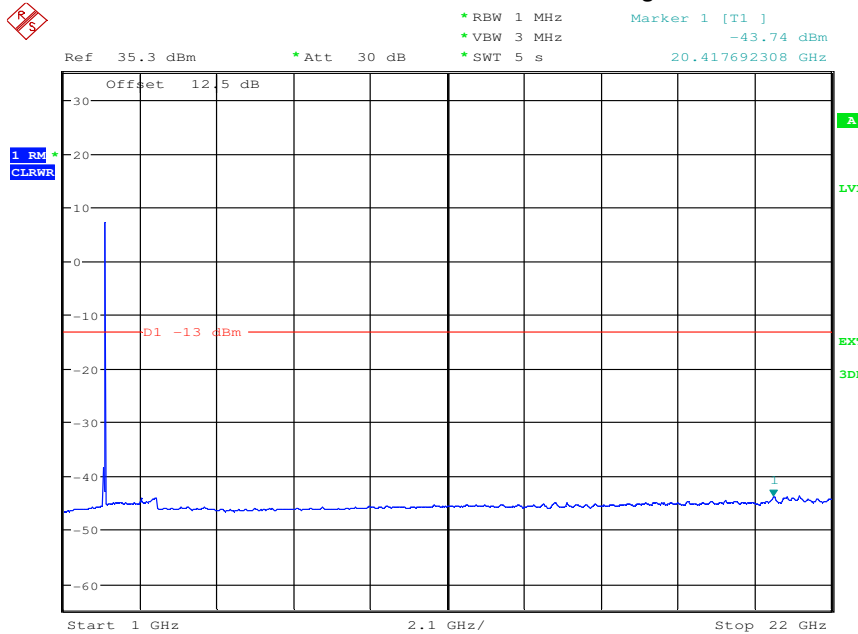


7.3.1.3 CDMA > 1MHz to band edge



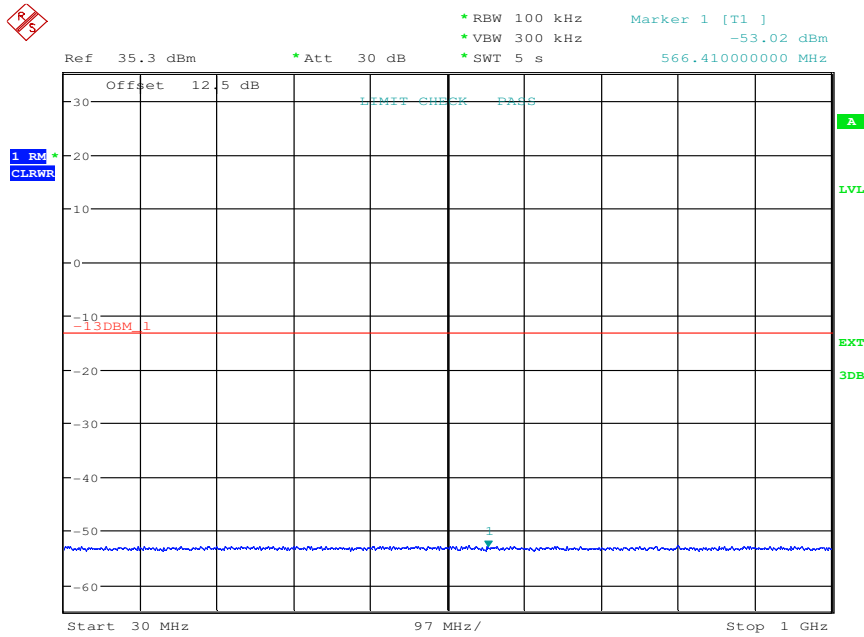
Date: 19.JAN.2010 18:25:42

plot 7.3.1.3-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA > 1MHz to band edge; Bottom; < 1 GHz



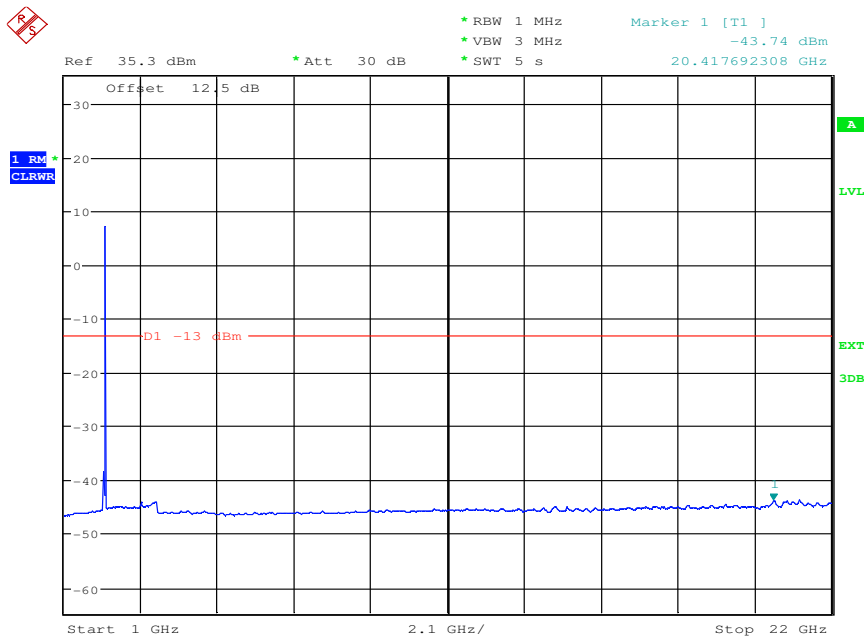
Date: 20.JAN.2010 10:00:26

plot 7.3.1.3-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA > 1MHz to band edge; Bottom; > 1 GHz



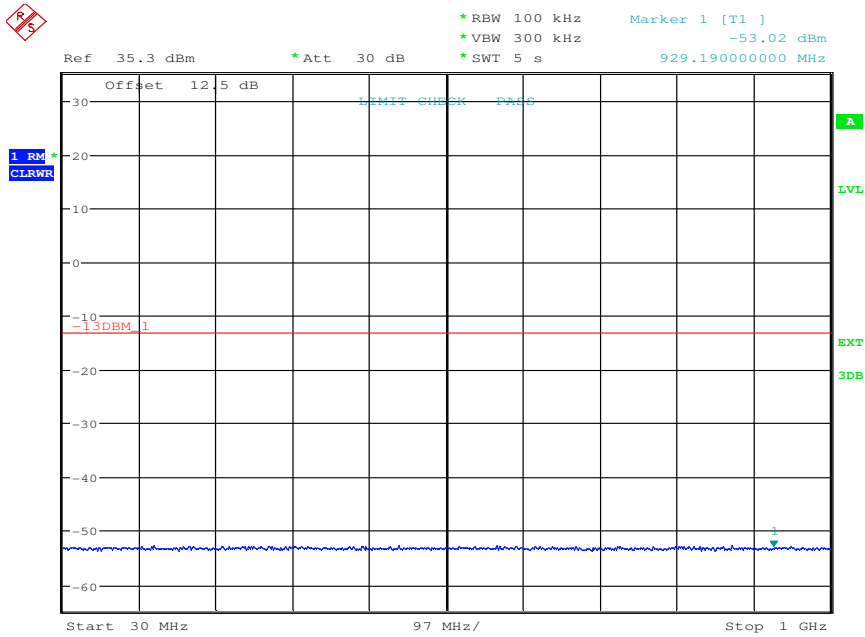
Date: 19.JAN.2010 18:27:08

plot 7.3.1.3-#3 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA > 1MHz to band edge; Middle; < 1GHz



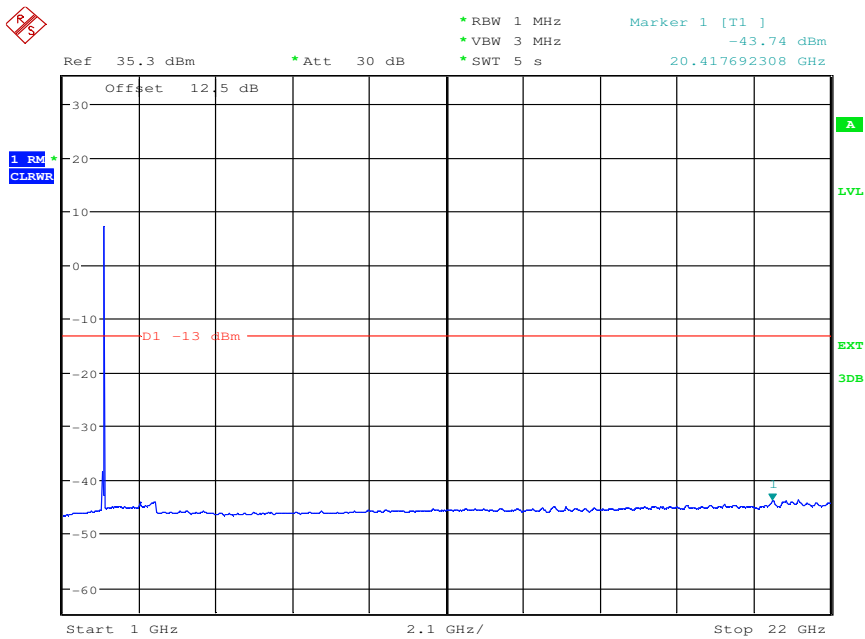
Date: 20.JAN.2010 10:00:26

plot 7.3.1.3-#4 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA > 1MHz to band edge; Middle; > 1 GHz



Date: 19.JAN.2010 18:27:42

plot 7.3.1.3-#5 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA > 1MHz to band edge; Top; < 1 GHz

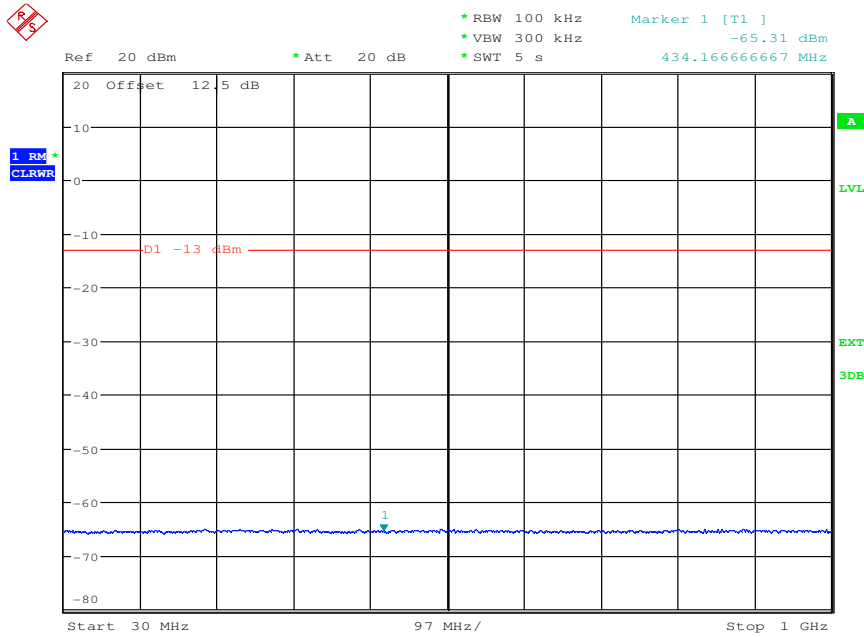


Date: 20.JAN.2010 10:00:26

plot 7.3.1.3-#6 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; CDMA > 1MHz to band edge; Top; > 1 GHz

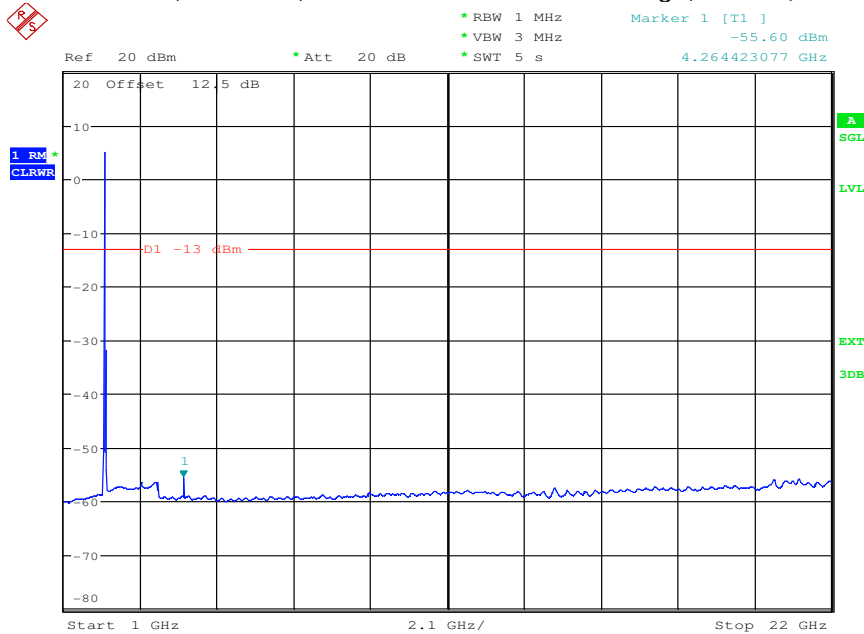


7.3.1.4 W-CDMA > 1MHz to band edge



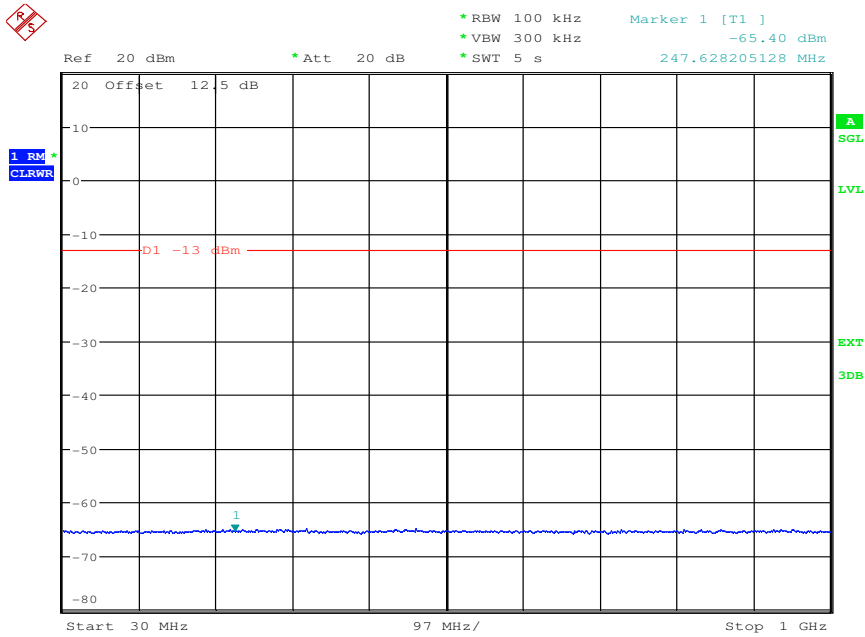
Date: 20.JAN.2010 17:49:00

plot 7.3.1.4-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA > 1MHz to band edge; Bottom; < 1 GHz



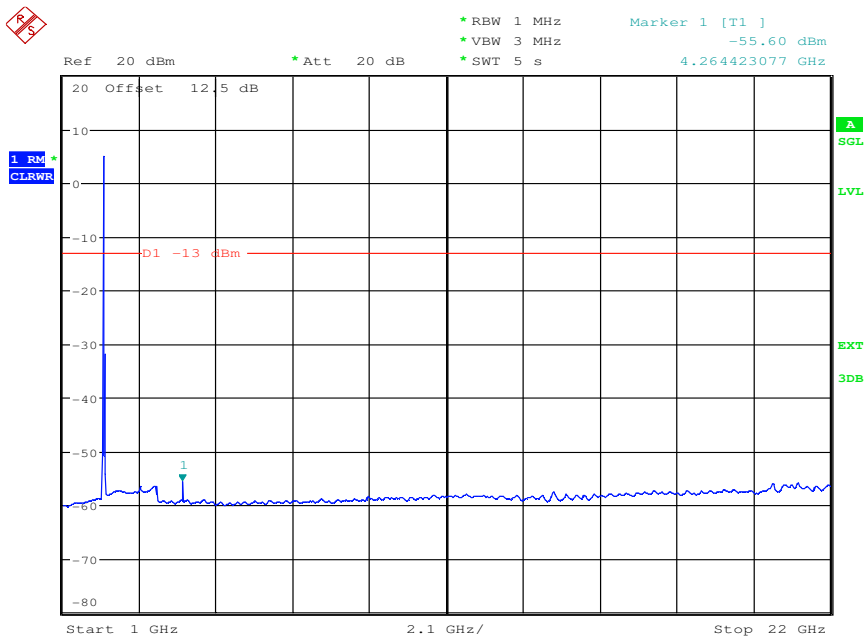
Date: 20.JAN.2010 18:05:51

plot 7.3.1.4-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA > 1MHz to band edge; Bottom; > 1 GHz



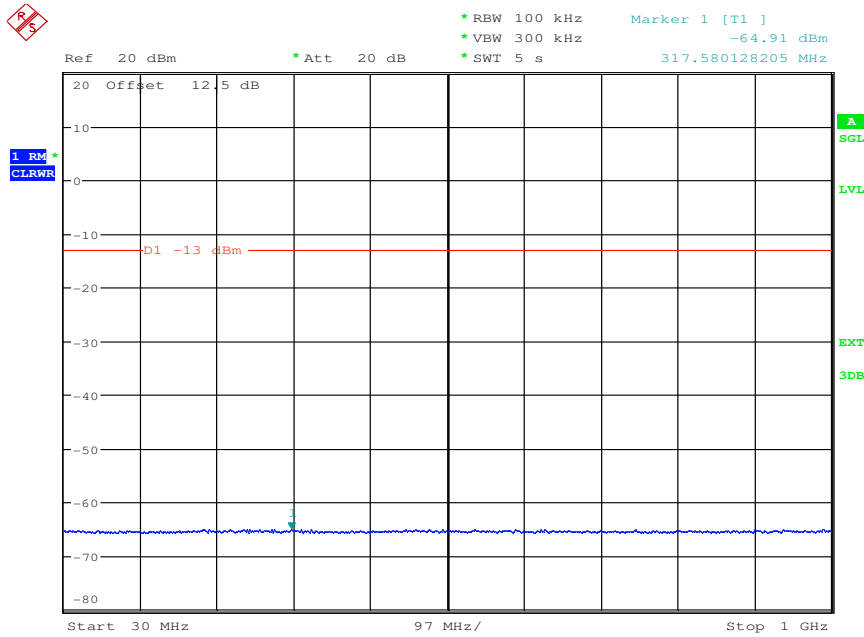
Date: 20.JAN.2010 17:50:44

plot 7.3.1.4-#3 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA > 1MHz to band edge; Middle; < 1 GHz



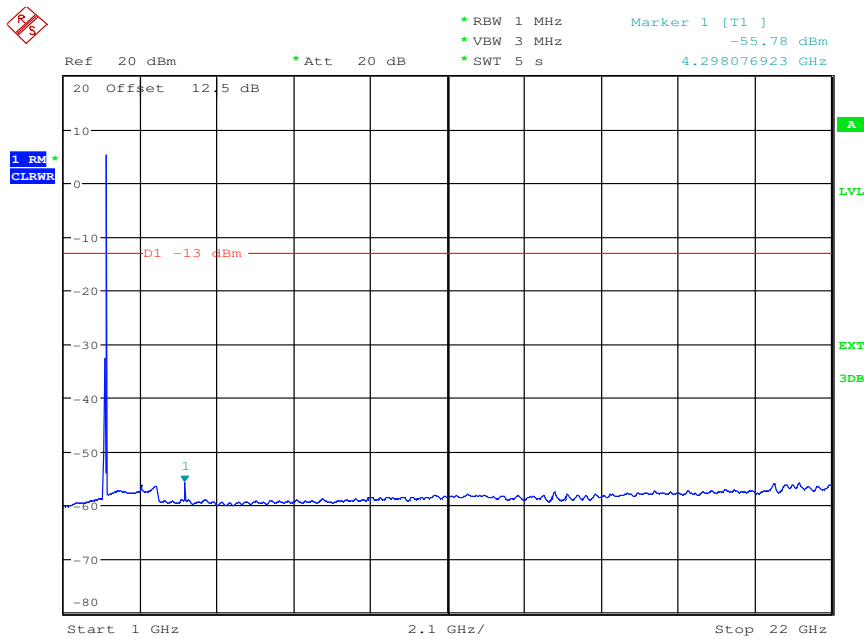
Date: 20.JAN.2010 18:03:35

plot 7.3.1.4-#4 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA > 1MHz to band edge; Middle; > 1 GHz



Date: 20.JAN.2010 17:54:06

plot 7.3.1.4-#5 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA > 1MHz to band edge; Top; < 1 GHz



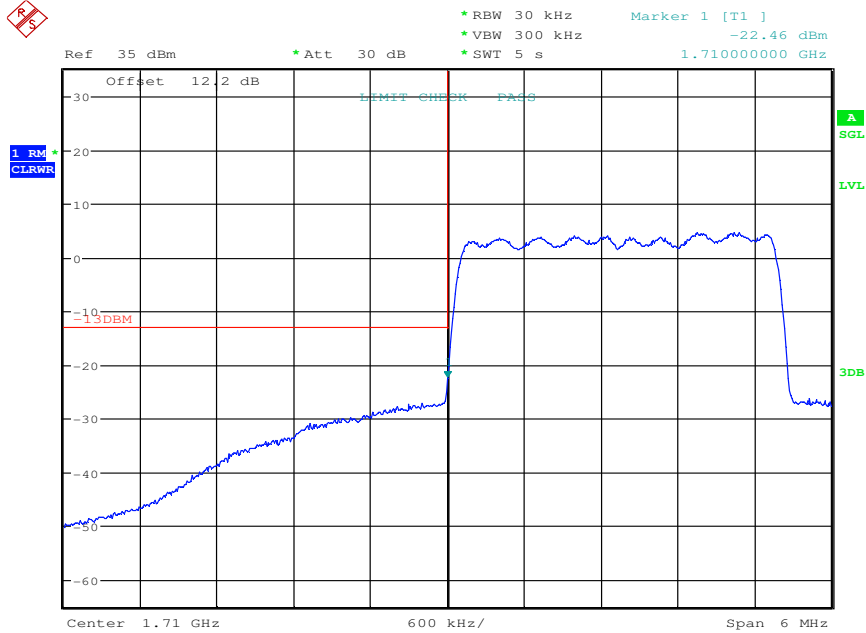
Date: 20.JAN.2010 17:58:19

plot 7.3.1.4-#6 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Downlink; W-CDMA > 1MHz to band edge; Top; > 1 GHz



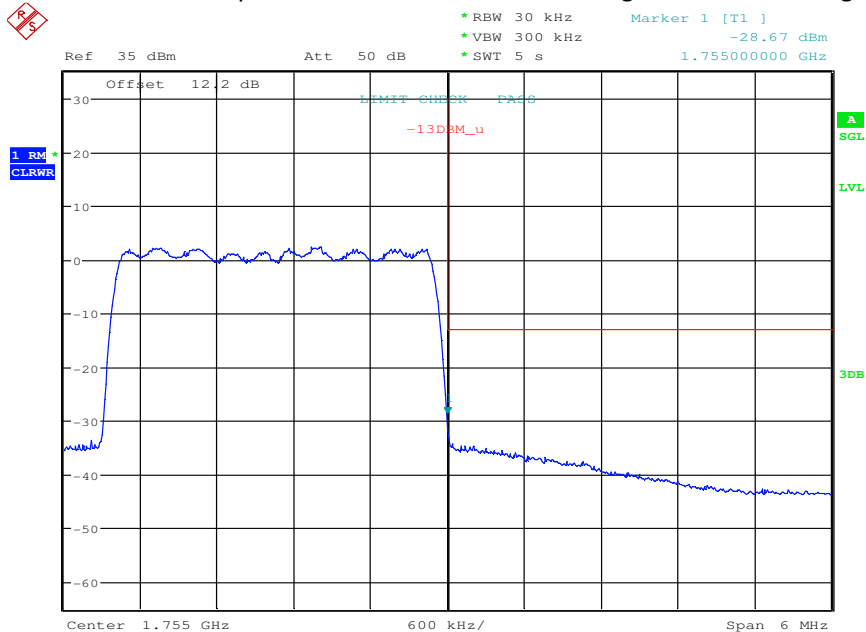
7.3.2 Uplink

7.3.2.1 CDMA < 1MHz to band edge



Date: 19.JAN.2010 13:24:35

plot 7.3.2.1-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA < 1MHz to band edge Lower Band Edge

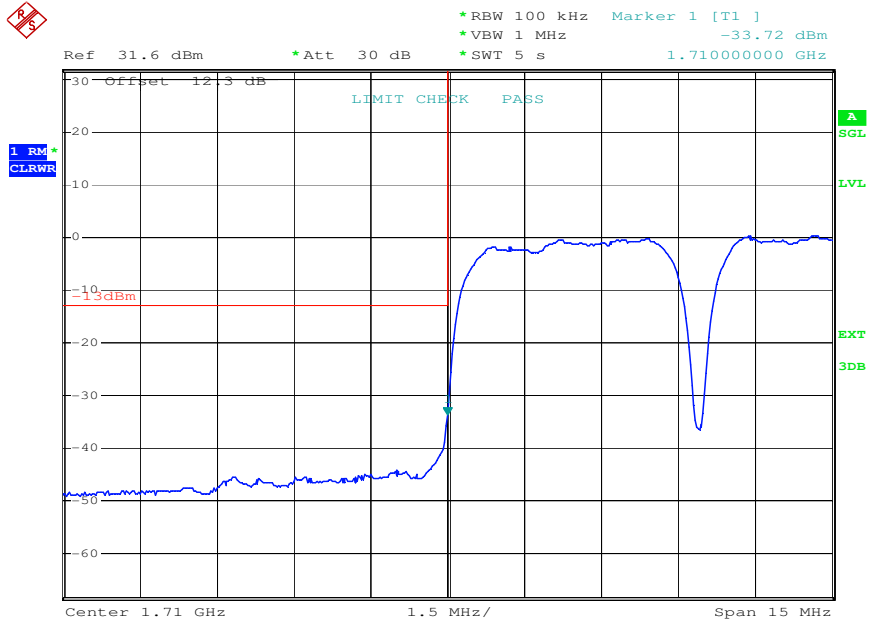


Date: 19.JAN.2010 11:34:27

plot 7.3.2.1-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA < 1MHz to band edge Upper Band Edge

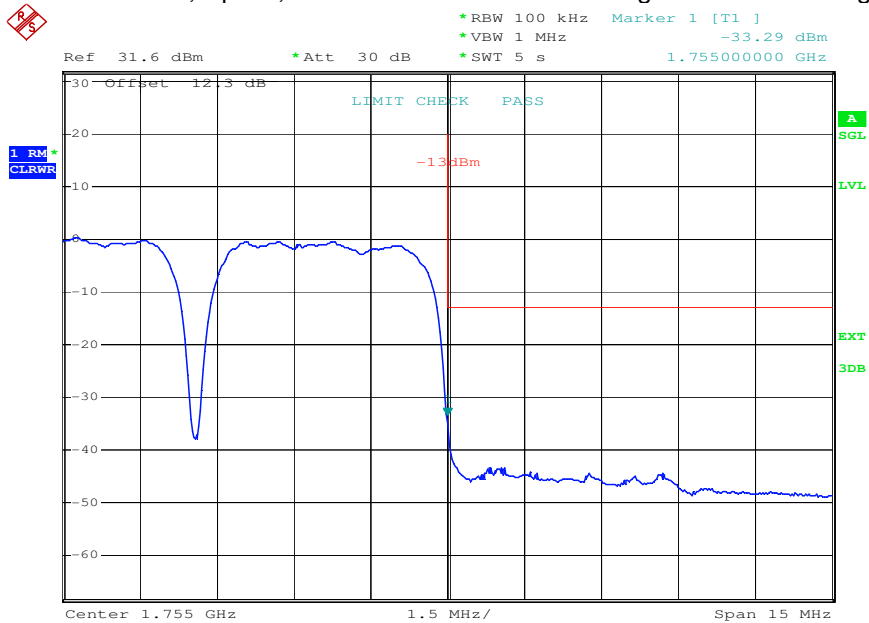


7.3.2.2 W-CDMA < 1MHz to band edge



Date: 11.MAR.2010 17:43:36

plot 7.3.2.2-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA < 1MHz to band edge Lower Band Edge

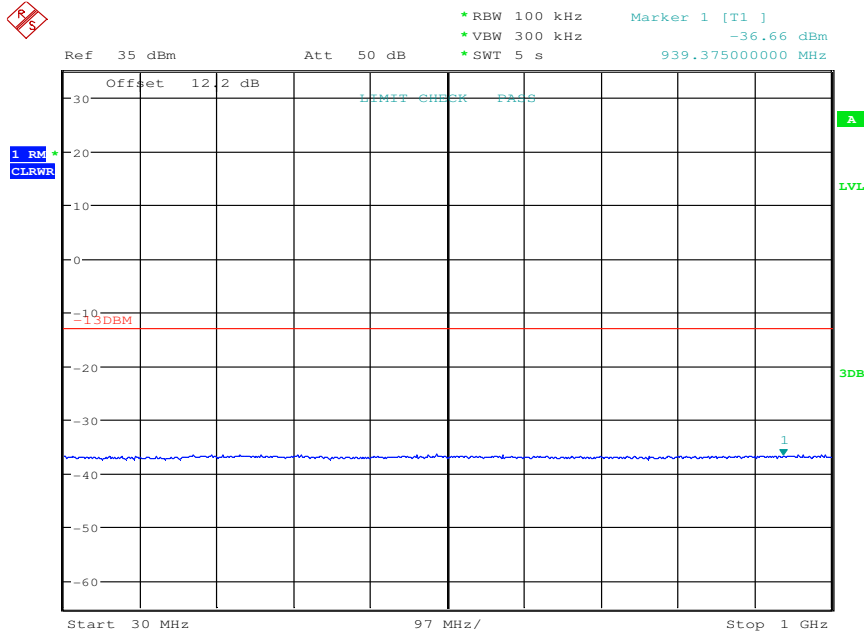


Date: 11.MAR.2010 17:44:04

plot 7.3.2.2-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA < 1MHz to band edge Upper Band Edge

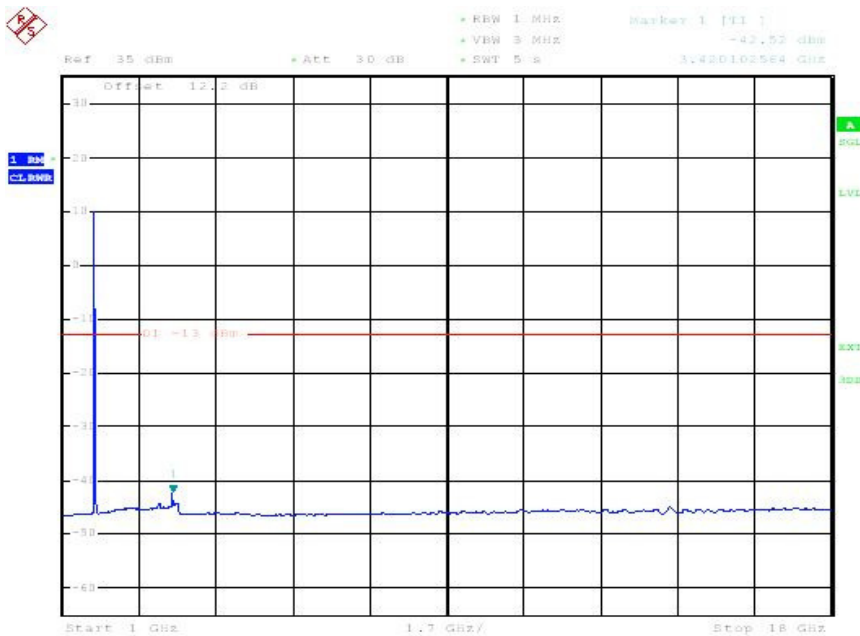


7.3.2.3 CDMA > 1MHz to band edge



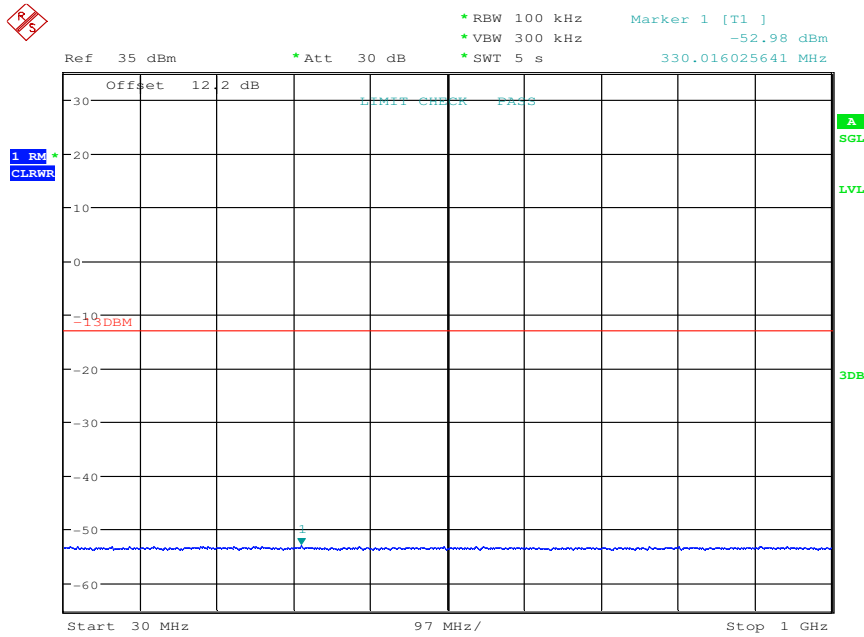
Date: 19.JAN.2010 11:52:38

plot 7.3.2.3-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA > 1MHz to band edge; Bottom; < 1 GHz



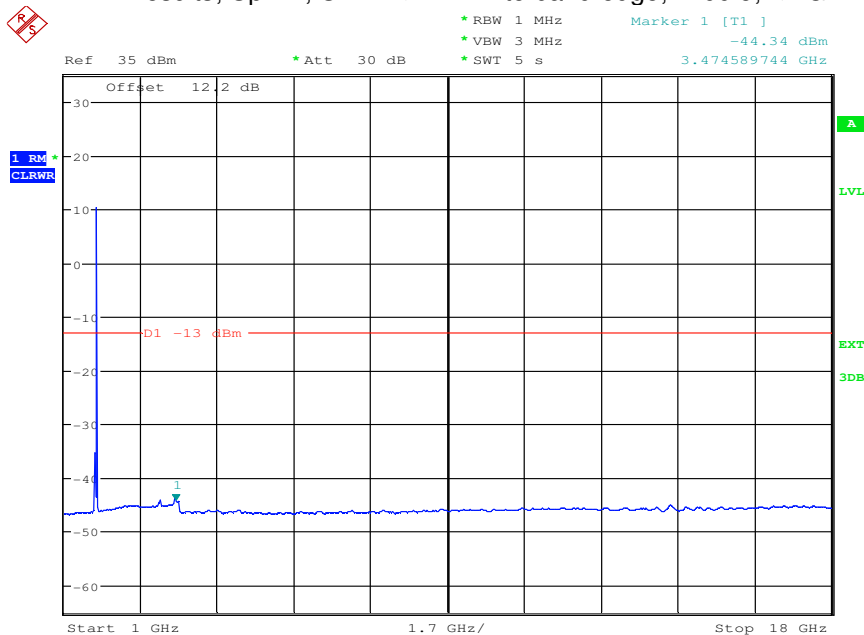
Date: 19.JAN.2010 16:53:03

plot 7.3.2.3-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA > 1MHz to band edge; Bottom; > 1 GHz



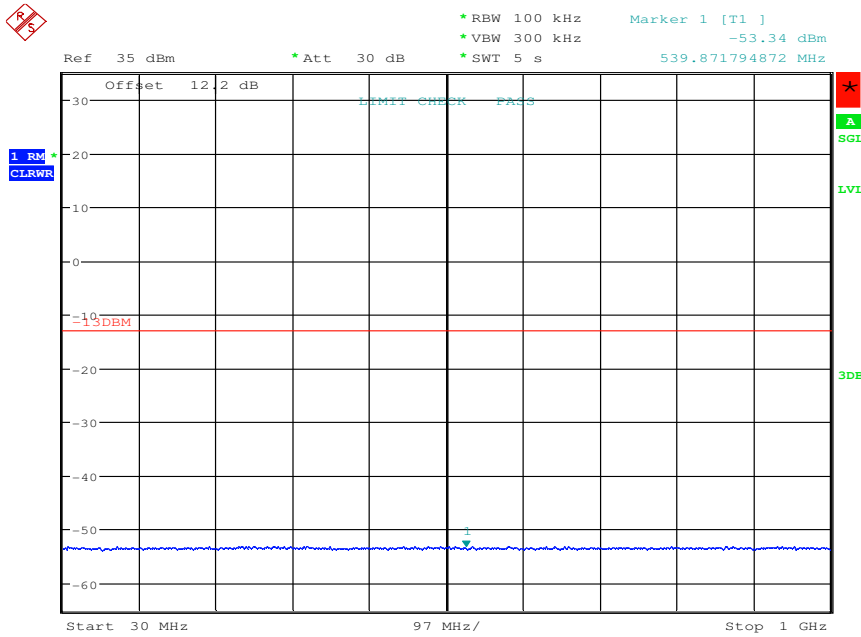
Date: 19.JAN.2010 15:59:09

plot 7.3.2.3-#3 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA > 1MHz to band edge; Middle; < 1GHz



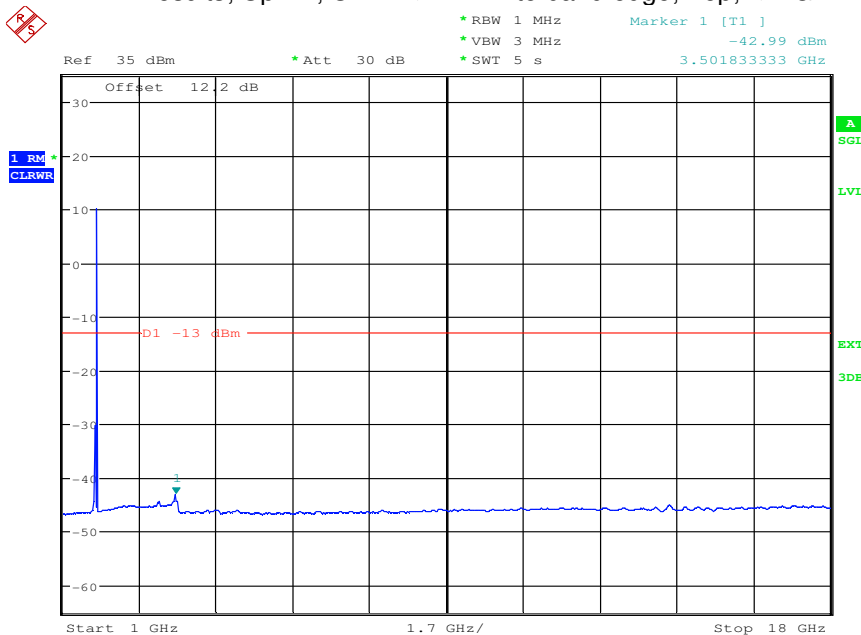
Date: 19.JAN.2010 16:47:59

plot 7.3.2.3-#4 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA > 1MHz to band edge; Middle; > 1 GHz



Date: 19.JAN.2010 15:57:27

plot 7.3.2.3-#5 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA > 1MHz to band edge; Top; < 1 GHz

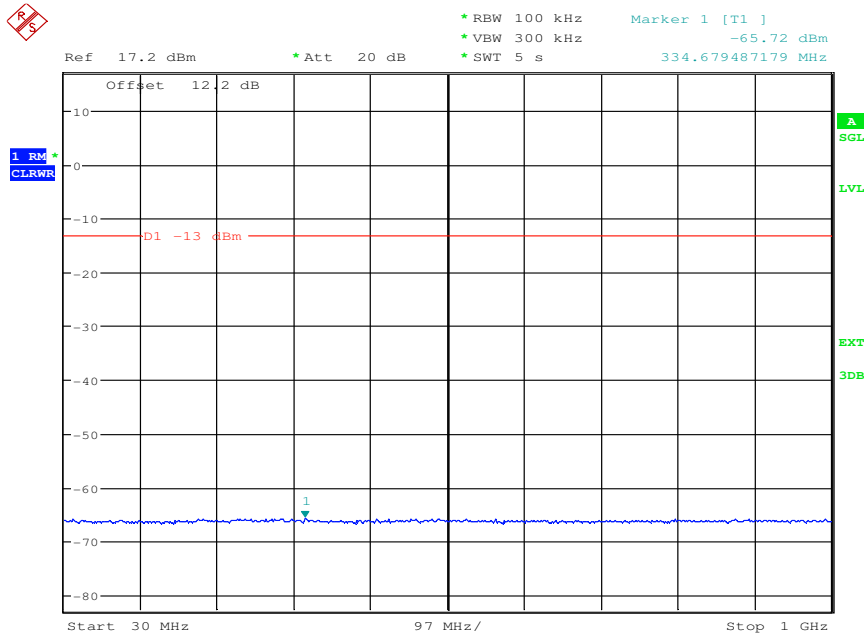


Date: 19.JAN.2010 17:02:17

plot 7.3.2.3-#6 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; CDMA > 1MHz to band edge; Top; > 1 GHz

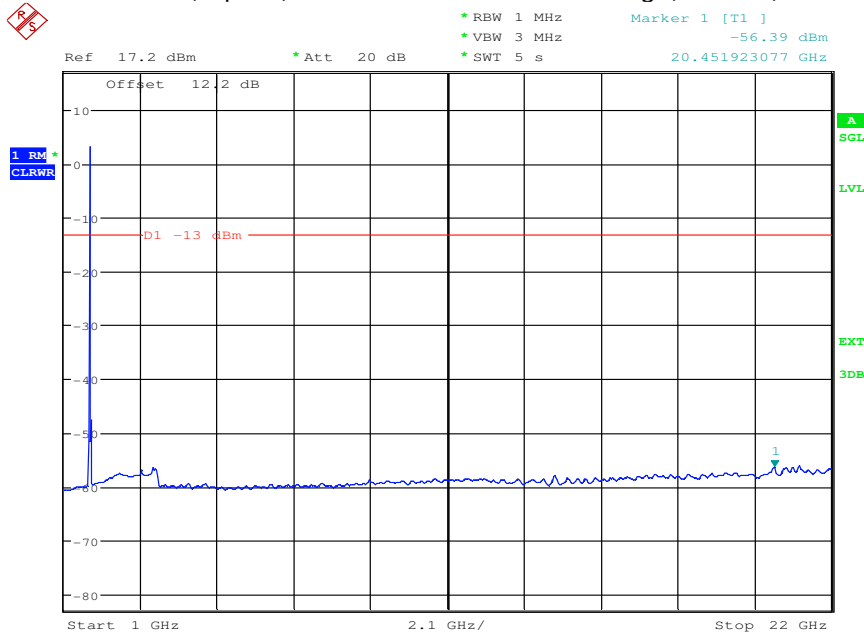


7.3.2.4 W-CDMA > 1MHz to band edge



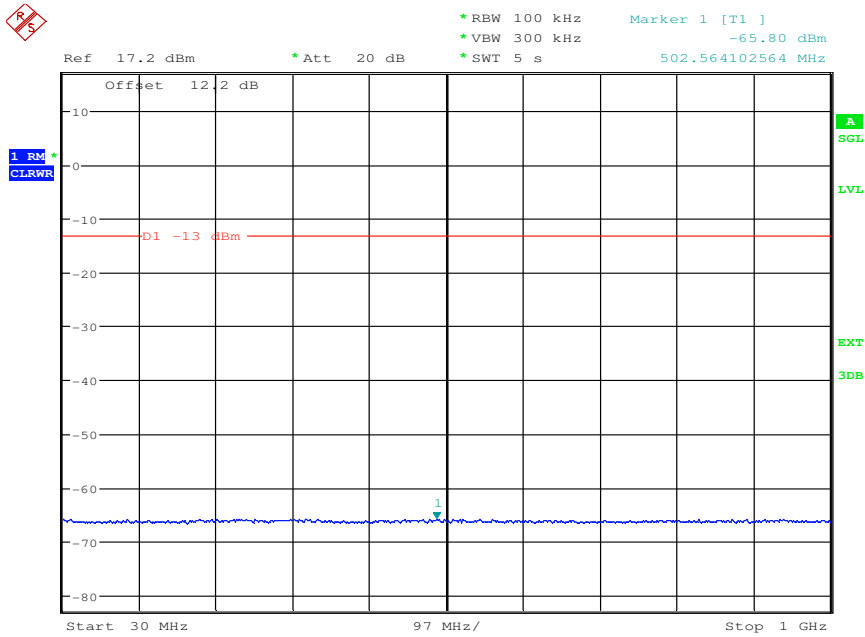
Date: 21.JAN.2010 10:28:39

plot 7.3.2.4-#1 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA > 1MHz to band edge; Bottom; < 1 GHz



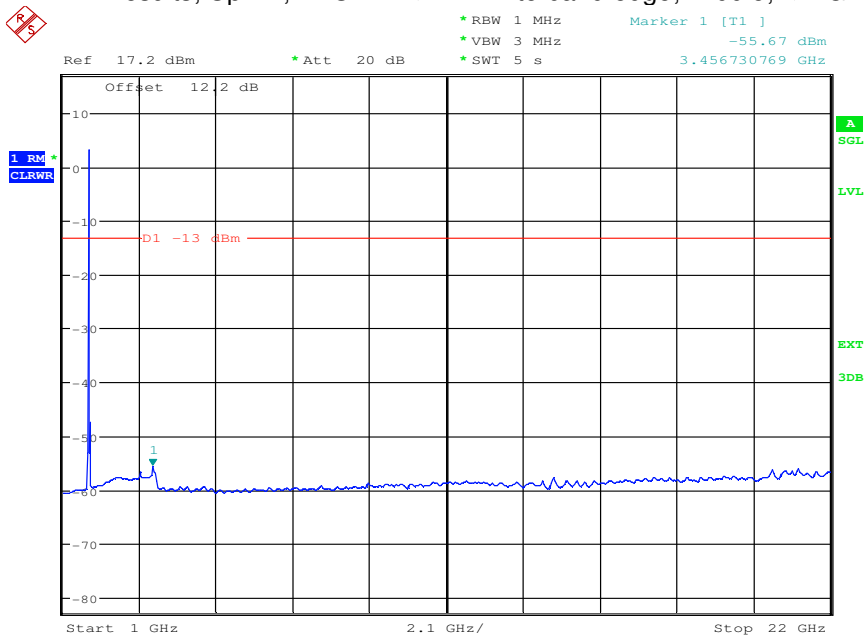
Date: 21.JAN.2010 10:07:14

plot 7.3.2.4-#2 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA > 1MHz to band edge; Bottom; > 1 GHz



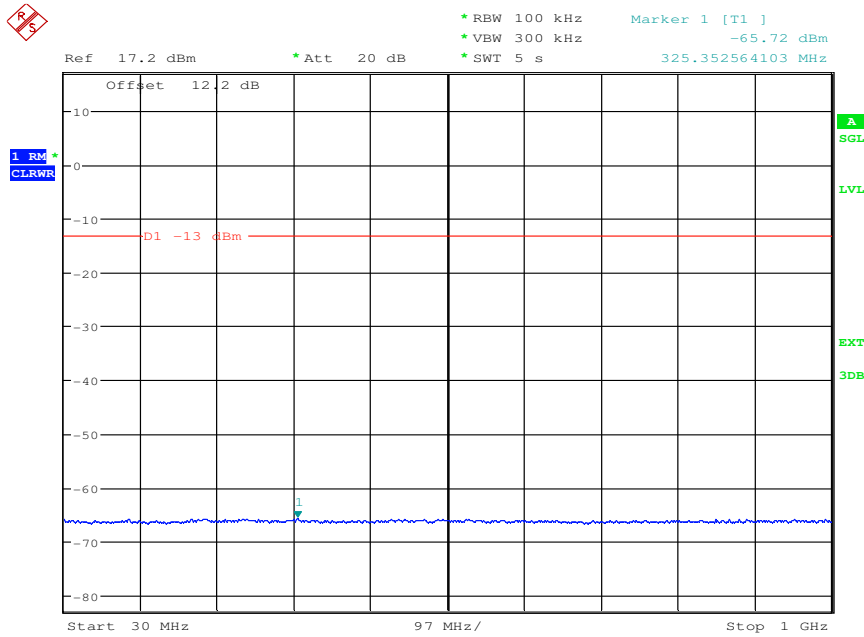
Date: 21.JAN.2010 10:25:55

plot 7.3.2.4-#3 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA > 1MHz to band edge; Middle; < 1 GHz



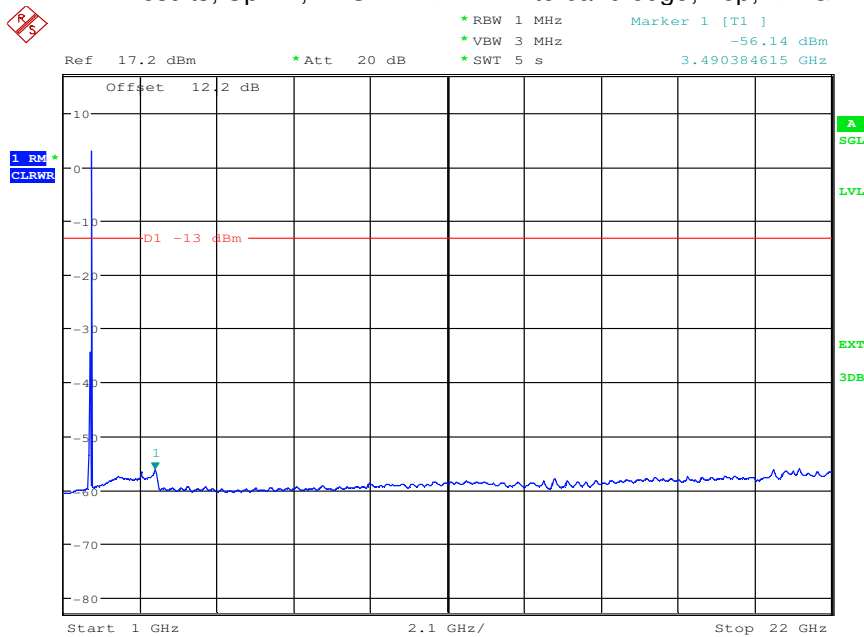
Date: 21.JAN.2010 10:11:00

plot 7.3.2.4-#4 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA > 1MHz to band edge; Middle; > 1 GHz



Date: 21.JAN.2010 10:24:05

plot 7.3.2.4-#5 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA > 1MHz to band edge; Top; < 1 GHz



Date: 21.JAN.2010 10:16:25

plot 7.3.2.4-#6 Spurious Emissions at Antenna Terminals: §27.53, §2.1051; RSS-131, RSS-GEN; Test results; Uplink; W-CDMA > 1MHz to band edge; Top; > 1 GHz

EMC Test Report No.: 10-033

FCC ID: XS5-MR171717

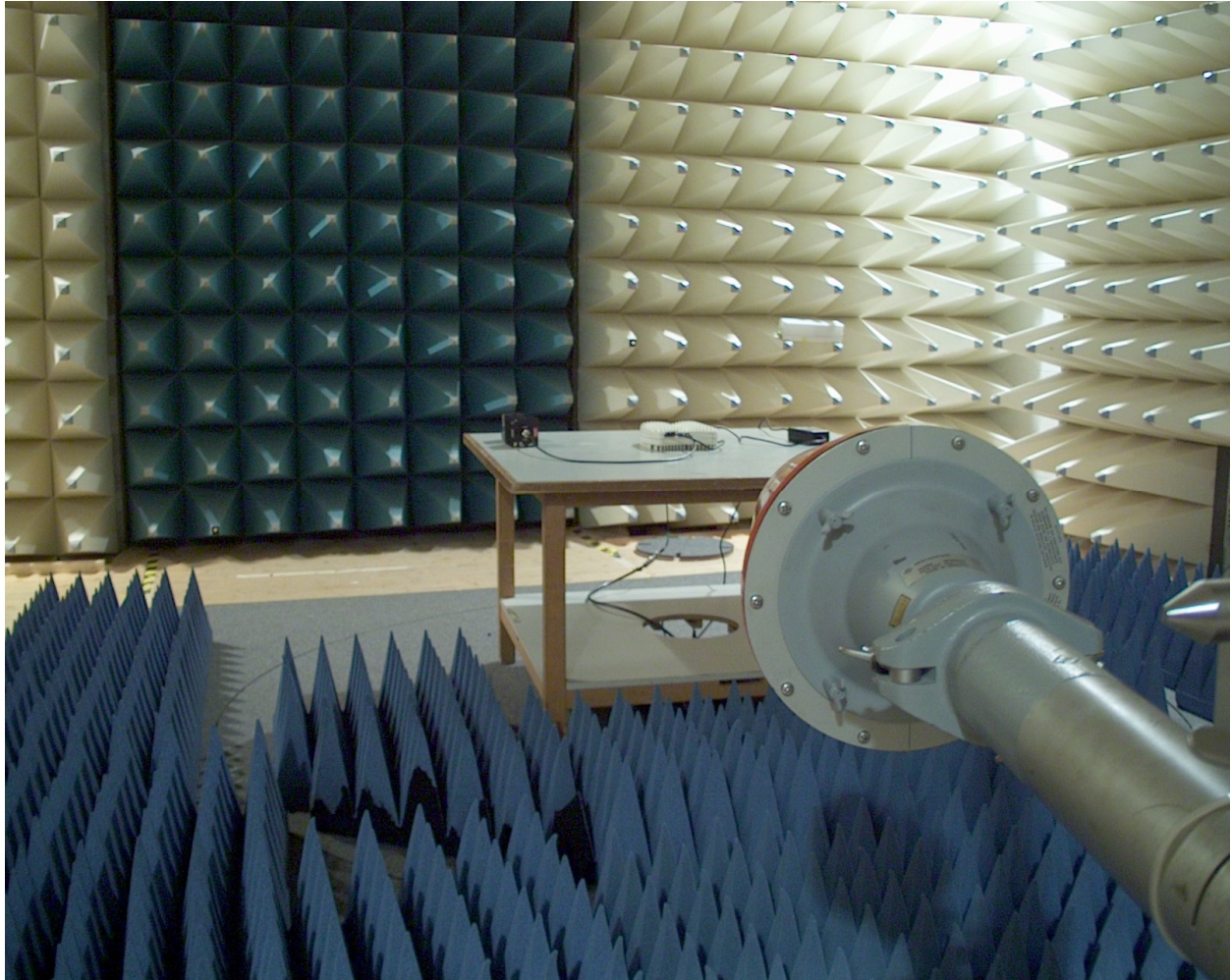
IC ID: 2237E- MR171717



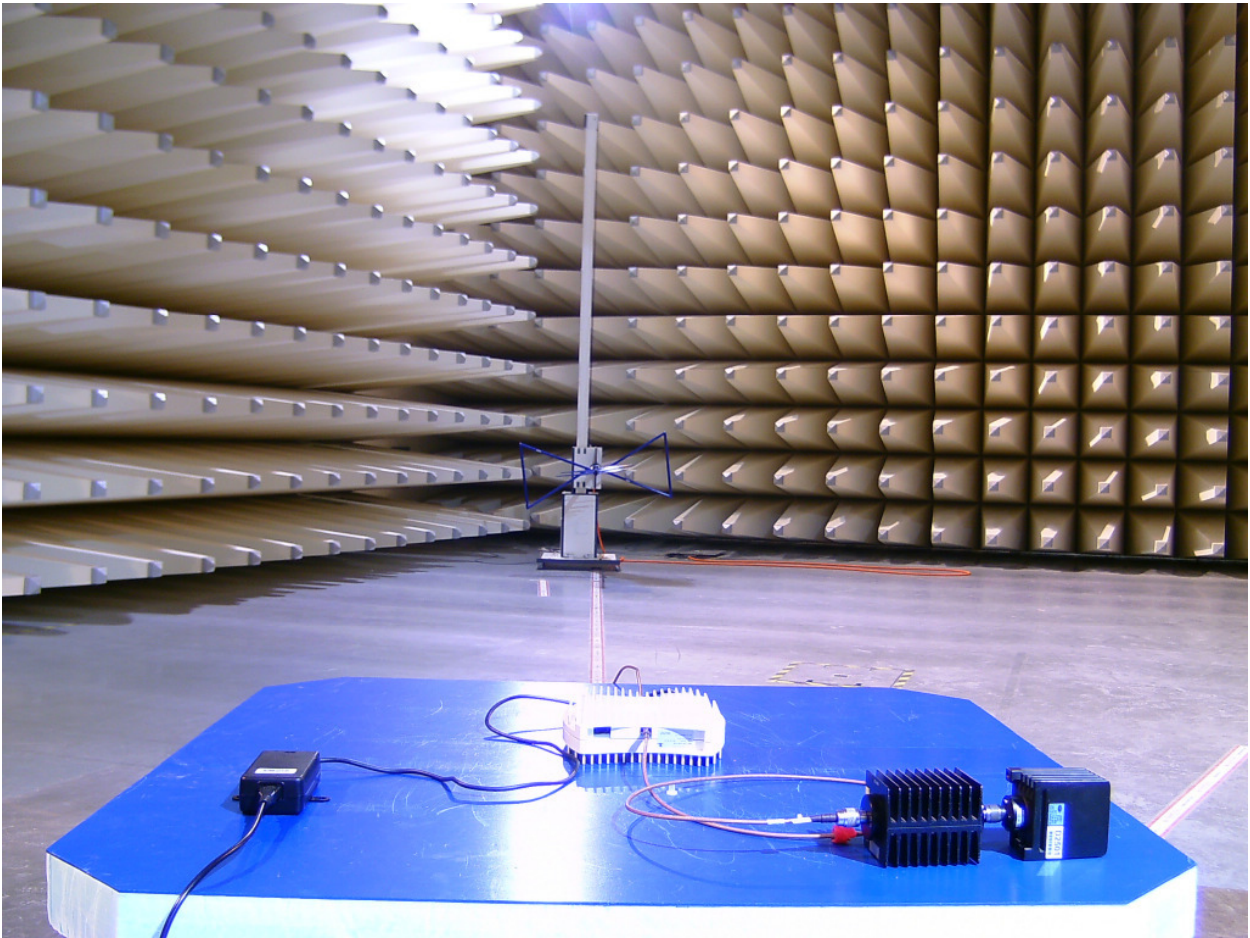
7.4 Summary test result

Test result	complies, according the plots above
Tested by:	Roland Macho
Date:	20.02.2010

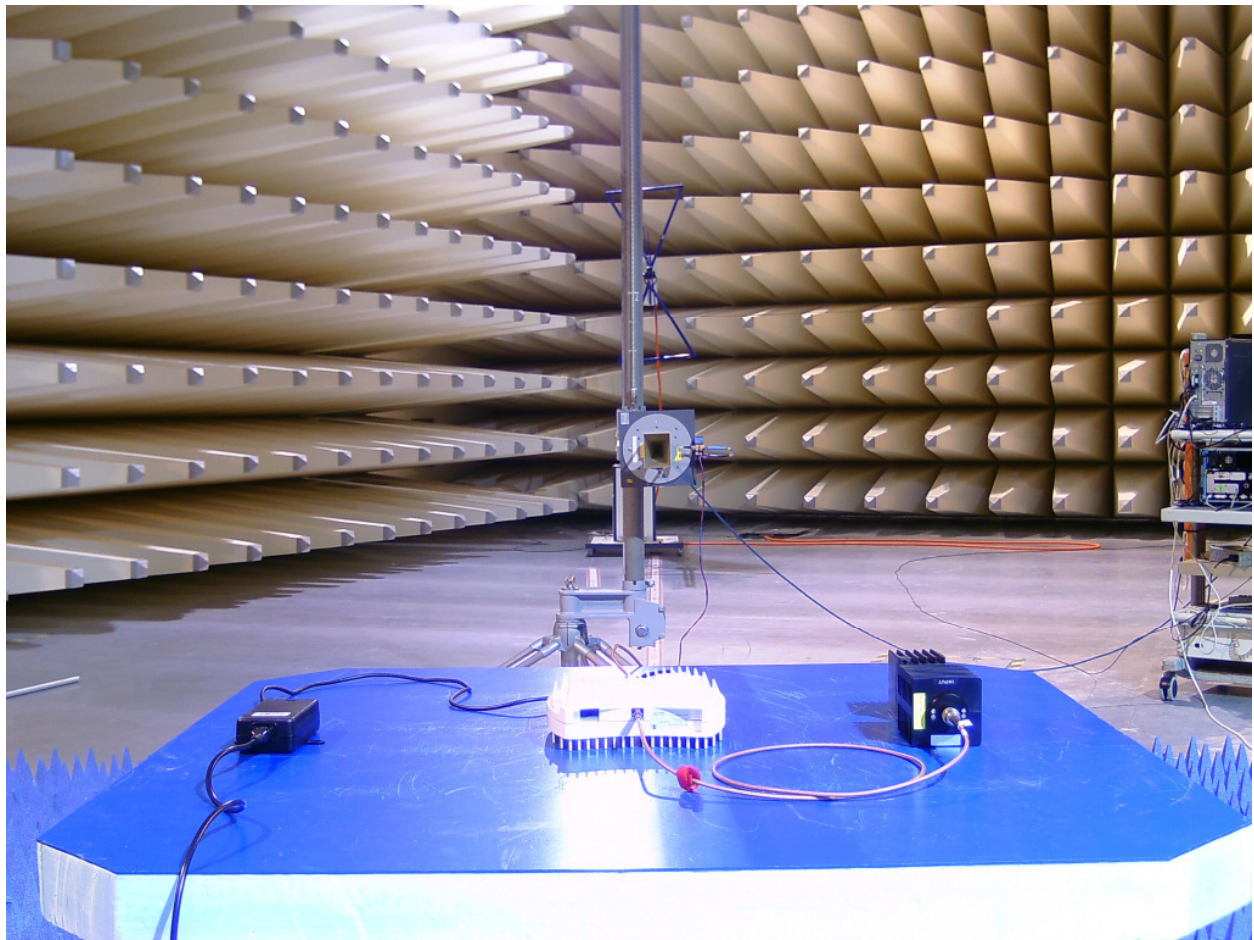
8 Field Strength of Spurious Emissions: §27.53, §2.1053, RSS-139, RSS-GEN



picture 8.1: Test setup: Field Strength Emission >1 GHz @3m in the FAC



picture 8.2: Test setup: Field Strength Emission <1 GHz @10m in the SAC



picture 8.3: Test setup: Field Strength Emission >20 GHz @3m in the SAC with Absorber material

This clause specifies requirements for the measurement of radiated emission.

Frequency range	Distance: EUT <-> antenna / location	Limit	Test method
30 MHz - 1 GHz	10 metres / SAC	FCC 47 CFR Part 27.53 IC RSS-139 sec. 6.4	TIA/EIA-603-C:2004
1 GHz – 9 GHz	3 metres / FAC	FCC 47 CFR Part 27.53 IC RSS-139 sec. 6.4	

Test equipment used:

Designation	Type	Manufacturer	Invent.-no.	Cal.-date	due Cal- date	used
EMI test receiver	ESI40	Rohde & Schwarz	E1687	20.10.2009	20.10.2010	X
EMI test receiver	ESI40	Rohde & Schwarz	E1607	04.03.2009	04.03.2010	
Antenna	CBL 6111	Chase	K1149	14.09.2009	14.09.2010	X
Antenna	CBL 6111	Chase	K1026	14.09.2009	14.09.2010	
RF Cable		Frankonia	K1121 SET	28.12.2009	28.12.2010	X
Pre amplifier	AM1431	Miteq	K1721	27.04.2009	27.04.2010	X
Antenna	HL 025	R&S	K809	06.05.2009	06.05.2010	X
Antenna	MWH-1826 / B	ARA Inc.	K1042	06.04.2009	06.04.2010	
Antenna	MWH-2640 / B	ARA Inc.	K1043	06.04.2009	06.04.2010	
Preamplifier	AFS4-00102000	Miteq	K817	11.11.2009	11.11.2010	X
Preamplifier	AFS4-00102000	Miteq	K838	06.10.2009	06.10.2010	
Preamplifier	JS43-1800-4000	Miteq	K1104	26.08.2009	26.08.2010	
RF Cable	Sucoflex 100	Suhner	K1742	09.04.2009	09.04.2010	X

The Tile-Software Version 4 has been used to maximize radiated emission from the EUT in the frequency area up to 1 GHz. Above 1 GHz the REMI version 2.135 has been used for max search.

Test set-up:

Test location: SAC/FAC
 Both, the Fully Anechoic Chamber (FAC) and the Semi Anechoic Chamber (SAC) fulfil the requirements of ANSI C63.4 and CISPR 16-1-4 with regards to NSA and SVSWR.

Test Voltage: 115V / 60 Hz
 Type of EUT: Wall mounted

Measurement uncertainty:

Measurement uncertainty expanded (95% or K=2)	± 4,7 dB for ANSI C63.4 measurement ± 0,5 dB for TIA-603 measurement
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8.1 Limit §27.53 (h)

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

The limit is -13dBm (e.i.r.p).

8.2 Test method §27.53 (h) ANSI/TIA/EA-603-C

1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(3) The measurements of emission power have been expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

Measurement procedure. TIA-603-C

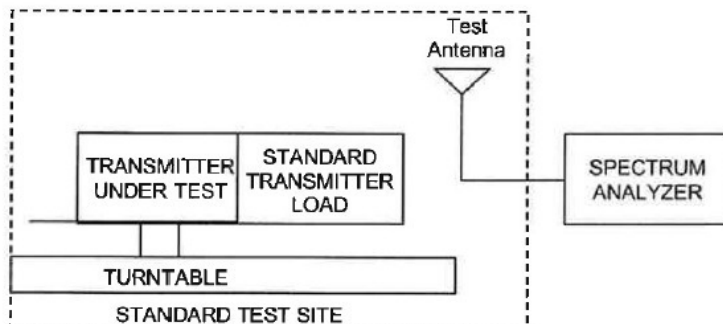
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic dipole (see Figure 7.2).

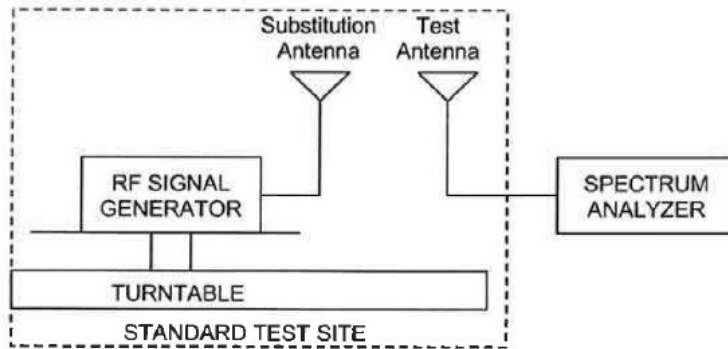
From KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET):

Radiated spurs (enclosure) – Use of CW signal (low, mid. and high freq.) is acceptable rather than all modulations.

The maximum RFI field strength was determined during the measurement by rotating the turntable (± 180 degrees) and varying the height of the receive antenna ($h = 1 \dots 4$ m) as like defined in ANSI C63.4. A measurement receiver has been used with a RBW 120 kHz up to 1 GHz and 1 MHz above 1 GHz. Steps with during pre measurement was half the RBW.

Both, the Fully Anechoic Chamber (FAC) and the Semi Anechoic Chamber (SAC) fulfil the requirements of ANSI C63.4 and CISPR 16-1-4 with regards to NSA and SVSWR.





picture 8.3: Substitution method

8.3 Climatic values in the lab

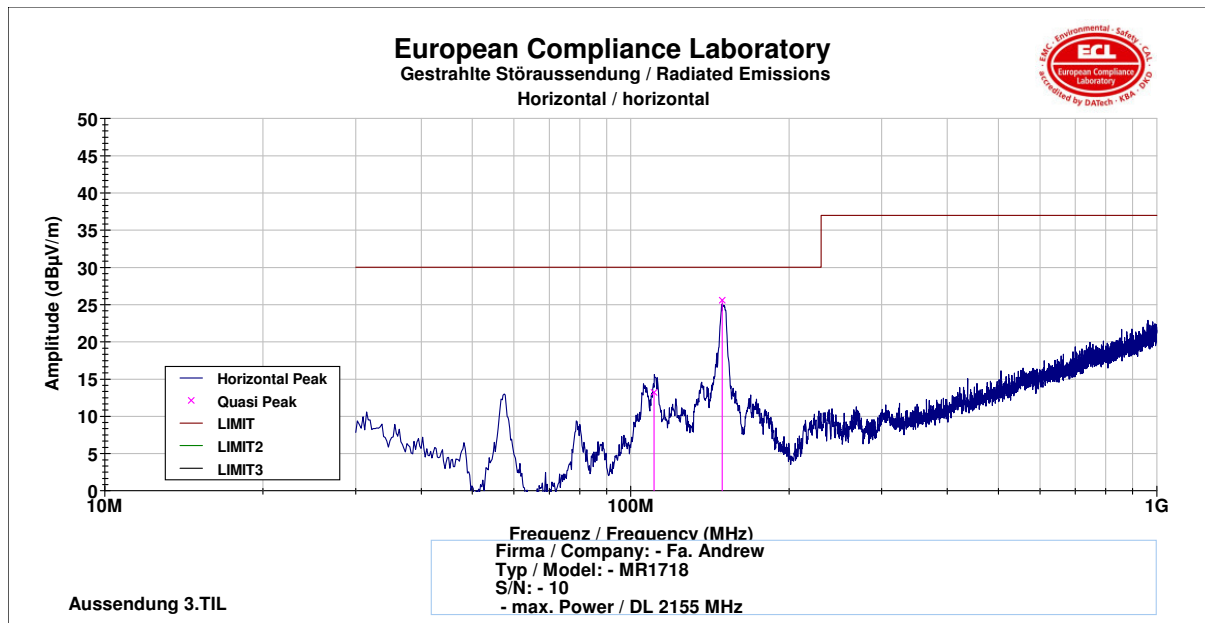
Temperature: 18,5°
Relative Humidity: 39%
Air-pressure: 1002 hPa

8.4 Test results

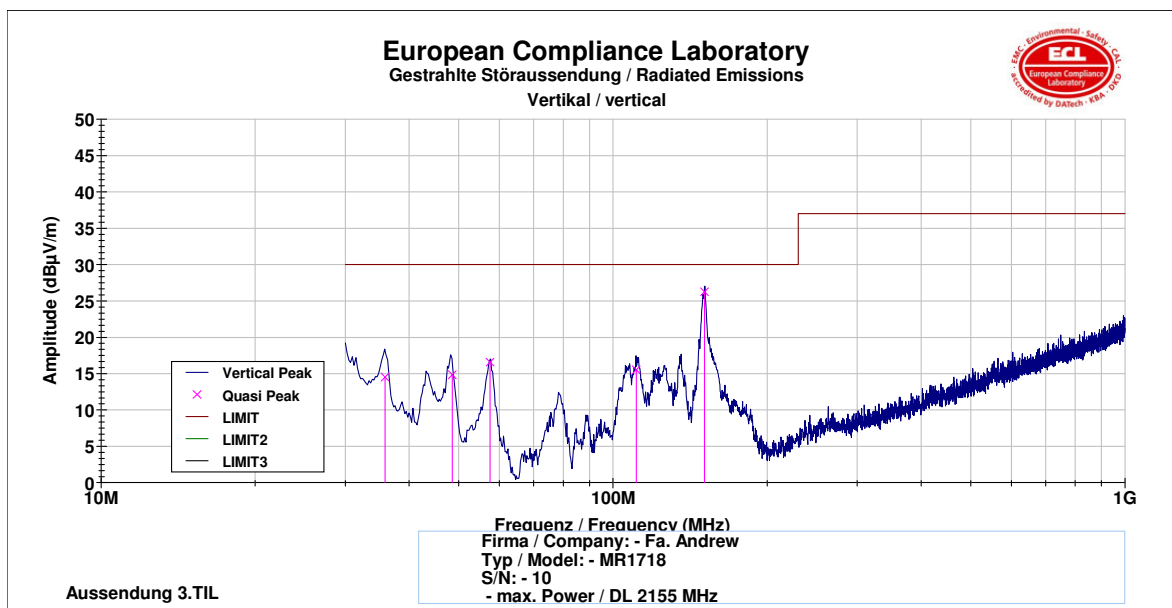
8.4.1 Premeasurements

8.4.1.1 30 MHz to 1 GHz Downlink (Bottom – Middle – Top)

Top frequency at 2155 MHz:



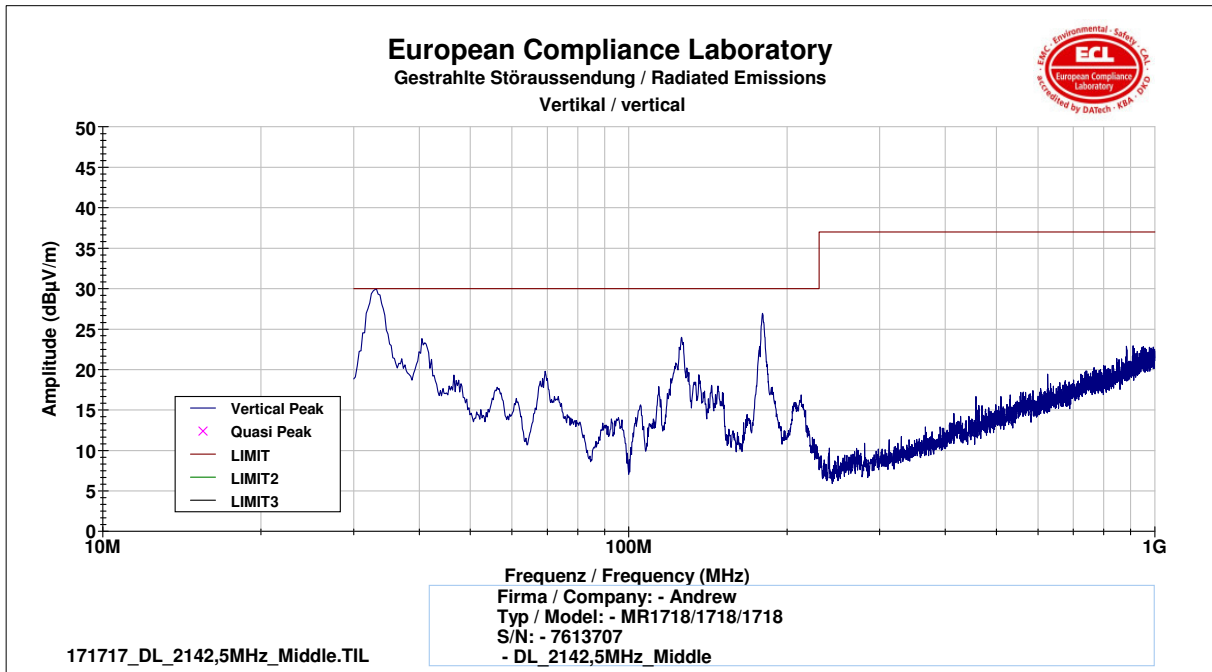
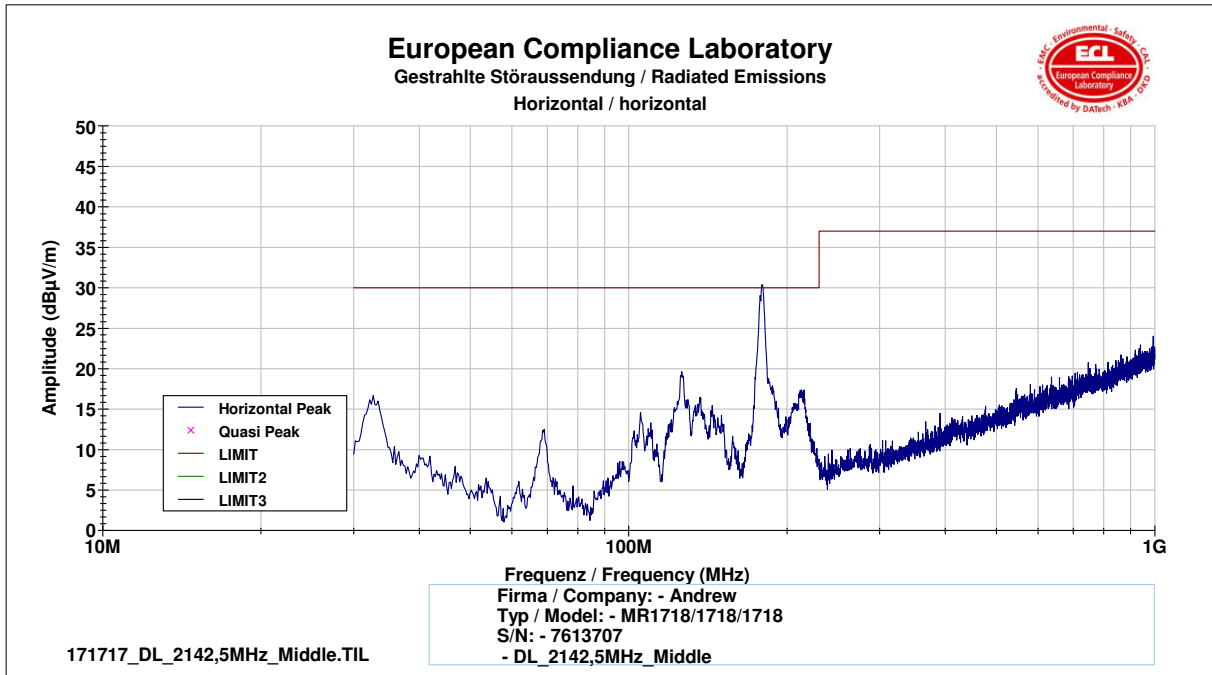
Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	Limit	Margin
[MHz]	H/V	[cm]	[°]	(dB)	(dB/m)	(dBµV)	(dBµV/m)	(dBµV/m)	(dB)
110.794	H	322	70	36.285	11.179	38.297	13.192	30.000	16.808
149.309	H	373	-156	36.130	10.698	51.013	25.581	30.000	4.419



Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	Limit	Margin
[MHz]	H/V	[cm]	[°]	(dB)	(dB/m)	(dBµV)	(dBµV/m)	(dBµV/m)	(dB)
35.8917	V	104	-22	37.080	14.460	37.144	14.523	30.000	15.477
48.5239	V	151	32	36.889	8.908	42.821	14.839	30.000	15.161
57.5204	V	207	72	36.761	5.580	47.743	16.561	30.000	13.439
111.034	V	103	54	36.283	11.203	40.593	15.514	30.000	14.486
150.887	V	106	70	36.126	10.588	51.803	26.265	30.000	3.735

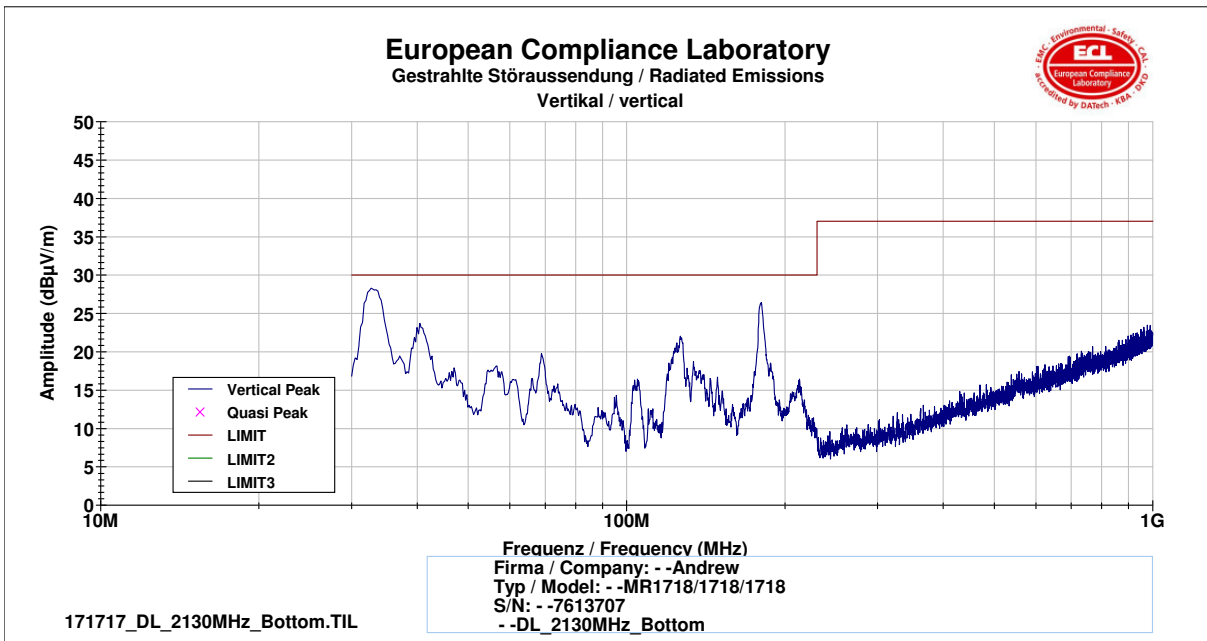
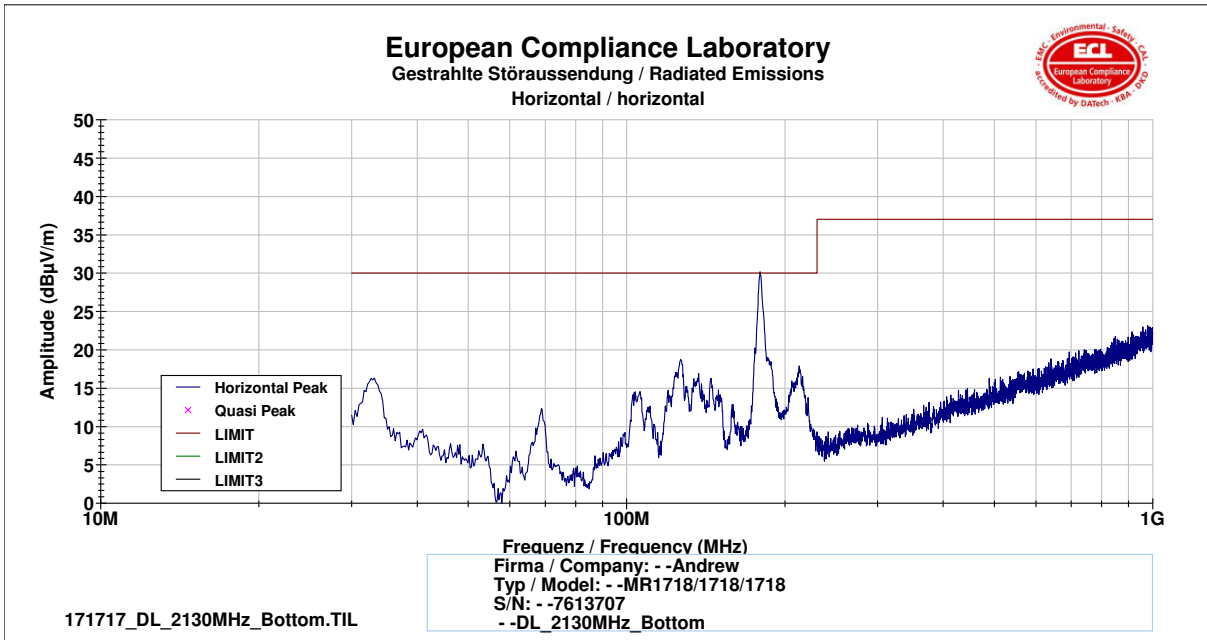


Middle frequency at 2142,5 MHz:





Bottom frequency at 2130 MHz:

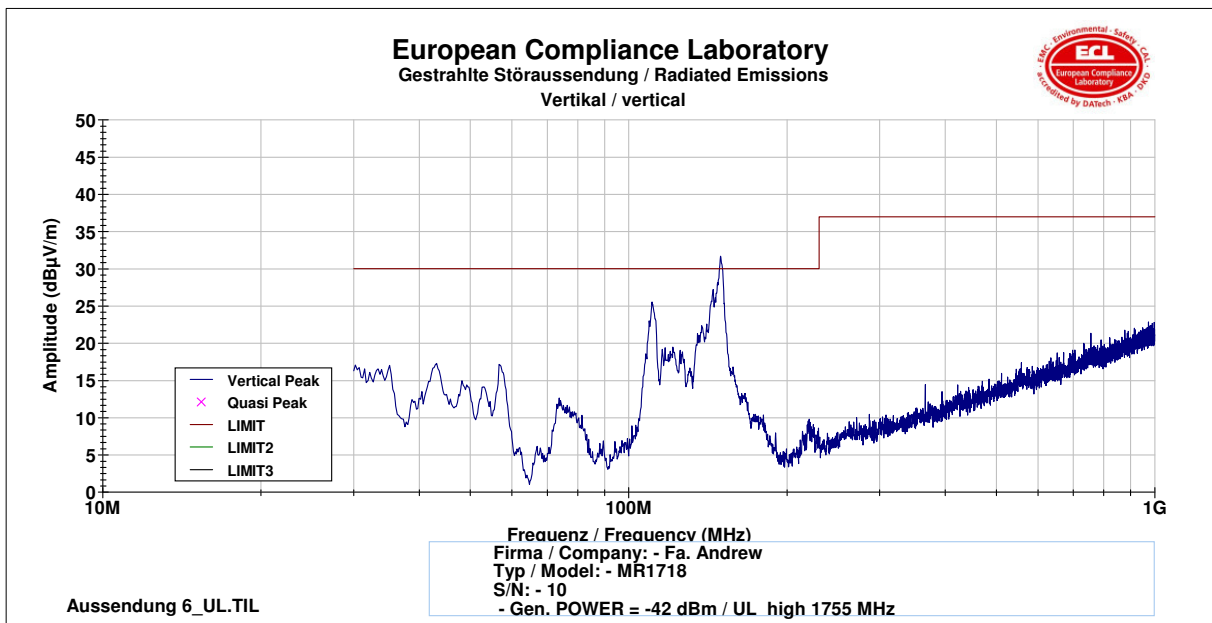
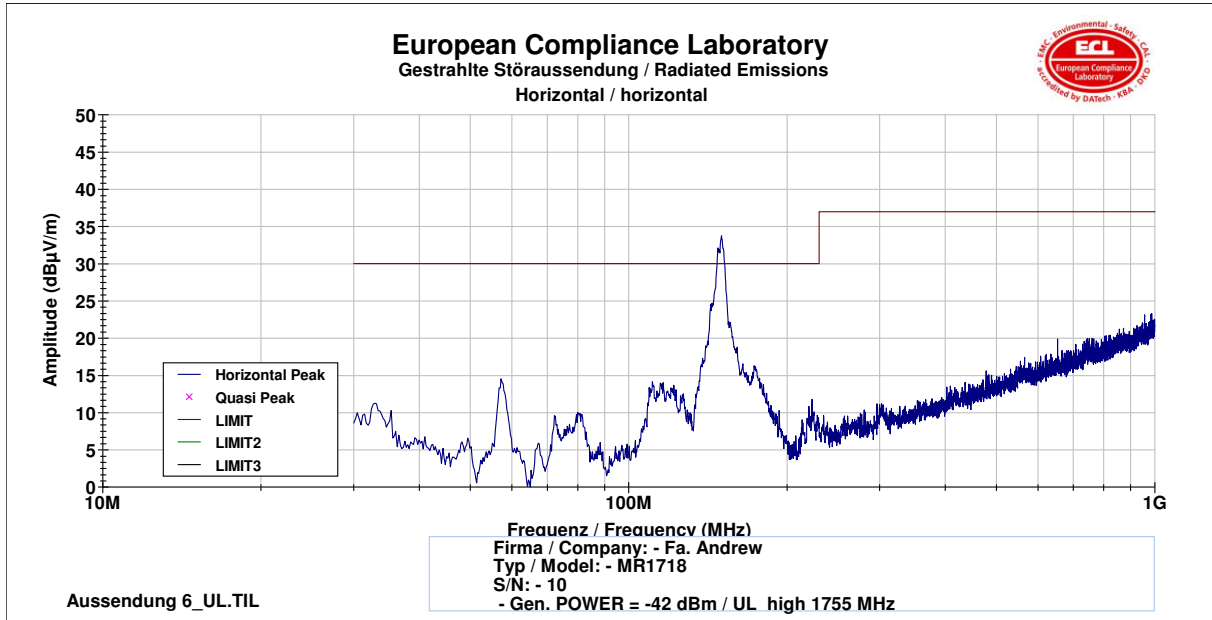


Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	Limit	Margin
[MHz]	H/V	[cm]	[°]	(dB)	(dB/m)	(dBµV)	(dBµV/m)	(dBµV/m)	(dB)
33.2218	V	107	179	37.126	15.889	50.173	28.1	30.000	1.9



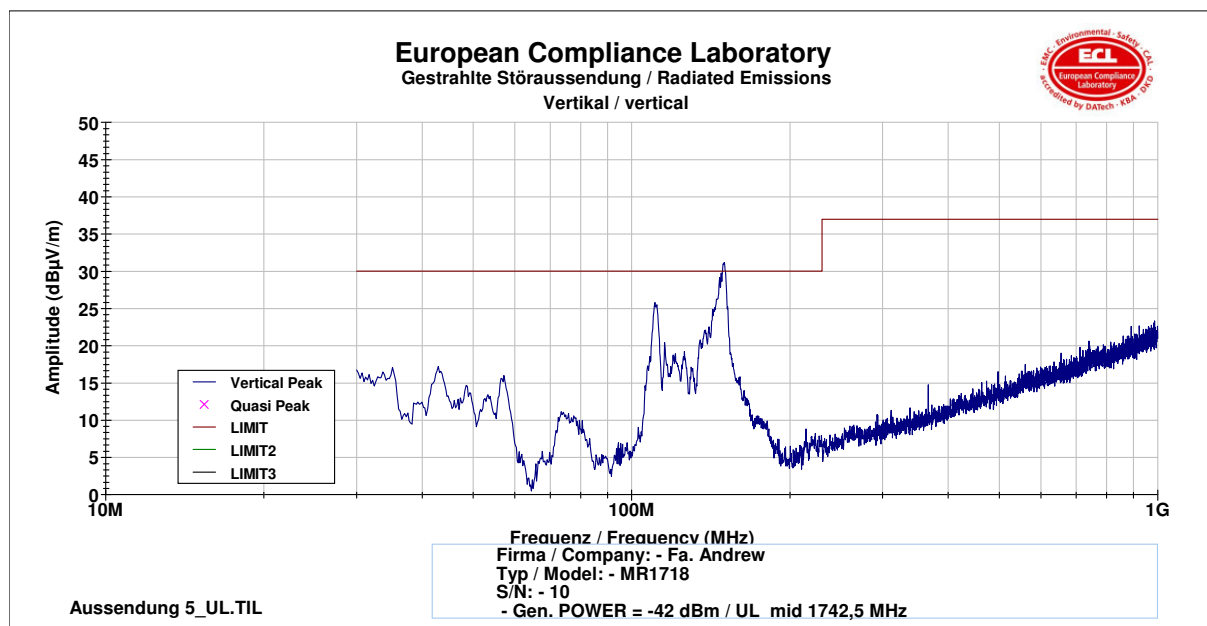
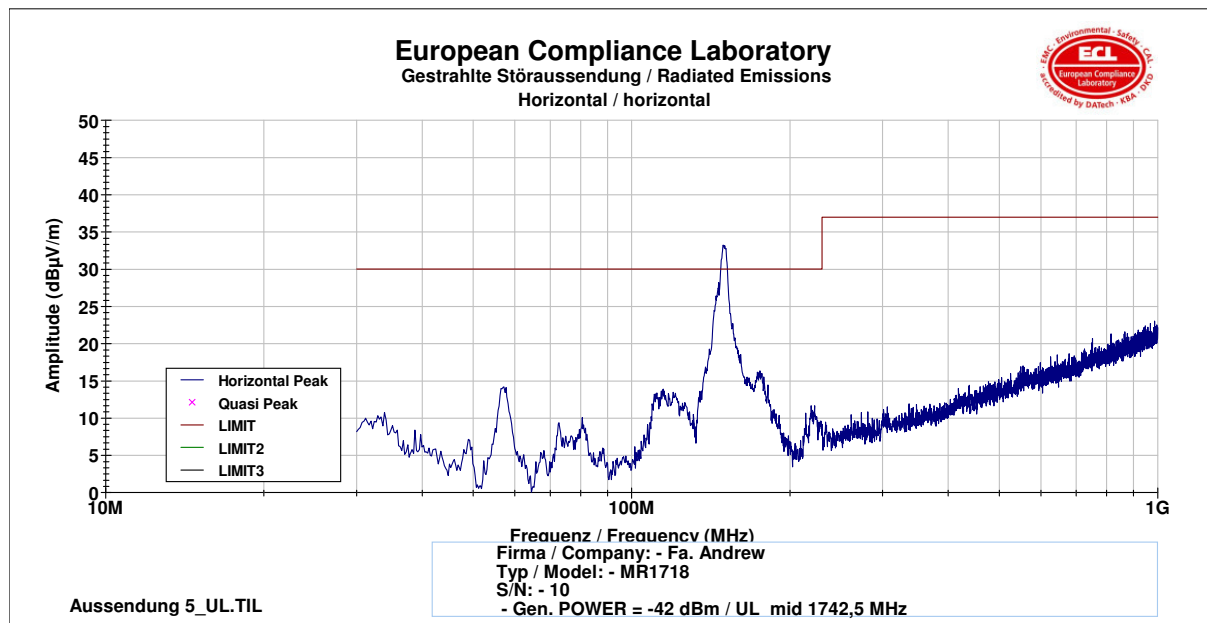
8.4.1.2 30 MHz to 1 GHz Uplink (Bottom – Middle – Top)

Top frequency at 1755 MHz:



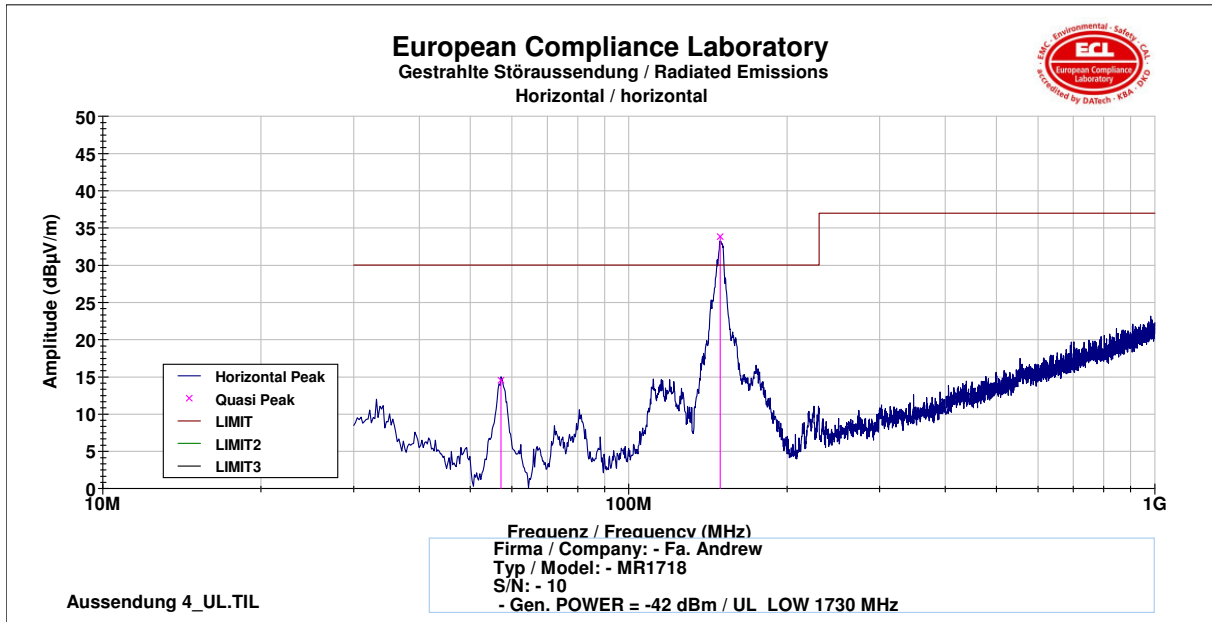


Middle frequency at 1742,5 MHz:

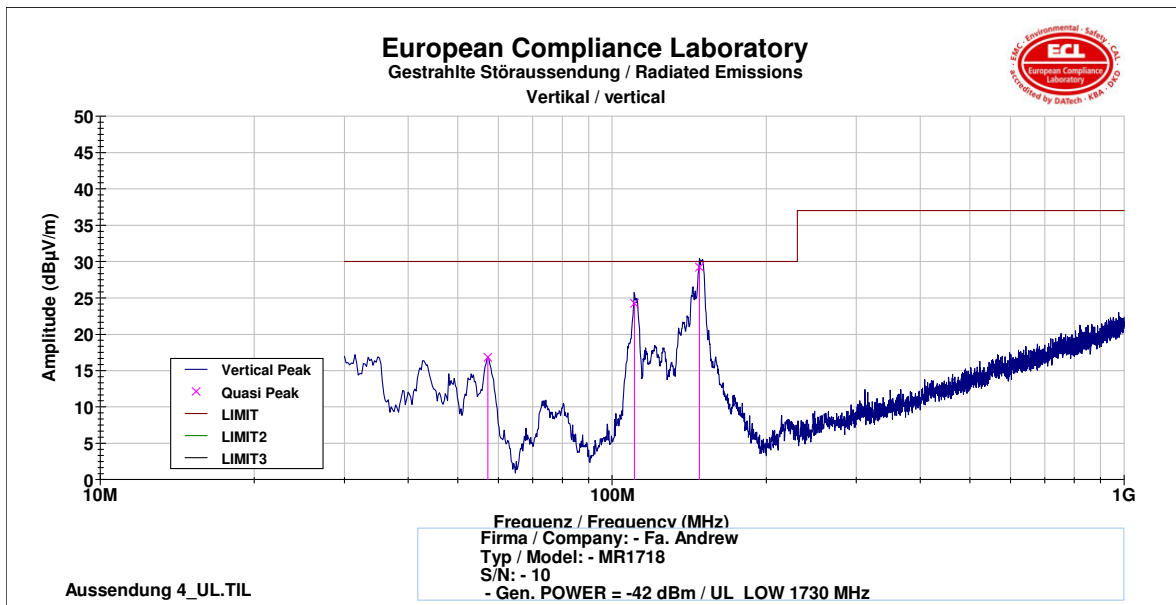




Bottom frequency at 1730 MHz:



Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	Limit	Margin
[MHz]	H/V	[cm]	[°]	(dB)	(dB/m)	(dBµV)	(dBµV/m)	(dBµV/m)	(dB)
57.1544	H	397	54	36.767	5.717	45.590	14.540	30.000	15.460
149.363	H	353	70	36.130	10.695	59.281	33.845	30.000	-3.845

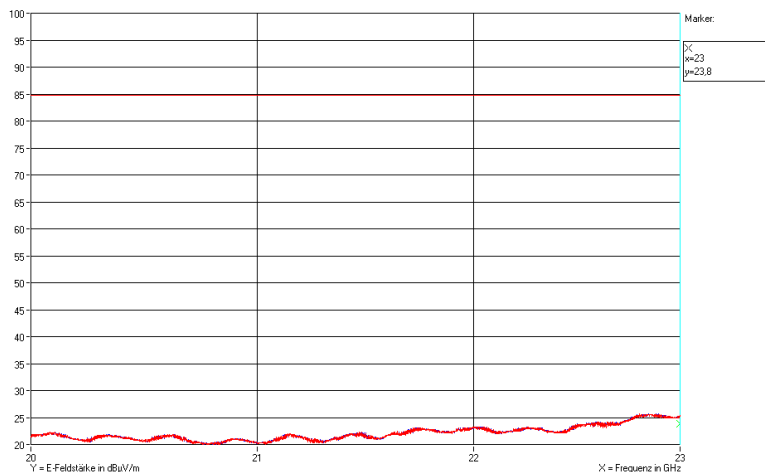




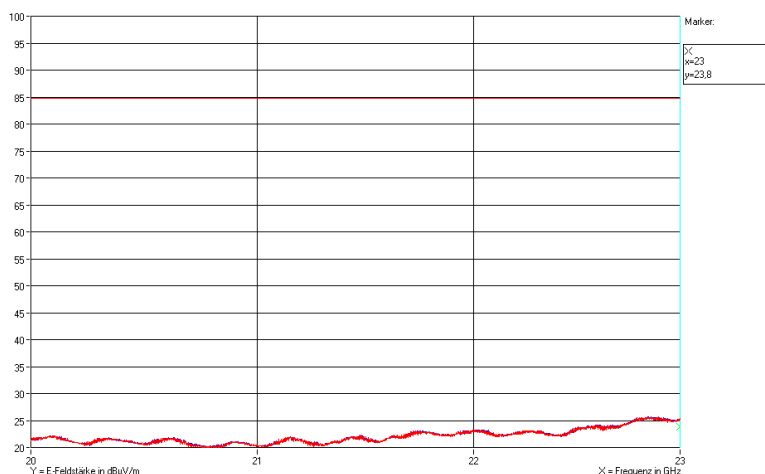
Frequency	Polarisation	Height	TT-Position	Cable Loss	Antenna Factor	Reading	Field Intensity	Limit	Margin
[MHz]	H/V	[cm]	[°]	(dB)	(dB/m)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
57.2144	V	290	-157	36.766	5.695	47.895	16.824	30.000	13.176
110.668	V	104	70	36.286	11.167	49.381	24.262	30.000	5.738
148.211	V	142	177	36.133	10.775	54.589	29.231	30.000	0.769

8.4.1.3 20 GHz to 23 GHz Downlink (Bottom – Middle – Top)

2130 MHz Bottom **horizontal**, **vertical**

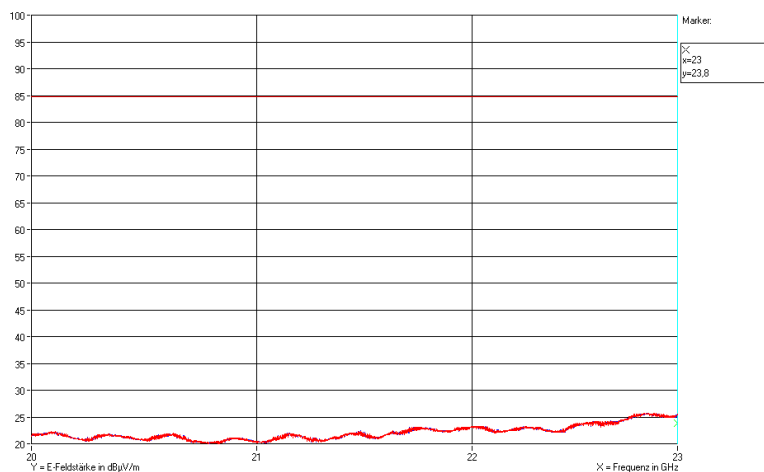


2142 MHz Middle **horizontal**, **vertical**



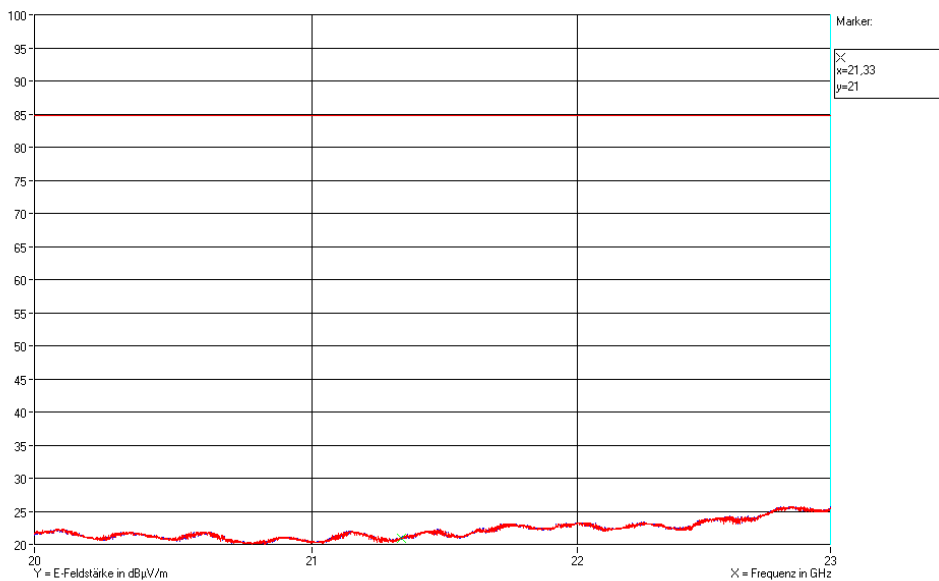


2155 MHz Top **horizontal**, **vertical**



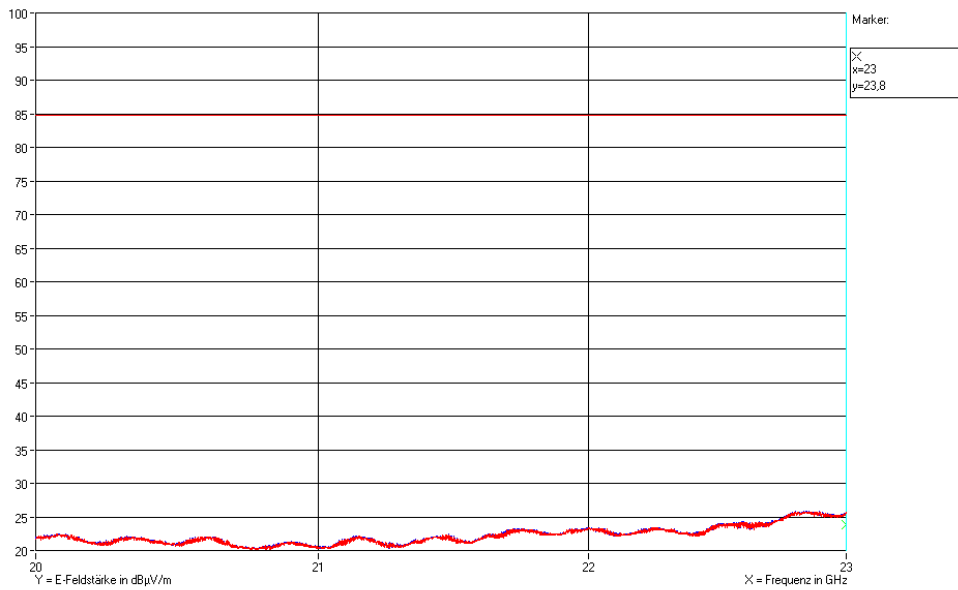
8.4.1.4 20 GHz to 23 GHz Uplink (Bottom – Middle – Top)

1730 MHz Bottom **horizontal**, **vertical**

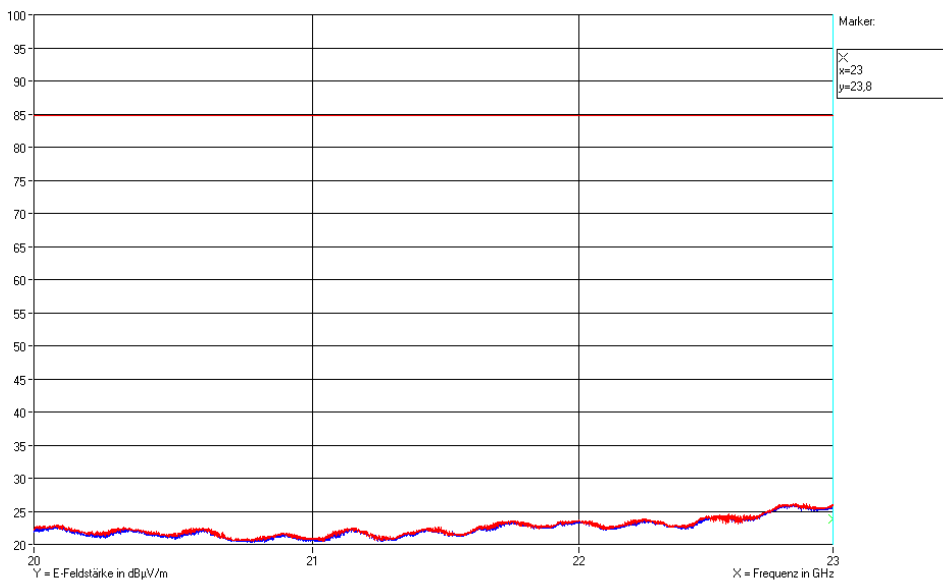




1742 MHz Middle **horizontal**, **vertical**



1755 MHz Top **horizontal**, **vertical**



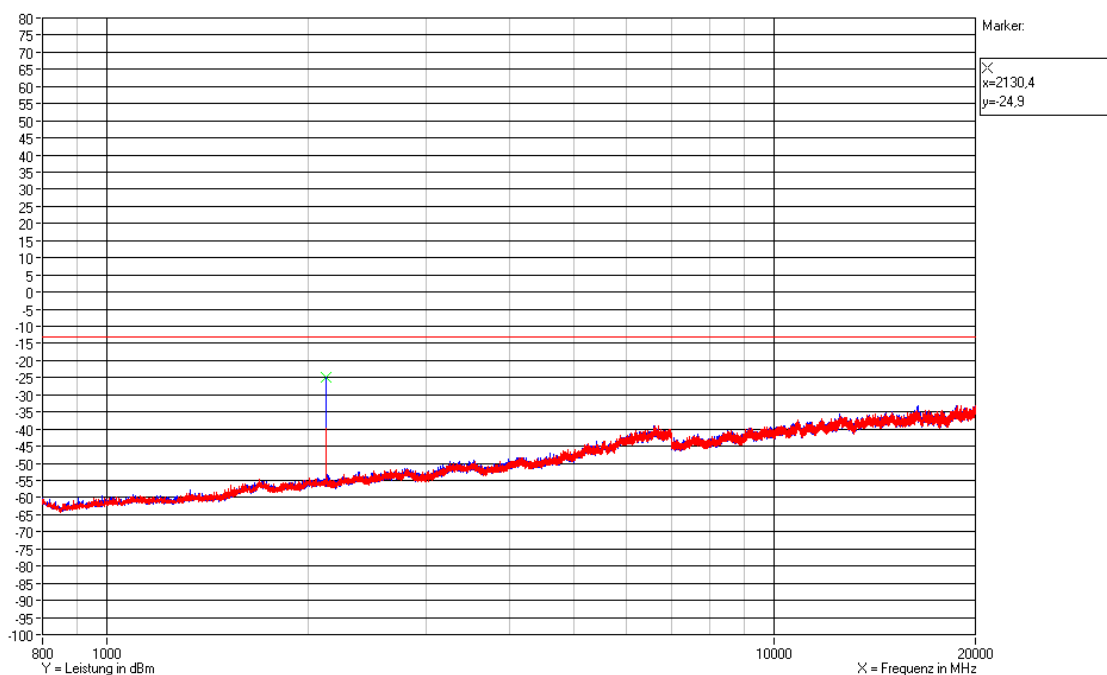
8.4.2 Final measurement

8.4.2.1 30 MHz to 1 GHz

B/M/T DL/UL	Frequency	Polarisation	Height	TT	e.i. r. p.	Limit	Margin
	[MHz]	H/V	[cm]	Deg	dBm	dBm	[dB]
M/DL	33.22	V	107	179	-54.8	-13	41.8
B/UL	148.21	V	142	177	-55.5	-13	42.5
T/DL	149.31	H	373	-156	-59.2	-13	46.2
B/UL	149.36	H	353	70	-50.9	-13	37.9
T/DL	150.89	V	106	70	-58.5	-13	45.5
M/DL	178.30	H	111.00	88.00	-54.8	-13	41.8

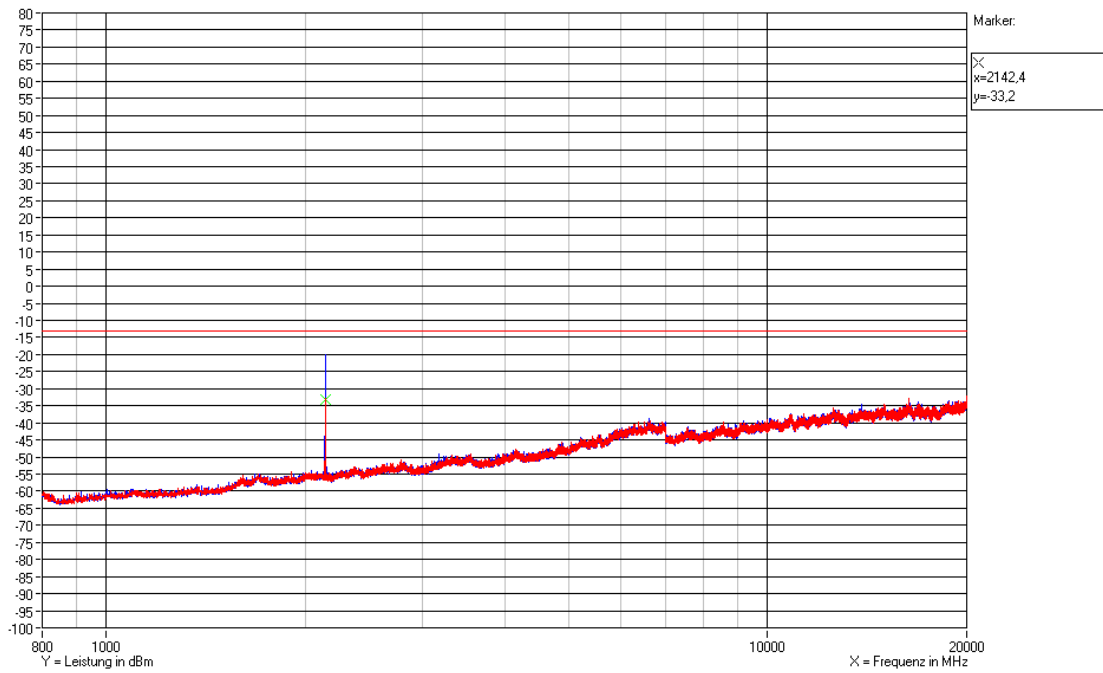
8.4.2.2 0,8 GHz to 20GHz Downlink

2130 MHz Bottom **horizontal**, **vertical**

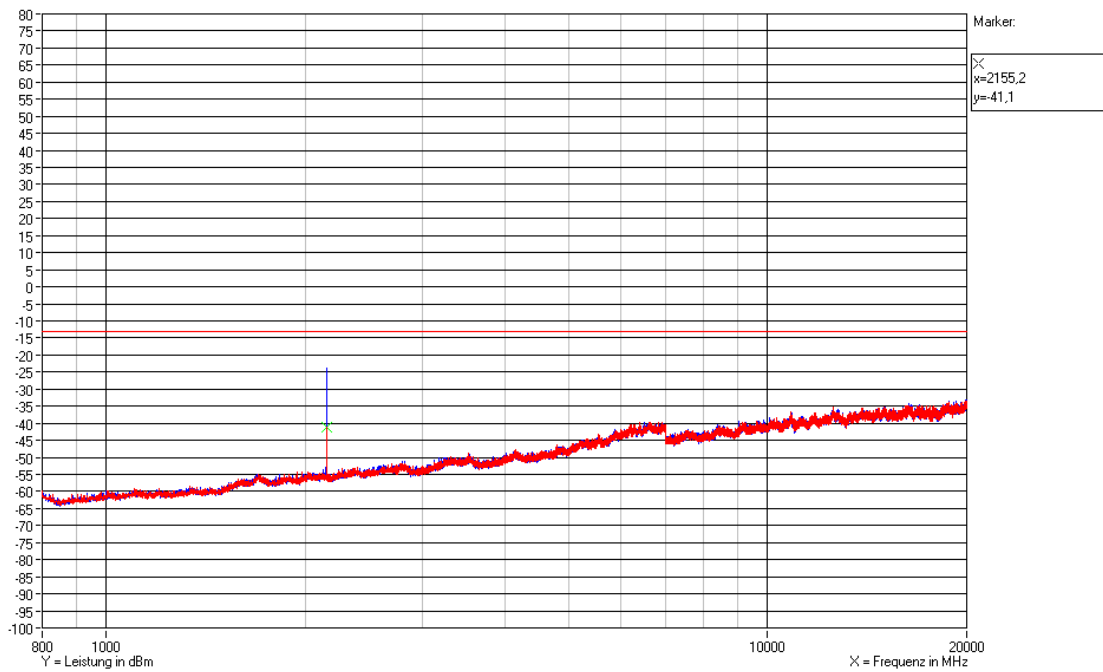




2142 MHz Middle horizontal, vertical



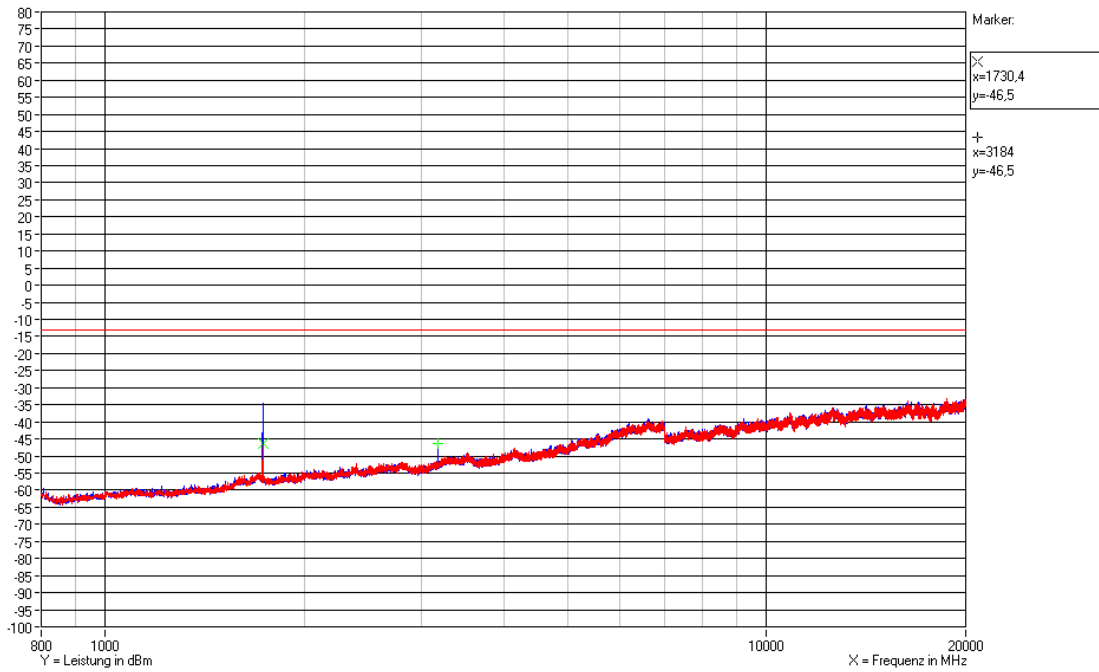
2155 MHz Top horizontal, vertical



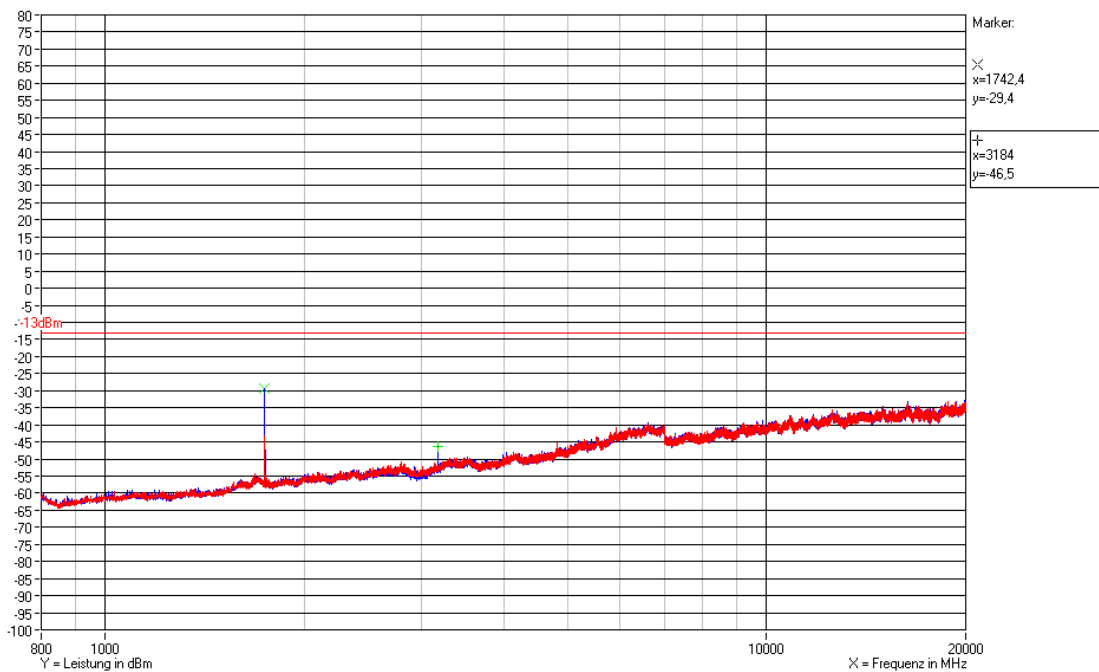


8.4.2.3 0,8 GHz to 20GHz Uplink

1730 MHz Bottom **horizontal**, **vertical**

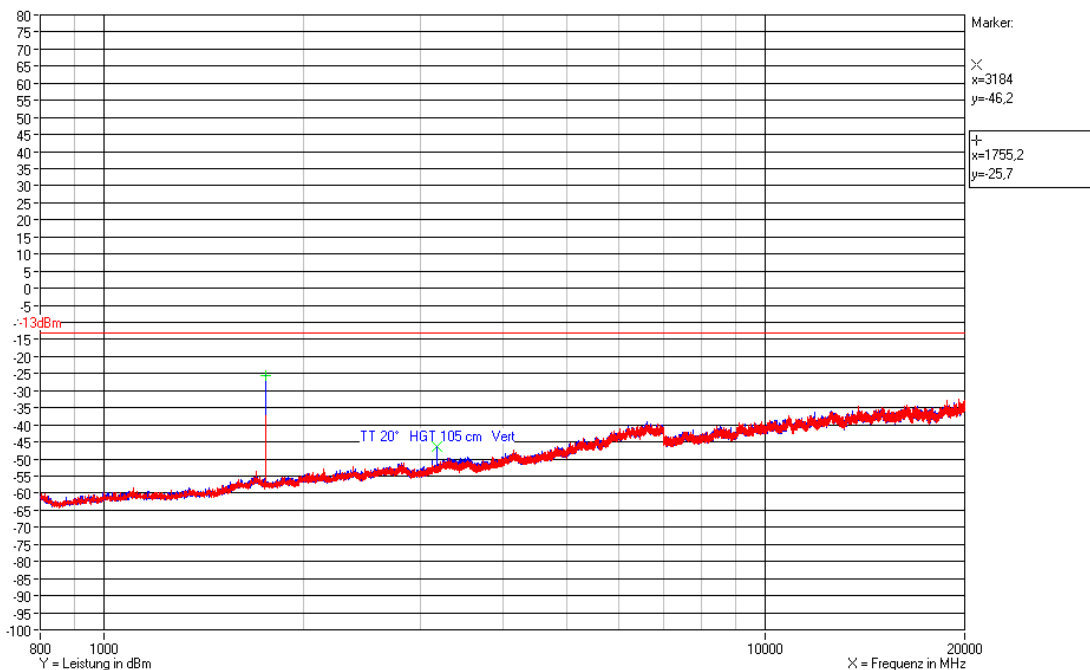


1742 MHz Middle **horizontal**, **vertical**





1755 MHz Top **horizontal**, **vertical**



B/M/T	Frequency	Polarisation	Height	TT	e.i. r. p.	Limit	Margin
DL/UL	[MHz]	H/V	[cm]	Deg	dBm	dBm	[dB]
T/UL	3184	V	105	20	-46.2	-13	33.2

8.4.2.4 20GHz to 23GHz

No substitution measurement has been performed, because there were no emissions detected during the pre measurement other than noise.

8.5 Summary test result

Test result	The spurious emission requirements have been met in all frequency bands.
Tested by:	Mario Lehmann
Date:	30.03.2010

EMC Test Report No.: 10-033

FCC ID: XS5-MR171717

IC ID: 2237E- MR171717



9 History

Revision	Modification	Date	Name
01.00	Initial Test report	30.03.2010	M. Lehmann

******* End of test report *******