FCC Test Report

Product Name: HSPA Rotate USB Stick

Model Number: UMG181

Report No: SYBH(R) 006092008EB-4
FCC ID: QISE181

Reliability Laboratory of Huawei Technologies Co., Ltd.

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REPORT ON	**FCC Test of HSPA Rotate USB Stick**
	M/N: UMG181
	Report No: SYBH(R) 006092008EB-4
REGULATION	**FCC CFR47 Part 2: Subpart J;**
	FCC CFR47 Part 27: Subpart C&L;
CONCLUSION	**Pass**

	Date	Name	signature
General Manager	**Oct.10, 2008**	张兴海	
Technical Responsibility For Area of Testing	**Oct.10, 2008**	余 辉	
Test Lab Engineer	**Oct. 10, 2008**	胡 俊	

Contents

1 Summary

The table below summarizes the measurements and results for the HUAWEI UMG181 Rotate USB Stick. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	27.50(d)(2)	Effective Radiated Power of Transmitter	PASS
2.1046	27.50(d)(2)	Conducted Power of Transmitter	PASS
2.1047	/	Modulation Characteristics	PASS
2.1049	/	Occupied Bandwidth	PASS
2.1051	27.53(g)	Band Edges Compliance	PASS
2.1051	27.53(g)	Spurious Emission at Antenna Terminal	PASS
2.1055	27.54	Frequency Stability	PASS

Note: The Radiated Spurious Emissions' test results are shown in the EMC report.

2 Product Description

2.1 Production Information

2.1.1 General Description

HUAWEI UMG181 Rotate USB Stick is subscriber equipment in the GSM/UMTS system. The frequency band is 1700M. The UMG181 implements such functions as RF signal receiving / Transmitting, UMTS/EDGE/GPRS/GSM protocol processing and data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface. It has an internal antenna. UMG181 uses Qualcomm MSM7225 chipset and Zero-IF technologies.

2.1.2 Support function and Service

The HUAWEI UMG181 Rotate USB Stick support the function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
Data	Modulation: QPSK	TM1	WCDMA
Data	Modulation: QPSK	TM2	HSDPA
Data	Modulation: QPSK	TM3	HSUPA

Note: * The WCDMA test condition & settings are defined in 3GPP TS 34.121 V7.5.0:2007.

2.2 Modification Information

For original equipment, following table is not application.

Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information

Not applicable

3 Test Site Description

The test site of:

Huawei Technologies Co. Ltd.
P.O. Box 518129
Huawei base, bantian,
Longgang District, Shenzhen, China

3.1 Testing Period

The test have been performed during the period of

Sep. 15, 2008 – Oct. 10, 2008

3.2 General Set up Description

HUAWEI UMG181Rotate USB Stick can support GSM/GPRS/EDGE/UMTSHSDPA/HSUPA mode and AWS Band. During this measurement, the HUAWEI UMG181 Rotate USB Stick just works in UMTSHSDPA/HSUPA mode and AWS Band.

TM1: WCDMA Mode with QPSK Modulation
TM2: HSDPA Mode with QPSK Modulation
TM3: HSUPA Mode with QPSK Modulation

4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	1710 to 1755 MHz
Downlink band:	2110 to 2155 MHz

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

	UMTS/HSDPA /HSUPA
Channel raster	200k Hz
Channel spacing:	5MHz

4.1.3 Type of Emission

Table 6 Type of Emission

	UMTS/HSDPA/HSUPA
Emission Designation:	5M00F9W

According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Environmental Requirements

Table 7 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%RH

4.1.5 Power Source

Table 8 Power Source

DC voltage nominal:	⎓ 5.0V; Supplied by USB port of notebook
DC voltage range	⎓ 4.75-5.25V
DC current maximal:	500mA

4.1.6 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

4.1.7 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Table 9 Applied RF Module Voltages and Currents

Voltage:	⎓ 2.85V (for the RF IC)
Current:	150mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)
Voltage:	⎓ 3.6V (for the PA module)
Current:	350mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)

4.2 EUT Identification List

4.2.1 Board Information

Table 10 Board Information

1700MHz HUAWEI HSPA Rotate USB Stick		
UMG181		
Board and Module		
Model name	Serial Number	Remarks
UMG181	DS2AB10881400104	CD83TCPA

4.2.2 Adapter Technical Data

Not Applicable.

4.2.3 Battery Technical Data

Not Applicable.

4.2.4 FCC Identification

Grantee Code: **QIS**
Product Code: **E181**
FCC Identification: **QISE181**

5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Receiver	R&S	ESIB 26	100318	04.21.2009
BiLog Antenna	Schaffner	CBL 6112B	2747	10.16.2008
Horn Antenna	ETS-Lindgren	3117	00062553	07.14.2009
Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	10.11.2008
Signal Generator	R&S	SMR 40	100325	05.11.2009
Signal Generator	R&S	SMU200A	101717	04.10.2009
Power Supply	Keithley	2306	1045337	05.11.2009
Climate Chamber	WEISS	ACS-1	9777	08.13.2009
Universal Radio Communication Tester	R&S	CMU200	108035	07.15.2009
Spectrum Analyzer	R&S	FSU26	200002	06.25.2009

6 Transmitter Measurements

6.1 Effective Radiated Power of Transmitter (EIRP)

6.1.1 Test Conditions

Table 12 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25℃
Relative humidity:	55%
Test Configurations:	TM1/TM2/TM3 at frequency Bottom, Middle, Top

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and Part 27.50(d)2

6.1.2.2 Supporting Standards

Table 13 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.1.2.3 Limits

Compliance with Part 27.232, mobile/portable stations are limited to 2 watts EIRP peak power.
W(dBm)= 10*log ($W_{In\ mW}$).

Table 14 Limits

Maximum Output Power (Watts)	< 2 Watts
Maximum Output Power (dBm)	< 33 dBm

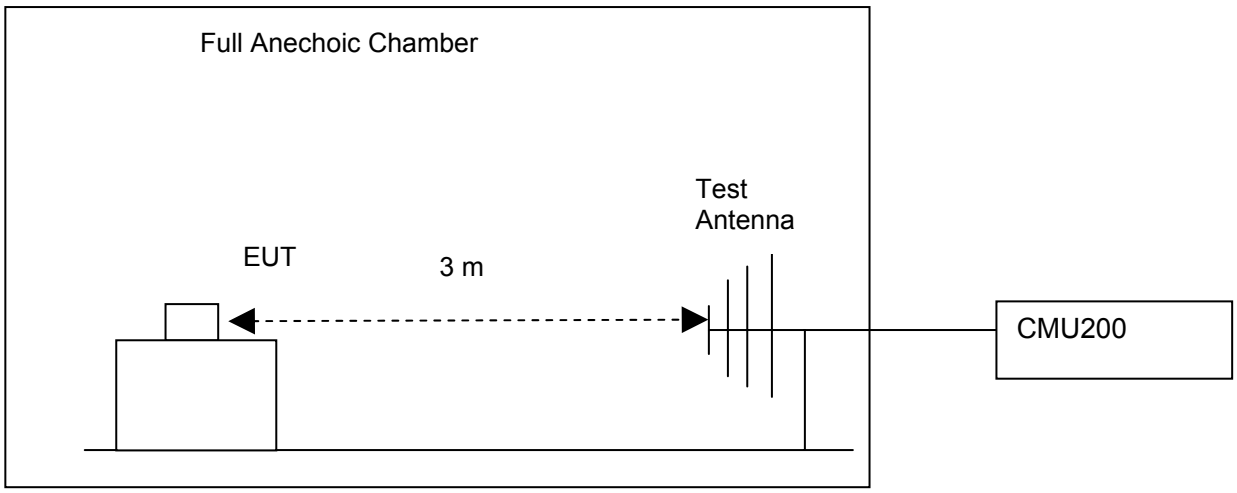
6.1.3 Test Method and Setup

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured 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). Connect the HUAWEI UMG181 Rotate USB Stick to the wireless communication tester CMU200 via the air interface. The band is set as AWS.
(b) Test the Radiated maximum output power by the CMU200 received from test antenna.
(c) Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step (b) on CMU200, and record the

power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

Test setup

Step 1: Pre-test



Step 2: Substitution method to verify the maximum EIRP

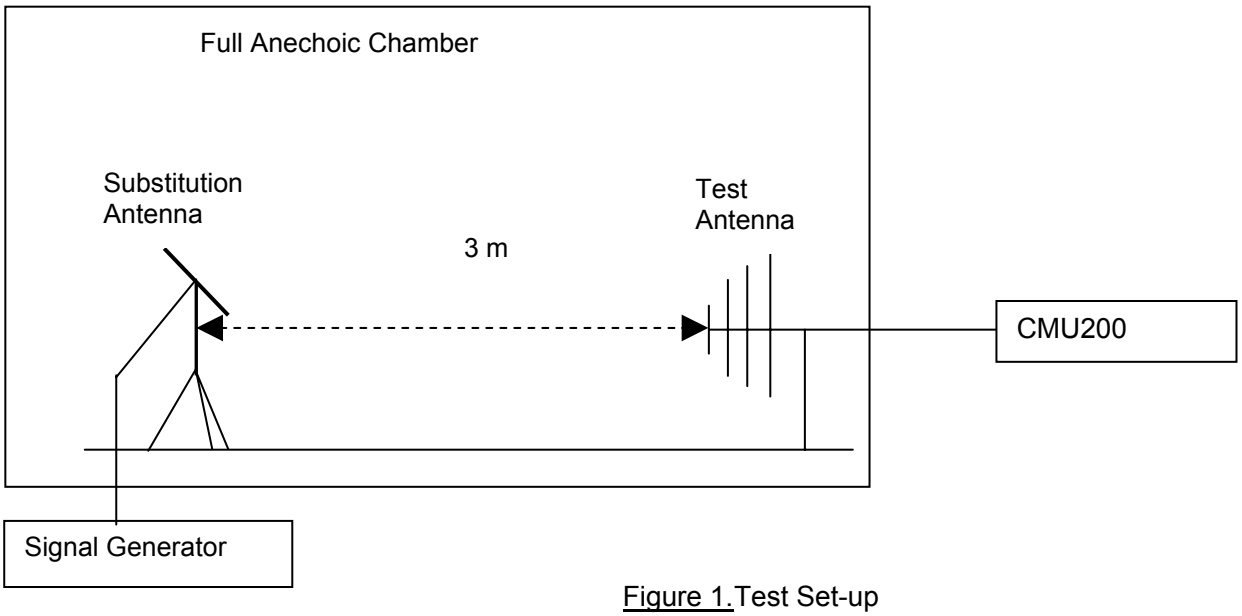


Figure 1.Test Set-up

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.
There is a constant difference of 2.15 dB between ERP and EIRP.
EIRP (dBm)= ERP (dBm) + 2.15 (ITU-R Recommendation SM.329-10).
EIRP was measured using 1 hosts.
Host 1: BenQ Joy book S72

6.1.4 Measurement Results

6.1.4.1 Pre-test Results

For HSDPA test mode, there are 5 sub-test for different configuration. For the sub-test 1, the max power of UMG181 is the maximum as followed table..
The channel is mid range.

Sub-test	c	d	d (SF)	c/d	HS (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)	Test result
1	2/15	15/15	64	2/15	4/15	0.0	0.0	21.81
2	12/15	15/15	64	12/15	24/15	1.0	0.0	21.68
3	15/15	8/15	64	15/8	30/15	1.5	0.5	20.64
4	15/15	4/15	64	15/4	30/15	1.5	0.5	20.19

For HSUPA test mode, there are 5 sub-test for different configuration. For the sub-test 1, the max power of UMG181 is the maximum as followed table..
The channel is mid range.

Table 15 HSUPA conducted max power pre-scan

Sub-test	βc	βd	βd (SF)	βc/βd	βHS	βec	βed	βed (SF)	βed (Codes)	CM (dB)	MPR (dB)	Test result
1	8/15	15/15	64	8/15	16/15	16/15	448/75	4	1	1.0	0.0	22.11
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	22.04
3	15/15	5/15	64	15/5	30/15	30/15	βed1: 47/15 βed2: 47/15	4 4	2	2.0	1.0	22.01
4	1/15	15/15	64	1/15	2/15	2/15	56/75	4	1	3.0	2.0	22.03
5	12/15	15/15	64	12/15	24/15	24/15	224/25	4	1	1.0	0.0	21.87

For the following test, the TM4 was used for HSDPA, the TM5 was used for HSUPA.

Table 16 Measurement Results

		RF Output Power (EIRP)					
TEST CONDITIONS		Channel1312(B) 1712.4MHz		Channel1412 (M) 1732.4MHz		Channel1513(T) 1752.6MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T_{nom} (25 °C) V_{nom} (5 V)	20.09	33	20.17	33	19.95	33
TM2	T_{nom} (25 °C) V_{nom} (5 V)	19.94	33	19.97	33	19.85	33

TM3	T_{nom} (25 °C) V_{nom} (5 V)	19.97	33	20.34	33	19.59	33	

6.1.4.2 Substitution Results

Table 17 Substitution Results

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP) [dBm]	FCC limit [dBm]	Result
TM1	1712.4	20.09	Horn Ant.	16.35	4.5	1.0	19.85	33	Pass
TM1	1732.4	20.17	Horn Ant.	16.56	4.5	1.0	20.06	33	Pass
TM1	1752.6	19.95	Horn Ant.	15.95	4.8	1.0	19.75	33	Pass
TM2	1712.4	19.94	Horn Ant.	16.31	4.5	1.0	19.81	33	Pass
TM2	1732.4	19.97	Horn Ant.	16.27	4.5	1.0	19.77	33	Pass
TM2	1752.6	19.85	Horn Ant.	15.95	4.8	1.0	19.75	33	Pass
TM3	1712.4	19.97	Horn Ant.	16.28	4.5	1.0	19.78	33	Pass
TM3	1732.4	20.34	Horn Ant.	16.63	4.5	1.0	20.13	33	Pass
TM3	1752.6	19.59	Horn Ant.	15.67	4.8	1.0	19.47	33	Pass

Note: a, For get the EIRP (Effective Isotropic Radiated Power) in substitution method, the following formula should take to calculate it,

EIRP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBi]

NOTE: SGP- Signal Generator Level

b, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 5M for TM1 and TM2 and TM3.

6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.

6.2 Conducted Power of Transmitter

6.2.1 Test Conditions

Table 18 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	52 %
Test Configurations:	TM1/TM2/TM3 at frequency Bottom, Middle, Top

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 2.1047 and Part 27.50(d)(2)

6.2.2.2 Supporting Standards

Table 19 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.2.2.3 Limits

Compliance with Part 27.232, in no any case may the peak power of a mobile station transmitter exceed 2 W. The calculated longitude EIRP by following formula:

EIRP(dBm)= 10*log (EIRP $_{mW}$).

And for conducted power, we can use Antenna Gain to calculate the limit. So the conducted power:

P_{cod}.(dBm)=EIRP(dBm)- Gain(dBi).
and Gain (dBi)= Gain(dBd)+ 2.15dB

Table 20 Limits

Maximum Output Power (Watts)	< 2 Watts (33 dBm)
Antenna Gain(dBi):	-1.78
Maximum Conducted Output Power (dBm)	< 34.78

6.2.3 Test Method and Setup

(a)For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, Conducted maximum power shall be measured 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). Connect the HUAWEI UMG181 Rotate USB Stick to the wireless communication tester CMU200 via the antenna connector. The band class is set as AWS.
(b)Test the Conducted maximum output power by the CMU200.

Test setup

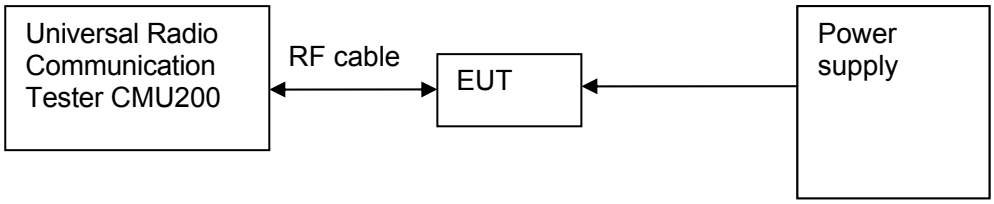


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 21 Measurement Results

TEST CONDITIONS		Channel1312(B) 1712.4MHz		Channel1412 (M) 1732.4MHz		Channel1513(T) 1752.6MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T_{nom} (25 °C) V_{nom} (5 V)	21.87	34.78	21.95	34.78	21.73	34.78
TM2	T_{nom} (25 °C) V_{nom} (5 V)	21.72	34.78	21.75	34.78	21.63	34.78
TM3	T_{nom} (25 °C) V_{nom} (5 V)	21.75	34.78	22.12	34.78	21.37	34.78

6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.

6.3 Modulation Characteristics

6.3.1 Test Conditions

Table 22 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	52 %
Test Configurations:	TM1 at frequency Middle

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 2.1047 and Part 27 Subpart C&L

6.3.2.2 Supporting Standards

Table 23 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.3.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and Part 27 Subpart C&L.

Table 24 Limits

Limits	Not applicable

6.3.3 Test Method and Setup

Connect the HUAWEI UMG181 Rotate USB Stick to Universal Radio Communication Tester CMU200 via the antenna connector. The frequency band is set as AWS; the HUAWEI UMG181 Rotate USB Stick ’s output is matched with 50 Ω load, test method was according to 3GPP TS 51.010. The waveform quality and constellation of the HUAWEI UMG181 Rotate USB Stick was tested.

Test setup

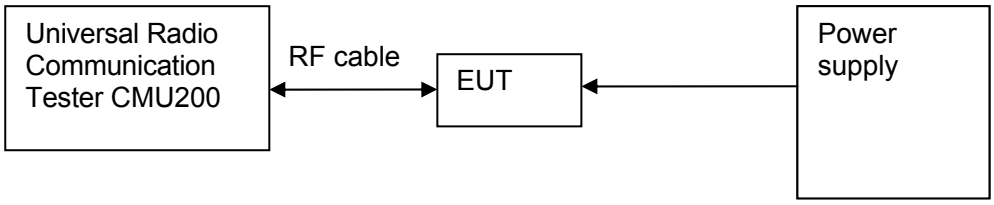


Figure 3.Test Set-up

6.3.4 Measurement Results

Table 25Measurement Results

		Modulation Characteristic
TEST CONDITIONS		Channel1412(M) 1732.4MHz
		Measured
		TM1
T_{nom} (25 °C)	V_{nom} (5.0V)	Refer to Appendix A

6.3.5 Conclusion

The equipment **PASSED** the requirement of this clause.

For the measurement results refer to appendix A.

6.4 Occupied Bandwidth

6.4.1 Test Conditions

Table 26 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1 at frequency Bottom, Middle, Top

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 2.1049 and Part 27

6.4.2.2 Supporting Standards

Table 27 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.4.2.3 Limits

No specific occupied bandwidth requirement in Part 27 Subpart C&L, but the occupied bandwidth was defined in part 2.1049: 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.

Table 28 Limits

Upper /lower frequency limits	0.5% of the mean power

6.4.3 Test Method and Setup

HUAWEI UMG181 Rotate USB Stick was connected to the wireless signal analyzer R&S FSU26 via the one RF connector. The band class is set as AWS; HUAWEI UMG181 Rotate USB Stick was controlled to transmit maximum power. Measure and record the occupied bandwidth of the HUAWEI UMG181 Rotate USB Stick by the R&S FSU26.

The OBW, 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:

Refer to 47CFR part2.1049 section (g)&(h).
(g) Transmitter in which the modulating base band comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The

level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.
(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudorandom generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

For TM1/TM2/TM3 following RBW and VBW are employed:
Measurement bandwidth (RBW): 50 kHz (Resolution bandwidth)
Video bandwidth (VBW): 500 kHz

Test Set-up

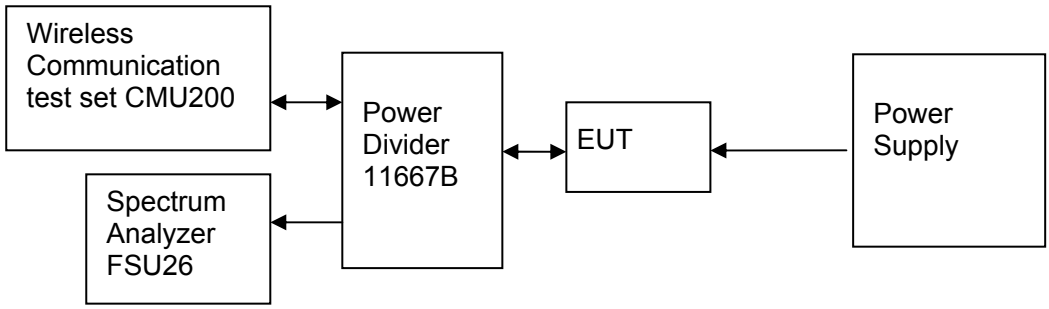


Figure 4.Test Set-up

6.4.4 Measurement Results

Table 29 Measurement Results

TEST CONDITIONS		Occupied Bandwidth		
Center Frequency		Channel1312(B) 1712.4MHz	Channel1412 (M) 1732.4MHz	Channel1513(T) 1752.6MHz
		Measured (MHz)	Measured (MHz)	Measured (MHz)
		TM3	TM3	TM3
T_{nom} (25 °C) V_{nom} (5 V)	99%	4.12	4.12	4.13

6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix B.

6.5 Band Edges Compliance

6.5.1 Test Conditions

Table 30 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55 %
Test Configurations:	TM1 at frequency Bottom, Top

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and Part 27.53

6.5.2.2 Supporting Standards

Table 31 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.5.2.3 Limits

Compliance with Part 27.50(d)(2), all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P(W). (Whereas P is the rated power of the EUT).

Table 32 Limits for WCDMA

	TM1
Rated Power:	24 dBm
Required attenuation:	43+10log (0.25) = 37 , 24 dBm - 37 dB
Absolute level	- 13 dBm

6.5.3 Test Method and Setup

HUAWEI UMG181 Rotate USB Stick was connected to the wireless signal analyzer R&S FSU26 via the one RF connector, the band class is set as AWS. HUAWEI UMG181 Rotate USB Stickwas controlled to transmit maximum power. Measure and record band edges compliance of the HUAWEI UMG181 Rotate USB Stick by the R&S FSU26.

For TM1/TM2/TM3 following RBW and VBW are employed:

Measurement bandwidth (RBW): 50 kHz (Resolution bandwidth)
Video bandwidth (VBW): 200 kHz

Test Set-up

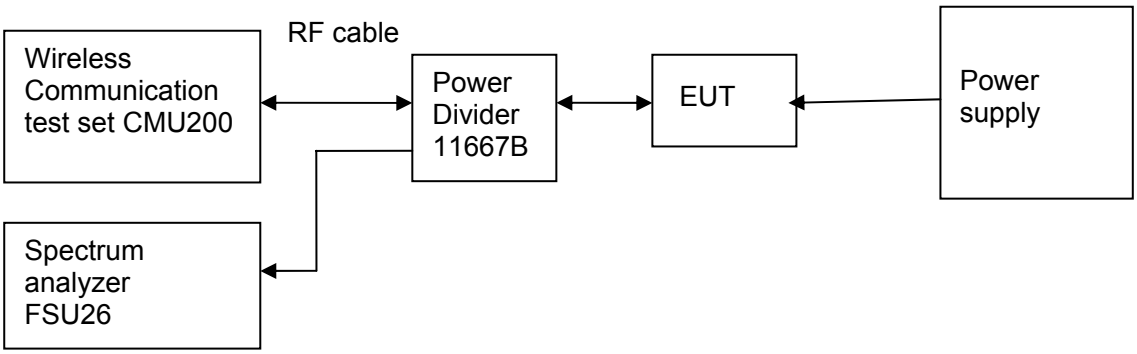


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 33 Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Spurious Level measured [dBm]	FCC limit	Result
AWS	T_{nom} (25 °C), V_{nom} (5.0V)					
	1712.4	1312	TM1	<-13(See appendix C)	- 13 dBm	Pass
	1752.6	1513	TM1	<-13(See appendix C)	- 13 dBm	Pass

6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix C.

6.6 Spurious Emission at Antenna Terminal

6.6.1 Test Conditions

Table 34 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	50 %
Test Configurations:	TM1 at frequency Bottom, Middle ,Top

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and Part 27.53

6.6.2.2 Supporting Standards

Table 35 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.6.2.3 Limits

Compliance with Part 27.50(d)(2), all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P. (Whereas P is the rated power of the EUT).

Table 36 Limits for WCDMA Mode

	TM1
Rated Power:	24 dBm
Required attenuation:	43+10log (0.25) = 37 , 24 dBm - 37 dB
Absolute level	- 13 dBm

6.6.3 Test Method and Setup

The EUT was connected to the wireless signal analyzer R&S FSU26 via the one RF connector, the band class is set as AWS. The EUT was controlled to transmit maximum power. Measure and record the Conducted Spurious Emission of the EUT by the R&S FSU26.

According to Part 27.50(d)(2), the defined measurement bandwidth as following:

24.238 (b) Measurement procedure: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz;
Measurement bandwidth (RBW) for 150 kHz up to 30MHz: 10 kHz;
Measurement bandwidth (RBW) for 30 MHz up to 20GHz: 1MHz;

Test Set-up

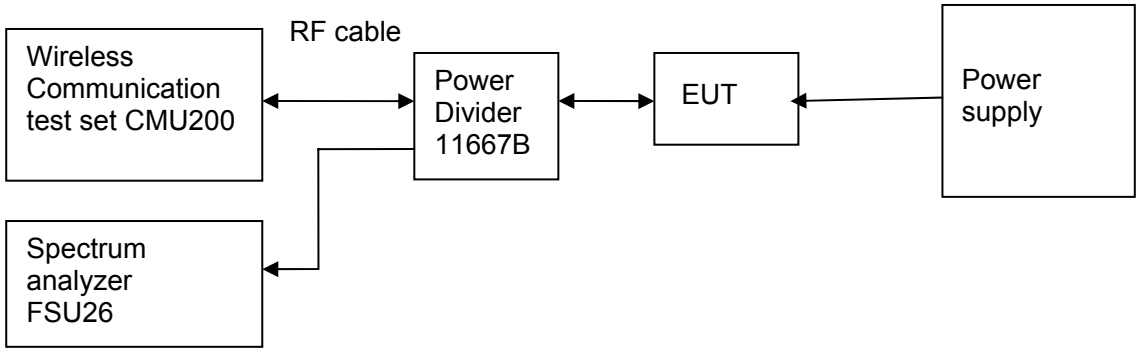


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 37 Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Output Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 1312(B)	TM1	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 1412(M)	TM1	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 1513(T)	TM1	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass

6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix D.

6.7 Frequency Stability

6.7.1 Test Conditions

Table 38 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 % at 25 °C
Test Configurations:	TM1 at frequency M

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 2.1055 and Part 27.54

6.7.2.2 Supporting Standards

Table 39 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.7.2.3 Limits

No specific frequency stability requirement in part 2.1055 and Part 27.50(d)(2).

6.7.3 Test Method and Setup

The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From -30 ° to +50 ° centigrade for all equipment except that specified in subparagraphs
(2) and (3) of paragraph 2.1055

(a) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(b) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 95 to 105 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply

voltage and at each extreme also shall be shown.
(c) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

The EUT can only work in such extreme voltage 4.75V and 5.25V，so here the EUT is tested in the 4.75V and 5.25V.

Test Set up

Connect the EUT to the Wireless Communication test set CMU200 via the connector. Then measure the frequency error by the Wireless Communication test set CMU200. The EUT's output is matched with a 50 Ω load.

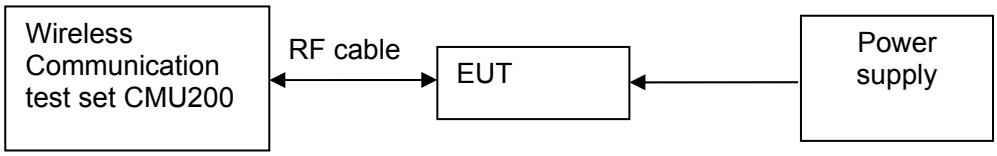


Figure 7. Test Set up

6.7.4 Measurement Results

6.7.4.1 Measurement Results vs. Variation of Temperature

- **TM1, 5.0V DC Channel No.1412(1732.4MHz)**

Table 40 Measurement Results vs. Variation of Temperature—TM1

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	1732.4	25	Pass
-20 °C	24	1732.4	-18	Pass
-10 °C	24	1732.4	14	Pass
0 °C	24	1732.4	15	Pass
+10 °C	24	1732.4	-13	Pass
+20 °C	24	1732.4	8	Pass
+30 °C	24	1732.4	-2	Pass
+40 °C	24	1732.4	12	Pass
+50 °C	24	1732.4	21	Pass

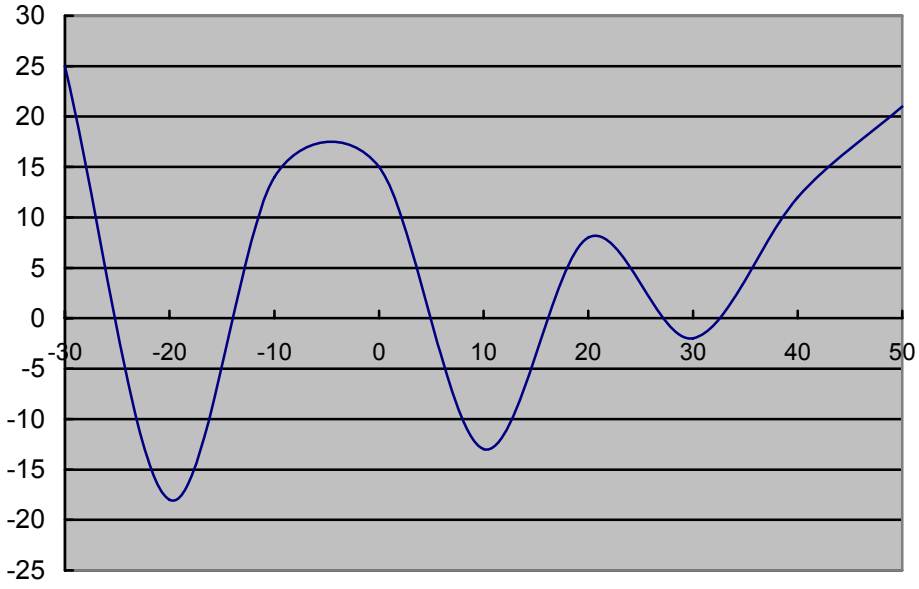


Figure 8. WCDMA Mode Test Graph

6.7.4.2 Measurement Results vs. Variation of Voltage

- **TM1, 25 °C ,Channel No.1412(1732.4MHz)**

Table 41 Measurement Results vs. Variation of Voltage－TM3

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
4.75 V	24	1732.4	-12	Pass
5 V	24	1732.4	14	Pass
5.25 V	24	1732.4	21	Pass

6.7.5 Conclusion

The equipment **PASSED** the requirement of this clause.

7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Table 42 System Measurement Uncertainty

Items		Extended Uncertainty
Effective Isotropic Radiated Power of Transmitter	EIRP (dBm)	U=3dB; k=2
Band Width	Magnitude (%)	U=0.2%; k=2
Band Edge Compliance	Disturbance Power(dBm)	U=2.0dB; k=2
Conducted Spurious Emission at Antenna Terminal	Disturbance Power(dBm)	U=2.0dB; k=2
Frequency Stability	Frequency Accuracy(ppm)	U=0.21ppm; k=2

8 Appendices

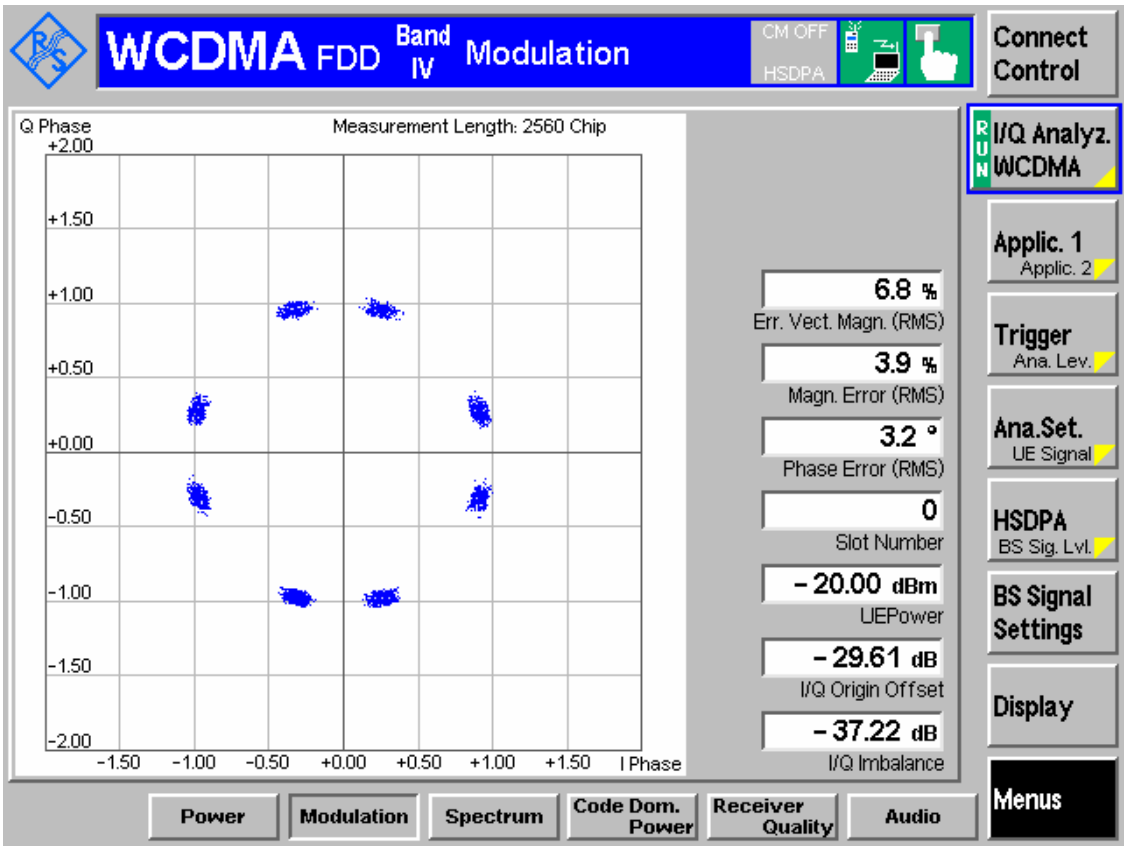
Appendix A	Measurement Results Modulation Characteristics	2 Pages
Appendix B	Measurement Results Occupied Bandwidth	4 Pages
Appendix C	Measurement Results Band Edges	3 Pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	10 Pages

Appendix A

Modulation Characteristics

According to FCC Part 2.1047 & Part 27 Subpart C&L

TM1: WCDMA
Channel 1412

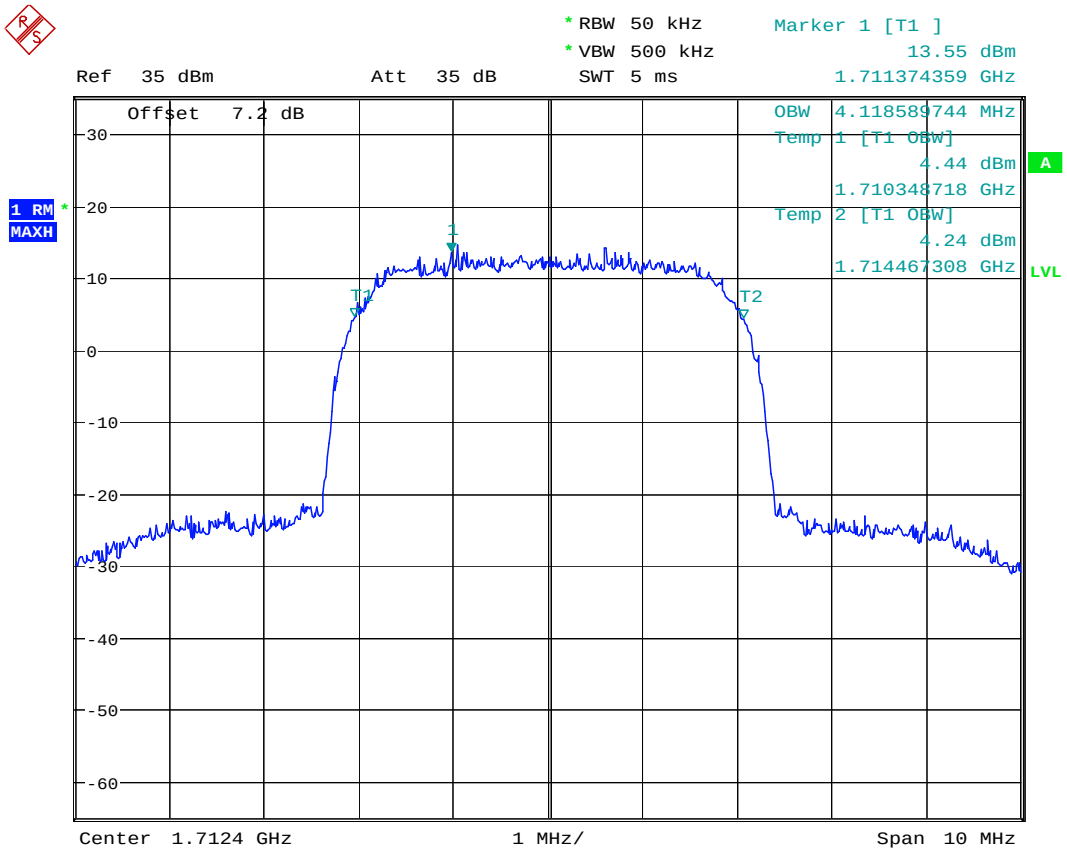


Appendix B

Occupied Bandwidth

According to FCC Part 2.1049 & Part 27 Subpart C&L

TM1: WCDMA
Channel 1312



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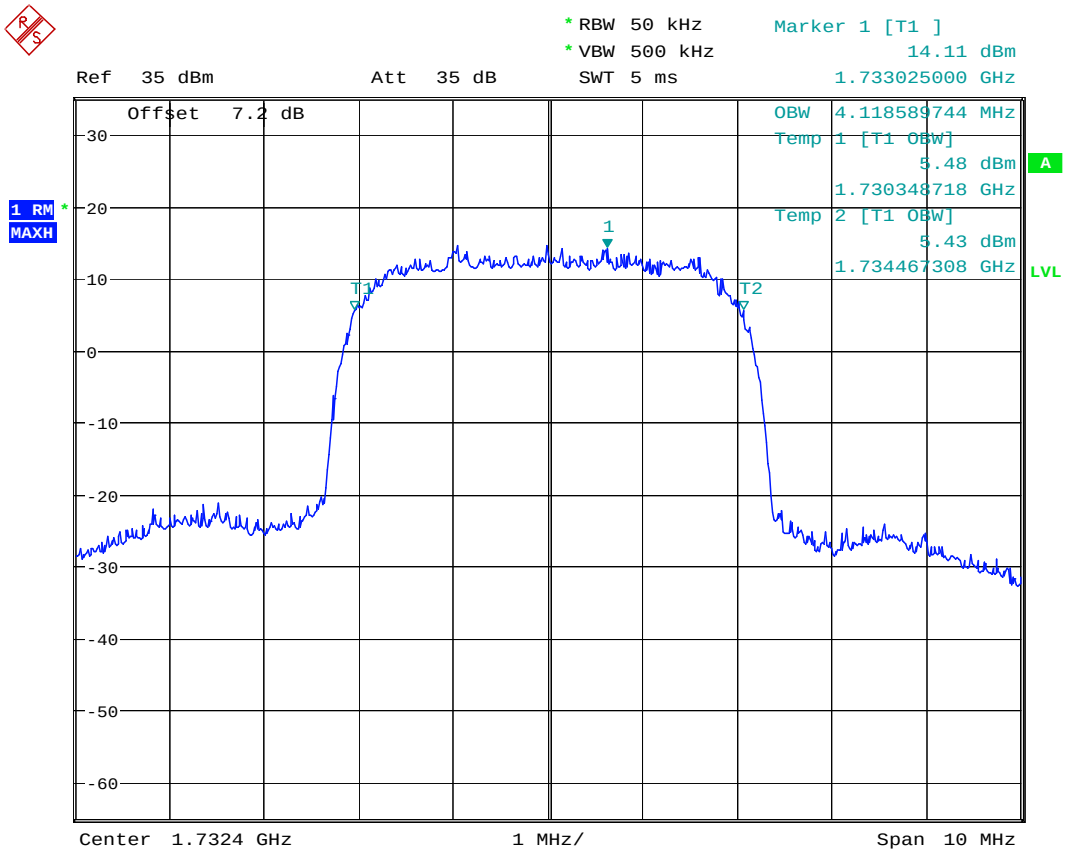
Channel 1412



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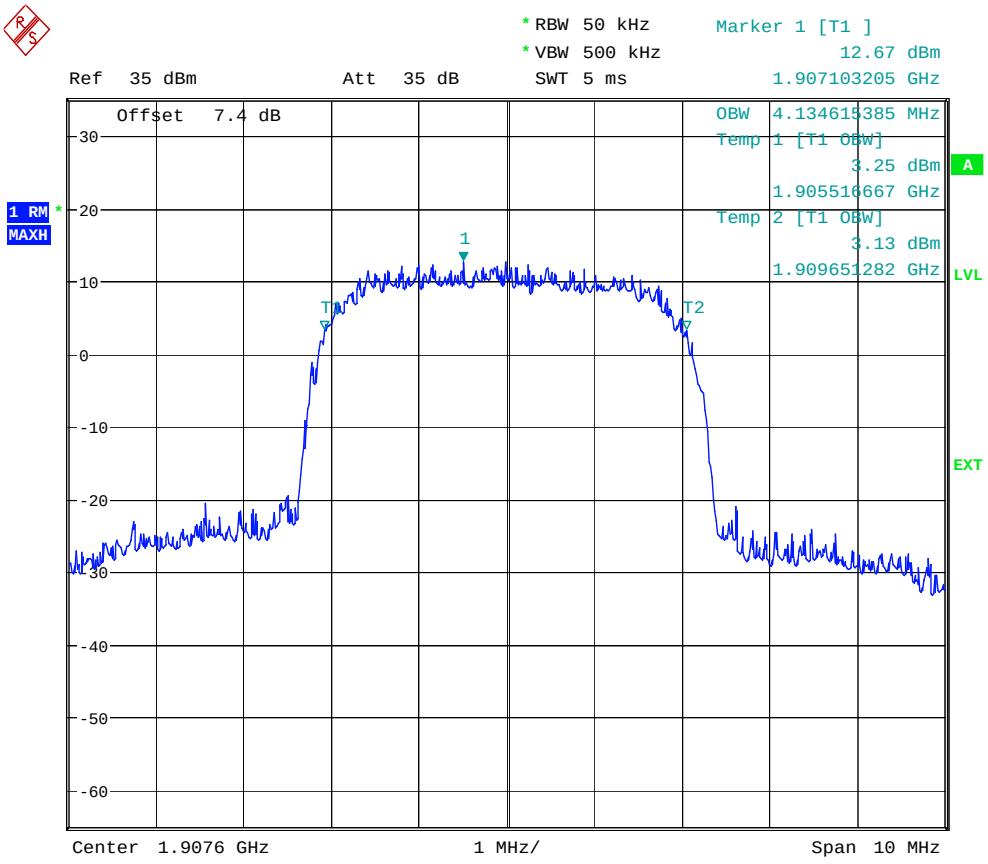
Channel1513



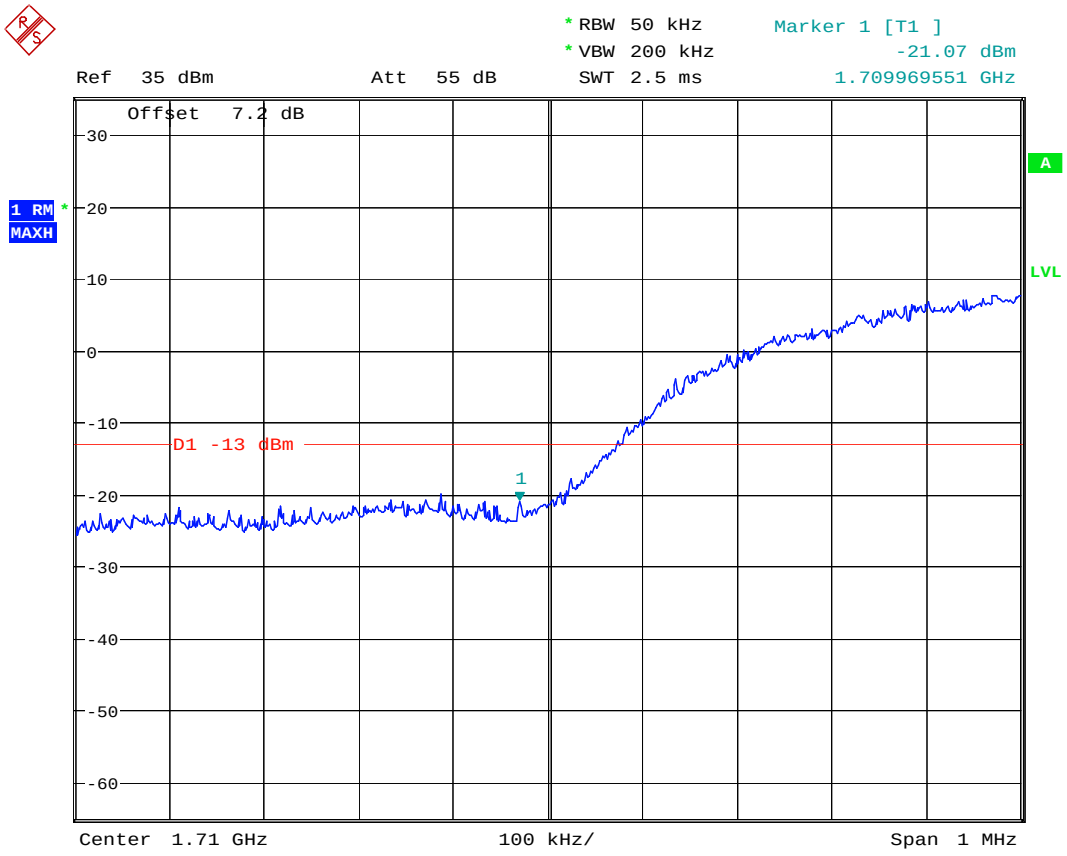
Date: 20.SEP.2008 18:17:01

Appendix C

Band Edges Compliance

According to FCC Part 2.1051 & Part 27 Subpart C&L

TM1: WCDMA
Left Edge
Channel 1312



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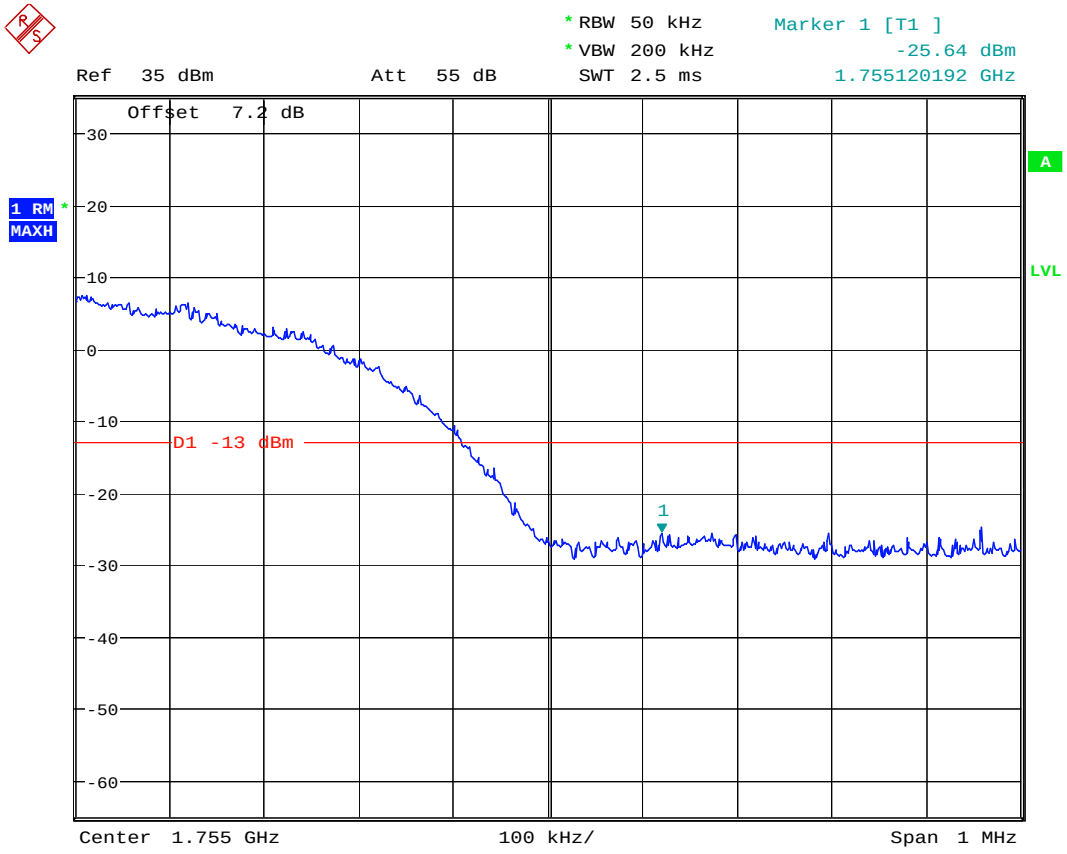
Right Edge
Channel 1513



Date: 8.OCT.2008 11:32:19

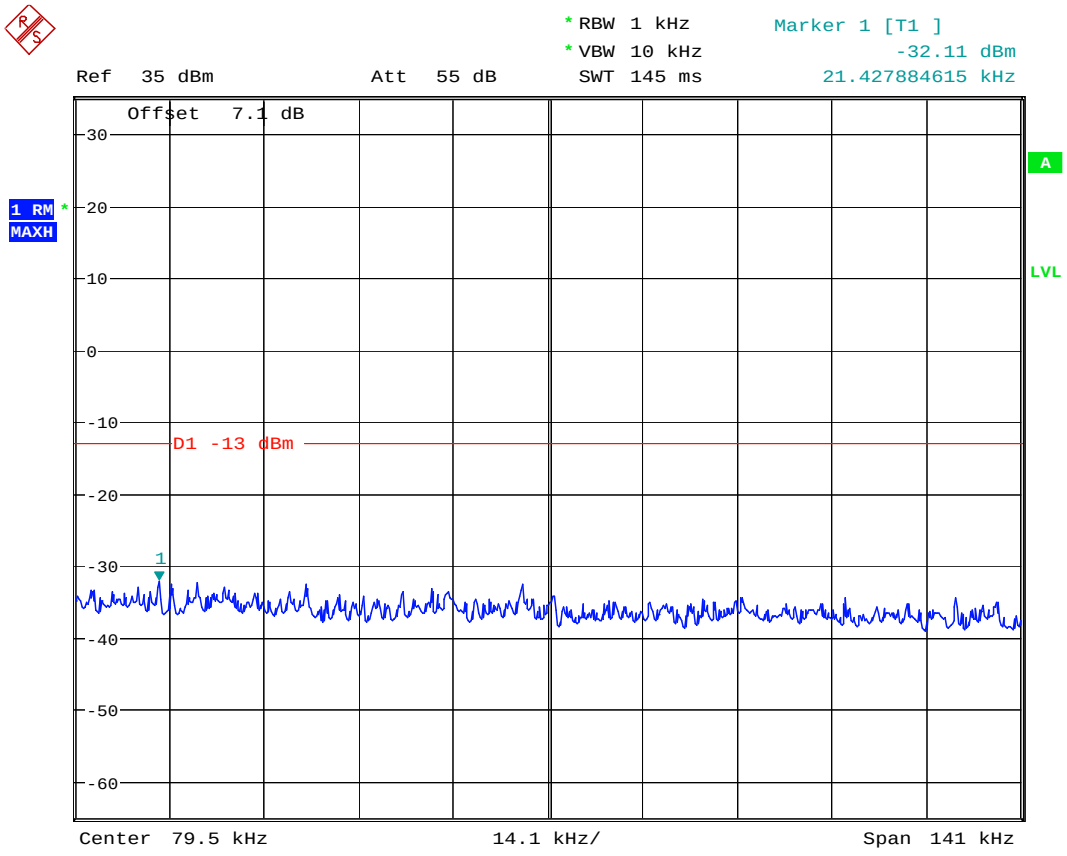
Appendix D

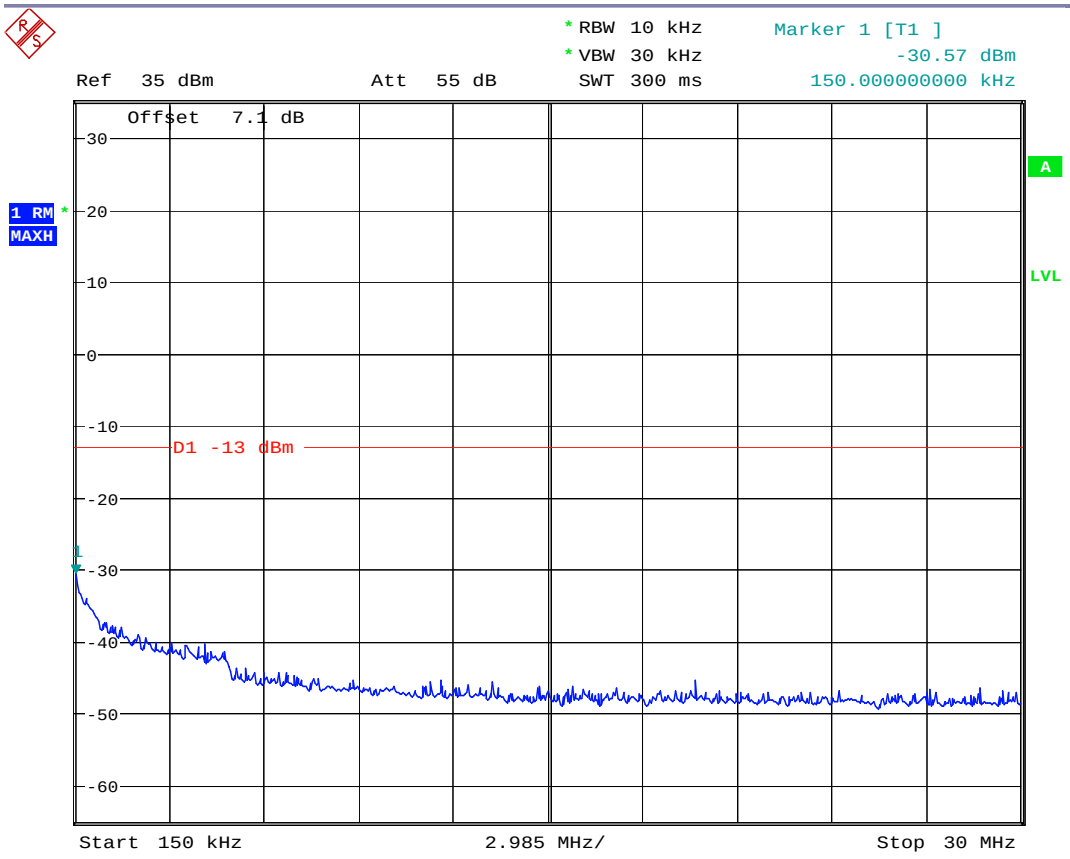
Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & Part 27 Subpart C&L

TM1: WCDMA

Channel 1312





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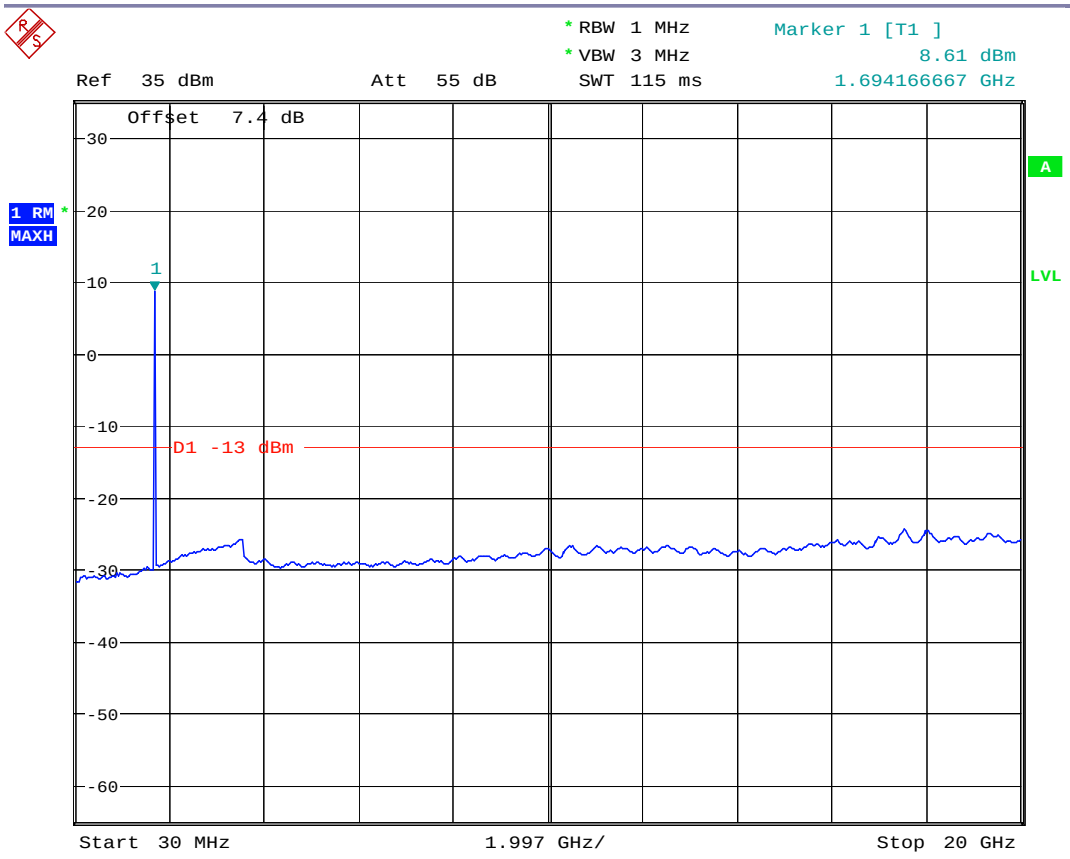
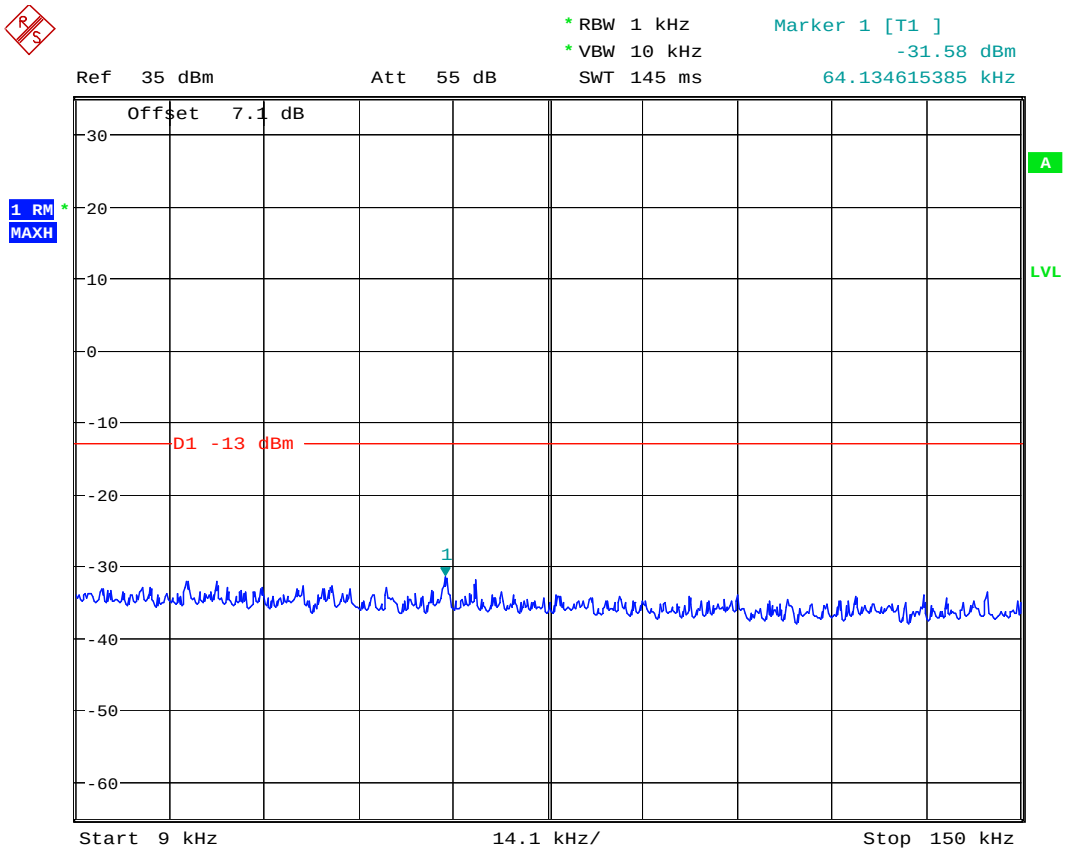

*RBW 1 MHz
*VBW 3 MHz
SWT 115 ms
Marker 1 [T1]
8.61 dBm
1.694166667 GHz
Ref 35 dBm
Att 55 dB
Offset 7.4 dB
1 RM
MAXH
A
LVL
D1 -13 dBm
Start 30 MHz
1.997 GHz/
Stop 20 GHz
Date: 8.OCT.2008 15:27:40

Channel 1412



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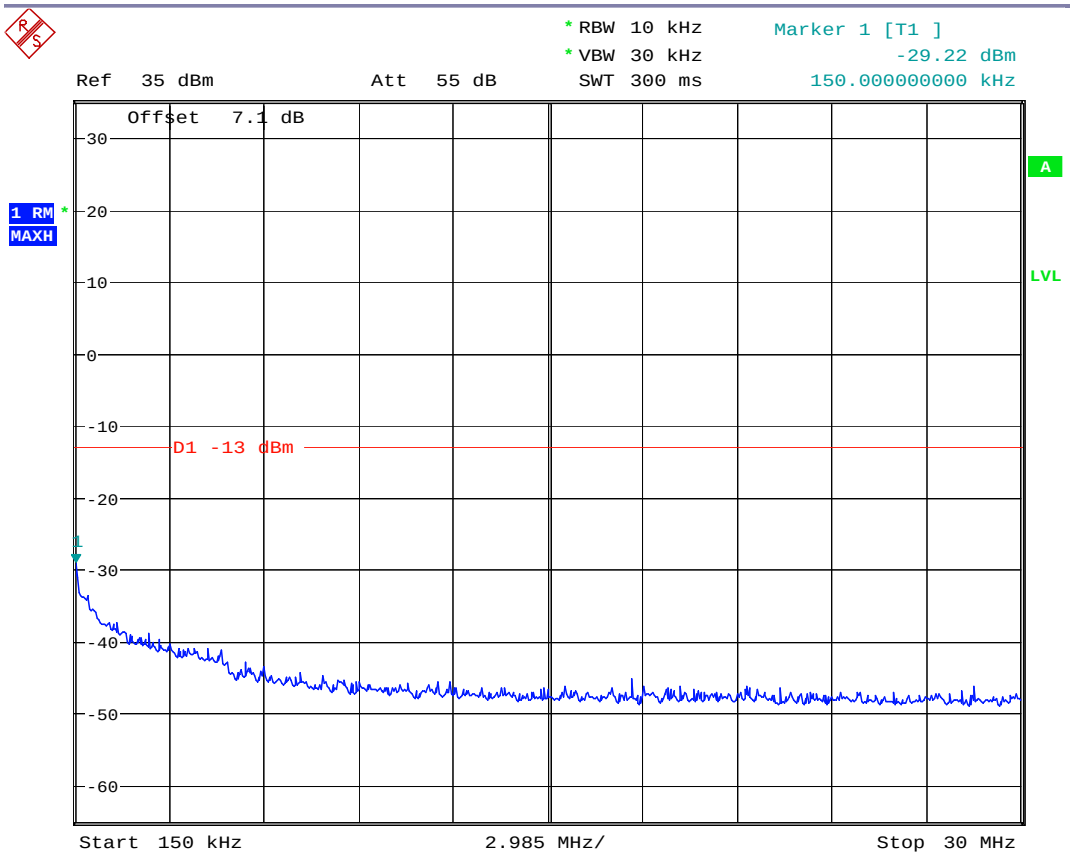

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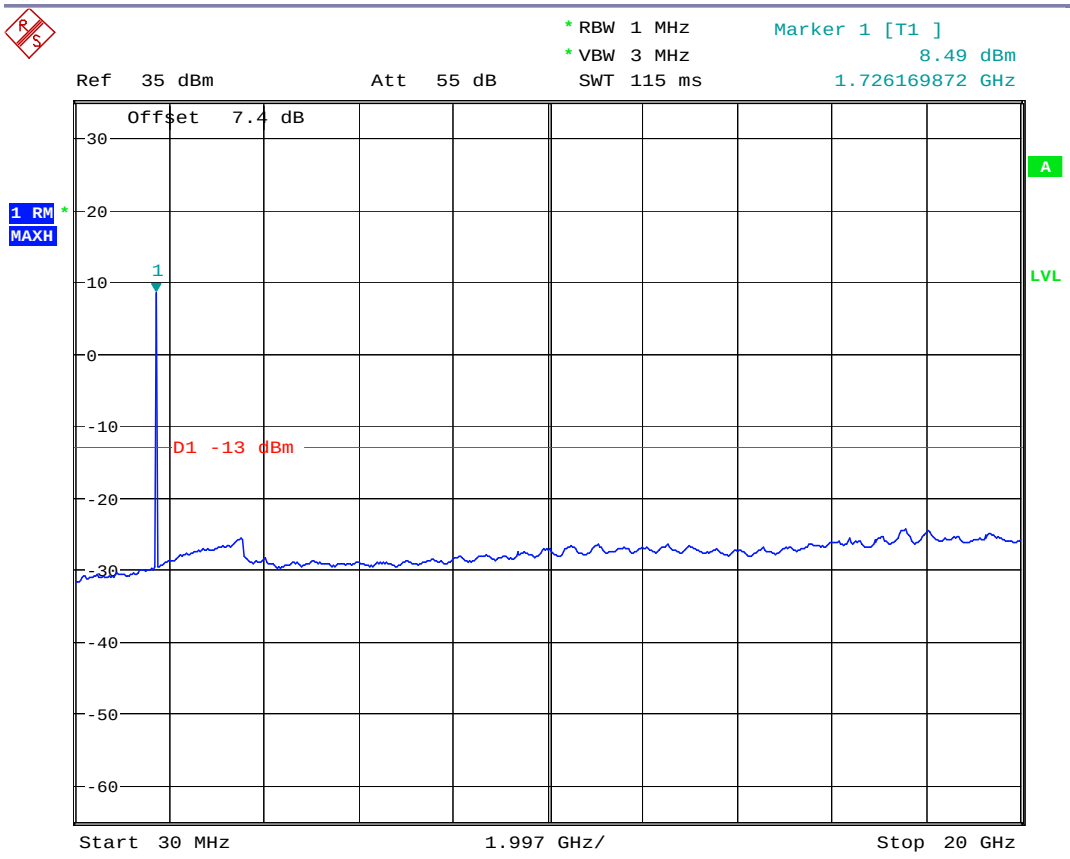

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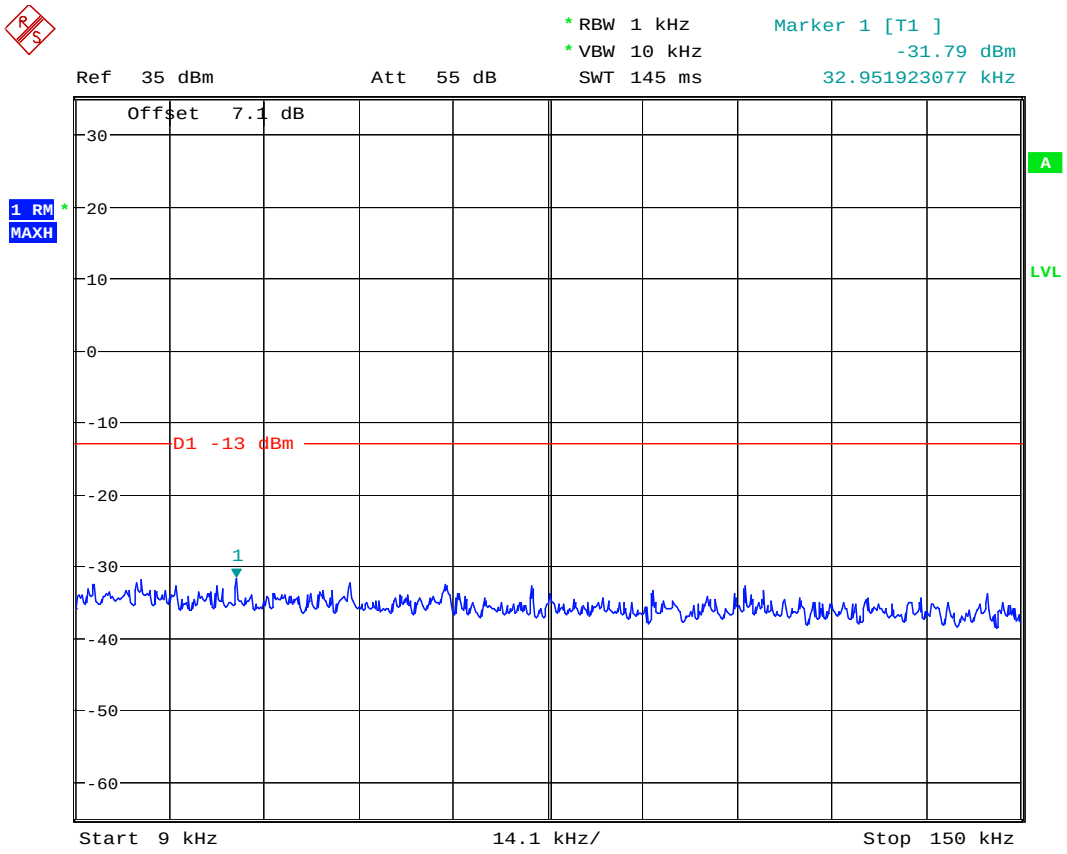
Channel 1513



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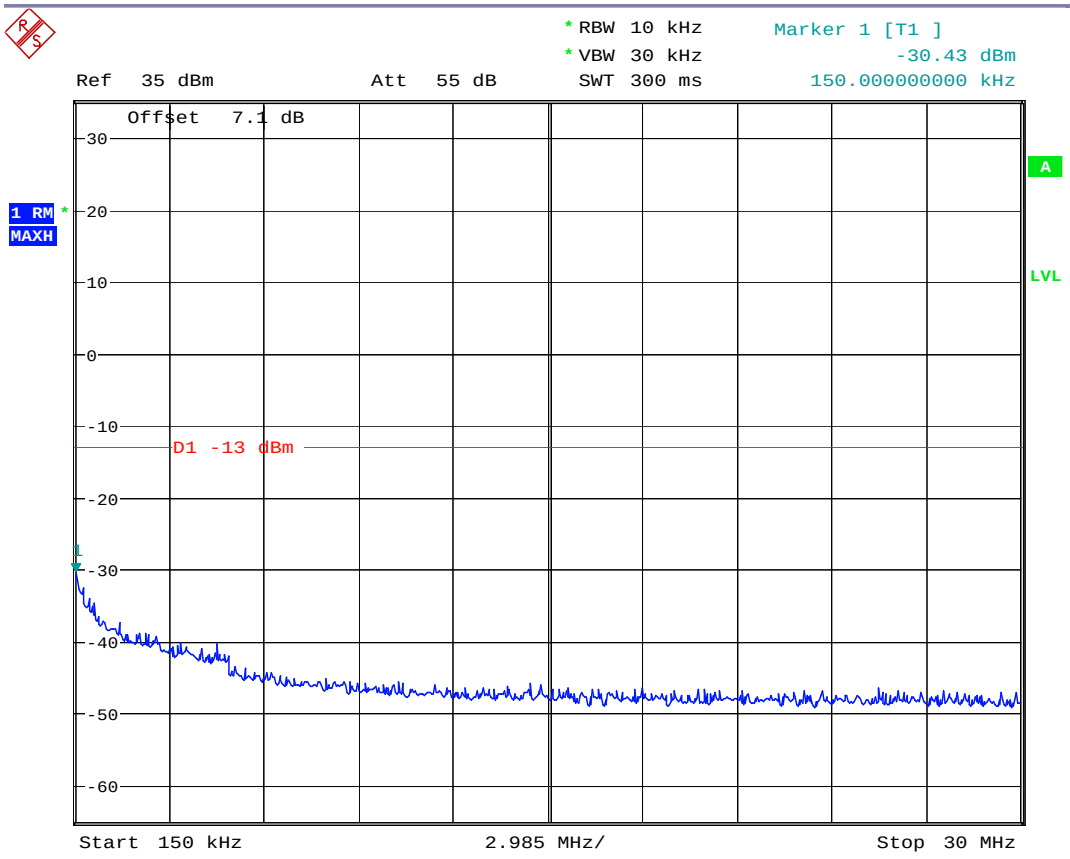

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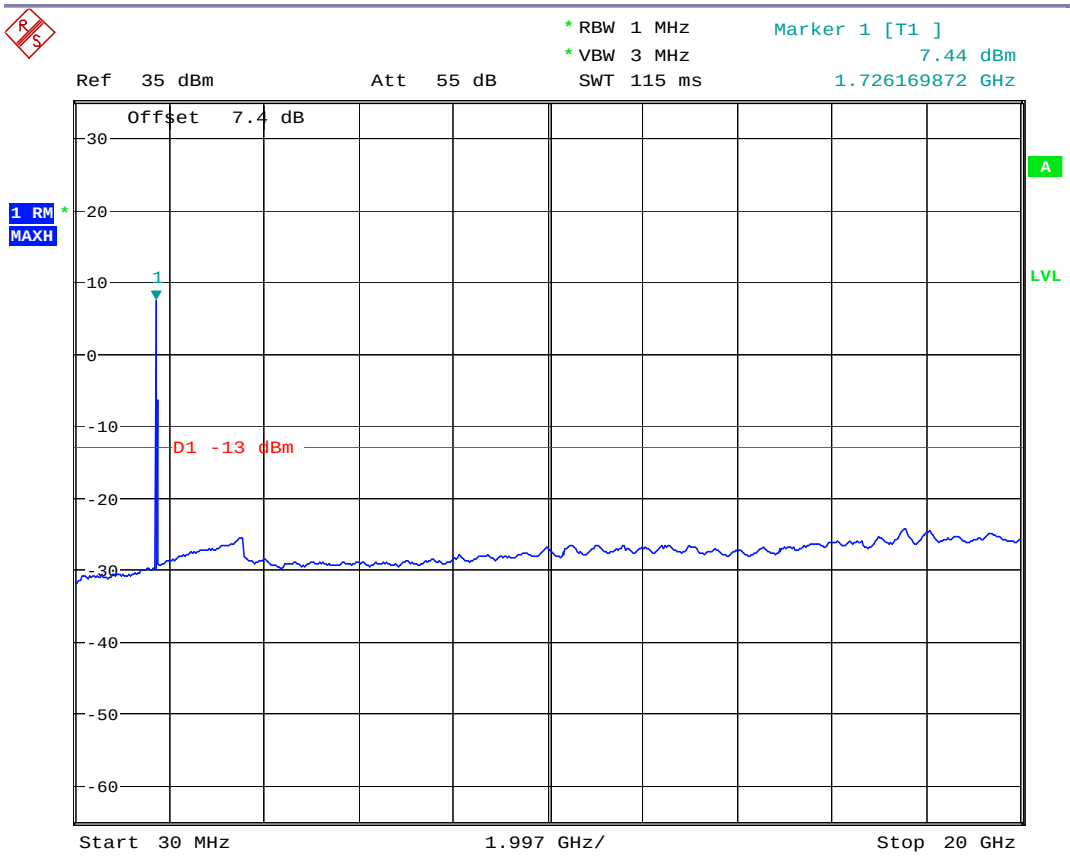

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