



FCC RF Test Report

**Product Name: HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone
with Bluetooth; StarTrail II; webphones Android™ by sfr
STARTRAIL II; HUAWEI Ascend Y 200; Ascend Y 200**

Model Number: HUAWEI U8655-1,U8655-1

**Report No: SYBH(Z-RF)007022012-2002
FCC ID: QISU8655-1**

Reliability Laboratory of Huawei Technologies Co., Ltd.

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

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Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
2. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
3. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-2.
4. The test report is invalid if not marked with "exclusive stamp for the test report".
5. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. If there is any dissidence for the test report, please file objection to the test centre within 15 days from the date of receiving the test report.
8. Normally, the test report is only responsible for the samples that have undergone the test.
9. Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.



Applicant: Huawei Technologies Co., Ltd.
Address: Huawei Base, Bantian, Longgang District, Shenzhen
518129, P.R. China
Date of Receipt Test Item: Feb.08, 2012
Start Date of Test: Feb.09, 2012
End Date of Test: Feb.17, 2012

Test Result: Pass

Approved By Senior Engineer Feb.20, 2012 Dai Linjun
Date Name Signature

Reviewed By Feb.20, 2012 Cousy Xu
Date Name Signature

Operator Feb.20, 2012 Huang Qiuliang
Date Name Signature

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1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2:2010, Subpart J
47 CFR FCC Part 24:2010, Subpart E
ANSI/TIA 603C:2004

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R.
China

1.3 Test Environment Condition

Ambient Temperature: 20 – 25 °C
Ambient Relative Humidity: 45 – 55 %
Atmospheric Pressure: 101 kPa

2 Summary

Table 1 Summary of results

Test Case	FCC Part No.	Requirements	Result
PCS Band			
Transmitter Output Power	2.1046 & 24.232	Peak EIRP not exceed 2 W Peak-to-average ratio not exceed 13 dB	Pass
Modulation Characteristics	2.104	Digital modulation	Pass
Occupied Bandwidth	2.104	(Not specified)	Pass
Band Edges Compliance	2.1051 & 24.238	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	2.1051 & 24.238	Below -13 dBm/1 kHz, 9 kHz to 150 kHz Below -13 dBm/10 kHz, 150 kHz to 30 MHz Below -13 dBm/1 MHz, 30 MHz to 10 th harmonics	Pass
Field Strength of Spurious Radiation	2.1053 & 24.238	Below -13 dBm/1 MHz	Pass
Frequency Stability	2.1055 & 24.235	Stay within the authorized frequency block	Pass

3 Product Description

3.1 Production Information

3.1.1 General Description

HUAWEI U8655-1, U8655-1 is subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band I and Band VIII. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only PCS1900 band test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

3.1.2 Board

Table 2 Board Information

Product Name: HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; StarTrail II; webphones Android™ by sfr STARTRAIL II; HUAWEI Ascend Y 200; Ascend Y 200		
HUAWEI U8655-1,U8655-1		
Board and Module		
Hardware Version	Software Version	Serial Number
HD1U8655M	U8655-1V100R001C00B869	L3F01A11C2000101

3.1.3 Adapter Technical Data

AC/DCAdapter Model	HW-050100U1W
Manufacturer	Huawei Technologies Co., Ltd.
Input Voltage	~100-240V 50/60Hz 0.2A
Output Voltage	5V  1A
Rated Power	5W

AC/DCAdapter Model	HW-050100A1W
Manufacturer	Huawei Technologies Co., Ltd.
Input Voltage	~100-240V 50/60Hz 0.2A
Output Voltage	5V  1A
Rated Power	5W

3.1.4 Battery Technical Data

Name	Manufacture	Description
Rechargeable Li-ion	Huawei Technologies Co., Ltd.	Battery Model: HB5K1 Rated capacity: 1250mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V

Name	Manufacture	Description
Rechargeable Li-ion	Huawei Technologies Co., Ltd.	Battery Model: HB5K1H Rated capacity: 1400mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V

4 Test Description

4.1 Supported Frequency Range

Characteristics	Description
Downlink	1930 to 1990 MHz;
Uplink	1850 to 1910 MHz

4.2 Transmitter / Receiver Characteristics

Characteristics	Description
System Type	GSM
TX Output Power (per Antenna Port)	GSM system: 30dBm;
Channel Spacing(s) / Bandwidth(s)	GSM system: 200 kHz
Designation of Emissions	GSM system: 247KGXW (GMSK modulation), 249KG7W (8PSK modulation)

4.3 Antenna Gain

Antenna Gain(dBi)	0.1
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4.4 Power Supply

Specification	Description
Power Supply Type	Directly Connected to DC /AC Power Supply
Input to EUT (DC power)	DC Voltage Nominal: $\approx$ 3.7 V DC Voltage Range: $\approx$ 3.6 V to 4.2 V
Input to EUT (AC power)	AC Voltage Nominal: $\sim$ 120 V (50/60 Hz) AC Voltage Range: $\sim$ 100-240V

5 General Test Conditions / Configurations

5.1 RF Channels under Test

Test Mode	TX / RX	RF Channel		
		Bottom (B)	Middle (M)	Top (T)
TM1/TM2	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0MHz	1909.8MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz

5.2 Test Modes

Test Mode	Test Modes Description
TM1	GSM/GPRS, GMSK modulation
TM2	EDGE, 8PSK modulation

5.3 Test Environments

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.6V
	VN	3.7V
	VH	4.2V

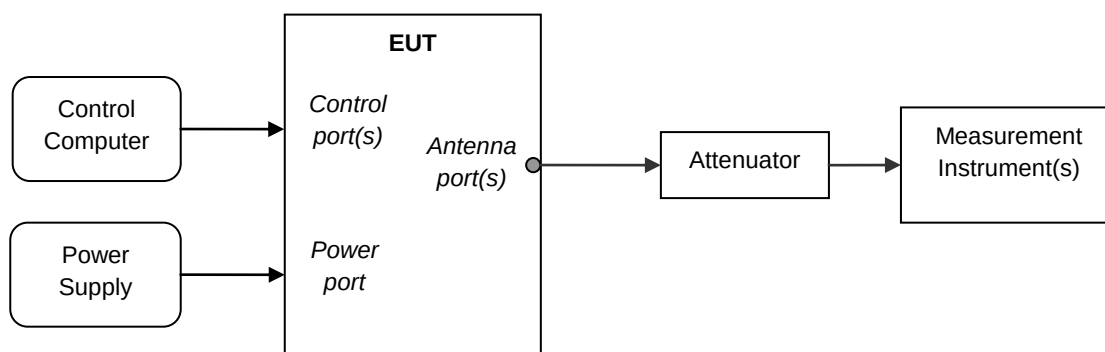
NOTE: VL= lower extreme test voltages
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

5.4 Test Setups

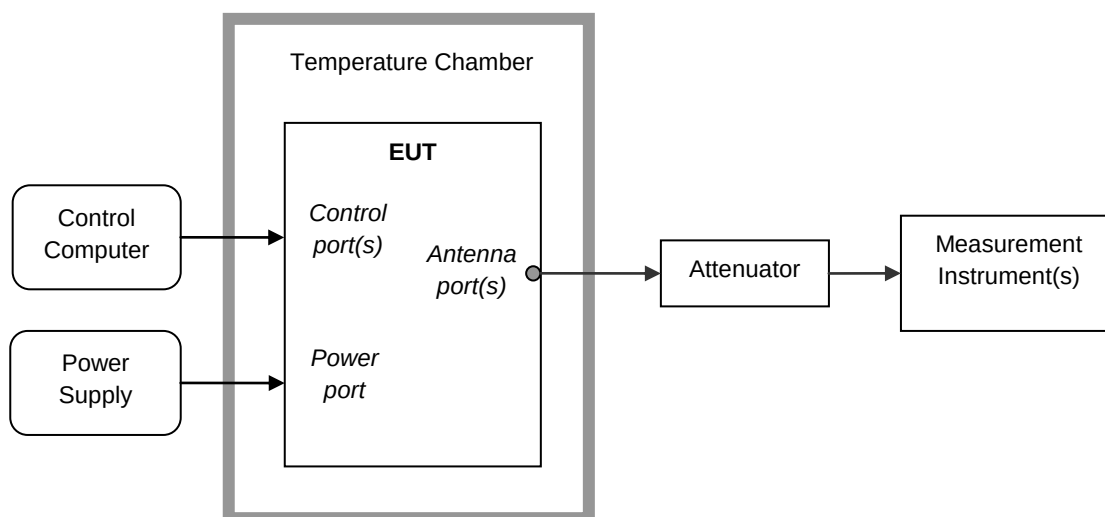
5.4.1 General Test Setup Configurations

Configuration	Description
Test Antenna Ports	Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

5.4.2 Test Setup 1



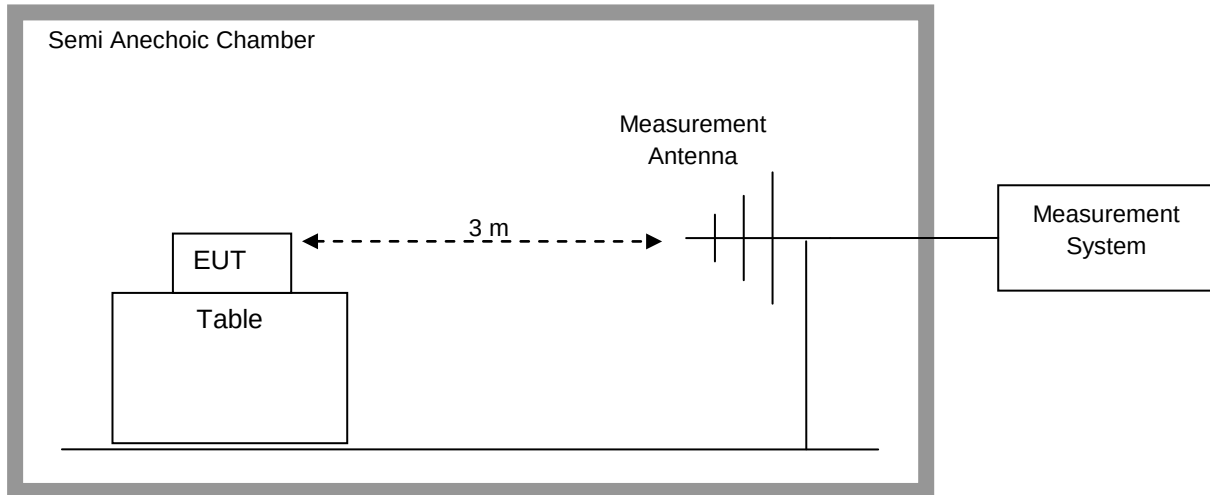
5.4.3 Test Setup 2



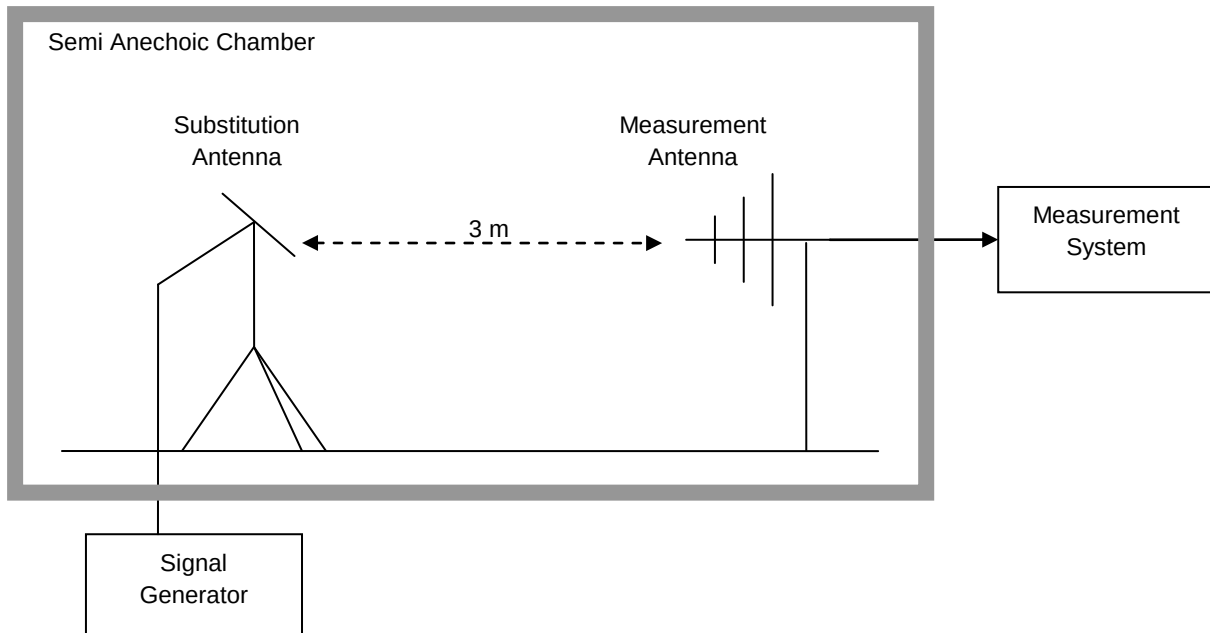
5.4.4 Test Setup 3

NOTE: Effective Isotropic radiated power (EIRP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

Step 1: Pre-test



Step 2: Substitution method to verify the maximum EIRP



5.5 Test Conditions

Test Case	Test Conditions	
Transmitter Output Power	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1 & Test Setup 3
	Detector	RMS
	RF Channels (TX)	B, M, T
	Test Mode	TM1/TM2
Modulation Characteristics	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	RF Channels (TX)	M
	Test Mode	TM1/TM2
Occupied Bandwidth	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	PK
	RF Channels (TX)	B, M, T
	Test Mode	TM1/TM2
Band Edges Compliance	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	RMS
	RF Channels (TX)	B, T
	Test Mode	TM1/TM2
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	PK
	RF Channels (TX)	B, M,T
	Test Mode	TM1/TM2
Field Strength of Spurious Radiation	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 3
	Detector	PK
	RF Channels (TX)	M
	Test Mode	TM1/TM2
Frequency Stability	Test Configuration	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Temperature.
	Test Setup	Test Setup 2



Test Case	Test Conditions	
	RF Channels (TX)	M
	Test Mode	TM1/TM2

6 Main Test Instruments

Table 3 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2012
Universal Radio Communication Tester	R&S	CMU200	117341	Jan.12.2013
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug.31,2012
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.20,2012
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2012
Temperature Chamber	WEISS	WKL64	24600294	Jan.03,2013
Signal generator	Agilent	E8257D	MY49281095	Jul.9.2012
Test receiver	R&S	ESU26	100150	May.29.2012
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	919/1009	Jan.29.2013
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	Jan.29.2013
Horn Antenna	R & S	HF906	100683	May.15, 2012
Horn Antenna	R & S	HF906	100684	Jul.01, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-357	May.15, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-356	May.15, 2012

7 Test Results

No.	Test Item	Test Result
1	Transmitter Output Power	Appendix A
2	Modulation Characteristics	Appendix B
3	Occupied Bandwidth	Appendix C
4	Band Edges Compliance	Appendix D
5	Spurious Emission at Antenna Terminals	Appendix E
6	Field Strength of Spurious Radiation	Appendix F
7	Frequency Stability	Appendix G
8	Photos of Field Strength of Spurious Radiation	Appendix H

NOTE: The Appendix H only photos of Field Strength of Spurious Radiation, no test data.

8 Measurement Uncertainty

For a 95% confidence level (k=2), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
Transmitter Output Power	Power (dBm)	U =0.39 dB
Occupied Bandwidth	Magnitude (%)	U=0.2%
Band Edge Compliance	Disturbance Power (dBm)	U=2.0 dB
Conducted Spurious Emissions	Disturbance Power (dBm)	U=2.0 dB
Field Strength of Spurious Radiation	ERP (dBm)	U=4.6 dB (30 MHz – 1GHz) U=3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy (ppm)	U=0.21 ppm

-----The END-----



Appendix A

Transmitter Output Power According to FCC Part 2.1046 & Part24.232



Conducted Power of Transmitter

Table 1 Measurement Results

TEST CONDITIONS	RF Output Power (Conducted)					
	Channel512(B)		Channel661(M)		Channel810(T)	
	1850.2MHz		1880.0MHz		1909.8MHz	
	dBm		dBm		dBm	
T_{nom} / V_{nom}	Measured	Limit	Measured	Limit	Measured	Limit
TM1	29.25	33	29.32	33	29.33	33
TM2	25.93	33	25.97	33	26.01	33

Effective Isotropic Radiated Power of Transmitter (EIRP)

Table 2 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	1850.2	29.35	Horn Ant.	25.89	4.5	1	29.39	33	Pass
TM1	1880.0	29.42	Horn Ant.	25.94	4.5	1	29.44	33	Pass
TM1	1909.8	29.43	Horn Ant.	25.61	4.8	1	29.41	33	Pass
TM2	1850.2	26.03	Horn Ant.	22.57	4.5	1	26.07	33	Pass
TM2	1880.0	26.07	Horn Ant.	22.52	4.5	1	26.02	33	Pass
TM2	1909.8	26.11	Horn Ant.	22.37	4.8	1	26.17	33	Pass

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

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level

-----The END-----



Appendix B

Modulation Characteristics

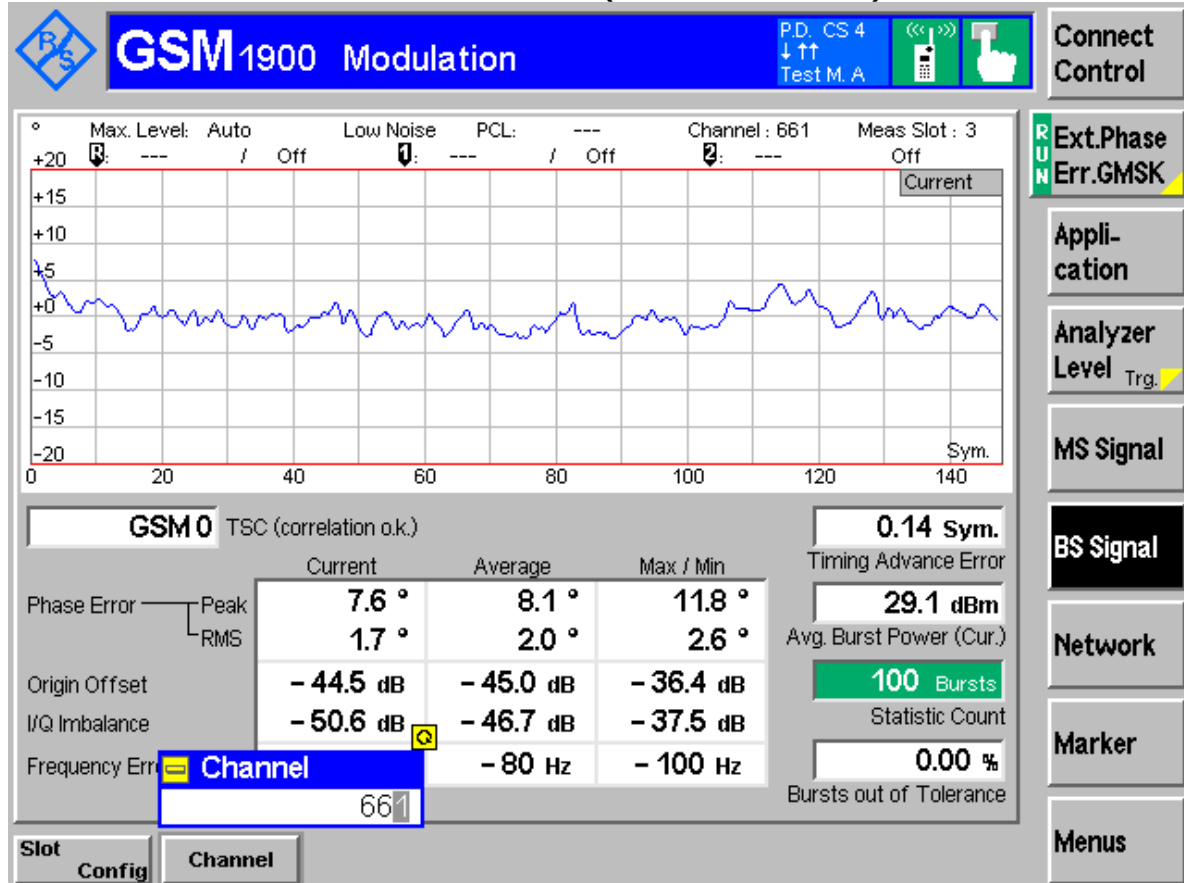
According to FCC Part 2.1047 & Part24 Subpart E



1 Test Plot

1.1 Test Mode = TM 1

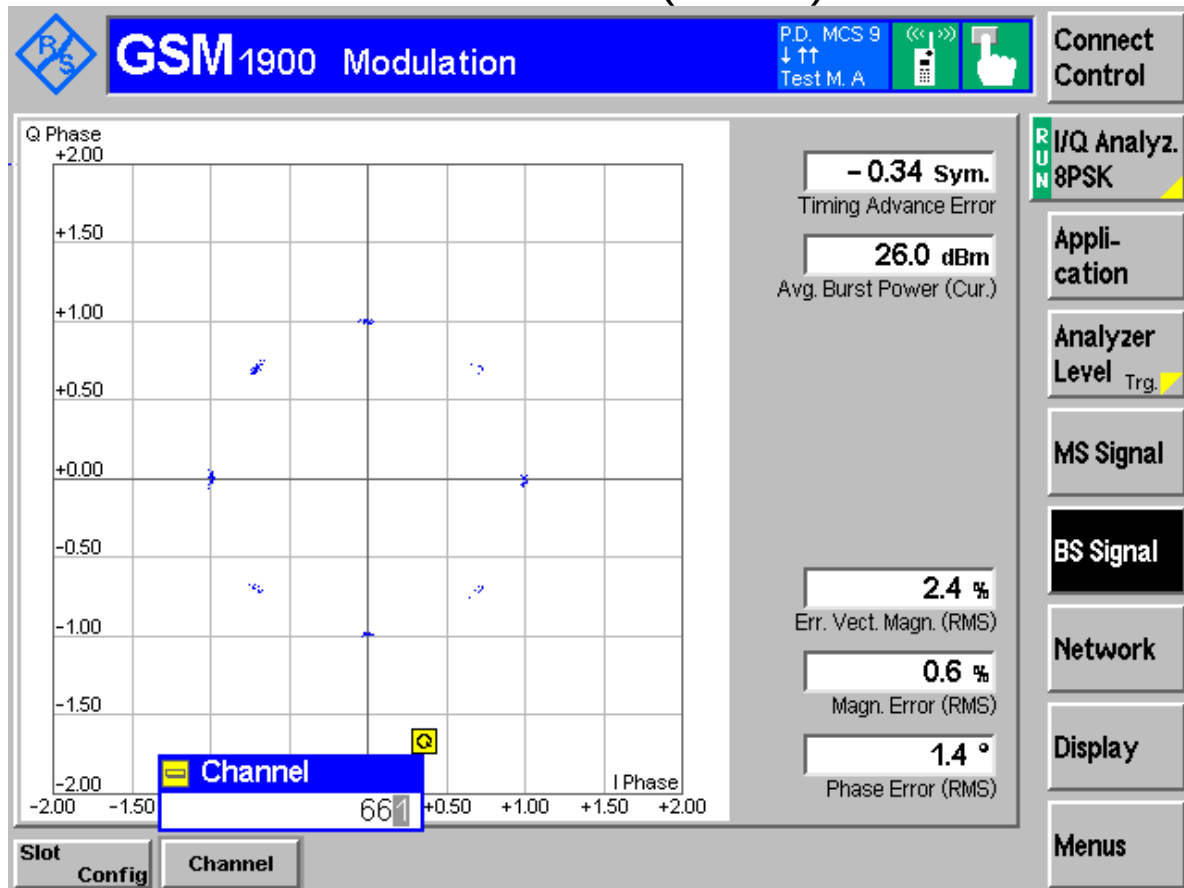
Channel 661 (GPRS/GSM)





1.2 Test Mode = TM 2

Channel 661 (EDGE)



-----The END-----



Appendix C

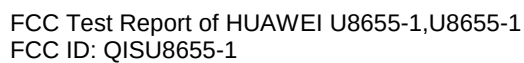
Occupied Bandwidth According to FCC Part 2.1049 & Part 24 Subpart E



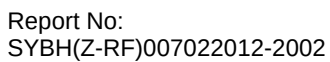
Result Table

Table 1 Measurement Results

Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	512	245.19	Pass
	661	246.79	Pass
	810	241.99	Pass
TM2	512	243.59	Pass
	661	248.40	Pass
	810	246.79	Pass



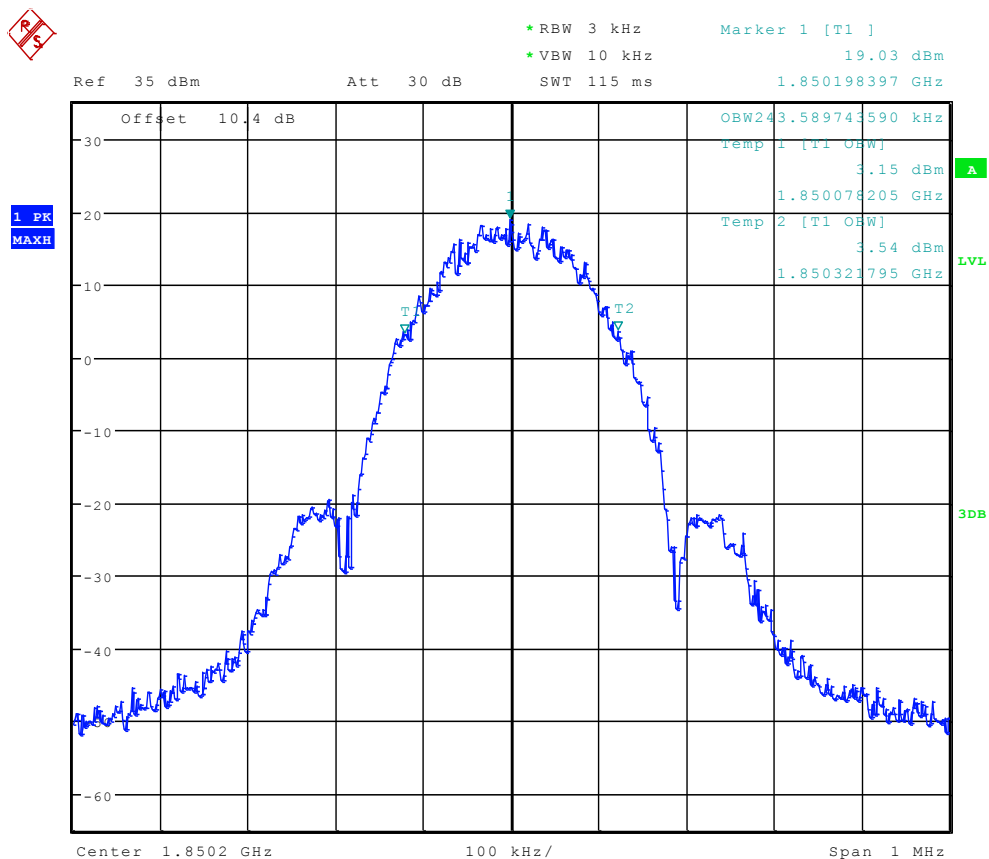
TM1:GPRS/GSM
Channel 512



Page3, Total8

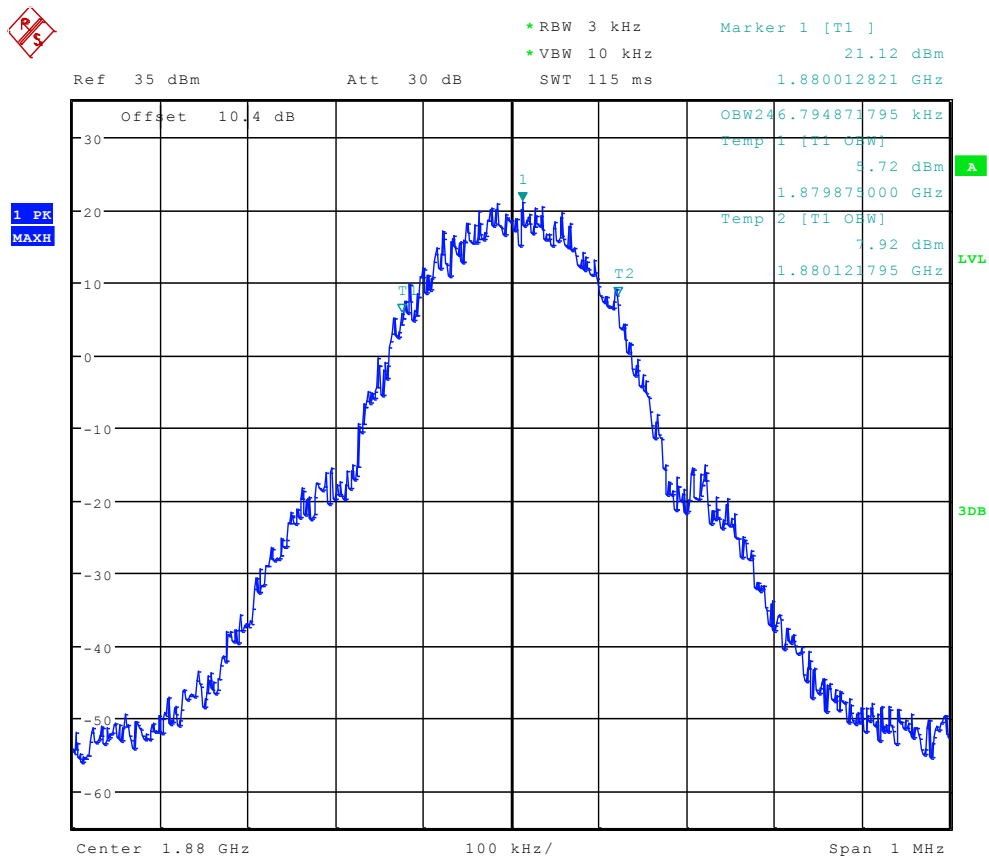


TM2:EDGE Channel 512



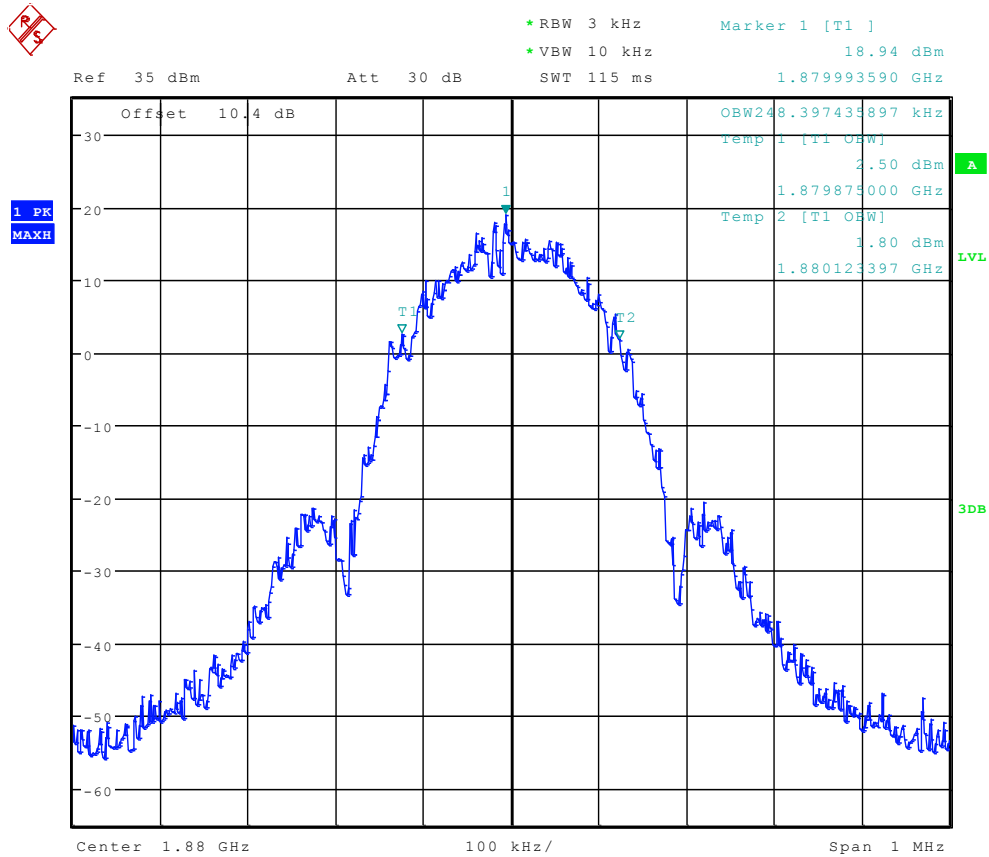


TM1:GPRS/GSM Channel 661



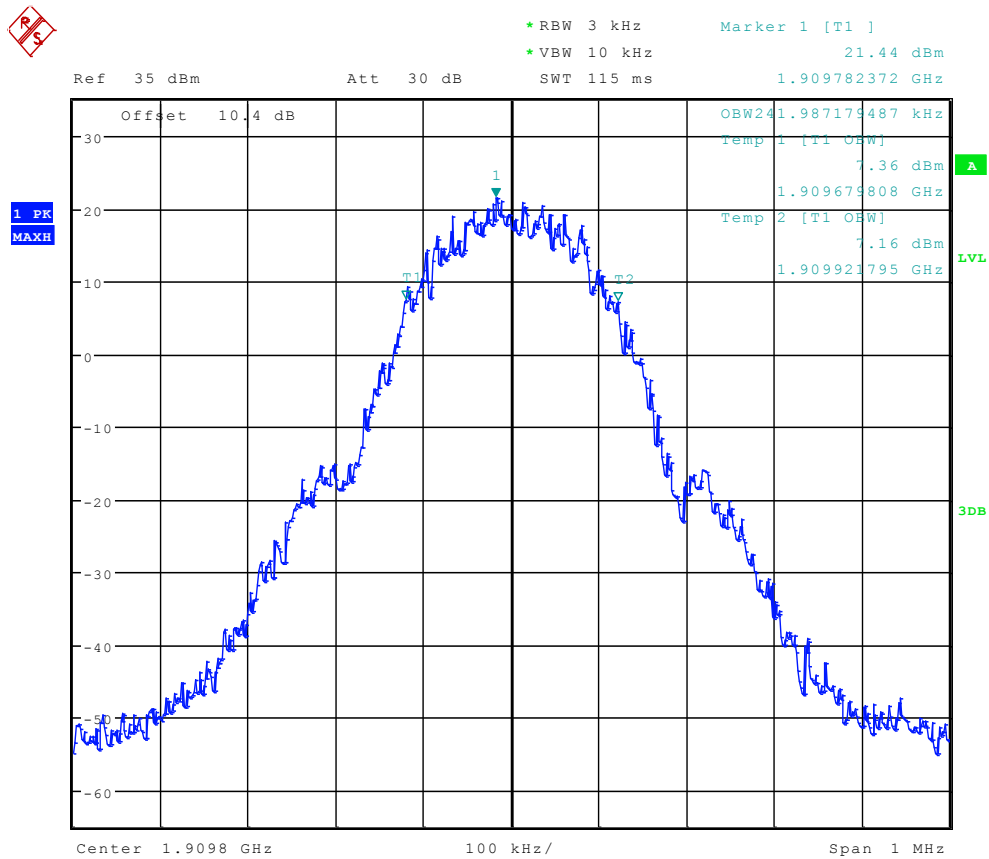


TM2:EDGE Channel 661



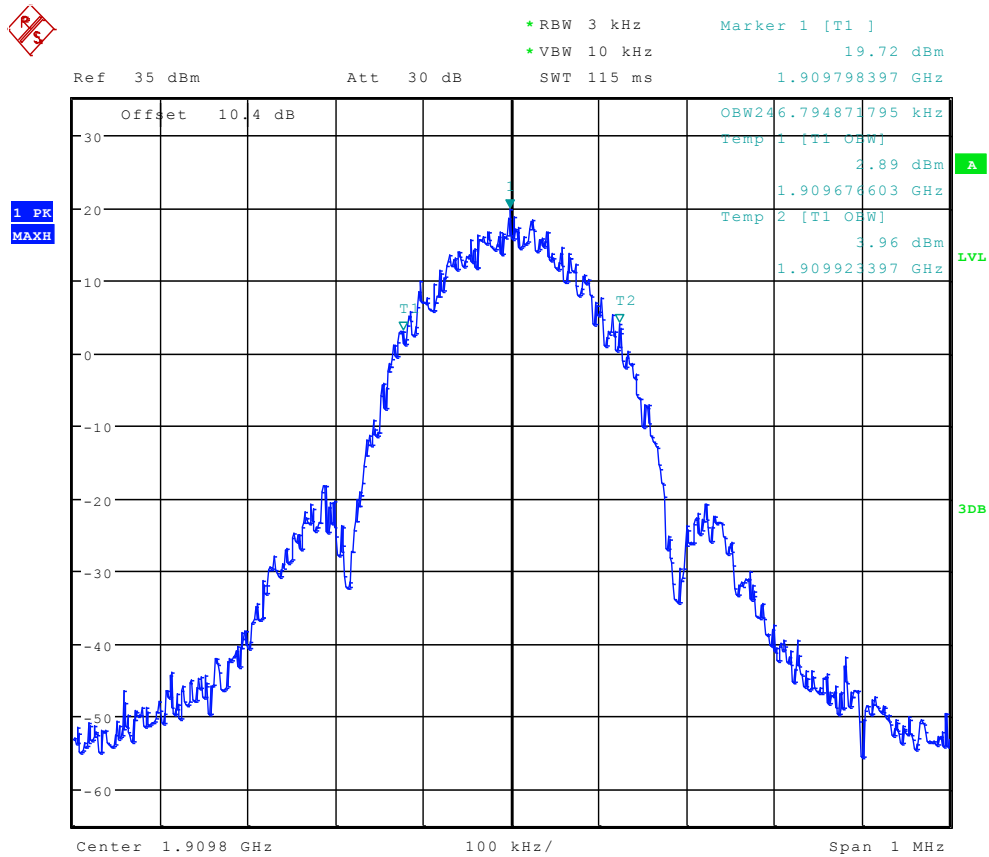


TM1:GPRS/GSM Channel 810





TM2:EDGE Channel 810



-----The END-----



Appendix D

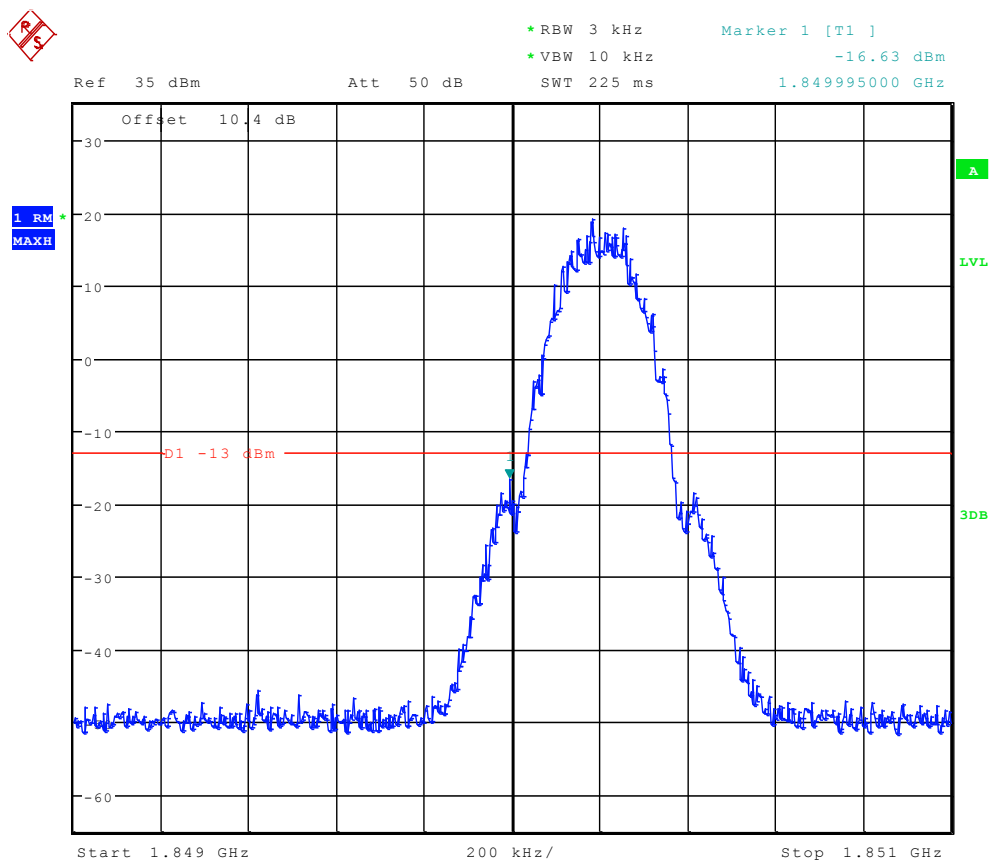
Band Edges Compliance According to FCC Part 2.1051 & 24.238



TM1:GPRS/GSM

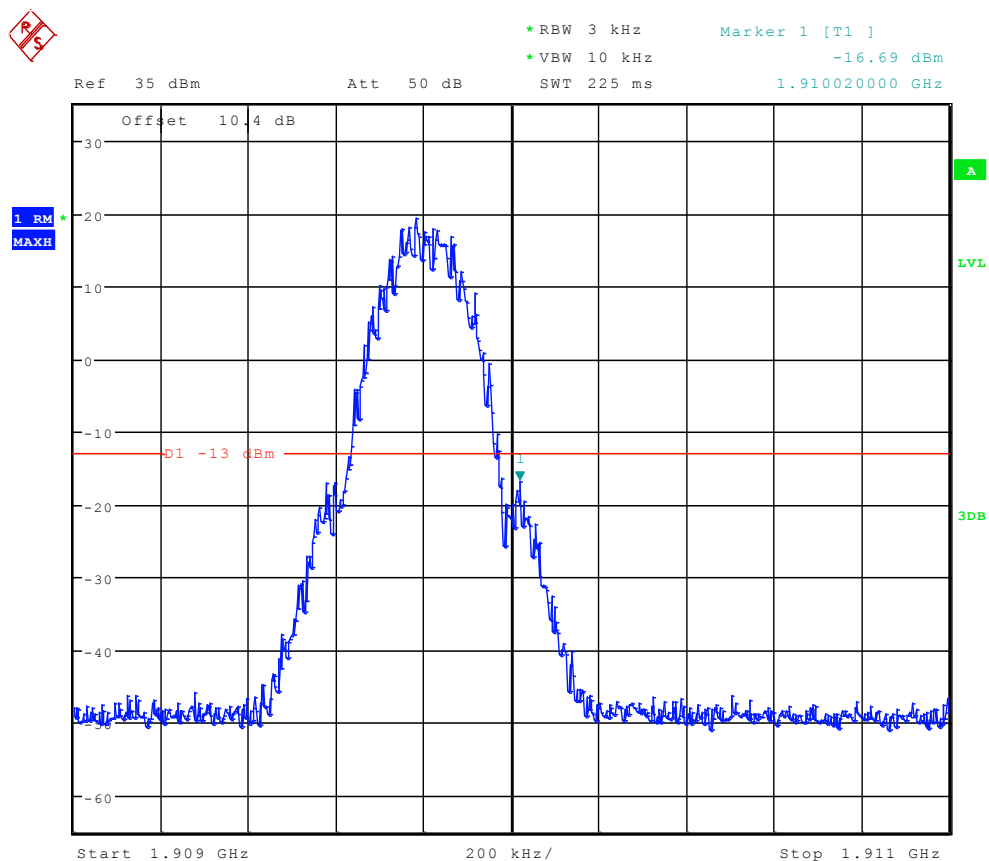
Left Edge

Channel 512



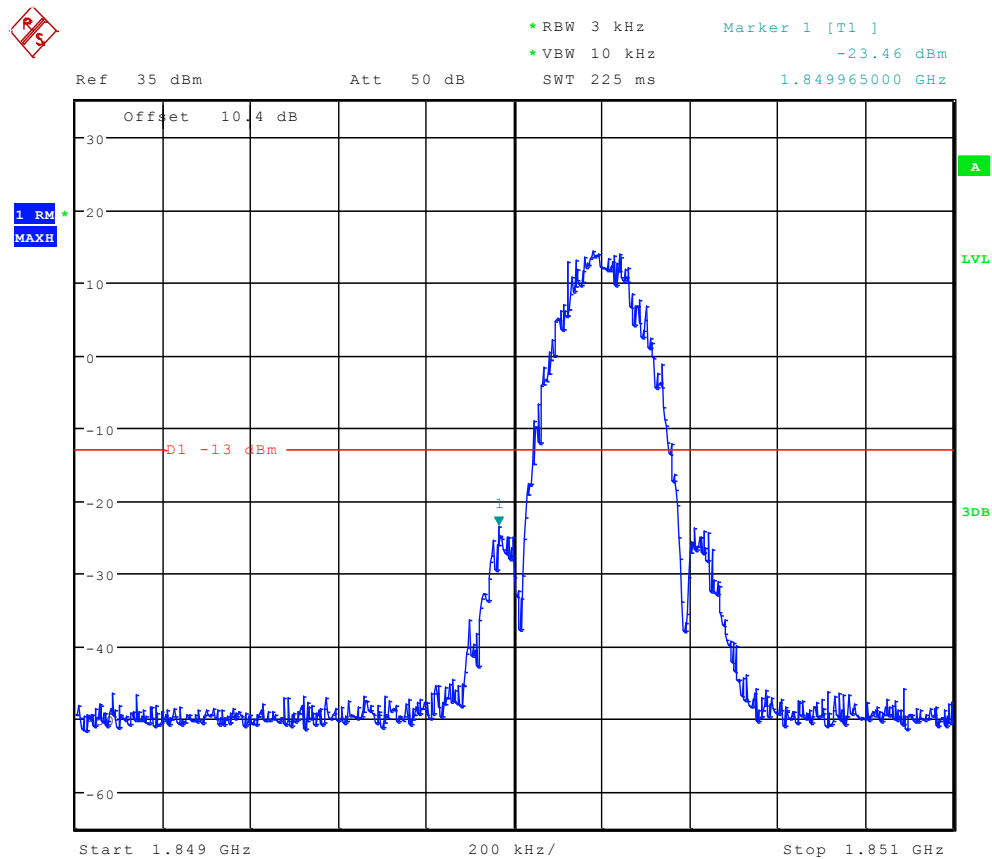


Right Edge Channel 810



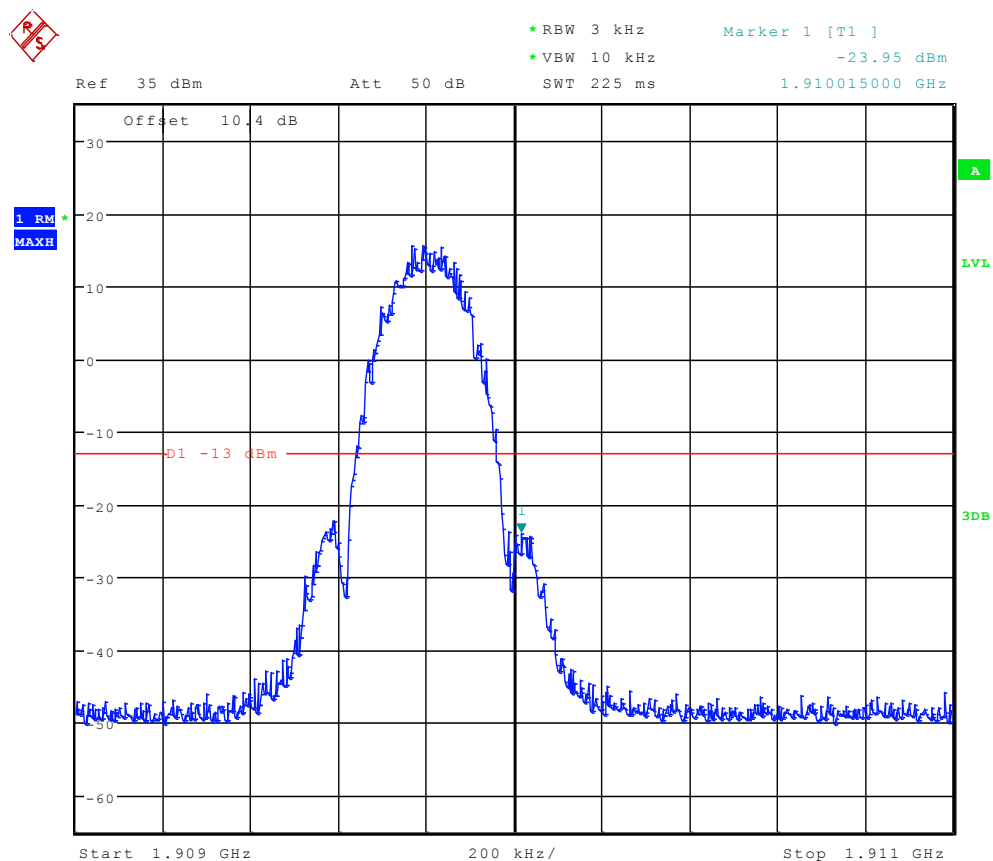


EDGE Left Edge Channel 512





Right Edge Channel 810



-----The END-----



Appendix E

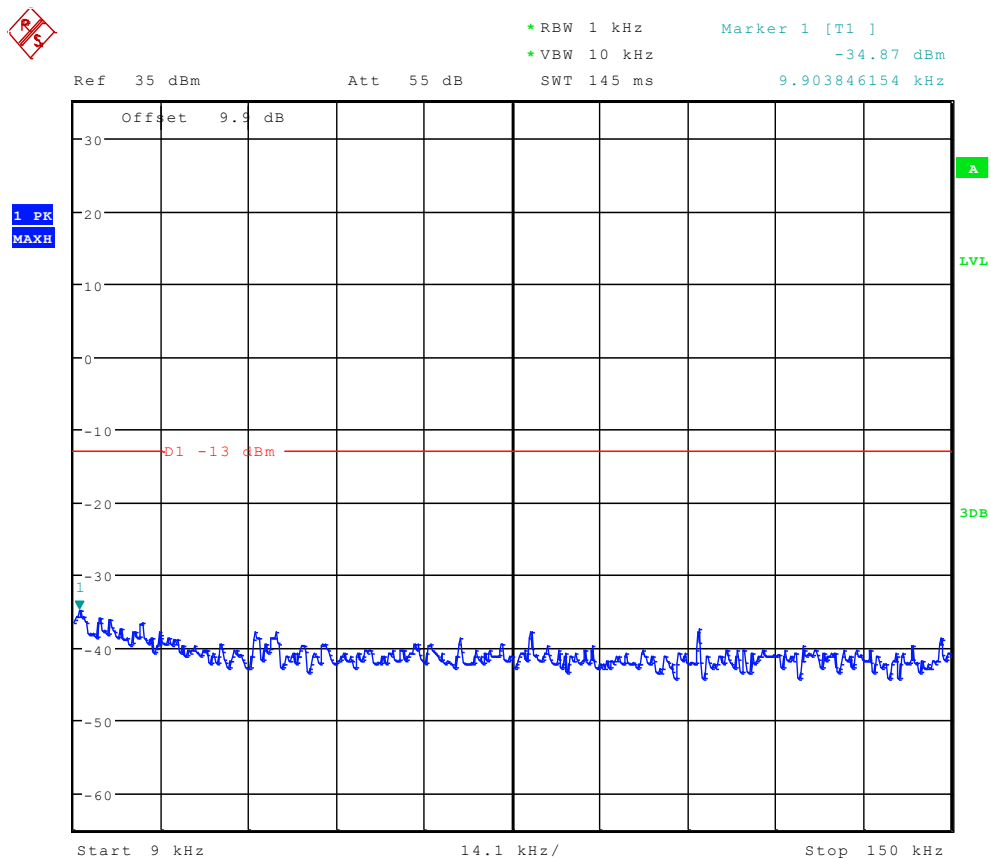
Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & 24.238



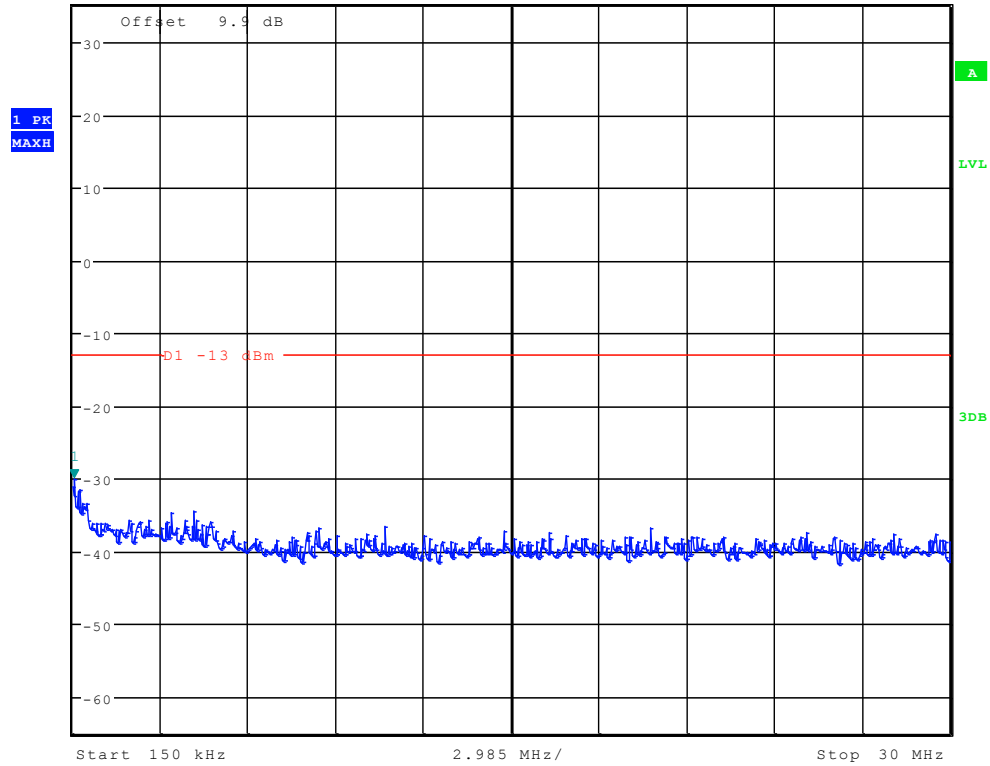
TM1:GPRS/GSM

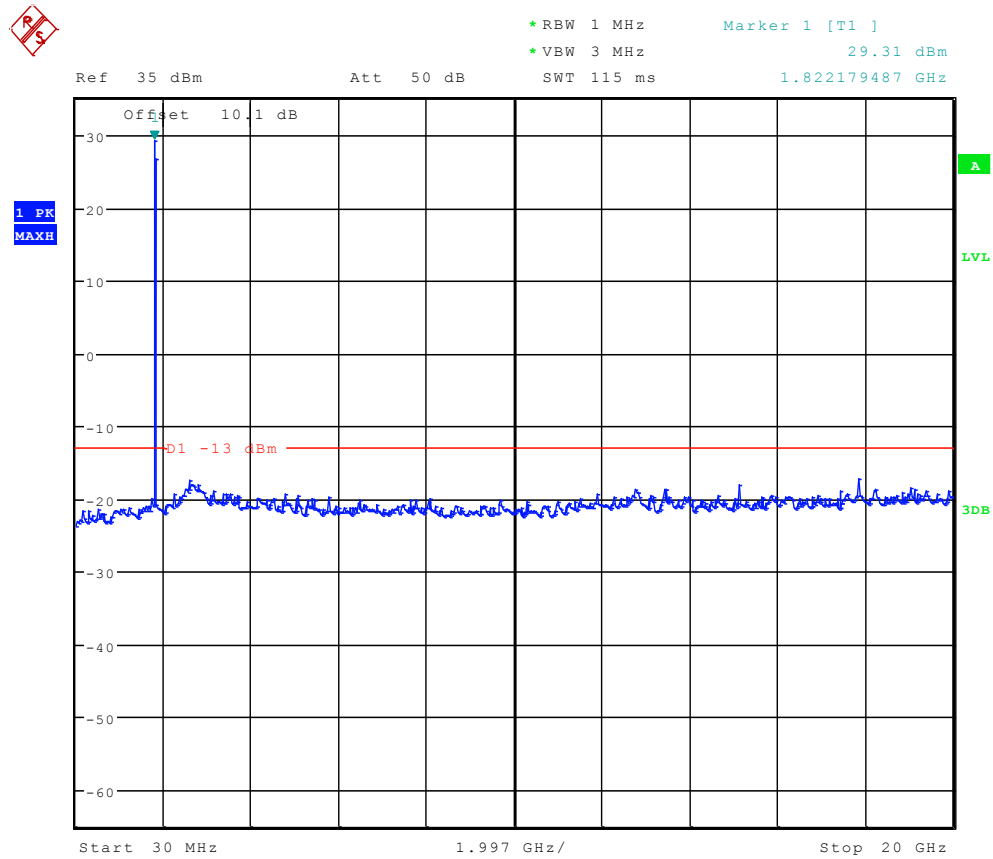
Channel 512





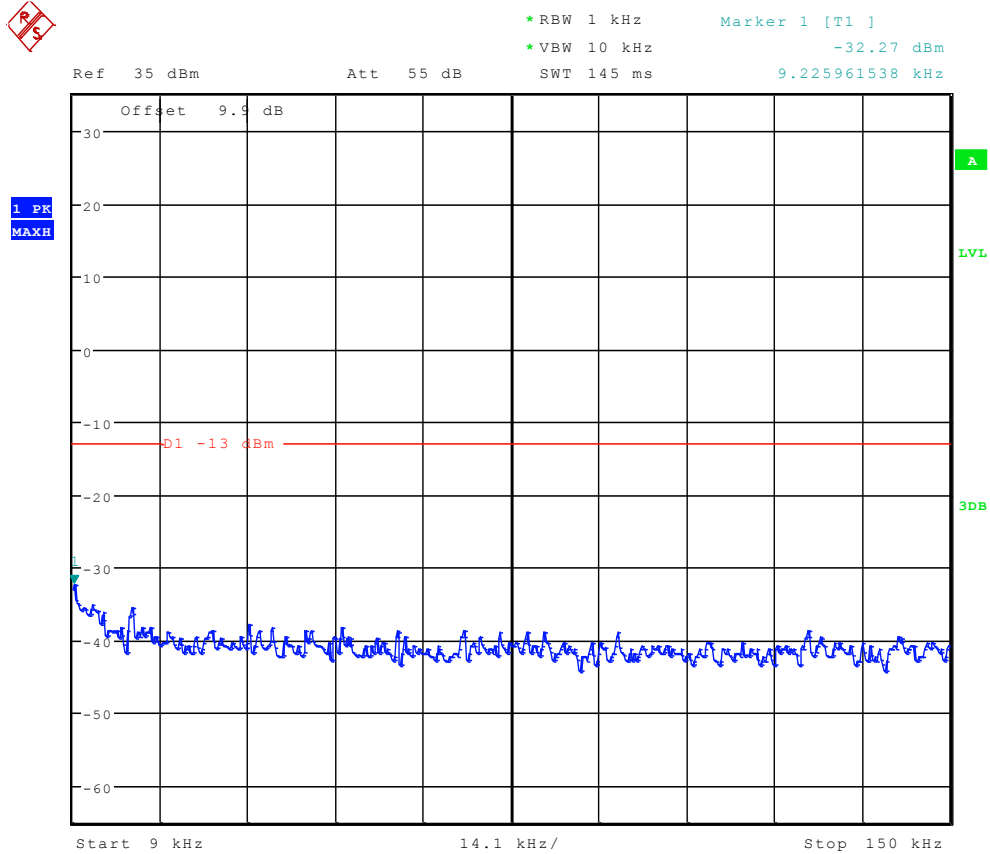
*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -30.04 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 197.836538462 kHz

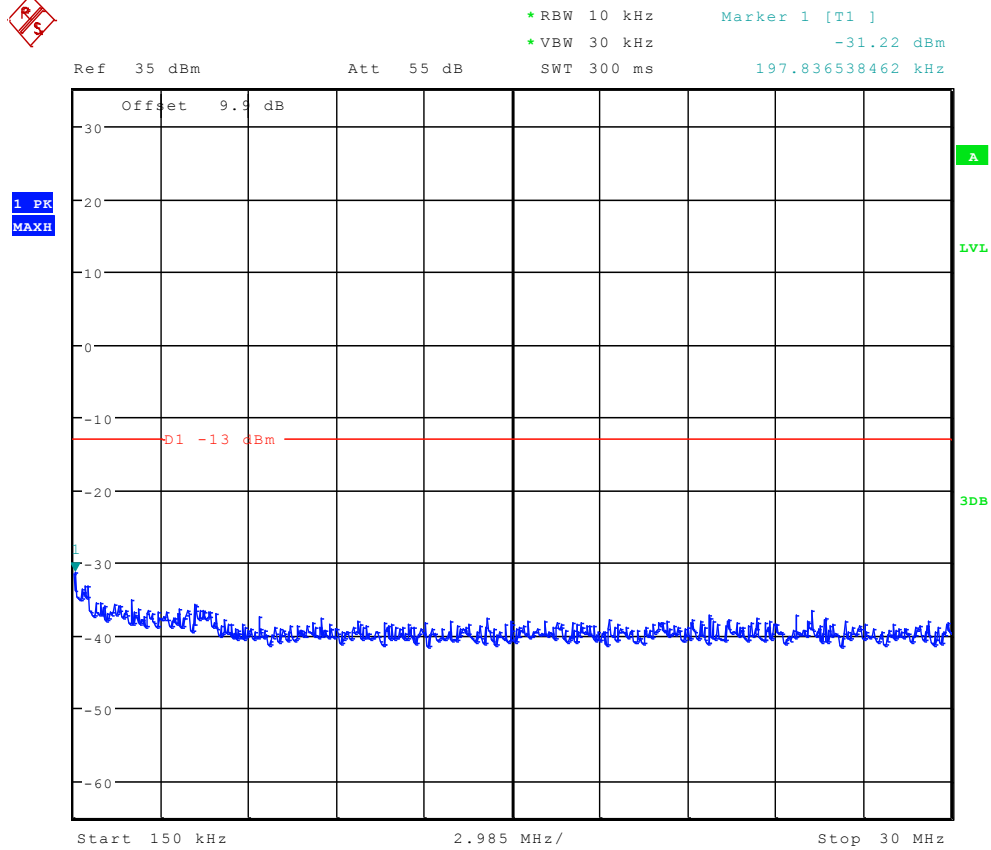


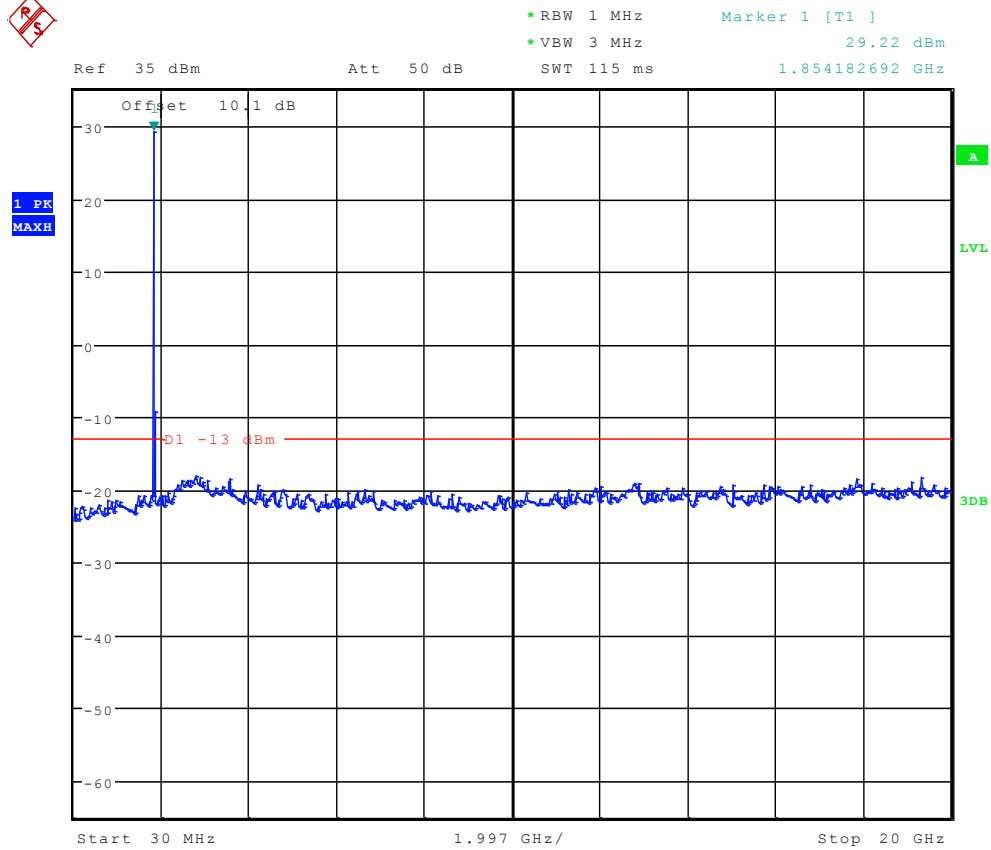




Channel 661

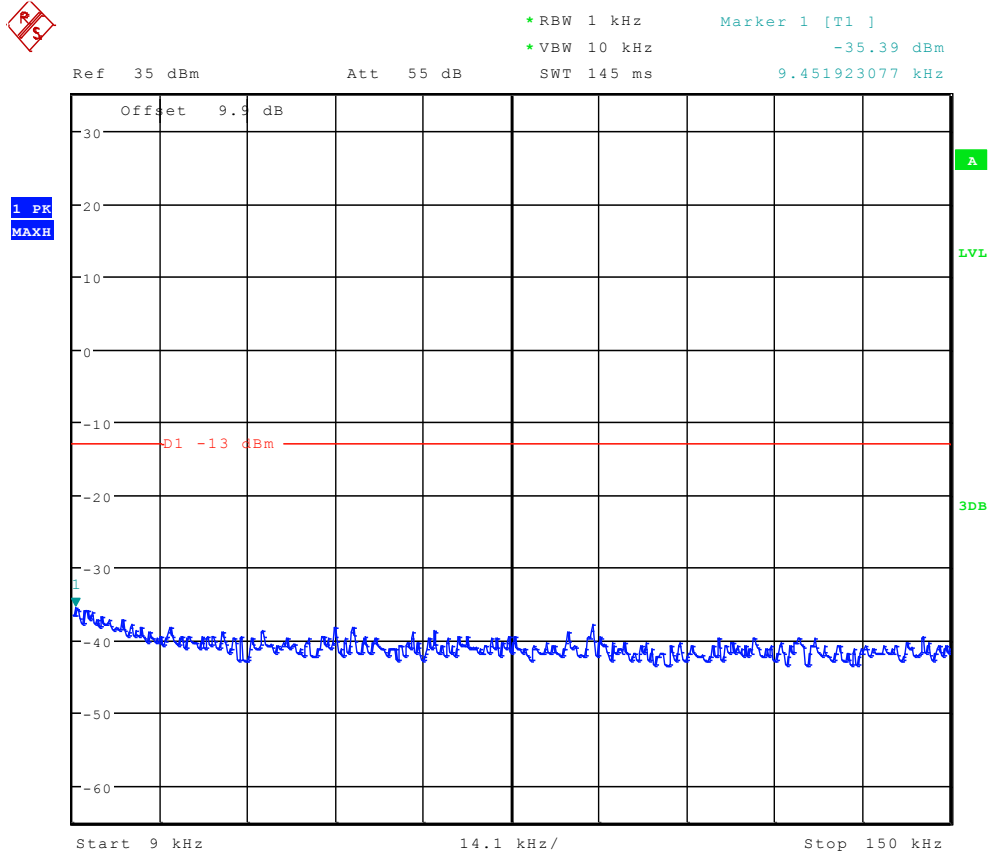


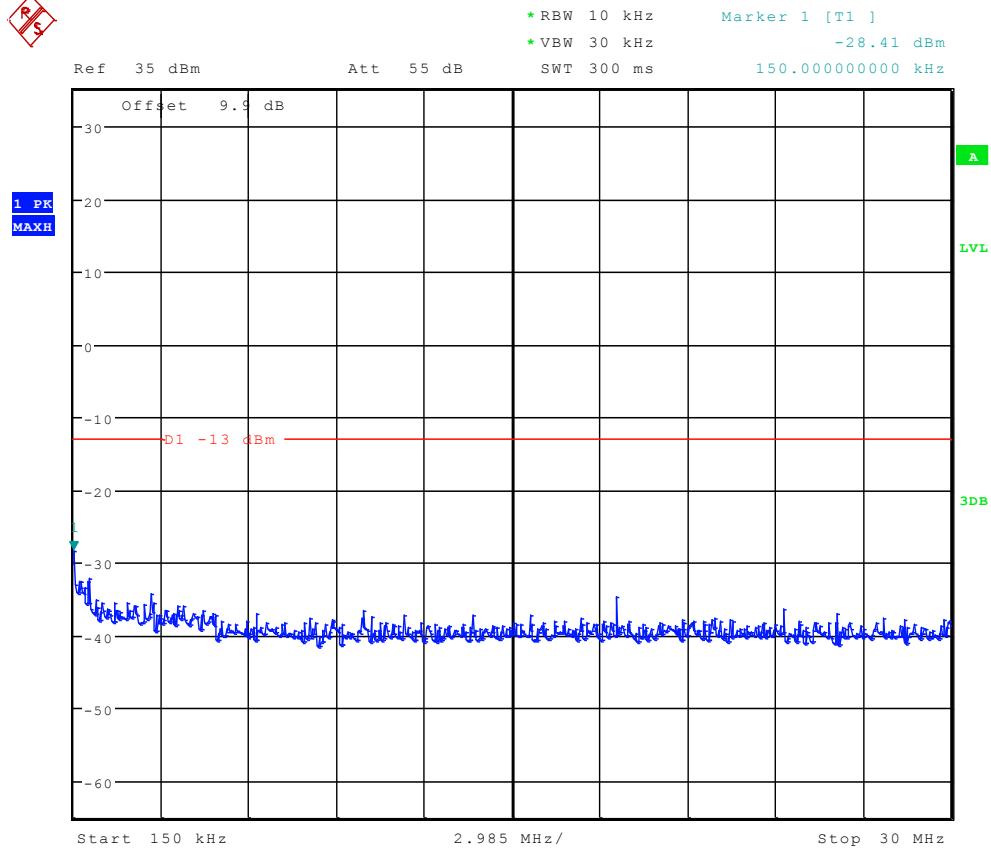


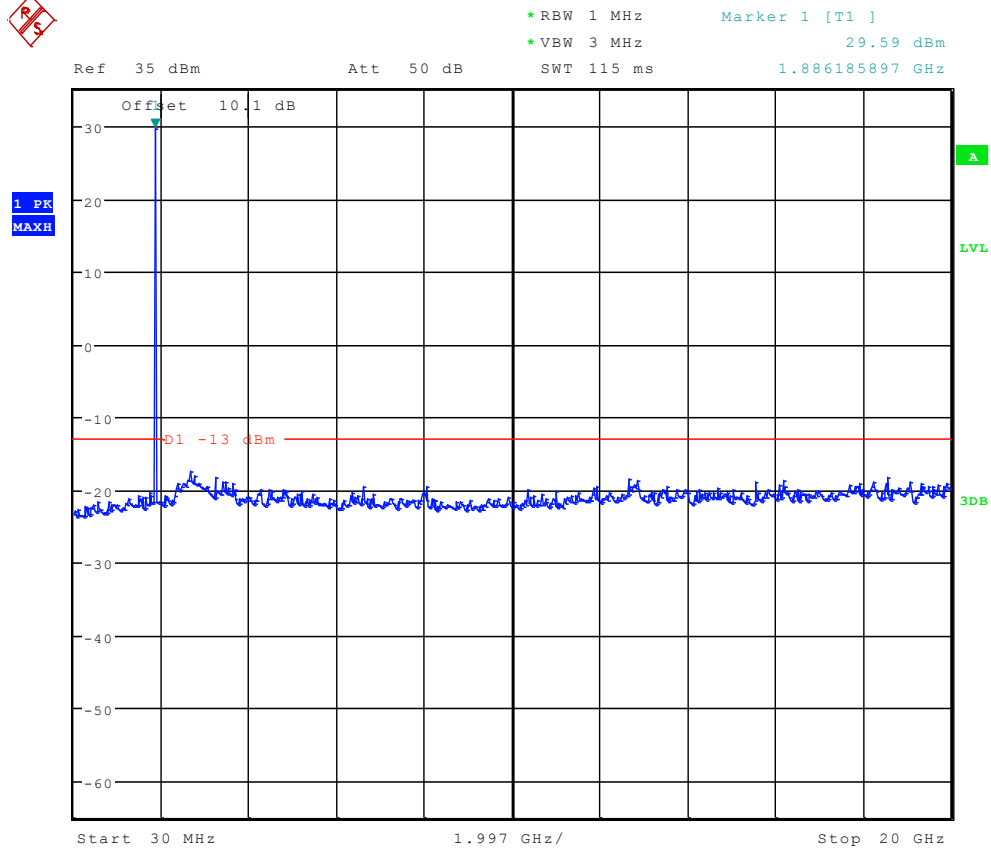




Channel 810

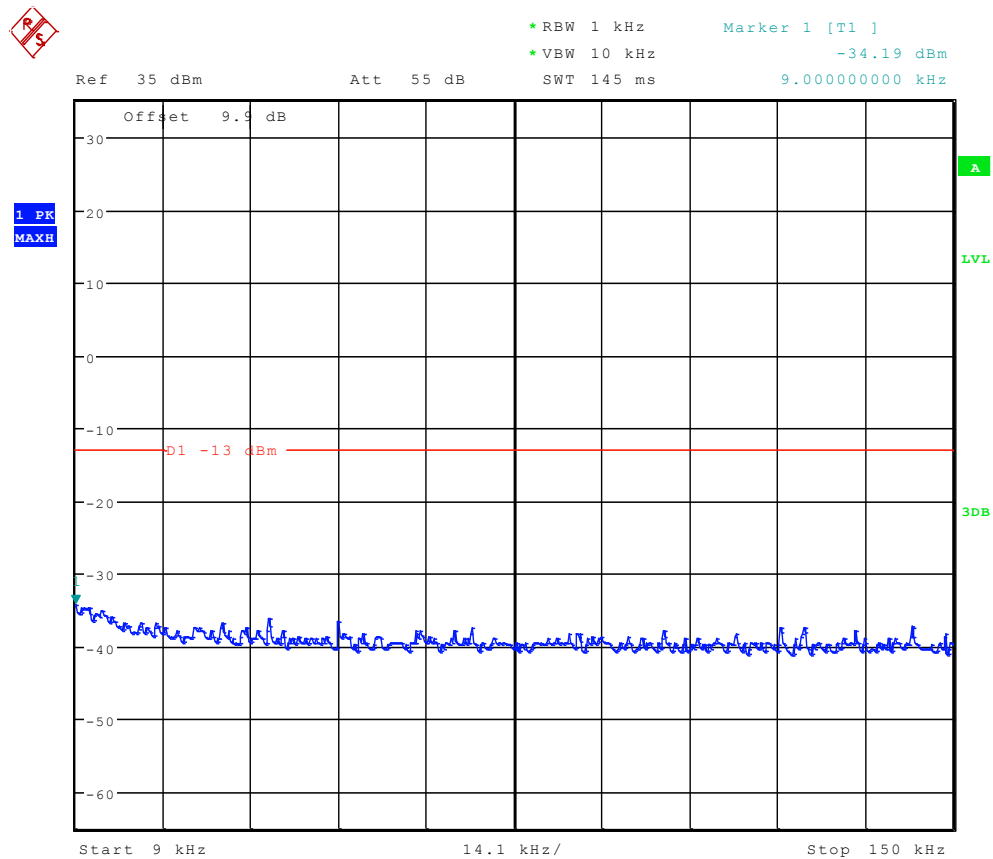


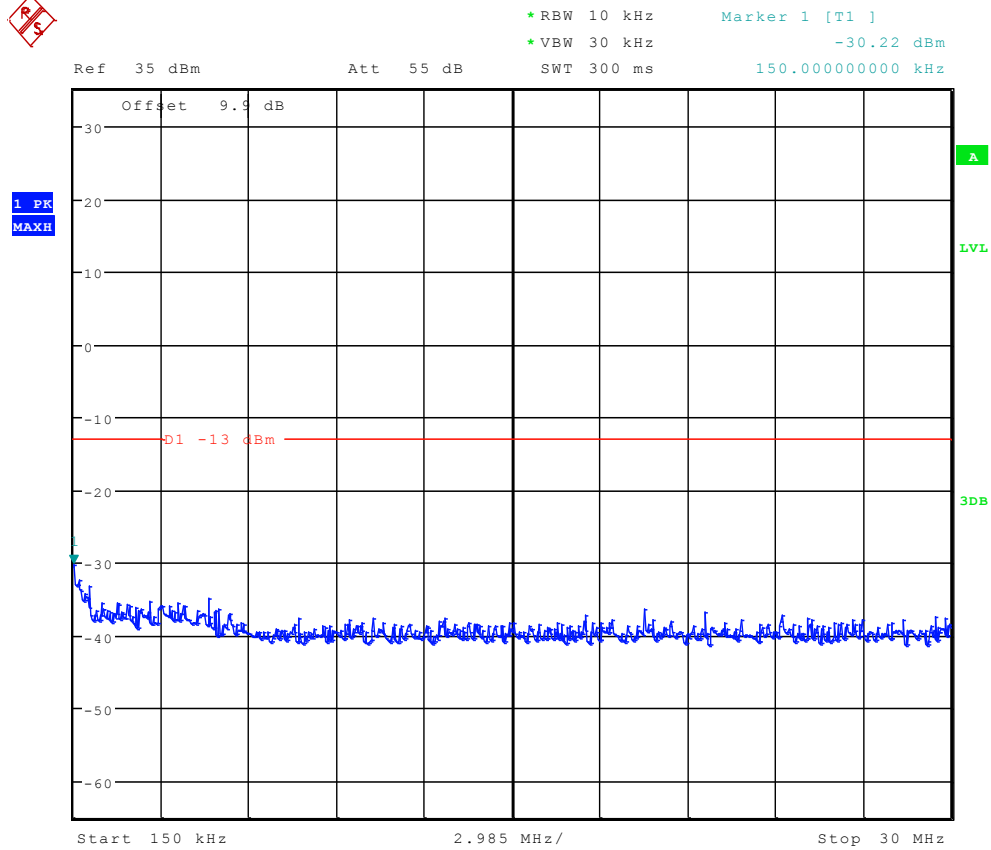


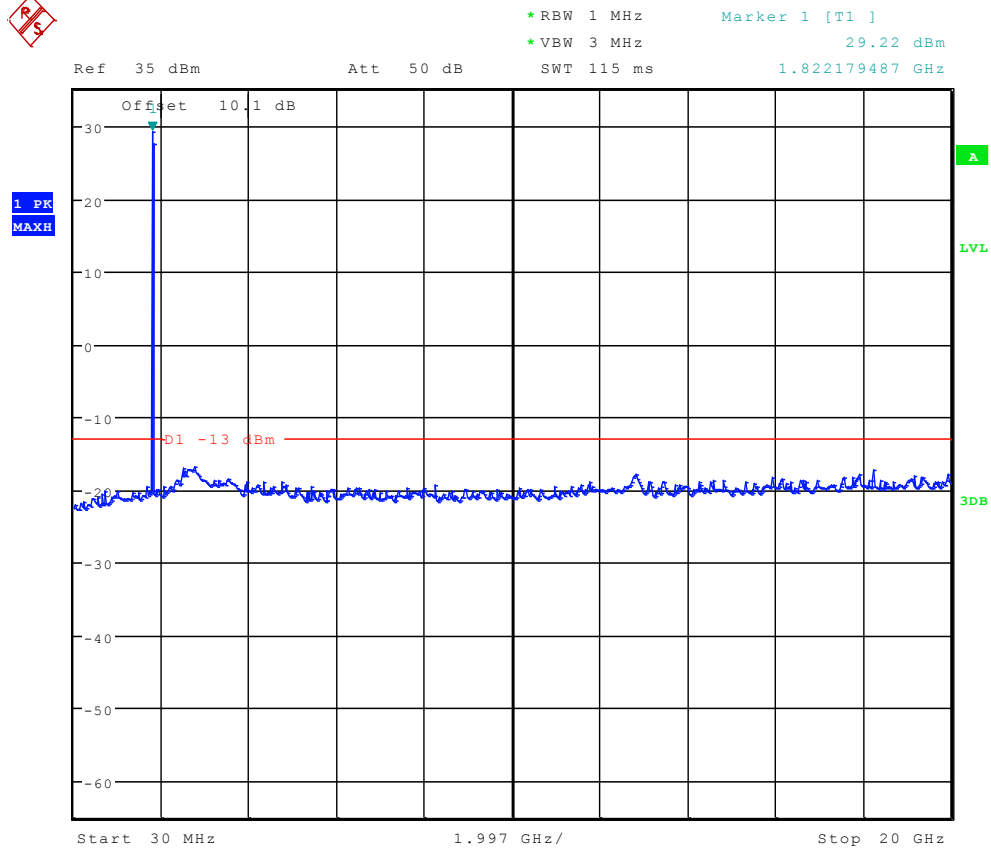




TM2:EDGE Channel 512

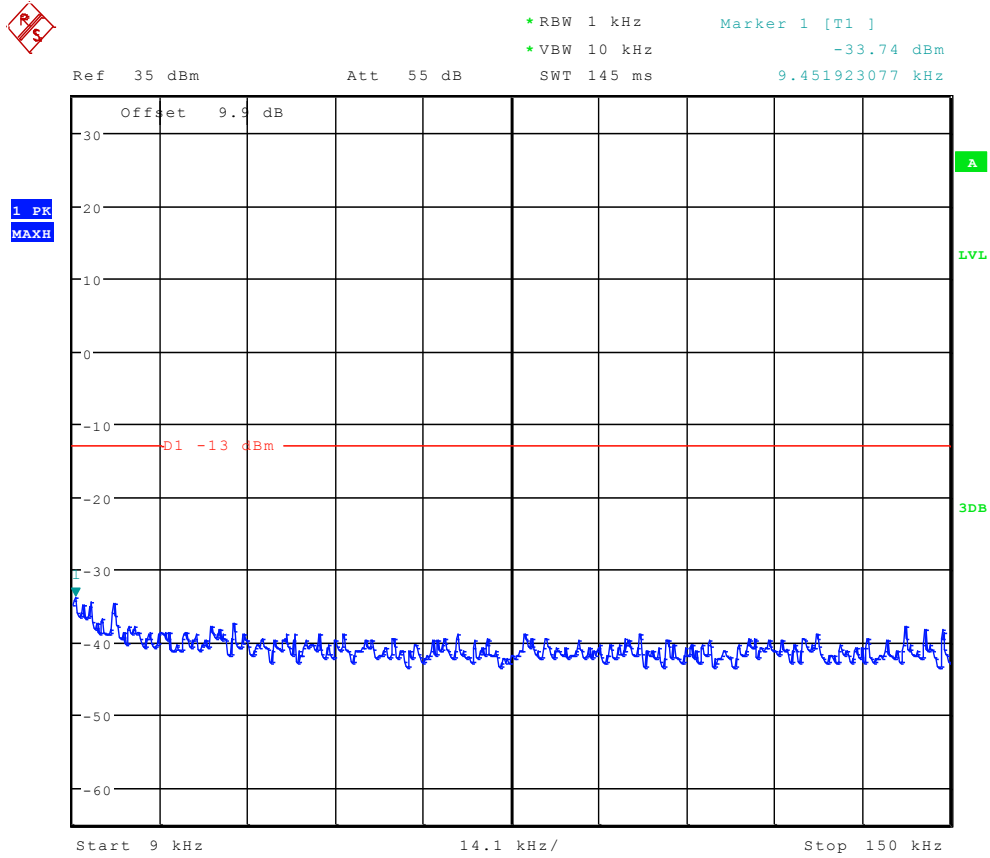


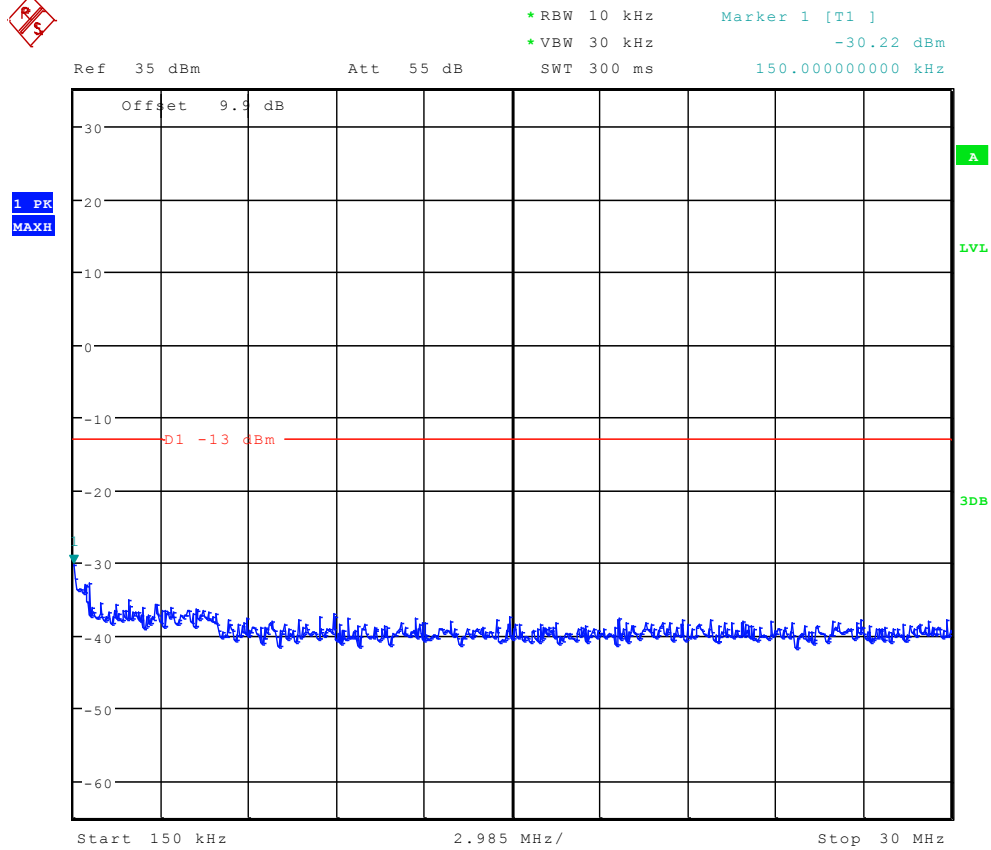


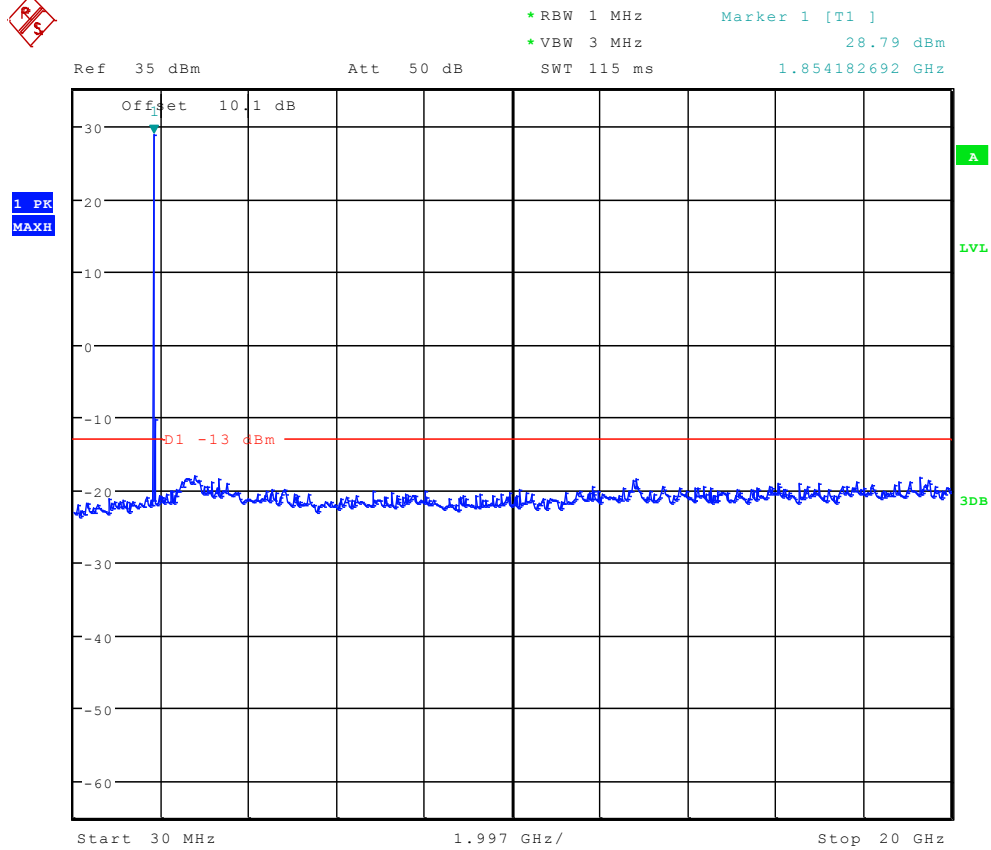




Channel 661

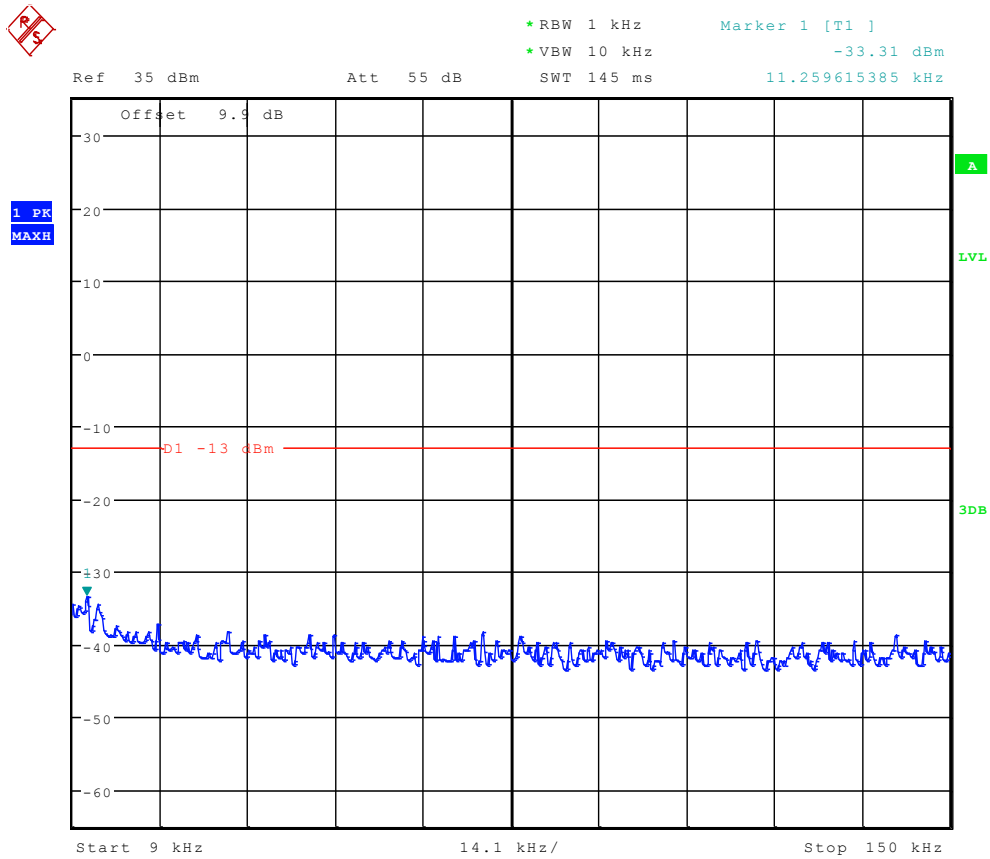


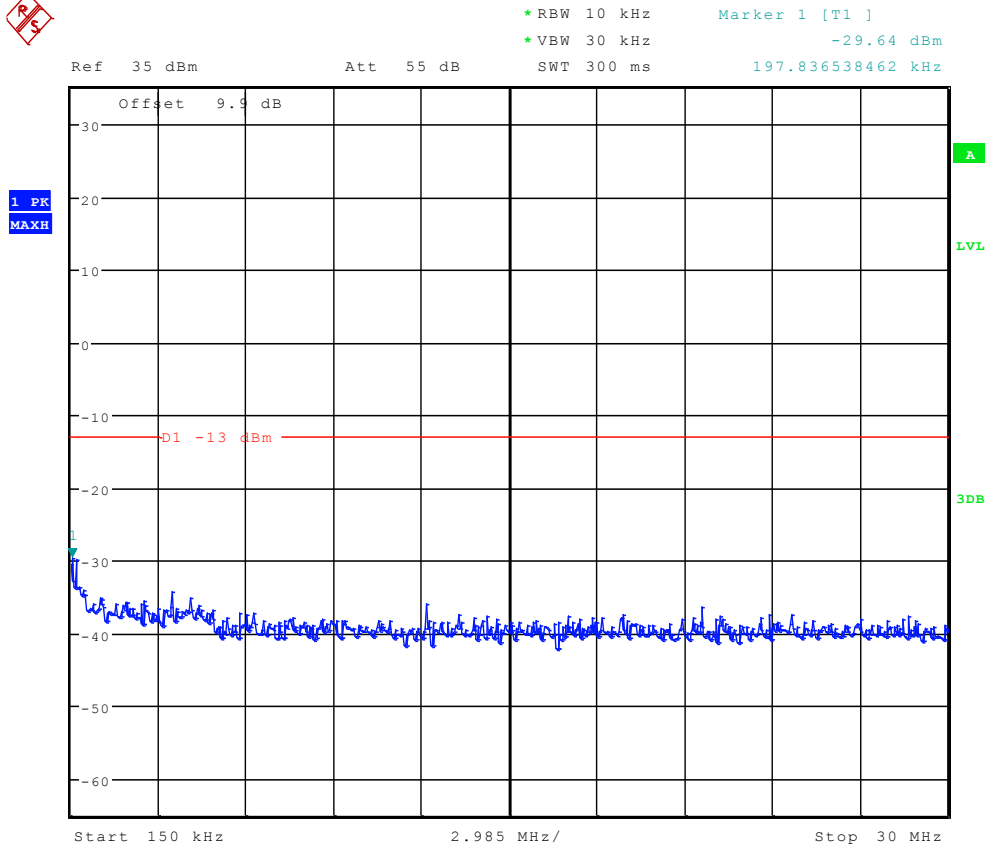


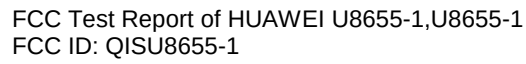




Channel 810







The plot shows a spectrum with a peak at 30 MHz. The peak is labeled "1 PK MAXR" in blue. A red horizontal line is drawn at -13 dBm, labeled "D1 -13 dBm". The peak is also labeled "Offset 10.1 dB". The plot has a grid with major lines every 10 dB and minor lines every 1 dB. The x-axis is labeled "Start 30 MHz", "1.997 GHz/", and "Stop 20 GHz". The y-axis is labeled "30", "20", "10", "0", "-10", "-20", "-30", "-40", "-50", and "-60".

-----The END.



Appendix F

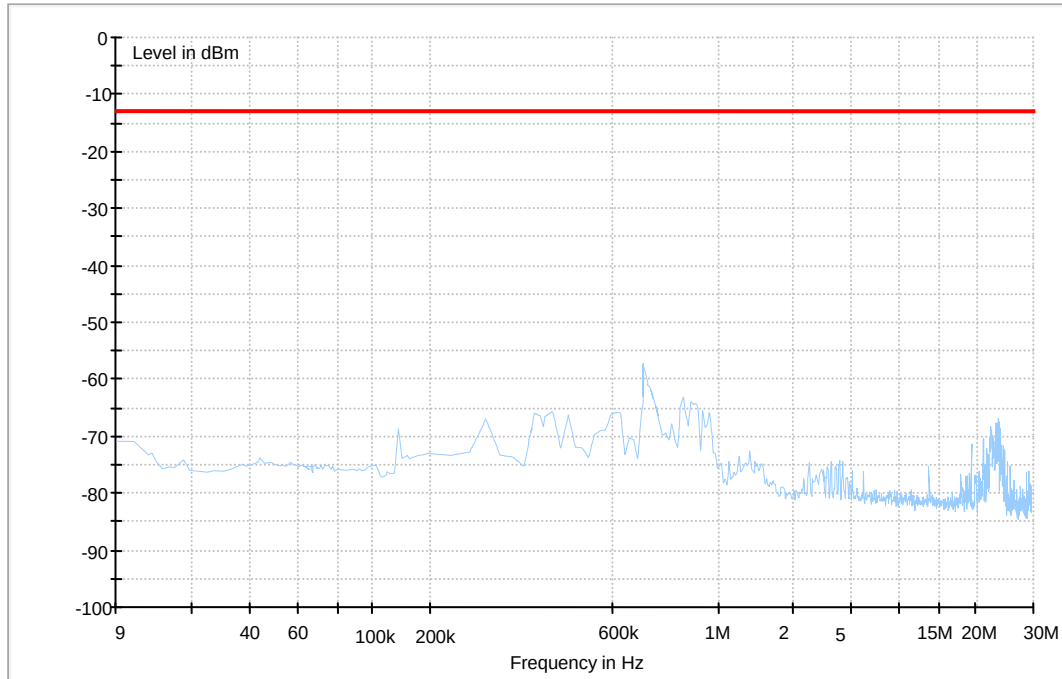
Field Strength of Spurious Emissions

According to FCC Part 2.1053 & Part24.238



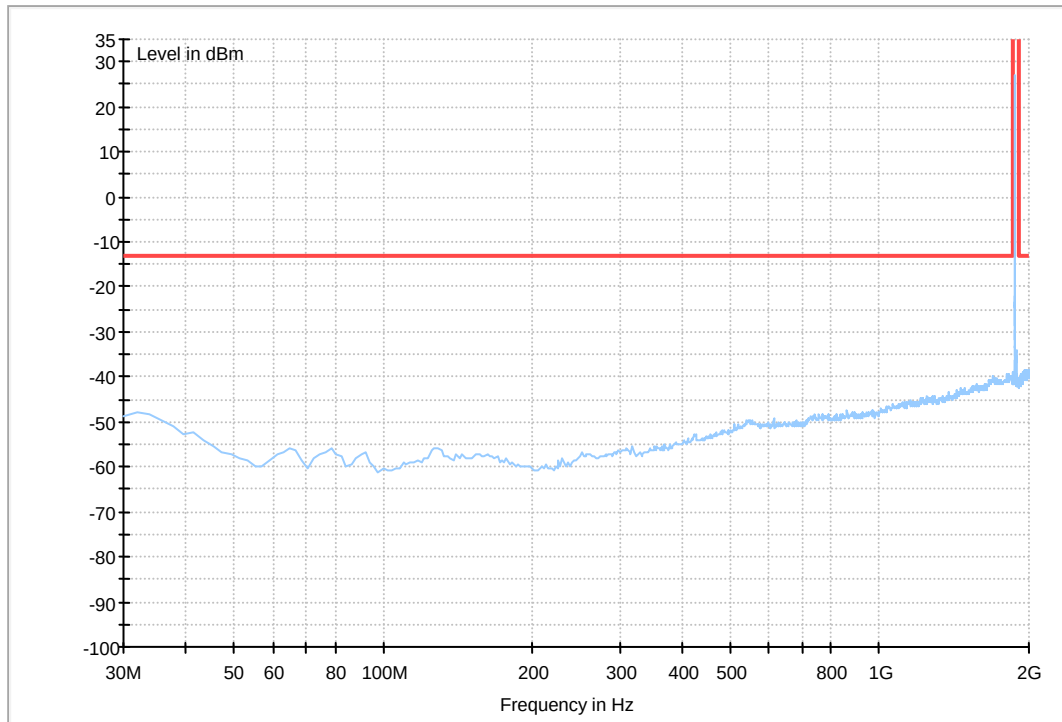
GSM 1900

Traffic Mode (9kHz-30MHz)



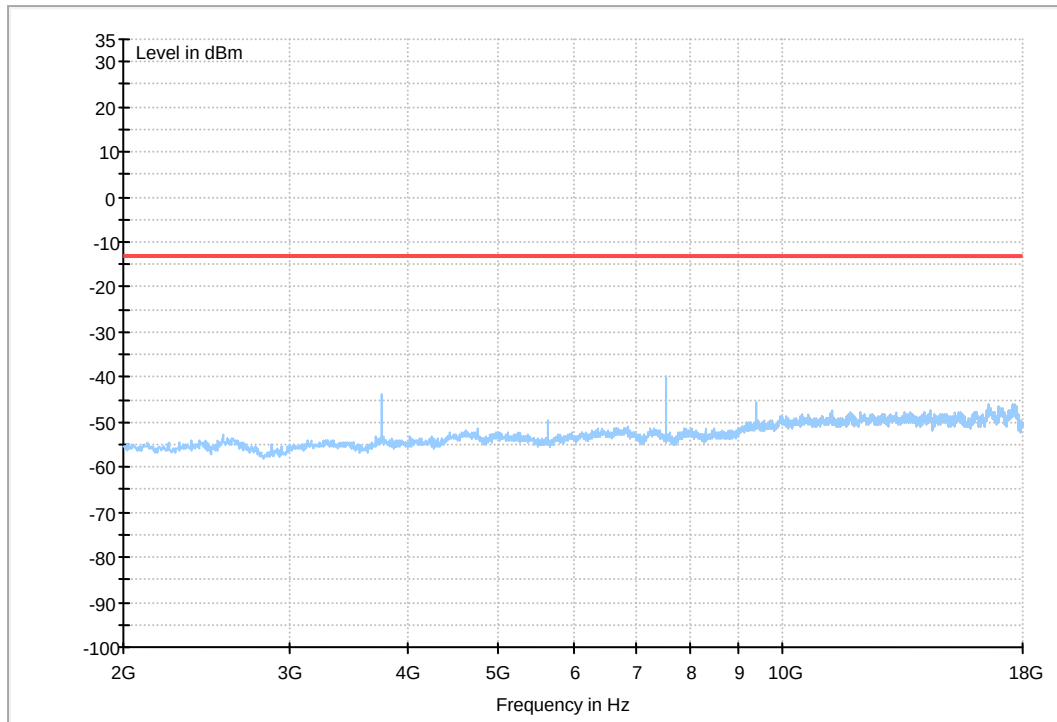


Traffic Mode (30MHz-2GHz)



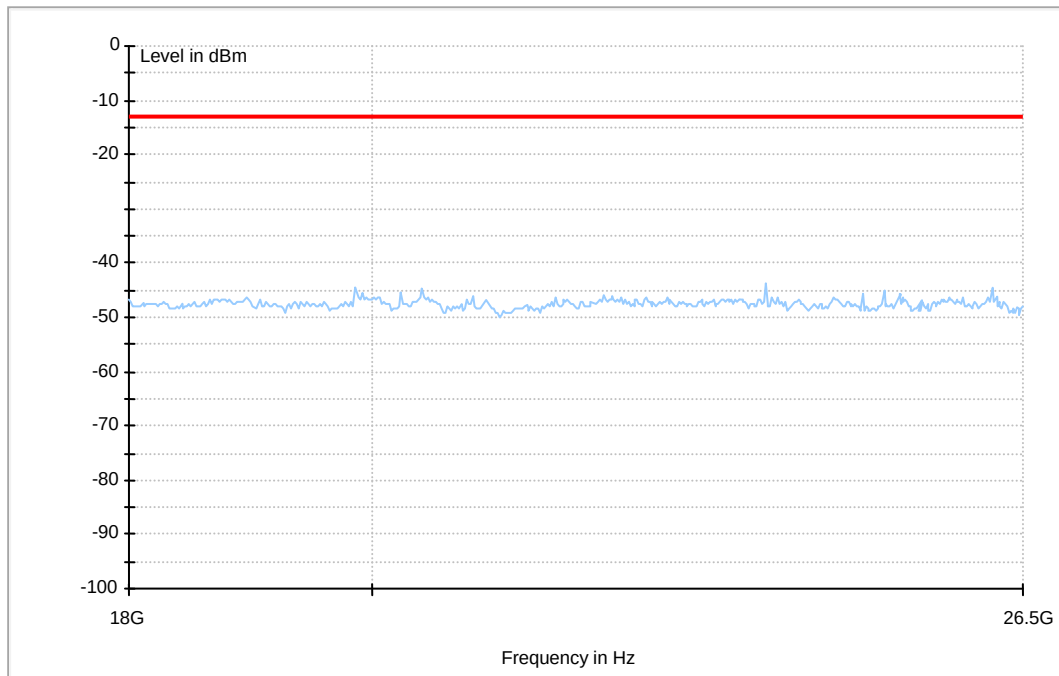


Traffic Mode (2GHz-18GHz)





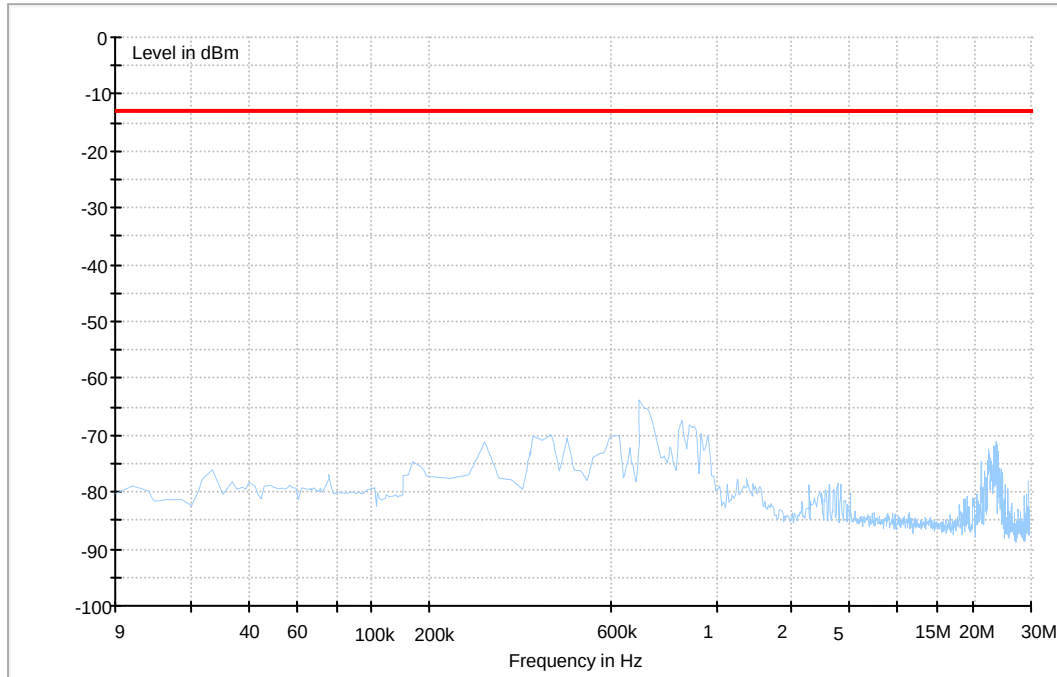
Traffic Mode (18GHz-26.5GHz)





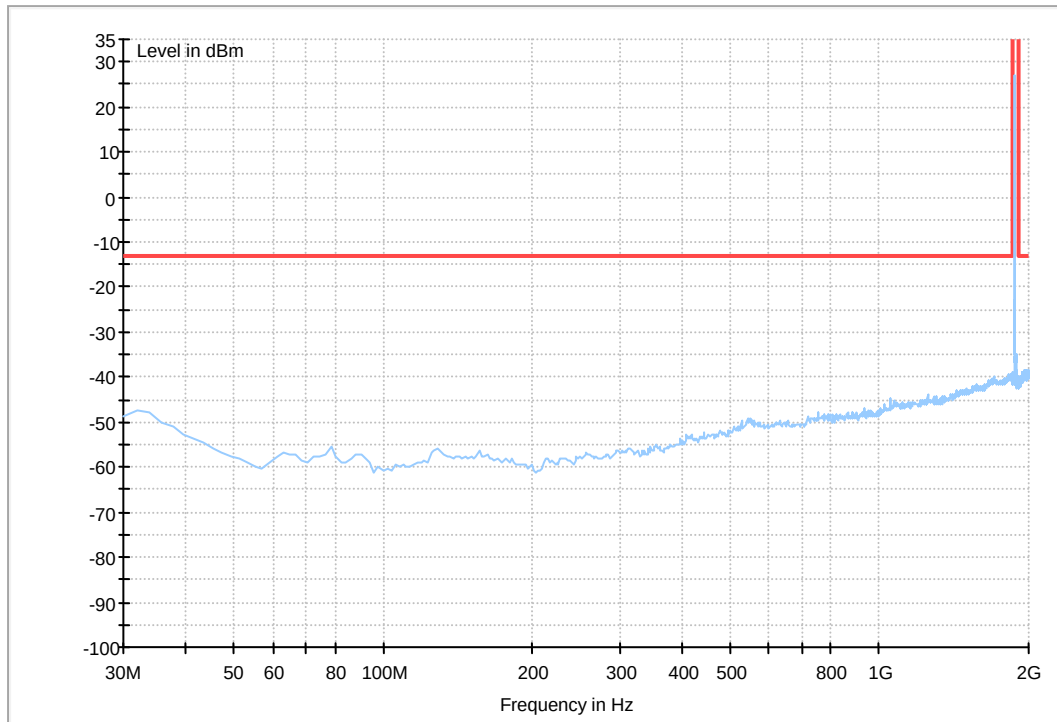
GPRS1900

Traffic Mode (9kHz-30MHz)



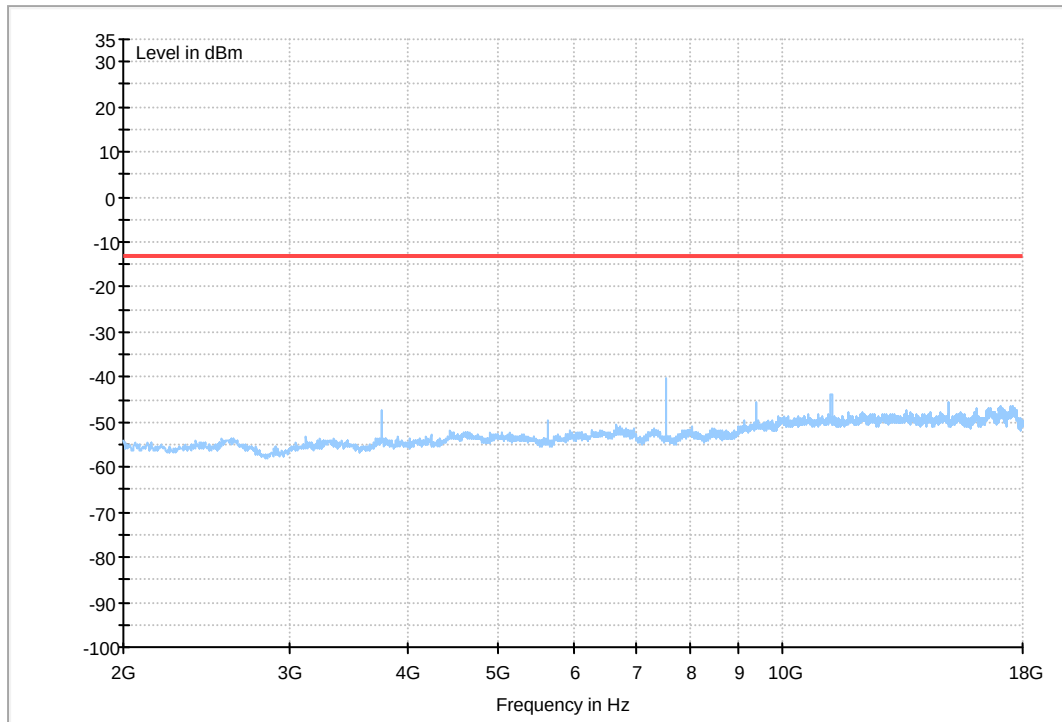


Traffic Mode (30MHz-2GHz)



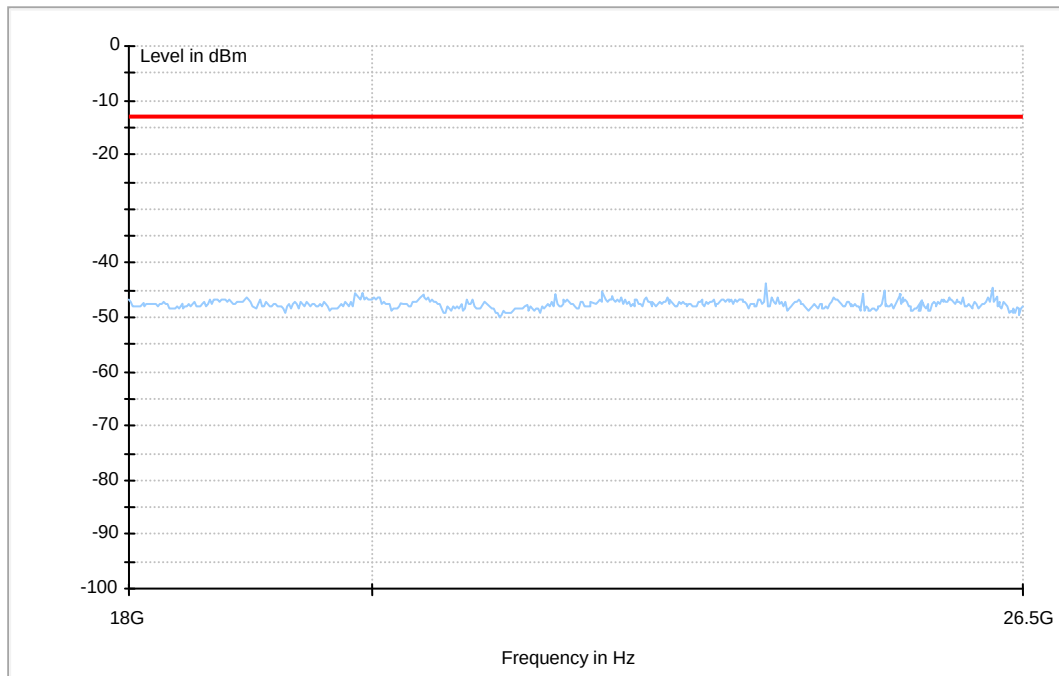


Traffic Mode (2GHz-18GHz)





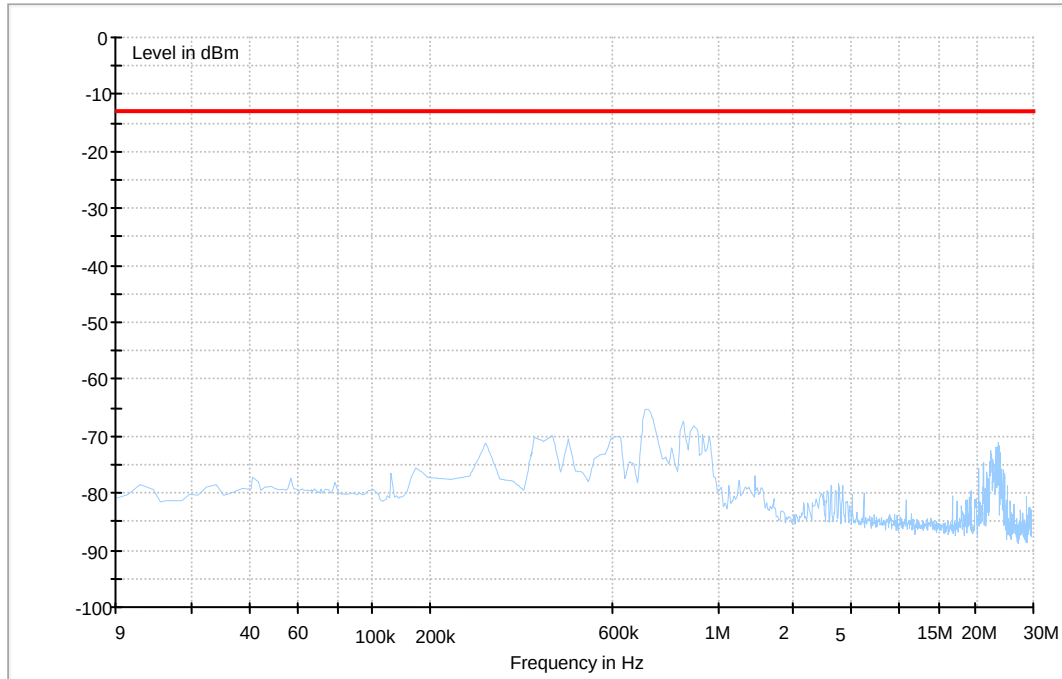
Traffic Mode (18GHz-26.5GHz)





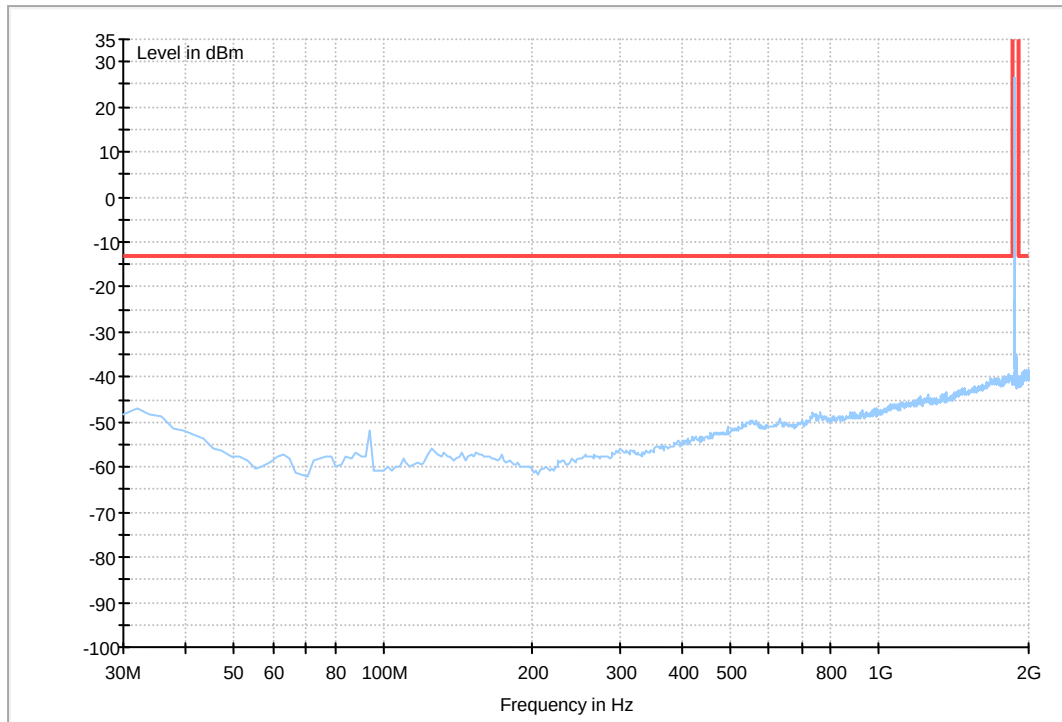
EDGE 1900

Traffic Mode (9kHz-30MHz)



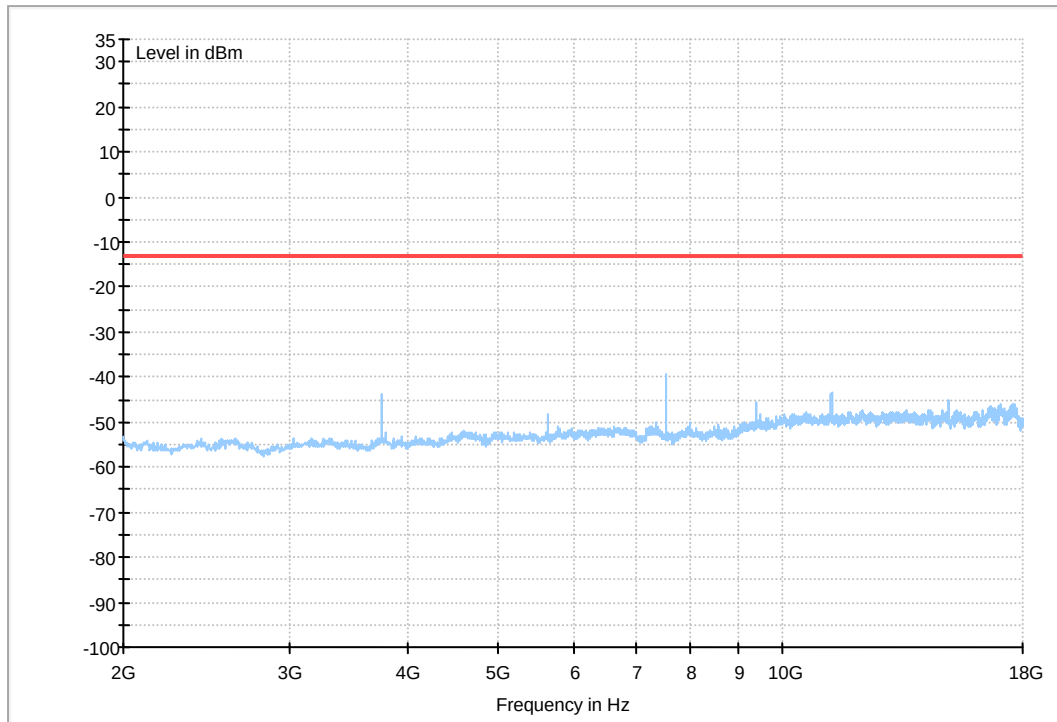


Traffic Mode (30MHz-2GHz)



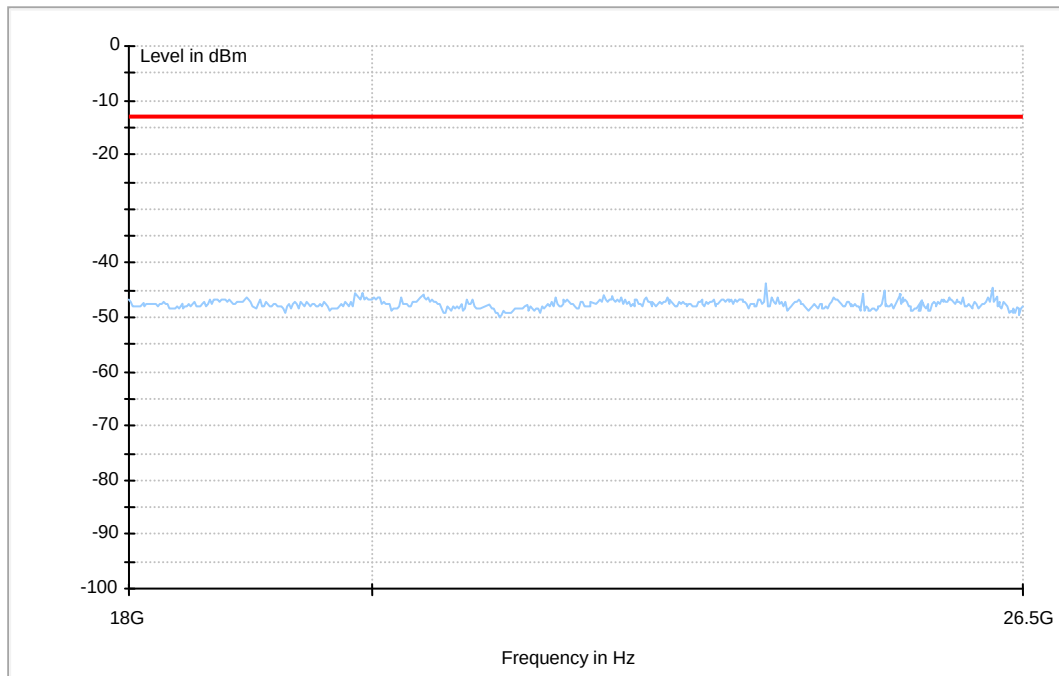


Traffic Mode (2GHz-18GHz)





Traffic Mode (18GHz-26.5GHz)



-----The END-----



Appendix G

Frequency Stability

According to FCC Part 2.1055& Part 24.235



Frequency Error vs. Temperature:

Test Mode	RF Ch.	Volt.	Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Freq. vs. 20 °C [ppm]	Limit [ppm]	Verdict
TM 1	M	100%	-30 °C	44	0.0234	---	±2.5	Pass
			-20 °C	-40	-0.0213	---	±2.5	Pass
			-10 °C	36	0.0191	---	±2.5	Pass
			0 °C	-22	-0.0117	---	±2.5	Pass
			10 °C	24	0.0128	---	±2.5	Pass
			20 °C	38	0.0202	---	±2.5	Pass
			30 °C	-34	-0.0181	---	±2.5	Pass
			40 °C	-22	-0.0117	---	±2.5	Pass
			50 °C	48	0.0255	---	±2.5	Pass
TM 2	M	100%	-30 °C	36	0.0191	---	±2.5	Pass
			-20 °C	-26	-0.0138	---	±2.5	Pass
			-10 °C	-28	-0.0149	---	±2.5	Pass
			0 °C	34	0.0181	---	±2.5	Pass
			10 °C	-42	-0.0223	---	±2.5	Pass
			20 °C	30	0.0160	---	±2.5	Pass
			30 °C	-32	-0.0170	---	±2.5	Pass
			40 °C	26	0.0138	---	±2.5	Pass
			50 °C	38	0.0202	---	±2.5	Pass

Frequency Error vs. Voltage:

Test Mode	RF Ch.	Temp.	Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Freq. vs. 20 °C [ppm]	Limit [ppm]	Verdict
TM 1	M	20 °C	85 %	30	0.0160	---	±2.5	Pass
			100 %	-40	-0.0213	---	±2.5	Pass
			115 %	34	0.0181	---	±2.5	Pass
TM 2	M	20 °C	85 %	26	0.0138	---	±2.5	Pass
			100 %	-24	-0.0128	---	±2.5	Pass
			115 %	38	0.0202	---	±2.5	Pass

-----The END-----