

FCC PART 27
FCC PART 22H, PART 24E
TEST REPORT

For

SHENZHEN HUAPTEC CO., LTD

5th FL, E BLDG, Sogood Science Park, Sanwei Commun Hangkong Road, Xixiang, Bao'an,
Shenzhen, 518102 China

FCC ID: OWWF25K-5S

Report Type: Original Report	Product Type: Wireless Cellular Repeater
Test Engineer: <u>Xiangguang Kong</u>	<i>Xiangguang Kong</i>
Report Number: <u>RSZ151214004-00B</u>	
Report Date: <u>2016-03-17</u>	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The SHENZHEN HUAPTEC CO., LTD's product, model number: F25K-5S (FCC ID: OWWF25K-5S) or the "EUT" in this report was a *Wireless Cellular Repeater*, and the EUT was an industrial booster, which was measured approximately: 218 mm (L) × 165 mm (W) × 50 mm (H), rated with input voltage: DC 12V from adapter.

Manufacturer information:

Company Name: SHENZHEN HUAPTEC CO., LTD

Address: 5th FL, E BLDG, Sogood Science Park, Sanwei Community, Hangkong Road, Xixiang, Bao'an, Shenzhen, 518102 China

EU Adapter Information:

Model: GM50-120300-F

Input: AC 100-240V, 50/60 Hz, 1.5A

Output: DC 12V, 3.0A

Specification:

Support Band	UL (MHz)	DL (MHz)	UL Max. power (dBm)	DL Max. power (dBm)
Lower 700MHz (B+C Block)	704-716	734-746	22	22
Upper 700MHz C Block	776-787	746-757	22	22
CELLULAR	824-849	869-894	24	24
PCS	1850-1910	1930-1990	23	23
AWS-1	1710-1755	2110-2155	22	22

Note: This series product, model F20K-5S, F17K-5S, F13K-5S and F25K-5S have the same designs, PCB board, electronic device. The difference between them is the model number just due to different output levels and gains achieved by adjusting the software, or different shell. Model F25K-5S was selected for full testing, which was explained in the attached product similarity declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: 1507351 (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2015-09-09.*

Objective

This test report is prepared on behalf of SHENZHEN HUAPTEC CO., LTD in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 20.21 – Signal Boosters
Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D, FCC KDB 935210.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.81 dB for 30MHz-1GHz and 4.88 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

Equipment Modifications

No modification was made to the EUT.

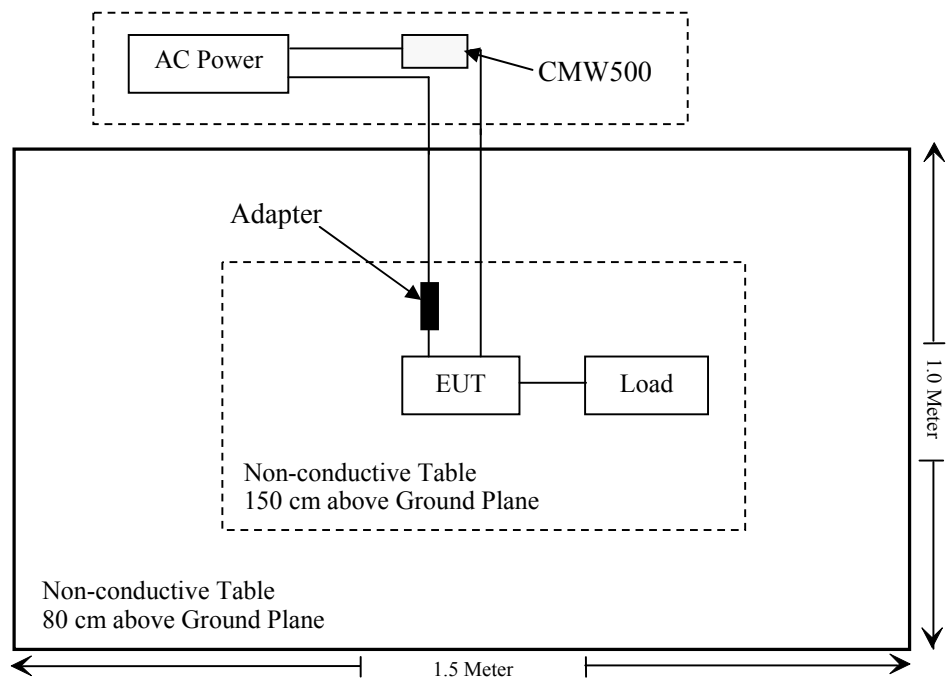
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R & S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh
Agilent	ESG Vector Signal Generator	E4438C	US41461205

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachable DC Power Cable	1.2	Adapter	EUT
Un-shielding Detachable AC Power Cable	1.8	AC Power	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 2.1091	Maximum Permissible exposure (MPE)	Compliance
§ 2.1046; § 22.913; § 24.232; § 22.913; § 27.50	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.917; § 24.238; §27.53	Bandwidth	Compliance
§ 2.1051; § 22.917; § 24.238; §27.53	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917; § 24.238; §27.53	Field Strength of Spurious Radiation	Compliance
§ 2.1053; § 22.917; § 24.238; §27.53	Band Edge & Intermodulation	Compliance
§ 2.1055; § 22.355; § 24.235; § 27.54	Frequency stability	N/A*
§ 20.21	Out of Band Rejection	Compliance

N/A*: EUT was a signal booster.

FCC §1.1307 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Uplink

Test Band	Frequency (MHz)	Target power (dBm)	Target power (mW)	Antenna Gain		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
				(dBi)	(numeric)			
Lower 700MHz (B+C Block)	706.5	24	251.19	9.5	8.91	30	0.20	0.47
	710.0	24	251.19	9.5	8.91	30	0.20	0.47
	713.5	24	251.19	9.5	8.91	30	0.20	0.48
Upper 700MHz C Block	778.5	24	251.19	9.5	8.91	30	0.20	0.52
	781.5	24	251.19	9.5	8.91	30	0.20	0.52
	784.5	24	251.19	9.5	8.91	30	0.20	0.52
CELLULAR	824.2	24	251.19	9.5	8.91	30	0.20	0.55
	836.6	24	251.19	9.5	8.91	30	0.20	0.56
	848.8	24	251.19	9.5	8.91	30	0.20	0.57
PCS	1850.2	24	251.19	9.5	8.91	30	0.20	1.00
	1880.0	24	251.19	9.5	8.91	30	0.20	1.00
	1909.8	24	251.19	9.5	8.91	30	0.20	1.00
AWS-1	1710.8	24	251.19	9.5	8.91	30	0.20	1.00
	1732.5	24	251.19	9.5	8.91	30	0.20	1.00
	1754.2	24	251.19	9.5	8.91	30	0.20	1.00

Downlink

Test Band	Frequency (MHz)	Target power (dBm)	Target power (mW)	Antenna Gain		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
				(dBi)	(numeric)			
Lower 700MHz (B+C Block)	736.5	24	251.19	9.5	8.91	30	0.20	0.49
	740.0	24	251.19	9.5	8.91	30	0.20	0.49
	743.5	24	251.19	9.5	8.91	30	0.20	0.50
Upper 700MHz C Block	748.5	24	251.19	9.5	8.91	30	0.20	0.50
	751.5	24	251.19	9.5	8.91	30	0.20	0.50
	754.5	24	251.19	9.5	8.91	30	0.20	0.50
CELLULAR	869.2	24	251.19	9.5	8.91	30	0.20	0.58
	881.6	24	251.19	9.5	8.91	30	0.20	0.59
	893.8	24	251.19	9.5	8.91	30	0.20	0.60
PCS	1930.2	24	251.19	9.5	8.91	30	0.20	1.00
	1960.0	24	251.19	9.5	8.91	30	0.20	1.00
	1989.8	24	251.19	9.5	8.91	30	0.20	1.00
AWS-1	2110.8	24	251.19	9.5	8.91	30	0.20	1.00
	2132.5	24	251.19	9.5	8.91	30	0.20	1.00
	2154.2	24	251.19	9.5	8.91	30	0.20	1.00

The Maximum indoor and outdoor Gain is 9.5 dBi

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 30cm from nearby persons.

Result: Compliance

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E and Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50 (b) (c) (d) - RF OUTPUT POWER and AMPLIFIER GAIN

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(b)(9), control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.

According to §27.50(c)(9), control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

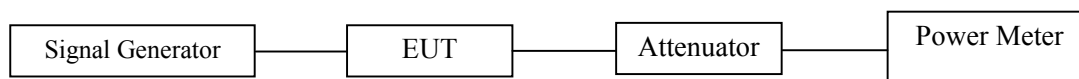
According to §27.50(d)(2), the power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to an EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Test Procedure

Conducted method:

According to KDB 935210 D05 Indus Booster Basic Meas v01 clause 3.5



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	P-Series Power Meter	N1912A	MY5000448	2015-11-03	2016-11-03
Agilent	Wideband Power Sensor	N1921A	ESR3	2015-12-12	2016-12-11
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
Agilent	ESG Vector Signal Generator	E4438C	US41461205	2015-11-12	2016-11-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	23 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong on 2016-03-16.

Conducted Power

Model: F25K-5S

Lower 700MHz (B+C Block):

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	ERP (dBm)
Uplink	710.06	AWGN	Pre-AGC	-44.2	20.95	65.15	27.30
			3dB above AGC	-41.2	21.25	62.45	27.60
		GSM	Pre-AGC	-42.5	20.86	63.36	27.21
			3dB above AGC	-39.5	21.42	60.92	27.77
Downlink	736.21	AWGN	Pre-AGC	-45.9	21.25	67.15	27.60
			3dB above AGC	-42.9	21.74	64.64	28.09
		GSM	Pre-AGC	-44.1	21.20	65.30	27.55
			3dB above AGC	-41.1	21.96	63.06	28.31

Upper 700MHz C Block:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	ERP (dBm)
Uplink	775.82	AWGN	Pre-AGC	-45.7	20.72	66.42	27.07
			3dB above AGC	-42.7	21.35	64.05	27.70
		GSM	Pre-AGC	-44.9	21.02	65.92	27.37
			3dB above AGC	-41.9	21.42	63.32	27.77
Downlink	750.68	AWGN	Pre-AGC	-45.7	21.62	67.32	27.97
			3dB above AGC	-42.7	21.94	64.64	28.29
		GSM	Pre-AGC	-44.2	21.73	65.93	28.08
			3dB above AGC	-41.2	21.98	63.18	28.33

CELLULAR Band:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	
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AWS-1 Band:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	EIRP (dBm)
Uplink	1741.29	AWGN	Pre-AGC	-46.9	19.19	66.09	27.69
			3dB above AGC	-43.9	20.01	63.91	28.51
		GSM	Pre-AGC	-45.6	19.33	64.93	27.83
			3dB above AGC	-42.6	20.12	62.72	28.62
Downlink	2134.98	AWGN	Pre-AGC	-47.0	20.56	67.56	29.06
			3dB above AGC	-44.0	21.18	65.18	29.68
		GSM	Pre-AGC	-46.8	20.45	67.25	28.95
			3dB above AGC	-43.8	21.25	65.05	29.75

Model: F13K-5S**Lower 700MHz (B+C Block):**

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	ERP (dBm)
Downlink	736.21	AWGN	Pre-AGC	-51.6	12.65	64.25	19.00
			3dB above AGC	-48.6	13.11	61.71	19.46
		GSM	Pre-AGC	-51.2	13.62	64.82	19.97
			3dB above AGC	-48.2	14.06	62.26	20.41

Upper 700MHz C Block:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	ERP (dBm)
Downlink	750.68	AWGN	Pre-AGC	-51.5	15.71	67.21	22.06
			3dB above AGC	-48.5	16.53	65.03	22.88
		GSM	Pre-AGC	-48.9	16.31	65.21	22.66
			3dB above AGC	-45.9	17.02	62.92	23.37

CELLULAR Band:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	ERP (dBm)
Downlink	878.37	AWGN	Pre-AGC	-48.8	17.16	65.96	23.51
			3dB above AGC	-45.8	17.88	63.68	24.23
		GSM	Pre-AGC	-50.7	16.70	67.40	23.05
			3dB above AGC	-47.7	17.34	65.04	24.36

PCS Band:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	EIRP (dBm)
Downlink	1983.75	AWGN	Pre-AGC	-46.8	17.63	64.43	26.13
			3dB above AGC	-43.8	18.10	61.90	26.60
		GSM	Pre-AGC	-46.3	17.14	63.44	24.56
			3dB above AGC	-43.3	17.85	61.15	27.35

AWS-1 Band:

Modes	Frequency (MHz)	Signal Type	Signal Level	Input power (dBm)	Output Power (dBm)	Gain	EIRP (dBm)
Downlink	2134.98	AWGN	Pre-AGC	-53.5	15.73	69.23	24.23
			3dB above AGC	-50.5	16.21	66.71	24.71
		GSM	Pre-AGC	-50.0	17.31	67.31	25.81
			3dB above AGC	-47.0	17.86	64.86	26.36

Note: ERP=Conducted Output Power(dBm) +Antenna Gain (dBi)-2.15 dB

The Max indoor & outdoor Ant Gain for all Bands are 9.5 dBi. RF cable loss is 1.0 dB. To meet FCC EIRP limit, the antenna gain of antenna used with this amplifier must be offset by the cable loss.

The frequency was selected to test, which according to the peak of the frequency point from out-of-band rejection test.

FCC §2.1049, §22.917 & §24.238 & §27.53 - BANDWIDTH

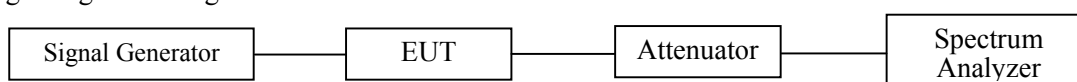
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238 & §27.53.

Test Procedure

According to KDB 935210 D05 Indus Booster Basic Meas v01 clause 3.4

A 26 dB bandwidth measurement shall be performed on the input signal and the output signal (alternatively, the 99% OBW can be measured and used) to demonstrate compliance to the technical requirements specified in §90.219(e)(4)(i) and (ii). See KDB Publication 971168 for more information regarding measuring the OBW.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
WEINSCHTEL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15
Agilent	ESG Vector Signal Generator	E4438C	US41461205	2015-11-12	2016-11-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20~23 °C
Relative Humidity:	48~52 %
ATM Pressure:	100.5~101.0 kPa

The testing was performed by Xiangguang Kong from 2015-12-28 to 2016-03-15.

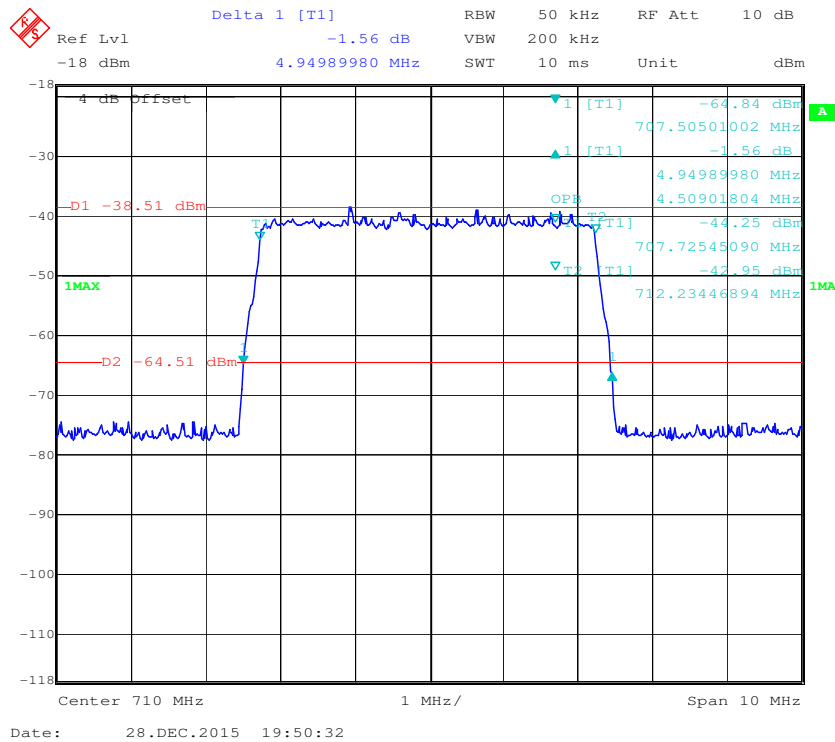
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables and plots.

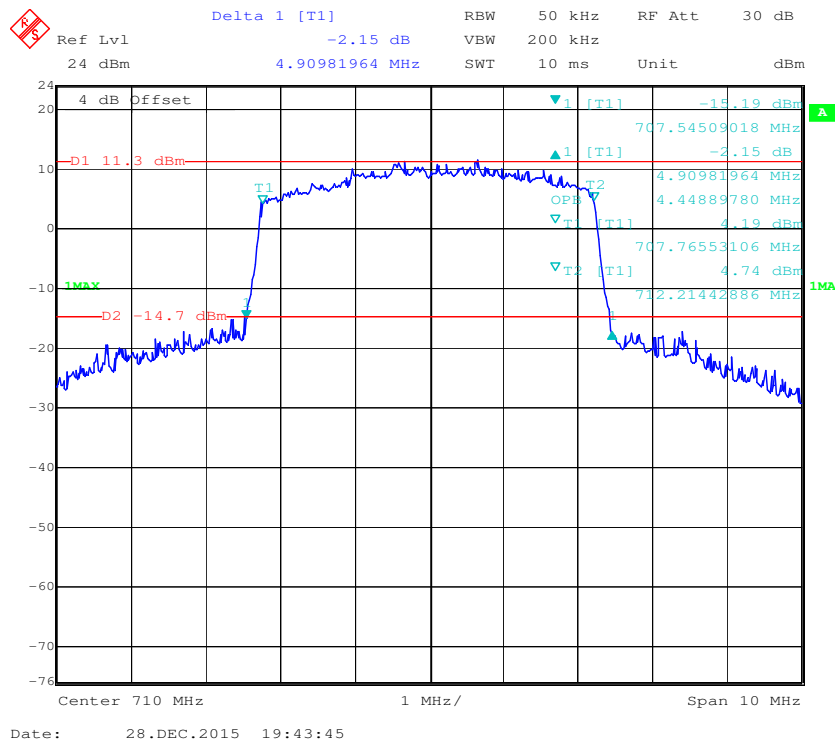
Lower 700MHz (B+C Block)

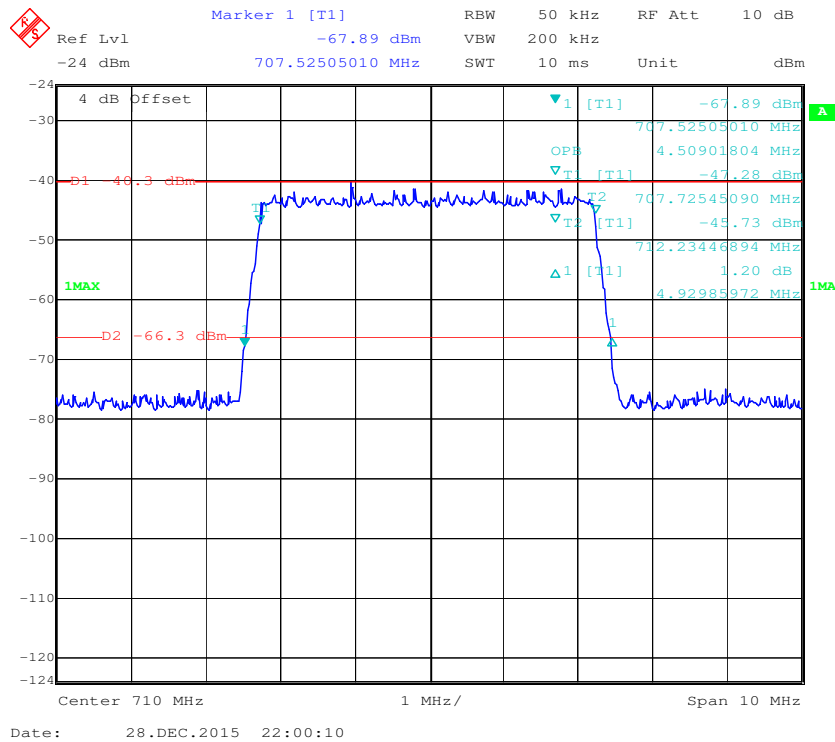
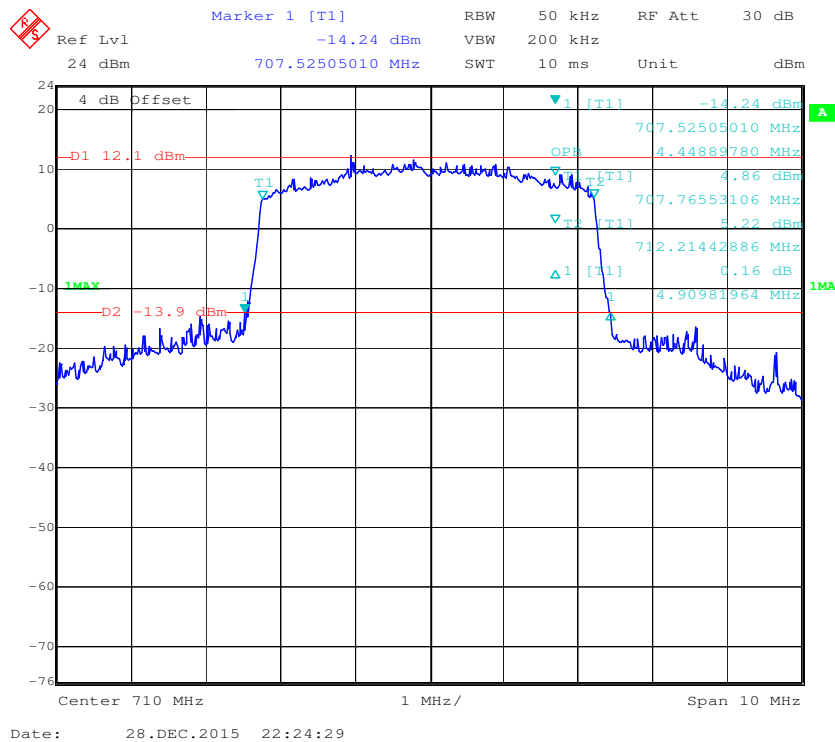
Mode	Signal Type	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
Uplink	AWGN	Pre-AGC	710	4.509	4.449	4.950	4.910
		3dB above AGC	710	4.509	4.449	4.930	4.910
	GSM	Pre-AGC	710	0.242	0.242	0.317	0.317
		3dB above AGC	710	0.242	0.242	0.315	0.317
Downlink	AWGN	Pre-AGC	740	4.529	4.509	4.930	4.930
		3dB above AGC	740	4.529	4.509	4.970	4.930
	GSM	Pre-AGC	740	0.242	0.246	0.317	0.313
		3dB above AGC	740	0.242	0.246	0.317	0.315

99% & 26 dB Bandwidth-UL-AWGN-Pre AGC-Input

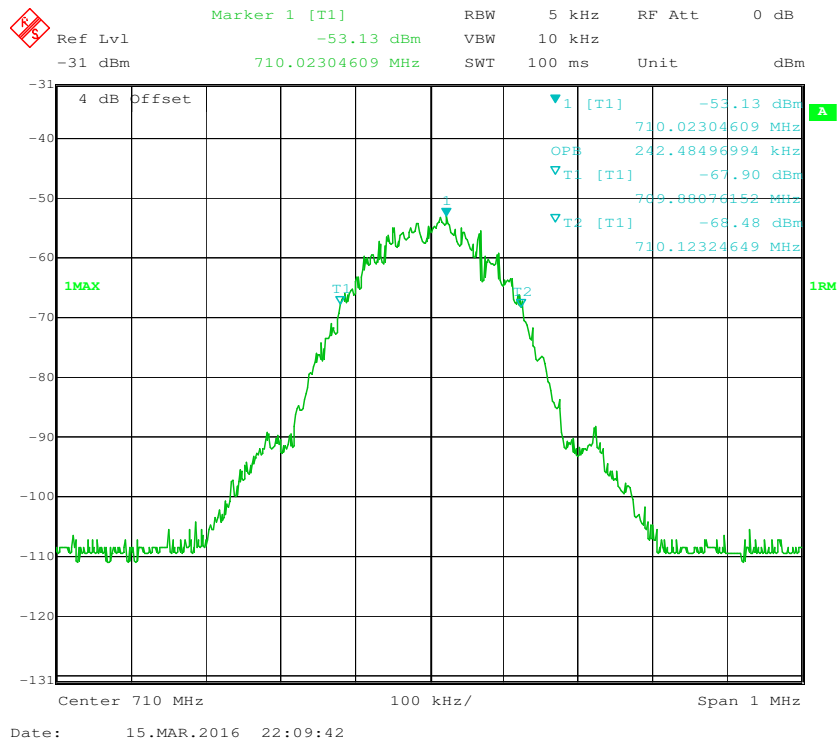


99% & 26 dB Bandwidth-UL-AWGN- Pre AGC -Output

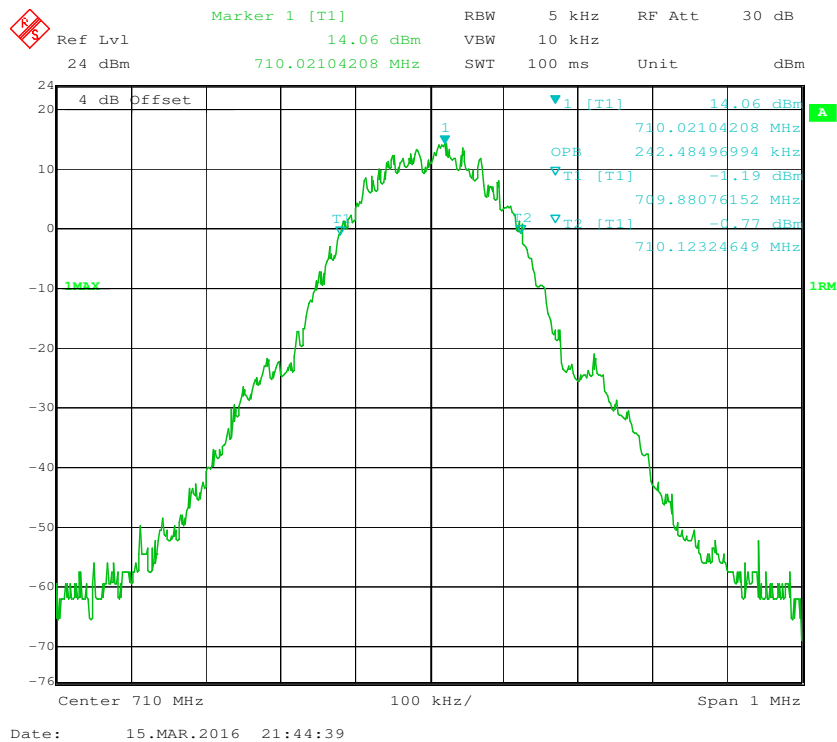


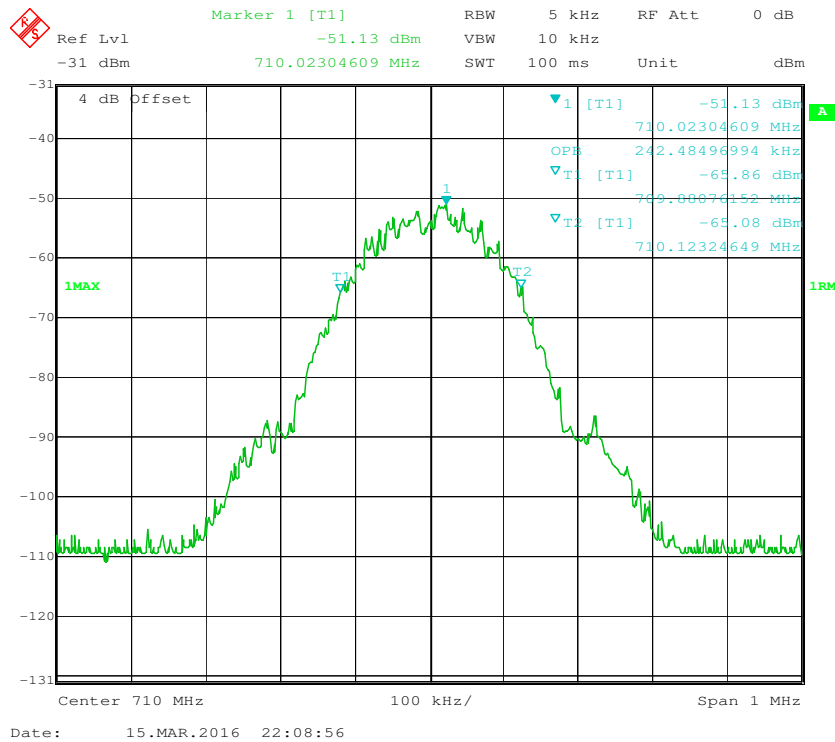
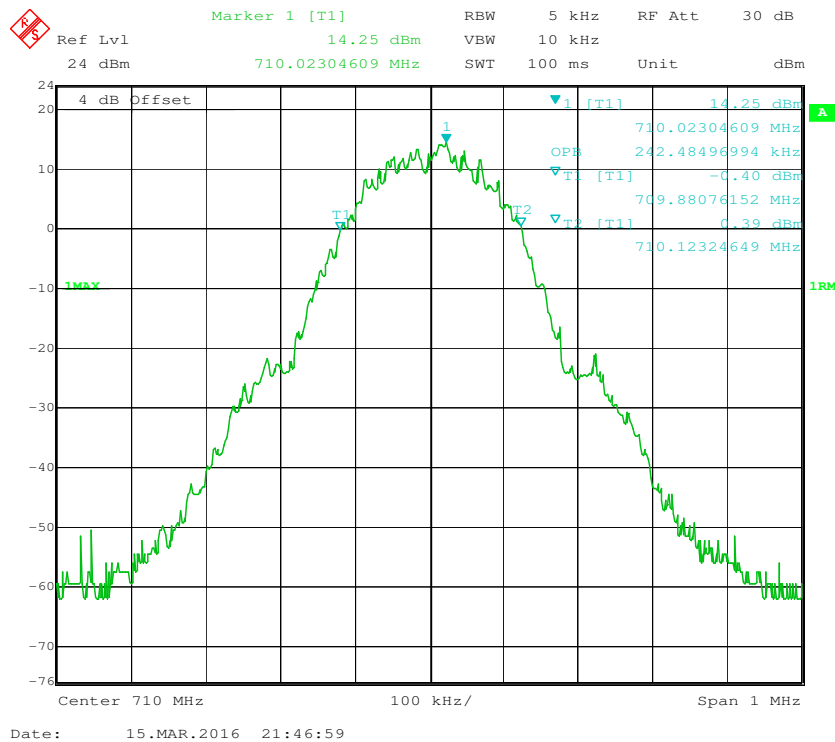
99% & 26 dB Bandwidth-UL- AWGN-3dB above AGC-Input**99% & 26 dB Bandwidth-UL-AWGN-3dB above AGC-Output**

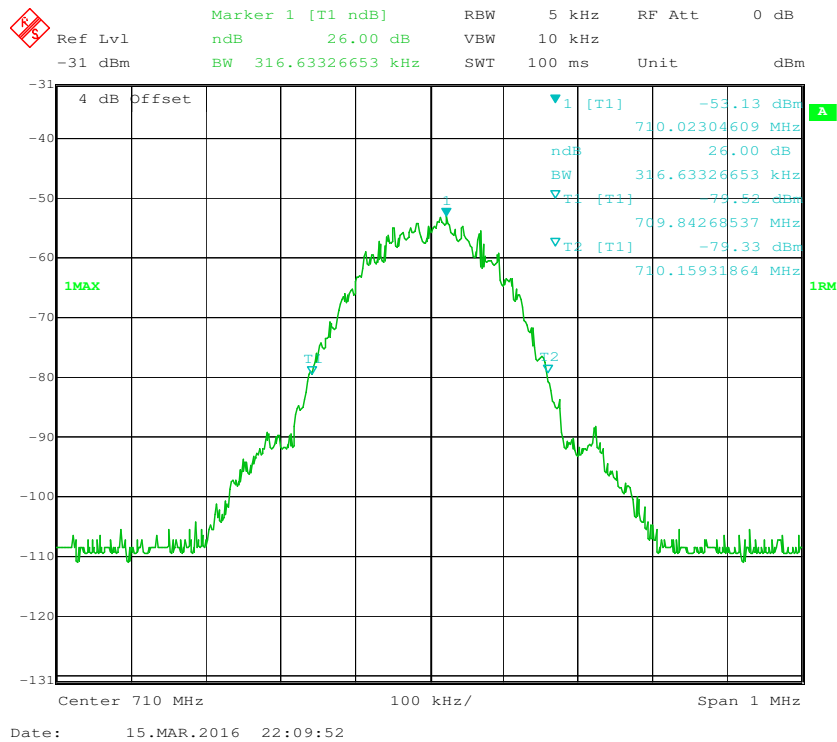
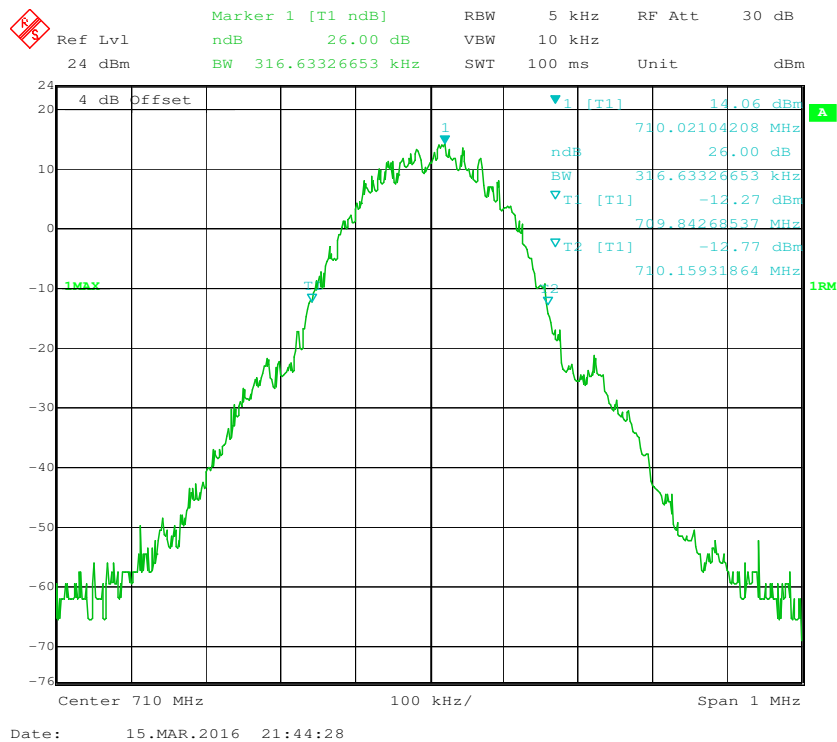
99% Bandwidth-UL-GSM-Pre AGC-Input

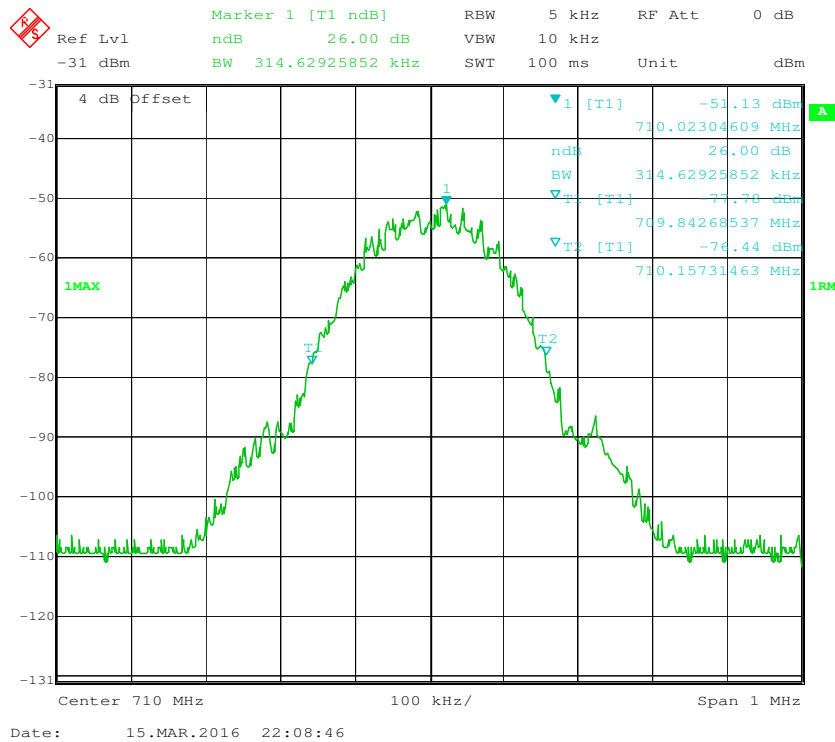
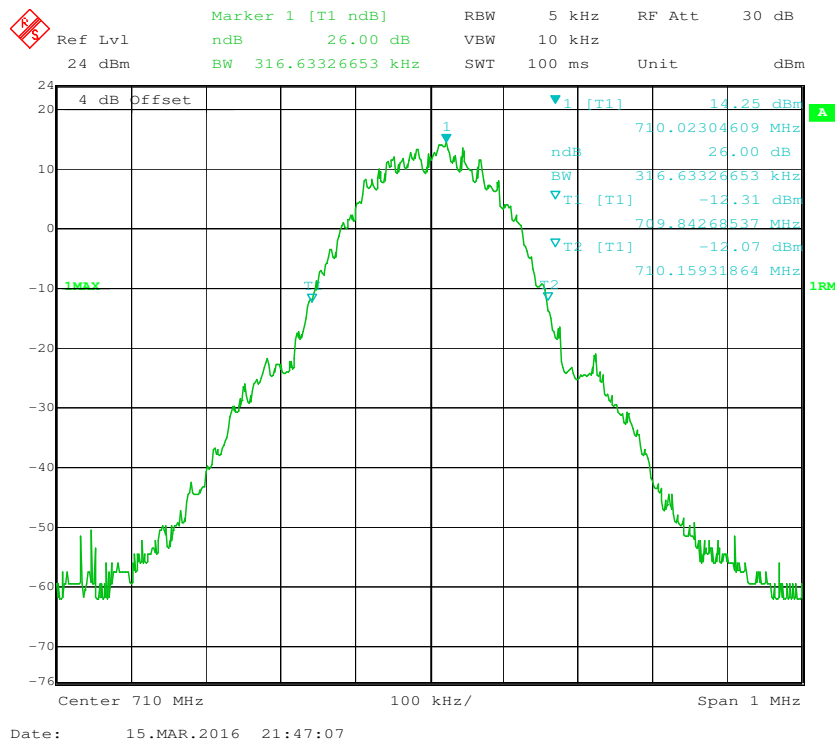


99% Bandwidth-UL-GSM- Pre AGC -Output

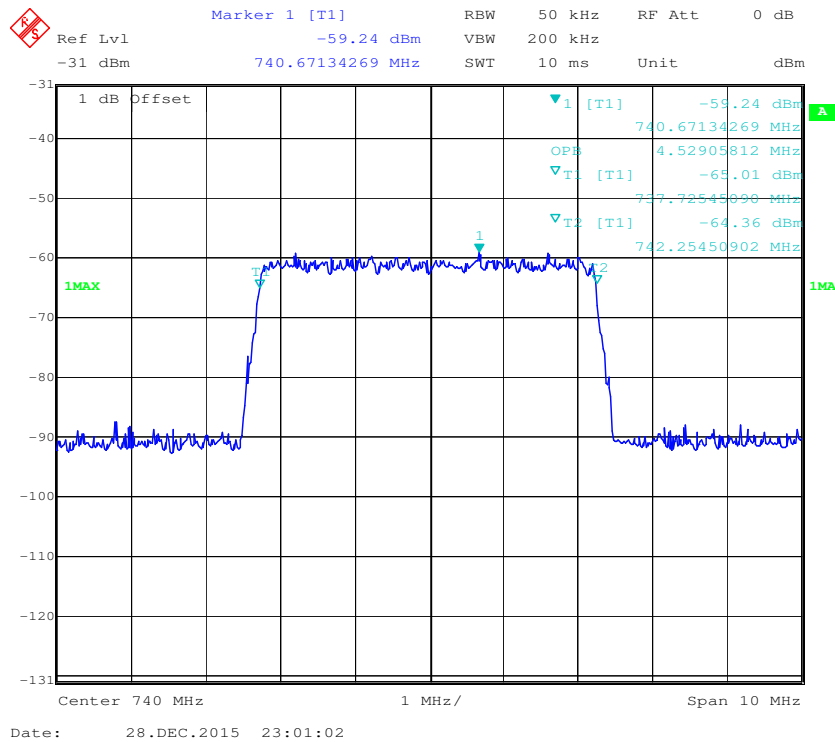


99% Bandwidth- GSM-3dB above AGC-Input**99% Bandwidth-UL-GSM-3dB above AGC-Output**

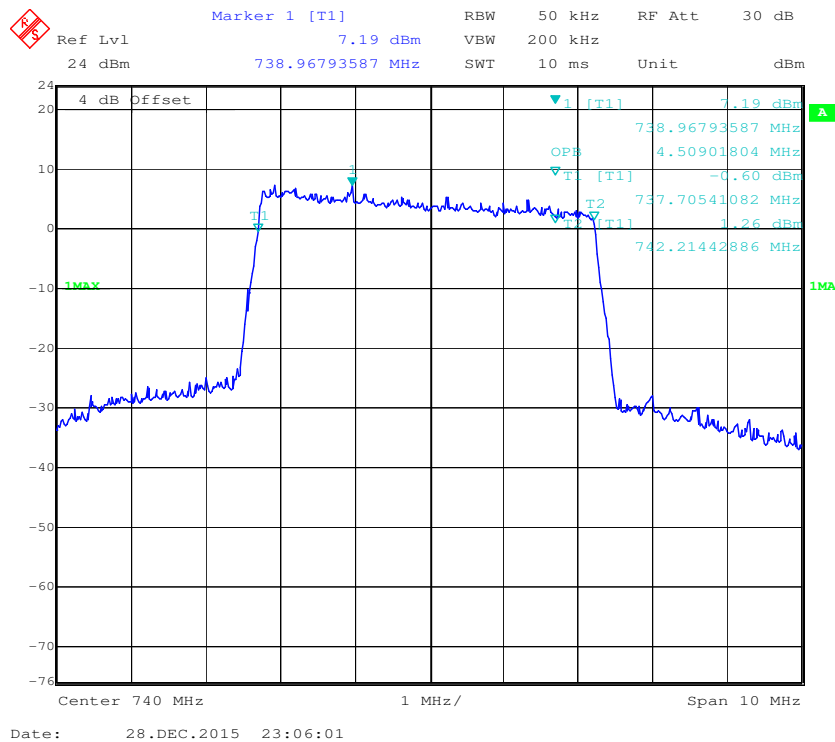
26 dB Bandwidth-UL-GSM-Pre AGC-Input**26 dB Bandwidth-UL-GSM- Pre AGC -Output**

26 dB Bandwidth-UL-GSM-3dB above AGC-Input**26 dB Bandwidth-UL-GSM-3dB above AGC-Output**

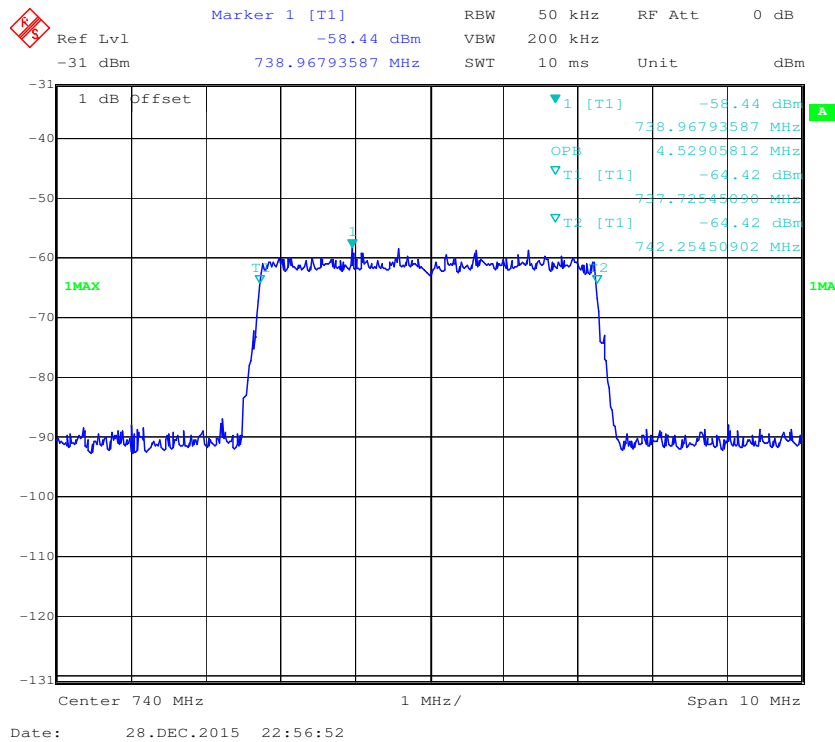
99% Bandwidth-DL-AWGN- Pre AGC -Input



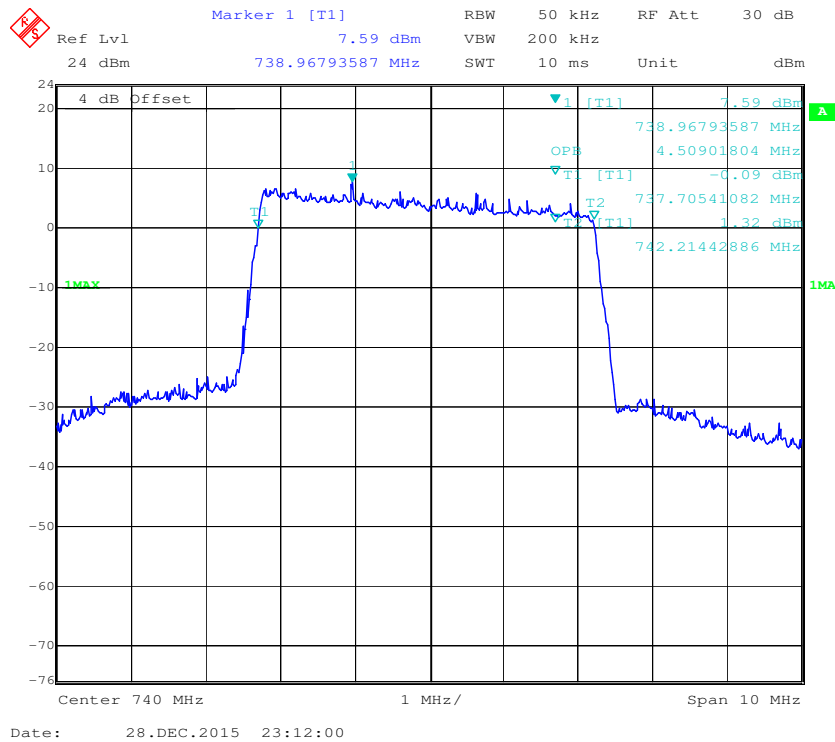
99% Bandwidth-DL-AWGN- Pre AGC -Output



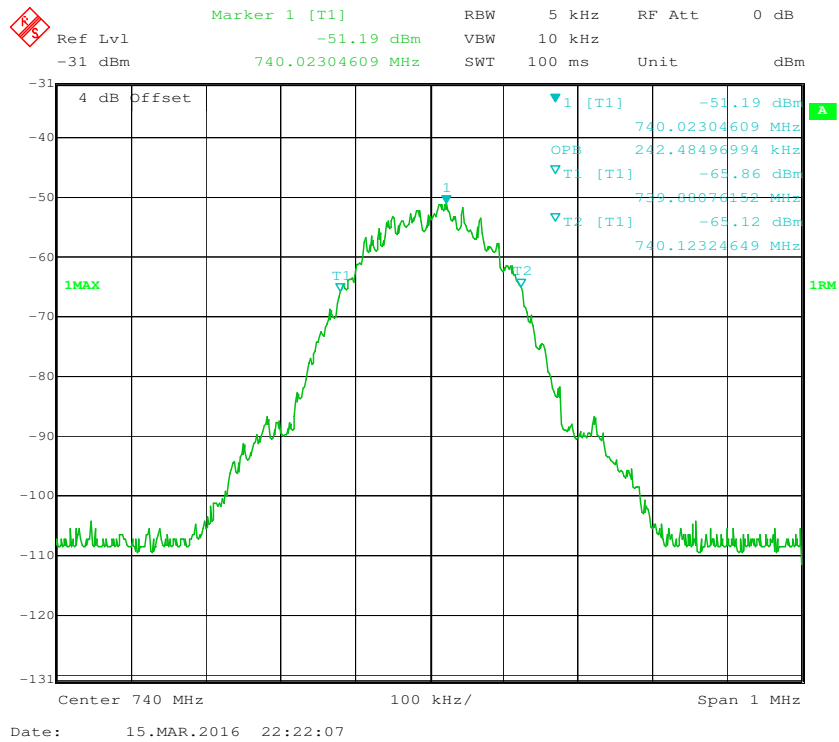
99% Bandwidth-DL- AWGN- 3dB Above AGC -Input



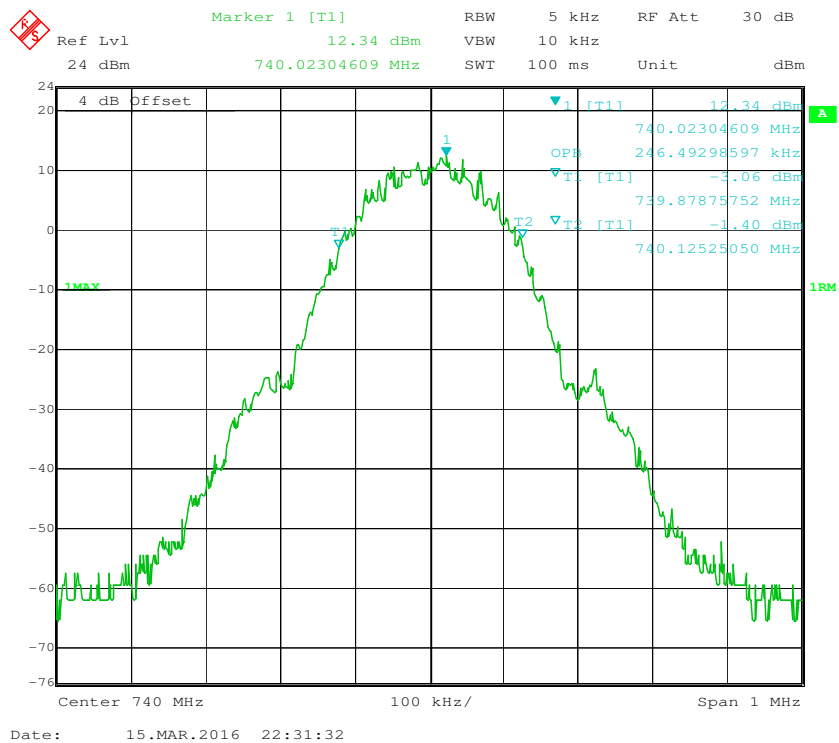
99% Bandwidth-DL-AWGN- 3dB Above AGC -Output

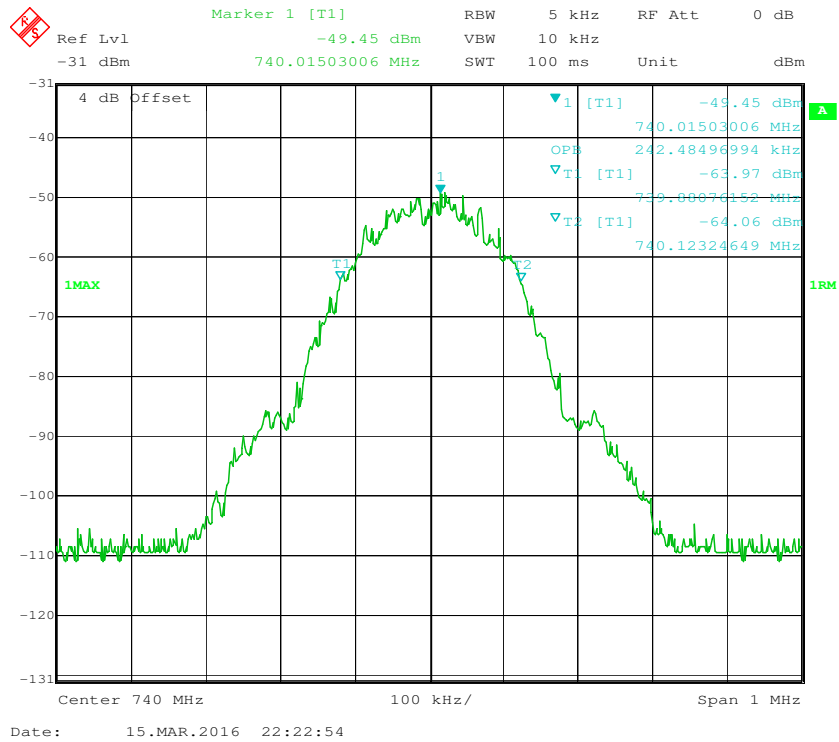
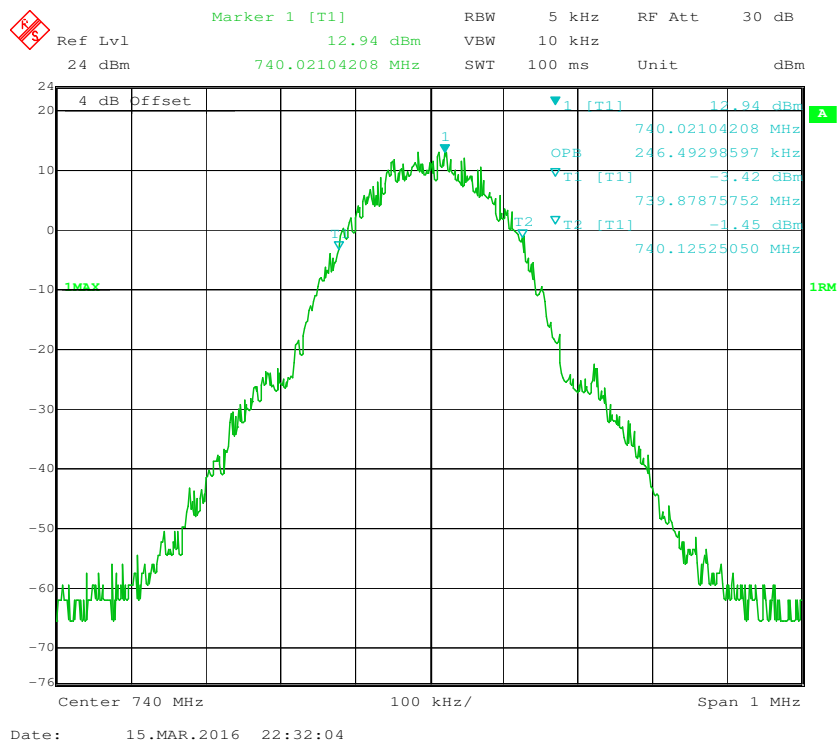


99% Bandwidth-DL- GSM- Pre AGC -Input

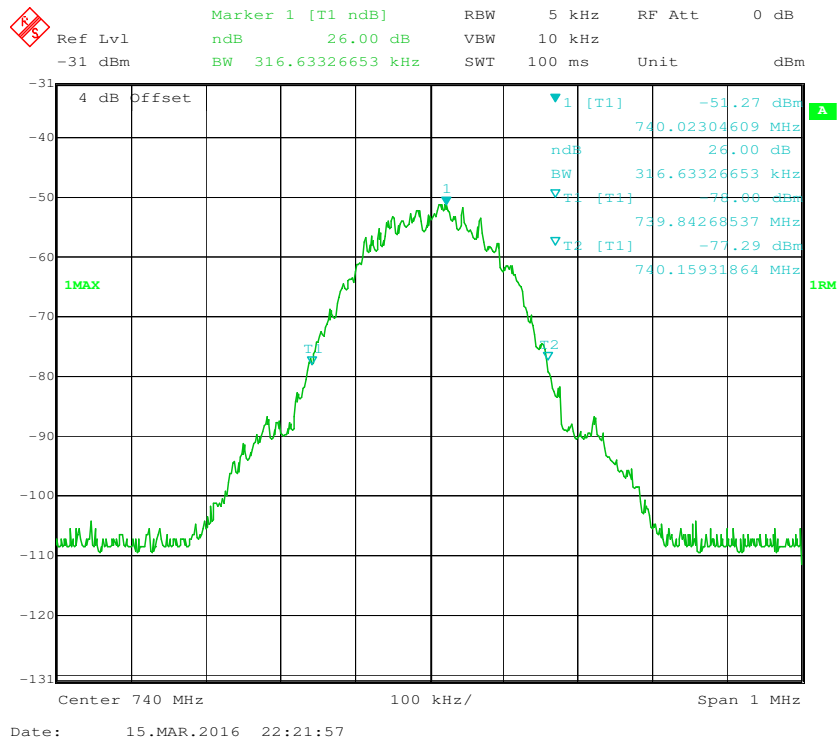


99% Bandwidth-DL- GSM- Pre AGC -Output

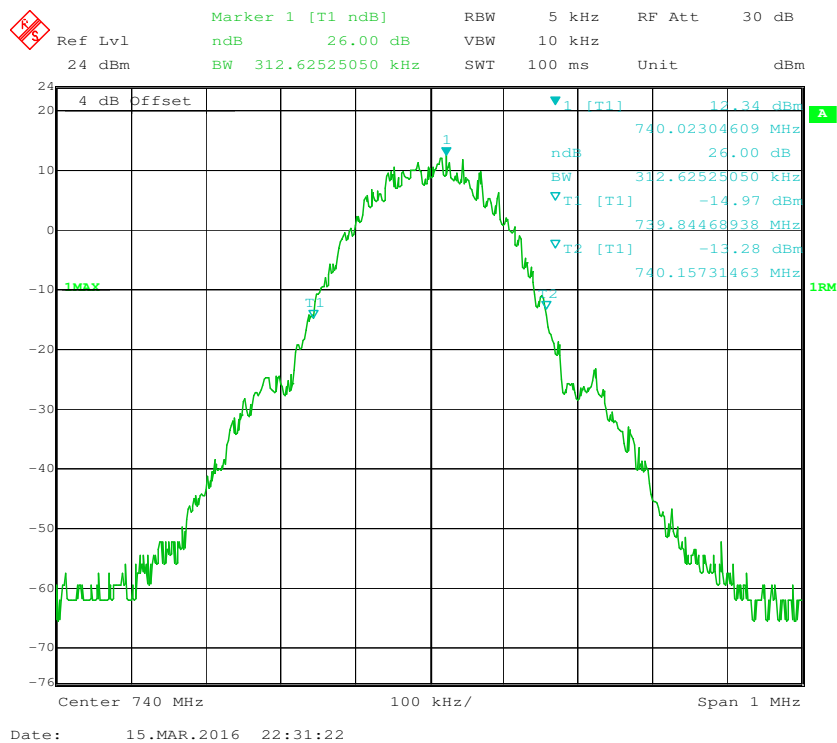


99% Bandwidth-DL- GSM- 3dB Above AGC -Input**99% Bandwidth-DL- GSM- 3dB Above AGC -Output**

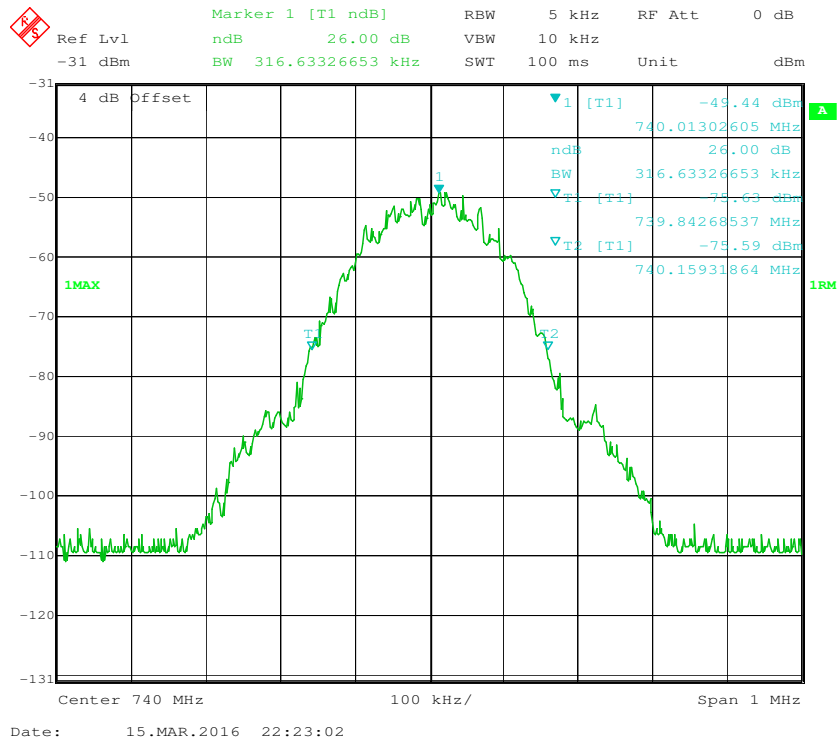
26dB Bandwidth-DL- GSM- Pre AGC -Input



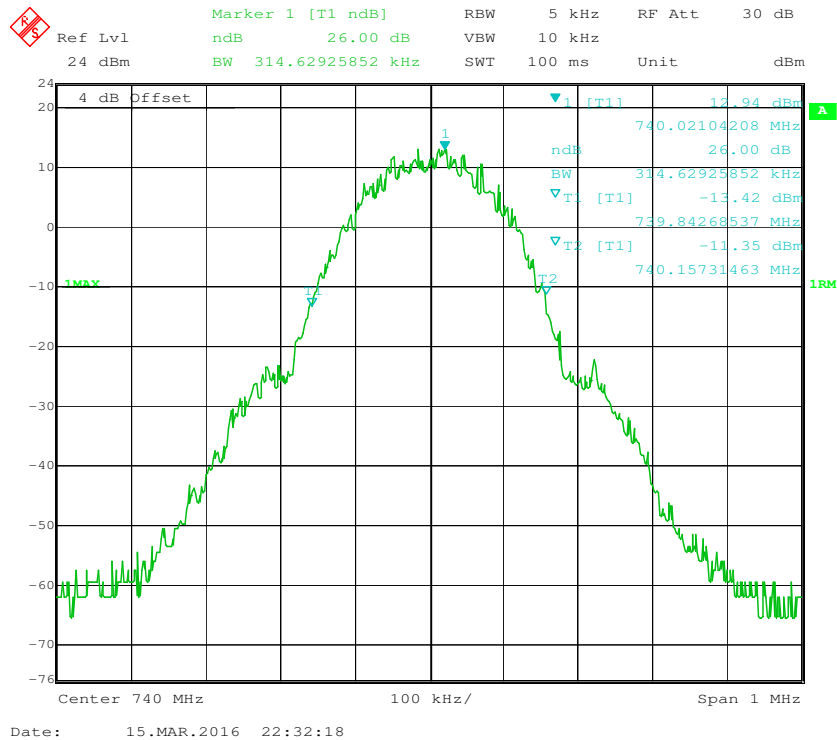
26dB Bandwidth-DL- GSM- Pre AGC -Output



26dB Bandwidth-DL- GSM- 3dB Above AGC -Input



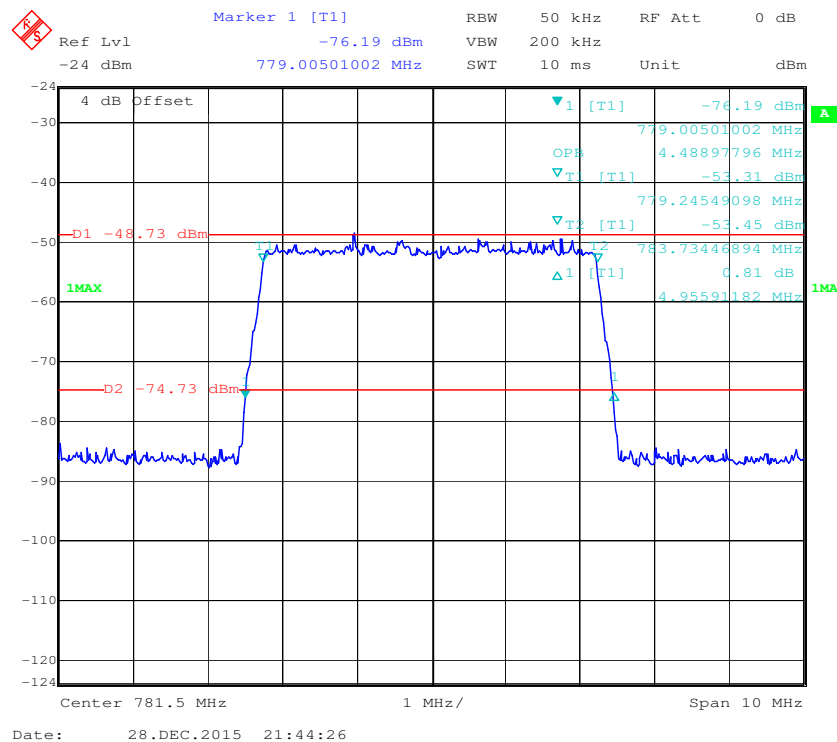
26dB Bandwidth-DL- GSM- 3dB Above AGC -Output



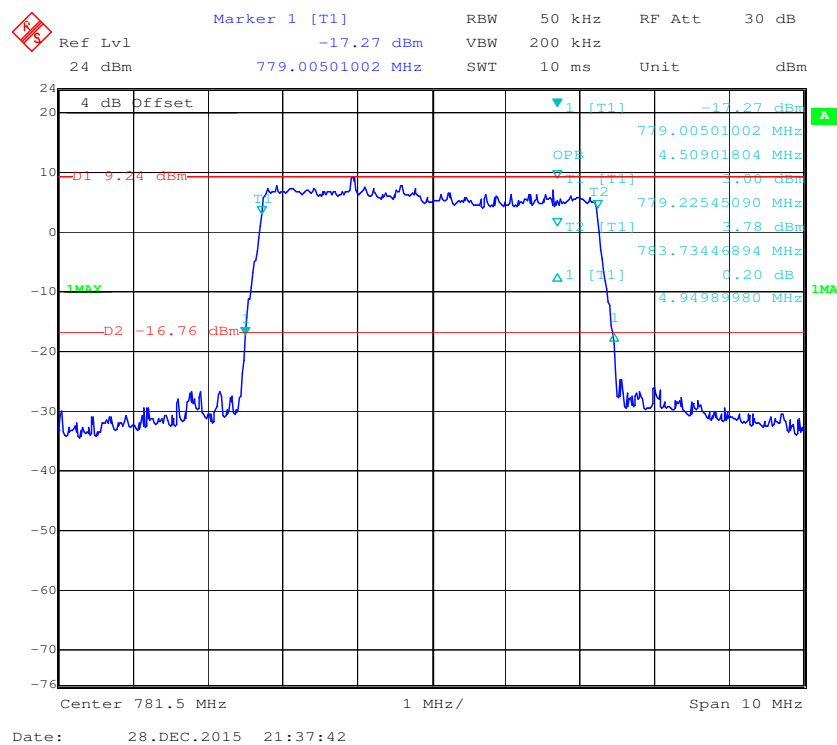
Upper 700MHz C Block:

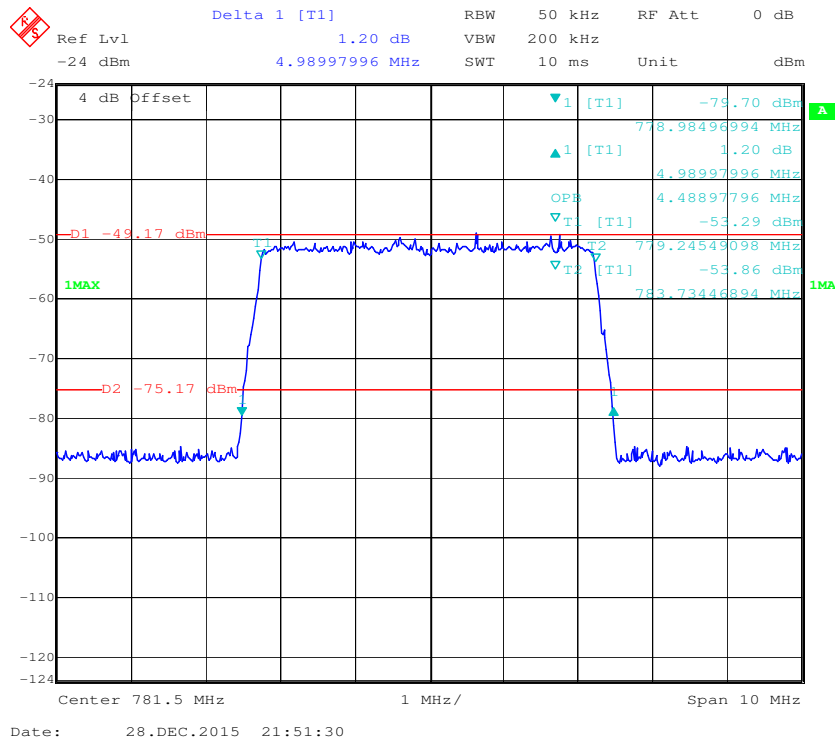
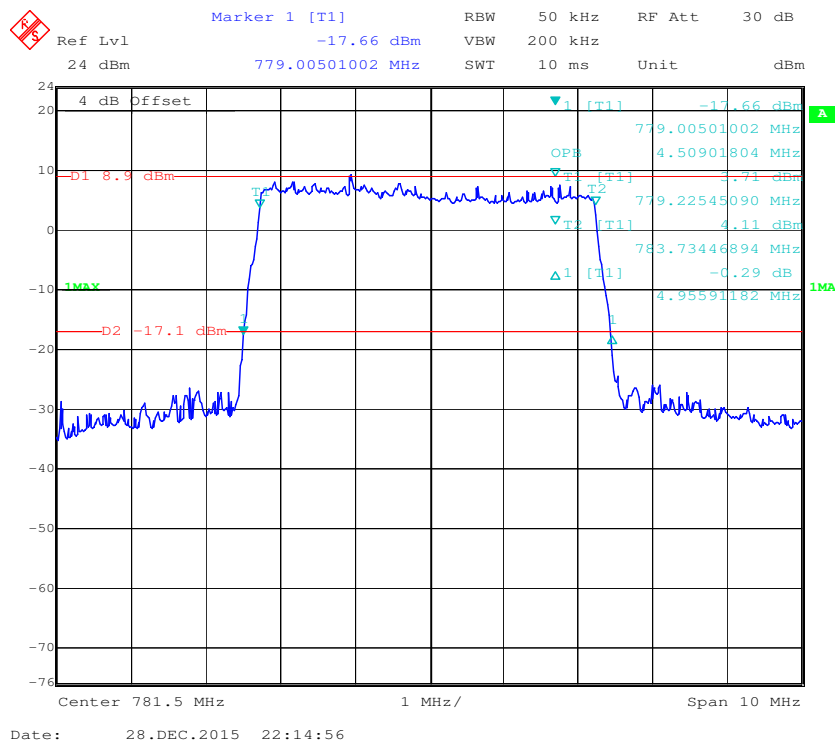
Mode	Signal Type	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
Uplink	AWGN	Pre-AGC	781.5	4.489	4.509	4.956	4.950
		3dB above AGC	781.5	4.489	4.509	4.990	4.956
	GSM	Pre-AGC	781.5	0.242	0.240	0.317	0.315
		3dB above AGC	781.5	0.242	0.242	0.317	0.317
Downlink	AWGN	Pre-AGC	751.5	4.509	4.469	4.930	4.910
		3dB above AGC	751.5	4.529	4.489	4.950	4.890
	GSM	Pre-AGC	751.5	0.242	0.244	0.317	0.315
		3dB above AGC	751.5	0.242	0.244	0.317	0.315

99% & 26 dB Bandwidth-UL-AWGN-Pre AGC-Input

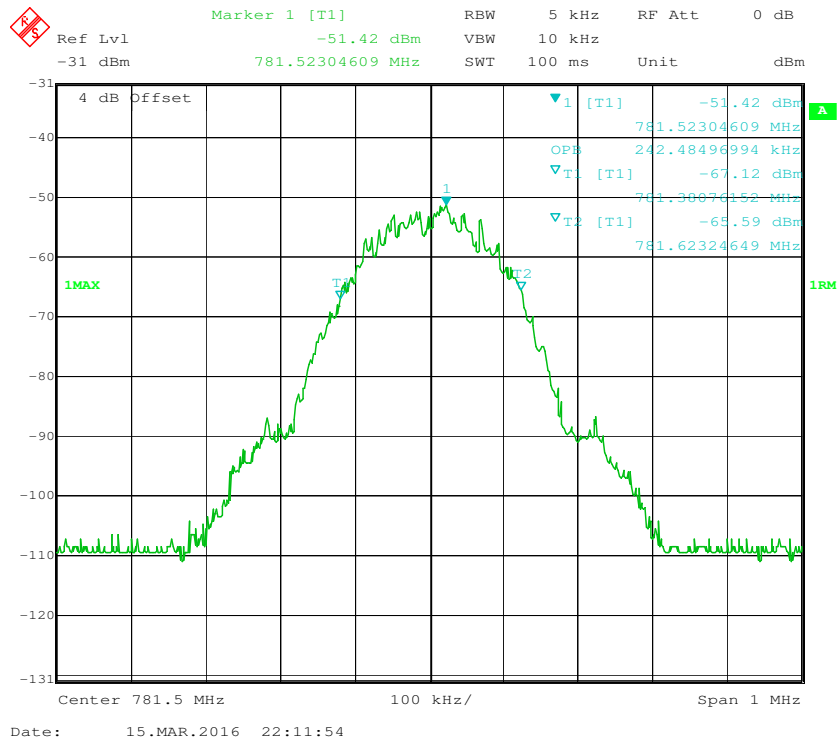


99% & 26 dB Bandwidth-UL- AWGN-Pre AGC-Output

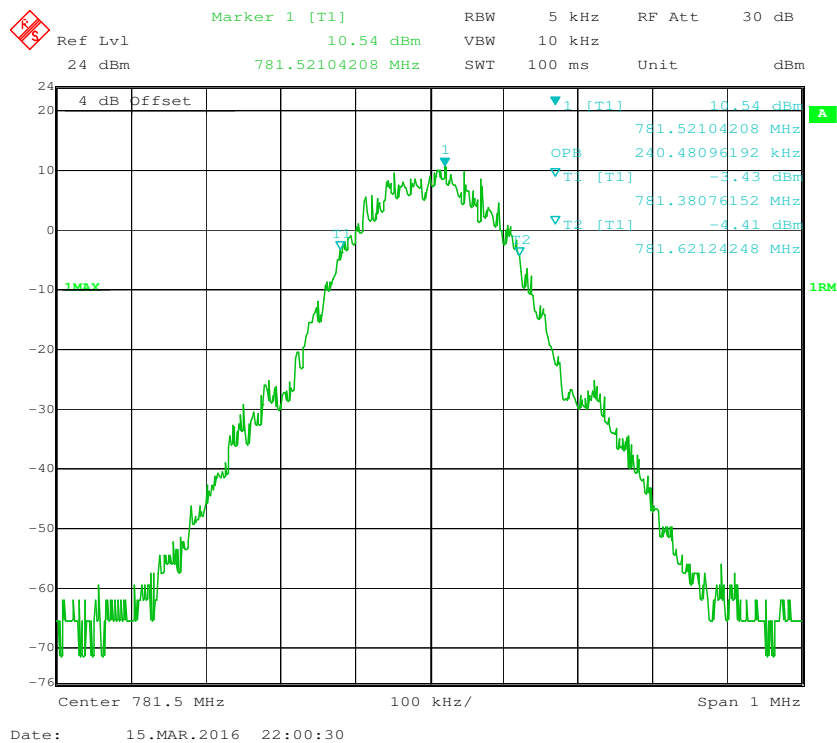


99% & 26 dB Bandwidth-UL- AWGN-3dB Above AGC-Input**99% & 26 dB Bandwidth-UL-AWGN-3dB Above AGC-Output**

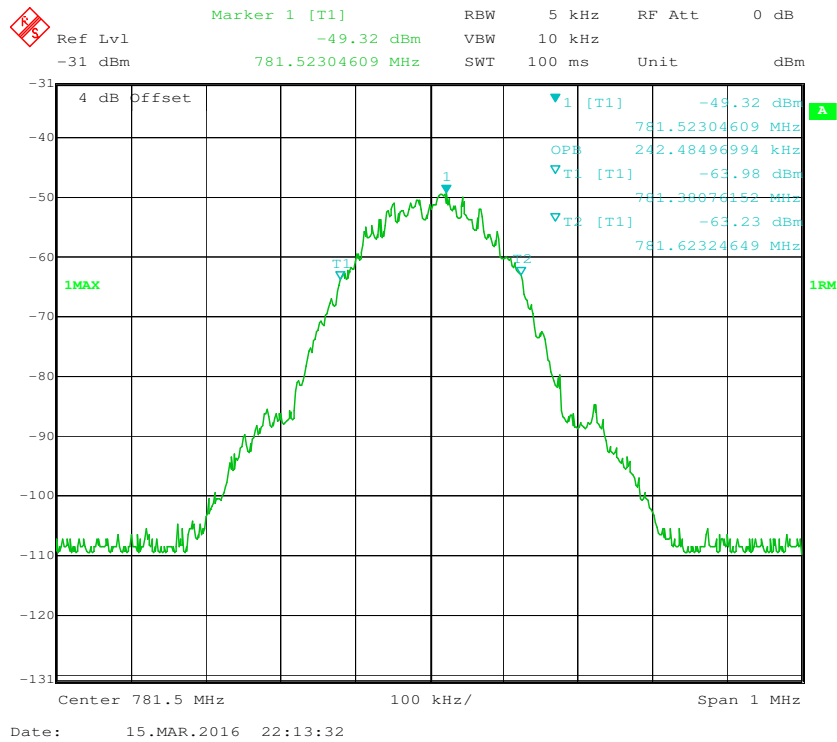
99% dB Bandwidth-UL-GSM-Pre AGC-Input



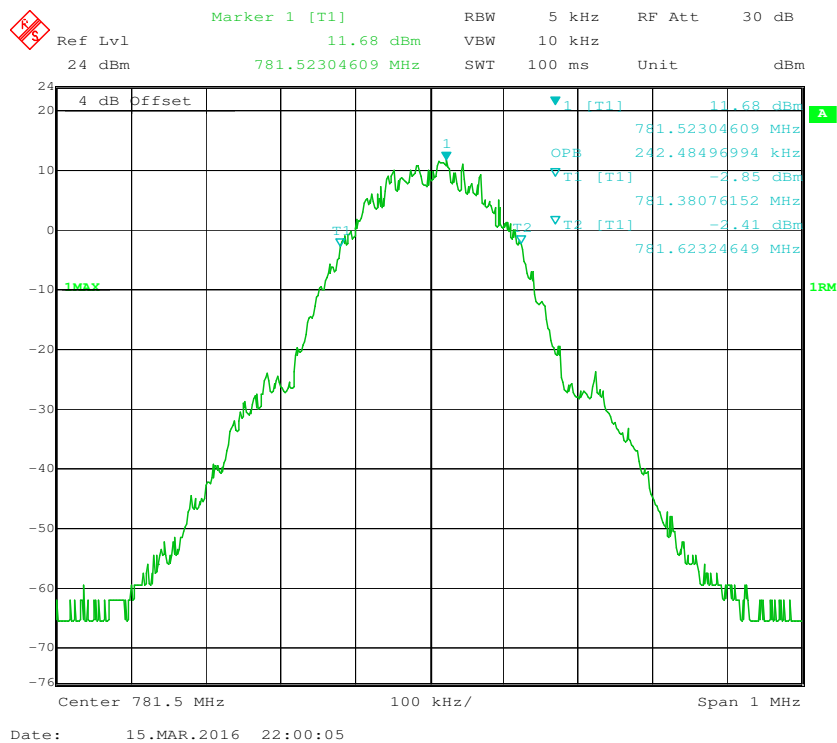
99% dB Bandwidth-UL- GSM-Pre AGC-Output



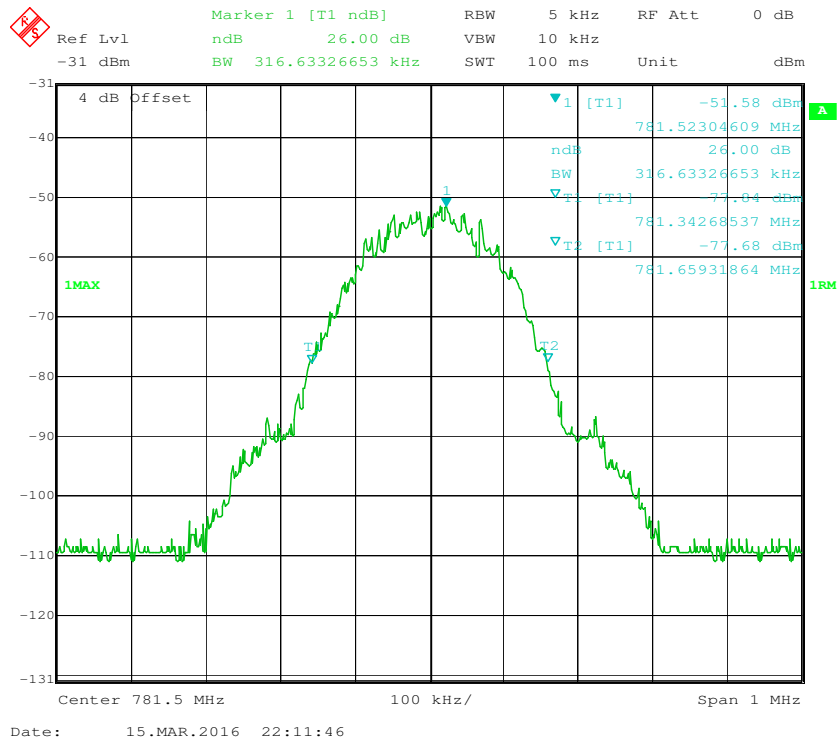
99% dB Bandwidth-UL- GSM-3dB Above AGC-Input



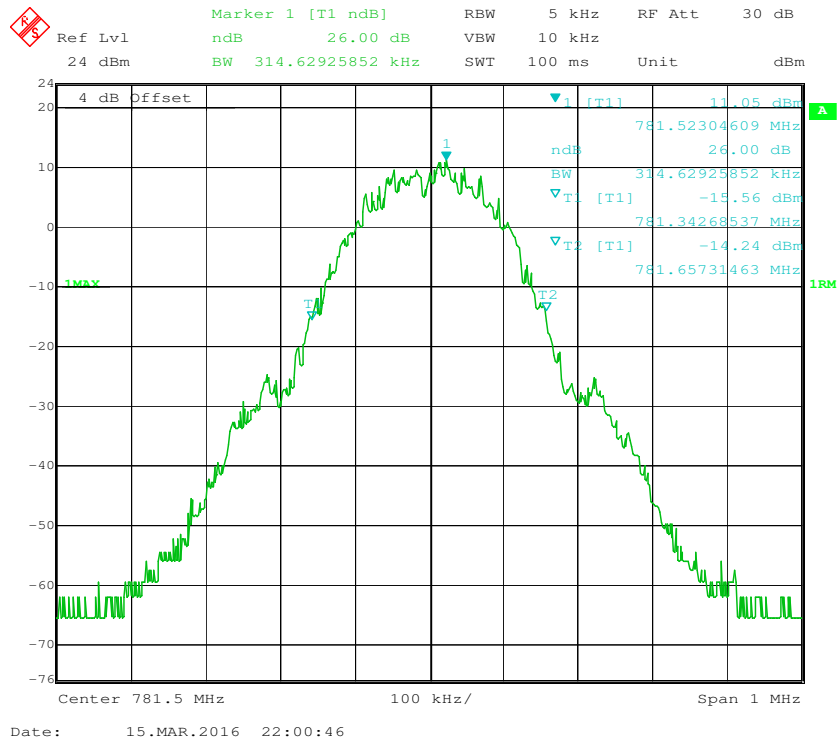
99% dB Bandwidth-UL-GSM-3dB Above AGC-Output

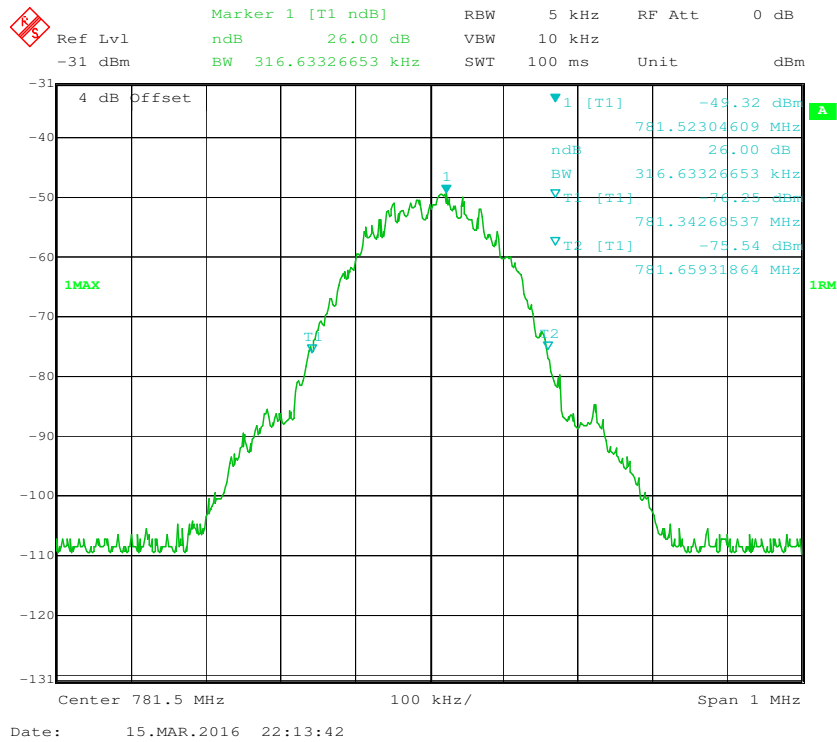
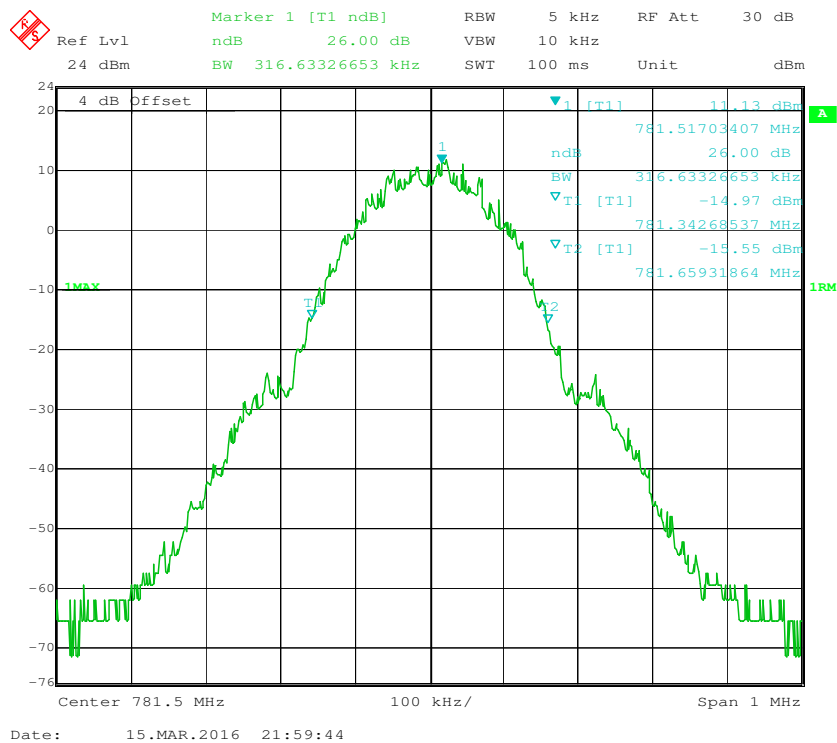


26 dB Bandwidth-UL-GSM-Pre AGC-Input

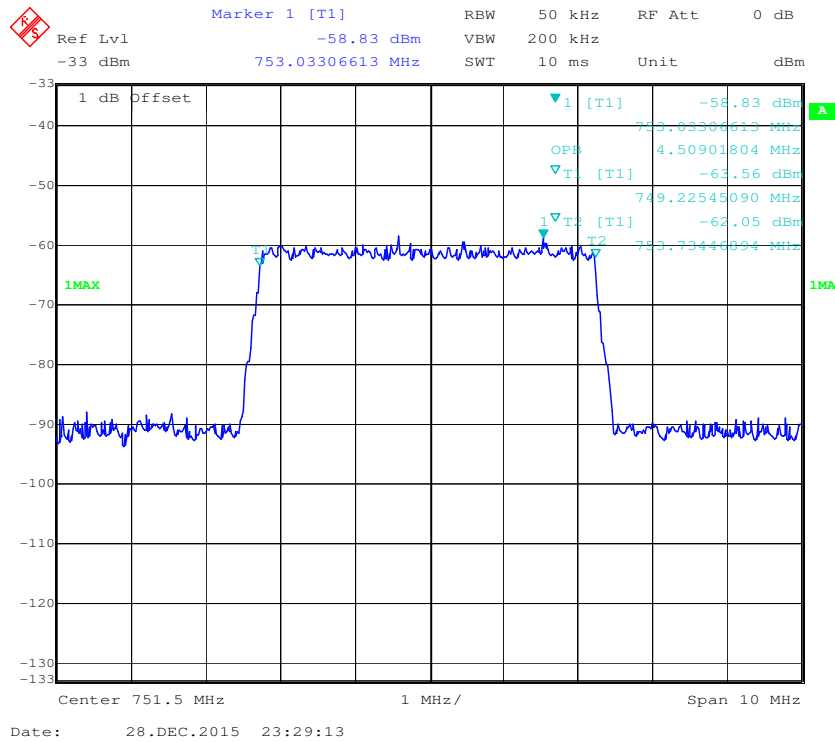


26 dB Bandwidth-UL- GSM-Pre AGC-Output

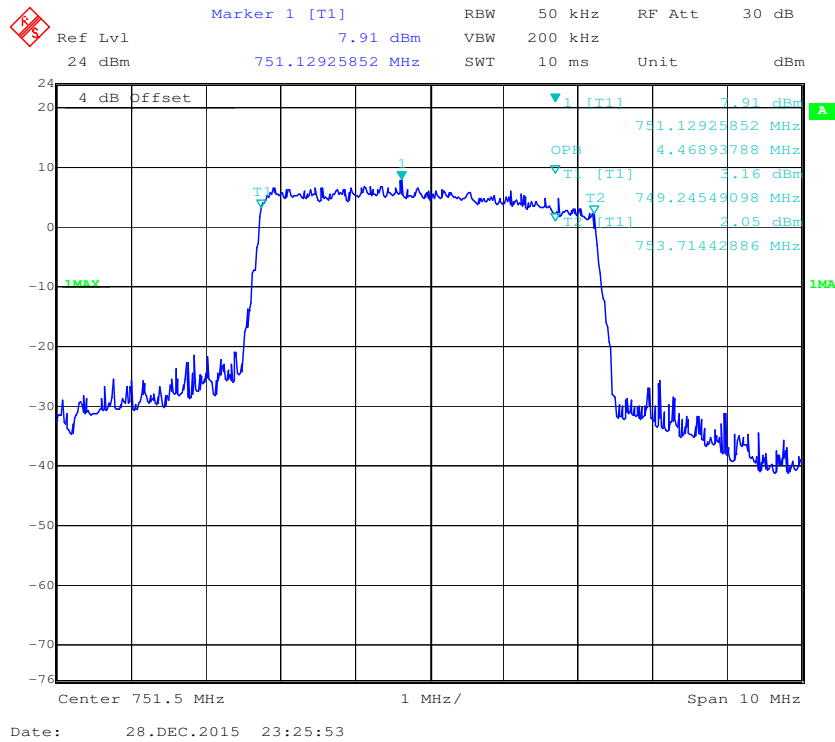


26 dB Bandwidth-UL- GSM-3dB Above AGC-Input**26 dB Bandwidth-UL-GSM-3dB Above AGC-Output**

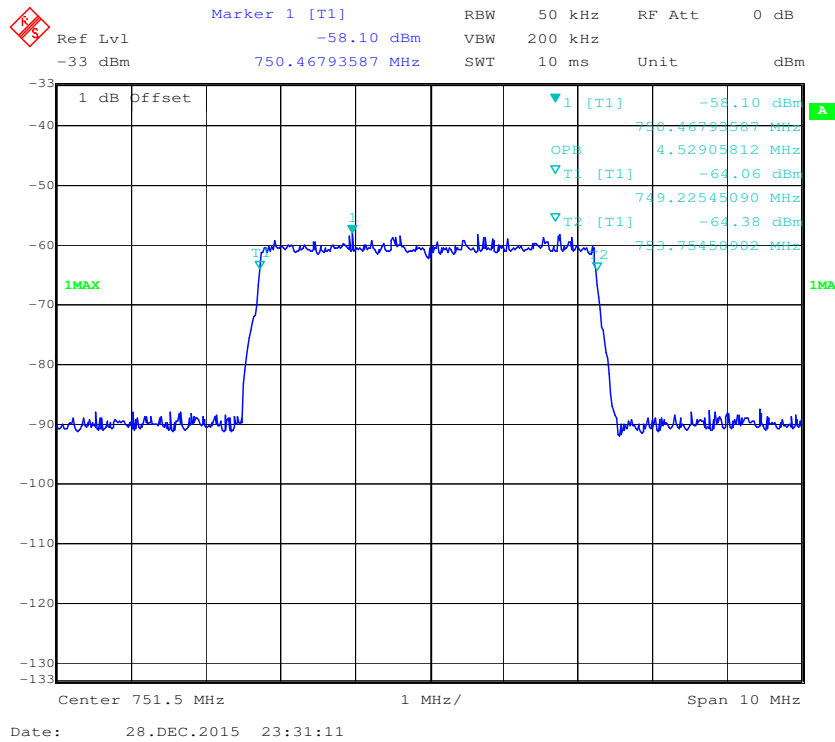
99% Bandwidth-DL-AWGN-Pre AGC-Input



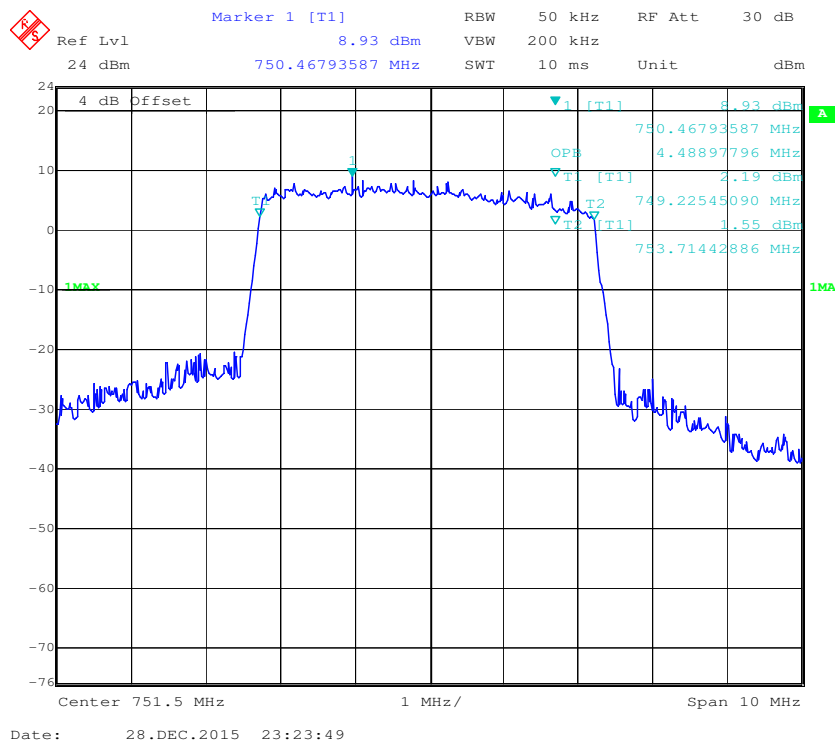
99% Bandwidth-DL- AWGN-Pre AGC-Output



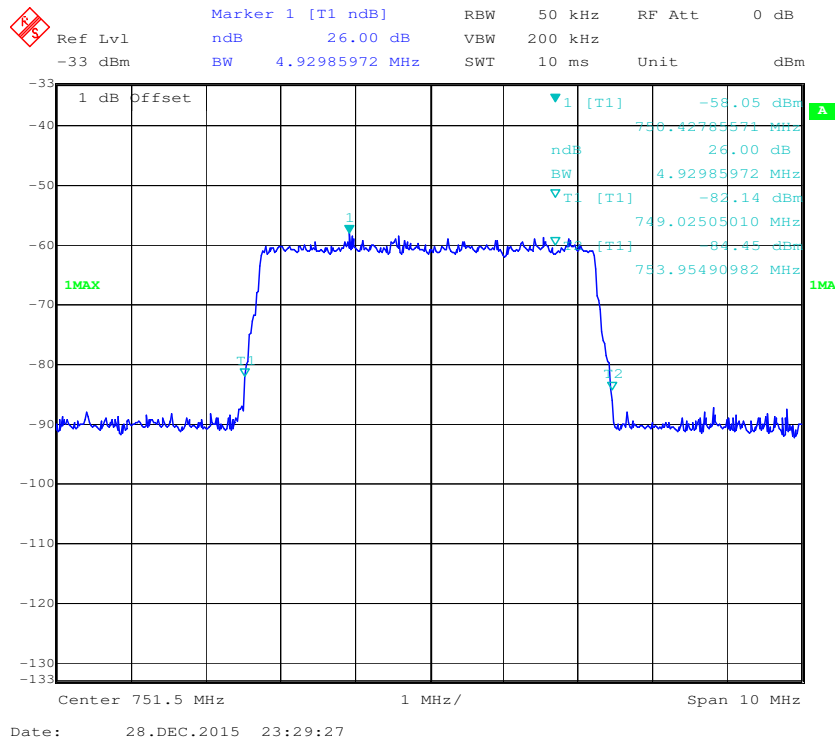
99% Bandwidth-DL- AWGN-3dB Above AGC-Input



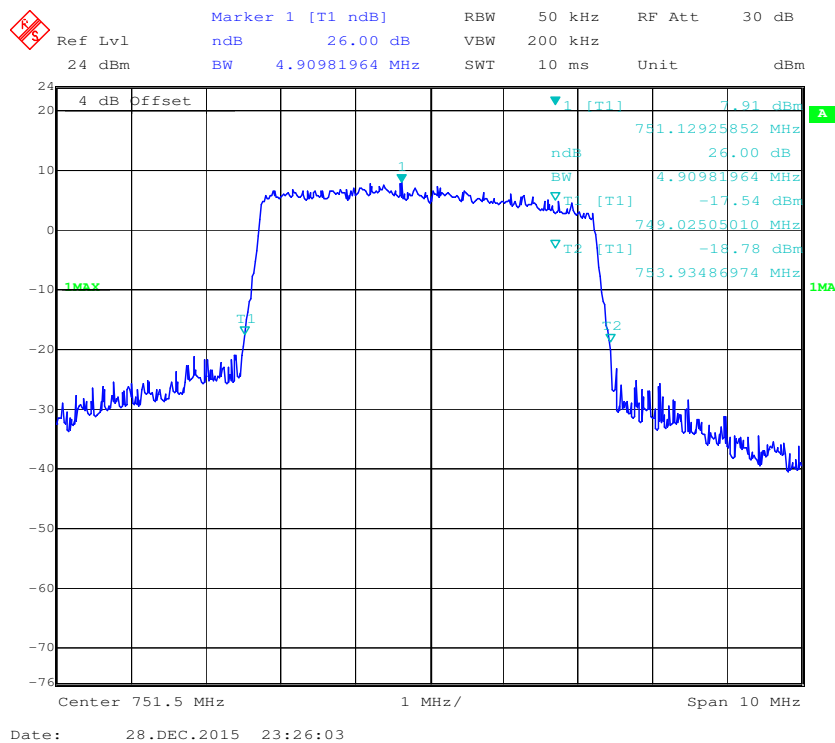
99% Bandwidth-DL- AWGN-3dB Above AGC-Output

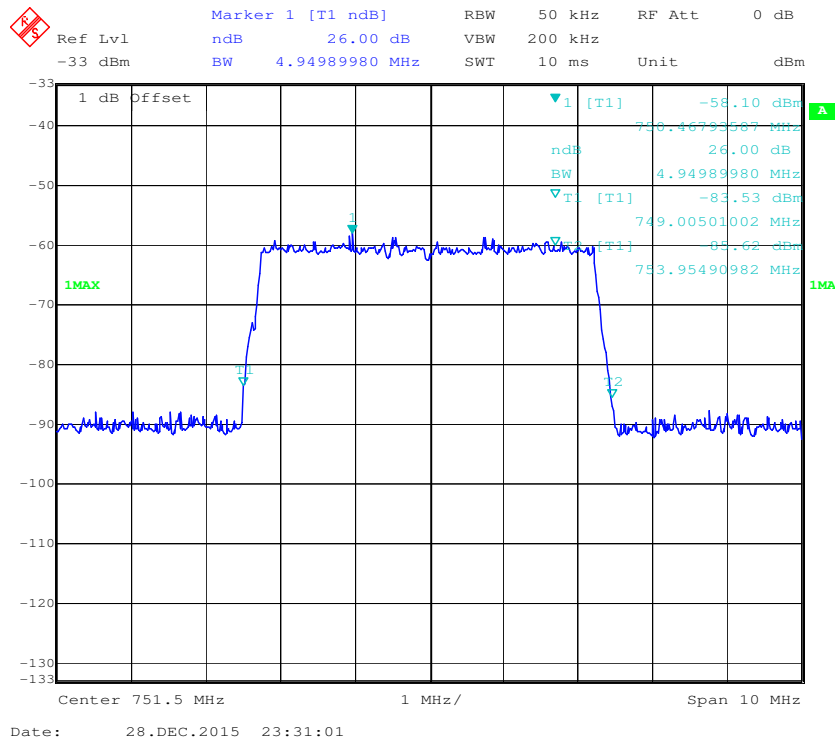
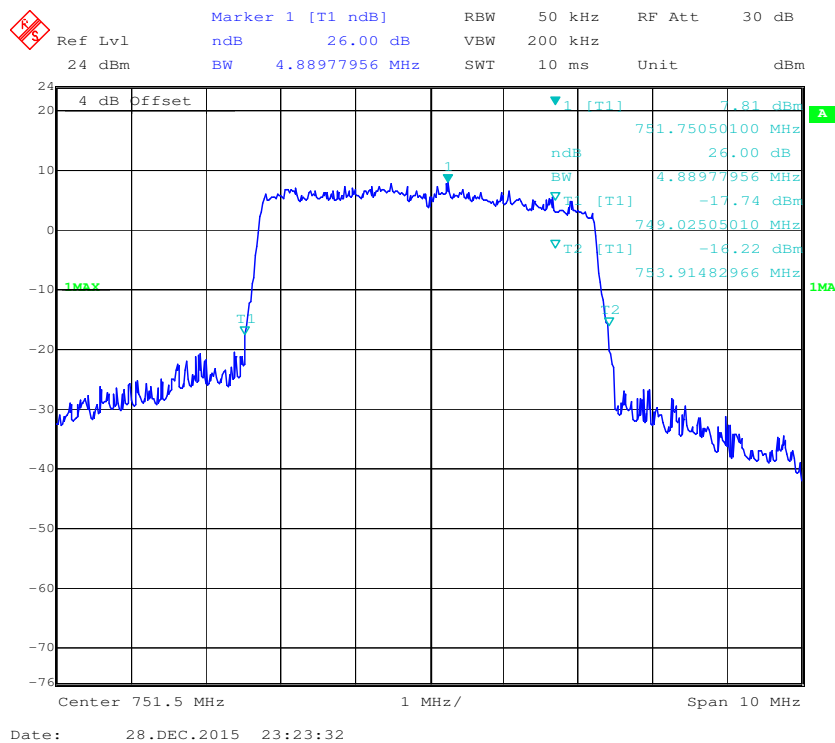


26 dB Bandwidth-DL- AWGN-Pre AGC-Input

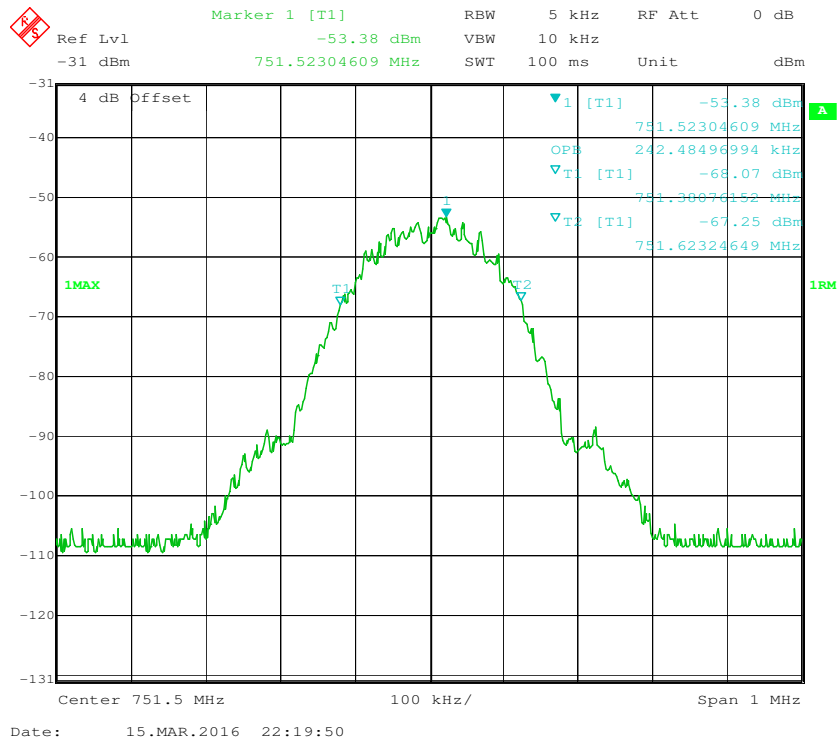


26 dB Bandwidth-DL- AWGN-Pre AGC-Output

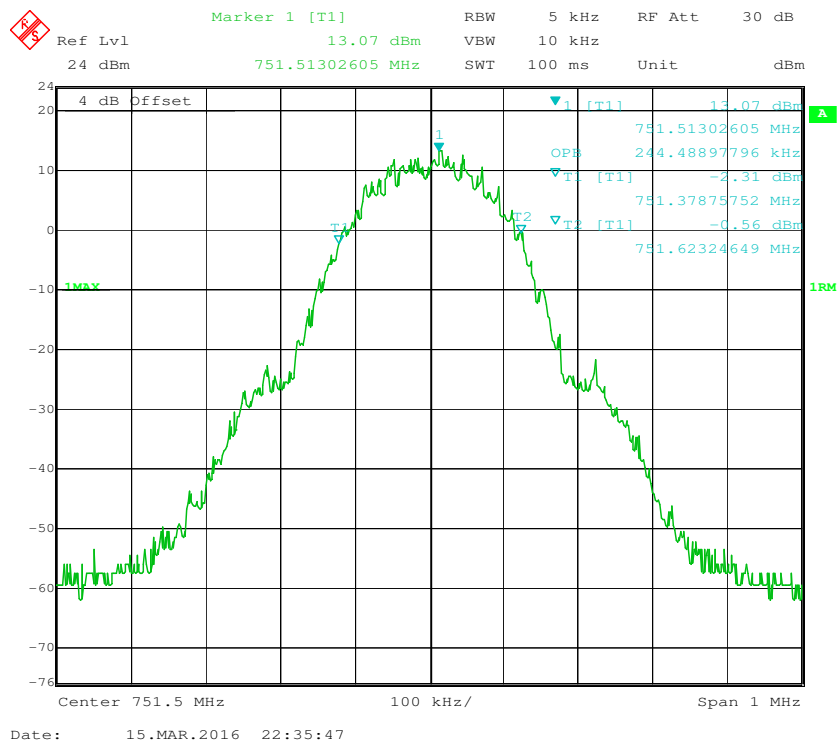


26 dB Bandwidth-DL- AWGN-3dB Above AGC-Input**26 dB Bandwidth-DL-AWGN-3dB Above AGC-Output**

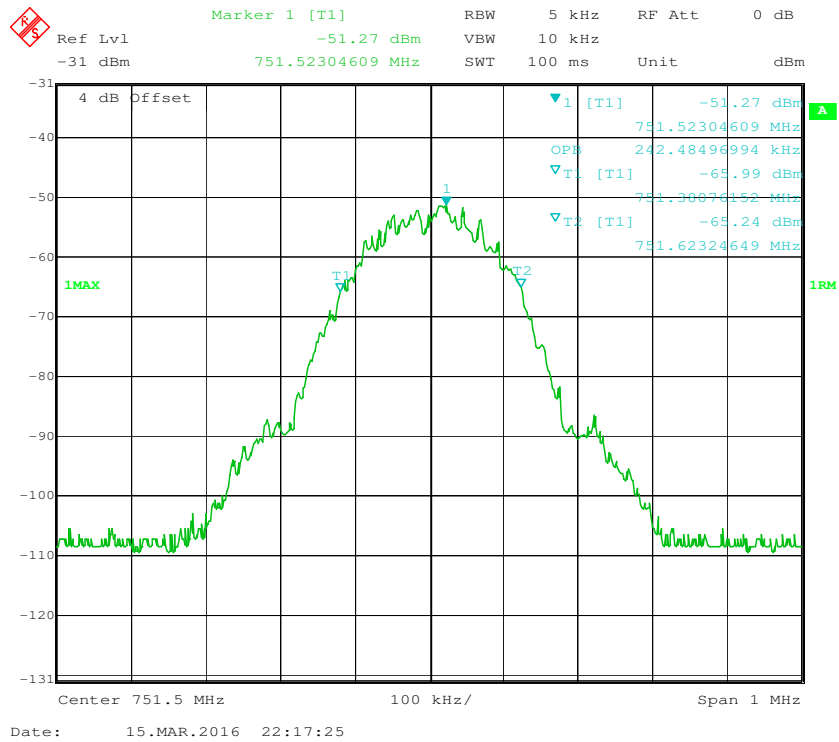
99% Bandwidth-DL-GSM-Pre AGC-Input



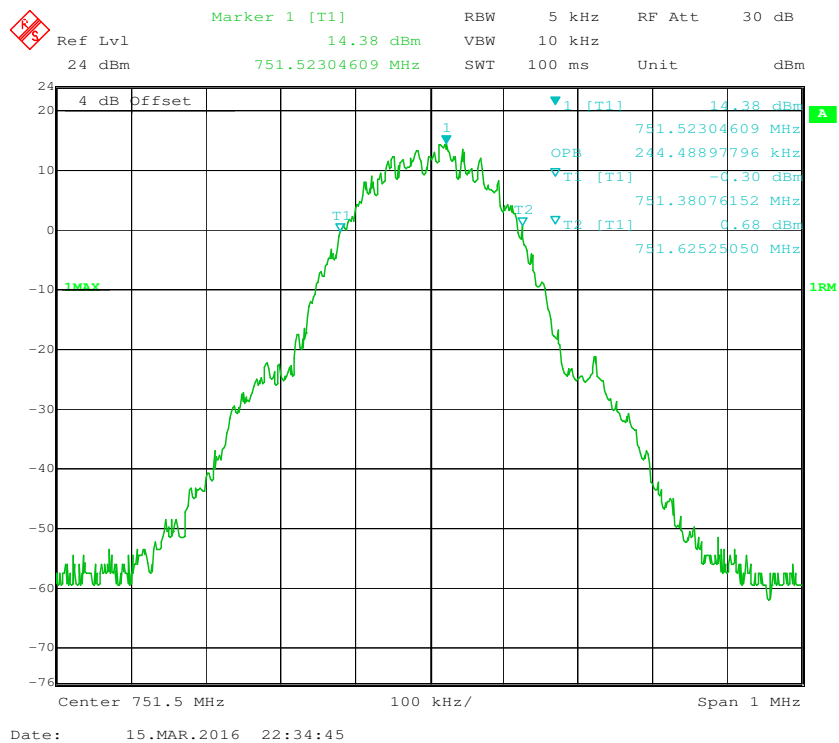
99% Bandwidth-DL- GSM-Pre AGC-Output



99% Bandwidth-DL- GSM-3dB Above AGC-Input



99% Bandwidth-DL- GSM-3dB Above AGC-Output



Ref Lvl: -31 dBm
 Marker 1 [T1] ndB: 26.00 dB
 BW: 316.63326653 kHz
 RBW: 5 kHz
 VBW: 10 kHz
 SWT: 100 ms
 RF Att: 0 dB
 Unit: dBm

4 dB Offset

1MAX

1

12

11

10

1 [T1] -52.38 dBm
 ndB: 26.00 dB
 BW: 316.63326653 kHz
 11 [T1] -74.64 dBm
 12 [T1] -79.60 dBm
 751.52304609 MHz
 751.34268537 MHz
 751.65931864 MHz

Center 751.5 MHz
 100 kHz/
 Span 1 MHz

Ref Lvl 24 dBm Marker 1 [T1 ndB] 26.00 dB RBW 5 kHz VBW 10 kHz SWT 100 ms Unit dBm

4 dB Offset

13.07 dBm

751.51302605 MHz

26.00 dB

314.62925852 kHz

-12.78 dBm

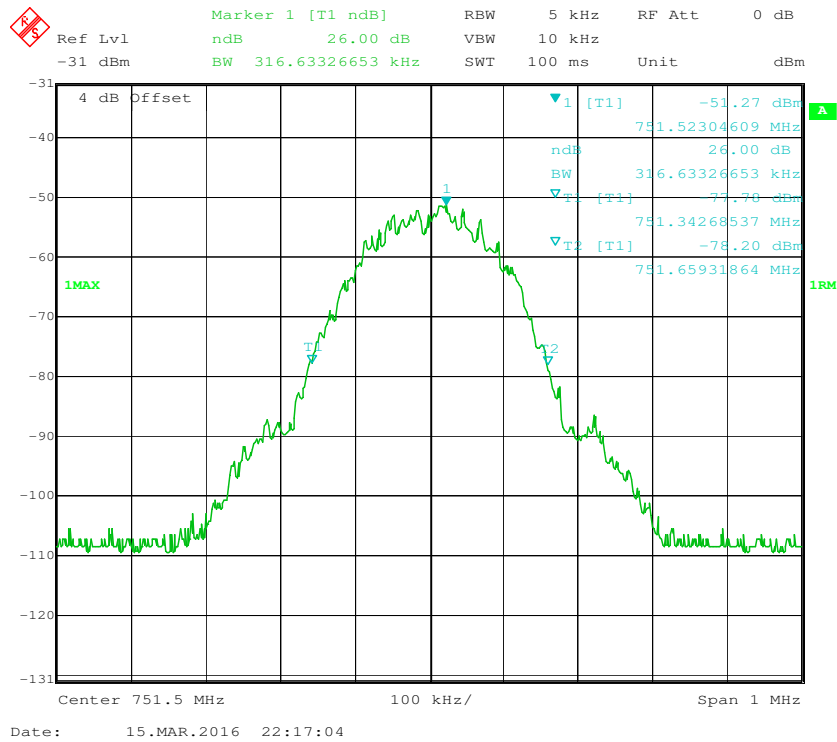
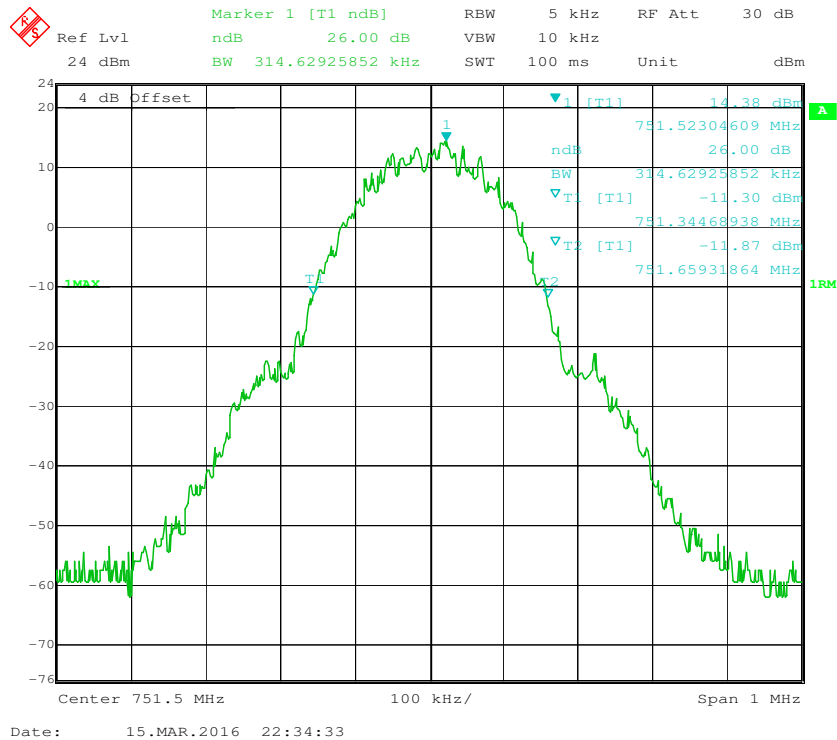
751.34468938 MHz

-12.80 dBm

751.65931864 MHz

Center 751.5 MHz 100 kHz/ Span 1 MHz

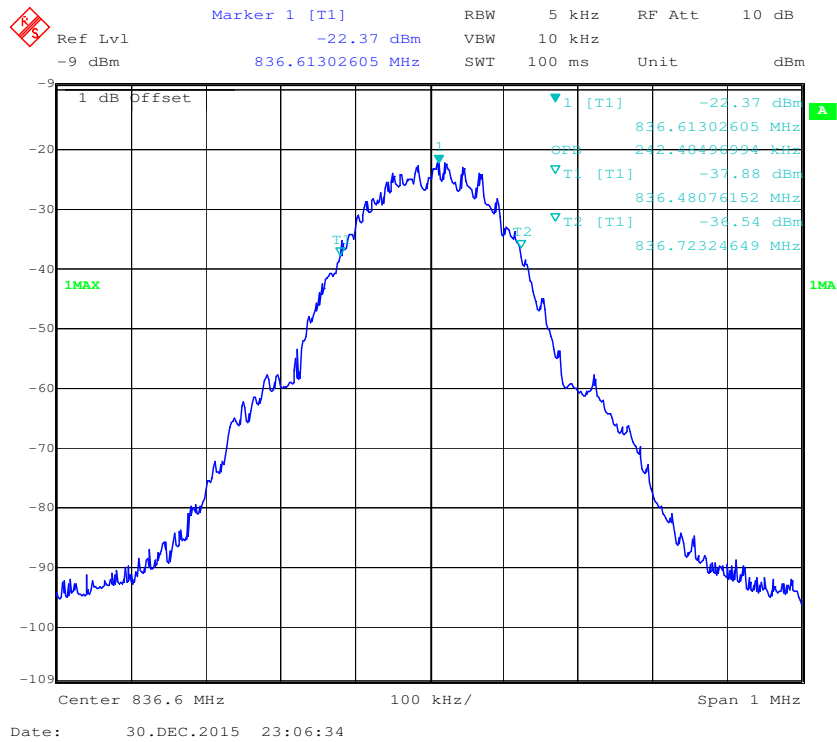
Date: 15.MAR.2016 22:35:57

26dB Bandwidth-DL- GSM-3dB Above AGC-Input**26dB Bandwidth-DL- GSM-3dB Above AGC-Output**

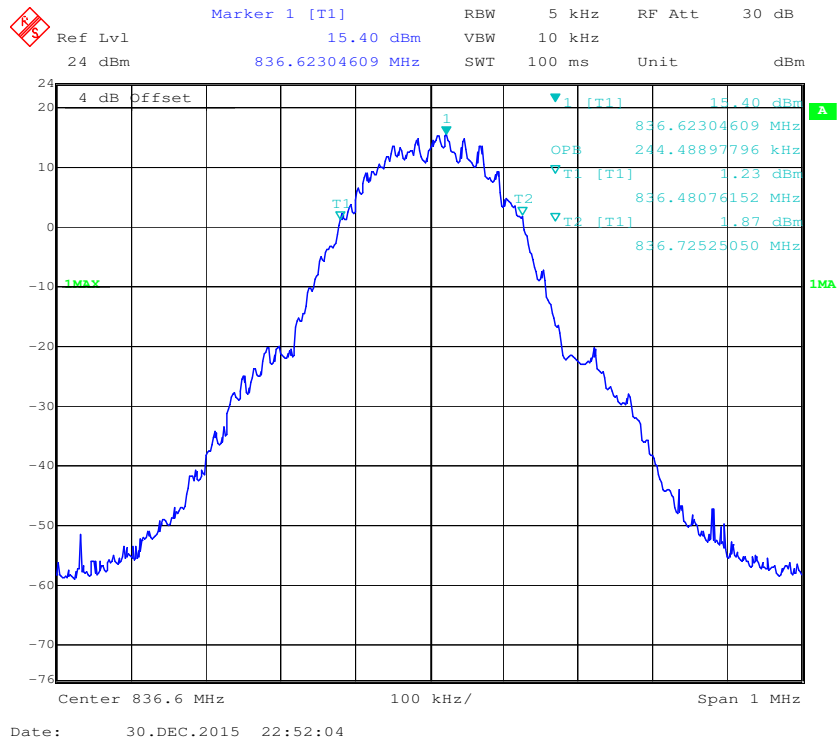
CELLULAR Band

Mode	Signal Type	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
Uplink	AWGN	Pre-AGC	836.5	4.509	4.529	4.950	4.930
		3dB above AGC	836.5	4.509	4.529	4.930	4.970
	GSM	Pre-AGC	836.6	0.244	0.244	0.315	0.313
		3dB above AGC	836.6	0.244	0.242	0.313	0.305
Downlink	AWGN	Pre-AGC	881.5	4.509	4.509	4.930	4.890
		3dB above AGC	881.5	4.509	4.509	4.910	4.910
	GSM	Pre-AGC	881.6	0.242	0.246	0.315	0.321
		3dB above AGC	881.6	0.248	0.246	0.309	0.311

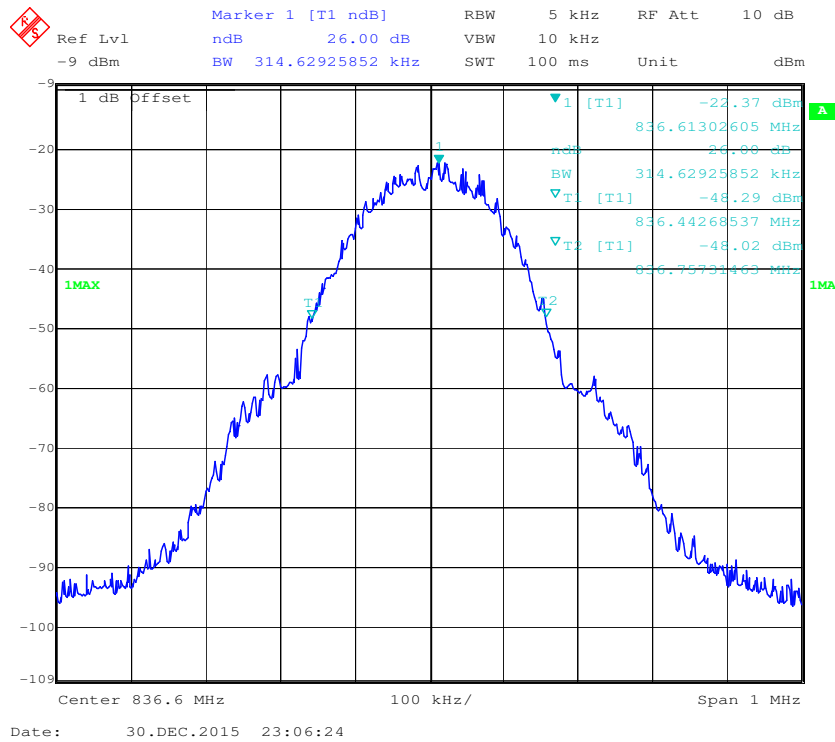
99% Bandwidth-UL -GSM-Pre AGC-Input



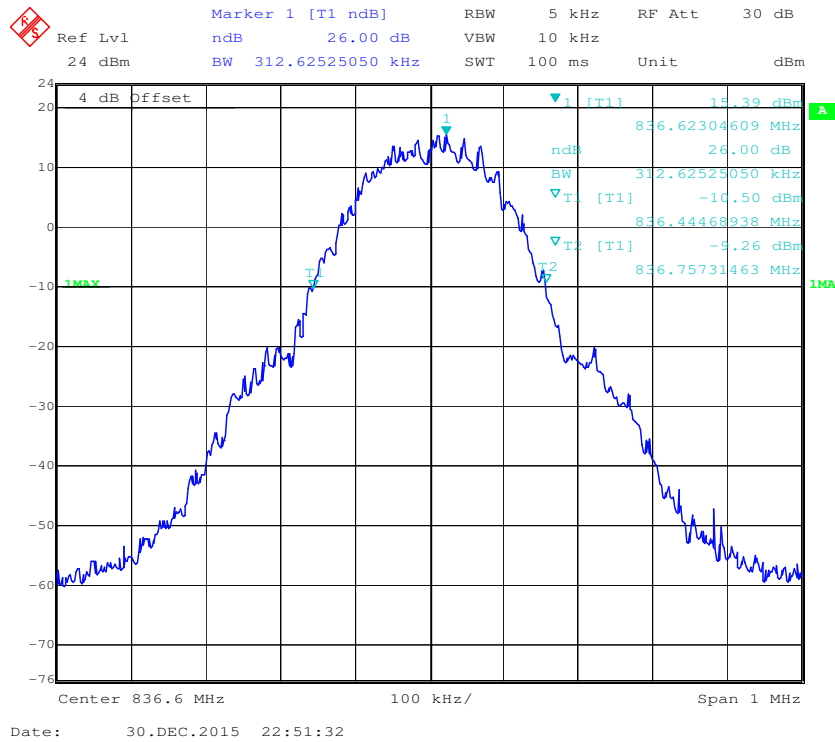
99% Bandwidth-UL- GSM-Pre AGC-Output

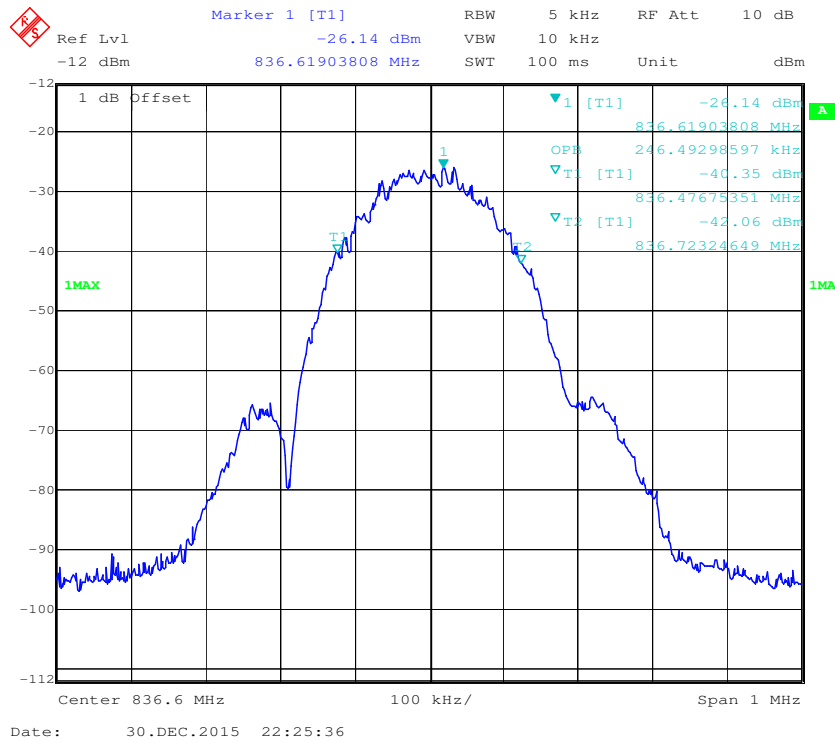
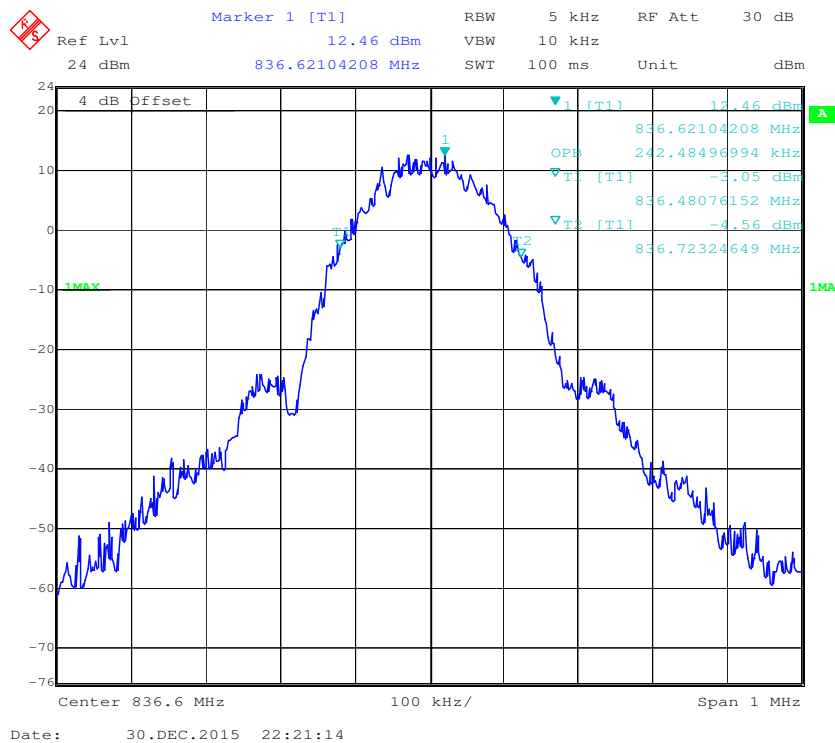


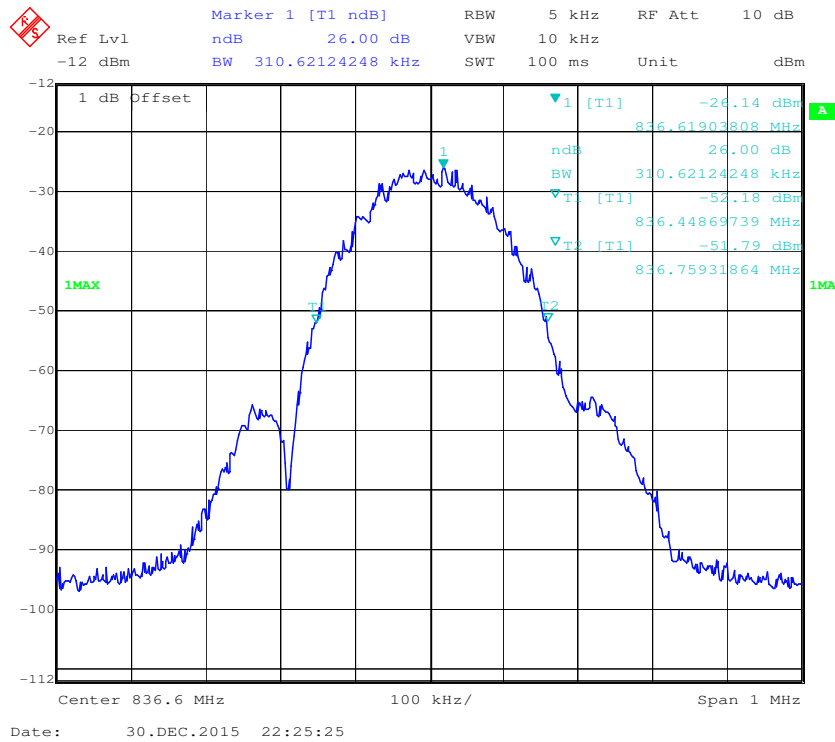
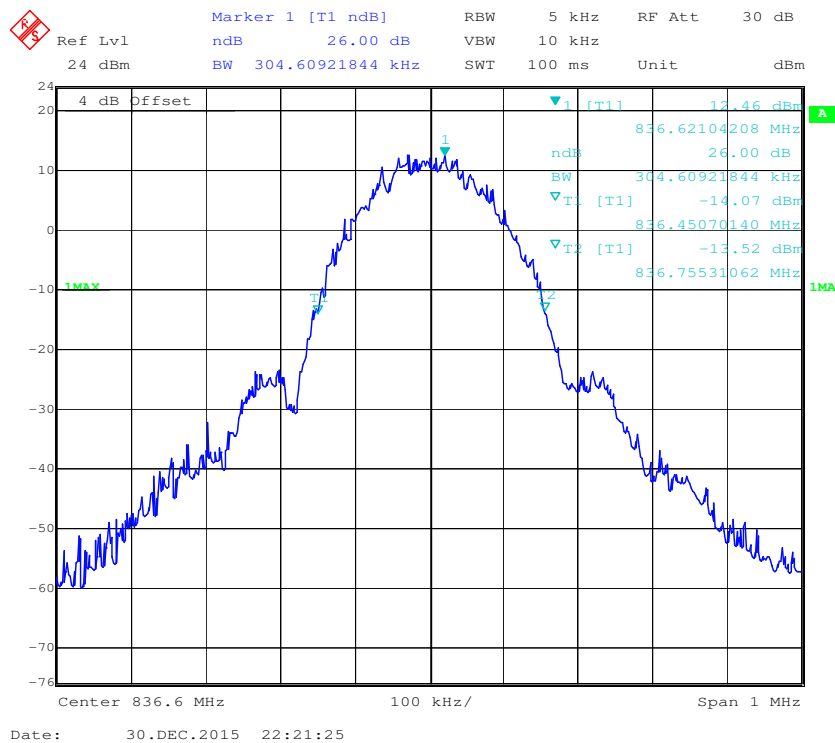
26 dB Bandwidth-UL- GSM-Pre AGC-Input



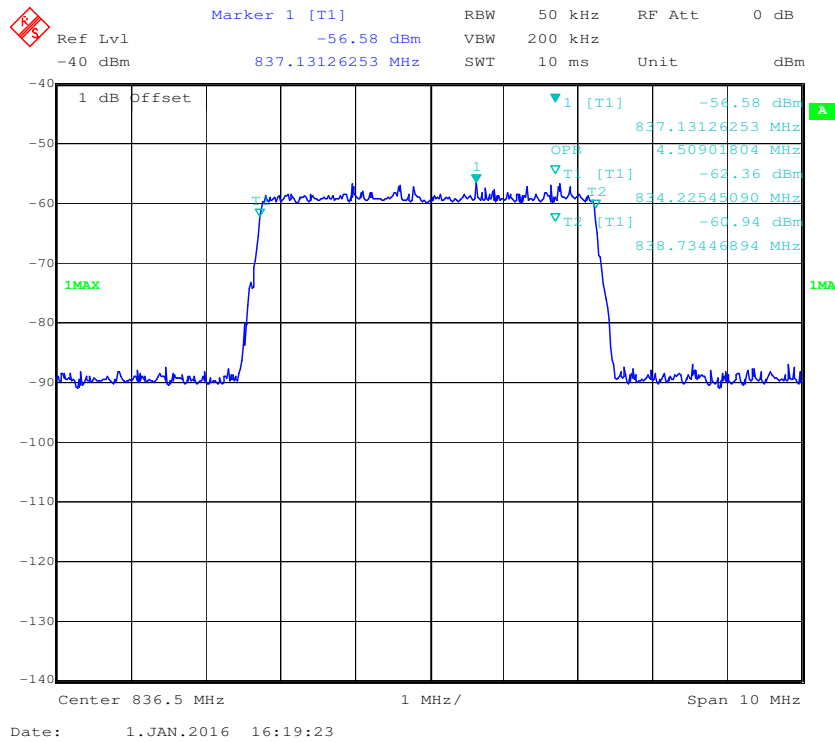
26 dB Bandwidth-UL- GSM-Pre AGC-Output



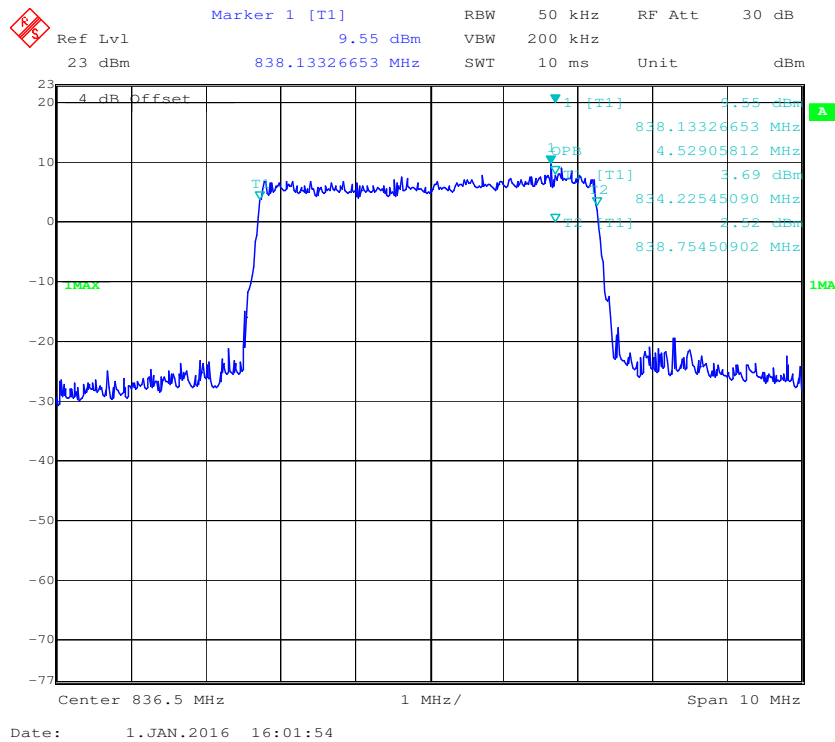
99% Bandwidth-UL- GSM-3dB Above AGC-Input**99% Bandwidth-UL- GSM-3dB Above AGC-Output**

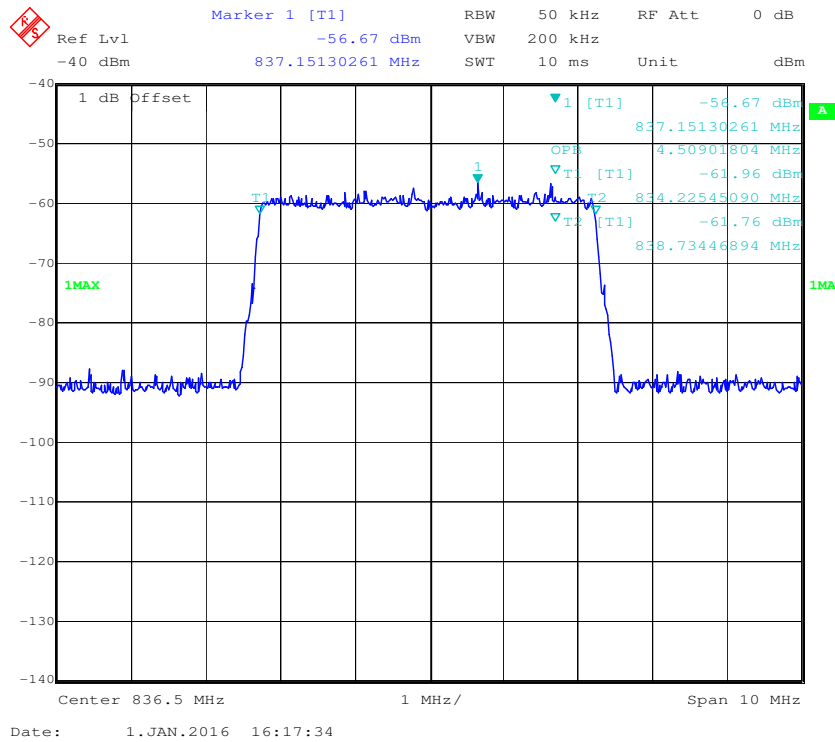
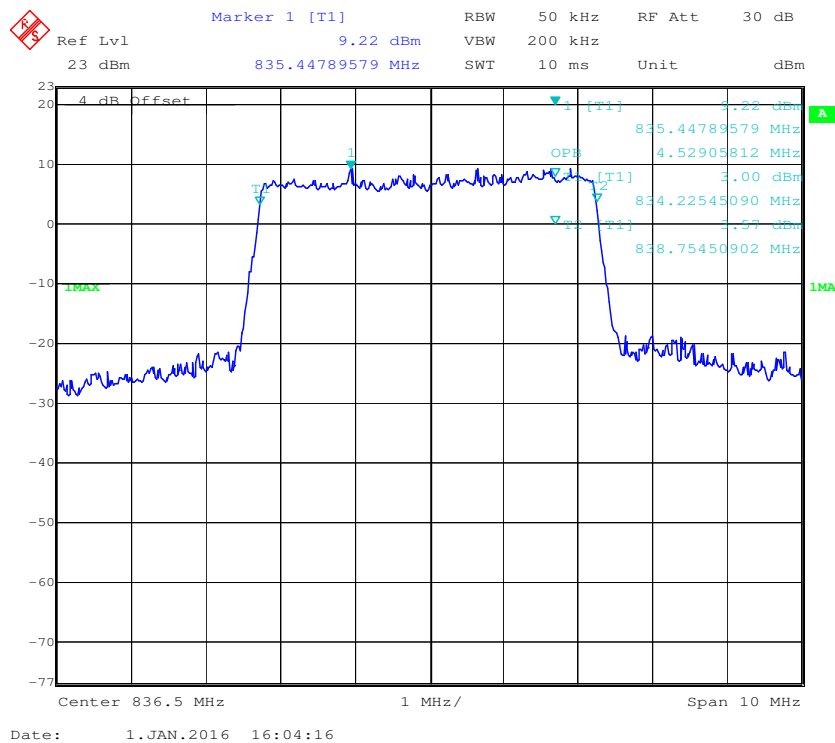
26 dB Bandwidth-UL- GSM-3dB Above AGC-Input**26 dB Bandwidth-UL- GSM-3dB Above AGC-Output**

99% Bandwidth-UL- AWGN-Pre AGC-Input

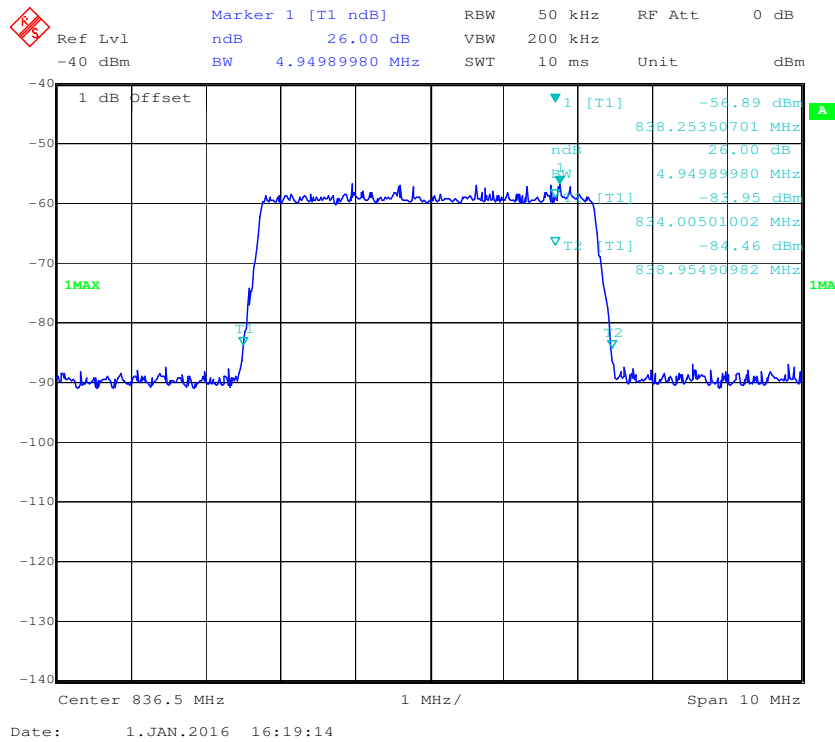


99% Bandwidth-UL- AWGN-Pre AGC-Output

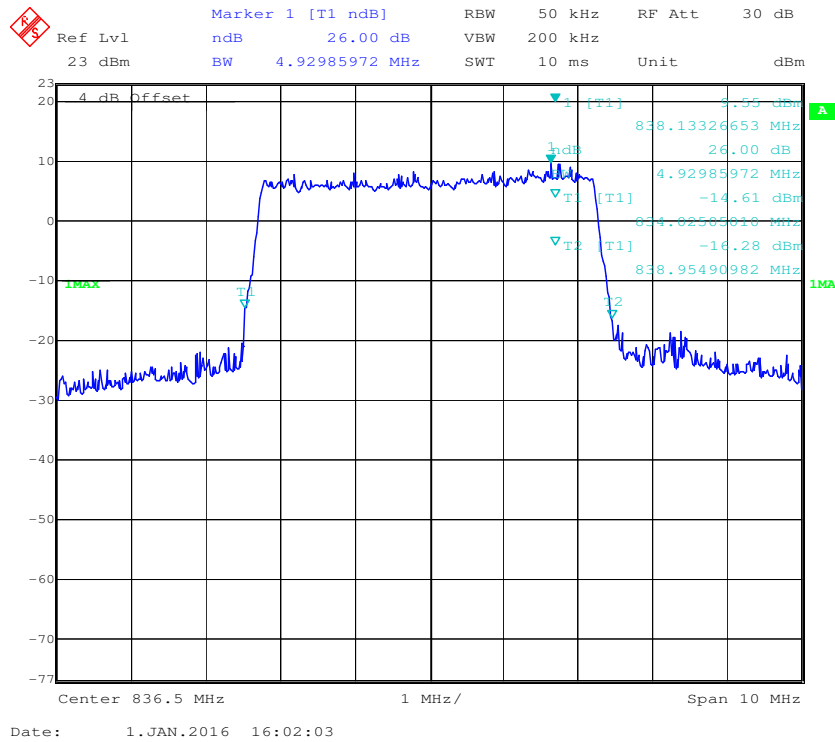


99% Bandwidth-UL- AWGN-3dB Above AGC-Input**99% dB Bandwidth-UL- AWGN-3dB Above AGC-Output**

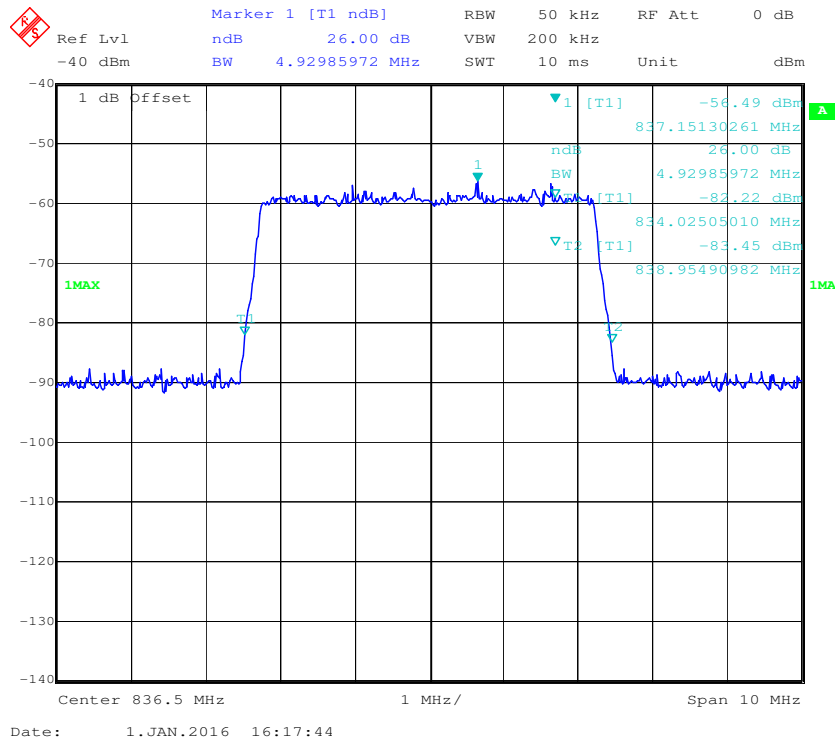
26 dB Bandwidth-UL- AWGN-Pre AGC-Input



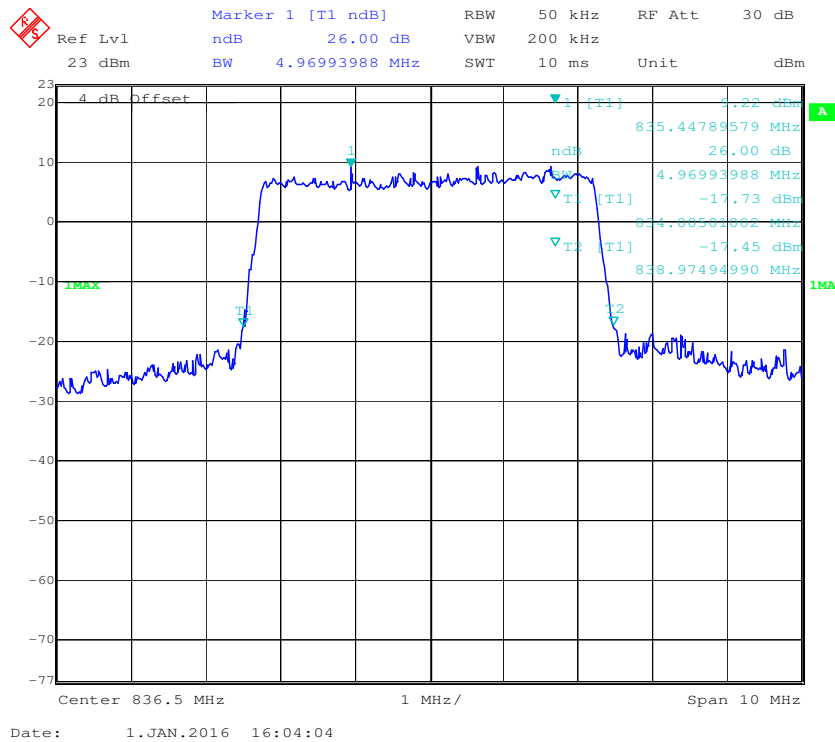
26 dB Bandwidth-UL- AWGN-Pre AGC-Output



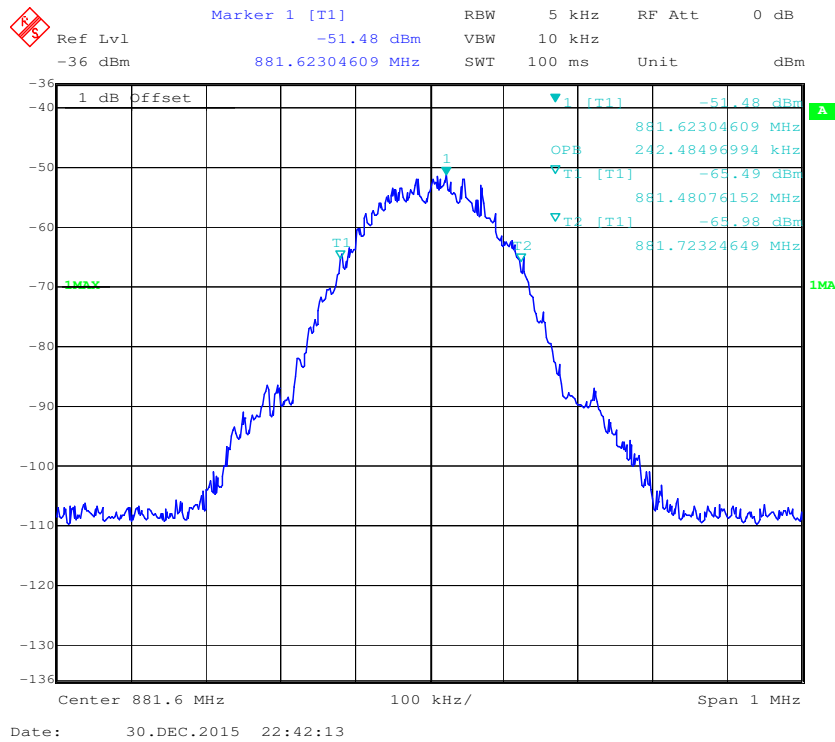
26 dB Bandwidth-UL- AWGN-3dB Above AGC-Input



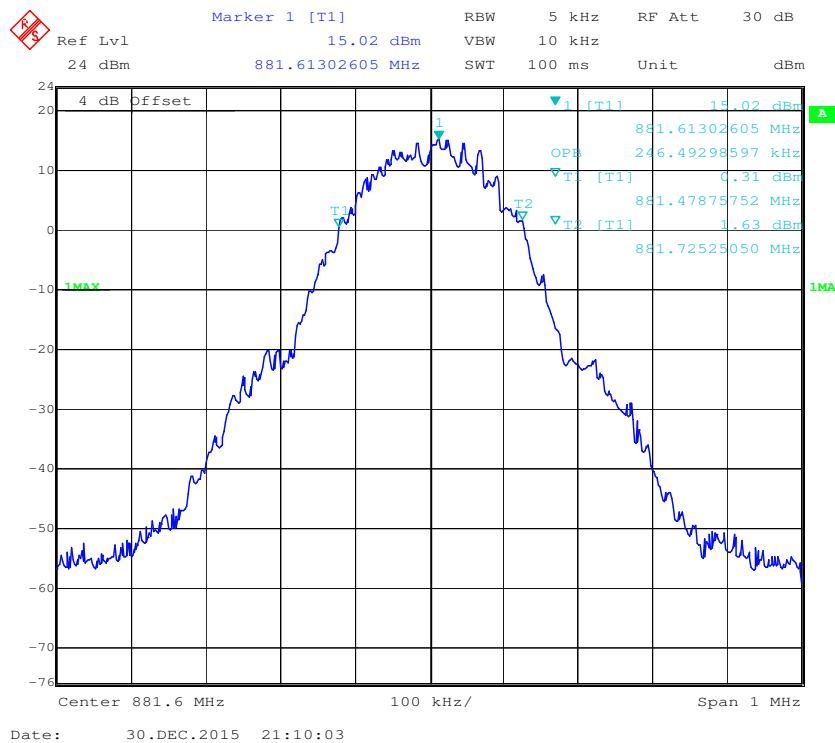
26 dB Bandwidth-UL- AWGN-3dB Above AGC-Output



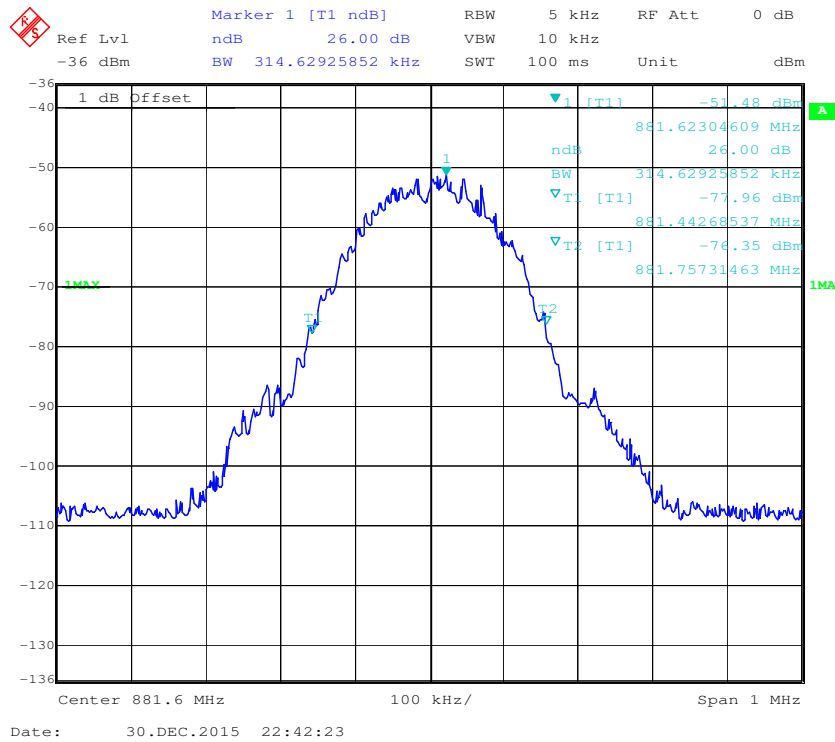
99% Bandwidth-DL- GSM- Pre AGC-Input



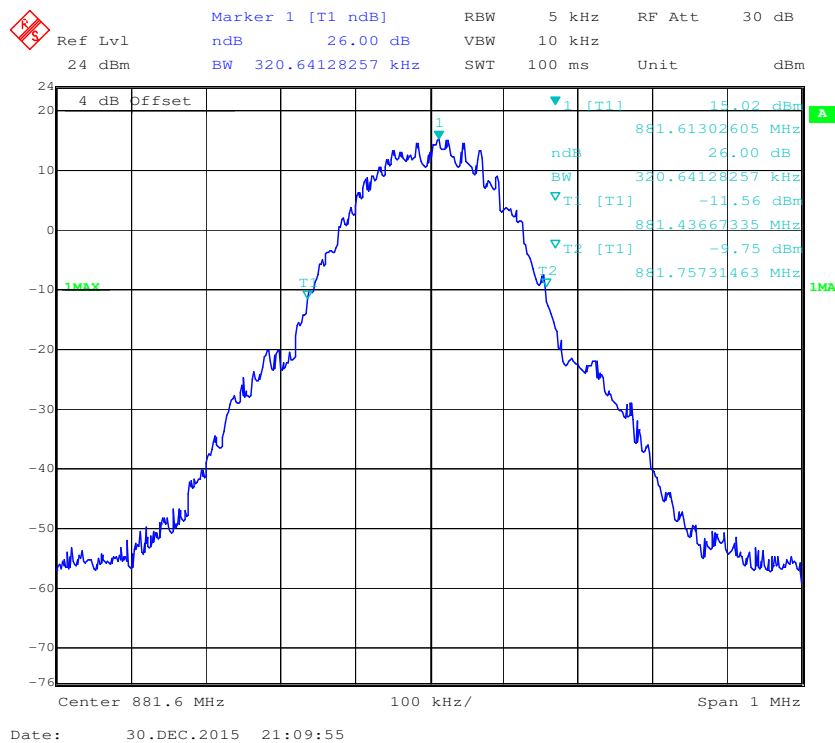
99% Bandwidth-DL- GSM- Pre AGC-Output



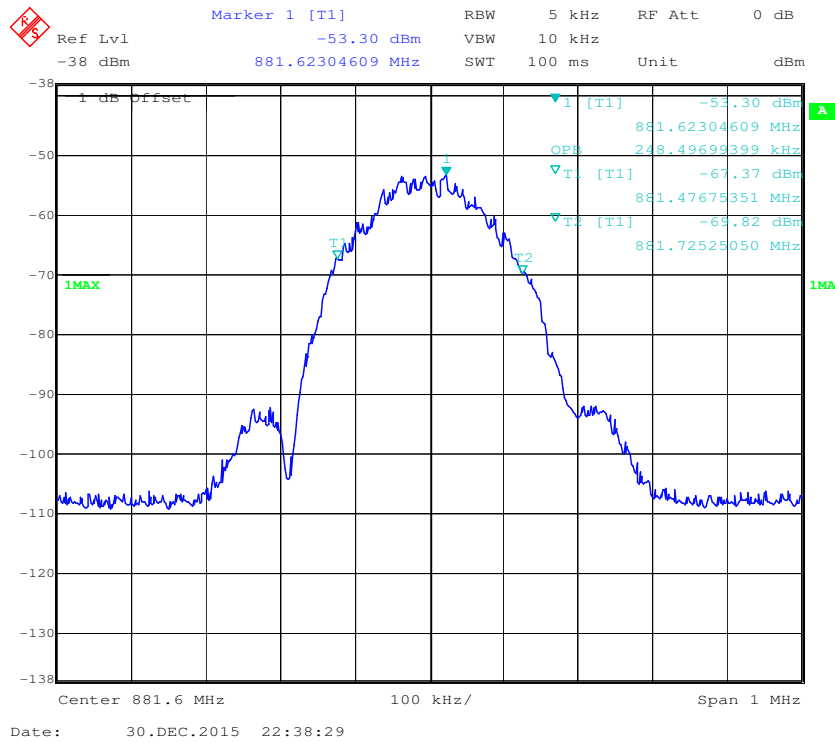
26 dB Bandwidth-DL- GSM- Pre AGC-Input



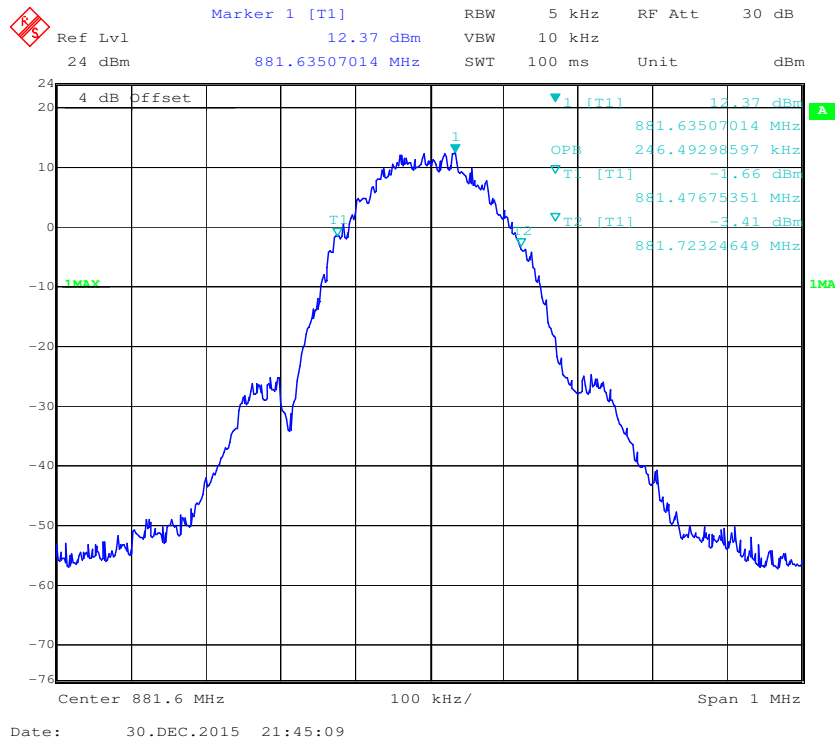
26 dB Bandwidth-DL- GSM- Pre AGC-Output

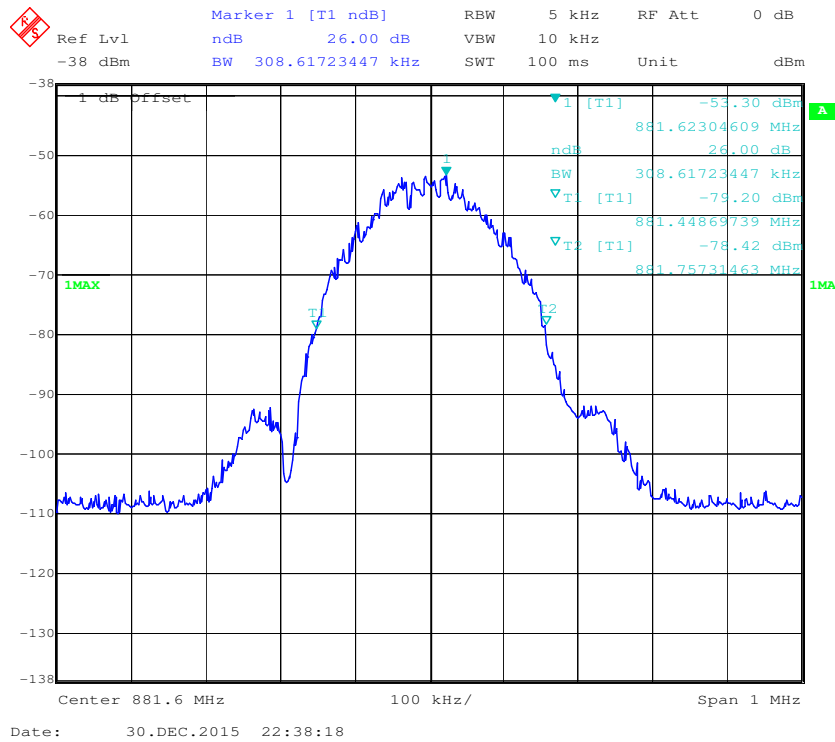
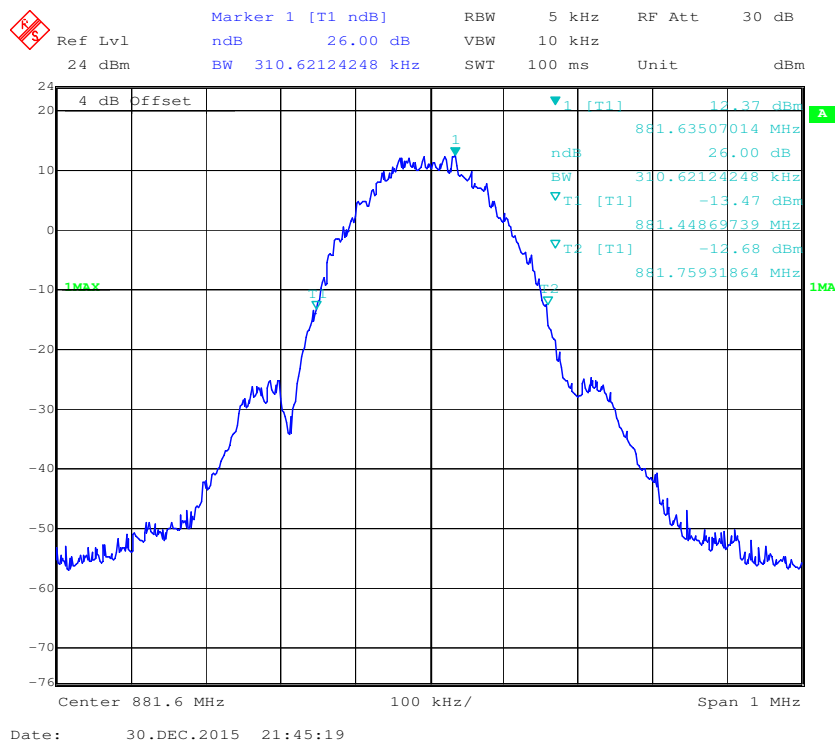


99% Bandwidth-DL- GSM-3dB Above AGC-Input

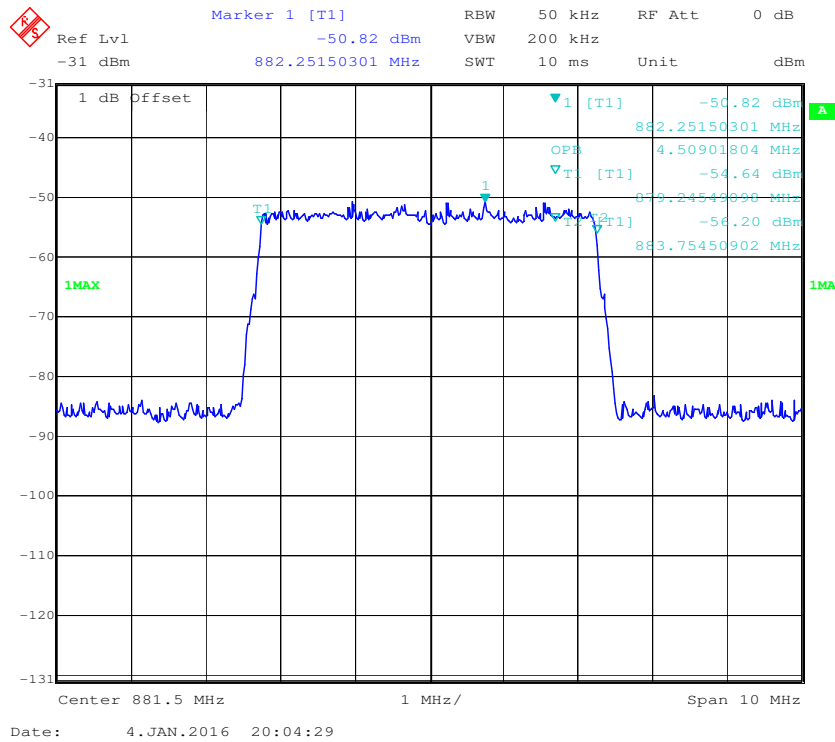


99% Bandwidth-DL- GSM-3dB Above AGC-Output

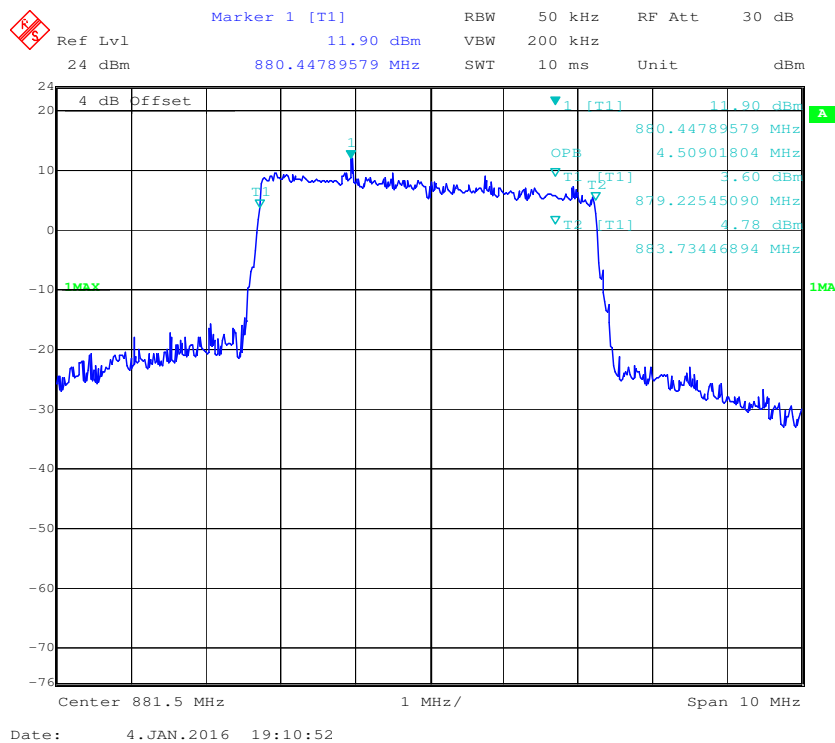


26 dB Bandwidth-DL- GSM-3dB Above AGC-Input**26 dB Bandwidth-DL- GSM-3dB Above AGC-Output**

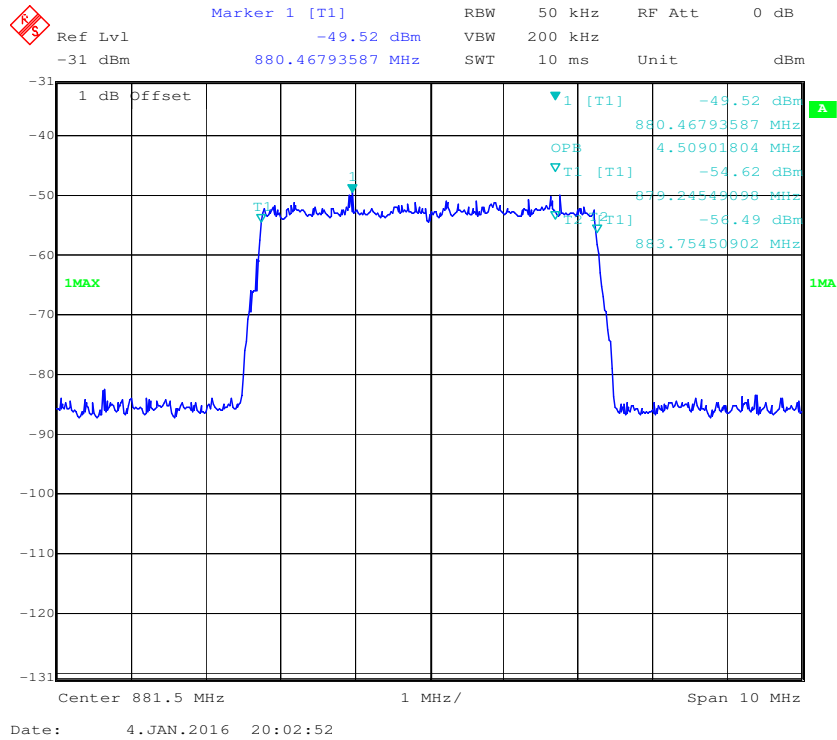
99% Bandwidth-DL- AWGN-Pre AGC-Input



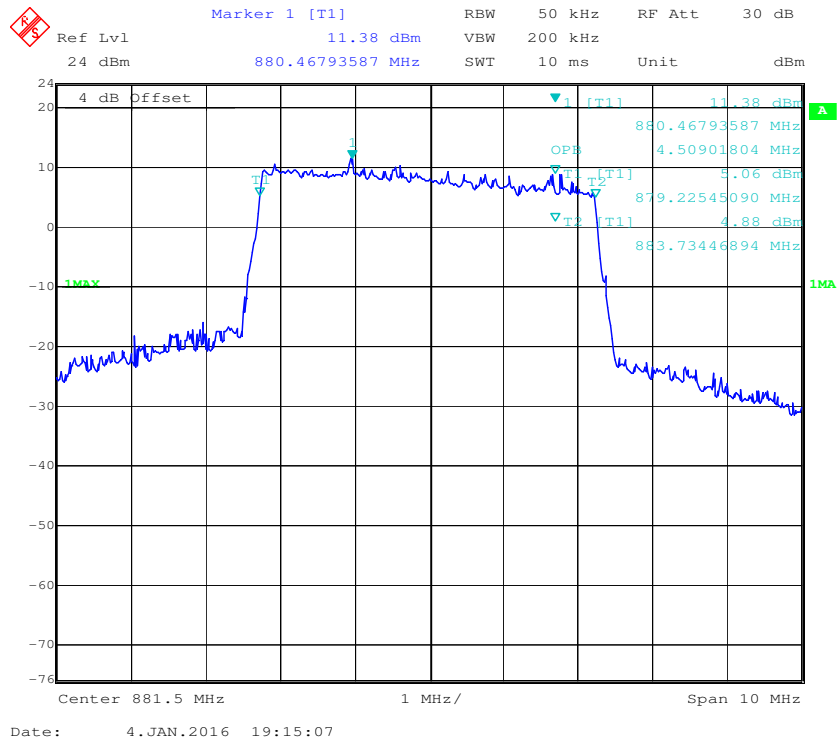
99% Bandwidth-DL- AWGN-Pre AGC-Output



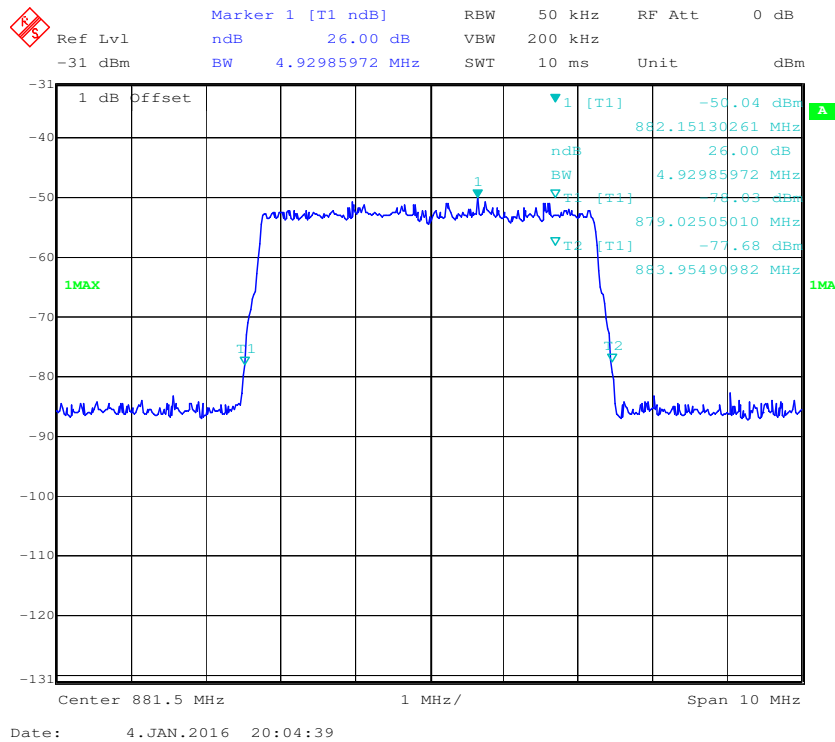
99% Bandwidth-DL- AWGN-3dB Above AGC-Input



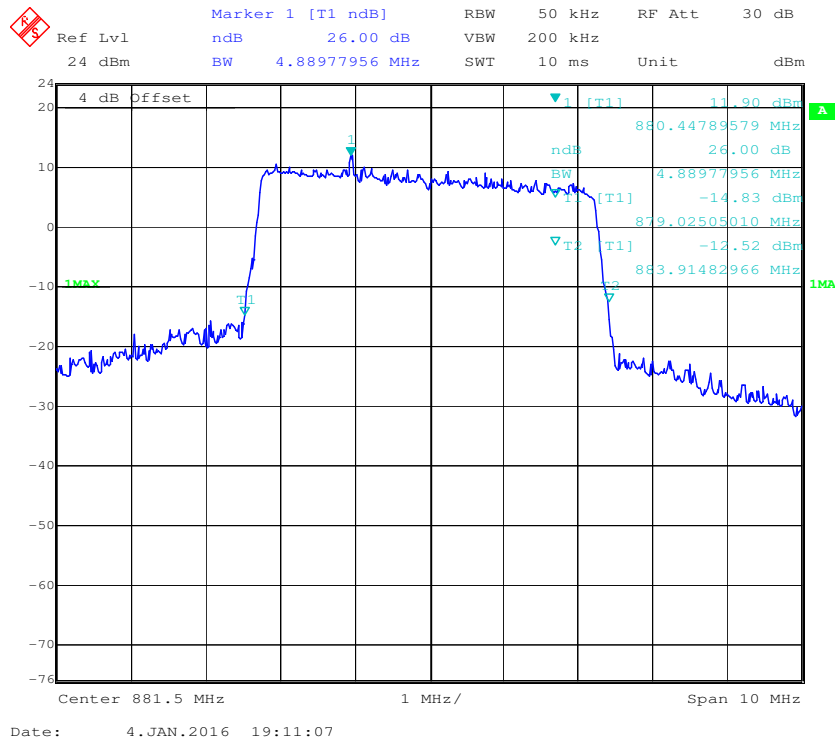
99% dB Bandwidth-DL- AWGN-3dB Above AGC-Output



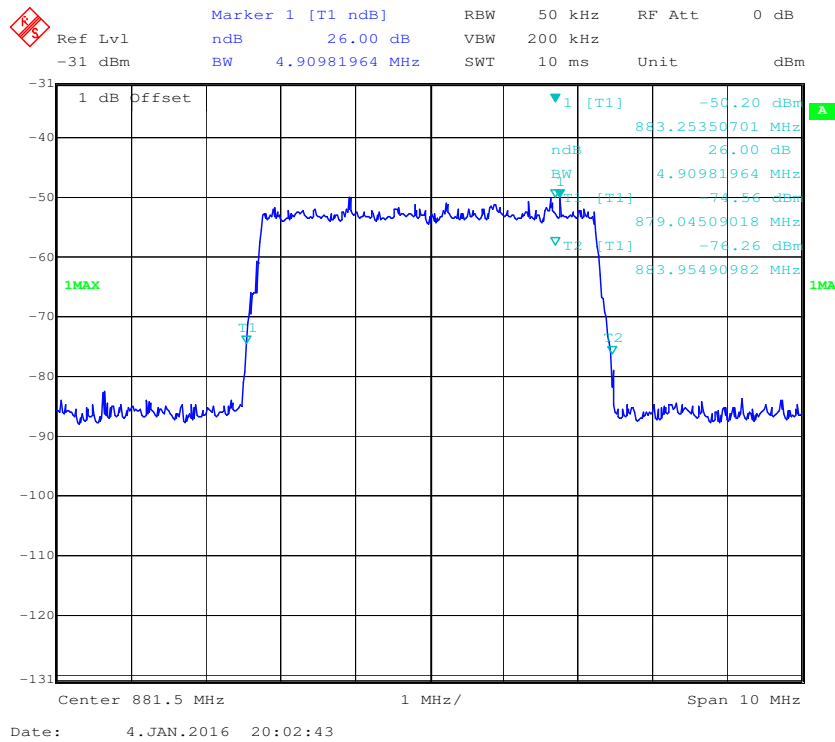
26 dB Bandwidth-DL- AWGN-Pre AGC-Input



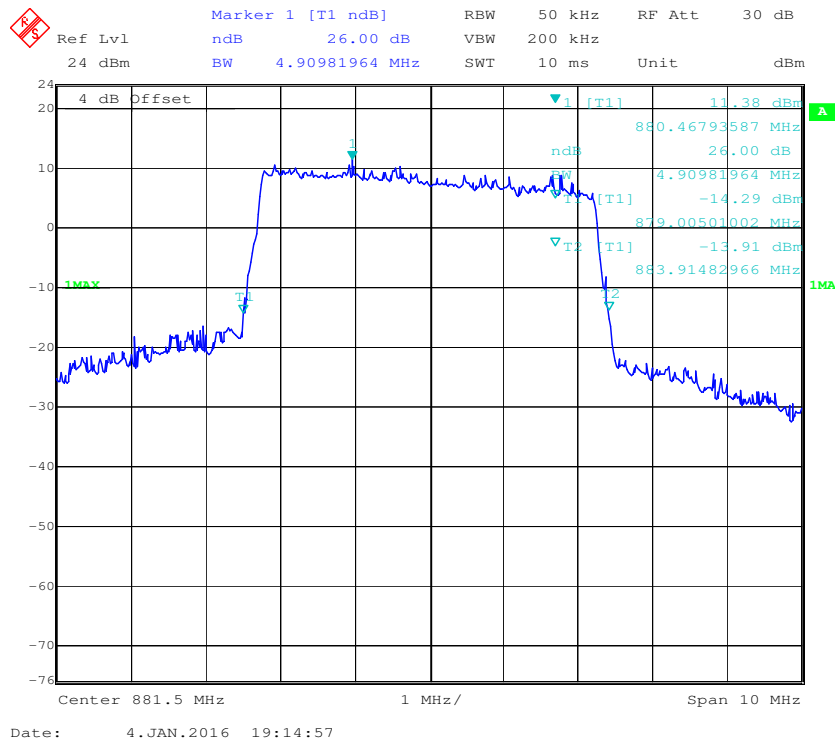
26 dB Bandwidth-DL- AWGN-Pre AGC-Output



26 dB Bandwidth-DL- AWGN-3dB Above AGC-Input



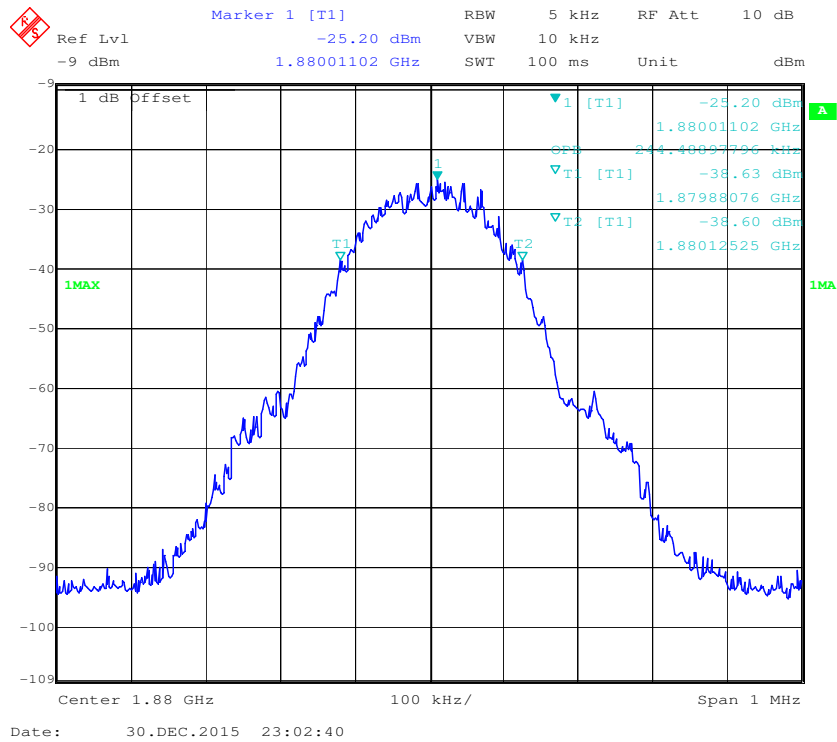
26 dB Bandwidth-DL- 3dB Above AGC-Output



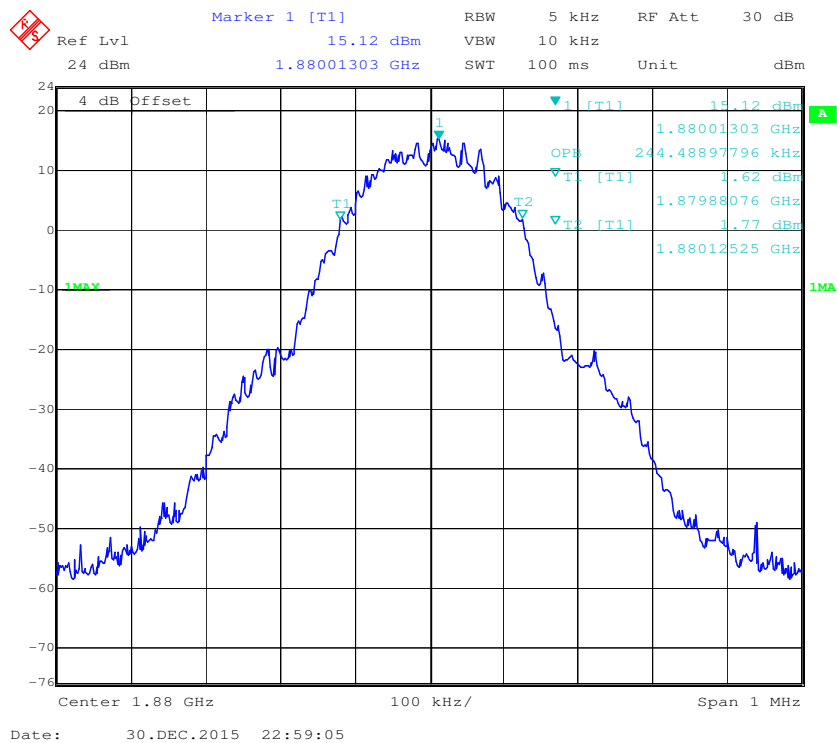
PCS Band

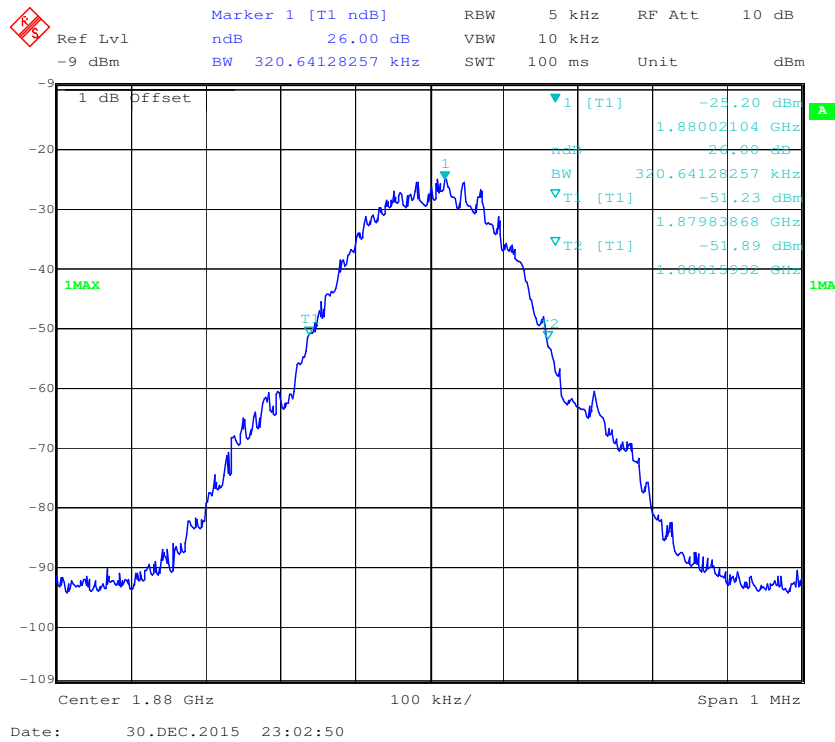
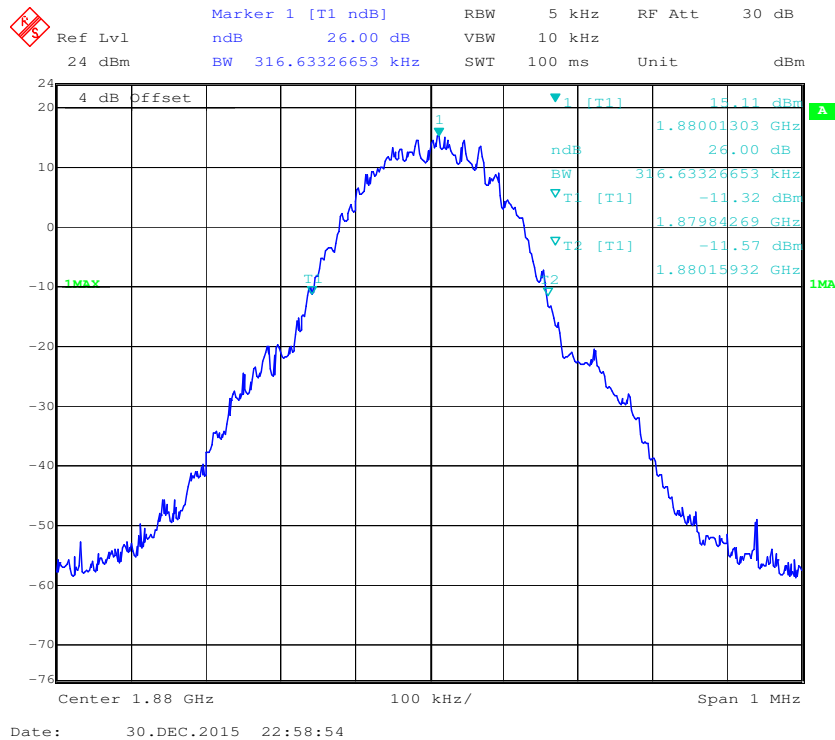
Mode	Signal Type	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
Uplink	AWGN	Pre-AGC	1880	4.489	4.509	4.930	4.930
		3dB above AGC	1880	4.529	4.510	4.930	4.950
	GSM	Pre-AGC	1880	0.244	0.244	0.321	0.317
		3dB above AGC	1880	0.244	0.246	0.309	0.309
Downlink	AWGN	Pre-AGC	1960	4.529	4.509	4.950	4.910
		3dB above AGC	1960	4.509	4.509	4.930	4.910
	GSM	Pre-AGC	1960	0.244	0.244	0.313	0.321
		3dB above AGC	1960	0.246	0.244	0.311	0.313

99% Bandwidth-UL-GSM-Pre AGC-Input

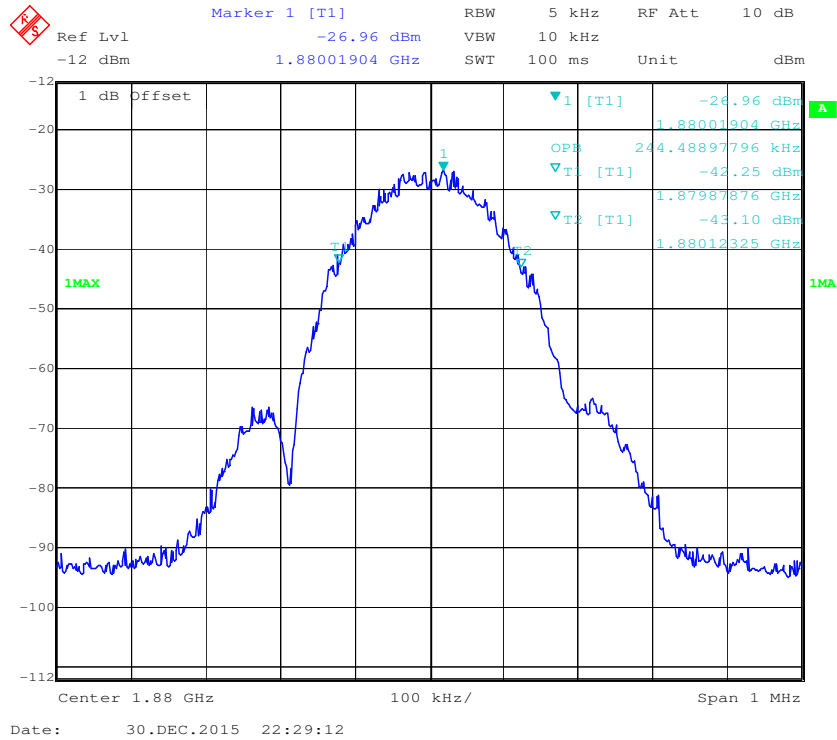


99% Bandwidth-UL- GSM-Pre AGC-Output

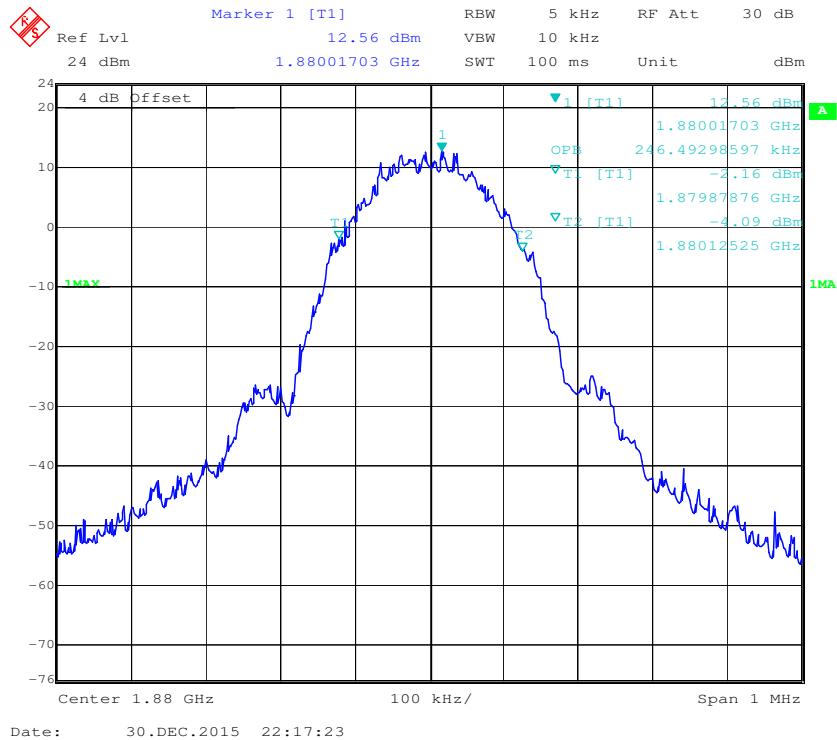


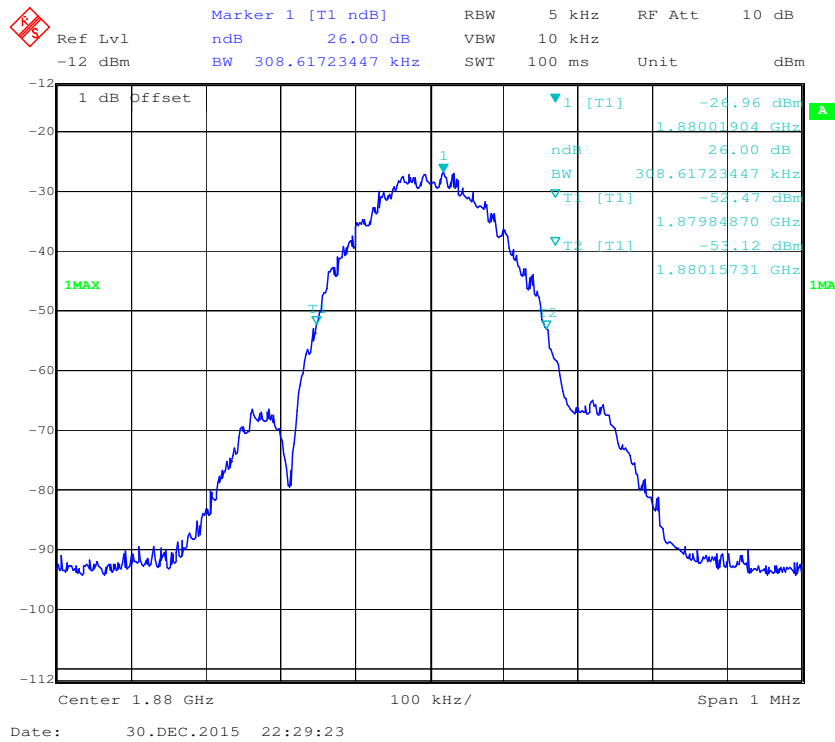
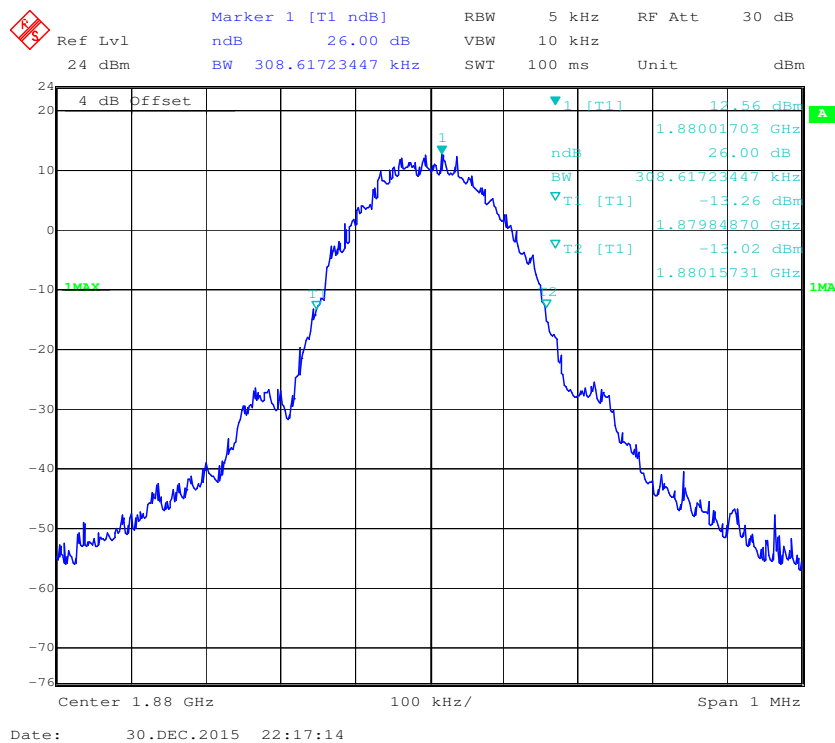
26 dB Bandwidth-UL- GSM-Pre AGC-Input**26 dB Bandwidth-UL- GSM-Pre AGC-Output**

99% Bandwidth-UL- GSM-3dB Above AGC-Input

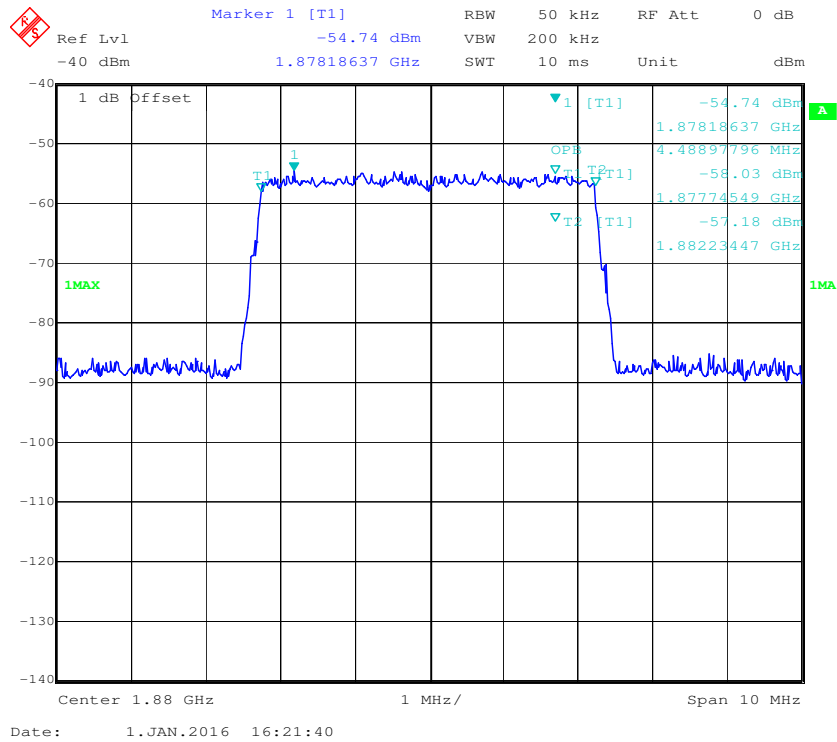


99% Bandwidth-UL- GSM-3dB Above AGC-Output

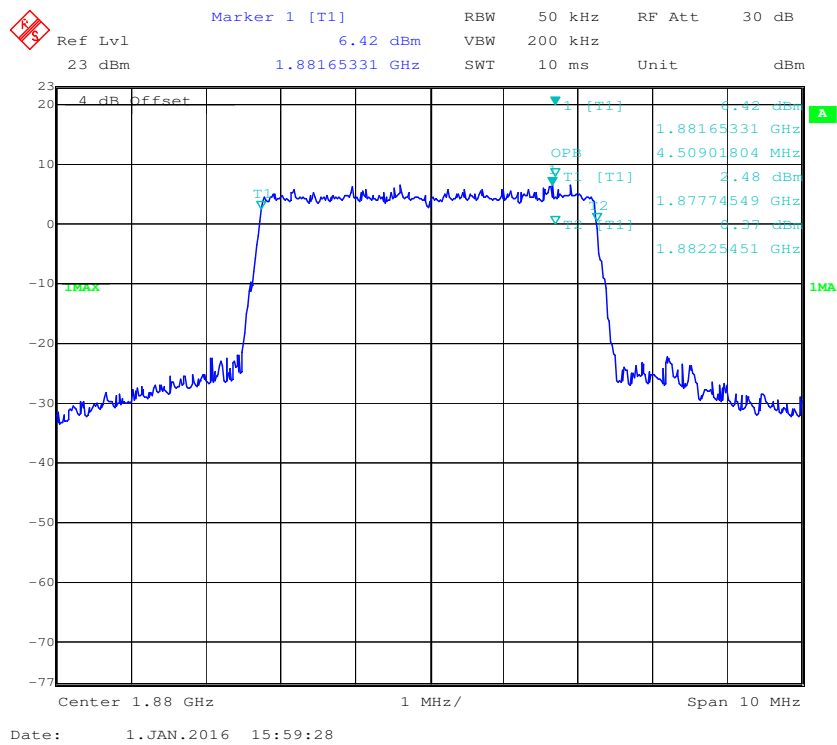


26 dB Bandwidth-UL- GSM-3dB Above AGC-Input**26 dB Bandwidth-UL- GSM-3dB Above AGC-Output**

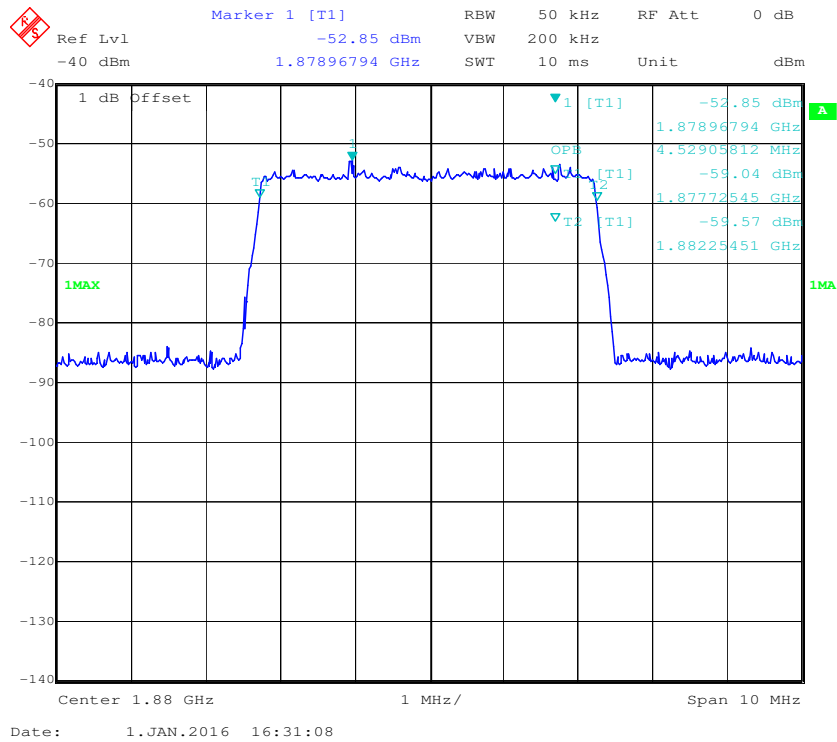
99% Bandwidth-UL- AWGN-Pre AGC-Input



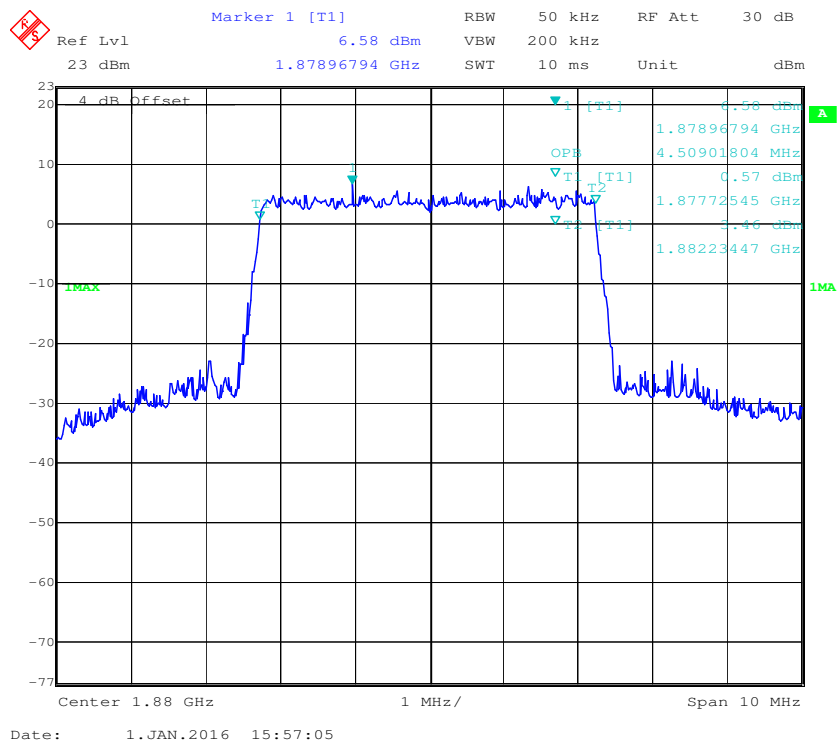
99% Bandwidth-UL- AWGN-Pre AGC-Output



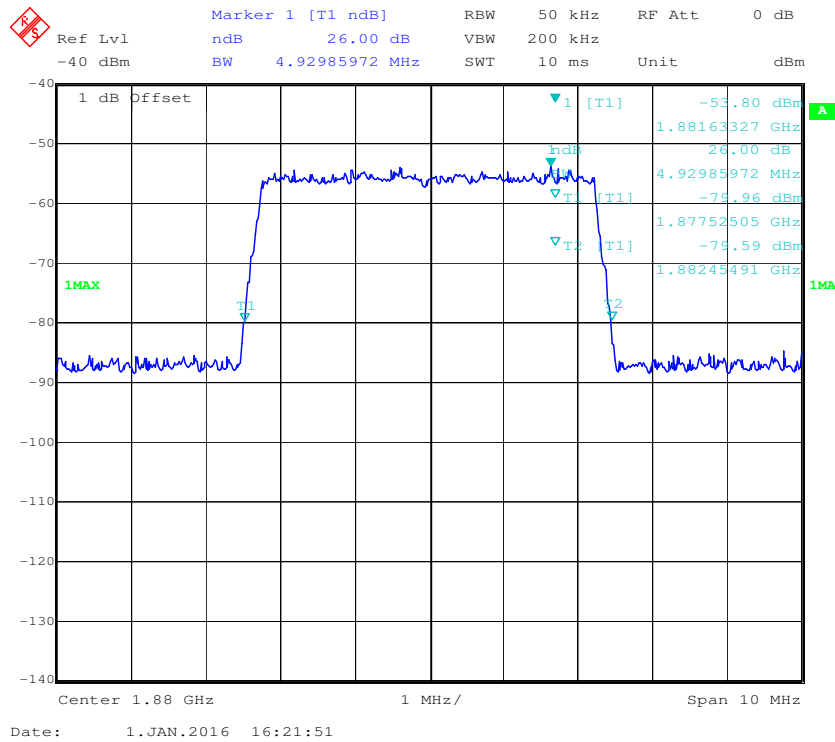
99% Bandwidth-UL- AWGN-3dB Above AGC-Input



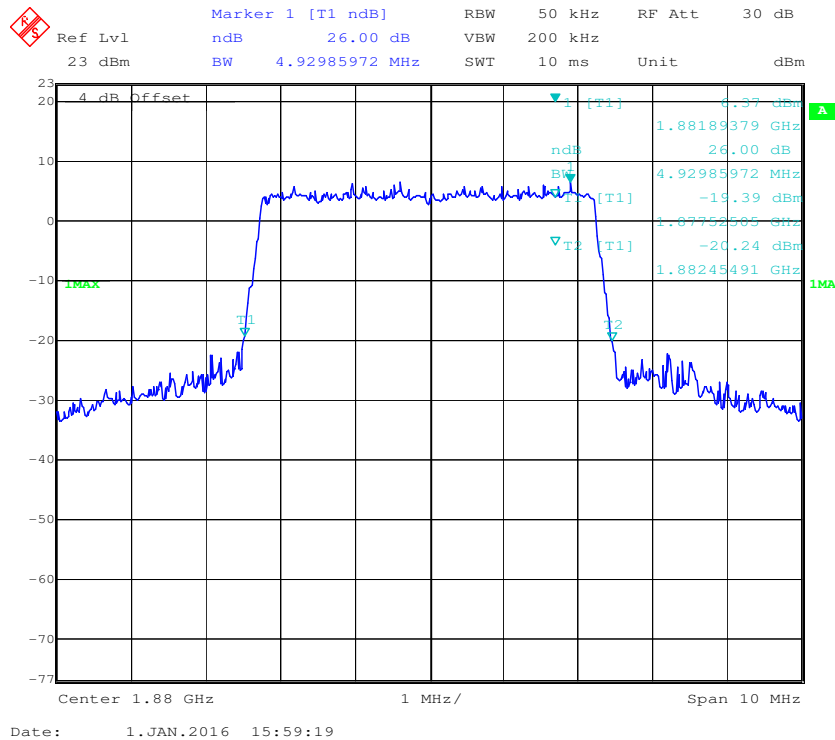
99% dB Bandwidth-UL- AWGN-3dB Above AGC- Output



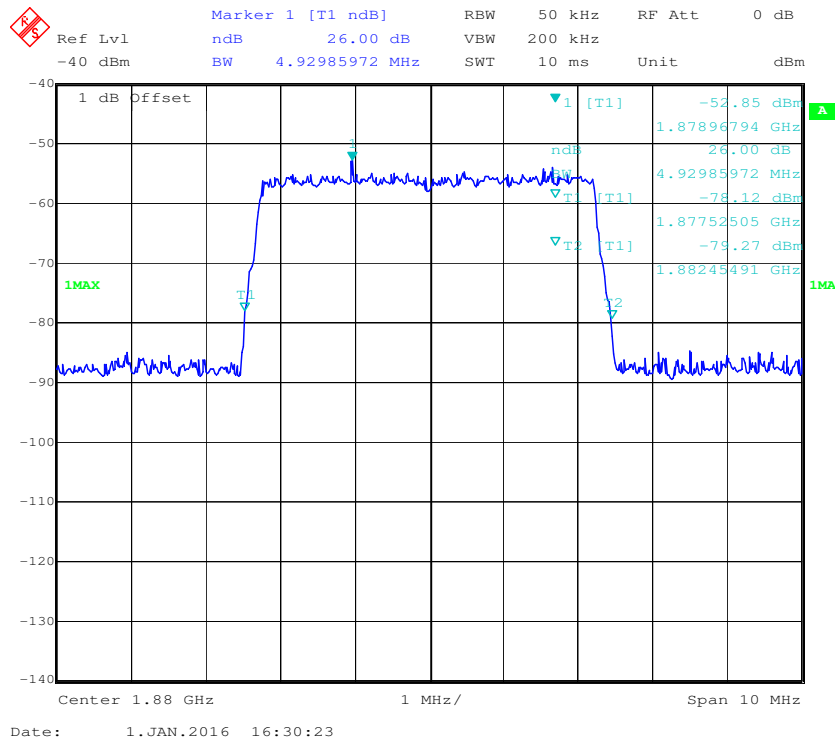
26 dB Bandwidth-UL- AWGN-Pre AGC-Input



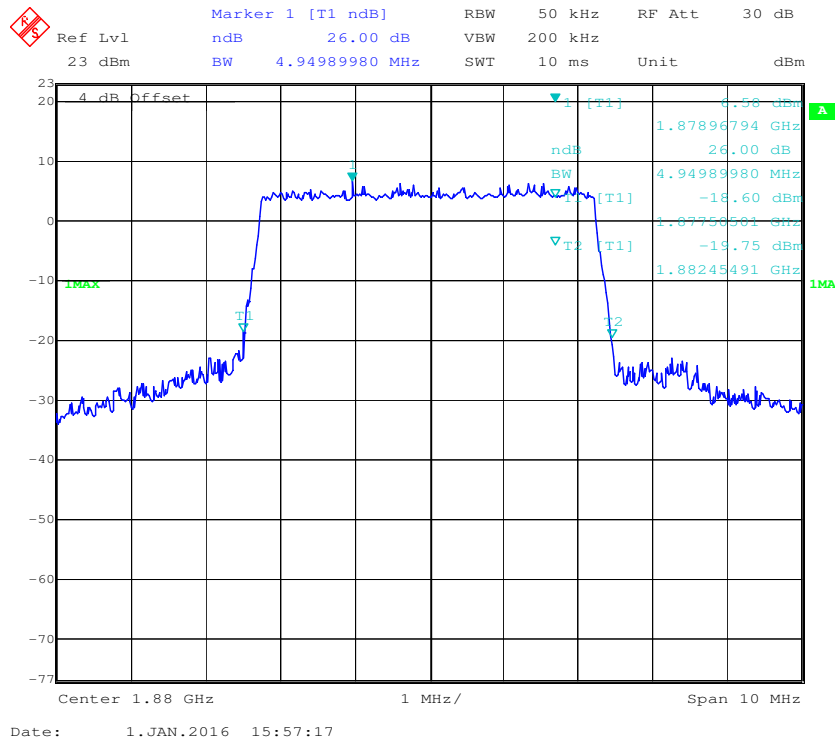
26 dB Bandwidth-UL- AWGN-Pre AGC-Output



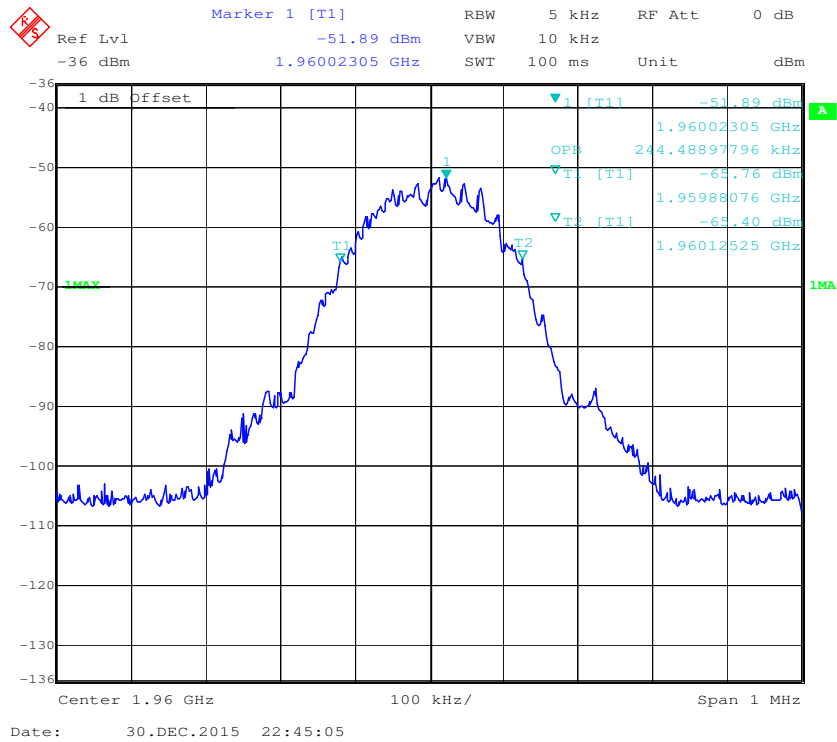
26 dB Bandwidth-UL- AWGN-3dB Above AGC-Input



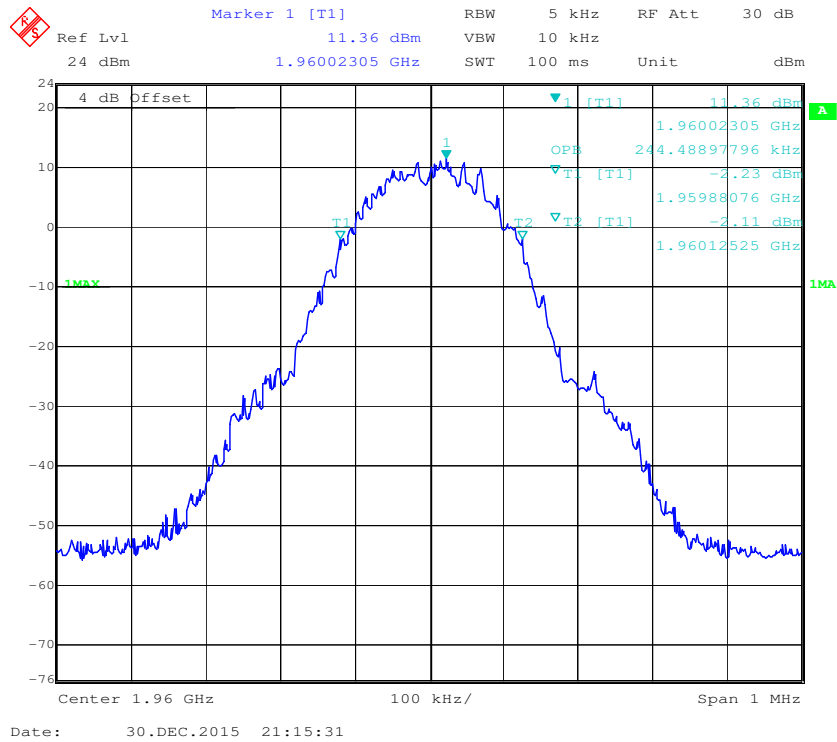
26 dB Bandwidth-UL- AWGN-3dB Above AGC-Output



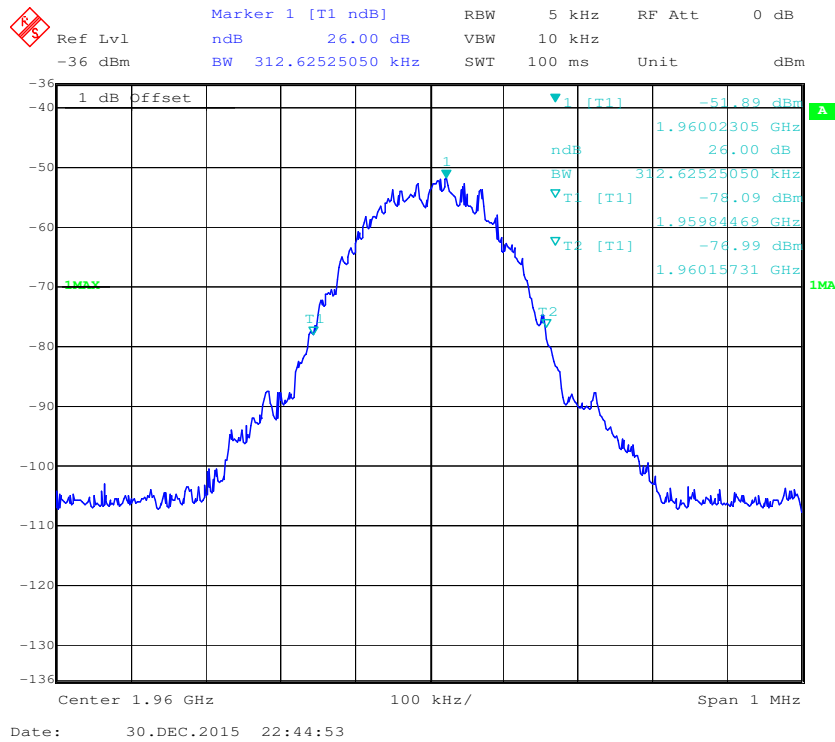
99% Bandwidth-DL-GSM-Pre AGC-Input



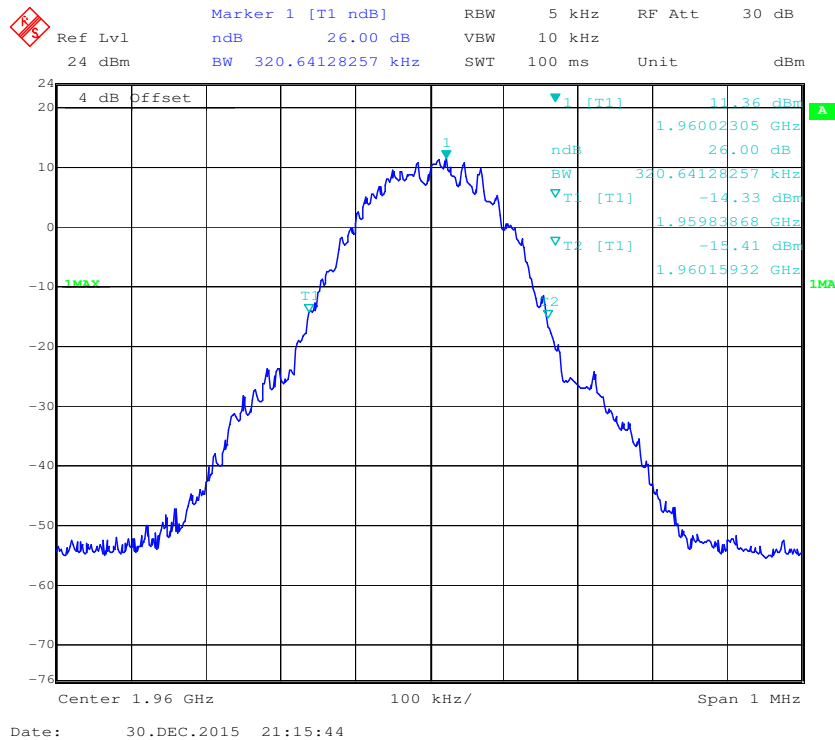
99% Bandwidth-DL- GSM-Pre AGC-Output

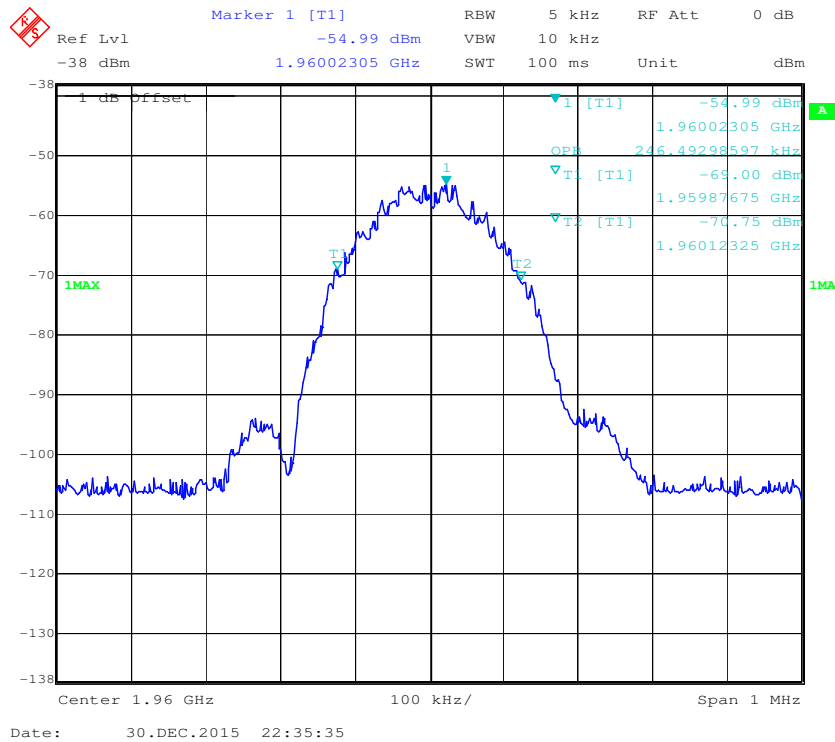
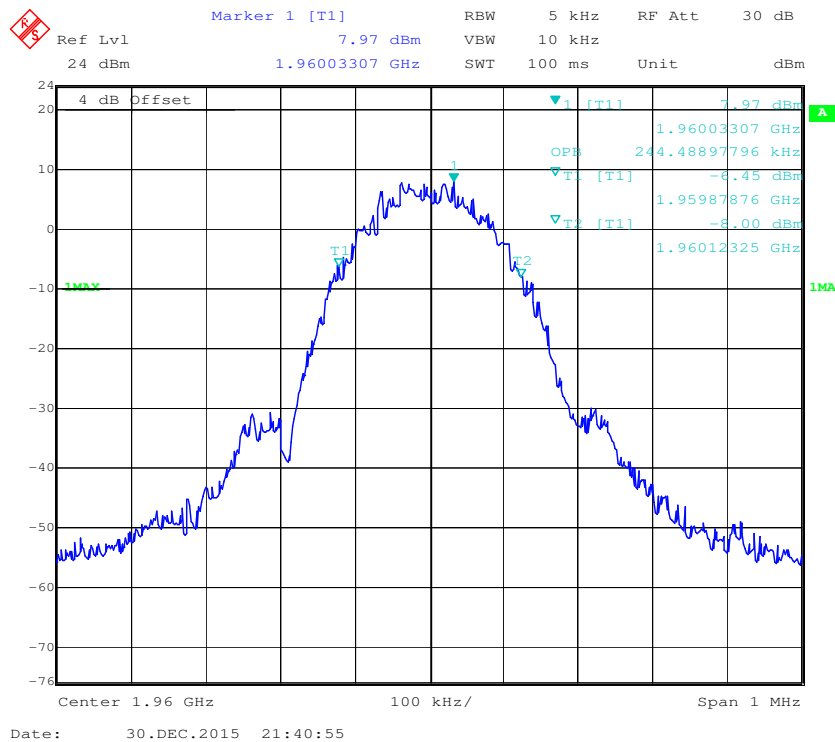


26 dB Bandwidth-DL- GSM-Pre AGC-Input

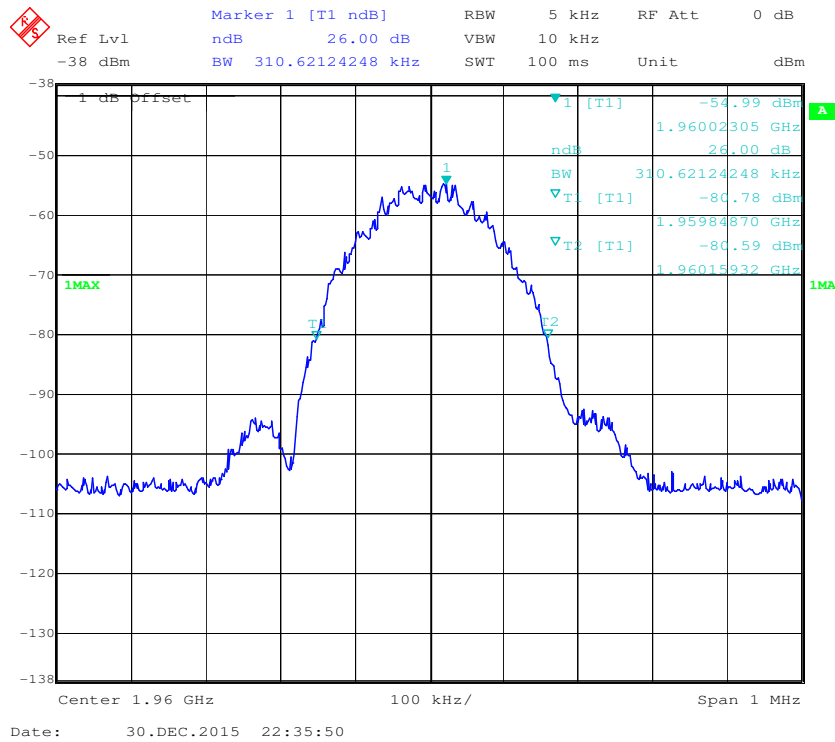


26 dB Bandwidth-DL- GSM-Pre AGC-Output

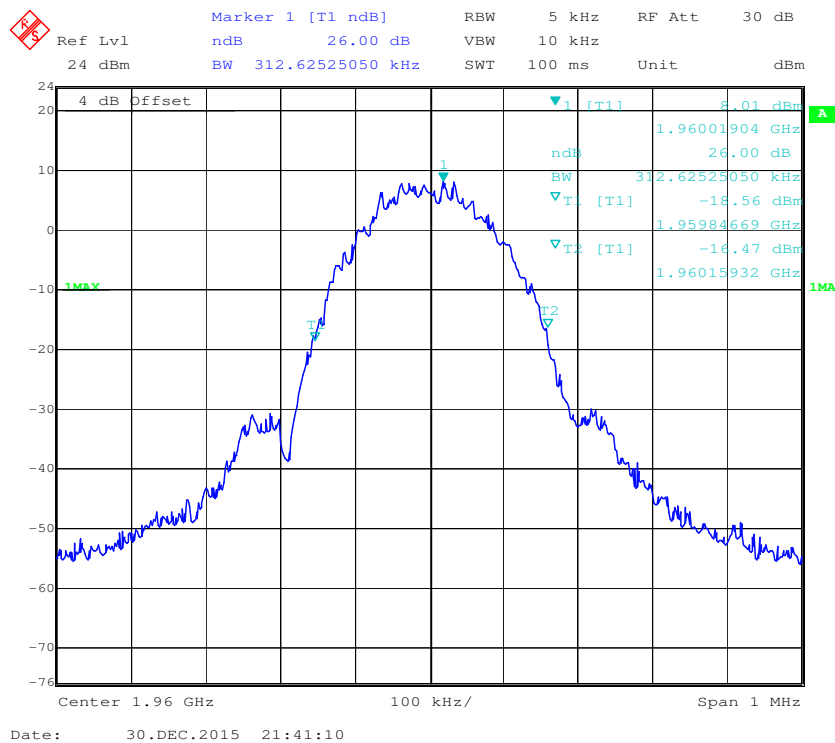


99% Bandwidth-DL- GSM-3dB Above AGC-Input**99% Bandwidth-DL- GSM-3dB Above AGC-Output**

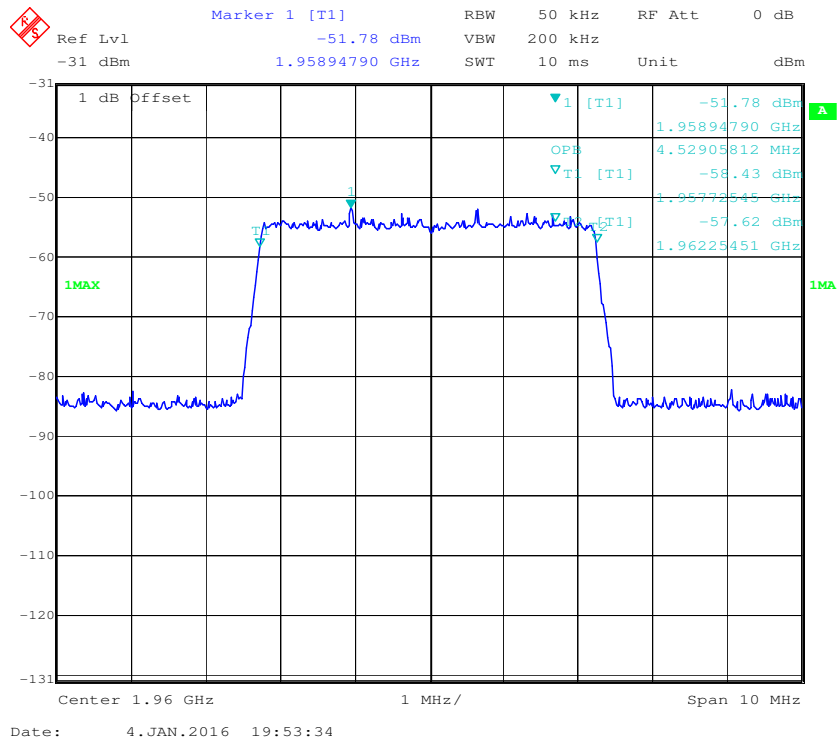
26 dB Bandwidth-DL- GSM-3dB Above AGC-Input



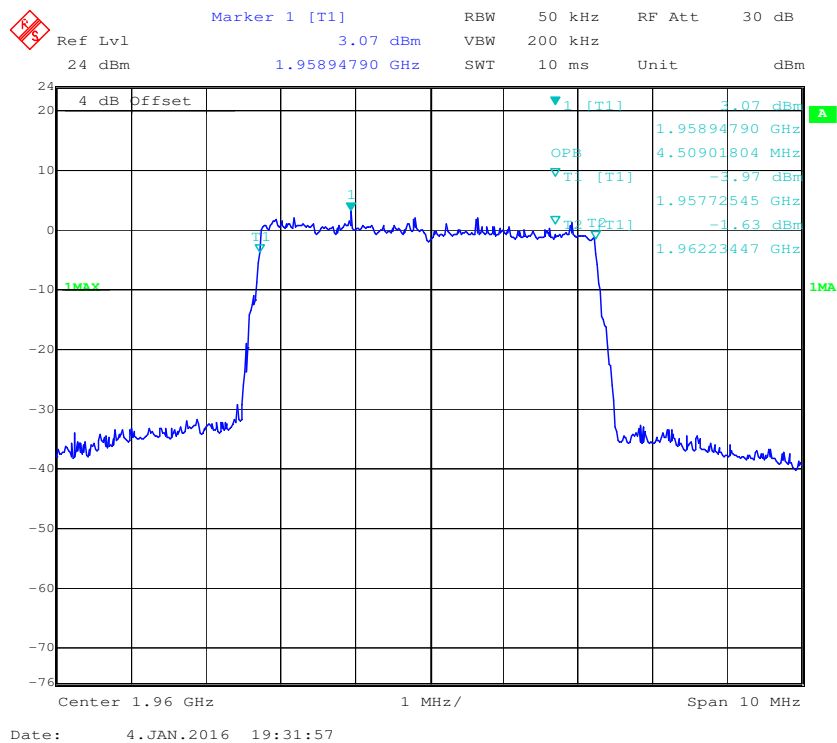
26 dB Bandwidth-DL-GSM-3dB Above AGC-Output

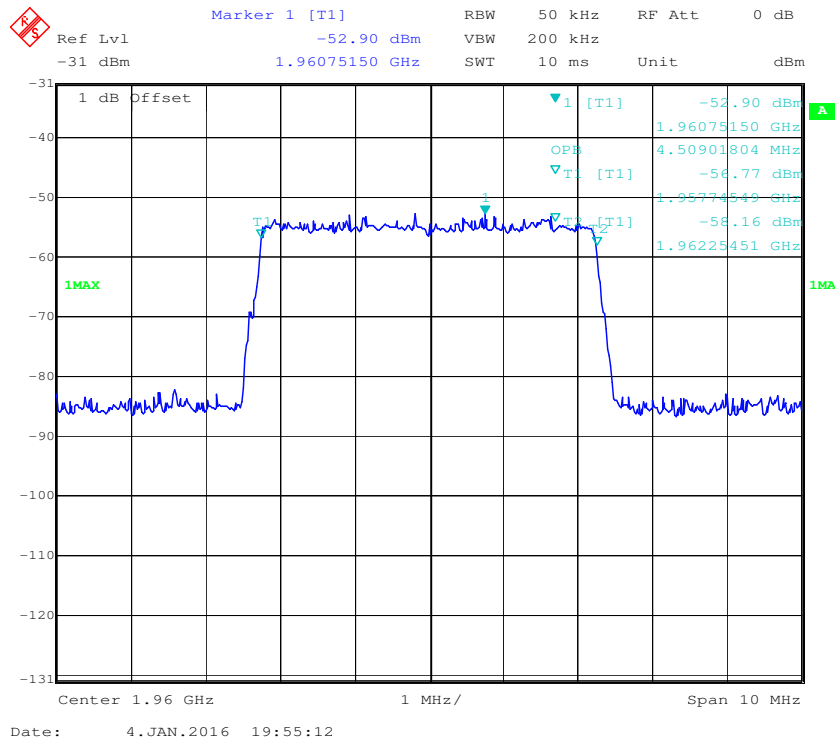
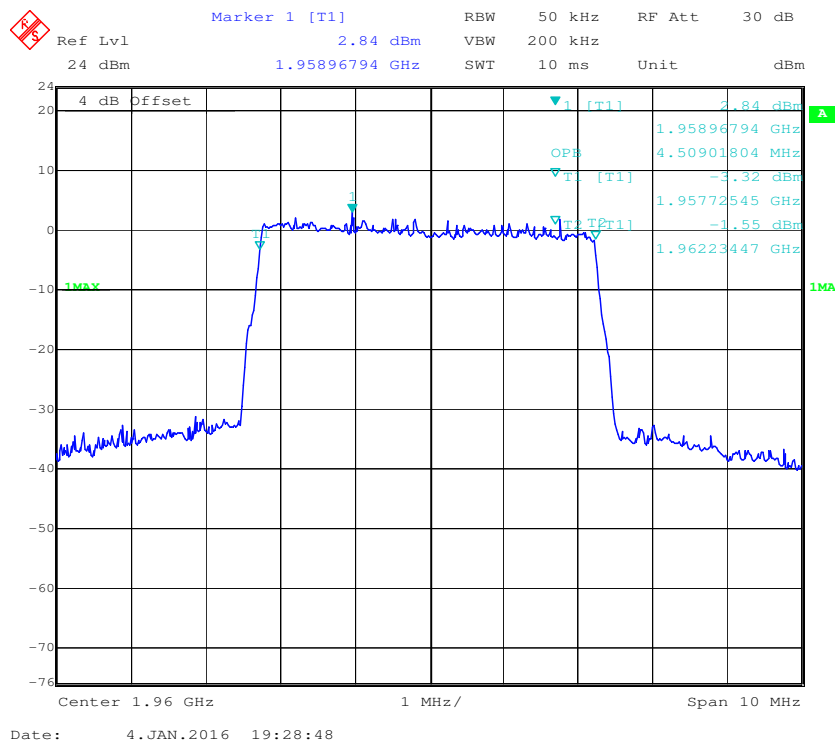


99% Bandwidth-DL- AWGN-Pre AGC--Input

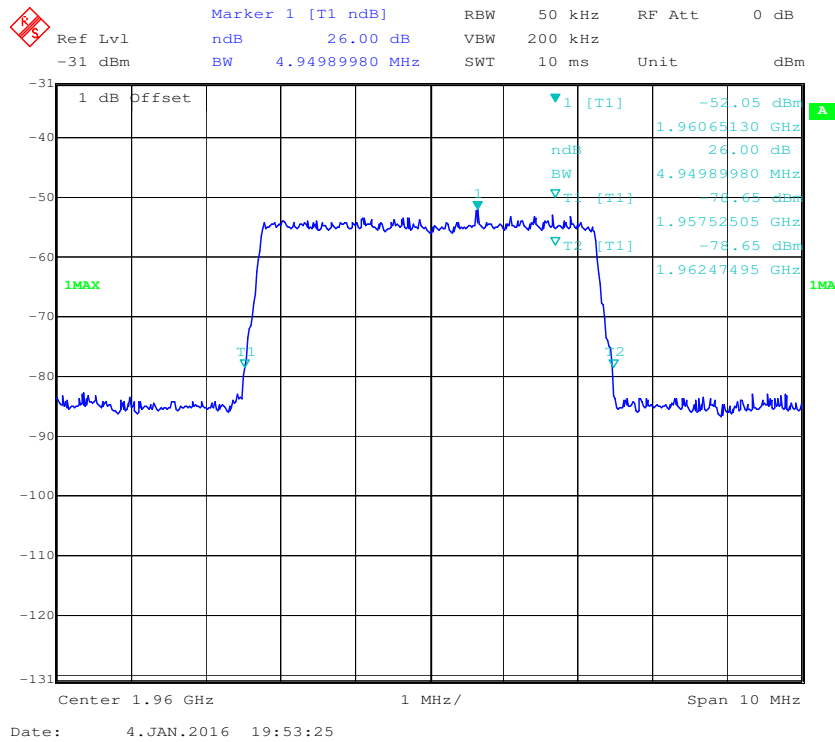


99% Bandwidth-DL- AWGN-Pre AGC-Output

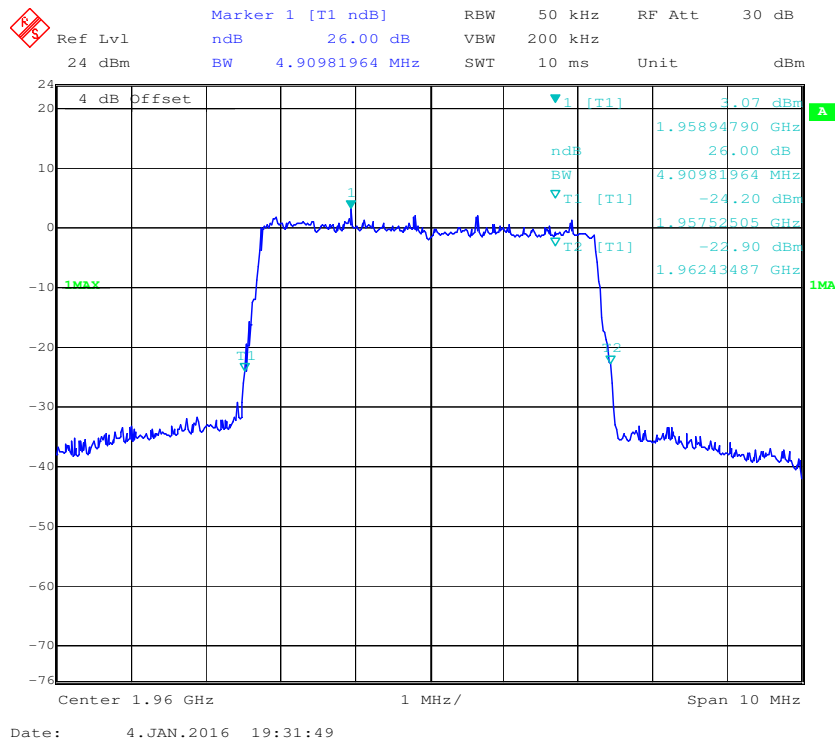


99% Bandwidth-DL- AWGN-3dB Above AGC-Input**99% dB Bandwidth-DL- AWGN-3dB Above AGC- Output**

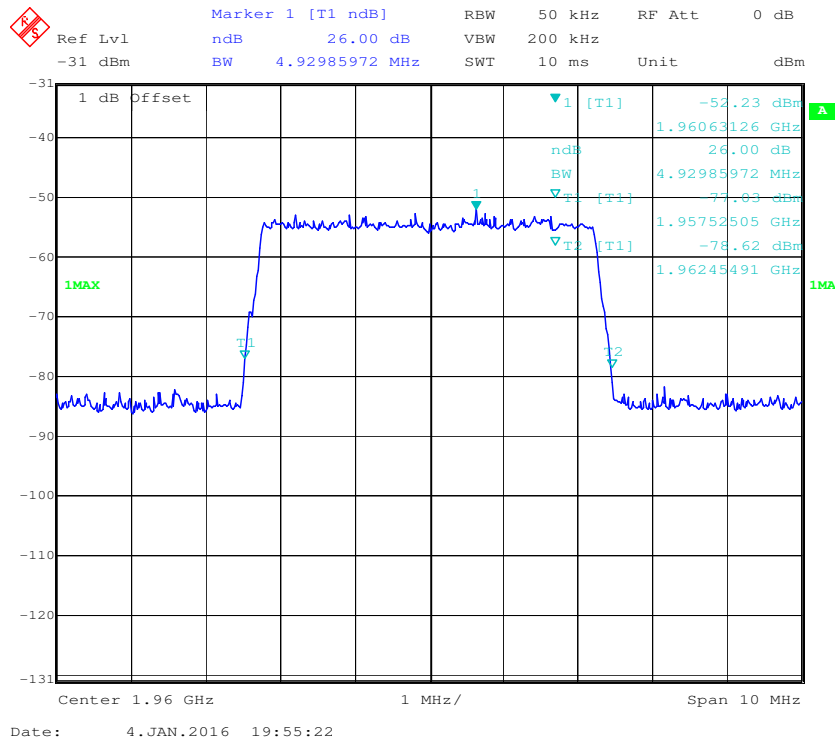
26 dB Bandwidth-DL- AWGN-Pre AGC-Input



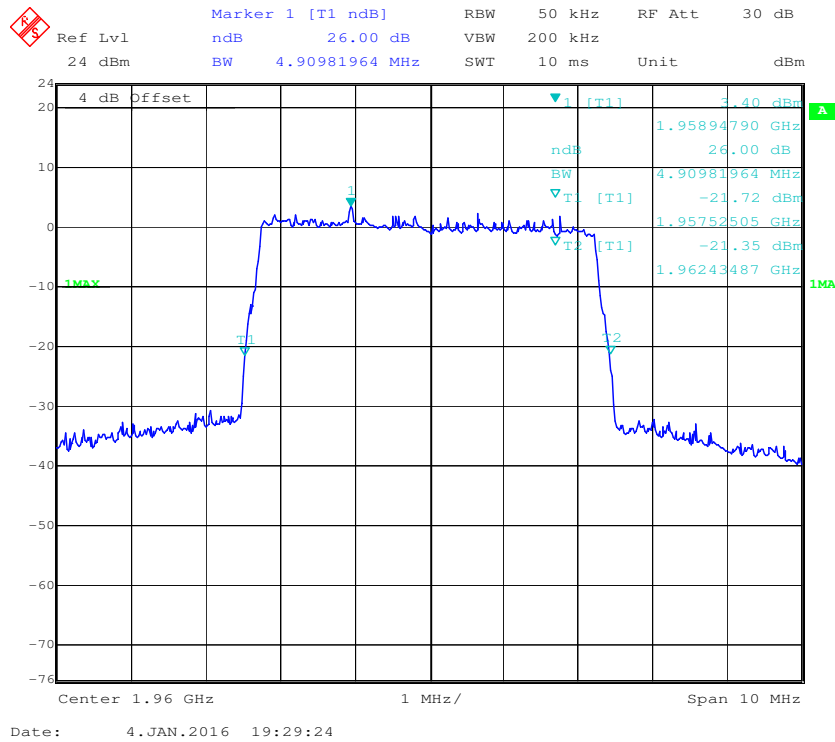
26 dB Bandwidth-DL- AWGN-Pre AGC-Output



26 dB Bandwidth-DL- AWGN-3dB Above AGC-Input

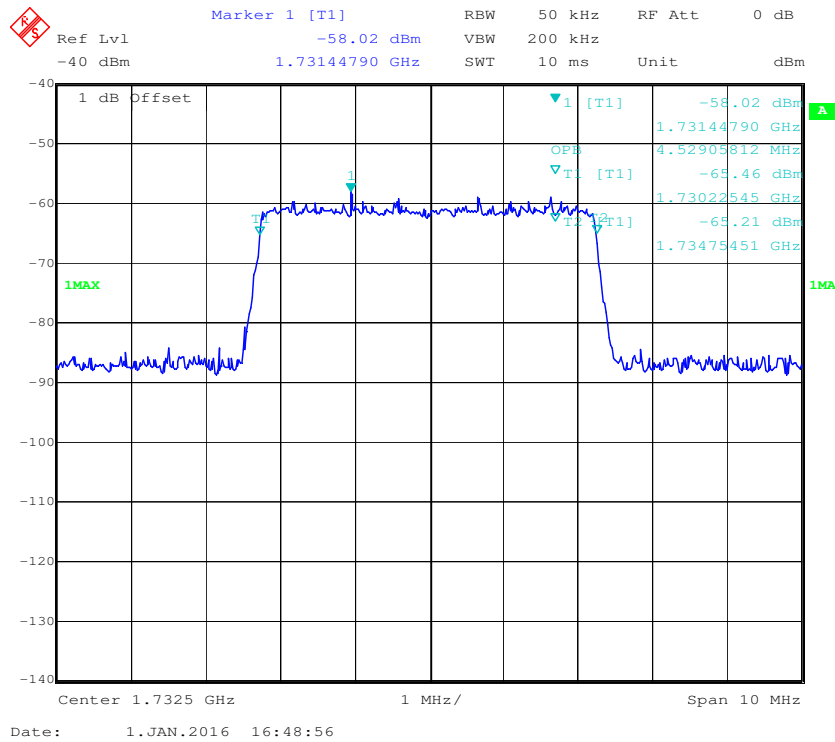
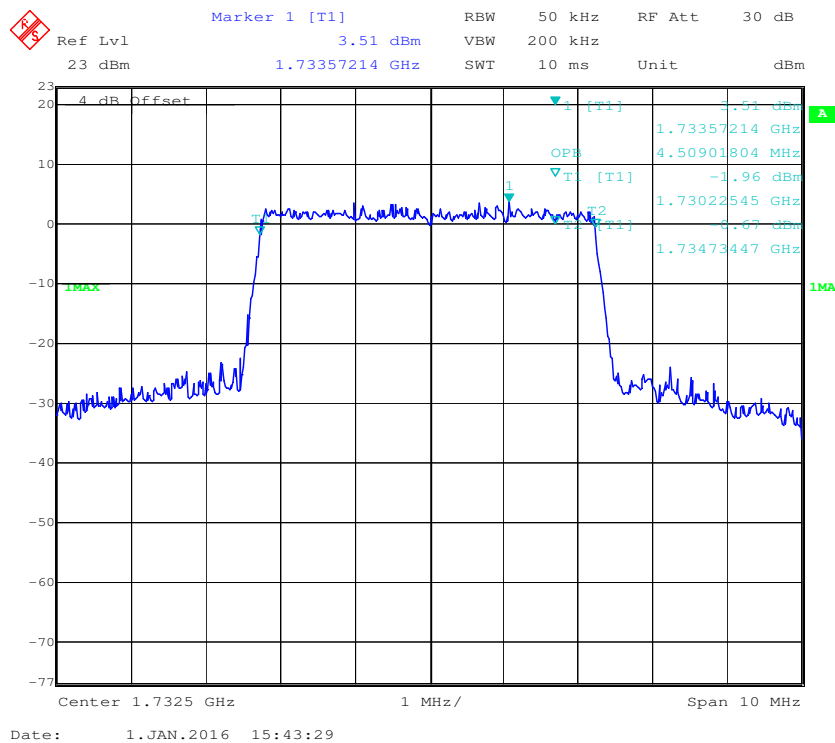


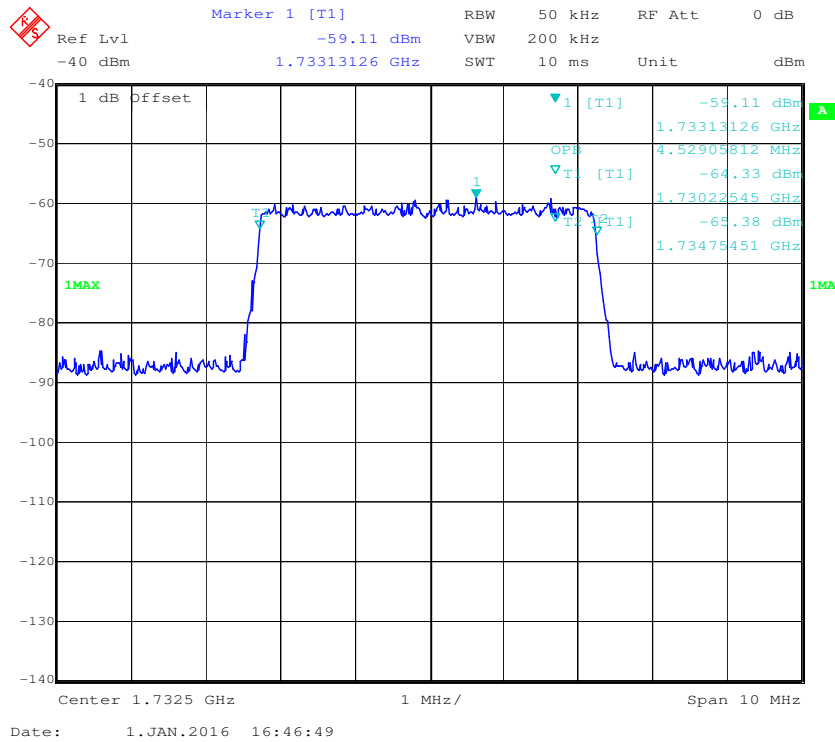
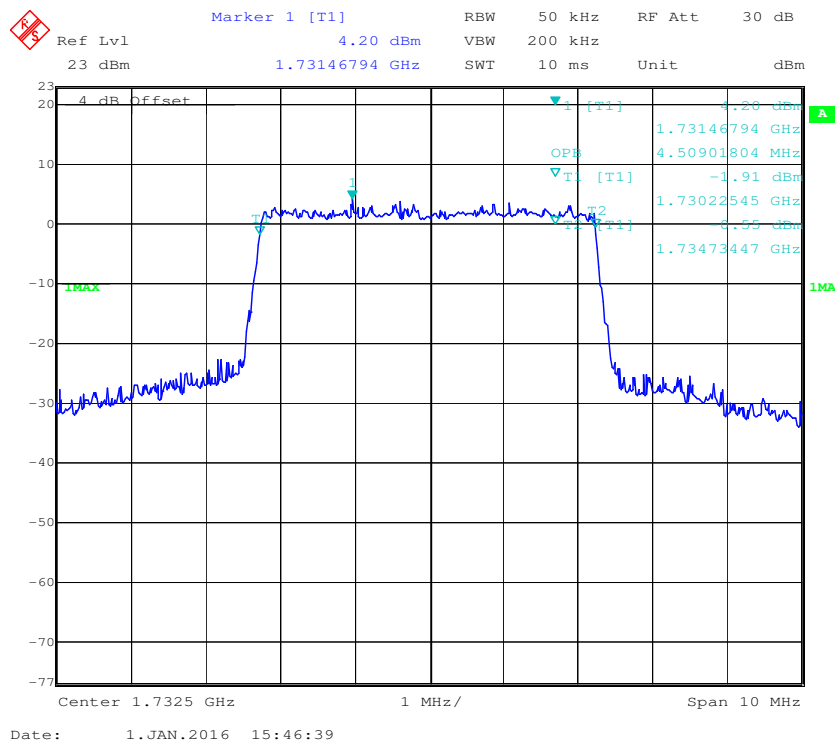
26 dB Bandwidth-DL- AWGN-3dB Above AGC-Output



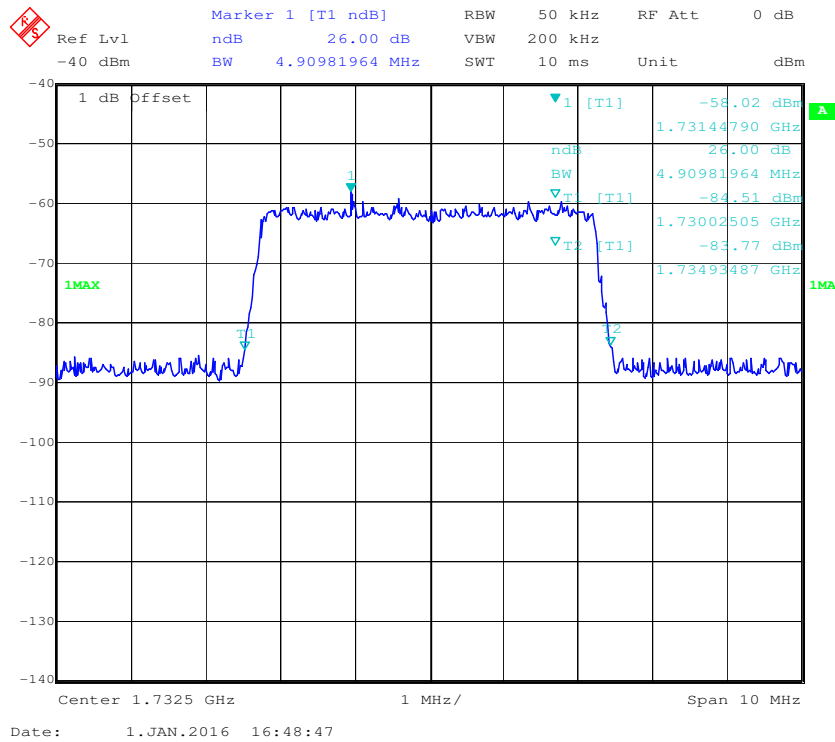
AWS-1 Band

Mode	Signal Type	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
Uplink	AWGN	Pre-AGC	1732.5	4.529	4.509	4.910	4.930
		3dB above AGC	1732.5	4.529	4.509	4.950	4.930
	GSM	Pre-AGC	1732.5	0.242	0.244	0.317	0.317
		3dB above AGC	1732.5	0.242	0.244	0.317	0.315
Downlink	AWGN	Pre-AGC	2132.5	4.509	4.509	4.930	4.930
		3dB above AGC	2132.5	4.529	4.509	4.930	4.950
	GSM	Pre-AGC	2132.5	0.242	0.242	0.315	0.313
		3dB above AGC	2132.5	0.242	0.242	0.315	0.317

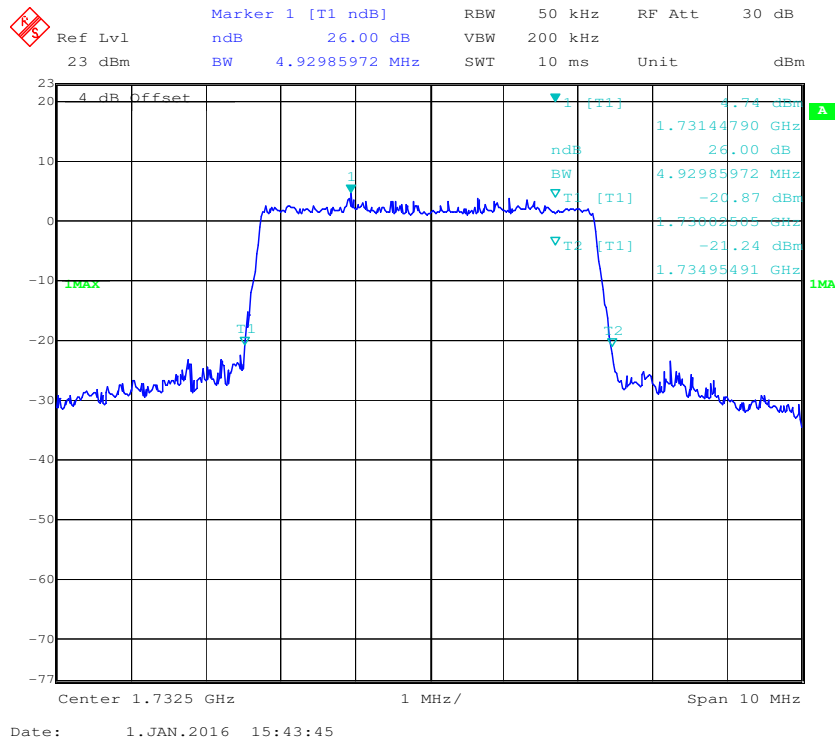
99% Bandwidth-UL-AWGN-Pre AGC-Input**99% Bandwidth-UL- AWGN-Pre AGC-Output**

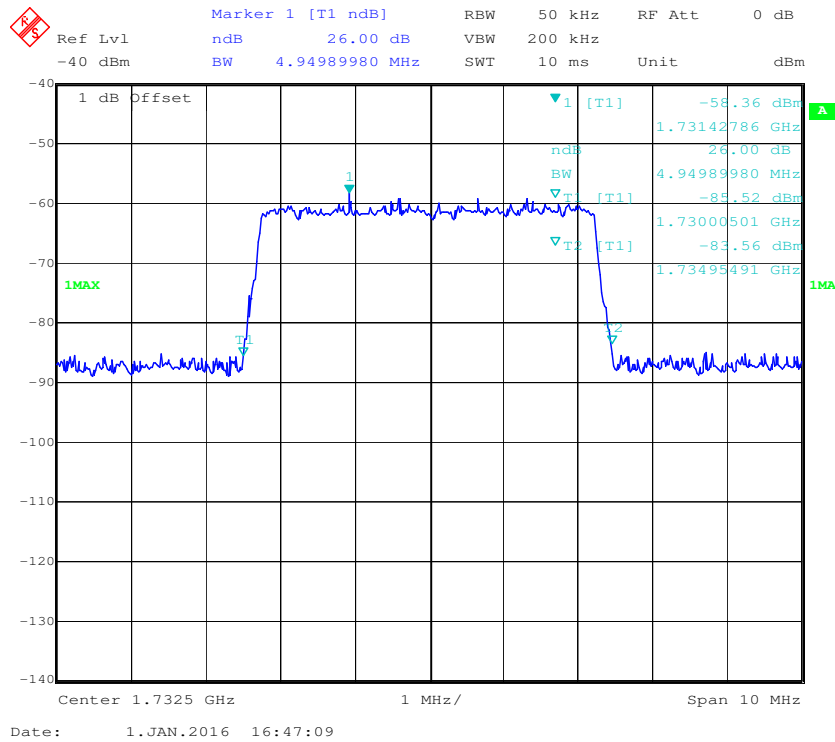
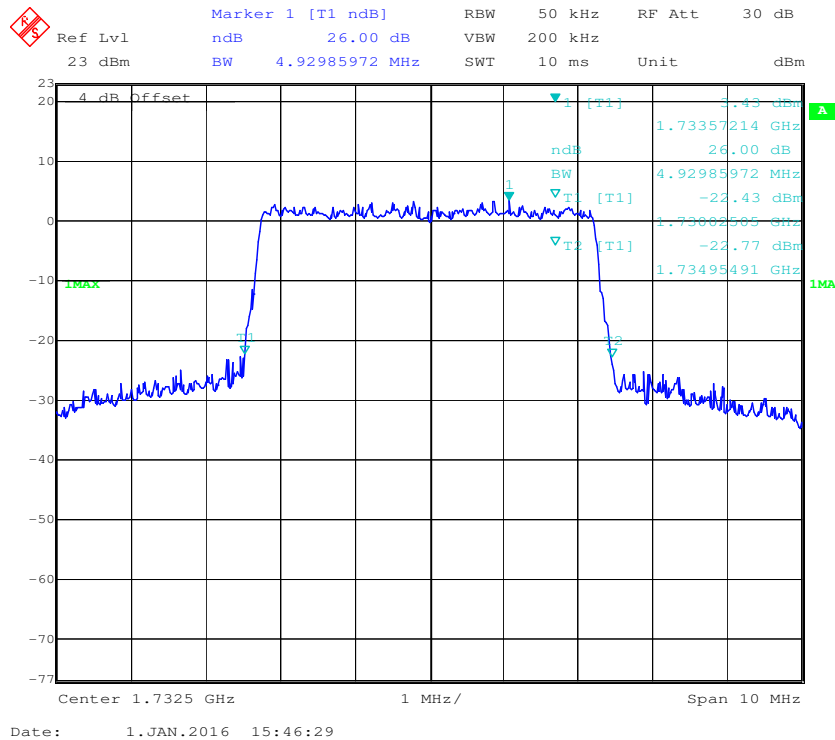
99% Bandwidth-UL- AWGN-3dB Above AGC-Input**99% dB Bandwidth-UL- AWGN-3dB Above AGC-Output**

26 dB Bandwidth-UL- AWGN-Pre AGC-Input

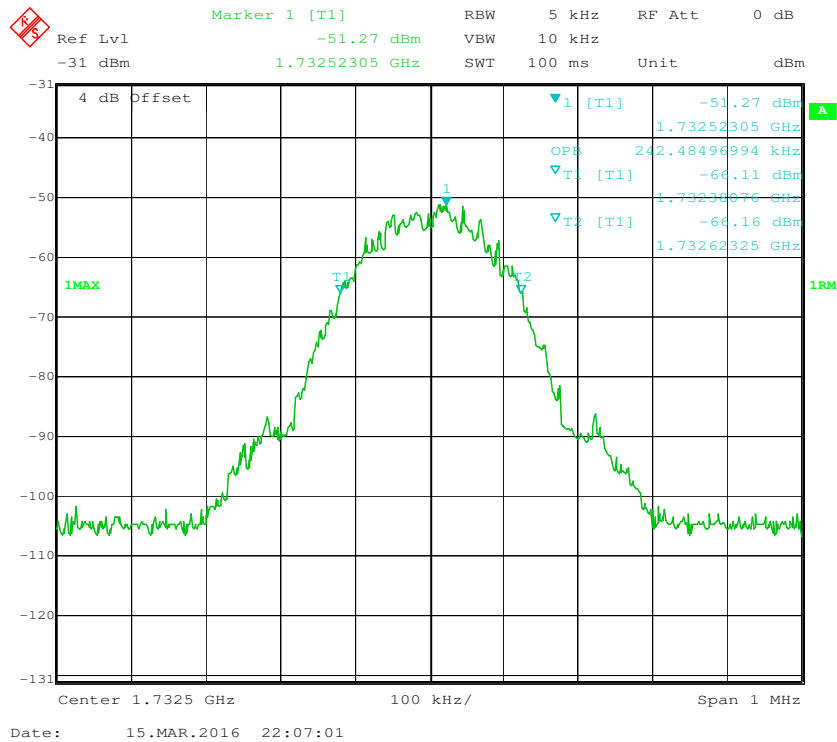


26 dB Bandwidth-UL- AWGN-Pre AGC-Output

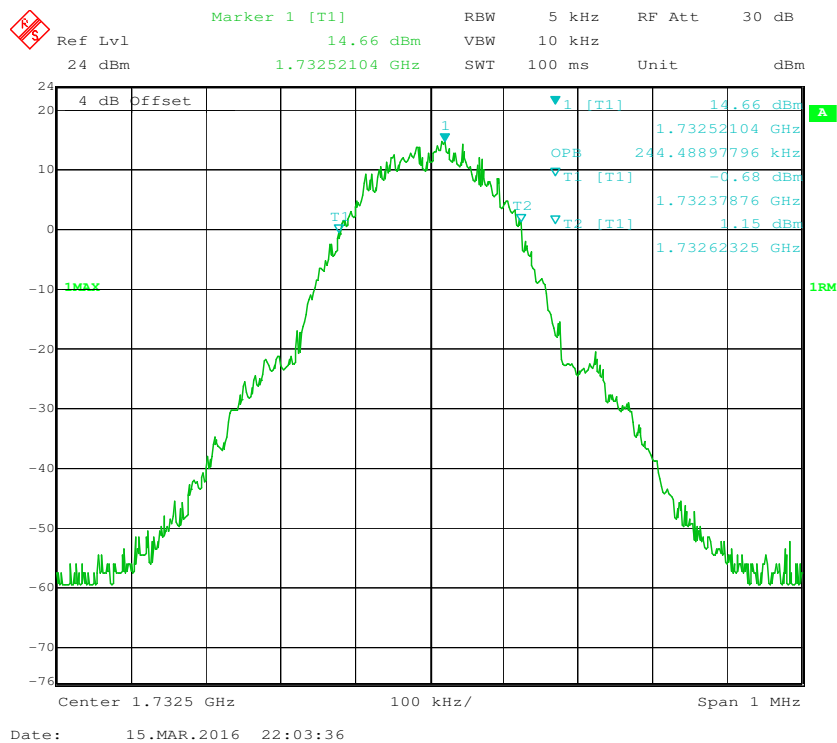


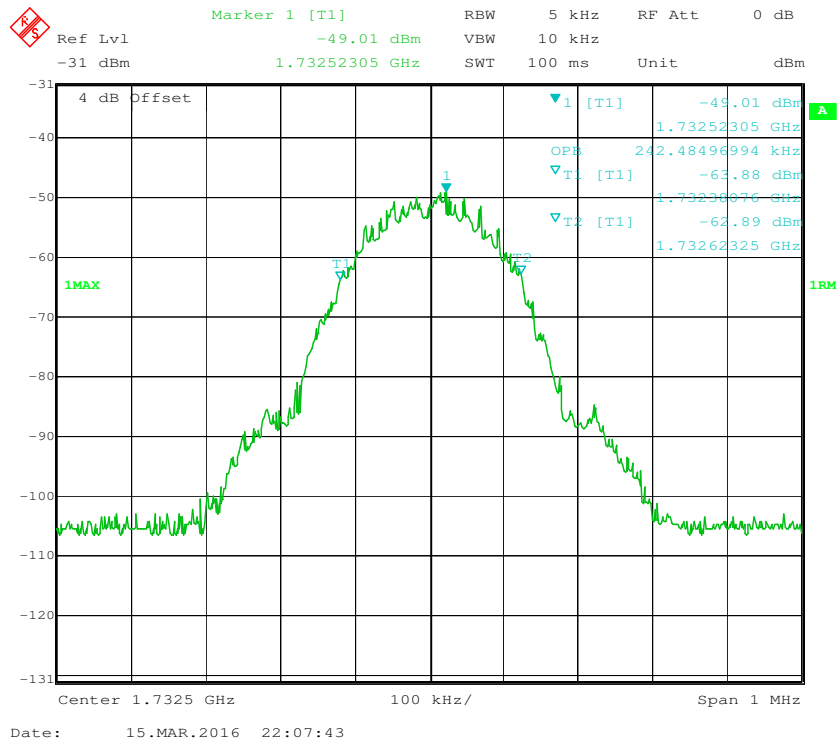
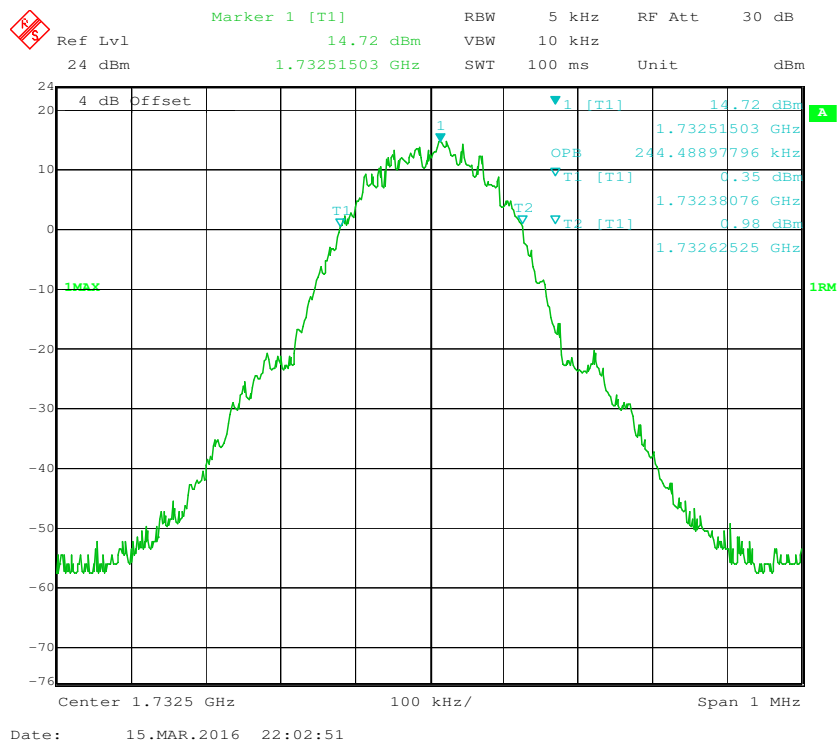
26 dB Bandwidth-UL- AWGN-3dB Above AGC-Input**26 dB Bandwidth-UL- AWGN-3dB Above AGC-Output**

99% Bandwidth-UL-GSM-Pre AGC-Input

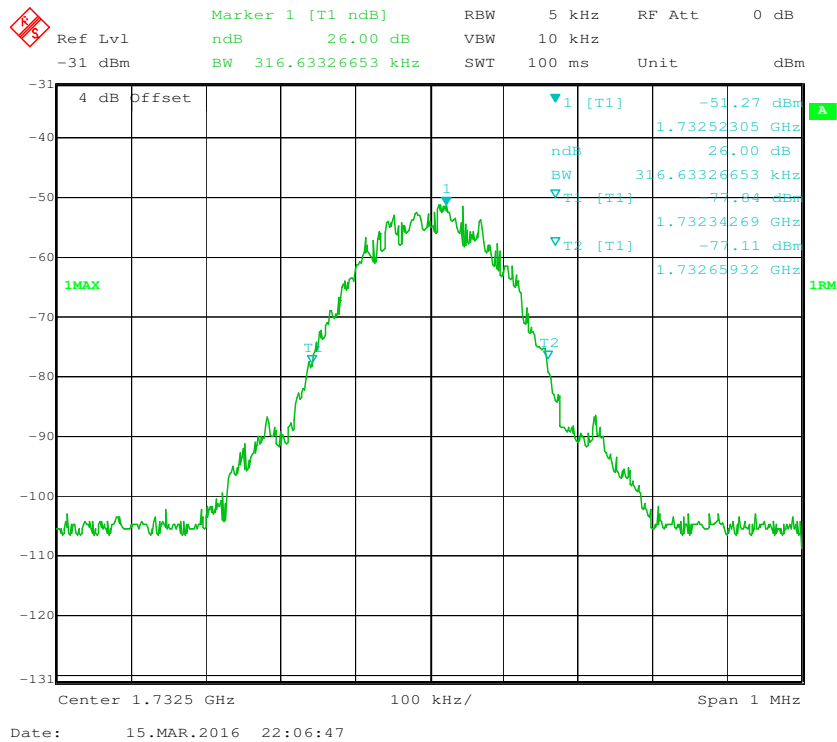


99% Bandwidth-UL- GSM-Pre AGC-Output

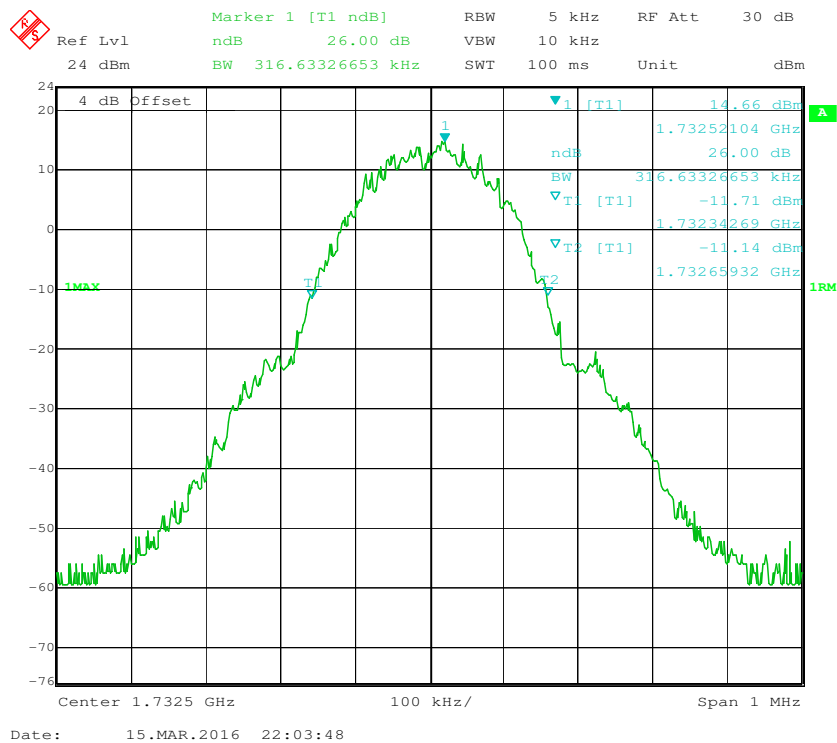


99% Bandwidth-UL- GSM-3dB Above AGC-Input**99% dB Bandwidth-UL- GSM-3dB Above AGC-Output**

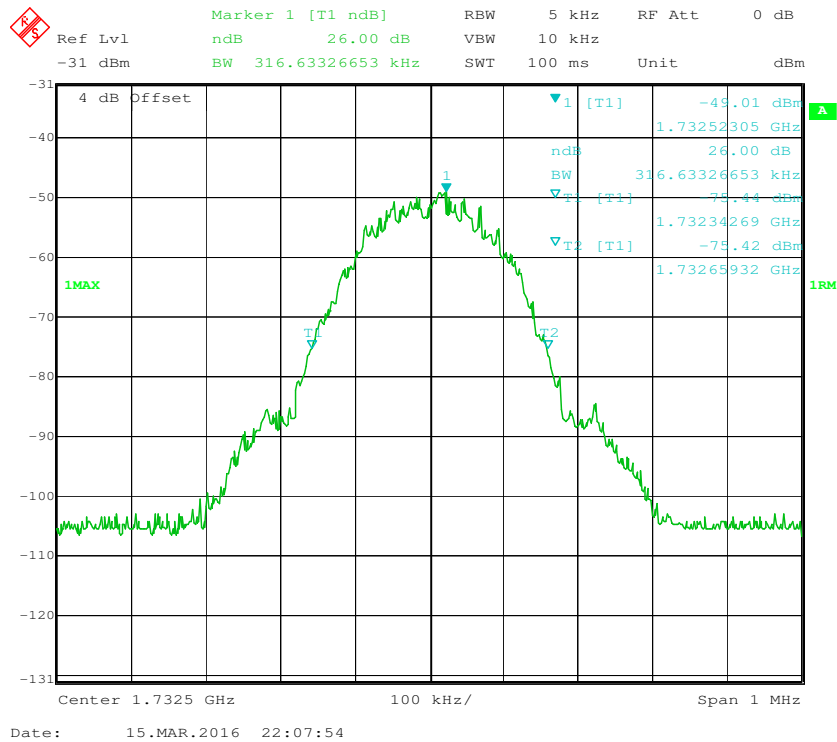
26 dB Bandwidth-UL- GSM-Pre AGC-Input



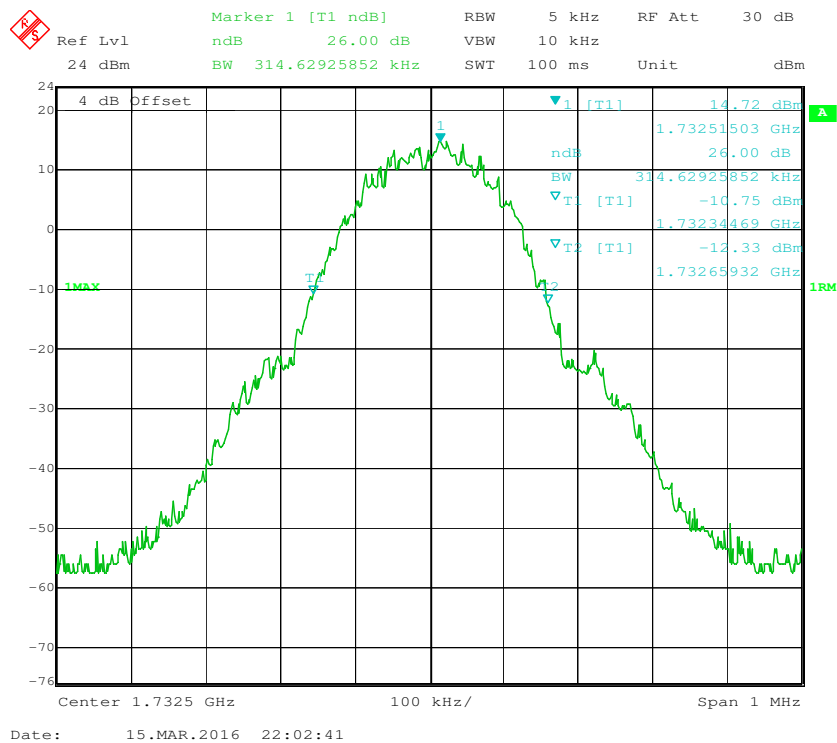
26 dB Bandwidth-UL- GSM-Pre AGC-Output



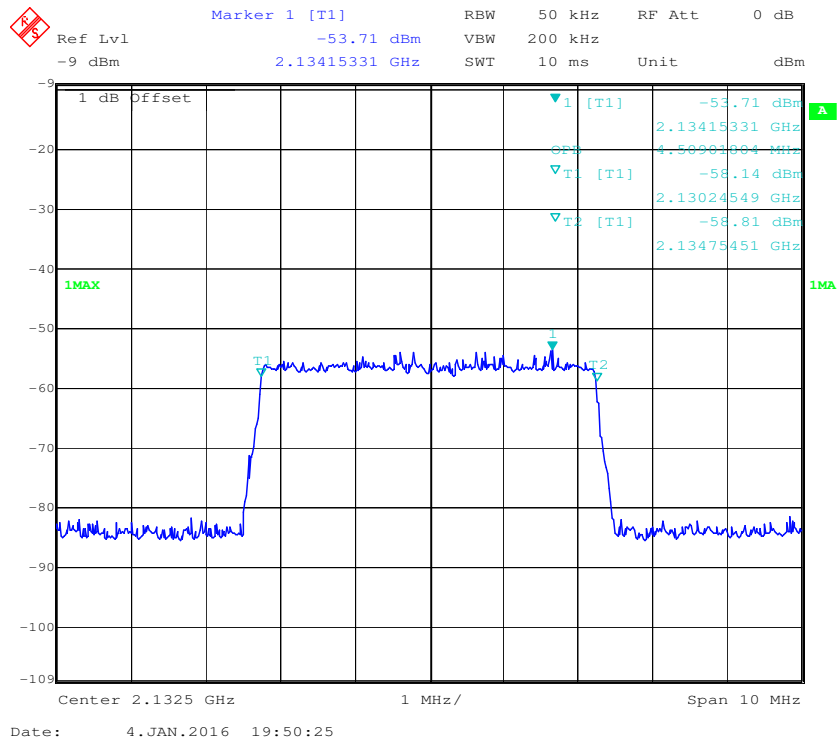
26 dB Bandwidth-UL- GSM-3dB Above AGC-Input



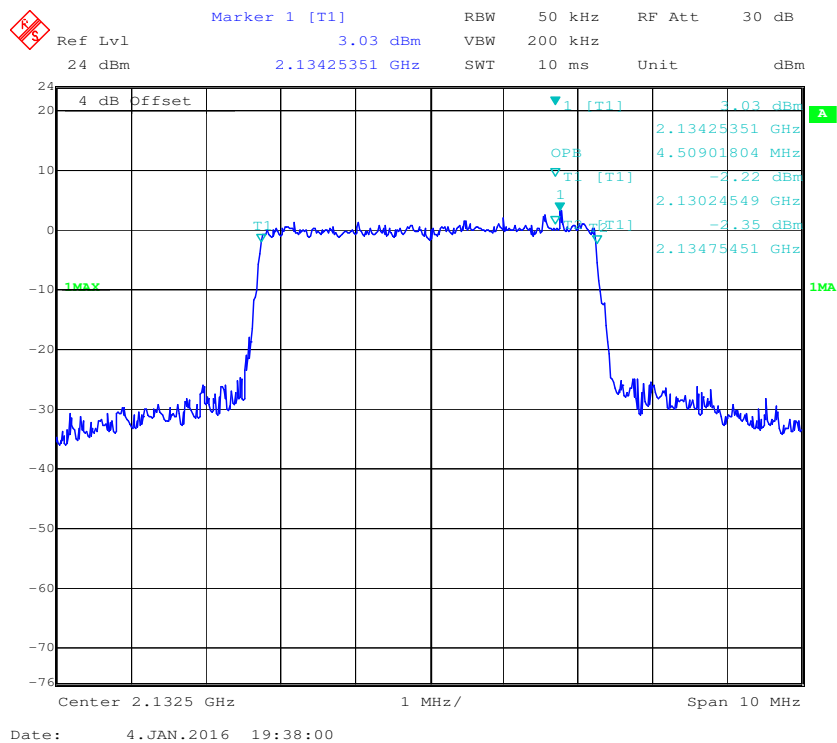
26 dB Bandwidth-UL- GSM-3dB Above AGC-Output



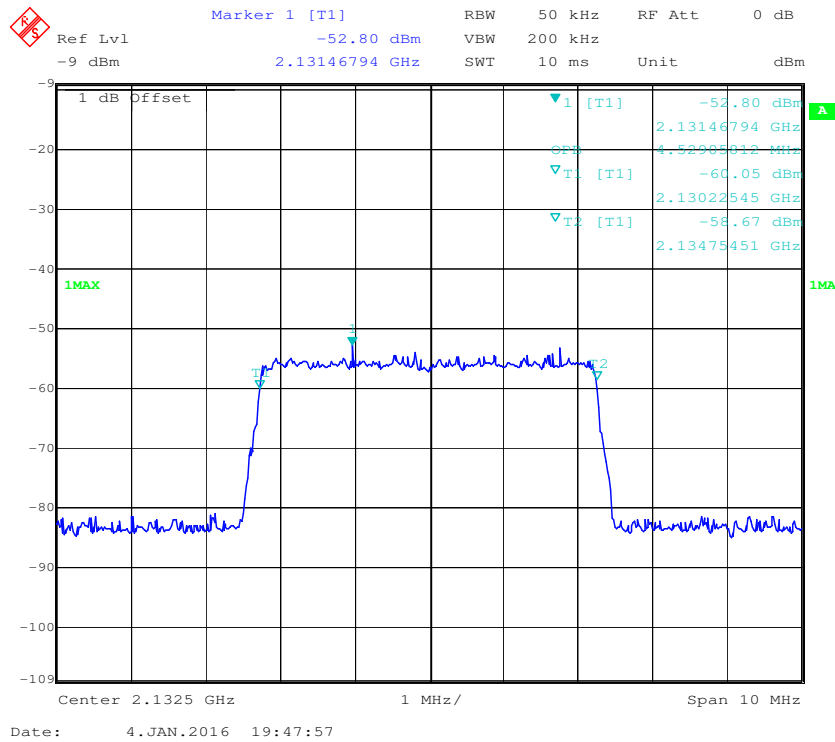
99% Bandwidth-DL- AWGN-Pre AGC-Input



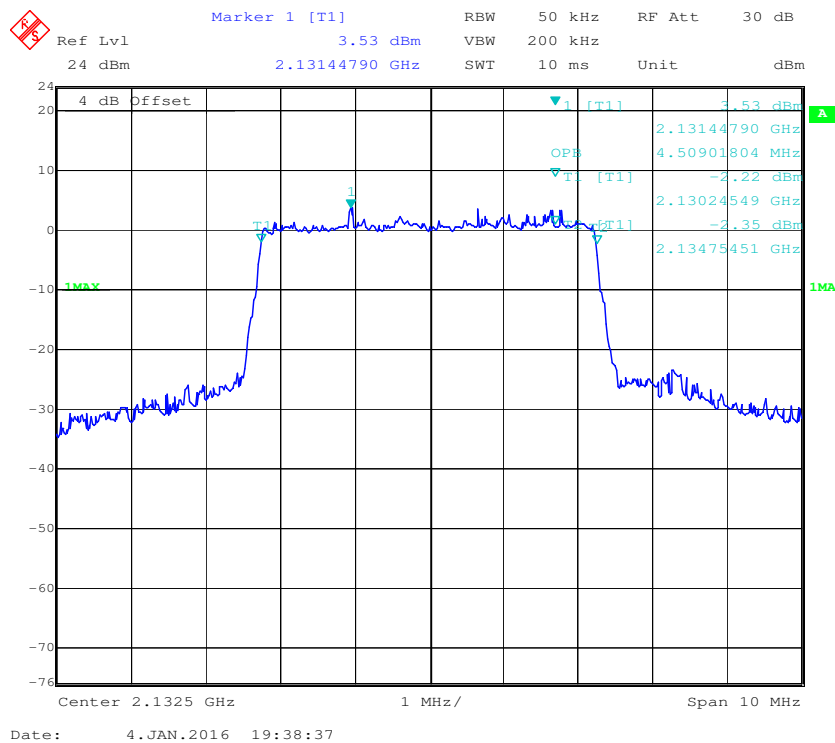
99% Bandwidth-DL- AWGN-Pre AGC-Output



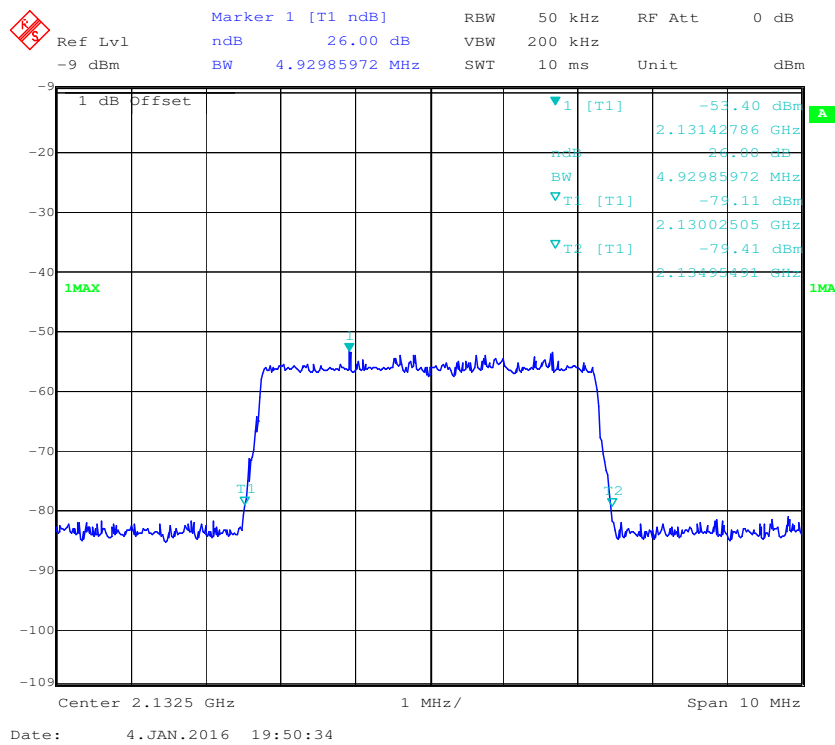
99% Bandwidth-DL- AWGN-3dB Above AGC-Input



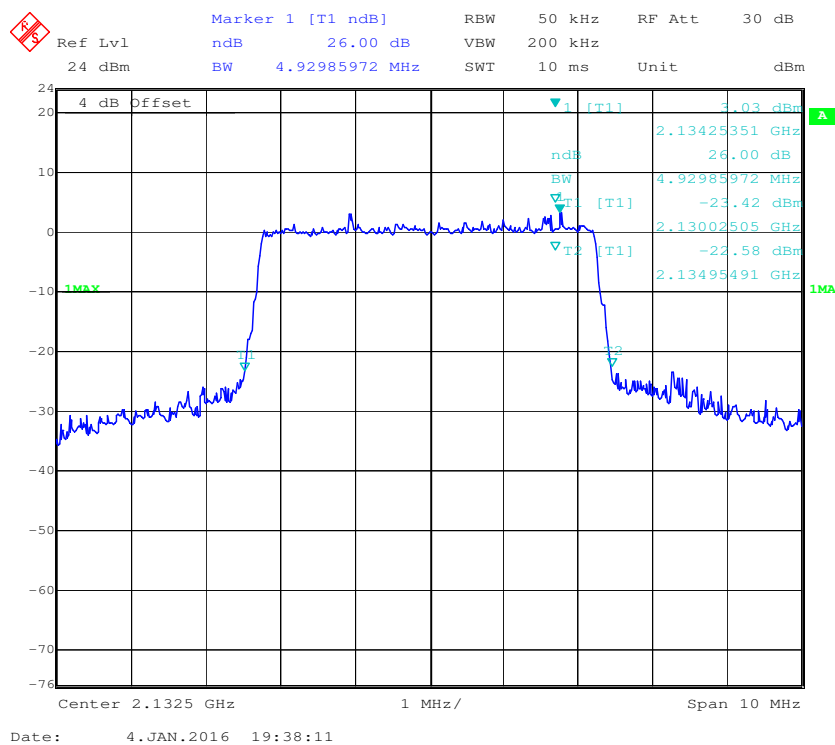
99% dB Bandwidth-DL- AWGN-3dB Above AGC-Output



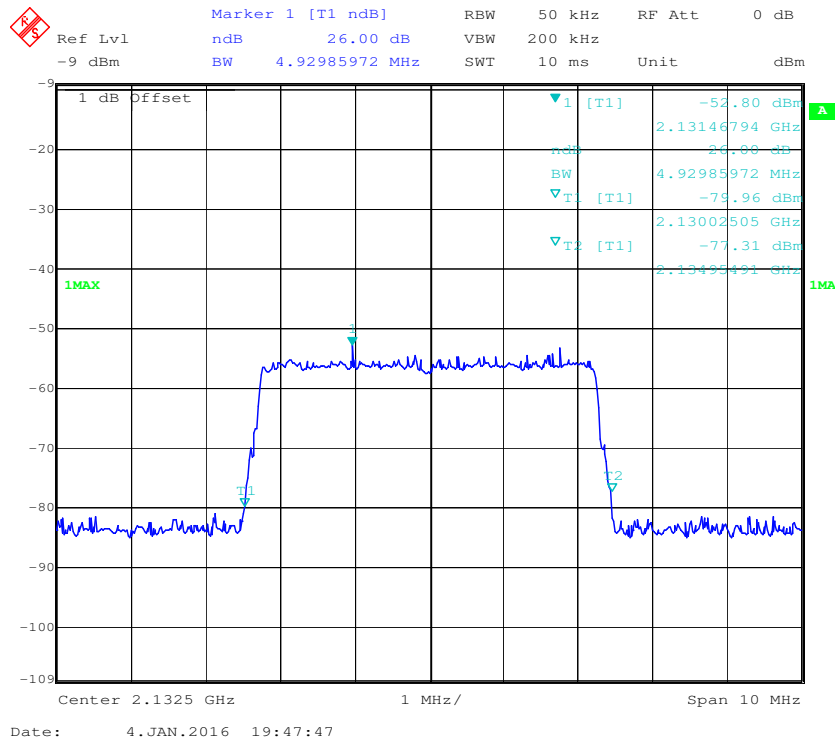
26 dB Bandwidth-DL- AWGN-Pre AGC-Input



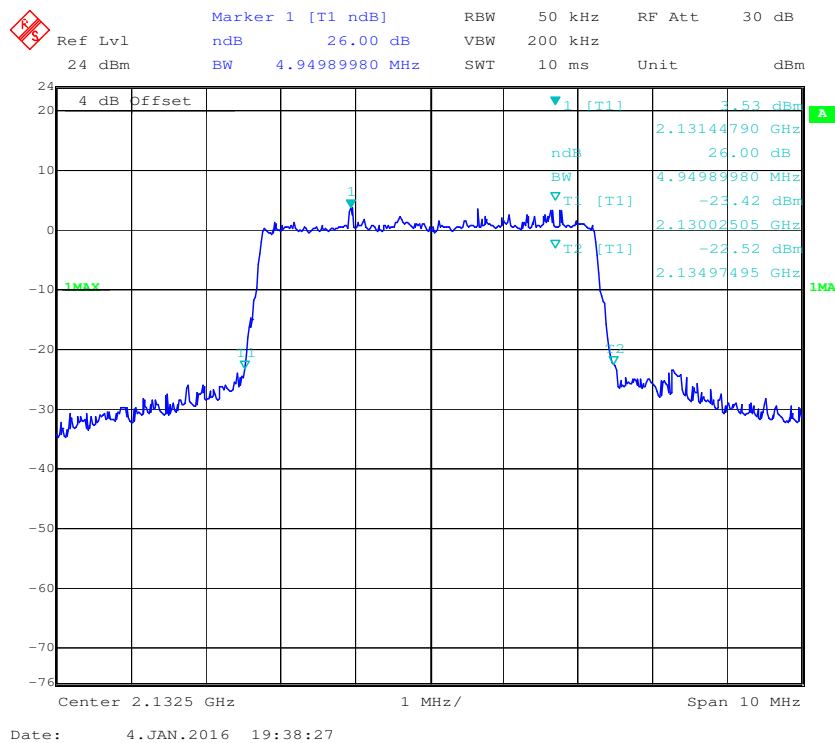
26 dB Bandwidth-DL- AWGN-Pre AGC-Output



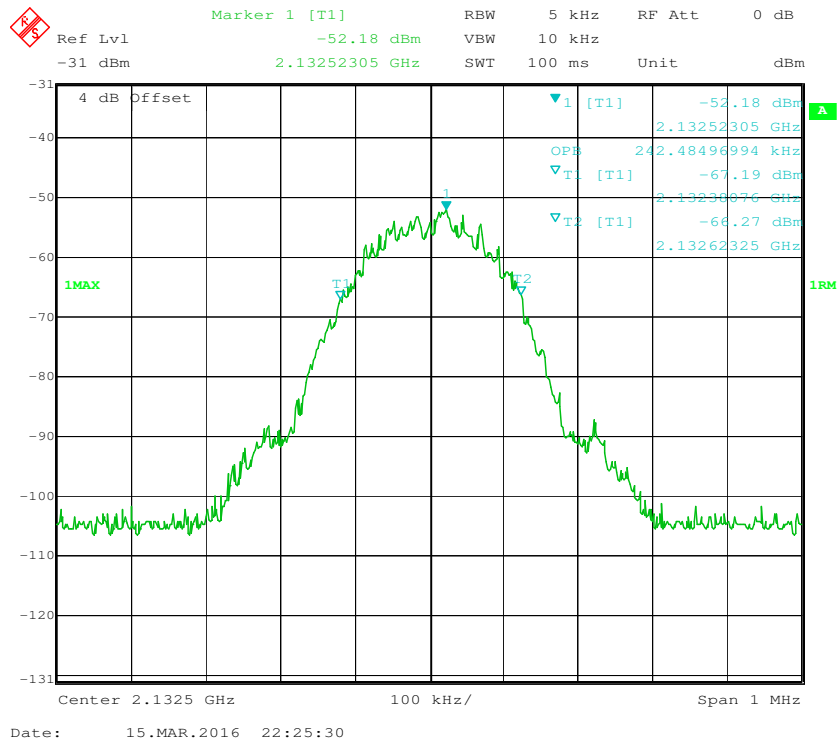
26 dB Bandwidth-DL- AWGN-3dB Above AGC-Input



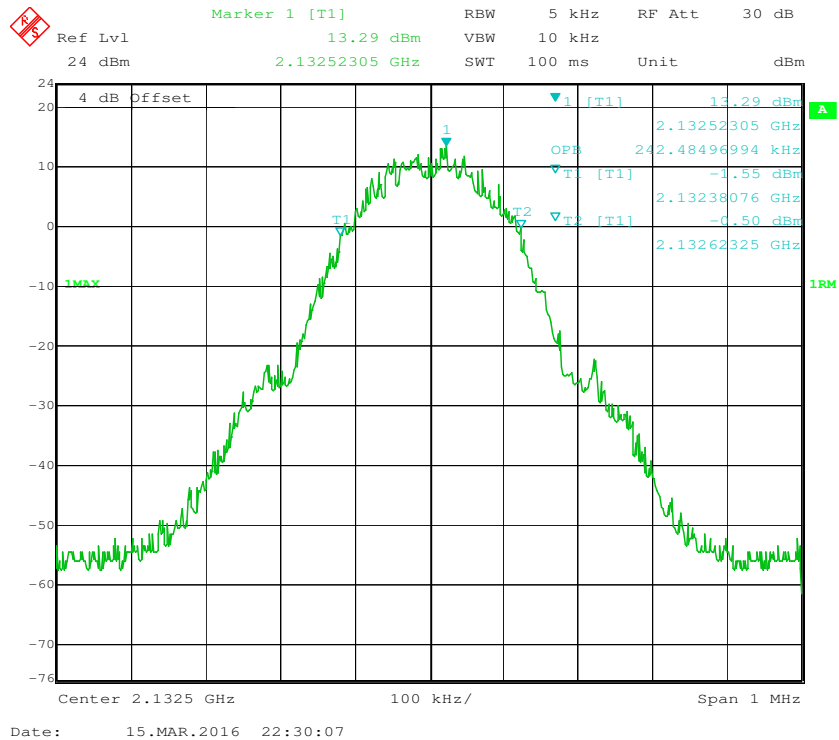
26 dB Bandwidth-DL- AWGN-3dB Above AGC-Output



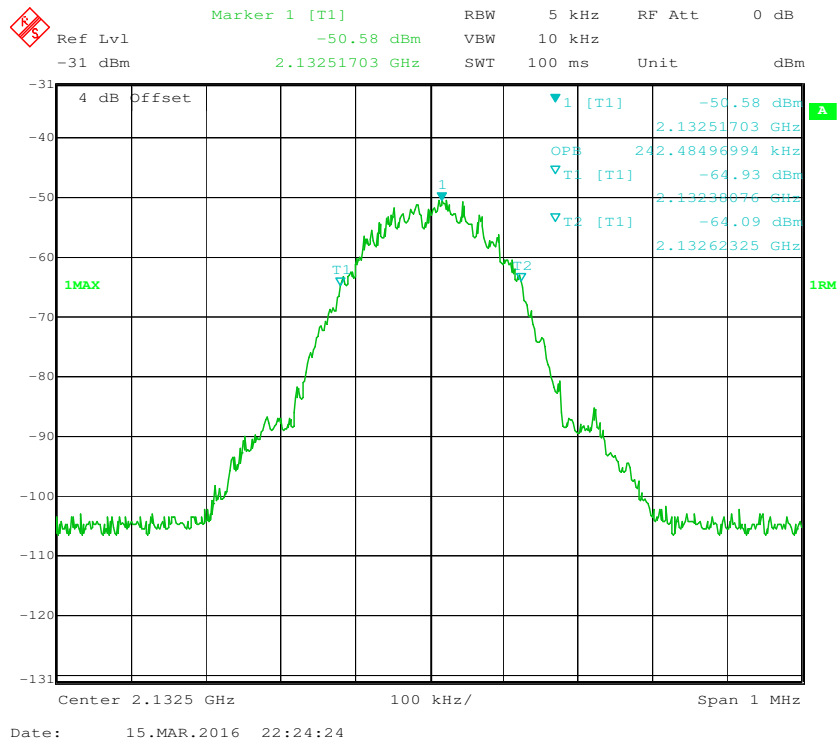
99% Bandwidth-DL- GSM-Pre AGC-Input



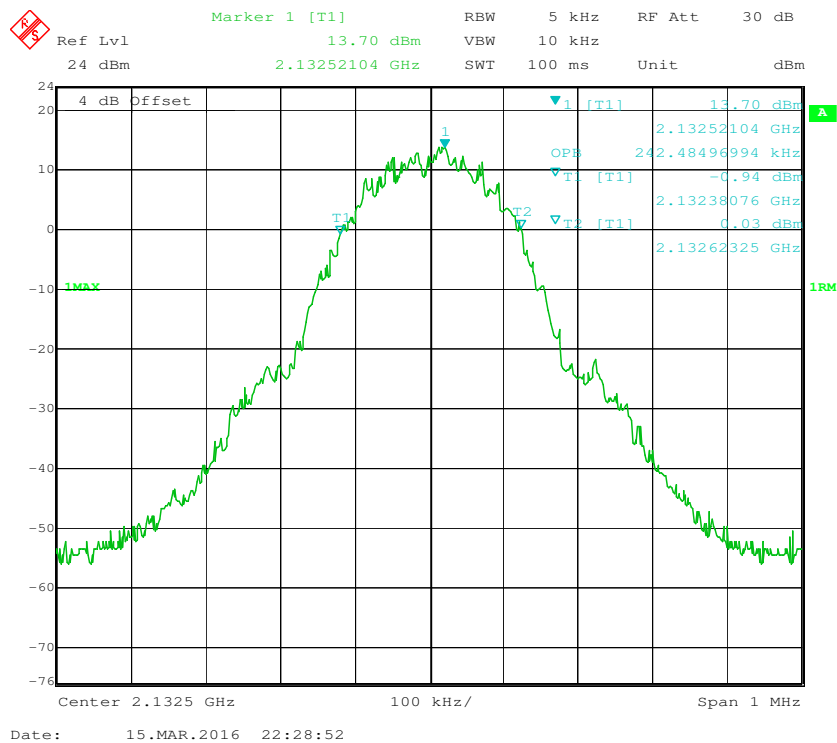
99% Bandwidth-DL- GSM-Pre AGC-Output



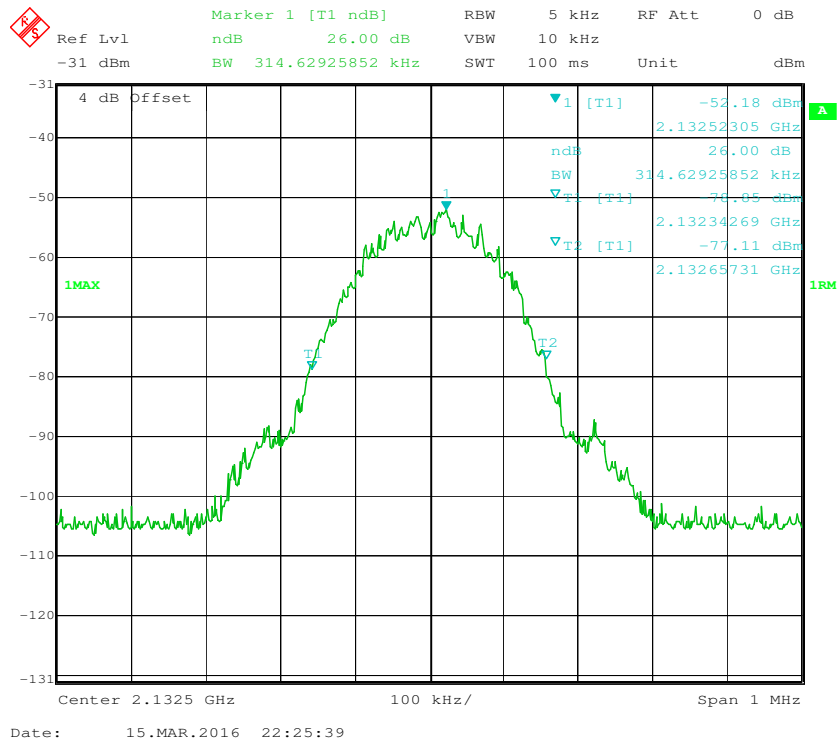
99% Bandwidth-DL- GSM-3dB Above AGC-Input



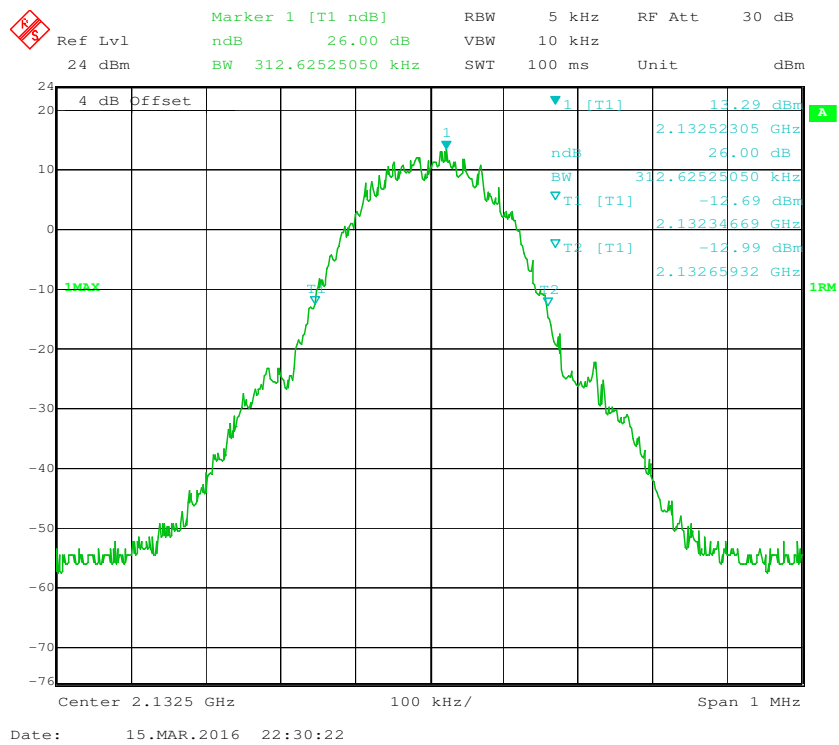
99% dB Bandwidth-DL- GSM-3dB Above AGC-Output



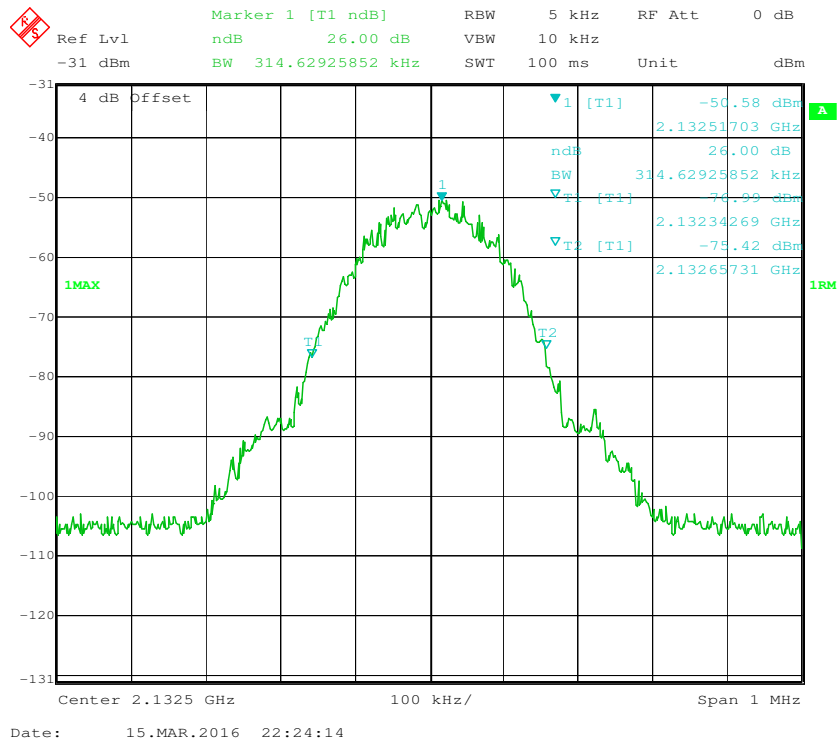
26 dB Bandwidth-DL- GSM-Pre AGC-Input



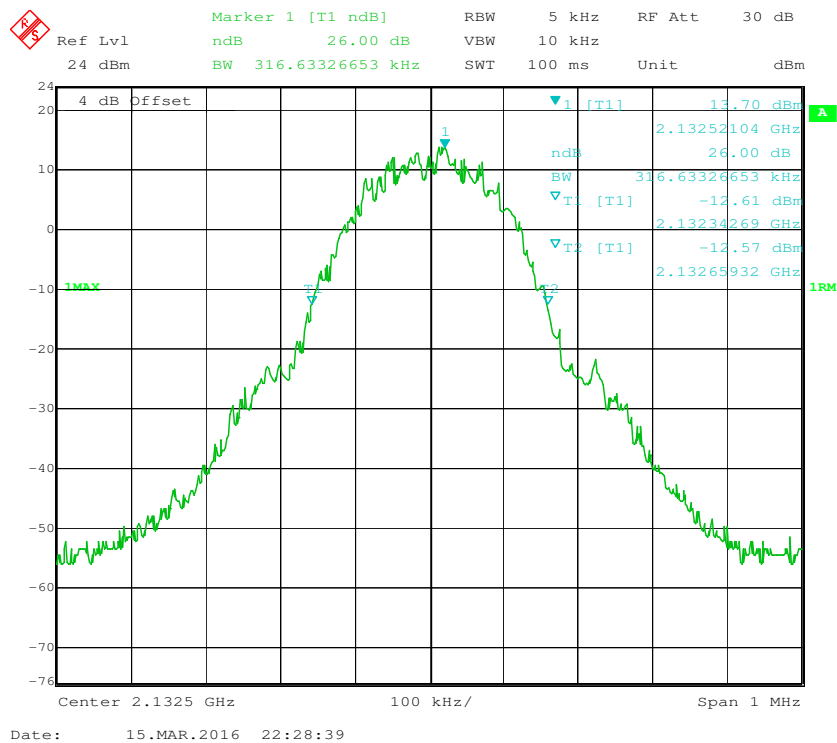
26 dB Bandwidth-DL- GSM-Pre AGC-Output



26 dB Bandwidth-DL- GSM-3dB Above AGC-Input



26 dB Bandwidth-DL- GSM-3dB Above AGC-Output



FCC §2.1051, §22.917 & §24.238 & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

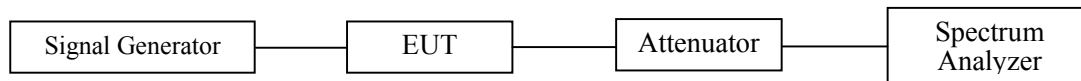
FCC §2.1051, §22.917, §24.238 and §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedure

Please refer to KDB 935210 D05 Indus Booster Basic Meas v01 clause 3.6.3



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15
WEINSCHL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18
WEINSCHL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
Agilent	ESG Vector Signal Generator	E4438C	US41461205	2015-11-12	2016-11-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

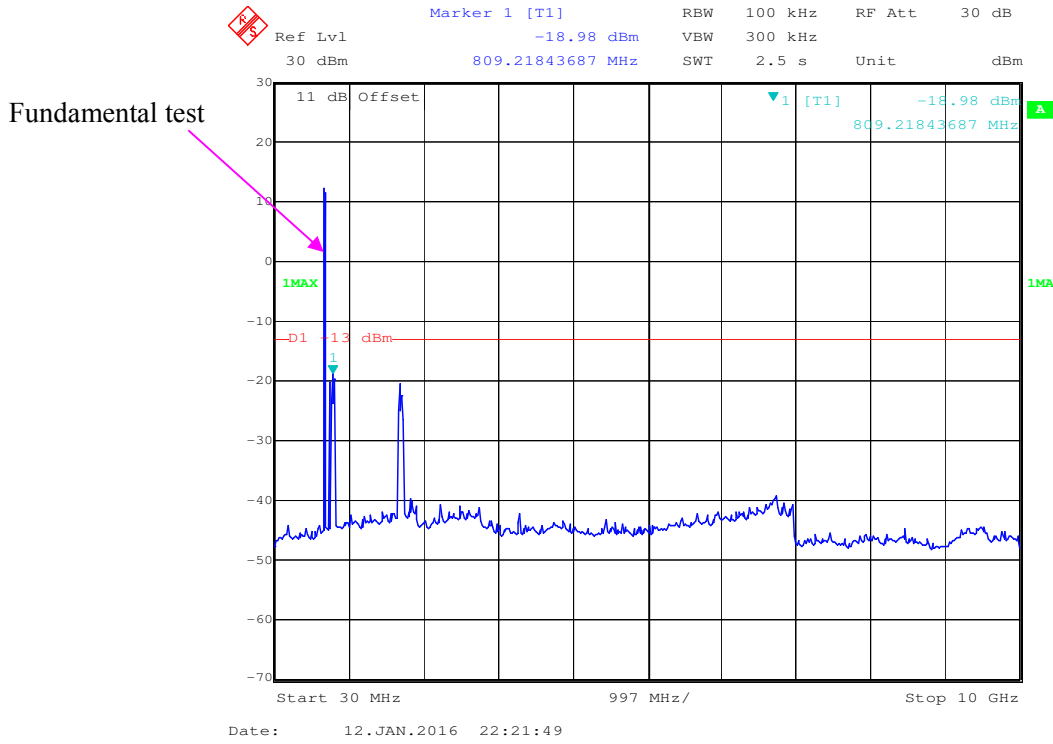
Temperature:	24~27 °C
Relative Humidity:	48~52 %
ATM Pressure:	100.5~101.0 kPa

The testing was performed by Xiangguang Kong on 2016-01-12 and 2016-03-15.

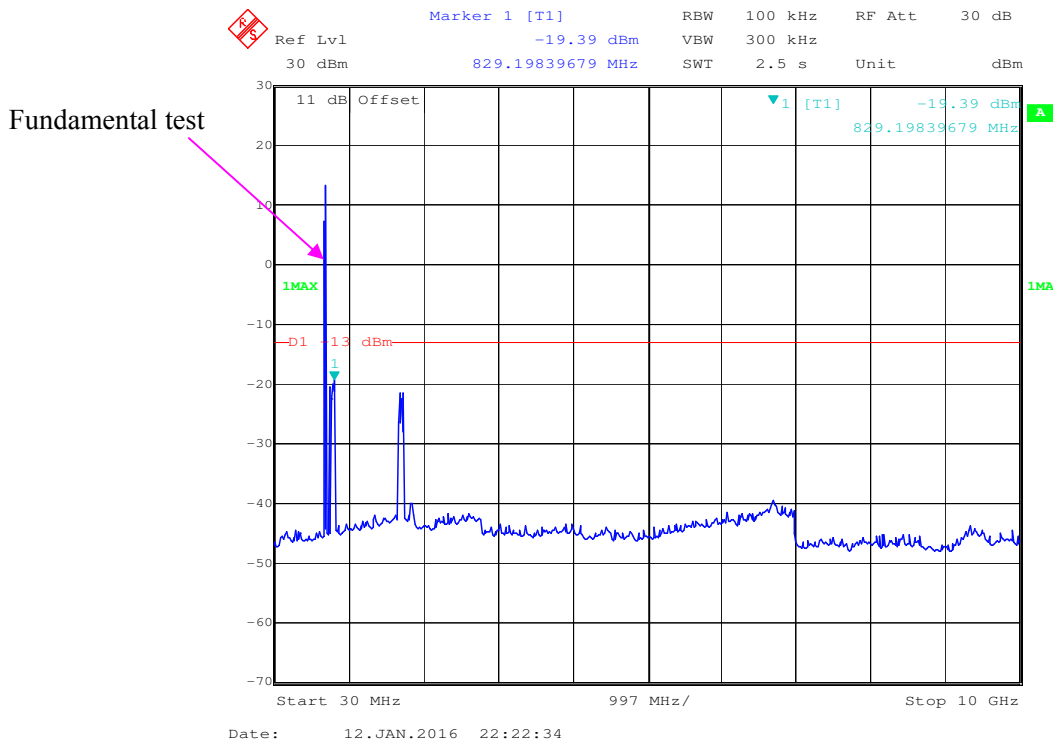
Test result: Compliance, please refer to the following plots.

Uplink:

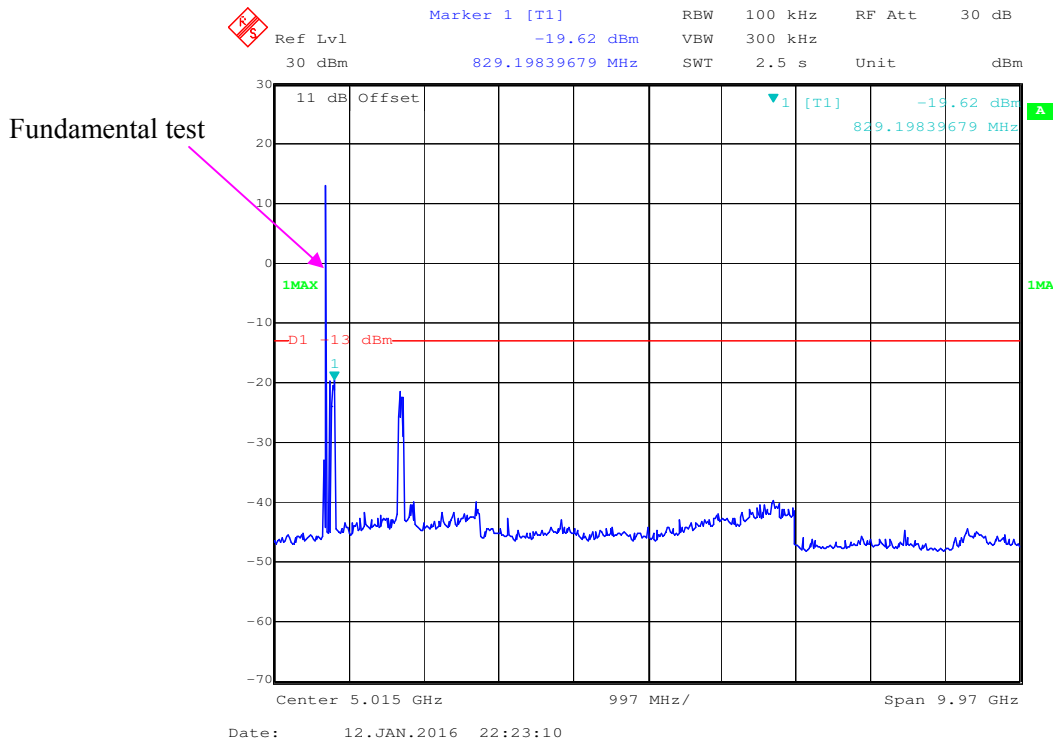
Lower 700MHz (B+C Block)-AWGN-Pre AGC-Low Channel



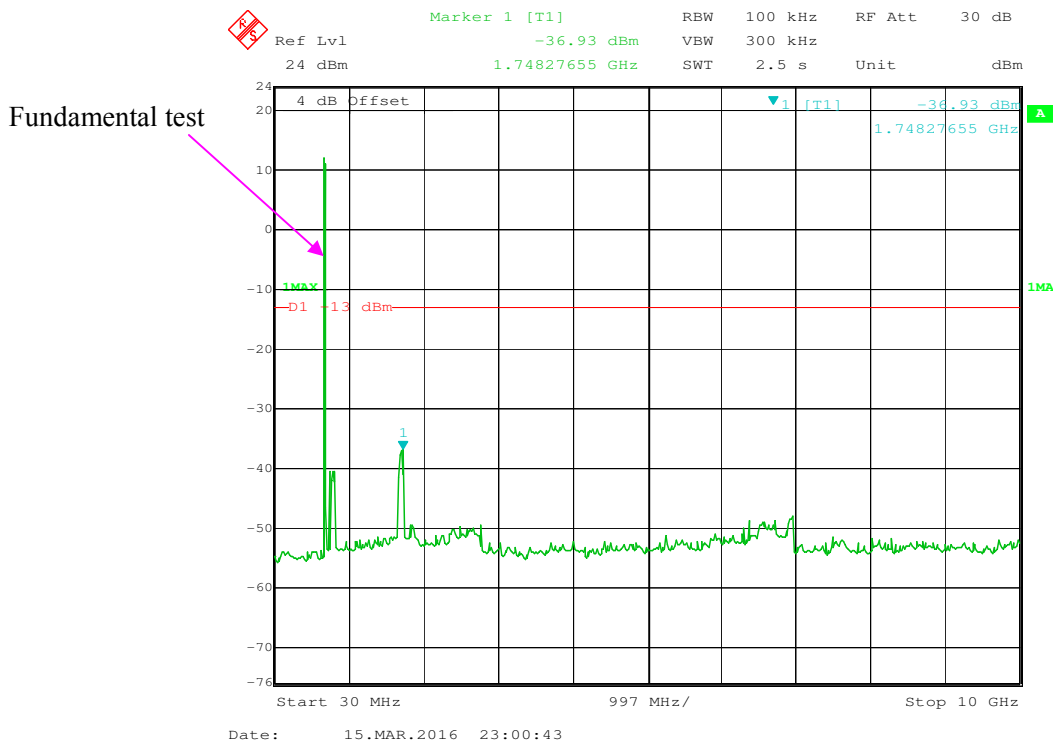
Lower 700MHz (B+C Block)- AWGN-Pre AGC-Middle Channel



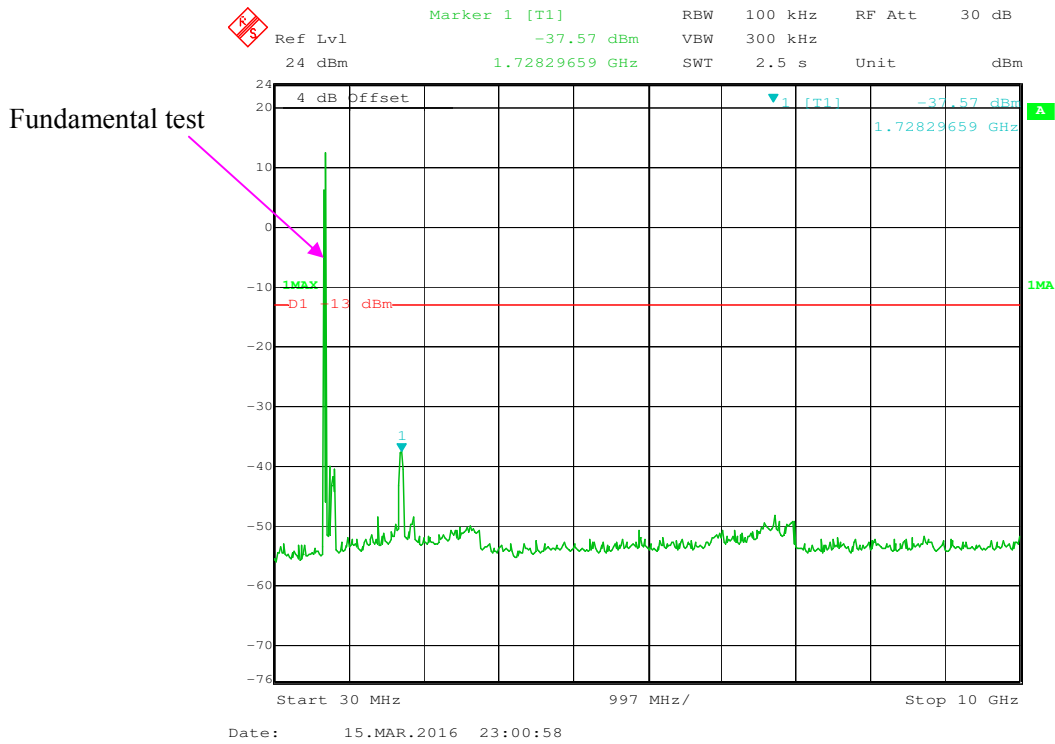
Lower 700MHz (B+C Block)- AWGN-Pre AGC-High Channel



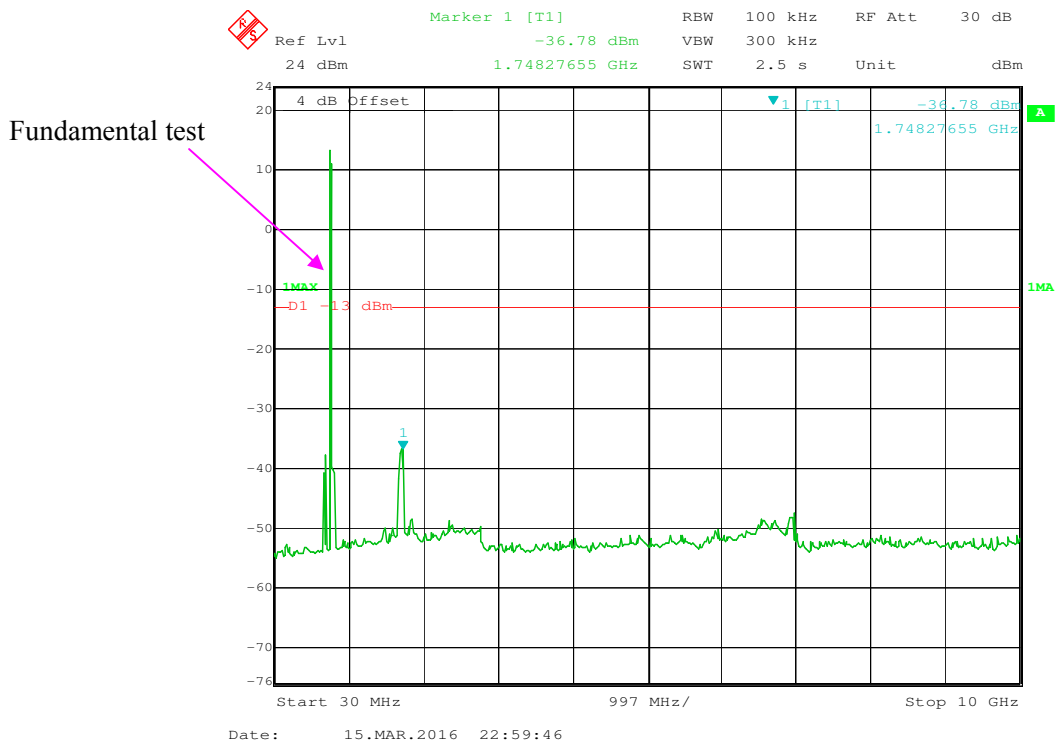
Lower 700MHz (B+C Block)-GSM-Pre AGC-Low Channel



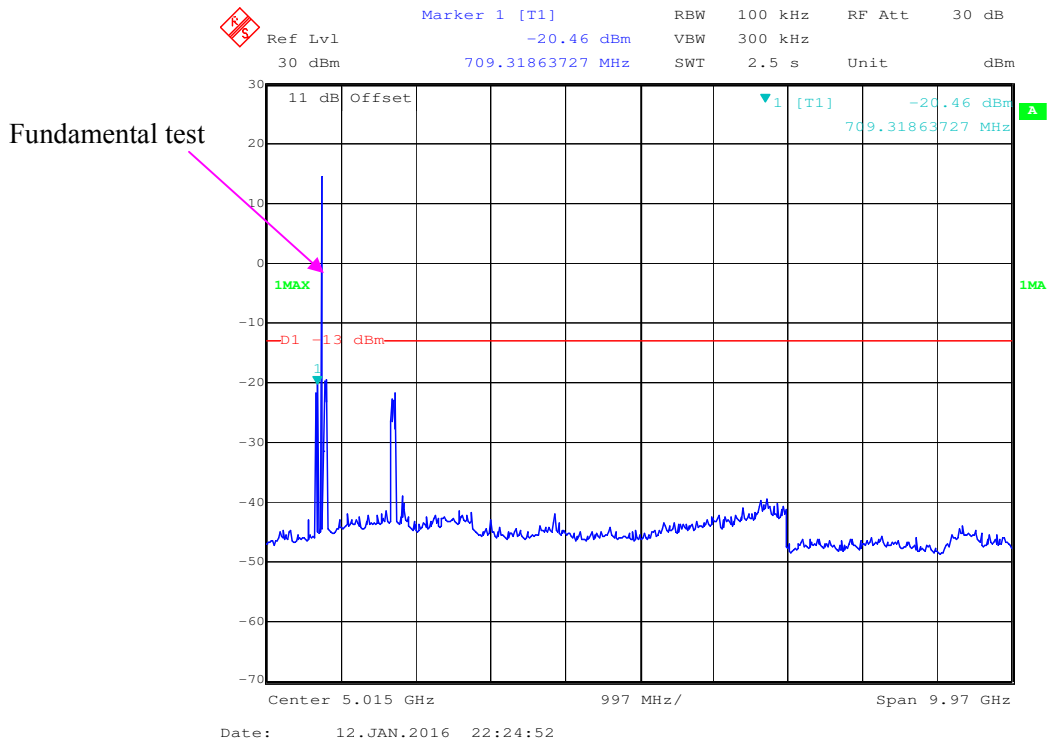
Lower 700MHz (B+C Block)- GSM-Pre AGC-Middle Channel



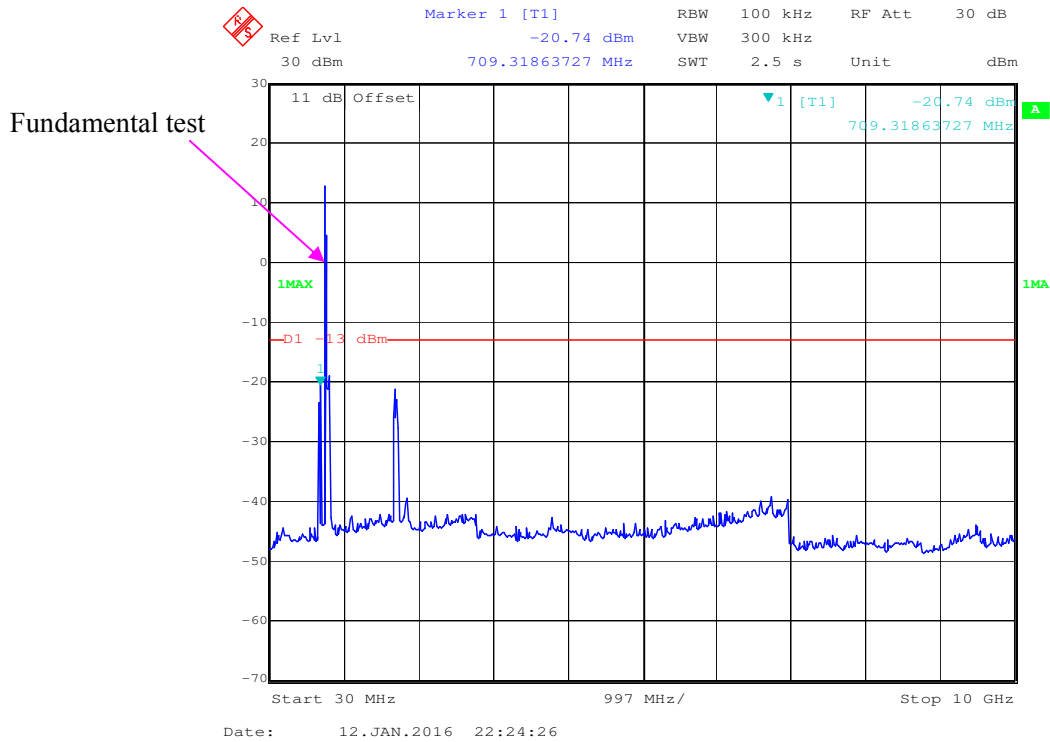
Lower 700MHz (B+C Block)- GSM-Pre AGC-High Channel



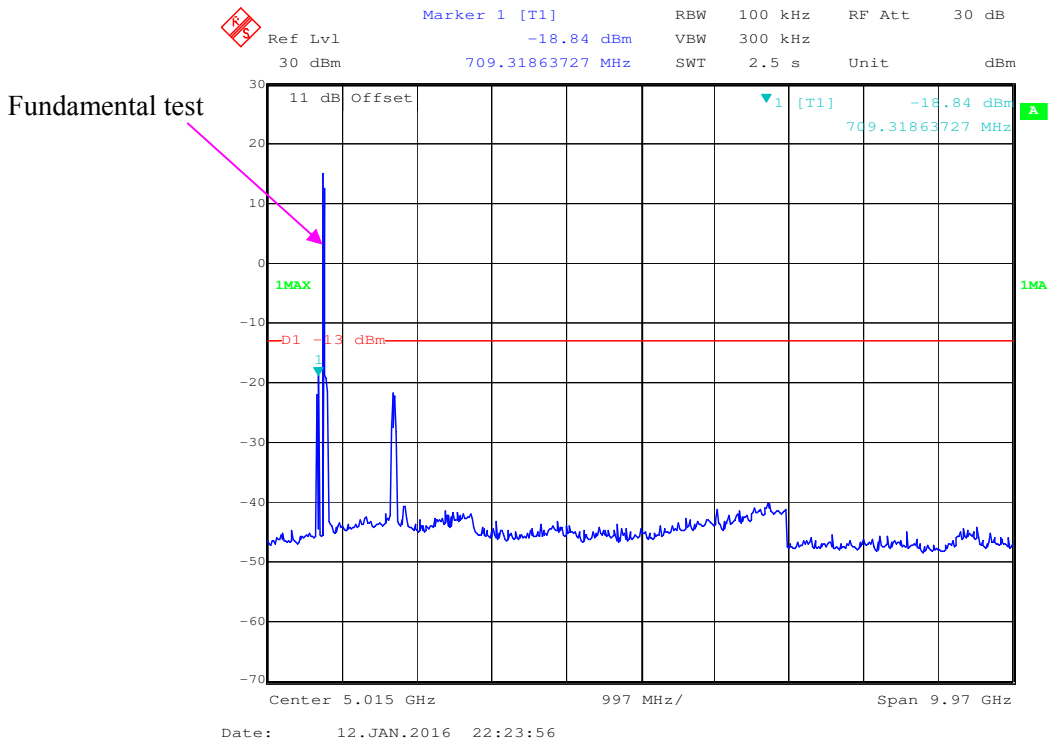
Upper 700MHz C Block - AWGN-Pre AGC-Low Channel



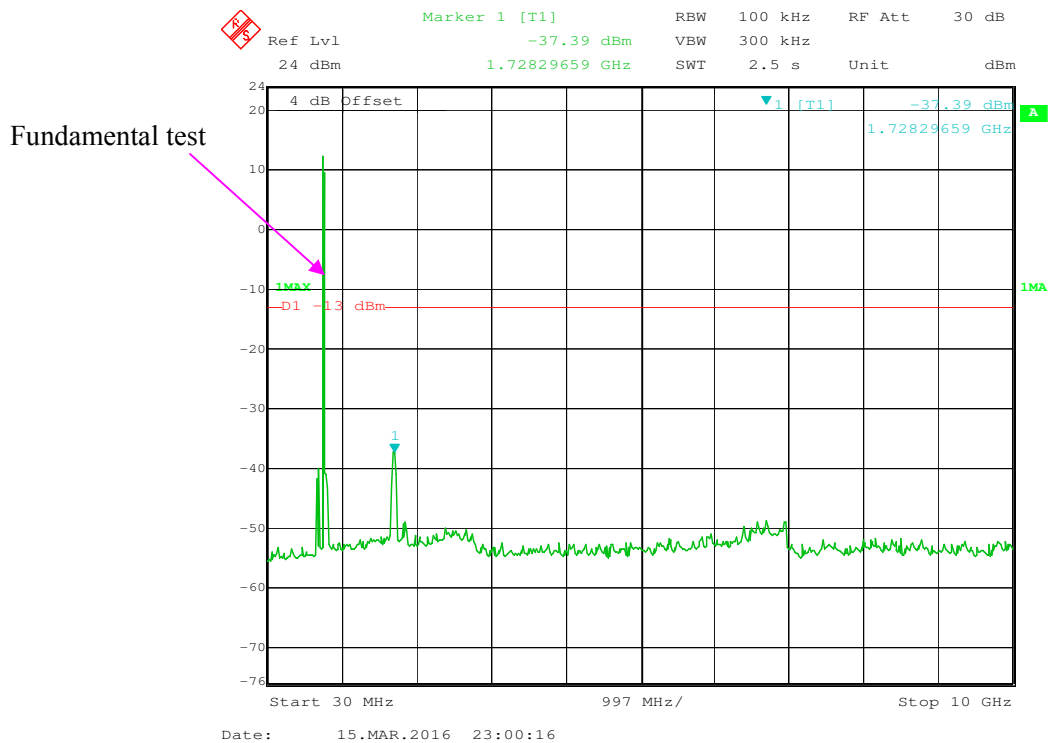
Upper 700MHz C Block - AWGN-Pre AGC-Middle Channel



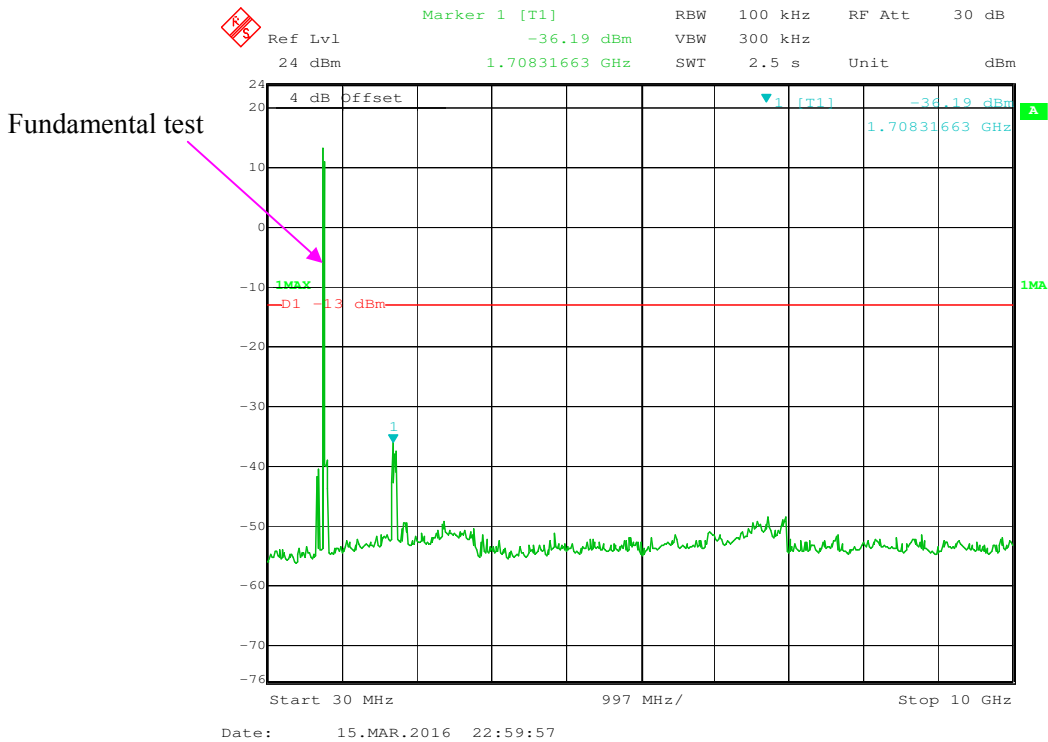
Upper 700MHz C Block - AWGN-Pre AGC-High Channel



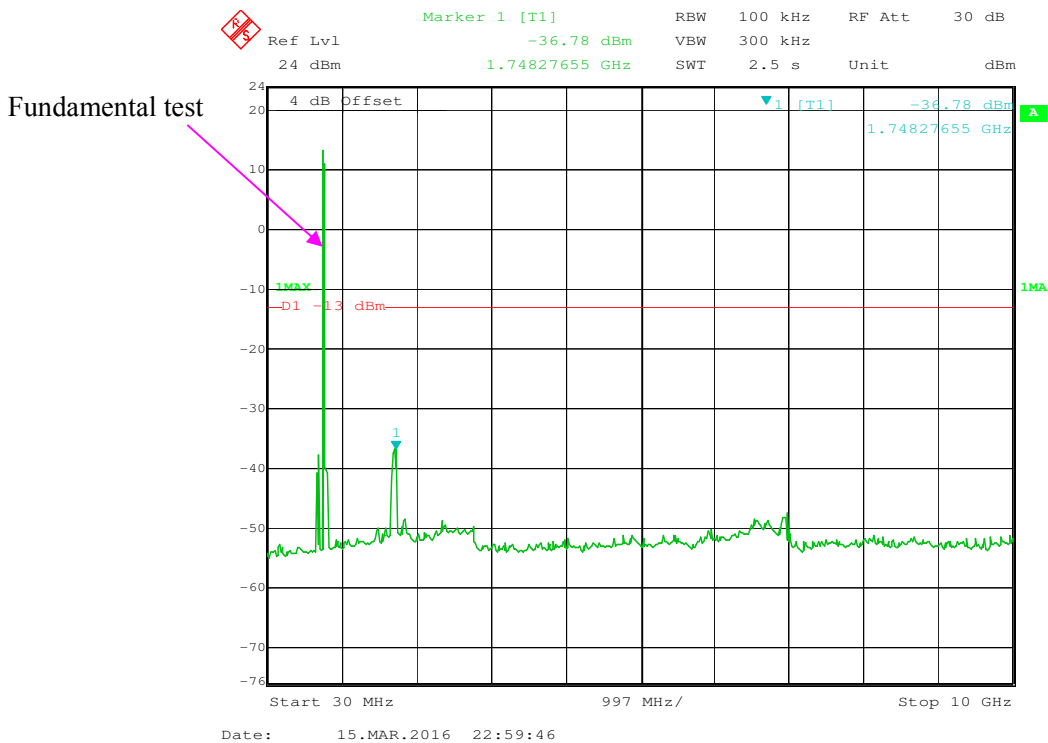
Upper 700MHz C Block - GSM-Pre AGC-Low Channel



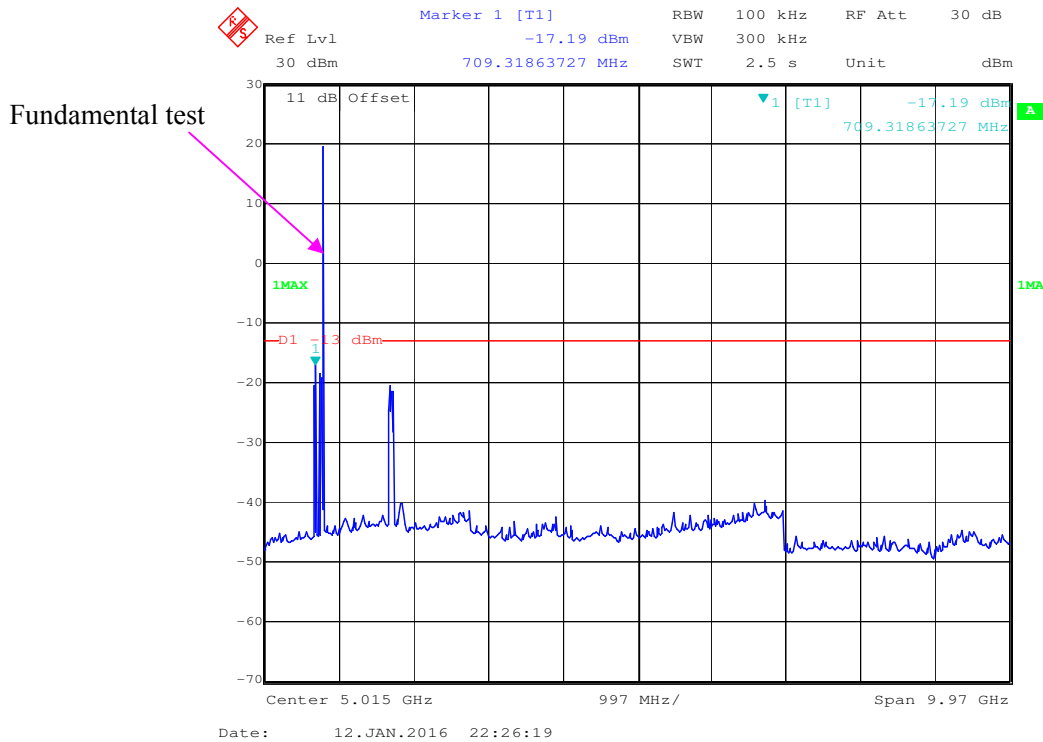
Upper 700MHz C Block - GSM-Pre AGC-Middle Channel



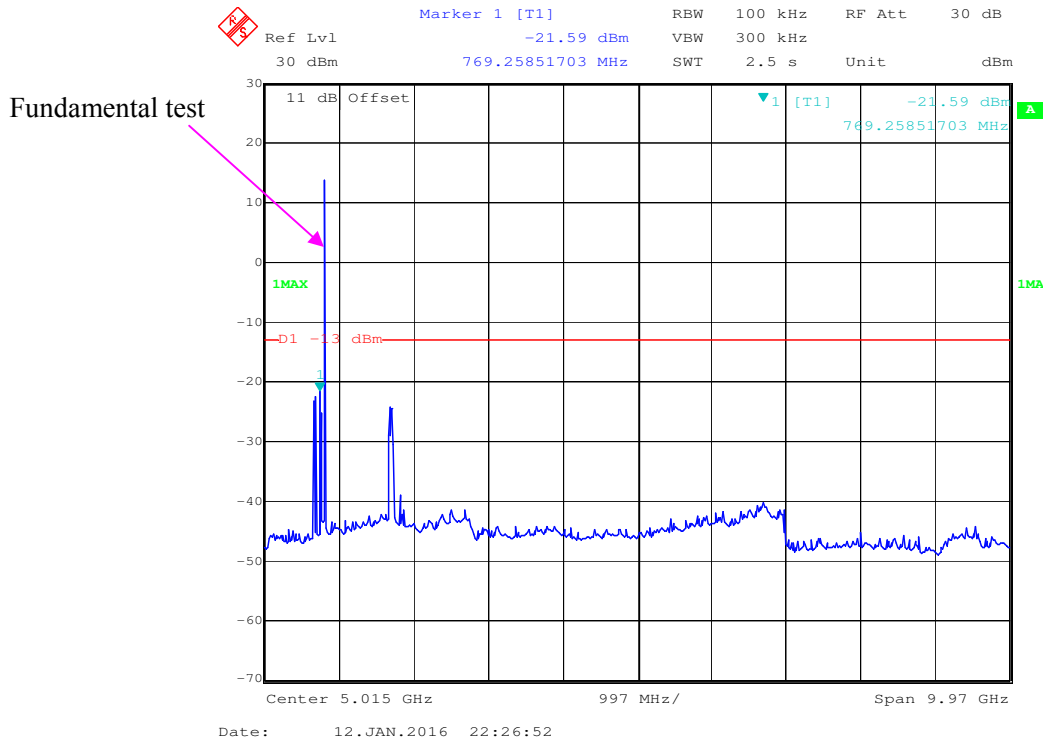
Upper 700MHz C Block - GSM-Pre AGC-High Channel



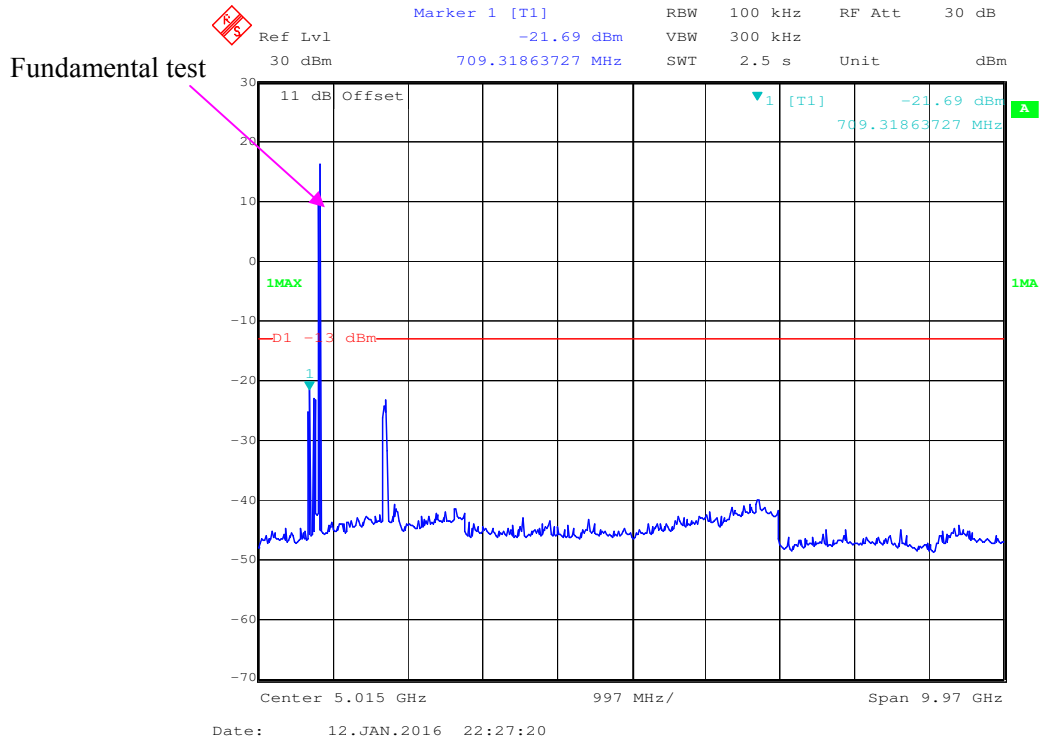
CELLULAR - AWGN-Pre AGC-Low Channel



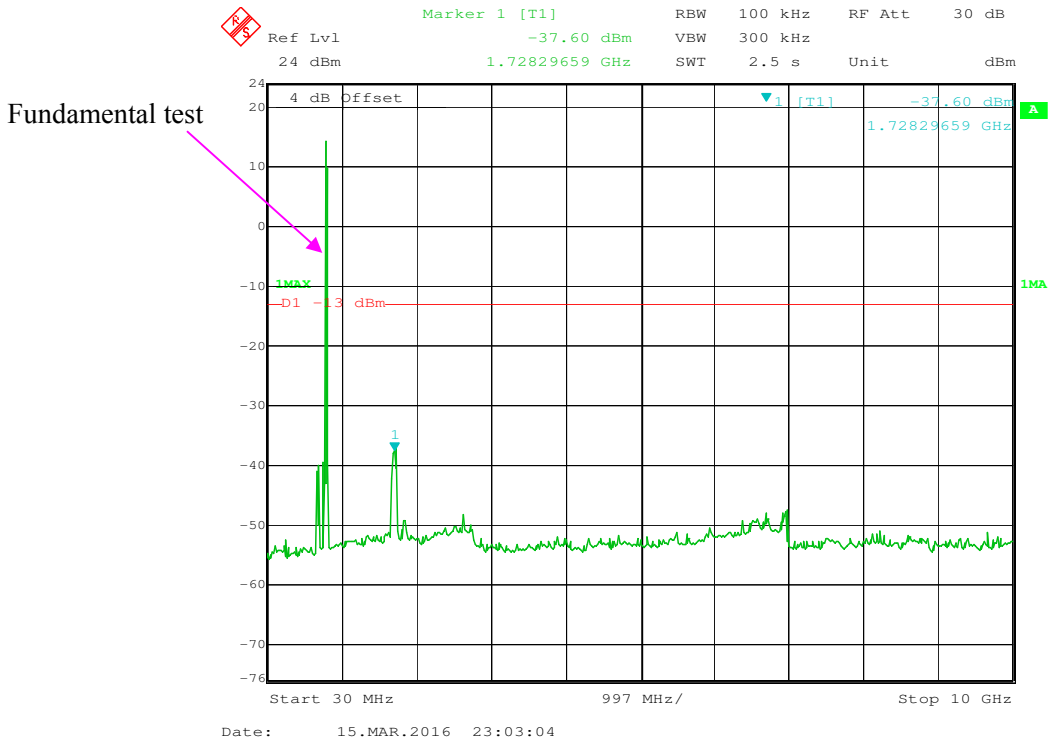
CELLULAR - AWGN-Pre AGC-Middle Channel



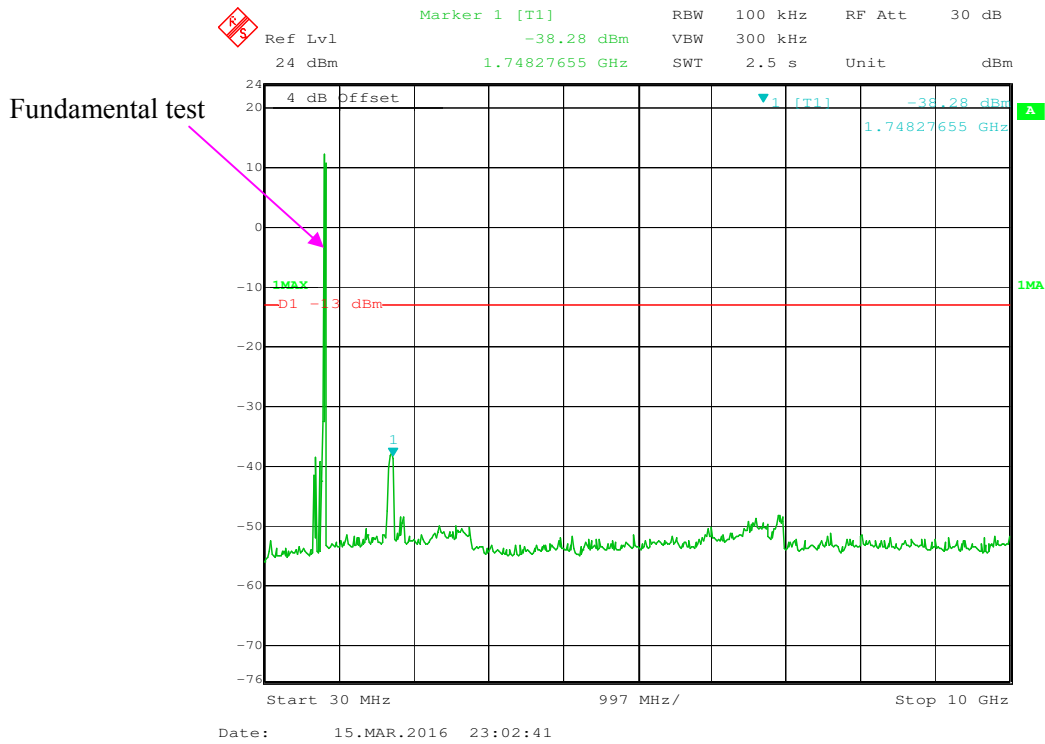
CELLULAR - AWGN-Pre AGC-High Channel



CELLULAR - GSM-Pre AGC-Low Channel



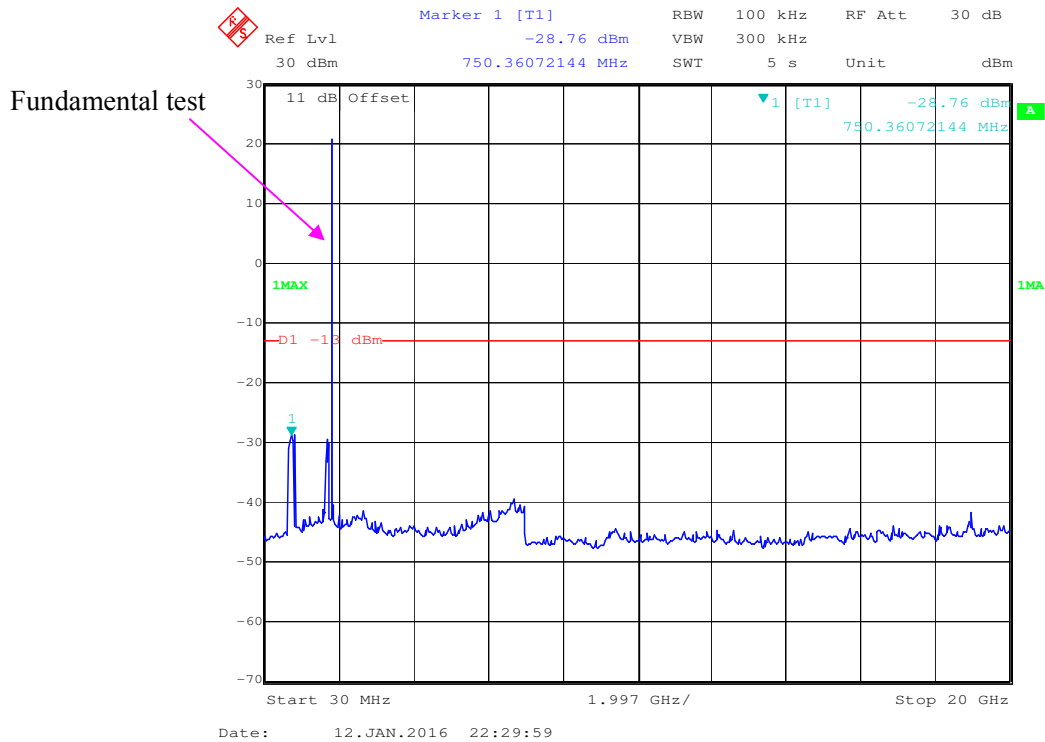
CELLULAR - GSM-Pre AGC-Middle Channel



CELLULAR - GSM-Pre AGC-High Channel



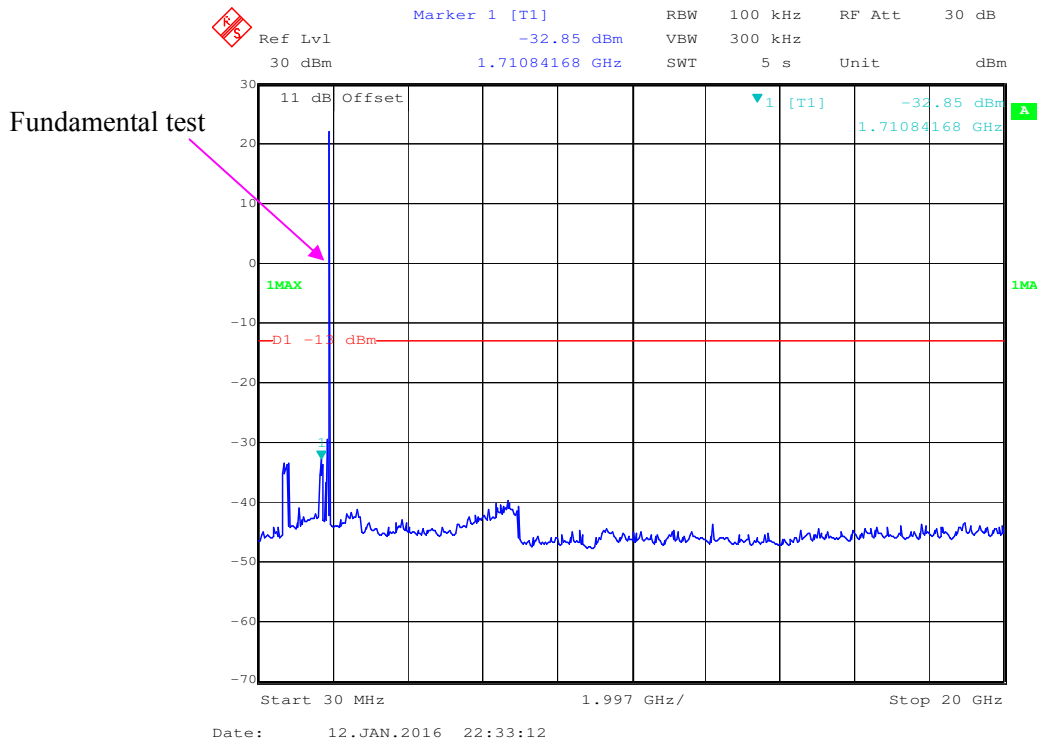
PCS- AWGN-Pre AGC-Low Channel



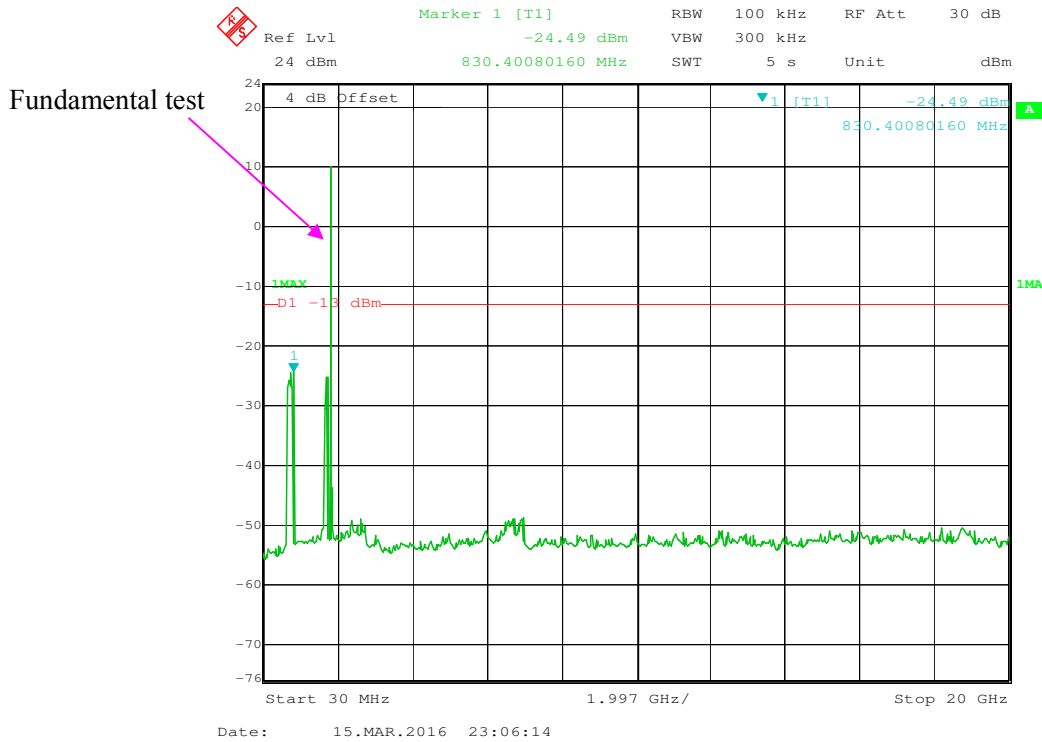
PCS- AWGN-Pre AGC-Middle Channel



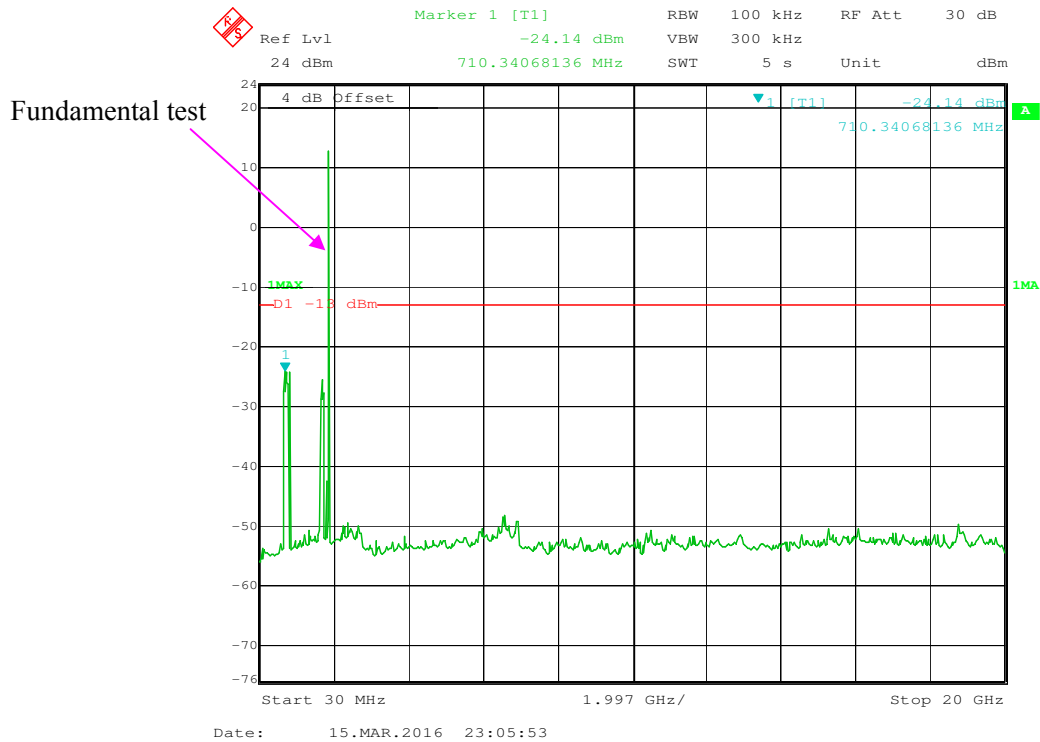
PCS- AWGN-Pre AGC-High Channel



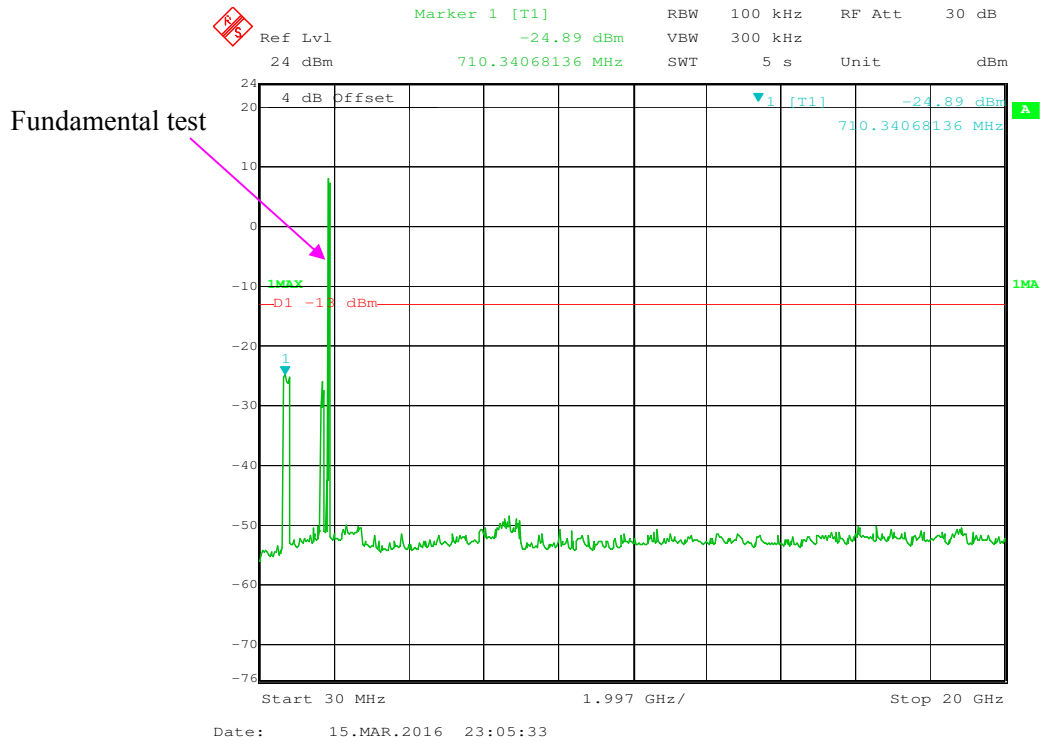
PCS- GSM-Pre AGC-Low Channel



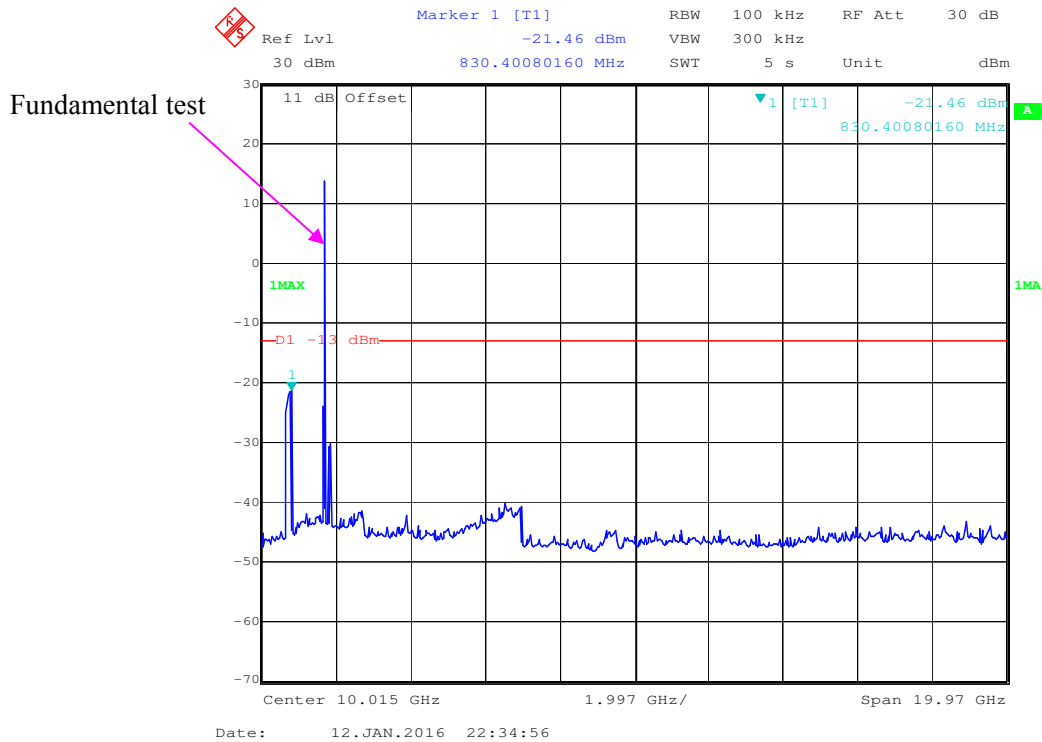
PCS- GSM-Pre AGC-Middle Channel



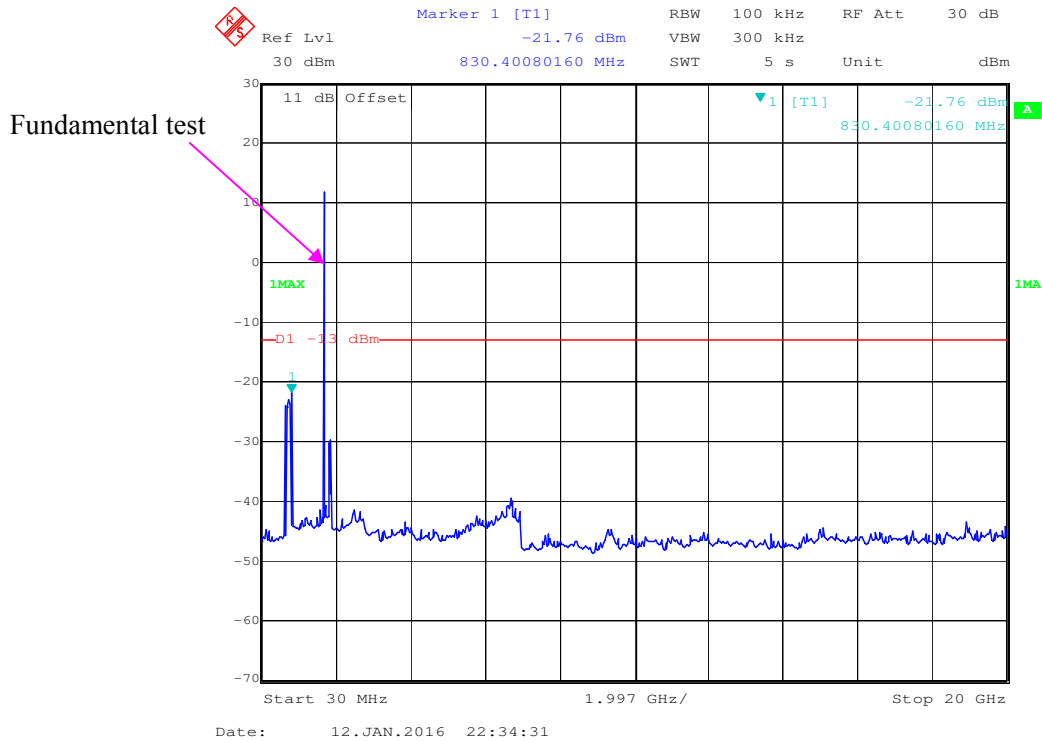
PCS- GSM-Pre AGC-High Channel



AWS-1- AWGN-Pre AGC-Low Channel



AWS-1- AWGN-Pre AGC-Middle Channel



The screenshot displays a Spectrum Analyzer interface. At the top, a status bar shows various measurement parameters: Ref Lvl (30 dBm), Marker 1 [T1] (-22.19 dBm), RBW (100 kHz), VBW (300 kHz), RF Att (30 dB), 30 dBm, 710.34068136 MHz, SWT (5 s), Unit, and dBm. The main plot area shows a spectrum with a prominent peak at 710.34068136 MHz. A pink arrow points to this peak with the text 'Fundamental test'. The peak is labeled '1MAX' in green. A red horizontal line indicates a level of -13 dBm. The x-axis is labeled 'Start 30 MHz', '1.997 GHz/', and 'Stop 20 GHz'. The y-axis ranges from -70 to 30. The date and time 'Date: 12.JAN.2016 22:34:06' are shown at the bottom.

Fundamental test

Marker 1 [T1]
 -40.20 dBm
 670.32064128 MHz

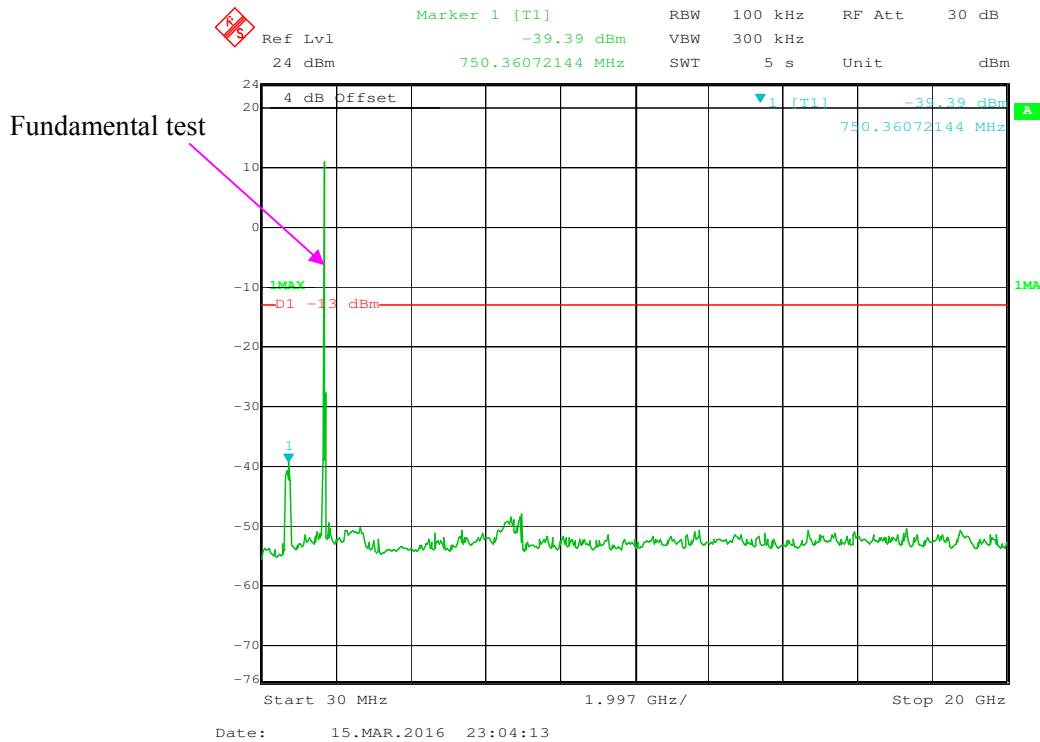
Ref Lvl 24 dBm
 RBW 100 kHz
 RF Att 30 dB
 VBW 300 kHz
 SWT 5 s
 Unit dBm

4 dB Offset
 1MAX
 -13 dBm
 1

Start 30 MHz
 1.997 GHz/
 Stop 20 GHz

Date: 15.MAR.2016 23:03:53

AWS-1- GSM-Pre AGC-Middle Channel

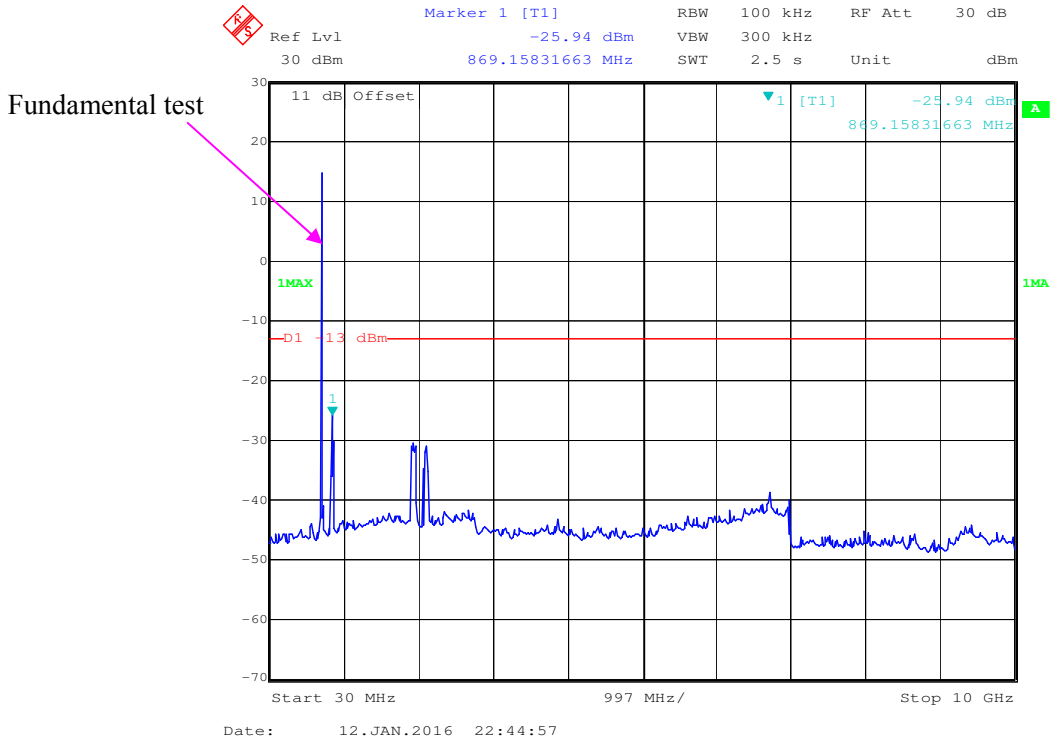


AWS-1- GSM-Pre AGC-High Channel

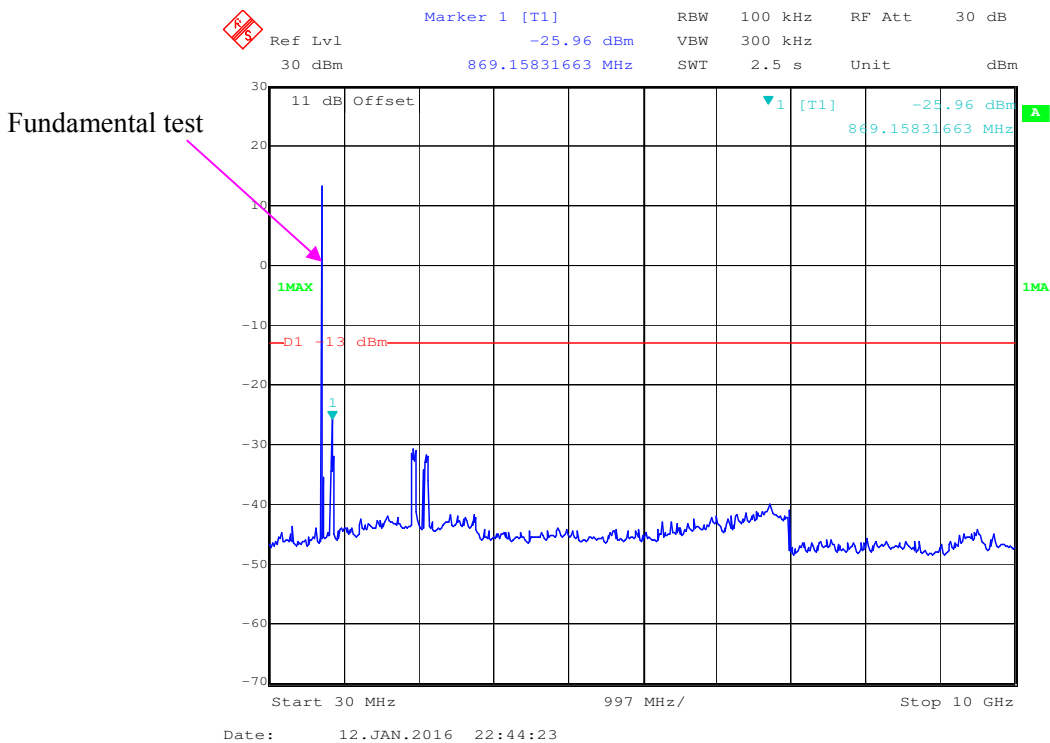


Downlink:

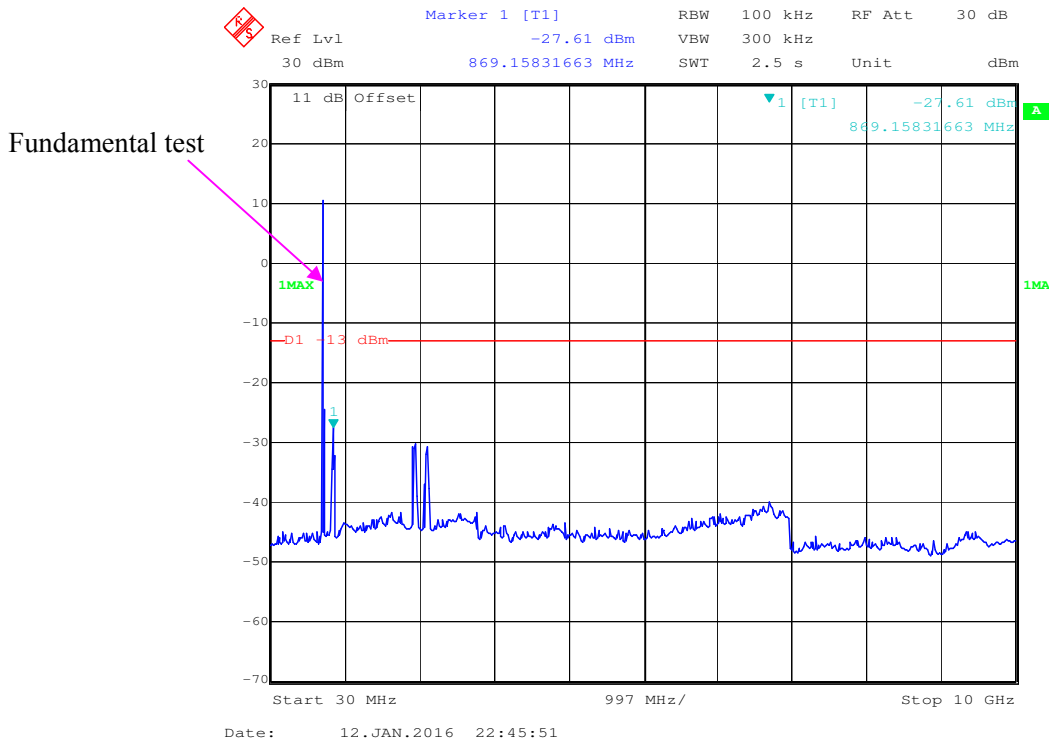
Lower 700MHz (B+C Block)- AWGN-Pre AGC-Low Channel



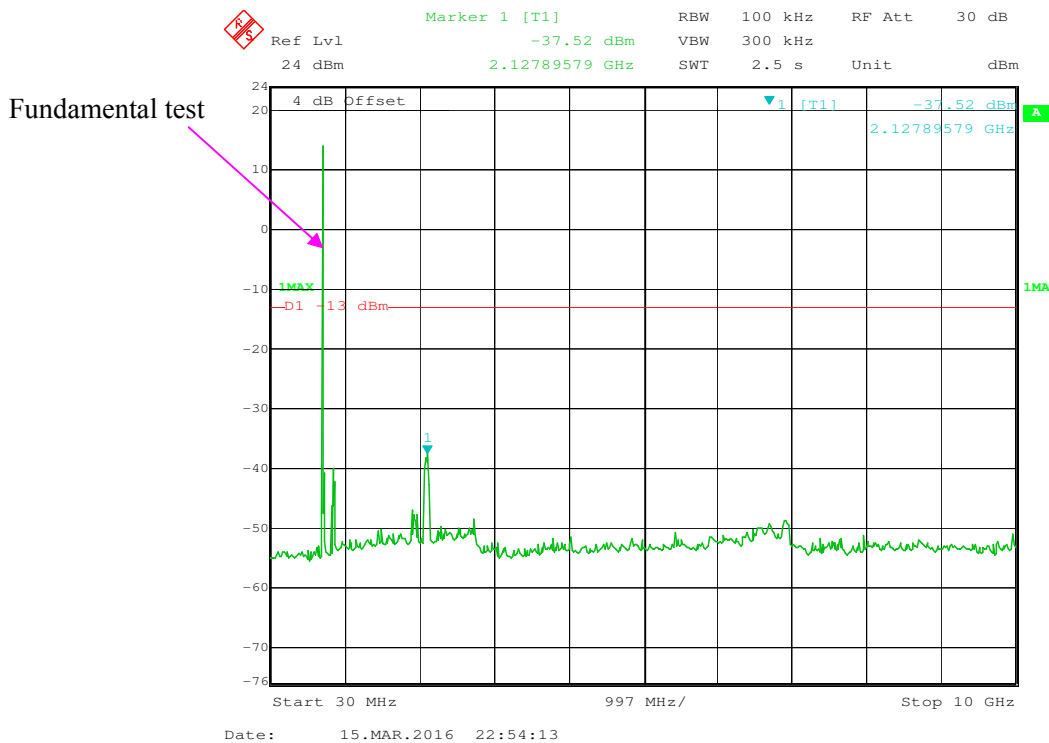
Lower 700MHz (B+C Block)- AWGN-Pre AGC-Middle Channel

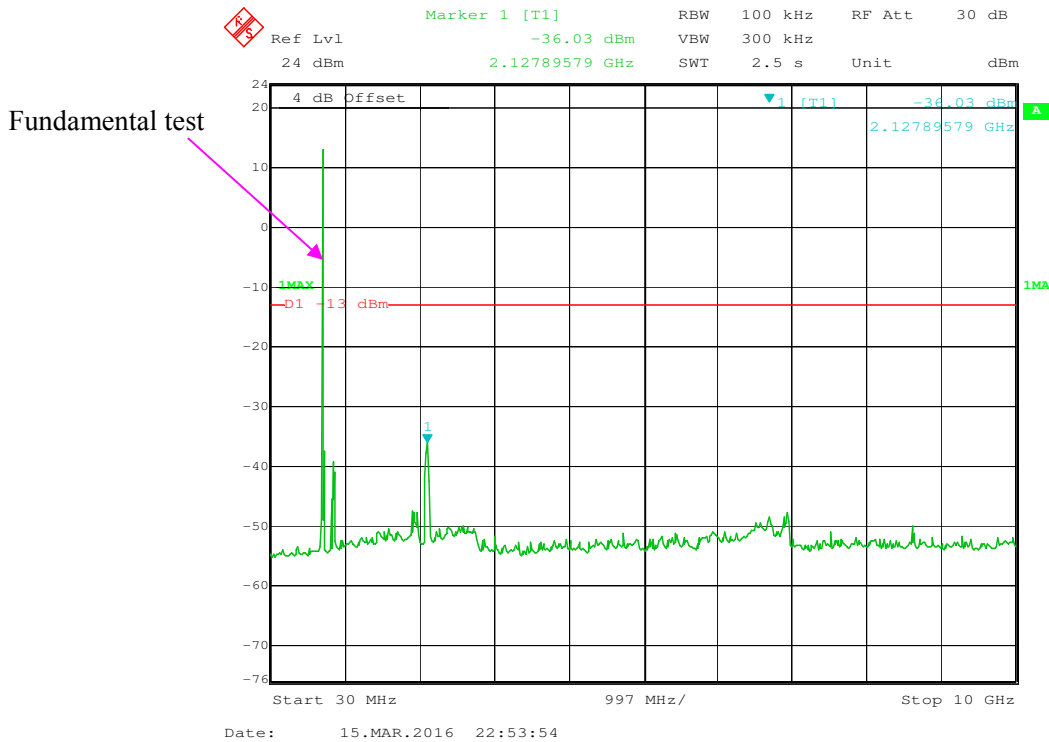
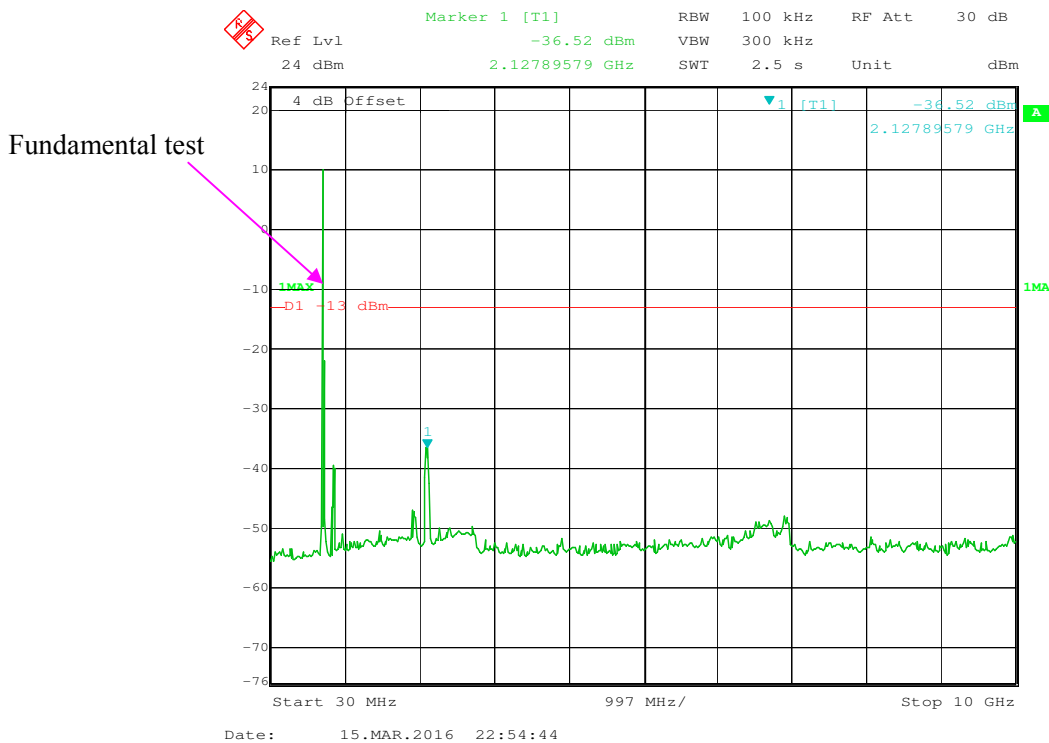


Lower 700MHz (B+C Block)- AWGN-Pre AGC-High Channel

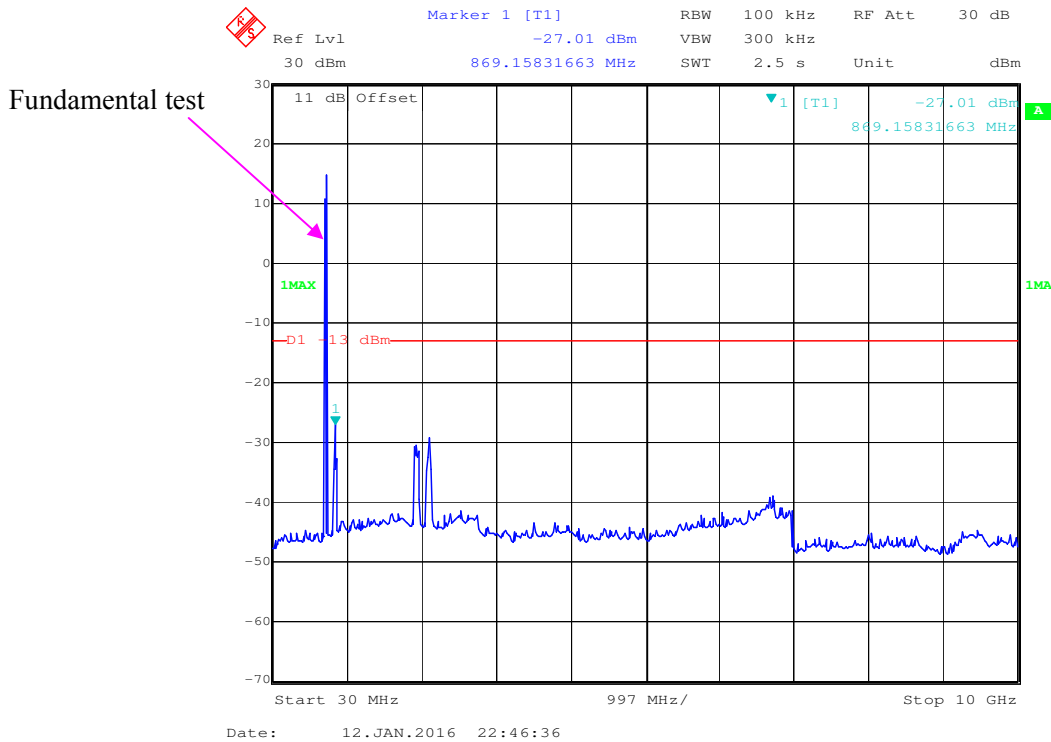


Lower 700MHz (B+C Block)- GSM-Pre AGC-Low Channel

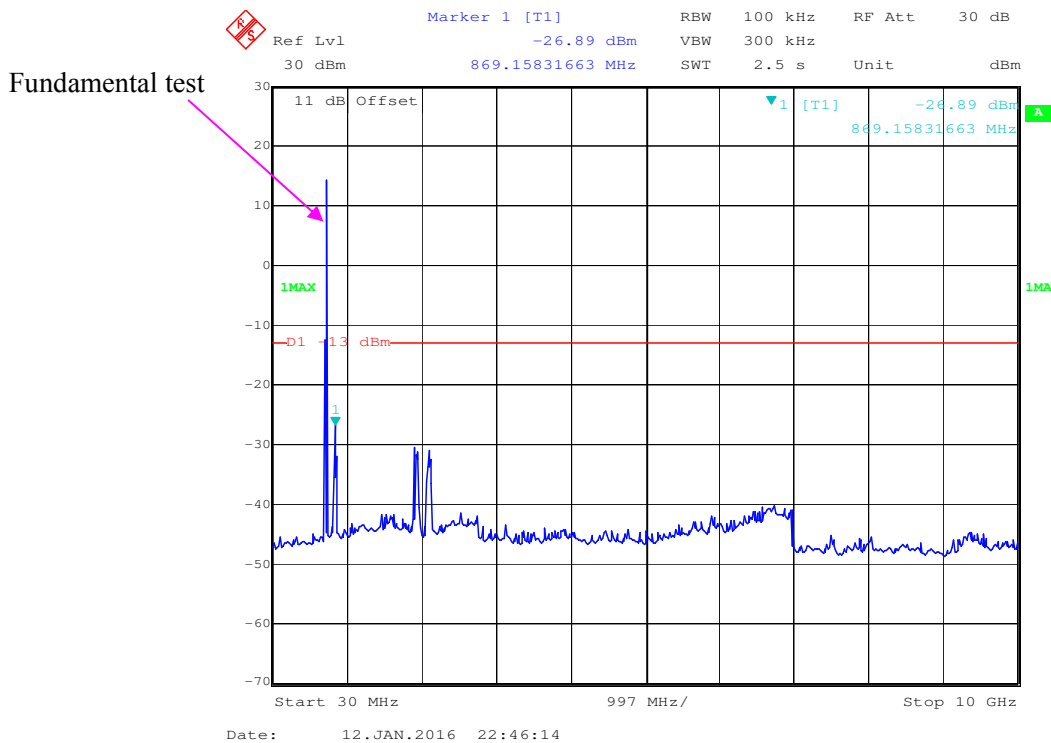


Lower 700MHz (B+C Block)- GSM-Pre AGC-Middle Channel**Lower 700MHz (B+C Block)- GSM-Pre AGC-High Channel**

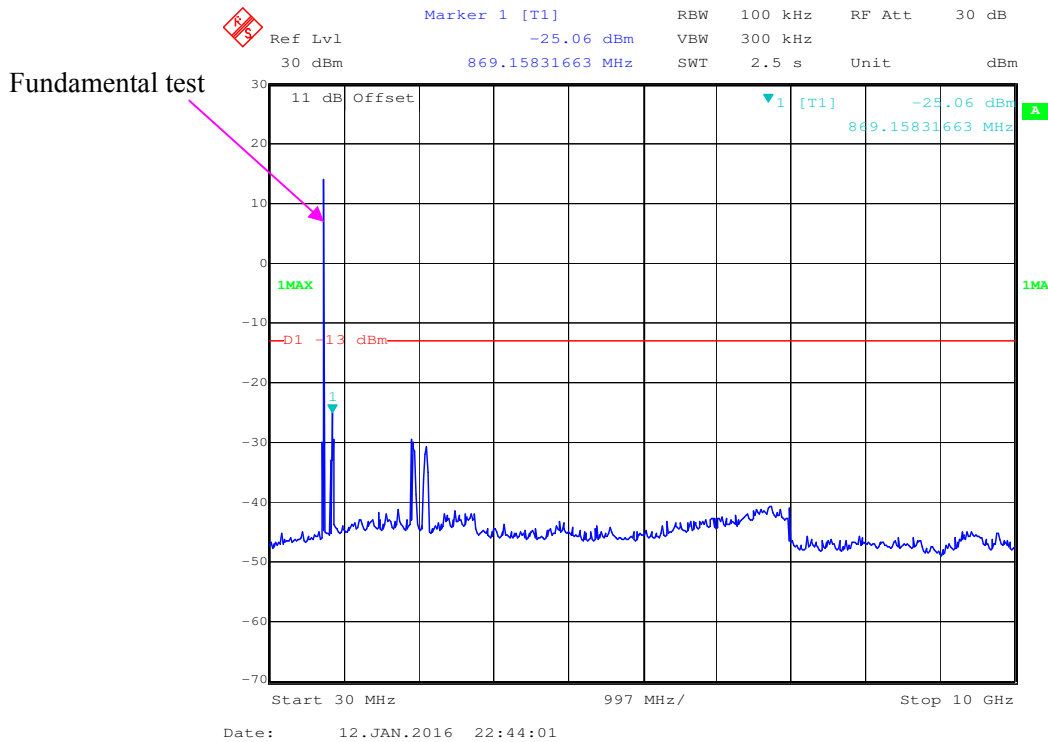
Upper 700MHz C Block - AWGN-Pre AGC-Low Channel



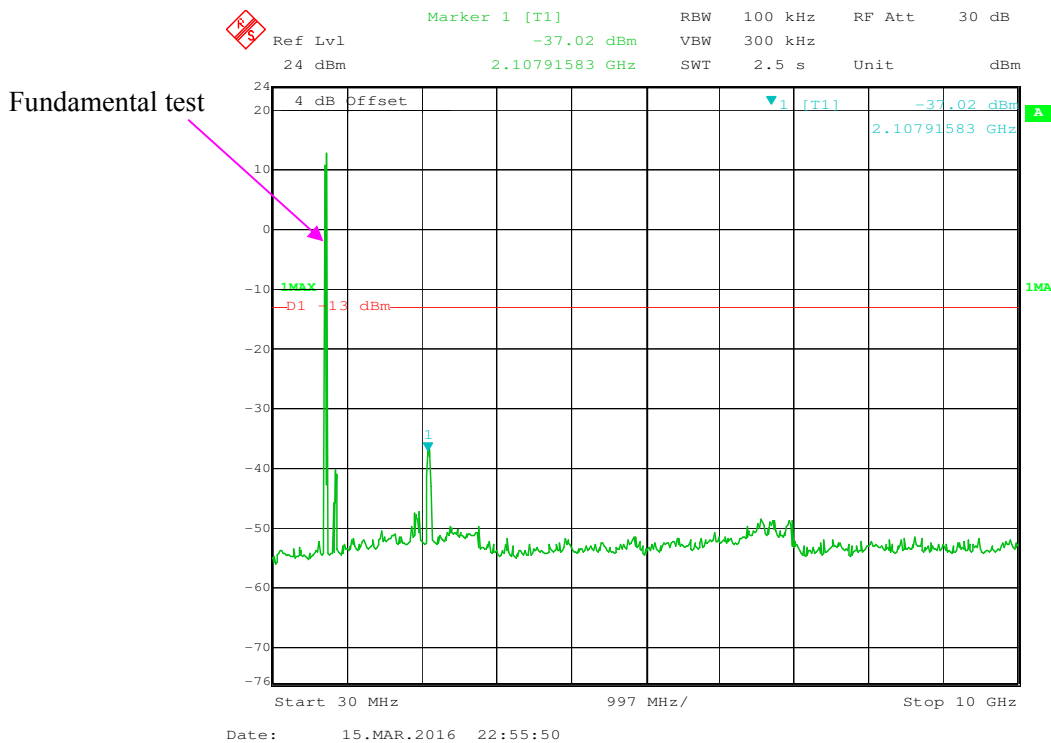
Upper 700MHz C Block - AWGN-Pre AGC-Middle Channel



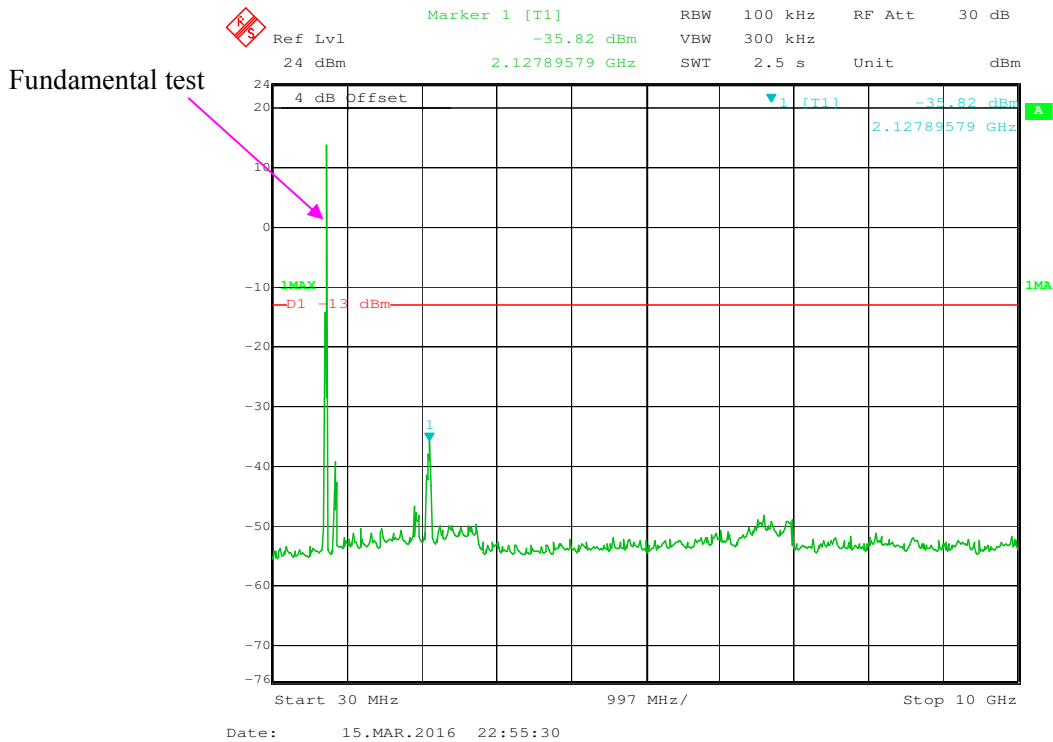
Upper 700MHz C Block - AWGN-Pre AGC-High Channel



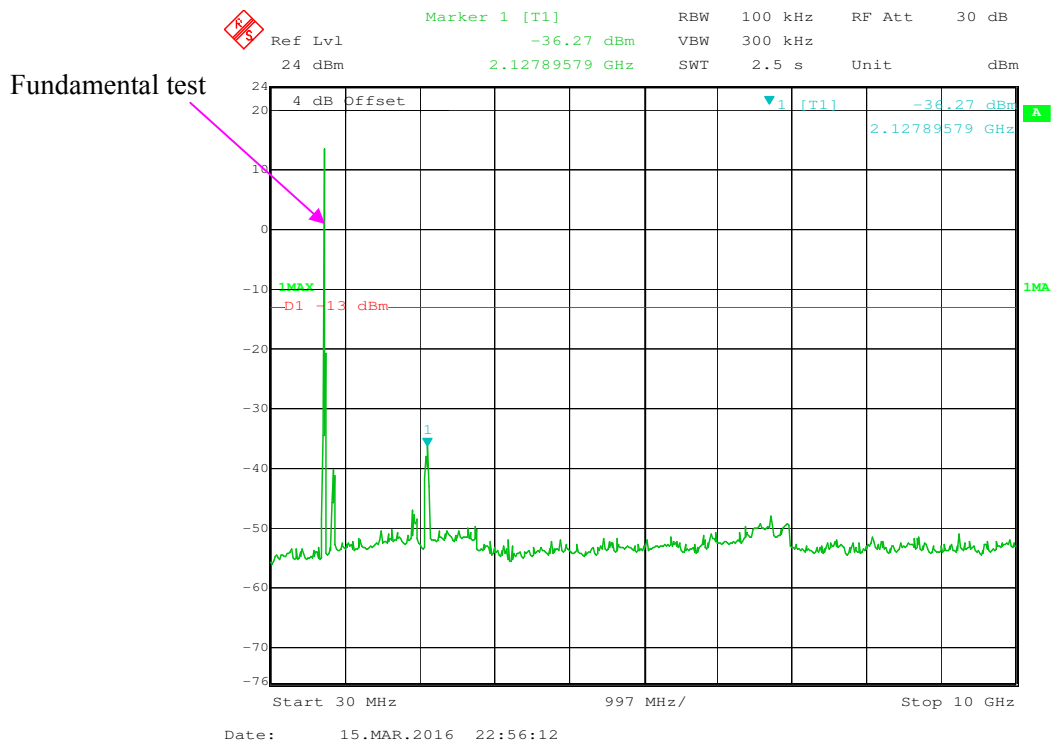
Upper 700MHz C Block - GSM-Pre AGC-Low Channel



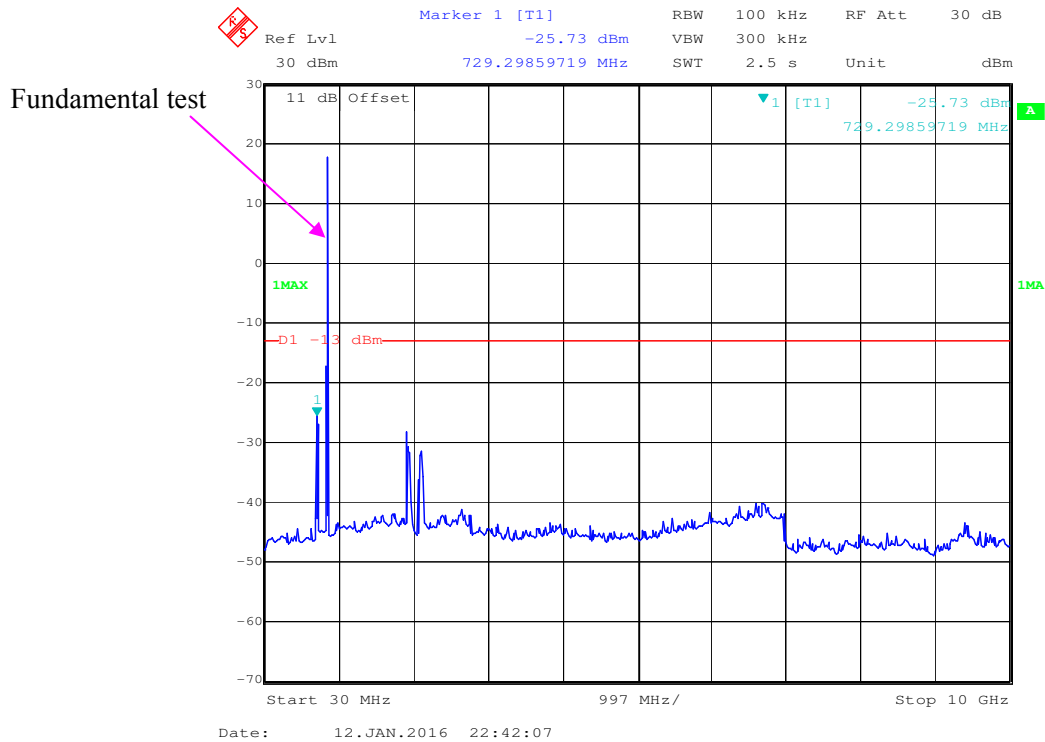
Upper 700MHz C Block - GSM-Pre AGC-Middle Channel



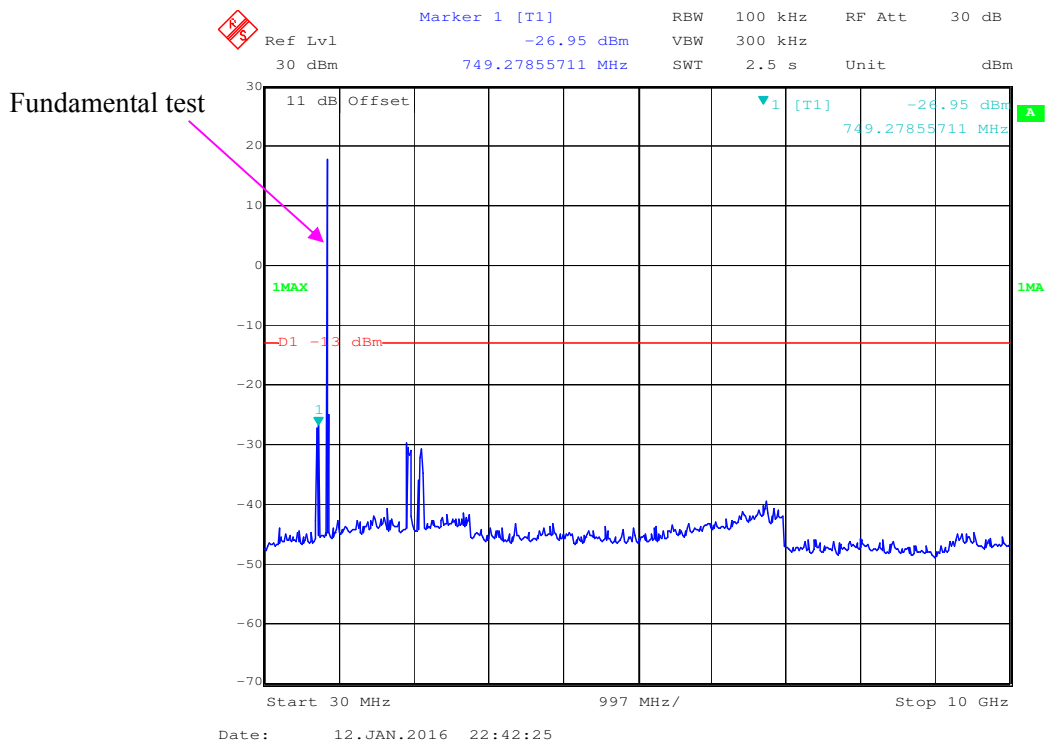
Upper 700MHz C Block - GSM-Pre AGC-High Channel



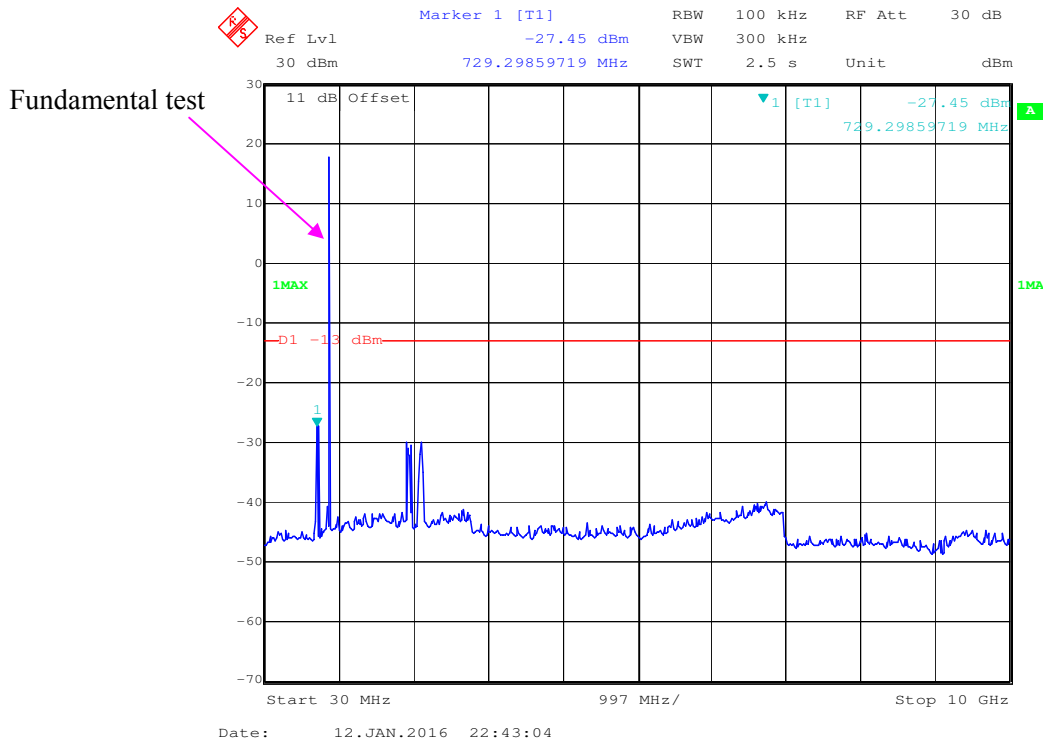
CELLULAR - AWGN-Pre AGC-Low Channel



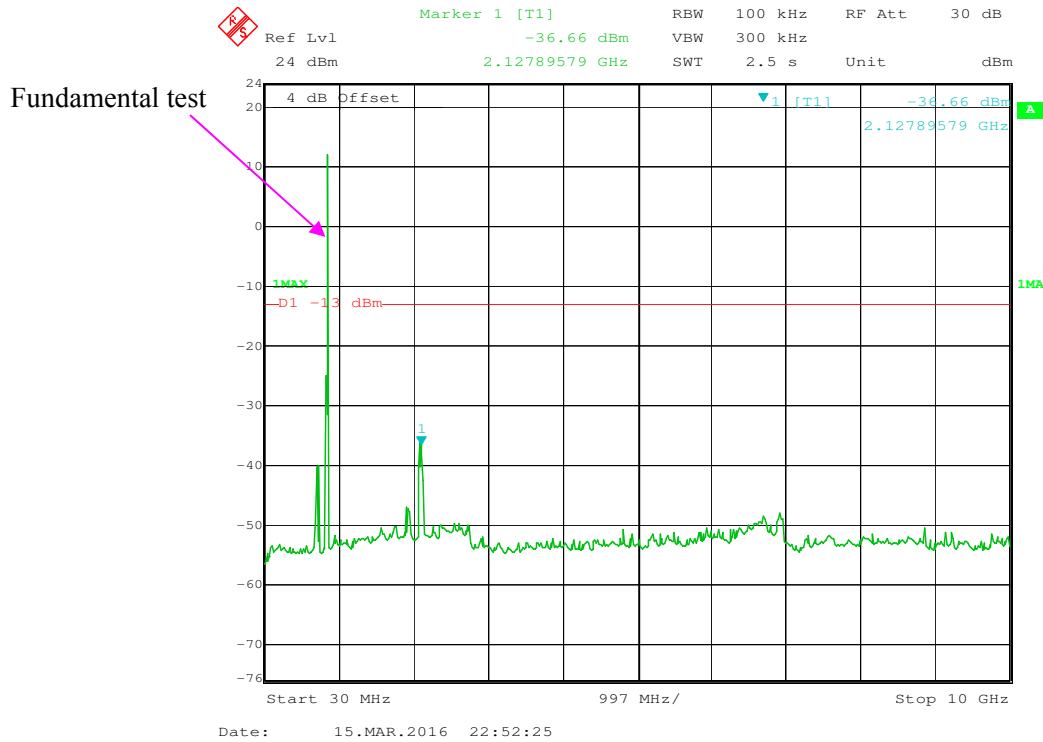
CELLULAR - AWGN-Pre AGC-Middle Channel



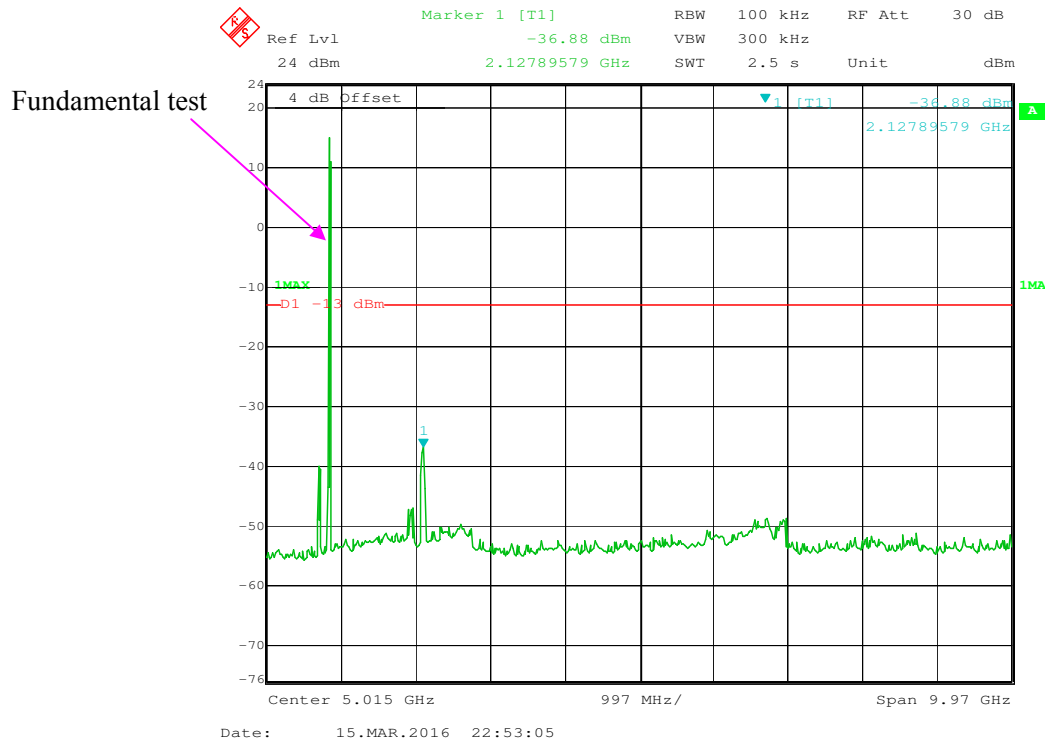
CELLULAR - AWGN-Pre AGC-High Channel



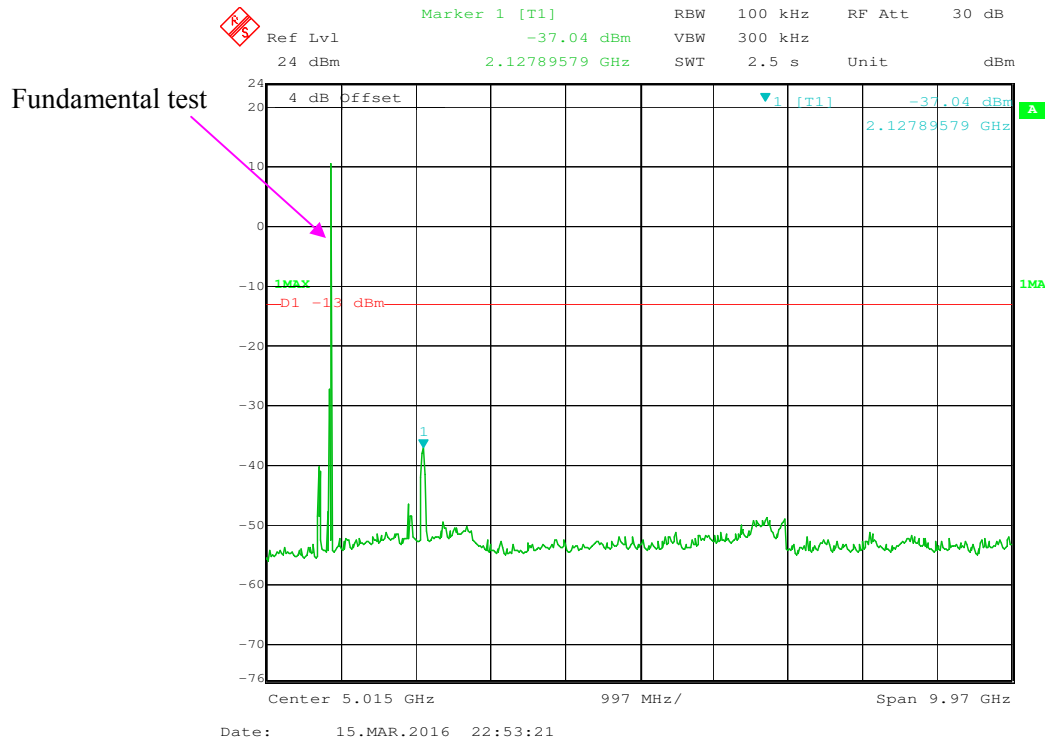
CELLULAR - GSM-Pre AGC-Low Channel



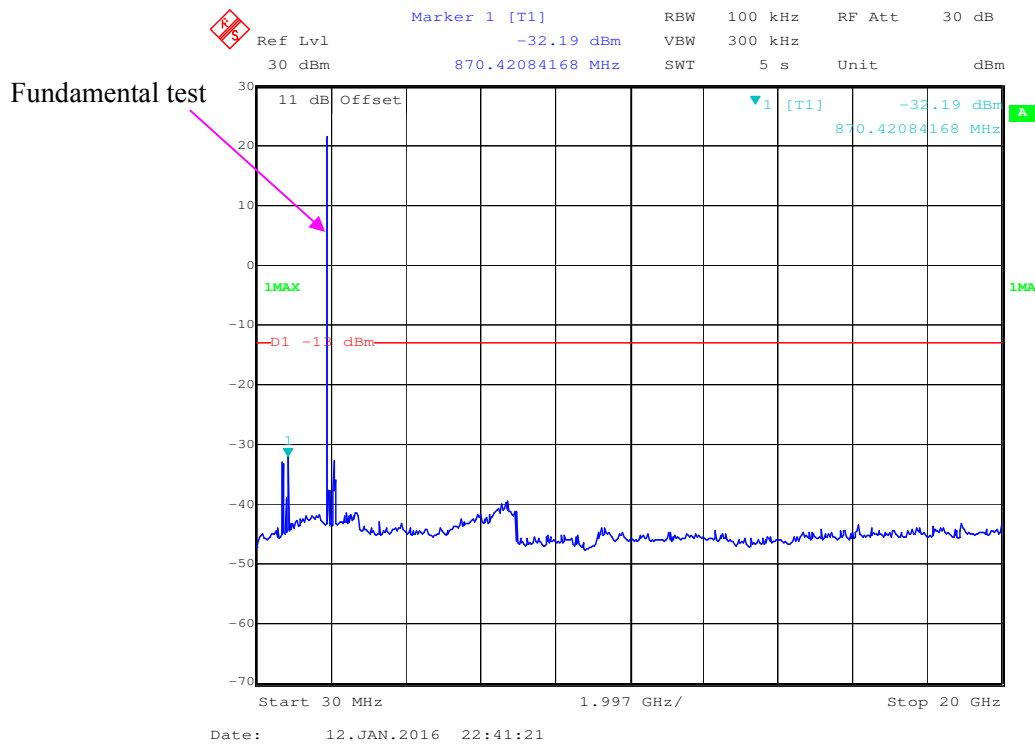
CELLULAR - GSM-Pre AGC-Middle Channel



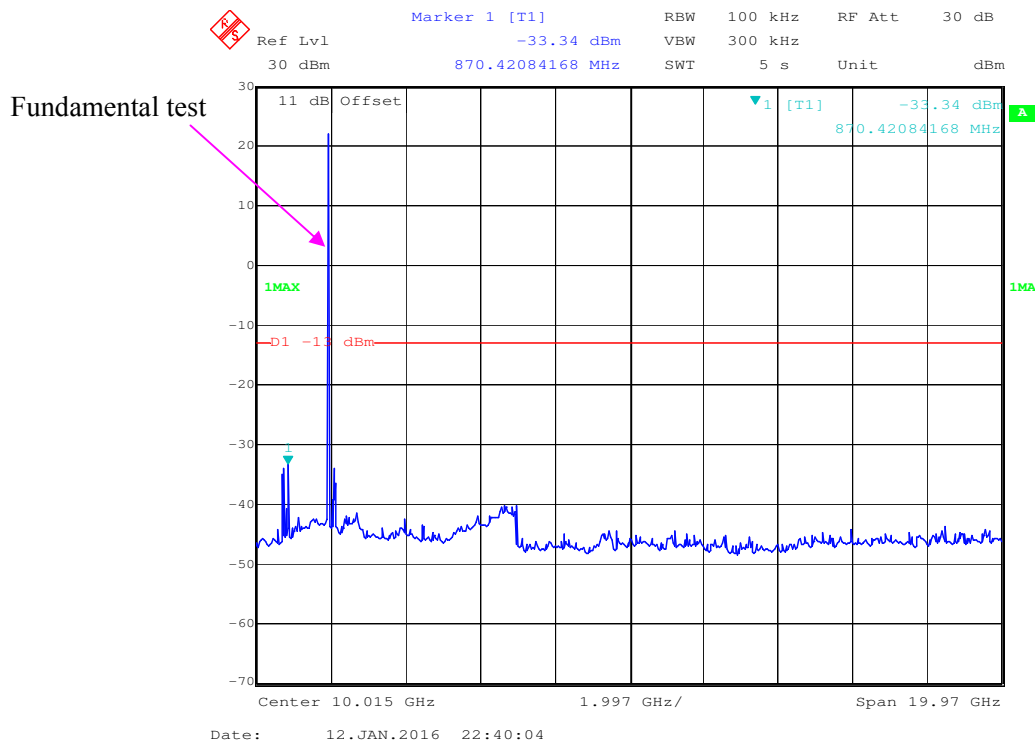
CELLULAR - GSM-Pre AGC-High Channel



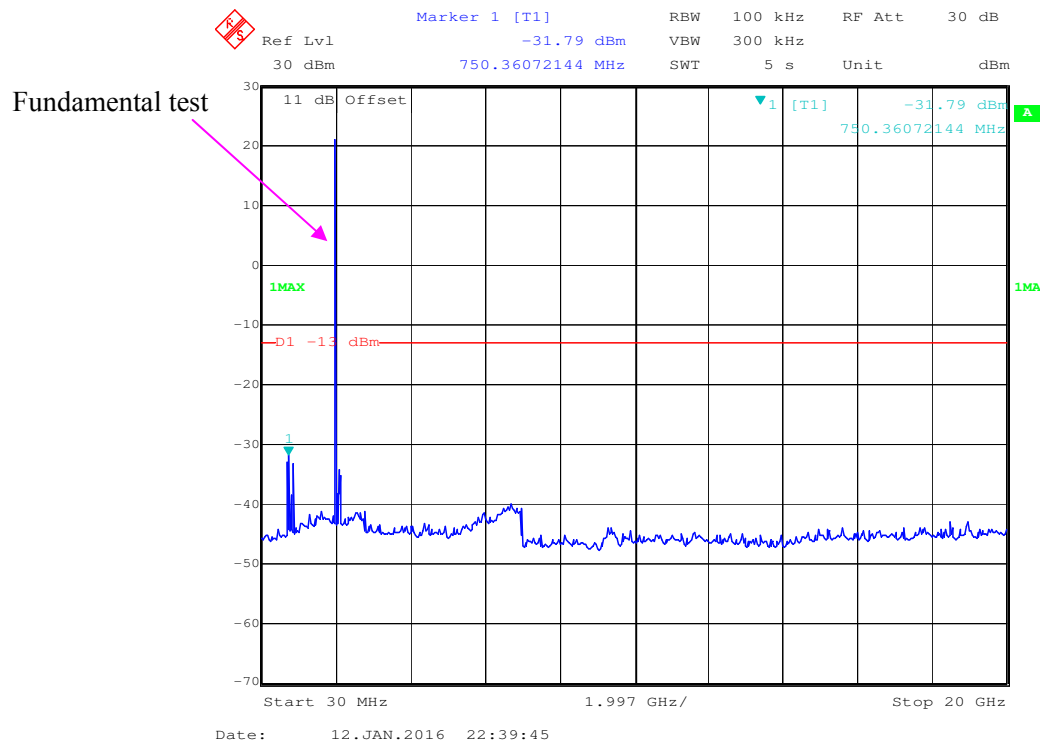
PCS- AWGN-Pre AGC-Low Channel



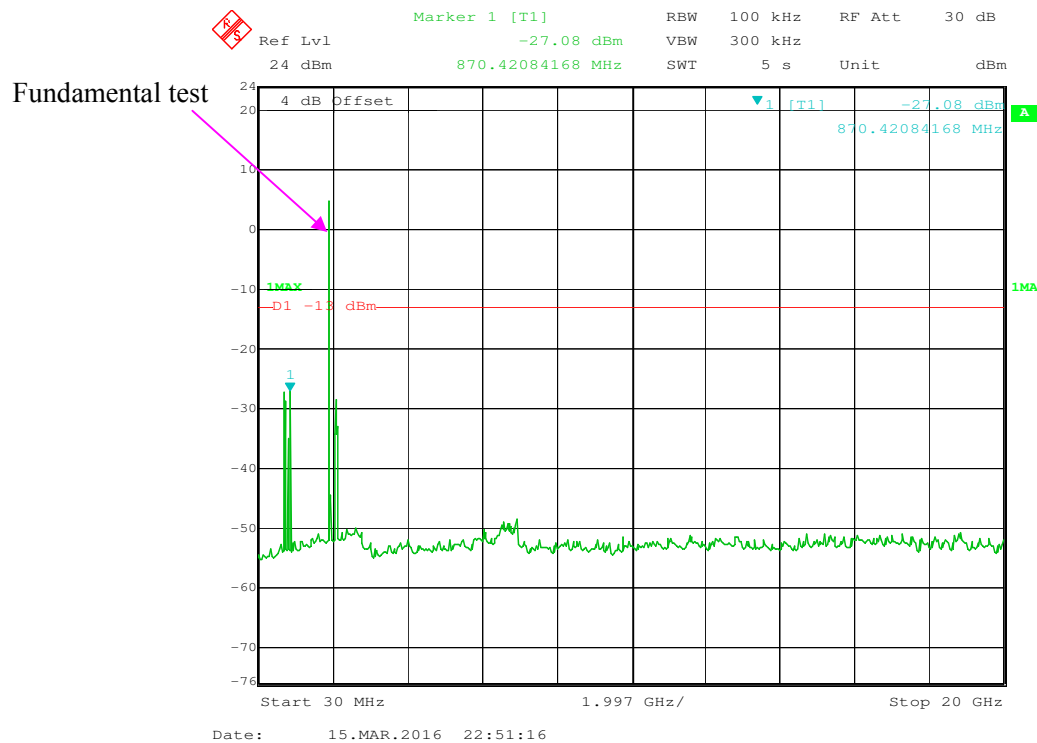
PCS- AWGN-Pre AGC-Middle Channel



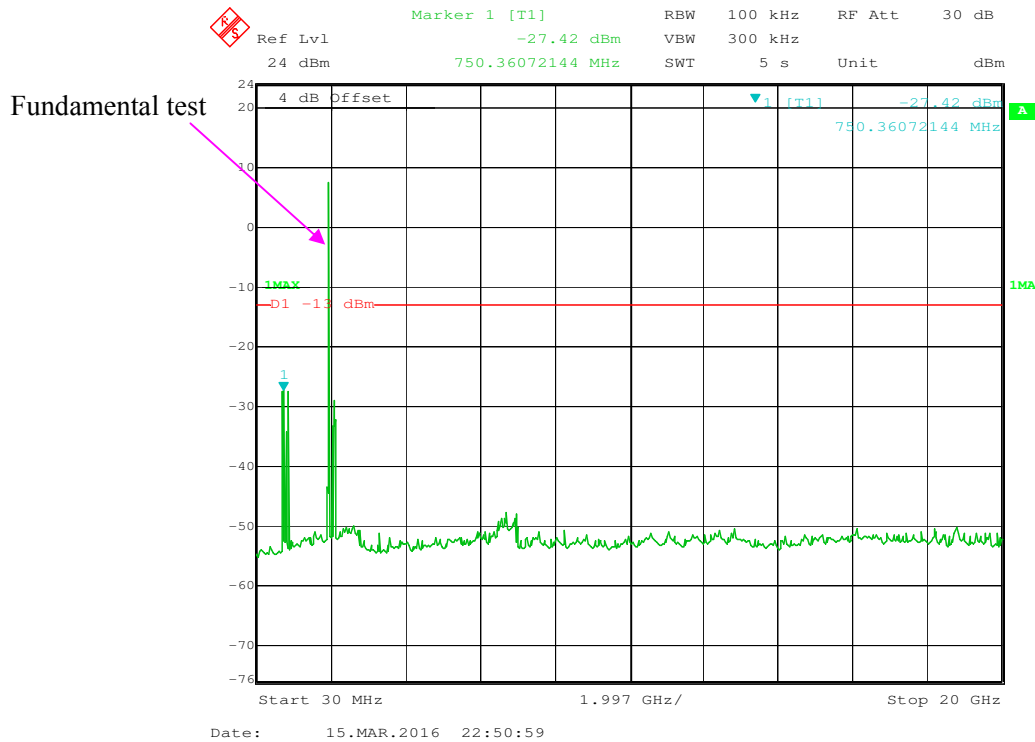
PCS- AWGN-Pre AGC-High Channel



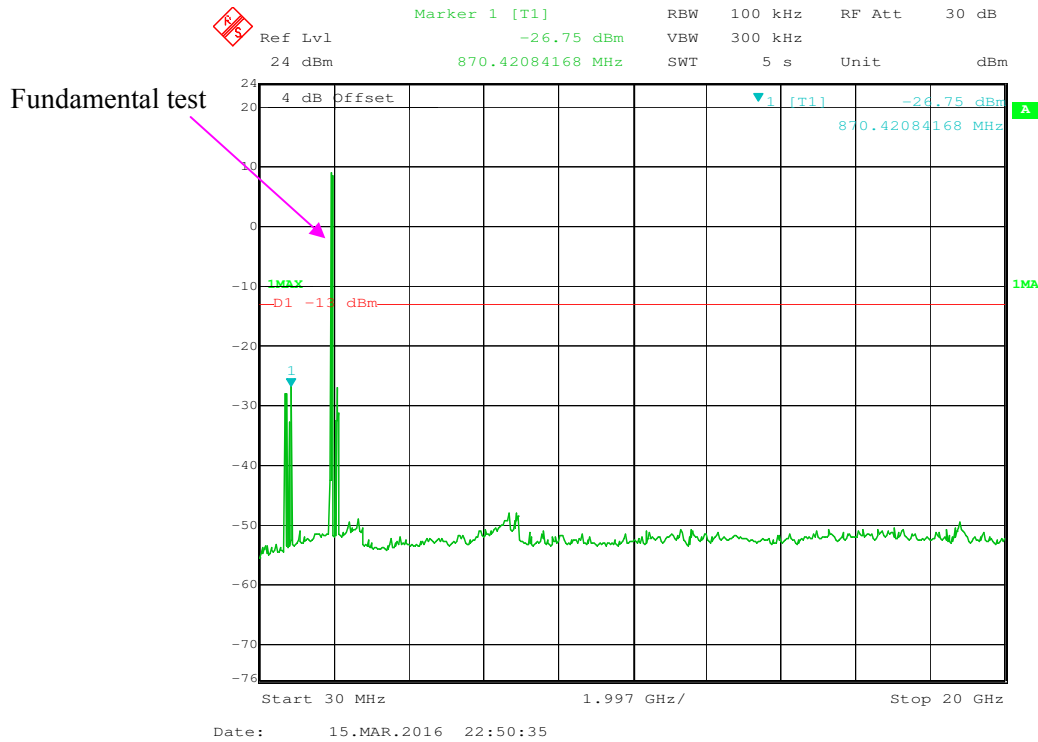
PCS- GSM-Pre AGC-Low Channel



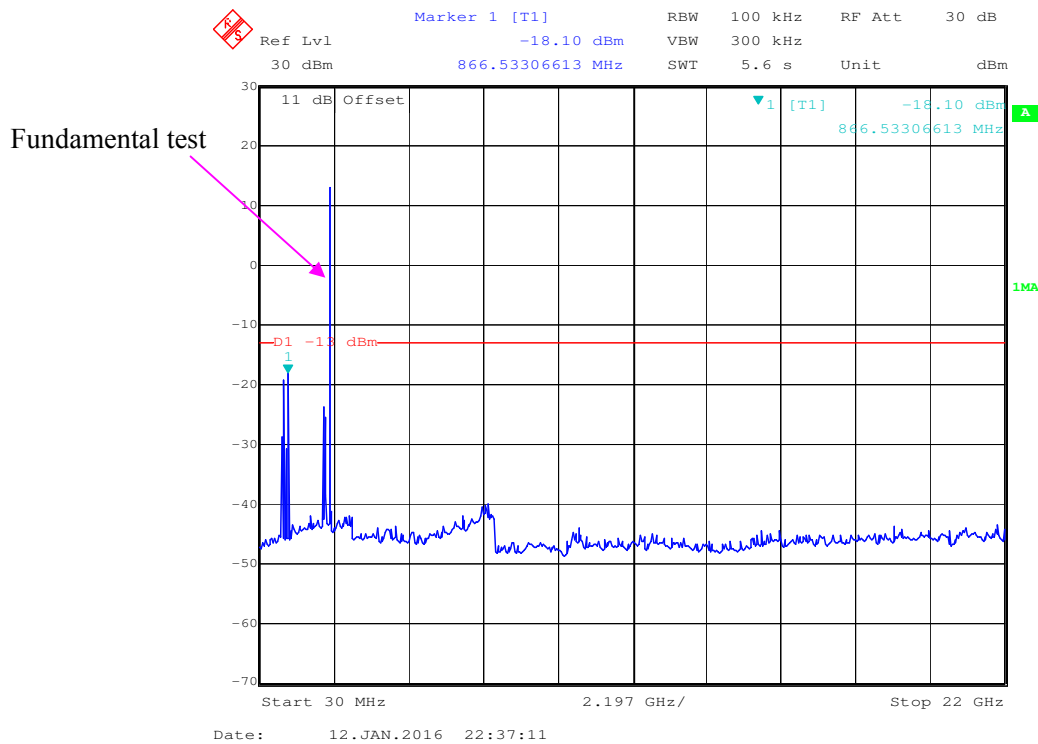
PCS- GSM-Pre AGC-Middle Channel



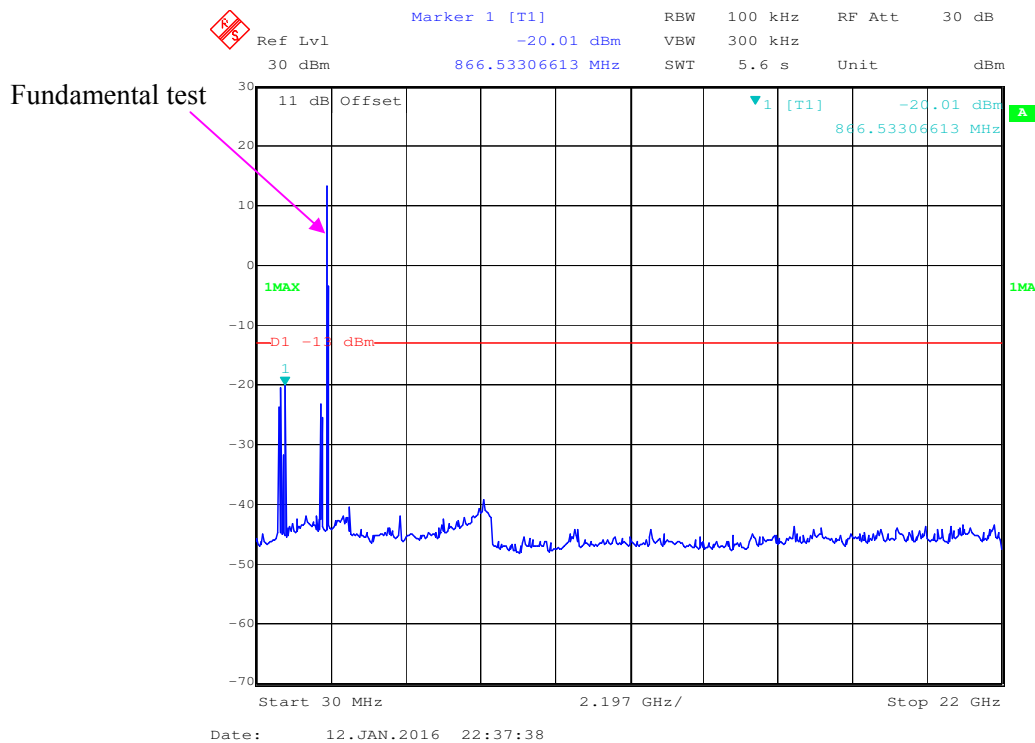
PCS- GSM-Pre AGC-High Channel



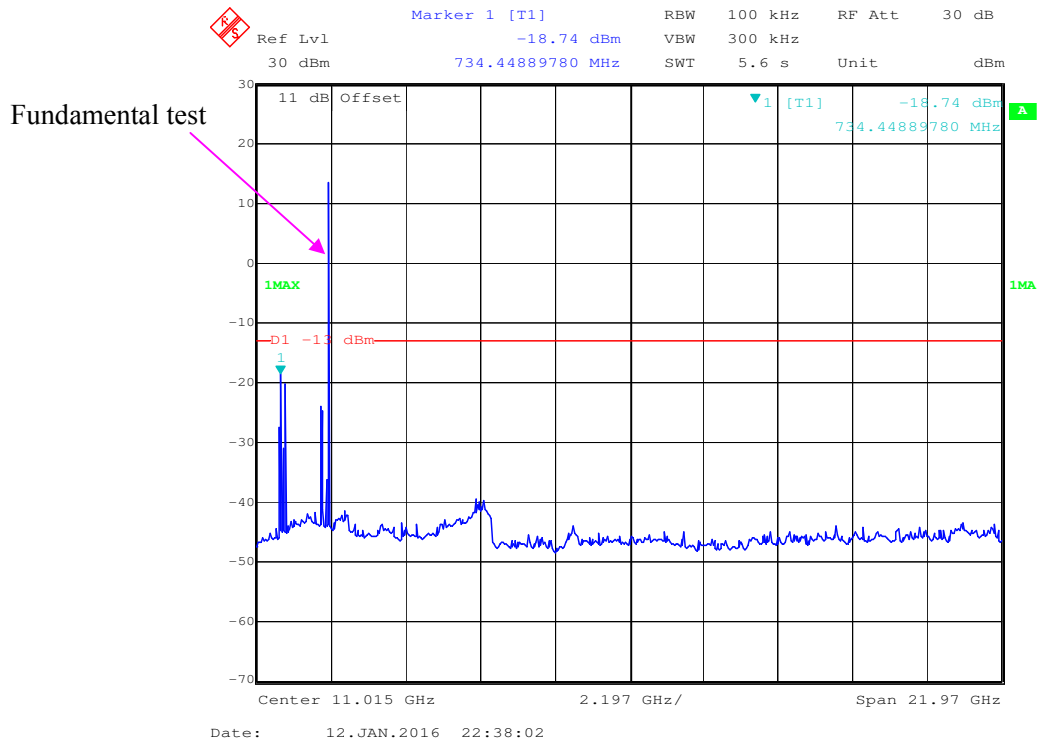
AWS-1- AWGN-Pre AGC-Low Channel



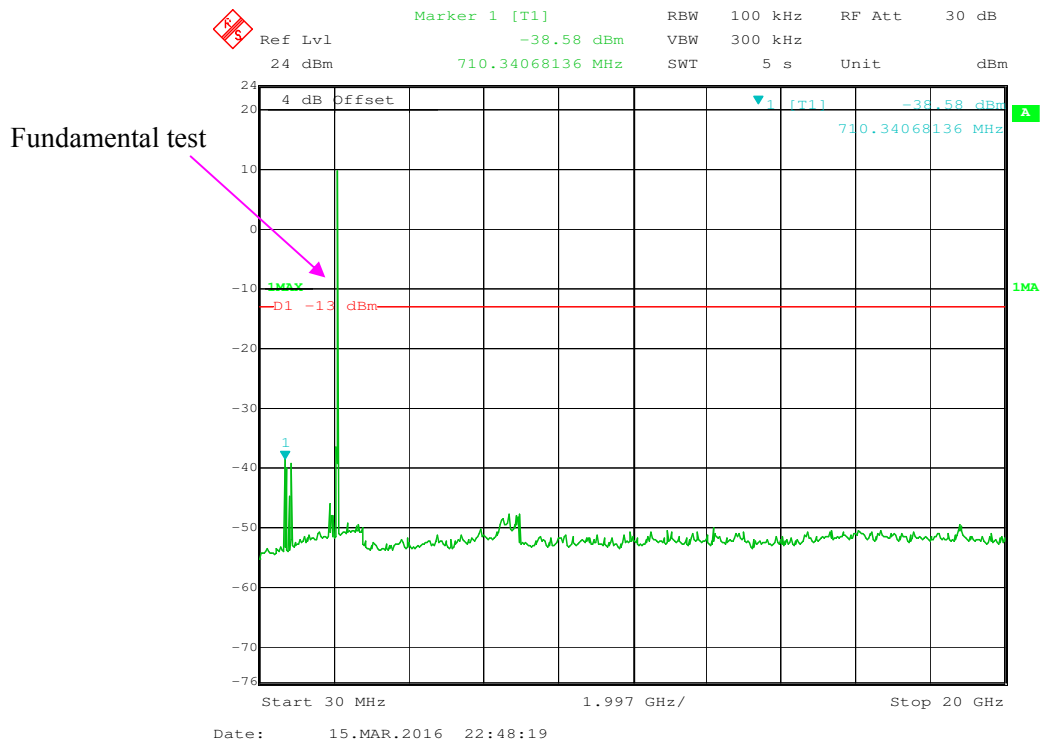
AWS-1- AWGN-Pre AGC-Middle Channel



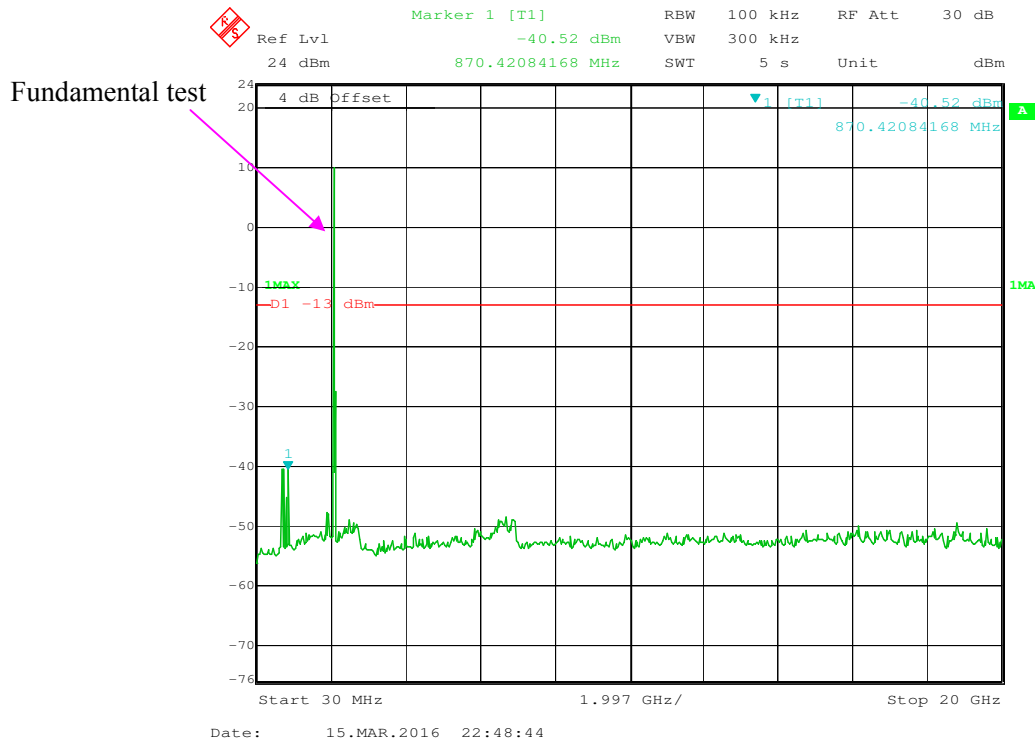
AWS-1- AWGN-Pre AGC-High Channel



AWS-1- GSM-Pre AGC-Low Channel



AWS-1- GSM-Pre AGC-Middle Channel



AWS-1- GSM-Pre AGC-High Channel



FCC §2.1053, §22.917 & §24.238 & §27.53 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-11-03	2016-11-03
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
HP	Signal Generator	HP 8341B	2624A00116	2015-07-02	2016-07-01
COM POWER	Dipole Antenna	AD-100	721027	2015-08-18	2016-08-18
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Electro-Mechanics	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
R & S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-06-03	2016-06-03
Agilent	ESG Vector Signal Generator	E4438C	US41461205	2015-11-12	2016-11-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong on 2016-01-12.

EUT operation mode: Transmitting(worst case as below)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E/27	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
Uplink										
Lower 700MHz (B+C Block)										
212.39	37.53	220	1.3	H	-59.5	0.30	0	-59.80	-13	46.80
212.39	36.02	164	1.7	V	-61.0	0.30	0	-61.30	-13	48.30
1420.00	49.23	54	1.5	H	-59.2	1.20	6.40	-54.00	-13	41.00
1420.00	47.28	296	2.1	V	-61.2	1.20	6.40	-56.00	-13	43.00
Upper 700MHz C Block										
212.39	36.12	95	1.2	H	-60.9	0.30	0	-61.20	-13	48.20
212.39	35.30	85	1.6	V	-61.7	0.30	0	-62.00	-13	49.00
1563.00	48.13	80	1.5	H	-60.7	1.30	6.70	-55.30	-13	42.30
1563.00	47.61	24	2.1	V	-60.7	1.30	6.70	-55.30	-13	42.30
CELLULAR Band										
212.39	38.68	319	2.0	H	-58.3	0.30	0	-58.60	-13	45.60
212.39	37.39	264	2.3	V	-59.6	0.30	0	-59.90	-13	46.90
1673.00	48.18	282	1.7	H	-59.2	1.60	6.90	-53.90	-13	40.90
1673.00	47.21	156	2.0	V	-60.6	1.60	6.90	-55.30	-13	42.30
PCS Band										
212.39	36.42	319	1.3	H	-60.6	0.30	0	-60.90	-13	47.90
212.39	37.51	26	1.2	V	-59.5	0.30	0	-59.80	-13	46.80
3760.00	47.11	201	1.8	H	-52.4	1.90	9.90	-44.40	-13	31.40
3760.00	45.85	162	1.4	V	-53.2	1.90	9.90	-45.20	-13	32.20
AWS-1 Band										
212.39	36.41	88	2.4	H	-60.6	0.30	0	-60.90	-13	47.90
212.39	35.10	36	2.1	V	-61.9	0.30	0	-62.20	-13	49.20
3465.00	46.89	286	1.7	H	-48.6	1.90	10.00	-40.50	-13	27.50
3465.00	45.58	246	1.8	V	-50.1	1.90	10.00	-42.00	-13	29.00

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E/27	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
Downlink										
Lower 700MHz (B+C Block)										
212.39	36.64	227	1.6	H	-60.4	0.30	0	-60.70	-13	47.70
212.39	35.59	337	1.6	V	-61.4	0.30	0	-61.70	-13	48.70
1480.00	49.92	78	2.3	H	-58.8	1.20	6.50	-53.50	-13	40.50
1480.00	48.53	238	1.6	V	-59.2	1.20	6.50	-53.90	-13	40.90
Upper 700MHz C Block										
212.39	37.46	107	1.4	H	-59.5	0.30	0	-59.80	-13	46.80
212.39	38.26	116	1.5	V	-58.7	0.30	0	-59.00	-13	46.00
1503.00	48.47	243	2.1	H	-60.3	1.20	6.50	-55.00	-13	42.00
1503.00	47.32	275	1.7	V	-60.4	1.20	6.50	-55.10	-13	42.10
CELLULAR Band										
212.39	38.65	250	1.7	H	-58.3	0.30	0	-58.60	-13	45.60
212.39	37.69	151	1.5	V	-59.3	0.30	0	-59.60	-13	46.60
1763.00	48.77	40	2.3	H	-59.1	1.40	7.10	-53.40	-13	40.40
1763.00	47.35	135	1.2	V	-60.4	1.40	7.10	-54.70	-13	41.70
PCS Band										
212.39	37.16	339	1.0	H	-59.8	0.30	0	-60.10	-13	47.10
212.39	36.33	59	1.3	V	-60.7	0.30	0	-61.00	-13	48.00
3920.00	46.61	132	1.1	H	-52.3	2.20	9.90	-44.60	-13	31.60
3920.00	44.51	143	1.3	V	-54.0	2.20	9.90	-46.30	-13	33.30
AWS-1 Band										
212.39	37.52	274	1.3	H	-59.5	0.30	0	-59.80	-13	46.80
212.39	36.56	37	1.3	V	-60.4	0.30	0	-60.70	-13	47.70
4265.00	47.33	225	2.1	H	-47.8	2.60	9.80	-40.60	-13	27.60
4265.00	45.73	90	1.3	V	-49.7	2.60	9.80	-42.50	-13	29.50

Note:

1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

FCC §2.1053, §22.917 & §24.238 & §27.53 - BAND EDGES & INTERMODULATION

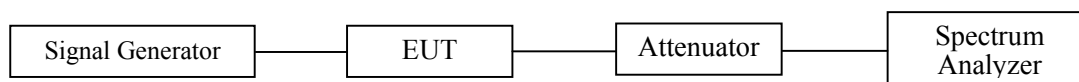
Applicable Standard

FCC §2.1053, §22.917, §24.238 and §27.53.

The power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedure

Please refer to KDB 935210 D05 Indus Booster Basic Meas v01 clause 3.6.2



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15
WEINSCHL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18
WEINSCHL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
Agilent	ESG Vector Signal Generator	E4438C	US41461205	2015-11-12	2016-11-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

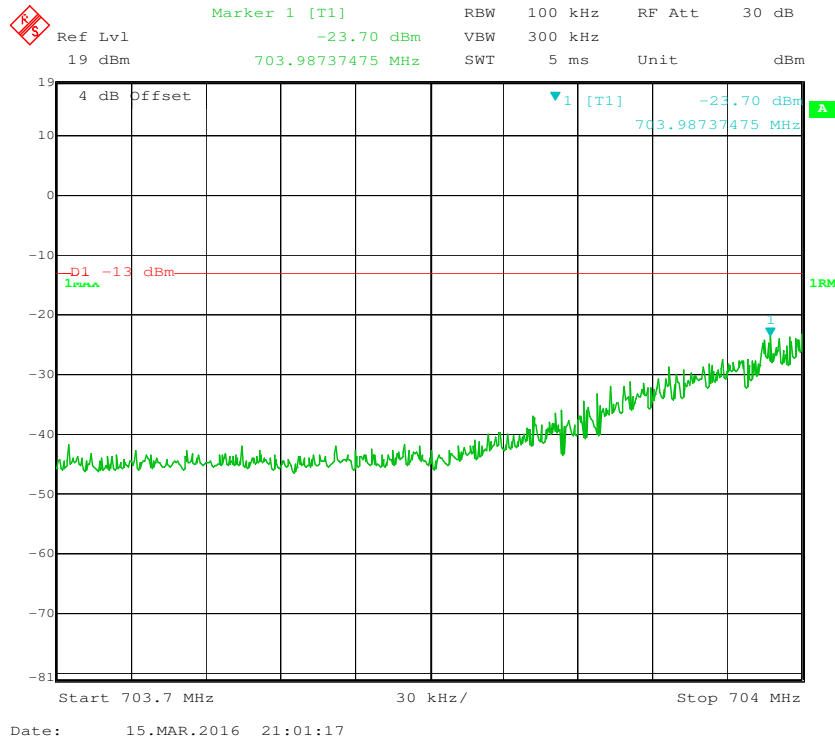
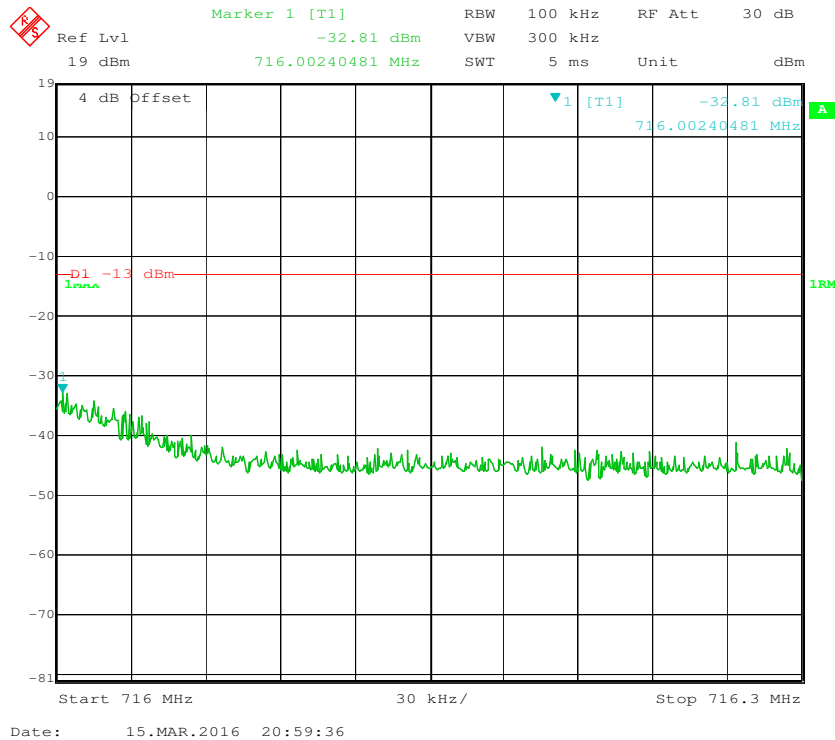
Environmental Conditions

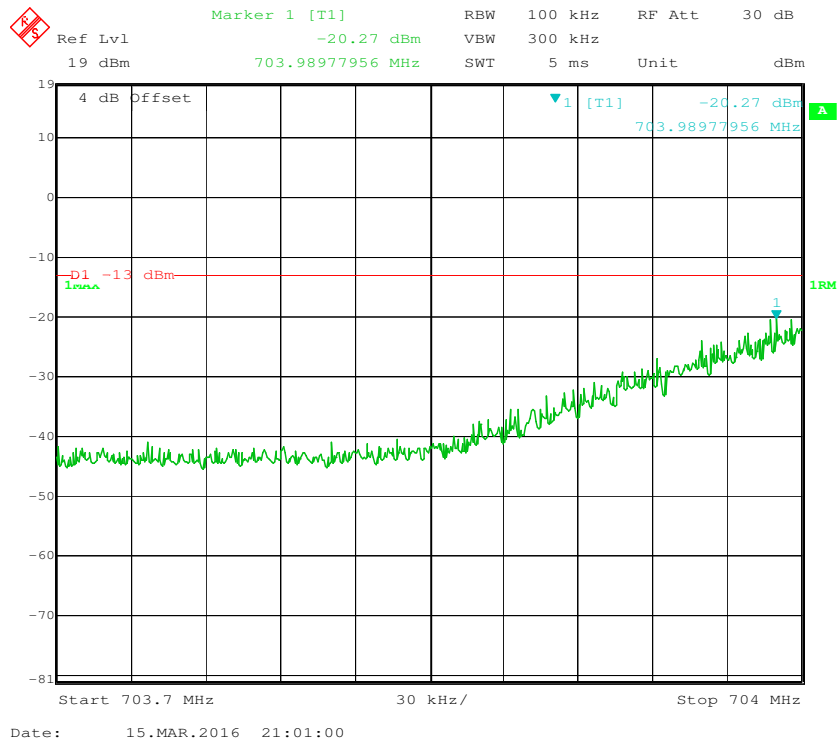
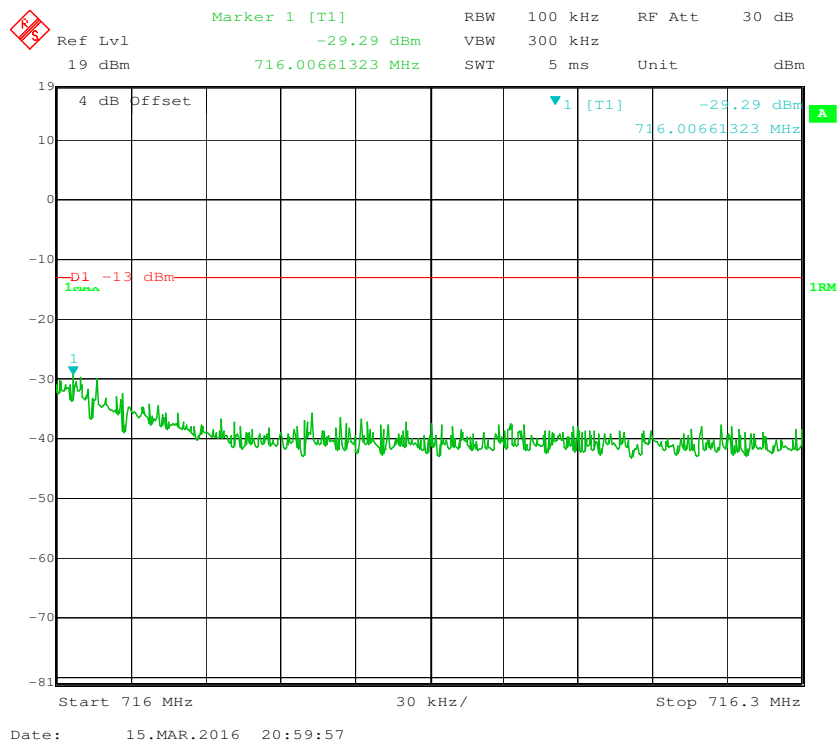
Temperature:	22~27°C
Relative Humidity:	48~52 %
ATM Pressure:	100.9~101.5 kPa

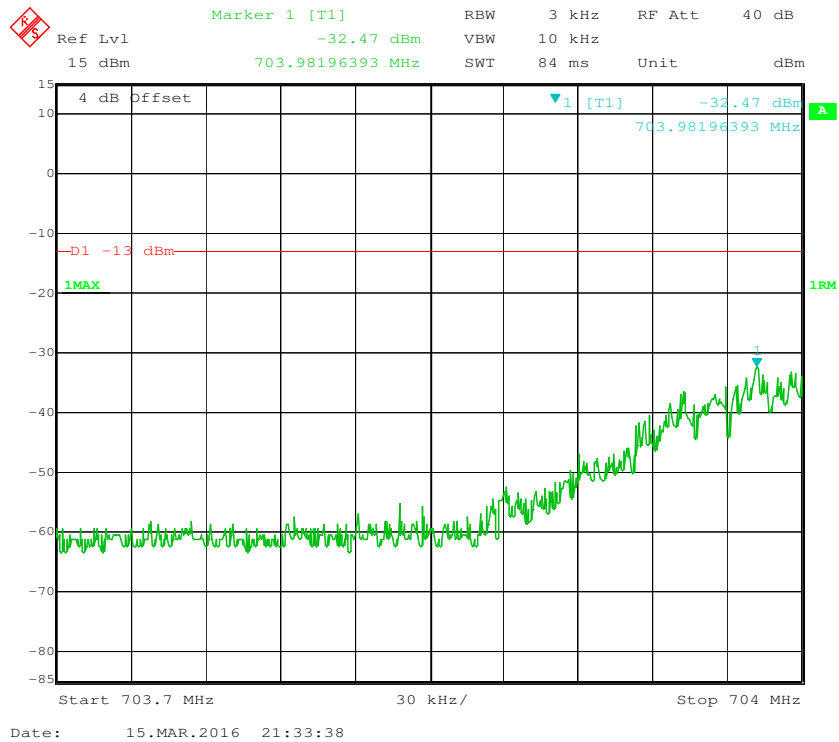
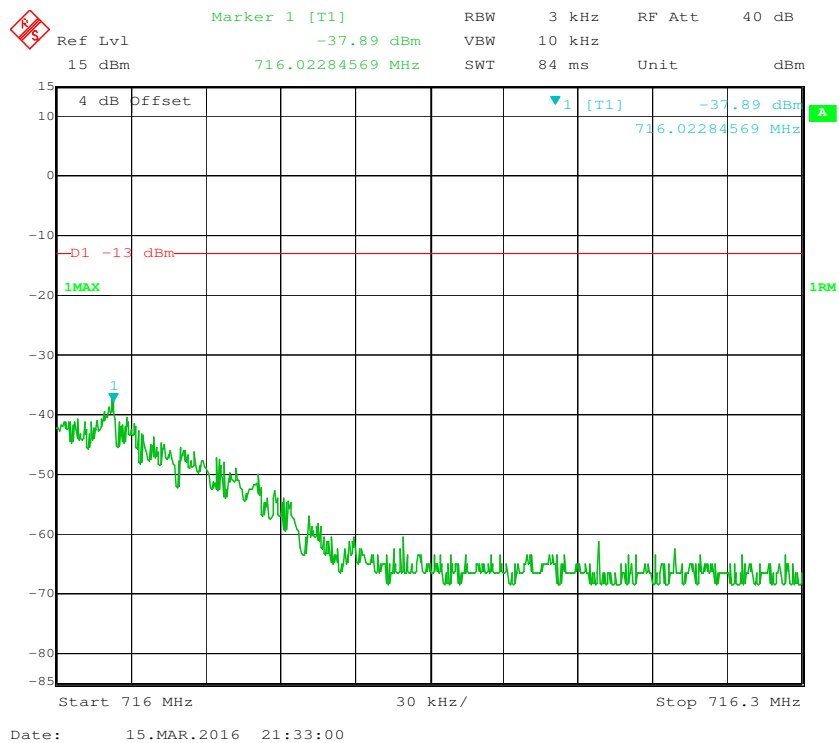
The testing was performed by Xiangguang Kong on 2016-03-14 and 2016-03-15.

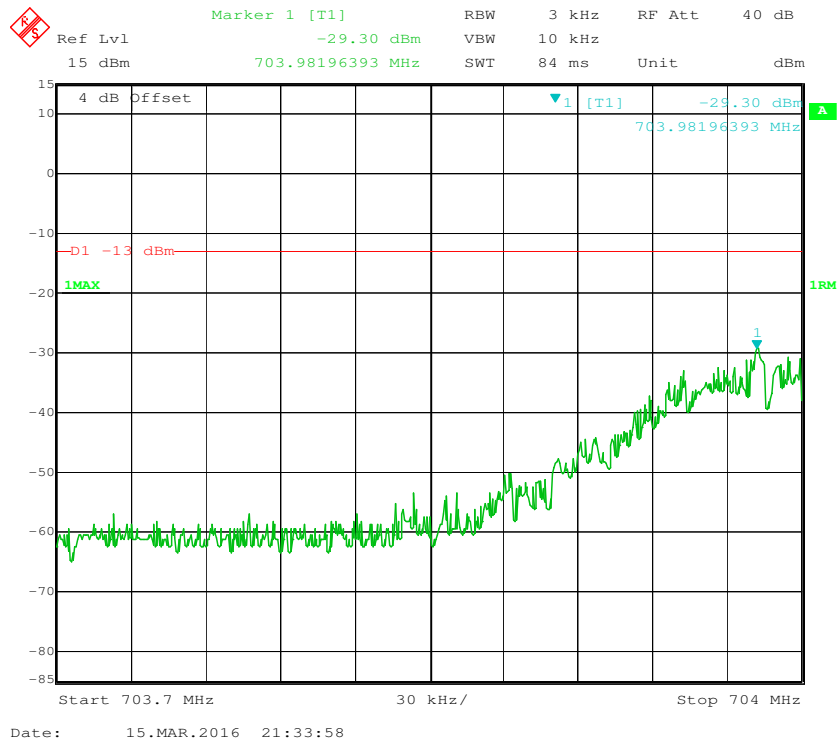
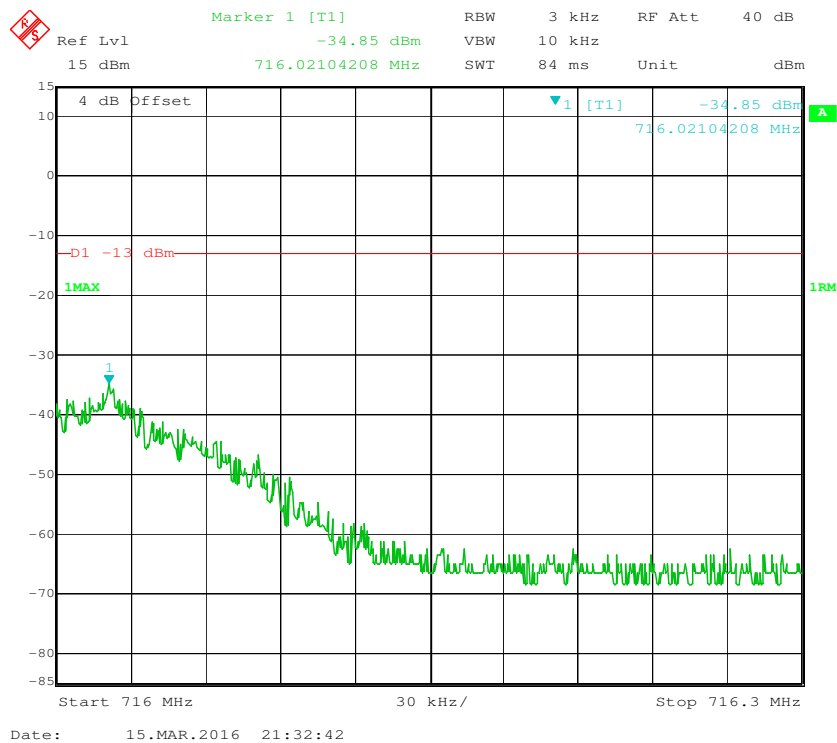
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following plots.

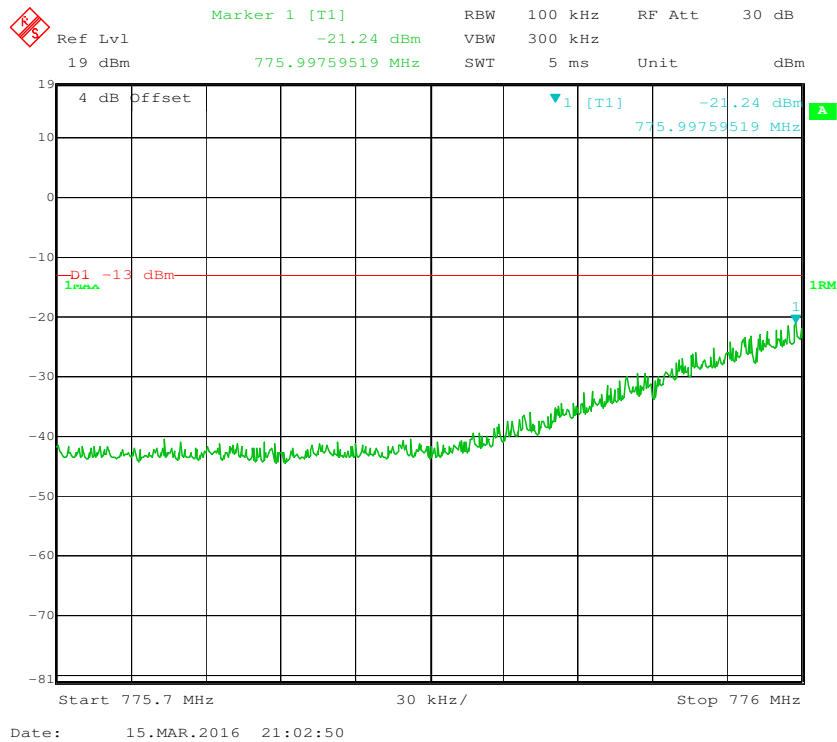
**For Band Edge:
Uplink:****Lower 700MHz (B+C Block), Left Band Edge for AWGN-Pre AGC****Lower 700MHz (B+C Block), Right Band Edge for AWGN-Pre AGC**

Lower 700MHz (B+C Block), Left Band Edge for AWGN-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for AWGN-3dB Above AGC**

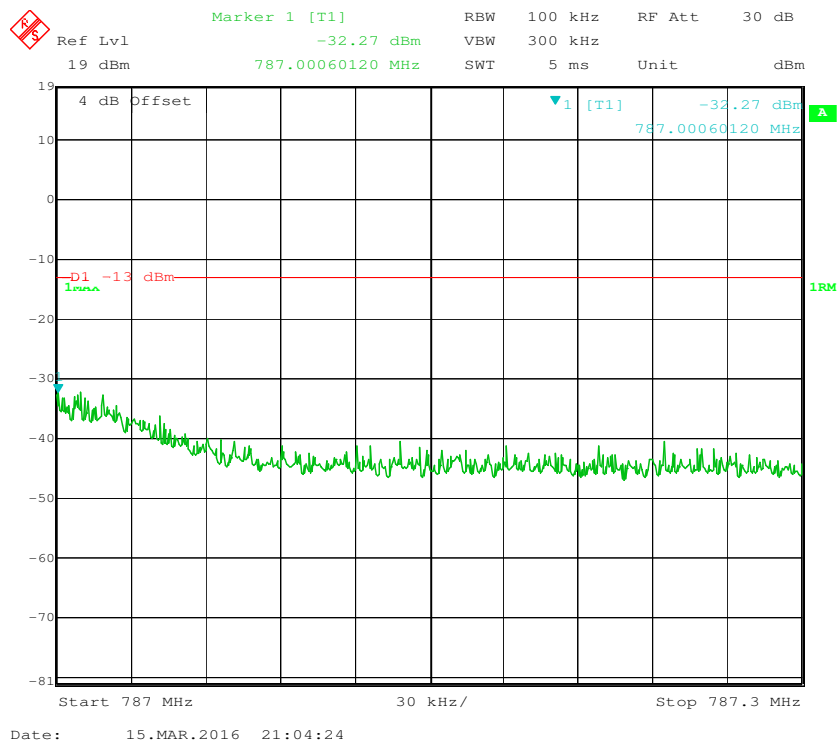
Lower 700MHz (B+C Block), Left Band Edge for GSM-Pre AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-Pre AGC**

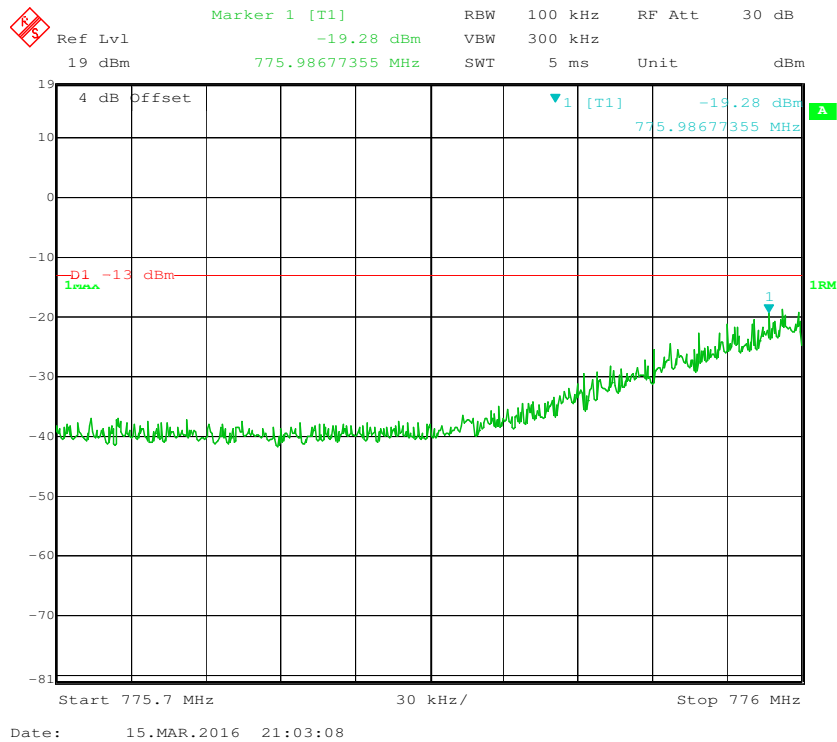
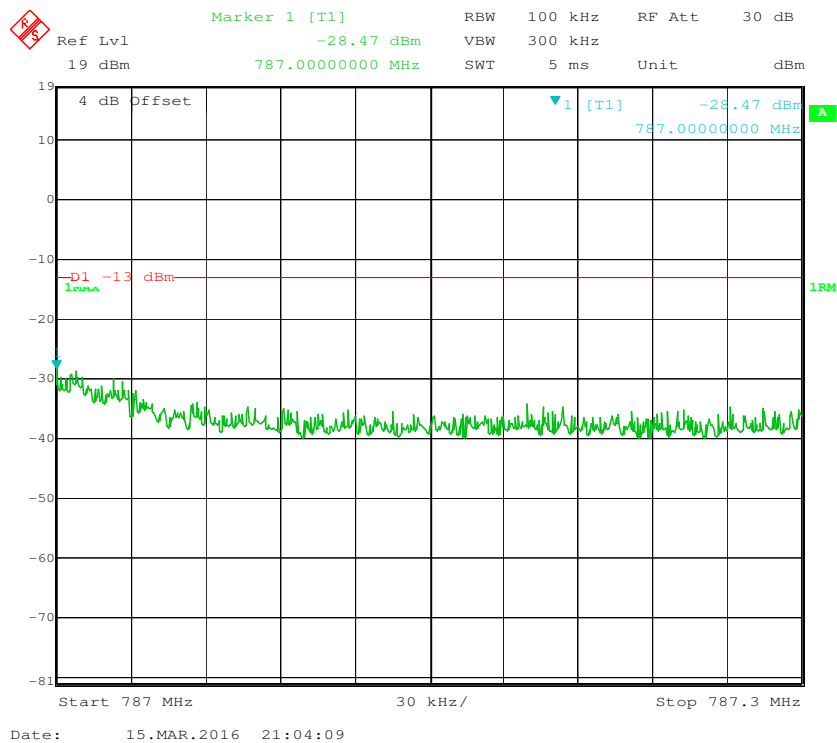
Lower 700MHz (B+C Block), Left Band Edge for GSM-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-3dB Above AGC**

Upper 700MHz C Block, Left Band Edge for AWGN-Pre AGC

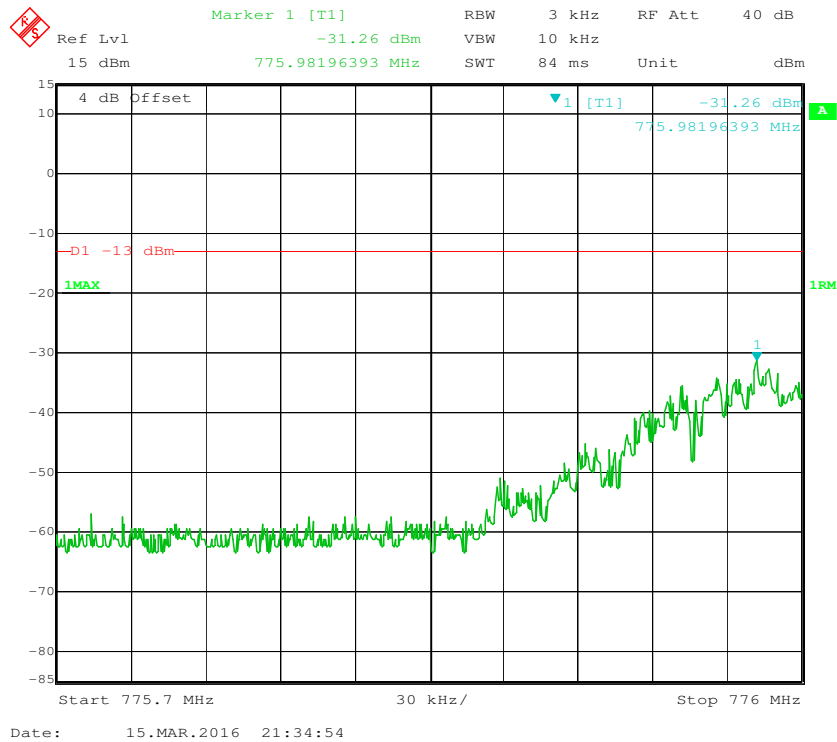


Upper 700MHz C Block, Right Band Edge for AWGN-Pre AGC

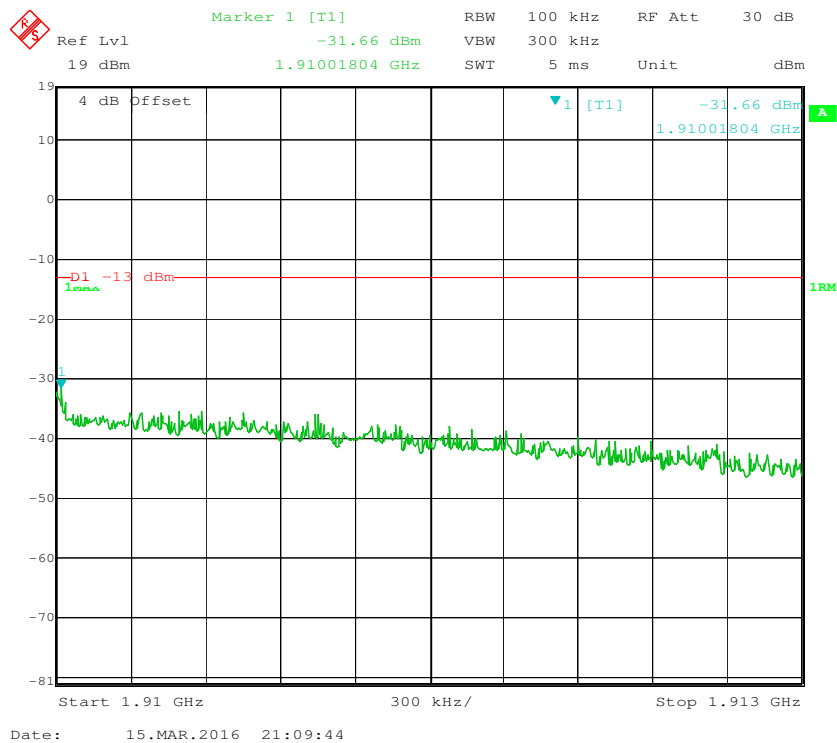


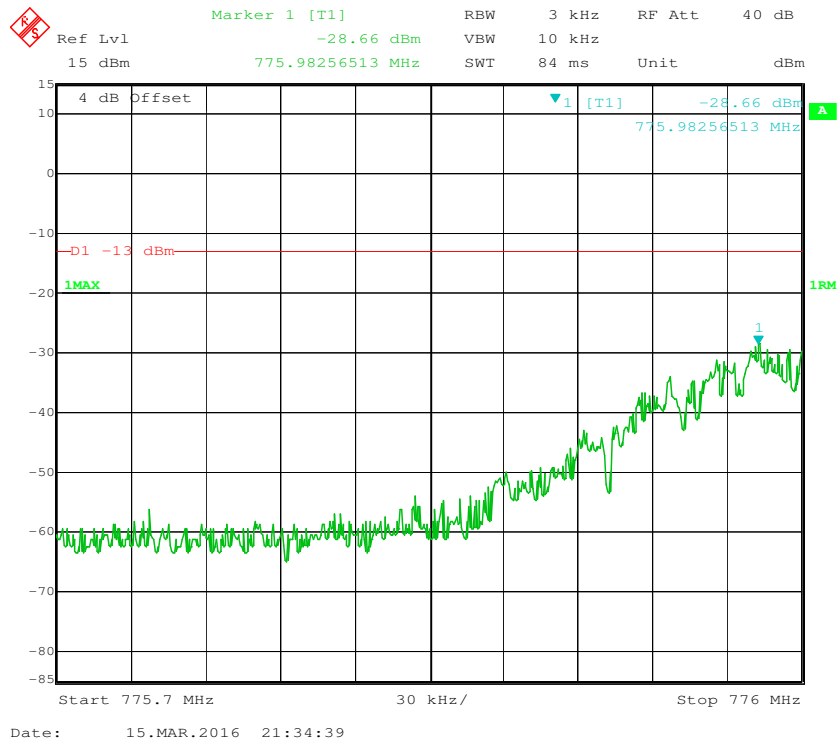
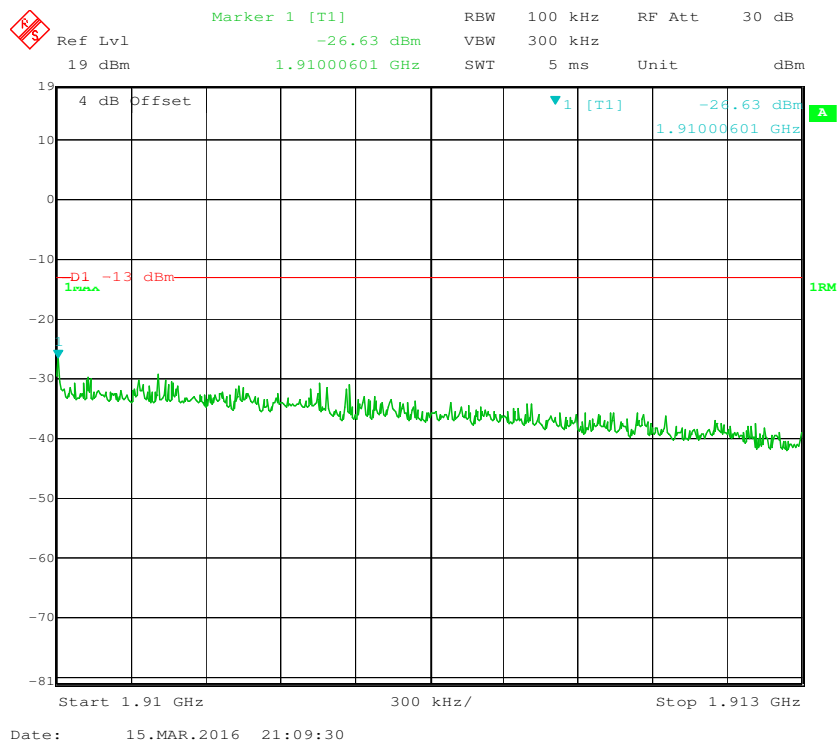
Upper 700MHz C Block, Left Band Edge for AWGN-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for AWGN-3dB Above AGC**

Upper 700MHz C Block, Left Band Edge for GSM-Pre AGC

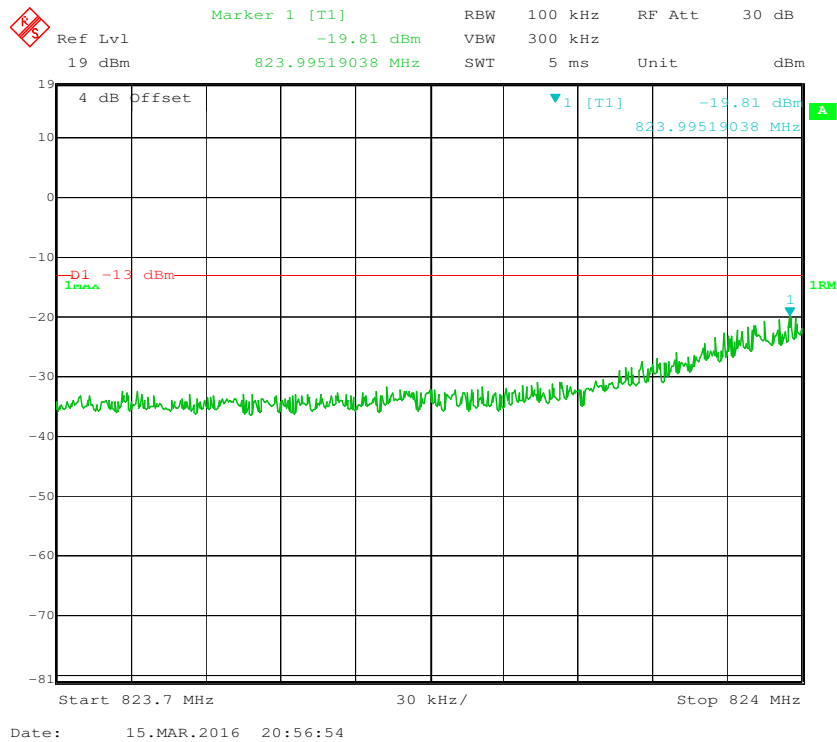


Upper 700MHz C Block, Right Band Edge for GSM-Pre AGC

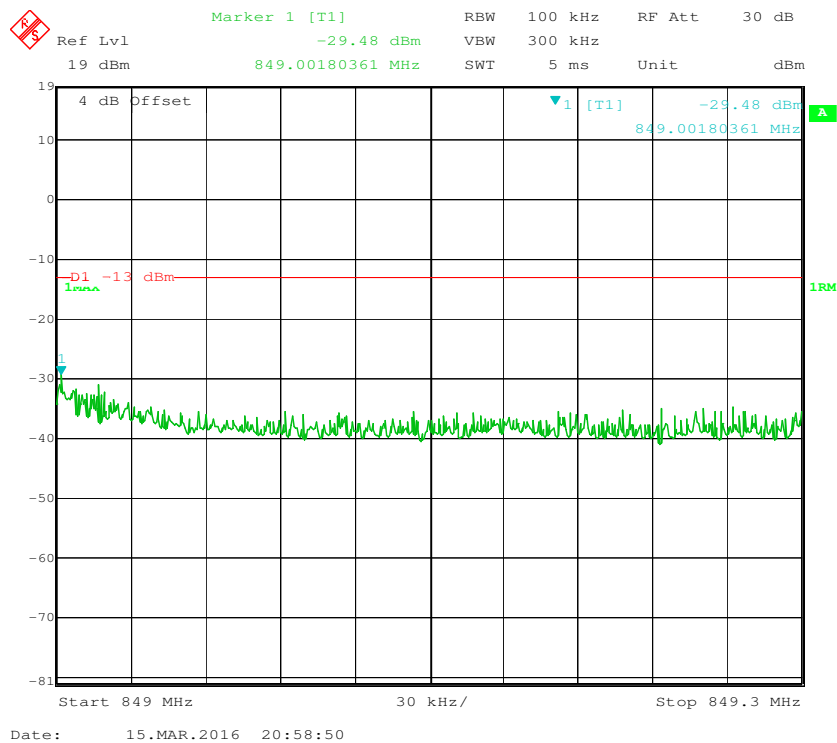


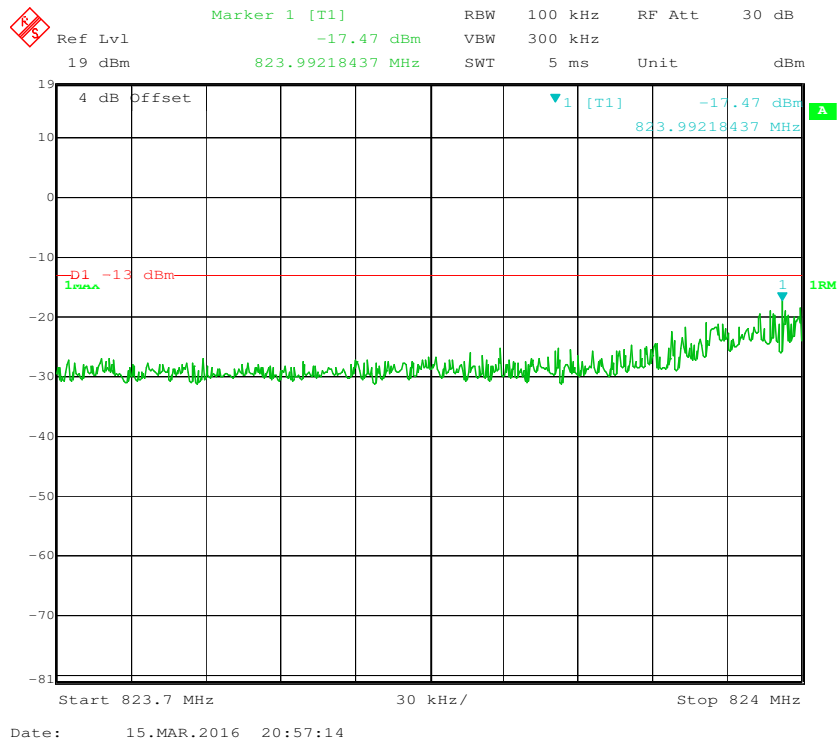
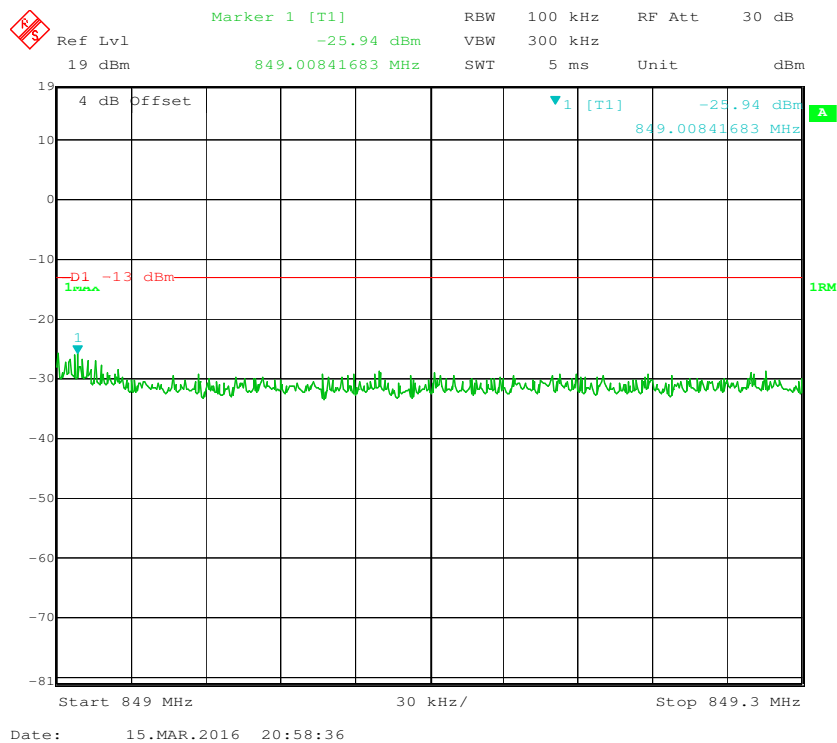
Upper 700MHz C Block, Left Band Edge for GSM-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for GSM-3dB Above AGC**

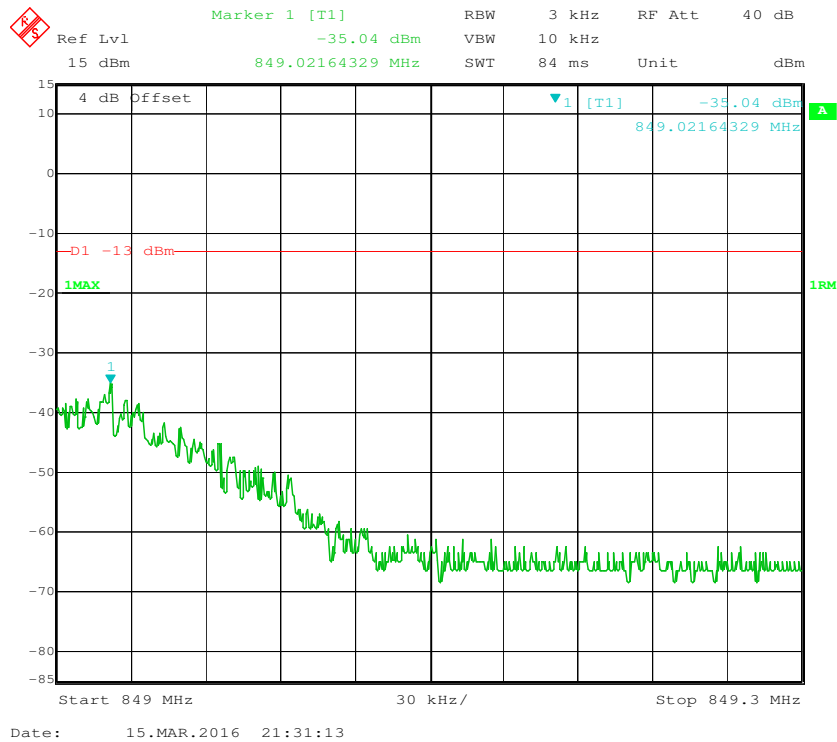
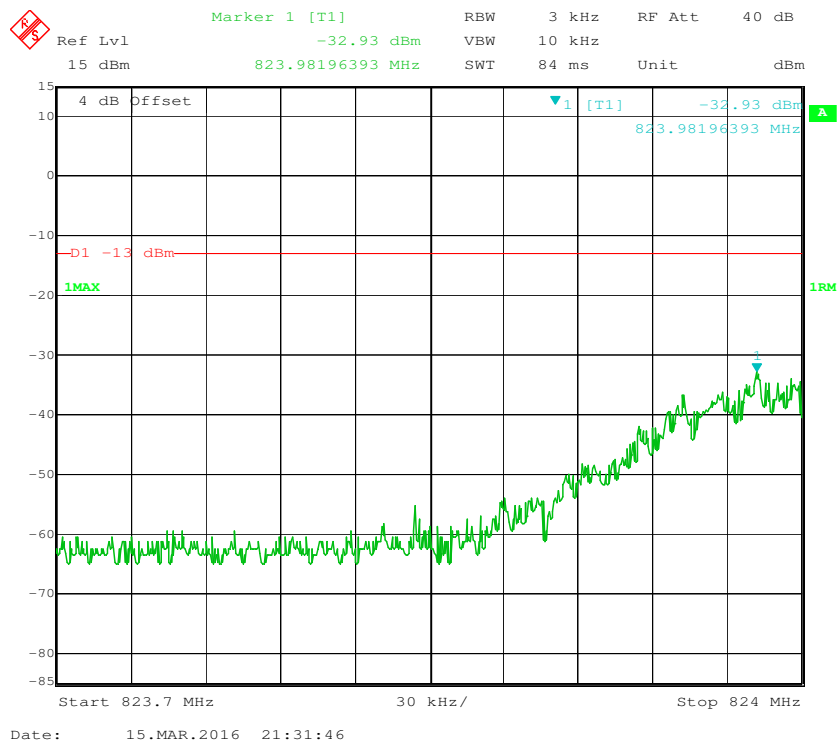
CELLULAR Band, Left Band Edge for AWGN-Pre AGC

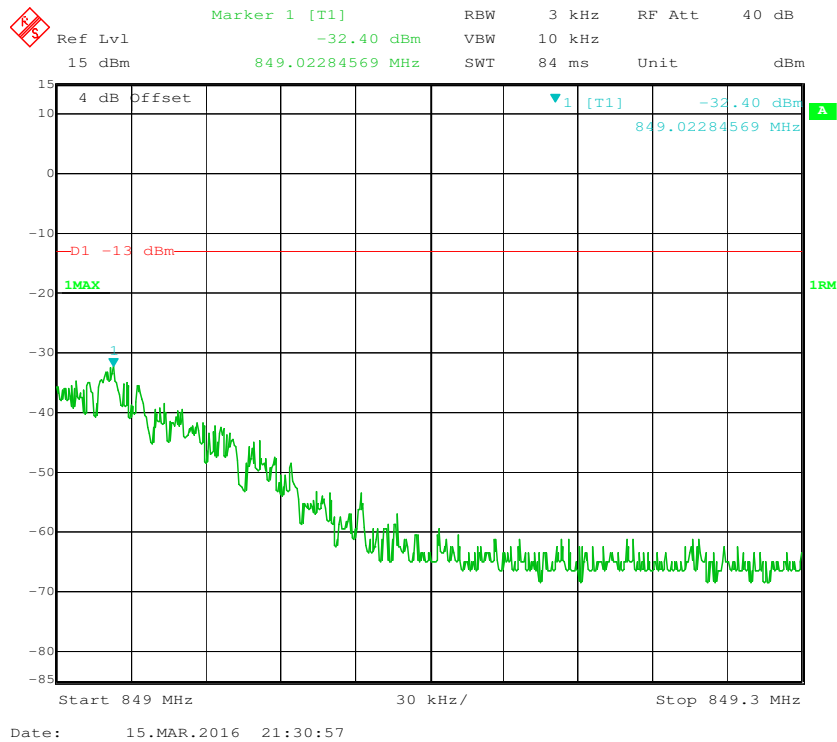
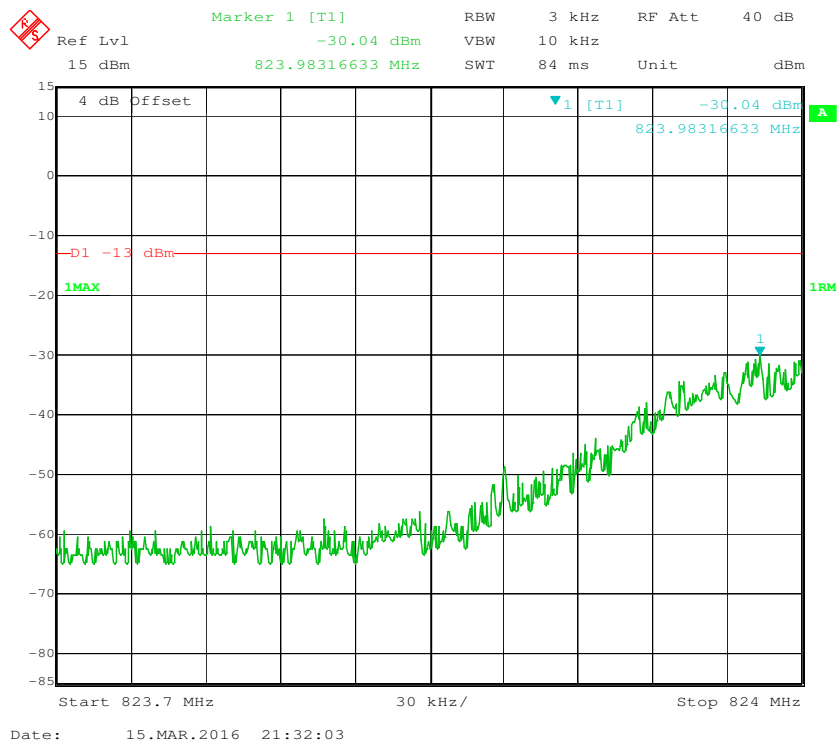


CELLULAR Band, Right Band Edge for AWGN-Pre AGC

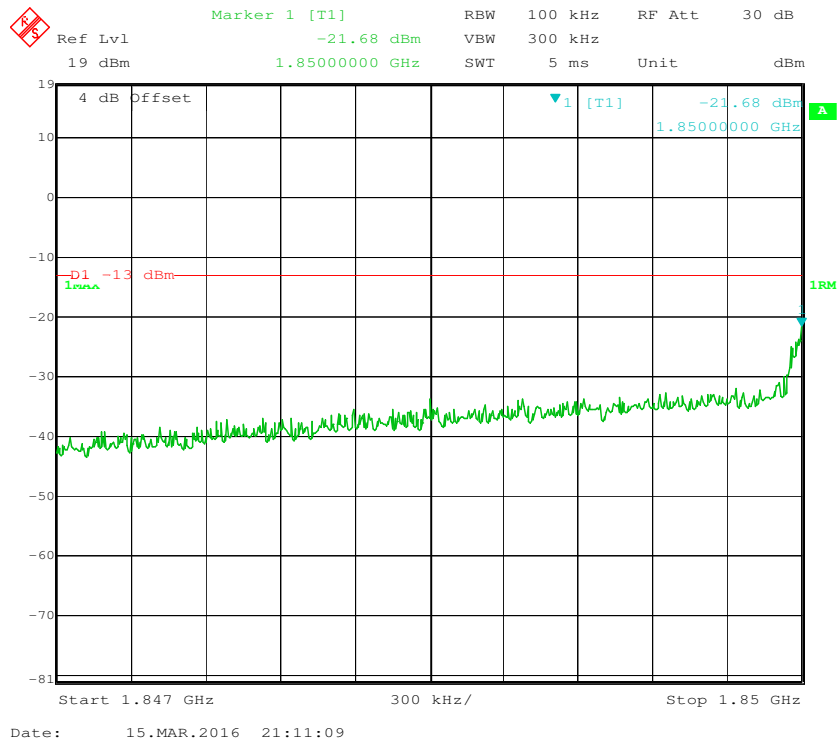


CELLULAR Band, Left Band Edge for AWGN-3dB Above AGC**CELLULAR Band, Right Band Edge for AWGN-3dB Above AGC**

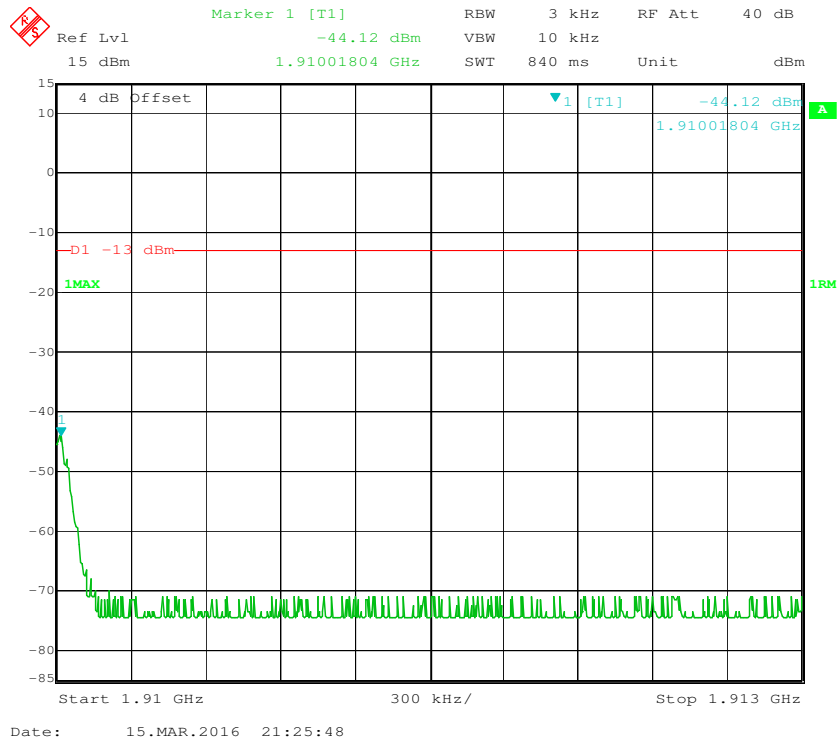
CELLULAR Band, Left Band Edge for GSM-Pre AGC**CELLULAR Band, Right Band Edge for GSM-Pre AGC**

CELLULAR Band, Left Band Edge for GSM-3dB Above AGC**CELLULAR Band, Right Band Edge for GSM-3dB Above AGC**

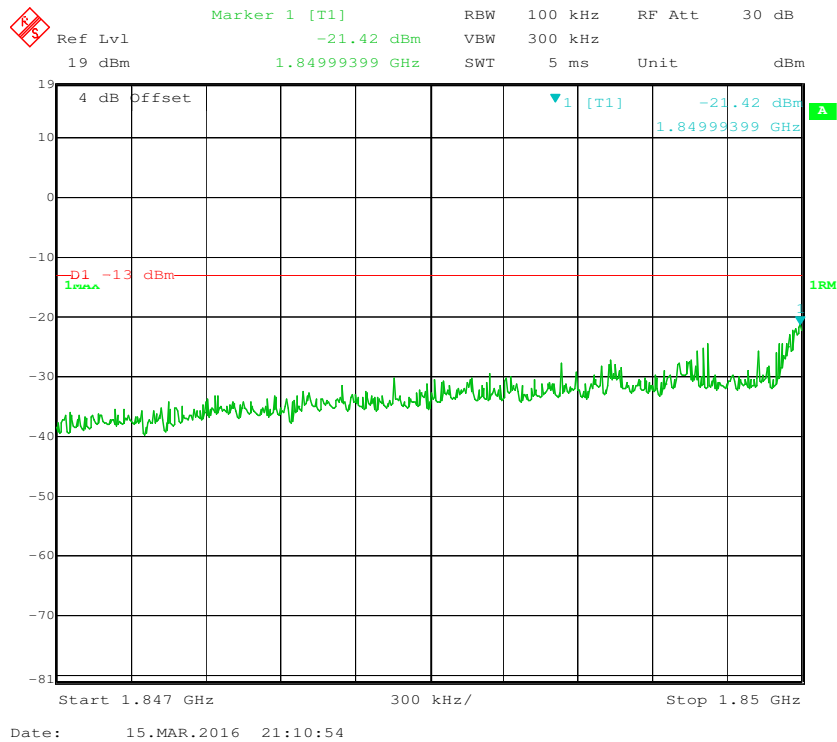
PCS Band, Left Band Edge for AWGN-Pre AGC



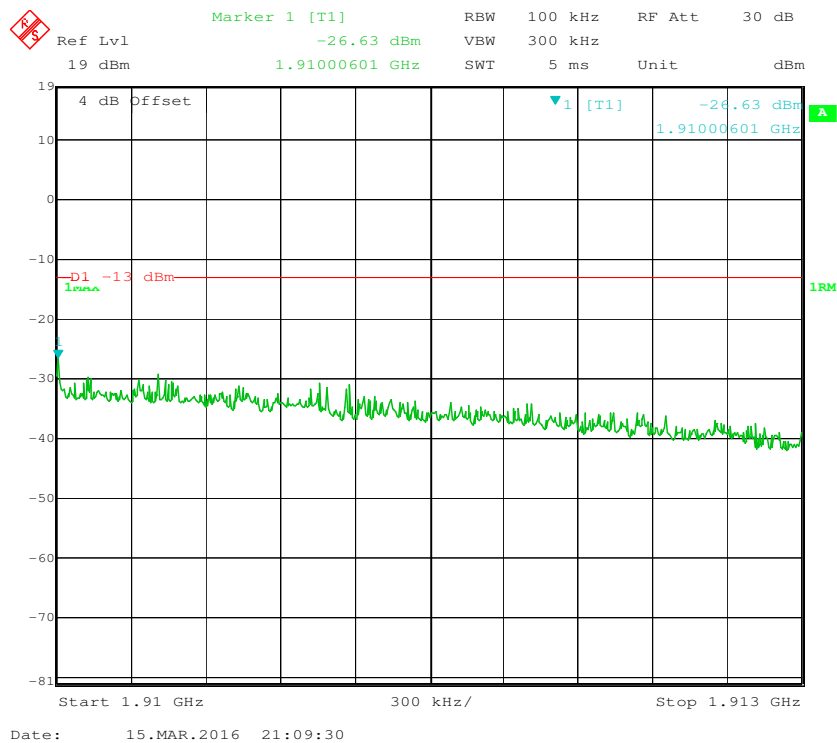
PCS Band, Right Band Edge for AWGN-Pre AGC



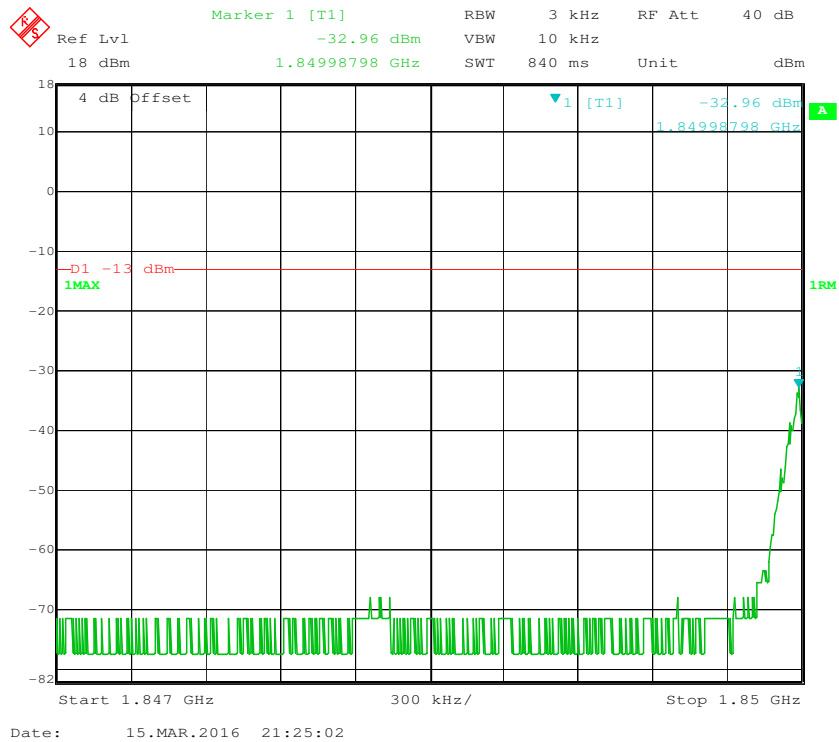
PCS Band, Left Band Edge for AWGN-3dB Above AGC



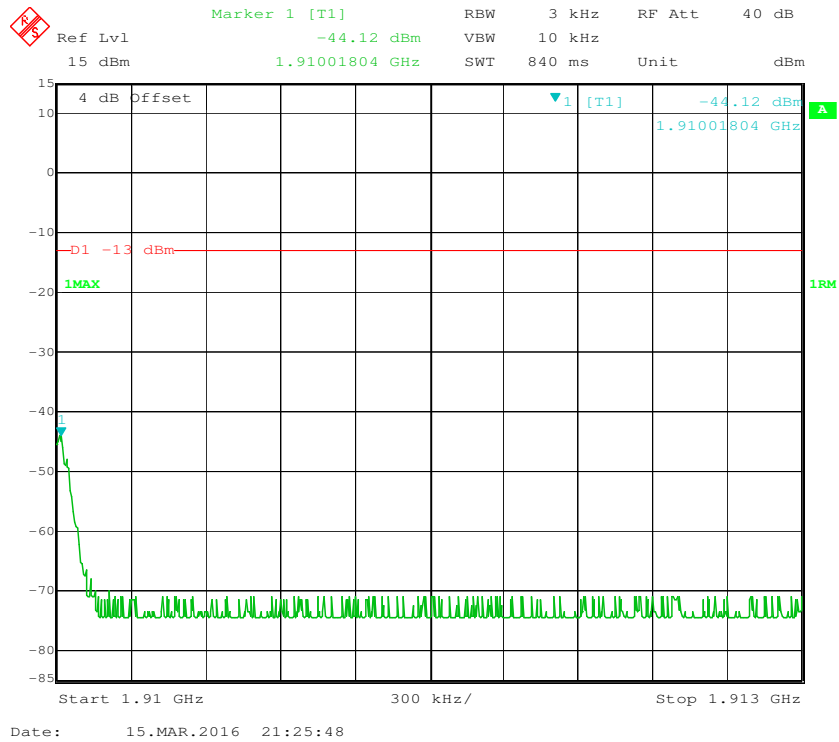
PCS Band, Right Band Edge for AWGN-3dB Above AGC



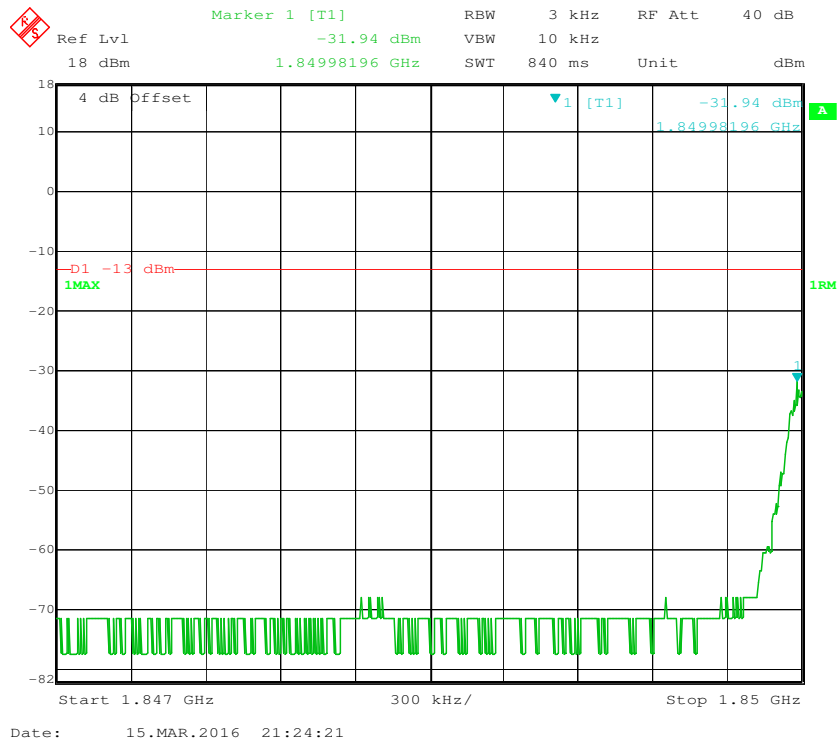
PCS Band, Left Band Edge for GSM-Pre AGC



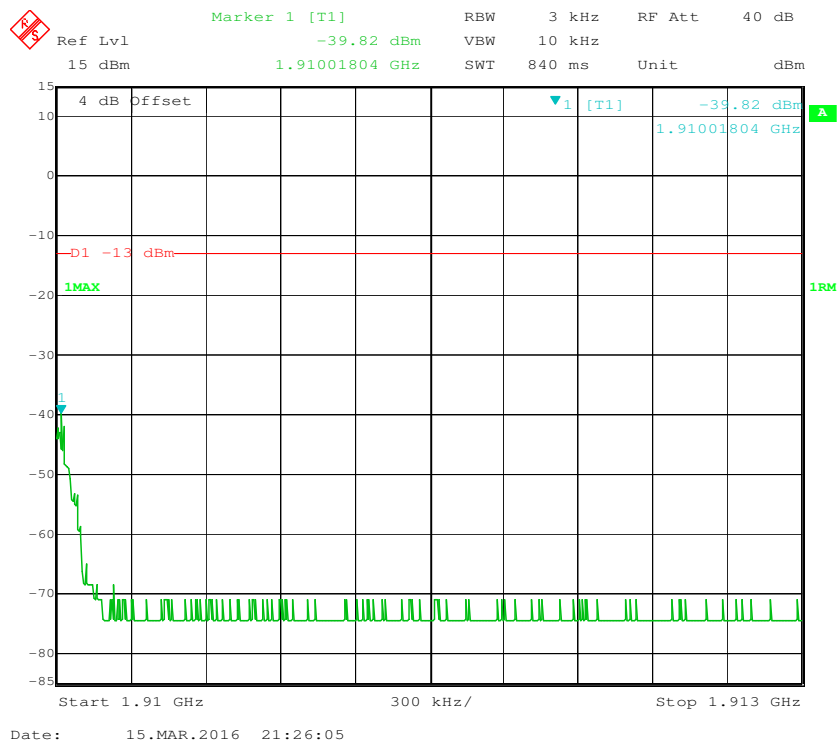
PCS Band, Right Band Edge for GSM-Pre AGC



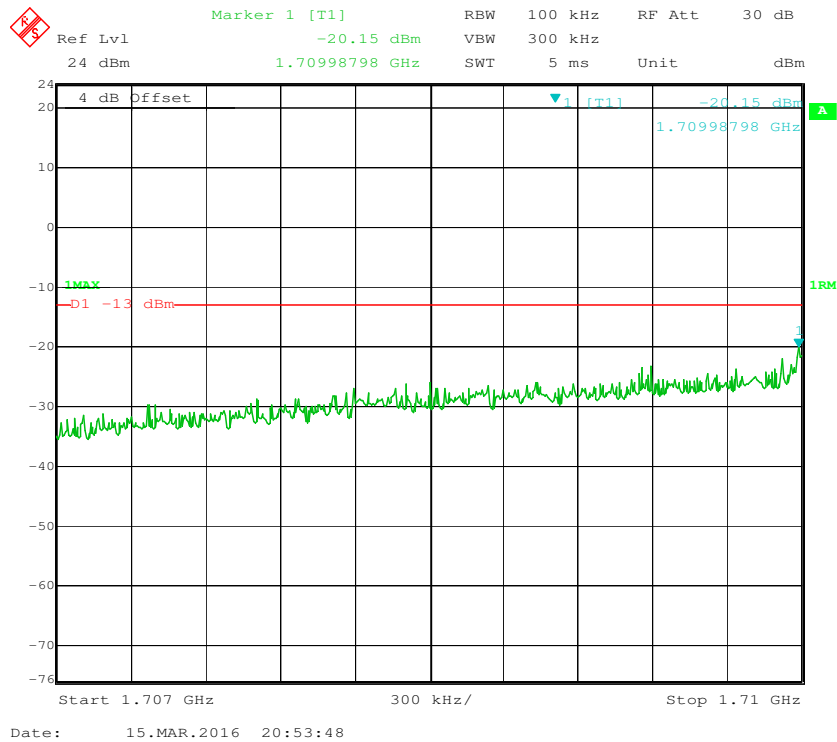
PCS Band, Left Band Edge for GSM-3dB Above AGC



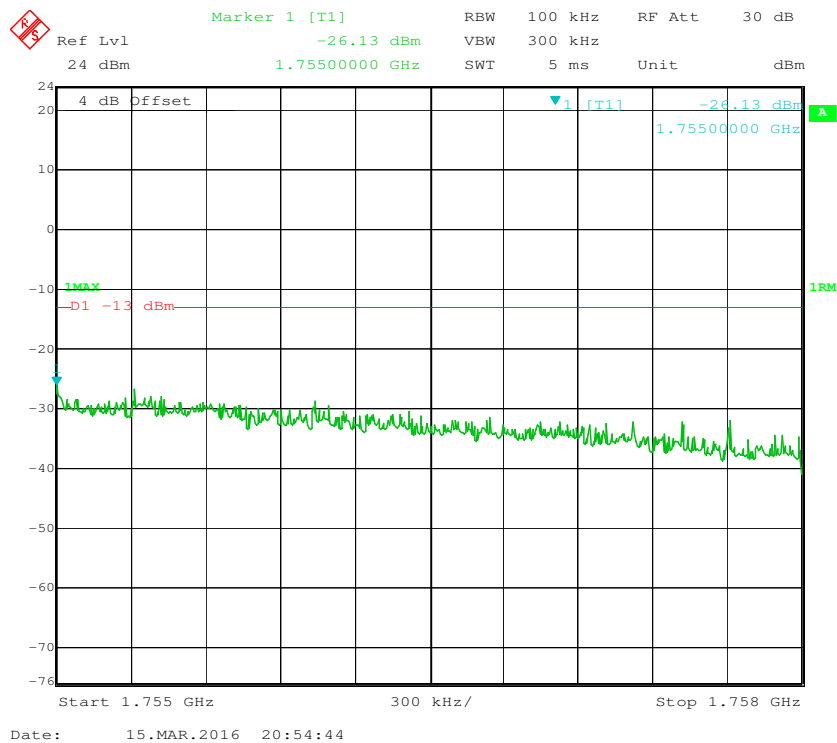
PCS Band, Right Band Edge for GSM-3dB Above AGC



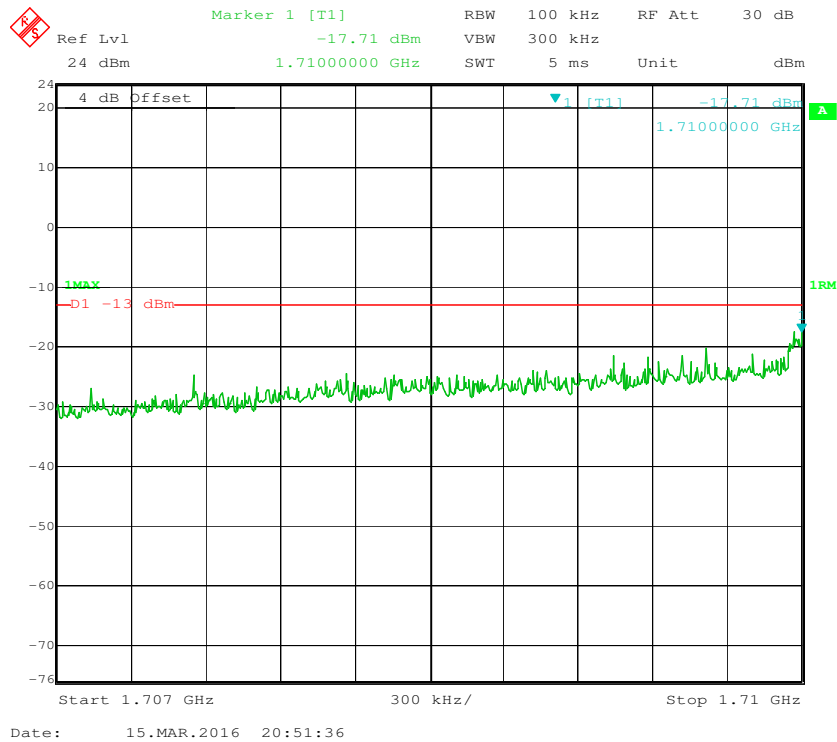
AWS-1 Band, Left Band Edge for AWGN-Pre AGC



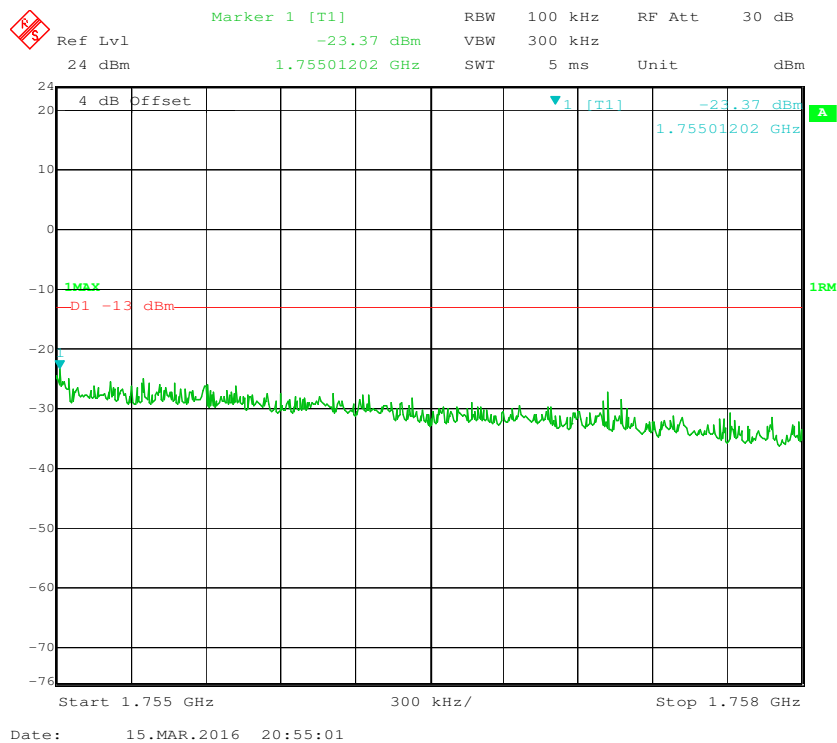
AWS-1 Band, Right Band Edge for AWGN-Pre AGC



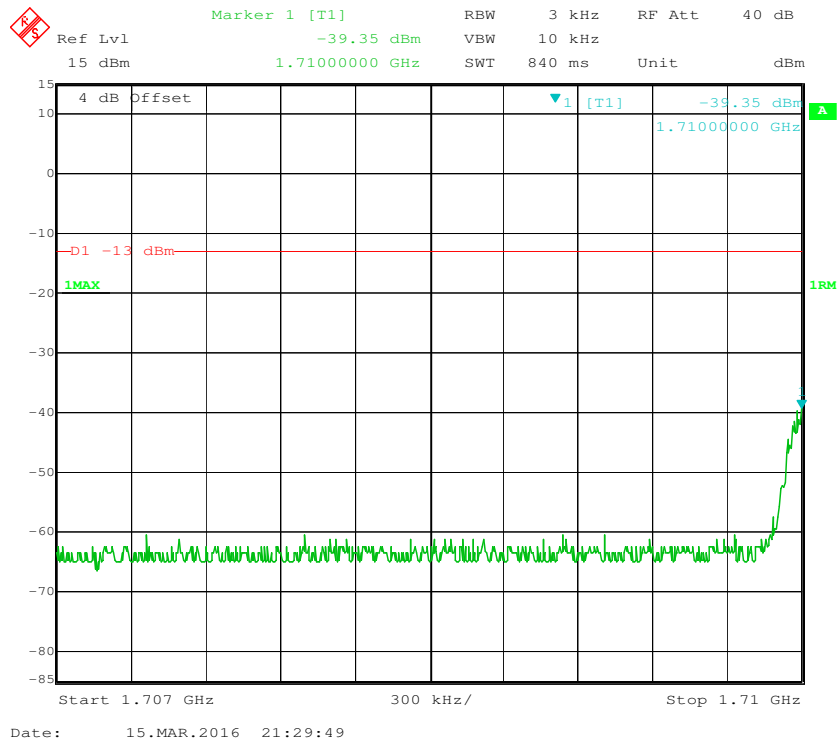
AWS-1 Band, Left Band Edge for AWGN-3dB Above AGC



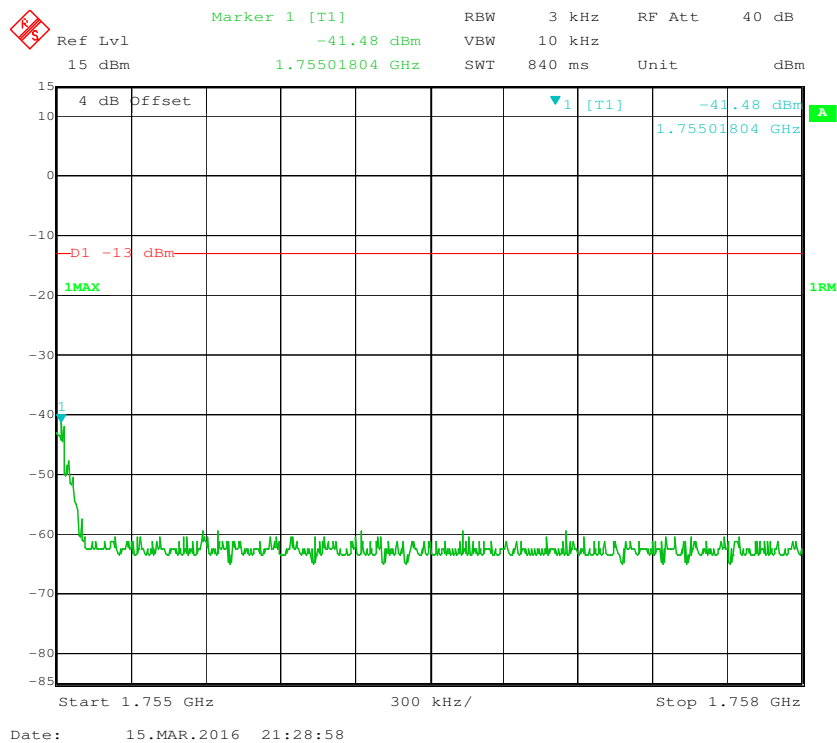
AWS-1 Band, Right Band Edge for AWGN-3dB Above AGC



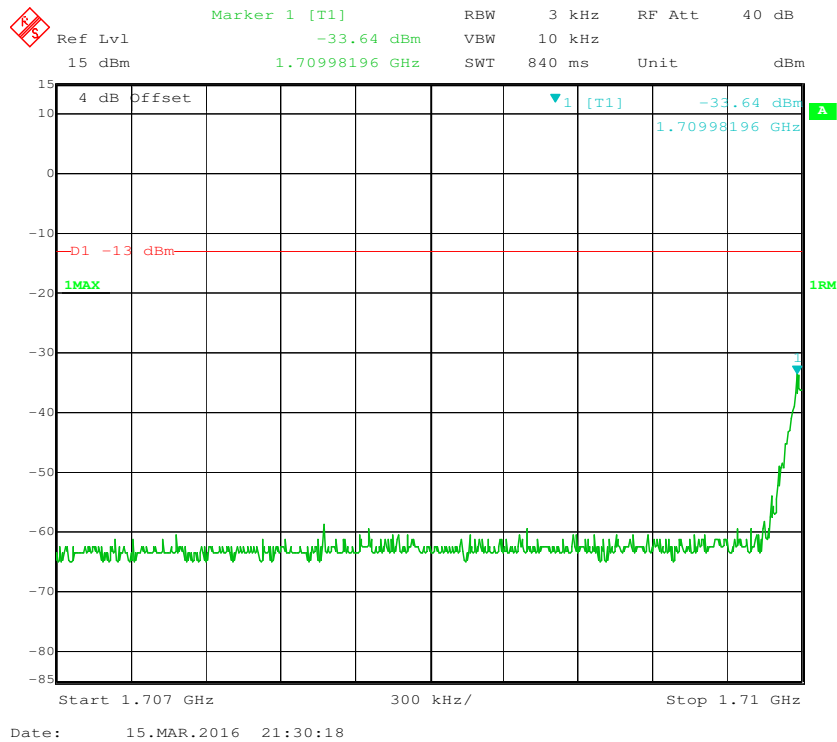
AWS-1 Band, Left Band Edge for GSM-Pre AGC



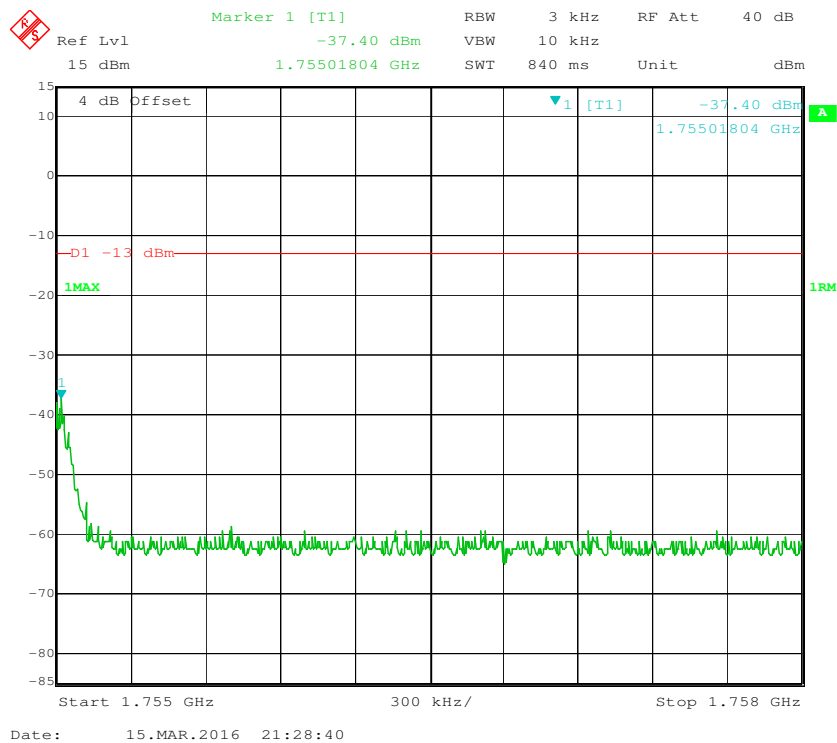
AWS-1 Band, Right Band Edge for GSM-Pre AGC

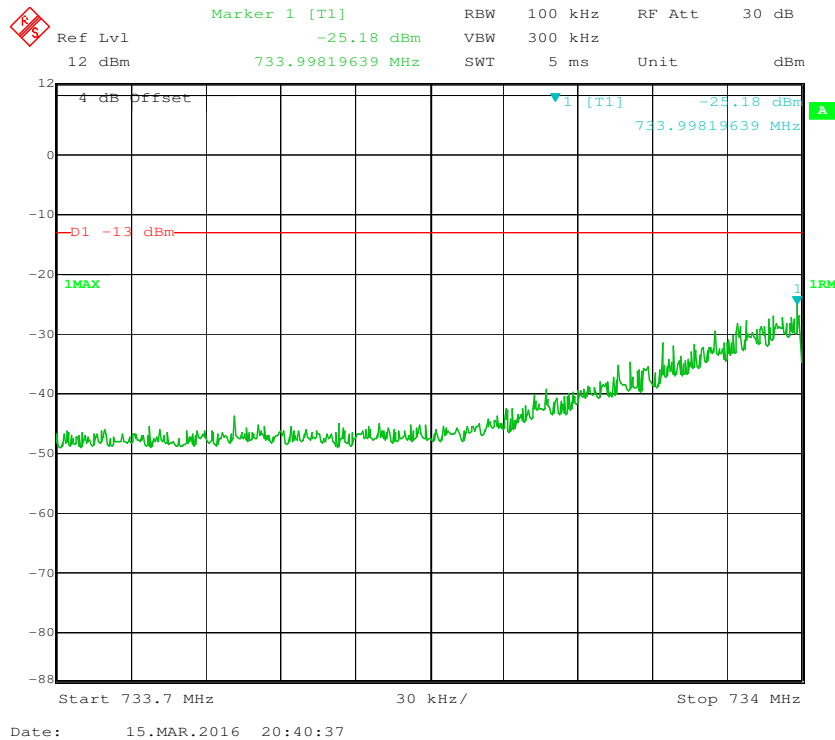
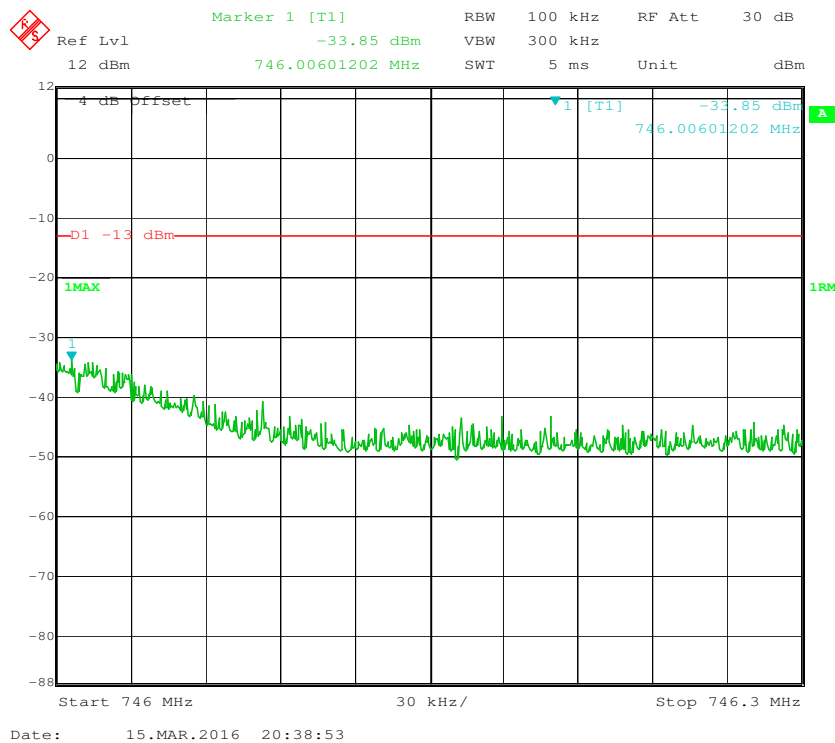


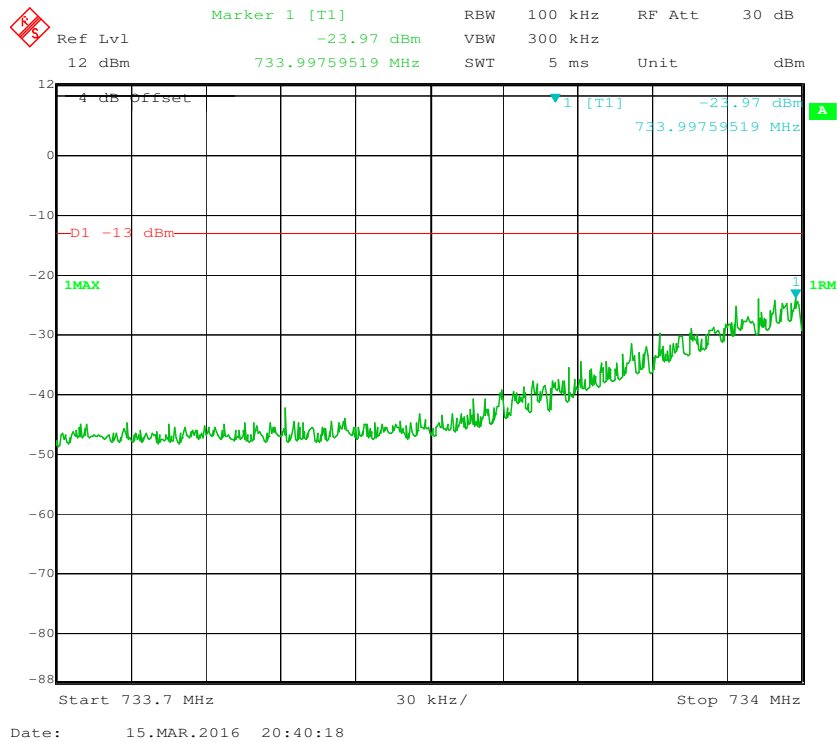
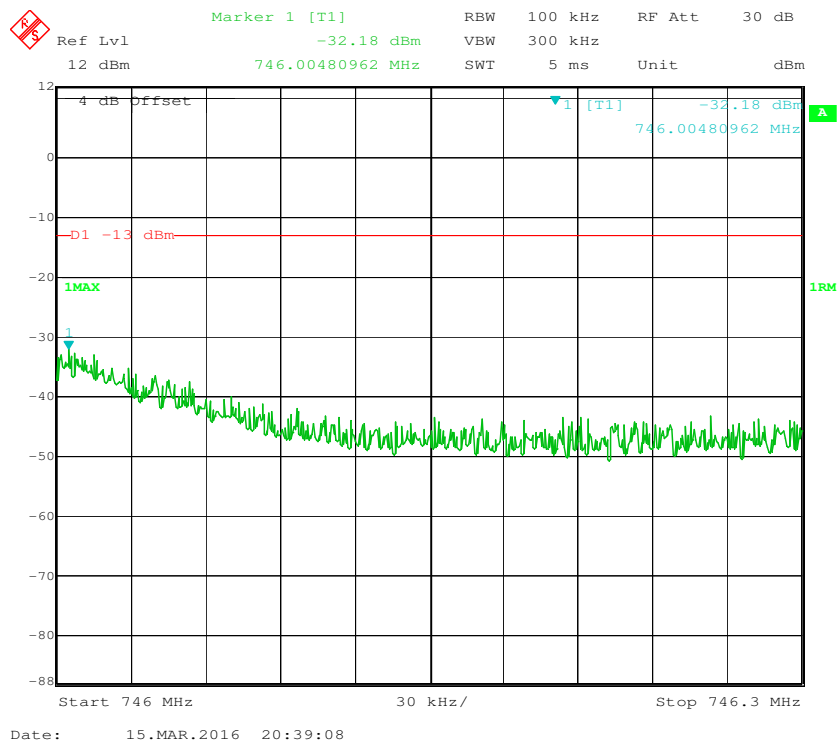
AWS-1 Band, Left Band Edge for GSM-3dB Above AGC

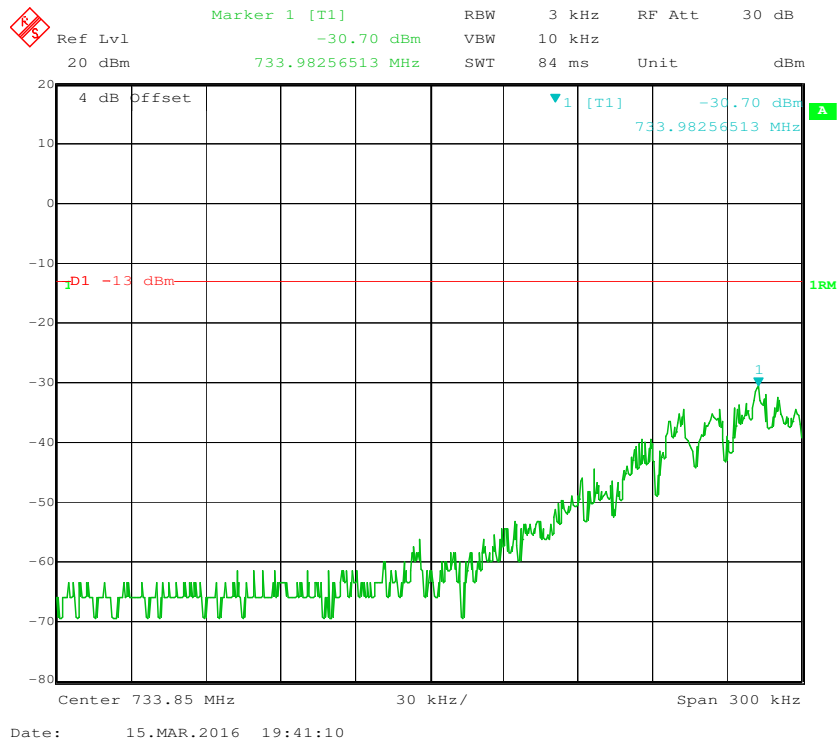
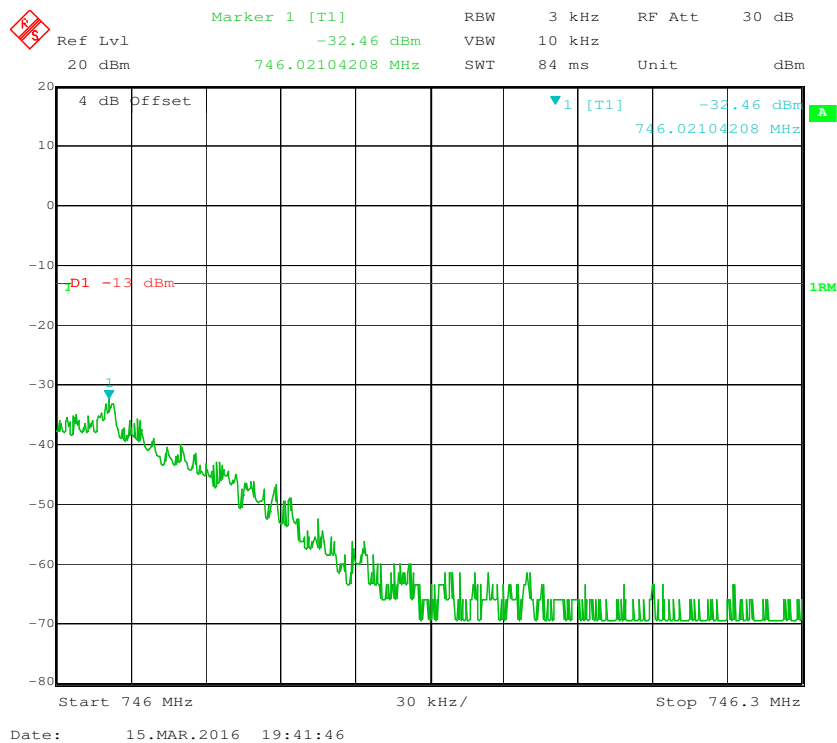


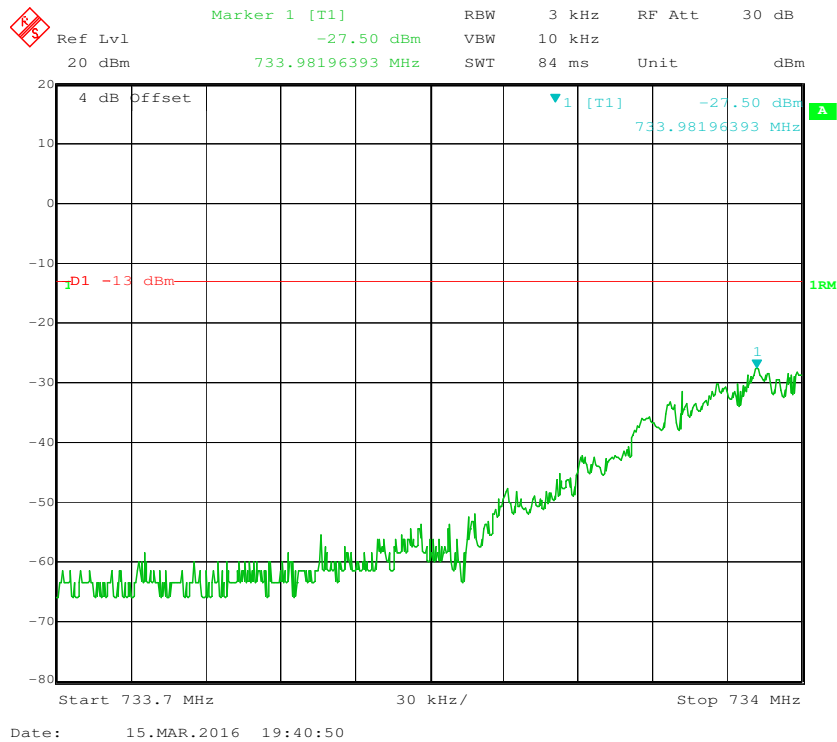
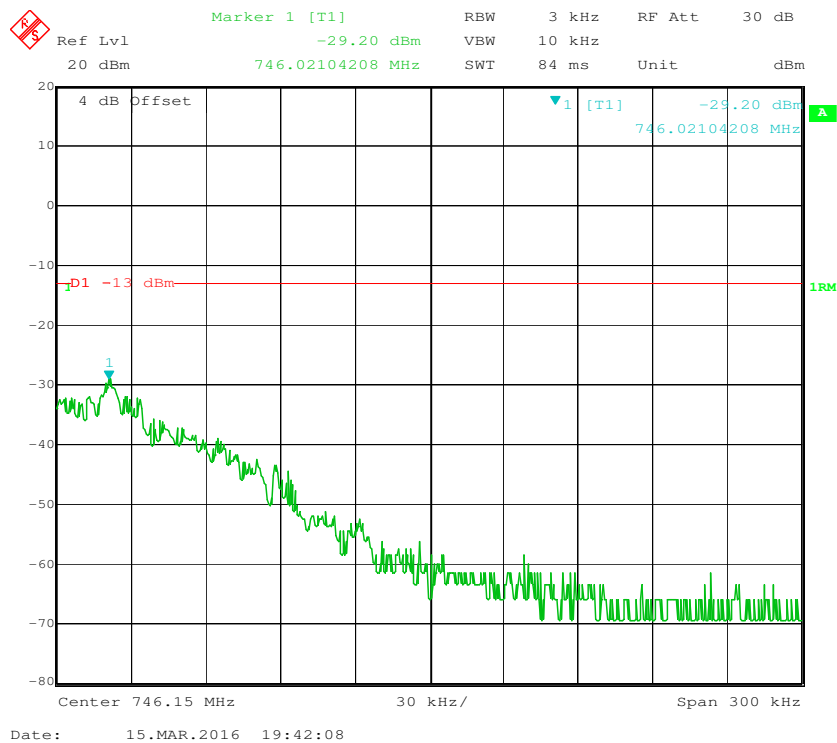
AWS-1 Band, Right Band Edge for GSM-3dB Above AGC

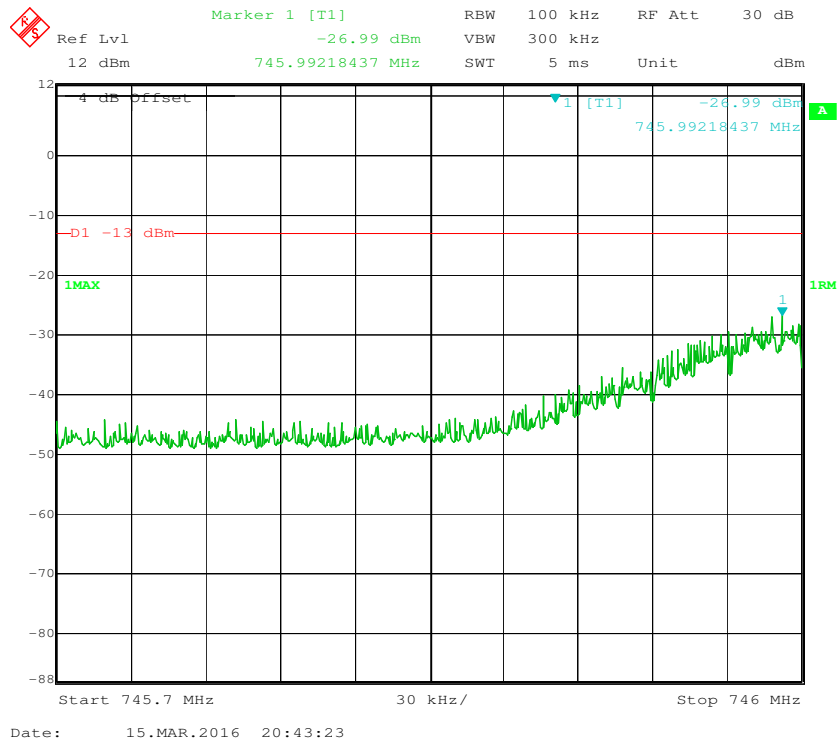
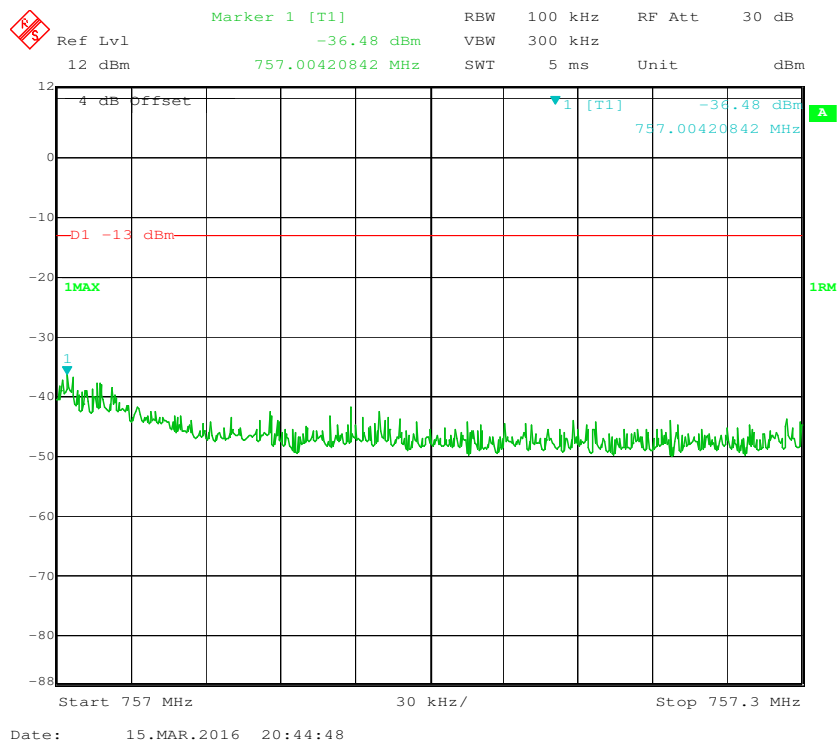


Downlink:**Lower 700MHz (B+C Block), Left Band Edge for AWGN-Pre AGC****Lower 700MHz (B+C Block), Right Band Edge for AWGN-Pre AGC**

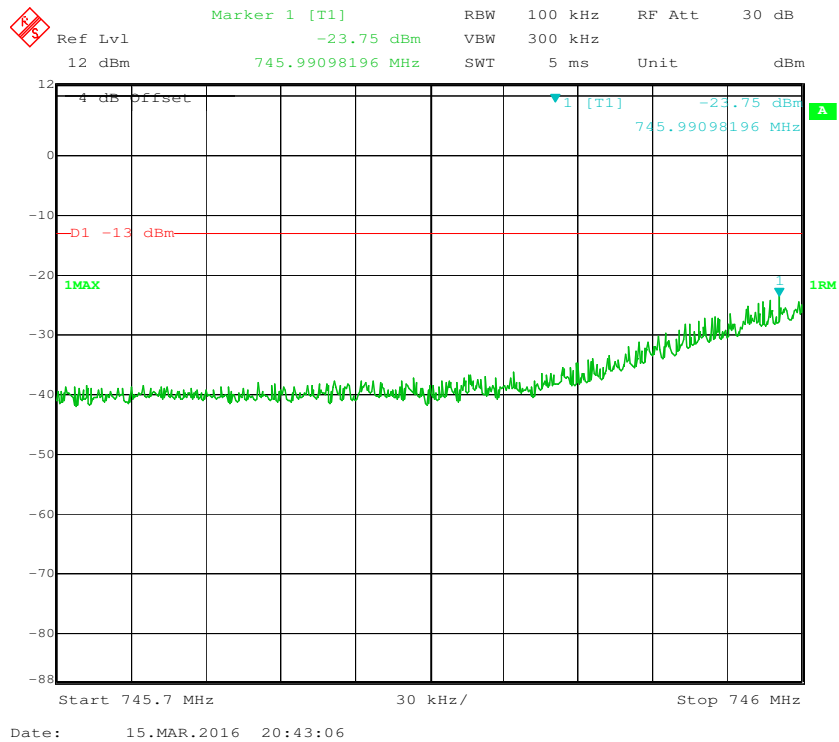
Lower 700MHz (B+C Block), Left Band Edge for AWGN-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for AWGN-3dB Above AGC**

Lower 700MHz (B+C Block), Left Band Edge for GSM-Pre AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-Pre AGC**

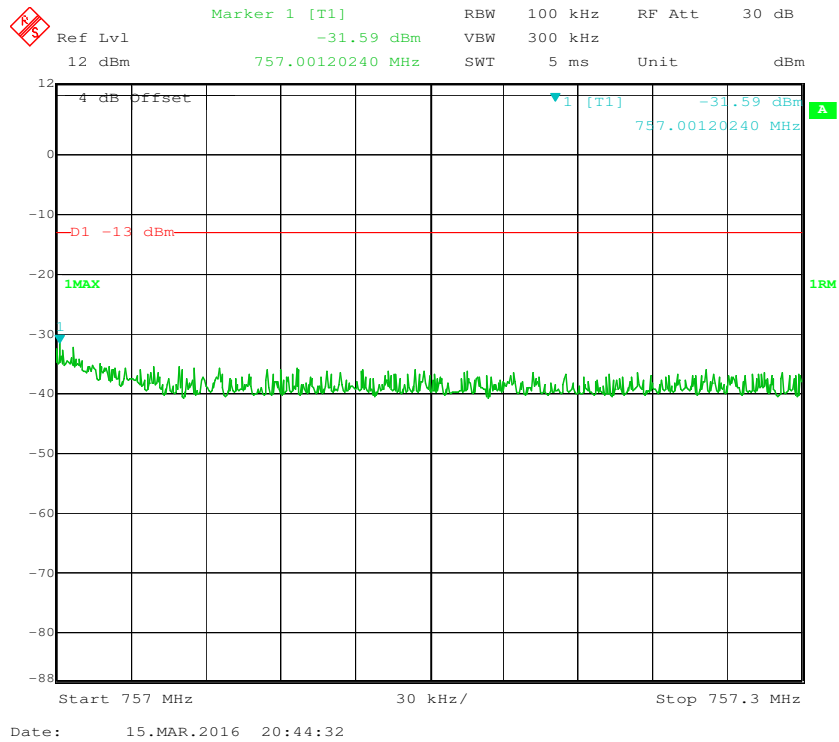
Lower 700MHz (B+C Block), Left Band Edge for GSM-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-3dB Above AGC**

Upper 700MHz C Block, Left Band Edge for AWGN-Pre AGC**LTE C Band, Right Band Edge for AWGN-Pre AGC**

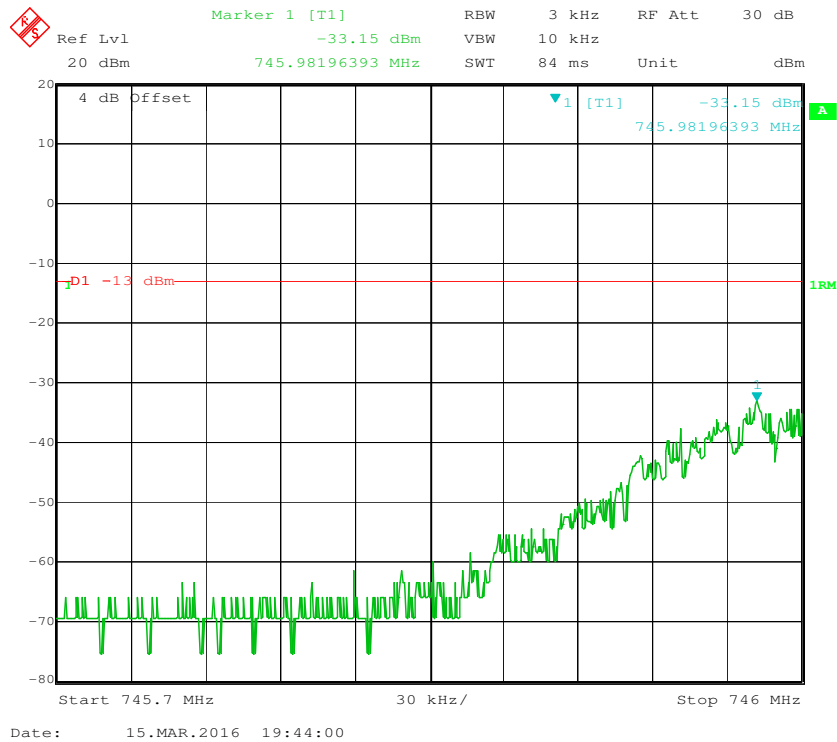
Upper 700MHz C Block, Left Band Edge for AWGN-3dB Above AGC



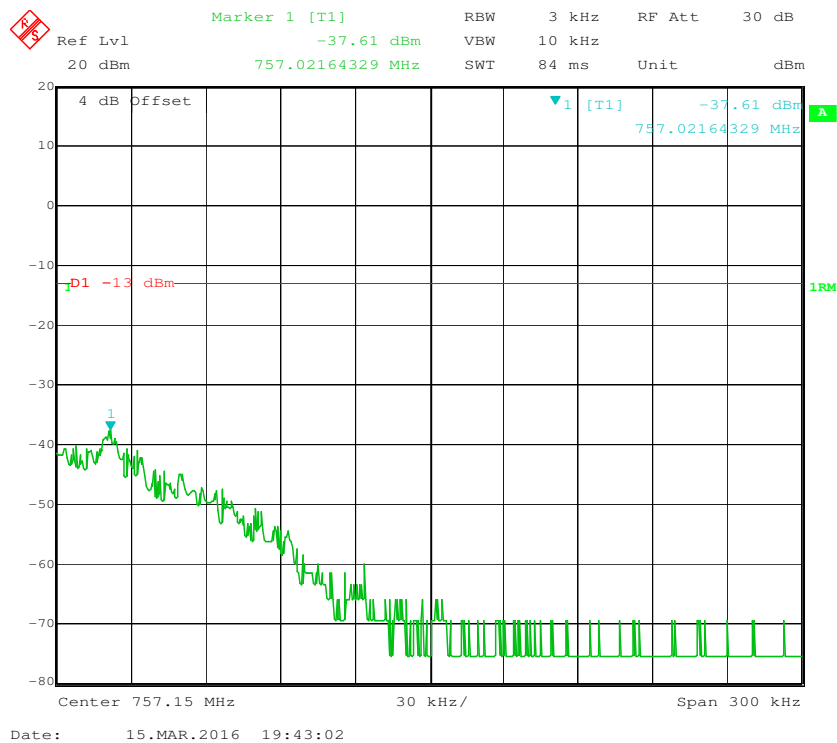
Upper 700MHz C Block, Right Band Edge for AWGN-3dB Above AGC

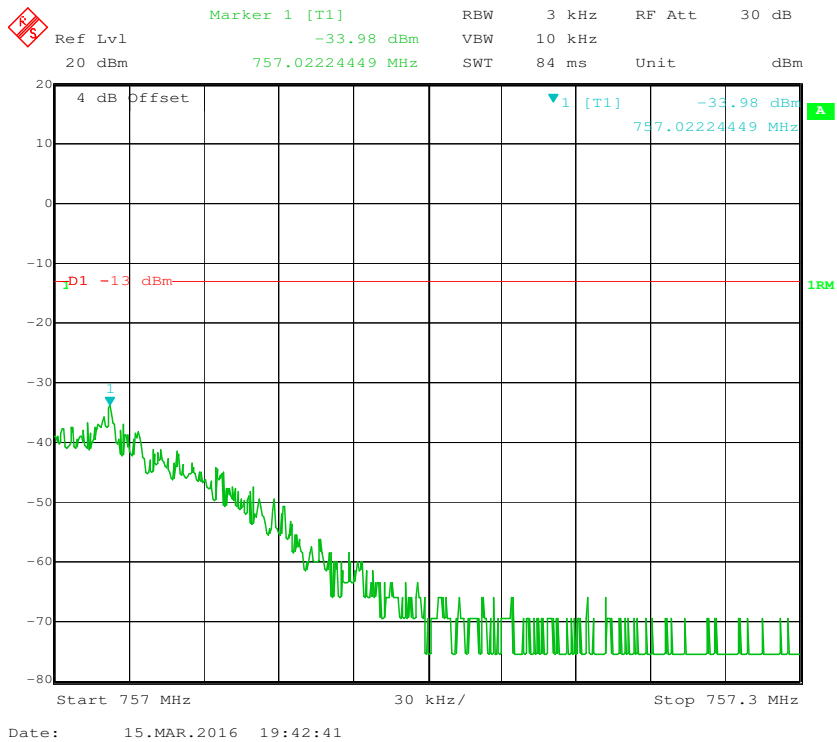
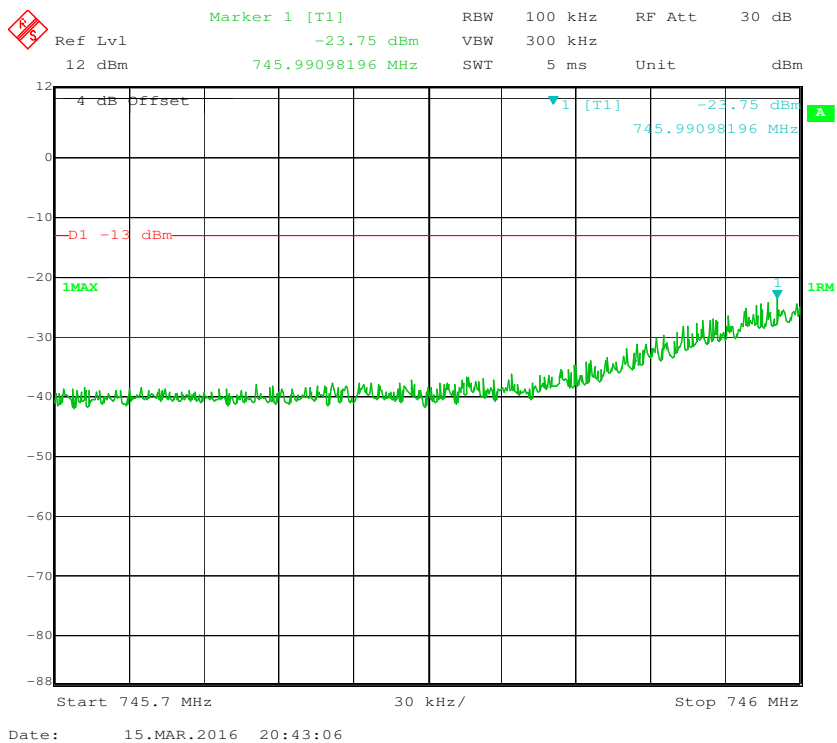


Upper 700MHz C Block, Left Band Edge for GSM-Pre AGC

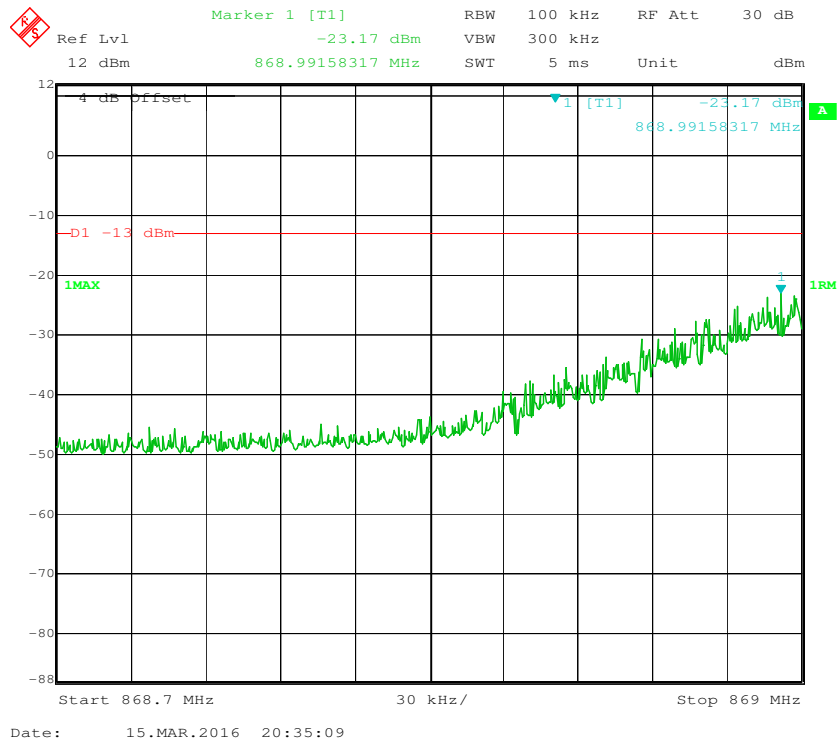


Upper 700MHz C Block, Right Band Edge for GSM-Pre AGC

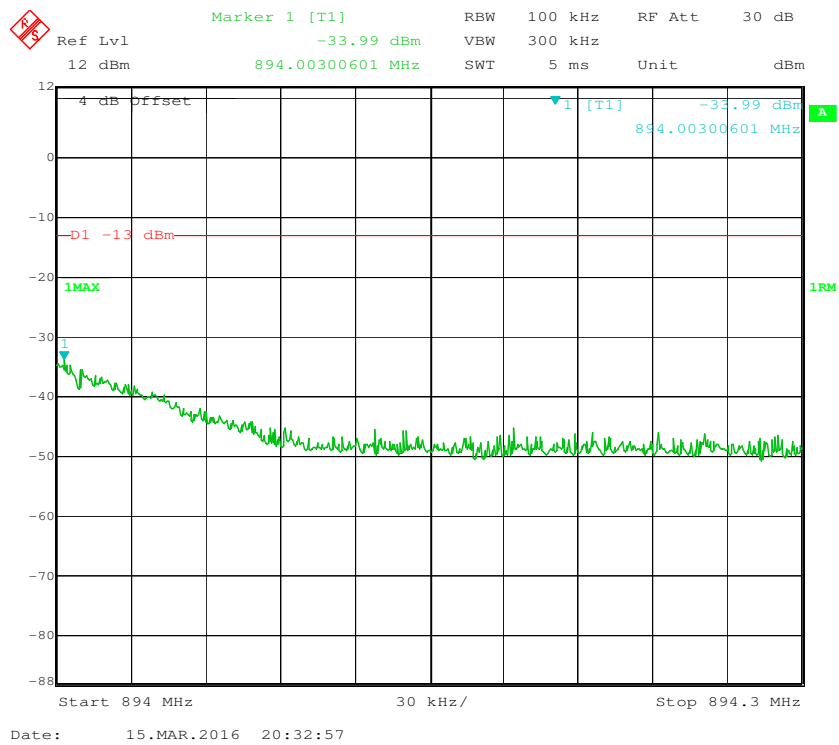


Upper 700MHz C Block, Left Band Edge for GSM-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for GSM-3dB Above AGC**

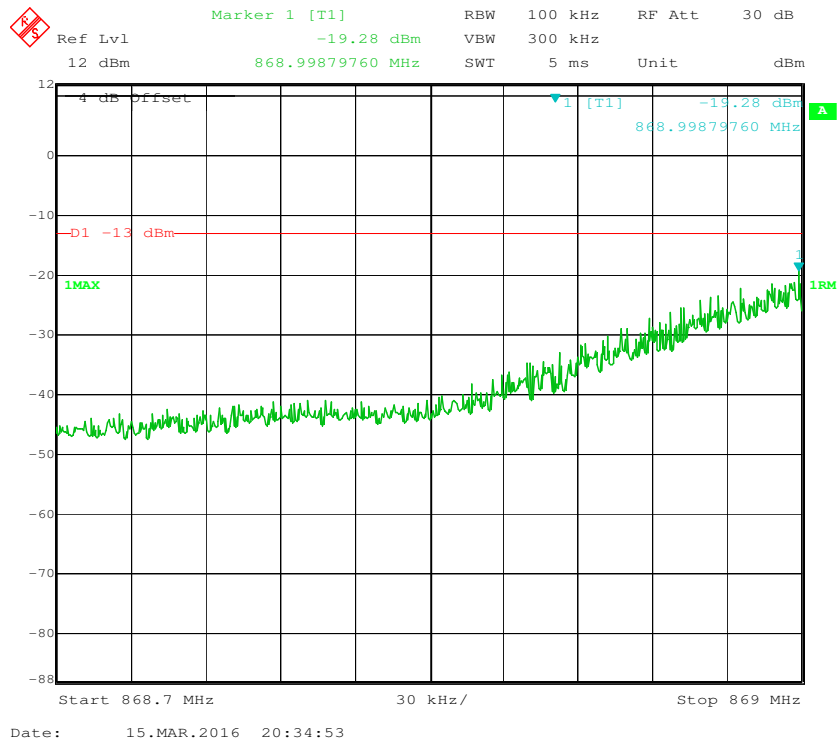
CELLULAR Band, Left Band Edge for AWGN-Pre AGC



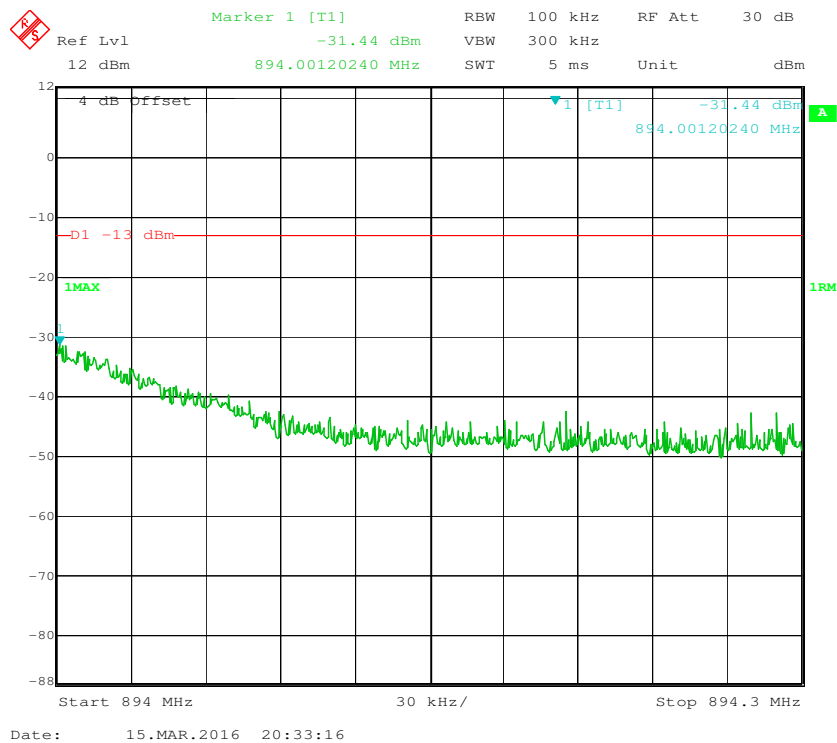
CELLULAR Band, Right Band Edge for AWGN-Pre AGC



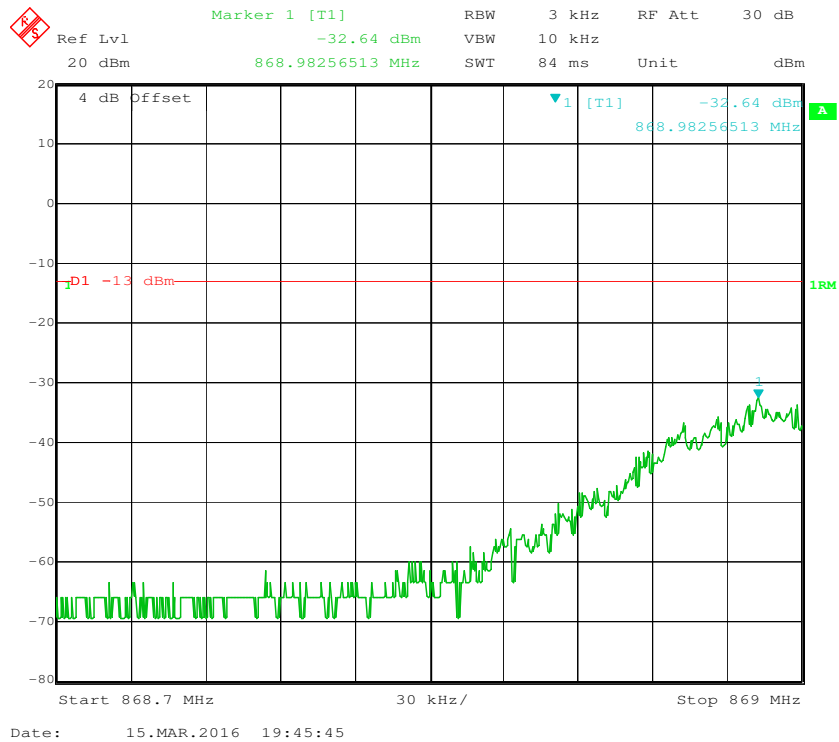
CELLULAR Band, Left Band Edge for AWGN-3dB Above AGC



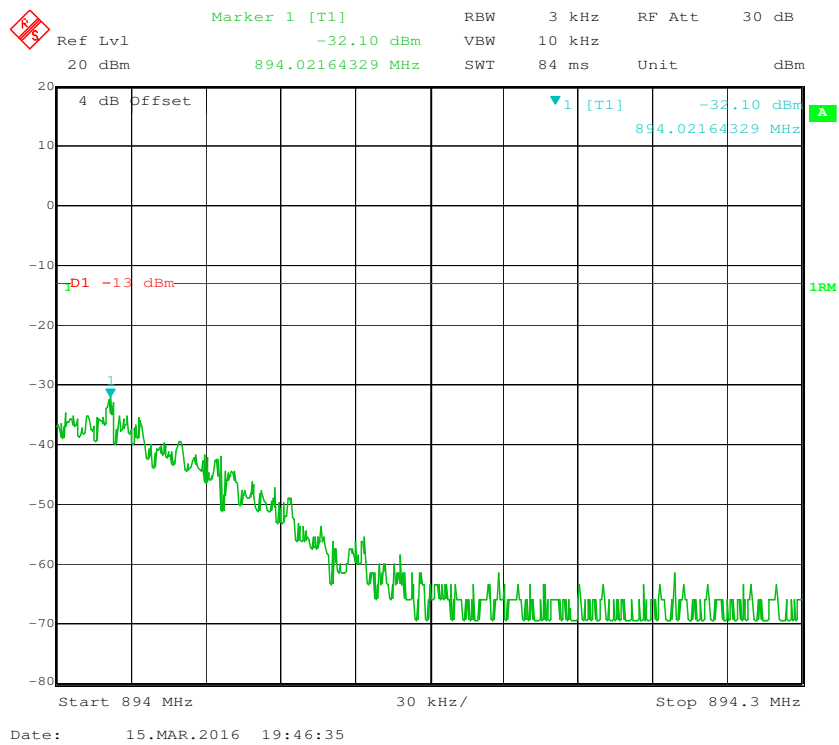
CELLULAR Band, Right Band Edge for AWGN-3dB Above AGC

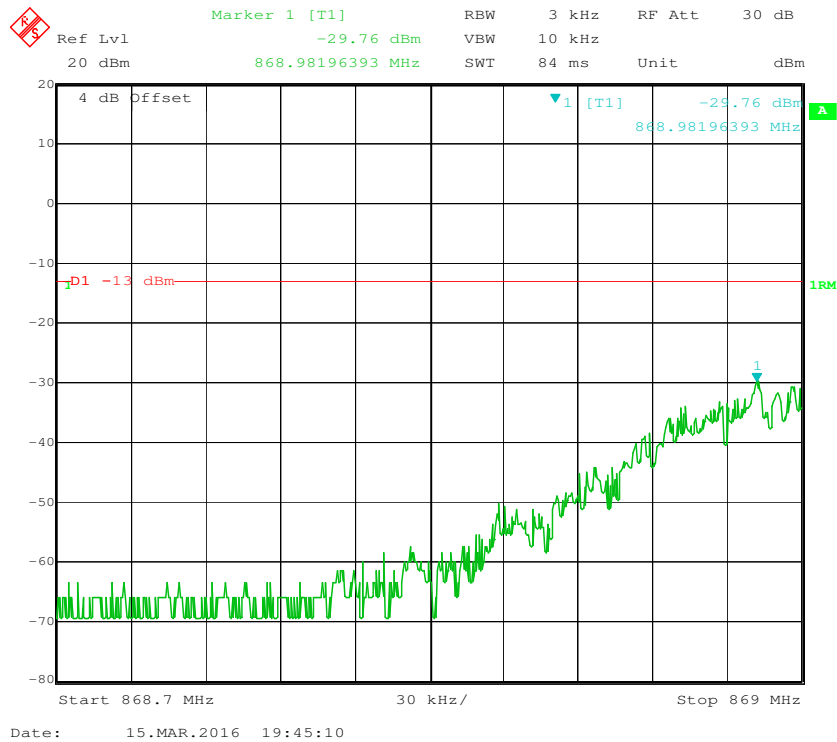
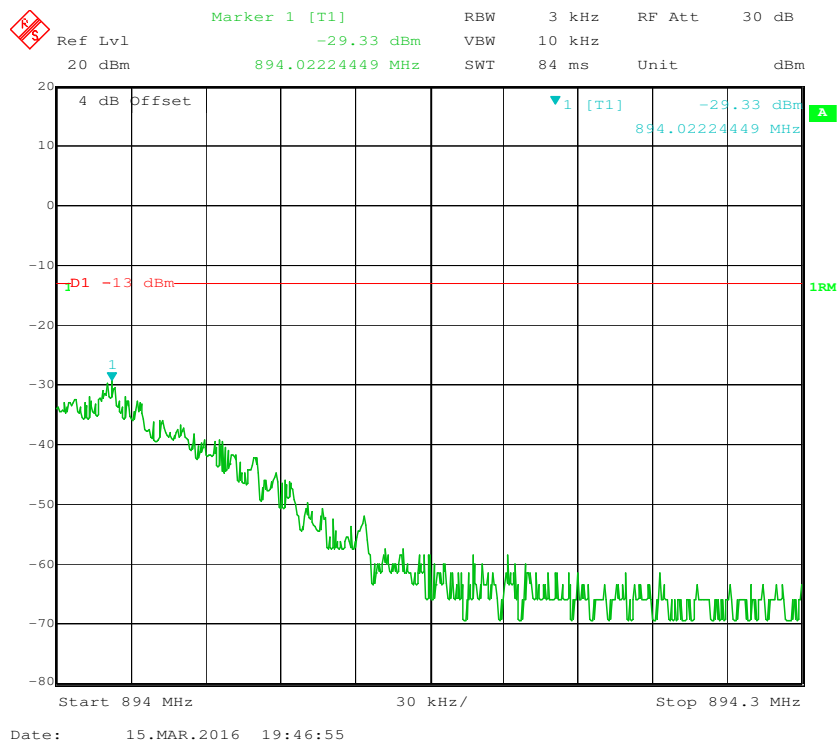


CELLULAR Band, Left Band Edge for GSM-Pre AGC

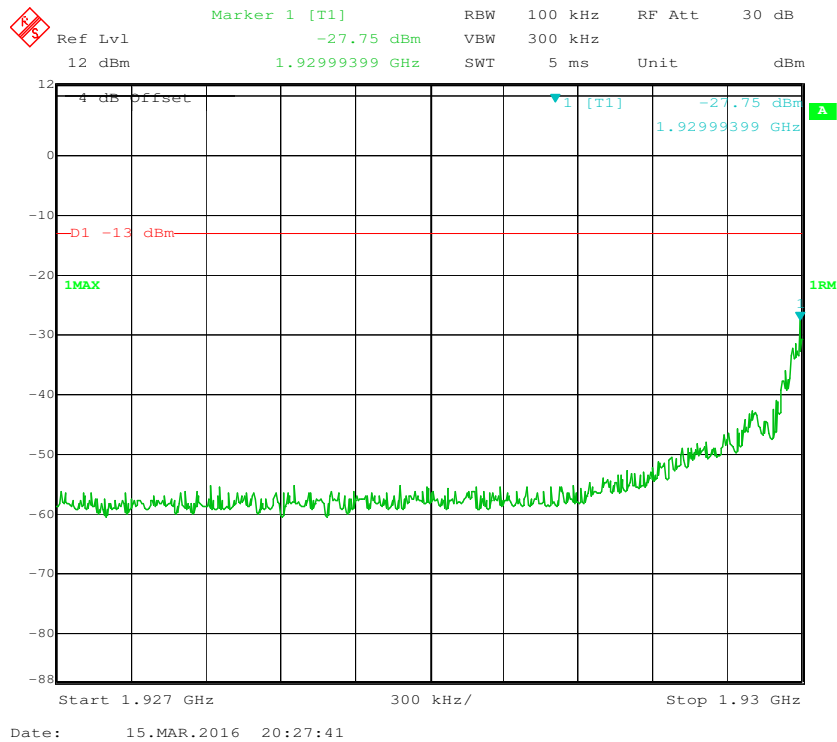


CELLULAR Band, Right Band Edge for GSM-Pre AGC

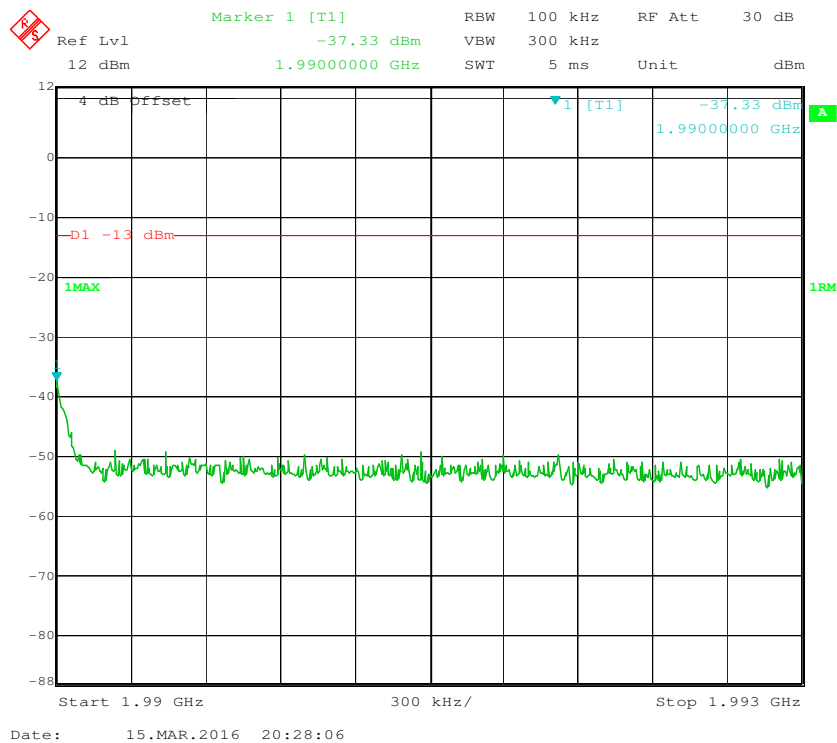


CELLULAR Band, Left Band Edge for GSM-3dB Above AGC**CELLULAR Band, Right Band Edge for GSM-3dB Above AGC**

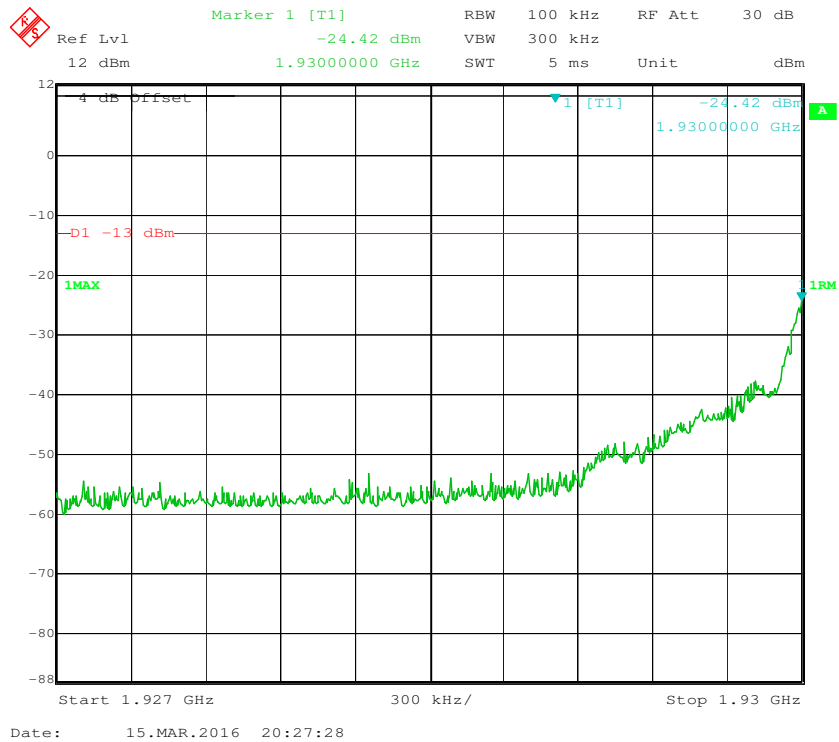
PCS Band, Left Band Edge for AWGN-Pre AGC



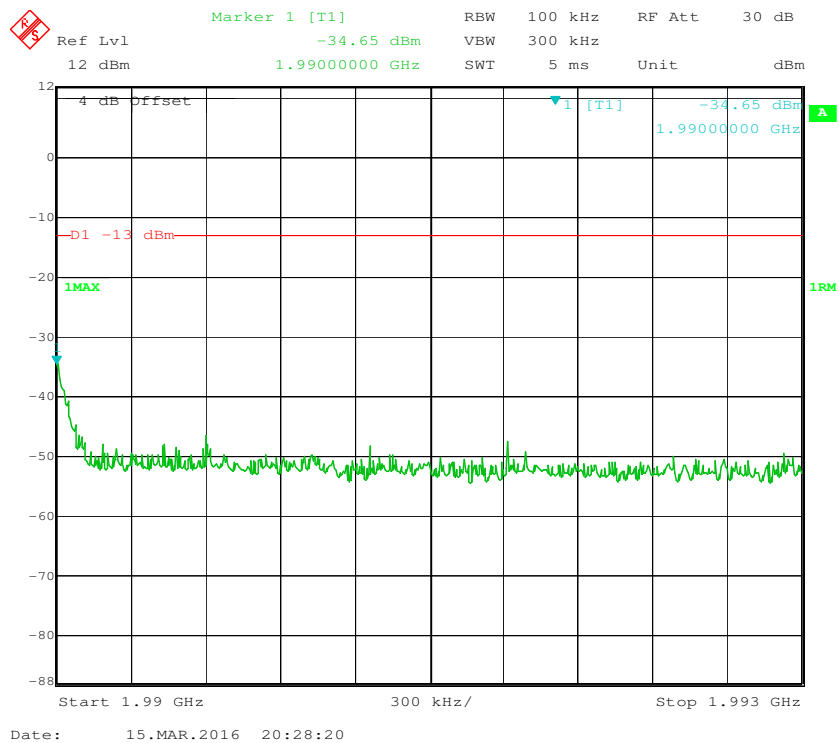
PCS Band, Right Band Edge for AWGN-Pre AGC



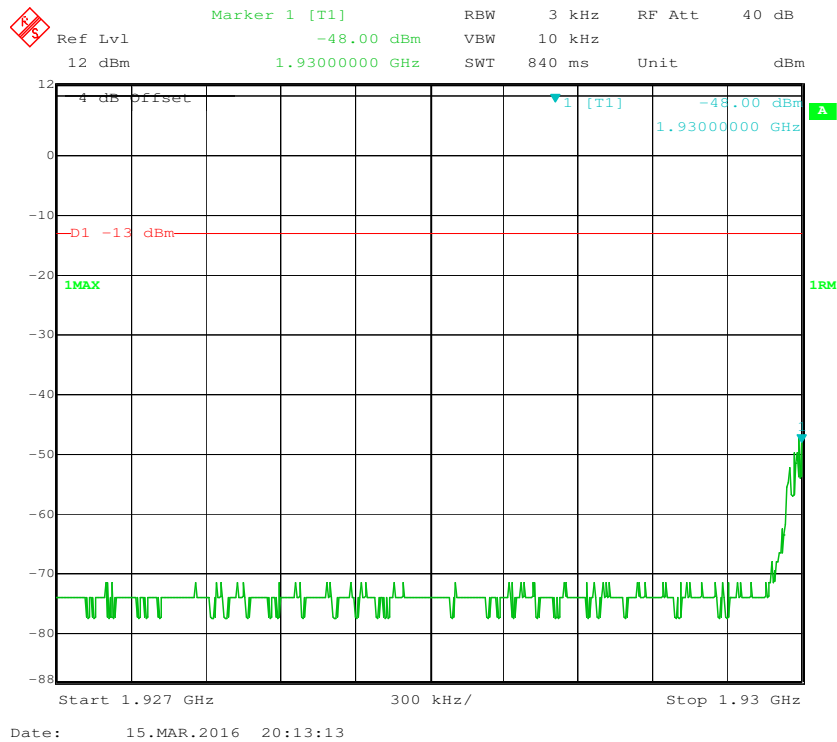
PCS Band, Left Band Edge for AWGN-3dB Above AGC



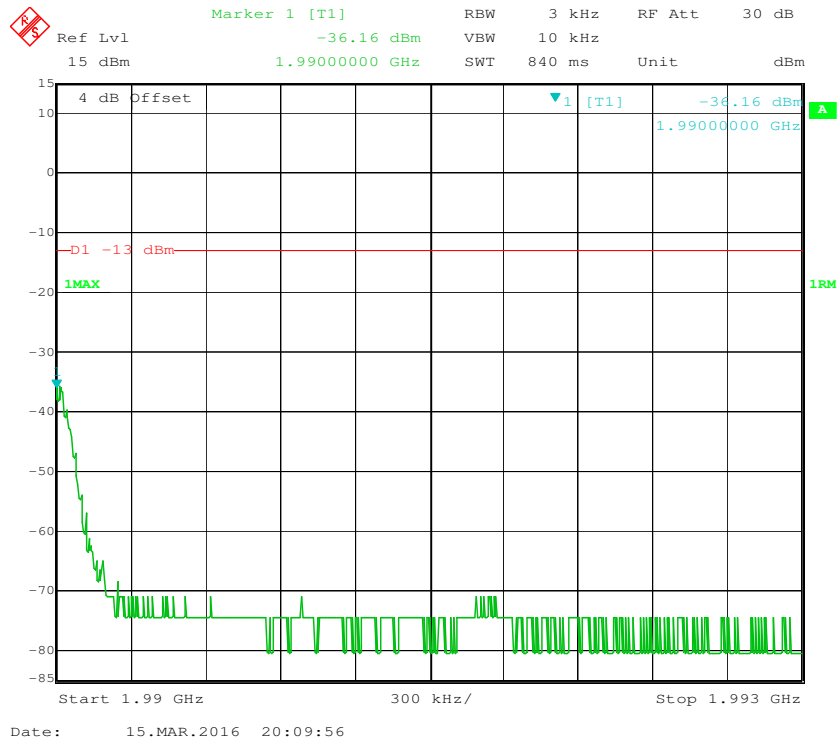
PCS Band, Right Band Edge for AWGN-3dB Above AGC



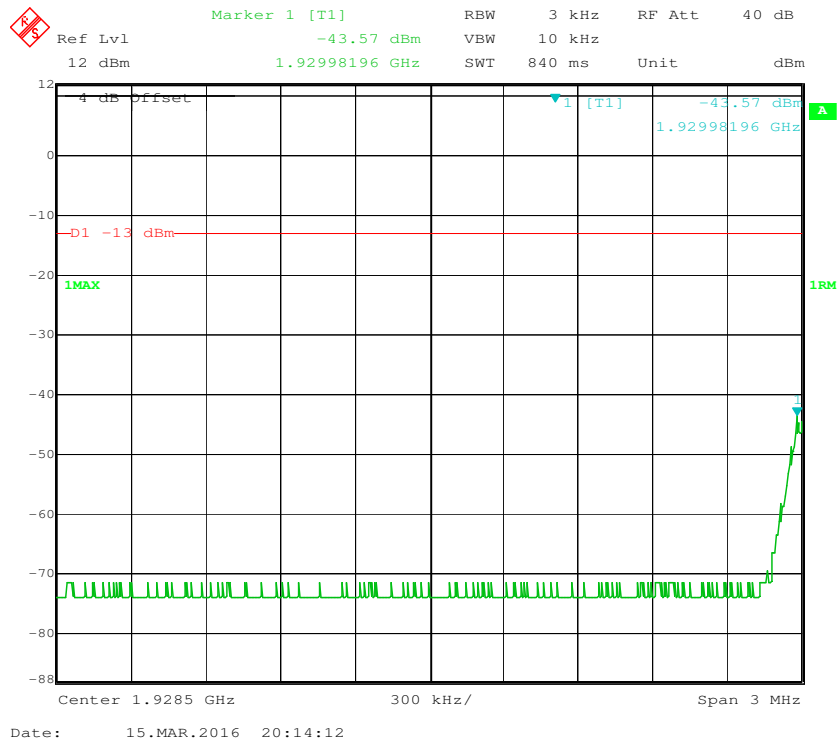
PCS Band, Left Band Edge for GSM-Pre AGC



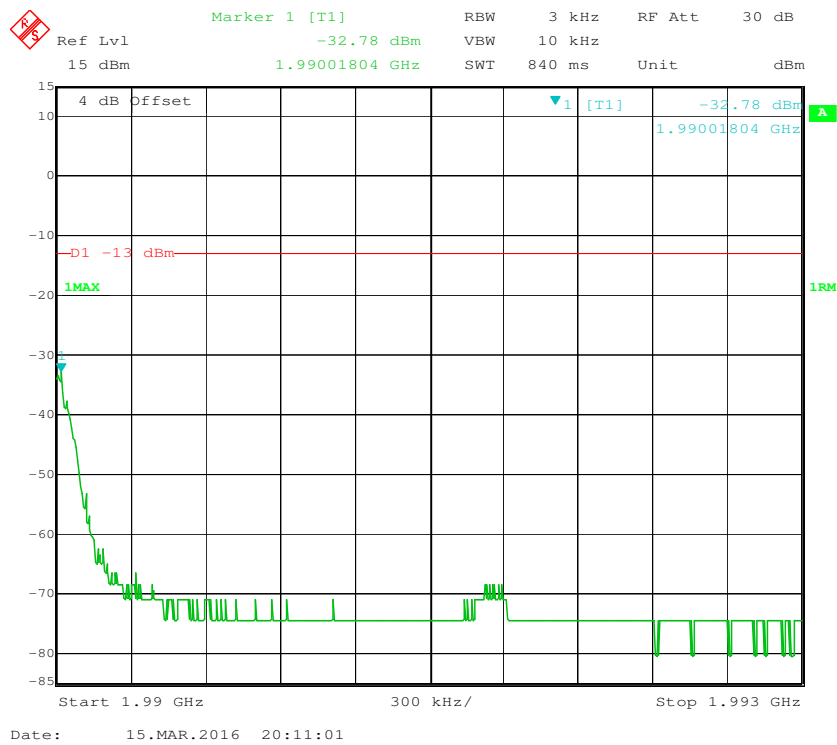
PCS Band, Right Band Edge for GSM-Pre AGC



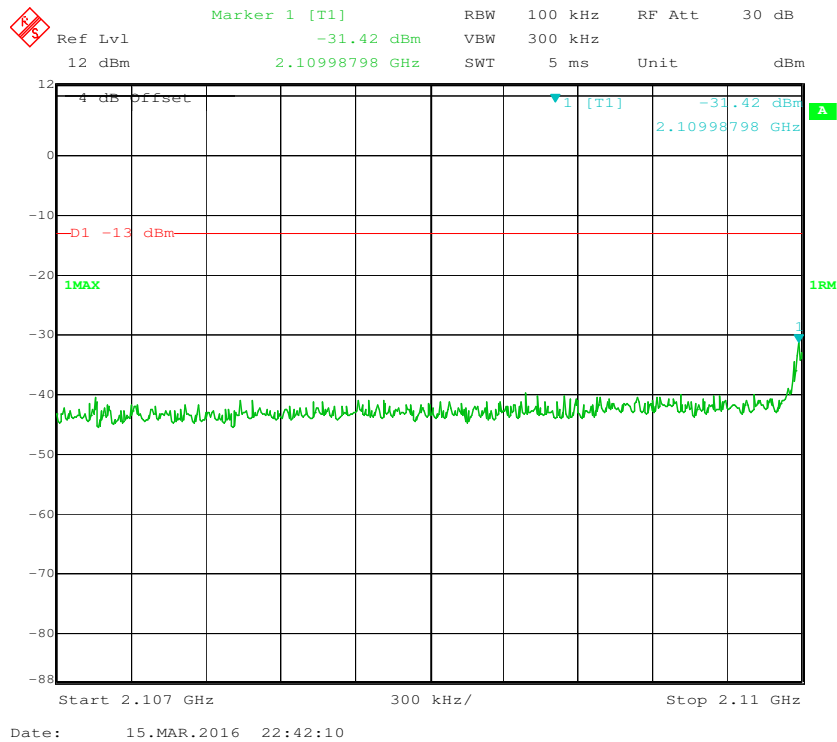
PCS Band, Left Band Edge for GSM-3dB Above AGC



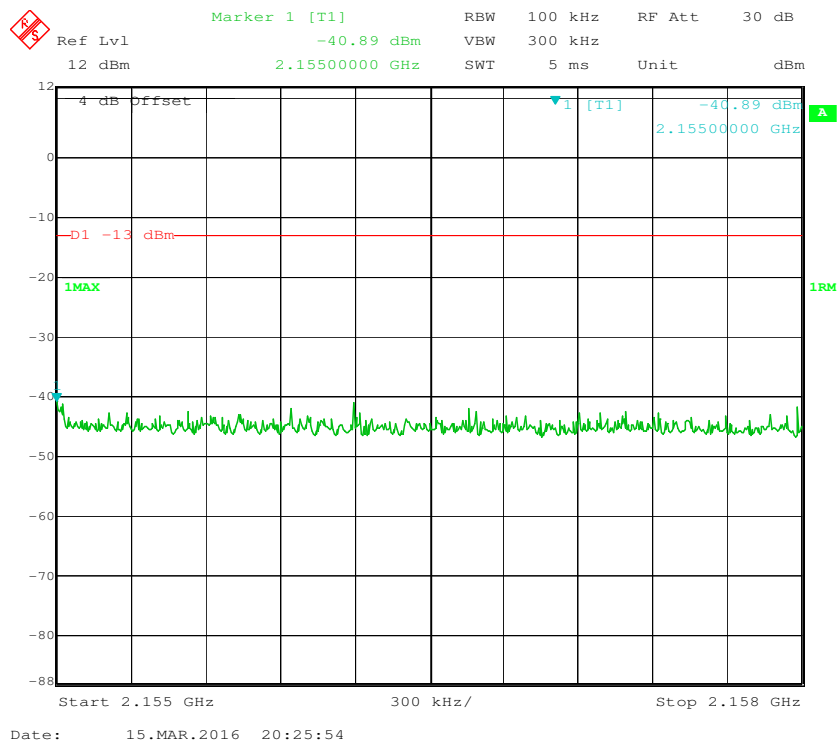
PCS Band, Right Band Edge for GSM-3dB Above AGC



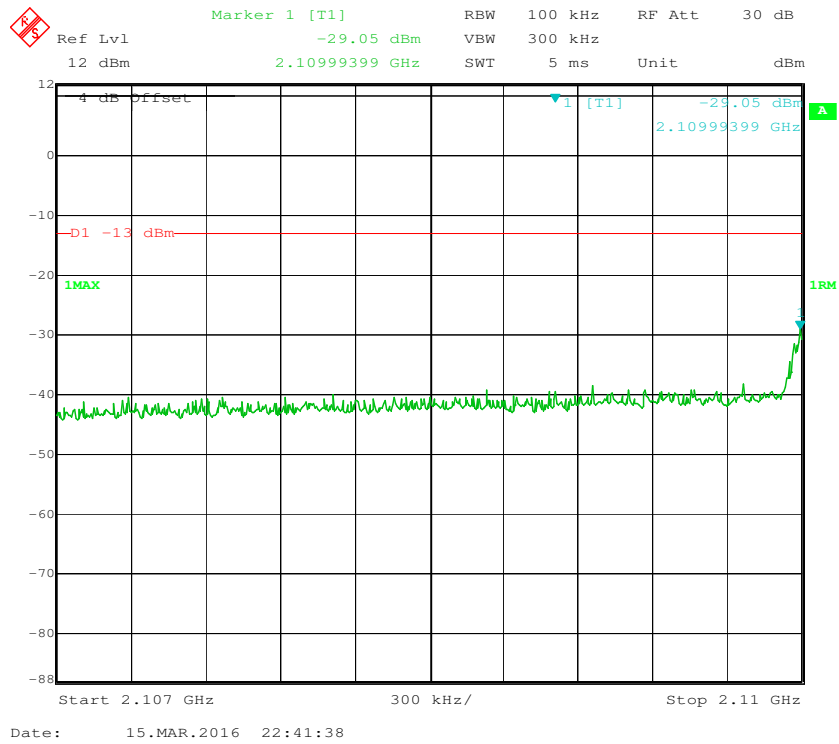
AWS-1 Band, Left Band Edge for AWGN-Pre AGC



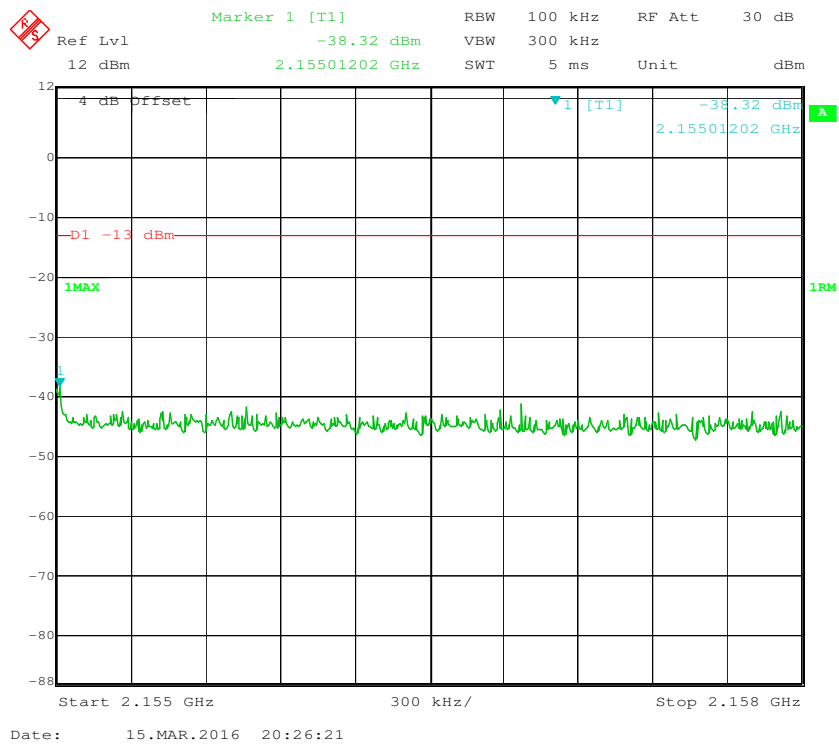
AWS-1 Band, Right Band Edge for AWGN-Pre AGC



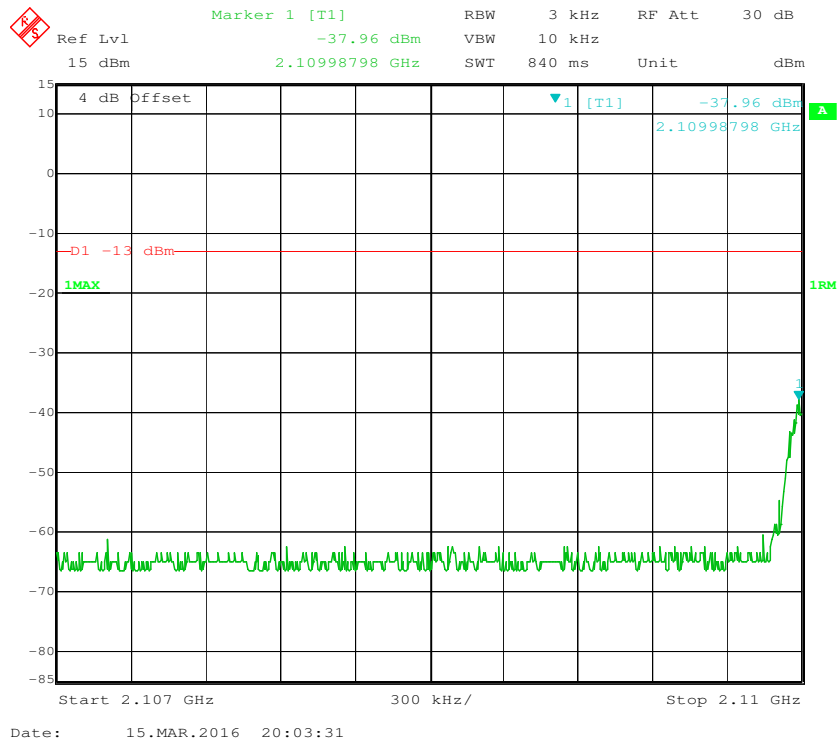
AWS-1 Band, Left Band Edge for AWGN-3dB Above AGC



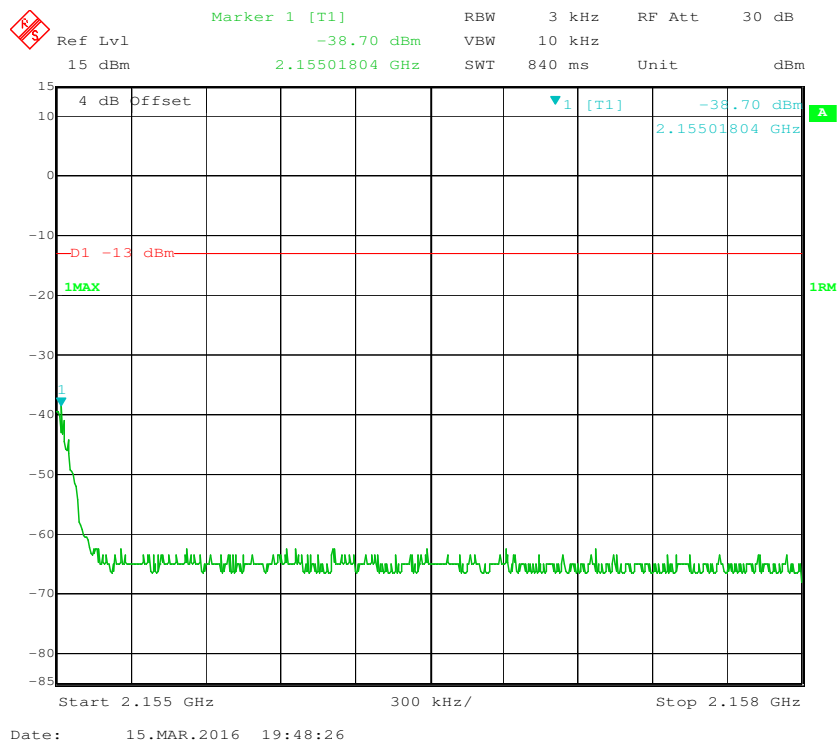
AWS-1 Band, Right Band Edge for AWGN-3dB Above AGC



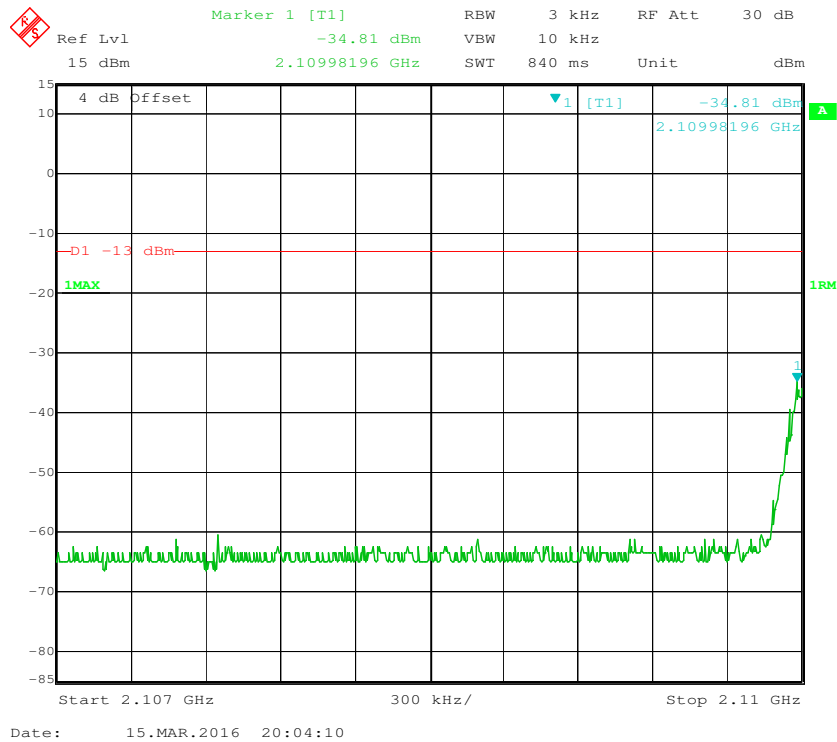
AWS-1 Band, Left Band Edge for GSM-Pre AGC



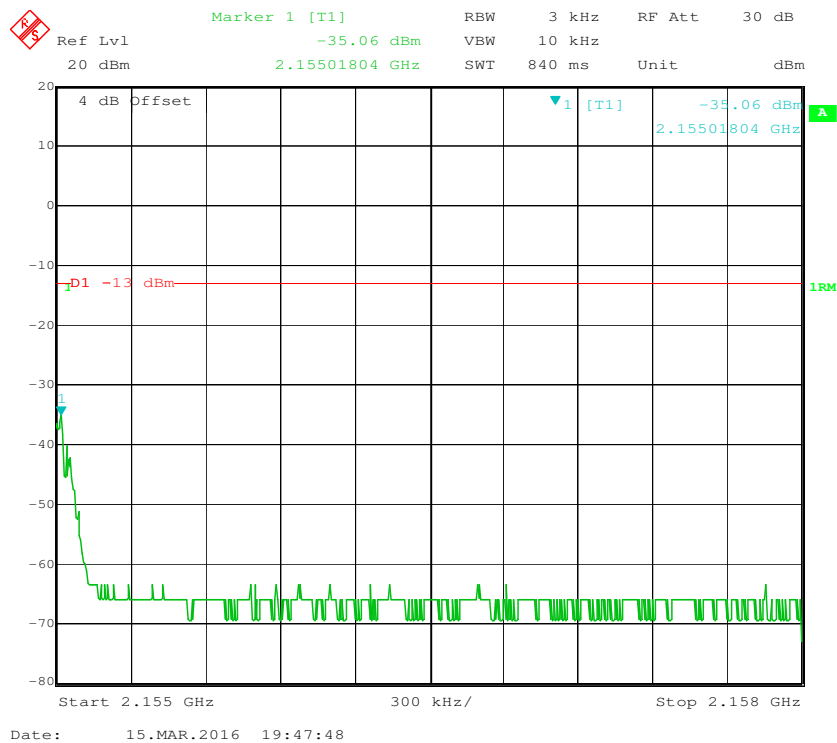
AWS-1 Band, Right Band Edge for GSM-Pre AGC

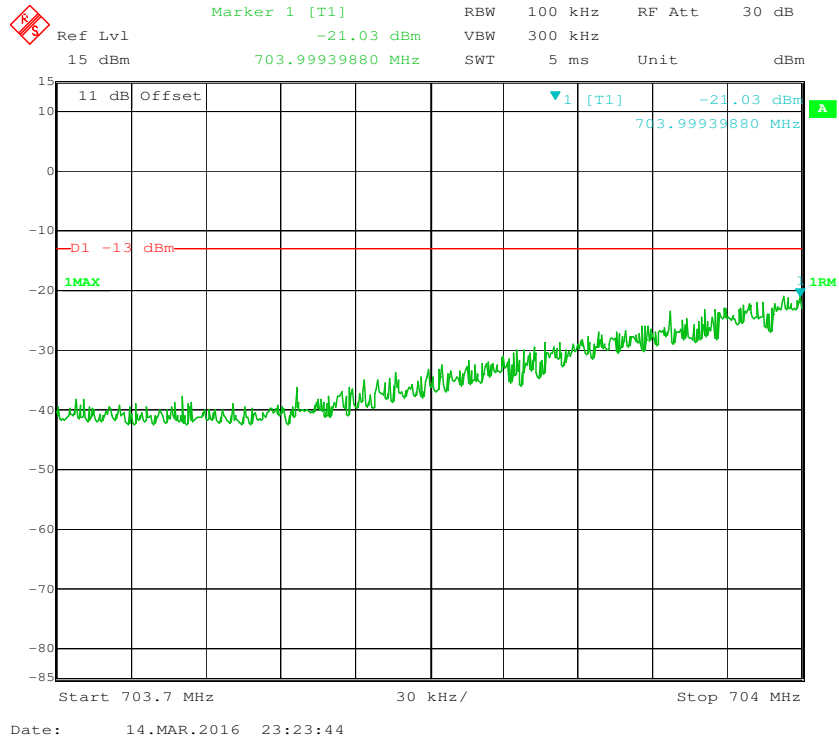
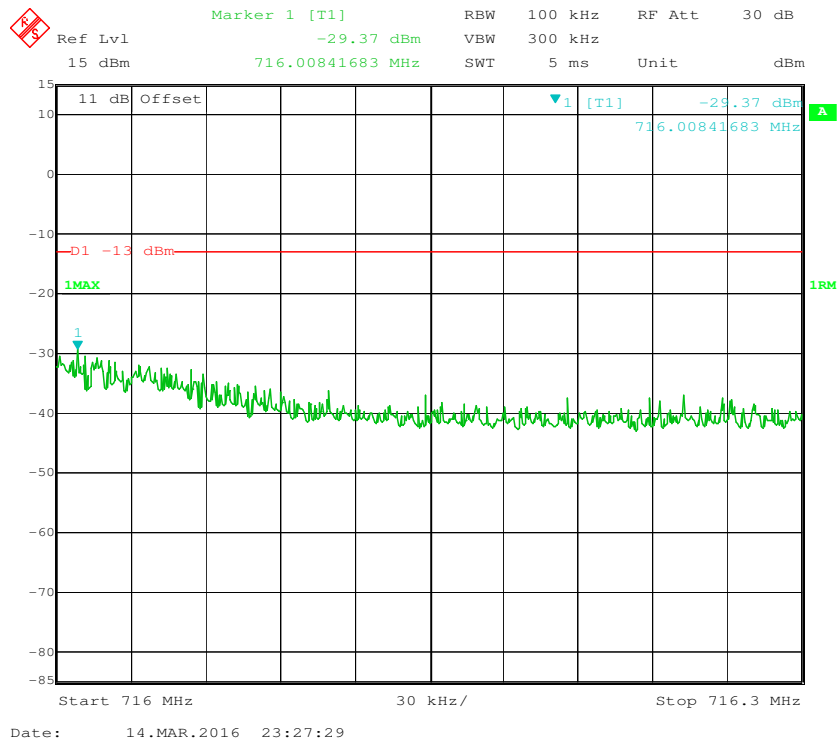


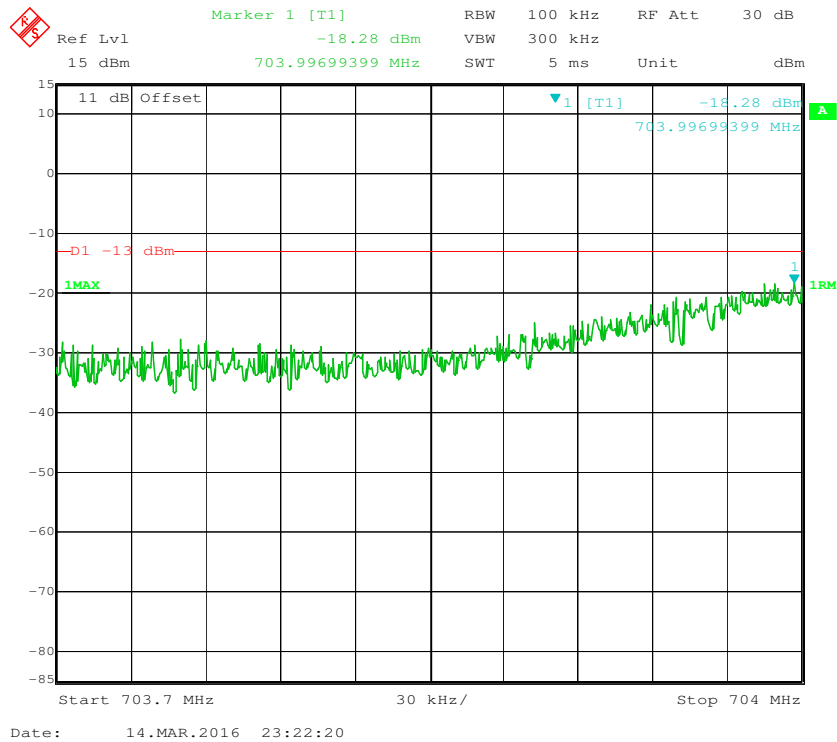
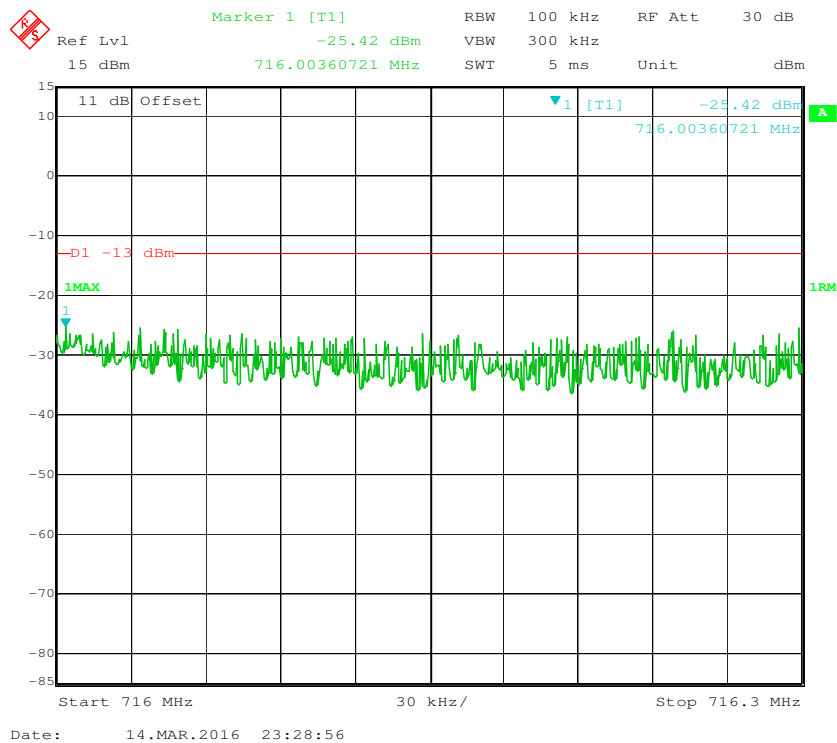
AWS-1 Band, Left Band Edge for GSM-3dB Above AGC

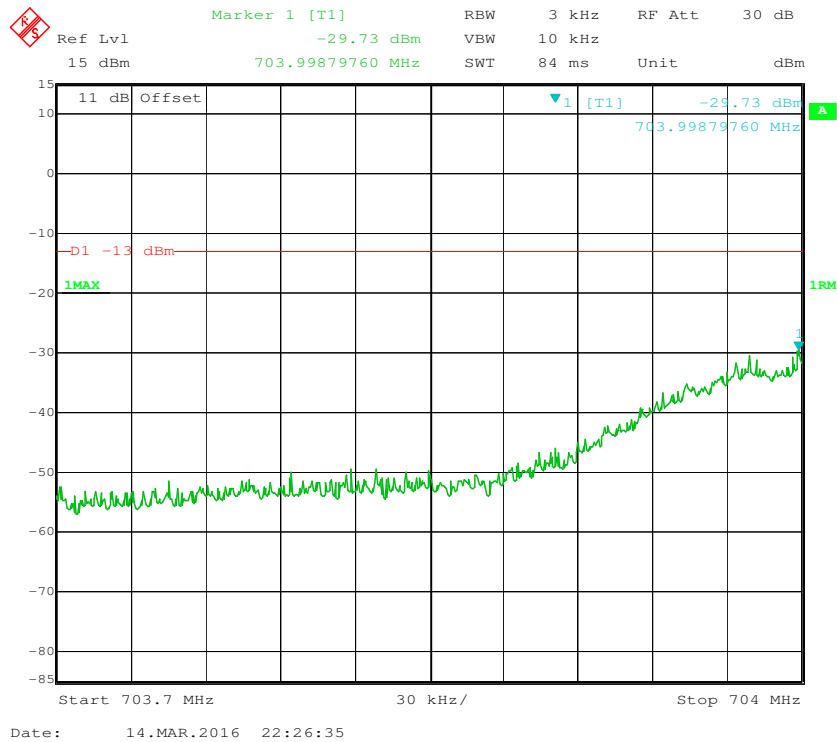
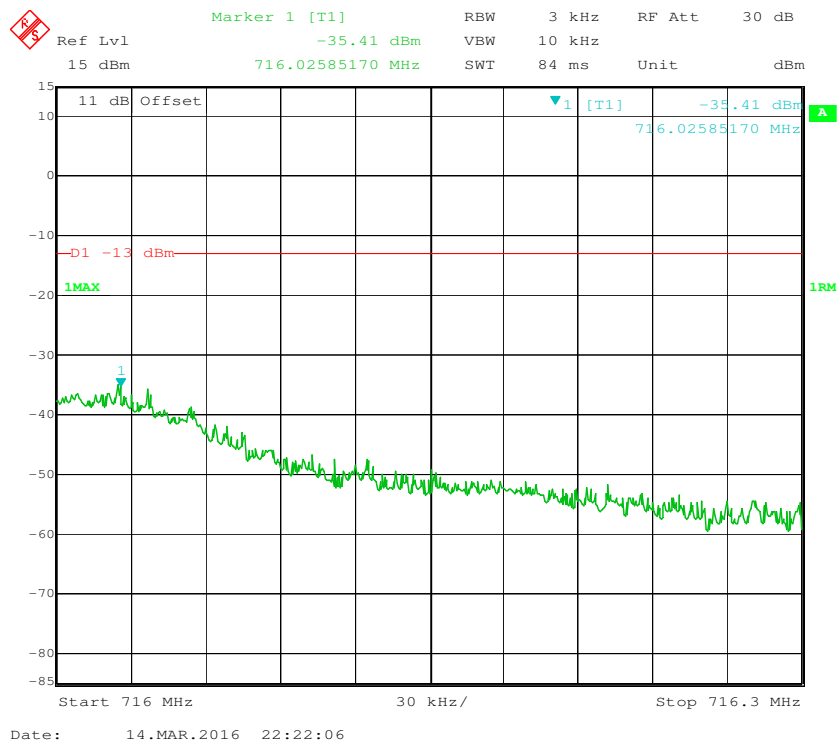


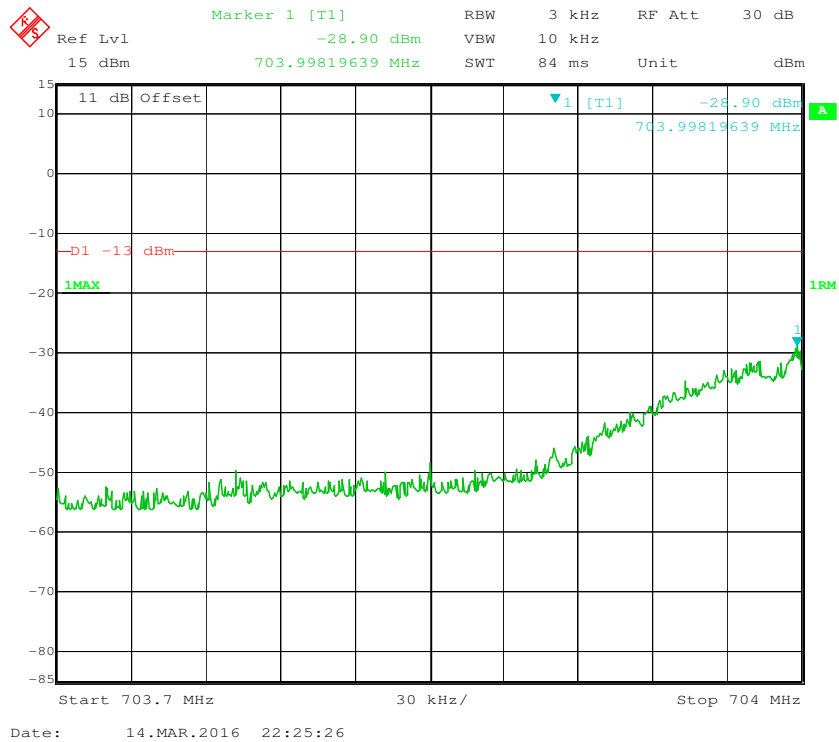
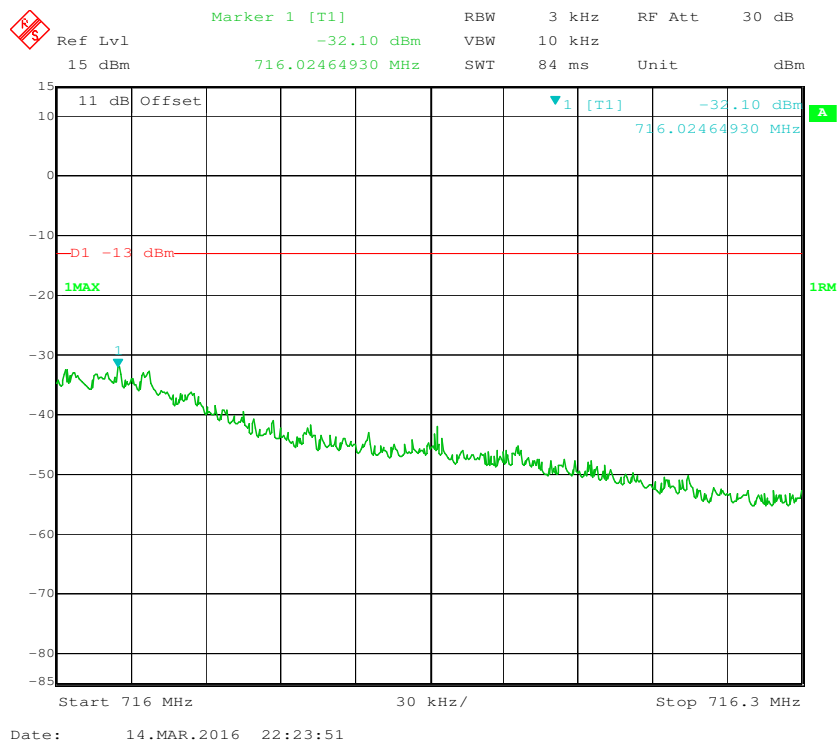
AWS-1 Band, Right Band Edge for GSM-3dB Above AGC



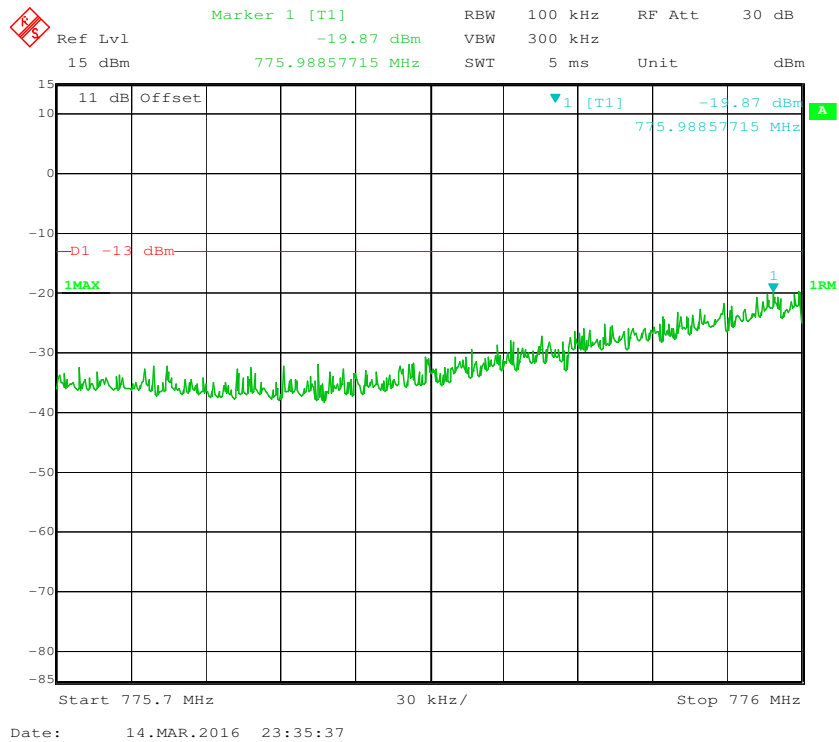
**Inter-Modulation
Uplink:****Lower 700MHz (B+C Block), Left Band Edge for AWGN-Pre AGC****LTE (A+B) Band, Right Band Edge for AWGN-Pre AGC**

Lower 700MHz (B+C Block), Left Band Edge for AWGN-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for AWGN-3dB Above AGC**

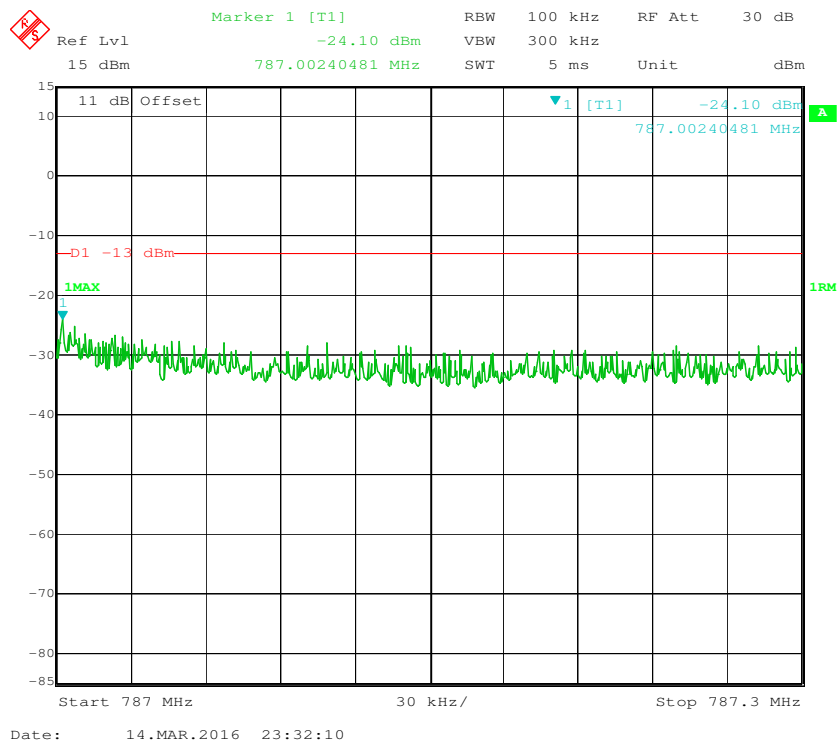
Lower 700MHz (B+C Block), Left Band Edge for GSM-Pre AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-Pre AGC**

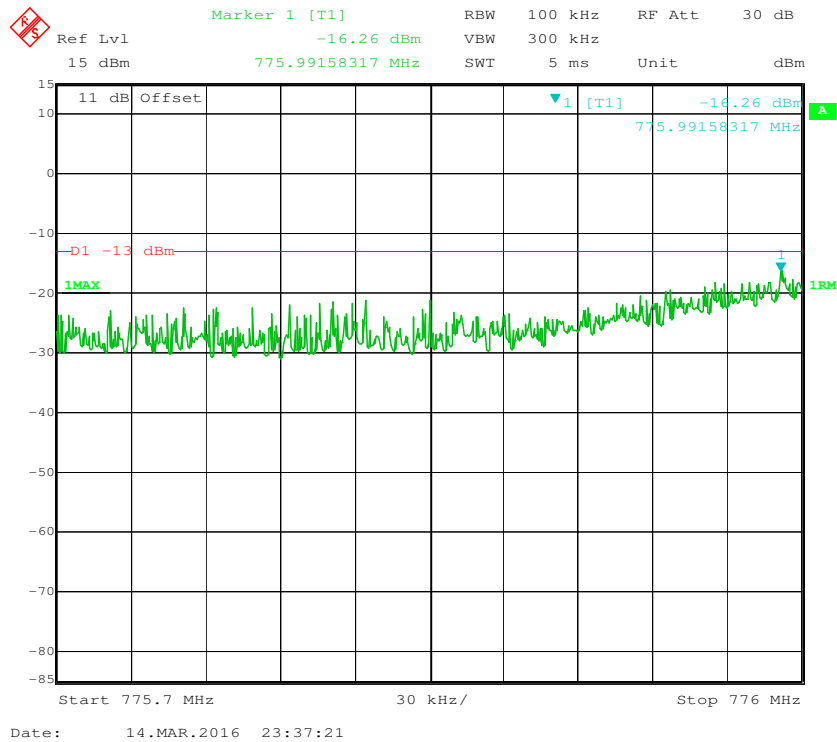
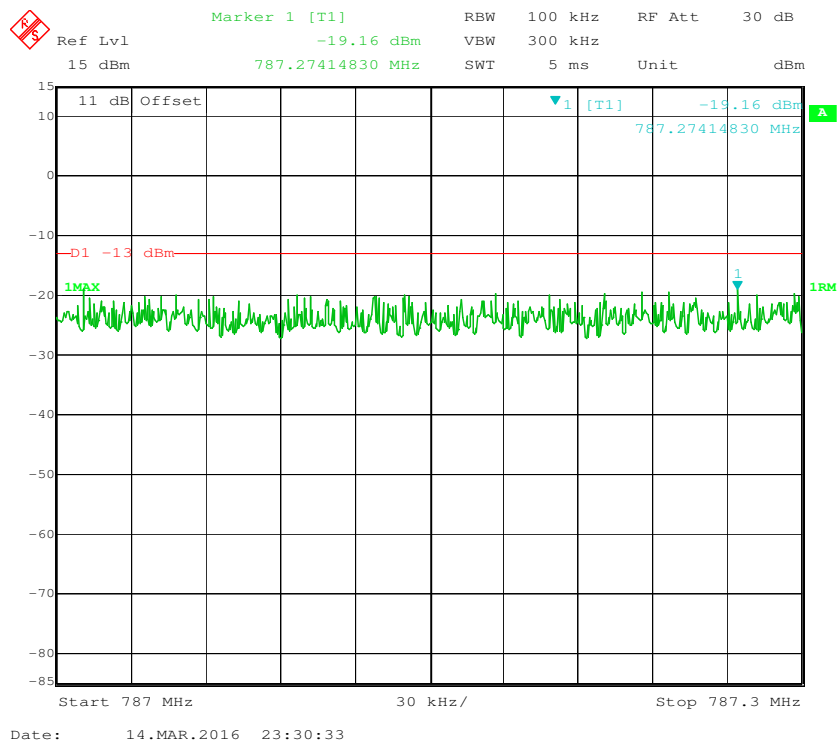
Lower 700MHz (B+C Block), Left Band Edge for GSM-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-3dB Above AGC**

Upper 700MHz C Block, Left Band Edge for AWGN-Pre AGC

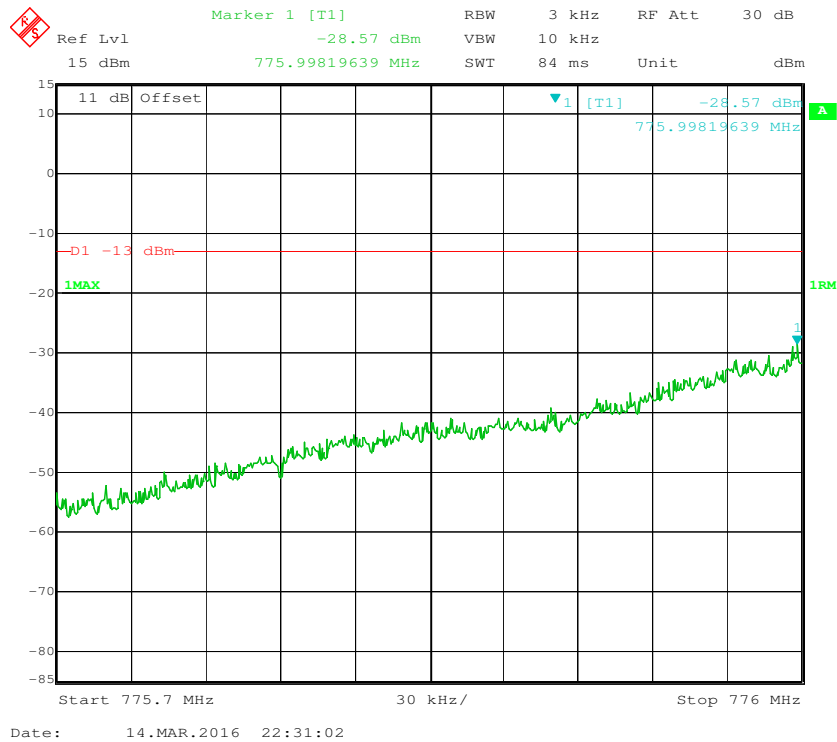


Upper 700MHz C Block, Right Band Edge for AWGN-Pre AGC

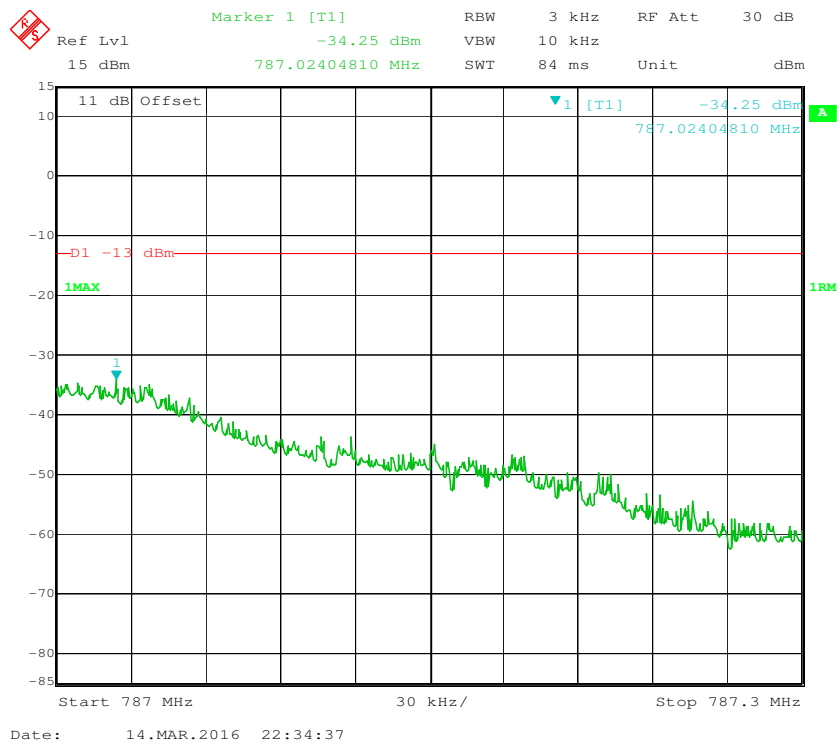


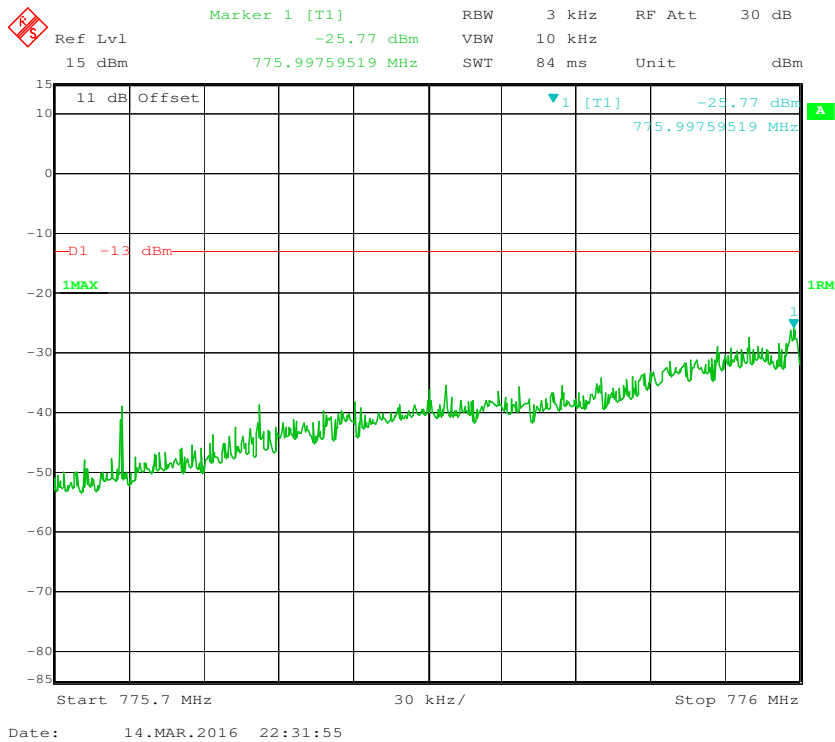
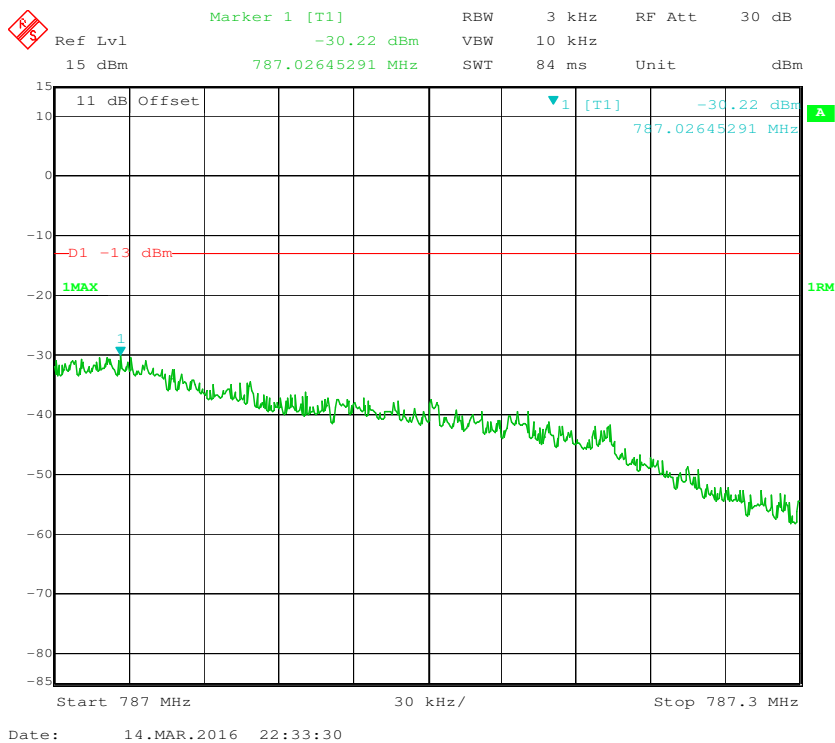
Upper 700MHz C Block, Left Band Edge for AWGN-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for AWGN-3dB Above AGC**

Upper 700MHz C Block, Left Band Edge for GSM-Pre AGC

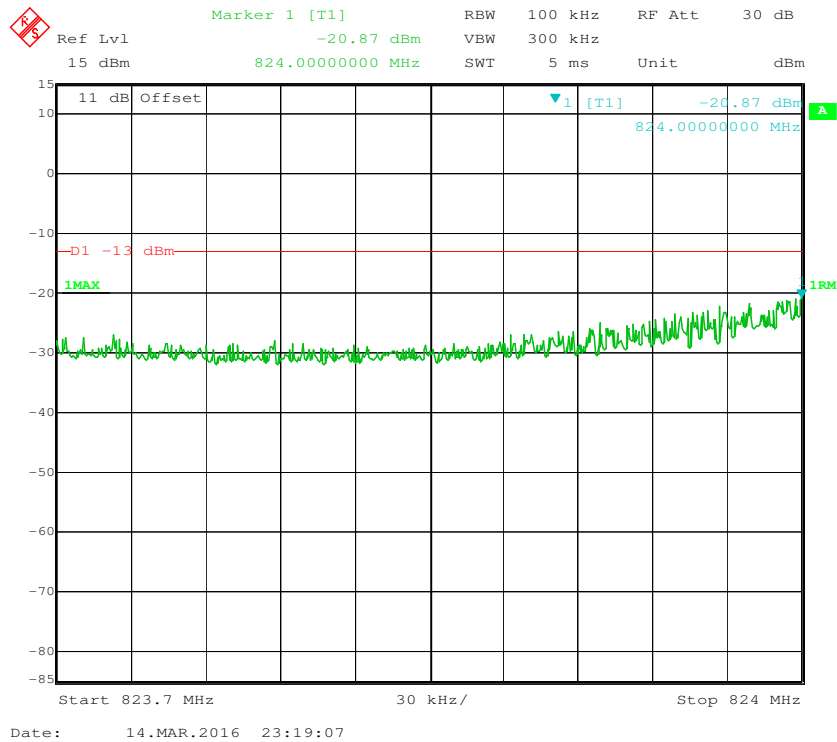


Upper 700MHz C Block, Right Band Edge for GSM-Pre AGC

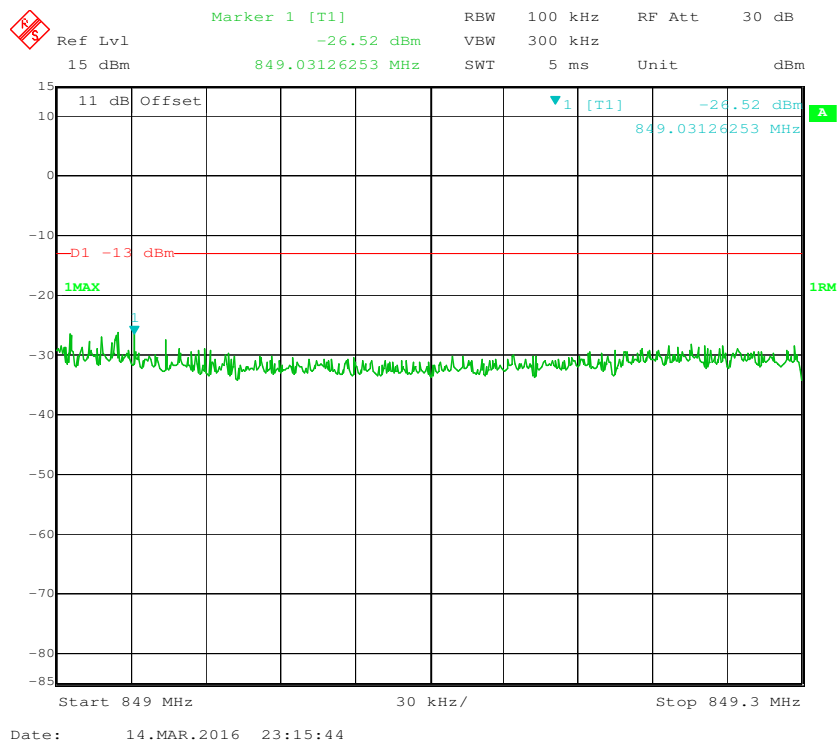


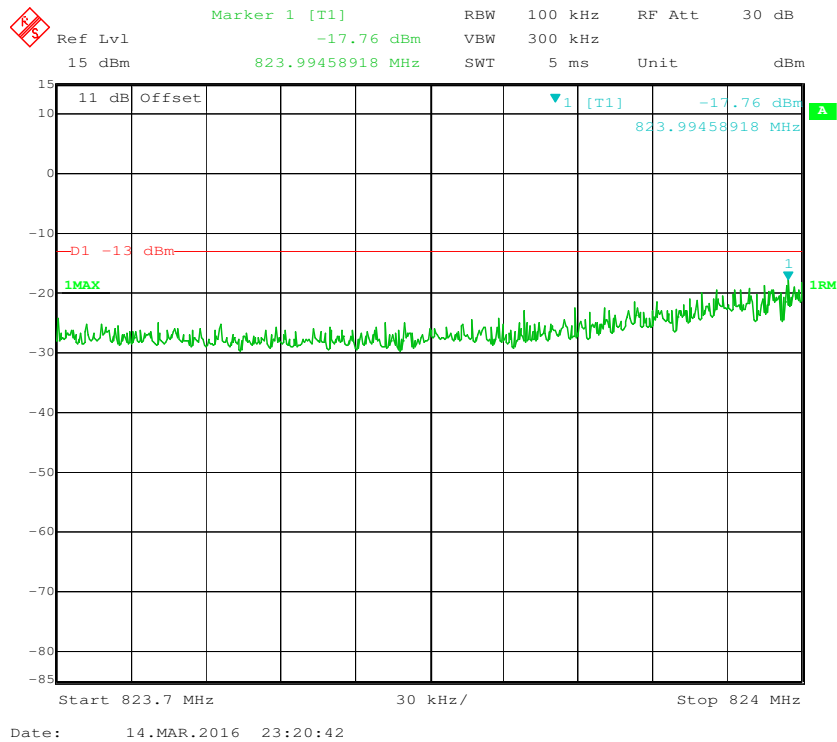
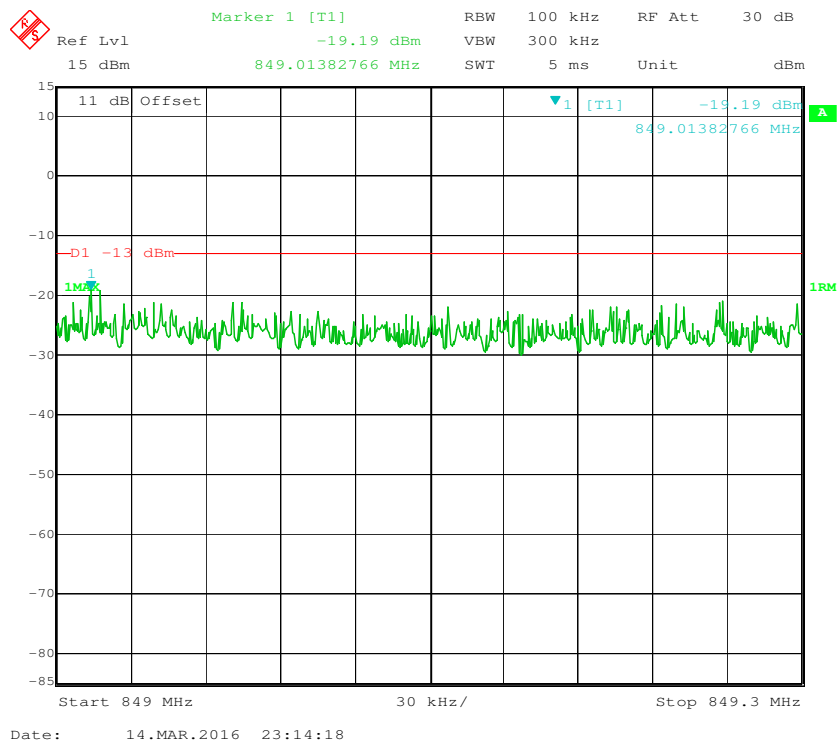
Upper 700MHz C Block, Left Band Edge for GSM-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for GSM-3dB Above AGC**

CELLULAR Band, Left Band Edge for AWGN-Pre AGC

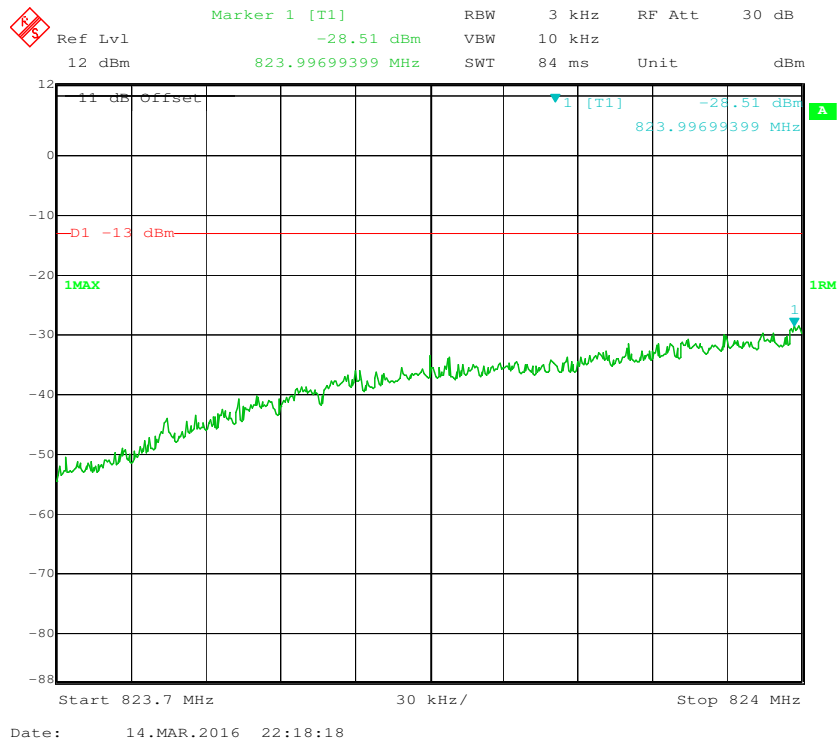


CELLULAR Band, Right Band Edge for AWGN-Pre AGC

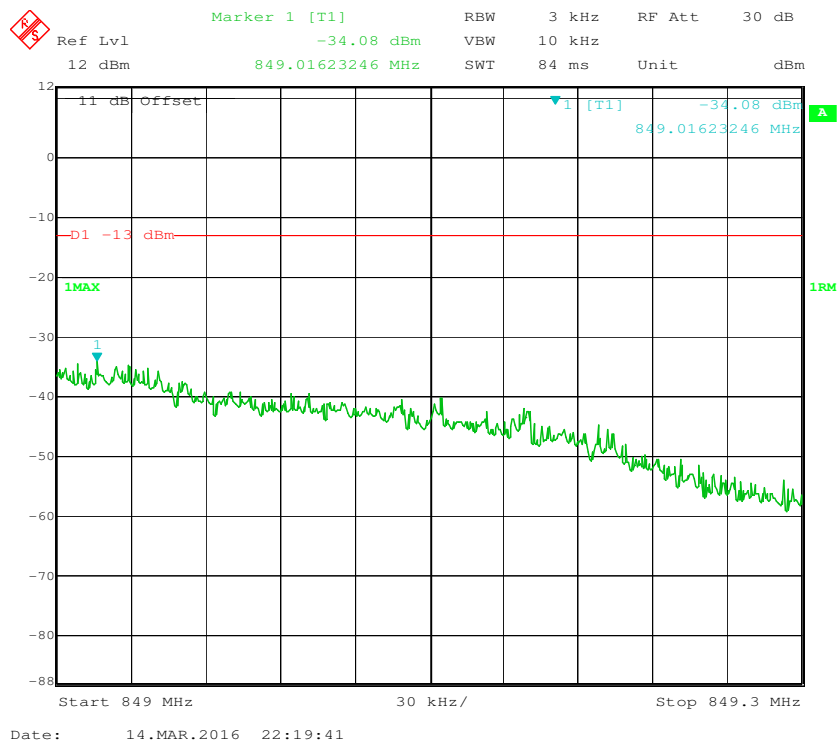


CELLULAR Band, Left Band Edge for AWGN-3dB Above AGC**CELLULAR Band, Right Band Edge for AWGN-3dB Above AGC**

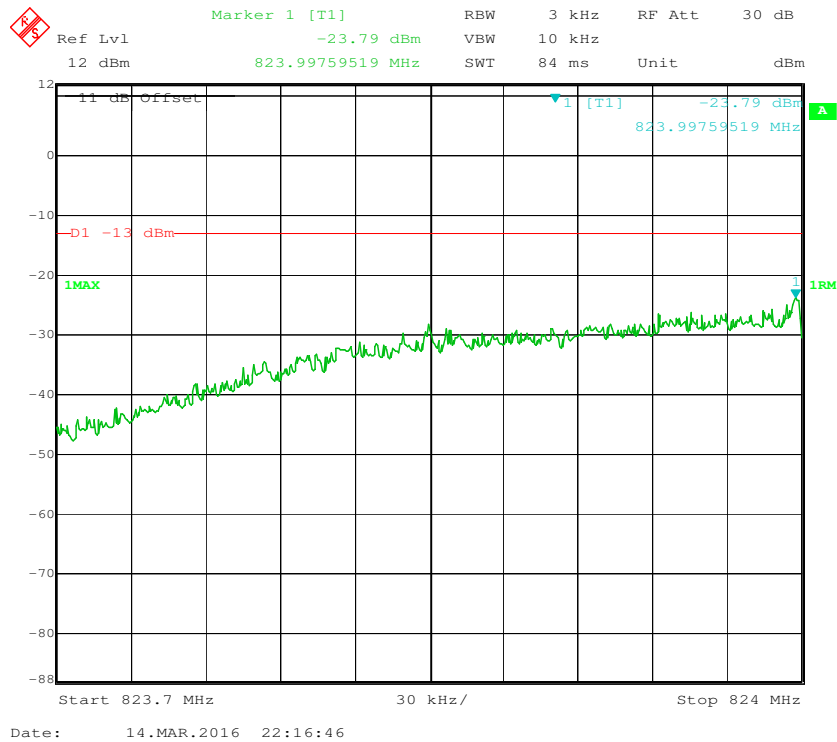
CELLULAR Band, Left Band Edge for GSM-Pre AGC



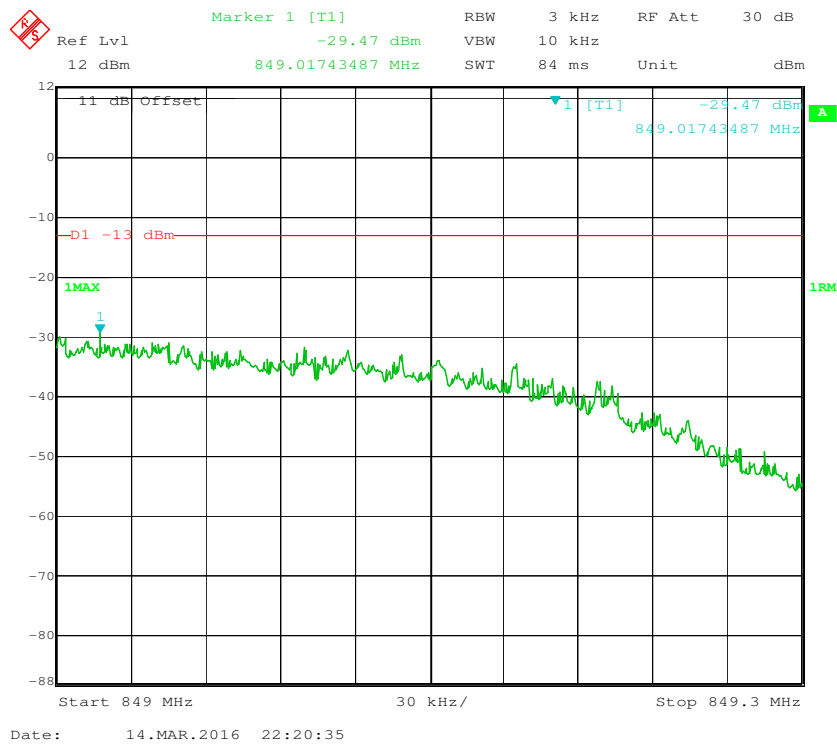
CELLULAR Band, Right Band Edge for GSM-Pre AGC



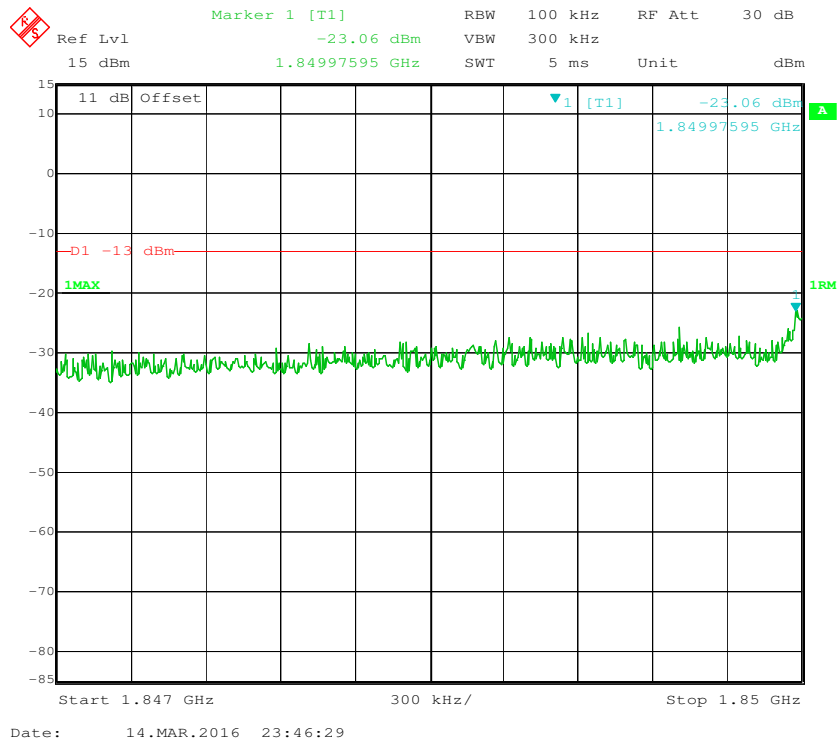
CELLULAR Band, Left Band Edge for GSM-3dB Above AGC



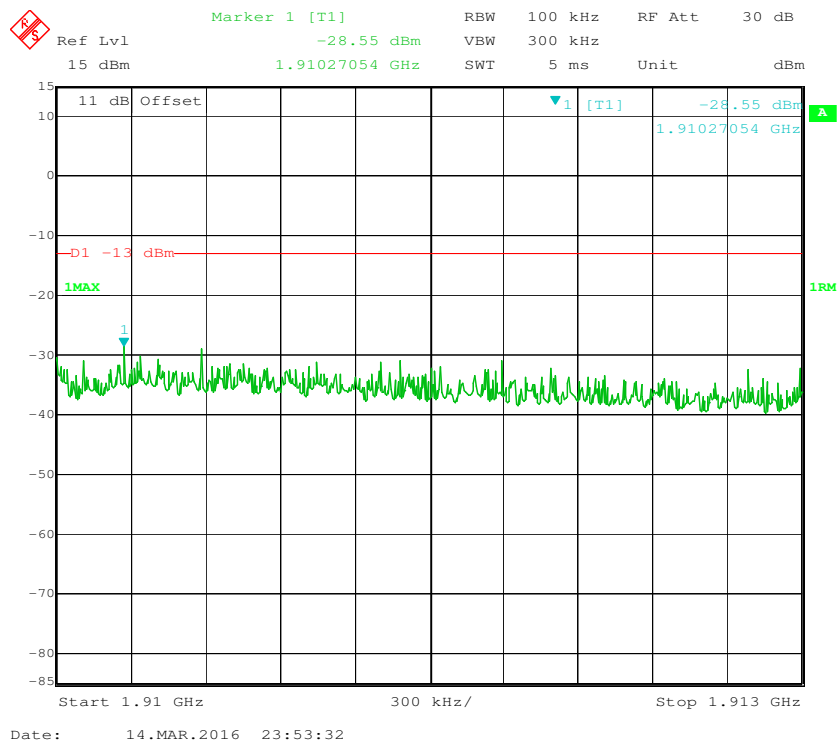
CELLULAR Band, Right Band Edge for GSM-3dB Above AGC



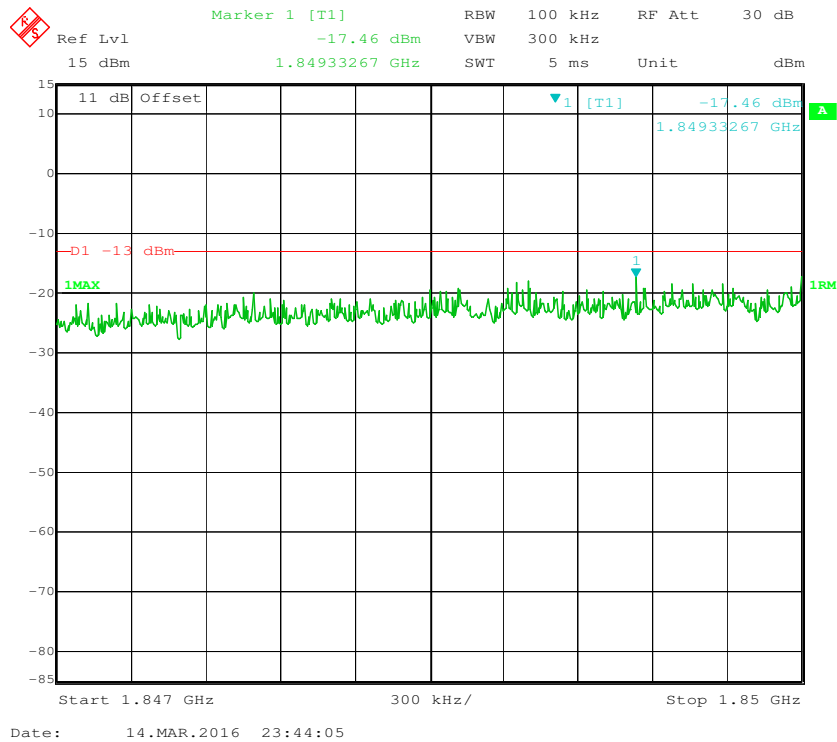
PCS Band, Left Band Edge for AWGN-Pre AGC



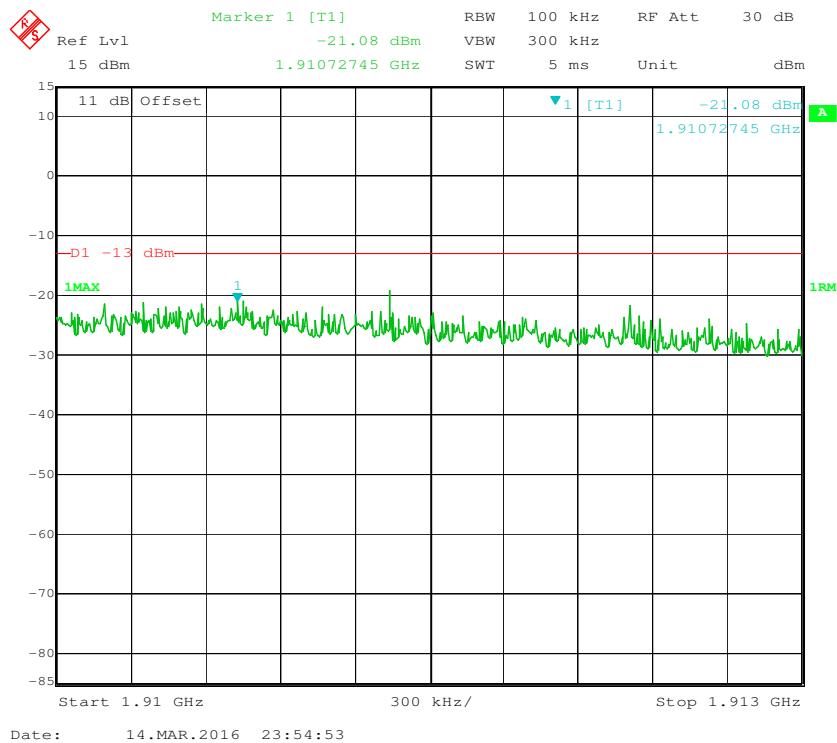
PCS Band, Right Band Edge for AWGN-Pre AGC



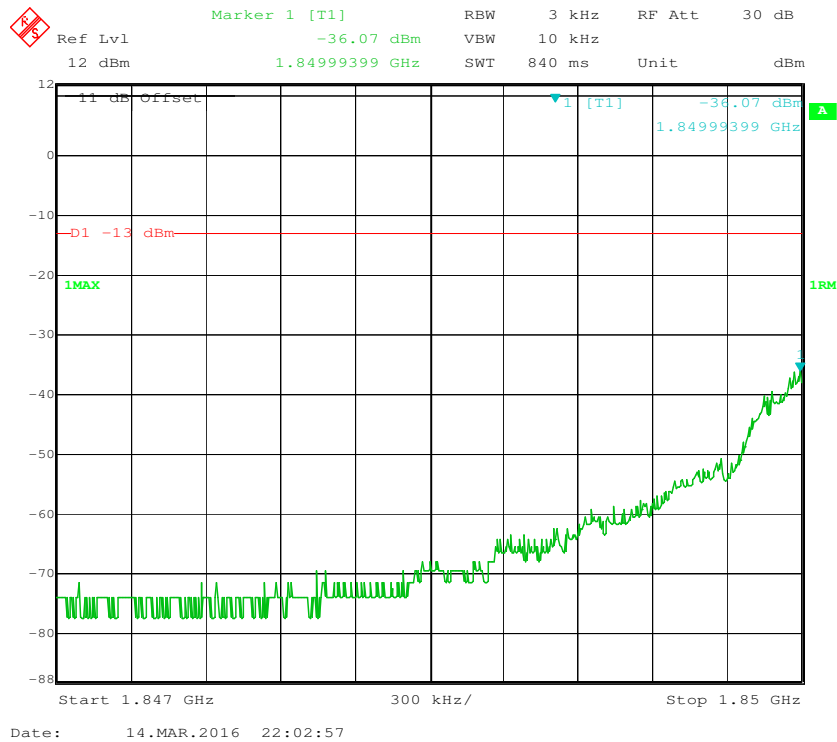
PCS Band, Left Band Edge for AWGN-3dB Above AGC



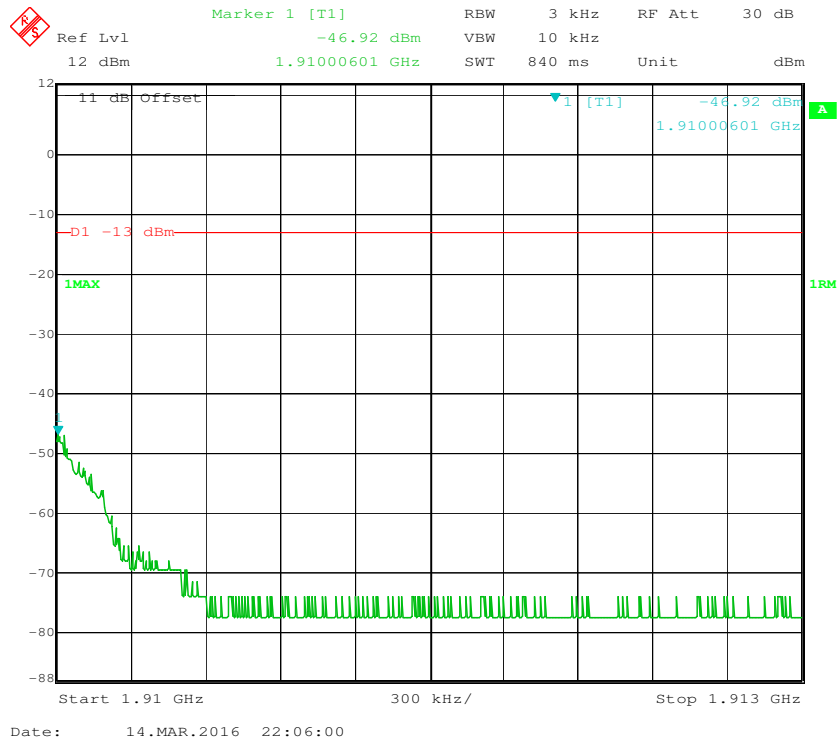
PCS Band, Right Band Edge for AWGN-3dB Above AGC



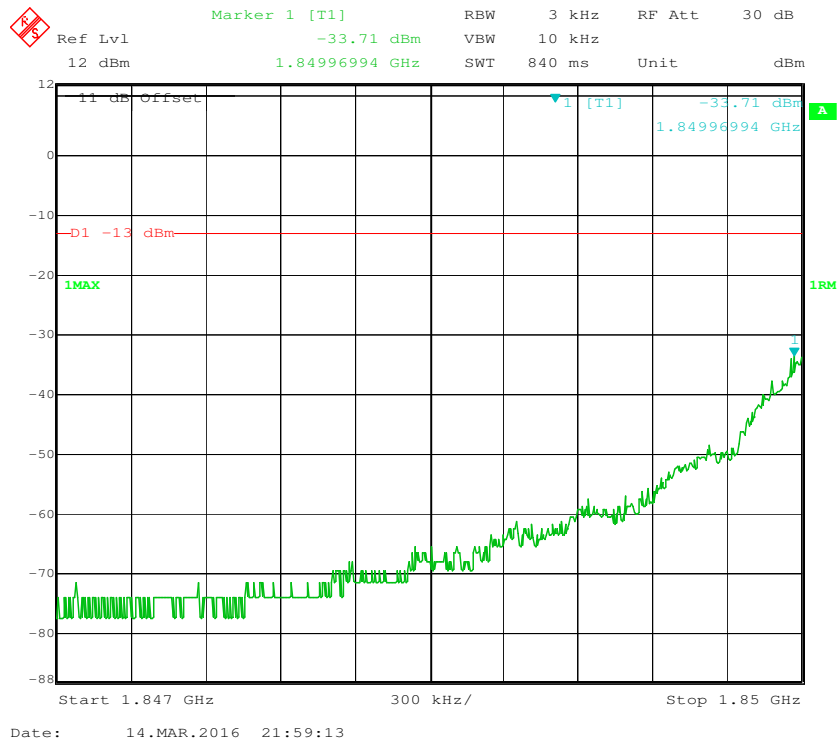
PCS Band, Left Band Edge for GSM-Pre AGC



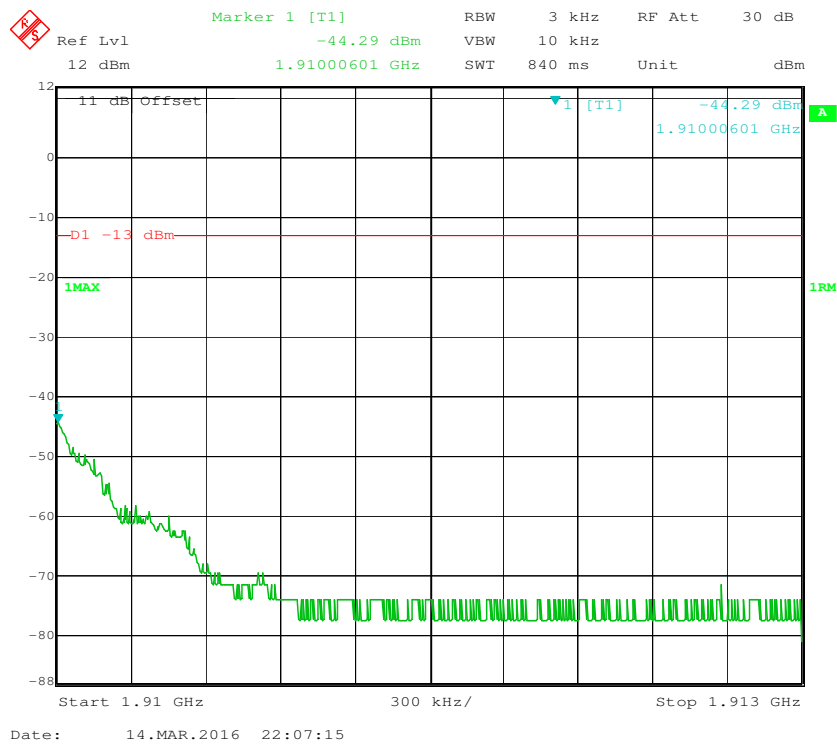
PCS Band, Right Band Edge for GSM-Pre AGC



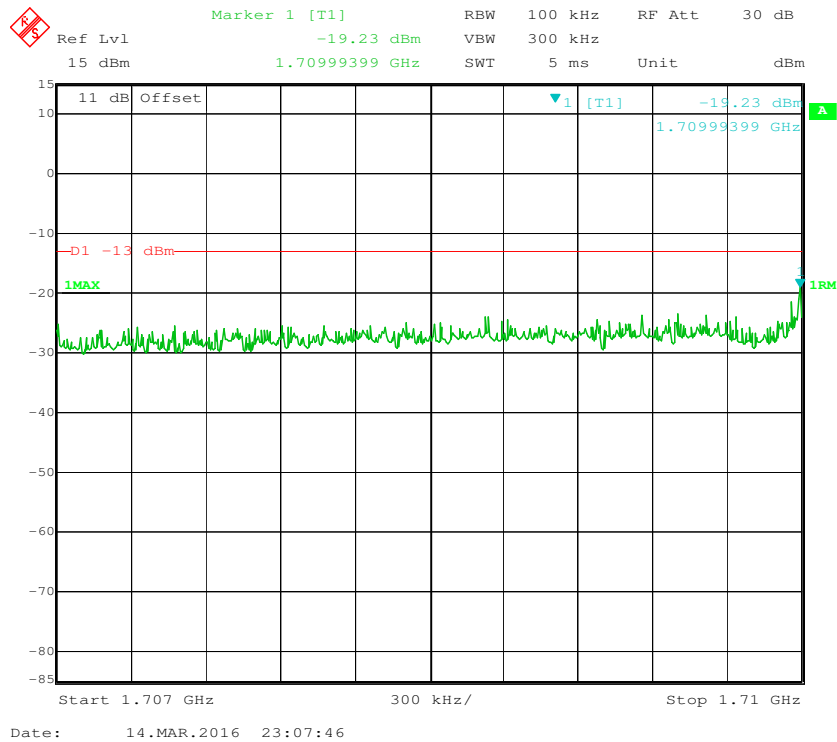
PCS Band, Left Band Edge for GSM-3dB Above AGC



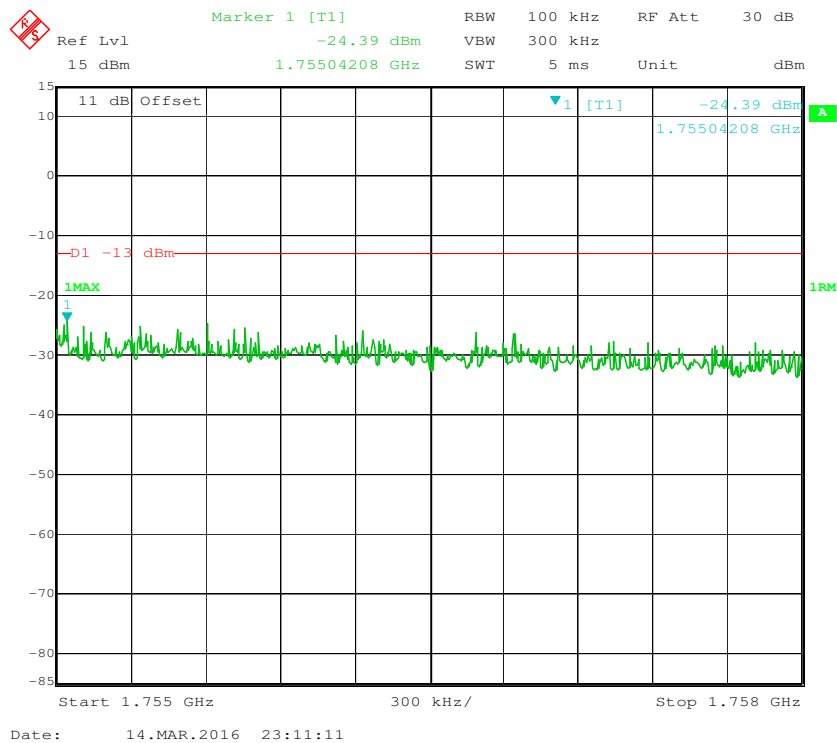
PCS Band, Right Band Edge for GSM-3dB Above AGC



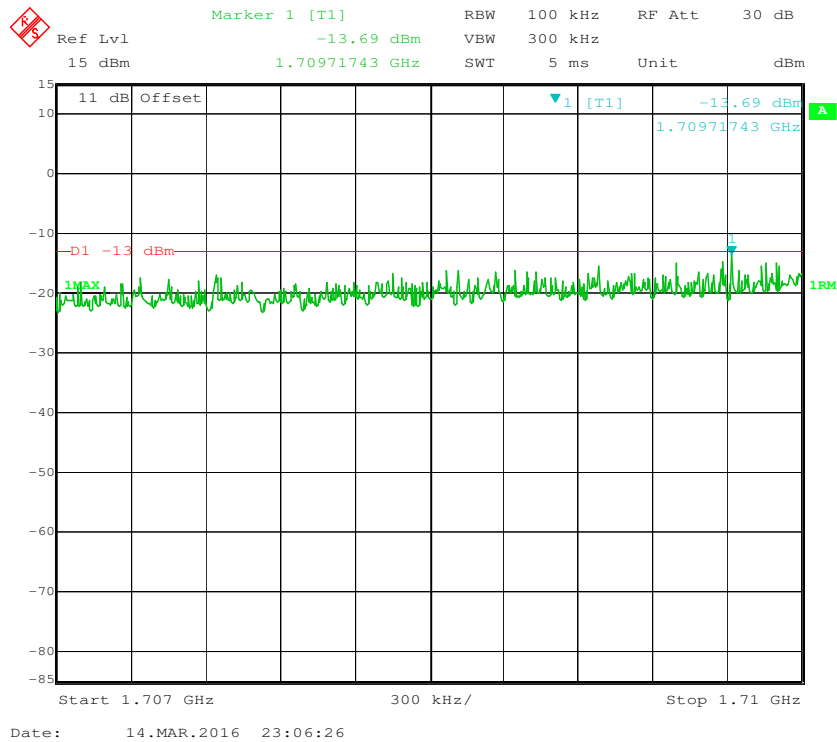
AWS-1 Band, Left Band Edge for AWGN-Pre AGC



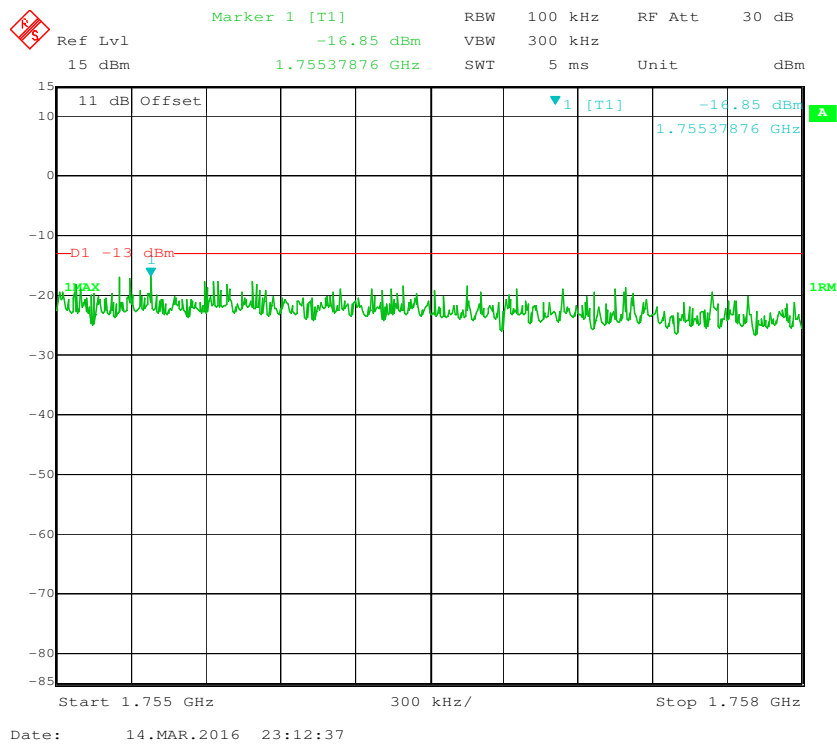
AWS-1 Band, Right Band Edge for AWGN-Pre AGC



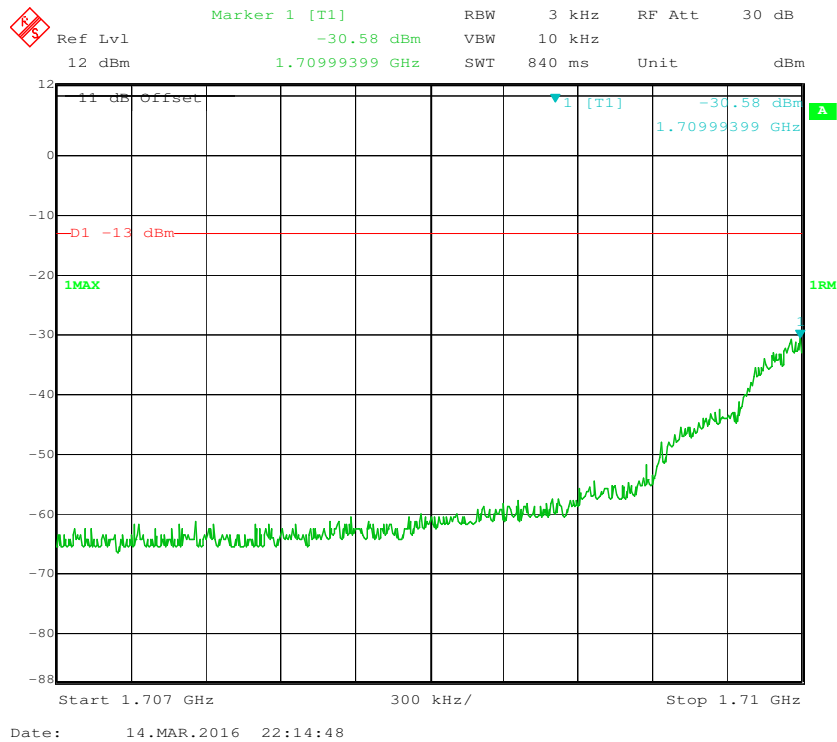
AWS-1 Band, Left Band Edge for AWGN-3dB Above AGC



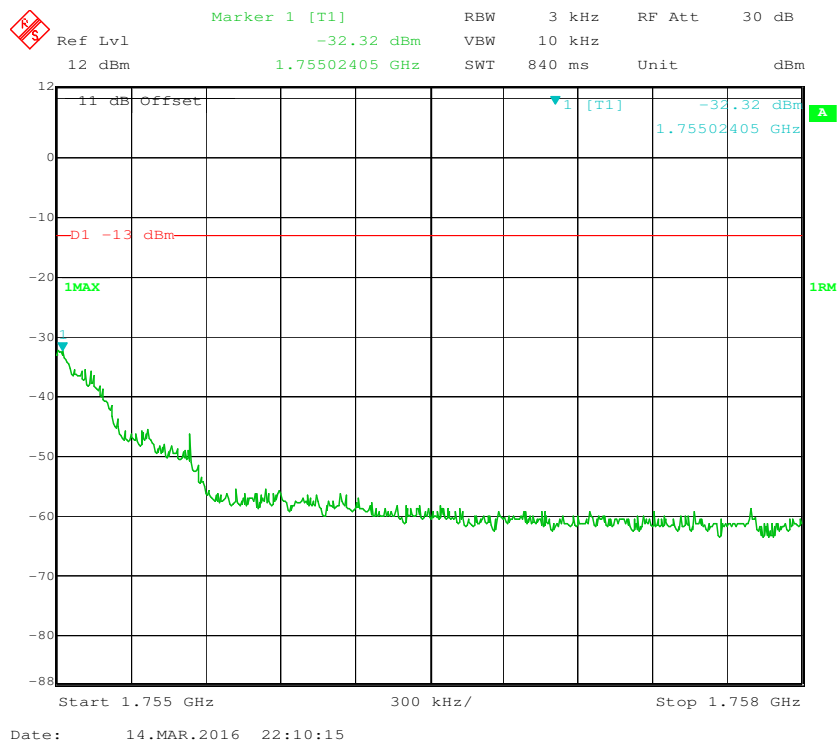
AWS-1 Band, Right Band Edge for AWGN-3dB Above AGC



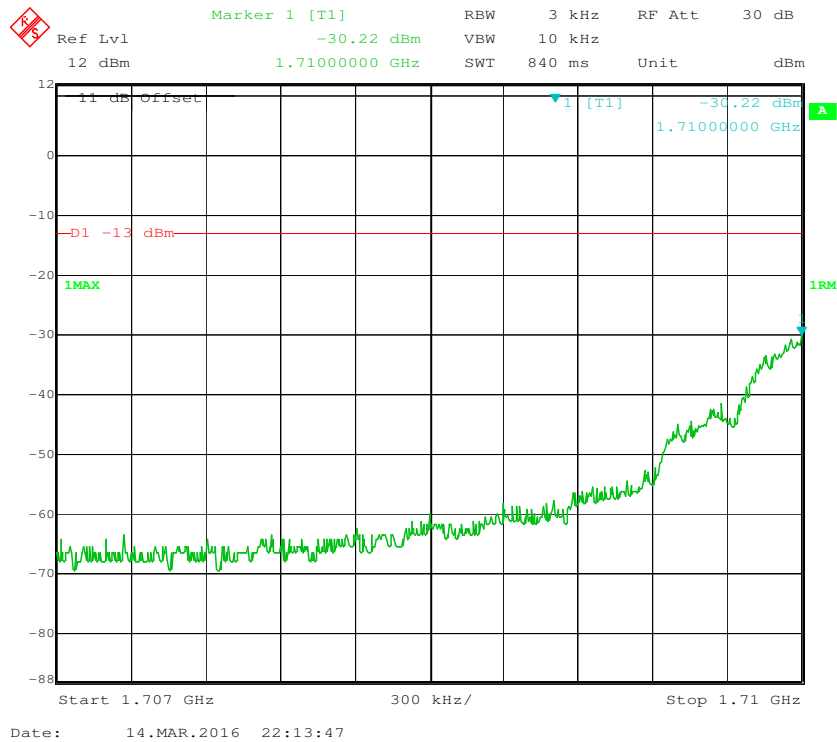
AWS-1 Band, Left Band Edge for GSM-Pre AGC



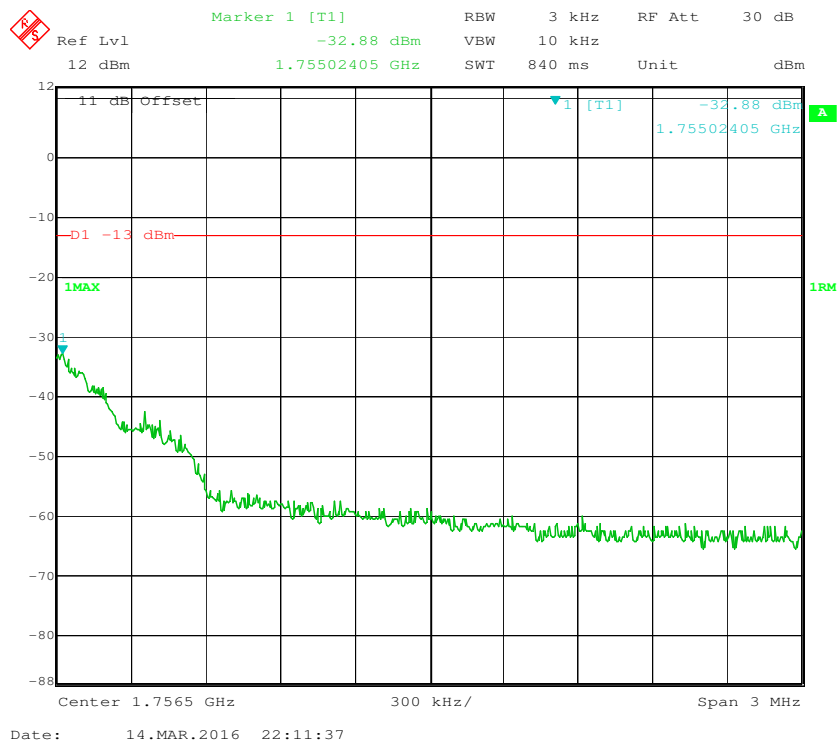
AWS-1 Band, Right Band Edge for GSM-Pre AGC

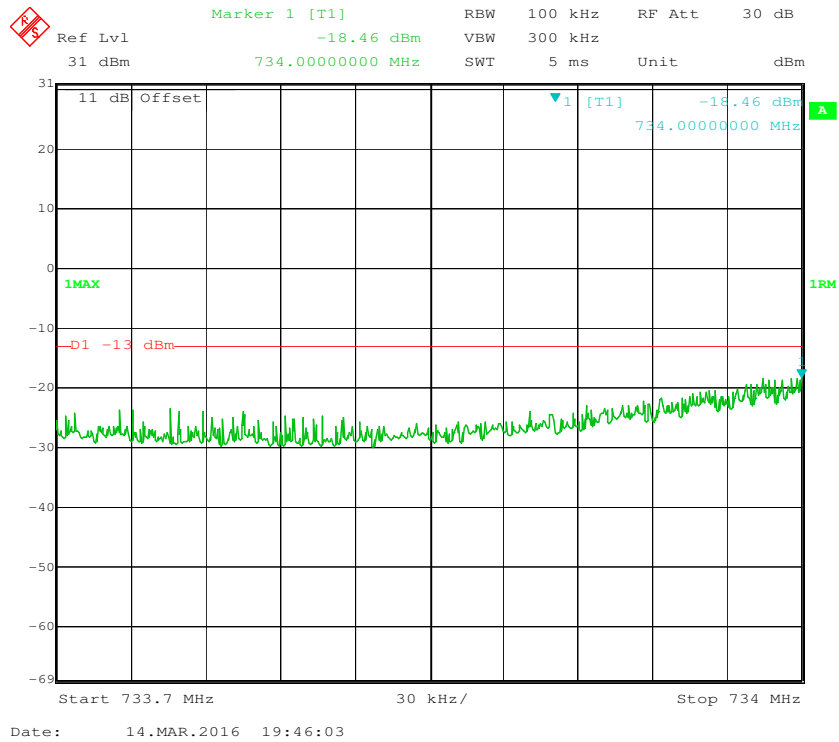
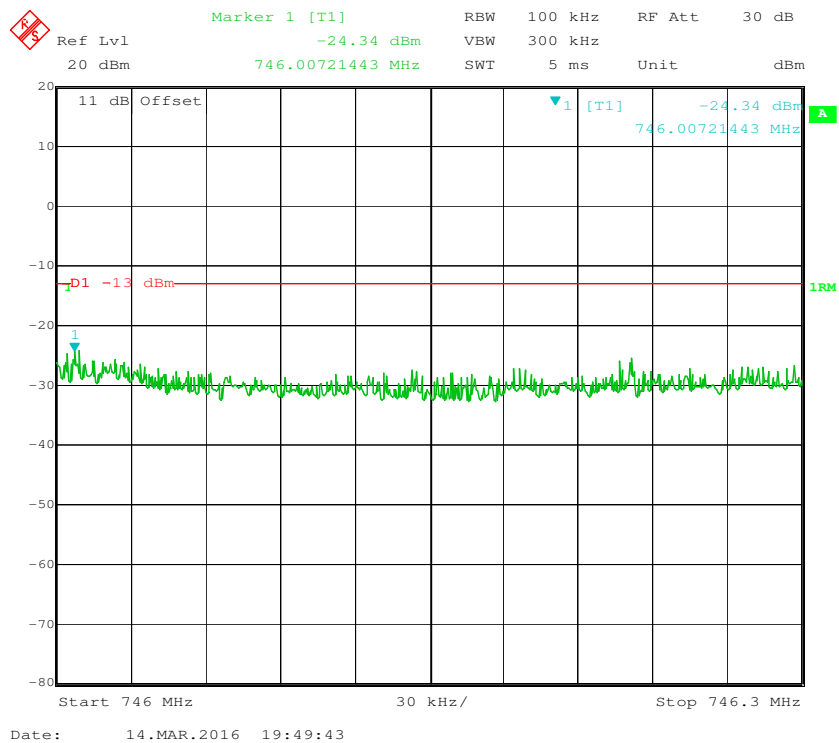


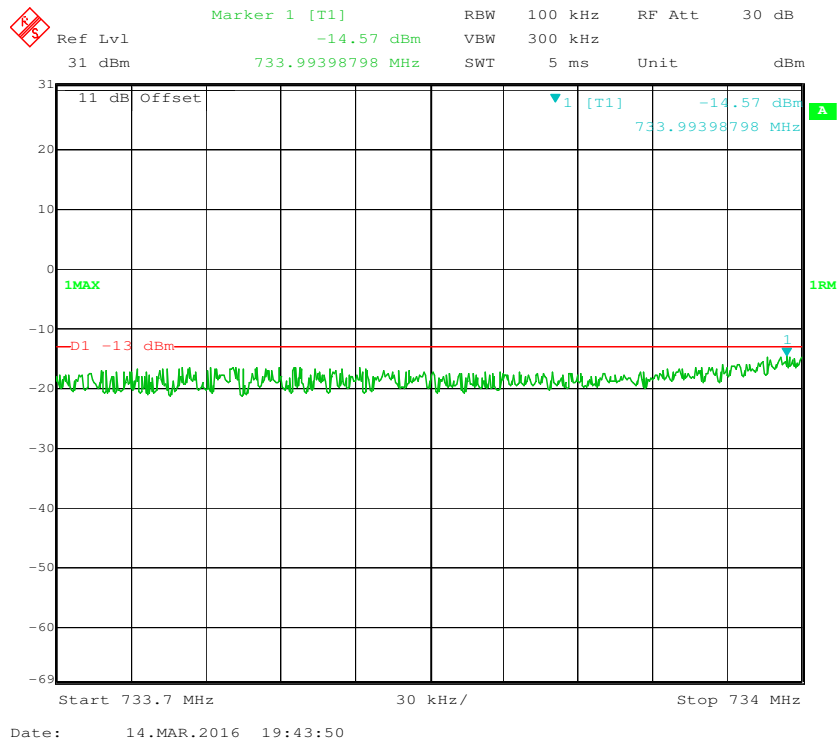
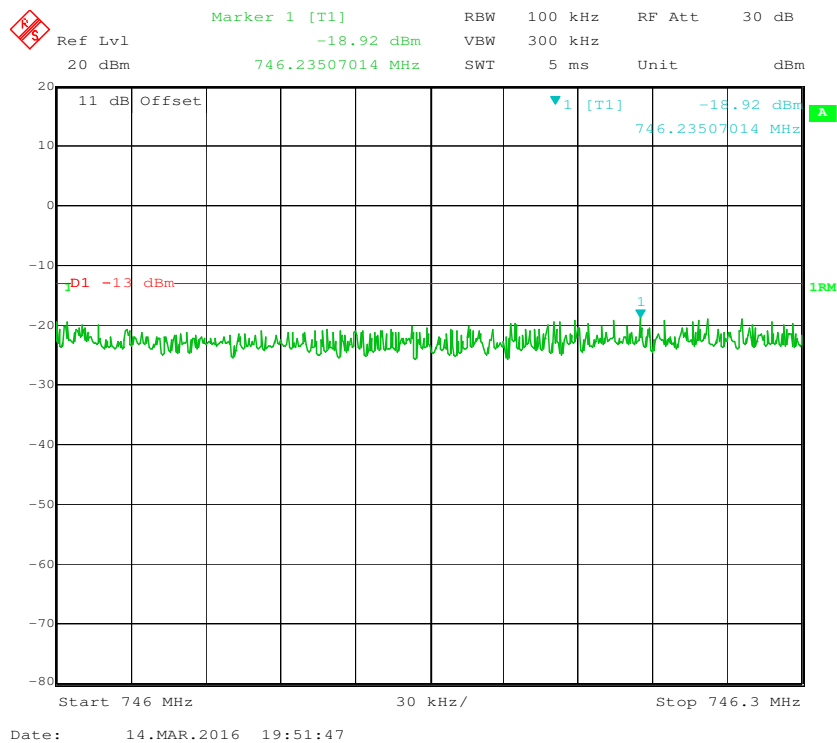
AWS-1 Band, Left Band Edge for GSM-3dB Above AGC

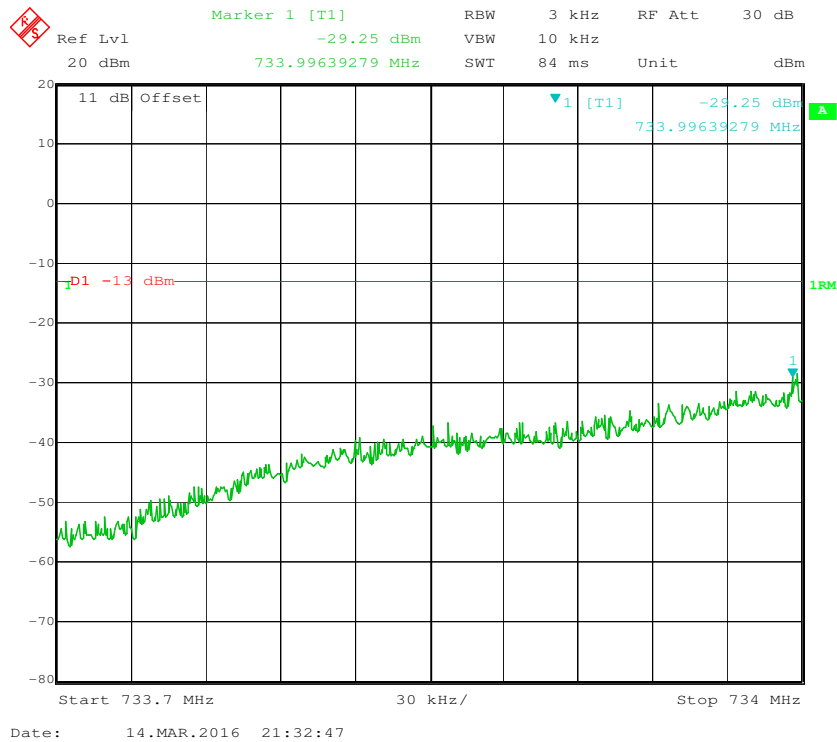
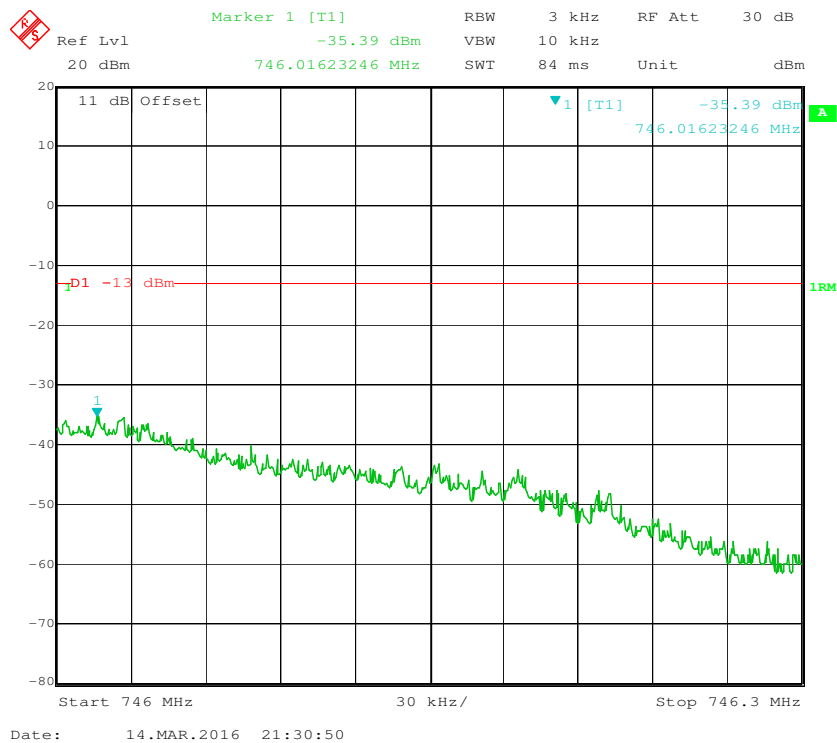


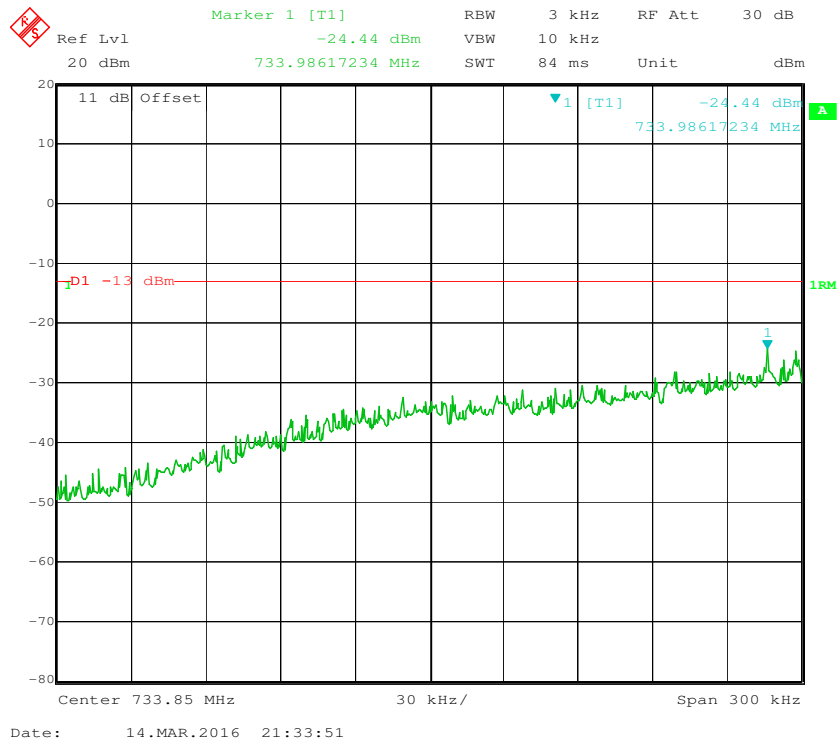
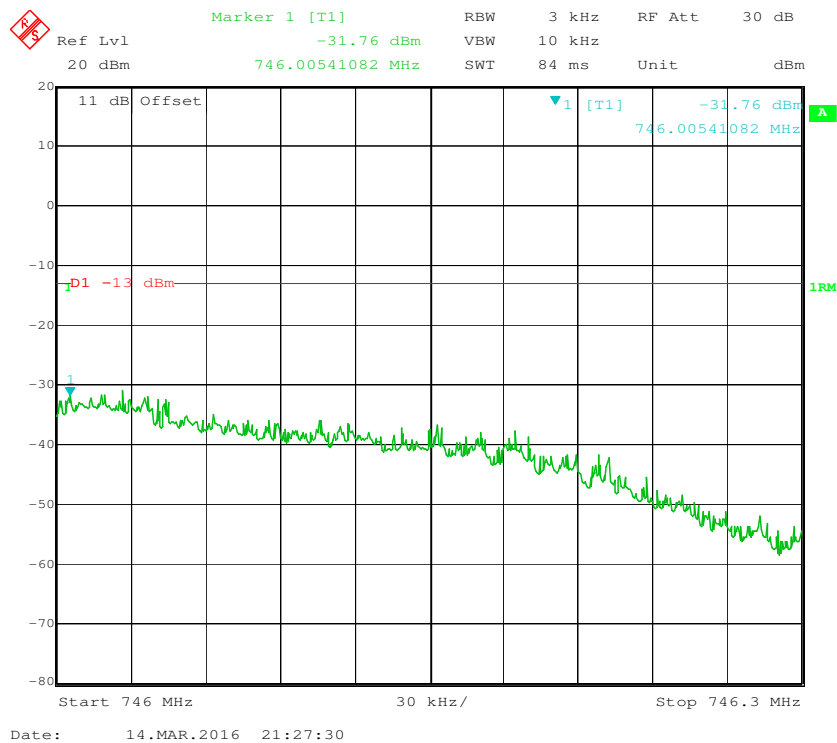
AWS-1 Band, Right Band Edge for GSM-3dB Above AGC

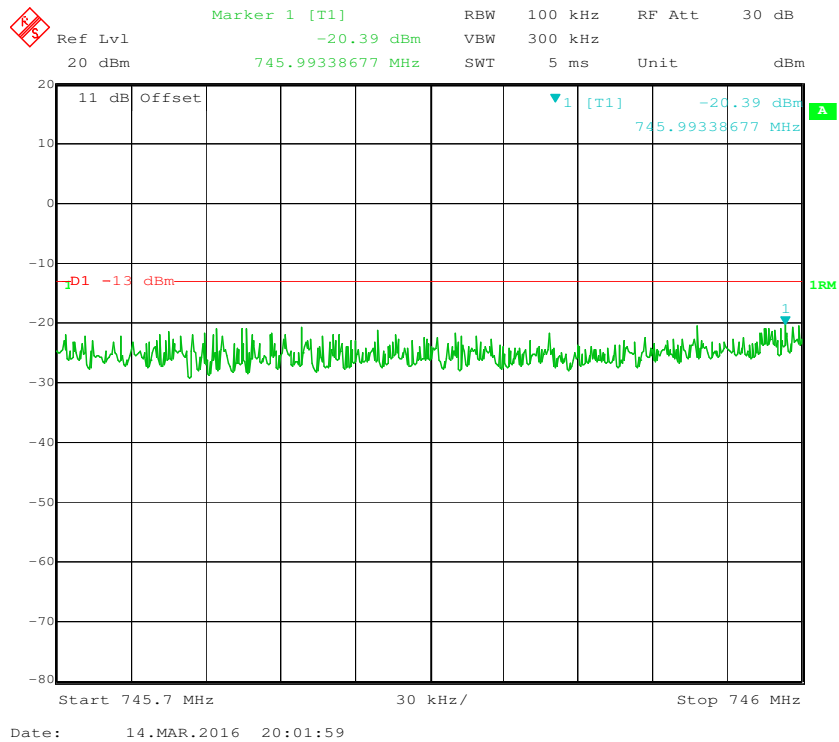
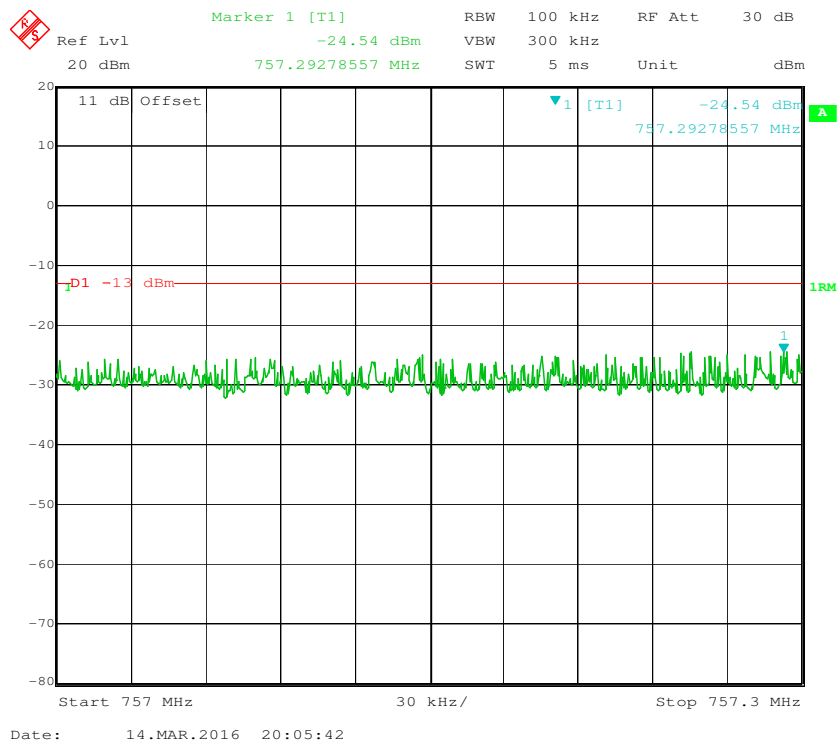


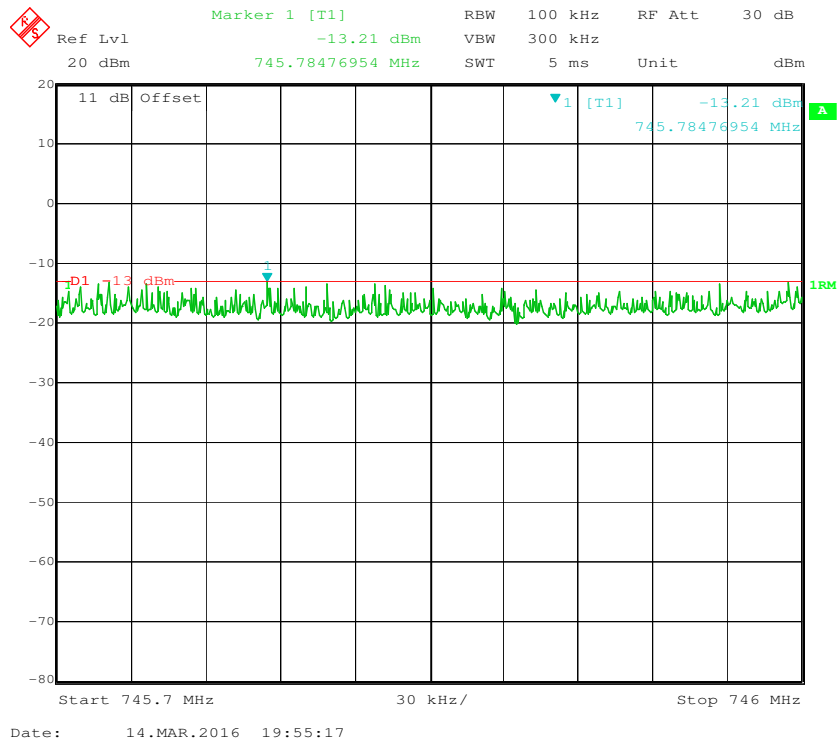
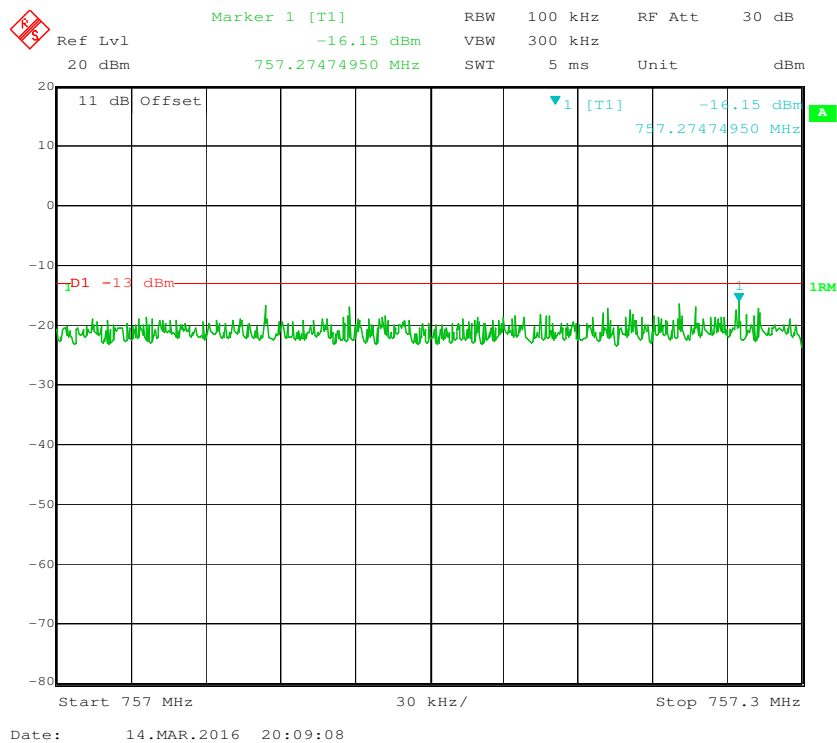
Downlink:**Lower 700MHz (B+C Block), Left Band Edge for AWGN-Pre AGC****Lower 700MHz (B+C Block), Right Band Edge for AWGN-Pre AGC**

Lower 700MHz (B+C Block), Left Band Edge for AWGN-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for AWGN-3dB Above AGC**

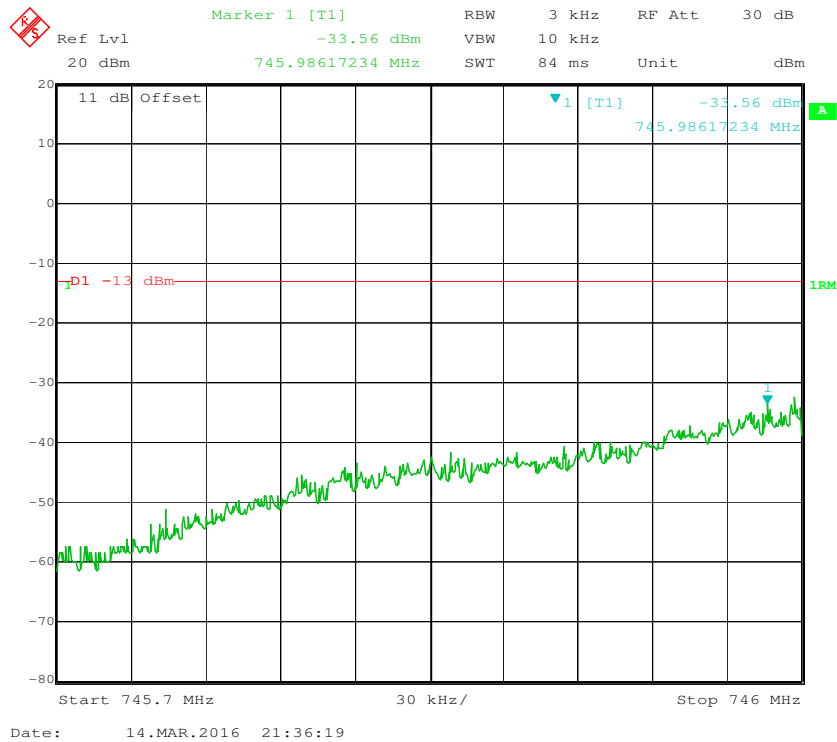
Lower 700MHz (B+C Block), Left Band Edge for GSM-Pre AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-Pre AGC**

Lower 700MHz (B+C Block), Left Band Edge for GSM-3dB Above AGC**Lower 700MHz (B+C Block), Right Band Edge for GSM-3dB Above AGC**

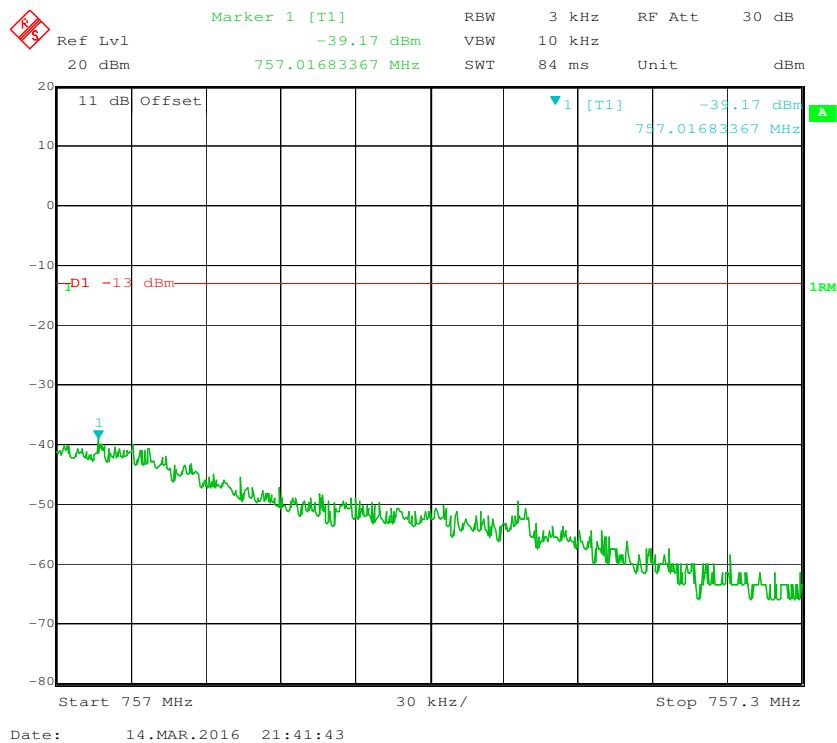
Upper 700MHz C Block, Left Band Edge for AWGN-Pre AGC**Upper 700MHz C Block, Right Band Edge for AWGN-Pre AGC**

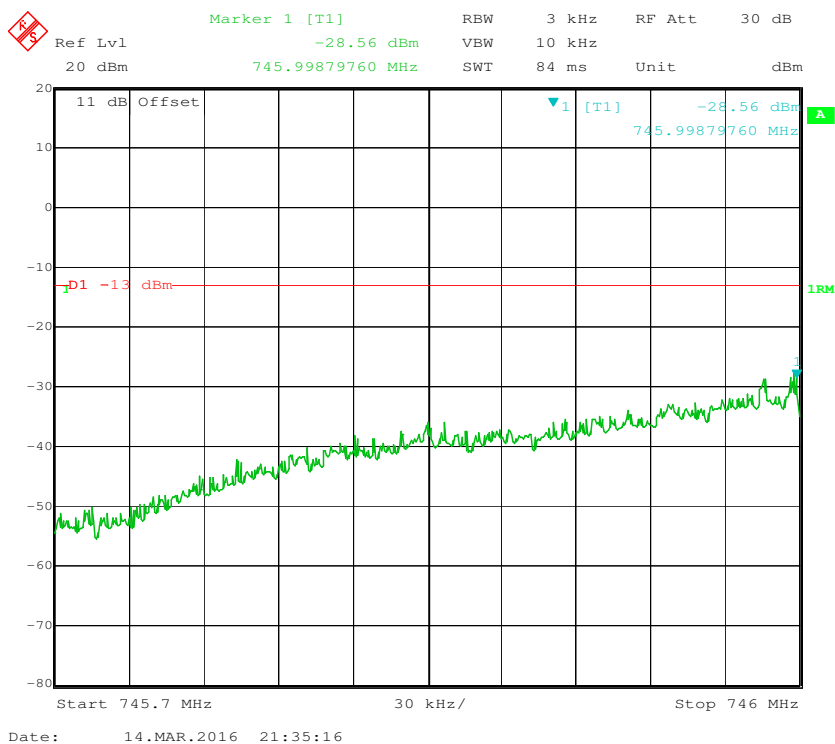
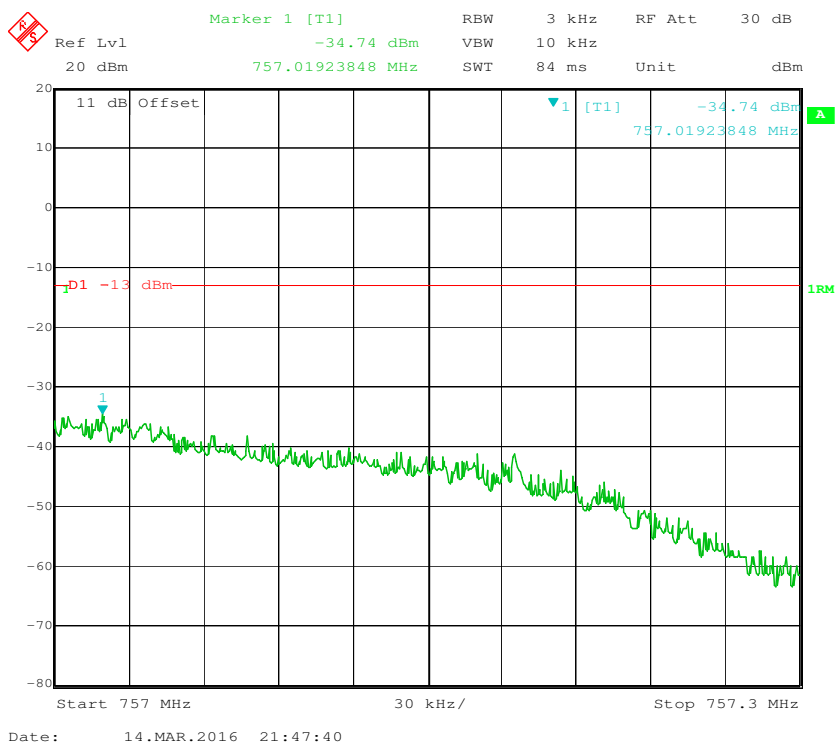
Upper 700MHz C Block, Left Band Edge for AWGN-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for AWGN-3dB Above AGC**

Upper 700MHz C Block, Left Band Edge for GSM-Pre AGC

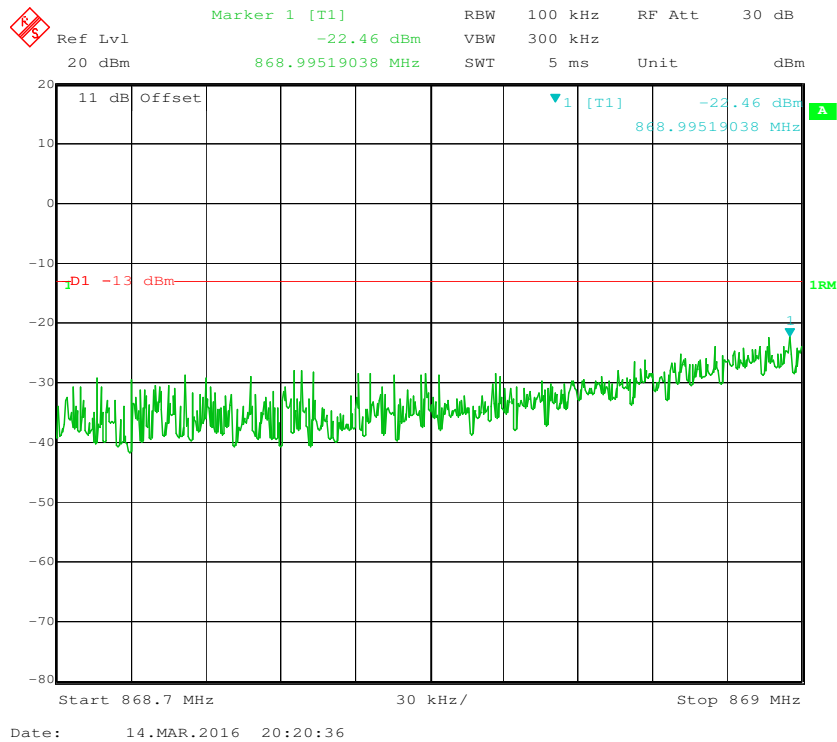


Upper 700MHz C Block, Right Band Edge for GSM-Pre AGC

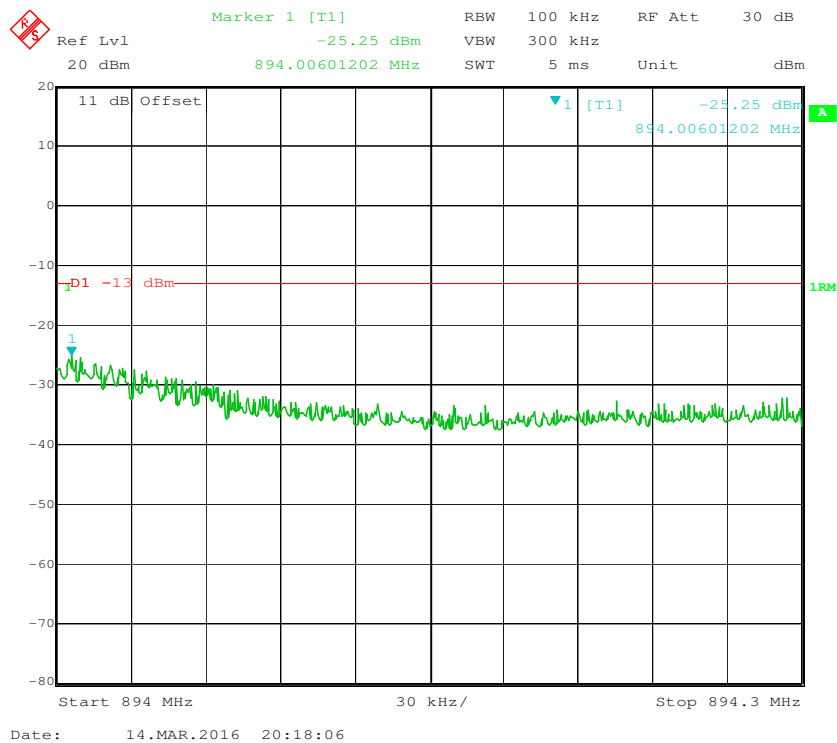


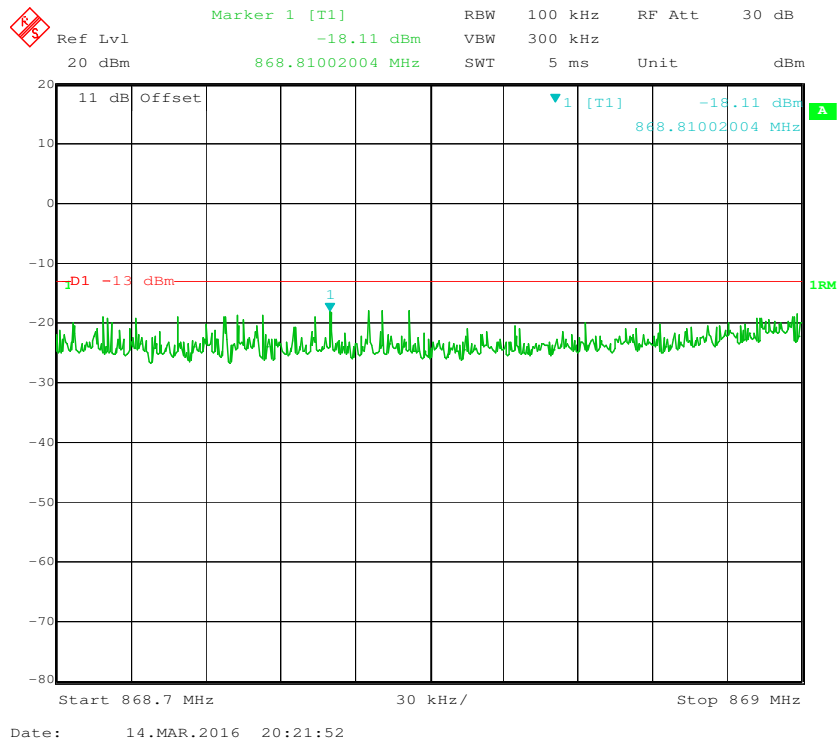
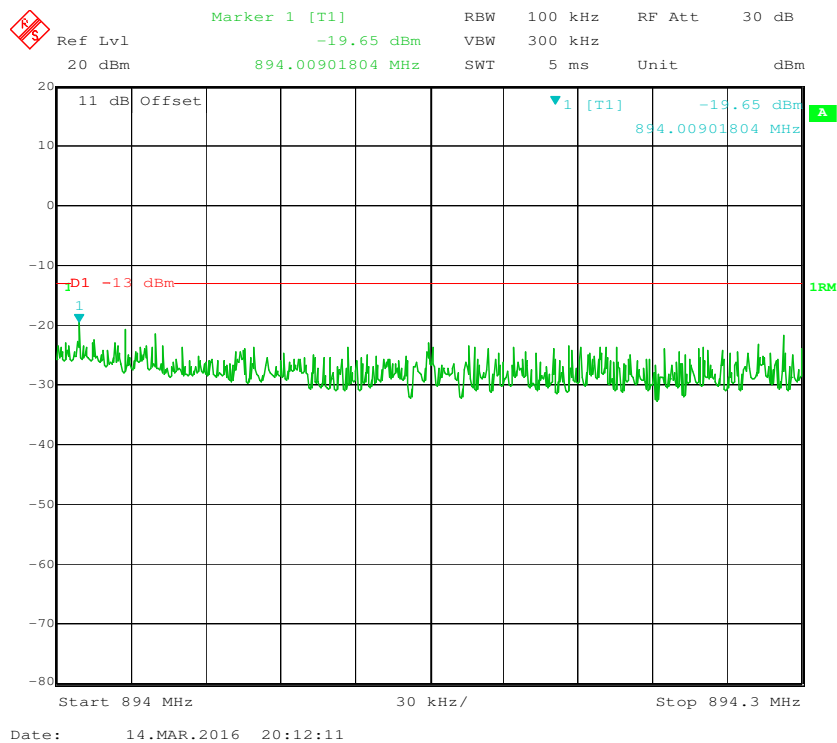
Upper 700MHz C Block, Left Band Edge for GSM-3dB Above AGC**Upper 700MHz C Block, Right Band Edge for GSM-3dB Above AGC**

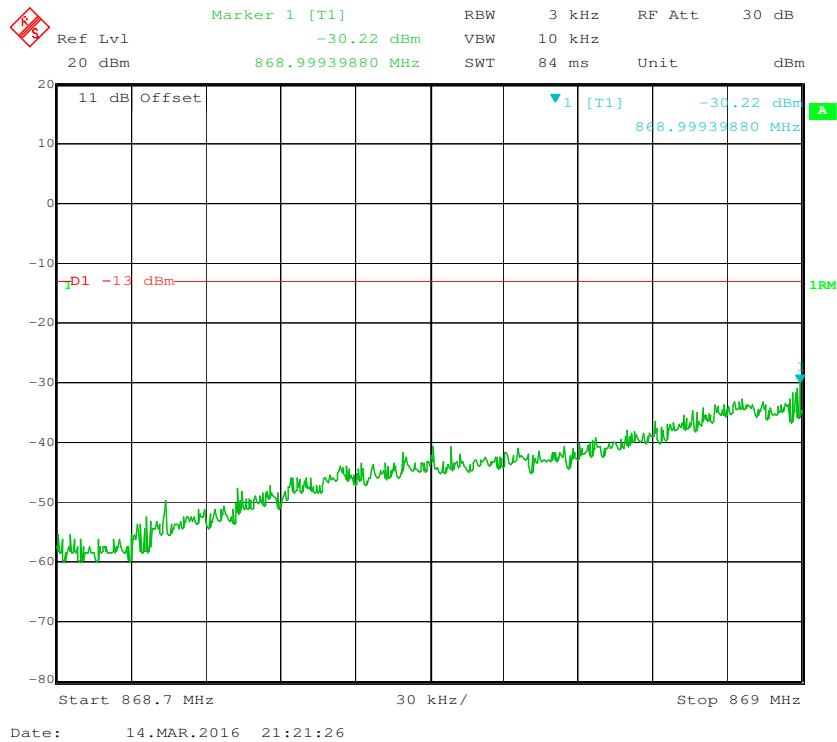
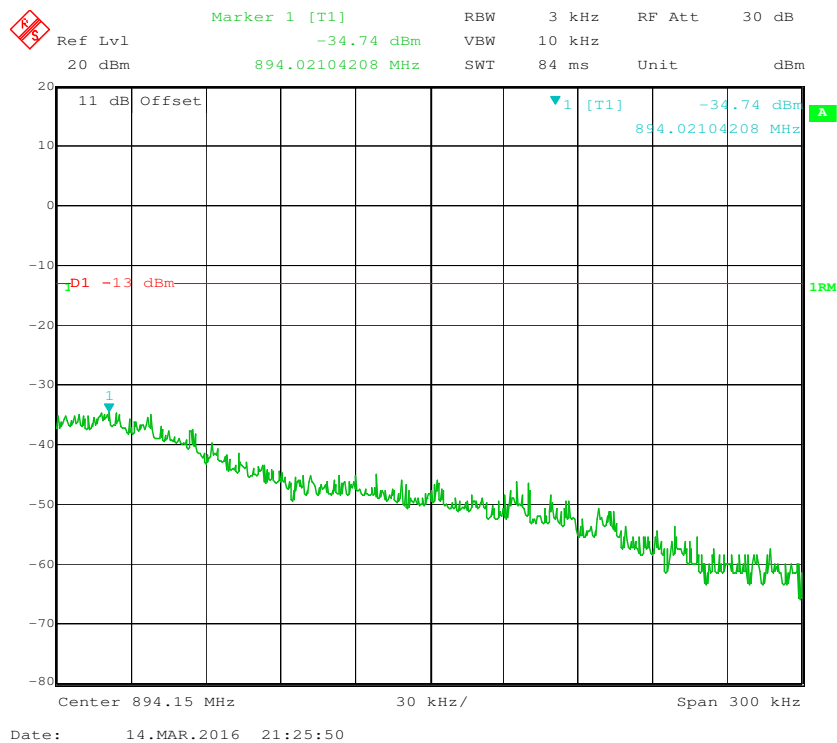
CELLULAR Band, Left Band Edge for AWGN-Pre AGC



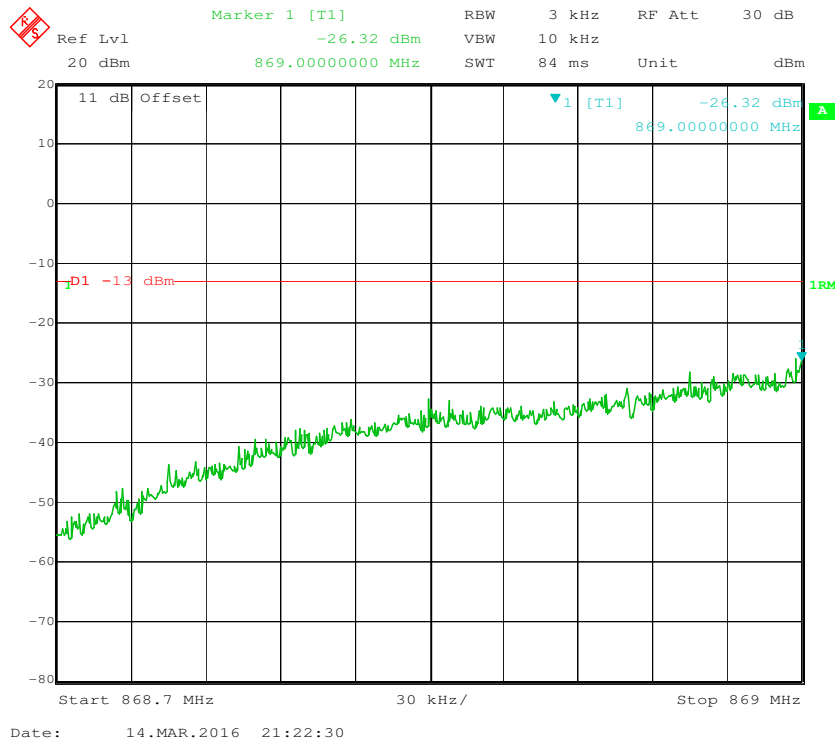
CELLULAR Band, Right Band Edge for AWGN-Pre AGC



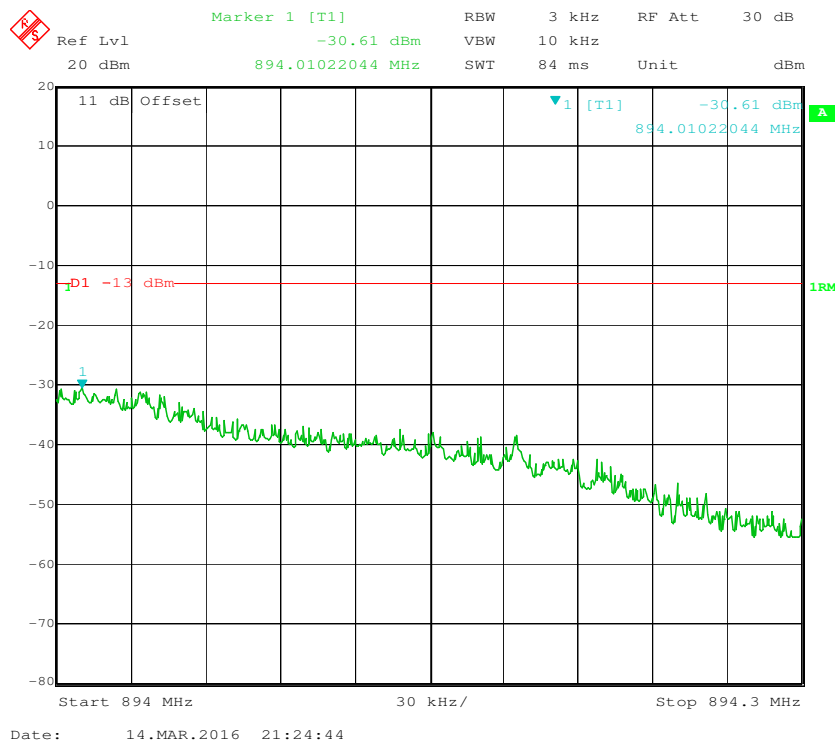
CELLULAR Band, Left Band Edge for AWGN-3dB Above AGC**CELLULAR Band, Right Band Edge for AWGN-3dB Above AGC**

CELLULAR Band, Left Band Edge for GSM-Pre AGC**CELLULAR Band, Right Band Edge for GSM-Pre AGC**

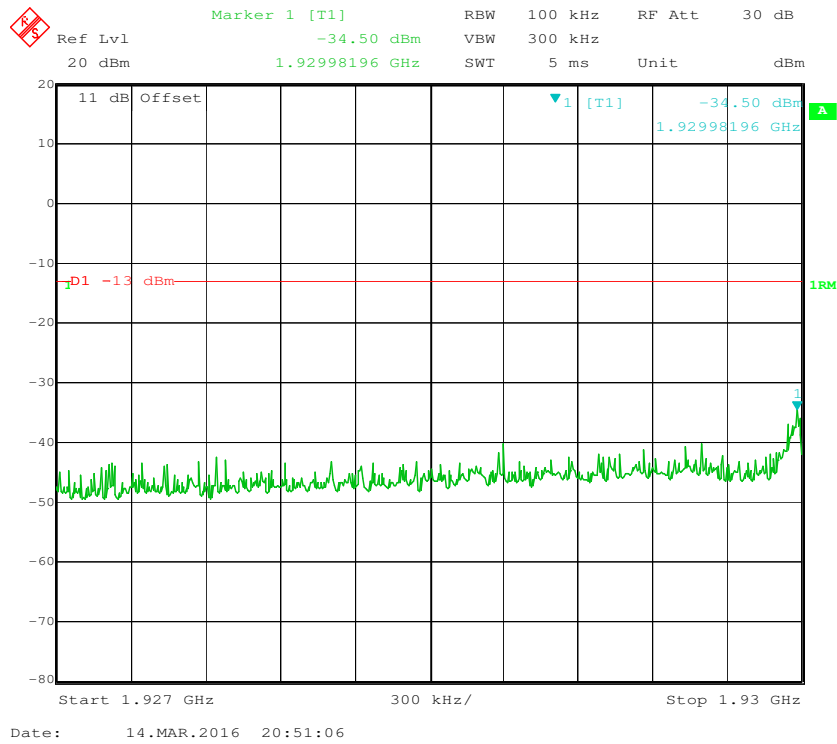
CELLULAR Band, Left Band Edge for GSM-3dB Above AGC



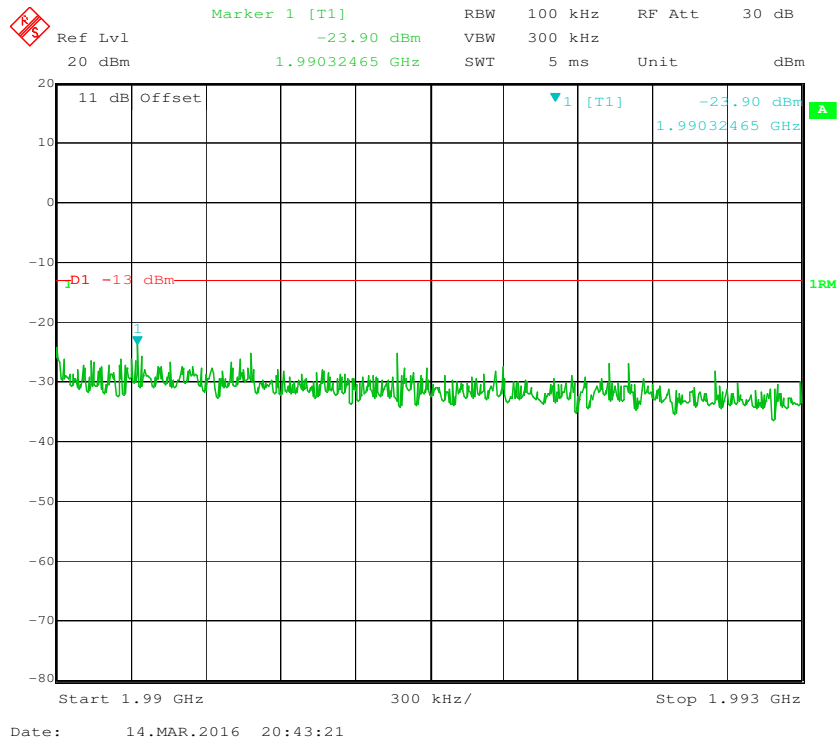
CELLULAR Band, Right Band Edge for GSM-3dB Above AGC



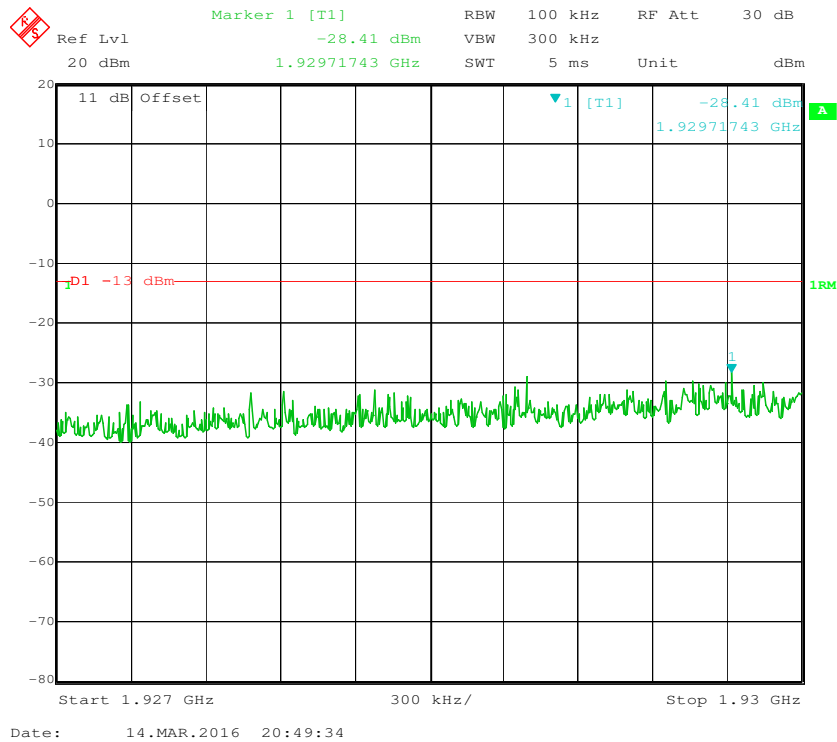
PCS Band, Left Band Edge for AWGN-Pre AGC



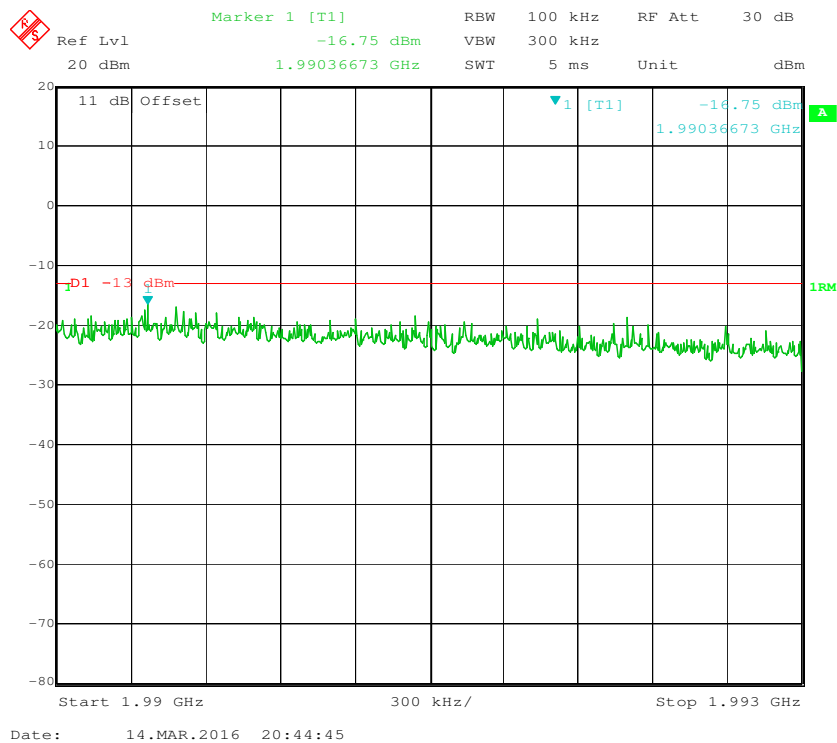
PCS Band, Right Band Edge for AWGN-Pre AGC



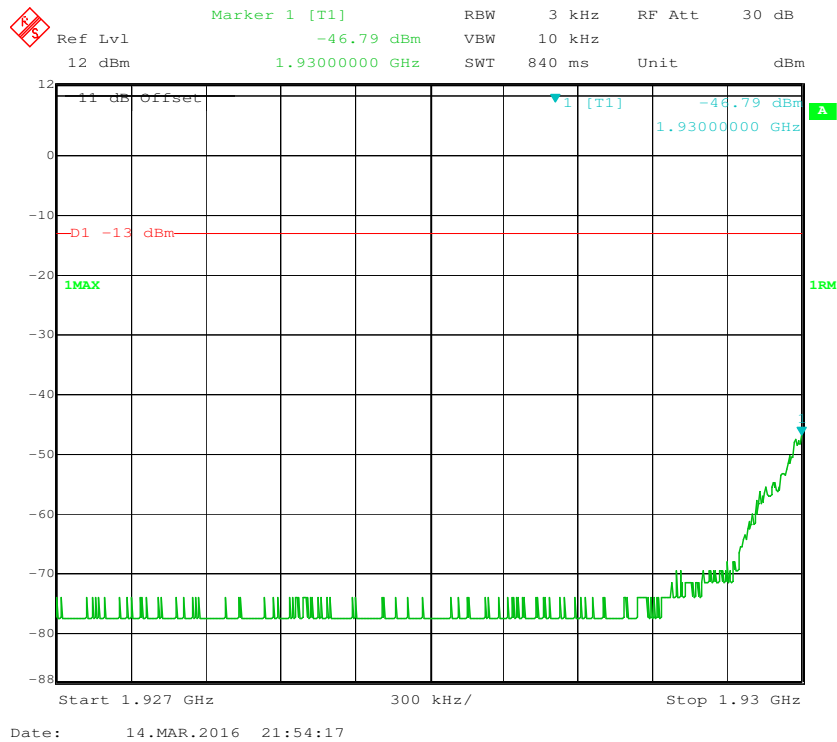
PCS Band, Left Band Edge for AWGN-3dB Above AGC



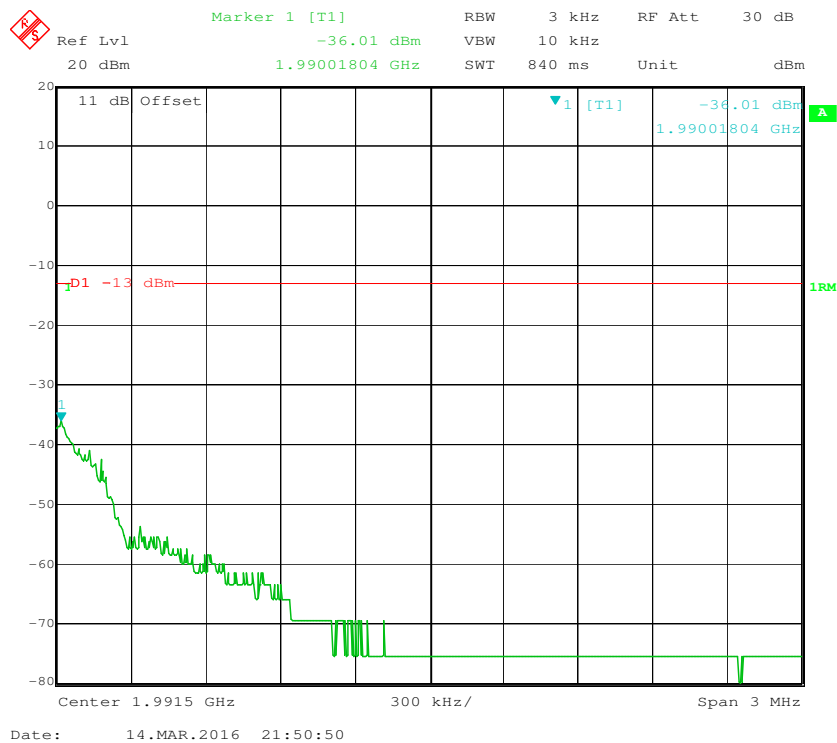
PCS Band, Right Band Edge for AWGN-3dB Above AGC



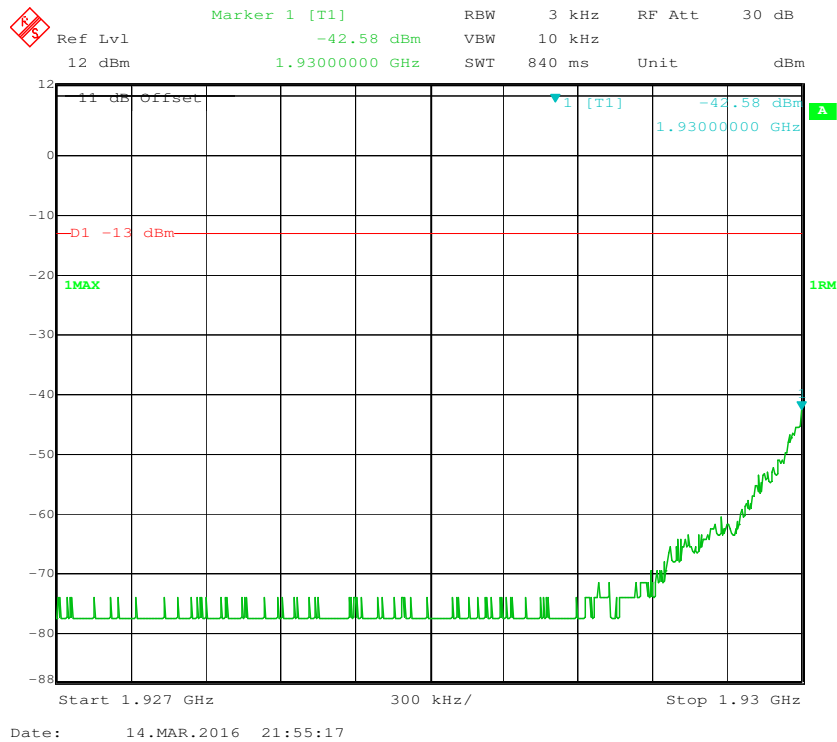
PCS Band, Left Band Edge for GSM-Pre AGC



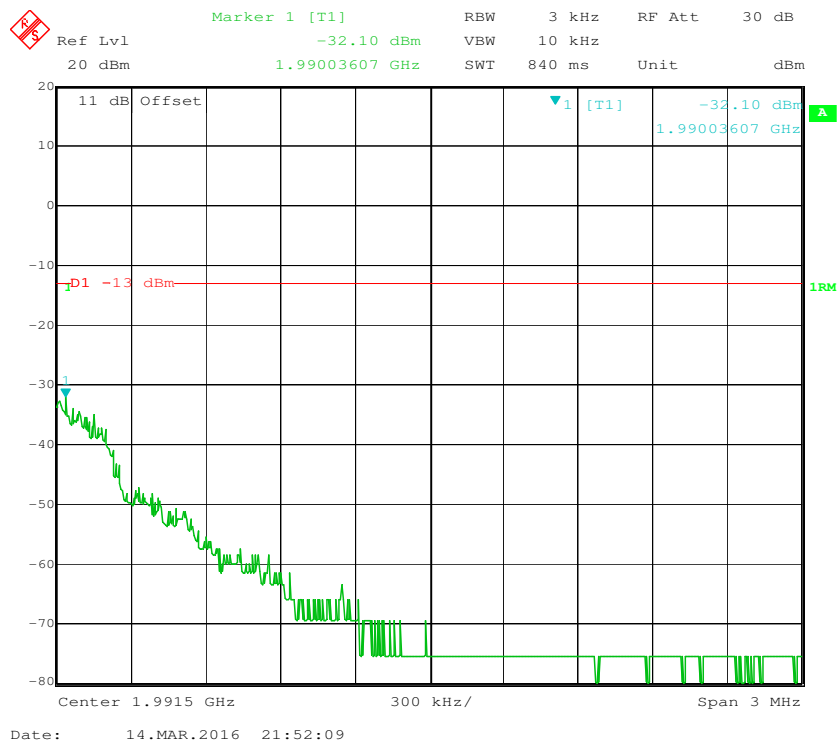
PCS Band, Right Band Edge for GSM-Pre AGC



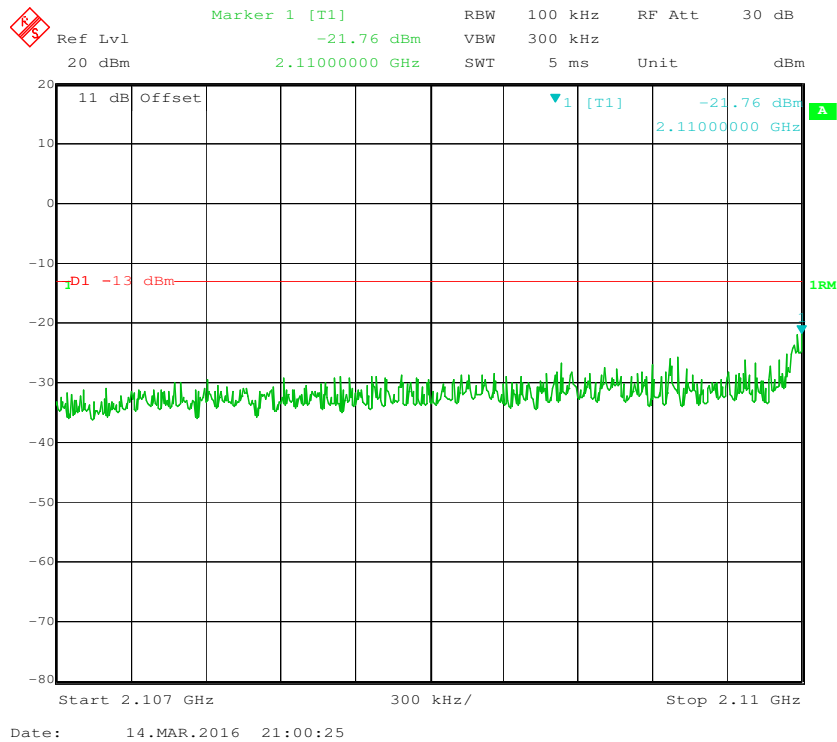
PCS Band, Left Band Edge for GSM-3dB Above AGC



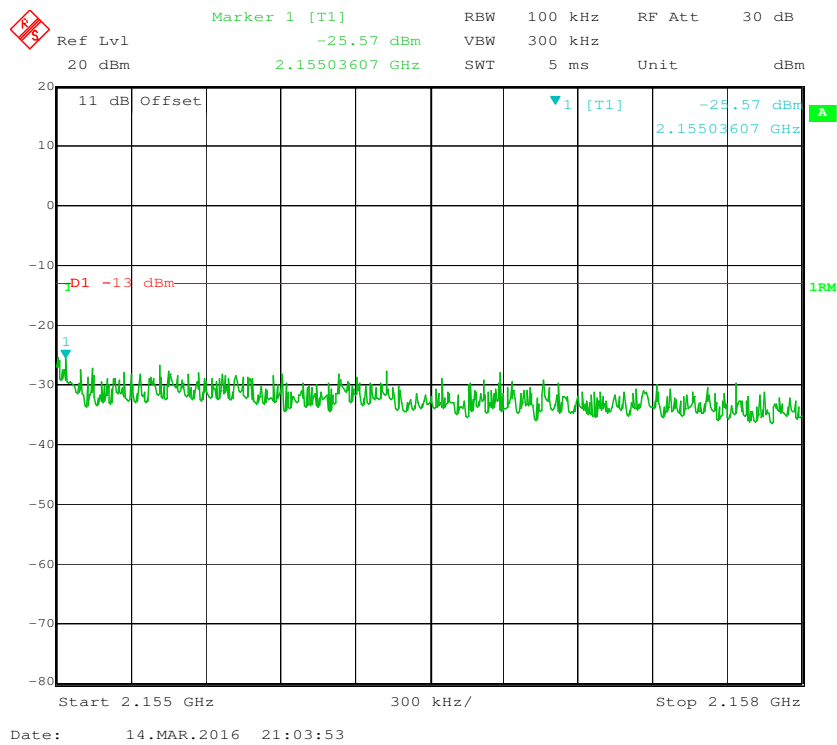
PCS Band, Right Band Edge for GSM-3dB Above AGC



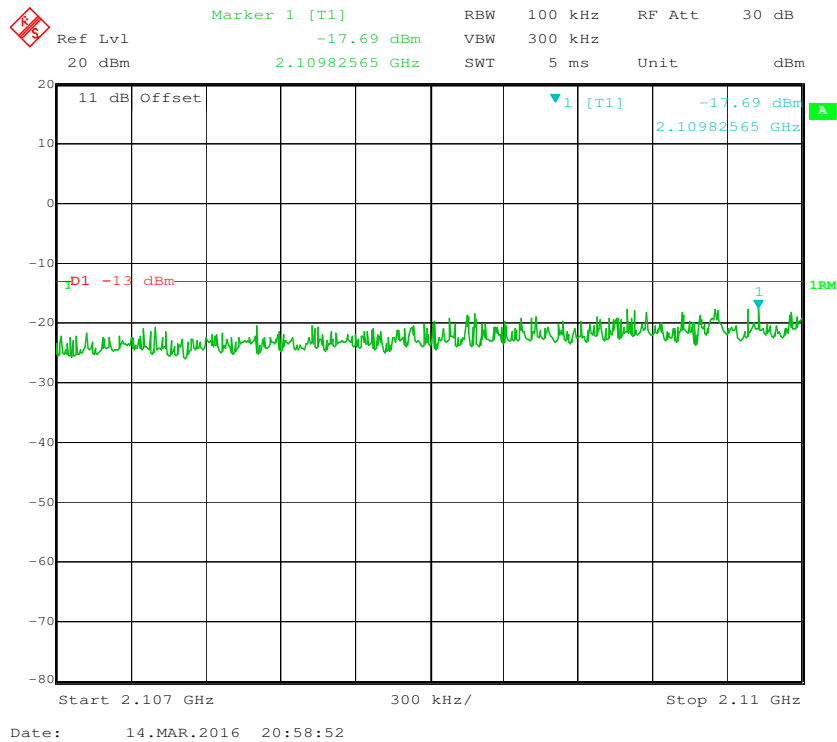
AWS-1 Band, Left Band Edge for AWGN-Pre AGC



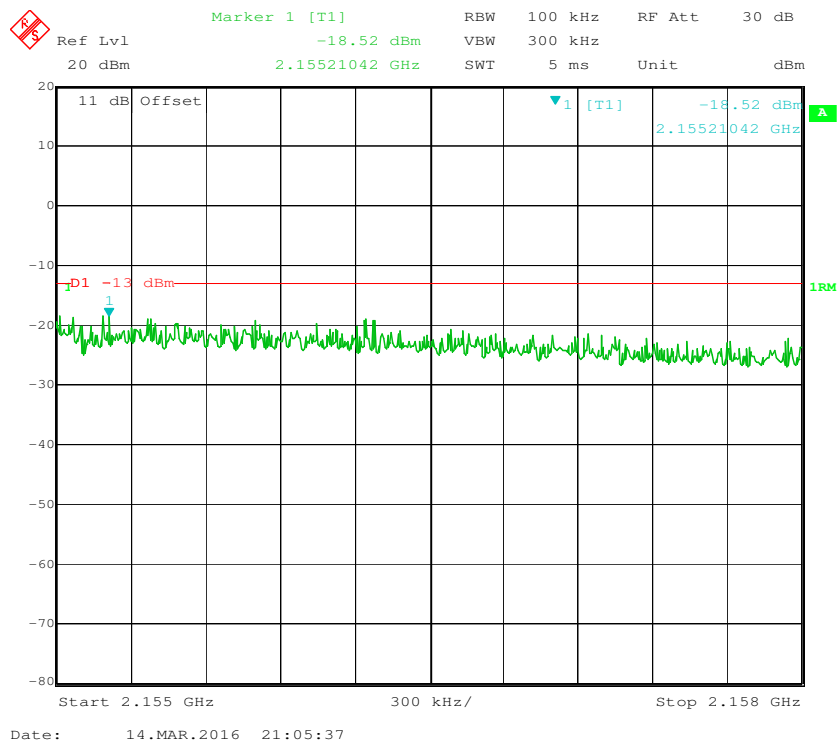
AWS-1 Band, Right Band Edge for AWGN-Pre AGC



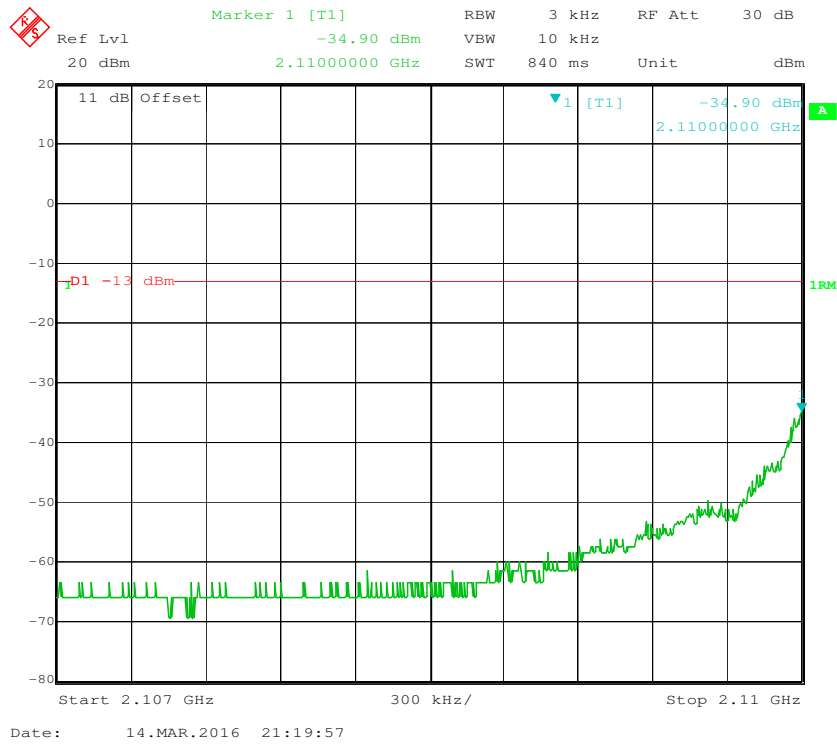
AWS-1 Band, Left Band Edge for AWGN-3dB Above AGC



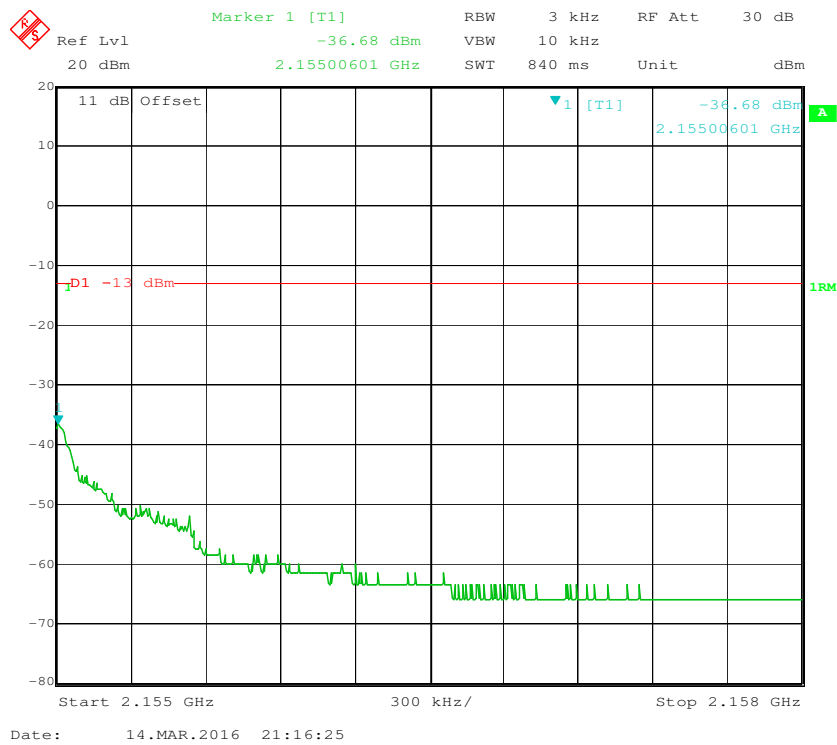
AWS-1 Band, Right Band Edge for AWGN-3dB Above AGC



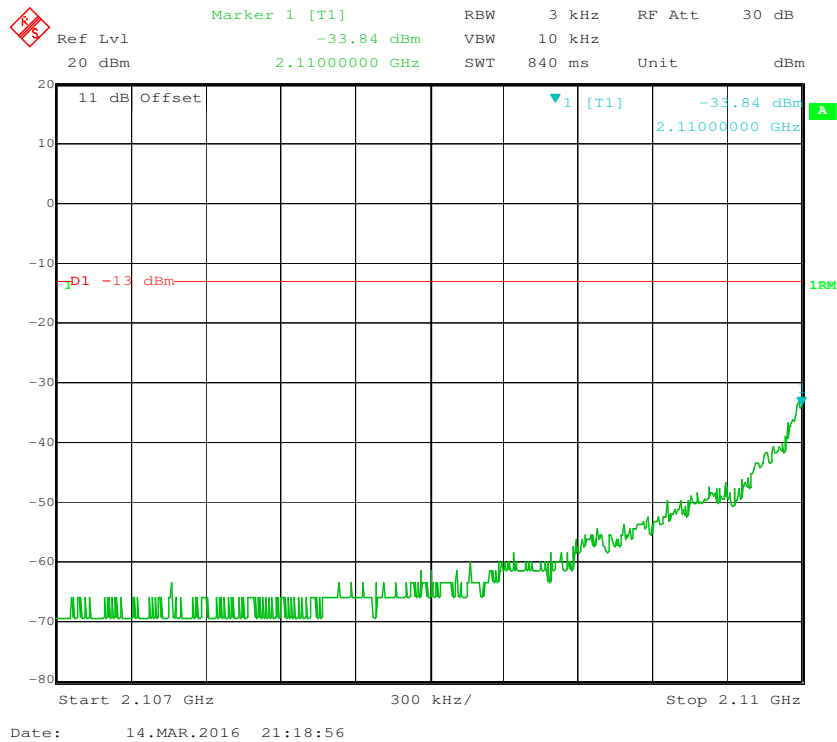
AWS-1 Band, Left Band Edge for GSM-Pre AGC



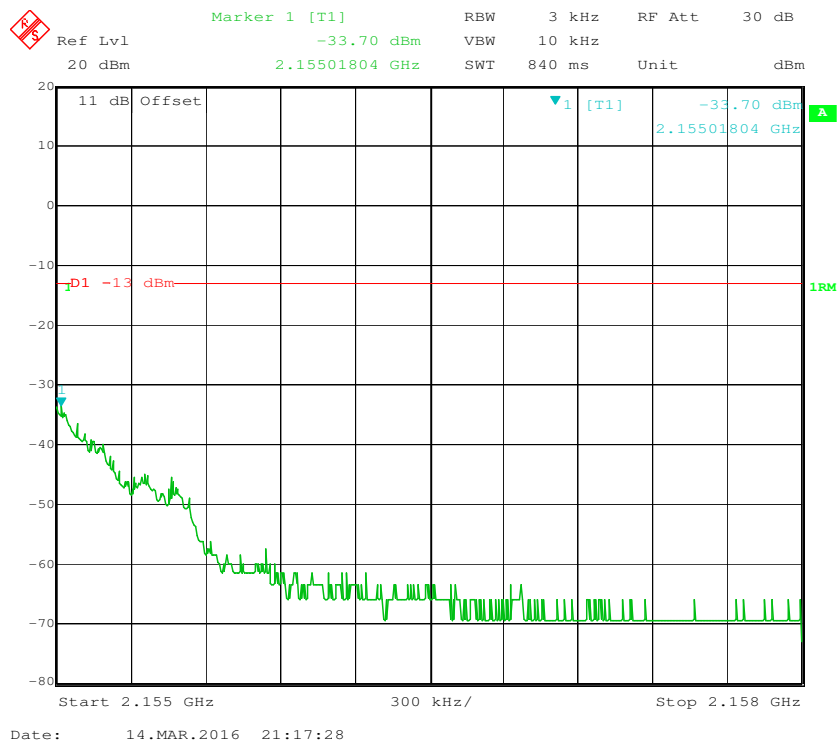
AWS-1 Band, Right Band Edge for GSM-Pre AGC



AWS-1 Band, Left Band Edge for GSM-3dB Above AGC



AWS-1 Band, Right Band Edge for GSM-3dB Above AGC



FCC §20.21 - OUT OF BAND REJECTION

Applicable Standard

According to FCC Part § 20.21, a frequency selective booster shall have -20dB at the band edge referenced to the gain in the center of the pass band of the booster, where band edge is the end of the licensee's allocated spectrum.

Test Procedure

KDB 935210 D05, Section 3.3.

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. The span of the spectrum analyzer was set to be wide enough in order to capture the spectrum of entire operating band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15
WEINSCHL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
Agilent	ESG Vector Signal Generator	E4438C	US41461205	2015-11-12	2016-11-12

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

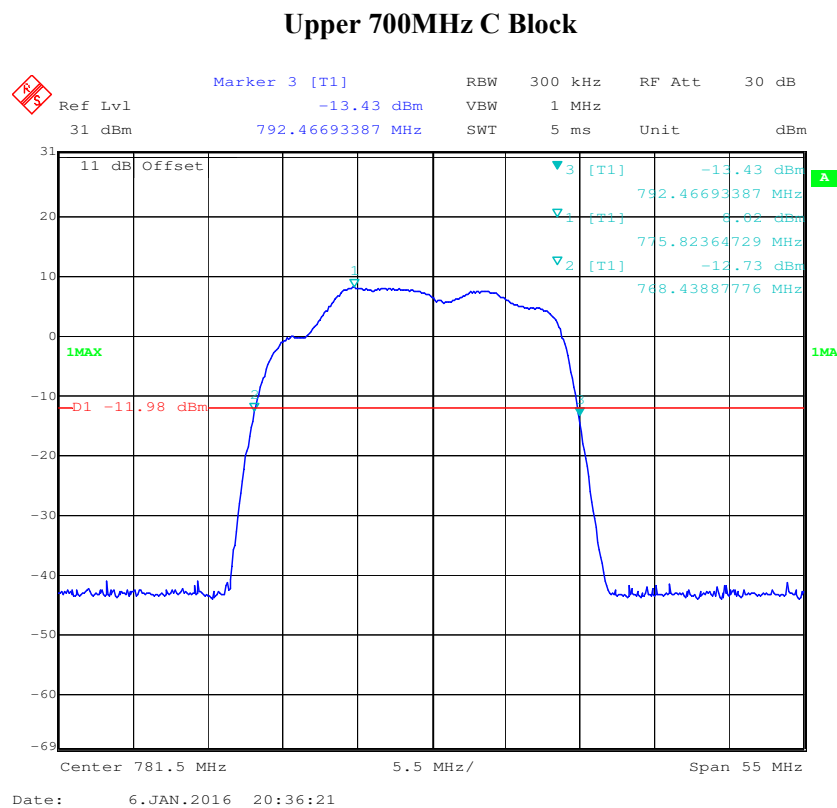
Temperature:	22 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong on 2016-01-06.

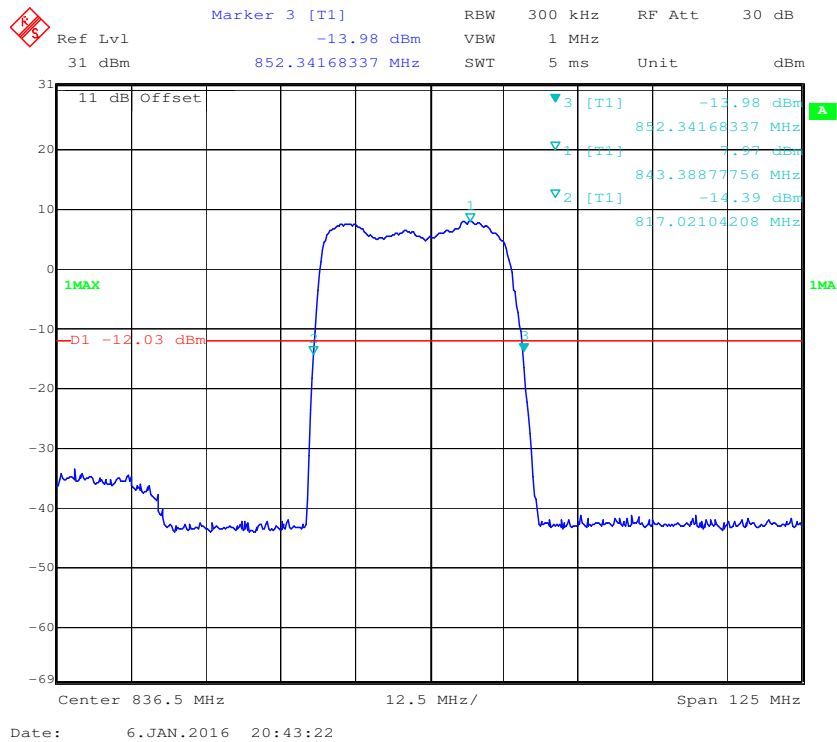
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following plots.

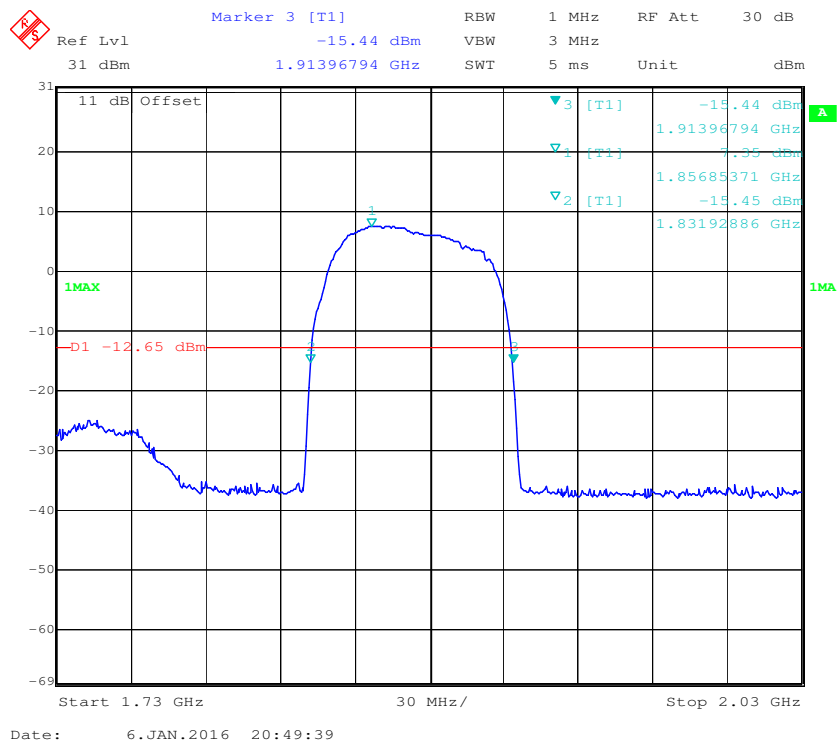
Lower 700MHz (B+C Block)



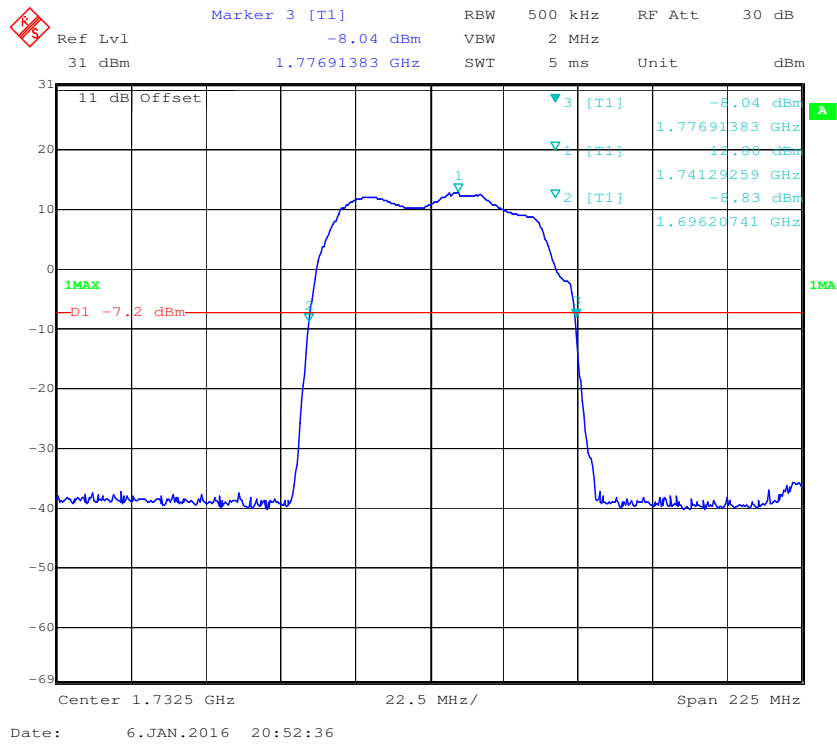
CELLULAR Band



PCS Band

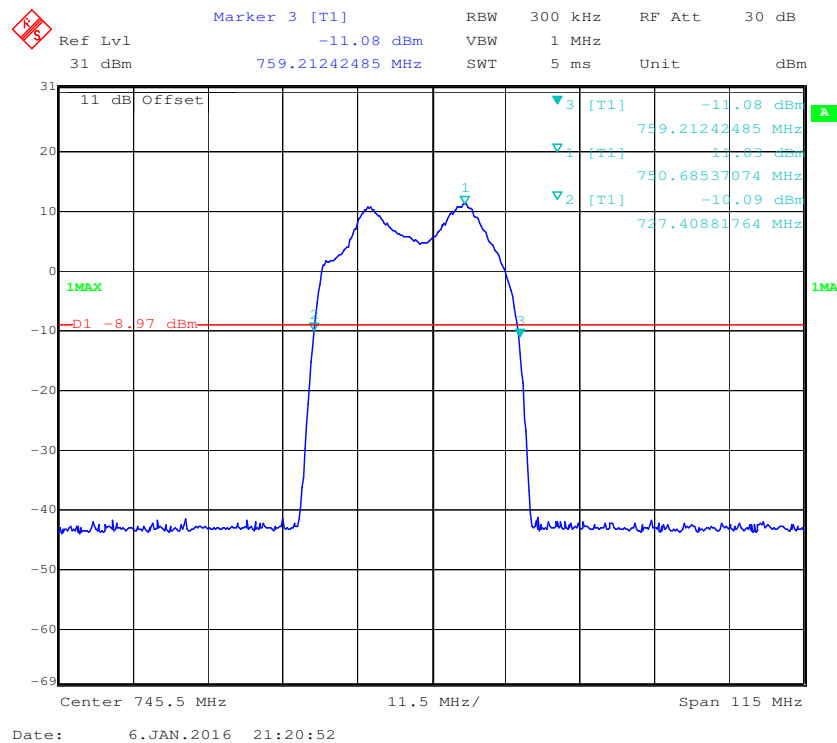


AWS-1 Band

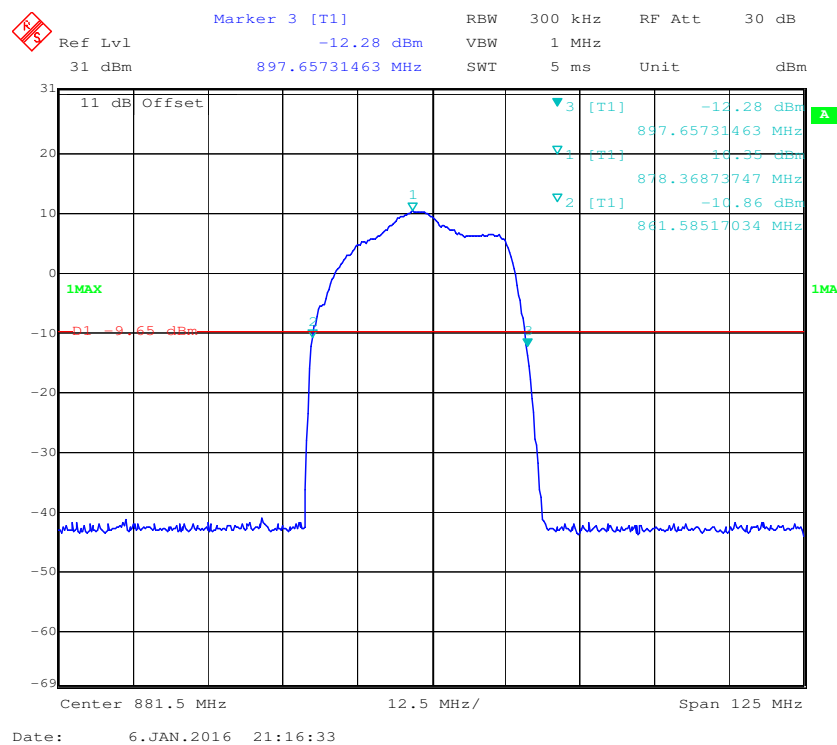


Downlink:

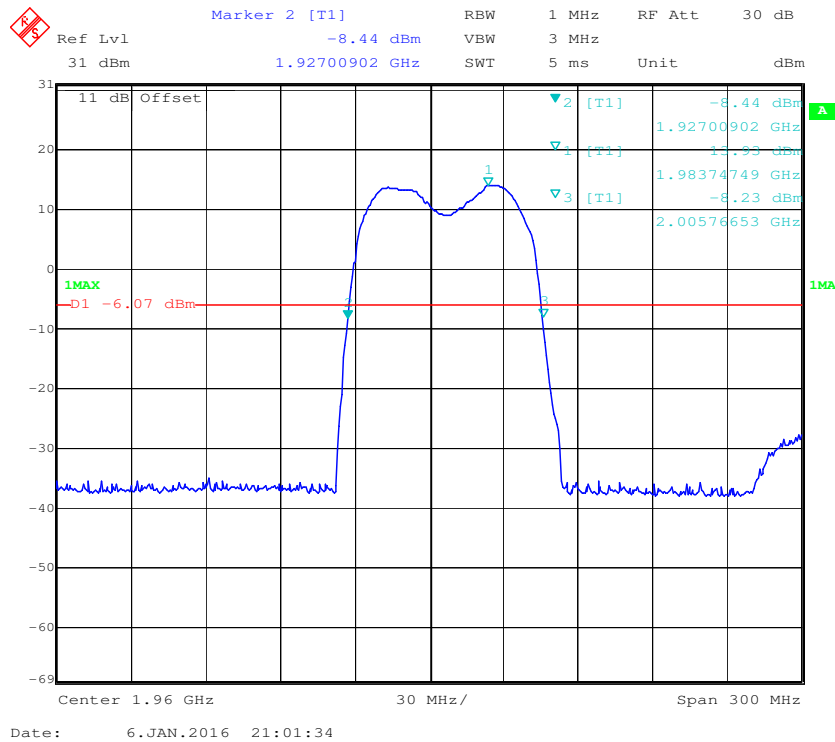
Lower 700MHz (B+C Block) + Upper 700MHz C Block



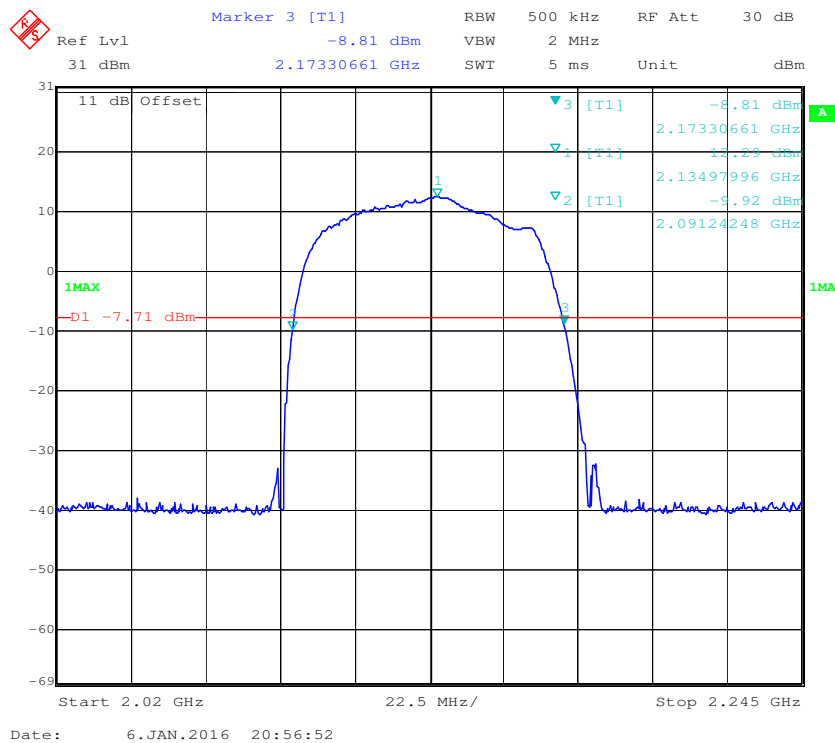
CELLULAR Band



PCS Band



AWS-1 Band



PRODUCT SIMILARITY DECLARATION LETTER

SHENZHEN HUAPTEC CO., LTD
 5th FL, E BLDG, Sogood Science Park, Sanwei Commun Hangkong Road, Xixiang,
 Bao'an, Shenzhen, 518102 China
 Tel: 86-755-29921635 Fax: 86-755-29921165

2015-12-11

Product Similarity Declaration

To
 FEDERAL COMMUNICATIONS COMMISSIONS
 Authorization and Evaluation Division
 7435 Oakland Mills Road
 Columbia, MD 21046

We, SHENZHEN HUAPTEC CO., LTD hereby declare that we have a product named as Wireless Cellular Repeater (Model number F25K-5S) FCC ID: OWWF25K-5S was tested by BACL, meanwhile, for our marketing purpose, We Would like to list a series models (F20K-5S, F17K-5S, F13K-5S) on reports and certificate. They named differently just due to different output power levels and gains achieved by adjusting the software, or different shell, however they have the same designs, PCB board, electronic device.

The F25K-5S type has a factory pre-set maximum output power of UL17~24dBm/ DL22~24dBm and maximum gain of UL68±3dB/ DL72±3dB. However, some user maybe want to use lower power, example 20 dBm, 17dBm or 13dBm booster in some smaller place. So we reduce the power and gain by adjust the software in factory.

And we summarized their difference in below file.

Item	Model Number	Nominal Output Power (Test in center frequency)	Rated Output Power	Max. Gain (Maximum point gain)	Size and color
1	F25K-5S	UL17~24dBm, DL22~24dBm	UL17dBm, DL17dBm	UL68±3dB, DL72±3dB	218*165*50mm/Black
	F25K-5S	UL17~24dBm, DL22~24dBm	UL17dBm, DL17dBm	UL68±3dB, DL72±3dB	218*165*50mm/Silver
2	F20K-5S	UL17~24dBm, DL20dBm	UL17dBm, DL17dBm	UL65±3dB, DL70±3dB	218*165*50mm/Black
	F20K-5S	UL17~24dBm, DL20dBm	UL17dBm, DL17dBm	UL65±3dB, DL70±3dB	218*165*50mm/Silver
3	F17K-5S	UL17~24dBm, DL17dBm	UL17dBm, DL17dBm	UL65±3dB, DL65±3dB	218*165*50mm/Black
	F17K-5S	UL17~24dBm, DL17dBm	UL17dBm, DL17dBm	UL65±3dB, DL65±3dB	218*165*50mm/Silver
4	F13K-5S	UL17~24dBm, DL13~18dBm	UL17dBm, DL13dBm	UL65±3dB, DL65±5dB	218*165*50mm/Black
	F13K-5S	UL17~24dBm, DL13~18dBm	UL17dBm, DL13dBm	UL65±3dB, DL65±5dB	218*165*50mm/Silver

We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Signature: Yanwei Wang

Yanwei Wang
 Title: Manager

***** END OF REPORT *****