

TEST REPORT

Reference No...... : WTX22X12260158W001
FCC ID..... : 2BAQOFG80
Applicant..... : Beijing Speedata Technology Co.,Ltd
Address..... : Office 01-2 08, Block D, 8 / F, Building 1-4, Yard A, 18 Zhongguancun South Street, Haidian District, Beijing.
Manufacturer..... : The same as Applicant
Address..... : The same as Applicant
Product Name..... : Wireless mobile tablet data terminal
Model No...... : FG80
Standards..... : FCC Part 22H, FCC Part 24E
Date of Receipt sample..... : 2022-12-26
Date of Test..... : 2022-12-26 to 2023-03-28
Date of Issue..... : 2023-03-28
Test Report Form No...... : WTX_Part 22_ Part 24W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

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Report version

Version No.	Date of issue	Description
Rev.00	2023-03-28	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	Wireless mobile tablet data terminal
Trade Name:	思必拓speedata, Haitech
Model No.:	FG80
Adding Model(s):	FN80, FD80, FP80, FC80, FT80, GT80, SC80, SD100, SD80, SD100Plus, T80, T100, HPAD-FG80
Rated Voltage:	DC3.85V
Battery:	/
Adapter Model:	HYX024-U012125XYE Input:AC100-240V 50/60Hz 0.5A Output:DC5V/7V/9V1.67A; DC12V1.25A
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i> <i>The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model FG80, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 34.09dBm, GSM1900: 30.17dBm EDGE850: 28.31dBm, EDGE1900: 27.65dBm
Type of Emission:	GSM850: 248KGXW, GSM1900: 246GXW EDGE850: 248KG7W, EDGE1900: 249KG7W
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	FPC Antenna
Antenna Gain:	GSM850: -2.5dBi; GSM1900: 0.5dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 23.39dBm, WCDMA Band 5: 23.74dBm
Type of Emission:	WCDMA Band 2: 4M20F9W WCDMA Band 5: 4M22F9W
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	FPC Antenna
Antenna Gain:	WCDMA Band 2: 0.5dBi, WCDMA Band 5: -2.5dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.

FCC Rules Part 22: Private Land Mobile Radio Services.

FCC Rules Part 24: Public Mobile Services.

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

KDB 971168 D01 Power Meas License Digital Systems v03r01: Measurement Guidance for Certification of Licensed Digital Transmitters.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band 5	Low, Middle, High Channels
TM8	HSDPA Band 5	Low, Middle, High Channels
TM9	HSUPA Band 5	Low, Middle, High Channels
TM10	WCDMA Band 2	Low, Middle, High Channels
TM11	HSDPA Band 2	Low, Middle, High Channels
TM12	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency(MHz)	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2	128
		836.6	190
		848.8	251
PCS 1900	GSM/GPRS/EDGE	1850.2	512
		1880.0	661
		1909.8	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4	4132
		836.6	4183
		846.6	4233
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4	9262
		1880.0	9400
		1907.6	9538
Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case.			

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.0	Shielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	XiaoXin Pro 14IHU 2021	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	$\pm 0.42\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2022-03-22	2023-03-21
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-25	2023-03-24
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-22	2023-03-21
SMET-1313	Spectrum Analyzer	Agilent	N9020A	MY54320548	2022-03-22	2023-03-21
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2022-03-22	2023-03-21
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-22	2023-03-21
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2022-03-22	2023-03-21
SEMT-1132	Attenuator	HP	8491A	MY39264419	2022-03-22	2023-03-21
SEMT-1320	EXA Signal Analyzer	KEYSIGHT	N9010B	MY59070494	2022-01-07	2023-01-06
SEMT-1320	EXA Signal Analyzer	KEYSIGHT	N9010B	MY59070494	2022-12-30	2023-12-29
SEMT-1325	Band Reject Filter Group	Tonscend	JS0806-F	2018060319	2022-03-22	2023-03-21
☒ Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-1008	Amplifier	HP	8447F	2805A03475	2022-01-07	2023-01-06
SEMT-1008	Amplifier	HP	8447F	2805A03475	2022-12-30	2023-12-29
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19
☒ Chamber A: Above 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2022-03-22	2023-03-21
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18

SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA917058 2	2021-04-27	2023-04-26
SEMT-1216	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2022-03-25	2023-03-24
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-22	2023-03-21
☐ Chamber B:Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2022-03-22	2023-03-21
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-22	2023-03-21
☐ Chamber C:Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-07	2023-01-06
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-12-30	2023-12-29
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2022-03-22	2023-03-21

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041A 1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24
WTXE1022A 1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-02-25	2024-02-24
WTXE1104A 1001	MXG Vector Signal Generator	Agilent	N5182A	MY474201 08	2023-02-25	2024-02-24
WTXE1104A 1002	DC Power Supply	Agilent	E3634A	MY400092 94	2023-02-25	2024-02-24
WTXE1104A 1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY612528 92	2023-02-25	2024-02-24
WTXE1104A 1004	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101559	2023-03-27	2024-03-26
WTXE1104A 1005-2	Band Reject Filter Group	Tonscend	JS0806-F	23A806F0 658	2023-02-25	2024-02-24
☒ Chamber A: Below 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2023-02-25	2024-02-24

WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/00 5	2023-02-25	2024-02-24
WTXE1007A 1001	Amplifier	HP	8447F	2805A034 75	2023-02-25	2024-02-24
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010A 1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☒ Chamber A: Above 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/00 5	2023-02-25	2024-02-24
WTXE1065A 1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010A 1005	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
WTXE1004A 1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2023-02-25	2024-02-24
☐ Chamber B: Below 1GHz						
WTXE1010A 1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
WTXE1038A 1001	Amplifier	Agilent	8447D	2944A101 79	2023-02-25	2024-02-24
WTXE1001A 1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
☐ Chamber C: Below 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
WTXE1007A 1002	Amplifier	HP	8447F	2944A038 69	2023-02-25	2024-02-24
☐ Chamber C: Above 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24

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WTXE1103A 1005	Horn Antenna	POAM	RTF-11A	LP228060 221	2023-03-10	2026-03-09
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2023-02-25	2024-02-24

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§22.913(a), §24.232(c)	RF Output Power	Compliant
§24.51	Peak-to-average Ratio (PAR) of Transmitter	Compliant
§22.917(b), §24.238(b)	Emission Bandwidth	Compliant
§22.917(a), §24.238(a)	Spurious Emissions at Antenna Terminal	Compliant
§22.917(a), §24.238(a)	Spurious Radiation Emissions	Compliant
§22.917(a), §24.238(a)	Out of Band Emissions	Compliant
§22.355, §24.235	Frequency Stability	Compliant
§2.1047	Modulation characteristics	Compliant

N/A: Not applicable.

3. RF Output Power

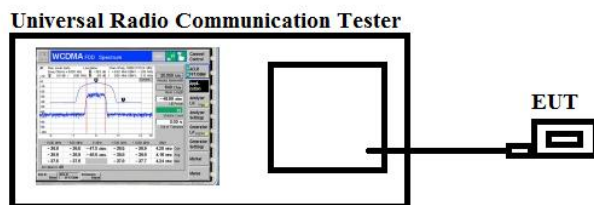
3.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §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.

3.2 Test Procedure

- Conducted output power test method:



- Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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.

3.3 Summary of Test Results/Plots

➤ **Max. Radiated Power**

Mode	Channel	Antenna Polar	ERP (dBm)	Limit (dBm)	Result
GSM850	128	V	28.25	<38.45	Pass
		H	20.69		
	190	V	28.27		
		H	20.55		
	251	V	28.85		
		H	21.62		
GPRS850	128	V	27.76	<38.45	Pass
		H	20.65		
	190	V	27.91		
		H	21.41		
	251	V	27.33		
		H	20.34		
EGPRS850	128	V	24.65	<38.45	Pass
		H	19.45		
	190	V	24.94		
		H	19.47		
	251	V	24.62		
		H	19.29		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	512	V	28.22	<33.00	Pass
		H	23.17		
	661	V	28.41		
		H	23.61		
	810	V	28.14		
		H	23.45		
GPRS1900	512	V	28.67	<33.00	Pass
		H	23.35		
	661	V	27.51		
		H	22.69		
	810	V	27.92		
		H	22.86		
EGPRS1900	512	V	22.61	<33.00	Pass
		H	17.95		
	661	V	22.86		
		H	17.11		
	810	V	22.27		
		H	17.31		

Mode	Channel	Antenna Polar	ERP	Limit (dBm)	Result
WCDMA Band V	4132	V	20.12	<38.45	Pass
		H	15.21		
	4183	V	19.27		
		H	14.52		
	4233	V	19.47		
		H	14.32		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band II	9262	V	20.65	<33.00	Pass
		H	15.14		
	9400	V	20.71		
		H	15.03		
	9538	V	20.06		
		H	14.67		

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

➤ **Max. Conducted Power (Average power)**

Please refer to Appendix A

4. Peak-to-average Ratio (PAR) of Transmitter

4.1 Standard Applicable

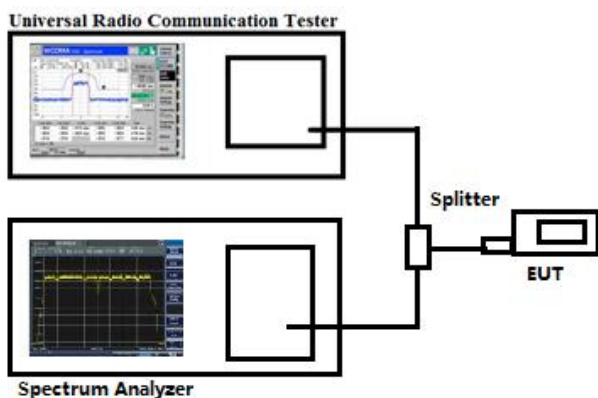
According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

4.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled.
2. Frequency = carrier center frequency.
3. Measurement BW > Emission bandwidth of signal.
4. The signal analyzer was set to collect one million samples to generate the CCDF curve.
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

Test Configuration for the emission bandwidth testing:



4.3 Summary of Test Results

Please refer to Appendix B.

5. Emission Bandwidth

5.1 Standard Applicable

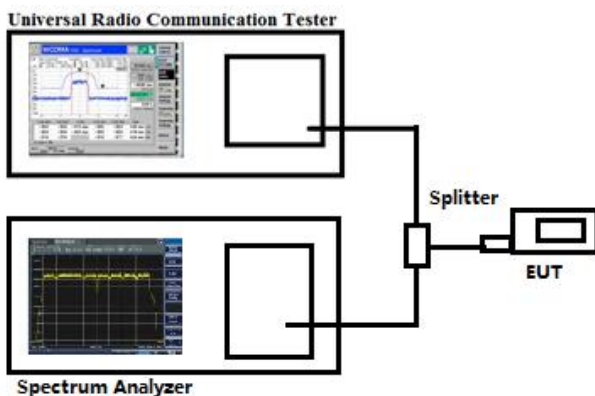
According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



5.3 Summary of Test Results/Plots

Please refer to Appendix C

6. Out of Band Emissions at Antenna Terminal

6.1 Standard Applicable

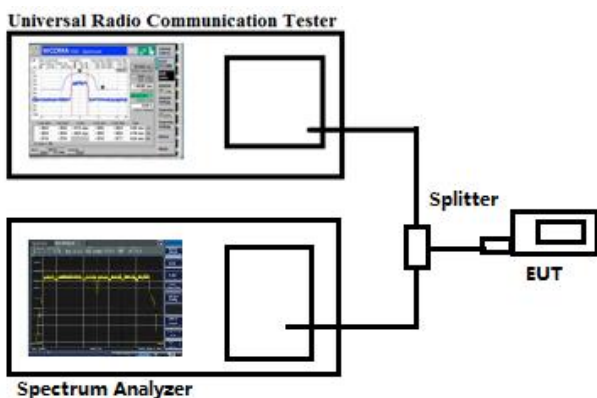
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), 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.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



6.3 Summary of Test Results/Plots

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

Please refer to Appendix D

7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §22.917(a), 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.

According to §24.238(a), 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.

7.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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.

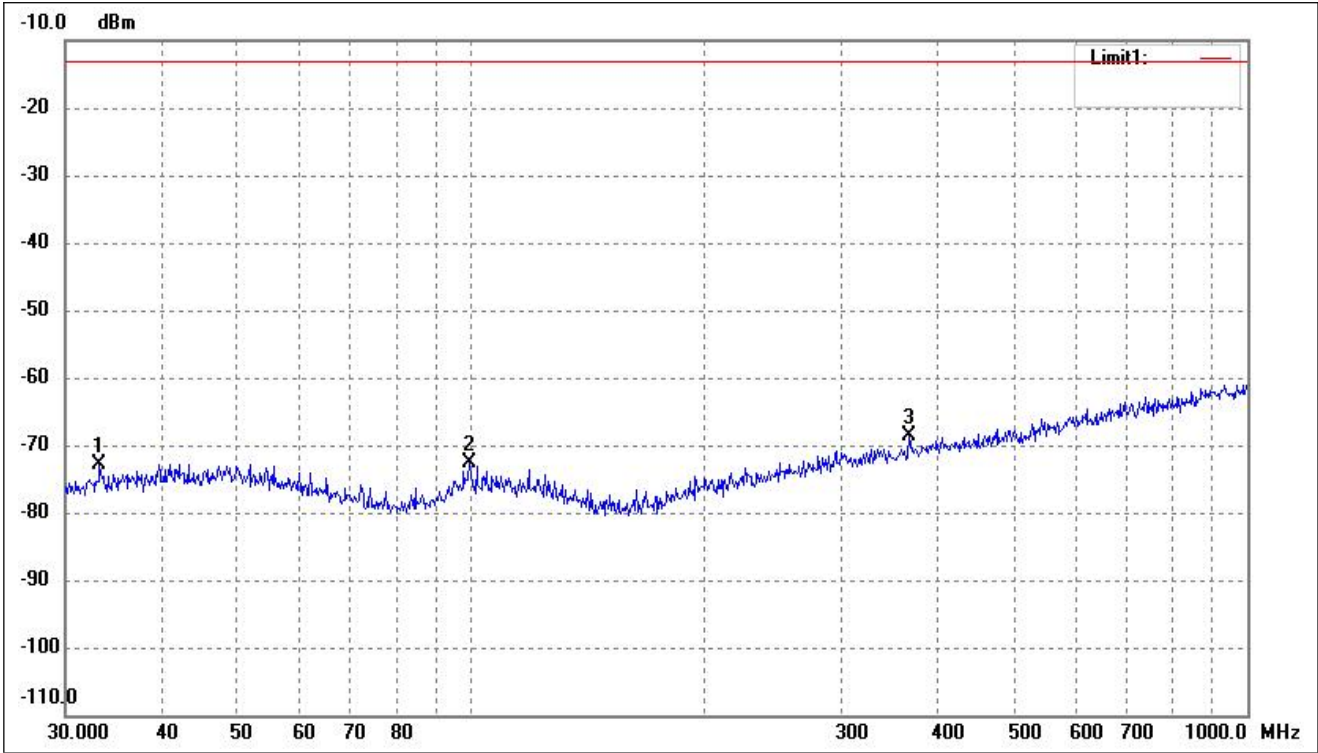
Spurious attenuation limit in dB $= 43 + 10 \log_{10}(\text{power out in Watts})$

7.3 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

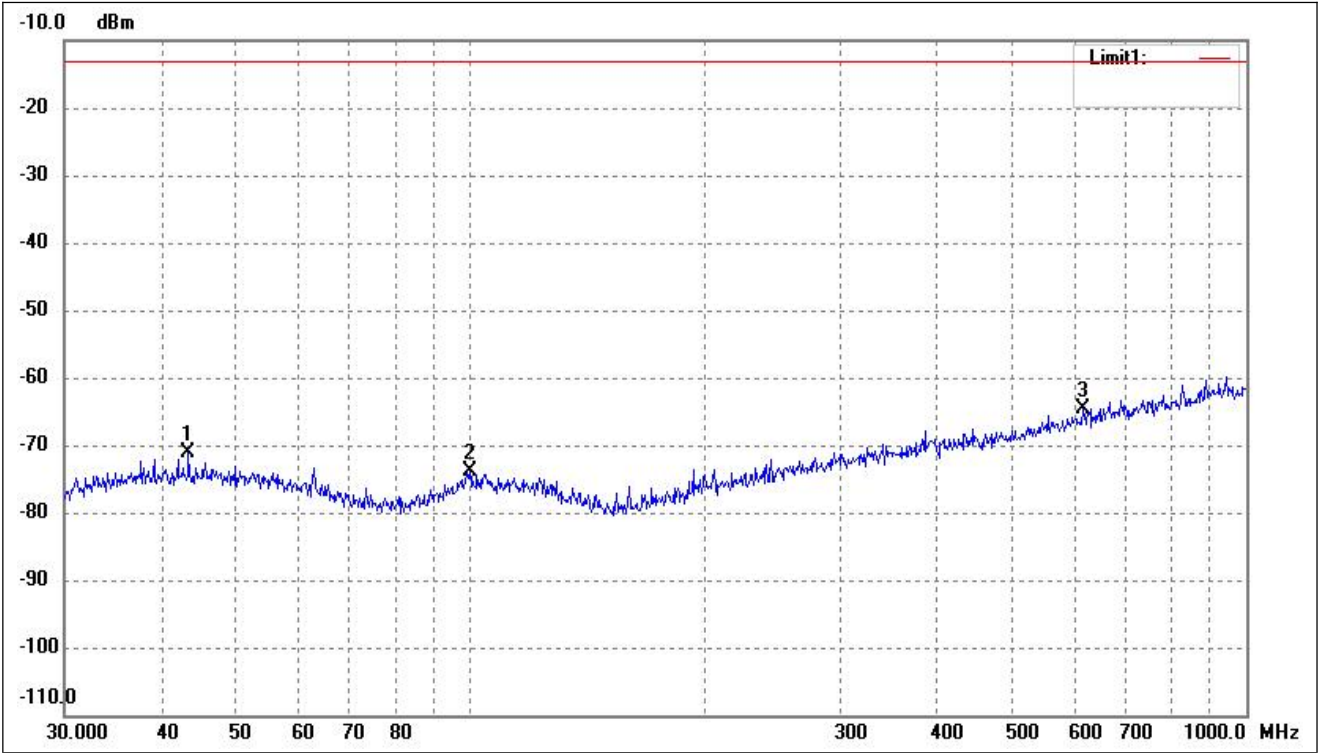
➤ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



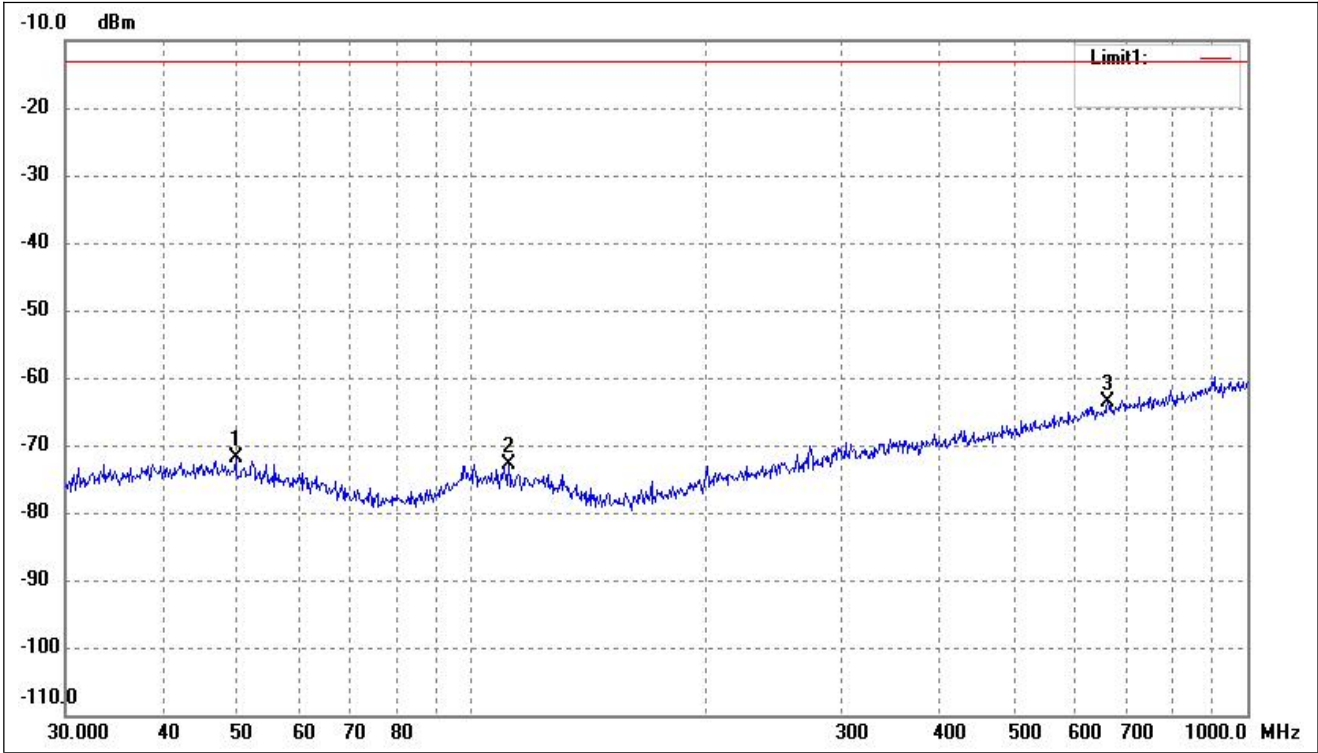
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	33.2112	-76.08	3.18	-72.90	-13.00	-59.90	-	-	peak
2	99.5281	-76.26	3.62	-72.64	-13.00	-59.64	-	-	peak
3	366.8231	-76.49	7.94	-68.55	-13.00	-55.55	-	-	peak

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



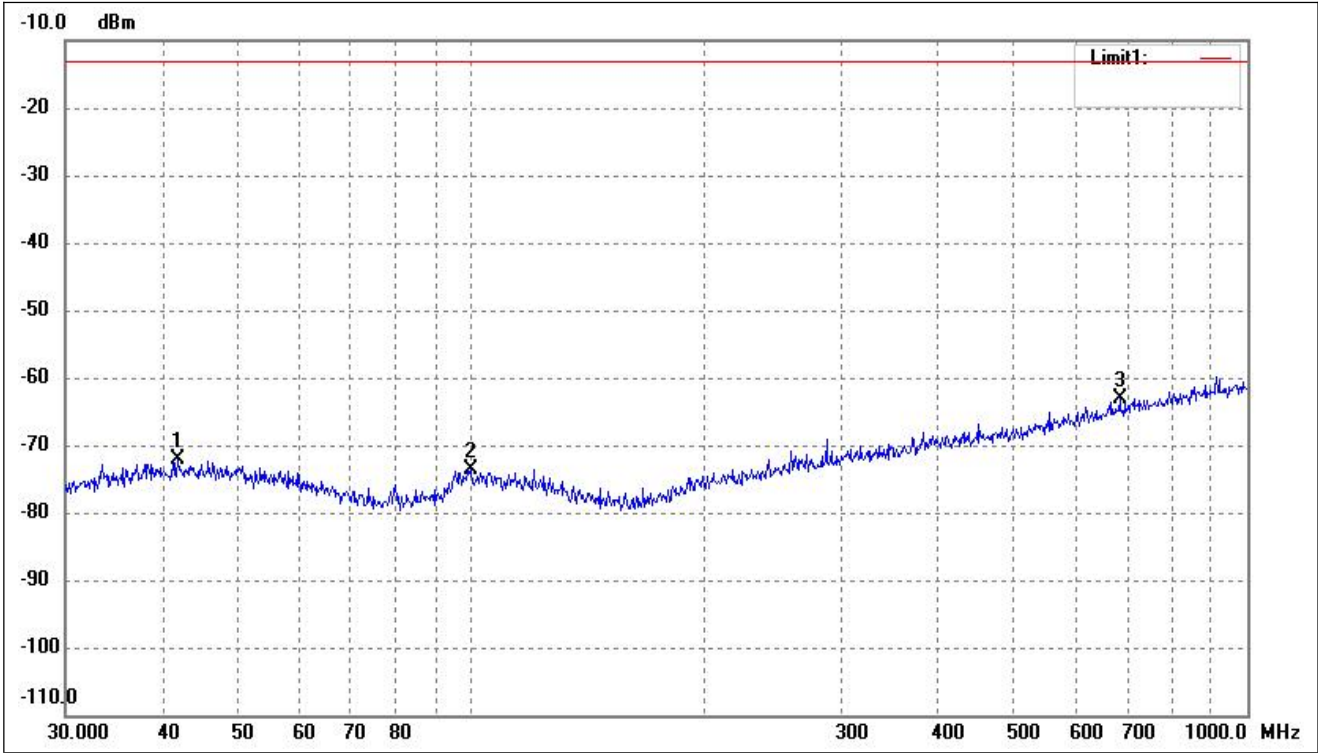
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	43.3534	-75.84	4.62	-71.22	-13.00	-58.22	-	-	peak
2	99.8777	-77.47	3.71	-73.76	-13.00	-60.76	-	-	peak
3	616.3718	-76.48	11.89	-64.59	-13.00	-51.59	-	-	peak

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	49.7068	-76.45	4.49	-71.96	-13.00	-58.96	-	-	peak
2	111.7380	-76.36	3.54	-72.82	-13.00	-59.82	-	-	peak
3	661.1505	-76.29	12.55	-63.74	-13.00	-50.74	-	-	peak

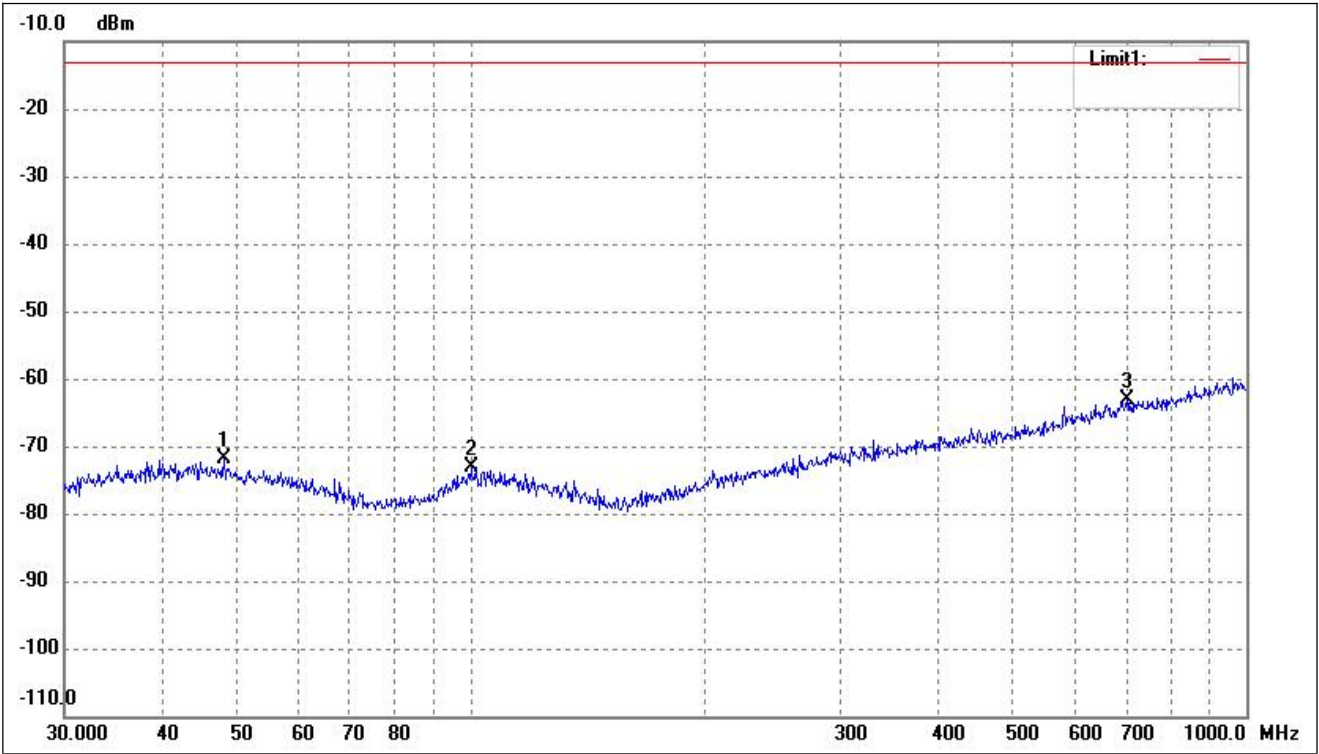
For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.8596	-76.87	4.64	-72.23	-13.00	-59.23	-	-	peak
2	99.8777	-77.22	3.71	-73.51	-13.00	-60.51	-	-	peak
3	684.7454	-76.01	12.92	-63.09	-13.00	-50.09	-	-	peak

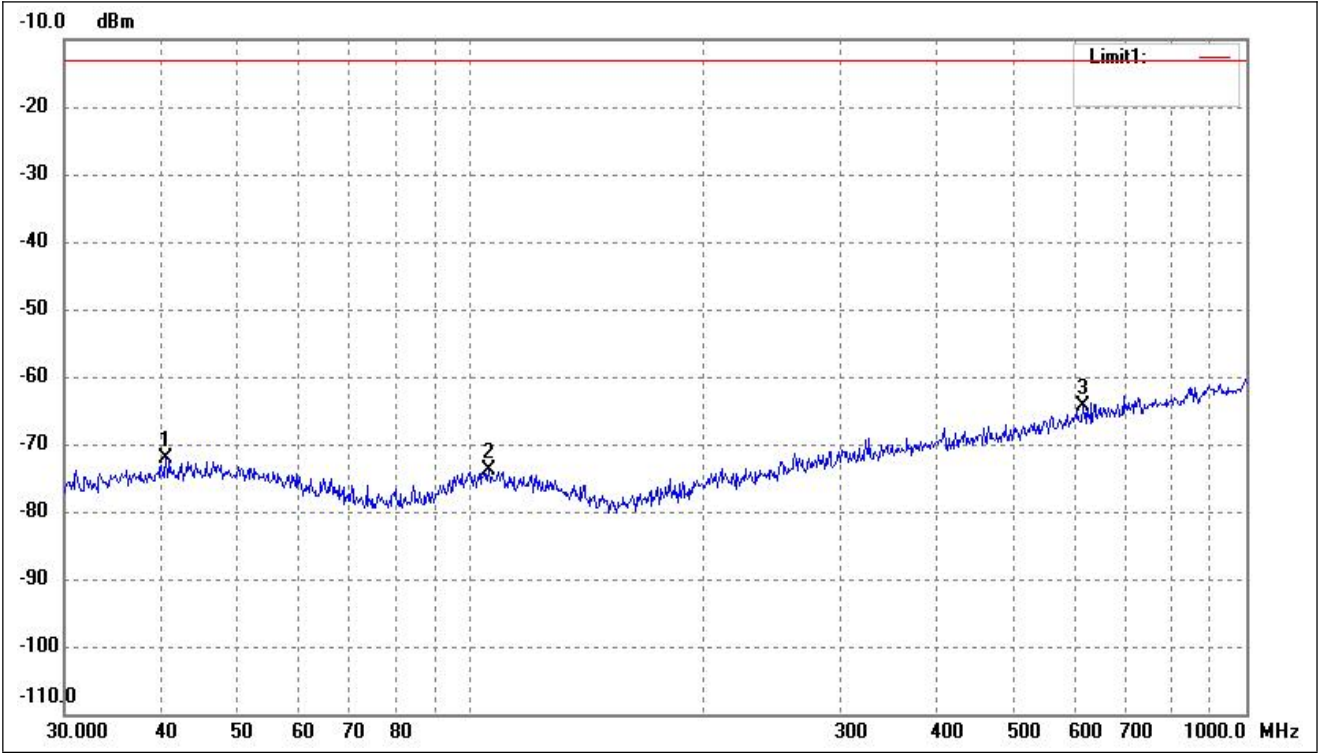
Note: Margin= (Reading+ Correct)- Limit

Test Channel	band 5	Polarity:	Horizontal
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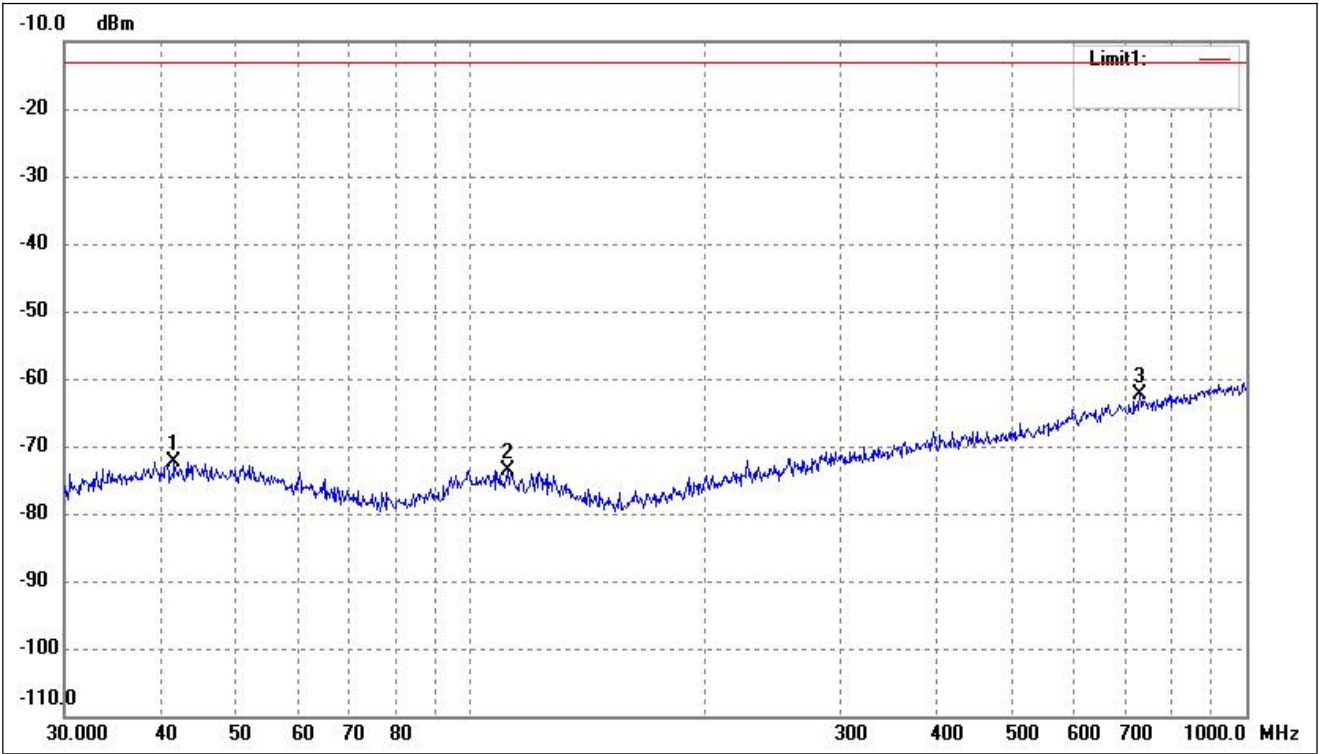
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	48.1626	-76.49	4.52	-71.97	-13.00	-58.97	-	-	peak
2	100.2286	-76.95	3.74	-73.21	-13.00	-60.21	-	-	peak
3	701.7610	-76.38	13.18	-63.20	-13.00	-50.20	-	-	peak

Test Channel	band 5	Polarity:	Vertical
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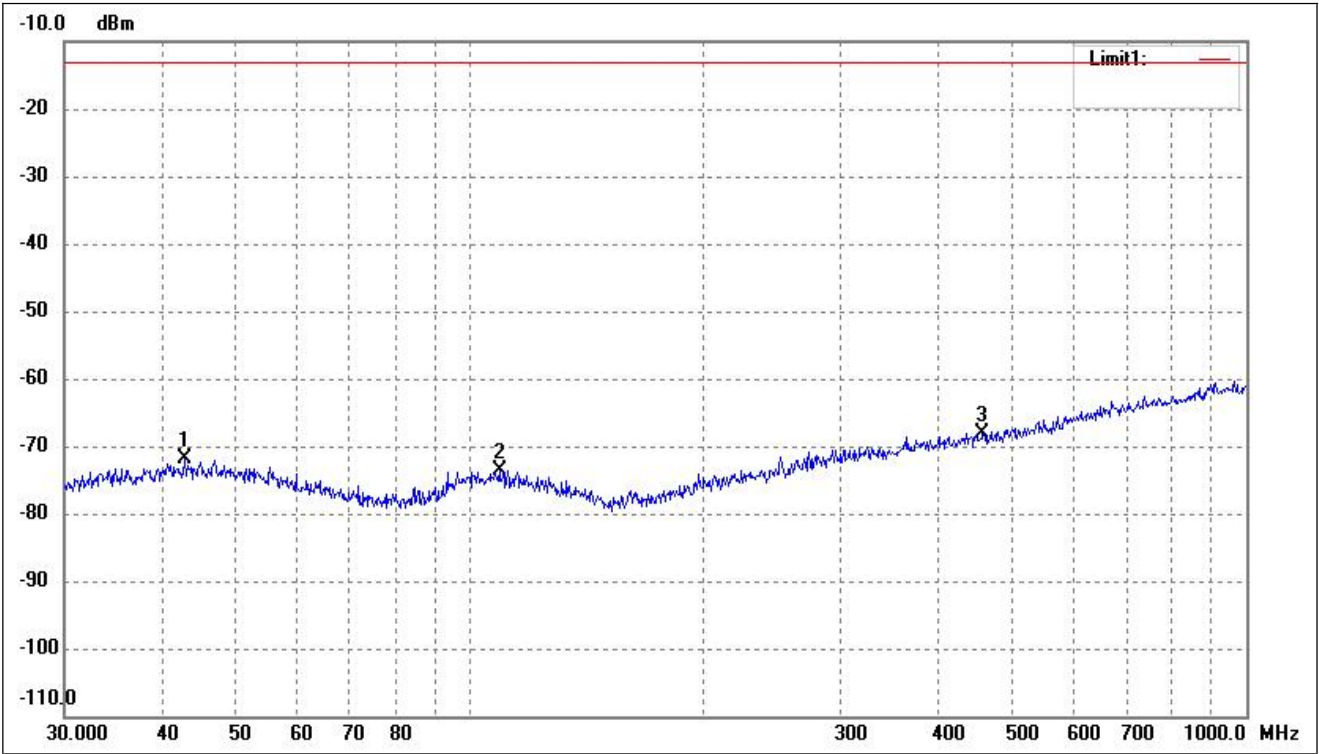
No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	40.5591	-76.69	4.67	-72.02	-13.00	-59.02	-	-	peak
2	105.6415	-77.51	3.70	-73.81	-13.00	-60.81	-	-	peak
3	616.3718	-76.37	11.89	-64.48	-13.00	-51.48	-	-	peak

Test Channel	band 2	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	41.5670	-76.95	4.65	-72.30	-13.00	-59.30	-	-	peak
2	111.7380	-77.26	3.54	-73.72	-13.00	-60.72	-	-	peak
3	729.3583	-75.70	13.43	-62.27	-13.00	-49.27	-	-	peak

Test Channel	band 2	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.8998	-76.56	4.62	-71.94	-13.00	-58.94	-	-	peak
2	109.0286	-77.31	3.67	-73.64	-13.00	-60.64	-	-	peak
3	457.5073	-77.28	9.11	-68.17	-13.00	-55.17	-	-	peak

Note: $Margin = (Reading + Correct) - Limit$

Remark: '-' Means the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

- Spurious Emissions Above 1GHz
- For Cellular Band_GSM850 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (824.2MHz)						
1648.4	-36.32	4.94	-31.38	-13	-18.38	H
2472.6	-42.12	8.46	-33.66	-13	-20.66	H
1648.4	-36.78	4.94	-31.84	-13	-18.84	V
2472.6	-44.31	8.46	-35.85	-13	-22.85	V
Middle Channel (836.6MHz)						
1673.2	-35.81	5.11	-30.7	-13	-17.7	H
2509.8	-43.73	8.54	-35.19	-13	-22.19	H
1673.2	-36.79	5.11	-31.68	-13	-18.68	V
2509.8	-41.27	8.54	-32.73	-13	-19.73	V
High Channel (848.8MHz)						
1697.6	-34.67	5.25	-29.42	-13	-16.42	H
2546.4	-44.31	8.57	-35.74	-13	-22.74	H
1697.6	-37.53	5.25	-32.28	-13	-19.28	V
2546.4	-44.41	8.57	-35.84	-13	-22.84	V

- For PCS Band_GSM1900 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1850.2MHz)						
3700.4	-40.63	10.54	-30.09	-13	-17.09	H
5550.6	-48.31	13.37	-34.94	-13	-21.94	H
3700.4	-42.35	10.54	-31.81	-13	-18.81	V
5550.6	-47.8	13.37	-34.43	-13	-21.43	V
Middle Channel (1880MHz)						
3760.0	-39.6	10.64	-28.96	-13	-15.96	H
5640.0	-48.14	13.54	-34.6	-13	-21.6	H
3760.0	-41	10.64	-30.36	-13	-17.36	V
5640.0	-46.12	13.54	-32.58	-13	-19.58	V
High Channel (1909.8MHz)						
3819.6	-42.89	10.74	-32.15	-13	-19.15	H
5729.4	-48.47	13.71	-34.76	-13	-21.76	H
3819.6	-40.86	10.74	-30.12	-13	-17.12	V
5729.4	-48.83	13.71	-35.12	-13	-22.12	V

➤ For WCDMA Band V Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (826.4MHz)						
1652.8	-32.21	9.87	-22.34	-13	-9.34	H
2479.2	-39.67	13.02	-26.65	-13	-13.65	H
1652.8	-34.15	9.87	-24.28	-13	-11.28	V
2479.2	-40.17	13.02	-27.15	-13	-14.15	V
Middle Channel (836.6MHz)						
1672.8	-35.31	9.97	-25.34	-13	-12.34	H
2509.2	-39.19	12.54	-26.65	-13	-13.65	H
1672.8	-34.88	9.97	-24.91	-13	-11.91	V
2509.2	-41.53	12.54	-28.99	-13	-15.99	V
High Channel (846.6MHz)						
1693.2	-33.85	10.03	-23.82	-13	-10.82	H
2539.8	-41.01	14.03	-26.98	-13	-13.98	H
1693.2	-34.32	10.03	-24.29	-13	-11.29	V
2539.8	-41.01	14.03	-26.98	-13	-13.98	V

➤ For WCDMA Band II Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1852.4MHz)						
3704.8	-37.45	10.17	-27.28	-13	-14.28	H
5557.2	-41.05	14.69	-26.36	-13	-13.36	H
3704.8	-36.6	10.17	-26.43	-13	-13.43	V
5557.2	-41.24	14.69	-26.55	-13	-13.55	V
Middle Channel (1880MHz)						
3760.8	-35.26	10.26	-25	-13	-12	H
5640.0	-44.2	14.78	-29.42	-13	-16.42	H
3760.8	-35.43	10.26	-25.17	-13	-12.17	V
5640.0	-42.89	14.78	-28.11	-13	-15.11	V
High Channel (1907.6MHz)						
3815.2	-37.68	10.59	-27.09	-13	-14.09	H
5722.8	-44.13	15.03	-29.1	-13	-16.1	H
3815.2	-35.36	10.59	-24.77	-13	-11.77	V
5722.8	-42.83	15.03	-27.8	-13	-14.8	H

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. Frequency Stability

8.1 Standard Applicable

According to §22.355, §24.235 the limit is 2.5ppm.

8.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

8.3 Summary of Test Results/Plots

Please refer to Appendix E

9. Modulation characteristics

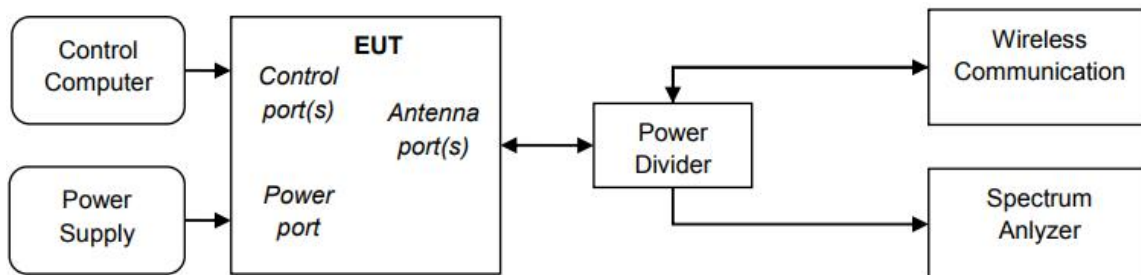
9.1 Standard Applicable

According to §2.1047, measurements required: Modulation characteristics is given below:

- (a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
- (b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.
- (c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.
- (d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

9.2 Test Procedure

According to ANSI C63.26-2015 section 5.3.2, the following test setup was performed.



9.3 Summary of Test Results/Plots

Only the worst case was selected to record.

Please refer to Appendix F

APPENDIX SUMMARY

Project No.	WTX22X12260158W	Test Engineer	Gala Wang
Start date	2022/03/02	Finish date	2022/03/06
Temperature	23℃	Humidity	45%
RF specifications	GSM/WCDMA		

APPENDIX	Description of Test Item	Result
A	RF Output Power	Compliant
B	Peak-to-average Ratio (PAR) of Transmitter	Compliant
C	Emission Bandwidth	Compliant
D	Out of Band Emissions at Antenna Terminal	Compliant
E	Frequency Stability	Compliant
F	Modulation characteristics	Compliant

APPENDIX A

Conducted Average power

Conducted Average power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.20	836.60	848.80	1850.20	1880.00	1909.80
GSM	34.09	32.89	33.67	30.07	29.8	29.71
GPRS(1Slot)	34.00	33.63	33.58	30.17	29.87	29.76
EGPRS(1Slot)	28.31	28.26	28.04	26.26	27.03	27.65

Conducted Average power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency(MHz)	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2k	23.39	23.27	23.10	23.74	23.65	23.67
HSDPA Subtest-1	22.36	22.3	22.10	22.70	22.68	22.66
HSDPA Subtest-2	22.34	22.24	22.06	22.68	22.64	22.54
HSDPA Subtest-3	22.35	22.20	22.04	22.64	22.60	22.50
HSDPA Subtest-4	22.31	22.14	22.01	22.60	22.54	22.48
HSUPA Subtest-1	22.33	22.23	22.03	22.63	22.70	22.62
HSUPA Subtest-2	22.22	22.2	22.01	22.6	22.65	22.59
HSUPA Subtest-3	22.14	22.15	21.99	22.57	22.6	22.54
HSUPA Subtest-4	22.07	22.09	21.96	22.49	22.54	22.50
HSUPA Subtest-5	22.06	22.04	21.92	22.40	22.5	22.47

APPENDIX B

Peak-to-average Ratio (PAR) of Transmitter

PCS1900				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	661	1850.2	4.36	13
GPRS(1 Slot)	661	1850.2	5.12	13
EDGE(1 Slot)	661	1850.2	4.57	13

WCDMA Band II				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	9262	1852.4	4.02	13
	9400	1880.0	4.21	13
	9538	1907.6	3.64	13

Note: Only the worst case was selected to record.

APPENDIX C

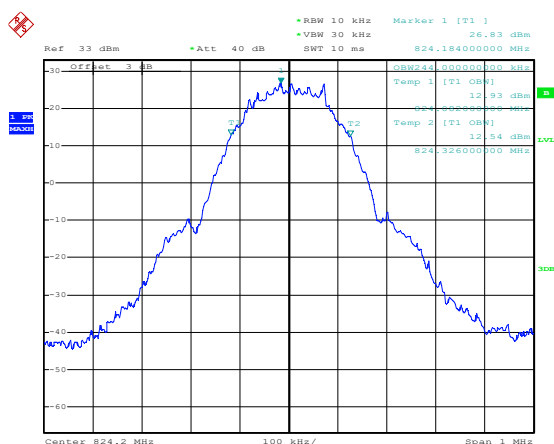
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
GSM 850 (GMSK)	128	824.20	244.00	326.00
	190	836.60	248.00	320.00
	251	848.80	248.00	316.00
GPRS850 (GMSK,1Slot)	128	824.20	244.00	326.00
	190	836.60	248.00	324.00
	251	848.80	242.00	322.00
EGPRS850 (8PSK,1Slot)	128	824.20	242.00	322.00
	190	836.60	248.00	326.00
	251	848.80	244.00	316.00
PCS1900 (GMSK)	512	1850.20	244.00	320.00
	661	1880.00	244.00	324.00
	810	1909.80	244.00	320.00
GPRS1900 (GMSK,1Slot)	512	1850.20	244.00	322.00
	661	1880.00	242.00	318.00
	810	1909.80	246.00	322.00
EGPRS1900 (8PSK,1Slot)	512	1850.20	246.00	316.00
	661	1880.00	249.00	320.00
	810	1909.80	244.00	315.00

EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	26dB bandwidth (kHz)
WCDMA Band V	4132	826.40	4180	4720
	4183	836.60	4200	4740
	4233	846.60	4200	4740
HSDPA	4132	826.40	4220	4760
	4183	836.60	4220	4820
	4233	846.60	4200	4720
HSUPA	4132	826.40	4200	4800
	4183	836.60	4180	4740
	4233	846.60	4180	4760
WCDMA Band II	9262	1852.40	4200	4720
	9400	1880.00	4160	4740
	9538	1907.60	4160	4740
HSDPA	9262	1852.40	4200	4740
	9400	1880.00	4200	4720
	9538	1907.60	4200	4760
HSUPA	9262	1852.40	4200	4720
	9400	1880.00	4200	4760
	9538	1907.60	4200	4740

99% Occupy bandwidth

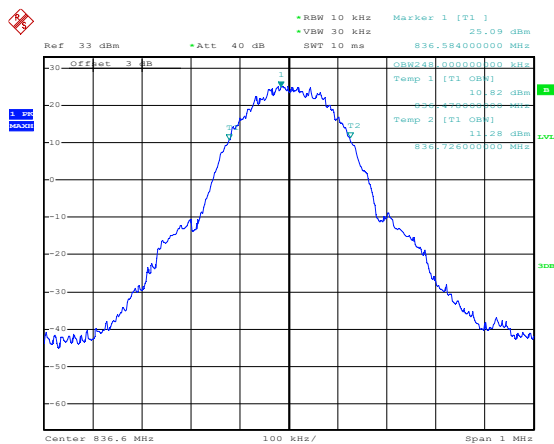
GSM 850 (GMSK)-Low	Ref 33 dBm Att 40 dB RBW 10 kHz VSW 30 kHz SWT 10 ms Marker 1 [T1] 29.73 dBm 824.226000000 MHz Center 824.2 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:35:43
GSM 850 (GMSK)-Middle	Ref 33 dBm Att 40 dB RBW 10 kHz VSW 30 kHz SWT 10 ms Marker 1 [T1] 29.62 dBm 836.600000000 MHz Center 836.6 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:36:14
GSM 850 (GMSK)-High	Ref 33 dBm Att 40 dB RBW 10 kHz VSW 30 kHz SWT 10 ms Marker 1 [T1] 29.50 dBm 848.822000000 MHz Center 848.8 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:36:56

GPRS850
(GMSK,1Slot)-Low



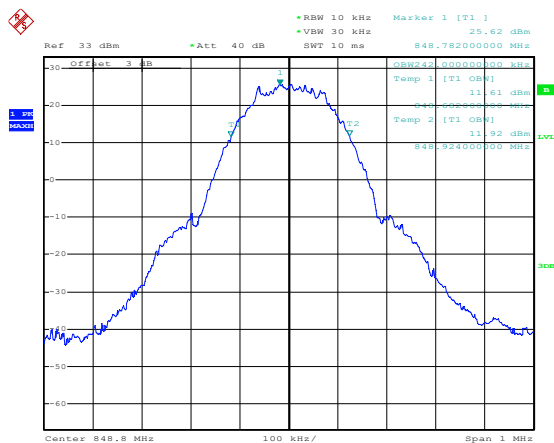
Date: 2.MAR.2023 18:44:48

GPRS850
(GMSK,1Slot)-Middle



Date: 2.MAR.2023 18:45:14

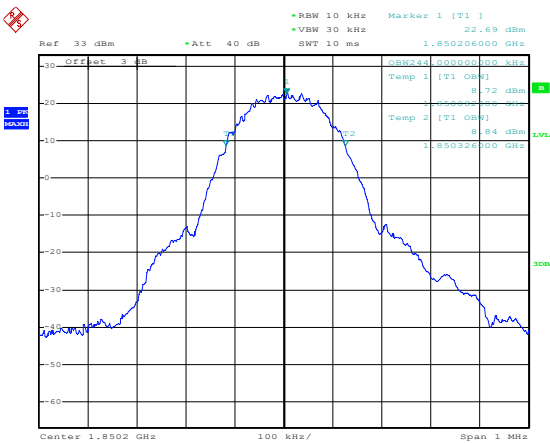
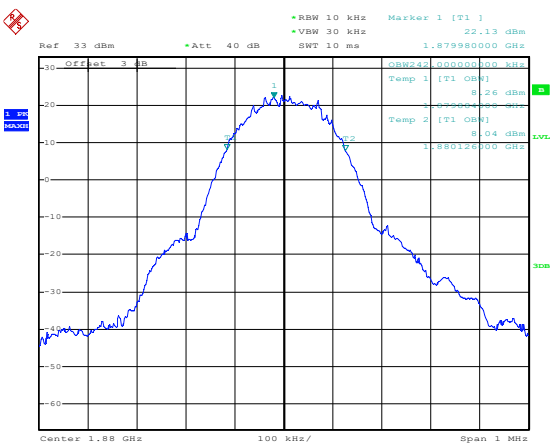
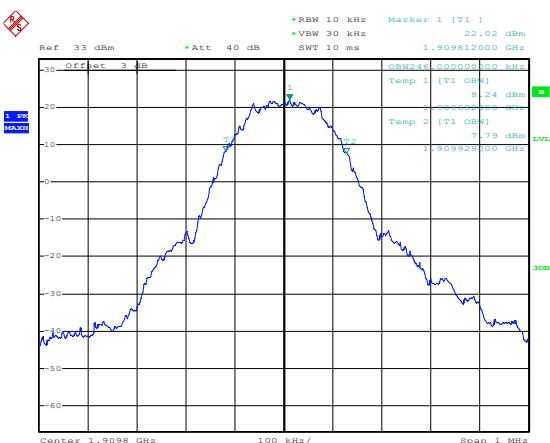
GPRS850
(GMSK,1Slot)-High

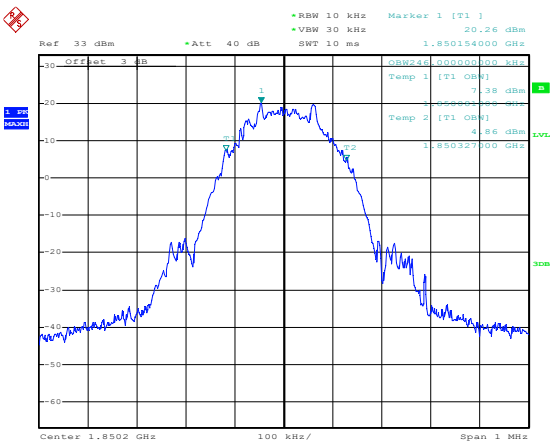
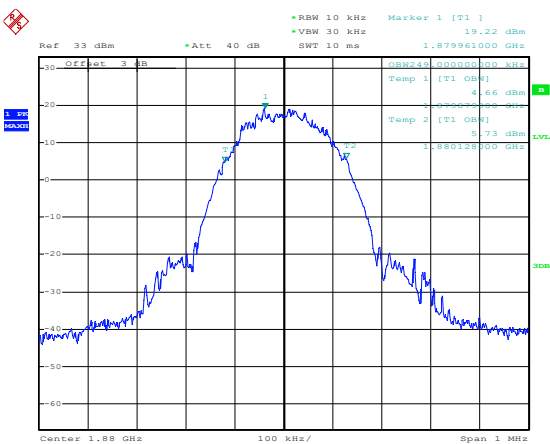
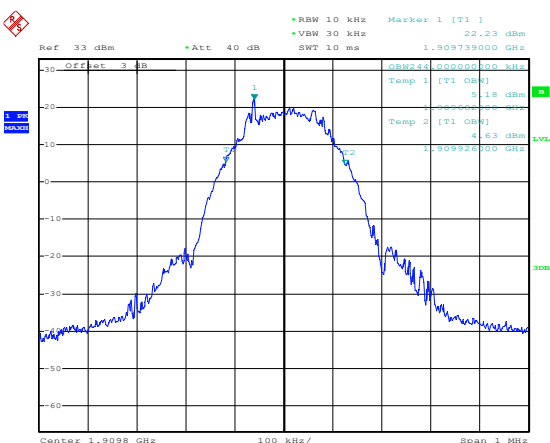


Date: 2.MAR.2023 18:45:56

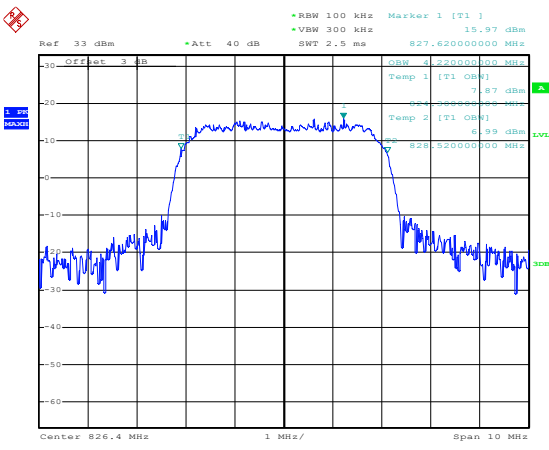
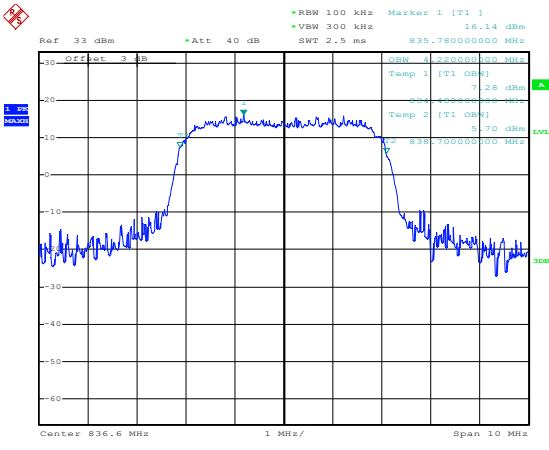
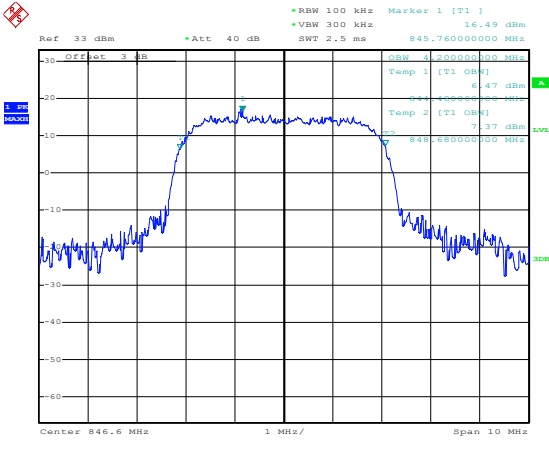
EGPRS850 (8PSK,1Slot)-Low	Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 21.43 dBm VBW 30 kHz 824.20600000 MHz SWT 10 ms Offset 3 dB Center 824.2 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:59:40
EGPRS850 (8PSK,1Slot)-Middle	Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 19.68 dBm VBW 30 kHz 836.56600000 MHz SWT 10 ms Offset 3 dB Center 836.6 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 19:00:17
EGPRS850 (8PSK,1Slot)-High	Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 21.29 dBm VBW 30 kHz 848.73600000 MHz SWT 10 ms Offset 3 dB Center 848.8 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 19:06:22

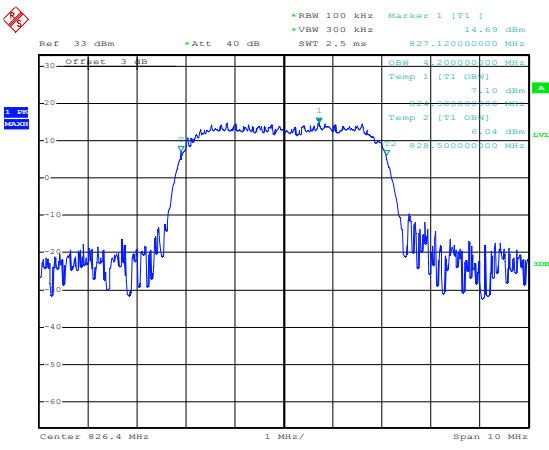
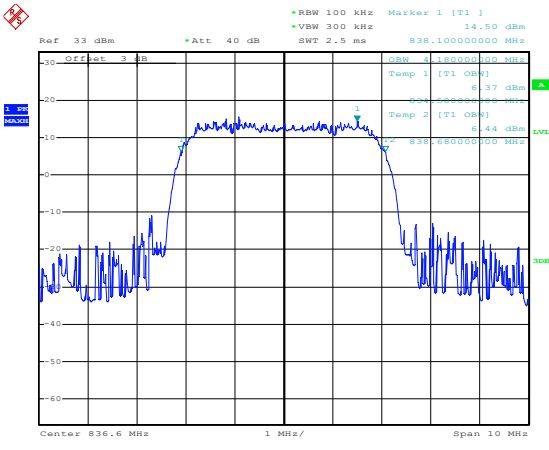
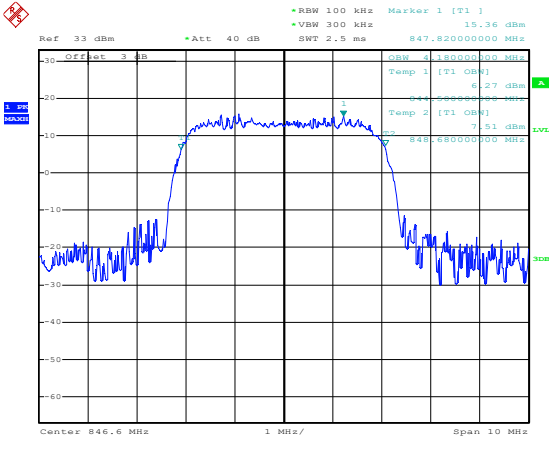
PCS1900 (GMSK)-Low	Date: 3.MAR.2023 14:24:59
PCS1900 (GMSK)-Middle	Date: 3.MAR.2023 14:27:25
PCS1900 (GMSK)-High	Date: 3.MAR.2023 14:29:57

GPRS1900 (GMSK,1Slot)-Low	 Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 22.69 dBm VSW 30 kHz SWT 10 ms 1.850206000 GHz Center 1.8502 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 15:22:52
GPRS1900 (GMSK,1Slot)-Middle	 Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 22.13 dBm VSW 30 kHz SWT 10 ms 1.879980500 GHz Center 1.88 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 15:24:59
GPRS1900 (GMSK,1Slot)-High	 Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 22.02 dBm VSW 30 kHz SWT 10 ms 1.909812000 GHz Center 1.9098 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 15:23:49

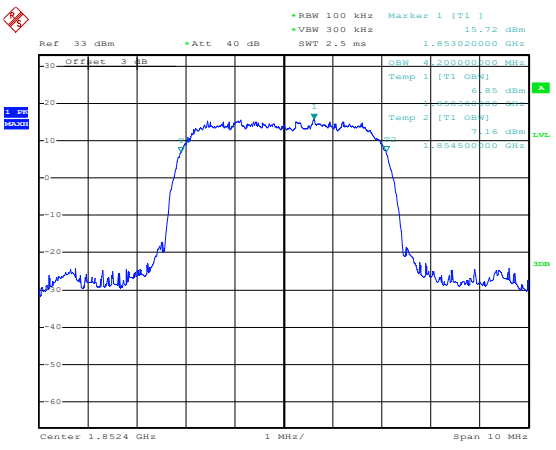
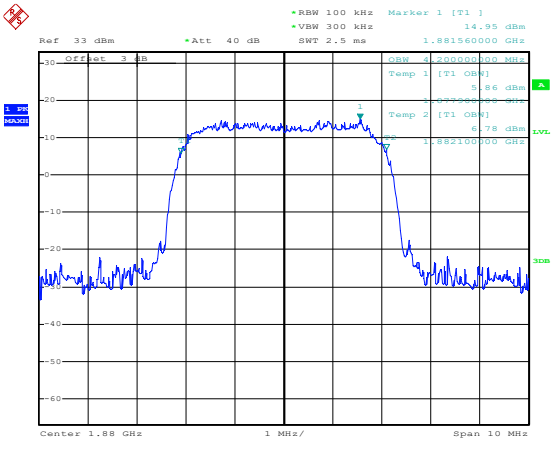
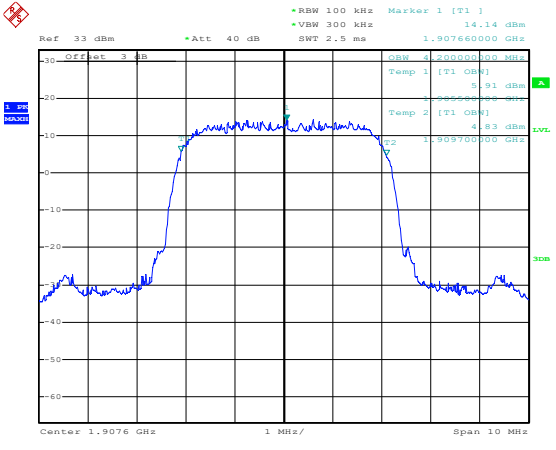
EGPRS1900 (8PSK,1Slot)-Low	 Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 20.26 dBm VBW 30 kHz 1.850154000 GHz Center 1.8502 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 16:23:25
EGPRS1900 (8PSK,1Slot)-Middle	 Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 19.22 dBm VBW 30 kHz 1.879961000 GHz Center 1.88 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 16:25:03
EGPRS1900 (8PSK,1Slot)-High	 Ref 33 dBm *Att 40 dB RBW 10 kHz Marker 1 [T1] 22.23 dBm VBW 30 kHz 1.909799000 GHz Center 1.9098 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 16:27:09

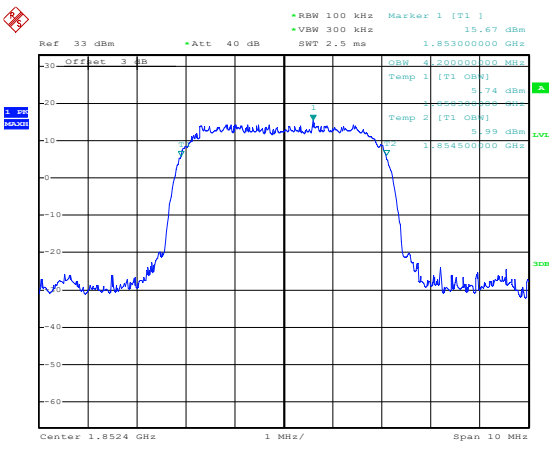
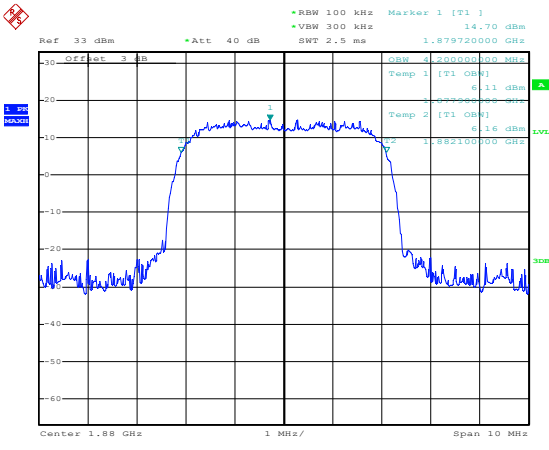
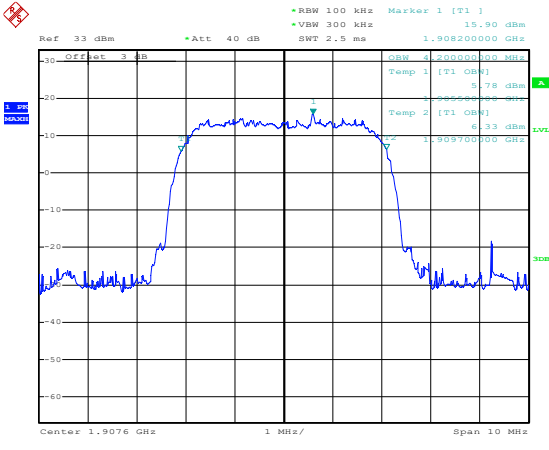


HSDPA-Low	 Date: 4.MAR.2023 10:09:45
HSDPA-Middle	 Date: 4.MAR.2023 10:10:40
HSDPA-High	 Date: 4.MAR.2023 10:11:29

HSUPA-Low	 Date: 4.MAR.2023 10:19:48
HSUPA-Middle	 Date: 4.MAR.2023 10:20:18
HSUPA-High	 Date: 4.MAR.2023 10:20:42

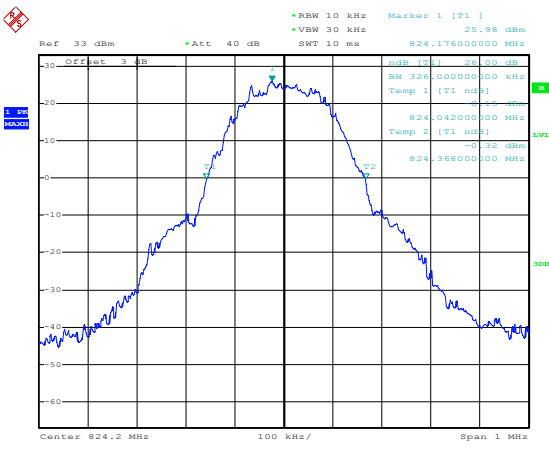
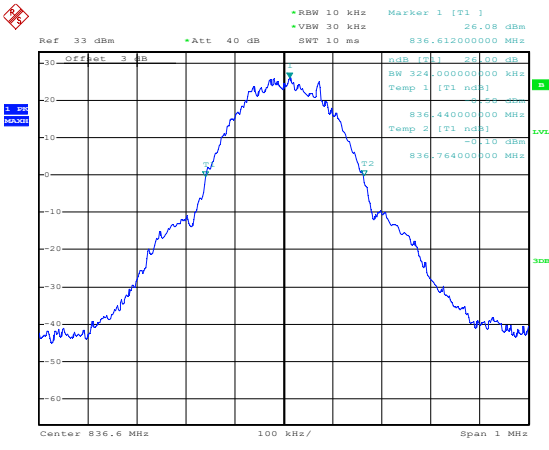
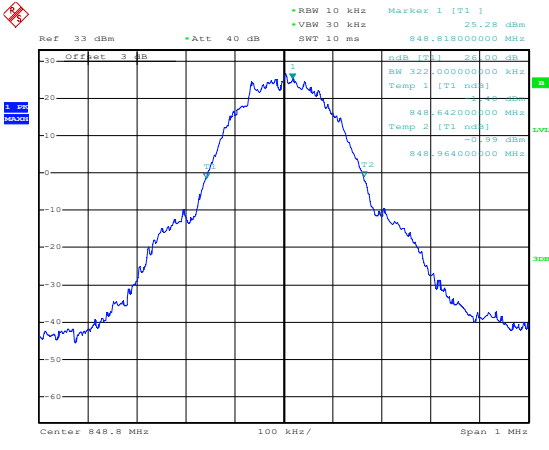


HSDPA-Low	 Date: 4.MAR.2023 09:00:03
HSDPA-Middle	 Date: 4.MAR.2023 09:00:34
HSDPA-High	 Date: 4.MAR.2023 09:00:53

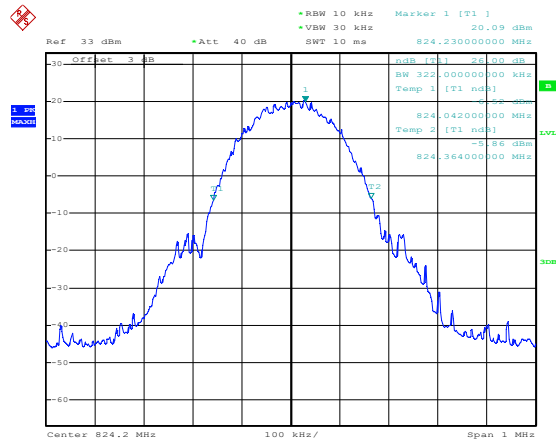
HSUPA-Low	 Ref 33 dBm *Att 40 dB RBW 100 kHz Marker 1 [T1] 15.67 dBm VSW 300 kHz 1.853000000 GHz SWT 2.5 ms Offset 3 dB RBW 100 kHz Temp 1 [T1] 15.67 dBm Temp 2 [T2] 1.854500000 GHz 15.99 dBm Center 1.8524 GHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 09:28:32
HSUPA-Middle	 Ref 33 dBm *Att 40 dB RBW 100 kHz Marker 1 [T1] 14.70 dBm VSW 300 kHz 1.879720000 GHz SWT 2.5 ms Offset 3 dB RBW 100 kHz Temp 1 [T1] 14.70 dBm Temp 2 [T2] 1.882100000 GHz 16.16 dBm Center 1.88 GHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 09:29:52
HSUPA-High	 Ref 33 dBm *Att 40 dB RBW 100 kHz Marker 1 [T1] 15.90 dBm VSW 300 kHz 1.907200000 GHz SWT 2.5 ms Offset 3 dB RBW 100 kHz Temp 1 [T1] 15.90 dBm Temp 2 [T2] 1.909700000 GHz 16.33 dBm Center 1.9076 GHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 09:31:26

26dB bandwidth

GSM 850 (GMSK)-Low	Ref 33 dBm Att 40 dB RBW 10 kHz VSW 30 kHz SWT 10 ms Marker 1 [T1] 28.38 dBm 824.270000000 MHz Center 824.2 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:38:13
GSM 850 (GMSK)-Middle	Ref 33 dBm Att 40 dB RBW 10 kHz VSW 30 kHz SWT 10 ms Marker 1 [T1] 29.58 dBm 836.586000000 MHz Center 836.6 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:39:09
GSM 850 (GMSK)-High	Ref 33 dBm Att 40 dB RBW 10 kHz VSW 30 kHz SWT 10 ms Marker 1 [T1] 29.50 dBm 848.768000000 MHz Center 848.8 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:39:45

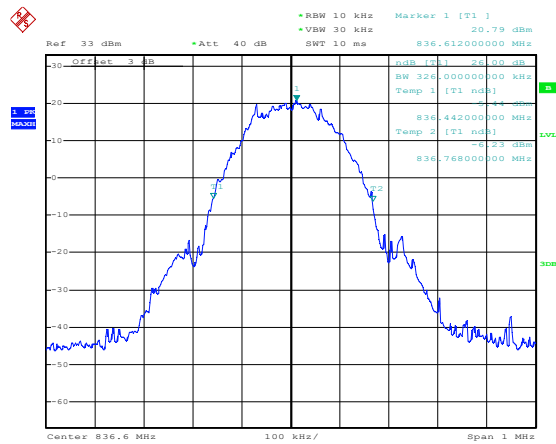
GPRS850 (GMSK,1Slot)-Low	 Ref 33 dBm *Att 40 dB Marker 1 [T1] 25.98 dBm RBW 10 kHz VBW 30 kHz SWT 10 ms 824.176000000 MHz Offset 3 dB dB (T1) 25.98 dB BW 326.000000000 kHz Temp 1 [T1 ndB] -10.32 dBm 824.042000000 MHz Temp 2 [T1 ndB] -10.32 dBm 824.368000000 MHz Center 824.2 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:47:26
GPRS850 (GMSK,1Slot)-Middle	 Ref 33 dBm *Att 40 dB Marker 1 [T1] 26.08 dBm RBW 10 kHz VBW 30 kHz SWT 10 ms 836.612000000 MHz Offset 3 dB dB (T1) 26.08 dB BW 326.000000000 kHz Temp 1 [T1 ndB] -10.10 dBm 836.440000000 MHz Temp 2 [T1 ndB] -10.10 dBm 836.764000000 MHz Center 836.6 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:47:48
GPRS850 (GMSK,1Slot)-High	 Ref 33 dBm *Att 40 dB Marker 1 [T1] 25.28 dBm RBW 10 kHz VBW 30 kHz SWT 10 ms 848.818000000 MHz Offset 3 dB dB (T1) 25.28 dB BW 322.000000000 kHz Temp 1 [T1 ndB] -10.98 dBm 848.642000000 MHz Temp 2 [T1 ndB] -10.98 dBm 848.964000000 MHz Center 848.8 MHz 100 kHz/ Span 1 MHz Date: 2.MAR.2023 18:48:09

EGPRS850
(8PSK,1Slot)-Low



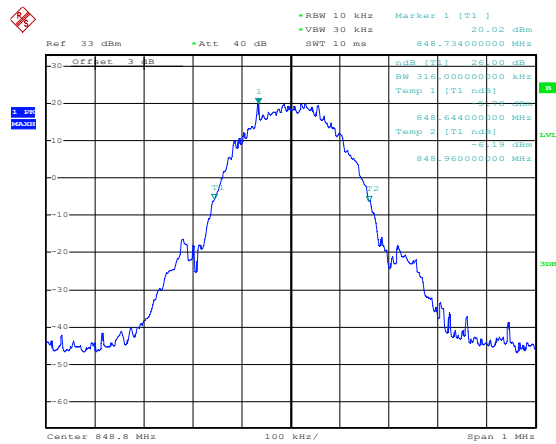
Date: 2.MAR.2023 19:07:46

EGPRS850
(8PSK,1Slot)-Middle

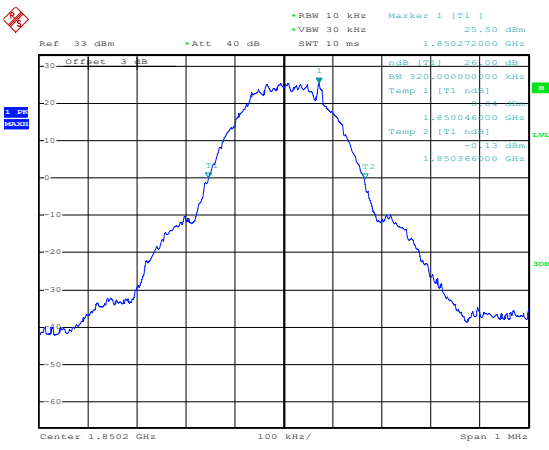
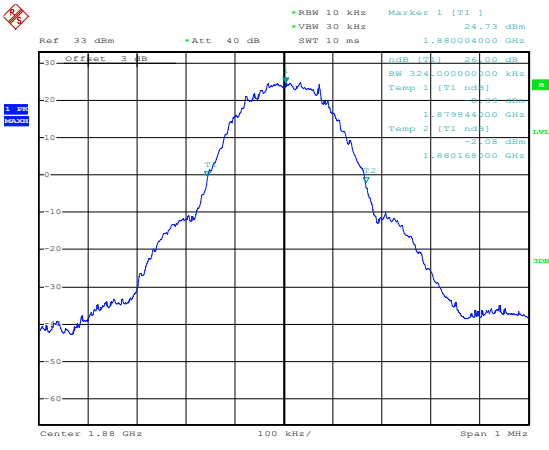
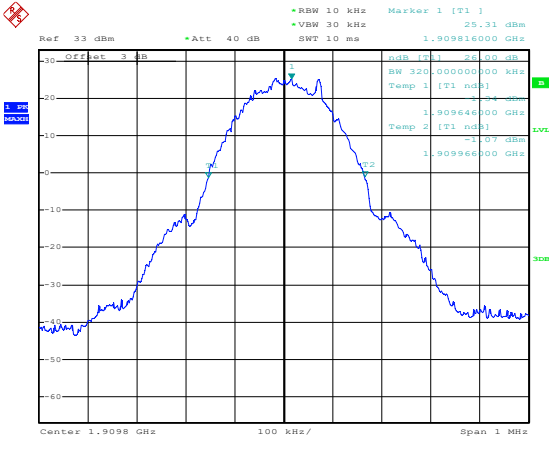


Date: 2.MAR.2023 19:08:41

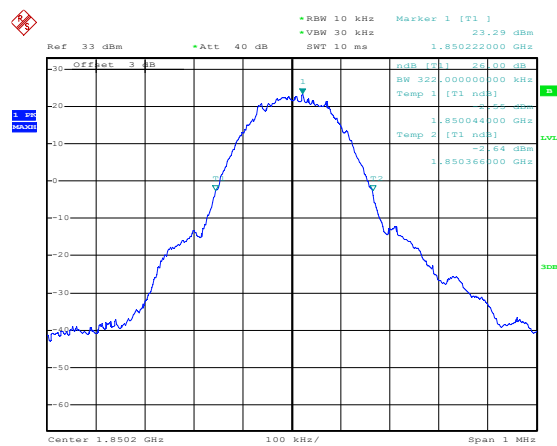
EGPRS850
(8PSK,1Slot)-High



Date: 2.MAR.2023 19:09:40

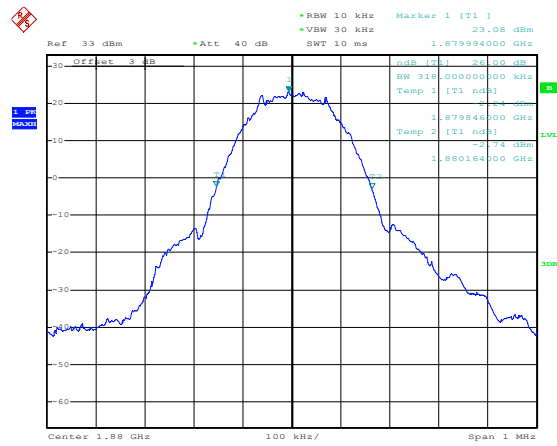
PCS1900 (GMSK)-Low	 Ref 33 dBm *Att 40 dB RBW 10 kHz VBW 30 kHz SWT 10 ms Marker 1 [T1] 25.50 dBm 1.850272000 GHz Center 1.8502 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 14:46:49
PCS1900 (GMSK)-Middle	 Ref 33 dBm *Att 40 dB RBW 10 kHz VBW 30 kHz SWT 10 ms Marker 1 [T1] 24.73 dBm 1.880004500 GHz Center 1.88 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 14:47:58
PCS1900 (GMSK)-High	 Ref 33 dBm *Att 40 dB RBW 10 kHz VBW 30 kHz SWT 10 ms Marker 1 [T1] 25.31 dBm 1.909816000 GHz Center 1.9098 GHz 100 kHz/ Span 1 MHz Date: 3.MAR.2023 14:48:50

GPRS1900
(GMSK,1Slot)-Low



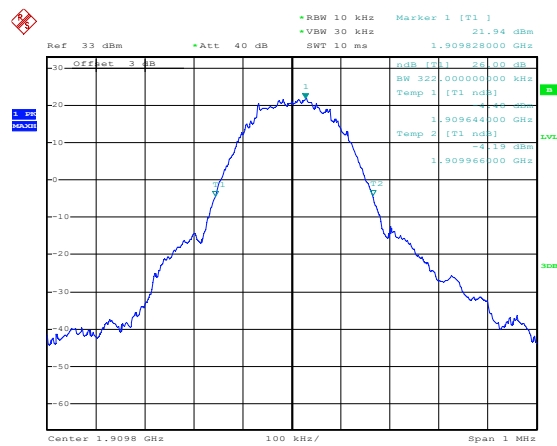
Date: 3.MAR.2023 15:27:24

GPRS1900
(GMSK,1Slot)-Middle



Date: 3.MAR.2023 15:30:44

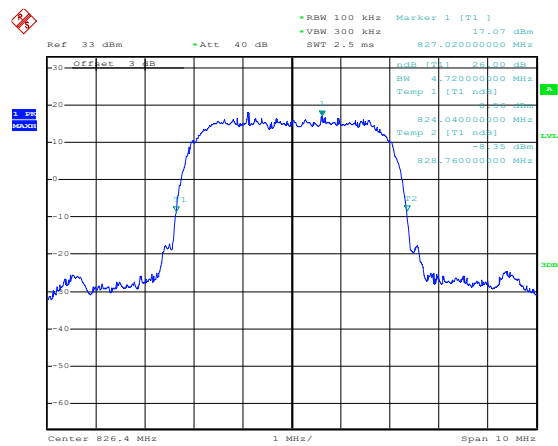
GPRS1900
(GMSK,1Slot)-High



Date: 3.MAR.2023 15:31:27

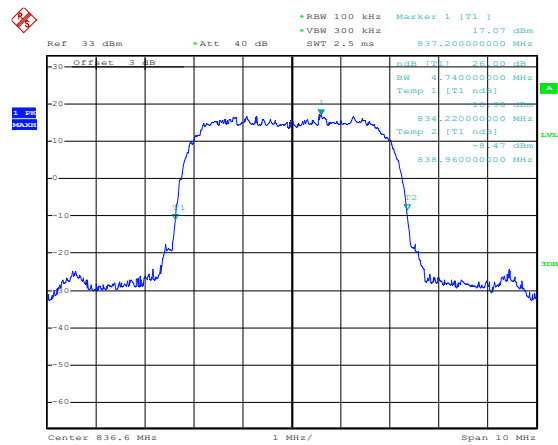
EGPRS1900 (8PSK,1Slot)-Low	Date: 3.MAR.2023 16:24:03
EGPRS1900 (8PSK,1Slot)-Middle	Date: 3.MAR.2023 16:25:38
EGPRS1900 (8PSK,1Slot)-High	Date: 3.MAR.2023 16:27:19

WCDMA Band V-Low



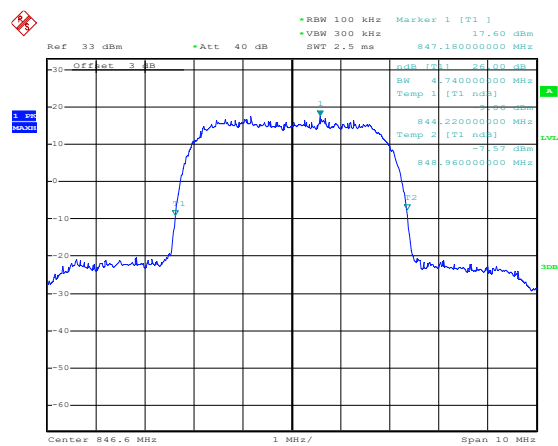
Date: 4.MAR.2023 09:57:42

WCDMA Band V-Middle

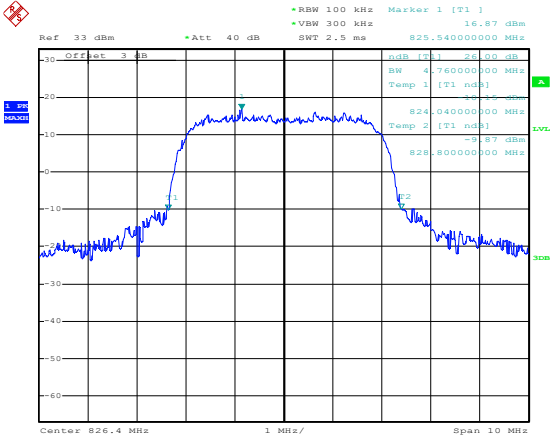
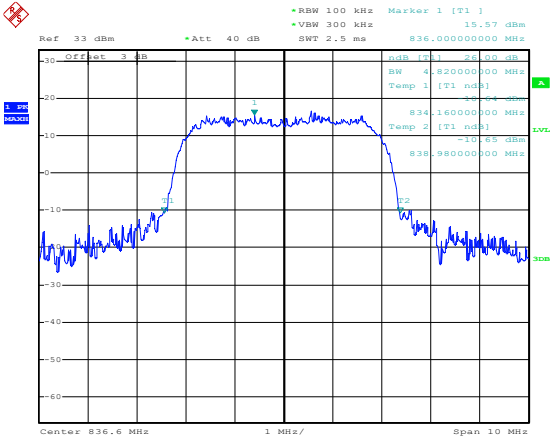
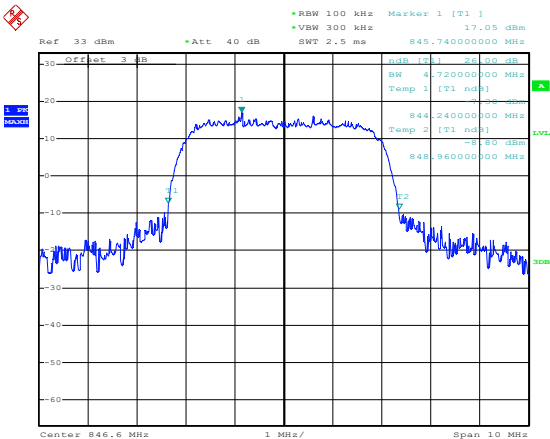


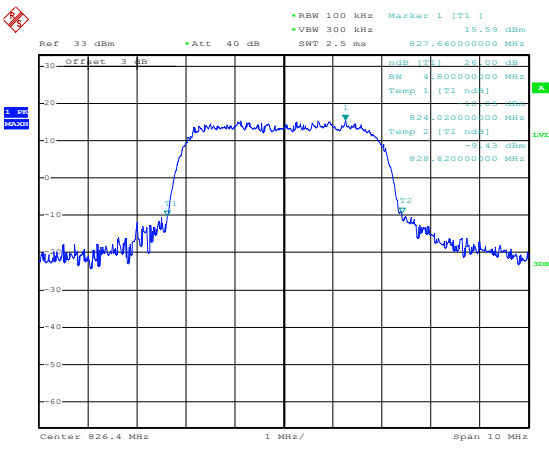
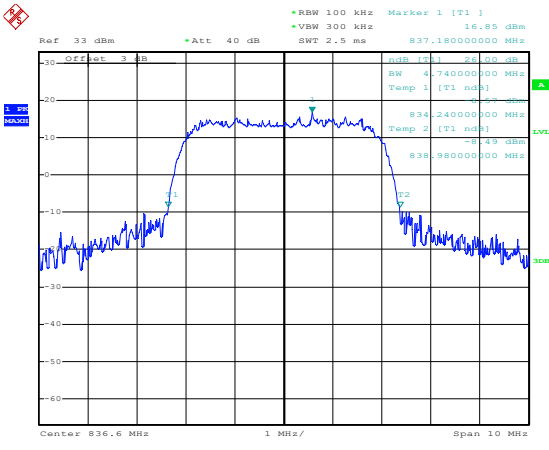
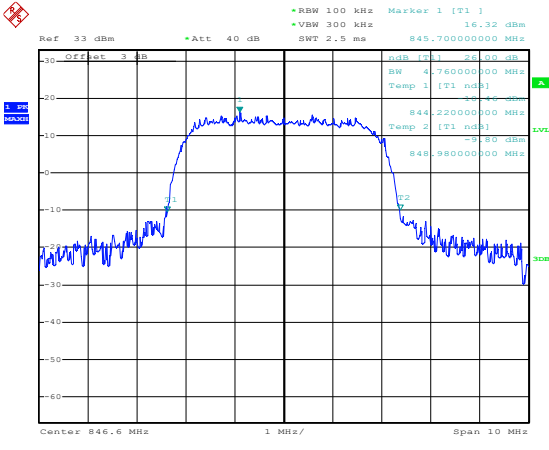
Date: 4.MAR.2023 09:58:21

WCDMA Band V-High

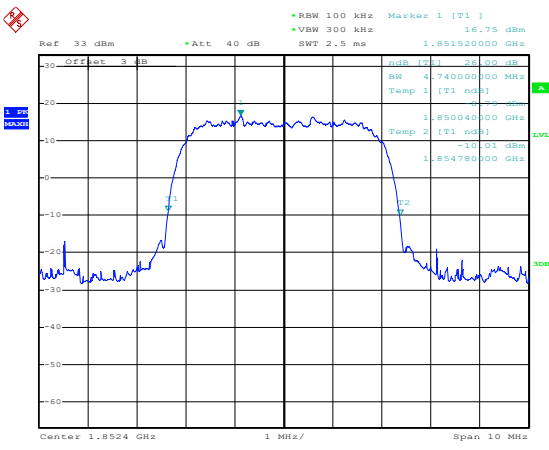
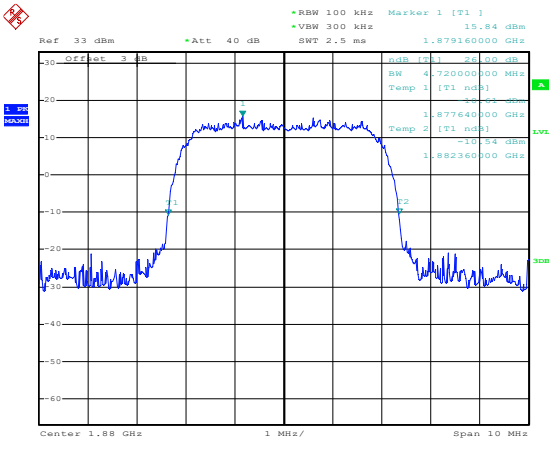
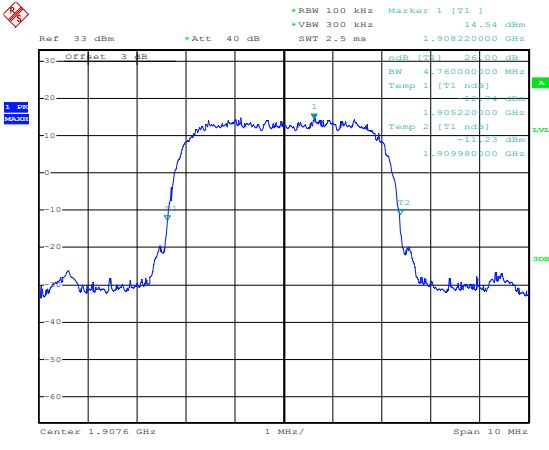


Date: 4.MAR.2023 09:58:55

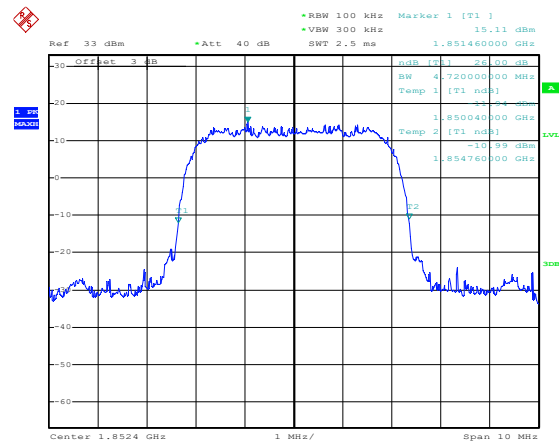
HSDPA-Low	 Ref 33 dBm *Att 40 dB *RBW 100 kHz Marker 1 [T1] 16.87 dBm *VBW 300 kHz 825.540000000 MHz SWT 2.5 ms Offset 3 dB n dB [T1] 26.00 dB BW 4.760000000 MHz Temp 1 [T1 n dB] 16.87 dBm 824.040000000 MHz Temp 2 [T1 n dB] 16.87 dBm 826.800000000 MHz Center 826.4 MHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 10:12:56
HSDPA-Middle	 Ref 33 dBm *Att 40 dB *RBW 100 kHz Marker 1 [T1] 15.57 dBm *VBW 300 kHz 836.000000000 MHz SWT 2.5 ms Offset 3 dB n dB [T1] 26.00 dB BW 4.820000000 MHz Temp 1 [T1 n dB] 15.57 dBm 834.160000000 MHz Temp 2 [T1 n dB] 15.57 dBm 838.980000000 MHz Center 836.6 MHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 10:13:44
HSDPA-High	 Ref 33 dBm *Att 40 dB *RBW 100 kHz Marker 1 [T1] 17.05 dBm *VBW 300 kHz 845.740000000 MHz SWT 2.5 ms Offset 3 dB n dB [T1] 26.00 dB BW 4.720000000 MHz Temp 1 [T1 n dB] 17.05 dBm 844.240000000 MHz Temp 2 [T1 n dB] 17.05 dBm 848.960000000 MHz Center 846.6 MHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 10:14:33

HSUPA-Low	 Ref 33 dBm *Att 40 dB RBW 100 kHz Marker 1 [T1] 15.59 dBm VSW 300 kHz 827.66000000 MHz SWT 2.5 ms Offset 3 dB n dB [T1] 28.00 dB BW 4.80000000 MHz Temp 1 [T1 n dB] -9.43 dBm 824.22000000 MHz Temp 2 [T1 n dB] -9.43 dBm 828.82000000 MHz Center 826.4 MHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 10:22:03
HSUPA-Middle	 Ref 33 dBm *Att 40 dB RBW 100 kHz Marker 1 [T1] 16.85 dBm VSW 300 kHz 837.18000000 MHz SWT 2.5 ms Offset 3 dB n dB [T1] 28.00 dB BW 4.74000000 MHz Temp 1 [T1 n dB] -9.49 dBm 834.24000000 MHz Temp 2 [T1 n dB] -9.49 dBm 838.98000000 MHz Center 836.6 MHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 10:22:54
HSUPA-High	 Ref 33 dBm *Att 40 dB RBW 100 kHz Marker 1 [T1] 16.32 dBm VSW 300 kHz 845.70000000 MHz SWT 2.5 ms Offset 3 dB n dB [T1] 28.00 dB BW 4.76000000 MHz Temp 1 [T1 n dB] -9.44 dBm 844.22000000 MHz Temp 2 [T1 n dB] -9.50 dBm 848.98000000 MHz Center 846.6 MHz 1 MHz/ Span 10 MHz Date: 4.MAR.2023 10:23:28

WCDMA Band II-Low	</
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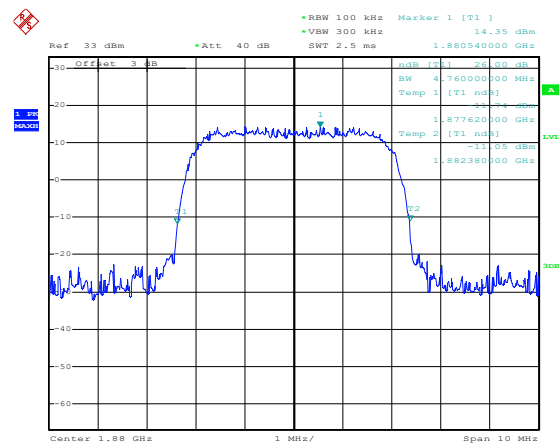
HSDPA-Low	 Date: 4.MAR.2023 09:11:45
HSDPA-Middle	 Date: 4.MAR.2023 09:12:19
HSDPA-High	 Date: 4.MAR.2023 09:12:54

HSUPA-Low



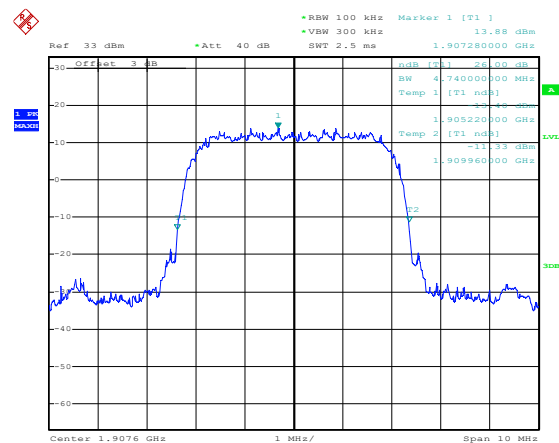
Date: 4.MAR.2023 09:32:16

HSUPA-Middle



Date: 4.MAR.2023 09:32:47

HSUPA-High

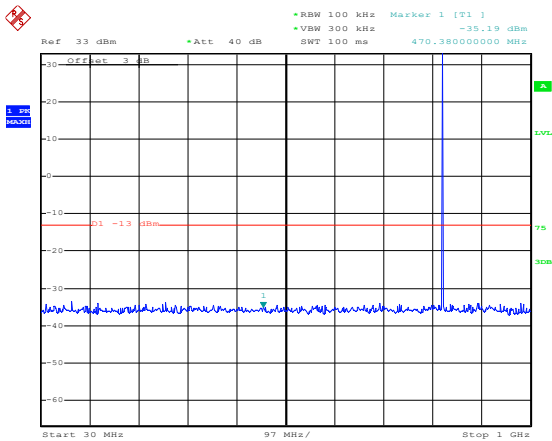


Date: 4.MAR.2023 09:33:08

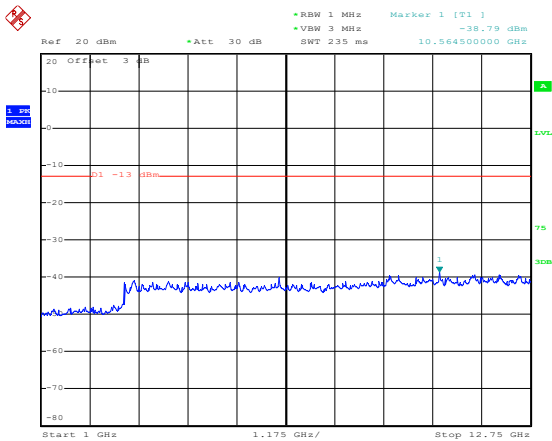
APPENDIX D

Out of Band Emissions at Antenna Terminal

GSM 850
(GMSK)-Low

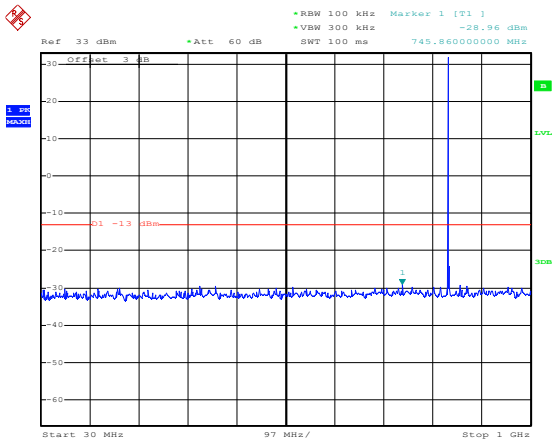


Date: 6.MAR.2023 16:37:24

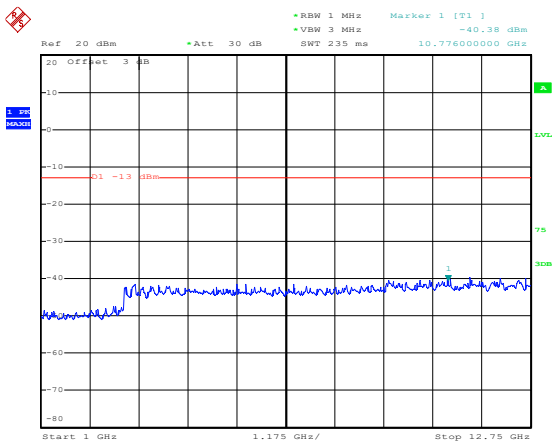


Date: 6.MAR.2023 16:05:14

GSM 850
(GMSK)-Middle

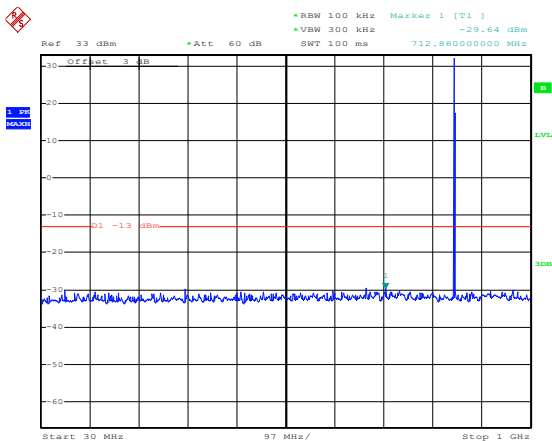


Date: 2.MAR.2023 18:30:58

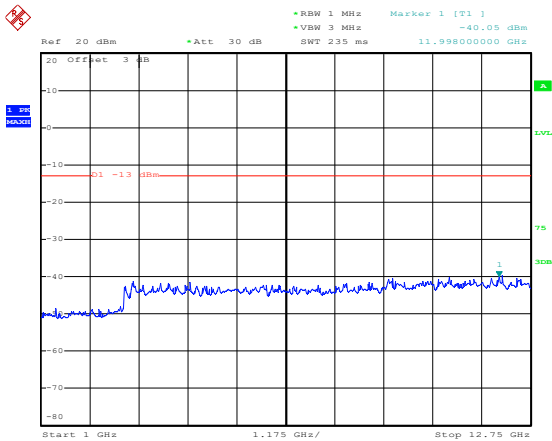
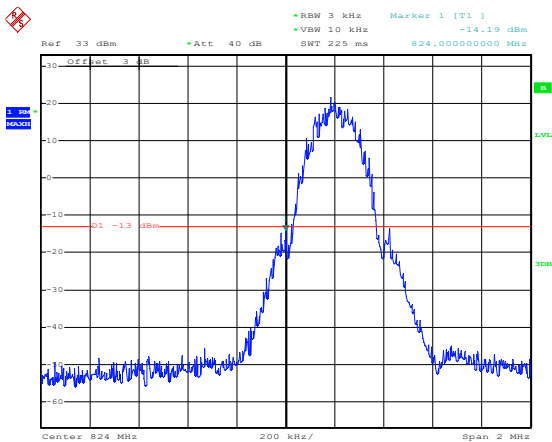
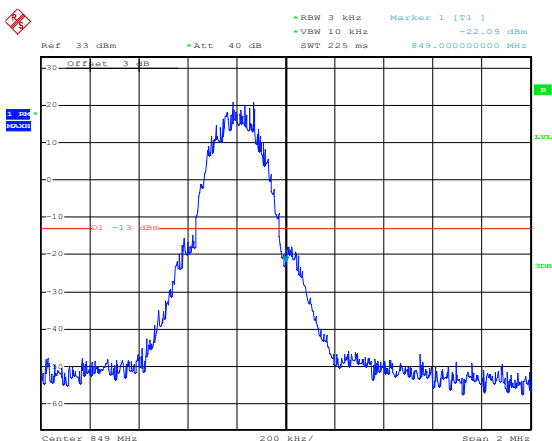


Date: 6.MAR.2023 16:05:56

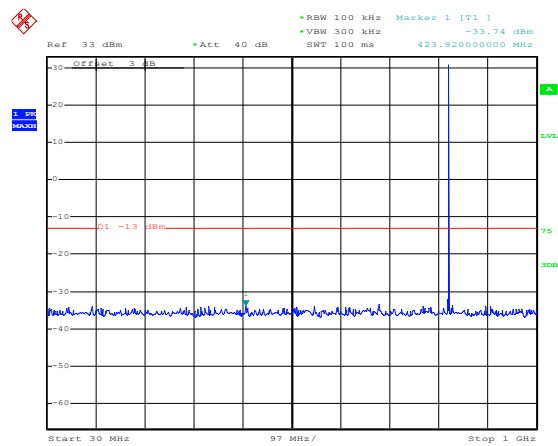
GSM 850
(GMSK)-High



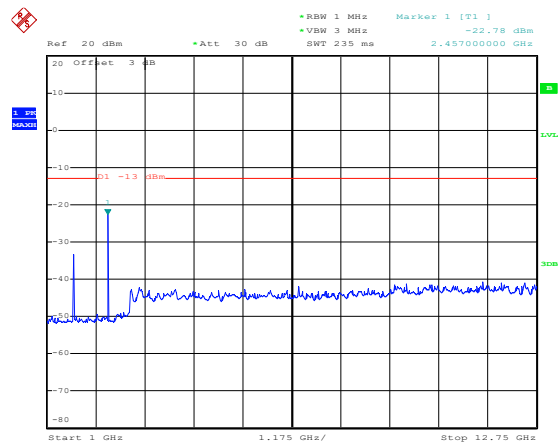
Date: 2.MAR.2023 18:32:46

	 Date: 6.MAR.2023 16:07:23
Bandedge	 Date: 2.MAR.2023 18:40:58
	 Date: 2.MAR.2023 18:41:21

GPRS850
(GMSK,1Slot)-Low

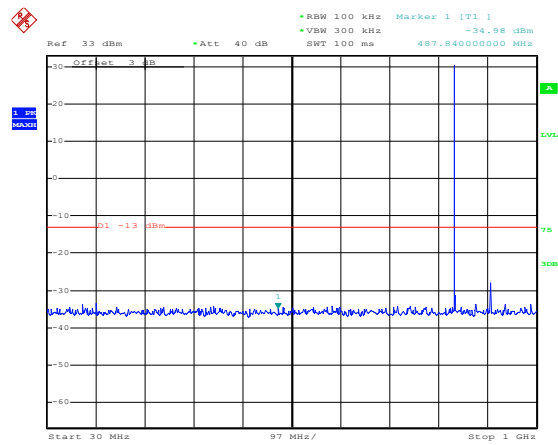


Date: 6.MAR.2023 16:39:00

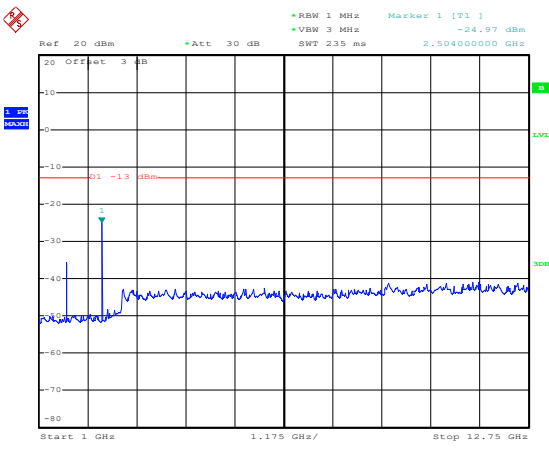
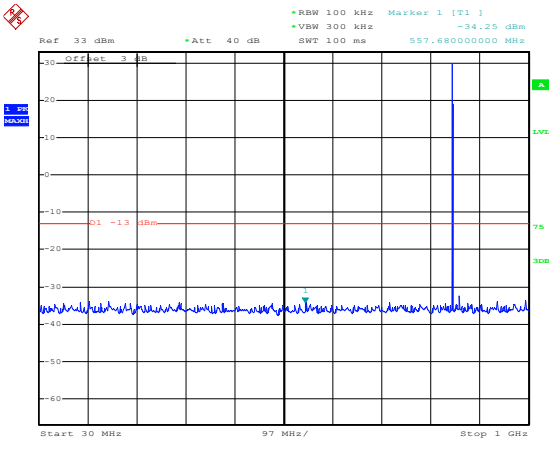
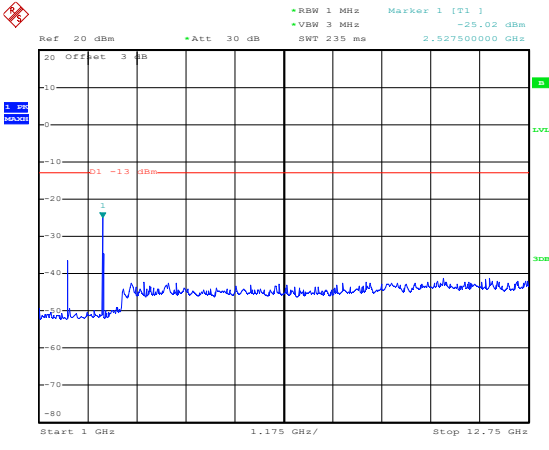


Date: 2.MAR.2023 18:51:05

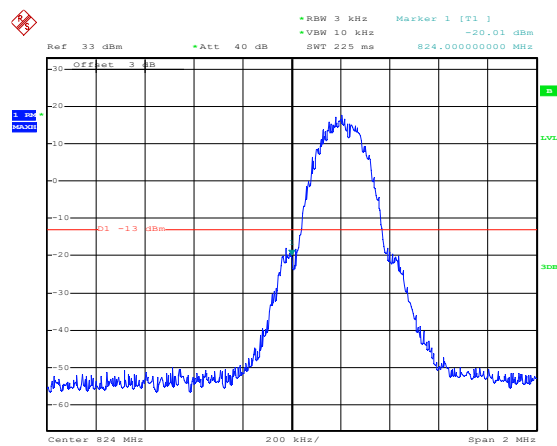
GPRS850
(GMSK,1Slot)-Middle



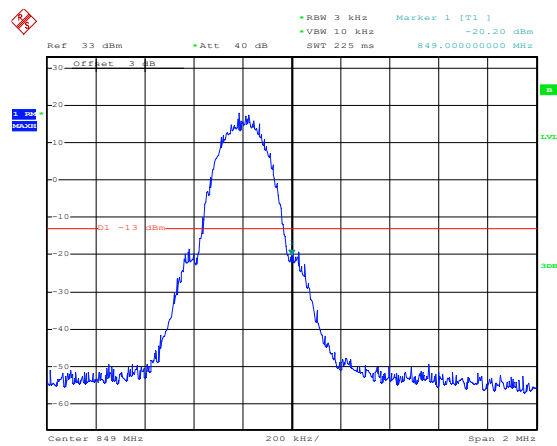
Date: 6.MAR.2023 16:39:44

	 Date: 2.MAR.2023 18:51:51
GPRS850 (GMSK)-High	 Date: 6.MAR.2023 16:40:01
	 Date: 2.MAR.2023 18:52:05

Bandedge

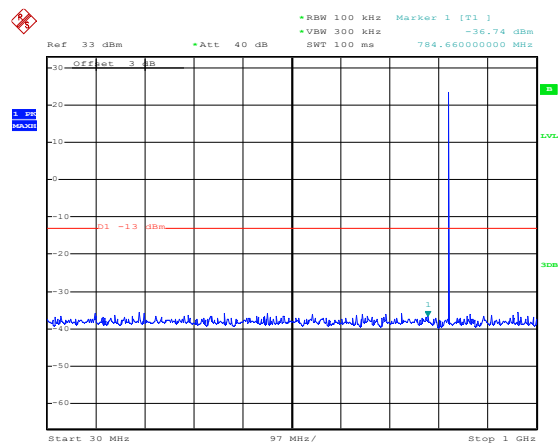


Date: 2.MAR.2023 18:43:07

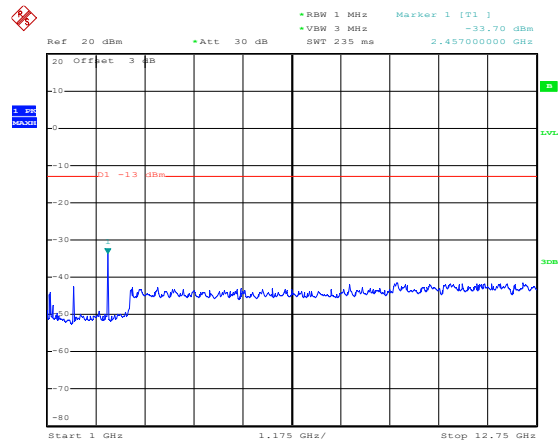


Date: 2.MAR.2023 18:43:30

EGPRS850
(8PSK,1Slot)-Low

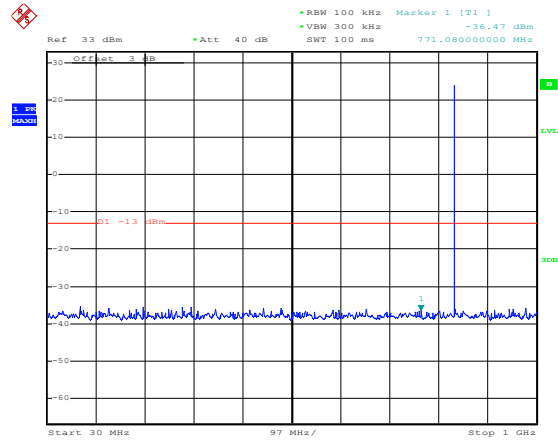


Date: 2.MAR.2023 18:54:58



Date: 2.MAR.2023 18:56:27

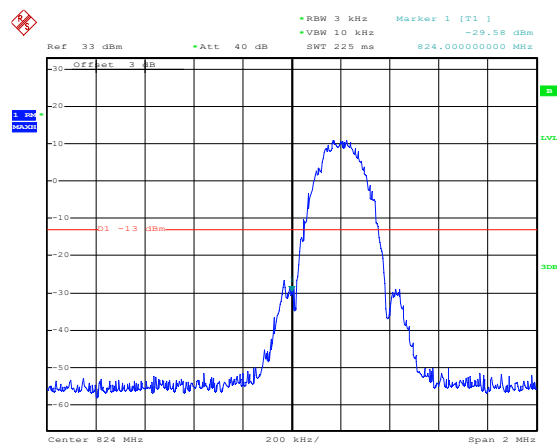
EGPRS850
(8PSK,1Slot)-Middle



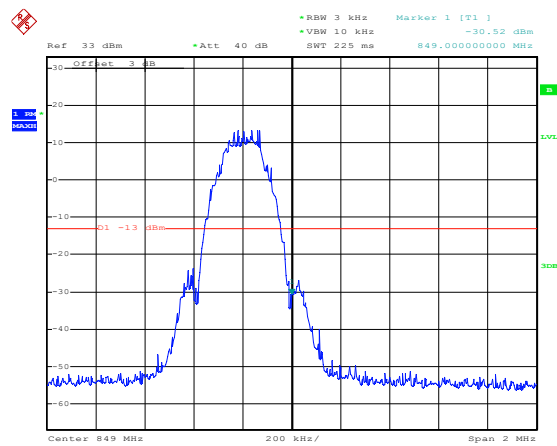
Date: 2.MAR.2023 18:55:14

	Date: 2.MAR.2023 18:56:50
EGPRS850 (8PSK,1Slot)-High	Date: 2.MAR.2023 18:55:39
	Date: 2.MAR.2023 18:57:01

Bandedge

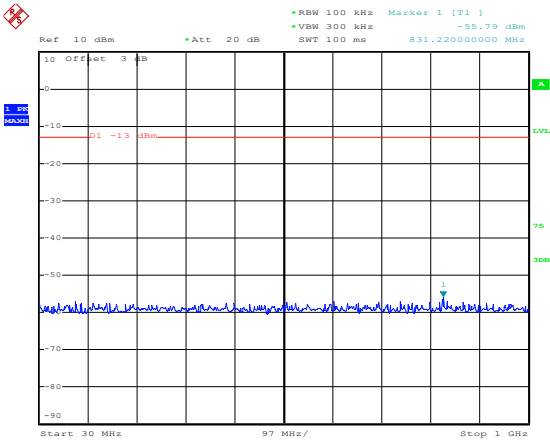


Date: 2.MAR.2023 19:11:50

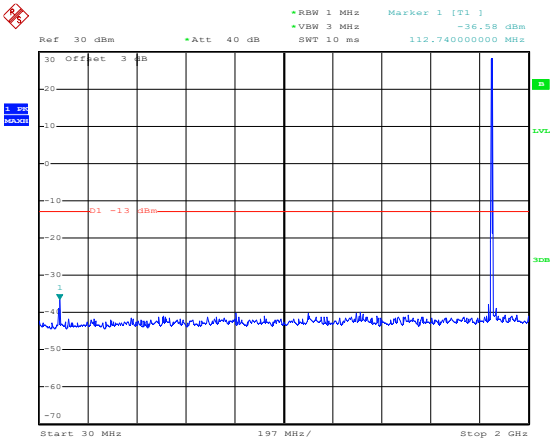


Date: 2.MAR.2023 19:13:16

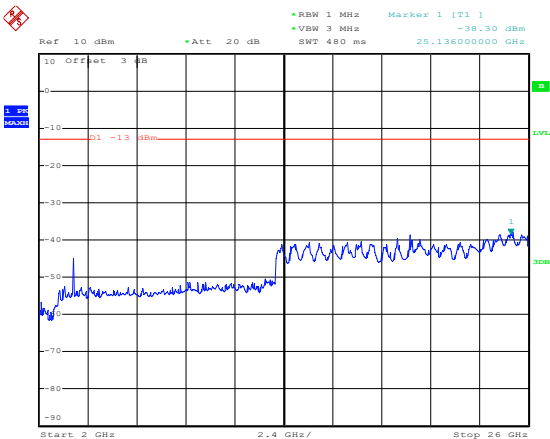
PCS1900
(GMSK)-Low



Date: 6.MAR.2023 16:09:53

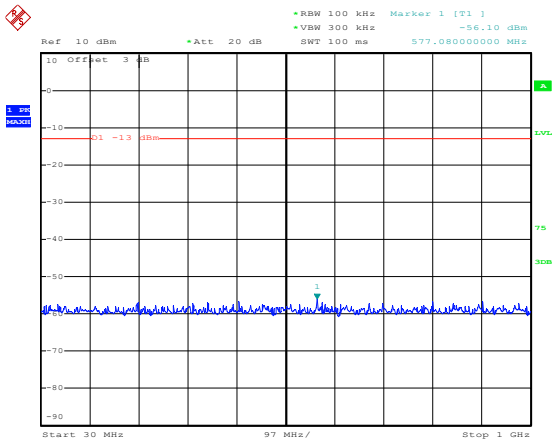


Date: 2.MAR.2023 19:29:15

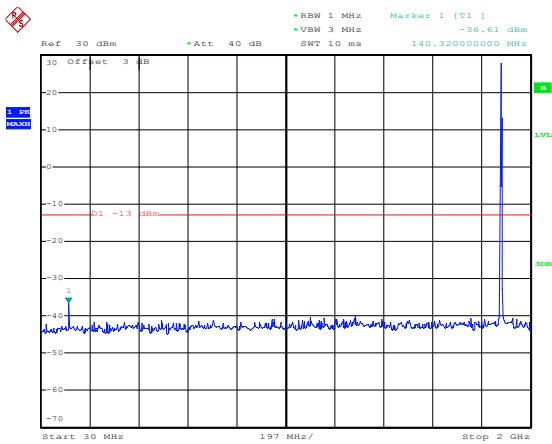


Date: 2.MAR.2023 19:30:31

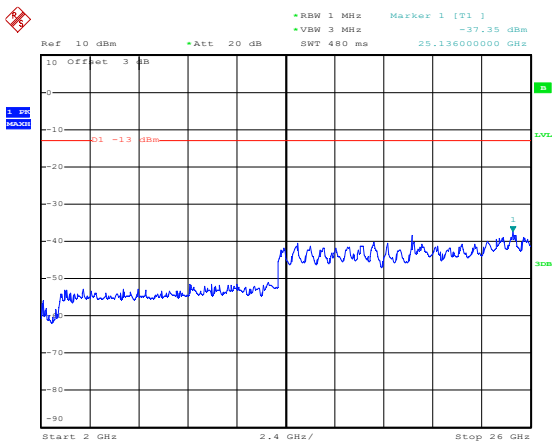
PCS1900
(GMSK)-Middle



Date: 6.MAR.2023 16:10:30

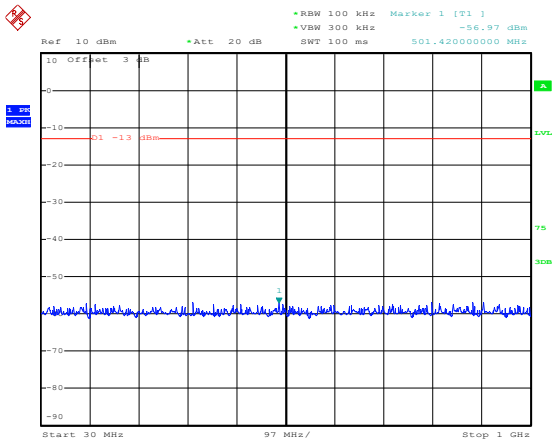


Date: 2.MAR.2023 19:29:26

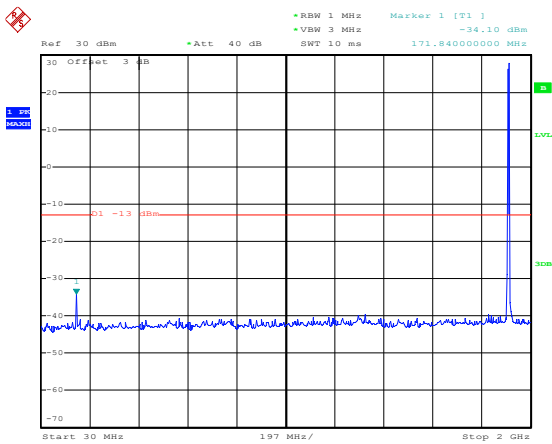


Date: 2.MAR.2023 19:30:40

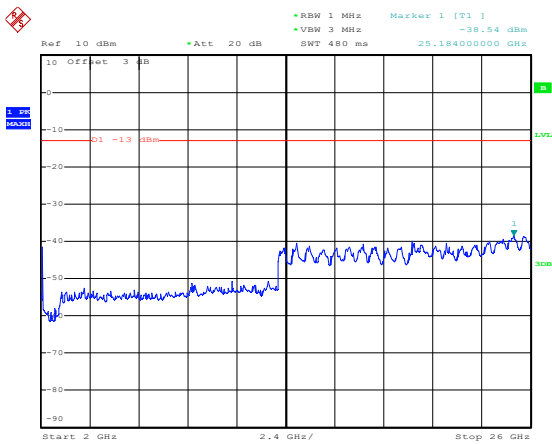
PCS1900
(GMSK)-High



Date: 6.MAR.2023 16:10:38

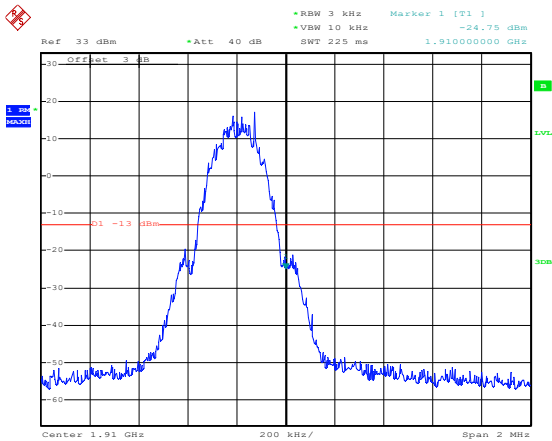


Date: 2.MAR.2023 19:29:47

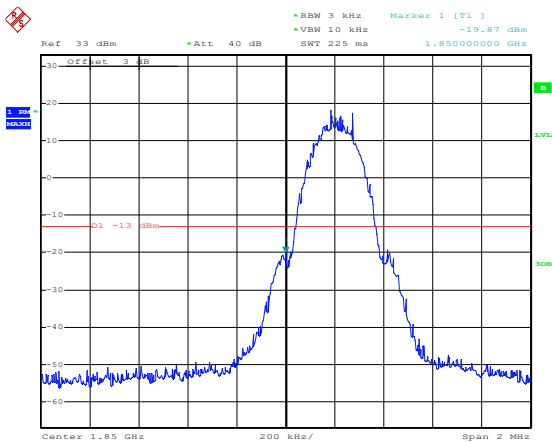


Date: 2.MAR.2023 19:31:00

Bandedge

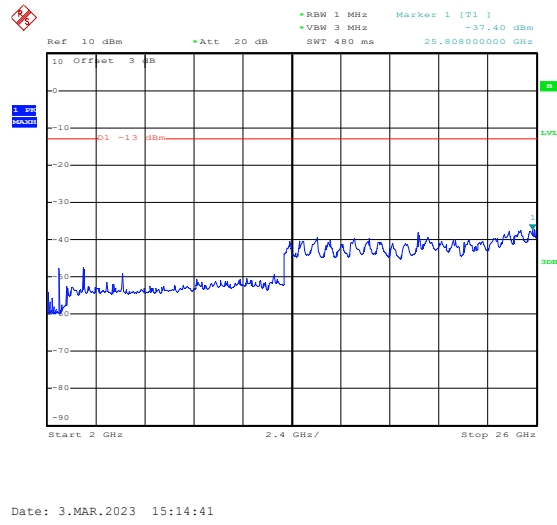
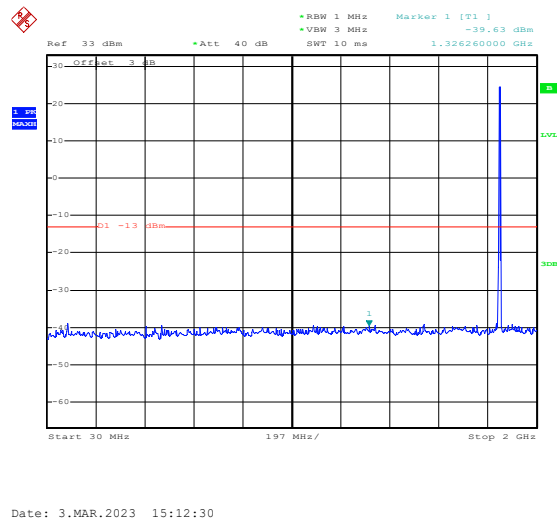
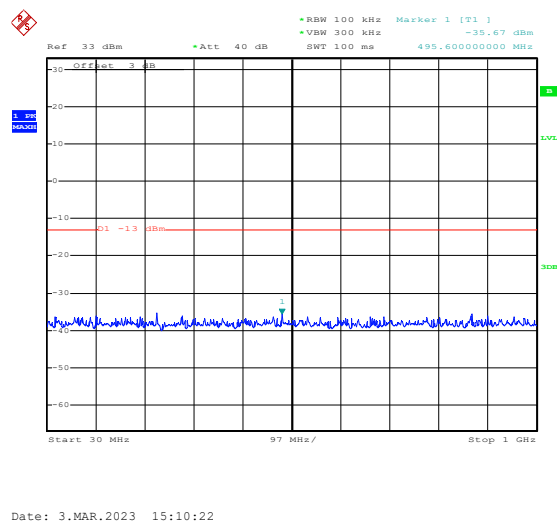


Date: 3.MAR.2023 14:22:49

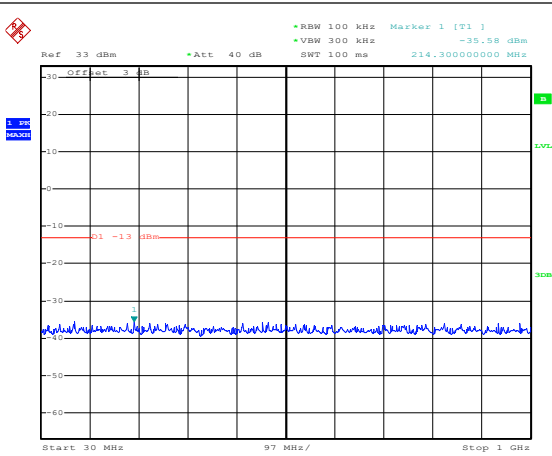


Date: 3.MAR.2023 14:21:56

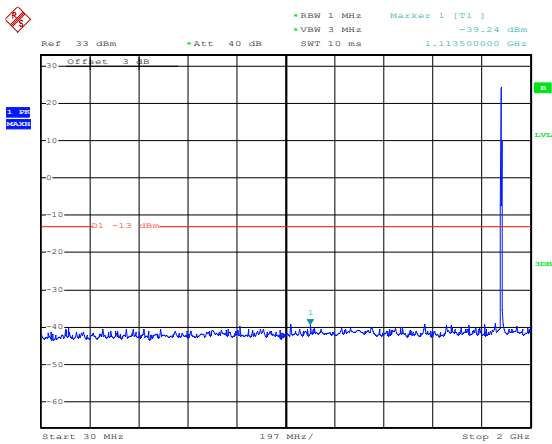
GPRS1900
(GMSK,1Slot)-Low



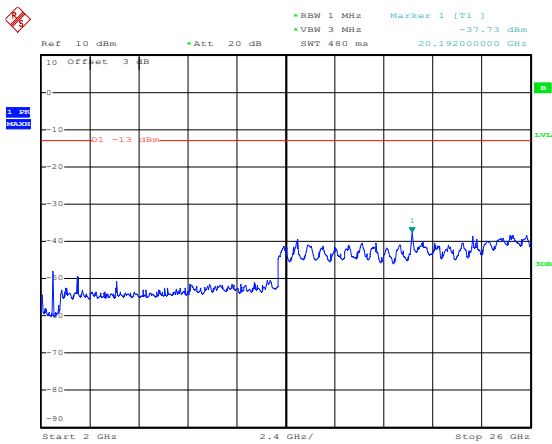
GPRS1900
(GMSK,1Slot)-Middle



Date: 3.MAR.2023 15:10:39

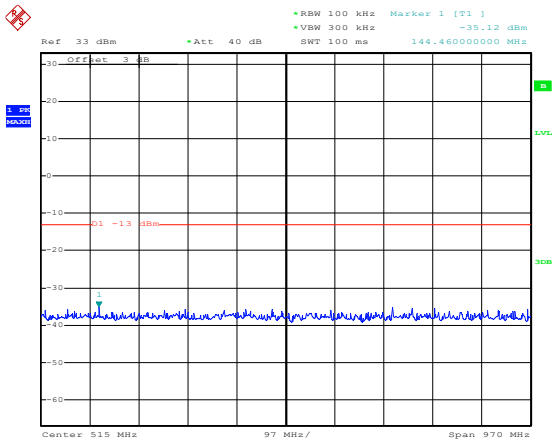


Date: 3.MAR.2023 15:12:42

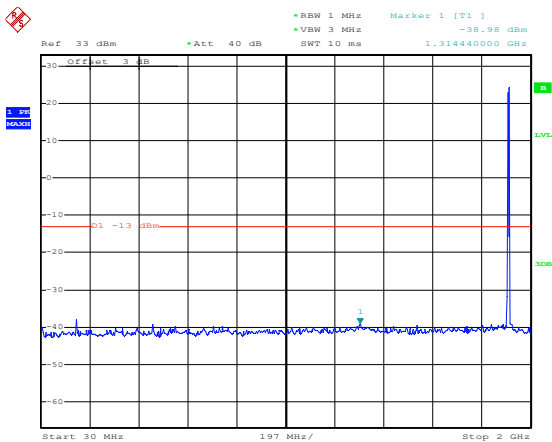


Date: 3.MAR.2023 15:14:56

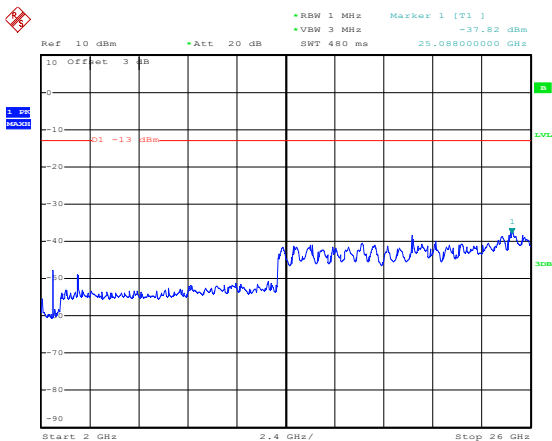
GPRS1900
(GMSK,1Slot)-High



Date: 3.MAR.2023 15:11:04

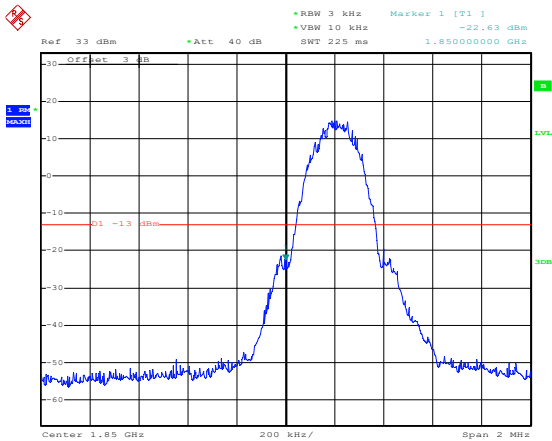


Date: 3.MAR.2023 15:13:15

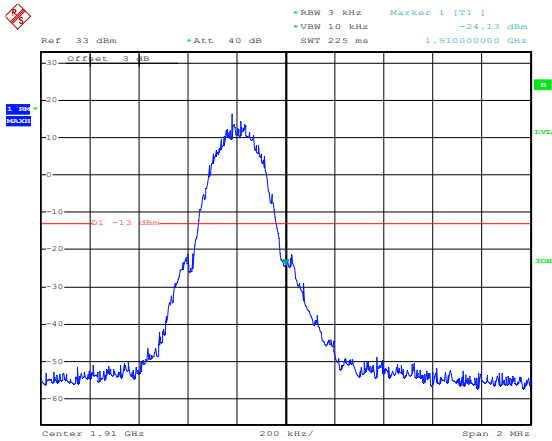


Date: 3.MAR.2023 15:15:04

Bandedge

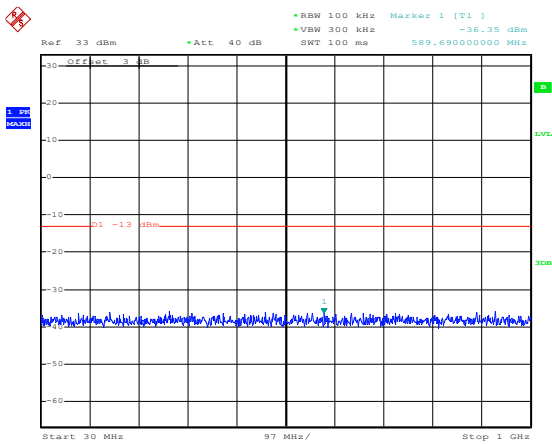


Date: 3.MAR.2023 15:17:17

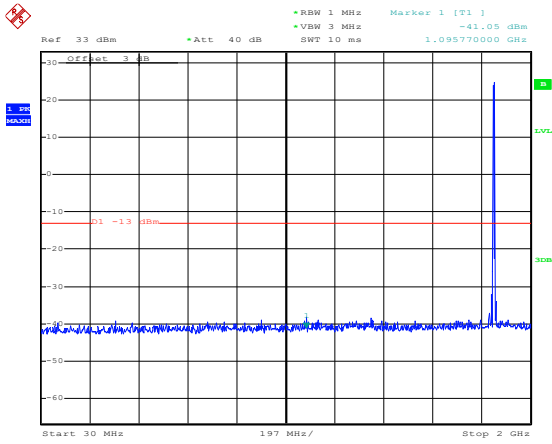


Date: 3.MAR.2023 15:18:10

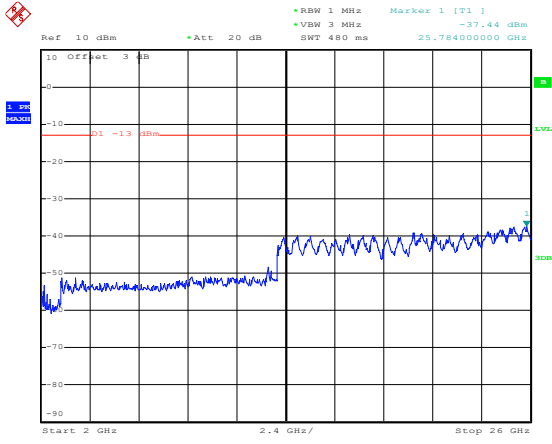
EGPRS1900
(8PSK,1Slot)-Low



Date: 3.MAR.2023 16:13:13

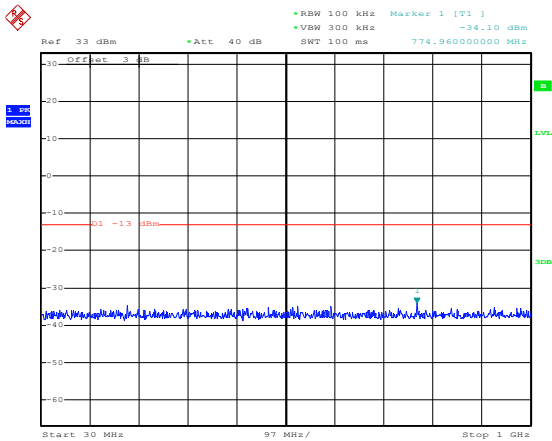


Date: 3.MAR.2023 16:14:08

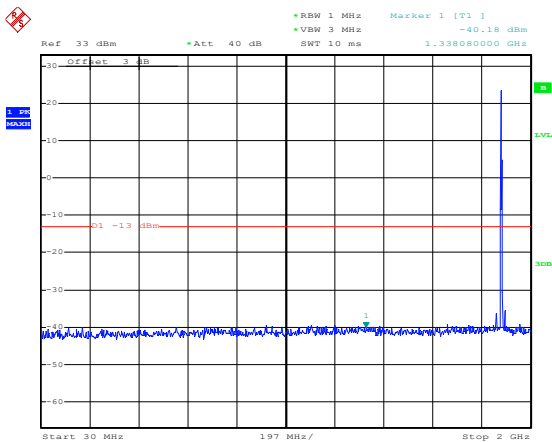


Date: 3.MAR.2023 16:15:26

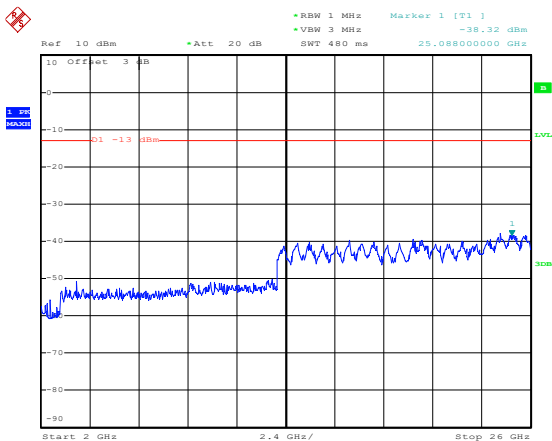
EGPRS1900
(8PSK,1Slot)-Middle



Date: 3.MAR.2023 16:16:49

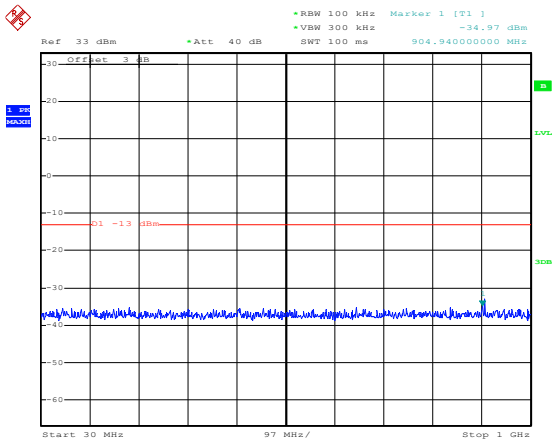


Date: 3.MAR.2023 16:17:38

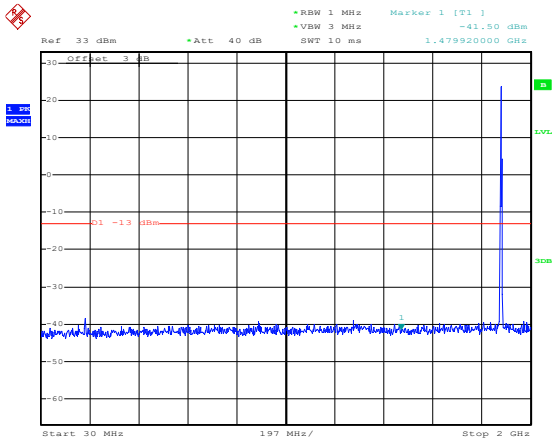


Date: 3.MAR.2023 16:18:10

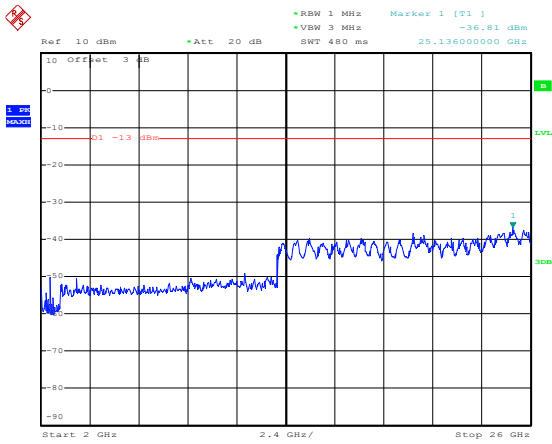
EGPRS1900
(8PSK,1Slot)-High



Date: 3.MAR.2023 16:19:16

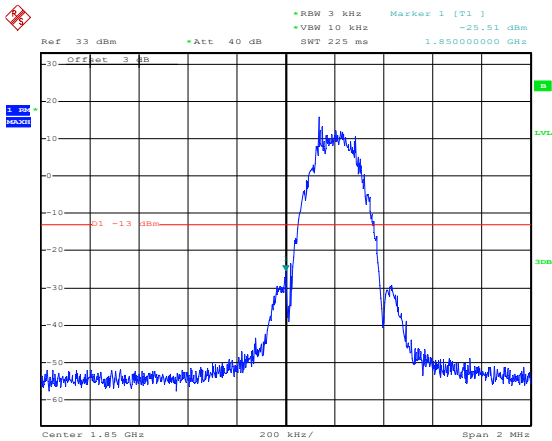


Date: 3.MAR.2023 16:19:43

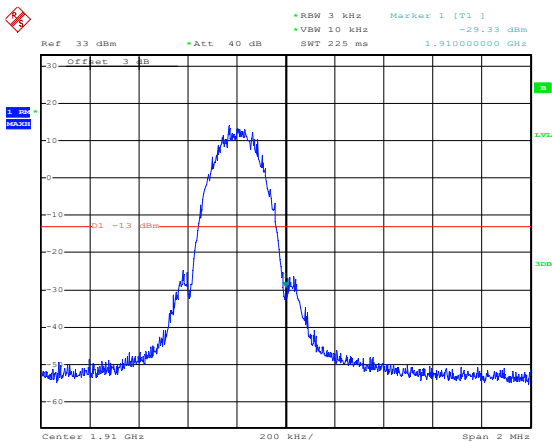


Date: 3.MAR.2023 16:21:04

Bandedge

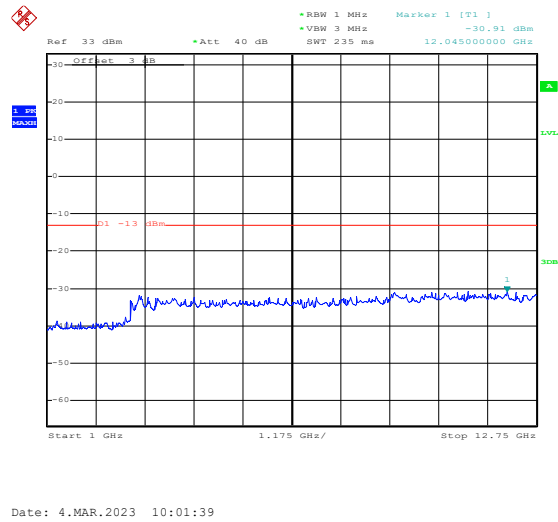
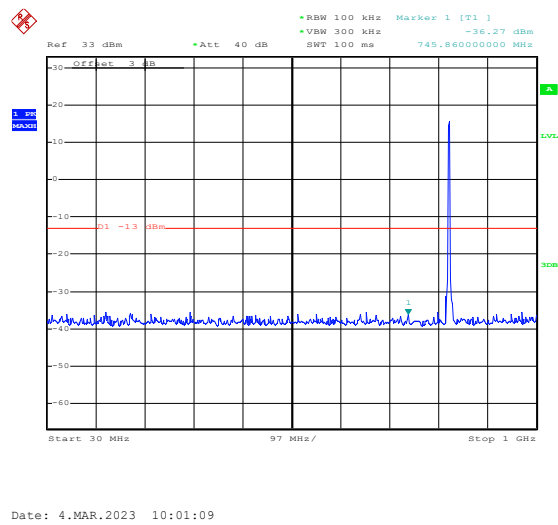


Date: 3.MAR.2023 16:29:29

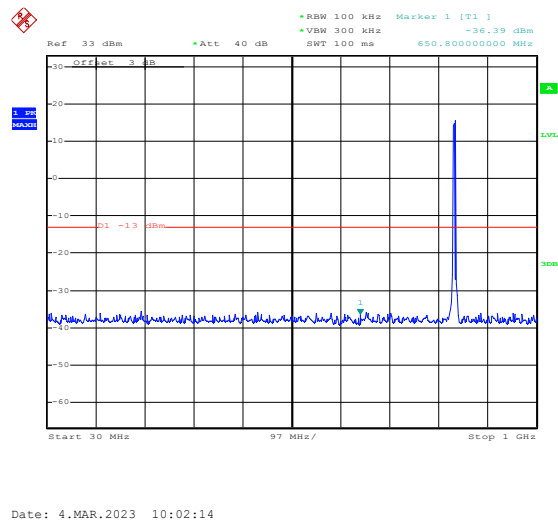


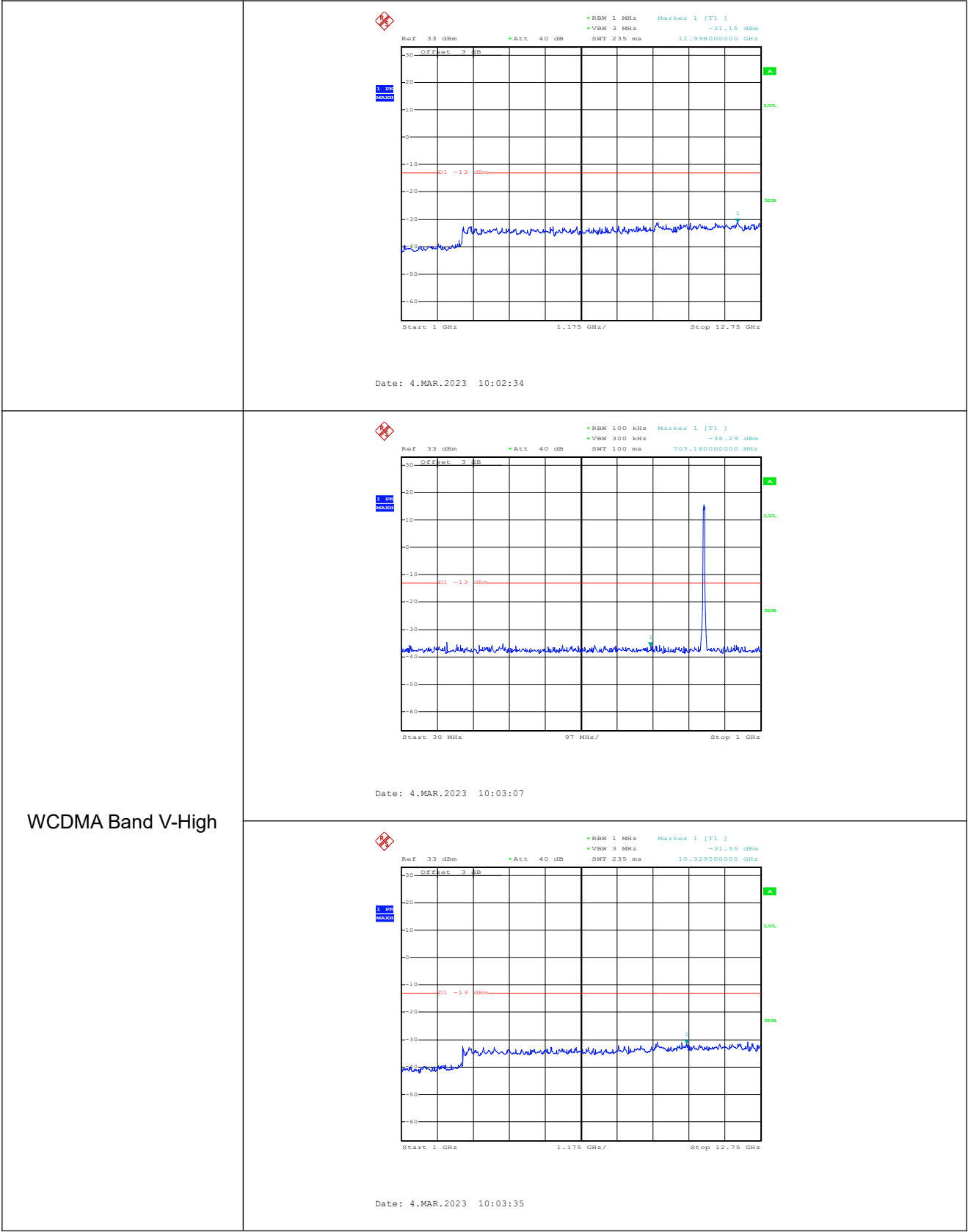
Date: 3.MAR.2023 16:32:02

WCDMA Band V-Low

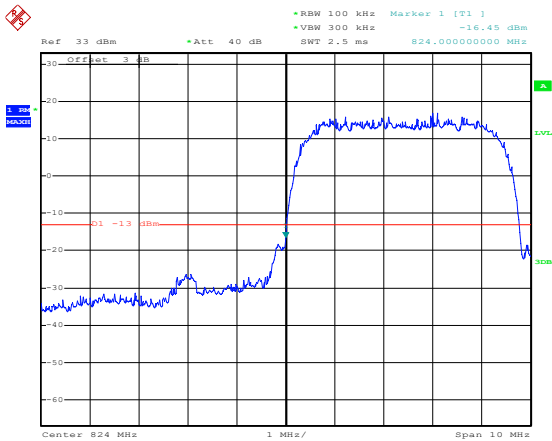


WCDMA Band V-Middle

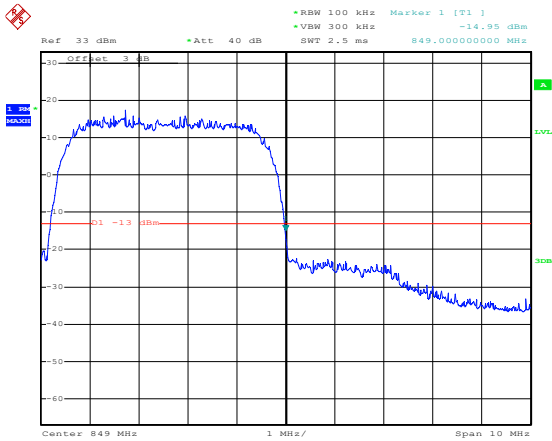




Bandedge

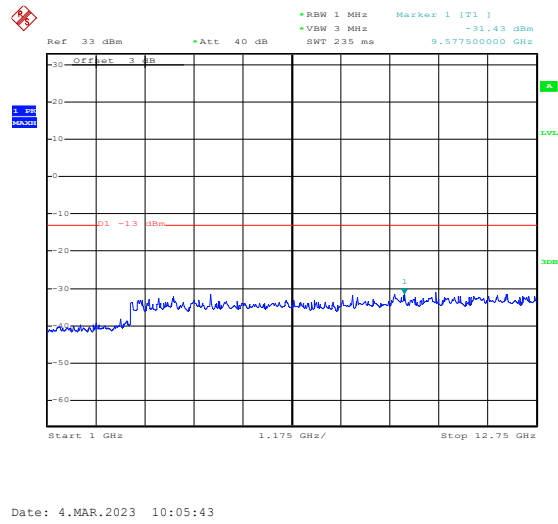
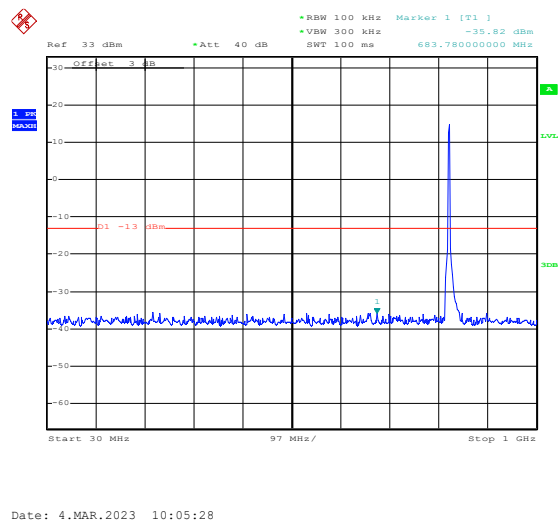


Date: 4.MAR.2023 09:52:34

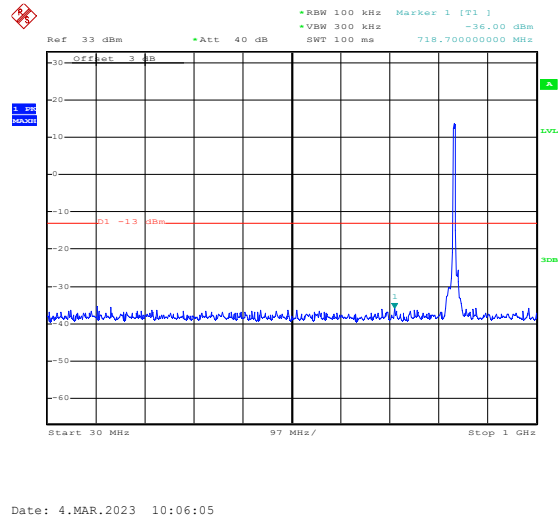


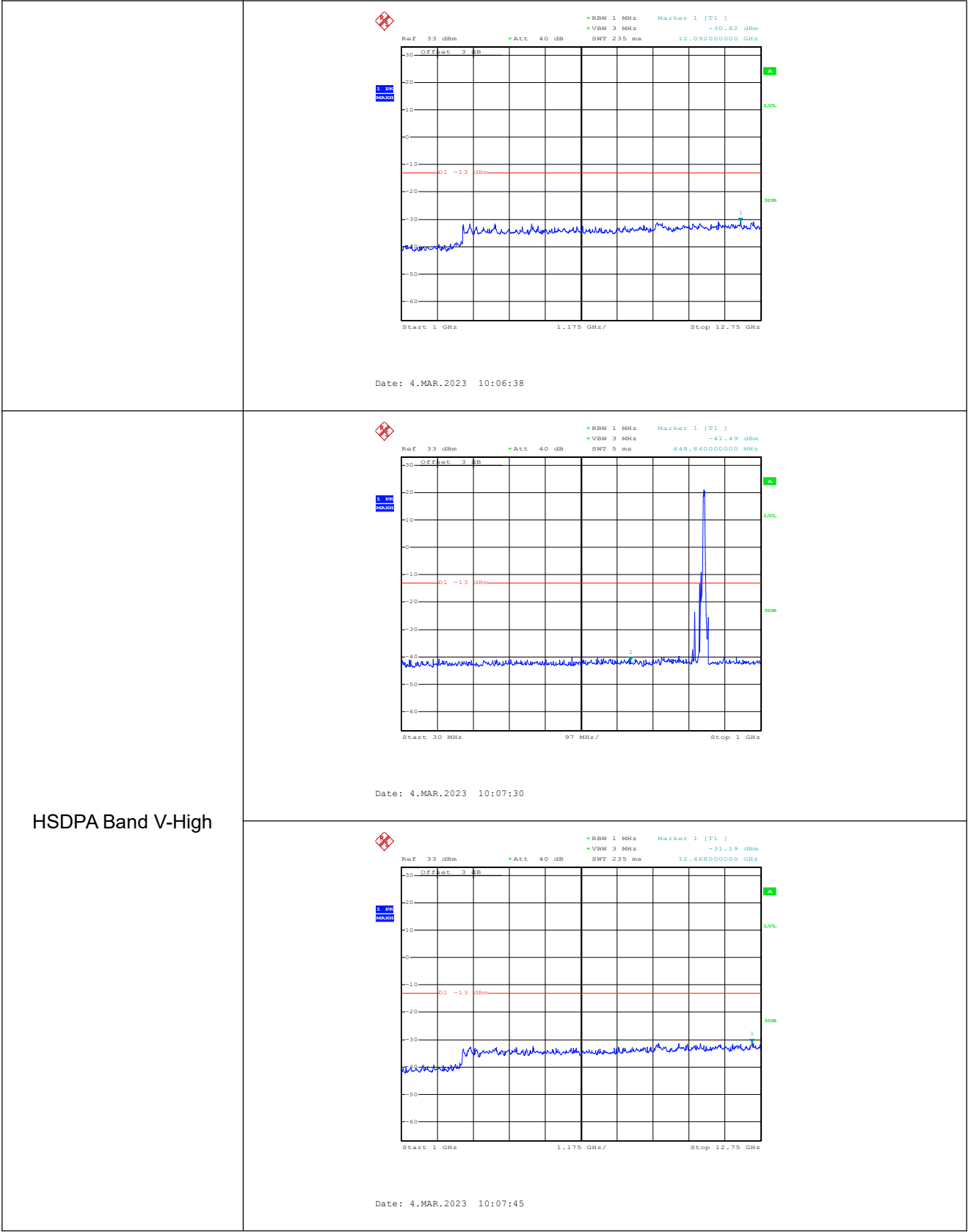
Date: 4.MAR.2023 09:53:24

HSDPA Band V-Low

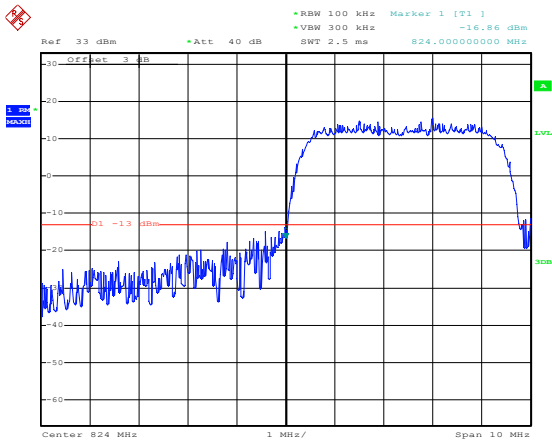


HSDPA Band V-Middle

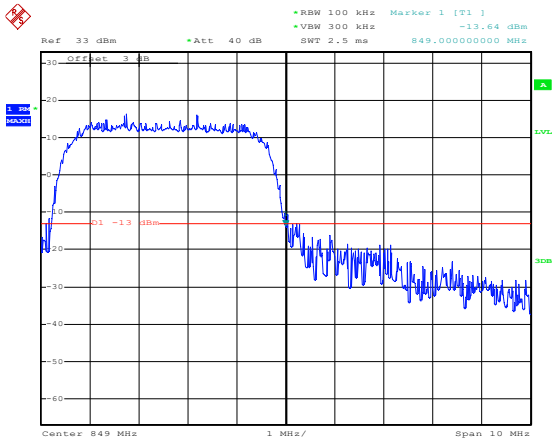




Bandedge

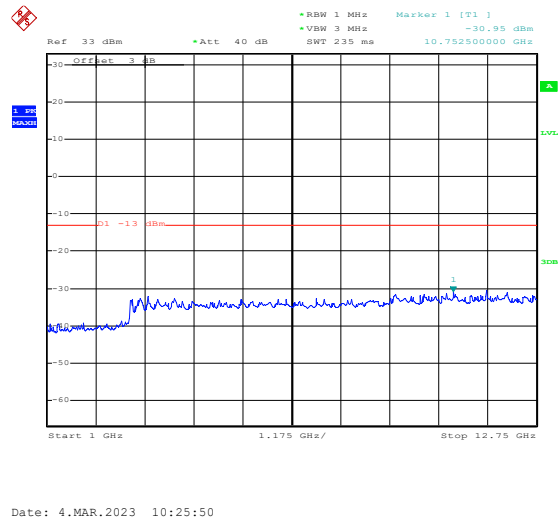
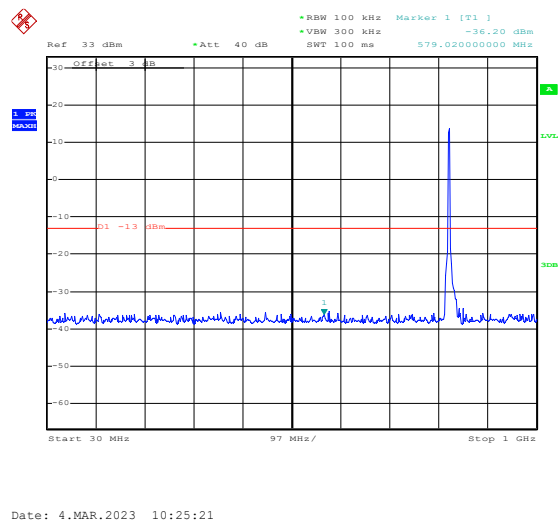


Date: 4.MAR.2023 10:15:42

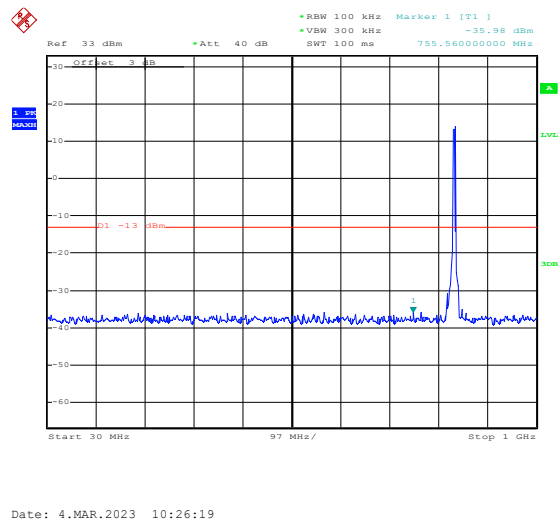


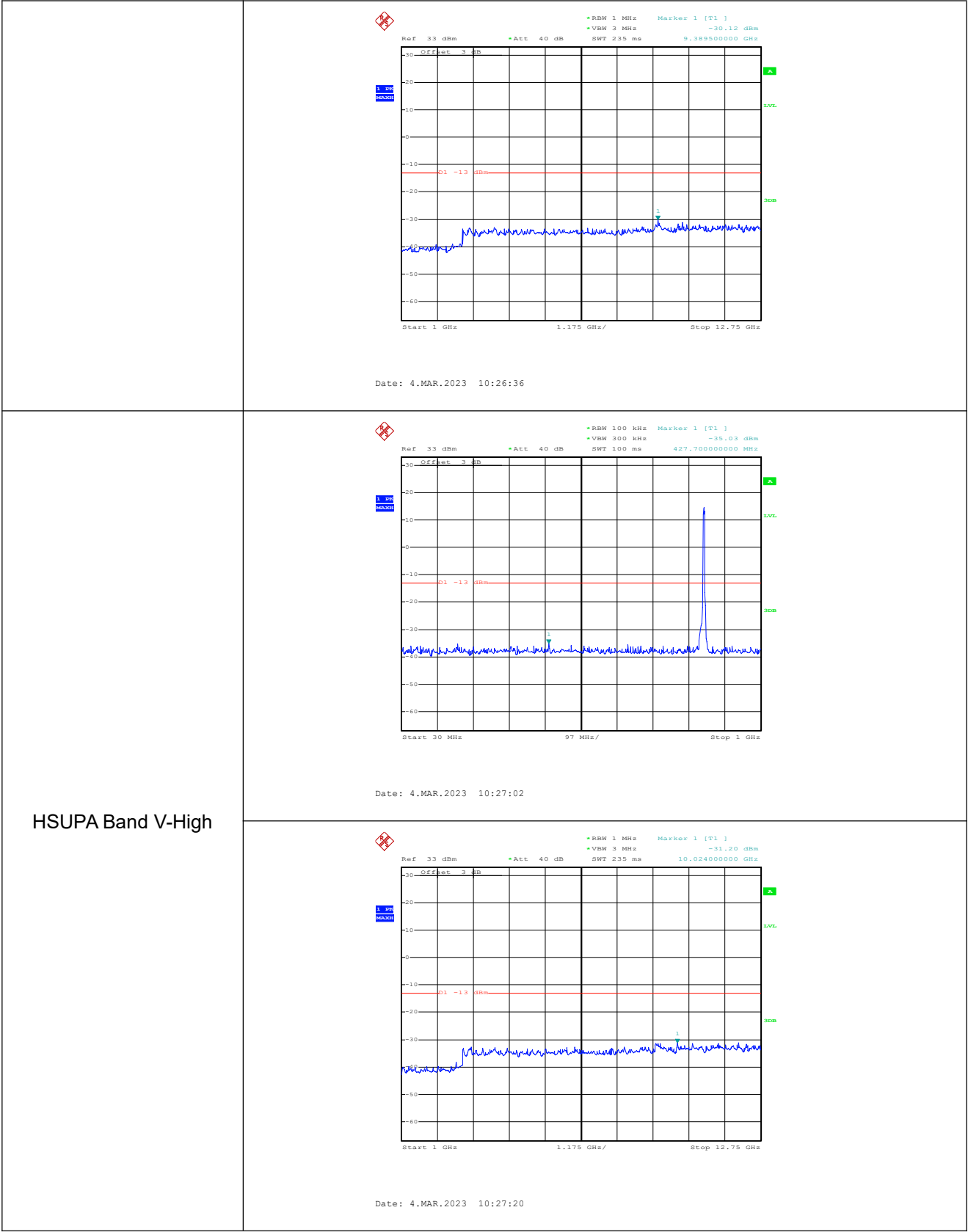
Date: 4.MAR.2023 10:16:10

HSUPA Band V-Low

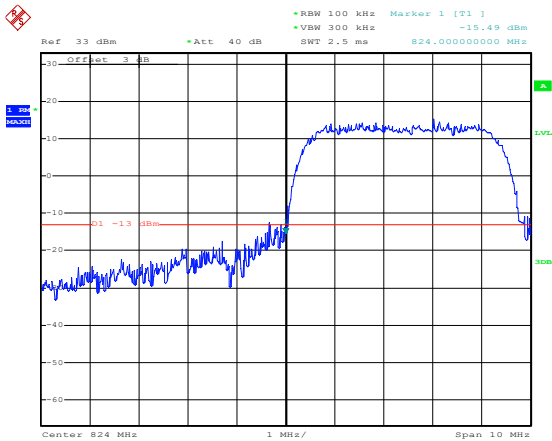


HSUPA Band V-Middle

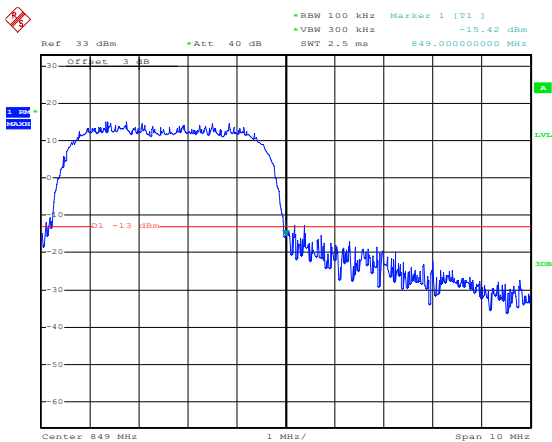




Bandedge

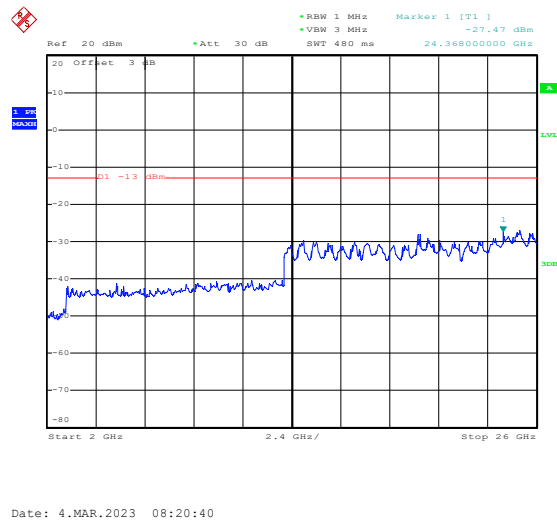
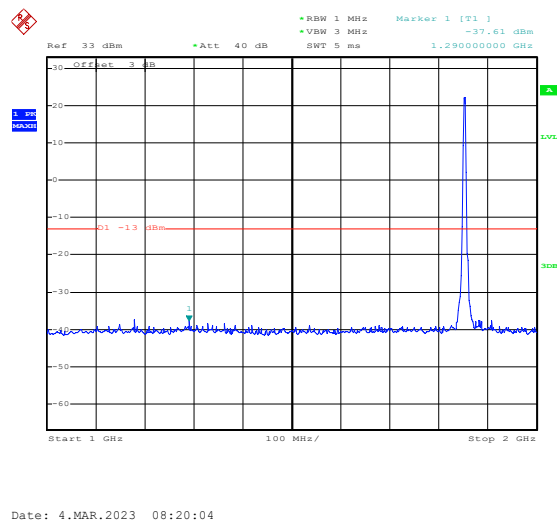
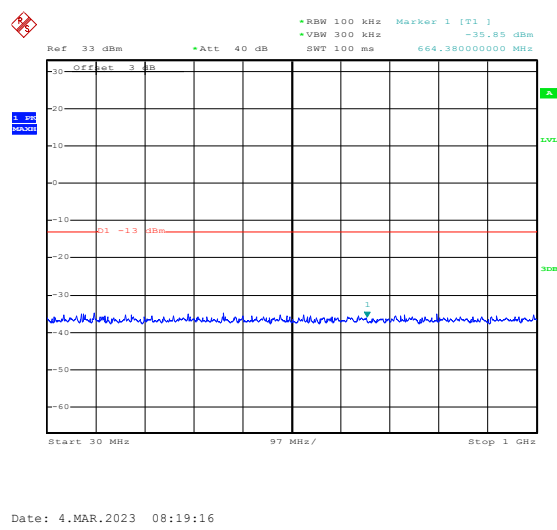


Date: 4.MAR.2023 10:17:56

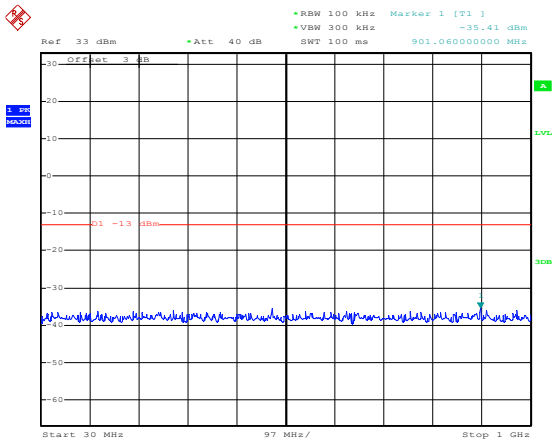


Date: 4.MAR.2023 10:18:37

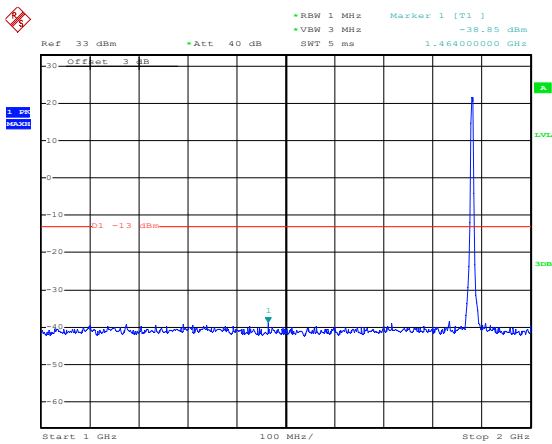
WCDMA Band II-Low



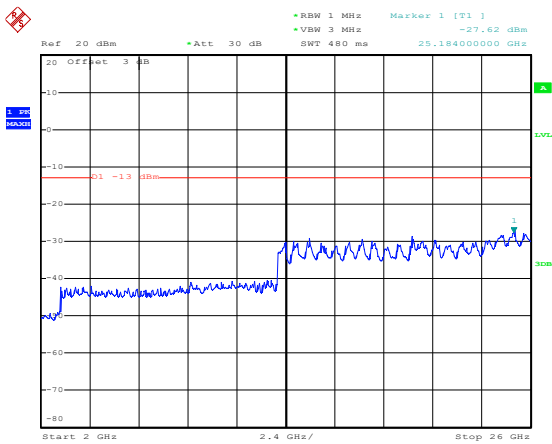
WCDMA Band II-Low



Date: 4.MAR.2023 08:21:19

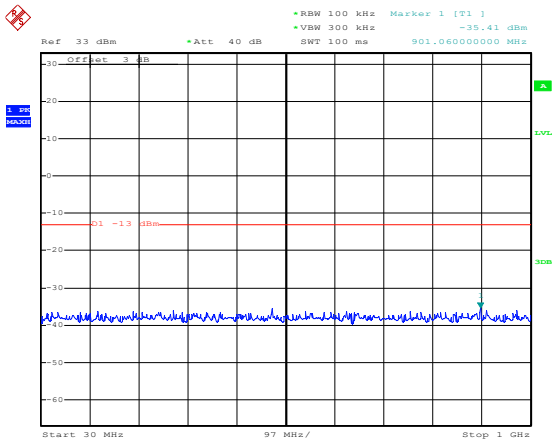


Date: 4.MAR.2023 08:21:38

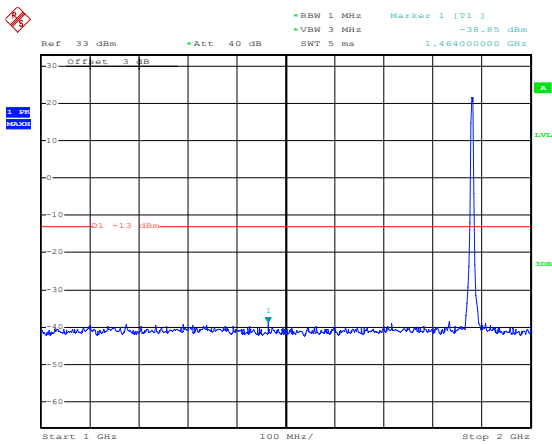


Date: 4.MAR.2023 08:22:39

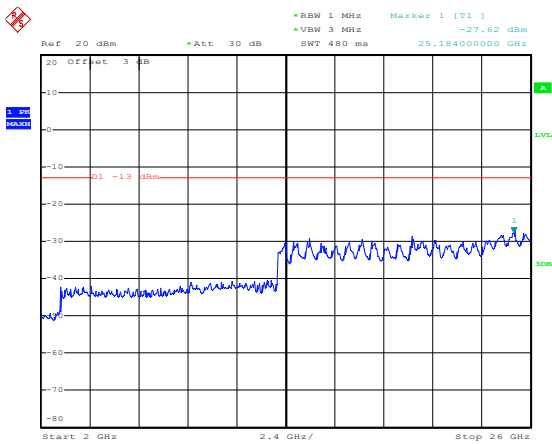
WCDMA Band II-Low



Date: 4.MAR.2023 08:21:19

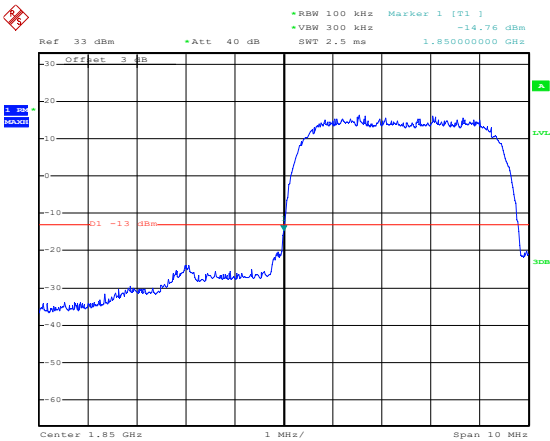


Date: 4.MAR.2023 08:21:38

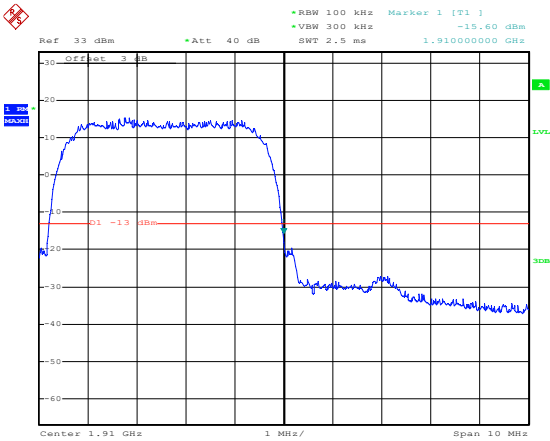


Date: 4.MAR.2023 08:22:39

Bandedge

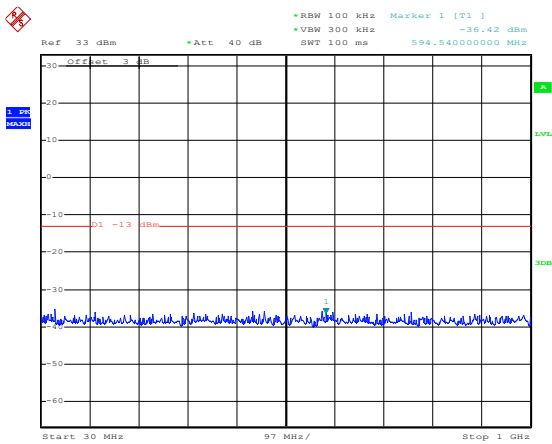


Date: 4.MAR.2023 08:37:42

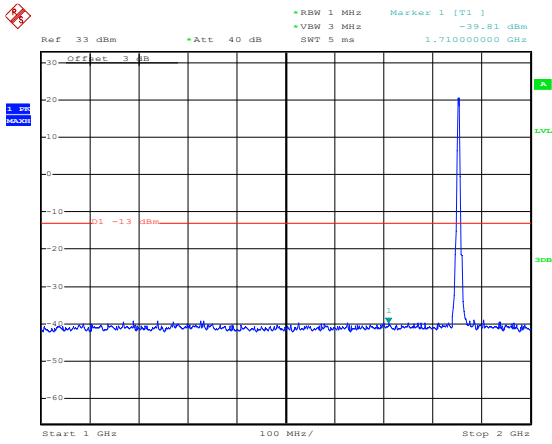


Date: 4.MAR.2023 08:38:23

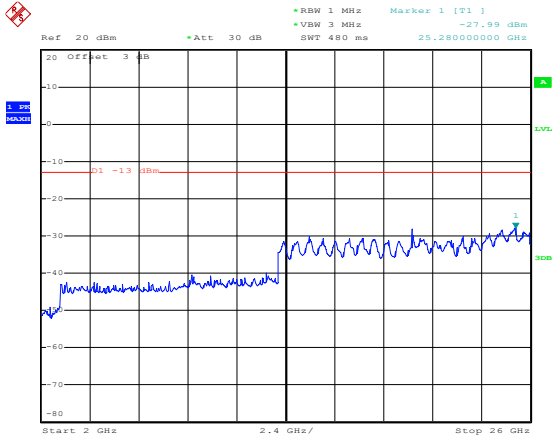
HSDPA Band II-Low



Date: 4.MAR.2023 09:14:29

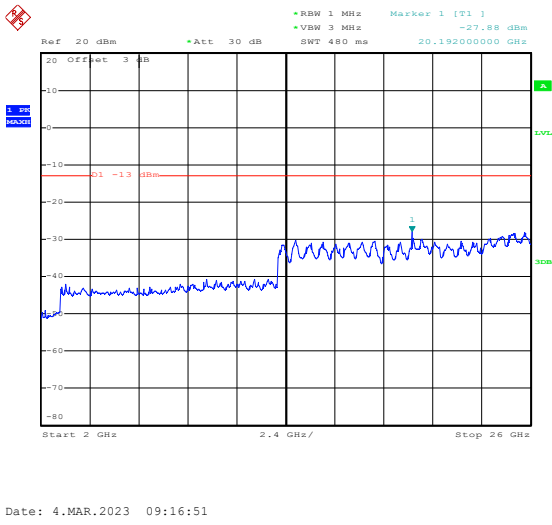
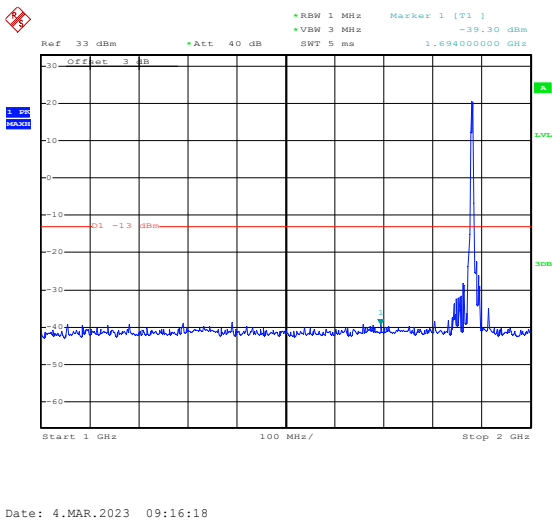
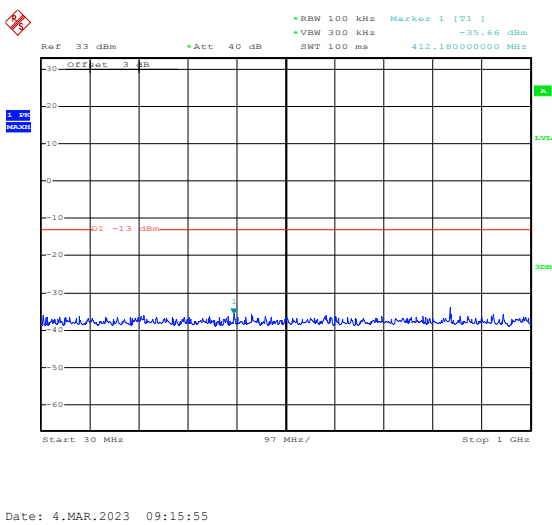


Date: 4.MAR.2023 09:14:57

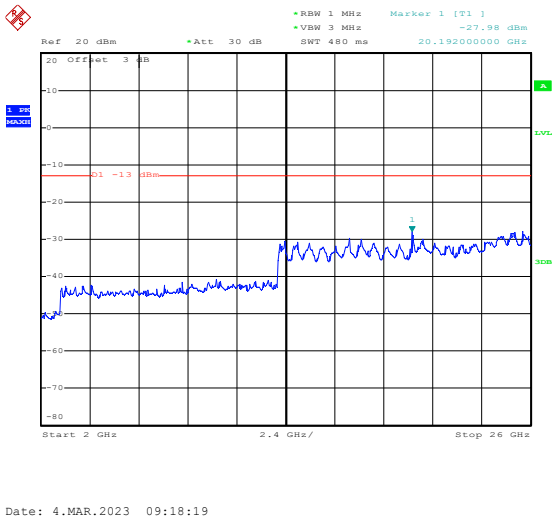
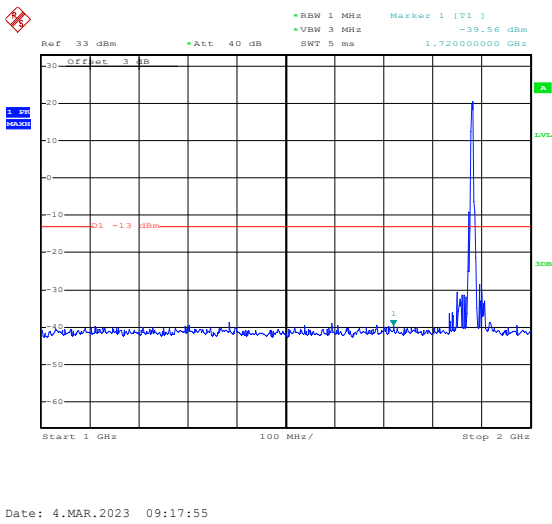
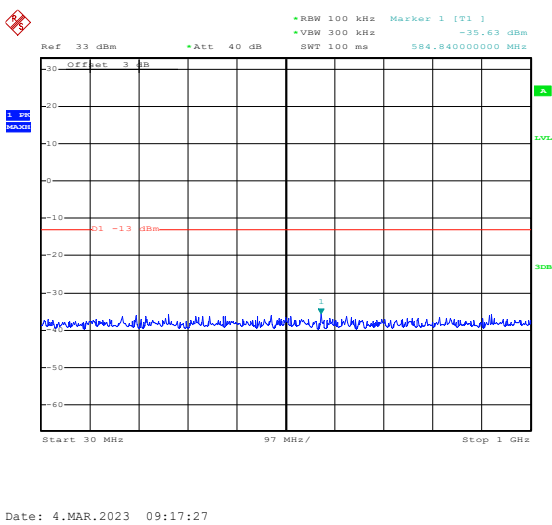


Date: 4.MAR.2023 09:15:20

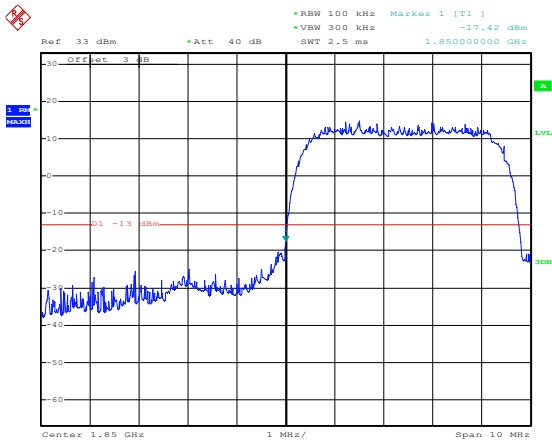
HSDPA Band II-Low



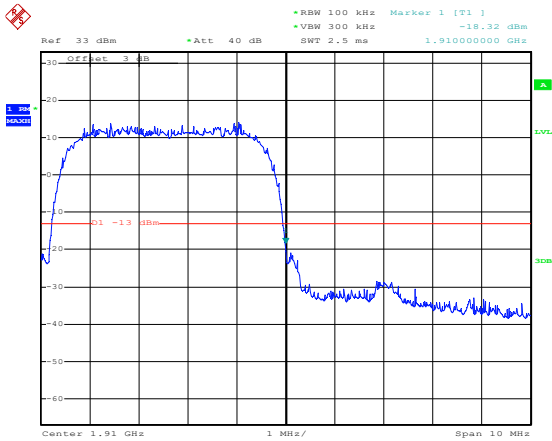
HSDPA Band II-Low



Bandedge

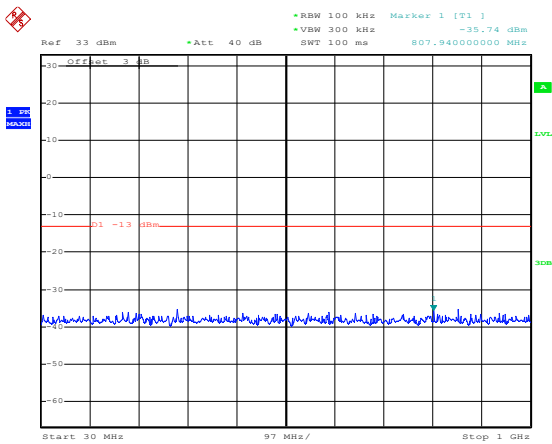


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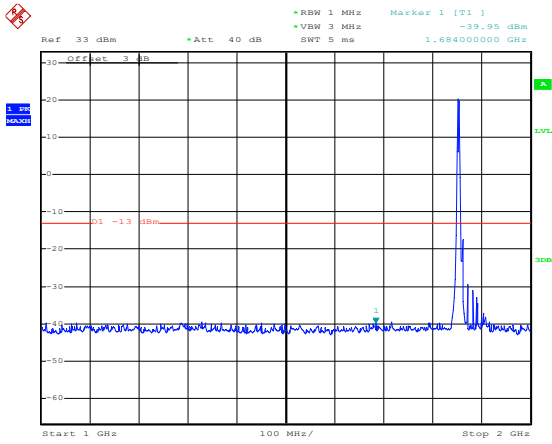


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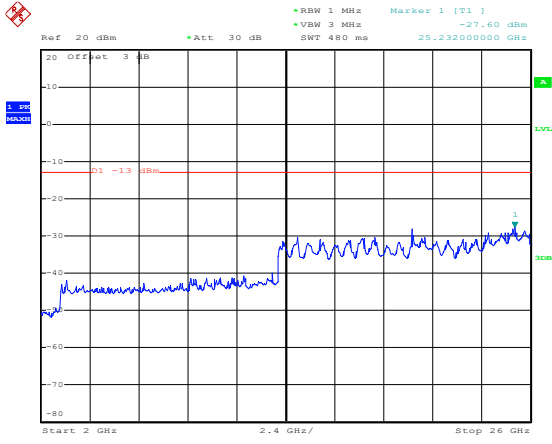
HSUPA Band II-Low



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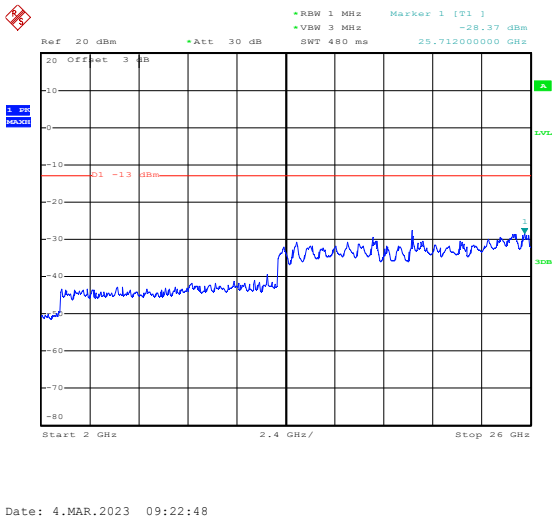
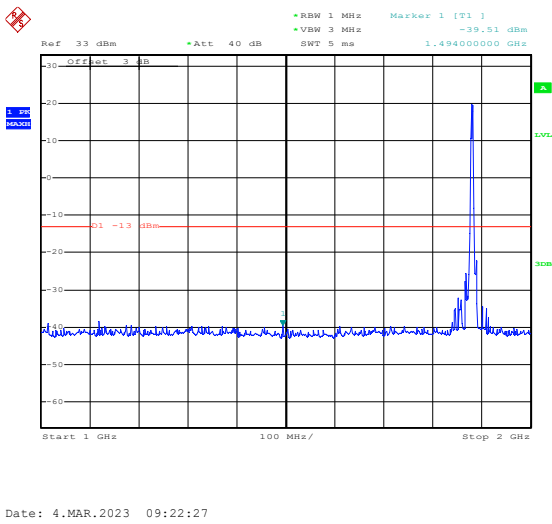
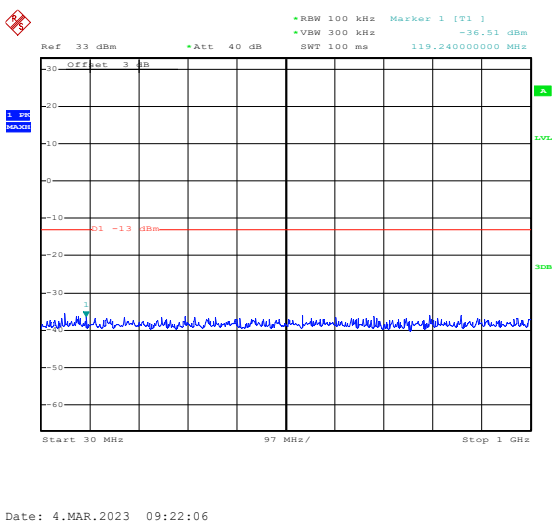


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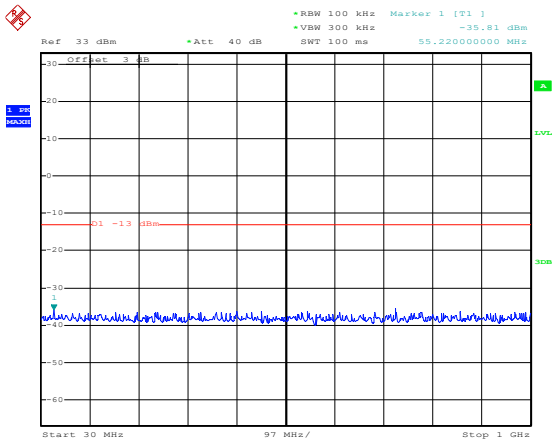


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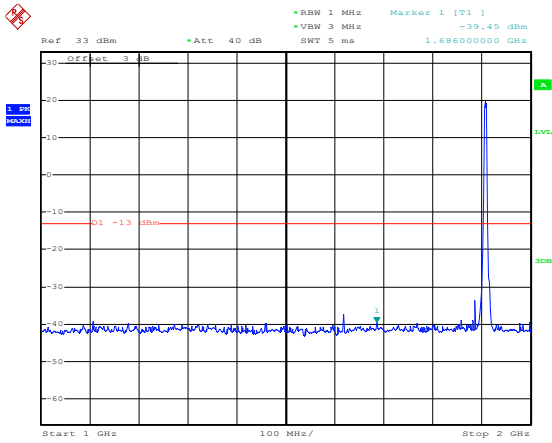
HSUPA Band II-Low



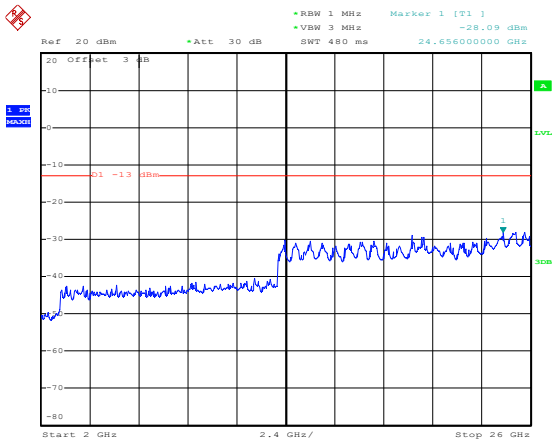
HSUPA Band II-Low



Date: 4.MAR.2023 09:23:24

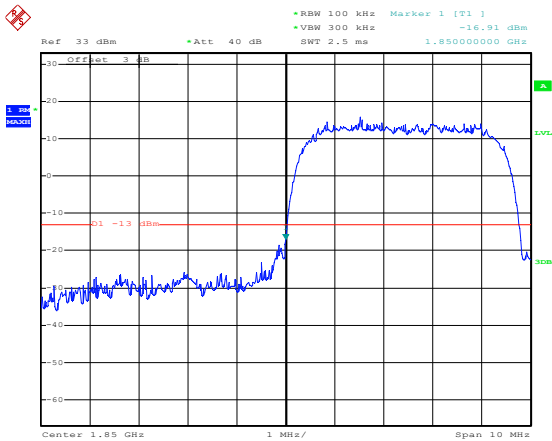


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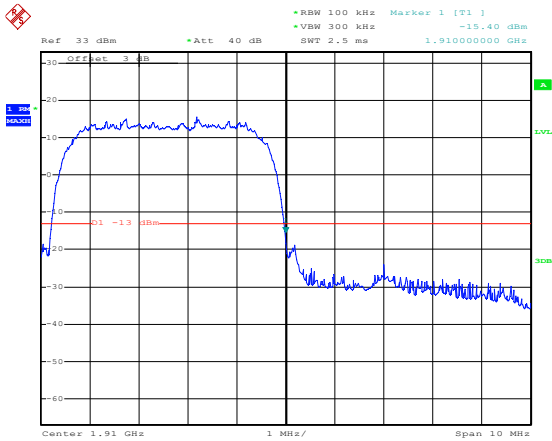


Date: 4.MAR.2023 09:24:13

Bandedge



Date: 4.MAR.2023 09:35:46



Date: 4.MAR.2023 09:50:00

APPENDIX E

Frequency Stability

Note: 1. Worst case at GSM850/PCS1900/WCDMA B2/B5 middle channel

2. Normal Voltage NV=DC3.85V; Low Voltage LV=DC3.5V; High Voltage HV=DC4.4V

➤ Frequency stability V.S. Temperature measurement

Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Power supplied (VDC)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	63	0.0754	2.50	Pass
	-20	48	0.0570		
	-10	42	0.0506		
	0	38	0.0451		
	10	32	0.0377		
	20	25	0.0294		
	30	29	0.0349		
	40	36	0.0432		
	50	41	0.0487		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	76	0.0405	2.50	Pass
	-20	66	0.0352		
	-10	55	0.0295		
	0	51	0.0270		
	10	46	0.0245		
	20	38	0.0205		
	30	46	0.0245		
	40	50	0.0266		
	50	55	0.0295		

Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	66	0.0791	2.50	Pass
	-20	57	0.0680		
	-10	51	0.0607		
	0	47	0.0561		
	10	41	0.0487		
	20	33	0.0395		
	30	38	0.0460		
	40	46	0.0552		
	50	50	0.0598		

Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	52	0.0278	2.50	Pass
	-20	39	0.0209		
	-10	35	0.0184		
	0	30	0.0160		
	10	24	0.0127		
	20	18	0.0098		
	30	26	0.0139		
	40	30	0.0160		
	50	34	0.0180		

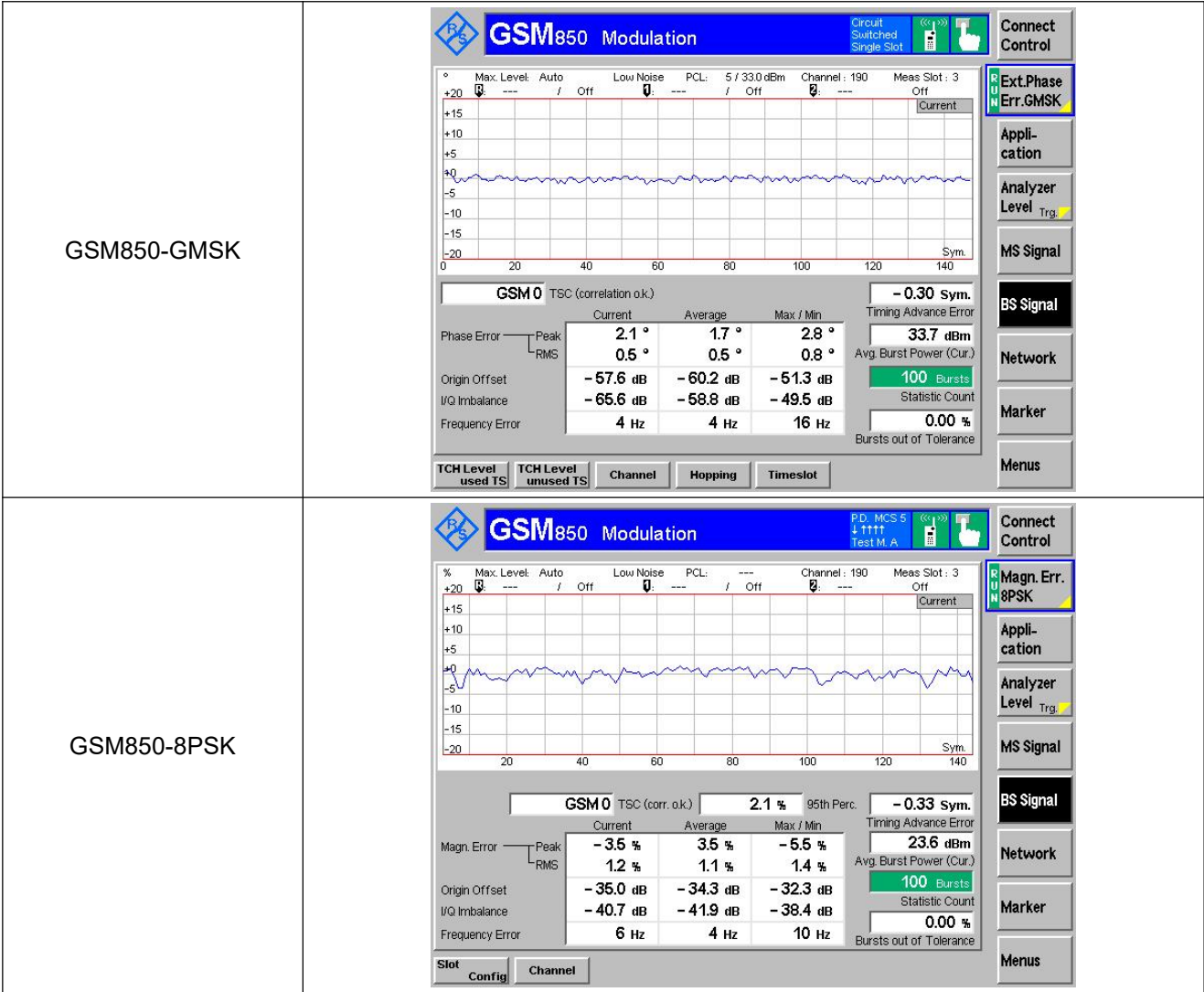
➤ Frequency stability V.S. Voltage measurement

Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	28	0.0340	2.50	Pass
	NV	22	0.0267		
	LV	26	0.0313		
Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	43	0.0229	2.50	Pass
	NV	31	0.0164		
	LV	37	0.0196		

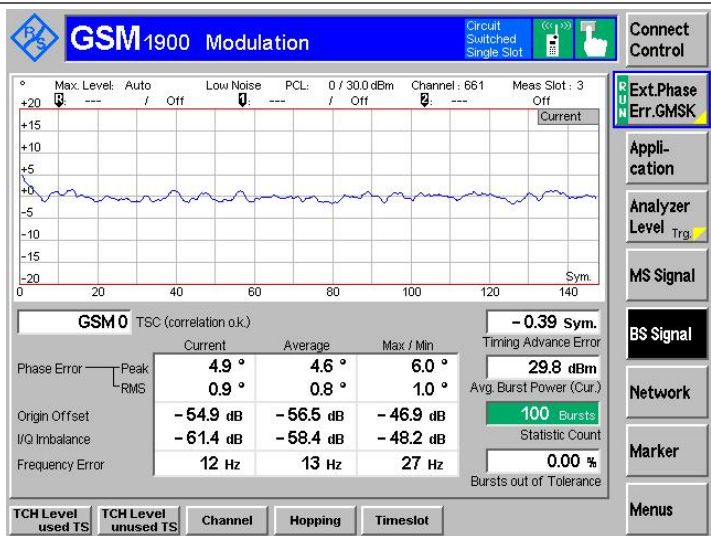
Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	
		Hz	ppm	Result	
25	HV	43	0.0515	2.50	Pass
	NV	37	0.0441		
	LV	48	0.0570		
Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	50	0.0266	2.50	Pass
	NV	38	0.0200		
	LV	42	0.0221		

APPENDIX F

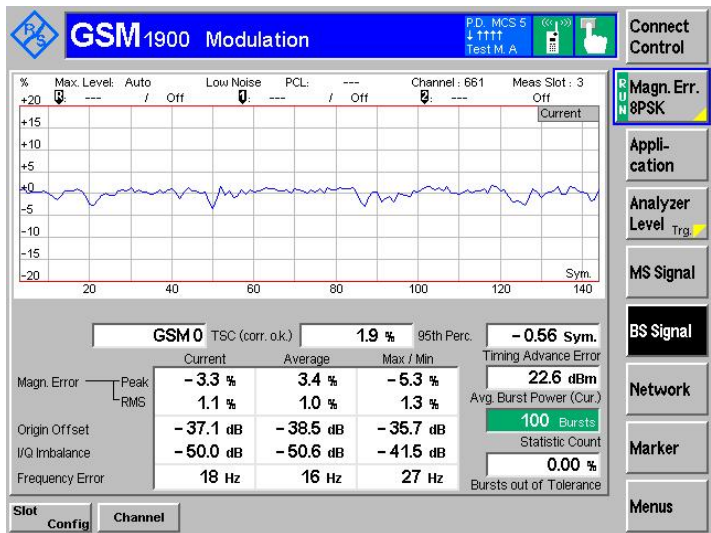
Modulation characteristics

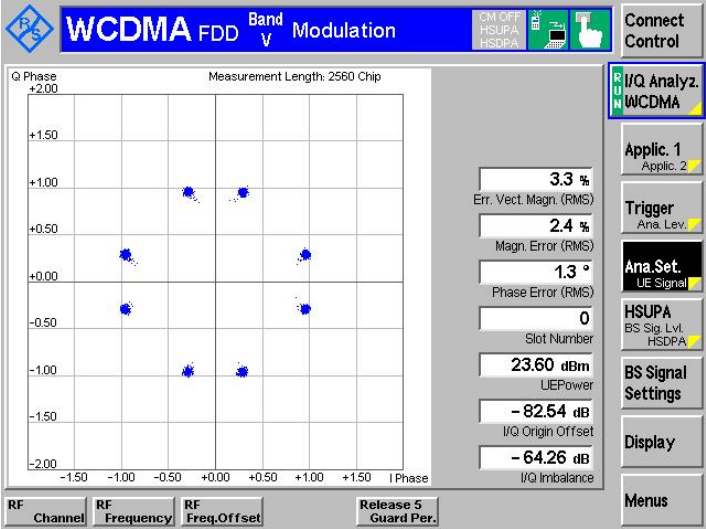
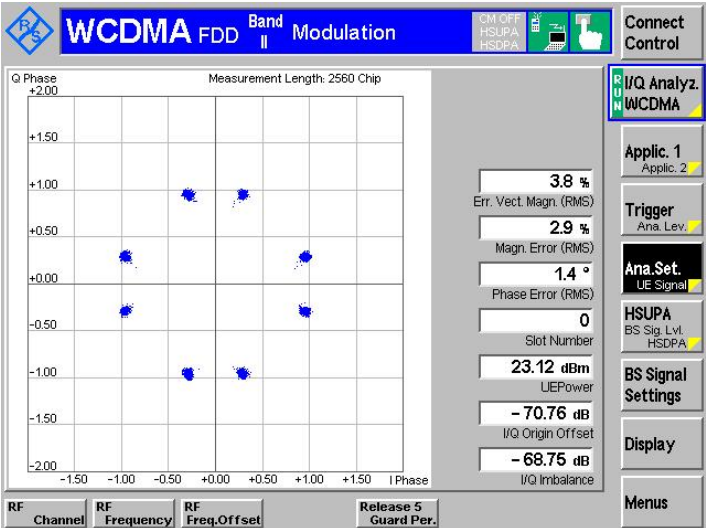


GSM1900-GMSK



GSM1900-8PSK



WCDMA B5	 The screenshot displays the WCDMA B5 measurement interface. The title bar indicates 'WCDMA FDD Band V Modulation'. The main area features a constellation diagram with a grid from -1.50 to +1.50 on both axes. The y-axis is labeled 'Q Phase' and the x-axis is 'I Phase'. The measurement length is 2560 chips. On the right, a list of metrics is shown: Err. Vect. Magn. (RMS) at 3.3 %, Magn. Error (RMS) at 2.4 %, Phase Error (RMS) at 1.3 °, Slot Number at 0, UE Power at 23.60 dBm, I/Q Origin Offset at -82.54 dB, and I/Q Imbalance at -64.26 dB. The bottom status bar includes buttons for RF Channel, RF Frequency, RF Freq.Offset, Release 5, and Guard Per.. A sidebar on the right contains buttons for Connect Control, I/Q Analyz. WCDMA, Applic. 1, Trigger, Ana.Set, HSUPA, BS Signal Settings, Display, and Menus.
WCDMA B2	 The screenshot displays the WCDMA B2 measurement interface. The title bar indicates 'WCDMA FDD Band II Modulation'. The main area features a constellation diagram with a grid from -1.50 to +1.50 on both axes. The y-axis is labeled 'Q Phase' and the x-axis is 'I Phase'. The measurement length is 2560 chips. On the right, a list of metrics is shown: Err. Vect. Magn. (RMS) at 3.8 %, Magn. Error (RMS) at 2.9 %, Phase Error (RMS) at 1.4 °, Slot Number at 0, UE Power at 23.12 dBm, I/Q Origin Offset at -70.76 dB, and I/Q Imbalance at -68.75 dB. The bottom status bar includes buttons for RF Channel, RF Frequency, RF Freq.Offset, Release 5, and Guard Per.. A sidebar on the right contains buttons for Connect Control, I/Q Analyz. WCDMA, Applic. 1, Trigger, Ana.Set, HSUPA, BS Signal Settings, Display, and Menus.

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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