TEST REPORT

Reference No.	:	WTX22X08159604W001
FCC ID	:	2AMLFJM-X3-MN
Applicant	:	Shenzhen Jimi IOT Co., Ltd
Address	:	3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen, Guangdong, China
Manufacturer	:	The same as Applicant
Address	:	The same as Applicant
Product Name	:	VEHICLE GPS TRACKER
Model No.	:	X3-MN
Standards	:	FCC Part 22H, FCC Part 24E
Date of Receipt sample	:	2022-08-05
Date of Test	:	2022-08-05 to 2022-11-03
Date of Issue	:	2022-11-03
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:

Waltek Testing Group (Shenzhen) Co., Ltd.

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Tested by:

Dashan Chen

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Approved by:

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Report version

Version No.	Date of issue	Description
Rev.00	2022-11-03	Original
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	VEHICLE GPS TRACKER
Trade Name:	JIMI
Model No.:	X3-MN
Adding Model(s):	/
Rated Voltage:	Input: DC 9-36V Battery: DC3.7V
Battery:	450mAh
Adapter Model:	/
Note: The Antenna Gain is provided by the customer and can affect the validity of results. *The test data is gathered from a production sample provided by the manufacturer.*	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS 850: 824~849MHz GSM/GPRS 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS 850: 869~894MHz GSM/GPRS 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 33.03dBm, GSM1900: 29.71dBm
Type of Emission:	GSM850: 244KGXW, GSM1900: 246KGXW
Type of Modulation:	GMSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850:-0.81dBi; GSM1900: 1.26dBi
GPRS/EDGE Class:	Class 12

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: Frequency Alloca-Tions and Radio Treaty Mat-Ters; General Rules and Reg-Ulations.
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 mai ntained 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.

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	GSM 1900	Low, Middle, High Channels
TM4	GPRS 1900	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency(MHz)	Channel Number
GSM 850	GSM/GPRS	824.2	128
		836.6	190
		848.8	251
PCS 1900	GSM/GPRS	1850.2	512
		1880.0	661
		1909.8	810
Note: the transmitter has been tested on the communications mode of GSM, GPRS 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
DC Cable	1.5	Unshielded	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
/	/	/	/

1.6 Measurement Uncertainty

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

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-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/
☒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	Agilent	8447F	3113A06717	2022-01-07	2023-01-06
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	BBHA9170582	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-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

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

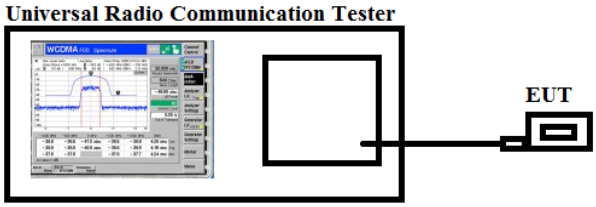
3.1 Standard Applicable

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	29.12	<38.45	Pass
		H	22.96		
	190	V	29.24		
		H	23.16		
	251	V	29.27		
		H	23.19		
GPRS850	128	V	28.99	<38.45	Pass
		H	22.86		
	190	V	28.92		
		H	22.98		
	251	V	29.09		
		H	23.06		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	512	V	27.35	<33.00	Pass
		H	21.74		
	661	V	27.46		
		H	21.53		
	810	V	27.39		
		H	21.31		
GPRS1900	512	V	27.11	<33.00	Pass
		H	20.98		
	661	V	27.09		
		H	20.86		
	810	V	27.18		
		H	21.29		

Max. Conducted Power (Average power)

Please refer to Appendix A

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

4.1 Standard Applicable

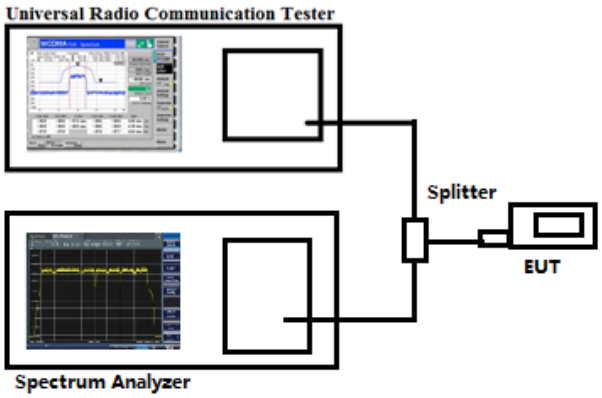
According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in 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

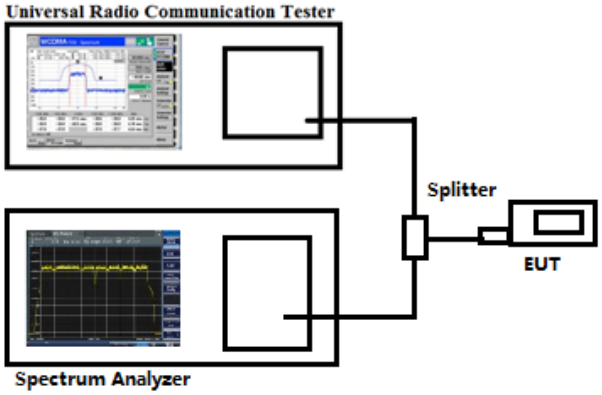
According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

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

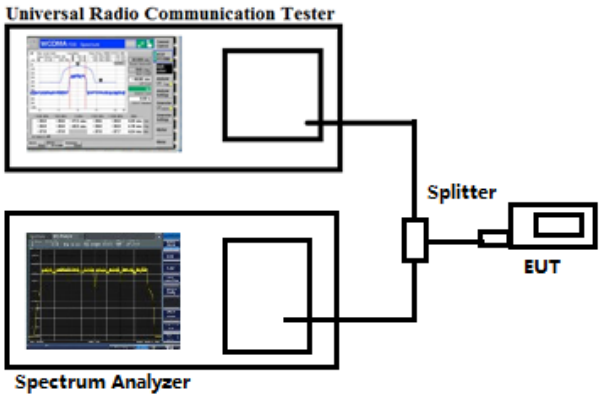
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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.

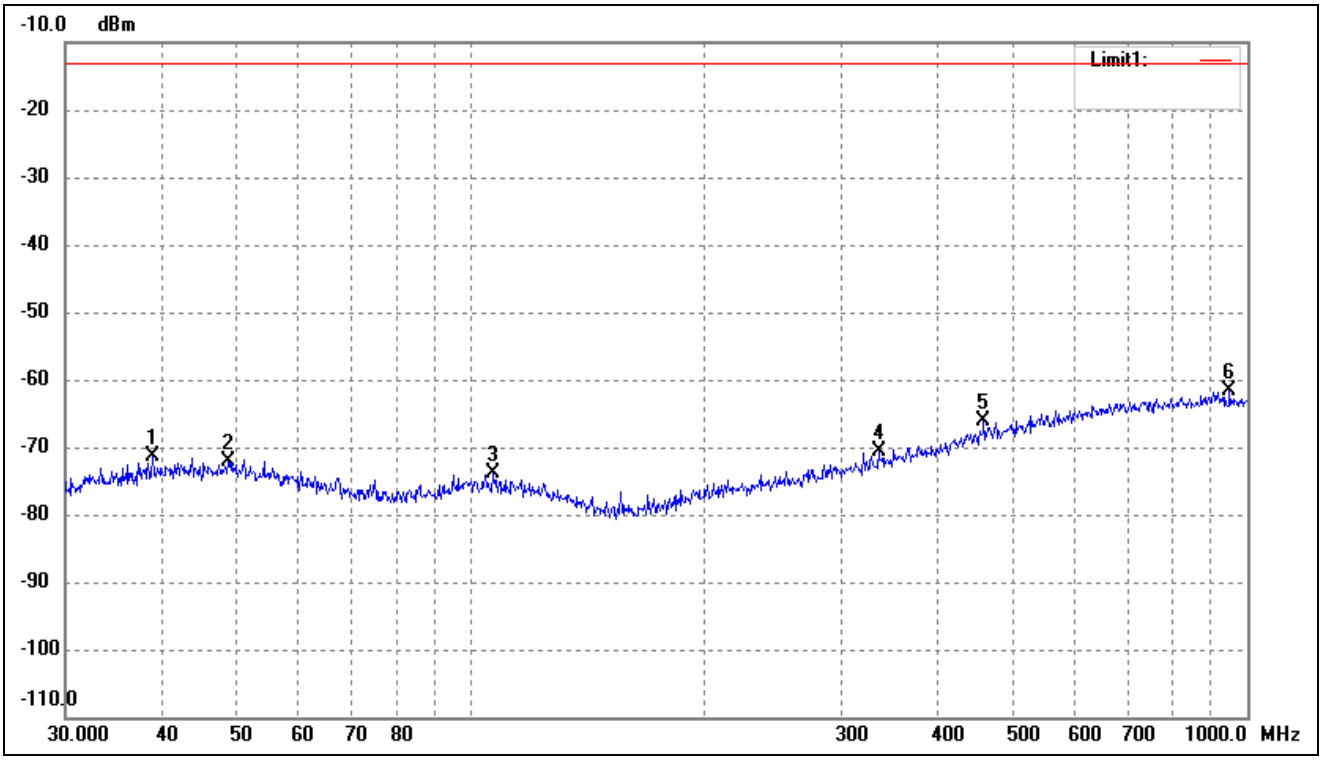
Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

7.3 Summary of Test Results/Plots

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

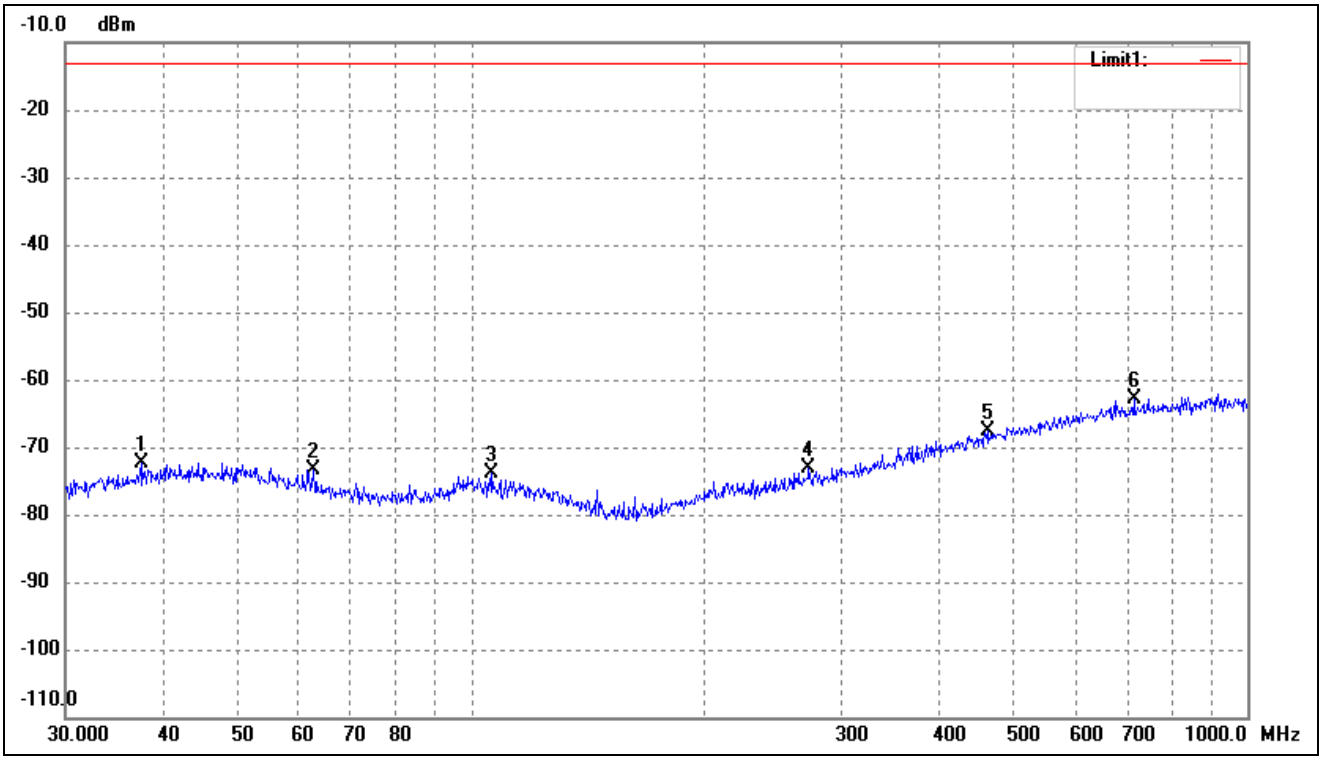
➢ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



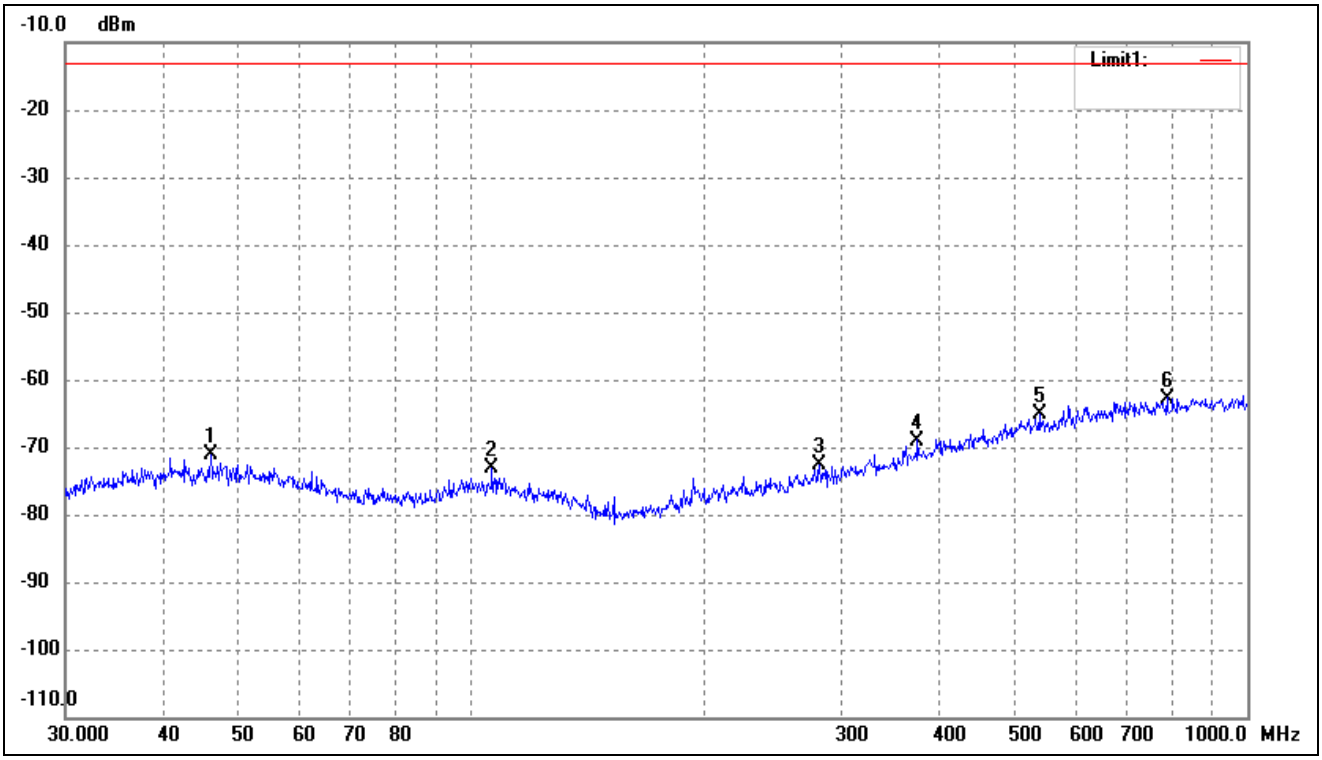
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	( )	(cm)	
1	38.8879	-75.87	4.53	-71.34	-13.00	-58.34	-	-	peak
2	48.6719	-76.95	4.83	-72.12	-13.00	-59.12	-	-	peak
3	106.7587	-76.96	2.97	-73.99	-13.00	-60.99	-	-	peak
4	334.8589	-76.44	5.93	-70.51	-13.00	-57.51	-	-	peak
5	457.5073	-75.66	9.43	-66.23	-13.00	-53.23	-	-	peak
6	948.7610	-76.08	14.39	-61.69	-13.00	-48.69	-	-	peak

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



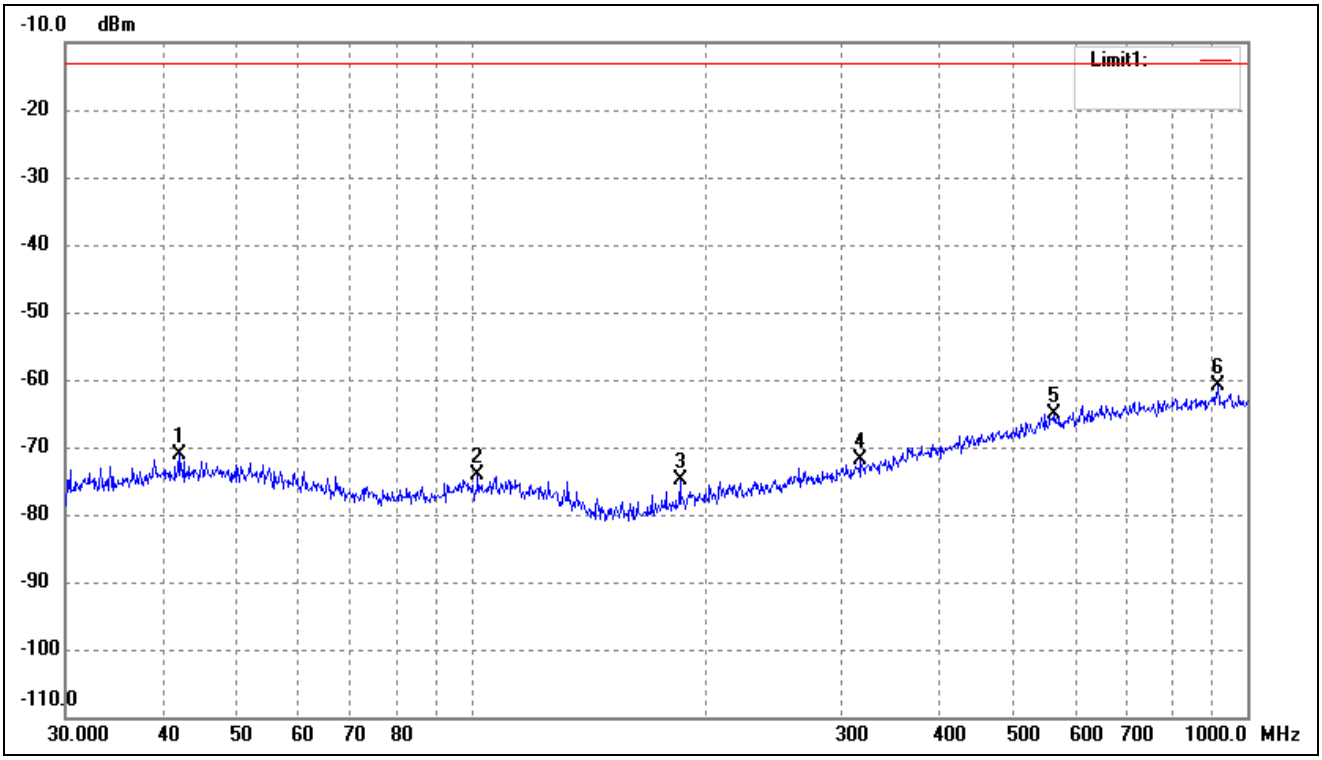
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	( )	(cm)	
1	37.5479	-76.50	4.20	-72.30	-13.00	-59.30	-	-	peak
2	62.6507	-76.33	2.91	-73.42	-13.00	-60.42	-	-	peak
3	106.3850	-76.75	2.98	-73.77	-13.00	-60.77	-	-	peak
4	272.2776	-77.10	4.09	-73.01	-13.00	-60.01	-	-	peak
5	462.3455	-77.16	9.55	-67.61	-13.00	-54.61	-	-	peak
6	714.1734	-76.31	13.32	-62.99	-13.00	-49.99	-	-	peak

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	( )	(cm)	
1	46.1780	-75.89	4.82	-71.07	-13.00	-58.07	-	-	peak
2	106.3850	-76.17	2.98	-73.19	-13.00	-60.19	-	-	peak
3	281.0075	-76.86	4.34	-72.52	-13.00	-59.52	-	-	peak
4	375.9385	-76.19	7.19	-69.00	-13.00	-56.00	-	-	peak
5	539.4775	-76.17	11.15	-65.02	-13.00	-52.02	-	-	peak
6	787.8513	-76.56	13.81	-62.75	-13.00	-49.75	-	-	peak

For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	( )	(cm)	
1	42.0066	-75.93	4.81	-71.12	-13.00	-58.12	-	-	peak
2	102.0014	-77.12	3.04	-74.08	-13.00	-61.08	-	-	peak
3	185.7882	-76.12	1.24	-74.88	-13.00	-61.88	-	-	peak
4	317.7011	-77.31	5.39	-71.92	-13.00	-58.92	-	-	peak
5	564.6389	-76.72	11.58	-65.14	-13.00	-52.14	-	-	peak
6	916.0687	-75.28	14.49	-60.79	-13.00	-47.79	-	-	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	-37.47	4.94	-32.53	-13	-19.53	H
2472.6	-44.93	8.46	-36.47	-13	-23.47	H
1648.4	-35.92	4.94	-30.98	-13	-17.98	V
2472.6	-43.74	8.46	-35.28	-13	-22.28	V
Middle Channel (836.6MHz)						
1673.2	-37.94	5.11	-32.83	-13	-19.83	H
2509.8	-43.33	8.54	-34.79	-13	-21.79	H
1673.2	-37.2	5.11	-32.09	-13	-19.09	V
2509.8	-42.12	8.54	-33.58	-13	-20.58	V
High Channel (848.8MHz)						
1697.6	-37.83	5.25	-32.58	-13	-19.58	H
2546.4	-42.3	8.57	-33.73	-13	-20.73	H
1697.6	-37.67	5.25	-32.42	-13	-19.42	V
2546.4	-41.14	8.57	-32.57	-13	-19.57	V

➢ For PCS Band_GSM1900 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
3700.4	-39.37	10.54	-28.83	-13	-15.83	H
5550.6	-49.89	13.37	-36.52	-13	-23.52	H
3700.4	-39.86	10.54	-29.32	-13	-16.32	V
5550.6	-46.1	13.37	-32.73	-13	-19.73	V
Middle Channel (1880MHz)						
3760.0	-39.61	10.64	-28.97	-13	-15.97	H
5640.0	-48.39	13.54	-34.85	-13	-21.85	H
3760.0	-42.11	10.64	-31.47	-13	-18.47	V
5640.0	-46.19	13.54	-32.65	-13	-19.65	V
High Channel (1909.8MHz)						
3819.6	-40.46	10.74	-29.72	-13	-16.72	H
5729.4	-49.87	13.71	-36.16	-13	-23.16	H
3819.6	-41.61	10.74	-30.87	-13	-17.87	V
5729.4	-47.51	13.71	-33.8	-13	-20.8	V

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

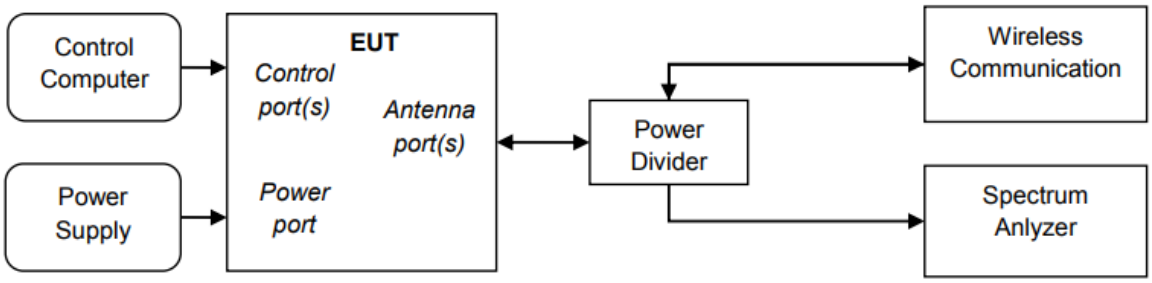
9.1 Standard Applicable

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.	WTX22X08159604W	Test Engineer	BAIdi zhong
Start date	2022/08/12	Finish date	2022/08/15
Temperature	24.6℃	Humidity	47%
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	32.76	32.86	33.03	28.16	28.11	28.13
GPRS(1Slot)	32.73	32.77	32.92	29.71	29.65	29.62

APPENDIX B

Peak-to-average Ratio (PAR) of Transmitter

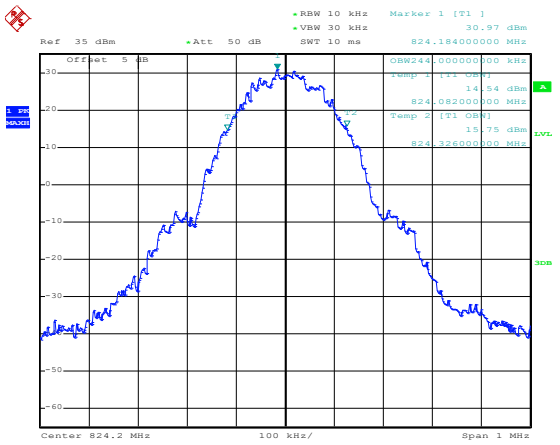
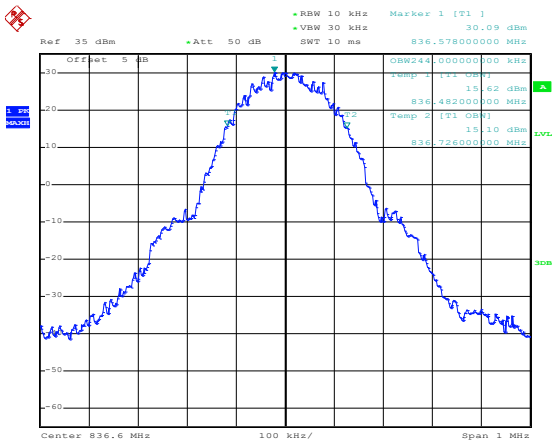
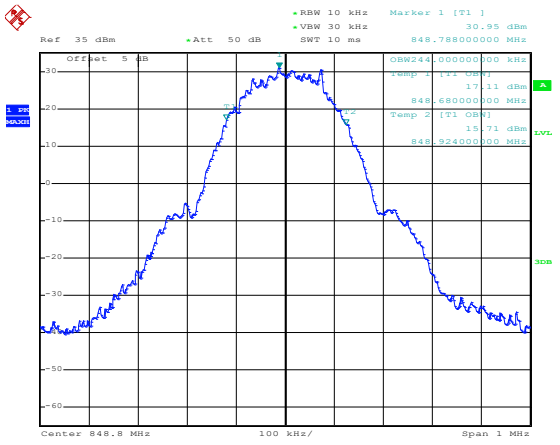
PCS1900				
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	661	1850.2	5.67	13
GPRS(1 Slot)	661	1850.2	5.81	13

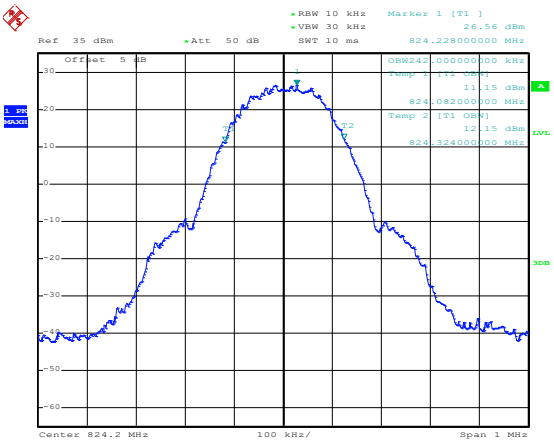
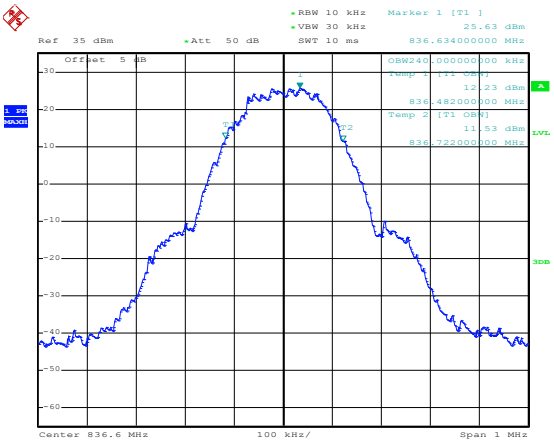
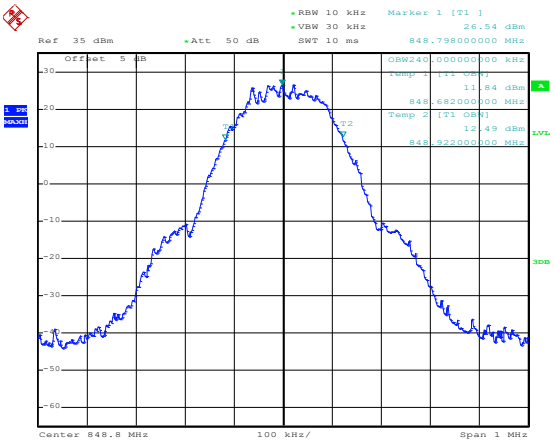
Note: Only the worst case was selected to record.

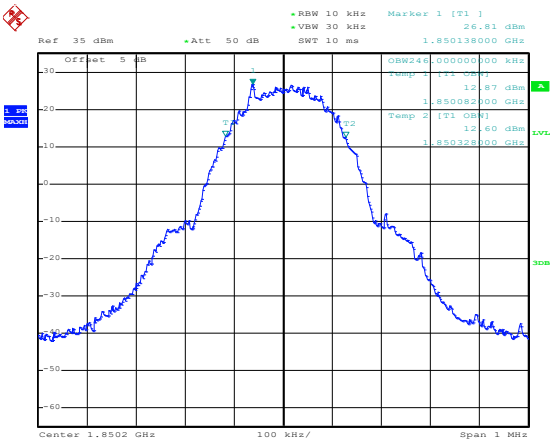
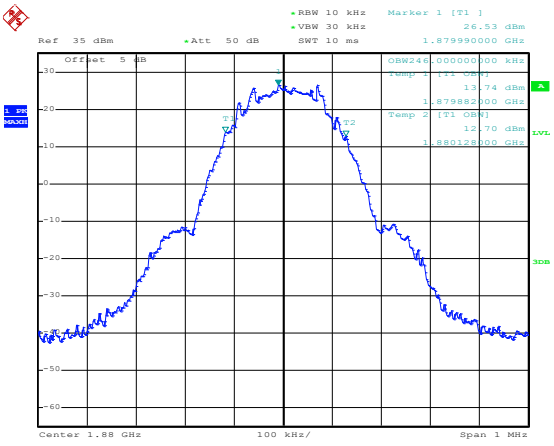
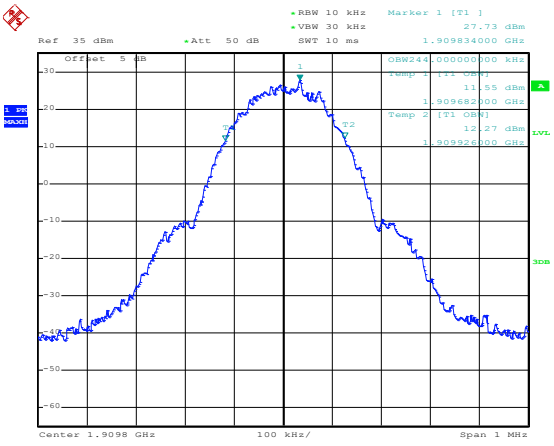
APPENDIX C

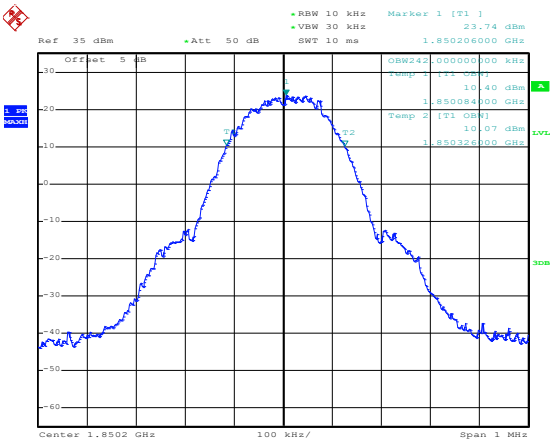
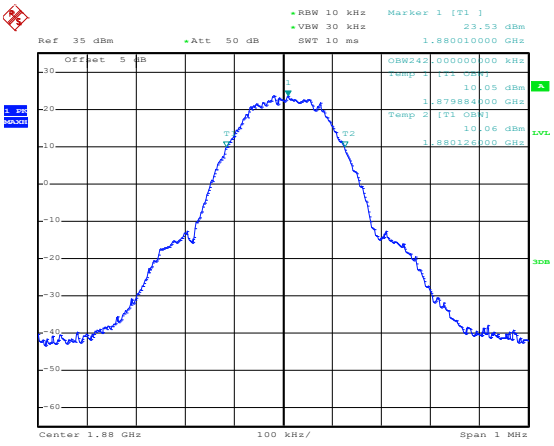
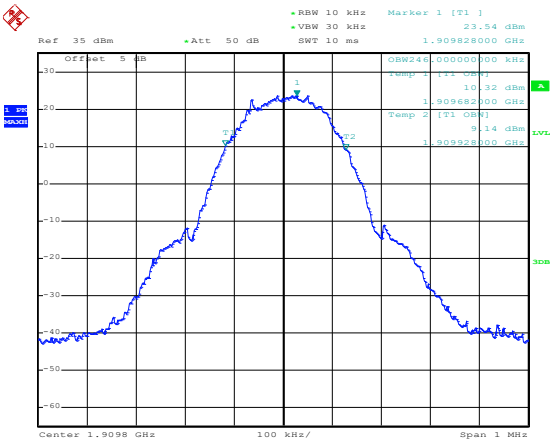
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)
GSM 850 (GMSK)	128	824.20	244.00	320.00
	190	836.60	244.00	312.00
	251	848.80	244.00	318.00
GPRS850 (GMSK,1Slot)	128	824.20	242.00	314.00
	190	836.60	240.00	322.00
	251	848.80	240.00	318.00
PCS1900 (GMSK)	512	1850.20	246.00	324.00
	661	1880.00	246.00	314.00
	810	1909.80	244.00	322.00
GPRS1900 (GMSK,1Slot)	512	1850.20	242.00	322.00
	661	1880.00	242.00	320.00
	810	1909.80	246.00	320.00

99% Occupy bandwidth

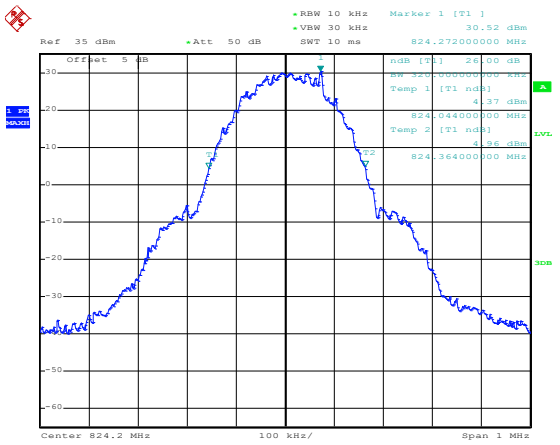
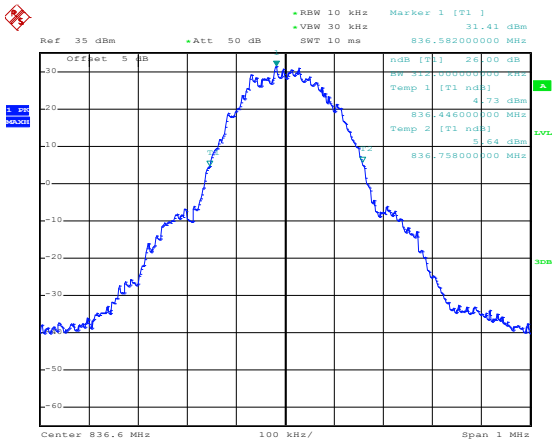
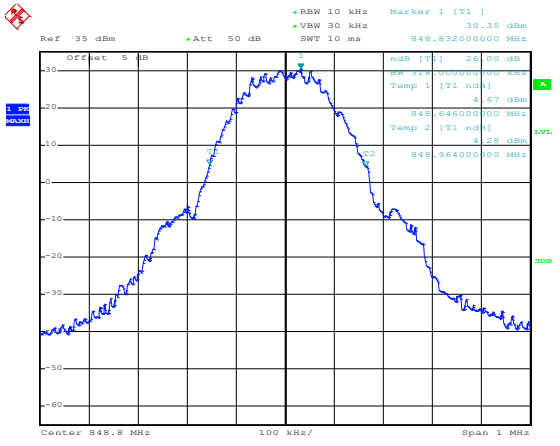
GSM 850 (GMSK)-Low	
GSM 850 (GMSK)-Middle	
GSM 850 (GMSK)-High	

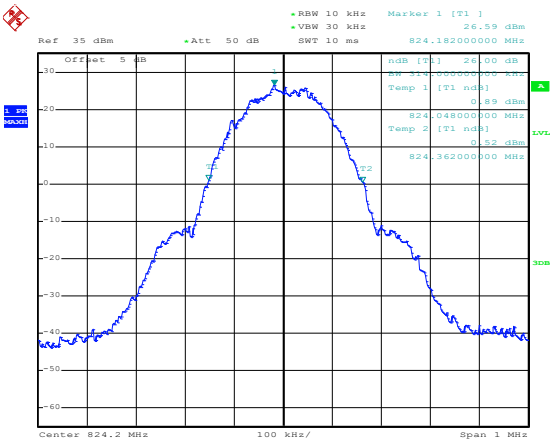
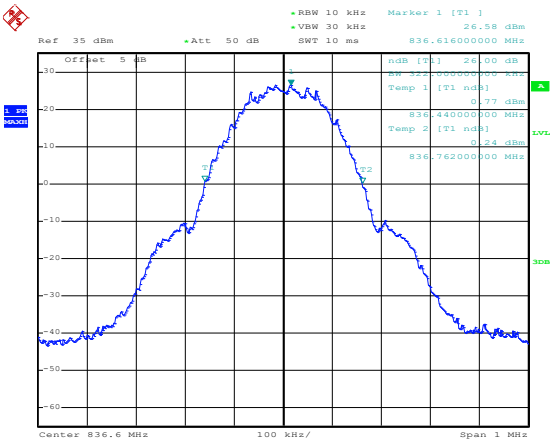
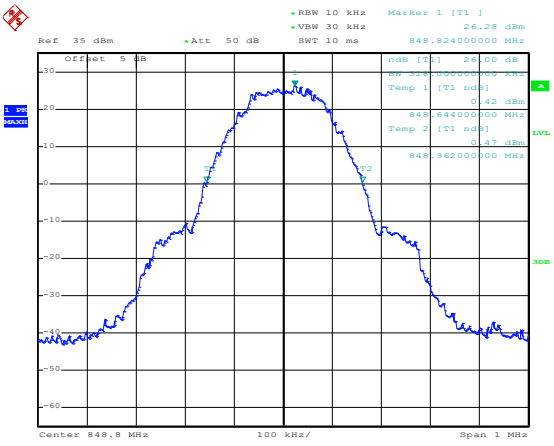
GPRS850 (GMSK,1Slot)-Low	 Date: 12.AUG.2022 16:08:54
GPRS850 (GMSK,1Slot)-Middle	 Date: 12.AUG.2022 16:09:15
GPRS850 (GMSK,1Slot)-High	 Date: 12.AUG.2022 16:09:40

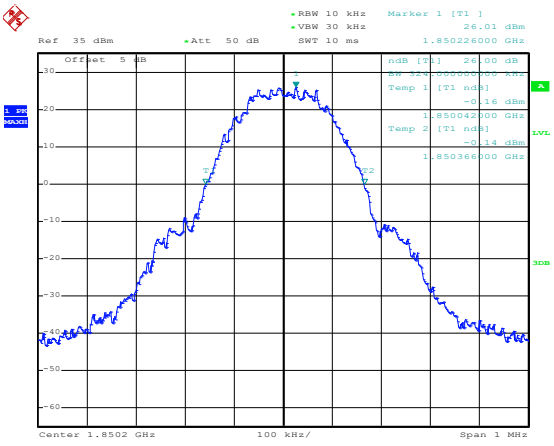
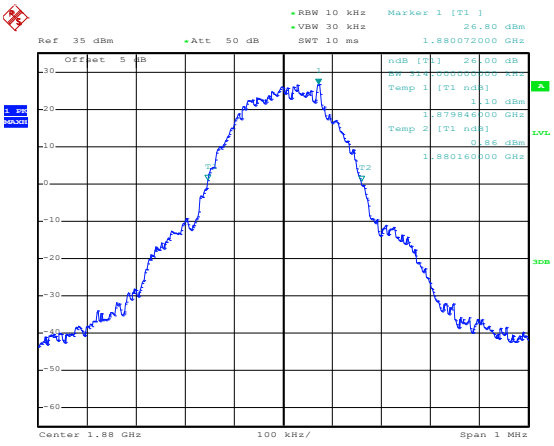
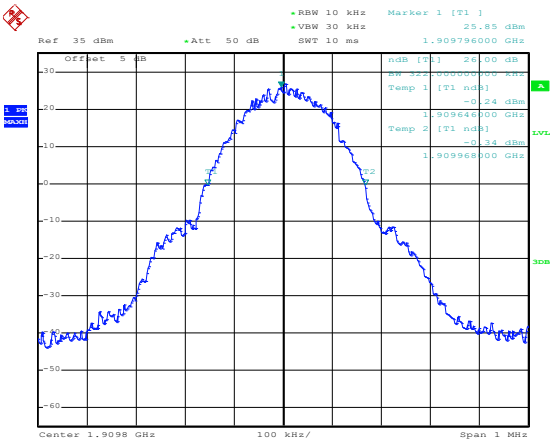
PCS1900 (GMSK)-Low	 Date: 12.AUG.2022 16:24:48
PCS1900 (GMSK)-Middle	 Date: 12.AUG.2022 16:25:18
PCS1900 (GMSK)-High	 Date: 12.AUG.2022 16:26:18

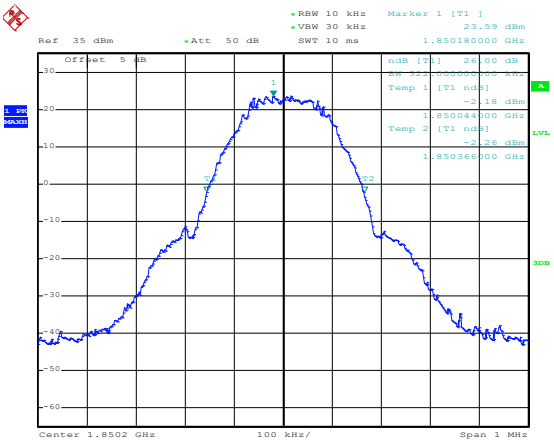
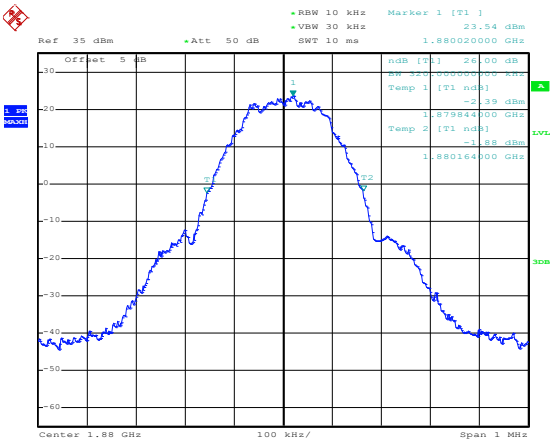
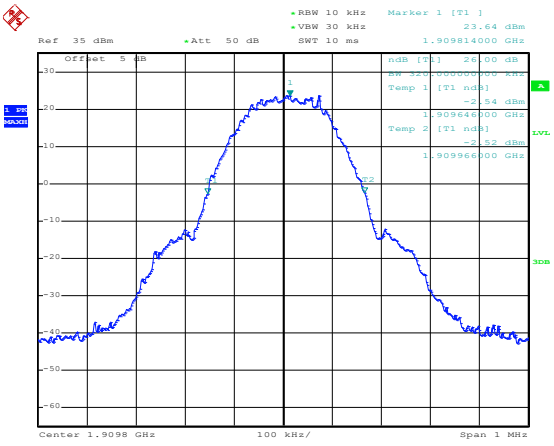
GPRS1900 (GMSK,1Slot)-Low	 Date: 12.AUG.2022 16:46:26
GPRS1900 (GMSK,1Slot)-Middle	 Date: 12.AUG.2022 16:47:16
GPRS1900 (GMSK,1Slot)-High	 Date: 12.AUG.2022 16:48:18

-26dB bandwidth

GSM 850 (GMSK)-Low	
GSM 850 (GMSK)-Middle	
GSM 850 (GMSK)-High	

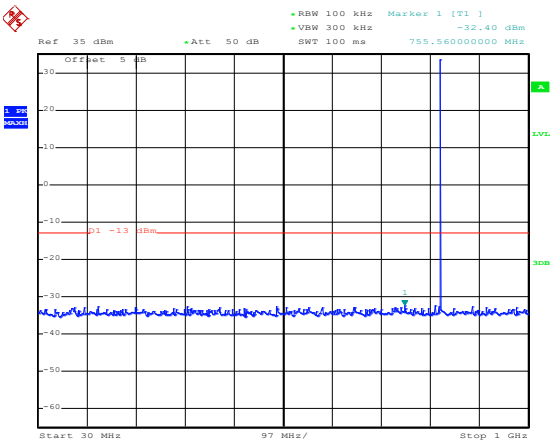
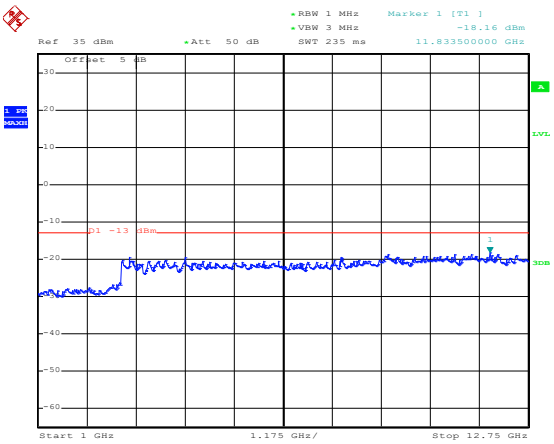
GPRS850 (GMSK,1Slot)-Low	 Date: 12.AUG.2022 16:11:10
GPRS850 (GMSK,1Slot)-Middle	 Date: 12.AUG.2022 16:11:42
GPRS850 (GMSK,1Slot)-High	 Date: 12.AUG.2022 16:12:24

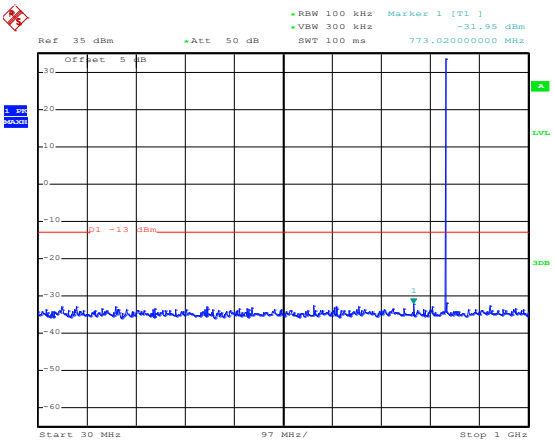
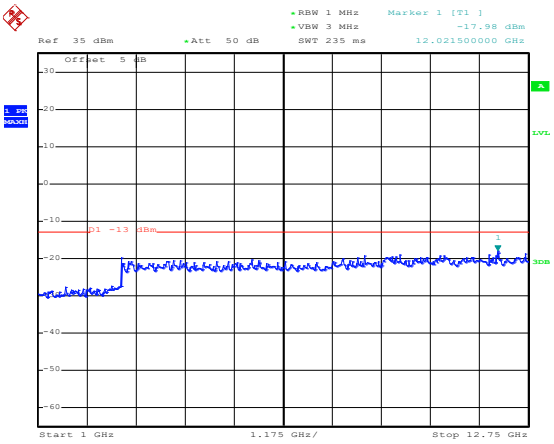
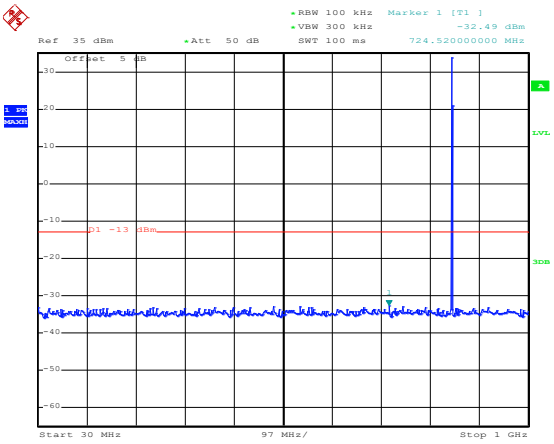
PCS1900 (GMSK)-Low	 Date: 12.AUG.2022 16:28:13
PCS1900 (GMSK)-Middle	 Date: 12.AUG.2022 16:28:38
PCS1900 (GMSK)-High	 Date: 12.AUG.2022 16:29:04

GPRS1900 (GMSK,1Slot)-Low	 Date: 12.AUG.2022 16:49:32
GPRS1900 (GMSK,1Slot)-Middle	 Date: 12.AUG.2022 16:49:57
GPRS1900 (GMSK,1Slot)-High	 Date: 12.AUG.2022 16:51:07

APPENDIX D

Out of Band Emissions at Antenna Terminal

GSM 850 (GMSK)-Low	
	

GSM 850 (GMSK)-Middle	 Date: 12.AUG.2022 15:58:44
	 Date: 12.AUG.2022 15:58:59
GSM 850 (GMSK)-High	 Date: 12.AUG.2022 15:59:44

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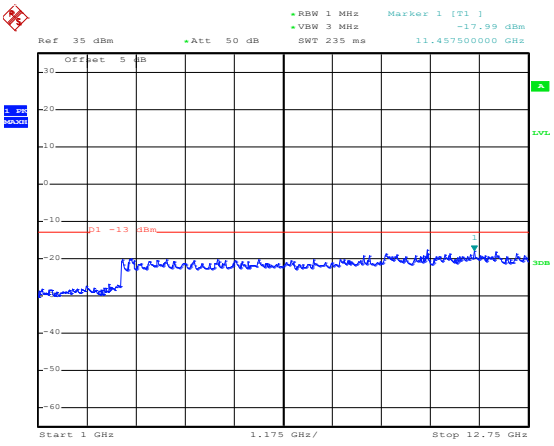
<tr><td></td><td> 

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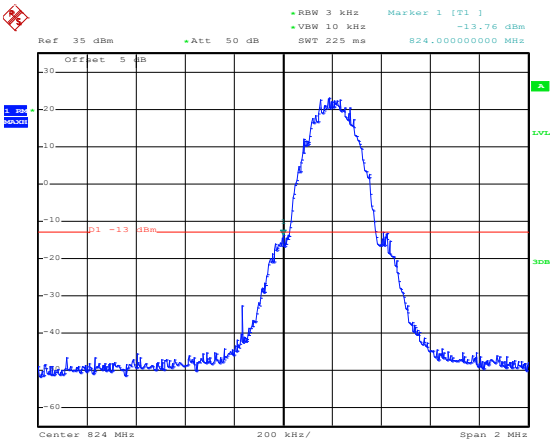
<tr><td rowspan="2">Bandedge</td><td> 

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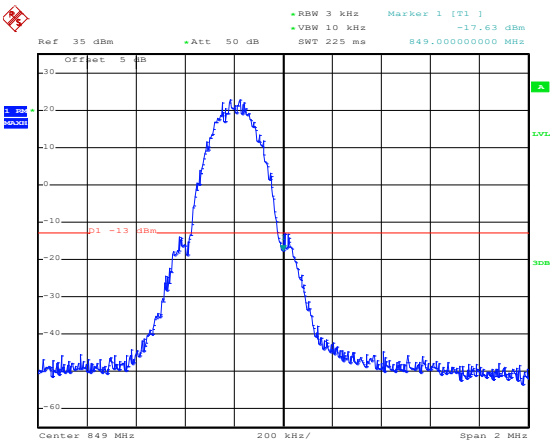
<tr><td> 

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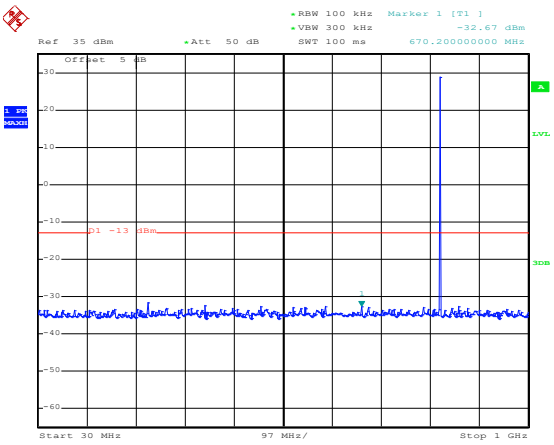
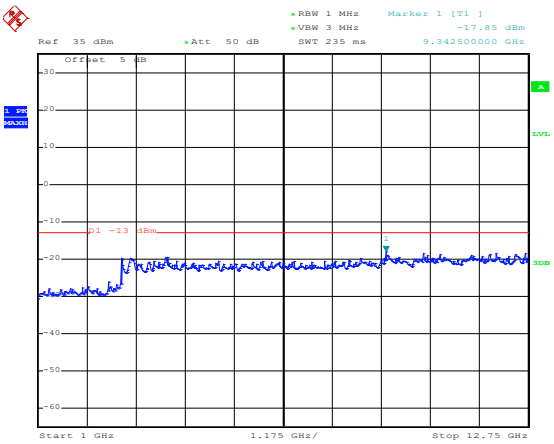
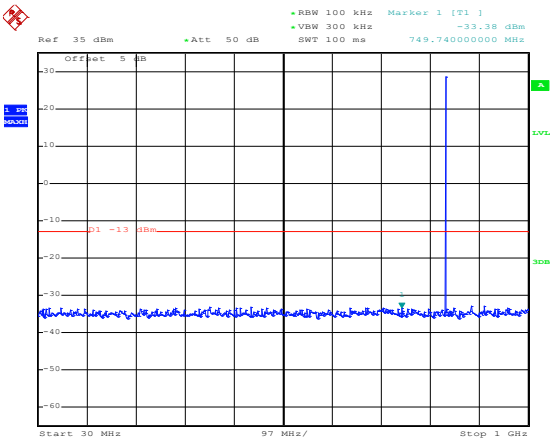
GPRS850 (GMSK,1Slot)-Low	 Date: 12.AUG.2022 16:13:33
	 Date: 12.AUG.2022 16:13:55
GPRS850 (GMSK,1Slot)-Middle	 Date: 12.AUG.2022 16:14:20

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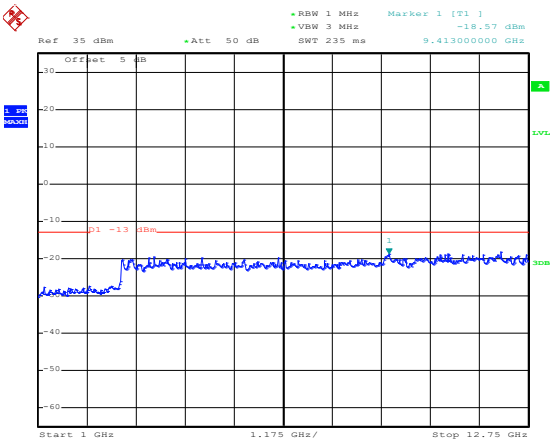
<tr><td></td><td> 

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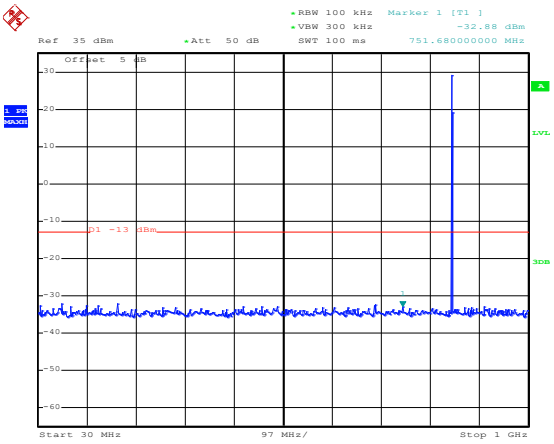
(GMSK)-High</td><td> 

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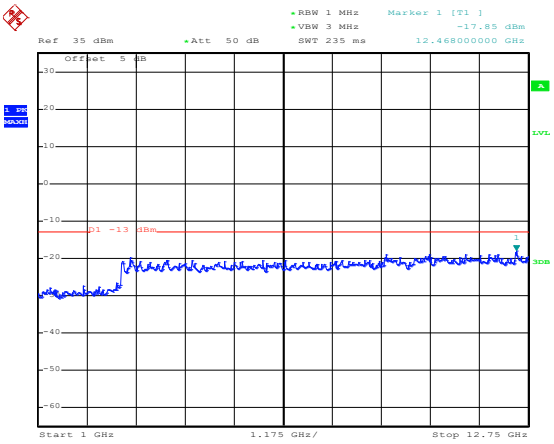
<tr><td> 

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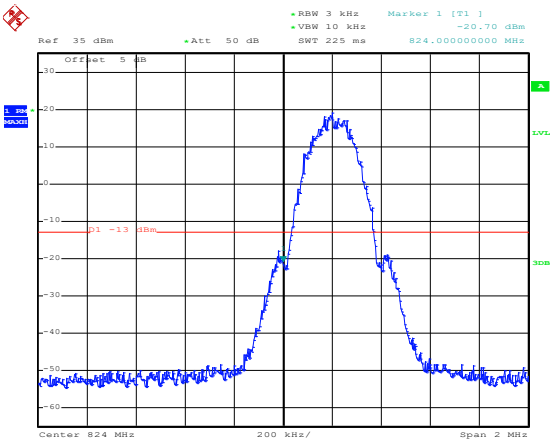
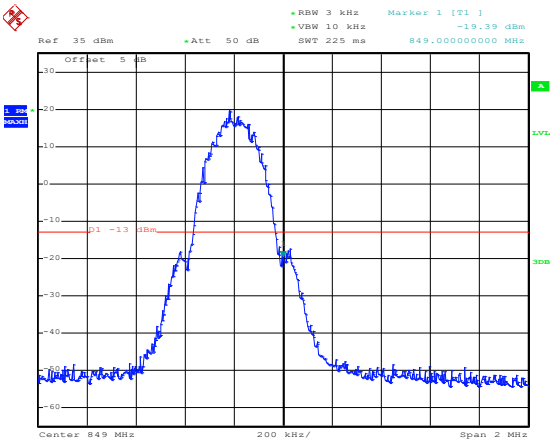
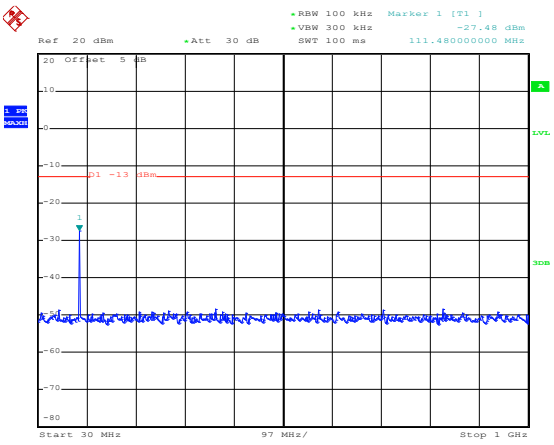
Bandedge	 
PCS1900 (GMSK)-Low	

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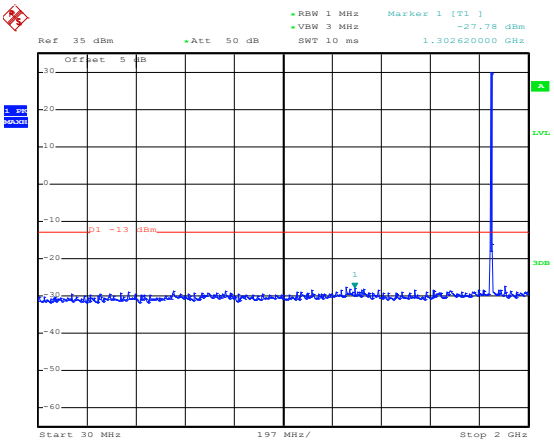
<tr><td></td><td> 

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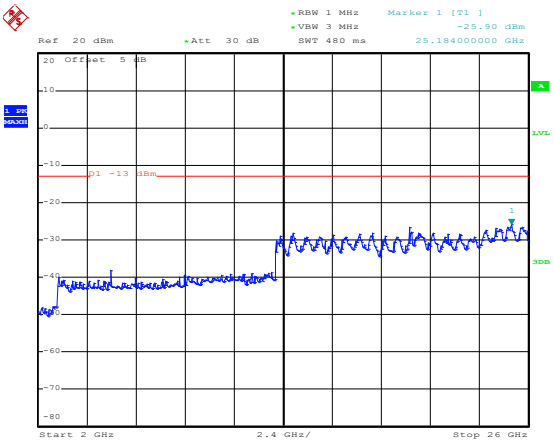
<tr><td></td><td> 

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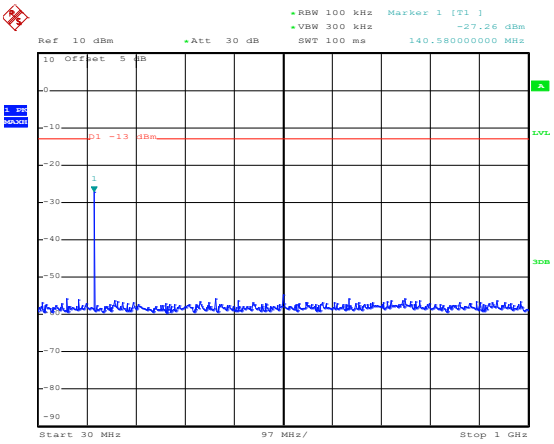
(GMSK)-Middle</td><td> 

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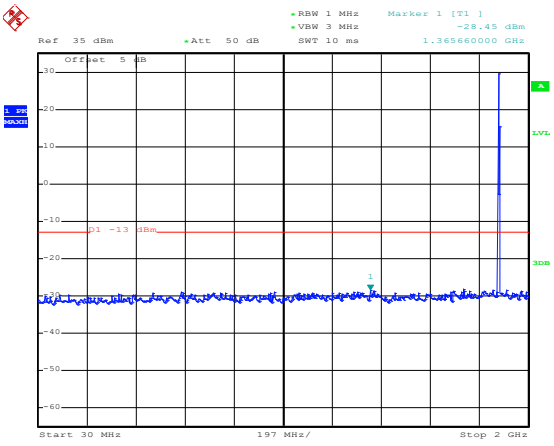
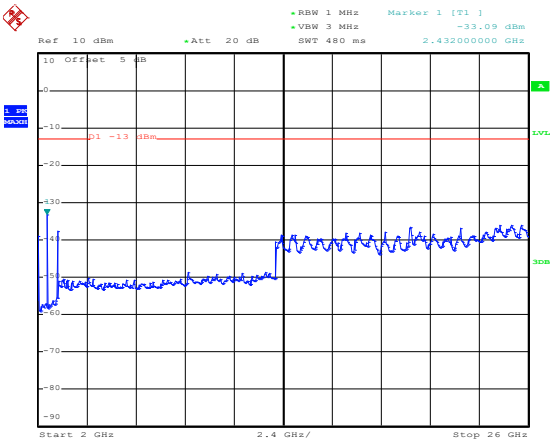
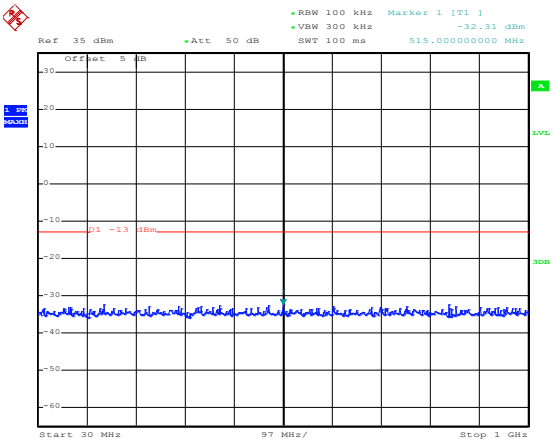
	 Date: 12.AUG.2022 16:36:54
	 Date: 12.AUG.2022 16:37:17
PCS1900 (GMSK)-High	 Date: 12.AUG.2022 16:31:33

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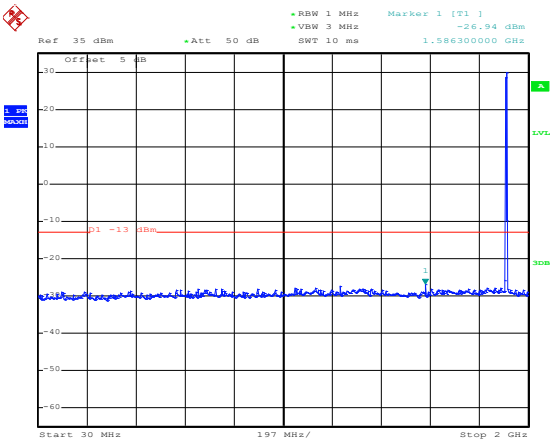
<tr><td></td><td> 

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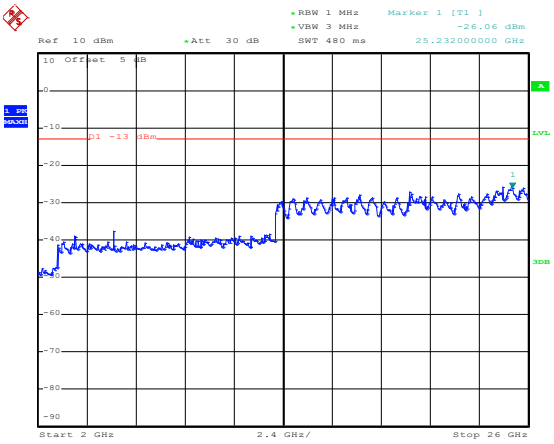
<tr><td></td><td> 

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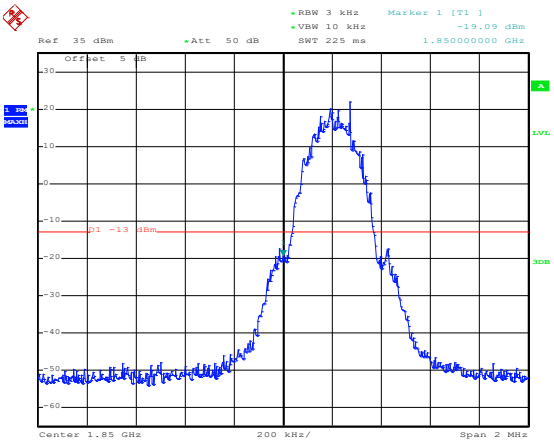
<tr><td>Bandedge</td><td> 

Date: 12.AUG.2022 16:42:17</td></tr>
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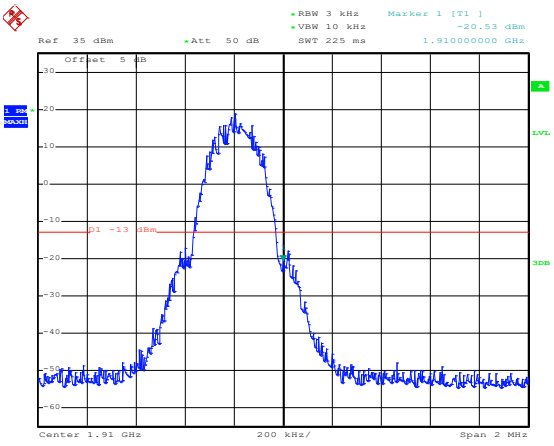
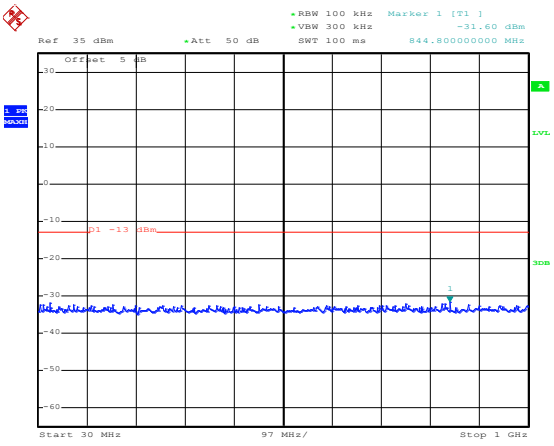
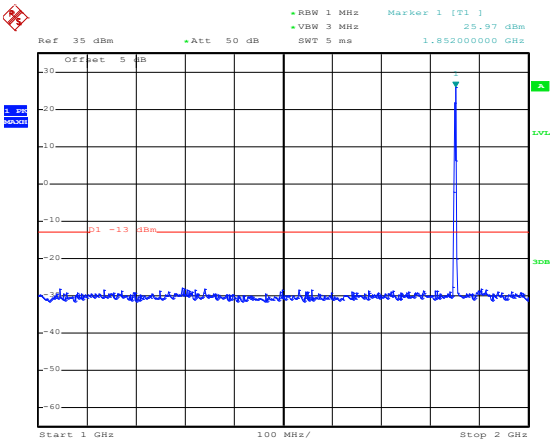
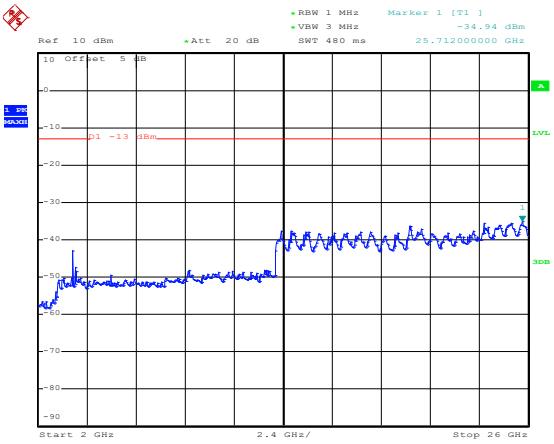
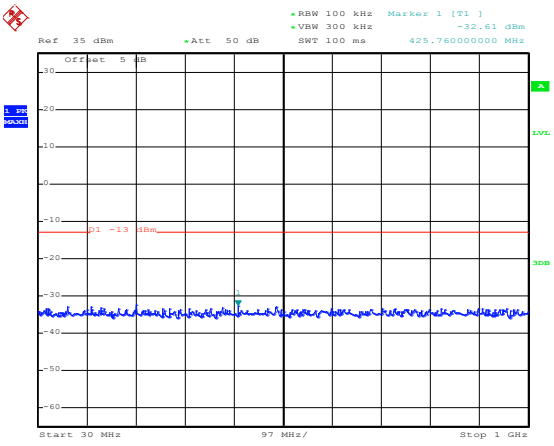
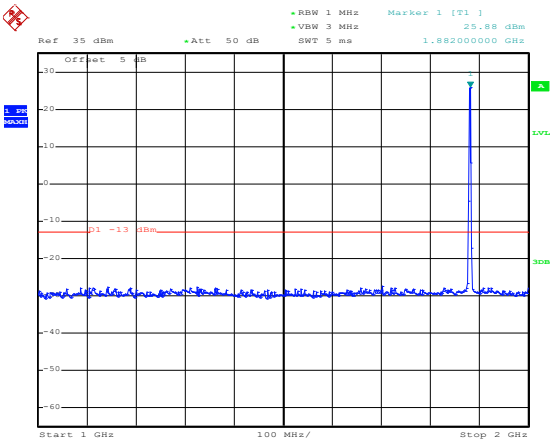
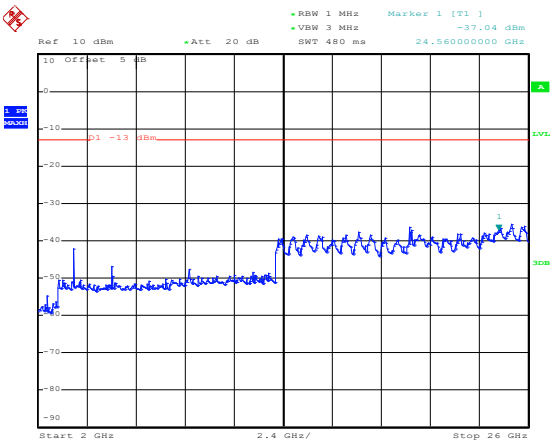
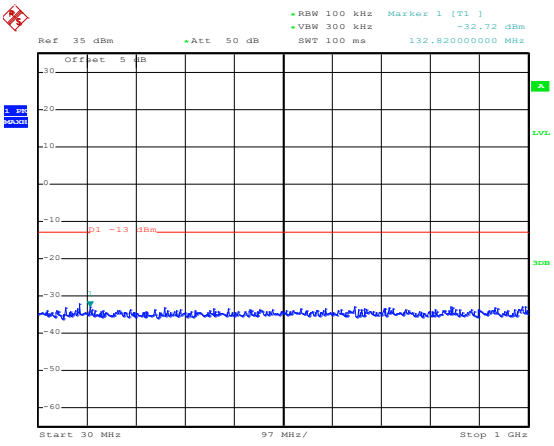
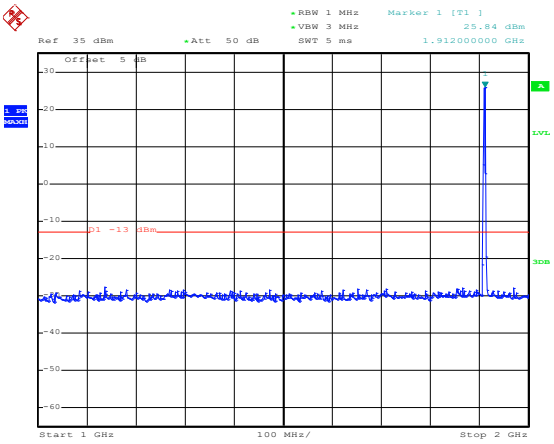
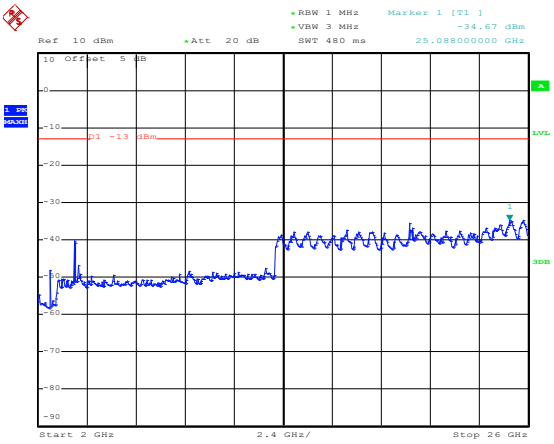
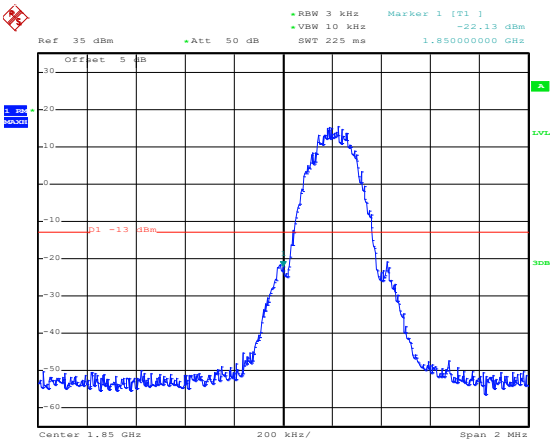
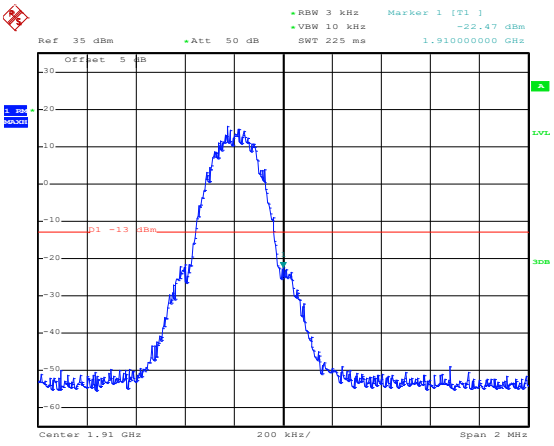
	 RBW 3 kHz VBW 10 kHz SWT 225 ms Marker 1 [T1] -20.53 dBm 1.910000000 GHz Ref 35 dBm Att 50 dB Offset 5 dB D1 -13 dBm Center 1.91 GHz 200 kHz/ Span 2 MHz A LVL 3DB Date: 12.AUG.2022 16:42:41

GPRS1900 (GMSK,1Slot)-Low	 Date: 12.AUG.2022 16:53:42
	 Date: 12.AUG.2022 16:53:54
	 Date: 12.AUG.2022 16:54:39

GPRS1900 (GMSK,1Slot)-Middle	 Date: 12.AUG.2022 16:56:09
	 Date: 12.AUG.2022 16:56:55
	 Date: 12.AUG.2022 16:57:29

GPRS1900 (GMSK,1Slot)-High	 Date: 12.AUG.2022 16:58:17
	 Date: 12.AUG.2022 16:59:06
	 Date: 12.AUG.2022 16:59:48

Bandedge	 RBW 3 kHz VBW 10 kHz SWT 225 ms Marker 1 [T1] -22.13 dBm 1.850000000 GHz Ref 35 dBm Att 50 dB Offset 5 dB D1 -13 dBm Center 1.85 GHz 200 kHz/ Span 2 MHz Date: 12.AUG.2022 16:44:39  RBW 3 kHz VBW 10 kHz SWT 225 ms Marker 1 [T1] -22.47 dBm 1.910000000 GHz Ref 35 dBm Att 50 dB Offset 5 dB D1 -13 dBm Center 1.91 GHz 200 kHz/ Span 2 MHz Date: 12.AUG.2022 16:44:56

APPENDIX E

Frequency Stability

Note: 1. Worst case at GSM850/PCS1900 middle channel
2. Normal Voltage NV=DC3.7V; Low Voltage LV=DC3.5V;High Voltage HV=DC4.2V

- Frequency stability V.S. Temperature measurement

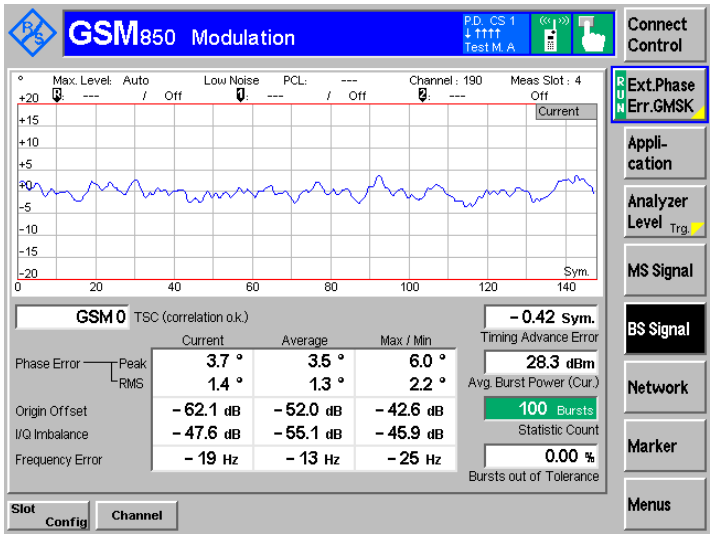
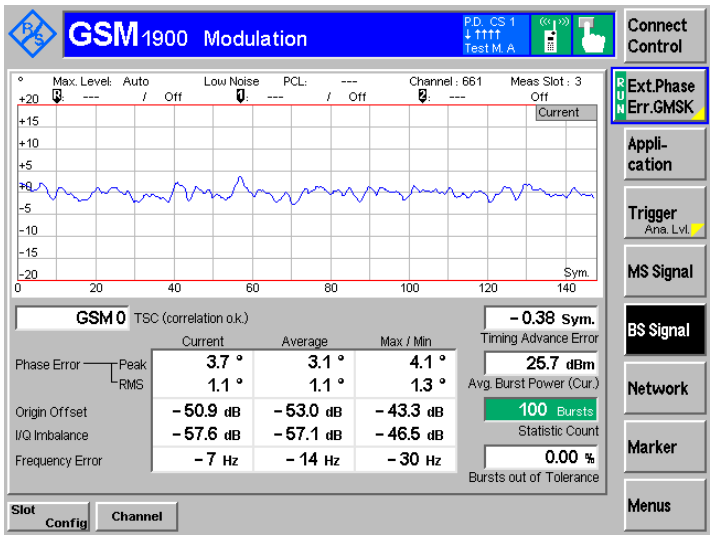
Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	52	0.0616	2.50	Pass
	-20	48	0.0570		
	-10	41	0.0487		
	0	37	0.0441		
	10	33	0.0395		
	20	27	0.0322		
	30	34	0.0405		
	40	38	0.0460		
	50	42	0.0506		
Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
NV	-30	64	0.0340	2.50	Pass
	-20	50	0.0266		
	-10	42	0.0225		
	0	35	0.0184		
	10	30	0.0160		
	20	26	0.0139		
	30	31	0.0164		
	40	35	0.0184		
	50	39	0.0209		

- 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	23	0.0276	2.50	Pass
	NV	18	0.0211		
	LV	30	0.0359		
Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	HV	42	0.0221	2.50	Pass
	NV	27	0.0143		
	LV	34	0.0180		

APPENDIX F

Modulation characteristics

GSM850-GMSK	
GSM1900-GMSK	

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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