



Report No.: SZEM190101023906

Page: 1 of 55

TEST REPORT

Application No.: SZEM1901010239CR
Applicant: Hytera Communications Corporation Limited
Address of Applicant: Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, People's Republic of China
Manufacturer: Hytera Communications Corporation Limited
Address of Manufacturer: Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, People's Republic of China
Equipment Under Test (EUT):
EUT Name: Multi-mode Advanced Radio
Model No.: PTC680 FxB1
Trade mark: Hytera
FCC ID: YAMPTC680FXB1
Standard(s) : 47 CFR Part 2
47 CFR Part 22 subpart H
47 CFR Part 24 subpart E
Date of Receipt: 2019-01-09
Date of Test: 2019-01-10 to 2019-02-18
Date of Issue: 2019-03-06

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-03-06		Original

Authorized for issue by:			
			
		Edison Li /Project Engineer	
			
		Eric Fu /Reviewer	



2 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913, §24.232	ERP≤7W(GSM850, CDMA BC0) EIRP≤2W(GSM1900)	PASS
Peak-Average Ratio	§24.232	≤13dB	PASS
Modulation Characteristics	§2.1047	Digital modulation	PASS
Bandwidth	§2.1049(h)	OBW: No limit EBW: No limit	PASS
Band Edge Compliance	§2.1051, §22.917, §24.238	≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	PASS
Spurious emissions at antenna terminals	§2.1051, §22.917, §24.238	≤ -13dBm	PASS
Field strength of spurious radiation	§2.1051, §22.917, §24.238	≤ -13dBm	PASS
Frequency stability	§2.1055, §22.355, §24.235	≤ ±2.5ppm	PASS



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4 General Information

4.1 Details of E.U.T.

Power supply:	Switching Power Supply Model: S024AZM1200200 Input: AC 100-240V, 50/60Hz, 600mA Output: DC 12V, 2000mA DC 7.7V, 2400mAh rechargeable battery which charged by Cradle charger
Sample Type:	Portable production
Support Network:	GSM, GPRS, EGPRS, CDMA
Operation Frequency Band:	GSM850/GSM1900; CDMA BC0
Modulation Type:	GMSK for GSM/GPRS/EGPRS; 8PSK for EGPRS; QPSK for CDMA BC0 1xRTT/ CDMA BC0 1xEV-DO;
Supported Channel Bandwidth:	200KHz for GSM; 1.25MHz for CDMA;
GPRS Class:	12
EGPRS Class:	12
Designation of Emissions	GSM850: 246KGXW, EGPRS850: 249KG7W GSM1900: 250KGXW, EGPRS1900: 246KG7W CDMA BC0: 1M28F9W
Antenna Type:	PIFA
Antenna Gain:	GSM/CDMA: 0dBi
SIM Card:	This device has dual SIM Card sockets. Both SIM Card have been tested. SIM1 was worst case, only record SIM1.
Extreme temp. Tolerance:	-30°C to +50°C
Extreme vol. Limits:	6.54VDC to 8.85VDC (nominal: 7.7VDC)

4.2 Test Frequency

Test mode:	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 190	Channel 251
		824.2MHz	836.6 MHz	848.8 MHz
	RX	Channel 128	Channel 190	Channel 251
		869.2 MHz	881.6 MHz	893.8 MHz
Test mode:	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0 MHz	1909.8 MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz
Test mode:	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
CDMA BC0	TX	Channel 1013	Channel 384	Channel 777
		824.7 MHz	836.52 MHz	848.31 MHz
	RX	Channel 1013	Channel 384	Channel 777
		869.7 MHz	881.52 MHz	893.31 MHz

4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1015Pa	
Temperature:	TN	25 °C
Voltage:	VL	6.54 V
	VN	7.7 V
	VH	8.85 V

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

4.4 Description of Support Units

The EUT has been tested independent unit.

4.5 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25×10^{-8}
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (Below 1GHz)
		4.8dB (Above 1GHz)
9	Temperature test	1 °C
10	Humidity test	3%
11	Supply voltages	1.5%
12	Time	3%

4.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None



5 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
DC Power Supply	ZhaoXin	PS-3005D	SEM011-05	2018-09-25	2019-09-24
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2018-04-13	2019-04-12
Signal Analyzer (10Hz-40GHz)	Rohde & Schwarz	FSV40	SEM008-04	2018-04-02	2019-04-01
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2018-04-02	2019-04-01
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	SEM010-02	2018-04-02	2019-04-01

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
EXA Signal Analyzer (10Hz-44GHz)	Agilent Technologies Inc	N9010A	SEM004-12	2018-04-13	2019-04-12
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2018-09-25	2019-09-24
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-11-12	2019-11-11
Pre-amplifier (26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018-04-02	2019-04-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018-07-12	2019-07-11



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Substitution Antenna	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Signal Generator	R&S	SMA100A	102174	2018-07-12	2019-07-11

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11
Substitution Antenna	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Signal Generator	R&S	SMA100A	102174	2018-07-12	2019-07-11

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2017-09-29	2018-09-28
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2017-09-29	2018-09-28
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2017-09-29	2018-09-28
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-17



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6 Radio Spectrum Matter Test Results

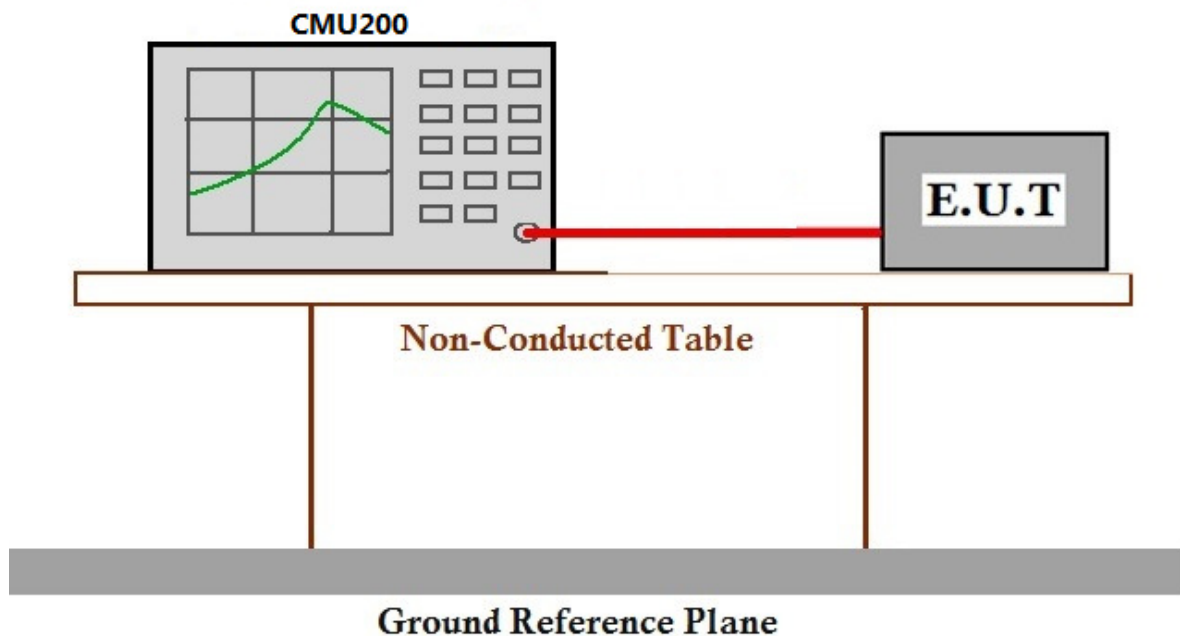
6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §22.913, §24.232
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: ERP≤7W(GSM850, CDMA BC0)
EIRP ≤ 2 W(GSM1900)

6.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data



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Test band: GSM850										
Conducted output power(dBm)					Antenna gain (dBd)	Antenna gain (dBi)	FCC: ERP(dBm)			Limit (dBm)
Channel		128	190	251			128	190	251	
GSM(GMSK)	GSM	31.14	31.25	31.13	-2.15	0	28.99	29.1	28.98	38.45
GPRS/EGPRS (GMSK)	1 TX Slot	31.29	31.22	31.19	-2.15	0	29.14	29.07	29.04	38.45
	2 TX Slots	29.79	29.78	29.74	-2.15	0	27.64	27.63	27.59	38.45
	3 TX Slots	27.73	27.82	27.95	-2.15	0	25.58	25.67	25.8	38.45
	4 TX Slots	25.67	25.92	25.94	-2.15	0	23.52	23.77	23.79	38.45
EGPRS(8PSK)	1 TX Slot	24.50	24.72	24.54	-2.15	0	22.35	22.57	22.39	38.45
	2 TX Slots	23.51	23.58	23.64	-2.15	0	21.36	21.43	21.49	38.45
	3 TX Slots	21.80	21.96	21.97	-2.15	0	19.65	19.81	19.82	38.45
	4 TX Slots	20.86	21.05	20.98	-2.15	0	18.71	18.9	18.83	38.45

Note:

- 1) dBd= dBi-2.15
- 2) ERP= Conducted output power+Antenna gain (dBd)
- 3) EIRP= Conducted output power+Antenna gain (dBi)

Test band: GSM1900									
Conducted output power(dBm)					Antenna gain (dBi)	FCC: EIRP(dBm)			Limit (dBm)
Channel		512	661	810		512	661	810	
GSM(GMSK)	GSM	31.82	31.59	31.06	0	31.82	31.59	31.06	33
GPRS/EGPRS (GMSK)	1 TX Slot	31.93	31.61	31.22	0	31.93	31.61	31.22	33
	2 TX Slots	30.78	30.51	30.25	0	30.78	30.51	30.25	33
	3 TX Slots	28.50	28.58	28.48	0	28.50	28.58	28.48	33
	4 TX Slots	27.01	27.10	27.11	0	27.01	27.10	27.11	33
EGPRS(8PSK)	1 TX Slot	27.02	27.09	27.09	0	27.02	27.09	27.09	33
	2 TX Slots	26.02	25.96	26.05	0	26.02	25.96	26.05	33
	3 TX Slots	24.25	24.34	24.47	0	24.25	24.34	24.47	33
	4 TX Slots	22.76	22.84	23.02	0	22.76	22.84	23.02	33

Note:

- 1) EIRP= Conducted output power+Antenna gain (dBi)



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Test band: CDMA BC0									
Conducted output power(dBm)				Antenna gain (dBd)	Antenna gain (dBi)	FCC: ERP(dBm)			Limit (dBm)
Channel	1013	384	777			1013	384	777	
1XRTT RC1 SO55	23.60	24.20	23.97	-2.15	0	21.45	22.05	21.82	38.45
1XRTT RC3 SO55	23.75	24.17	23.96	-2.15	0	21.6	22.02	21.81	38.45
1XRTT RC3 SO55 (+ F-SCH)	23.71	24.16	23.92	-2.15	0	21.56	22.01	21.77	38.45
1XRTT RC3 SO55 (+ SCH)	23.59	24.26	23.95	-2.15	0	21.44	22.11	21.8	38.45
1XEVD0 RTAP 153.6Kbps	23.73	24.17	23.95	-2.15	0	21.58	22.02	21.8	38.45
1XEVD0 RTAP 4096Bits	23.59	24.13	23.93	-2.15	0	21.44	21.98	21.78	38.45

Note:

- 1) dBd= dBi-2.15
- 2) ERP= Conducted output power+Antenna gain (dBd)
- 3) EIRP= Conducted output power+Antenna gain (dBi)



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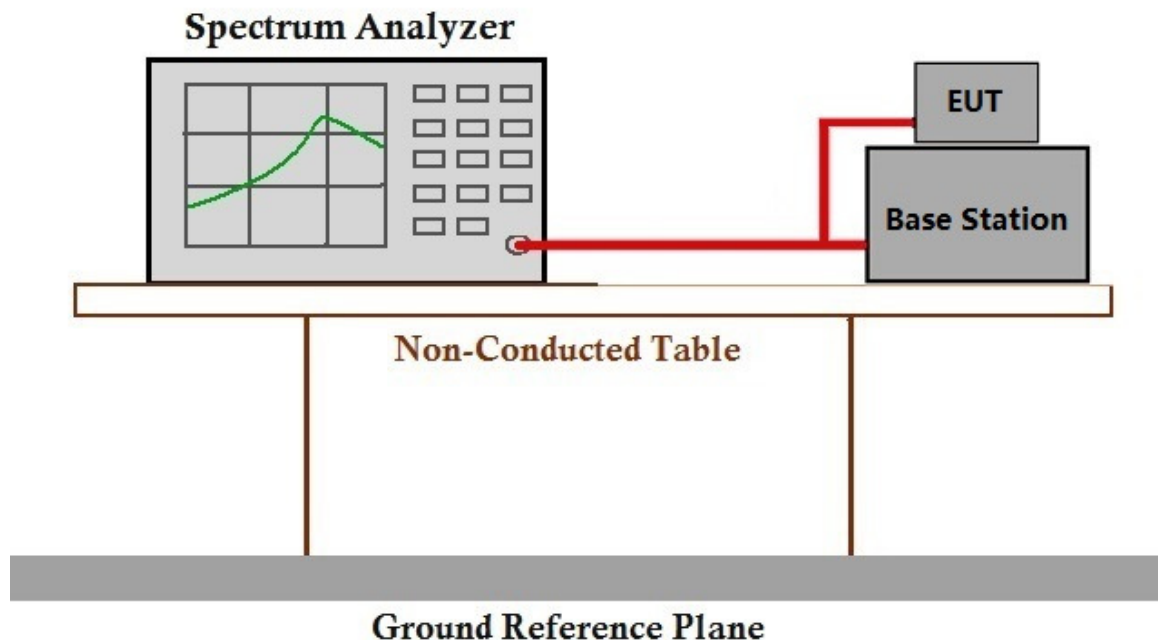
6.2 Peak-Average Ratio

Test Requirement: §24.232
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: ≤13dB

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

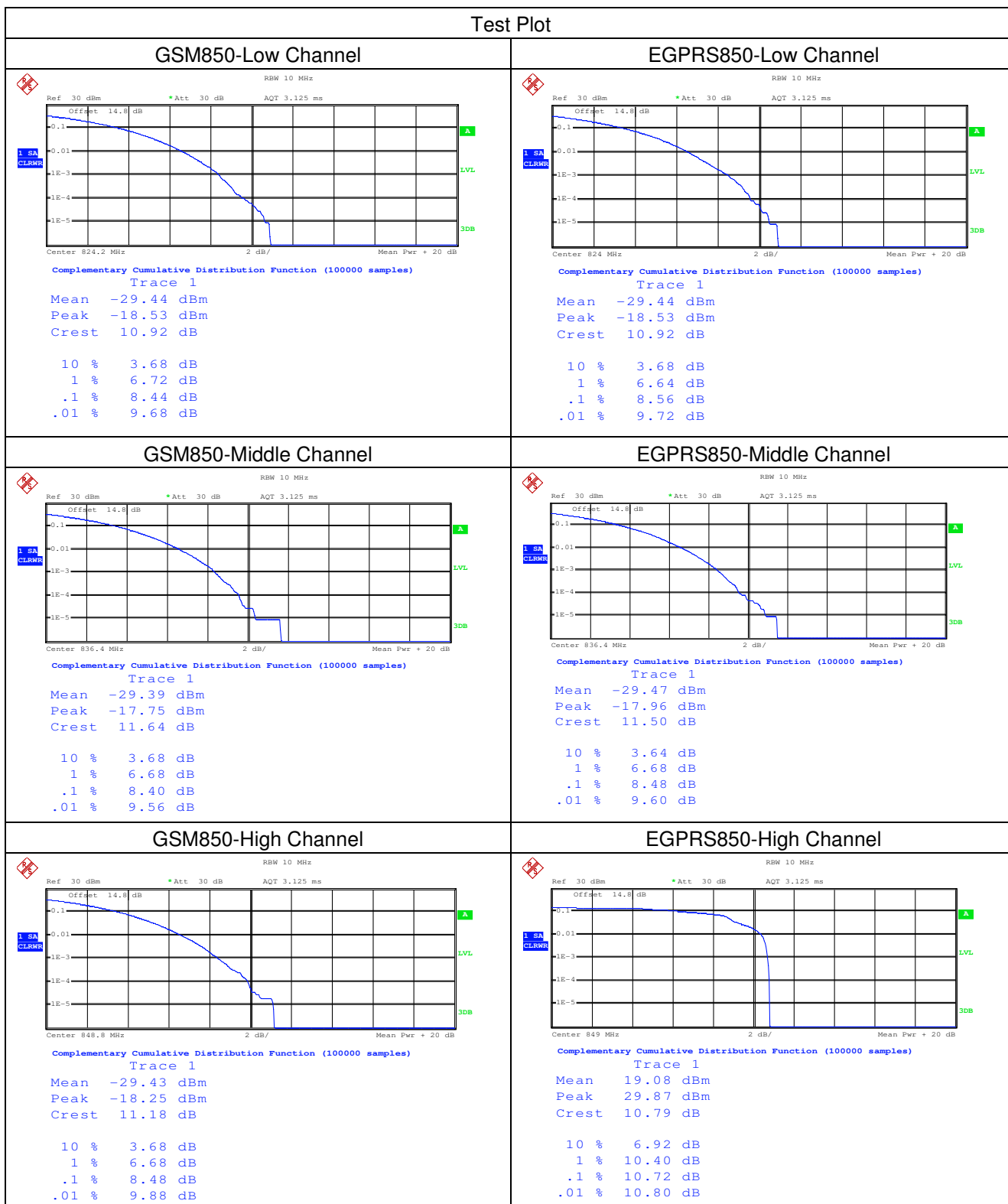
6.2.2 Test Setup Diagram

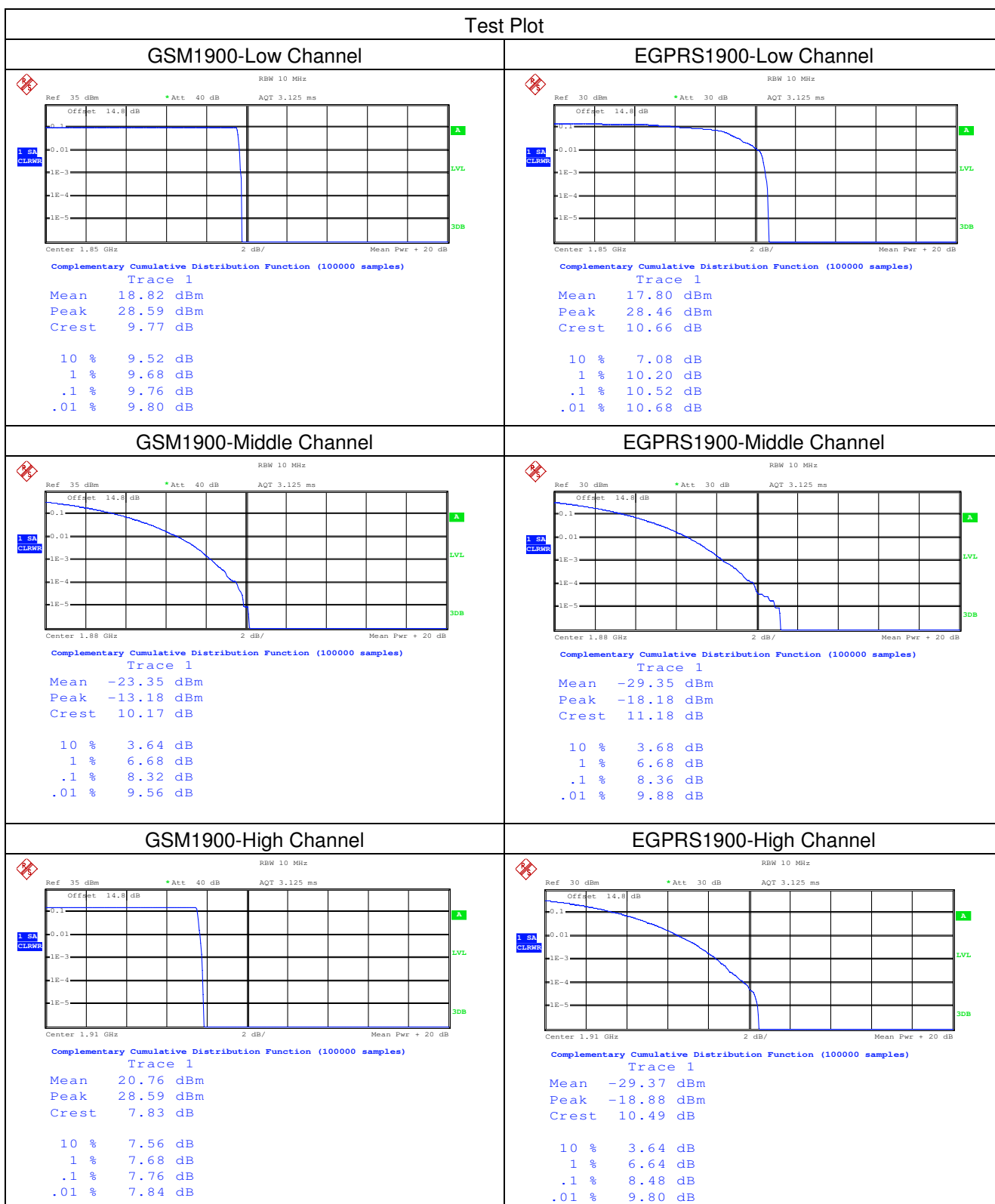


6.2.3 Measurement Data

Test mode:	Test Band	Test result (dB)			Limit (dB)	Verdict
		LCH	MCH	HCH		
GSM	GSM850	8.44	8.40	8.48	13	Pass
	EGPRS850	8.56	8.48	10.72	13	Pass
	GSM1900	9.76	8.32	7.76	13	Pass
	EGPRS1900	10.52	8.36	8.48	13	Pass
CDMA	CDMA BC0	4.20	3.36	3.20	13	Pass

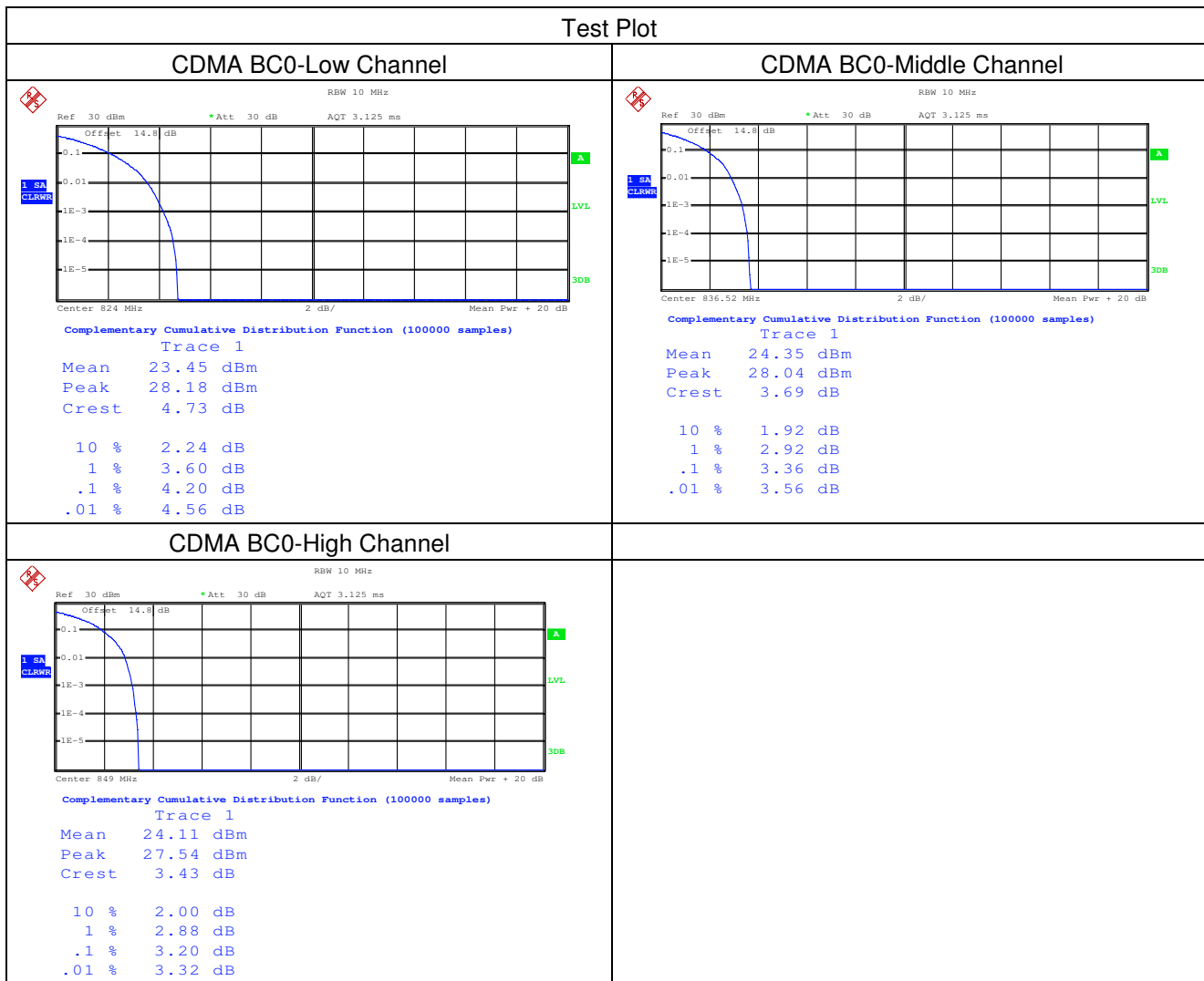
Note: All modes have been tested and we found CDMA 1xRTT Test mode has the worst test result. Only record the worst test result.





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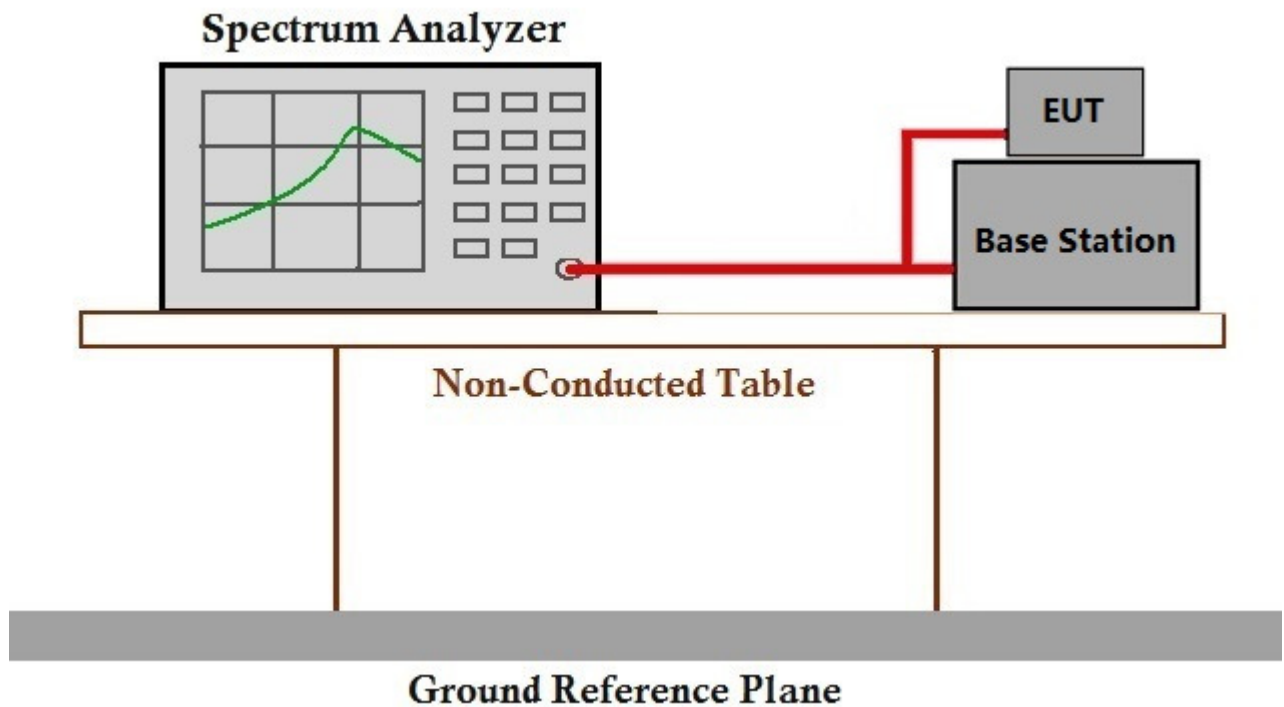
6.3 Bandwidth

Test Requirement: §2.1049(h), §22.917, §24.238
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: OBW: No limit
EBW: No limit

6.3.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data



Test mode:	Test Band	Test result of 26dB Bandwidth (MHz)			Limit (dB)	Verdict
		LCH	MCH	HCH		
GSM	GSM850	0.311	0.313	0.312	N/A	Pass
	EGPRS850	0.314	0.308	0.309	N/A	Pass
	GSM1900	0.323	0.314	0.316	N/A	Pass
	EGPRS1900	0.310	0.317	0.313	N/A	Pass
CDMA	CDMA BC0	1.419	1.422	1.422	N/A	Pass

Test mode:	Test Band	Test result of Occupied Bandwidth (MHz)			Limit (dB)	Verdict
		LCH	MCH	HCH		
GSM	GSM850	0.246	0.241	0.246	N/A	Pass
	EGPRS850	0.245	0.246	0.249	N/A	Pass
	GSM1900	0.249	0.250	0.244	N/A	Pass
	EGPRS1900	0.244	0.246	0.240	N/A	Pass
CDMA	CDMA BC0	1.275	1.272	1.272	N/A	Pass

Note: All modes have been tested and we found CDMA 1xRTT Test mode has the worst test result. Only record the worst test result.

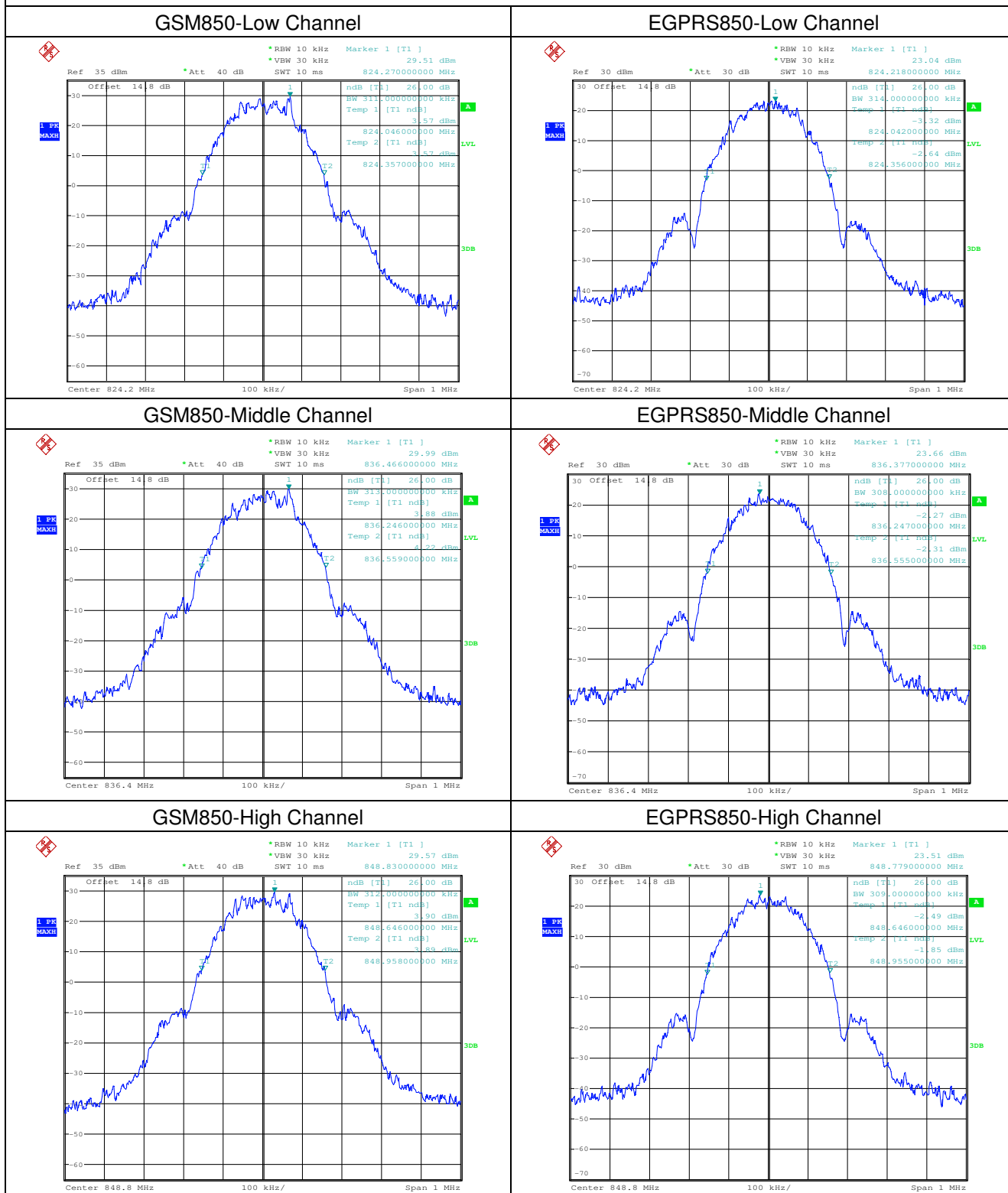


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Test Plot for 26dB Bandwidth

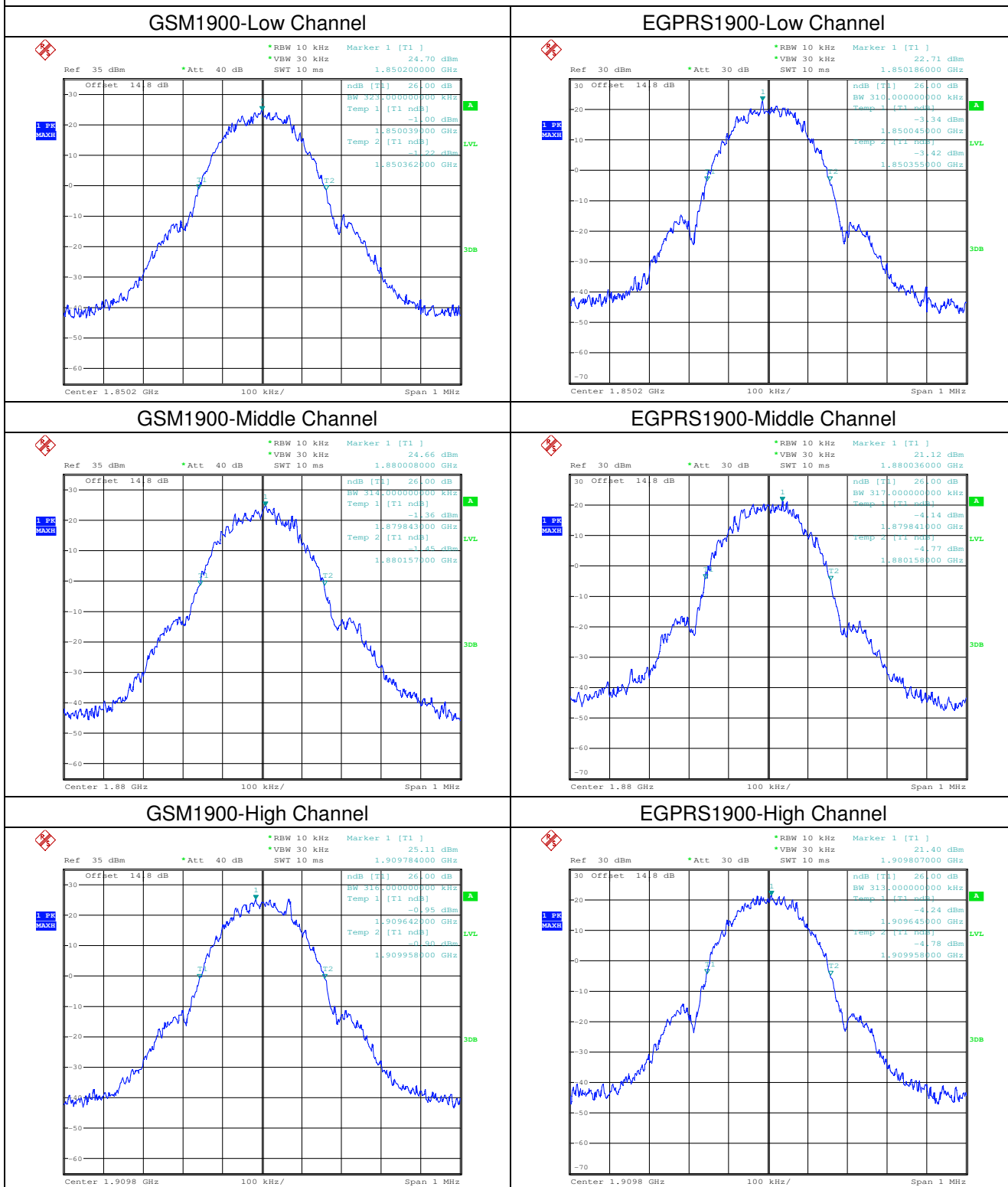


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Test Plot for 26dB Bandwidth



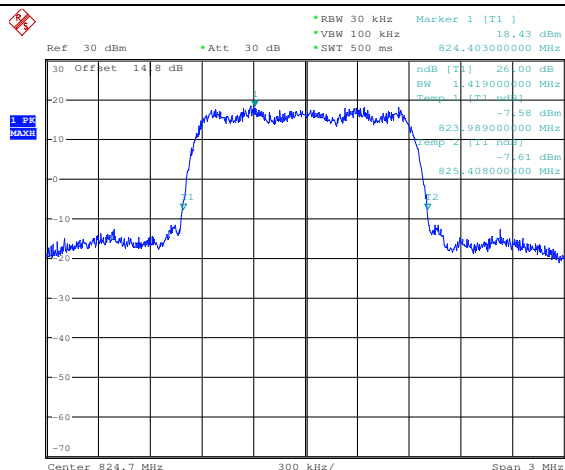
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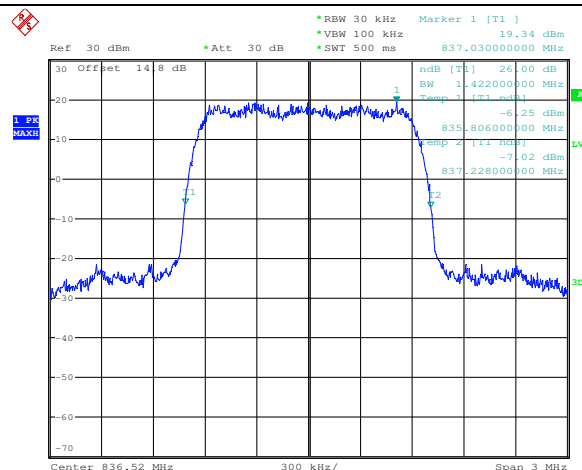


Test Plot for 26dB Bandwidth

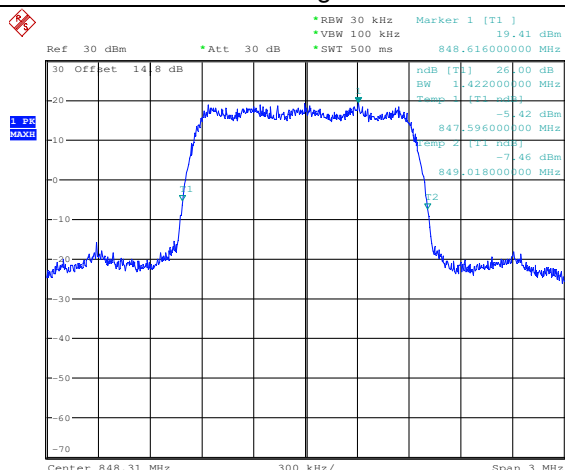
CDMA BC0-Low Channel



CDMA BC0-Middle Channel

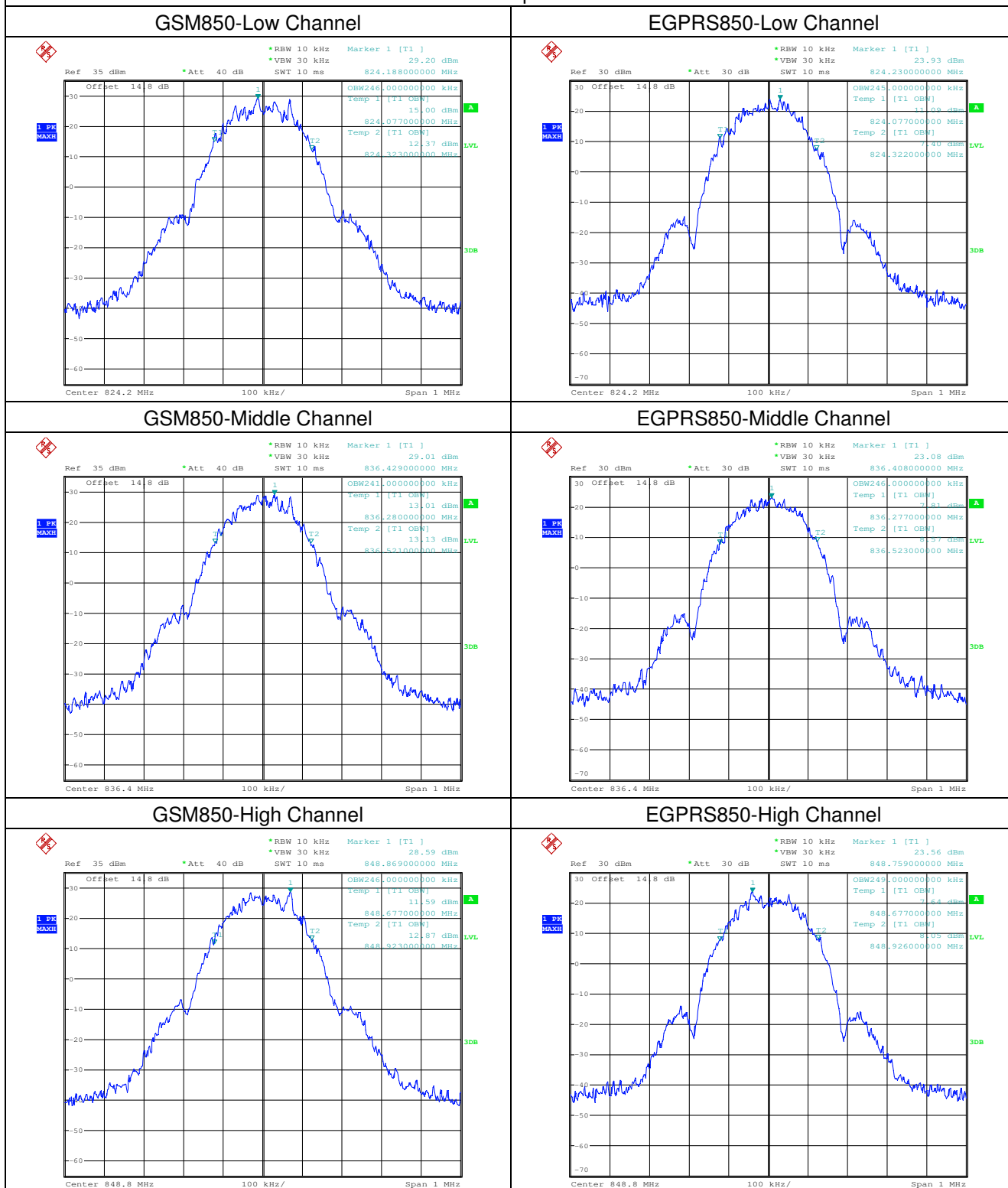


CDMA BC0-High Channel





Test Plot for Occupied Bandwidth



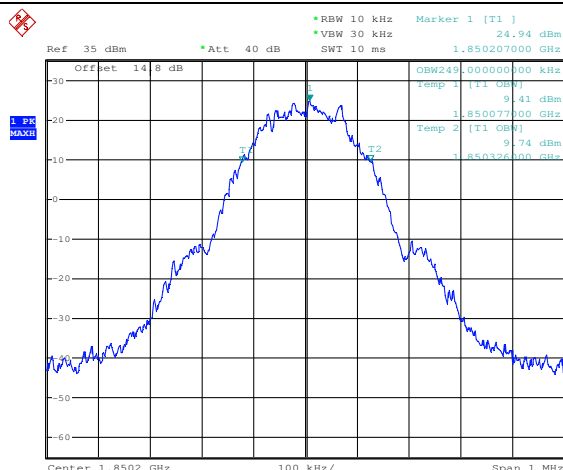
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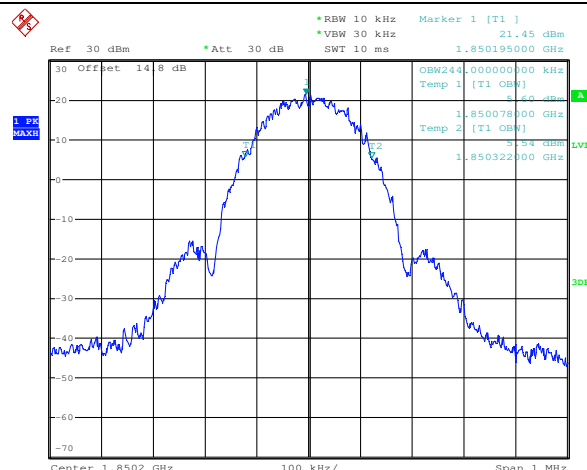


Test Plot for Occupied Bandwidth

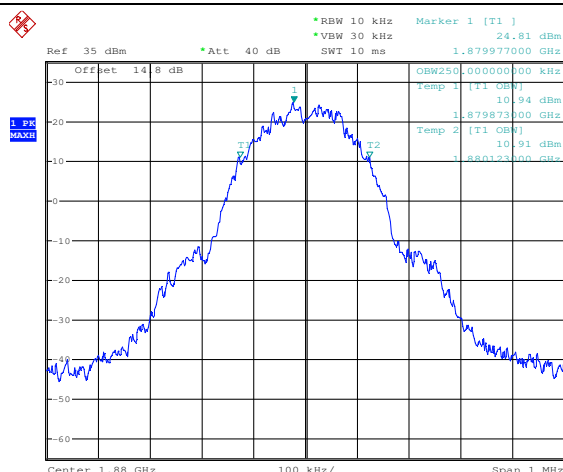
GSM1900-Low Channel



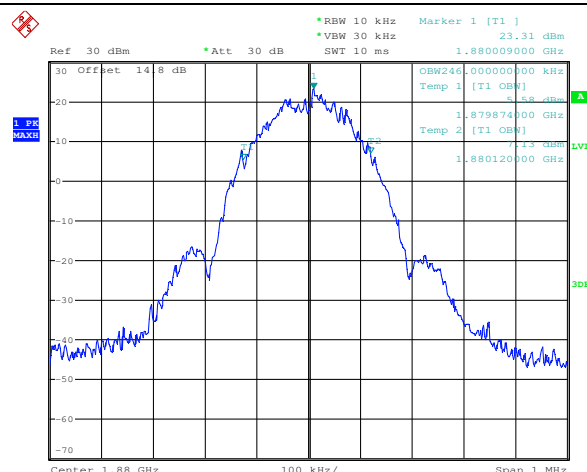
EGPRS1900-Low Channel



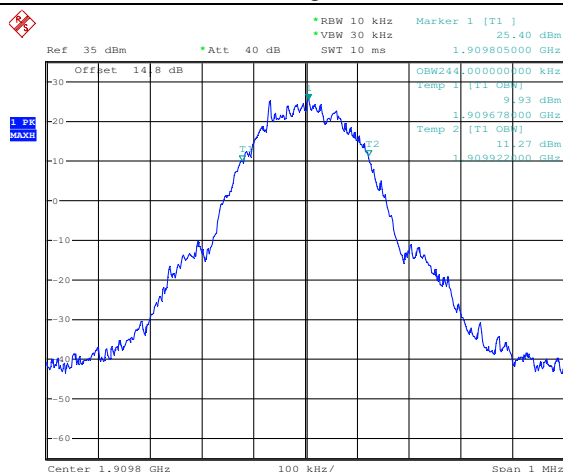
GSM1900-Middle Channel



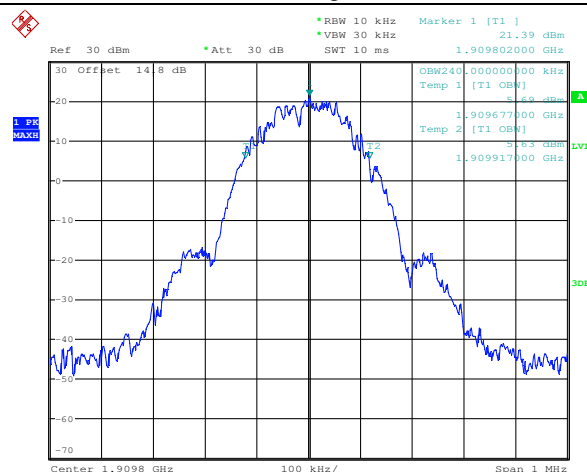
EGPRS1900-Middle Channel



GSM1900-High Channel



EGPRS1900-High Channel



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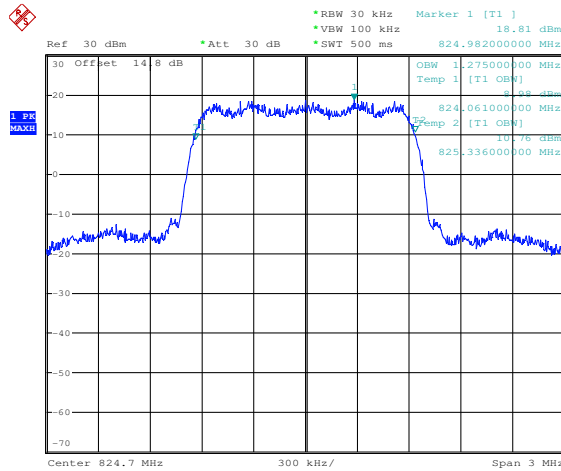
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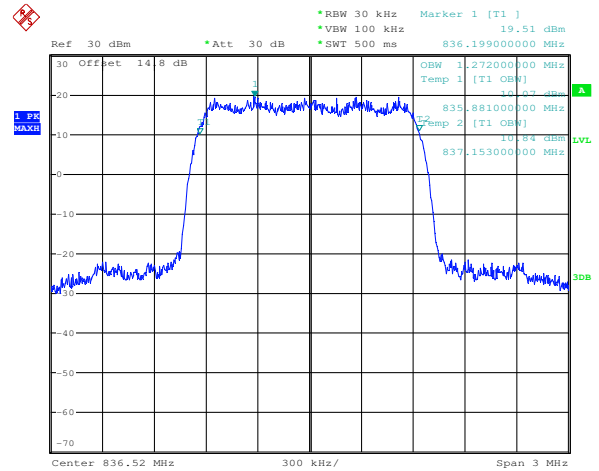
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Test Plot for Occupied Bandwidth

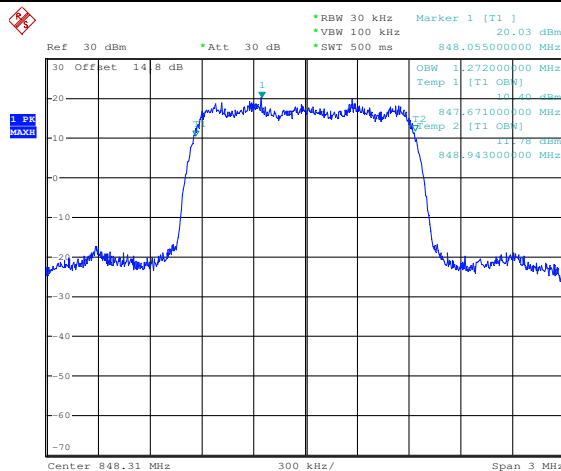
CDMA BC0-Low Channel



CDMA BC0-Middle Channel



CDMA BC0-High Channel



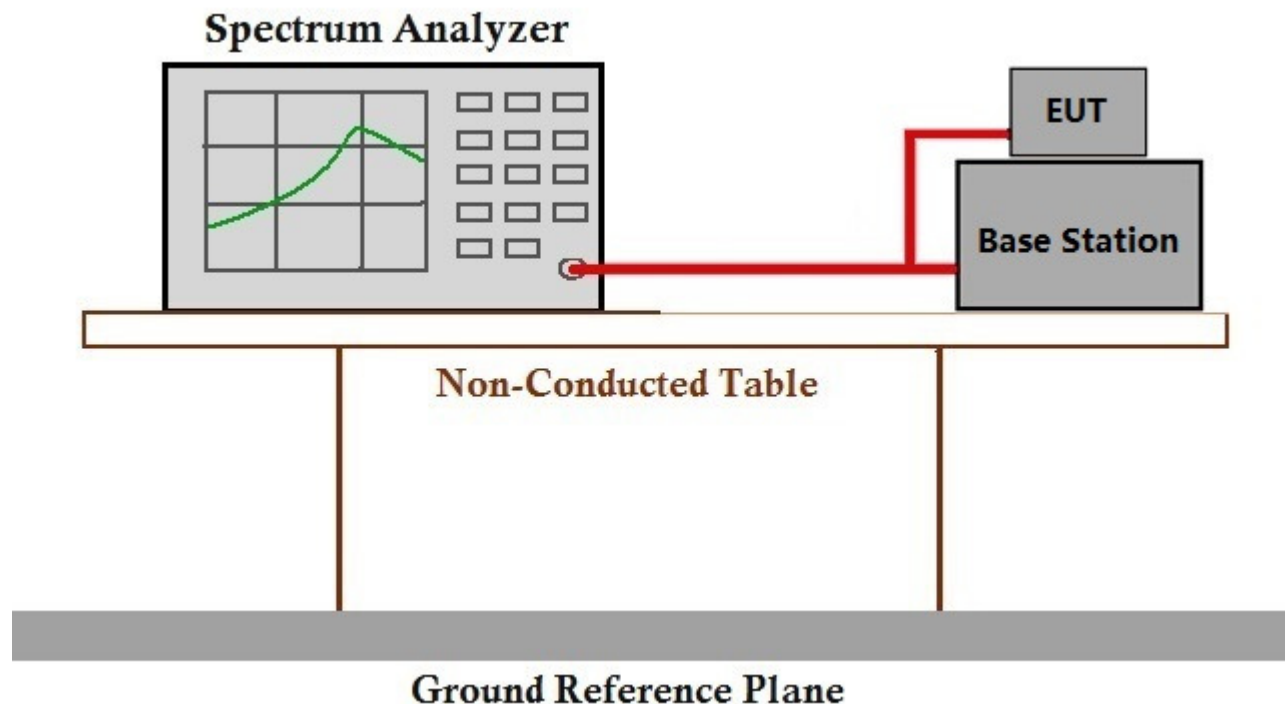
6.4 Band Edge Compliance

Test Requirement: §2.1051, §22.917, §24.238
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: $\leq -13\text{dBm}/1\% \cdot \text{EBW}$, in 1 MHz bands immediately outside and adjacent to the frequency block.

6.4.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.4.2 Test Setup Diagram



6.4.3 Measurement Data



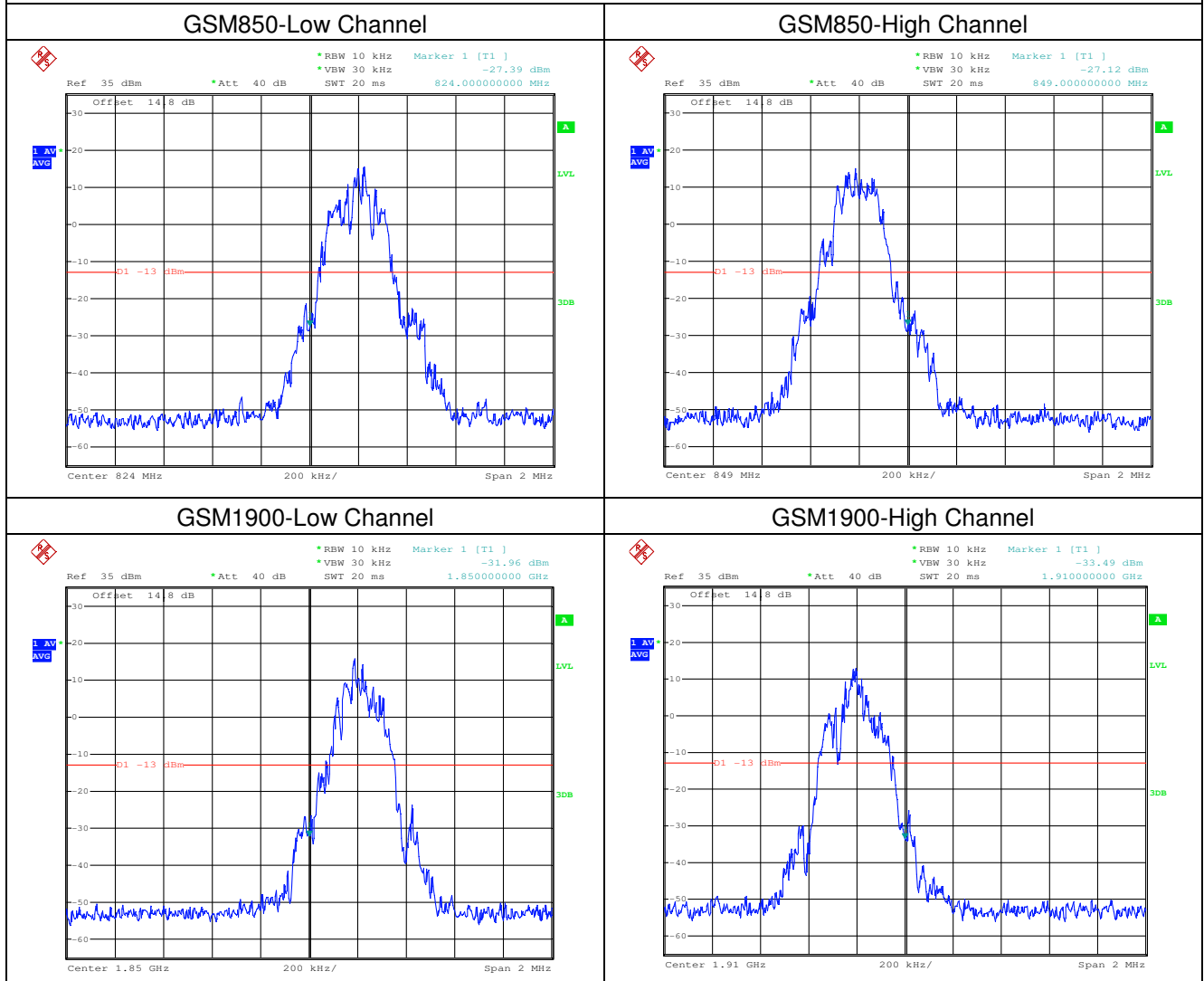
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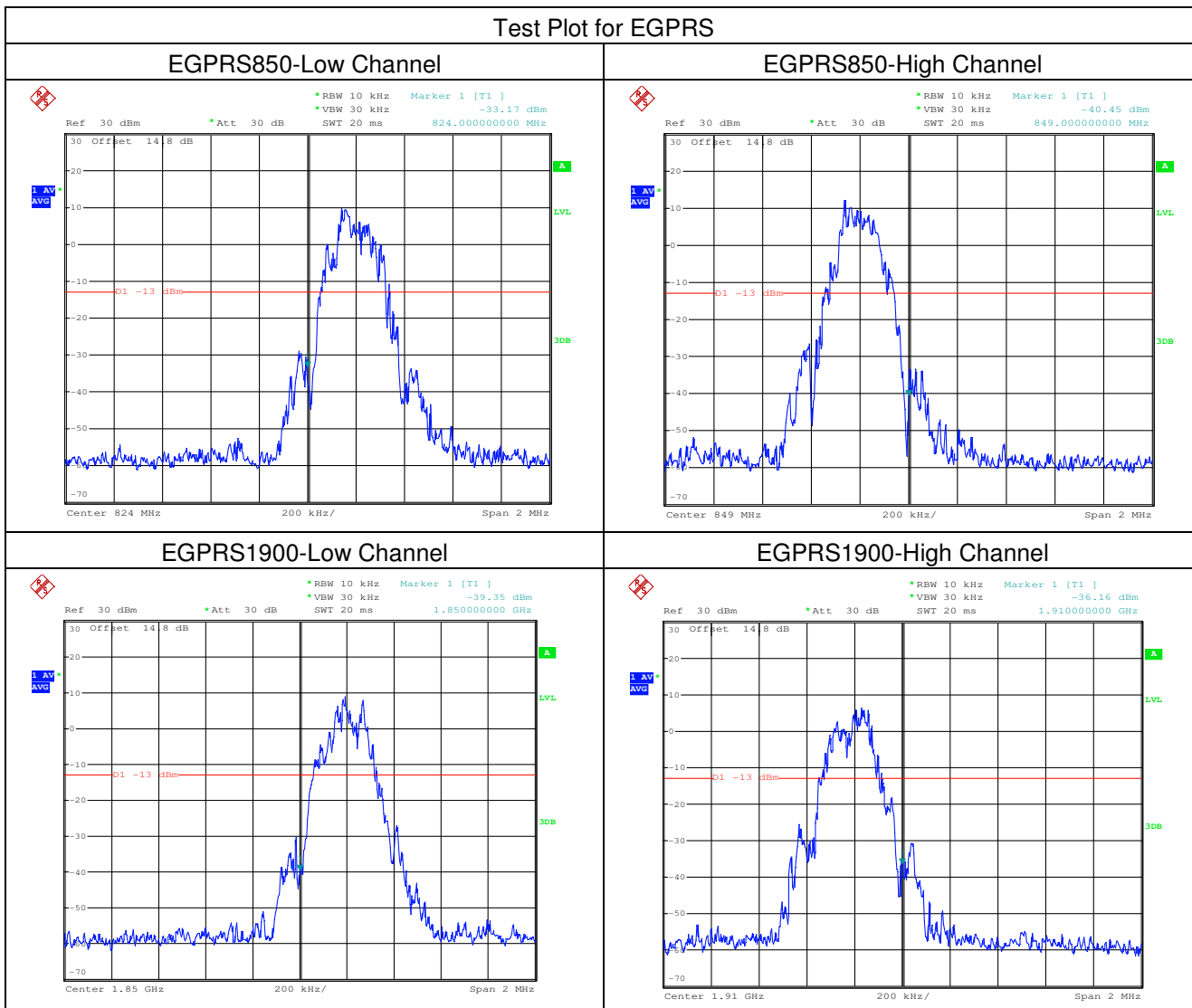
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Test Plot for GSM



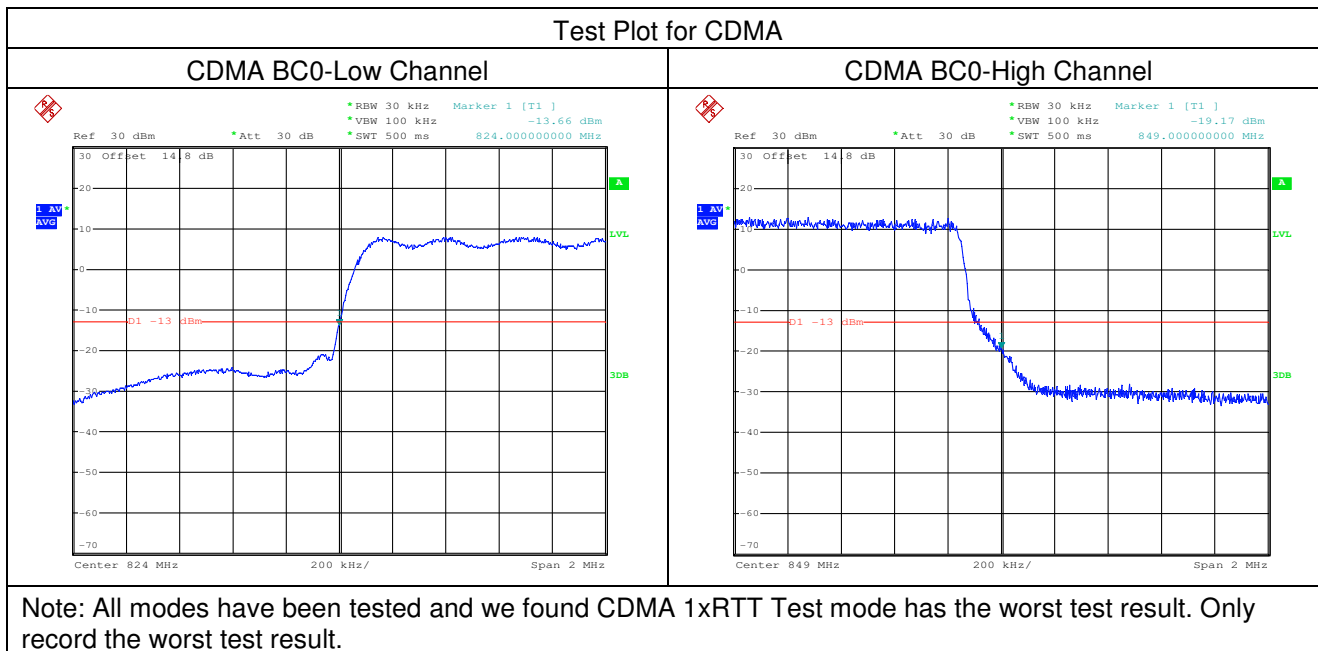


Test Plot for EGPRS



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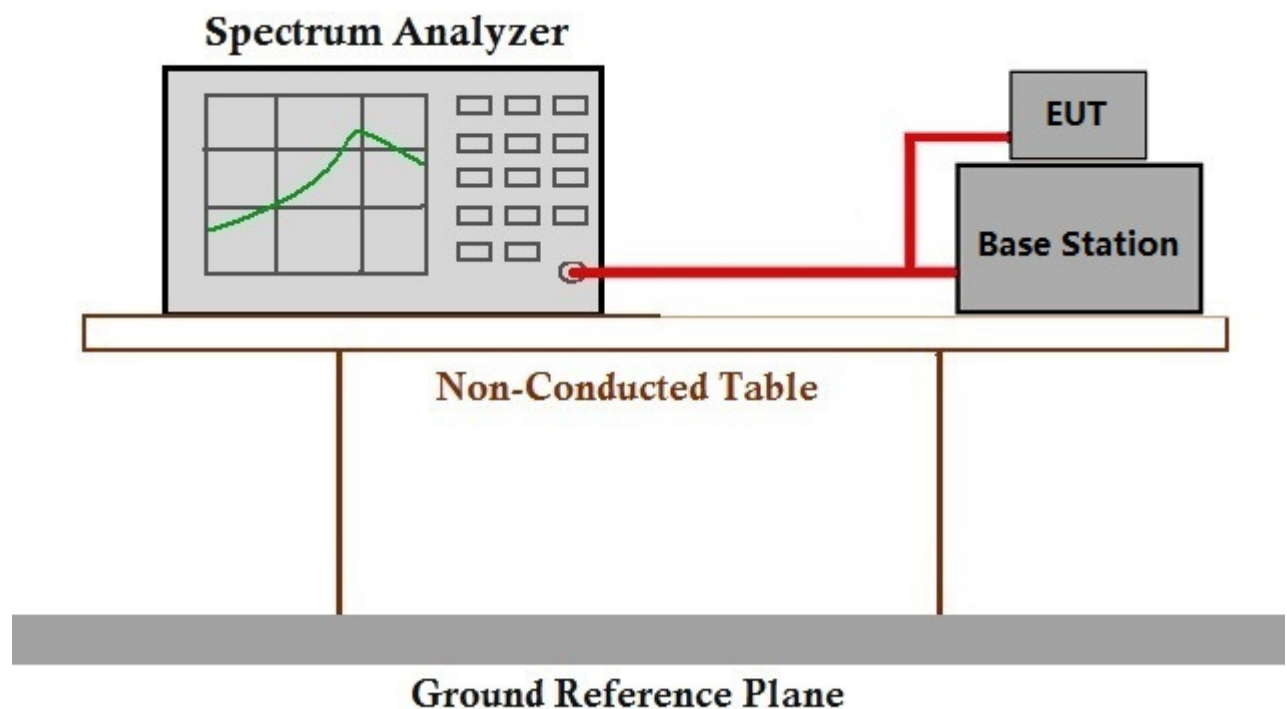
6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §22.917, §24.238
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: $\leq -13\text{dBm}$

6.5.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.5.2 Test Setup Diagram



6.5.3 Measurement Data



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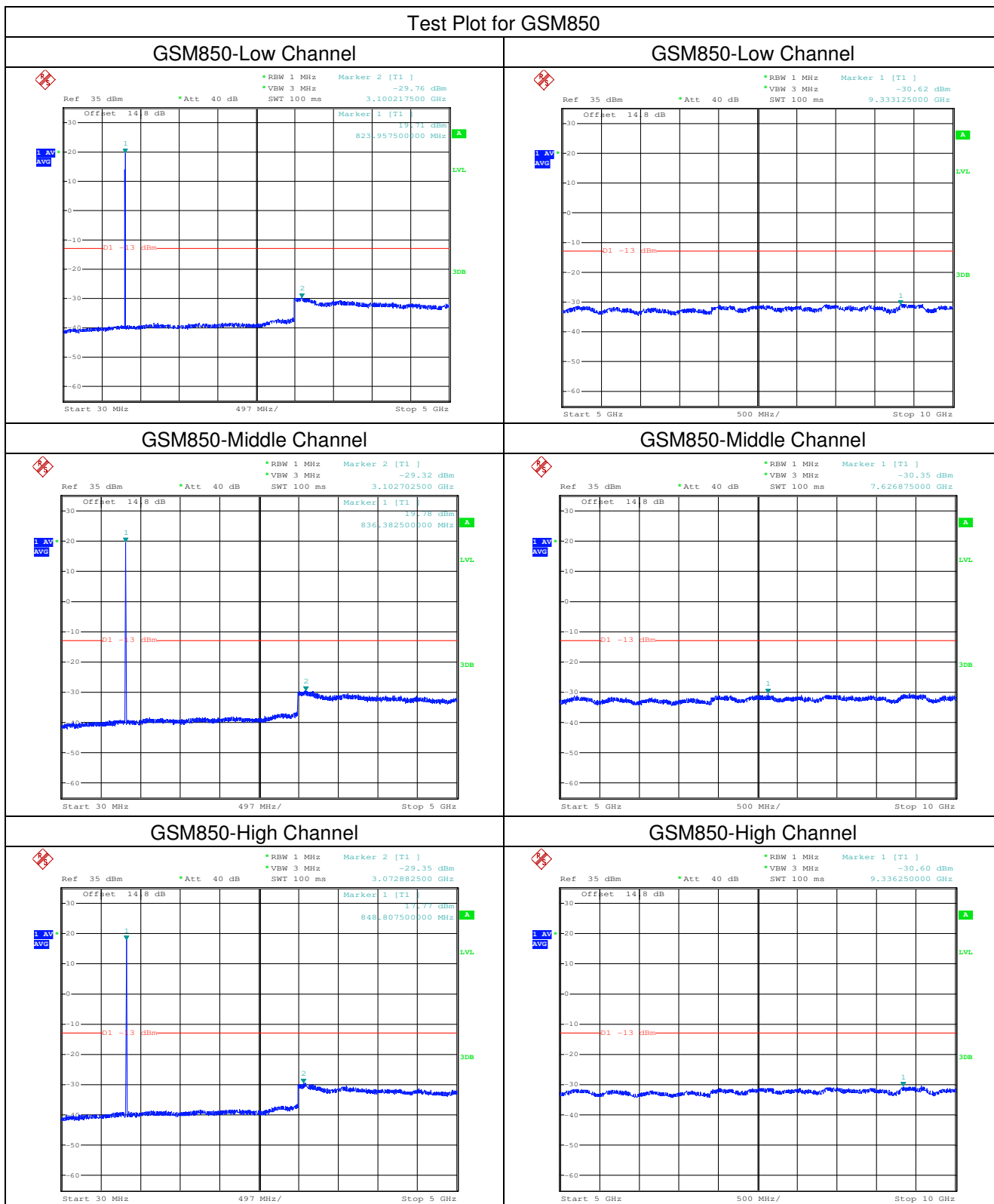
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Test Plot for GSM850

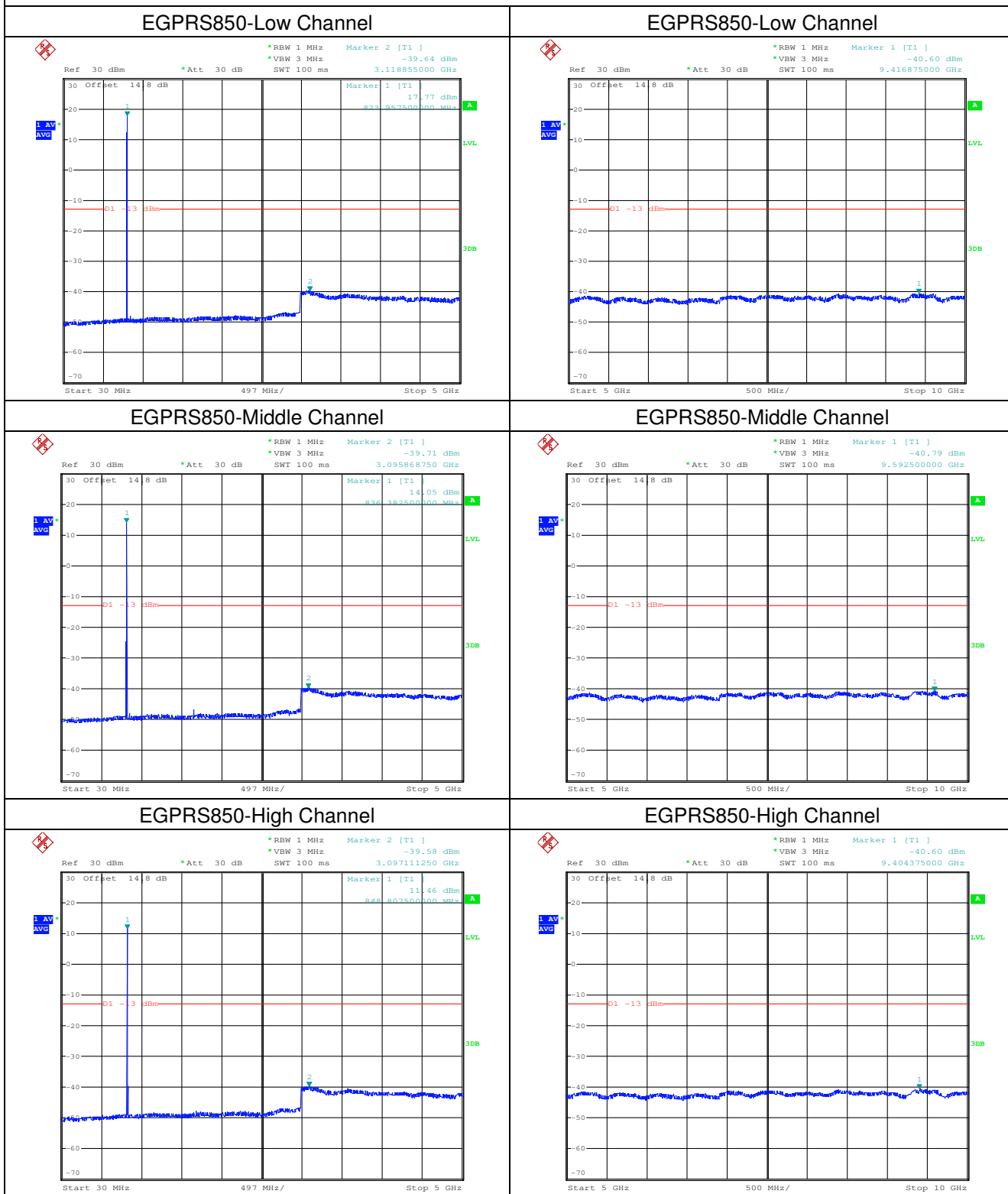


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Test Plot for EGPRS850

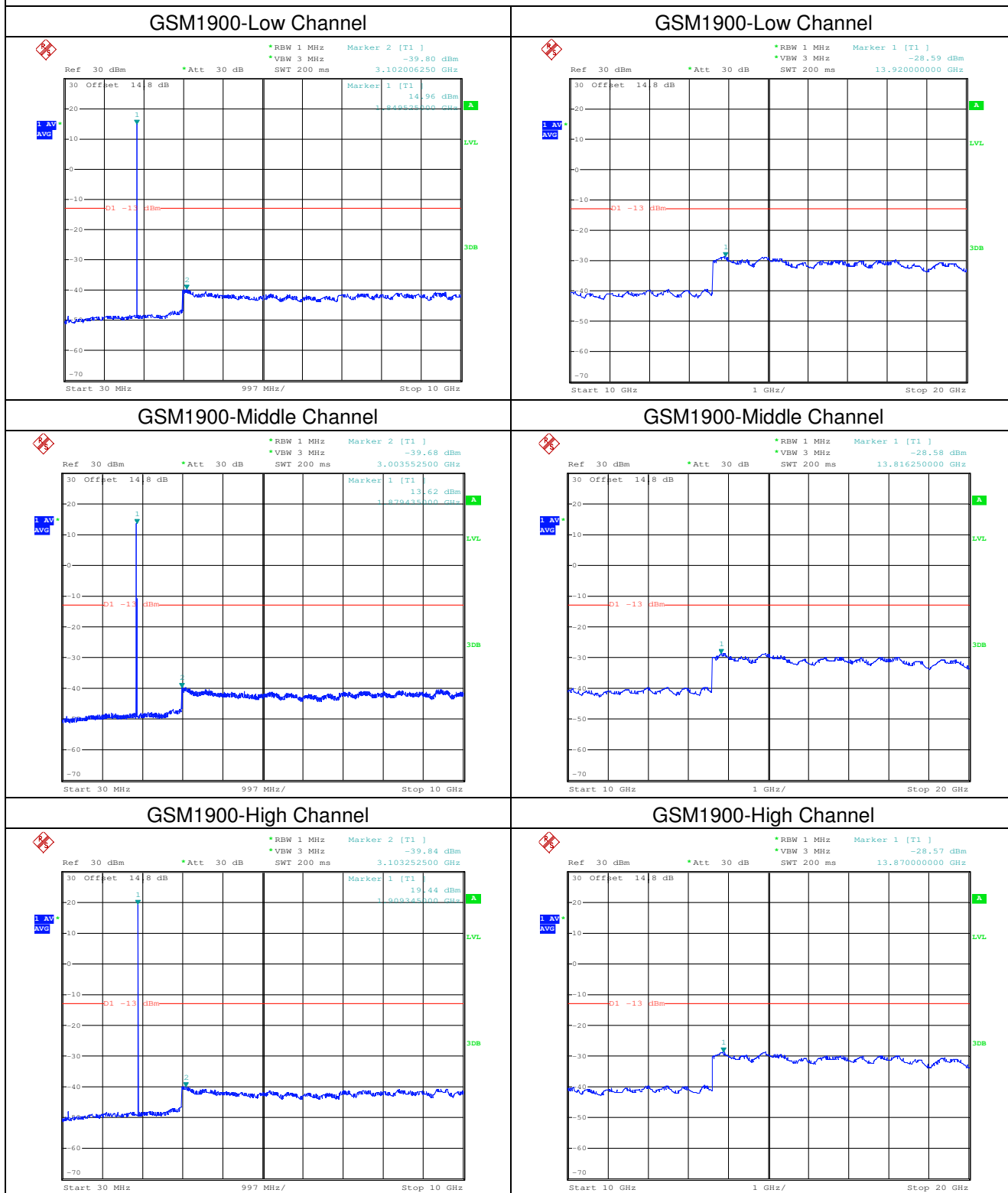


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Test Plot for GSM1900



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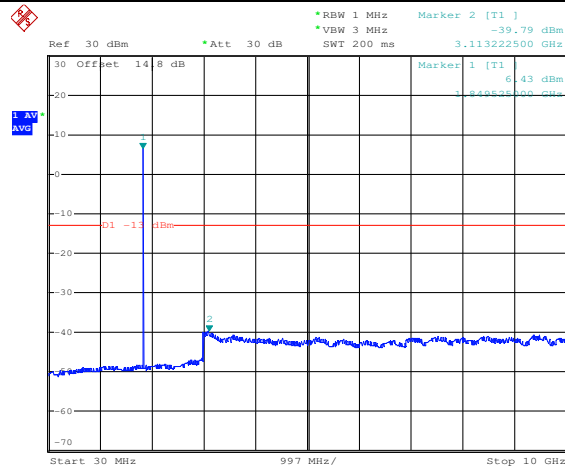
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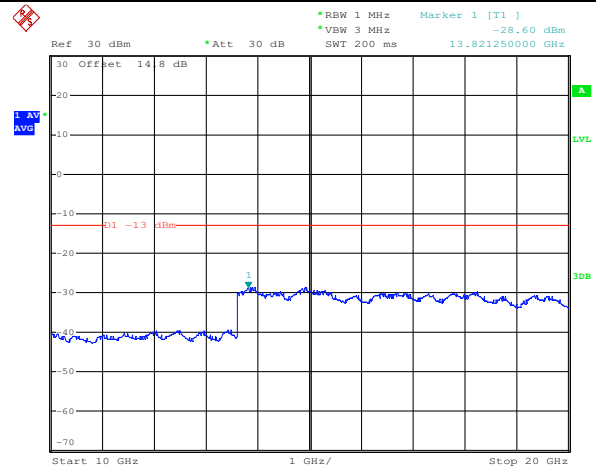


Test Plot for EGPRS1900

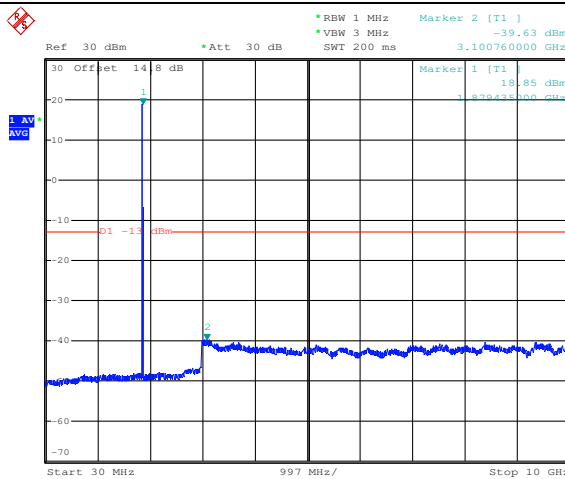
EGPRS1900-Low Channel



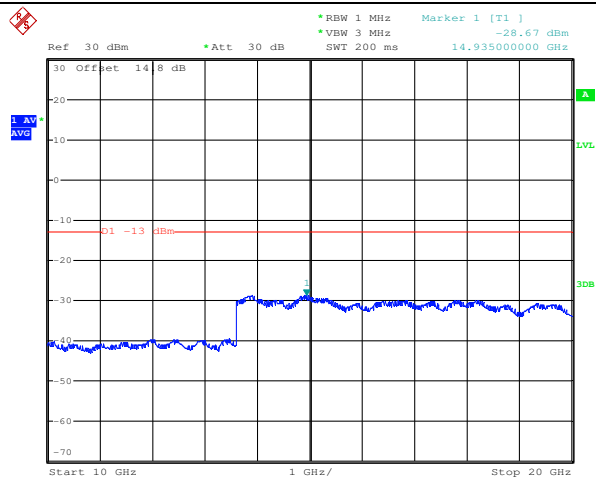
EGPRS1900-Low Channel



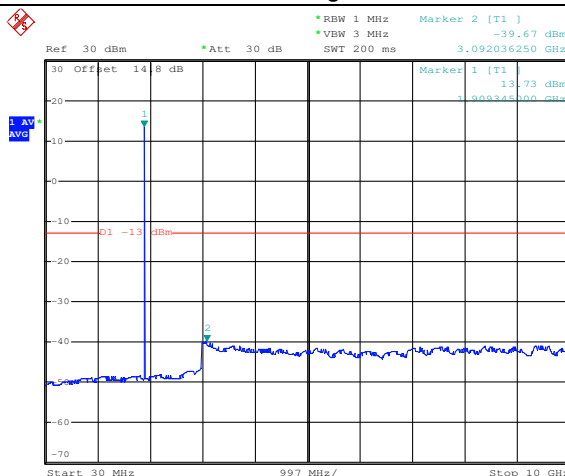
EGPRS1900-Middle Channel



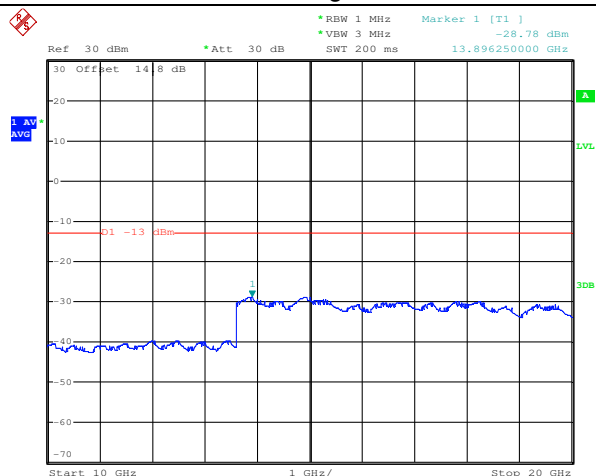
EGPRS1900-Middle Channel



EGPRS1900-High Channel

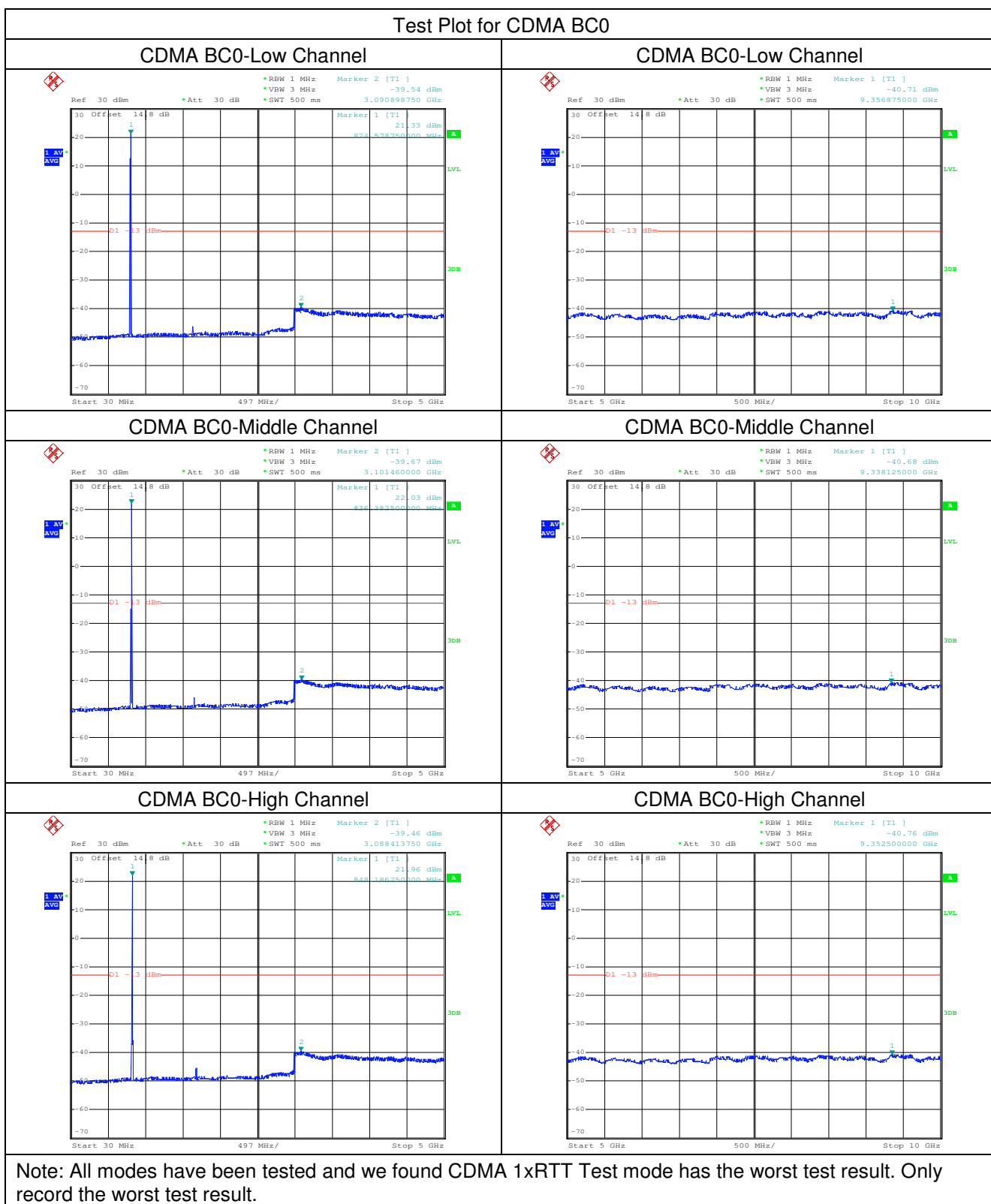


EGPRS1900-High Channel



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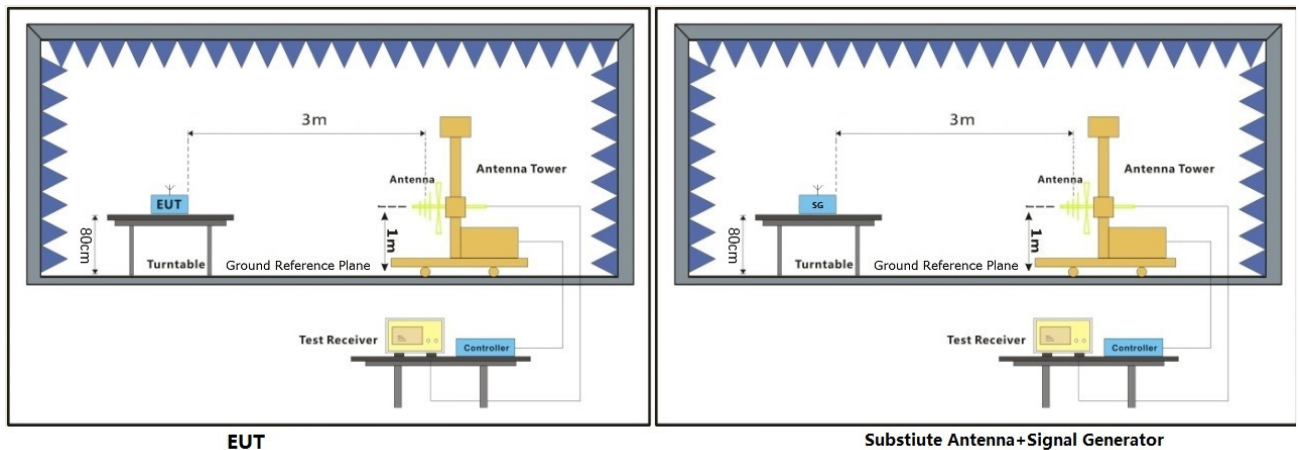
6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §22.917, §24.238,
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: $\leq -13\text{dBm}$

6.6.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.6.2 Test Setup Diagram



6.6.3 Measurement Procedure and Data

Test Procedure:

- (1) On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.



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GSM850-Low channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1648.4	-65.21	0.52	6	-59.73	-13	-46.73	Horizontal	Pass
2472.6	-62.06	0.53	5.8	-56.79	-13	-43.79	Horizontal	Pass
3296.8	-58.68	0.65	6.2	-53.13	-13	-40.13	Horizontal	Pass
1648.4	-65.69	0.52	6	-60.21	-13	-47.21	Vertical	Pass
2472.6	-61.86	0.53	5.8	-56.59	-13	-43.59	Vertical	Pass
3296.8	-58.22	0.65	6.2	-52.67	-13	-39.67	Vertical	Pass

GSM850-Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1672.8	-64.27	0.52	6	-58.79	-13	-45.79	Horizontal	Pass
2509.2	-60.69	0.59	5.3	-55.98	-13	-42.98	Horizontal	Pass
3345.6	-56.8	0.65	6.2	-51.25	-13	-38.25	Horizontal	Pass
1672.8	-64.81	0.52	6	-59.33	-13	-46.33	Vertical	Pass
2509.2	-60.92	0.59	5.3	-56.21	-13	-43.21	Vertical	Pass
3345.6	-57.18	0.65	6.2	-51.63	-13	-38.63	Vertical	Pass

GSM850-High channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1697.6	-65.77	0.52	6	-60.29	-13	-47.29	Horizontal	Pass
2546.4	-62.22	0.59	5.3	-57.51	-13	-44.51	Horizontal	Pass
3395.2	-58.22	0.65	6.2	-52.67	-13	-39.67	Horizontal	Pass
1697.6	-65.48	0.52	6	-60	-13	-47	Vertical	Pass
2546.4	-61.54	0.59	5.3	-56.83	-13	-43.83	Vertical	Pass
3395.2	-59.09	0.65	6.2	-53.54	-13	-40.54	Vertical	Pass



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GSM1900-Low channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
3700.4	-59.8	0.71	7.6	-52.91	-13	-39.91	Horizontal	Pass
5550.6	-58.44	0.85	10.3	-48.99	-13	-35.99	Horizontal	Pass
7400.8	-58.84	1	12.9	-46.94	-13	-33.94	Horizontal	Pass
3700.4	-61.39	0.71	7.6	-54.5	-13	-41.5	Vertical	Pass
5550.6	-58.85	0.85	10.3	-49.4	-13	-36.4	Vertical	Pass
7400.8	-60.25	1	12.9	-48.35	-13	-35.35	Vertical	Pass

GSM1900-Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
3760	-59.9	0.71	7.6	-53.01	-13	-40.01	Horizontal	Pass
5640	-58.33	0.85	10.3	-48.88	-13	-35.88	Horizontal	Pass
7520	-60.05	0.99	13.2	-47.84	-13	-34.84	Horizontal	Pass
3760	-60.46	0.71	7.6	-53.57	-13	-40.57	Vertical	Pass
5640	-57.94	0.85	10.3	-48.49	-13	-35.49	Vertical	Pass
7520	-59.69	0.99	13.2	-47.48	-13	-34.48	Vertical	Pass

GSM1900-High channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
3819.6	-59.39	0.71	7.6	-52.5	-13	-39.5	Horizontal	Pass
5729.4	-58.59	0.85	10.3	-49.14	-13	-36.14	Horizontal	Pass
7639.2	-59.24	0.99	13.2	-47.03	-13	-34.03	Horizontal	Pass
3819.6	-59.35	0.71	7.6	-52.46	-13	-39.46	Vertical	Pass
5729.4	-59.08	0.85	10.3	-49.63	-13	-36.63	Vertical	Pass
7639.2	-58.17	0.99	13.2	-45.96	-13	-32.96	Vertical	Pass



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EDGE850-Low channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1648.4	-66.14	0.52	6	-60.66	-13	-47.66	Horizontal	Pass
2472.6	-61.95	0.53	5.8	-56.68	-13	-43.68	Horizontal	Pass
3296.8	-58.81	0.65	6.2	-53.26	-13	-40.26	Horizontal	Pass
1648.4	-64.48	0.52	6	-59	-13	-46	Vertical	Pass
2472.6	-58.18	0.53	5.8	-52.91	-13	-39.91	Vertical	Pass
3296.8	-58.6	0.65	6.2	-53.05	-13	-40.05	Vertical	Pass

EDGE850-Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1672.8	-64.16	0.52	6	-58.68	-13	-45.68	Horizontal	Pass
2509.2	-61.28	0.59	5.3	-56.57	-13	-43.57	Horizontal	Pass
3345.6	-58.99	0.65	6.2	-53.44	-13	-40.44	Horizontal	Pass
1672.8	-67.38	0.52	6	-61.9	-13	-48.9	Vertical	Pass
2509.2	-62.7	0.59	5.3	-57.99	-13	-44.99	Vertical	Pass
3345.6	-58.56	0.65	6.2	-53.01	-13	-40.01	Vertical	Pass

EDGE850-High channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1697.6	-66.15	0.52	6	-60.67	-13	-47.67	Horizontal	Pass
2546.4	-61.14	0.59	5.3	-56.43	-13	-43.43	Horizontal	Pass
3395.2	-58.8	0.65	6.2	-53.25	-13	-40.25	Horizontal	Pass
1697.6	-66.66	0.52	6	-61.18	-13	-48.18	Vertical	Pass
2546.4	-60.92	0.59	5.3	-56.21	-13	-43.21	Vertical	Pass
3395.2	-58.44	0.65	6.2	-52.89	-13	-39.89	Vertical	Pass



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EDGE1900-Low channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
3700.4	-60.73	0.71	7.6	-53.84	-13	-40.84	Horizontal	Pass
5550.6	-58.26	0.85	10.3	-48.81	-13	-35.81	Horizontal	Pass
7400.8	-59.47	1	12.9	-47.57	-13	-34.57	Horizontal	Pass
3700.4	-60.72	0.71	7.6	-53.83	-13	-40.83	Vertical	Pass
5550.6	-58.82	0.85	10.3	-49.37	-13	-36.37	Vertical	Pass
7400.8	-59.46	1	12.9	-47.56	-13	-34.56	Vertical	Pass

EDGE1900-Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
3760	-60.19	0.71	7.6	-53.3	-13	-40.3	Horizontal	Pass
5640	-58.44	0.85	10.3	-48.99	-13	-35.99	Horizontal	Pass
7520	-60.31	0.99	13.2	-48.1	-13	-35.1	Horizontal	Pass
3760	-60.53	0.71	7.6	-53.64	-13	-40.64	Vertical	Pass
5640	-59.01	0.85	10.3	-49.56	-13	-36.56	Vertical	Pass
7520	-59.66	0.99	13.2	-47.45	-13	-34.45	Vertical	Pass

EDGE1900-High channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
3819.6	-59.59	0.71	7.6	-52.7	-13	-39.7	Horizontal	Pass
5729.4	-58.08	0.85	10.3	-48.63	-13	-35.63	Horizontal	Pass
7639.2	-57.9	0.99	13.2	-45.69	-13	-32.69	Horizontal	Pass
3819.6	-60.14	0.71	7.6	-53.25	-13	-40.25	Vertical	Pass
5729.4	-58.93	0.85	10.3	-49.48	-13	-36.48	Vertical	Pass
7639.2	-57.95	0.99	13.2	-45.74	-13	-32.74	Vertical	Pass



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CDMA BC0-Low channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1649.4	-63.95	0.52	6	-58.47	-13	-45.47	Horizontal	Pass
2474.1	-59.16	0.53	5.8	-53.89	-13	-40.89	Horizontal	Pass
3298.8	-55.34	0.65	6.2	-49.79	-13	-36.79	Horizontal	Pass
1649.4	-65.25	0.52	6	-59.77	-13	-46.77	Vertical	Pass
2474.1	-60.97	0.53	5.8	-55.7	-13	-42.7	Vertical	Pass
3298.8	-56.43	0.65	6.2	-50.88	-13	-37.88	Vertical	Pass

CDMA BC0-Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1673.04	-64.96	0.52	6	-59.48	-13	-46.48	Horizontal	Pass
2509.56	-61.77	0.59	5.3	-57.06	-13	-44.06	Horizontal	Pass
3346.08	-58.3	0.65	6.2	-52.75	-13	-39.75	Horizontal	Pass
1673.04	-62.94	0.52	6	-57.46	-13	-44.46	Vertical	Pass
2509.56	-60.94	0.59	5.3	-56.23	-13	-43.23	Vertical	Pass
3346.08	-57.2	0.65	6.2	-51.65	-13	-38.65	Vertical	Pass

CDMA BC0-High channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Polarization (H/V)	Result
1696.62	-64.43	0.52	6	-58.95	-13	-45.95	Horizontal	Pass
2544.93	-61.02	0.59	5.3	-56.31	-13	-43.31	Horizontal	Pass
3393.24	-57.42	0.65	6.2	-51.87	-13	-38.87	Horizontal	Pass
1696.62	-65.37	0.52	6	-59.89	-13	-46.89	Vertical	Pass
2544.93	-62.72	0.59	5.3	-58.01	-13	-45.01	Vertical	Pass
3393.24	-60.03	0.65	6.2	-54.48	-13	-41.48	Vertical	Pass

Note: All modes have been tested and we found CDMA 1xRTT Test mode has the worst test result. Only record the worst test result.



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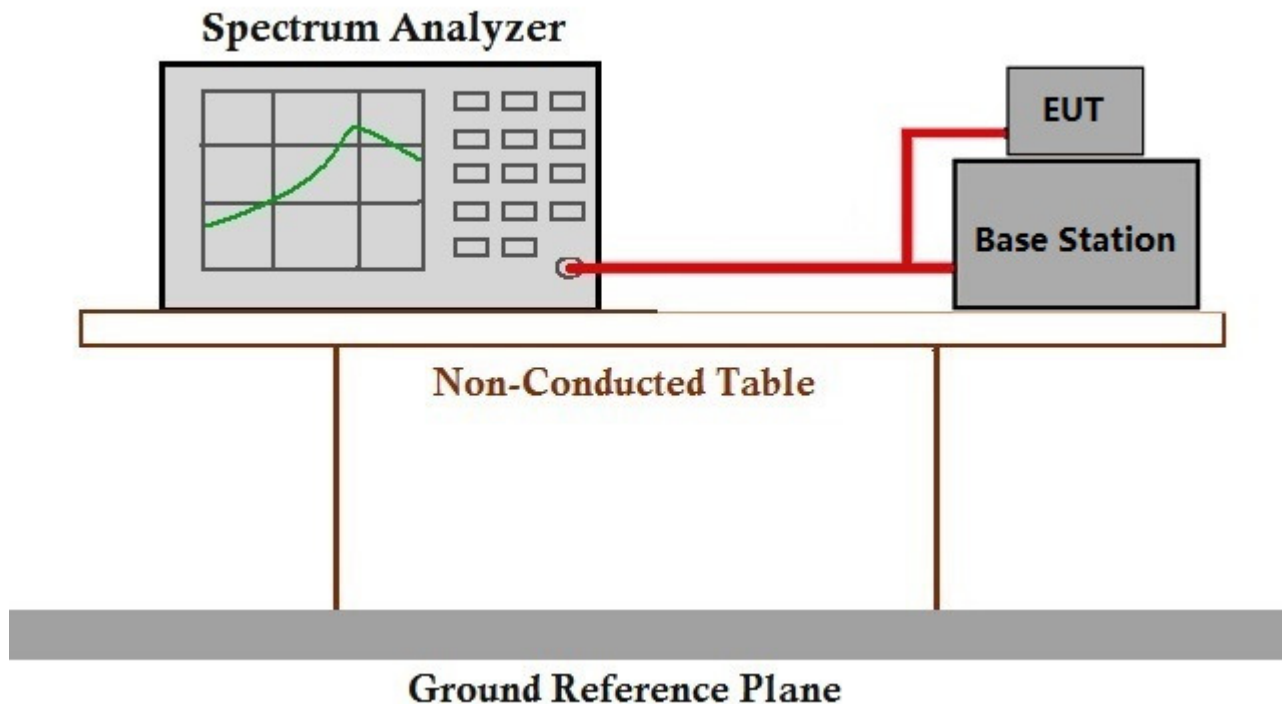
6.7 Frequency stability

Test Requirement: §2.1055, §22.355, §24.235
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: $\leq \pm 2.5\text{ppm}$.

6.7.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.7.2 Test Setup Diagram



6.7.3 Measurement Data



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Shenzhen Branch Testing Center EEC Laboratory

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Frequency Error VS. Voltage

Test Band	Test mode:	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 850	GSM	LCH	TN	VL	2.34	0.00284	PASS
				VN	1.26	0.00153	PASS
				VH	-3.82	-0.00463	PASS
		MCH	TN	VL	-2.44	-0.00292	PASS
				VN	-1.8	-0.00215	PASS
				VH	-4.49	-0.00537	PASS
		HCH	TN	VL	3.51	0.00414	PASS
				VN	-1.33	-0.00157	PASS
				VH	-2.68	-0.00316	PASS
	EGPRS	LCH	TN	VL	-4.12	-0.00500	PASS
				VN	0.95	0.00115	PASS
				VH	-2.99	-0.00363	PASS
		MCH	TN	VL	3.29	0.00393	PASS
				VN	2.01	0.00240	PASS
				VH	-4.99	-0.00596	PASS
		HCH	TN	VL	0.58	0.00068	PASS
				VN	-3.73	-0.00439	PASS
				VH	1.95	0.00230	PASS



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Test Band	Test mode:	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 1900	GSM	LCH	TN	VL	-4.89	-0.00264	PASS
				VN	2.04	0.00110	PASS
				VH	1.47	0.00079	PASS
		MCH	TN	VL	0.96	0.00051	PASS
				VN	-2.94	-0.00156	PASS
				VH	3.12	0.00166	PASS
		HCH	TN	VL	-2.91	-0.00152	PASS
				VN	2.04	0.00107	PASS
				VH	-4.53	-0.00237	PASS
	EGPRS	LCH	TN	VL	0.99	0.00054	PASS
				VN	-4.15	-0.00224	PASS
				VH	2.52	0.00136	PASS
		MCH	TN	VL	-4.52	-0.00240	PASS
				VN	1.55	0.00082	PASS
				VH	0.6	0.00032	PASS
		HCH	TN	VL	-2.63	-0.00138	PASS
				VN	3.61	0.00189	PASS
				VH	-5.13	-0.00269	PASS

Test Band	Test mode:	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
CDMA 2000	CDMA 1xRTT	LCH	TN	VL	-4.65	-0.00597	PASS
				VN	2.37	0.00255	PASS
				VH	1.78	0.00183	PASS
		MCH	TN	VL	1.24	0.00116	PASS
				VN	-2.66	-0.00350	PASS
				VH	3.36	0.00369	PASS
		HCH	TN	VL	-2.64	-0.00343	PASS
				VN	2.32	0.00242	PASS
				VH	-4.26	-0.00534	PASS

Note: All modes have been tested and we found CDMA 1xRTT Test mode has the worst test result. Only record the worst test result.



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Frequency Error VS. Temperature

Test Band	Test mode:	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 850	GSM	LCH	VN	-30	1.48	0.00180	PASS
				-20	1.4	0.00170	PASS
				-10	1.69	0.00205	PASS
				0	-2.63	-0.00319	PASS
				10	0.68	0.00083	PASS
				20	-5.11	-0.00620	PASS
				30	1.34	0.00163	PASS
				40	-0.99	-0.00120	PASS
				50	-3.91	-0.00474	PASS
		MCH	VN	-30	-2.47	-0.00295	PASS
				-20	-2.54	-0.00304	PASS
				-10	-0.95	-0.00114	PASS
				0	-3.44	-0.00411	PASS
				10	1.58	0.00189	PASS
				20	2.39	0.00286	PASS
				30	1.25	0.00149	PASS
				40	0.64	0.00077	PASS
				50	-4.56	-0.00545	PASS
		HCH	VN	-30	3.52	0.00415	PASS
				-20	3.54	0.00417	PASS
				-10	3.33	0.00392	PASS
				0	-5.63	-0.00663	PASS
				10	1.34	0.00158	PASS
				20	-2.39	-0.00282	PASS
				30	3.36	0.00396	PASS
				40	-0.49	-0.00058	PASS
				50	-4.43	-0.00522	PASS



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Test Band	Test mode:	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 850	EGPRS	LCH	VN	-30	-2.29	-0.00278	PASS
				-20	-2.33	-0.00283	PASS
				-10	2.28	0.00277	PASS
				0	-4.02	-0.00488	PASS
				10	1.59	0.00193	PASS
				20	-3.87	-0.00470	PASS
				30	-4.61	-0.00559	PASS
				40	-4.43	-0.00537	PASS
				50	-3.85	-0.00467	PASS
		MCH	VN	-30	-2.33	-0.00279	PASS
				-20	-2.36	-0.00282	PASS
				-10	3.55	0.00424	PASS
				0	-5.14	-0.00614	PASS
				10	1.77	0.00212	PASS
				20	-3.95	-0.00472	PASS
				30	-3.69	-0.00441	PASS
				40	-2.61	-0.00312	PASS
				50	-3.84	-0.00459	PASS
		HCH	VN	-30	-3.95	-0.00465	PASS
				-20	-3.9	-0.00459	PASS
				-10	-2.84	-0.00335	PASS
				0	-2.54	-0.00299	PASS
				10	-2.83	-0.00333	PASS
				20	1.14	0.00134	PASS
				30	-4.84	-0.00570	PASS
				40	-3.66	-0.00431	PASS
				50	-3.1	-0.00365	PASS



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Test Band	Test mode:	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 1900	GSM	LCH	VN	-30	-3.43	-0.00185	PASS
				-20	-3.44	-0.00186	PASS
				-10	-4.61	-0.00249	PASS
				0	2.37	0.00128	PASS
				10	-3.89	-0.00210	PASS
				20	-0.82	-0.00044	PASS
				30	1.28	0.00069	PASS
				40	-3.52	-0.00190	PASS
				50	-2.91	-0.00157	PASS
		MCH	VN	-30	-4.63	-0.00246	PASS
				-20	-4.64	-0.00247	PASS
				-10	1.06	0.00056	PASS
				0	-2.81	-0.00149	PASS
				10	4.1	0.00218	PASS
				20	-4.11	-0.00219	PASS
				30	-2.24	-0.00119	PASS
				40	-4.17	-0.00222	PASS
				50	-4.95	-0.00263	PASS
		HCH	VN	-30	-3.52	-0.00184	PASS
				-20	-3.53	-0.00185	PASS
				-10	3.04	0.00159	PASS
				0	1.36	0.00071	PASS
				10	-0.83	-0.00043	PASS
				20	-3.73	-0.00195	PASS
				30	-4.6	-0.00241	PASS
				40	1.17	0.00061	PASS
				50	-3.43	-0.00180	PASS



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Shenzhen Branch

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Test Band	Test mode:	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 1900	EGPRS	LCH	VN	-30	-3.04	-0.00164	PASS
				-20	-3.05	-0.00165	PASS
				-10	-4.92	-0.00266	PASS
				0	1.48	0.00080	PASS
				10	-2.72	-0.00147	PASS
				20	-2.41	-0.00130	PASS
				30	-4.7	-0.00254	PASS
				40	1.47	0.00079	PASS
				50	-3.95	-0.00213	PASS
		MCH	VN	-30	-3.63	-0.00193	PASS
				-20	-3.62	-0.00193	PASS
				-10	-2.8	-0.00149	PASS
				0	-4.44	-0.00236	PASS
				10	1.26	0.00067	PASS
				20	-3.42	-0.00182	PASS
				30	-2.3	-0.00122	PASS
				40	-3.92	-0.00209	PASS
				50	0.65	0.00035	PASS
		HCH	VN	-30	-3.22	-0.00169	PASS
				-20	-3.23	-0.00169	PASS
				-10	2.75	0.00144	PASS
				0	1.59	0.00083	PASS
				10	-3.61	-0.00189	PASS
				20	-4.93	-0.00258	PASS
				30	-4.03	-0.00211	PASS
				40	-2.82	-0.00148	PASS
				50	-2.51	-0.00131	PASS



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Test Band	Test mode:	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
CDMA 2000	CDMA 1xRTT	LCH	VN	-30	-2.98	-0.00361	PASS
				-20	-2.99	-0.00363	PASS
				-10	-4.93	-0.00598	PASS
				0	1.46	0.00177	PASS
				10	-2.7	-0.00327	PASS
				20	-2.4	-0.00291	PASS
				30	-4.69	-0.00569	PASS
				40	1.47	0.00178	PASS
				50	-3.94	-0.00478	PASS
		MCH	VN	-30	-1.65	-0.00197	PASS
				-20	-1.66	-0.00198	PASS
				-10	-2.81	-0.00336	PASS
				0	-4.43	-0.00530	PASS
				10	1.3	0.00155	PASS
				20	-3.41	-0.00408	PASS
				30	-2.36	-0.00282	PASS
				40	-3.92	-0.00469	PASS
				50	0.64	0.00077	PASS
		HCH	VN	-30	-3.2	-0.00377	PASS
				-20	-3.21	-0.00378	PASS
				-10	2.76	0.00325	PASS
				0	1.6	0.00189	PASS
				10	-2.62	-0.00309	PASS
				20	-1.9	-0.00224	PASS
				30	-4.02	-0.00474	PASS
				40	-2.83	-0.00334	PASS
				50	-2.5	-0.00295	PASS

Note: All modes have been tested and we found CDMA 1xRTT Test mode has the worst test result. Only record the worst test result.



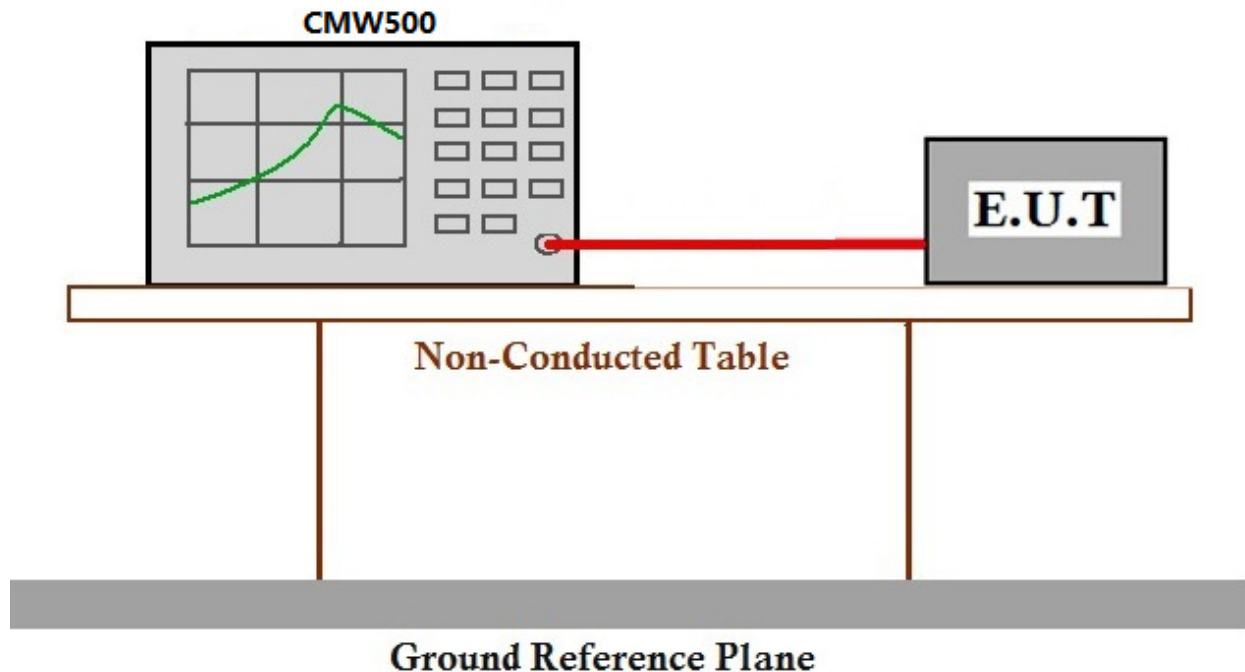
6.8 Modulation Characteristics

Test Requirement: §2.1047
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: Digital modulation

6.8.1 E.U.T. Operation

Operating Environment:
Temperature: 22.7 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: I: Tx mode, Keep the EUT in transmitting mode.

6.8.2 Test Setup Diagram



6.8.3 Measurement Data



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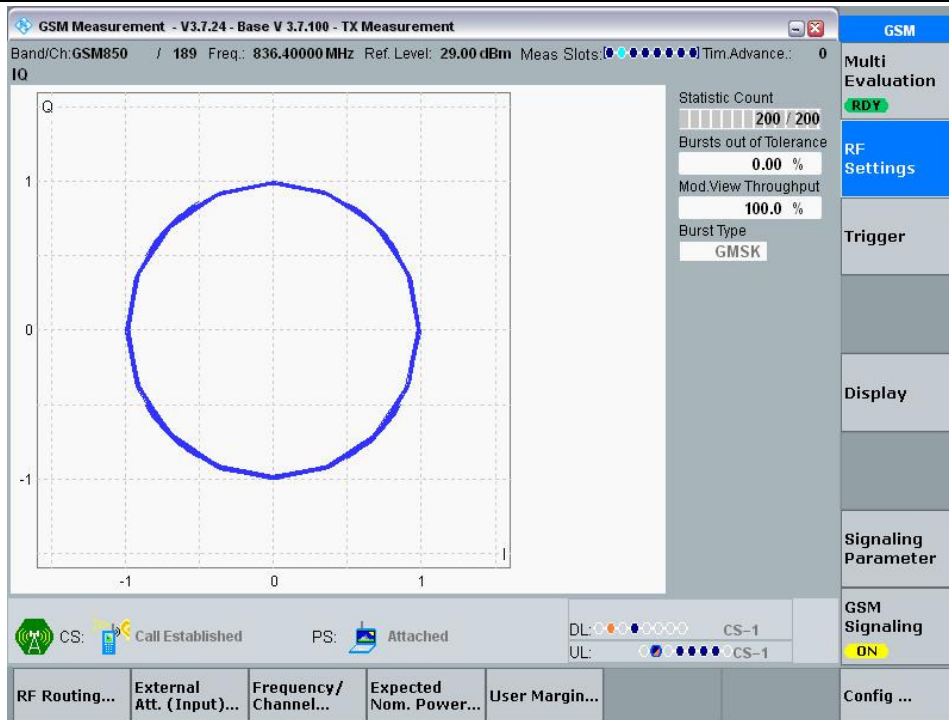
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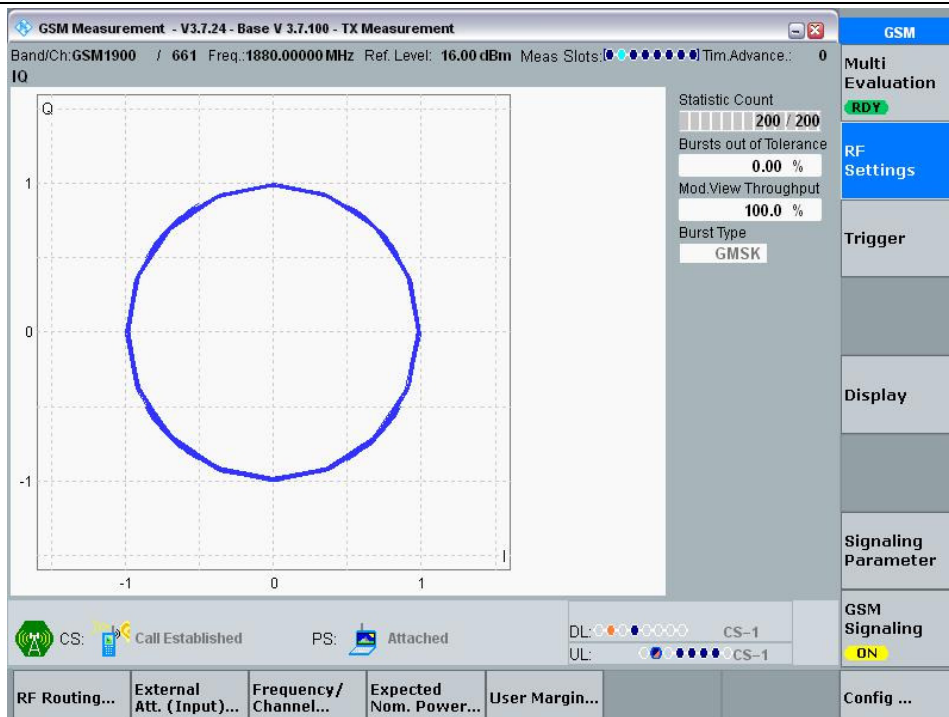
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Test Plot

GSM850

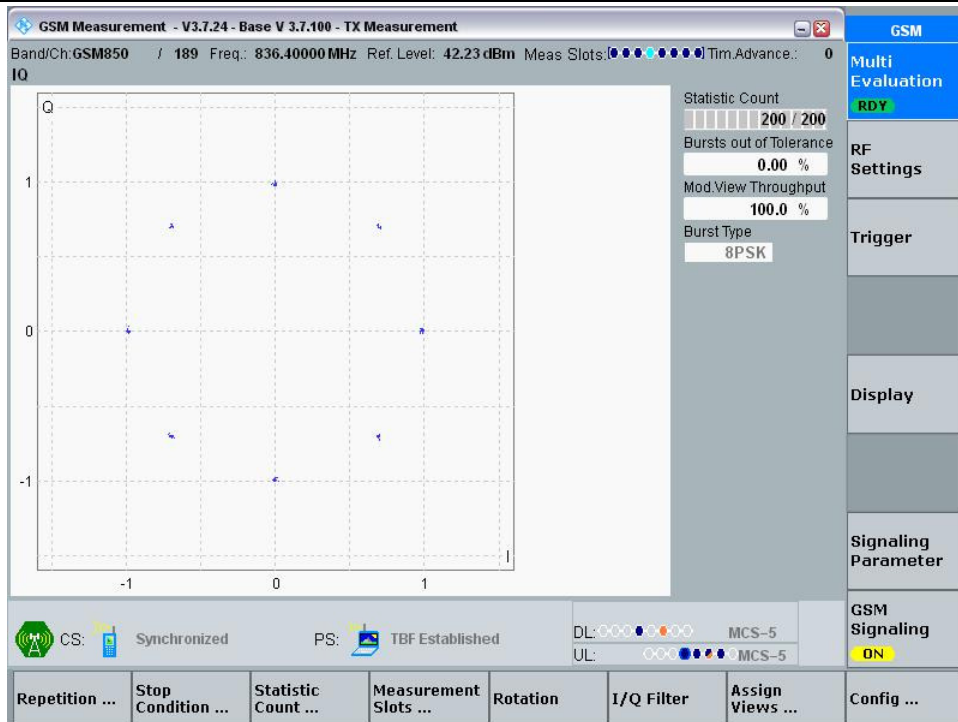


GSM1900

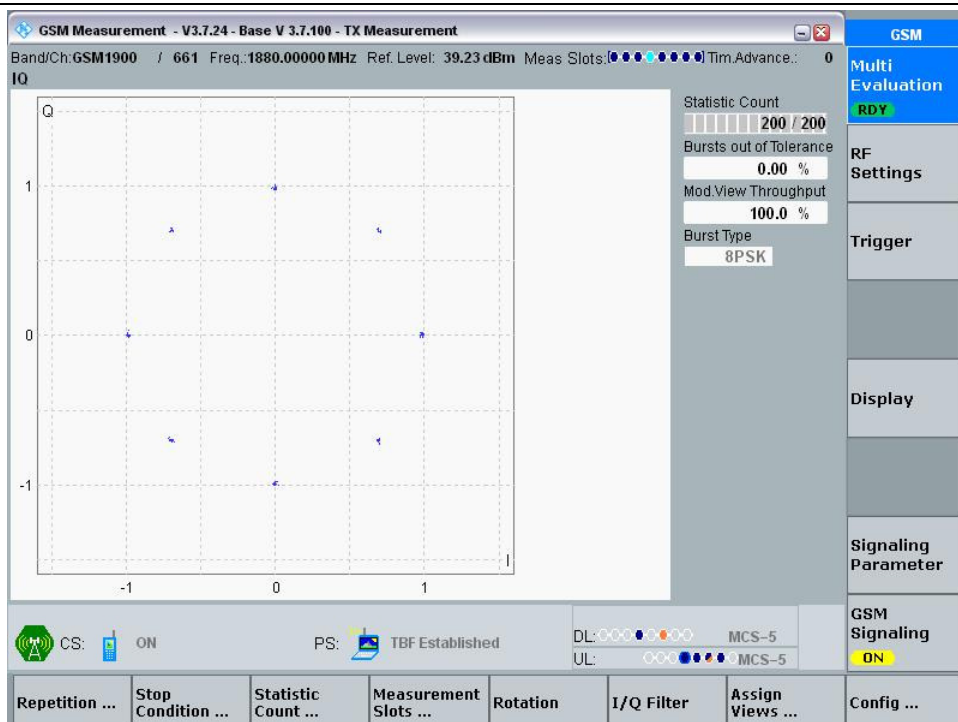


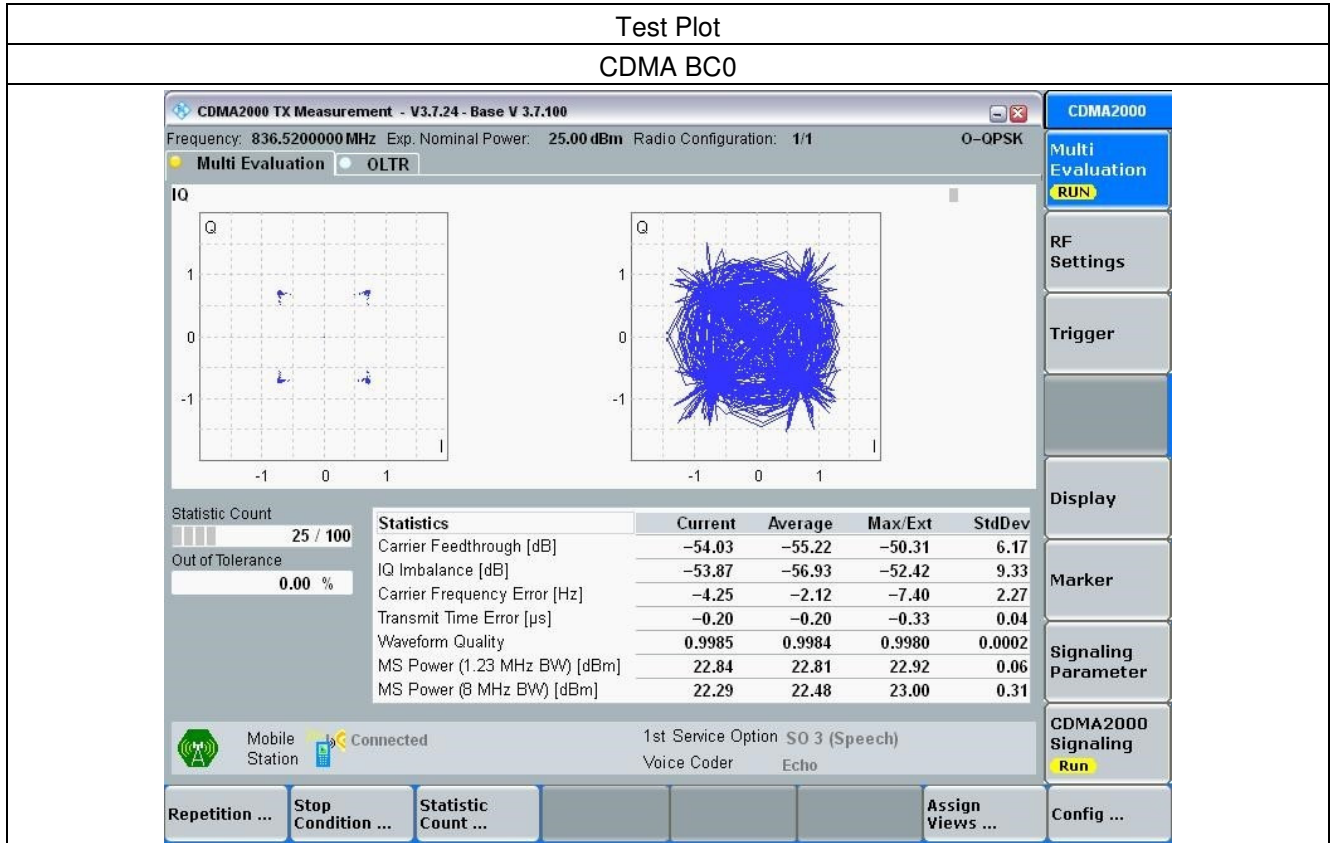
Test Plot

EGPRS850



EGPRS1900





- End of the Report -