



FCC TEST REPORT

**Test report
On Behalf of
FLASH 3C LIMITED
For
Mobile phone
Model No.: PRIME 1**

FCC ID: 2A2LB-PRIME1

Prepared for : FLASH 3C LIMITED
FLAT/RM 605 6/F STAG BUILDING 148-150 QUEEN'S ROAD CENTRAL HK

Prepared By : Shenzhen Tongzhou Testing Co.,Ltd
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Date of Test: 2021/7/19 ~ 2021/8/3

Date of Report: 2021/8/4

Report Number: TZ210702407-E4

The test report apply only to the specific sample(s) tested under stated test conditions
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TEST RESULT CERTIFICATION

Applicant's name : **FLASH 3C LIMITED**
Address..... : FLAT/RM 605 6/F STAG BUILDING 148-150 QUEEN'S ROAD
CENTRAL HK

Manufacture's Name : **YOLOTEL MOBILE LIMITED**
Address..... : Room 2309, Sanhang Science and Technology Building, Northwester
n Polytechnical University, Yuexing Fifth Road, Nanshan District , Sh
enzhen, China

Product description

Trade Mark : FLASH
Product name : Mobile phone
Model and/or type reference . : PRIME 1

Standards : FCC Rules and Regulations Part 22, Part 24 & Part 27
ANSI C63.26:2015

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Date of Test :
Date (s) of performance of tests..... : **2021/7/19 ~ 2021/8/3**
Date of Issue : **2021/8/4**
Test Result..... : **Pass**

Testing Engineer : Anna Hu
(Anna Hu)

Technical Manager : Hugo Chen
(Hugo Chen)

Authorized Signatory : Andy Zhang
(Andy Zhang)



Revision History

Revision	Issue Date	Revisions	Revised By
000	2021/8/4	Initial Issue	Andy Zhang



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1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 2:](#) FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[FCC Part 22 Subpart H:](#) PRIVATE LAND MOBILE RADIO SERVICES.

[FCC Part 24 Subpart E:](#) PUBLIC MOBILE SERVICES

[FCC Part 27:](#) Miscellaneous Wireless Communications Services.

[ANSI/TIA-603-E-2016:](#) Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[ANSI C63.26-2015:](#) IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

[FCCKDB971168D01](#) Power Meas License Digital Systems



E-UTRA

E-UTRA FCC Operation Frequency	: FDD Band 2 (UL: 1850 – 1910 MHz/DL: 1930 – 1990 MHz) FDD Band 4 (UL: 1710 – 1755 MHz/DL: 2110 – 2155 MHz) FDD Band 5 (UL: 824 – 849 MHz/DL: 869 – 894 MHz) FDD Band 7 (UL: 2500 – 2570 MHz/DL: 2620 – 2690 MHz) FDD Band 12(UL: 699 – 716 MHz/DL: 729 – 746 MHz) FDD Band 17(UL: 704 – 716 MHz/DL: 746– 756 MHz) FDD Band 66 (UL: 1710 – 1780 MHz/DL: 2110 – 2180 MHz)
Channel Separation	: 0.1 MHz
Modulation Technology	: OFDM (16QAM, QPSK)
Antenna Type And Gain	: Internal Antenna FDD Band 2: -2.58dBi, FDD Band 4: -2.69dBi, FDD Band 5: -3.35dBi, FDD Band 7: -3.02dBi, FDD Band 12: -4.74dBi, FDD Band 17: -4.58dBi, FDD Band 66: -2.53dBi

Note: Antenna position refer to EUT Photos.



GSM/WCDMA Card Slot :

	Maximum ERP/EIRP (dBm)	Max. Conducted Power (dBm)	Max. Average Burst Power (dBm)
GSM 850	27.49	32.24	32.10
EGPRS 850	20.52	26.86	24.68
PCS 1900	25.69	30.23	30.05
EGPRS 1900	19.27	25.43	22.31
UMTS BAND II	19.48	25.69	22.55
UMTS BAND IV	19.74	25.39	22.35
UMTS BAND V	18.80	25.21	22.36



2.2 Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate

2.3 Short description of the Equipment under Test (EUT)

EUT is subscriber equipment in the GSM/WCDMA/LTE system. Frequency bands Shows in section 2.1.

2.4 Normal Accessory setting

Fully charged battery was used during the test.

2.5 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

supplied by the lab supplied by the manufacturer

Manufacturer	Description	Model	Serial Number	Certificate
N/A	N/A	N/A	N/A	N/A

2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2A2LB-PRIME1** filing to comply with FCC Part 22 and FCC Part 24 Rules.

2.7 Modifications

No modifications were implemented to meet testing criteria.



3 TEST ENVIRONMENT

3.1 Test Facility

FCC

Designation Number: CN1275

Test Firm Registration Number: 167722

Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA

Certificate Number: 5463.01

Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC

ISED#: 22033

CAB identifier: CN0099

Shenzhen Tongzhou Testing Co.,Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010

3.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar



3.3 Test Description

PCS 1900/UMTS BAND II:

Test Item	FCC Rule No.	Requirements	Judgement	Sample ID
Effective (Isotropic) Radiated Power	2.1046, 24.232(c)	EIRP ≤ 2W(33dBm)	Pass	TZ210702407-2#
Bandwidth	2.1049 24.238(a)	OBW: No limit. EBW: No limit.	Pass	TZ210702407-1#
Band Edges	2.1051, 24.238(a)	-13dBm	Pass	TZ210702407-1#
Spurious Emission at Antenna Terminals	2.1051, 24.238(a)	-13dBm	Pass	TZ210702407-1#
Field Strength of Spurious Radiation	2.1053, 24.238(a)	-13dBm	Pass	TZ210702407-2#
Frequency Stability	2.1055, 24.235	the fundamental emission stays within the authorized frequency block.	Pass	TZ210702407-1#
Peak to average ratio	24.232(d)	<13dB	Pass	TZ210702407-1#

GSM850/UMTS BAND V:

Test Item	FCC Rule No.	Requirements	Judgement	Sample ID
Effective (Isotropic) Radiated Power	2.1046, 22.913(a)	ERP ≤ 7W(38.5dBm)	Pass	TZ210702407-2#
Occupied Bandwidth	2.1049	OBW: No limit.	Pass	TZ210702407-1#
Emission Bandwidth	22.917(b)	EBW: No limit.	Pass	TZ210702407-1#
Band Edges Compliance	2.1051, 22.917(a)(b)	-13dBm	Pass	TZ210702407-1#
Spurious Emission at Antenna Terminals	2.1051, 22.917	-13dBm	Pass	TZ210702407-1#
Field Strength of Spurious Radiation	2.1053, 22.917	-13dBm	Pass	TZ210702407-2#
Frequency Stability	2.1055, 22.355	the fundamental emissions stay within the authorized bands of operation. (2.5ppm)	Pass	TZ210702407-1#
Peak to average ratio	2.1046, 2.913(a)	<13dB	Pass	TZ210702407-1#

UMTS BAND IV:

Test Item	FCC Rule No.	Requirements	Judgement	Sample ID
Effective (Isotropic) Radiated Power	2.1046, 27.50(d)	ERP ≤ 1W(30dBm)	Pass	TZ210702407-1#
Occupied Bandwidth	2.1049	OBW: No limit.	Pass	TZ210702407-1#
Emission Bandwidth	2.1049	EBW: No limit.	Pass	TZ210702407-1#
Band Edges Compliance	2.1051, 27.53(h)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Pass	TZ210702407-1#
Spurious Emission at Antenna Terminals	2.1051, 27.53(h)	-13dBm	Pass	TZ210702407-1#
Field Strength of Spurious Radiation	2.1053, 27.53(h)	-13dBm	Pass	TZ210702407-2#
Frequency Stability	2.1055, 27.54	the fundamental emissions stay within the authorized bands of operation. (2.5ppm)	Pass	TZ210702407-1#
Peak to average ratio	2.1046, 27.50(d)	<13dB	Pass	TZ210702407-1#



3.4 Equipment Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2021/1/4	2022/1/3
2	Power Sensor	Agilent	U2021XA	MY5365004	2021/1/4	2022/1/3
3	Power Meter	Agilent	U2531A	TW53323507	2021/1/4	2022/1/3
4	Loop Antenna	schwarzbeck	FMZB1519B	00023	2019/11/16	2022/11/15
5	Wideband Antenna	schwarzbeck	VULB 9163	958	2019/11/16	2022/11/15
6	Horn Antenna	schwarzbeck	9120D-1141	1574	2019/11/16	2022/11/15
7	EMI Test Receiver	R&S	ESCI	100849/003	2021/1/4	2022/1/3
8	Controller	MF	MF7802	N/A	N/A	N/A
9	Amplifier	schwarzbeck	BBV 9743	209	2021/1/4	2022/1/3
10	Amplifier	Tonscend	TSAMP-0518SE	--	2021/1/4	2022/1/3
11	RF Cable(below 1GHz)	HUBER+SUHNER	RG214	N/A	2021/1/4	2022/1/3
12	RF Cable(above 1GHz)	HUBER+SUHNER	RG214	N/A	2021/1/4	2022/1/3
12	RE test software	Tonscend	JS32-RE	V2.0.2.0	N/A	N/A
14	Test Software	Tonscend	JS1120-3	V2.5.77.0418	N/A	N/A
15	Horn Antenna	A-INFO	LB-180400-KF	J211020657	2020/10/12	2022/10/11
16	Amplifier	CDSA	PAP-1840	17021	2020/10/10	2021/10/09
17	Spectrum Analyzer	R&S	FSPRIME 1	100550	2021/1/10	2022/1/9
18	UNIVERSAL RADIO COMMUNICATION	R&S	CMW500	101855	2021/1/4	2022/1/3
19	Signal Generator	Keysight	N5182A	MY4620709	2021/1/4	2022/1/3



3.5 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to ETSI TR 100 028 " Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics" and is documented in the Shenzhen Tongzhou Testing Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Tongzhou Testing Co.,Ltd is reported:

Test	Range	Measurement	Note
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.70 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occupied Bandwidth	9KHz~40GHz	-	(1)
Frequency Error	9KHz~40GHz	1×10^{-7}	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.



4 DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both GSM and PCS frequency band.

*****Note:** GSM/GPRS 850, GSM/GPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band V mode have been tested during the test.

The worst condition was recorded in the test report if no other modes test data.

5 TEST CONDITIONS AND RESULTS

5.1 OUTPUT POWER

5.1.1 CONDUCTED OUTPUT POWER

5.1.1.1 MEASUREMENT METHOD

The transmitter output port was connected to base station.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Measure the maximum burst average power and average power for other modulation signal.

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes(GSM/GPRS 850, GSM/GPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band IV, WCDMA/HSPA band V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

5.1.1.2 MEASUREMENT RESULT



GSM850

Mode	Frequency (MHz)	Peak Power	Avg.Burst Power	Duty cycle Factor(dB)	Frame Power (dBm)	Peak to Average Ratio
GSM850	824.2	32.05	31.85	-9	22.85	0.20
	836.6	32.24	32.02	-9	23.02	0.22
	848.8	32.22	32.10	-9	23.10	0.11
GPRS850 (1 Slot)	824.2	31.56	31.32	-9	22.32	0.25
	836.6	31.85	31.57	-9	22.57	0.28
	848.8	31.84	31.66	-9	22.66	0.17
GPRS850 (2 Slot)	824.2	30.05	29.93	-6	23.93	0.11
	836.6	30.33	30.04	-6	24.04	0.29
	848.8	30.29	30.05	-6	24.05	0.23
GPRS850 (3 Slot)	824.2	29.40	29.19	-4.26	24.93	0.21
	836.6	29.40	29.30	-4.26	25.04	0.10
	848.8	29.19	29.00	-4.26	24.74	0.18
GPRS850 (4 Slot)	824.2	27.20	27.04	-3	24.04	0.16
	836.6	27.16	26.96	-3	23.96	0.20
	848.8	27.48	27.21	-3	24.21	0.27
EGPRS850 (1 Slot)	824.2	26.86	24.68	-9	15.68	2.18
	836.6	26.55	24.33	-9	15.33	2.23
	848.8	26.55	23.56	-9	14.56	2.99
EGPRS850 (2 Slot)	824.2	25.39	23.30	-6	17.30	2.09
	836.6	25.08	22.63	-6	16.63	2.45
	848.8	25.30	22.73	-6	16.73	2.57
EGPRS850 (3 Slot)	824.2	23.21	20.47	-4.26	16.21	2.74
	836.6	23.19	20.30	-4.26	16.04	2.89
	848.8	23.39	21.29	-4.26	17.03	2.10
EGPRS850 (4 Slot)	824.2	21.55	19.21	-3	16.21	2.34
	836.6	21.57	19.06	-3	16.06	2.52
	848.8	21.50	18.81	-3	15.81	2.69



GSM1900

Mode	Frequency (MHz)	Peak Power	Avg.Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)	Peak to Average Ratio
GSM1900	1850.2	30.11	30.01	-9	21.01	0.10
	1880	30.23	29.97	-9	20.97	0.26
	1909.8	30.21	30.05	-9	21.05	0.16
GPRS1900 (1 Slot)	1850.2	29.75	29.64	-9	20.64	0.11
	1880	29.78	29.68	-9	20.68	0.10
	1909.8	29.78	29.55	-9	20.55	0.23
GPRS1900 (2 Slot)	1850.2	27.76	27.59	-6	21.59	0.17
	1880	27.73	27.60	-6	21.60	0.13
	1909.8	27.57	27.34	-6	21.34	0.23
GPRS1900 (3 Slot)	1850.2	26.62	26.45	-4.26	22.19	0.17
	1880	26.98	26.77	-4.26	22.51	0.21
	1909.8	26.59	26.44	-4.26	22.18	0.16
GPRS1900 (4 Slot)	1850.2	25.72	25.52	-3	22.52	0.20
	1880	25.78	25.67	-3	22.67	0.11
	1909.8	25.86	25.64	-3	22.64	0.23
EGPRS1900 (1 Slot)	1850.2	25.19	21.94	-9	12.94	3.25
	1880	25.23	21.27	-9	12.27	3.95
	1909.8	25.43	22.31	-9	13.31	3.12
EGPRS1900 (2 Slot)	1850.2	24.73	21.03	-6	15.03	3.70
	1880	24.54	21.09	-6	15.09	3.46
	1909.8	24.98	21.04	-6	15.04	3.94
EGPRS1900 (3 Slot)	1850.2	22.88	19.01	-4.26	14.75	3.87
	1880	22.83	19.00	-4.26	14.74	3.82
	1909.8	22.95	19.40	-4.26	15.14	3.55
EGPRS1900 (4 Slot)	1850.2	21.89	18.21	-3	15.21	3.67
	1880	21.65	17.93	-3	14.93	3.73
	1909.8	21.62	18.39	-3	15.39	3.23



UMTS BAND II

Mode	Frequency (MHz)	Peak Power	Avg.Burst Power	Peak to Average Ratio
RMC	1852.4	25.69	22.55	3.14
	1880	24.39	22.07	2.32
	1907.6	25.24	22.22	3.02
AMR	1852.4	24.04	22.01	2.04
	1880	24.20	22.05	2.14
	1907.6	24.87	22.04	2.83
HSDPA Subtest 1	1852.4	24.15	21.20	2.95
	1880	22.80	20.77	2.04
	1907.6	23.12	20.68	2.44
HSDPA Subtest 2	1852.4	22.31	20.05	2.26
	1880	22.14	20.12	2.02
	1907.6	23.44	20.80	2.64
HSDPA Subtest 3	1852.4	22.67	19.84	2.82
	1880	22.58	20.01	2.56
	1907.6	22.74	20.18	2.57
HSDPA Subtest 4	1852.4	22.77	20.39	2.38
	1880	23.63	20.62	3.02
	1907.6	22.72	20.56	2.16
HSUPA Subtest 1	1852.4	22.68	20.62	2.06
	1880	22.31	20.31	2.00
	1907.6	23.00	20.25	2.75
HSUPA Subtest 2	1852.4	24.63	21.64	2.99
	1880	24.23	21.75	2.48
	1907.6	23.84	21.48	2.37
HSUPA Subtest 3	1852.4	24.20	21.42	2.78
	1880	23.29	21.14	2.15
	1907.6	23.70	21.09	2.61
HSUPA Subtest 4	1852.4	24.14	21.26	2.88
	1880	24.40	22.11	2.30
	1907.6	24.55	22.07	2.48
HSUPA Subtest 5	1852.4	23.75	21.03	2.71
	1880	24.46	21.57	2.90
	1907.6	24.57	21.91	2.66



UMTS BAND IV

Mode	Frequency (MHz)	Peak Power	Avg.Burst Power	Peak to Average Ratio
RMC	1712.4	25.39	22.35	3.04
	1732.4	25.18	22.11	3.07
	1752.6	25.19	22.26	2.94
AMR	1712.4	24.92	22.16	2.76
	1732.4	24.58	21.92	2.66
	1752.6	24.31	21.79	2.51
HSDPA Subtest 1	1712.4	24.18	21.12	3.06
	1732.4	23.09	20.79	2.30
	1752.6	23.86	20.79	3.07
HSDPA Subtest 2	1712.4	22.82	20.41	2.42
	1732.4	23.18	20.22	2.97
	1752.6	23.52	20.79	2.73
HSDPA Subtest 3	1712.4	22.56	19.92	2.64
	1732.4	22.00	20.00	2.01
	1752.6	22.08	19.98	2.09
HSDPA Subtest 4	1712.4	22.77	20.02	2.75
	1732.4	23.16	20.59	2.57
	1752.6	23.36	20.91	2.46
HSUPA Subtest 1	1712.4	23.49	20.68	2.80
	1732.4	23.07	20.34	2.73
	1752.6	22.92	20.57	2.35
HSUPA Subtest 2	1712.4	23.64	21.38	2.26
	1732.4	24.72	21.52	3.20
	1752.6	23.46	21.26	2.20
HSUPA Subtest 3	1712.4	24.12	21.26	2.86
	1732.4	24.01	21.05	2.96
	1752.6	24.24	21.31	2.94
HSUPA Subtest 4	1712.4	23.56	21.34	2.22
	1732.4	24.32	22.19	2.13
	1752.6	24.47	22.33	2.14
HSUPA Subtest 5	1712.4	23.35	21.24	2.12
	1732.4	24.66	21.75	2.91
	1752.6	24.43	21.97	2.47



UMTS BAND V

Mode	Frequency (MHz)	Peak Power	Avg.Burst Power	Peak to Average Ratio
RMC	826.4	25.21	22.32	2.88
	836.4	24.12	21.84	2.28
	846.6	24.41	22.02	2.39
AMR	826.4	24.09	21.97	2.12
	836.4	24.32	21.86	2.45
	846.6	24.06	21.91	2.14
HSDPA Subtest 1	826.4	23.53	21.20	2.33
	836.4	23.11	21.02	2.10
	846.6	23.75	20.78	2.97
HSDPA Subtest 2	826.4	22.85	20.35	2.50
	836.4	22.42	20.00	2.42
	846.6	23.56	20.70	2.85
HSDPA Subtest 3	826.4	22.46	19.83	2.62
	836.4	22.77	19.96	2.80
	846.6	22.23	20.22	2.02
HSDPA Subtest 4	826.4	22.90	20.04	2.85
	836.4	22.71	20.35	2.36
	846.6	23.33	20.80	2.53
HSUPA Subtest 1	826.4	22.92	20.44	2.47
	836.4	23.06	20.22	2.85
	846.6	22.49	20.31	2.18
HSUPA Subtest 2	826.4	23.57	21.47	2.10
	836.4	23.68	21.55	2.13
	846.6	23.30	21.22	2.07
HSUPA Subtest 3	826.4	23.92	21.30	2.62
	836.4	23.68	21.10	2.58
	846.6	24.19	21.10	3.09
HSUPA Subtest 4	826.4	23.15	21.02	2.13
	836.4	24.73	22.36	2.37
	846.6	24.94	22.35	2.59
HSUPA Subtest 5	826.4	23.09	21.09	2.00
	836.4	23.71	21.54	2.17
	846.6	24.56	21.88	2.68

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX(CM-1,0)
Note: CM=1 for $\beta_d/\beta_{d=12/15}, \beta_{hs}/\beta_{c=24/15}$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		



The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensate for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.



5.1.2 RADIATED OUTPUT POWER

5.1.2.1 MEASUREMENT METHOD

The measurements procedures specified in ANSI/TIA-603-E-2016 were applied.

1. Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signal operating below 1GHz are performed using dipole antennas. Measurements on signals operating above 1GHz are performed using broadband horn antennas. All measurements are performed as RMS average measurements while the EUT operating at its maximum duty cycle, at maximum power, and at the approximate frequencies.
2. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (P_{in}) is applied to the input of the dipole, and the power received (P_r) at the chamber's probe antenna is recorded.
3. The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as $AR_{pl} = P_{in} + 2.15 - P_r$. The AR_{pl} is the attenuation of "reference path loss", and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: $Power = P_{Mea} + AR_{pl}$
4. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
5. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
6. The EUT is then put into continuously transmitting mode at its maximum power level.
7. Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step 1 is added to this result.
8. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (P_{in}).
9. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}...$

5.1.2.2 PROVISIONS APPLICABLE

Mode	FCC Part Section(s)	Nominal Peak Power
GSM/GPRS 850	22.913(a)(2)	$\leq 38.45\text{dBm}$ (7W). ERP
GSM/GPRS 1900	24.232(c)	$\leq 33\text{dBm}$ (2W). EIRP
UMTS BAND II	24.232(c)	$\leq 33\text{dBm}$ (2W), EIRP
UMTS BAND V	22.913(a)(2)	$\leq 38.45\text{dBm}$ (7W). ERP
UMTS BAND IV	27.50(d)	$\leq 30\text{dBm}$ (1W) .ERP



5.1.2.3 MEASUREMENT RESULT

Radiated Power (ERP) for GPRS/EGPRS 850				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. E.R.P	
GSM	824.2	27.09	Horizontal	Pass
	836.6	26.01	Horizontal	Pass
	848.8	27.49	Horizontal	Pass
	824.2	22.38	Vertical	Pass
	836.6	21.92	Vertical	Pass
	848.8	21.53	Vertical	Pass
GPRS	824.2	26.50	Horizontal	Pass
	836.6	26.51	Horizontal	Pass
	848.8	25.22	Horizontal	Pass
	824.2	21.47	Vertical	Pass
	836.6	21.19	Vertical	Pass
	848.8	20.16	Vertical	Pass
EGPRS	824.2	20.52	Horizontal	Pass
	836.6	19.86	Horizontal	Pass
	848.8	20.45	Horizontal	Pass
	824.2	16.04	Vertical	Pass
	836.6	16.01	Vertical	Pass
	848.8	16.05	Vertical	Pass



Radiated Power (E.I.R.P) for GPRS/EGPRS 1900				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. E.I.R.P	
GSM	1850.2	25.69	Horizontal	Pass
	1880.0	25.45	Horizontal	Pass
	1909.8	25.44	Horizontal	Pass
	1850.2	20.53	Vertical	Pass
	1880.0	22.05	Vertical	Pass
	1909.8	20.91	Vertical	Pass
GPRS	1850.2	23.74	Horizontal	Pass
	1880.0	24.60	Horizontal	Pass
	1909.8	22.93	Horizontal	Pass
	1850.2	20.44	Vertical	Pass
	1880.0	21.79	Vertical	Pass
	1909.8	21.30	Vertical	Pass
EGPRS	1850.2	19.27	Horizontal	Pass
	1880.0	18.85	Horizontal	Pass
	1909.8	18.50	Horizontal	Pass
	1850.2	14.36	Vertical	Pass
	1880.0	14.24	Vertical	Pass
	1909.8	14.20	Vertical	Pass



Radiated Power (E.I.R.P) for UMTS band II				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P (dBm)	Polarization Of Max. E.I.R.P	
UMTS	1852.4	19.02	Horizontal	Pass
	1880.0	19.48	Horizontal	Pass
	1907.6	18.23	Horizontal	Pass
	1852.4	13.97	Vertical	Pass
	1880.0	12.12	Vertical	Pass
	1907.6	13.46	Vertical	Pass

Radiated Power (E.I.R.P) for UMTS band IV				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P (dBm)	Polarization Of Max. E.I.R.P	
UMTS	1712.4	19.11	Horizontal	Pass
	1732.4	19.74	Horizontal	Pass
	1752.6	18.35	Horizontal	Pass
	1712.4	14.11	Vertical	Pass
	1732.4	12.71	Vertical	Pass
	1752.6	11.59	Vertical	Pass

Radiated Power (ERP) for UMTS band V				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. E.R.P	
UMTS	826.4	18.80	Horizontal	Pass
	836.4	18.43	Horizontal	Pass
	846.6	18.21	Horizontal	Pass
	826.4	12.14	Vertical	Pass
	836.4	12.95	Vertical	Pass
	846.6	11.32	Vertical	Pass

Note: Above is the worst mode data.



5.2 PEAK-TO-AVERAGE RATIO

5.2.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

5.2.2 PROVISIONS APPLICABLE

This is the test for the Peak-to-Average Ratio from the EUT.

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

**5.2.3 MEASUREMENT RESULT**

Modes	Max Peak to Average Ratio(dB)	Upper limit(dB)	Result
GSM850	2.99	13	Pass
PCS1900	3.95	13	Pass
UMTS BAND II	3.14	13	Pass
UMTS BAND IV	3.20	13	Pass
UMTS BAND V	3.09	13	Pass

Note: refer to section of 5.1.1.2.



5.3 OCCUPIED BANDWIDTH

5.3.1 MEASUREMENT METHOD

1. The Occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper Frequency limits, the mean power radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.
2. RBW=1~5% of the expected OBW, VBW>=3 x RBW, Detector=Peak, Trace mode=max hold, Sweep=auto couple, and the trace was allowed to stabilize.

5.3.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as 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

5.3.3 MEASUREMENT RESULT

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	247.79	311.5	---	PASS
GSM850	190	245.8	312.7	---	PASS
GSM850	251	244.81	313.1	---	PASS
GPRS850	128	242.44	315.8	---	PASS
GPRS850	190	246.63	310.5	---	PASS
GPRS850	251	245.28	322	---	PASS
EGPRS850	128	248.69	286	---	PASS
EGPRS850	190	253.84	316.4	---	PASS
EGPRS850	251	233.69	291.5	---	PASS
GSM1900	512	244.04	302.2	---	PASS
GSM1900	661	248.8	317.2	---	PASS
GSM1900	810	247.73	324.2	---	PASS
GPRS1900	128	241.75	309.7	---	PASS
GPRS1900	190	243.41	302.8	---	PASS
GPRS1900	251	245.97	306.3	---	PASS
EGPRS1900	512	250.05	314	---	PASS
EGPRS1900	661	247.24	311.7	---	PASS
EGPRS1900	810	246.89	326.4	---	PASS

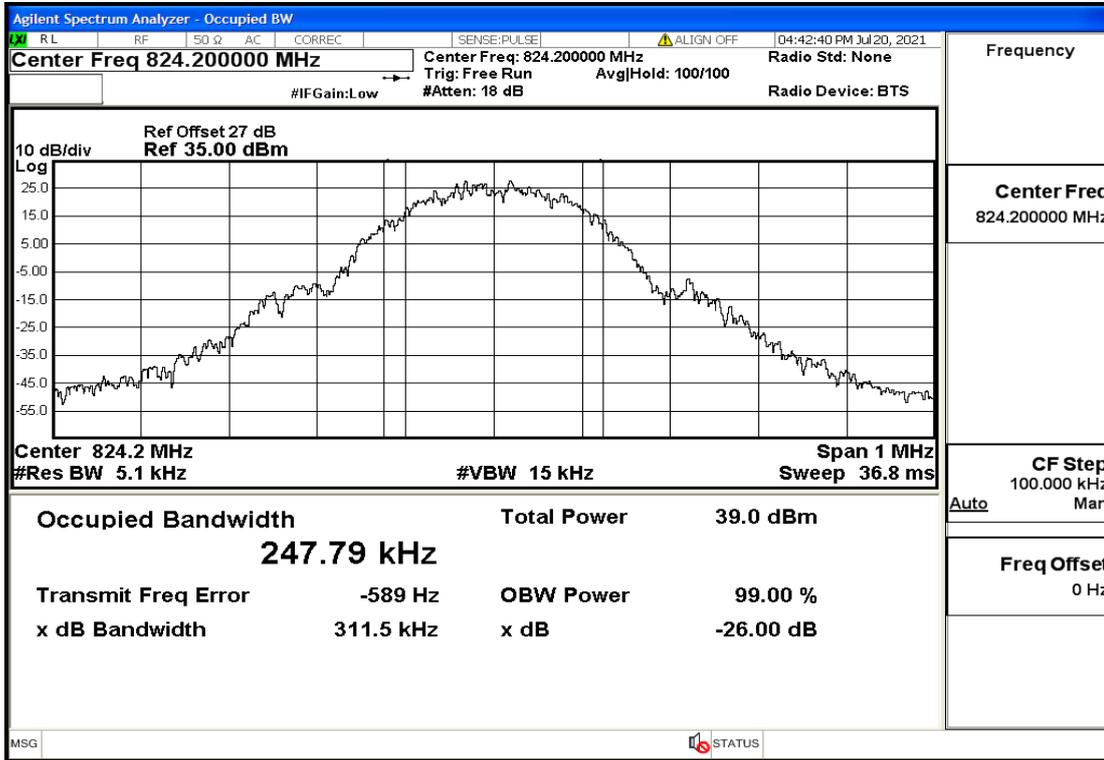
Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
Band II	9262	4147.62	4635.9	---	PASS
Band II	9400	4146.24	4646	---	PASS
Band II	9538	4153.21	4638.4	---	PASS
Band V	4132	4171.82	4667.5	---	PASS
Band V	4182	4137.09	4614	---	PASS
Band V	4233	4161.76	4649.7	---	PASS
Band IV	1312	4141.19	4627.8	---	PASS
Band IV	1413	4150.48	4638.5	---	PASS
Band IV	1513	4151.03	4649	---	PASS



5.3.3.1 For GSM

Test Band=GSM850/PCS1900

GSM850-824.2MHz-Voice

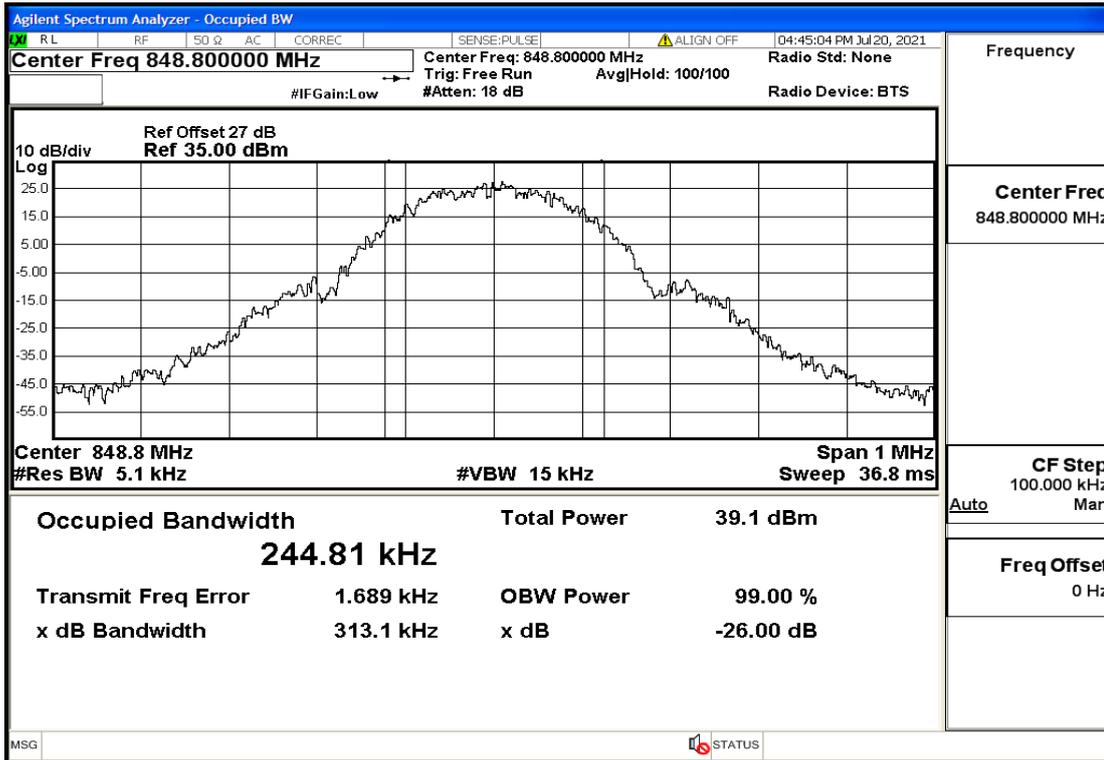


GSM850-836.6MHz-Voice





GSM850-848.8MHz-Voice

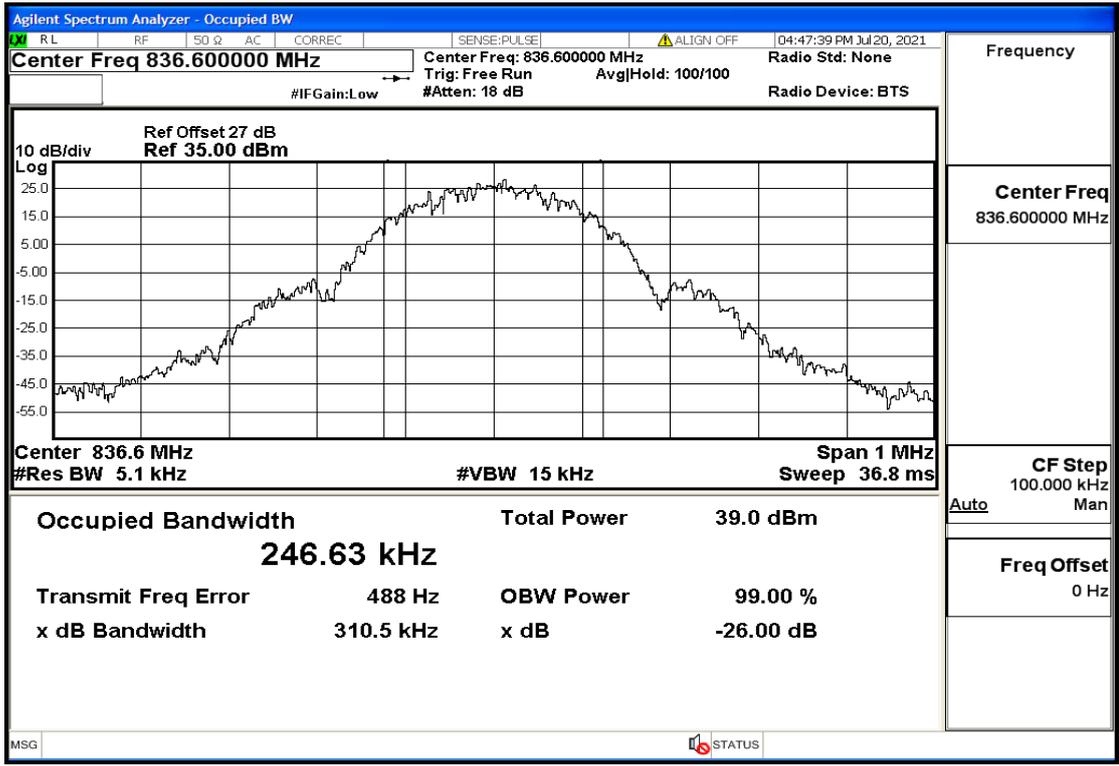


GSM850-824.2MHz-GPRS

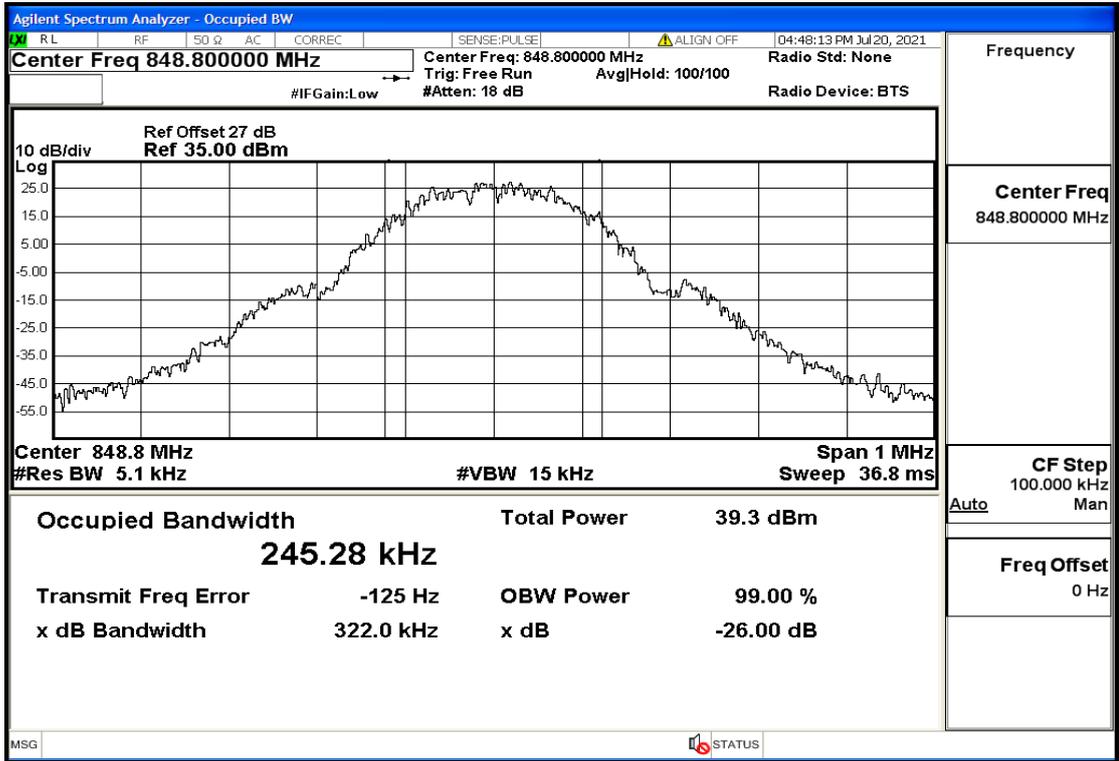




GSM850-836.6MHz-GPRS

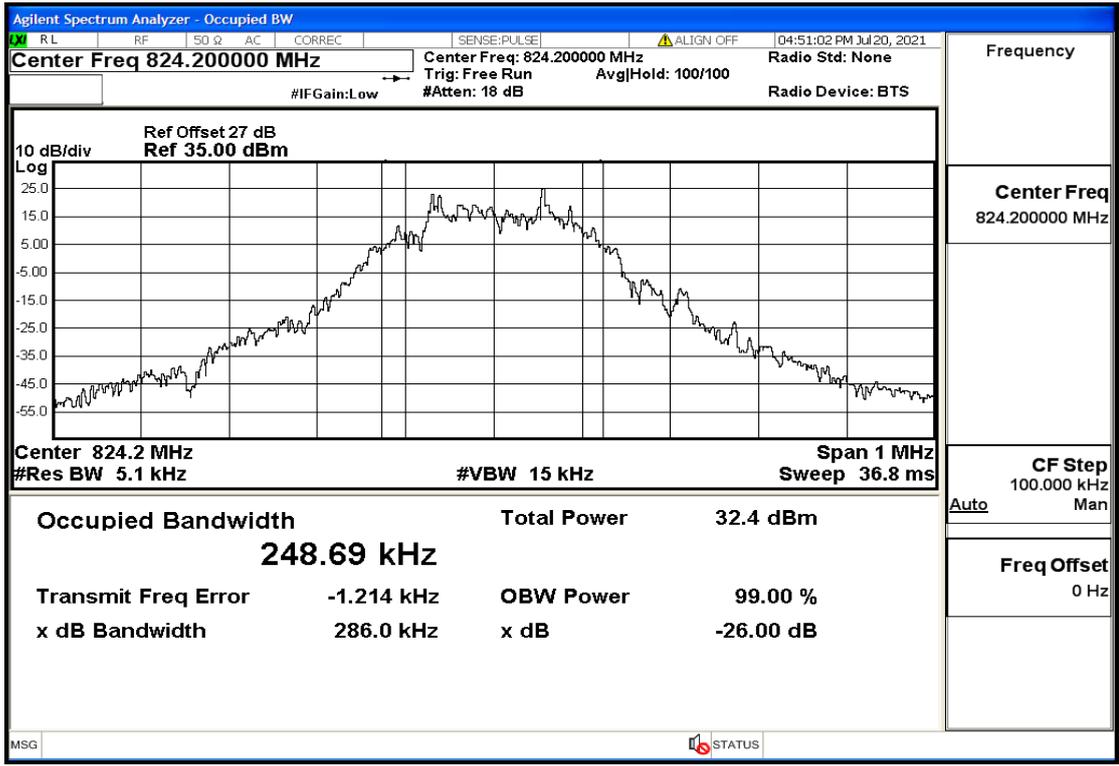


GSM850-848.8MHz-GPRS

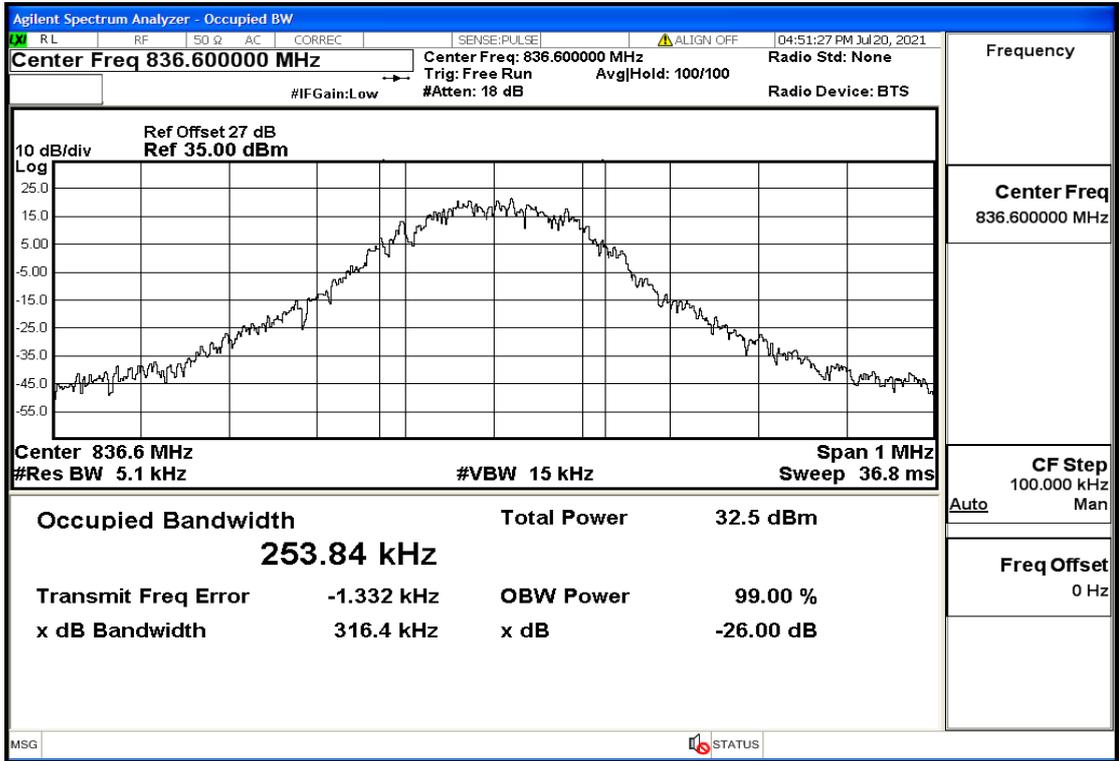




GSM850-824.2MHz-EGPRS



GSM850-836.6MHz-EGPRS





GSM850-848.8MHz-EGPRS

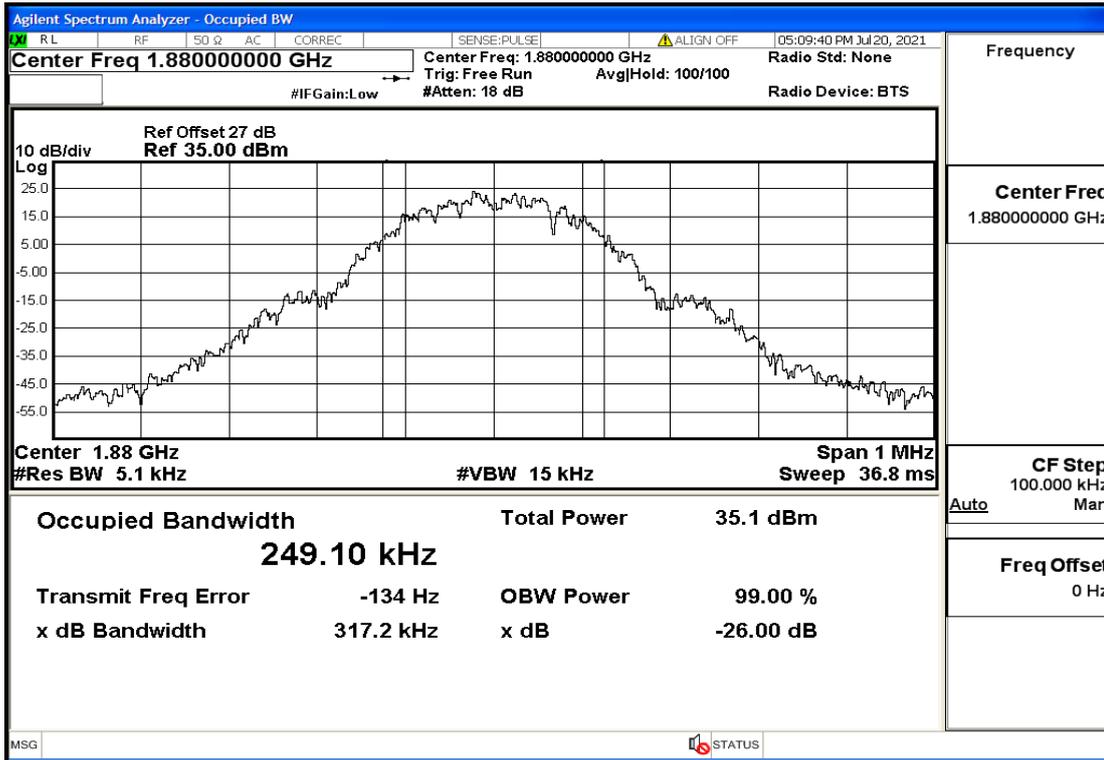


GSM1900-1850.2MHz-Voice

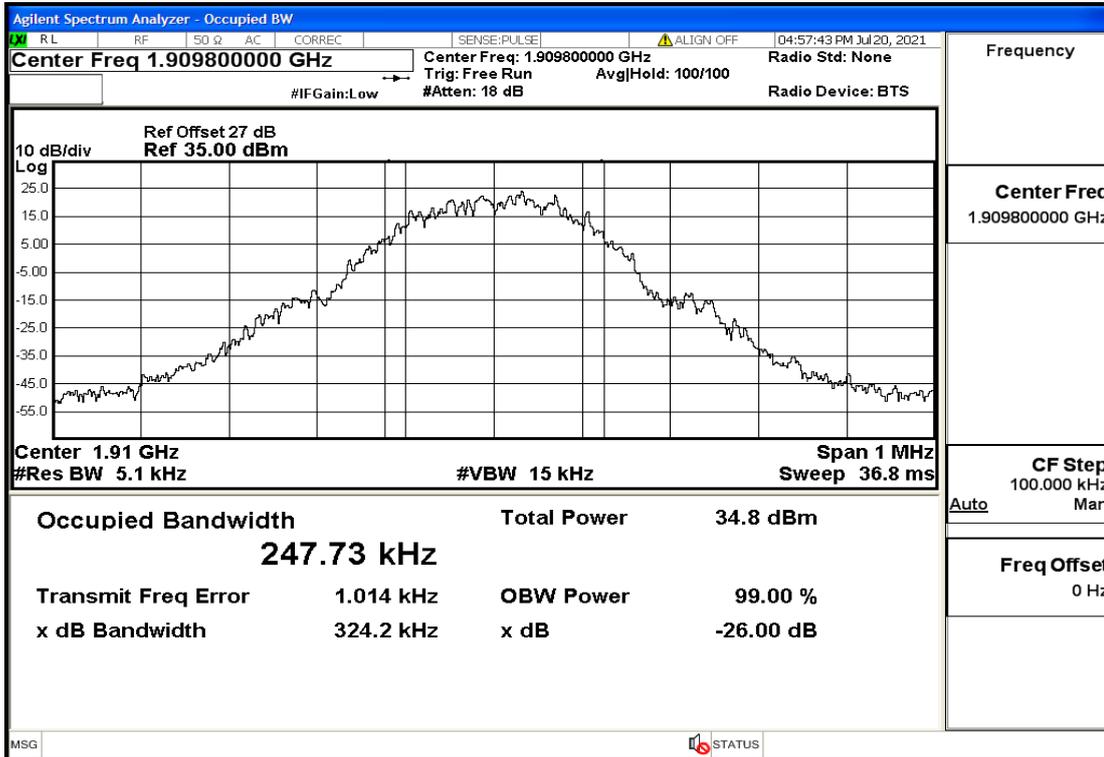




GSM1900-1880MHz-Voice



GSM1900-1909.8MHz-Voice

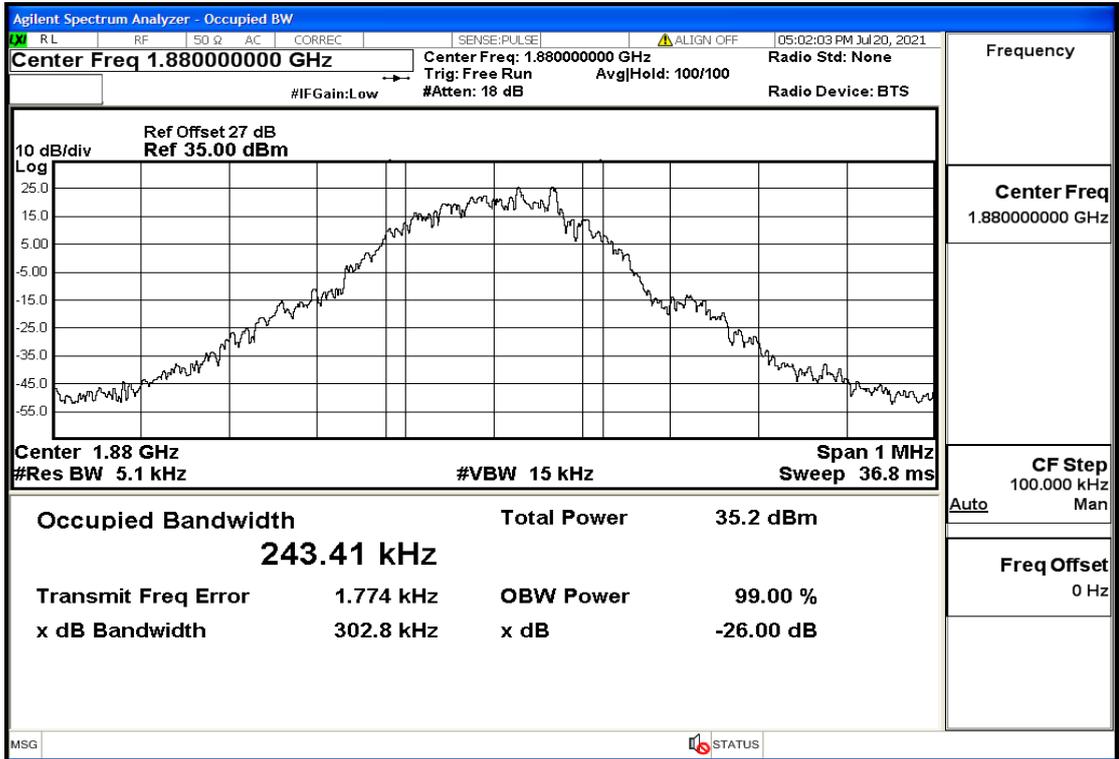




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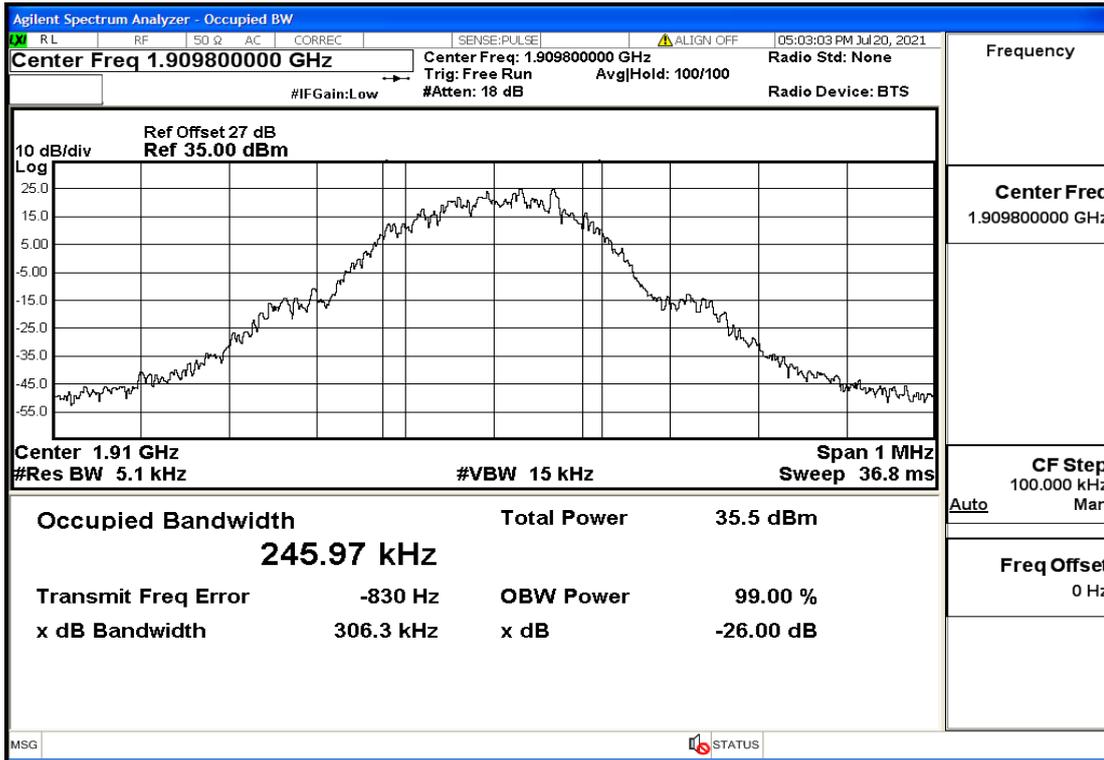


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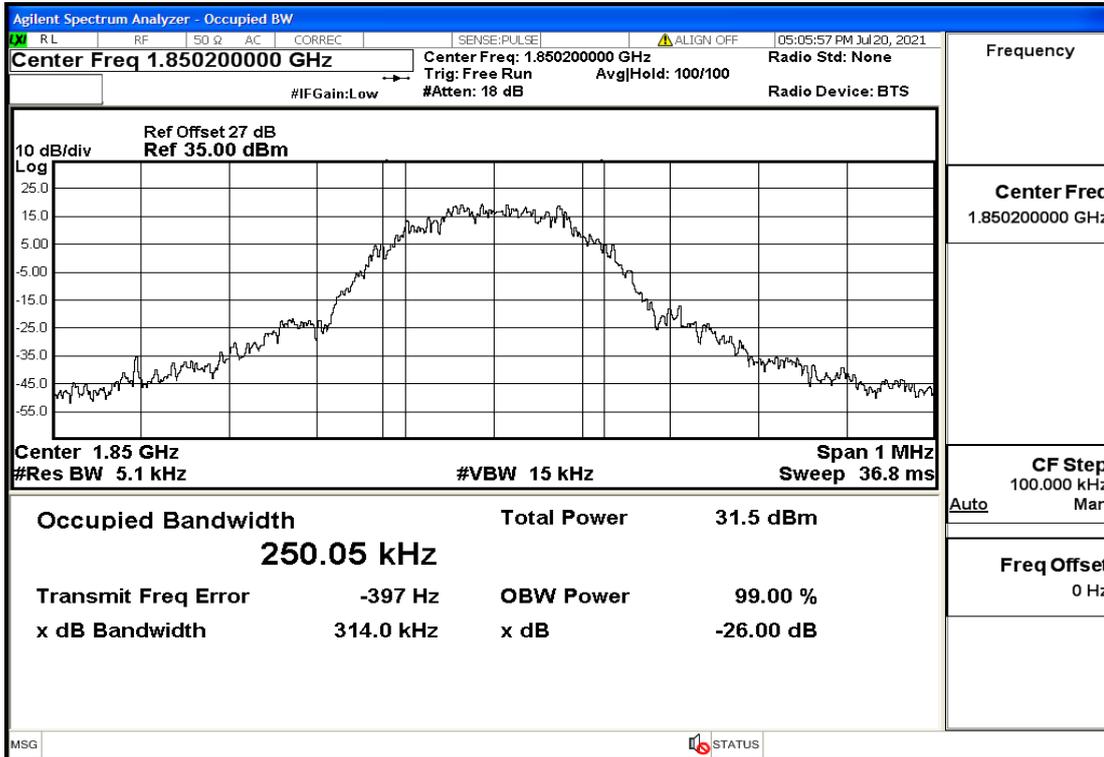




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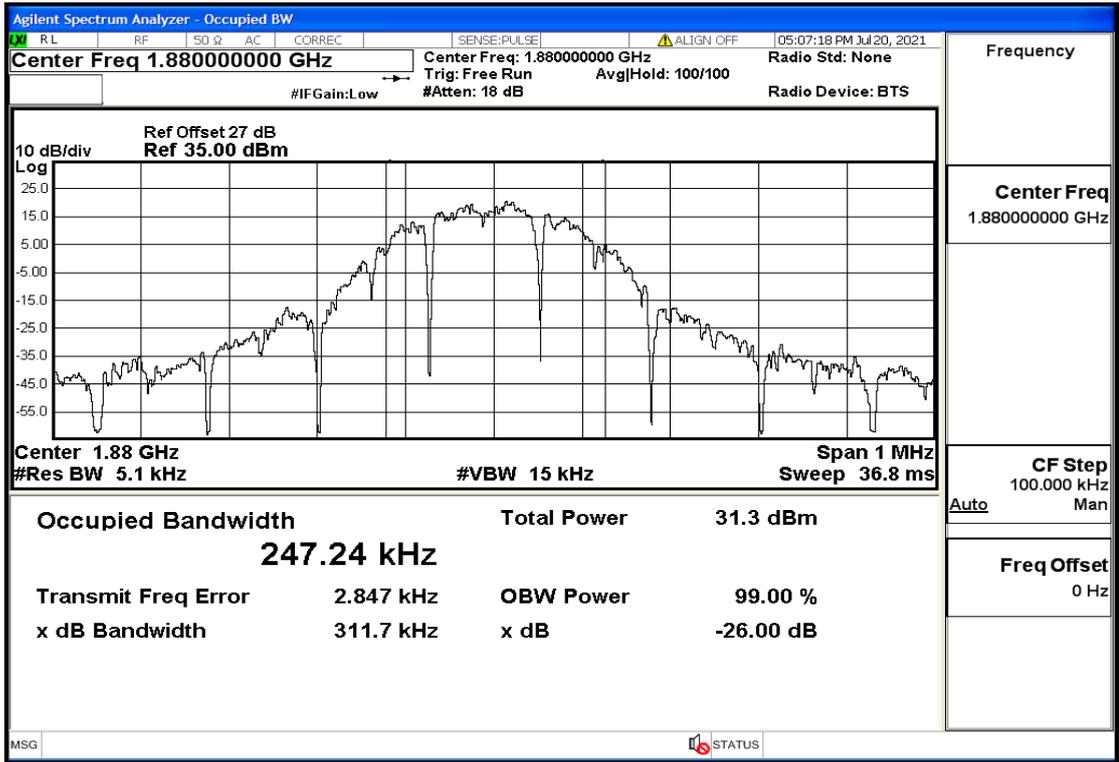


GSM1900-1850.2MHz-EGPRS

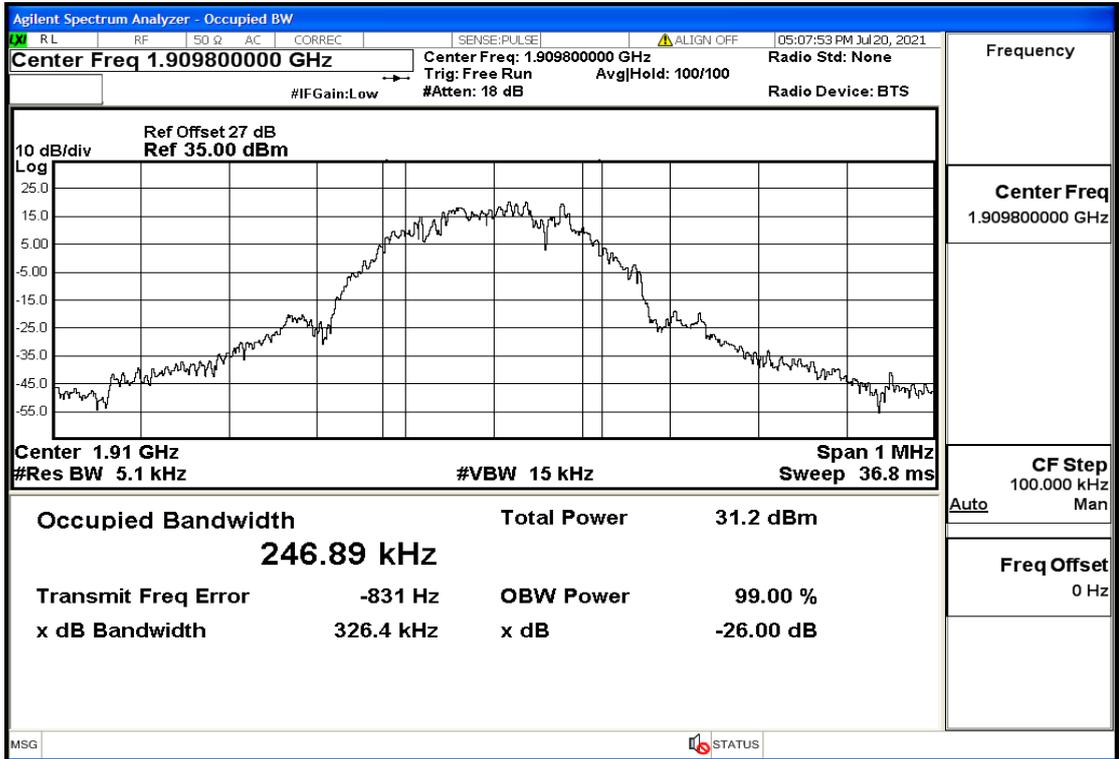




GSM1900-1880MHz-EGPRS



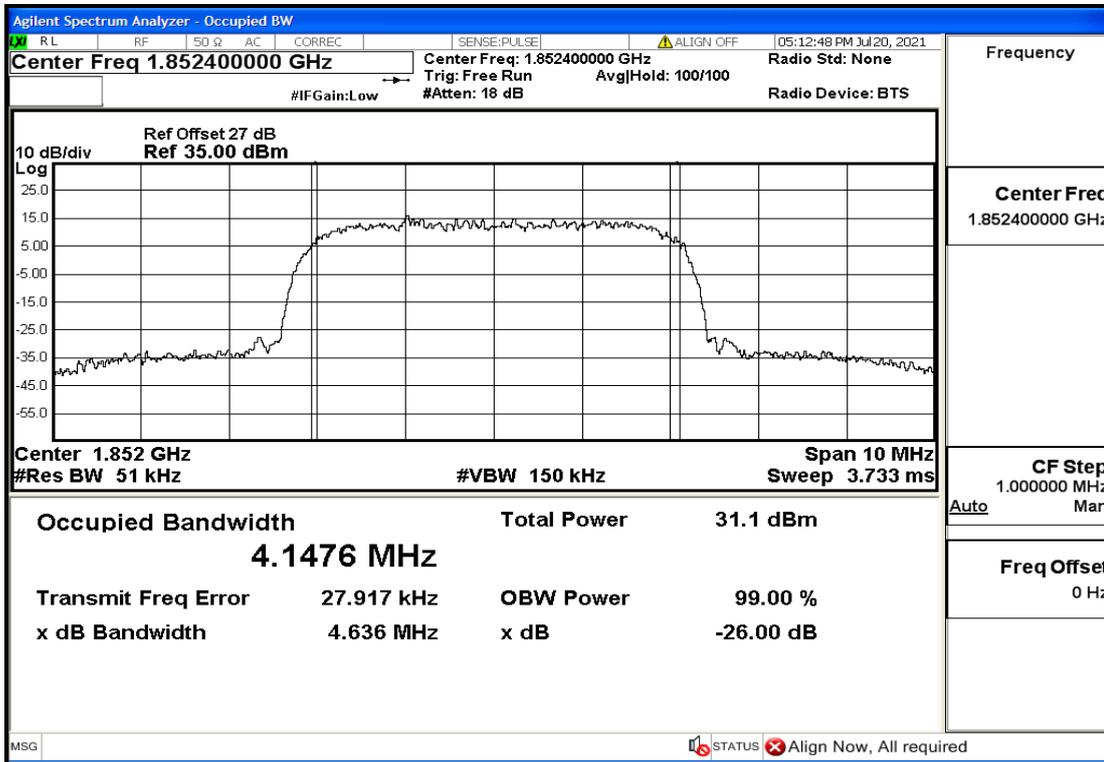
GSM1900-1909.8MHz-EGPRS



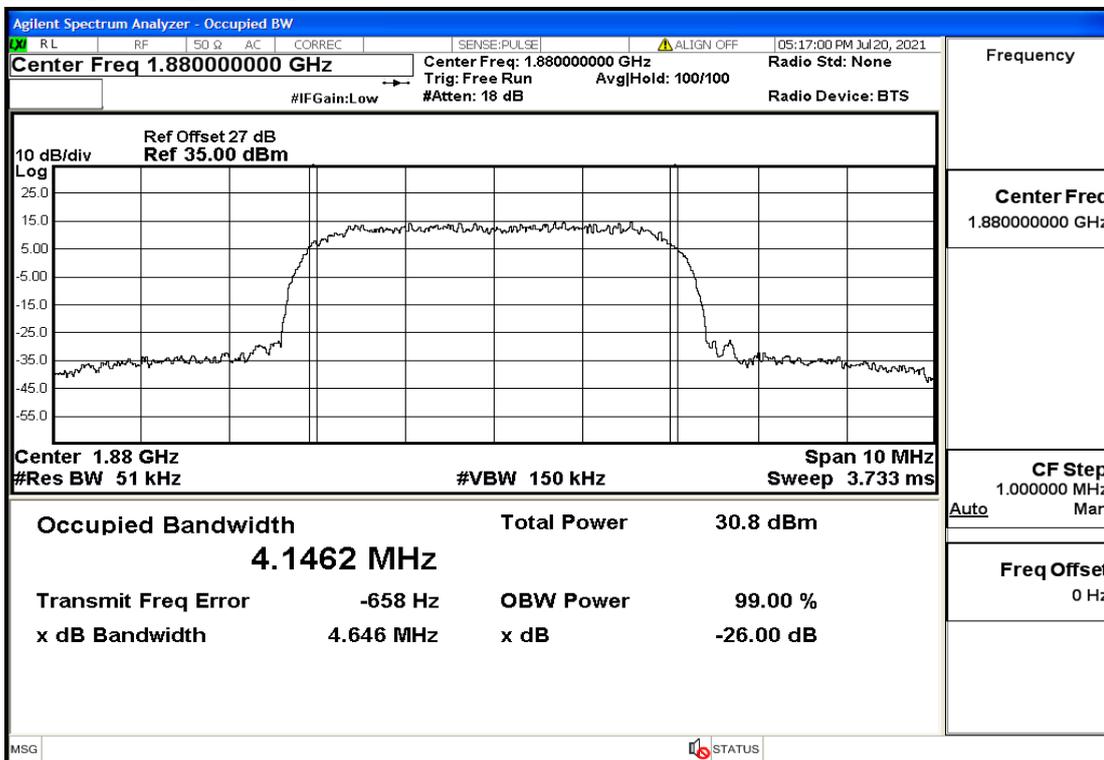


5.3.3.2 For WCDMA

Test Band=WCDMABand II/ WCDMABand V/ WCDMABand IV
UMTS BAND II-1852.4MHz-RMC

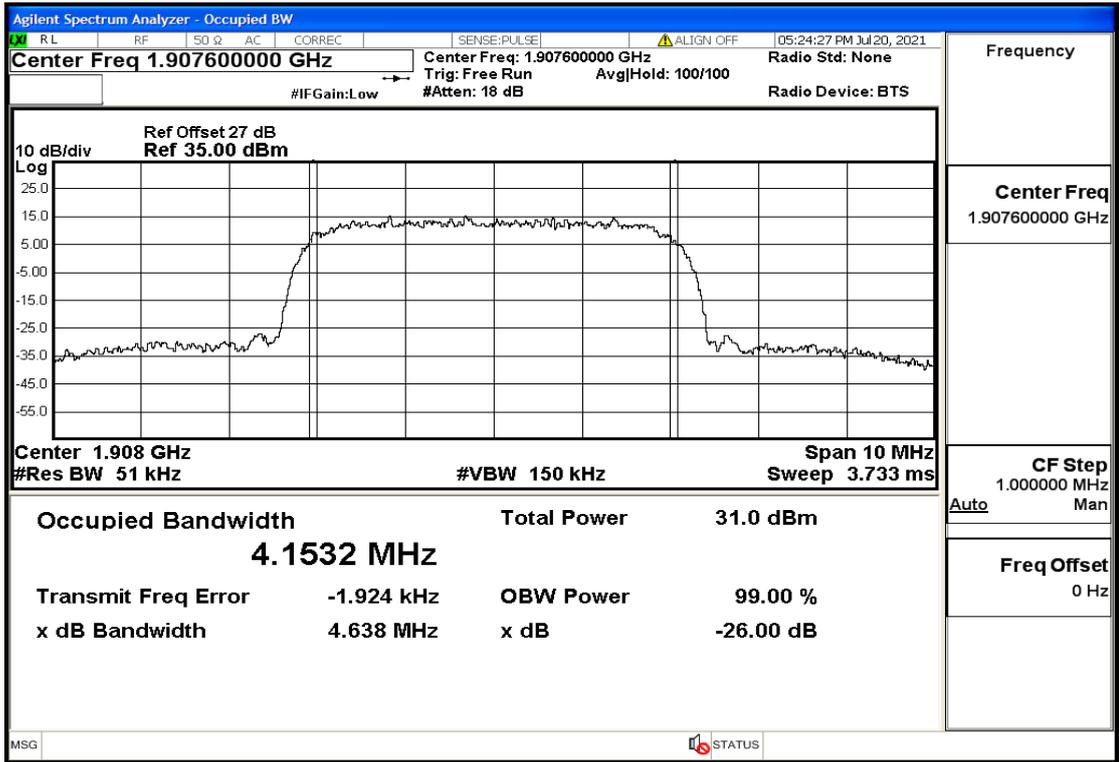


UMTS BAND II-1880MHz-RMC

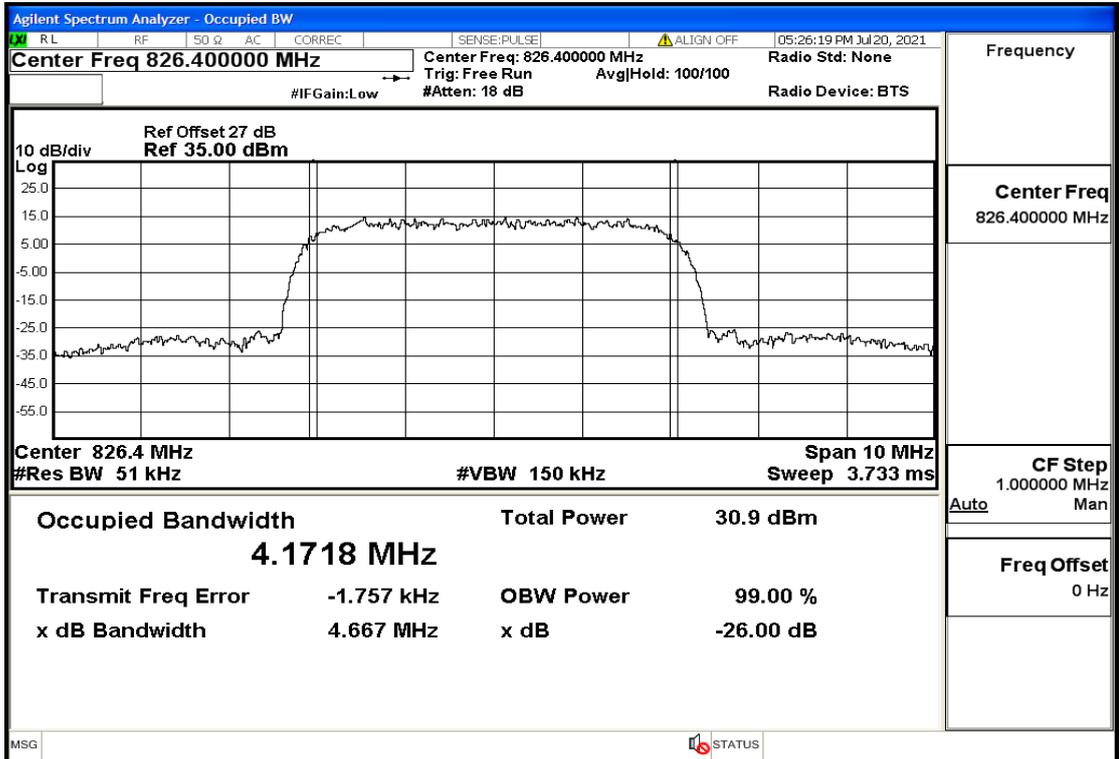




UMTS BAND II-1907.6MHz-RMC

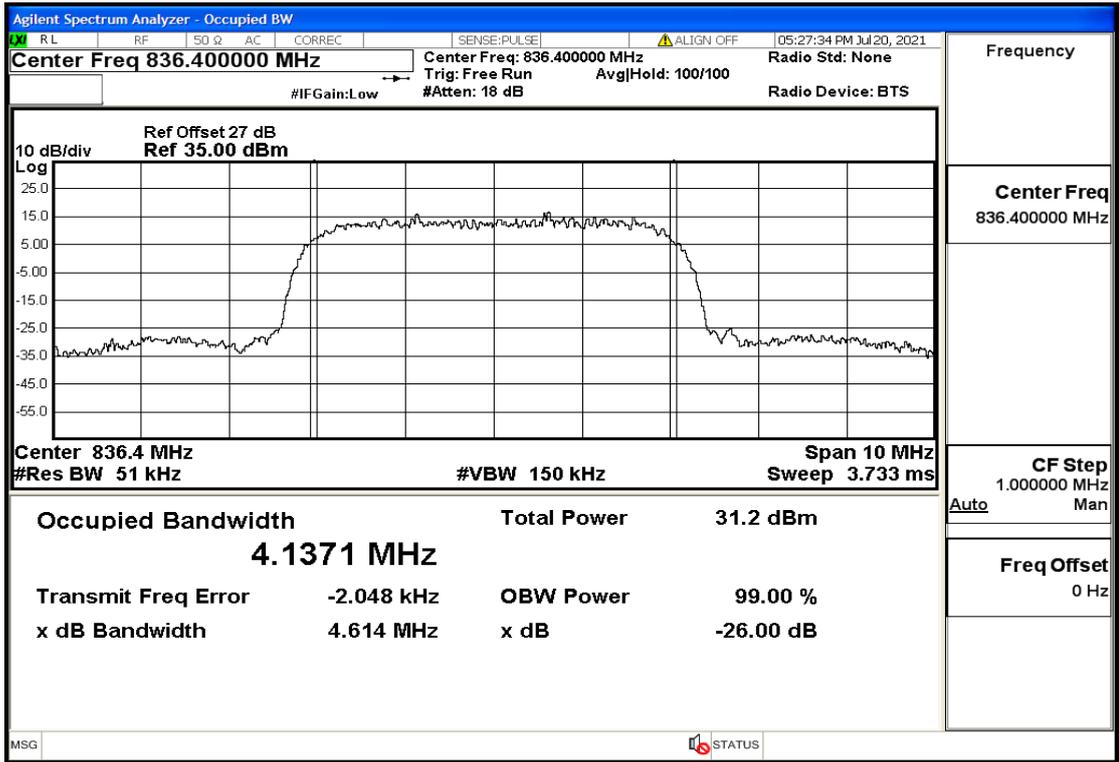


UMTS BAND V-826.4MHz-RMC

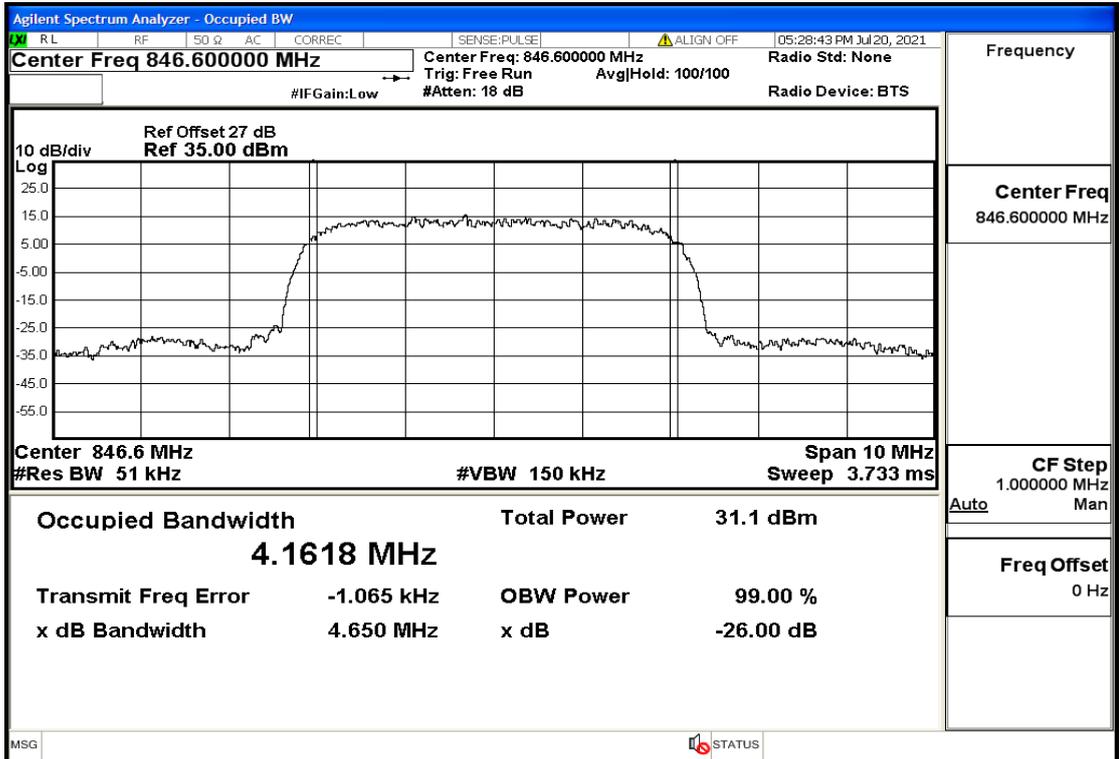




UMTS BAND V-836.4MHz-RMC

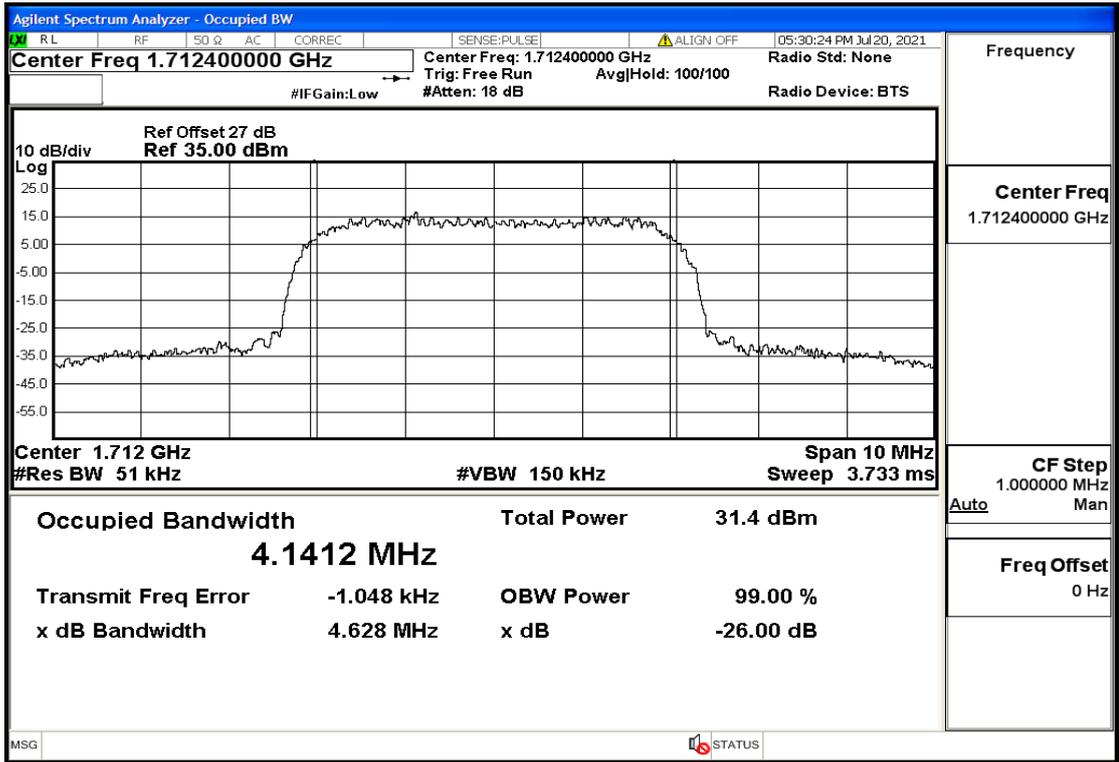


UMTS BAND V-846.6MHz-RMC

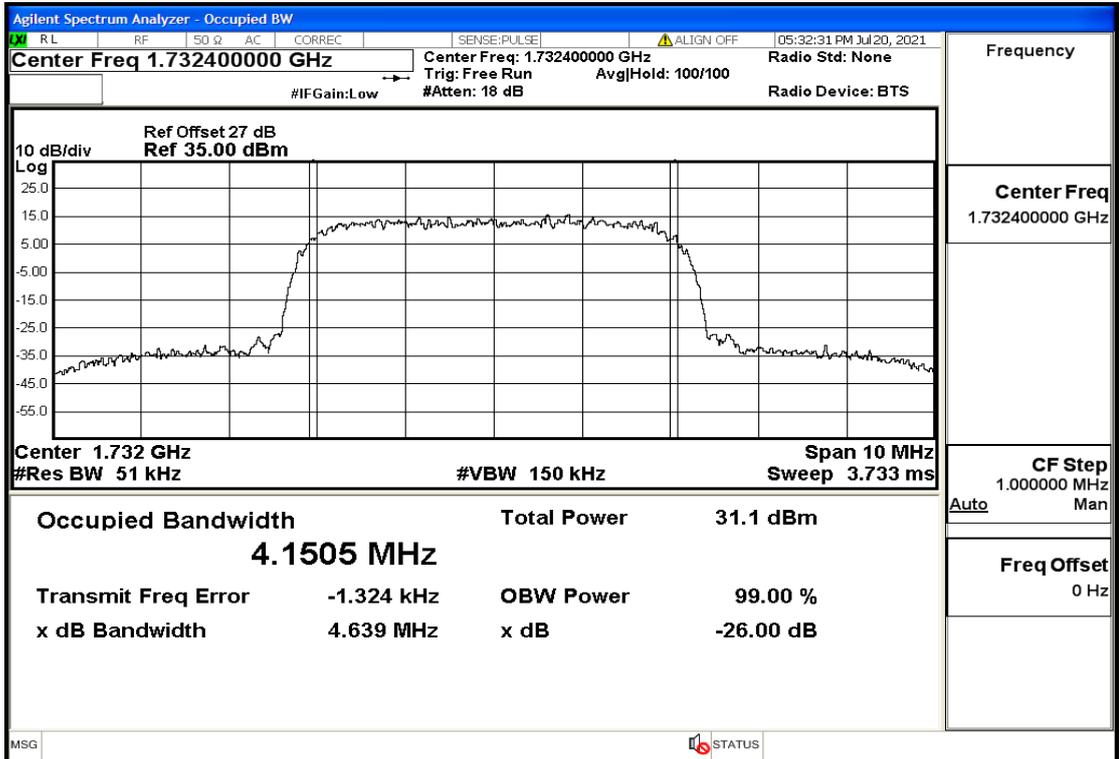




UMTS BAND IV-1712.4MHz-RMC

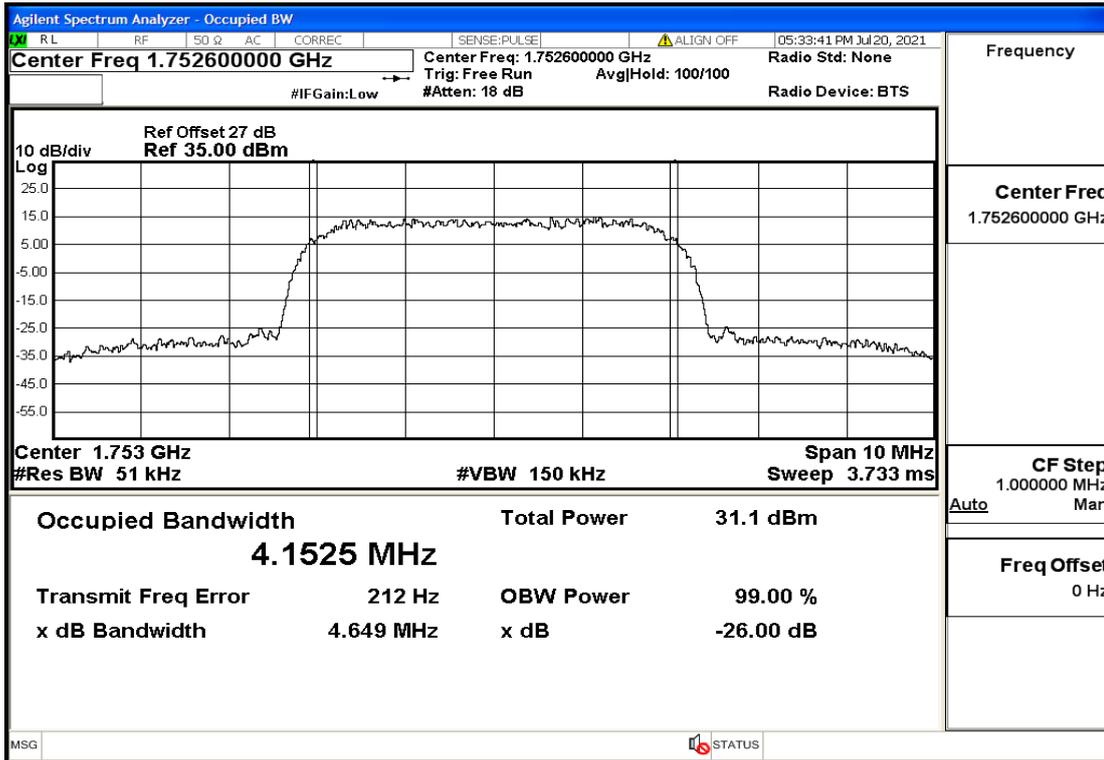


UMTS BAND IV-1732.4MHz-RMC





UMTS BAND IV-1752.6MHz-RMC





5.4 BAND EDGE

5.4.1 MEASUREMENT METHOD

1. All out of band emissions are measured with an analyzer spectrum connected to the antenna terminal of the EUT while the EUT at its maximum duty cycle, at maximum power, and at the approximate frequencies. All data rates were investigated to determine the worst case configuration
2. The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.
3. Start and stop frequency were set such that the band edge would be placed in the center of the plot.
4. Span was set large enough so as to capture all out of band emissions near the band edge.
5. RBW>1% of the emission bandwidth, VBW $\geq 3 \times$ RBW, Detector=RMS, Number of points $\geq 2 \times$ Span/RBW, Trace mode=max hold, Sweep time=auto couple, and the trace was allowed to stabilize

5.4.2 PROVISIONS APPLICABLE

As Specified in FCC rules of 22.917(a), 24.238(a)and KDB 971168 D1 V03R01.

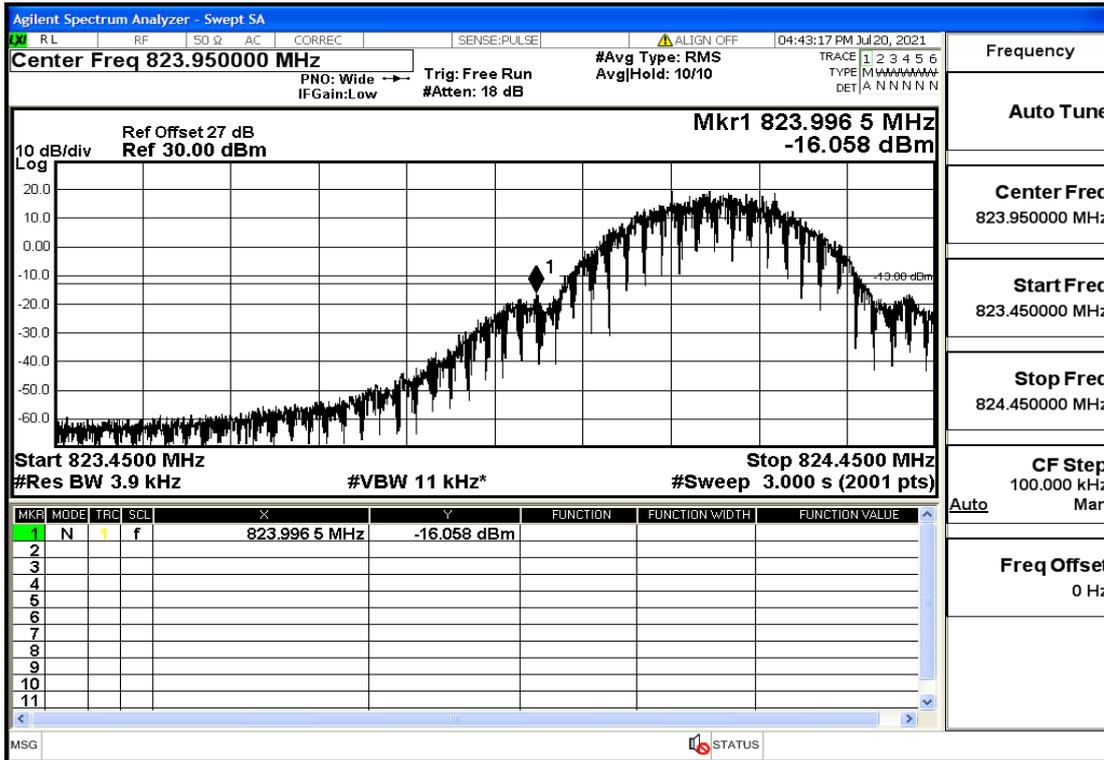
5.4.3 Test Results

For GSM

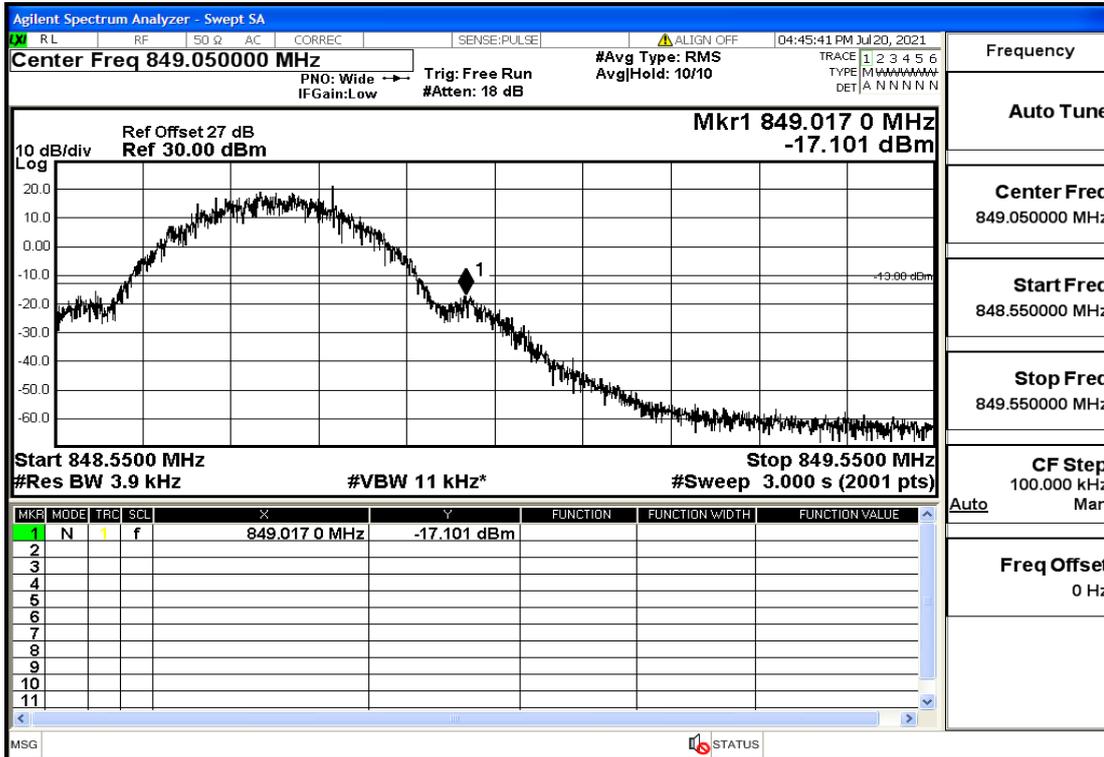
Test Band=GSM850/GSM1900



GSM850-824.2MHz-Voice

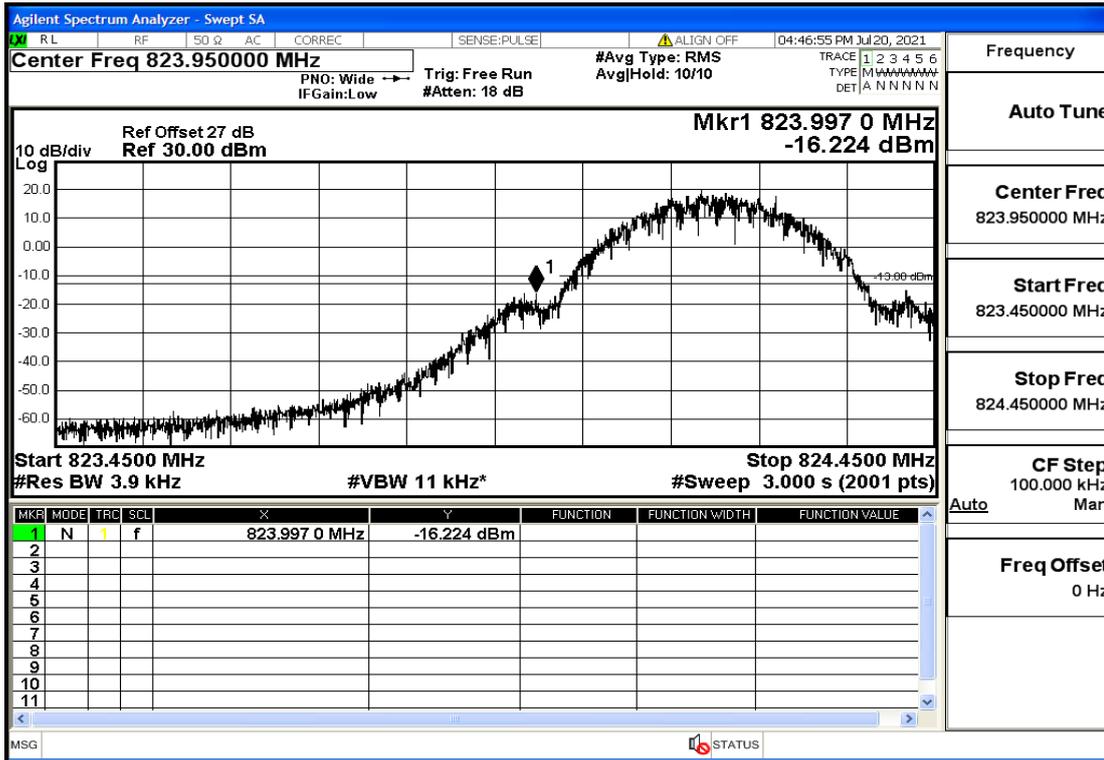


GSM850-848.8MHz-Voice

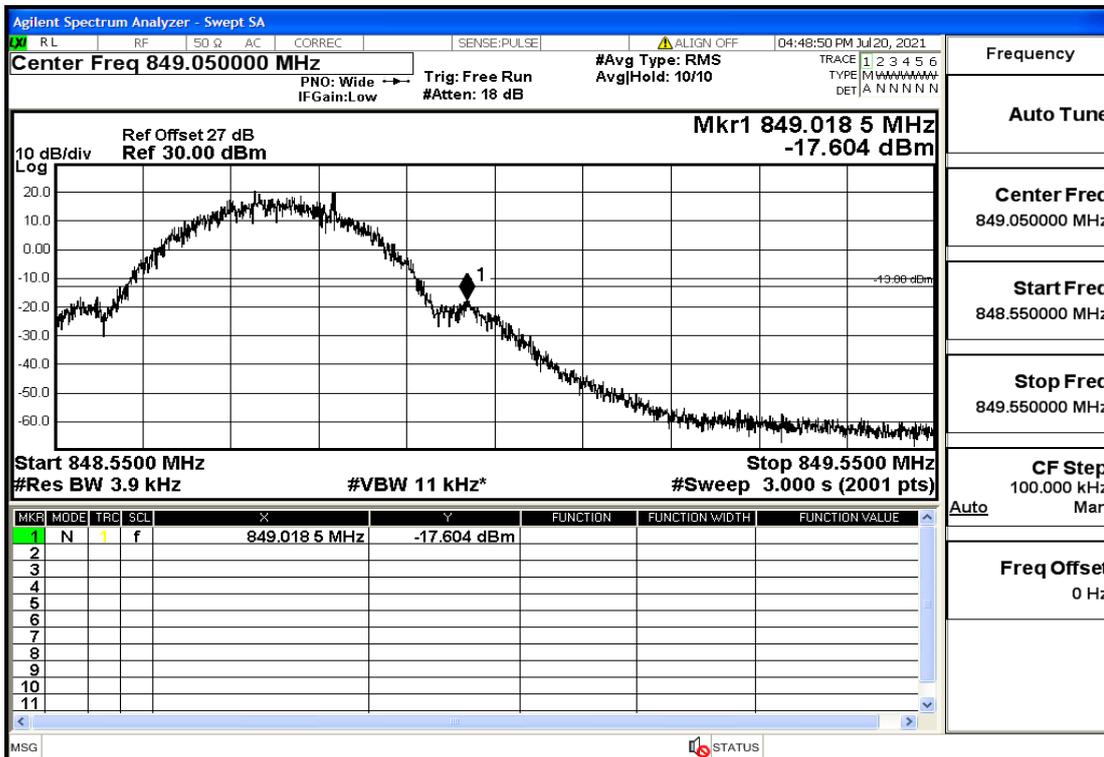




GSM850-824.2MHz-GPRS

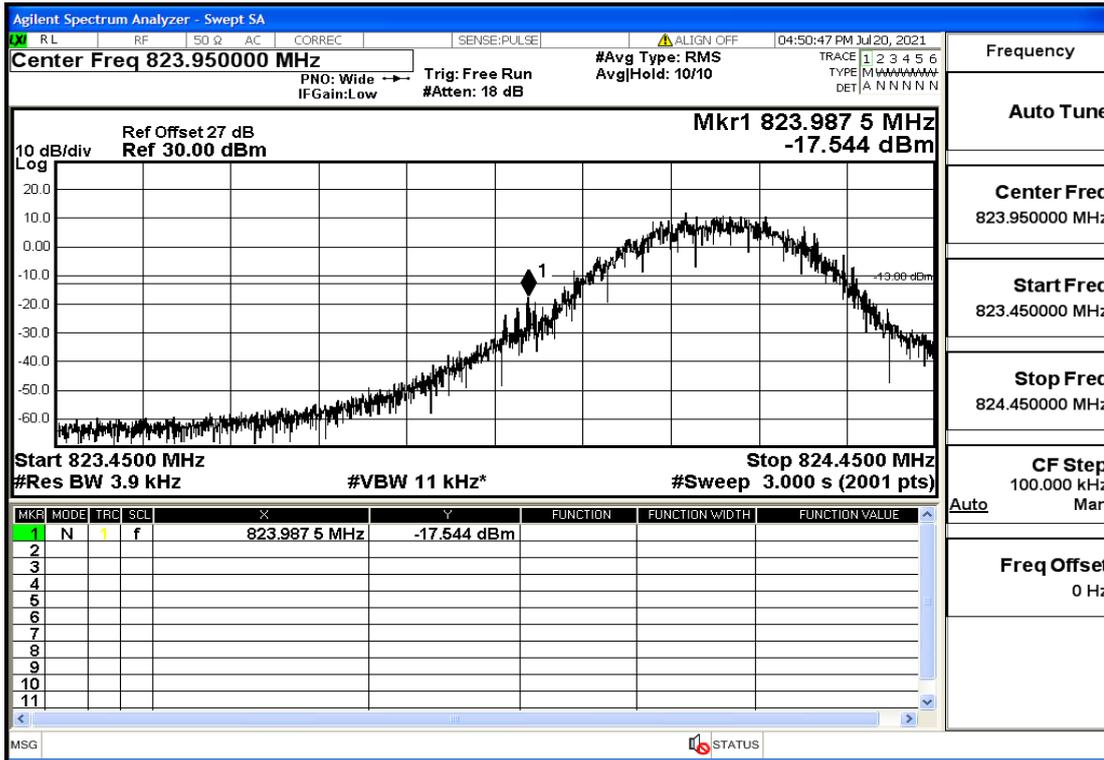


GSM850-848.8MHz-GPRS

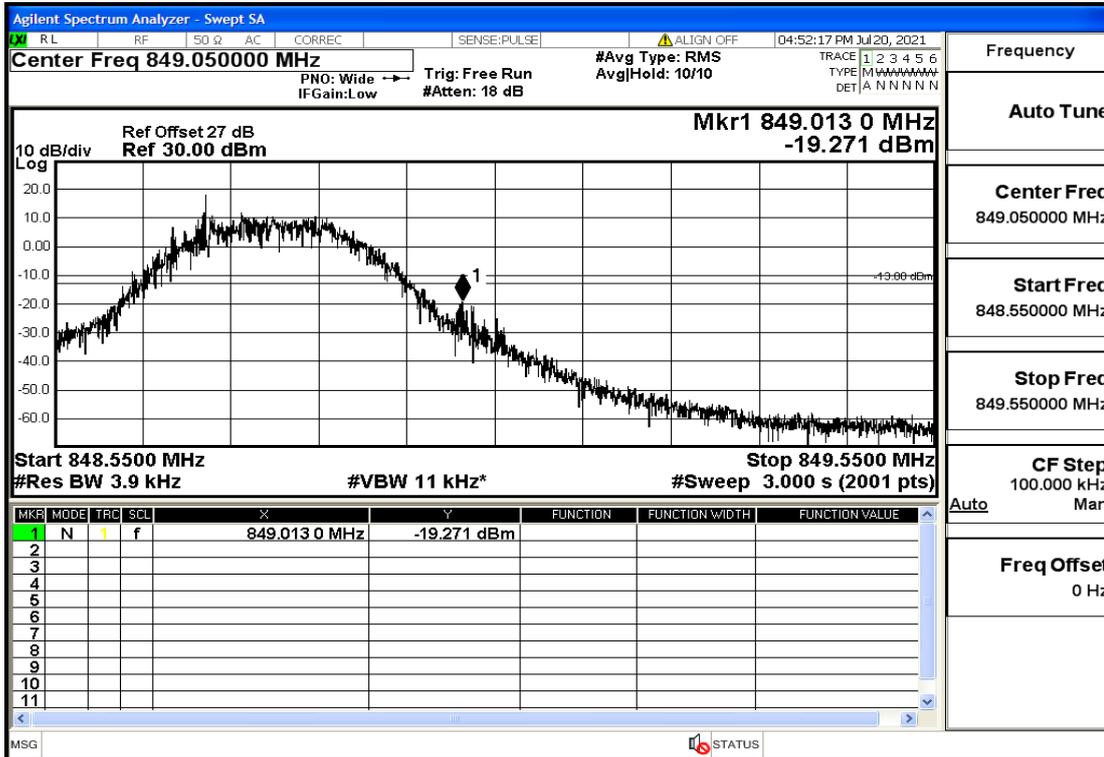




GSM850-824.2MHz-EGPRS

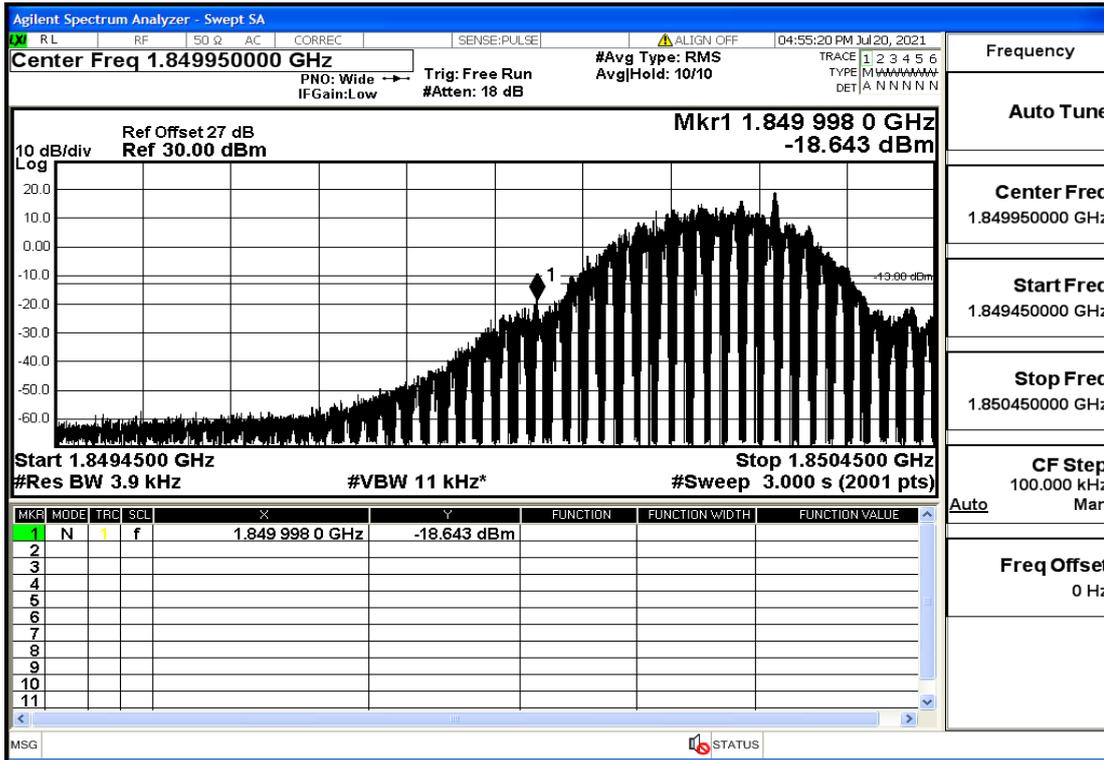


GSM850-848.8MHz-EGPRS

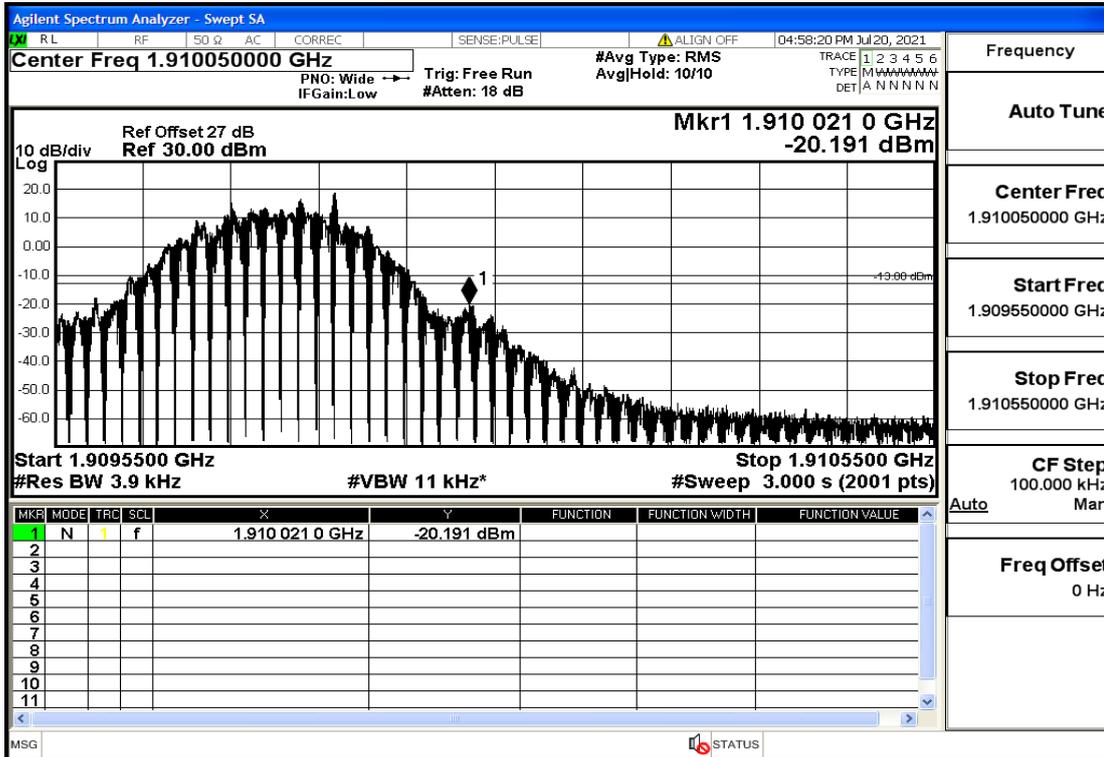




GSM1900-1850.2MHz-Voice

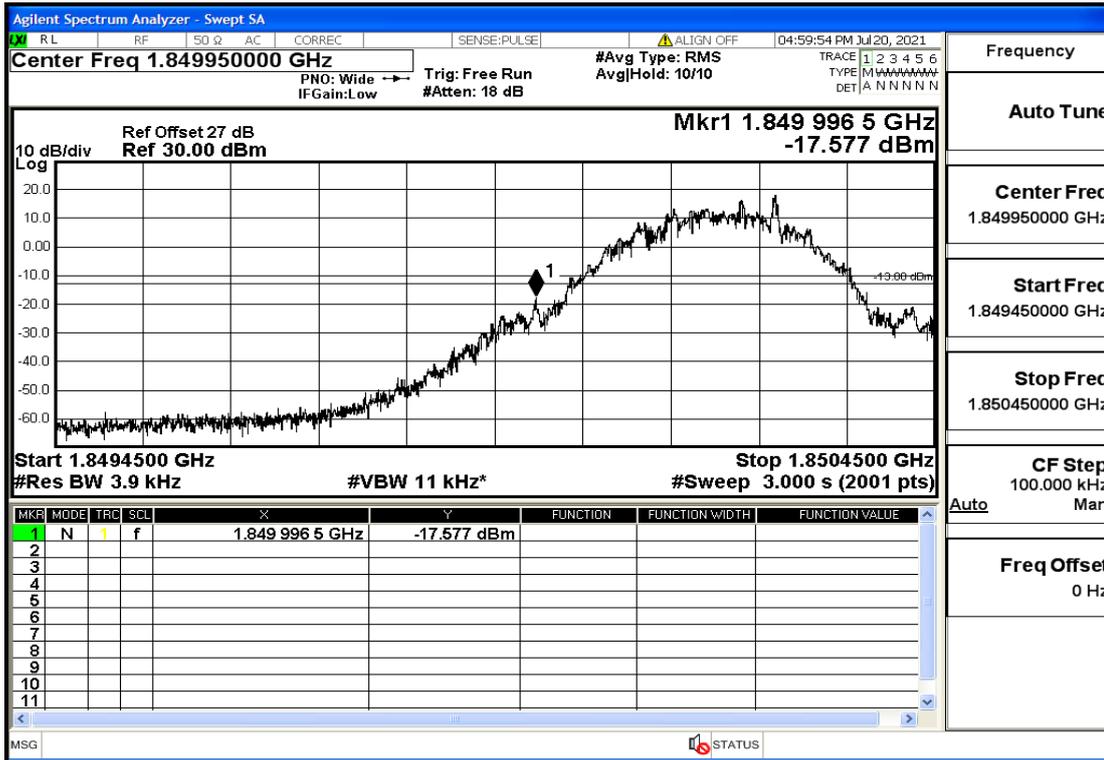


GSM1900-1909.8MHz-Voice

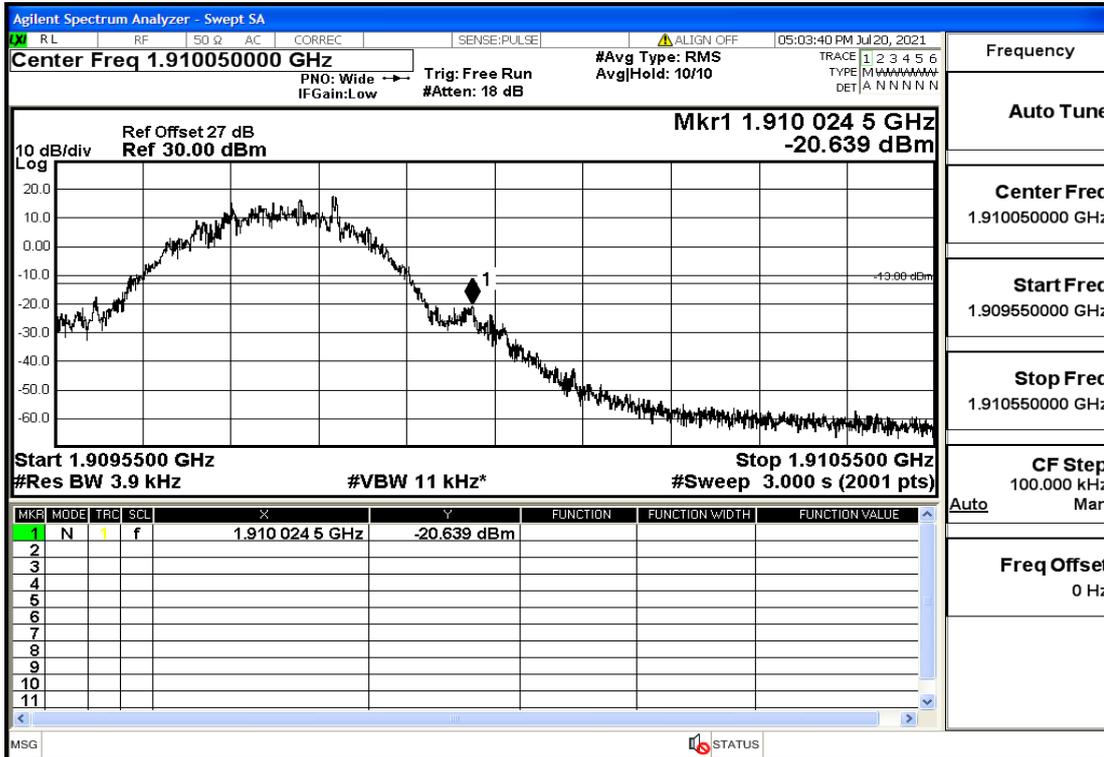




GSM1900-1850.2MHz-GPRS

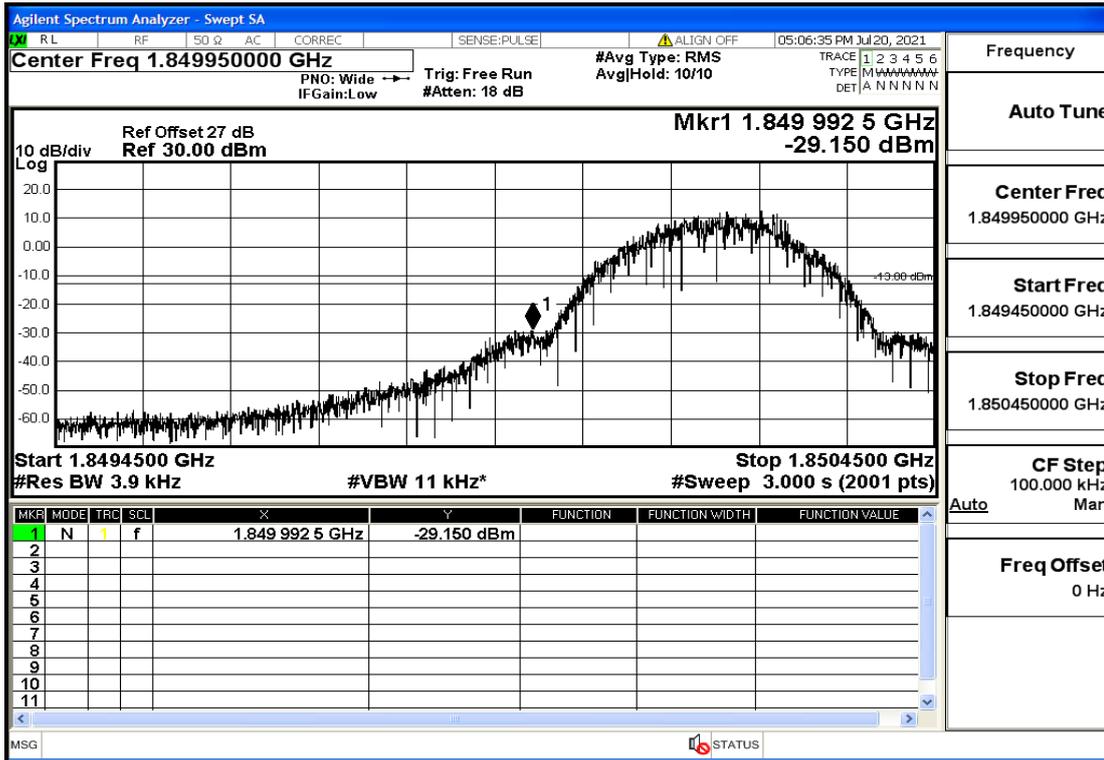


GSM1900-1909.8MHz-GPRS

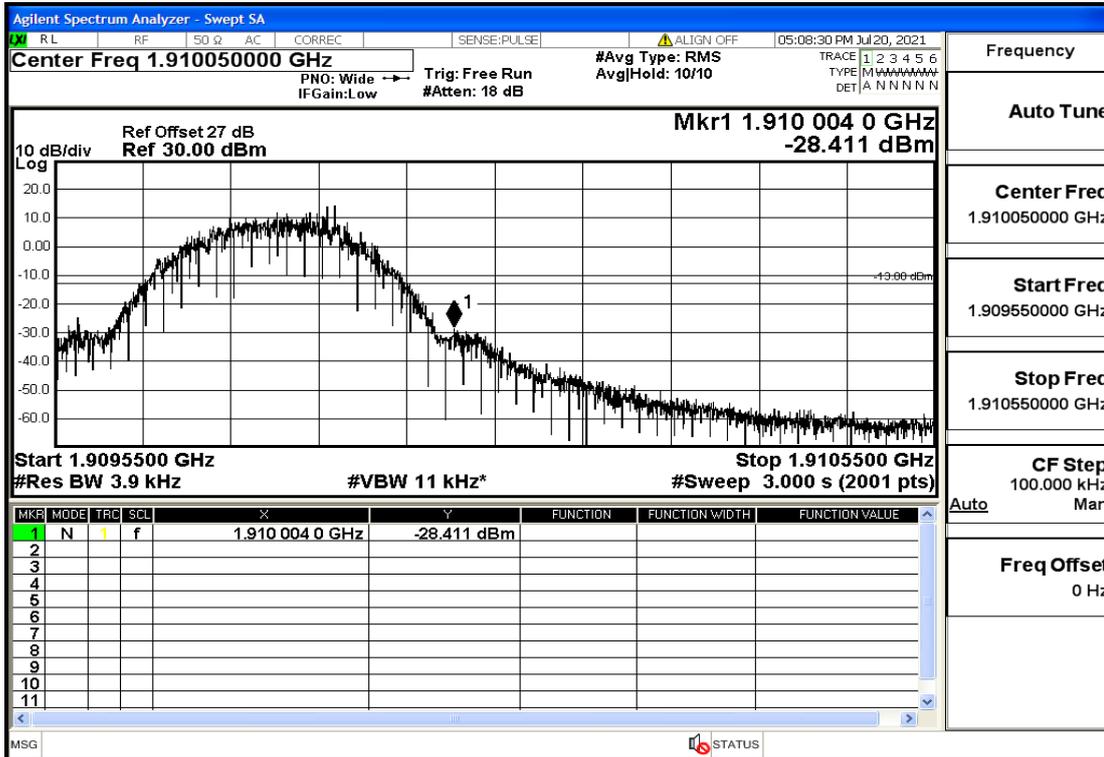




GSM1900-1850.2MHz-EGPRS



GSM1900-1909.8MHz-EGPRS

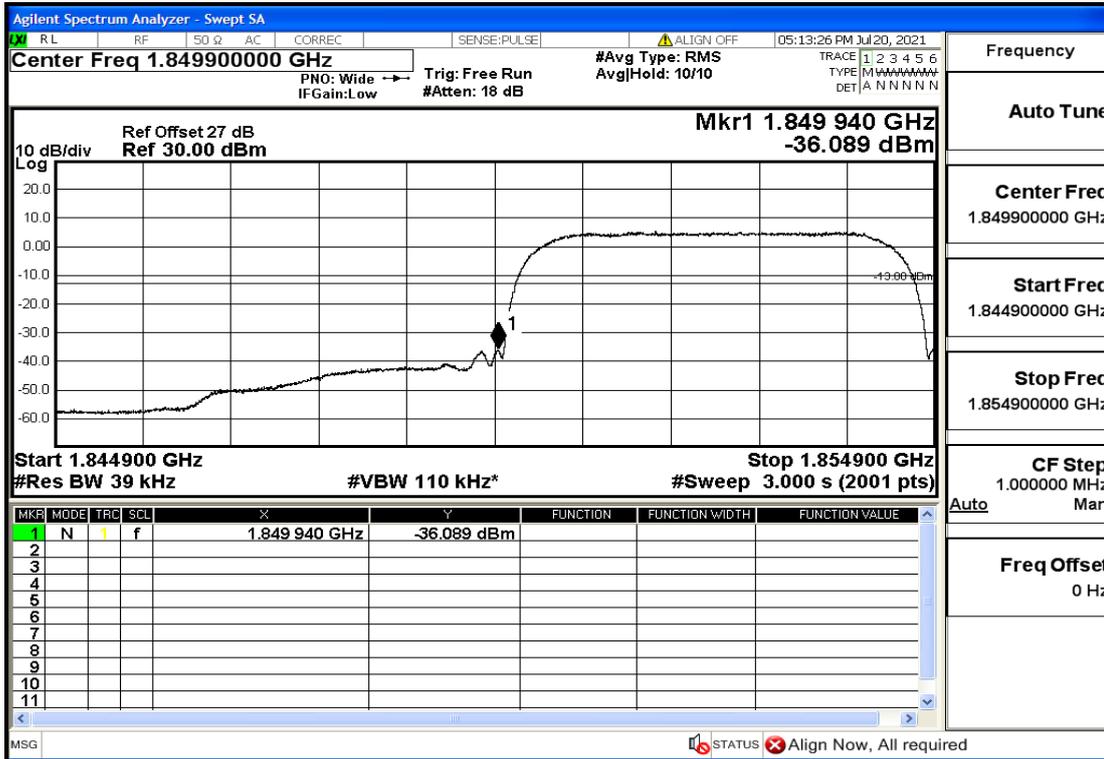




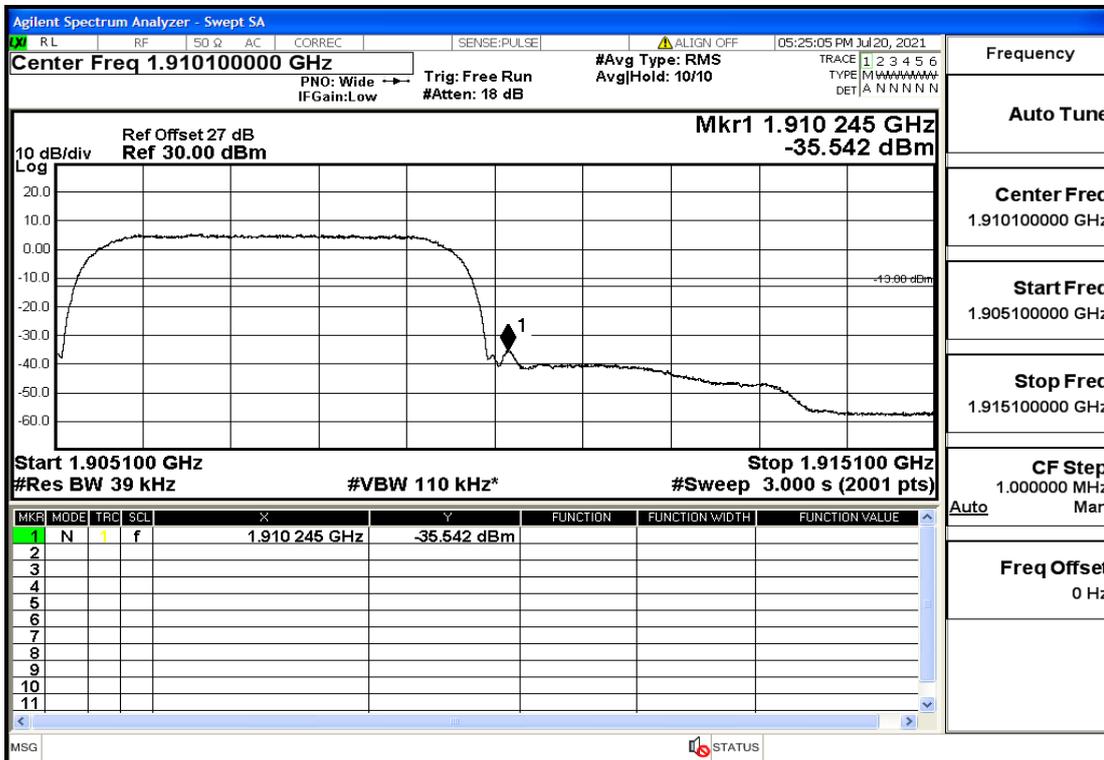
For WCDMA

Test Band=WCDMA Band II/ WCDMA Band V

UMTS BAND II-1852.4MHz-RMC

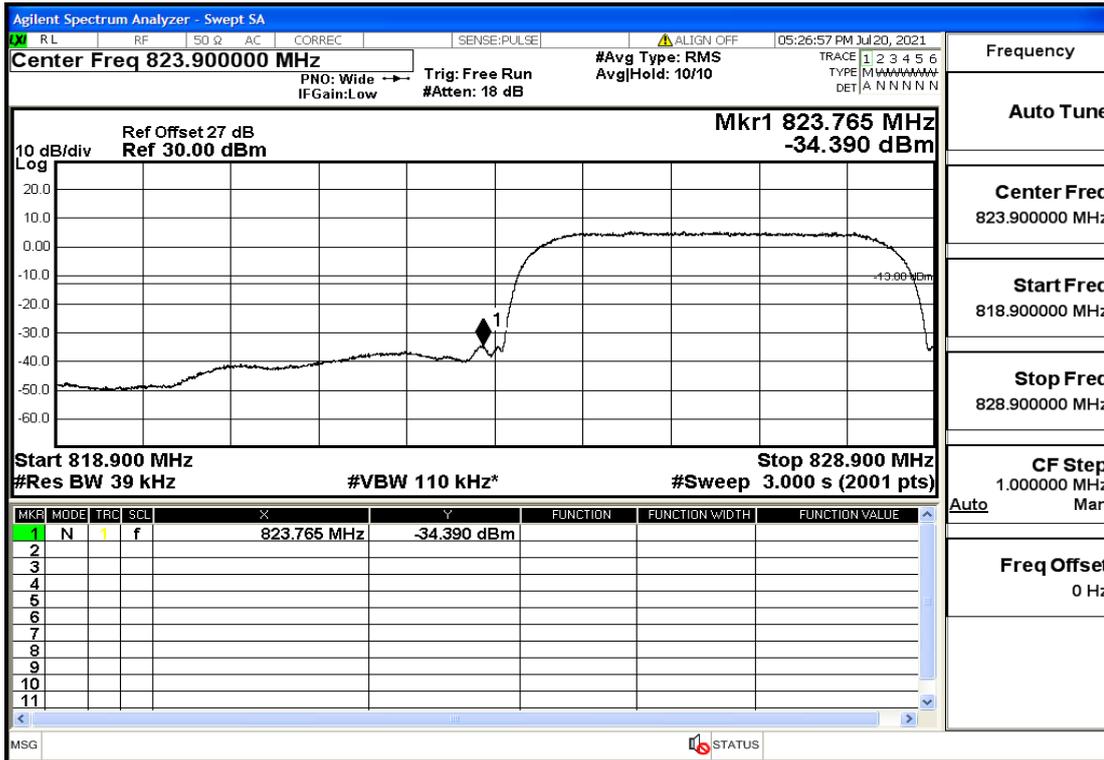


UMTS BAND II-1907.6MHz-RMC

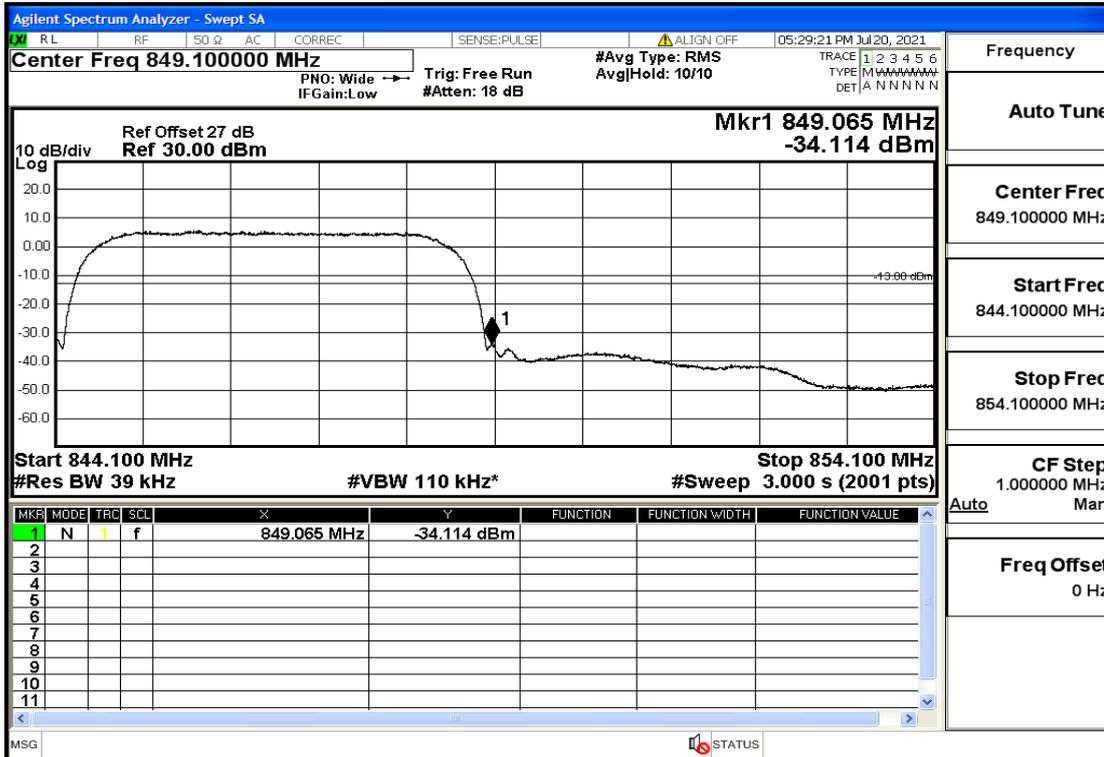




UMTS BAND V-826.4MHz-RMC

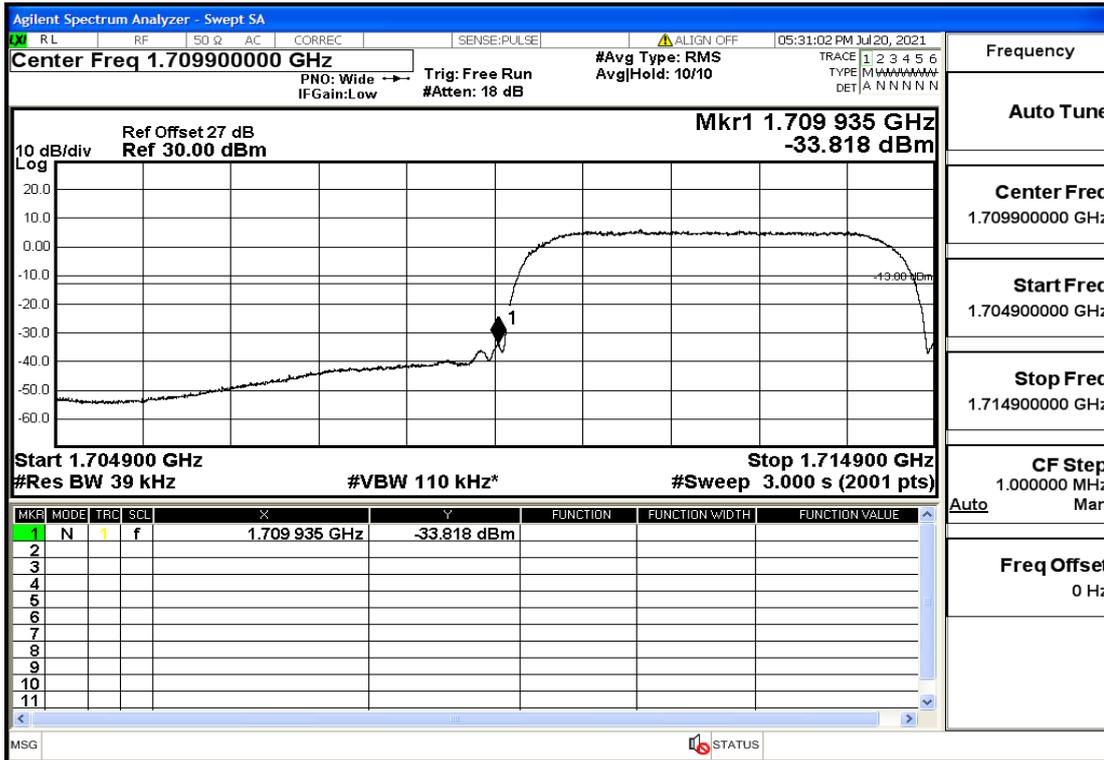


UMTS BAND V-846.6MHz-RMC





UMTS BAND IV-1712.4MHz-RMC



UMTS BAND IV-1752.6MHz-RMC

