

Test Report

FCC ID: GAO-LIFE3G

Date of issue: Oct. 29, 2019

Report number: MTi19070905-2E2

Sample description: Feature Phone

Model(s): Life 3G

Applicant: Collage Investments LLC.

Address: 6030 NW 99 Ave #414 Doral Florida United States

Date of test: Aug. 07, 2019 to Oct. 29, 2019

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>

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Test Result Certification

Applicant's name: Collage Investments LLC.

Address: 6030 NW 99 Ave #414 Doral Florida United States

Manufacture's name: Pingxiang Yibo Intelligent Technology Co., Ltd.

Address: Electronic Information Industry Park, Pingxiang Economic and Technological Development Zone, Pingxiang City, Jiangxi Province

Product name: Feature Phone

Trademark: SMOOTH

Model name: Life 3G

Standards: FCC Part 22 Subpart H
FCC Part 24 Subpart E

Test procedure: FCC Part 2
ANSI/TIA-603-E-2016
ANSI C63.26:2015
KDB 971168 D01 Power Meas License Digital Systems v03r01

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by: 
Demi Mu Oct. 29, 2019

Reviewed by: 
Blue Zheng Oct. 29, 2019

Approved by: 
Smith Chen Oct. 29, 2019

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	Feature Phone
Trade name	SMOOTH
Model name:	Life 3G
Difference in series models:	N/A
Frequency range:	GSM850: TX824.2MHz~848.8MHz /RX869.2MHz~893.8MHz; PCS1900: TX1850.2MHz~1909.8MHz /RX1930.2MHz~1989.8MHz; WCDMA Band II: TX1852.4MHz~1907.6MHz RX1932.4MHz~1987.6MHz; WCDMA Band V: TX826.4MHz~846.6MHz RX871.4MHz~891.6MHz;
Modulation type:	GMSK for GSM/GPRS; QPSK for WCDMA bands;
Power class:	Multi-Class12 Only 4 timeslots are used for GPRS
SIM card:	Feature Phone has Two SIM Card socket
Antenna Type	FPC Antenna
Antenna gain:	GSM 850 Gain: 1dBi GSM 1900 Gain: 1.5dBi WCDMA Band II: 1.5dBi WCDMA Band V: 0.5dBi
Hardware version	MB_V1.1.
Software version	SK005-Smooth-V02
Power supply:	DC 3.7V from battery or DC 5V from adapter AC 120V/60Hz
Battery:	DC 3.7V 1000mAh
Adapter information:	Model: Life 3G Travel Charger Input:100-240V 50/60Hz 0.2A Output:5V-500mA



1.2 Test frequency channel

Frequency Band	Frequency	Channel	Frequency(MHz)
GSM 850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8
GSM 1900	Low	512	1850.2
	Middle	661	1880
	High	810	1909.8

Frequency Band	Frequency	Channel	Frequency(MHz)
GPRS 850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8
GPRS 1900	Low	512	1850.2
	Middle	661	1880
	High	810	1909.8

WCDMA Band II	Low	9262	1852.4
	Middle	9400	1880
	High	9538	1907.6
WCDMA Band V	Low	4132	826.4
	Middle	4183	836.6
	High	4233	846.6

1.3 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement. The EUT is configured to transmit continuously (duty cycle > 98 %) at the maximum power control level.

1.4 Test conditions

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

- Temperature: 15°C~35°C
- Humidity: 20%~75%
- Atmospheric pressure: 98kPa~101kPa

1.5 Testing site

Test Site	Shenzhen Microtest Co., Ltd.
Test Site Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

1.6 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
Adapter	Life 3G Travel Charger	/	/	/

1.7 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$

RF frequency	1×10^{-7}
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %



2 Summary of Test Result

Item	FCC Part No.	Description of Test	Result
1	2.1046, 22.913(a); 24.232(c)	Maximum output power	Pass
2	2.1046, 22.913(d); 24.232(d)	Peak to average power ratio(PAPR)	Pass
3	2.1046, 22.913(a); 24.232(c)	Transmitter Radiated Power (EIRP/ERP)	Pass
4	2.1049; 22.917(b); 24.238(b)	Occupied Bandwidth	Pass
5	2.1051; 22.917(a); 24.238(a)	Conducted spurious emissions	Pass
6	2.1051; 22.917(b); 24.238(b)	Spurious emissions at band edge	Pass
7	2.1053; 22.917(a); 24.238(a)	Radiated spurious emissions	Pass
8	2.1055; 22.355; 24.235	Frequency Stability	Pass

3 Test facilities and accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

3.2 Environmental conditions

Temperature:	15°C~35°C
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$

RF frequency	1×10^{-7}
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %

3.4 Test software

Software Name	Manufacturer	Model	Version
GSM	Shenzhen JS tonscent co., ltd	JS1120-4	2.1.6
WCDMA	Shenzhen JS tonscent co., ltd	JS1120-2	2.1.5.10



4 List of test equipment

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI7	100314	2019/10/09	2020/10/08
MTI-E006	TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-872	2019/10/15	2020/10/14
MTI-E014	amplifier	Hewlett-Packard	8447D	3113A06150	2019/10/09	2020/10/08
MTI-E036	Single path vehicle AMN(LISN)	Schwarzbeck	NNBM 8124	01175	2019/10/09	2020/10/08
MTI-E038	Low noise active vertical monopole antenna	Schwarzbeck	VAMP 9243	#565	2019/10/16	2020/10/15
MTI-E039	Biconical antenna	Schwarzbeck	BBA 9106	#164	2019/10/15	2020/10/14
MTI-E041	MXG Vector Signal Generator	Agilent	N5182A	MY49060455	2019/04/16	2020/04/15
MTI-E042	ESG Series Analog signal generator	Agilent	E4421B	GB40051240	2019/05/21	2020/05/20
MTI-E044	Thermometer clock humidity monitor	-	HTC-1	/	2019/04/17	2020/04/16
MTI-E062	Log Periodic Antenna	Schwarzbeck	VUSLP 9111B	#312	2018/04/11	2020/04/10
MTI-E063	Log Periodic Dipole Array Antenna	ETS-LINDGREN	3148B	00224524	2018/04/11	2020/04/10
MTI-E065	Amplifier	EMtrace	RP06A	00117	2019/04/29	2020/04/28
MTI-E066	Comprehensive test instrument	Rohde&schwarz	CMW500	149155	2019/04/16	2020/04/15
MTI-E071	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2018/10/25	2019/10/24
MTI-E076	EMI Test Receiver	Rohde&schwarz	ESIB26	100273	2019/04/16	2020/04/15
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2019/04/16	2020/04/15
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2019/04/16	2020/04/15
MTI-E093	Artificial mains network	3ctest	LISN J50	ES3911805	2019/04/16	2020/04/15
MTI-E096	Power amplifier	Space-Dtronics	EWLNA0118G-P40	1852001	2019/04/29	2020/04/28
MTI-E097	Current Probe	SOLAR ELECTRONICS CO.	9207-1	220095-1	2019/04/17	2020/04/16
MTI-E098	Loop Sensor	SOLAR ELECTRONICS CO.	7334-1	220095-2	2019/04/21	2020/04/20
MTI-E080	Temperature& Humidity test chamber	Safety test	AG80L	171200018	2019/04/16	2020/04/15

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

5 Test Result

5.1 Maximum output power and EIRP & ERP

5.1.1 Limit

For FCC 22.913: The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC 24.234: 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. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

5.1.2 Test method

For Conducted output power:

1. Use a universal radio communication tester, the output power of EUT was measured at the antenna terminal. The path loss was calibrated and entered as an offset into the test equipment.
2. The EUT was configured to transmit on maximum power by the radio communication tester.
3. Measured the peak and average powers.

For EIRP & ERP:

1. In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).
2. The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = P_{\text{Meas}} + \text{GT} - \text{LC}$$

Where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

dBd (ERP)=dBi (EIRP) -2.15 dB

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.



5.1.3 Test Result

For Conducted output power:

Band	Channel	PCL	Power(dBm)	Limit(dBm)	Verdict
GSM850	128	5	30.02	38.5	PASS
GSM850	190	5	30.00	38.5	PASS
GSM850	251	5	30.22	38.5	PASS
GSM1900	512	0	26.39	33	PASS
GSM1900	661	0	26.19	33	PASS
GSM1900	810	0	25.71	33	PASS

Band	Channel	PCL	Slot	Power(dBm)	Limit(dBm)	Verdict
GPRS850	128	5	1	29.74	38.5	PASS
GPRS850	128	5	2	28.22	38.5	PASS
GPRS850	128	5	3	26.41	38.5	PASS
GPRS850	128	5	4	23.98	38.5	PASS
GPRS850	190	5	1	29.75	38.5	PASS
GPRS850	190	5	2	28.29	38.5	PASS
GPRS850	190	5	3	26.50	38.5	PASS
GPRS850	190	5	4	24.06	38.5	PASS
GPRS850	251	5	1	29.93	38.5	PASS
GPRS850	251	5	2	28.39	38.5	PASS
GPRS850	251	5	3	26.57	38.5	PASS
GPRS850	251	5	4	24.13	38.5	PASS
GPRS1900	512	0	1	26.24	33	PASS
GPRS1900	512	0	2	24.34	33	PASS
GPRS1900	512	0	3	22.55	33	PASS
GPRS1900	512	0	4	20.06	33	PASS
GPRS1900	661	0	1	25.97	33	PASS
GPRS1900	661	0	2	24.37	33	PASS
GPRS1900	661	0	3	22.63	33	PASS
GPRS1900	661	0	4	20.21	33	PASS
GPRS1900	810	0	1	25.49	33	PASS
GPRS1900	810	0	2	23.92	33	PASS
GPRS1900	810	0	3	22.19	33	PASS
GPRS1900	810	0	4	19.75	33	PASS

Band	Channel	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	19.65	33	PASS
Band II	9400	19.89	33	PASS
Band II	9538	19.56	33	PASS
Band V	4132	19.16	38.5	PASS
Band V	4182	18.73	38.5	PASS
Band V	4233	19.33	38.5	PASS



Band	Channel	SubTest	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	HSDPA_Sub1	18.98	33	PASS
Band II	9262	HSDPA_Sub2	18.98	33	PASS
Band II	9262	HSDPA_Sub3	19.00	33	PASS
Band II	9262	HSDPA_Sub4	18.95	33	PASS
Band II	9400	HSDPA_Sub1	19.62	33	PASS
Band II	9400	HSDPA_Sub2	19.58	33	PASS
Band II	9400	HSDPA_Sub3	19.65	33	PASS
Band II	9400	HSDPA_Sub4	19.61	33	PASS
Band II	9538	HSDPA_Sub1	18.46	33	PASS
Band II	9538	HSDPA_Sub2	18.50	33	PASS
Band II	9538	HSDPA_Sub3	18.49	33	PASS
Band II	9538	HSDPA_Sub4	18.45	33	PASS
Band V	4132	HSDPA_Sub1	18.52	38.5	PASS
Band V	4132	HSDPA_Sub2	18.30	38.5	PASS
Band V	4132	HSDPA_Sub3	18.37	38.5	PASS
Band V	4132	HSDPA_Sub4	18.29	38.5	PASS
Band V	4182	HSDPA_Sub1	17.43	38.5	PASS
Band V	4182	HSDPA_Sub2	17.36	38.5	PASS
Band V	4182	HSDPA_Sub3	17.43	38.5	PASS
Band V	4182	HSDPA_Sub4	17.39	38.5	PASS
Band V	4233	HSDPA_Sub1	19.42	38.5	PASS
Band V	4233	HSDPA_Sub2	19.14	38.5	PASS
Band V	4233	HSDPA_Sub3	19.16	38.5	PASS
Band V	4233	HSDPA_Sub4	19.12	38.5	PASS



Band	Channel	SubTest	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	HSUPA_Sub1	18.74	33	PASS
Band II	9262	HSUPA_Sub2	18.80	33	PASS
Band II	9262	HSUPA_Sub3	18.31	33	PASS
Band II	9262	HSUPA_Sub4	19.02	33	PASS
Band II	9262	HSUPA_Sub5	19.47	33	PASS
Band II	9400	HSUPA_Sub1	19.38	33	PASS
Band II	9400	HSUPA_Sub2	19.48	33	PASS
Band II	9400	HSUPA_Sub3	19.05	33	PASS
Band II	9400	HSUPA_Sub4	19.70	33	PASS
Band II	9400	HSUPA_Sub5	20.18	33	PASS
Band II	9538	HSUPA_Sub1	18.34	33	PASS
Band II	9538	HSUPA_Sub2	18.39	33	PASS
Band II	9538	HSUPA_Sub3	17.92	33	PASS
Band II	9538	HSUPA_Sub4	18.60	33	PASS
Band II	9538	HSUPA_Sub5	19.07	33	PASS
Band V	4132	HSUPA_Sub1	18.21	38.5	PASS
Band V	4132	HSUPA_Sub2	18.10	38.5	PASS
Band V	4132	HSUPA_Sub3	17.84	38.5	PASS
Band V	4132	HSUPA_Sub4	18.36	38.5	PASS
Band V	4132	HSUPA_Sub5	18.96	38.5	PASS
Band V	4182	HSUPA_Sub1	17.46	38.5	PASS
Band V	4182	HSUPA_Sub2	17.48	38.5	PASS
Band V	4182	HSUPA_Sub3	17.03	38.5	PASS
Band V	4182	HSUPA_Sub4	17.69	38.5	PASS
Band V	4182	HSUPA_Sub5	18.18	38.5	PASS
Band V	4233	HSUPA_Sub1	19.11	38.5	PASS
Band V	4233	HSUPA_Sub2	19.10	38.5	PASS
Band V	4233	HSUPA_Sub3	18.76	38.5	PASS
Band V	4233	HSUPA_Sub4	19.31	38.5	PASS
Band V	4233	HSUPA_Sub5	19.89	38.5	PASS

For EIRP & ERP:
For GSM 850

Radiated Power (ERP) for GSM850							
Frequency	Polarization	SG Level	Pcl	Ga	Correction	(ERP)	ERP
(MHz)		(dBm)	(dB)	(dB)	(dBi)	(dBm)	(W)
824.2	H	32.04	0.39	1	2.15	30.50	1.1220
836.6	H	32.07	0.35	1	2.15	30.57	1.1402
848.8	H	32.08	0.32	1	2.15	30.61	1.1508
824.2	V	32.11	0.39	1	2.15	30.57	1.1402
836.6	V	32.05	0.35	1	2.15	30.55	1.1350
848.8	V	32.01	0.32	1	2.15	30.54	1.1324

For GSM 1900

Radiated Power (E.I.R.P) for GSM 1900 MHZ						
Frequency		SGLevel	Pcl	Ga	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	26.41	0.47	1	26.94	0.4943
1880	H	26.45	0.47	1	26.98	0.4989
1909.8	H	26.33	0.46	1	26.87	0.4864
1850.2	V	26.31	0.47	1	26.84	0.4831
1880	V	26.40	0.47	1	26.93	0.4932
1909.8	V	26.41	0.46	1	26.95	0.4955

For GPRS 850

Radiated Power (ERP) for GPRS850							
Frequency	Polarization	SG Level	Pcl	Ga	Correction	(ERP)	ERP
(MHz)		(dBm)	(dB)	(dB)	(dBi)	(dBm)	(W)
824.2	H	29.77	0.39	1	2.15	28.23	0.6653
836.6	H	29.74	0.35	1	2.15	28.24	0.6668
848.8	H	29.76	0.32	1	2.15	28.29	0.6745
824.2	V	29.65	0.39	1	2.15	28.11	0.6471
836.6	V	29.69	0.35	1	2.15	28.19	0.6592
848.8	V	29.84	0.32	1	2.15	28.37	0.6871

For GPRS 1900

Radiated Power (E.I.R.P) for GPRS 1900 MHZ						
Frequency		SGLevel	Pcl	Ga	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	25.79	0.47	1	26.32	0.4285
1880	H	25.43	0.47	1	25.96	0.3945
1909.8	H	25.26	0.46	1	25.80	0.3802
1850.2	V	25.38	0.47	1	25.91	0.3899
1880	V	25.77	0.47	1	25.30	0.3388
1909.8	V	25.69	0.46	1	25.23	0.3334

For WCDMA BAND II

Radiated Power (E.I.R.P) for UMTS band II						
Frequency		SGLevel	Pcl	Ga	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1852.4	H	20.42	0.47	1	20.95	0.1245
1880	H	20.04	0.47	1	20.57	0.1140
1907.6	H	20.13	0.46	1	20.67	0.1167
1852.4	V	20.32	0.47	1	20.85	0.1216
1880	V	20.41	0.47	1	20.94	0.1242
1907.6	V	20.24	0.46	1	20.78	0.1197

For WCDMA BAND V

Radiated Power (ERP) for UMTS band V							
Frequency		SG Level	Pcl	Ga	Correction	(ERP)	ERP
(MHz)		(dBm)	(dB)	(dB)	(dBi)	(dBm)	(W)
826.4	H	19.84	0.39	1	2.15	18.30	0.0676
836.6	H	19.64	0.35	1	2.15	18.14	0.0652
846.6	H	19.66	0.32	1	2.15	18.19	0.0659
826.4	V	19.86	0.39	1	2.15	18.32	0.0679
836.6	V	19.88	0.35	1	2.15	18.38	0.0689
846.6	V	19.78	0.32	1	2.15	18.31	0.0678

Note: ERP = SG Level- Cable Loss + Antenna Gain – Correction
 EIRP= SG Level- Cable Loss + Antenna Gain

5.2 Peak to average power ratio (PAPR)

5.2.1 Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

5.2.2 Test method

The EUT was connected to Spectrum Analyzer and Base Station via power divider.

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.

Set the number of counts to a value that stabilizes the measured CCDF curve.

Set the measurement interval to 1 ms.

Record the maximum PAPR level associated with a probability of 0.1%.

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval as follows:
 - 1) for continuous transmissions, set to 1 ms,
 - 2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
- e) Record the maximum PAPR level associated with a probability of 0.1%.

5.2.3 Test Result

Cellular Band						
Modes	GSM850			GSM1900		
Channel	128 (Low)	190 (Mid)	251 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	2.64	2.63	2.63	2.67	2.68	2.68

Cellular Band						
Modes	GPRS850			GPRS1900		
Channel	128 (Low)	190 (Mid)	251 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	2.64	2.64	2.63	2.67	2.67	2.68

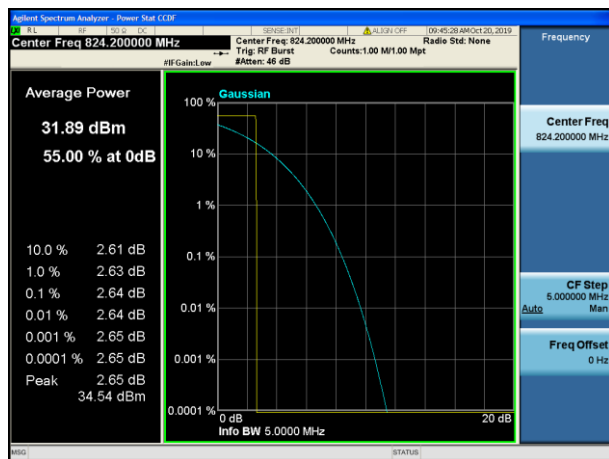
Cellular Band						
Modes	WCDMA BAND II			WCDMA BAND V		
Channel	9262 (Low)	9400 (Mid)	9538 (High)	4132 (Low)	4183 (Mid)	4233 (High)
Frequency(MHz)	1852.4	1880	1907.6	826.4	836.6	846.6
Peak-to-Average Ratio (dB)	3.23	3.23	3.21	3.15	3.18	3.10



Test plot

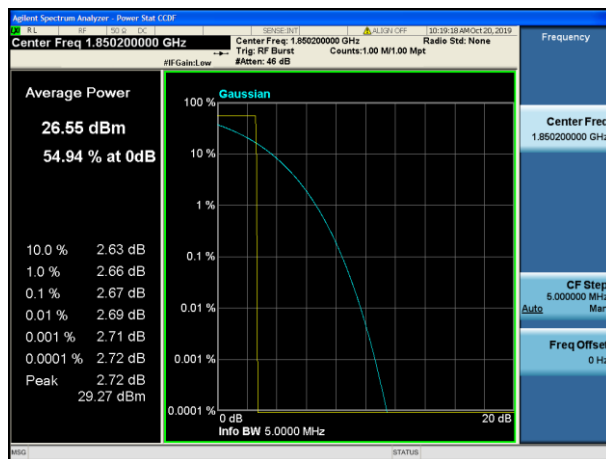
(GSM850)

Peak-to-Average Ratio on channel 128

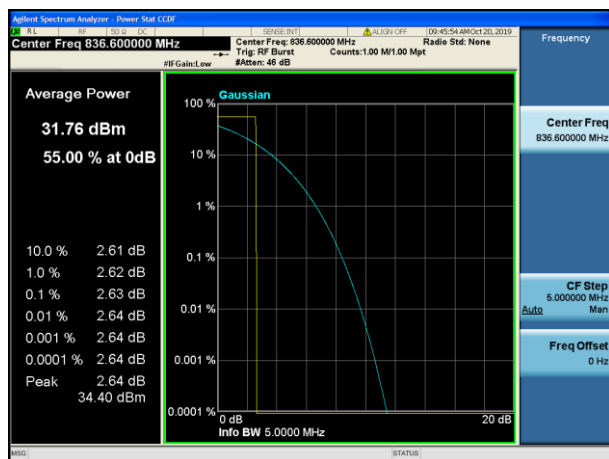


(GSM1900)

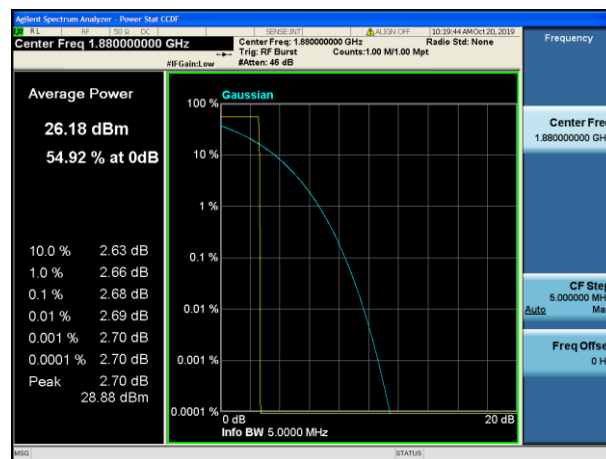
Peak-to-Average Ratio on channel 512



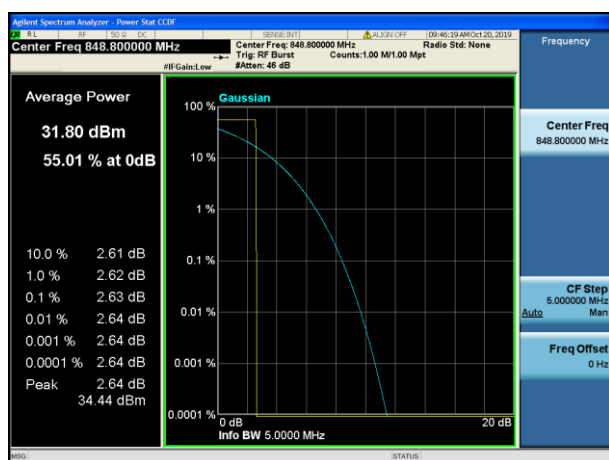
Peak-to-Average Ratio on channel 190



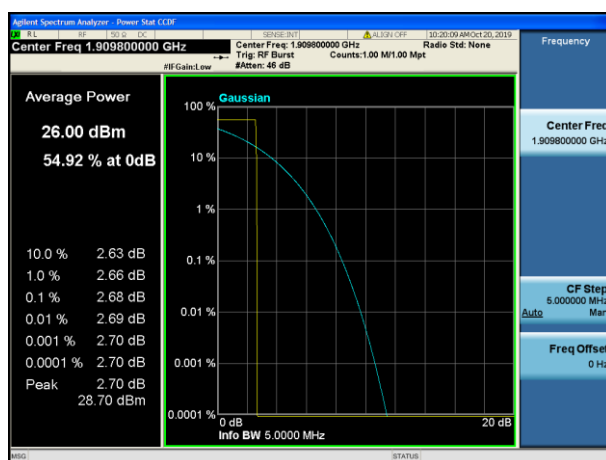
Peak-to-Average Ratio on channel 661



Peak-to-Average Ratio on channel 251



Peak-to-Average Ratio on channel 810

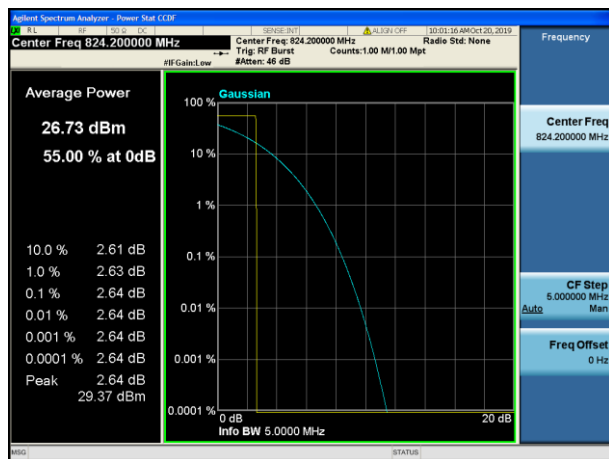




Test plot

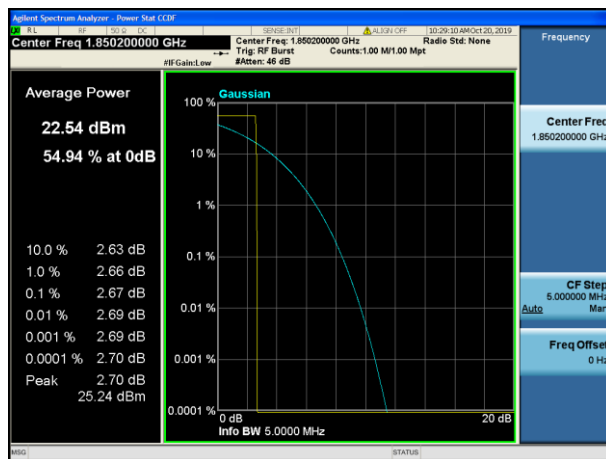
(GPRS850)

Peak-to-Average Ratio on channel 128

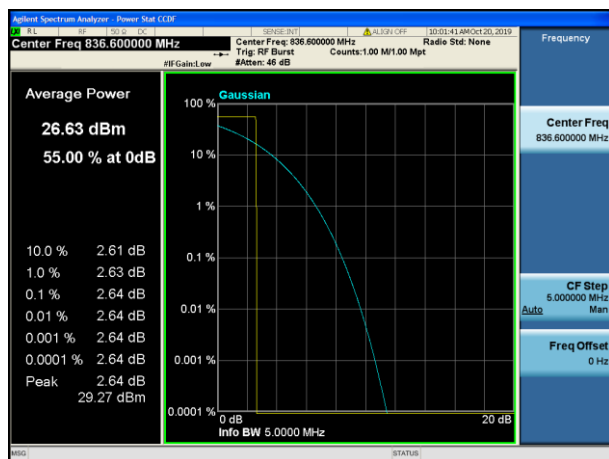


(GPRS1900)

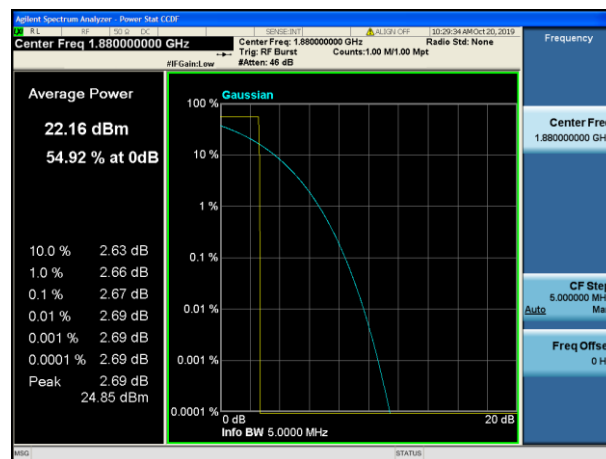
Peak-to-Average Ratio on channel 512



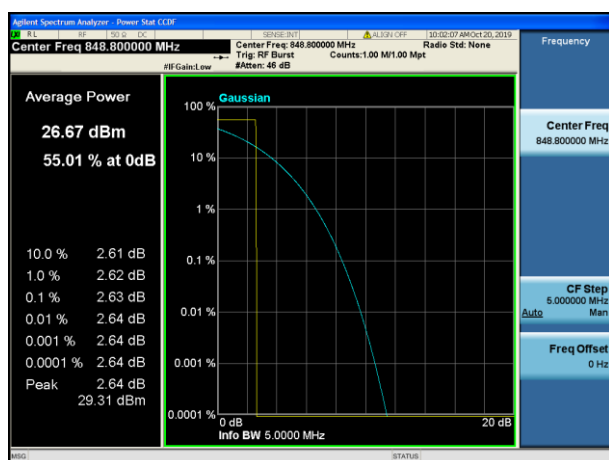
Peak-to-Average Ratio on channel 190



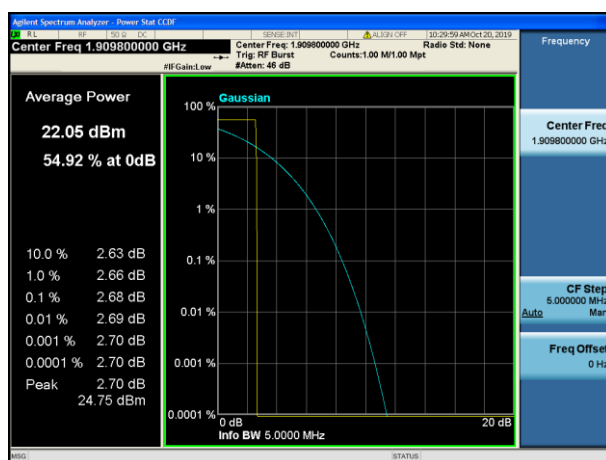
Peak-to-Average Ratio on channel 661



Peak-to-Average Ratio on channel 251



Peak-to-Average Ratio on channel 810





Test plot

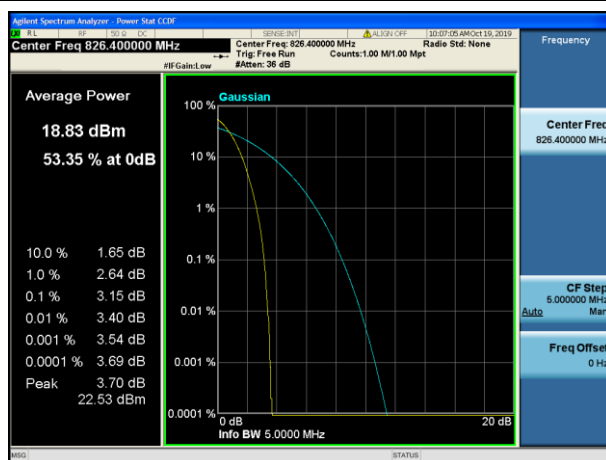
(WCDMA BAND II)

Peak-to-Average Ratio on channel 9262

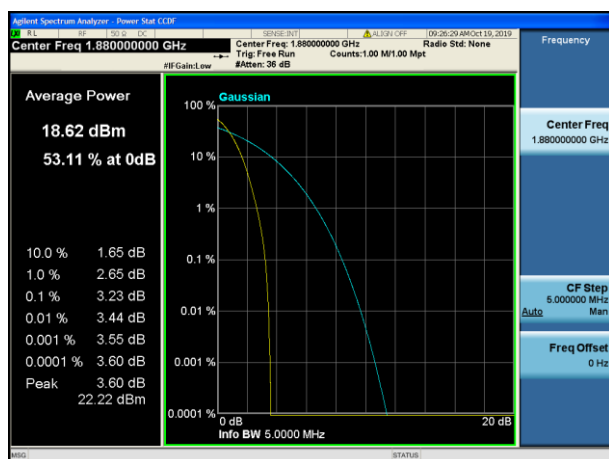


(WCDMA BAND V)

Peak-to-Average Ratio on channel 4132



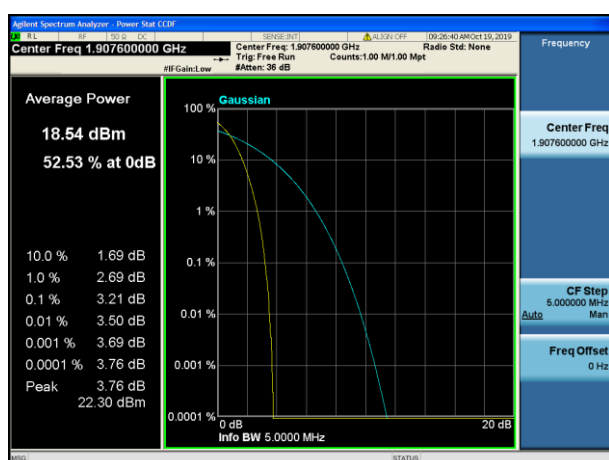
Peak-to-Average Ratio on channel 9400



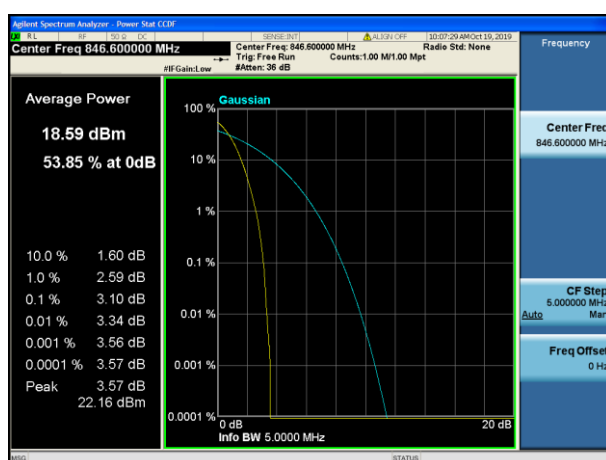
Peak-to-Average Ratio on channel 4183



Peak-to-Average Ratio on channel 9538



Peak-to-Average Ratio on channel 4233



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.3 Occupied bandwidth

5.3.1 Test method

1. The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
2. The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.
5. Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

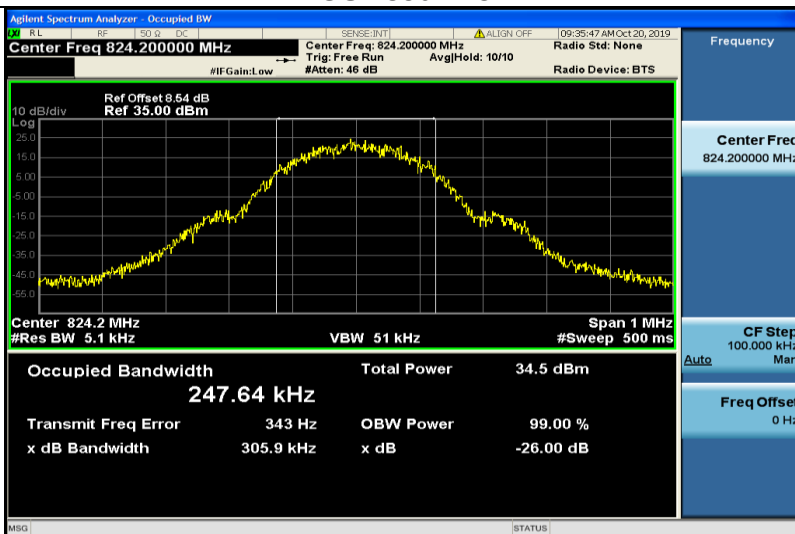
5.3.2 Test result

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	247.64	305.9	---	PASS
GSM850	190	248.96	307.8	---	PASS
GSM850	251	248.89	315.9	---	PASS
GPRS850	128	245.00	315.8	---	PASS
GPRS850	190	248.41	313.8	---	PASS
GPRS850	251	247.82	313.9	---	PASS
GSM1900	512	245.18	316.6	---	PASS
GSM1900	661	245.92	322.3	---	PASS
GSM1900	810	244.71	314.4	---	PASS
GPRS1900	512	246.44	307.9	---	PASS
GPRS1900	661	245.87	300.5	---	PASS
GPRS1900	810	245.49	311.6	---	PASS

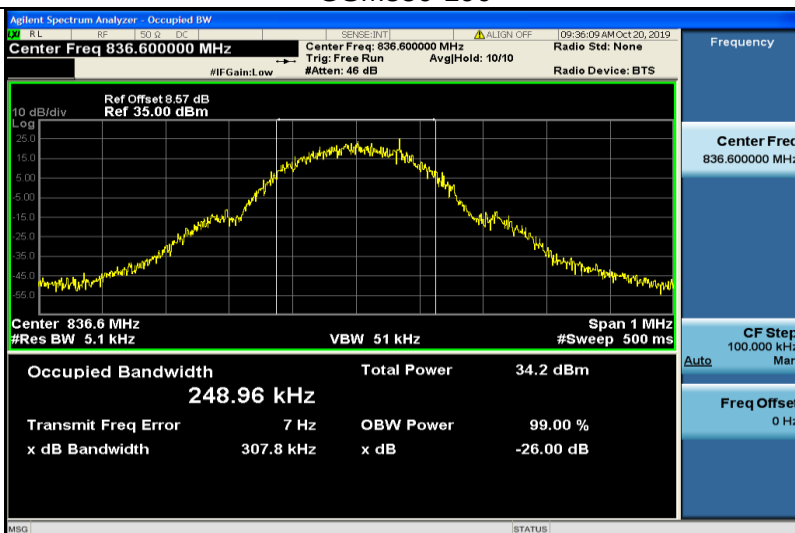
Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
Band II	9262	4090.9	4645	---	PASS
Band II	9400	4084.7	4662	---	PASS
Band II	9538	4086.9	4657	---	PASS
Band V	4132	4094.6	4647	---	PASS
Band V	4182	4100.9	4667	---	PASS
Band V	4233	4078.5	4662	---	PASS



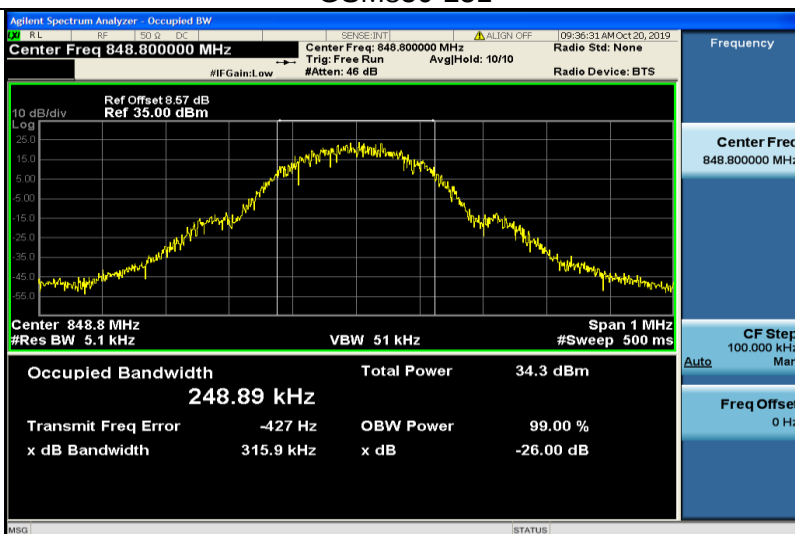
GSM850-128



GSM850-190

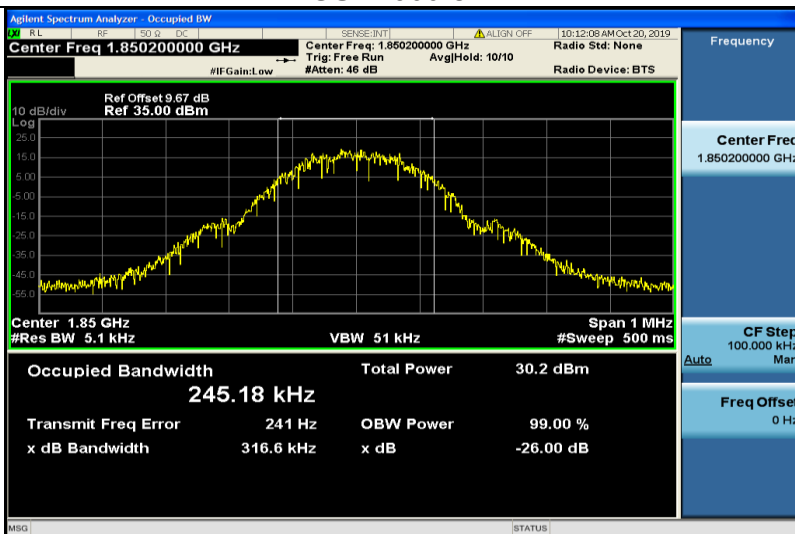


GSM850-251

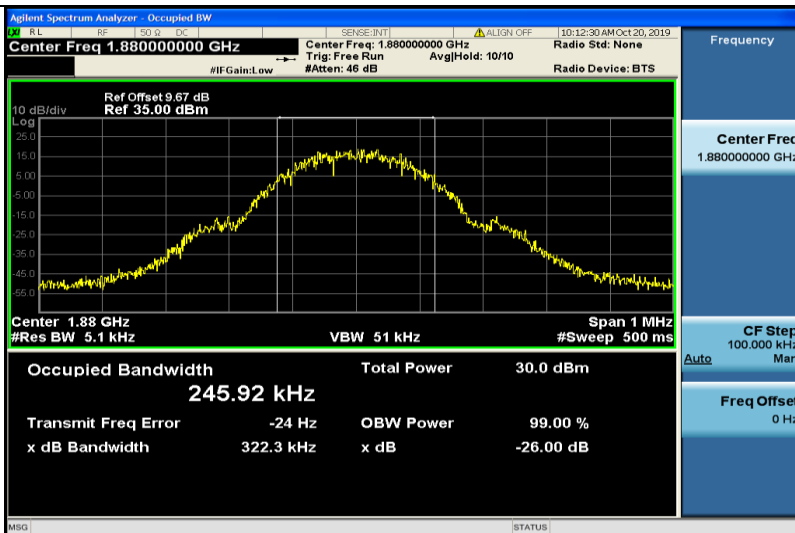




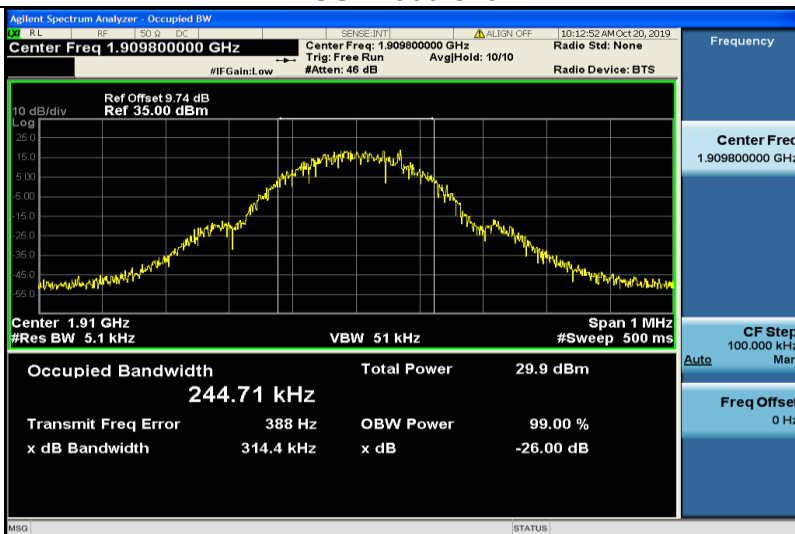
GSM1900-512



GSM1900-661

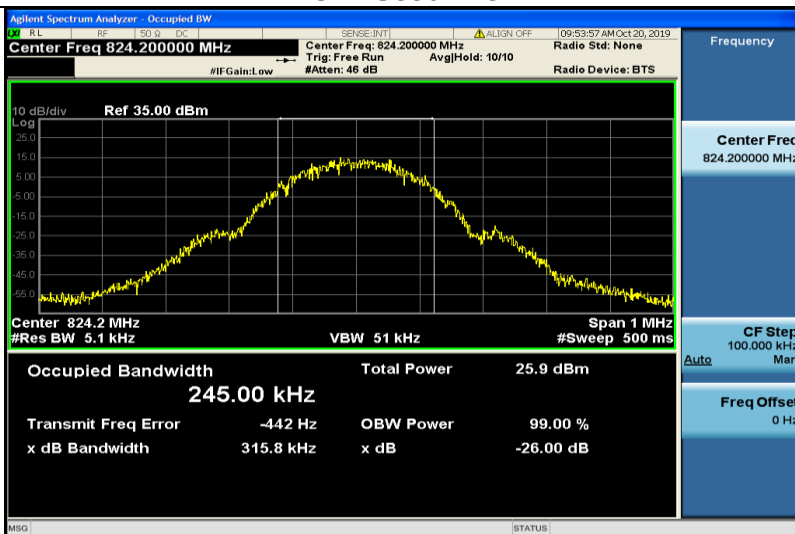


GSM1900-810

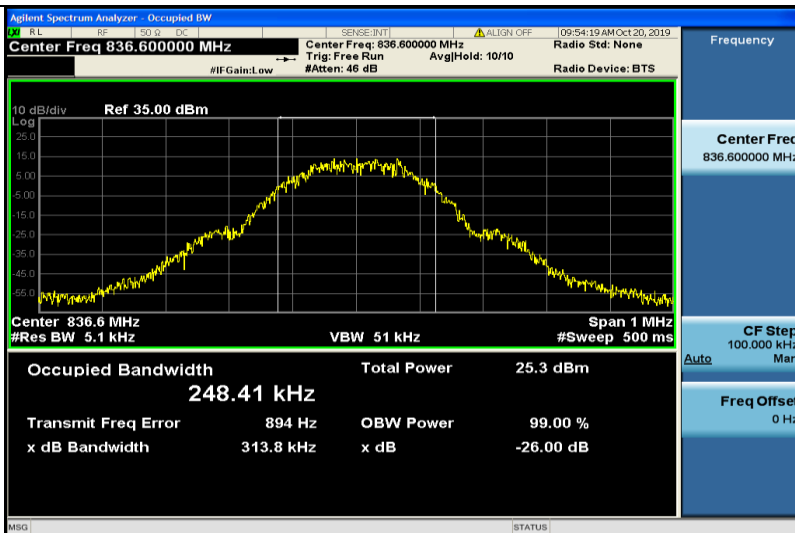




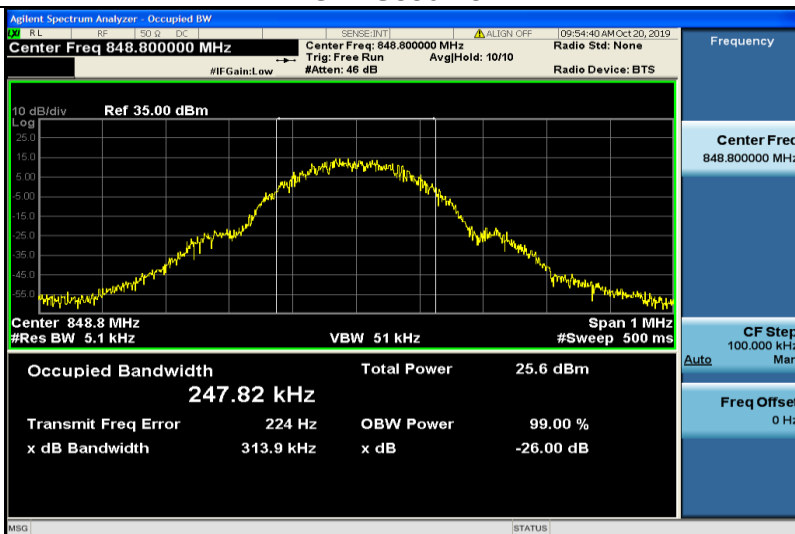
GPRS850-128



GPRS850-190



GPRS850-251





Agilent Spectrum Analyzer - Occupied BW

[IF] [RBW] [VBW] [SFB] [SMB] [SMB] [SENSE] [INT] [ALIGN] [OFF] 10:26:33 AM Oct 10, 2019
 Center Freq 1.850200000 GHz Trig: Free Run AvgHld: 10/10 Radio Std: None Frequency
 #IF Gain: Low #Atten: 46 dB Radio Device: BTS

10 dB/div Ref 35.00 dBm

Center 1.85 GHz Span 1 MHz
 #Res BW 5.1 kHz VBW 51 kHz #Sweep 500 ms

Occupied Bandwidth	Total Power	20.7 dBm
246.44 kHz		
Transmit Freq Error	OBW Power	99.00 %
252 Hz		
x dB Bandwidth	x dB	-26.00 dB
307.9 kHz		

MSG [STATUS]

CF Step 100.000 kHz
 Auto Man
 Freq Offset 0 Hz

Agilent Spectrum Analyzer - Occupied BW

SENSE:INT1 ALIGN:OFF 10:26:55 AM Oct 20, 2019

Center Freq 1.880000000 GHz Center Freq: 1.880000000 GHz Radio Std: None Frequency

#IF Gain: Low Trig: Free Run Avg/Hold: 10/10 Radio Device: BTS

#Res BW 5.1 kHz VBW 51 kHz Span 1 MHz CF Step 100.000 kHz

Autoset Man

Transmit Freq Error -122 Hz OBW Power 99.00 % Freq Offset 0 Hz

x dB Bandwidth 300.5 kHz x dB -26.00 dB

The image shows a screenshot of an Agilent Spectrum Analyzer. The main display is a frequency plot with a yellow trace showing a signal centered at 1.88 GHz. The plot has a logarithmic scale for power (dBm) and a linear scale for frequency (kHz). The signal is a broad peak, indicating a wide bandwidth. The plot is overlaid on a grid. The top of the screen shows the center frequency and other settings. The bottom of the screen shows a table of key parameters.

Parameter	Value
Center Freq	1.880000000 GHz
Radio Std	None
Radio Device	BTS
Trig	Free Run
Avg/Hold	10/10
#IF Gain	Low
Center Freq	1.88 GHz
#Res BW	5.1 kHz
VBW	51 kHz
Span	1 MHz
CF Step	100.000 kHz
Autoset	Man
Transmit Freq Error	-122 Hz
OBW Power	99.00 %
Freq Offset	0 Hz
x dB Bandwidth	300.5 kHz
x dB	-26.00 dB

Agilent Spectrum Analyzer - Occupied BW

REF: 10.000000 GHz | SENSE: INT | 10:27:17 AM Oct 10, 2019
 Center Freq: 1.909800000 GHz | Trig: Free Run | Avg/Hold: 10/10 | Radio Std: None
 #IF Gain: Low | #Atten: 46 dB | Radio Device: BTS

10 dB/div | Ref 35.00 dBm
 Log
 25.0
 15.0
 5.00
 5.00
 15.0
 25.0
 35.0
 45.0
 55.0

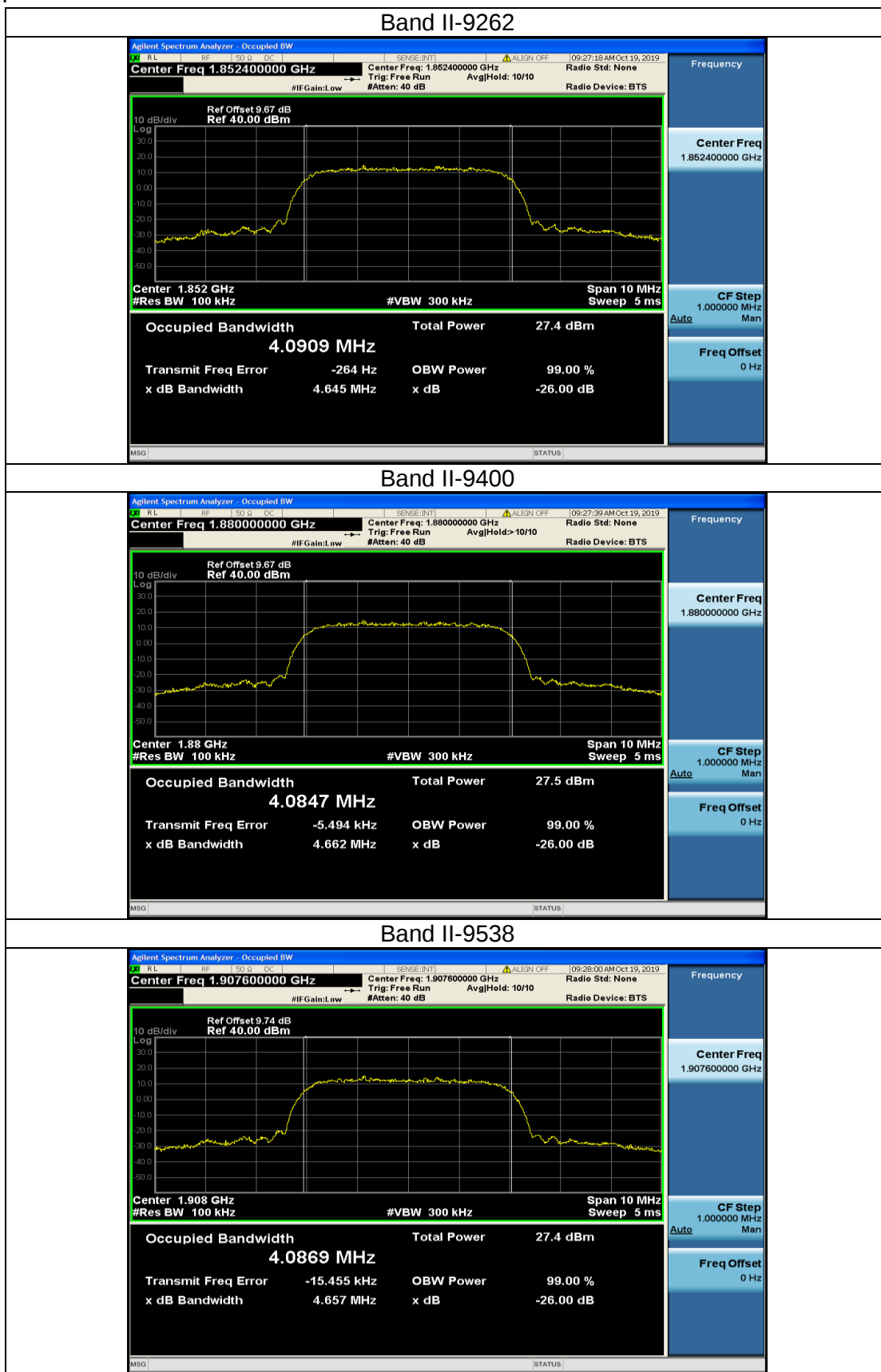
Center 1.91 GHz | Span 1 MHz
 #Res BW 5.1 kHz | VBW 51 kHz | #Sweep 500 ms

Occupied Bandwidth	Total Power	20.1 dBm
245.49 kHz		
Transmit Freq Error	609 Hz	OBW Power
99.00 %		
x dB Bandwidth	311.6 kHz	x dB
-26.00 dB		

MSG | STATUS



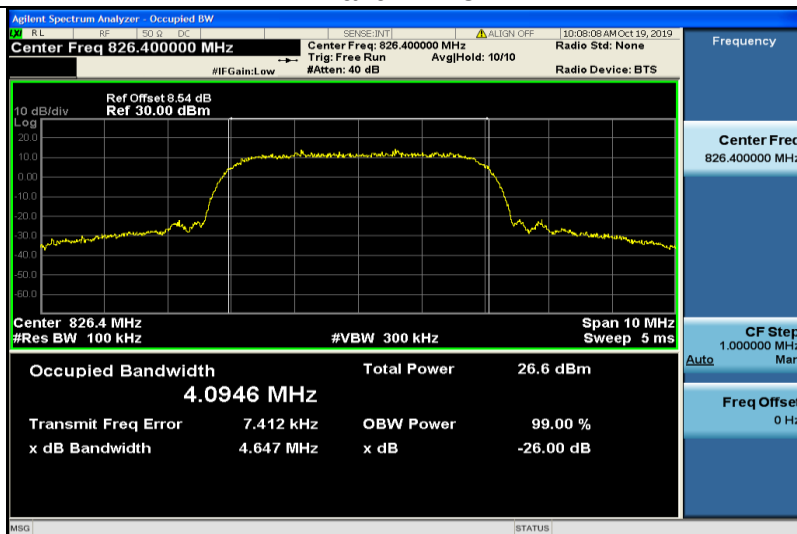
Band II



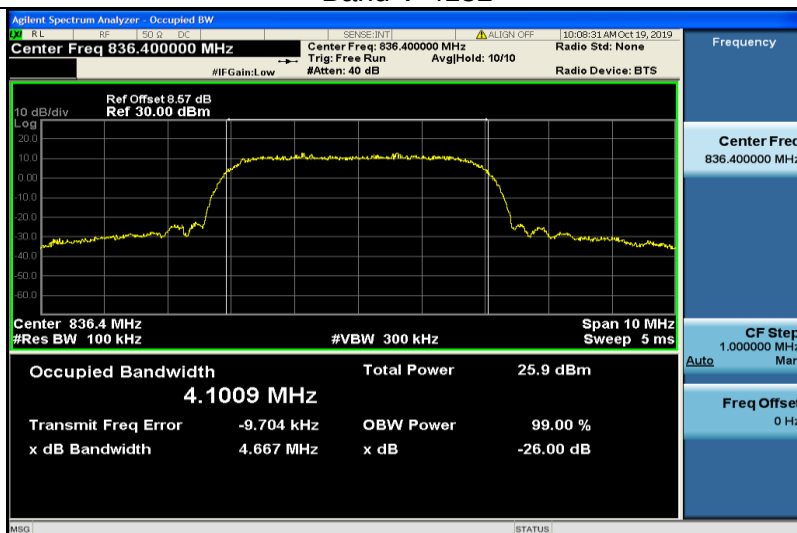


Band V

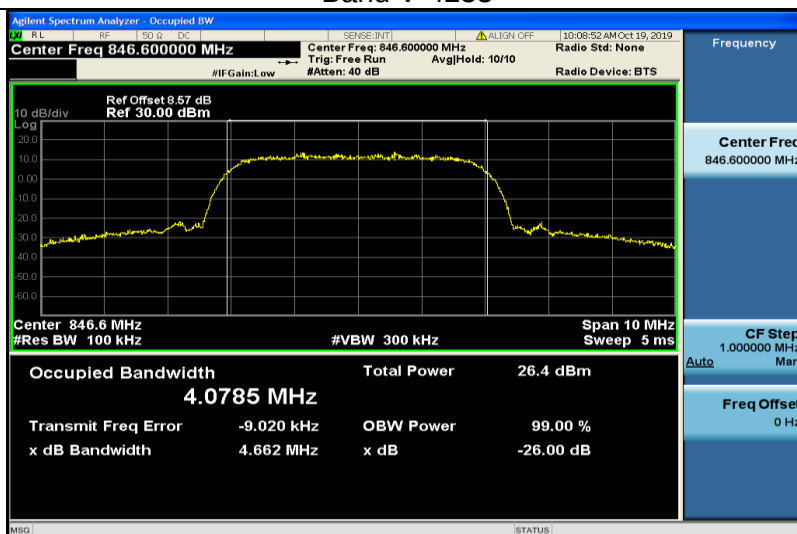
Band V-4132



Band V-4182



Band V-4233



Note: all modes of EUT have been tested; only the data of worst case mode is reported.

5.4 Conducted spurious emissions

5.4.1 Limits

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

5.4.2 Test method

1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.

2, Spectrum Setting:

Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.

Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.

3, The low, middle and high channels of each band and mode's spurious emissions for 30 MHz to 10th Harmonic were measured by Spectrum analyzer.

5.4.3 Test result

Band	Channel	Frequency Range(Mhz)	Value(dBm)	Limit(dBm)	Verdict
GSM850	128	15~30	-56.90	-13	PASS
GSM850	128	30~1000	-33.44	-13	PASS
GSM850	128	1000~5000	-39.96	-13	PASS
GSM850	128	5000~12000	-54.12	-13	PASS
GSM850	128	12000~18000	-51.67	-13	PASS
GSM850	190	15~30	-56.74	-13	PASS
GSM850	190	30~1000	-37.05	-13	PASS
GSM850	190	1000~5000	-40.03	-13	PASS
GSM850	190	5000~12000	-54.15	-13	PASS
GSM850	190	12000~18000	-51.77	-13	PASS
GSM850	251	15~30	-56.68	-13	PASS
GSM850	251	30~1000	-35.69	-13	PASS
GSM850	251	1000~5000	-39.99	-13	PASS
GSM850	251	5000~12000	-54.04	-13	PASS
GSM850	251	12000~18000	-51.67	-13	PASS
GPRS850	128	15~30	-56.42	-13	PASS
GPRS850	128	30~1000	-34.96	-13	PASS
GPRS850	128	1000~5000	-40.20	-13	PASS
GPRS850	128	5000~12000	-54.24	-13	PASS
GPRS850	128	12000~18000	-51.62	-13	PASS
GPRS850	190	15~30	-56.61	-13	PASS
GPRS850	190	30~1000	-35.16	-13	PASS
GPRS850	190	1000~5000	-40.11	-13	PASS
GPRS850	190	5000~12000	-54.21	-13	PASS
GPRS850	190	12000~18000	-51.69	-13	PASS
GPRS850	251	15~30	-56.38	-13	PASS
GPRS850	251	30~1000	-34.12	-13	PASS
GPRS850	251	1000~5000	-40.02	-13	PASS
GPRS850	251	5000~12000	-54.11	-13	PASS
GPRS850	251	12000~18000	-51.48	-13	PASS
GSM1900	512	0.009~0.15	-80.46	-43	PASS

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GSM1900	512	15~30	-55.98	-23	PASS
GSM1900	512	30~1000	-37.92	-13	PASS
GSM1900	512	1000~5000	-40.03	-13	PASS
GSM1900	512	5000~12000	-54.16	-13	PASS
GSM1900	512	12000~18000	-51.65	-13	PASS
GSM1900	661	0.009~0.15	-81.30	-43	PASS
GSM1900	661	15~30	-56.33	-23	PASS
GSM1900	661	30~1000	-37.40	-13	PASS
GSM1900	661	1000~5000	-40.03	-13	PASS
GSM1900	661	5000~12000	-53.77	-13	PASS
GSM1900	661	12000~18000	-51.50	-13	PASS
GSM1900	810	0.009~0.15	-80.97	-43	PASS
GSM1900	810	15~30	-57.04	-23	PASS
GSM1900	810	30~1000	-37.34	-13	PASS
GSM1900	810	1000~5000	-40.03	-13	PASS
GSM1900	810	5000~12000	-53.28	-13	PASS
GSM1900	810	12000~18000	-51.49	-13	PASS

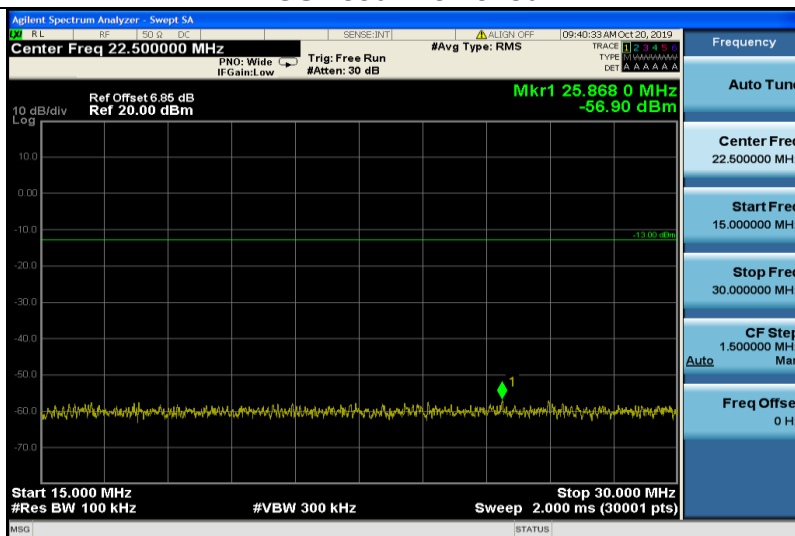


Band	Channel	Frequency Range (Mhz)	Value(dBm)	Limit(dBm)	Verdict
Band II	9262	15~30	-56.78	-13	PASS
Band II	9262	30~1000	-38.24	-13	PASS
Band II	9262	1000~5000	-40.05	-13	PASS
Band II	9262	5000~12000	-54.28	-13	PASS
Band II	9262	12000~18000	-51.77	-13	PASS
Band II	9400	15~30	-56.07	-13	PASS
Band II	9400	30~1000	-37.48	-13	PASS
Band II	9400	1000~5000	-40.16	-13	PASS
Band II	9400	5000~12000	-54.26	-13	PASS
Band II	9400	12000~18000	-51.61	-13	PASS
Band II	9538	15~30	-56.74	-13	PASS
Band II	9538	30~1000	-37.58	-13	PASS
Band II	9538	1000~5000	-40.10	-13	PASS
Band II	9538	5000~12000	-54.18	-13	PASS
Band II	9538	12000~18000	-51.71	-13	PASS
Band V	4132	15~30	-56.70	-13	PASS
Band V	4132	30~1000	-33.80	-13	PASS
Band V	4132	1000~5000	-39.90	-13	PASS
Band V	4132	5000~12000	-54.11	-13	PASS
Band V	4132	12000~18000	-51.50	-13	PASS
Band V	4182	15~30	-56.51	-13	PASS
Band V	4182	30~1000	-35.13	-13	PASS
Band V	4182	1000~5000	-40.08	-13	PASS
Band V	4182	5000~12000	-54.13	-13	PASS
Band V	4182	12000~18000	-51.62	-13	PASS
Band V	4233	15~30	-56.90	-13	PASS
Band V	4233	30~1000	-33.35	-13	PASS
Band V	4233	1000~5000	-39.93	-13	PASS
Band V	4233	5000~12000	-54.19	-13	PASS
Band V	4233	12000~18000	-51.67	-13	PASS

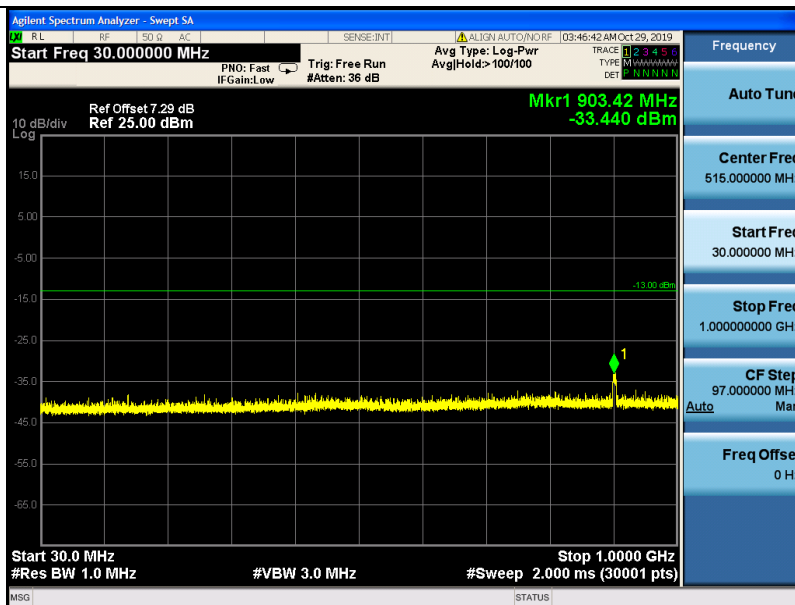


GSM850

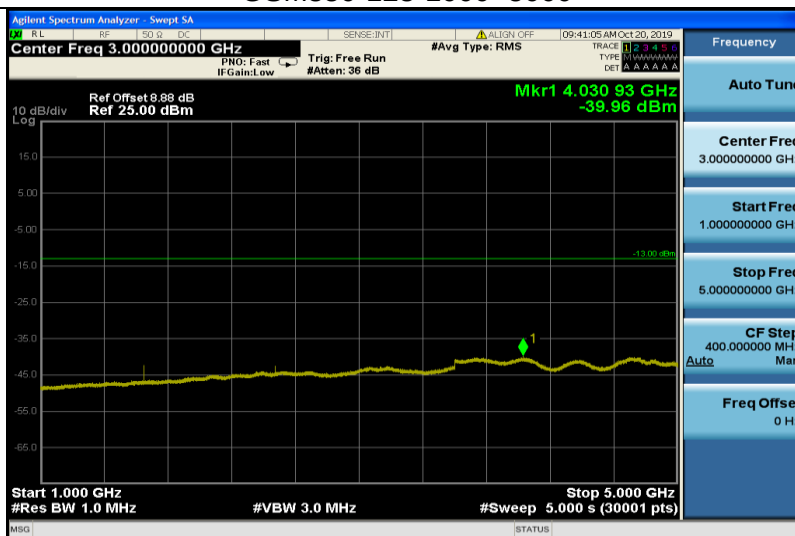
GSM850-128-15~30



GSM850-128-30~1000

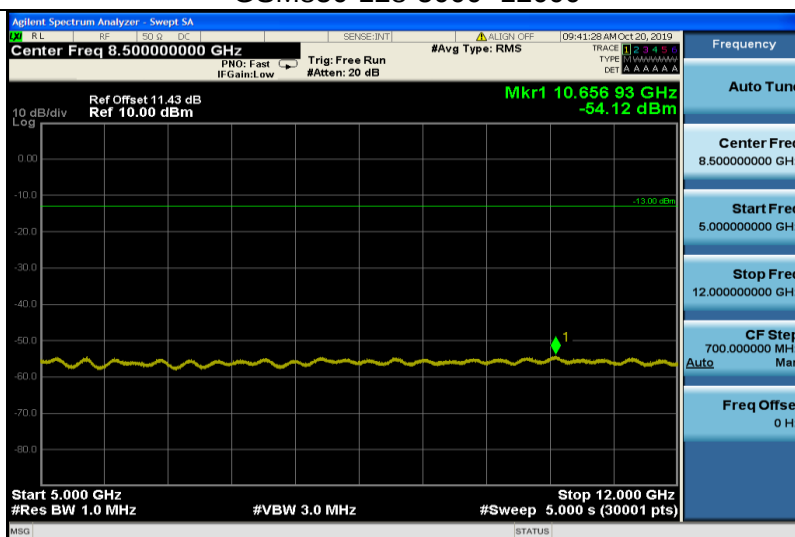


GSM850-128-1000~5000

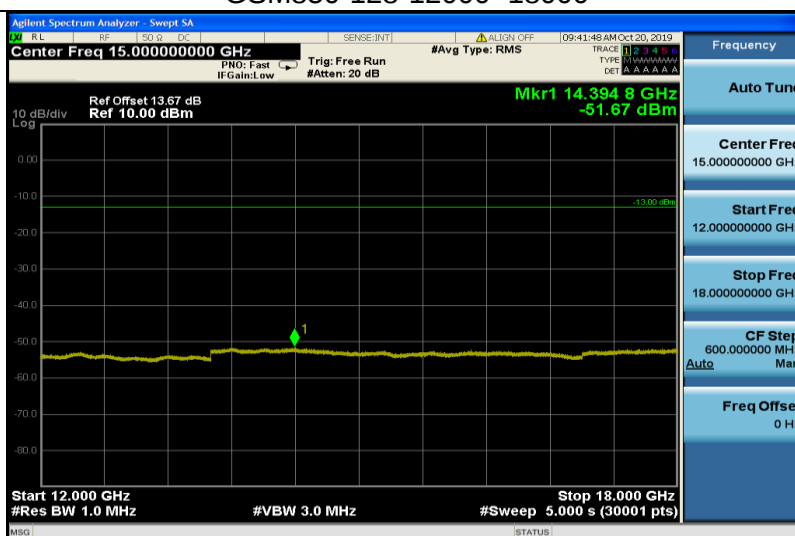




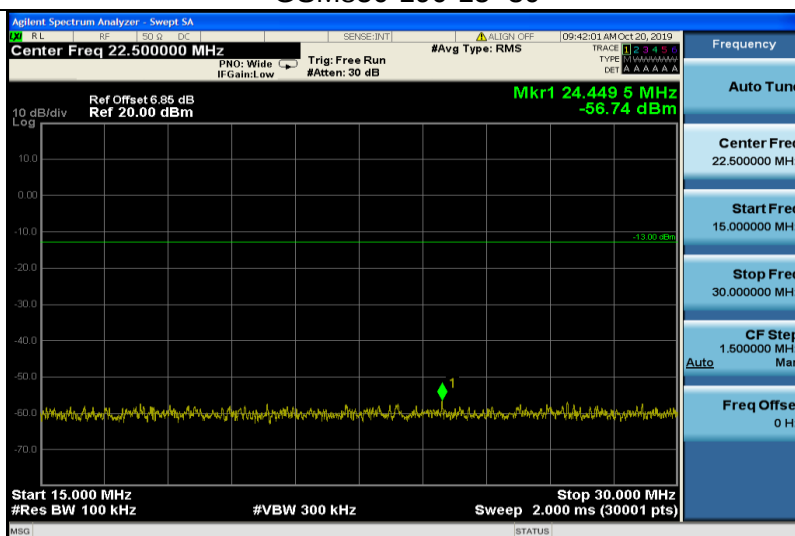
GSM850-128-5000~12000



GSM850-128-12000~18000

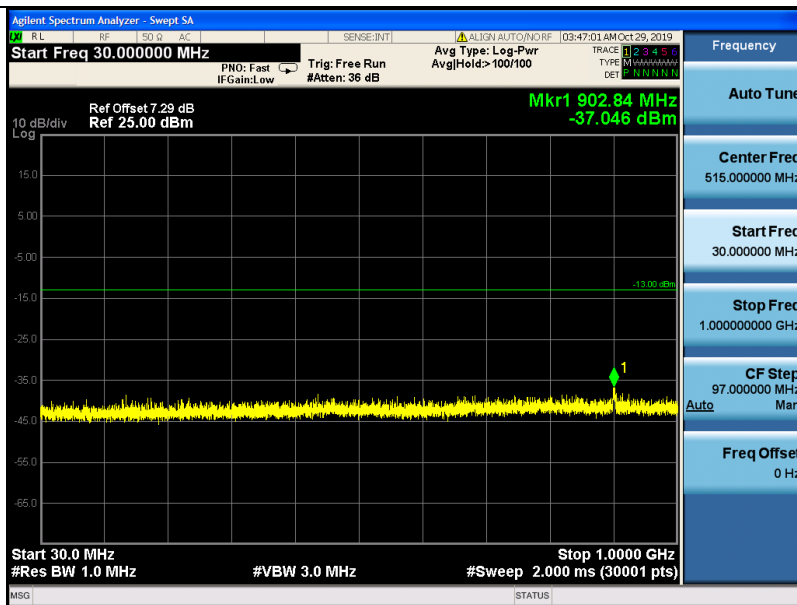


GSM850-190-15~30

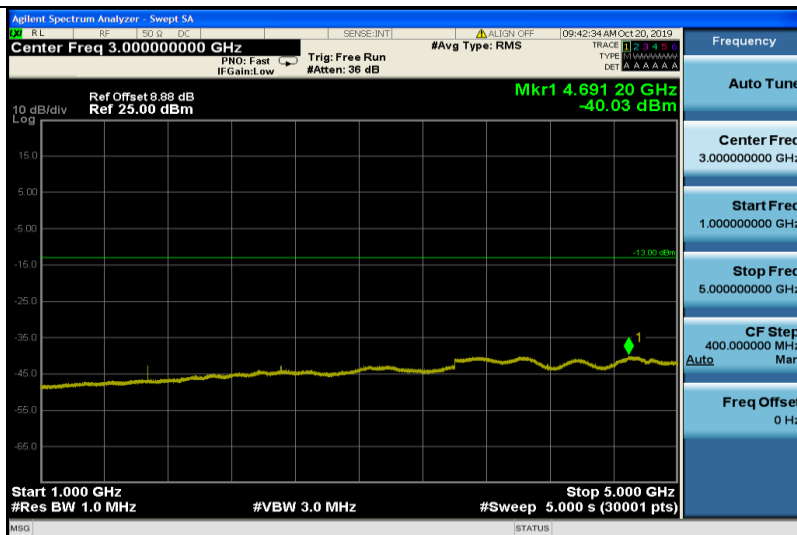




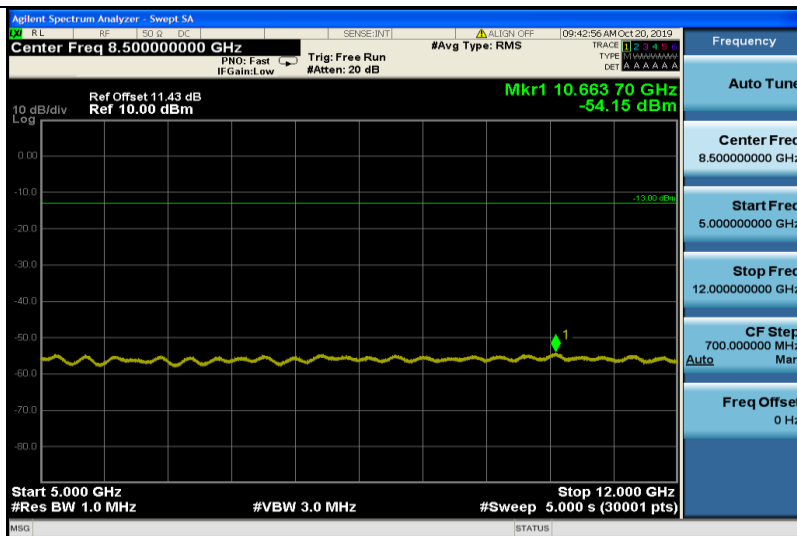
GSM850-190-30~1000



GSM850-190-1000~5000



GSM850-190-5000~12000





Agilent Spectrum Analyzer - Swept SA

Center Freq 15.00000000 GHz

Ref Offset 13.67 dB
Ref 10.00 dBm

10 dB/div
Log

Start 12.000 GHz
#Res BW 1.0 MHz

Stop 18.000 GHz
#Sweep 5,000 s (30001 pts)

#VBW 3.0 MHz

Trig: Free Run
#Atten: 20 dB

#Avg Type: RMS

Mkr1 14.421 4 GHz
-51.77 dBm

Frequency

Auto Tune

Center Freq 15.00000000 GHz

Start Freq 12.00000000 GHz

Stop Freq 18.00000000 GHz

CF Step 600.000000 MHz

Auto

Freq Offset 0 Hz

Agilent Spectrum Analyzer - Swept SA

CH1 R/L RF ISO Q DC SENSE: INT

Center Freq 22.500000 MHz

Pho: Wide IF Gain: Low Trig: Free Run #Atten: 30 dB

#Avg Type: RMS

09:43:29 AM Oct 20, 2019

Trace 1 3 4 0 Type 1 Waveform Det A A A A A A A

Auto Tun

Center Freq 22.500000 MHz

Start Freq 15.000000 MHz

Stop Freq 30.000000 MHz

CF Step 1.500000 MHz

Auto

Freq Offset 0 MHz

Ref Offset: 6.95 dB

Ref 20.00 dBm

Mkr1 22.016 0 MHz -56.68 dBm

10 dB/div

Log

10.0

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

-70.0

-19.00 dBm

Start 15.000 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 30.000 MHz

Sweep 2.000 ms (30001 pts)

MSG1

STATUS

Agilent: Spectrum Analyzer - Swept SA

Start Freq 30.000000 MHz

Ref Offset 7.29 dB
Ref 25.00 dBm

PNO: Fast
IF Gain: Low

Trig: Free Run
#Atten: 36 dB

ALIGN AUTO/NO/RF

Avg Type: Log-Pwr
Avg/Hold: 100/100

03:47:20 AM Oct 29, 2019

TRACE 1 2 3 4 5 6
TYPE BWANWAWW
DET NNNNNN

Frequency

Auto Tun

Center Freq
515.000000 MHz

Start Freq
30.000000 MHz

Stop Freq
1.000000000 GHz

CF Step
97.000000 MHz

Auto

Freq Offset
0 Hz

10 dB/div
Log

15.0
5.00
-5.00
-15.0
-25.0
-35.0
-45.0
-55.0
-65.0

Mkr1 902.26 MHz
-35.685 dBm

-13.00 dBm

1

Start 30.0 MHz
#Res BW 1.0 MHz

#VBW 3.0 MHz

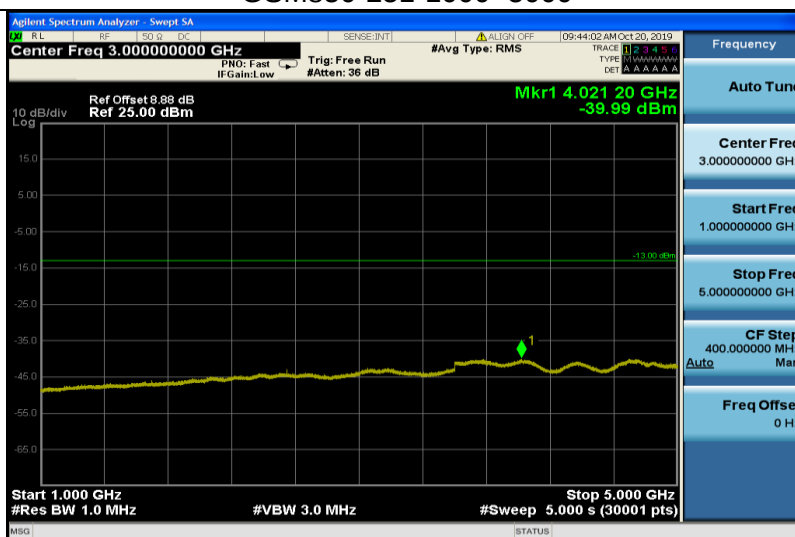
Stop 1.0000 GHz
#Sweep 2.000 ms (30001 pts)

MSG

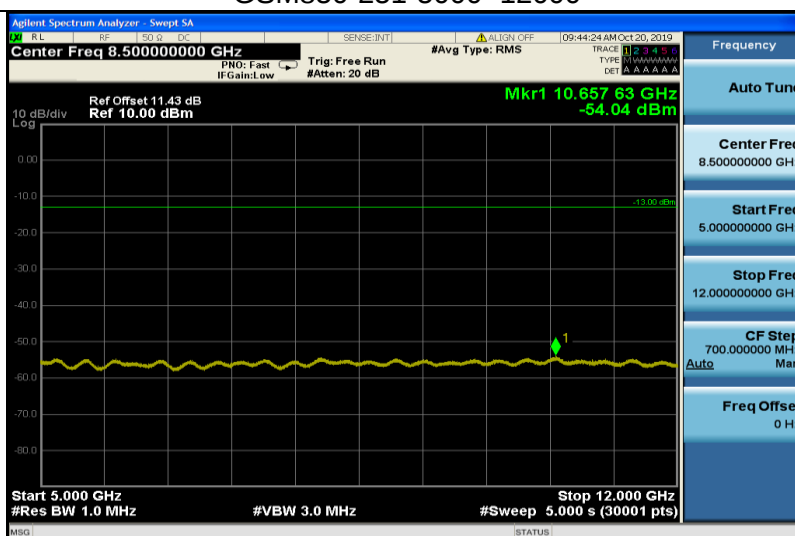
STATUS



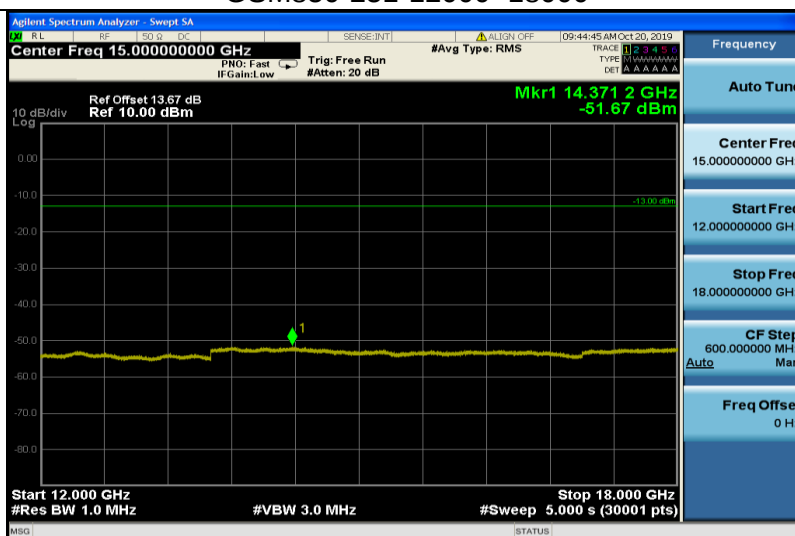
GSM850-251-1000~5000



GSM850-251-5000~12000



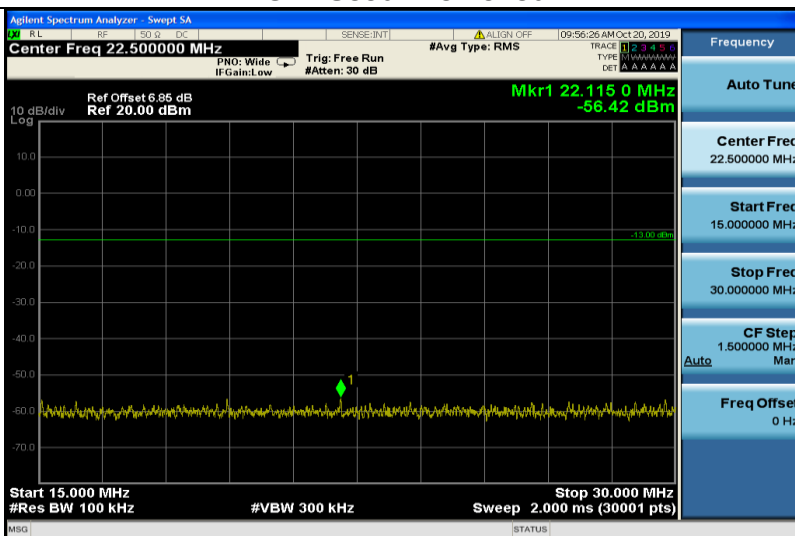
GSM850-251-12000~18000



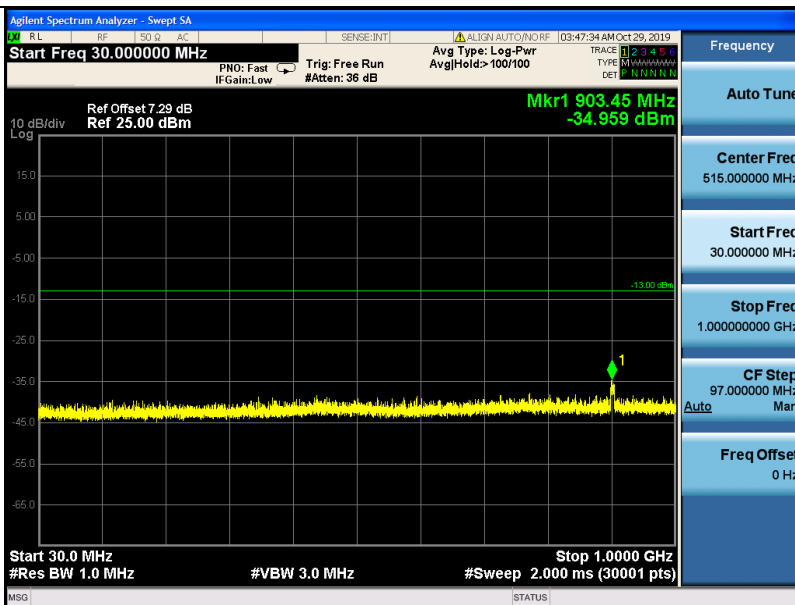


GPRS 850

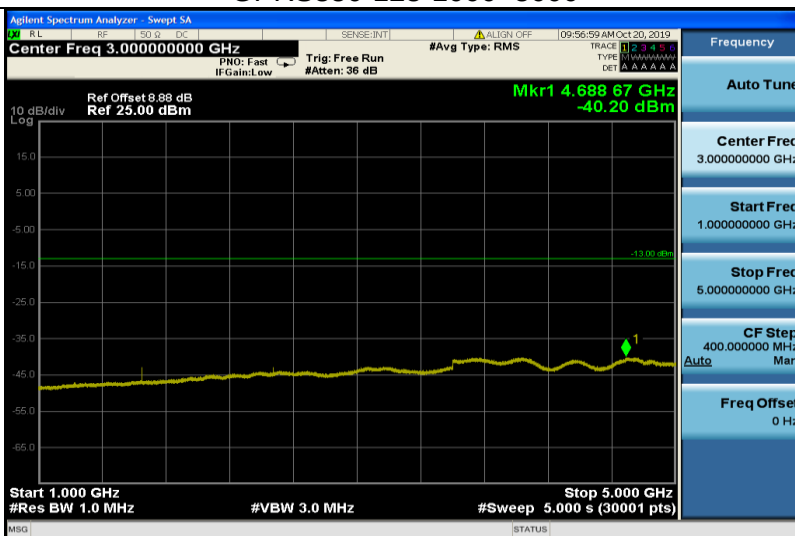
GPRS850-128-15~30



GPRS850-128-30~1000

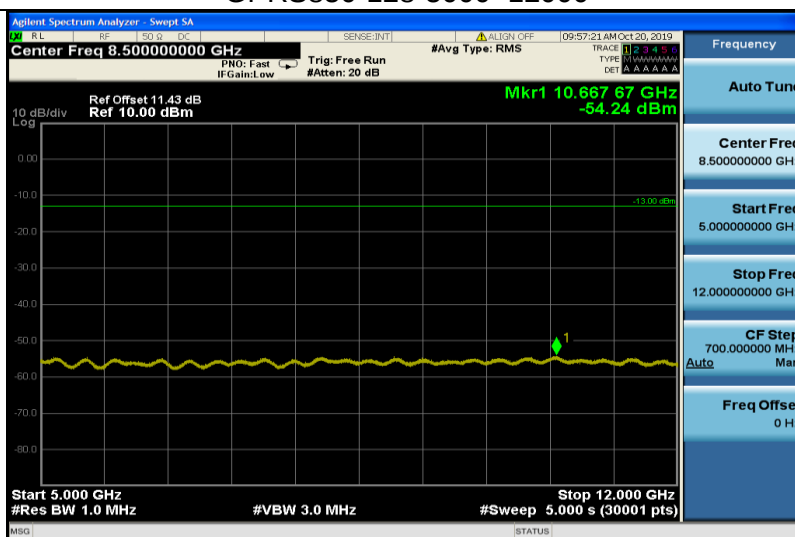


GPRS850-128-1000~5000

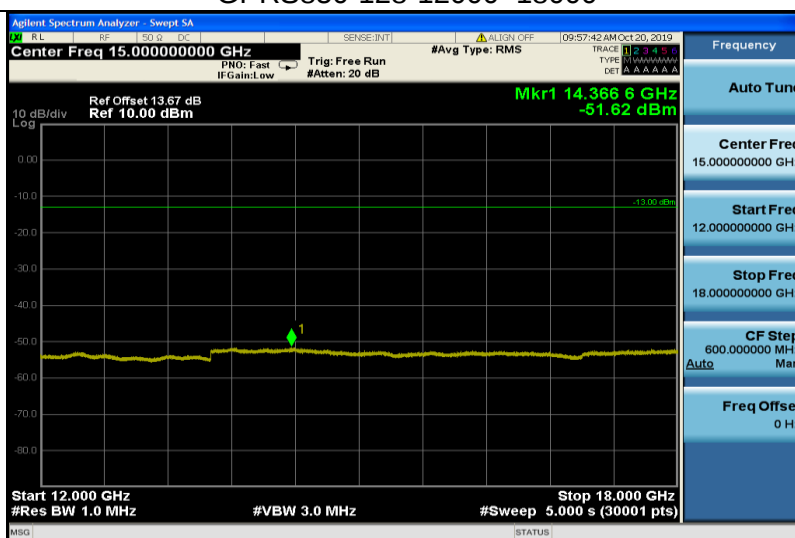




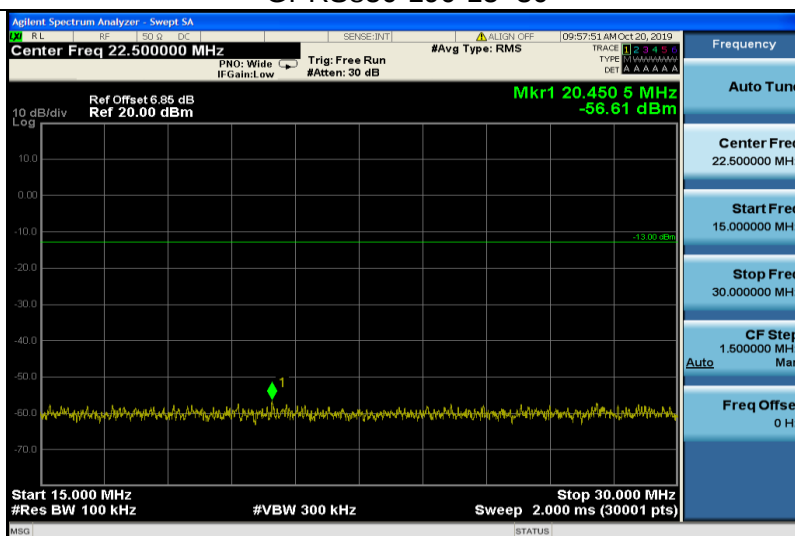
GPRS850-128-5000~12000



GPRS850-128-12000~18000

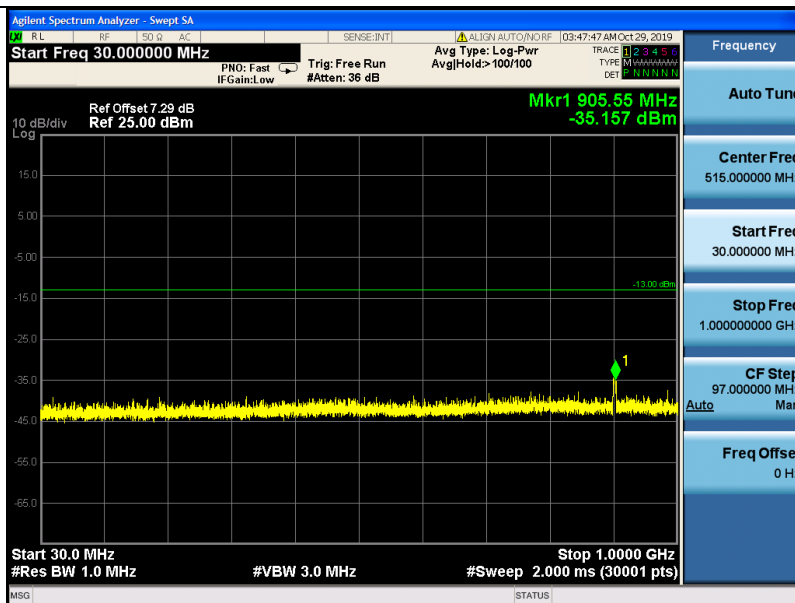


GPRS850-190-15~30

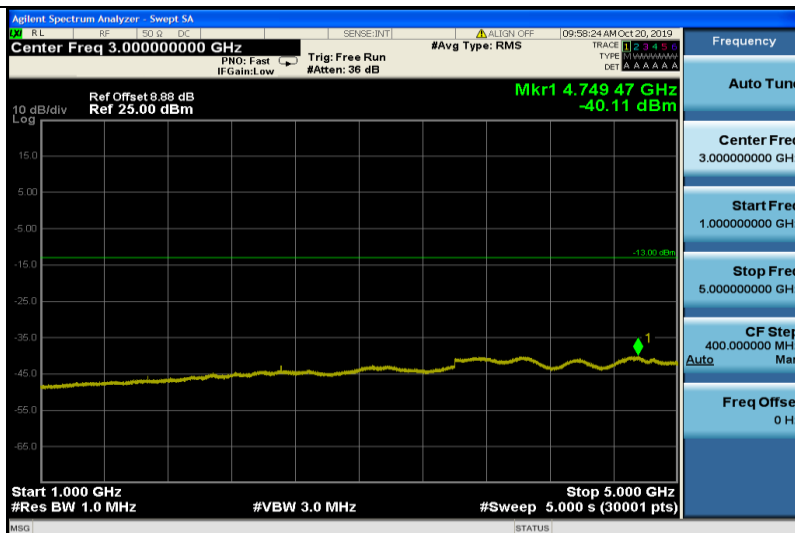




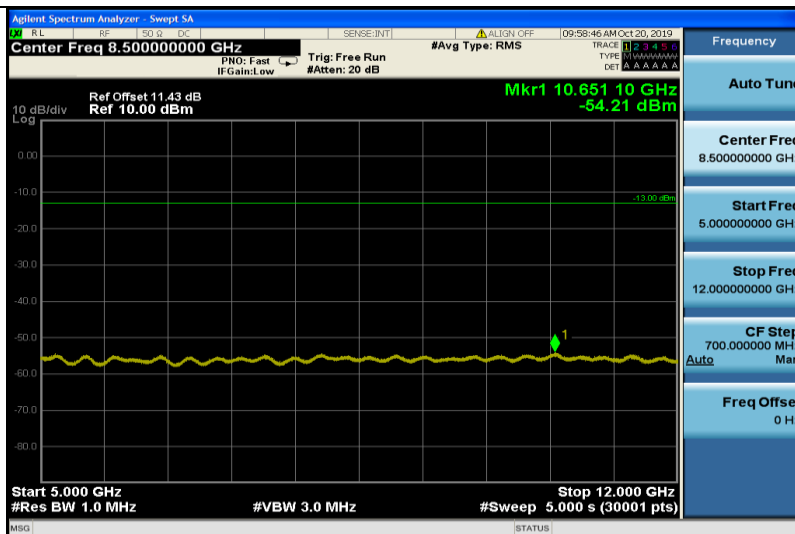
GPRS850-190-30~1000



GPRS850-190-1000~5000

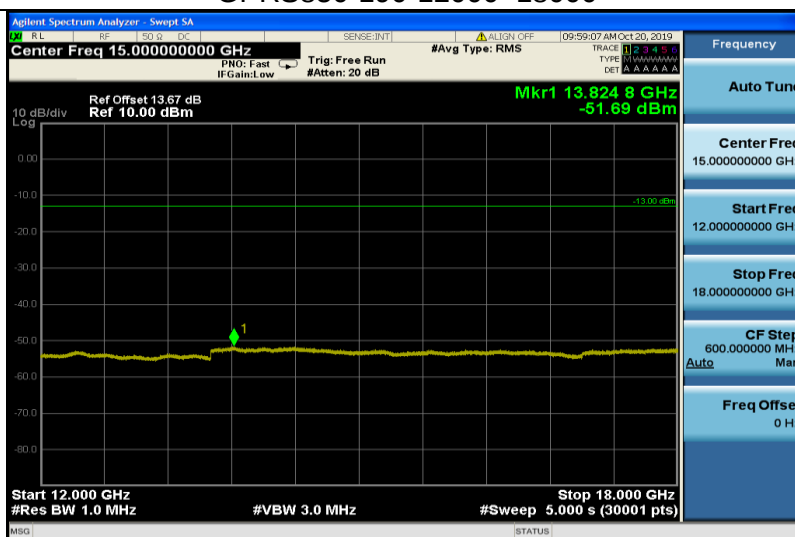


GPRS850-190-5000~12000

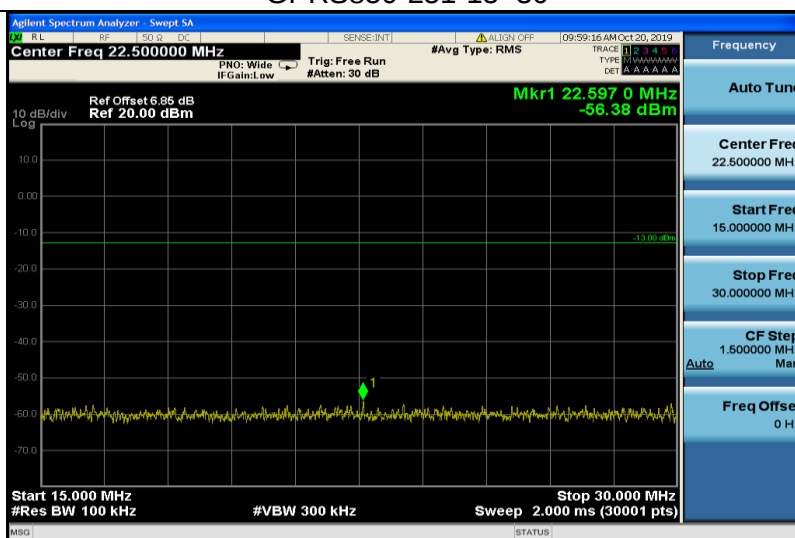




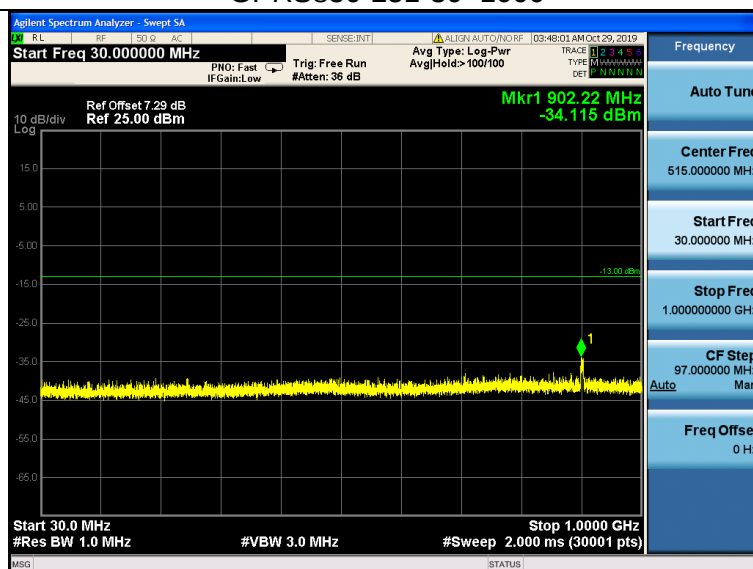
GPRS850-190-12000~18000



GPRS850-251-15~30



GPRS850-251-30~1000

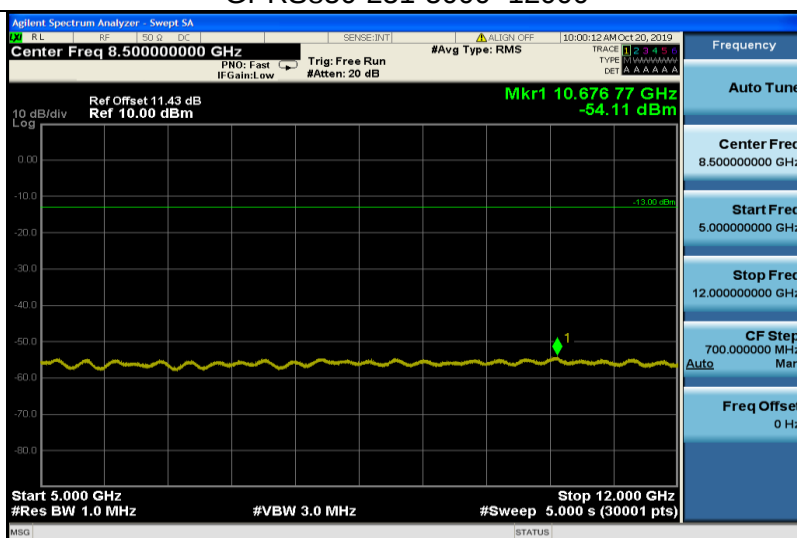




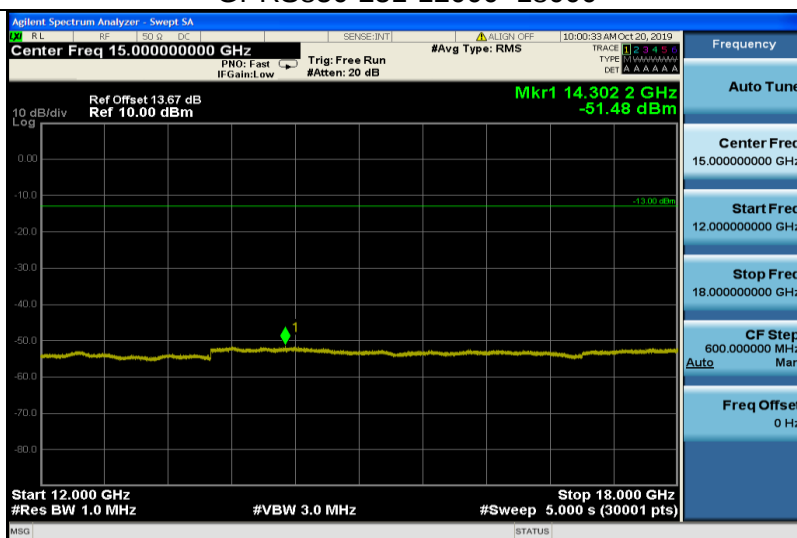
GPRS850-251-1000~5000



GPRS850-251-5000~12000



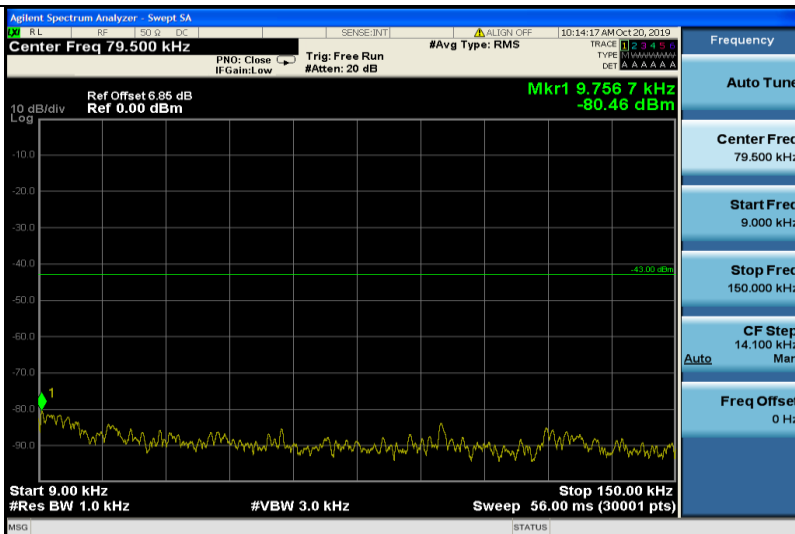
GPRS850-251-12000~18000



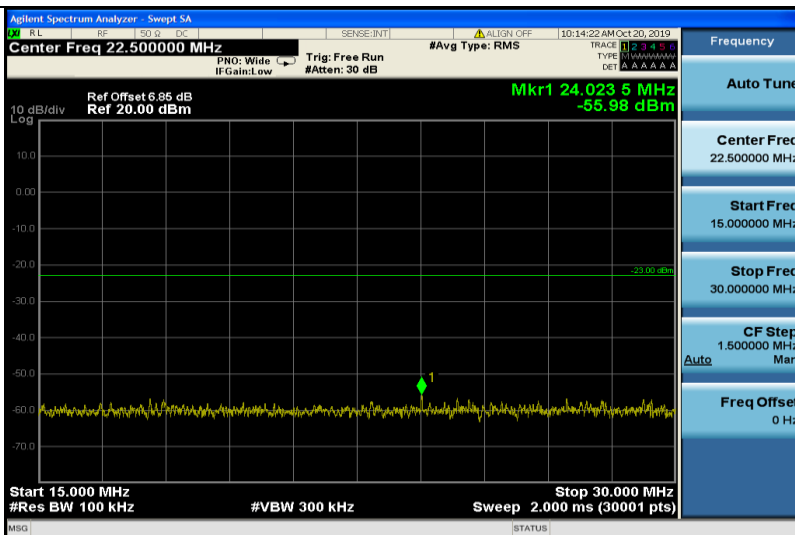


GSM1900

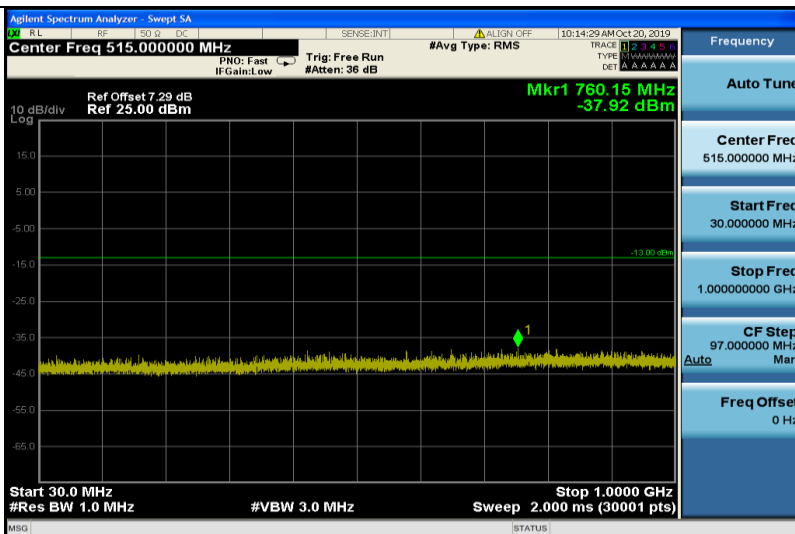
GSM1900-512-0.009~0.15



GSM1900-512-15~30



GSM1900-512-30~1000

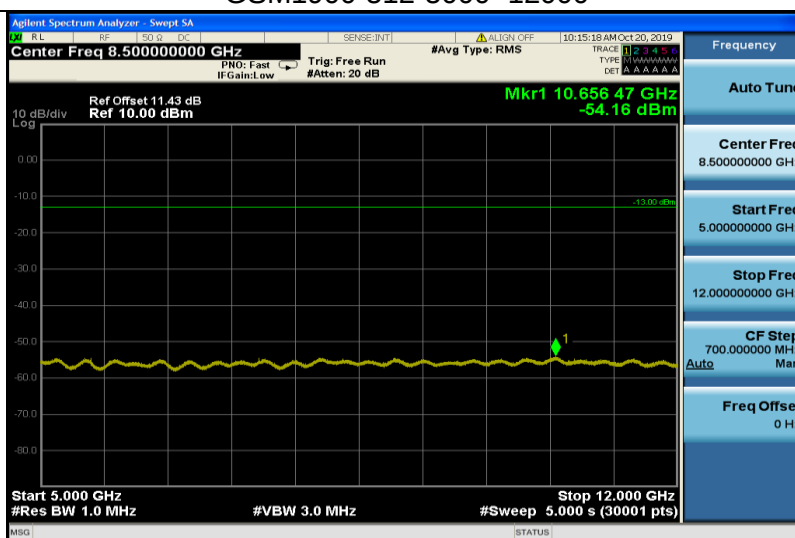




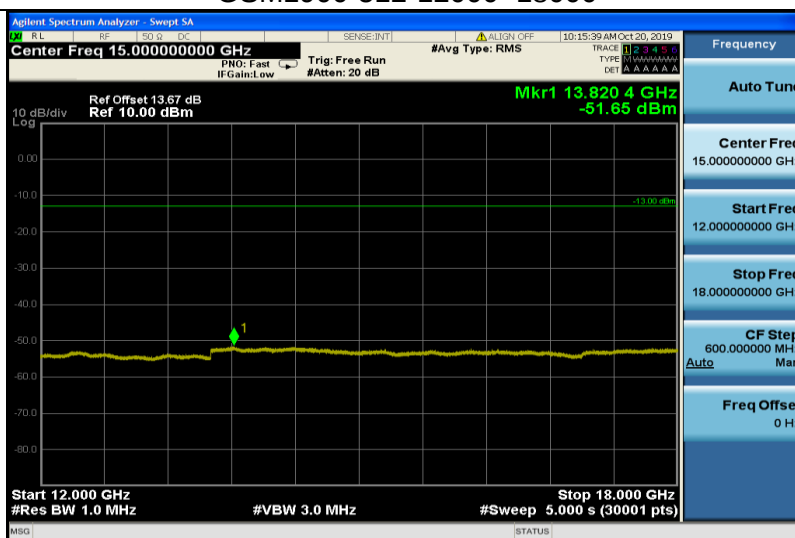
GSM1900-512-1000~5000



GSM1900-512-5000~12000

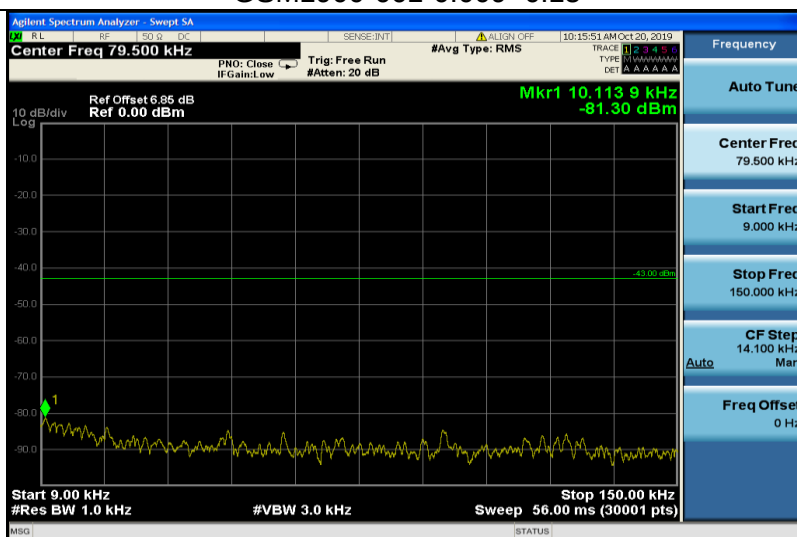


GSM1900-512-12000~18000

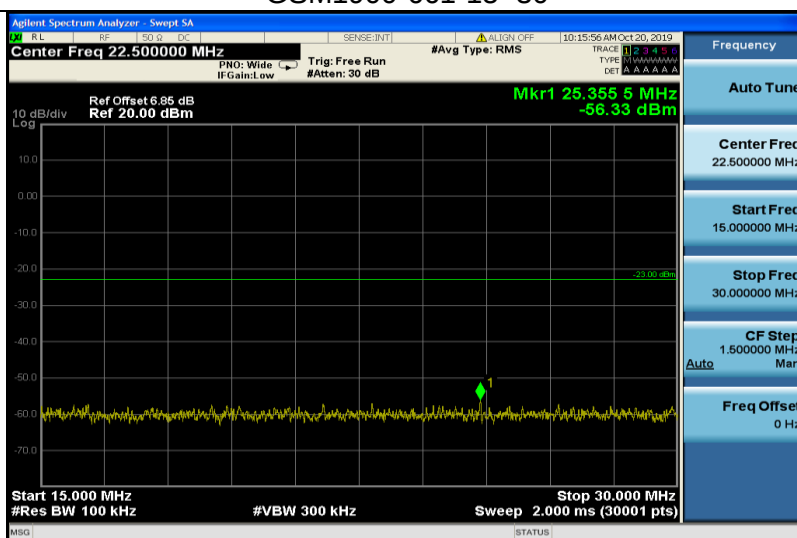




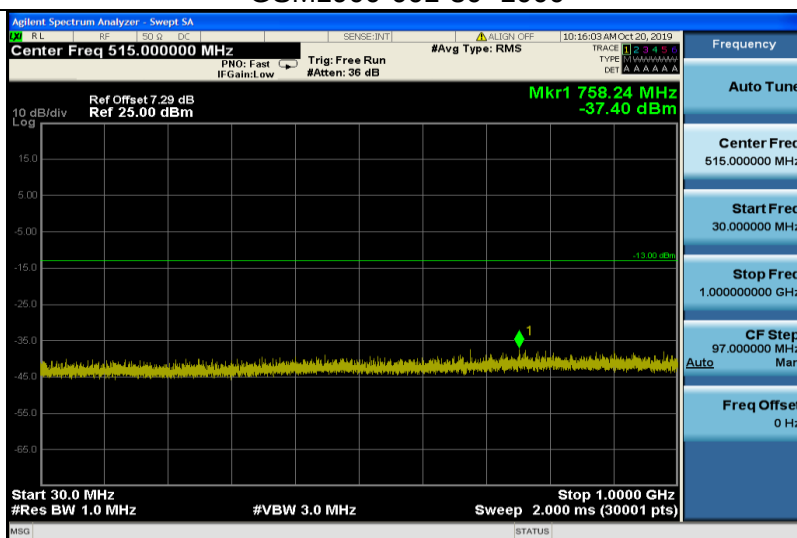
GSM1900-661-0.009~0.15



GSM1900-661-15~30

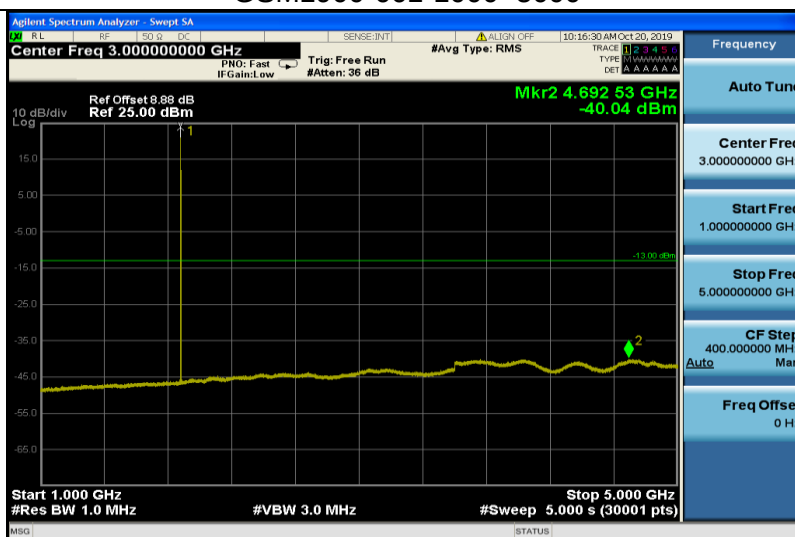


GSM1900-661-30~1000

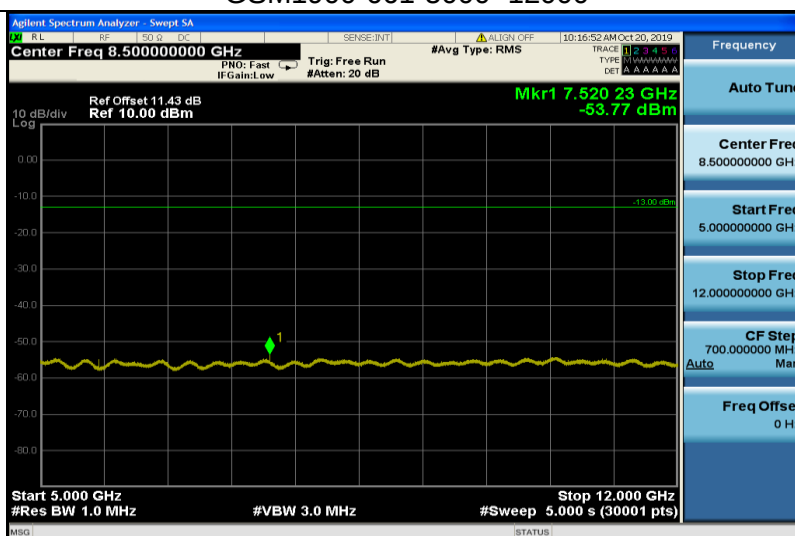




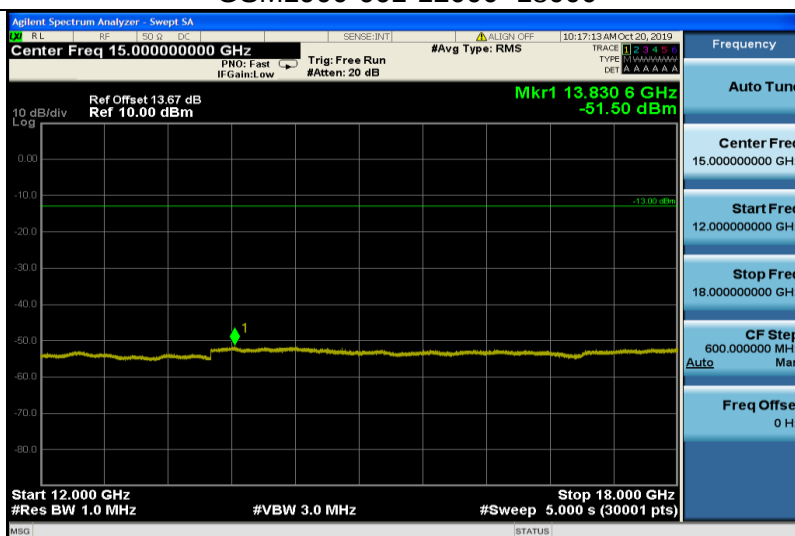
GSM1900-661-1000~5000



GSM1900-661-5000~12000

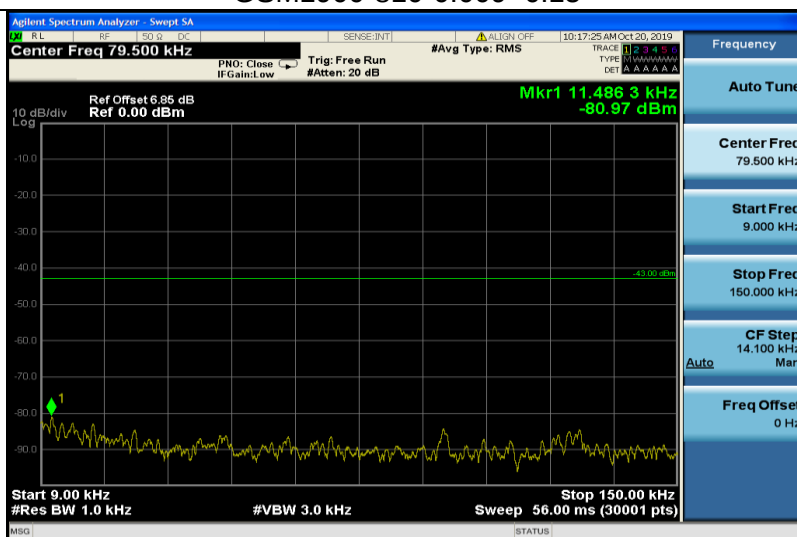


GSM1900-661-12000~18000

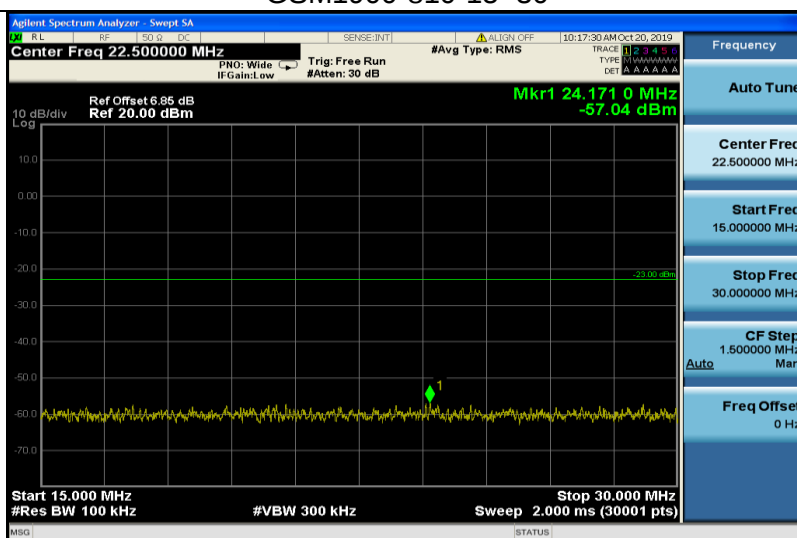




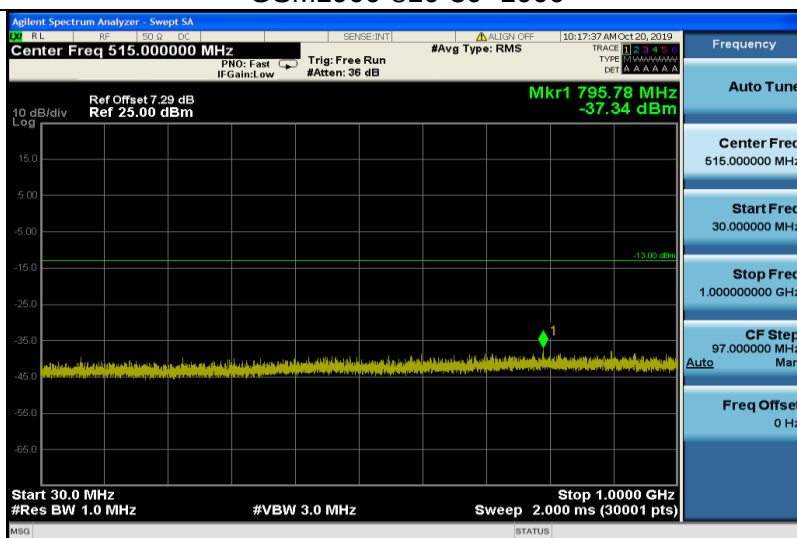
GSM1900-810-0.009~0.15



GSM1900-810-15~30

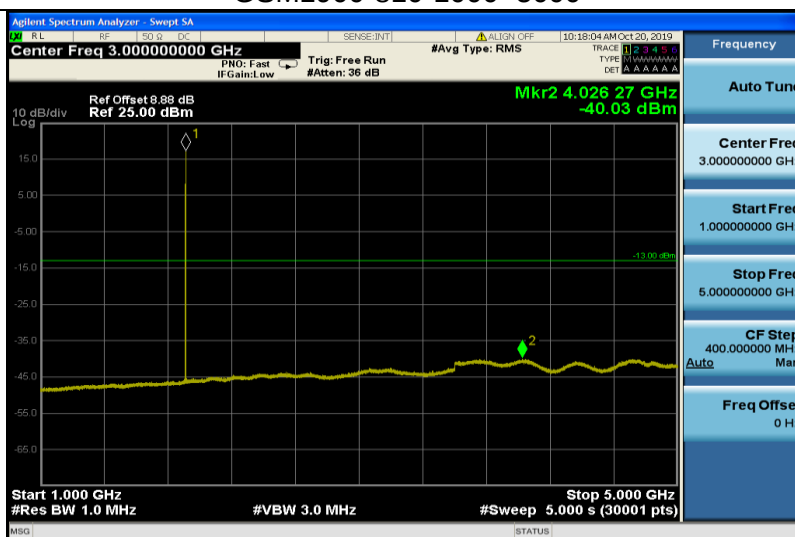


GSM1900-810-30~1000

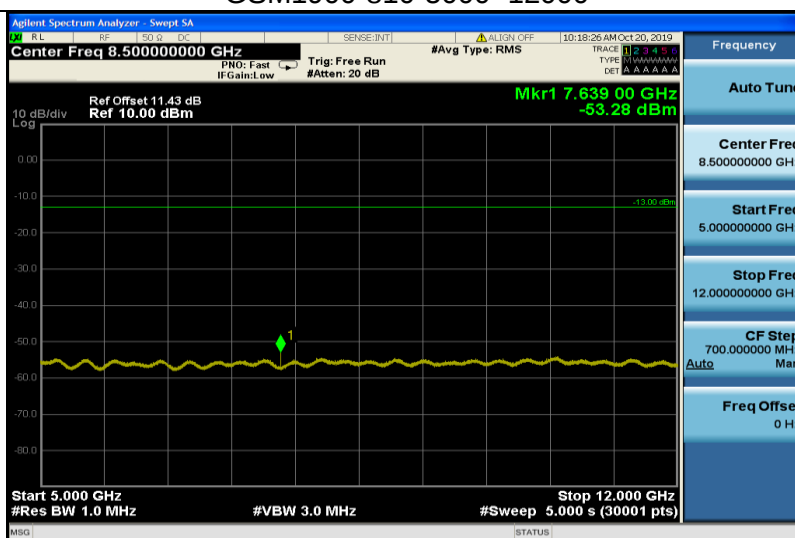




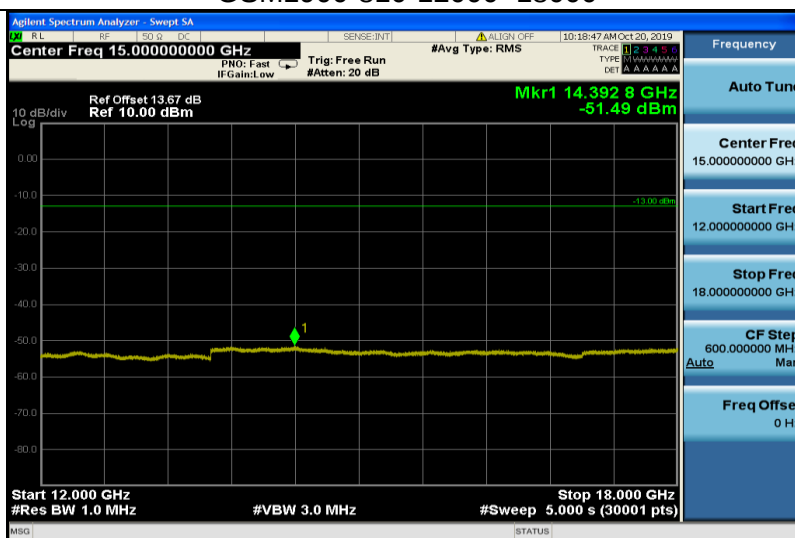
GSM1900-810-1000~5000



GSM1900-810-5000~12000

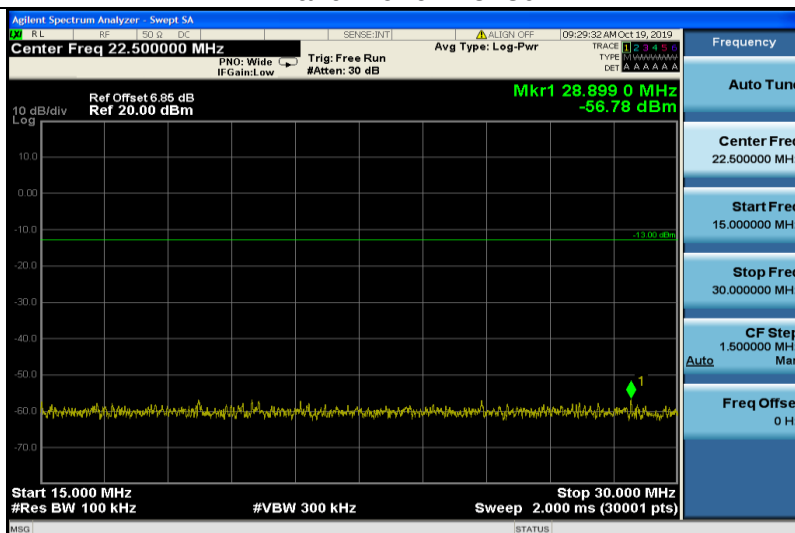


GSM1900-810-12000~18000

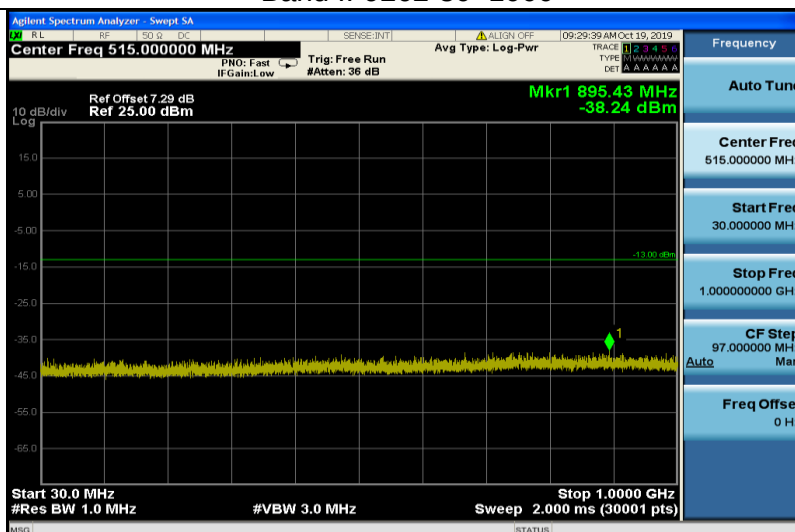


WCDMA Band II

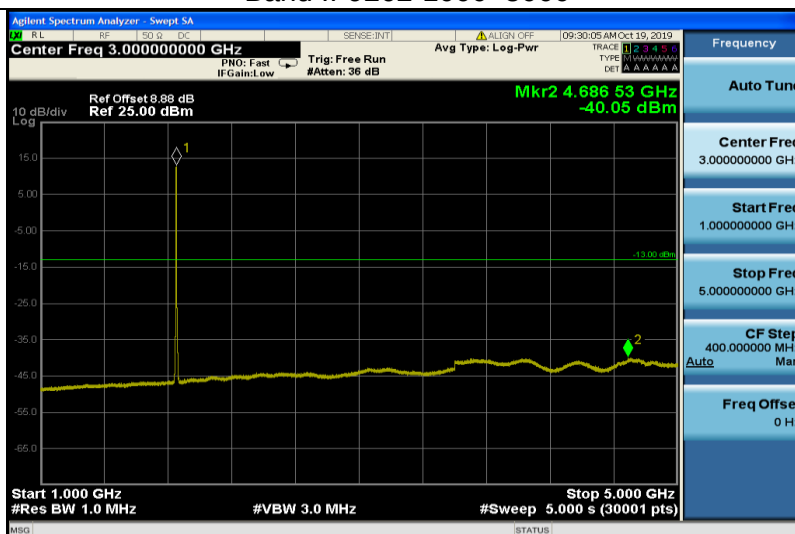
Band II-9262-15~30



Band II-9262-30~1000

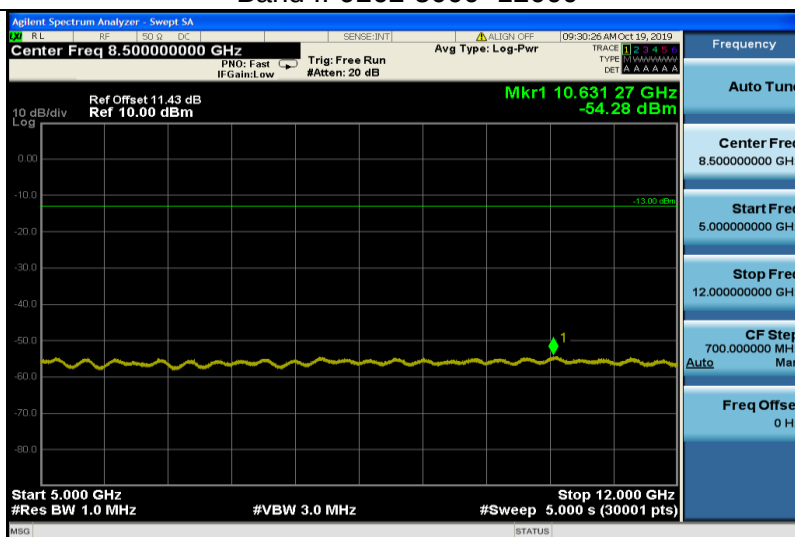


Band II-9262-1000~5000

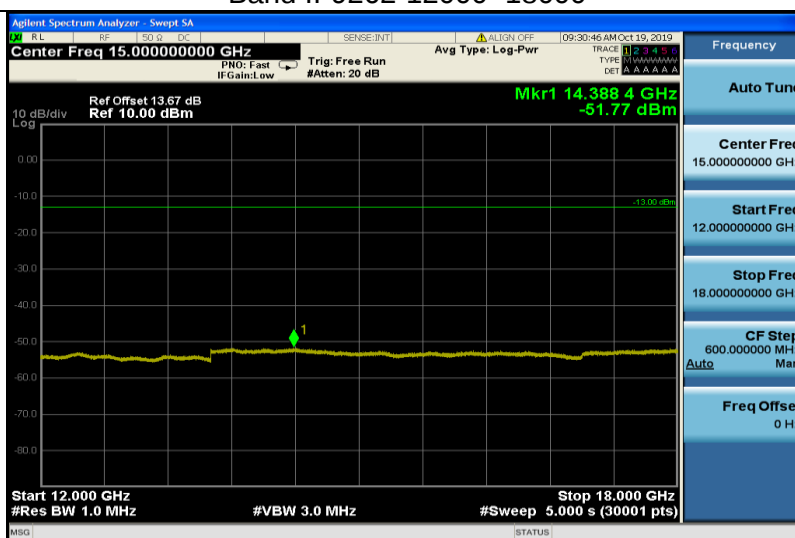




Band II-9262-5000~12000



Band II-9262-12000~18000



Band II-9400-15~30

