

Test Report

FCC ID: 2AT35-P21

Date of issue: Aug. 14, 2019

Report Number:	MTi19071025-1E2
Sample Description:	LTE Wireless Router
Model(s):	P21, P21B, P22, P25, P11, S10, S12
Applicant:	Xiamen Yifan Communication Technology Co., Ltd.
Address:	G612-2, Room601, Building 2, No. 151, YueHua Road, Huli District, Xiamen, 361006
Date of Test:	July 07, 2019 to Aug. 14, 2019

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

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Test Result Certification

Applicant's name: Xiamen Yifan Communication Technology Co., Ltd.

Address: G612-2, Room601, Building 2, No. 151, YueHua Road, Huli District, Xiamen, 361006

Manufacture's Name: Xiamen Yifan Communication Technology Co., Ltd.

Address: G612-2, Room601, Building 2, No. 151, YueHua Road, Huli District, Xiamen, 361006

Product name: LTE Wireless Router

Trademark: Yeacomm

Model name: P21, P21B, P22, P25, P11, S10, S12

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

Aug. 14, 2019

Reviewed by:

Blue Zheng

Aug. 14, 2019

Approved by:

Smith Chen

Aug. 14, 2019

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	LTE Wireless Router
Trade name	Yeacomm
Model name:	P21, P21B, P22, P25, P11, S10, S12
Difference in series models:	All the model are the same circuit and RF module, except the model No. and color.
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 GPRS; 8PSK for EGPRS; QPSK for WCDMA bands;
Power class:	Multi-Class12 Only 4 timeslots are used for GPRS
SIM card:	The LTE Wireless Router has Two SIM Card socket
Antenna Type	External Antenna
Antenna gain:	GSM 850 Gain: 3dBi GSM 1900 Gain: 3dBi WCDMA Band II: 3dBi WCDMA Band V: 3dBi
Hardware version	TZ7.823.326
Software version	P21 V1.0
Power supply:	DC 12V from adapter
Battery:	N/A
Adapter information:	MODEL: KL-AD-120100 INPUT:AC100-240V 50/60Hz 0.5A OUTPUT:DC 12V 1A

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



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	KL-AD-120100	/	/	/

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.:	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	2018/10/09	2019/10/08
MTI-E006	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-872	2018/10/15	2020/10/14
MTI-E014	amplifier	Hewlett-Packard	8447D	3113A06150	2018/10/09	2019/10/08
MTI-E036	Single path vehicle AMN(LISN)	Schwarzbeck	NNBM 8124	01175	2018/10/09	2019/10/08
MTI-E038	Low noise active vertical monopole antenna	Schwarzbeck	VAMP 9243	#565	2018/10/16	2019/10/15
MTI-E039	Biconical antenna	Schwarzbeck	BBA 9106	#164	2018/10/15	2019/10/14
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
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	Slot	Power(dBm)	Limit(dBm)	Verdict
GPRS850	128	5	1	32.02	38.5	PASS
GPRS850	128	5	2	30.44	38.5	PASS
GPRS850	128	5	3	28.09	38.5	PASS
GPRS850	128	5	4	27.90	38.5	PASS
GPRS850	190	5	1	31.97	38.5	PASS
GPRS850	190	5	2	30.47	38.5	PASS
GPRS850	190	5	3	28.16	38.5	PASS
GPRS850	190	5	4	27.95	38.5	PASS
GPRS850	251	5	1	31.92	38.5	PASS
GPRS850	251	5	2	30.42	38.5	PASS
GPRS850	251	5	3	28.13	38.5	PASS
GPRS850	251	5	4	27.93	38.5	PASS
GPRS1900	512	0	1	31.02	33	PASS
GPRS1900	512	0	2	29.49	33	PASS
GPRS1900	512	0	3	27.35	33	PASS
GPRS1900	512	0	4	27.27	33	PASS
GPRS1900	661	0	1	31.05	33	PASS
GPRS1900	661	0	2	29.34	33	PASS
GPRS1900	661	0	3	27.07	33	PASS
GPRS1900	661	0	4	26.99	33	PASS
GPRS1900	810	0	1	31.17	33	PASS
GPRS1900	810	0	2	29.25	33	PASS
GPRS1900	810	0	3	27.01	33	PASS
GPRS1900	810	0	4	26.93	33	PASS

Band	Channel	PCL	Slot	Power(dBm)	Limit(dBm)	Verdict
EGPRS850	128	8	1	26.60	38.5	PASS
EGPRS850	128	8	2	26.42	38.5	PASS
EGPRS850	128	8	3	26.26	38.5	PASS
EGPRS850	128	8	4	26.01	38.5	PASS
EGPRS850	190	8	1	26.63	38.5	PASS
EGPRS850	190	8	2	26.50	38.5	PASS
EGPRS850	190	8	3	26.33	38.5	PASS
EGPRS850	190	8	4	26.13	38.5	PASS
EGPRS850	251	8	1	26.64	38.5	PASS
EGPRS850	251	8	2	26.57	38.5	PASS
EGPRS850	251	8	3	26.32	38.5	PASS
EGPRS850	251	8	4	26.13	38.5	PASS
EGPRS1900	512	2	1	27.04	33	PASS
EGPRS1900	512	2	2	26.98	33	PASS
EGPRS1900	512	2	3	26.89	33	PASS
EGPRS1900	512	2	4	26.81	33	PASS
EGPRS1900	661	2	1	26.80	33	PASS
EGPRS1900	661	2	2	26.77	33	PASS
EGPRS1900	661	2	3	26.64	33	PASS
EGPRS1900	661	2	4	26.58	33	PASS
EGPRS1900	810	2	1	26.24	33	PASS
EGPRS1900	810	2	2	26.20	33	PASS
EGPRS1900	810	2	3	26.12	33	PASS
EGPRS1900	810	2	4	26.03	33	PASS



Band	Channel	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	23.63	33	PASS
Band II	9400	22.81	33	PASS
Band II	9538	22.32	33	PASS
Band V	4132	24.27	38.5	PASS
Band V	4182	23.23	38.5	PASS
Band V	4233	24.11	38.5	PASS

Band	Channel	SubTest	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	HSDPA_Sub1	23.78	33	PASS
Band II	9262	HSDPA_Sub2	23.20	33	PASS
Band II	9262	HSDPA_Sub3	23.22	33	PASS
Band II	9262	HSDPA_Sub4	22.76	33	PASS
Band II	9400	HSDPA_Sub1	23.25	33	PASS
Band II	9400	HSDPA_Sub2	22.73	33	PASS
Band II	9400	HSDPA_Sub3	22.80	33	PASS
Band II	9400	HSDPA_Sub4	22.30	33	PASS
Band II	9538	HSDPA_Sub1	22.43	33	PASS
Band II	9538	HSDPA_Sub2	21.89	33	PASS
Band II	9538	HSDPA_Sub3	21.94	33	PASS
Band II	9538	HSDPA_Sub4	21.50	33	PASS
Band V	4132	HSDPA_Sub1	24.59	38.5	PASS
Band V	4132	HSDPA_Sub2	24.04	38.5	PASS
Band V	4132	HSDPA_Sub3	24.06	38.5	PASS
Band V	4132	HSDPA_Sub4	23.62	38.5	PASS
Band V	4182	HSDPA_Sub1	22.71	38.5	PASS
Band V	4182	HSDPA_Sub2	22.23	38.5	PASS
Band V	4182	HSDPA_Sub3	22.29	38.5	PASS
Band V	4182	HSDPA_Sub4	21.86	38.5	PASS
Band V	4233	HSDPA_Sub1	23.77	38.5	PASS
Band V	4233	HSDPA_Sub2	23.11	38.5	PASS
Band V	4233	HSDPA_Sub3	23.32	38.5	PASS
Band V	4233	HSDPA_Sub4	22.88	38.5	PASS

Band	Channel	SubTest	Power(dBm)	Limit(dBm)	Verdict
Band II	9262	HSUPA_Sub1	21.46	33	PASS
Band II	9262	HSUPA_Sub2	23.01	33	PASS
Band II	9262	HSUPA_Sub3	21.49	33	PASS
Band II	9262	HSUPA_Sub4	22.48	33	PASS
Band II	9262	HSUPA_Sub5	23.42	33	PASS
Band II	9400	HSUPA_Sub1	21.76	33	PASS
Band II	9400	HSUPA_Sub2	23.26	33	PASS
Band II	9400	HSUPA_Sub3	21.76	33	PASS
Band II	9400	HSUPA_Sub4	22.77	33	PASS
Band II	9400	HSUPA_Sub5	23.72	33	PASS
Band II	9538	HSUPA_Sub1	21.82	33	PASS
Band II	9538	HSUPA_Sub2	23.26	33	PASS
Band II	9538	HSUPA_Sub3	21.00	33	PASS
Band II	9538	HSUPA_Sub4	22.76	33	PASS
Band II	9538	HSUPA_Sub5	23.78	33	PASS
Band V	4132	HSUPA_Sub1	21.56	38.5	PASS
Band V	4132	HSUPA_Sub2	22.23	38.5	PASS
Band V	4132	HSUPA_Sub3	22.92	38.5	PASS
Band V	4132	HSUPA_Sub4	21.70	38.5	PASS
Band V	4132	HSUPA_Sub5	24.12	38.5	PASS
Band V	4182	HSUPA_Sub1	21.84	38.5	PASS



Band V	4182	HSUPA_Sub2	21.94	38.5	PASS
Band V	4182	HSUPA_Sub3	22.58	38.5	PASS
Band V	4182	HSUPA_Sub4	21.19	38.5	PASS
Band V	4182	HSUPA_Sub5	23.51	38.5	PASS
Band V	4233	HSUPA_Sub1	21.99	38.5	PASS
Band V	4233	HSUPA_Sub2	22.08	38.5	PASS
Band V	4233	HSUPA_Sub3	22.76	38.5	PASS
Band V	4233	HSUPA_Sub4	21.32	38.5	PASS
Band V	4233	HSUPA_Sub5	23.74	38.5	PASS

For EIRP & ERP:

For GPRS 850

Frequency	Polarization	SG Level	Cable Loss	Antenna Gain	Correction	ERP	ERP
(MHz)		(dBm)	(dB)	(dB)	(dB)	(dBm)	(W)
824.2	H	30.98	0.39	3	2.15	31.44	1.3942
836.6	H	30.41	0.35	3	2.15	30.91	1.2318
848.8	H	32.27	0.32	3	2.15	32.80	1.9063
824.2	V	32.07	0.39	3	2.15	32.53	1.7899
836.6	V	32.05	0.35	3	2.15	32.55	1.8006
848.8	V	30.46	0.32	3	2.15	30.99	1.2571

For EGPRS 850

Frequency	Polarization	SG Level	Cable Loss	Antenna Gain	Correction	ERP	ERP
(MHz)		(dBm)	(dB)	(dB)	(dB)	(dBm)	(W)
824.2	H	24.95	0.39	3	2.15	25.41	0.3473
836.6	H	25.02	0.35	3	2.15	25.52	0.3568
848.8	H	26.09	0.32	3	2.15	26.62	0.4588
824.2	V	25.68	0.39	3	2.15	26.14	0.4109
836.6	V	25.49	0.35	3	2.15	25.99	0.3974
848.8	V	25.82	0.32	3	2.15	26.35	0.4314

For GPRS 1900

Frequency	Polarization	SG Level	Cable Loss	Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	29.62	0.47	3	32.15	1.6423
1880	H	29.76	0.47	3	32.29	1.6950
1909.8	H	29.82	0.46	3	32.36	1.7211
1850.2	V	29.78	0.47	3	32.31	1.7019
1880	V	30.49	0.47	3	30.02	1.0053
1909.8	V	30.80	0.46	3	30.34	1.0806

For EGPRS 1900

Frequency	Polarization	SG Level	Cable Loss	Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	25.48	0.47	3	28.01	0.6329
1880	H	25.47	0.47	3	28.00	0.6317
1909.8	H	25.82	0.46	3	28.36	0.6855
1850.2	V	25.59	0.47	3	28.12	0.6490
1880	V	27.51	0.47	3	27.04	0.5058
1909.8	V	27.82	0.46	3	27.36	0.5440

For WCDMA BAND II

Frequency	Polarization	SG Level	Cable Loss	Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1852.4	H	21.24	0.47	3	23.77	0.2384
1880	H	20.99	0.47	3	23.52	0.2250
1907.6	H	20.79	0.46	3	23.33	0.2151
1852.4	V	20.32	0.47	3	22.85	0.1927
1880	V	20.60	0.47	3	23.13	0.2057
1907.6	V	21.08	0.46	3	23.62	0.2300

For WCDMA BAND V

Radiated Power (ERP) for UMTS band V							
Frequency	Polarization	SG Level	Cable Loss	Antenna Gain	Correction	(ERP)	ERP
(MHz)		(dBm)	(dB)	(dB)	(dBi)	(dBm)	(W)
826.4	H	23.08	0.39	3	2.15	23.54	0.2259
836.6	H	23.79	0.35	3	2.15	24.29	0.2684
846.6	H	23.92	0.32	3	2.15	24.45	0.2789
826.4	V	23.55	0.39	3	2.15	24.01	0.2518
836.6	V	23.79	0.35	3	2.15	24.29	0.2688
846.6	V	23.63	0.32	3	2.15	24.16	0.2604

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	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)	2.68	2.68	2.84	3.01	2.88	2.82

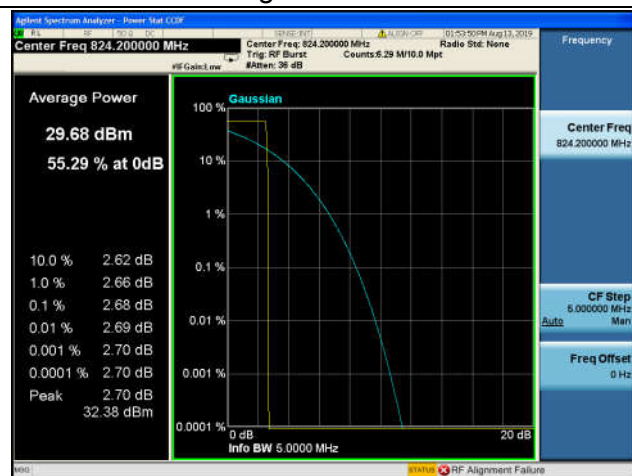
Cellular Band						
Modes	EGPRS850			EGPRS1900		
Channel	128 (Low)	190 (Mid)	251 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	2.78	2.78	2.78	2.78	2.73	2.73

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)	2.97	3.20	3.09	2.96	3.06	3.04

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



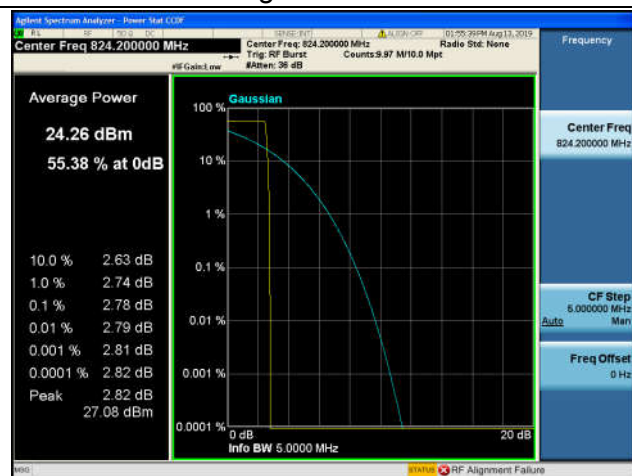
Peak-to-Average Ratio on channel 810



Test plot

(EGPSM850)

Peak-to-Average Ratio on channel 128



(EGPSM1900)

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.

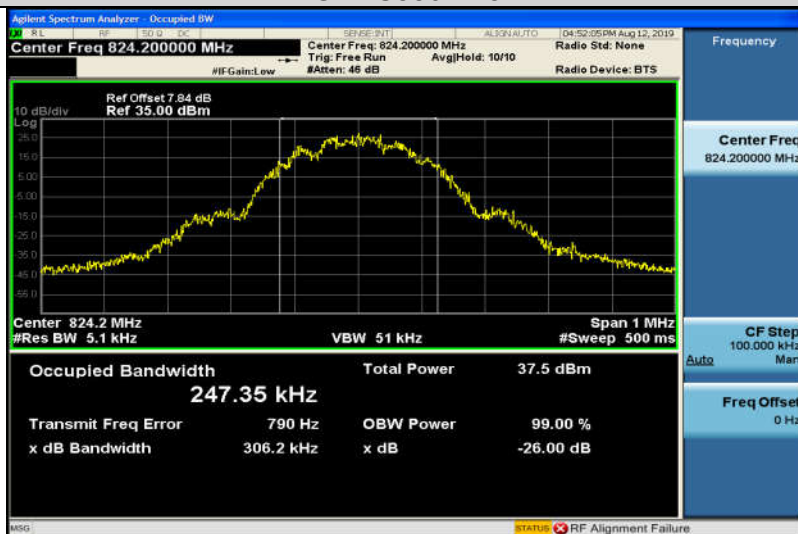
5.3.2 Test result

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GPRS850	128	247.35	306.19	---	PASS
GPRS850	190	245.90	308.52	---	PASS
GPRS850	251	247.84	307.98	---	PASS
EGPRS850	128	249.11	308.57	---	PASS
EGPRS850	190	247.51	307.31	---	PASS
EGPRS850	251	243.93	307.32	---	PASS
GPRS1900	512	246.44	312.39	---	PASS
GPRS1900	661	250.14	306.93	---	PASS
GPRS1900	810	247.69	308.06	---	PASS
EGPRS1900	512	247.17	308.45	---	PASS
EGPRS1900	661	246.15	307.67	---	PASS
EGPRS1900	810	246.29	307.68	---	PASS

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
Band II	9262	4159.9	4697	---	PASS
Band II	9400	4166.5	4683	---	PASS
Band II	9538	4164.2	4682	---	PASS
Band V	4132	4157.9	4694	---	PASS
Band V	4182	4164.7	4691	---	PASS
Band V	4233	4163.4	4676	---	PASS



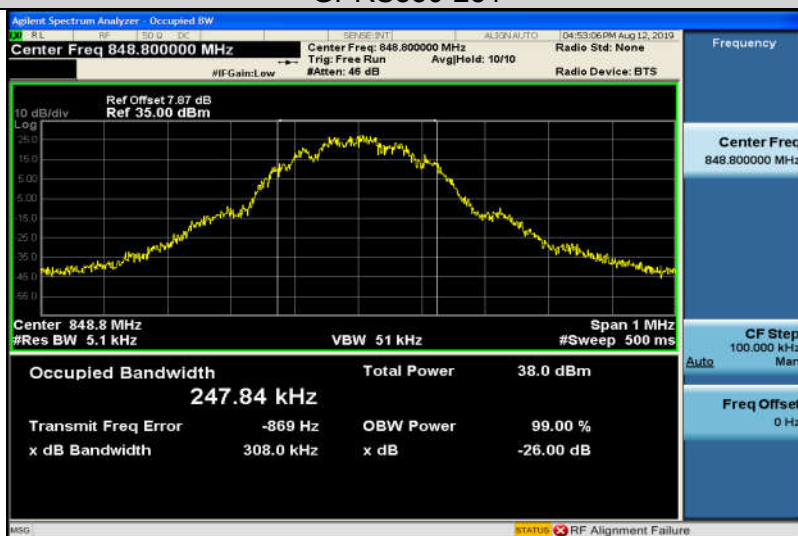
GPRS850-128



GPRS850-190

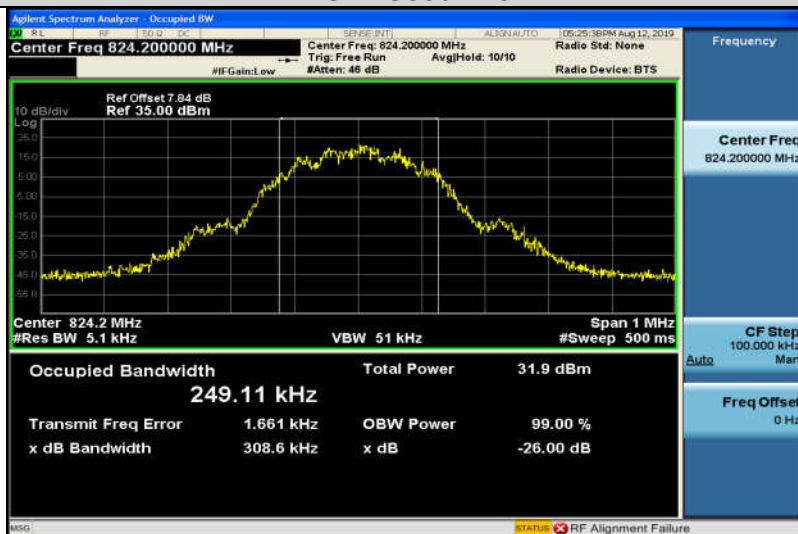


GPRS850-251

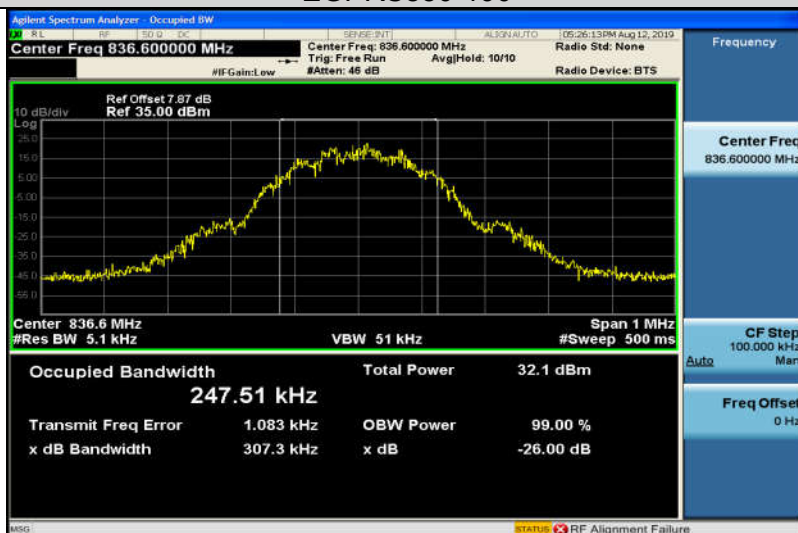




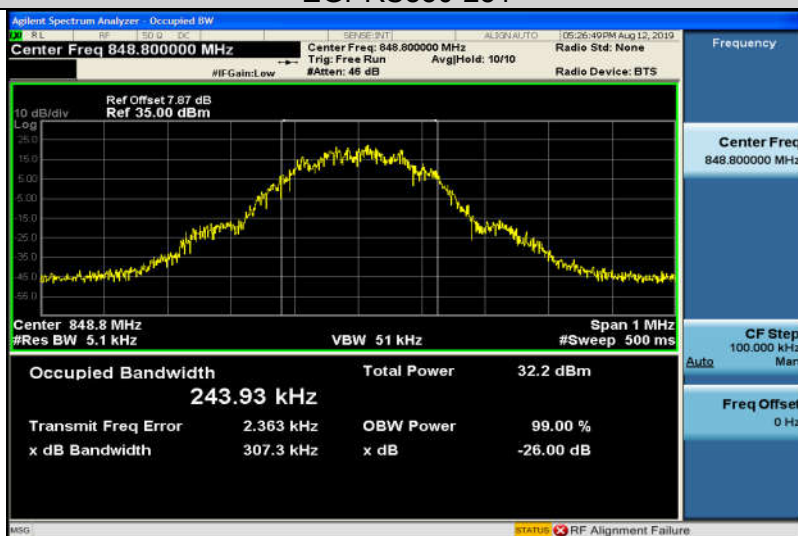
EGPRS850-128



EGPRS850-190

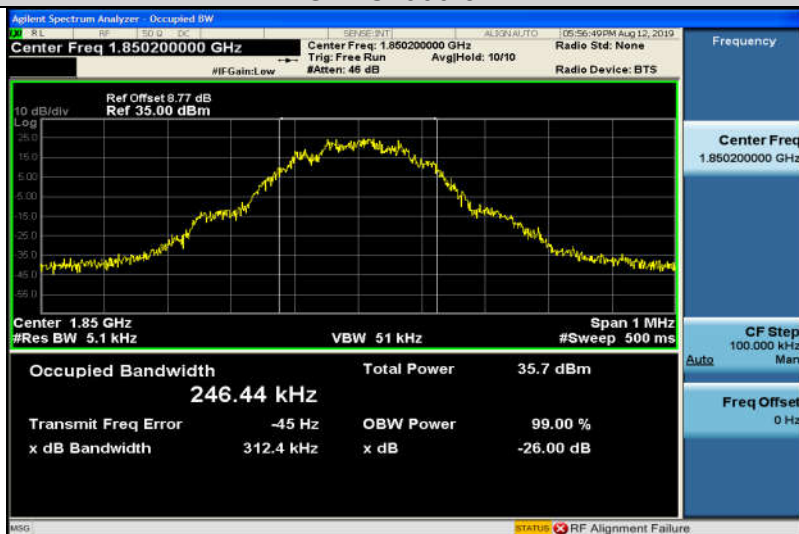


EGPRS850-251

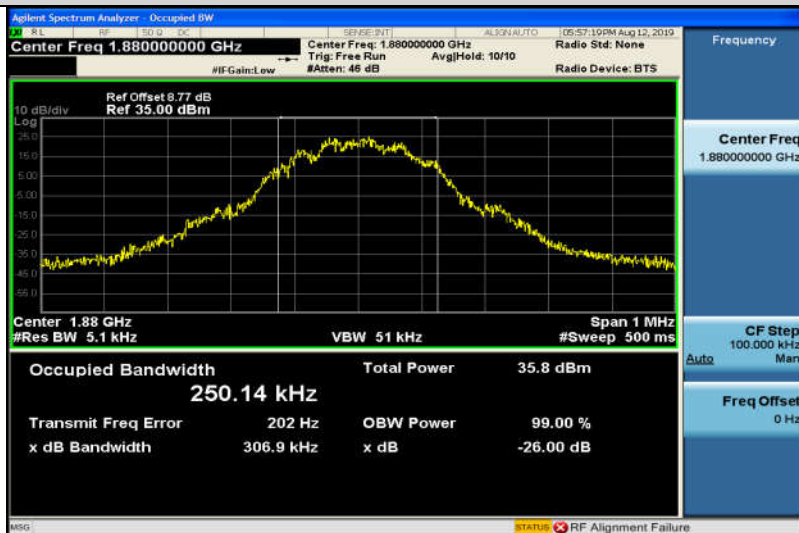




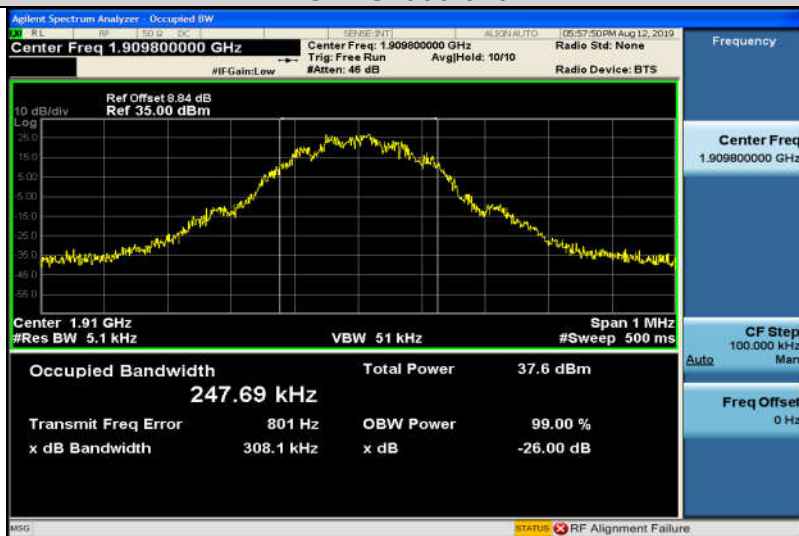
GPRS1900-512



GPRS1900-661

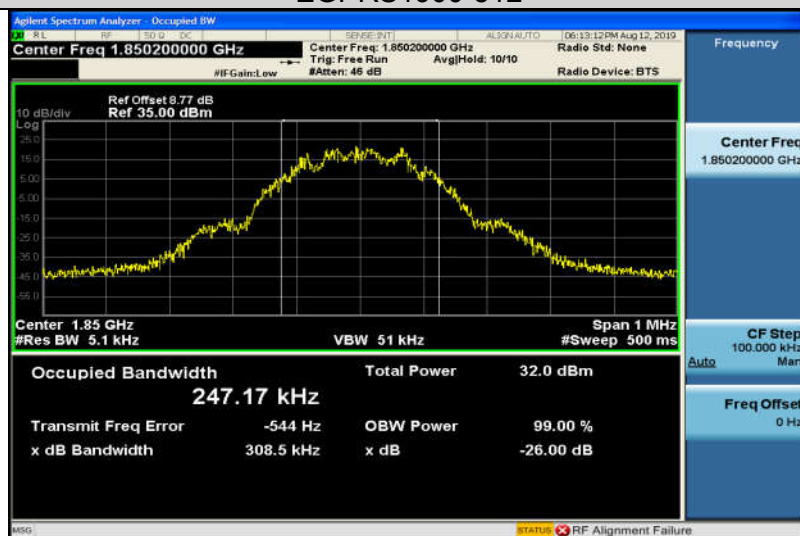


GPRS1900-810

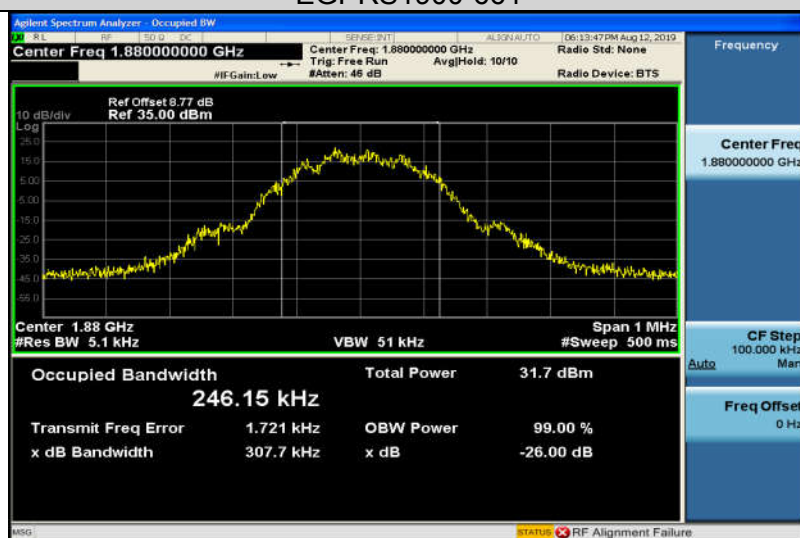




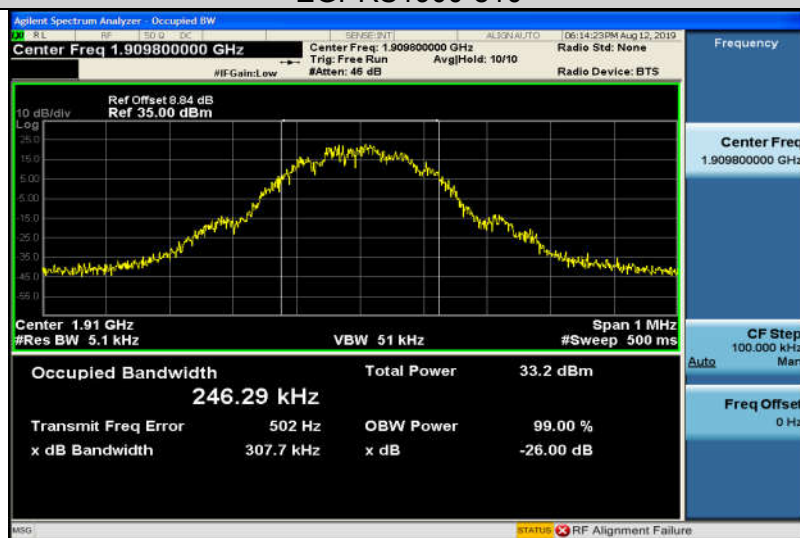
EGPRS1900-512



EGPRS1900-661



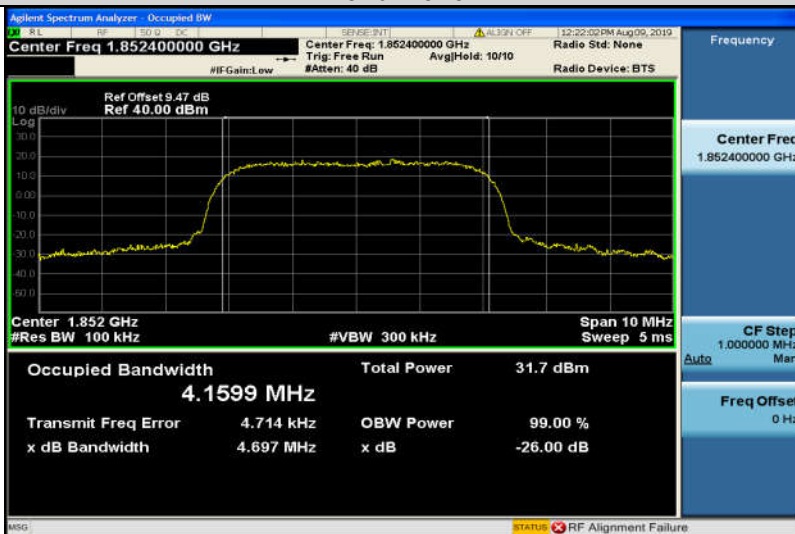
EGPRS1900-810



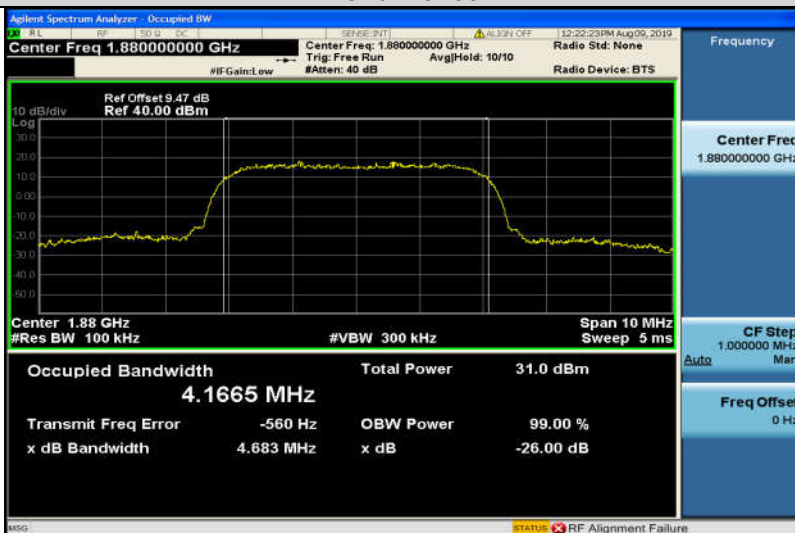


Band Band II

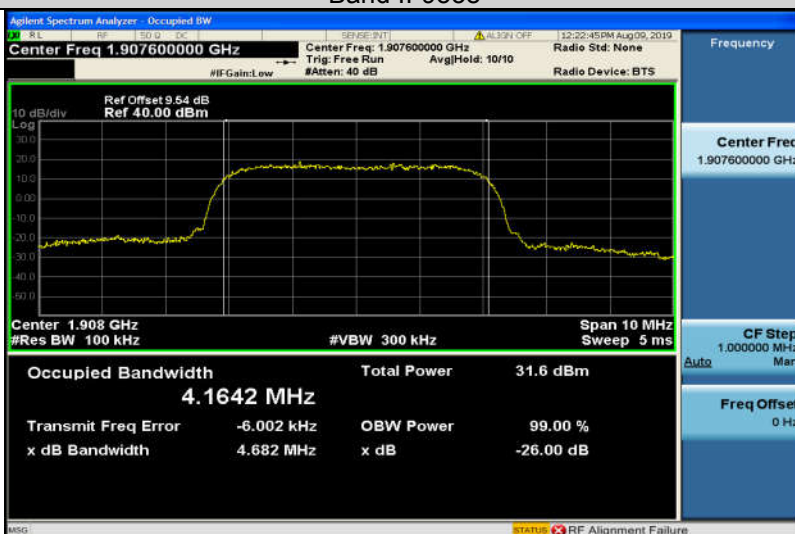
Band II-9262



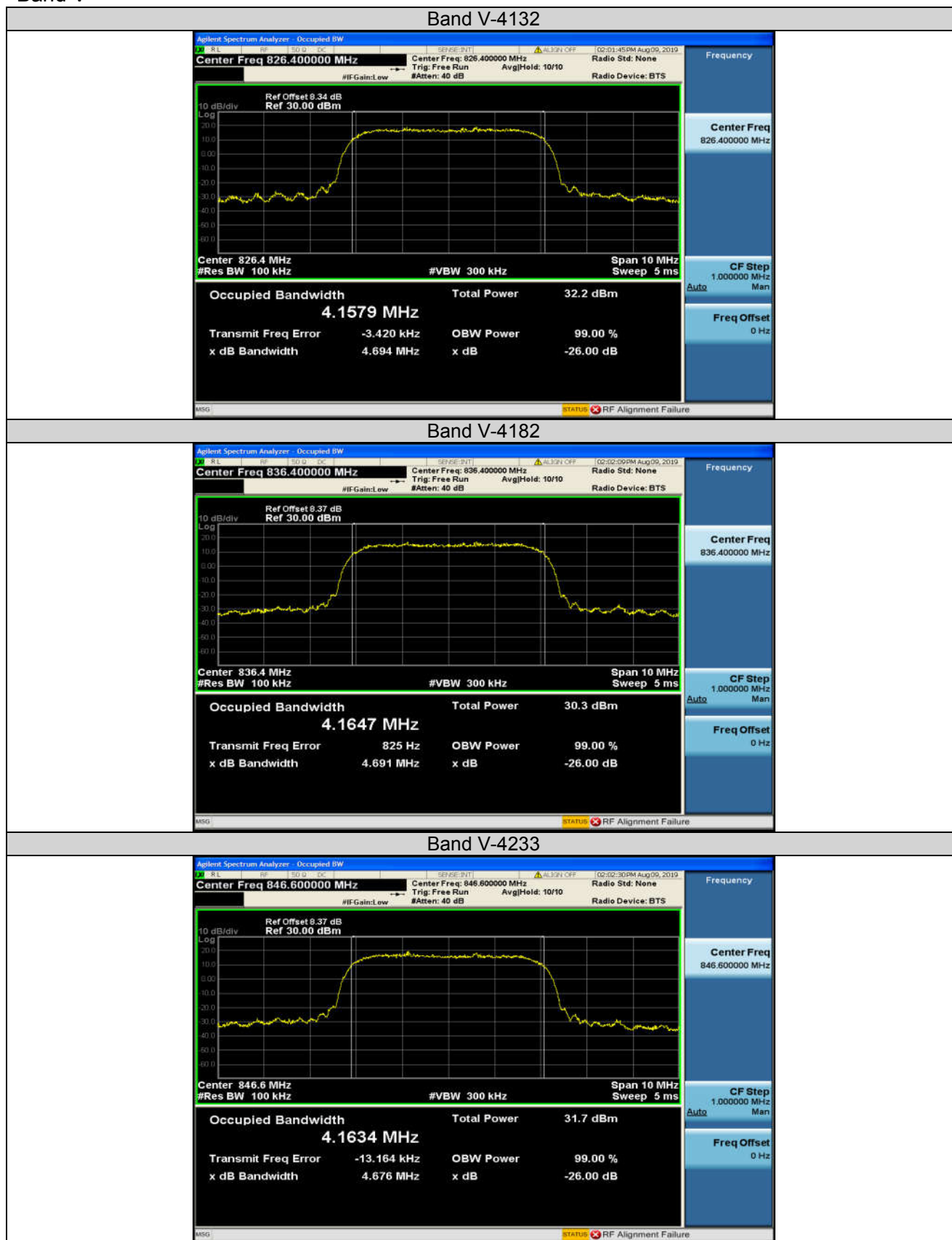
Band II-9400



Band II-9538



Band V



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

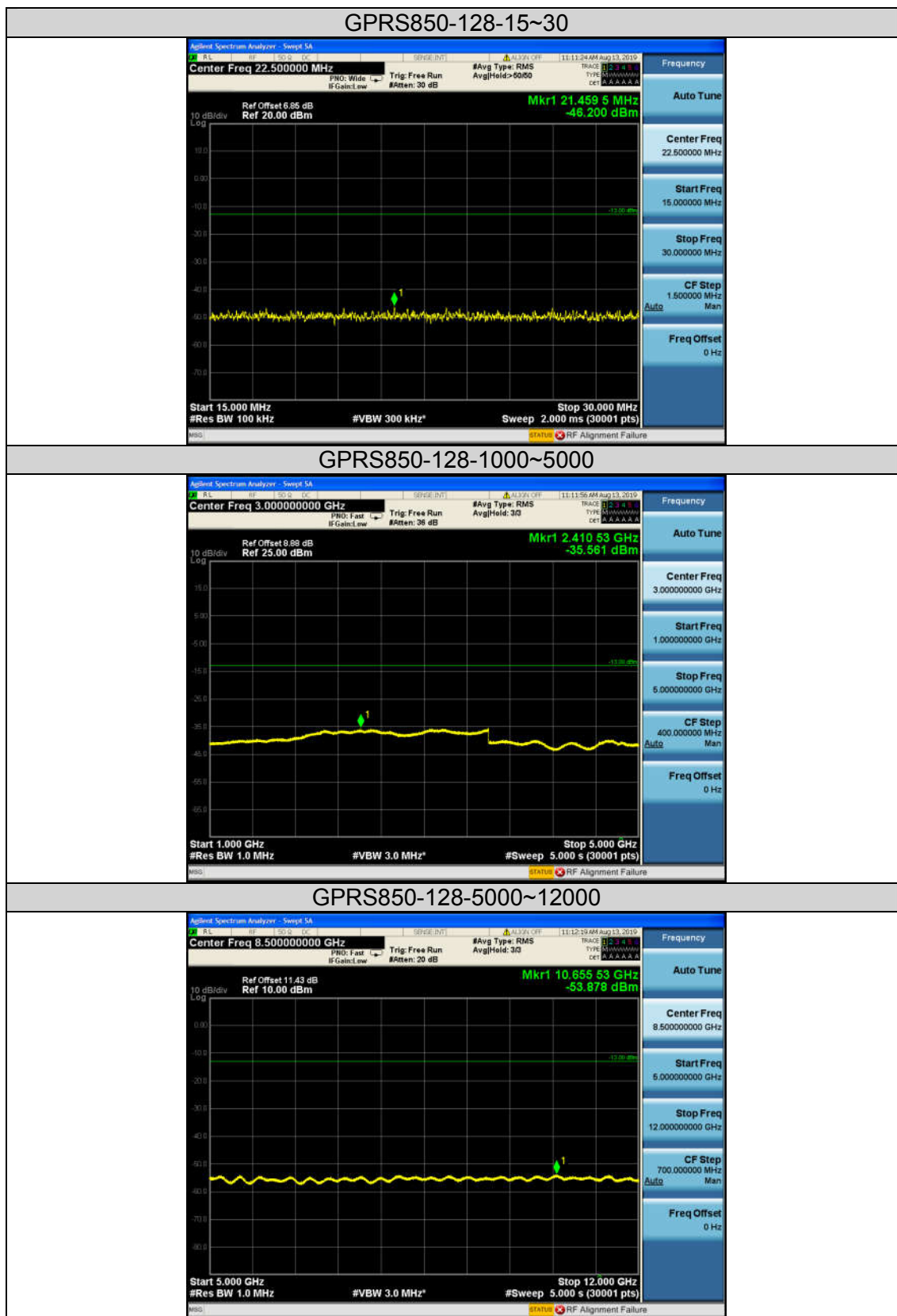
Band	Channel	Frequency Range(Mhz)	Value(dBm)	Limit(dBm)	Verdict
GPRS850	128	15~30	-46.002	-13	PASS
GPRS850	128	1000~5000	-35.561	-13	PASS
GPRS850	128	5000~12000	-53.878	-13	PASS
GPRS850	128	12000~18000	-51.137	-13	PASS
GPRS850	190	15~30	-46.000	-13	PASS
GPRS850	190	1000~5000	-34.647	-13	PASS
GPRS850	190	5000~12000	-53.702	-13	PASS
GPRS850	190	12000~18000	-51.014	-13	PASS
GPRS850	251	15~30	-46.157	-13	PASS
GPRS850	251	1000~5000	-32.695	-13	PASS
GPRS850	251	5000~12000	-53.783	-13	PASS
GPRS850	251	12000~18000	-51.147	-13	PASS
EGPRS850	128	15~30	-46.826	-13	PASS
EGPRS850	128	1000~5000	-29.253	-13	PASS
EGPRS850	128	5000~12000	-53.579	-13	PASS
EGPRS850	128	12000~18000	-51.106	-13	PASS
EGPRS850	190	15~30	-46.131	-13	PASS
EGPRS850	190	1000~5000	-30.272	-13	PASS
EGPRS850	190	5000~12000	-53.407	-13	PASS
EGPRS850	190	12000~18000	-50.962	-13	PASS
EGPRS850	251	15~30	-46.351	-13	PASS
EGPRS850	251	1000~5000	-27.091	-13	PASS
EGPRS850	251	5000~12000	-53.635	-13	PASS
EGPRS850	251	12000~18000	-50.975	-13	PASS
GPRS1900	521	15~30	-60.657	-13	PASS
GPRS1900	521	1000~5000	-36.168	-13	PASS
GPRS1900	521	5000~12000	-54.881	-13	PASS
GPRS1900	521	12000~18000	-54.692	-13	PASS
GPRS1900	661	15~30	-53.016	-13	PASS
GPRS1900	661	1000~5000	-26.945	-13	PASS
GPRS1900	661	5000~12000	-48.101	-13	PASS
GPRS1900	661	12000~18000	-47.667	-13	PASS
GPRS1900	810	15~30	-64.86	-13	PASS
GPRS1900	810	1000~5000	-38.300	-13	PASS

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GPRS1900	810	5000~12000	-55.169	-13	PASS
GPRS1900	810	12000~18000	-54.730	-13	PASS
EGPRS1900	521	15~30	-46.081	-13	PASS
EGPRS1900	521	1000~5000	-35.683	-13	PASS
EGPRS1900	521	5000~12000	-53.649	-13	PASS
EGPRS1900	521	12000~18000	-46.402	-13	PASS
EGPRS1900	661	15~30	-46.353	-13	PASS
EGPRS1900	661	1000~5000	-31.738	-13	PASS
EGPRS1900	661	5000~12000	-53.743	-13	PASS
EGPRS1900	661	12000~18000	-46.386	-13	PASS
EGPRS1900	810	15~30	-45.701	-13	PASS
EGPRS1900	810	1000~5000	-30.335	-13	PASS
EGPRS1900	810	5000~12000	-53.618	-13	PASS
EGPRS1900	810	12000~18000	-51.104	-13	PASS

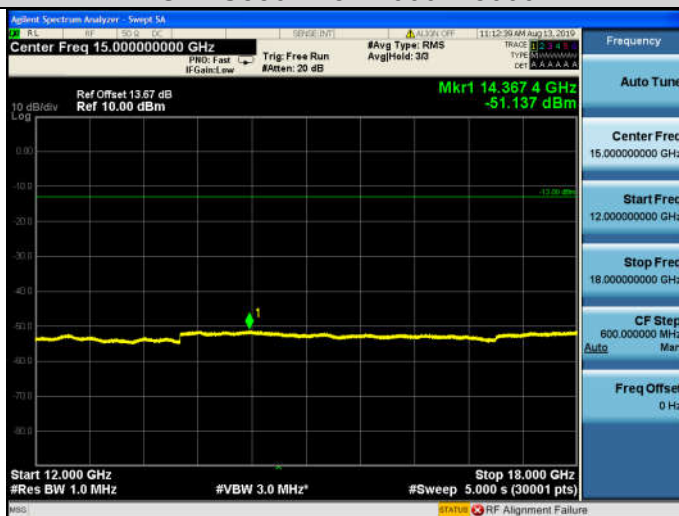
Band	Channel	Frequency Range (Mhz)	Value(dBm)	Limit(dBm)	Verdict
Band II	9262	30~1000	-31.16		
Band II	9262	1000~5000	-27.83	-13	PASS
Band II	9262	5000~12000	-54.36	-13	PASS
Band II	9262	12000~18000	-51.81	-13	PASS
Band II	9400	30~1000	-31.24	-13	PASS
Band II	9400	1000~5000	-36.30	-13	PASS
Band II	9400	5000~12000	-56.23	-13	PASS
Band II	9400	12000~18000	-51.76	-13	PASS
Band II	9538	30~1000	-31.42	-13	PASS
Band II	9538	1000~5000	-36.41	-13	PASS
Band II	9538	5000~12000	54.29	-13	PASS
Band II	9538	12000~18000	-51.74	-13	PASS
Band V	4132	15~30	-45.93	-13	PASS
Band V	4132	1000~5000	-35.16	-13	PASS
Band V	4132	5000~12000	-54.38	-13	PASS
Band V	4132	12000~18000	-51.84	-13	PASS
Band V	4182	15~30	-47.73	-13	PASS
Band V	4182	1000~5000	-34.73	-13	PASS
Band V	4182	5000~12000	-54.34	-13	PASS
Band V	4182	12000~18000	-51.63	-13	PASS
Band V	4233	15~30	-48.31	-13	PASS
Band V	4233	1000~5000	-27.84	-13	PASS
Band V	4233	5000~12000	-54.38	-13	PASS
Band V	4233	12000~18000	-51.82	-13	PASS

GPRS850

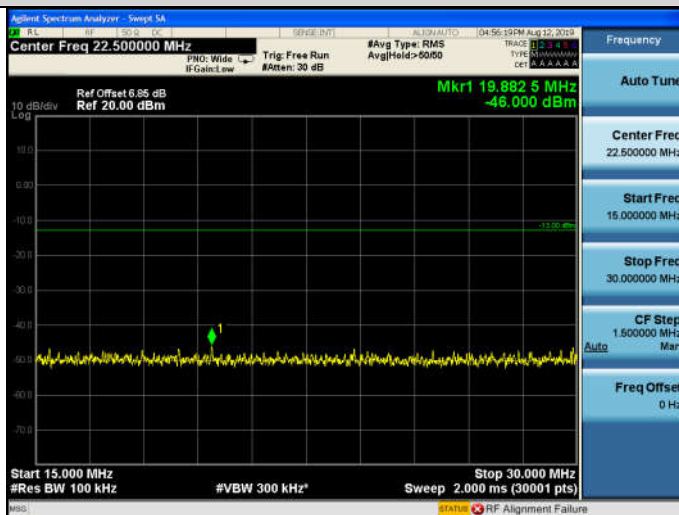




GPRS850-128-12000~18000



GPRS850-190-15~30

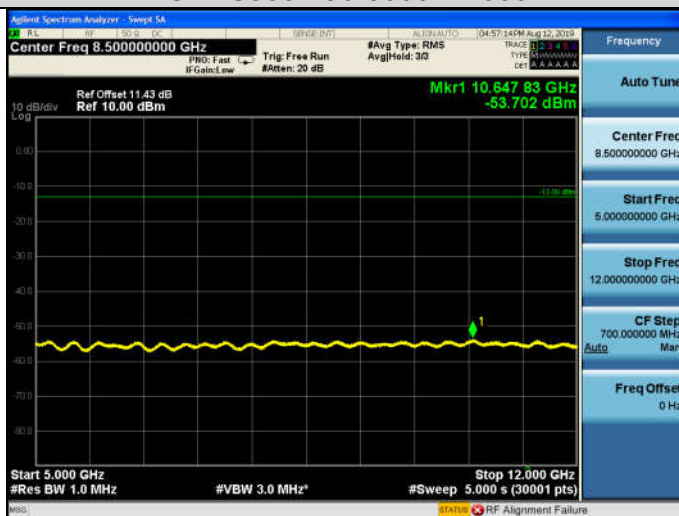


GPRS850-190-1000~5000





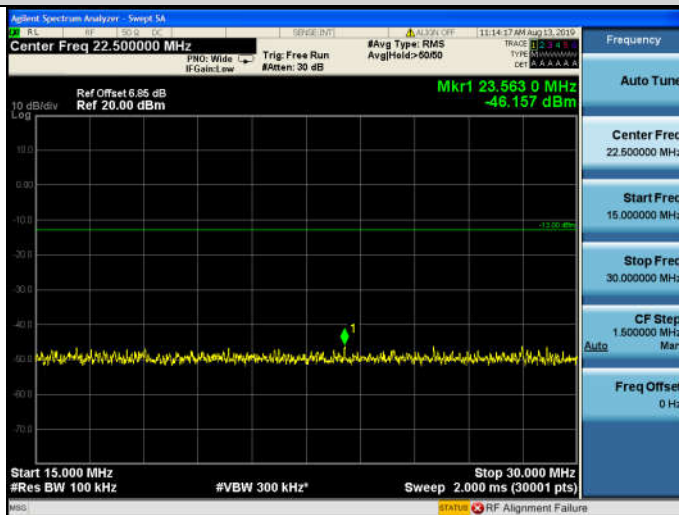
GPRS850-190-5000~12000



GPRS850-190-12000~18000



GPRS850-251-15~30

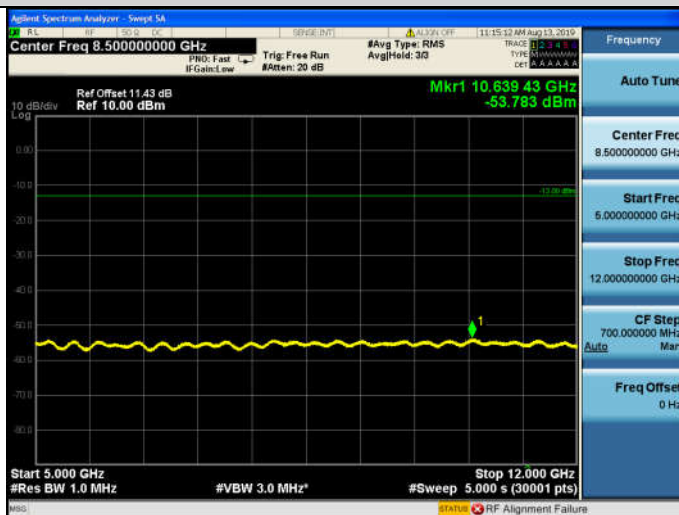




GPRS850-251-1000~5000



GPRS850-251-5000~12000

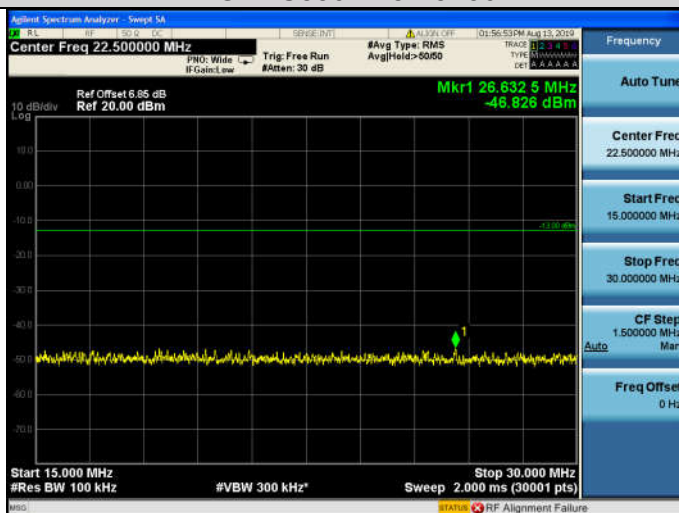


GPRS850-251-12000~18000



EGPRS850

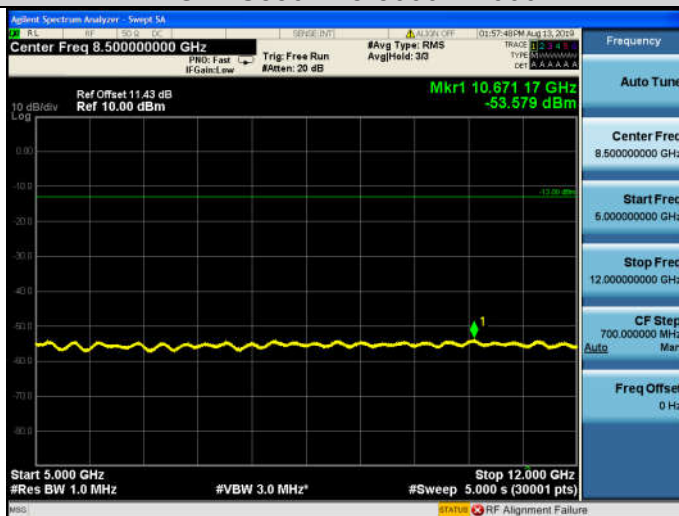
EGPRS850-128-15~30



EGPRS850-128-1000~5000

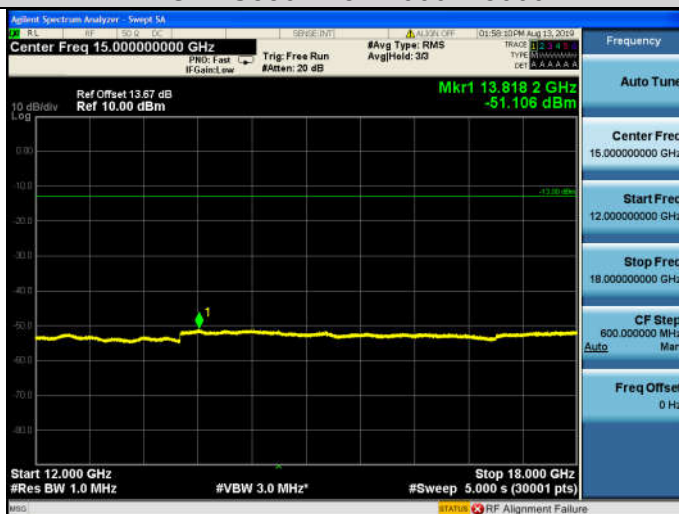


EGPRS850-128-5000~12000

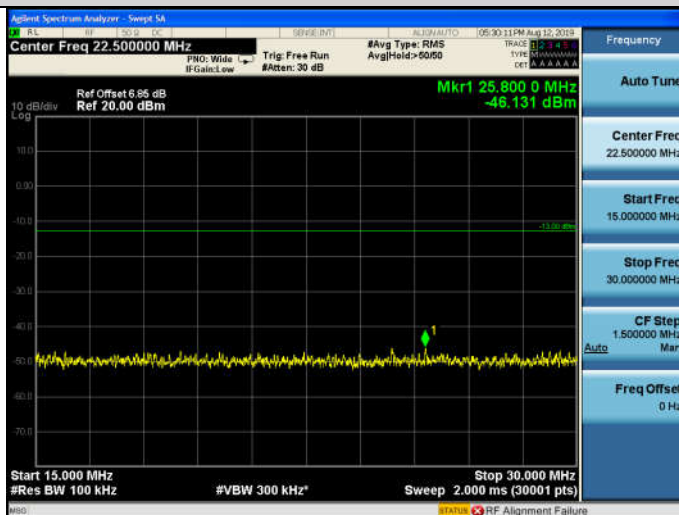




EGPRS850-128-12000~18000



EGPRS850-190-15~30

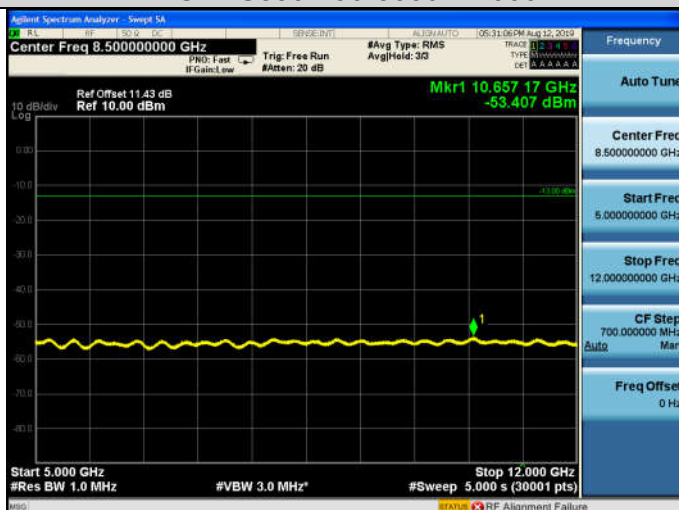


EGPRS850-190-1000~5000





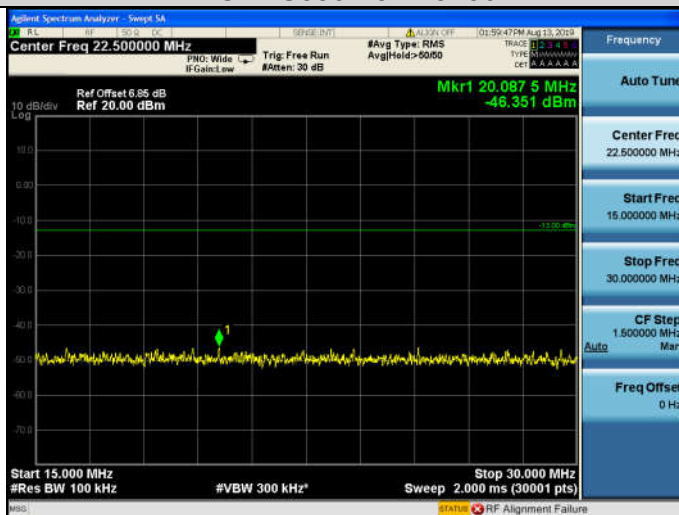
EGPRS850-190-5000~12000



EGPRS850-190-12000~18000



EGPRS850-251-15~30

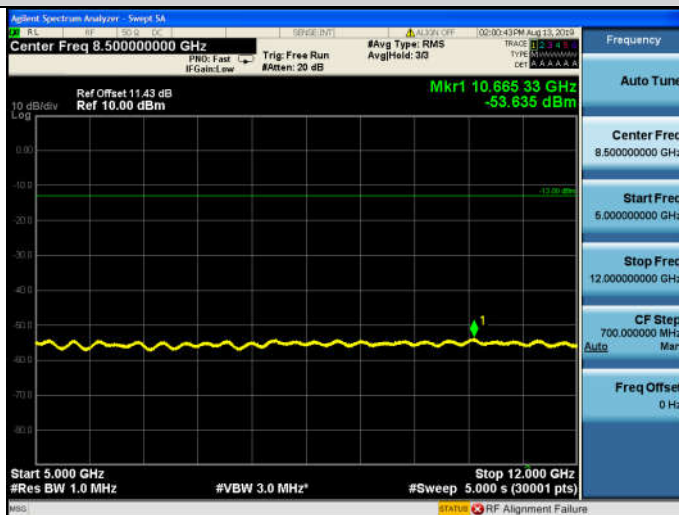




EGPRS850-251-1000~5000



EGPRS850-251-5000~12000

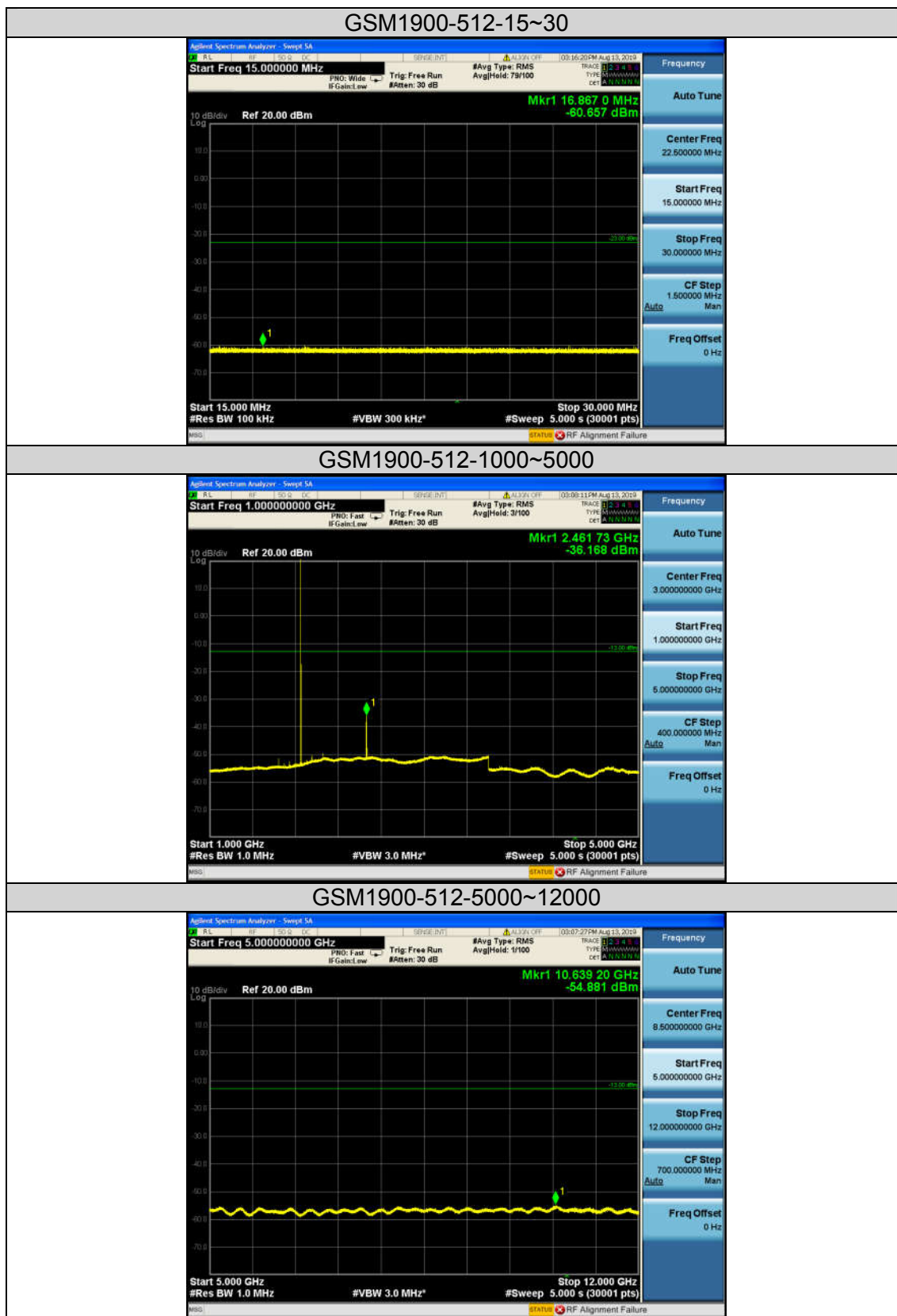


EGPRS850-251-12000~18000



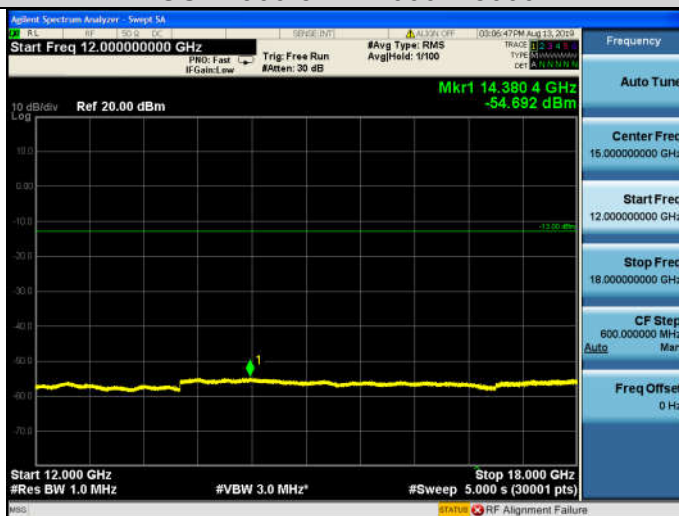


GSM1900

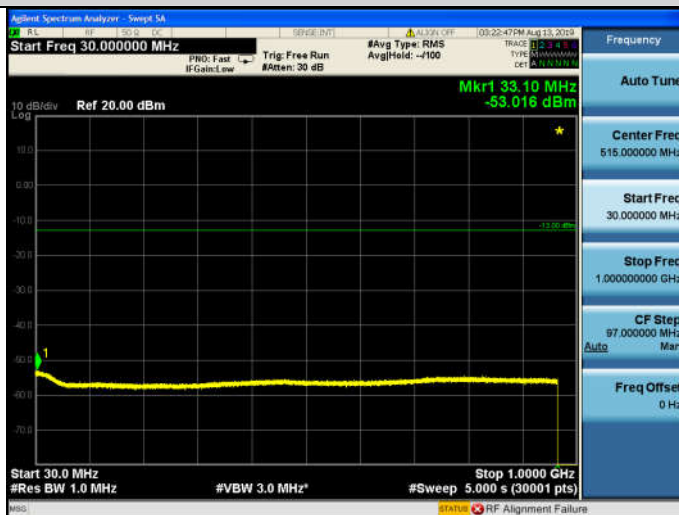




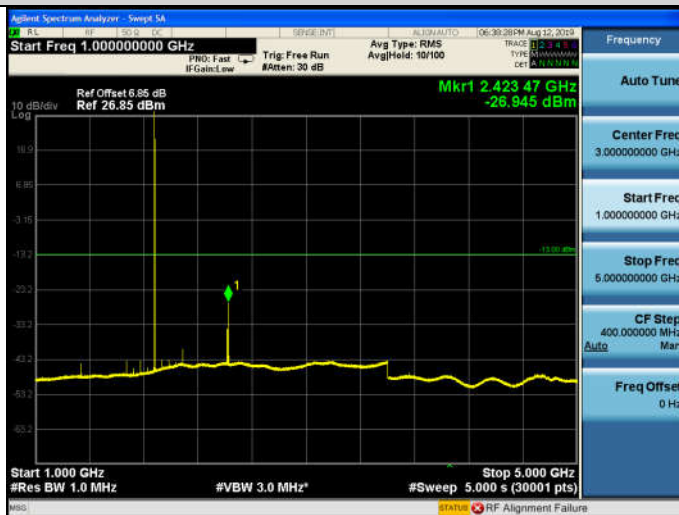
GSM1900-512-12000~18000



GSM1900-661-30~1000

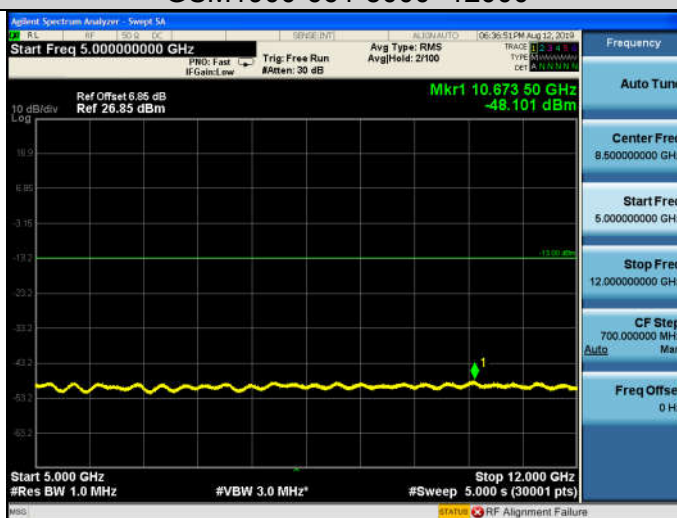


GSM1900-661-1000~5000

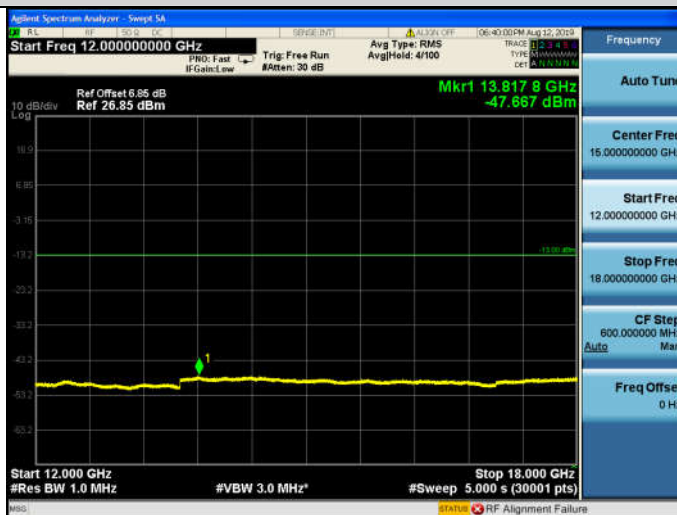




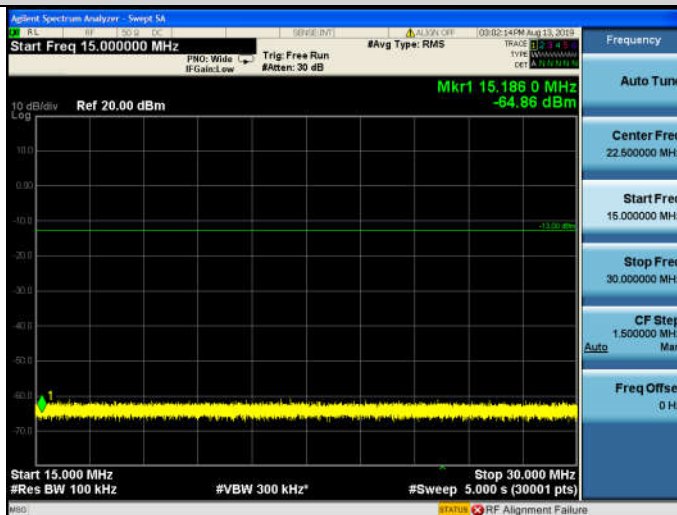
GSM1900-661-5000~12000



GSM1900-661-12000~18000

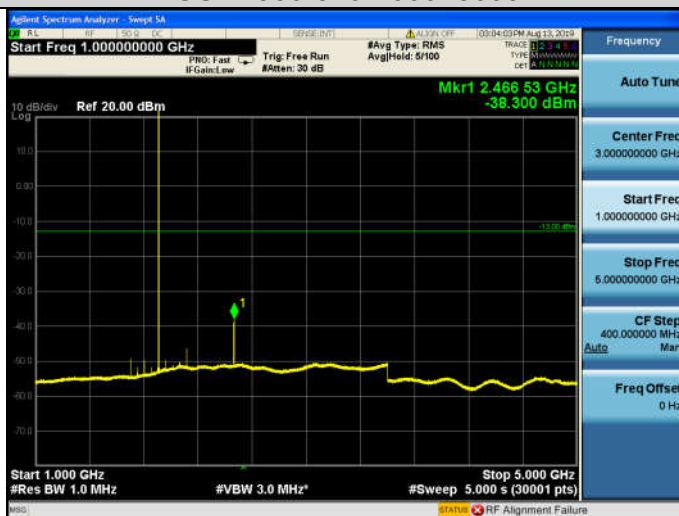


GSM1900-810-15~30

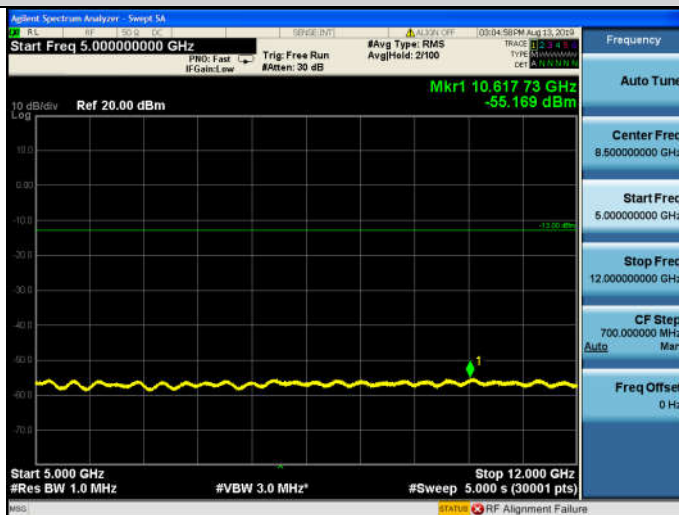




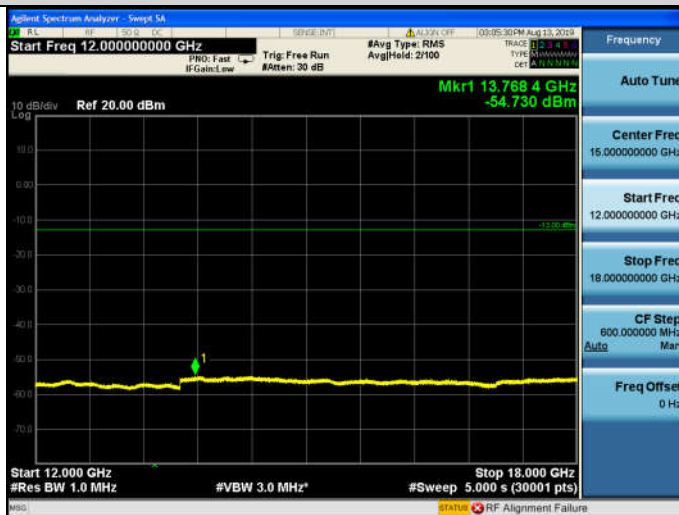
GSM1900-810-1000~5000



GSM1900-810-5000~12000

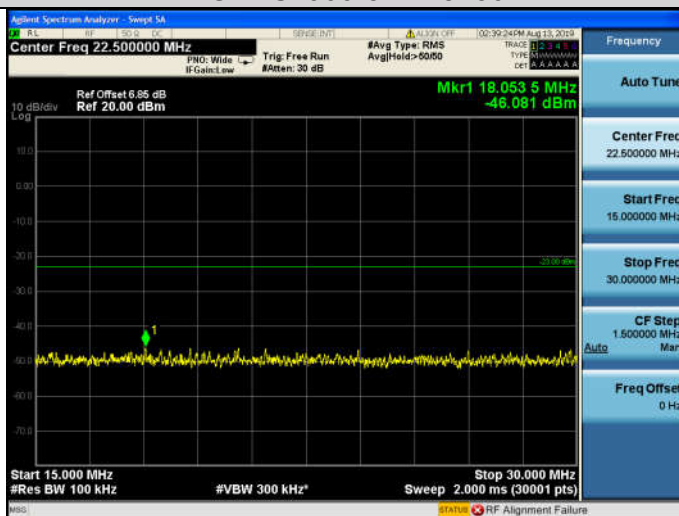


GSM1900-810-12000~18000

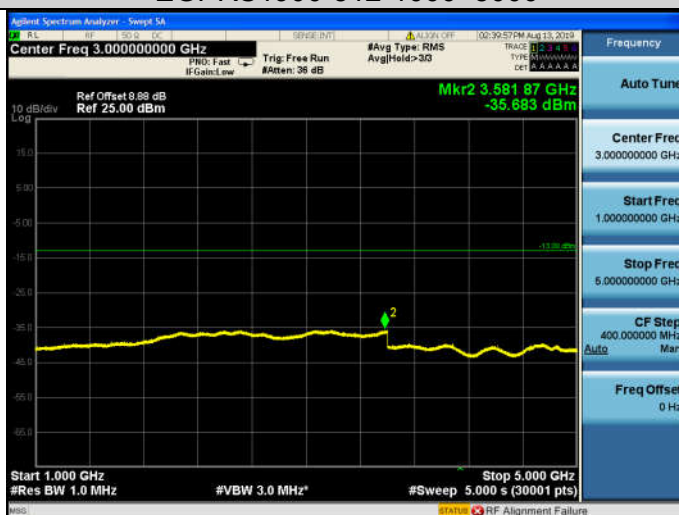


EGPRS1900

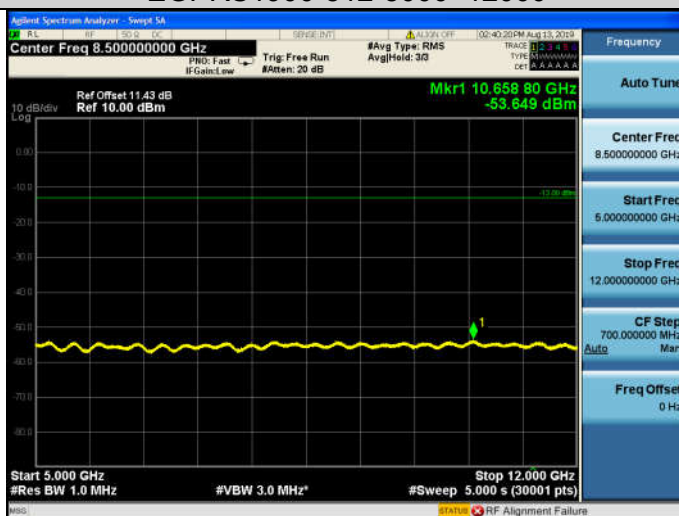
EGPRS1900-512-15~30



EGPRS1900-512-1000~5000



EGPRS1900-512-5000~12000

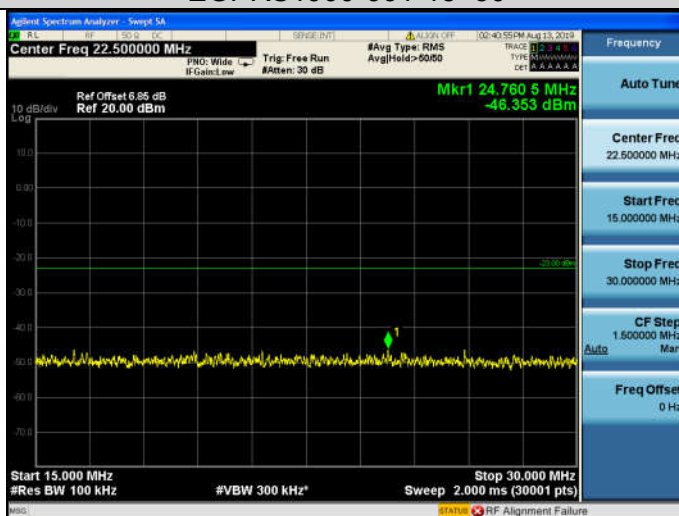




EGPRS1900-512-12000~18000



EGPRS1900-661-15~30

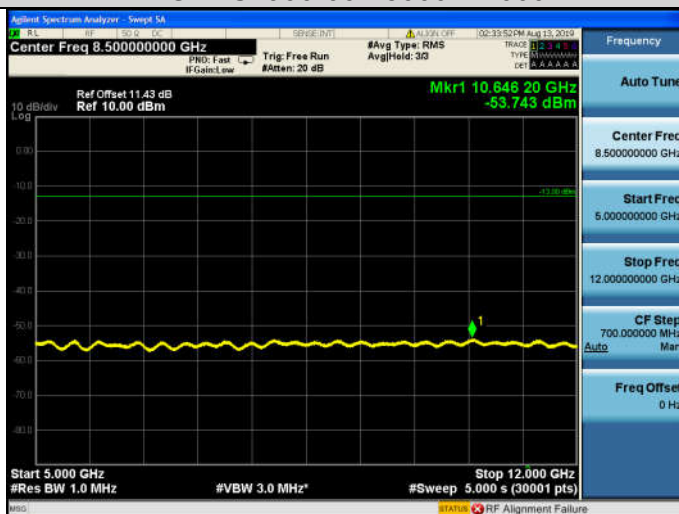


EGPRS1900-661-1000~5000





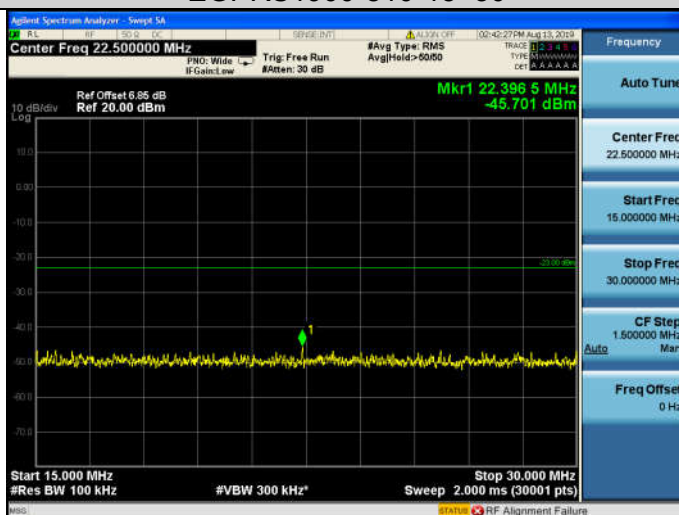
EGPRS1900-661-5000~12000



EGPRS1900-661-12000~18000



EGPRS1900-810-15~30

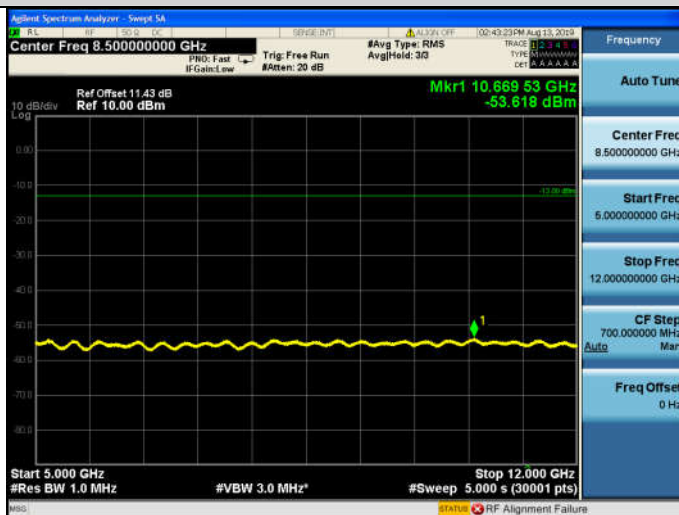




EGPRS1900-810-1000~5000



EGPRS1900-810-5000~12000

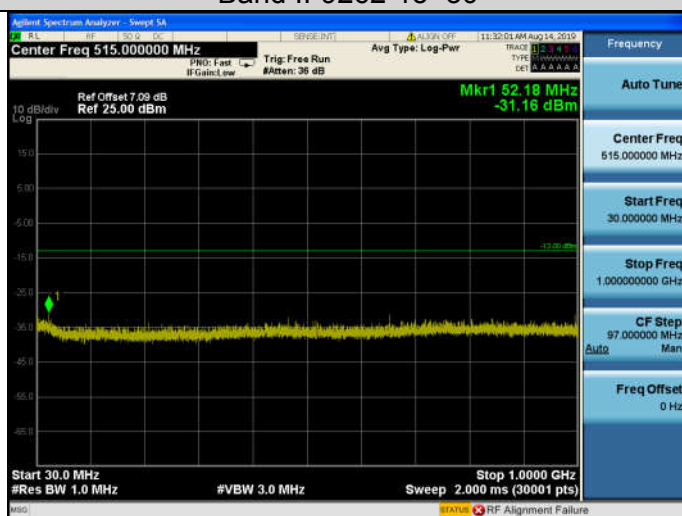


EGPRS1900-810-12000~18000

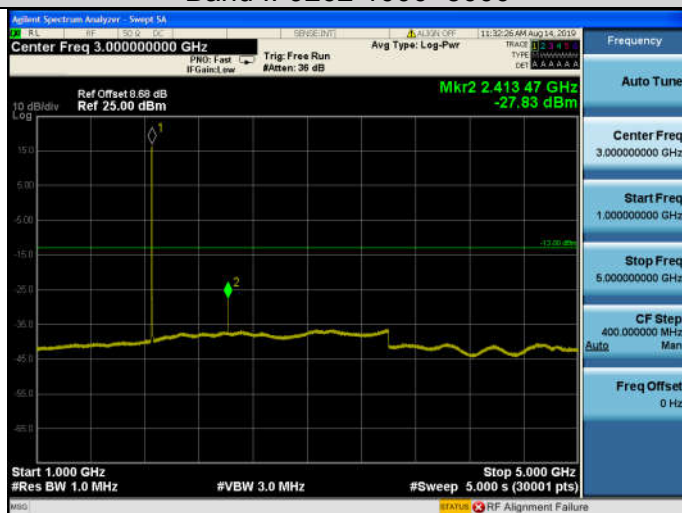


WCDMA Band II

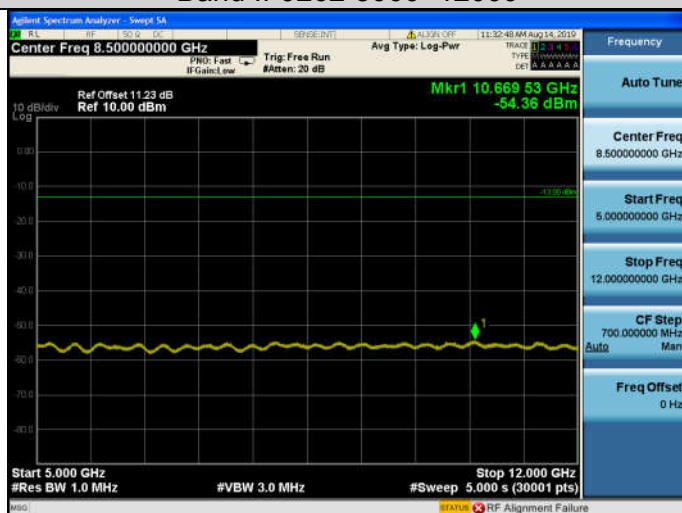
Band II-9262-15~30



Band II-9262-1000~5000

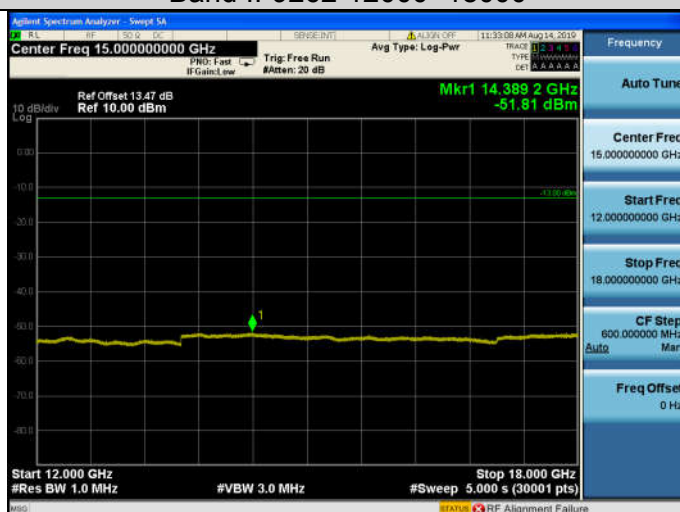


Band II-9262-5000~12000

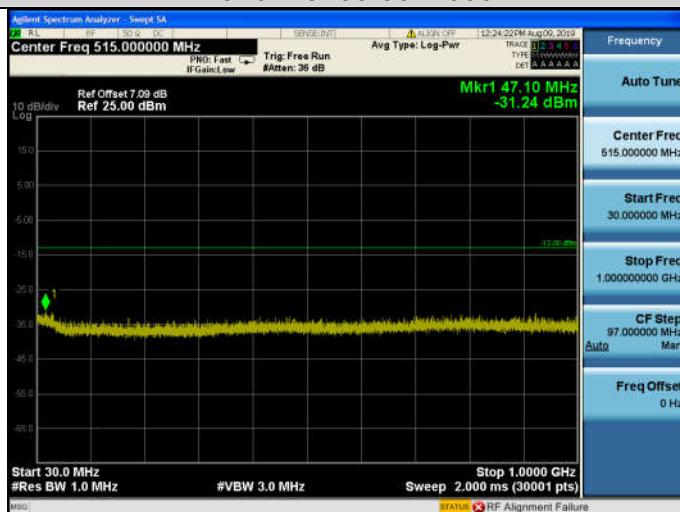




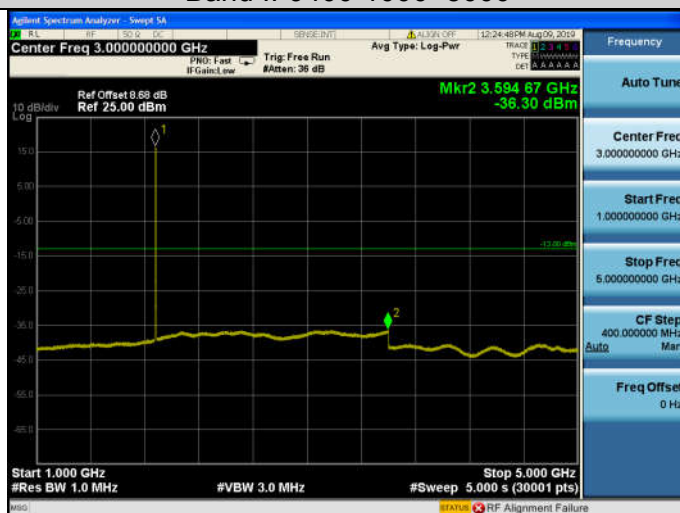
Band II-9262-12000~18000



Band II-9400-30~1000

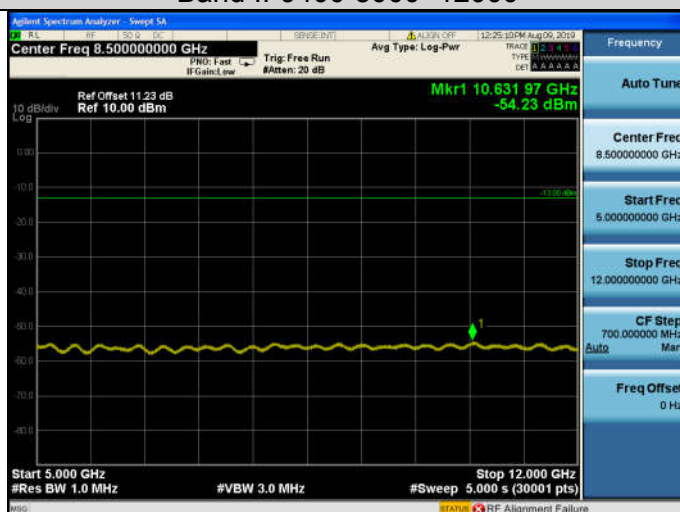


Band II-9400-1000~5000

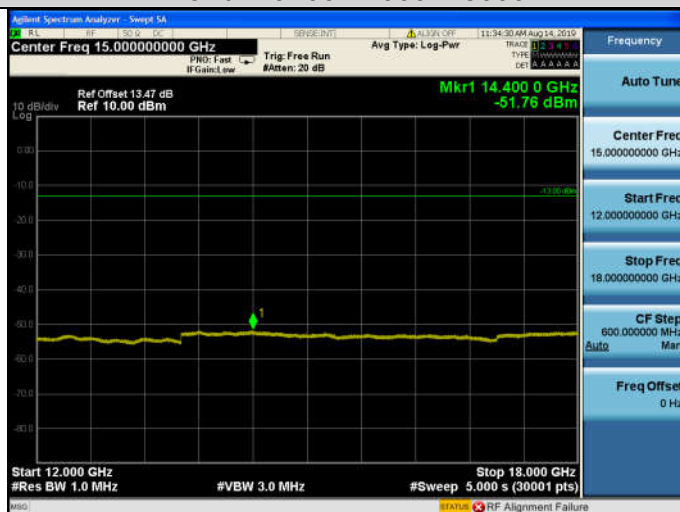




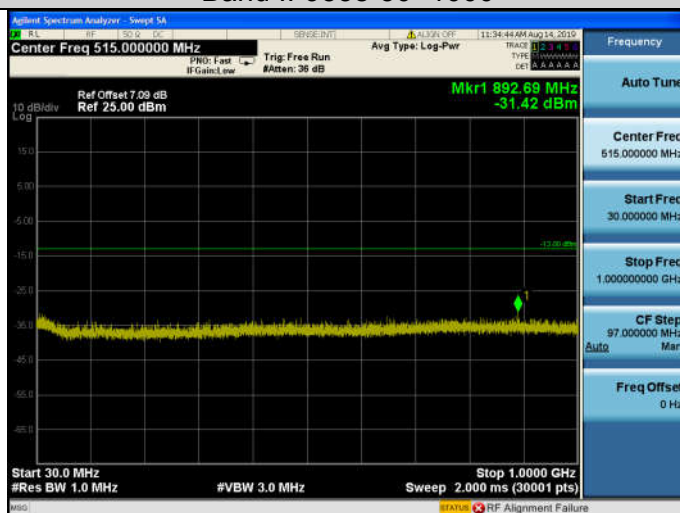
Band II-9400-5000~12000



Band II-9400-12000~18000

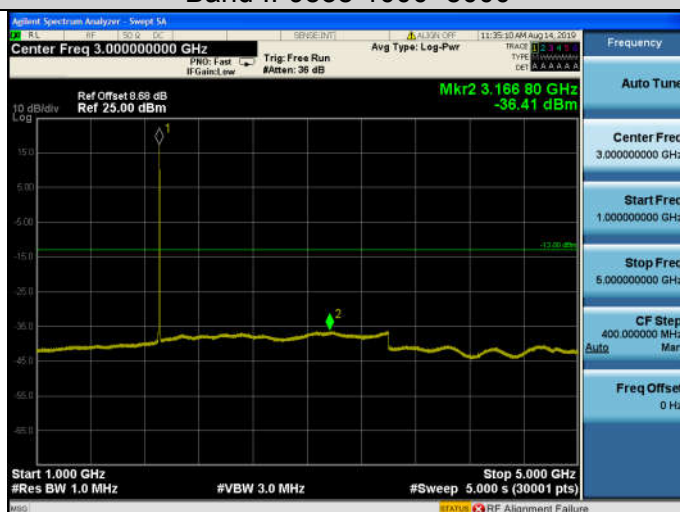


Band II-9538-30~1000

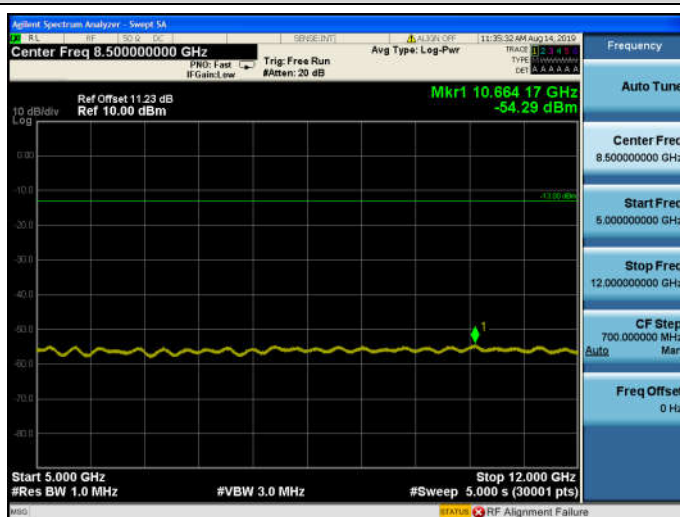




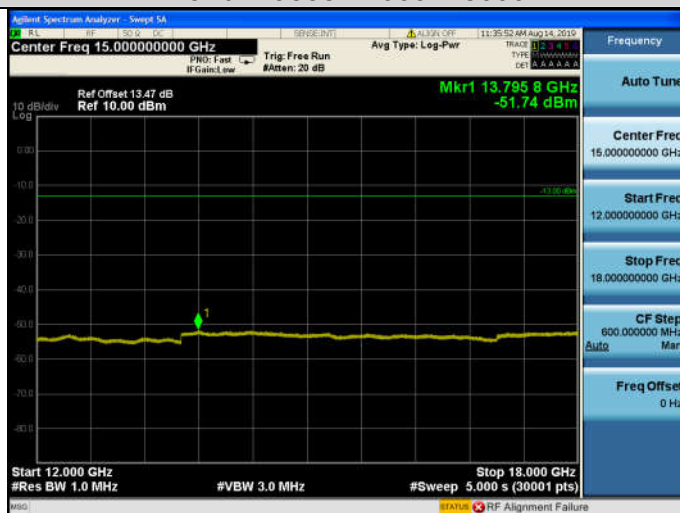
Band II-9538-1000~5000



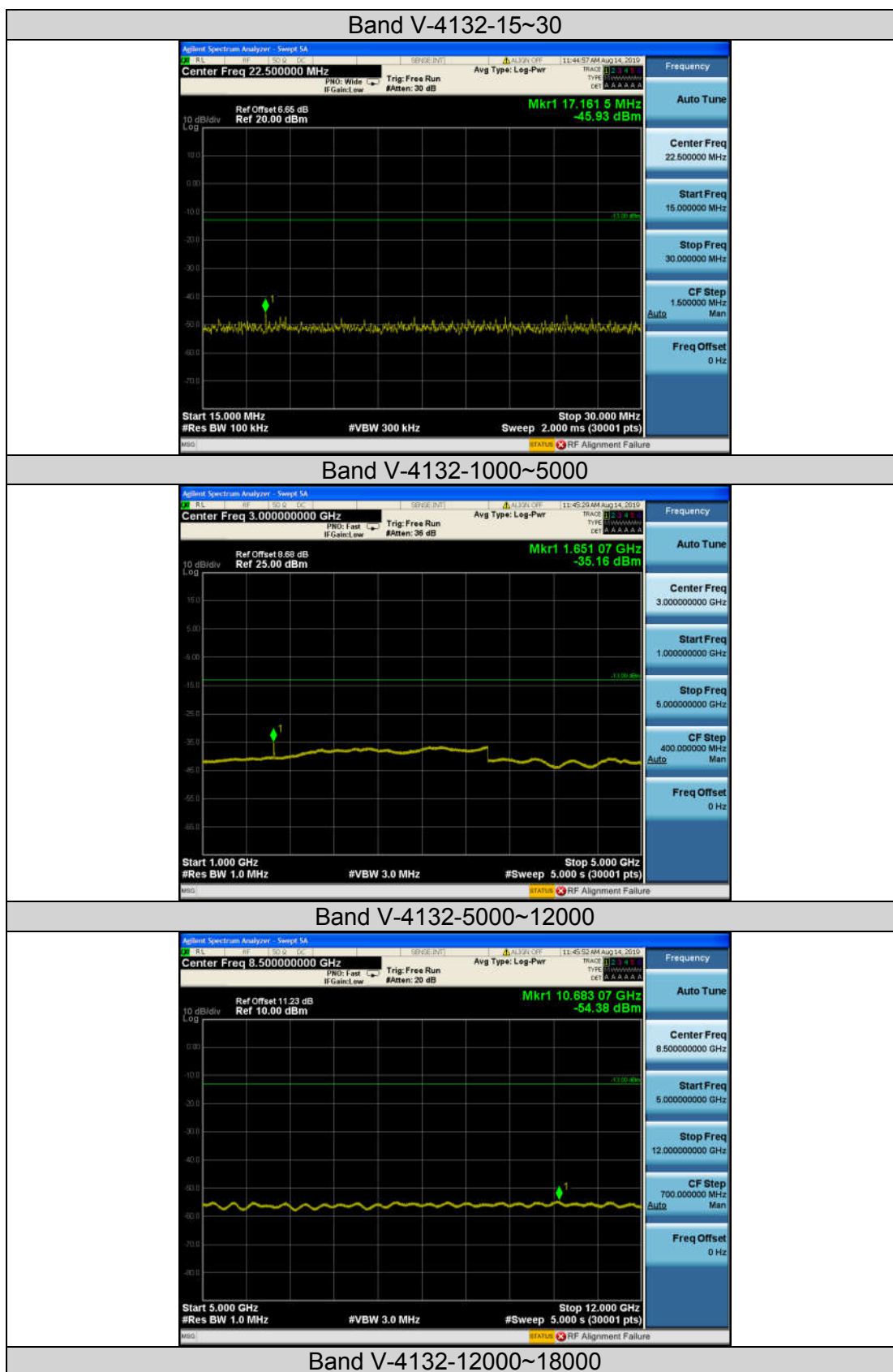
Band II-9538-5000~12000

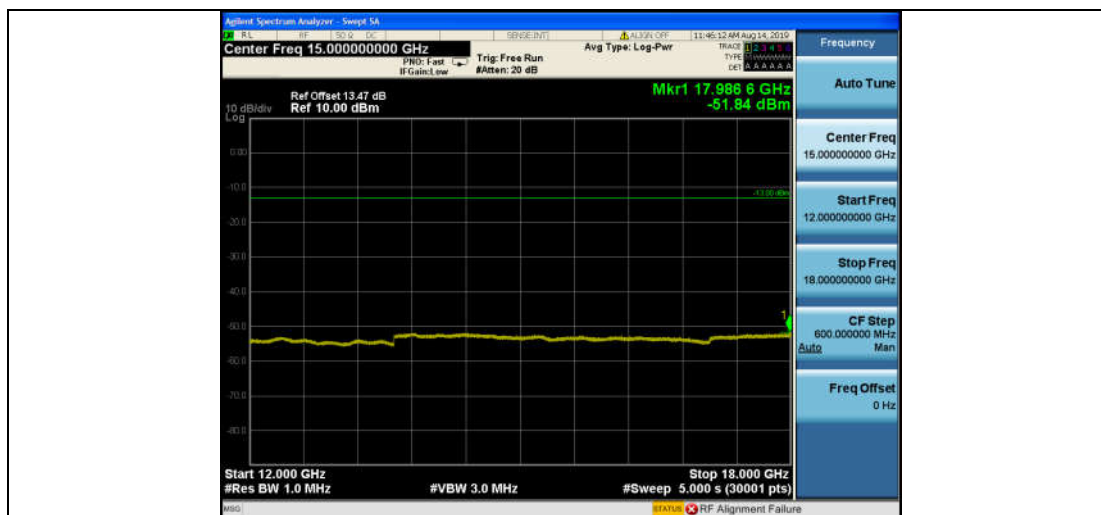


Band II-9538-12000~18000



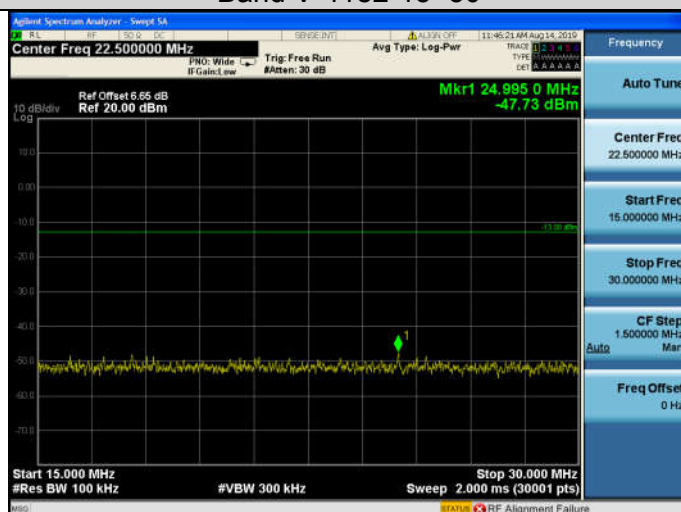
WCDMA Band V



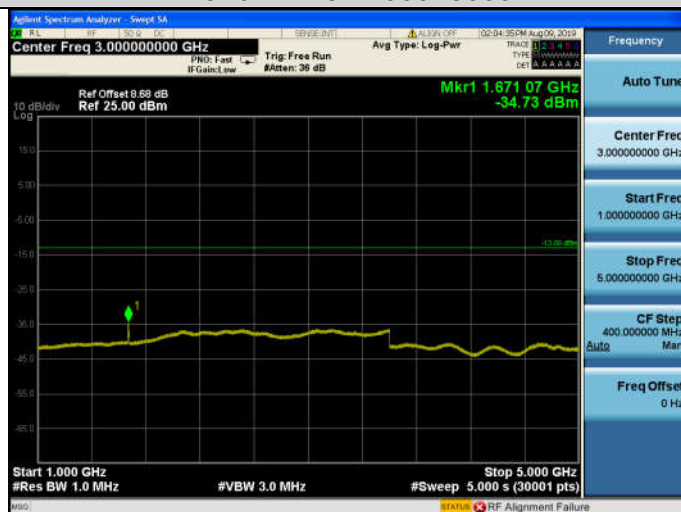




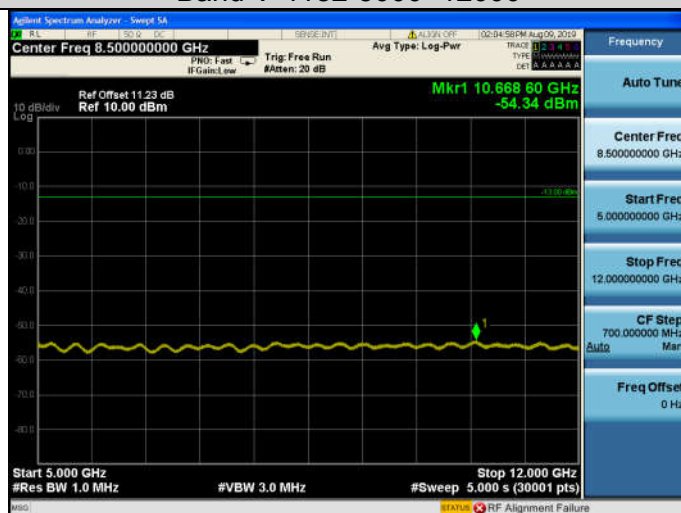
Band V-4182-15~30



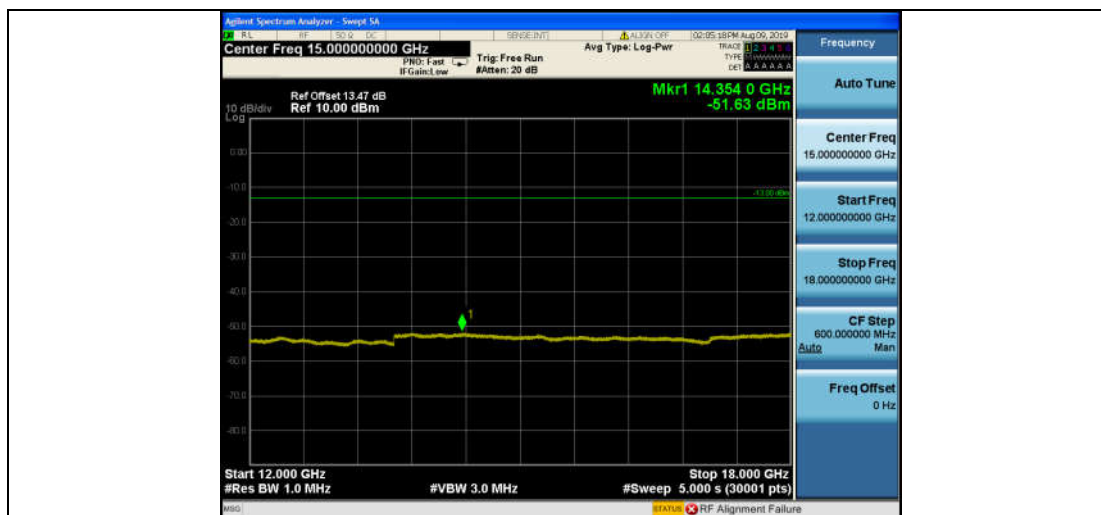
Band V-4182-1000~5000



Band V-4182-5000~12000

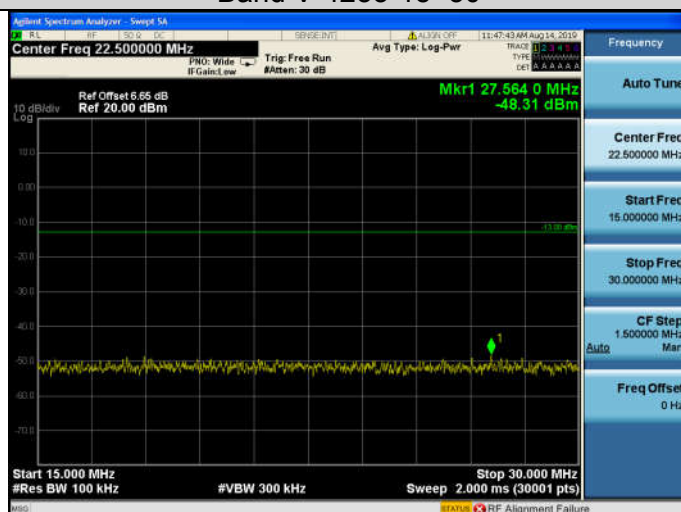


Band V-4182-12000~18000

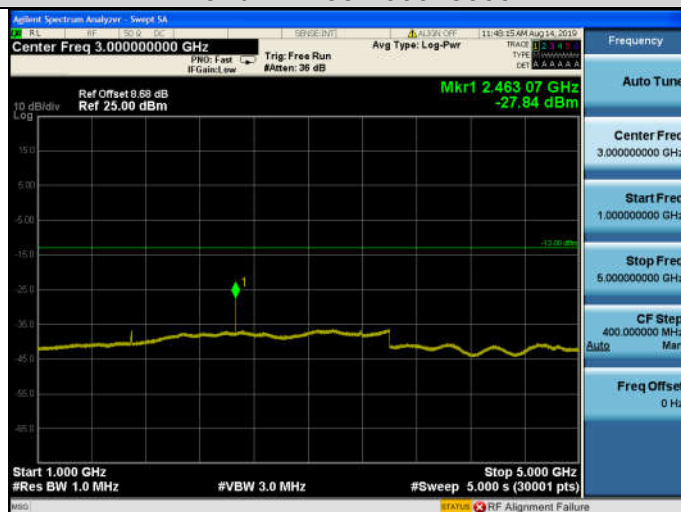




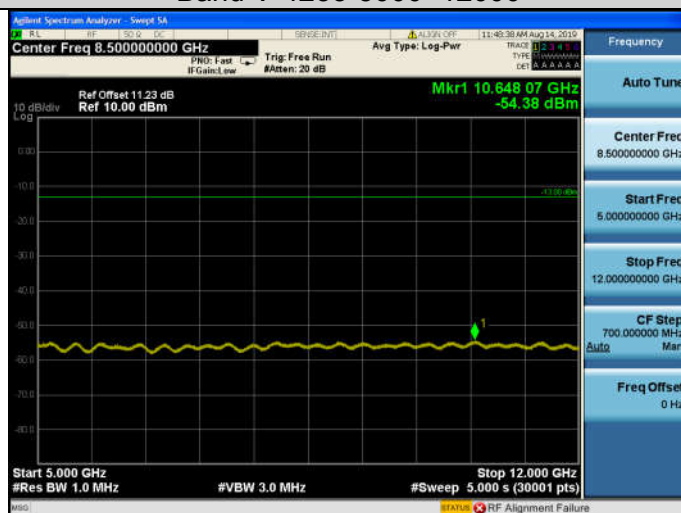
Band V-4233-15~30



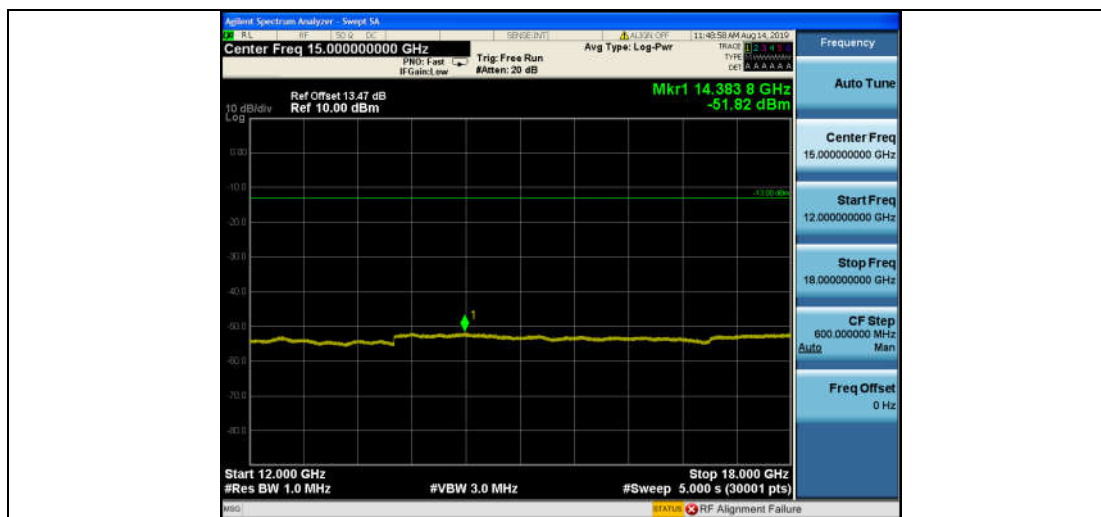
Band V-4233-1000~5000



Band V-4233-5000~12000



Band V-4233-12000~18000



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

5.5 Band edge

5.5.1 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, for all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm

5.5.2 Test method

The testing follows FCC KDB 971168 D01v03r01 Section 6.0.

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.

The band edges of low and high channels for the highest RF powers were measured.

The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

= $P(W) - [43 + 10\log(P)]$ (dB)

= $[30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)

= -13dBm.

5.5.3 Test result

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
GPRS850	128	-17.06237617	-13	PASS
GPRS850	251	-16.9867028	-13	PASS
EGPRS850	128	-22.4870359	-13	PASS
EGPRS850	251	-22.48775375	-13	PASS
GPRS1900	512	-16.85842941	-13	PASS
GPRS1900	810	-14.29528633	-13	PASS
EGPRS1900	512	-22.21973846	-13	PASS
EGPRS1900	810	-19.41196075	-13	PASS

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
Band II	9262	-19.65	-13	PASS
Band II	9538	-20.56	-13	PASS
Band V	4132	-21.79	-13	PASS
Band V	4233	-23.59	-13	PASS



GPRS850-128



GPRS850-251



EGPRS850-128

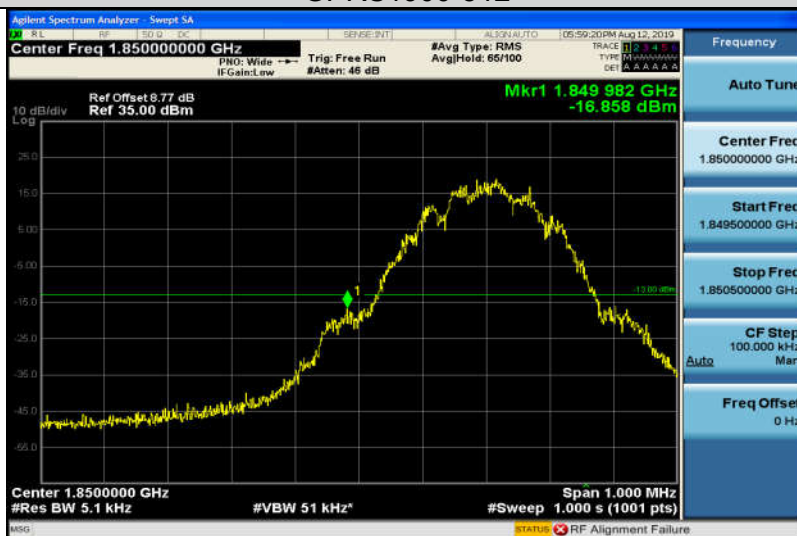




EGPRS850-251



GPRS1900-512



GPRS1900-810





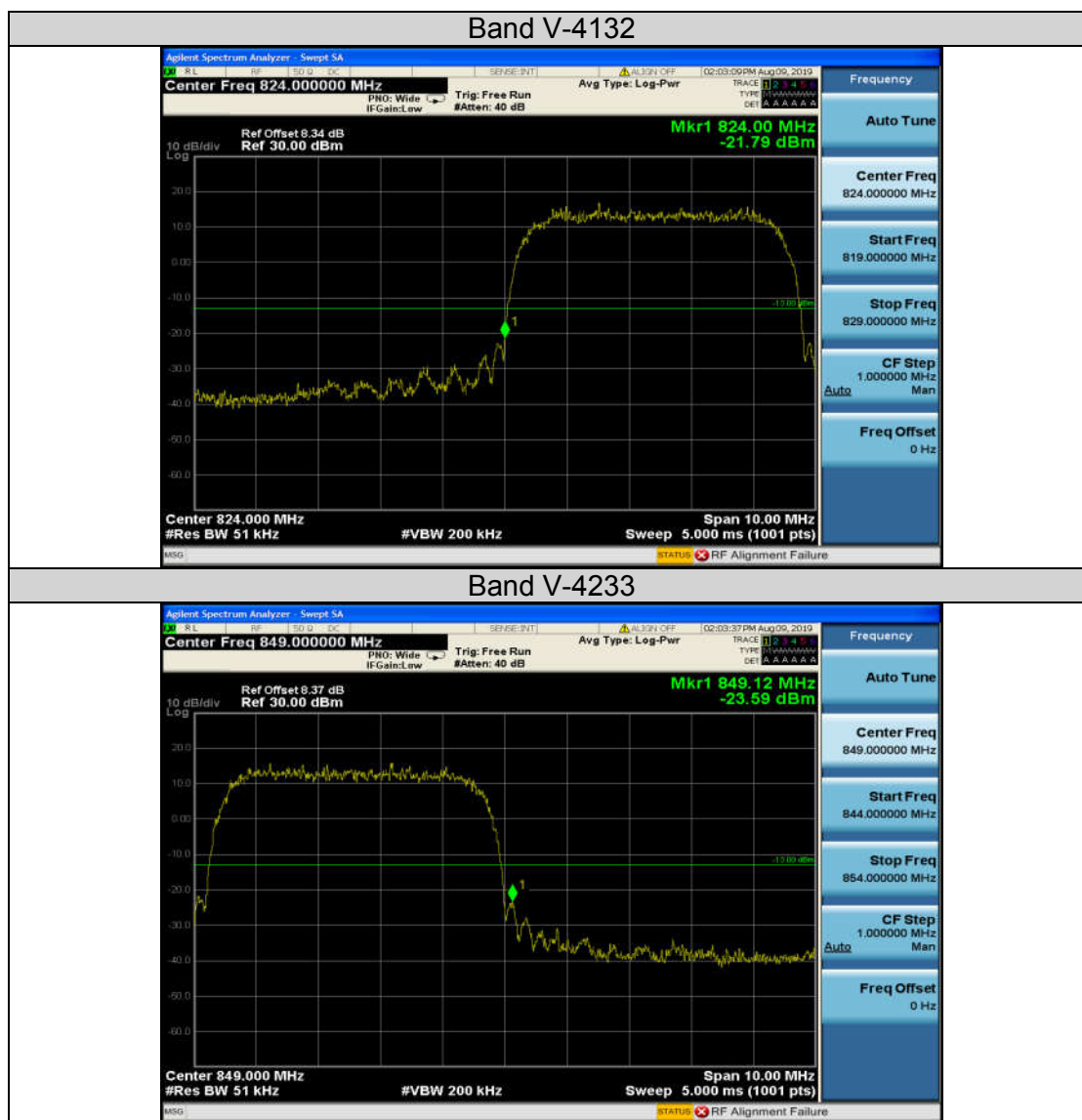
EGPRS1900-512



EGPRS1900-810







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

5.6 Radiated spurious emission

5.6.1 Limit

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

5.6.2 Test method

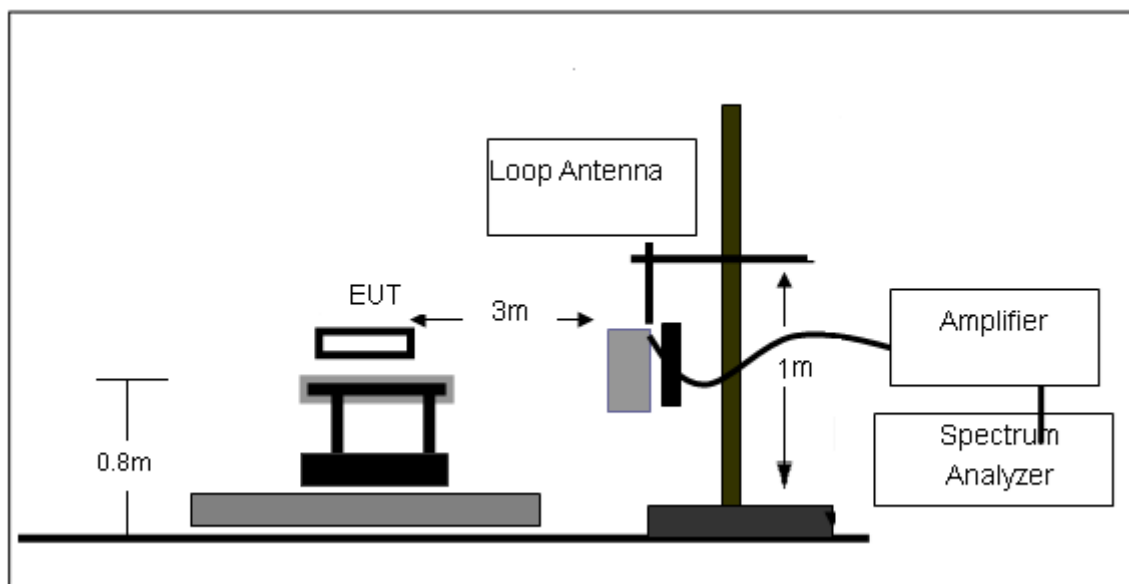
1. The test system setup as show in the block diagram above.
2. The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
3. During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB= $10 \log(\text{TX power in Watts}/0.001)$ -the absolute level

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

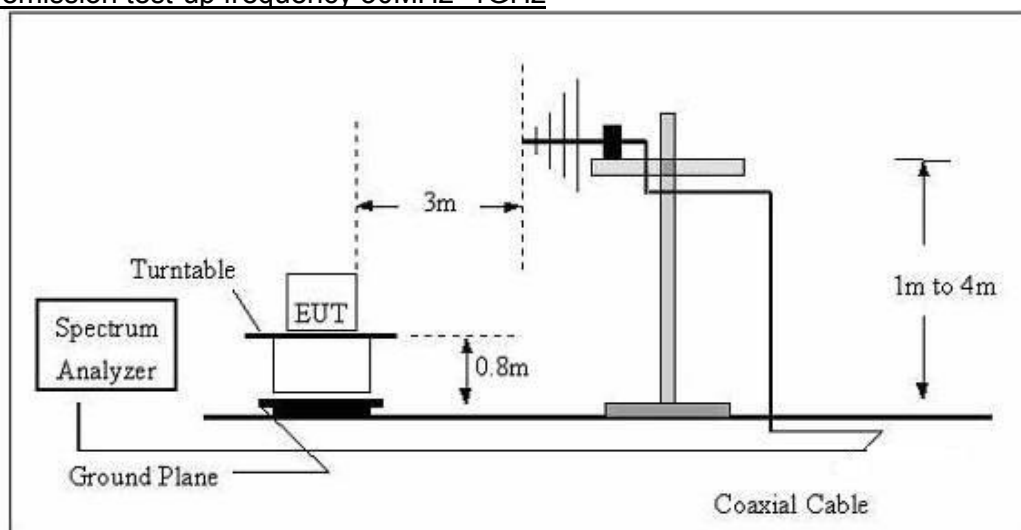
5.6.3 Test setup

Radiated emission test-up frequency below 30MHz

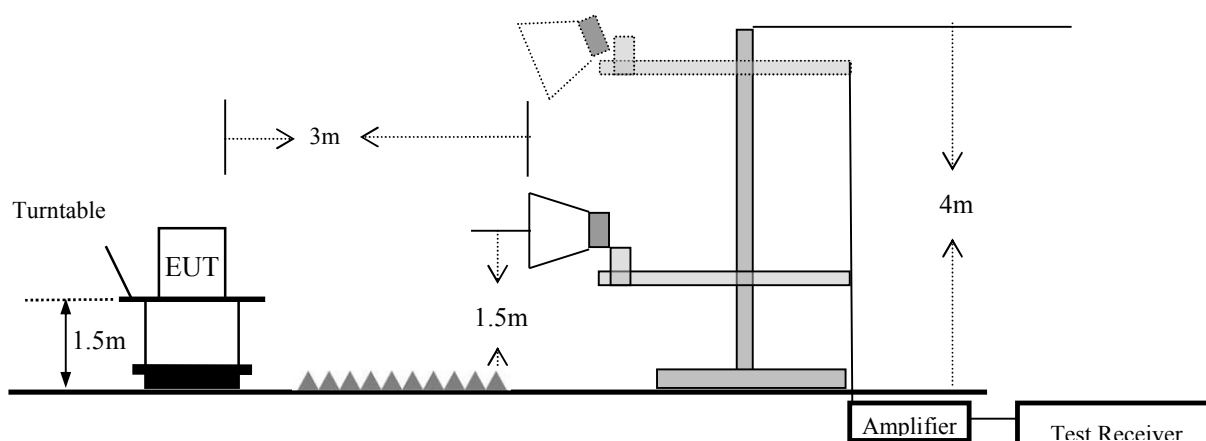




Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz





5.6.4 Test Result

Note: All the configuration was tested and only the worse case was reported

GPRS850_Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1648.4	-48.84	3.86	3	8.56	-44.14	-13	-31.14	H
2472.6	-53.09	4.29	3	6.98	-50.40	-13	-37.40	H
1648.4	-44.76	3.86	3	8.56	-40.06	-13	-27.06	V
2472.6	-51.19	4.29	3	6.98	-48.50	-13	-35.50	V
GPRS850_Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1673.2	-46.89	3.9	3	8.58	-42.21	-13	-29.21	H
2509.8	-51.90	4.32	3	6.8	-49.42	-13	-36.42	H
1673.2	-41.49	3.9	3	8.58	-36.81	-13	-23.81	V
2509.8	-48.59	4.32	3	6.8	-46.11	-13	-33.11	V
GPRS850_High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1697.6	-54.21	3.91	3	9.06	-49.06	-13	-36.06	H
2546.4	-54.72	4.32	3	6.65	-52.39	-13	-39.39	H
1697.6	-50.88	3.91	3	9.06	-45.73	-13	-32.73	V
2546.4	-51.67	4.32	3	6.65	-49.34	-13	-36.34	V



EGPRS850_Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1648.4	-52.14	3.86	3	8.56	-47.44	-13	-34.44	H
2472.6	-53.12	4.29	3	6.98	-50.43	-13	-37.43	H
1648.4	-48.81	3.86	3	8.56	-44.11	-13	-31.11	V
2472.6	-49.70	4.29	3	6.98	-47.01	-13	-34.01	V
EGPRS850_Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1673.2	-51.84	3.9	3	8.58	-47.16	-13	-34.16	H
2509.8	-52.37	4.32	3	6.8	-49.89	-13	-36.89	H
1673.2	-48.91	3.9	3	8.58	-44.23	-13	-31.23	V
2509.8	-49.37	4.32	3	6.8	-46.89	-13	-33.89	V
EGPRS850_High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1697.6	-52.41	3.91	3	9.06	-47.26	-13	-34.26	H
2546.4	-53.16	4.32	3	6.65	-50.83	-13	-37.83	H
1697.6	-48.85	3.91	3	9.06	-43.70	-13	-30.70	V
2546.4	-50.03	4.32	3	6.65	-47.70	-13	-34.70	V



GPRS1900_Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3700.4	-50.75	5.26	3	9.88	-46.13	-13	-33.13	H
5550.6	-57.64	6.11	3	11.36	-52.39	-13	-39.39	H
3700.4	-54.42	5.26	3	9.88	-49.80	-13	-36.80	V
5550.6	-62.45	6.11	3	11.36	-57.20	-13	-44.20	V
GPRS1900_Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	EIRP(dBm)	(dBm)	(dB)	
3760	-47.16	5.32	3	10.03	-42.45	-13	-29.45	H
5640	-55.68	6.19	3	11.41	-50.46	-13	-37.46	H
3760	-50.45	5.32	3	10.03	-45.74	-13	-32.74	V
5640	-58.56	6.19	3	11.41	-53.34	-13	-40.34	V
GPRS1900_High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3819.6	-59.63	5.36	3	9.62	-55.37	-13	-42.37	H
5729.4	-62.20	6.24	3	11.46	-56.98	-13	-43.98	H
3819.6	-60.00	5.36	3	9.62	-55.74	-13	-42.74	V
5729.4	-64.18	6.24	3	11.46	-58.96	-13	-45.96	V

EGPRS1900_ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dBi)	(dBm)	(dBm)	(dB)	
3700.4	-57.50	5.26	3	9.88	-52.88	-13	-39.88	H
5550.6	-48.75	6.11	3	11.36	-43.50	-13	-30.50	H
3700.4	-57.25	5.26	3	9.88	-52.63	-13	-39.63	V
5550.6	-50.22	6.11	3	11.36	-44.97	-13	-31.97	V
EGPRS1900_ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dBi)	EIRP(dBm)	(dBm)	(dB)	
3760	-55.63	5.32	3	10.03	-50.92	-13	-37.92	H
5640	-51.19	6.19	3	11.41	-45.97	-13	-32.97	H
3760	-49.52	5.32	3	10.03	-44.81	-13	-31.81	V
5640	-52.40	6.19	3	11.41	-47.18	-13	-34.18	V
EGPRS1900_ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dBi)	(dBm)	(dBm)	(dB)	
3819.6	-50.90	5.36	3	9.62	-46.64	-13	-33.64	H
5729.4	-44.36	6.24	3	11.46	-39.14	-13	-26.14	H
3819.6	-39.50	5.36	3	9.62	-35.24	-13	-22.24	V
5729.4	-37.32	6.24	3	11.46	-32.10	-13	-19.10	V



WCDMA Band II _ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3704.8	-45.54	5.26	3	9.88	-40.92	-13	-27.92	H
5557.2	-48.77	6.11	3	11.36	-43.52	-13	-30.52	H
3704.8	-49.81	5.26	3	9.88	-45.19	-13	-32.19	V
5557.2	-56.16	6.11	3	11.36	-50.91	-13	-37.91	V
WCDMA Band II _ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3760	-39.55	5.32	3	10.03	-34.84	-13	-21.84	H
5640	-48.60	6.19	3	11.41	-43.38	-13	-30.38	H
3760	-46.92	5.32	3	10.03	-42.21	-13	-29.21	V
5640	-54.06	6.19	3	11.41	-48.84	-13	-35.84	V
WCDMA Band II _ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
3815.2	-49.43	5.36	3	9.62	-45.17	-13	-32.17	H
5722.8	-53.90	6.24	3	11.46	-48.68	-13	-35.68	H
3815.2	-54.06	5.36	3	9.62	-49.80	-13	-36.80	V
5722.8	-57.76	6.24	3	11.46	-52.54	-13	-39.54	V

WCDMA Band V _ Low Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1652.8	-46.03	3.86	3	8.56	-41.33	-13	-28.33	H
2479.2	-48.15	4.29	3	6.98	-45.46	-13	-32.46	H
1652.8	-42.77	3.86	3	8.56	-38.07	-13	-25.07	V
2479.2	-42.63	4.29	3	6.98	-39.94	-13	-26.94	V
WCDMA Band V _ Middle Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1672.8	-43.69	3.9	3	8.58	-39.01	-13	-26.01	H
2509.2	-44.95	4.32	3	6.8	-42.47	-13	-29.47	H
1672.8	-38.39	3.9	3	8.58	-33.71	-13	-20.71	V
2509.2	-42.18	4.32	3	6.8	-39.70	-13	-26.70	V
WCDMA Band V _ High Channel								
Frequency	SG Level	Cable Loss	Diatance	Antenna Gain	Absolute Level	Limit	Margin	Polarization
(MHz)	(dBm)	(dB)	(m)	(dB)	(dBm)	(dBm)	(dB)	
1693.2	-47.91	3.91	3	9.06	-42.76	-13	-29.76	H
2539.8	-48.46	4.32	3	6.65	-46.13	-13	-33.13	H
1693.2	-44.06	3.91	3	9.06	-38.91	-13	-25.91	V
2539.8	-45.34	4.32	3	6.65	-43.01	-13	-30.01	V

5.7 Frequency stability

5.7.1 Limit

For FCC part 22.355: the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm for mobile $\leq$ 3W condition.

For FCC part 24.235: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.7.2 Test method

Test Procedures for Temperature Variation:

- 1, The EUT was set up in the thermal chamber and connected with the base station.
- 2, With power off, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 3, With power off, the temperature was raised in 10°C set up to 50°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 4, measure the carrier frequency error.

Test Procedures for Voltage Variation:

- 1, The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the base station.
- 2, Reduce the primary supply voltage to the battery operating end point.
- 3, measure the carrier frequency error.

5.7.3 Test Result

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GPRS850	128	VL	TN	4.08	0.004950	±2.5	PASS
GPRS850	128	VN	TN	-6.06	-0.007349	±2.5	PASS
GPRS850	128	VH	TN	4.54	0.005514	±2.5	PASS
GPRS850	190	VL	TN	-11.30	-0.013511	±2.5	PASS
GPRS850	190	VN	TN	8.01	0.009577	±2.5	PASS
GPRS850	190	VH	TN	7.89	0.009433	±2.5	PASS
GPRS850	251	VL	TN	11.48	0.013522	±2.5	PASS
GPRS850	251	VN	TN	-10.56	-0.012441	±2.5	PASS
GPRS850	251	VH	TN	5.73	0.006746	±2.5	PASS
GPRS1900	512	VL	TN	3.94	0.002131	within1850-1910	PASS
GPRS1900	512	VN	TN	-2.38	-0.001286	within1850-1910	PASS
GPRS1900	512	VH	TN	6.33	0.003421	within1850-1910	PASS
GPRS1900	661	VL	TN	-16.69	-0.008878	within1850-1910	PASS
GPRS1900	661	VN	TN	-1.84	-0.000980	within1850-1910	PASS
GPRS1900	661	VH	TN	2.77	0.001474	within1850-1910	PASS
GPRS1900	810	VL	TN	27.62	0.014460	within1850-1910	PASS
GPRS1900	810	VN	TN	-3.69	-0.001934	within1850-1910	PASS
GPRS1900	810	VH	TN	-7.28	-0.003811	within1850-1910	PASS

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GPRS850	128	VN	-30	7.88	0.009563	±2.5	PASS
GPRS850	128	VN	-20	-12.99	-0.015765	±2.5	PASS
GPRS850	128	VN	-10	2.21	0.002677	±2.5	PASS
GPRS850	128	VN	0	12.05	0.014622	±2.5	PASS
GPRS850	128	VN	10	5.08	0.006167	±2.5	PASS
GPRS850	128	VN	20	2.44	0.002955	±2.5	PASS
GPRS850	128	VN	30	-14.99	-0.018191	±2.5	PASS
GPRS850	128	VN	40	-14.78	-0.017928	±2.5	PASS
GPRS850	128	VN	50	1.09	0.001319	±2.5	PASS
GPRS850	190	VN	-30	7.62	0.009104	±2.5	PASS
GPRS850	190	VN	-20	5.53	0.006608	±2.5	PASS
GPRS850	190	VN	-10	-2.59	-0.003098	±2.5	PASS
GPRS850	190	VN	0	-3.05	-0.003649	±2.5	PASS
GPRS850	190	VN	10	-0.61	-0.000726	±2.5	PASS
GPRS850	190	VN	20	7.97	0.009527	±2.5	PASS
GPRS850	190	VN	30	9.37	0.011206	±2.5	PASS
GPRS850	190	VN	40	2.89	0.003453	±2.5	PASS
GPRS850	190	VN	50	9.65	0.011540	±2.5	PASS
GPRS850	251	VN	-30	3.33	0.003927	±2.5	PASS
GPRS850	251	VN	-20	11.65	0.013726	±2.5	PASS
GPRS850	251	VN	-10	11.45	0.013493	±2.5	PASS
GPRS850	251	VN	0	-2.59	-0.003049	±2.5	PASS
GPRS850	251	VN	10	8.83	0.010399	±2.5	PASS
GPRS850	251	VN	20	-3.19	-0.003755	±2.5	PASS
GPRS850	251	VN	30	1.14	0.001342	±2.5	PASS
GPRS850	251	VN	40	-6.01	-0.007086	±2.5	PASS



GPRS850	251	VN	50	-2.09	-0.002468	±2.5	PASS
GPRS1900	512	VN	-30	-1.07	-0.000578	within1850-1910	PASS
GPRS1900	512	VN	-20	-4.39	-0.002370	within1850-1910	PASS
GPRS1900	512	VN	-10	4.23	0.002285	within1850-1910	PASS
GPRS1900	512	VN	0	-17.64	-0.009533	within1850-1910	PASS
GPRS1900	512	VN	10	-8.95	-0.004837	within1850-1910	PASS
GPRS1900	512	VN	20	2.54	0.001373	within1850-1910	PASS
GPRS1900	512	VN	30	-0.13	-0.000068	within1850-1910	PASS
GPRS1900	512	VN	40	10.95	0.005918	within1850-1910	PASS
GPRS1900	512	VN	50	4.43	0.002392	within1850-1910	PASS
GPRS1900	661	VN	-30	1.53	0.000816	within1850-1910	PASS
GPRS1900	661	VN	-20	2.39	0.001271	within1850-1910	PASS
GPRS1900	661	VN	-10	6.59	0.003506	within1850-1910	PASS
GPRS1900	661	VN	0	-11.50	-0.006119	within1850-1910	PASS
GPRS1900	661	VN	10	-6.75	-0.003588	within1850-1910	PASS
GPRS1900	661	VN	20	11.36	0.006043	within1850-1910	PASS
GPRS1900	661	VN	30	3.44	0.001830	within1850-1910	PASS
GPRS1900	661	VN	40	-2.96	-0.001575	within1850-1910	PASS
GPRS1900	661	VN	50	-0.58	-0.000309	within1850-1910	PASS
GPRS1900	810	VN	-30	4.88	0.002557	within1850-1910	PASS
GPRS1900	810	VN	-20	-17.99	-0.009419	within1850-1910	PASS
GPRS1900	810	VN	-10	-11.47	-0.006004	within1850-1910	PASS
GPRS1900	810	VN	0	-17.52	-0.009173	within1850-1910	PASS
GPRS1900	810	VN	10	-31.34	-0.016408	within1850-1910	PASS
GPRS1900	810	VN	20	-12.67	-0.006632	within1850-1910	PASS
GPRS1900	810	VN	30	0.04	0.000022	within1850-1910	PASS
GPRS1900	810	VN	40	-0.98	-0.000512	within1850-1910	PASS
GPRS1900	810	VN	50	-0.34	-0.000177	within1850-1910	PASS



Voltage							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band II	9262	VL	TN	-5.31	-0.002865	within1850-1910	PASS
Band II	9262	VN	TN	-1.40	-0.000757	within1850-1910	PASS
Band II	9262	VH	TN	-11.18	-0.006035	within1850-1910	PASS
Band II	9400	VL	TN	6.59	0.003508	within1850-1910	PASS
Band II	9400	VN	TN	-6.44	-0.003424	within1850-1910	PASS
Band II	9400	VH	TN	-5.22	-0.002777	within1850-1910	PASS
Band II	9538	VL	TN	-6.12	-0.003206	within1850-1910	PASS
Band II	9538	VN	TN	-2.03	-0.001065	within1850-1910	PASS
Band II	9538	VH	TN	-1.67	-0.000874	within1850-1910	PASS
Band V	4132	VL	TN	-3.47	-0.004198	±2.5	PASS
Band V	4132	VN	TN	-0.26	-0.000320	±2.5	PASS
Band V	4132	VH	TN	-6.19	-0.007495	±2.5	PASS
Band V	4182	VL	TN	-0.67	-0.000795	±2.5	PASS
Band V	4182	VN	TN	-2.16	-0.002583	±2.5	PASS
Band V	4182	VH	TN	-2.90	-0.003472	±2.5	PASS
Band V	4233	VL	TN	-3.86	-0.004554	±2.5	PASS
Band V	4233	VN	TN	0.91	0.001073	±2.5	PASS
Band V	4233	VH	TN	-9.38	-0.011085	±2.5	PASS

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band II	9262	VN	-30	0.67	0.000359	within1850-1910	PASS
Band II	9262	VN	-20	-4.63	-0.002498	within1850-1910	PASS
Band II	9262	VN	-10	-4.94	-0.002664	within1850-1910	PASS
Band II	9262	VN	0	-1.04	-0.000564	within1850-1910	PASS
Band II	9262	VN	10	-1.57	-0.000846	within1850-1910	PASS
Band II	9262	VN	20	1.64	0.000884	within1850-1910	PASS
Band II	9262	VN	30	-6.37	-0.003437	within1850-1910	PASS
Band II	9262	VN	40	4.44	0.002398	within1850-1910	PASS
Band II	9262	VN	50	-2.31	-0.001247	within1850-1910	PASS
Band II	9400	VN	-30	-2.95	-0.001571	within1850-1910	PASS
Band II	9400	VN	-20	0.01	0.000004	within1850-1910	PASS
Band II	9400	VN	-10	-9.28	-0.004938	within1850-1910	PASS
Band II	9400	VN	0	0.76	0.000403	within1850-1910	PASS
Band II	9400	VN	10	-3.53	-0.001879	within1850-1910	PASS
Band II	9400	VN	20	-3.19	-0.001697	within1850-1910	PASS
Band II	9400	VN	30	-3.88	-0.002062	within1850-1910	PASS
Band II	9400	VN	40	-0.48	-0.000255	within1850-1910	PASS
Band II	9400	VN	50	-3.96	-0.002104	within1850-1910	PASS
Band II	9538	VN	-30	-1.11	-0.000581	within1850-1910	PASS
Band II	9538	VN	-20	-1.92	-0.001009	within1850-1910	PASS
Band II	9538	VN	-10	-3.21	-0.001684	within1850-1910	PASS
Band II	9538	VN	0	-4.53	-0.002373	within1850-1910	PASS
Band II	9538	VN	10	-7.87	-0.004124	within1850-1910	PASS
Band II	9538	VN	20	-3.53	-0.001849	within1850-1910	PASS
Band II	9538	VN	30	-6.81	-0.003570	within1850-1910	PASS
Band II	9538	VN	40	-0.57	-0.000296	within1850-1910	PASS



Band II	9538	VN	50	1.14	0.000600	within1850-1910	PASS
Band V	4132	VN	-30	-4.18	-0.005055	±2.5	PASS
Band V	4132	VN	-20	-3.54	-0.004284	±2.5	PASS
Band V	4132	VN	-10	-6.18	-0.007478	±2.5	PASS
Band V	4132	VN	0	-6.78	-0.008205	±2.5	PASS
Band V	4132	VN	10	-2.26	-0.002735	±2.5	PASS
Band V	4132	VN	20	-5.63	-0.006812	±2.5	PASS
Band V	4132	VN	30	-5.53	-0.006690	±2.5	PASS
Band V	4132	VN	40	-7.06	-0.008543	±2.5	PASS
Band V	4132	VN	50	-6.60	-0.007989	±2.5	PASS
Band V	4182	VN	-30	-2.95	-0.003532	±2.5	PASS
Band V	4182	VN	-20	0.95	0.001137	±2.5	PASS
Band V	4182	VN	-10	-6.54	-0.007816	±2.5	PASS
Band V	4182	VN	0	-2.07	-0.002471	±2.5	PASS
Band V	4182	VN	10	-3.58	-0.004284	±2.5	PASS
Band V	4182	VN	20	-1.32	-0.001573	±2.5	PASS
Band V	4182	VN	30	-2.67	-0.003190	±2.5	PASS
Band V	4182	VN	40	-2.40	-0.002873	±2.5	PASS
Band V	4182	VN	50	-5.57	-0.006662	±2.5	PASS
Band V	4233	VN	-30	-4.46	-0.005272	±2.5	PASS
Band V	4233	VN	-20	-1.52	-0.001791	±2.5	PASS
Band V	4233	VN	-10	-5.09	-0.006007	±2.5	PASS
Band V	4233	VN	0	-3.38	-0.003988	±2.5	PASS
Band V	4233	VN	10	-4.86	-0.005745	±2.5	PASS
Band V	4233	VN	20	-4.48	-0.005289	±2.5	PASS
Band V	4233	VN	30	-2.87	-0.003388	±2.5	PASS
Band V	4233	VN	40	-7.35	-0.008677	±2.5	PASS
Band V	4233	VN	50	-1.54	-0.001825	±2.5	PASS

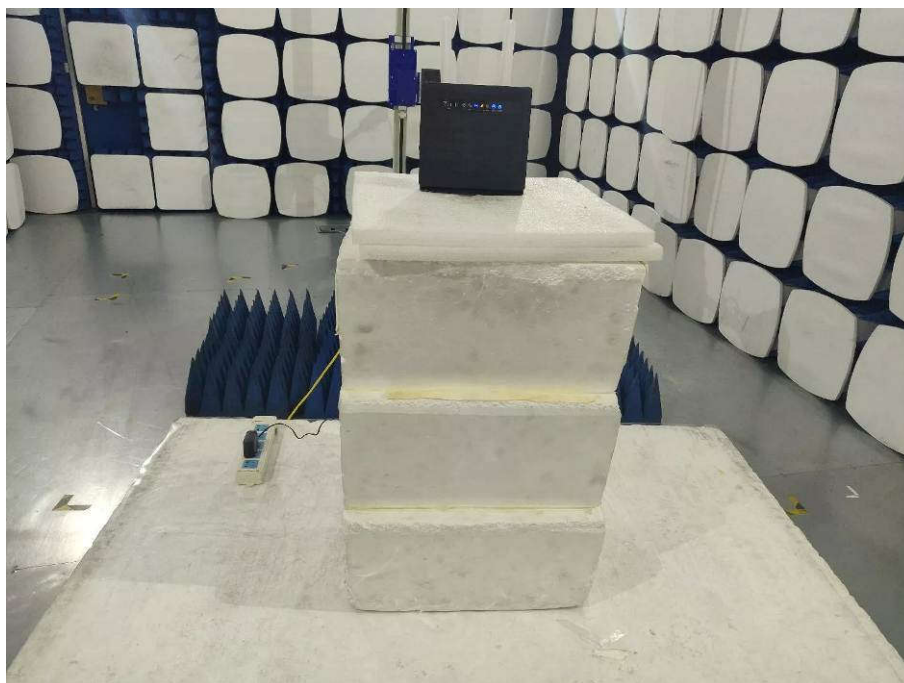
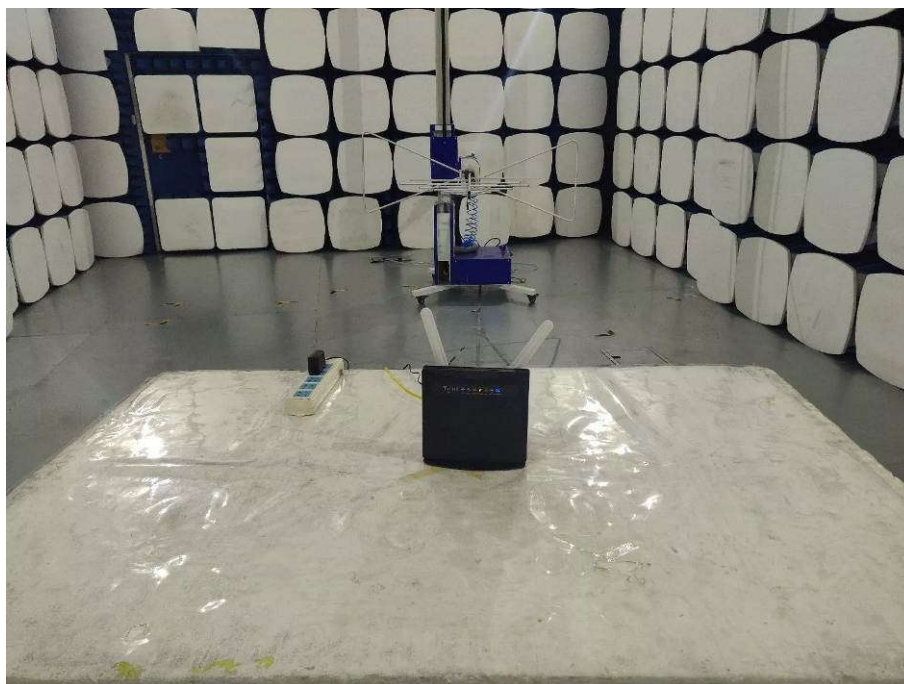
Note:

1. Normal Voltage = 12V; Minumun (BEP) = 10.8V; Maximum Voltage =13.2V
2. All modes of EUT have been tested; only the data of worst case mode is reported.



Photographs of the Test Setup

Radiated emission



Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi19071025-1E1-1.

----END OF REPORT----