



# RF TEST REPORT

**Applicant**      Mobiwire SAS  
**FCC ID**          QPN-LINIWA  
**Product**        4G Smart Phone  
**Brand**            MobiWire,ALTICE  
**Model**            MobiWire Liniwa,Altice S24  
**Report No.**      R2104A0308-R1V2  
**Issue Date**      April 28, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2019)/ FCC CFR 47 Part 22H (2019)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

*Performed by: Peng Tao*

*Approved by: Kai Xu*

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## TA Technology (Shanghai) Co., Ltd.

*No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China*

*TEL: +86-021-50791141/2/3*

*FAX: +86-021-50791141/2/3-8000*



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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	April 25, 2021
Rev.1	Update Brand.	April 25, 2021
Rev.2	Update Adapter 3.	April 28, 2021

Note: This revised report (Report No. R2104A0308-R1V2) supersedes and replaces the previously issued report (Report No. R2104A0308-R1V1). Please discard or destroy the previously issued report and dispose of it accordingly.



### Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF Power Output and Effective Radiated Power	2.1046 22.913(a)(5)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	2.1051 / 22.917(a)	PASS
4	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 22.355	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
7	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS
Date of Testing: February 15,2020~ March 18,2020			
Note: All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

**MobiWire Liniwa,Altice S24 (Report No.: R2104A0308-R1V1) is a variant model of MobiWire Liniwa, ALTICE S23 (Report No.: R1912A0709-R1V1). Only the software version, shell and model have been updated, and the product has not been changed. After laboratory evaluation, the software version update does not need to add any tests. The detailed product change description please refers to the Difference Declaration Letter.**



## 1. Test Laboratory

### 1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

### 1.2. Test facility

#### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

#### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

### 1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
Country: P. R. China  
Contact: Xu Kai  
Telephone: +86-021-50791141/2/3  
Fax: +86-021-50791141/2/3-8000  
Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)

## 2. General Description of Equipment under Test

### 2.3. Applicant and Manufacturer Information

Applicant	Mobiwire SAS
Applicant address	79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France
Manufacturer	Mobiwire SAS
Manufacturer address	79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France

### 2.4. General Information

EUT Description			
Model	MobiWire Liniwa,Altice S24		
IMEI	353633110000503		
Hardware Version	V01		
Software Version	ALTICE_S24_DS_O_T_V01.1		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	-3.5dBi		
Test Mode(s)	GSM 850; WCDMA Band V		
Test Modulation	(GSM)GMSK,8PSK; (WCDMA) BPSK, QPSK,16QAM;		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	24		
HSUPA UE Category	7		
DC-HSDPA UE Category	24		
HSPA+ UE Category	7		
Maximum E.R.P.	GSM 850:	26.73dBm	
	WCDMA Band V:	17.04dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.6V    Maximum: 4.35V		
Extreme Temperature	Lowest: -10°C    Highest: +55°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 ~ 849	869 ~ 894
	WCDMA Band V	824 ~ 849	869 ~ 894
EUT Accessory			
Adapter 1	Manufacturer: Dongguan Aohai Power Technology CO.,LTD Model: A31A-050100U-EU1		
Adapter 2	Manufacturer: Dongguan Aohai Power Technology CO.,LTD		



	Model: A31A-050100U-US1
Adapter 3	Manufacturer: Dongguan Aohai Technology CO.,LTD Model: A18A-050100U-US2
Battery	Manufacturer: GUANGDONG FENGHUA NEW ENERGY CO.,LTD Model: 178172056
Earphone	Manufacturer: Shenzhen Juwei Electronics Co.,Ltd Model: JWEP0957-M01R
USB Cable	Manufacturer: SHENZHEN FKY-QY HARDWARE ELECTRONIC CO.,LTD Model: 2CA0MBWE001
<p>Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.</p> <p>2. There are more than one Adapter, each one should be applied throughout the compliance test respectively, however, only the worst case (Adapter1) will be recorded in this report.</p>	



### 3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**Test standards:**

**FCC CFR 47 Part 22H (2019)**

**ANSI C63.26 (2015)**

**Reference standard:**

**FCC CFR47 Part 2 (2019)**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**



## 4. Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions were investigated. Subsequently, only the worst case emissions are reported.

The following testing in GSM/WCDMA is set based on the maximum RF Output Power.

Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation	
	GSM 850	WCDMA Band V
RF Power Output and Effective Radiated power	GSM GPRS EGPRS	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
Occupied Bandwidth	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Band Edge Compliance	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Peak-to-Average Power Ratio	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Frequency Stability	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Spurious Emissions at Antenna Terminals	GSM	RMC
Radiates Spurious Emission	GSM	RMC

## 5. Test Case Results

### 5.1. RF Power Output and Effective Radiated Power

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

During the process of the testing, The EUT was connected to the Base Station Simulator with a known loss. The EUT is controlled by the Base Station Simulator test set to ensure max power transmission with proper modulation.

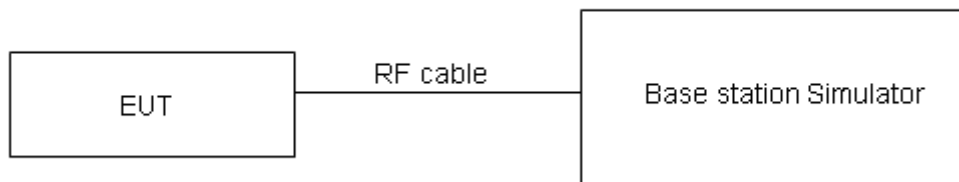
ERP can then be calculated as follows:

$$\text{EIRP (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$$

where:dBd refers to gain relative to an ideal dipole.

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15 \text{ (dB)}.$$

#### Test Setup



#### Limits

No specific RF power output requirements in part 2.1046.

Rule Part 22.913(a)(5) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	≤ 7 W (38.45 dBm)
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#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.4 \text{ dB}$  for RF power output,  $k = 2$ ,  $U = 1.19 \text{ dB}$  for ERP .

**Test Results**

GSM 850		Conducted Power (dBm)			ERP (dBm)		
		Channel 128	Channel 190	Channel 251	Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)	824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GSM	Results	32.37	32.38	32.35	26.72	26.73	26.70
GPRS/EGPRS (GMSK)	1TXslot	32.32	32.31	32.30	26.67	26.66	26.65
	2TXslots	30.81	30.76	30.75	25.16	25.11	25.10
	3TXslots	28.76	28.75	28.76	23.11	23.10	23.11
	4TXslots	27.75	27.77	27.73	22.10	22.12	22.08
EGPRS (8PSK)	1TXslot	28.05	27.64	27.68	22.40	21.99	22.03
	2TXslots	26.82	26.52	26.53	21.17	20.87	20.88
	3TXslots	24.53	24.34	24.35	18.88	18.69	18.70
	4TXslots	23.24	23.08	23.01	17.59	17.43	17.36

WCDMA Band V		Conducted Power (dBm)			ERP (dBm)		
		Channel 4132	Channel 4183	Channel 4233	Channel 4132	Channel 4183	Channel 4233
		826.4 (MHz)	836.6 (MHz)	846.6 (MHz)	826.4 (MHz)	836.6 (MHz)	846.6 (MHz)
RMC	12.2k	22.62	22.69	22.66	16.97	17.04	17.01
HSDPA	Sub - Test 1	22.08	22.11	22.10	16.43	16.46	16.45
	Sub - Test 2	22.07	22.13	22.07	16.42	16.48	16.42
	Sub - Test 3	21.54	21.63	21.59	15.89	15.98	15.94
	Sub - Test 4	21.55	21.64	21.57	15.90	15.99	15.92
HSUPA	Sub - Test 1	22.04	22.10	22.05	16.39	16.45	16.40
	Sub - Test 2	21.03	21.08	21.04	15.38	15.43	15.39
	Sub - Test 3	21.50	21.56	21.53	15.85	15.91	15.88
	Sub - Test 4	20.96	21.05	21.01	15.31	15.40	15.36
	Sub - Test 5	21.97	22.03	21.99	16.32	16.38	16.34
DC-HSDPA	Sub - Test 1	21.96	22.05	22.00	16.31	16.40	16.35
	Sub - Test 2	21.95	22.04	21.99	16.30	16.39	16.34
	Sub - Test 3	21.53	21.53	21.50	15.88	15.88	15.85
	Sub - Test 4	21.52	21.52	21.49	15.87	15.87	15.84
HSPA+	16QAM	21.51	21.60	21.56	15.86	15.95	15.91

## 5.2. Occupied Bandwidth

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

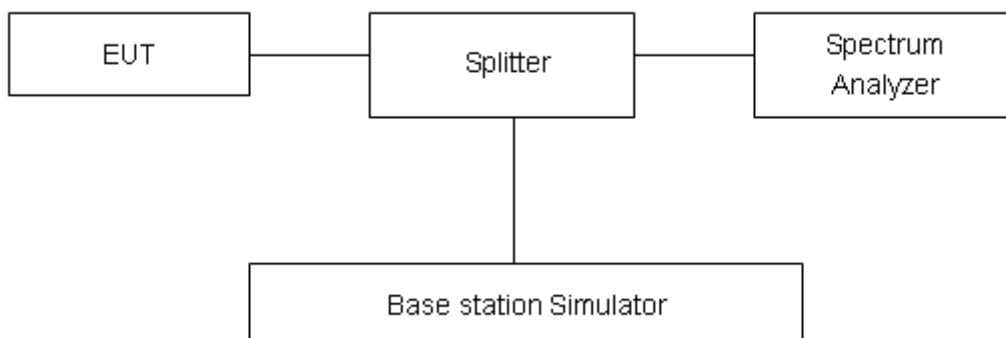
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 3kHz, VBW is set to 10kHz for GSM 850,

RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band V,

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

### Test Setup



### Limits

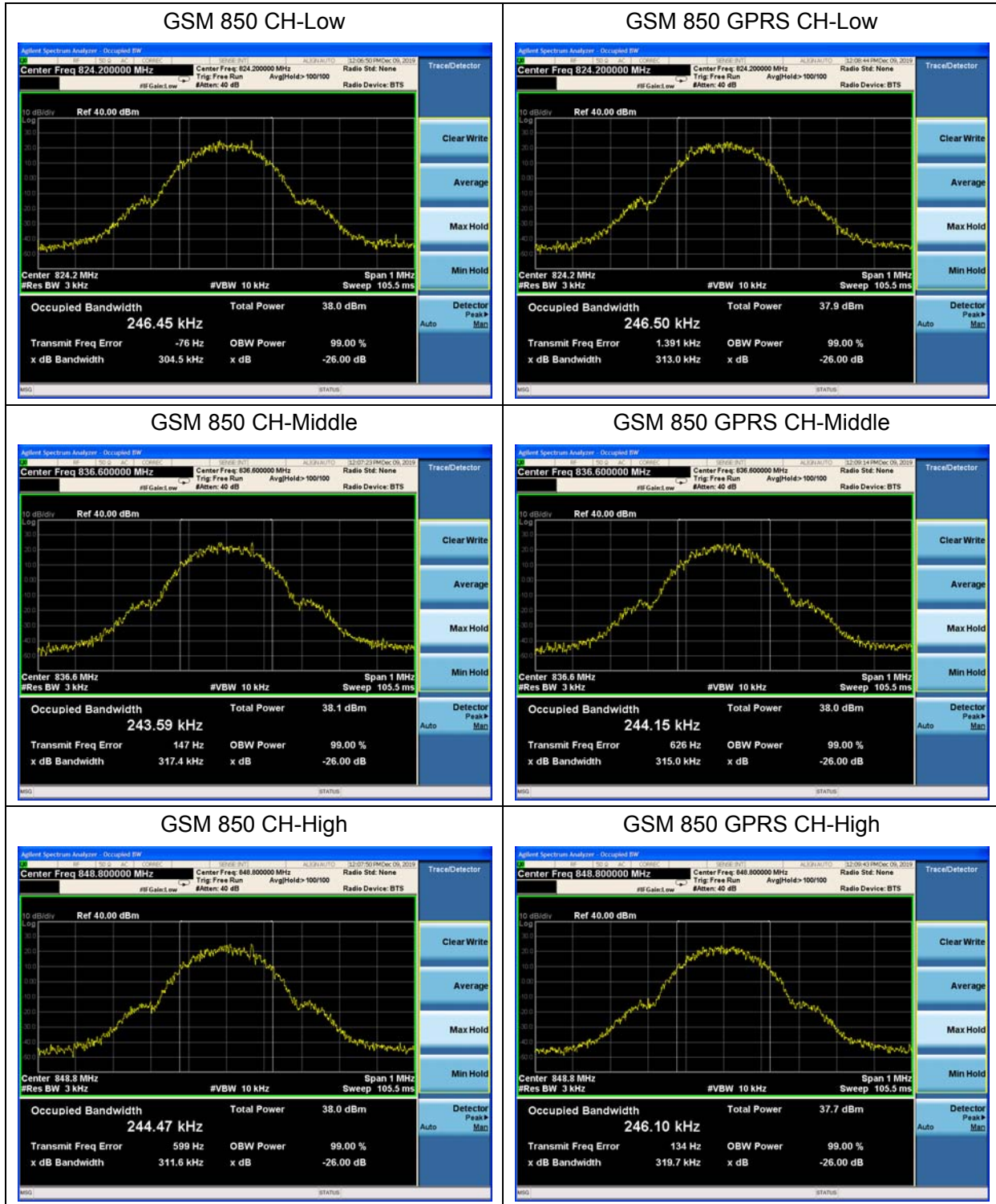
No specific occupied bandwidth requirements in part 2.1049.

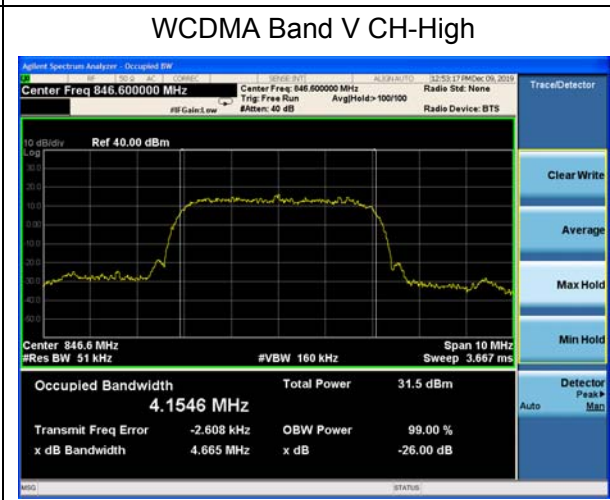
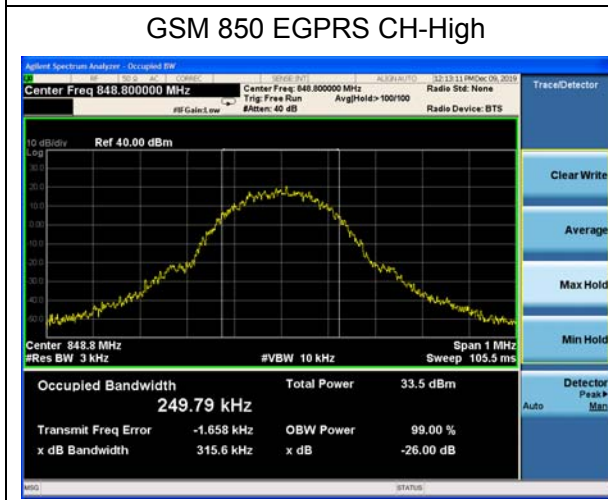
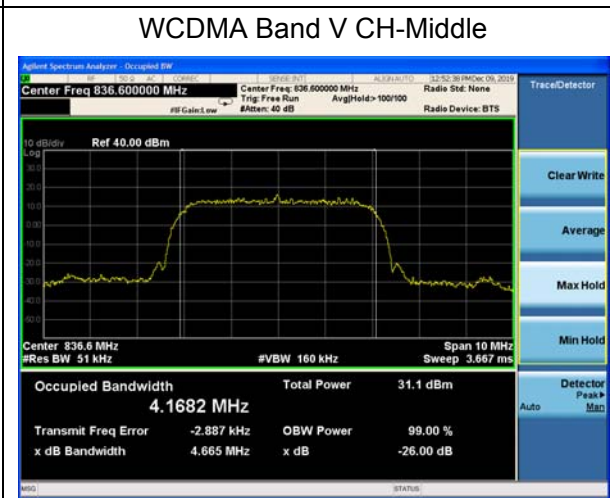
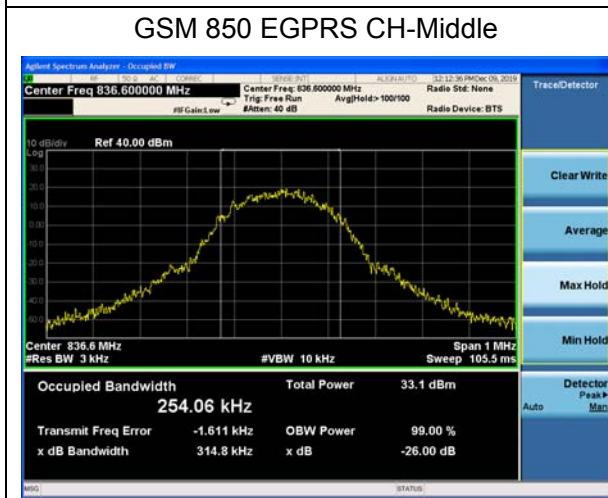
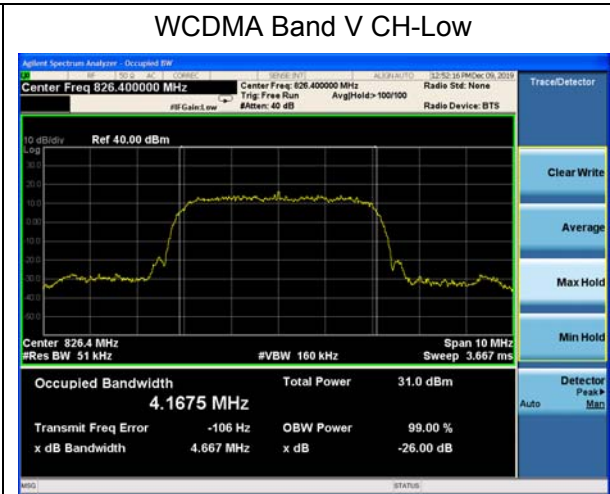
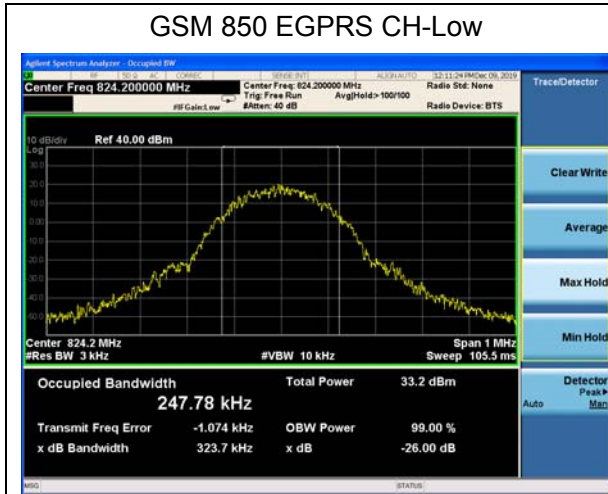
### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 624\text{Hz}$ .

**Test Result**

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
<b>GSM 850 (GSM)</b>	128	824.2	0.24665	0.3045
	190	836.6	0.24359	0.3174
	251	848.8	0.24447	0.3116
<b>GPRS 850 (GMSK)</b>	128	824.2	0.2465	0.313
	190	836.6	0.24415	0.315
	251	848.8	0.2461	0.3197
<b>EGPRS 850 (8-PSK)</b>	128	824.2	0.24778	0.3237
	190	836.6	0.25406	0.3148
	251	848.8	0.24979	0.3156
<b>WCDMA Band V (RMC)</b>	4132	826.4	4.1675	4.667
	4183	836.6	4.1682	4.665
	4233	846.6	4.1546	4.665





### 5.3. Band Edge Compliance

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

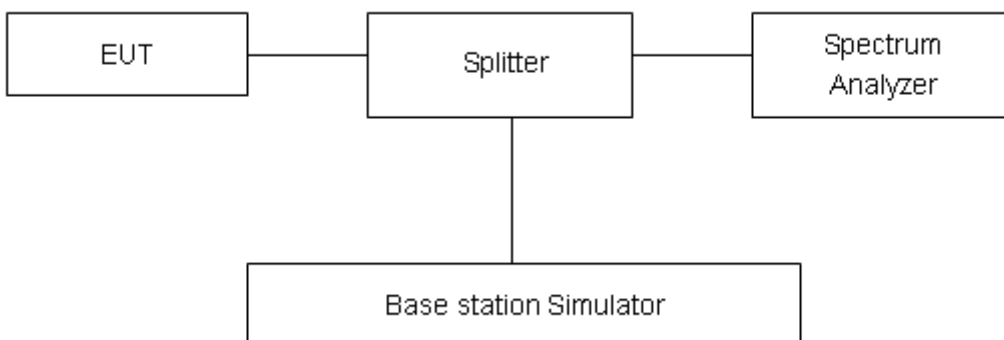
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used.

RBW is set to 3kHz,VBW is set to 10kHz for GSM 850,

RBW is set to 51kHz,VBW is set to 160kHz for WCDMA Band V,

Spectrum analyzer plots are included on the following pages.

#### Test Setup



#### Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm
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#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U=0.684$ dB.



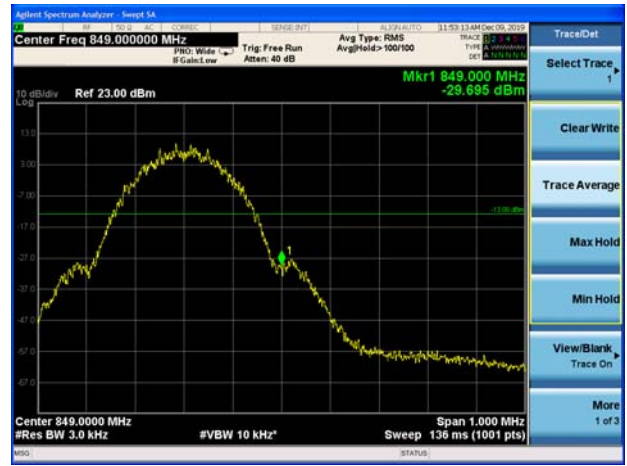


Test Result:

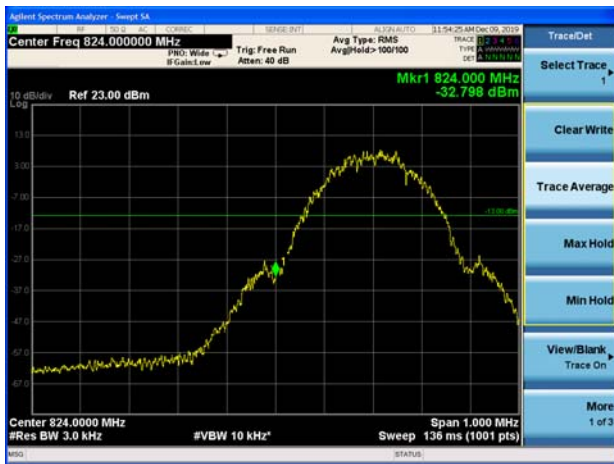
GSM 850 CH-Low



GSM 850 CH-High



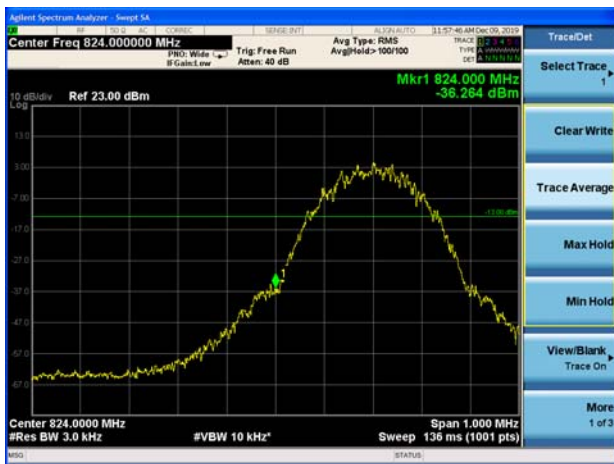
GSM 850 GPRS CH-Low



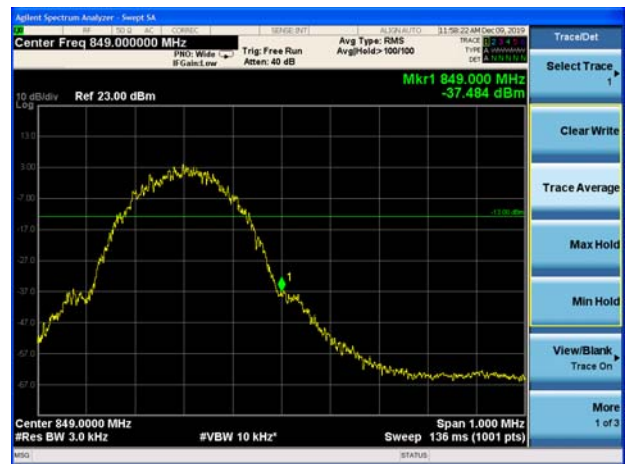
GSM 850 GPRS CH-High



GSM 850 EGPRS CH-Low

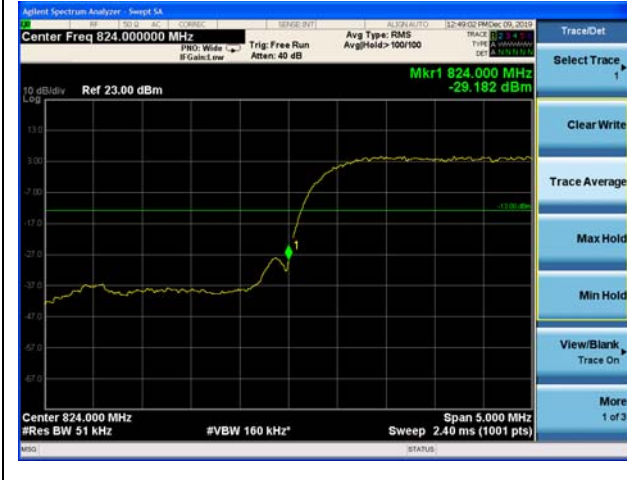


GSM 850 EGPRS CH-High





### WCDMA Band V CH-Low



### WCDMA Band V CH-High



### 5.4. Peak-to-Average Power Ratio (PAPR)

#### Ambient condition

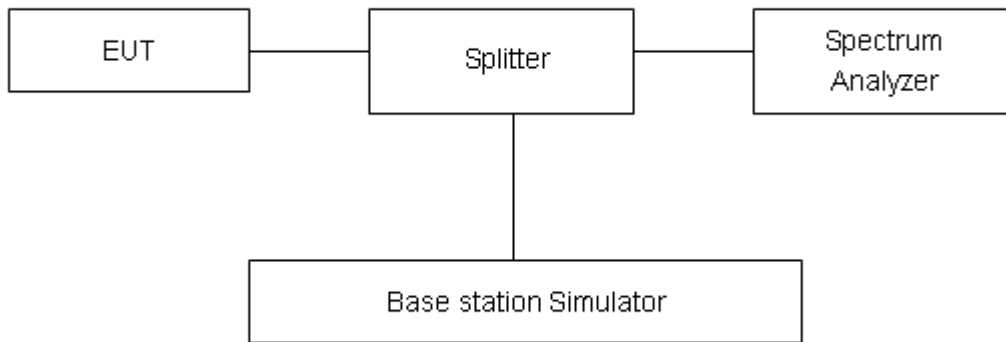
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

Measure the total peak power and record as  $P_{Pk}$ . And measure the total average power and record as  $P_{Avg}$ . Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm).$$

#### Test Setup



#### Limits

According to the Sec. 22.913(d), The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.4$  dB.

**Test Results**

Mode	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
<b>GSM 850 (GSM)</b>	128	824.2	33.83	32.37	1.46	≤13	PASS
	190	836.6	33.65	32.28	1.37	≤13	PASS
	251	848.8	33.89	32.35	1.54	≤13	PASS
<b>GPRS 850 (GMSK)</b>	128	824.2	33.81	32.32	1.49	≤13	PASS
	190	836.6	33.95	32.31	1.64	≤13	PASS
	251	848.8	33.82	32.30	1.52	≤13	PASS
<b>EGPRS 850 (8-PSK)</b>	128	824.2	30.81	28.05	2.76	≤13	PASS
	190	836.6	30.32	27.64	2.68	≤13	PASS
	251	848.8	30.51	27.68	2.83	≤13	PASS
<b>WCDMA Band V (RMC)</b>	4132	826.4	25.43	22.41	3.02	≤13	PASS
	4183	836.6	25.37	22.49	2.88	≤13	PASS
	4233	846.6	25.43	22.43	3.00	≤13	PASS

## 5.5. Frequency Stability

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

#### Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +55°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -30°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

#### Frequency Stability (Voltage Variation)

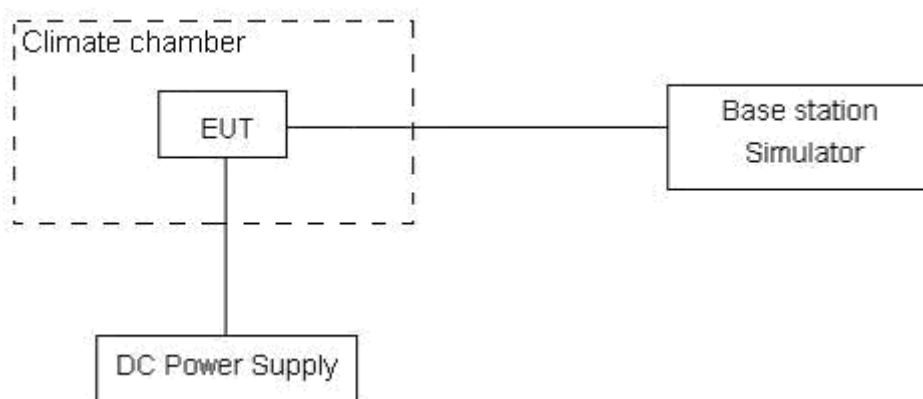
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.6 V and 4.35 V, with a nominal voltage of 3.8V.

### Test setup





## Limits

According to the Sec. 22.355, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency for mobile stations.

Limits	$\leq 2.5$ ppm
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## Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 3$ ,  $U = 0.01$  ppm.

**Test Result**

GSM850						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal (25°C)	Normal	4.88	15.94	0.00260	0.00848	PASS
Extreme (55°C)		12.18	5.94	0.00648	0.00316	PASS
Extreme (50°C)		8.30	4.78	0.00441	0.00255	PASS
Extreme (40°C)		14.48	8.24	0.00770	0.00438	PASS
Extreme (30°C)		15.63	9.03	0.00832	0.00481	PASS
Extreme (20°C)		4.47	13.04	0.00238	0.00694	PASS
Extreme (10°C)		12.36	3.56	0.00658	0.00189	PASS
Extreme (0°C)		5.19	12.84	0.00276	0.00683	PASS
Extreme (-10°C)		13.36	12.27	0.00711	0.00652	PASS
Extreme (-20°C)		9.88	15.22	0.00525	0.00810	PASS
Extreme (-30°C)		12.10	10.42	0.00643	0.00554	PASS
25°C	LV	14.41	1.11	0.00767	0.00059	PASS
	HV	10.10	5.54	0.00537	0.00295	PASS

WCDMA Band 5						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	QPSK	BPSK	QPSK	BPSK	
Normal (25°C)	Normal	14.80	17.04	0.00787	0.00906	PASS
Extreme (55°C)		2.64	1.72	0.00140	0.00092	PASS
Extreme (50°C)		4.52	5.98	0.00241	0.00318	PASS
Extreme (40°C)		10.19	15.45	0.00542	0.00822	PASS
Extreme (30°C)		12.28	6.50	0.00653	0.00346	PASS
Extreme (20°C)		1.89	15.17	0.00101	0.00807	PASS
Extreme (10°C)		12.04	16.79	0.00640	0.00893	PASS
Extreme (0°C)		4.13	8.74	0.00220	0.00465	PASS
Extreme (-10°C)		10.57	5.78	0.00562	0.00307	PASS
Extreme (-20°C)		6.81	8.21	0.00362	0.00437	PASS
Extreme (-30°C)		5.86	15.88	0.00312	0.00845	PASS
25°C	LV	2.51	7.18	0.00133	0.00382	PASS
	HV	12.20	15.34	0.00649	0.00816	PASS

## 5.6. Spurious Emissions at Antenna Terminals

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier.

The peak detector is used. RBW are set to 100 kHz and VBW are set to 300 kHz for below 1G, RBW are set to 1MHz and VBW are set to 3MHz for above 1G, Sweep is set to ATUO.

RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),

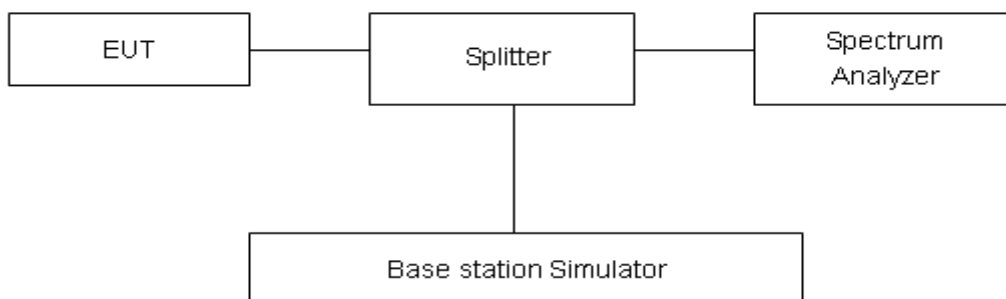
RBW is set to 10 kHz (0.15 MHz~ 30 MHz)

RBW is set to 100 kHz (30MHz~1000 MHz)

RBW is set to 1000 kHz (above 1000MHz)

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

### Test setup



### Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm
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### Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .





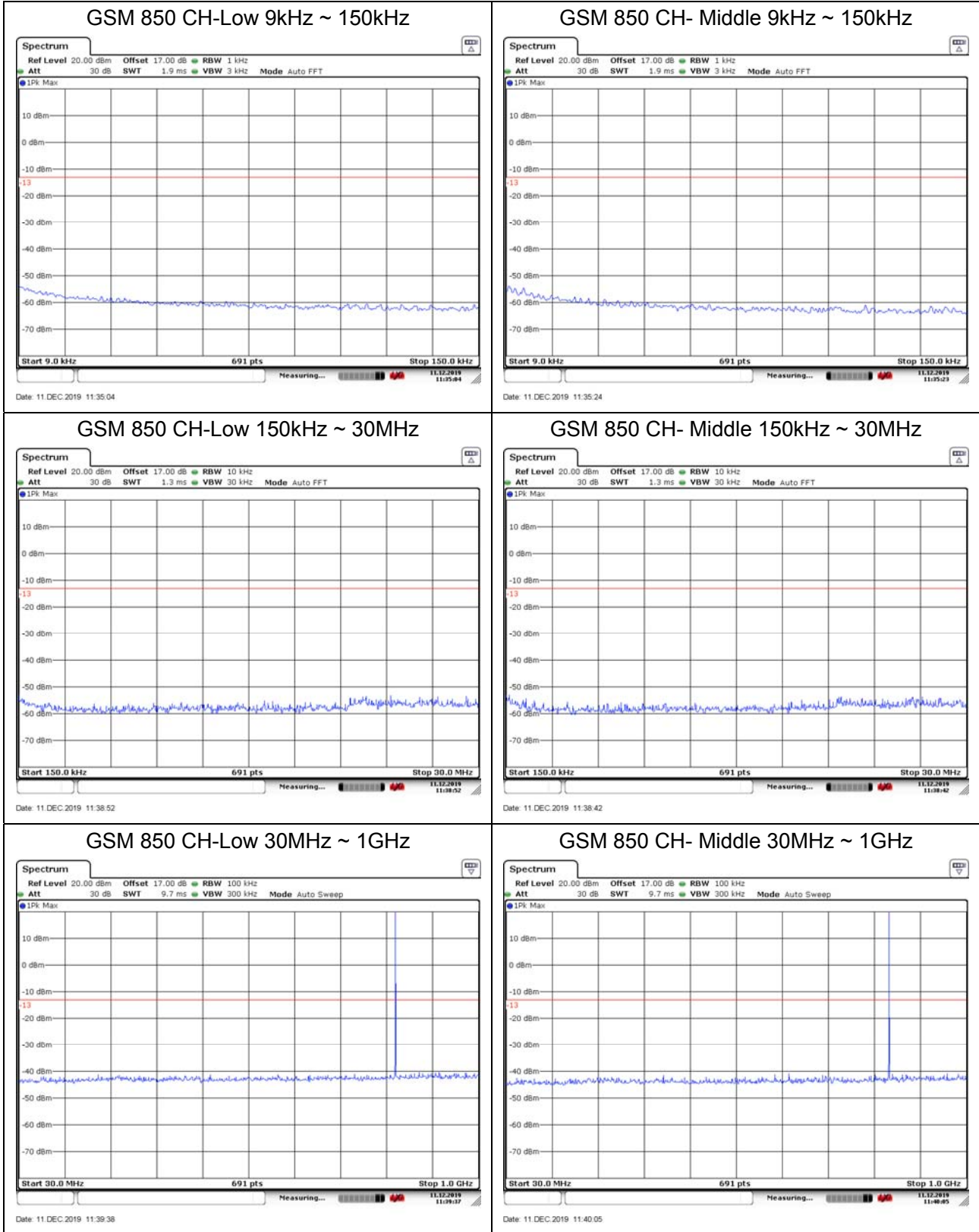
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-18GHz	1.407 dB



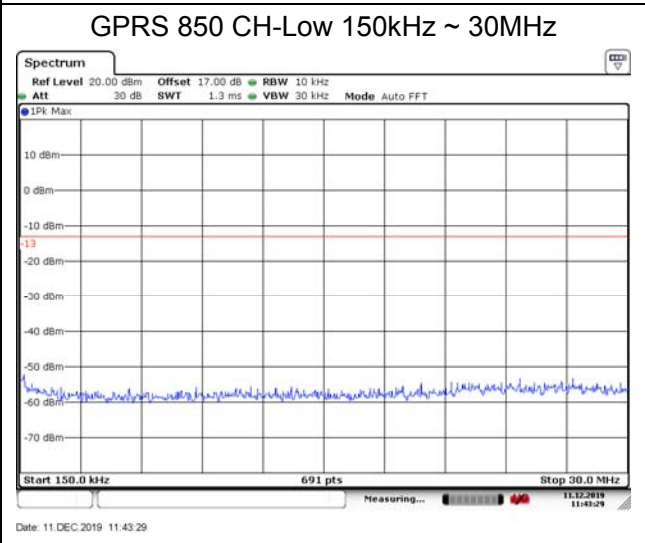
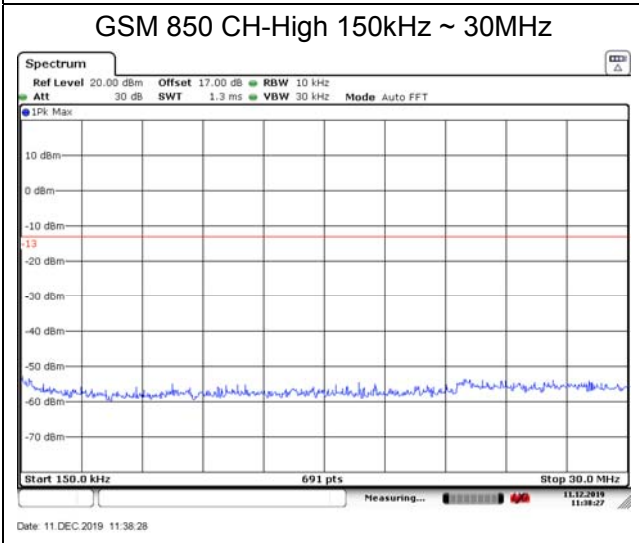
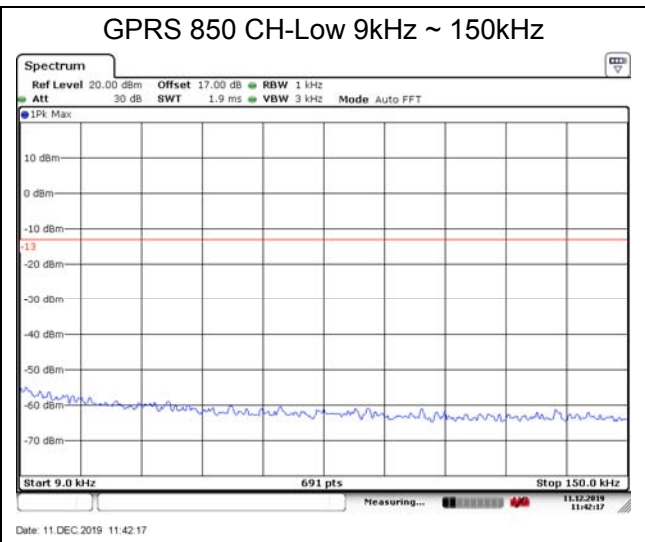
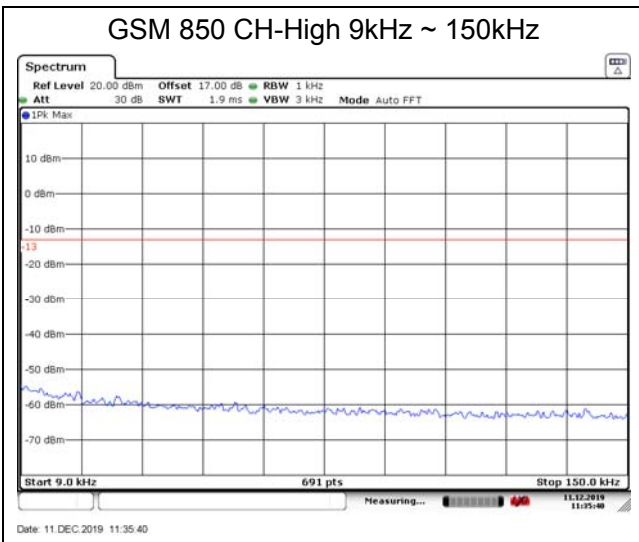
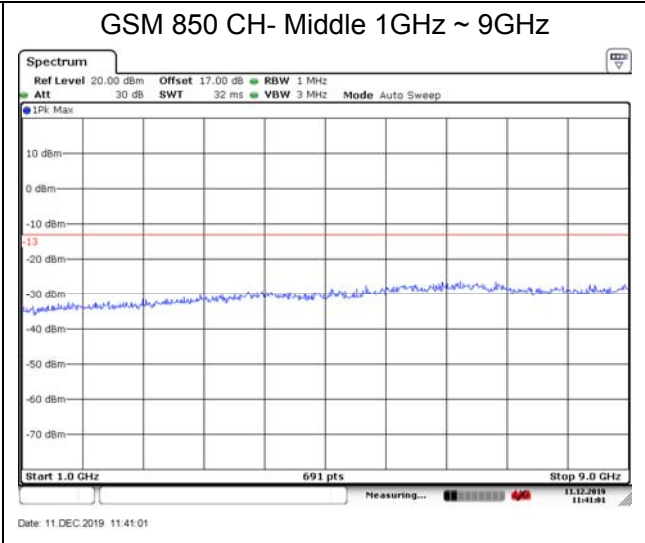
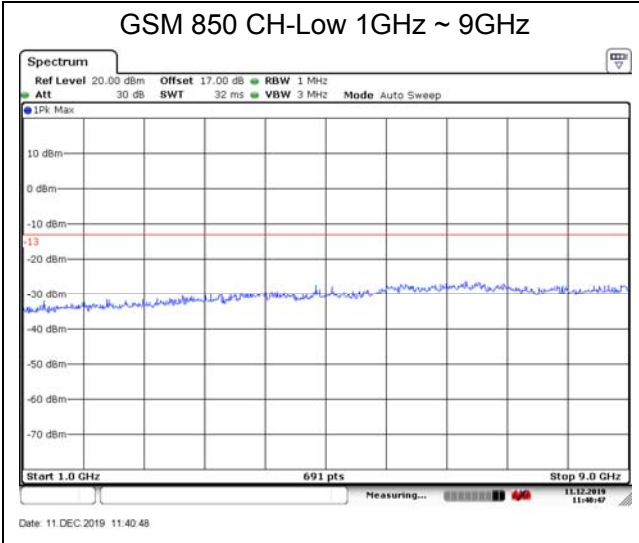
### Test Result

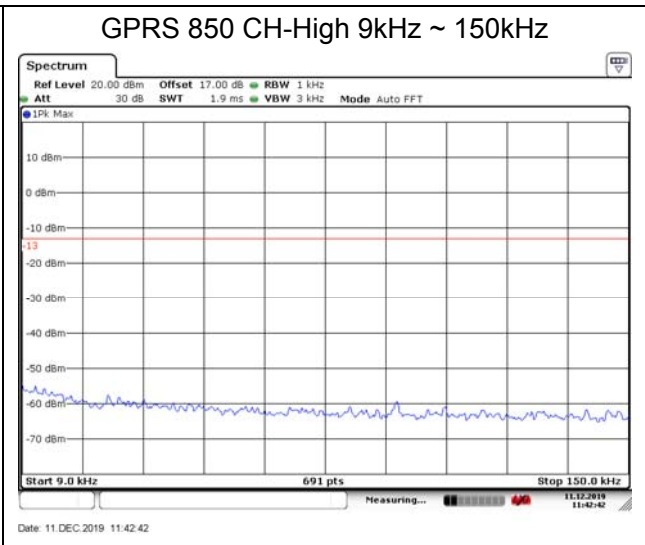
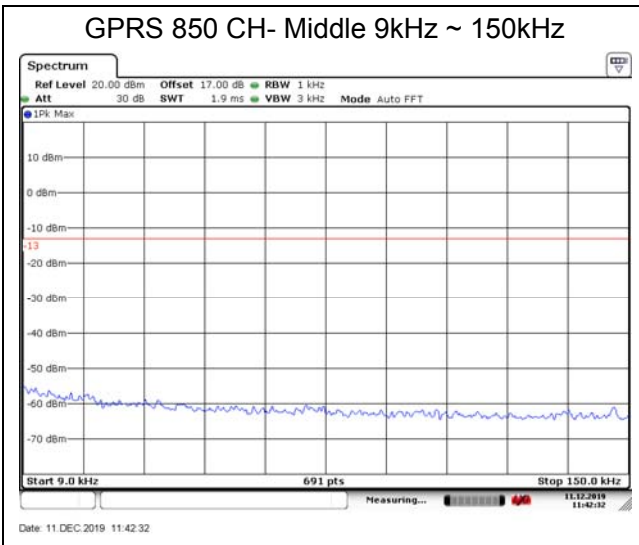
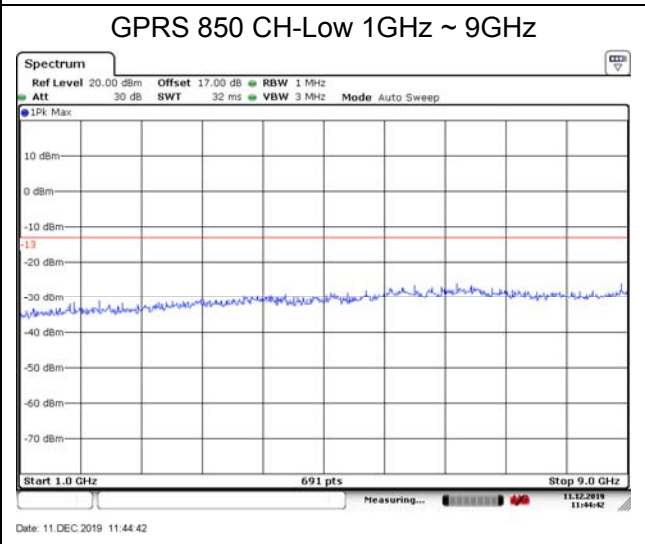
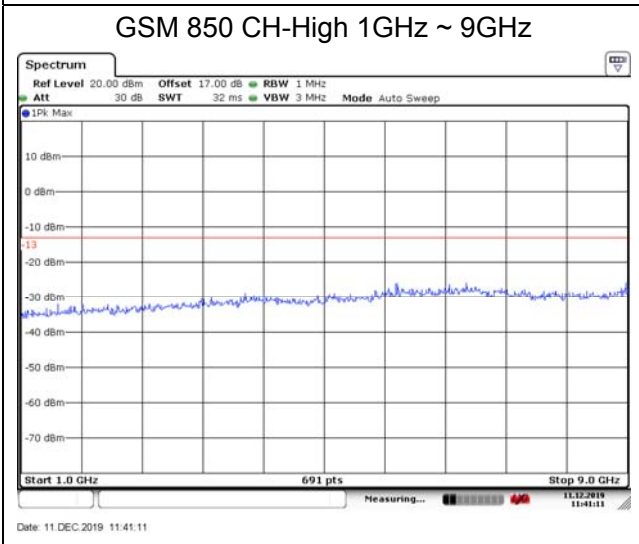
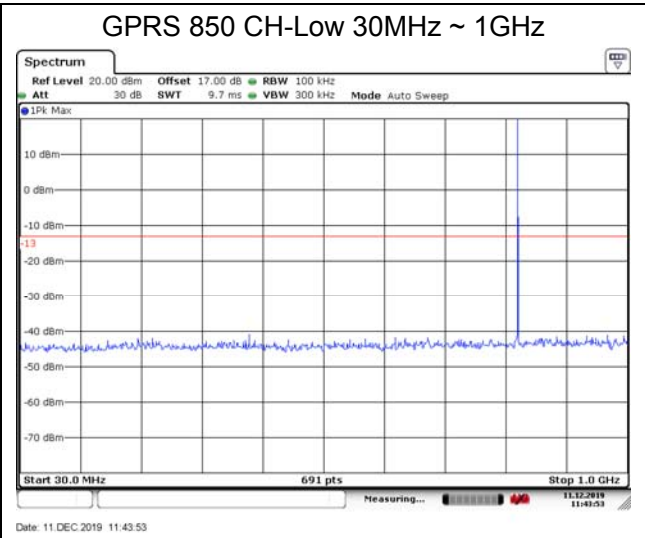
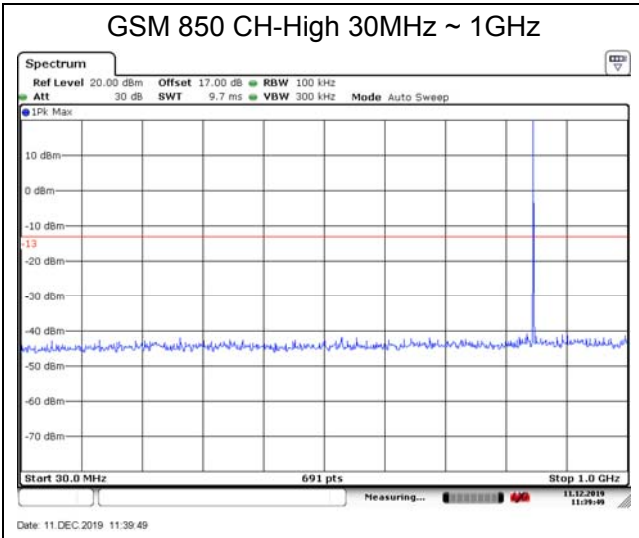
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

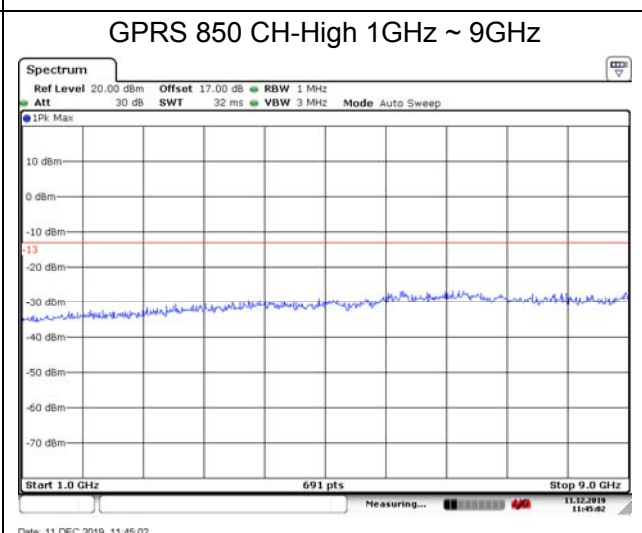
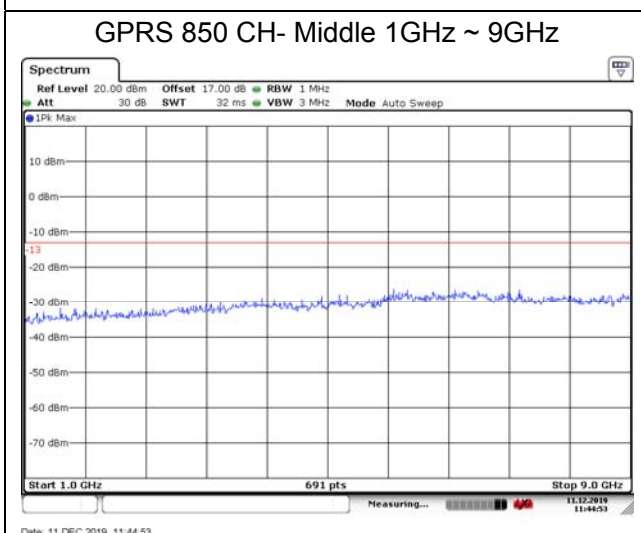
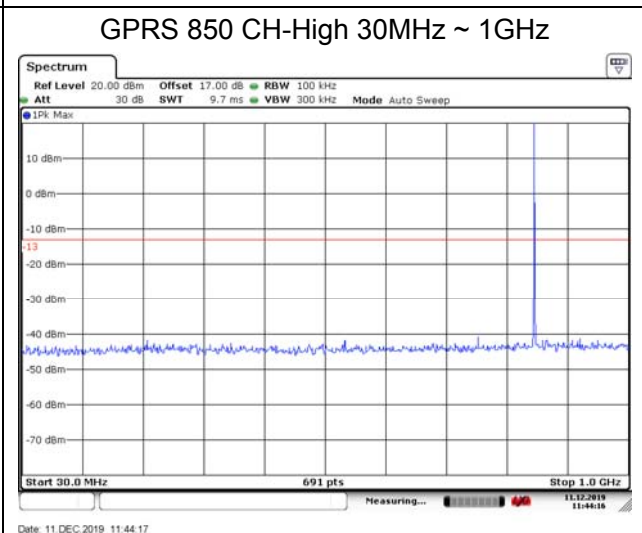
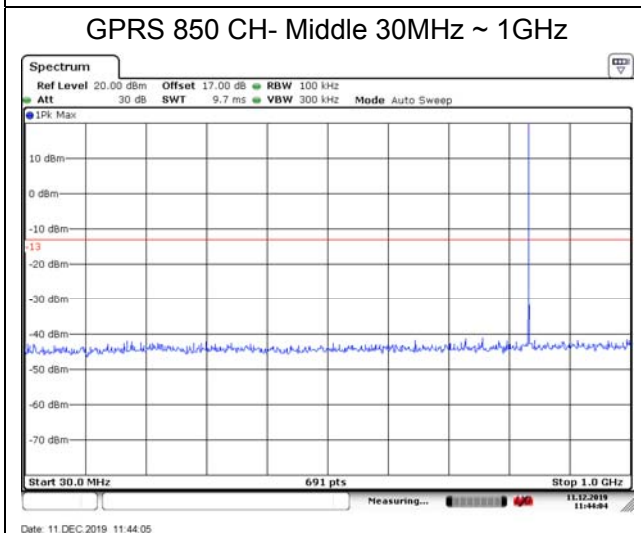
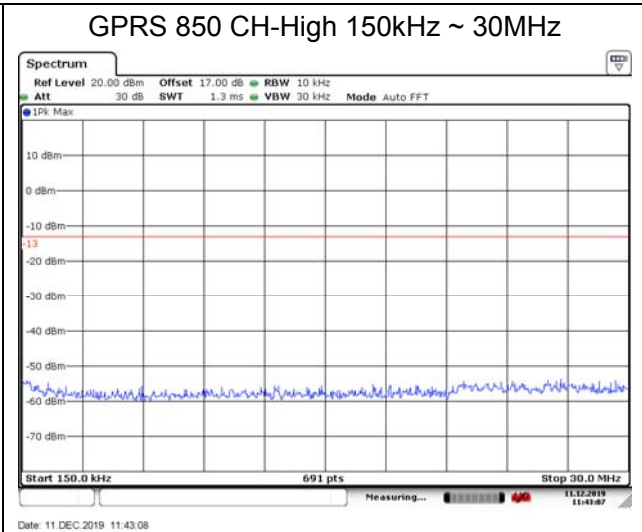
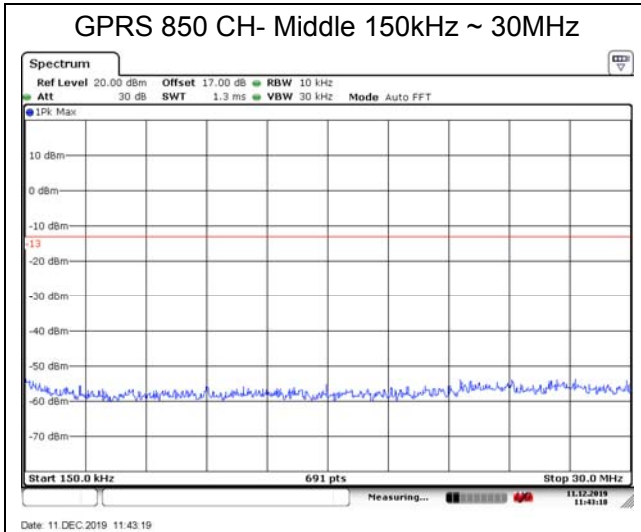
The signal beyond the limit is carrier.

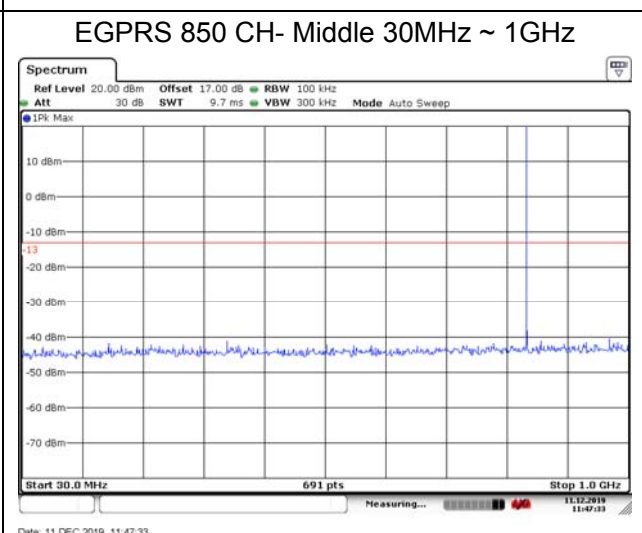
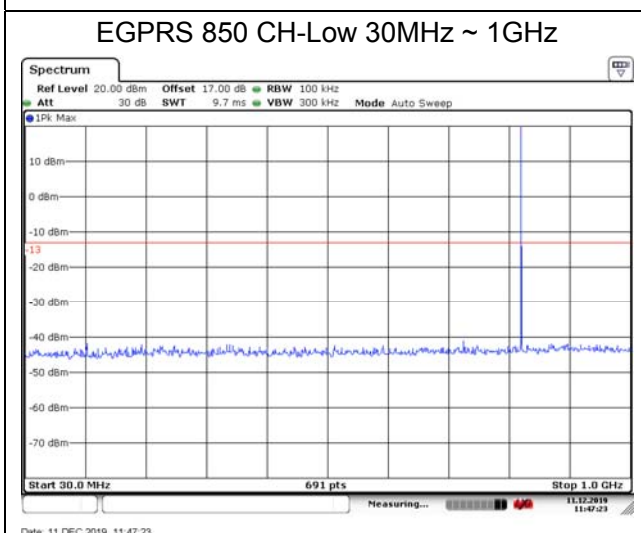
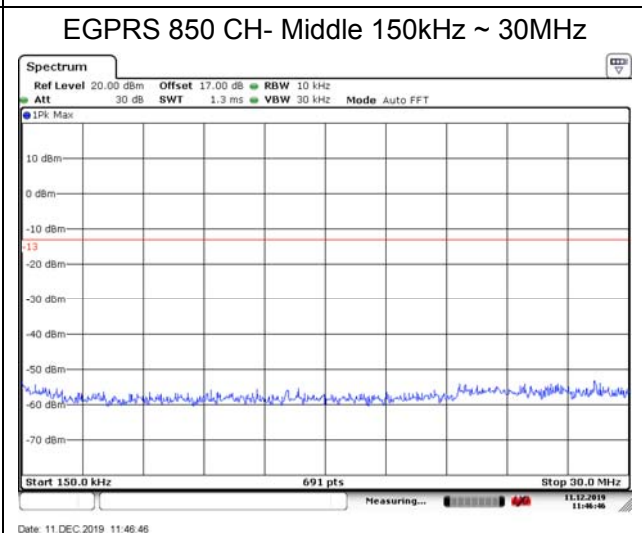
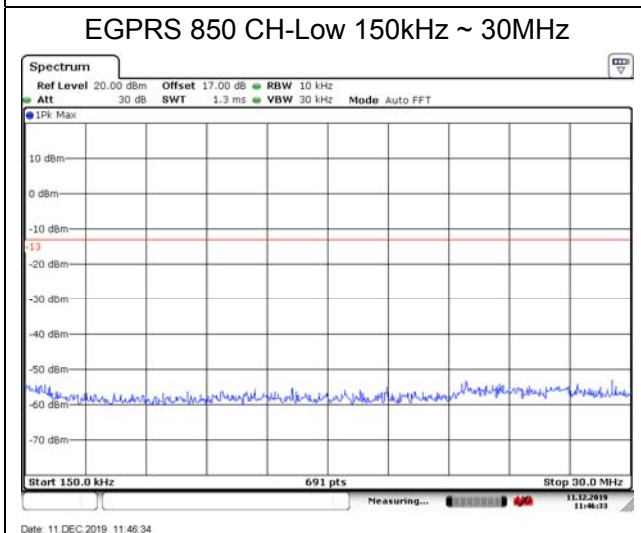
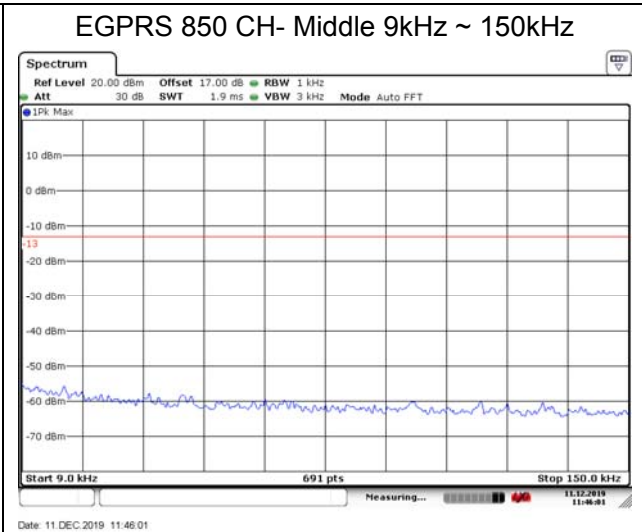
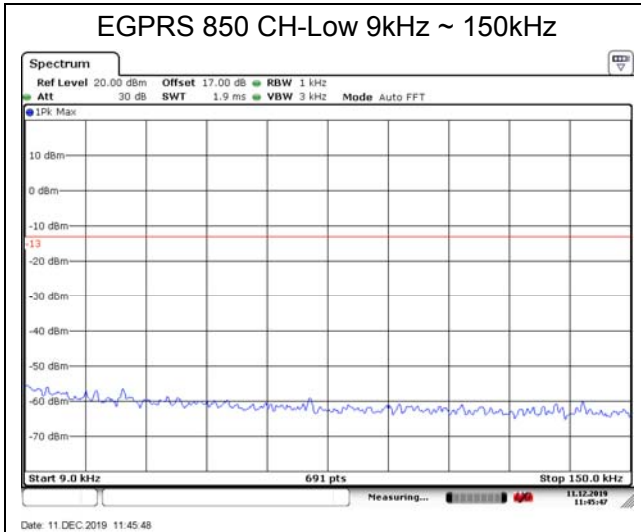




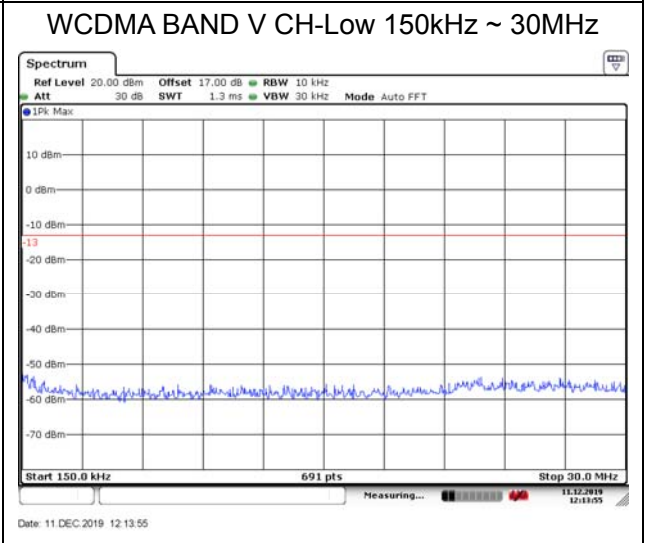
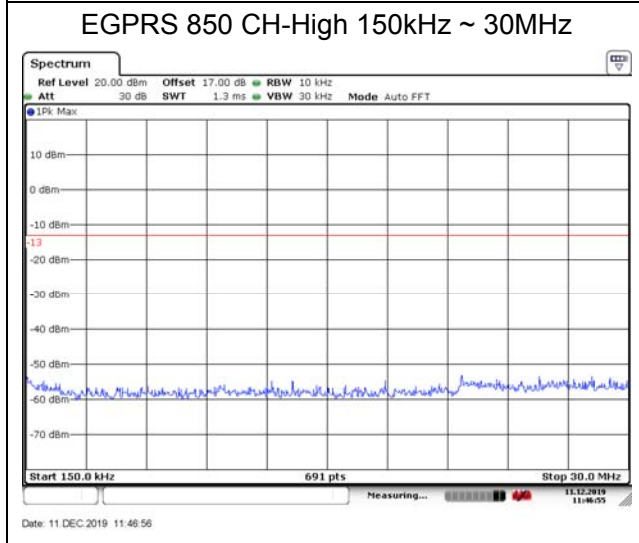
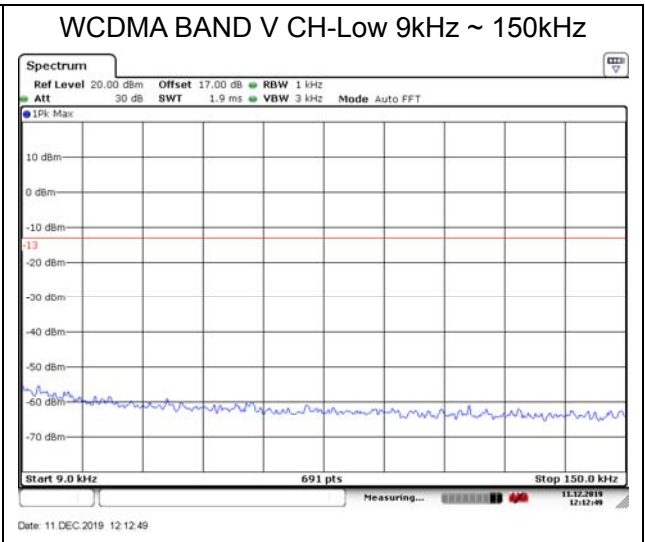
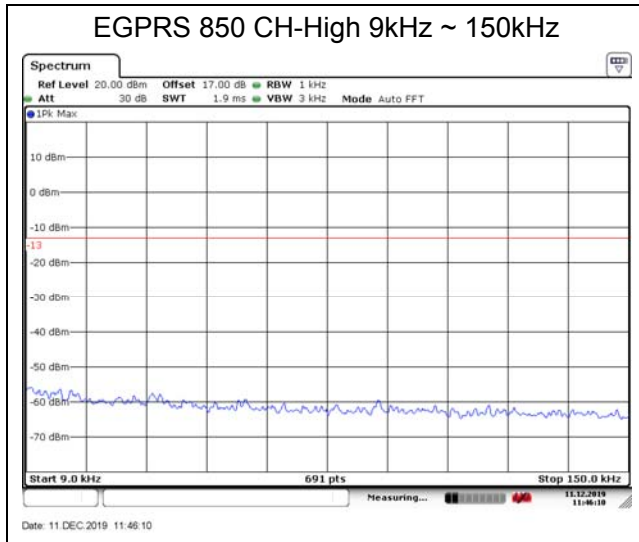
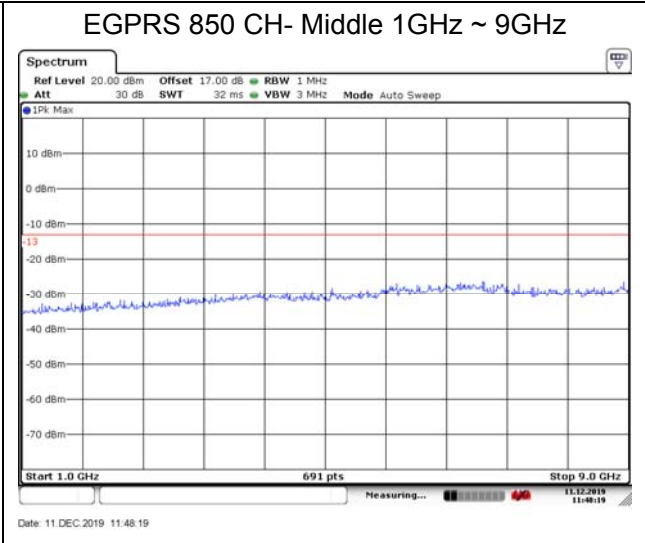
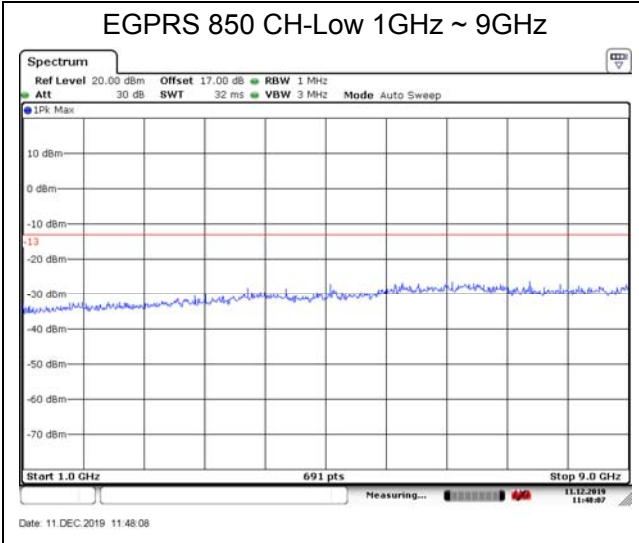




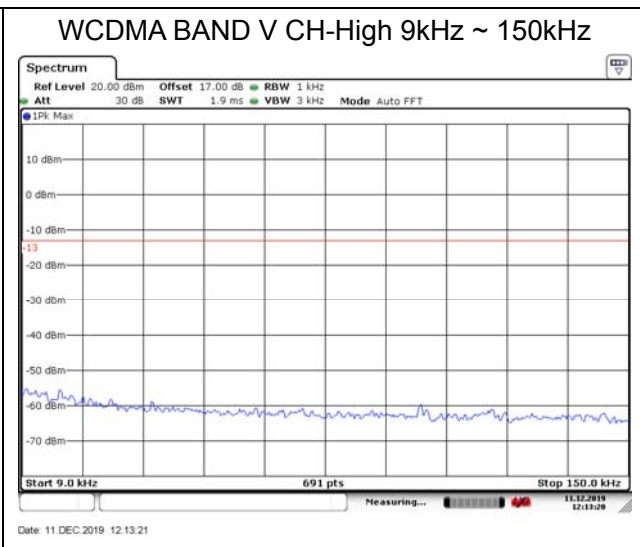
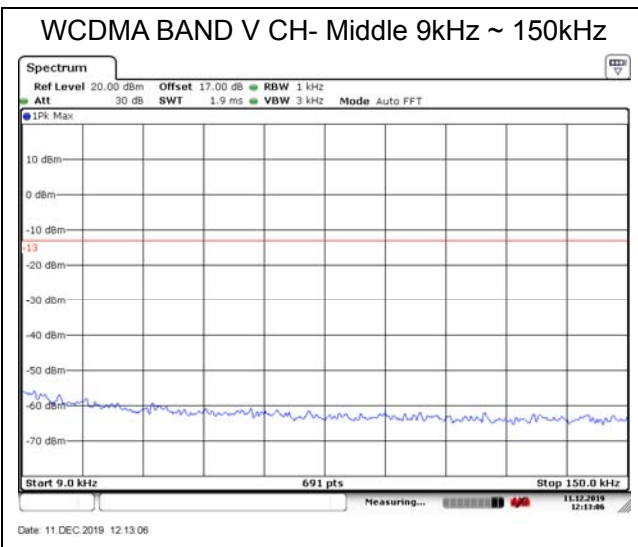
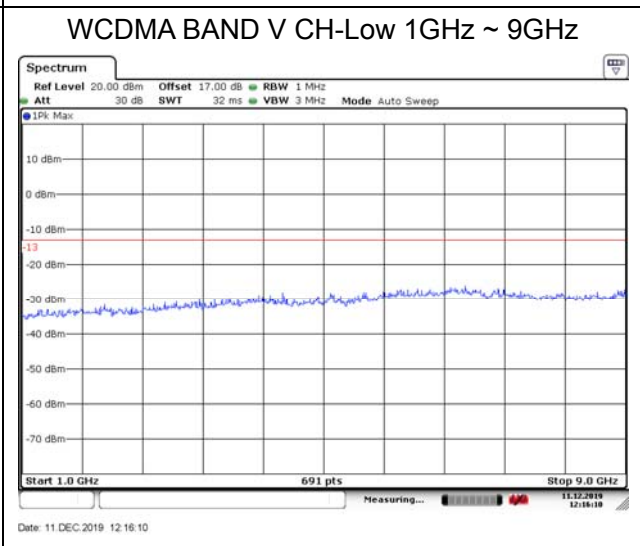
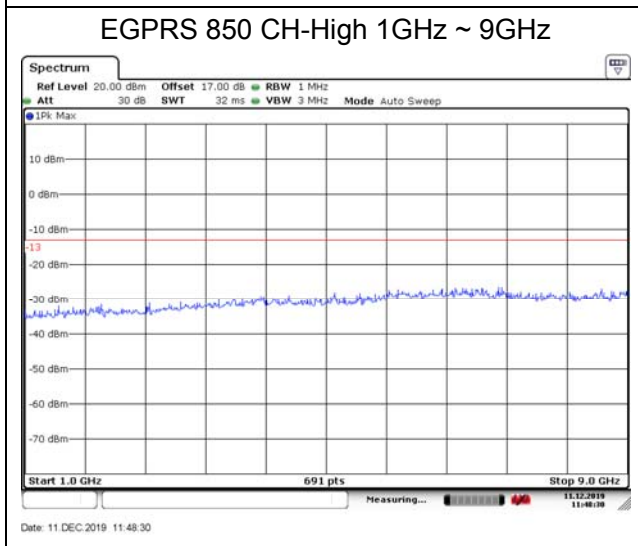
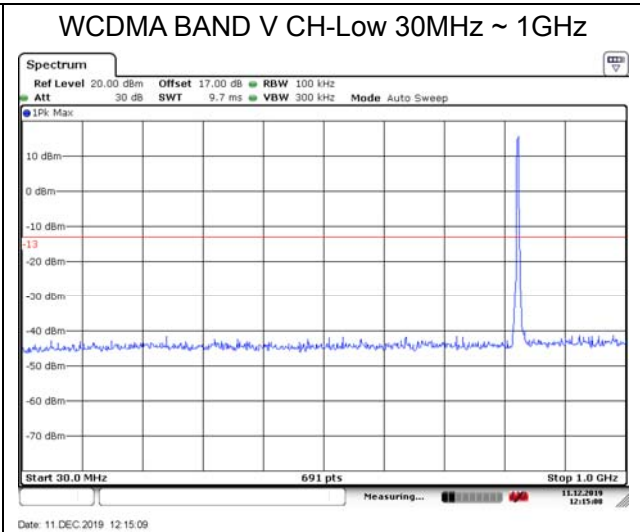
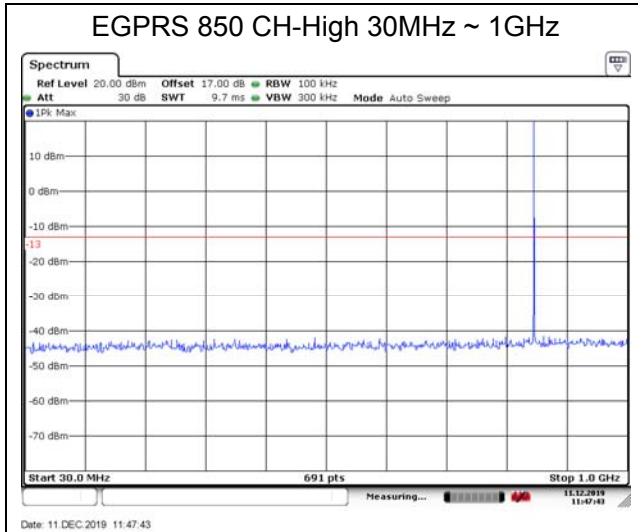






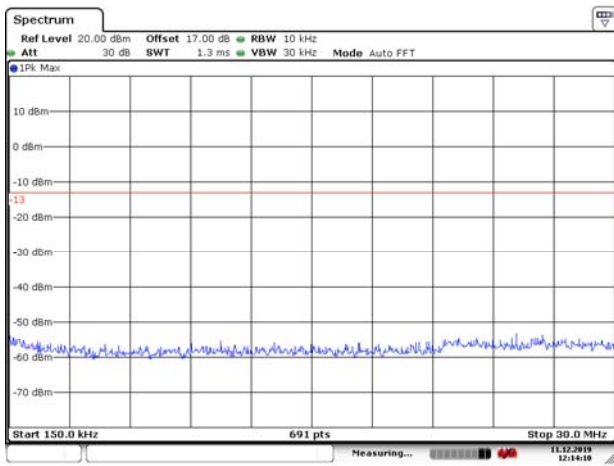




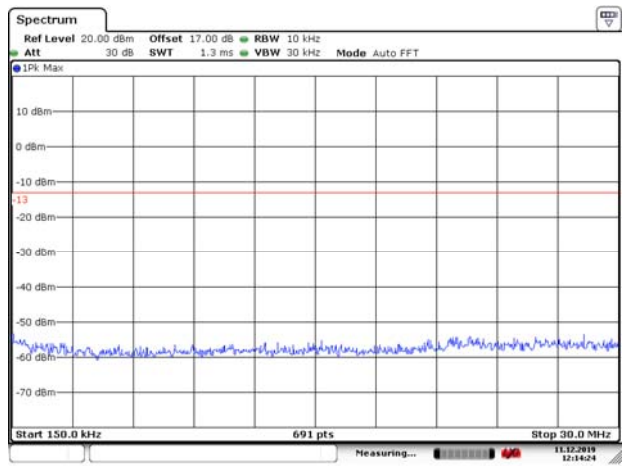




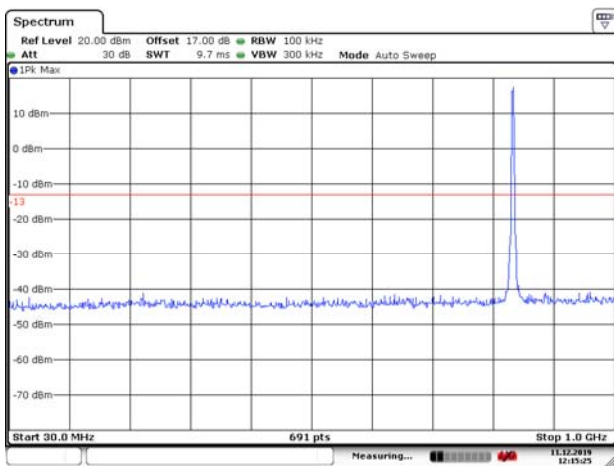
### WCDMA BAND V CH- Middle 150kHz ~ 30MHz



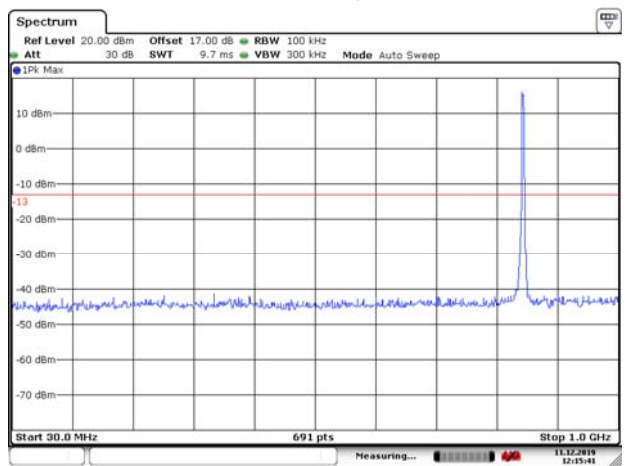
### WCDMA BAND V CH-High 150kHz ~ 30MHz



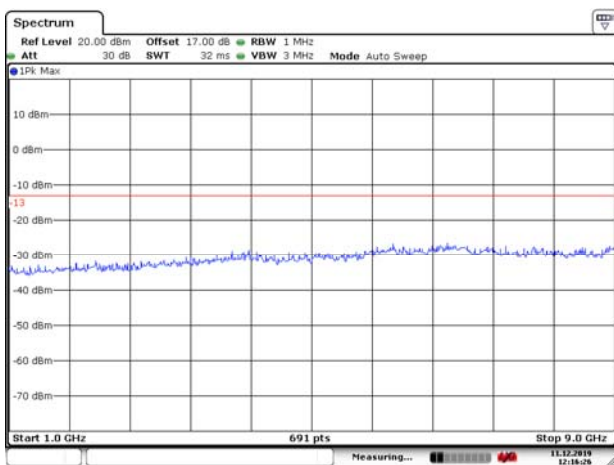
### WCDMA BAND V CH- Middle 30MHz ~ 1GHz



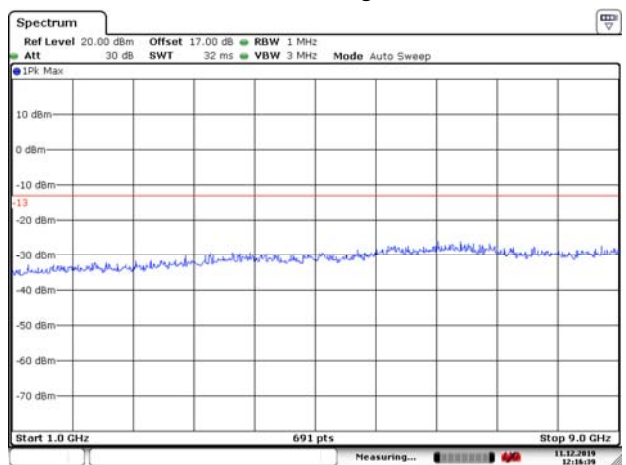
### WCDMA BAND V CH-High 30MHz ~ 1GHz



### WCDMA BAND V CH- Middle 1GHz ~ 9GHz



### WCDMA BAND V CH-High 1GHz ~ 9GHz



## 5.7. Radiates Spurious Emission

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

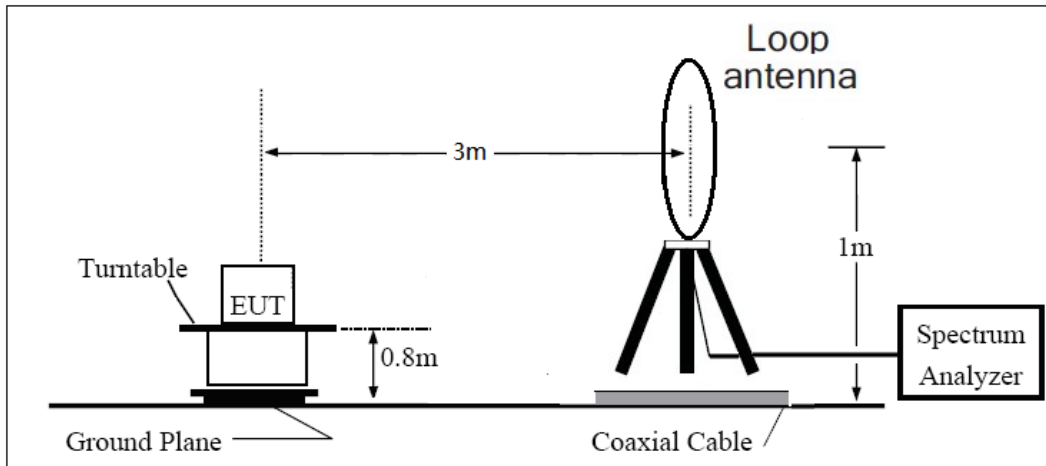
1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz-150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:  
Power(EIRP)=PMea- PAg - Pcl + Ga  
The measurement results are amend as described below:  
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

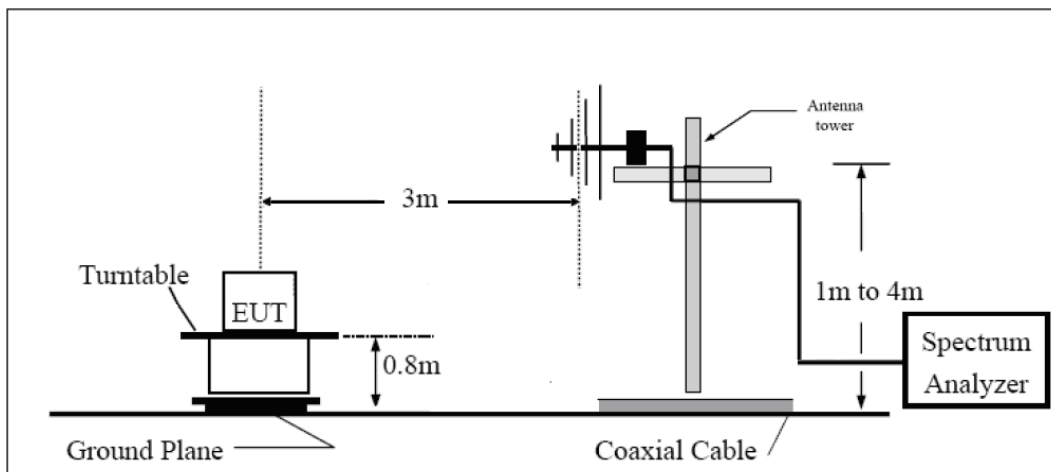
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

**Test setup**

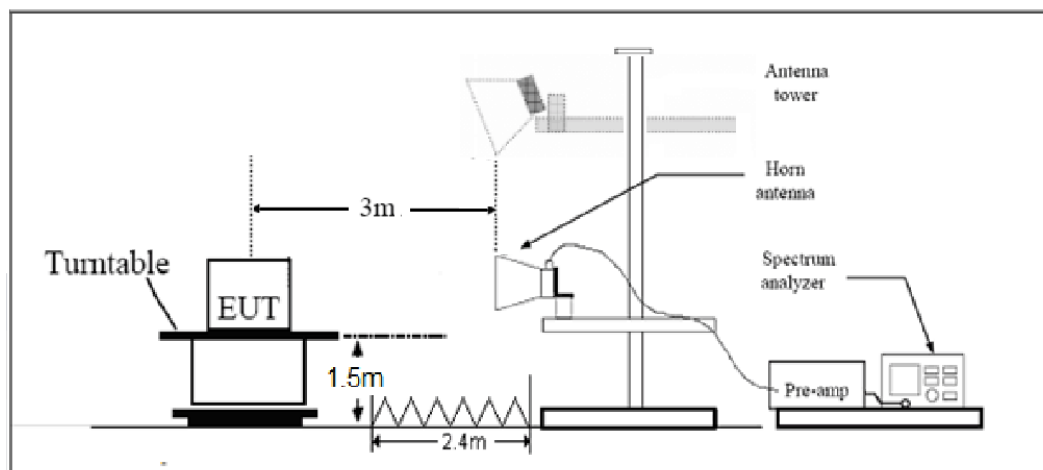
**9KHz ~ 30MHz**



**30MHz ~ 1GHz**



**Above 1GHz**





Note: Area side:2.4mX3.6m

**Limits**

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm
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**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 3.55$  dB.

**Test Result**

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

## GSM 850 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.2	-55.90	2.00	10.75	Horizontal	-49.30	-13.00	36.30	135
3	2509.8	-47.47	2.51	11.05	Horizontal	-41.08	-13.00	28.08	0
4	3346.4	-57.62	4.20	11.15	Horizontal	-52.82	-13.00	39.82	90
5	4183.0	-54.06	5.20	11.15	Horizontal	-50.26	-13.00	37.26	180
6	5019.6	-54.23	5.50	11.95	Horizontal	-49.93	-13.00	36.93	0
7	5856.2	-55.72	5.70	13.55	Horizontal	-50.02	-13.00	37.02	135
8	6692.8	-54.54	6.30	13.75	Horizontal	-49.24	-13.00	36.24	0
9	7529.4	-53.33	6.80	13.85	Horizontal	-48.43	-13.00	35.43	45
10	8366.0	-53.92	6.90	14.25	Horizontal	-48.72	-13.00	35.72	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

## WCDMA Band V CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.2	-65.01	2.00	10.75	Horizontal	-58.41	-13.00	45.41	270
3	2509.8	-62.51	2.51	11.05	Horizontal	-56.12	-13.00	43.12	0
4	3346.4	-57.44	4.20	11.15	Horizontal	-52.64	-13.00	39.64	135
5	4183.0	-54.69	5.20	11.15	Horizontal	-50.89	-13.00	37.89	180
6	5019.6	-54.50	5.50	11.95	Horizontal	-50.20	-13.00	37.20	45
7	5856.2	-57.04	5.70	13.55	Horizontal	-51.34	-13.00	38.34	180
8	6692.8	-55.03	6.30	13.75	Horizontal	-49.73	-13.00	36.73	45
9	7529.4	-54.04	6.80	13.85	Horizontal	-49.14	-13.00	36.14	90
10	8366.0	-53.96	6.90	14.25	Horizontal	-48.76	-13.00	35.76	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

## 6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-05-19	2020-05-18
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV30	100815	2019-12-15	2020-12-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2020-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Signal generator	R&S	SMB 100A	102594	2019-05-19	2020-05-18
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2019-05-19	2020-05-18
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2019-05-20	2020-05-21
RF Cable	Agilent	SMA 15cm	0001	2019-12-13	2020-06-12
Software	R&S	EMC32	9.26.0	/	/

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