



Test Report No.: W7L-P22010017-1RF01



# FCC TEST REPORT

## (PART 22)

Applicant:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Product:	Mobile Phone
Brand Name:	NOKIA
Model Name:	TA-1453
FCC ID:	2AJOTTA-1453
Date of tests:	Jan. 28, 2022 ~ Feb. 16, 2022

The tests have been carried out according to the requirements of the following standard:

- FCC PART 22, Subpart H       FCC Part 2
- ANSI/TIA/EIA-603-D       ANSI C63.26-2015
- ANSI/TIA/EIA-603-E

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Date: Feb. 16, 2022	Date: Feb. 16, 2022

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P22010017-1RF01	Original release	Feb. 16, 2022



# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2		
STANDARD SECTION	TEST TYPE	RESULT
§2.1046	Conducted Output Power	Compliance
§22.913 (a)	Effective Radiated Power	Compliance
§2.1055 §22.355	Frequency Stability	Compliance
§2.1049 §22.917 (b)	Occupied Bandwidth	Compliance
§22.913 (d)	Peak to average ratio*	Compliance
§22.917	Band Edge Measurements	Compliance
§2.1051 §22.917	Conducted Spurious Emissions	Compliance
§2.1053 §22.917	Radiated Spurious Emissions	Compliance

Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

Note: Except the data of RSE and power, other data please refer to APPENDIX.

## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Maximum Peak Output Power	±2.06dB
Frequency Stability	±76.97Hz
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Band Edge Measurements	±4.70dB
Peak to average ratio	±0.76dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



## 1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 22,21	Apr. 21,22
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Jun. 03,21	Jun. 02,22
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Aug. 19,21	Aug. 18,22
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Apr. 02,21	Apr. 01,22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 25,21	Feb. 24,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 03,21	Jun. 02,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 22,21	Apr. 21,22
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V 7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
Power Meter	Anritsu	ML2495A	1506002	Apr. 07,21	Apr. 06,22
Power Sensor	Anritsu	MA2411B	1339352	May. 07,21	May. 06,22
Temperature Chamber	ESPEC	SH-242	93000855	Jun. 02,21	Jun. 01,22
MXG Analog Microwave Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 05,21	Mar. 04,22
Power Divider	MCLI/USA	PS2-15	24880	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
  2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
  3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile Phone	
BRAND NAME	NOKIA	
MODEL NAME	TA-1453	
NOMINAL VOLTAGE	5.0Vdc(adapter or host equipment) 3.7Vdc (Li-ion, battery)	
MODULATION TYPE	GSM	GMSK
FREQUENCY RANGE	GSM	824.2MHz ~ 848.8MHz
MAX. ERP POWER	GSM	650.13mW
EMISSION DESIGNATOR GOGN	GSM	246KGXW
ANTENNA TYPE	PIFA Antenna with -2.27dBi gain for GSM850	
HW VERSION	MM61101	
SW VERSION	00.04.10	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	
EXTREME TEMPERATURE	-20-60 °C	
EXTREME VOLTAGE	3.6V - 4.2V	

**NOTE:**

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
GSM	1TX/1RX

- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



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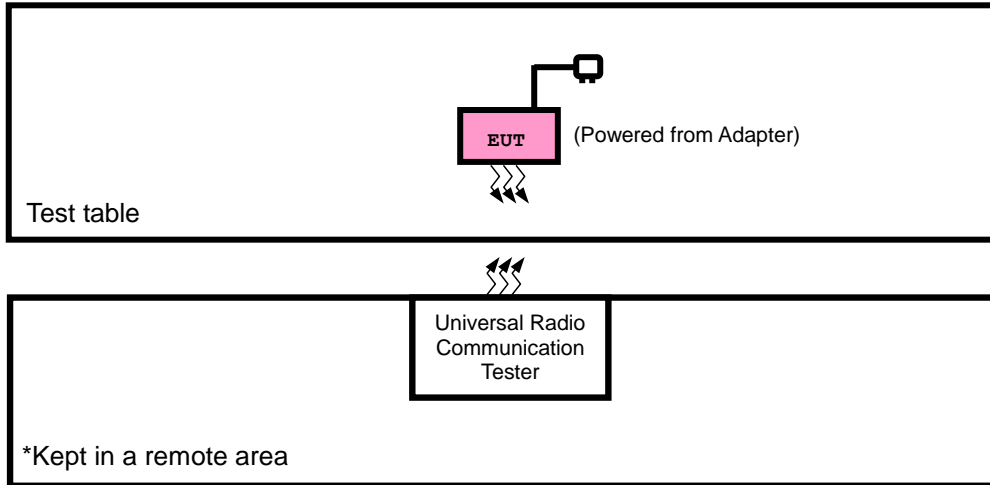
**List of Accessory:**

<b>ACCESSORIES</b>	<b>BRAND</b>	<b>MANUFACTURER</b>	<b>MODEL</b>	<b>SPECIFICATION</b>
Battery 1	Nokia	Andefeng	BL-L5G	Capacity: 3.7 Vdc, 800mAh
Battery 2	Nokia	Fenghua	BL-L5G	Capacity: 3.7 Vdc, 800mAh
AC Adapter 1	Nokia	Baijunda	AC-18U	I/P: 100-240Vac, 100mA, O/P: 5.0Vdc, 550mA





## 2.2 CONFIGURATION OF SYSTEM UNDER TEST FOR RADIATION EMISSION





### 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	Kikusui/JP	PMX18-5A	0000001	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

### 2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case in ERP and radiated emission was found when positioned on X-plane for GSM. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter with GSM link
B	EUT + Battery with GSM link



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### GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	ERP	128 to 251	128, 189, 251	GSM
B	FREQUENCY STABILITY	128 to 251	128, 189, 251	GSM
A	OCCUPIED BANDWIDTH	128 to 251	128, 189, 251	GSM
A	BAND EDGE	128 to 251	128, 251	GSM
A	CONDCUDETED EMISSION	128 to 251	128, 189, 251	GSM
A	RADIATED EMISSION	128 to 251	128, 189, 251	GSM
A	PEAK TO AVERAGE RATIO	128 to 251	128, 189, 251	GSM



**TEST CONDITION:**

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 5V By Adapter	Jace Hu
FREQUENCY STABILITY	23deg. C, 70%RH	3.6/3.7/4.2V By Battery	James Fu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC5V By Adapter	James Fu
BAND EDGE	23deg. C, 70%RH	DC 5V By Adapter	James Fu
CONDCUDED EMISSION	23deg. C, 70%RH	DC5V By Adapter	James Fu
RADIATED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Jace Hu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC5V By Adapter	James Fu

**2.5 EUT OPERATING CONDITIONS**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency



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## 2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

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

**ANSI/TIA/EIA-603-D**

**ANSI/TIA/EIA-603-E**

**ANSI C63.26-2015**

**NOTE:** All test items have been performed and recorded as per the above standards.

### 3 TEST TYPES AND RESULTS

#### 3.1 OUTPUT POWER MEASUREMENT

##### 3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile / Portable station are limited to 7 watts e.r.p.

##### 3.1.2 TEST PROCEDURES

###### **EIRP / ERP MEASUREMENT:**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_{\text{T}} - L_{\text{C}}$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as  $P_{\text{Meas}}$ , typically dBW or dBm);

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

$G_{\text{T}}$  = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

$L_{\text{C}}$  = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

###### **CONDUCTED POWER MEASUREMENT:**

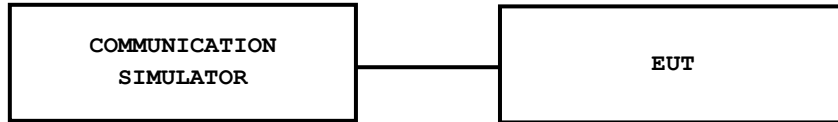
The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.



### 3.1.3 TEST SETUP

**EIRP / ERP Measurement:**

**CONDUCTED POWER MEASUREMENT:**



### 3.1.4 TEST RESULTS

**CONDUCTED OUTPUT POWER (dBm)**

Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	32.43	32.51	32.55



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**ERP POWER (dBm)**

**GSM**

Channel	Frequency (MHz)	Conducted Power (dBm)	G <sub>T</sub> -L <sub>c</sub> (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.43	-2.27	28.01	632.41	7
189	836.4	32.51	-2.27	28.09	644.17	7
251	848.8	32.55	-2.27	28.13	650.13	7

**REMARKS:** ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).



## 3.2 FREQUENCY STABILITY MEASUREMENT

### 3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

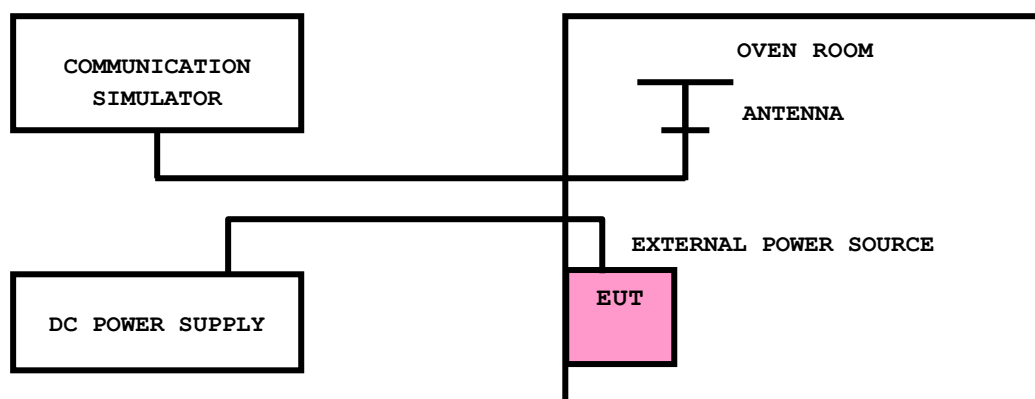
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 3.2.2 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

### 3.2.3 TEST SETUP





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### 3.2.4 TEST RESULTS

Please Refer to Appendix Of this test report.

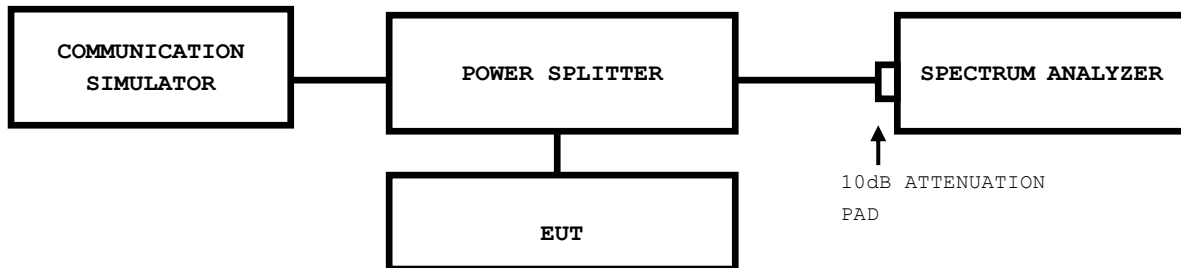


### 3.3 OCCUPIED BANDWIDTH MEASUREMENT

#### 3.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

#### 3.3.2 TEST SETUP





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### 3.3.3 TEST RESULTS

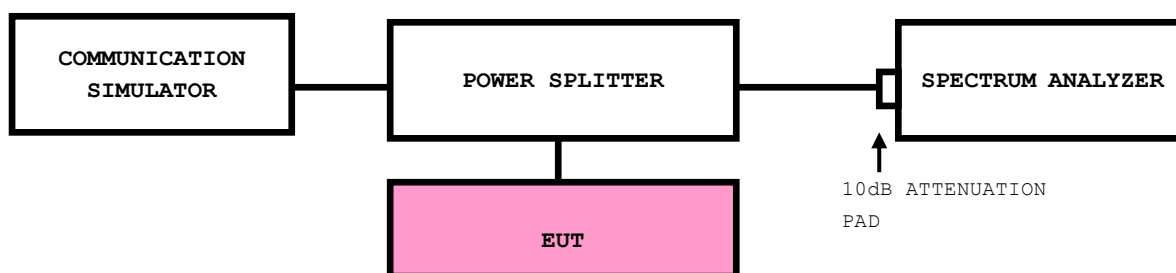
Please Refer to Appendix Of this test report.

### 3.4 BAND EDGE MEASUREMENT

#### 3.4.1 LIMITS OF BAND EDGE MEASUREMENT

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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

#### 3.4.2 TEST SETUP





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### 3.4.3 TEST PROCEDURES

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz.  
RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM).
- c. Record the max trace plot into the test report.



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### 3.4.4 TEST RESULTS

Please Refer to Appendix Of this test report.

### 3.5 CONDUCTED SPURIOUS EMISSIONS

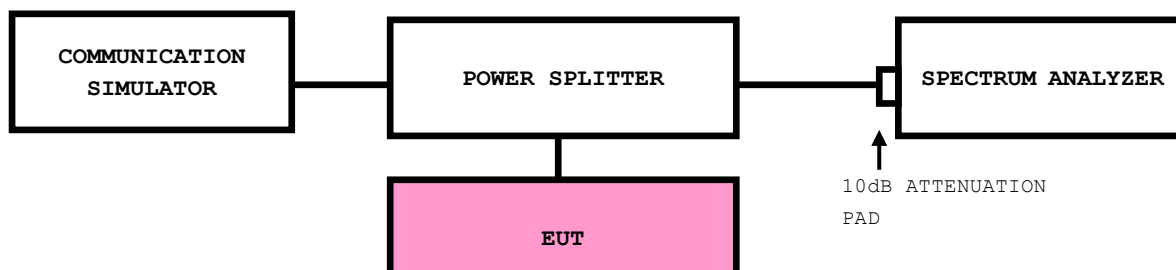
#### 3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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. The emission limit equal to  $-13\text{dBm}$ .

#### 3.5.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30MHz up to a frequency including its 10<sup>th</sup> harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

#### 3.5.3 TEST SETUP







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### 3.5.4 TEST RESULTS

Please Refer to Appendix Of this test report.



### 3.6 RADIATED EMISSION MEASUREMENT

#### 3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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. The emission limit equal to  $-13\text{dBm}$ .

#### 3.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}$ .

**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

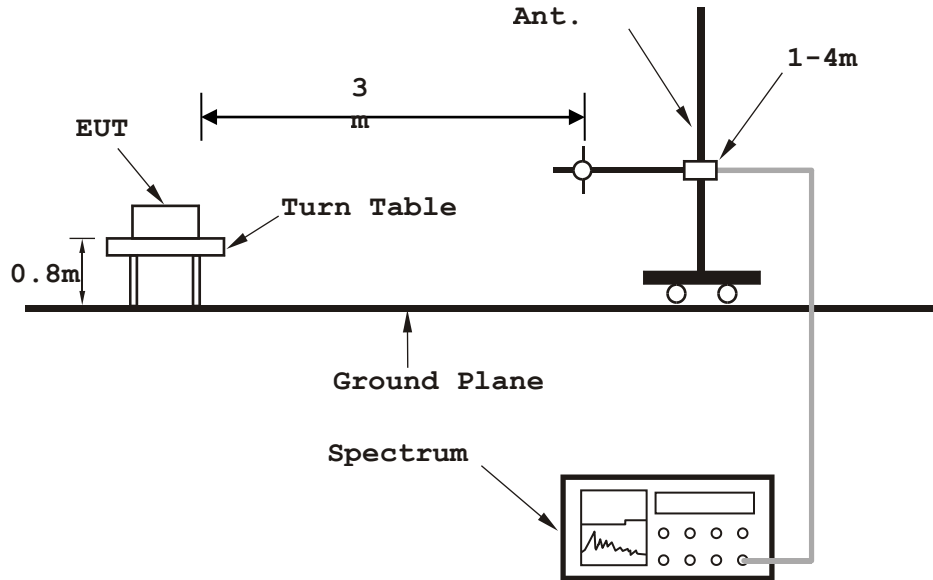
#### 3.6.3 DEVIATION FROM TEST STANDARD

No deviation

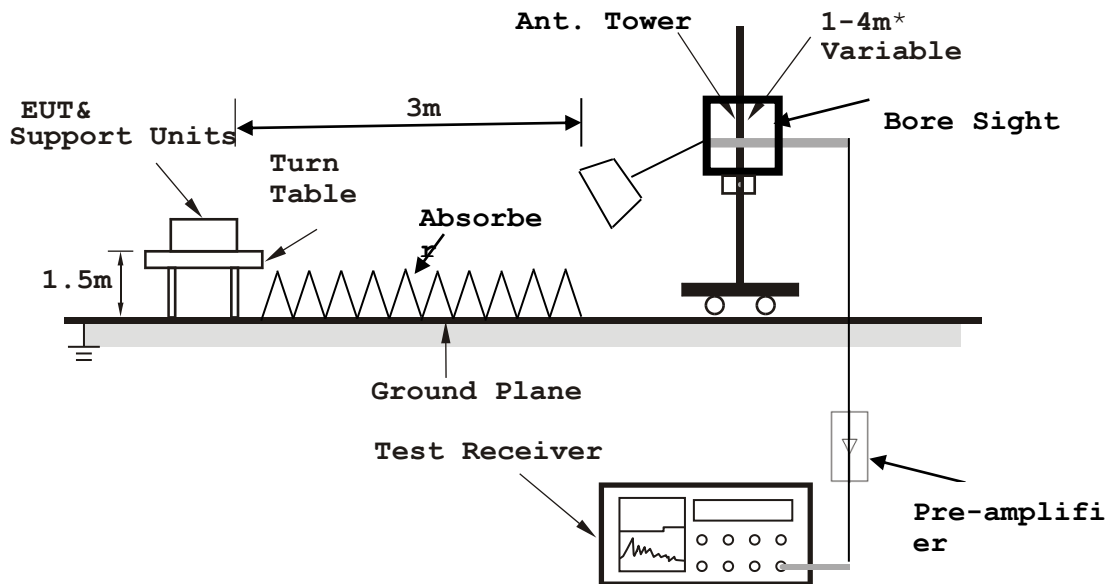


### 3.6.4 TEST SETUP

#### < Frequency Range 30MHz~1GHz >



#### <Frequency Range above 1GHz>



**Note:** Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).



### 3.6.5 TEST RESULTS

#### BELOW 1GHz WORST-CASE DATA

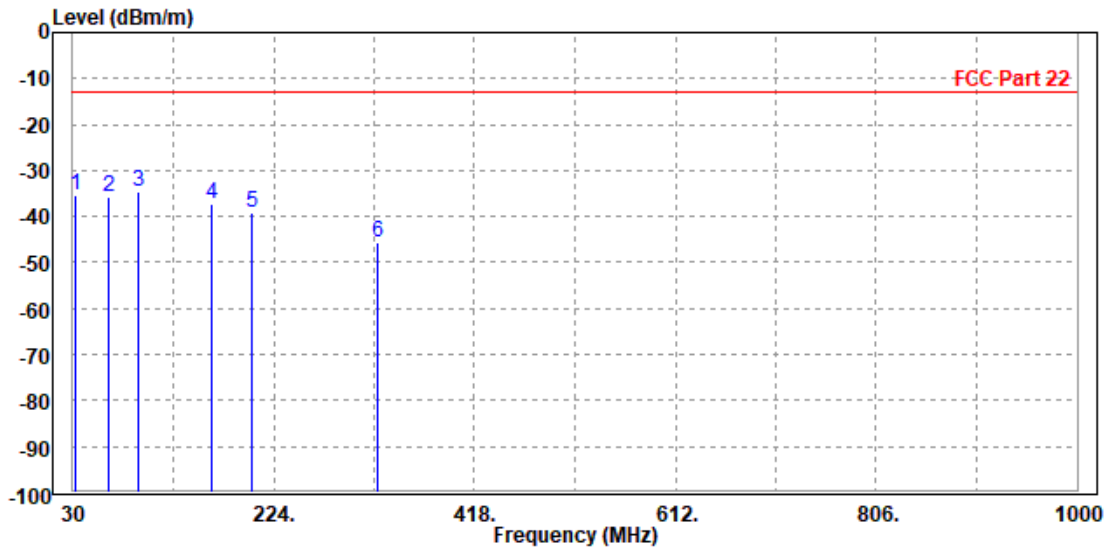
30 MHz – 1GHz data:

GSM 850

CHANNEL BANDWIDTH: 128 ~ 251

<b>MODE</b>	TX channel 251	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	32.910	-35.50	-54.93	-13.00	-22.50	19.43	Peak	Horizontal
2	63.950	-35.77	-43.41	-13.00	-22.77	7.64	Peak	Horizontal
3 PP	94.020	-34.75	-42.71	-13.00	-21.75	7.96	Peak	Horizontal
4	164.830	-37.13	-47.86	-13.00	-24.13	10.73	Peak	Horizontal
5	202.660	-39.04	-50.16	-13.00	-26.04	11.12	Peak	Horizontal
6	323.910	-45.64	-60.33	-13.00	-32.64	14.69	Peak	Horizontal



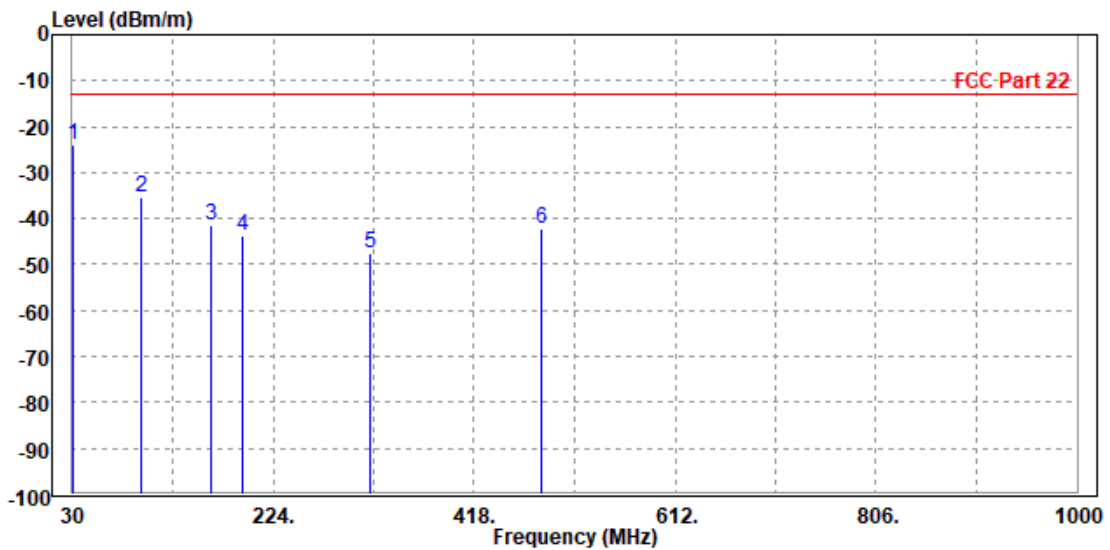


**BUREAU  
VERITAS**

Test Report No.: W7L-P22010017-1RF01

<b>MODE</b>	TX channel 251	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>			

	Freq	Level	Read Level	Limit	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	30.970	-24.03	-43.80	-13.00	-11.03	19.77 Peak	Vertical
2		95.960	-35.23	-43.67	-13.00	-22.23	8.44 Peak	Vertical
3		163.860	-41.31	-52.58	-13.00	-28.31	11.27 Peak	Vertical
4		194.900	-43.57	-54.76	-13.00	-30.57	11.19 Peak	Vertical
5		318.090	-47.71	-63.11	-13.00	-34.71	15.40 Peak	Vertical
6		482.990	-42.22	-61.00	-13.00	-29.22	18.78 Peak	Vertical





BUREAU VERITAS

Test Report No.: W7L-P22010017-1RF01

ABOVE 1GHz DATA

Note:

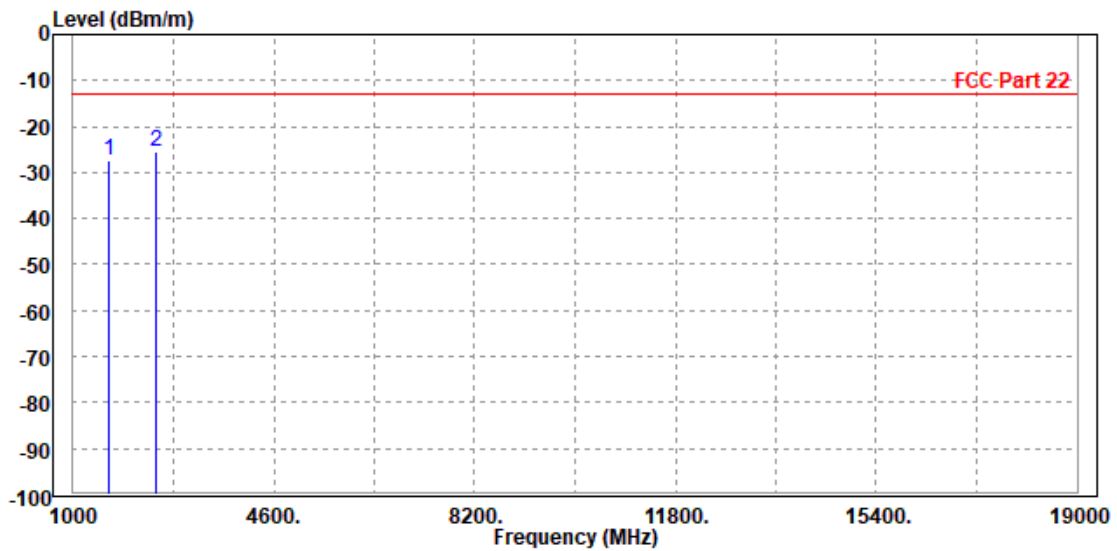
- 1. For higher frequency, the emission is too low to be detected.

GSM 850

CH 128:

MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1648.000	-27.32	-30.57	-13.00	-14.32	3.25	Peak	Horizontal
2 PP	2476.000	-25.59	-33.62	-13.00	-12.59	8.03	Peak	Horizontal



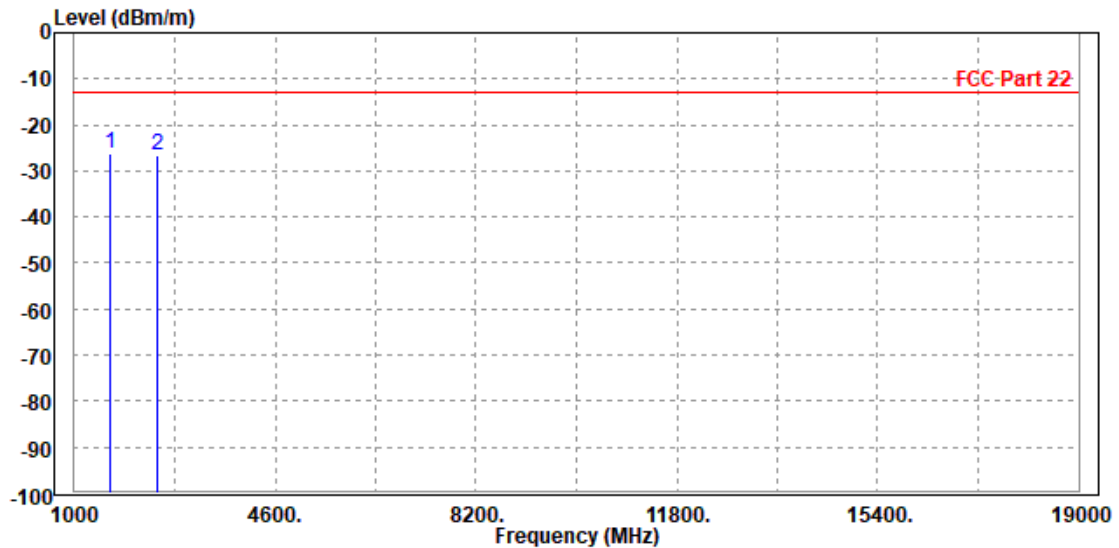


**BUREAU  
VERITAS**

**Test Report No.: W7L-P22010017-1RF01**

<b>MODE</b>	TX channel 128	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP 1648.400	-26.40	-29.79	-13.00	-13.40	3.39	Peak	Vertical
2	2476.000	-26.48	-33.52	-13.00	-13.48	7.04	Peak	Vertical





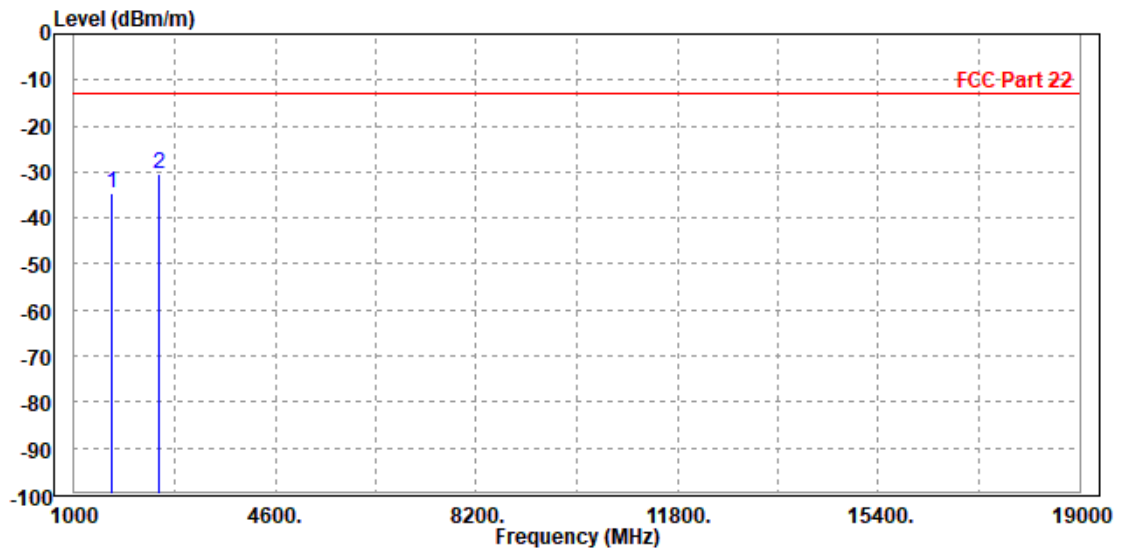
**BUREAU  
VERITAS**

Test Report No.: W7L-P22010017-1RF01

CH 189:

<b>MODE</b>	TX channel 189	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1672.800	-34.42	-37.97	-13.00	-21.42	3.55	Peak	Horizontal
2 PP	2512.000	-30.47	-38.53	-13.00	-17.47	8.06	Peak	Horizontal





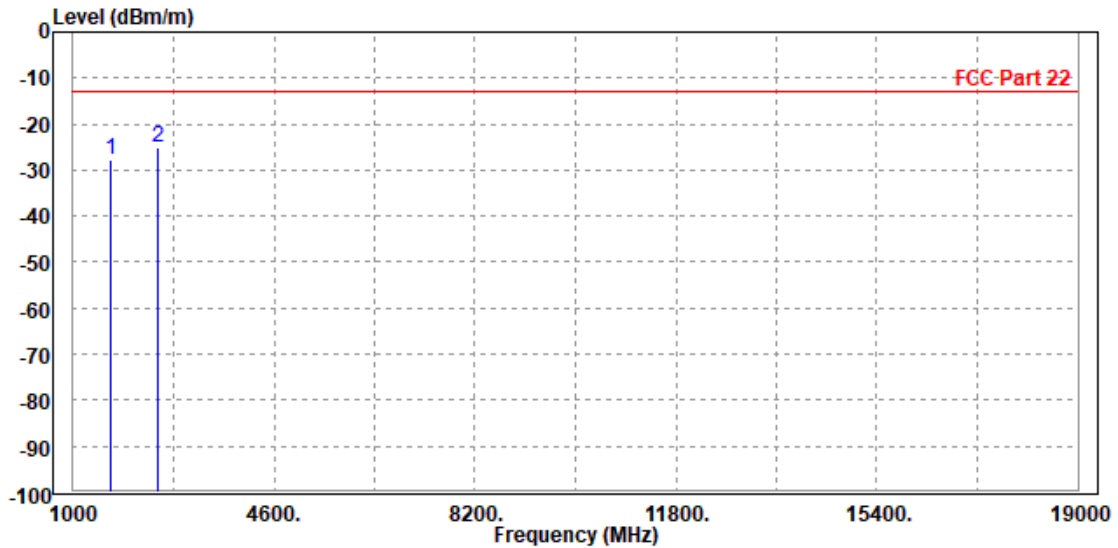


**BUREAU  
VERITAS**

**Test Report No.: W7L-P22010017-1RF01**

<b>MODE</b>	TX channel 189	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1666.000	-27.88	-31.42	-13.00	-14.88	3.54	Peak	Vertical
2 PP	2509.200	-25.11	-32.21	-13.00	-12.11	7.10	Peak	Vertical





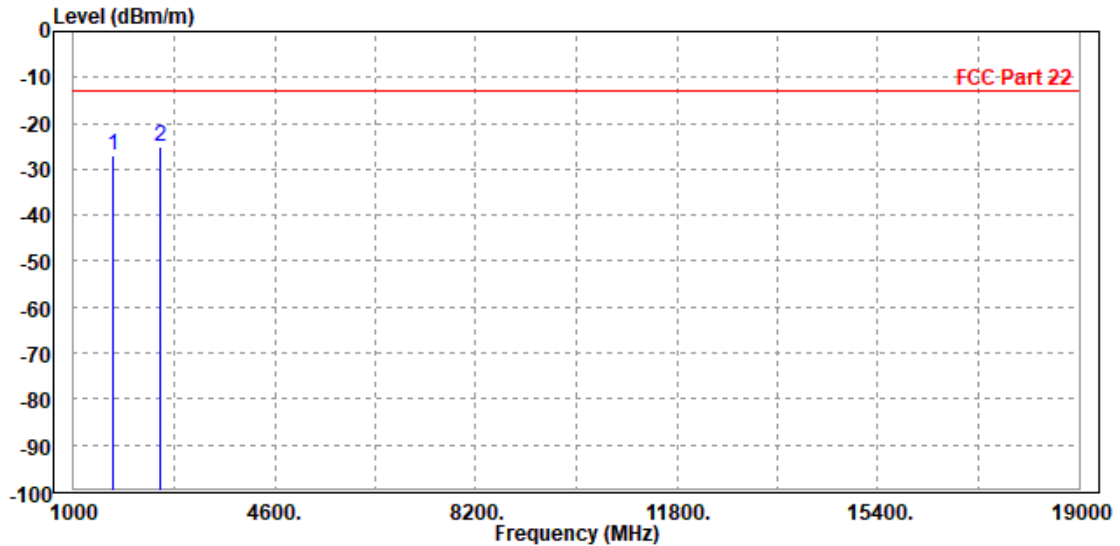
**BUREAU  
VERITAS**

**Test Report No.: W7L-P22010017-1RF01**

**CH 251:**

<b>MODE</b>	TX channel 251	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1697.600	-27.14	-31.00	-13.00	-14.14	3.86	Peak	Horizontal
2 PP	2548.000	-25.11	-33.22	-13.00	-12.11	8.11	Peak	Horizontal



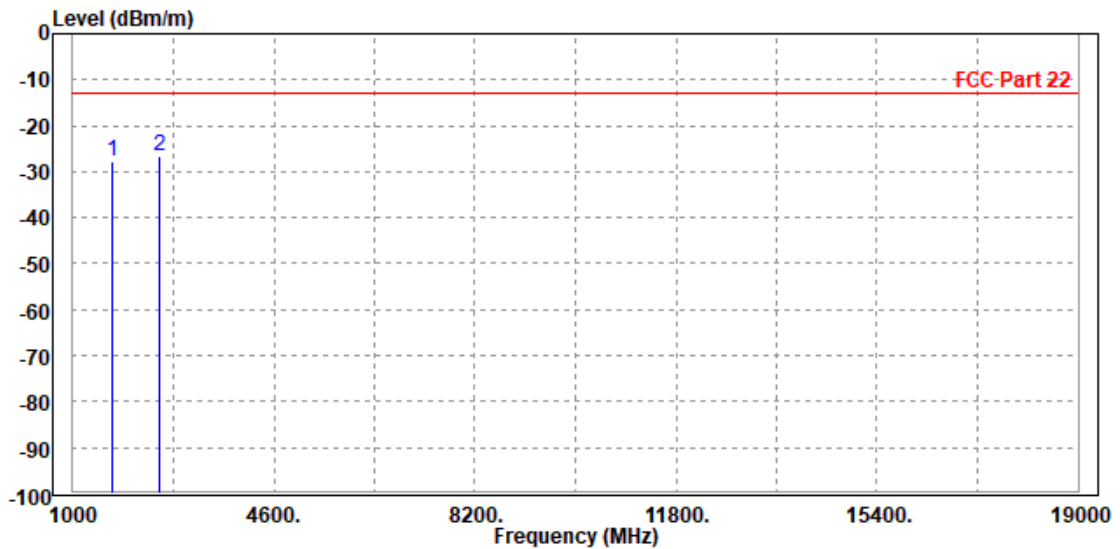


**BUREAU  
VERITAS**

**Test Report No.: W7L-P22010017-1RF01**

<b>MODE</b>	TX channel 251	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH	<b>INPUT POWER</b>	AC 120V/60Hz
<b>TESTED BY</b>	Jace Hu		
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	1702.000	-27.58	-31.45	-13.00	-14.58	3.87	Peak	Vertical
2	PP 2546.400	-26.80	-34.02	-13.00	-13.80	7.22	Peak	Vertical

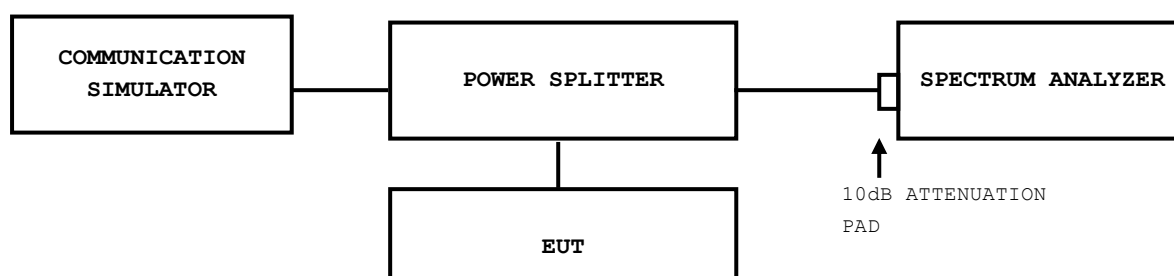


### 3.7 PEAK TO AVERAGE RATIO

#### 3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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

#### 3.7.2 TEST SETUP



#### 3.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.



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### 3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.



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## 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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## 5 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Shenzhen EMC/RF Lab:**

Tel: +86-755-88696566

Fax: +86-755-88696577

**Email:** [customerservice.sw@bureauveritas.com](mailto:customerservice.sw@bureauveritas.com)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.



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## **6 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.





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## 7 APPENDIX

### GSM 850

#### PEAK-TO-AVERAGE RATIO(CCDF)

##### Test Result

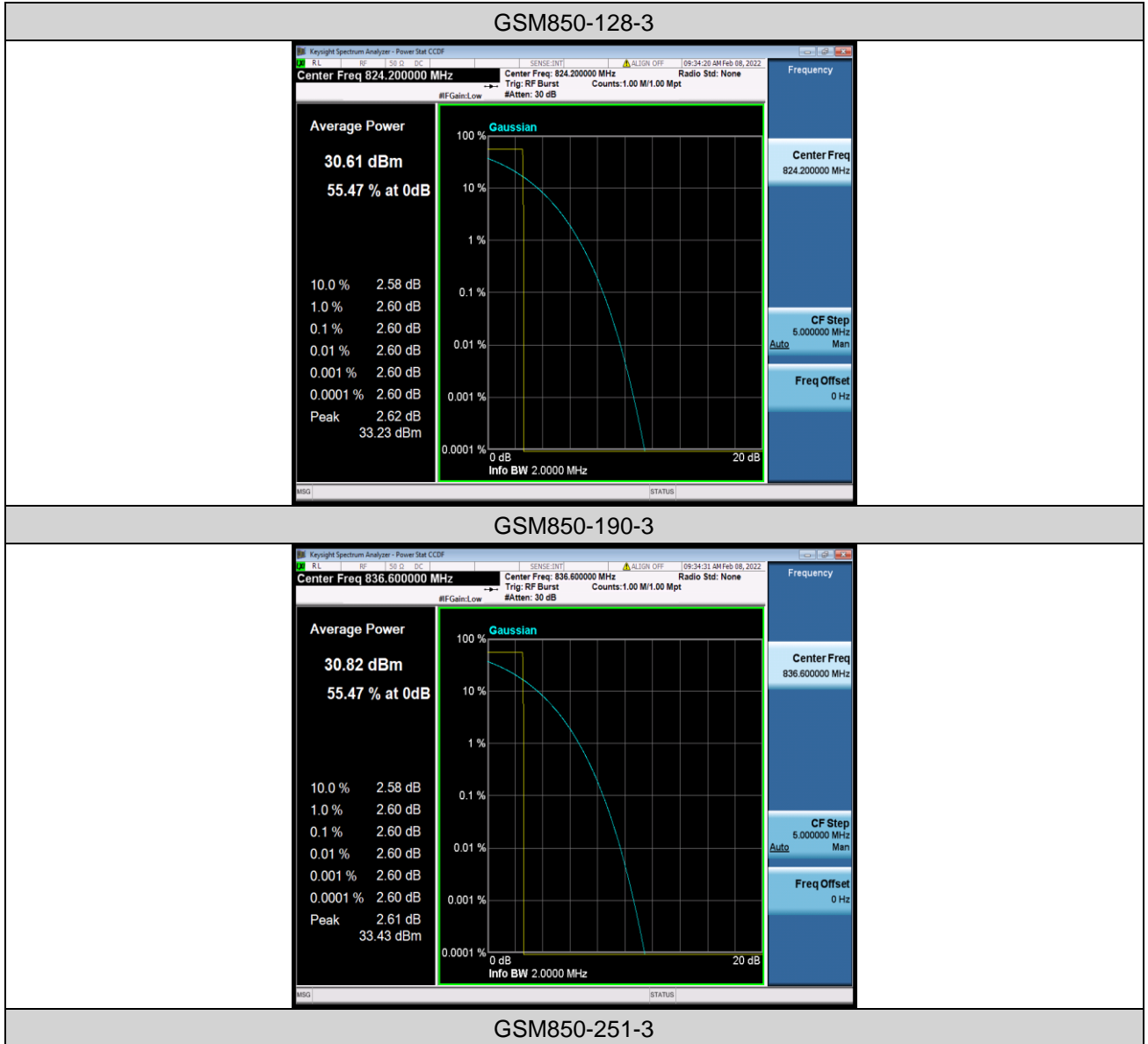
Band	Channel	Result(dB)	Limit(dB)	Verdict
GSM850	128	2.6	13	PASS
GSM850	190	2.6	13	PASS
GSM850	251	2.6	13	PASS



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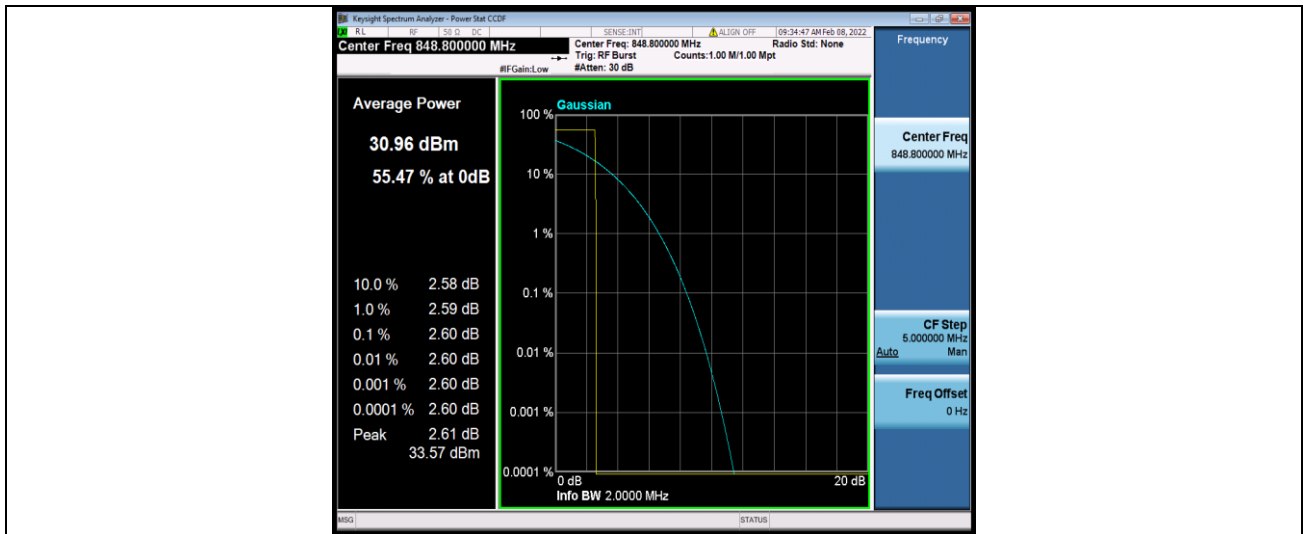
## Test Graphs





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## 26DB BANDWIDTH AND OCCUPIED BANDWIDTH

### Test Result

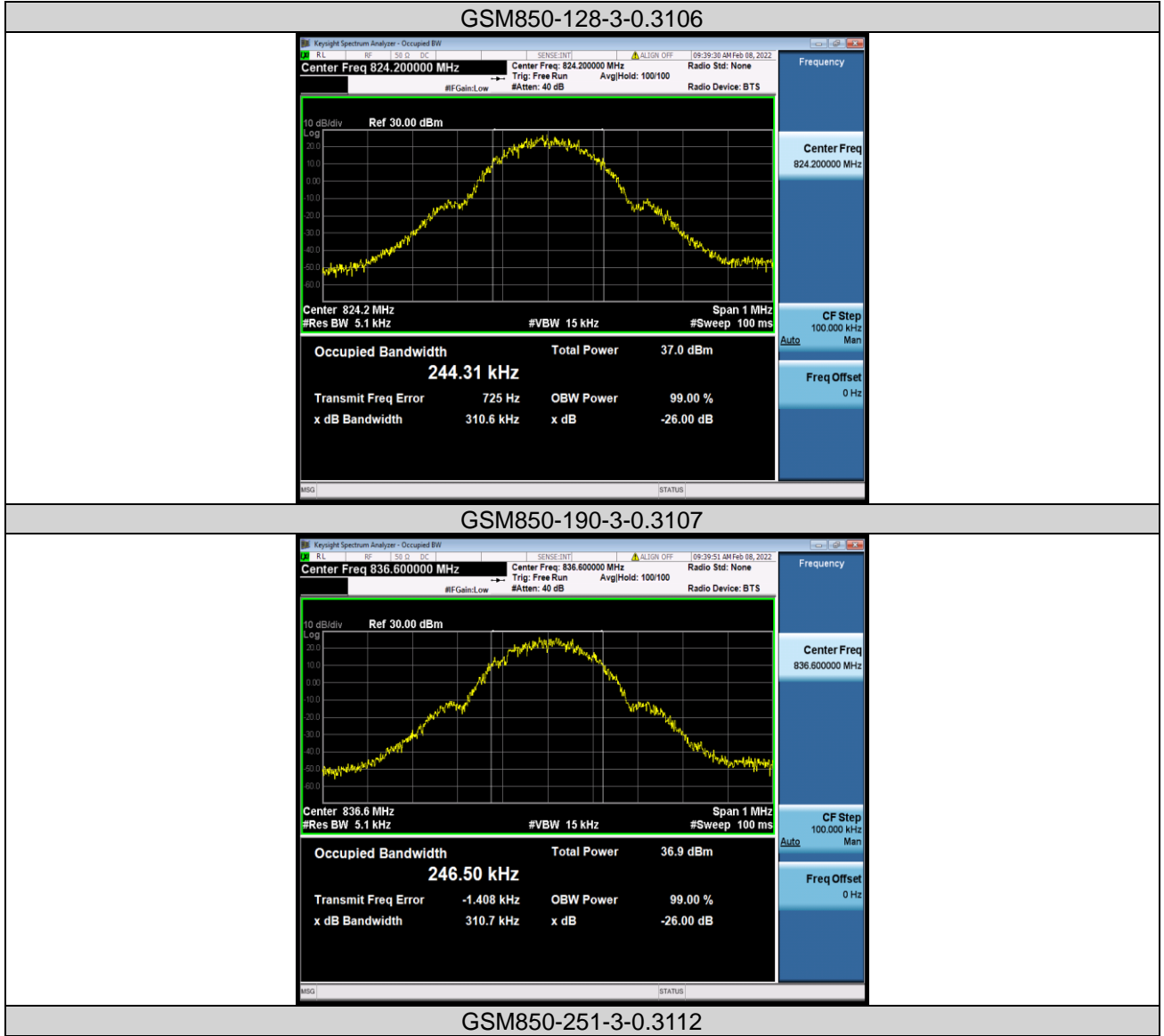
Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
GSM850	128	0.24431	0.3106	---	PASS
GSM850	190	0.24650	0.3107	---	PASS
GSM850	251	0.24391	0.3112	---	PASS



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Test Report No.: W7L-P22010017-1RF01

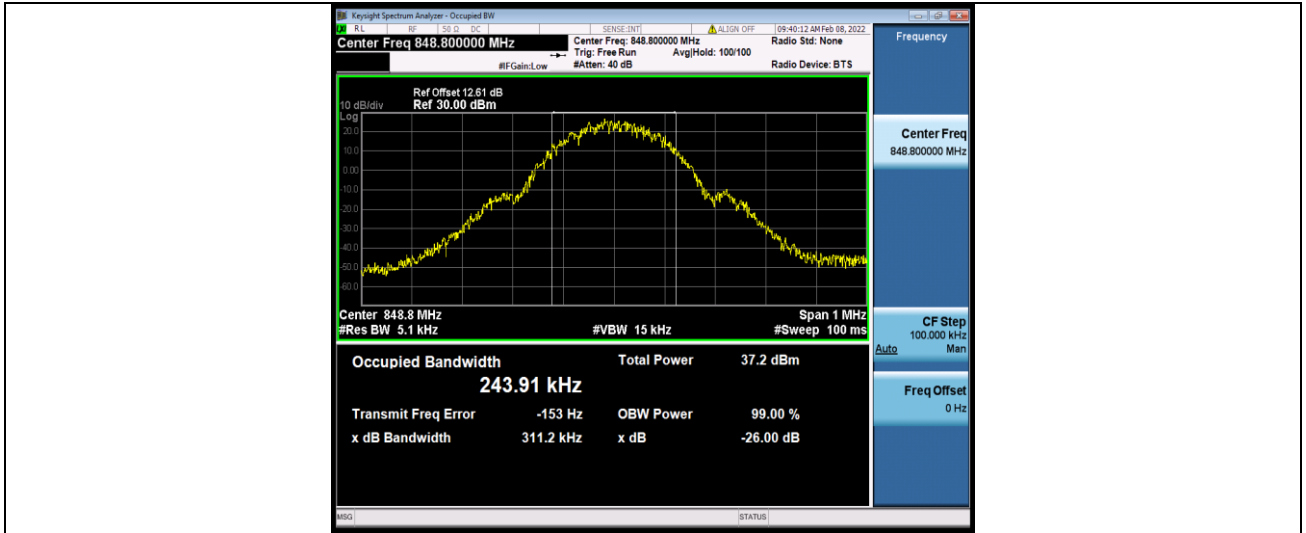
## Test Graphs





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## BAND EDGE

### Test Result

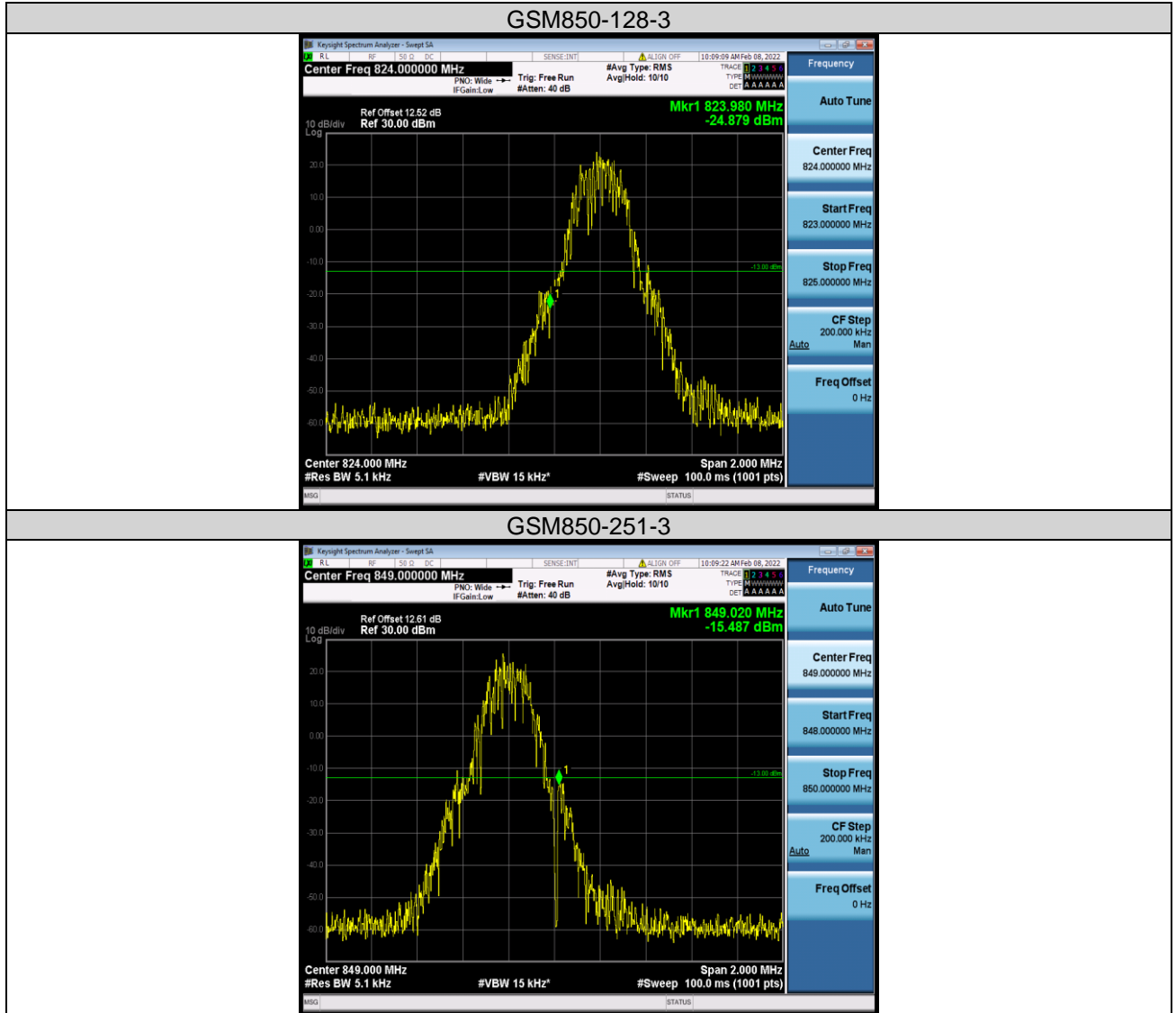
Band	Channel	Freq (MHz)	Result (dBm)	Limit(dBm)	Verdict
GSM850	128	823.98	-24.88	-13	PASS
GSM850	251	849.02	-15.49	-13	PASS



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## Test Graphs







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## CONDUCTED SPURIOUS EMISSION

### Test Result

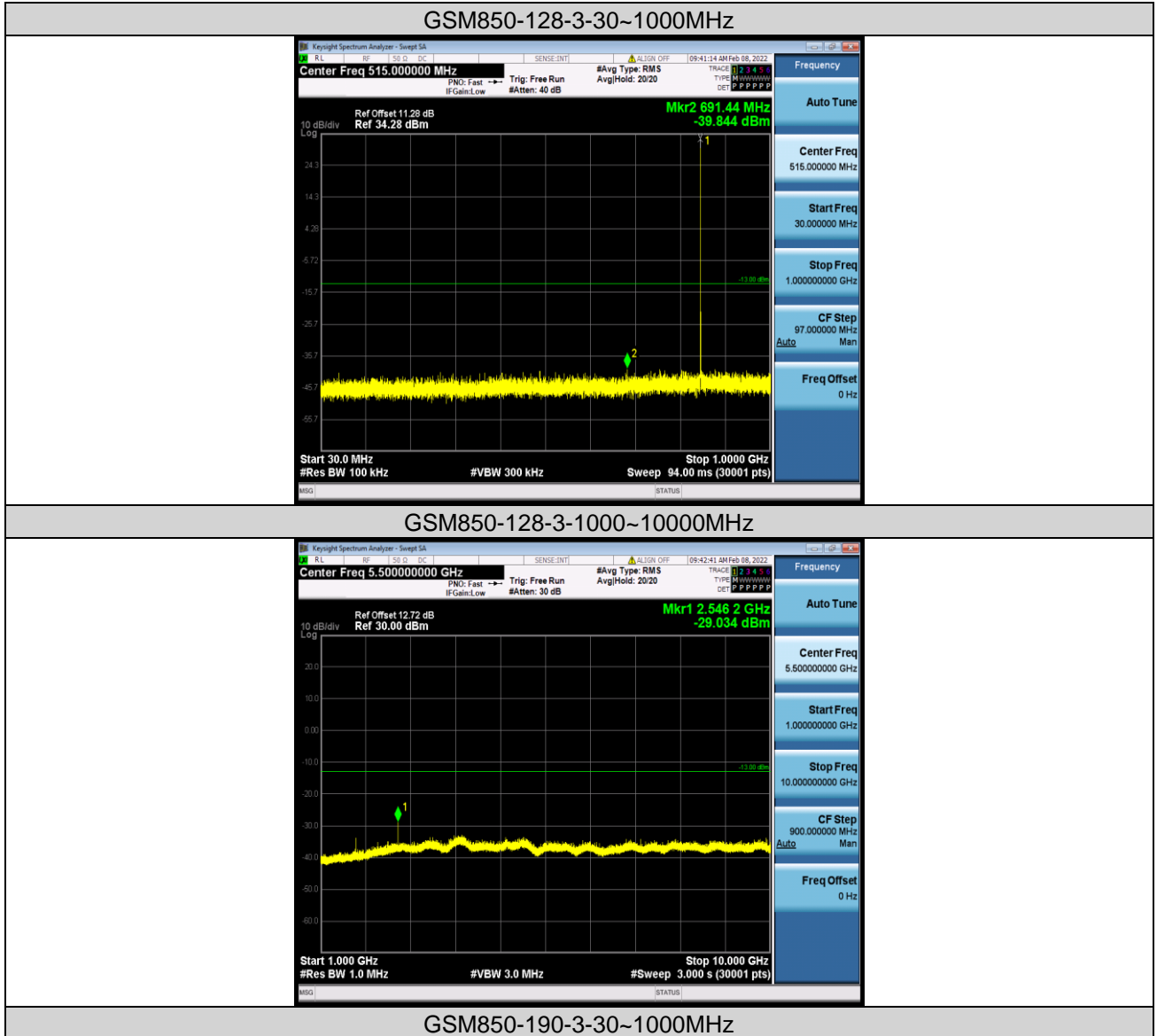
Band	Channel	Frequency Range(MHz)	Max.Freq. (MHz)	Result (dBm)	Limit (dBm)	Verdict
GSM850	128	30~1000MHz	691.44	-39.84	-13	PASS
GSM850	128	1000~10000MHz	2546.2	-29.03	-13	PASS
GSM850	190	30~1000MHz	713.14	-39.32	-13	PASS
GSM850	190	1000~10000MHz	2546.8	-29.7	-13	PASS
GSM850	251	30~1000MHz	968.99	-39.69	-13	PASS
GSM850	251	1000~10000MHz	2546.8	-29.84	-13	PASS



BUREAU VERITAS

Test Report No.: W7L-P22010017-1RF01

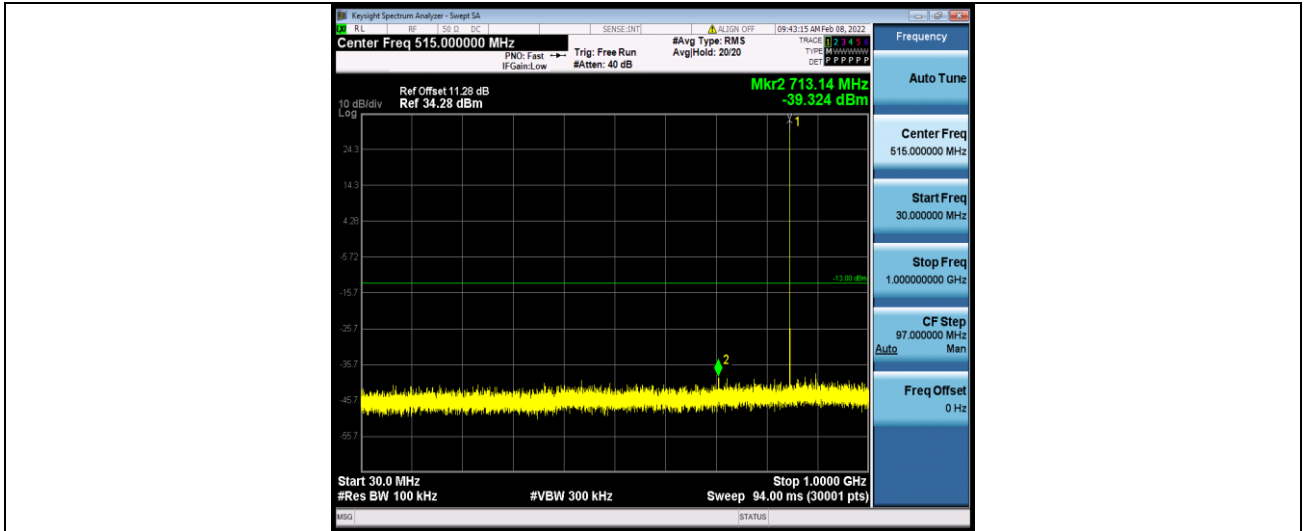
### Test Graphs



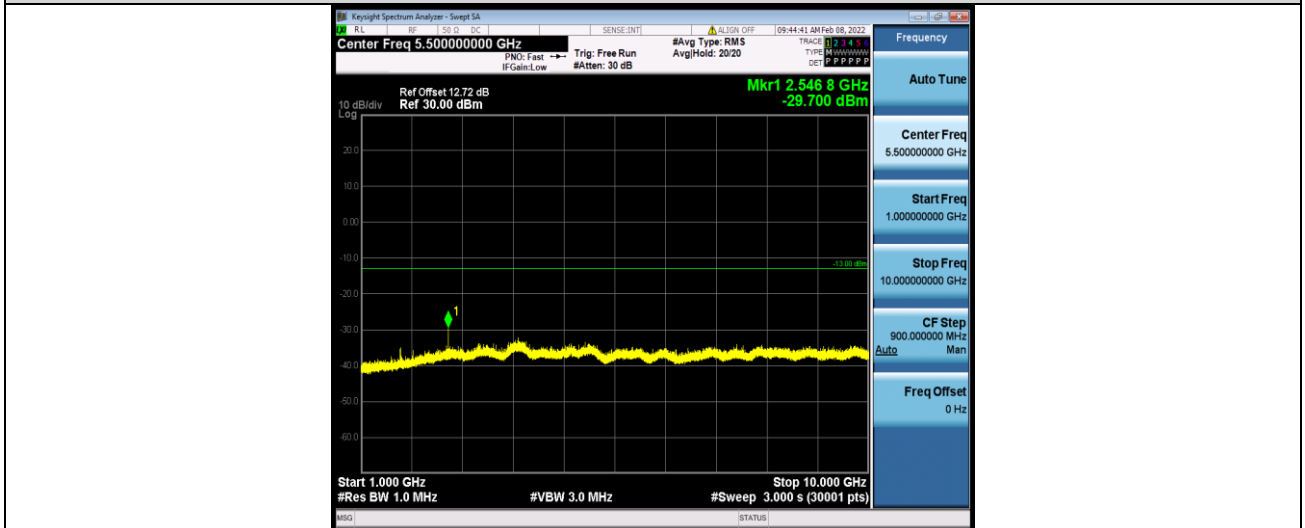


BUREAU VERITAS

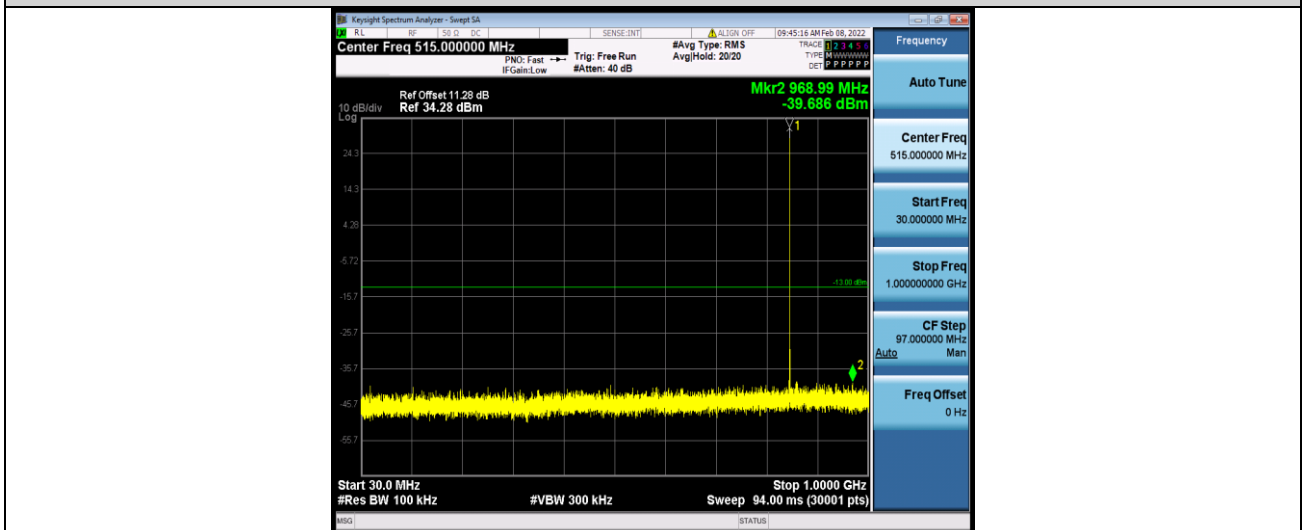
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GSM850-190-3-1000~10000MHz



GSM850-251-3-30~1000MHz

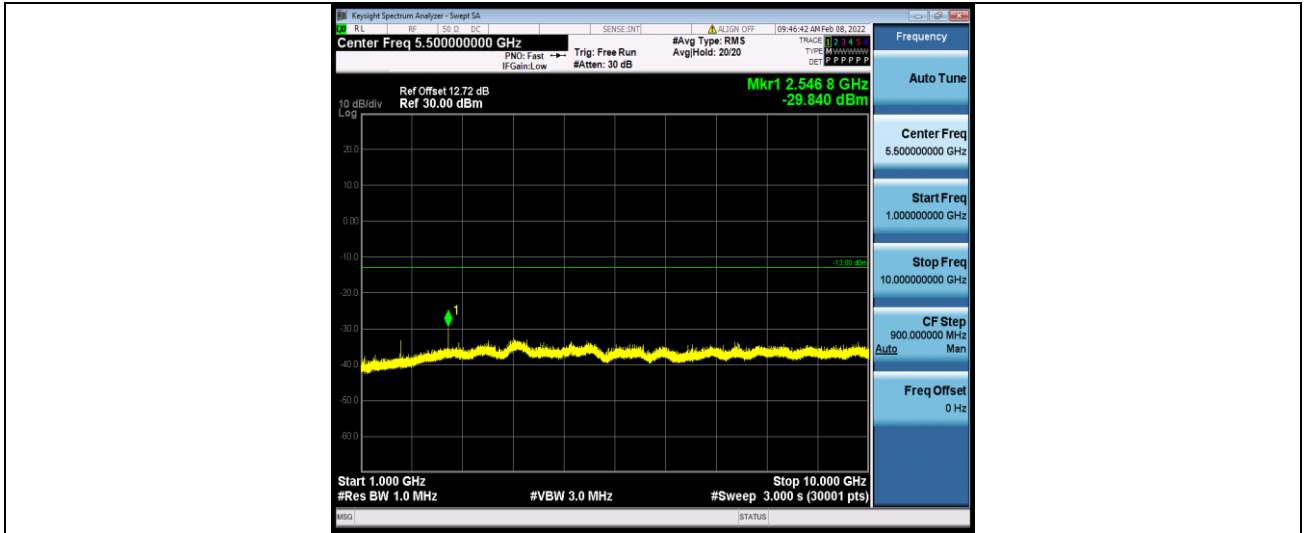


GSM850-251-3-1000~10000MHz



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Test Report No.: W7L-P22010017-1RF01





### FREQUENCY STABILITY

#### Test Result

Voltage							
Band	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VL	NT	-18.40	-0.022325	±2.5	PASS
GSM850	128	VN	NT	-13.01	-0.015785	±2.5	PASS
GSM850	128	VH	NT	-13.98	-0.016962	±2.5	PASS
GSM850	190	VL	NT	-12.88	-0.015396	±2.5	PASS
GSM850	190	VN	NT	-16.50	-0.019723	±2.5	PASS
GSM850	190	VH	NT	-10.20	-0.012192	±2.5	PASS
GSM850	251	VL	NT	-12.01	-0.014149	±2.5	PASS
GSM850	251	VN	NT	-14.69	-0.017307	±2.5	PASS
GSM850	251	VH	NT	-17.08	-0.020123	±2.5	PASS

Temperature							
Band	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	NV	-30	-14.11	-0.017120	±2.5	PASS
GSM850	128	NV	-20	-17.79	-0.021585	±2.5	PASS
GSM850	128	NV	-10	-13.43	-0.016295	±2.5	PASS
GSM850	128	NV	0	-17.08	-0.020723	±2.5	PASS
GSM850	128	NV	10	-16.69	-0.020250	±2.5	PASS
GSM850	128	NV	20	-18.92	-0.022956	±2.5	PASS
GSM850	128	NV	30	-15.08	-0.018297	±2.5	PASS
GSM850	128	NV	40	-18.85	-0.022871	±2.5	PASS
GSM850	128	NV	50	-14.01	-0.016998	±2.5	PASS
GSM850	190	NV	-30	-12.62	-0.015085	±2.5	PASS
GSM850	190	NV	-20	-13.08	-0.015635	±2.5	PASS
GSM850	190	NV	-10	-15.88	-0.018982	±2.5	PASS
GSM850	190	NV	0	-18.08	-0.021611	±2.5	PASS
GSM850	190	NV	10	-12.62	-0.015085	±2.5	PASS
GSM850	190	NV	20	-16.98	-0.020296	±2.5	PASS
GSM850	190	NV	30	-18.14	-0.021683	±2.5	PASS
GSM850	190	NV	40	-12.72	-0.015204	±2.5	PASS
GSM850	190	NV	50	-14.21	-0.016985	±2.5	PASS
GSM850	251	NV	-30	-12.01	-0.014149	±2.5	PASS
GSM850	251	NV	-20	-9.88	-0.011640	±2.5	PASS
GSM850	251	NV	-10	-13.37	-0.015752	±2.5	PASS
GSM850	251	NV	0	-13.59	-0.016011	±2.5	PASS
GSM850	251	NV	10	-14.46	-0.017036	±2.5	PASS
GSM850	251	NV	20	-15.24	-0.017955	±2.5	PASS
GSM850	251	NV	30	-16.98	-0.020005	±2.5	PASS
GSM850	251	NV	40	-12.20	-0.014373	±2.5	PASS
GSM850	251	NV	50	-20.02	-0.023586	±2.5	PASS