

FCC TEST REPORT

(PART 24)

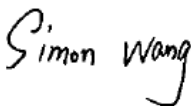
Applicant:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 ESPOO.Finland

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 ESPOO.Finland
Product:	Mobile Phone
Brand Name:	NOKIA
Model Name:	TA-1683
FCC ID:	2AJOTTA-1683
Date of tests:	May. 27, 2024 ~ Jun. 04, 2024

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

☒ **FCC PART 24, Subpart E** ☒ **FCC PART 2**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

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: Jun. 04, 2024	Date: Jun. 04, 2024

This report is governed by, and incorporates by reference, the Conditions of Testing 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. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. 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.



TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1 SUMMARY OF TEST RESULTS	5
1.1 MEASUREMENT UNCERTAINTY	5
1.2 TEST SITE AND INSTRUMENTS	6
2 GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 CONFIGURATION OF SYSTEM UNDER TEST	9
2.3 DESCRIPTION OF SUPPORT UNITS	10
2.4 TEST ITEM AND TEST CONFIGURATION	10
2.5 EUT OPERATING CONDITIONS	11
2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3 TEST TYPES AND RESULTS	12
3.1 OUTPUT POWER MEASUREMENT	12
3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT	12
3.1.2 TEST PROCEDURES	12
3.1.3 TEST SETUP	13
3.1.4 TEST RESULTS	13
3.2 FREQUENCY STABILITY MEASUREMENT	15
3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT	15
3.2.2 TEST PROCEDURE	15
3.2.3 TEST SETUP	15
3.2.4 TEST RESULTS	16
3.3 OCCUPIED BANDWIDTH MEASUREMENT	17
3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT	17
3.3.2 TEST SETUP	17
3.3.3 TEST PROCEDURES	17
3.3.4 TEST RESULTS	18
3.4 BAND EDGE MEASUREMENT	19
3.4.1 LIMITS OF BAND EDGE MEASUREMENT	19
3.4.2 TEST SETUP	19
3.4.3 TEST PROCEDURES	20
3.4.4 TEST RESULTS	21
3.5 CONDUCTED SPURIOUS EMISSIONS	22
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	22
3.5.2 TEST PROCEDURE	22
3.5.3 TEST SETUP	22
3.5.4 TEST RESULTS	23
3.6 RADIATED EMISSION MEASUREMENT	24
3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT	24
3.6.2 TEST PROCEDURES	24



**BUREAU
VERITAS**

Test Report No.: W7L-240527W003RF02

3.6.3 DEVIATION FROM TEST STANDARD	24
3.6.4 TEST SETUP	25
3.6.5 TEST RESULTS	27
3.7 PEAK TO AVERAGE RATIO	35
3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT	35
3.7.2 TEST SETUP	35
3.7.3 TEST PROCEDURES	35
3.7.4 TEST RESULTS	36
4 INFORMATION ON THE TESTING LABORATORIES	37
5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	38
6 APPENDIX	39
GSM1900.....	39



Test Report No.: W7L-240527W003RF02

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-240527W003RF02	Original release	Jun. 04, 2024

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2		
STANDARD SECTION	TEST TYPE	RESULT
§2.1046	Conducted Output Power	Compliance
§24.232(c)	Equivalent Isotropic Radiated Power	Compliance
§2.1055 §24.235	Frequency Stability	Compliance
§2.1049	Occupied Bandwidth	Compliance
§24.232(d)	Peak to average ratio	Compliance
§24.238(a)(b)	Band Edge Measurements	Compliance
§2.1051 §24.238(a)(b)	Conducted Spurious Emissions	Compliance
§2.1053 §24.238(a)(b)	Radiated Spurious Emissions	Compliance

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
Frequency Stability	±76.97Hz
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions & Radiated Power (30MHz~1GHz)	±4.98dB
Radiated emissions & Radiated Power (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
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	Mar. 28,24	Mar. 27,25
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.10,24	May.09,25
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.03,23	Sep.02,24
Bilog Antenna	ETS-LINDGRE N	3143B	00161965	Feb. 18,24	Feb. 17,25
Horn Antenna	ETS-LINDGRE N	3117	00168692	Feb. 18,24	Feb. 17,25
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K- SG/QMS-00361	15433	Sep.04, 23	Sep.03, 24
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,24	Feb. 13,25
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May. 06,24	May. 05,25
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.10,24	May.09,25
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,24	Feb.16,25
3m Semi-anechoic Chamber	ETS-LINDGRE N	9m*6m*6m	Euroshieldpn- CT0001143-121 6	Nov. 14,23	Nov. 13,26
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	50HF-010-SMA	May. 06,24	May. 05,25
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,24	Feb. 13,25
Power Sensor	Anritsu	MA2411B	1339352	Feb. 14,24	Feb. 13,25
Temperature Chamber	ESPEC	SH-242	93000855	May. 06,24	May. 05,25
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 14,24	Feb. 13,25
Base station R&S CMW500	Rohde&Schwa rz	CMW500	153085	May.10,24	May.09,25
DC Source	Kikusui/JP	PMX18-5A	N/A	Aug. 11,23	Aug. 10,24

- 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-1683	
NOMINAL VOLTAGE	5.0Vdc(adapter or host equipment) 3.7Vdc (Li-ion, battery)	
MODULATION TYPE	GSM: GMSK	
FREQUENCY RANGE	GSM	1850.2MHz ~ 1909.8MHz
MAX. EIRP POWER	GSM	1621.81mW
EMISSION DESIGNATOR	GSM	245KGXW
ANTENNA TYPE	PIFA Antenna with 1.87dBi gain for GSM1900	
HW VERSION	F31E70_V1.0	
SW VERSION	10.00. 17.00	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	Earphone cable: non-shielded cable, with w/o ferrite core, 1.0 meter	
EXTREME TEMPERATURE	0-40 °C	
EXTREME VOLTAGE	3.4V - 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.
- Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.

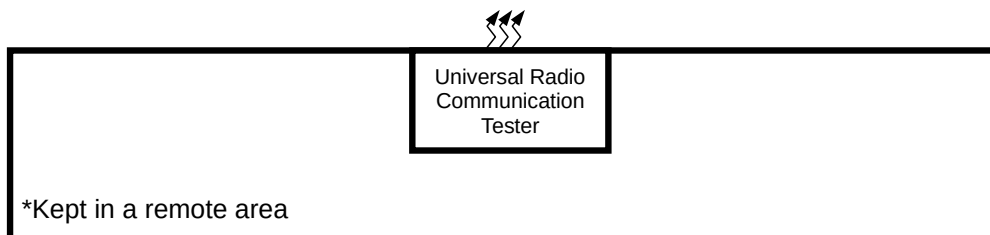
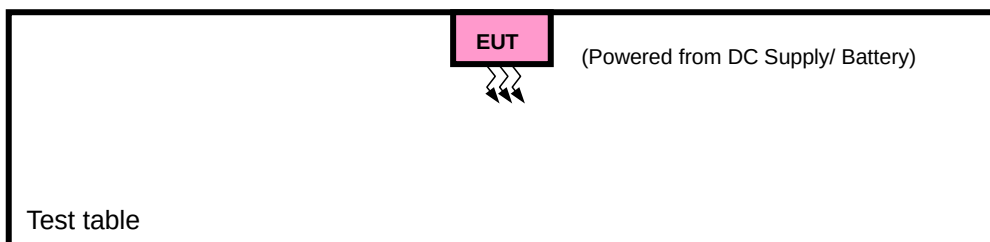
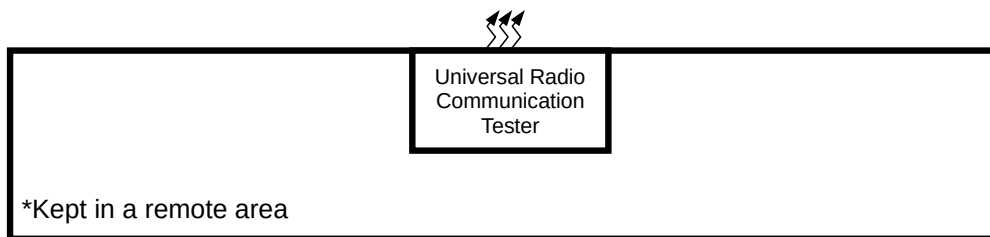
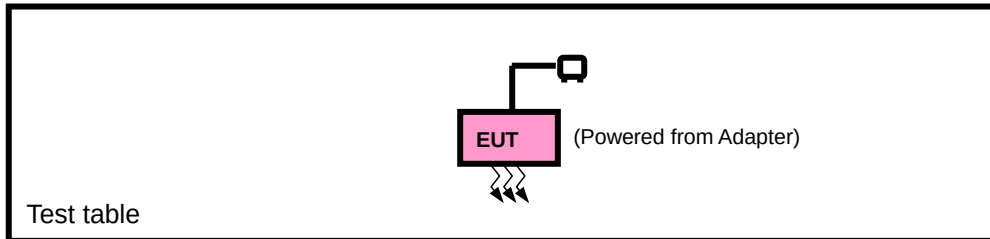
**List of Accessory:**

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION	Country
Battery 1	NOKIA	GuangDong FengHua New Energy Co., Ltd.	BL-L5K	Capacity : 3.7Vdc, 1000mAh	China
Battery 2	NOKIA	Shenzhen Aerospace Electronic Co., Ltd.	BL-L5K	Capacity : 3.7Vdc, 1000mAh	China
Battery 3	NOKIA	FENG HUA NEW ENERGY PRIVATE LIMITED	BL-L5K	Capacity : 3.7Vdc, 1000mAh	India
Battery 4	NOKIA	Shenzhen Aerospace Electronic Co., Ltd.	BL-L5K	Capacity : 3.7Vdc, 1000mAh	India
AC Adapter	NOKIA	SHENZHEN BAIJUNDA ELECTRONIC CO LTD	AC-18U	I/P: 100-240Vac, 0.1A, O/P: 5.0Vdc, 0.55A	N/A
Earphone Cable	N/A	Huizhou Juwei Electronics Co., LTD	JWEP125 2-H21H	Signal Line,1.0meter	N/A



2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST





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 EIRP 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 + DC Supply with GSM link

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	EIRP	512 to 810	512, 661, 810	GSM
B	FREQUENCY STABILITY	512 to 810	512, 661, 810	GSM
A	OCCUPIED BANDWIDTH	512 to 810	512, 661, 810	GSM
A	PEAK TO AVERAGE RATIO	512 to 810	512, 661, 810	GSM
A	BAND EDGE	512 to 810	512, 810	GSM
A	CONDUCTED EMISSION	512 to 810	512, 661, 810	GSM
A	RADIATED EMISSION	512 to 810	512, 661, 810	GSM

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 57%RH	DC 5V By Adapter	Jace Hu
FREQUENCY STABILITY	23deg. C, 61%RH	DC 3.4V/3.7V/4.2V By DC Supply	James Fu
OCCUPIED BANDWIDTH	23deg. C, 61%RH	DC5V By Adapter	James Fu
PEAK TO AVERAGE RATIO	23deg. C, 61%RH	DC 5V By Adapter	James Fu
BAND EDGE	23deg. C, 61%RH	DC5V By Adapter	James Fu
CONDUCTED EMISSION	23deg. C, 61%RH	DC5V By Adapter	James Fu
RADIATED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Jace Hu

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

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 24

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 and portable stations are limited to 2 watts EIRP.

3.1.2 TEST PROCEDURES

EIRP 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:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T - L_C$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically 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;

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

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

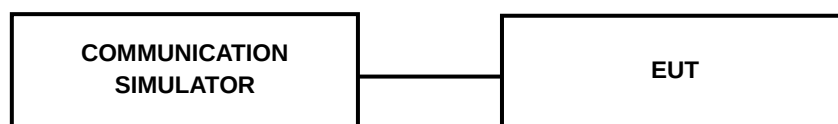
CONDUCTED POWER MEASUREMENT:

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	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
GSM	30.23	30.02	30.08



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VERITAS

Test Report No.: W7L-240527W003RF02

EIRP POWER (dBm)

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
512	1850.2	30.23	1.87	32.1	1621.81	2
661	1880.0	30.02	1.87	31.89	1545.25	2
810	1909.8	30.08	1.87	31.95	1566.75	2



3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

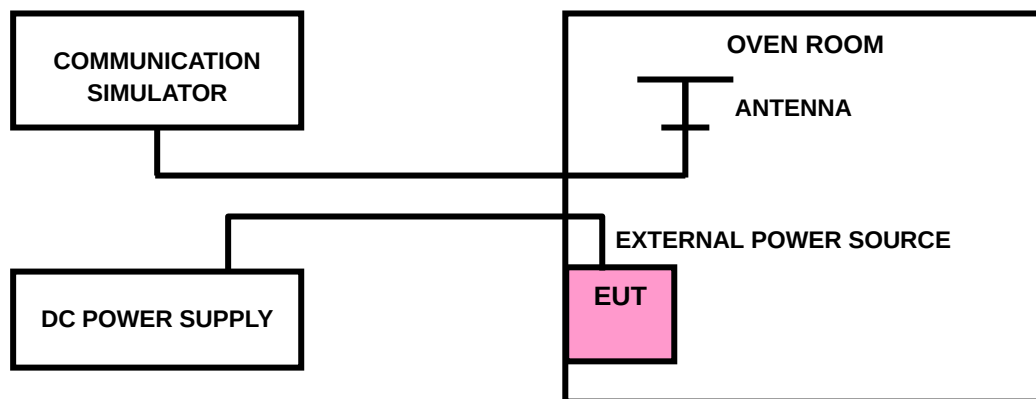
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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





Test Report No.: W7L-240527W003RF02

3.2.4 TEST RESULTS

Please Refer to Appendix Of this test report.

Note: VL = Low voltage(3.4V); VN/NV = Normal voltage(3.7V); VH = High voltage(4.2V);
NT = Normal temperature (25°C)

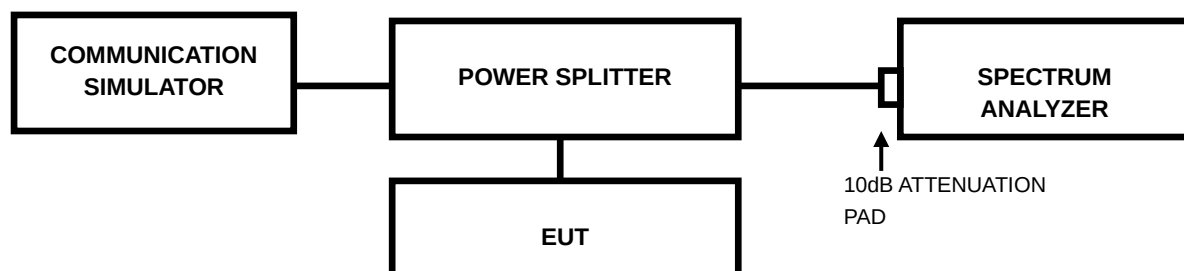


3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.



Test Report No.: W7L-240527W003RF02

3.3.4 TEST RESULTS

Please Refer to Appendix Of this test report.

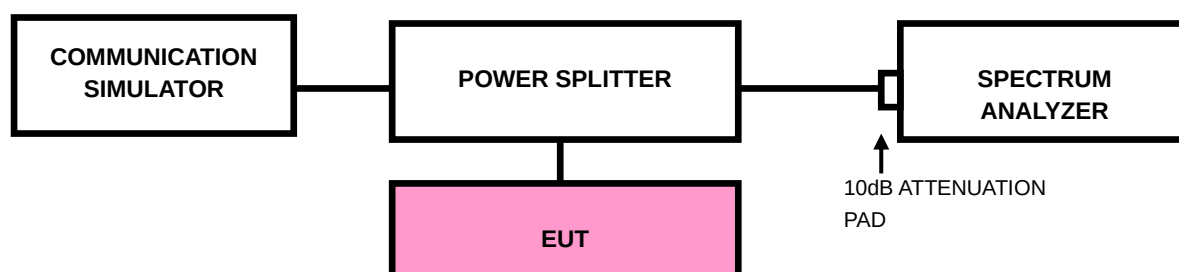


3.4 BAND EDGE MEASUREMENTC

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



3.4.3 TEST PROCEDURES

- a) All measurements were done at low and high operational frequency range
- b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
- c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)
- d) .Set the resolution bandwidth (RBW) $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
- e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.
- f) Set the video bandwidth (VBW) to $\geq 3 \times$ RBW.
- g) Select the average power (RMS) display detector.
- h) Set the number of measurement points to ≥ 1001 .
- i) Use auto-coupled sweep time.
- j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.
- k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.
- l) Record the max trace plot into the test report.



Test Report No.: W7L-240527W003RF02

3.4.4. TEST RESULTS

Please Refer to Appendix Of this test report.



3.5 CONDUCTED SPURIOUS EMISSIONS

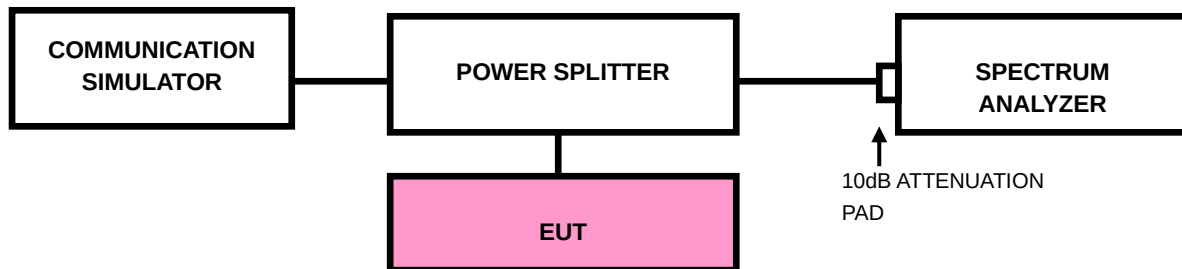
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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 -13dBm .

3.5.2 TEST PROCEDURE

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

3.5.3 TEST SETUP





Test Report No.: W7L-240527W003RF02

3.5.4 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

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 -13dBm .

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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

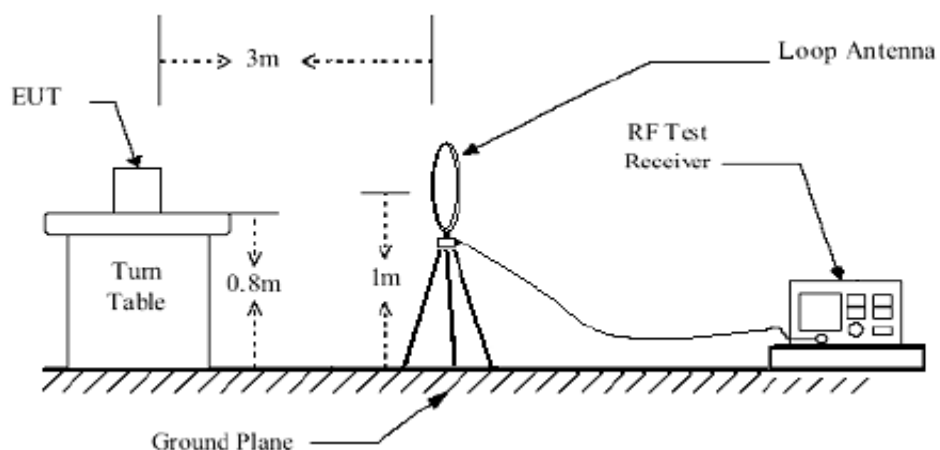
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

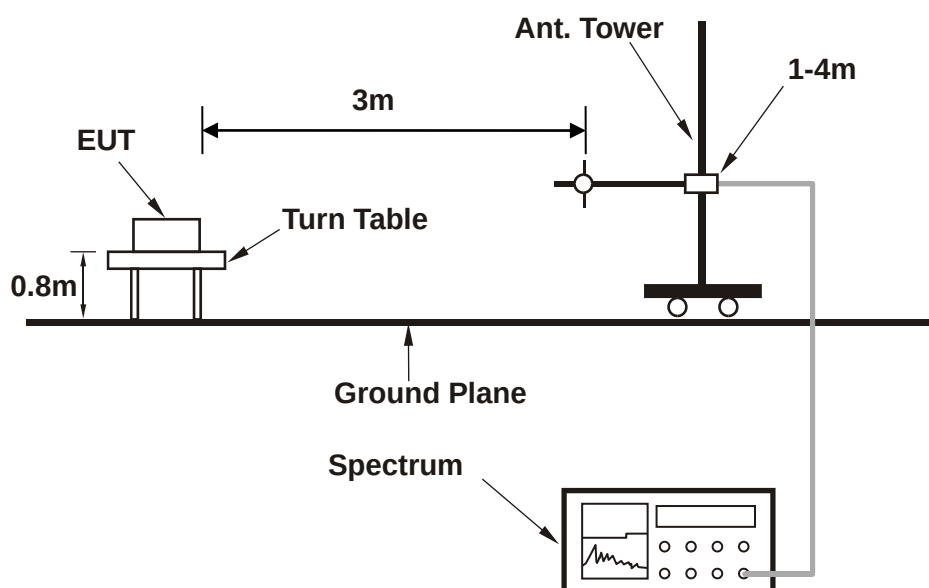
No deviation

3.6.4 TEST SETUP

< Frequency Range below 30MHz >



< Frequency Range 30MHz~1GHz >

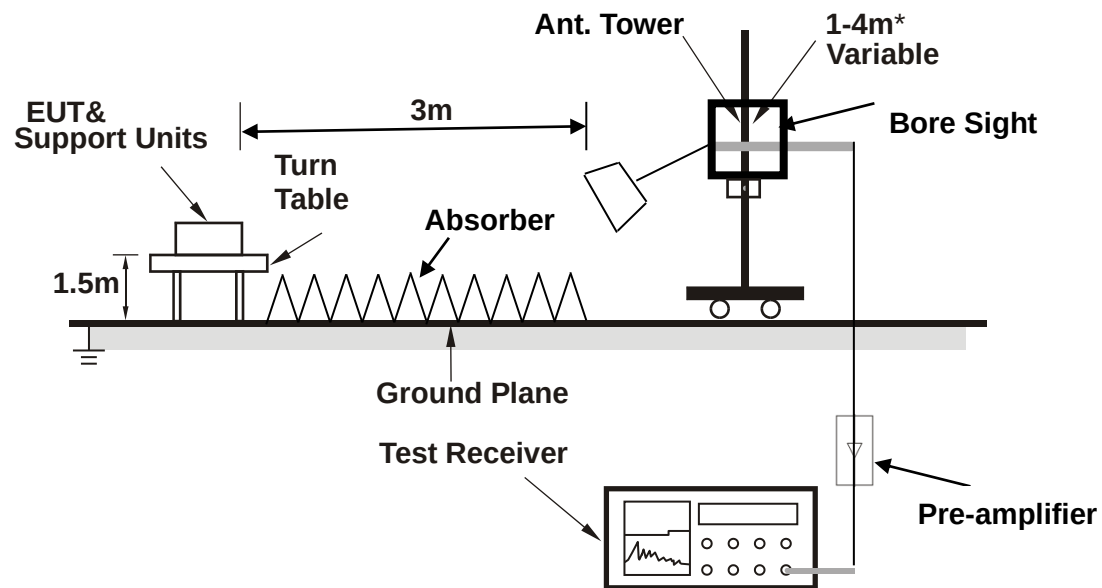




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Test Report No.: W7L-240527W003RF02

<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

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA

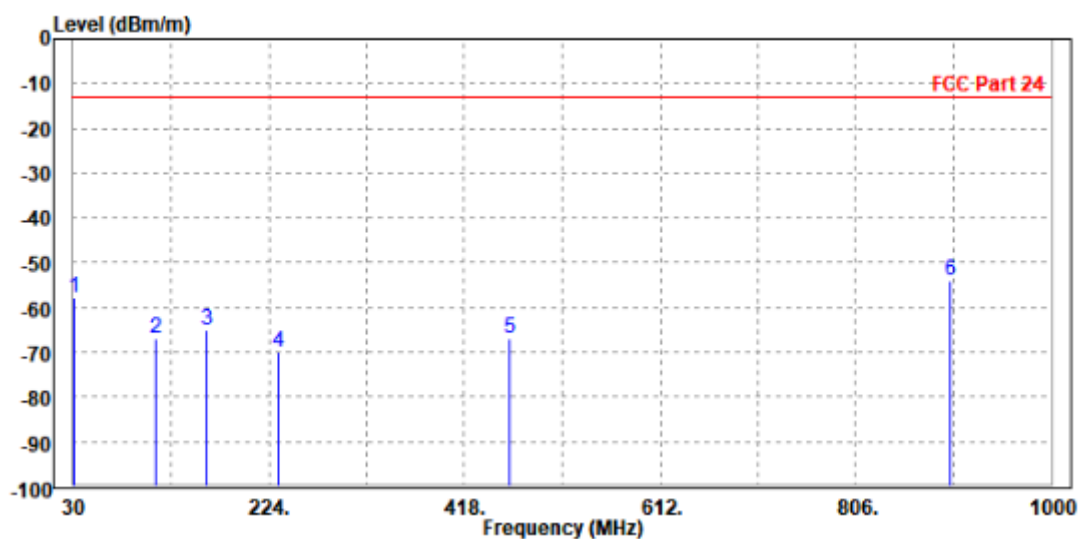
30 MHz – 1GHz data:

GSM 1900:

CHANNEL BANDWIDTH: 512 ~ 810

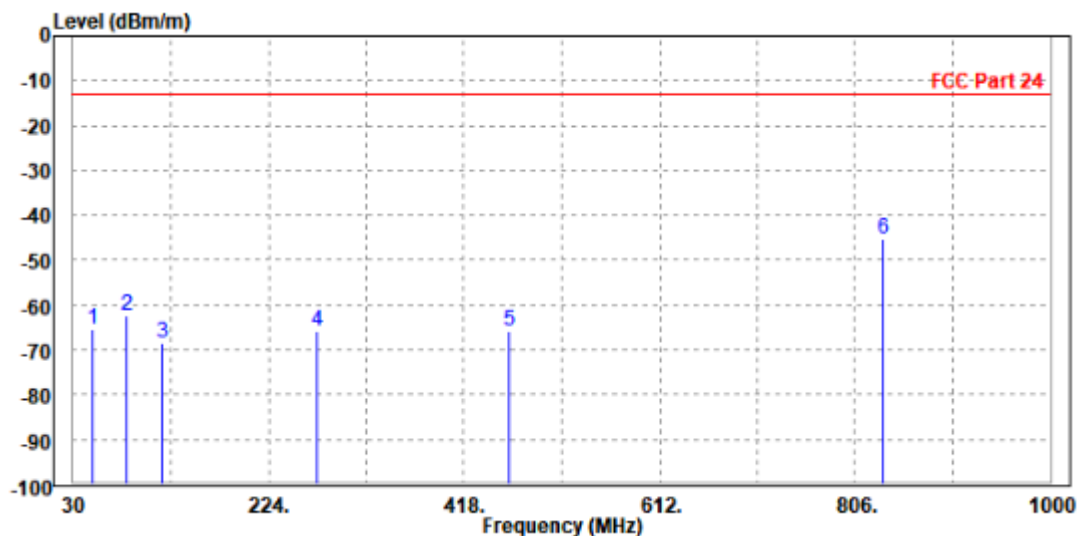
MODE	TX channel 661	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	30.970	-57.61	-55.10	-13.00	-44.61	-2.51	Peak	Horizontal
2	111.480	-66.87	-52.32	-13.00	-53.87	-14.55	Peak	Horizontal
3	161.920	-64.97	-49.39	-13.00	-51.97	-15.58	Peak	Horizontal
4	232.730	-69.90	-57.27	-13.00	-56.90	-12.63	Peak	Horizontal
5	462.620	-66.78	-61.06	-13.00	-53.78	-5.72	Peak	Horizontal
6 PP	900.090	-54.09	-54.51	-13.00	-41.09	0.42	Peak	Horizontal



MODE	TX channel 661	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	49.400	-65.49	-44.96	-13.00	-52.49	-20.53	Peak	Vertical
2	83.350	-62.49	-44.05	-13.00	-49.49	-18.44	Peak	Vertical
3	119.240	-68.27	-52.06	-13.00	-55.27	-16.21	Peak	Vertical
4	272.500	-65.88	-62.29	-13.00	-52.88	-3.59	Peak	Vertical
5	462.620	-65.92	-61.09	-13.00	-52.92	-4.83	Peak	Vertical
6 PP	833.160	-45.12	-52.49	-13.00	-32.12	7.37	Peak	Vertical





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Test Report No.: W7L-240527W003RF02

ABOVE 1GHz DATA

Note: For higher frequency, the emission is too low to be detected.

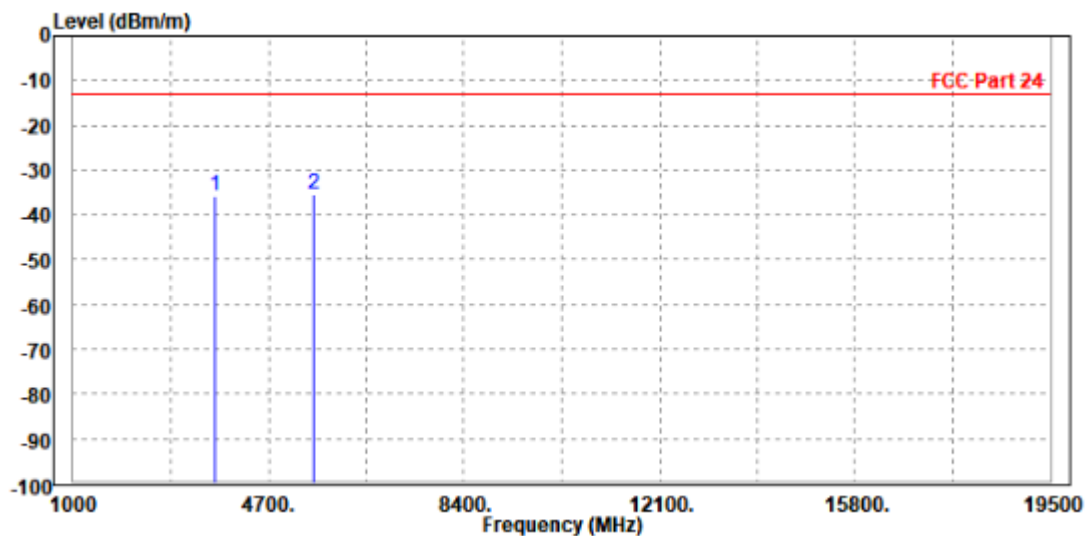
WORST-CASE DATA

GSM 1900:

CH 512

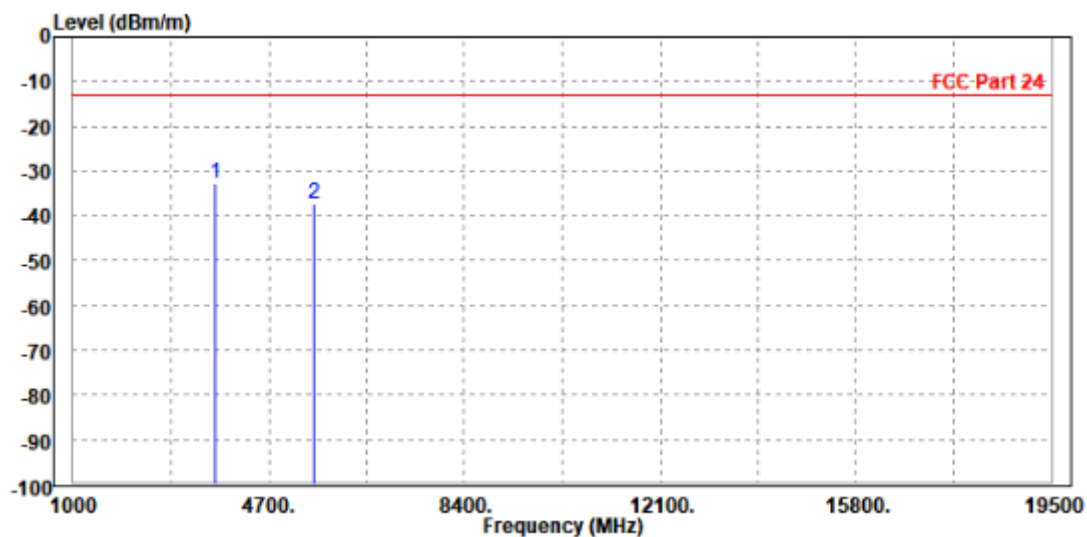
MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3701.000	-35.81	-44.21	-13.00	-22.81	8.40	Peak	Horizontal
2 PP	5551.000	-35.44	-47.24	-13.00	-22.44	11.80	Peak	Horizontal



MODE	TX channel 512	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

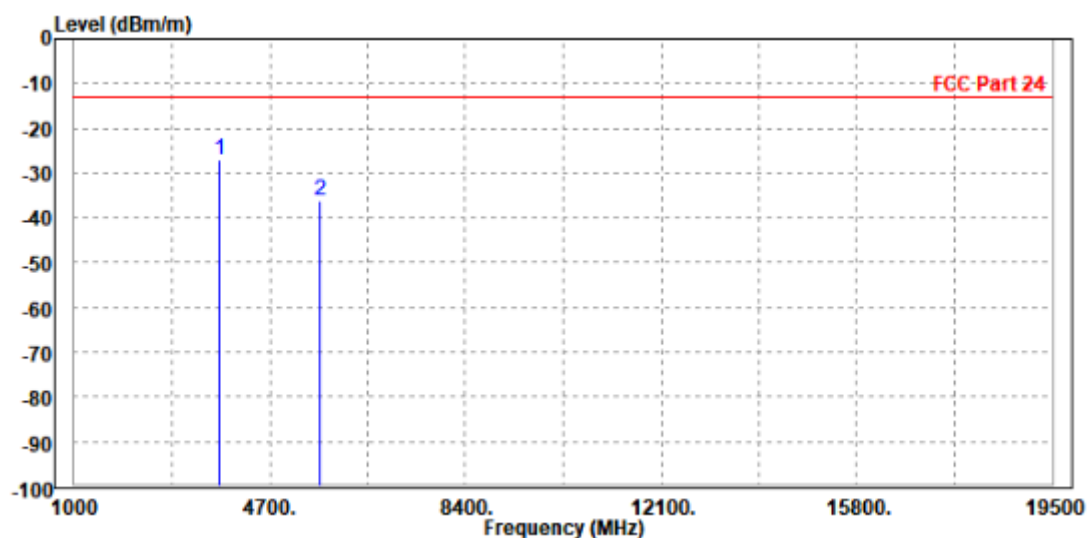
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3701.000	-32.76	-41.39	-13.00	-19.76	8.63	Peak	Vertical
2		5551.000	-37.33	-49.66	-13.00	-24.33	12.33	Peak	Vertical



CH 661

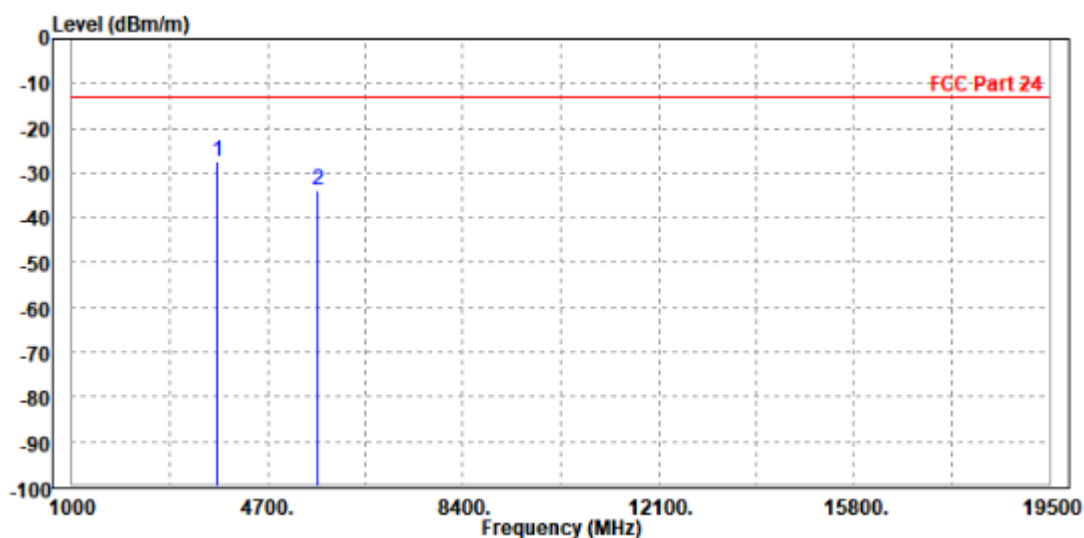
MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3756.500	-27.10	-35.45	-13.00	-14.10	8.35	Peak	Horizontal
2		5643.500	-36.14	-47.95	-13.00	-23.14	11.81	Peak	Horizontal



MODE	TX channel 661	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3756.500	-27.20	-35.83	-13.00	-14.20	8.63	Peak	Vertical
2		5643.500	-33.89	-46.21	-13.00	-20.89	12.32	Peak	Vertical





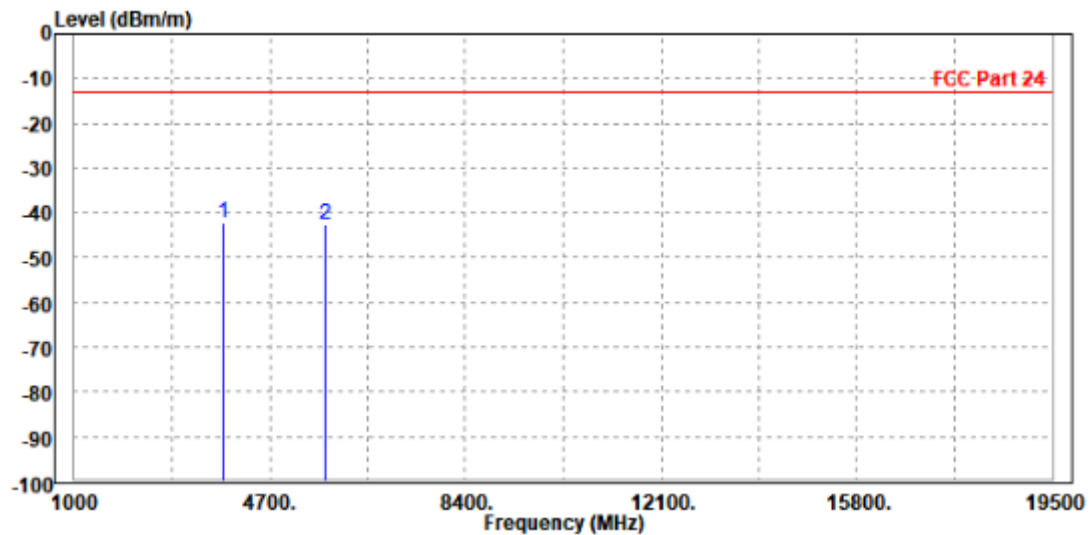
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Test Report No.: W7L-240527W003RF02

CH 810

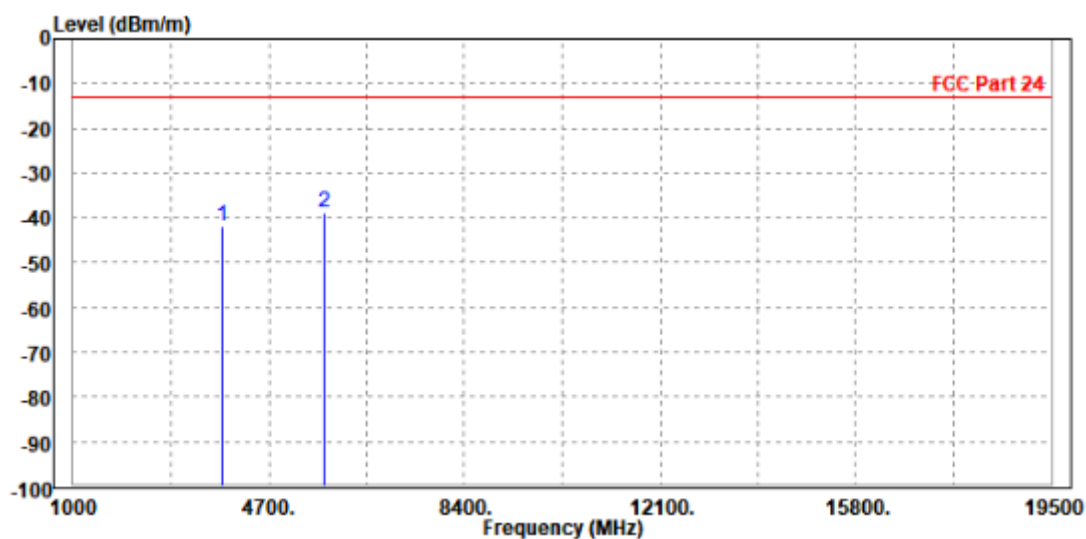
MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3812.000	-42.38	-50.69	-13.00	-29.38	8.31	Peak	Horizontal
2		5736.000	-42.49	-54.31	-13.00	-29.49	11.82	Peak	Horizontal



MODE	TX channel 810	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3812.000	-41.93	-50.56	-13.00	-28.93	8.63	Peak	Vertical
2 PP	5736.000	-38.60	-50.91	-13.00	-25.60	12.31	Peak	Vertical

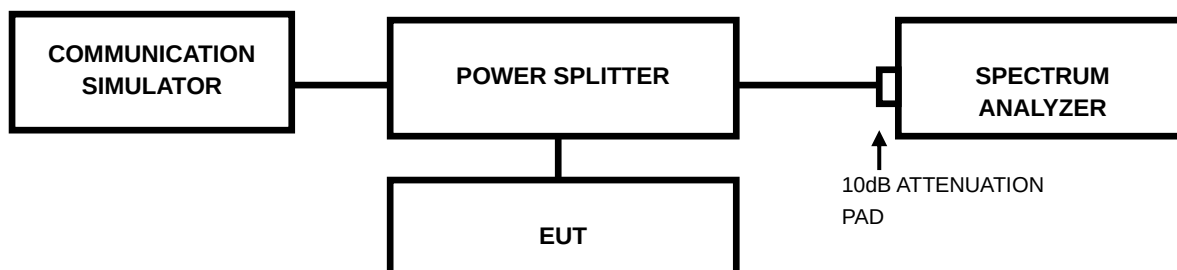


3.7 PEAK TO AVERAGE RATIO

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%.



Test Report No.: W7L-240527W003RF02

3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.



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Test Report No.: W7L-240527W003RF02

4 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:

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Tel: +86-755-88696566

Fax: +86-755-88696577

Email: customerservice.sw@bureauveritas.com

Web Site: www.adt.com.tw

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



Test Report No.: W7L-240527W003RF02

5 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.

6 APPENDIX

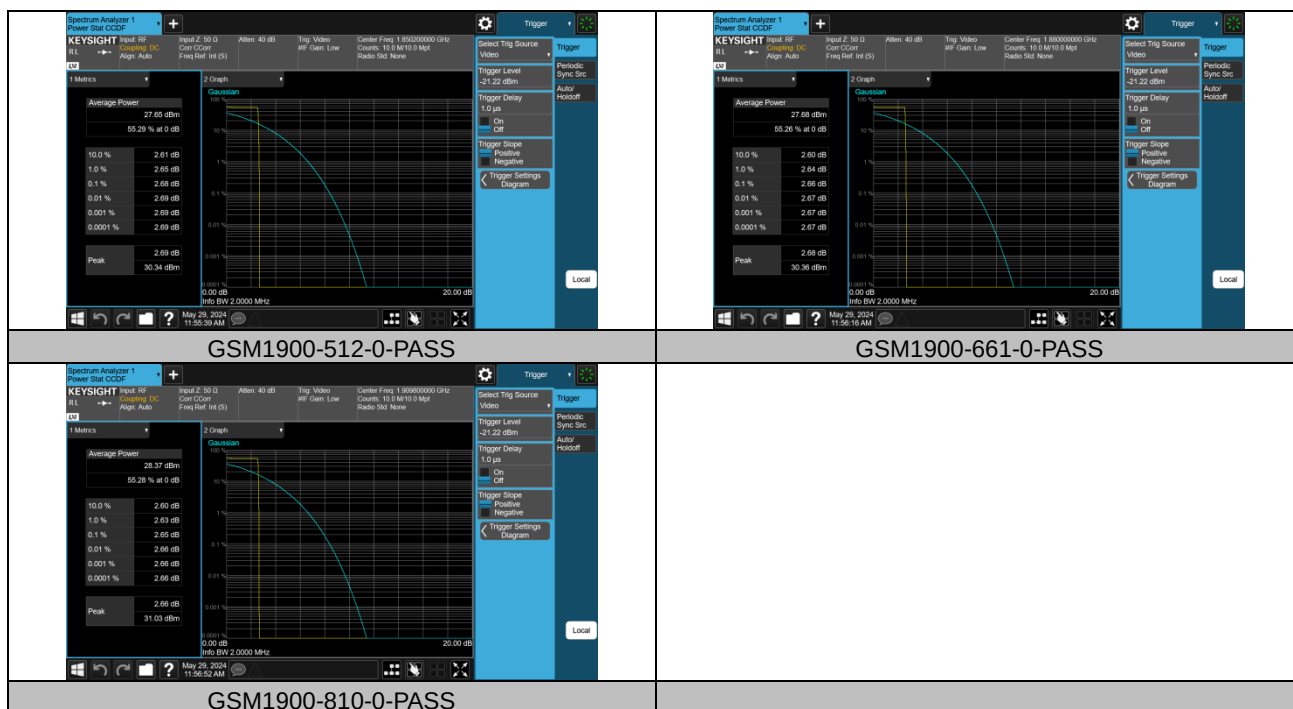
GSM1900.

PEAK-TO-AVERAGE RATIO(CCDF)

Test Result

Band	Channel	Result(dB)	Limit(dB)	Verdict
GSM1900	512	2.68	13	PASS
GSM1900	661	2.66	13	PASS
GSM1900	810	2.65	13	PASS

Test Graphs

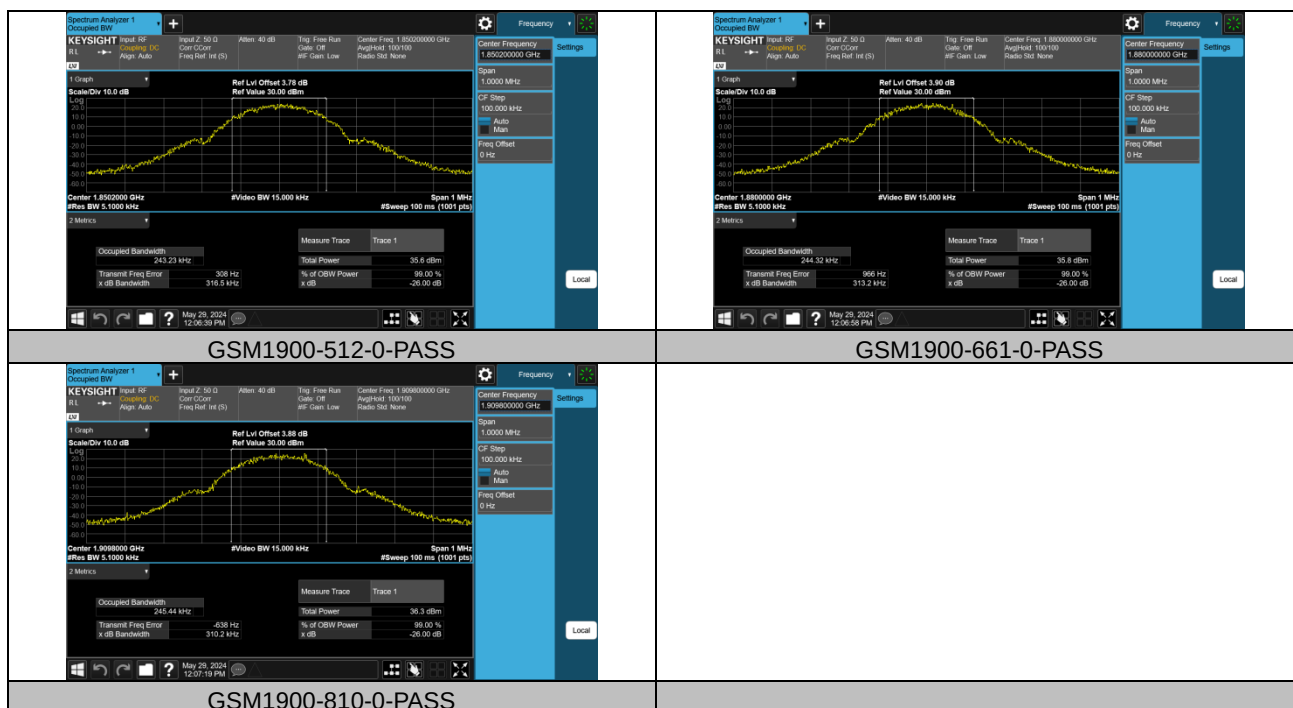


26DB BANDWIDTH AND OCCUPIED BANDWIDTH

Test Result

Band	Channel	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
GSM1900	512	0.24323	0.3165	---	PASS
GSM1900	661	0.24432	0.3132	---	PASS
GSM1900	810	0.24544	0.3102	---	PASS

Test Graphs





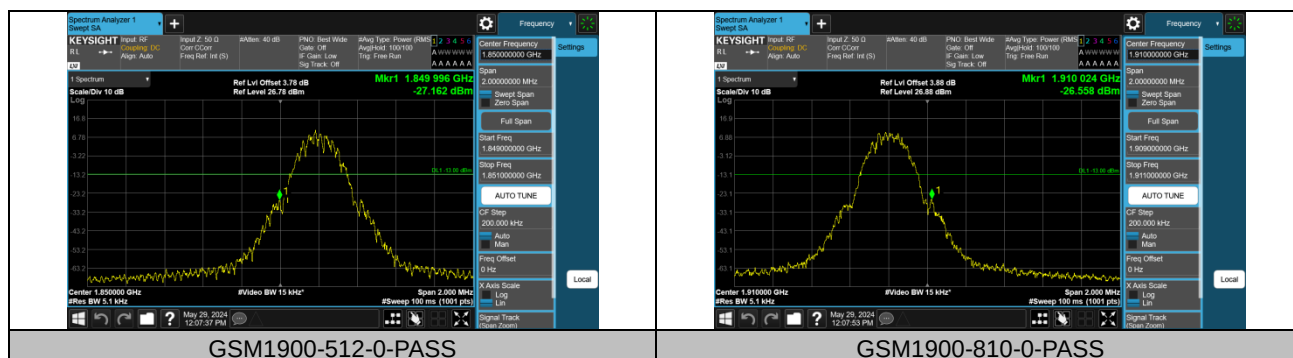
Test Report No.: W7L-240527W003RF02

BAND EDGE

Test Result

Band	Channel	Freq (MHz)	Result (dBm)	Limit(dBm)	Verdict
GSM1900	512	1850.00	-27.16	-13	PASS
GSM1900	810	1910.02	-26.56	-13	PASS

Test Graphs

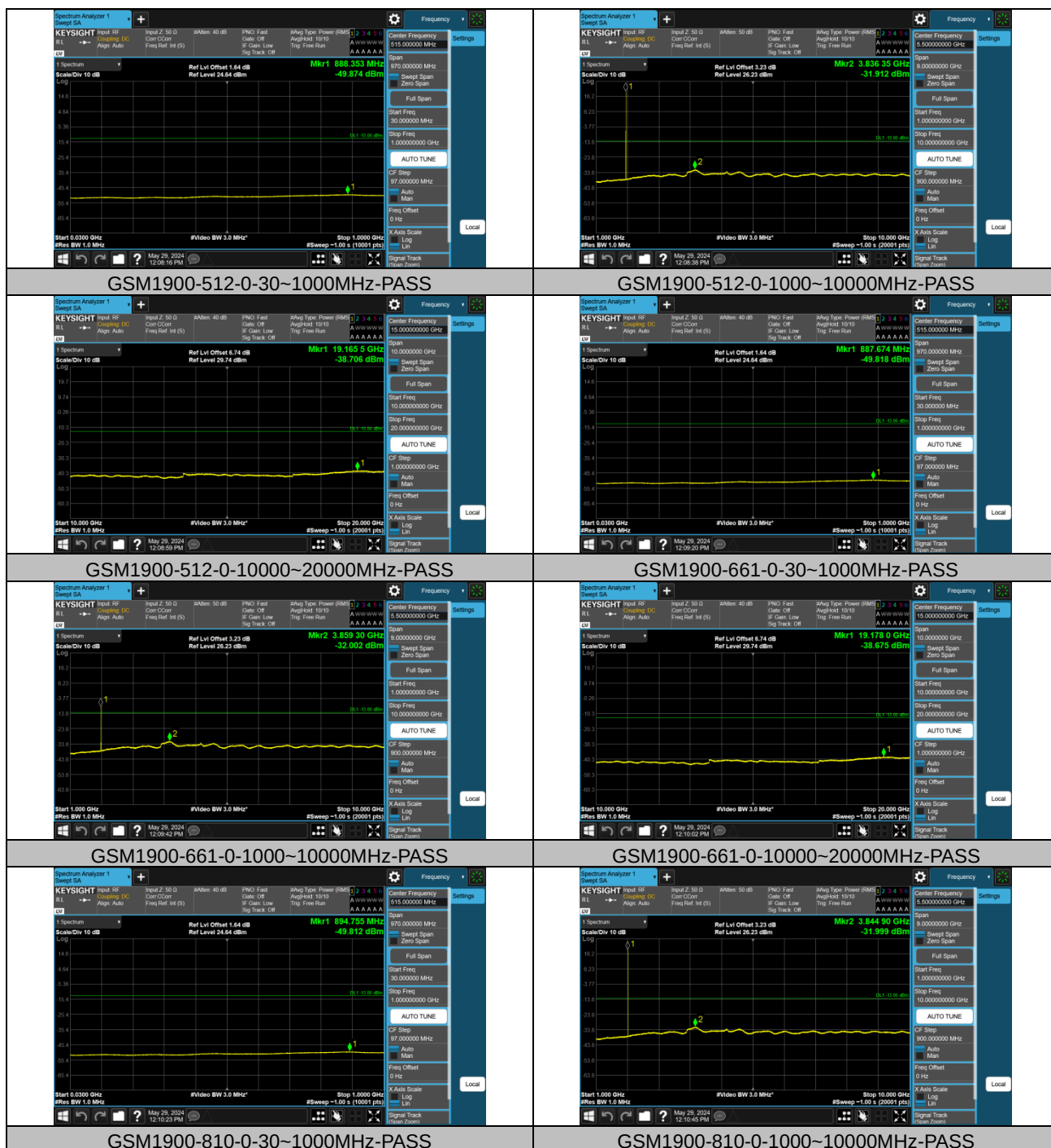


CONDUCTED SPURIOUS EMISSION

Test Result

Band	Channel	Frequency Range(MHz)	Max.Freq. (MHz)	Result (dBm)	Limit (dBm)	Verdict
GSM1900	512	30~1000MHz	888.35	-49.87	-13	PASS
GSM1900	512	1000~10000MHz	3836.35	-31.91	-13	PASS
GSM1900	512	10000~20000MHz	19165.5	-38.71	-13	PASS
GSM1900	661	30~1000MHz	887.67	-49.82	-13	PASS
GSM1900	661	1000~10000MHz	3859.3	-32	-13	PASS
GSM1900	661	10000~20000MHz	19178	-38.68	-13	PASS
GSM1900	810	30~1000MHz	894.76	-49.81	-13	PASS
GSM1900	810	1000~10000MHz	3844.9	-32	-13	PASS
GSM1900	810	10000~20000MHz	19299	-38.67	-13	PASS

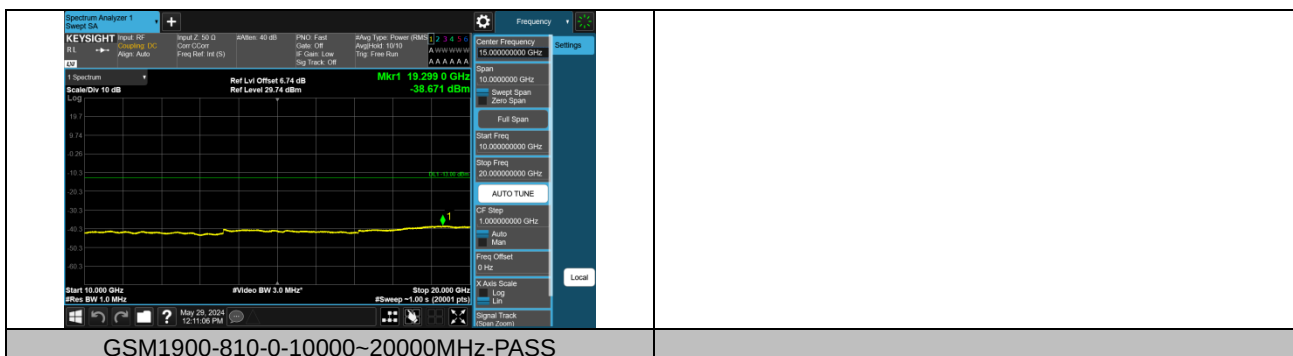
Test Graphs





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Test Report No.: W7L-240527W003RF02



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Email: customerservice.sw@bureauveritas.com

FREQUENCY STABILITY

Test Result

Voltage									
Band	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
GSM1900	512	VN	NT	680.00	0.367528	1850.07894	---	1850-1910	PASS
GSM1900	512	VL	NT	-310.00	-0.167549	1850.0774	---	1850-1910	PASS
GSM1900	512	VH	NT	70.00	0.037834	1850.078015	---	1850-1910	PASS
GSM1900	810	VN	NT	1390.00	0.727825	---	1909.92367	1850-1910	PASS
GSM1900	810	VL	NT	270.00	0.141376	---	1909.92218	1850-1910	PASS
GSM1900	810	VH	NT	420.00	0.219918	---	1909.922735	1850-1910	PASS

Temperature									
Band	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
GSM1900	512	NV	-30	-650.00	-0.351313	1850.076705	---	1850-1910	PASS
GSM1900	512	NV	-20	790.00	0.426981	1850.07808	---	1850-1910	PASS
GSM1900	512	NV	-10	180.00	0.097287	1850.079485	---	1850-1910	PASS
GSM1900	512	NV	0	640.00	0.345909	1850.078225	---	1850-1910	PASS
GSM1900	512	NV	10	-50.00	-0.027024	1850.07878	---	1850-1910	PASS
GSM1900	512	NV	20	710.00	0.383742	1850.07827	---	1850-1910	PASS
GSM1900	512	NV	30	1370.00	0.740460	1850.08005	---	1850-1910	PASS
GSM1900	512	NV	40	20.00	0.010810	1850.077305	---	1850-1910	PASS
GSM1900	512	NV	50	1080.00	0.583721	1850.077445	---	1850-1910	PASS
GSM1900	810	NV	-30	140.00	0.073306	---	1909.922355	1850-1910	PASS
GSM1900	810	NV	-20	-20.00	-0.010472	---	1909.921735	1850-1910	PASS
GSM1900	810	NV	-10	320.00	0.167557	---	1909.922045	1850-1910	PASS
GSM1900	810	NV	0	100.00	0.052362	---	1909.923425	1850-1910	PASS
GSM1900	810	NV	10	-200.00	-0.104723	---	1909.921515	1850-1910	PASS
GSM1900	810	NV	20	280.00	0.146612	---	1909.92176	1850-1910	PASS
GSM1900	810	NV	30	740.00	0.387475	---	1909.92343	1850-1910	PASS
GSM1900	810	NV	40	550.00	0.287988	---	1909.92299	1850-1910	PASS
GSM1900	810	NV	50	310.00	0.162321	---	1909.922595	1850-1910	PASS

---END---