

FCC TEST REPORT

(PART 22)

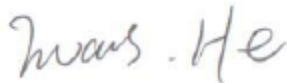
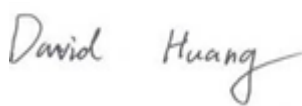
Applicant:	Jethro Trading LTD.
Address:	505 - 8840 210TH STREET, #231 Langley, Canada V1M2Y2

Manufacturer or Supplier:	Ying Tai Electronics Co., Ltd
Address:	ROOM 803,CHEVALIER HOUSE 45-51 CHATHAM ROAD SOUTH, TSIM SHA TSUI,KOWLOON,HONG KONG
Product:	Jethro 4G Simple Phone
Brand Name:	Jethro
Model Name:	SC490
FCC ID:	2AAWJSC490
Date of tests:	Jun. 04, 2020~ Aug. 05, 2020

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

- ☒ **FCC PART 22, Subpart H**
- ☒ **ANSI/TIA/EIA-603-D**
- ☒ **ANSI/TIA/EIA-603-E**

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

Issued by Evans He Engineer / Mobile Department	Approved by David Huang Manager / Mobile Department
 Date: Aug. 05, 2020	 Date: Aug. 05, 2020

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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Test Report No.: RF200512S004-4

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF200512S004-4	Original release	Aug. 05, 2020

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	REMARK
2.1046 22.913 (a)	Effective Radiated Power	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 22.917b	Occupied Bandwidth	PASS	Meet the requirement of limit.
--	Peak to average ratio*	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -12.82dB at 1697.6MHz.

* Refer to KDB 971168 D01 Power Meas License Digital Systems v02r02.

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	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GHz	3.74dB
	1GHz ~ 18GHz	4.66dB
	18GHz ~ 40GHz	4.67dB

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.
EMI Test Receiver	Rohde&Schwarz	ESL6	1300.5001K06-10 0262-eQ	Mar. 24,20	Mar. 24,21
Bilog Antenna	Sunol Sciences	JB6	A110712	Apr. 08, 20	Apr. 07, 21
Active Antenna	CMO-POWER	AL-130	121031	Mar. 27, 20	Mar. 26, 21
Signal Amplifier	HP	8447E	443008	Mar. 24, 20	Mar. 24, 21
Spectrum	Agilent	E4446A	MY46180622	Mar. 24, 20	Mar. 24, 21
MXA signal analyzer	Agilent	N9020A	MY49100060	Mar. 22, 20	Mar. 21, 21
Horn Antenna	COM-POWER	HAH-118	71259	Mar. 20, 20	Mar. 19, 21
Horn Antenna	COM-POWER	HAH-118	71283	Jun. 30, 20	Jun. 29, 21
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170147	Jun. 30, 20	Jun. 29, 21
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170242	Mar. 24, 20	Mar. 24, 21
AMPLIFIER	EM Electornic Corporation	EM01G26G	60613	Jan. 04, 20	Jan. 03,21
AMPLIFIER	Emc Instruments Corporation	Emc012645	980077	Oct. 18,18	Oct. 17,21
3m Semi-anechoic Chamber	SAEMC	9m*6m*6m	N/A	Mar. 24, 20	Mar. 24, 21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A
Wireless Connectivity Tester	R&S	CMW270	1201.0002K75	Dec. 18, 19	Dec. 17, 20
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 24,20	Mar. 24,21
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 24,20	Mar. 24,21
RF Control Unit	Tonscend	JS0806-2	188060112	Mar. 24,20	Mar. 24,21
Signal Generation	Agilent	E4421B	US40051152	Dec. 18, 19	Dec. 17, 20
DC Power Supply	Agilent	E3640A	MY40004013	Mar. 28,20	Mar. 27,21
Programmable Temperature & Humidity Chamber	Hongjin	HYC-TH-225D H	DG-180746	Mar. 24,20	Mar. 24,21
Test System	Tonscend	JS 1120-3	N/A	N/A	N/A
Power Splitter	Weinschel	1580-1	TL177	Mar. 20,20	Mar. 19,21
Universal Radio Communication	ROHDE&SCHW ARZ	CMU200	112012	Mar. 24,20	Mar. 24,21
Universal Radio Communication	ROHDE&SCHW ARZ	CMU200	121393	Mar. 28,20	Mar. 27,21
Wireless Communication Test Set	ROHDE&SCHW ARZ	CMW500	1201.0002K500-1 55842-Gd	Nov. 1, 19	Oct. 31, 20

- NOTE:** 1. The calibration interval of the above test instruments is 12 months (except 3m Semi-anechoic Chamber). 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 535293.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	Jethro 4G Simple Phone	
MODEL NAME	SC490	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.7Vdc (Li-ion, ion battery)	
MODULATION TYPE	GSM/GPRS	GMSK
	WCDMA	BPSK, QPSK
FREQUENCY RANGE	GSM/GPRS	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
MAX. ERP POWER	GSM	1227.44mW
	GPRS	1213.39 mW
	WCDMA	127.06mW
EMISSION DESIGNATOR	GSM	247KGXW
	GPRS	246KG7W
	WCDMA	4M19F9W
ANTENNA TYPE	PIFA Antenna with 0.5dBi gain	
HW VERSION	L831-MB-V2.2	
SW VERSION	4.4.95 Sat Jul 18 19:54:38 CST 2020	
I/O PORTS	Refer to user's manual	
DATA CABLE	USB cable: Unshielded, detachable, 1.0m	

NOTE:

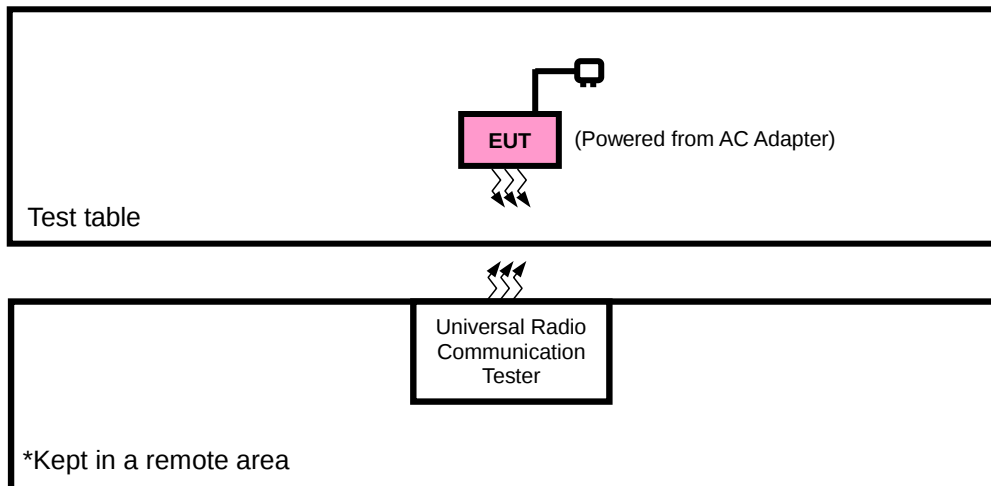
- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT was powered by the following adapter:

ADAPTER	
BRAND:	N/A
MODEL:	HJ-0500600E1-US
INPUT:	100-240V~50/60Hz 0.2A
OUTPUT:	5.0V --- 600mA

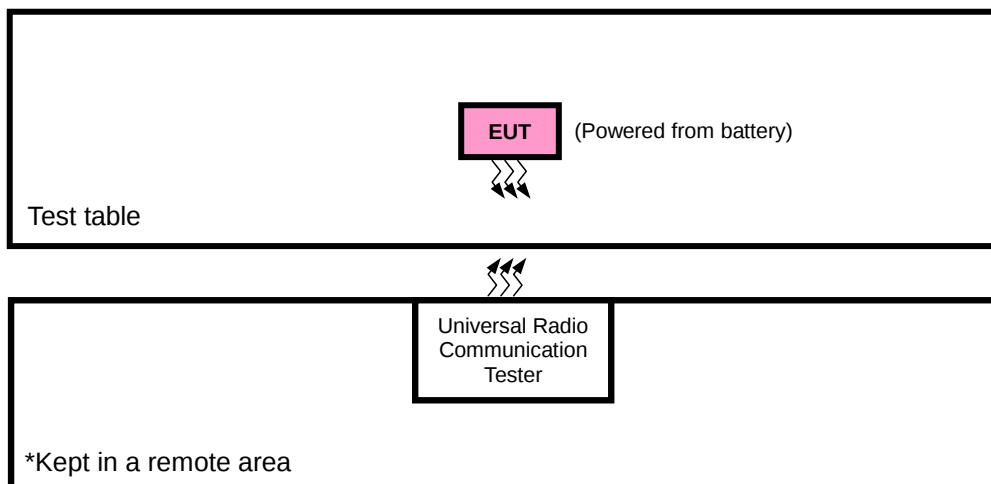
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION



FOR CONDUCTED & E.R.P. 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	N/A	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

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/EDGE/WCDMA/LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter + USB Cable with LTE link
B	EUT + Battery with LTE link

GSM MODE

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

WCDMA MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
B	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
B	FREQUENCY STABILITY	4132 to 4233	4132, 4233	WCDMA
B	OCCUPIED BANDWIDTH	4132 to 4233	4132, 4182, 4233	WCDMA
B	BAND EDGE	4132 to 4233	4132, 4233	WCDMA
B	CONDCUDED EMISSION	4132 to 4233	4132, 4182, 4233	WCDMA
A	RADIATED EMISSION	4132 to 4233	4132, 4182, 4233	WCDMA
B	PEAK TO AVERAGE RATIO	4132 to 4233	4132, 4182, 4233	WCDMA

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
PEAK TO AVERAGE RATIO	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
FREQUENCY STABILITY	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
OCCUPIED BANDWIDTH	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
BAND EDGE	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
CONDCUDED EMISSION	24deg. C, 60%RH	3.7Vdc from Battery	Aaron Liang
RADIATED EMISSION	25deg. C, 59%RH	5Vdc from adapter	Aaron Liang



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 22

KDB 971168 D01 Power Meas License Digital Systems v03

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:

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

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);

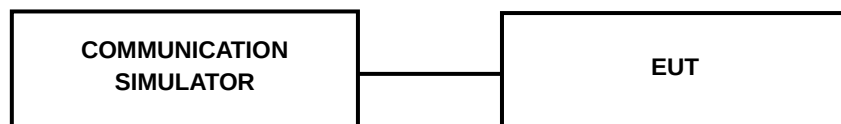
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

CONDUCTED POWER MEASUREMENT:

- The EUT was set up for the maximum power with LTE 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

CONDUCTED POWER MEASUREMENT:



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

3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM850			
Channel	128	190	251	Max. Tune-up Power
Frequency	824.2	836.4	848.8	
GSM (GMSK, 1Tx-slot)	32.43	32.53	32.54	33
GPRS (GMSK, 1Tx-slot)	32.33	32.39	32.49	33
GPRS (GMSK, 2Tx-slot)	29.98	29.99	30.06	30.5
GPRS (GMSK, 3Tx-slot)	28.66	28.69	28.77	29
GPRS (GMSK, 4Tx-slot)	26.45	26.58	26.65	27

Band	WCDMA V			WCDMA V
TX Channel	4132	4182	4233	Max. Tune-up Power
Rx Channel	4357	4407	4458	
Frequency	826.4	836.4	846.6	
RMC 12.2K	23.23	23.24	23.26	23.5
HSDPA Subtest-1	22.41	22.28	22.45	22.50
HSDPA Subtest-2	22.16	22.24	22.43	22.50
HSDPA Subtest-3	22.41	22.19	22.38	22.50
HSDPA Subtest-4	22.13	22.31	22.28	22.50
HSUPA Subtest-1	22.42	22.14	22.34	22.50
HSUPA Subtest-2	22.26	22.18	22.37	22.5
HSUPA Subtest-3	22.30	22.22	22.23	22.5
HSUPA Subtest-4	22.29	22.34	22.37	22.5
HSUPA Subtest-5	22.37	22.42	22.44	22.50



ERP POWER (dBm)

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.43	0.5	30.78	1196.74	7
189	836.4	32.53	0.5	30.88	1224.62	7
251	848.8	32.54	0.5	30.89	1227.44	7

GPRS

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.33	0.5	30.68	1169.5	7
189	836.4	32.39	0.5	30.74	1185.77	7
251	848.8	32.49	0.5	30.84	1213.39	7

WCDMA

Channel	Frequency (MHz)	Conducted Power (dBm)	G _T -L _C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
4132	826.4	22.6	0.5	20.95	124.45	7
4182	836.4	22.65	0.5	21.00	125.89	7
4233	846.6	22.69	0.5	21.04	127.06	7

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
: 2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

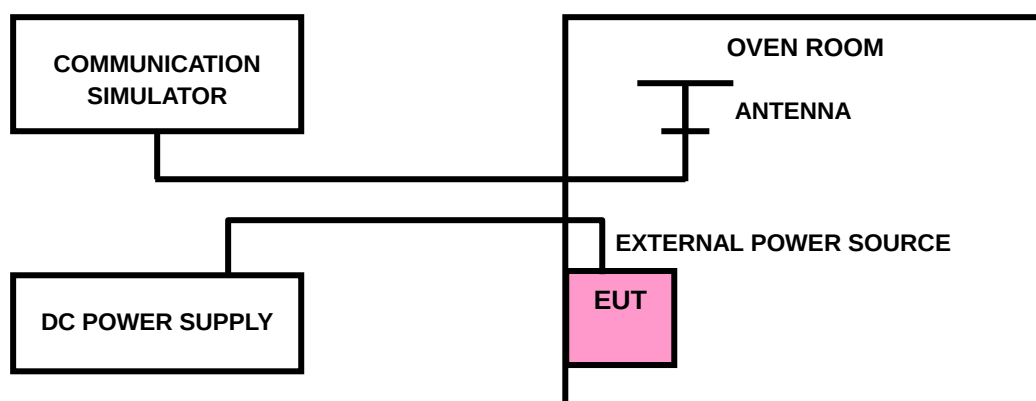
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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





3.2.4 TEST RESULTS

GSM 850

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.0221	0.0294	2.5
V_{min}	0.0323	0.0362	2.5
V_{max}	0.0256	0.0347	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	0.0409	0.0391	2.5
-20	0.0374	0.0372	2.5
-10	0.0457	0.0386	2.5
0	0.0341	0.0381	2.5
10	0.0329	0.0519	2.5
20	0.0255	0.0555	2.5
30	0.0183	0.0655	2.5
40	0.0061	0.0558	2.5
50	0.0005	0.0667	2.5



GPRS 850

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.0443	0.0412	2.5
V_{min}	0.0567	0.0324	2.5
V_{max}	0.0612	0.0239	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	0.0687	0.0302	2.5
-20	0.0825	0.0396	2.5
-10	0.0745	0.0407	2.5
0	0.0599	0.0532	2.5
10	0.0654	0.0425	2.5
20	0.0625	0.0501	2.5
30	0.0604	0.0513	2.5
40	0.0688	0.0644	2.5
50	0.0698	0.056	2.5

WCDMA Band V

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
V_{nor}	0.0381	0.0383	2.5
V_{min}	0.0361	0.0349	2.5
V_{max}	0.044	0.0339	2.5

NOTE: The applicant defined the normal working voltage of the battery is from V_{min} to V_{max} .

FREQUENCY ERROR vs. TEMPERATURE.

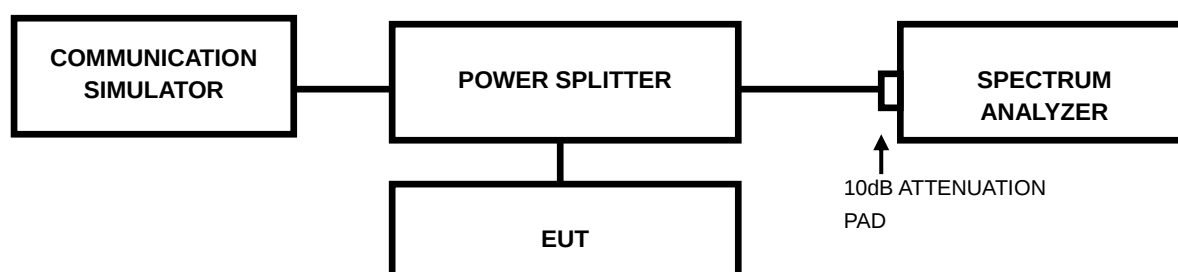
TEMP. (°C)	FREQUENCY ERROR (ppm)		LIMIT (ppm)
	Low Channel	High Channel	
-30	0.0292	0.0213	2.5
-20	0.0157	0.0092	2.5
-10	0.0053	0.0054	2.5
0	-0.0054	0.0067	2.5
10	0.0071	0.0215	2.5
20	-0.0077	0.0111	2.5
30	-0.002	0.0121	2.5
40	-0.009	0.0268	2.5
50	-0.0001	0.0146	2.5

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.

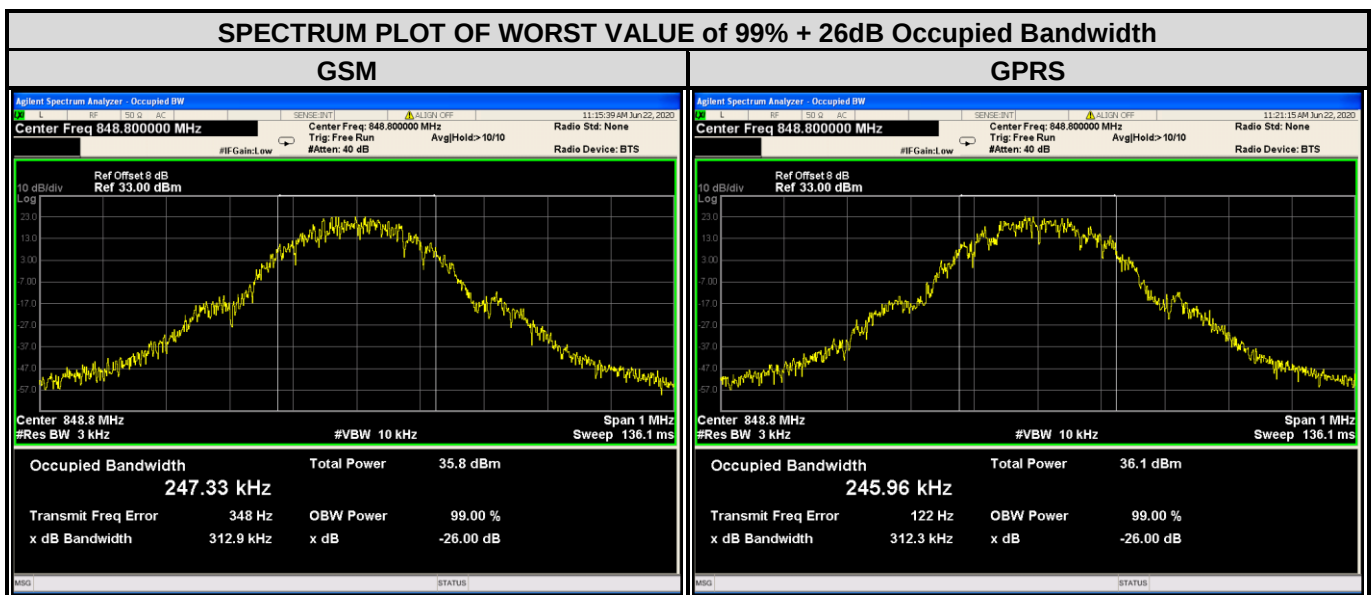
3.3.2 TEST SETUP



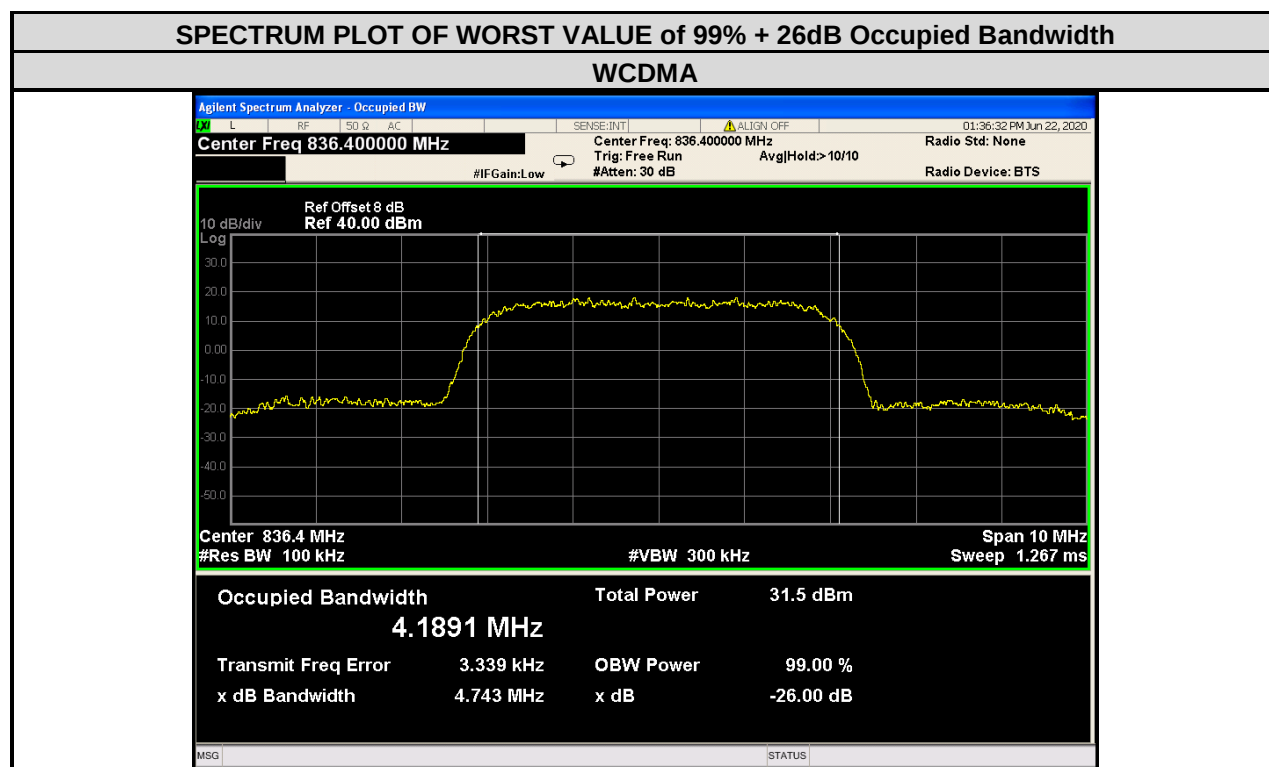


3.3.3 TEST RESULTS

CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)	
		GSM	GPRS			GSM	GPRS
128	824.2	246.24	245.94	128	824.2	312.6	312.6
189	836.4	244.20	245.04	189	836.4	312.1	312.3
251	848.8	247.33	245.96	251	848.8	312.9	312.3



CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)	CHANNEL	Frequency (MHz)	26dB Bandwidth (MHz)
		WCDMA			WCDMA
4132	826.4	4.1859	4132	826.4	4.702
4182	836.4	4.1891	4182	836.4	4.743
4233	846.6	4.1720	4233	846.6	4.697

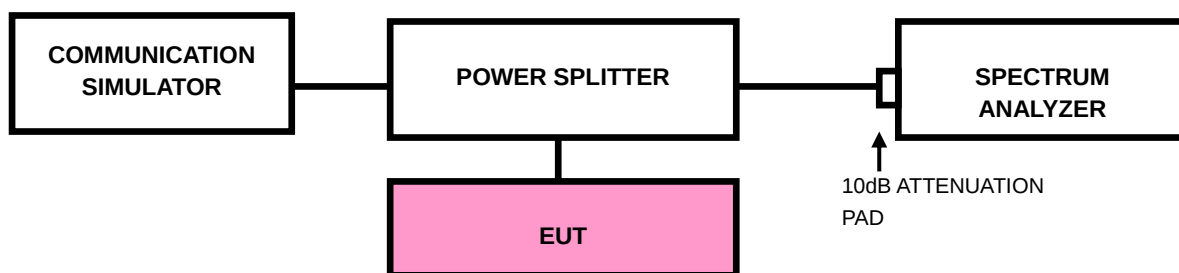


3.4 BAND EDGE MEASUREMENT

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



3.4.3 TEST PROCEDURES

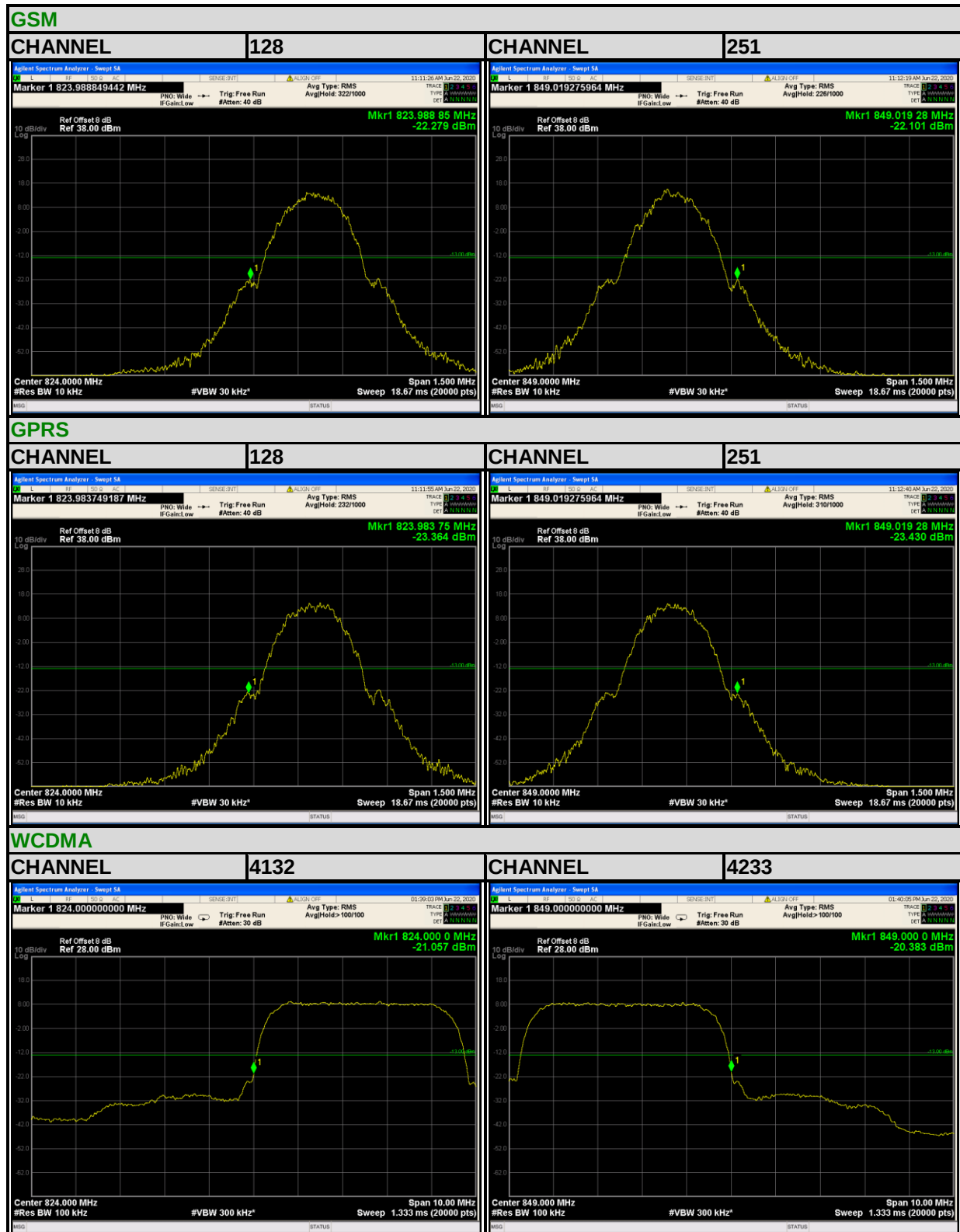
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz)
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- h. Record the max trace plot into the test report.



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Test Report No.: RF200512S004-4

3.4.4 TEST RESULTS



Bureau Veritas (Shenzhen)
Consumer Products Services Co., Ltd.

Zone A, Floor 1, Building 2, Wan Ye Long Technology
Park, South Side of Zhoushi Road, Bao'an District,
Shenzhen Guangdong, 518108, China.

Tel: +86-755-26014629 Ext.800
Email: customerservice.sz@bureauveritas.com

3.5 CONDUCTED SPURIOUS EMISSIONS

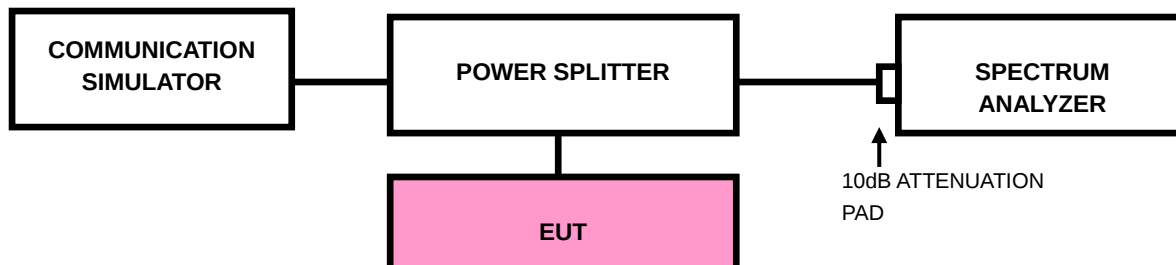
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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

- 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 9 kHz to 9GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP

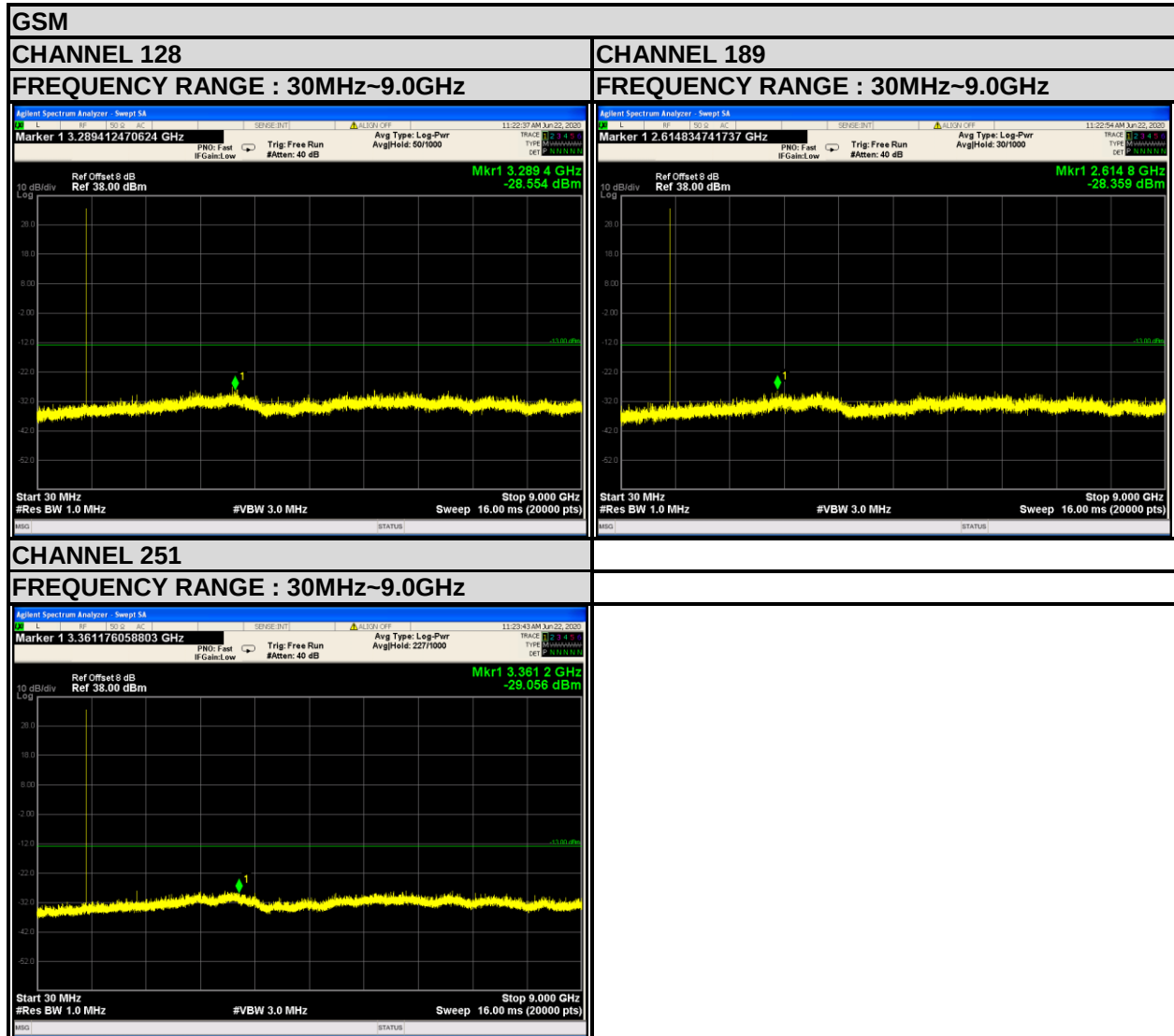




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3.5.4 TEST RESULTS





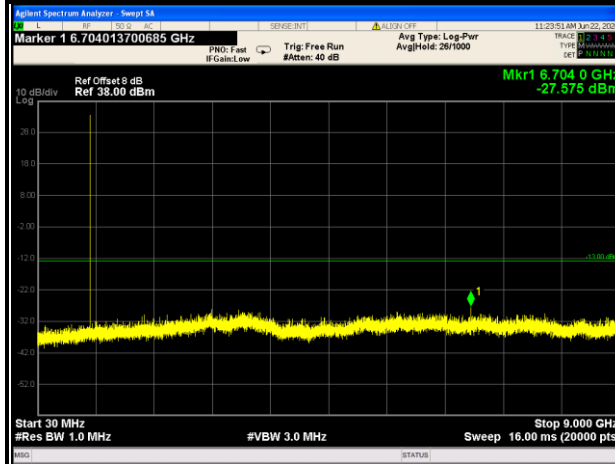
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Test Report No.: RF200512S004-4

GPRS

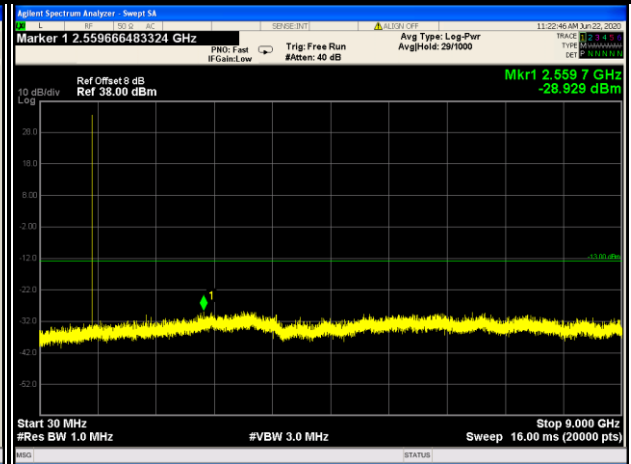
CHANNEL 128

FREQUENCY RANGE : 30MHz~9.0GHz



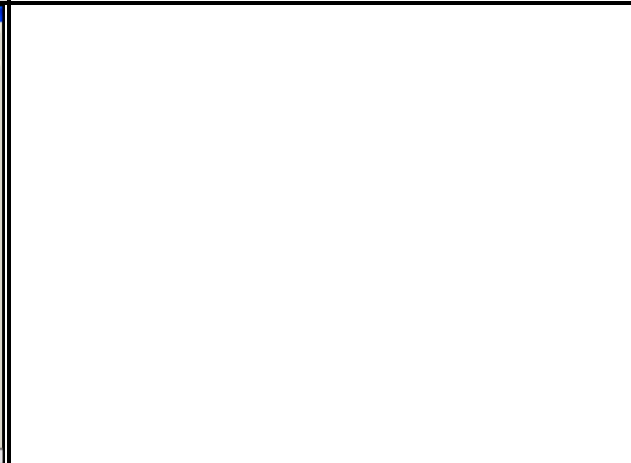
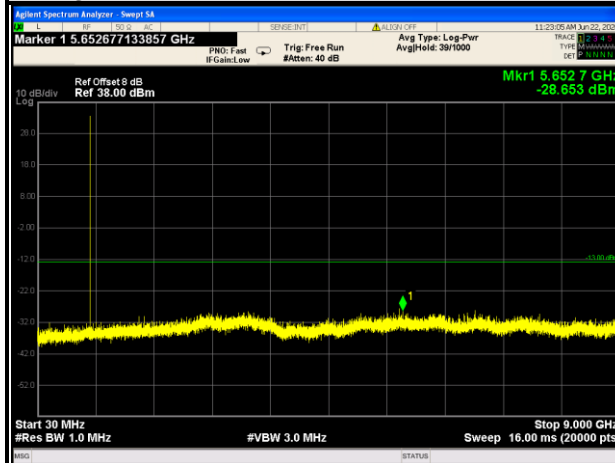
CHANNEL 189

FREQUENCY RANGE : 30MHz~9.0GHz



CHANNEL 251

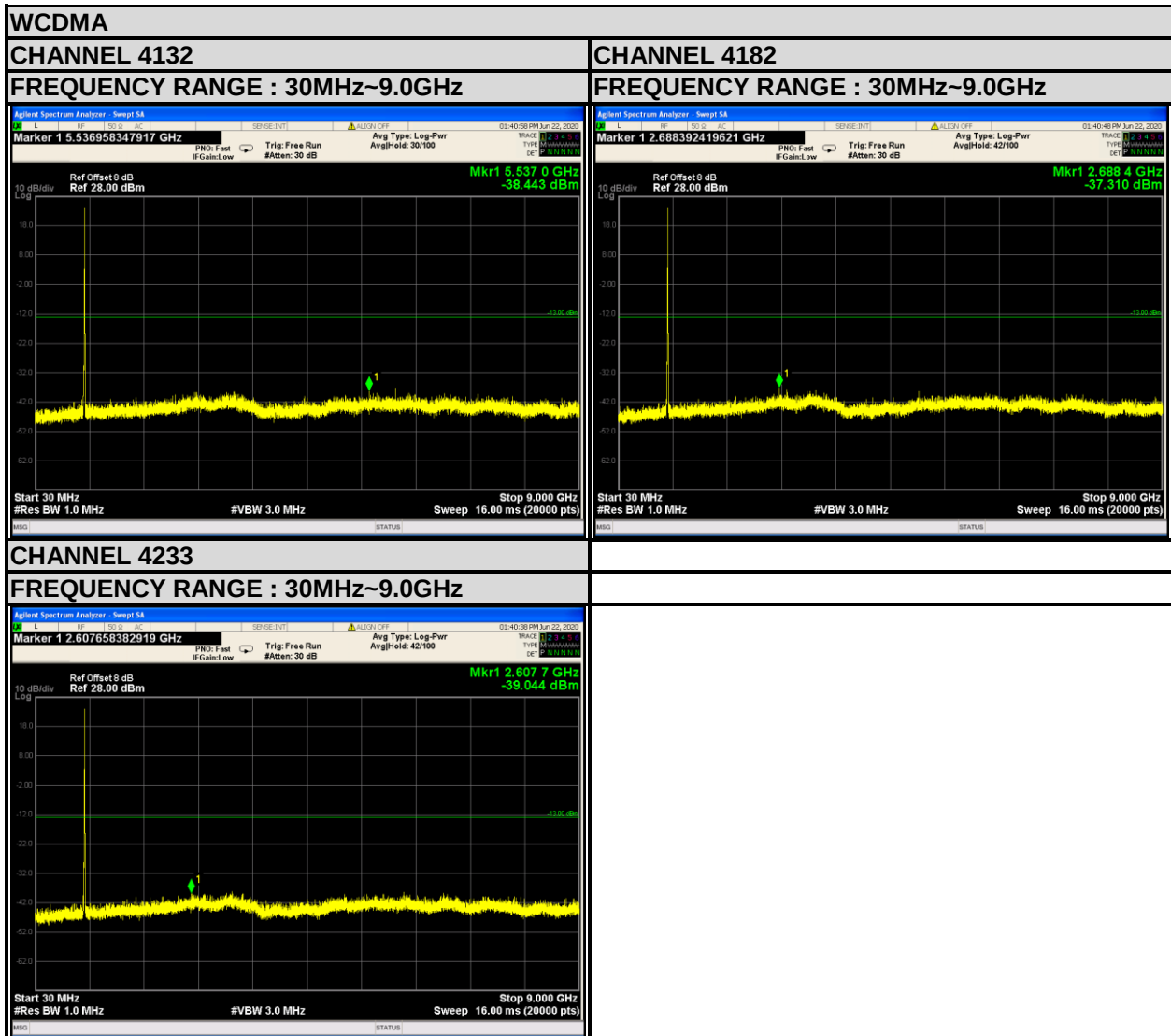
FREQUENCY RANGE : 30MHz~9.0GHz





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Test Report No.: RF200512S004-4



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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,
 $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}$.

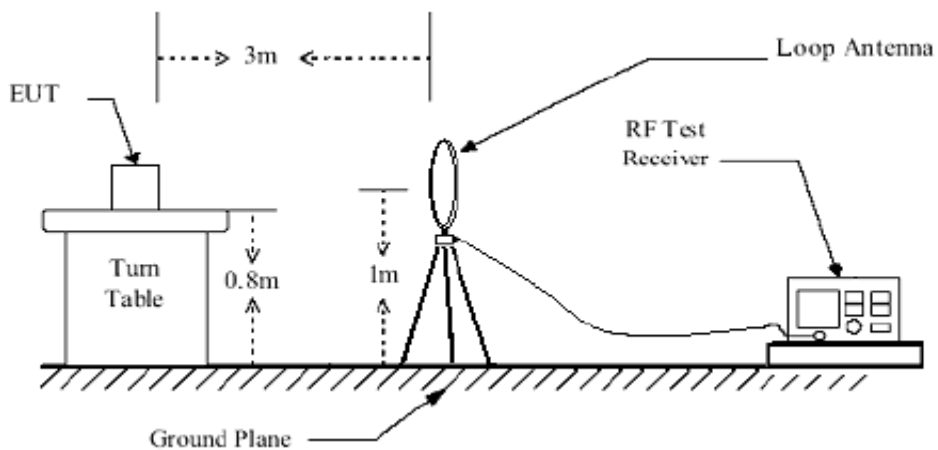
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

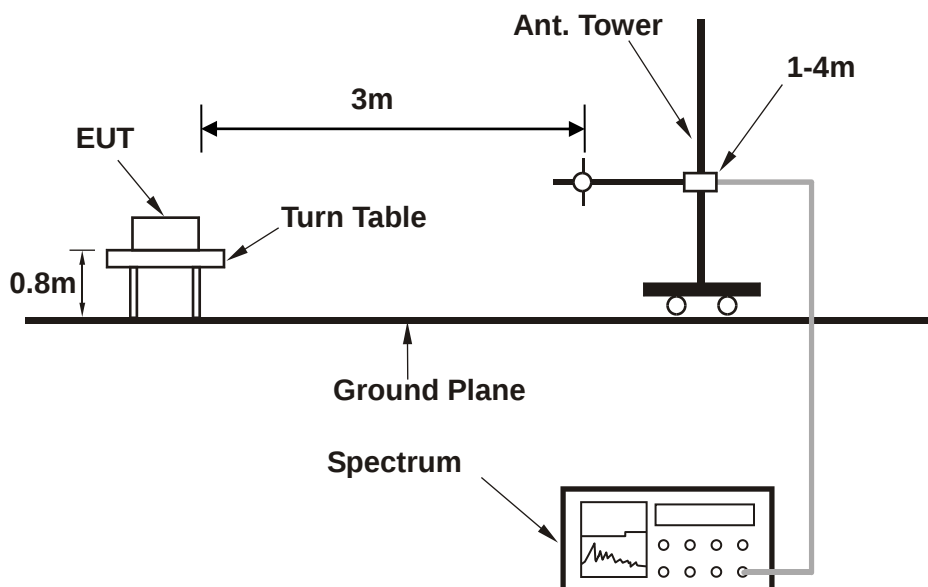
No deviation

3.6.4 TEST SETUP

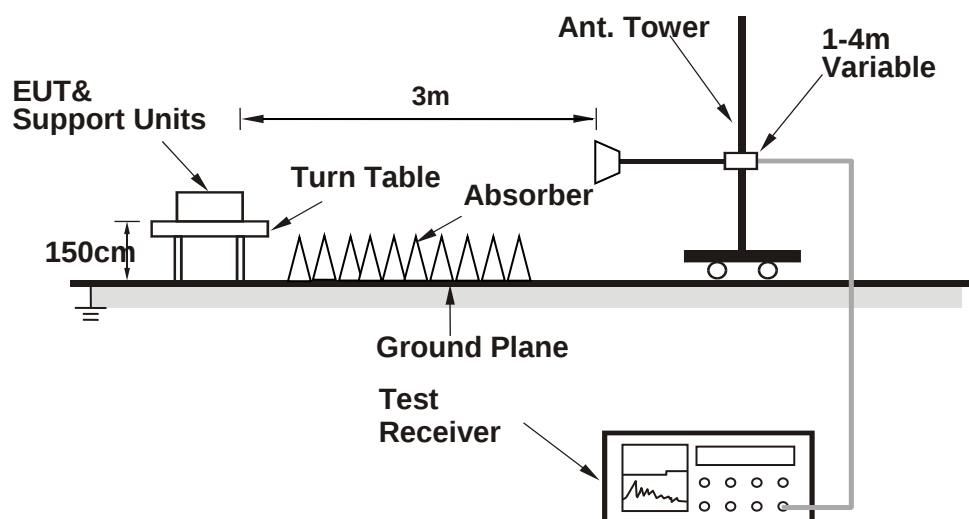
<Below 30MHz>



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



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

3.6.5 TEST RESULTS

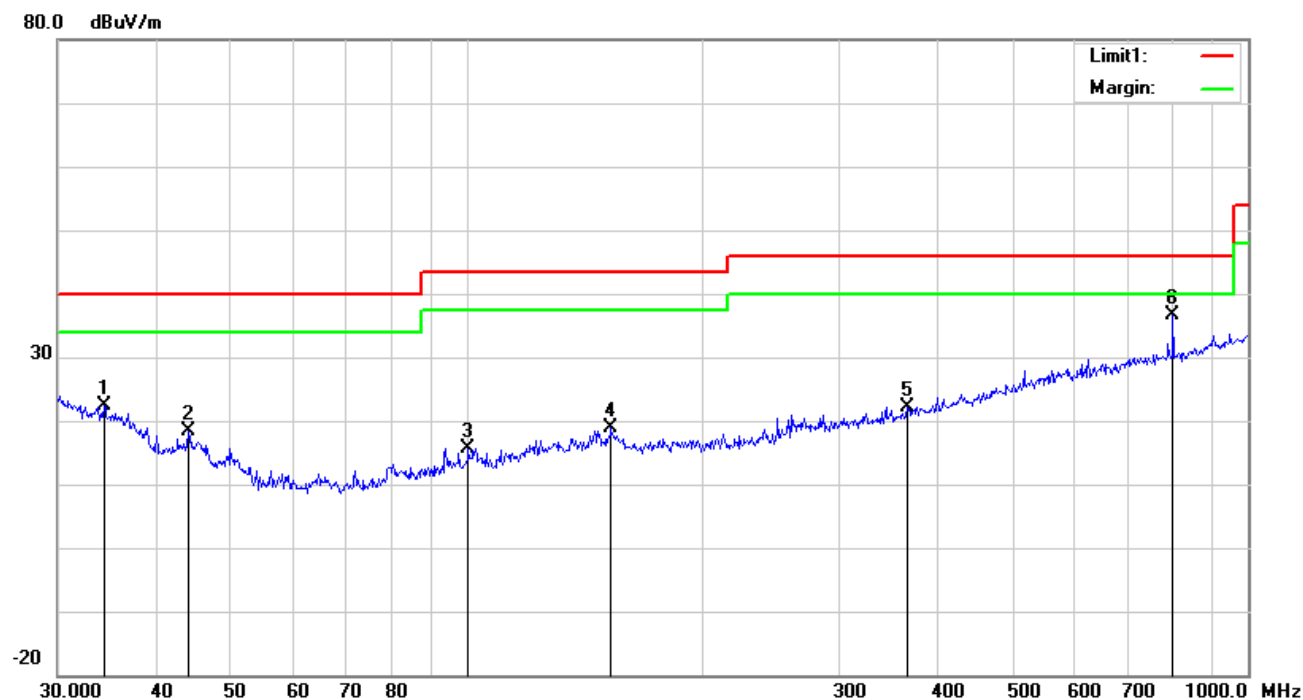
BELOW 1GHz WORST-CASE DATA

30 MHz – 1GHz data:

GSM 850

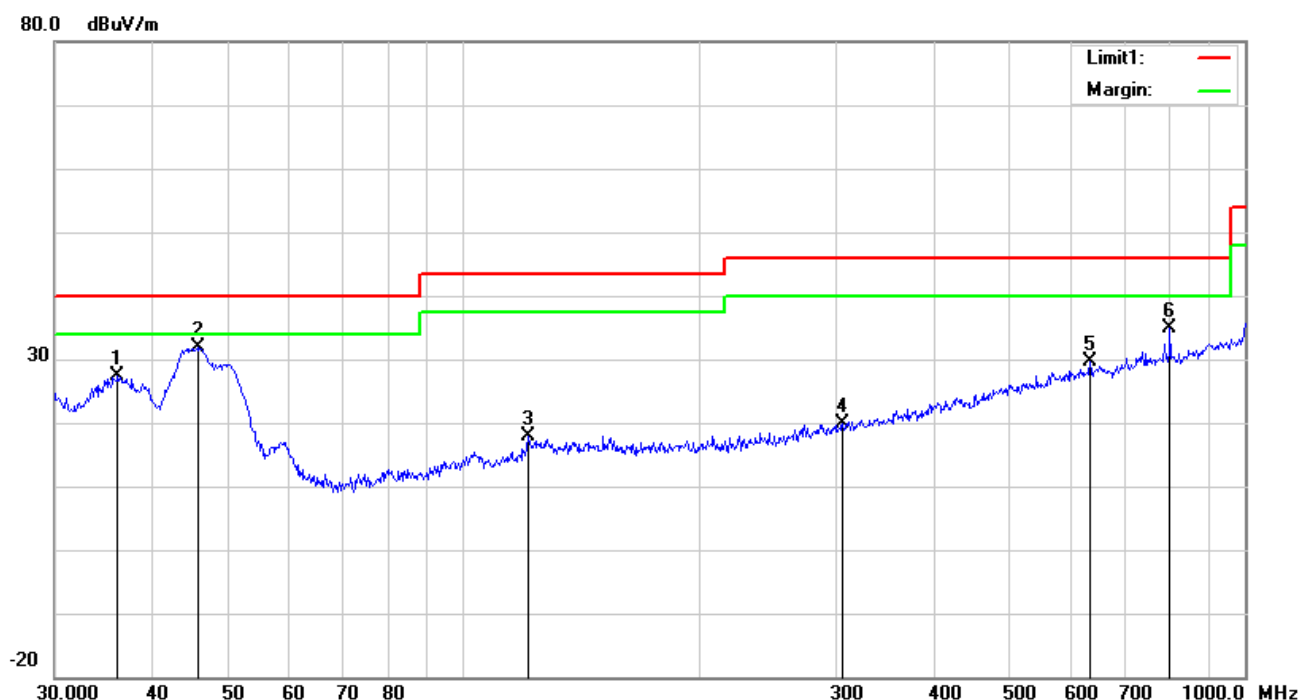
MODE	TX channel 189	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Aaron Liang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m										
No.	Frequency (MHz)	Reading (dBuV/m)	Ant_F (dB/m)	PA_G (dB)	Cab_L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	34.3964	27.10	17.29	22.25	0.15	22.29	40.00	-17.71	140	240
2	44.1202	30.22	10.15	22.29	0.20	18.28	40.00	-21.72	140	240
3	100.5806	28.42	8.77	22.32	0.82	15.69	43.50	-27.81	137	169
4	153.2004	28.96	10.94	22.32	1.28	18.86	43.50	-24.64	137	169
5	366.8231	27.14	15.31	22.10	1.88	22.23	46.00	-23.77	144	170
6	801.7863	32.84	22.29	21.15	2.56	36.54	46.00	-9.46	144	170



MODE	TX channel 189	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Aaron Liang		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m										
No.	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
	(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	36.1272	33.58	15.95	22.26	0.16	27.43	40.00	-12.57	131	29
2	45.6948	44.64	9.34	22.30	0.21	31.89	40.00	-8.11	131	29
3	121.1231	28.02	11.23	22.36	0.96	17.85	43.50	-25.65	162	241
4	305.6800	26.68	13.81	22.27	1.73	19.95	46.00	-26.05	162	241
5	633.9073	28.25	20.48	21.51	2.34	29.56	46.00	-16.44	136	222
6	801.7863	31.24	22.29	21.15	2.56	34.94	46.00	-11.06	136	222



ABOVE 1GHz

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

GSM 850

Low channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1648.55	V	-23.22	-13	-10.22
1648.55	H	-23.8	-13	-10.8
2471.5	V	-39.86	-13	-26.86
2471.5	H	-35.69	-13	-22.69

Middle channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1672.35	V	-20.16	-13	-7.16
1672.35	H	-22.93	-13	-9.93
2511.7	V	-34.98	-13	-21.98
2511.7	H	-30.31	-13	-17.31

High channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
2696.5	V	-21.89	-13	-8.89
1696.5	H	-27.63	-13	-14.63
2547.97	V	-40.27	-13	-27.27
2547.97	H	-38.91	-13	-25.91

Note:

- 1, The testing has been conformed to $10 \times 848.8 \text{ MHz} = 8,488 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

WCDMA Band V:

Low channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1654.47	V	-45.02	-13	-32.02
1654.4	H	-49.38	-13	-36.38
2498.2	V	-46.43	-13	-33.43
2650.4	H	-39.93	-13	-26.93

Middle channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1666.37	V	-44.02	-13	-31.02
1666.37	H	-49.55	-13	-36.55
2498.2	V	-44.8	-13	-31.8
2640.9	H	-47.23	-13	-34.23

High channel

Frequency (MHz)	Antenna Polarization (H/V)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1690.4	V	-46.16	-13	-33.16
1690.4	H	-48.84	-13	-35.84
2584.76	V	-45.73	-13	-32.73
2575.5	H	-46.5	-13	-33.5

Note:

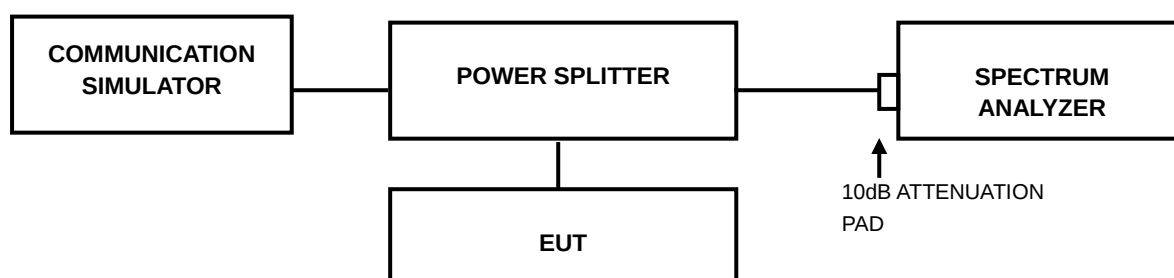
- 1, The testing has been conformed to $10 \times 846.6 \text{ MHz} = 8,466 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

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



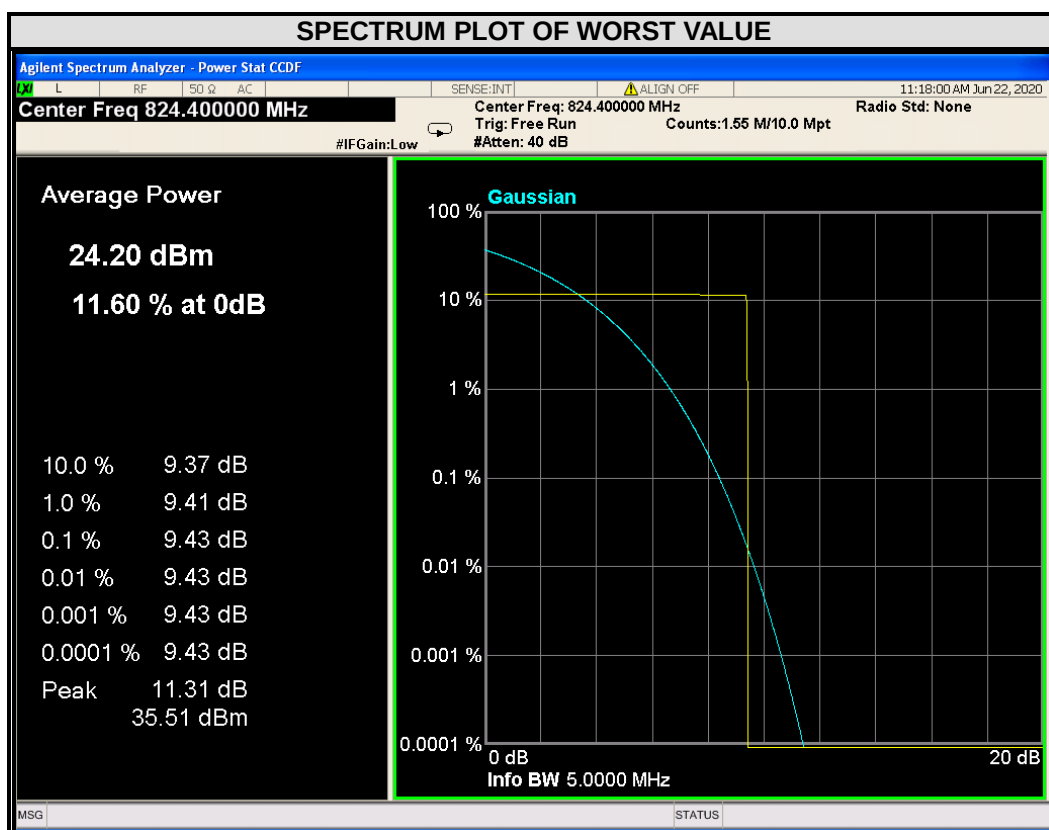
3.7.3 TEST PROCEDURES

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%.

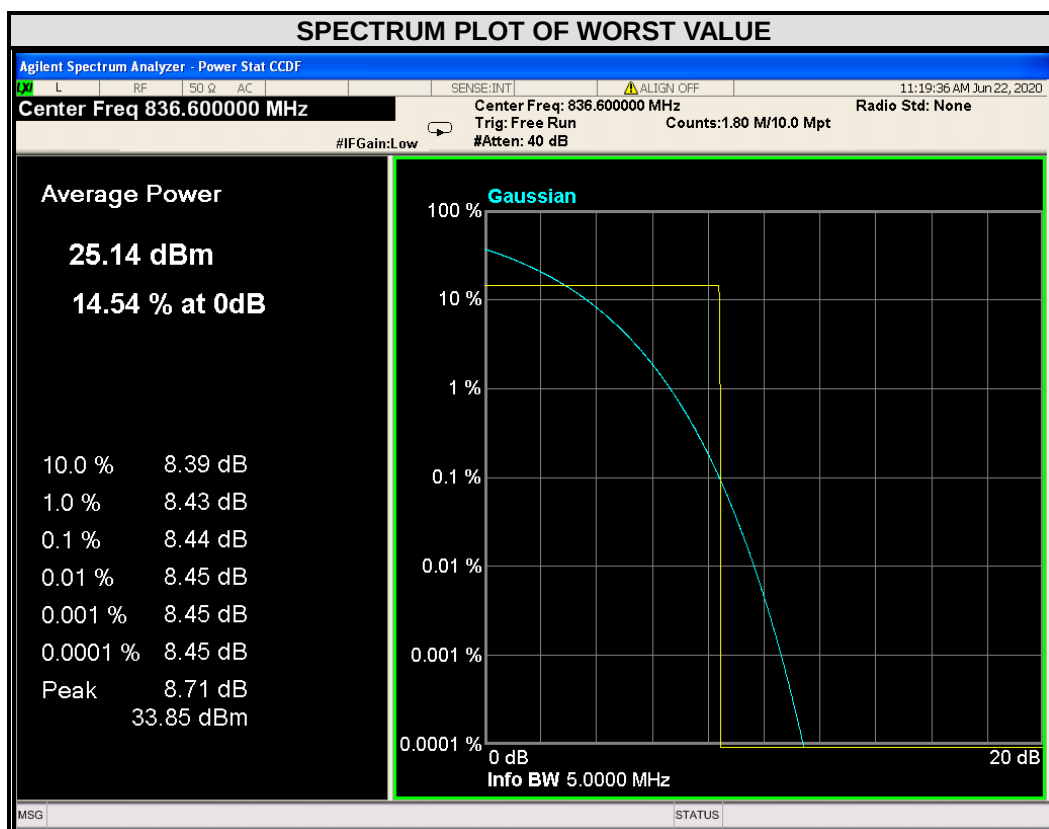
3.7.4 TEST RESULTS

GSM

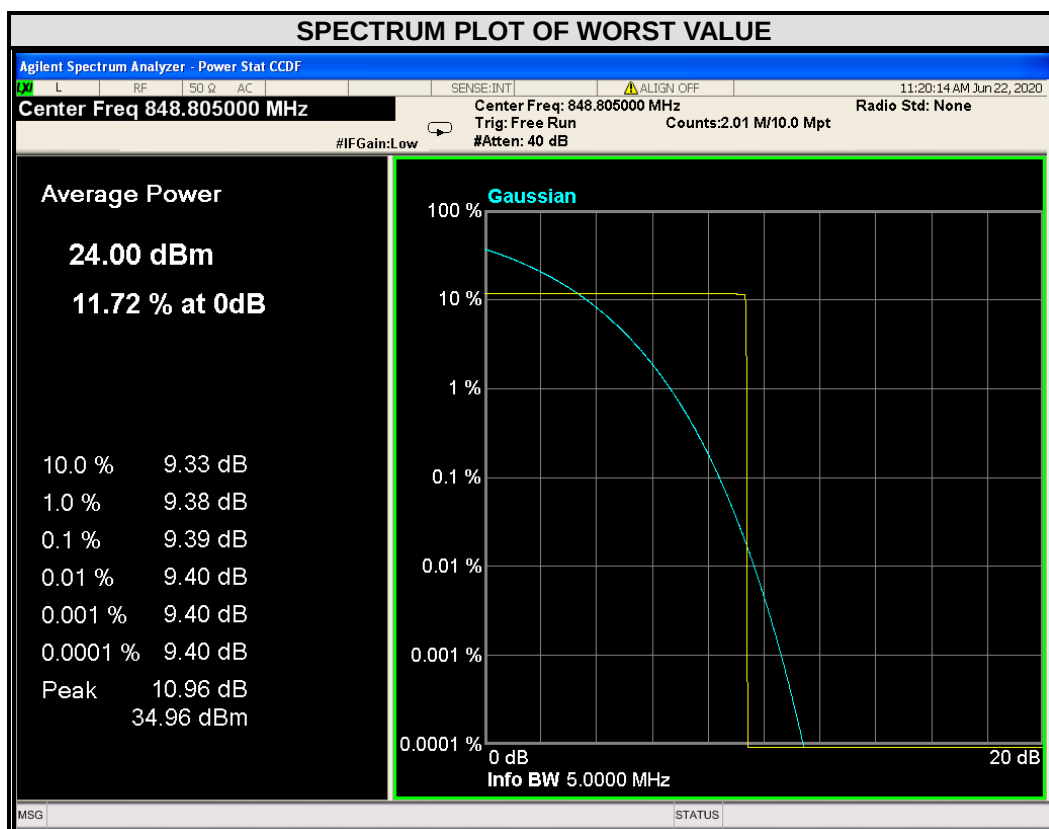
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
128	824.2	9.43



CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
189	836.4	8.44

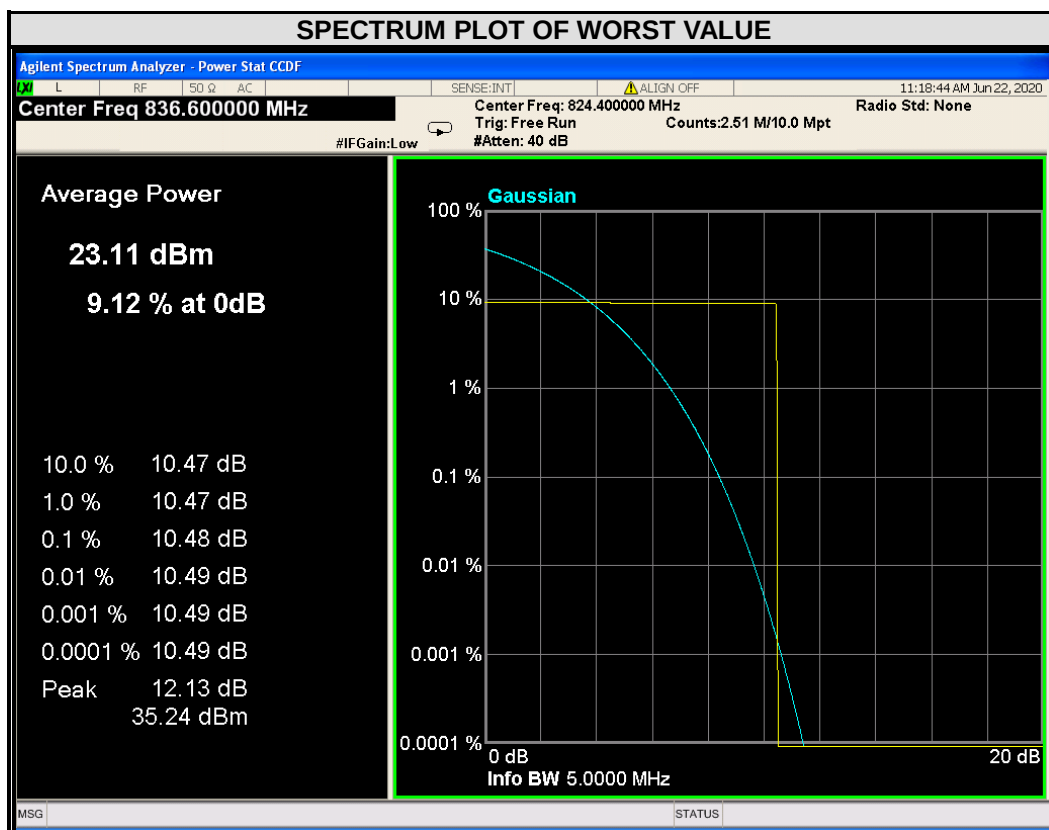


CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
251	848.8	9.39

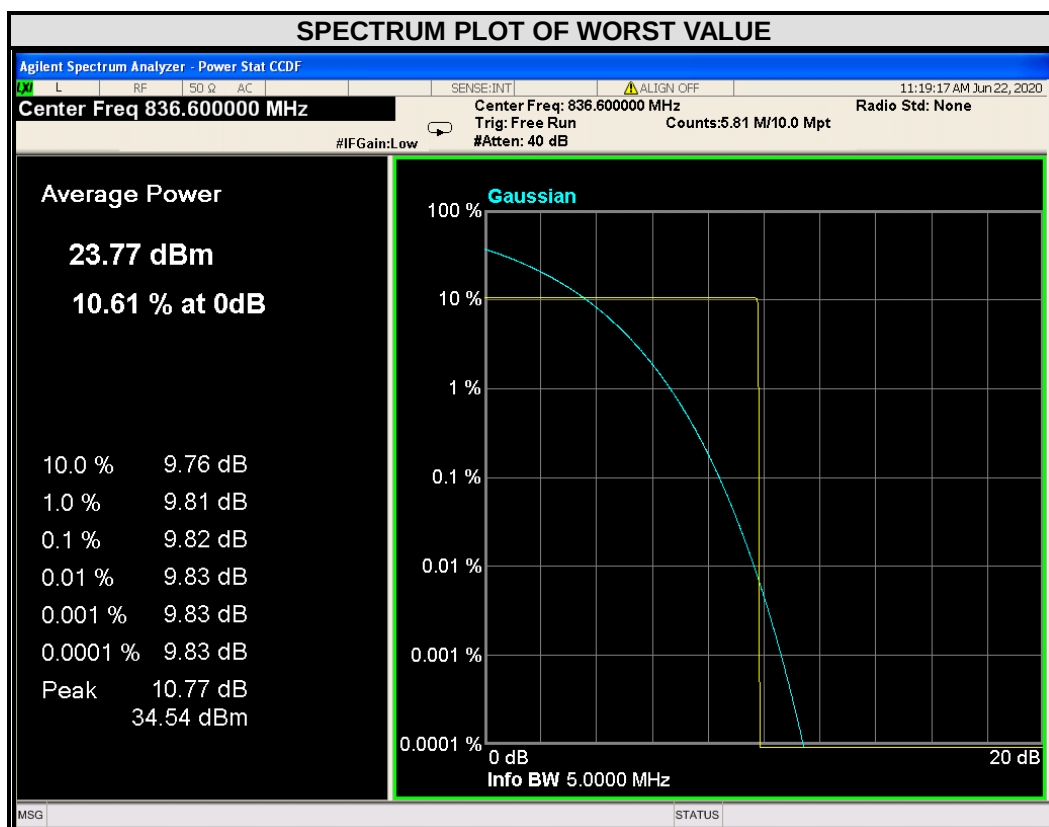


GPRS

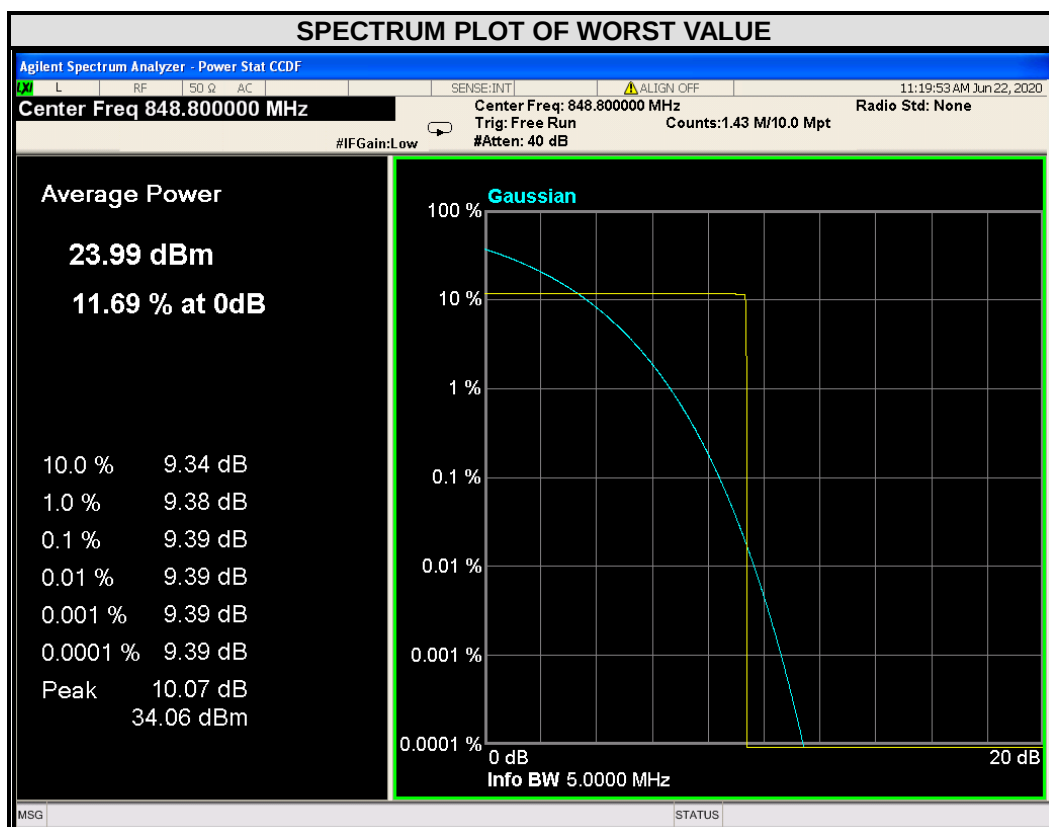
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
128	824.2	10.48



CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
189	836.4	9.82

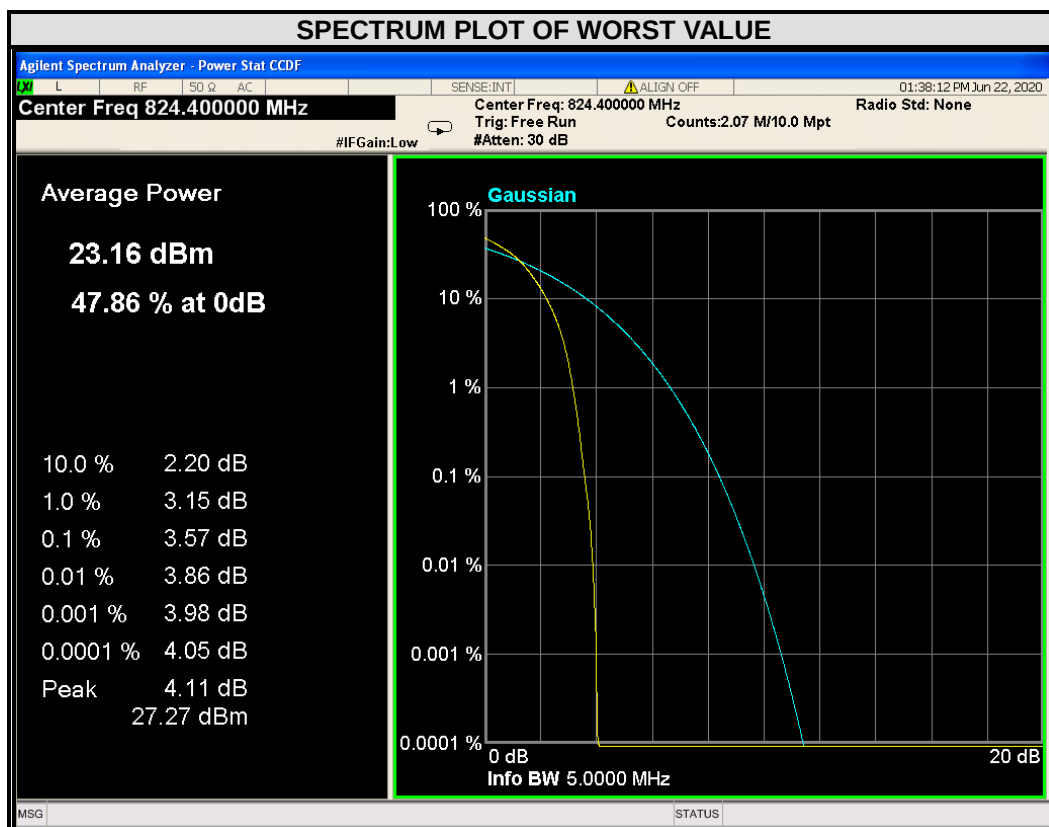


CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
251	848.8	9.39

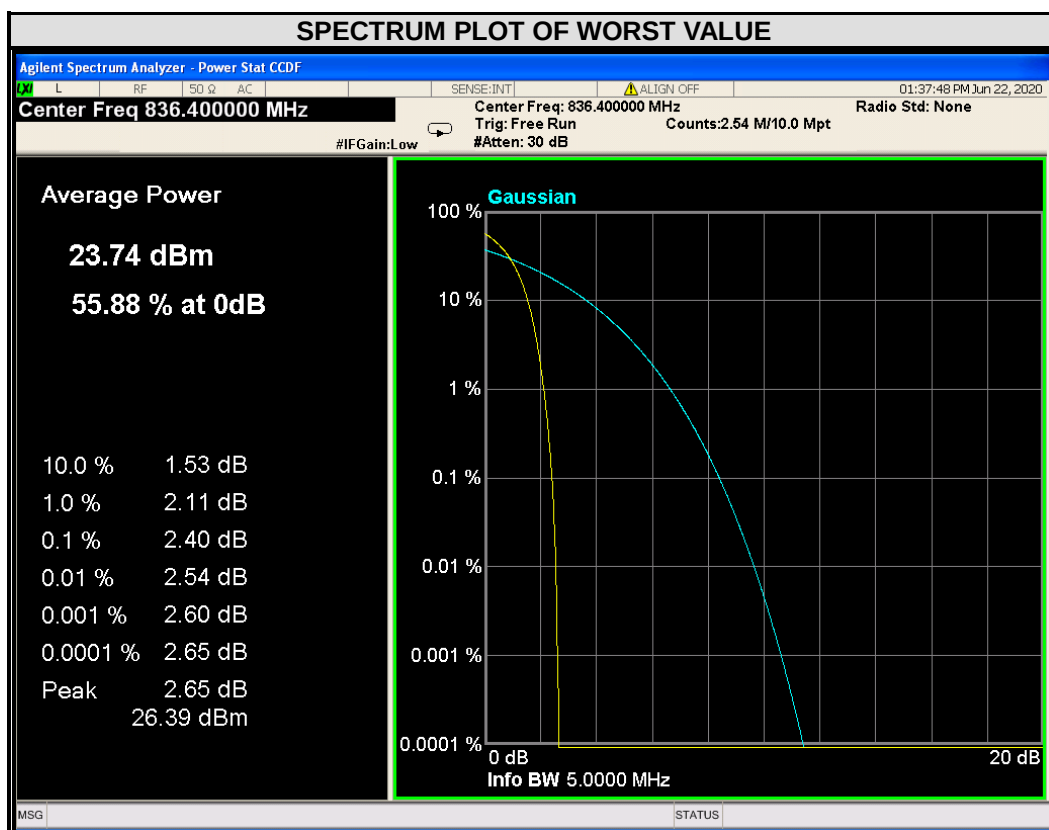


WCDMA

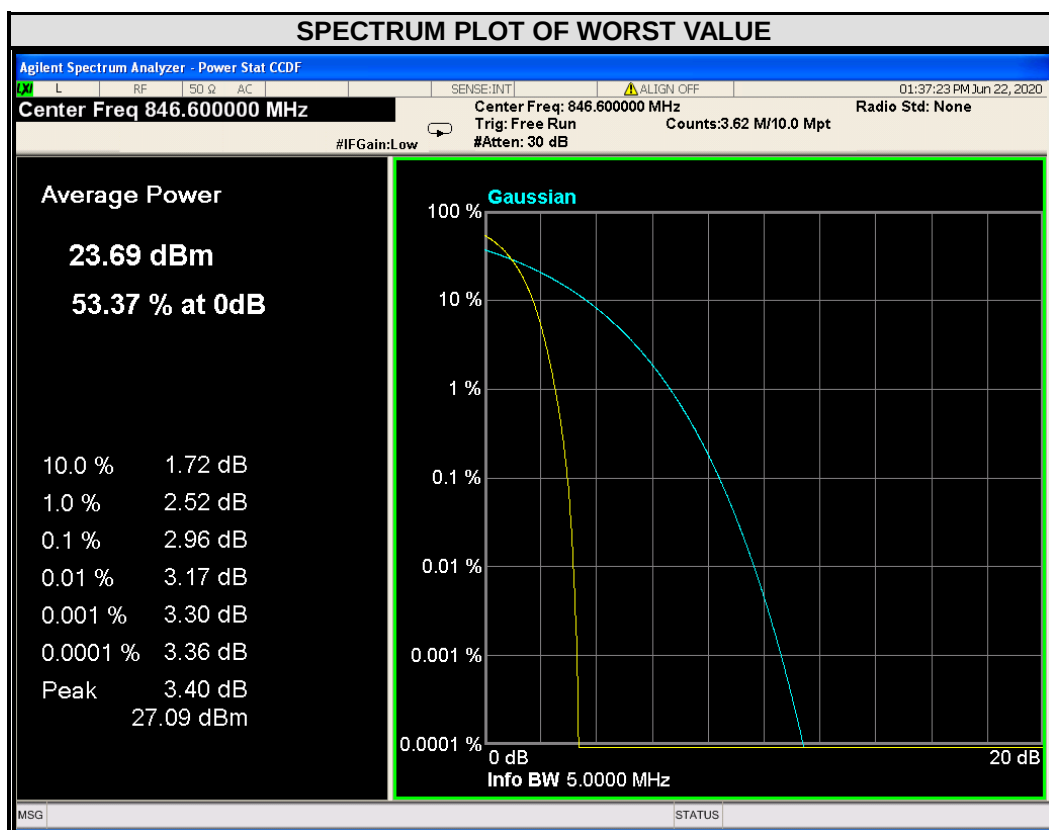
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
4132	826.4	3.57



CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
4182	836.4	2.40



CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
4233	846.6	2.96



4 APPENDIX A – 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.

---END---