

# Report No.SET2020-06188Report No.SG NR Multi model smart phoneFCC 100SRQ-2TG01Hodel No.ZTG01Model No.ZTG01ApplicaneTBDApplicaneZTE Plaza, Keji Road South, Shenzhen, China.Dates of TestingO5/20/200 -06/15/2020Issued 100CIC Southern Testing Co., Ltd.Lab LocationElectronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan<br/>District, Shenzhen, Guangdong, China.Ter. 18 of 55 26627338Tax: 86 755 26627238

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# **Test Report**

Product	5G NR Multi model smart phone
Brand Name:	ZTE
Trade Name:	ZTE
Applicant	ZTE Corporation.
Applicant Address:	ZTE Plaza, Keji Road South, Shenzhen, China
Manufacturer:	ZTE Corporation.
Manufacturer Address:	ZTE Plaza, Keji Road South, Shenzhen, China
Test Standards	47 CFR FCC Part 2/22/24/27
Test Result:	PASS
Tested by	Vincent 2020.06.15
	Vincent, Test Engineer
Reviewed by:	Chris Jon 2020.06.15
	Chris You, Senior Engineer
Approved by	Shuangwan Zhang 2020.06.15
	Shuangwen Zhang, Manager



# **Table of Contents**

1.	GENERAL INFORMATION
1.1	EUT Description
1.2	Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator6
1.3	Test Standards and Results7
1.4	Test Configuration of Equipment under Test8
1.5	Measurement Results Explanation Example8
1.6	Facilities and Accreditations9
2.	47 CFR PART 2, PART 22H & 24E 27L REQUIREMENTS10
2.1	Conducted RF Output Power10
2.2	Peak to Average Radio13
2.3	99% Occupied Bandwidth and 26dB Bandwidth Measurement15
2.4	Frequency Stability
2.5	Conducted Out of Band Emissions25
2.6	Bandedge42
2.7	Transmitter Radiated Power (EIRP/ERP)48
2.8	Radiated Spurious Emissions
3.	LIST OF MEASURING EQUIPMENT
4.	UNCERTAINTY OF EVALUATION



	Change History				
Issue	Date	Reason for change			
1.0	2020.06.15	First edition			



# 1. GENERAL INFORMATION

# **1.1 EUT Description**

EUT Type	5G NR Multi model smart phone
Hardware Version	ZTG01HW1.1
Software Version	0.4.0
EUT supports Radios application	GPRS/EDGE/WCDMA/HSPA
Multi Slot Class	GPRS: Multi slot Class12, EGPRS: Multi slot Class12
	GSM 850MHz:
	Tx: 824.2 - 848.8MHz (at intervals of 200kHz);
	Rx: 869.2 - 893.8MHz (at intervals of 200kHz)
	GSM 1900MHz:
Frequency Range	Tx: 1850.2 - 1909.8MHz (at intervals of 200kHz);
	Rx: 1930.2 - 1989.8MHz (at intervals of 200kHz)
	WCDMA 850MHz
	Tx: 826.4 - 846.6MHz (at intervals of 200kHz);
	Rx: 871.4 - 891.6MHz (at intervals of 200kHz)
	GSM 850: 32.67dBm
Maximum Output Downs to	GSM 1900: 29.73dBm
Maximum Output Power to	EDGE 850: 26.60dBm
Antenna	EDGE 1900: 25.51dBm
	WCDMA 850: 24.36dBm
	GSM / GPRS:GMSK
	EDGE:GMSK / 8PSK
Type of Modulation	WCDMA: QPSK(Uplink)
	HSDPA:QPSK(Downlink)
	HSUPA:QPSK(Uplink)
Antenna Type	Internal Antenna



1.2	2 Maximum Designator	ERP/EIRP	Power, Freq	uency Tolerance	e, and Emission
	System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)
	GSM 850	GMSK	246KGXW	0.0042	1.936
	GSM 1900	GMSK	244KGXW	0.0098	0.925
	EDGE 850	8PSK	241KG7W	0.0046	0.433
	EDGE 1900	8PSK	245KG7W	0.0052	0.340
	WCDMA 850 RMC 12.2Kbps	QPSK	4M16F9W	0.0074	0.243



### 1.3 **Test Standards and Results**

1. 47 CFR Part 2, 22(H), 24(E)

2. ANSI / TIA / EIA-603-D-2010

3. FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation

during the test.This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Limit	Result
INO.	FCC	Description	Lillit	Result
1	2.1046	Conducted Output Power Reporting Only		PASS
2	24.232(d)	Peak to Average Radio	<13dBm	PASS
3	2.1049 22.917(b) 24.238(b)	Occupied Bandwidth	Reporting Only	PASS
4	2.1055 22.355 24.235	Frequency Stability	≤±2.5ppm	PASS
5	2.1051 22.917 24.238	Conducted Out of Band Emissions	< 43+10log10 (P[Watts])	PASS
6	2.1051 22.917 24.238	Band Edge	< 43+10log10 (P[Watts])	PASS
	22.913	Effective Radiated Power	<7Watts	PASS
7	24.232	Equivalent Isotropic Radiated Power	<2Watts	PASS
	27.50(d)	Effective Radiated Power	<1Watts	PASS
8	2.1053 22.917 24.238	Radiated Spurious Emissions	< 43+10log10 (P[Watts])	PASS



## **1.4** Test Configuration of Equipment under Test

Antenna port conducted and radiated test items were performed according to KDB 971168

D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test

planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

- 1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
- 2. 30 MHz to 20000 MHz for GSM1900 and WCDMA Band II.
- 3. 30 MHz to 18000 MHz for WCDMA Band IV.

All modes and data rates and positions were investigated.

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

Test Modes					
Band	Radiated TCs	Conducted TCs			
GSM 850	GPRS Link	GPRS Link			
G2W 920	GPRS Link	GPRS Link			
GSM 1900	GPRS Link	GPRS Link			
GSM 1900	GPRS Link	GPRS Link			
WCDMA Band V	RMC 12.2Kbps Link	RMC 12.2Kbps Link			
WCDMA Band II	RMC 12.2Kbps Link	RMC 12.2Kbps Link			
WCDMA Band IV	RMC 12.2Kbps Link	RMC 12.2Kbps Link			

Note: The maximum power levels are chosen to test as the worst case configuration as follows: GPRS mode for GMSK modulation,

EDGE multi-slot class 8 mode for 8PSK modulation,

RMC 12.2Kbps mode for WCDMA band V,

RMC 12.2Kbps mode for WCDMA band II,

RMC 12.2Kbps mode for WCDMA band IV, only these modes were used for all tests.

### **1.5** Measurement Results Explanation Example

### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6B and 10dB attenuator.



### Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB). = 7.5+10 = 17.5(dB)

### **1.6** Facilities and Accreditations

### **1.6.1** Test Facilities

### NVLAP Lab Code: 201008-0

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

### FCC- Designation Number: CN5031

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2020.

### **ISED Registration: 11185A-1**

### CAB identifier: CN0064

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Dec. 03, 2020

### **1.6.2** Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15°C-35°C
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa





# 2. 47 CFR PART 2, PART 22H & 24E 27L REQUIREMENTS

### 2.1 Conducted RF Output Power

### 2.1.1 Definition

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

### 2.1.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.1.3 Test Procedures

- 1. The transmitter output port was connected to the system simulator.
- 2. Set EUT at maximum power through system simulator.
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Measure and record the power level from the system simulator.

### 2.1.4 Test Setup





# 2.1.5 Test Results of Conducted Output Power

### 1. Test Verdict:

GSM850		Burst-	Averaged output Pov	wer (dBm)	
		128CH	190CH	251CH	
GS	M (CS)	32.63	32.55	32.67	
	1 Tx Slot	32.58	32.57	32.62	
GPRS	2 Tx Slots	31.04	31.07	31.08	
(GMSK)	3 Tx Slots	28.81	28.6	28.19	
	4 Tx Slots	28.12	28.16	28.13	
	1 Tx Slot	26.55	26.4	26.6	
EDGE	2 Tx Slots	25.27	25.41	25.4	
(8PSK)	3 Tx Slots	23.27	24	23.78	
	4 Tx Slots		22.8	22.41	
C S	M1900	Burst-Averaged output Power (dBm)			
63	1011900	512CH	661CH	810CH	
GS	M (CS)	29.71	29.68	29.73	
	1 Tx Slot	30.12	30.17	30.08	
GPRS	2 Tx Slots	28.01	28.19	28.10	
(GMSK)	3 Tx Slots	26.33	26.57	26.45	
	4 Tx Slots		25.37	25.26	
	1 Tx Slot	25.43	25.51	25.17	
EDGE	2 Tx Slots	23.33	23.51	23.36	
(8PSK)	3 Tx Slots	21.67	21.79	21.64	
	4 Tx Slots	20.46	20.58	20.44	

Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.



### 2. WCDMA Model Test Verdict:

UMTS850		Average Power (dBm)		
(B	and V)	4132CH	4183CH	4233CH
WCDMA	12.2kbps RMC	24.36	24.19	24.07
	Subtest 1	23.37	23.45	23.41
LICDDA	Subtest 2	23.43	23.36	23.4
HSDPA	Subtest 3	23.34	23.42	23.43
	Subtest 4	23.35	23.36	23.45
	Subtest 1	23.15	23.15	23.21
	Subtest 2	23.18	23.06	23.22
HSUPA	Subtest 3	23.1	23.16	23.22
	Subtest 4	23.04	23.06	23.23
	Subtest 5	23.05	23.11	23.21



### 2.2 Peak to Average Radio

### 2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

### 2.2.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.2.3 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.1.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

3. For GSM/EGPRS operating modes:

a. Set EUT in maximum power output.

b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector on spectrum analyzer for first trace.

c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second

trace.

d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.

4. For UMTS operating modes:

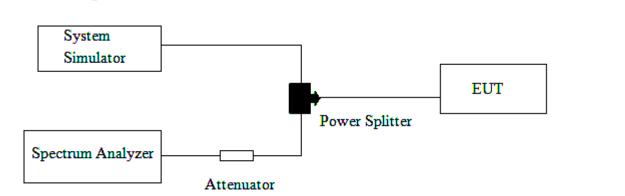
a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.

b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

5. Record the deviation as Peak to Average Ratio.



# 2.2.4 Test Setup



### 2.2.5 Test Results of Peak-to-Average Ratio

Dond	Channel	Frequency	Peak to Average radio	Limit	Vardiat
Band	Channel	(MHz)	dB	dB	Verdict
CSM	512	1850.2	0.6		PASS
GSM 1900MHz	661	1880.0	0.3	13	PASS
1900/01/12	810	1909.8	0.1		PASS
EDCE	512	1850.2	3.9		PASS
EDGE 1900MHz	661	1880.0	2.6	13	PASS
	810	1909.8	4.3		PASS



### 2.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement

### 2.3.1 Definition

The 99% occupied bandwidth is 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 transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at

the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 2.3.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.3.3 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.2.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

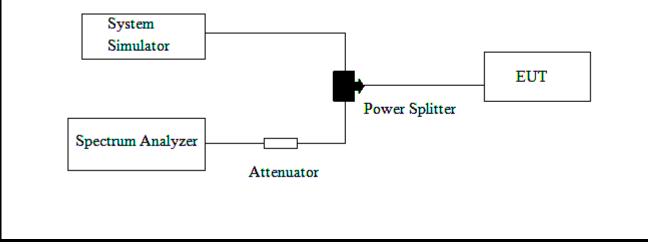
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3\*RBW, sample detector, trace maximum hold.

5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3\*RBW, peak detector, trace maximum hold.

### 2.3.4 Test Setup





Band	Channel	Frequency (MHz)	26dB bandwidth (KHz)	99% Occupied Bandwidth (KHz)	Refer to Plot
	128	824.2	310.9	244.93	Plot A1
GSM 850MHz	190	836.6	311	246.26	Plot A2
	251	848.8	309.4	244.84	Plot A3
	512	1850.2	311.2	243.11	Plot B1
GSM 1900MHz	661	1880.0	308.3	243.63	Plot B2
	810	1909.8	317.4	243.27	Plot B3
	128	824.2	304.8	240.76	Plot C1
EDGE 850MHz	190	836.6	307.5	237.23	Plot C2
	251	848.8	291.6	235.53	Plot C3
	512	1850.2	301.5	241.2	Plot D1
EDGE 1900MHz	661	1880.0	307.7	24012	Plot D2
	810	1909.8	307.2	244.8	Plot D3
	4132	826.4	4654	4144.5	Plot E1
WCDMA 850MHz	4183	836.6	4656	4151.9	Plot E2
	4233	846.6	4655	4155.1	Plot E3

### ..... .]\_\_\_\_!.]4]. 4 764D D ~ . . . ..... .

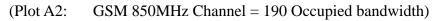


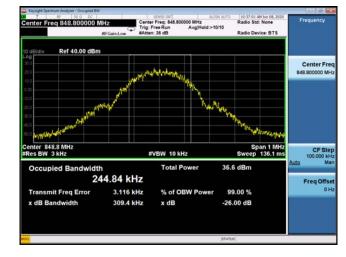
### 2.3.6 Test Results (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth



(Plot A1: GSM 850MHz Channel = 128 Occupied bandwidth)

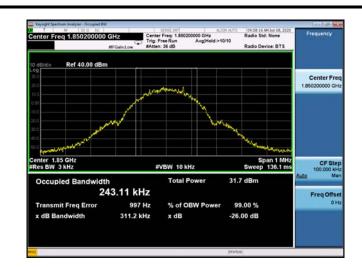


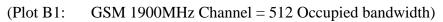




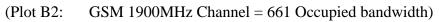
(Plot A3: GSM 850MHz Channel = 251 Occupied bandwidth)

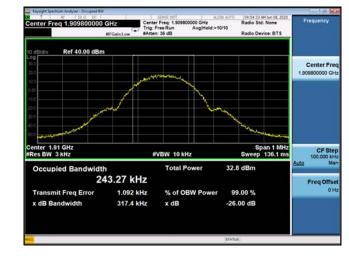






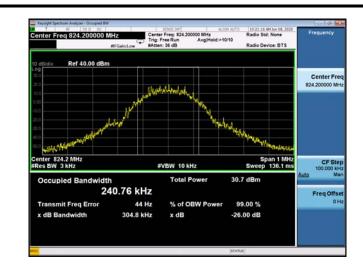


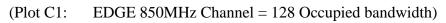


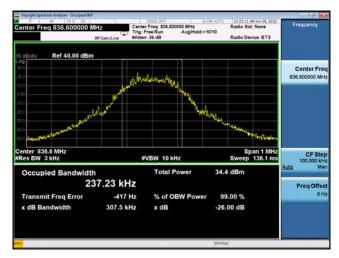


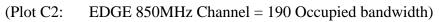
(Plot B3: GSM 1900MHz Channel = 810 Occupied bandwidth)

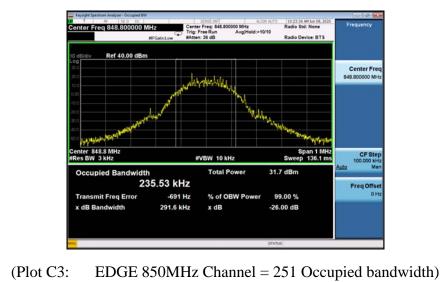




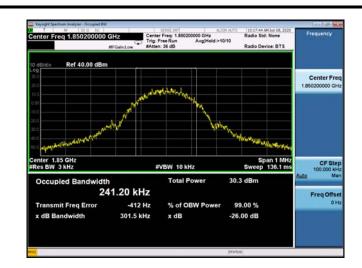


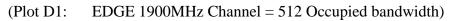


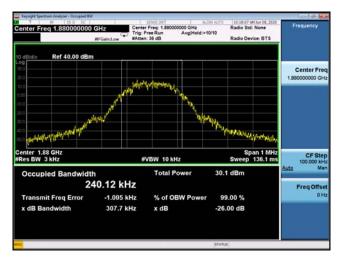


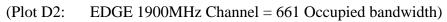


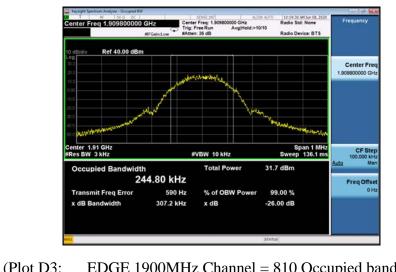










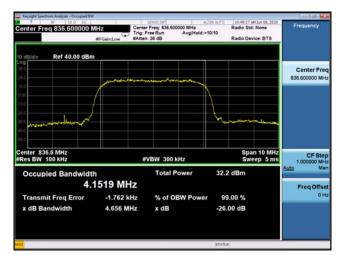




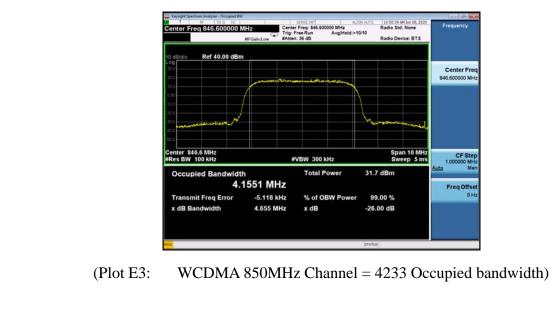
4. Transmit Freq Error x dB Bandwidth	1445 MHz 6.579 kHz 4.654 MHz	% of OBW Power x dB	99.00 % -26.00 dB	Fr	eq Offse 0 H
Occupied Bandwidt		Total Power	32.4 dBm	Auto	Ma
Center 826.4 MHz #Res BW 100 kHz	÷	VBW 300 kHz	Spa Swe	2ep 5 ms 1.00	CF Ste
60.0					
30 martin and			Mare danna	therease	
20.0			1		
0.00	/				
10.0	proceeding .	- Annonement		826.40	0000 MI
10.0 30.0				Cer	nter Fre
10 dB/div Ref 40.00 dBm	1				
	#FGaini.ow #Atte	Free Run Avg Hold:>1 n: 36 dB	10/10 Radio Dev	rice: BTS	
Center Freg 826,400000 M	Center	r Freg: 826.400000 MHz	Radio Std	None Freq	uency



WCDMA 850MHz Channel = 4132 Occupied bandwidth)



WCDMA 850MHz Channel = 4183 Occupied bandwidth) (Plot E2:





### 2.4 Frequency Stability

### 2.4.1 Requirement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$ ppm) of the center frequency.

### 2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.4.3 Test Procedures for Temperature Variation

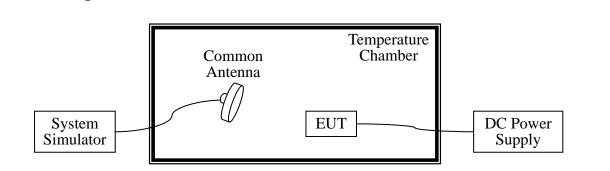
- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.
- 2. The EUT was set up in the thermal chamber and connected with the system simulator.
- 3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
- 4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

### 2.4.4 Test Procedures for Voltage Variation

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.
- 2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
- 3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
- 4. The variation in frequency was measured for the worst case.



### 2.4.5 Test Setup



### 2.4.6 Test Results of Frequency Stability

### GSM 850MHz Band

Band:		GS	M 850	Channel:	190		
Limit(ppm):		2.5		Frequency:	836.6MHz		
Power	Tomporate	1400	GSM	EDGE			
(VDC)	Temperatu	ne	Deviation	Deviation	Result		
(VDC)	(°C)		(ppm)	(ppm)			
	-30		0.0021	0.0046			
	-20		0.0021	0.0043			
	-10		0.0024	0.0016			
	0		0.0022	0.0044			
3.87	+10		0.0031	0.0023			
	+20		0.0042	0.0029	PASS		
	+30		0.0021	0.0045			
	+40		0.0026	0.0027			
	+50		0.0023	0.0031	]		
4.45	+25		0.0041	0.0029			
3.6	+25		0.0021	0.0032			



### GSM 1900MHz Band

Band:		GS	SM 1900	Channel:	661
Limit(ppm):		2.5		Frequency:	1880.0MHz
Power	Temperatu	GSM		EDGE	Develt
(VDC)	(°C)		Deviation (ppm)	Deviation (ppm)	Result
	-30		0.0029	0.0015	
	-20		0.0013	0.0026	
	-10		0.0014	0.0024	
	0		0.0015	0.0052	
3.87	+10		0.0034	0.0034	
	+20		0.0098	0.0022	PASS
	+30		0.0026	0.0037	
	+40		0.0023	0.0027	
	+50		0.0021	0.0036	
4.45	+25		0.0022	0.0028	
3.6	+25		0.0016	0.0025	

### WCDMA 850MHz Band

Band:	WCDMA Ba	nd V Channel:	4183
Limit(ppm)	2.5	Frequency:	836.6MHz
Power (VDC)	Temperature (℃)	RMC 12.2Kbps Deviation (ppm)	Result
	-30 -20	0.0046 0.0051	
	-10 0	<b>0.0074</b> 0.0049	
3.87	+10 +20	0.0047 0.0050	PASS
	+30 +40	0.0044 0.0052	
4.45	+50 +25	0.0052	
3.6	+25	0.0050	



### 2.5 Conducted Out of Band Emissions

### 2.5.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ .

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

### 2.5.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

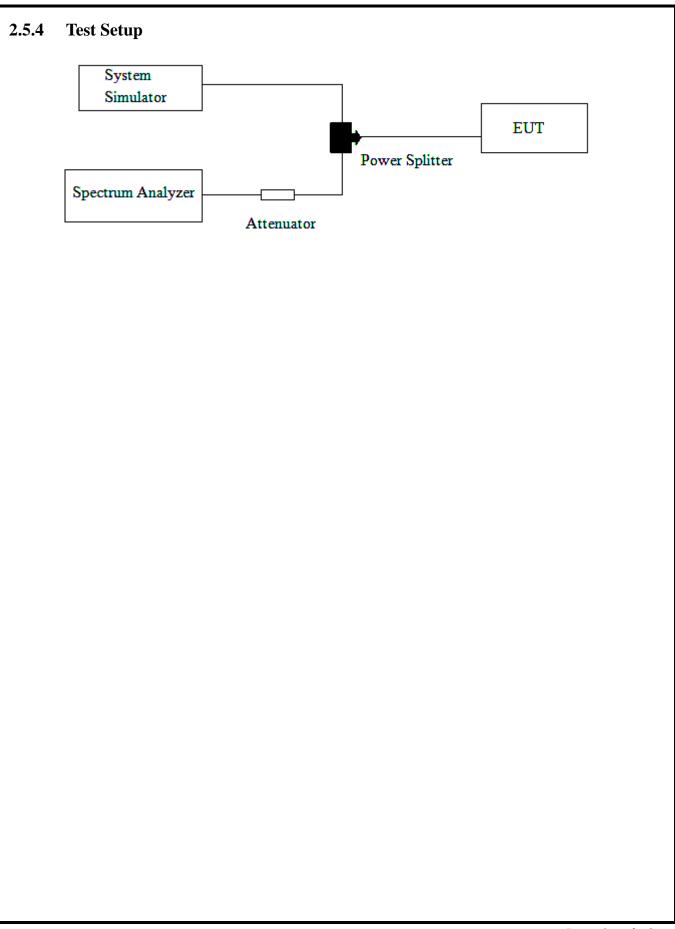
### 2.5.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.
- 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 4. The middle channel for the highest RF power within the transmitting frequency was measured.
- 5. The conducted spurious emission for the whole frequency range was taken.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

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

- = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
- = -13dBm.
- 8. For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.

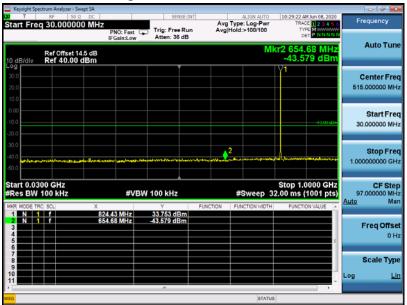




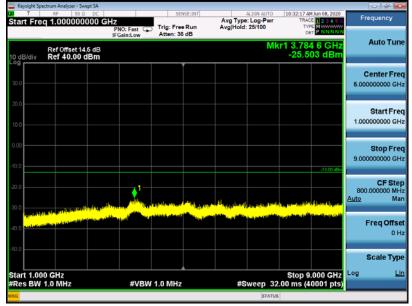


### 2.5.5 Test Result (Plots) of Conducted Spurious Emission

Note: For 9 KHz to 30MHz: the amplitude of spurious emissions is attenuated by more than 20dB below the permissible value, so we not provide the test result here.



GSM 850MHz Channel = 128, 30MHz to 1GHz



GSM 850MHz Channel = 128, 1GHz to 9GHz



Start Fre	RF 50 Ω DC q 30.000000 M		Trig: Free Run Atten: 36 dB	Avs	Type: Log-Pwr Hold:>100/100	10:30:36 AM Jun 08, 2020 TRACE 1 2 3 4 5 TYPE MUSEL DET P NNNN	Frequency
10 dB/div	Ref Offset 14.5 di Ref 40.00 dBn	8			M	43.400 dBm	
20.0						¥1	Center Fre 515.000000 Mi
0.00 -10.0 -20.0							Start Fre 30.000000 Mi
-30.0 -40.0 -60.0	การสร้างไม่เสียงการเหตุกล้างเสีย	and the stand of the				and a station of the second second	Stop Fre 1.000000000 GF
Start 0.03 #Res BW	100 kHz	#VB	W 100 kHz	FUNCTION	#Sweep 3	Stop 1.0000 GHz 2.00 ms (1001 pts	CF Ste 97.000000 Mi <u>Auto</u> Mi
	1	836.07 MHz 642.07 MHz	33.690 dBm -43.400 dBm	Policilou	Pole lot lot		Freq Offs 01
6 7 8 9							Scale Typ
10							Log L

GSM 850MHz Channel = 190, 30MHz to 1GHz

Keysight Sp	ectrum Analyzer - Swept SA								_	
Start Fre	RF   50 Ω DC   eq 1.000000000 G	Hz PNO: Fast		Run	Avg Type Avg Hold		T TRAC	M)un 08, 2020 E 1 2 3 4 5 6 E M	Fr	equency
10 dB/div	Ref Offset 14.5 dB Ref 40.00 dBm	IFGain:Low	Atten: 36	dB	-	N	/kr1 5.97	1 8 GHz 88 dBm		Auto Tur
30.0										Center Fro
20.0									1.00	<b>Start Fr</b> 0000000 G
10.00								-13.00 dBm	9.00	<b>Stop Fr</b> 0000000 G
20.0							<b>n</b>		800 Auto	CF St 0.000000 M N
30.0 40.0	a fan de fanteine often en bleven de s <mark>An an tean an tean an an tean an An tean an tean</mark>					and a state of the second			1	F <b>req Off</b> s 0
50.0										Scale Ty
Start 1.00 #Res BW		#VBW	1.0 MHz		#S	weep	9 Stop 32.00 ms (4	.000 GHz 0001 pts)	Log	i
SG						STA	TUS			

GSM 850MHz Channel = 190, 1GHz to 9GHz



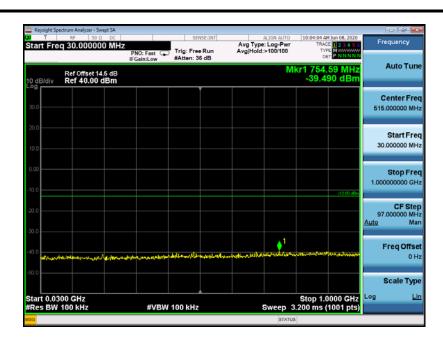
Start Fre		50 Ω DC 0000 MHz	PNO: Fast	Trig: Free Ro Atten: 36 dE	Avg un Avg	aLIGN AUTO g Type: Log-Pwr  Hold:>100/100	10:31:24 AM Jun 08, 20 TR4CE 2 3 4 TYPE 0 DET P NNN	5.6 Frequency
10 dB/div		et 14.5 dB 00 dBm				M	43.556 dB	
20.0							<b>♥1</b>	Center Fr 515.000000 M
0.00 -10.0 -20.0								Start Fr 30.000000 M
-30.0 -40.0 -50.0		4	d-142937	atur cush thirage magetabu	2	an an the second second second second		Stop Fr 1.000000000 G
Start 0.0 #Res BW	100 kHz	x	#VB	W 100 kHz	FUNCTION	#Sweep 3	Stop 1.0000 GH 2.00 ms (1001 pt	1z CF St 97.000000 M Auto M
	1 1	849	8.68 MHz 7.68 MHz	33,484 dBm -43,556 dBm			Tone non theore	Freq Offs 0
7 8 9								Scale Ty

GSM 850MHz Channel = 251, 30MHz to 1GHz

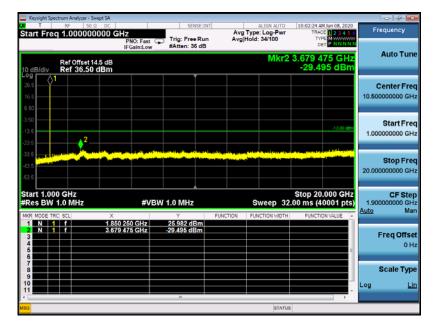


GSM 850MHz Channel = 251, 1GHz to 9GHz



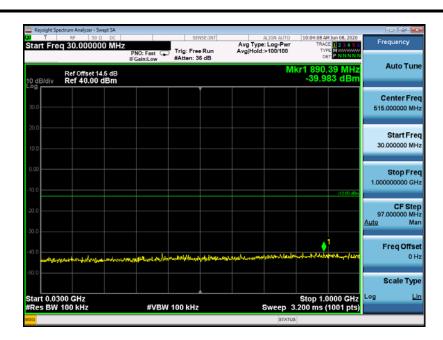


GSM 1900MHz Channel = 512, 30MHz to 1GHz

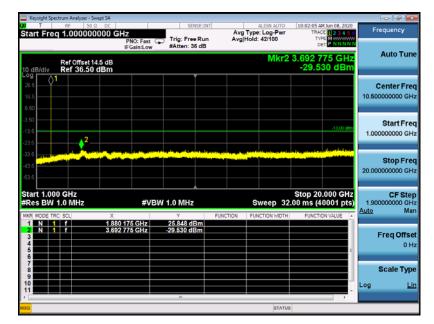


GSM 1900MHz Channel = 512, 1GHz to 20GHz





GSM 1900MHz Channel = 661, 30MHz to 1GHz

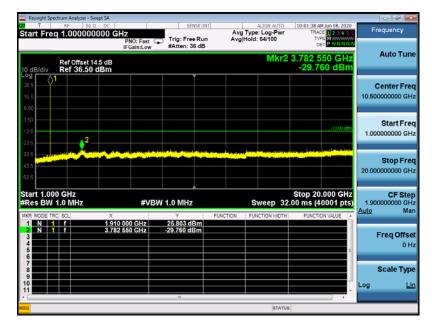


GSM 1900MHz Channel = 661, 1GHz to 20GHz



T	RF S0 Ω DC 30.000000 MHz		SENSE:INT	ALIGN		AM Jun 08, 2020	Frequer	_
Start Fre	eq 50.000000 MHz	PNO: East ( ) Trig	: Free Run ten: 36 dB	Avg Hold:>100/	100			
10 dB/div	Ref Offset 14.5 dB Ref 40.00 dBm					2.54 MHz 609 dBm	Auto	Tun
30.0							Cente 515.0000	
20.0								
10.0							Star 30.0000	tFre 00 MH
0.00							Stoj	
10.0						-13.00 dBm	1.0000000	00 Gr
20.0							CI 97.0000 <u>Auto</u>	F Ste 00 Mi Mi
-30.0						4	Freq	Offs
-40.0	alequilense there is a light of the second	and happened to be a second	espenden van ei	wigen - proved and property and	Best Sugar	iller on the state of the state		01
-50.0							Scale	е Тур
Start 0.03	300 GHz 100 kHz	#VBW 100	kH7	Swei	Stop 1 ep 3.200 ms	.0000 GHz	Log	L
80	100 112	# 100 TOO	1111 <u>2</u>		STATUS	(Toon proj		-

GSM 1900MHz Channel = 810, 30MHz to 1GHz



GSM 1900MHz Channel = 810, 1GHz to 20GHz



Keysight Sp	ectrum Analyze	r - Swept SA 50 ฏ DC		SENSE:1	NT	ALIGN AUTO	10:27:18 AM Jun 08, 2020	
Start Fre		0000 MHz	PNO: Fast IFGain:Low		Avg	Type: Log-Pwr Hold:>100/100	TRACE 12345 TYPE MUNITOR	Frequency
10 dB/div		et 14.5 dB .00 dBm				M	kr2 630.43 MH: -43.352 dBn	
20.0							Ÿ1	Center Fr 515.000000 M
0.00 -10.0 -20.0							-10.00 dD	Start Fre 30.000000 M
-30.0 -40.0 -50.0	المواجع المحمد المحمد والعرب	harn-yerrow	1,-11,-14,-19,-19,-11-	et a la litte a fait a se la com	¢ <sup>2</sup>	فرامرا بإلى وراميا والمراجع وراي	นใจและฟิโรกจ่างละสุดเหละไ	Stop Fr 1.000000000 G
Start 0.03 #Res BW			#VE	3W 100 kHz		#Sweep 3	Stop 1.0000 GH; 2.00 ms (1001 pts	CF St 97.000000 M Auto M
MKR MODE T	1 1		212 MHz	Y 33.916 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
3 4 5		63	0.43 MHz	-43.352 dBm				Freq Offs 0
7 8 9								Scale Ty
10								Log
						STATUS		

EDGE 850MHz Channel = 128, 30MHz to 1GHz



EDGE 850MHz Channel = 128, 1GHz to 9GHz



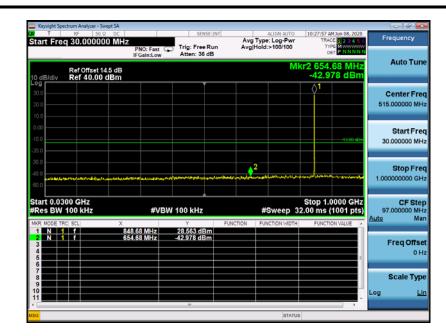
Start Fre	g 30.0000	00 MHz PNO	:Fast 😱	Trig: Free Run Atten: 36 dB	Avg	Type: Log-Pwr Hold:>100/100	TRACE	Jun 08, 2020	Frequency
10 dB/div	Ref Offset Ref 40.00					M	(r2 740.) -42.14	04 MHz 12 dBm	Auto Tu
20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0							1 		Center Fr 515.000000 M
0.00 -10.0 -20.0								-10.00 dDm	Start Fr 30.000000 M
-30.0 -40.0 -50.0		41 <sub>0</sub> 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	andres some some	er Angeling bergereter	47 y - 2013 av - 1 y - 1 av - 1 y - 1 av - 1	adventure (hand)	4.3.9 <sup>0</sup> agr. <del></del>	ov <b>a</b> tradovan	<b>Stop Fr</b> 1.000000000 G
Start 0.03 #Res BW	100 kHz	×	#VBW	100 kHz	FUNCTION	#Sweep 3	Stop 1.0 2.00 ms (1	001 pts)	CF St 97.000000 M Auto M
1 N 1 2 N 1 3 4 5	1	837.04   740.04		29.447 dBm 42.142 dBm	- diction	Tote tote the the	- Sileno		Freq Offs 0
6 7 8 9									Scale Ty
11								- ,	Log j

EDGE 850MHz Channel = 190, 30MHz to 1GHz

Keysight :	Spectrum Analyz	er - Swept SA 50 Ω DC		L en	ues nur		ALIGN AUT	0	u h 00 2020		- 6 🖻
Start Fr		0000000	Hz PNO: Fast		Run	Avg Type Avg Hold:	: Log-Pw	r TRAC	M Jun 08, 2020 E 1 2 3 4 5 6 E M	Fre	quency
10 dB/div		et 14.5 dB .00 dBm	IFGain:Low	Atten: 32			N	/kr1 8.50			Auto Tun
25.0											enter Fre 000000 G⊦
15.0 5.00										1.000	Start Fre
-5.00									-13.00 dBn	9.000	Stop Fre
-25.0			. الأله						• <sup>1</sup>	800. Auto	CF Ste 000000 Mi Mi
	ri-enimitetti			a bie na dia ang ang ang ang ang ang ang ang ang an		alladi, salah Sangaran	a an la fai	nii <sub>bu</sub> attaba Maganatisti	inter and in the second se		Init
-45.0 <mark>vojulj</mark>	in a second shifting									F	req Offs
-55.0											Scale Typ
	000 GHz N 1.0 MHz		#\/8/	V 1.0 MHz		#0	ween	Stop 9 32.00 ms (4	.000 GHZ	Log	L
ISG	1.0 WI12		#404	- 1.0 WiH2		#5	STA		oco i pisj		

EDGE 850MHz Channel = 190, 1GHz to 9GHz



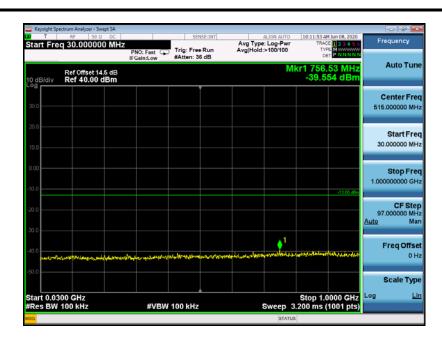


EDGE 850MHz Channel = 251, 30MHz to 1GHz



EDGE 850MHz Channel = 251, 1GHz to 9GHz



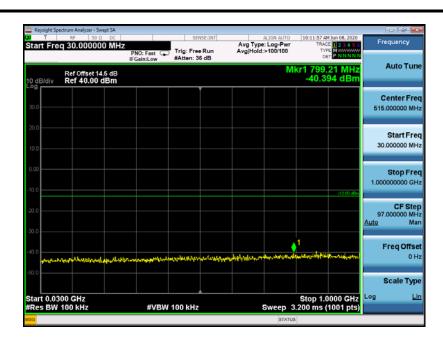


EDGE 1900MHz Channel = 512, 30MHz to 1GHz

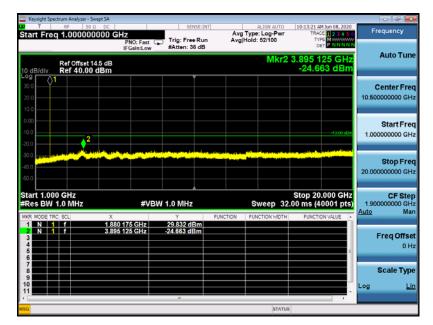


EDGE 1900MHz Channel = 512, 1GHz to 20GHz



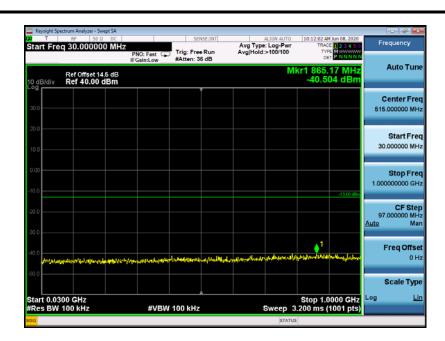


EDGE 1900MHz Channel = 661, 30MHz to 1GHz

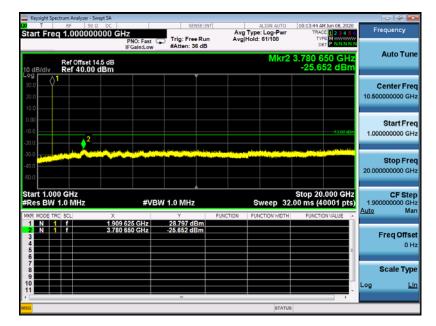


EDGE 1900MHz Channel = 661, 1GHz to 20GHz





EDGE 1900MHz Channel = 810, 30MHz to 1GHz



EDGE 1900MHz Channel = 810, 1GHz to 20GHz



Start Fre	q 30.0000	0 Q DC 000 MHz	PNO: Fast	Trig: Free R Atten: 36 d	Avg tun Avg	ALIGN AUTO Type: Log-Pwr  Hold:>100/100	TRAC	MJun 08, 2020 25 1 2 3 4 5 6 26 M	Frequenc
10 dB/div	Ref Offset Ref 40.0					M		34 MHz 69 dBm	Auto
20.0							<b>≬</b> ¹		Center 515.000000
0.00 -10.0 -20.0								-10:00 dDm	Start 30.000000
-30.0 -40.0 -50.0			-p-lage-starter	angen de Staarkenaangegeweg, wet	ad age and when a first free free free for	لاملوموالكافيات ويرصعن	Λ	• <sup>2</sup>	Stop 1.000000000
Start 0.03 #Res BW	100 kHz	X	#VE	3W 100 kHz	FUNCTION	Sweep 3	.200 ms (	0000 GHz 1001 pts)	07.000000 Auto
2 N 3 4 5			7.34 MHz 4.34 MHz	20.071 dBn -41.469 dBn					Freq O
6 7 8 9									Scale '
11								-	Log

WCDMA850MHz Channel = 4132, 30MHz to 1GHz



WCDMA850MHz Channel = 4132, 1GHz to 9GHz



Start Fre	RF 50		ast	sense:INT	Avg Avg	Type: Log-Pwr Hold:>100/100	TRA	M Jun 08, 2020 CE 1 2 3 4 5 6 PE M	Freque	ncy
10 dB/div	Ref Offset 1 Ref 40.00	4.5 dB				MI	kr2 934. -40.9	04 MHz 13 dBm	Auto	o Tur
20.0							<b>∂</b> <sup>1</sup>		Cente 515.0000	
0.00 -10.0 -20.0								-10:00 dDm	Sta 30.0000	rt Fre
-30.0 -40.0 -50.0	and the second second		يە يېرىكى بىلىكى بىلىكى	****	ر. مراجع روماني	nga nadagana Binng kilo dina dina ding k	Д.,	2	Sto 1.0000000	<b>p Fr</b> 100 G
Start 0.03 #Res BW	100 kHz	X	#VBW 100	kHz	FUNCTION	Sweep 3	.200 ms (	0000 GHz 1001 pts)	07.0000 97.0000 Auto	F Ste 100 Mi M
1 N 2 2 N 3 4 5	1 1	837.04 M 934.04 M	Iz 20.1	194 dBm 113 dBm					Freq	Offs 0
6 7 8 9									Scal	
11								-	Log	ł

WCDMA850MHz Channel = 4183, 30MHz to 1GHz

XI T	RF 50 Q DC	Hz PNO: Fast	Trig: Free			ALIGN AUTO E: Log-Pwr : 23/100	TRAC	1 Jun 08, 2020 E 1 2 3 4 5 6 E M	Frequency
10 dB/div	Ref Offset 14.5 dB Ref 40.00 dBm	IFGain:Low	Atten: 36	dB		Mk	r1 8.198		Auto Tun
30.0									Center Fre 5.000000000 GH
10.0									Start Fre 1.000000000 GF
10.00								-13.00 d <del>D</del> n	<b>Stop Fr</b> 9.000000000 Gi
20.0		الماقالين ماليان	فاد بحاد بالبريدا	<sup>March</sup> ault, Ista	din	والإيراب ا	ور من المراجع	1 adaamilada	CF Ste 800.000000 Mi <u>Auto</u> M
	an a		ennely period add	Strate of the second	ala lu si	and a part of	Uzej <sup>a</sup> l minora	Chiastica, Br	Freq Offs 0
50.0	00 GHz						Stop 9		Scale Tyj
Res BW	1.0 MHz	#VBW	1.0 MHz		S	weep 13	.33 ms (4	0001 pts)	

WCDMA850MHz Channel = 4183, 1GHz to 9GHz



RF 50 Ω 30.000000		Trig: Free Run Atten: 36 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	10:59:08 AM Jun 08, 2020 TRACE 1 2 3 4 5 0 TYPE M	Frequency
			М	kr2 943.74 MHz -39.574 dBm	Auto Tu
				¢ <sup>1</sup>	Center Fr 515.000000 M
					Start Fr 30.000000 M
*******	utilitaanan tertamaa makaimaninin	, and the second se	مارومومورور ورومورور ورومورور ورومورور ورومورور ورومورور ورومورور ورومورور ورومورور ورومورو ورومور ورومور وروم		Stop Fr 1.000000000 G
00 kHz	#VE	3W 100 kHz	-		CF St 97.000000 M Auto M
	846.74 MHz 943.74 MHz	20.830 dBm -39.574 dBm			Freq Off
					Scale Ty
	30.000000 Ref Offset 14. Ref 40.00 d	30.000000 MH2 PNC: Fatt IF Gain:Low Ref 0ffset 14.5 dB Ref 40.00 dBm 0 dBm 0 GHz 00 GHz 00 KHz #VE SCL × 84574 MHz	30.000000 MHz PNO: Fast If GainLow Trig: Free Run Atten: 36 dB Ref 40.00 dBm 0 GHz 00 GHz 00 KHz #VBW 100 kHz SCL X Y 4 40.00 dBm 2030 dBm	30.000000 MHz         PN0: Fast IF din:Low         Trig: Free Run Atten: 36 dB         Avg Type: Log-Pwr Avg Hold>100/100           Ref Offset 14.5 dB         M           Ref 40.00 dBm         M           0 GHz         Sweep 3           00 GHz         Sweep 3           SCL         X           Y         YB: 2030 dBm	30.000000 MHz         PNC: Fast         Trig: Free Run         Avg Type: Log-Pwr         Trace Type: Log-Pwr           Ref Offset 14.5 dB         Mkr2 943.74 MHz         Mkr2 943.74 MHz         Trig: Free Run         Avg Type: Log-Pwr         Trace Type: Log-Pwr           Ref Offset 14.5 dB         Mkr2 943.74 MHz         -39.574 dBm         -39.574 dBm         -39.574 dBm           Ref 40.00 dBm         -

WCDMA850MHz Channel = 4233, 30MHz to 1GHz



WCDMA850MHz Channel = 4233, 1GHz to 9GHz



## 2.6 Bandedge

#### 2.6.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ .

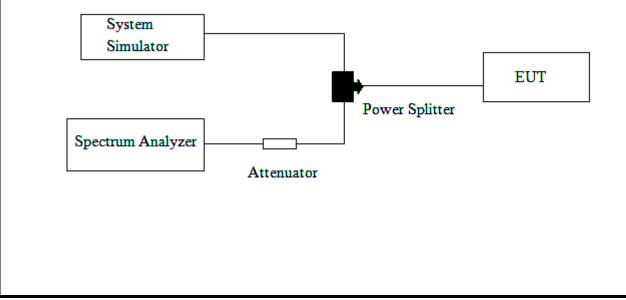
#### 2.6.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

#### 2.6.3 Test Procedures

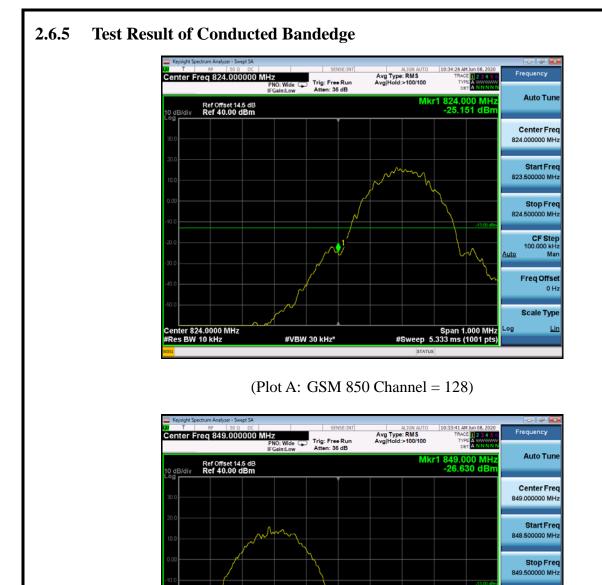
- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.
- 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 4. The band GPRSs of low and high channels for the highest RF powers were measured.
- 5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 6. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)
  - = P(W) [43 + 10log(P)] (dB)
  - $= [30 + 10\log(P)] (dBm) [43 + 10\log(P)] (dB)$
  - = -13dBm.

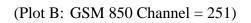
#### 2.6.4 Test Setup











#VBW 30 kHz\*

Center 849.0000 MHz #Res BW 10 kHz CF Step 100.000 kHz Man

Freq Offset 0 Hz

Scale Type

Lir

Auto

Log

Span 1.000 MHz #Sweep 5.333 ms (1001 pts)





(Plot C:GSM 1900 Channel = 512)



(Plot D: GSM 1900 Channel = 810)





(Plot E: EDGE 850 Channel = 128)



(Plot F: EDGE 850 Channel = 251)





(Plot G: EDGE 1900 Channel = 512)



(Plot H: EDGE 1900 Channel = 810)





(Plot I: WCDMA 850 Channel = 4132)



(Plot J: WCDMA 850 Channel = 4233)



## 2.7 Transmitter Radiated Power (EIRP/ERP)

#### 2.7.1 Requirement

The substitution method, in ANSI / TIA / EIA-603-D-2010, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

#### 2.7.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

#### 2.7.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GSM/GPRS) and ANSI / TIA-603-D-2010 Section 2.2.17.
- 2. The EUT was placed on a turntable 1.5 meters high in a fully anechoic chamber.
- 3. The EUT was placed 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 4. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;

UMTS operating modes: Set RBW= 100 kHz, VBW= 300 kHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per KDB 971168 D01 v03r01.

- 5. The table was rotated 360 degrees to determine the position of the highest radiated power.
- 6. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
- 7. Taking the record of maximum ERP/EIRP.
- 8. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.





9. The conducted power at the terminal of the dipole antenna is measured.

10. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.

11. ERP/EIRP = Ps + Et - Es + Gs = Ps + Rt - Rs + Gs

Ps (dBm): Input power to substitution antenna.

Gs (dBi or dBd): Substitution antenna Gain.

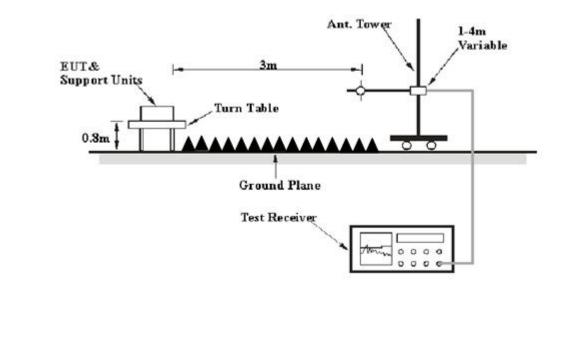
Et = Rt + AF Es = Rs + AF

AF (dB/m): Receive antenna factor

Rt: The highest received signal in spectrum analyzer for EUT.

Rs: The highest received signal in spectrum analyzer for substitution antenna.

#### 2.7.4 Test Setup





## 2.7.5 Test Result of Transmitter Radiated Power

Test Notes:

1. This device employs GMSK technology with GSM capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.

2. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.

3. This unit was tested with its standard battery.

4. The worst case test configuration was found in the vertical positioning where the EUT is laying on its side. The data reported in the tables below were measured in this test setup.

Band	Channel	Frequency	PCL	Antenna Pol	Measured ERP	Limit	Verdict	
		(MHz)		(H/V)	dBm	dBm		
	128	824.20	5	Н	32.28		PASS	
	120	024.20	5	V	31.79		1733	
GSM	190	836.60	5	Н	32.87	20 5	DACC	
850MHz				V	31.18	- 38.5	PASS	
	251	848.80	5	Н	32.33		DACC	
	251			V	31.27		PASS	

Band	Channel	Frequency (MHz)	PCL	Antenna Pol (H/V)	Measured EIRP dBm	Limit dBm	Verdict
	510	1850.2	0	Н	29.66		PASS
	512	1630.2	0	V	27.18		1499
GSM	661	1880.0	0	Н	29.61	22	DACC
1900MHz				V	26.38	33	PASS
	010	1909.8	0	Н	29.21		DACC
	810			V	27.04		PASS



Band	Channel	Frequency	PCL	Antenna Pol	Measured ERP	Limit	Verdict	
Dallu	Channel	(MHz)	FCL	(H/V)	dBm	dBm	veruict	
	128	824.20	5	Н	26.36		PASS	
	120	024.20	5	V	25.16		IASS	
EDGE	190	836.60	5	Н	26.32	38.5	DACC	
850MHz				V	25.22	38.3	PASS	
	0.51	0.40,000	~	Н	26.27		DACC	
	251	848.80	5	V	25.15		PASS	

Band	Channel	Frequency (MHz)	PCL	Antenna Pol (H/V)	Measured EIRP dBm	Limit dBm	Verdict	
	510	1850.2	0	Н	25.16		DAGG	
	512	1830.2	0	V	23.21		PASS	
EDGE	661	1880.0	0	Н	25.31	22	PASS	
1900MHz				V	23.13	33	FASS	
	010	1000.0	0	Н	25.14		DACC	
	810	1909.8	0	V	23.26		PASS	

Dand	Channel	Frequency	Antenna Pol	Measured ERP	Limit	Verdict	
Band	Channel	(MHz)	(H/V)	dBm	dBm	verdict	
	4132	876 1	Н	23.85		DACC	
	4132	826.4	V	22.16		PASS	
WCDMA	4175	025	Н	23.74	29.5	DACC	
850MHz	4175	835	V	22.37	38.5	PASS	
	1000	046.6	Н	23.70		DACC	
	4233	846.6	V	22.62		PASS	



## 2.8 Radiated Spurious Emissions

#### 2.8.1 Requirement

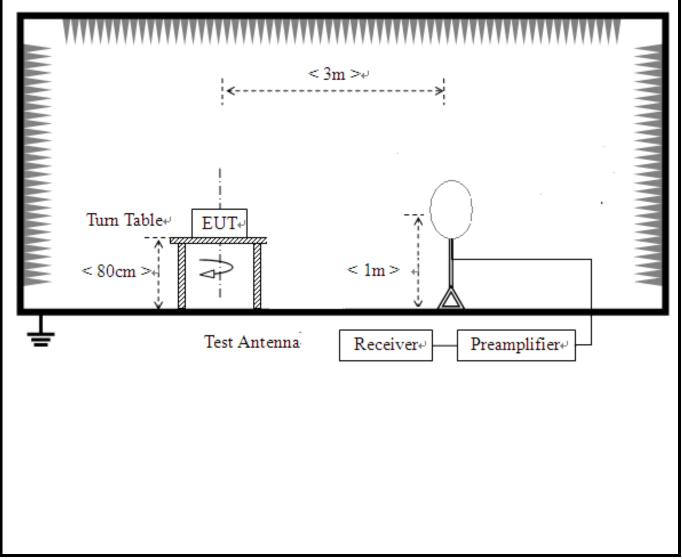
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ . The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

#### 2.8.2 Measuring Instruments

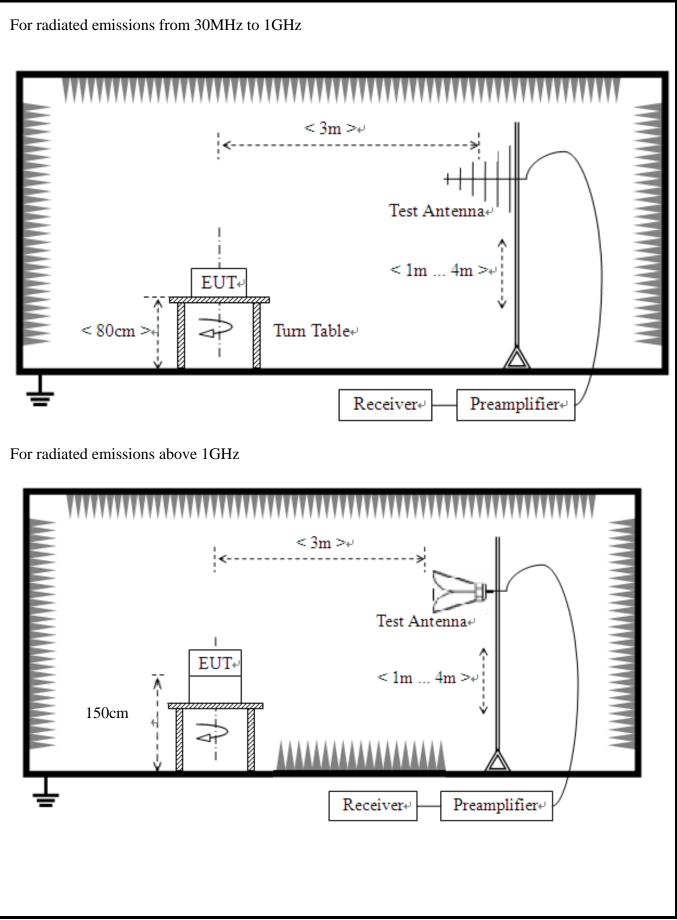
The measuring equipment is listed in the section 3 of this test report.

## 2.8.3 Test Setup

For radiated emissions from 9 kHz to 30MHz









#### 2.8.4 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
- 2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground(below 1GHz) and 1.5 meter above 1GHz
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
- 6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
- 7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- 9. Taking the record of output power at antenna port.
- 10. Repeat step 7 to step 8 for another polarization.
- 11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 12. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
  - = P(W) [43 + 10log(P)] (dB)
  - = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
  - = -13dBm.
- 13. This device employs GMSK technology with GSM and GSM capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.
- 14. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.
- 15. This unit was tested with its standard battery.
- 16. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle,



high channel. And only the worst axis test condition was recorded in this test report.

- 17. The spectrum is measured from 9 KHz to the 10<sup>th</sup> harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. The worst case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 18. For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.



# 2.8.5 Test Results of Radiated Spurious Emissions

#### Note: 1. (Absolute)Level=Reading Level + Factor

Worst-Case test data provide as below:

#### GSM850 Middle Channel

Susp	ected List						
NO	Freq.	Reading	Level	Limit	Margin	Factor	Delority
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-87.01	-64.50	-13.00	51.50	22.51	Horizontal
2	49.4097	-90.92	-71.34	-13.00	58.34	19.58	Horizontal
3	121.710	-101.37	-80.96	-13.00	67.96	20.41	Horizontal
4	1779.38	-47.10	-45.83	-13.00	32.83	1.27	Horizontal
5	3892.94	-59.68	-50.03	-13.00	37.03	9.65	Horizontal
6	7952.47	-60.58	-42.54	-13.00	29.54	18.04	Horizontal

Susp	ected List						
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delarity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-88.60	-67.85	-13.00	54.85	20.75	Vertical
2	48.4392	-93.33	-74.08	-13.00	61.08	19.25	Vertical
3	73.6718	-97.09	-75.27	-13.00	62.27	21.82	Vertical
4	1942.47	-54.70	-55.14	-13.00	42.14	-0.44	Vertical
5	5071.03	-60.03	-46.02	-13.00	33.02	14.01	Vertical
6	9670.83	-61.78	-39.15	-13.00	26.15	22.63	Vertical



Worst-Case test data provide as below:

#### GSM1900 Middle Channel

#### 30MHz~20GHz:

Suspected List							
	Freq.	Reading	Level	Limit	Margin	Factor	Delority
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-85.04	-65.15	-13.00	52.15	19.89	Vertical
2	74.1571	-84.07	-63.37	-13.00	50.37	20.70	Vertical
3	122.196	-99.48	-78.17	-13.00	65.17	21.31	Vertical
4	613.261	-105.24	-75.08	-13.00	62.08	30.16	Vertical
5	5056.02	-60.00	-46.13	-13.00	33.13	13.87	Vertical
6	7224.61	-60.71	-44.07	-13.00	31.07	16.64	Vertical

Suspected List							
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-84.48	-62.83	-13.00	49.83	21.65	Horizontal
2	74.1571	-97.24	-78.86	-13.00	65.86	18.38	Horizontal
3	175.087	-102.96	-82.07	-13.00	69.07	20.89	Horizontal
4	501.170	-105.11	-74.99	-13.00	61.99	30.12	Horizontal
5	2690.84	-57.76	-50.01	-13.00	37.01	7.75	Horizontal
6	6166.58	-60.28	-46.19	-13.00	33.19	14.09	Horizontal





Worst-Case test data provide as below:

#### WCDMA 850 Middle Channel

#### 30MHz~10GHz:

Suspected List							
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delority
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-84.55	-62.90	-13.00	49.90	21.65	Horizontal
2	73.1866	-100.23	-81.84	-13.00	68.84	18.39	Horizontal
3	121.710	-98.69	-79.79	-13.00	66.79	18.90	Horizontal
4	506.993	-104.31	-70.49	-13.00	57.49	33.82	Horizontal
5	2909.95	-57.94	-50.04	-13.00	37.04	7.90	Horizontal
6	7929.96	-60.25	-42.64	-13.00	29.64	17.61	Horizontal

Suspected List							
	Freq.	Reading	Level	Limit	Margin	Factor	Delority
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-84.17	-64.28	-13.00	51.28	19.89	Vertical
2	48.4392	-93.48	-75.04	-13.00	62.04	18.44	Vertical
3	121.710	-99.25	-77.89	-13.00	64.89	21.36	Vertical
4	417.708	-103.77	-77.41	-13.00	64.41	26.36	Vertical
5	3217.60	-58.61	-49.52	-13.00	36.52	9.09	Vertical
6	7157.07	-60.19	-43.67	-13.00	30.67	16.52	Vertical



# 3. LIST OF MEASURING EQUIPMENT

Description	Manufacturer	Model	Serial No.	Cal. Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB7	A0501375	2019.07.30	2020.07.29	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2019.04.26	2022.04.25	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2017.07.14	2020.07.13	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101339	2017.07.14	2020.07.13	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100150	2019.04.27	2022.04.26	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100149	2019.04.17	2022.04.16	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.07.12	2020.07.11	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4003A	0329293	2018.09.17	2020.09.16	Radiation
Amplifier 1GHz-18GHz	AR	25S1G4AM1	22018	2018.09.17	2020.09.16	Radiation
Ampilier 20M~3GHz	MILMEGA	80RF1000-250	1064573	2017.10.09	2020.10.08	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2019.06.05	2020.06.04	Conducted
Test Receiver	R&S	ESCI	A0902601	2019.07.02	2020.07.01	Conducted
Temperature chamber	welissom Inc.	SU-642	A150802409	2019.07.18	2020.07.17	Conducted
Wideband Radio Communication tester	R&S	CMW500	A130101034	2019.07.30	2021.07.29	Conducted
Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02	Conducted



# 4. UNCERTAINTY OF EVALUATION

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150KHz~30MHz)

Measuring Uncertainty for a level of	2.8dB
confidence of 95%(U=2Uc(y))	2.80D

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of	5.0dB	
confidence of 95%(U=2Uc(y))	5.0dB	

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of	5.1dB
confidence of 95%(U=2Uc(y))	5.10B

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a level of	5.1dB
confidence of 95%(U=2Uc(y))	5.105

\*\* END OF REPORT \*\*