



RF TEST REPORT

Applicant Bullitt Group
FCC ID ZL5B40E
Product Mobile Phone
Brand CAT
Model B40
Report No. R2101A0004-R2V2
Issue Date March 31, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2019)/ FCC CFR 47 Part 24E (2019)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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TABLE OF CONTENT

1. Test Laboratory	5
1.1. Notes of the test report	5
1.2. Test facility	5
1.3. Testing Location	5
2. General Description of Equipment under Test	6
2.1. Applicant and Manufacturer Information	6
2.2. General information	6
3. Applied Standards	8
4. Test Configuration	9
5. Test Case Results	10
5.1. RF Power Output and Effective Isotropic Radiated Power	10
5.2. Occupied Bandwidth	12
5.3. Band Edge Compliance	16
5.4. Peak-to-Average Power Ratio (PAPR)	19
5.5. Frequency Stability	21
5.6. Spurious Emissions at Antenna Terminals	24
5.7. Radiates Spurious Emission	27
6. Main Test Instruments	31
ANNEX A: The EUT Appearance	32
ANNEX B: Test Setup Photos	33



Version	Revision description	Issue Date
Rev.0	Initial issue of report.	March 17, 2021
Rev.1	Update information.	March 19, 2021
Rev.2	Update description in Page 9.	March 31, 2021
Note: This revised report (Report No. R2101A0004-R2V2) supersedes and replaces the previously issued report (Report No. R2101A0004-R2V1). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF Power Output and Effective Isotropic Radiated Power	2.1046 24.232(c)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	2.1051 / 24.238(a)	PASS
4	Peak-to-Average Power Ratio	24.232/KDB 971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 24.235	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 24.238(a)	PASS
7	Radiates Spurious Emission	2.1053 / 24.238(a)	PASS
Date of Testing: January 11, 2021 ~ February 19, 2021 Date of Sample Received: January 4, 2021			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			



1. Test Laboratory

1.1. Notes of the test report

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

1.2. Test facility

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

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

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City: Shanghai
Post code: 201201
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E-mail: xukai@ta-shanghai.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	Bullitt Group
Applicant address	One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR, United Kingdom
Manufacturer	Bullitt Mobile Limited
Manufacturer address	One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR, United Kingdom

2.2. General information

EUT Description			
Model	B40		
IMEI	IMEI 1:351743660016965 IMEI 2:351743660016973		
Hardware Version	V00		
Radio Version	Dual SIM: LTE_D03140.10_B40 Single SIM: LTE_S03140.10_B40		
Power Supply	Battery / AC adapter		
Antenna Type	PIFA Antenna		
Antenna Gain	-0.5dBi		
Test Mode(s)	GSM1900; WCDMA Band II		
Test Modulation	(GSM/GPRS)GMSK, (EGPRS) GMSK/ 8PSK; (WCDMA) BPSK, QPSK;		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	14		
HSUPA UE Category	6		
Maximum E.I.R.P	GSM 1900:	28.72dBm	
	WCDMA Band II:	21.87dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.23V Maximum: 4.37V		
Extreme Temperature	Lowest: -30°C Highest: +55°C		
Operating Voltage	Minimum: 3.6V Maximum: 4.35V		
Operating Temperature	Lowest: -25°C Highest: +55°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM1900	1850 ~ 1910	1930 ~ 1990
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
EUT Accessory			



Battery	Manufacturer: NINGBO VEKEN BATTERY CO., LTD Model: 178205511
Earphone	Manufacturer: JIU JIANG JUWEI ELECTRONICS CO.,LTD Model: JWEP1192-M01H
USB Cable	Manufacturer: SHENZHEN FKY-QY HARDWARE ELECTRONIC CO.,LTD Model: MO36B2000100
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.	

Difference Configuration Statement				
Configuration	Configuration 1		Configuration 2	
	Dual card slots	Single card slot	Dual card slots	Single card slot
Memory	DOS DS35M1GA-IB		ESMT F50D1G41LB-83YG2ME	
LCD	Sanlong CT024TN01 (CTC glass)		HLT HTB040WB085 (HSD glass)	
Antibacterial	No		Yes	
Radio Version	LTE_D03140.10_ B40	LTE_S03140.10_ B40	LTE_D03140.10_ B40	LTE_S03140.10_ B40
SIM Card Slot	SIM 1, SIM 2	SIM 1 (SIM 2 slot closed)	SIM 1, SIM 2	SIM 1 (SIM 2 slot closed)
Others	The same		The same	
Customer declared that the difference between the four EUT is only the Memory, LCD, Antibacterial, Radio Version and the quantity of SIM Card Slot. There are more than one Configure, each one should be applied throughout the compliance test respectively, however, only the worst case (Configure 1, Dual card slots) will be recorded in this report.				

3. Applied Standards

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

Test standards:

FCC CFR 47 Part 24E (2019)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2019)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4. Test Configuration

There is more than one SIM card slot, each one should be applied throughout the compliance test respectively, and however, only the worst case (SIM 1) will be recorded in this report.

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

All mode and data rates and positions and modulations were investigated.

Subsequently, only the worst case emissions are reported.

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

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

Test items	Modes/Modulation	
	GSM 1900	WCDMA Band II
RF Power Output and Effective Isotropic Radiated Power	GSM GPRS EGPRS	RMC HSDPA/HSUPA
Occupied Bandwidth	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Band Edge Compliance	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Peak-to-Average Power Ratio	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Frequency Stability	GSM GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Spurious Emissions at Antenna Terminals	GSM	RMC
Radiates Spurious Emission	GSM (CH-Middle)	RMC (CH-Middle)

5. Test Case Results

5.1.RF Power Output and Effective Isotropic Radiated Power

Ambient condition

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

Methods of Measurement

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

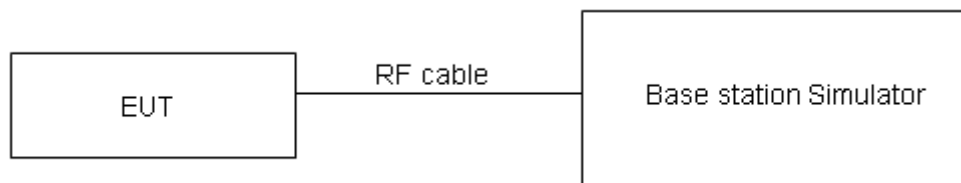
ERP can then be calculated as follows:

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

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

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

Test Setup



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 24.232(c) Mobile and portable stations are limited to 2 watts EIRP.

Rule Part 24.232(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Limit	$\leq 2 \text{ W}$ (33 dBm)
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Measurement Uncertainty

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

Test Results

GSM 1900		Maximum Output Power (dBm)			EIRP (dBm)		
		Channel 512	Channel 661	Channel 810	Channel 512	Channel 661	Channel 810
		1850.2 (MHz)	1880 (MHz)	1909.8 (MHz)	1850.2 (MHz)	1880 (MHz)	1909.8 (MHz)
GSM(GMSK)	Results	29.22	29.16	29.15	28.72	28.66	28.65
GPRS (GMSK)	1TXslot	29.16	29.07	29.05	28.66	28.57	28.55
	2TXslots	27.21	26.96	26.74	26.71	26.46	26.24
	3TXslots	25.68	25.41	25.19	25.18	24.91	24.69
	4TXslots	23.63	23.37	23.08	23.13	22.87	22.58
EGPRS (8PSK)	1TXslot	26.54	26.32	26.42	26.04	25.82	25.92
	2TXslots	25.09	24.75	24.96	24.59	24.25	24.46
	3TXslots	23.05	22.64	22.72	22.55	22.14	22.22
	4TXslots	21.23	20.75	20.85	20.73	20.25	20.35

WCDMA Band II		Maximum Output Power (dBm)			EIRP (dBm)		
		Channel 9262	Channel 9400	Channel 9538	Channel 9262	Channel 9400	Channel 9538
		1852.4 (MHz)	1880 (MHz)	1907.6 (MHz)	1852.4 (MHz)	1880 (MHz)	1907.6 (MHz)
RMC		22.37	22.26	22.17	21.87	21.76	21.67
HSDPA	Sub - Test 1	21.83	21.68	21.61	21.33	21.18	21.11
	Sub - Test 2	21.82	21.70	21.58	21.32	21.20	21.08
	Sub - Test 3	21.29	21.20	21.10	20.79	20.70	20.60
	Sub - Test 4	21.30	21.21	21.08	20.80	20.71	20.58
HSUPA	Sub - Test 1	21.79	21.67	21.56	21.29	21.17	21.06
	Sub - Test 2	20.78	20.65	20.55	20.28	20.15	20.05
	Sub - Test 3	21.25	21.13	21.04	20.75	20.63	20.54
	Sub - Test 4	20.71	20.62	20.52	20.21	20.12	20.02
	Sub - Test 5	21.72	21.60	21.50	21.22	21.10	21.00

5.2.Occupied Bandwidth

Ambient condition

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

Method of Measurement

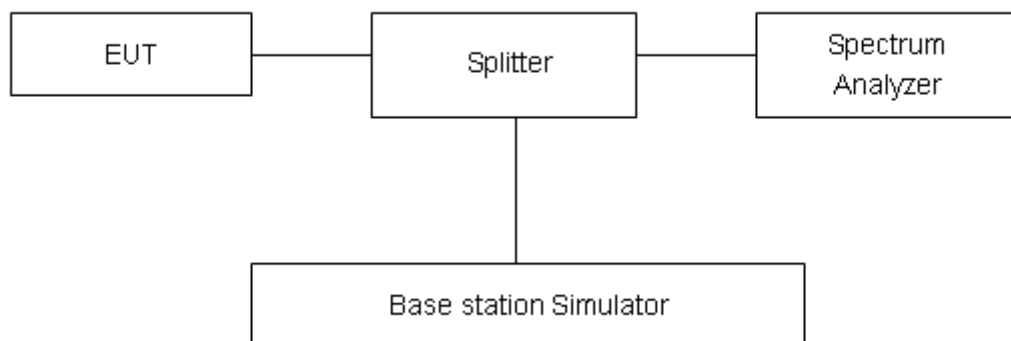
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 6.2kHz, VBW is set to 18kHz for GSM 1900,

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

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

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

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

Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GSM 1900 (GMSK)	512	1850.2	0.24590	0.3147
	661	1880.0	0.24399	0.3151
	810	1909.8	0.24630	0.3118
GPRS 1900 (GMSK)	512	1850.2	0.24098	0.3079
	661	1880.0	0.24209	0.3084
	810	1909.8	0.24687	0.3157
EGPRS 1900 (8PSK)	512	1850.2	0.24507	0.3075
	661	1880.0	0.24165	0.3094
	810	1909.8	0.25221	0.3139
WCDMA Band II (RMC)	9262	1852.4	4.14550	4.6390
	9400	1880	4.13970	4.6390
	9538	1907.6	4.14240	4.6350



GSM1900 GSM CH-Low



GSM1900 GPRS CH-Low



GSM 1900 GSM CH-Middle



GSM 1900 GPRS CH-Middle



GSM 1900 GSM CH-High



GSM 1900 GPRS CH-High



GSM1900 EGPRS CH-Low



WCDMA Band II RMC CH-Low



GSM 1900 EGPRS CH-Middle



WCDMA Band II RMC CH-Middle



GSM 1900 EGPRS CH-High



WCDMA Band II RMC CH-High



5.3.Band Edge Compliance

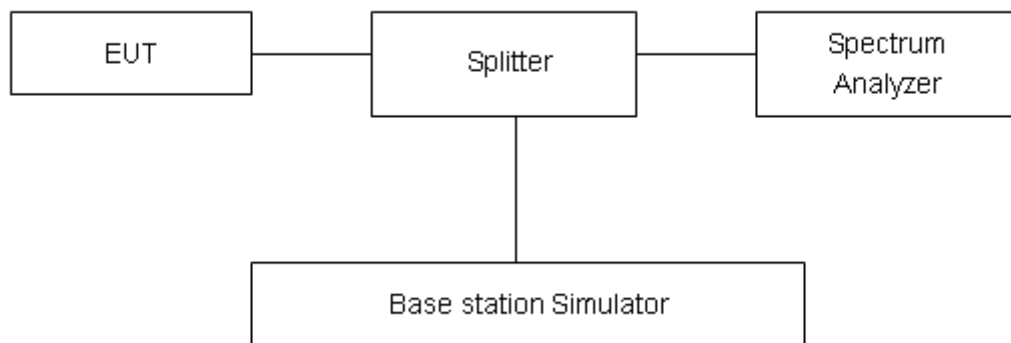
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The Average detector is used and RBW is set to 6.2kHz, VBW is set to 18kHz for GSM 1900, RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band II, Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

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

Test Result:

GSM1900 GSM CH-Low



GSM 1900 GSM CH-High



GSM1900 GPRS CH-Low



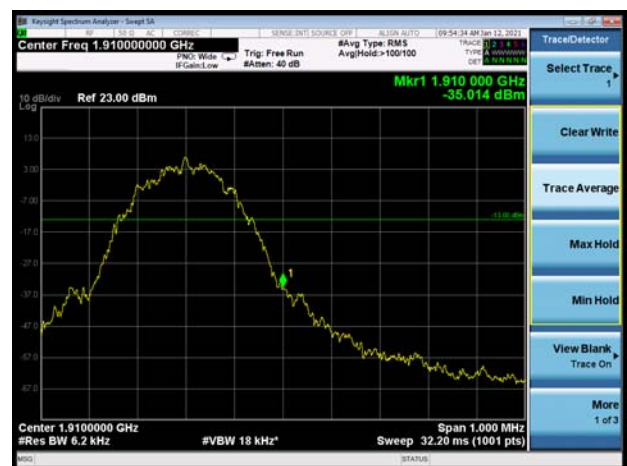
GSM 1900 GPRS CH-High



GSM1900 EGPRS CH-Low



GSM 1900 EGPRS CH-High



CDMA Band II RMC CH-Low



WCDMA Band II RMC CH-High



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

Ambient condition

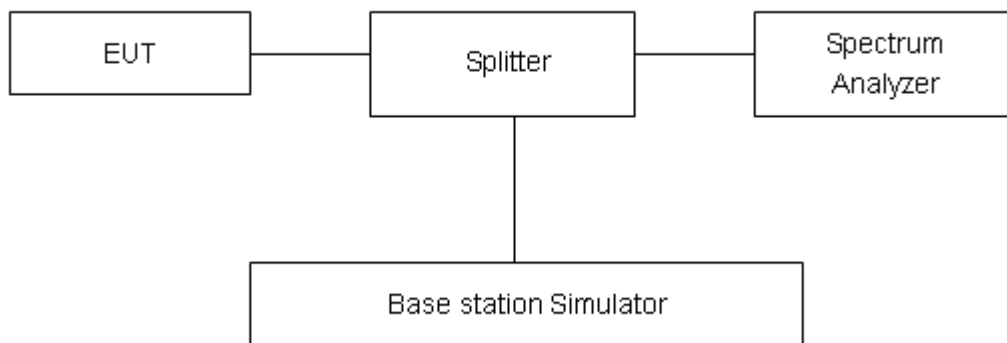
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

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 in 24.232(d).

Measurement Uncertainty

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

**Test Results**

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GMSK)	512	1850.2	30.76	29.22	1.54	≤13	PASS
	661	1880	30.80	29.16	1.64	≤13	PASS
	810	1909.8	30.68	29.15	1.53	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	30.63	29.16	1.47	≤13	PASS
	661	1880	30.59	29.07	1.52	≤13	PASS
	810	1909.8	30.63	29.05	1.58	≤13	PASS
EGPRS 1900 (8PSK)	512	1850.2	28.58	26.54	2.04	≤13	PASS
	661	1880	28.45	26.32	2.13	≤13	PASS
	810	1909.8	28.50	26.42	2.08	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	25.19	22.11	3.08	≤13	PASS
	9400	1880	24.88	21.86	3.02	≤13	PASS
	9538	1907.6	24.81	21.83	2.98	≤13	PASS

5.5.Frequency Stability

Ambient condition

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

Method of Measurement

Frequency Stability (Temperature Variation)

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

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

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

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

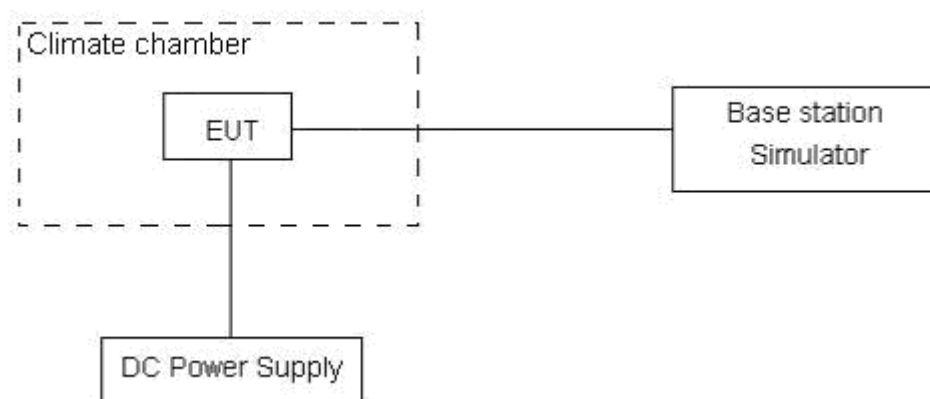
Frequency Stability (Voltage Variation)

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

Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.23V and 4.37V with a nominal voltage of 3.8V.

Test setup



Limits

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

Measurement Uncertainty

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

Test Result

GSM1900						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal (25℃)	Normal	5.36	5.63	0.00285	0.00300	PASS
Extreme (55℃)		4.93	3.39	0.00262	0.00180	PASS
Extreme (50℃)		4.78	11.62	0.00254	0.00618	PASS
Extreme (40℃)		10.37	6.35	0.00552	0.00338	PASS
Extreme (30℃)		15.81	8.11	0.00841	0.00431	PASS
Extreme (20℃)		8.75	17.07	0.00466	0.00908	PASS
Extreme (10℃)		7.74	16.76	0.00412	0.00891	PASS
Extreme (0℃)		12.48	6.26	0.00664	0.00333	PASS
Extreme (-10℃)		14.10	16.76	0.00750	0.00891	PASS
Extreme (-20℃)		3.37	8.19	0.00179	0.00436	PASS
Extreme (-30℃)		3.81	6.63	0.00203	0.00353	PASS
25℃	LV	13.85	8.39	0.00737	0.00446	PASS
	HV	3.66	13.25	0.00195	0.00705	PASS

WCDMA Band II						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal (25℃)	Normal	14.78	6.57	0.00786	0.00350	PASS
Extreme (55℃)		4.16	14.60	0.00221	0.00777	PASS
Extreme (50℃)		2.62	10.84	0.00140	0.00577	PASS
Extreme (40℃)		17.36	4.30	0.00923	0.00229	PASS
Extreme (30℃)		6.21	12.48	0.00330	0.00664	PASS
Extreme (20℃)		13.39	14.42	0.00712	0.00767	PASS
Extreme (10℃)		11.90	12.38	0.00633	0.00658	PASS
Extreme (0℃)		6.69	13.61	0.00356	0.00724	PASS
Extreme (-10℃)		6.18	4.23	0.00329	0.00225	PASS
Extreme (-20℃)		2.43	10.99	0.00129	0.00584	PASS
Extreme (-30℃)		3.45	16.22	0.00184	0.00863	PASS
25℃	LV	13.32	16.49	0.00709	0.00877	PASS
	HV	5.21	8.49	0.00277	0.00451	PASS

5.6. Spurious Emissions at Antenna Terminals

Ambient condition

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

Method of Measurement

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

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

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

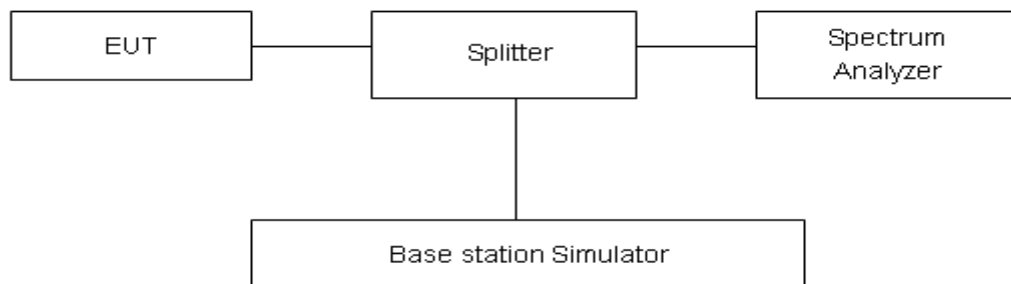
RBW is set to 100 kHz (30MHz~1000MHz),

RBW is set to 1000 kHz (above 1000MHz),

Sweep is set to ATUO.

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

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

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

Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

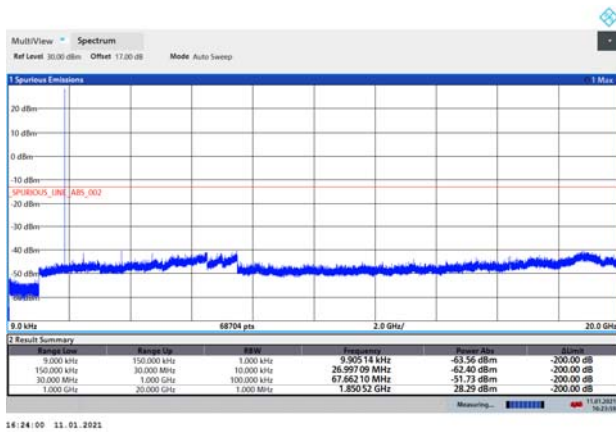


Test Result

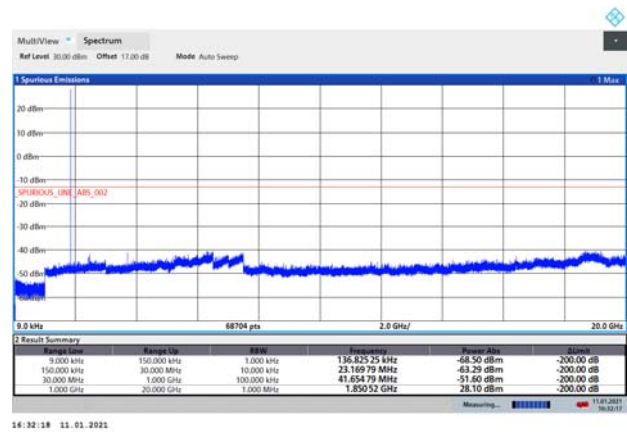
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

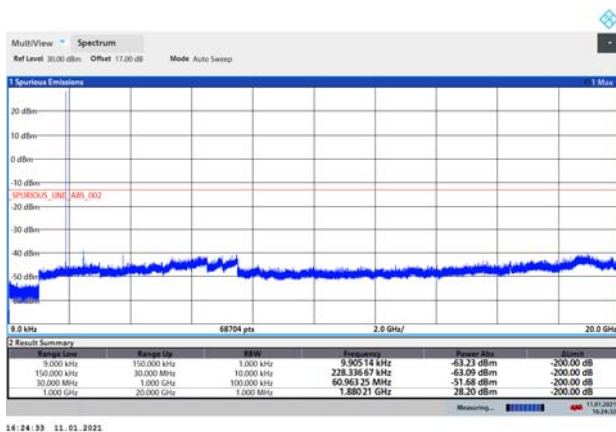
GSM 1900 CH-Low 9kHz ~ 20GHz



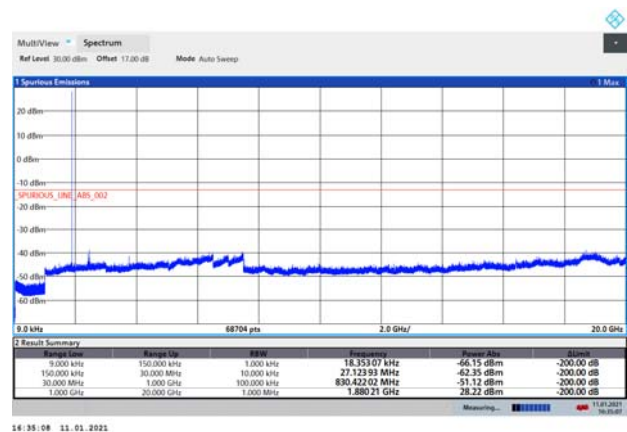
GPRS 1900 CH-Low 9kHz ~ 20GHz



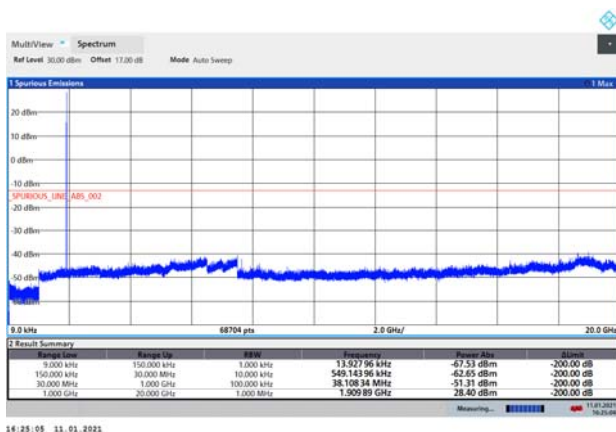
GSM 1900 CH- Middle 9kHz ~ 20GHz



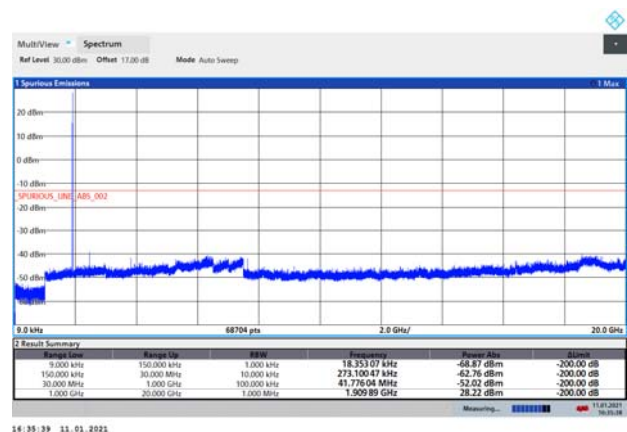
GPRS 1900 CH- Middle 9kHz ~ 20GHz



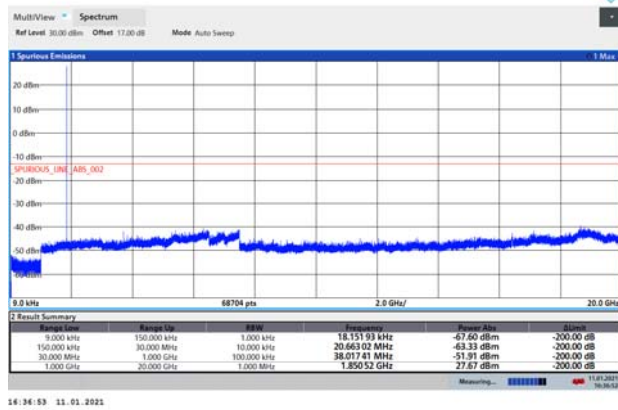
GSM 1900 CH-High 9kHz ~ 20GHz



GPRS 1900 CH-High 9kHz ~ 20GHz

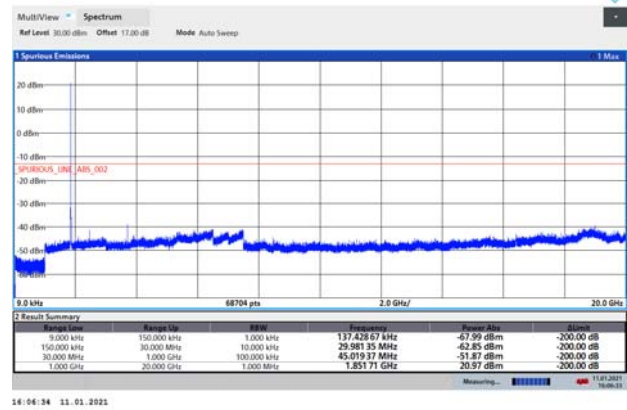


EGPRS 1900 CH-Low 9kHz ~20GHz



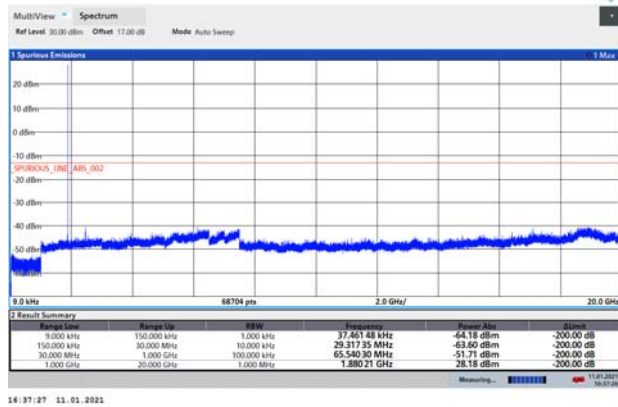
14:34:59 11.01.2021

WCDMA BAND II CH-Low 9kHz ~ 20GHz



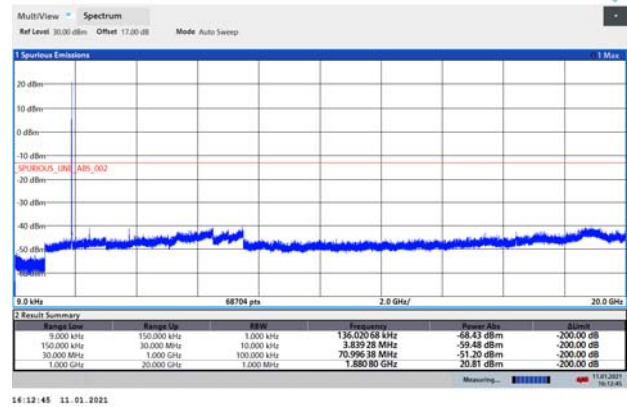
14:06:34 11.01.2021

EGPRS 1900 CH- Middle 9kHz ~ 20GHz



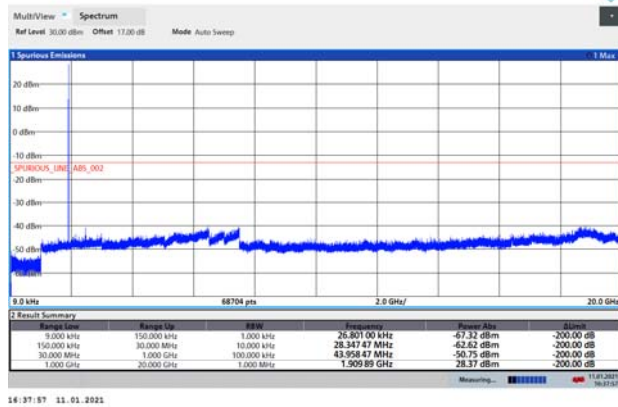
14:37:27 11.01.2021

WCDMA BAND II CH- Middle 9kHz ~20GHz



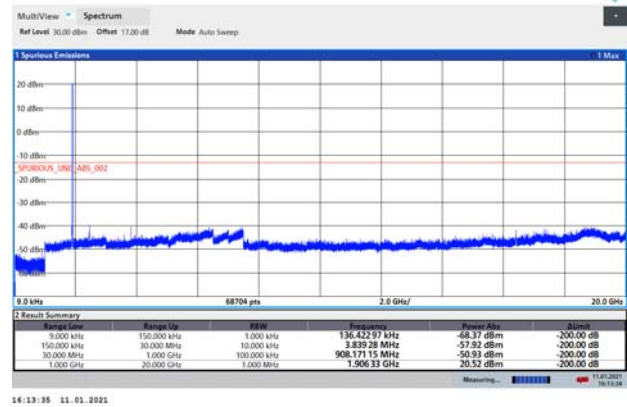
14:12:45 11.01.2021

EGPRS 1900 CH-High 9kHz ~ 20GHz



14:37:57 11.01.2021

WCDMA BAND II CH-High 9kHz ~ 20GHz



14:13:35 11.01.2021

5.7. Radiates Spurious Emission

Ambient condition

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

Method of Measurement

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

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$
The measurement results are amend as described below:

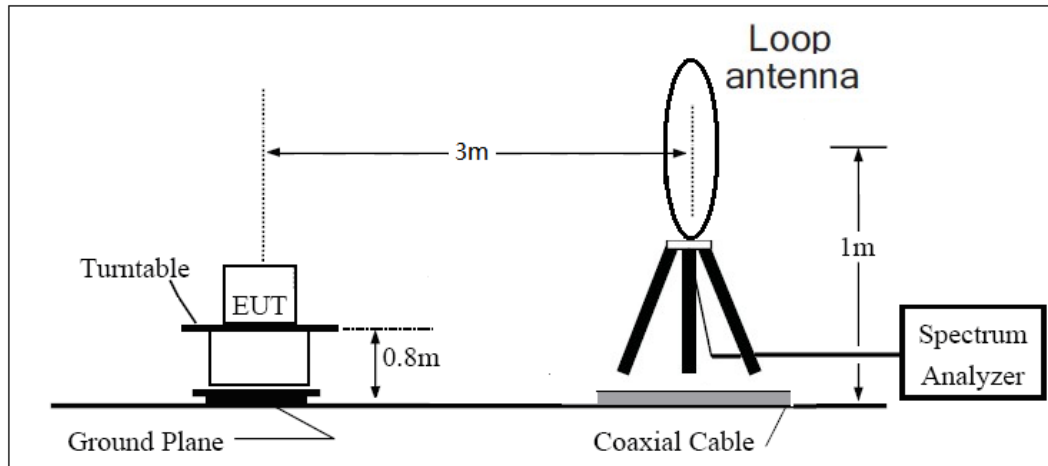
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

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

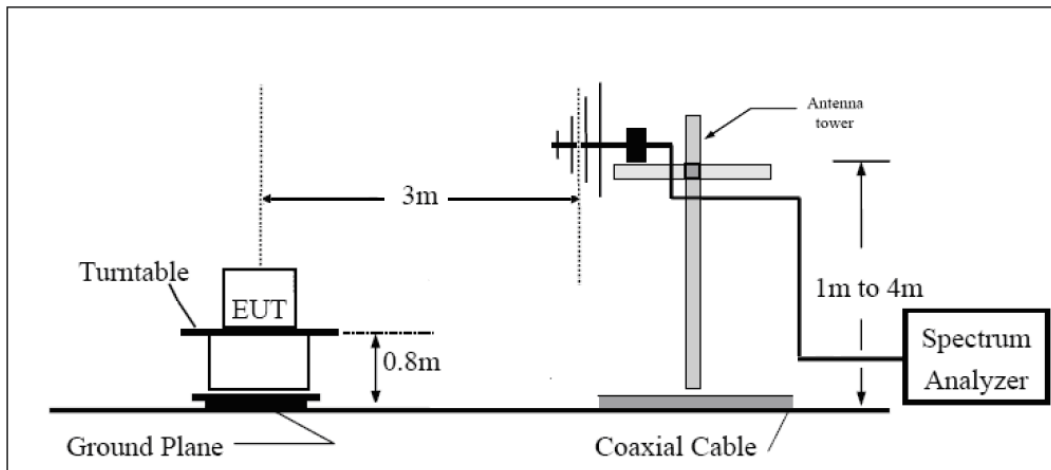
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

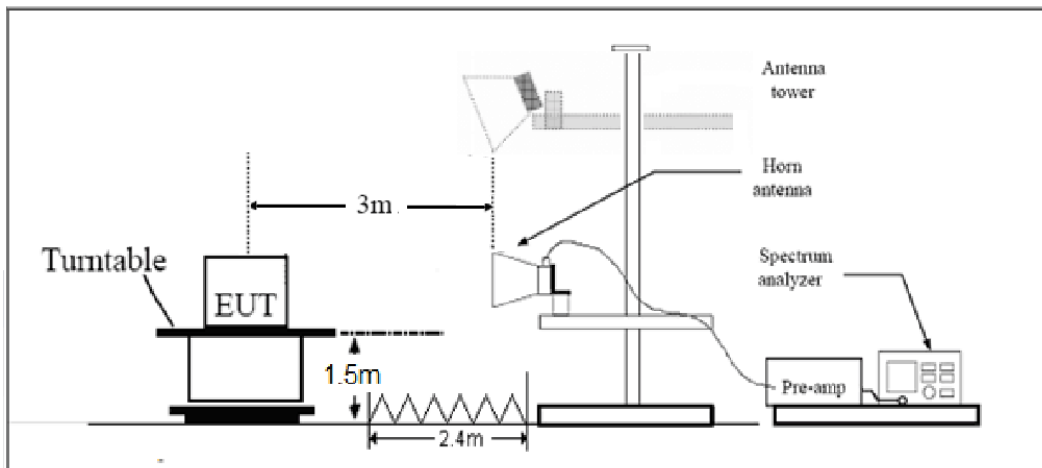
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz





Note: Area side: 2.4mX3.6m

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

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

Test Result

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

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.00	-60.56	2.60	12.50	Horizontal	-50.66	-13.00	37.66	45
3	5640.00	-52.53	3.30	12.50	Horizontal	-43.33	-13.00	30.33	315
4	7520.00	-49.24	4.20	12.20	Horizontal	-41.24	-13.00	28.24	90
5	9400.00	-51.00	4.30	11.10	Horizontal	-44.20	-13.00	31.20	270
6	11280.00	-48.77	5.90	11.90	Horizontal	-42.77	-13.00	29.77	180
7	13160.00	-51.90	5.70	14.00	Horizontal	-43.60	-13.00	30.60	45
8	15040.00	-47.60	5.80	13.10	Horizontal	-40.30	-13.00	27.30	270
9	16920.00	-46.53	6.10	14.60	Horizontal	-38.03	-13.00	25.03	315
10	18800.00	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

WCDMA Band II CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-52.68	2.60	12.50	Horizontal	-42.78	-13.00	29.78	315
3	5640.0	-54.32	3.30	12.50	Horizontal	-45.12	-13.00	32.12	45
4	7520.0	-55.29	4.20	12.20	Horizontal	-47.29	-13.00	34.29	315
5	9400.0	-51.75	4.30	11.10	Horizontal	-44.95	-13.00	31.95	90
6	11280.0	-51.26	5.90	11.90	Horizontal	-45.26	-13.00	32.26	135
7	13160.0	-52.71	5.70	14.00	Horizontal	-44.41	-13.00	31.41	45
8	15040.0	-49.01	5.80	13.10	Horizontal	-41.71	-13.00	28.71	315
9	16920.0	-47.10	6.10	14.60	Horizontal	-38.60	-13.00	25.60	135
10	18800.0	-	-	-	-	-	-	-	-
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2020-05-17	2021-05-16
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2020-05-18	2021-05-17
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2020-05-27	2021-05-26
Signal Analyzer	R&S	FSV30	100815	2020-12-13	2021-12-12
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2021-12-15
Horn Antenna	R&S	HF907	102723	2018-08-11	2021-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2021-06-19
Signal generator	R&S	SMB 100A	102594	2020-05-18	2021-05-17
Climatic Chamber	ESPEC	SU-242	93000506	2020-12-13	2021-12-12
Preamplifier	R&S	SCU18	102327	2020-05-18	2021-05-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2020-05-18	2021-05-17
RF Cable	Agilent	SMA 15cm	0001	2020-12-10	2021-06-09
Software	R&S	EMC32	9.26.0	/	/

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



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.