

Report No.: SUZR/2021/7002001

Rev.: 01

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# FCC TEST REPORT

**Application No.:** ZR/2021/70020  
**Applicant:** Fibocom Wireless Inc.  
**Address of Applicant:** 1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China  
**Manufacturer:** Fibocom Wireless Inc.  
**Address of Manufacturer:** 1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China  
**EUT Description:** 5G module  
**Model No.:** FG360-NA  
**Trade Mark:** Fibocom  
**FCC ID:** ZMOFG360NA  
**Standards:** 47 CFR Part 2  
47 CFR Part 27 subpart C  
**Date of Receipt:** 2021/10/1  
**Date of Test:** 2021/10/1 to 2021/10/27  
**Date of Issue:** 2021/10/30

<b>Test Result :</b>	<b>PASS *</b>
----------------------	---------------

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

*Panta Sun*  
Panta Sun

Wireless Laboratory Manager



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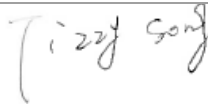
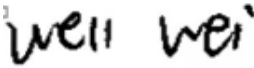
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# 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-10-30		Original

Authorized for issue by:		
Prepared By		 (Tizzy Song) / Engineer
Checked By		 (Well Wei) /Reviewer



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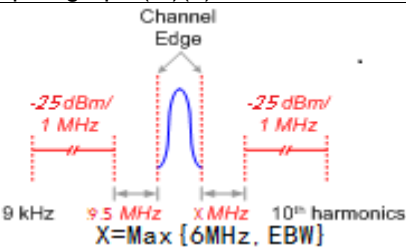
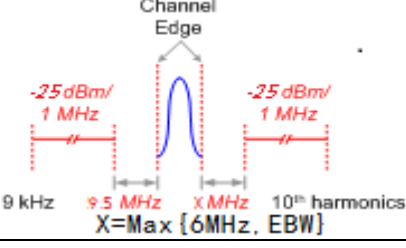
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## 2 Test Summary

### 2.1 LTE Band CA\_41C

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)	$EIRP \leq 2W$	Section 1 of Appendix B	Pass
Peak-Average Ratio	§27.50(a)	$\leq 13 \text{ dB}$	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Band Edges Compliance	§2.1051, §27.53(m4)	For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P) \text{ dB}$ on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P) \text{ dB}$ on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P) \text{ dB}$ on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(m)		Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(m)		Section 7 of Appendix B	Pass
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Section 8 of Appendix B	Pass



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### 3 General Information

#### 3.1 Details of Client

Applicant:	Fibocom Wireless Inc.
Address of Applicant	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan,Shenzhen, China
Manufacturer:	Fibocom Wireless Inc.
Address of Manufacturer	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan,Shenzhen, China

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Tizzy song



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### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number:0031225543



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### 3.4 General Description of EUT

EUT Description:	5G module
Model No.:	FG360-NA
Trade Mark:	Fibocom
Hardware Version:	V1.0
Software Version:	81103.7000.30.02.01.09
IMEI:	861139050018252
Sample Type:	<input type="checkbox"/> Portable Device, <input checked="" type="checkbox"/> Module
Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated
HPUE(only for CA_41C):	<input checked="" type="checkbox"/> Support <input type="checkbox"/> Not Support
RF Cable*:	<input checked="" type="checkbox"/> Provided by the applicant 0.9dB
Antenna Gain*:	<input checked="" type="checkbox"/> Provided by the applicant LTE CA_41C:1.52dBi;

Remark:

\*Since the above data and/or information is provided by the applicant relevant results or conclusions of this report are only made for these data and/or information , SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

### 3.5 Test Mode

Test Mode	Test Modes Description
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation
LTE/TM3	LTE system, 64QAM modulation
LTE/TM4	LTE system, 256QAM modulation

Remark: The test mode(s) are selected according to relevant radio technology specifications.



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### 3.6 Test Environment

Operating Environment:		
Humidity:	45~55 % RH	
Atmospheric Pressure:	101.0~101.30 KPa	
Temperature	NT	25 °C
Voltage:	LV	3.3V
	NV	3.8V
	HV	4.4V

Remark: LV= lower extreme test voltage; NV= nominal voltage  
HV= upper extreme test voltage; NT= normal temperature



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### 3.7 Technical Specification

Characteristics	Description		
Radio System Type	<input checked="" type="checkbox"/> LTE		
Supported Frequency Range	Band	TX	RX
	LTE CA_41C	2496 to 2690MHz	2496 to 2690MHz
Supported Channel Bandwidth	LTE Band CA_41C	<input checked="" type="checkbox"/> 5MHz+20MHz <input checked="" type="checkbox"/> 10MHz+15MHz <input checked="" type="checkbox"/> 10MHz+20MHz <input checked="" type="checkbox"/> 15MHz+15MHz <input checked="" type="checkbox"/> 15MHz+20MHz <input checked="" type="checkbox"/> 20MHz+20MHz	
Characteristics	Description		
Designation of Emissions (Remark: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	LTE Band CA_41C	25RB+100RB:22M7G7D;22M7W7D; 22M7W7D; 22M8W7D 50RB+75RB:23M1G7D;23M1W7D; 23M1W7D; 23M1W7D 50RB+100RB:27M6G7D;27M7W7D; 27M6W7D; 27M6W7D 75RB+50RB:23M0G7D;23M0W7D; 23M0W7D; 23M0W7D 75RB+75RB:28M6G7D;28M6W7D; 28M6W7D; 28M6W7D 75RB+100RB:32M8G7D;32M8W9D; 32M8W7D; 32M8W7D 100RB+25RB:22M8G7D;22M8W7D; 22M8W7D; 22M8W7D 100RB+50RB:27M6G7D;27M6W7D; 27M6W7D; 27M6W7D 100RB+75RB:32M5G7D;32M6W7D; 32M5W7D; 32M5W7D 100RB+100RB:37M4G7D;37M3W7D; 37M4W7D; 37M4W7D	



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### 3.8 Test Frequencies

**Table 4.3.1.2.9A-1: Test frequencies for CA\_41C**

Range	CC-Combo / N <sub>RB_agg</sub> [RB]	CC1 Note1			CC2 Note1		
		BW [RB]	N <sub>UL/DL</sub>	f <sub>UL/DL</sub> [MHz]	BW [RB]	N <sub>UL/DL</sub>	f <sub>UL/DL</sub> [MHz]
Low	25+100	25	39683	2499.3	100	39800	2511
		100	39750	2506	25	39867	2517.7
	50+75	50	39703	2501.3	75	39823	2513.3
		75	39725	2503.5	50	39845	2515.5
	50+100	50	39705	2501.5	100	39849	2515.9
		100	39750	2506	50	39894	2520.4
	75+75	75	39725	2503.5	75	39875	2518.5
		75	39728	2503.8	100	39899	2520.9
	75+100	100	39750	2506	75	39921	2523.1
		100	39750	2506	100	39948	2525.8
Mid	25+100	25	40528	2583.8	100	40645	2595.5
		100	40595	2590.5	25	40712	2602.2
	50+75	50	40549	2585.9	75	40669	2597.9
		75	40571	2588.1	50	40691	2600.1
	50+100	50	40526	2583.6	100	40670	2598.0
		100	40571	2588.1	50	40715	2602.5
	75+75	75	40545	2585.5	75	40695	2600.5
		75	40523	2583.3	100	40694	2600.4
	75+100	100	40546	2585.6	75	40717	2602.7
		100	40521	2583.1	100	40719	2602.9
High	25+100	25	41373	2668.3	100	41490	2680
		100	41440	2675	25	41557	2686.7
	50+75	50	41395	2670.5	75	41515	2682.5
		75	41417	2672.7	50	41537	2684.7
	50+100	50	41346	2665.6	100	41490	2680
		100	41391	2670.1	50	41535	2684.5
	75+75	75	41365	2667.5	75	41515	2682.5
		75	41319	2662.9	100	41490	2680
	75+100	100	41341	2665.1	75	41512	2682.2
		100	41292	2660.2	100	41490	2680

Note 1: Carriers in increasing frequency order.



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## 4 Description of Tests

### 4.1 Conducted Output Power

Measurement Procedure: FCC KDB 971168 D01 V03r01

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

**Remark: Reference test setup 1**



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## 4.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure: FCC KDB 971168 D01 V03r01 ; C63.26 (2015)

Calculate power in dBm by the following formula:

ERP (dBm) = Conducted Power (dBm) + antenna gain (dBd)

EIRP(dBm) = Conducted Power (dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB

Measurement Procedure: FCC KDB 971168 D01 V03r01 ; ANSI/C63.26 (2015)

### Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 0.8m high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6). The output power into the substitution antenna was then measured.
- 7). Steps 5) and 6) were repeated with both antennas polarized.
- 8). Calculate power in dBm by the following formula:

ERP (dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)

Where:

Pg is the generator output power into the substitution antenna.

### Above 1GHz test procedure as below:

- 1). Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber
- 2). Calculate power in dBm by the following formula:  
EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)  
EIRP=ERP+2.15dB  
Where:  
Pg is the generator output power into the substitution antenna.
- 3). Test the EUT in the lowest channel, the middle channel the Highest channel
- 4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 5). Repeat above procedures until all frequencies measured was complete.

**Remark: Reference test setup 2**



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### 4.3 EIRP Power Density

For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, *except that* for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

#### Test Settings

1. Set instrument center frequency to OBW center frequency.
2. Set span to at least 1.5 times the OBW.
3. Set the RBW to the specified reference bandwidth (often 1 MHz).
4. Set VBW  $\geq 3 \times$  RBW.
5. Detector = RMS (power averaging).
6. Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW.
7. Sweep time = auto couple.
8. Employ trace averaging (RMS) mode over a minimum of 100 traces.
9. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).



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## 4.4 Occupied Bandwidth

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 4.2

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel, middle channel and high channel). The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

### Remark: Reference test setup 1

#### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq$  3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7



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## 4.5 Band Edge at Antenna Terminals

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at two frequencies (low channel and high channel).in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emission are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to rms.

**Remark: Reference test setup 1**

### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW  $\geq$  1% of the emission bandwidth
4. VBW  $\geq$  3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq$  2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize



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## 4.6 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure: FCC KDB 971168 D01 V03r01

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyzer, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel). The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. 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  $43 + 10 \log(P)$  dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

**Remark: Reference test setup 1**

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings



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## 4.7 Peak-Average Ratio

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.7.1

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

### Remark: Reference test setup 1

#### Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power



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## 4.8 Field Strength of Spurious Radiation

Measurement Procedure: FCC KDB 971168 D01 V03r01

### Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 80cm high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4). Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- 5). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 6). Repeat above procedures until all frequencies measured was complete.

$$E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

### Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber
- 2) Calculate power in dBm by the following formula:  

$$E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

$$\text{EIRP} = \text{ERP} + 2.15 \text{ dB}$$
- 3). Test the EUT in the lowest channel, the middle channel the Highest channel
- 4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 5). Repeat above procedures until all frequencies measured was complete

Remark1: Reference test setup 2

Remark2: The emission below 18G were measured at a 3m test distance, while emissions above 18GHz were measured at a 1m test distance.

### Remark: Reference test setup 2

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$
- 2) Scan from 9kHz to 40GHz, The disturbance between 9KHz to 30MHz and 18GHz to 40GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
- 4) All modes have been tested, but only the worst case data displayed in this report.



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## 4.9 Frequency Stability / Temperature Variation

### Measurement Procedure:

Frequency stability testing is performed in accordance with the guidelines of FCC KDB 971168 D01 V03r01; ANSI/C63.26 (2015)

. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **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.

Specification – The frequency stability shall be sufficient 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.

### Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

**Remark: Reference test setup 3**



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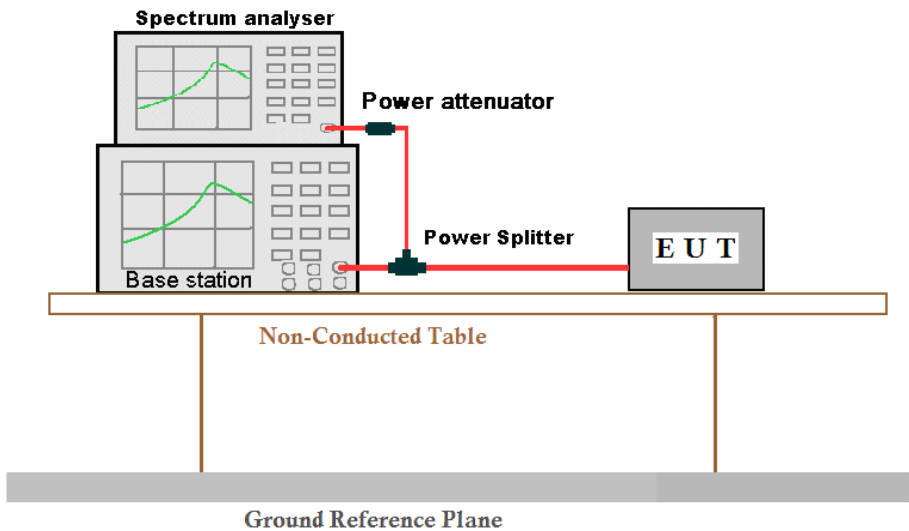
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## 4.10 Test Setups

### 4.10.1 Test Setup 1



### 4.10.2 Test Setup 2

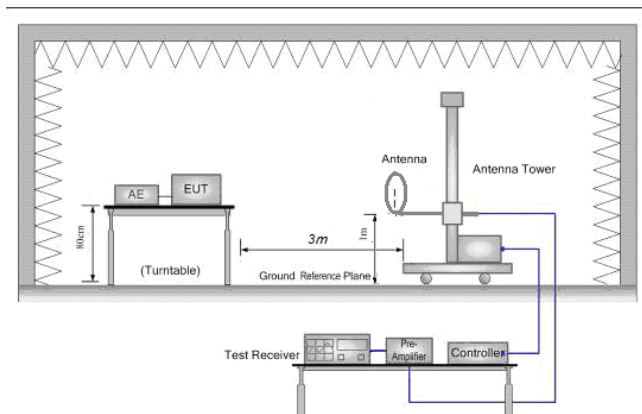


Figure 1. Below 30MHz

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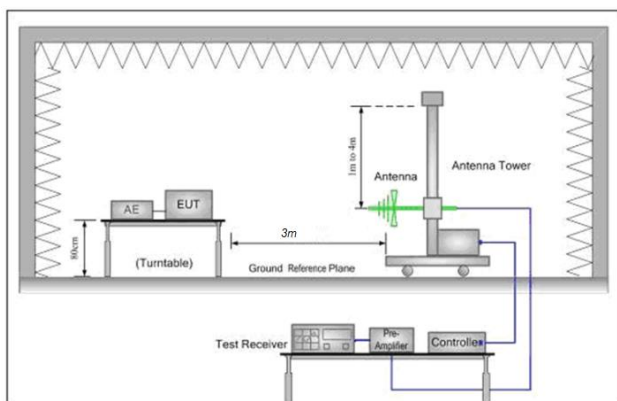


Figure 2. 30MHz to 1GHz

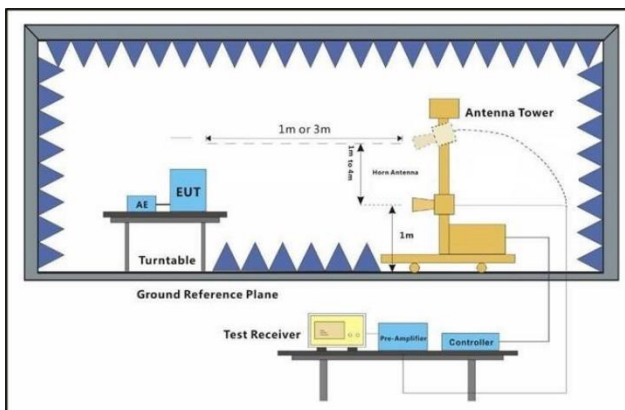
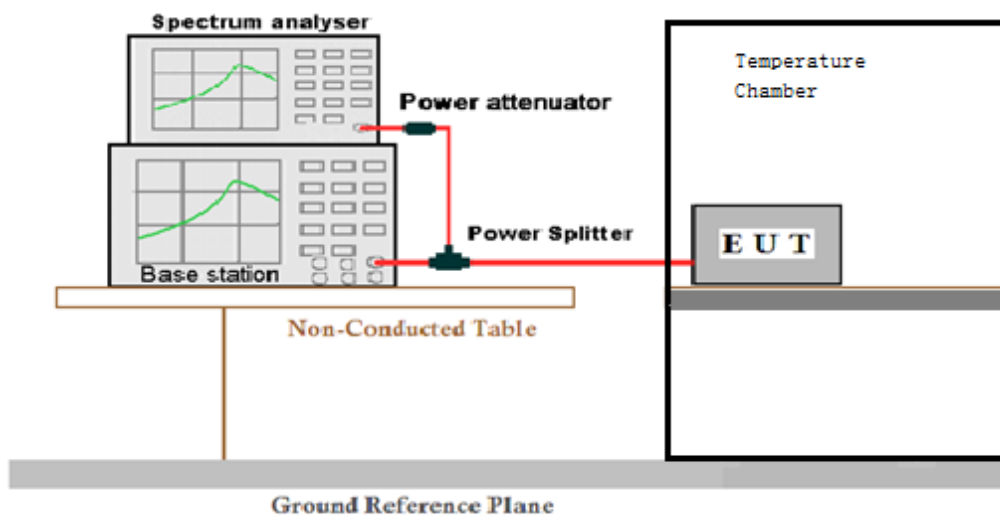


Figure 3. above 1GHz

## 4.10.3 Test Setup 3



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## 4.11 Test Conditions

Test Case		Test Conditions	
Transmit Output Power Data	Average Power, Total	Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;
	Average Power, Spectral Density (if required )	Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;
Peak-to-Average Ratio (if required)	Test Environment	Ambient Climate & Rated Voltage	
	Test Setup	Test Setup 1	
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )	
	Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;	
Modulation Characteristics	Test Environment	Ambient Climate & Rated Voltage	
	Test Setup	Test Setup 1	
	RF Channels (TX)	M (M= middle channel )	
	Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;	

Bandwidth	Occupied Bandwidth	Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;
	Emission Bandwidth (if required )	Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;
Band Edges Compliance		Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, H (L= low channel, H= high channel )
		Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;
Spurious Emission at Antenna Terminals		Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L,M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1; LTE/TM1;
Field Strength of Spurious Radiation		Test Environment	Ambient Climate & Rated Voltage



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	Test Setup	Test Setup 2
	Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4; Remark: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
Frequency Stability	Test Environment	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) VL, VN and VH of Rated Voltage at Ambient Climate.
	Test Setup	Test Setup 3
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
	Test Mode	UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;



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## 5 Main Test Instruments

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/5/8	2024/5/7
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2021/2/20	2022/2/19
Signal Analyzer	ROHDE&SCHW ARZ	FSV3030	SUWI-01-02-02	2021/5/28	2022/5/27
Signal Analyzer	ROHDE&SCHW ARZ	FSW43	SUWI-01-02-04	2021/5/28	2022/5/27
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2021/2/20	2022/2/19
Radio Communication Analyzer	ROHDE&SCHW ARZ	CMW500	SUWI-01-27-01	2021/9/29	2022/9/28
Radio Communication Analyzer	Anritsu	MT8821C	SUWI-01-26-04	2021/9/29	2022/9/28
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2021/2/20	2022/2/19
Measurement Software	Tonscend	JS1120-3 Test System V 2.6.88.0336	SUWI-02-09-09	NCR	NCR



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RSE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/5/8	2024/5/7
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2021/2/20	2022/2/19
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2021/5/28	2022/5/27
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2021/2/20	2022/2/19
Radio Communication Analyzer	Anritsu	MT8821C	SUWI-01-26-04	2021/9/29	2022/9/28
Active Loop Antenna	SCHWVRZBEC K MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/6/10	2022/6/9
Receiving antenna	SCHWVRZBEC K MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2021/5/16	2024/5/15
Receiving antenna	SCHWVRZBEC K MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2021/5/16	2024/5/15
Receiving antenna	SCHWVRZBEC K MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/5/16	2024/5/15
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2021/2/20	2022/2/19
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2021/2/20	2022/2/19
Measurement Software	Tonscend	JS32-RE V3.0.0.3	SUWI-02-09-04	NCR	NCR



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## 6 Measurement Uncertainty

For a 95% confidence level ( $k = 2$ ), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	$\pm 0.54\text{dB}$
2	RF power density, conducted	$\pm 1.03\text{dB}$
3	Spurious emissions, conducted	$\pm 0.54\text{dB}$
4	Radio Frequency	$\pm 7.25 \times 10^{-8}$
5	Occupied Bandwidth	$\pm 7.25 \times 10^{-8}$
6	Radiated Emission	$\pm 4.8\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (1GHz to 6GHz)
		$\pm 4.8\text{dB}$ (6GHz to 18GHz)
		$\pm 4.8\text{dB}$ (Above 18GHz)



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## 7 Appendixes

Appendix A	Setup Photos
Appendix B.1	LTE CA_41C

The End



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