FCC Test Report

Applicant:	Shenzhen Emperor Technology Company Limited
Address of Applicant:	F9, Block C, Building 1, Software Industry Base, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Emperor Technology Company Limited
Address of Manufacturer:	F9, Block C, Building 1, Software Industry Base, Nanshan District, Shenzhen, China
Factory:	Shenzhen Emperor Technology Company Limited
Address of Factory:	F9, Block C, Building 1, Software Industry Base, Nanshan District, Shenzhen, China
Product Name:	ID tablet
Model No.(EUT):	EMP2920
Trade Mark:	EMPEROR
FCC ID:	2AKP2-2920A
Standards:	47 CFR Part 2 47 CFR Part 22 subpart H 47 CFR Part 24 subpart E 47 CFR Part 27
Test Method:	FCC KDB 971168 D01 Power Meas License Digital Systems v02r02
Date of Test:	2017-02-27 to 2017-04-20
Date of Issue:	2017-04-20
Report No. :	FCC17050447A-3
Test Result:	**PASS**

Tested By: Daisy Qin

(Daisy Qin)

Reviewed By: Sol Qin

(Sol Qin)

Approved By:

(Michal Ling)

Prepared by:

QTC Certification & Testing Co., Ltd.
2nd Floor, Bl Building,Fengyeyuan Industrial Plant,, Liuxian 2st. Road, Xin'an Street, Bao'an District,,Shenzhen,518000

Registration Number: 588523

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
FCC17050447A-2	Rev.01	Initial report	2017-04-20

3 Test Summary

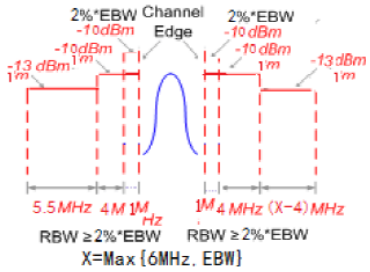
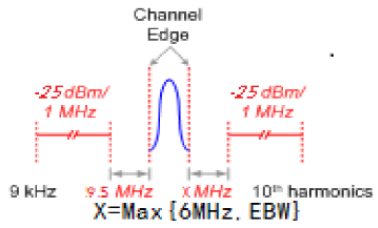
3.1 Cellular Band (824-849 MHz Paired With 869-894 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913,	ERP ≤ 7 W(38.45dBm)	Section 1 of Appendix B	PASS
Peak-Average Ratio	--	--	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 Edge Compliance	§2.1051, §22.917,	≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	PASS
Spurious emissions at antenna terminals	§2.1051, §22.917,	F≤ -13dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	PASS
Field strength of spurious radiation	§2.1051, §22.917,	≤ -13dBm	Section 7 of Appendix B	PASS
Frequency stability	§2.1055, §22.355,	≤ ±2.5ppm.	Section 8 of Appendix B	PASS

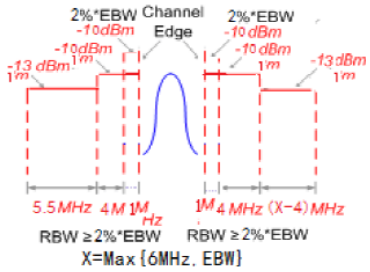
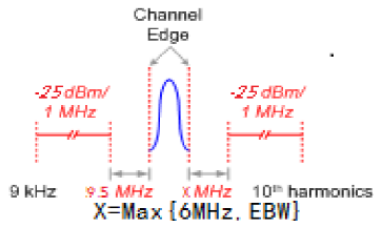
3.2 PCS Band (1850-1910 MHz paired with 1930-1990 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232	EIRP ≤ 2 W(33dBm)	Section 1 of Appendix B	PASS
Peak-Average Ratio	§2.1046, §24.232	≤13dB	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 Edge Compliance	§2.1051, §24.238	≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	PASS
Spurious emissions at antenna terminals	§2.1051, §24.238	≤ -13dBm/1MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	PASS
Field strength of spurious radiation	§2.1051, §24.238	≤ -13dBm	Section 7 of Appendix B	PASS
Frequency stability	§2.1055, §24.235	Within authorized frequency block	Section 8 of Appendix B	PASS

3.3 BRS&EBS Band7 (2500-2570 MHz paired with 2620-2690 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)	EIRP ≤ 2 W(33dBm)	Section 1 of Appendix C	PASS
Peak-Average Ratio	§27.50(a)	≤13dB	Section 2 of Appendix C	PASS
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix C	PASS
Bandwidth	§2.1049	OBW: No limit EBW: No limit	Section 4 of Appendix C	PASS
Band Edge Compliance	§2.1051, §27.53(m)		Section 5 of Appendix C	PASS
Spurious emissions at antenna terminals	§2.1051, §27.53(m)		Section 6 of Appendix C	PASS
Field strength of spurious radiation	§2.1051, §27.53(m)	≤ -25dBm,	Section 7 of Appendix C	PASS
Frequency stability	§2.1055, §27.54	Within authorized bands of operation/ frequency block	Section 8 of Appendix C	PASS

3.4 BRS&EBS Band41 (2496-2690 MHz paired with 2496-2690 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)	EIRP ≤ 2 W(33dBm)	Section 1 of Appendix D	PASS
Peak-Average Ratio	§27.50(a)	≤13dB	Section 2 of Appendix D	PASS
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix D	PASS
Bandwidth	§2.1049	OBW: No limit EBW: No limit	Section 4 of Appendix D	PASS
Band Edge Compliance	§2.1051, §27.53(m)		Section 5 of Appendix D	PASS
Spurious emissions at antenna terminals	§2.1051, §27.53(m)		Section 6 of Appendix D	PASS
Field strength of spurious radiation	§2.1051, §27.53(m)	≤ -25dBm,	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

4 Content

5 General Information

5.1 Client Information

Applicant:	Shenzhen Emperor Technology Company Limited
Address of Applicant:	F9, Block C, Building 1, Software Industry Base, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Emperor Technology Company Limited
Address of Manufacturer:	F9, Block C, Building 1, Software Industry Base, Nanshan District, Shenzhen, China
Factory:	Shenzhen Emperor Technology Company Limited
Address of Factory:	F9, Block C, Building 1, Software Industry Base, Nanshan District, Shenzhen, China

5.2 General Description of EUT

Product Name:	ID tablet
Model No.:	EMP2920
Trade Mark:	EMPEROR
Hardware Version:	V1.0
Software Version:	EMP2920_J979_V1.0_20170224
Sample Type:	Portable production
Antenna Type:	Integral antenna
Antenna Gain:	GSM 850: 0.8dBi, GSM 1900: 1.0dBi, WCDMA 850: 0.8dBi, WCDMA 1900: 0.8dBi, LTE BAND7: 1.2dBi. LTE BAND41: 1.2dBi.
Power Supply:	Rechargeable Battery: 3.7VDC/8000mAh AC adapter: Model No.: HYX-05300W Input:100-240VAC 50/60Hz 0.5A Output: DC5V 3000mA

5.3 Technical Specification

Characteristics	Description	
Radio System Type	☒ GSM ☒ UMTS ☒ LTE	
Supported Frequency Range	GSM850 /WCDMA850	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	GSM1900 /WCDMA1900	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
	LTE BAND7	Transmission (TX): 2500 to 2570 MHz
		Receiving (RX): 2620 to 2690 MHz
	LTE BAND41	Transmission (TX): 2496 to 2690 MHz
		Receiving (RX): 2496 to 2690 MHz
Target TX Output Power	GSM850: 32.5dBm , GSM1900: 30dBm WCDMA850: 22dBm, WCDMA1900: 21dBm LTE BAND7: 21dBm, LTE BAND41: 22.5dBm	
Supported Channel Bandwidth	GSM system:	☒200 kHz
	UMTS system:	☒5 MHz
	LTE BAND7	☒5MHz☒10MHz☒15 MHz☒20 MHz
	LTE BAND41	☒5MHz☒10MHz☒15 MHz☒20 MHz
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	GSM850:	243KGXW, 246KG7W
	GSM1900:	244KGXW, 245KG7W
	UMTS850:	4M13F9W
	UMTS1900:	4M14F9W
	LTE BAND7:	4M50G7D (5 MHz QPSK modulation), 4M49W7D (5 MHz 16QAM modulation) 8M85G7D (10 MHz QPSK modulation), 8M93W7D (10 MHz 16QAM modulation) 13M52G7D (15 MHz QPSK modulation), 13M49W7D (15 MHz 16QAM modulation) 17M90G7D (20 MHz QPSK modulation), 17M90W7D (20 MHz 16QAM modulation)
	LTE BAND41:	4M49G7D (5 MHz QPSK modulation), 4M48W7D (5 MHz 16QAM modulation) 8M95G7D (10 MHz QPSK modulation), 8M95W7D (10 MHz 16QAM modulation) 13M58G7D (15 MHz QPSK modulation), 13M88W7D (15 MHz 16QAM modulation) 17M90G7D (20 MHz QPSK modulation), 17M90W7D (20 MHz 16QAM modulation)

5.4 Test Mode

Test Mode	Test Modes Description
GSM/TM1	GSM system, GSM/GPRS/EGPRS, GMSK modulation
GSM/TM2	GSM system, EGPRS, 8PSK modulation
UMTS/TM1	UMTS system, WCDMA, QPSK modulation
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation

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

5.5 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1005Pa	
Temperature	TN	25 °C
Voltage :	VL	3.6V
	VN	3.7V
	VH	4.2V

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

5.6 Test Frequency

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 192	Channel 251
		824.2MHz	836.6MHz	848.8MHz
	RX	Channel 128	Channel 192	Channel 251
		869.2MHz	881.6MHz	893.8MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA850	TX	Channel 4132	Channel 4182	Channel 4233
		826.4MHz	836.4MHz	846.6MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4 MHz	881.4 MHz	891.6 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0MHz	1909.8MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA1900	TX	Channel 512	Channel 661	Channel 810
		1852.4MHz	1880.0MHz	1907.6MHz
	RX	Channel 512	Channel 661	Channel 810
		1932.4 MHz	1960.0 MHz	1987.6 MHz

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 5MHz	TX	Channel 20775	Channel 21100	Channel 21425
		2502.5 MHz	2535 MHz	2567.5 MHz
	RX	Channel 2775	Channel 3100	Channel 3425
		2622.5 MHz	2630 MHz	2687.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 10MHz	TX	Channel 20800	Channel 21100	Channel 21400
		2505 MHz	2535 MHz	2565 MHz
	RX	Channel 2800	Channel 3100	Channel 3400
		2625 MHz	2630 MHz	2685 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 15MHz	TX	Channel 20825	Channel 21100	Channel 21375
		2507.5 MHz	2535 MHz	2562.5 MHz
	RX	Channel 2825	Channel 3100	Channel 3375
		2627.5 MHz	2630 MHz	2682.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 20MHz	TX	Channel 20850	Channel 21100	Channel 21350
		2510 MHz	2535 MHz	2560 MHz
	RX	Channel 2850	Channel 3100	Channel 3350
		2630 MHz	2630 MHz	2680 MHz

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 5MHz	TX	Channel 39675	Channel 40620	Channel 41565
		2498.5 MHz	2593 MHz	2687.5 MHz
	RX	Channel 39675	Channel 40620	Channel 41565
		2498.5 MHz	2593 MHz	2687.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 10MHz	TX	Channel 39700	Channel 40620	Channel 41540
		2504 MHz	2593 MHz	2685 MHz
	RX	Channel 39700	Channel 40620	Channel 41540
		2504 MHz	2593 MHz	2685 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 15MHz	TX	Channel 39725	Channel 40620	Channel 41515
		2503.5 MHz	2593 MHz	2682.5 MHz
	RX	Channel 39725	Channel 40620	Channel 41515
		2503.5 MHz	2593 MHz	2682.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 20MHz	TX	Channel 39750	Channel 40620	Channel 41490
		2506 MHz	2593 MHz	2680 MHz
	RX	Channel 39750	Channel 40620	Channel 41490
		2506 MHz	2593 MHz	2680 MHz

5.7 Test Location

The above equipment was tested by QTC Certification & Testing Co., Ltd.

2nd Floor, Bl Building, Fengyeyuan Industrial Plant,, Liuxian 2st. Road, Xin'an Street, Bao'an District,,Shenzhen,518000

Registration Number: 588523

5.8 Deviation from Standards

None.

5.9 Abnormalities from Standard Conditions

None.

5.10Other Information Requested by the Customer

None.

6 Description of Tests

6.1 Conducted Output Power

Measurement Procedure:

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.

Note: Reference test setup 1

6.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure:

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.

Note: Reference test setup 2

6.3 Occupied Bandwidth

Measurement Procedure:

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.

Note: Reference test setup 1

6.4 Band Edge at Antenna Terminals

Measurement Procedure:

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 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 peak or peak hold power.

Note: Reference test setup 1

6.5 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure:

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.

Note: Reference test setup 1

6.6 Peak-Average Ratio

Measurement Procedure:

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.

Note: Reference test setup 1

6.7 Field Strength of Spurious Radiation

Measurement Procedure:

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). 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:

Pd is the dipole equivalent power, Pg is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic

source (dBi). The substitute level is equal to Pg [dBm] – cable loss [dB]. The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log10(Power [Watts]).

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

Note: Reference test setup 3

6.8 Frequency Stability / Temperature Variation

Measurement Procedure:

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. 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 ±0.00025% (±2.5 ppm) of the center frequency.

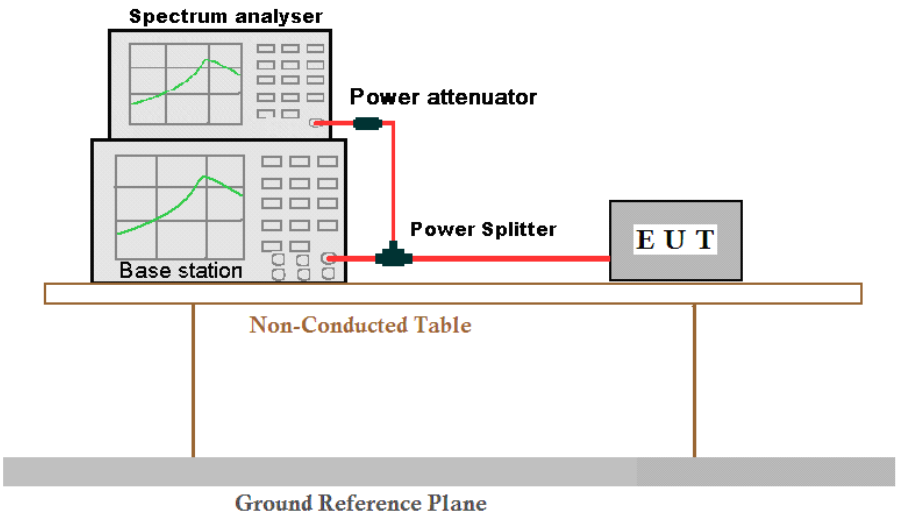
Time Period and Procedure:

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.

Note: Reference test setup 4

6.9 Test Setups

6.9.1 Test Setup 1



6.9.2 Test Setup 2

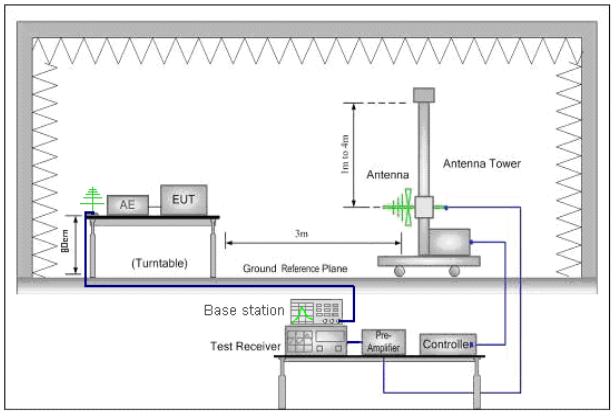


Figure 1. 30MHz to 1GHz

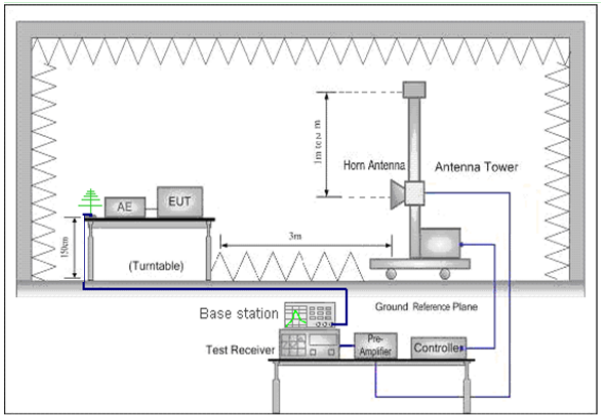


Figure 2. above 1GHz

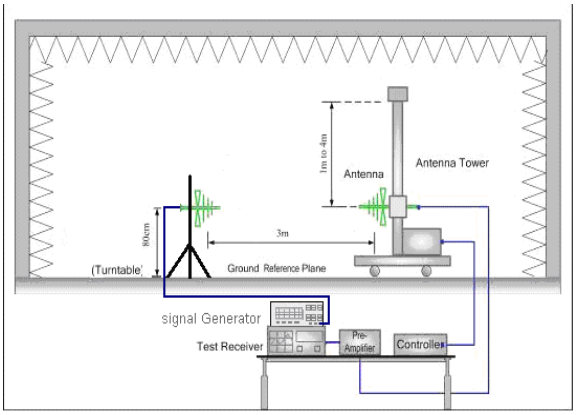


Figure 1. 30MHz to 1GHz

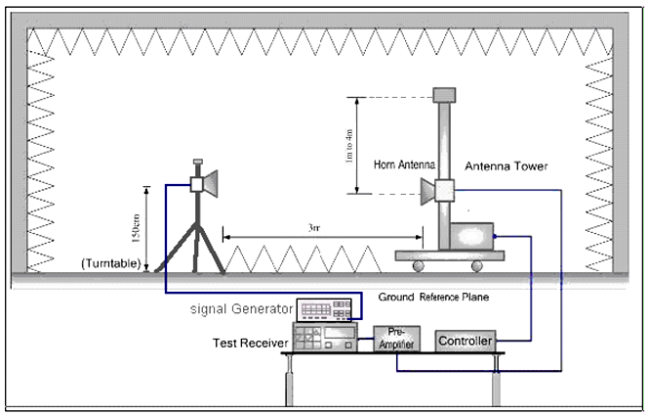


Figure 2. above 1GHz

6.9.3 Test Setup 3

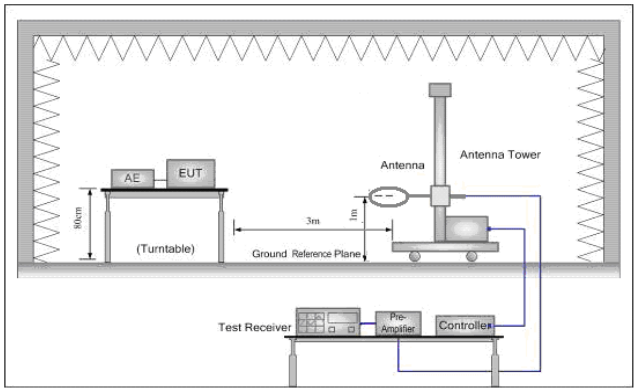


Figure 1. Below 30MHz

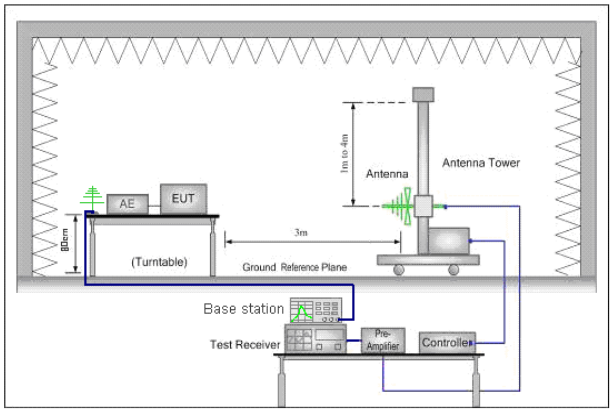


Figure 2. 30MHz to 1GHz

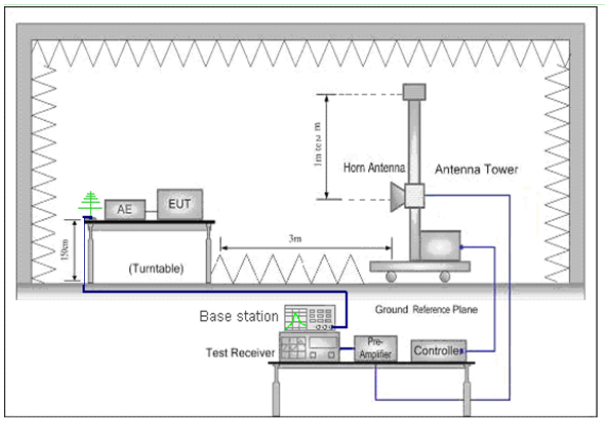


Figure 3. above 1GHz

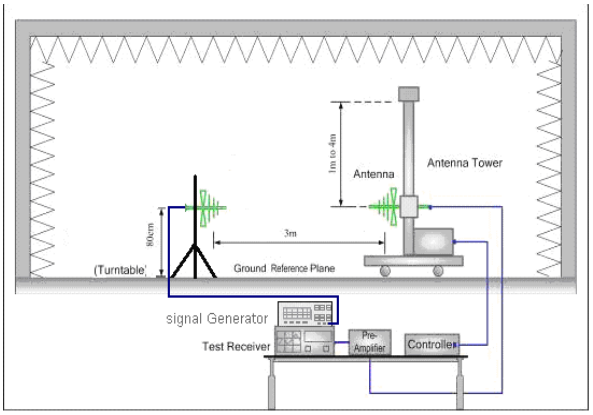


Figure 2. 30MHz to 1GHz

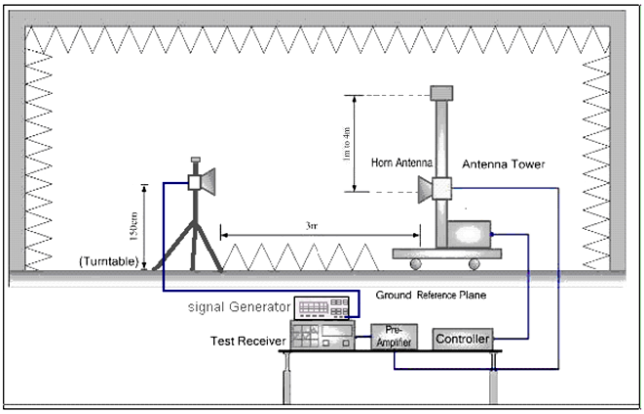
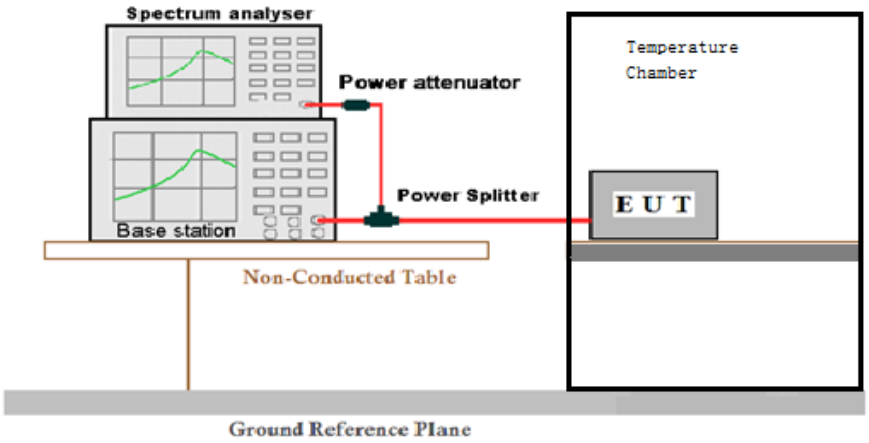


Figure 3. above 1GHz

6.9.4 Test Setup 4



6.10 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	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
	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	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
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	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
Modulation Characteristics		Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	M (M= middle channe)
		Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1;
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	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
	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	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
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	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
Spurious Emission at Antenna Terminals	Test Environment	Ambient Climate & Rated Voltage
	Test Setup	Test Setup 1
	RF Channels (TX)	L, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2
Field Strength of Spurious Radiation	Test Environment	Ambient Climate & Rated Voltage
	Test Setup	Test Setup 2
	Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2 NOTE: 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 Env.	(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 4
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2

7 Main Test Instruments

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	**Calibration Date**	**Calibration Due.**
EMI Test Receiver	R&S	ESCI	100005	08/19/2016	08/18/2017
LISN	AFJ	LS16	16010222119	08/19/2016	08/18/2017
LISN(EUT)	Mestec	AN3016	04/10040	08/19/2016	08/18/2017
Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	08/19/2016	08/18/2017
Coaxial cable	Megalon	LMR400	N/A	08/12/2016	08/11/2017
GPIB cable	Megalon	GPIB	N/A	08/12/2016	08/11/2017
Spectrum Analyzer	R&S	FSU	100114	08/19/2016	08/18/2017
Pre Amplifier	H.P.	HP8447E	2945A02715	10/13/2016	10/12/2017
Pre-Amplifier	CDSI	PAP-1G18-38	--	10/13/2016	10/12/2017
Loop Antenna	R&S	HFH2-Z2	100296	10/13/2016	10/12/2017
Bi-log Antenna	SUNOL Sciences	JB3	A021907	09/13/2016	09/12/2017
9*6*6 Anechoic	--	--	--	08/21/2016	08/20/2017
Horn Antenna	COMPLIANCE ENGINEERING	CE18000	--	09/13/2016	09/12/2017
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	08/23/2016	08/22/2017
Power meter	Anritsu	ML2487A	6K00003613	08/23/2016	08/22/2017
Power meter	Anritsu	MA2491A	32263	08/23/2016	08/22/2017
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	04/24/2016	04/23/2017
System-Controller	CCS	N/A	N/A	N.C.R	N.C.R
Turn Table	CCS	N/A	N/A	N.C.R	N.C.R
Antenna Tower	CCS	N/A	N/A	N.C.R	N.C.R
RF cable	Murata	MXHQ87WA3000	-	08/21/2016	08/20/2017
Loop Antenna	EMCO	6502	00042960	08/22/2016	08/21/2017
Wideband Radio Communication Tester	R&S	CMW 500	103974	08/19/2016	08/18/2017
Signal & Spectrum Analyzer	R&S	FSV40	101094	08/19/2016	08/18/2017
Horn Antenna	SCHWARZBECK	BBHA 9170	1123	08/19/2016	08/18/2017
H & T Chamber	Guangzhou gongwen	GDJS-500-40	0329	08/19/2016	08/18/2017

8 Measurement Uncertainty

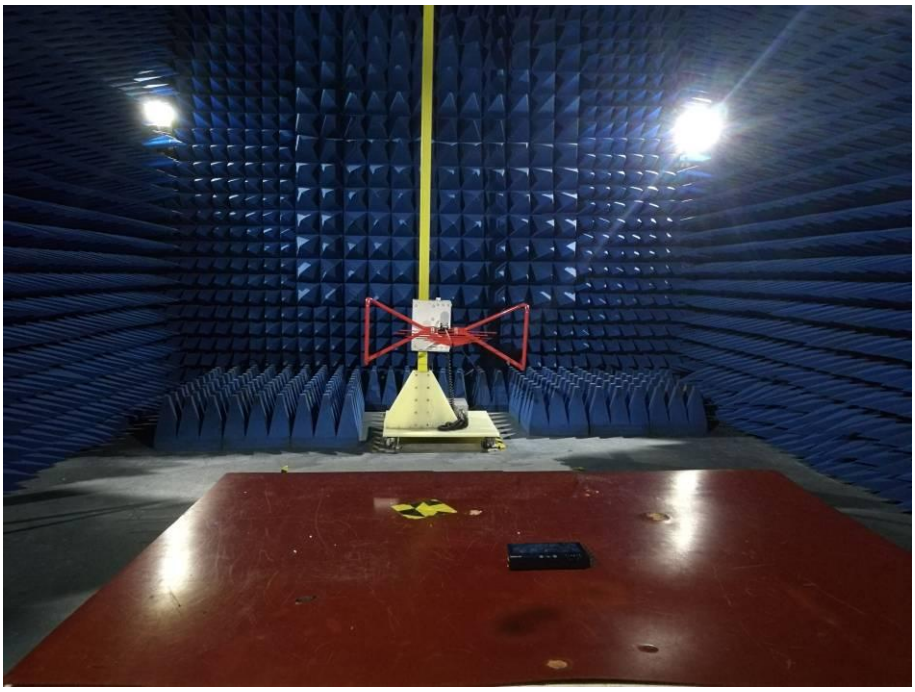
The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	±3.2dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(<1G)	±4.7dB
5	All emissions, radiated(>1G)	±4.7dB
6	Temperature	±0.5°C
7	Humidity	±2%

9 Photographs - EUT Test Setup

9.1 Radiated Spurious Emission

Below 1GHz:



Above 1GHz:

10 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for FCC17050447A.

The End