FCC Test Report

Applicant	:	**TFP INDUSTRIAL CO,.LTD**
Address	:	**No.209-211 CHAOKAMROP RD.,POM PRAP,POM PRAP SATTRU PHAI, BANGKOK 10100, THAILAND**
Product Name	:	**TFP-4G DVR**
Report Date	:	**May 15, 2024**

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant	:	TFP INDUSTRIAL CO,.LTD
Manufacturer	:	Shenzhen Julide Electronics Co., LTD
Product Name	:	TFP-4G DVR
Test Model No.	:	TFP-4G DVR
Reference Model No.	:	N/A
Trade Mark	:	N/A
Rating(s)	:	Input: 12V⎓ 1.5A

Test Standard(s)	:	**47 CFR Part 2, 47 CFR Part 22(H), 47 CFR Part 24(E), 47 CFR Part 27(C), 47 CFR Part 90(R)**
Test Method(s)	:	**ANSI C63.26-2015** **KDB 971168 D01 Power Meas License Digital Systems v03r01**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the 47 CFR Part 22, 47 CFR Part 24, 47 CFR Part 27, 47 CFR Part 90 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt		Mar. 25, 2024
Date of Test :	:	Mar. 25, 2024 to Apr. 29, 2024
Prepared by :	:	Ella Liang (Ella Liang)
Approved & Authorized Signer :	:	Edward pan (Edward Pan)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	May 15, 2024

1. General Information

1.1. Client Information

Applicant	:	TFP INDUSTRIAL CO,.LTD
Address	:	No.209-211 CHAOKAMROP RD.,POM PRAP,POM PRAP SATTRU PHAI, BANGKOK 10100, THAILAND
Manufacturer	:	Shenzhen Julide Electronics Co., LTD
Address	:	No. 11 Gufeng 1st Road, Xintian Community, Guanhu Street, Longhua District, Shenzhen
Factory	:	Shenzhen Julide Electronics Co., LTD
Address	:	No. 11 Gufeng 1st Road, Xintian Community, Guanhu Street, Longhua District, Shenzhen

1.2. Description of Device (EUT)

Product Name	:	TFP-4G DVR
Test Model No.	:	TFP-4G DVR
Reference Model No.	:	N/A
Trade Mark	:	N/A
Test Power Supply	:	DC 12V
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A
RF Specification		
Support Band	:	☒ FDD Band 2 ☒ FDD Band 4 ☒ FDD Band 5 ☐ FDD Band 7 ☒ FDD Band 12 ☒ FDD Band 13 ☒ FDD Band 14 ☐ FDD Band 17 ☐ FDD Band 25 ☐ FDD Band 26 ☐ TDD Band 38 ☐ TDD Band 41 ☒ FDD Band 66 ☒ FDD Band 71
Transmit Frequency	:	FDD Band 2: 1850.7 MHz – 1909.3 MHz FDD Band 4: 1710.7 MHz – 1754.3 MHz FDD Band 5: 824.7 MHz – 848.3 MHz FDD Band 12: 699.7 MHz – 715.3 MHz FDD Band 13: 779.5 MHz – 784.5 MHz FDD Band 14: 790.5 MHz – 795.5 MHz FDD Band 66: 1710.7 MHz-1779.3 MHz FDD Band 71: 665.5 MHz – 695.5 MHz
Receive Frequency	:	FDD Band 2: 1930.7 MHz – 1989.3 MHz FDD Band 4: 2110.7 MHz – 2154.3 MHz FDD Band 5: 869.7 MHz – 893.3 MHz FDD Band 12: 729.7 MHz – 745.3 MHz FDD Band 13: 748.5 MHz – 753.5 MHz

		FDD Band 14: 760.5 MHz – 765.5 MHz FDD Band 66: 2110.7 MHz – 2179.3 MHz FDD Band 71: 619.5MHz – 649.5 MHz
Modulation Type	:	QPSK, 16QAM
Power Class	:	Class 3
Antenna Type	:	FPC Antenna
Antenna Gain(Peak):		FDD Band 2: 2.38dBi FDD Band 4: 1.08dBi FDD Band 5: 0.9dBi FDD Band 12: -2.21dBi FDD Band 13: 0.78dBi FDD Band 14: 0.78dBi FDD Band 66: 1.24dBi FDD Band 71: 0.5dBi
Remark: 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

Title	Manufacturer	Model No.	Serial No.
/	/	/	/

1.4. Operation State

Test frequency list:

Band	Frequency (MHz)

FDD Band 2

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	18607	1850.7	607	1930.7
	3	18615	1851.5	615	1931.5
	5	18625	1852.5	625	1932.5
	10	18650	1855	650	1935
	15 [1]	18675	1857.5	675	1937.5
	20 [1]	18700	1860	700	1940
Mid Range	1.4/3/5/10 15 [1]/20 [1]	18900	1880	900	1960
High Range	1.4	19193	1909.3	1193	1989.3
	3	19185	1908.5	1185	1988.5
	5	19175	1907.5	1175	1987.5
	10	19150	1905	1150	1985
	15 [1]	19125	1902.5	1125	1982.5
	20 [1]	19100	1900	1100	1980

FDD Band 4

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	19957	1710.7	1957	2110.7
	3	19965	1711.5	1965	2111.5
	5	19975	1712.5	1975	2112.5
	10	20000	1715	2000	2115
	15	20025	1717.5	2025	2117.5
	20	20050	1720	2050	2120
Mid Range	1.4/3/5/10/15/20	20175	1732.5	2175	2132.5
High Range	1.4	20393	1754.3	2393	2154.3
	3	20385	1753.5	2385	2153.5
	5	20375	1752.5	2375	2152.5
	10	20350	1750	2350	2150
	15	20325	1747.5	2325	2147.5
	20	20300	1745	2300	2145

FDD Band 5

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	20407	824.7	2407	869.7
	3	20415	825.5	2415	870.5
	5	20425	826.5	2425	871.5
	10 [1]	20450	829	2450	874
Mid Range	1.4/3/5 10 [1]	20525	836.5	2525	881.5
High Range	1.4	20643	848.3	2643	893.3
	3	20635	847.5	2635	892.5
	5	20625	846.5	2625	891.5
	10 [1]	20600	844	2600	889

FDD Band 12

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	23017	699.7	5017	729.7
	3	23025	700.5	5025	730.5
	5 [1]	23035	701.5	5035	731.5
	10 [1]	23060	704	5060	734
Mid Range	1.4/3 5 [1]/10 [1]	23095	707.5	5095	737.5
High Range	1.4	23173	715.3	5173	745.3
	3	23165	714.5	5165	744.5
	5 [1]	23155	713.5	5155	743.5
	10 [1]	23130	711	5130	741

FDD Band 13

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	5 [1]	23205	779.5	5205	748.5
	10 [1]	23230	782	5230	751
Mid Range	5 [1]/10 [1]	23230	782	5230	751
High Range	5 [1]	23255	784.5	5255	753.5
	10 [1]	23230	782	5230	751

FDD Band 14

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	5 [1]	23305	790.5	5305	760.5
	10 [1]	23330	793	5330	763
Mid Range	5 [1]/10 [1]	23330	793	5330	763
High Range	5 [1]	23355	795.5	5355	765.5
	10 [1]	23330	793	5330	763

FDD Band 66

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	131979	1710.7	66443	2110.7
	3	131987	1711.5	66451	2111.5
	5	131997	1712.5	66461	2112.5
	10	132022	1715	66486	2115
	15	132047	1717.5	66511	2117.5
	20	132072	1720	66536	2120
Mid Range	1.4/3/5/10/15/20	132197	1732.5	66661	2132.5
High Range	1.4	132415	1754.3	66879	2154.3
	3	132407	1753.5	66871	2153.5
	5	132397	1752.5	66861	2152.5
	10	132372	1750	66836	2150
	15	132347	1747.5	66811	2147.5
	20	132322	1745	66786	2145

FDD Band 71

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	5	133147	665.5	68611	619.5
	10	133172	668	68636	622
	15	133197	670.5	68661	624.5
	20	133222	673	68686	627
Mid Range	5/10/15	133297	680.5	68761	634.5
	20	133322	683	68786	637
High Range	5	133447	695.5	68911	649.5
	10	133422	693	68886	647
	15	133397	690.5	68861	644.5
	20	133372	688	68836	642

1.5. Environmental Conditions

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	Jan. 17, 2024	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Jan. 23, 2024	1 Year
3.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
4.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
5.	Pre-amplifier	SONOMA	310N	186860	Jan. 17, 2024	1 Year
6.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
7.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 12, 2023	1 Year
8.	DC Power Supply	LW	TPR-6420D	374470	Oct. 20, 2023	1 Year
9.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 16, 2023	1 Year
10.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	167336	Feb. 04, 2024	1 Year
11.	High-Pass Filter	CDKMV	ZHPF-BM1100-4000-0730	B2015094550	Oct. 20, 2023	1 Year
12.	High-Pass Filter	CDKMV	ZHPF-M3.5-18G-3834	1307006523	Oct. 20, 2023	1 Year
13.	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	Oct. 16, 2022	3 Year
14.	Double Ridged Horn Antenna	Chengyi Electronics Co., Ltd.	GTH-0118	351600	Nov. 02, 2022	2 Year
15.	Signal Generator	Anritsu	MG3690A	MY48180749	Oct. 12, 2023	1 Year

1.7. Measurement Uncertainty

Parameter	Uncertainty
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.78dB; 6G-18GHz: 4.88dB
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

1.8. Description of Test Facility

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

FCC-Registration No.: 434132

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

1.9. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2. Summary of Test

2.1. Summary of test result

Description of Test	FCC Rules	Requirements	Result
Conducted Output Power	Part 2.1046 Part 22.913(a) Part 24.232(b) Part 27.50(b) Part 27.50(c) Part 27.50(d) Part 90.542(a)	N/A	Compliance
Peak-Average Ratio	Part 22.913 Part 24.232 Part 27.50	≤13dB	Compliance
Modulation Characteristics	§ 2.1047	Digital modulation	N/A
99% Occupied Bandwidth & 26 dB Bandwidth	Part 2.1049	OBW: No limit EBW: No limit	Compliance
Conducted Spurious Emission	Part 2.1051 Part 22.917 Part 24.238 Part 27.53(c)(f) Part 27.53(g) Part 27.53(h) Part 90.543(e)	≤ -13dBm(LTE Band5) ≤ -13dBm(LTE Band2) Refer to clause 7.1 for LTE Band13 ≤ -13dBm(LTE Band12,71) ≤ -13dBm(LTE Band4,66) ≤ -13dBm(LTE Band14))	Compliance
Band Edge	Part 2.1051 Part 22.917 Part 24.238 Part 27.53(c)(f) Part 27.53(g) Part 27.53(h) Part 90.543(e)	≤ -13dBm (LTE Band5) ≤ -13dBm (LTE Band2) Refer to clause 8.1 for LTE Band13 ≤ -13dBm (LTE Band12,71) ≤ -13dBm (LTE Band4,66) Refer to clause 8.1 for LTE Band14	Compliance
Frequency stability VS. temperature	Part 2.1055(a)(1)(b) Part 22.355 Part 24.235 Part 27.54 Part 90.213	≤ ±2.5ppm	Compliance
Frequency stability VS. voltage	Part 2.1055(d)(1)(2) Part 22.355	≤ ±2.5ppm	Compliance

	Part 24.235 Part 27.54 Part 90.213		
ERP and EIRP	Part 2.1046 Part 22.913(a) Part 24.232(c) Part 27.50(b) Part 27.50(c) Part 27.50(d) Part 90.542(a)	ERP≤ 7W(LTE Band 5) EIRP≤ 2W(LTE Band 2) ERP≤ 3W(LTE Band 13) ERP≤ 3W(LTE Band 12,71) EIRP≤ 1W(LTE Band 4, 66) ERP≤ 30W(LTE Band 14)	Compliance
Radiated Spurious Emission	Part 2.1053 Part 22.917 Part 24.238 Part 27.53(c)(f) Part 27.53(g) Part 27.53(h) Part 90.543(e)	≤ -13dBm(LTE Band5) ≤ -13dBm(LTE Band2) Refer to clause 9.1 for LTE Band13 ≤ -13dBm(LTE Band12,71) ≤ -13dBm(LTE Band4,66) Refer to clause 9.1 for LTE Band14	Compliance

Note:

1.“N/A” is an abbreviation for Not Applicable.

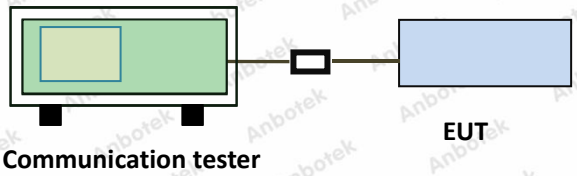
2. Testing was performed by configuring EUT to maximum output power status, the declared output power class for different

3. Conducted Output Power Test

3.1. Test Standard and Limit

Applicable Standard:	Part 2.1046 Part 22.913(a) Part 24.232(b) Part 27.50(b) Part 27.50(c) Part 27.50(d) Part 90.542(a)
Limit:	N/A

3.2. Test Setup



3.3. Test Procedure

1. The EUT output port was connected to communication tester.
2. Set EUT at maximum power through communication tester.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power.

3.4. Test Data

Pass

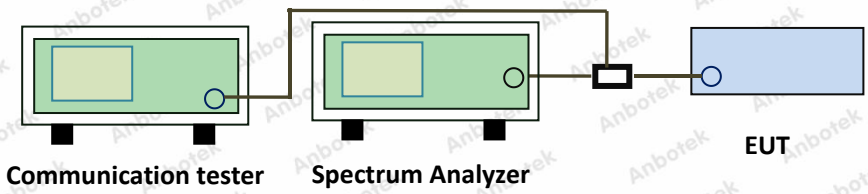
Please Refer to Appendix for Details.

4. Peak-Average Ratio

4.1. Test Standard and Limit

Applicable Standard:	Part 22.913 Part 24.232 Part 27.50
Limit:	≤13dB

4.2. Test Setup



4.3. Test Procedure

According with KDB 971168 D01 Section 5.7:

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
2. Set EUT in maximum power output.
3. Center Frequency = Carrier frequency, RBW > 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.

i. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

ii. 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

6. Record the maximum PAPR level associated with a probability of 0.1%.

4.4. Test Data

Pass

Please Refer to Appendix for Details.

5. Modulation Characteristic

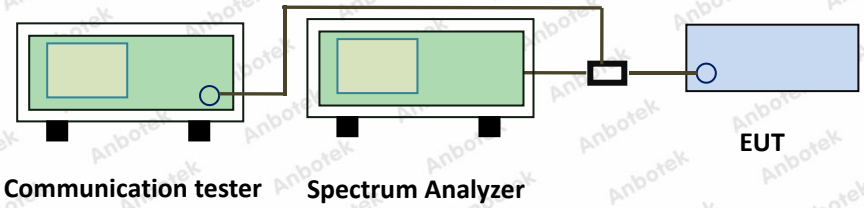
According to FCC § 2.1047, Part 22H, Part 24E, Part 27C, Part 90R there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

6. 99% Occupied Bandwidth & 26 dB Bandwidth

6.1. Test Standard and Limit

Applicable Standard:	Part 2.1049
Limit:	N/A

6.2. Test Setup



6.3. Test Procedure

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
2. Set EUT in maximum power output.
3. Spectrum analyzer setting as follow:
   Center Frequency= Carrier frequency, RBW=1% to 5% of anticipated OBW, VBW= 3 * RBW, Detector=Peak,
   Trace maximum hold.
4. Record the value of 99% Occupied bandwidth and -26dB bandwidth.

6.4. Test Data

Pass

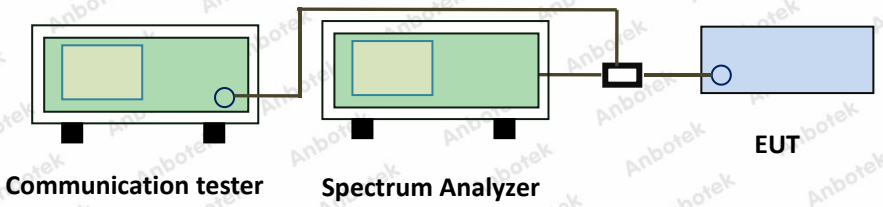
Please Refer to Appendix for Details.

7. Conducted Spurious Emission

7.1. Test Standard and Limit

Applicable Standard:	Part 2.1051 Part 22.917 Part 24.238 Part 27.53(c)(f) Part 27.53(g) Part 27.53(h) Part 90.543(e)
Limit:	≤ -13dBm(LTE Band5) ≤ -13dBm(LTE Band2) ≤ -13dBm(LTE Band12,71) ≤ -13dBm(LTE Band4,66) For LTE Band 13: (1) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB; (2) For operations in the 775-788 MHz, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm. For LTE Band 14: On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB. For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals.

7.2. Test Setup



7.3. Test Procedure

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
2. Set EUT in maximum power output.
3. Spectrum analyzer setting as follow:
   Below 1GHz, RBW=100KHz, VBW = 300KHz, Detector=Peak, Sweep time= Auto
   Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peak, Sweep time= Auto
   Scan frequency range up to 10th harmonic.
4. Record the test plot.

7.4. Test Data

Pass

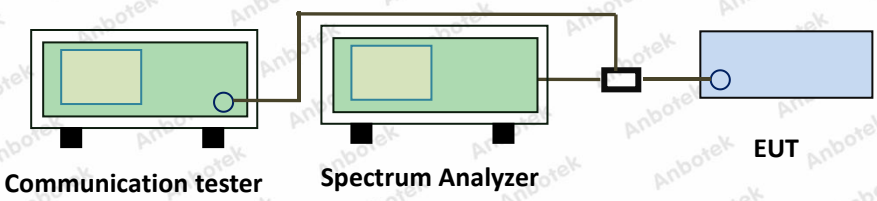
Please Refer to Appendix for Details.

8. Band Edge

8.1. Test Standard and Limit

Applicable Standard:	Part 2.1051 Part 22.917 Part 24.238 Part 27.53(c)(f) Part 27.53(g) Part 27.53(h) Part 90.543(e)
Limit:	≤ -13dBm (LTE Band5) ≤ -13dBm (LTE Band2) ≤ -13dBm (LTE Band12,71) ≤ -13dBm (LTE Band4,66) For LTE Band 13: (1) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB; (2) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations. For LTE Band 14: On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB. For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals.

8.2. Test Setup



8.3. Test Procedure

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter.
2. Set EUT in maximum power output.
3. The band edges of low and high channels were measured.
4. Spectrum analyzer setting as follow:
   RBW=3KHz, VBW = 10KHz, Sweep time= Auto
5. Record the test plot.

8.4. Test Data

Pass

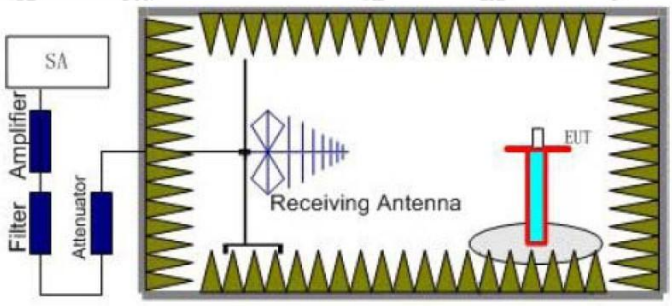
Please Refer to Appendix for Details.

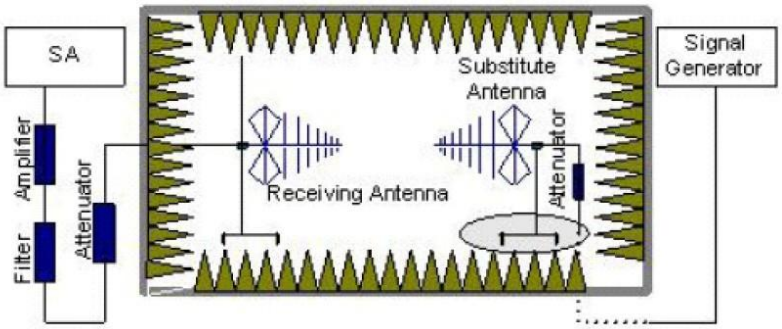
9. Radiated Spurious Emission

9.1. Test Standard and Limit

Applicable Standard:	Part 2.1053 Part 22.917 Part 24.238 Part 27.53(c)(f) Part 27.53(g) Part 27.53(h) Part 90.543(e)
Limit:	≤ -13dBm(LTE Band5) ≤ -13dBm(LTE Band2) ≤ -13dBm(LTE Band12,71) ≤ -13dBm(LTE Band4,66) For LTE Band 13: (1) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB; (2) For operations in the 775-788 MHz, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm. For LTE Band 14: On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB. For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals.

9.2. Test Setup





9.3. Test Procedure

1. Place the EUT in the center of the turntable.
   a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
   b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:

   Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto
   Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
   a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
   b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
   c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
   d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
   e) Record the measured emission amplitude level and frequency
6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency

where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.

10. For each emission that was detected and measured in the initial test
    a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
    b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
    c) Record the output power level of the signal generator when equivalence is achieved in step b).
11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

    Pe = Ps(dBm) − cable loss (dB) + antenna gain (dBd)

    where

    Pe = equivalent emission power in dBm

    Ps = source (signal generator) power in dBm

    NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.
13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

    gain (dBd) = gain (dBi) − 2.15 dB.

    If necessary, the antenna gain can be calculated from calibrated antenna factor information
14. Provide the complete measurement results as a part of the test report.

9.4. Test Data

Pass

Please to see the following pages

Note: All mode are tested, and the report only shows the worst mode of QPSK.

LTE Band 2								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
1.4MHz	Low	3701.40	Vertical	-48.78	13.21	-35.57	-13.00	PASS
		5552.10	V	-55.84	16.61	-39.23		
		7402.80	V	-58.37	18.03	-40.34		
		3701.40	Horizontal	-50.33	13.21	-37.12	-13.00	PASS
		5552.10	H	-57.30	16.61	-40.69		
		7402.80	H	-59.61	18.03	-41.58		
	Mid	3760.00	Vertical	-46.76	12.36	-34.40	-13.00	PASS
		5640.00	V	-55.16	17.03	-38.13		
		7520.00	V	-57.16	17.85	-39.31		
		3760.00	Horizontal	-48.06	12.36	-35.70	-13.00	PASS
		5640.00	H	-56.57	17.03	-39.54		
		7520.00	H	-58.33	17.85	-40.48		
	High	3818.60	Vertical	-45.19	12.78	-32.41	-13.00	PASS
		5727.90	V	-54.18	17.86	-36.32		
		7637.20	V	-56.15	18.56	-37.59		
		3818.60	Horizontal	-47.78	12.78	-35.00	-13.00	PASS
		5727.90	H	-56.74	17.86	-38.88		
		7637.20	H	-58.48	18.56	-39.92		
3MHz	Low	3703.00	Vertical	-43.90	12.78	-31.12	-13.00	PASS
		5554.50	V	-49.37	16.69	-32.68		
		7406.00	V	-53.12	18.18	-34.94		
		3703.00	Horizontal	-44.63	12.78	-31.85	-13.00	PASS
		5554.50	H	-51.83	16.69	-35.14		
		7406.00	H	-56.15	18.18	-37.97		
	Mid	3760.00	Vertical	-40.35	12.79	-27.56	-13.00	PASS
		5640.00	V	-46.04	16.72	-29.32		
		7520.00	V	-49.50	18.22	-31.28		
		3760.00	Horizontal	-41.67	12.79	-28.88	-13.00	PASS
		5640.00	H	-49.78	16.72	-33.06		
		7520.00	H	-53.80	18.22	-35.58		
	High	3817.00	Vertical	-37.23	12.93	-24.30	-13.00	PASS
		5725.50	V	-43.96	17.01	-26.95		

		7634.00	V	-48.15	18.41	-29.74		
		3817.00	Horizontal	-38.68	12.93	-25.75	-13.00	PASS
		5725.50	H	-47.69	17.01	-30.68		
		7634.00	H	-49.80	18.41	-31.39		
5MHz	Low	3705.00	Vertical	-34.05	13.25	**-20.80**	-13.00	PASS
		5557.50	V	-38.22	16.59	-21.63		
		7410.00	V	-43.87	18.12	-25.75		
		3705.00	Horizontal	-41.66	13.25	-28.41	-13.00	PASS
		5557.50	H	-52.01	16.59	-35.42		
		7410.00	H	-51.84	18.12	-33.72		
	Mid	3760.00	Vertical	-34.82	12.31	-22.51	-13.00	PASS
		5640.00	V	-41.95	17.14	-24.81		
		7520.00	V	-46.45	17.96	-28.49		
		3760.00	Horizontal	-44.68	12.31	-32.37	-13.00	PASS
		5640.00	H	-55.25	17.14	-38.11		
		7520.00	H	-53.73	17.96	-35.77		
	High	3815.00	Vertical	-39.60	12.77	-26.83	-13.00	PASS
		5722.50	V	-45.70	17.82	-27.88		
		7630.00	V	-49.73	18.59	-31.14		
		3815.00	Horizontal	-48.24	12.77	-35.47	-13.00	PASS
		5722.50	H	-58.80	17.82	-40.98		
		7630.00	H	-56.55	18.59	-37.96		
10MHz	Low	3710.00	Vertical	-36.54	12.59	-23.95	-13.00	PASS
		5565.00	V	-42.94	16.61	-26.33		
		7420.00	V	-47.62	18.35	-29.27		
		3710.00	Horizontal	-52.45	12.59	-39.86	-13.00	PASS
		5565.00	H	-60.59	16.61	-43.98		
		7420.00	H	-59.76	18.35	-41.41		
	Mid	3760.00	Vertical	-40.07	12.71	-27.36	-13.00	PASS
		5640.00	V	-45.83	16.65	-29.18		
		7520.00	V	-50.97	18.27	-32.70		
		3760.00	Horizontal	-54.81	12.71	-42.10	-13.00	PASS
		5640.00	H	-63.98	16.65	-47.33		
		7520.00	H	-62.32	18.27	-44.05		
	High	3810.00	Vertical	-41.54	12.91	-28.63	-13.00	PASS
		5715.00	V	-49.25	17.23	-32.02		

		7620.00	V	-54.59	18.59	-36.00		
		3810.00	Horizontal	-52.30	12.91	-39.39	-13.00	PASS
		5715.00	H	-62.98	17.23	-45.75		
		7620.00	H	-60.54	18.59	-41.95		
15MHz	Low	3715.00	Vertical	-39.53	13.21	-26.32	-13.00	PASS
		5572.50	V	-46.58	16.65	-29.93		
		7430.00	V	-52.06	18.29	-33.77		
		3715.00	Horizontal	-54.79	13.21	-41.58	-13.00	PASS
		5572.50	H	-64.46	16.65	-47.81		
		7430.00	H	-61.99	18.29	-43.70		
	Mid	3760.00	Vertical	-40.36	12.39	-27.97	-13.00	PASS
		5640.00	V	-48.66	17.18	-31.48		
		7520.00	V	-53.21	17.99	-35.22		
		3760.00	Horizontal	-51.89	12.39	-39.50	-13.00	PASS
		5640.00	H	-62.83	17.18	-45.65		
		7520.00	H	-60.47	17.99	-42.48		
	High	3805.00	Vertical	-39.12	12.86	-26.26	-13.00	PASS
		5707.50	V	-46.17	17.89	-28.28		
		7610.00	V	-50.73	18.69	-32.04		
		3805.00	Horizontal	-55.08	12.86	-42.22	-13.00	PASS
		5707.50	H	-67.95	17.89	-50.06		
		7610.00	H	-65.70	18.69	-47.01		
20MHz	Low	3720.00	Vertical	-41.53	12.57	-28.96	-13.00	PASS
		5580.00	V	-47.94	16.59	-31.35		
		7440.00	V	-53.02	18.67	-34.35		
		3720.00	Horizontal	-55.23	12.57	-42.66	-13.00	PASS
		5580.00	H	-67.07	16.59	-50.48		
		7440.00	H	-66.03	18.67	-47.36		
	Mid	3760.00	Vertical	-42.05	12.76	-29.29	-13.00	PASS
		5640.00	V	-48.35	16.69	-31.66		
		7520.00	V	-53.02	18.38	-34.64		
		3760.00	Horizontal	-55.71	12.76	-42.95	-13.00	PASS
		5640.00	H	-67.41	16.69	-50.72		
		7520.00	H	-65.96	18.38	-47.58		
	High	3800.00	Vertical	-40.29	12.97	-27.32	-13.00	PASS
		5700.00	V	-46.21	17.19	-29.02		

		7600.00	V	-51.02	18.28	-32.74		
		3800.00	Horizontal	-56.23	12.97	-43.26	-13.00	PASS
		5700.00	H	-68.20	17.19	-51.01		
		7600.00	H	-66.11	18.28	-47.83		

LTE Band 4								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
1.4MHz	Low	3421.40	Vertical	-46.33	12.89	-33.44	-13.00	PASS
		5132.10	V	-54.73	15.86	-38.87		
		6842.80	V	-57.34	18.92	-38.42		
		3421.40	Horizontal	-47.68	12.89	-34.79	-13.00	PASS
		5132.10	H	-55.99	15.86	-40.13		
		6842.80	H	-58.41	18.92	-39.49		
	Mid	3465.00	Vertical	-44.92	12.49	-32.43	-13.00	PASS
		5197.50	V	-53.63	15.71	-37.92		
		6930.00	V	-55.79	18.26	-37.53		
		3465.00	Horizontal	-46.05	12.49	-33.56	-13.00	PASS
		5197.50	H	-54.84	15.71	-39.13		
		6930.00	H	-56.80	18.26	-38.54		
	High	3508.60	Vertical	-43.72	13.01	**-30.71**	-13.00	PASS
		5262.90	V	-52.24	15.89	-36.35		
		7017.20	V	-54.71	18.67	-36.04		
		3508.60	Horizontal	-45.15	13.01	-32.14	-13.00	PASS
		5262.90	H	-53.68	15.89	-37.79		
		7017.20	H	-55.93	18.67	-37.26		
3MHz	Low	3423.00	Vertical	-45.61	12.74	-32.87	-13.00	PASS
		5134.50	V	-53.96	15.68	-38.28		
		6846.00	V	-56.54	18.59	-37.95		
		3423.00	Horizontal	-46.60	12.74	-33.86	-13.00	PASS
		5134.50	H	-56.19	15.68	-40.51		
		6846.00	H	-57.92	18.59	-39.33		
	Mid	3465.00	Vertical	-47.62	12.49	-35.13	-13.00	PASS
		5197.50	V	-56.43	15.89	-40.54		
		6930.00	V	-58.35	18.66	-39.69		

		3465.00	Horizontal	-50.68	12.49	-38.19	-13.00	PASS
		5197.50	H	-59.45	15.89	-43.56		
		6930.00	H	-61.54	18.66	-42.88		
	High	3507.00	Vertical	-50.09	13.44	-36.65	-13.00	PASS
		5260.50	V	-57.81	15.89	-41.92		
		7014.00	V	-59.39	18.39	-41.00		
		3507.00	Horizontal	-53.73	13.44	-40.29	-13.00	PASS
		5260.50	H	-61.81	15.89	-45.92		
		7014.00	H	-62.99	18.39	-44.60		
5MHz	Low	3425.00	Vertical	-46.75	12.87	-33.88	-13.00	PASS
		5137.50	V	-55.73	15.85	-39.88		
		6850.00	V	-57.17	18.93	-38.24		
		3425.00	Horizontal	-52.05	12.87	-39.18	-13.00	PASS
		5137.50	H	-62.81	15.85	-46.96		
		6850.00	H	-62.65	18.93	-43.72		
	Mid	3465.00	Vertical	-47.18	12.47	-34.71	-13.00	PASS
		5197.50	V	-54.80	15.7	-39.10		
		6930.00	V	-57.26	18.29	-38.97		
		3465.00	Horizontal	-52.62	12.47	-40.15	-13.00	PASS
		5197.50	H	-61.87	15.7	-46.17		
		6930.00	H	-61.80	18.29	-43.51		
	High	3505.00	Vertical	-46.80	13.29	-33.51	-13.00	PASS
		5257.50	V	-56.05	15.86	-40.19		
		7010.00	V	-56.56	18.63	-37.93		
		3505.00	Horizontal	-52.66	13.29	-39.37	-13.00	PASS
		5257.50	H	-61.30	15.86	-45.44		
		7010.00	H	-61.52	18.63	-42.89		
10MHz	Low	3430.00	Vertical	-44.11	12.72	-31.39	-13.00	PASS
		5145.00	V	-57.09	15.61	-41.48		
		6860.00	V	-55.76	18.62	-37.14		
		3430.00	Horizontal	-52.35	12.72	-39.63	-13.00	PASS
		5145.00	H	-61.29	15.61	-45.68		
		6860.00	H	-61.72	18.62	-43.10		
	Mid	3465.00	Vertical	-43.99	12.41	-31.58	-13.00	PASS
		5197.50	V	-57.58	15.92	-41.66		
		6930.00	V	-56.30	18.63	-37.67		

		3465.00	Horizontal	-52.25	12.41	-39.84	-13.00	PASS
		5197.50	H	-61.77	15.92	-45.85		
		6930.00	H	-61.89	18.63	-43.26		
	High	3500.00	Vertical	-45.25	13.41	-31.84	-13.00	PASS
		5250.00	V	-57.49	15.59	-41.90		
		7000.00	V	-56.21	18.31	-37.90		
		3500.00	Horizontal	-53.45	13.41	-40.04	-13.00	PASS
		5250.00	H	-61.63	15.59	-46.04		
		7000.00	H	-61.73	18.31	-43.42		
15MHz	Low	3435.00	Vertical	-45.42	12.89	-32.53	-13.00	PASS
		5152.50	V	-57.06	15.86	-41.20		
		6870.00	V	-57.40	18.95	-38.45		
		3435.00	Horizontal	-51.24	12.89	-38.35	-13.00	PASS
		5152.50	H	-63.49	15.86	-47.63		
		6870.00	H	-59.43	18.95	-40.48		
	Mid	3465.00	Vertical	-47.78	12.49	-35.29	-13.00	PASS
		5197.50	V	-54.33	15.73	-38.60		
		6930.00	V	-59.20	18.31	-40.89		
		3465.00	Horizontal	-48.69	12.49	-36.20	-13.00	PASS
		5197.50	H	-65.10	15.73	-49.37		
		6930.00	H	-57.14	18.31	-38.83		
	High	3495.00	Vertical	-50.64	13.32	-37.32	-13.00	PASS
		5242.50	V	-52.63	15.88	-36.75		
		6990.00	V	-57.78	18.65	-39.13		
		3495.00	Horizontal	-47.62	13.32	-34.30	-13.00	PASS
		5242.50	H	-61.56	15.88	-45.68		
		6990.00	H	-56.56	18.65	-37.91		
20MHz	Low	3440.00	Vertical	-47.13	12.74	-34.39	-13.00	PASS
		5160.00	V	-51.73	15.65	-36.08		
		6880.00	V	-57.20	18.64	-38.56		
		3440.00	Horizontal	-48.97	12.74	-36.23	-13.00	PASS
		5160.00	H	-62.86	15.65	-47.21		
		6880.00	H	-57.00	18.64	-38.36		
	Mid	3465.00	Vertical	-47.31	12.44	-34.87	-13.00	PASS
		5197.50	V	-52.24	15.93	-36.31		
		6930.00	V	-57.42	18.64	-38.78		

		3465.00	Horizontal	-48.98	12.44	-36.54	-13.00	PASS
		5197.50	H	-63.45	15.93	-47.52		
		6930.00	H	-60.12	18.64	-41.48		
	High	3490.00	Vertical	-50.31	13.43	-36.88	-13.00	PASS
		5235.00	V	-53.56	15.61	-37.95		
		6980.00	V	-58.61	18.34	-40.27		
		3490.00	Horizontal	-51.39	13.43	-37.96	-13.00	PASS
		5235.00	H	-63.48	15.61	-47.87		
		6980.00	H	-61.10	18.34	-42.76		

LTE Band 5								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
1.4MHz	Low	1649.40	Vertical	-42.82	7.29	-35.53	-13.00	PASS
		2474.10	V	-52.53	9.41	-43.12		
		3298.80	V	-56.32	12.69	-43.63		
		1649.40	Horizontal	-46.05	7.29	-38.76	-13.00	PASS
		2474.10	H	-56.33	9.41	-46.92		
		3298.80	H	-59.78	12.69	-47.09		
	Mid	1673.00	Vertical	-41.89	7.32	-34.57	-13.00	PASS
		2509.50	V	-51.61	9.39	-42.22		
		3346.00	V	-55.36	12.78	-42.58		
		1673.00	Horizontal	-45.10	7.32	-37.78	-13.00	PASS
		2509.50	H	-55.39	9.39	-46.00		
		3346.00	H	-59.00	12.78	-46.22		
	High	1696.60	Vertical	-40.80	7.33	-33.47	-13.00	PASS
		2544.90	V	-50.79	9.46	-41.33		
		3393.20	V	-54.45	12.71	-41.74		
		1696.60	Horizontal	-41.29	7.33	-33.96	-13.00	PASS
		2544.90	H	-50.34	9.46	-40.88		
		3393.20	H	-55.23	12.71	-42.52		
3MHz	Low	1651.00	Vertical	-38.84	7.36	-31.48	-13.00	PASS
		2476.50	V	-48.97	9.51	-39.46		
		3302.00	V	-52.87	12.72	-40.15		
		1651.00	Horizontal	-40.01	7.36	-32.65	-13.00	PASS

		2476.50	H	-49.16	9.51	-39.65		
		3302.00	H	-54.19	12.72	-41.47		
	Mid	1673.00	Vertical	-37.91	7.41	-30.50	-13.00	PASS
		2509.50	V	-48.06	9.52	-38.54		
		3346.00	V	-52.01	12.73	-39.28		
		1673.00	Horizontal	-38.31	7.41	-30.90	-13.00	PASS
		2509.50	H	-47.75	9.52	-38.23		
		3346.00	H	-52.85	12.73	-40.12		
	High	1695.00	Vertical	-35.86	7.52	-28.34	-13.00	PASS
		2542.50	V	-46.04	9.46	-36.58		
		3390.00	V	-50.23	12.81	-37.42		
		1695.00	Horizontal	-36.82	7.52	-29.30	-13.00	PASS
		2542.50	H	-46.18	9.46	-36.72		
		3390.00	H	-51.65	12.81	-38.84		
5MHz	Low	1653.00	Vertical	-31.96	7.61	**-24.35**	-13.00	PASS
		2479.50	V	-43.59	9.49	-34.10		
		3306.00	V	-47.01	12.86	-34.15		
		1653.00	Horizontal	-37.87	7.61	-30.26	-13.00	PASS
		2479.50	H	-47.11	9.49	-37.62		
		3306.00	H	-52.47	12.86	-39.61		
	Mid	1673.00	Vertical	-32.79	7.72	-25.07	-13.00	PASS
		2509.50	V	-44.31	9.53	-34.78		
		3346.00	V	-47.63	12.84	-34.79		
		1673.00	Horizontal	-38.13	7.72	-30.41	-13.00	PASS
		2509.50	H	-47.27	9.53	-37.74		
		3346.00	H	-52.57	12.84	-39.73		
	High	1693.00	Vertical	-33.75	7.79	-25.96	-13.00	PASS
		2539.50	V	-45.12	9.53	-35.59		
		3386.00	V	-48.45	12.89	-35.56		
		1693.00	Horizontal	-36.54	7.79	-28.75	-13.00	PASS
		2539.50	H	-45.71	9.53	-36.18		
		3386.00	H	-51.29	12.89	-38.40		
10MHz	Low	1658.00	Vertical	-32.64	7.81	-24.83	-13.00	PASS
		2487.00	V	-44.19	9.56	-34.63		
		3316.00	V	-47.66	12.91	-34.75		
		1658.00	Horizontal	-37.85	7.81	-30.04	-13.00	PASS

		2487.00	H	-46.95	9.56	-37.39		
		3316.00	H	-52.34	12.91	-39.43		
	Mid	1673.00	Vertical	-33.63	7.83	-25.80	-13.00	PASS
		2509.50	V	-45.13	9.59	-35.54		
		3346.00	V	-48.54	12.94	-35.60		
		1673.00	Horizontal	-38.06	7.83	-30.23	-13.00	PASS
		2509.50	H	-47.13	9.59	-37.54		
		3346.00	H	-52.52	12.94	-39.58		
	High	1688.00	Vertical	-33.92	7.89	-26.03	-13.00	PASS
		2532.00	V	-45.37	9.62	-35.75		
		3376.00	V	-48.76	12.96	-35.80		
		1688.00	Horizontal	-38.30	7.89	-30.41	-13.00	PASS
		2532.00	H	-47.33	9.62	-37.71		
		3376.00	H	-52.68	12.96	-39.72		

LTE Band 12								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
1.4MHz	Low	1399.40	Vertical	-40.27	4.21	-36.06	-13.00	PASS
		2099.10	V	-48.85	9.12	-39.73		
		2798.80	V	-52.03	11.36	-40.67		
		1399.40	Horizontal	-41.24	4.21	-37.03	-13.00	PASS
		2099.10	H	-49.76	9.12	-40.64		
		2798.80	H	-52.80	11.36	-41.44		
	Mid	1415.00	Vertical	-39.59	4.26	-35.33	-13.00	PASS
		2122.50	V	-48.20	9.15	-39.05		
		2830.00	V	-51.42	11.39	-40.03		
		1415.00	Horizontal	-40.40	4.26	-36.14	-13.00	PASS
		2122.50	H	-49.07	9.15	-39.92		
		2830.00	H	-52.15	11.39	-40.76		
	High	1430.60	Vertical	-38.38	4.29	-34.09	-13.00	PASS
		2145.90	V	-47.03	9.11	-37.92		
		2861.20	V	-50.27	11.31	-38.96		
		1430.60	Horizontal	-40.00	4.29	-35.71	-13.00	PASS
		2145.90	H	-48.62	9.11	-39.51		

		2861.20	H	-51.72	11.31	-40.41		
3MHz	Low	1401.00	Vertical	-37.61	4.32	-33.29	-13.00	PASS
		2101.50	V	-44.81	9.16	-35.65		
		2802.00	V	-48.65	11.35	-37.30		
		1401.00	Horizontal	-38.07	4.32	-33.75	-13.00	PASS
		2101.50	H	-46.34	9.16	-37.18		
		2802.00	H	-50.54	11.35	-39.19		
	Mid	1415.00	Vertical	-35.33	4.26	-31.07	-13.00	PASS
		2122.50	V	-42.71	9.15	-33.56		
		2830.00	V	-46.41	11.39	-35.02		
		1415.00	Horizontal	-36.16	4.26	-31.90	-13.00	PASS
		2122.50	H	-45.03	9.15	-35.88		
		2830.00	H	-49.09	11.39	-37.70		
	High	1429.00	Vertical	-33.46	4.42	-29.04	-13.00	PASS
		2143.50	V	-41.33	9.25	-32.08		
		2858.00	V	-45.52	11.46	-34.06		
		1429.00	Horizontal	-34.37	4.42	-29.95	-13.00	PASS
		2143.50	H	-43.65	9.25	-34.40		
		2858.00	H	-46.55	11.46	-35.09		
5MHz	Low	1403.00	Vertical	-30.99	4.13	**-26.86**	-13.00	PASS
		2104.50	V	-37.82	9.06	-28.76		
		2806.00	V	-42.84	11.27	-31.57		
		1403.00	Horizontal	-35.74	4.13	-31.61	-13.00	PASS
		2104.50	H	-46.42	9.06	-37.36		
		2806.00	H	-47.81	11.27	-36.54		
	Mid	1415.00	Vertical	-32.19	4.26	-27.93	-13.00	PASS
		2122.50	V	-39.89	9.15	-30.74		
		2830.00	V	-44.67	11.39	-33.28		
		1415.00	Horizontal	-38.34	4.26	-34.08	-13.00	PASS
		2122.50	H	-48.19	9.15	-39.04		
		2830.00	H	-49.21	11.39	-37.82		
	High	1427.00	Vertical	-34.84	4.22	-30.62	-13.00	PASS
		2140.50	V	-41.82	9.16	-32.66		
		2854.00	V	-46.25	11.32	-34.93		
		1427.00	Horizontal	-40.23	4.22	-36.01	-13.00	PASS
		2140.50	H	-49.99	9.16	-40.83		

		2854.00	H	-50.50	11.32	-39.18		
10MHz	Low	1408.00	Vertical	-33.12	4.29	-28.83	-13.00	PASS
		2112.00	V	-40.88	9.19	-31.69		
		2816.00	V	-45.12	11.35	-33.77		
		1408.00	Horizontal	-43.04	4.29	-38.75	-13.00	PASS
		2112.00	H	-51.89	9.19	-42.70		
		2816.00	H	-52.68	11.35	-41.33		
	Mid	1415.00	Vertical	-35.21	4.26	-30.95	-13.00	PASS
		2122.50	V	-42.62	9.15	-33.47		
		2830.00	V	-47.30	11.39	-35.91		
		1415.00	Horizontal	-44.41	4.26	-40.15	-13.00	PASS
		2122.50	H	-53.94	9.15	-44.79		
		2830.00	H	-54.37	11.39	-42.98		
	High	1422.00	Vertical	-36.10	4.36	-31.74	-13.00	PASS
		2133.00	V	-44.51	9.27	-35.24		
		2844.00	V	-49.36	11.39	-37.97		
		1422.00	Horizontal	-42.82	4.36	-38.46	-13.00	PASS
		2133.00	H	-53.08	9.27	-43.81		
		2844.00	H	-53.06	11.39	-41.67		

LTE Band 13								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
5MHz	Low	1559.00	Vertical	-59.60	4.98	-54.62	-40.00	PASS
		2338.50	V	-49.28	9.12	-40.16	-13.00	
		3118.00	V	-53.26	12.46	-40.80		
		1559.00	Horizontal	-60.57	4.98	-55.59	-40.00	PASS
		2338.50	H	-50.19	9.12	-41.07	-13.00	
		3118.00	H	-54.03	12.46	-41.57		
	Mid	1564.00	Vertical	-58.92	5.03	-53.89	-40.00	PASS
		2346.00	V	-48.67	9.19	-39.48	-13.00	
		3128.00	V	-52.63	12.47	-40.16		
		1564.00	Horizontal	-59.73	5.03	-54.70	-40.00	PASS
		2346.00	H	-49.54	9.19	-40.35	-13.00	
		3128.00	H	-53.36	12.47	-40.89		

	High	1569.00	Vertical	-57.74	5.09	-52.65	-40.00	PASS
		2353.50	V	-47.57	9.22	-38.35	-13.00	
		3138.00	V	-51.62	12.53	-39.09		
		1569.00	Horizontal	-59.36	5.09	-54.27	-40.00	PASS
		2353.50	H	-49.16	9.22	-39.94	-13.00	
		3138.00	H	-53.07	12.53	-40.54		
10MHz	Mid	1564.00	Vertical	-56.88	5.03	-51.85	-40.00	PASS
		2346.00	V	-45.27	9.19	**-36.08**	-13.00	
		3128.00	V	-49.90	12.47	-37.43		
		1564.00	Horizontal	-57.34	5.03	-52.31	-40.00	PASS
		2346.00	H	-46.80	9.19	-37.61	-13.00	
		3128.00	H	-51.79	12.47	-39.32		

LTE Band 14								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
5MHz	Low	1581.00	Vertical	-49.89	4.26	-45.63	-40.00	PASS
		2371.50	V	-48.20	8.72	-39.48	-13.00	PASS
		3162.00	V	-51.88	11.36	-40.52		
		1581.00	Horizontal	-51.22	4.26	-46.96	-40.00	PASS
		2371.50	H	-49.45	8.72	-40.73	-13.00	PASS
		3162.00	H	-52.94	11.36	-41.58		
	Mid	1586.00	Vertical	-48.84	4.21	-44.63	-40.00	PASS
		2379.00	V	-47.80	9.26	-38.54	-13.00	PASS
		3172.00	V	-51.02	11.38	-39.64		
		1586.00	Horizontal	-49.95	4.21	-45.74	-40.00	PASS
		2379.00	H	-49.00	9.26	-39.74	-13.00	PASS
		3172.00	H	-52.02	11.38	-40.64		
	High	1591.00	Vertical	-48.18	4.26	-43.92	-40.00	PASS
		2386.50	V	-46.12	9.13	-36.99	-13.00	PASS
		3182.00	V	-49.51	11.35	-38.16		
		1591.00	Horizontal	-49.40	4.26	-45.14	-40.00	PASS
		2386.50	H	-48.31	9.13	-39.18	-13.00	PASS
		3182.00	H	-51.51	11.35	-40.16		
10MHz	Low	1586.00	Vertical	-46.95	4.13	-42.82	-40.00	PASS

		2379.00	V	-43.10	9.23	-33.87	-13.00	PASS
		3172.00	V	-47.73	11.85	-35.88		
		1586.00	Horizontal	-46.57	4.13	-42.44	-40.00	PASS
		2379.00	H	-45.21	9.23	-35.98	-13.00	PASS
		3172.00	H	-50.33	11.85	-38.48		
	Mid	1586.00	Vertical	-46.79	4.21	-42.58	-40.00	PASS
		2379.00	V	-40.25	9.26	-30.99	-13.00	PASS
		3172.00	V	-44.12	11.38	-32.74		
		1586.00	Horizontal	-49.58	4.21	-45.37	-40.00	PASS
		2379.00	H	-43.46	9.26	-34.20	-13.00	PASS
		3172.00	H	-47.81	11.38	-36.43		
	High	1586.00	Vertical	-47.02	4.18	-42.84	-40.00	PASS
		2379.00	V	-38.20	9.24	**-28.96**	-13.00	PASS
		3172.00	V	-43.24	11.82	-31.42		
		1586.00	Horizontal	-46.87	4.18	-42.69	-40.00	PASS
		2379.00	H	-41.40	9.24	-32.16	-13.00	PASS
		3172.00	H	-44.66	11.82	-32.84		

LTE Band 66								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
1.4MHz	Low	3421.40	Vertical	-47.88	12.41	-35.47	-13.00	PASS
		5132.10	V	-54.81	15.69	-39.12		
		6842.80	V	-59.21	18.95	-40.26		
		3421.40	Horizontal	-49.56	12.41	-37.15	-13.00	PASS
		5132.10	H	-56.39	15.69	-40.70		
		6842.80	H	-60.55	18.95	-41.60		
	Mid	3465.00	Vertical	-46.67	12.46	-34.21	-13.00	PASS
		5197.50	V	-53.64	15.71	-37.93		
		6930.00	V	-58.12	18.97	-39.15		
		3465.00	Horizontal	-48.07	12.46	-35.61	-13.00	PASS
		5197.50	H	-55.16	15.71	-39.45		
		6930.00	H	-59.39	18.97	-40.42		
	High	3508.60	Vertical	-44.55	12.49	-32.06	-13.00	PASS
		5262.90	V	-51.73	15.76	-35.97		

		7017.20	V	-56.31	19.02	-37.29		
		3508.60	Horizontal	-47.35	12.49	-34.86	-13.00	PASS
		5262.90	H	-54.50	15.76	-38.74		
		7017.20	H	-58.84	19.02	-39.82		
3MHz	Low	3423.00	Vertical	-43.20	12.53	-30.67	-13.00	PASS
		5134.50	V	-47.83	15.79	-32.04		
		6846.00	V	-53.54	19.12	-34.42		
		3423.00	Horizontal	-43.99	12.53	-31.46	-13.00	PASS
		5134.50	H	-50.49	15.79	-34.70		
		6846.00	H	-56.83	19.12	-37.71		
	Mid	3465.00	Vertical	-39.28	12.46	-26.82	-13.00	PASS
		5197.50	V	-44.12	15.71	-28.41		
		6930.00	V	-49.43	18.97	-30.46		
		3465.00	Horizontal	-40.71	12.46	-28.25	-13.00	PASS
		5197.50	H	-48.16	15.71	-32.45		
		6930.00	H	-54.10	18.97	-35.13		
	High	3507.00	Vertical	-35.89	12.59	-23.30	-13.00	PASS
		5260.50	V	-41.69	15.84	-25.85		
		7014.00	V	-47.98	19.19	-28.79		
		3507.00	Horizontal	-37.46	12.59	-24.87	-13.00	PASS
		5260.50	H	-45.72	15.84	-29.88		
		7014.00	H	-49.79	19.19	-30.60		
5MHz	Low	3425.00	Vertical	-31.64	12.12	**-19.52**	-13.00	PASS
		5137.50	V	-35.83	15.72	-20.11		
		6850.00	V	-43.51	19.03	-24.48		
		3425.00	Horizontal	-39.87	12.12	-27.75	-13.00	PASS
		5137.50	H	-50.72	15.72	-35.00		
		6850.00	H	-52.15	19.03	-33.12		
	Mid	3465.00	Vertical	-33.83	12.46	-21.37	-13.00	PASS
		5197.50	V	-39.25	15.71	-23.54		
		6930.00	V	-46.41	18.97	-27.44		
		3465.00	Horizontal	-44.49	12.46	-32.03	-13.00	PASS
		5197.50	H	-53.61	15.71	-37.90		
		6930.00	H	-54.31	18.97	-35.34		
	High	3505.00	Vertical	-38.22	12.19	-26.03	-13.00	PASS
		5257.50	V	-42.65	15.79	-26.86		

		7010.00	V	-49.53	19.23	-30.30		
		3505.00	Horizontal	-47.56	12.19	-35.37	-13.00	PASS
		5257.50	H	-56.79	15.79	-41.00		
		7010.00	H	-56.93	19.23	-37.70		
10MHz	Low	3430.00	Vertical	-35.15	12.23	-22.92	-13.00	PASS
		5145.00	V	-41.01	15.82	-25.19		
		6860.00	V	-47.54	19.26	-28.28		
		3430.00	Horizontal	-52.34	12.23	-40.11	-13.00	PASS
		5145.00	H	-60.06	15.82	-44.24		
		6860.00	H	-60.69	19.26	-41.43		
	Mid	3465.00	Vertical	-39.06	12.46	-26.60	-13.00	PASS
		5197.50	V	-43.98	15.71	-28.27		
		6930.00	V	-50.96	18.97	-31.99		
		3465.00	Horizontal	-54.99	12.46	-42.53	-13.00	PASS
		5197.50	H	-63.56	15.71	-47.85		
		6930.00	H	-63.26	18.97	-44.29		
	High	3500.00	Vertical	-40.32	12.35	-27.97	-13.00	PASS
		5250.00	V	-47.23	15.89	-31.34		
		7000.00	V	-54.90	19.35	-35.55		
		3500.00	Horizontal	-51.95	12.35	-39.60	-13.00	PASS
		5250.00	H	-62.04	15.89	-46.15		
		7000.00	H	-61.37	19.35	-42.02		
15MHz	Low	3435.00	Vertical	-37.86	12.39	-25.47	-13.00	PASS
		5152.50	V	-45.00	15.92	-29.08		
		6870.00	V	-52.53	19.39	-33.14		
		3435.00	Horizontal	-54.36	12.39	-41.97	-13.00	PASS
		5152.50	H	-64.29	15.92	-48.37		
		6870.00	H	-63.30	19.39	-43.91		
	Mid	3465.00	Vertical	-39.71	12.46	-27.25	-13.00	PASS
		5197.50	V	-46.46	15.71	-30.75		
		6930.00	V	-53.68	18.97	-34.71		
		3465.00	Horizontal	-52.19	12.46	-39.73	-13.00	PASS
		5197.50	H	-61.74	15.71	-46.03		
		6930.00	H	-61.56	18.97	-42.59		
	High	3495.00	Vertical	-37.92	12.52	-25.40	-13.00	PASS
		5242.50	V	-42.82	15.53	-27.29		

		6990.00	V	-50.77	19.49	-31.28		
		3495.00	Horizontal	-55.19	12.52	-42.67	-13.00	PASS
		5242.50	H	-66.32	15.53	-50.79		
		6990.00	H	-66.98	19.49	-47.49		
20MHz	Low	3440.00	Vertical	-40.91	12.59	-28.32	-13.00	PASS
		5160.00	V	-46.18	15.58	-30.60		
		6880.00	V	-53.31	19.53	-33.78		
		3440.00	Horizontal	-55.70	12.59	-43.11	-13.00	PASS
		5160.00	H	-66.79	15.58	-51.21		
		6880.00	H	-67.37	19.53	-47.84		
	Mid	3465.00	Vertical	-41.11	12.46	-28.65	-13.00	PASS
		5197.50	V	-46.62	15.71	-30.91		
		6930.00	V	-53.04	18.97	-34.07		
		3465.00	Horizontal	-55.86	12.46	-43.40	-13.00	PASS
		5197.50	H	-67.16	15.71	-51.45		
		6930.00	H	-67.03	18.97	-48.06		
	High	3490.00	Vertical	-39.24	12.71	-26.53	-13.00	PASS
		5235.00	V	-43.78	15.72	-28.06		
		6980.00	V	-51.65	19.63	-32.02		
		3490.00	Horizontal	-56.42	12.71	-43.71	-13.00	PASS
		5235.00	H	-67.46	15.72	-51.74		
		6980.00	H	-67.94	19.63	-48.31		

LTE Band 71								
Bandwidth	Channel	Frequency (MHz)	Spurious Emission				Limit (dBm)	Result
			Polarization	reading (dBm)	factor (dB)	Level (dBm)		
5MHz	Low	1331.00	Vertical	-40.35	4.26	-36.09	-13.00	PASS
		1996.50	V	-48.61	8.76	-39.85		
		2662.00	V	-50.51	9.75	-40.76		
		1331.00	Horizontal	-41.24	4.26	-36.98	-13.00	PASS
		1996.50	H	-49.45	8.76	-40.69		
		2662.00	H	-51.22	9.75	-41.47		
	Mid	1361.00	Vertical	-39.74	4.32	-35.42	-13.00	PASS
		2041.50	V	-48.00	8.78	-39.22		
		2722.00	V	-49.96	9.79	-40.17		

		1361.00	Horizontal	-40.48	4.32	-36.16	-13.00	PASS
		2041.50	H	-48.81	8.78	-40.03		
		2722.00	H	-50.63	9.79	-40.84		
	High	1391.00	Vertical	-38.67	4.39	-34.28	-13.00	PASS
		2086.50	V	-47.00	8.82	-38.18		
		2782.00	V	-49.00	9.82	-39.18		
		1391.00	Horizontal	-40.15	4.39	-35.76	-13.00	PASS
		2086.50	H	-48.47	8.82	-39.65		
		2782.00	H	-50.34	9.82	-40.52		
10MHz	Low	1336.00	Vertical	-37.96	4.42	-33.54	-13.00	PASS
		2004.00	V	-45.00	8.91	-36.09		
		2672.00	V	-47.52	9.86	-37.66		
		1336.00	Horizontal	-38.37	4.42	-33.95	-13.00	PASS
		2004.00	H	-46.42	8.91	-37.51		
		2672.00	H	-49.26	9.86	-39.40		
	Mid	1361.00	Vertical	-35.82	4.32	-31.50	-13.00	PASS
		2041.50	V	-42.94	8.78	-34.16		
		2722.00	V	-45.35	9.79	-35.56		
		1361.00	Horizontal	-36.57	4.32	-32.25	-13.00	PASS
		2041.50	H	-45.10	8.78	-36.32		
		2722.00	H	-47.82	9.79	-38.03		
	High	1386.00	Vertical	-34.12	4.49	-29.63	-13.00	PASS
		2079.00	V	-41.79	8.99	-32.80		
		2772.00	V	-44.59	9.92	-34.67		
		1386.00	Horizontal	-34.95	4.49	-30.46	-13.00	PASS
		2079.00	H	-43.95	8.99	-34.96		
		2772.00	H	-45.55	9.92	-35.63		
15MHz	Low	1341.00	Vertical	-31.88	4.13	**-27.62**	-13.00	PASS
		2011.50	V	-38.51	8.75	-29.75		
		2682.00	V	-42.13	9.53	-32.38		
		1341.00	Horizontal	-36.25	4.13	-31.99	-13.00	PASS
		2011.50	H	-46.44	8.75	-37.68		
		2682.00	H	-46.72	9.53	-36.97		
	Mid	1361.00	Vertical	-32.92	4.32	-28.60	-13.00	PASS
		2041.50	V	-40.35	8.78	-31.57		
		2722.00	V	-43.74	9.79	-33.95		

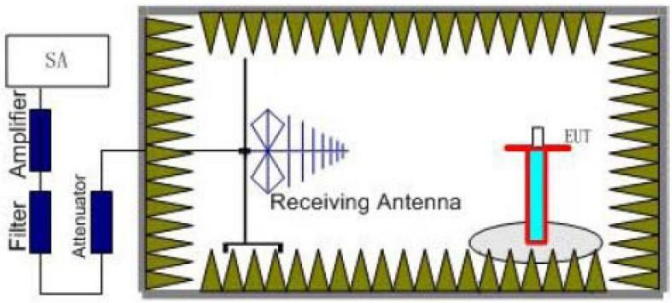
		1361.00	Horizontal	-38.58	4.32	-34.26	-13.00	PASS
		2041.50	H	-48.00	8.78	-39.22		
		2722.00	H	-47.94	9.79	-38.15		
	High	1381.00	Vertical	-35.47	4.21	-31.08	-13.00	PASS
		2071.50	V	-42.15	8.85	-33.33		
		2762.00	V	-45.29	9.62	-35.47		
		1381.00	Horizontal	-40.43	4.21	-36.04	-13.00	PASS
		2071.50	H	-49.69	8.85	-40.87		
		2762.00	H	-49.22	9.62	-39.40		
20MHz	Low	1346.00	Vertical	-33.85	4.26	-29.43	-13.00	PASS
		2019.00	V	-41.35	8.92	-32.44		
		2692.00	V	-44.26	9.69	-34.40		
		1346.00	Horizontal	-42.98	4.26	-38.56	-13.00	PASS
		2019.00	H	-51.50	8.92	-42.59		
		2692.00	H	-51.24	9.69	-41.38		
	Mid	1366.00	Vertical	-35.70	4.32	-31.38	-13.00	PASS
		2049.00	V	-42.86	8.78	-34.08		
		2732.00	V	-46.16	9.79	-36.37		
		1366.00	Horizontal	-44.17	4.32	-39.85	-13.00	PASS
		2049.00	H	-53.29	8.78	-44.51		
		2732.00	H	-52.69	9.79	-42.90		
	High	1376.00	Vertical	-36.60	4.42	-32.11	-13.00	PASS
		2064.00	V	-44.70	9.26	-35.71		
		2752.00	V	-48.18	9.79	-38.26		
		1376.00	Horizontal	-42.79	4.42	-38.30	-13.00	PASS
		2064.00	H	-52.60	9.26	-43.61		
		2752.00	H	-51.61	9.79	-41.69		

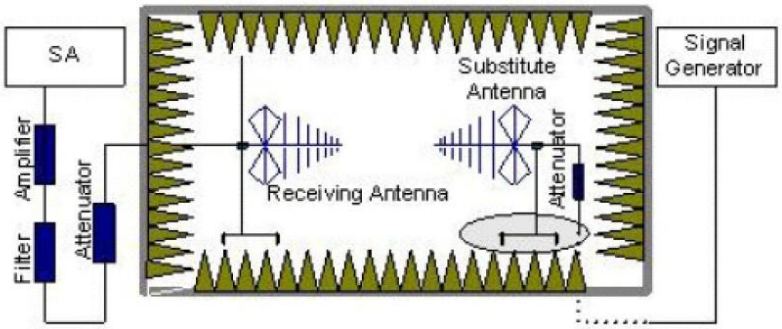
10. ERP and EIRP

10.1. Test Standard and Limit

Applicable Standard:	Part 2.1046 Part 22.913(a) Part 24.232(c) Part 27.50(b) Part 27.50(c) Part 27.50(d) Part 90.542(a)
Limit:	ERP≤ 7W(LTE Band 5) EIRP≤ 2W(LTE Band 2) ERP≤ 3W(LTE Band 13) ERP≤ 3W(LTE Band 12,71) EIRP≤ 1W(LTE Band 4, 66) ERP≤ 30W(LTE Band 14)

10.2. Test Setup





10.3. Test Procedure

1. Place the EUT in the center of the turntable.
   a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
   b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:

   Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto

   Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
   a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
   b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
   c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
   d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
   e) Record the measured emission amplitude level and frequency
6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
10. For each emission that was detected and measured in the initial test
    a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
    b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.

c) Record the output power level of the signal generator when equivalence is achieved in step b).

11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

    Pe = Ps(dBm) − cable loss (dB) + antenna gain (dBd)

    where

    Pe = equivalent emission power in dBm

    Ps = source (signal generator) power in dBm

    NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.
13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

    gain (dBd) = gain (dBi) − 2.15 dB.

    If necessary, the antenna gain can be calculated from calibrated antenna factor information
14. Provide the complete measurement results as a part of the test report.

10.4. Test Data

Pass

Please to see the following pages

LTE Band 2						
Bandwidth	Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
1.4MHz	QPSK	Low	22.12	19.44	33.00	PASS
		Mid	22.47	19.33		
		High	22.40	19.51		
	16QAM	Low	18.17	15.94		PASS
		Mid	18.66	16.24		
		High	18.39	16.62		
3MHz	QPSK	Low	21.64	18.51	33.00	PASS
		Mid	22.16	19.31		
		High	21.88	19.13		
	16QAM	Low	19.46	17.27		PASS
		Mid	19.37	16.92		
		High	18.45	16.93		
5MHz	QPSK	Low	23.75	20.53	33.00	PASS
		Mid	24.07	20.24		
		High	**24.34**	20.52		
	16QAM	Low	20.00	16.98		PASS
		Mid	20.21	17.19		
		High	19.85	17.47		
10MHz	QPSK	Low	23.67	20.71	33.00	PASS
		Mid	23.99	20.42		
		High	24.25	20.90		
	16QAM	Low	19.91	17.26		PASS
		Mid	20.13	17.60		
		High	19.78	17.76		
15MHz	QPSK	Low	22.99	19.62	33.00	PASS
		Mid	23.48	20.26		
		High	23.49	20.34		
	16QAM	Low	20.97	18.42		PASS
		Mid	20.65	18.10		
		High	19.66	17.92		
20MHz	QPSK	Low	23.35	19.95	33.00	PASS
		Mid	24.04	20.70		
		High	24.06	20.70		
	16QAM	Low	21.51	19.15		PASS
		Mid	21.11	18.47		
		High	20.08	18.11		

LTE Band 4						
Bandwidth	Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
1.4MHz	QPSK	Low	23.40	21.32	30.00	PASS
		Mid	24.15	21.96		
		High	24.42	21.59		
	16QAM	Low	18.53	17.74		PASS
		Mid	19.16	18.47		
		High	19.16	18.39		
3MHz	QPSK	Low	24.31	21.31	30.00	PASS
		Mid	23.97	21.44		
		High	23.74	21.26		
	16QAM	Low	19.15	18.69		PASS
		Mid	19.62	17.36		
		High	19.81	18.84		
5MHz	QPSK	Low	25.62	22.48	30.00	PASS
		Mid	25.96	23.07		
		High	**26.16**	22.78		
	16QAM	Low	20.18	18.55		PASS
		Mid	20.61	20.42		
		High	20.37	19.02		
10MHz	QPSK	Low	24.66	22.13	30.00	PASS
		Mid	25.18	22.70		
		High	25.41	22.34		
	16QAM	Low	19.47	18.38		PASS
		Mid	19.99	19.04		
		High	19.85	18.86		
15MHz	QPSK	Low	25.64	22.00	30.00	PASS
		Mid	25.06	22.10		
		High	24.78	21.97		
	16QAM	Low	20.14	19.18		PASS
		Mid	20.49	18.53		
		High	20.53	19.22		
20MHz	QPSK	Low	25.77	22.13	30.00	PASS
		Mid	25.56	22.33		
		High	25.22	22.09		
	16QAM	Low	20.10	19.34		PASS
		Mid	20.97	18.39		
		High	21.07	19.57		

LTE Band 5						
Bandwidth	Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
1.4MHz	QPSK	Low	23.28	22.16	38.45	PASS
		Mid	24.10	22.45		
		High	24.04	22.49		
	16QAM	Low	19.09	17.99		PASS
		Mid	19.34	18.75		
		High	19.45	18.29		
3MHz	QPSK	Low	**26.00**	20.99	38.45	PASS
		Mid	25.31	21.19		
		High	24.27	20.83		
	16QAM	Low	18.84	19.41		PASS
		Mid	19.31	18.19		
		High	19.43	17.81		
5MHz	QPSK	Low	24.97	21.64	38.45	PASS
		Mid	24.62	21.86		
		High	23.62	21.25		
	16QAM	Low	20.28	19.48		PASS
		Mid	20.01	19.67		
		High	19.89	19.47		
10MHz	QPSK	Low	24.80	21.70	38.45	PASS
		Mid	24.46	21.91		
		High	23.51	21.29		
	16QAM	Low	20.30	18.62		PASS
		Mid	20.69	19.45		
		High	20.90	19.05		

LTE Band 12						
Bandwidth	Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
1.4MHz	QPSK	Low	22.60	19.92	34.77	PASS
		Mid	22.82	19.79		
		High	23.07	19.98		
	16QAM	Low	17.66	15.56		PASS
		Mid	18.07	15.93		
		High	18.06	16.37		
3MHz	QPSK	Low	22.00	18.77	34.77	PASS
		Mid	22.43	19.75		
		High	22.42	19.51		
	16QAM	Low	19.28	17.22		PASS
		Mid	18.96	16.77		
		High	18.13	16.75		
5MHz	QPSK	Low	24.64	21.28	34.77	PASS
		Mid	24.81	20.93		
		High	**25.49**	21.24		
	16QAM	Low	19.94	16.86		PASS
		Mid	20.01	17.11		
		High	19.88	17.43		
10MHz	QPSK	Low	24.53	21.51	34.77	PASS
		Mid	24.71	21.15		
		High	25.37	21.71		
	16QAM	Low	19.83	17.21		PASS
		Mid	19.91	17.62		
		High	19.79	17.79		

LTE Band 13						
Bandwidth	Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
5MHz	QPSK	Low	23.66	21.65	34.77	PASS
		Mid	24.09	21.54		
		High	**24.28**	21.85		
	16QAM	Low	16.40	15.23		PASS
		Mid	17.10	15.86		
		High	16.92	16.55		
10MHz	QPSK	Mid	22.77	19.96	34.77	PASS
	16QAM	Mid	23.52	21.49		

LTE Band 14						
Bandwidth	Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
5MHz	QPSK	Low	23.52	21.19	44.77	PASS
		Mid	**24.08**	20.83		
		High	23.21	21.96		
	16QAM	Low	18.16	17.19		PASS
		Mid	18.84	17.68		
		High	18.57	17.69		
10MHz	QPSK	Low	23.38	20.02	44.77	PASS
		Mid	23.92	20.37		
		High	23.08	20.02		
	16QAM	Low	18.28	17.41		PASS
		Mid	18.95	17.82		
		High	18.67	17.76		

LTE Band 66						
Bandwidth	Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
1.4MHz	QPSK	Low	22.72	19.94	30.00	PASS
		Mid	23.12	19.82		
		High	23.16	20.06		
	16QAM	Low	17.45	15.28		PASS
		Mid	18.05	15.70		
		High	17.82	16.21		
3MHz	QPSK	Low	22.08	18.71	30.00	PASS
		Mid	22.71	19.78		
		High	22.47	19.56		
	16QAM	Low	19.18	17.05		PASS
		Mid	19.00	16.60		
		High	17.90	16.62		
5MHz	QPSK	Low	24.89	21.39	30.00	PASS
		Mid	25.25	21.03		
		High	**25.75**	21.41		
	16QAM	Low	19.88	16.67		PASS
		Mid	20.12	16.96		
		High	19.76	17.34		
10MHz	QPSK	Low	24.78	21.63	30.00	PASS
		Mid	25.14	21.27		
		High	25.62	21.91		
	16QAM	Low	19.76	17.04		PASS
		Mid	20.01	17.51		
		High	19.67	17.72		
15MHz	QPSK	Low	23.87	20.18	30.00	PASS
		Mid	24.47	21.04		
		High	24.61	21.17		
	16QAM	Low	21.19	18.58		PASS
		Mid	20.71	18.17		
		High	19.51	17.94		
20MHz	QPSK	Low	24.36	20.63	30.00	PASS
		Mid	25.21	21.63		
		High	25.37	21.65		
	16QAM	Low	21.90	19.56		PASS
		Mid	21.31	18.66		
		High	20.08	18.19		

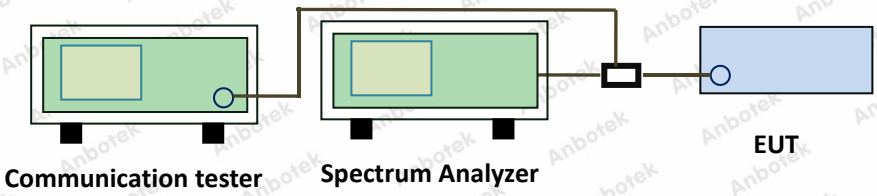
LTE Band 71						
Bandwidth	Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
			Vertical	Horizontal		
5MHz	QPSK	Low	23.97	20.69	34.77	PASS
		Mid	24.29	20.40		
		High	**24.62**	20.68		
	16QAM	Low	19.97	16.92		PASS
		Mid	20.19	17.15		
		High	19.83	17.44		
10MHz	QPSK	Low	23.89	20.88	34.77	PASS
		Mid	24.20	20.59		
		High	24.51	21.09		
	16QAM	Low	19.88	17.22		PASS
		Mid	20.11	17.58		
		High	19.75	17.75		
15MHz	QPSK	Low	23.15	19.73	34.77	PASS
		Mid	23.66	20.41		
		High	23.70	20.49		
	16QAM	Low	21.02	18.45		PASS
		Mid	20.66	18.12		
		High	19.62	17.92		
20MHz	QPSK	Low	23.54	20.08	34.77	PASS
		Mid	24.26	20.88		
		High	24.30	20.88		
	16QAM	Low	21.58	19.23		PASS
		Mid	21.15	18.51		
		High	20.08	18.12		

11. Frequency stability VS Voltage measurement

11.1. Test Standard and Limit

Applicable Standard:	Part 2.1055(d)(1)(2) Part 22.355 Part 24.235 Part 27.54 Part 90.213
Limit:	≤ ±2.5ppm

11.2. Test Setup



11.3. Test Procedure

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. The EUT output port was connected to communication tester.
3. The EUT was placed inside the temperature chamber at 25°C.
4. The power supply voltage to the EUT was varied ±15% of the nominal value measured at the input to the EUT.
5. Record the maximum frequency change.

11.4. Test Data

Pass

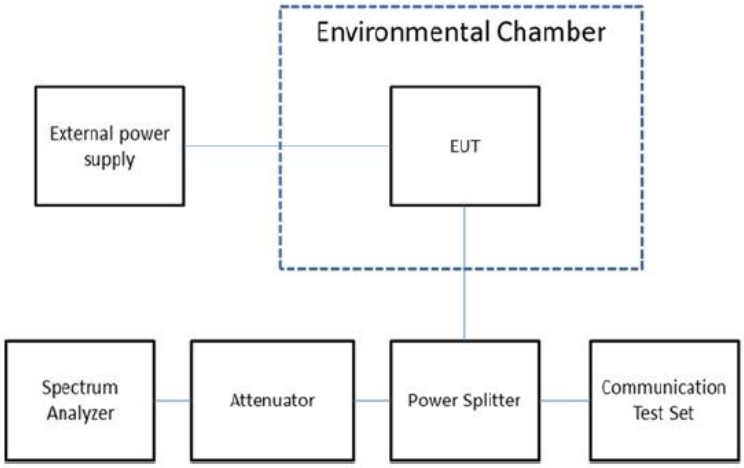
Please Refer to Appendix for Details.

12. Frequency stability VS Temperature measurement

12.1. Test Standard and Limit

Applicable Standard:	Part 2.1055(a)(1)(b) Part 22.355 Part 24.235 Part 27.54 Part 90.213
Limit:	≤ ±2.5ppm

12.2. Test Setup



12.3. Test Procedure

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. The EUT output port was connected to communication tester.
3. The EUT was placed inside the temperature chamber.
4. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
5. Repeat step 4 measure with 10°C increased per stage until the highest temperature of +50°C reached.

12.4. Test Data

Pass

Please Refer to Appendix for Details.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph_Licensed

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

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