

RF TEST REPORT

Report No.: AIT22103109W7

FCC ID: 2AFDQ-EG21

Equipment : Comms Gateway

Brand Name : Acorn Stairlifts

Test Model : T715 Comms Gateway

Series Model : T715

Applicant: Acorn Mobility Service Ltd

Address : Telecom House, Millennium Business Park, Steeton, Station Road, BD20

6RB UK

Manufacturer : Sixfab, Inc.

Address: 1185 Campbell Ave Unit K12 San Jose, CA 95126 USA.

Date of Receipt : 2022.11.01

Date of Test : 2022.11.01-2022.11.25

Issued Date : 2022.11.29

Report Version : V1.0

Test Sample : Engineering Sample No.: AIT22103108-1

Standard(s): 47 CFR FCC Part 02:2020;47 CFR FCC Part 22:2020;47 CFR FCC Part

24:2020;47 CFR FCC Part 27:2020;ANSI C63.26:2015

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This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Reviewed by:	Gimba Huang	Approved by:	Seal-Chen
,	Simba huang	,	Seal Chen





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Revision History

Revision	Issue Date	Revisions	Revised By
V1.0	2022.11.29	Initial Issue	Seal Chen

Note: Replace the LTE module on the basis of the original project (AIT22103108W7).

Module EG21: Refer Appendix _LTE Test Data for Module EG21.



1. General Information

1.1 Applicant

Acorn Mobility Service Ltd

Telecom House, Millennium Business Park, Steeton, Station Road, BD20 6RB UK

1.2 Manufacturer

Sixfab, Inc.

1185 Campbell Ave Unit K12 San Jose, CA 95126 USA.

1.3 Factory

Sixfab, Inc.

1185 Campbell Ave Unit K12 San Jose, CA 95126 USA

1.4 Basic Description of Equipment Under Test

Items	Description		
Equipment Name	Comms Gateway		
Trademark	Acorn Stairlifts		
Test Model Number	T715 Comms Gateway		
Series Model	T715		
Difference Description	The series model uses two different LTE modules (Module: EG25;		
Difference Description	Module:EG21), everything else is the same.		
D 0	Input:100~240V 50/60Hz 0.4A Max.		
Power Supply	Output:5.1V 3A 15.3W		
Antenna Type:	PCB antenna		
Operating Temperature	-20~40℃		
Hardware Version	T715 V1.0		
Software Version	T715 V1.0		
EUT Stage	○Product Unit ●Final-Sample		
Radio SystemType	LTE		
Operating Band	Band 2, Band 4, Band 5,Band 7, Band 12, Band13, Band 41		



1.5 Technical Specification

Characteristics	Description				
Radio System Type	LTE				
Supported Frequency	LTE BAND2	Transmission (TX): 1850 to 1910 MHz			
Range		Receiving (RX): 1930 to 1990 MHz			
	LTE BAND4	Transmission (TX): 1710 to 1755 MHz			
		Receiving (RX): 2110 to 2155 MHz			
	LTE BAND5	Transmission (TX): 824 to 849 MHz			
		Receiving (RX): 869 to 894 MHz			
	LTE BAND7	Transmission (TX): 2500to 2570MHz			
		Receiving (RX): 2620to 2690 MHz			
	LTE BAND12	Transmission (TX): 699 to 716 MHz			
		Receiving (RX): 729 to 746MHz			
	LTE BAND13	Transmission (TX): 777 to 787MHz			
		Receiving (RX): 746 to 756MHz			
	LTE BAND41	Transmission (TX): 2496 to 2690MHz			
		Receiving (RX): 2496 to 2690MHz			
TX and RX Antenna Ports	TX & RX port:	1			
	TX-only port:	0			
	RX-only port:	1			
Target TX Output Power	For module(EG21):				
	LTE BAND2:26.70dBm; LTE BAND4:25.41dBm;				
	LTE BAND5:23.67dBn	n;LTE BAND7:25.54dBm;			
	LTE BAND12:23.89dB	m;LTE BAND13:23.05dBm;			
	LTE BAND41: 26.34dE	Bm;			
Antenna Gain:	LTE BAND2:3.80dBi;L	TE BAND4: 3.80dBi;			
	LTE BAND7: 4.60dBi;l	TE BAND12:3.50dBi;			
	LTE BAND13: 3.50dBi; LTE BAND41: 4.60dBi;				
	LTE BAND5: 3.50dBi;				
Supported Channel	LTE BAND2	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz,			
Bandwidth		20 MHz			
	LTE BAND4	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz,			
		20 MHz			
	LTE BAND5	1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE BAND7 5 MHz, 10 MHz, 15 MHz, 20 MI				
	LTE BAND12	1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE BAND13	1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE BAND41	5 MHz, 10 MHz, 15 MHz, 20 MHz			
Designation of Emissions	LTE BAND2:	For module(EG21):			
(Note: the necessary		1M1G7D (1.4 MHz QPSK modulation),			
bandwidth of which is the		1M1W7D (1.4 MHz 16QAM modulation)			



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Characteristics	Description	1105 TREPORT 110 711122 100 100 W7
worst value from the	1	2M70G7D (3 MHz QPSK modulation),
measured occupied		2M70W7D (3 MHz 16QAM modulation)
bandwidths for each type of		4M52G7D (5 MHz QPSK modulation)
channel bandwidth		4M52W7D (5 MHz 16QAM modulation)
configuration.)		8M99G7D (10 MHz QPSK modulation)
,		8M99W7D (10 MHz 16QAM modulation)
		13M5G7D (15 MHz QPSK modulation)
		13M5W7D (15 MHz 16QAM modulation)
		18M0G7D (20 MHz QPSK modulation)
		18M1W7D (20 MHz 16QAM modulation)
	LTE BAND4:	For module(EG21):
		1M1G7D (1.4 MHz QPSK modulation)
		1M09W7D (1.4 MHz 16QAM modulation)
		2M69G7D (3 MHz QPSK modulation)
		2M69W7D (3 MHz 16QAM modulation)
		4M50G7D (5 MHz QPSK modulation)
		4M50W7D (5 MHz 16QAM modulation)
		8M97G7D (10 MHz QPSK modulation)
		8M99W7D (10 MHz 16QAM modulation)
		13M5G7D (15 MHz QPSK modulation)
		13M5W7D (15 MHz 16QAM modulation)
		18M0G7D (20 MHz QPSK modulation)
		18M0W7D (20 MHz 16QAM modulation)
	LTE BAND5:	For module(EG21):
		1M09G7D (1.4 MHz QPSK modulation)
		1M1W7D (1.4 MHz 16QAM modulation)
		2M69G7D (3 MHz QPSK modulation)
		2M69W7D (3 MHz 16QAM modulation)
		4M50G7D (5 MHz QPSK modulation)
		4M49W7D (5 MHz 16QAM modulation)
		8M99G7D (10 MHz QPSK modulation)
		8M99W7D (10 MHz 16QAM modulation)
	LTE BAND7:	For module(EG21):
		4M50G7D (5 MHz QPSK modulation),
		4M50W7D (5 MHz 16QAM modulation)
		8M99G7D (10 MHz QPSK modulation),
		9M0W7D (10 MHz 16QAM modulation)
		13M5G7D (15 MHz QPSK modulation),
		13M5W7D (15 MHz 16QAM modulation)
		18M0G7D (20 MHz QPSK modulation)
		18M0W7D (20 MHz 16QAM modulation)
	LTE BAND12:	For module(EG21):
		1M09G7D (1.4 MHz QPSK modulation)



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Characteristics	Description	
		1M1W7D (1.4 MHz 16QAM modulation)
		2M68G7D (3 MHz QPSK modulation)
		2M68W7D (3 MHz 16QAM modulation)
		4M53G7D (5 MHz QPSK modulation)
		4M53W7D (5 MHz 16QAM modulation)
		9M0G7D (10 MHz QPSK modulation)
		9M0W7D (10 MHz 16QAM modulation)
	LTE BAND13:	For module(EG21):
		4M53G7D (5 MHz QPSK modulation)
		4M53W7D (5 MHz 16QAM modulation)
		9M0G7D (10 MHz QPSK modulation)
		8M98W7D (10 MHz 16QAM modulation)
	LTE BAND41:	For module(EG21):
		4M49G7D (5 MHz QPSK modulation)
		4M50W7D (5 MHz 16QAM modulation)
		8M98G7D (10 MHz QPSK modulation)
		8M99W7D (10 MHz 16QAM modulation)
		13M5G7D (15 MHz QPSK modulation)
		13M5W7D (15 MHz 16QAM modulation)
		18M0G7D (20 MHz QPSK modulation)
		18M0W7D (20 MHz 16QAM modulation



2. Summary of Test Results

2.1 Application of Standard

47 CFR FCC Part 02:2020

47 CFR FCC Part 22:2020

47 CFR FCC Part 24:2020

47 CFR FCC Part 27:2020

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI C63.26:2015

2.2 Band2 (1850-1910MHz paired with 1930-1990MHz)

TestItem	FCCRule No.	Requirements	TestResult	Verdict (Note1)
Effective(Isotropic) RadiatedPowerOutput Data	Part 2.1046, 24.232	EIRP≤2W	AppendixA	Pass
Peak-AverageRatio	Part 2.1046, 24.232	Limit≤13dB	AppendixB	Pass
Bandwidth	Part 2.1049	OBW:Nolimit. EBW:Nolimit.	AppendixC	Pass
BandEdgesCompliance	Part 2.1051, 24.238	≤ -13dBm/1%*EBW,in1 MHzbandsimmediately outsideandadjacenttothe frequencyblock.	AppendixD	Pass
SpuriousEmissionat AntennaTerminals	Part 2.1051, 24.238	≤ -13dBm/1MHz,from 9 kHzto 10 th harmonicsbut outsideauthorizedoperating frequencyranges.	AppendixE	Pass
FieldStrengthof Spurious Radiation	Part 2.1053, 24.238	≤ -13dBm/1MHz.	AppendixF	Pass
FrequencyStability "No. 14 To 15 The	Part 2.1055, 24.235	≤ ±2.5ppm. notapplicable",the"N/T"denotes"nottest	AppendixG	Pass

Page 10 of 33 Report No.: AIT22103109W7 2.3 Band4 (1710-1755MHz paired with 2110-2155MHz)

TestItem	FCC Rule No.	Requirements	TestResult	Verdict (Note1)
Effective(Isotropic) RadiatedPower OutputData	Part 2.1046, 27.50(d)	EIRP≤1W	AppendixA	Pass
Peak-AverageRatio	Part 2.1046, 27.50(d)	Limit≤13 dB	AppendixB	Pass
Bandwidth	Part 2.1049	OBW:Nolimit. EBW:No limit.	AppendixC	Pass
BandEdges Compliance	Part 2.1051, 27.53(h)	≤ -13 dBm/1%*EBW,in1MHz bands immediately outsideandadjacentto the frequencyblock.	AppendixD	Pass
SpuriousEmissionat AntennaTerminals	Part 2.1051, 27.53(h)	≤ -13 dBm/1MHz,from9 kHzto 10 th harmonicsbutoutsideauthorized operatingfrequencyranges.	AppendixE	Pass
FieldStrengthof SpuriousRadiation	Part 2.1053, 27.53(h)	≤ -13 dBm/1MHz.	AppendixF	Pass
FrequencyStability	Part 2.1055, 27.54	≤ ±2.5ppm. "notapplicable" the"N/T"denotes"nottes	AppendixG	Pass

Note1: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".



2.4 Band5 (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)
Effective (Isotropic)	Part			
Radiated	2.1046,	FCC: ERP ≤ 7 W.	AppendixA	Pass
Power Output Data	22.913			
Peak-Average Ratio			AppendixB	Pass
Bandwidth	Part	OBW: No limit.	AnnandivC	Doos
Danawidin	2.1049	EBW: No limit.	AppendixC	Pass
	Part	≤ -13 dBm/1%*EBW,		
Band Edges Compliance	2.1051,	in 1 MHz bands immediately outside	AppendixD	Pass
	22.917	and adjacent to the frequency block.		
		FCC: ≤ -13 dBm/100 kHz,		
Country Engineers	Part	from 9 kHz to 10th harmonics but		
Spurious Emission at Antenna Terminals	2.1051,	outside	AppendixE	Pass
Antenna Terminais	22.917	authorized operating frequency		
		ranges.		
Field Other athers	Part			
Field Strength of	2.1053,	FCC: ≤ -13 dBm/100 kHz.	AppendixF	Pass
Spurious Radiation	22.917			
	Part			
Frequency Stability	2.1055,	≤ ±2.5ppm.	AppendixG	Pass
	22.355			
Note1: For the verdic	ct, the "N/A" d	lenotes "not applicable", the "N/T" deno	otes "not teste	d".

2.5 Band7/41 (2496-2690MHz paired with 2496-2690MHz)

TestItem	FCC Rule No.	Requirements	TestResult	Verdict (Note1)
Effective(Isotropic)	Part			
RadiatedPower	2.1046,	EIRP ≤ 2W	AppendixA	Pass
OutputData	27.50(d)			
	Part			
Peak-AverageRatio	2.1046,	Limit≤13 dB	AppendixB	Pass
	27.50(d)			
Bandwidth	Part	OBW:Nolimit.	Appendix	Pass
Dariuwiutii	2.1049	EBW:No limit.	С	F a 5 5
PandEdges	Part	For mobile digital stations, the attenuation factor	Annondiv	
BandEdges	2.1051,	shall be not less than 40 + 10 log (P) dB on all	Appendix	Pass
Compliance	27.53(m4	frequencies between the channel edge and 5	U	

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)	megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.		
SpuriousEmissionat AntennaTerminals	Part 2.1051, 27.53(m)	Channel Edge -25dBm/ 1 MHz 1 MHz 1 MHz 9 kHz 9 5 MHz X=Max {6MHz, EBW}	AppendixE	Pass
FieldStrengthof SpuriousRadiation	Part 2.1053, 27.53(m)	Channel Edge -25dBm/ 1 MHz 1 MHz 1 MHz 9 kHz 9.5 MHz × MHz 10 th harmonics i X=Max {6MHz, EBW}	AppendixF	Pass
FrequencyStability	Part 2.1055, 27.54	Within authorized bands of operation/frequency block.	Appendix G	Pass



2.6 Band12 (699-716MHz paired with 729-746 MHz)

Test Item	FCC Rule	Requirements	Test Result	Verdict (Note1)			
Effective (Isotropic) Radiated Power Output Data	Part 27.50(c)	FCC: ERP ≤ 3 W.	AppendixA	Pass			
Peak-Average Ratio	Part 2.1046, Part 27.50(c)	Limit≤13 dB	AppendixB	Pass			
Bandwidth	Part 2.1047	OBW: No limit. EBW: No limit.	AppendixC	Pass			
Band Edges Compliance	Part 2.1051, Part 27.53(g)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	AppendixD	Pass			
Spurious Emission at Antenna Terminals	Part 2.1051, 27.53(g)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	AppendixE	Pass			
Field Strength of Spurious Radiation	Part 2.1051, 27.53(g)	FCC: ≤ -13 dBm/100 kHz.	AppendixF	Pass			
Frequency Stability	Part 2.1055 27.54	≤ ±2.5ppm.	AppendixG	Pass			
Note1: For the verdic	Note1: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".						



2.7 Band13 (777-787 MHz)

Test Item	FCC Rule No	Requirements	Test Result	Verdict (Note1)
Effective (Isotropic) Radiated Power Output Data	Part 2.1046, Part 27.50(b)	FCC: ERP ≤ 3 W.	Appendix A	Pass
Peak-Average Ratio	Part 27.50	Limit≤13 dB	Appendix B	Pass
Bandwidth	Part 2.1049	OBW: No limit. EBW: No limit.	Appendix C	Pass
Band Edges Compliance	Part 2.1051, Part 27.53(g)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix D	Pass
Spurious Emission at Antenna Terminals	Part 2.1051, Part 27.53(c) Part 27.53(f)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. 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 operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	Appendix E	Pass
Field Strength of Spurious Radiation	Part 2.1051, Part 27.53(c) Part 27.53(f)	FCC: ≤ -13 dBm/100 kHz. For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	Appendix F	Pass



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		3 1		
Frequency Stability	Part 2.1055 27.54	≤ ±2.5ppm.	Appendix G	Pass

Note1: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".



3. General Test Frequency and Configuration

3.1 Test Modes

Test Mode	Test Modes Description
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation

3.2 Test Frequency

Toot Made	TX / RX	RF Channel			
Test Mode		Low (B)	Middle (M)	High (T)	
	TV/4 4NA\	Channel 18607	Channel 18900	Channel 19193	
	TX(1.4M)	1850.7 MHz	1880 MHz	1909.3 MHz	
	TV/OM)	Channel 18615	Channel 18900	Channel 19185	
	TX(3M)	1851.5 MHz	1880 MHz	1908.5 MHz	
	TV/FNA)	Channel 18625	Channel 18900	Channel 19175	
	TX(5M)	1852.5 MHz	1880 MHz	1907.5 MHz	
	TV(40M)	Channel 18650	Channel 18900	Channel 19150	
	TX(10M)	1855 MHz	1880 MHz	1905 MHz	
	TV/15M)	Channel 18675	Channel 18900	Channel 19125	
	TX(15M)	1857.5 MHz	1880 MHz	1902.5 MHz	
	TV(20M)	Channel 18700	Channel 18900	Channel 19100	
LTE Band 2	TX(20M)	1860 MHz	1880 MHz	1900 MHz	
	RX(1.4M)	Channel 607	Channel 900	Channel 1193	
		1930.7 MHz	1960 MHz	1989.3 MHz	
	RX(3M)	Channel 615	Channel 900	Channel 1185	
		1931.5 MHz	1960 MHz	1988.5 MHz	
	RX(5M)	Channel 625	Channel 900	Channel 1175	
		1932.5 MHz	1960 MHz	1987.5 MHz	
	RX(10M)	Channel 650	Channel 900	Channel 1150	
		1935 MHz	1960 MHz	1985 MHz	
	DV/45M)	Channel 675	Channel 900	Channel 1125	
	RX(15M)	1937.5 MHz	1960 MHz	1982.5 MHz	
	RX(20M)	Channel 700	Channel 900	Channel 1100	
	KX(20IVI)	1940 MHz	1960 MHz	1980 MHz	
Test Mode	TX / RX		RF Channel		
rest Mode	IA/KA	Low (B)	Middle (M)	High (T)	
	TX(1.4M)	Channel 19957	Channel 20175	Channel 20393	
LTE Band 4	17(1.4101)	1710.7 MHz	1732.5 MHz	1754.3 MHz	
LIL Dallu 4	TX(3M)	Channel 19965	Channel 20175	Channel 20385	
	I \(\O\V\)	1711.5 MHz	1732.5 MHz	1753.5 MHz	



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TX(5M)
TX(10M) Channel 20000 Channel 20175 Channel 20350 1715 MHz TX(15M) TX(15M) Channel 20025 Channel 20175 Channel 20325 TX(15M) TX(20M) TX(20M) TX(20M) Channel 20500 Channel 20175 Channel 20300 TX(20M) TX(20M) TX(20M) Channel 20500 Channel 20175 Channel 20300 TX(20M) TX(20M) Channel 1975 Channel 2175 Channel 2375 Channel 2000 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 1975 Channel 2175 Channel 2375 Channel 2175 Channel 2350
TX(10M) 1715 MHz 1732.5 MHz 1750 MHz Channel 20025 1717.5 MHz 1732.5 MHz 1747.5 MHz 1747.5 MHz Channel 20050 1720 MHz 1732.5 MHz 1745 MHz 1747 MHz 1745 MHz 1745 MHz 1747 MHz 1745 MHz 1747 MHz 1745 MHz 1747 MHz 1745 MHz 1745 MHz 1747 MHz 1745 MHz 1747 M
TX(15M) Channel 20025
TX(15M) 1717.5 MHz 1732.5 MHz 1747.5 MHz Channel 20050 1720 MHz 1732.5 MHz 1745 MHz 1745 MHz Channel 29300 1720 MHz 1732.5 MHz 1745 MHz 1745 MHz Channel 2975 Channel 2175 Channel 2375 2112.5 MHz Channel 2000 Channel 2175 Channel 2350 2115 MHz Channel 1975 Channel 2175 Channel 2350 Channel 2175 Channel 2375 Channel 2175 Channel 2350 Channel 2175 Channel 2325
TX(20M) Channel 20050 Channel 20175 Channel 20300 1720 MHz T732.5 MHz T745 MHz T747.5 MHz T745 MHz
TX(20M) 1720 MHz 1732.5 MHz 1745 MHz Channel 1975 Channel 2175 Channel 2375 2112.5 MHz 2132.5 MHz Channel 2000 Channel 2175 Channel 2350 2115 MHz Channel 1975 Channel 2175 Channel 2350 Channel 1975 Channel 2175 Channel 2375 Channel 2175 Channel 2350
RX(1.4M) RX(1.4M) Channel 1975 Channel 2175 Channel 2375 Channel 2375 Channel 2175 Channel 2375 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 1975 Channel 2175 Channel 2375 Channel 2375 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 2350 Channel 2175 Channel 2325
RX(1.4M) 2112.5 MHz 2132.5MHz 2152.5 MHz RX(3M) Channel 2000 Channel 2175 Channel 2350 2115 MHz 2132.5MHz 2152.5 MHz Channel 1975 Channel 2175 Channel 2375 2112.5 MHz 2132.5MHz 2152.5 MHz Channel 2000 Channel 2175 Channel 2350 2115 MHz 2132.5MHz 2150 MHz Channel 2025 Channel 2175 Channel 2325
RX(3M) Channel 2000 Channel 2175 Channel 2350 2115 MHz 2132.5MHz 2152.5 MHz Channel 2350 2115 MHz Channel 1975 Channel 2175 Channel 2375 2112.5 MHz Channel 2175 Channel 2375 2112.5 MHz Channel 2000 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 2175 Channel 2350 Channel 2175 Channel 2325 Channel 2175 Channel 2325
RX(3M) 2115 MHz 2132.5MHz 2150 MHz Channel 1975 Channel 2175 Channel 2375 2112.5 MHz 2132.5MHz 2152.5 MHz Channel 2000 Channel 2175 Channel 2350 2115 MHz 2132.5MHz Channel 2175 Channel 2350 Channel 2175 Channel 2325 Channel 2025 Channel 2175 Channel 2325
RX(5M) RX(5M) Channel 1975
RX(5M) 2112.5 MHz 2132.5MHz 2152.5 MHz Channel 2000 Channel 2175 Channel 2350 2115 MHz 2132.5MHz 2150 MHz Channel 2025 Channel 2175 Channel 2325
RX(10M) RX(10M) RX(15M) Channel 2000 Channel 2175 Channel 2350 2115 MHz 2132.5MHz Channel 2175 Channel 2350 Channel 2175 Channel 2325 Channel 2175 Channel 2325
RX(10M) 2115 MHz 2132.5MHz 2150 MHz Channel 2025 Channel 2175 Channel 2325
RX(10M) 2115 MHz 2132.5MHz 2150 MHz Channel 2025 Channel 2175 Channel 2325
RX(15M) Channel 2025 Channel 2175 Channel 2325
RX(15M)
Channel 2050 Channel 2175 Channel 2300
RX(20M) 2120 MHz 2132.5MHz 2145 MHz
RF Channel
Test Mode TX / RX Low (B) Middle (M) High (T)
Channel 20407
TX(1.4M) 824.7 MHz 836.5 MHz 848.3 MHz
Channel 20415
TX(3M) 825.5 MHz 836.5 MHz 847.5 MHz
Channel 20425
TX(5M) 826.5 MHz 836.5 MHz 846.5 MHz
Channel 20450
TX(10M) 829 MHz 836.5 MHz 844 MHz
LTE Band 5 Channel 20407 Channel 20525 Channel 20643
RX(1.4M) 869.7 MHz 881.5 MHz 893.3 MHz
Channel 20415
RX(3M) 870.5 MHz 881.5 MHz 892.5 MHz
Channel 20425
RX(5M) 871.5 MHz 881.5 MHz 891.5 MHz
Channel 20450
RX(10M) 874 MHz 881.5 MHz 889 MHz
RF Channel
Test Mode TX / RX Low (B) Middle (M) High (T)
CH20775 CH21100 CH21425
LTE Band 7 TX(5M) 2502.5MHz 2535MHz 2567.5MHz
TX(10M) CH20800 CH21100 CH21400

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		2505MHz	2535MHz	2565MHz
	TV/45NA)	CH20825	CH21100	CH21375
	TX(15M)	2507.5MHz	2535MHz	2562.5MHz
	TV(0014)	CH20850	CH21100	CH21350
	TX(20M)	2510MHz	2535MHz	2560MHz
DV/CA		Channel 2775	Channel 3100	Channel 5825
	RX(5M)	2622.5 MHz	2655 MHz	2687.5 MHz
	DV (40M)	Channel 2800	Channel 3100	Channel 3400
	RX (10M)	2625 MHz	2655 MHz	2685 MHz
	DV/45M)	Channel 2825	Channel 3100	Channel 3375
	RX(15M)	2627.5 MHz	2655 MHz	2682.5 MHz
	DV (20M)	Channel 2850	Channel 3100	Channel 3350
	RX (20M)	2630 MHz	2655 MHz	2680 MHz
Toot Mode	TV / DV		RF Channel	
Test Mode	TX / RX	Low (B)	Middle (M)	High (T)
	TV/4 4NA)	Channel 23017	Channel 23095	Channel 23173
	TX(1.4M)	699.7 MHz	707.5 MHz	715.3 MHz
	TV(OM)	Channel 23025	Channel 23095	Channel 23165
	TX(3M)	700.5 MHz	707.5 MHz	714.5 MHz
	TX(5M)	Channel 23035	Channel 23095	Channel 23155
		701.5 MHz	707.5 MHz	713.5 MHz
	TX(10M)	Channel 23060	Channel 23095	Channel 23130
LTE D 1.40		704 MHz	707.5 MHz	711 MHz
LTE Band 12	RX(1.4M) RX (3M) RX(5M)	Channel 5017	Channel 5095	Channel 5173
		729.7 MHz	737.5 MHz	745.3 MHz
		Channel 5025	Channel 5095	Channel 5165
		730.5 MHz	737.5 MHz	744.5 MHz
		Channel 5035	Channel 5095	Channel 5155
		731.5 MHz	737.5 MHz	743.5 MHz
	DV (10M)	Channel 5060	Channel 5095	Channel 5130
	RX (10M)	734 MHz	737.5 MHz	741 MHz
Toot Made	TV / DV		RF Channel	
Test Mode	TX / RX	Low (B)	Middle (M)	High (T)
	TV(EM)	Channel 23025	Channel 23230	Channel 23255
	TX(5M)	779.5 MHz	782 MHz	784.5 MHz
	TV(10M)	Channel 23230	Channel 23230	Channel 23230
LTE Band 13	TX(10M)	782 MHz	782 MHz	782 MHz
LIEDANU 13	DV/EMAN	Channel 5205	Channel 5230	Channel 5255
	RX(5M)	748.5 MHz	751 MHz	753.5 MHz
	DV (40M)	Channel 5230	Channel 5230	Channel 5230
	RX (10M)	751 MHz	751 MHz	751 MHz
Toot Mode	TV / DV		RF Channel	
Test Mode	TX / RX	Low (B)	Middle (M)	High (T)

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	TV/FNA)	Channel 39675	Channel40620	Channel 41565
	TX(5M)	2498.5 MHz	2593.0 MHz	2652.5 MHz
	TV(40M)	Channel 39700	Channel40620	Channel 41540
	TX(10M)	2501 MHz	2593.0 MHz	2685 MHz
	TV/4EMA	Channel39725	Channel40620	Channel 41515
	TX(15M)	2503.5 MHz	2593.0 MHz	2682.5 MHz
LTE Band 41	TV(20M)	Channel39750	Channel40620	Channel 41490
	TX(20M)	2506 MHz	2593.0 MHz	2680 MHz
	RX(5M)	Channel 39675	Channel40620	Channel 41565
		2498.5 MHz	2593.0 MHz	2652.5 MHz
	RX (10M)	Channel 39700	Channel40620	Channel 41540
		2501 MHz	2593.0 MHz	2685 MHz
	D)//4514)	Channel39725	Channel40620	Channel 41515
	RX(15M)	2503.5 MHz	2593.0 MHz	2682.5 MHz
	DV (20M)	Channel39750	Channel40620	Channel 41490
	RX (20M)	2506 MHz	2593.0 MHz	2680 MHz

3.3 Test Environment

Applicable to	Environmental conditions	Input Power	Tested by
Transmitter Conducted	24.5°C, 52 % RH	120Vac, 60Hz	Simba Huang
Power Output	24.5 C, 52 % KH	120VaC, 00HZ	Silliba Hualig
Peak-Average Ratio	24.5°C, 52 % RH	120Vac, 60Hz	Simba Huang
Modulation Characteristics	24.5°C, 52 % RH	120Vac, 60Hz	Simba Huang
Bandwidth	24.5°C, 52 % RH	120Vac, 60Hz	Simba Huang
Emission Mask	24.5°C, 52 % RH	120Vac, 60Hz	Simba Huang
Spurious Emission at	24 F°C F2 0/ DII	120\/aa_601.	Cimbo Huong
Antenna Terminals	24.5°C, 53 % RH	120Vac, 60Hz	Simba Huang
Field Strength of	24.4°C E2.0/ DII	120\/aa_60Uz	Cimbo Huana
Spurious Radiation	24.4°C, 53 % RH	120Vac, 60Hz	Simba Huang
Frequency Stability	24.5°C, 52 % RH	120Vac, 60Hz	Simba Huang

The applicant declare the operating environment of EUT as below:

Normal conditions: 5.1 V DC,15°C ~35°C

Extreme conditions:4.59V DC~5.61V DC, -10°C ~50°C

VL= lower extreme test voltage, VN= nominal voltage, VH= upper extreme test voltage

TL= lower extreme test temperature, TN= normal temperature, TH= upper extreme test temperature



3.4 Test Instruments

N o	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2022.09.02	2023.09.01
2	EMI Measuring Receiver	R&S	ESR	101660	2022.09.02	2023.09.01
3	Low Noise Pre Amplifier	HP	HP8447E	1937A0185 5	2022.09.02	2023.09.01
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A0 2-34	2648A0473 8	2022.09.02	2023.09.01
5	Passive Loop	ETS	6512	00165355	2020.09.05	2022.09.04
6	TRILOG Super Broadband test Antenna	SCHWARZBE CK	VULB9160	9160-3206	2021.08.29	2024.08.28
7	Broadband Horn Antenna	SCHWARZBE CK	BBHA9120D	452	2021.08.29	2024.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBE CK	BBHA9170	BBHA9170 367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2022.09.02	2023.09.01
10	LISN	Kyoritsu	KNW-242	8-837-4	2022.09.02	2023.09.01
11	LISN	R&S	ESH3-Z2	0357.8810.54 101161-S2	2022.09.02	2023.09.01
12	Pro.Temp&Humi.chamb er	MENTEK	MHP-150-1C	MAA081125 01	2022.09.02	2023.09.01
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
14	Signal Generator	Agilent	N5182A	MY5014300 9	2022.09.02	2023.09.01
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K 50	2022.09.02	2023.09.01
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
17	DC power supply	ZHAOXIN	RXN-305D-2	280700025 59	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A
21	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A
22	Spectrum Analyzer	Agilent	N9020A	MT21033052	2022.09.02	2023.09.01

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.



3.5 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.08KHz
RF power conducted	±0.74dB
Band Edge Compliance	±1.24dB
Frequency stability	±0.12 ppm
Spurious emissions, radiated (0.009MHz~30MHz)	3.10dB
Spurious emissions, radiated (30MHz~1GHz)	3.75dB
Spurious emissions, radiated (1GHz~18GHz)	3.88dB
Spurious emissions, radiated (18GHz ~ 40GHz)	3.88dB
Humidity	±4.0%
Temperature	±0.5°C
Time	±1.20%

3.6 Test Location

Company:	Dongguan Yaxu (AiT) Technology Limited
Address:	No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan,
	Guangdong, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6317.01
FCC Accredited Lab. Designation Number:	CN1313
FCC Test Firm Registration Number:	703111

3.7 Deviation from Standards

None

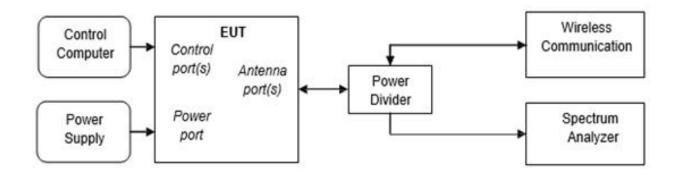
3.8 Abnormalities from Standard Conditions

None

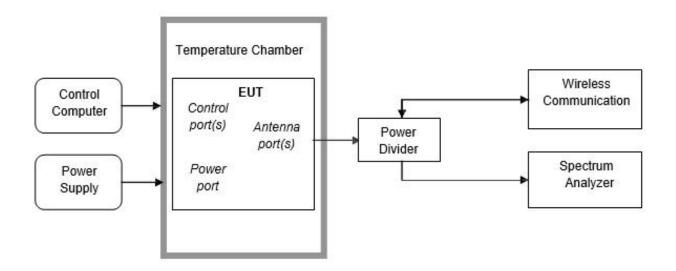


4. Test Setup and Conditions

4.1 Test Setup 1



4.2 Test Setup 2

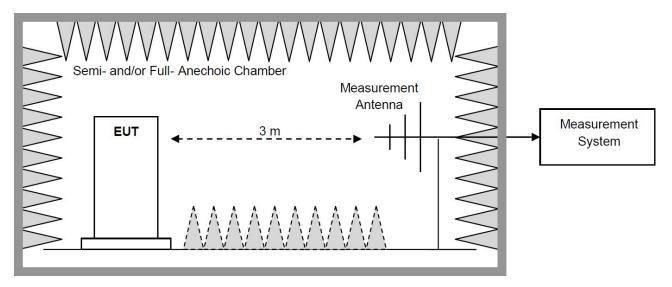




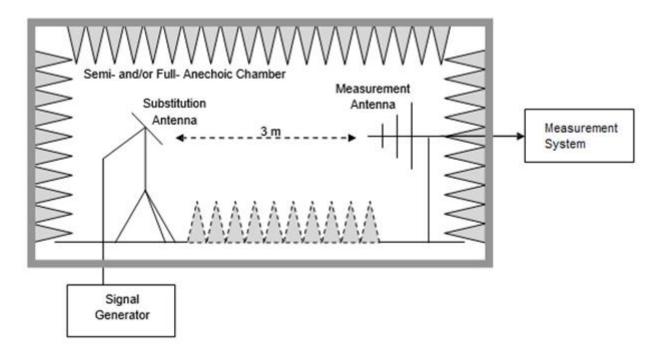
4.3 Test Setup 3

NOTE: Effective radiated power (ERP) and Equivalent Isotropic Radiated Power (EIRP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP/EIRP





4.4 Test Conditions

Test	Test Case Test Conditions		Test Conditions	
- Transmit	Average	Test Env.	Ambient Climate & Rated Voltage	
- Output			Test Setup 1	
Power Data		Test Setup RF Channels	L, M, H	
		(TX)	(L= low channel, M= middle channel, H= high channel)	
-		Test Mode	LTE/TM1, LTE/TM2	
-	Average	Test Env.	Ambient Climate & Rated Voltage	
	Power,	Test Setup	Test Setup 1	
	Spectral	RF Channels	L, M, H	
	Density (if	(TX)	(L= low channel, M= middle channel, H= high channel)	
-	required)	Test Mode	LTE/TM1,LTE/TM2	
- Peak-to-A	verage Ratio	Test Env.	Ambient Climate & Rated Voltage	
(if re	quired)	Test Setup	Test Setup 1	
· •		RF Channels	L, M, H	
		(TX)	(L= low channel, M= middle channel, H= high channel)	
		Test Mode	LTE/TM1,LTE/TM2	
Bandwidth	Occupied	Test Env.	Ambient Climate & Rated Voltage	
	Bandwidth	Test Setup	Test Setup 1	
		RF Channels	L, M, H	
		(TX)	(L= low channel, M= middle channel, H= high channel)	
		Test Mode	LTE/TM1,LTE/TM2	
	Emission	Test Env.	Ambient Climate & Rated Voltage	
	Bandwidth (if	Test Setup	Test Setup 1	
	required)	RF Channels	L, M, H	
		(TX)	(L= low channel, M= middle channel, H= high channel)	
		Test Mode	LTE/TM1,LTE/TM2	
Band Edge	s Compliance	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		RF Channels	L, H	
		(TX)	(L= low channel, M= middle channel, H= high channel)	
		Test Mode	LTE/TM1,LTE/TM2	
Spurious	Emission at	Test Env.	Ambient Climate & Rated Voltage	
Antenna	aTerminals	Test Setup	Test Setup 1	
		RF Channels	L, M, H	
		(TX)	(L= low channel, M= middle channel, H= high channel)	
		Test Mode	LTE/TM1,LTE/TM2	
Field S	trength of	Test Env.	Ambient Climate & Rated Voltage	
SpuriousRadiation		Test Setup	Test Setup 3	
		RF Channels	L, M, H (L= low channel, M= middle channel, H= high	
		(TX)	channel)	
		Test Mode	LTE/TM1, LTE/TM2	
			NOTE: If applicable, the EUT conf. that has maximum	



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		1 ago 20 01 00 1 (open 110.17 ii 122 100 100 111
		power density (based on the equivalent power level) is
		selected.
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 2
	RF Channels	L, M, H (L= low channel, M= middle channel, H= high
	(TX)	channel)
	Test Mode	LTE/TM1, LTE/TM2



5. Description of Tests

5.1 Effective (Isotropic) Radiated Power

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.

Test Procedures Used

FCC KDB 971168 D01 V03r01; ANSI/ C63.10

Note: Reference test setup 3

Test result

Please refer to Appendix:

Module EG21: Refer Appendix _LTE Test Data for Module EG21.



5.2 Peak-Average Ratio

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.

Test Settings

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

Test Procedures Used

FCC KDB 971168 D01 V03r01 Section 5.7.1

Note: Reference test setup 1

Test result

Please refer to Appendix:

Module EG21: Refer Appendix _LTE Test Data for Module EG21.



5.3 Occupied Bandwidth

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.

Test Procedures Used:

FCC KDB 971168 D01 V03r01 Section 4.2

Test Settings

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

Note: Reference test setup 1.

Test result

Please refer to Appendix:

Module EG21: Refer Appendix LTE Test Data for Module EG21.

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5.4 Band Edge Compliance

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.

Test Procedures Used

FCC KDB 971168 D01 V03r01 Section 6.0

Test Settings

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

Note: Reference test setup 1.

Test result

Please refer to Appendix:

Module EG21: Refer Appendix _LTE Test Data for Module EG21.

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5.5 Spurious and Harmonic Emissions at Antenna Terminal

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.

Test Procedures Used

FCC KDB 971168 D01 V03r01

Test Settings

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

Note: Reference test setup 1.

Test result

Please refer to Appendix:

Module EG21: Refer Appendix LTE Test Data for Module EG21.



5.6 Field Strength of Spurious Radiation

PROVISIONS APPLICABLE:

(A) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm.

At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

(B) For specific criteria, please refer to the description in section 10.2 of the report for corresponding evaluation.

MEASUREMENT PROCEDURE:

- 1). The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2). Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4). For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5). Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6). For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7). When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8).If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.



- 9). For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10). In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.
- 11). For spurious emissions above 1GHz, a horn antenna is substituted in place of the EUT.

The substitute antenna is drivenby a signal generator and the previously recorded signal was duplicated.

The spurious emissions is calculated by the following formula;

Result(dBm) = Pg(dBm) +Factor(dB)

Factor(dB) = Ant Gain(dB)-Cable Loss(dB) + Power Splitter(dB) (Above 1GHz)
Factor(dB) = Ant Gain(dB)-Cable Loss(dB) (Below 1GHz)

Where: Pgis the generator output power into the substitution antenna.

If the fundalmatal frequency is below 1GHz, RF output power has been converted to EIRP.

EIRP(dBm) = ERP(dBm) + 2.15

Examples of Factor parameters for testing radiation spurious:

FrequencyRange(MHz)	Factor(dB)
30-500	6.18
500-1000	9.37
1000-1500	27.56
1500-2000	28.27
2000-3000	29.45
3000-5000	30.15
5000-10000	31.26
10000-15000	32.78
15000-20000	33.99
Above 20GHz	35.04

Test Procedures Used

FCC KDB 971168 D01 V03r01; ANSI/ C63.10

Note: Reference test setup 3.

Test result

Please refer to Appendix:

Module EG21: Refer Appendix _LTE Test Data for Module EG21.



5.7 Frequency Stability / Temperature Variation

The frequency stability of the transmitter is measured by:

- a.) Temperature: The temperature is varied from -10°C to +50°C in 10°C increments using an environmental chamber.
- b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer. Specification The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 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 -10°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Procedures Used

Frequency stability testing is performed in accordance with the guidelines of FCC KDB 971168 D01 V03r01; ANSI/ C63.10

Note: Reference test setup 2.

Test result

Please refer to Appendix:

Module EG21: Refer Appendix _LTE Test Data for Module EG21.

(END OF REPORT)	