



# **RF Test Report**

Applicant:	Eagle Electronics Inc.		
Address:	114 Venture Dr Paraskala, OH 43062-9239 United States		
Product:	LTE Cat 4 module		
Model No.:	I425-GLGA		
Brand Name:	Eagle		
FCC ID:	2BNX7I425GLGAA		
Standards:	47 CFR Part 22 47 CFR Part 24 47 CFR Part 27 47 CFR Part 90		
Report No.:	PD20250026-R3A		
Issue Date:	2025/04/03		
Test Result:	PASS *		

\* Testing performed at Hefei Panwin Technology Co., Ltd. on the above equipment indicates the product meets the requirements of the relevant standards.

Charlie. Wang

Reviewed By: Charlie Wang

Ster Jug

Approved By: Alec Yang

# Hefei Panwin Technology Co., Ltd.

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## **Revision History**

Report No.	Version	Description	Issue Date	Note
PD20250026-R3A	01	Initial Report	2025/04/03	Valid

#### Remark:

Model I425-GLGA have two packaged types: LGA and MINIPCIE.

MINIPCIE is make up with I425-GLGA LGA module and PCIe carrier board.

There are no any other internal changes in these modules.

We hereby state that they are identical in interior structure and components, and just connector interface is different for the marketing requirement.



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# **Test Summary**

### GSM1900 / UMTS Band II / LTE Band 2 / 25

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §24.232(c)	EIRP ≤2 Watt	PASS
2	Peak-to-Average Ratio	§24.232(d)	≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
4	Conducted Band Edge Measurement	§2.1051, §24.238(a)	<ul> <li>≤ -13 dBm/1%*EBW, in 1</li> <li>MHz bands immediately outside and adjacent to the frequency block.</li> </ul>	PASS
5	Spurious Emissions at Antenna Terminals	§2.1051, §24.238(a)	<ul> <li>≤ -13 dBm/1 MHz, from 9</li> <li>kHz to 10<sup>th</sup> harmonics but</li> <li>outside authorized</li> <li>operating frequency</li> <li>ranges.</li> </ul>	PASS
6	Radiated Spurious Emission	§2.1053, §24.238(a)	≤ -13 dBm/1 MHz.	PASS
7	Frequency Stability	§2.1055 §24.235	Within authorized bands of operation/frequency block.	PASS



### UMTS Band IV / LTE Band 4 / 66

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(d)(4)	EIRP ≤ 1 Watt	PASS
2	Peak-to-Average Ratio	§27.50(d)(5)	≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
4	Conducted Band Edge Measurement	§2.1051, §27.53(h)	<ul> <li>≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.</li> <li>≤ -13 dBm/1 MHz, from 9 kHz to 10<sup>th</sup> harmonics but</li> </ul>	PASS
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(h)	outside authorized operating frequency ranges.	PASS
6	Radiated Spurious Emission	§2.1053, §27.53(h)	≤ -13 dBm/1 MHz.	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	PASS



### GSM850 / UMTS Band V / LTE Band 5 / 26(824~849 MHz)

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective	§2.1046		DASS
	Radiated Power	§22.913 (a)(5)		FA00
2	Peak-to-Average Ratio	§22.913 (d)	≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
			≤ -13 dBm/1%*EBW, in 1	
	Conducted Band Edge	§2.1051	MHz bands immediately	DASS
4	Measurement	§22.917 (a)	outside and adjacent to	FA00
			the frequency block.	
			FCC: ≤ -13 dBm/100 kHz,	
5 Spurious E	Spurious Emissions at Antonna	82 1051	from 9 kHz to 10 <sup>th</sup>	
		§2.1001	harmonics but outside	PASS
		§22.917(a)	authorized operating	
			frequency ranges.	
6	Dedicted Spurious Emission	§2.1053		DASS
0	Radiated Spurious Emission	§22.917(a)	FGG. ≥ - 13 0DIII/ 100 KHZ.	PASS
7	Fraguanay Stability	§2.1055		DASS
		§22.355	> ±2.5 ppm	PASS



### LTE Band 26(814~824 MHz)

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §90.635(b)	< 100 W	PASS
2	Peak-to-Average Ratio		≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
4	Emission Mask	§2.1051 § 90.691(a)	For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.	PASS
5	Spurious Emissions at Antenna Terminals	§2.1051, §90.691	< 43 + 10Log10(P[Watts]) for all out-of- band	PASS
6	Radiated Spurious Emission	§2.1053, §90.691	emissions	PASS
7	Frequency Stability	§2.1055 §90.213	Within authorized bands of operation/frequency block.	PASS



### LTE Band 13

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(b)(10)	ERP ≤ 3 Watt	PASS
2	Peak-to-Average Ratio		≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
4	Conducted Band Edge Measurement	§2.1051, §27.53(c)	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; Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;	PASS
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(c) §27.53(f)	<ul> <li>FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10<sup>th</sup> 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;</li> <li>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.</li> </ul>	PASS
6	Radiated Spurious Emission	§2.1053, §27.53(c) §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.	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	PASS



### LTE Band 12

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(c)(10)	ERP ≤ 3 Watt	PASS
2	Peak-to-Average Ratio		≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
4	Conducted Band Edge Measurement	§2.1051, §27.53(g)	For operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.	PASS
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.	PASS
6	Radiated Spurious Emission	§2.1053, §27.53(g)	FCC: ≤ -13 dBm/100 kHz.	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	PASS



### LTE Band 7 / 38 / 41

No.	Test Case	FCC Rules	Limit	Verdict
1	RF Output Power & Effective Radiated Power	§2.1046, §27.50(h)(2)	EIRP ≤ 2 Watt	PASS
2	Peak-to-Average Ratio		≤13 dB	PASS
3	Occupied Bandwidth	§2.1049	No limit.	Report Only
4	Conducted Band Edge Measurement	§2.1051, §27.53(m4)	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 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. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.	PASS
5	Spurious Emissions at Antenna Terminals	§2.1051, §27.53(m)	Channel Edge	PASS
6	Radiated Spurious Emission	§2.1053, §27.53(m)	9 kHz 9.5 MHz XMHz 10 <sup>th</sup> harmonics X=Max {6MHz, EBW}	PASS
7	Frequency Stability	§2.1055 §27.54	Within authorized bands of operation/frequency block.	PASS

Conducted detection date: 2025/03/03 to 2025/03/11 Radiated detection date: 2025/03/06 to 2025/03/07 Date of sample received: 2025/02/28

Date of sample received: 2025/02/28

The samples tested have been evaluated in accordance with the procedures given in the application standards in Section 2.4 of this report and have been shown to comply with the applicable technical standards.

All indications of PASS/FAIL in this report are based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

# **1** General Information

### **1.1 Notes of the Test Report**

This report is invalid without signature of auditor and approver or with any alterations. The report shall not be partially reproduced without written approval of the testing company. Entrusted test results are only responsible for incoming samples. If there is any objection to the testing report, it shall be raised to the testing company within 15 days from the date of receiving the report. In the test results, "NA" means "not applicable", and the test items marked with " $\Delta$ " are subcontracted projects.

### 1.2 Test Facility

### A2LA (Certificate Number: 6849.01)

Hefei Panwin Technology Co., Ltd. has been accredited by American Association for Laboratory Accreditation to perform measurement.

### FCC (Designation Number: CN1361, Test Firm Registration Number: 473156)

Hefei Panwin Technology Co., Ltd. has been accredited on the US Federal Communications Commission list of test facilities recognized to perform measurements.

### **1.3 Testing Laboratory**

Company Name	Hefei Panwin Technology Co., Ltd.		
Address	Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, No.106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province,China		
Telephone	+86-0551-63811775		
Post Code	230031		

# **2** General Description of Equipment under Test

### 2.1 Details of Application

Applicant	Eagle Electronics Inc.	
Applicant Address	114 Venture Dr Paraskala, OH 43062-9239 United States	
Manufacturer	Eagle Electronics Inc.	
Manufacturer Address	114 Venture Dr Paraskala, OH 43062-9239 United States	



## 2.2 Details of EUT

Product		LTE C	LTE Cat 4 module								
Model		1425-0	I425-GLGA								
Hardware Ve	rsion	R1.0									
Software Ver	rsion	1425G	LGAR0	7A01M	1G						
GSM Specific	cation										
Single Band		GSM8	850, GS	M1900							
Multi-slot cla	ISS	GPRS	5: 33/ E	GPRS: 3	33						
Type of Mode	ulation	GMSH	K(GSM,	GPRS)	,8PS	SK (	(EGPR	S)			
UMTS Specif	fication										
Single Band		WCD	MA Ban	d II, IV,	V						
Power Class	for UMTS	PC3									
Type of Mod	ulation	Suppo	orts QP	SK, 16C	(AM	and	d 64QA	M modu	ulations		
E-UTRA Spe	cification										
Single Band		FDD Band: 2, 4, 5, 7, 12, 13, 25, 26, 66 TDD Band: 38, 41									
Power Class	for LTE	PC3									
Type of Mod	ulation	UL: Q DL: Q	PSK, 16 PSK, 16	6qam 6qam, 6	64Q/	AM					
Antenna Typ	e	⊡ Ext	ernal		] Int	egr	ated				
Antenna Gain		GSM850: 2.13dBi       LTE Band 12: 3.26dBi         GSM1900: 1.59dBi       LTE Band 12: 3.26dBi         WCDMA Band II: 1.59dBi       LTE Band 13: 4.45dBi         WCDMA Band IV: 2.00dBi       LTE Band 25: 1.59dBi         WCDMA Band V: 2.13dBi       LTE Band 26(814 to 824MHz): 2.53dI         LTE Band 2: 1.59dBi       LTE Band 26(824 to 849MHz): 2.13dI         LTE Band 4: 2.00dBi       LTE Band 38: 2.06dBi         LTE Band 5: 2.13dBi       LTE Band 66: 2.00dBi						4MHz): 2.53dBi 9MHz): 2.13dBi			
			Ban	d			Тx	(MHz)		F	Rx (MHz)
GSM Freque	ncy Range(s)		GSM 8	350			824	to 849		8	69 to 894
			GSM 1	900			1850	) to 191	0	19	30 to 1990
	SISO Band	Supp	oorted	Channe	el Ba	and	width (	MHz)	Tv	(MH7)	Rx (MH-)
Frequency	GIGG Ballu	1.4	3	5	10	0	15	20		(11112)	
Band(s)	WCDMA Band II	-	-	v	-		-	-	1850	to 1910	1930 to 1990
	WCDMA Band IV	-	-	v	-		-	-	1710	to 1755	2110 to 2155



WCDMA Band V	-	-	v	-	-	-	824 to 849	869 to 894
LTE Band 2	v	v	v	v	v	v	1850 to 1910	1930 to 1990
LTE Band 4	v	v	v	v	v	v	1710 to 1755	2110 to 2155
LTE Band 5	v	v	v	v	-	-	824 to 849	869 to 894
LTE Band 7	-	-	v	v	v	v	2500 to 2570	2620 to 2690
LTE Band 12	v	v	v	v	-	-	699 to 716	729 to 746
LTE Band 13	-	-	v	v	-	-	777 to 787	746 to 756
LTE Band 25	v	v	v	v	v	v	1850 to 1915	1930 to 1995
LTE Band 26	v	v	v	v	v	-	814 to 849	859 to 894
LTE Band 38	-	-	v	v	v	v	2570 to 2620	2570 to 2620
LTE Band 41	-	-	v	v	v	v	2496 to 2690	2496 to 2690
LTE Band 66	v	v	v	v	v	v	1710 to 1780	2110 to 2180

**Note:** The declared of product specification for EUT and/or Antenna presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Support Equipment								
Equipment	Manufacturer	Description	Model	Serial Number				
EVB	Eagle Electronics Inc.	-	Q1-A0770	MP825AK0Y000440 MP825AK0Y000713				
Base Station Simulator	Anritsu	-	MT8821C	PWC0039				
Adapter	Shenzhen Keyu Power Technology Co., LTD	AC to DC power supply to EVB	KA1801A-0503000DE	-				



# 2.3 Frequency List of Low/Middle/High Channels

GSM850 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
0.2	Channel	128	190	251				
	Frequency	824.2	836.6	848.8				

GSM1900 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
0.2	Channel	512	661	810				
	Frequency	1850.2	1880.0	1909.8				

WCDMA Band II Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
5	Channel	9262	9400	9538				
	Frequency	1852.4	1880.0	1907.6				

WCDMA Band IV Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
5	Channel	1312	1413	1513				
	Frequency	1712.4	1732.6	1752.6				

WCDMA Band V Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
F	Channel	4132	4182	4233				
5	Frequency	826.4	836.4	846.6				

LTE Band 2 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
1.4	Channel	18607	18900	19193				
1.4	Frequency	1850.7	1880	1909.3				
2	Channel	18615	18900	19185				
3	Frequency	1851.5	1880	1908.5				
5	Channel	18625	18900	19175				
Ð	Frequency	1852.5	1880	1907.5				
10	Channel	18650	18900	19150				
10	Frequency	1855	1880	1905				
15	Channel	18675	18900	19125				
15	Frequency	1857.5	1880	1902.5				
20	Channel	18700	18900	19100				
20	Frequency	1860	1880	1900				



LTE Band 4 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
1 4	Channel	19957	20175	20393				
1.4	Frequency	1710.7	1732.5	1754.3				
2	Channel	19965	20175	20385				
5	Frequency	1711.5	1732.5	1753.5				
_	Channel	19975	20175	20375				
5	Frequency	1712.5	1732.5	1752.5				
10	Channel	20000	20175	20350				
10	Frequency	1715	1732.5	1750				
15	Channel	20025	20175	20325				
15	Frequency	1717.5	1732.5	1747.5				
20	Channel	20050	20175	20300				
20	Frequency	1720	1732.5	1745				

LTE Band 5 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
1.4	Channel	20407	20525	20643				
1.4	Frequency	824.7	836.5	848.3				
2	Channel	20415	20525	20635				
3	Frequency	825.5	836.5	847.5				
5	Channel	20425	20525	20625				
5	Frequency	826.5	836.5	846.5				
40	Channel	20450	20525	20600				
10	Frequency	829	836.5	844				

LTE Band 7 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
F	Channel	20775	21100	21425				
Ð	Frequency	2502.5	2535	2567.5				
10	Channel	20800	21100	21400				
10	Frequency	2505	2535	2565				
15	Channel	20825	21100	21375				
15	Frequency	2507.5	2535	2562.5				
20	Channel	20850	21100	21350				
20	Frequency	2510	2535	2560				



	LTE Band 12 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest					
1.4	Channel	23017	23095	23173					
1.4	Frequency	699.7	707.5	715.3					
0	Channel	23025	23095	23165					
5	Frequency	700.5	707.5	714.5					
5	Channel	23035	23095	23155					
5	Frequency	701.5	707.5	713.5					
10	Channel	23060	23095	23130					
10	Frequency	704	707.5	711					

LTE Band 13 Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest					
5	Channel	23205	23230	23255					
Ð	Frequency	779.5	782	784.5					
10	Channel	23230	23230	23230					
10	Frequency	782	782	782					

LTE Band 25 Channel and Frequency List								
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest				
1 /	Channel	26047	26365	26683				
1.4	Frequency	1850.7	1882.5	1914.3				
2	Channel	26055	26365	26675				
5	Frequency	1851.5	1882.5	1913.5				
F	Channel	26065	26365	26665				
5	Frequency	1852.5	1882.5	1912.5				
10	Channel	26090	26365	26640				
10	Frequency	1855	1882.5	1910				
15	Channel	26115	26365	26615				
15	Frequency	1857.5	1882.5	1907.5				
20	Channel	26140	26365	26590				
20	Frequency	1860	1882.5	1905				

LTE Band 26 (814 to 824MHz) Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	and 26 (814 to 824MHz) Channel and Frequency List           equency(MHz)         Lowest         Middle         High           annel         26697         26740         267           quency         814.7         819         823           annel         26705         26740         267           quency         815.5         819         822           annel         26715         26740         267		Highest					
1 4	Channel	26697	26740	26783					
1.4	Frequency	814.7	819	823.3					
	Channel	26705	26740	26775					
5	Frequency	815.5	819	822.5					
5	Channel	26715	26740	26765					
5	Frequency	816.5	819	821.5					
10	Channel	26740	26740	26740					

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Frequency	819	819	819
			1

	LTE Band 26 (824 to 849MHz) Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	and 26 (824 to 849MHz) Channel and Freque equency(MHz)LowestLowestannel26797uency824.7annel26805uency825.5annel26815uency826.5		Highest						
1.4	Channel	26797	26915	27033						
1.4	Frequency	824.7	836.5	848.3						
2	Channel	26805	26915	27025						
3	Frequency	825.5	836.5	847.5						
5	Channel	26815	26915	27015						
5	Frequency	826.5	836.5	846.5						
10	Channel	26840	26915	26990						
10	Frequency	829.0	836.5	844.0						
15	Channel	26865	26915	26965						
15	Frequency	831.5	836.5	841.5						

	LTE Band 38 Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest						
5	Channel	37775	38000	38225						
5	Frequency	2572.5	2595	2617.5						
10	Channel	37800	38000	38200						
10	Frequency	2575	2595	2615						
15	Channel	37825	38000	38175						
15	Frequency	2577.5	2595	2612.5						
20	Channel	37850	38000	38150						
20	Frequency	2580	2595	2610						

	LTE Band 41 (2496 to 2690MHz) Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest						
5	Channel	39675	40620	41565						
5	Frequency	2498.5	2593	2687.5						
40	Channel	39700	40620	41540						
10	Frequency	2501	2593	2685						
15	Channel	39725	40620	41515						
15	Frequency	2503.5	2593	2682.5						
20	Channel	39750	40620	41490						
20	Frequency	2506	2593	2680						



	LTE Band 66 Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest						
1.4	Channel	131979	132322	132665						
1.4	Frequency	1710.7	1745	1779.3						
2	Channel	131987	132322	132657						
3	Frequency	1711.5	1745	1778.5						
	Channel	131997	132322	132647						
5	Frequency	1712.5	1745	1777.5						
10	Channel	132022	132322	132622						
10	Frequency	1715	1745	1775						
15	Channel	132047	132322	132597						
15	Frequency	1717.5	1745	1772.5						
20	Channel	132072	132322	132572						
20	Frequency	1720	1745	1770						



### 2.4 Application Standards

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

47 CFR Part 2
47 CFR Part 22
47 CFR Part 24
47 CFR Part 27
47 CFR Part 90
ANSI C63.26-2015
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



# **3 Test Condition**

## **3.1 Test Environmental Conditions**

During testing, environmental conditions are described below.

Normal Configuration		Extreme Configuration				
Voltage	3.8V	Voltage	High: 4.3V	Low: 3.3V		

# 3.2 Test Configuration

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The worst cases were recorded in this report.

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

GSM											
Task Oses	BW		Mod	ulation		RB		СН			
Test Case	(MHz)	G	MSK	8PSK 1 full L		М	Н				
RF Output Power & Effective (Isotropic) Radiated	0.2	v			v	-	-	V	v	v	
Occupied Bandwidth	0.2		v		v	-	-	v	v	v	
Conducted Band Edge	0.2		V		v	-	-	v	-	v	
Spurious Emissions at Antenna Terminals	0.2	v			v	-	-	V	v	v	
Peak-to-Average Ratio	0.2		v		v	-	-	v	v	v	
Frequency Stability	0.2		V		v	-	-	-	v	-	
Radiated Spurious Emission				v	vorst case						
			WCDMA	L							
Test Case	BW		Mod	ulation	_	RB CH					
Test Case	(MHz)	QPSK	16QAM	64QAM	256QAM	1	full	L	М	Н	
RF Output Power & Effective (Isotropic) Radiated	5	v	-	-	-	-	-	V	v	v	
Occupied Bandwidth	5	v	-	-	-	-	-	v	v	v	
Conducted Band Edge	5	v	-	-	-	-	-	v	-	v	
Spurious Emissions at Antenna Terminals	5	v	-	-	-	-	-	v	v	v	



Peak-to-Average Ratio	5	v	-	-	-	-	-	v	v	v
Frequency Stability	5	v	-	-	-	-	-	-	v	-
Radiated Spurious Emission				W	orst case					
			LTE							
Test Case	DW/		Mod	ulation		R	В		СН	
	DVV	QPSK	16QAM	64QAM	256QAM	1	full	L	М	Н
RF Output Power &			N			N/		V	N	N
Effective (Isotropic) Radiated	an	v	v	-	-	v	v	v	v	v
Occupied Bandwidth	all	v	v	-	-	-	v	-	v	-
Conducted Band Edge	all	v	-	-	-	v	v	v	-	v
Spurious Emissions at Antenna Terminals	all	v	-	-	-	v	-	v	v	v
Peak-to-Average Ratio	all	v	v	-	-	-	v	-	v	-
Frequency Stability	max	v	-	-	-	-	v	-	v	-
Radiated Spurious Emission	worst case									
Note:										

1. The mark " V " means that this configuration is chosen for testing.

2. The mark " -- " means that this bandwidth is not supported.

3.The device is investigated from 30Hz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.
4.Frequency Stability : Normal Voltage = 3.8V ; Low Voltage =3.3V. ; High Voltage =4.3V



# 3.3 Equipment List

Instrument	Manufacturer	Model	Asset No.	Cal. Interval	Cal. Due Date
		Conducted			
Base Station Simulator	R&S	CMW500	PWC0052	1 Year	2025/09/12
Spectrum Analyzer	KEYSIGHT	N9020B	PWC0047	1 Year	2025/09/11
DC Power	KEYSIGHT	E3640A	PWC0043	1 Year	2025/09/12
Climate Chamber	Boyi	B-T-48C	PWC0051	1 Year	2025/09/12
Shielded Chamber	Mao Rui	MR534	PWC0041	3 Years	2026/08/26
RF cable	TIMES Microwave Systems	SFT205PUR- NMSWSM-1.50M	PWD0165	1 Year	2025/09/12
RF cable	TIMES Microwave Systems	HF160- KMKMR-1.50M	PWD0166	1 Year	2025/09/12
Coupling unit	COM-MW	ZDC6-10M1	PWD0167	1 Year	2025/09/12
Trigger cable	-	ZT06-BNCJ- BNCJ-1M	-	-	-
Test Software	Tonscend	JS1120 V3.1.46	-	-	-
		Radiated			
Receiver	R&S	ESR7	PWB0023	1 Year	2025/09/11
Spectrum Analyzer	R&S	FSV3044	PWB0024	1 Year	2025/09/11
Loop Antenna	R&S	HFH2-Z2E	PWB0026	1 Year	2025/09/13
TRILOG Broadband Antenna	Schwarzbeck	VULB9162	PWB0029	1 Year	2025/09/09
Double-Ridged Guide Antenna	ETS-Lindgren	3117	PWB0031	1 Year	2025/09/26
k Type Horn Antenna	Steatite Antennas	QMS-00880	PWB0035	1 Year	2025/09/08
Pre-Amplifier	R&S	OSP220 (OSP-B155G)	PWB0042	1 Year	2025/09/11
Pre-Amplifier	COM-MW	DLNA8	PWB0094	1 Year	2025/09/11
Pre-Amplifier	R&S	SCU18F	PWB0034	1 Year	2025/09/11
Pre-Amplifier	R&S	SCU40F1	PWB0036	1 Year	2025/09/11
Anechoic Chamber	ETS-Lindgren	Fact 3-2m	PWB0003	3 Years	2026/06/05
Test Software	Tonscend	JS36	-	-	-



# 3.4 Test Uncertainty

No.	Parameter	Uncertainty
1	Maximum transmit power	0.677dB
2	Frequency error	37.064Hz
3	Bandwidth occupied	5.9kHz
		10Hz-3.5GHz: 0.982dB
А	Emission enurious, Rand edge and DADR	3.5GHz-18GHz: 1dB
4	Emission spurious, Band edge and FAFR	18GHz-26.5GHz: 0.777dB
		26.5GHz-40GHz: 1.066dB
F	Dedicted Cruzieus Emission	Below 1GHz: 4.88 dB
Э	Radiated Spurious Emission	Above 1GH: 5.06 dB
6	Temperature	3°C
7	Humidity	1.3 %
8	Supply voltages	0.006 V



# **4 Test Items Description**

### Ambient condition

Shielded Chamber

Temperature [°C]	21.4 to 24.3
Humidity [%RH]	31 to 44
Pressure [kPa]	101.2 to 104.1
Temperature [°C]	20.3 to 21.3
Humidity [%RH]	40 to 44
Pressure [kPa]	101.5 to 102.1

### Anechoic Chamber

# 4.1 RF Output Power & Effective (Isotropic) Radiated Power

### Methods of Measurement

Base Station Simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

According to KDB 412172 D01 Power Approach,

EIRP = PT + GT - LC, ERP = EIRP - 2.15, where

PT = transmitter output power in dBm

GT = gain of the transmitting antenna in dBi

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

### Test Setup

		EU
· · · · · · · · · · · · · · · · · · ·		
	0000	

1. The testing follows ANSI C63.26 Section 5.2.

2. The transmitter output port was connected to the base station simulator.

3.Set EUT at maximum power through the base station simulator

4.Select lowest, middle, and highest channels for each band and different modulation.

5.Measure and record the power level from the system simulator.



# 4.2 EIRP Power Density

### **Methods of Measurement**

Measurement Procedure: C63.26 -2015 section 5.2.4

### **Test Setup**



1.Set instrument center frequency to OBW center frequency.

2.Set span to at least 1.5 times the OBW.

3.Set the RBW to the specified reference bandwidth (often 1 MHz).

4.Set VBW  $\geq$  3 × RBW.

5.Detector = RMS (power averaging).

6.Ensure that the number of measurement points in the sweep  $\geq$  2 × span/RBW.

7.Sweep time = auto couple.

8.Employ trace averaging (RMS) mode over a minimum of 100 traces.

9.Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).

## 4.3 Peak-to-Average Ratio

### Methods of Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth.

#### Test Setup



1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).

2. The EUT was connected to spectrum and system simulator via a coupling unit.

3.Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.

4.The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

5.Record the deviation as Peak to Average Ratio.

### 4.4 Occupied Bandwidth

### Methods of Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

#### **Test Setup**



The testing follows ANSI C63.26 Section 5.4.

The EUT was connected to spectrum analyzer and system simulator via a coupling unit.

The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.

The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

Set the detection mode to peak, and the trace mode to max hold.

Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.

(this is the reference value).

Determine the '-26 dB down amplitude' as equal to (Reference Value – X).

Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the '–X dB down amplitude' determined in step 6. If a marker is below this '-X dB down amplitude' value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.

Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

### 4.5 Conducted Band Edge Measurement

### Methods of Measurement

### Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

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

### Test Setup



1. The testing follows ANSI C63.26 section 5.7

2. The EUT was connected to spectrum analyzer and system simulator via a coupling unit.

3. The band edges of low and high channels for the highest RF powers were measured.

4.Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

5.Beyond the 1 MHz band from the band edge, RBW=1MHz was used or a narrower RBW was used and the measured power was integrated over the full required measurement bandwidth of 1 MHz.

6.Set spectrum analyzer with RMS detector.

7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 4.6 Spurious Emissions at Antenna Terminals

### Methods of Measurement

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

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 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 Setup**



1. The testing follows ANSI C63.26 section 5.7

2. The EUT was connected to spectrum analyzer and system simulator via a coupling unit.

3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

4. The middle channel for the highest RF power within the transmitting frequency was measured.

5. The conducted spurious emission for the whole frequency range was taken.

6.Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.

7.Set spectrum analyzer with RMS detector.

8. Taking the record of maximum spurious emission.

9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

**Note:** As described in Section C63.26 4.2.3: Generally, the measurement must be corrected by adding 10 log [(reference bandwidth) / (resolution or measurement bandwidth)] to the measured value (such bandwidth scaling is limited to cases where the measurement bandwidth used to perform the measurement is less than the reference bandwidth). Therefore, the converted limit value is the standard limit value minus the conversion factor.

### 4.7 Frequency Stability

### Methods of Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$ ppm) of the center frequency.

### Test Setup



### **Test Procedures for Temperature Variation**

1. The testing follows ANSI C63.26 section 5.6.4

2. The EUT was set up in the thermal chamber and connected with the system simulator.

3.With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.

4.With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

### **Test Procedures for Voltage Variation**

1.The testing follows ANSI C63.26 section 5.6.5

2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.

3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.

4.For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

5. The variation in frequency was measured for the worst case.



### 4.8 Radiated Spurious Emission

### Methods of Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

#### Test Setup



For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz

1.The testing follows ANSI C63.26 Section 5.5

2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.

3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.

4. The table was rotated 360 degrees to determine the position of the highest spurious emission.

5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.

6.During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.

7.Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.

8.A horn antenna was substituted in place of the EUT and was driven by a signal generator.

9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

10.EIRP (dBm) = S.G. Power - Tx Cable Loss + Tx Antenna Gain

11.ERP (dBm) = EIRP - 2.15

12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

**Remark:** The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

### ----- THE END ------



# **ANNEX A: Test Results**

### **Test Results of Conducted Test**

GSM850	Refer to ANNEX A.1
GSM1900	Refer to ANNEX A.2
WCDMA Band II	Refer to ANNEX A.3
WCDMA Band IV	Refer to ANNEX A.4
WCDMA Band V	Refer to ANNEX A.5
LTE Band 2	Refer to ANNEX A.6
LTE Band 4	Refer to ANNEX A.7
LTE Band 5	Refer to ANNEX A.8
LTE Band 7	Refer to ANNEX A.9
LTE Band 12	Refer to ANNEX A.10
LTE Band 13	Refer to ANNEX A.11
LTE Band 25	Refer to ANNEX A.12
LTE Band 26 (814 to 824MHz)	Refer to ANNEX A.13
LTE Band 26 (824 to 849MHz)	Refer to ANNEX A.14
LTE Band 38	Refer to ANNEX A.15
LTE Band 41	Refer to ANNEX A.16
LTE Band 66	Refer to ANNEX A.17

### **Test Results of Radiated Test**

Radiated Emission Refer to ANNEX A.18
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# **ANNEX B: The EUT Appearance**

The EUT Appearance (internal and external photographs) are submitted separately.

# **ANNEX C: Test Setup Photographs**

The Test Setup Photographs are submitted separately.