TEST REPORT

Applicant:	Franklin Technology
Address:	#906 JEI Platz, 186, Gasan digital1-ro, Geumcheon-gu, Seoul 08502 Korea
Equipment Type:	Module
Model Name:	M3100
Brand Name:	Franklin Wireless
FCC ID:	XHG-M3100
Test Standard:	47 CFR Part 2 (Others refer to chapter 3.1)
Sample Arrival Date:	Aug. 12, 2024
Test Date:	Sep. 03, 2024 - Oct. 22, 2023
Date of Issue:	Nov. 28, 2024

ISSUED BY:

Shanghai Tejet Communications Technology Co., Ltd. Testing Center

Tested by: She Junyang **Checked by:** Zhu Feng **Approved by:** Chen Zidong

(Technical Director)

She Junyang Zhu Feng Chen Zidong

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Nov. 28, 2024	Initial Issue

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Address	1-2/F., Building 1, No.222, Xuanlan Road, Xuanqiao, Pudong New District, Shanghai, China

1.2 Test Location

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Location	1-2/F., Building 1, No.222, Xuanlan Road, Xuanqiao, Pudong New District, Shanghai, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory.The designation number is CN1352

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Franklin Technology
Address	#906 JEI Platz, 186, Gasan digital1-ro, Geumcheon-gu, Seoul 08502 Korea

2.2 Manufacturer Information

Manufacturer	Franklin Technology
Address	#906 JEI Platz, 186, Gasan digital1-ro, Geumcheon-gu, Seoul 08502 Korea

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Module
Model Name Under Test	M3100
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	P1
Software Version	RG3100.FR.1068
Dimensions (Approx.)	L133mm*W85mm*H25.3mm
Weight (Approx.)	N/A

2.5 Technical Information

All Network and Wireless connectivity for EUT	3G Network WCDMA/HSDPA/HSUPA Band 1/2/4/5/8 4G Network FDD LTE Band 1/2/3/4/5/7/8/12/13/14/20/25/26/28/29/30/66/71 TDD LTE Band 38/39/40/41/48 LTE CA with 2 carriers:CA_12A-12A, CA_12A-30A ,CA_12A-66A CA_12B, CA_14A-30A, CA_14A-66A, CA_25A-25A, CA_29A-30A CA_29A-66A, CA_2A-12A, CA_2A-14A, CA_2A-29A, CA_2A-2A CA_2A-30A, CA_2A-48A, CA_2A-4A, CA_2A-5A, CA_2A-66A CA_2A-71A, CA_2C, CA_30A-66A, CA_41A-41A, CA_41C CA_48A-48A, CA_48A-66A, CA_48B, CA_48C, CA_4A-12A CA_4A-29A, CA_4A-30A, CA_4A-48A, CA_4A-4A, CA_4A-5A CA_4A-71A, CA_5A-12A, CA_5A-12A, CA_5A-30A, CA_5A-48A CA_5A-5A, CA_5A-66A, CA_5B, CA_66A-66A, CA_66A-71A CA_66B, CA_66C LTE CA with 3 carriers:CA_12A-30A-66A, CA_12A-66A-66A CA_12A-66C, CA_12B-66A, CA_14A-30A-66A, CA_14A-66A-66A CA_29A-30A-66A, CA_29A-66A-66A, CA_2A-12A-12A CA_2A-12A-30A, CA_2A-12A-66A, CA_2A-12B, CA_2A-14A-30A CA_2A-14A-66A, CA_2A-29A-30A, CA_2A-2A-12A, CA_2A-2A-14A CA_2A-2A-29A, CA_2A-2A-30A, CA_2A-2A-4A, CA_2A-2A-5A CA_2A-2A-66A, CA_2A-2A-71A, CA_2A-30A-66A, CA_2A-48A-48A CA_2A-48C, CA_2A-4A-12A, CA_2A-4A-29A, CA_2A-4A-30A CA_2A-4A-4A, CA_2A-4A-71A, CA_2A-5A-12A, CA_2A-5A-30A CA_2A-5A-48A, CA_2A-5A-5A, CA_2A-5A-66A, CA_2A-5B CA_2A-66A-66A, CA_2A-66A-71A, CA_2A-66B, CA_2A-66C CA_2C-12A, CA_2C-29A, CA_2C-30A, CA_2C-5A, CA_2C-66A CA_30A-66A-66A, CA_41A-41C, CA_41D, CA_48A-48A-66A CA_48A-48C, CA_48A-66A-66A, CA_48A-66B, CA_48A-66C CA_48B-66A, CA_48C-66A, CA_48D, CA_4A-12A-12A CA_4A-12A-30A, CA_4A-12B, CA_4A-29A-30A, CA_4A-48C CA_4A-4A-12A, CA_4A-4A-29A, CA_4A-4A-30A, CA_4A-4A-5A CA_4A-4A-71A, CA_4A-5A-12A, CA_4A-5A-29A, CA_4A-5A-30A CA_4A-5B, CA_5A-12A-66A, CA_5A-12B, CA_5A-30A-66A CA_5A-48A-66A, CA_5A-48C, CA_5A-5A-66A, CA_5A-66A-66A CA_5A-66B, CA_5A-66C, CA_5B-30A, CA_5B-66A CA_66A-66A-66A, CA_66A-66A-71A, CA_66A-66B, CA_66A-66C CA_66C-71A,CA_66D LTE CA with 4 carriers:CA_12A-30A-66A-66A, CA_12B-66A-66A CA_14A-30A-66A-66A, CA_25A-41D, CA_29A-30A-66A-66A CA_2A-12A-66A-66A, CA_2A-12A-66C, CA_2A-12B-66A

	CA_2A-14A-66A-66A, CA_2A-2A-12A-12A, CA_2A-2A-12A-30A CA_2A-2A-12A-66A, CA_2A-2A-12B, CA_2A-2A-14A-66A CA_2A-2A-29A-30A, CA_2A-2A-29A-66A, CA_2A-2A-30A-66A CA_2A-2A-4A-12A, CA_2A-2A-4A-4A 5G Network SA: NR n2/n5/n14/n25/n28/n30/n41/n48/n66/n71/n77/n78 SA UL MIMO: n2/n25/n41/n48/n66/n77 TXD:n41 PC1.5, n77 PC1.5(3450-3550), n77 PC1.5(3700-3980) NSA(EN-DC): 1DL+FR1:DC_2A_n66A, DC_2A_n71A, DC_66A_n25A DC_66A_n71A, DC_66A_n5A, DC_66A_n2A, DC_5A_n2A DC_30A_n66A, DC_30A_n5A, DC_30A_n2A, DC_2A_n66A DC_2A_n5A, DC_14A_n66A, DC_14A_n2A, DC_12A_n66A DC_12A_n2A, DC_2A_n41A, DC_66A_n41A, DC_66A_n77A DC_5A_n77A, DC_30A_n77A, DC_2A_n77A, DC_14A_n77A DC_12A_n77A, DC_2A_n41A, DC_66A_n41A, DC_1A_n78A DC_3A_n78A 2DL+FR1:DC_2A-2A_n71A, DC_2A-66A_n25A, DC_2A-66A_n66A DC_2A-66A_n71A, DC_2A-71A_n71A, DC_2C_n71A DC_66A-66A_n71A, DC_66A-71A_n71A, DC_66C_n71A DC_66A-66A_n5A, DC_5A-66A_n5A, DC_5A-66A_n2A DC_5A-30A_n2A, DC_30A-66A_n66A, DC_30A-66A_n5A DC_30A-66A_n2A, DC_5A-30A_n5A, DC_2A-66A_n66A DC_2A-66A_n5A, DC_2A-66A_n2A, DC_2A-5A_n5A DC_2A-5A_n2A, DC_2A-30A_n66A, DC_2A-30A_n5A DC_2A-30A_n2A, DC_2A-2A_n66A, DC_2A-2A_n5A DC_2A-29A_n66A, DC_2A-14A_n66A, DC_2A-14A_n2A DC_2A-12A_n66A, DC_2A-12A_n2A, DC_2A-66A_n66A DC_2A-5A_n5A, DC_29A-66A_n2A, DC_29A-30A_n66A DC_29A-30A_n2A, DC_14A-66A_n66A, DC_14A-66A_n2A DC_14A-66A_n2A, DC_14A-30A_n66A, DC_14A-30A_n2A DC_12A-66A_n66A, DC_12A-66A_n2A, DC_12A-30A_n66A DC_12A-30A_n2A, DC_2A-2A_n41A, DC_2A-66A_n41A DC_2A-71A_n77A, DC_2C_n41A, DC_66A-66A_n77A DC_5A-66A_n77A, DC_5A-30A_n77A, DC_30A-66A_n77A DC_2A-66A_n77A, DC_2A-5A_n77A, DC_2A-30A_n77A DC_2A-2A_n77A, DC_2A-29A_n77A, DC_2A-14A_n77A DC_2A-12A_n77A, DC_29A-66A_n77A, DC_29A-30A_n77A DC_14A-66A_n77A, DC_14A-30A_n77A, DC_12A-66A_n77A DC_12A-30A_n77A, DC_2A-2A_n41A, DC_2C_n41A 3DL+FR1:DC_2A-2A-66A_n71A, DC_2A-66A-66A_n71A DC_2A-66C_n71A, DC_2C-66A_n71A, DC_66C-71A_n71A

	DC_5A-66A-66A_n5A, DC_5A-66A-66A_n5A, DC_30A-66A-66A_n5A DC_30A-66A-66A_n2A, DC_2A-66A-66A_n5A, DC_2A-2A-66A_n5A DC_2A-2A-5A_n5A, DC_2A-2A-30A_n66A, DC_2A-2A-30A_n5A DC_2A-2A-14A_n66A, DC_2A-2A-5A_n5A, DC_29A-66A-66A_n2A DC_2A-2A-66A_n41A, DC_2C-66A_n41A, DC_66A-66A-66A_n77A DC_5A-66A-66A_n77A, DC_30A-66A-66A_n77A DC_2A-66A-66A_n77A, DC_2A-2A-66A_n77A, DC_2A-2A-5A_n77A DC_2A-2A-30A_n77A, DC_2A-2A-29A_n77A, DC_2A-2A-14A_n77A DC_2A-2A-12A_n77A, DC_29A-66A-66A_n77A 4DL+FR1:DC_2A-2A-66A-66A_n5A, DC_2A-2A-66A-66A_n77A 1DL+2FR1:DC_2A_n41A-n41A, DC_2A_n41C, DC_66A_n41A-n41A DC_66A_n41C, DC_66A_n77A-n77A, DC_5A_n77A-n77A DC_30A_n77A-n77A, DC_2A_n77A-n77A, DC_14A_n77A-n77A DC_12A_n77A-n77A, DC_2A_n41A-n66A, DC_2A_n41A-n71A DC_66A_n25A-n41A, DC_66A_n41A-n71A 2DL+2FR1:DC_66A-66A_n77A-n77A, DC_2A-2A_n77A-n77A NR CA: 1FR1,:CA_n14A, CA_n25A, CA_n28A, CA_n2A, CA_n30A, CA_n41A CA_n48A, CA_n5A, CA_n66A, CA_n71A, CA_n77A, CA_n78A 2FR1:CA_n25A-n41A, CA_n25A-n48A, CA_n25A-n77A CA_n41A-n66A, CA_n41A-n71A, CA_n48A-n66A ,CA_n48A-n71A CA_n66A-n77A, CA_n71A-n77A, CA_n66A-n77A, CA_n5A-n77A CA_n2A-n77A, CA_n30A-n77A, CA_n14A-n77A, CA_n66A-n77A CA_n25A-n41A, CA_n25A-n77A, CA_n41A-n66A, CA_n41A-n71A CA_n66A-n77A, CA_n71A-n77A, CA_n41A-n41A, CA_n41A-n48A CA_n41A-n77A, CA_n41C, CA_n48A-n48A, CA_n48A-n77A CA_n48B, CA_n48C, CA_n77A-n77A, CA_n48C, CA_n48B CA_n48A-n48A, CA_n41A-n41A, CA_n41A-n48A, CA_n41A-n77A CA_n48A-n77A, CA_n25A-n25A, CA_n25A-n66A, CA_n25A-n71A CA_n25A-n66A, CA_n66A-n66A, CA_n25A-n71A, CA_n66A-n71A CA_n25A-n71A, CA_n66A-n66A, CA_n66A-n71A, CA_n71A-n71A CA_n71B, CA_n66A-n66A, CA_n5A-n66A, CA_n5A-n30A CA_n30A-n66A, CA_n2A-n66A, CA_n2A-n5A, CA_n2A-n30A CA_n2A-n14A, CA_n2A-n2A, CA_n14A-n66A, CA_n14A-n30A 3FR1 :CA_n25A-n41A-n41A, CA_n25A-n41A-n77A, CA_n25A-n41C CA_n25A-n48A-n48A, CA_n25A-n48C, CA_n25A-n77A-n77A CA_n41A-n41A-n66A, CA_n41A-n41A-n71A, CA_n41A-n66A-n77A CA_n41A-n71A-n77A, CA_n41C-n66A, CA_n41C-n71A

	CA_n48A-n48A-n66A, CA_n48A-n48A-n71A, CA_n48A-n66A-n77A CA_n48B-n66A, CA_n48B-n71A, CA_n48C-n66A CA_n66A-n77A-n77A, CA_n71A-n77A-n77A, CA_n66A-n77A-n77A CA_n2A-n77A-n77A, CA_n30A-n77A-n77A, CA_n14A-n77A-n77A CA_n5A-n77A-n77A, CA_n41A-n41A-n41A, CA_n41A-n41A-n48A CA_n41A-n41A-n77A, CA_n41A-n41C, CA_n41A-n48B CA_n41A-n48C, CA_n41A-n77A-n77A, CA_n41C-n48A CA_n41C-n77A, CA_n48B-n77A, CA_n25A-n25A-n25A CA_n25A-n25A-n66A, CA_n25A-n25A-n66A, CA_n25A-n25A-n71A CA_n25A-n66A-n66A, CA_n25A-n71A-n71A, CA_n25A-n71B CA_n66A-n66A-n71A, CA_n66A-n71A-n71A, CA_n66A-n71B CA_n66A-n66A-n66A, CA_n5A-n66A-n66A, CA_n5A-n30A-n66A CA_n30A-n66A-n66A, CA_n2A-n66A-n66A, CA_n2A-n5A-n66A CA_n2A-n5A-n30A, CA_n2A-n30A-n66A, CA_n2A-n14A-n66A CA_n2A-n14A-n30A, CA_n2A-n2A-n66A, CA_n2A-n2A-n5A CA_n2A-n2A-n30A, CA_n2A-n2A-n14A, CA_n14A-n66A-n66A CA_n14A-n30A-n66A, CA_n25A-n25A-n41A, CA_n25A-n25A-n77A CA_n25A-n41A-n66A
About the Product	The equipment is Module, intended for used with information technology equipment.The designation number is CN1352.

The requirement for the following technical information of the EUT was tested in this report:

Operating Bands	4G Network TDD LTE Band 48 5G Network SA: NR n48 SA UL MIMO: n48	
Modulation Type	WCDMA	QPSK
	HSDPA /HSUPA	QPSK
		16QAM
	LTE	UL: QPSK/16QAM/64QAM DL: QPSK/16QAM/64QAM
	NR	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM
		DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM
Antenna Type	Dipole Antenna	
Antenna Gain	TDD LTE Band 48: 0.68 dBi TDD NR Band n48: 0.68 dBi	
The Max RF Output Power (EIRP/ERP)	TDD LTE Band 48: 22.76 dBm TDD NR Band n48: 22.87 dBm n48 UL MIMO: 21.777 dBm	
SCS and Channel Bandwidths	n48_SCS 30kHz: 10MHz, 15MHz, 20 MHz, 30MHz, 40 MHz	

Band	Power Class	Tx Frequency Range	Rx Frequency Range
LTE B48	3	3550 MHz ~ 3700 MHz	3550 MHz ~ 3700 MHz
NR n48	2	3550 MHz ~ 3700 MHz	3550 MHz ~ 3700 MHz

Note1: The EUT information provided by the applicant, except for The Max RF Conducted Power. For more detailed band specifications and features description, please refer to the manufacturer's specifications or user's manual.

Note2: All ENDC bands support Power Class 3 only.

Note3: These frequency ranges are only applicable in the United States.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 96	CITIZENS BROADBAND RADIO SERVICE
3	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
4	KDB 971168 D01 v03	Measurement Guidance for Certification of Licensed Digital Transmitters

3.2 Test Verdict

No.	Test Description	FCC Part No.	Test Result	Test Verdict
1	Conducted RF Output Power	2.1046	Reporting only (ANNEX A.1)	Pass
2	Effective (Isotropic) Radiated Power	2.1046 96.41(b)	ANNEX A.1	Pass
3	Peak to Average Radio	2.1046	ANNEX A.2	Pass
4	Occupied Bandwidth	2.1049	ANNEX A.3	Pass
5	Frequency Stability	2.1055	ANNEX A.4	Pass
6	Spurious Emission at Antenna Terminals	2.1051 96.41(e)	ANNEX A.5	Pass
7	Band Edge	2.1051 96.41(e)	ANNEX A.6	Pass
8	Field Strength of Spurious Radiation	2.1053 96.41(e)	ANNEX A.7	Pass

3.3 Decision Rule

☐ No Need

☒ Use General conformity decision rule (Consider uncertainty or not ☒ No ☐ Yes)

☐ Use Special Conformity Decision Rule (Consider uncertainty or not ☐ No ☐ Yes)

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the environmental conditions were within the listed ranges:

Relative Humidity		25% to 75%
Atmospheric Pressure		98 kPa to 102 kPa
Test Voltage of the EUT	NV (Normal Voltage)	3.8 V
	LV (Low Voltage)	3.6V
	HV (High Voltage)	4.2V
Test Temperature of the EUT	NT (Normal Temperature)	15 °C to 35 °C
	LT (Low Temperature)	-10 °C
	HT (High Temperature)	+60 °C

4.2 Test Equipment List

Description	Manufacturer	Model	Equipment No.	Software /Firmware Version	Cal. Date	Cal. Due
BL410 2G/3G/4/5G RF Test System						
Wideband Radio Communication Tester	R&S	CMW 500	BH-EMC-L094	V3.7.172	2024/2/22	2025/2/21
Spectrum Analyzer	Agilent	E4440A	BH-EMC-L027	A.11.21	2024/2/21	2025/2/20
Spectrum Analyzer	Keysight	N9020A	BH-EMC-L066	A.17.05	2024/2/22	2025/2/21
Temperature Chamber	ESPEC	ECT	BH-EMC-L068	NA	2024/4/18	2025/4/17
DC Power Supply	ITECH	IT6863A	BH-EMC-L113	NA	2024/2/22	2025/2/21
Vector Signal Generator	Agilent	E4438C	BH-EMC-L028	C.05.76	2024/2/22	2025/2/21
Analog Signal Generator	Keysight	N5173B	BH-EMC-L074	B.01.90	2024/2/19	2025/2/18
Test Software	BALUN	BL410R	NA	V3.0.1.539	N/A	N/A
Radiated Test System						
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	BH-EMC-L008	NA	2024/3/11	2027/3/10
Test Antenna-Horn	Schwarzbeck	BBHA 9120D	BH-EMC-L044	NA	2024/3/11	2027/3/10

Anechoic Chamber	YIHENG	9m*6m*6m	BH-EMC-L001	NA	2024/4/14	2027/4/13
EMI Receiver	KEYSIGHT	N9038A	BH-EMC-L015	A.21.06	2024/2/21	2025/2/20
Wideband Radio Communication Tester	R&S	CMW 500	BH-EMC-L094	V3.7.172	2024/2/22	2025/2/21
Test Software	BALUN	BL410-E	NA	V21.919	N/A	N/A

4.3 Test Configurations

LTE Band	Bandwidth (MHz)						Modulation Type		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
Effective (Isotropic) Radiated Power														
48	n	n	v	v	v	v	v	v	v	v	v	v	v	v
Peak to Average Ratio														
48	n	n	--	v	--	--	v	v	v	--	v	v	v	v
Occupied Bandwidth														
48	n	n	v	v	v	v	v	v	--	--	v	v	v	v
Frequency Stability														
48	n	n	--	v	--	--	v	v	--	--	v	--	v	--
Spurious Emission at Antenna Terminals														
48	n	n	v	v	v	v	v	v	v	--	--	v	v	v
Band Edge														
48	n	n	v	v	v	v	v	v	v	--	v	v	--	v
Field Strength of Spurious Radiation														
48	n	n	n	n	v	n	v	--	v	--	--	v	--	--

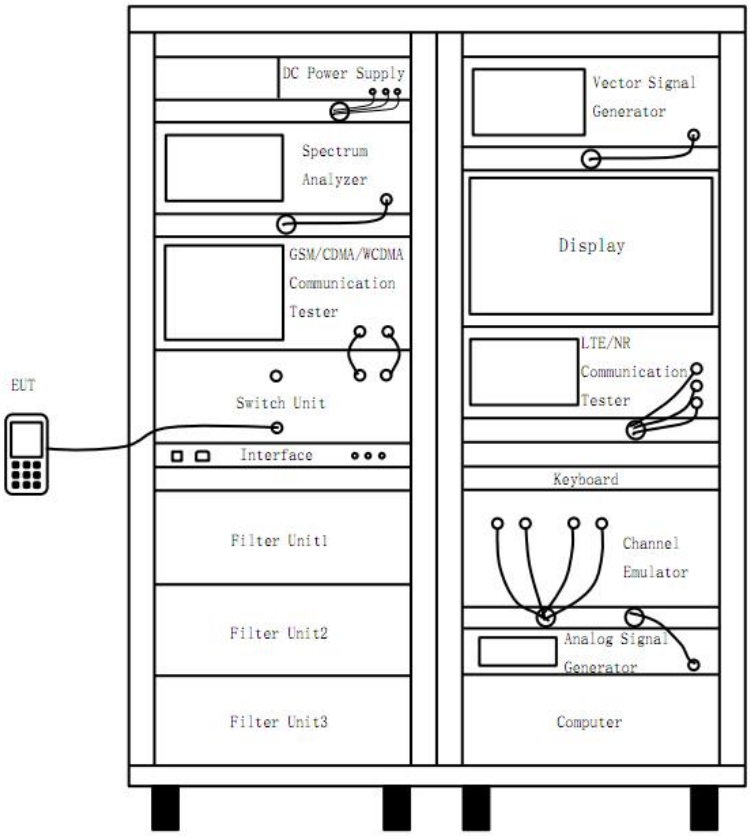
Note 1: The mark “v” means that this configuration is chosen for testing.
Note 2: The mark “n” means that this bandwidth is not supported.

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
LTE Band 48(Part 96)	Low Range	5	55265	3552.5
		10	55290	3555
		15	55315	3557.5
		20	55340	3560
	Middle Range	5/10/15/20	55990	3625
	High Range	5	56715	3697.5
		10	56690	3695
		15	56665	3692.5
		20	56640	3690

Test Mode	Channel Bandwidth (MHz)	UL Channel	UL Channel No.	UL Frequency (MHz)
NR Band n48(SCS 30kHz)	10	Low Range	637000	3555
		Middle Range	641666	3624.99
		High Range	646332	3694.98
	15	Low Range	637168	3557.52
		Middle Range	641666	3624.99
		High Range	646166	3692.49
	20	Low Range	637334	3560.01
		Middle Range	641666	3624.99
		High Range	646000	3690
	30	Low Range	637668	3565.02
		Middle Range	641666	3624.99
		High Range	645666	3684.99
	40	Low Range	638000	3570
		Middle Range	641666	3624.99
		High Range	645332	3679.98

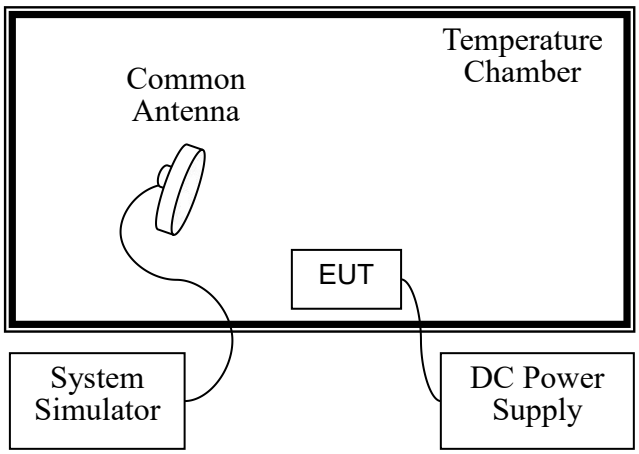
4.4 Test Setup

4.4.1 For Antenna Port Test



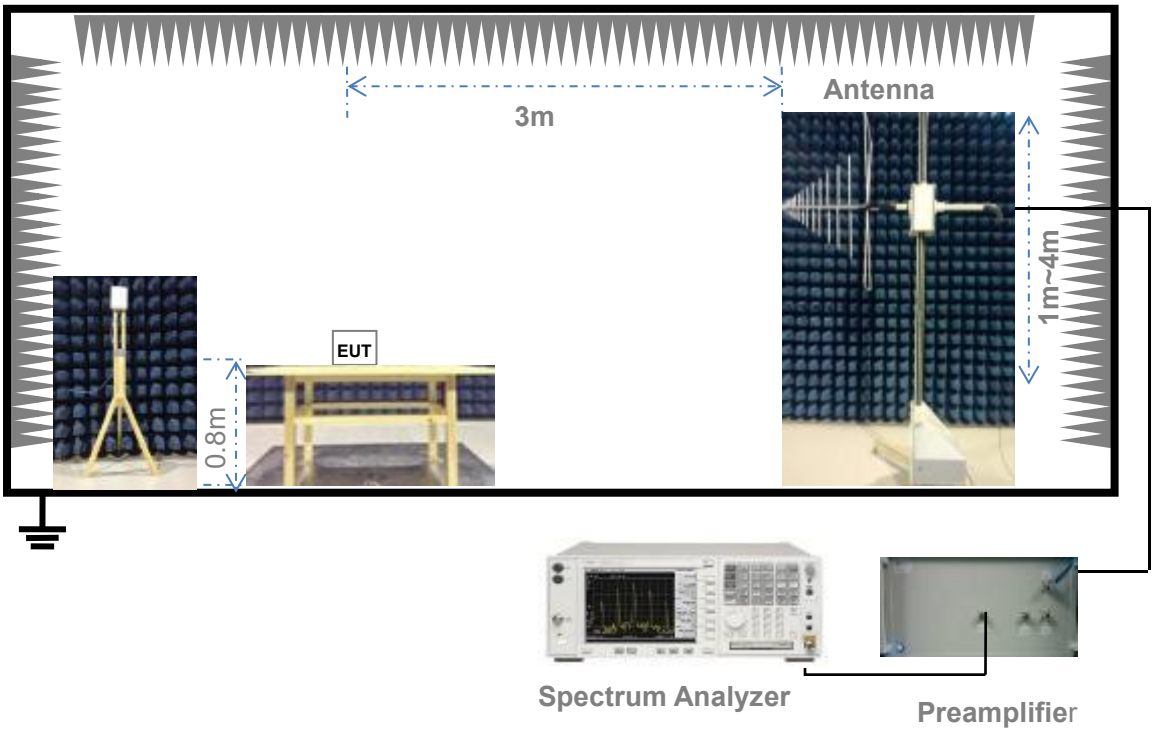
(Diagram 1)

4.4.2 For Frequency Stability Test



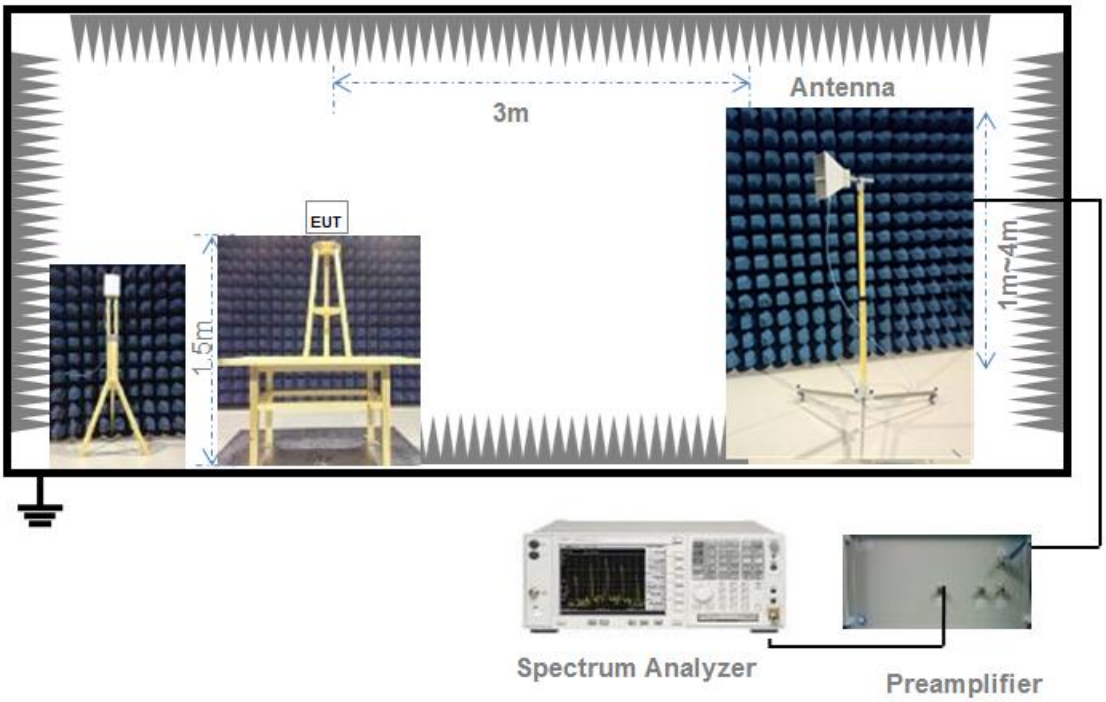
(Diagram 2)

4.4.3 For Radiated Test (30 MHz ~ 1 GHz)



(Diagram 3)

4.4.4 For Radiated Test (Above 1 GHz)



(Diagram 4)

5 TEST ITEMS

5.1 Transmitter Radiated Power (EIRP/ERP)

5.1.1 Limit

FCC § 2.1046 & 96.41(b)

FCC section 96.41(b), the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table in this paragraph below:

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	N/A
Category A CBSD	30	20
Category B CBSD[note1]	47	37
Note1: Category B CBSDs will only be authorized for use after an ESC is approved and commercially deployed consistent with §§ 96.15 and 96.67.		

5.1.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for conducted test, and the section 4.4.3 and 4.4.4 (Diagram 3, 4) test setup description is used for radiated test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Description of the Conducted Output Power Measurement

The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. A system simulator is used to establish communication with the EUT, and its parameters are 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.

The relevant equation for determining the conducted measured value is:

Conducted Output Power Value (dBm) = Measured Value (dBm) + Path Loss (dB)

where:
Conducted Output Power Value = final conducted measured value in the conducted power test, in dBm;
Measured Value = measured conducted power received by spectrum analyzer or power meter, in dBm;
Path Loss = signal attenuation in the connecting cable between the transmitter and spectrum analyzer or

power meter, including external cable loss, in dB;

During the test, the data of Path Loss (dB) is added in the spectrum analyzer or power meter, so Measured Value (dBm) is the final values which contains the data of Path Loss (dB).

For example:

In the conducted output power test, when measured value for GSM850 is 24.7 dBm, and path loss is 8.5 dB, then final conducted output power value is:

Conducted Output Power Value (dBm) = 24.7 dBm + 8.5 dB = 33.2 dBm

Description of the Transmitter Radiated Power Measurement

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

Final measurement calculation as below:

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$ERP/EIRP = P_{Meas} + GT - LC$

where:
ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);
P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
dBd (ERP)=dBi (EIRP) -2.15 dB
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

For example:
In the EIRP test, when P_{Meas} value for GSM1900 is 30.2 dBm, LC is 0.6 dB, and GT is -3.4 dB, then final

EIRP value is:
EIRP for GSM1900 = 30.2 dBm - 3.4 dBi - 0.6 dB = 26.2 dBm

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:
ERP/EIRP (dBm) = SA Read Value (dBm) + Correction Factor (dB)

where:
ERP/EIRP = effective or equivalent radiated power, in dBm;
SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;
Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is:

ERP (dBm) = 21dBm + 8dB = 29dBm

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Peak to Average Ratio

5.2.1 Limit

FCC § 2.1046

In addition, when the transmitter power is measured in terms of average value, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

5.2.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

According to KDB 971168 D01, there is CCDF procedure for PAPR:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval as follows:

1) for continuous transmissions, set to 1 ms,

2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.

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

Alternate procedure for PAPR:

Use one of the procedures presented in 4.1 to measure the total peak power and record as P_{Pk}. Use one of the applicable procedures presented 4.2 to measure the total average power and record as P_{Avg}. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm).

5.2.4 Test Result

Please refer to ANNEX A.2.

5.3 Occupied Bandwidth

5.3.1 Limit

FCC § 2.1049

The occupied bandwidth 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.

Many of the individual rule parts specify a relative OBW in lieu of the 99% OBW. In such cases, the OBW is defined as the width of the signal between two points, one below the carrier center frequency and on above the carrier center frequency, outside of which all emissions are attenuated by at least X dB below the transmitter power, where the value of X is typically specified as 26.

5.3.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The following procedure shall be used for measuring power bandwidth.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the anticipated OBW).

b) The nominal IF filter bandwidth (3 dB 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.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.

e) For -26 dB OBW, the dynamic range of the spectrum analyzer at the selected RBW shall be at least 10dB below the target “-X dB down” requirement, e.g. -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be 36dB below the reference value.

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

g) For 99% OBW, use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is

recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % power bandwidth is the difference between these two frequencies.

h) For -26 dB OBW, 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 “-X dB down amplitude” as equal to (reference value -X). Alternatively, this calculation can be performed by the analyzer by using the marker-delta function.

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 “-X dB down amplitude” determined in step g). 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.

i) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

j) Change variable modulations, coding, or channel bandwidth settings, then repeat above test procedures.

5.3.4 Test Result

Please refer to ANNEX A.3.

5.4 Frequency Stability

5.4.1 Limit

FCC § 2.1055

FCC § 2.1055

The frequency stability shall be measured with variation of ambient temperature as follows:

(1) The temperature is varied from -30°C to +50°C.

(2) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10°C through the range.

The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating and point which shall be specified by the manufacture.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

5.4.2 Test Setup

The section 4.4.2 (Diagram 2) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The EUT is placed in a temperature chamber.

2. The temperature is set to 25°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured.

3. The temperature is increased by not more than 10 degrees, allowed to stabilize and soak, and then repeat the frequency error measurement.

4. Repeat procedure 3 until +50°C and -30°C is reached.

5. Change supply voltage, and repeat measurement until extreme voltage is reached.

5.4.4 Test Result

Please refer to ANNEX A.4.

5.5 Spurious Emission at Antenna Terminals

5.5.1 Limit

FCC § 2.1051 & 96.41(e)

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 emissions are attenuated at least 26 dB below the transmitter power.

FCC § 96.41(e)

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed-25 dBm/MHz.The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed-40 dBm/MHz.

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than1GHz.However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolutionbandwidth 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 least26 dB below the transmitter power.

5.5.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

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 blocks 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 emissions are attenuated at least 26 dB below the transmitter power.

1. The EUT is coupled to the system simulator and spectrum analyzer; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2. CMW500 is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power.

3. The RF output of the transmitter is connected to the input of the spectrum analyzer through sufficient attenuation.

4. Spurious emissions are tested with 0.001MHz RBW for frequency less than 150kHz, 0.01MHz RBW for frequency less than 30MHz, 0.1MHz RBW for frequency less than 1GHz, and 1MHz RBW for frequency above 1GHz. And sweep point number are at least 401, referring to following formula.

Sweep point number = Span/RBW

VBW=3*RBW

Detector Mode=mean or average power

5. Record the frequencies and levels of spurious emissions.

5.5.4 Test Result

Please refer to ANNEX A.5.

5.6 Band Edge

5.6.1 Limit

FCC § 2.1051 & 96.41(e)

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 emissions are attenuated at least 26 dB below the transmitter power.

FCC § 96.41(e)

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed-25 dBm/MHz.The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed-40 dBm/MHz.

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than1GHz.However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolutionbandwidth 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 least26 dB below the transmitter power.

5.6.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading.

1.The EUT is coupled to the system simulator and spectrum analyzer; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2. CMW500 is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power.

3. The RF output of the transmitter is connected to the input of the spectrum analyzer through sufficient attenuation.

4. The center of the spectrum analyzer was set to block edge frequency.

5. Band edge are tested with 1%*cBW (RBW), and sweep point number referred to following formula.

Sweep point number = 2*Span/RBW

VBW=3RBW

6. Record the frequencies and levels of spurious emissions.

For mobile and portable stations, 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. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance. By using a 10 kHz bandwidth on the spectrum analyzer.

10*log(10 kHz / 6.25 kHz) = 2.04 dB
Limit Line = -35 dBm + 2.04 dB = -32.96dBm

5.6.4 Test Result

Please refer to ANNEX A.6.

5.7 Field Strength of Spurious Radiation

5.7.1 Limit

FCC § 2.1053 & 96.41(e)

FCC § 96.41(e)

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed-25 dBm/MHz.The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed-40 dBm/MHz.

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than1GHz.However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolutionbandwidth 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 least26 dB below the transmitter power.

5.7.2 Test Setup

The section 4.4.3 and 4.4.4 (Diagram 3, 4) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.

2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.

3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.

4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth

was set to 1 MHz.

5. The transmitter shall be switched on; the measuring receiver shall be tuned to the frequency of the

transmitter under test.

6. The test antenna shall be raised and lowered through the specified range of height until the maximum

signal level is detected by the measuring receiver.

7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.

9. The maximum signal level detected by the measuring receiver shall be noted.

10. The EUT was replaced by half-wave dipole (824 ~ 849 MHz) or horn antenna (1 850 ~ 1 910 MHz) connected to a signal generator.

11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase

the sensitivity of the measuring receiver.

12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.

13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

14. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

Final measurement calculation as below:

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:

ERP/EIRP (dBm) = SA Read Value (dBm) + Correction Factor (dB)

where:
ERP/EIRP = effective or equivalent radiated power, in dBm;
SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;
Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is:

ERP (dBm) = 21dBm + 8dB = 29dBm

5.7.4 Test Result

Please refer to ANNEX A.7.

ANNEX A TEST RESULTS

A.1 Transmitter Radiated Power (EIRP/ERP)

LTE Mode Test Data

Test BW	Test Channel	Test Mode	Test RB (Size#Offset)	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND48									
5 MHz	LCH	QPSK	RB1#0	21.9	0.68	22.58	0.181	0.200	Pass
			RB1#13	21.94	0.68	22.62	0.183	0.200	Pass
			RB1#24	21.77	0.68	22.45	0.176	0.200	Pass
			RB12#0	20.96	0.68	21.64	0.146	0.200	Pass
			RB12#6	20.99	0.68	21.67	0.147	0.200	Pass
			RB12#13	20.95	0.68	21.63	0.146	0.200	Pass
			RB25#0	20.95	0.68	21.63	0.146	0.200	Pass
		16-QAM	RB1#0	21.34	0.68	22.02	0.159	0.200	Pass
			RB1#13	21.34	0.68	22.02	0.159	0.200	Pass
			RB1#24	21.28	0.68	21.96	0.157	0.200	Pass
			RB12#0	20.05	0.68	20.73	0.118	0.200	Pass
			RB12#6	20.09	0.68	20.77	0.119	0.200	Pass
			RB12#13	20	0.68	20.68	0.117	0.200	Pass
			RB25#0	19.97	0.68	20.65	0.116	0.200	Pass
	MCH	QPSK	RB1#0	21.94	0.68	22.62	0.183	0.200	Pass
			RB1#13	21.99	0.68	22.67	0.185	0.200	Pass
			RB1#24	21.98	0.68	22.66	0.185	0.200	Pass
			RB12#0	20.91	0.68	21.59	0.144	0.200	Pass
			RB12#6	21.01	0.68	21.69	0.148	0.200	Pass
			RB12#13	20.94	0.68	21.62	0.145	0.200	Pass
			RB25#0	20.95	0.68	21.63	0.146	0.200	Pass
		16-QAM	RB1#0	21.26	0.68	21.94	0.156	0.200	Pass
			RB1#13	21.46	0.68	22.14	0.164	0.200	Pass
			RB1#24	21.41	0.68	22.09	0.162	0.200	Pass
			RB12#0	19.91	0.68	20.59	0.115	0.200	Pass
			RB12#6	20.04	0.68	20.72	0.118	0.200	Pass
			RB12#13	20.03	0.68	20.71	0.118	0.200	Pass
			RB25#0	19.97	0.68	20.65	0.116	0.200	Pass
	HCH	QPSK	RB1#0	21.93	0.68	22.61	0.182	0.200	Pass
			RB1#13	22.02	0.68	22.70	0.186	0.200	Pass
			RB1#24	21.98	0.68	22.66	0.185	0.200	Pass
			RB12#0	20.95	0.68	21.63	0.146	0.200	Pass

Test BW	Test Channel	Test Mode	Test RB (Size#Offset)	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND48									
			RB12#6	21.08	0.68	21.76	0.150	0.200	Pass
			RB12#13	21	0.68	21.68	0.147	0.200	Pass
			RB25#0	21.02	0.68	21.70	0.148	0.200	Pass
		16-QAM	RB1#0	21.24	0.68	21.92	0.156	0.200	Pass
			RB1#13	21.53	0.68	22.21	0.166	0.200	Pass
			RB1#24	21.33	0.68	22.01	0.159	0.200	Pass
			RB12#0	20	0.68	20.68	0.117	0.200	Pass
			RB12#6	20.12	0.68	20.80	0.120	0.200	Pass
			RB12#13	20	0.68	20.68	0.117	0.200	Pass
			RB25#0	19.96	0.68	20.64	0.116	0.200	Pass
10 MHz	LCH	QPSK	RB1#0	21.86	0.68	22.54	0.179	0.200	Pass
			RB1#25	21.86	0.68	22.54	0.179	0.200	Pass
			RB1#49	21.76	0.68	22.44	0.175	0.200	Pass
			RB25#0	20.95	0.68	21.63	0.146	0.200	Pass
			RB25#13	21.03	0.68	21.71	0.148	0.200	Pass
			RB25#25	20.96	0.68	21.64	0.146	0.200	Pass
			RB50#0	20.94	0.68	21.62	0.145	0.200	Pass
		16-QAM	RB1#0	21.2	0.68	21.88	0.154	0.200	Pass
			RB1#25	21.24	0.68	21.92	0.156	0.200	Pass
			RB1#49	21.27	0.68	21.95	0.157	0.200	Pass
			RB25#0	19.99	0.68	20.67	0.117	0.200	Pass
			RB25#13	19.95	0.68	20.63	0.116	0.200	Pass
			RB25#25	19.96	0.68	20.64	0.116	0.200	Pass
			RB50#0	19.98	0.68	20.66	0.116	0.200	Pass
	MCH	QPSK	RB1#0	21.9	0.68	22.58	0.181	0.200	Pass
			RB1#25	21.93	0.68	22.61	0.182	0.200	Pass
			RB1#49	21.98	0.68	22.66	0.185	0.200	Pass
			RB25#0	20.87	0.68	21.55	0.143	0.200	Pass
			RB25#13	21.04	0.68	21.72	0.149	0.200	Pass
			RB25#25	21	0.68	21.68	0.147	0.200	Pass
			RB50#0	20.98	0.68	21.66	0.147	0.200	Pass
		16-QAM	RB1#0	21.22	0.68	21.90	0.155	0.200	Pass
			RB1#25	21.21	0.68	21.89	0.155	0.200	Pass
			RB1#49	21.39	0.68	22.07	0.161	0.200	Pass
			RB25#0	19.95	0.68	20.63	0.116	0.200	Pass
			RB25#13	20.06	0.68	20.74	0.119	0.200	Pass
			RB25#25	20.03	0.68	20.71	0.118	0.200	Pass
			RB50#0	20.01	0.68	20.69	0.117	0.200	Pass

Test BW	Test Channel	Test Mode	Test RB (Size#Offset)	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND48									
	HCH	QPSK	RB1#0	22.05	0.68	22.73	0.187	0.200	Pass
			RB1#25	21.93	0.68	22.61	0.182	0.200	Pass
			RB1#49	21.95	0.68	22.63	0.183	0.200	Pass
			RB25#0	20.88	0.68	21.56	0.143	0.200	Pass
			RB25#13	21.02	0.68	21.70	0.148	0.200	Pass
			RB25#25	20.99	0.68	21.67	0.147	0.200	Pass
			RB50#0	21.01	0.68	21.69	0.148	0.200	Pass
		16-QAM	RB1#0	21.37	0.68	22.05	0.160	0.200	Pass
			RB1#25	21.24	0.68	21.92	0.156	0.200	Pass
			RB1#49	21.29	0.68	21.97	0.157	0.200	Pass
			RB25#0	19.94	0.68	20.62	0.115	0.200	Pass
			RB25#13	20.06	0.68	20.74	0.119	0.200	Pass
			RB25#25	20.04	0.68	20.72	0.118	0.200	Pass
			RB50#0	20.03	0.68	20.71	0.118	0.200	Pass
15 MHz	LCH	QPSK	RB1#0	21.81	0.68	22.49	0.177	0.200	Pass
			RB1#38	21.97	0.68	22.65	0.184	0.200	Pass
			RB1#74	21.78	0.68	22.46	0.176	0.200	Pass
			RB36#0	20.99	0.68	21.67	0.147	0.200	Pass
			RB36#19	20.96	0.68	21.64	0.146	0.200	Pass
			RB36#39	20.92	0.68	21.60	0.145	0.200	Pass
			RB75#0	20.95	0.68	21.63	0.146	0.200	Pass
		16-QAM	RB1#0	21.23	0.68	21.91	0.155	0.200	Pass
			RB1#38	21.15	0.68	21.83	0.152	0.200	Pass
			RB1#74	21.01	0.68	21.69	0.148	0.200	Pass
			RB36#0	20	0.68	20.68	0.117	0.200	Pass
			RB36#19	20.01	0.68	20.69	0.117	0.200	Pass
			RB36#39	19.9	0.68	20.58	0.114	0.200	Pass
			RB75#0	19.96	0.68	20.64	0.116	0.200	Pass
	MCH	QPSK	RB1#0	21.82	0.68	22.50	0.178	0.200	Pass
			RB1#38	21.8	0.68	22.48	0.177	0.200	Pass
			RB1#74	21.9	0.68	22.58	0.181	0.200	Pass
			RB36#0	20.88	0.68	21.56	0.143	0.200	Pass
			RB36#19	20.97	0.68	21.65	0.146	0.200	Pass
			RB36#39	20.95	0.68	21.63	0.146	0.200	Pass
			RB75#0	20.96	0.68	21.64	0.146	0.200	Pass
		16-QAM	RB1#0	21.06	0.68	21.74	0.149	0.200	Pass
			RB1#38	21.25	0.68	21.93	0.156	0.200	Pass
			RB1#74	21.08	0.68	21.76	0.150	0.200	Pass

Test BW	Test Channel	Test Mode	Test RB (Size#Offset)	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND48									
			RB36#0	19.95	0.68	20.63	0.116	0.200	Pass
			RB36#19	20.02	0.68	20.70	0.117	0.200	Pass
			RB36#39	20	0.68	20.68	0.117	0.200	Pass
			RB75#0	20.01	0.68	20.69	0.117	0.200	Pass
	HCH	QPSK	RB1#0	22.08	0.68	22.76	0.189	0.200	Pass
			RB1#38	21.83	0.68	22.51	0.178	0.200	Pass
			RB1#74	21.89	0.68	22.57	0.181	0.200	Pass
			RB36#0	20.92	0.68	21.60	0.145	0.200	Pass
			RB36#19	21.04	0.68	21.72	0.149	0.200	Pass
			RB36#39	20.99	0.68	21.67	0.147	0.200	Pass
			RB75#0	20.99	0.68	21.67	0.147	0.200	Pass
		16-QAM	RB1#0	21.19	0.68	21.87	0.154	0.200	Pass
			RB1#38	21.24	0.68	21.92	0.156	0.200	Pass
			RB1#74	21.08	0.68	21.76	0.150	0.200	Pass
			RB36#0	20	0.68	20.68	0.117	0.200	Pass
			RB36#19	20.07	0.68	20.75	0.119	0.200	Pass
			RB36#39	20.02	0.68	20.70	0.117	0.200	Pass
			RB75#0	20.05	0.68	20.73	0.118	0.200	Pass
20 MHz	LCH	QPSK	RB1#0	21.92	0.68	22.60	0.182	0.200	Pass
			RB1#50	21.86	0.68	22.54	0.179	0.200	Pass
			RB1#99	21.77	0.68	22.45	0.176	0.200	Pass
			RB50#0	20.84	0.68	21.52	0.142	0.200	Pass
			RB50#25	20.98	0.68	21.66	0.147	0.200	Pass
			RB50#50	20.92	0.68	21.60	0.145	0.200	Pass
			RB100#0	20.93	0.68	21.61	0.145	0.200	Pass
		16-QAM	RB1#0	21.17	0.68	21.85	0.153	0.200	Pass
			RB1#50	21.11	0.68	21.79	0.151	0.200	Pass
			RB1#99	21.02	0.68	21.70	0.148	0.200	Pass
			RB50#0	19.91	0.68	20.59	0.115	0.200	Pass
			RB50#25	20	0.68	20.68	0.117	0.200	Pass
			RB50#50	19.9	0.68	20.58	0.114	0.200	Pass
			RB100#0	19.96	0.68	20.64	0.116	0.200	Pass
	MCH	QPSK	RB1#0	21.86	0.68	22.54	0.179	0.200	Pass
			RB1#50	21.91	0.68	22.59	0.182	0.200	Pass
			RB1#99	21.91	0.68	22.59	0.182	0.200	Pass
			RB50#0	20.91	0.68	21.59	0.144	0.200	Pass
			RB50#25	20.99	0.68	21.67	0.147	0.200	Pass
			RB50#50	20.95	0.68	21.63	0.146	0.200	Pass

Test BW	Test Channel	Test Mode	Test RB (Size#Offset)	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
LTE BAND48									
			RB100#0	20.97	0.68	21.65	0.146	0.200	Pass
		16-QAM	RB1#0	21.16	0.68	21.84	0.153	0.200	Pass
			RB1#50	21.17	0.68	21.85	0.153	0.200	Pass
			RB1#99	21.25	0.68	21.93	0.156	0.200	Pass
			RB50#0	19.96	0.68	20.64	0.116	0.200	Pass
			RB50#25	20.03	0.68	20.71	0.118	0.200	Pass
			RB50#50	19.99	0.68	20.67	0.117	0.200	Pass
			RB100#0	20	0.68	20.68	0.117	0.200	Pass
	HCH	QPSK	RB1#0	22.08	0.68	22.76	0.189	0.200	Pass
			RB1#50	21.95	0.68	22.63	0.183	0.200	Pass
			RB1#99	21.87	0.68	22.55	0.180	0.200	Pass
			RB50#0	20.92	0.68	21.60	0.145	0.200	Pass
			RB50#25	21	0.68	21.68	0.147	0.200	Pass
			RB50#50	20.99	0.68	21.67	0.147	0.200	Pass
			RB100#0	20.97	0.68	21.65	0.146	0.200	Pass
		16-QAM	RB1#0	21.27	0.68	21.95	0.157	0.200	Pass
			RB1#50	21.38	0.68	22.06	0.161	0.200	Pass
			RB1#99	21.22	0.68	21.90	0.155	0.200	Pass
			RB50#0	19.99	0.68	20.67	0.117	0.200	Pass
			RB50#25	20.1	0.68	20.78	0.120	0.200	Pass
			RB50#50	20	0.68	20.68	0.117	0.200	Pass
			RB100#0	19.99	0.68	20.67	0.117	0.200	Pass

NR Mode Test Data

Test BW	Test Channel	Test Mode	UL RB Number	UL RB Position	Conducted Output AV Power(dBm)	Antenna Gain (dBi)	EIRP (dBm)	ERP (W)	Limit (W)	Verdict
NR Band n48										
10	LCH	PI/2 BPSK	12	6	18.23	0.68	18.91	0.078	2.00	Pass
			1	1	22.12	0.68	22.80	0.191	2.00	Pass
			1	22	22.12	0.68	22.80	0.191	2.00	Pass
		QPSK	12	6	21.99	0.68	22.67	0.185	2.00	Pass
			1	1	21.98	0.68	22.66	0.185	2.00	Pass
			1	22	22.08	0.68	22.76	0.189	2.00	Pass
		16QAM	12	6	20.84	0.68	21.52	0.142	2.00	Pass
			1	1	20.92	0.68	21.60	0.145	2.00	Pass
			1	22	20.98	0.68	21.66	0.147	2.00	Pass
		64QAM	12	6	19.48	0.68	20.16	0.104	2.00	Pass
			1	1	19.43	0.68	20.11	0.103	2.00	Pass
			1	22	19.43	0.68	20.11	0.103	2.00	Pass
		256QAM	12	6	17.53	0.68	18.21	0.066	2.00	Pass
			1	1	17.43	0.68	18.11	0.065	2.00	Pass
			1	22	17.56	0.68	18.24	0.067	2.00	Pass
	MCH	PI/2 BPSK	12	6	22.16	0.68	22.84	0.192	2.00	Pass
			1	1	22.11	0.68	22.79	0.190	2.00	Pass
			1	22	22.19	0.68	22.87	0.194	2.00	Pass
		QPSK	12	6	22.16	0.68	22.84	0.192	2.00	Pass
			1	1	22.15	0.68	22.83	0.192	2.00	Pass
			1	22	22.13	0.68	22.81	0.191	2.00	Pass
		16QAM	12	6	20.96	0.68	21.64	0.146	2.00	Pass
			1	1	21.02	0.68	21.70	0.148	2.00	Pass
			1	22	21.19	0.68	21.87	0.154	2.00	Pass
		64QAM	12	6	19.53	0.68	20.21	0.105	2.00	Pass
			1	1	19.5	0.68	20.18	0.104	2.00	Pass
			1	22	19.66	0.68	20.34	0.108	2.00	Pass
		256QAM	12	6	17.54	0.68	18.22	0.066	2.00	Pass
			1	1	17.58	0.68	18.26	0.067	2.00	Pass
			1	22	17.67	0.68	18.35	0.068	2.00	Pass
	HCH	PI/2 BPSK	12	6	22.03	0.68	22.71	0.187	2.00	Pass
			1	1	22.02	0.68	22.70	0.186	2.00	Pass
			1	22	22.02	0.68	22.70	0.186	2.00	Pass
		QPSK	12	6	22.08	0.68	22.76	0.189	2.00	Pass
			1	1	22.03	0.68	22.71	0.187	2.00	Pass
			1	22	21.96	0.68	22.64	0.184	2.00	Pass
		16QAM	12	6	20.97	0.68	21.65	0.146	2.00	Pass

			1	1	21.03	0.68	21.71	0.148	2.00	Pass
			1	22	21.08	0.68	21.76	0.150	2.00	Pass
		64QAM	12	6	19.53	0.68	20.21	0.105	2.00	Pass
			1	1	19.49	0.68	20.17	0.104	2.00	Pass
			1	22	19.58	0.68	20.26	0.106	2.00	Pass
		256QAM	12	6	17.46	0.68	18.14	0.065	2.00	Pass
			1	1	17.5	0.68	18.18	0.066	2.00	Pass
			1	22	17.54	0.68	18.22	0.066	2.00	Pass
20	LCH	PI/2 BPSK	25	12	21.93	0.68	22.61	0.182	2.00	Pass
			1	1	22.06	0.68	22.74	0.188	2.00	Pass
			1	49	21.98	0.68	22.66	0.185	2.00	Pass
		QPSK	25	12	22	0.68	22.68	0.185	2.00	Pass
			1	1	22	0.68	22.68	0.185	2.00	Pass
			1	49	22.02	0.68	22.70	0.186	2.00	Pass
		16QAM	25	12	20.97	0.68	21.65	0.146	2.00	Pass
			1	1	20.95	0.68	21.63	0.146	2.00	Pass
			1	49	20.97	0.68	21.65	0.146	2.00	Pass
		64QAM	25	12	19.39	0.68	20.07	0.102	2.00	Pass
			1	1	19.42	0.68	20.10	0.102	2.00	Pass
			1	49	19.31	0.68	19.99	0.100	2.00	Pass
		256QAM	25	12	17.41	0.68	18.09	0.064	2.00	Pass
			1	1	17.45	0.68	18.13	0.065	2.00	Pass
			1	49	17.45	0.68	18.13	0.065	2.00	Pass
	MCH	PI/2 BPSK	25	12	22.14	0.68	22.82	0.191	2.00	Pass
			1	1	21.97	0.68	22.65	0.184	2.00	Pass
			1	49	22.09	0.68	22.77	0.189	2.00	Pass
		QPSK	25	12	22.03	0.68	22.71	0.187	2.00	Pass
			1	1	22	0.68	22.68	0.185	2.00	Pass
			1	49	22.01	0.68	22.69	0.186	2.00	Pass
		16QAM	25	12	20.99	0.68	21.67	0.147	2.00	Pass
			1	1	20.91	0.68	21.59	0.144	2.00	Pass
			1	49	20.93	0.68	21.61	0.145	2.00	Pass
		64QAM	25	12	19.46	0.68	20.14	0.103	2.00	Pass
			1	1	19.39	0.68	20.07	0.102	2.00	Pass
			1	49	19.43	0.68	20.11	0.103	2.00	Pass
		256QAM	25	12	17.55	0.68	18.23	0.067	2.00	Pass
			1	1	17.39	0.68	18.07	0.064	2.00	Pass
			1	49	17.56	0.68	18.24	0.067	2.00	Pass
	HCH	PI/2 BPSK	25	12	22	0.68	22.68	0.185	2.00	Pass
			1	1	21.95	0.68	22.63	0.183	2.00	Pass
			1	49	21.97	0.68	22.65	0.184	2.00	Pass
		QPSK	25	12	22.05	0.68	22.73	0.187	2.00	Pass
			1	1	21.99	0.68	22.67	0.185	2.00	Pass

			1	49	21.93	0.68	22.61	0.182	2.00	Pass
		16QAM	25	12	20.97	0.68	21.65	0.146	2.00	Pass
			1	1	20.88	0.68	21.56	0.143	2.00	Pass
			1	49	20.87	0.68	21.55	0.143	2.00	Pass
		64QAM	25	12	19.47	0.68	20.15	0.104	2.00	Pass
			1	1	19.44	0.68	20.12	0.103	2.00	Pass
			1	49	19.28	0.68	19.96	0.099	2.00	Pass
		256QAM	25	12	17.4	0.68	18.08	0.064	2.00	Pass
			1	1	17.43	0.68	18.11	0.065	2.00	Pass
			1	49	17.35	0.68	18.03	0.064	2.00	Pass
40	LCH	PI/2 BPSK	50	25	22.07	0.68	22.75	0.188	2.00	Pass
			1	1	22.02	0.68	22.70	0.186	2.00	Pass
			1	104	22	0.68	22.68	0.185	2.00	Pass
		QPSK	50	25	22.13	0.68	22.81	0.191	2.00	Pass
			1	1	22.02	0.68	22.70	0.186	2.00	Pass
			1	104	22.03	0.68	22.71	0.187	2.00	Pass
		16QAM	50	25	21.07	0.68	21.75	0.150	2.00	Pass
			1	1	20.92	0.68	21.60	0.145	2.00	Pass
			1	104	20.91	0.68	21.59	0.144	2.00	Pass
		64QAM	50	25	19.56	0.68	20.24	0.106	2.00	Pass
			1	1	19.58	0.68	20.26	0.106	2.00	Pass
			1	104	19.56	0.68	20.24	0.106	2.00	Pass
		256QAM	50	25	17.59	0.68	18.27	0.067	2.00	Pass
			1	1	17.57	0.68	18.25	0.067	2.00	Pass
			1	104	17.59	0.68	18.27	0.067	2.00	Pass
	MCH	PI/2 BPSK	50	25	22.17	0.68	22.85	0.193	2.00	Pass
			1	1	22.08	0.68	22.76	0.189	2.00	Pass
			1	104	22.15	0.68	22.83	0.192	2.00	Pass
		QPSK	50	25	22.13	0.68	22.81	0.191	2.00	Pass
			1	1	22.1	0.68	22.78	0.190	2.00	Pass
			1	104	22.08	0.68	22.76	0.189	2.00	Pass
		16QAM	50	25	21.14	0.68	21.82	0.152	2.00	Pass
			1	1	21.06	0.68	21.74	0.149	2.00	Pass
			1	104	21.18	0.68	21.86	0.153	2.00	Pass
		64QAM	50	25	19.59	0.68	20.27	0.106	2.00	Pass
			1	1	19.56	0.68	20.24	0.106	2.00	Pass
			1	104	19.63	0.68	20.31	0.107	2.00	Pass
		256QAM	50	25	17.66	0.68	18.34	0.068	2.00	Pass
			1	1	17.52	0.68	18.20	0.066	2.00	Pass
			1	104	17.66	0.68	18.34	0.068	2.00	Pass
	HCH	PI/2 BPSK	50	25	22.14	0.68	22.82	0.191	2.00	Pass
			1	1	22.08	0.68	22.76	0.189	2.00	Pass
			1	104	22.07	0.68	22.75	0.188	2.00	Pass

		QPSK	50	25	21.98	0.68	22.66	0.185	2.00	Pass
			1	1	22.01	0.68	22.69	0.186	2.00	Pass
			1	104	21.87	0.68	22.55	0.180	2.00	Pass
		16QAM	50	25	21.04	0.68	21.72	0.149	2.00	Pass
			1	1	20.87	0.68	21.55	0.143	2.00	Pass
			1	104	20.84	0.68	21.52	0.142	2.00	Pass
		64QAM	50	25	19.49	0.68	20.17	0.104	2.00	Pass
			1	1	19.5	0.68	20.18	0.104	2.00	Pass
			1	104	19.51	0.68	20.19	0.104	2.00	Pass
		256QAM	50	25	17.66	0.68	18.34	0.068	2.00	Pass
			1	1	17.43	0.68	18.11	0.065	2.00	Pass
			1	104	17.56	0.68	18.24	0.067	2.00	Pass

Bandwidth (MHz)	UL Channel	UL OFDM	UL Modulation	UL RB Number	UL RB Position	Conducted Output Power (dBm)			SUM - EIRP (W)	Limit (W)
NR Band n48 UL MIMO										
10	Low	CP-OFDM	QPSK	25	12	18.330	17.544	20.9651	0.173	0.200
			QPSK	1	0	16.774	15.960	19.3963	0.156	0.200
			QPSK	51	0	16.794	16.089	19.4661	0.109	0.200
			16QAM	25	12	17.676	17.100	20.4078	0.111	0.200
			16QAM	1	0	16.927	15.927	19.466	0.137	0.200
			16QAM	51	0	16.806	16.129	19.491	0.111	0.200
			64QAM	1	0	16.159	15.439	18.8242	0.111	0.200
			64QAM	51	0	16.306	15.433	18.9017	0.095	0.200
			256QAM	1	0	13.063	12.348	15.7305	0.097	0.200
			256QAM	51	0	13.349	12.547	15.9768	0.047	0.200
	High		QPSK	25	12	18.443	18.021	21.2474	0.050	0.200
			QPSK	1	0	16.818	16.658	19.749	0.166	0.200
			QPSK	51	0	16.876	16.658	19.7787	0.118	0.200
			16QAM	25	12	17.710	17.485	20.6093	0.119	0.200
			16QAM	1	0	16.826	16.505	19.6788	0.144	0.200
			16QAM	51	0	16.910	16.679	19.8063	0.116	0.200
			64QAM	1	0	16.287	16.025	19.1683	0.119	0.200
			64QAM	51	0	16.445	15.951	19.2153	0.103	0.200
			256QAM	1	0	13.266	12.892	16.0933	0.104	0.200
			256QAM	51	0	13.333	13.005	16.1824	0.051	0.200
20	Low	CP-OFDM	QPSK	1	0	18.209	17.966	21.0995	0.161	0.200
			QPSK	106	0	16.566	16.168	19.3819	0.108	0.200
			QPSK	53	26	16.418	16.299	19.3692	0.108	0.200
			16QAM	1	0	16.803	16.351	19.5932	0.114	0.200
			16QAM	106	0	17.700	17.332	20.5302	0.141	0.200
			16QAM	1	0	16.636	16.039	19.3581	0.108	0.200
			64QAM	106	0	16.565	16.086	19.3424	0.107	0.200
			64QAM	1	0	16.544	16.285	19.4267	0.109	0.200
			256QAM	106	0	15.801	15.616	18.7198	0.093	0.200
			256QAM	53	26	17.216	17.693	20.4713	0.138	0.200
	High		QPSK	1	0	15.644	16.138	18.9083	0.097	0.200
			QPSK	106	0	15.625	16.039	18.8472	0.095	0.200
			QPSK	53	26	15.707	16.181	18.9608	0.098	0.200
			16QAM	1	0	16.633	17.162	19.9158	0.122	0.200
			16QAM	106	0	15.608	16.085	18.8633	0.096	0.200
			16QAM	1	0	15.527	15.976	18.7676	0.093	0.200
			64QAM	106	0	15.603	16.073	18.8547	0.095	0.200
			64QAM	1	0	14.982	15.512	18.2654	0.083	0.200
			256QAM	106	0	14.973	15.484	18.2463	0.083	0.200

40	Low	CP-OFDM	QPSK	53	26	16.742	16.085	19.4362	0.052	0.200
			QPSK	1	0	16.913	16.079	19.5263	0.168	0.200
			QPSK	106	0	18.026	17.176	20.6321	0.110	0.200
			16QAM	53	26	16.736	16.035	19.4099	0.112	0.200
			16QAM	1	0	16.899	16.075	19.5168	0.145	0.200
			16QAM	106	0	16.101	15.474	18.8091	0.109	0.200
			64QAM	1	0	16.376	15.589	19.0106	0.112	0.200
			64QAM	106	0	12.976	12.273	15.649	0.095	0.200
			256QAM	1	0	13.349	12.636	16.0174	0.100	0.200
			256QAM	106	0	18.623	18.150	21.4032	0.046	0.200
	High		QPSK	53	26	16.831	16.499	19.6785	0.050	0.200
			QPSK	1	0	17.008	16.659	19.8473	0.173	0.200
			QPSK	106	0	18.016	17.573	20.8104	0.116	0.200
			16QAM	53	26	16.888	16.499	19.7082	0.121	0.200
			16QAM	1	0	16.992	16.546	19.785	0.151	0.200
			16QAM	106	0	16.280	16.150	19.2258	0.117	0.200
			64QAM	1	0	16.369	16.029	19.2126	0.119	0.200
			64QAM	106	0	13.143	12.792	15.9813	0.104	0.200
			256QAM	1	0	13.497	13.115	16.3205	0.104	0.200
			256QAM	106	0	18.330	17.544	20.9651	0.049	0.200

A.2 Peak to Average Ratio

Note 1: Test plots please refer to the document “Annex No.:BL-SH2480562-503 Data Part 1.pdf”.

LTE Mode Test Data

Test Band	Test Band width	Test Channel	Test Mode	Test RB (Size#Offset)	Peak to Average Ratio (dB)	Limit (dB)	Refer to Plot[Note1]	Verdict
LTE Band 48	10 MHz	LCH	QPSK	RB1#Low	7.27	13	1.1	Pass
				RB50#Low	8.4	13	1.2	Pass
			16-QAM	RB1#Low	8.36	13	1.3	Pass
				RB50#Low	9.28	13	1.4	Pass
		MCH	QPSK	RB1#Low	7.52	13	1.5	Pass
				RB50#Low	8.37	13	1.6	Pass
			16-QAM	RB1#Low	8.3	13	1.7	Pass
				RB50#Low	9.3	13	1.8	Pass
		HCH	QPSK	RB1#Low	7.55	13	1.9	Pass
				RB50#Low	8.41	13	1.10	Pass
			16-QAM	RB1#Low	8.32	13	1.11	Pass
				RB50#Low	9.44	13	1.12	Pass

NR Mode Test Data

Test Band	NR Test Bandwidth	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Peak to Average Ratio (dB)	Limit (dB)	Refer to Plot[Note2]	Verdict
n48	10 MHz	LCH	PI2 BPSK	1	0	8.35	13	2.1	Pass
				24	0	8.26	13	2.2	Pass
			QPSK	1	0	8.35	13	2.3	Pass
				24	0	8.46	13	2.4	Pass
			16QAM	1	0	8.33	13	2.5	Pass
				24	0	8.35	13	2.6	Pass
			64QAM	1	0	8.32	13	2.7	Pass
				24	0	8.31	13	2.8	Pass
			256QAM	1	0	8.39	13	2.9	Pass
				24	0	8.35	13	2.10	Pass
		MCH	PI2 BPSK	1	0	8.38	13	2.11	Pass
				24	0	8.34	13	2.12	Pass
			QPSK	1	0	8.3	13	2.13	Pass
				24	0	8.33	13	2.14	Pass
			16QAM	1	0	8.4	13	2.15	Pass
				24	0	8.37	13	2.16	Pass
			64QAM	1	0	8.36	13	2.17	Pass
				24	0	8.39	13	2.18	Pass
			256QAM	1	0	8.32	13	2.19	Pass
				24	0	8.33	13	2.20	Pass
		HCH	PI2 BPSK	1	0	8.36	13	2.21	Pass
				24	0	8.41	13	2.22	Pass
			QPSK	1	0	8.38	13	2.23	Pass
				24	0	8.52	13	2.24	Pass
			16QAM	1	0	8.36	13	2.25	Pass
				24	0	8.37	13	2.26	Pass
			64QAM	1	0	8.48	13	2.27	Pass
				24	0	8.3	13	2.28	Pass
			256QAM	1	0	8.4	13	2.29	Pass
				24	0	8.38	13	2.30	Pass
	20 MHz	LCH	PI2 BPSK	1	0	8.39	13	2.31	Pass
				50	0	8.36	13	2.32	Pass
			QPSK	1	0	8.32	13	2.33	Pass
				50	0	8.42	13	2.34	Pass
			16QAM	1	0	8.43	13	2.35	Pass
				50	0	8.43	13	2.36	Pass
			64QAM	1	0	8.36	13	2.37	Pass
				50	0	8.36	13	2.38	Pass

Test Band	NR Test Bandwidth	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Peak to Average Ratio (dB)	Limit (dB)	Refer to Plot[Note2]	Verdict
			256QAM	1	0	8.34	13	2.39	Pass
				50	0	8.39	13	2.40	Pass
		MCH	PI2 BPSK	1	0	8.44	13	2.41	Pass
				50	0	8.4	13	2.42	Pass
			QPSK	1	0	8.39	13	2.43	Pass
				50	0	8.38	13	2.44	Pass
			16QAM	1	0	8.37	13	2.45	Pass
				50	0	8.36	13	2.46	Pass
			64QAM	1	0	8.31	13	2.47	Pass
				50	0	8.44	13	2.48	Pass
			256QAM	1	0	8.44	13	2.49	Pass
				50	0	8.42	13	2.50	Pass
		HCH	PI2 BPSK	1	0	8.43	13	2.51	Pass
				50	0	8.36	13	2.52	Pass
			QPSK	1	0	8.33	13	2.53	Pass
				50	0	8.35	13	2.54	Pass
			16QAM	1	0	8.38	13	2.55	Pass
				50	0	8.35	13	2.56	Pass
			64QAM	1	0	8.4	13	2.57	Pass
				50	0	8.37	13	2.58	Pass
			256QAM	1	0	8.35	13	2.59	Pass
				50	0	8.36	13	2.60	Pass
	40 MHz	LCH	PI2 BPSK	1	0	8.39	13	2.61	Pass
				100	0	8.41	13	2.62	Pass
			QPSK	1	0	8.39	13	2.63	Pass
				100	0	8.35	13	2.64	Pass
			16QAM	1	0	8.32	13	2.65	Pass
				100	0	8.35	13	2.66	Pass
			64QAM	1	0	8.39	13	2.67	Pass
				100	0	8.39	13	2.68	Pass
			256QAM	1	0	8.4	13	2.69	Pass
				100	0	8.38	13	2.70	Pass
		MCH	PI2 BPSK	1	0	8.42	13	2.71	Pass
				100	0	8.37	13	2.72	Pass
			QPSK	1	0	8.37	13	2.73	Pass
				100	0	8.42	13	2.74	Pass
			16QAM	1	0	8.41	13	2.75	Pass
				100	0	8.37	13	2.76	Pass
			64QAM	1	0	8.37	13	2.77	Pass

Test Band	NR Test Bandwidth	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Peak to Average Ratio (dB)	Limit (dB)	Refer to Plot[Note2]	Verdict
				100	0	8.41	13	2.78	Pass
			256QAM	1	0	8.37	13	2.79	Pass
				100	0	8.39	13	2.80	Pass
		HCH	PI2 BPSK	1	0	8.36	13	2.81	Pass
				100	0	8.39	13	2.82	Pass
			QPSK	1	0	8.38	13	2.83	Pass
				100	0	8.39	13	2.84	Pass
			16QAM	1	0	8.34	13	2.85	Pass
				100	0	8.3	13	2.86	Pass
			64QAM	1	0	8.39	13	2.87	Pass
				100	0	8.38	13	2.88	Pass
			256QAM	1	0	8.34	13	2.89	Pass
				100	0	8.34	13	2.90	Pass

A.3 Occupied Bandwidth

Note 1: All modes were tested, but only the typical data were reported in this report.

Note 2: Test plots please refer to the document “Annex No.:BL-SH2480562-503 Data Part 2.pdf”.

LTE Mode Test Data

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB (Size#Offset)	Measured 99% Occupied Bandwidth (MHz)	Measured -26 dB Occupied Bandwidth (MHz)	Refer to Plot[Note2]
Band 48(Part 96)	5 MHz	LCH	QPSK	RB25#Low	4.502	5.24	1.1
			16-QAM	RB25#Low	4.513	5.092	1.2
		MCH	QPSK	RB25#Low	4.496	5.087	1.3
			16-QAM	RB25#Low	4.505	5.176	1.4
		HCH	QPSK	RB25#Low	4.498	5.175	1.5
			16-QAM	RB25#Low	4.503	5.149	1.6
	10 MHz	LCH	QPSK	RB50#Low	8.973	10.127	1.7
			16-QAM	RB50#Low	8.962	9.952	1.8
		MCH	QPSK	RB50#Low	8.983	10.307	1.9
			16-QAM	RB50#Low	8.954	9.992	1.10
		HCH	QPSK	RB50#Low	8.96	10.111	1.11
			16-QAM	RB50#Low	8.961	10.31	1.12
	15 MHz	LCH	QPSK	RB75#Low	13.468	14.635	1.13
			16-QAM	RB75#Low	13.525	14.596	1.14
		MCH	QPSK	RB75#Low	13.517	14.714	1.15
			16-QAM	RB75#Low	13.48	14.614	1.16
		HCH	QPSK	RB75#Low	13.534	14.598	1.17
			16-QAM	RB75#Low	13.463	14.543	1.18
	20 MHz	LCH	QPSK	RB100#Low	17.975	19.769	1.19
			16-QAM	RB100#Low	18.012	19.497	1.20
		MCH	QPSK	RB100#Low	17.999	19.495	1.21
			16-QAM	RB100#Low	17.978	19.354	1.22
		HCH	QPSK	RB100#Low	17.971	19.48	1.23
			16-QAM	RB100#Low	18.007	19.376	1.24

NR Mode Test Data

Test Band	NR Test Bandwidth	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Measured 99% Occupied Bandwidth (MHz)	Measured -26 dB Occupied Bandwidth (MHz)	Verdict	Refer to Plot[Note2]
n48	10 MHz	LCH	QPSK	24	0	8.56	9.36	Pass	2.1
		MCH	QPSK	24	0	8.56	9.49	Pass	2.2
		HCH	QPSK	24	0	8.56	9.51	Pass	2.3
	15 MHz	LCH	QPSK	38	0	8.57	9.36	Pass	2.4
		MCH	QPSK	38	0	8.57	9.32	Pass	2.5
		HCH	QPSK	38	0	8.56	9.49	Pass	2.6
	20 MHz	LCH	QPSK	51	0	8.56	9.43	Pass	2.7
		MCH	QPSK	51	0	8.56	9.43	Pass	2.8
		HCH	QPSK	51	0	8.56	9.41	Pass	2.9
	30 MHz	LCH	QPSK	78	0	8.55	9.51	Pass	2.10
		MCH	QPSK	78	0	8.55	9.49	Pass	2.11
		HCH	QPSK	78	0	8.55	9.5	Pass	2.12
	40 MHz	LCH	QPSK	106	0	13.57	14.46	Pass	2.13
		MCH	QPSK	106	0	13.58	14.41	Pass	2.14
		HCH	QPSK	106	0	13.55	14.45	Pass	2.15
	10 MHz	LCH	16QAM	24	0	13.57	14.79	Pass	2.16
		MCH	16QAM	24	0	13.56	14.66	Pass	2.17
		HCH	16QAM	24	0	13.54	14.34	Pass	2.18
	15 MHz	LCH	16QAM	38	0	13.55	14.22	Pass	2.19
		MCH	16QAM	38	0	13.54	14.29	Pass	2.20
		HCH	16QAM	38	0	13.55	14.57	Pass	2.21
	20 MHz	LCH	16QAM	51	0	13.54	14.33	Pass	2.22
		MCH	16QAM	51	0	13.54	14.34	Pass	2.23
		HCH	16QAM	51	0	13.53	14.34	Pass	2.24
	30 MHz	LCH	16QAM	78	0	18.17	19.1	Pass	2.25
		MCH	16QAM	78	0	18.19	19.1	Pass	2.26
		HCH	16QAM	78	0	18.18	18.98	Pass	2.27
	40 MHz	LCH	16QAM	106	0	18.16	18.9	Pass	2.28
		MCH	16QAM	106	0	18.18	19.08	Pass	2.29
		HCH	16QAM	106	0	18.19	19.05	Pass	2.30
	10 MHz	LCH	64QAM	24	0	18.23	19.14	Pass	2.31
		MCH	64QAM	24	0	18.19	19.06	Pass	2.32
		HCH	64QAM	24	0	18.17	19.02	Pass	2.33
	15 MHz	LCH	64QAM	38	0	18.15	18.8	Pass	2.34
		MCH	64QAM	38	0	18.17	18.86	Pass	2.35
		HCH	64QAM	38	0	18.16	18.93	Pass	2.36

Test Band	NR Test Bandwidth	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Measured 99% Occupied Bandwidth (MHz)	Measured -26 dB Occupied Bandwidth (MHz)	Verdict	Refer to Plot[Note2]
	20 MHz	LCH	64QAM	51	0	28.29	31.03	Pass	2.37
		MCH	64QAM	51	0	28.36	31.06	Pass	2.38
		HCH	64QAM	51	0	28.24	31.99	Pass	2.39
	30 MHz	LCH	64QAM	78	0	28.25	31.95	Pass	2.40
		MCH	64QAM	78	0	28.27	31.87	Pass	2.41
		HCH	64QAM	78	0	28.32	31.03	Pass	2.42
	40 MHz	LCH	16QAM	106	0	28.3	31.36	Pass	2.43
		MCH	16QAM	106	0	28.31	31.37	Pass	2.44
		HCH	16QAM	106	0	28.28	31.23	Pass	2.45
	10 MHz	LCH	256QAM	24	0	28.24	31.88	Pass	2.46
		MCH	256QAM	24	0	28.29	31.14	Pass	2.47
		HCH	256QAM	24	0	28.25	31.04	Pass	2.48
	15 MHz	LCH	256QAM	38	0	38.11	41.01	Pass	2.49
		MCH	256QAM	38	0	38.05	40.92	Pass	2.50
		HCH	256QAM	38	0	38.05	40.82	Pass	2.51
	20 MHz	LCH	256QAM	51	0	38.14	41.18	Pass	2.52
		MCH	256QAM	51	0	38.15	41.33	Pass	2.53
		HCH	256QAM	51	0	38.09	41.16	Pass	2.54
	30 MHz	LCH	256QAM	78	0	38.2	41.42	Pass	2.55
		MCH	256QAM	78	0	38.19	41.17	Pass	2.56
		HCH	256QAM	78	0	38.18	41.1	Pass	2.57
	40 MHz	LCH	256QAM	106	0	38.08	41.07	Pass	2.58
		MCH	256QAM	106	0	38.09	41.1	Pass	2.59
		HCH	256QAM	106	0	38.1	41.04	Pass	2.60

A.4 Frequency Stability

LTE Band 48(Part 96) QPSK 10 MHz

Test Conditions		Frequency Deviation		Verdict
Power (VDC)	Temperature (°C)	MCH 3625 MHz		
		Value (Hz)	Limits (Hz)	
3.8	-30	-3.88	±8162.5	Pass
	-20	-0.84		
	-10	-6.83		
	0	-0.5		
	+10	-4.08		
	+20	-7.58		
	+25	-5.16		
	+30	-3.31		
	+40	-4.37		
	+50	-9.83		
	+60	/		
	+70	/		
4.2	+25	-3.14		
3.6	+25	-3.47		

LTE Band 48(Part 96) 16QAM10 MHz

Test Conditions		Frequency Deviation		Verdict
Power (VDC)	Temperature (°C)	MCH 3625 MHz		
		Value (Hz)	Limits (Hz)	
3.8	-30	-0.89	±8162.5	Pass
	-20	-5.4		
	-10	-0.95		
	0	-4.25		
	+10	0.98		
	+20	-1.7		
	+25	-3.34		
	+30	0.52		
	+40	-1.13		
	+50	1.09		
	+60	/		
	+70	/		
4.2	+25	-8.3		
3.6	+25	0.2		

NR Band n48 QPSK 40 MHz

Test Conditions		Frequency Deviation		Verdict
Power (VDC)	Temperature (°C)	MCH 3624.99 MHz		
		Value(Hz)	Limits (Hz)	
3.8	-30	-5.95	±9062.48	Pass
	-20	-10.65		
	-10	-12.67		
	0	-7.95		
	+10	-4.93		
	+20	-6.8		
	+25	-8.05		
	+30	-12.13		
	+40	-9.17		
	+50	-12.57		
	+60	/		
	+70	/		
4.2	+25	-10.44		
3.6	+25	-3.95		

A.5 Spurious Emission at Antenna Terminals

Note 1: The frequencies of verdict which are marked by "N/A" should be ignored because they are UE carrier frequency.

Note 2: Test plots please refer to the document “Annex No.:BL-SH2480562-503 Data Part 3.pdf”.

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB (Size#Offset)	Refer to Plot[Note2]	Verdict
Band 48(Part 96)	5 MHz	LCH	QPSK	RB1#Low	1.1	Pass
			16-QAM	RB1#Low	1.2	Pass
		MCH	QPSK	RB1#Low	1.3	Pass
			16-QAM	RB1#Low	1.4	Pass
		HCH	QPSK	RB1#Low	1.5	Pass
			16-QAM	RB1#Low	1.6	Pass
	10 MHz	LCH	QPSK	RB1#Low	1.7	Pass
			16-QAM	RB1#Low	1.8	Pass
		MCH	QPSK	RB1#Low	1.9	Pass
			16-QAM	RB1#Low	1.10	Pass
		HCH	QPSK	RB1#Low	1.11	Pass
			16-QAM	RB1#Low	1.12	Pass
	15 MHz	LCH	QPSK	RB1#Low	1.13	Pass
			16-QAM	RB1#Low	1.14	Pass
		MCH	QPSK	RB1#Low	1.15	Pass
			16-QAM	RB1#Low	1.16	Pass
		HCH	QPSK	RB1#Low	1.17	Pass
			16-QAM	RB1#Low	1.18	Pass
	20 MHz	LCH	QPSK	RB1#Low	1.19	Pass
			16-QAM	RB1#Low	1.20	Pass
		MCH	QPSK	RB1#Low	1.21	Pass
			16-QAM	RB1#Low	1.22	Pass
		HCH	QPSK	RB1#Low	1.23	Pass
			16-QAM	RB1#Low	1.24	Pass

NR Mode Test Verdict

Test Band	NR Test Bandwidth (MHz)	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Refer to Plot[Note3]	Verdict
n48	10	LCH	QPSK	25	0	2.1	Pass
			QPSK	1	0	2.2	Pass
			QPSK	1	24	2.3	Pass
		MCH	QPSK	25	0	2.4	Pass
			QPSK	1	0	2.5	Pass
			QPSK	1	24	2.6	Pass
		HCH	QPSK	25	0	2.7	Pass
			QPSK	1	0	2.8	Pass
			QPSK	1	24	2.9	Pass
	20	LCH	QPSK	79	0	2.10	Pass
			QPSK	1	0	2.11	Pass
			QPSK	1	78	2.12	Pass
		MCH	QPSK	79	0	2.13	Pass
			QPSK	1	0	2.14	Pass
			QPSK	1	78	2.15	Pass
		HCH	QPSK	79	0	2.16	Pass
			QPSK	1	0	2.17	Pass
			QPSK	1	78	2.18	Pass
	40	LCH	QPSK	106	0	2.19	Pass
			QPSK	1	0	2.20	Pass
			QPSK	1	105	2.21	Pass
		MCH	QPSK	106	0	2.22	Pass
			QPSK	1	0	2.23	Pass
			QPSK	1	105	2.24	Pass
		HCH	QPSK	106	0	2.25	Pass
			QPSK	1	0	2.26	Pass
			QPSK	1	105	2.27	Pass

A.6 Band Edge

Note 1: Test plots please refer to the document “Annex No.:BL-SH2480562-503 Data Part 4.pdf”.

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Test Mode	Test RB (Size#Offset)	Refer to Plot[Note1]	Verdict
Band 48(Part 96)	5 MHz	LCH	QPSK	RB1#Low	1.1	Pass
				RB25#Low	1.2	Pass
			16-QAM	RB1#Low	1.3	Pass
				RB25#Low	1.4	Pass
		HCH	QPSK	RB1#High	1.5	Pass
				RB25#High	1.6	Pass
			16-QAM	RB1#High	1.7	Pass
				RB25#High	1.8	Pass
	10 MHz	LCH	QPSK	RB1#Low	1.9	Pass
				RB50#Low	1.10	Pass
			16-QAM	RB1#Low	1.11	Pass
				RB50#Low	1.12	Pass
		HCH	QPSK	RB1#High	1.13	Pass
				RB50#High	1.14	Pass
			16-QAM	RB1#High	1.15	Pass
				RB50#High	1.16	Pass
	15 MHz	LCH	QPSK	RB1#Low	1.17	Pass
				RB75#Low	1.18	Pass
			16-QAM	RB1#Low	1.19	Pass
				RB75#Low	1.20	Pass
		HCH	QPSK	RB1#High	1.21	Pass
				RB75#High	1.22	Pass
			16-QAM	RB1#High	1.23	Pass
				RB75#High	1.24	Pass
	20 MHz	LCH	QPSK	RB1#Low	1.25	Pass
				RB100#Low	1.26	Pass
			16-QAM	RB1#Low	1.27	Pass
				RB100#Low	1.28	Pass
		HCH	QPSK	RB1#High	1.29	Pass
				RB100#High	1.30	Pass
			16-QAM	RB1#High	1.31	Pass
				RB100#High	1.32	Pass

NR Mode Test Verdict

Test Band	NR Test Bandwidth (MHz)	Test Channel	Test Mode	NR UL RB No.	NR UL RB Pos.	Refer to Plot[Note1]	Verdict
n48	10	LCH	QPSK	1	0	2.1	Pass
				24	0	2.2	Pass
		HCH	QPSK	1	23	2.3	Pass
				24	0	2.4	Pass
	20	LCH	QPSK	1	0	2.5	Pass
				51	0	2.6	Pass
		HCH	QPSK	1	50	2.7	Pass
				51	0	2.8	Pass
	40	LCH	QPSK	1	0	2.9	Pass
				106	0	2.10	Pass
		HCH	QPSK	1	105	2.11	Pass
				106	0	2.12	Pass

A.7 Field Strength of Spurious Radiation

Note 1: All modes have been tested, and only the worst case data are shown here.

Note 2: The frequencies of verdict which are marked by "N/A" should be ignored because they are UE carrier frequency.

Note 3: Test plots please refer to the document “Annex No.:BL-Sh2480562-503 Data Part 5.pdf”.

LTE Mode Test Verdict

Test Band	Test Bandwidth	Test Channel	Refer to PlotNote3	Verdict
Band 48	15 MHz	LCH	1.1	Pass

NR Mode Test Verdict

Test Band	NR Test Bandwidth (MHz)	SCS(kHz)	UL OFDM	NR UL RB No.	NR UL RB Pos.	Refer to Plot[Note3]	Verdict
n48	40 MHz	30 kHz	DFT-s-OFDM	50	25	2.1	Pass

Test Band	NR Test Bandwidth (MHz)	Test Channel	Test Mode	Refer to Plot[Note3]	Verdict
n48 UL MIMO	40	645332	QPSK	3.1	Pass

ANNEX B TEST SETUP PHOTOS

Please refer to the document “BL-SH2480562-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer to the document “BL-SH2480562-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer to the document “BL-SH2480562-AI.PDF”.

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--END OF REPORT--