



FCC RF Test Report

APPLICANT : VINFAST TRADING AND PRODUCTION JOINT
STOCK COMPANY
EQUIPMENT : MULTIMEDIA HEAD UNIT
BRAND NAME : VINFAST
MODEL NAME : VF-EC32U
FCC ID : 2A6HEVF-EC32U
STANDARD : 47 CFR Part 2, 22(H), 24(E), 27(L), 27(F), 27(H), 27(M)
CLASSIFICATION : PCS Licensed Transmitter (PCB)
TEST DATE(S) : Sep. 01, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

This product installed a RF module (Brand Name: Quectel, Model Name: AG35-NA, FCC ID: XMR201905AG35NA), during the test, only Conducted power, ERP/ EIRP and RSE test items are tested in this report, all the other test results are leveraged from module RF report.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG362705B	Rev. 01	Initial issue of report	Nov. 10, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	-	Report Only	-
	§22.913(a)(5)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS	-
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (Band 12) (Band 13)	ERP < 3 Watt		-
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2) (Band 7)	EIRP < 2Watt		-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		-
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	1
3.6	§2.1049	Occupied Bandwidth	-	Report Only	1
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2)(4) §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 13)	< 43+10log ₁₀ (P[Watts])	PASS	1
	§27.53(m)(4)	Conducted Band Edge Measurement (Band 7)	§27.53(m)(4)		
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13)	< 43+10log ₁₀ (P[Watts])	PASS	1
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 7)	< 55+10log ₁₀ (P[Watts])		
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	1
	§2.1055 §24.235 §27.54		Within Authorized Band		



Report Section	FCC Rule	Description	Limit	Result	Remark
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13)	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	Under limit 17.36 dB at 1560.000 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	$< 55 + 10\log_{10}(P[\text{Watts}])$		

Remark 1: All test results were leveraged from module RF report which can refer to Report No. FG912203B.

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



1 General Description

1.1 Applicant

VINFAST TRADING AND PRODUCTION JOINT STOCK COMPANY

Dinh Vu - Cat Hai Economic Zone, Cat Hai Island, Cat Hai Town, Cat Hai District, Hai Phong City, Vietnam

1.2 Manufacturer

VINFAST TRADING AND PRODUCTION JOINT STOCK COMPANY

Dinh Vu - Cat Hai Economic Zone, Cat Hai Island, Cat Hai Town, Cat Hai District, Hai Phong City, Vietnam

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	MULTIMEDIA HEAD UNIT
Brand Name	VINFAST
Model Name	VF-EC32U
FCC ID	2A6HEVF-EC32U
SN Code	Radiation: 230530D00011
HW Version	EEP70005507
SW Version	SOW70005570
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz
Rx Frequency	LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz
Maximum Output Power to Antenna	LTE Band 2 : 22.55 dBm LTE Band 4 : 22.33 dBm LTE Band 5 : 22.95 dBm LTE Band 7 : 22.22 dBm LTE Band 12 : 22.88 dBm LTE Band 13 : 22.67 dBm
Antenna Gain	LTE Band 2 : 2.1 dBi LTE Band 4 : 3.5 dBi LTE Band 5 : 0.7 dBi LTE Band 7 : -1.7 dBi LTE Band 12 : 1.8 dBi LTE Band 13 : 0.1 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum ERP/EIRP Power and Emission Designator

LTE Band 2		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
1.4	1850.7 ~ 1909.3	0.2786	0.2173
3	1851.5 ~ 1908.5	0.2812	0.2148
5	1852.5 ~ 1907.5	0.2831	0.2723
10	1855.0 ~ 1905.0	0.2871	0.2163
15	1857.5 ~ 1902.5	0.2891	0.2208
20	1860.0 ~ 1900.0	0.2917	0.2897
LTE Band 4		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
1.4	1710.7 ~ 1754.3	0.3776	0.2965
3	1711.5 ~ 1753.5	0.3793	0.2979
5	1712.5 ~ 1752.5	0.3733	0.2972
10	1715.0 ~ 1750.0	0.3767	0.2944
15	1717.5 ~ 1747.5	0.3802	0.2958
20	1720.0 ~ 1745.0	0.3828	0.2985
LTE Band 5		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Maximum ERP(W)
1.4	824.7 ~ 848.3	0.1352	0.1059
3	825.5 ~ 847.5	0.1393	0.1059
5	826.5 ~ 846.5	0.1374	0.1062
10	829.0 ~ 844.0	0.1413	0.1064
LTE Band 7		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
5	2502.5 ~ 2567.5	0.1117	0.0828
10	2505.0 ~ 2565.0	0.1114	0.0830
15	2507.5 ~ 2562.5	0.1117	0.0836
20	2510.0 ~ 2560.0	0.1127	0.0838

LTE Band 12		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Maximum ERP(W)
1.4	699.7 ~ 715.3	0.1762	0.1343
3	700.5 ~ 714.5	0.1782	0.1343
5	701.5 ~ 713.5	0.1750	0.1337
10	704.0 ~ 711.0	0.1791	0.1349
LTE Band 13		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Maximum ERP(W)
5	779.5 ~ 784.5	0.1138	0.0867
10	782.0	0.1153	0.0933

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	210616

1.9 Applicable Standards

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

- ♦ 47 CFR Part 2, 22(H), 24(E), 27(L), 27(F), 27(H), 27(M)
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

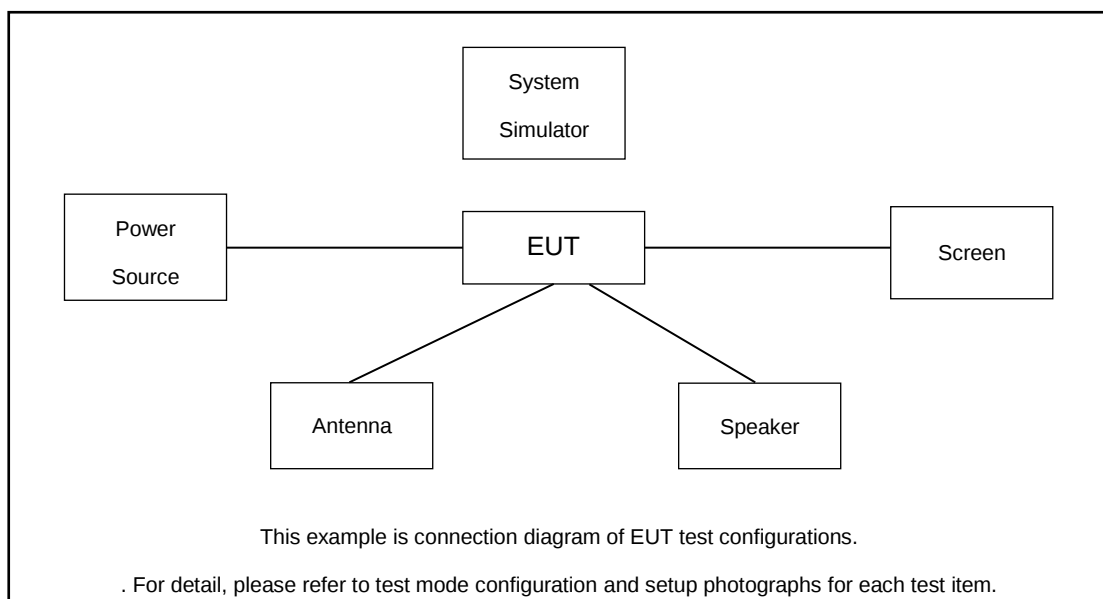
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (X-Plane)

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	-	v		v	v	v	v
	4	v	v	v	v	v	v	v	v	-	v		v	v	v	v
	5	v	v	v	v	-	-	v	v	-	v		v	v	v	v
	7	-	-	v	v	v	v	v	v	-	v		v	v	v	v
	12	v	v	v	v	-	-	v	v	-	v		v	v	v	v
	13	-	-	v	v	-	-	v	v	-	v		v	v	v	v
E.R.P / E.I.R.P	2	v	v	v	v	v	v	v	v	-	v		v	v	v	v
	4	v	v	v	v	v	v	v	v	-	v		v	v	v	v
	5	v	v	v	v	-	-	v	v	-	v		v	v	v	v
	7	-	-	v	v	v	v	v	v	-	v		v	v	v	v
	12	v	v	v	v	-	-	v	v	-	v		v	v	v	v
	13	-	-	v	v	-	-	v	v	-	v		v	v	v	v
Radiated Spurious Emission	2	Worst Case													v	
	4	Worst Case													v	
	5	Worst Case													v	
	7	Worst Case													v	
	12	Worst Case													v	
	13	Worst Case													v	
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 30MHz 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.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820/8821	N/A	N/A	Unshielded, 1.8 m
2.	DC Power	GWINSTEK	PLR36-10	N/A	N/A	Unshielded,1.8m
3.	Antenna	N/A	N/A	N/A	N/A	N/A
4.	Speaker	N/A	N/A	N/A	N/A	N/A
5.	Screen	N/A	N/A	N/A	N/A	N/A



2.4 Frequency List of Low/Middle/High Channels

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

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



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

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

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



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

3 Conducted Test Items

3.1 Conducted Output Power and ERP/EIRP

3.1.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system 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.

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12, Band 13.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 2 and Band 7.

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

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

3.1.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system 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.

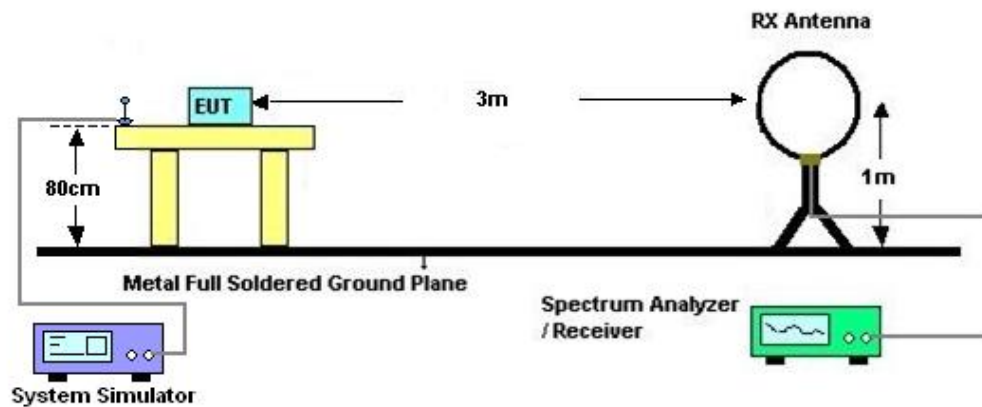
4 Radiated Test Items

4.1 Measuring Instruments

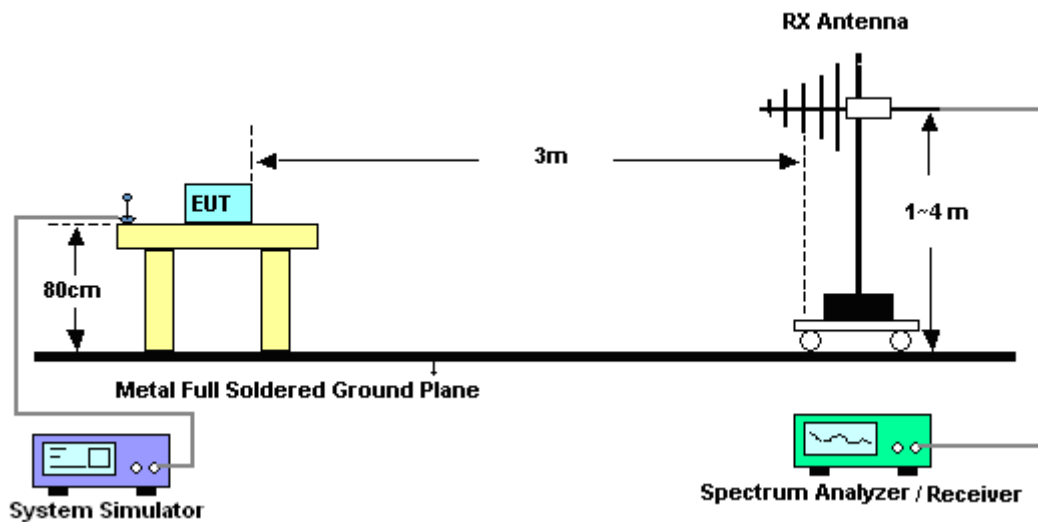
See list of measuring instruments of this test report.

4.2 Test Setup

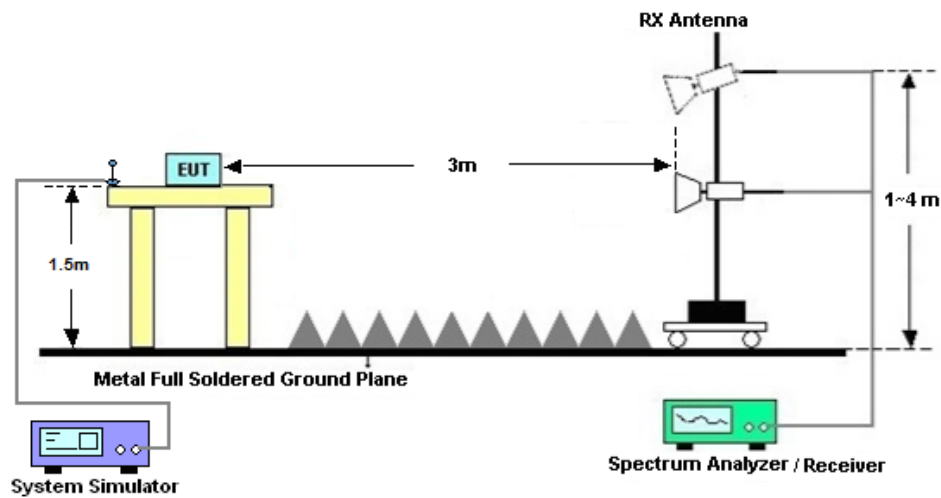
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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.

Please refer to Appendix B.



4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

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.

For Band 7

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 $55 + 10 \log (P)$ dB.

For LTE Band 13

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.

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

4.4.2 Test Procedures

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. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

13. For Band 7:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Sep. 01, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 22, 2022	Sep. 01, 2023	Sep. 21, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	Sep. 01, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	Sep. 01, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Sep. 01, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 06, 2023	Sep. 01, 2023	Jul. 05, 2024	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 05, 2023	Sep. 01, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 12, 2022	Sep. 01, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Sep. 01, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 01, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 01, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 01, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.82 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.56 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.54 dB
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Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	Temperature :	22~23°C
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and ERP/EIRP

LTE Band 2

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				18700	18900	19100			
Frequency (MHz)				1860	1880	1900	L	M	H
20	QPSK	1	0	22.41	22.55	22.52	0.2825	0.2917	0.2897
20	QPSK	1	99	22.38	22.35	22.28	0.2805	0.2786	0.2742
20	QPSK	100	0	21.48	21.44	21.39	0.2280	0.2259	0.2233
20	16QAM	1	0	21.64	21.59	22.52	0.2366	0.2339	0.2897
Channel				18675	18900	19125	EIRP(W)		
Frequency (MHz)				1857.5	1880	1902.5	L	M	H
15	QPSK	1	0	22.50	22.51	22.50	0.2884	0.2891	0.2884
15	16QAM	1	0	21.34	21.26	21.23	0.2208	0.2168	0.2153
Channel				18650	18900	19150	EIRP(W)		
Frequency (MHz)				1855	1880	1905	L	M	H
10	QPSK	1	0	22.48	22.39	22.34	0.2871	0.2812	0.2780
10	16QAM	1	0	21.25	21.21	21.13	0.2163	0.2143	0.2104
Channel				18625	18900	19175	EIRP(W)		
Frequency (MHz)				1852.5	1880	1907.5	L	M	H
5	QPSK	1	0	22.42	22.34	22.26	0.2831	0.2780	0.2729
5	16QAM	1	0	21.21	22.25	21.16	0.2143	0.2723	0.2118
Channel				18615	18900	19185	EIRP(W)		
Frequency (MHz)				1851.5	1880	1908.5	L	M	H
3	QPSK	1	0	22.36	22.39	22.27	0.2793	0.2812	0.2735
3	16QAM	1	0	21.16	21.21	21.22	0.2118	0.2143	0.2148
Channel				18607	18900	19193	EIRP(W)		
Frequency (MHz)				1850.7	1880	1909.3	L	M	H
1.4	QPSK	1	0	22.35	22.32	22.20	0.2786	0.2767	0.2692
1.4	16QAM	1	0	21.27	21.24	21.19	0.2173	0.2158	0.2133



LTE Band 4

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				20050	20175	20300			
Frequency (MHz)				1720	1732.5	1745	L	M	H
20	QPSK	1	0	22.18	22.29	22.33	0.3698	0.3793	0.3828
20	QPSK	1	99	22.15	22.18	22.21	0.3673	0.3698	0.3724
20	QPSK	100	0	22.24	21.21	21.26	0.3750	0.2958	0.2992
20	16QAM	1	0	21.25	21.14	21.19	0.2985	0.2911	0.2944
Channel				20025	20175	20325	EIRP(W)		
Frequency (MHz)				1717.5	1732.5	1747.5	L	M	H
15	QPSK	1	0	22.21	22.26	22.30	0.3724	0.3767	0.3802
15	16QAM	1	0	21.09	21.18	21.21	0.2877	0.2938	0.2958
Channel				20000	20175	20350	EIRP(W)		
Frequency (MHz)				1715	1732.5	1750	L	M	H
10	QPSK	1	0	22.13	22.17	22.26	0.3656	0.3690	0.3767
10	16QAM	1	0	21.11	21.15	21.19	0.2891	0.2917	0.2944
Channel				19975	20175	20375	EIRP(W)		
Frequency (MHz)				1712.5	1732.5	1752.5	L	M	H
5	QPSK	1	0	22.15	22.22	22.18	0.3673	0.3733	0.3698
5	16QAM	1	0	21.22	21.21	21.23	0.2965	0.2958	0.2972
Channel				19965	20175	20385	EIRP(W)		
Frequency (MHz)				1711.5	1732.5	1753.5	L	M	H
3	QPSK	1	0	22.23	22.29	22.25	0.3741	0.3793	0.3758
3	16QAM	1	0	21.17	21.24	21.23	0.2931	0.2979	0.2972
Channel				19957	20175	20393	EIRP(W)		
Frequency (MHz)				1710	1732.5	1754.3	L	M	H
1.4	QPSK	1	0	22.19	22.27	22.24	0.3707	0.3776	0.3750
1.4	16QAM	1	0	21.13	21.20	21.22	0.2904	0.2951	0.2965



LTE Band 5

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				20450	20525	20600			
Frequency (MHz)				829	836.5	844	L	M	H
10	QPSK	1	0	22.92	22.73	22.95	0.1403	0.1343	0.1413
10	QPSK	1	49	22.71	22.64	22.67	0.1337	0.1315	0.1324
10	QPSK	50	0	21.96	21.98	21.92	0.1125	0.1130	0.1114
10	16QAM	1	0	21.65	21.60	21.72	0.1047	0.1035	0.1064
Channel				20425	20525	20625	ERP(W)		
Frequency (MHz)				826.5	836.5	846.5	L	M	H
5	QPSK	1	0	22.81	22.83	22.74	0.1368	0.1374	0.1346
5	16QAM	1	0	21.63	21.71	21.64	0.1042	0.1062	0.1045
Channel				20415	20525	20635	ERP(W)		
Frequency (MHz)				825.5	836.5	847.5	L	M	H
3	QPSK	1	0	22.89	22.61	22.67	0.1393	0.1306	0.1324
3	16QAM	1	0	21.70	21.66	21.69	0.1059	0.1050	0.1057
Channel				20407	20525	20643	ERP(W)		
Frequency (MHz)				824.7	836.5	848.3	L	M	H
1.4	QPSK	1	0	22.74	22.72	22.76	0.1346	0.1340	0.1352
1.4	16QAM	1	0	21.70	21.61	21.69	0.1059	0.1038	0.1057

LTE Band 7

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				20850	21100	21350			
Frequency (MHz)				2510	2535	2560	L	M	H
20	QPSK	1	0	22.02	22.22	22.08	0.1076	0.1127	0.1091
20	QPSK	1	99	21.79	21.82	21.80	0.1021	0.1028	0.1023
20	QPSK	100	0	20.96	20.98	20.95	0.0843	0.0847	0.0841
20	16QAM	1	0	20.78	20.93	20.75	0.0809	0.0838	0.0804
Channel				20825	21100	21375	EIRP(W)		
Frequency (MHz)				2507.5	2535	2562.5	L	M	H
15	QPSK	1	0	22.13	22.18	21.96	0.1104	0.1117	0.1062
15	16QAM	1	0	20.92	20.83	20.85	0.0836	0.0818	0.0822
Channel				20800	21100	21400	EIRP(W)		
Frequency (MHz)				2505	2535	2565	L	M	H
10	QPSK	1	0	22.07	22.17	21.87	0.1089	0.1114	0.1040
10	16QAM	1	0	20.86	20.89	20.83	0.0824	0.0830	0.0818
Channel				20775	21100	21425	EIRP(W)		
Frequency (MHz)				2502.5	2535	2567.5	L	M	H
5	QPSK	1	0	22.04	22.18	21.82	0.1081	0.1117	0.1028
5	16QAM	1	0	20.75	20.88	20.85	0.0804	0.0828	0.0822



LTE Band 12

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23060	23095	23130			
Frequency (MHz)				704	707.5	711	L	M	H
10	QPSK	1	0	22.52	22.88	22.73	0.1648	0.1791	0.1730
10	QPSK	1	49	22.71	22.78	22.74	0.1722	0.1750	0.1734
10	QPSK	50	0	21.76	21.72	21.89	0.1384	0.1371	0.1426
10	16QAM	1	0	21.65	21.48	21.51	0.1349	0.1297	0.1306
Channel				23035	23095	23155	ERP(W)		
Frequency (MHz)				701.5	707.5	713.5	L	M	H
5	QPSK	1	0	22.75	22.53	22.78	0.1738	0.1652	0.1750
5	16QAM	1	0	21.57	21.51	21.61	0.1324	0.1306	0.1337
Channel				23025	23095	23165	ERP(W)		
Frequency (MHz)				700.5	707.5	714.5	L	M	H
3	QPSK	1	0	22.80	22.72	22.86	0.1758	0.1726	0.1782
3	16QAM	1	0	21.62	21.63	21.60	0.1340	0.1343	0.1334
Channel				23017	23095	23173	ERP(W)		
Frequency (MHz)				699.7	707.5	715.3	L	M	H
1.4	QPSK	1	0	22.76	22.81	22.80	0.1742	0.1762	0.1758
1.4	16QAM	1	0	21.63	21.59	21.58	0.1343	0.1330	0.1327

LTE Band 13

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23230					
Frequency (MHz)				782				M	
10	QPSK	1	0		22.67			0.1153	
10	QPSK	1	49		22.56			0.1125	
10	QPSK	50	0		21.74			0.0931	
10	16QAM	1	0		21.75			0.0933	
Channel				23205	23230	23255	ERP(W)		
Frequency (MHz)				779.5	782	784.5	L	M	H
5	QPSK	1	0	22.53	22.50	22.61	0.1117	0.1109	0.1138
5	16QAM	1	0	21.36	21.36	21.43	0.0853	0.0853	0.0867



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Carl Ni	Temperature :	23~25°C
		Relative Humidity :	41~42%

LTE Band 2 / 20MHz / QPSK								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3735	-57.56	-13	-44.56	-69.82	2.64	14.90	H
	5610	-51.71	-13	-38.71	-63.57	2.94	14.80	H
	7485	-52.89	-13	-39.89	-62.66	3.39	13.16	H
	3735	-57.24	-13	-44.24	-69.50	2.64	14.90	V
	5610	-52.75	-13	-39.75	-64.61	2.94	14.80	V
	7485	-52.95	-13	-39.95	-62.72	3.39	13.16	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

LTE Band 4 / 20MHz / QPSK								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3450	-57.01	-13	-44.01	-67.75	2.604	13.34	H
	5175	-40.67	-13	-27.67	-51.18	3.011	13.52	H
	6900	-54.64	-13	-41.64	-64.84	3.271	13.47	H
	3450	-51.04	-13	-38.04	-61.78	2.604	13.34	V
	5175	-40.98	-13	-27.98	-51.49	3.011	13.52	V
	6900	-54.73	-13	-41.73	-64.93	3.271	13.47	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

LTE Band 5 / 10MHz / QPSK								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1664	-62.87	-13	-49.87	-69.84	1.58	10.70	H
	2496	-49.01	-13	-36.01	-57.26	2.102	12.50	H
	3328	-61.25	-13	-48.25	-70.14	2.856	13.90	H
	1664	-63.62	-13	-50.62	-70.59	1.58	10.70	V
	2496	-42.00	-13	-29.00	-50.25	2.10	12.50	V
	3328	-61.09	-13	-48.09	-69.98	2.86	13.90	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 7 / 20MHz / QPSK								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5050	-60.74	-25	-35.74	-70.95	3.03	13.24	H
	7584	-57.61	-25	-32.61	-67.06	3.56	13.01	H
	10104	-61.42	-25	-36.42	-70.94	3.92	13.44	H
	5050	-58.50	-25	-33.50	-68.71	3.03	13.24	V
	7584	-60.17	-25	-35.17	-69.62	3.56	13.01	V
	10104	-61.97	-25	-36.97	-71.49	3.92	13.44	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

LTE Band 12 / 10MHz / QPSK								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1408	-63.93	-13	-50.93	-70.90	1.58	10.70	H
	2112	-45.06	-13	-32.06	-53.31	2.102	12.50	H
	2808	-59.89	-13	-46.89	-68.78	2.856	13.90	H
	1408	-62.18	-13	-49.18	-69.15	1.58	10.70	V
	2112	-42.44	-13	-29.44	-50.69	2.10	12.50	V
	2808	-55.42	-13	-42.42	-64.31	2.86	13.90	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

LTE Band 13 / 5MHz / QPSK								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1560	-63.72	-42.15	-21.57	-66.35	1.09	5.87	H
	2336	-47.11	-13	-34.11	-49.51	1.37	5.92	H
	3120	-60.45	-13	-47.45	-64.34	1.64	7.68	H
	1560	-59.51	-42.15	-17.36	-62.14	1.09	5.87	V
	2336	-43.30	-13	-30.30	-45.70	1.37	5.92	V
	3120	-59.81	-13	-46.81	-63.70	1.64	7.68	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



LTE Band 13 / 10MHz / QPSK								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1552	-63.90	-13	-50.90	-66.53	1.09	5.87	H
	2328	-51.47	-13	-38.47	-53.87	1.37	5.92	H
	3112	-60.13	-13	-47.13	-64.02	1.64	7.68	H
	1552	-59.97	-13	-46.97	-62.60	1.09	5.87	V
	2328	-43.82	-13	-30.82	-46.22	1.37	5.92	V
	3112	-60.11	-13	-47.11	-64.00	1.64	7.68	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.