FCC RF Test Report

APPLICANT	:	**VINFAST TRADING AND PRODUCTION JOINT STOCK COMPANY**
EQUIPMENT	:	**MULTIMEDIA HEAD UNIT**
BRAND NAME	:	**VINFAST**
MODEL NAME	:	**VF-EC22U**
FCC ID	:	**2A6HEVF-EC22U**
STANDARD	:	**47 CFR Part 2, 22(H), 24(E), 27(L), 27(M), 27(H), 27(F)**
CLASSIFICATION	:	**PCS Licensed Transmitter (PCB)**
TEST DATE(S)	:	**May 21, 2022**

We, Sporton International Inc. (ShenZhen), 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 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. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

Sporton International Inc. (ShenZhen)

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People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG233104B	Rev. 01	Initial issue of report	Aug. 23, 2022

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)	Equivalent Isotropic Radiated Power (Band 2) (Band 7)	EIRP < 2Watt		-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		-
-	§24.232(d)	Peak-to-Average Ratio	<13 dB	-	1
-	§2.1049	Occupied Bandwidth	-	-	1
-	§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+10log10(P[Watts])	-	1
	§27.53(m)(4)	Conducted Band Edge Measurement (Band 7)	§27.53(m)(4)		
-	§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+10log10(P[Watts])	-	1
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 7)	< 55+10log$_{10}$(P[Watts])		
-	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	-	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[Watts])	PASS	Under limit 19.08 dB at 1559.500 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	< $55+10\log_{10}$(P[Watts])		
Remark 1: All test results were leveraged from module RF report which can refer to Report No. FG912203B.					

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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-EC22U
FCC ID	2A6HEVF-EC22U
IMEI Code	Radiation: 864694040048055
HW Version	C2.2
SW Version	SOW30005092
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 : 22.68 dBm LTE Band 4 : 23.38 dBm LTE Band 5 : 23.06 dBm LTE Band 7 : 22.50 dBm LTE Band 12 : 23.03 dBm LTE Band 13 : 22.79 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

Remark: Verify that the power is less than the module power, so the module power is used when calculating ERP/EIRP in this report.

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP

LTE Band 2		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
1.4	1850.7 ~ 1909.3	0.2999	0.2547
3	1851.5 ~ 1908.5	0.2999	0.2339
5	1852.5 ~ 1907.5	0.2864	0.2198
10	1855.0 ~ 1905.0	0.2825	0.2223
15	1857.5 ~ 1902.5	0.2938	0.2228
20	1860.0 ~ 1900.0	0.3006	0.2366
LTE Band 4		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
1.4	1710.7 ~ 1754.3	0.4819	0.3724
3	1711.5 ~ 1753.5	0.4634	0.3631
5	1712.5 ~ 1752.5	0.4571	0.3556
10	1715.0 ~ 1750.0	0.4550	0.3597
15	1717.5 ~ 1747.5	0.4613	0.3565
20	1720.0 ~ 1745.0	0.4656	0.3499
LTE Band 5		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Maximum ERP(W)
1.4	824.7 ~ 848.3	0.1429	0.1143
3	825.5 ~ 847.5	0.1406	0.1119
5	826.5 ~ 846.5	0.1406	0.1072
10	829.0 ~ 844.0	0.1449	0.1102
LTE Band 7		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
5	2502.5 ~ 2567.5	0.1183	0.0966
10	2505.0 ~ 2565.0	0.1197	0.0993
15	2507.5 ~ 2562.5	0.1194	0.0959
20	2510.0 ~ 2560.0	0.1202	0.0944

LTE Band 12		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Maximum ERP(W)
1.4	699.7 ~ 715.3	0.1845	0.1503
3	700.5 ~ 714.5	0.1845	0.1435
5	701.5 ~ 713.5	0.1845	0.1469
10	704.0 ~ 711.0	0.1854	0.1380
LTE Band 13		**QPSK**	**16QAM**
BW (MHz)	**Frequency Range (MHz)**	**Maximum ERP(W)**	**Maximum ERP(W)**
5	779.5 ~ 784.5	0.1175	0.0914
10	782.0	0.1186	0.0946

Note: The ERP/EIRP details refer to Appendix A

1.7 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24

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(M), 27(H), 27(F)
- 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

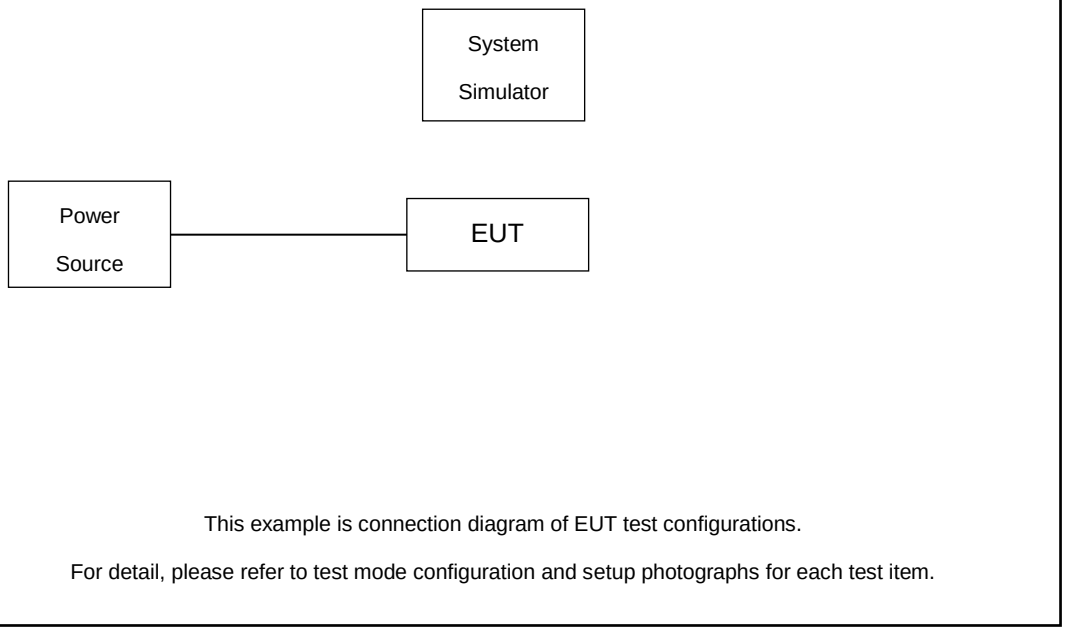
2.1 Test Mode

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. (Y-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
E.R.P / E.I.R.P	2	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
	5	v	v	v	v	-	-	v	v	-	v			v	v	v
	7	-	-	v	v	v	v	v	v	-	v			v	v	v
	12	v	v	v	v	-	-	v	v	-	v			v	v	v
	13	-	-	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. 4. The RSE was pre-scanned L/M/H channels and the worst cases are middle channel which are reported only in this report.															

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.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	WWAN Antenna	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 and 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.

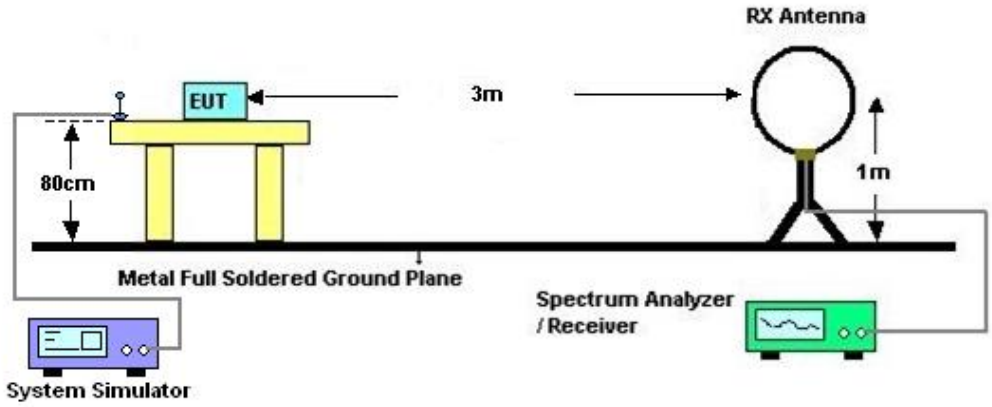
4 Radiated Test Items

4.1 Measuring Instruments

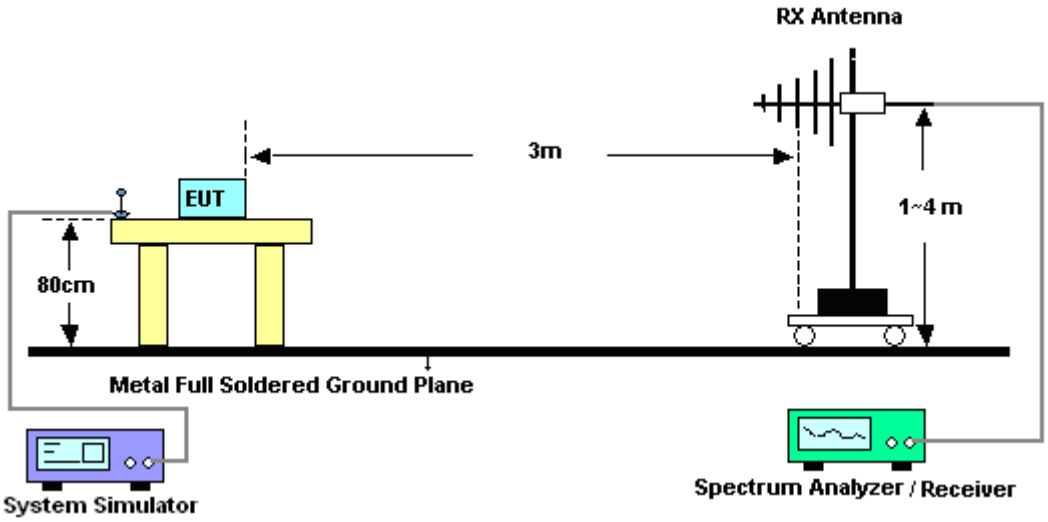
See list of measuring instruments of this test report.

4.2 Test Setup

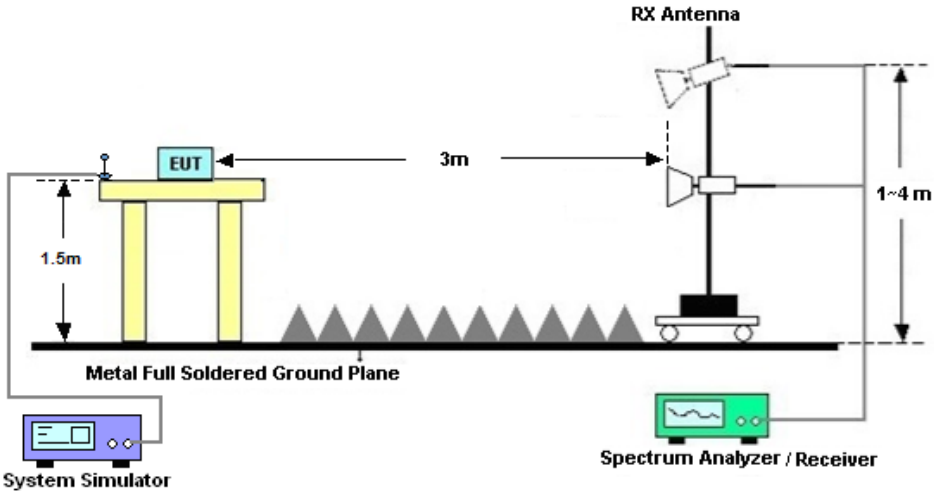
4.2.1 For radiated test below 30MHz



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 (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For Band 7:
    The limit line is derived from 55 + 10log(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
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2021	May 21, 2022	Dec. 26, 2022	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2021	May 21, 2022	Jun. 21, 2022	Radiation (03CH03-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 22, 2021	May 21, 2022	Oct. 21, 2022	Radiation (03CH01-SZ
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Sep. 28, 2021	May 21, 2022	Sep. 27, 2022	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 05, 2021	May 21, 2022	Jul. 04, 2022	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 10, 2022	May 21, 2022	Apr. 09, 2023	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 06, 2022	May 21, 2022	Apr. 05, 2023	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 22, 2021	May 21, 2022	Oct. 21, 2022	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 05, 2021	May 21, 2022	Jul. 04, 2022	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	May 21, 2022	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 21, 2022	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 21, 2022	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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))	**2.48dB**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.53dB**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.02dB**

Appendix A. Test Results of Conducted Test

Test Engineer :	Jeff Yao	Temperature :	22~23℃
		Relative Humidity :	40~42%

ERP/EIRP

LTE Band 2 (GT - LC = 2.1 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	18607	18900	19193	18615	18900	19185	18625	18900	19175
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1850.7	1880	1909.3	1851.5	1880	1908.5	1852.5	1880	1907.5
Conducted Power (dBm)	22.67	22.67	22.49	22.57	22.50	22.67	22.11	22.14	22.47
Conducted Power (Watts)	0.1849	0.1849	0.1774	0.1807	0.1778	0.1849	0.1626	0.1637	0.1766
EIRP(dBm)	24.77	24.77	24.59	24.67	24.60	24.77	24.21	24.24	24.57
EIRP(Watts)	0.2999	0.2999	0.2877	0.2931	0.2884	0.2999	0.2636	0.2655	0.2864

LTE Band 2 (GT - LC = 2.1 dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	18650	18900	19150	18675	18900	19125	18650	18900	19100
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1855	1880	1905	1857.5	1880	1902.5	1860	1880	1900
Conducted Power (dBm)	22.18	22.31	22.41	22.48	22.34	22.58	22.29	22.36	22.68
Conducted Power (Watts)	0.1652	0.1702	0.1742	0.1770	0.1714	0.1811	0.1694	0.1722	0.1854
EIRP(dBm)	24.28	24.41	24.51	24.58	24.44	24.68	24.39	24.46	24.78
EIRP(Watts)	0.2679	0.2761	0.2825	0.2871	0.2780	0.2938	0.2748	0.2793	0.3006

LTE Band 2 (GT - LC = 2.1 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	18607	18900	19193	18615	18900	19185	18625	18900	19175
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1850.7	1880	1909.3	1851.5	1880	1908.5	1852.5	1880	1907.5
Conducted Power (dBm)	21.79	21.67	21.96	21.59	21.40	21.38	21.08	21.32	21.03
Conducted Power (Watts)	0.1510	0.1469	0.1570	0.1442	0.1380	0.1374	0.1282	0.1355	0.1268
EIRP(dBm)	23.89	23.77	24.06	23.69	23.50	23.48	23.18	23.42	23.13
EIRP(Watts)	0.2449	0.2382	0.2547	0.2339	0.2239	0.2228	0.2080	0.2198	0.2056

LTE Band 2 (GT - LC = 2.1 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	18650	18900	19150	18675	18900	19125	18650	18900	19100
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1855	1880	1905	1857.5	1880	1902.5	1860	1880	1900
Conducted Power (dBm)	21.31	21.36	21.37	21.34	21.19	21.38	21.63	21.64	21.29
Conducted Power (Watts)	0.1352	0.1368	0.1371	0.1361	0.1315	0.1374	0.1455	0.1459	0.1346
EIRP(dBm)	23.41	23.46	23.47	23.44	23.29	23.48	23.73	23.74	23.39
EIRP(Watts)	0.2193	0.2218	0.2223	0.2208	0.2133	0.2228	0.2360	0.2366	0.2183

LTE Band 4 (GT - LC = 3.5 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	19957	20175	20393	19965	20175	20385	19975	20175	20375
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1710.7	1732.5	1754.3	1711.5	1732.5	1753.5	1712.5	1732.5	1752.5
Conducted Power (dBm)	23.11	23.33	23.25	23.13	23.16	23.06	23.05	23.10	22.93
Conducted Power (Watts)	0.2046	0.2153	0.2113	0.2056	0.2070	0.2023	0.2018	0.2042	0.1963
EIRP(dBm)	26.61	26.83	26.75	26.63	26.66	26.56	26.55	26.60	26.43
EIRP(Watts)	0.4581	0.4819	0.4732	0.4603	0.4634	0.4529	0.4519	0.4571	0.4395

LTE Band 4 (GT - LC = 3.5 dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	20000	20175	20350	20025	20175	20325	20050	20175	20300
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1715	1732.5	1750	1717.5	1732.5	1747.5	1720	1732.5	1745
Conducted Power (dBm)	23.03	23.08	22.96	22.70	23.14	22.95	22.94	23.18	23.14
Conducted Power (Watts)	0.2009	0.2032	0.1977	0.1862	0.2061	0.1972	0.1968	0.2080	0.2061
EIRP(dBm)	26.53	26.58	26.46	26.20	26.64	26.45	26.44	26.68	26.64
EIRP(Watts)	0.4498	0.4550	0.4426	0.4169	0.4613	0.4416	0.4406	0.4656	0.4613

LTE Band 4 (GT - LC = 3.5 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	19957	20175	20393	19965	20175	20385	19975	20175	20375
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1710.7	1732.5	1754.3	1711.5	1732.5	1753.5	1712.5	1732.5	1752.5
Conducted Power (dBm)	22.21	21.82	21.94	22.10	21.76	21.76	22.01	21.67	21.78
Conducted Power (Watts)	0.1663	0.1521	0.1563	0.1622	0.1500	0.1500	0.1589	0.1469	0.1507
EIRP(dBm)	25.71	25.32	25.44	25.60	25.26	25.26	25.51	25.17	25.28
EIRP(Watts)	0.3724	0.3404	0.3499	0.3631	0.3357	0.3357	0.3556	0.3289	0.3373

LTE Band 4 (GT - LC = 3.5 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	20000	20175	20350	20025	20175	20325	20050	20175	20300
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1715	1732.5	1750	1717.5	1732.5	1747.5	1720	1732.5	1745
Conducted Power (dBm)	22.06	21.76	21.77	21.81	21.83	22.02	21.85	21.77	21.94
Conducted Power (Watts)	0.1607	0.1500	0.1503	0.1517	0.1524	0.1592	0.1531	0.1503	0.1563
EIRP(dBm)	25.56	25.26	25.27	25.31	25.33	25.52	25.35	25.27	25.44
EIRP(Watts)	0.3597	0.3357	0.3365	0.3396	0.3412	0.3565	0.3428	0.3365	0.3499

LTE Band 5 (GT - LC = 0.7 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	20407	20525	20643	20415	20525	20635	20425	20525	20625
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
Conducted Power (dBm)	23.00	22.99	22.98	22.93	22.64	22.70	22.92	22.91	22.93
Conducted Power (Watts)	0.1995	0.1991	0.1986	0.1963	0.1837	0.1862	0.1959	0.1954	0.1963
ERP(dBm)	21.55	21.54	21.53	21.48	21.19	21.25	21.47	21.46	21.48
ERP(Watts)	0.1429	0.1426	0.1422	0.1406	0.1315	0.1334	0.1403	0.1400	0.1406

LTE Band 5 (GT - LC = 0.7 dB) QPSK			
Bandwidth	10M		
Channel	20450	20525	20600
	(Low)	(Mid)	(High)
Frequency (MHz)	829	836.5	844
Conducted Power (dBm)	23.06	22.95	22.99
Conducted Power (Watts)	0.2023	0.1972	0.1991
ERP(dBm)	21.61	21.50	21.54
ERP(Watts)	0.1449	0.1413	0.1426

LTE Band 5 (GT - LC = 0.7 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	20407	20525	20643	20415	20525	20635	20425	20525	20625
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
Conducted Power (dBm)	22.03	21.65	21.72	21.67	21.94	21.60	21.66	21.75	21.65
Conducted Power (Watts)	0.1596	0.1462	0.1486	0.1469	0.1563	0.1445	0.1466	0.1496	0.1462
ERP(dBm)	20.58	20.20	20.27	20.22	20.49	20.15	20.21	20.30	20.20
ERP(Watts)	0.1143	0.1047	0.1064	0.1052	0.1119	0.1035	0.1050	0.1072	0.1047

LTE Band 5 (GT - LC = 0.7 dB) 16QAM			
Bandwidth	10M		
Channel	20450	20525	20600
	(Low)	(Mid)	(High)
Frequency (MHz)	829	836.5	844
Conducted Power (dBm)	21.87	21.78	21.74
Conducted Power (Watts)	0.1538	0.1507	0.1493
ERP(dBm)	20.42	20.33	20.29
ERP(Watts)	0.1102	0.1079	0.1069

LTE Band 7 (GT - LC = -1.7 dB) QPSK			
Bandwidth	**5M**		
Channel	**20775**	**21100**	**21425**
	(Low)	**(Mid)**	**(High)**
Frequency (MHz)	**2502.5**	**2535**	**2567.5**
Conducted Power (dBm)	22.43	22.32	22.40
Conducted Power (Watts)	0.1750	0.1706	0.1738
EIRP(dBm)	20.73	20.62	20.70
EIRP(Watts)	0.1183	0.1153	0.1175

LTE Band 7 (GT - LC = -1.7 dB) QPSK									
Bandwidth	**10M**			**15M**			**20M**		
Channel	**20800**	**21100**	**21400**	**20825**	**21100**	**21375**	**20850**	**21100**	**21350**
	(Low)	**(Mid)**	**(High)**	**(Low)**	**(Mid)**	**(High)**	**(Low)**	**(Mid)**	**(High)**
Frequency (MHz)	**2505**	**2535**	**2565**	**2507.5**	**2535**	**2562.5**	**2510**	**2535**	**2560**
Conducted Power (dBm)	22.17	22.35	22.48	22.22	22.40	22.47	22.19	22.37	22.50
Conducted Power (Watts)	0.1648	0.1718	0.1770	0.1667	0.1738	0.1766	0.1656	0.1726	0.1778
EIRP(dBm)	20.47	20.65	20.78	20.52	20.70	20.77	20.49	20.67	20.80
EIRP(Watts)	0.1114	0.1161	0.1197	0.1127	0.1175	0.1194	0.1119	0.1167	0.1202

LTE Band 7 (GT - LC = -1.7 dB) 16QAM			
Bandwidth	5M		
Channel	20775	21100	21425
	(Low)	(Mid)	(High)
Frequency (MHz)	2502.5	2535	2567.5
Conducted Power (dBm)	21.21	21.43	21.55
Conducted Power (Watts)	0.1321	0.1390	0.1429
EIRP(dBm)	19.51	19.73	19.85
EIRP(Watts)	0.0893	0.0940	0.0966

LTE Band 7 (GT - LC = -1.7 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	20800	21100	21400	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2505	2535	2565	2507.5	2535	2562.5	2510	2535	2560
Conducted Power (dBm)	21.21	21.43	21.67	21.18	21.38	21.52	21.15	21.45	21.20
Conducted Power (Watts)	0.1321	0.1390	0.1469	0.1312	0.1374	0.1419	0.1303	0.1396	0.1318
EIRP(dBm)	19.51	19.73	19.97	19.48	19.68	19.82	19.45	19.75	19.50
EIRP(Watts)	0.0893	0.0940	0.0993	0.0887	0.0929	0.0959	0.0881	0.0944	0.0891

LTE Band 12 (GT - LC = 1.8 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
Conducted Power (dBm)	23.00	22.99	23.01	22.91	22.75	23.01	22.84	23.01	22.88
Conducted Power (Watts)	0.1995	0.1991	0.2000	0.1954	0.1884	0.2000	0.1923	0.2000	0.1941
ERP(dBm)	22.65	22.64	22.66	22.56	22.40	22.66	22.49	22.66	22.53
ERP(Watts)	0.1841	0.1837	0.1845	0.1803	0.1738	0.1845	0.1774	0.1845	0.1791

LTE Band 12 (GT - LC = 1.8 dB) QPSK			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency (MHz)	704	707.5	711
Conducted Power (dBm)	22.67	22.76	23.03
Conducted Power (Watts)	0.1849	0.1888	0.2009
ERP(dBm)	22.32	22.41	22.68
ERP(Watts)	0.1706	0.1742	0.1854

LTE Band 12 (GT - LC = 1.8 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
Conducted Power (dBm)	21.88	22.10	22.12	21.75	21.74	21.92	21.60	21.58	22.02
Conducted Power (Watts)	0.1542	0.1622	0.1629	0.1496	0.1493	0.1556	0.1445	0.1439	0.1592
ERP(dBm)	21.53	21.75	21.77	21.40	21.39	21.57	21.25	21.23	21.67
ERP(Watts)	0.1422	0.1496	0.1503	0.1380	0.1377	0.1435	0.1334	0.1327	0.1469

LTE Band 12 (GT - LC = 1.8 dB) 16QAM			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency (MHz)	704	707.5	711
Conducted Power (dBm)	21.48	21.66	21.75
Conducted Power (Watts)	0.1406	0.1466	0.1496
ERP(dBm)	21.13	21.31	21.40
ERP(Watts)	0.1297	0.1352	0.1380

LTE Band 13 (GT - LC = 0.1 dB) QPSK						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency (MHz)	779.5	782	784.5	-	782	-
Conducted Power (dBm)	22.54	22.66	22.75	-	22.79	-
Conducted Power (Watts)	0.1795	0.1845	0.1884	-	0.1901	-
ERP(dBm)	20.49	20.61	20.70	-	20.74	-
ERP(Watts)	0.1119	0.1151	0.1175	-	0.1186	-

LTE Band 13 (GT - LC = 0.1 dB) 16QAM						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency (MHz)	779.5	782	784.5	-	782	-
Conducted Power (dBm)	21.40	21.38	21.66	-	21.81	-
Conducted Power (Watts)	0.1380	0.1374	0.1466	-	0.1517	-
ERP(dBm)	19.35	19.33	19.61	-	19.76	-
ERP(Watts)	0.0861	0.0857	0.0914	-	0.0946	-

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Shiwei Wen	Temperature :	22~25℃
		Relative Humidity :	48~52%

LTE Band 2 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3742.18	-51.41	-13	-38.41	-74.30	-58.16	5.85	12.60	H
	5613.27	-49.68	-13	-36.68	-73.96	-55.48	7.30	13.10	H
	7484.36	-54.65	-13	-41.65	-81.11	-57.80	8.35	11.50	H
	3742.18	-49.76	-13	-36.76	-74.66	-56.51	5.85	12.60	V
	5613.27	-52.03	-13	-39.03	-77.16	-57.83	7.30	13.10	V
	7484.36	-54.76	-13	-41.76	-81.2	-57.91	8.35	11.50	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3447.18	-54.54	-13	-41.54	-75.70	-55.96	11.78	13.20	H
	5170.77	-52.90	-13	-39.90	-76.82	-52.18	12.52	11.80	H
	6894.36	-55.03	-13	-42.03	-80.70	-55.63	13.60	14.20	H
	3447.18	-54.04	-13	-41.04	-76.14	-55.46	11.78	13.20	V
	5170.77	-49.30	-13	-36.30	-73.72	-48.58	12.52	11.80	V
	6894.36	-54.11	-13	-41.11	-81.06	-54.71	13.60	14.20	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1664.18	-62.12	-13	-49.12	-73.77	-65.37	4.00	9.40	H
	2496.27	-52.78	-13	-39.78	-71.55	-56.35	4.88	10.60	H
	3328.36	-58.80	-13	-45.80	-79.77	-63.73	5.52	12.60	H
	1664.18	-59.18	-13	-46.18	-71.50	-62.43	4.00	9.40	V
	2496.27	-48.57	-13	-35.57	-67.60	-52.14	4.88	10.60	V
	3328.36	-58.34	-13	-45.34	-79.81	-63.27	5.52	12.60	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	5052.18	-55.33	-25	-30.33	-78.43	-60.89	7.14	12.70	H
	7578.27	-55.33	-25	-30.33	-81.41	-58.63	8.30	11.60	H
	10104.36	-52.61	-25	-27.61	-82.81	-54.13	10.48	12.00	H
	5052.18	-51.97	-25	-26.97	-76.4	-57.53	7.14	12.70	V
	7578.27	-55.35	-25	-30.35	-81.43	-58.65	8.30	11.60	V
	10104.36	-51.35	-25	-26.35	-82.53	-52.87	10.48	12.00	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1406	-62.90	-13	-49.90	-73.69	-66.15	4.00	9.40	H
	2109	-53.31	-13	-40.31	-70.78	-56.88	4.88	10.60	H
	2812	-51.71	-13	-38.71	-70.80	-56.64	5.52	12.60	H
	3515	-53.44	-13	-40.44	-75.77	-57.91	6.00	12.62	H
	1406	-55.34	-13	-42.34	-67.19	-58.59	4.00	9.40	V
	2109	-49.25	-13	-36.25	-66.51	-52.82	4.88	10.60	V
	2812	-51.72	-13	-38.72	-71.62	-56.65	5.52	12.60	V
	3515	-54.29	-13	-41.29	-77.02	-58.76	6.00	12.62	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1559.5	-64.80	-42.15	-22.65	-76.09	-68.05	4.00	9.40	H
	2339.25	-47.32	-13	-34.32	-65.30	-50.89	4.88	10.60	H
	3119	-58.73	-13	-45.73	-78.82	-63.66	5.52	12.60	H
	1559.5	-61.23	-42.15	-19.08	-73.14	-64.48	4.00	9.40	V
	2339.25	-45.28	-13	-32.28	-63.63	-48.85	4.88	10.60	V
	3119	-57.91	-13	-44.91	-79.80	-62.84	5.52	12.60	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)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1559.5	-65.54	-42.15	-23.39	-76.83	-68.79	4.00	9.40	H
	2339.25	-56.27	-13	-43.27	-74.25	-59.84	4.88	10.60	H
	3119	-59.61	-13	-46.61	-79.70	-64.54	5.52	12.60	H
	1559.5	-62.93	-42.15	-20.78	-74.84	-66.18	4.00	9.40	V
	2339.25	-54.82	-13	-41.82	-73.17	-58.39	4.88	10.60	V
	3119	-57.83	-13	-44.83	-79.72	-62.76	5.52	12.60	V

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