FCC RADIO TEST REPORT

FCC ID	:	**2AVDZTC4N**
Equipment	:	**WCDMA and LTE cellular wireless module**
Brand Name	:	**LiveU**
Applicant	:	**LiveU, Inc** **2 University Plaza Drive Suite 505, Hackensack, New Jersey**
Manufacturer	:	**LiveU Ltd.** **5 Hagavish St, Kfar Saba 4442211, Israel**
Standard	:	**FCC 47 CFR Part 2, 22(H), 24(E), 27**

The product was received on Jan. 15, 2022 and testing was performed from Feb. 11, 2022 to Feb. 17, 2022. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

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

Neil Kao

Approved by: Neil Kao

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035

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History of this test report

Report No.	Version	Description	Issued Date
FG220103003B	01	Initial issue of report	May 04, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	§2.1046	Conducted Output Power	Reporting only	See Note
	§22.913 (a)(5)	Effective Radiated Power (Band 5)	-	
	§27.50 (b)(10) §27.50 (c)(10)	Effective Radiated Power (Band 12) (Band 13) (Band 71)		
	§24.232 (c)	Equivalent Isotropic Radiated Power (Band 2)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)		
-	§24.232 (d) §27.50 (d)(5)	Peak-to-Average Ratio	-	See Note
-	§2.1049	Occupied Bandwidth	-	See Note
-	§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) (Band 66) (Band 71)	-	See Note
-	§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) (Band 66) (Band 71)	-	See Note
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	-	See Note

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
4.2	§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) (Band 66) (Band 71)	Pass	Under limit 26.57 dB at 2104.000 MHz
Remark: The module (FCC ID: 2AVDZTC4N) makes no difference after verifying output power, please refer to the original module report for conducted test results.				

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/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. Please refer to the section ”Uncertainty Evaluation” for measurement uncertainty.

Comments and Explanations:

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

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE

Product Feature	
Installed into the Host	Equipment Name: Live Video Transmission System Brand Name: LiveU Model Name: LU800
Sample 1	Module 1
Sample 2	Module 2
Antenna Type	Monopole PCB Printed Antenna

Remark: The EUT's information above was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2 Modification of EUT

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

1.3 Testing Location

Test Site	Sporton International (USA) Inc.	
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300	
Test Site No.	**Sporton Site No.**	
	03CH01-CA	
Test Engineer	Leo Liu	
Temperature (℃)	18~23	
Relative Humidity (%)	38~45	

Note: The test site complies with ANSI C63.4 2014 requirement.

1.4 Applicable Standards

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

- ANSI C63.26-2015
- ANSI / TIA-603-E
- FCC 47 CFR Part 2, 22(H), 24(E), 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.

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

2 Test Configuration of Equipment Under Test

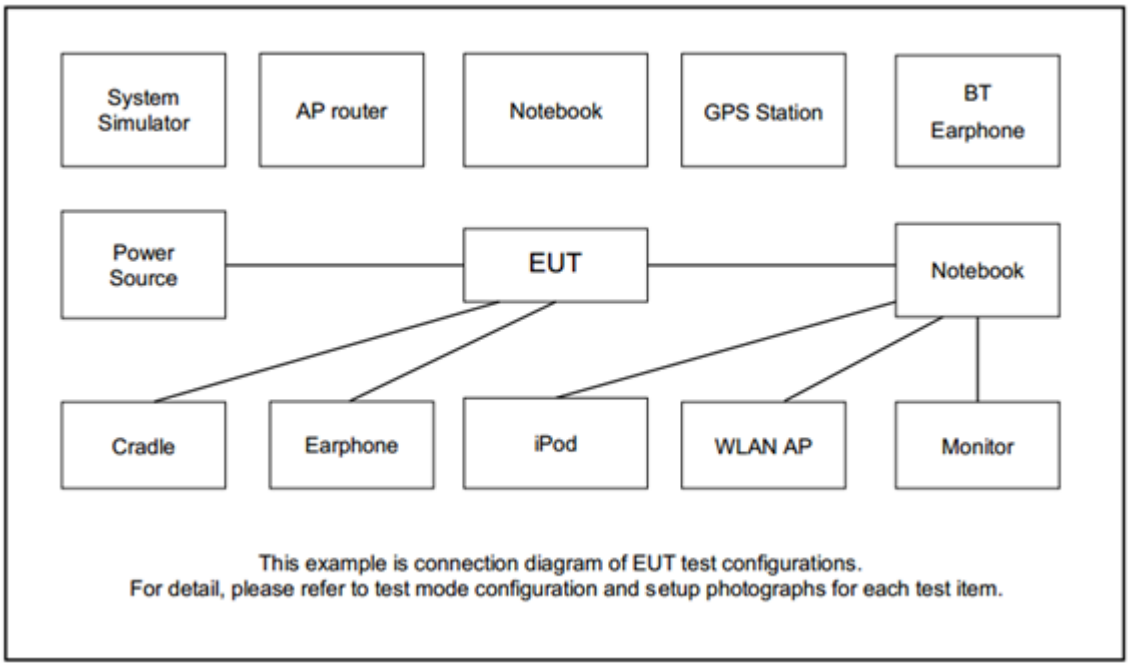
2.1 Test Mode

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.

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find Y plane as worst plane.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	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	v
	5	v	v	v	v	-	-	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	71	-	-	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	12			v		-	-	v		v			v	v	v
Remark	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	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

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 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

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

LTE Band 71 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	133222	133297	133372
	Frequency	673.0	680.5	688.0
15	Channel	133197	133297	133397
	Frequency	670.5	680.5	690.5
10	Channel	133172	133297	133422
	Frequency	668.0	680.5	693.0
5	Channel	133147	133297	133447
	Frequency	665.5	680.5	695.5

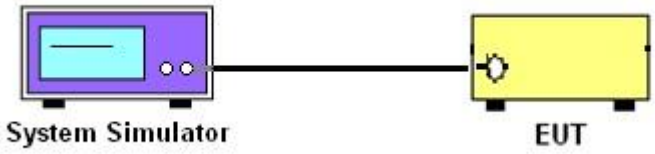
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

LTE Band 2				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	22.40	22.11	22.31
		1	3	22.43	22.37	22.31
		1	5	22.42	22.34	22.24
		3	0	22.40	22.34	22.39
		3	1	22.40	22.36	22.38
		3	3	22.42	22.37	22.35
		6	0	21.49	21.39	21.47
	16QAM	1	0	21.39	21.20	21.27
		1	3	21.43	21.39	21.49
		1	5	21.32	21.28	21.34
		3	0	21.52	21.35	21.47
		3	1	21.54	21.63	21.46
		3	3	21.39	21.62	21.43
		6	0	20.31	20.62	20.52
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	22.39	22.50	22.42
		1	8	22.23	22.29	22.46
		1	14	22.26	22.27	22.21
		8	0	21.35	21.36	21.46
		8	4	21.34	21.32	21.43
		8	7	21.20	21.39	21.39
		15	0	21.22	21.38	21.40
	16QAM	1	0	21.22	21.30	21.30
		1	8	21.10	21.16	21.24
		1	14	21.15	21.25	21.28
		8	0	20.29	20.34	20.50
		8	4	20.47	20.45	20.32
		8	7	20.32	20.34	20.27
		15	0	20.31	20.15	20.43

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	22.38	22.43	22.25
		1	12	22.40	22.40	22.38
		1	24	21.97	22.00	21.97
		12	0	21.30	21.40	21.46
		12	7	21.27	21.35	21.35
		12	13	21.32	21.37	21.34
		25	0	21.33	21.34	21.34
	16QAM	1	0	21.11	21.13	21.19
		1	12	20.87	21.20	21.20
		1	24	21.07	21.18	21.08
		12	0	20.31	20.26	20.24
		12	7	20.47	20.37	20.34
		12	13	20.39	20.29	20.28
		25	0	20.22	20.45	20.29
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	22.16	22.23	22.17
		1	25	22.51	22.46	22.63
		1	49	21.96	22.25	22.13
		25	0	21.47	21.36	21.35
		25	12	21.32	21.41	21.49
		25	250	21.41	21.40	21.40
		50	0	21.38	21.38	21.37
	16QAM	1	0	21.23	21.29	21.20
		1	25	21.40	21.48	21.41
		1	49	21.07	21.16	21.14
		25	0	20.54	20.38	20.31
		25	12	20.39	20.50	20.50
		25	250	20.40	20.35	20.34
		50	0	20.55	20.48	20.40

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	22.26	22.28	22.38
		1	37	22.56	22.56	22.59
		1	74	22.28	22.34	22.29
		36	0	21.58	21.49	21.38
		36	20	21.50	21.45	21.37
		36	39	21.41	21.35	21.34
		75	0	21.30	21.39	21.29
	16QAM	1	0	21.20	21.59	21.19
		1	37	21.12	21.62	21.10
		1	74	21.06	20.93	21.07
		36	0	20.42	20.39	20.28
		36	20	20.42	20.44	20.27
		36	39	20.45	20.18	20.26
		75	0	20.52	20.38	20.33
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	22.23	22.11	22.06
		1	49	22.42	22.30	**22.82**
		1	99	22.33	21.95	21.89
		50	0	21.53	21.45	21.34
		50	24	21.39	21.44	21.21
		50	50	21.33	21.29	21.20
		100	0	21.29	21.33	21.17
	16QAM	1	0	21.22	21.26	20.90
		1	49	21.23	21.20	21.01
		1	99	21.10	20.98	20.92
		50	0	20.40	20.45	20.23
		50	24	20.46	20.42	20.30
		50	50	20.40	20.17	20.27
		100	0	20.35	20.36	20.23

LTE Band 4				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	21.33	21.48	21.65
		1	3	21.47	21.54	21.70
		1	5	21.46	21.49	21.56
		3	0	21.40	21.50	21.59
		3	1	21.46	21.54	21.63
		3	3	21.39	21.52	21.59
		6	0	20.45	20.54	20.66
	16QAM	1	0	20.33	20.29	20.59
		1	3	20.71	20.56	20.73
		1	5	20.21	20.49	20.43
		3	0	20.45	20.57	20.91
		3	1	20.51	20.61	20.96
		3	3	20.41	20.57	20.90
		6	0	19.36	19.41	19.78
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	22.14	21.72	22.09
		1	8	22.04	21.58	22.03
		1	14	21.84	21.59	21.74
		8	0	20.90	20.81	20.86
		8	4	20.87	20.84	20.92
		8	7	20.90	20.82	20.90
		15	0	20.91	20.81	20.84
	16QAM	1	0	20.80	20.64	20.82
		1	8	20.68	20.73	20.62
		1	14	20.80	20.82	20.76
		8	0	19.98	19.86	20.06
		8	4	20.00	19.90	20.01
		8	7	20.11	20.00	19.96
		15	0	19.82	19.75	19.95

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.17	22.05	21.93
		1	12	**22.39**	22.06	22.05
		1	24	22.04	21.94	22.02
		12	0	21.14	20.91	21.08
		12	7	21.12	20.89	21.08
		12	13	21.08	20.95	21.03
		25	0	21.05	20.92	21.12
	16QAM	1	0	20.80	20.76	20.93
		1	12	20.84	20.88	20.97
		1	24	20.61	20.70	20.86
		12	0	19.94	19.93	20.23
		12	7	20.02	19.89	20.18
		12	13	20.02	19.97	20.15
		25	0	20.04	19.94	20.14
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	21.83	21.80	21.88
		1	25	22.30	22.09	22.13
		1	49	21.84	21.85	21.74
		25	0	21.06	20.98	21.13
		25	12	21.09	20.89	21.12
		25	250	20.98	20.89	21.06
		50	0	20.99	20.94	21.09
	16QAM	1	0	20.96	20.76	21.09
		1	25	20.96	20.88	21.18
		1	49	20.79	20.65	20.83
		25	0	19.94	20.00	20.22
		25	12	20.01	20.11	20.30
		25	250	20.09	20.15	20.16
		50	0	20.06	20.00	20.19

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	21.86	21.73	21.96
		1	37	22.16	22.15	22.10
		1	74	22.05	21.71	21.68
		36	0	20.95	20.87	20.96
		36	20	20.91	20.84	20.98
		36	39	20.94	20.71	20.86
		75	0	20.89	20.76	20.92
	16QAM	1	0	20.70	20.52	20.86
		1	37	20.93	21.21	21.17
		1	74	20.80	20.69	20.45
		36	0	19.91	19.81	19.98
		36	20	19.88	19.85	19.90
		36	39	19.97	19.80	19.88
		75	0	19.89	19.84	19.94
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	21.54	21.76	21.80
		1	49	21.79	21.73	22.38
		1	99	21.74	21.54	21.44
		50	0	20.83	20.67	21.01
		50	24	20.76	20.75	20.85
		50	50	20.90	20.70	20.77
		100	0	20.86	20.67	20.94
	16QAM	1	0	20.50	20.54	20.60
		1	49	20.69	20.49	20.73
		1	99	20.70	20.51	20.54
		50	0	19.74	19.76	20.00
		50	24	19.74	19.68	20.05
		50	50	19.88	19.71	19.80
		100	0	19.78	19.63	19.89

LTE Band 5				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20407/824.7	20525/836.5	20643/848.3
1.4MHz	QPSK	1	0	21.83	21.81	22.09
		1	3	22.07	21.91	22.17
		1	5	22.08	21.91	21.96
		3	0	22.01	21.78	22.15
		3	1	22.11	21.95	22.11
		3	3	22.17	21.91	22.13
		6	0	21.10	20.94	21.13
	16QAM	1	0	20.86	20.76	21.11
		1	3	21.05	20.97	21.10
		1	5	20.90	20.81	20.98
		3	0	20.98	20.93	21.18
		3	1	21.06	21.12	21.28
		3	3	21.01	21.13	21.16
		6	0	20.12	20.05	20.25
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20415/825.5	20525/836.5	20635/847.5
3MHz	QPSK	1	0	22.13	22.07	22.37
		1	8	22.42	22.19	22.05
		1	14	22.36	22.20	21.97
		8	0	21.37	21.08	21.42
		8	4	21.46	21.09	21.36
		8	7	21.49	21.15	21.21
		15	0	21.47	21.07	21.37
	16QAM	1	0	21.34	20.97	21.27
		1	8	21.20	20.99	21.21
		1	14	21.22	20.89	20.73
		8	0	20.44	20.13	20.37
		8	4	20.59	20.14	20.36
		8	7	20.44	20.20	20.38
		15	0	20.45	20.02	20.26

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20425/826.5	20525/836.5	20625/846.5
5MHz	QPSK	1	0	21.77	21.56	21.97
		1	12	**22.53**	21.75	22.16
		1	24	22.17	21.90	21.65
		12	0	21.16	20.76	21.05
		12	7	21.24	20.82	21.06
		12	13	21.15	20.86	20.95
		25	0	21.19	20.80	21.02
	16QAM	1	0	20.87	20.56	20.81
		1	12	21.35	20.69	20.67
		1	24	20.90	20.68	20.74
		12	0	20.04	19.85	20.08
		12	7	20.23	19.85	19.93
		12	13	20.17	19.77	19.91
		25	0	20.23	19.90	19.99

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20450/829	20525/836.5	20600/844
10MHz	QPSK	1	0	22.08	21.93	21.77
		1	25	22.47	22.15	22.19
		1	49	21.71	22.19	21.75
		25	0	21.45	21.01	20.99
		25	12	21.35	20.96	21.17
		25	250	21.13	21.18	21.11
		50	0	21.26	21.01	21.18
	16QAM	1	0	20.62	20.87	20.91
		1	25	21.38	21.09	21.18
		1	49	20.84	20.95	20.93
		25	0	20.28	20.03	20.11
		25	12	20.48	20.06	20.17
		25	250	20.18	19.92	20.20
		50	0	20.15	20.01	20.15

LTE Band 12				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	21.74	22.45	22.38
		1	3	22.02	22.36	22.41
		1	5	21.90	22.23	22.35
		3	0	21.75	22.37	22.51
		3	1	21.86	22.46	22.57
		3	3	21.88	22.44	22.43
		6	0	20.93	21.47	21.44
	16QAM	1	0	20.92	21.26	21.27
		1	3	20.81	21.44	21.40
		1	5	20.54	21.34	21.30
		3	0	20.58	21.58	21.59
		3	1	20.89	21.51	21.44
		3	3	20.96	21.44	21.38
		6	0	19.72	20.35	20.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	22.15	22.19	22.59
		1	8	22.11	22.20	22.22
		1	14	22.20	22.14	22.14
		8	0	21.13	21.51	21.65
		8	4	21.24	21.46	21.50
		8	7	21.14	21.41	21.62
		15	0	21.17	21.44	21.58
	16QAM	1	0	20.93	21.21	21.40
		1	8	20.86	21.17	21.30
		1	14	21.07	21.34	21.40
		8	0	20.20	20.51	20.54
		8	4	20.64	20.42	20.55
		8	7	20.32	20.47	20.67
		15	0	20.16	20.21	20.43

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	21.87	22.29	22.11
		1	12	22.64	22.50	**22.84**
		1	24	22.40	22.05	22.09
		12	0	21.00	21.41	21.59
		12	7	21.35	21.35	21.56
		12	13	21.35	21.42	21.55
		25	0	21.20	21.42	21.54
	16QAM	1	0	20.78	21.23	21.26
		1	12	21.04	21.24	21.48
		1	24	21.15	21.15	21.32
		12	0	20.08	20.26	20.50
		12	7	20.32	20.38	20.70
		12	13	20.36	20.40	20.62
		25	0	20.27	20.48	20.54
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	21.85	22.19	22.33
		1	25	22.52	22.51	22.47
		1	49	22.03	22.07	22.32
		25	0	21.04	21.27	21.42
		25	12	21.15	21.41	21.49
		25	250	21.31	21.40	21.63
		50	0	21.19	21.41	21.54
	16QAM	1	0	20.66	20.96	21.27
		1	25	21.37	21.48	21.36
		1	49	21.25	21.34	21.23
		25	0	20.14	20.32	20.56
		25	12	20.22	20.46	20.45
		25	250	20.45	20.48	20.50
		50	0	20.26	20.50	20.63

LTE Band 13				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23205/779.5	23230/782	23255/784.5
5MHz	QPSK	1	0	22.11	21.69	21.99
		1	12	22.49	22.39	22.75
		1	24	22.15	22.40	22.51
		12	0	21.06	21.03	21.24
		12	7	21.10	21.09	21.43
		12	13	21.14	21.23	21.53
		25	0	21.12	21.25	21.44
	16QAM	1	0	20.98	20.87	20.99
		1	12	21.03	21.31	21.35
		1	24	20.93	21.18	21.47
		12	0	20.05	20.09	20.40
		12	7	20.18	20.25	20.58
		12	13	20.07	20.47	20.68
		25	0	20.16	20.19	20.37
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
					23230/782	
10MHz	QPSK	1	0		22.33	
		1	25		**22.95**	
		1	49		22.58	
		25	0		21.51	
		25	12		21.76	
		25	250		21.79	
		50	0		21.64	
	16QAM	1	0		21.17	
		1	25		21.86	
		1	49		21.41	
		25	0		20.60	
		25	12		20.78	
		25	250		20.59	
		50	0		20.65	

LTE Band 66				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131979/1710.70	132322/1745	132665/1779.3
1.4MHz	QPSK	1	0	21.21	21.47	21.58
		1	3	21.25	21.55	21.54
		1	5	21.33	21.58	21.29
		3	0	21.21	21.50	21.47
		3	1	21.37	21.54	21.45
		3	3	21.33	21.60	21.47
		6	0	20.30	20.57	20.48
	16QAM	1	0	20.27	20.71	20.44
		1	3	20.40	20.74	20.55
		1	5	20.26	20.45	20.43
		3	0	20.29	20.60	20.58
		3	1	20.36	20.55	20.61
		3	3	20.23	20.58	20.45
		6	0	19.09	19.53	19.38
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131987/1711.5	132322/1745	132657/1778.5
3MHz	QPSK	1	0	21.91	22.02	22.13
		1	8	21.69	22.07	22.01
		1	14	21.86	22.12	21.84
		8	0	20.77	21.08	20.90
		8	4	20.79	21.15	20.86
		8	7	19.53	21.10	20.81
		15	0	22.22	21.03	20.87
	16QAM	1	0	20.90	20.98	20.82
		1	8	20.77	20.89	20.69
		1	14	20.90	20.91	20.81
		8	0	20.00	19.99	19.75
		8	4	20.01	19.94	19.85
		8	7	20.04	20.13	19.71
		15	0	19.93	20.05	19.78

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131997/1712.5	132322/1745	132647/1777.5
5MHz	QPSK	1	0	22.03	22.36	22.17
		1	12	22.16	22.52	22.16
		1	24	21.97	22.26	21.87
		12	0	20.89	21.27	21.06
		12	7	20.88	21.26	21.01
		12	13	19.69	21.20	20.96
		25	0	22.48	21.22	20.98
	16QAM	1	0	21.04	20.89	20.81
		1	12	21.19	21.04	20.75
		1	24	21.13	20.98	20.75
		12	0	20.17	20.09	19.89
		12	7	20.35	20.17	19.79
		12	13	20.31	20.03	19.76
		25	0	20.10	20.13	20.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				132022/1715	132322/1745	132622/1775
10MHz	QPSK	1	0	21.86	22.30	21.97
		1	25	22.11	22.42	22.24
		1	49	21.77	22.19	21.58
		25	0	20.98	21.20	21.03
		25	12	20.94	21.19	20.96
		25	250	20.12	21.22	20.87
		50	0	22.42	21.25	20.90
	16QAM	1	0	21.13	21.17	21.15
		1	25	21.23	21.25	21.02
		1	49	21.12	21.01	20.69
		25	0	20.19	20.26	19.99
		25	12	20.39	20.19	19.97
		25	250	20.34	20.27	19.86
		50	0	20.40	20.22	19.91

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				132047/1717.5	132322/1745	132597/1772.5
15MHz	QPSK	1	0	21.55	21.79	21.46
		1	37	21.96	21.86	21.58
		1	74	21.47	21.37	21.30
		36	0	20.75	20.79	20.63
		36	20	20.72	20.78	20.60
		36	39	20.71	20.75	20.47
		75	0	20.79	20.73	20.53
	16QAM	1	0	20.43	20.52	20.50
		1	37	20.63	20.94	20.39
		1	74	20.56	20.60	20.28
		36	0	19.62	19.69	19.43
		36	20	19.64	19.64	19.38
		36	39	19.53	19.59	19.33
		75	0	19.71	19.71	19.54
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				132072/1720	132322/1745	132572/1770
20MHz	QPSK	1	0	21.81	21.99	21.79
		1	49	22.01	**22.56**	21.59
		1	99	21.85	21.78	21.25
		50	0	21.06	20.99	20.79
		50	24	21.04	21.03	20.78
		50	50	20.94	20.86	20.63
		100	0	20.91	20.92	20.78
	16QAM	1	0	20.70	20.79	20.67
		1	49	20.89	20.79	20.63
		1	99	20.83	20.64	20.45
		50	0	20.03	19.91	19.52
		50	24	19.84	19.74	19.62
		50	50	19.95	19.88	19.56
		100	0	19.83	19.83	19.72

LTE Band 71				Conducted Power (dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133147/665.5	133247/675.5	133447/695.5
5MHz	QPSK	1	0	22.38	22.04	22.10
		1	12	22.34	**22.74**	22.47
		1	24	21.98	22.28	21.93
		12	0	21.47	21.31	21.39
		12	7	21.32	21.44	21.28
		12	13	21.28	21.40	21.36
		25	0	21.38	21.32	21.39
	16QAM	1	0	21.20	21.11	21.49
		1	12	21.28	21.68	21.91
		1	24	21.12	21.10	21.10
		12	0	20.45	20.29	20.25
		12	7	20.30	20.54	20.37
		12	13	20.18	20.44	20.14
		25	0	20.37	20.54	20.25
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133172/668	133272/678	133422/693
10MHz	QPSK	1	0	22.14	21.88	22.32
		1	25	22.15	22.26	22.49
		1	49	22.00	22.28	22.37
		25	0	21.34	21.33	21.26
		25	12	21.36	21.36	21.42
		25	250	21.36	21.16	21.46
		50	0	21.37	21.33	21.43
	16QAM	1	0	21.05	20.91	21.04
		1	25	21.12	21.34	21.29
		1	49	21.04	21.03	21.20
		25	0	20.23	20.39	20.37
		25	12	20.27	20.29	20.45
		25	250	20.33	20.27	20.40
		50	0	20.20	20.35	20.42

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133197/670.5	133297/680.5	133397/690.5
15MHz	QPSK	1	0	22.21	22.21	22.08
		1	37	22.49	22.07	22.49
		1	74	22.33	22.30	22.42
		36	0	21.17	21.30	21.34
		36	20	21.31	21.15	21.32
		36	39	21.36	21.22	21.48
		75	0	21.28	21.26	21.45
	16QAM	1	0	21.10	21.09	21.00
		1	37	21.05	21.06	21.11
		1	74	21.15	20.90	21.28
		36	0	20.23	20.31	20.36
		36	20	20.37	20.25	20.41
		36	39	20.31	20.17	20.48
		75	0	20.35	20.23	20.47
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133222/673	133297/680.5	133372/688
20MHz	QPSK	1	0	21.99	21.75	21.96
		1	49	22.16	22.15	22.23
		1	99	21.87	21.81	21.93
		50	0	21.16	21.21	21.07
		50	24	21.21	21.09	21.25
		50	50	21.29	21.18	21.39
		100	0	21.25	21.24	21.19
	16QAM	1	0	21.02	20.32	21.26
		1	49	21.10	21.76	21.06
		1	99	20.87	20.80	21.07
		50	0	20.34	20.32	20.02
		50	24	20.18	20.20	20.21
		50	50	20.33	20.30	20.44
		100	0	20.33	20.11	20.30

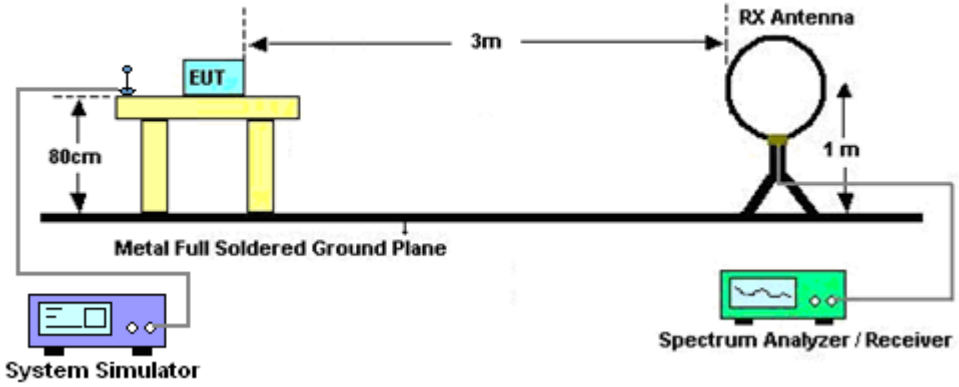
4 Radiated Test Items

4.1 Measuring Instruments

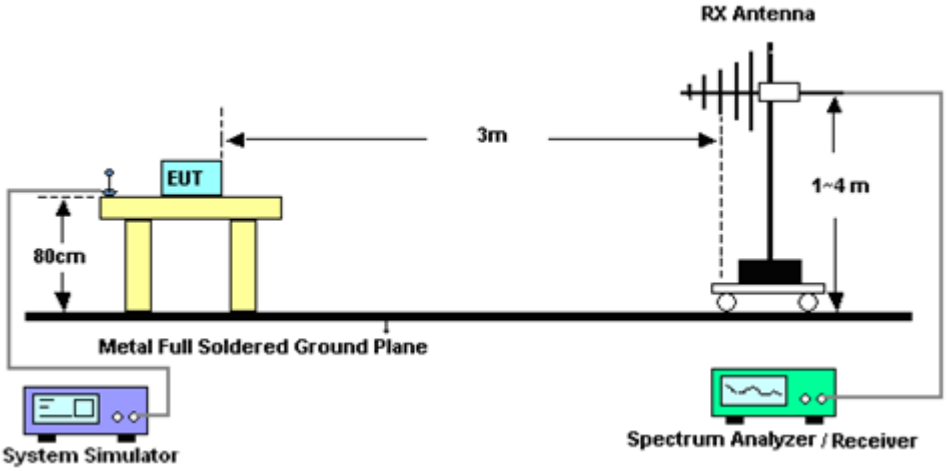
See list of measuring instruments of this test report.

4.1.1 Test Setup

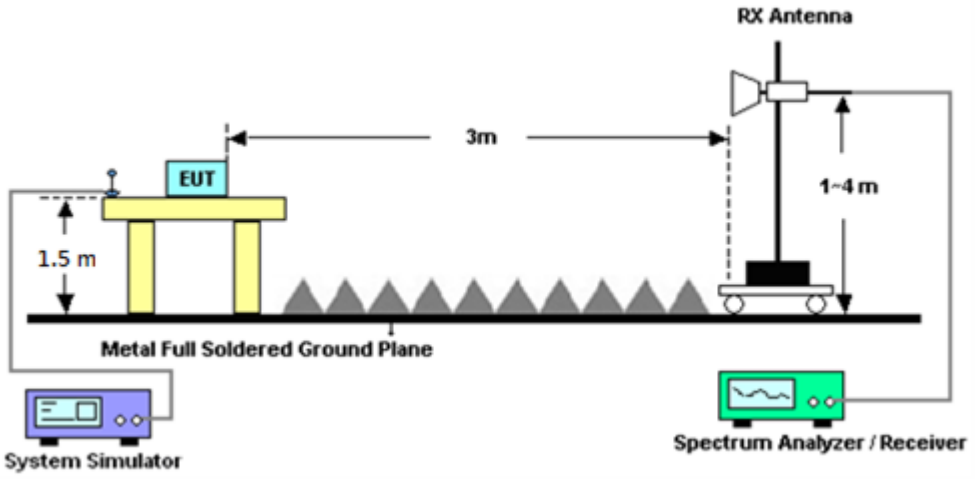
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix A.

Note:

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.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. 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 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.

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. 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)

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

    ERP (dBm) = EIRP - 2.15

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	R&S	HFH2-Z2E	100840	9kHz~30MHz	Jun. 21, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jun. 20, 2022	Radiation (03CH01-CA)
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Oct. 15, 2021	Feb. 11, 2022~ Feb. 17, 2022	Oct. 14, 2022	Radiation (03CH01-CA)
Bilog Antenna	TESEQ	6111D	50391	30MHz~1GHz	Aug. 10, 2021	Feb. 11, 2022~ Feb. 17, 2022	Aug. 09,2022	Radiation (03CH01-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	02140	1GHz~18GHz	Sep. 30, 2021	Feb. 11, 2022~ Feb. 17, 2022	Sep. 29, 2022	Radiation (03CH01-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	01895	1GHz~18GHz	Aug. 25, 2021	Feb. 11, 2022~ Feb. 17, 2022	Aug. 24, 2022	Radiation (03CH01-CA)
Preamplifier	SONOMA	310N	372241	9kHz~1GHz	Jul. 13, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 12, 2022	Radiation (03CH01-CA)
Preamplifier	Keysight	83017A	MY53270321	1GHz~26.5GHz	Aug. 26, 2021	Feb. 11, 2022~ Feb. 17, 2022	Aug. 25, 2022	Radiation (03CH01-CA)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055004	1GHz~18GHz	Jul. 21, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 20, 2022	Radiation (03CH01-CA)
EMI Test Receiver	R&S	ESU26	100049	20Hz~26.5GHz	Jun. 01, 2021	Feb. 11, 2022~ Feb. 17, 2022	May. 31, 2022	Radiation (03CH01-CA)
Signal Generator	Rohde & Schwarz	SMF100A	105544	9kHz~44GHz	Jun. 02, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jun. 01, 2022	Radiation (03CH01-CA)
Radio Communication Analyzer	Anritsu	MT8820C	6201300652	30MHz-2.7GHz, 3.4GHz-3.8GHz	Aug. 30, 2021	Feb. 11, 2022~ Feb. 17, 2022	Aug. 29, 2022	Radiation (03CH01-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8015932/2, 8015762/2, 6015772/2	N/A	Aug. 09, 2021	Feb. 11, 2022~ Feb. 17, 2022	Aug. 08, 2022	Radiation (03CH01-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN1	1.2GHz Low Pass Filter	Jul. 22, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 21, 2022	Radiation (03CH01-CA)
Filter	Wainwright	WHKX12-1080-1200-15000-60ST	SN7	1.2GHz High Pass Filter	Jul. 22, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 21, 2022	Radiation (03CH01-CA)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST 60ST	SN9	3GHz High Pass Filter	Jul. 22, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 21, 2022	Radiation (03CH01-CA)
Notch Filter	Wainwright	WRCJV10-2436-2496-2690-2750-40SS	SN1	Notch Filter	Jul. 22, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 21, 2022	Radiation (03CH01-CA)
Notch Filter	Wainwright	WRCGV10-1675-1695-1780-1800-40SS	SN1	Notch Filter	Jul. 22, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 21, 2022	Radiation (03CH01-CA)
Notch Filter	Wainwright	WRCGV8-1835-1850-1910-1925-40SS	SN9	Notch Filter	Jul. 22, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 21, 2022	Radiation (03CH01-CA)
Hygrometer	TESTO	608-H1	45141354	N/A	Jul. 30, 2021	Feb. 11, 2022~ Feb. 17, 2022	Jul. 29, 2022	Radiation (03CH01-CA)
Controller	Chaintek	EM-1000	060881	Control Turn Table & Antenna Mast	N/A	Feb. 11, 2022~ Feb. 17, 2022	N/A	Radiation (03CH01-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Feb. 11, 2022~ Feb. 17, 2022	N/A	Radiation (03CH01-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Feb. 11, 2022~ Feb. 17, 2022	N/A	Radiation (03CH01-CA)
Test Software	Audix E3	E6.2009-8-24d	PK-002093	N/A	N/A	Feb. 11, 2022~ Feb. 17, 2022	N/A	Radiation (03CH01-CA)

6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.4 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.6 dB**

Appendix A. Test Results of Radiated Test

<Sample 1>

LTE Band 12

LTE Band 12 / 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)
Lowest	1403	-54.74	-13.00	-41.74	-68.18	-59.09	0.52	7.02	H
	2104	-39.92	-13.00	-26.92	-56.04	-46.56	0.58	9.36	H
	2806	-57.91	-13.00	-44.91	-76.35	-66.02	0.67	10.94	H
									H
									H
									H
	1403	-52.46	-13.00	-39.46	-65.64	-56.81	0.52	7.02	V
	2104	-43.70	-13.00	-30.70	-60.02	-50.34	0.58	9.36	V
	2806	-57.78	-13.00	-44.78	-76.36	-65.89	0.67	10.94	V
									V
									V
									V
Middle	1416	-53.49	-13.00	-40.49	-67.00	-58.00	0.52	7.17	H
	2121	-40.47	-13.00	-27.47	-56.72	-47.04	0.58	9.30	H
	2828	-56.05	-13.00	-43.05	-74.61	-64.25	0.67	11.02	H
									H
									H
									H
	1416	-49.93	-13.00	-36.93	-63.15	-54.44	0.52	7.17	V
	2121	-41.34	-13.00	-28.34	-57.79	-47.91	0.58	9.30	V
	2828	-57.72	-13.00	-44.72	-76.40	-65.92	0.67	11.02	V
									V
									V
									V

Highest	1424	-57.30	-13.00	-44.30	-70.86	-62.05	0.85	7.75	H
	2136	-46.90	-13.00	-33.90	-63.26	-53.87	1.07	10.19	H
	2848	-57.68	-13.00	-44.68	-76.31	-65.41	1.23	11.12	H
									H
									H
									H
	1424	-54.83	-13.00	-41.83	-68.09	-59.58	0.85	7.75	V
	2136	-48.40	-13.00	-35.40	-64.97	-55.37	1.07	10.19	V
	2848	-57.68	-13.00	-44.68	-76.41	-65.41	1.23	11.12	V
									V
									V
									V

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

<Sample 2>

LTE Band 12

LTE Band 12 / 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)**
Lowest	1403	-49.70	-13.00	-36.70	-63.14	-54.05	0.52	7.02	H
	2104	-39.57	-13.00	-26.57	-55.69	-46.21	0.58	9.36	H
	2806	-57.10	-13.00	-44.10	-75.54	-65.21	0.67	10.94	H
									H
									H
									H
	1403	-46.53	-13.00	-33.53	-59.71	-50.88	0.52	7.02	V
	2104	-47.47	-13.00	-34.47	-63.79	-54.11	0.58	9.36	V
	2806	-57.23	-13.00	-44.23	-75.81	-65.34	0.67	10.94	V
									V
									V
									V
Middle	1416	-57.42	-13.00	-44.42	-70.93	-61.93	0.52	7.17	H
	2121	-47.53	-13.00	-34.53	-63.78	-54.10	0.58	9.30	H
	2828	-57.57	-13.00	-44.57	-76.13	-65.77	0.67	11.02	H
									H
									H
									H
	1416	-54.27	-13.00	-41.27	-67.49	-58.78	0.52	7.17	V
	2121	-46.96	-13.00	-33.96	-63.42	-53.53	0.58	9.30	V
	2828	-57.58	-13.00	-44.58	-76.26	-65.78	0.67	11.02	V
									V
									V
									V

Highest	1424	-57.30	-13.00	-44.30	-70.86	-62.05	0.85	7.75	H
	2136	-46.90	-13.00	-33.90	-63.26	-53.87	1.07	10.19	H
	2848	-57.68	-13.00	-44.68	-76.31	-65.41	1.23	11.12	H
									H
									H
									H
	1424	-54.83	-13.00	-41.83	-68.09	-59.58	0.85	7.75	V
	2136	-48.40	-13.00	-35.40	-64.97	-55.37	1.07	10.19	V
	2848	-57.68	-13.00	-44.68	-76.41	-65.41	1.23	11.12	V
									V
									V
									V

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