TEST REPORT

Product Name	:	**Data Concentrator Unit**
Model Number	:	**AJ102C**
FCC ID	:	**2AQPUAJ102C**

Prepared for	:	Lin Man Power Technology, Inc.
Address	:	No.6 3rd street, Meridian Industrial Complex Balibago, Sta. Rosa City, Laguna 4026, Philippines.
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282

Report Number	:	ENS2410180034W00103R
Date(s) of Tests	:	November 11, 2024 to December 24, 2024
Date of Issue	:	December 27, 2024

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Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2410180034W00103R	/	Original Report

1 TEST RESULT CERTIFICATION

Applicant	:	Lin Man Power Technology, Inc.
Address	:	No.6 3rd street, Meridian Industrial Complex Balibago, Sta. Rosa City, Laguna 4026, Philippines.
Manufacturer	:	Lin Man Power Technology, Inc.
Address	:	No.6 3rd street, Meridian Industrial Complex Balibago, Sta. Rosa City, Laguna 4026, Philippines.
Product Name	:	Data Concentrator Unit
Model Number	:	AJ102C
Trademark	:	ENERTEK

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2 , Subpart J FCC 47 CFR Part 27, Subpart C	PASS

The device described above is tested by EMTEK (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (Shenzhen) Co., Ltd. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the above table standards requirement.
This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (Shenzhen) Co., Ltd.

Date of Test	:	November 11, 2024 to December 24, 2024
Prepared by	:	Una Yu/Editor
Reviewer	:	Joe Xia/Supervisor
Approved & Authorized Signer	:	Lisa Wang/Manager

EMTEK (SHENZHEN) CO., LTD. TESTING

2 EUT TECHNICAL DESCRIPTION

Product Name:	Data Concentrator Unit
Model Number:	AJ102C
Operation Band:	LTE Band41
Modulation:	UL: QPSK, 16QAM
Frequency Range:	LTE Band 41: Tx/Rx:2496~2690MHz
Antenna Type:	External Antenna
Antenna Gain:	LTE Band41: 4.25dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)
Power Supply:	AC 120V/60Hz
Temperature Range:	-25℃~85℃

Note: for more details, please refer to the user's manual of the EUT.

3 SUMMARY OF TEST RESULT

3.1 TEST ITEMS

FCC Rule	Test Parameter	Verdict	Remark
2.1046	RF Power Output	PASS	*
22.913, 24.232, 27.50, 90.635	Equivalent (Isotropic) Radiated Power	PASS	
2.1047	Modulation Characteristics	PASS	*
2.1049	Occupied Bandwidth	PASS	*
2.1051, 22.917, 24.238, 27.53, 90.691	Out of Band Emissions at Antenna Terminals	PASS	*
	Band Edge Compliance	PASS	*
2.1053, 22.917, 24.238, 27.53, 90.691	Field Strength of Spurious Radiation	PASS	
2.1055, 22.355, 24.235, 27.54, 90.213	Frequency Stability versus Temperature	PASS	*
	Frequency Stability versus Voltage	PASS	*
24.232, 27.50	Peak to Average Ratio	PASS	*
NOTE: * these modules have been tested and comply with the above table standards requirement, according to technical characteristic,only Equivalent (Isotropic) Radiated Power and Field Strength of Spurious Radiation retest for this device, all other test results please reference original module's test report No.: I22W00078-LTE-RF-FCC-Rev3.			

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is filing to comply with the above table standards requirement.

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2 , Subpart J
FCC 47 CFR Part 27, Subpart C
KDB971168 D01:v02r02
ANSI/TIA-603-D-2010
ANSI C63.26:2015

4.2 MEASUREMENT EQUIPMENT USED

For Spurious Emissions Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Pre-Amplifier	Bonn	BLMA 011001N	2213967A	2024/10/18	1Year
EMI Test Receiver	Rohde & Schwarz	ESR7	102551	2024/10/18	1Year
Bilog Antenna	Schwarzbeck	VULB9163	9163142	2024/7/8	2Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1198	2023/6/2	2Year
Pre-Amplifier	Bonn	BLMA 0118-5G	2213967B-01	2024/10/18	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	2024/5/10	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2023/5/12	2Year
Pre-Amplifier	Lunar EM	LNA18G26-40	J1012131010 001	2024/5/11	1Year
Pre-Amplifier	Lunar EM	LNA26G40-40	J1013131028 001	2024/5/11	1Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2023/5/12	2Year
Wideband Radio Communication Tester	R&S	CMW500	171168	2024/9/18	1Year
Coaxial Cable	TIMES	NmNm-7-C1570 2	N/A	2024/5/23	1Year
Coaxial Cable	TIMES	HF290-NMSM-6. 5M	N/A	2024/5/23	1Year

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition. The CMU200 and CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

During all testing, EUT is in link mode with base station emulator at maximum power level.
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.
Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.
Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

■ Test Mode and system config

Configure the CMW500 call box to support all LTE tests in respect to the 3GPP 36.521.

UE term. Conn: User defined Channels.

Exp. Nominal Power Mode: According to UL Power Control Settings.

RS EPRE: -75.0 dBm/15kHz Full Cell BW Power: -50.2 dBm.

PSS Power Offset = SSS Power Offset = PBCH Power Offset = PCFICH Power Offset = PDCCH Power. Offset = 0.0 dB.

PHICH Power Offset = -12 dB.

OCNG ON.

PDSCH Power Offset PA: 0 dB, Power Ratio Index PB: 0 (rhoB/rhoA: 1).

Active TPC Setup: Max Power.

Security Settings: Authentication OFF, NAS Security OFF, AS Security OFF.

Integrity Algortithm: NULL.

Milenage OFF.

Configure the desired channel, BW, resource block allocation and modulation.

Connect to test set.

Set CMW500 TPC Setup to Max Power (Up power control command).

According to 3GPP 36.521, V9.1.0., the output power level for Power Class 3 LTE is to be 23.0dBm + 2.7dB. The lower limit is shifted down by the MPR amount allowed for certain configurations.
Maximum Power Reduction (MPR) is allowed due to higher order modulation and transmit bandwidth configurations. These MPR levels reduce the lower limit of each output power by the either 1 or 2dB per 3GPP 36.521.

Modulation	Channel bandwidth / Transmission bandwidth configuration[RB]						MPR (dB)
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

Modulation	CA bandwidth Class B and C							MPR (dB)
	25 RB + 50 RB	50 RB + 50 RB	25 RB + 100 RB	50 RB + 100 RB	75 RB + 75 RB	75 RB + 100 RB	100 RB + 100 RB	
QPSK	> 8 and ≤25	> 12 and ≤50	> 8 and ≤25	> 12 and ≤50	> 16 and ≤75	> 16 and ≤75	> 18 and ≤100	≤ 1
QPSK	> 25	> 50	> 25	> 50	> 75	> 75	> 100	≤ 1
16 QAM	≤8	≤12	≤8	≤12	≤16	≤16	≤18	≤ 2
16 QAM	> 8 and ≤25	> 12 and ≤50	> 8 and ≤25	> 12 and ≤50	> 16 and ≤75	> 16 and ≤75	> 18 and ≤100	≤ 2
16 QAM	> 25	> 50	> 25	> 50	> 75	> 75	> 100	≤ 3

Modulation	CA bandwidth Class B and C							MPR (dB)
	25 RB + 50 RB	50 RB + 50 RB	25 RB + 100 RB	50 RB + 100 RB	75 RB + 75 RB	75 RB + 100 RB	100 RB + 100 RB	
64 QAM	8 and a≤llocation wholly contained within a single CC	12 and a≤llocation wholly contained within a single CC	8 and a≤llocation wholly contained within a single CC	12 and a≤llocation wholly contained within a single CC	16 and a≤llocation wholly contained within a single CC	16 and a≤llocation wholly contained within a single CC	18 and a≤llocation wholly contained within a single CC	≤ 2
64 QAM	> 8 or allocation extends across two CC's	> 12 or allocation extends across two CC's	> 8 or allocation extends across two CC's	> 12 or allocation extends across two CC's	> 16 or allocation extends across two CC's	> 16 or allocation extends across two CC's	> 18 or allocation extends across two CC's	≤ 3

■ Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Ambient	VL	AC 108V
	VN	AC 120V
	VH	AC 132V
NOTE: VL= Lower Extreme Test Voltage. VN= Nominal Voltage. VH= Upper Extreme Test Voltage. TN= Normal Temperature.		

5 FACILITIES AND ACCREDITATIONS

5.1 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged wave guide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.
Calibrated wide band preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods”.

5.2 DESCRIPTION OF TEST FACILITY

Site Description

EMC Lab. : **Accredited by CNAS**
The Certificate Registration Number is L2291
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by A2LA
The Certificate Number is 4321.01

Accredited by Industry Canada
The Conformity Assessment Body Identifier is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

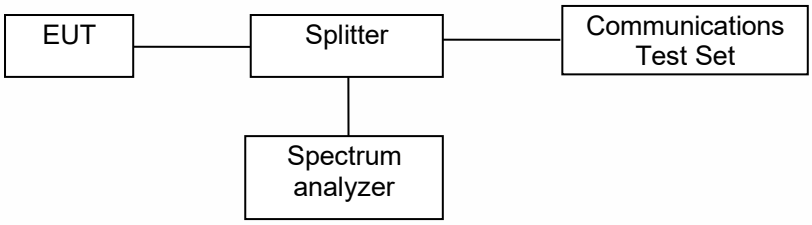
Parameter	Uncertainty
Radio Frequency	±1x10^-5
RF Power Output	±1.0dB
Radiated Emission Test	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%.
NOTE: The results of this report do not take into account the uncertainty.

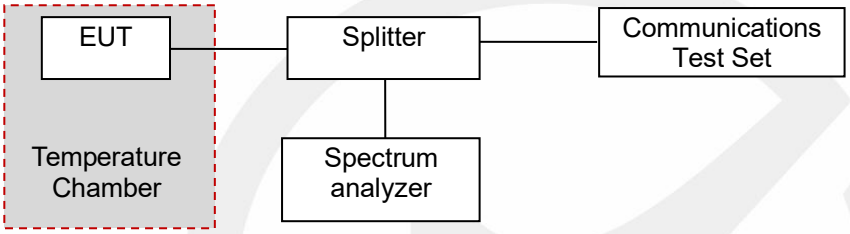
7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

The sample component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP 2



7.3 RADIO FREQUENCY TEST SETUP 3

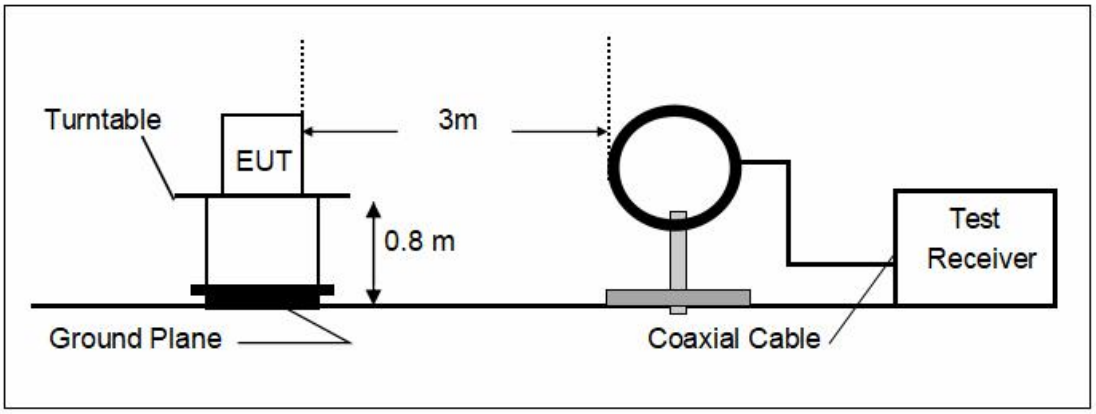
The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.26-2015 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

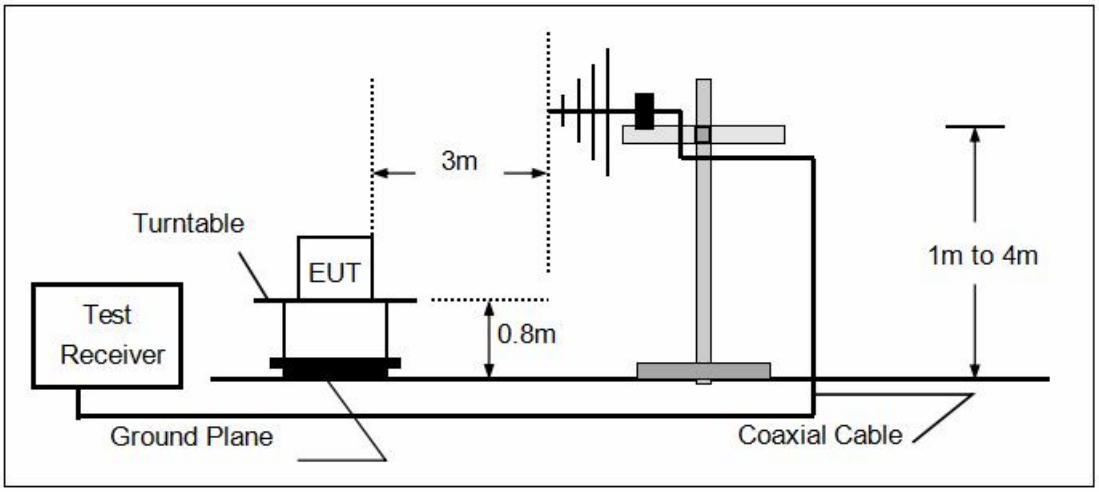
Above 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:
(Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.)
The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

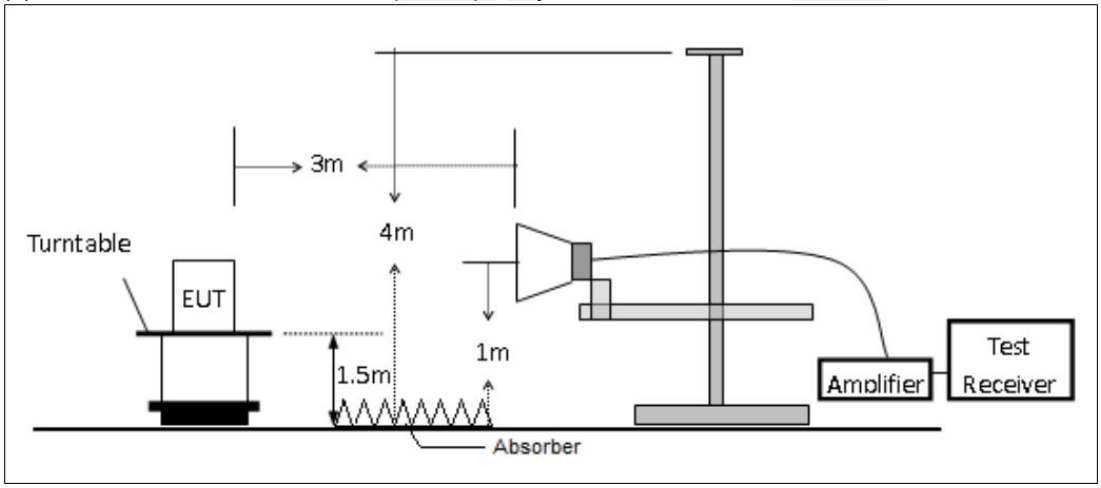
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz



7.4 SUPPORT EQUIPMENT

N/A

Notes:

1.All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2.Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

8 TEST REQUIREMENTS

8.1 EQUIVALENT (ISOTROPIC) RADIATED POWER

Measurement Procedure: FCC KDB 971168 D01 V03r01 ; C63.26 (2015)

Calculate power in dBm by the following formula:

ERP (dBm) = Conducted Power (dBm) + antenna gain (dBd)

EIRP(dBm) = Conducted Power (dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB

Measurement Procedure: FCC KDB 971168 D01 V03r01 ; ANSI/C63.26 (2015)

Below 1GHz test procedure as below:

1). The EUT was powered ON and placed on a 0.8m high table in the chamber. The antenna of the transmitter was extended to its maximum length.

2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.

3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.

4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.

5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.

6). The output power into the substitution antenna was then measured.

7). Steps 5) and 6) were repeated with both antennas polarized.

8). Calculate power in dBm by the following formula:

ERP (dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)

Where:

Pg is the generator output power into the substitution antenna.

Above 1GHz test procedure as below:

1). Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber

2). Calculate power in dBm by the following formula:

EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)

EIRP=ERP+2.15dB

Where:

Pg is the generator output power into the substitution antenna.

3). Test the EUT in the lowest channel, the middle channel the Highest channel

4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.

5). Repeat above procedures until all frequencies measured was complete.

LTE Band41

Bandwidth	RB size/offset	Frequency (MHz)	Modulation	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Verdict
5MHz	1 RB low	2498.5	QPSK	21.88	4.25	26.13	33	PASS
5MHz	1 RB mid	2498.5	QPSK	21.89	4.25	26.14	33	PASS
5MHz	1 RB high	2498.5	QPSK	21.84	4.25	26.09	33	PASS
5MHz	50%,low	2498.5	QPSK	20.66	4.25	24.91	33	PASS
5MHz	50% RB mid	2498.5	QPSK	20.74	4.25	24.99	33	PASS
5MHz	50%,high	2498.5	QPSK	20.70	4.25	24.95	33	PASS
5MHz	100% RB	2498.5	QPSK	20.67	4.25	24.92	33	PASS
5MHz	1 RB low	2498.5	16QAM	21.12	4.25	25.37	33	PASS
5MHz	1 RB mid	2498.5	16QAM	21.16	4.25	25.41	33	PASS
5MHz	1 RB high	2498.5	16QAM	21.15	4.25	25.40	33	PASS
5MHz	50%,low	2498.5	16QAM	19.83	4.25	24.08	33	PASS
5MHz	50% RB mid	2498.5	16QAM	19.92	4.25	24.17	33	PASS
5MHz	50%,high	2498.5	16QAM	19.86	4.25	24.11	33	PASS
5MHz	100% RB	2498.5	16QAM	19.65	4.25	23.90	33	PASS
5MHz	1 RB low	2593	QPSK	21.79	4.25	26.04	33	PASS
5MHz	1 RB mid	2593	QPSK	21.76	4.25	26.01	33	PASS
5MHz	1 RB high	2593	QPSK	21.65	4.25	25.90	33	PASS
5MHz	50%,low	2593	QPSK	20.59	4.25	24.84	33	PASS
5MHz	50% RB mid	2593	QPSK	20.65	4.25	24.90	33	PASS
5MHz	50%,high	2593	QPSK	20.57	4.25	24.82	33	PASS
5MHz	100% RB	2593	QPSK	20.57	4.25	24.82	33	PASS
5MHz	1 RB low	2593	16QAM	20.81	4.25	25.06	33	PASS
5MHz	1 RB mid	2593	16QAM	20.79	4.25	25.04	33	PASS
5MHz	1 RB high	2593	16QAM	20.68	4.25	24.93	33	PASS
5MHz	50%,low	2593	16QAM	19.76	4.25	24.01	33	PASS
5MHz	50% RB mid	2593	16QAM	19.82	4.25	24.07	33	PASS
5MHz	50%,high	2593	16QAM	19.75	4.25	24.00	33	PASS
5MHz	100% RB	2593	16QAM	19.71	4.25	23.96	33	PASS
5MHz	1 RB low	2687.5	QPSK	21.59	4.25	25.84	33	PASS
5MHz	1 RB mid	2687.5	QPSK	21.39	4.25	25.64	33	PASS
5MHz	1 RB high	2687.5	QPSK	21.40	4.25	25.65	33	PASS
5MHz	50%,low	2687.5	QPSK	20.33	4.25	24.58	33	PASS
5MHz	50% RB mid	2687.5	QPSK	20.37	4.25	24.62	33	PASS
5MHz	50%,high	2687.5	QPSK	20.30	4.25	24.55	33	PASS
5MHz	100% RB	2687.5	QPSK	20.31	4.25	24.56	33	PASS
5MHz	1 RB low	2687.5	16QAM	20.67	4.25	24.92	33	PASS
5MHz	1 RB mid	2687.5	16QAM	20.57	4.25	24.82	33	PASS
5MHz	1 RB high	2687.5	16QAM	20.50	4.25	24.75	33	PASS
5MHz	50%,low	2687.5	16QAM	19.34	4.25	23.59	33	PASS
5MHz	50% RB mid	2687.5	16QAM	19.39	4.25	23.64	33	PASS
5MHz	50%,high	2687.5	16QAM	19.31	4.25	23.56	33	PASS
5MHz	100% RB	2687.5	16QAM	19.36	4.25	23.61	33	PASS
10MHz	1 RB low	2501	QPSK	22.00	4.25	26.25	33	PASS
10MHz	1 RB mid	2501	QPSK	22.03	4.25	26.28	33	PASS
10MHz	1 RB high	2501	QPSK	22.03	4.25	26.28	33	PASS
10MHz	50%,low	2501	QPSK	20.74	4.25	24.99	33	PASS
10MHz	50% RB mid	2501	QPSK	20.89	4.25	25.14	33	PASS
10MHz	50%,high	2501	QPSK	20.76	4.25	25.01	33	PASS
10MHz	100% RB	2501	QPSK	20.74	4.25	24.99	33	PASS
10MHz	1 RB low	2593	QPSK	22.02	4.25	26.27	33	PASS
10MHz	1 RB mid	2593	QPSK	21.92	4.25	26.17	33	PASS
10MHz	1 RB high	2593	QPSK	21.75	4.25	26.00	33	PASS
10MHz	50%,low	2593	QPSK	20.69	4.25	24.94	33	PASS
10MHz	50% RB mid	2593	QPSK	20.79	4.25	25.04	33	PASS
10MHz	50%,high	2593	QPSK	20.61	4.25	24.86	33	PASS
10MHz	100% RB	2593	QPSK	20.65	4.25	24.90	33	PASS
10MHz	1 RB low	2685	QPSK	21.83	4.25	26.08	33	PASS
10MHz	1 RB mid	2685	QPSK	21.66	4.25	25.91	33	PASS
10MHz	1 RB high	2685	QPSK	21.48	4.25	25.73	33	PASS
10MHz	50%,low	2685	QPSK	20.43	4.25	24.68	33	PASS
10MHz	50% RB mid	2685	QPSK	20.59	4.25	24.84	33	PASS
10MHz	50%,high	2685	QPSK	20.38	4.25	24.63	33	PASS
10MHz	100% RB	2685	QPSK	20.45	4.25	24.70	33	PASS
15MHz	1 RB low	2503.5	QPSK	22.00	4.25	26.25	33	PASS
15MHz	1 RB mid	2503.5	QPSK	22.11	4.25	26.36	33	PASS

15MHz	1 RB high	2503.5	QPSK	21.97	4.25	26.22	33	PASS
15MHz	50%,low	2503.5	QPSK	20.89	4.25	25.14	33	PASS
15MHz	50% RB mid	2503.5	QPSK	20.98	4.25	25.23	33	PASS
15MHz	50%,high	2503.5	QPSK	20.96	4.25	25.21	33	PASS
15MHz	100% RB	2503.5	QPSK	20.86	4.25	25.11	33	PASS
15MHz	1 RB low	2593	QPSK	21.99	4.25	26.24	33	PASS
15MHz	1 RB mid	2593	QPSK	21.94	4.25	26.19	33	PASS
15MHz	1 RB high	2593	QPSK	21.66	4.25	25.91	33	PASS
15MHz	50%,low	2593	QPSK	20.84	4.25	25.09	33	PASS
15MHz	50% RB mid	2593	QPSK	20.85	4.25	25.10	33	PASS
15MHz	50%,high	2593	QPSK	20.69	4.25	24.94	33	PASS
15MHz	100% RB	2593	QPSK	20.74	4.25	24.99	33	PASS
15MHz	1 RB low	2682.5	QPSK	21.75	4.25	26.00	33	PASS
15MHz	1 RB mid	2682.5	QPSK	21.72	4.25	25.97	33	PASS
15MHz	1 RB high	2682.5	QPSK	21.42	4.25	25.67	33	PASS
15MHz	50%,low	2682.5	QPSK	20.61	4.25	24.86	33	PASS
15MHz	50% RB mid	2682.5	QPSK	20.66	4.25	24.91	33	PASS
15MHz	50%,high	2682.5	QPSK	20.55	4.25	24.80	33	PASS
15MHz	100% RB	2682.5	QPSK	20.56	4.25	24.81	33	PASS
20MHz	1 RB low	2506	QPSK	21.85	4.25	26.10	33	PASS
20MHz	1 RB mid	2506	QPSK	22.11	4.25	26.36	33	PASS
20MHz	1 RB high	2506	QPSK	21.78	4.25	26.03	33	PASS
20MHz	50%,low	2506	QPSK	20.81	4.25	25.06	33	PASS
20MHz	50% RB mid	2506	QPSK	21.02	4.25	25.27	33	PASS
20MHz	50%,high	2506	QPSK	20.83	4.25	25.08	33	PASS
20MHz	100% RB	2506	QPSK	20.86	4.25	25.11	33	PASS
20MHz	1 RB low	2593	QPSK	21.86	4.25	26.11	33	PASS
20MHz	1 RB mid	2593	QPSK	21.90	4.25	26.15	33	PASS
20MHz	1 RB high	2593	QPSK	21.33	4.25	25.58	33	PASS
20MHz	50%,low	2593	QPSK	20.78	4.25	25.03	33	PASS
20MHz	50% RB mid	2593	QPSK	20.83	4.25	25.08	33	PASS
20MHz	50%,high	2593	QPSK	20.57	4.25	24.82	33	PASS
20MHz	100% RB	2593	QPSK	20.66	4.25	24.91	33	PASS
20MHz	1 RB low	2680	QPSK	21.85	4.25	26.10	33	PASS
20MHz	1 RB mid	2680	QPSK	21.89	4.25	26.14	33	PASS
20MHz	1 RB high	2680	QPSK	21.33	4.25	25.58	33	PASS
20MHz	50%,low	2680	QPSK	20.57	4.25	24.82	33	PASS
20MHz	50% RB mid	2680	QPSK	20.63	4.25	24.88	33	PASS
20MHz	50%,high	2680	QPSK	20.50	4.25	24.75	33	PASS
20MHz	100% RB	2680	QPSK	20.48	4.25	24.73	33	PASS

Note: EIRP = Output Power + Antenna Gain

8.2 FIELD STRENGTH OF SPURIOUS RADIATION

8.2.1 Conformance Limit

LTE BAND2 (25) FCC Part 24.238
Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
LTE BAND4(66) FCC Part 27.53(h)
Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
LTE BAND5(26) FCC Part 22.917
Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
LTE BAND7 (41) FCC Part 27.53(m)
For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees
LTE BAND12 FCC Part 27.53(g)
Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
LTE BAND13 FCC Part 27.53(c)
Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
LTE BAND30 FCC Part 27.53(a)
By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

8.2.2 Test Configuration

Test according to clause 7.3 radio frequency test setup 3.

8.2.3 Test Procedure

Connect the EUT to Universal Radio Communication Tester CMU200 or CMU500 via the antenna connector. A call is set up by the SS according to the generic call set up procedure on a channel with ARFCN in the Mid ARFCN range, power control level set to Max power. MS TXPWR_MAX_CCH is set to the maximum value supported by the Power Class of the Mobile under test.
Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as

specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power, then the following procedure can be used to determine spurious emission.

a) RBW = 1 MHz for f ≥ 1 GHz(1GHz to 25GHz), 100 kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for f<30MHz(150KHz to 30KHz).
b) Set VBW ≥ 3 × RBW.
c) Set span wide enough to fully capture the emission being measured.
d) Sweep time = auto couple.
e) Detector = peak.
f) Ensure that the number of measurement points ≥ span/RBW.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the peak amplitude level.

Step1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
Step2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
Step3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
Step4. 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.
Step5. Make the measurement with the spectrum analyzer's RBW , VBW , taking the record of maximum spurious emission.
Step6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
Step7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
Step8. Taking the record of output power at antenna port.
Step9. Repeat step 7 to step 8 for another polarization.
Step10. Emission level (dBm) = output power + substitution Gain.

8.2.4 Test Results

PASS

NOTE: All the modulation modes were tested, the data of the worst mode are described in the table.

LTE Band 41:

Operating Mode:	**Traffic Mode (9KHz to 30MHz)**		
Temperature:	25℃	Test By:	CZF
Humidity:	60%	Test mode:	TX Mode

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) PK	Limit 3m(dBuV/m) PK	Over(dB) PK
--	--	--	--	--

Note: Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operating Mode: **Traffic Mode (BELOW 1GHz)**
Temperature: 25℃ Air Pressure: 106kPa
Humidity: 60% Test By: CZF

Frequency (MHz)	Antenna Polarization	Emission level (dBm)	Limit (dBm)	Over (dB)	Verdict
83.7892	H	-52.20	-13.00	39.20	PASS
246.3208	H	-53.17	-13.00	40.17	PASS
398.3759	H	-58.50	-13.00	45.50	PASS
597.8179	H	-53.53	-13.00	40.53	PASS
785.9103	H	-52.82	-13.00	39.82	PASS
974.8272	H	-50.21	-13.00	37.21	PASS
83.7407	V	-51.96	-13.00	38.96	PASS
198.2549	V	-57.58	-13.00	44.58	PASS
491.3066	V	-57.41	-13.00	44.41	PASS
670.3775	V	-56.05	-13.00	43.05	PASS
836.9348	V	-53.60	-13.00	40.60	PASS
996.9443	V	-51.73	-13.00	38.73	PASS

Operating Mode: **Traffic Mode (ABOVE 1GHz)**
Temperature: 25℃ Air Pressure: 106kPa
Humidity: 60% Test By: CZF

Frequency (MHz)	Antenna Polarization	Emission level (dBm)	Limit (dBm)	Over (dB)	Verdict
3822.564	H	-42.42	-13.00	29.42	PASS
6410.482	H	-36.71	-13.00	23.71	PASS
8675.335	H	-30.52	-13.00	17.52	PASS
10685.13	H	-26.70	-13.00	13.70	PASS
14289.85	H	-20.22	-13.00	7.22	PASS
17153.23	H	-21.62	-13.00	8.62	PASS
3802.160	V	-43.27	-13.00	30.27	PASS
6505.701	V	-37.28	-13.00	24.28	PASS
9348.669	V	-29.86	-13.00	16.86	PASS
10698.73	V	-26.70	-13.00	13.70	PASS
14293.25	V	-21.26	-13.00	8.26	PASS
17469.49	V	-23.56	-13.00	10.56	PASS

Note:
(1) Emission Level= Reading Level+ Correct Factor +Cable Loss.
(2) Correct Factor= Ant_F + Cab_L - Preamp.
(3) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Detail of factor for radiated emission:

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

--- End of Report ---

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