Shenzhen CTL Testing Technology Co., Ltd.
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TEST REPORT

FCC Part 27

Report Reference No..... :	**CTL2103249071-WF09**	
Compiled by: (position+printed name+signature)	Happy Guo (File administrators)	Happy Guo
Tested by: (position+printed name+signature)	Gary Gao (Test Engineer)	Gary Gao
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	Ivan Xie

Product Name..... :	Electrocardiograph
Model/Type reference ..... :	iSE-1210
List Model(s)..... :	iSE-1810
Trade Mark..... :	N/A
FCC ID..... :	SMQISEEDAN
Applicant's name ..... :	**EDAN INSTRUMENTS, INC.**
Address of applicant..... :	#15 Jinhui Road, Jinsha Community, Kengzi Sub-District, Pingshan District, 518122 Shenzhen P.R. China
Test Firm..... :	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm ..... :	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification..... :	
Standard ..... :	**FCC CFR Title 47 Part 2, Part 27** **EIA/TIA 603-D: 2010** **KDB 971168 D01**
TRF Originator ..... :	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF..... :	Dated 2011-01
Date of receipt of test item ..... :	Apr. 08, 2021
Date of sampling..... :	Apr. 08, 2021
Date of Test Date ..... :	Apr. 08, 2021-Apr. 21, 2021
Date of Issue ..... :	Apr. 22, 2021
Result..... :	Pass

TEST REPORT

Test Report No. :	CTL2103249071-WF09	Apr. 22, 2021 Date of issue

Equipment under Test	:	Electrocardiograph
Sample No	:	CTL210324907-1-S001
Model /Type	:	iSE-1210
Listed Models	:	iSE-1280
Applicant	:	**EDAN INSTRUMENTS, INC.**
Address	:	#15 Jinhui Road, Jinsha Community, Kengzi Sub-District, Pingshan District, 518122 Shenzhen P.R. China
Manufacturer	:	**EDAN INSTRUMENTS, INC.**
Address	:	#15 Jinhui Road, Jinsha Community, Kengzi Sub-District, Pingshan District, 518122 Shenzhen P.R. China

Test result	Pass *

*In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2021-04-16	CTL2103249071-WF09	Tracy Qi

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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:
FCC Part 27 : MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES
TIA/EIA 603 D June 2010:Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
KDB971168 D01: v02r02 MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS
ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices
ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 27.50(h)(2)	Pass
Peak-to-Average Ratio	Part 27.50(a)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 27.53(m)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(m)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(m)	Pass
Out of band emission, Band Edge	Part 2.1051 Part 27.53(m)	Pass
Frequency stability	Part 2.1055 Part 27.54	Pass

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan. 22, 2019.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	Electrocardiograph	
Model/Type reference:	iSE-1210	
Power supply:	DC 19.0V from adapter	
Adapter information:	Model: UE48-190253SPA3 Input: 100-240V~, 50/60Hz, 1.1A MAX Output: 19V⎓2.53A 48.0W	
Hardware version:	V1.0	
Software version:	V2.0	
LTE		
Operation Band:	FDD-LTE: Band 5 TDD-LTE: Band 40/41	
Operating Frequency Range（s）	Band	Tx（MHz）
	LTE: Band 5	824~849
	LTE: Band 40a	2305~2315
	LTE: Band 40b	2350~2360
	LTE: Band 41	2555~2655
Modulation Type:	QPSK, 16QAM	
Release Version:	Release 9	
Category:	Cat 4	
Antenna type:	FPC antenna	
Antenna gain:	Band 5： 0.78dBi Band 40：1.35dBi Band 41：1.45dBi	

Note: For more details, refer to the user's manual of the EUT.
Note1: This report only reports band 41.

2.3 Description of Test Modes

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.

Test Frequency:

FDD Band 5				
Channel	1.4MHz Bandwidth/ Frequency (MHz)	3MHz Bandwidth/ Frequency (MHz)	5MHz Bandwidth/ Frequency (MHz)	10MHz Bandwidth/ Frequency (MHz)
LCH	824.7	825.5	826.5	829.0
MCH	836.5	836.5	836.5	836.5
HCH	848.3	847.5	846.5	844.0

TDD Band 40a		
Channel	5MHz Bandwidth/ Frequency (MHz)	10MHz Bandwidth/ Frequency (MHz)
LCH	2307.5	2310
MCH	2310.0	
HCH	2312.5	

TDD Band 40b		
Channel	5MHz Bandwidth/ Frequency (MHz)	10MHz Bandwidth/ Frequency (MHz)
LCH	2352.5	2355
MCH	2355.0	
HCH	2357.5	

TDD Band 41				
Channel	5MHz Bandwidth/ Frequency (MHz)	10MHz Bandwidth/ Frequency (MHz)	15MHz Bandwidth/ Frequency (MHz)	20MHz Bandwidth/ Frequency (MHz)
LCH	2557.5	2560	2562.5	2565.0
MCH	2605.0	2605	2605.0	2605.0
HCH	2652.5	2650	2647.5	2645.0

2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2020/05/14	2021/05/13
Bilog Antenna	Sunol Sciences Corp.	JB1	A061714	2020/05/14	2021/05/13
EMI Test Receiver	R&S	ESCI	103710	2020/05/14	2021/05/13
Spectrum Analyzer	Agilent	E4407B	MY41440676	2020/05/14	2021/05/13
Spectrum Analyzer	Agilent	N9020	US46220290	2020/05/14	2021/05/13
Spectrum Analyzer	Keysight	N9020A	MY53420874	2020/05/14	2021/05/13
Controller	EM Electronics	Controller EM 1000	N/A	2020/05/22	2021/05/21
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2020/05/14	2021/05/13
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062014	2020/05/14	2021/05/13
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2020/05/24	2021/05/23
Amplifier	Agilent	8349B	3008A02306	2020/05/14	2021/05/14
Amplifier	Agilent	8447D	2944A10176	2020/05/14	2021/05/14
Temperature/Humidity Meter	Gangxing	CTH-608	02	2020/05/14	2021/05/15
Wideband Radio Communication Tester	R&S	CMW500	101814	2020/05/14	2021/05/13
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2020/05/14	2021/05/13
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2020/05/14	2021/05/13
RF Cable	HUBER+SUHNER	RG214	N/A	2020/05/14	2021/05/13
Climate Chamber	ESPEC	EL-10KA	A20120523	2020/05/14	2021/05/13
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2020/05/14	2021/05/13
Directional Coupler	Agilent	87300B	3116A03638	2020/05/14	2021/05/13
Power Sensor	Agilent	U2021XA	MY5365004	2020/05/14	2021/05/13
Power Meter	Agilent	U2531A	TW53323507	2020/05/14	2021/05/13

2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with of the Part 27 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

3 TEST CONDITIONS AND RESULTS

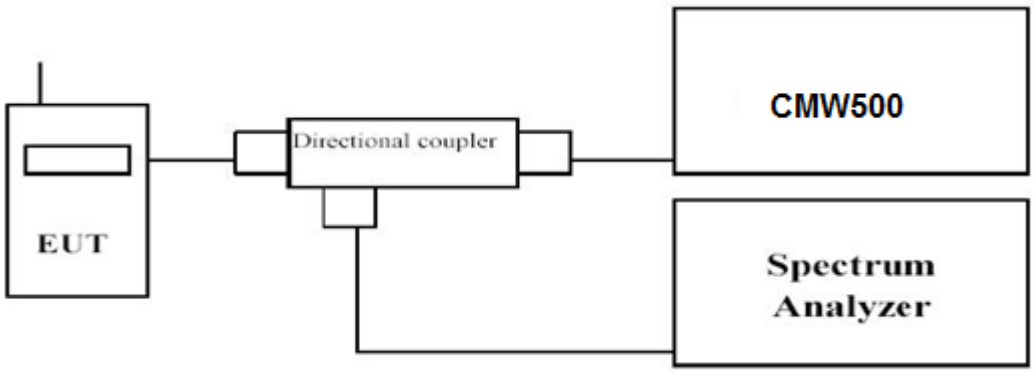
3.1 Output Power

LIMIT

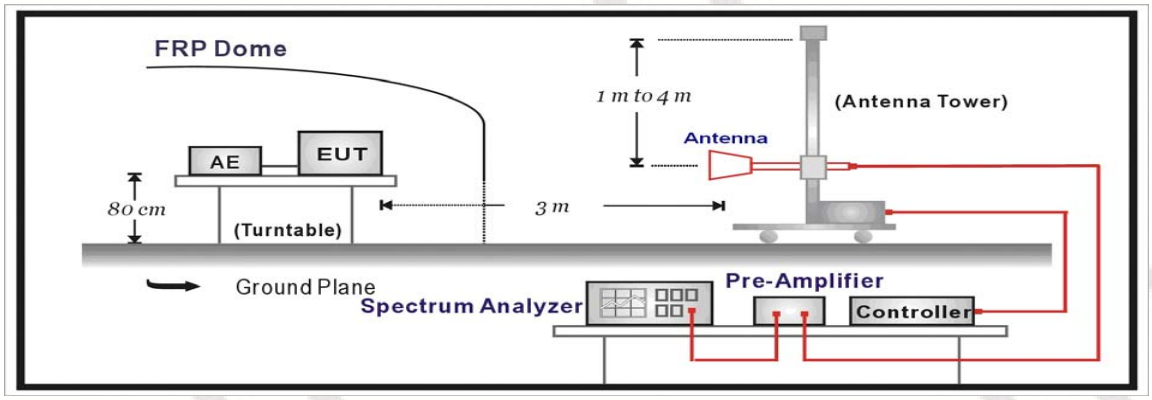
According to §27.50 (h) (2): Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
c) EUT Communicate with CMW500, then select a channel for testing.
d) Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to thefrequency of the transmitter
c. The output of the test antenna shall be connected to the measuring receiver.
d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h. The maximum signal level detected by the measuring receiver shall be noted.
i. The transmitter shall be replaced by a substitution antenna.
j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k. The substitution antenna shall be connected to a calibrated signal generator.
l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q. Test site anechoic chamber refer to ANSI C63.4.

TEST RESULTS

Conducted Measurement: See Appendix A.

Radiated Measurement:

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE TDD Band 41; recorded worst case for each Channel Bandwidth of LTE TDD Band 41.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. We test the H direction and V direction recorded worst case（v）

LTE TDD Band 41_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2498.5	-20.19	3.65	10.77	34.50	21.43	33.01	11.58	V
2593.0	-20.16	3.71	11.10	34.44	21.67	33.01	11.34	V
2687.5	-20.09	3.78	11.05	34.40	21.58	33.01	11.43	V

LTE TDD Band 41_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2501.0	-20.34	3.65	10.77	34.50	21.28	33.01	11.73	V
2593.0	-20.47	3.71	11.10	34.44	21.36	33.01	11.65	V
2685.0	-20.48	3.78	11.05	34.40	21.19	33.01	11.82	V

LTE TDD Band 41_Channel Bandwidth 15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2503.5	-20.94	3.65	10.77	34.50	20.68	33.01	12.33	V
2593.0	-20.47	3.71	11.10	34.44	21.36	33.01	11.65	V
2682.5	-19.84	3.78	11.05	34.40	21.83	33.01	11.18	V

LTE TDD Band 41_Channel Bandwidth 20MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2506.0	-20.54	3.65	10.77	34.50	21.08	33.01	11.93	V
2593.0	-20.66	3.71	11.10	34.44	21.17	33.01	11.84	V
2680.0	-20.62	3.78	11.05	34.40	21.05	33.01	11.96	V

LTE TDD Band 41_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2498.5	-20.76	3.65	10.77	34.50	20.86	33.01	12.15	V
2593.0	-20.80	3.71	11.10	34.44	21.03	33.01	11.98	V
2687.5	-20.49	3.78	11.05	34.40	21.18	33.01	11.83	V

LTE TDD Band 41_Channel Bandwidth 10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2501.0	-20.84	3.65	10.77	34.50	20.78	33.01	12.23	V
2593.0	-20.67	3.71	11.10	34.44	21.16	33.01	11.85	V
2685.0	-20.58	3.78	11.05	34.40	21.09	33.01	11.92	V

LTE TDD Band 41_Channel Bandwidth 15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2503.5	-20.51	3.65	10.77	34.50	21.11	33.01	11.90	V
2593.0	-21.07	3.71	11.10	34.44	20.76	33.01	12.25	V
2682.5	-20.60	3.78	11.05	34.40	21.07	33.01	11.94	V

LTE TDD Band 41_Channel Bandwidth 20MHz_16QAM

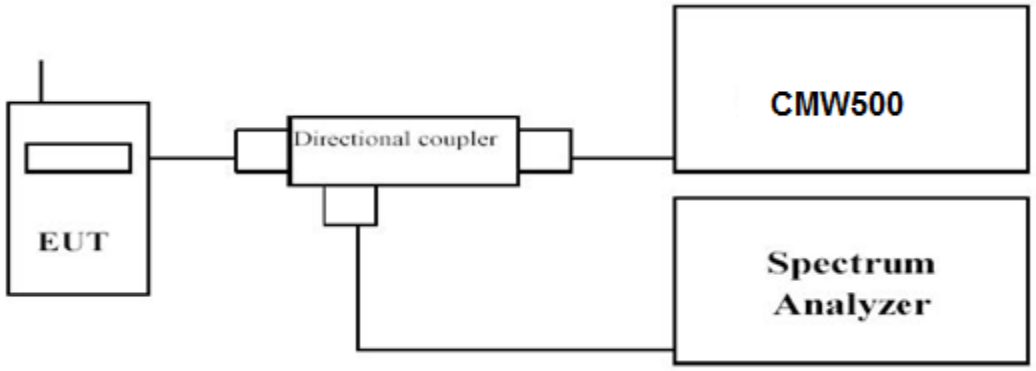
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2506.0	-20.51	3.65	10.77	34.50	21.11	33.01	11.90	V
2593.0	-20.97	3.71	11.10	34.44	20.86	33.01	12.15	V
2680.0	-20.53	3.78	11.05	34.40	21.14	33.01	11.87	V

3.2 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

According to KDB971168 D01 Power Meas License Digital Systems v02r02: Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm).

TEST RESULTS

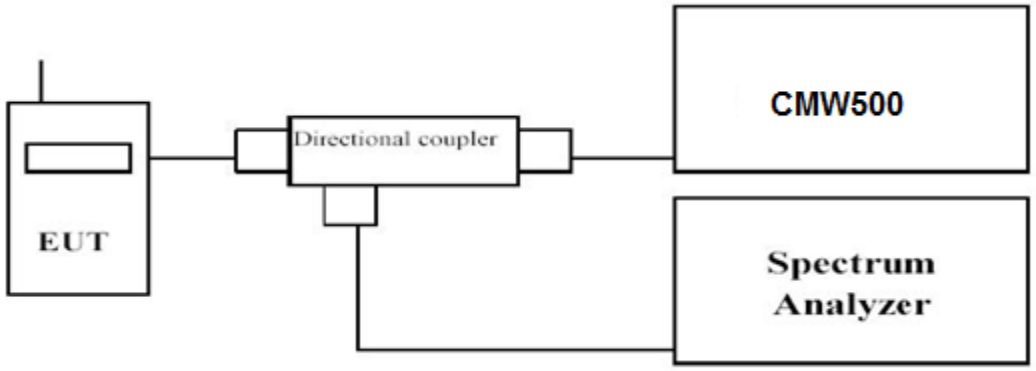
See Appendix B.

3.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded. Set RBW was set to about 1% of emission BW, VBW≥3 times RBW.
-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

See Appendix C.

3.4 Band Edge compliance

LIMIT

For LTE FDD Band 2:Per FCC §24.238 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 + 10log(P) dB.
For LTE FDD Band 4: Per §27.53(h): For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.
For LTE FDD Band 5:Per FCC §22.917 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 + 10log(P) dB.
For LTE FDD Band 7: Per FCC §27.53 (m)(4): For mobile digital stations, the attenuation factor shall be not less than:

○40+10logP dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge,

○43+10logP dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and

○55+10logP dB (−25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB). [§ 27.53(m)(4)]
In addition, the attenuation factor (fixed limit) shall not be less than:

○43+10logP dB on all frequencies between 2490.5 MHz and 2496 MHz, and

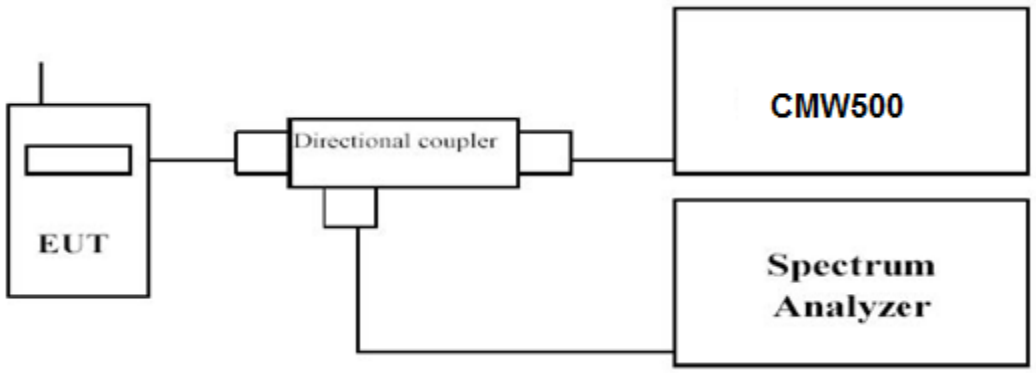
○55+10logP dB at or below 2490.5 MHz. [§ 27.53(m)(4)]

For LTE FDD Band 12: Per §27.53 (g): For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.
For LTE FDD Band 17: Per §27.53(g): (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For LTE TDD Band 40: Per §27.53(m)(4): 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.

For LTE TDD Band 41: Per §27.53(m)(4): 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.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

See Appendix D.

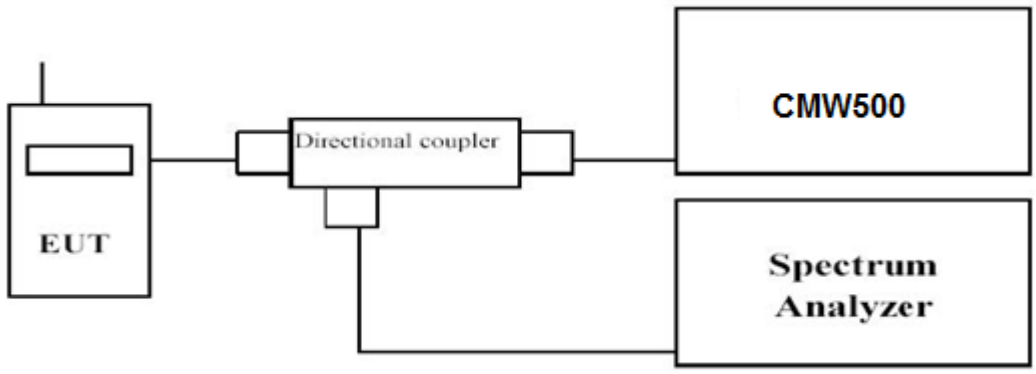
3.5 Spurious Emission

LIMIT

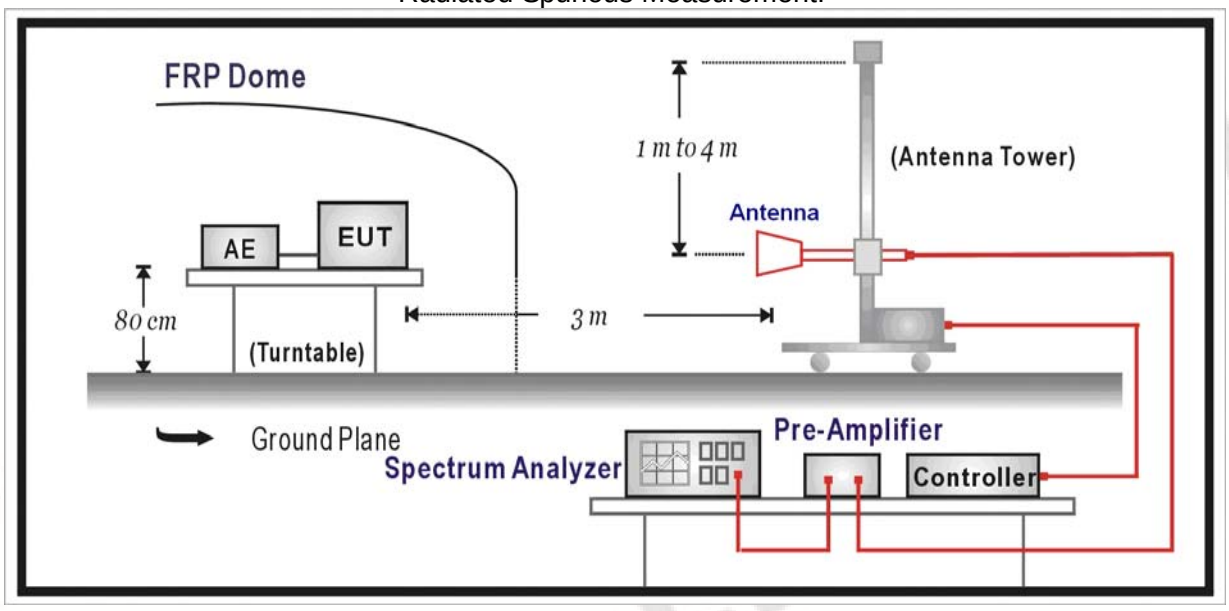
According to Part 27.83(m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, 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.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Spurious Measurement:

a. Place the EUT on a bench and set it in transmitting mode.
b. Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
c. EUT Communicate with CMW500, then select a channel for testing.
d. Add a correction factor to the display of spectrum, and then test.

e. The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to10th harmonic.
f. Please refer to following tables for test antenna conducted emissions.

Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (s)
LTE TDD Band 41	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~27.0*	1 MHz	3 MHz	Auto

Radiated Spurious Measurement:

a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c. The output of the test antenna shall be connected to the measuring receiver.
d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h. The maximum signal level detected by the measuring receiver shall be noted.
i. The transmitter shall be replaced by a substitution antenna.
j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k. The substitution antenna shall be connected to a calibrated signal generator.
l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
r. Test site anechoic chamber refer to ANSI C63.

TEST RESULTS

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE TDD Band 41; recorded worst case for each Channel Bandwidth of LTE TDD Band 41.*
2. *We tested from 9KHz to 27GHz and recorded 9KHz at 26GHz as the emission values from 26GHz to 27GHz too lower.*

Conducted Measurement: See Appendix E.

Radiated Measurement:

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE TDD Band 41; recorded worst case for each Channel Bandwidth of LTE TDD Band 41 @ QPSK*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB) +G_a(dBi)*
3. *We were not recorded other points as values lower than limits.*
4. *Margin = Limit - EIRP*

LTE TDD Band 41_Channel Bandwidth 5MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
4997.0	-34.89	6.86	3.00	12.88	-28.87	-25.00	3.87	H
7495.5	-37.98	7.01	3.00	11.73	-33.26	-25.00	8.26	H
4997.0	-32.55	6.86	3.00	12.88	-26.53	-25.00	1.53	V
7495.5	-36.55	7.01	3.00	11.73	-31.83	-25.00	6.83	V

LTE TDD Band 41_Channel Bandwidth 5MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5186.0	-34.09	6.70	3.00	13.21	-27.58	-25.00	2.58	H
7779.0	-37.75	7.28	3.00	12.10	-32.93	-25.00	7.93	H
5186.0	-32.80	6.70	3.00	13.21	-26.29	-25.00	1.29	V
7779.0	-36.50	7.28	3.00	12.10	-31.68	-25.00	6.68	V

LTE TDD Band 41_Channel Bandwidth 5MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5375.0	-35.41	6.77	3.00	13.49	-28.69	-25.00	3.69	H
8062.5	-37.62	7.52	3.00	11.61	-33.53	-25.00	8.53	H
5375.0	-33.10	6.77	3.00	13.49	-26.38	-25.00	1.38	V
8062.5	-35.43	7.52	3.00	11.61	-31.34	-25.00	6.34	V

LTE TDD Band 41_Channel Bandwidth 10MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5002.0	-35.70	6.86	3.00	12.88	-29.68	-25.00	4.68	H
7503.0	-39.58	7.01	3.00	11.73	-34.86	-25.00	9.86	H
5002.0	-34.65	6.86	3.00	12.88	-28.63	-25.00	3.63	V
7503.0	-38.26	7.01	3.00	11.73	-33.54	-25.00	8.54	V

LTE TDD Band 41_Channel Bandwidth 10MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5186.0	-35.13	6.70	3.00	13.21	-28.62	-25.00	3.62	H
7779.0	-38.21	7.28	3.00	12.10	-33.39	-25.00	8.39	H
5186.0	-34.04	6.70	3.00	13.21	-27.53	-25.00	2.53	V
7779.0	-36.71	7.28	3.00	12.10	-31.89	-25.00	6.89	V

LTE TDD Band 41_Channel Bandwidth 10MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5370.0	-36.00	6.77	3.00	13.49	-29.28	-25.00	4.28	H
8055.0	-37.48	7.52	3.00	11.61	-33.39	-25.00	8.39	H
5370.0	-34.13	6.77	3.00	13.49	-27.41	-25.00	2.41	V
8055.0	-36.35	7.52	3.00	11.61	-32.26	-25.00	7.26	V

LTE TDD Band 41_Channel Bandwidth 15MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5007.0	-34.28	6.86	3.00	12.88	-28.26	-25.00	3.26	H
7510.5	-38.35	7.01	3.00	11.73	-33.63	-25.00	8.63	H
5007.0	-32.58	6.86	3.00	12.88	-26.56	-25.00	1.56	V
7510.5	-36.61	7.01	3.00	11.73	-31.89	-25.00	6.89	V

LTE TDD Band 41_Channel Bandwidth 15MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5186.0	-35.9	6.70	3.00	13.21	-29.39	-25.00	4.39	H
7779.0	-38.16	7.28	3.00	12.10	-33.34	-25.00	8.34	H
5186.0	-33.14	6.70	3.00	13.21	-26.63	-25.00	1.63	V
7779.0	-36.74	7.28	3.00	12.10	-31.92	-25.00	6.92	V

LTE TDD Band 41_Channel Bandwidth 15MHz_QPSK_ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5365.0	-35.24	6.77	3.00	13.49	-28.52	-25.00	3.52	H
8047.5	-37.45	7.52	3.00	11.61	-33.36	-25.00	8.36	H
5365.0	-34.26	6.77	3.00	13.49	-27.54	-25.00	2.54	V
8047.5	-36.51	7.52	3.00	11.61	-32.42	-25.00	7.42	V

LTE TDD Band 41_Channel Bandwidth 20MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5012.0	-34.27	6.86	3.00	12.88	-28.25	-25.00	3.25	H
7518.0	-37.95	7.01	3.00	11.73	-33.23	-25.00	8.23	H
5012.0	-32.85	6.86	3.00	12.88	-26.83	-25.00	1.83	V
7518.0	-36.61	7.01	3.00	11.73	-31.89	-25.00	6.89	V

LTE TDD Band 41_Channel Bandwidth 20MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5186.0	-35.9	6.70	3.00	13.21	-29.39	-25.00	4.39	H
7779.0	-37.5	7.28	3.00	12.10	-32.68	-25.00	7.68	H
5186.0	-34.04	6.70	3.00	13.21	-27.53	-25.00	2.53	V
7779.0	-36.64	7.28	3.00	12.10	-31.82	-25.00	6.82	V

LTE TDD Band 41_Channel Bandwidth 20MHz_QPSK_ High Channel

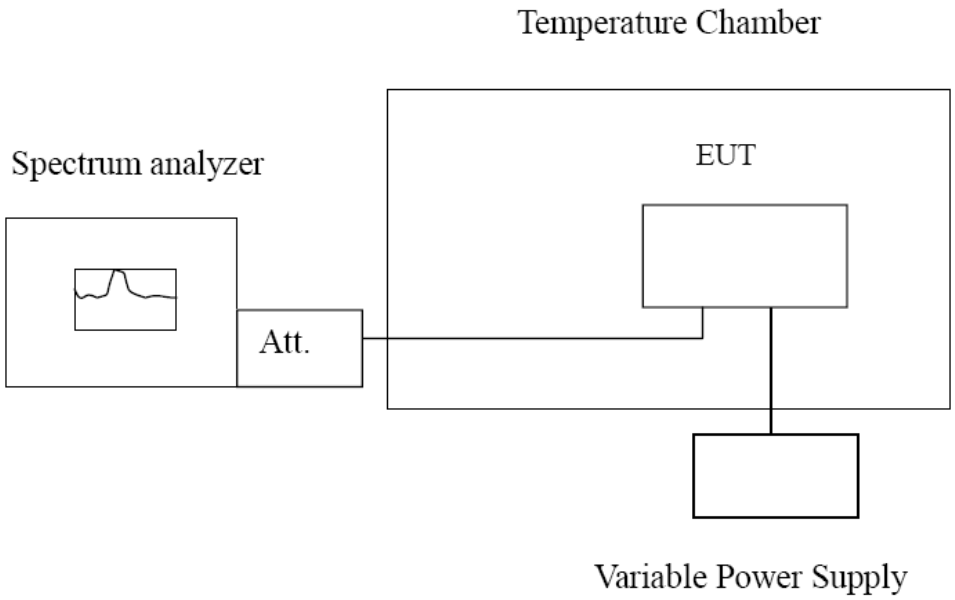
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5360.0	-38.97	6.77	3.00	13.49	-32.25	-25.00	7.25	H
8040.0	-37.42	7.52	3.00	11.61	-33.33	-25.00	8.33	H
5360.0	-34.86	6.77	3.00	13.49	-28.14	-25.00	3.14	V
8040.0	-35.62	7.52	3.00	11.61	-31.53	-25.00	6.53	V

3.6 Frequency Stability under Temperature & Voltage Variations

LIMIT

According to §27.50(a), §2.1055 requirement, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation and should not exceed 2.5ppm.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Frequency Stability Under Temperature Variations:
In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.
1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 4, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.
Frequency Stability Under Voltage Variations:
Set chamber temperature to 20℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark:
1. We tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE TDD Band 41; recorded worst case.

LTE Band 41, 5MHz bandwidth (worst case of all bandwidths)

Test Band: 41 _ 5MHz Bandwidth (Frequency Error VS. Voltage)												
Test Mode	RB Allocation		Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
QPSK	25	0	NT	LV	1.4734	-8.5688	-6.6090	0.0006	-0.0033	-0.0025	2.50	PASS
				NV	-14.7200	-0.4721	12.8174	-0.0059	-0.0002	0.0048	2.50	PASS
				HV	-2.6894	-10.9291	-10.0708	-0.0011	-0.0042	-0.0037	2.50	PASS
16QAM	25	0	NT	LV	-13.2179	-15.9216	-0.9871	-0.0053	-0.0061	-0.0004	2.50	PASS
				NV	-11.8446	2.7752	-15.0061	-0.0047	0.0011	-0.0056	2.50	PASS
				HV	-9.5272	-9.0408	11.6158	-0.0038	-0.0035	0.0043	2.50	PASS

Test Band: 41 _ 5MHz Bandwidth (Frequency Error VS. Temperature)												
Test Mode	RB Allocation		Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
QPSK	25	0	NV	-30.00	-9.3269	-14.8201	9.7275	-0.0037	-0.0057	0.0036	2.50	PASS
				-20.00	-14.0190	0.4292	6.2656	-0.0056	0.0002	0.0023	2.50	PASS
				-10.00	-1.0300	-4.8494	11.8875	-0.0004	-0.0019	0.0044	2.50	PASS
				0.00	-6.1369	-11.6158	-13.3896	-0.0025	-0.0045	-0.0050	2.50	PASS
				10.00	-7.8535	-7.3385	3.3760	-0.0031	-0.0028	0.0013	2.50	PASS
				20.00	-12.2309	-7.8821	7.6246	-0.0049	-0.0030	0.0028	2.50	PASS
				30.00	-11.0149	0.4435	2.8038	-0.0044	0.0002	0.0010	2.50	PASS
				40.00	-10.2282	-3.4904	-6.4945	-0.0041	-0.0013	-0.0024	2.50	PASS
				50.00	-14.5912	-8.8835	0.8583	-0.0058	-0.0034	0.0003	2.50	PASS
16QAM	25	0	NV	-30.00	-5.8937	-9.3412	0.3290	-0.0024	-0.0036	0.0001	2.50	PASS
				-20.00	-6.6948	-9.4986	-2.2602	-0.0027	-0.0037	-0.0008	2.50	PASS
				-10.00	-11.9591	3.7909	2.9898	-0.0048	0.0015	0.0011	2.50	PASS
				0.00	-11.2724	-12.9318	2.3031	-0.0045	-0.0050	0.0009	2.50	PASS
				10.00	-16.4938	-2.7180	-2.4033	-0.0066	-0.0010	-0.0009	2.50	PASS
				20.00	-15.5210	-7.4100	-5.9366	-0.0062	-0.0029	-0.0022	2.50	PASS
				30.00	-21.0285	-23.7036	-7.4959	-0.0084	-0.0091	-0.0028	2.50	PASS
				40.00	-15.5210	-3.4332	-1.8024	-0.0062	-0.0013	-0.0007	2.50	PASS
				50.00	-8.2254	-3.0899	-1.2732	-0.0033	-0.0012	-0.0005	2.50	PASS

Test Band: 41 _ 10MHz Bandwidth (Frequency Error VS. Voltage)												
Test Mode	RB Allocation		Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
16QAM	50	0	NT	LV	-8.2254	-6.9380	-9.7132	-0.0033	-0.0027	-0.0041	2.50	PASS
				NV	-7.3099	-15.5354	-12.2881	-0.0029	-0.0060	-0.0052	2.50	PASS
				HV	-12.6028	-2.0027	-12.3882	-0.0050	-0.0008	-0.0053	2.50	PASS

Test Band: 41 _ 10MHz Bandwidth (Frequency Error VS. Temperature)												
Test Mode	RB Allocation		Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
	Size	Offset			LCH	MCH	HCH	LCH	MCH	HCH		
16QAM	50	0	NV	-30.00	-15.5067	-6.3515	-8.2254	-0.0062	-0.0024	-0.0035	2.50	PASS
				-20.00	-0.2289	2.6035	0.1717	-0.0001	0.0010	0.0001	2.50	PASS
				-10.00	-3.6478	-10.2568	-7.3385	-0.0015	-0.0040	-0.0031	2.50	PASS
				0.00	-13.2465	-2.0456	-14.5340	-0.0053	-0.0008	-0.0042	2.50	PASS
				10.00	-14.5197	-2.2316	-14.4196	-0.0058	-0.0009	-0.0061	2.50	PASS
				20.00	-6.0081	-9.5558	-18.7397	-0.0024	-0.0037	-0.0059	2.50	PASS
				30.00	-12.5885	-6.1512	-16.9802	-0.0050	-0.0024	-0.0052	2.50	PASS
				40.00	-6.7520	-9.8276	-13.6757	-0.0027	-0.0038	-0.0058	2.50	PASS
				50.00	-2.8753	-13.2036	-16.9802	-0.0011	-0.0051	-0.0042	2.50	PASS

4 Test Setup Photos of the EUT

5 External and Internal Photos of the EUT

Please reference to the test report No.: CTL2103249071-WF01

********** End of Report **********