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TEST REPORT

FCC Part 27C

Report Reference No..... : CTL2202111011-WF06

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Product Name..... : TickTalk 4 Kids Smartwatch

Model/Type reference..... : TickTalk 4

List Model(s)..... : N/A

Trade Mark..... : TickTalk

FCC ID..... : 2AS8N-TT4

Applicant's name..... : TickTalk Tech LLC

Address of applicant..... : 565 W Lambert Rd, Unit B, Brea, CA 92821, United States

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
TIA-603-E March 2016
KDB 971168 D01

TRF Originator..... : Shenzhen CTL Testing Technology Co., Ltd.

Master TRF..... : Dated 2011-01

Date of receipt of test item..... : Feb. 16, 2022

Date of Test Date..... : Feb. 16, 2022-Apr. 14, 2022

Data of Issue..... : Apr. 14, 2022

Result..... : Pass

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TEST REPORT

Test Report No. :	CTL2202111011-WF06	Apr. 14, 2022 Date of issue
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Equipment under Test : TickTalk 4 Kids Smartwatch

Sample No : CTL220211101-1-S001

Model /Type : TickTalk 4

Listed Models : N/A

Applicant : **TickTalk Tech LLC**

Address : 565 W Lambert Rd, Unit B, Brea, CA 92821, United States

Manufacturer : **Famous Works Electronics (Shanghai) Co., Ltd**

Address : Room 2236, Lane 3,1473, Jinguang Road, Putuo District, Shanghai, China

Test result	Pass *
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*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.

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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-603-E March](#):Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[KDB971168 D01: v03r01](#) MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

[ANSI C63.10: 2020](#): 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

Band 4

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 27.50(d)(4)	Pass
Peak-to-Average Ratio	Part 2.1046 Part 27.50(d)(4)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(h)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(h)	Pass
Out of band emission, Band Edge	Part 2.1051 Part 27.53(h)	Pass
Frequency stability	Part 2.1055 Part 27.54	Pass

Band 7

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

Band 12

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

Band 17

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

(2) 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:	TickTalk 4 Kids Smartwatch		
Model/Type reference:	TickTalk 4		
Power supply:	DC 3.87V from battery		
Hardware version:	V1.0		
Software version:	V1.0		
LTE			
Mode:	LTE Band 4; LTE Band7; LTE Band12; LTE Band17		
Modulation Type:	(LTE)QPSK, 16QAM		
Operating Frequency Range(S)	Band	Tx(MHz)	Rx(MHz)
	LTE Band 4	1710~1755	2110~2155
	LTE Band 7	2500~2570	2620~2690
	LTE Band 12	699~716	729~746
	LTE Band 17	704~716	734~746
Release Version:	Release 9		
Category:	Cat 4		
Antenna type:	Shrapnel antenna		
Antenna gain:	LTE Band 4: -0.86 dBi LTE Band 7:-1.25 dBi LTE Band 12: -1.31 dBi LTE Band 17: -1.27dBi		

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

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.

2.4. Test Frequencies

Test Mode	Bandwidth	TX/RX	RF Channel		
			Low (L)	Middle (M)	High (H)
LTE Band 4	1.4MHz	TX	Channel 19957 1710.7MHz	Channel 20175 1732.5MHz	Channel 20393 1754.3MHz
		RX	Channel 1975 2112.5MHz	Channel 2175 2132.5MHz	Channel 2375 2152.5MHz
	3MHz	TX	Channel 19965 1711.5MHz	Channel 20175 1732.5MHz	Channel 20385 1753.5MHz
		RX	Channel 2000 2115MHz	Channel 2175 2132.5MHz	Channel 2350 2150MHz
	5MHz	TX	Channel 19975 1712.5MHz	Channel 20175 1732.5MHz	Channel 20375 1752.5MHz
		RX	Channel 1975 2112.5MHz	Channel 2175 2132.5MHz	Channel 2375 2152.5MHz
	10MHz	TX	Channel 20000 1715MHz	Channel 20175 1732.5MHz	Channel 20350 1750MHz
		RX	Channel 2000 2115MHz	Channel 2175 2132.5MHz	Channel 2350 2150MHz
	15MHz	TX	Channel 20025 1717.5MHz	Channel 20175 1732.5MHz	Channel 20325 1747.5MHz
		RX	Channel 2025 2117.5MHz	Channel 2175 2132.5MHz	Channel 2325 2147.5MHz
	20 MHz	TX	Channel 200.50 1720MHz	Channel 20175 1732.5MHz	Channel 20300 1745MHz
		RX	Channel 2050 2120MHz	Channel 2175 2132.5MHz	Channel 2300 2145MHz

Test Mode	Bandwidth	TX/RX	RF Channel		
			Low (L)	Middle (M)	High (H)
LTE Band 7	5MHz	TX	Channel 20775 2502.5MHz	Channel 21100 2535MHz	Channel 21425 2567.5MHz
		RX	Channel 2775 2622.5MHz	Channel 3100 2655MHz	Channel 5825 2687.5MHz
	10MHz	TX	Channel 20800 2505MHz	Channel 21100 2535MHz	Channel 21400 2565MHz
		RX	Channel 2800 2625MHz	Channel 3100 2655MHz	Channel 3400 2685MHz
	15MHz	TX	Channel 20825 2507.5MHz	Channel 21100 2535MHz	Channel 21375 2562.5MHz
		RX	Channel 2825 2627.5MHz	Channel 3100 2655MHz	Channel 3375 2682.5MHz
	20 MHz	TX	Channel 20850 2510MHz	Channel 21100 2535MHz	Channel 21350 2560MHz
		RX	Channel 2850 2630MHz	Channel 3100 2655MHz	Channel 3350 2680MHz

Test Mode	Bandwidth	TX/RX	RF Channel		
			Low (L)	Middle (M)	High (H)
LTE Band 12	1.4MHz	TX	Channel 23017	Channel 23095	Channel 23173
			699.7MHz	707.5MHz	715.3MHz
		RX	Channel 5017	Channel 5095	Channel 5173
			729.7MHz	737.5MHz	745.3MHz
	3MHz	TX	Channel 23025	Channel 23095	Channel 23165
			700.5MHz	707.5MHz	714.5MHz
		RX	Channel 5025	Channel 5095	Channel 5165
			730.5MHz	737.5MHz	744.5MHz
	5MHz	TX	Channel 23035	Channel 23095	Channel 23155
			701.5MHz	707.5MHz	713.5MHz
		RX	Channel 5035	Channel 5095	Channel 5155
			731.5MHz	737.5MHz	743.5MHz
	10MHz	TX	Channel 23060	Channel 23095	Channel 23130
			704MHz	707.5MHz	711MHz
		RX	Channel 5060	Channel 5095	Channel 5130
			734MHz	737.5MHz	741MHz

Test Mode	Bandwidth	TX/RX	RF Channel		
			Low (L)	Middle (M)	High (H)
LTE Band 17	5MHz	TX	Channel 23755	Channel 23790	Channel 23825
			706.5MHz	710MHz	713.5MHz
		RX	Channel 5755	Channel 5790	Channel 5825
			736.5MHz	740MHz	743.5MHz
	10MHz	TX	Channel 23780	Channel 23790	Channel 23800
			709MHz	710MHz	711MHz
		RX	Channel 5780	Channel 5290	Channel 5800
			739MHz	740MHz	741MHz

2.5. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2020/04/08	2023/04/07
EMI Test Receiver	R&S	ESCI	101235	2021/08/20	2022/08/19
Spectrum Analyzer	Agilent	E4407B	MY41440676	2021/05/14	2022/05/13
Spectrum Analyzer	Agilent	N9020	US46220290	2021/05/14	2022/05/13
Spectrum Analyzer	Keysight	N9020A	MY53420874	2021/05/14	2022/05/13
Controller	EM Electronics	Controller EM 1000	N/A	2021/05/22	2022/05/21
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2020/09/22	2023/09/21
Active Loop Antenna	SCHWARZBEC K	ZN30900A	N/A	2021/05/13	2024/05/12
Amplifier	Agilent	8349B	3008A02306	2021/05/10	2022/05/09
Amplifier	Agilent	8447D	2944A10176	2021/05/10	2022/05/09
Temperature/Humidity Meter	Gangxing	CTH-608	02	2021/05/11	2022/05/10
Wideband Radio Communication Tester	R&S	CMW500	101814	2021/05/14	2022/05/13
High-Pass Filter	K&L	9SH10-2700/X1 2750-O/O	N/A	2021/05/22	2022/05/21
High-Pass Filter	K&L	41H10-1375/U1 2750-O/O	N/A	2021/05/22	2022/05/21
RF Cable	HUBER+SUHNER	RG214	N/A	2021/05/22	2022/05/21
Climate Chamber	ESPEC	EL-10KA	A20120523	2021/05/22	2022/05/21
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2021/05/14	2022/05/13
Directional Coupler	Agilent	87300B	3116A03638	2021/05/14	2022/05/13
Power Sensor	Agilent	U2021XA	MY5365004	2021/05/14	2022/05/13
Power Meter	Agilent	U2531A	TW53323507	2021/05/14	2022/05/13

The calibration interval was one year

2.6. Related Submittal(s) / Grant (s)

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

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

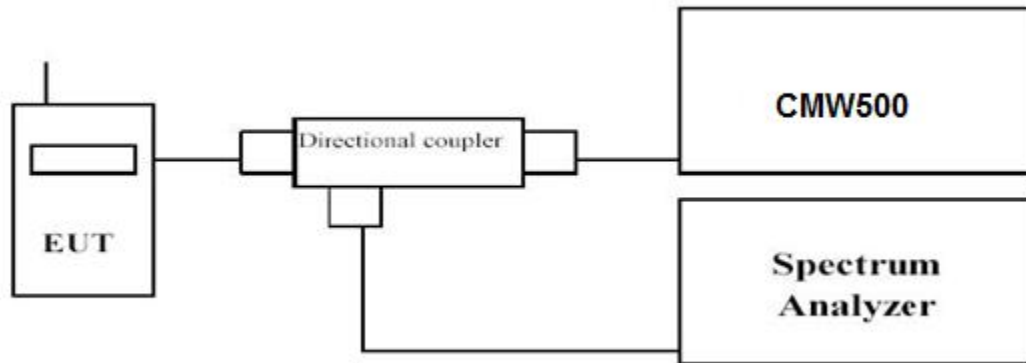
3.1. Output Power

LIMIT

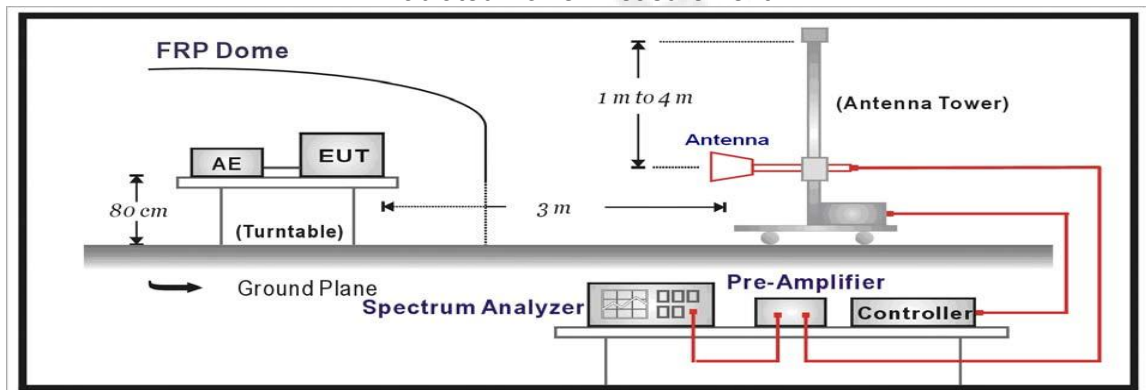
According to §27.50 (d) (4): Fixed, mobile, and portable (hand- held) stations operating in are limited to 1 watt EIRP.

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to TIA-603-E

Conducted Power Measurement:

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

Radiated Power Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- 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 C63.10.

TEST RESULTS

Conducted Measurement :

1. Please refer to Appendix C: Section 1
2. Please refer to Appendix D: Section 1
3. Please refer to Appendix E: Section 1
4. Please refer to Appendix F: Section 1

Radiated Measurement:

Limits

Rule Part 27.50(b)(10) specifies that " Portable stations (hand-held devices) transmitting in the 746~757 MHz , 776MHz~788MHz, and 805~806MHz bands are limited to 3 watts ERP "

Rule Part 27.50(c)(10) specifies that " Portable stations (hand-held devices) in the 600MHz uplink band and the 698-746MHz band, and mobile stations in the 600MHz uplink band are limited to 3 watts ERP "

Rule Part 27.50(d)(4) specifies that " mobile stations (hand-held) stations operating in the 1710~1755 MHz , band and mobile and portable stations operating in the 1695MHz~1710MHz and 1755~1780MHz bands are limited to 1 watts ERP "

Rule Part 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.

Remark:

1. We were tested all RB Configuration refer for each Channel Bandwidth of LTE Band 4, LTE Band 7, LTE Band 12, LTE Band 17 recorded worst case for each Channel Bandwidth of LTE Band 4, LTE Band 7, LTE Band 12, LTE Band 17.
2. The actual data of H polarization test data for ERP was poor, so only H polarization test data was recorded.

LTE FDD Band 4

Bandwidth	Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Polarization	Conclusion
1.4MHz QPSK	Low	1710.7	20.19	30.00	H	Pass
	Mid	1732.5	20.34	30.00	H	Pass
	High	1754.3	20.46	30.00	H	Pass
3MHz QPSK	Low	1711.5	21.61	30.00	H	Pass
	Mid	1732.5	21.48	30.00	H	Pass
	High	1753.5	21.75	30.00	H	Pass
5MHz QPSK	Low	1712.5	21.02	30.00	H	Pass
	Mid	1732.5	21.18	30.00	H	Pass
	High	1752.5	20.48	30.00	H	Pass
10MHz QPSK	Low	1715.0	20.46	30.00	H	Pass
	Mid	1732.5	21.75	30.00	H	Pass
	High	1750.0	20.26	30.00	H	Pass
15MHz QPSK	Low	1717.5	20.89	30.00	H	Pass
	Mid	1732.5	20.86	30.00	H	Pass
	High	1747.5	20.76	30.00	H	Pass
20MHz QPSK	Low	1720.0	20.64	30.00	H	Pass
	Mid	1732.5	20.75	30.00	H	Pass
	High	1745.0	20.19	30.00	H	Pass
1.4MHz 16QAM	Low	1710.7	21.29	30.00	H	Pass
	Mid	1732.5	21.59	30.00	H	Pass

3MHz 16QAM	High	1754.3	21.29	30.00	H	Pass
	Low	1711.5	22.46	30.00	H	Pass
	Mid	1732.5	21.26	30.00	H	Pass
	High	1753.5	22.35	30.00	H	Pass
5MHz 16QAM	Low	1712.5	22.33	30.00	H	Pass
	Mid	1732.5	21.49	30.00	H	Pass
	High	1752.5	21.76	30.00	H	Pass
10MHz 16QAM	Low	1715.0	22.84	30.00	H	Pass
	Mid	1732.5	22.46	30.00	H	Pass
	High	1750.0	21.76	30.00	H	Pass
15MHz 16QAM	Low	1717.5	22.64	30.00	H	Pass
	Mid	1732.5	22.36	30.00	H	Pass
	High	1747.5	22.15	30.00	H	Pass
20MHz 16QAM	Low	1720.0	21.19	30.00	H	Pass
	Mid	1732.5	22.76	30.00	H	Pass
	High	1745.0	22.46	30.00	H	Pass

LTE FDD Band 7

Bandwidth	Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Polarization	Conclusion
5MHz QPSK	Low	2502.5	20.24	33.01	H	Pass
	Mid	2535	20.19	33.01	H	Pass
	High	2567.5	20.35	33.01	H	Pass
10MHz QPSK	Low	2505	19.48	33.01	H	Pass
	Mid	2535	19.64	33.01	H	Pass
	High	2565	19.75	33.01	H	Pass
5MHz 16QAM	Low	2507.5	19.64	33.01	H	Pass
	Mid	2535	19.46	33.01	H	Pass
	High	2562.5	20.30	33.01	H	Pass
10MHz 16QAM	Low	2510	21.32	33.01	H	Pass
	Mid	2535	19.25	33.01	H	Pass
	High	2560	19.86	33.01	H	Pass
15MHz QPSK	Low	2507.5	20.15	33.01	H	Pass
	Mid	2535	21.23	33.01	H	Pass
	High	2562.5	21.02	33.01	H	Pass
20MHz QPSK	Low	2510	19.46	33.01	H	Pass
	Mid	2535	19.75	33.01	H	Pass
	High	2560	19.95	33.01	H	Pass
15MHz 16QAM	Low	2507.5	20.06	33.01	H	Pass
	Mid	2535	19.94	33.01	H	Pass
	High	2562.5	20.17	33.01	H	Pass
20MHz 16QAM	Low	2510	20.72	33.01	H	Pass
	Mid	2535	19.68	33.01	H	Pass
	High	2560	20.75	33.01	H	Pass

LTE FDD Band 12

Bandwidth	Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Polarization	Conclusion
1.4MHz QPSK	Low	699.7	22.12	34.77	H	Pass
	Mid	707.5	22.02	34.77	H	Pass
	High	715.3	21.58	34.77	H	Pass
3MHz QPSK	Low	700.5	21.76	34.77	H	Pass
	Mid	707.5	22.11	34.77	H	Pass
	High	714.5	21.28	34.77	H	Pass
5MHz QPSK	Low	701.5	21.57	34.77	H	Pass
	Mid	707.5	21.62	34.77	H	Pass
	High	713.5	22.64	34.77	H	Pass
10MHz QPSK	Low	704.0	22.48	34.77	H	Pass
	Mid	707.5	22.75	34.77	H	Pass
	High	711.0	21.64	34.77	H	Pass
1.4MHz 16QAM	Low	699.7	21.78	34.77	H	Pass
	Mid	707.5	21.64	34.77	H	Pass
	High	715.3	22.59	34.77	H	Pass
3MHz 16QAM	Low	700.5	22.75	34.77	H	Pass
	Mid	707.5	22.76	34.77	H	Pass
	High	714.5	22.74	34.77	H	Pass
5MHz 16QAM	Low	701.5	22.48	34.77	H	Pass
	Mid	707.5	22.49	34.77	H	Pass
	High	713.5	22.46	34.77	H	Pass
10MHz 16QAM	Low	704.0	22.18	34.77	H	Pass
	Mid	707.5	22.76	34.77	H	Pass
	High	711.0	22.15	34.77	H	Pass

LTE FDD Band 17

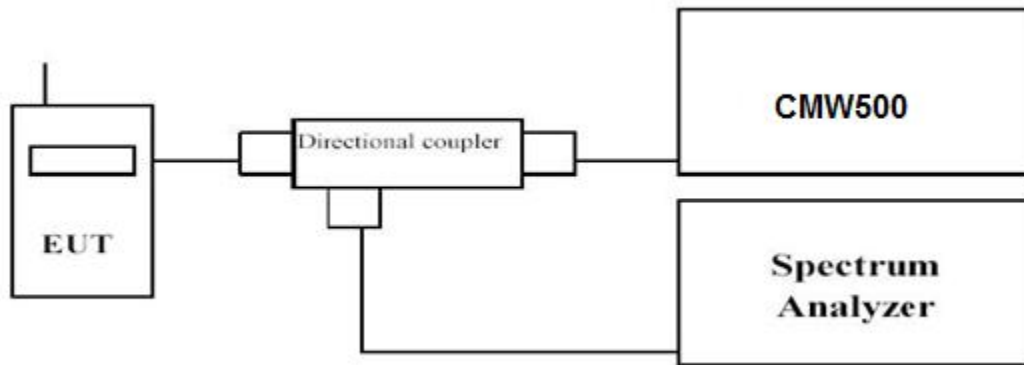
Bandwidth	Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Polarization	Conclusion
5MHz QPSK	Low	706.5	22.18	34.77	H	Pass
	Mid	710	22.32	34.77	H	Pass
	High	713.5	22.19	34.77	H	Pass
10MHz QPSK	Low	709	21.65	34.77	H	Pass
	Mid	710	21.84	34.77	H	Pass
	High	711	21.64	34.77	H	Pass
5MHz 16QAM	Low	706.5	22.36	34.77	H	Pass
	Mid	710	22.84	34.77	H	Pass
	High	713.5	21.75	34.77	H	Pass
10MHz 16QAM	Low	709	22.19	34.77	H	Pass
	Mid	710	22.18	34.77	H	Pass
	High	711	20.98	34.77	H	Pass

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

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
 - 1). for continuous transmissions, set to 1 ms,
 - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

TEST RESULTS

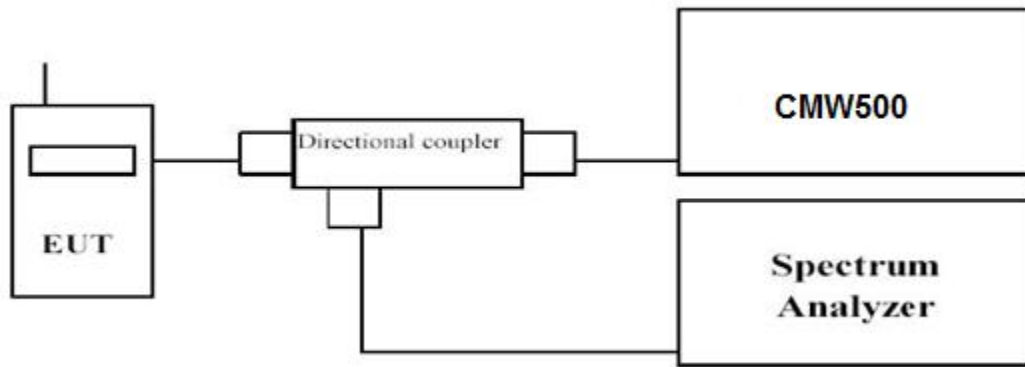
1. Please refer to Appendix C: Section 5
2. Please refer to Appendix D: Section 5
3. Please refer to Appendix E: Section 5
4. Please refer to Appendix F: Section 5

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 $\geq$ 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

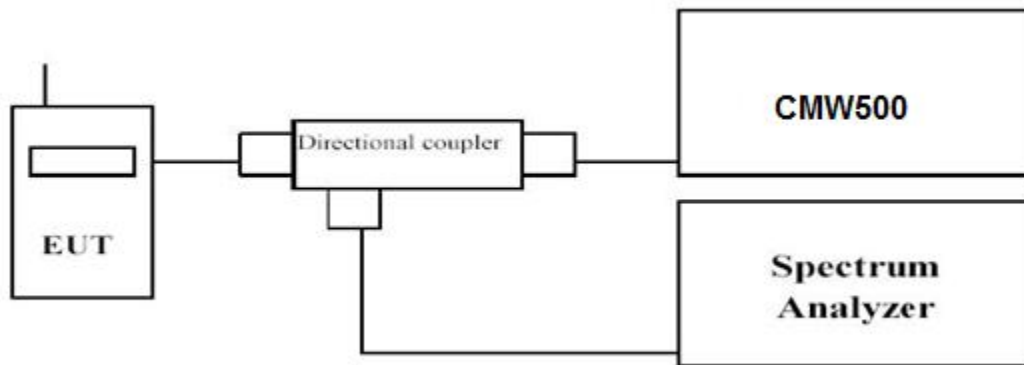
1. Please refer to Appendix C: Section 4
2. Please refer to Appendix D: Section 4
3. Please refer to Appendix E: Section 4
4. Please refer to Appendix F: Section 4

3.4. Band Edge compliance

LIMIT

According to §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 $43 + 10 \log_{10}(P)$ dB.

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

1. Please refer to Appendix C: Section 6
2. Please refer to Appendix D: Section 6
3. Please refer to Appendix E: Section 6
4. Please refer to Appendix F: Section 6

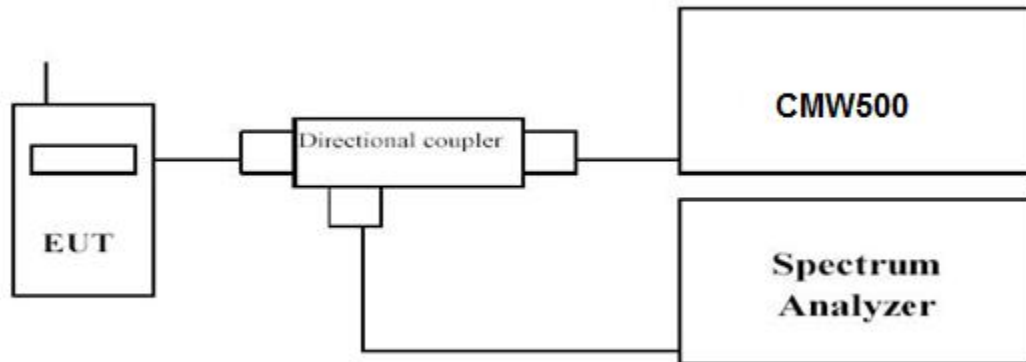
3.5. Spurious Emission

LIMIT

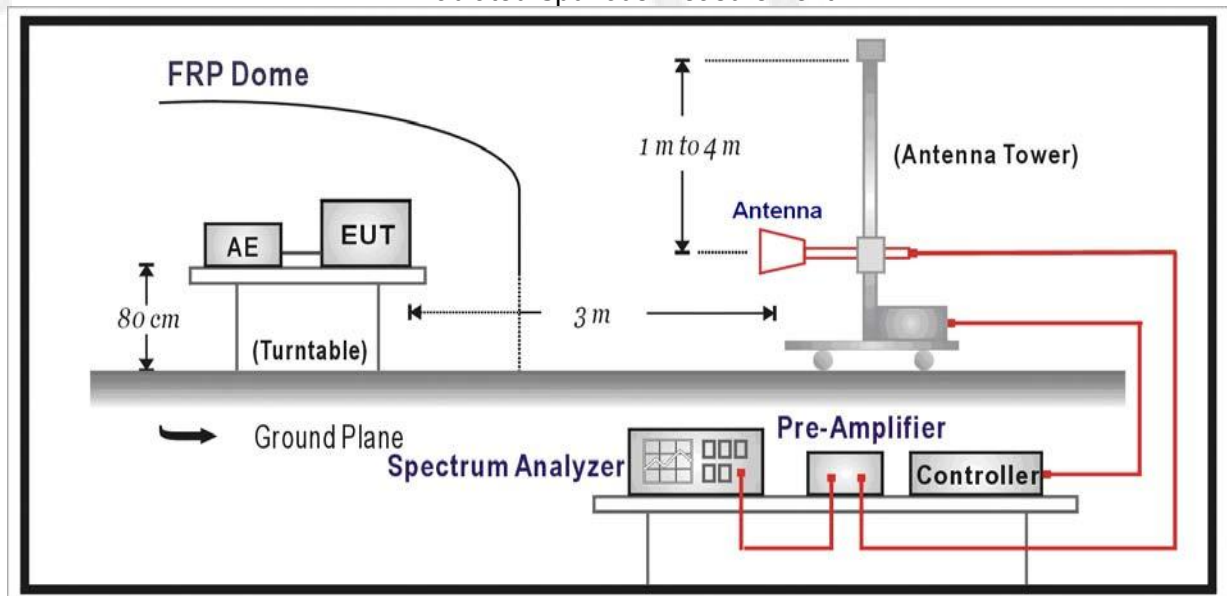
According to §27.53 (h): For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to TIA-603-E

Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500 then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

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**Conducted Measurement :**

1. Please refer to Appendix C: Section 6
2. Please refer to Appendix D: Section 6
3. Please refer to Appendix E: Section 6
4. Please refer to Appendix F: Section 6

Radiated Measurement:

Remark:

1. We tested all RB configurations for each channel bandwidth of LTE Band 4, LTE Band 7, LTE Band 12, LTE Band17@QPSK and @16QAM modulation and recorded the worst QPSK modulation.
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 = EIRP- Limit

LTE Band 4 Channel Bandwidth 1.4MHz_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
3421.4	-45.76	5.88	3.00	10.77	-40.87	-13.00	-27.87	H
5132.1	-51.10	7.12	3.00	12.26	-45.96	-13.00	-32.96	H
3421.4	-40.83	5.88	3.00	10.77	-35.94	-13.00	-22.94	V
5132.1	-49.19	7.12	3.00	12.26	-44.05	-13.00	-31.05	V

LTE Band 4 Channel Bandwidth 1.4MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-44.75	5.9	3.00	10.81	-39.84	-13.00	-26.84	H
5197.5	-53.82	7.19	3.00	12.32	-48.69	-13.00	-35.69	H
3465.0	-40.58	5.9	3.00	10.81	-35.67	-13.00	-22.67	V
5197.5	-55.22	7.19	3.00	12.32	-50.09	-13.00	-37.09	V

LTE Band 4 Channel Bandwidth 1.4MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3508.6	-45.39	5.94	3.00	10.86	-40.47	-13.00	-45.39	H
5262.9	-55.65	7.25	3.00	12.98	-49.92	-13.00	-55.65	H
3508.6	-40.16	5.94	3.00	10.86	-35.24	-13.00	-40.16	V
5262.9	-49.32	7.25	3.00	12.98	-43.59	-13.00	-49.32	V

LTE Band 4 Channel Bandwidth 3MHz_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
3423.0	-44.20	5.88	3.00	10.77	-39.31	-13.00	-26.31	H
5134.5	-48.34	7.12	3.00	12.26	-43.20	-13.00	-30.20	H
3423.0	-44.91	5.88	3.00	10.77	-40.02	-13.00	-27.02	V
5134.5	-54.49	7.12	3.00	12.26	-49.35	-13.00	-36.35	V

LTE Band 4 Channel Bandwidth 3MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-42.67	5.9	3.00	10.81	-37.76	-13.00	-24.76	H
5197.5	-51.88	7.19	3.00	12.32	-46.75	-13.00	-33.75	H
3465.0	-45.84	5.9	3.00	10.81	-40.93	-13.00	-27.93	V
5197.5	-50.39	7.19	3.00	12.32	-45.26	-13.00	-32.26	V

LTE Band 4 Channel Bandwidth 3MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3507.0	-41.66	5.94	3.00	10.86	-36.74	-13.00	-23.74	H
5260.5	-50.06	7.25	3.00	12.98	-44.33	-13.00	-31.33	H
3507.0	-42.48	5.94	3.00	10.86	-37.56	-13.00	-24.56	V
5260.5	-49.35	7.25	3.00	12.98	-43.62	-13.00	-30.62	V

LTE Band 4 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
3425.0	-41.65	5.88	3.00	10.77	-36.76	-13.00	-23.76	H
5137.5	-52.95	7.12	3.00	12.26	-47.81	-13.00	-34.81	H
3425.0	-40.82	5.88	3.00	10.77	-35.93	-13.00	-22.93	V
5137.5	-46.74	7.12	3.00	12.26	-41.60	-13.00	-28.60	V

LTE Band 4 Channel Bandwidth 5MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-45.76	5.9	3.00	10.81	-40.85	-13.00	-27.85	H
5197.5	-53.91	7.19	3.00	12.32	-48.78	-13.00	-35.78	H
3465.0	-45.53	5.9	3.00	10.81	-40.62	-13.00	-27.62	V
5197.5	-55.68	7.19	3.00	12.32	-50.55	-13.00	-37.55	V

LTE Band 4 Channel Bandwidth 5MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3505.0	-43.69	5.94	3.00	10.86	-38.77	-13.00	-25.77	H
5257.5	-53.73	7.25	3.00	12.98	-48.00	-13.00	-35.00	H
3505.0	-45.13	5.94	3.00	10.86	-40.21	-13.00	-27.21	V
5257.5	-50.04	7.25	3.00	12.98	-44.31	-13.00	-31.31	V

LTE Band 4 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
3430.0	-45.75	5.88	3.00	10.77	-40.86	-13.00	-27.86	H
5145.0	-50.51	7.12	3.00	12.26	-45.37	-13.00	-32.37	H
3430.0	-43.44	5.88	3.00	10.77	-38.55	-13.00	-25.55	V
5145.0	-50.88	7.12	3.00	12.26	-45.74	-13.00	-32.74	V

LTE Band 4 Channel Bandwidth 10MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-45.41	5.9	3.00	10.81	-40.50	-13.00	-27.50	H
5197.5	-53.92	7.19	3.00	12.32	-48.79	-13.00	-35.79	H
3465.0	-43.32	5.9	3.00	10.81	-38.41	-13.00	-25.41	V
5197.5	-52.42	7.19	3.00	12.32	-47.29	-13.00	-34.29	V

LTE Band 4 Channel Bandwidth 10MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3500.0	5.94	3.00	10.86	-39.48	-13.00	-26.48	5.94	H
5250.0	7.25	3.00	12.98	-45.10	-13.00	-32.10	7.25	H
3500.0	5.94	3.00	10.86	-35.28	-13.00	-22.28	5.94	V
5250.0	7.25	3.00	12.98	-45.20	-13.00	-32.20	7.25	V

LTE Band 4 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
3435.0	-44.47	5.88	3.00	10.77	-39.58	-13.00	-26.58	H
5152.5	-52.90	7.12	3.00	12.26	-47.76	-13.00	-34.76	H
3435.0	-40.60	5.88	3.00	10.77	-35.71	-13.00	-22.71	V
5152.5	-47.75	7.12	3.00	12.26	-42.61	-13.00	-29.61	V

LTE Band 4 Channel Bandwidth 15MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-41.83	5.9	3.00	10.81	-36.92	-13.00	-23.92	H
5197.5	-53.49	7.19	3.00	12.32	-48.36	-13.00	-35.36	H
3465.0	-44.00	5.9	3.00	10.81	-39.09	-13.00	-26.09	V
5197.5	-54.80	7.19	3.00	12.32	-49.67	-13.00	-36.67	V

LTE Band 4 Channel Bandwidth 15MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3495.0	-40.12	5.94	3.00	10.86	-35.20	-13.00	-22.20	H
5242.5	-55.61	7.25	3.00	12.98	-49.88	-13.00	-36.88	H
3495.0	-45.28	5.94	3.00	10.86	-40.36	-13.00	-27.36	V
5242.5	-49.04	7.25	3.00	12.98	-43.31	-13.00	-30.31	V

LTE Band 4 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
3440.0	-42.21	5.88	3.00	10.77	-37.32	-13.00	-24.32	H
5160.0	-54.64	7.12	3.00	12.26	-49.50	-13.00	-36.50	H
3440.0	-42.64	5.88	3.00	10.77	-37.75	-13.00	-24.75	V
5160.0	-52.46	7.12	3.00	12.26	-47.32	-13.00	-34.32	V

LTE Band 4 Channel Bandwidth 20MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3465.0	-44.32	5.9	3.00	10.81	-39.41	-13.00	-26.41	H
5197.5	-54.91	7.19	3.00	12.32	-49.78	-13.00	-36.78	H
3465.0	-41.74	5.9	3.00	10.81	-36.83	-13.00	-23.83	V
5197.5	-47.81	7.19	3.00	12.32	-42.68	-13.00	-29.68	V

LTE Band 4 Channel Bandwidth 20MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3490.0	-40.02	5.94	3.00	10.86	-35.10	-13.00	-22.10	H
5235.0	-46.16	7.25	3.00	12.98	-40.43	-13.00	-27.43	H
3490.0	-42.84	5.94	3.00	10.86	-37.92	-13.00	-24.92	V
5235.0	-47.07	7.25	3.00	12.98	-41.34	-13.00	-28.34	V

LTE Band 7 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
5005	-41.26	5.88	3.00	10.77	-36.37	-25.00	-11.37	H
7507.5	-49.41	7.12	3.00	12.26	-44.27	-25.00	-19.27	H
5005	-45.60	5.88	3.00	10.77	-40.71	-25.00	-15.71	V
7507.5	-47.28	7.12	3.00	12.26	-42.14	-25.00	-17.14	V

LTE Band 7 Channel Bandwidth 5MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5070	-44.21	5.9	3.00	10.81	-39.30	-25.00	-14.30	H
7605	-53.92	7.19	3.00	12.32	-48.79	-25.00	-23.79	H
5070	-42.12	5.9	3.00	10.81	-37.21	-25.00	-12.21	V
7605	-48.78	7.19	3.00	12.32	-43.65	-25.00	-18.65	V

LTE Band 7 Channel Bandwidth 5MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5135	-44.00	5.94	3.00	10.86	-39.08	-25.00	-14.08	H
7702.5	-50.46	7.25	3.00	12.98	-44.73	-25.00	-19.73	H
5135	-43.29	5.94	3.00	10.86	-38.37	-25.00	-13.37	V
7702.5	-49.21	7.25	3.00	12.98	-43.48	-25.00	-18.48	V

LTE Band 7 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
5010	-43.89	5.88	3.00	10.77	-39.00	-25.00	-14.00	H
7515	-53.04	7.12	3.00	12.26	-47.90	-25.00	-22.90	H
5010	-40.94	5.88	3.00	10.77	-36.05	-25.00	-11.05	V
7515	-54.73	7.12	3.00	12.26	-49.59	-25.00	-24.59	V

LTE Band 7 Channel Bandwidth 10MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5070	-45.99	5.9	3.00	10.81	-41.08	-25.00	-16.08	H
7605	-48.13	7.19	3.00	12.32	-43.00	-25.00	-18.00	H
5070	-41.06	5.9	3.00	10.81	-36.15	-25.00	-11.15	V
7605	-50.24	7.19	3.00	12.32	-45.11	-25.00	-20.11	V

LTE Band 7 Channel Bandwidth 10MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5730	-43.87	5.94	3.00	10.86	-38.95	-25.00	-13.95	H
7695	-55.56	7.25	3.00	12.98	-49.83	-25.00	-24.83	H
5730	-44.24	5.94	3.00	10.86	-39.32	-25.00	-14.32	V
7695	-53.89	7.25	3.00	12.98	-48.16	-25.00	-23.16	V

LTE Band 7 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
5015	-45.50	5.88	3.00	10.77	-40.61	-25.00	-15.61	H
7522.5	-51.29	7.12	3.00	12.26	-46.15	-25.00	-21.15	H
5015	-42.43	5.88	3.00	10.77	-37.54	-25.00	-12.54	V
7522.5	-46.66	7.12	3.00	12.26	-41.52	-25.00	-16.52	V

LTE Band 7 Channel Bandwidth 15MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5070	-41.91	5.9	3.00	10.81	-37.00	-25.00	-12.00	H
7605	-54.22	7.19	3.00	12.32	-49.09	-25.00	-24.09	H
5070	-43.69	5.9	3.00	10.81	-38.78	-25.00	-13.78	V
7605	-52.55	7.19	3.00	12.32	-47.42	-25.00	-22.42	V

LTE Band 7 Channel Bandwidth 15MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5125	-40.81	5.94	3.00	10.86	-35.89	-25.00	-10.89	H
7687.5	-48.55	7.25	3.00	12.98	-42.82	-25.00	-17.82	H
5125	-40.62	5.94	3.00	10.86	-35.70	-25.00	-10.70	V
7687.5	-46.40	7.25	3.00	12.98	-40.67	-25.00	-15.67	V

LTE Band 7 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
5020	-43.19	5.88	3.00	10.77	-38.30	-25.00	-13.30	H
7530	-54.05	7.12	3.00	12.26	-48.91	-25.00	-23.91	H
5020	-43.37	5.88	3.00	10.77	-38.48	-25.00	-13.48	V
7530	-50.36	7.12	3.00	12.26	-45.22	-25.00	-20.22	V

LTE Band 7 Channel Bandwidth 20MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5070	-44.06	5.9	3.00	10.81	-39.15	-25.00	-14.15	H
5705	-49.56	7.19	3.00	12.32	-44.43	-25.00	-19.43	H
5070	-41.68	5.9	3.00	10.81	-36.77	-25.00	-11.77	V
5705	-46.15	7.19	3.00	12.32	-41.02	-25.00	-16.02	V

LTE Band 7_Channel Bandwidth 20MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5120	-40.60	5.94	3.00	10.86	-35.68	-25.00	-10.68	H
7680	-50.57	7.25	3.00	12.98	-44.84	-25.00	-19.84	H
5120	-42.33	5.94	3.00	10.86	-37.41	-25.00	-12.41	V
7680	-51.26	7.25	3.00	12.98	-45.53	-25.00	-20.53	V

LTE Band 12_Channel Bandwidth 1.4MHz_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
1399.40	-45.87	4.73	3.00	10.42	-40.18	-13.00	-27.18	H
2099.10	-54.72	5.64	3.00	12.30	-48.06	-13.00	-35.06	H
1399.40	-42.95	4.73	3.00	10.42	-37.26	-13.00	-24.26	V
2099.10	-55.43	5.64	3.00	12.30	-48.77	-13.00	-35.77	V

LTE Band 12_Channel Bandwidth 1.4MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.00	-45.08	4.75	3.00	10.44	-39.39	-13.00	-26.39	H
2122.50	-47.41	5.66	3.00	12.33	-40.74	-13.00	-27.74	H
1415.00	-44.91	4.75	3.00	10.44	-39.22	-13.00	-26.22	V
2122.50	-46.42	5.66	3.00	12.33	-39.75	-13.00	-26.75	V

LTE Band 12_Channel Bandwidth 1.4MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1430.60	-40.86	4.73	3.00	10.42	-35.17	-13.00	-22.17	H
2145.90	-47.87	5.64	3.00	12.30	-41.21	-13.00	-28.21	H
1430.60	-43.86	4.73	3.00	10.42	-38.17	-13.00	-25.17	V
2145.90	-50.50	5.64	3.00	12.30	-43.84	-13.00	-30.84	V

LTE Band 12_Channel Bandwidth 3MHz_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
1401.00	-41.00	4.77	3.00	10.45	-35.32	-13.00	-22.32	H
2101.50	-55.96	5.69	3.00	12.36	-49.29	-13.00	-36.29	H
1401.00	-40.33	4.77	3.00	10.45	-34.65	-13.00	-21.65	V
2101.50	-46.20	5.69	3.00	12.36	-39.53	-13.00	-26.53	V

LTE Band 12_Channel Bandwidth 3MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.00	-40.25	4.73	3.00	10.42	-34.56	-13.00	-21.56	H
2122.50	-48.55	5.64	3.00	12.30	-41.89	-13.00	-28.89	H
1415.00	-41.67	4.73	3.00	10.42	-35.98	-13.00	-22.98	V
2122.50	-46.80	5.64	3.00	12.30	-40.14	-13.00	-27.14	V

LTE Band 12_Channel Bandwidth 3MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1429.00	-45.91	4.75	3.00	10.44	-40.22	-13.00	-27.22	H
2143.50	-52.35	5.66	3.00	12.33	-45.68	-13.00	-32.68	H
1429.00	-42.67	4.75	3.00	10.44	-36.98	-13.00	-23.98	V
2143.50	-52.60	5.66	3.00	12.33	-45.93	-13.00	-32.93	V

LTE Band 12_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
1403.00	-39.83	4.75	3.00	10.44	-34.14	-13.00	-21.14	H
2104.50	-44.46	5.66	3.00	12.33	-37.79	-13.00	-24.79	H
1403.00	-44.01	4.75	3.00	10.44	-38.32	-13.00	-25.32	V
2104.50	-48.02	5.66	3.00	12.33	-41.35	-13.00	-28.35	V

LTE Band 12_Channel Bandwidth 5MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.00	-44.56	4.77	3.00	10.45	-38.88	-13.00	-25.88	H
2122.50	-50.26	5.69	3.00	12.36	-43.59	-13.00	-30.59	H
1415.00	-42.57	4.77	3.00	10.45	-36.89	-13.00	-23.89	V
2122.50	-55.72	5.69	3.00	12.36	-49.05	-13.00	-36.05	V

LTE Band 12_Channel Bandwidth 5MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1427.00	-40.07	4.73	3.00	10.42	-34.38	-13.00	-21.38	H
2140.50	-50.30	5.64	3.00	12.30	-43.64	-13.00	-30.64	H
1427.00	-43.58	4.73	3.00	10.42	-37.89	-13.00	-24.89	V
2140.50	-55.34	5.64	3.00	12.30	-48.68	-13.00	-35.68	V

LTE and 12_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
1408.00	-43.53	4.73	3.00	10.42	-37.84	-13.00	-24.84	H
2112.00	-50.11	5.64	3.00	12.30	-43.45	-13.00	-30.45	H
1408.00	-41.15	4.73	3.00	10.42	-35.46	-13.00	-22.46	V
2112.00	-46.91	5.64	3.00	12.30	-40.25	-13.00	-27.25	V

LTE Band 12_Channel Bandwidth 10MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.00	-40.00	4.75	3.00	10.44	-34.31	-13.00	-21.31	H
2122.50	-51.15	5.66	3.00	12.33	-44.48	-13.00	-31.48	H
1415.00	-41.73	4.75	3.00	10.44	-36.04	-13.00	-23.04	V
2122.50	-54.37	5.66	3.00	12.33	-47.70	-13.00	-34.70	V

LTE Band 12_Channel Bandwidth 10MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1422.00	-45.38	4.77	3.00	10.45	-39.70	-13.00	-26.70	H
2133.00	-47.49	5.69	3.00	12.36	-40.82	-13.00	-27.82	H
1422.00	-43.80	4.77	3.00	10.45	-38.12	-13.00	-25.12	V
2133.00	-50.74	5.69	3.00	12.36	-44.07	-13.00	-31.07	V

LTE Band 17Channel 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
1412	-43.87	4.73	3.00	10.42	-38.18	-13.00	-25.18	H
2119.5	-50.06	5.64	3.00	12.30	-43.40	-13.00	-30.40	H
1412	-41.31	4.73	3.00	10.42	-35.62	-13.00	-22.62	V
2119.5	-53.93	5.64	3.00	12.30	-47.27	-13.00	-34.27	V

LTE Band 17Channel Bandwidth 5MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1420	-45.83	4.75	3.00	10.44	-40.14	-13.00	-27.14	H
2130	-50.85	5.66	3.00	12.33	-44.18	-13.00	-31.18	H
1420	-40.03	4.75	3.00	10.44	-34.34	-13.00	-21.34	V
2130	-48.28	5.66	3.00	12.33	-41.61	-13.00	-28.61	V

LTE Band 17Channel Bandwidth 5MHz_QPSK_High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1427	-42.25	4.77	3.00	10.45	-36.57	-13.00	-23.57	H
2440.5	-46.57	5.69	3.00	12.36	-39.90	-13.00	-26.90	H
1427	-40.26	4.77	3.00	10.45	-34.58	-13.00	-21.58	V
2440.5	-46.04	5.69	3.00	12.36	-39.37	-13.00	-26.37	V

LTE Band 17Channel 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
1418	-40.88	4.73	3.00	10.42	-35.19	-13.00	-40.88	H
2127	-51.28	5.64	3.00	12.30	-44.62	-13.00	-51.28	H
1418	-40.61	4.73	3.00	10.42	-34.92	-13.00	-40.61	V
2127	-47.02	5.64	3.00	12.30	-40.36	-13.00	-47.02	V

LTE Band 17Channel Bandwidth 10MHz_QPSK_Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1420	-42.28	4.75	3.00	10.44	-36.59	-13.00	-23.59	H
2130	-51.78	5.66	3.00	12.33	-45.11	-13.00	-32.11	H
1420	-45.25	4.75	3.00	10.44	-39.56	-13.00	-26.56	V
2130	-50.75	5.66	3.00	12.33	-44.08	-13.00	-31.08	V

LTE Band 17Channel Bandwidth 10MHz_QPSK_High Channel

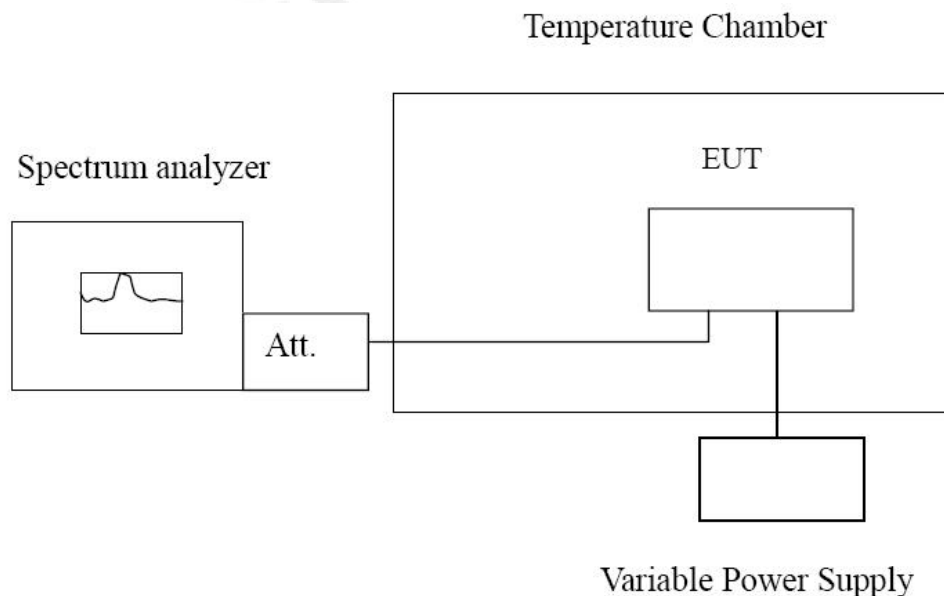
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1422	-43.15	4.77	3.00	10.45	-37.47	-13.00	-24.47	H
2133	-54.34	5.69	3.00	12.36	-47.67	-13.00	-34.67	H
1422	-41.80	4.77	3.00	10.45	-36.12	-13.00	-23.12	V
2133	-54.96	5.69	3.00	12.36	-48.29	-13.00	-35.29	V

3.6. Frequency Stability under Temperature & Voltage Variations

LIMIT

According to §27.54, §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 TIA-603-E

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°C.
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°C increments from -30°C to +50°C. 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°C.
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 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. 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 ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

1. Please refer to Appendix C: Section 2
2. Please refer to Appendix D: Section 2
3. Please refer to Appendix E: Section 2
4. Please refer to Appendix F: Section 2

3.7. Modulation Characteristics

Standard Applicable

According to FCC Part 2 §2.1047:

(a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

(b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

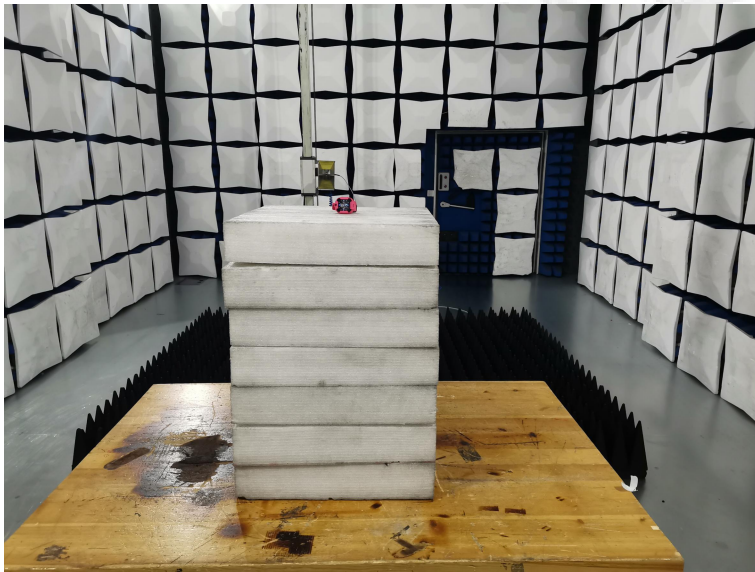
(c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.

(d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

TEST RESULTS

1. Please refer to Appendix C: Section 3
2. Please refer to Appendix D: Section 3
3. Please refer to Appendix E: Section 3
4. Please refer to Appendix F: Section 3

4. Test Setup Photos of the EUT



5. External and Internal Photos of the EUT

Reference to the test report No. CTL2202111011-W01

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