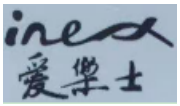
FCC/ISED REPORT

(LTE)

Product Name	:	Vehicle Terminal
Trade mark	:	
Model No.	:	5213 6201、6202、6203、6207、6208、 6209、6210、6211、6213、6215、 6217、6218、6219、6223、6225、 6227、6229、6231、6233、6236、 6239、6243、6245、6251、6253、 6256、6257、6258、6261、6263、 6267、6268、6271、6273、6278、 6283、6288、6293、6502、6503、
Extension model	:	6509、6513、6538、6810、6833、 6858、6868、5208、5209、5211、 5215、5217、5218、5219、5224、 5225、5227、5231、5236、5239、 5243、5245、5251、5256、5257、 5258、5261、5263、5267、5268、 5271、5273、5278、5288、5293、 5509、5513、5523、5538、5807、 5810、5833、5858、5868
FCC ID	:	2AZHT-AL-XXXX
Report Number	:	BLA-EMC-202103-A12305
Date of sample receipt	:	2021/3/29
Date of Test	:	2021/3/29 to 2021/5/7
Date of Issue	:	2021/5/10
Test standard	:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part22 Subpart H FCC CFR Title 47 Part24 Subpart E FCC CFR Title 47 Part 27 Subpart L
Test result	:	PASS

Prepared for:

Shenzhen ALEX Electronics Co., Ltd.

A & B Block, building 1, Jinshun Industrial Park, No.29, Anju Road, Anliang Community, Henggang Subdistrict, Longgang District, Shenzhen(No.6, 5F, A Block), China

Prepared by:

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Compiled by: Kagan

Review by: Sweet.Liang

Approved by:

Date: 2021/5/10

2. Version

Version No.	Date	Description
00	2021/5/10	Original

3. Contents

4. Test Summary

Test Items	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Passed (Please refer toSAR Report)
RF Output Power	Part 2.1046 Part 27.50 (d)(4)	Pass
Peak-to-Average Ratio	Part 24.232 (d) Part 27.50(d)(5)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 27.53(h)	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 22.917(a) Part 27.53 (h)	Pass
Frequency stability vs. temperature	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(d)(2)	Pass
Pass: The EUT complies with the essential requirements in the standard.		

5. General Information

5.1 Client Information

Applicant:	Shenzhen ALEX Electronics Co., Ltd.
Address:	A & B Block, building 1, Jinshun Industrial Park, No.29, Anju Road, Anliang Community, Henggang Subdistrict, Longgang District, Shenzhen(No.6, 5F, A Block), China
Manufacturer:	Shenzhen ALEX Electronics Co., Ltd.
Address:	A & B Block, building 1, Jinshun Industrial Park, No.29, Anju Road, Anliang Community, Henggang Subdistrict, Longgang District, Shenzhen(No.6, 5F, A Block), China
Factory	Shenzhen ALEX Electronics Co., Ltd.
Address	A & B Block, building 1, Jinshun Industrial Park, No.29, Anju Road, Anliang Community, Henggang Subdistrict, Longgang District, Shenzhen(No.6, 5F, A Block), China

5.2 General Description of E.U.T.

Product Name:	Vehicle Terminal
Test Model No.:	5213
Operation Frequency range:	LTE Band 2:TX: 1850MHz-1910MHz, RX: 1930MHz-1990MHz LTE Band 4:TX: 1710MHz-1755MHz, RX: 2110MHz-2155MHz LTE Band 5:TX: 824MHz-849MHz, RX: 869MHz-894MHz LTE Band 7:TX: 2500MHz-2570MHz, RX: 2620MHz-2690MHz
Modulation type:	QPSK, 16QAM
Antenna type:	External Antenna
Antenna gain:	LTE Band2:1.97dBi LTE Band4:4.69dBi LTE Band5:1.69dBi LTE Band7:6.87dBi
Power supply:	DC12V
Remark:The Antenna Gain is supplied by the customer.BlueAsia is not responsible for this data	

Operation Frequency List:

Regards to the operating frequency range, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channels as below:

LTE Band 4(1.4MHz)			LTE Band 4(3MHz)		
Channel:		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	19957	1710.70	Lowest channel	19965	1711.50
Middle channel	20175	1732.50	Middle channel	20175	1732.50
Highest channel	20393	1754.30	Highest channel	20385	1753.50
LTE Band 4(5MHz)			LTE Band 4(10MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	19975	1712.50	Lowest channel	20000	1715.00
Middle channel	20175	1732.50	Middle channel	20175	1732.50
Highest channel	20375	1752.50	Highest channel	20350	1750.00
LTE Band 4(15MHz)			LTE Band 4(20MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20025	1717.50	Lowest channel	20050	1720.00
Middle channel	20175	1732.50	Middle channel	20175	1732.50
Highest channel	20325	1747.50	Highest channel	20300	1745.00

LTE Band 2(1.4MHz)			LTE Band 2(3MHz)		
Channel:		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	18607	1850.70	Lowest channel	18615	1851.5
Middle channel	18900	1880.00	Middle channel	18900	1880.00
Highest channel	19193	1909.30	Highest channel	19185	1908.5
LTE Band 2(5MHz)			LTE Band 2(10MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	18625	1852.50	Lowest channel	18650	1855.00
Middle channel	18900	1880.00	Middle channel	18900	1880.00
Highest channel	19175	1907.50	Highest channel	19150	1905.00
LTE Band 2(15MHz)			LTE Band 2(20MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	18675	1857.50	Lowest channel	18700	1860.00
Middle channel	18900	1880.00	Middle channel	18900	1880.00
Highest channel	19125	1902.50	Highest channel	19100	1900.00

LTE Band 5(1.4MHz)			LTE Band 5(3MHz)		
Channel:		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20407	824.7	Lowest channel	20415	825.5
Middle channel	20525	836.5	Middle channel	20525	836.5
Highest channel	20643	848.3	Highest channel	20635	847.5
LTE Band 5(5MHz)			LTE Band 5(10MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20425	826.5	Lowest channel	20450	829.0
Middle channel	20525	836.5	Middle channel	20525	836.5
Highest channel	20625	846.5	Highest channel	20600	844.0

LTE Band 7(5MHz)			LTE Band 7(10MHz)		
Channel:		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20775	2502.5	Lowest channel	20800	2505.0
Middle channel	21100	2535.0	Middle channel	21100	2535.0
Highest channel	21425	2567.5	Highest channel	21400	2465.0
LTE Band 7(15MHz)			LTE Band 7(20MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20825	2507.5	Lowest channel	20850	2510.0
Middle channel	21100	2435.0	Middle channel	21100	2535.0
Highest channel	21375	2562.5	Highest channel	21350	2560.0

5.3 Test environment and mode

Operating Environment:	
Temperature:	Normal: 15℃~ 35℃, Extreme: -30℃ ~ +50℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 12Vdc
Test mode:	
LTE QPSKmode	Keep the EUT communication with simulated station in QPSK mode
LTE 16-QAMmode	Keep the EUT communication with simulated station in 16-QAM mode
Remark: The EUT has been tested undercontinuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes with power adaptor, earphone and Data cable. Just the worst case position (H mode) shown in report.	

5.4 Description of Support Units

Test Equipment	Manufacturer	Model No.	Serial No.
Simulated Station	Rohde&Schwarz	CMW500	1201.0002K50

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 dB (k=2)

5.6 Related Submittal(s) / Grant (s)

Thisis an original grant, no related submittals and grants.

5.7 Laboratory Facility

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

● FCC — Designation No.: CN1252

BlueAsia of Technical Services(Shenzhen) Co., Ltd. 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 files. Designation CN1252.

●ISED — CAB identifier No.: CN0028

BlueAsia of Technical Services(Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing with CAB identifier CN0028.

●CNAS - Registration No.: CNAS L9788

BlueAsia of Technical Services(Shenzhen) Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L9788

5.8 Laboratory Location

BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

5.9 Test Instruments list

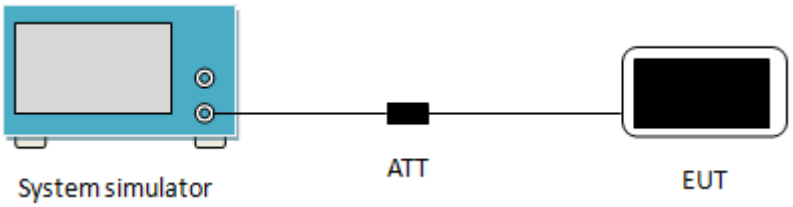
Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Chamber	SKET	966	N/A	2020/11/10	2023/11/9
2	Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
3	Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
4	broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
5	Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25
6	Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
7	EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
8	Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
9	Controller	SKET	N/A	N/A	N/A	N/A
10	Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
11	Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
12	Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Spectrum Analyzer	Agilent	N9030A	MY50510123	2020/10/12	2021/10/11
2	Spectrum analyzer	Rohde & Schwarz	FSP40	100817	2020/10/12	2021/10/11
3	Vector Signal Generator	Agilent	E4438C	MY45092582	2020/10/12	2021/10/11
4	Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11
5	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO27	2020/10/12	2021/10/11

7	DC Power Supply	LODESTAR	LP305DE	N/A	2020/10/12	2021/10/11
8	Temperature Humidity Chamber	Mingle	TH101B	N/A	2020/10/12	2021/10/11

6. Test results

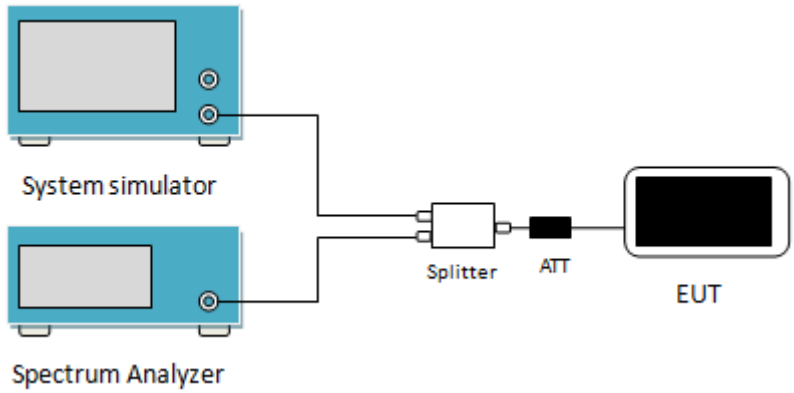
6.1 Conducted Output Power

Test Requirement:	Part 22.913(a)(2), Part 27.50(d)(4),
Test Method:	ANSI/TIA-603-E 2016
Limit:	LTE Band 2: 2W; Band 4:1W; Band5:7W;Band 7: 2W;
Test Setup:	
Test Procedure:	The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the CMW500. Transmitter output power was read off in dBm.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Please Refer To Appendix 2: LTE RF Test data

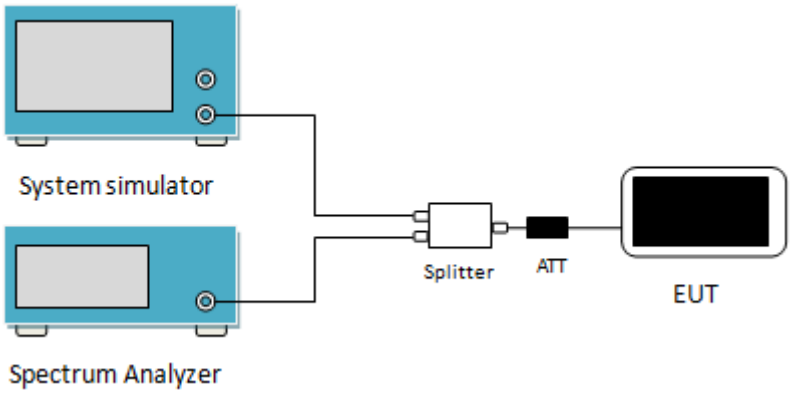
6.2 Peak-to-Average Ratio

Test Requirement:	Part 24.232 (d), Part 27.50(d)(5)
Test Method:	ANSI/TIA-603-E 2016
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test Setup:	
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 Set the CCDF option in spectrum analyzer, RBW ≥ OBW, 3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level. 4 Repeat step 1~3 at other frequency and modulations.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Please Refer To Appendix 2: LTE RF Test data

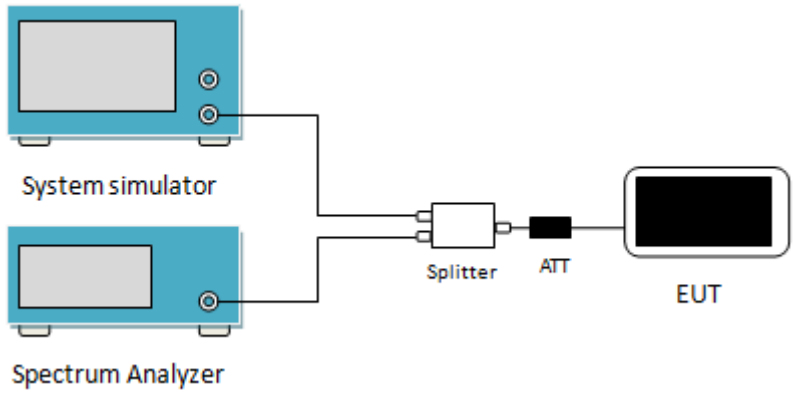
6.3 Occupy Bandwidth

Test Requirement:	Part 22.917(b), Part 27.53(h)
Test Method:	ANSI/TIA-603-E 2016
Test Setup:	
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW. 3. -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 Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Please Refer To Appendix 2: LTE RF Test data

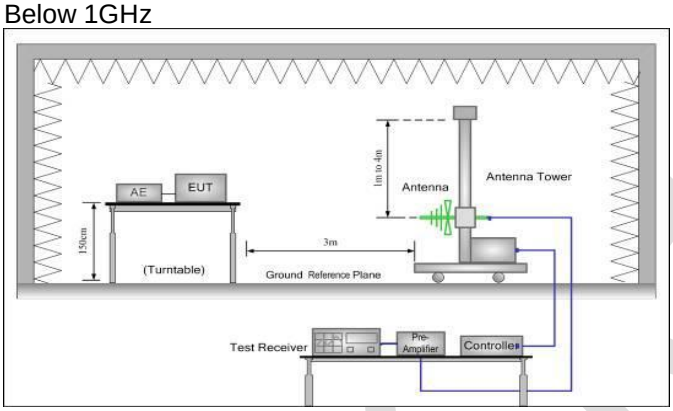
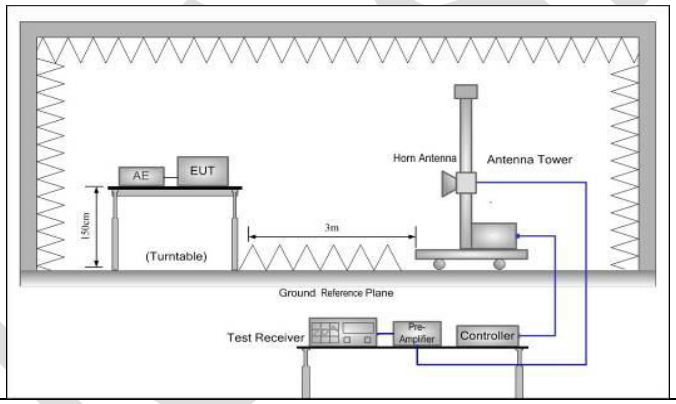
6.4 Out of band emission at antenna terminals

Test Requirement:	Part 24.238 (a), part 27.53(h)
Test Method:	ANSI/TIA-603-E 2016
Limit:	LTE Band4: Thepower of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$(P) dB (-13 dBm). frequencies between 5 megahertz and Xmegahertz 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 emissionbandwidth as defined in paragraph (m)(6) of this section. Inaddition, the attenuation factor shall not be less that 43 + 10 log (P) dB on allfrequencies between 2490.5 MHz and 2496 MHzand 55 + 10 log (P) dB at or below 2490.5 MHz.
Test Setup:	
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Please Refer To Appendix 2: LTE RF Test data

6.5 ERP, EIRP Measurement

Test Requirement:	Part 22.913(a)(2), Part 27.50 (h)
Test Method:	ANSI/TIA-603-E 2016
Limit:	LTE Band 2: 2W EIRP, Band5:7W ERP, LTE Band 4: 1W EIRP, LTE Band 7: 2W EIRP,
Test setup:	Below 1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated. 3. ERP in frequency band below 1GHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB) 4. EIRP in frequency band above 1GHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB) 5. The worse case was relating to the conducted output power.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

LTE Band 4

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1710.70	19957	QPSK	1.4	H	V	21.23	30.00	Pass
					H	20.04		
1710.70	19957	16QAM	1.4	H	V	19.87		
					H	20.01		
Middle Channel								
1732.50	20175	QPSK	1.4	H	V	22.04	30.00	Pass
					H	19.87		
1732.50	20175	16QAM	1.4	H	V	20.13		
					H	20.08		
Highest Channel								
1754.30	20393	QPSK	1.4	H	V	22.15	30.00	Pass
					H	21.24		
1754.30	20393	16QAM	1.4	H	V	19.88		
					H	20.03		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1711.50	19965	QPSK	3	H	V	21.18	30.00	Pass
					H	20.49		
1711.50	19965	16QAM	3	H	V	20.25		
					H	20.79		
Middle Channel								
1732.50	20175	QPSK	3	H	V	21.78	30.00	Pass
					H	20.43		
1732.50	20175	16QAM	3	H	V	21.05		
					H	20.61		
Highest Channel								
1753.50	20385	QPSK	3	H	V	22.12	30.00	Pass
					H	20.25		
1753.50	20385	16QAM	3	H	V	21.69		
					H	20.11		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1712.50	19975	QPSK	5	H	V	21.88	30.00	Pass
					H	21.36		
1712.50	19975	16QAM	5	H	V	20.98		
					H	21.44		
Middle Channel								
1732.50	20175	QPSK	5	H	V	22.15	30.00	Pass
					H	21.46		
1732.50	20175	16QAM	5	H	V	21.58		
					H	21.77		
Highest Channel								
1752.50	20375	QPSK	5	H	V	22.03	30.00	Pass
					H	21.24		
1752.50	20375	16QAM	5	H	V	20.84		
					H	19.58		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1715.00	2000	QPSK	10	H	V	21.46	30.00	Pass
					H	20.67		
1715.00	2000	16QAM	10	H	V	21.39		
					H	20.22		
Middle Channel								
1732.50	20175	QPSK	10	H	V	22.14	30.00	Pass
					H	20.56		
1732.50	20175	16QAM	10	H	V	21.69		
					H	20.41		
Highest Channel								
1750.00	20350	QPSK	10	H	V	21.71	30.00	Pass
					H	21.36		
1750.00	20350	16QAM	10	H	V	21.00		
					H	20.77		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1717.50	20025	QPSK	15	H	V	22.03	30.00	Pass
					H	21.17		
1717.50	20025	16QAM	15	H	V	21.43		
					H	20.08		
Middle Channel								
1732.50	20175	QPSK	15	H	V	21.24	30.00	Pass
					H	20.68		
1732.50	20175	16QAM	15	H	V	21.01		
					H	19.75		
Highest Channel								
1747.50	20325	QPSK	15	H	V	21.86	30.00	Pass
					H	20.47		
1747.50	20325	16QAM	15	H	V	21.52		
					H	19.64		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1720.00	20050	QPSK	20	H	V	21.57	30.00	Pass
					H	21.09		
1720.00	20050	16QAM	20	H	V	19.98		
					H	20.71		
Middle Channel								
1732.50	20175	QPSK	20	H	V	22.06	30.00	Pass
					H	21.54		
1732.50	20175	16QAM	20	H	V	20.87		
					H	19.98		
Highest Channel								
1745.00	20300	QPSK	20	H	V	21.47	30.00	Pass
					H	19.87		
1745.00	20300	16QAM	20	H	V	20.36		
					H	19.63		

LTE Band 2

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1850.70	18607	QPSK	1.4	H	V	22.43	33.00	Pass
					H	21.05		
1850.70	18607	16QAM	1.4	H	V	21.74		
					H	20.13		
Middle Channel								
1880.00	18900	QPSK	1.4	H	V	22.15	33.00	Pass
					H	21.79		
1880.00	18900	16QAM	1.4	H	V	20.26		
					H	20.08		
Highest Channel								
1909.30	19193	QPSK	1.4	H	V	21.89	33.00	Pass
					H	20.03		
1909.30	19193	16QAM	1.4	H	V	20.46		
					H	19.87		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1851.50	18615	QPSK	3	H	V	21.74	30.00	Pass
					H	20.65		
1851.50	18615	16QAM	3	H	V	20.78		
					H	19.52		
Middle Channel								
1880.00	18900	QPSK	3	H	V	22.14	30.00	Pass
					H	21.03		
1880.00	18900	16QAM	3	H	V	21.48		
					H	20.87		
Highest Channel								
1908.50	19185	QPSK	3	H	V	22.03	30.00	Pass
					H	21.76		
1908.50	19185	16QAM	3	H	V	21.36		
					H	19.87		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1852.50	18625	QPSK	5	H	V	21.55	30.00	Pass
					H	21.16		
1852.50	18625	16QAM	5	H	V	20.74		
					H	19.35		
Middle Channel								
1880.00	18900	QPSK	5	H	V	21.03	30.00	Pass
					H	19.25		
1880.00	18900	16QAM	5	H	V	20.47		
					H	19.52		
Highest Channel								
1907.50	19175	QPSK	5	H	V	21.36	30.00	Pass
					H	21.01		
1907.50	19175	16QAM	5	H	V	20.43		
					H	20.28		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1855.00	18650	QPSK	10	H	V	21.51	30.00	Pass
					H	21.39		
1855.00	18650	16QAM	10	H	V	20.78		
					H	21.00		
Middle Channel								
1880.00	18900	QPSK	10	H	V	21.87	30.00	Pass
					H	21.16		
1880.00	18900	16QAM	10	H	V	20.52		
					H	19.69		
Highest Channel								
1905.00	19150	QPSK	10	H	V	21.44	30.00	Pass
					H	21.03		
1905.00	19150	16QAM	10	H	V	20.67		
					H	19.46		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1857.50	18675	QPSK	15	H	V	21.45	30.00	Pass
					H	21.36		
1857.50	18675	16QAM	15	H	V	20.05		
					H	19.87		
Middle Channel								
1880.00	18900	QPSK	15	H	V	21.45	30.00	Pass
					H	19.68		
1880.00	18900	16QAM	15	H	V	21.11		
					H	19.52		
Highest Channel								
1902.50	19125	QPSK	15	H	V	22.02	30.00	Pass
					H	21.34		
1902.50	19125	16QAM	15	H	V	21.74		
					H	21.06		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
1860.00	18700	QPSK	20	H	V	22.25	33.00	Pass
					H	21.03		
1860.00	18700	16QAM	20	H	V	20.17		
					H	21.48		
Middle Channel								
1880.00	18900	QPSK	20	H	V	21.58	33.00	Pass
					H	22.03		
1880.00	18900	16QAM	20	H	V	21.58		
					H	20.36		
Highest Channel								
1900.00	19100	QPSK	20	H	V	21.54	33.00	Pass
					H	20.26		
1900.00	19100	16QAM	20	H	V	20.74		
					H	19.98		

LTE Band 5

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LowestChannel								
824.7	20407	QPSK	1.4	H	V	23.01	33.00	Pass
					H	22.20		
824.7	20407	16QAM	1.4	H	V	21.25		
					H	21.44		
Middle Channel								
836.5	20525	QPSK	1.4	H	V	22.87	33.00	Pass
					H	21.45		
836.5	20525	16QAM	1.4	H	V	22.03		
					H	21.05		
Highest Channel								
848.3	20643	QPSK	1.4	H	V	22.45	33.00	Pass
					H	22.03		
848.3	20643	16QAM	1.4	H	V	21.47		
					H	21.26		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LowestChannel								
825.5	20415	QPSK	3	H	V	22.14	33.00	Pass
					H	21.36		
825.5	20415	16QAM	3	H	V	21.75		
					H	21.22		
Middle Channel								
836.5	20525	QPSK	3	H	V	22.35	33.00	Pass
					H	21.77		
836.5	20525	16QAM	3	H	V	21.69		
					H	21.41		
Highest Channel								
847.5	20635	QPSK	3	H	V	21.96	33.00	Pass
					H	21.04		
847.5	20635	16QAM	3	H	V	21.00		
					H	20.87		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LowestChannel								
826.5	24025	QPSK	5	H	V	22.15	33.00	Pass
					H	21.36		
826.5	24025	16QAM	5	H	V	21.44		
					H	20.75		
Middle Channel								
836.5	20525	QPSK	5	H	V	22.05	33.00	Pass
					H	21.49		
836.5	20525	16QAM	5	H	V	21.03		
					H	20.85		
Highest Channel								
846.5	20625	QPSK	5	H	V	21.69	33.00	Pass
					H	21.04		
846.5	20625	16QAM	5	H	V	20.77		
					H	20.52		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
LowestChannel								
829	20450	QPSK	10	H	V	22.78	33.00	Pass
					H	21.47		
829	20450	16QAM	10	H	V	21.36		
					H	22.25		
Middle Channel								
836.5	20525	QPSK	10	H	V	23.01	33.00	Pass
					H	22.47		
836.5	20525	16QAM	10	H	V	21.59		
					H	20.68		
Highest Channel								
844	20600	QPSK	10	H	V	22.58	33.00	Pass
					H	21.49		
844	20600	16QAM	10	H	V	21.58		
					H	22.03		

LTE Band 7

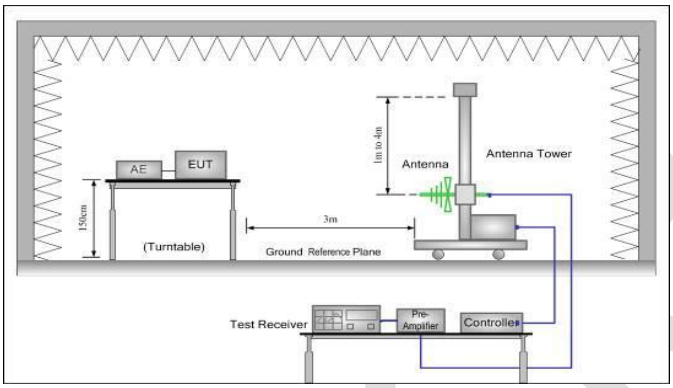
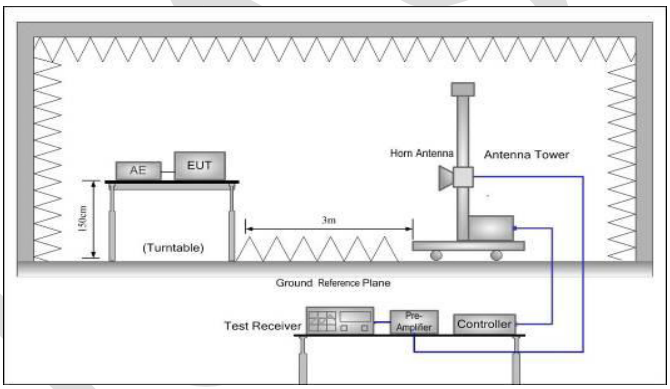
Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
2502.5	20775	QPSK	5	H	V	22.14	33.00	Pass
					H	21.03		
2502.5	20775	16QAM	5	H	V	22.05		
					H	20.87		
Middle Channel								
2535	21100	QPSK	5	H	V	21.69	33.00	Pass
					H	21.11		
2535	21100	16QAM	5	H	V	22.26		
					H	19.87		
Highest Channel								
2567.5	21425	QPSK	5	H	V	22.03	33.00	Pass
					H	21.05		
2567.5	21425	16QAM	5	H	V	19.78		
					H	20.15		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
2505	20800	QPSK	10	H	V	21.88	33.00	Pass
					H	21.35		
2505	20800	16QAM	10	H	V	21.29		
					H	20.17		
Middle Channel								
2535	21100	QPSK	10	H	V	22.01	33.00	Pass
					H	21.46		
2535	21100	16QAM	10	H	V	21.53		
					H	20.87		
Highest Channel								
2565	21400	QPSK	10	H	V	22.06	33.00	Pass
					H	21.53		
2565	21400	16QAM	10	H	V	21.47		
					H	20.82		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
2507.5	20825	QPSK	15	H	V	21.78	33.00	Pass
					H	21.33		
2507.5	20825	16QAM	15	H	V	21.09		
					H	21.45		
Middle Channel								
2535	21100	QPSK	15	H	V	22.04	33.00	Pass
					H	21.73		
2535	21100	16QAM	15	H	V	21.45		
					H	21.05		
Highest Channel								
2562.5	21375	QPSK	15	H	V	21.65	33.00	Pass
					H	21.07		
2562.5	21375	16QAM	15	H	V	21.49		
					H	20.36		

Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
LowestChannel								
2510	20850	QPSK	20	H	V	21.87	33.00	Pass
					H	21.26		
2510	20850	16QAM	20	H	V	21.53		
					H	20.44		
Middle Channel								
2535	21100	QPSK	20	H	V	22.01	33.00	Pass
					H	21.35		
2535	21100	16QAM	20	H	V	21.06		
					H	20.28		
Highest Channel								
2560	21350	QPSK	20	H	V	21.98	33.00	Pass
					H	22.03		
2560	21350	16QAM	20	H	V	21.45		
					H	19.77		

6.6 Field strength of spurious radiation measurement

Test Requirement:	Part 24.238 (a),Part 27.53(h)
Test Method:	ANSI/TIA-603-E 2016
Limit:	LTE Band 2, LTE Band 4, LTE Band 5: <-13dBm, LTE Band 7:<-25dBm
Test setup:	Below 1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data:

LTE Band 4 / 1.4 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
3421.40	Vertical	-45.36	-13.00	Pass
5132.10	V	-43.15		
3421.40	Horizontal	-47.02		
5132.10	H	-46.59		
Middle				
3465.00	Vertical	-44.11	-13.00	Pass
5197.50	V	-42.02		
3465.00	Horizontal	-40.87		
5197.50	H	-43.36		
Highest				
3508.60	Vertical	-48.87	-13.00	Pass
5262.90	V	-43.26		
3508.60	Horizontal	-49.21		
5262.90	H	-43.12		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

LTE Band 4 / 20 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
3440.00	Vertical	-49.26	-13.00	Pass
5160.00	V	-47.12		
3440.00	Horizontal	-48.02		
5160.00	H	-49.03		
Middle				
3465.00	Vertical	-43.26	-13.00	Pass
5197.50	V	-42.01		
3465.00	Horizontal	-44.37		
5197.50	H	-45.58		
Highest				
3490.00	Vertical	-47.15	-13.00	Pass
5235.00	V	-45.02		
3490.00	Horizontal	-44.29		
5235.00	H	-46.18		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

Measurement Data:

LTE Band 2 / 1.4 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
2701.4	Vertical	-41.25	-13.00	Pass
5552.1	V	-42.38		
2701.4	Horizontal	-45.51		
5552.1	H	-43.26		
Middle				
3760	Vertical	-45.16	-13.00	Pass
5640	V	-42.48		
3760	Horizontal	-44.94		
5640	H	-42.05		
Highest				
3818.6	Vertical	-41.26	-13.00	Pass
5727.9	V	-43.02		
3818.6	Horizontal	-42.28		
5727.9	H	-44.47		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

LTE Band 2 / 20 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
3720	Vertical	-42.36	-13.00	Pass
5580	V	-43.48		
3720	Horizontal	-45.69		
5580	H	-46.01		
Middle				
3760	Vertical	-44.71	-13.00	Pass
5640	V	-45.52		
3760	Horizontal	-43.03		
5640	H	-44.87		
Highest				
3800	Vertical	-46.36	-13.00	Pass
5700	V	-45.25		
3800	Horizontal	-42.58		
5700	H	-43.38		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

Measurement Data:

LTE Band 5/ 1.4 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
1649.7	Vertical	-48.03	-13.00	Pass
2474.1	V	-42.16		
1649.7	Horizontal	-43.37		
2474.1	H	-45.15		
Middle				
1673.0	Vertical	-46.36	-13.00	Pass
2509.5	V	-42.74		
1673.0	Horizontal	-44.03		
2509.5	H	-45.51		
Highest				
1696.6	Vertical	-44.17	-13.00	Pass
2544.9	V	-42.29		
1696.6	Horizontal	-43.35		
2544.9	H	-46.02		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

LTE Band 5 / 10 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
1658	Vertical	-47.59	-13.00	Pass
2487	V	-48.26		
1658	Horizontal	-49.03		
2487	H	-46.58		
Middle				
1673.0	Vertical	-46.25	-13.00	Pass
2509.5	V	-47.71		
1673.0	Horizontal	-48.03		
2509.5	H	-49.45		
Highest				
1688	Vertical	-45.26	-13.00	Pass
2532	V	-46.03		
1688	Horizontal	-47.71		
2532	H	-45.52		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

Measurement Data:

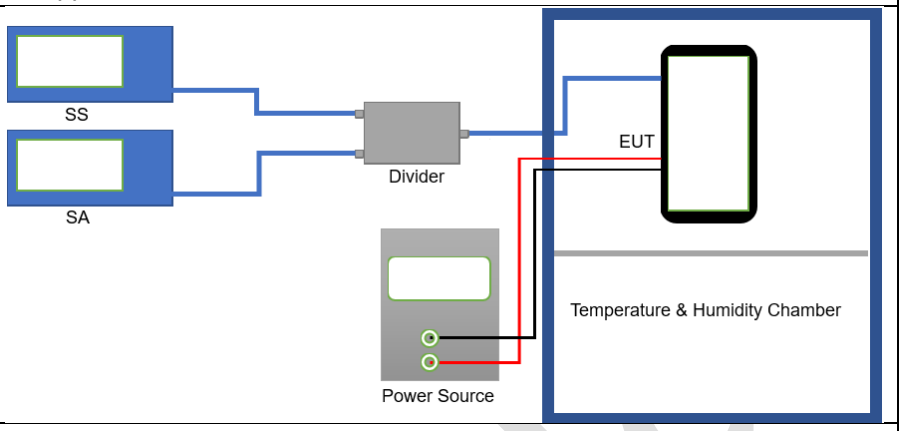
LTE Band 7/ 5 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
5005.0	Vertical	-48.03	-25.00	Pass
7507.5	V	-47.74		
5005.0	Horizontal	-46.65		
7507.5	H	-47.05		
Middle				
5070	Vertical	-46.36	-25.00	Pass
7605	V	-45.58		
5070	Horizontal	-47.01		
7605	H	-46.28		
Highest				
5135.0	Vertical	-47.01	-25.00	Pass
7702.5	V	-48.11		
5135.0	Horizontal	-45.39		
7702.5	H	-47.23		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

LTE Band 7 / 20 MHz / RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest				
5020	Vertical	-42.36	-25.00	Pass
7530	V	-43.87		
5020	Horizontal	-41.69		
7530	H	-45.55		
Middle				
5070	Vertical	-44.39	-25.00	Pass
7605	V	-46.63		
5070	Horizontal	-42.05		
7605	H	-45.88		
Highest				
5120	Vertical	-43.36	-25.00	Pass
7680	V	-45.52		
5120	Horizontal	-43.03		
7680	H	-44.08		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

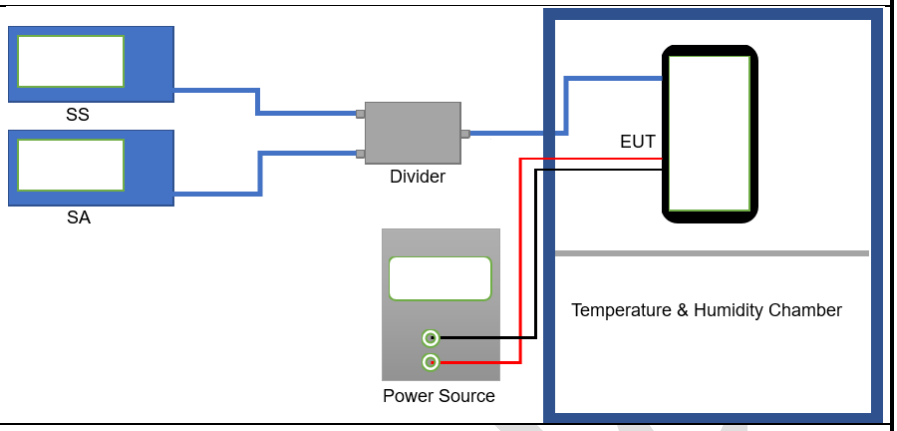
6.7 Frequency stability V.S. Temperature measurement

Test Requirement:	Part 22.355, Part 24.235, Part 27.54, Part 2.1055(a)(1)(b)
Test Method:	ANSI/TIA-603-E 2016
Limit:	±2.5ppm
Test setup:	
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Please Refer To Appendix 2: LTE RF Test data

6.8 Frequency stability V.S. Voltage measurement

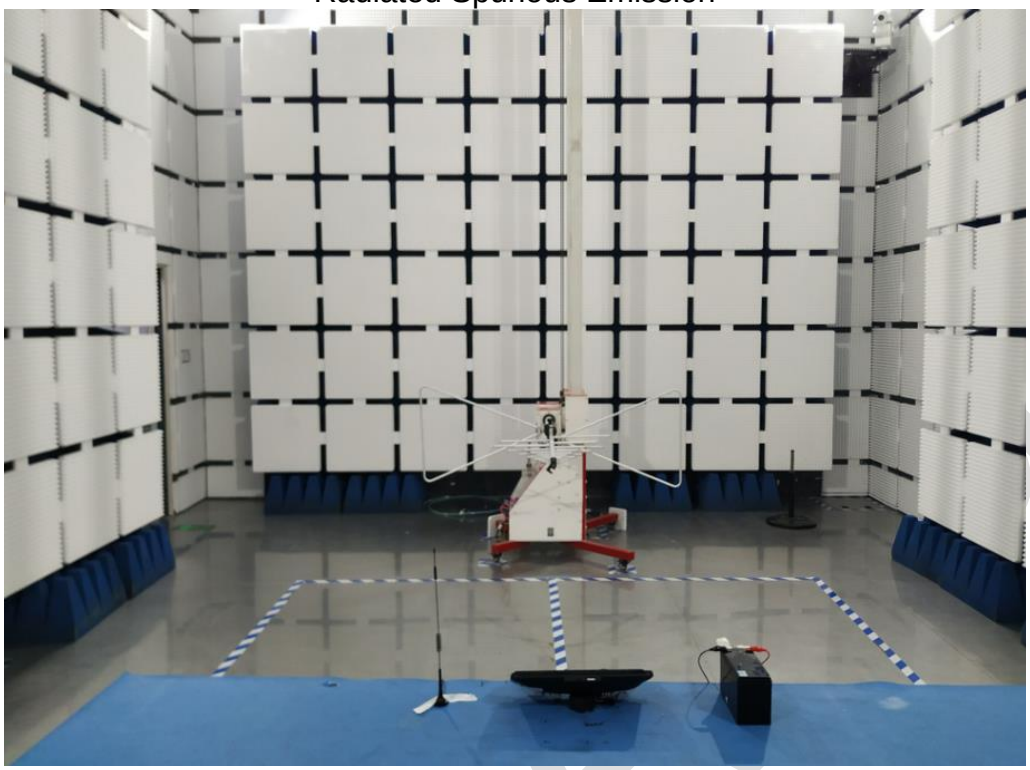
Test Requirement:	Part 22.355, Part 24.235, Part 27.54, Part 2.1055(d)(2)
Test Method:	ANSI/TIA-603-E 2016
Limit:	±2.5ppm
Test setup:	
Test procedure:	1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Please Refer To Appendix 2: LTE RF Test data

7 Test Setup Photo

Radiated Spurious Emission



8 EUT Constructional Details

Reference to the test report No. BLA-EMC-202103-A12301

------End of report------