

TEST REPORT

Product : MDVR
Trade mark :  VISIONTRACK
Model/Type reference : VT5500-G-LTE
Serial Number : N/A
Report Number : EED32M00128503
FCC ID : 2AWHE-VT5500-G-LTE
Date of Issue : Jul. 06, 2020
Test Standards : 47 CFR Part 2
47 CFR Part 22 subpart H
Test result : PASS

Prepared for:

MSG AUTOMOTIVE SOLUTIONS LIMITED
2 Chapman Way, High Brooms Industrial Estate,
Tunbridge Wells, Kent, United Kingdom

Prepared by:

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Date:

Jul. 06, 2020

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Check No.: 3336860701



2 Version

Version No.	Date	Description
00	Jul. 06, 2020	Original

3 Test Summary

LTE Band 5			
Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a)/Part 22.913(a)	TIA-603-E-2016&KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	Part 2.1053/ Part 2.1057/ Part 22.917(a)(b)	TIA-603-E-2016&KDB 971168 D01v03r01	PASS

Remark:

The tested samples and the sample information are provided by the client.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

Volt: In this whole report Volt means Voltage.

Temp: In this whole report Temp means Temperature.

Humid: In this whole report Humid means humidity.

Press: In this whole report Press means Pressure.

N/A: In this whole report not application

The certified module ID is FCC ID: XMR201808EC25AF, and report numbers of this certified module are R1806A0301-R1V1/ R1806A0301-R2V1/ R1806A0301-R3V1/ R1806A0301-R4V1/ R1806A0301-M1V3.

This certified module will be integrated into this host that is installed in a car to apply for a new FCC ID.

Therefore, it is the same mobile condition as the original filling.

In this report, this certified module is same as the original filling. We have verified the power and test for new radiated emission/exposure evaluation to demonstrate full compliance.

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5 Test Requirement

5.1 Test setup

5.1.1 For Radiated Emissions test setup

Radiated Emissions setup:

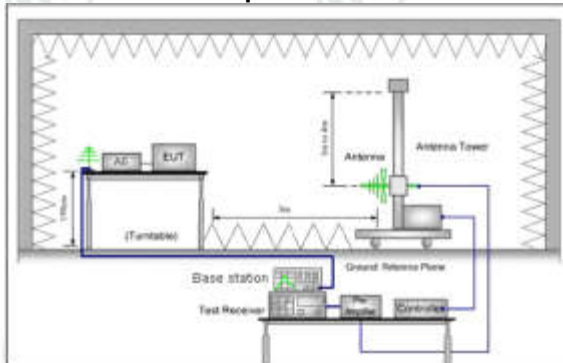


Figure 1.30MHz to 1GHz

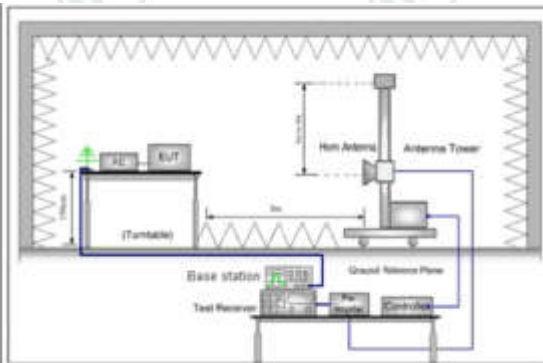


Figure 2. above 1GHz

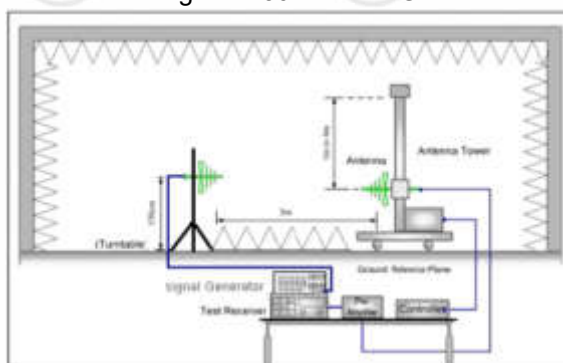


Figure 1. 30MHz to 1GHz

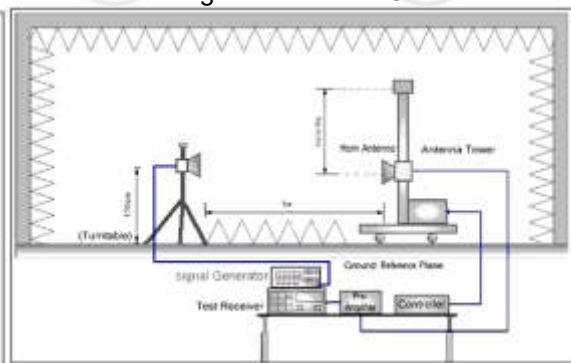


Figure 2. above 1GHz

5.2 Test Environment

Operating Environment:

Temperature:	25°C
Humidity:	53.6 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test channel:

LTE

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)	Number [DL]	Frequency of Downlink(MHz)
LTE band 5 TX:824-849 MHz RX: 869-894MHz	Low Range	1.4	20407	824.7	2407	869.7
		3	20415	825.5	2415	870.5
		5	20425	826.5	2425	871.5
		10	20450	829	2450	874
	Mid Range	1.4/3/5/10	20525	836.5	2525	881.5
		1.4	20643	848.3	2643	893.3
	High Range	3	20635	847.5	2635	892.5
		5	20625	846.5	2625	891.5
		10	20600	844	2600	889

6 General Information

6.1 Client Information

Applicant:	MSG AUTOMOTIVE SOLUTIONS LIMITED
Address of Applicant:	2 Chapman Way, High Brooms Industrial Estate, Tunbridge Wells, Kent, United Kingdom
Manufacturer:	Streamax Technology Co., Ltd
Address of Manufacturer:	21-23/F, Building B1, Zhiyuan, No.1001, Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, P.R.China
Factory:	Streamax Electronics Co., Ltd
Address of Factory:	5th-6thFloor, West, Chuangxiang 2nd Building, Yanxiang Technology Park, 11# High-tech West Road, Guangming District, Shenzhen, Guangdong Province, P.R. China

6.2 General Description of EUT

Product Name:	MDVR
Model No.(EUT):	VT5500-G-LTE
Trade mark:	
EUT Supports Radios application:	LTE Band 2: Tx: 1850-1910MHz, Rx: 1930-1990MHz LTE Band 4: Tx: 1710-1755 MHz, Rx: 2110-2155 MHz LTE Band 5: Tx: 824-849 MHz, Rx: 869-894MHz LTE Band 12: Tx: 699-716 MHz, Rx: 729-746 MHz LTE Band 13: Tx: 777-787 MHz, Rx: 746-756 MHz LTE Band 14:Tx: 788-798 MHz, Rx: 758-768 MHz LTE Band 66:Tx: 1710-1780 MHz, Rx: 2110-2180 MHz LTE Band 71:Tx: 663-698 MHz, Rx: 617-652 MHz
Test Power Grade:	Default
Test Software of EUT:	Default
Power Supply:	DC9-36V
Firmware version:	N/A
Hardware version:	N/A
Sample Received Date:	May 15, 2020
Sample tested Date:	May 15, 2020 to Jun. 11, 2020

6.3 Product Specification subjective to this standard

Frequency Band:	LTE Band 5: Tx: 824 MHz – 849 MHz, Rx: 869 MHz – 894MHz
Modulation Type:	QPSK, 16QAM
Antenna Type:	Passive antenna
Antenna Gain:	3 dBi
Test Voltage:	DC 18V

6.4 Description of Support Units

The EUT has been tested with associated equipment below

Associated equipment name		Manufacture	model	S/N serial number	Supplied by	Certification
AE1	Notebook	DELL	DELL 3490	D245DX2	DELL	CE&FCC

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

6.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

Communication RF test system					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Spectrum Analyzer	Agilent	E4440A	MY46185649	11-05-2019	11-04-2020
Communication test set	R&S	CMW200	111935	02-17-2020	02-16-2021
Signal Generator	Keysight	E8257D	MY53401106	02-17-2020	02-16-2021
Communication test set	R&S	CMW500	152394	02-17-2020	02-16-2021
High-pass filter	Sinoscite	FL3CX03WG18 NM12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
band rejection filter	Sinoscite	FL5CX01CA09C L12-0395-001	---	---	---
band rejection filter	Sinoscite	FL5CX01CA08C L12-0393-001	---	---	---
band rejection filter	Sinoscite	FL5CX02CA04C L12-0396-002	---	---	---
band rejection filter	Sinoscite	FL5CX02CA03C L12-0394-001	---	---	---
DC Power	Keysight	E3642A	MY55156236	02-17-2020	02-16-2021
DC Power	Keysight	E3642A	MY56376035	02-17-2020	02-16-2021
PC-2	Lenovo	R4960d	---	---	---
PC-3	Lenovo	R4960d	---	---	---
RF control unit	JS Tonscend	JS0806-1	158060004	02-17-2020	02-16-2021
DC power Box	JS Tonscend	JS0806-4	158060007	---	---
LTE Automatic test software	JS Tonscend	JS1120-1	---	---	---
WCDMA Automatic test software	JS Tonscend	JS1120-3	---	---	---
GSM Automatic test software	JS Tonscend	JS1120-3	---	---	---
Temperature/Humidity Indicator	biaozhi	HM10	1804186	07-26-2019	07-25-2020

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-26-2019	07-25-2020
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Receiver	R&S	ESCI7	100938-003	10-21-2019	10-20-2020
Multi device Controller	maturo	NCD/070/107 11112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	07-26-2019	07-25-2020
Communication test set	Agilent	E5515C	GB470505 34	03-01-2019	02-28-2022
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---
band rejection filter	Sinoscite	FL5CX01CA0 8CL12-0393-001	---	---	---

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	06-19-2019	06-18-2020
Receiver	Keysight	N9038A	MY57290136	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-05-2020	03-04-2021
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-25-2018	04-24-2021
Communication Antenna	Schwarzbeck	CLSA 0110L	1014	---	---
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980596	---	---
Communication test set	R&S	CMW500	102898	01-14-2020	01-13-2021
Preamplifier	EMCI	EMC001330	980563	04-22-2020	04-21-2021
Preamplifier	JS Tonscend	980380	EMC051845 SE	01-09-2020	01-08-2021
Temperature/Humidity Indicator	biaozhi	GM1360	EE1186631	04-27-2020	04-26-2021
Fully Anechoic Chamber	TDK	FAC-3	---	01-17-2018	01-16-2021
Filter bank	JS Tonscend	JS0806-F	188060094	04-10-2018	04-09-2021
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	PART 22	PART 22 – PUBLIC MOBILE SERVICES Subpart H – Cellular Radiotelephone Service
2	PART 24	PART 24 – PERSONAL COMMUNICATIONS SERVICES Subpart E – Broadband PCS
3	PART 27	PART 27 – MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES
3	PART 2	Frequency allocations and radio treaty matters; general rules and regulations
4	TIA-603-E-2016	Land Mobile FM or PM -Communications Equipment -Measurement and Performance Standards
5	KDB971168 D01	KDB971168 D01 Power Meas License Digital Systems v03r01

Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part 2.1046(a)/Part 22.913(a)	TIA-603-E-2016& KDB 971168 D01v03r01	Conducted output power	PASS	Appendix A)
Part 2.1053/ Part 2.1057/ Part 22.917(a)(b)	TIA-603-E-2016& KDB 971168 D01v03r01	Field strength of spurious radiation	PASS	Appendix B)

Appendix A: Effective (Isotropic) Radiated Power Output Data

Test Result

$$E.i.r.p = P_T + G_T - L_c \quad L_c = 0.5 \text{ dB} \quad ERP = E.i.r.p - 2.15$$

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Average Power [dBm]	ERP [dBm]	Verdict
		Size	Offset			
QPSK	LCH	1	0	24.08	24.13	PASS
		1	3	24.25	24.30	PASS
		1	5	24.09	24.14	PASS
		3	0	24.03	24.08	PASS
		3	2	24.12	24.17	PASS
		3	3	23.96	24.01	PASS
		6	0	23.86	23.91	PASS
	MCH	1	0	24.27	24.32	PASS
		1	3	24.25	24.30	PASS
		1	5	24.17	24.22	PASS
		3	0	24.15	24.20	PASS
		3	2	24.26	24.31	PASS
		3	3	24.11	24.16	PASS
		6	0	24.13	24.18	PASS
	HCH	1	0	24.26	24.31	PASS
		1	3	24.40	24.45	PASS
		1	5	24.28	24.33	PASS
		3	0	24.18	24.23	PASS
		3	2	24.17	24.22	PASS
		3	3	24.15	24.20	PASS
		6	0	24.27	24.32	PASS
16QAM	LCH	1	0	23.33	23.38	PASS
		1	3	23.47	23.52	PASS
		1	5	23.25	23.30	PASS
		3	0	23.86	23.91	PASS
		3	2	23.85	23.90	PASS
		3	3	23.89	23.94	PASS
		6	0	22.53	22.58	PASS
	MCH	1	0	23.27	23.32	PASS
		1	3	23.44	23.49	PASS
		1	5	23.28	23.33	PASS
		3	0	24.13	24.18	PASS
		3	2	24.13	24.18	PASS
		3	3	24.10	24.15	PASS
		6	0	23.09	23.14	PASS
	HCH	1	0	23.46	23.51	PASS
		1	3	23.72	23.77	PASS
		1	5	23.37	23.42	PASS
		3	0	24.15	24.20	PASS
		3	2	24.15	24.20	PASS
		3	3	24.24	24.29	PASS
		6	0	23.12	23.17	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Average Power [dBm]	ERP [dBm]	Verdict
		Size	Offset			
QPSK	LCH	1	0	24.05	24.10	PASS
		1	7	23.94	23.99	PASS
		1	14	23.92	23.97	PASS
		8	0	23.03	23.08	PASS
		8	4	23.02	23.07	PASS
		8	7	22.97	23.02	PASS
		15	0	23.05	23.10	PASS
	MCH	1	0	24.06	24.11	PASS
		1	7	24.24	24.29	PASS
		1	14	24.38	24.43	PASS
		8	0	23.18	23.23	PASS
		8	4	23.18	23.23	PASS
		8	7	23.18	23.23	PASS
		15	0	23.12	23.17	PASS
	HCH	1	0	24.37	24.42	PASS
		1	7	24.28	24.33	PASS
		1	14	24.17	24.22	PASS
		8	0	23.20	23.25	PASS
		8	4	23.30	23.35	PASS
		8	7	23.29	23.34	PASS
		15	0	23.28	23.33	PASS
16QAM	LCH	1	0	22.85	22.90	PASS
		1	7	22.80	22.85	PASS
		1	14	22.70	22.75	PASS
		8	0	22.95	23.00	PASS
		8	4	22.94	22.99	PASS
		8	7	22.94	22.99	PASS
		15	0	21.94	21.99	PASS
	MCH	1	0	23.02	23.07	PASS
		1	7	22.88	22.93	PASS
		1	14	22.95	23.00	PASS
		8	0	23.17	23.22	PASS
		8	4	23.13	23.18	PASS
		8	7	23.13	23.18	PASS
		15	0	22.27	22.32	PASS
	HCH	1	0	23.09	23.14	PASS
		1	7	23.14	23.19	PASS
		1	14	23.12	23.17	PASS
		8	0	23.29	23.34	PASS
		8	4	23.29	23.34	PASS
		8	7	23.29	23.34	PASS
		15	0	22.18	22.23	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Average Power [dBm]	ERP [dBm]	Verdict
		Size	Offset			
QPSK	LCH	1	0	23.91	23.96	PASS
		1	12	23.92	23.97	PASS
		1	24	23.97	24.02	PASS
		12	0	22.95	23.00	PASS
		12	6	22.95	23.00	PASS
		12	13	22.93	22.98	PASS
		25	0	22.95	23.00	PASS
	MCH	1	0	23.93	23.98	PASS
		1	12	24.02	24.07	PASS
		1	24	24.07	24.12	PASS
		12	0	23.03	23.08	PASS
		12	6	23.03	23.08	PASS
		12	13	23.24	23.29	PASS
		25	0	23.13	23.18	PASS
	HCH	1	0	24.15	24.20	PASS
		1	12	24.35	24.40	PASS
		1	24	24.20	24.25	PASS
		12	0	23.22	23.27	PASS
		12	6	23.22	23.27	PASS
		12	13	23.28	23.33	PASS
		25	0	23.19	23.24	PASS
16QAM	LCH	1	0	22.48	22.53	PASS
		1	12	22.38	22.43	PASS
		1	24	22.51	22.56	PASS
		12	0	22.98	23.03	PASS
		12	6	22.97	23.02	PASS
		12	13	22.95	23.00	PASS
		25	0	22.03	22.08	PASS
	MCH	1	0	22.50	22.55	PASS
		1	12	22.56	22.61	PASS
		1	24	22.65	22.70	PASS
		12	0	23.13	23.18	PASS
		12	6	23.13	23.18	PASS
		12	13	23.22	23.27	PASS
		25	0	22.13	22.18	PASS
	HCH	1	0	22.65	22.70	PASS
		1	12	22.67	22.72	PASS
		1	24	22.61	22.66	PASS
		12	0	23.21	23.26	PASS
		12	6	23.21	23.26	PASS
		12	13	23.26	23.31	PASS
		25	0	22.20	22.25	PASS

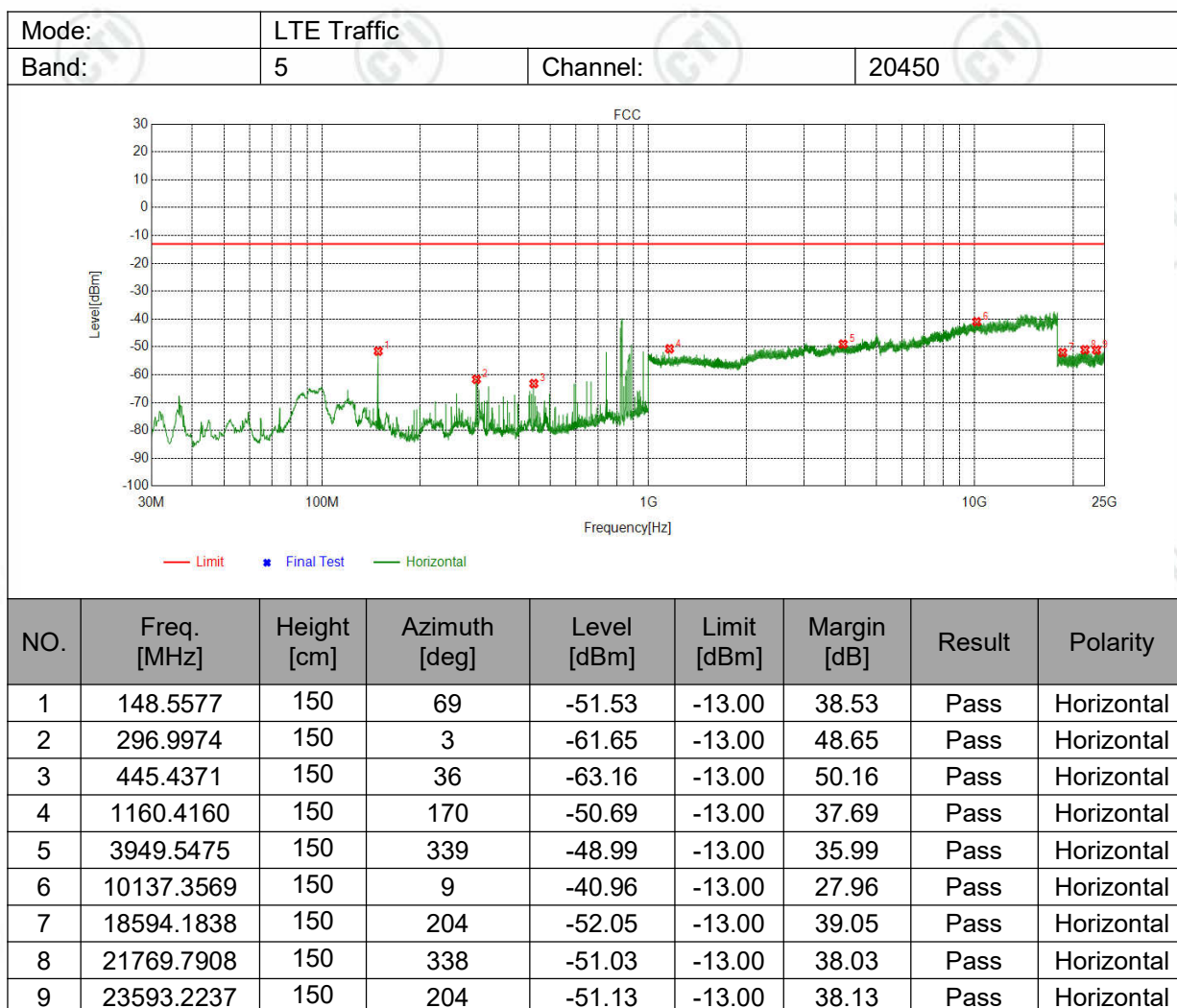
Channel Bandwidth: 10 MHz

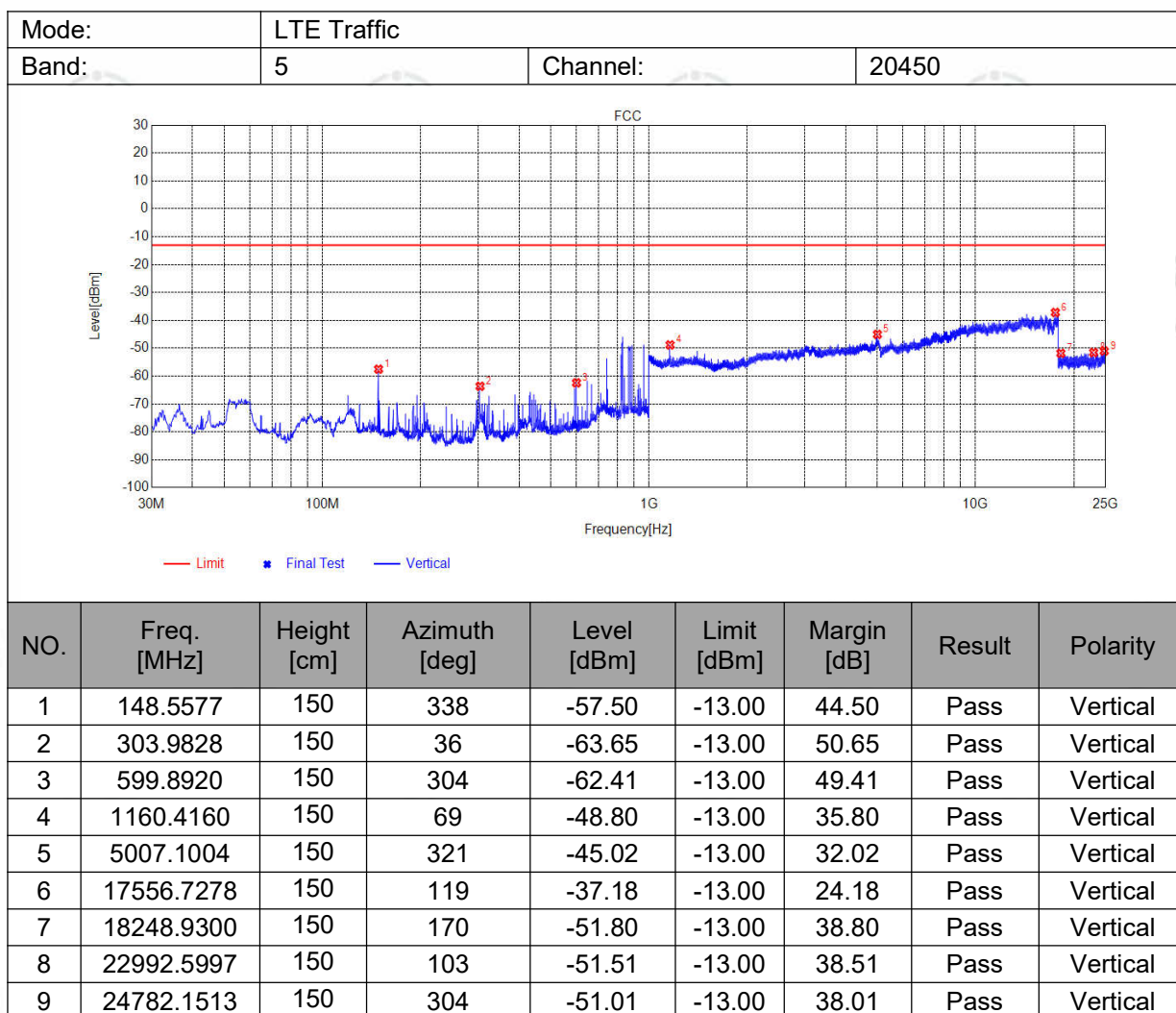
Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Average Power [dBm]	ERP [dBm]	Verdict
		Size	Offset			
QPSK	LCH	1	0	23.75	23.80	PASS
		1	24	23.87	23.92	PASS
		1	49	23.82	23.87	PASS
		25	0	23.02	23.07	PASS
		25	12	23.02	23.07	PASS
		25	25	23.07	23.12	PASS
		50	0	23.02	23.07	PASS
	MCH	1	0	23.89	23.94	PASS
		1	24	24.29	24.34	PASS
		1	49	23.91	23.96	PASS
		25	0	23.12	23.17	PASS
		25	12	23.12	23.17	PASS
		25	25	23.22	23.27	PASS
		50	0	23.13	23.18	PASS
	HCH	1	0	23.97	24.02	PASS
		1	24	24.03	24.08	PASS
		1	49	24.30	24.35	PASS
		25	0	23.21	23.26	PASS
		25	12	23.20	23.25	PASS
		25	25	23.22	23.27	PASS
		50	0	23.24	23.29	PASS
16QAM	LCH	1	0	23.01	23.06	PASS
		1	24	22.98	23.03	PASS
		1	49	22.92	22.97	PASS
		25	0	22.96	23.01	PASS
		25	12	22.96	23.01	PASS
		25	25	23.02	23.07	PASS
		50	0	21.97	22.02	PASS
	MCH	1	0	22.98	23.03	PASS
		1	24	23.40	23.45	PASS
		1	49	23.07	23.12	PASS
		25	0	23.22	23.27	PASS
		25	12	23.21	23.26	PASS
		25	25	23.32	23.37	PASS
		50	0	22.05	22.10	PASS
	HCH	1	0	23.06	23.11	PASS
		1	24	22.96	23.01	PASS
		1	49	23.23	23.28	PASS
		25	0	23.18	23.23	PASS
		25	12	23.18	23.23	PASS
		25	25	23.21	23.26	PASS
		50	0	22.20	22.25	PASS

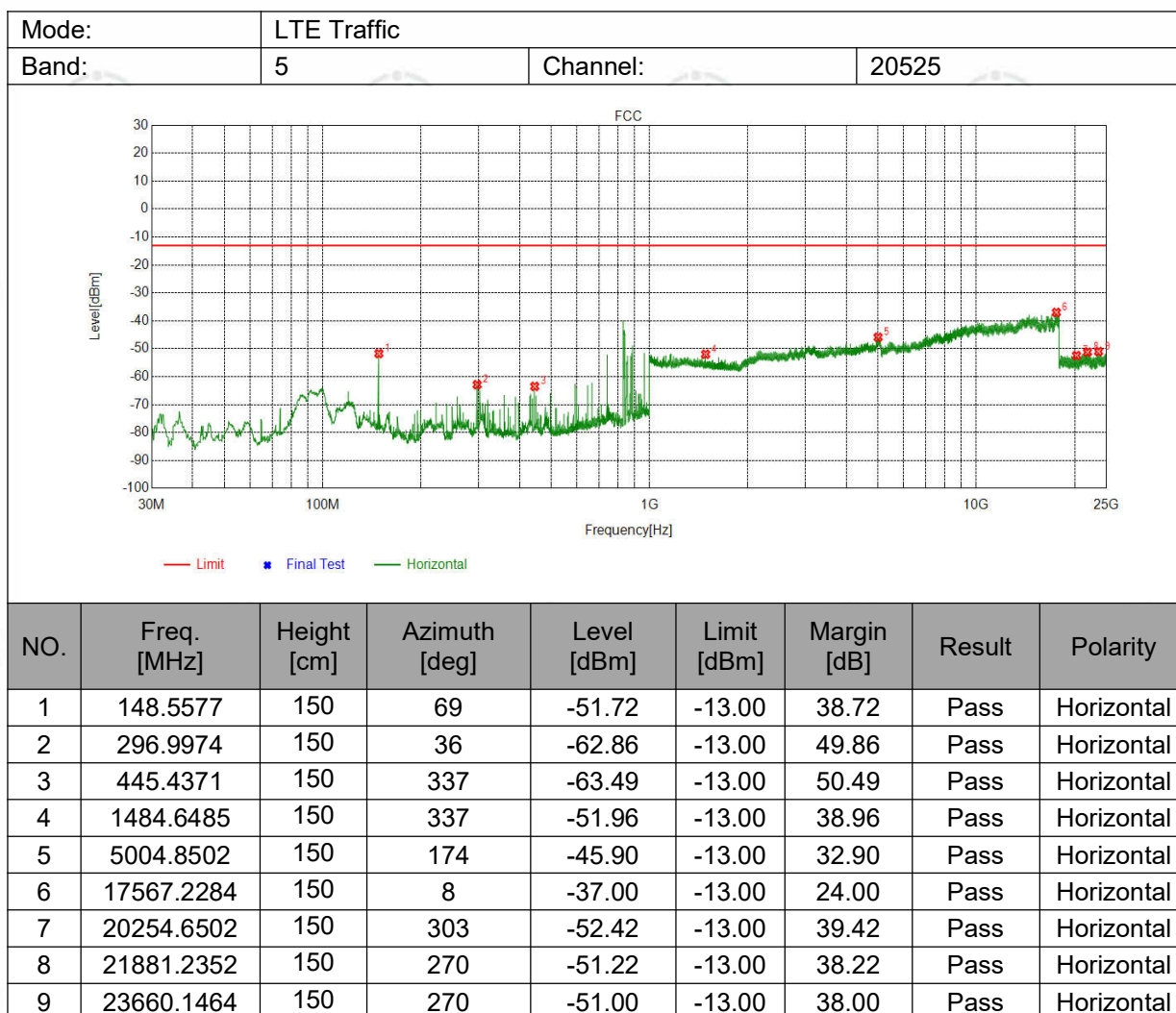
Appendix B): Field strength of spurious radiation

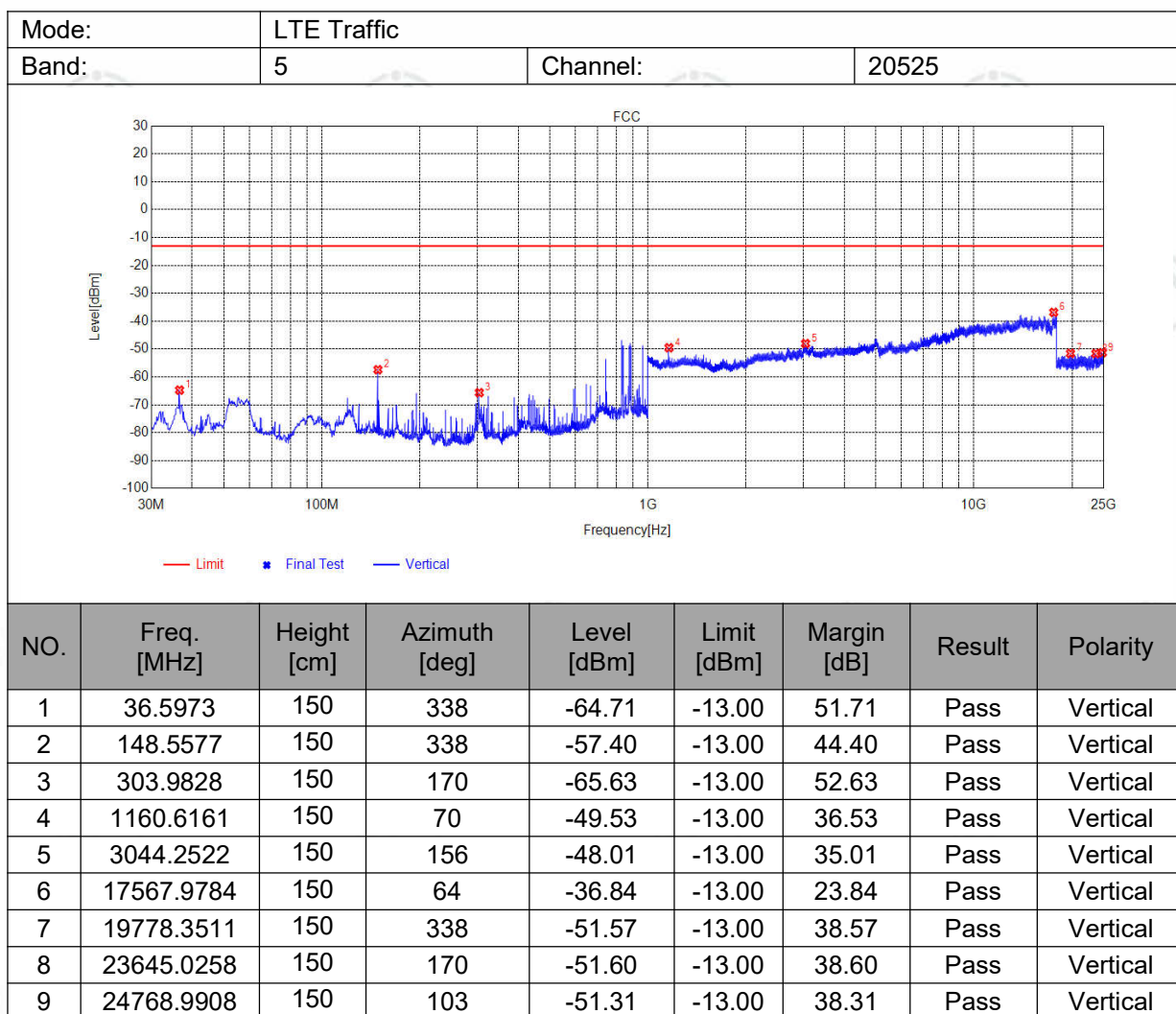
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-30MHz	Peak	10kHz	30kHz	Peak
	30MHz-1GHz	Peak	120kHz	300kHz	Peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Measurement Procedure:	1. Scan up to 10th harmonic, find the maximum radiation frequency to measure. 2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT. Test procedure as below: 1) The EUT was powered ON and placed on a 1.5m high table at a 3 meter fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test. 2) The EUT was set 3 meters(above 18GHz the distance is 1 meter) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made. 4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization. 5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter. 6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions. 7) The output power into the substitution antenna was then measured. 8) Steps 6) and 7) were repeated with both antennas polarized. 9) Calculate power in dBm by the following formula: $\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$ $\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ $\text{EIRP} = \text{ERP} + 2.15\text{dB}$ where: Pg is the generator output power into the substitution antenna. 10) Test the EUT in the lowest channel, the middle channel the Highest channel 11) The radiation measurements are performed in X, Y, Z axis positioning for EUT operation mode, And found the X axis positioning which it is worse case. 12) Repeat above procedures until all frequencies measured was complete.				
Limit:	Attenuated at least 43+10log(P)				

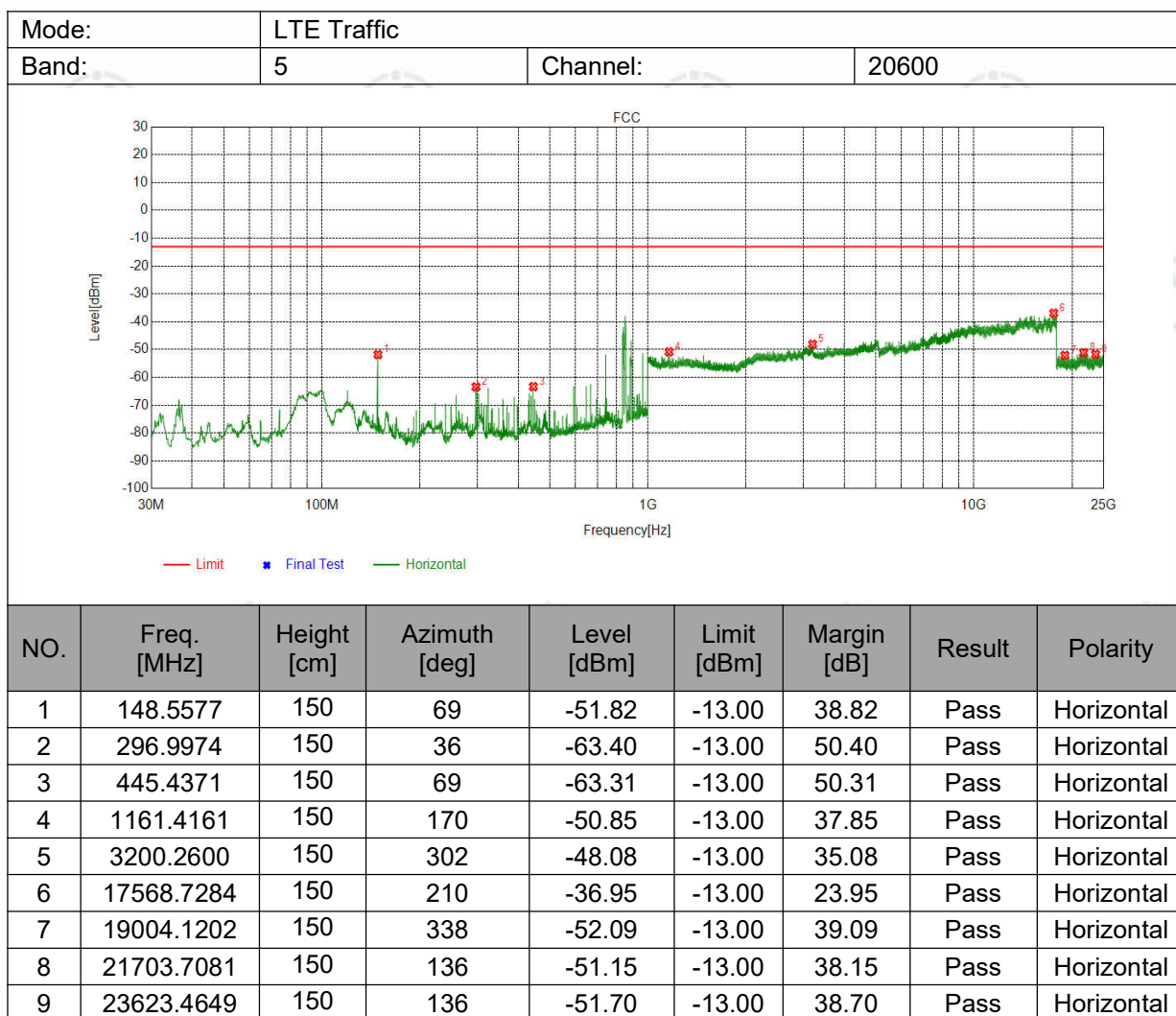
Test Data:

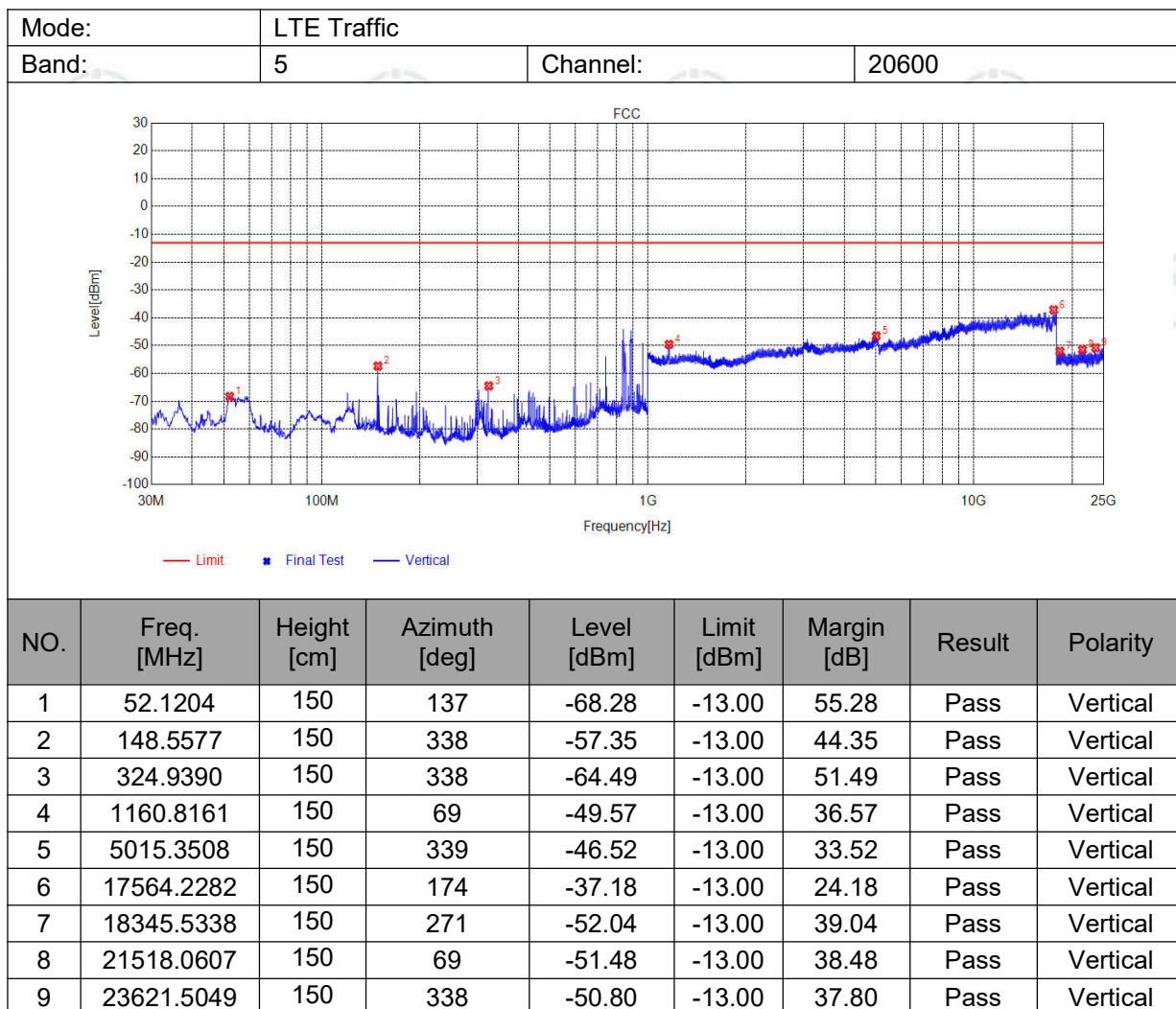












Note:

Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.