



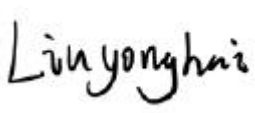
Test Report No.:
FCC2023-0025-RF2

RF Test Report

EUT : Quantum HotSpot HS2
MODEL : HotSpot HS2
BRAND NAME : QUANTUM CONNECTIVITY DE
MÉXICO, S.A. DE C.V.
APPLICANT : QUANTUM CONNECTIVITY DE
MEXICO, S.A. DE C.V.
Classification Of Test : N/A

CVC Testing Technology Co., Ltd.



Applicant		Name: QUAMTUM CONNECTIVITY DE MEXICO, S.A. DE C.V. Address: Torcuato Tasso 245, Despacho 403, Oficina 21Col. Polanco V Sección, C.P. 11560 Alcaldía Miguel Hidalgo, CDMX,México	
Manufacturer		Name: QUAMTUM CONNECTIVITY DE MEXICO, S.A. DE C.V. Address: Torcuato Tasso 245, Despacho 403, Oficina 21Col. Polanco V Sección, C.P. 11560 Alcaldía Miguel Hidalgo, CDMX,México	
Equipment Under Test		Product Name: Quantum HotSpot HS2 Model/Type: HotSpot HS2 Brand Name: QUAMTUM CONNECTIVITY DE MÉXICO, S.A. DE C.V. Serial NO.: N/A Sample NO.:4-1	
Date of Receipt.	2023.05.10	Date of Testing	2023.05.10~2023.05.26
Test Specification		Test Result	
47 CFR Part 2, 22(H), 24(E), 27(H) ANSI/TIA-603-E, ANSI C63.26-2015		PASS	
Evaluation of Test Result		The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC Issue Date: 2023.06.09	
Tested by:  Xu ZhenFei Name Signature		Reviewed by:  Liu YongHai Name Signature	Approved by:  Chen HuaWen Name Signature
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2023-0025-RF2	Original release	2023.06.09



1 SUMMARY OF TEST RESULTS AND LIMIT

1.1 WCDMA B2/B5

FCC STANDARD SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A of FCC2023-0025-RF2-A6	Report Only
§22.913(a)(5)	Effective Radiated Power (WCDMA B5)	ERP < 7 Watt	Annex A of FCC2023-0025-RF2-A6	PASS
§24.232(c)	Equivalent Isotropic Radiated Power (WCDMA B2)	EIRP < 2Watt		
§2.1049	Occupied Bandwidth	---	Annex C of FCC2023-0025-RF2-A6	Report Only
§24.232(d)	Peak-to-Average Power Ratio	<13 dB	Annex B of FCC2023-0025-RF2-A6	PASS
§2.1055 §22.355	Frequency Stability	< 2.5 ppm	Annex F of FCC2023-0025-RF2-A6	PASS
§2.1055 §24.235		Within authorized bands of operation/frequency block.		
§2.1051 §22.917 §24.238(a)	Band Edge Compliance	< 43+10log10(P[Watts])	Annex D of FCC2023-0025-RF2-A6	PASS
§2.1051 §22.917 §24.238(a)	Conducted Spurious Emission	< 43+10log10(P[Watts])	Annex E of FCC2023-0025-RF2-A6	PASS
§2.1051 §22.917 §24.238(a)	Radiates Spurious Emission	< 43+10log10(P[Watts])	See section 3.1	PASS



1.2 LTE Band 2

FCC PART SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A of FCC2023-0025-RF2-A1	Report Only
§24.232(c)	Equivalent Isotropic Radiated Power	EIRP < 2Watt	Annex A of FCC2023-0025-RF2-A1	PASS
§2.1049	Occupied Bandwidth	---	Annex C of FCC2023-0025-RF2-A1	Report Only
---	Peak-to-Average Power Ratio	<13 dB	Annex B of FCC2023-0025-RF2-A1	PASS
§2.1055 24.235	Frequency Stability	Within authorized bands of operation/frequency block.	Annex F of FCC2023-0025-RF2-A1	PASS
§2.1051 §24.238(a)	Band Edge Compliance	< 43+10log10(P[Watts])	Annex D of FCC2023-0025-RF2-A1	PASS
§2.1051 §24.238(a)	Conducted Spurious Emission	< 43+10log10(P[Watts])	Annex E of FCC2023-0025-RF2-A1	PASS
§2.1051 §24.238(a)	Radiates Spurious Emission	< 43+10log10(P[Watts])	See section 3.1	PASS



1.3 LTE Band 4

FCC PART SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A of FCC2023-0025-RF2-A2	Report Only
§27.50(d)(4)	Equivalent Isotropic Radiated Power	EIRP < 1Watt	Annex A of FCC2023-0025-RF2-A2	PASS
§2.1049	Occupied Bandwidth	---	Annex C of FCC2023-0025-RF2-A2	Report Only
---	Peak-to-Average Power Ratio	<13 dB	Annex B of FCC2023-0025-RF2-A2	PASS
§2.1055 §27.54	Frequency Stability	Within authorized bands of operation/frequency block.	Annex F of FCC2023-0025-RF2-A2	PASS
§2.1051 §27.53(h)	Band Edge Compliance	< 43+10log10(P[Watts])	Annex D of FCC2023-0025-RF2-A2	PASS
§2.1051 §27.53(h)	Conducted Spurious Emission	< 43+10log10(P[Watts])	Annex E of FCC2023-0025-RF2-A2	PASS
§2.1051 §27.53(h)	Radiates Spurious Emission	< 43+10log10(P[Watts])	See section 3.1	PASS

1.4 LTE Band 5

FCC PART SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A of FCC2023-0025-RF2-A3	Report Only
§22.913(a)(5)	Equivalent Radiated Power	EIRP < 7Watt	Annex A of FCC2023-0025-RF2-A3	PASS
§2.1049	Occupied Bandwidth	---	Annex C of FCC2023-0025-RF2-A3	Report Only
---	Peak-to-Average Power Ratio	<13 dB	Annex B of FCC2023-0025-RF2-A3	PASS
§2.1055 §22.355	Frequency Stability	< 2.5 ppm	Annex F of FCC2023-0025-RF2-A3	PASS
§2.1051 §22.917	Band Edge Compliance	< 43+10log10(P[Watts])	Annex D of FCC2023-0025-RF2-A3	PASS
§2.1051 §22.917	Conducted Spurious Emission	< 43+10log10(P[Watts])	Annex E of FCC2023-0025-RF2-A3	PASS
§2.1051 §22.917	Radiates Spurious Emission	< 43+10log10(P[Watts])	See section 3.1	PASS



1.5 LTE Band 7

FCC PART SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A of FCC2023-0025-RF2-A4	Report Only
§27.50(h)(2)	Equivalent Isotropic Radiated Power	EIRP < 2Watt	Annex A of FCC2023-0025-RF2-A4	PASS
§2.1049	Occupied Bandwidth	>1MHz	Annex C of FCC2023-0025-RF2-A4	Report Only
---	Peak-to-Average Power Ratio	<13 dB	Annex B of FCC2023-0025-RF2-A4	PASS
§2.1055 §27.54	Frequency Stability	Within authorized bands of operation/frequency block.	Annex F of FCC2023-0025-RF2-A4	PASS
§2.1051 §27.53(m4)	Band Edge Compliance	For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least: (i) 40 + 10 log ₁₀ p from the channel edges to 5 MHz away (ii) 43 + 10 log ₁₀ p between 5 MHz and X MHz from the channel edges, and (iii) 55 + 10 log ₁₀ p at X MHz and beyond from the channel edges In addition, the attenuation shall not be less than 43 + 10 log(p) on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log ₁₀ p at or below 2490.5 MHz	Annex D of FCC2023-0025-RF2-A4	PASS
§2.1051 §27.53(m4)	Conducted Spurious Emission		Annex E of FCC2023-0025-RF2-A4	PASS
§2.1051 §27.53(m4)	Radiates Spurious Emission		See section 3.1	PASS



1.6 LTE Band 66

FCC PART SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A of FCC2023-0025-RF2-A5	Report Only
§27.50(d)(4)	Equivalent Isotropic Radiated Power	EIRP < 1Watt	Annex A of FCC2023-0025-RF2-A5	PASS
§2.1049	Occupied Bandwidth	---	Annex C of FCC2023-0025-RF2-A5	Report Only
---	Peak-to-Average Power Ratio	<13 dB	Annex B of FCC2023-0025-RF2-A5	PASS
§2.1055 §27.54	Frequency Stability	Within authorized bands of operation/frequency block.	Annex F of FCC2023-0025-RF2-A5	PASS
§2.1051 §27.53(h)	Band Edge Compliance	< 43+10log10(P[Watts])	Annex D of FCC2023-0025-RF2-A5	PASS
§2.1051 §27.53(h)	Conducted Spurious Emission	< 43+10log10(P[Watts])	Annex E of FCC2023-0025-RF2-A5	PASS
§2.1051 §27.53(h)	Radiates Spurious Emission	< 43+10log10(P[Watts])	See section 3.1	PASS



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Quantum HotSpot HS2			
BRAND	QUAMTUM CONNECTIVITY DE MÉXICO, S.A. DE C.V.			
TEST MODEL	HotSpot HS2			
ADDITIONAL MODEL	N/A			
FCC ID	2A3WD-HS2			
POWER SUPPLY	DC 3.8 from Battery or USB host unit			
MODULATION TYPE	WCDMA	BPSK, QPSK		
	LTE	QPSK, 16QAM		
OPERATING FREQUENCY And MAXIMUM OUTPUT POWER	Band	TX(MHz)	RX(MHz)	Maximum Output Power to Antenna (dBm)
	WCDMA B2	1850 ~ 1910	1930 ~ 1990	23.31
	WCDMA B5	824 ~ 849	869 ~ 894	23.66
	LTE B2	1850 ~ 1910	1930 ~ 1990	22.60
	LTE B4	1710 ~ 1755	2110 ~ 2155	23.15
	LTE B5	824 ~ 849	869 ~ 894	23.24
	LTE B7	2500 ~ 2570	2620 ~ 2690	23.11
	LTE B66	1710 ~ 1780	2110 ~ 2180	24.16
ANTENNA TYPE(Note 4)	See section 2.2			
I/O PORTS	Refer to user's manual			
HW	V1.0			
SW	HotSpot HS2_TELCEL Ver 1.0			
CABLE SUPPLIED	USB line, 0.35 Meter, Shielded without ferrite			

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: FCC2023-0025-E) for detailed product photo.
4. Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.



2.2 ANTENNA TYPE

ANTENNA TYPE	Band	TX(MHz)	RX(MHz)	Antenna Type	Antenna Port	Antenna Gain
	WCDMA B2	1850 ~ 1910	1930 ~ 1990	PIFA Antenna	0	2.56
	WCDMA B5	824 ~ 849	869 ~ 894	PIFA Antenna	0	-1.23
	LTE B2	1850 ~ 1910	1930 ~ 1990	PIFA Antenna	0	2.56
	LTE B4	1710 ~ 1755	2110 ~ 2155	PIFA Antenna	0	2.15
	LTE B5	824 ~ 849	869 ~ 894	PIFA Antenna	0	-1.23
	LTE B7	2500 ~ 2570	2620 ~ 2690	PIFA Antenna	0	1.45
	LTE B66	1710 ~ 1780	2110 ~ 2180	PIFA Antenna	0	2.15

2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.

EUT CONFIGURE MODE	DESCRIPTION
-	EUT + Adapter + with WCDMA link or LTE link



Test modes are chosen as the worst case configuration below for WCDMA

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
RF power output	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
	9262 to 9538	4132, 4182, 4233	WCDMA Band 5
Equivalent Isotropic Radiated Power	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
Effective Radiated Power	9262 to 9538	4132, 4182, 4233	WCDMA Band 5
Frequency Stability	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
	9262 to 9538	4132, 4182, 4233	WCDMA Band 5
Occupied Bandwidth	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
	9262 to 9538	4132, 4182, 4233	WCDMA Band 5
Band Edge Compliance	4132 to 4233	9262, 9538	WCDMA Band 2
	9262 to 9538	4132, 4233	WCDMA Band 5
Conducted Spurious Emission	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
	9262 to 9538	4132, 4182, 4233	WCDMA Band 5
Radiates Spurious Emission	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
	9262 to 9538	4132, 4182, 4233	WCDMA Band 5
Peak-to-Average Power Ratio	4132 to 4233	9262, 9400, 9538	WCDMA Band 2
	9262 to 9538	4132, 4182, 4233	WCDMA Band 5



Test modes are chosen as the worst case configuration below for LTE

Test items	LTE	Bandwidth (MHz)						Modulation	16 QAM	RB			Test Channel		
		1.4	3	5	10	15	20			1%	50%	100%	L	M	H
RF power output	2	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	5	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	7	-		O	O	O	O	O	O	O	O	O	O	O	O
	66	O	O	O	O	O	O	O	O	O	O	O	O	O	O
ERP/ EIRP	2	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	5	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	7	-		O	O	O	O	O	O	O	O	O	O	O	O
	66	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	2	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	5	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	7	-		O	O	O	O	O	O	-	-	O	O	O	O
	66	O	O	O	O	O	O	O	O	-	-	O	O	O	O
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing. 3. Only the worst case was shown in test report														



Test items	LTE	Bandwidth (MHz)						Modulation	16 QAM	RB			Test Channel		
		1.4	3	5	10	15	20			1%	50%	100%	L	M	H
Band Edge Compliance	2	O	O	O	O	O	O	O	-	O	-	O	O	-	O
	4	O	O	O	O	O	O	O	-	O	-	O	O	-	O
	5	O	O	O	O	-	-	O	-	O	-	O	O	-	O
	7	-	-	O	O	O	O	O	-	O	-	O	O	-	O
	66	O	O	O	O	O	O	O	-	O	-	O	O	-	O
Peak-to-Average Power Ratio	2	O	O	O	O	O	O	O	O	O	-	O	O	O	O
	4	O	O	O	O	O	O	O	O	O	-	O	O	O	O
	5	O	O	O	O	-	-	O	O	O	-	O	O	O	O
	7	-	-	O	O	O	O	O	O	O	-	O	O	O	O
	66	O	O	O	O	O	O	O	O	O	-	O	O	O	O
Frequency Stability	2	-	-	-	-	-	O	O	-	-	-	O	O	O	O
	4	-	-	-	-	-	O	O	-	-	-	O	O	O	O
	5	-	-	-	O	-	-	O	-	-	-	O	O	O	O
	7	-	-	-	-	-	O	O	-	-	-	O	O	O	O
	66	-	-	-	-	-	O	O	-	-	-	O	O	O	O
Conducted Spurious Emission	2	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	5	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	7	-	-	O	O	O	O	O	-	O	-	-	O	O	O
	66	O	O	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission (Note3)	2	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	5	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	7	-	-	O	O	O	O	O	-	O	-	-	O	O	O
	66	O	O	O	O	O	O	O	-	O	-	-	O	O	O
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing. 3. Only the worst case was shown in test report														



Test CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RF power output	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing
Effective Radiated Power	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing
Equivalent Isotropic Radiated Power	22deg. C, 65%RH	DC 3.8V from Battery	LI JiaLin
Frequency Stability	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing
Occupied Bandwidth	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing
Band Edge Compliance	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing
Conducted Spurious Emission	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing
Radiates Spurious Emission	23deg. C, 63%RH	DC 3.8V from Battery	Li Jialing
Peak-to-Average Power Ratio	22deg. C, 65%RH	DC 3.8V from Battery	Li Jialing



2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR PART 2

FCC 47 CFR PART 22

FCC 47 CFR PART 24

FCC 47 CFR PART 27

KDB 971168 D01 POWER MEAS LICENSE DIGITAL SYSTEMS V03R01

ANSI/TIA-603-E

ANSI C63.26-2015

ANSI C63.4-2014

Note: All test items have been performed and recorded as per the above standards

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment							
NO	Description	Brand		Model No.	Serial Number	Supplied by	
N/A	N/A	N/A		N/A	N/A	N/A	
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



2.6 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
GSM/WCDMA/LTE/NB-IOT/NR Test System					/
Communication Shielded Room 1	4m*3m*3m	CRTDSWКСR44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV30	104337	DZ-000235	R&S	2023/12/06
Comprehensive Test Instrument	CMW500	137779	DZ-000220	R&S	2023/07/10
Comprehensive Test Instrument	CMW500	169888	DZ-000342	R&S	2023/12/06
LTE Comprehensive Test Instrument	E7515A	MY58010639	DZ-000173	KEYSIGHT	2024/03/27
Analog Signal Generator	SMA100B	103663	DZ-000239-2	R&S	2023/07/10
Vector Signal Generator	SMBV100B	101757	DZ-000239-1	R&S	2023/06/22
Programmable DC Power Supply	E3642A	MY59108106	DZ-000242-2	KEYSIGHT	2023/08/04
Communication Shielded Room 1	4m*3m*3m	CRTDSWКСR44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV30	104337	DZ-000235	R&S	2023/12/06
Comprehensive Test Instrument	CMW500	137779	DZ-000220	R&S	2023/07/10
Comprehensive Test Instrument	CMW500	169888	DZ-000342	R&S	2023/12/06
LTE Comprehensive Test Instrument	E7515A	MY58010639	DZ-000173	KEYSIGHT	2024/03/27
Analog Signal Generator	SMA100B	103663	DZ-000239-2	R&S	2023/07/10
Radiation Spurious Test System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Loop Antenna	FMZB1513	1513-170	EM-000384	SCHWARZBECK	2024-02-24
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2024-02-22
EMI Test Receiver (3M)	N9038A-508	MY532290079	EM-000397	Agilent	2024-02-22
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2023/06/25
Waveguide Horn Antenna	BBHA9120B	602	EM-000383	SCHWARZBECK	2024-01-11
Waveguide Horn Antenna	HF906	360306/008	WKNA-0024-8	R&S	2024-02-24
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2023/06/05
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2023/12/06
Comprehensive tester	CMW500	159000	DZ-000240-2	R&S	2023/12/06



2.7 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Maximum Peak Output Power	$\pm 0.9\text{dB}$
Frequency Stability	$\pm 76.97\text{Hz}$
Radiated emissions (30MHz~1GHz)	$\pm 5.0\text{dB}$
Radiated emissions (1GHz ~18GHz)	$\pm 4.8\text{dB}$
Radiated emissions (18GHz ~40GHz)	$\pm 5.1\text{dB}$
Conducted emissions	$\pm 2.7\text{dB}$
Occupied Channel Bandwidth	$\pm 43.58\text{KHz}$
Band Edge Measurements	$\pm 2.7\text{dB}$
Peak to average ratio	$\pm 0.76\text{dB}$

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

2.8 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

CABID:CN0103

Address: No.3, TiantaiyiRoad, KaitaiAvenue, ScienceCity, Guangzhou, China

Post Code: 510663 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

<http://www.cvc.org.cn>



3 TEST TYPES AND DESCRIPTION

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 TEST PROCEDURES

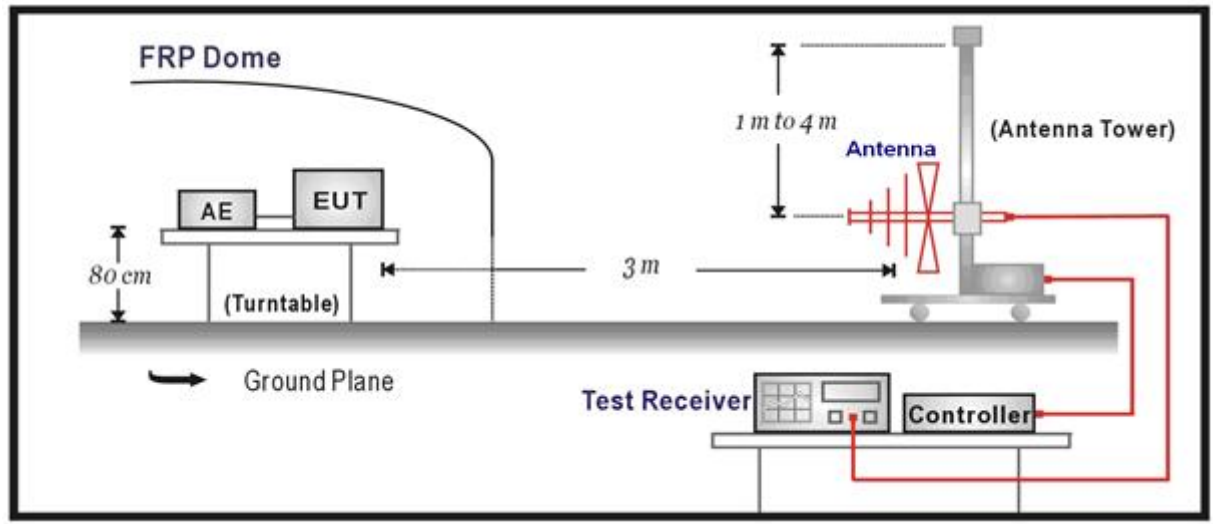
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “ Read Value ” is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “ Read Value ” of step a. Record the power level of S.G
- c. $EIRP(dBm) = S.G.POWER - TX \text{ cable loss} + \text{Antenna gain}.$
- d. $E.R.P(dBm) = E.I.P.R - 2.15dB_i.$

NOTE:

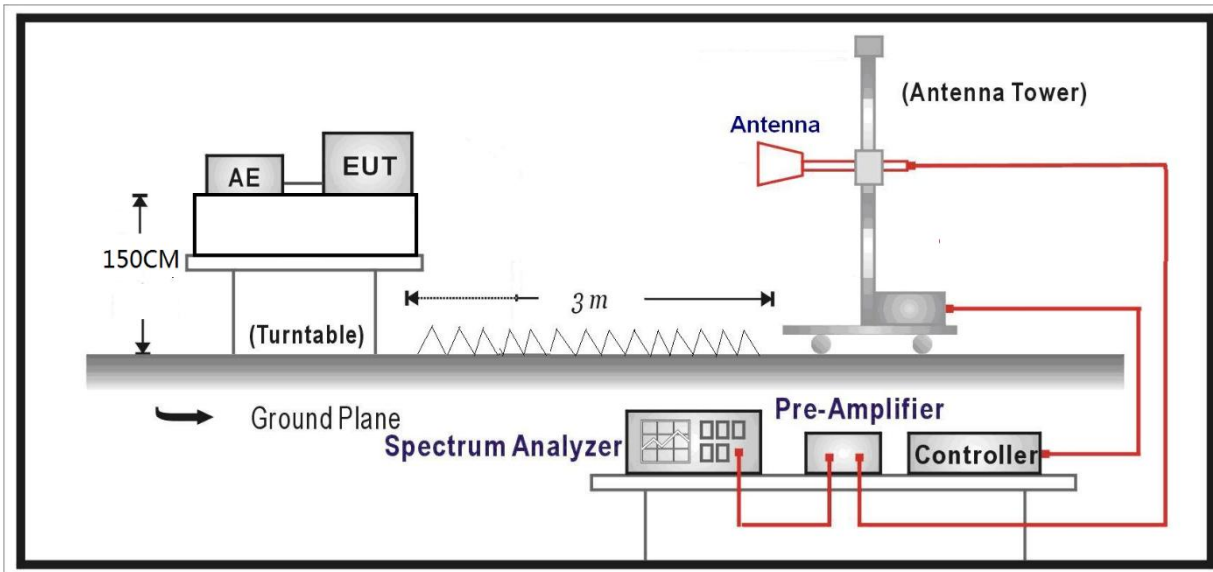
- 1.The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
- 2.Only the worst case was shown in test report

3.1.2 TEST SETUP

Below 1GHz Test Setup:



Above 1GHz Test Setup:

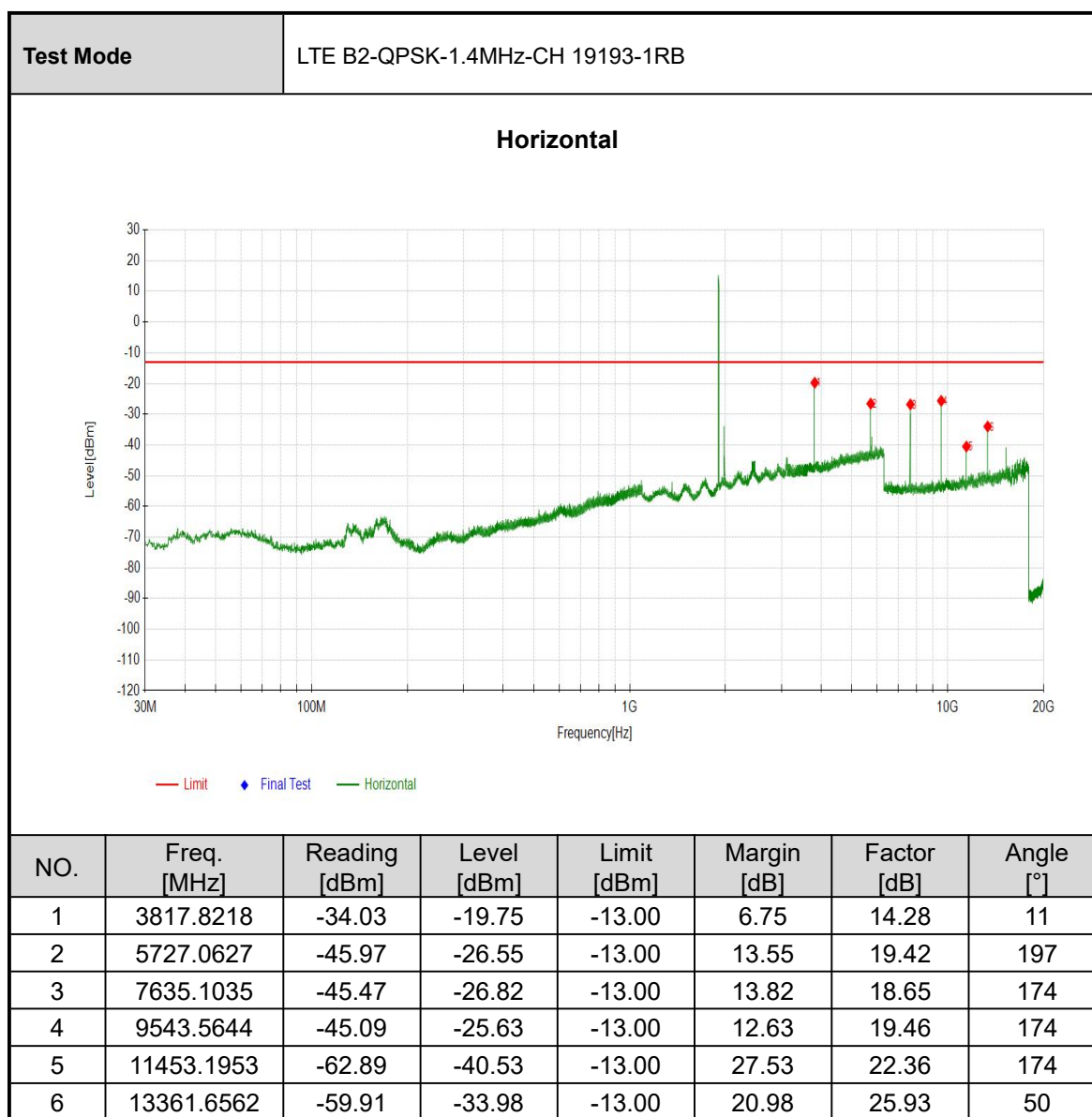


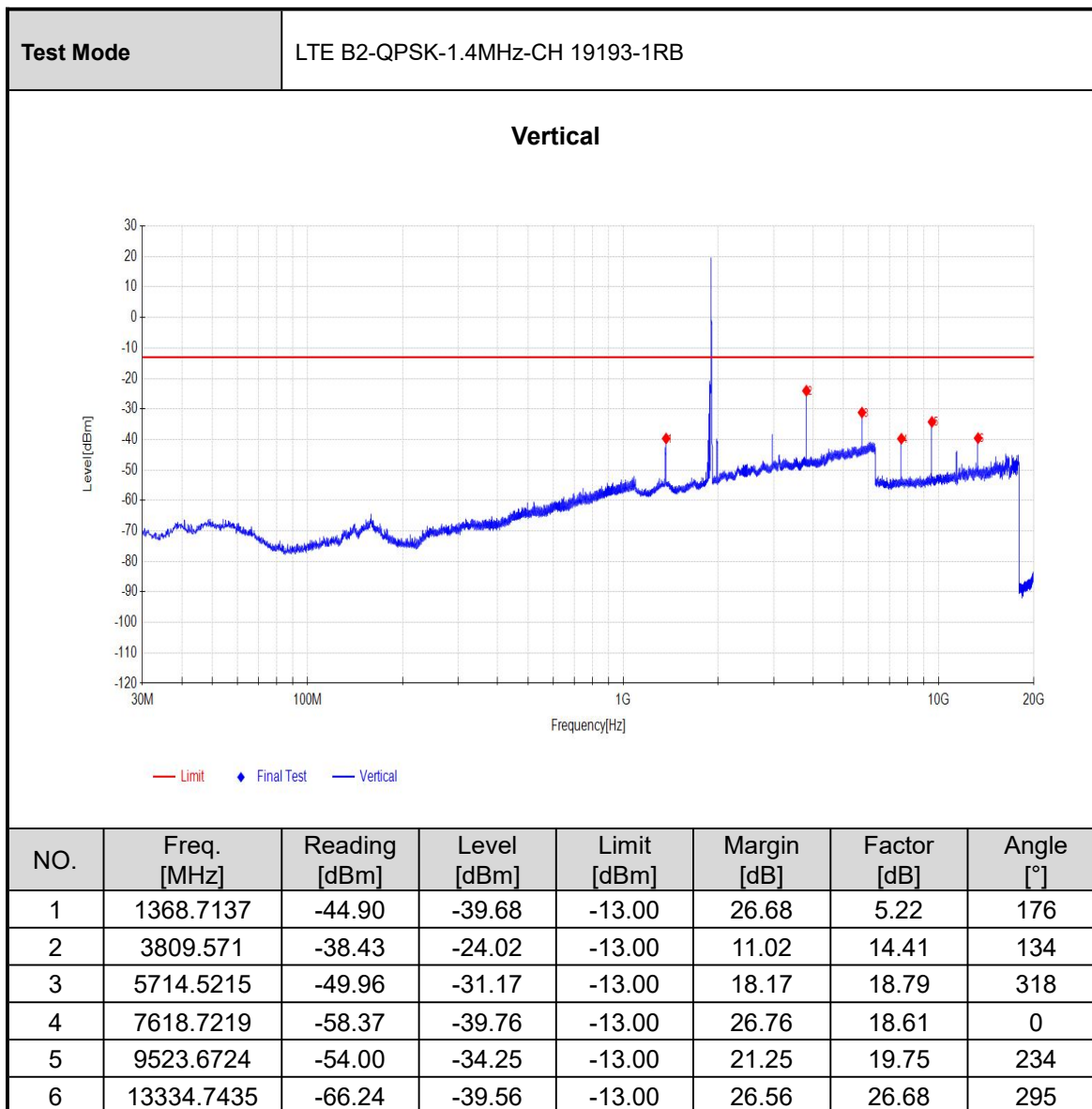
Note: Above 1G is a directional antenna

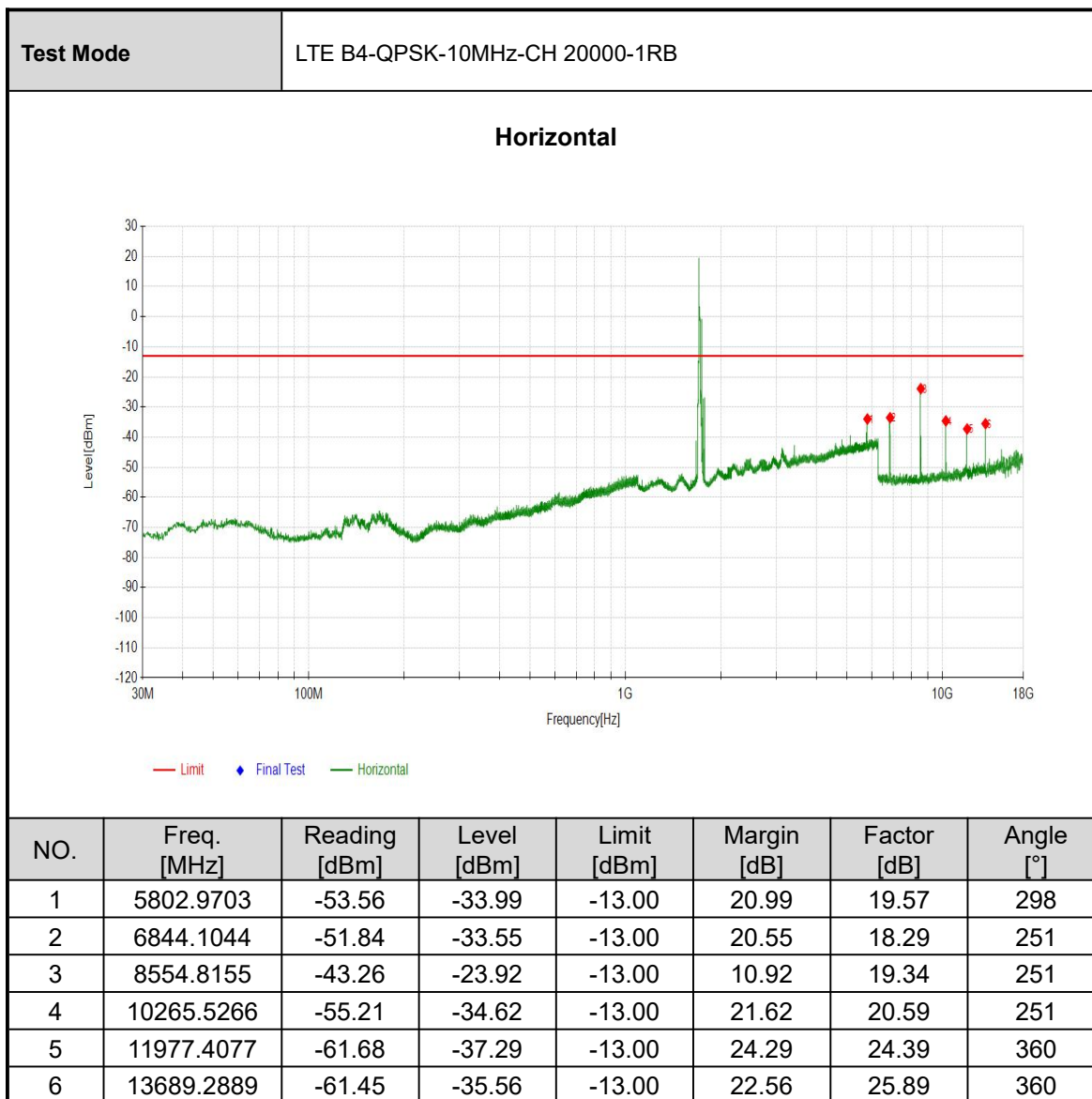
Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

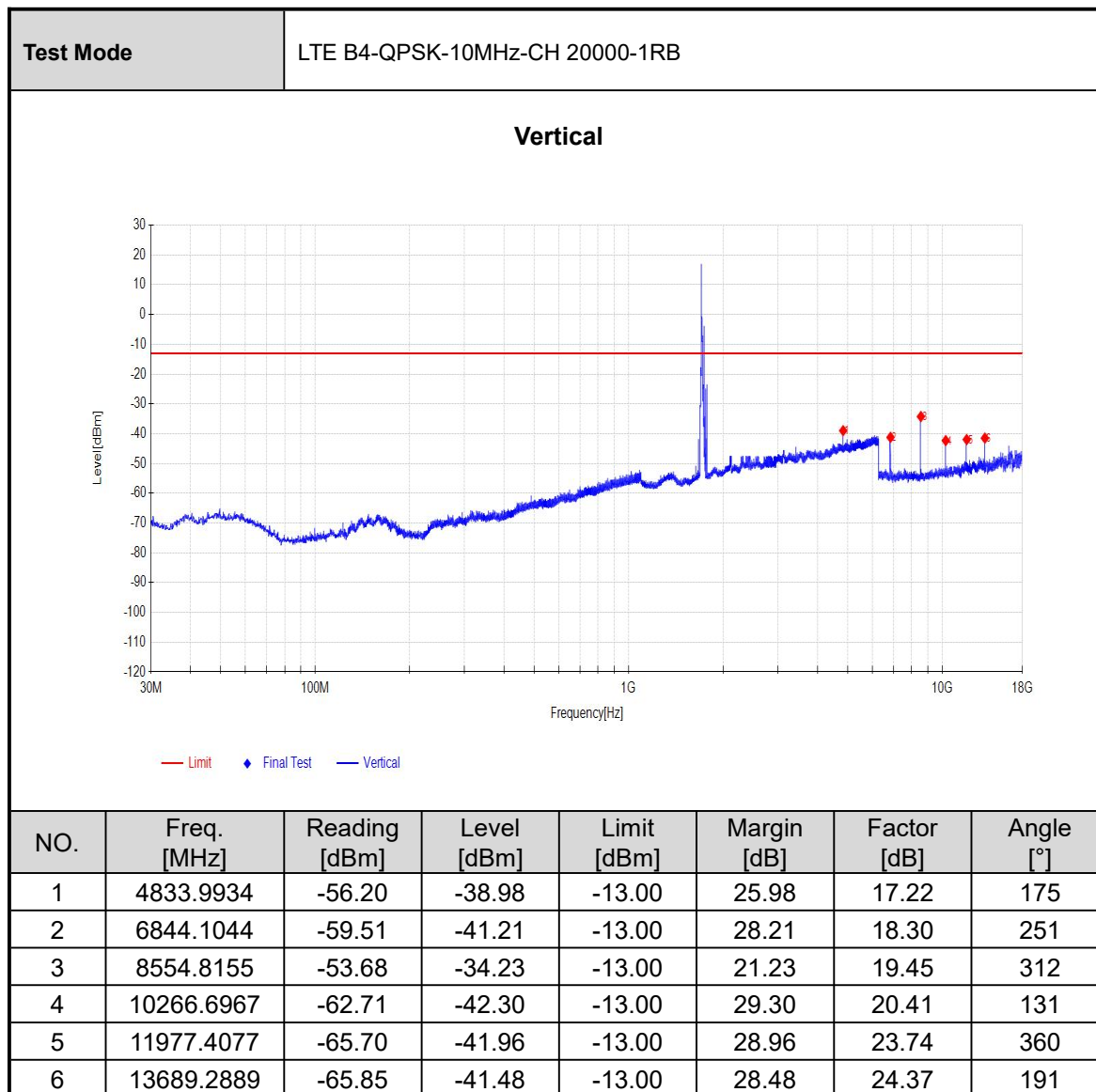
For the actual test configuration, please refer to the attached file (Test Setup Photo).

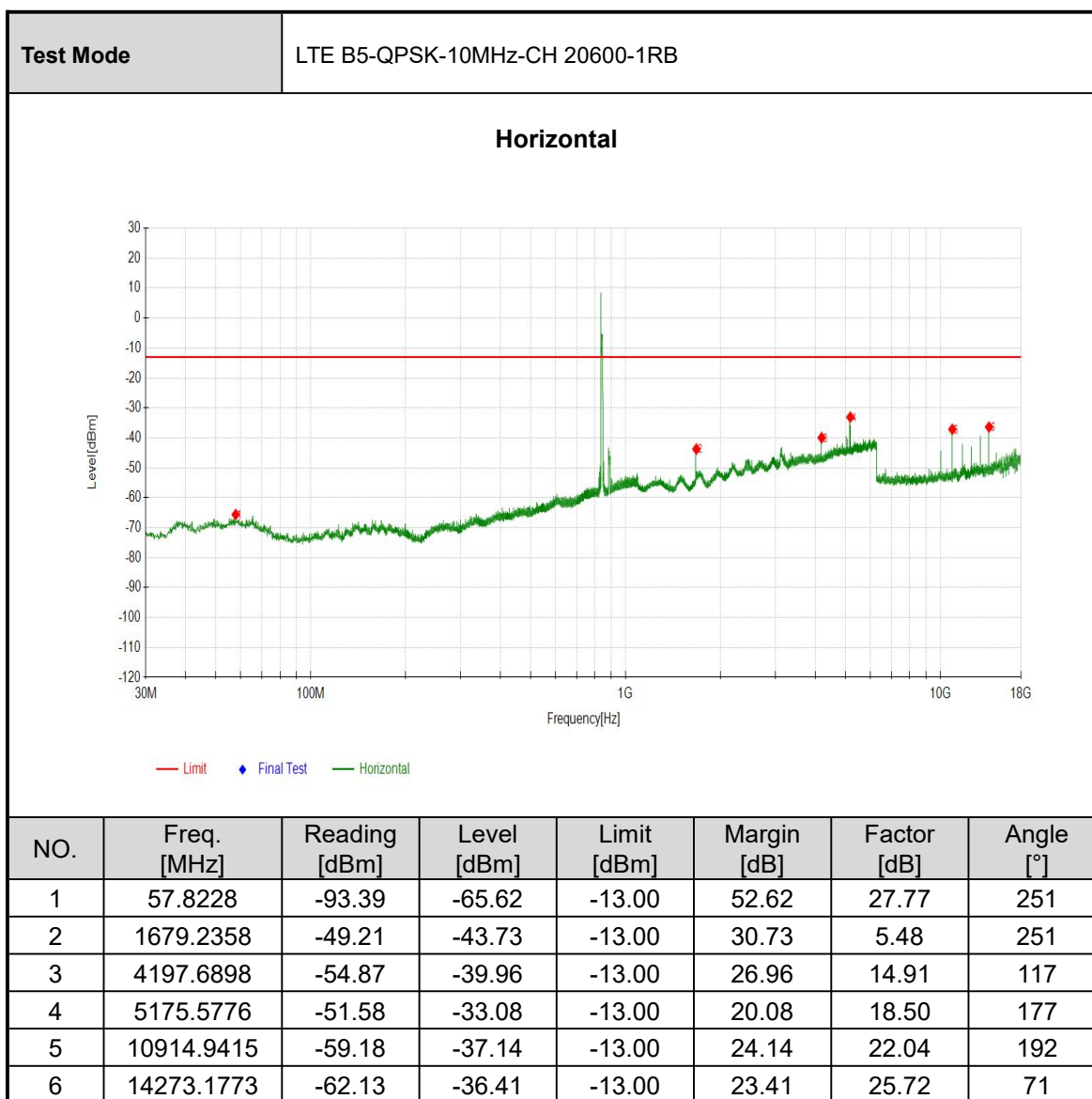
3.1.3 TEST RESULTS

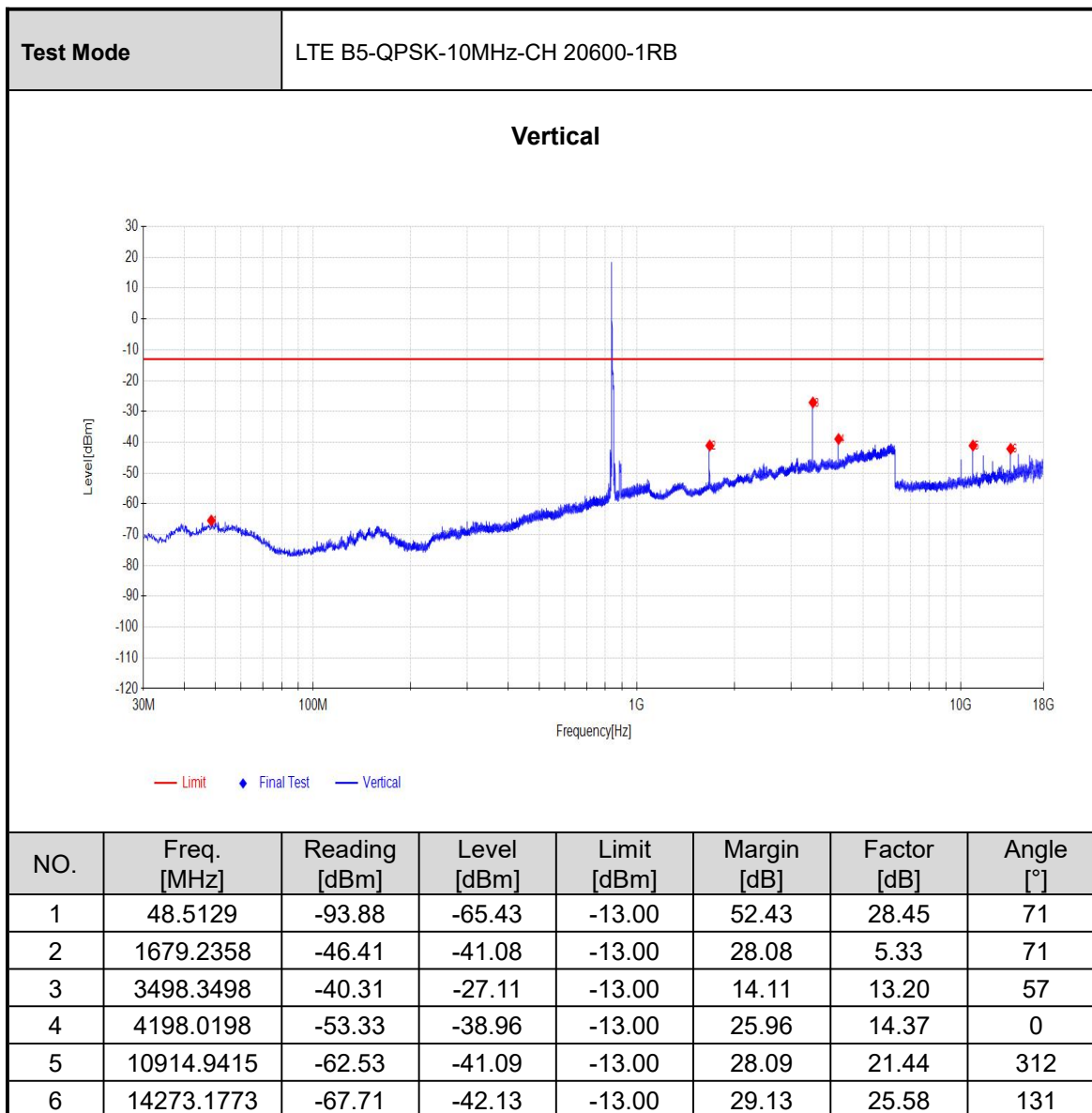


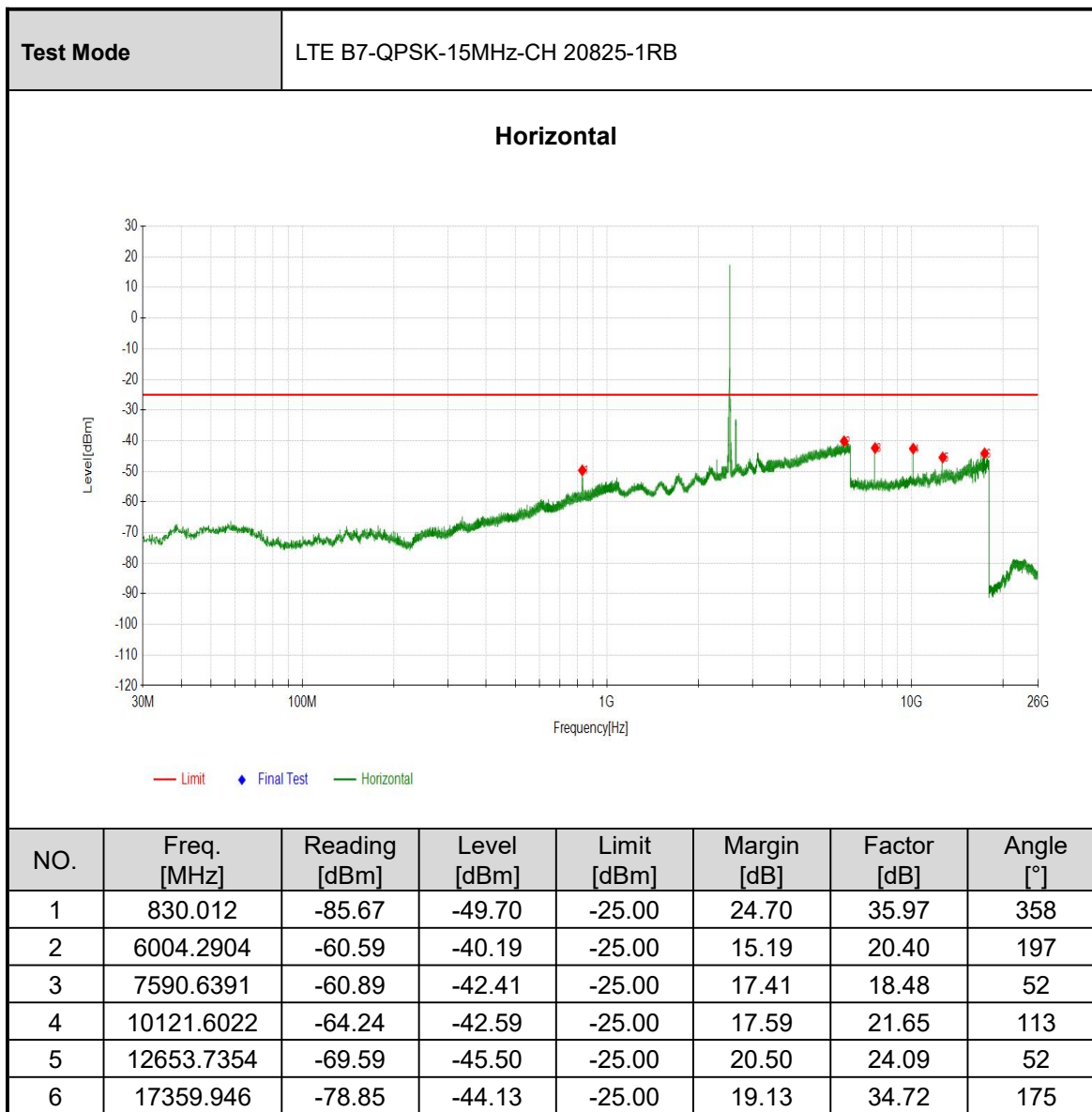


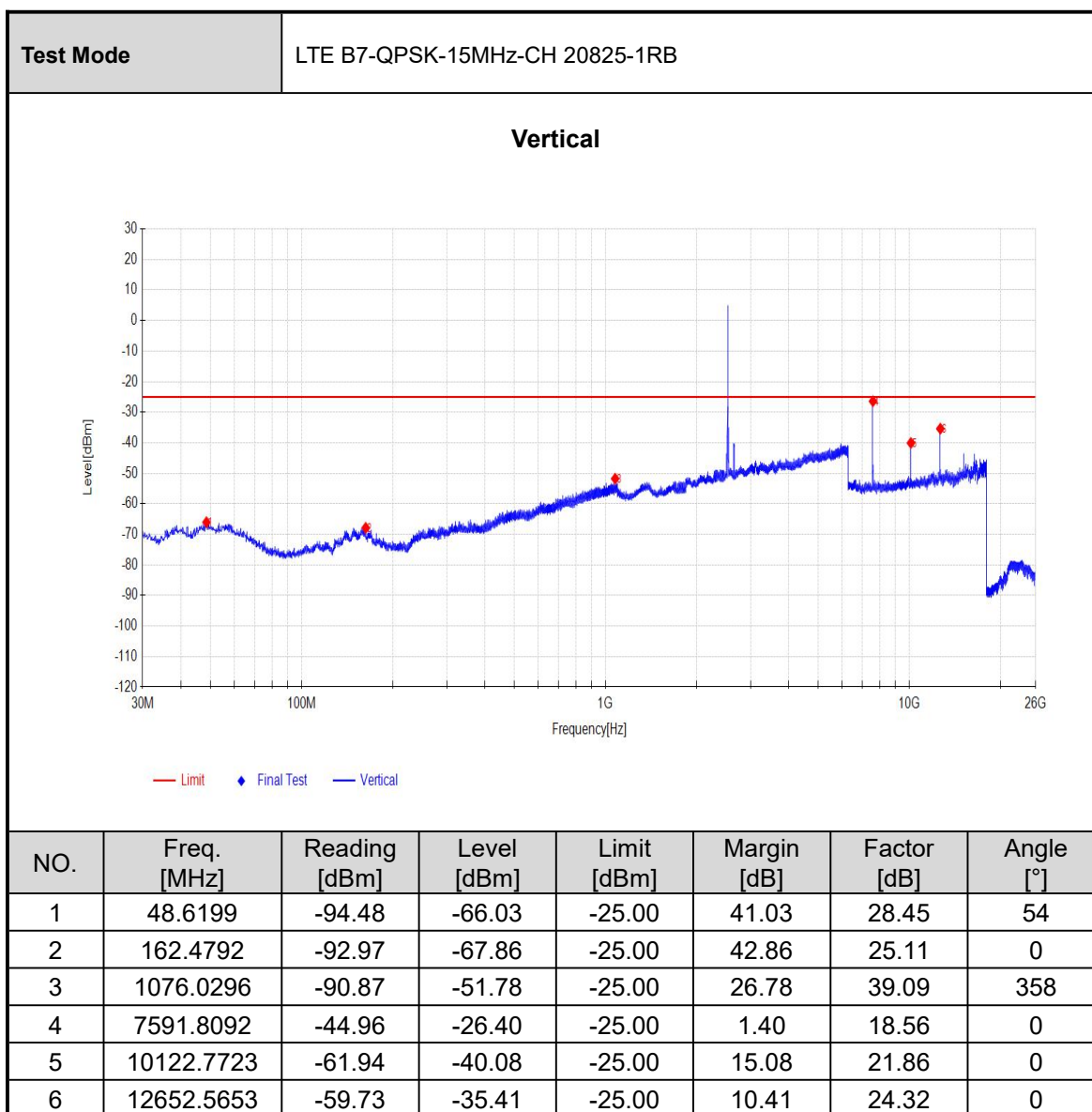


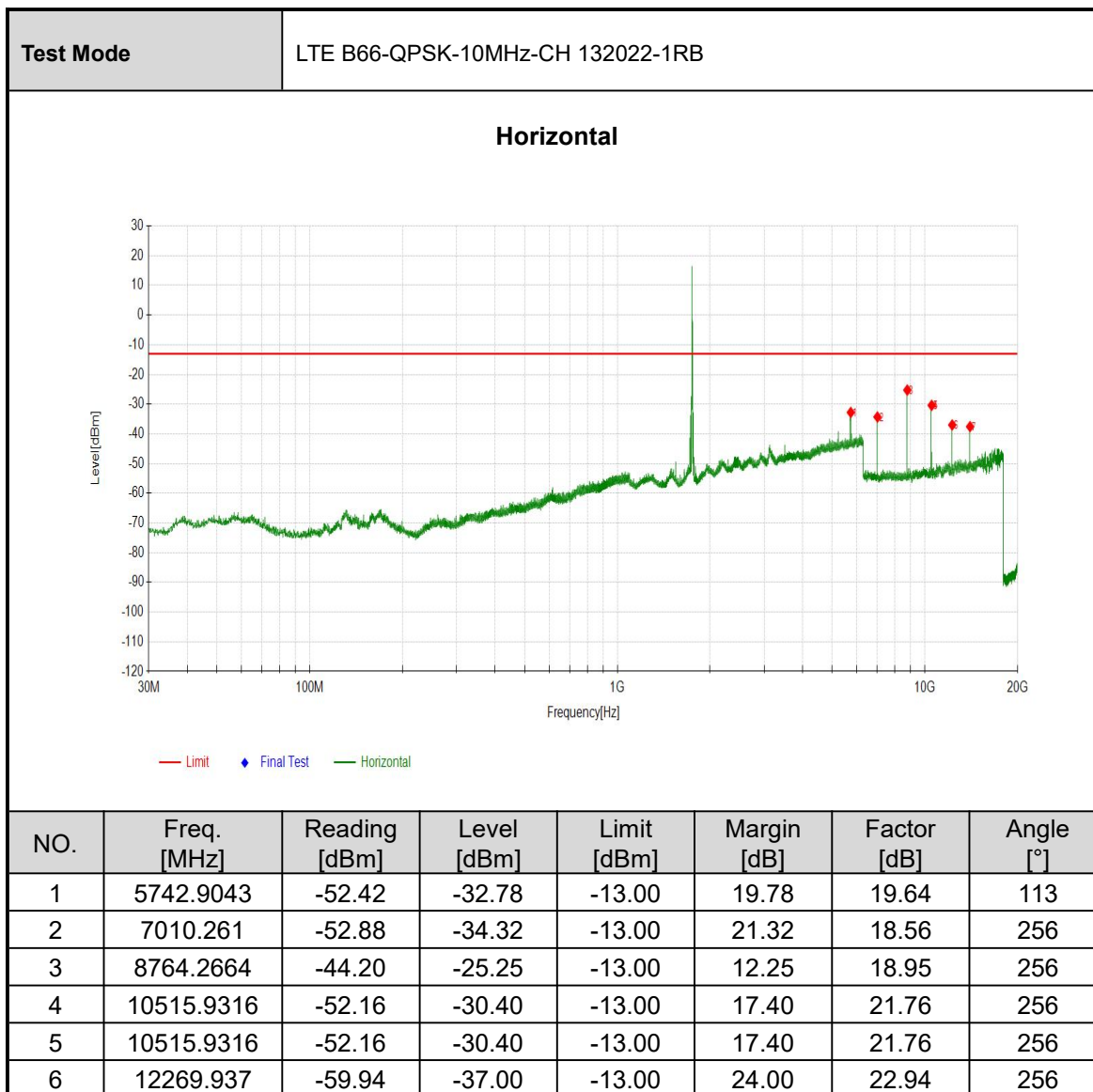


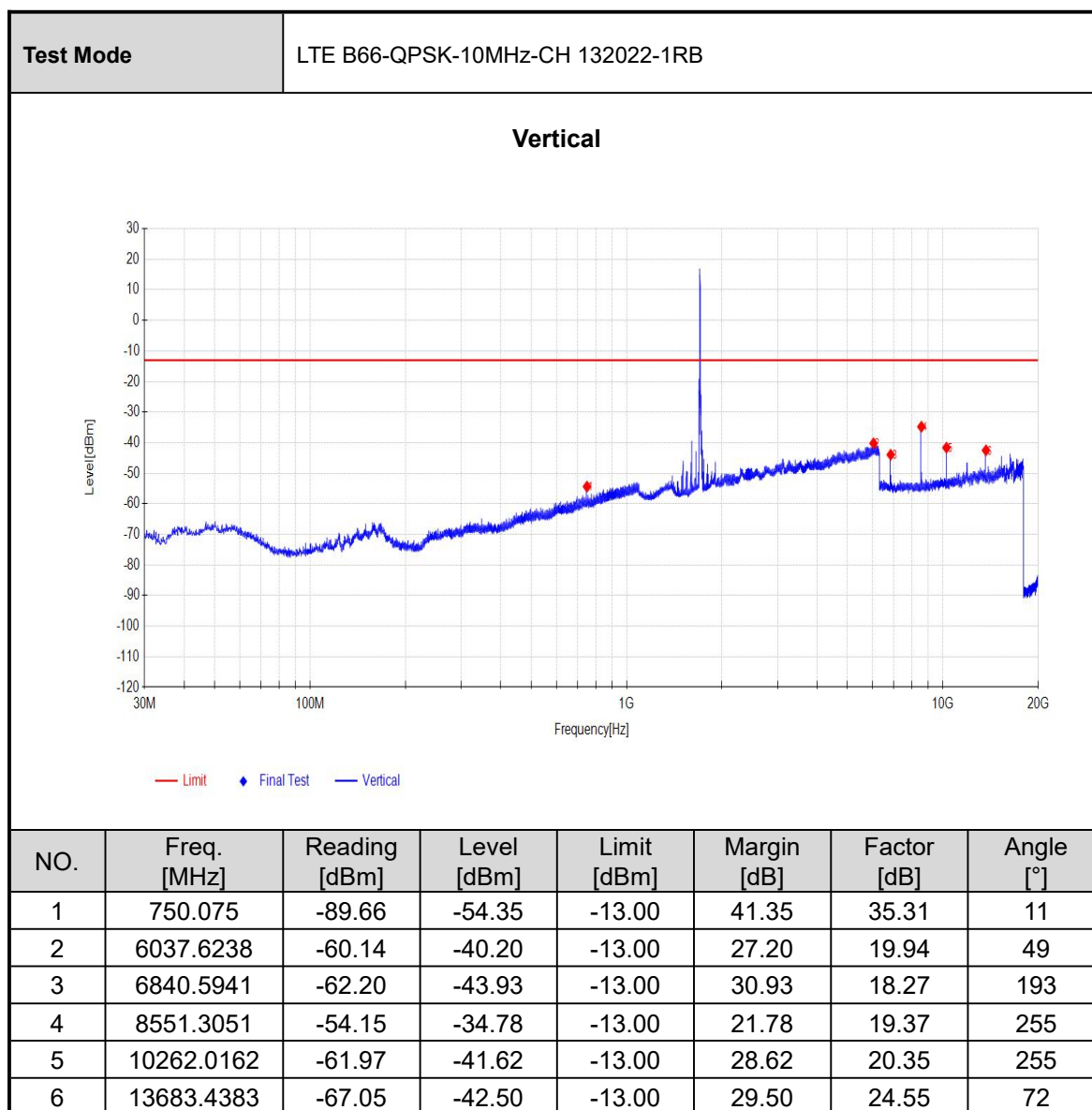












3.2 OUT POWER MEASUREMENT

3.2.1 TEST PROCEDURES

Subclause 5.6 of Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$EIRP = PT + GT - LC$, $ERP = EIRP - 2.15dB_i$, where

PT = transmitter output power dBm;

GT = gain of the transmitting antenna dB_i;

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

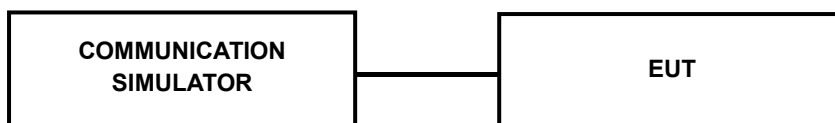
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.2.2 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



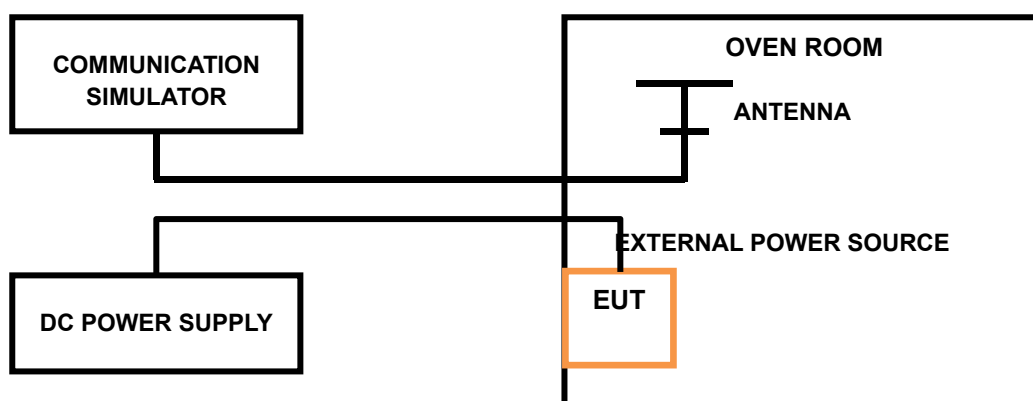
3.3 FREQUENCY STABILITY

3.3.1 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.3.2 TEST SETUP

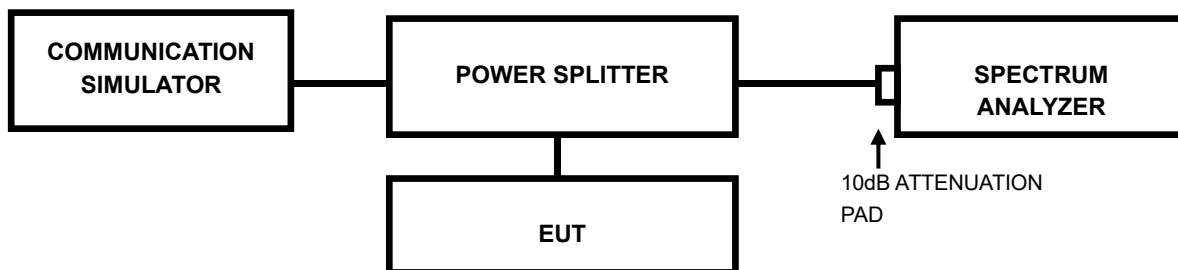


3.4 OCCUPIED BANDWIDTH MEASUREMENT

3.4.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.4.2 TEST SETUP

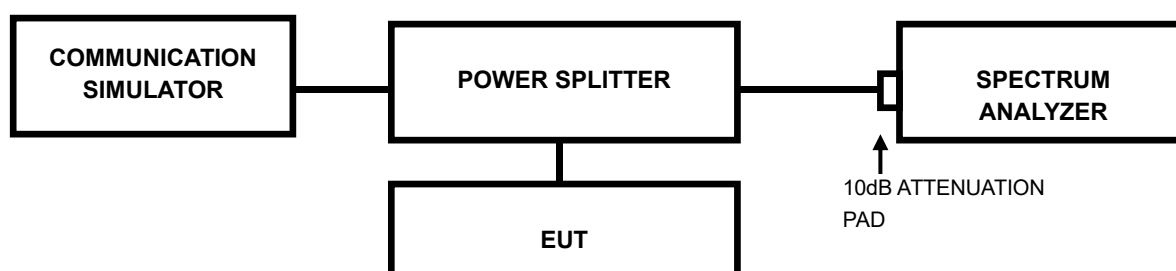


3.5 BAND EDGE MEASUREMENT

3.5.1 TEST PROCEDURES

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 1.4MHz).
- c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz).
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 5MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 600kHz. (LTE bandwidth 15MHz).
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 300kHz and VBW of the spectrum is 1000kHz. (LTE bandwidth 20MHz).
- h. Set the spectrum with RMS detector.
- i. Record the AVG trace plot into the test report.

3.5.2 TEST SETUP

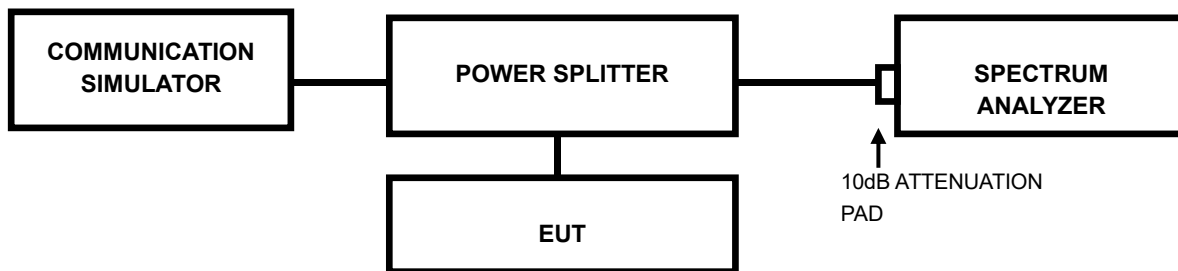


3.6 CONDUCTED SPURIOUS EMISSIONS

3.6.1 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30 MHz up to a frequency including its 10th harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.6.2 TEST SETUP

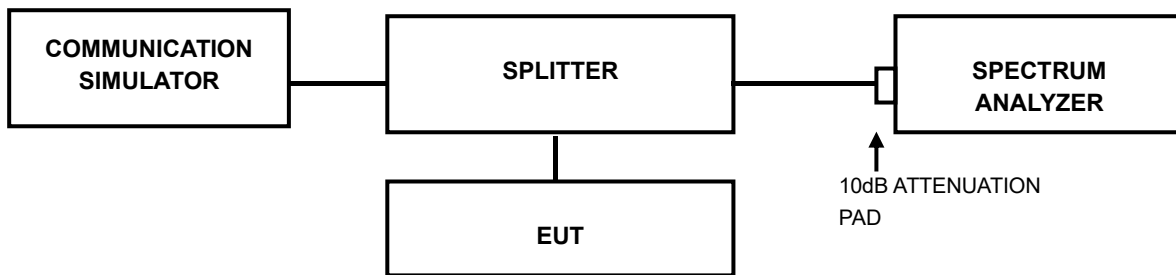


3.7 PEAK TO AVERAGE RATIO

3.7.1 TEST PROCEDURES

1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.7.2 TEST SETUP





4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).



5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).

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Important

- (1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.
- (2) The test report is invalid if altered.
- (3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.
- (4) Objections to the test report must be submitted to the laboratory within 15 days.
- (5) Generally, commission test is responsible for the tested samples only.

Address of the laboratory:

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