



Test Report No.:
FCC2022-0037-RF1

RF Test Report

EUT : Wireless Module
MODEL : N/A
BRAND NAME : A7672G
CLIENT : SIMCom Wireless Solutions Limited
Classification Of Test : N/A

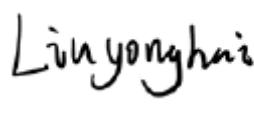
CVC Testing Technology Co., Ltd.



CVC Testing Technology Co., Ltd.

Test Report No.:FCC2022-0037-RF3

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Client	Name: SIMCom Wireless Solutions Limited Address:Building 3, No.289 LinHongRoad,ChangningDistrict,Shanghai,P.R.China				
Manufacturer	Name: SIMCom Wireless Solutions Limited Address:Building 3, No.289 LinHongRoad,ChangningDistrict,Shanghai,P.R.China				
Equipment Under Test	Name:Wireless Module Model/Type: A7672G Trade mark: N/A Serial NO.:N/A Sampe NO.:3-1				
Date of Receipt.	2022.7.25	Date of Testing	2022.07.25~2022.08.24		
Test Specification		Test Result			
ANSI C63.26-2015 47 CFR Part 2, 22(H), 24(E) ANSI/TIA-603-E		PASS			
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied.				
Issue Date: 2022.09.06					
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
FCC2022-0037-RF3	Original release	2022.09.06



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT	LIMIT	ReportSection	RESULT
§2.1046	Conducted power output	---	Annex A	Report Only
§22.913(a)(5)	Effective Radiated Power	ERP < 7 Watt	3.1	N/A
§24.232(c)	Equivalent Isotropic Radiated Power	EIRP < 2Watt		
§2.1049	Occupied Bandwidth	---	Annex C	Report Only
§24.232(d)	Peak-to-Average Power Ratio	<13 dB	Annex B	PASS
§2.1055 §22.355	Frequency Stability	< 2.5 ppm	Annex F	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	PASS
§2.1051 §22.917 §24.238(a)	Conducted Spurious Emission	< 43+10log10(P[Watts])	Annex E	PASS
§2.1051 §22.917 §24.238(a)	Radiates Spurious Emission	< 43+10log10(P[Watts])	3.6	PASS



1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Antenna Port Conducted Test				
Equipment	Manufacturer	Model No.	Serial Number	Cal. Due
Communication Shielded Room 1	CRT	4m*3m*3m	CRTDSWKS44301	2024/04/24
Spectrum Analyzer	R&S	FSV30	104337	2022/11/03
Comprehensive Test Instrument	R&S	CMW500	137779	2023/07/10
Comprehensive Test Instrument	R&S	CMW500	169888	2022/12/01
LTE Comprehensive Test Instrument	KEYSIGHT	E7515A	MY58010639	2023/04/07
Analog Signal Generator	R&S	SMA100B	103663	2023/07/10
Vector Signal Generator	R&S	SMBV100B	101757	2023/06/22
Radiated Spurious Emission Test - 3M Chamber				
Equipment	Manufacturer	Model No.	Serial Number	Cal. Due
3m Semi-Anechoic Chamber	Rohde&Schwarz	FACT-4	ST08035	2024/12/12
Spectrum Analyzer	Rohde&Schwarz	N9010B	MY57470323	2023/03/02
EMI Test Receiver	SCHWARZBECK	N9038A-508	MY532290079	2023/03/02
Broadband Antenna	ETS	VULB 9163	9163-530	2023/06/25
Waveguide Horn Antenna	QMS	HF906	360306/008	2023/03/04
Waveguide Horn Antenna	MORI	BBHA9170	00949	2023/07/31
Preamplifier	Rohde&Schwarz	BBV 9721	9721-050	2023/06/05
5G Bandstop Filters	Rohde&Schwarz	WRCJV12-4900-51 00-5900-6100-50EE	N/A	2022/12/20
Comprehensive tester	Rohde&Schwarz	CMW500	159000	2022/12/20



1.2 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	±0.9dB
Frequency Stability	± 76.97Hz
Radiated emissions (30MHz~1GHz)	±5.0dB
Radiated emissions (1GHz ~18GHz)	±4.8dB
Radiated emissions (18GHz ~40GHz)	±5.1dB
Conducted emissions	±2.7dB
Occupied Channel Bandwidth	±43.58KHz
Band Edge Measurements	±2.7dB
Peak to average ratio	±0.76dB

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

1.3 TEST LOCATION

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

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

Post Code: 510663 Tel: 020-32293888

FAX: 020-32293889 E-mail: office@cvc.org.cn

Test Firm Registration Number: 937273



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Wireless Module			
BRAND	N/A			
MODEL	A7672G			
FCC ID	2AJYU-8BAE005			
POWER SUPPLY	DC 3.8V From host unit			
MODULATION TYPE	GSM	GMSK, 8PSK		
OPERATING FREQUENCY And MAXIMUM OUTPUTPOWER	Band	TX(MHz)	RX(MHz)	Maximum Output Power toAntenna
	GSM1900	1850 ~ 1910	1930 ~ 1990	28.58 dBm
	GSM 850	824 ~ 849	869 ~ 894	32.42 dBm
I/O PORTS	Refer to user's manual			
CABLE SUPPLIED	N/A			
Remark:	<p>1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.</p> <p>2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.</p> <p>3. Please refer to the EUT photo document (Reference No.: FCC2022-0037-E) for detailed product photo.</p> <p>4. FCC ID:2AJYU-8BAE005 and FCC ID:2AJYU-8BAE003, present the same electrical, physical and electro mechanics characteristics, the same PCB, layout and components. The only difference between them is the module names printed in the label, so the test data in the two reports is exactly the same.</p> <p>5. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.</p>			

2.2 Description of Accessories

N/A



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 + withGSM link

Test mode

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
GSM850	RF power output	128 to 251	128,190,251	-
GSM1900		512 to 810	512,661,810	-
GSM850	Equivalent Radiated Power	128 to 251	128,190,251	-
GSM1900	Equivalent Isotropic Radiated Power	512 to 810	512,661,810	-
GSM850	Frequency Stability	128 to 251	128,190,251	-
GSM1900		512 to 810	512,661,810	-
GSM850	Occupied Bandwidth	128 to 251	128,190,251	-
GSM1900		512 to 810	512,661,810	-
GSM850	Band Edge Compliance	128 to 251	128,251	-
GSM1900		512 to 810	512,810	-
GSM850	Conducted Spurious Emission	128 to 251	128,190,251	-
GSM1900		512 to 810	512,661,810	-
GSM850	Radiates Spurious Emission	128 to 251	128,190,251	-
GSM1900		512 to 810	512,661,810	-
GSM850	Peak-to-Average Power Ratio	128 to 251	128,190,251	-
GSM1900		512 to 810	512,661,810	-

Test CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RF power output	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Equivalent Isotropic Radiated Power	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Frequency Stability	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Occupied Bandwidth	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Band Edge Compliance	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Conducted Spurious Emission	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Radiates Spurious Emission	23deg. C, 63%RH	DC 12V from Adapter	Li Jialing
Peak-to-Average Power Ratio	22deg. C, 65%RH	DC 12V from Adapter	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

KDB 971168 D01 POWER MEAS LICENSE DIGITAL SYSTEMS V03R01

ANSI/TIA-603-E

ANSI C63.26-2015

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
1	Adapter	SHE	P-050B-050200 EU	N/A	Client
Support Cable					
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)
N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 OUTPOWER MEASUREMENT

3.1.1 LIMITS OF OUTPUTPOWER MEASUREMENT

Mobile / Portable station are limited to 7 watts (38.45 dBm)E.R.P for GSM 850.

Mobile / Portable station are limited to 2 watts (33 dBm)E.I.R.P for GSM 1900.

3.1.2 TEST PROCEDURES

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:

$EIRP = PT + GT - LC$, $ERP = EIRP - 2.15\text{dBi}$, where

PT = transmitter output power dBm;

GT = gain of the transmitting antenna dBi;

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

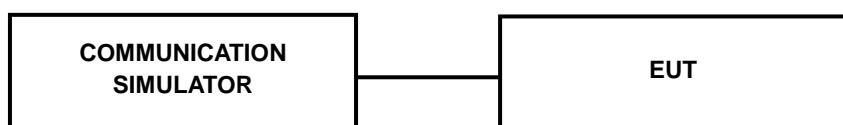
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with WCDMA 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.

3.1.3 TEST SETUP

EIRP / ERPMeasurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

Please refer Annex A

3.2 FREQUENCY STABILITY

3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

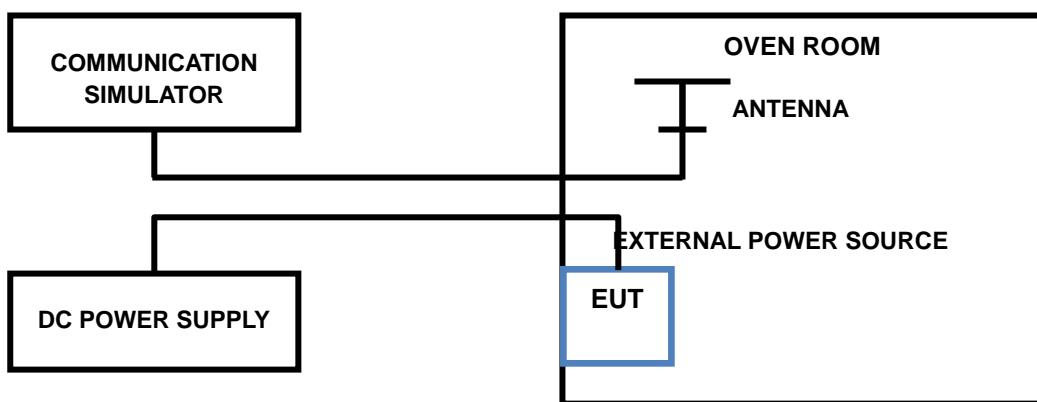
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

3.2.2 TEST PROCEDURE

- a. 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.
- b. 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.
- c. 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.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

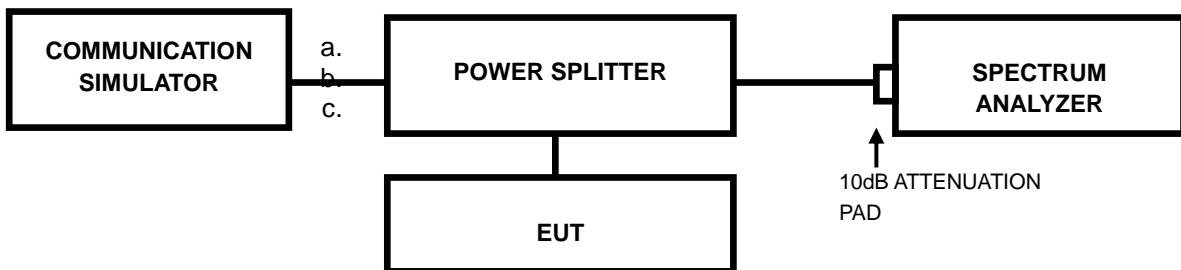
Please refer Annex F

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 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.

3.3.2 TEST SETUP



3.3.3 TEST RESULTS

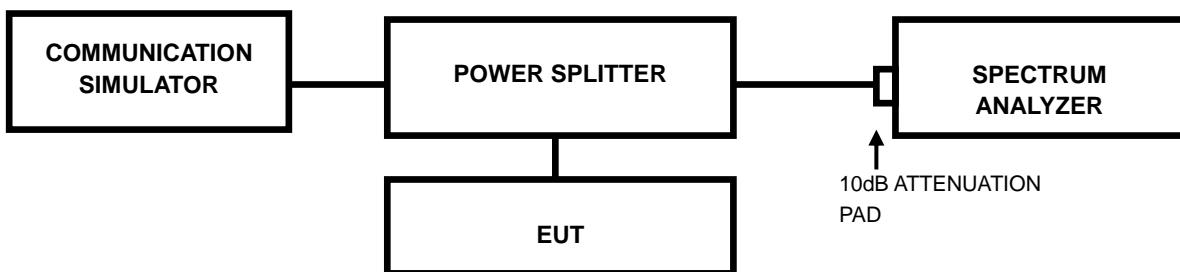
Please refer Annex C

3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



3.4.3 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 2MHz. RBW of the spectrum is 5kHz and VBW of the spectrum is 20kHz (GSM).
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).
- d. Set the spectrum with RMS detector.
- e. Record the max trace plot into the test report.

3.4.4 TEST RESULTS

Please refer Annex D

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

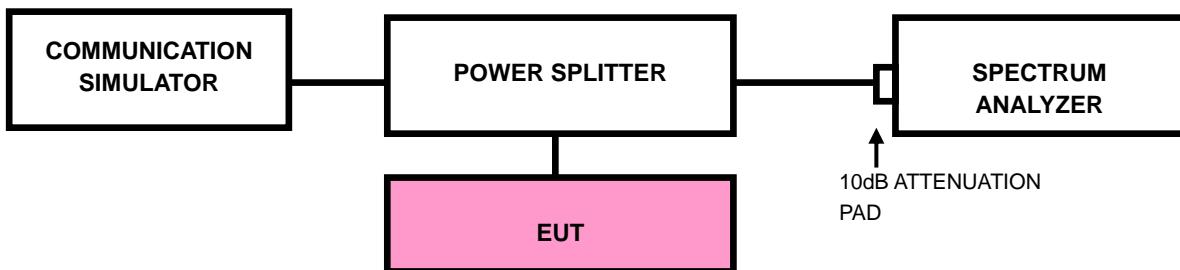
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

3.5.2 TEST PROCEDURE

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

The spectrum is scanned from 30MHz up to a frequency including its 10th harmonic.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

Please refer Annex E

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm .

The spectrum is scanned from 30MHz up to a frequency including its 10th harmonic.

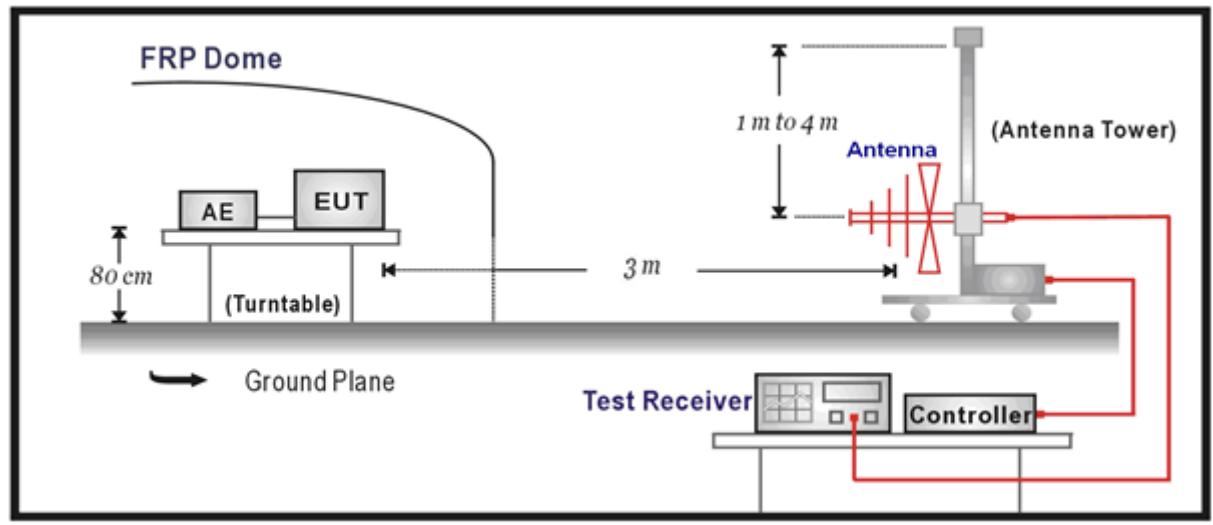
3.6.2 TEST PROCEDURES

- 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 = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

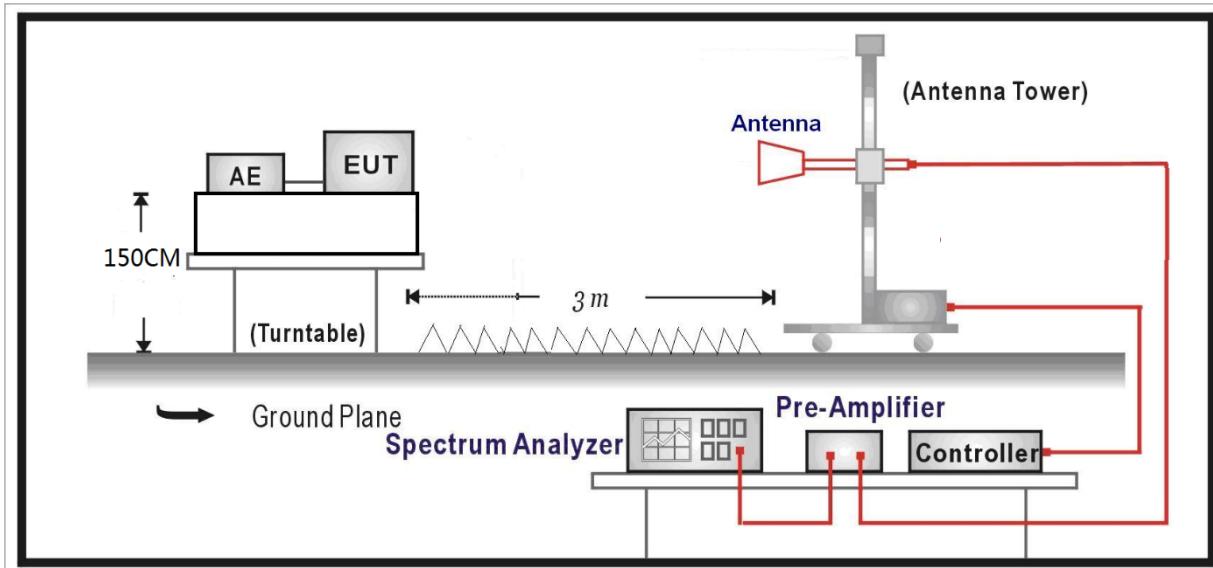
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 TEST SETUP

Below 1GHz Test Setup:



Above 1GHz Test Setup:

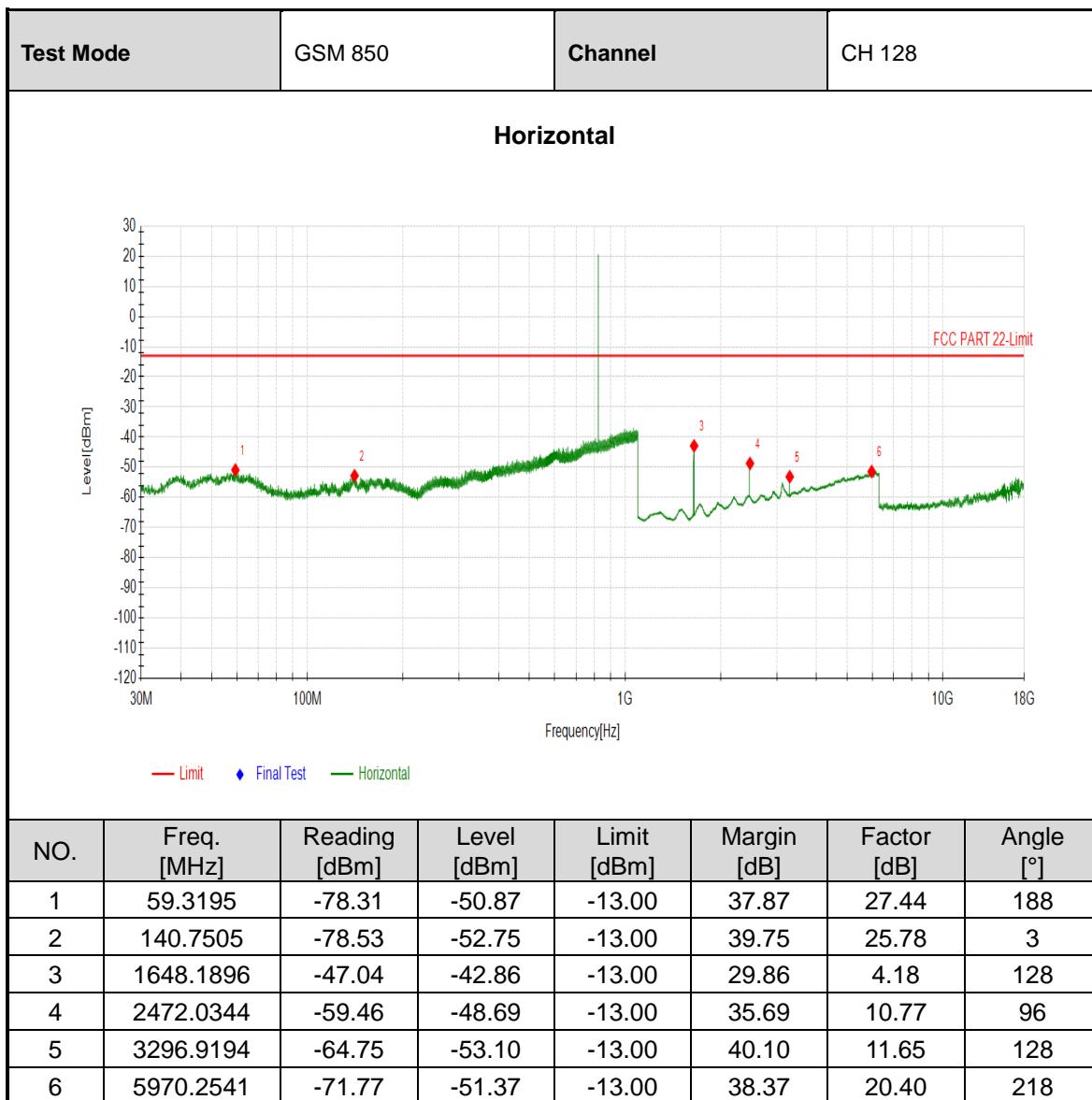


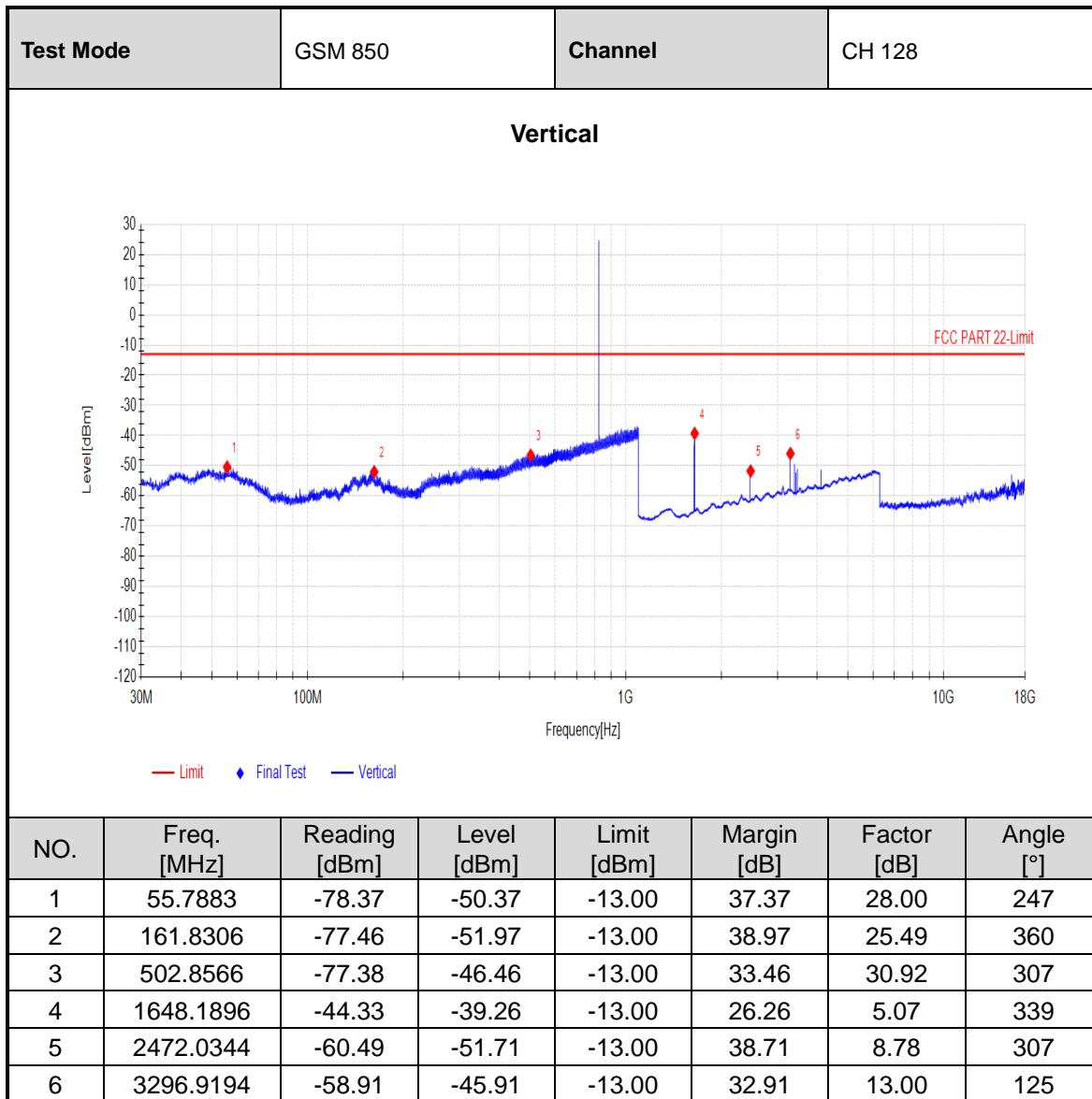
Note: Above 1G is a directional antenna

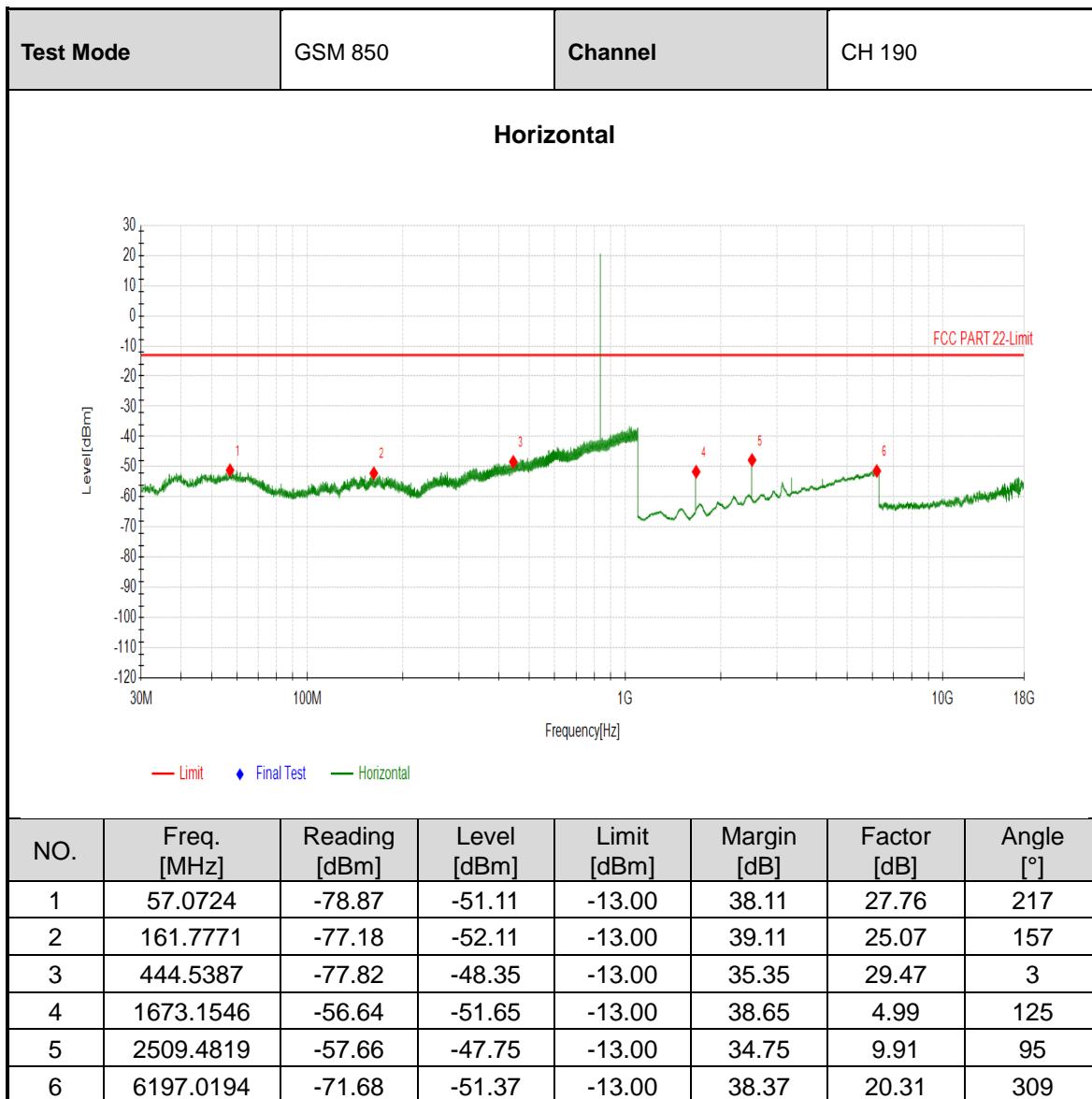
Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

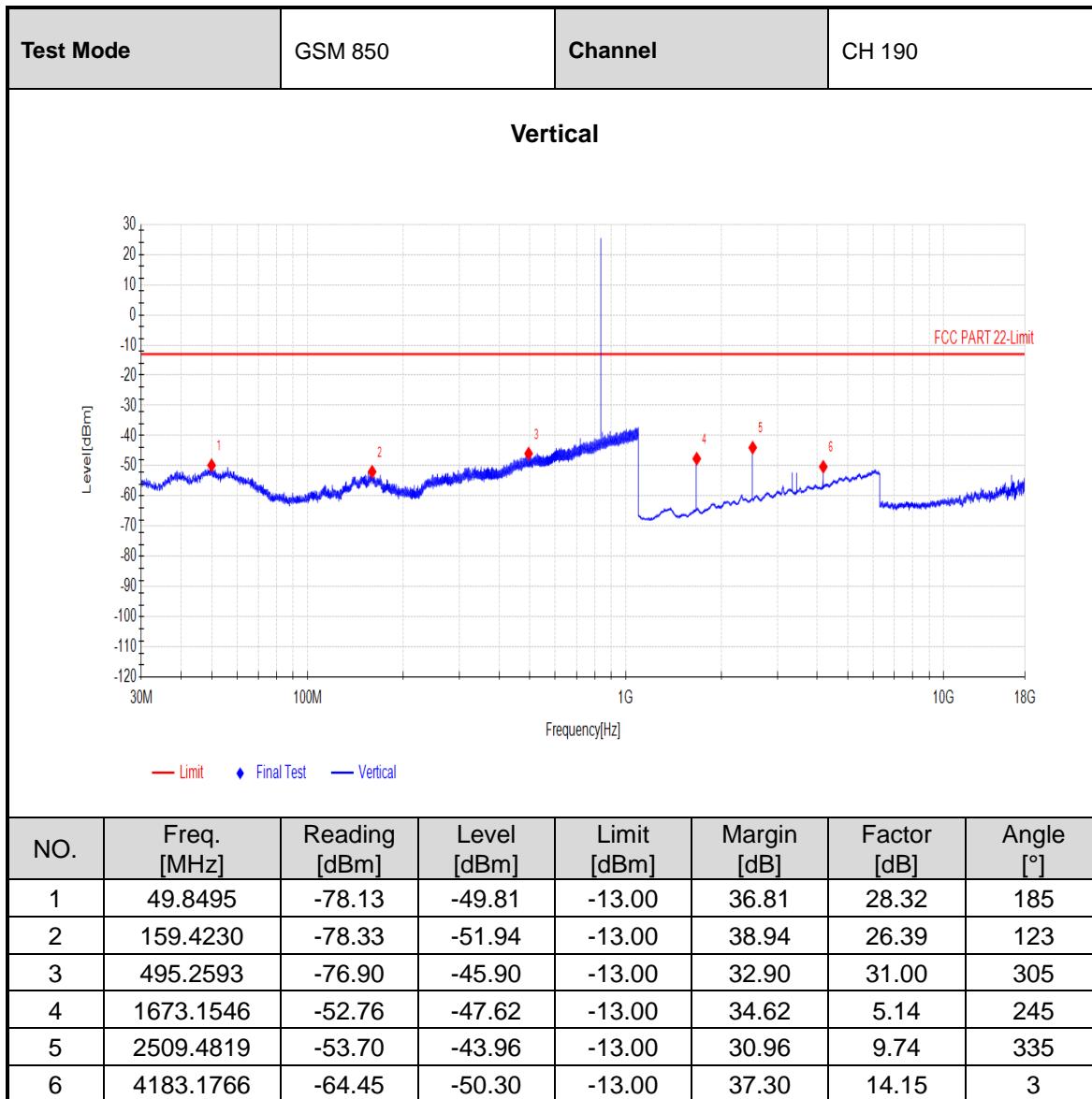
For the actual test configuration, please refer to the attached file (Test Setup Photo).

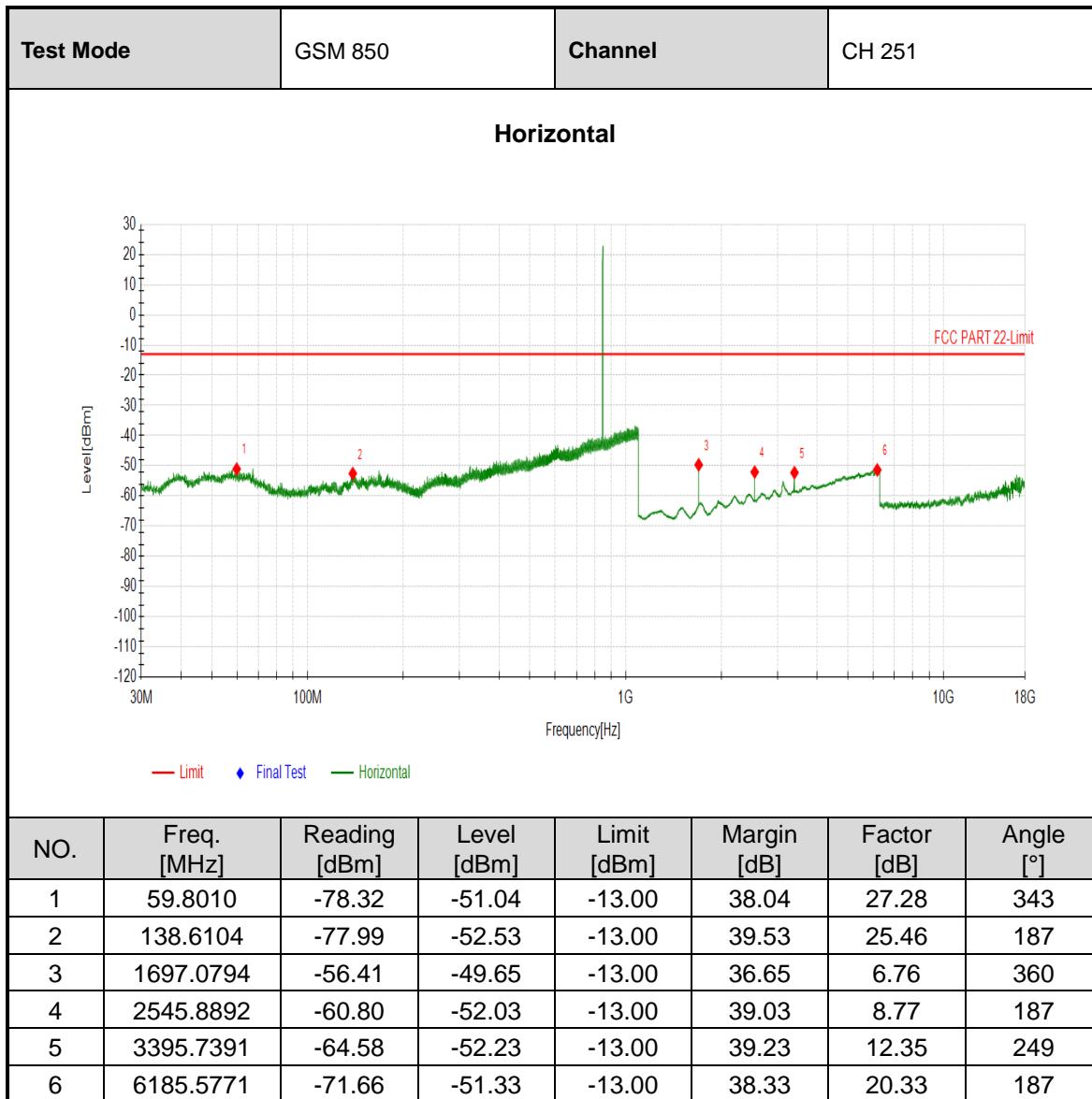
3.6.4 TEST RESULTS

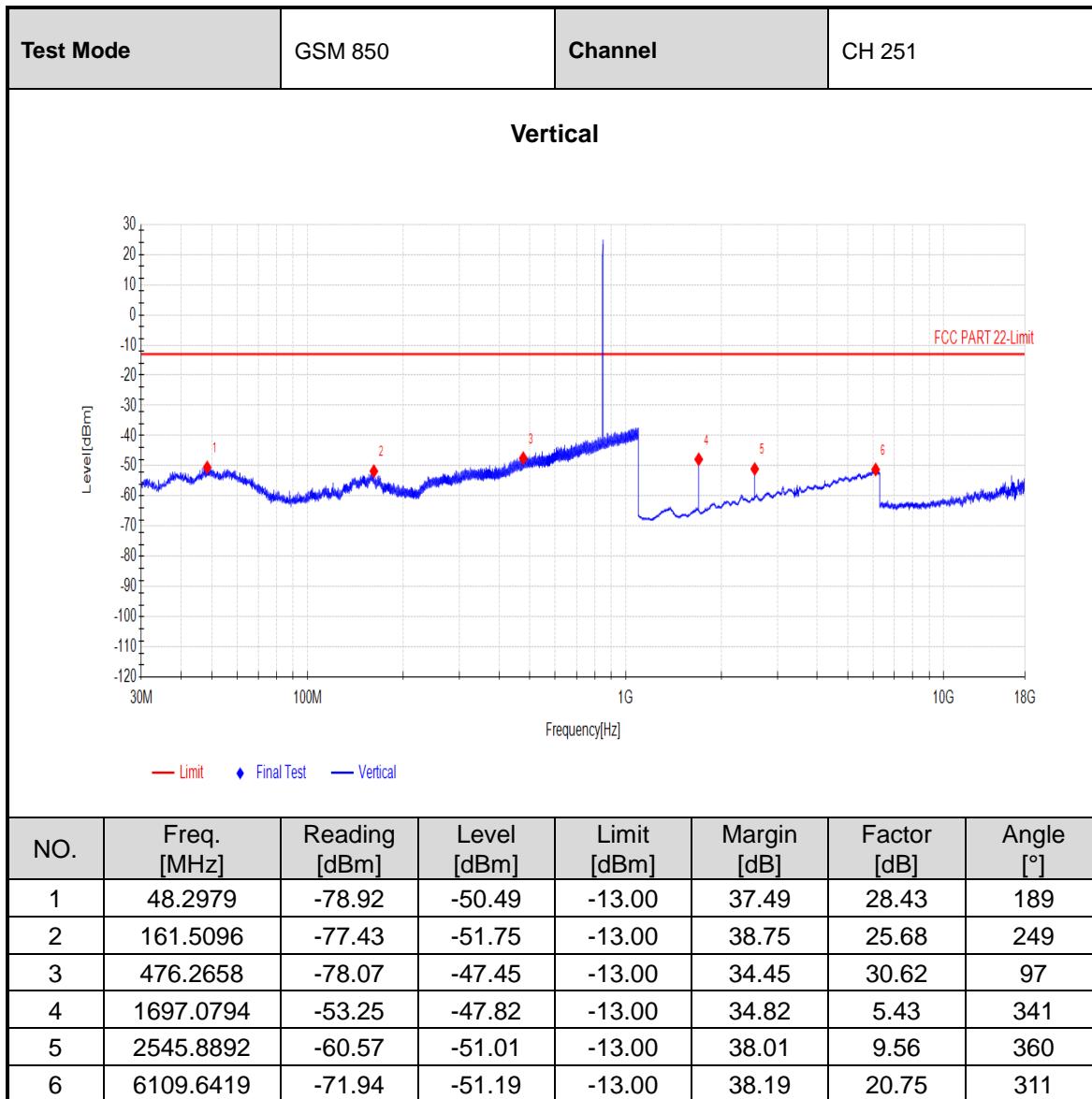


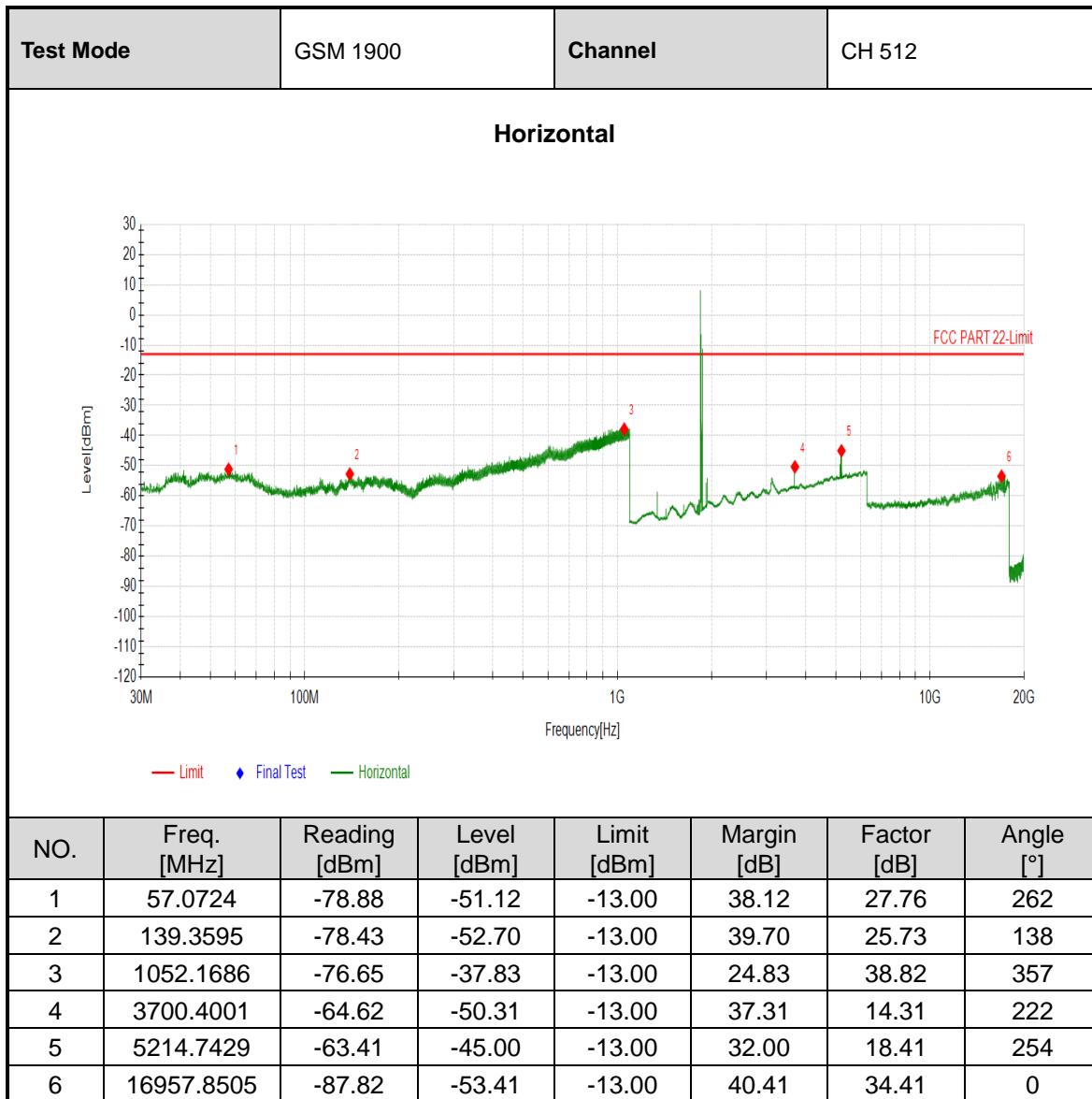


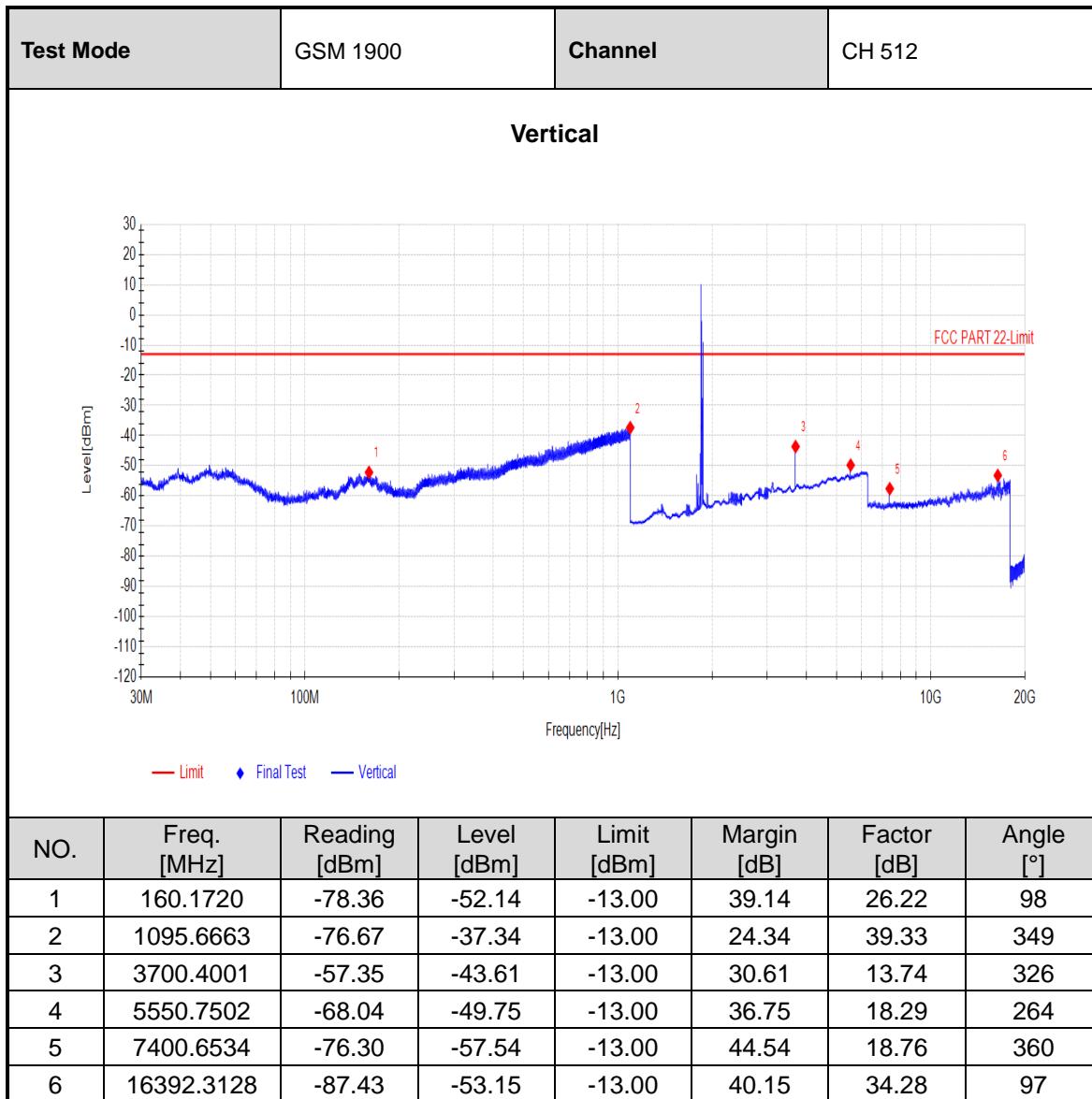


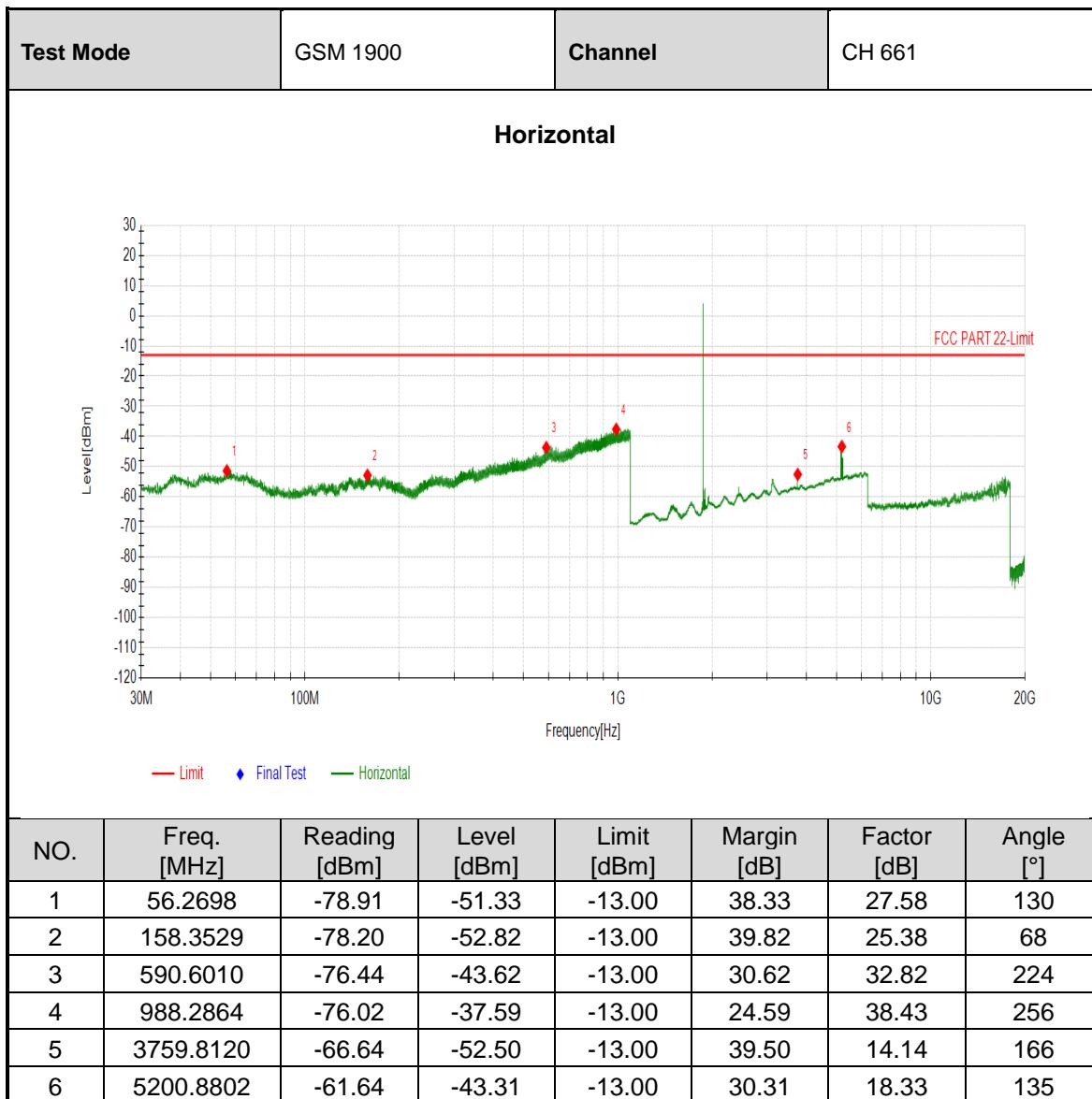


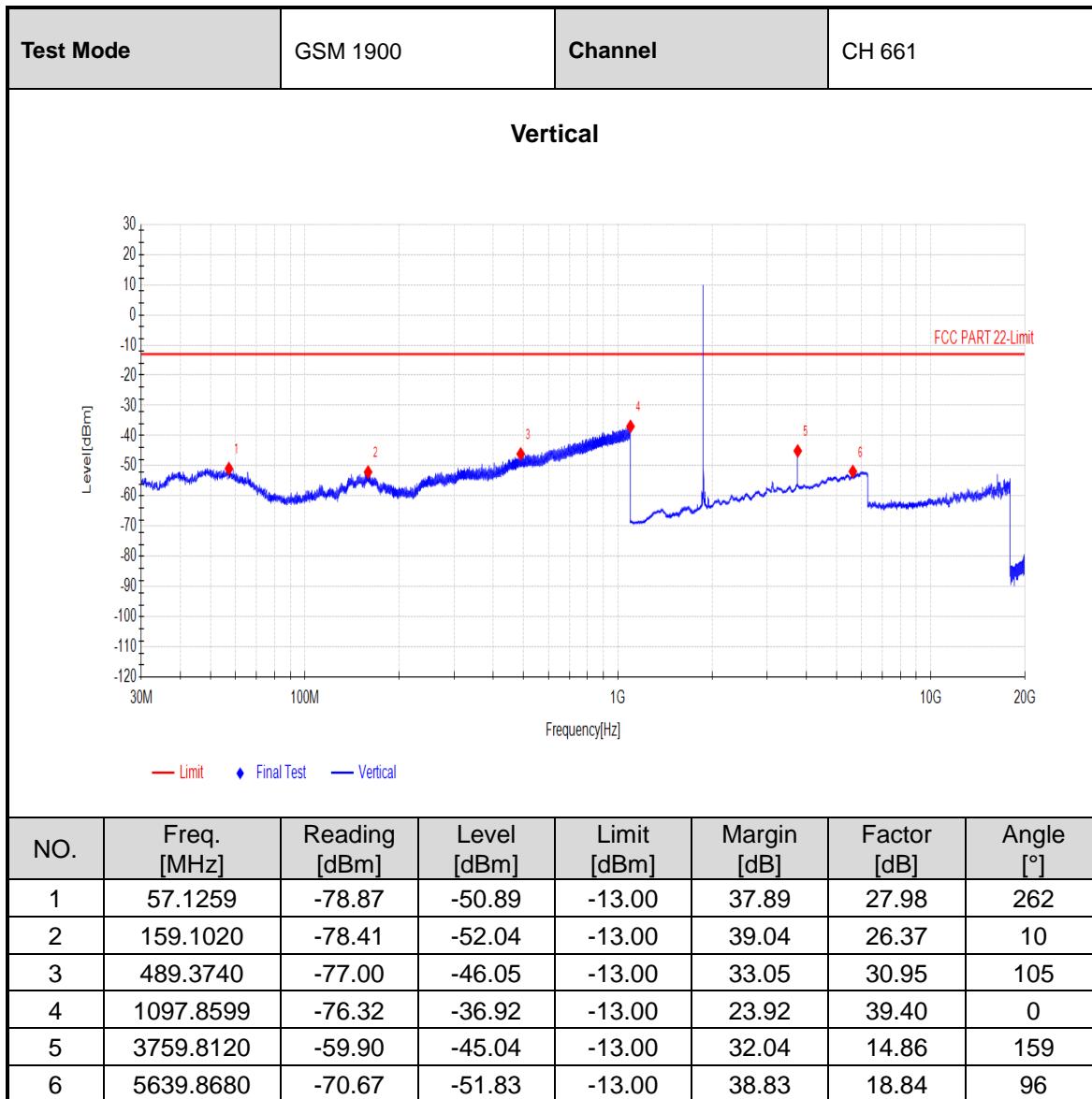


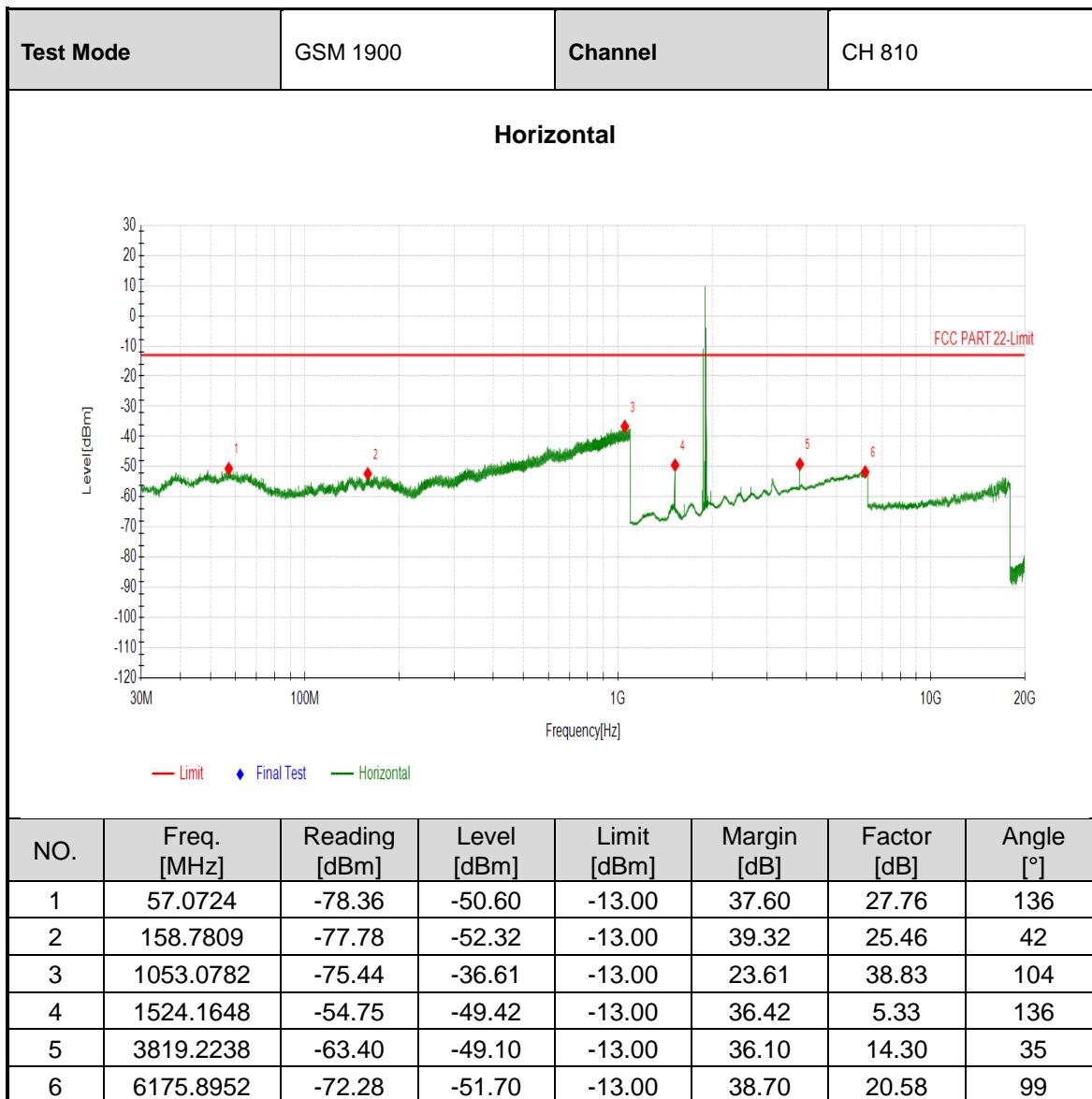


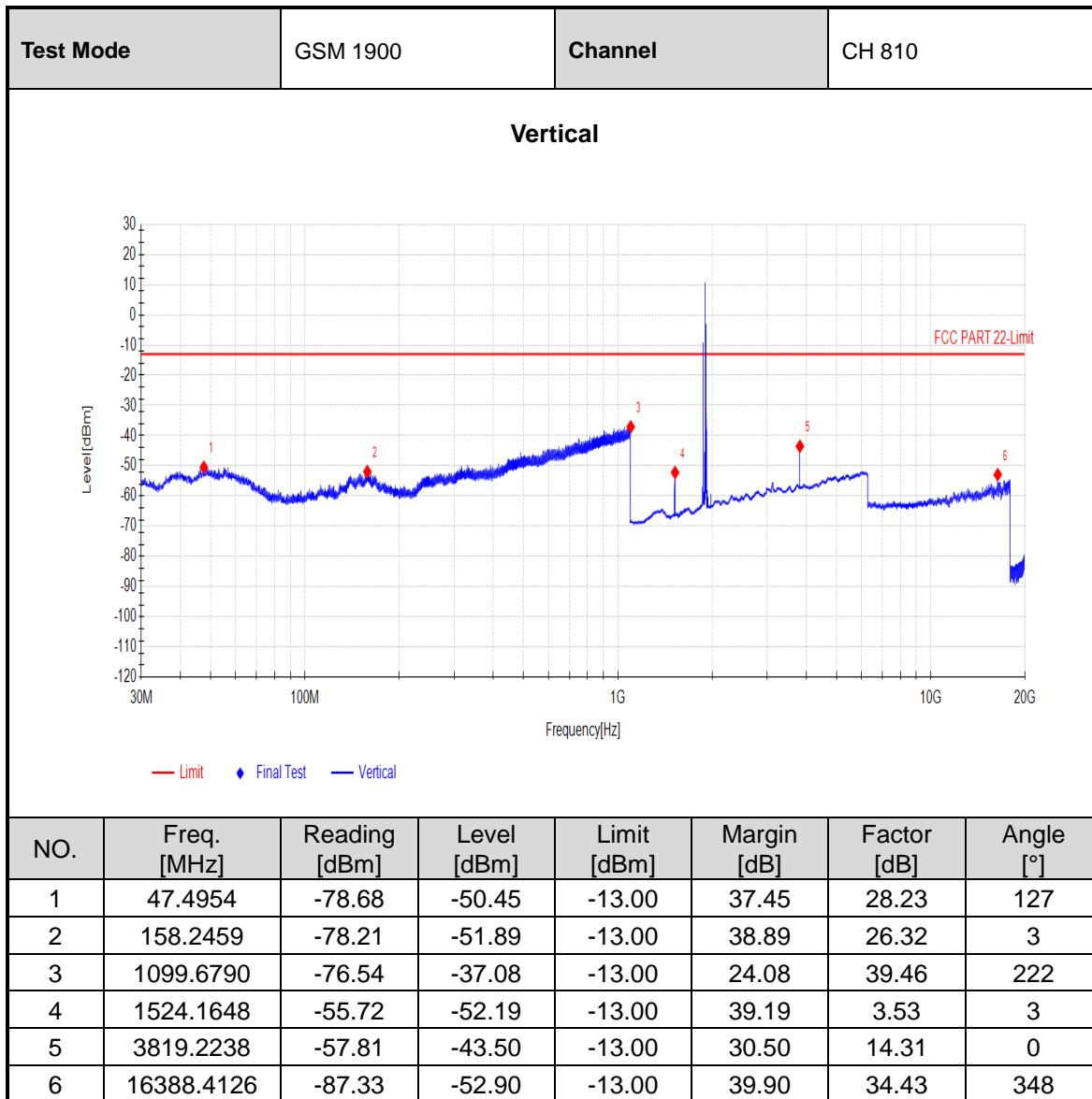










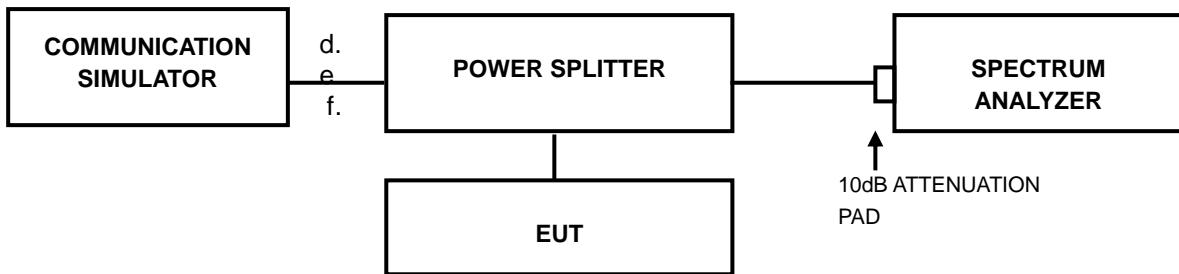


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

3.7.2 TEST SETUP



3.7.3 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%.

3.7.4 TEST RESULTS

Please refer Annex B



4 PHOTOGRAPHS OF TEST SETUP

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



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:

CVC Testing Technology Co., Ltd.

Address: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, China

Post Code: 510663 Tel: 020-32293888

FAX: 020-32293889 E-mail: office@cvc.org.cn