



KSIGN (Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China
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TEST REPORT

Report No.: **KS2102S00365E07**

FCC ID.....: **2AM8GCHAMELEONH**

Applicant.....: **GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED**

Address.....: No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District, Guangzhou, Guangdong, China

Manufacturer.....: **GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED**

Address.....: No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District, Guangzhou, China

Product Name.....: **Chameleon-H**

Trade Mark.....: CHAMELEON

Model/Type reference.....: E9XG-A05-M

Listed Model(s): N/A

Standard.....: **FCC CFR Title 47 Part 2, Part 22 Subpart H, Part 24 Subpart E**

Date of receipt of test sample..: Mar. 01, 2021

Date of testing.....: Mar. 01, 2021~May. 14, 2021

Date of issue.....: May. 14, 2021

Test Result.....: **PASS**

Compiled by:
(Printed name+signature) Rory Huang

Supervised by:
(Printed name+signature) Eder Zhan

Approved by:
(Printed name+signature) Cary Luo



Testing Laboratory Name...: **KSIGN(Guangdong) Testing Co., Ltd.**

Address.....: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

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Table of Contents**Page**

1. SUMMARY.....	3
1.1. TEST STANDARDS.....	3
1.2. REPORT VERSION.....	3
1.3. TEST DESCRIPTION.....	4
1.4. TEST FACILITY.....	5
1.5. MEASUREMENT UNCERTAINTY.....	6
1.6. ENVIRONMENTAL CONDITIONS.....	6
2. GENERAL INFORMATION.....	7
2.1. CLIENT INFORMATION.....	7
2.2. GENERAL DESCRIPTION OF EUT.....	8
2.3. DESCRIPTION OF TEST MODES AND TEST FREQUENCY.....	9
2.4. MEASUREMENT INSTRUMENTS LIST.....	10
2.5. TEST SOFTWARE.....	10
3. TEST ITEM AND RESULTS.....	11
3.1. CONDUCTED OUTPUT POWER.....	11
3.2. PEAK-TO-AVERAGE RATIO.....	13
3.3. OCCUPY BANDWIDTH.....	21
3.4. OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	29
3.5. BAND EDGE COMPLIANCE.....	33
3.6. RADIATED POWER MEASUREMENT.....	35
3.7. RADIATED SPURIOUS EMISSION.....	38
3.8. FREQUENCY STABILITY.....	42
4. EUT TEST PHOTOS.....	45
5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL.....	47

1. SUMMARY

1.1. Test Standards

FCC Rules Part 2: FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

FCC Rules Part 22: PRIVATE LAND MOBILE RADIO SERVICES.

FCC Rules Part 24: PUBLIC MOBILE SERVICES

FCC Rules Part 27: MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26: 2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

KDB 971168 D01 Power Meas License Digital Systems v03: MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

1.2. Report version

Revised No.	Date of issue	Description
01	May. 14, 2021	Original

1.3. Test Description

Test Item	Section in CFR 47	Result	Test Engineer
Conducted Output Power	Part 2.1046 Part 22.913(a) Part 24.232(c) Part 27.50	Pass	Rory Huang
Peak-to-Average Ratio	Part 24.232 Part 27.50	Pass	Rory Huang
99% Occupied Bandwidth & 26 dB Bandwidth	Part 2.1049 Part 22.917(b) Part 24.238(b) Part 27.53	Pass	Rory Huang
Band Edge	Part 2.1051 Part 22.917 Part 24.238 Part 27.53	Pass	Rory Huang
Conducted Spurious Emissions	Part 2.1051 Part 22.917 Part 24.238 Part 27.53	Pass	Rory Huang
Frequency stability vs temperature	Part 2.1055(a)(1)(b) Part 22.355 Part 24.235 Part 27.54	Pass	Rory Huang
Frequency stability vs voltage	Part 2.1055(d)(1)(2) Part 22.355 Part 24.235 Part 27.54	Pass	Rory Huang
ERP and EIRP	Part 22.913(a) Part 24.232(b) Part 27.50	Pass	Rory Huang
Radiated Spurious Emissions	Part 2.1053 Part 22.917 Part 24.238 Part 27.53	Pass	Rory Huang

Note:

- 1.The measurement uncertainty is not included in the test result.
- 2.There are dual-SIM cards(SIM1 ,SIM2),Only the worst test data SIM1 recorded in the report.

1.4. Test Facility

Address of the test laboratory

KSIGN(Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Laboratory accreditation

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

CNAS-Lab Code: L13261

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5457.01

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: CN0096

The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

FCC-Registration No.: CN1272

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements and is documented in the Shenzhen General Testing & Inspection Technology Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for General Testing & Inspection laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Conducted spurious emission 12.75-40GHz	2.03 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)
Emission Mask	-----	(1)
Modulation Characteristic	-----	(1)
Transmitter Frequency Behavior	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2. GENERAL INFORMATION

2.1. Client Information

Applicant:	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED
Address:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District,Guangzhou,China
Manufacturer:	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED
Address:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District,Guangzhou,China

2.2. General Description of EUT

Test Sample Number:	1-1-1(Normal Sample),1-1-2(Engineering Sample)
Product Name:	Chameleon-H
Model/Type reference:	E9XG-A05-M
Trademark:	CHAMELEON
Listed Model(s):	/
Power supply(Battery):	DC 3.7V 10000mAh 37Wh
Power Supply(Adapter):	AC/DC ADAPTER MODEL:AD018A120150UV INPUT:100-240V~ 50/60Hz 0.5A Max OUTPUT:DC 12V1.5A
Hardware version:	V1.0
Software version:	V1.0
WCDMA	
Operation Band:	Band II: UL: 1852.4MHz~1907.6MHz, DL: 1932.6MHz~1987.4MHz Band V: UL: 826.4MHz~846.6MHz, DL: 871.6MHz~1891.4MHz
Modulation Type:	QPSK for WCDMA ;QPSK for HSUPA;QPSK for HSDPA
Antenna Type:	FPC antenna
Antenna Gain:	Band V:1.0dBi Band II:1.1dBi

2.3. Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM200 used to control the EUT staying in continuous transmitting and receiving mode for testing.

Test Frequency:

WCDMA Band II		WCDMA Band V	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
9262	1852.40	4132	826.40
9400	1880.00	4183	836.60
9538	1907.60	4233	846.60

2.4. Measurement Instruments List

Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	Spectrum Analyzer	R&S	FSV40-N	101798	03/22/2022
2	Vector Signal Generator	Agilent	N5182A	MY50142520	03/18/2022
3	Analog Signal Generator	HP	83752A	3344A00337	03/18/2022
4	Power Sensor	Agilent	E9304A	MY50390009	03/18/2022
5	Power Sensor	Agilent	E9300A	MY41498315	03/18/2022
6	Wideband Radio Communication Tester	R&S	CMW500	157282	03/18/2022
7	Climate Chamber	Angul	AGNH80L	1903042120	03/18/2022
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	03/18/2022
9	RF Control Unit	Tonscend	JS0806-2	/	03/18/2022

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	03/18/2022
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/22/2022
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/22/2022
4	Spectrum Analyzer	HP	8593E	3831U02087	03/22/2022
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	03/29/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/27/2022
7	Spectrum Analyzer	R&S	FSV40-N	101798	03/22/2022
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	03/22/2022
10	Pre-Amplifier	EMCI	EMC051835SE	980662	03/22/2022
11	Wideband Radio Communication Tester	R&S	CMW500	157282	04/06/2022
12	Horn Antenna	Schwarzbeck	BBHA 9170	00943	25/11/2021
13	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-57	25/11/2021

Note:

1)The Cal. Interval was one year.

2)The cable loss has calculated in test result which connection between each test instruments.

2.5. Test Software

Software name	Model	Version
Test System	JS1120-3	2.5.77.0418
Test System	TST	V1.0.5
Radiated emission Measurement Software	EZ-EMC	FA-03A.2.RE

3. TEST ITEM AND RESULTS

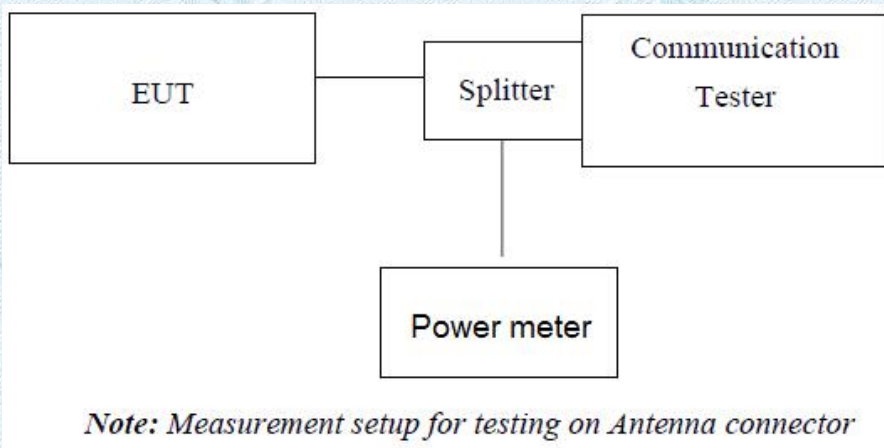
3.1. Conducted Output Power

LIMIT:

GSM850/WCDMA Band V: 7W

PCS1900/WCDMA Band II/WCDMA Band IV: 2W

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure the maximum PK burst power and maximum Avg. burst power.

TEST RESULTS

WCDMA Band II		Conducted Power (dBm)		
		CH9262	CH9400	CH9538
		1852.40	1880.00	1907.60
AMR 12.2K		22.04	21.93	21.79
RMC 12.2K		22.41	22.98	22.52
HSDPA	Subtest-1	22.33	22.55	22.60
	Subtest-2	22.23	22.35	22.45
	Subtest-3	22.64	22.85	22.12
	Subtest-4	22.98	22.91	22.75
HSUPA	Subtest-1	22.96	22.57	22.94
	Subtest-2	22.66	22.87	22.63
	Subtest-3	22.01	22.30	22.01
	Subtest-4	22.52	22.61	22.43
	Subtest-5	22.35	22.51	22.25

WCDMA Band V		Conducted Power (dBm)		
		CH4132	CH4183	CH4233
		826.40	836.60	846.60
AMR 12.2K		22.56	22.73	22.49
RMC 12.2K		22.77	22.89	22.69
HSDPA	Subtest-1	22.53	22.16	22.66
	Subtest-2	22.66	22.27	22.58
	Subtest-3	22.65	22.48	22.39
	Subtest-4	21.81	21.90	21.69
HSUPA	Subtest-1	21.54	21.83	21.59
	Subtest-2	22.26	22.32	22.43
	Subtest-3	22.53	22.35	22.28
	Subtest-4	22.05	22.16	21.96
	Subtest-5	21.87	21.95	21.75

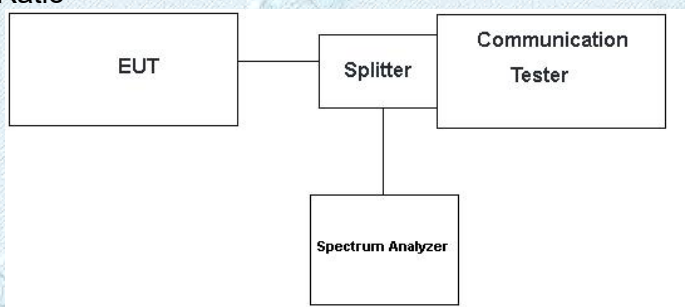
3.2. Peak-to-Average Ratio

LIMIT:

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13dB.

TEST CONFIGURATION

- For Peak-to-Average Ratio



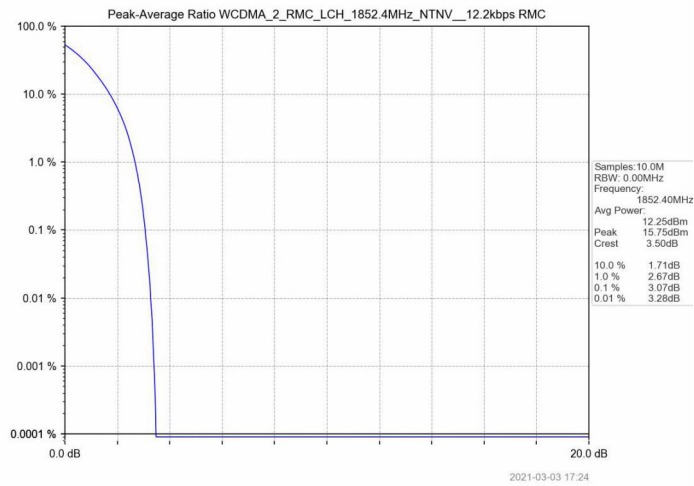
TEST PROCEDURE

- For Peak-to-Average Ratio
 1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
 2. The EUT was connected to spectrum and communication tester via a splitter
 3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
 4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
 5. ATT:35dB ,Offset:6.50dB for WCDMA Band V, ATT:35dB ,Offset:7.80dB for WCDMA Band II
 6. Record the deviation as Peak to Average Ratio.

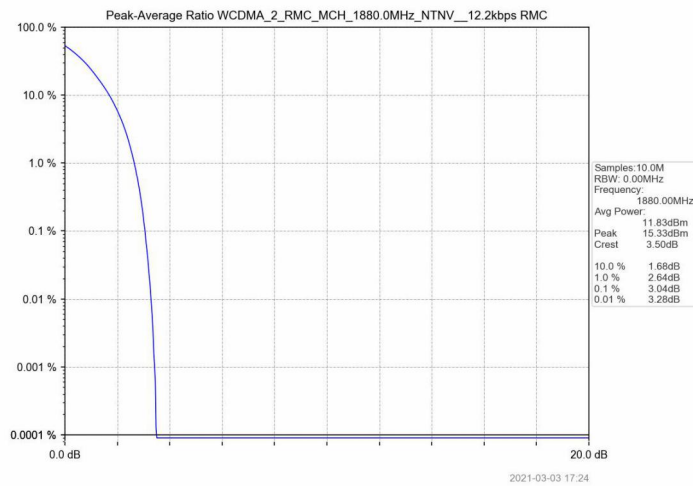
TEST RESULTS

Test Mode	Channel	Frequency	Test Result (dB)	Limit (dB)	Verdict	
WCDMA Band II RMC	9262	1852.40	3.07	13	PASS	
	9400	1880.00	3.04	13		
	9538	1907.60	2.96	13		
WCDMA Band II HSDPA	9262	1852.40	5.65	13		
	9400	1880.00	5.59	13		
	9538	1907.60	5.54	13		
WCDMA Band II HSUPA	9262	1852.40	5.68	13		
	9400	1880.00	5.57	13		
	9538	1907.60	5.51	13		
WCDMA Band V WCDMA	4132	826.40	3.16	13		PASS
	4183	836.60	3.07	13		
	4233	846.60	3.19	13		
WCDMA Band V HSDPA	4132	826.40	5.48	13		
	4183	836.60	5.48	13		
	4233	846.60	5.54	13		
WCDMA Band V HSUPA	4132	826.40	5.54	13		
	4183	836.60	5.45	13		
	4233	846.60	5.59	13		

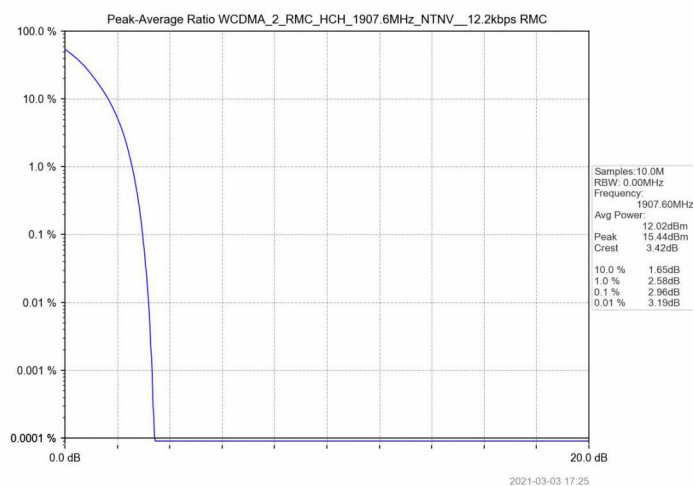
Band II_ WCDMA_ Lowest channel



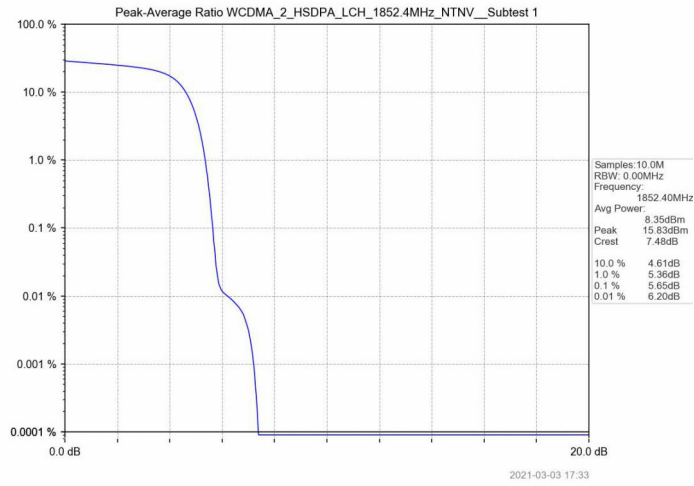
Band II_ WCDMA_ Middle channel



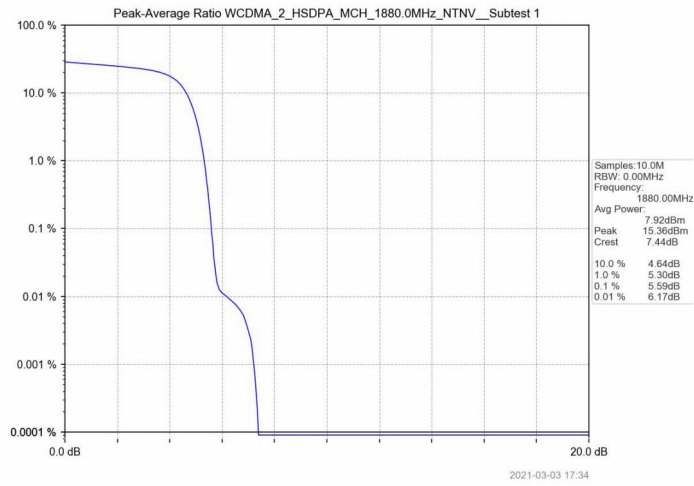
Band II_ WCDMA_ Highest channel



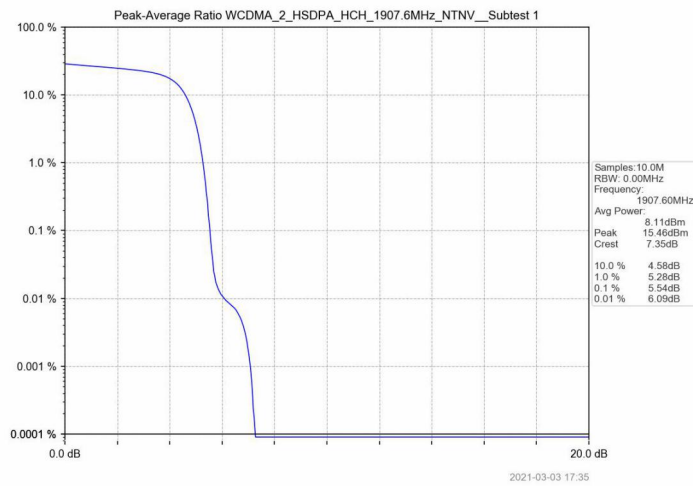
Band II_ HSDPA_ Lowest channel



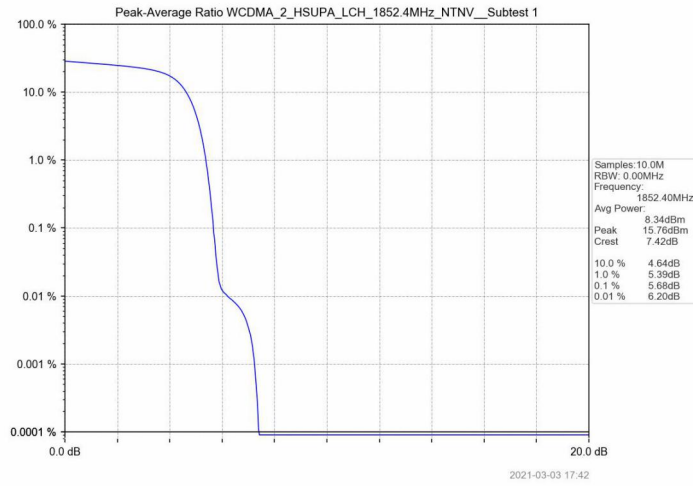
Band II_ HSDPA_ Middle channel



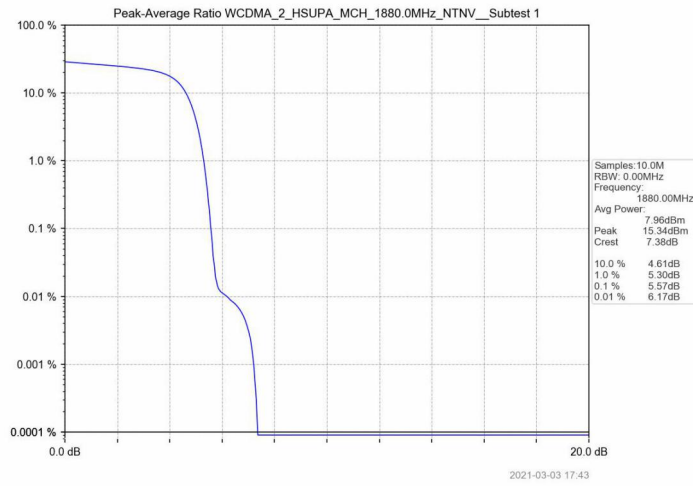
Band II_ HSDPA_ Highest channel



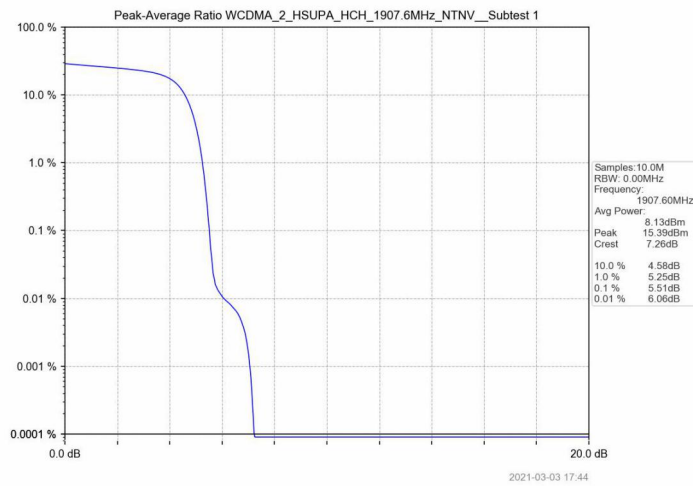
Band II_ HSUPA_ Lowest channel



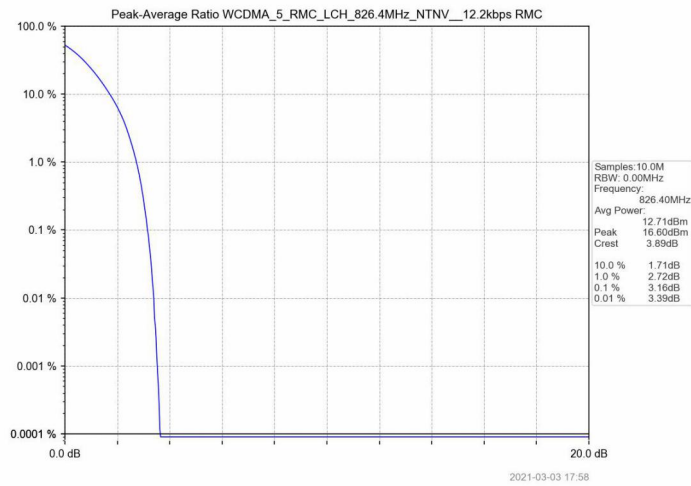
Band II_ HSUPA_ Middle channel



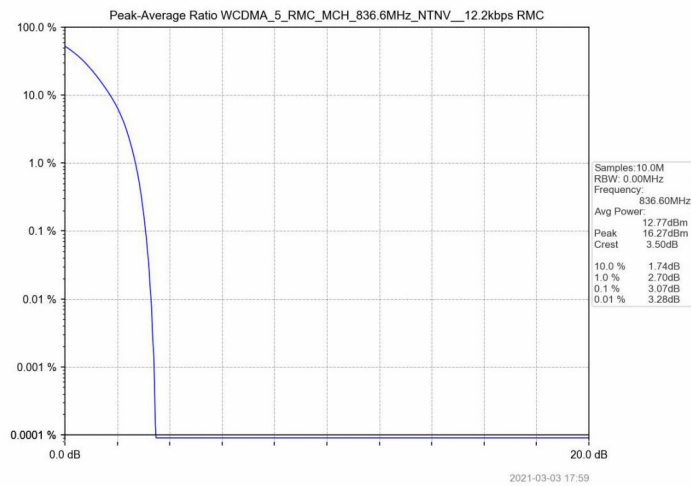
Band II_ HSUPA_ Highest channel



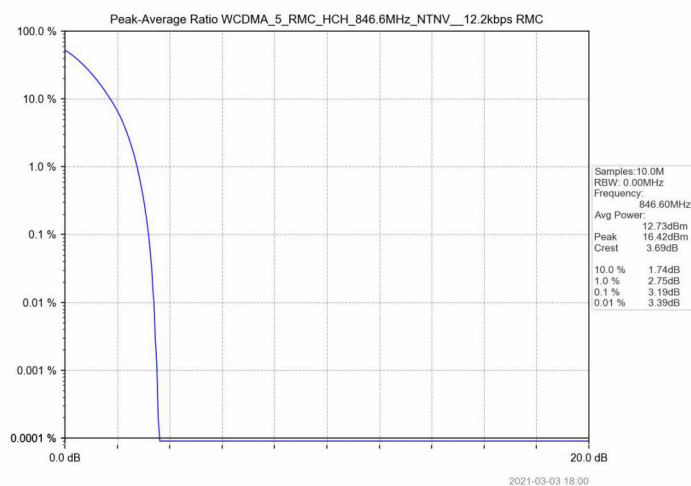
Band V_ WCDMA_ Lowest channel



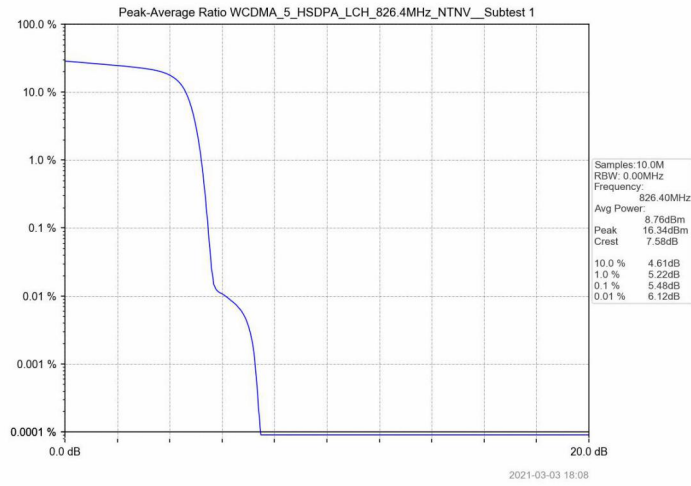
Band V_ WCDMA_ Middle channel



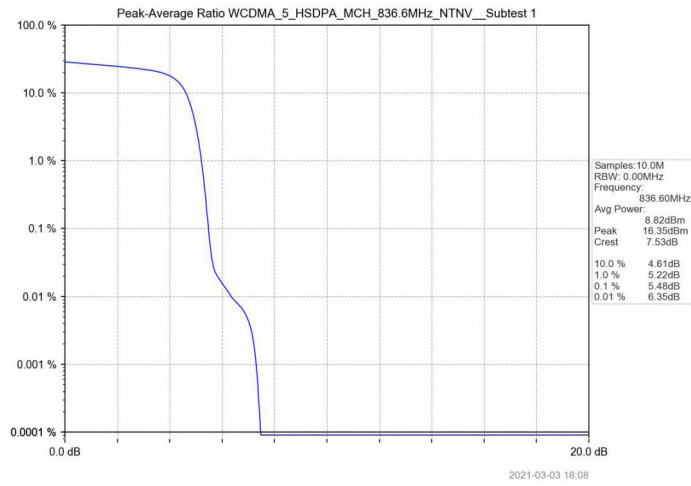
Band V_ WCDMA_ Highest channel



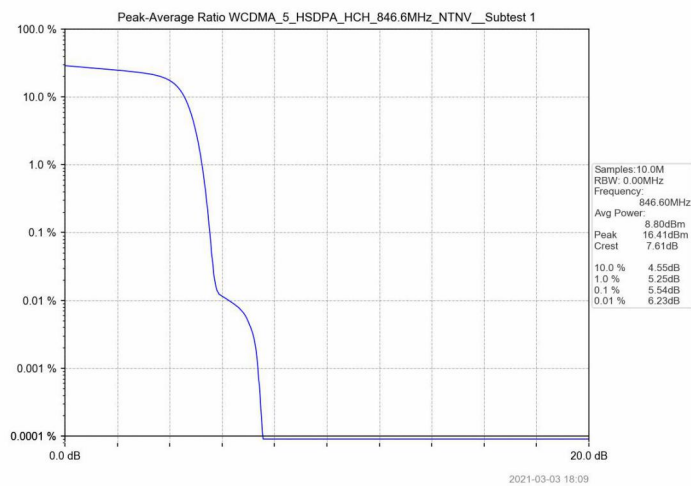
Band V_ HSDPA_ Lowest channel



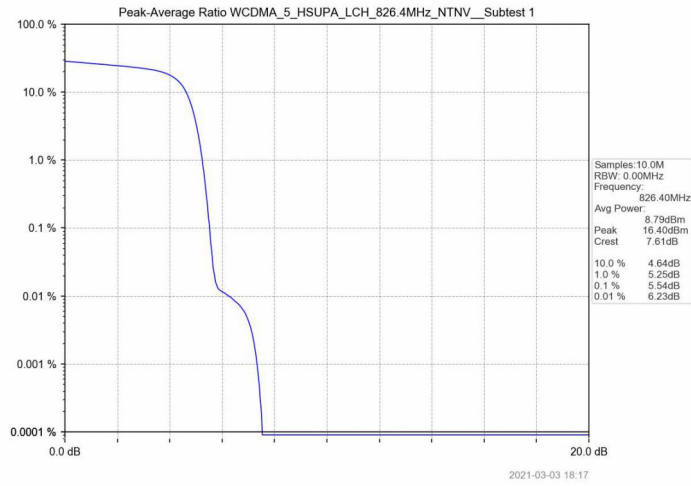
Band V_ HSDPA_ Middle channel



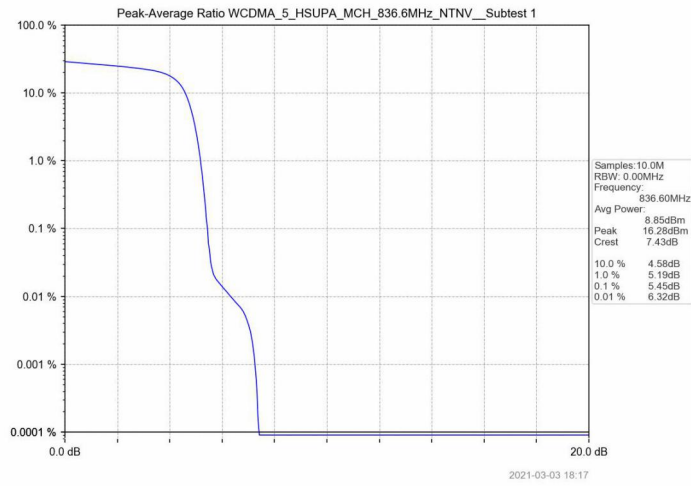
Band V_ HSDPA_ Highest channel



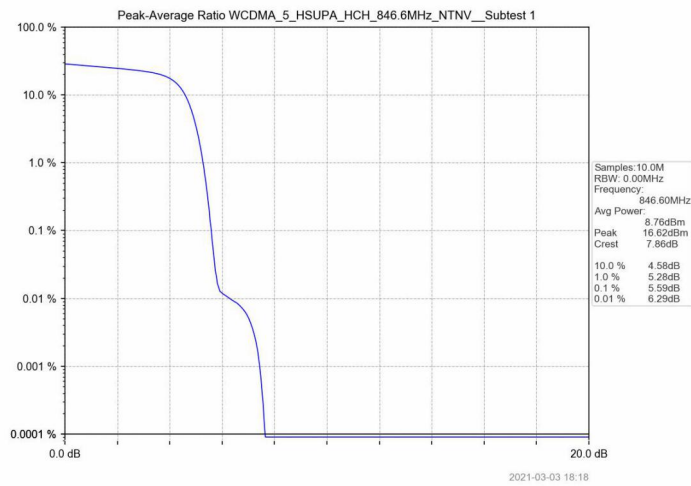
Band V_ HSUPA_ Lowest channel



Band V_ HSUPA_ Middle channel

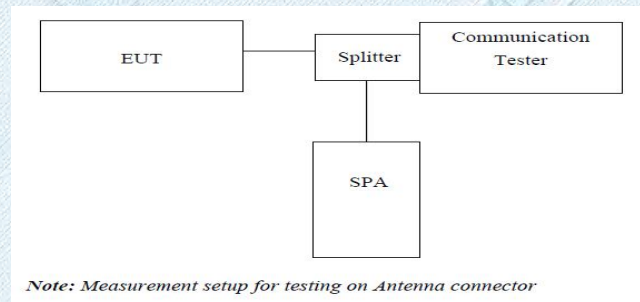


Band V_ HSUPA_ Highest channel



3.3. Occupy Bandwidth

TEST CONFIGURATION



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% 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.
4. ATT:35dB ,Offset:6.50dB for WCDMA Band V, ATT:35dB ,Offset:7.80dB for WCDMA Band II

TEST RESULTS

WCDMA Band II

Test Mode	99% Occupied Bandwidth (MHz)			Verdict
	LCH	MCH	HCH	
HSUPA	4.246	4.247	4.226	PASS
HSDPA	4.250	4.275	4.223	PASS
RMC	4.215	4.214	4.222	PASS

Test Mode	26dB Bandwidth (MHz)			Verdict
	LCH	MCH	HCH	
HSUPA	5.335	5.124	5.124	PASS
HSDPA	5.403	5.266	4.981	PASS
RMC	4.862	4.817	4.848	PASS

WCDMA Band V

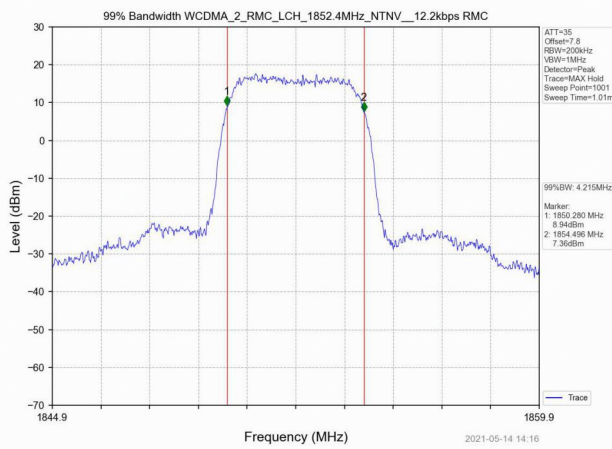
Test Mode	99% Occupied Bandwidth (MHz)			Verdict
	LCH	MCH	HCH	
HSUPA	4.252	4.272	4.282	PASS
HSDPA	4.257	4.256	4.280	PASS
RMC	4.200	4.199	4.201	PASS

Test Mode	26dB Bandwidth (MHz)			Verdict
	LCH	MCH	HCH	
HSUPA	5.028	6.293	5.466	PASS
HSDPA	5.337	5.658	5.548	PASS
RMC	4.819	4.829	4.826	PASS

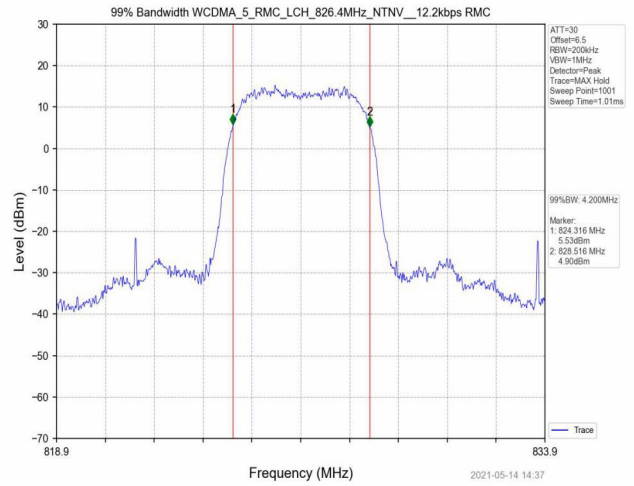
Test plots as follow:

99% Occupy bandwidth

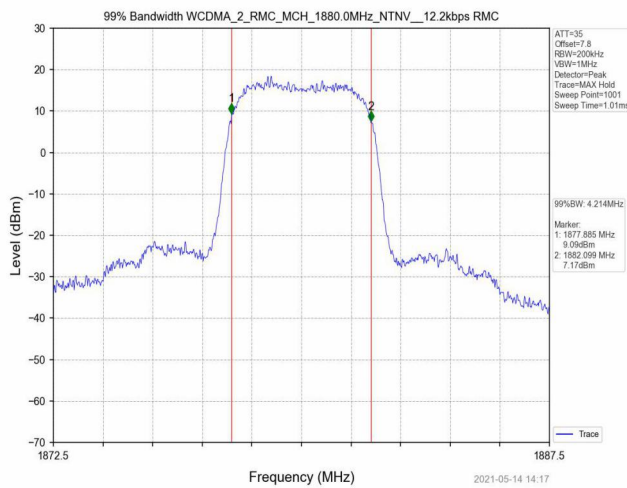
WCDMA II - RMC



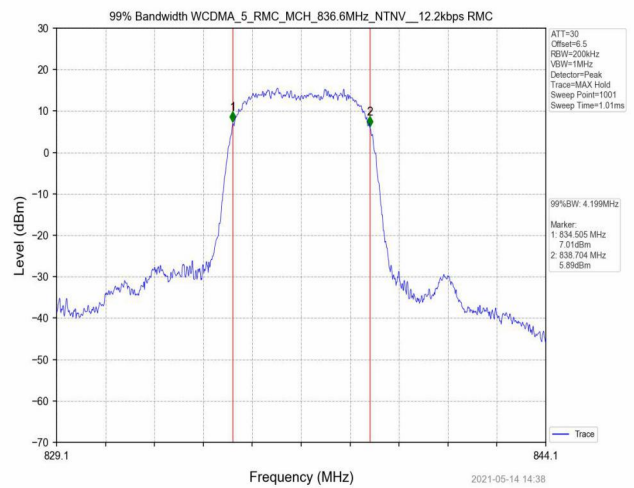
WCDMA V - RMC



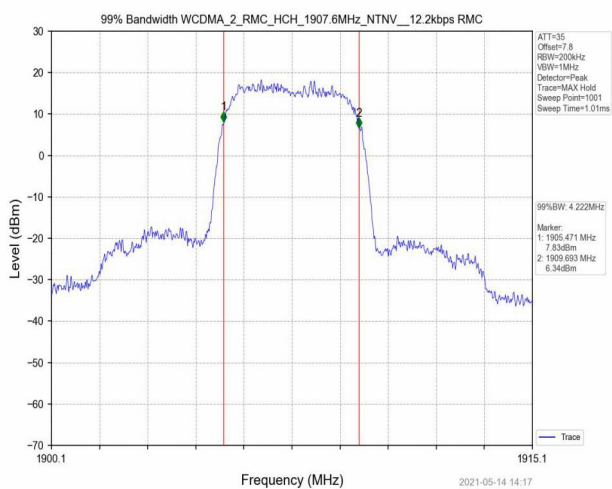
Lowest channel



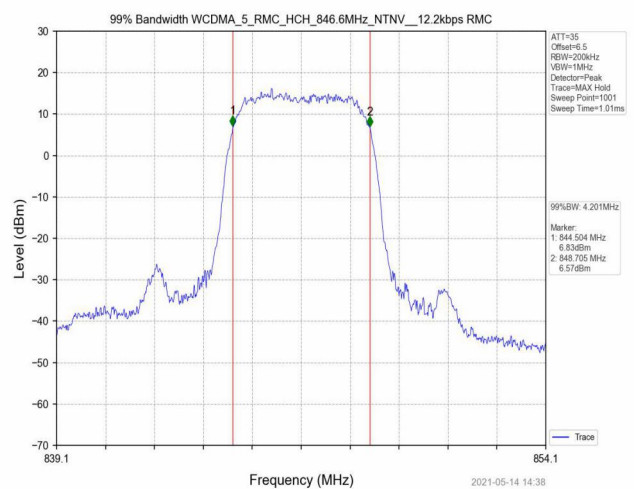
Lowest channel



Middle channel



Middle channel

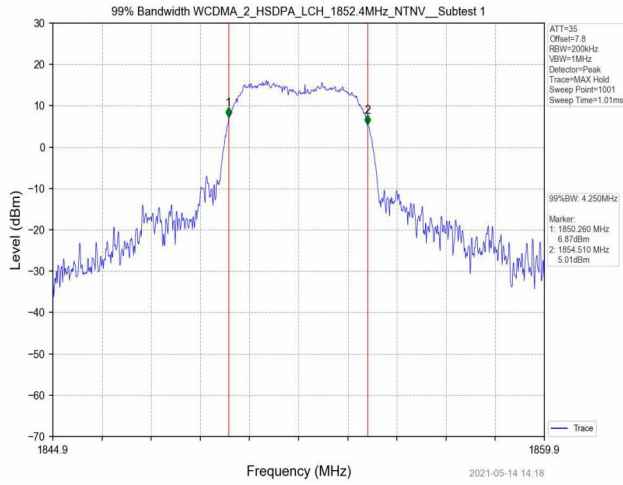


Highest channel

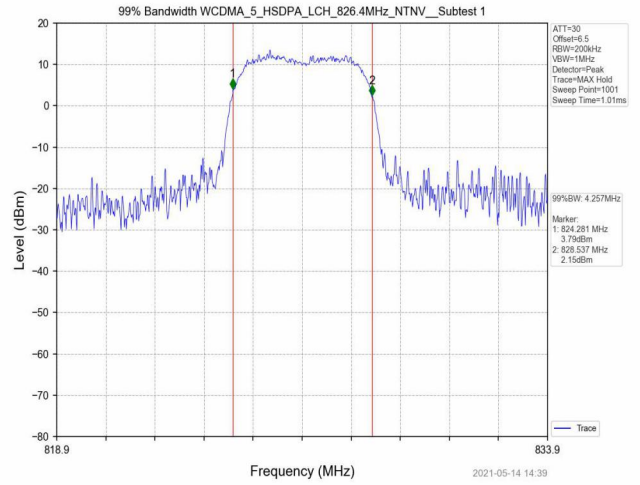
Highest channel

99% Occupy bandwidth

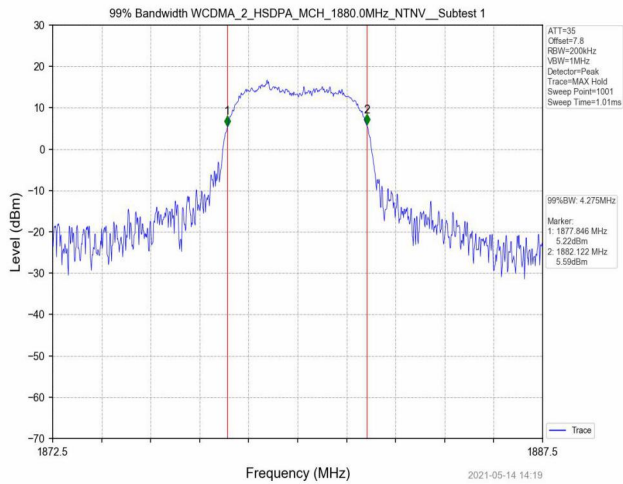
WCDMA II -HSDPA



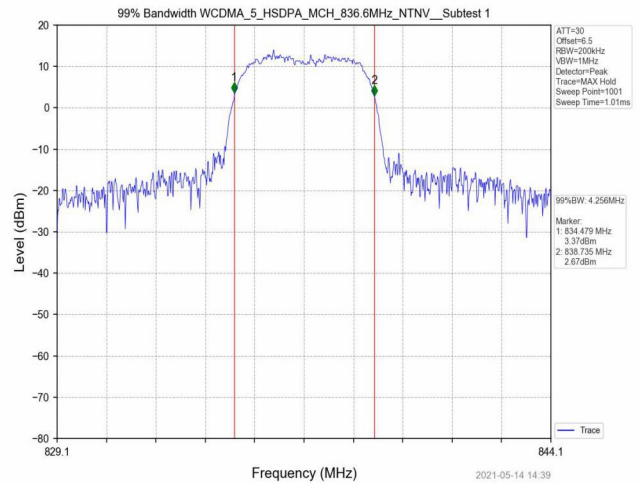
WCDMA V- -HSDPA



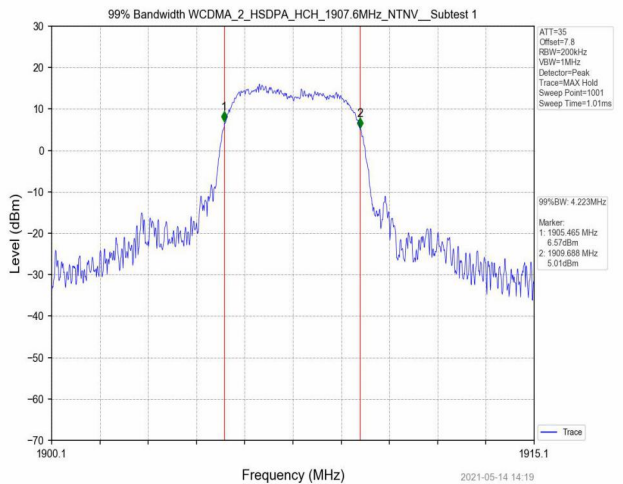
Lowest channel



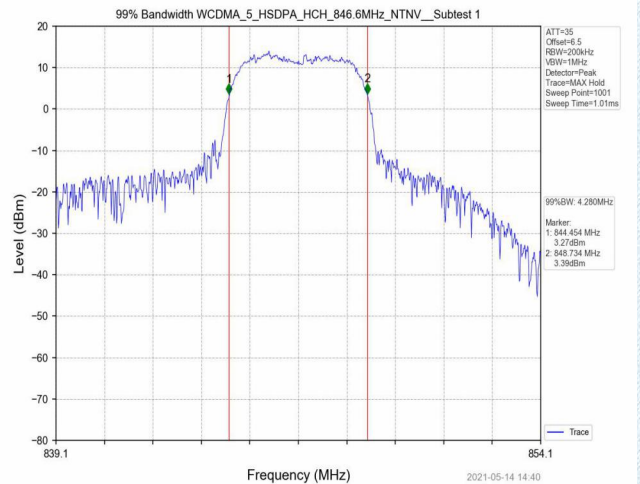
Lowest channel



Middle channel



Middle channel

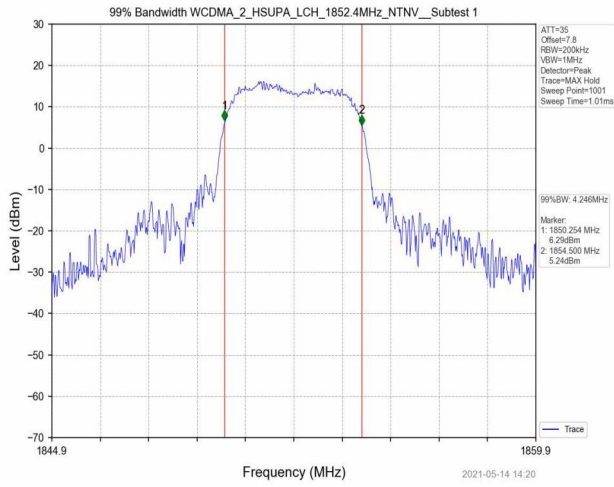


Highest channel

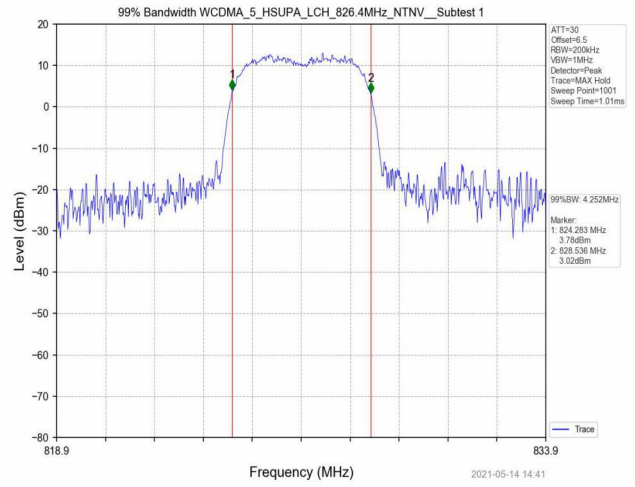
Highest channel

99% Occupy bandwidth

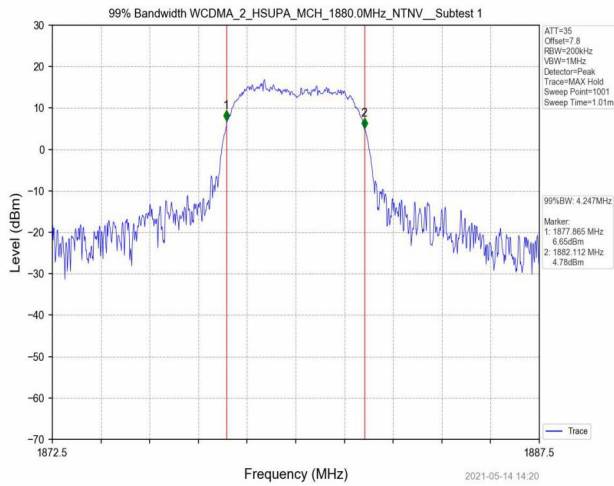
WCDMA II -HSUPA



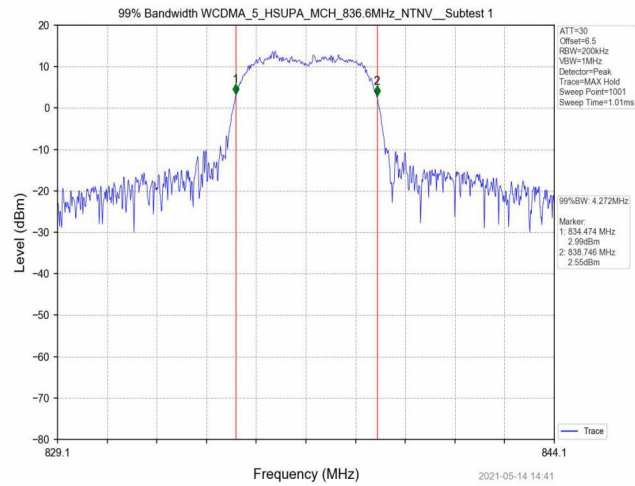
WCDMA V -HSUPA



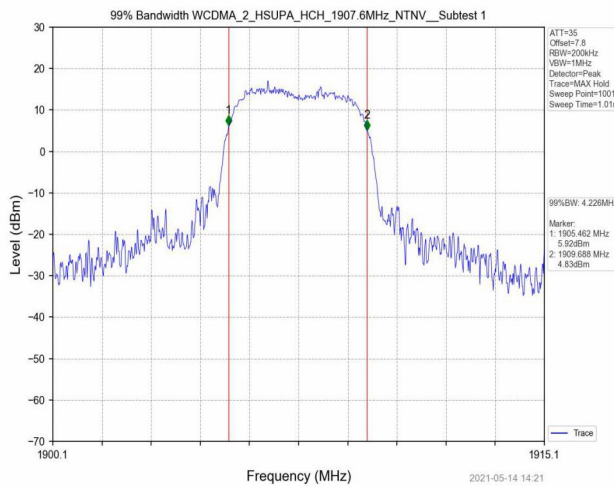
Lowest channel



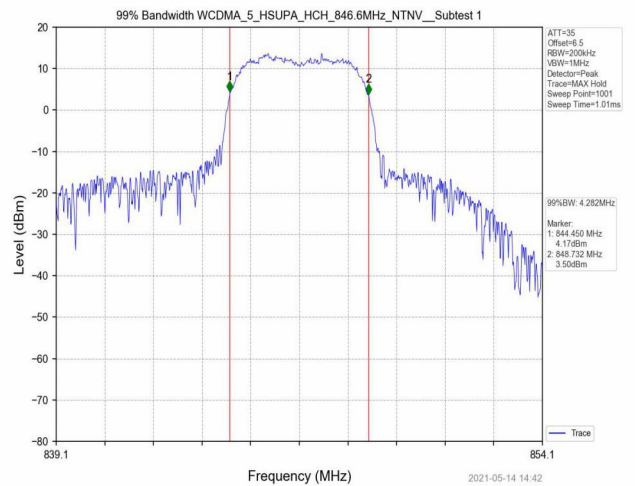
Lowest channel



Middle channel



Middle channel

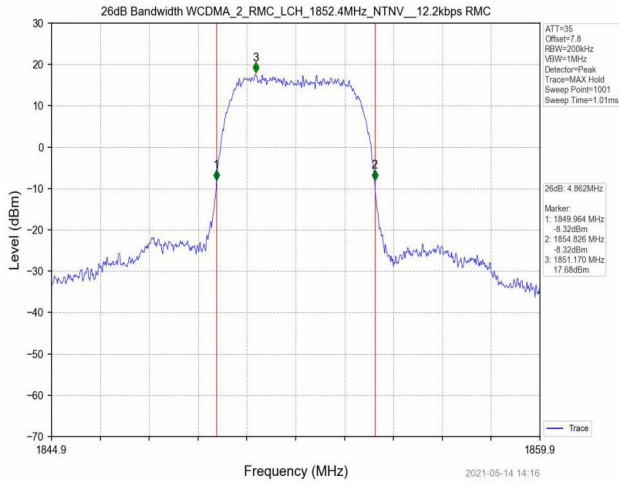


Highest channel

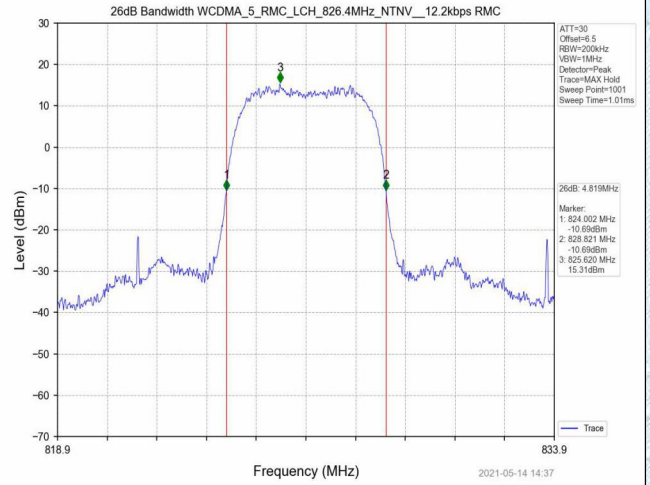
Highest channel

-26dB bandwidth

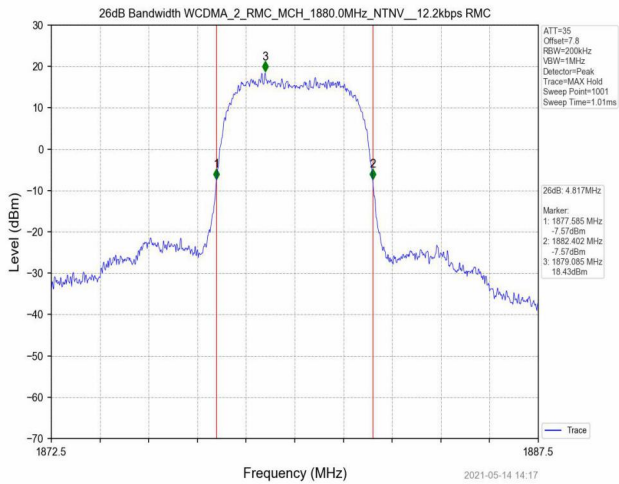
WCDMA II - RMC



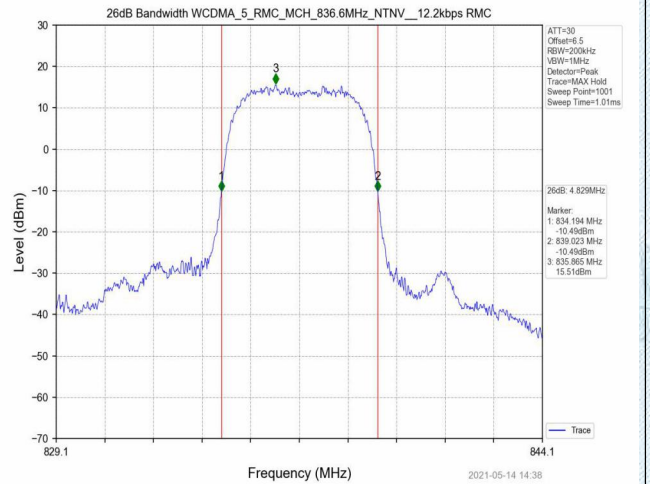
WCDMA V - RMC



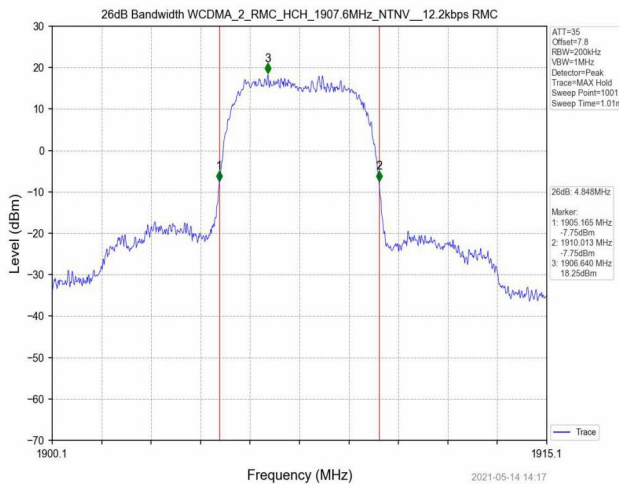
Lowest channel



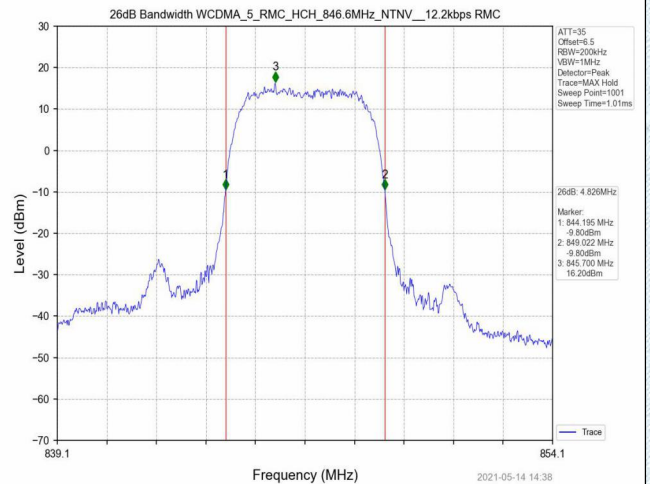
Lowest channel



Middle channel



Middle channel

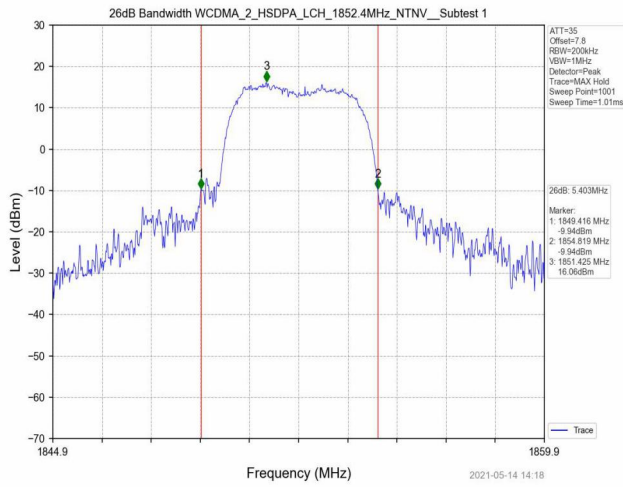


Highest channel

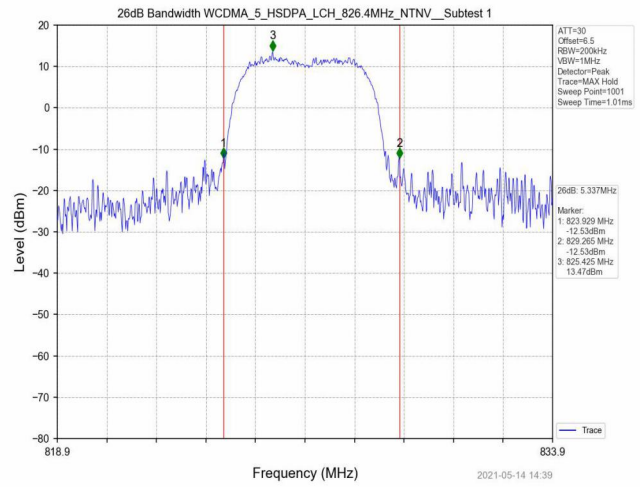
Highest channel

-26dB bandwidth

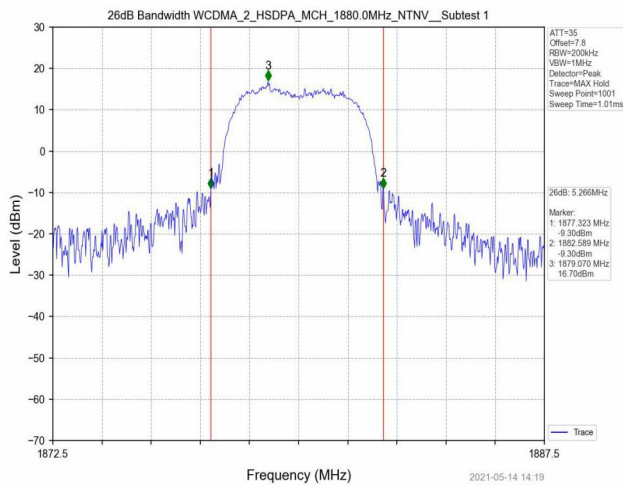
WCDMA II - HSDPA



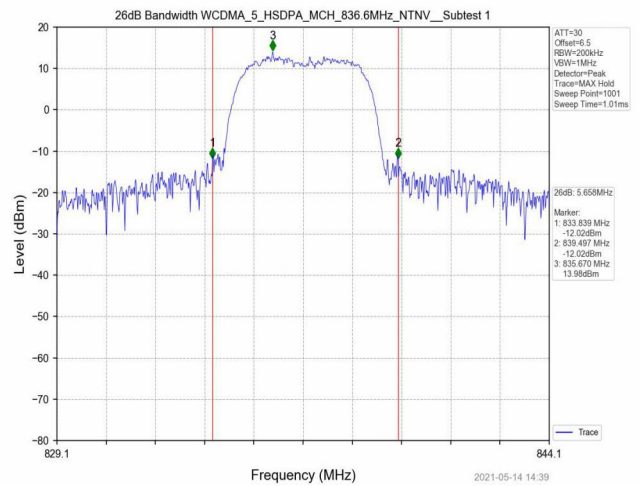
WCDMA V - HSDPA



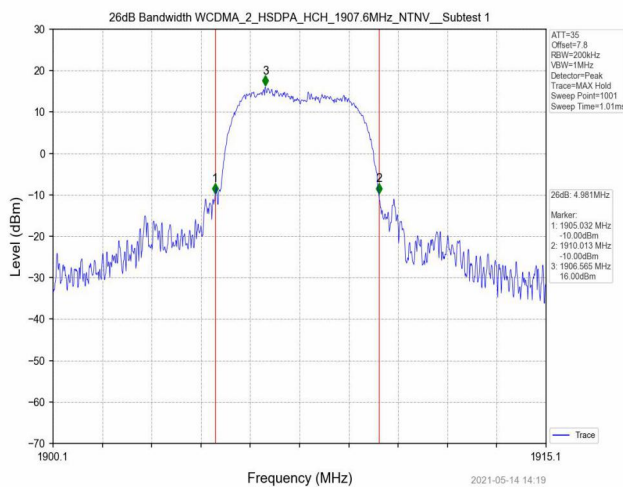
Lowest channel



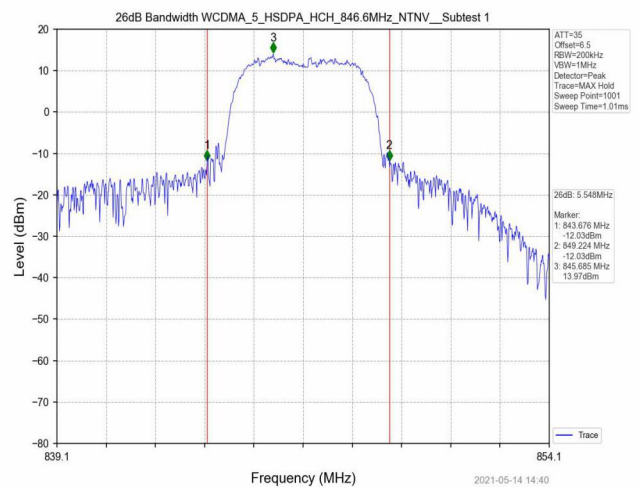
Lowest channel



Middle channel



Middle channel

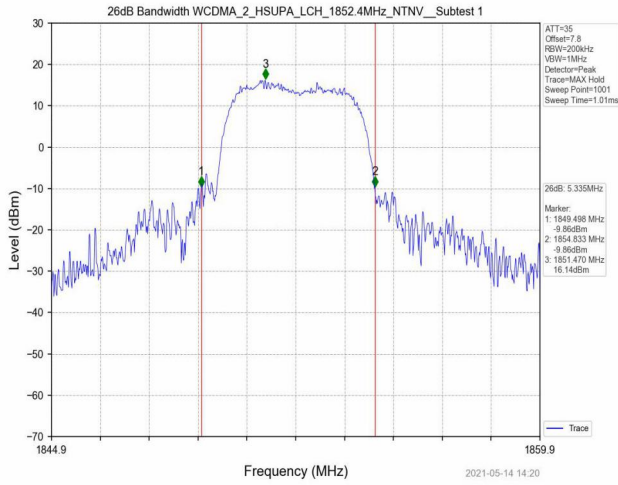


Highest channel

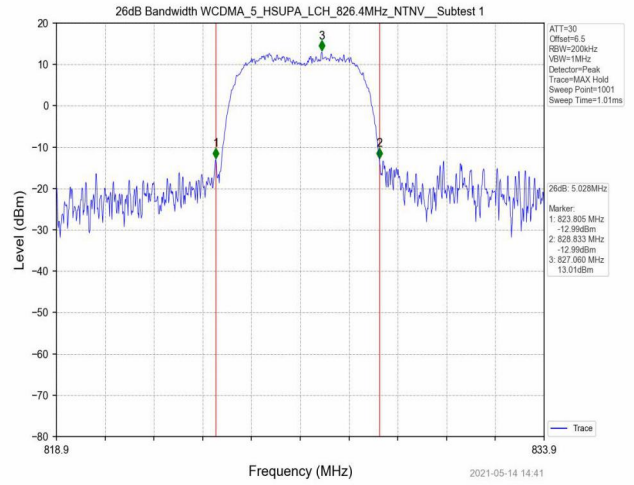
Highest channel

-26dB bandwidth

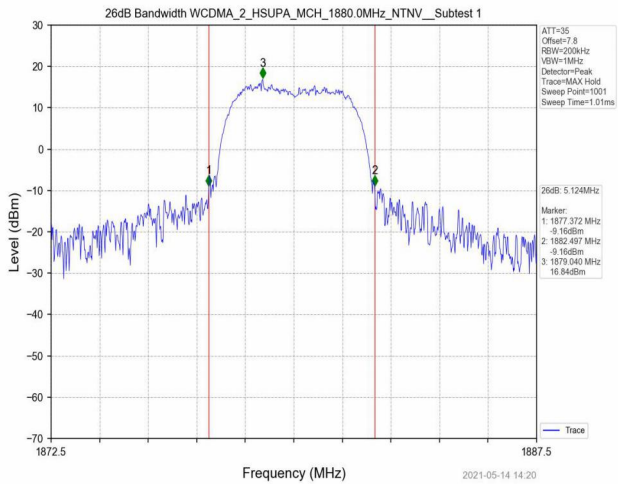
WCDMA II - HSUPA



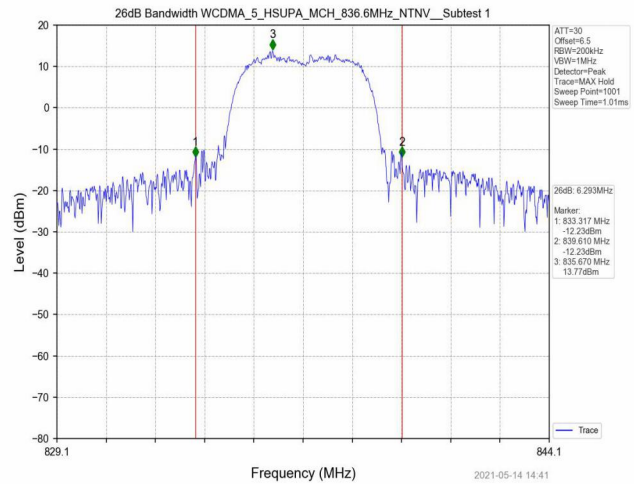
WCDMA V - HSUPA



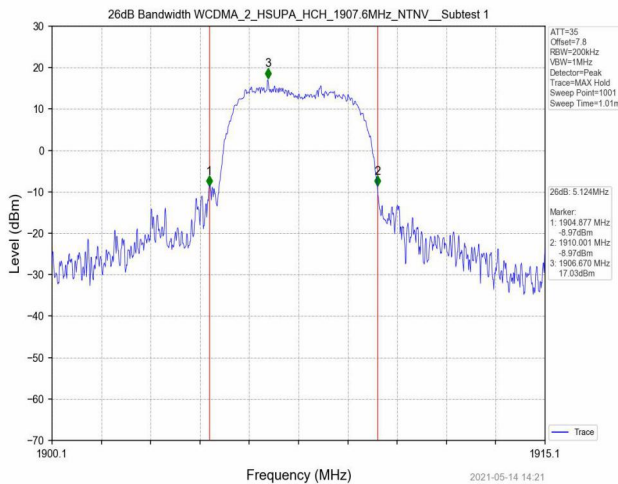
Lowest channel



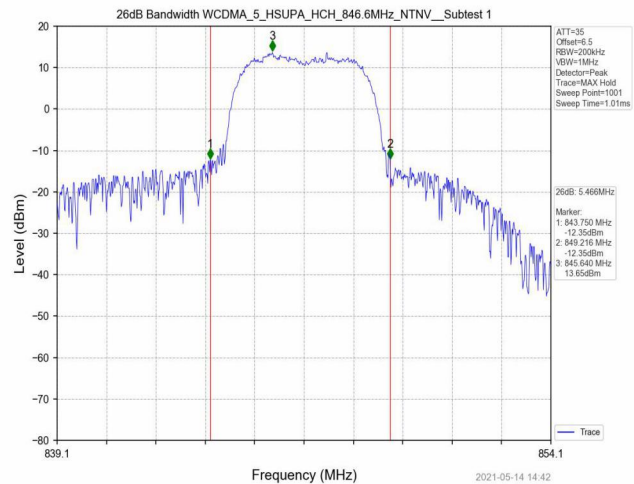
Lowest channel



Middle channel



Middle channel



Highest channel

Highest channel

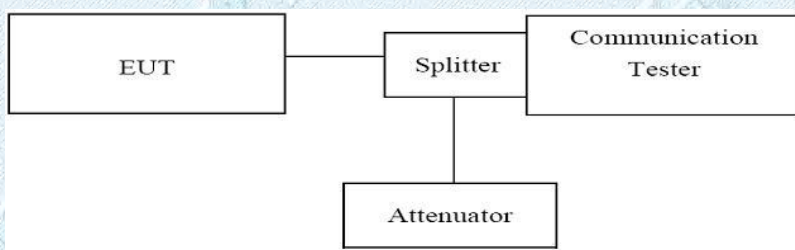
3.4. Out of band emission at antenna terminals

LIMIT

Part 24.238 and Part 22.917 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST CONFIGURATION

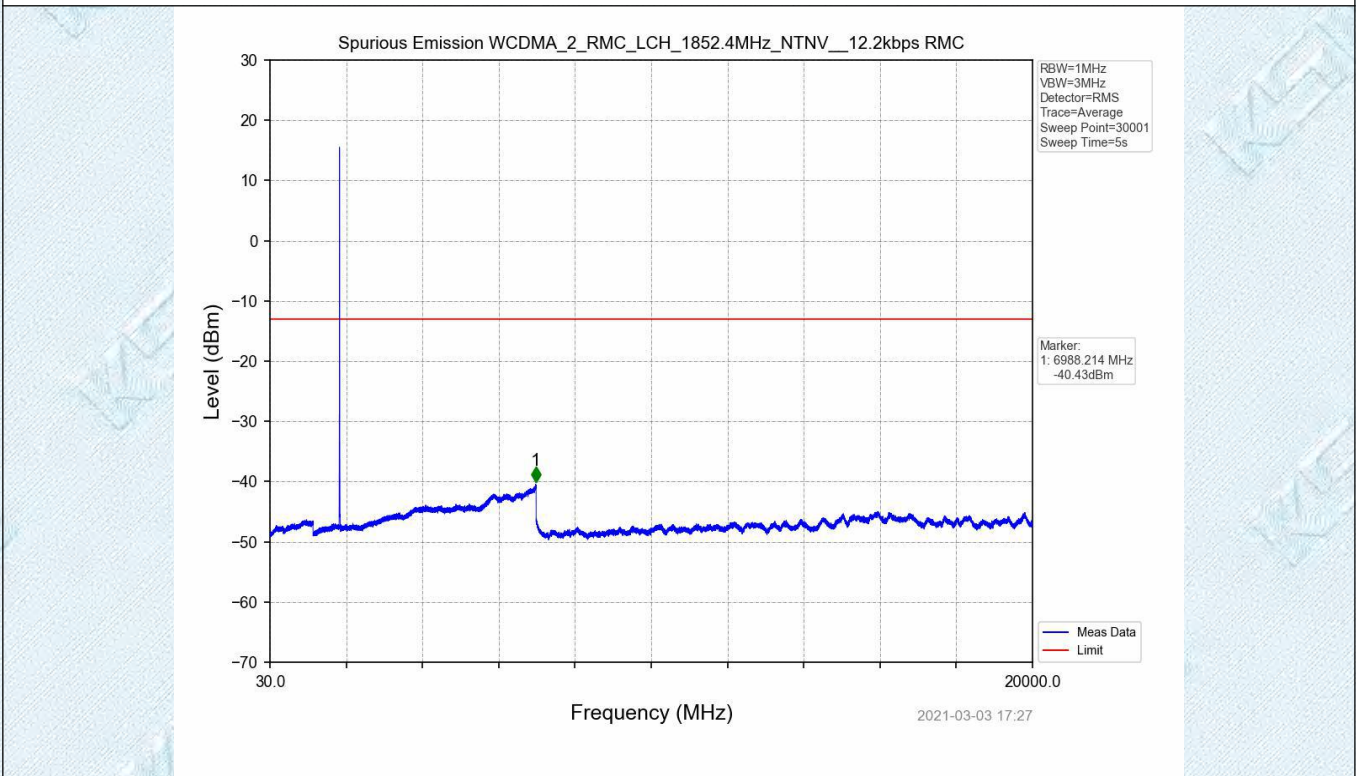


TEST PROCEDURE

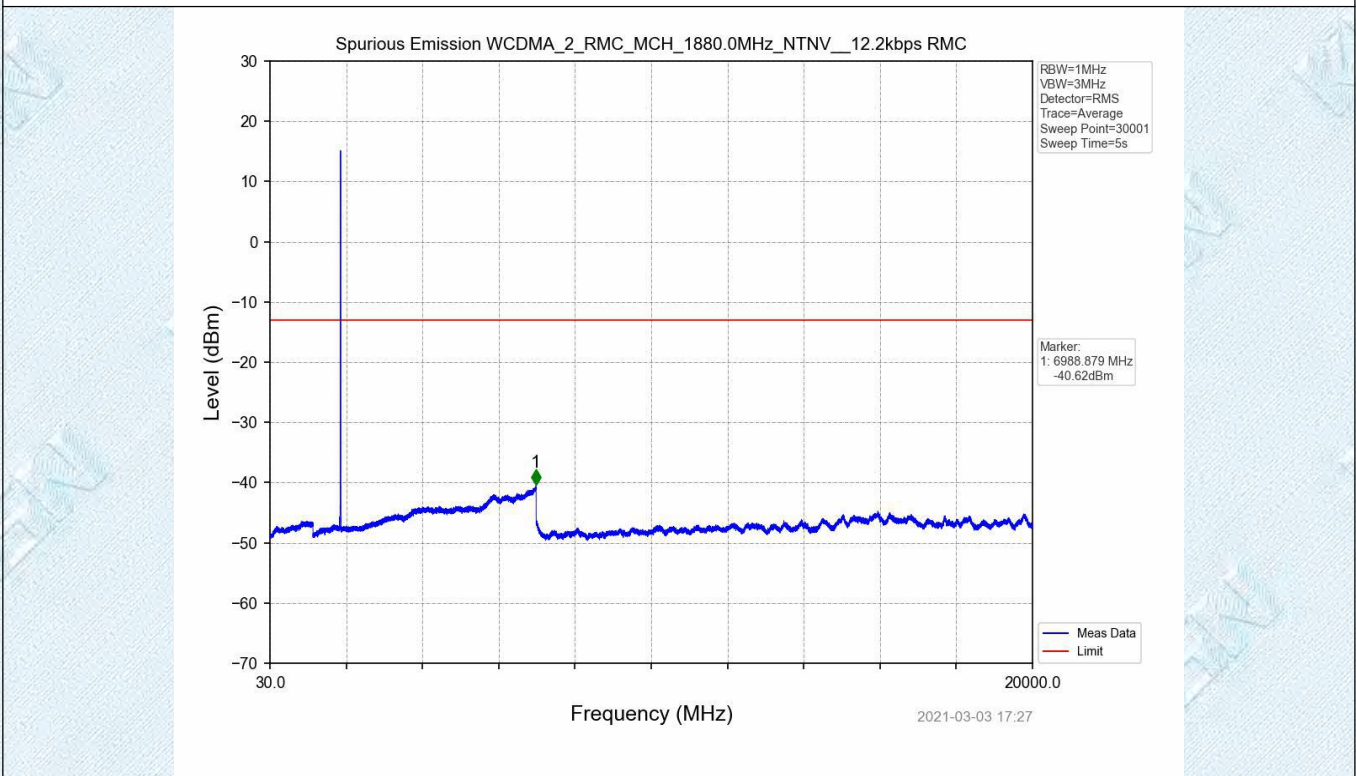
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
 For the out of band: Set the RBW = 1MHz VBW ≥ 3 times RBW, Start=30MHz, Stop= 10th harmonic. ATT:35dB ,Offset:6.50dB for WCDMA Band V, ATT:35dB ,Offset:7.80dB for WCDMA Band II
3. All modes have been tested and only the worst mode has been shown in the report.

TEST RESULTS

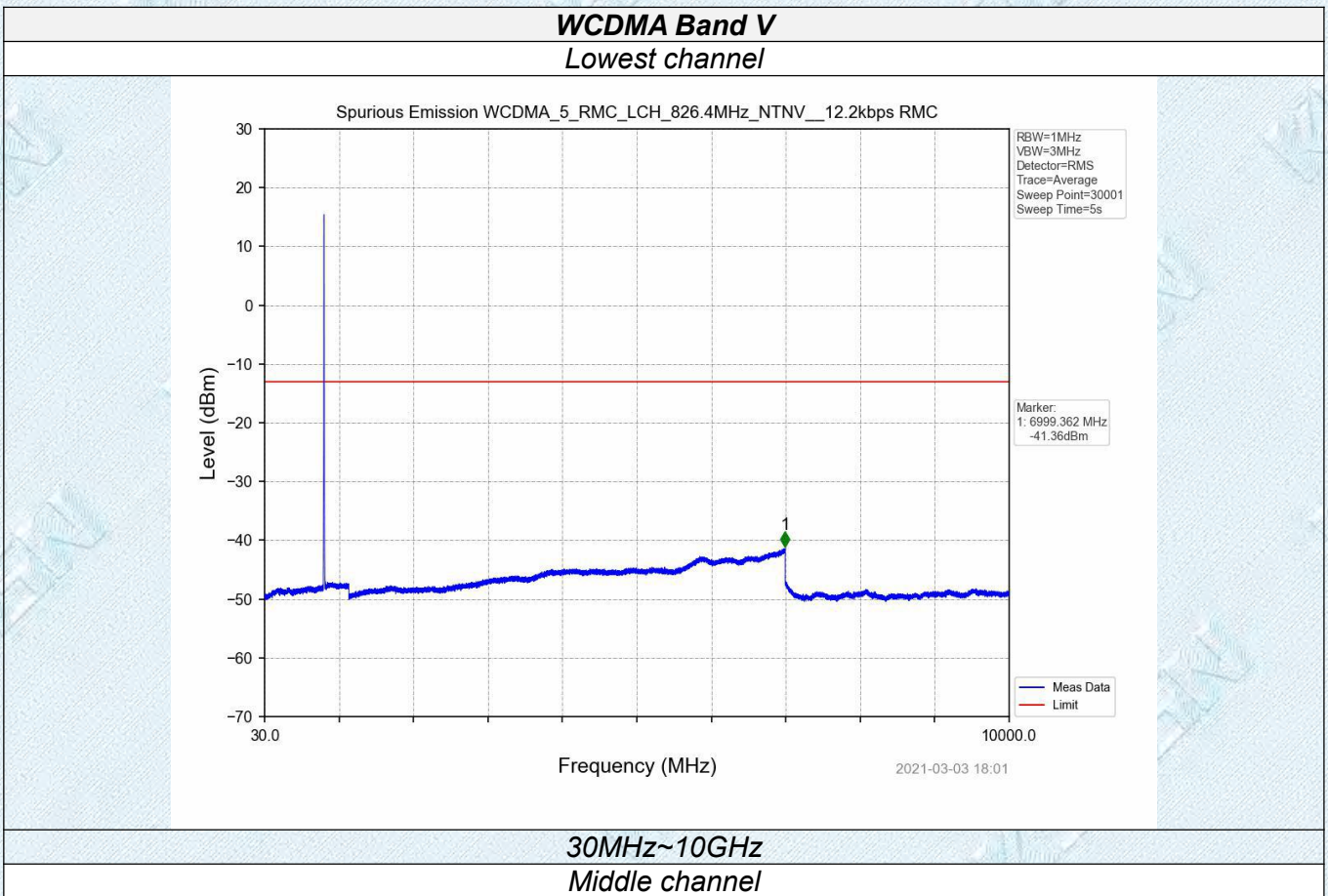
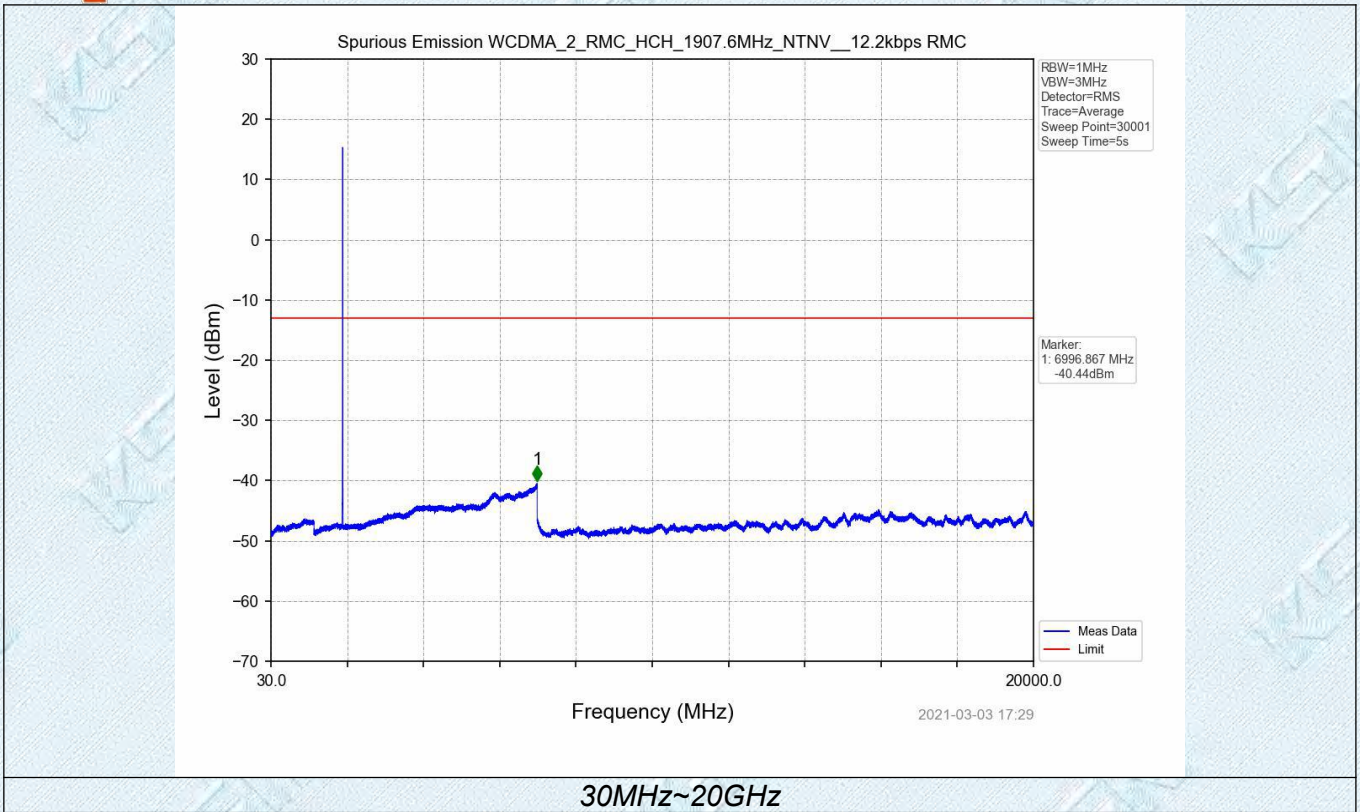
WCDMA Band II
Lowest channel

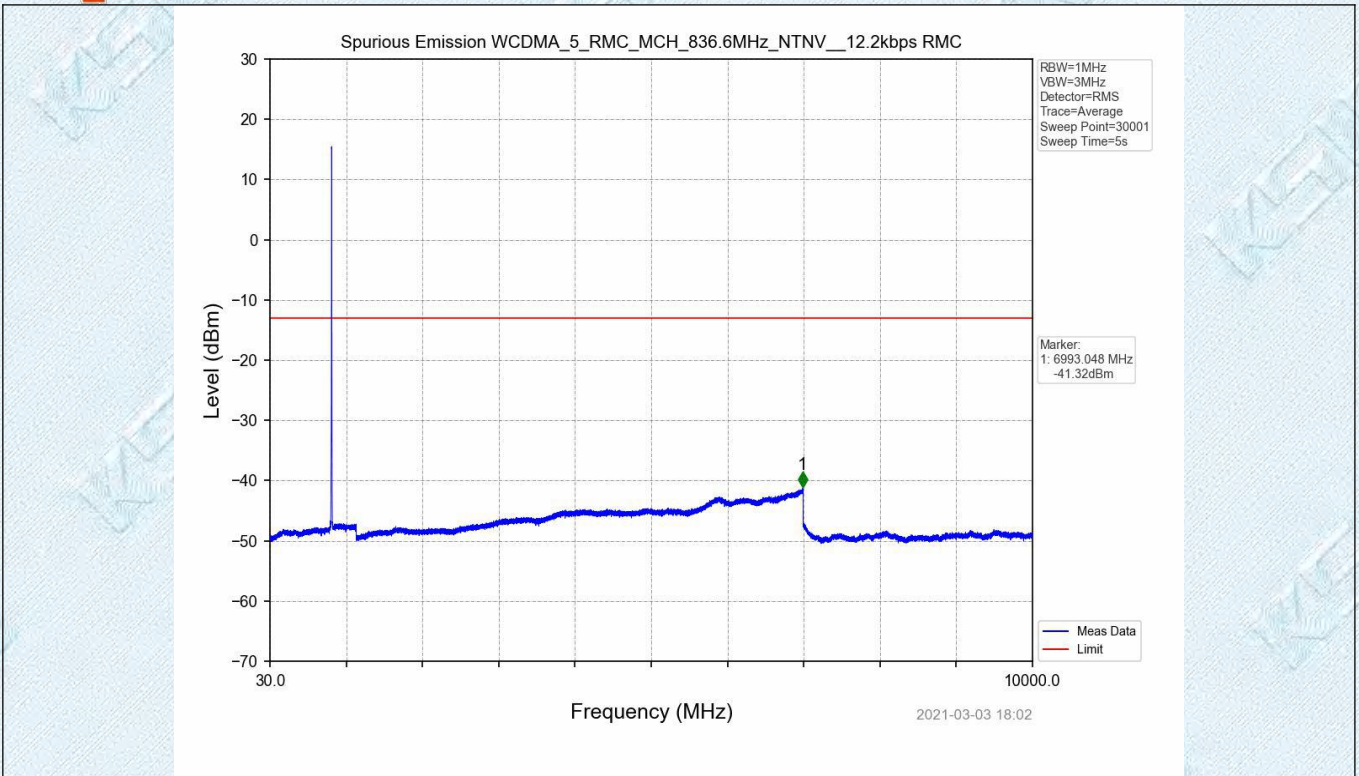


30MHz~20GHz
Middle channel

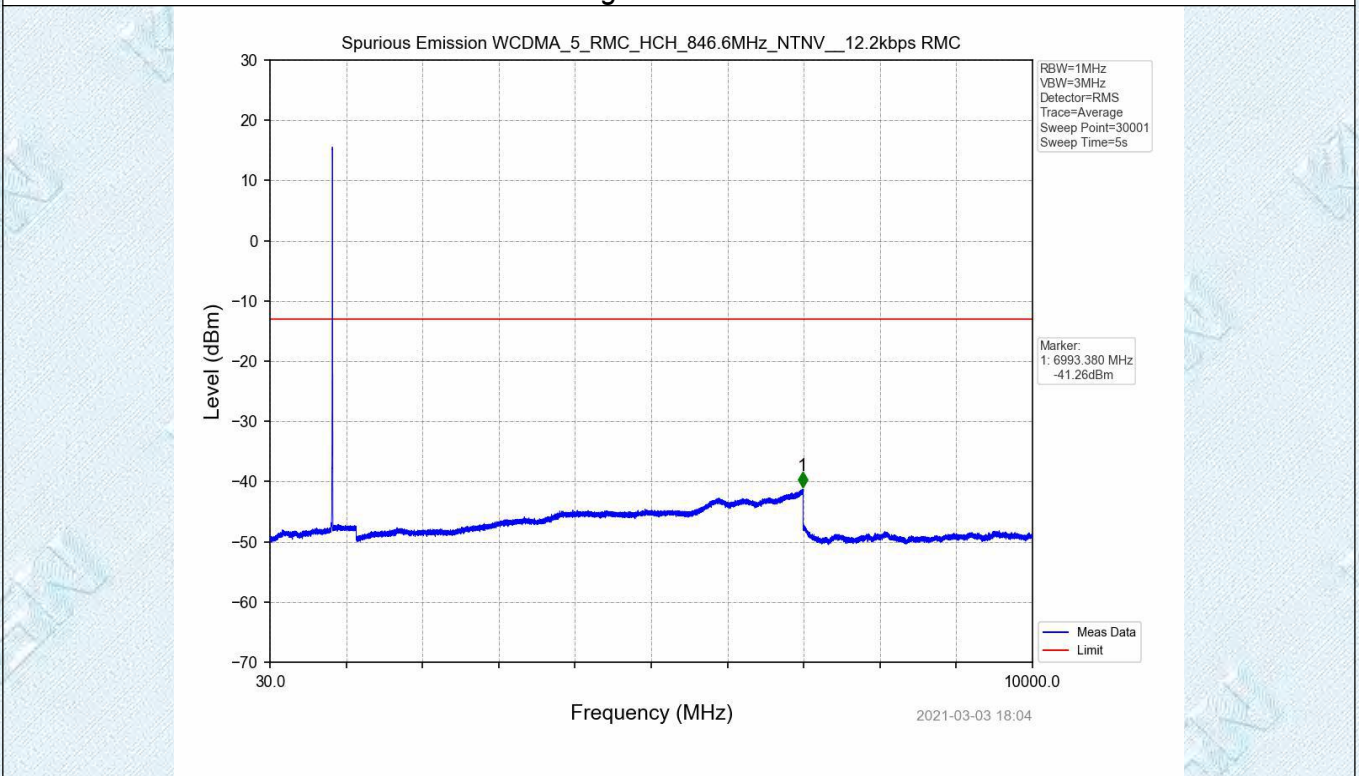


30MHz~20GHz
Highest channel





30MHz~10GHz
Highest channel



30MHz~10GHz

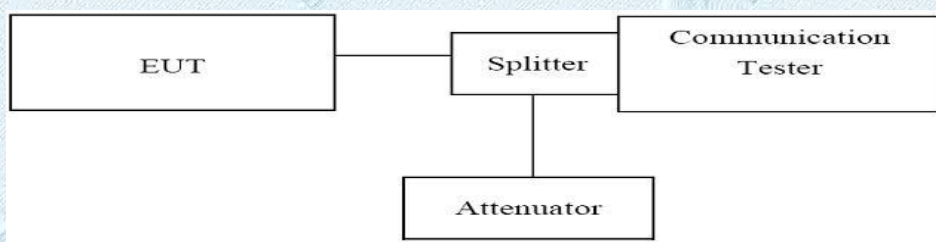
3.5. Band Edge compliance

LIMIT

Part 24.238 and Part 22.917 specify that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

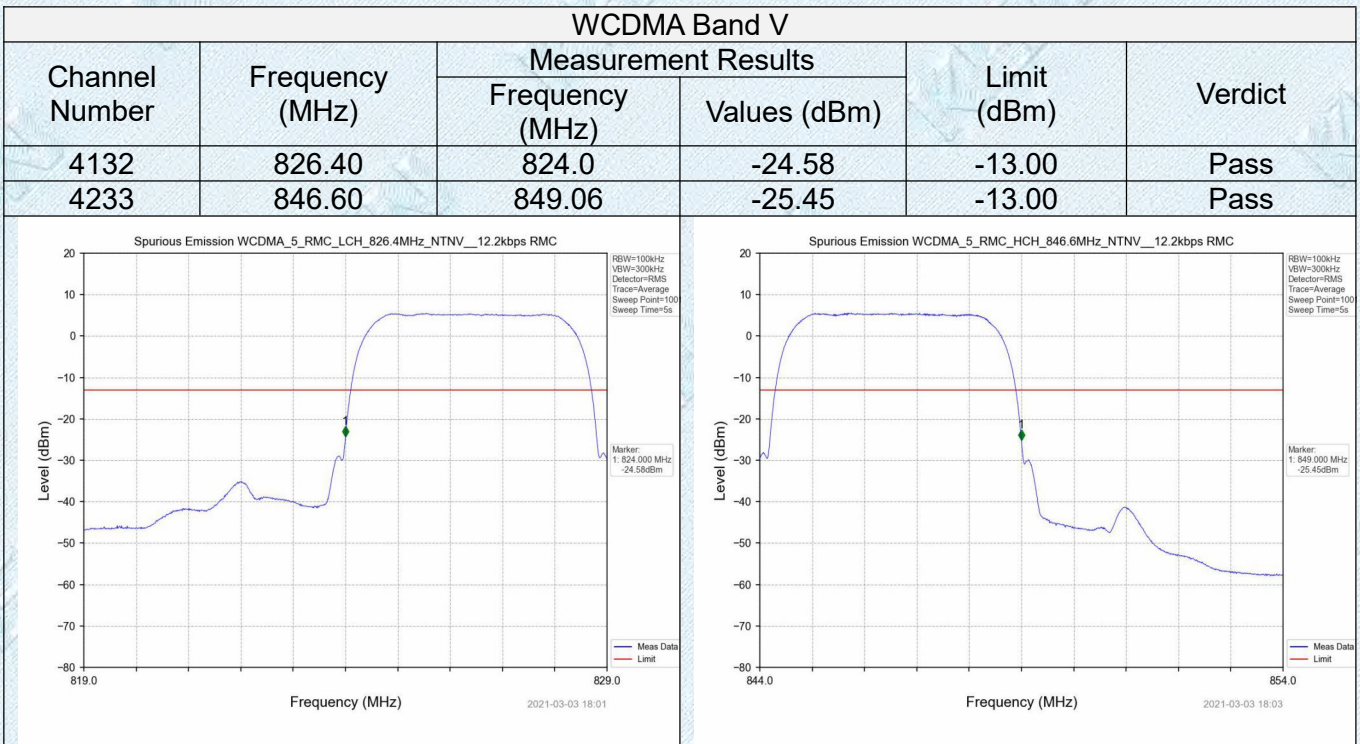
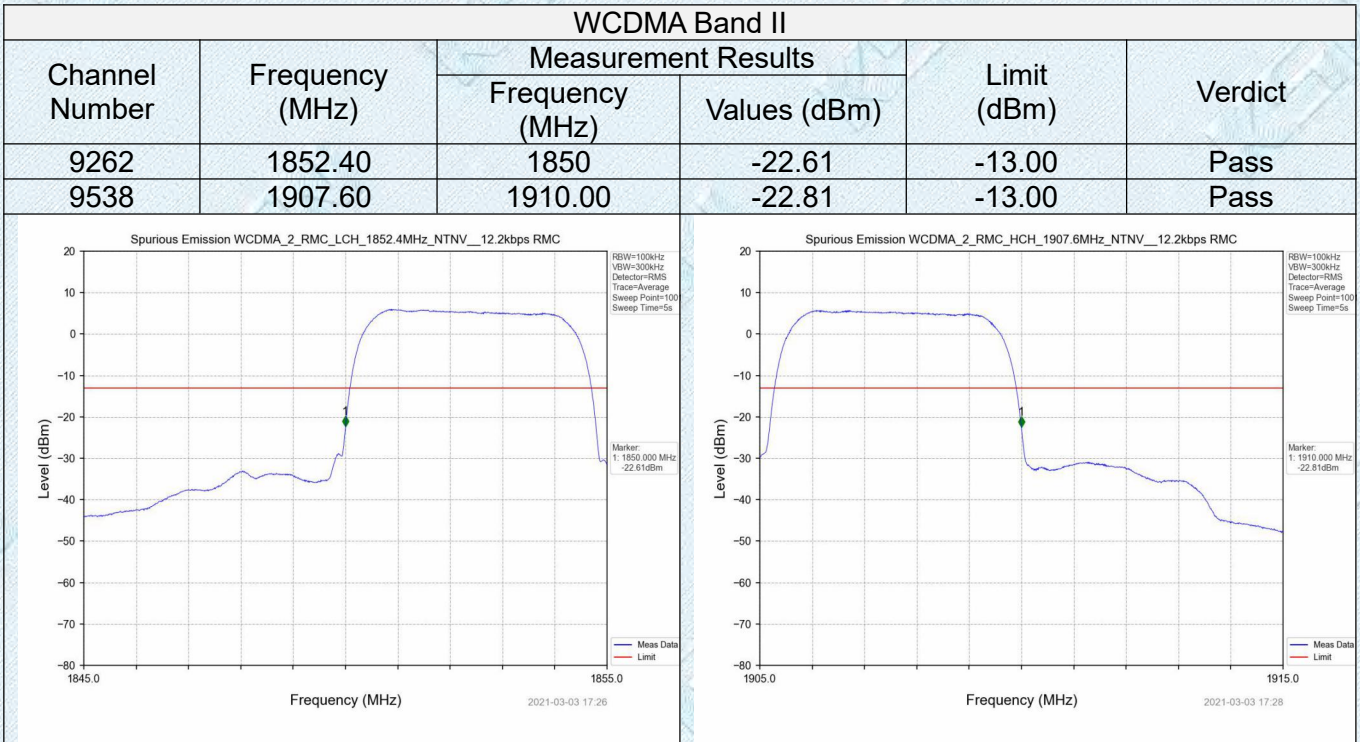
TEST CONFIGURATION



TEST PROCEDURE

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. Set the RBW=5 KHz, VBW = 50KHz, Span=1MHz Sweep time= Auto for 2G system measurement.
3. Set the RBW=50 KHz, VBW = 300KHz, Span=1MHz Sweep time= Auto for 3G system measurement. ATT:35dB ,Offset:6.50dB for WCDMA Band V,ATT:35dB ,Offset:7.80dB for WCDMA Band II
4. All modes have been tested and only the worst mode has been shown in the report.

TEST RESULTS



3.6. Radiated Power Measurement

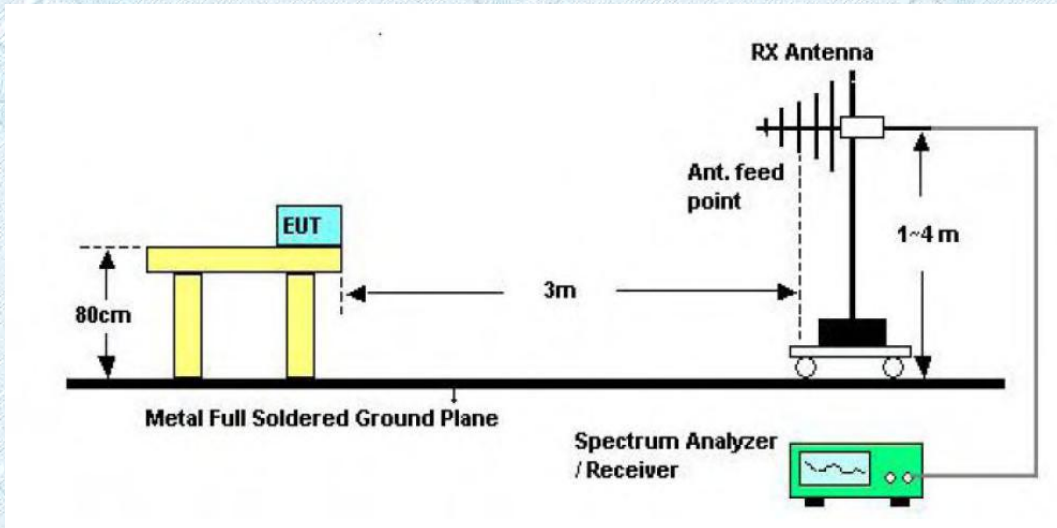
LIMIT

GSM850/WCDMA Band V: 7W ERP

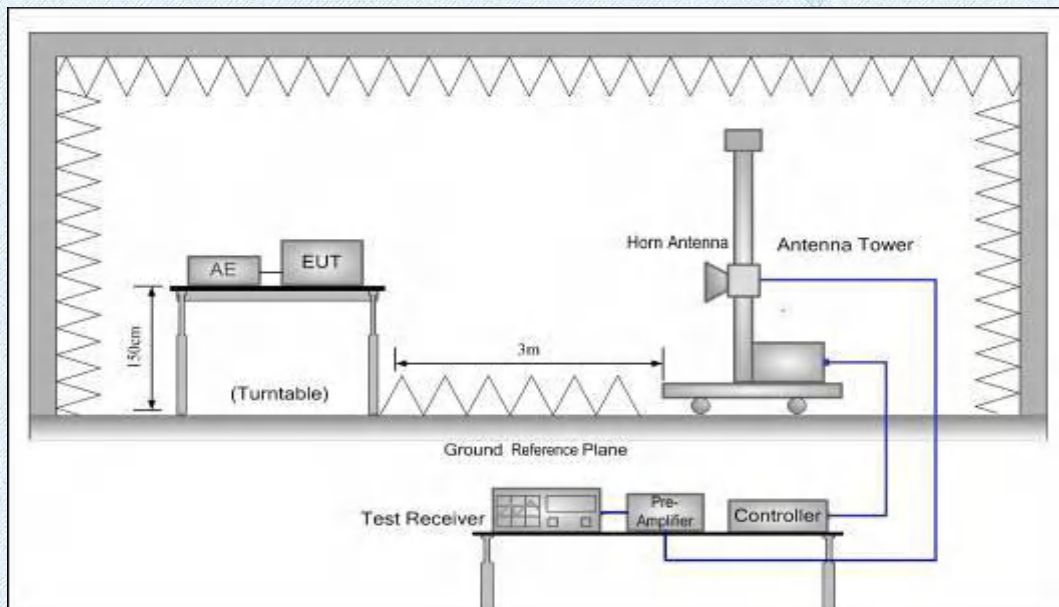
PCS1900/WCDMA Band II/WCDMA Band IV: 2W ERP

TEST CONFIGURATION

For the actual test configuration, please refer to the related Item – EUT Test Photos.



Below 1GHz



Above 1GHz

TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
6. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
We used N5182A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
2. All modes have been tested and only the worst mode has been shown in the report.

Measurement Data (worst case) :

Mode	Channel	Antenna Pol.	EIRP	Limit (dBm)	Result
WCDMA Band II (QPSK)	9262	V	23.76	33.00	Pass
		H	19.98		
	9400	V	23.72		
		H	20.77		
	9538	V	23.96		
		H	20.67		

Mode	Channel	Antenna Pol.	ERP	Limit (dBm)	Result
WCDMA Band V (QPSK)	4132	V	22.07	38.45	Pass
		H	19.39		
	4183	V	21.42		
		H	19.06		
	4233	V	22.14		
		H	18.19		

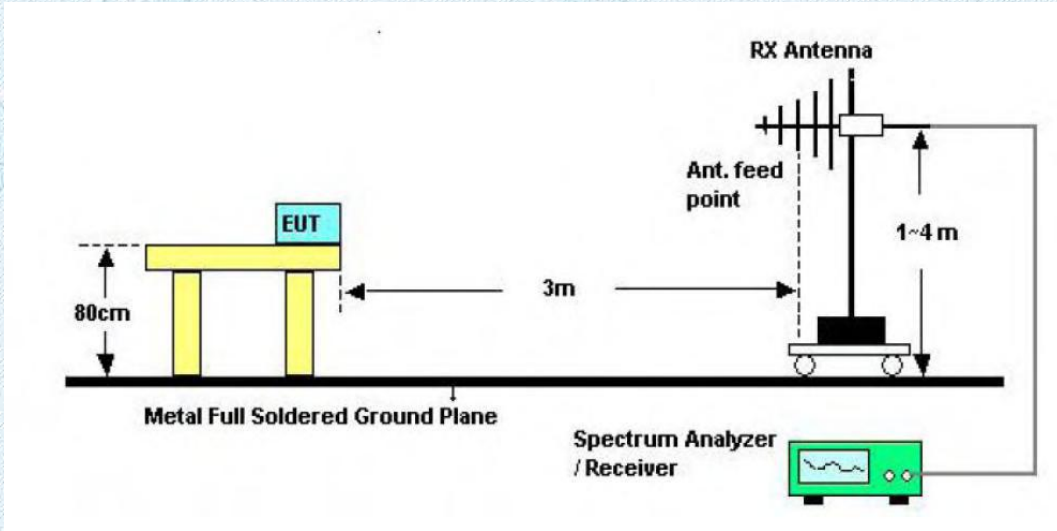
3.7. Radiated Spurious Emission

LIMIT

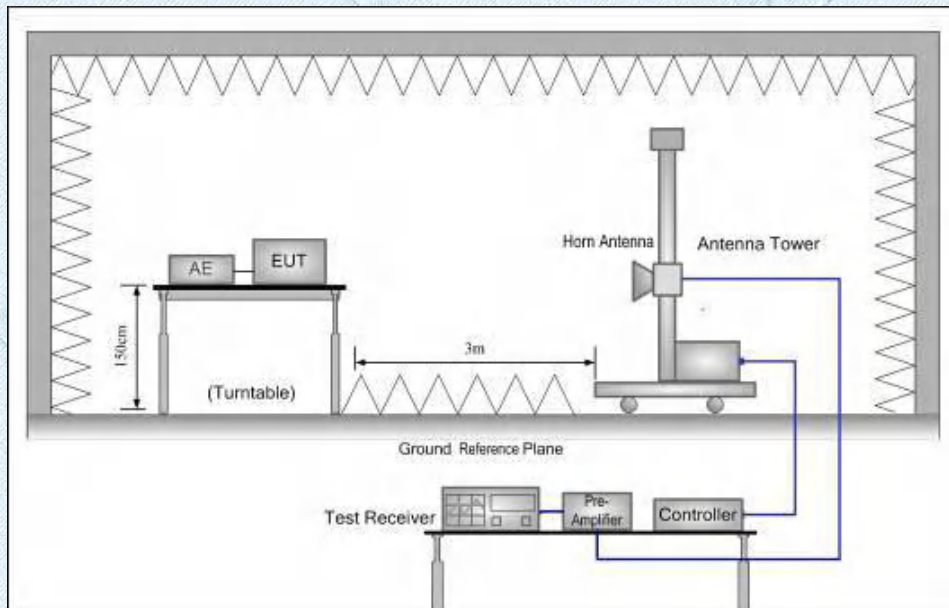
-13dBm

TEST CONFIGURATION

For the actual test configuration, please refer to the related Item – EUT Test Photos.



Below 1GHz



Above 1GHz

TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier should be connected to the Signal Source output port. And the cable should be connecting between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAG) should be recorded after test.
6. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAG - Pcl + Ga
We used SMF100A microwave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.
8. Test frequency range should extend to 10th harmonic of highest fundamental frequency.

TEST RESULTS

Remark:

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.

Measurement Data (worst case):

RMC- WCDMA Band II					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
9262	3705.20	Vertical	-41.72	-13.00	Pass
	5557.80	Vertical	-49.37		
	3705.20	Horizontal	-47.33		
	5557.80	Horizontal	-54.60		
9400	3760.00	Vertical	-41.90		
	5640.00	Vertical	-49.66		
	3760.00	Horizontal	-42.31		
	5640.00	Horizontal	-52.63		
9538	3814.80	Vertical	-40.41		
	5722.20	Vertical	-47.32		
	3814.80	Horizontal	-42.02		
	5722.20	Horizontal	-52.43		

Remark:

The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.

RMC- WCDMA Band V					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
4132	1653.20	Vertical	-41.93	-13.00	Pass
	2479.80	Vertical	-49.30		
	1653.20	Horizontal	-47.20		
	2479.80	Horizontal	-54.58		
4183	1672.80	Vertical	-42.32		
	2509.20	Vertical	-49.73		
	1672.80	Horizontal	-42.46		
	2509.20	Horizontal	-53.07		
4233	1692.80	Vertical	-40.36		
	2539.20	Vertical	-47.40		
	1692.80	Horizontal	-42.06		
	2539.20	Horizontal	-48.66		

Remark:

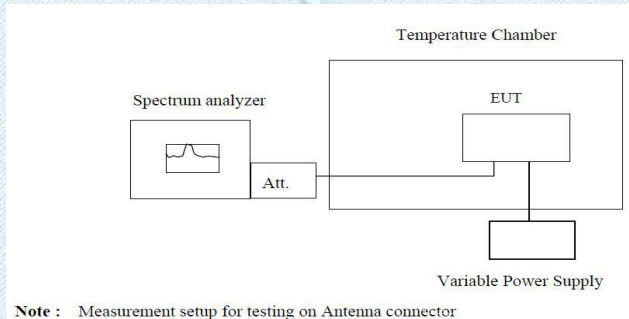
1. The emission levels of below 1 GHz are very lower than the limit above 10dB and not show in test report.

3.8. Frequency stability

LIMIT

Cellular Band: $\pm 2.5\text{ppm}$ PCS Band: Within the authorized frequency block

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

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°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -30°C . After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of $+50^{\circ}\text{C}$ reached.
7. Reduce the input voltage to specified extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark: All modes have been tested and only the worst mode has been shown in the report.

1. Temperature measurement:

WCDMA Band II Middle channel=9400 channel=1880MHz (Frequency Error VS. Voltage)										
Test Mode	Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
			LCH	MCH	HCH	LCH	MCH	HCH		
RMC	NT	LV	-12.774	-9.3126	-12.795	-0.0069	-0.0050	-0.0067	±2.50	PASS
		NV	-12.309	-7.2169	-8.1825	-0.0066	-0.0038	-0.0043	±2.50	PASS
		HV	-15.456	-12.173	-12.674	-0.0083	-0.0065	-0.0066	±2.50	PASS

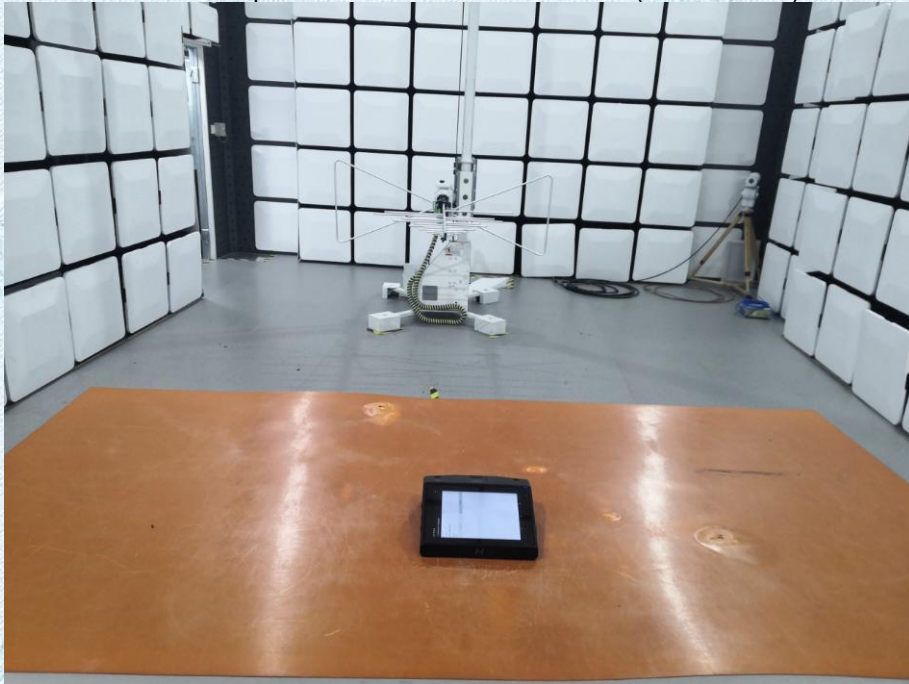
WCDMA Band II Middle channel=9400 channel=1880MHz (Frequency Error VS. Temperature)										
Test Mode	Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
			LCH	MCH	HCH	LCH	MCH	HCH		
		-20.00	-16.665	-13.325	-10.056	-0.0090	-0.0071	-0.0053	±2.50	PASS
		-10.00	-7.7534	-12.230	-8.1611	-0.0042	-0.0065	-0.0043	±2.50	PASS
		0.00	-8.3256	-11.7516	-15.099	-0.0045	-0.0063	-0.0079	±2.50	PASS
		10.00	-12.509	-15.099	-12.052	-0.0068	-0.0080	-0.0063	±2.50	PASS
		20.00	-9.7561	-13.039	-12.509	-0.0053	-0.0069	-0.0066	±2.50	PASS
		30.00	-16.686	-12.981	-12.416	-0.0090	-0.0069	-0.0065	±2.50	PASS
		40.00	-13.861	-16.615	-15.885	-0.0075	-0.0088	-0.0083	±2.50	PASS
		50.00	-11.701	-14.813	-15.764	-0.0063	-0.0079	-0.0083	±2.50	PASS

WCDMA Band V Middle channel=4183 channel=836.6MHz (Frequency Error VS. Voltage)										
Test Mode	Test Temp.	Test Volt.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
			LCH	MCH	HCH	LCH	MCH	HCH		
RMC	NT	LV	-7.1955	-6.4230	-10.035	-0.0087	-0.0077	-0.0119	±2.50	PASS
		NV	-8.3900	-6.8736	-10.657	-0.0102	-0.0082	-0.0126	±2.50	PASS
		HV	-9.0408	-7.2598	-11.6873	-0.0109	-0.0087	-0.0138	±2.50	PASS

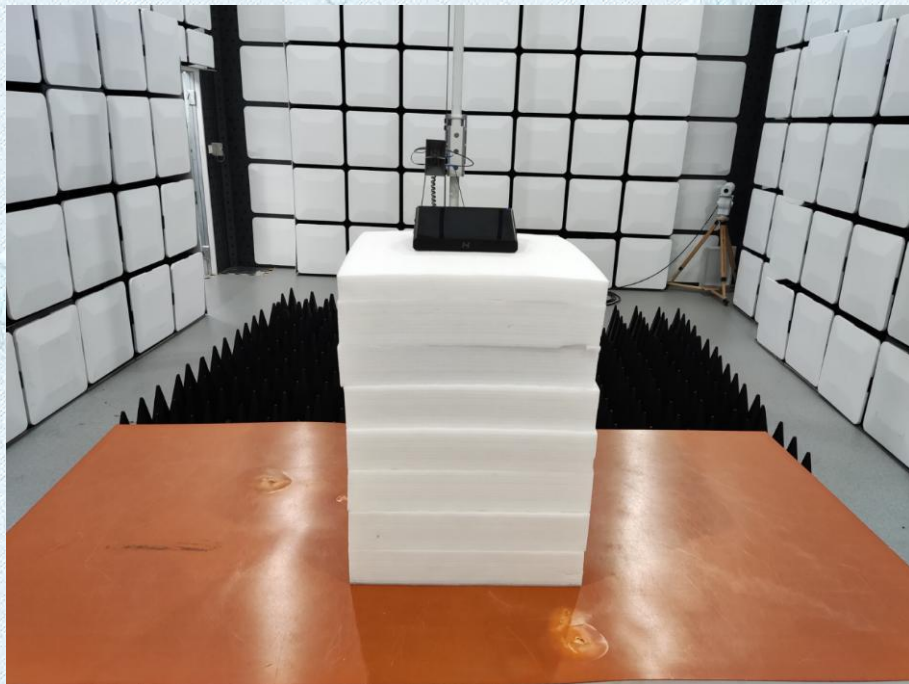
WCDMA Band V Middle channel=4183 channel=836.6MHz (Frequency Error VS. Temperature)										
Test Mode	Test Volt.	Test Temp.	Freq. Error (Hz)			Freq. vs. rated (ppm)			Limit (ppm)	Verdict
			LCH	MCH	HCH	LCH	MCH	HCH		
				-20.00	-11.3726	-7.5102	-11.9448	-0.0138	-0.0090	-0.0141
		-10.00	-12.066	-8.3828	-5.8007	-0.0146	-0.0100	-0.0069	±2.50	PASS
		0.00	-12.710	-9.1052	-7.5531	-0.0154	-0.0109	-0.0089	±2.50	PASS
		10.00	-13.454	-10.192	-12.581	-0.0163	-0.0122	-0.0149	±2.50	PASS
		20.00	-14.798	-10.707	-9.0265	-0.0179	-0.0128	-0.0107	±2.50	PASS
		30.00	-9.2769	-11.2295	-4.5848	-0.0112	-0.0134	-0.0054	±2.50	PASS
		40.00	-6.1584	-12.445	-6.3157	-0.0075	-0.0149	-0.0075	±2.50	PASS
		50.00	-6.6733	-12.939	-7.1883	-0.0081	-0.0155	-0.0085	±2.50	PASS

4. EUT TEST PHOTOS

Radiated Spurious Emission Measurement (Below 1GHz)



Radiated Spurious Emission Measurement (Above 1GHz)



RF Conducted



5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Please Refer to the External attachment for internal photos and external photos.

*****THE END*****