

FCC Radio Test Report

FCC ID: R6H-HZJGSM6031

This report concerns (check one): ☒ Original Grant ☐ Class II Change

Project No. : 1806C012
Equipment : FIXED WIRELESS PHONE
Model Name : CF 6031
Series Model : GW3600
Applicant : HUIZHOU QIAOXING FAMOUS SCIENCE&TECHNOLOGY CO.LTD
Address : QIAOXING SCIENCE INDUSTRIAL PARK,TANGQUAN,HUIZHOU CITY,GAUNGDONG P.R.C

Date of Receipt : Jun. 05, 2018
Date of Test : Jun. 05, 2018 ~ Jun. 11, 2018
Issued Date : Jun. 19, 2018
Tested by : BTL Inc.

Technical Engineer : Shawn Xiao
(Shawn Xiao)

Authorized Signatory : Steven Lu
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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1806C012	Original Issue.	Jun. 19, 2018

1. CERTIFICATION

Equipment : FIXED WIRELESS PHONE
Brand Name : N/A
Model Name : CF 6031
Series Model : GW3600
Applicant : HUIZHOU QIAOXING FAMOUS SCIENCE&TECHNOLOGY CO.LTD
Manufacturer : HUIZHOU QIAOXING FAMOUS SCIENCE&TECHNOLOGY CO.LTD
Address : QIAOXING SCIENCE INDUSTRIAL PARK,TANGQUAN,HUIZHOU
CITY,GAUNGDONG P.R.C
Factory : HUIZHOU QIAOXING FAMOUS SCIENCE&TECHNOLOGY CO.LTD
Address : QIAOXING SCIENCE INDUSTRIAL PARK,TANGQUAN,HUIZHOU
CITY,GAUNGDONG P.R.C
Date of Test : Jun. 05, 2018 ~ Jun. 11, 2018
Test Sample : Engineering Sample NO.: D180604762
Standard(s) : 47 CFR FCC Part 22 Subpart H
47 CFR FCC Part 2
ANSI/TIA-603-D-2010
KDB 971168 D01 Power Meas License Digital Systems v03

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1806C012) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP according to the ISO-17025 quality assessment standard and technical standard(s).

Test result included in this report is only for the GSM850, WCDMA Band 5

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 22 Subpart H & Part 2			
Standard(s) Section	Test Item	Judgment	Tested By
2.1046 22.913(a)	Radiated power	PASS	Paul Li
2.1046 22.913(a)	Conducted Output Power	PASS	Paul Li
2.1049(h) 22.917(a)	Occupied Bandwidth	PASS	Paul Li
2.1051 22.917(a)	Conducted Spurious Emissions	PASS	Paul Li
2.1053 22.917(a)	Radiated Spurious Emissions	PASS	Paul Li
22.917(a)	Band Edge Measurements	PASS	Paul Li
-	Peak To Average Ratio	PASS	Paul Li
2.1055 22.355	Frequency Stability	PASS	Paul Li

Note:

(1) "N/A" denotes test is not applicable to this device.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's test firm number for FCC: 854385

BTL's designation number for FCC: CN5020

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor) $k=1.96$ or $k=2$ (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$.

The BTL measurement uncertainty as below table:

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 18GHz	V	3.12
		1GHz ~ 18GHz	H	3.68

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (1m)	CISPR	18GHz ~ 40GHz	V	4.15
		18GHz ~ 40GHz	H	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	FIXED WIRELESS PHONE			
Brand Name	N/A			
Model Name	CF 6031			
Series Model	GW3600			
Model Difference	Only differ in model name.			
Modulation Type	GSM/GPRS	GMSK		
	EDGE	GMSK, 8PSK		
	WCDMA	UP: BPSK DL: QPSK,		
	WCDMA(HSDPA)	16QAM		
Operation Frequency	GSM /EDGE/GPRS	824.2 ~ 848.8 MHz		
	WCDMA Band 5	826.4 ~ 846.6 MHz		
Max. ERP Power	GSM/GPRS	GMSK	30.52	dBm
	EDGE	8PSK	23.97	dBm
	WCDMA	BPSK	20.54	dBm
	WCDMA_HSDPA	16QAM	19.21	dBm
Antenna Type	External Antenna			
Antenna Gain	0.95 dBi(GSM 850), 095 dBi(WCDMA BAND 5)			
Hardware Version	GW3500-A-MB_V1.1			
Softwarre Version	COSUN_CF6031_CLARO_B2B5_0006			
IMEI No.	Radiated	352273017386340		
	Conducted	352273017386340		
Power Source	#1 DC Voltage supplied from AC/DC adapter. #2 Supplied from battery.			
Power Rating	#1 AC 100–240V 50/60Hz 150mA #2 DC 3.7V/1000mAh			

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. European adapter is used for the purpose of exporting to Chile.

3.2 DESCRIPTION OF TEST MODES AND TEST CONDITION

Following channel(s) was (were) selected for the final test as listed below:

GSM MODE			
Test Item	Available Channel	Tested Channel	Mode
ERP	128 to 251	128, 190, 251	GSM, EDGE
Conducted Output Power	128 to 251	128, 190, 251	GSM, EDGE
Occupied Bandwidth	128 to 251	128, 190, 251	GSM, EDGE
Conducuted Emission	128 to 251	128	GSM, EDGE
Radiated Emission	128 to 251	128	GSM, EDGE
Band Edge	128 to 251	128, 251	GSM, EDGE
Peak to Average Ratio	128 to 251	128, 190, 251	GSM, EDGE
Frequency Stability	128 to 251	190	GSM

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in **128 CH**.

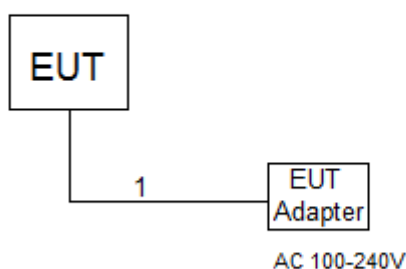
WCDMA MODE			
Test Item	Available Channel	Tested Channel	Mode
ERP	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA
Conducted Output Power	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA
Conducuted Emission	4132 to 4233	4132	WCDMA, HSDPA
Radiated Emission	4132 to 4233	4132	WCDMA, HSDPA
Band Edge	4132 to 4233	4132, 4233	WCDMA, HSDPA
Peak to Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA
Frequency Stability	4132 to 4233	4182	WCDMA

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in **4132 CH**.

EUT TEST CONDITIONS:

Test Item	Environmental Conditions	Test Voltage
ERP	25°C, 60%RH	AC 120V/60Hz
Conducted Output Power	25°C, 65%RH	AC 120V/60Hz
Occupied Bandwidth	25°C, 65%RH	AC 120V/60Hz
Conducted Emission	25°C, 65%RH	AC 120V/60Hz
Radiated Emission	25°C, 60%RH	AC 120V/60Hz
Band Edge	25°C, 65%RH	AC 120V/60Hz
Peak to Average Ratio	25°C, 65%RH	AC 120V/60Hz
Frequency Stability	25°C, 65%RH	AC 108V , AC 120V, AC 132V

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED FOR RADIATED



3.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.2m	DC cable

4. TEST RESULT

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMIT

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 TEST PROCEDURE

EIRP/ERP:

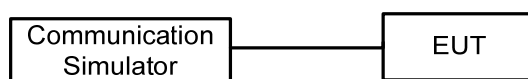
1. ERP power=EIPR power-2.15dBi.

Conducted Power:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, 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.

4.1.3 TESTSETUP LAYOUT

Conducted Power Measurement



4.1.4 TEST DEVIATION

No deviation

4.1.5 TEST RESULTS

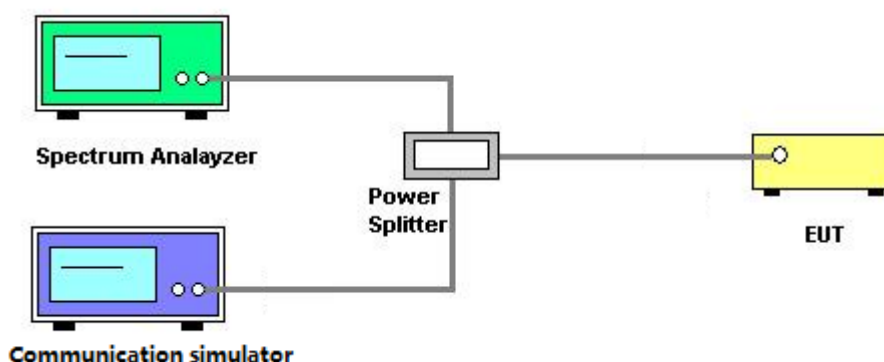
Please refer to the Appendix A.

4.2 OCCUPIED BANDWIDTH MEASUREMENT

4.2.1 TEST PROCEDURE

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 and 26dB bandwidth.

4.2.2 TEST SETUP LAYOUT



4.2.3 TEST DEVIATION

No deviation

4.2.4 TEST RESULTS

Please refer to the Appendix B.

4.3 CONDUCTED EMISSIONS MEASUREMENT

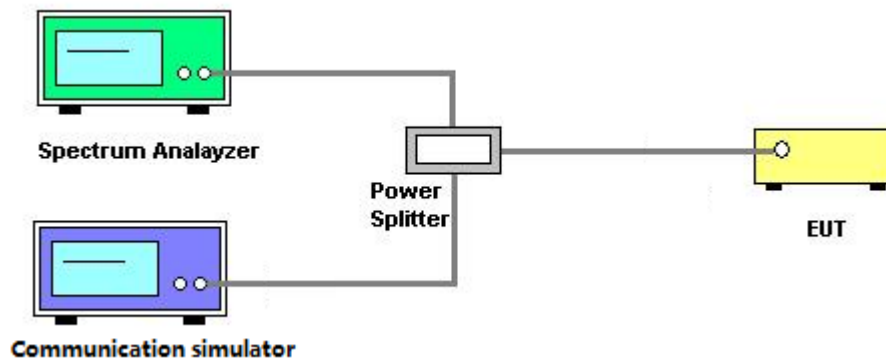
4.3.1 LIMIT

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.

4.3.2 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v03 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set $RBW \geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10 \log(P)](dB)$
 $= [30 + 10 \log(P)](dBm) - [43 + 10 \log(P)](dB)$
 $= -13dBm$

4.3.3 TESTSETUP LAYOUT



4.3.4 TESTDEVIATION

No deviation

4.3.5 TEST RESULTS

Please refer to the Appendix C.

4.4 RADIATED EMISSIONS MEASUREMENT

4.4.1 LIMIT

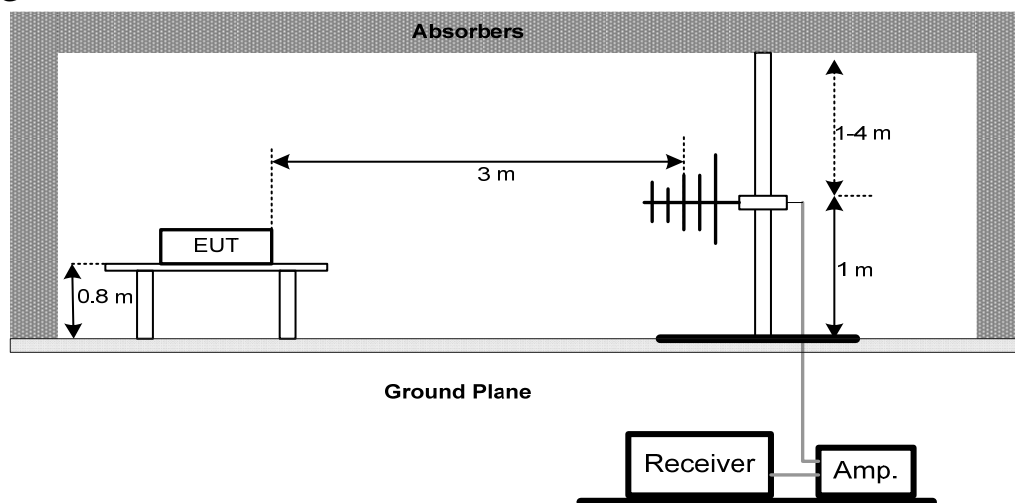
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm.

4.4.2 TEST PROCEDURES

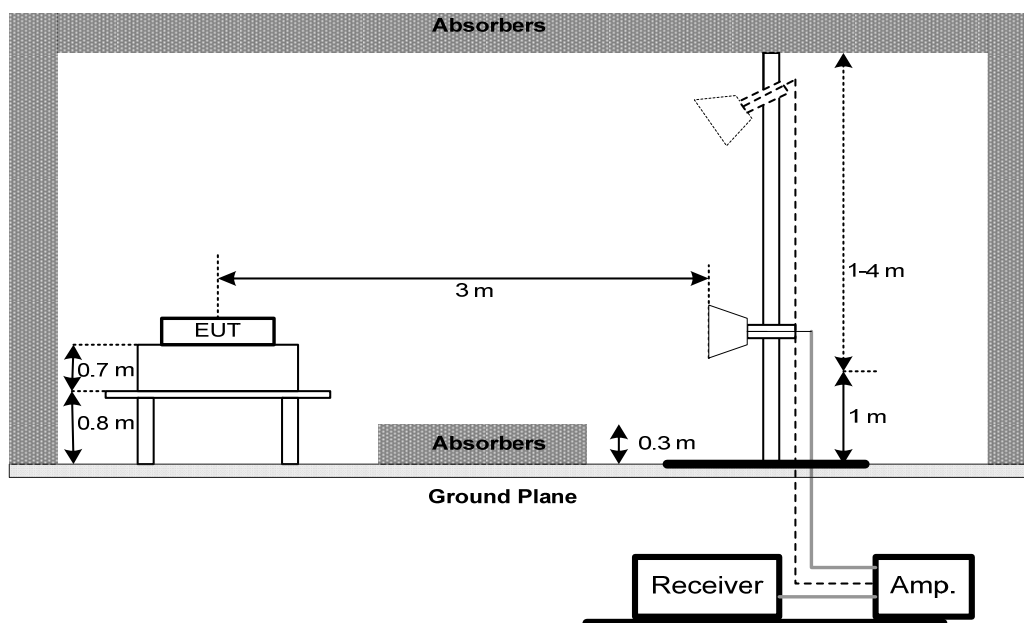
1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value. (below 1GHz)
2. For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table or support at a nominal height of 1.5 m above the ground plane. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The height scan of the measurement antenna shall be varied from 1 m to 4 m in a search for the relative positioning that produces the maximum radiated signal level (i.e., field strength or received power). When using the direct field strength method and the EUT is manipulated through three different orientations, then the scan height range of the measurement antenna is limited to 2.5 m, or 0.5 m above the top of the EUT, whichever is higher. (above 1GHz)
3. 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
4. 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.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.4.3 TESTSETUP LAYOUT

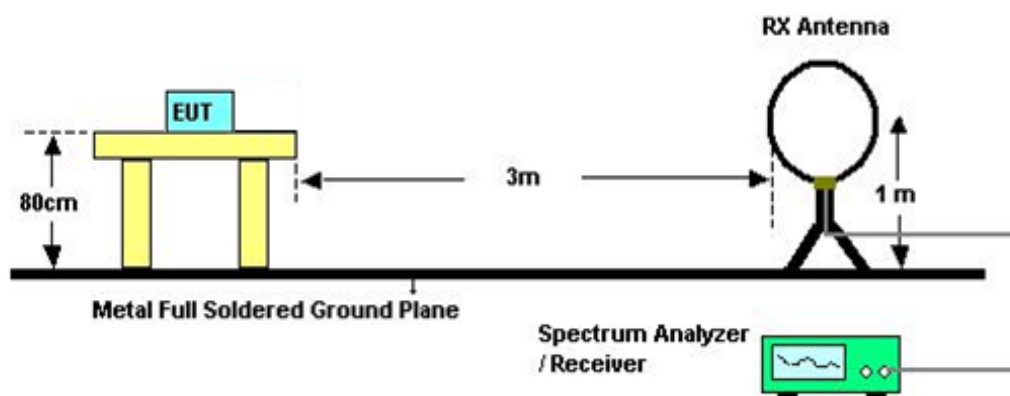
Below 1G



Above 1G



Below 30MHz



4.4.4 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix D.

4.4.5 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the Appendix E.

4.4.6 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the Appendix F.

4.5 BAND EDGE MEASUREMENT

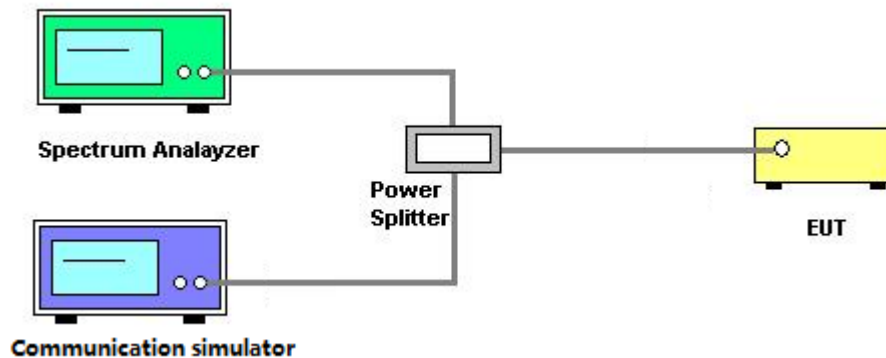
4.5.1 LIMIT

A 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.

4.5.2 TEST PROCEDURES

1. All measurements were done at low and high operational frequency range.
2. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/GPRS/EDGE).
3. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).
4. Record the max trace plot into the test report.

4.5.3 TESTSETUP LAYOUT



4.5.4 TESTDEVIATION

No deviation

4.5.5 TEST RESULTS

Please refer to the Appendix G.

4.6 PEAK TO AVERAGE RATIO MEASUREMENT

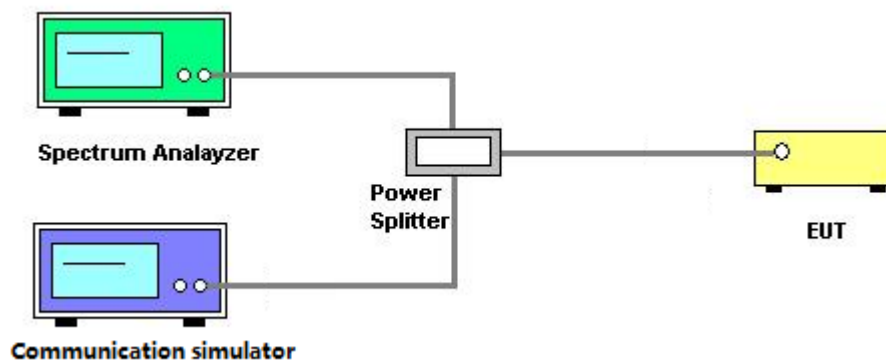
4.6.1 LIMIT

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.

4.6.2 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%.

4.6.3 TESTSETUP LAYOUT



4.6.4 TESTDEVIATION

No deviation

4.6.5 TEST RESULTS

Please refer to the Appendix H.

4.7 FREQUENCY STABILITY MEASUREMENT

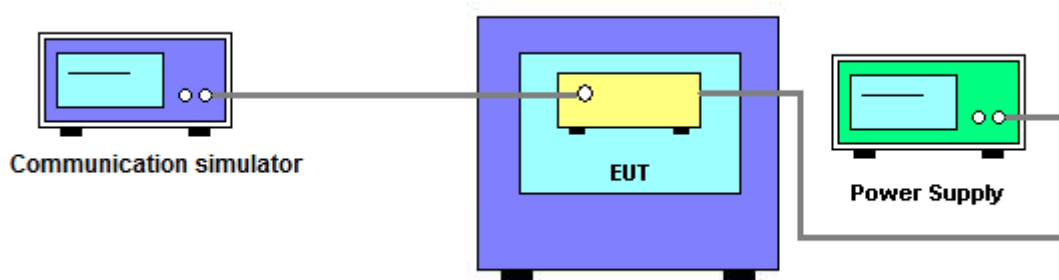
4.7.1 LIMIT

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

4.7.2 TEST PROCEDURES

1. 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.
2. 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.
3. 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.
4. The frequency error was recorded frequency error from the communication simulator.

4.7.3 TESTSETUP LAYOUT



4.7.4 TESTDEVIATION

No deviation

4.7.5 TEST RESULTS

Please refer to the Appendix I.

5. LIST OF MEASUREMENT EQUIPMENTS

Radiated Emission & ERP or EIRP Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 11, 2019
2	Amplifier	Agilent	8449B	3008A02274	Mar. 11, 2019
3	Amplifier	HP	8447D	2944A09673	Oct. 19, 2018
4	HighPass Filter	Wairwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Mar. 11, 2019
5	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1710/1785-1690/180 5-60/12SS	38	Mar. 11, 2019
6	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 824/849-810/863-60/ 9SS	7	Mar. 11, 2019
7	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 880/915-860/935-60/ 9SS	14	Mar. 11, 2019
8	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1850/1910-1830/193 0-60/10SS	17	Mar. 11, 2019
9	HighPass Filter	Wairwright Instruments Gmbh	WHK3.1/18G-10SS	24	Mar. 11, 2019
10	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 11, 2019
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 11, 2019
12	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
13	wideband radio communication tester	R&S	CMW500	152372	Mar. 11, 2019
14	Cable	emci	LMR-400(30MHz-1G Hz)(8m+5m)	N/A	Jun. 26, 2018
15	Cable	emci	EMC104-SM-SM-12 000(12m)	N/A	Jun. 26, 2018
16	Controller	ETS-Lindgren	2090	N/A	N/A
17	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Conducted Emission & Band Edge & Occupied Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 11, 2019
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 11, 2019
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 11, 2019
4	wideband radio communication tester	R&S	CMW500	152372	Mar. 11, 2019

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 11, 2019
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 11, 2019
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 11, 2019
4	wideband radio communication tester	R&S	CMW500	152372	Mar. 11, 2019

Remark: "N/A" denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

6. EUT TEST PHOTO

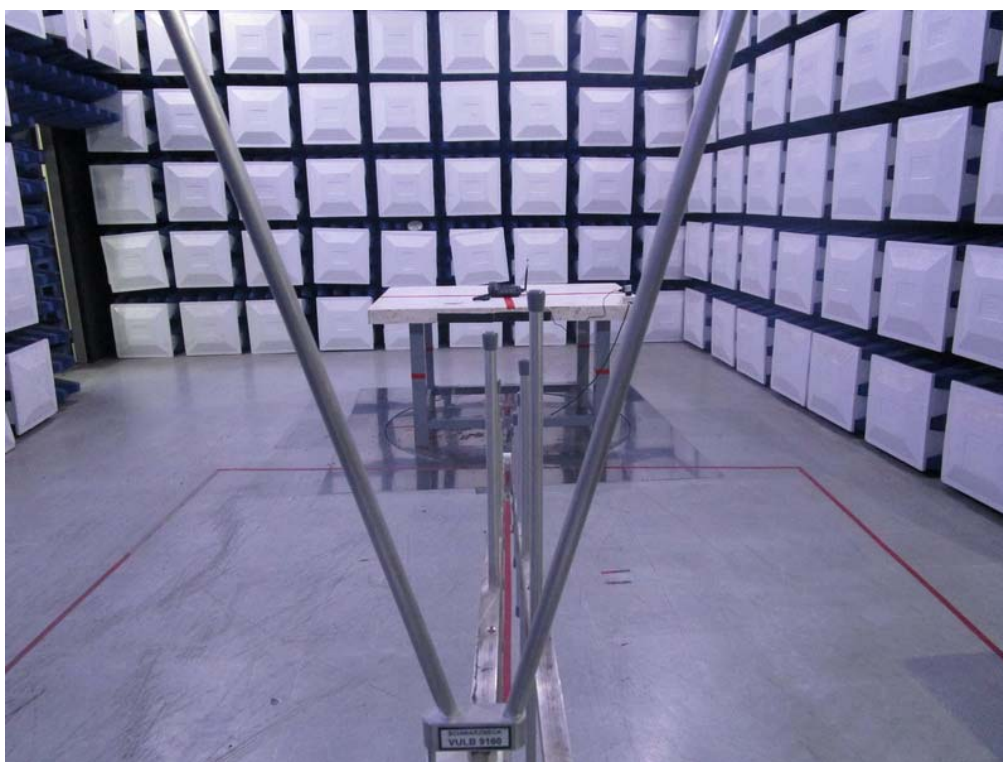
Radiated Measurement Photos

9KHz to 30MHz



Radiated Measurement Photos

30MHz to 1000MHz



Radiated Measurement Photos

Above 1GHz



APPENDIX A - OUTPUT POWER

Conducted Power:

GSM850		Burst Conducted Power (dBm)		
		128CH	190CH	251CH
		824.2MHz	836.6MHz	848.8MHz
GSM (CS)		31.72	31.34	31.40
GPRS/EDGE (GMSK)	1 Tx Slot	31.68	31.31	30.37
	2 Tx Slot	29.68	29.61	29.73
	3 Tx Slot	27.62	27.57	27.82
	4 Tx Slot	25.35	25.69	25.61
EDGE (8PSK)	1 Tx Slot	24.98	25.17	24.86
	2 Tx Slot	24.72	24.85	24.72
	3 Tx Slot	23.36	23.64	23.51
	4 Tx Slot	21.12	21.36	21.06

Modulation	Band	WCDMA V		
	Tx Channel	4132CH	4182CH	4233CH
	Rx Channel	4357CH	4407CH	4458CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
BPSK	RMC 12.2K	21.74	21.43	21.25
	RMC 64K	21.70	21.42	21.19
	RMC 144K	21.73	21.39	21.26
	RMC 384K	21.71	21.39	21.27
16QAM	HSDPA Subtest-1	20.34	19.77	20.01
	HSDPA Subtest-2	20.38	19.84	20.05
	HSDPA Subtest-3	20.41	19.81	20.08
	HSDPA Subtest-4	20.21	19.83	19.91

ERP Power:

GSM850	ERP Power (dBm)		
	128CH	190CH	251CH
	824.2MHz	836.6MHz	848.8MHz
GSM (CS)	30.52	30.14	30.20
GPRS/EDGE (GMSK)	30.48	30.11	29.17
	28.48	28.41	28.53
	26.42	26.37	26.62
	24.15	24.49	24.41
EDGE (8PSK)	23.78	23.97	23.66
	23.52	23.65	23.52
	22.16	22.44	22.31
	19.92	20.16	19.86

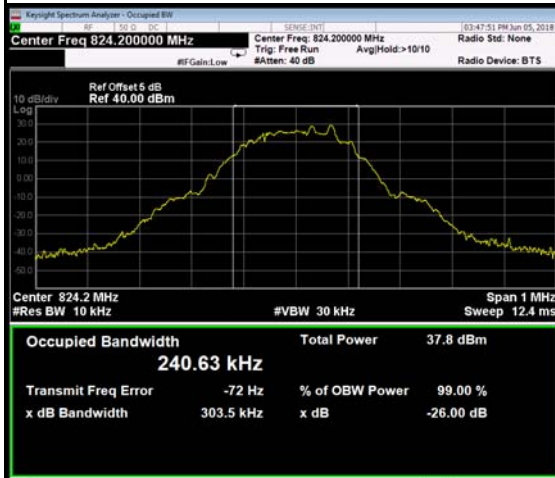
Modulation	Band	WCDMA V		
	Tx Channel	4132CH	4182CH	4233CH
	Rx Channel	4357CH	4407CH	4458CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
BPSK	RMC 12.2K	20.54	20.23	20.05
	RMC 64K	20.50	20.22	19.99
	RMC 144K	20.53	20.19	20.06
	RMC 384K	20.51	20.19	20.07
16QAM	HSDPA Subtest-1	19.14	18.57	18.81
	HSDPA Subtest-2	19.18	18.64	18.85
	HSDPA Subtest-3	19.21	18.61	18.88
	HSDPA Subtest-4	19.01	18.63	18.71

APPENDIX B - OCCUPIED BANDWIDTH

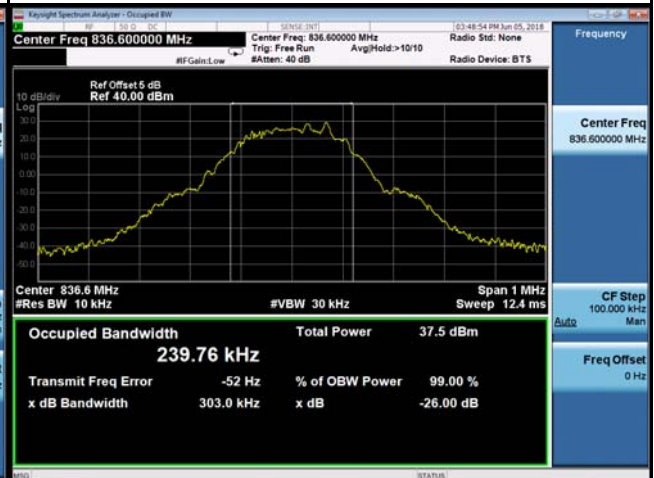
GSM850					
GSM			EDGE		
CS			8PSK		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
128	824.2	0.241	128	824.2	0.240
190	836.6	0.240	190	836.6	0.241
251	848.8	0.243	251	848.8	0.242
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
128	824.2	0.304	128	824.2	0.307
190	836.6	0.303	190	836.6	0.303
251	848.8	0.303	251	848.8	0.311

Spectrum Plot

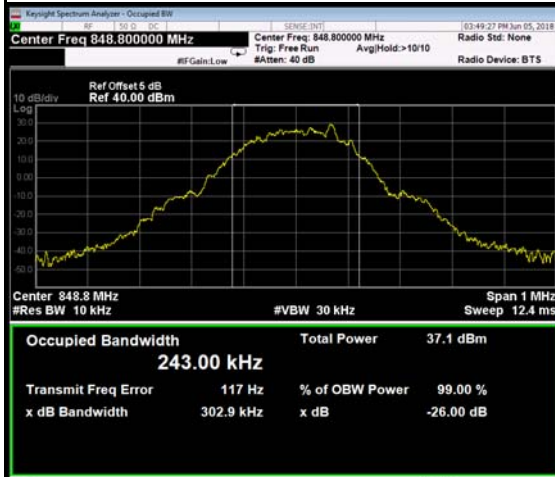
GSM -128



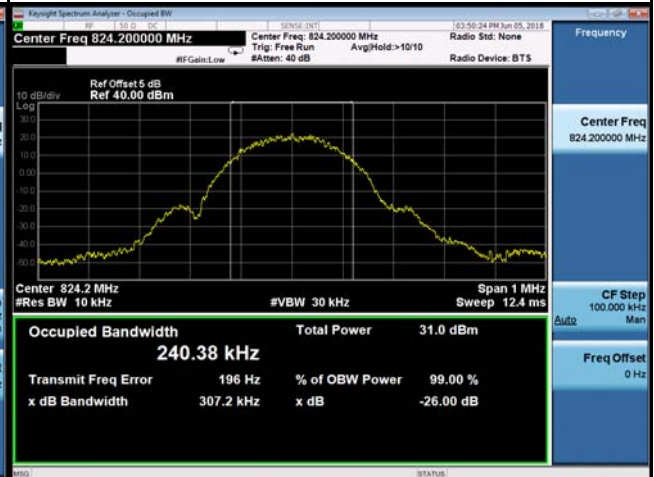
GSM-190



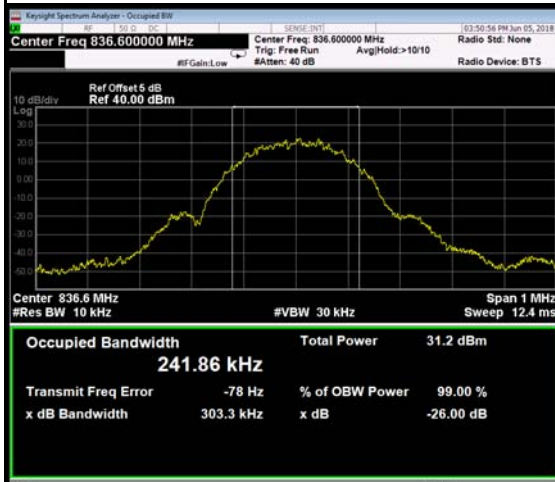
GSM-251



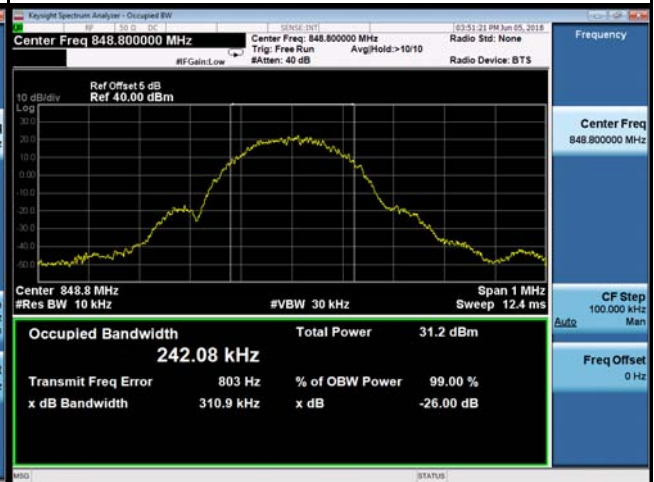
EDGE-128



EDGE-190



EDGE-251



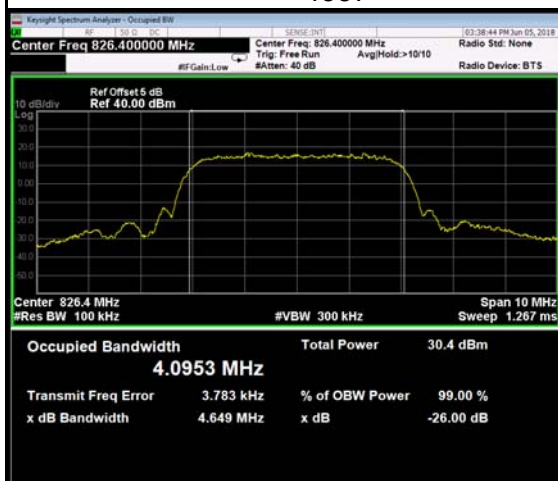
WCDMA Band V

BPSK

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4357	826.4	4.095	4357	826.4	4.649
4407	836.4	4.081	4407	836.4	4.648
4458	846.6	4.094	4458	846.6	4.651

Spectrum Plot

4357



4407



4458



-

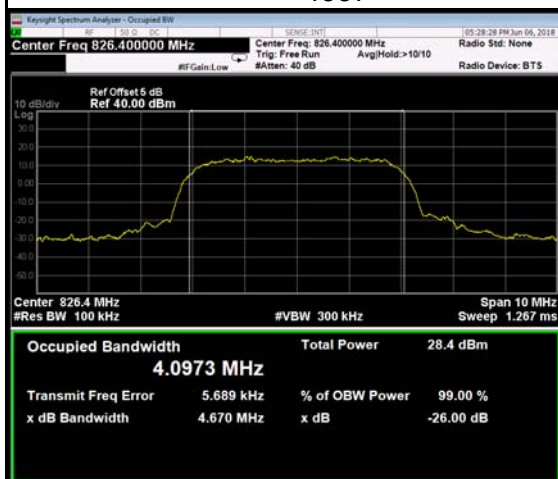
WCDMA_HSDPA Band V

16QAM

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4357	826.4	4.097	4357	826.4	4.670
4407	836.4	4.075	4407	836.4	4.659
4458	846.6	4.098	4458	846.6	4.667

Spectrum Plot

4357



4407



4458



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APPENDIX C - CONDUCTED EMISSIONS

GSM850			
GSM		GSM	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
128	824.2	128	824.2
Date: 4.JUN.2018 19:40:40		Date: 4.JUN.2018 19:43:26	
GSM		EDGE	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
128	824.2	190	836.6
Date: 4.JUN.2018 19:49:15		Date: 4.JUN.2018 19:56:22	
EDGE		EDGE	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
190	836.6	190	836.6
Date: 4.JUN.2018 19:57:28		Date: 4.JUN.2018 19:53:08	

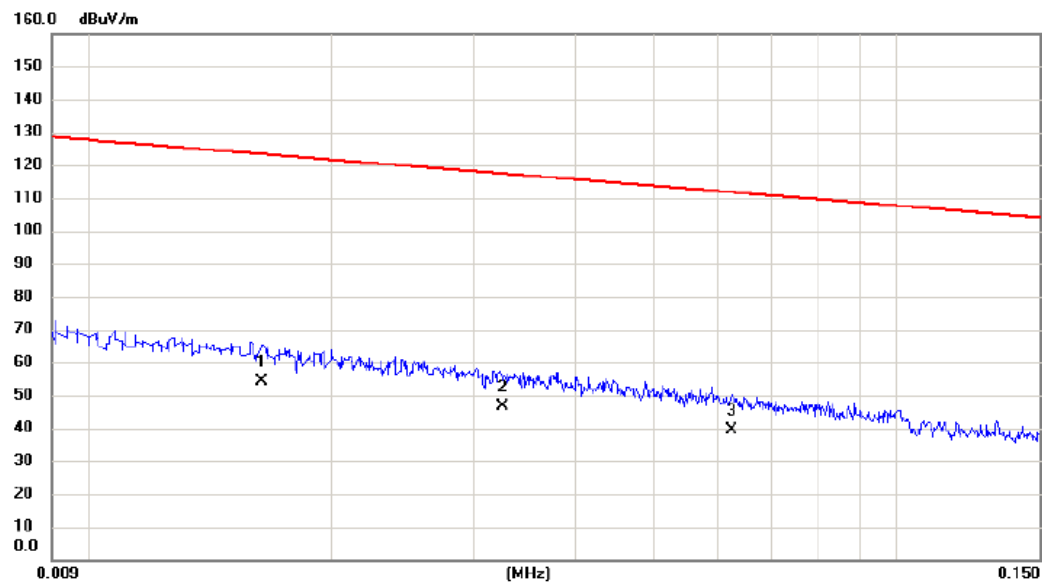
WCDMA Band V			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
4357	826.4	4357	826.4
Date: 4.JUN.2018 20:06:13		Date: 4.JUN.2018 20:04:31	
Channel	Frequency(MHz)	-	-
4357	826.4	-	-
Date: 4.JUN.2018 20:17:23		-	

WCDMA_HSDPA Band V			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
4357	826.4	4357	826.4
Date: 4.JUN.2018 20:08:46		Date: 4.JUN.2018 20:12:37	
Channel	Frequency(MHz)	-	-
4357	826.4	-	-
Date: 4.JUN.2018 20:20:17		-	

APPENDIX D - RADIATED EMISSION (9KHZ TO 30MHZ)

Test Mode:	TX Mode
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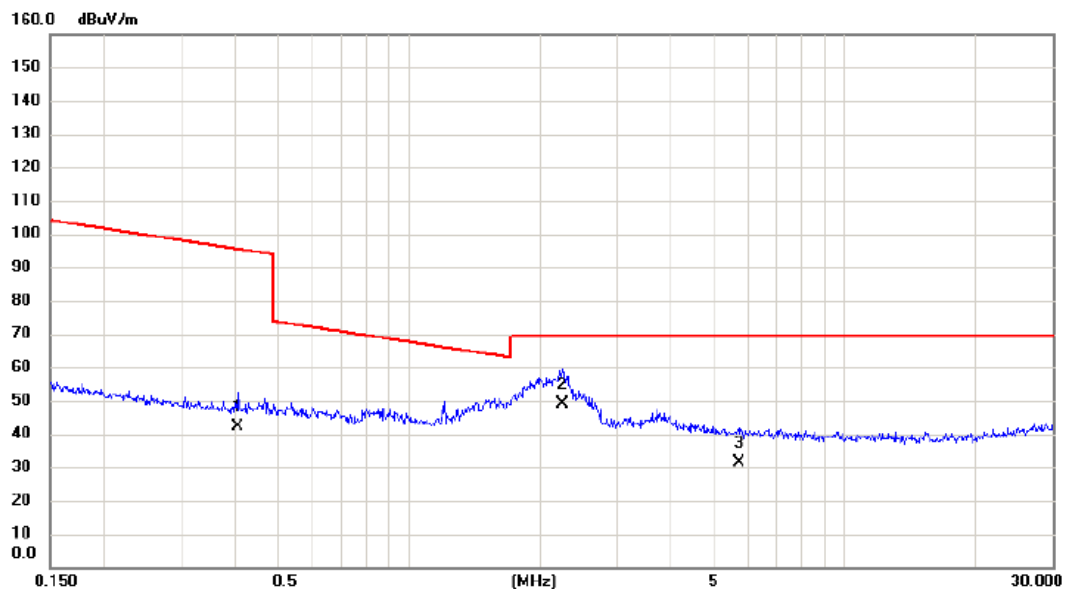
Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0164	33.80	20.52	54.32	123.31	-68.99	AVG	
2		0.0325	26.70	19.81	46.51	117.37	-70.86	AVG	
3		0.0625	20.30	19.28	39.58	111.69	-72.11	AVG	

Test Mode: TX Mode

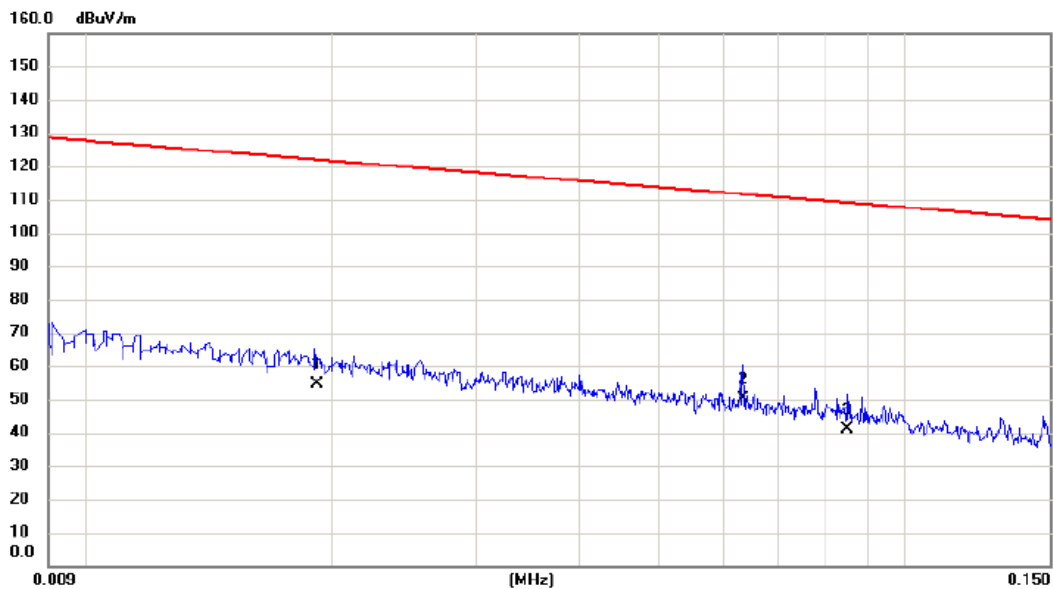
Ant 0°



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.4061	25.20	17.00	42.20	95.43	-53.23	AVG	
2	*	2.2486	32.10	16.96	49.06	69.54	-20.48	QP	
3		5.7135	16.20	15.05	31.25	69.54	-38.29	QP	

Test Mode: TX Mode

Ant 90°

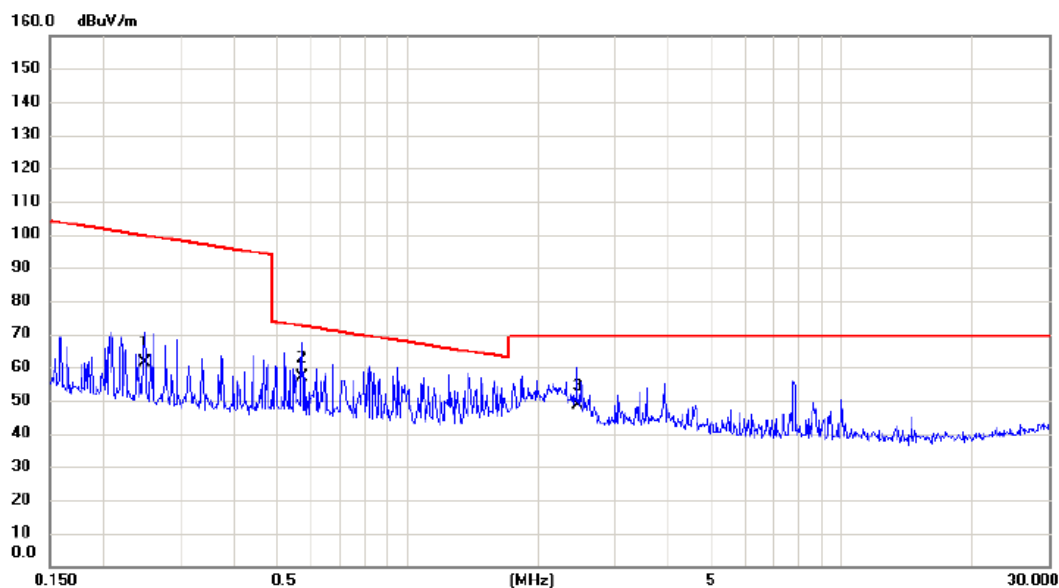


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0192	34.50	20.13	54.63	121.94	-67.31	AVG	
2	*	0.0634	31.10	19.26	50.36	111.56	-61.20	AVG	
3		0.0851	22.40	18.79	41.19	109.01	-67.82	AVG	

Test Mode:

TX Mode

Ant 90°

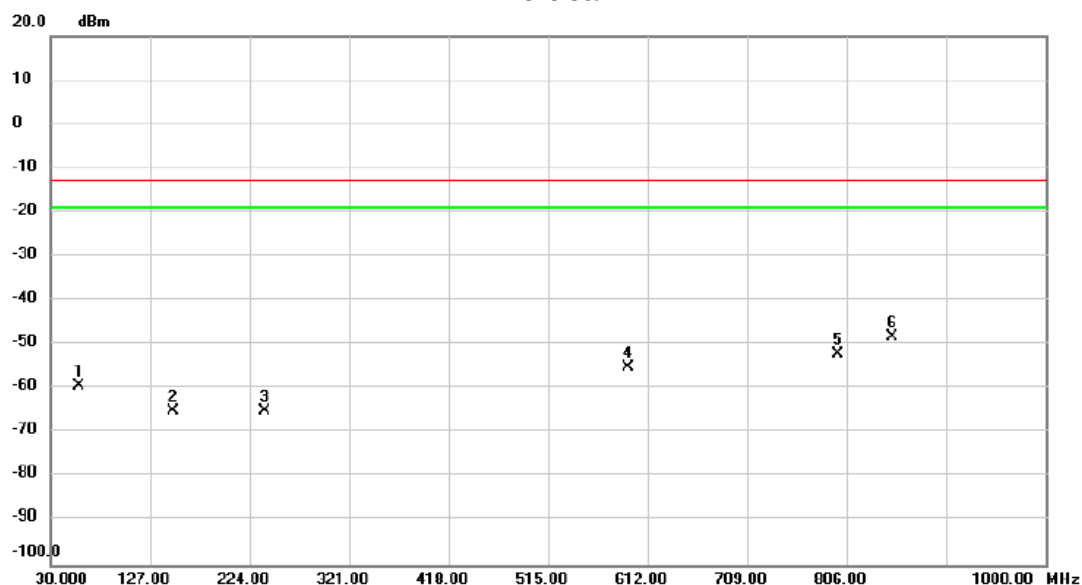


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.2481	44.30	17.06	61.36	99.71	-38.35	AVG	
2	*	0.5701	40.00	16.94	56.94	72.48	-15.54	QP	
3		2.4606	31.70	16.84	48.54	69.54	-21.00	QP	

APPENDIX E - RADIATED EMISSION (30MHZ TO 1GHZ)

Test Mode:	GSM850_TX CH128_GSM
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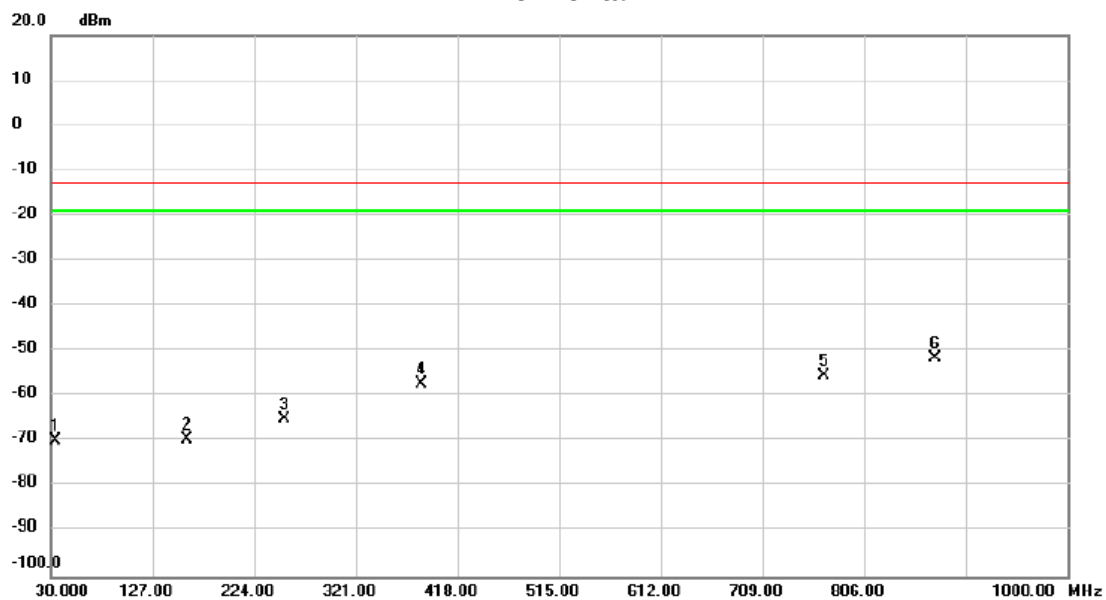
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		57.160	-60.99	1.74	-59.25	-13.00	-46.25	peak	
2		149.310	-68.24	3.08	-65.16	-13.00	-52.16	peak	
3		238.550	-65.41	0.27	-65.14	-13.00	-52.14	peak	
4		593.570	-63.82	8.54	-55.28	-13.00	-42.28	peak	
5		797.270	-64.21	11.91	-52.30	-13.00	-39.30	peak	
6	*	850.620	-62.75	14.46	-48.29	-13.00	-35.29	peak	

Test Mode:	GSM850_TX CH128_GSM
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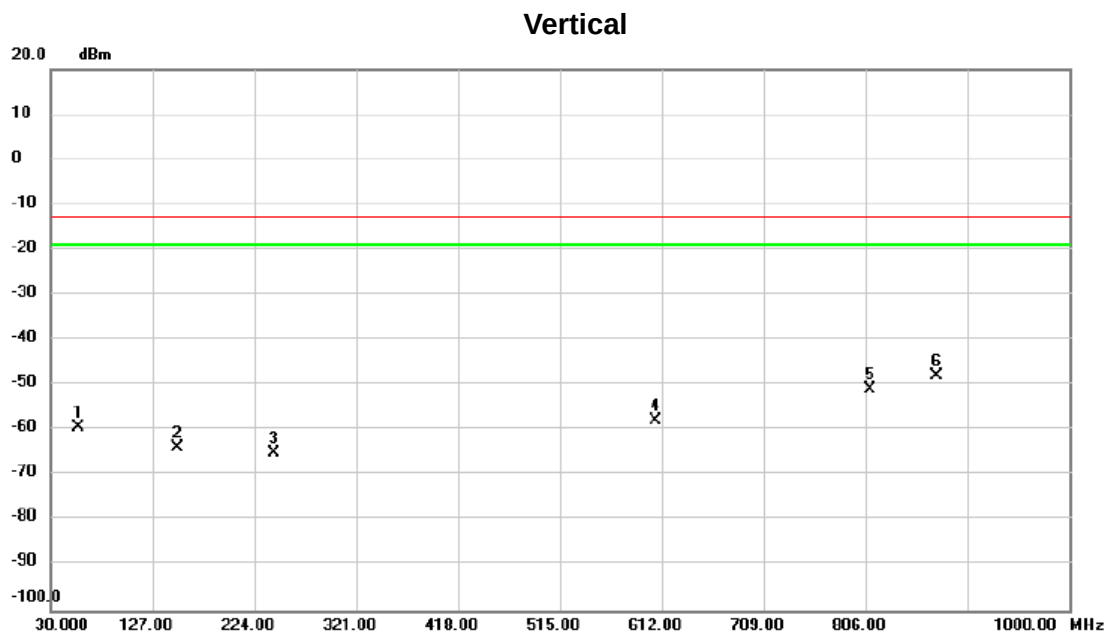
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		33.880	-70.62	0.65	-69.97	-13.00	-56.97	peak	
2		159.980	-72.21	2.75	-69.46	-13.00	-56.46	peak	
3		253.100	-66.98	1.89	-65.09	-13.00	-52.09	peak	
4		384.050	-63.18	6.06	-57.12	-13.00	-44.12	peak	
5		768.170	-67.85	12.50	-55.35	-13.00	-42.35	peak	
6	*	873.900	-64.00	12.37	-51.63	-13.00	-38.63	peak	

Test Mode:

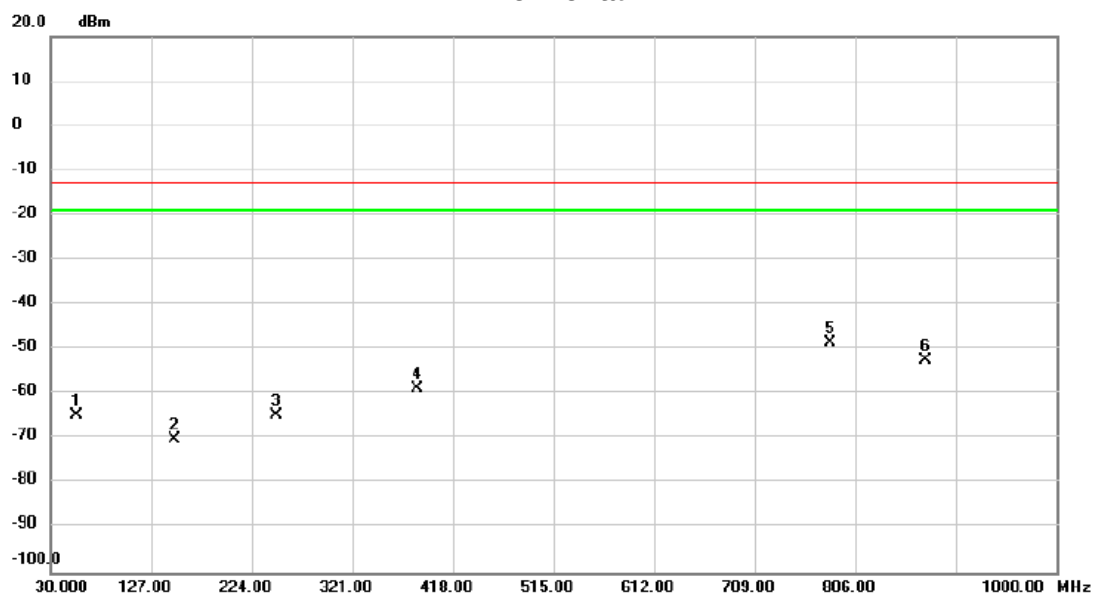
GSM850_TX CH190_EDGE



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		56.190	-61.56	2.18	-59.38	-13.00	-46.38	peak	
2		150.280	-67.10	3.15	-63.95	-13.00	-50.95	peak	
3		242.430	-65.18	0.22	-64.96	-13.00	-51.96	peak	
4		606.180	-66.73	8.88	-57.85	-13.00	-44.85	peak	
5		809.880	-63.34	12.39	-50.95	-13.00	-37.95	peak	
6	*	873.900	-61.68	13.62	-48.06	-13.00	-35.06	peak	

Test Mode: GSM850_TX CH190_EDGE

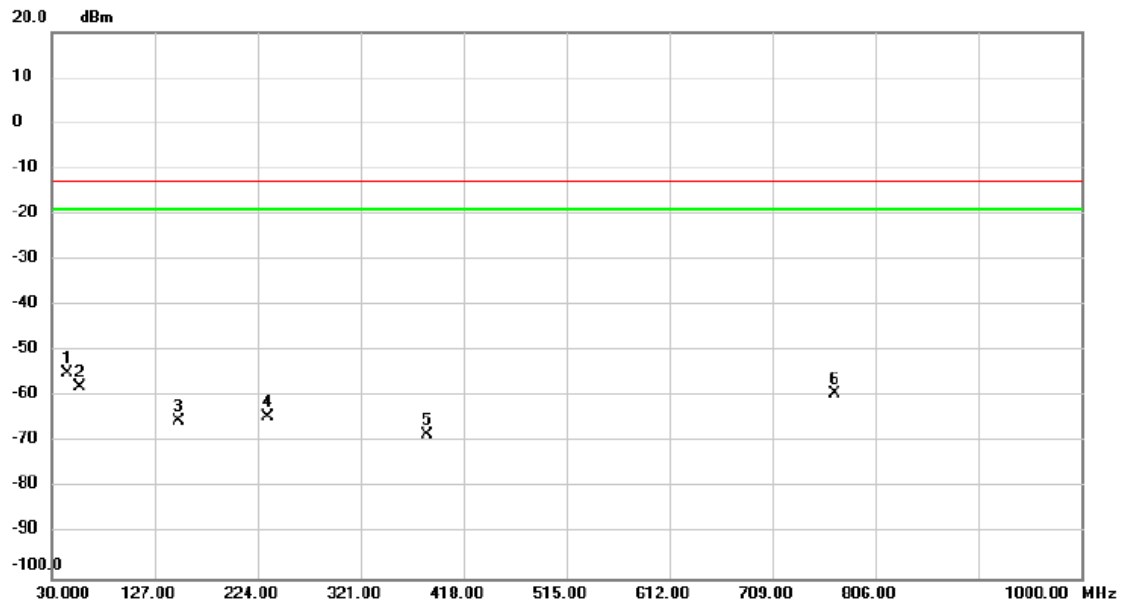
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		55.220	-67.15	2.53	-64.62	-13.00	-51.62	peak	
2		149.310	-74.45	4.16	-70.29	-13.00	-57.29	peak	
3		248.250	-66.85	1.96	-64.89	-13.00	-51.89	peak	
4		384.050	-64.71	6.06	-58.65	-13.00	-45.65	peak	
5	*	781.750	-60.84	12.31	-48.53	-13.00	-35.53	peak	
6		873.900	-64.69	12.37	-52.32	-13.00	-39.32	peak	

Test Mode:	WCDMA Band V_TX CH4132
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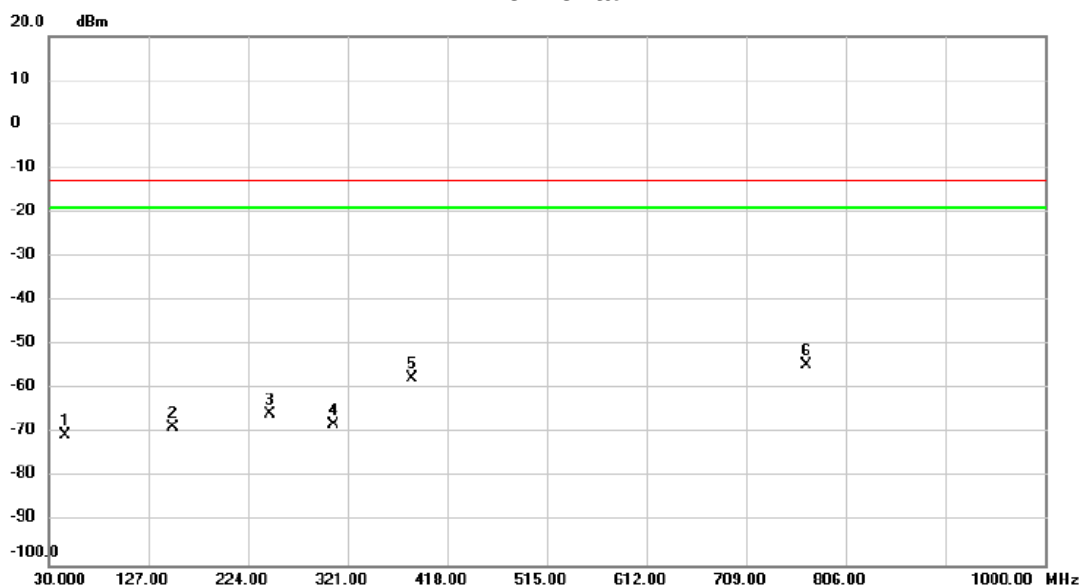
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	44.550	-56.69	1.96	-54.73	-13.00	-41.73	peak	
2		56.190	-60.05	2.18	-57.87	-13.00	-44.87	peak	
3		149.310	-68.36	3.08	-65.28	-13.00	-52.28	peak	
4		233.700	-64.85	0.39	-64.46	-13.00	-51.46	peak	
5		384.050	-72.24	3.89	-68.35	-13.00	-55.35	peak	
6		768.170	-71.68	12.26	-59.42	-13.00	-46.42	peak	

Test Mode:	WCDMA Band V_TX CH4132
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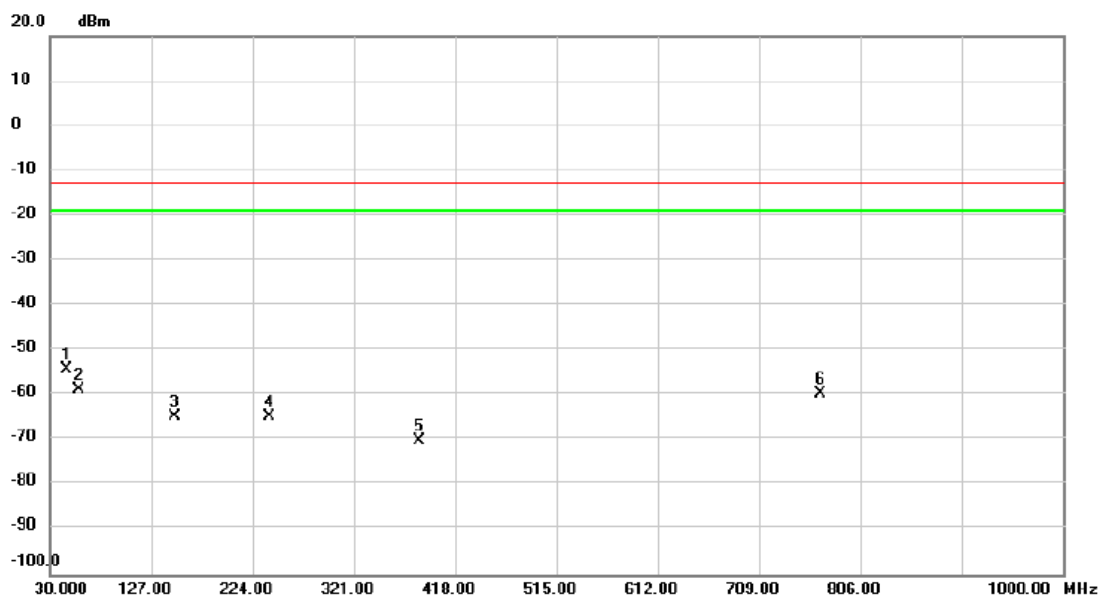
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		45.520	-73.43	2.87	-70.56	-13.00	-57.56	peak	
2		150.280	-72.86	4.20	-68.66	-13.00	-55.66	peak	
3		245.340	-67.89	2.12	-65.77	-13.00	-52.77	peak	
4		307.420	-69.22	1.18	-68.04	-13.00	-55.04	peak	
5		384.050	-63.52	6.06	-57.46	-13.00	-44.46	peak	
6	*	768.170	-67.16	12.50	-54.66	-13.00	-41.66	peak	

Test Mode:	WCDMA Band V_TX CH4132_HSDPA
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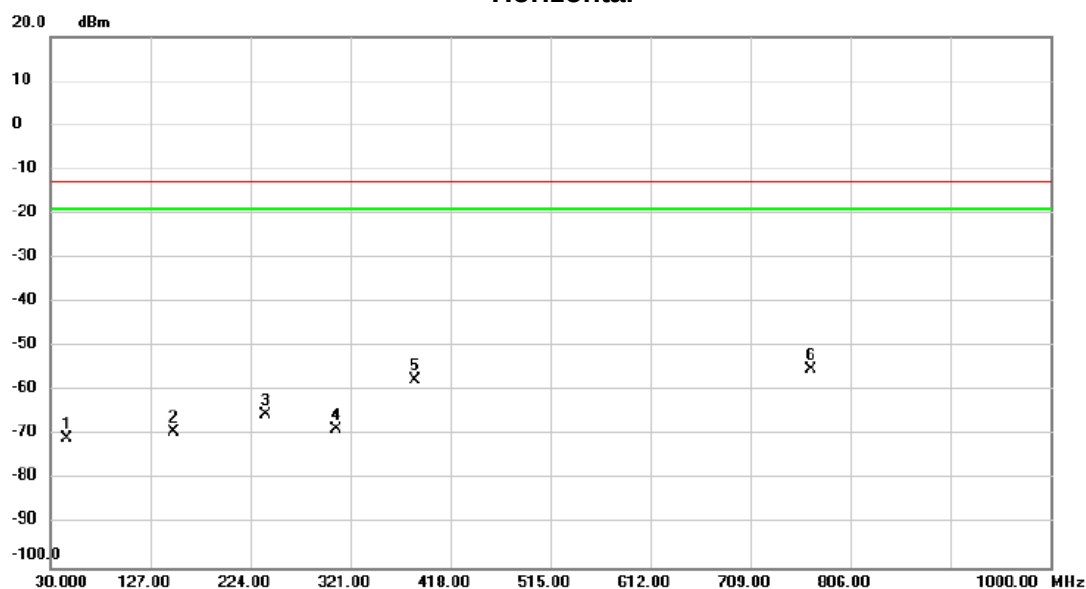
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	46.490	-55.80	1.54	-54.26	-13.00	-41.26	peak	
2		57.160	-60.56	1.74	-58.82	-13.00	-45.82	peak	
3		149.310	-67.90	3.08	-64.82	-13.00	-51.82	peak	
4		240.490	-65.09	0.24	-64.85	-13.00	-51.85	peak	
5		384.050	-74.07	3.89	-70.18	-13.00	-57.18	peak	
6		768.170	-71.82	12.26	-59.56	-13.00	-46.56	peak	

Test Mode:	WCDMA Band V_TX CH4132_HSDPA
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Horizontal

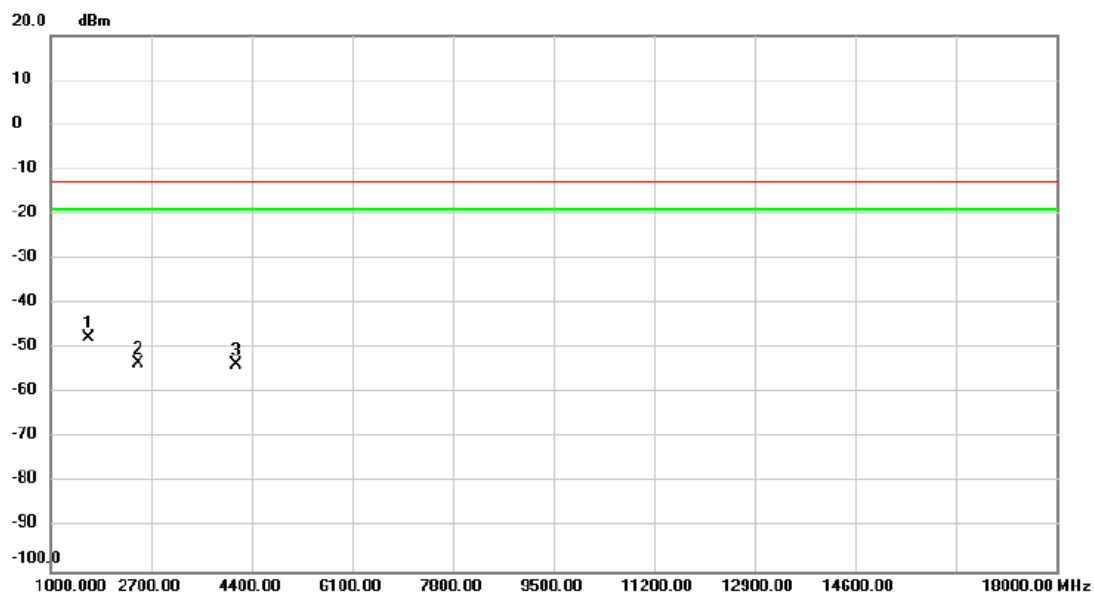


No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		45.520	-73.56	2.87	-70.69	-13.00	-57.69	peak	
2		149.310	-73.42	4.16	-69.26	-13.00	-56.26	peak	
3		238.550	-67.77	2.52	-65.25	-13.00	-52.25	peak	
4		307.420	-69.92	1.18	-68.74	-13.00	-55.74	peak	
5		384.050	-63.69	6.06	-57.63	-13.00	-44.63	peak	
6	*	768.170	-67.70	12.50	-55.20	-13.00	-42.20	peak	

APPENDIX F - RADIATED EMISSION (ABOVE 1GHZ)

Test Mode:	GSM850_TX CH128_GSM
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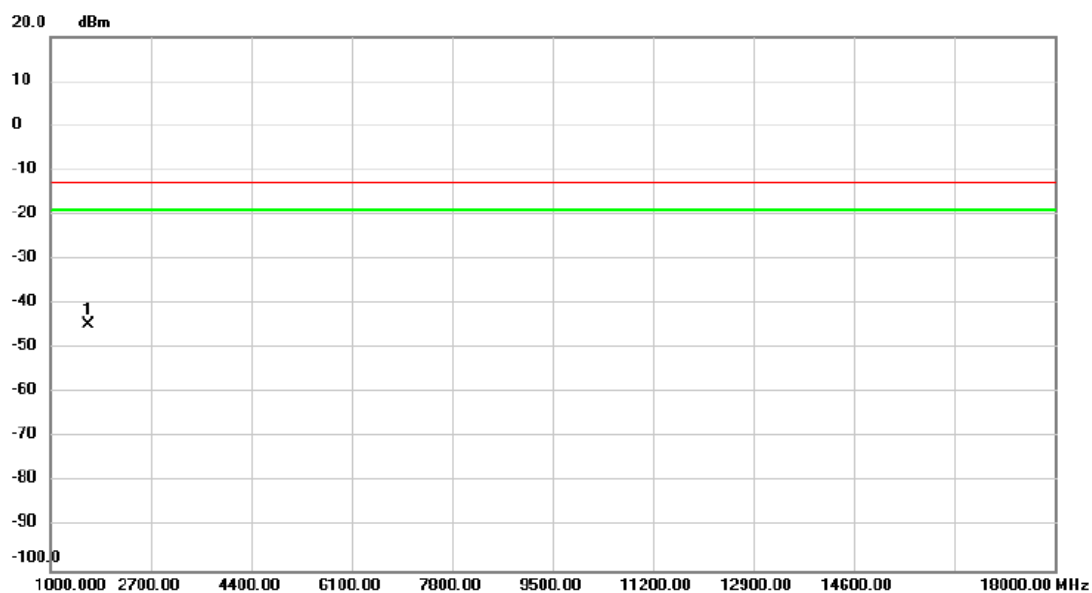
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	1646.000	-53.81	6.12	-47.69	-13.00	-34.69	peak	
2		2479.000	-65.49	12.15	-53.34	-13.00	-40.34	peak	
3		4128.000	-68.39	14.66	-53.73	-13.00	-40.73	peak	

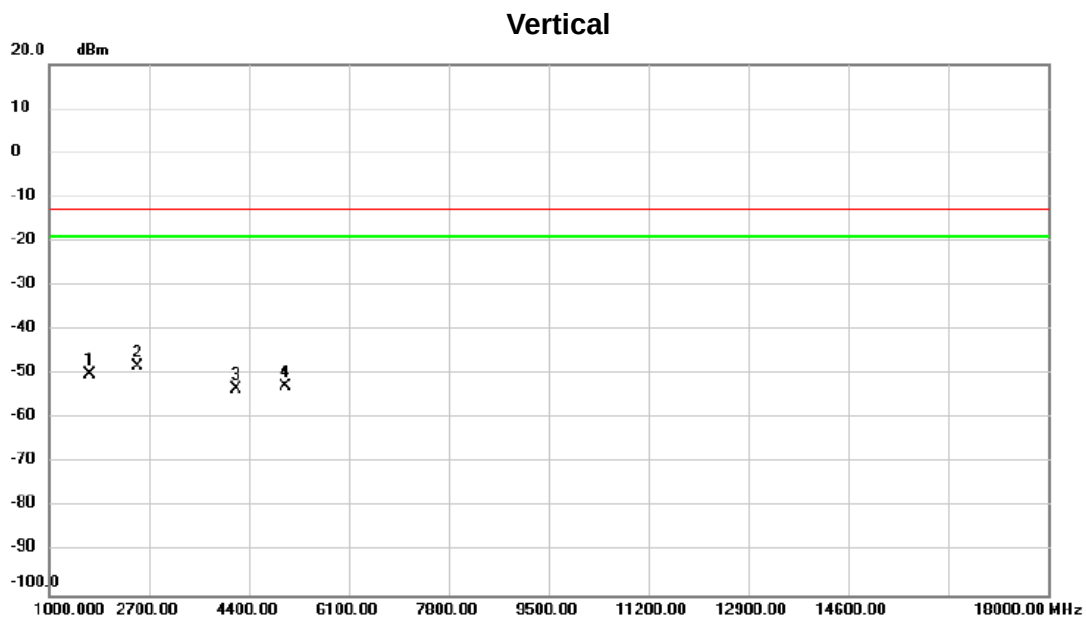
Test Mode:	GSM850_TX CH128_GSM
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Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1646.000	-52.86	8.15	-44.71	-13.00	-31.71	peak	

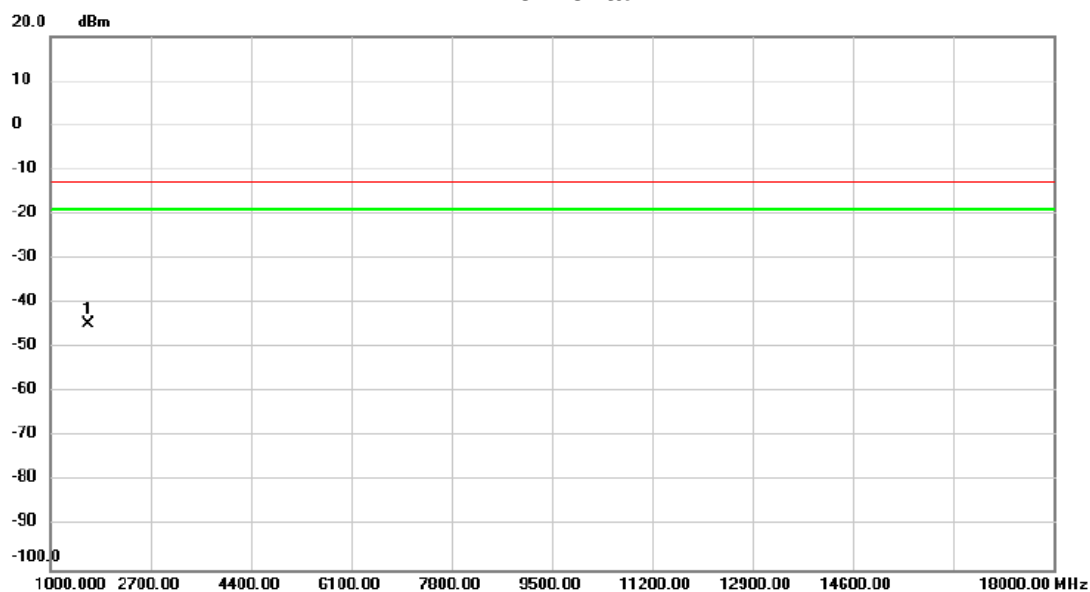
Test Mode: GSM850_TX CH190_EDGE



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		1680.000	-56.76	6.59	-50.17	-13.00	-37.17	peak	
2	*	2513.000	-60.48	12.21	-48.27	-13.00	-35.27	peak	
3		4179.000	-68.05	14.63	-53.42	-13.00	-40.42	peak	
4		5012.000	-67.39	14.62	-52.77	-13.00	-39.77	peak	

Test Mode:	GSM850_TX CH190_EDGE
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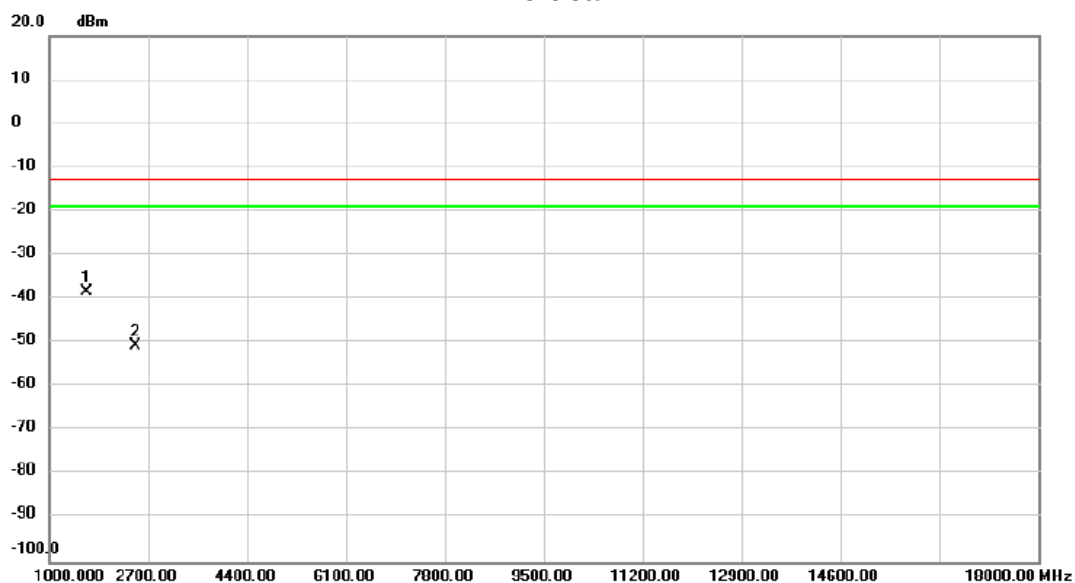
Horizontal



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	1646.000	-52.86	8.15	-44.71	-13.00	-31.71	peak	

Test Mode:	WCDMA Band V_TX CH4132
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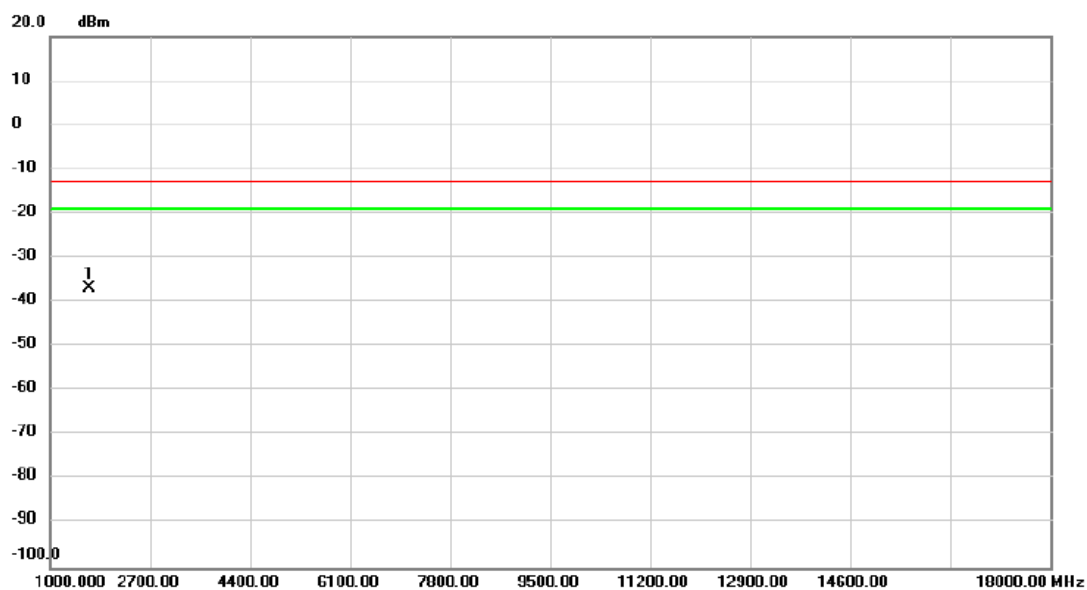
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	1646.000	-44.50	6.12	-38.38	-13.00	-25.38	peak	
2		2479.000	-62.92	12.15	-50.77	-13.00	-37.77	peak	

Test Mode:	WCDMA Band V_TX CH4132
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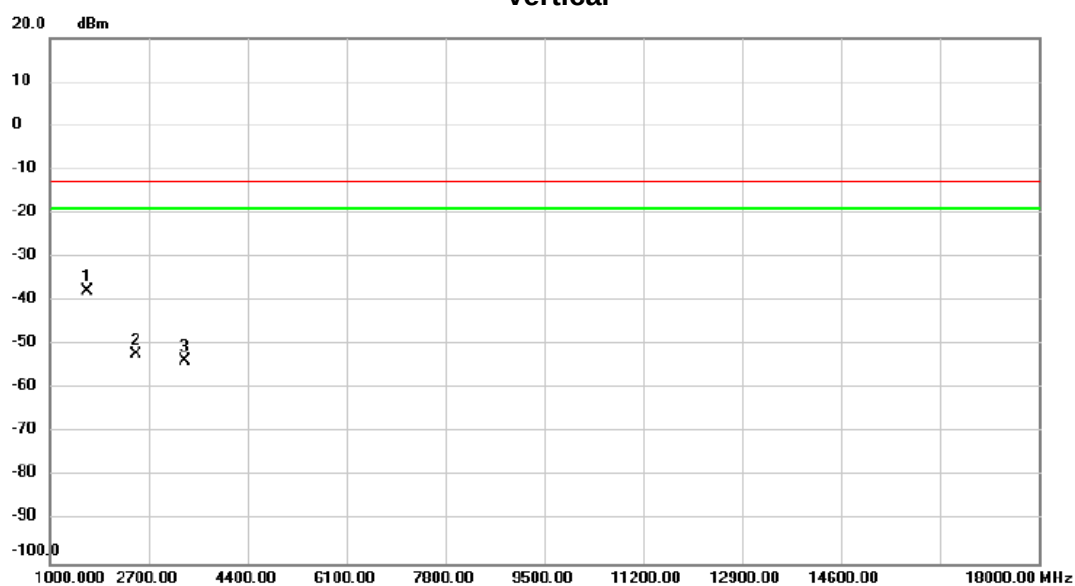
Horizontal



No. Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1 *	1663.000	-45.07	8.16	-36.91	-13.00	-23.91	peak	

Test Mode:	WCDMA Band V_TX CH4132_HSDPA
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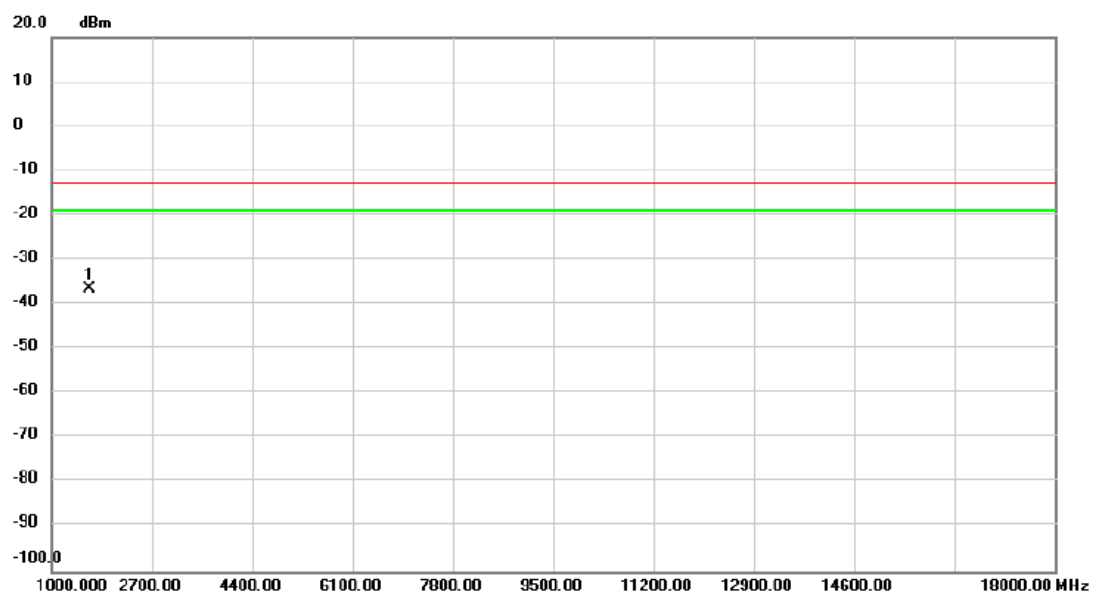
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	1646.000	-43.85	6.12	-37.73	-13.00	-24.73	peak	
2		2479.000	-64.15	12.15	-52.00	-13.00	-39.00	peak	
3		3312.000	-67.32	13.58	-53.74	-13.00	-40.74	peak	

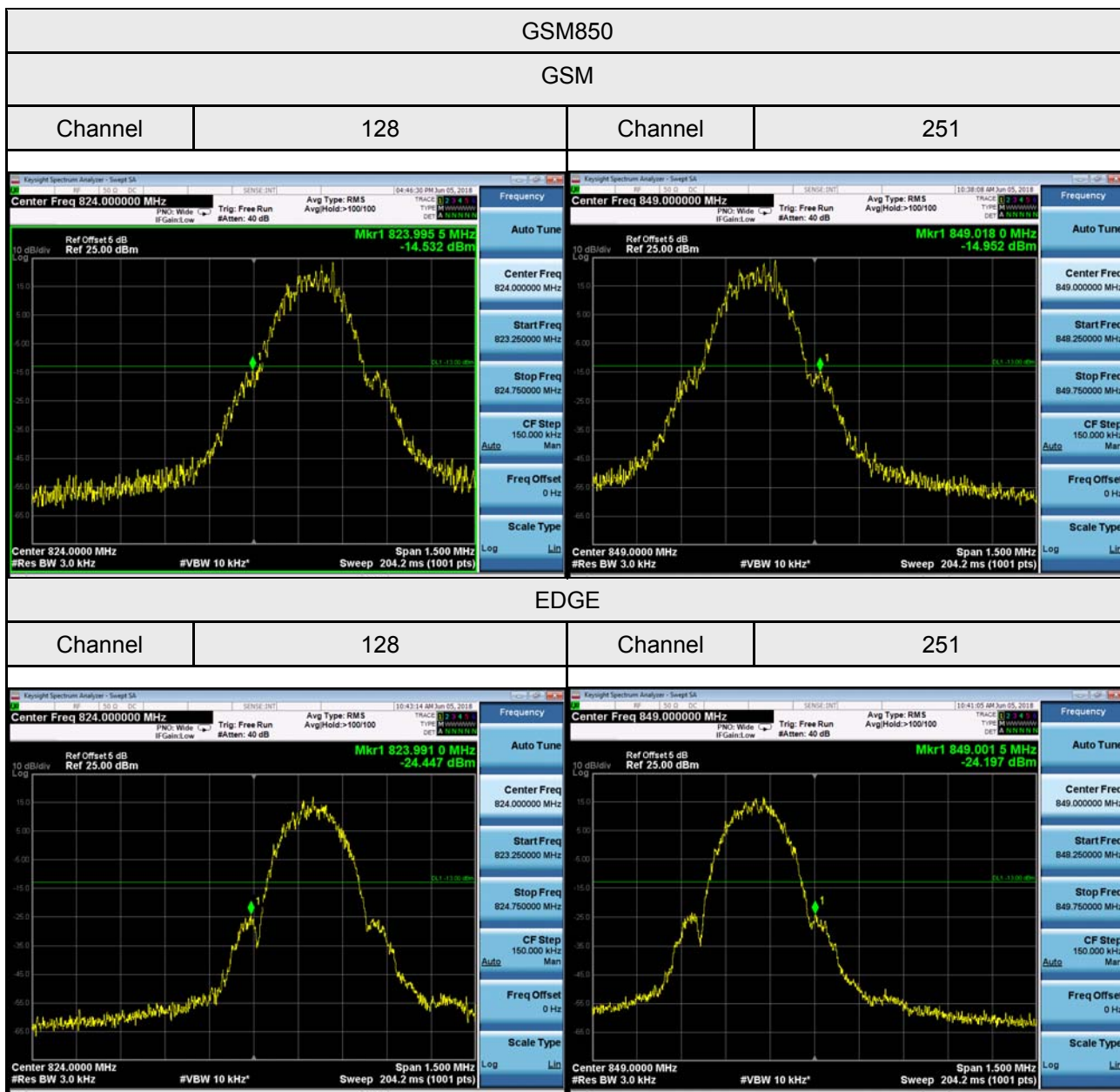
Test Mode:	WCDMA Band V_TX CH4132_HSDPA
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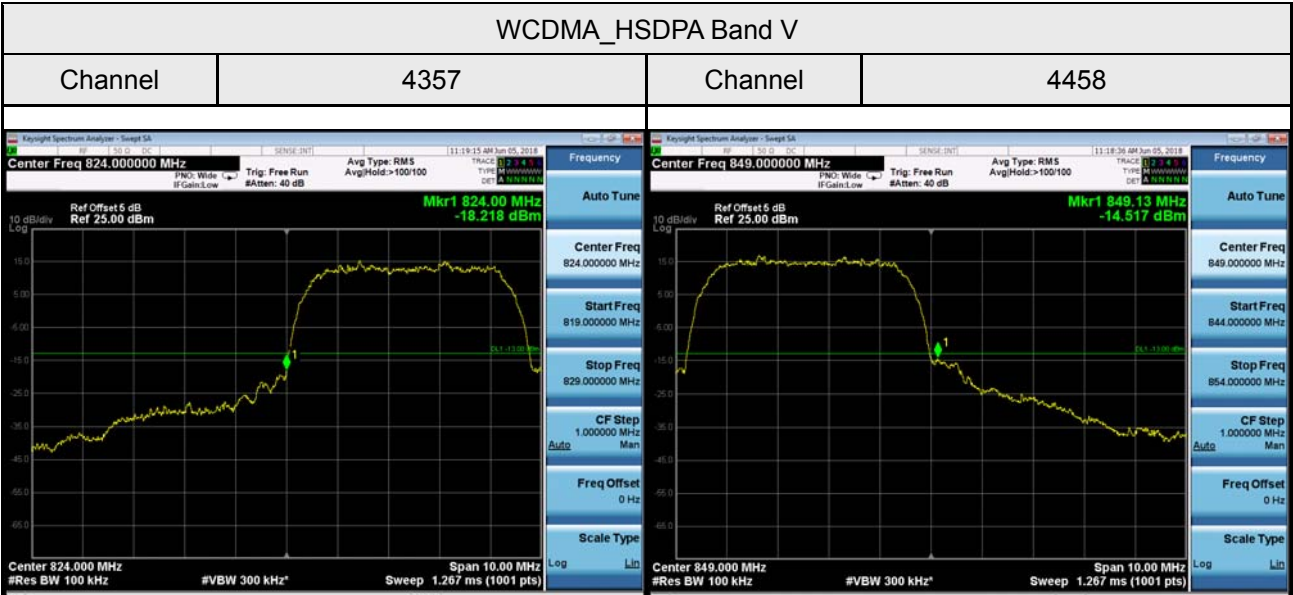
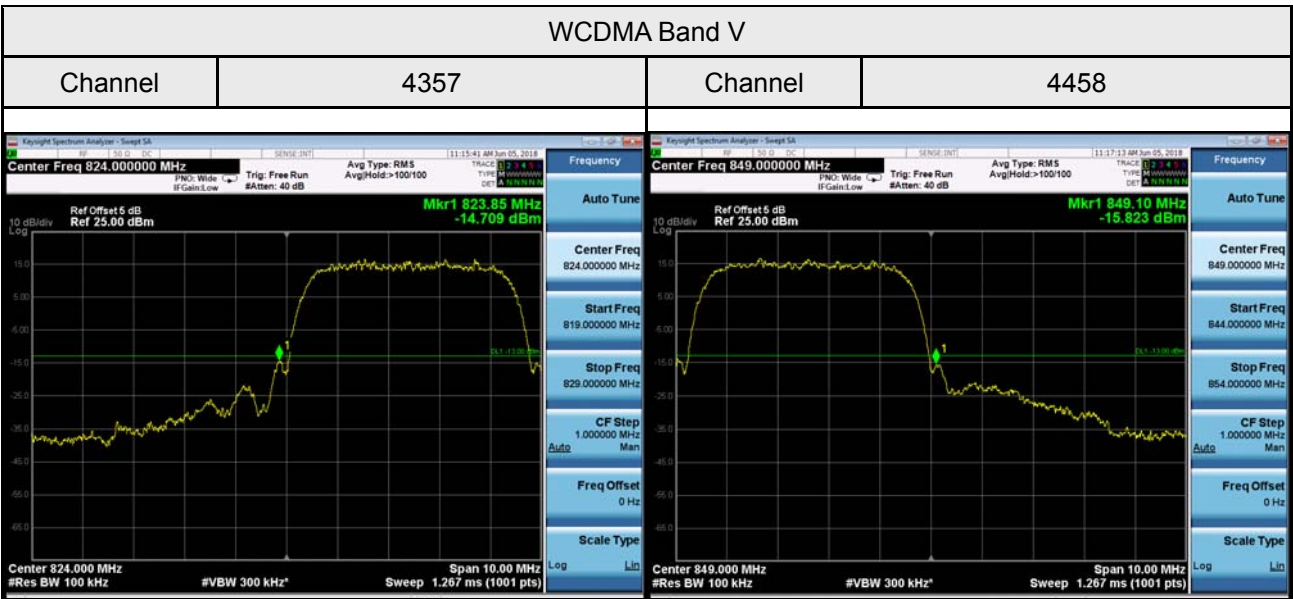
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	1646.000	-44.71	8.15	-36.56	-13.00	-23.56	peak	

APPENDIX G - BAND EDGE



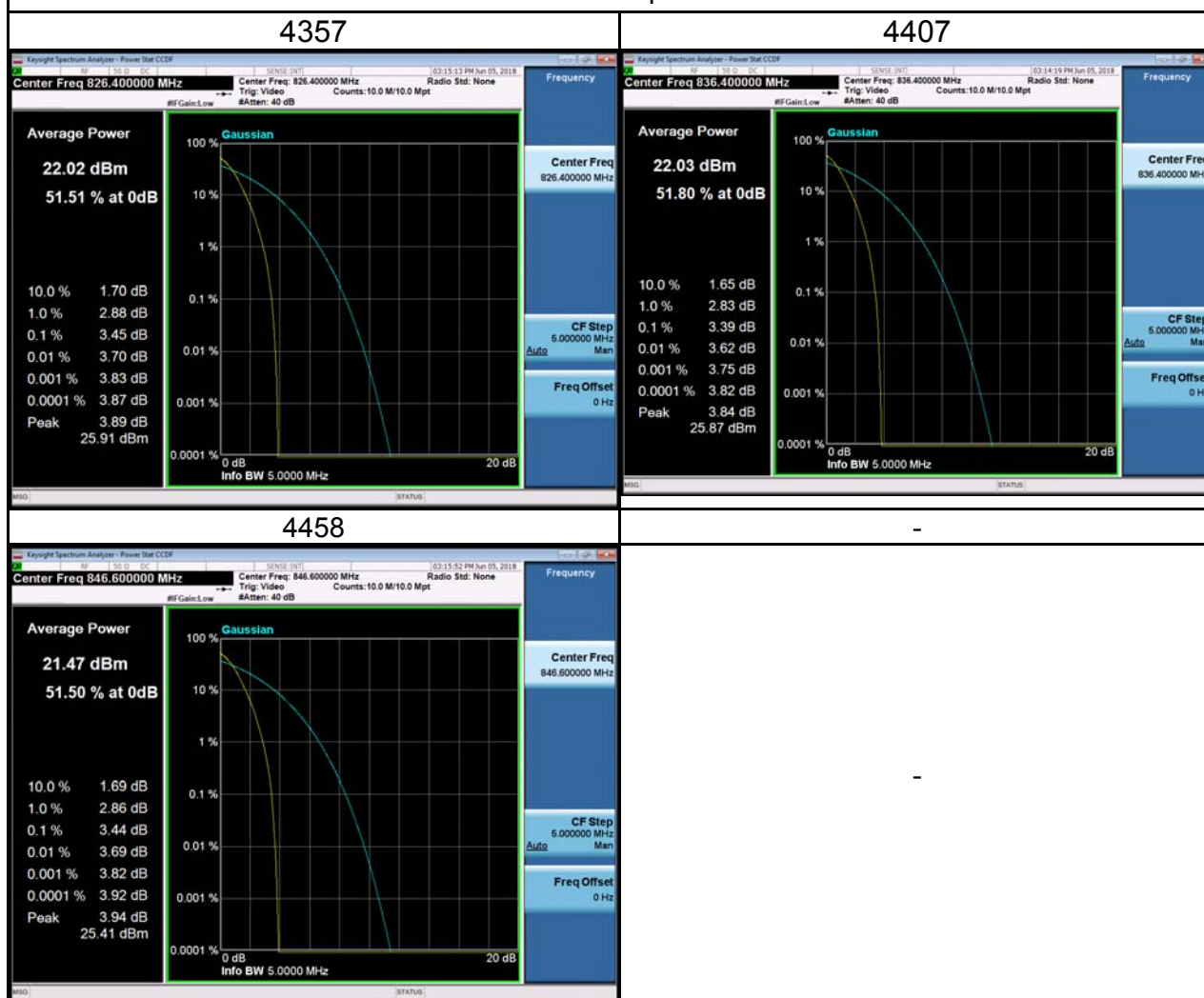


APPENDIX H - PEAK TO AVERAGE RATIO

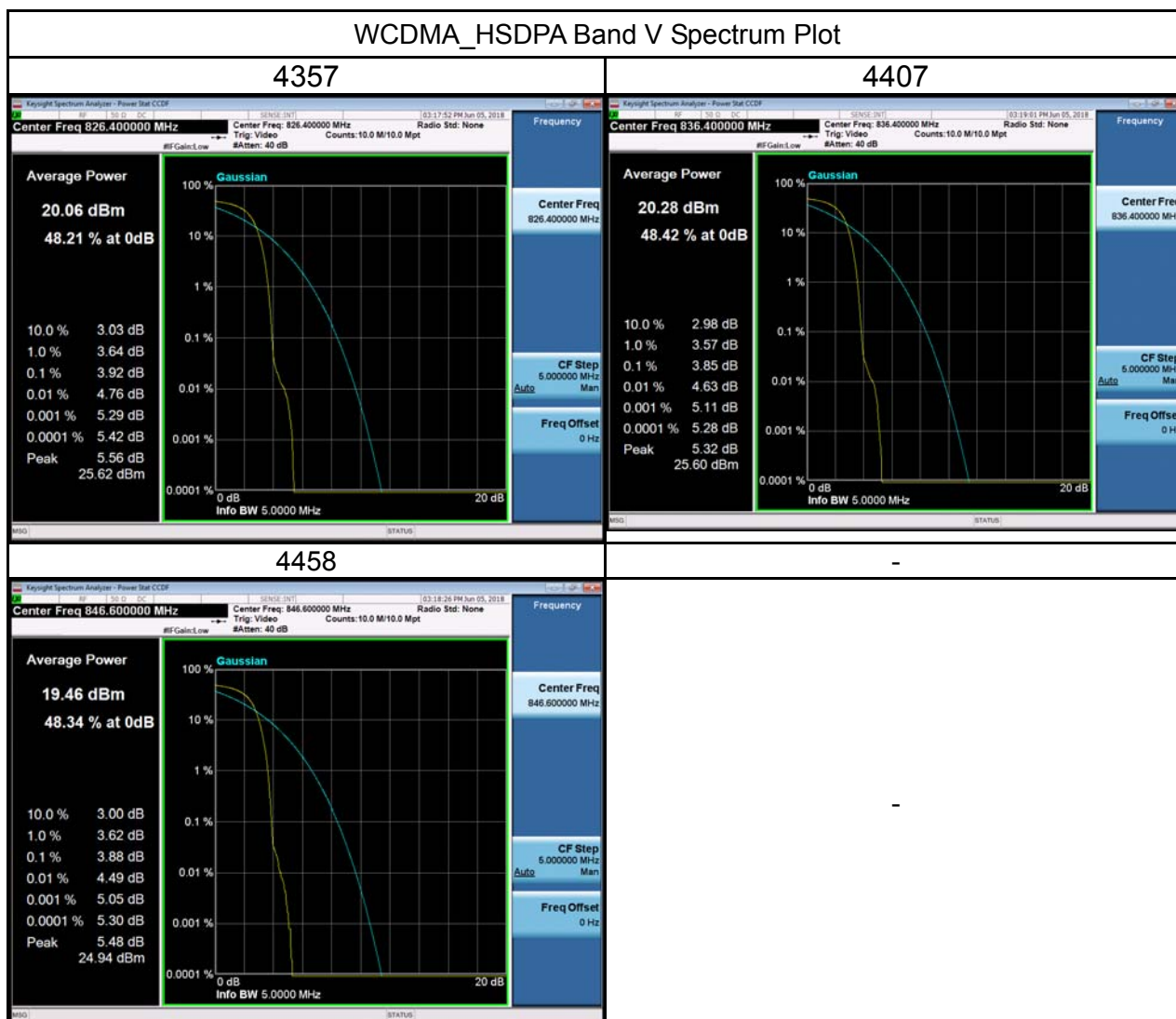
GSM850							
GSM				EDGE			
CS				8PSK			
Channel	Frequency (MHz)	PAPR (dB)	Limit (dB)	Channel	Frequency (MHz)	PAPR (dB)	Limit (dB)
128	824.2	0.70	13	128	824.2	3.17	13
190	836.6	0.72	13	190	836.6	3.16	13
251	848.8	0.72	13	251	848.8	3.50	13

WCDMA Band V			
Channel	Frequency (MHz)	0.1% PAPR (dB)	Limit (dB)
4132	826.4	3.45	13
4182	836.4	3.39	13
4233	846.6	3.44	13

WCDMA Band V Spectrum Plot



WCDMA_HSDPA Band V			
Channel	Frequency (MHz)	0.1% PAPR (dB)	Limit (dB)
4132	826.4	3.92	13
4182	836.4	3.85	13
4233	846.6	3.88	13



APPENDIX I - FREQUENCY STABILITY

Test Mode:	GSM850_CH190
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Temperature vs. Frequency Stability

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-30	6.7	0.008008606	±2.5
-20	4.81	0.005749462	
-10	7.59	0.009072436	
0	9.41	0.011247908	
10	5.30	0.006335166	
20	10.23	0.012228066	
30	6.72	0.008032513	
40	4.81	0.005749462	
50	6.96	0.008319388	
Max. Deviation (ppm)	10.23	0.012228066	

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
108	6.44	0.007697825	±2.5
120	4.96	0.005928759	
132	3.58	0.004279225	
Max. Deviation (ppm)	6.44	0.007697825	

Test Mode:	WCDMA Band V_CH4407
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Temperature vs. Frequency Stability

Temperature(°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
-30	4.44	0.005308465	±2.5
-20	3.44	0.004112865	
-10	7.18	0.008584409	
0	3.78	0.004519369	
10	8.41	0.010054998	
20	7.85	0.009385462	
30	2.53	0.003024868	
40	6.42	0.007675753	
50	1.52	0.001817312	
Max. Deviation (ppm)	8.41	0.010054998	

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
108	3.44	0.004112865	±2.5
120	1.38	0.001649928	
132	4.03	0.004818269	
Max. Deviation (ppm)	4.03	0.004818269	