FCC Radio Test Report

FCC ID: QISB315S-22

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

Project No.	: 1602C003
Equipment	: LTE CPE
Model Name	: B315s-22
Applicant	: Huawei Technologies Co.,Ltd.
Address	: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District Shenzhen, 518129, P.R.C

Date of Receipt	: Feb. 02, 2016
Date of Test	: Feb. 02, 2016 ~ Feb. 25, 2016
Issued Date	: Feb. 26, 2016
Tested by	: BTL Inc.

Technical Engineer : Shawn xiao
(Shawn Xiao)

Authorized Signatory : Steven Lu
(Steven Lu)

BTL INC.

No.3,Jinshagang 1st Road, Shixia,Dalang Town, Dongguan, Guangdong, China.
TEL: +86-769-8318-3000 FAX: +86-769-8319-6000

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).

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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-2-1602C003	Original Issue.	Feb. 26, 2016

1. CERTIFICATION

Equipment	:	LTE CPE
Brand Name	:	HUAWEI
Model Name	:	B315s-22
Applicant	:	Huawei Technologies Co.,Ltd.
Manufacturer	:	Huawei Technologies Co.,Ltd.
Address	:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District Shenzhen, 518129, P.R.C
Factory	:	Huawei Technologies Co.,Ltd.
Address	:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District Shenzhen, 518129, P.R.C
Date of Test	:	Feb. 02, 2016 ~ Feb. 25, 2016
Test Sample	:	Engineering Sample
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 v02r02

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-2-1602C003) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test result included in this report is only for the GSM850 part.

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	Robort Luo
2.1046 24.232(c)	Conducted Output Power	PASS	Allen Li
2.1049(h) 22.917(a)	Occupied Bandwidth	PASS	Allen Li
2.1051 22.917(a)	Conducted Spurious Emissions	PASS	Allen Li
2.1053 22.917(a)	Radiated Spurious Emissions	PASS	Robort Luo
22.917(a)	Band Edge Measurements	PASS	Allen Li
-	Peak To Average Ratio	PASS	Allen Li
2.1055 22.355	Frequency Stability	PASS	Allen 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: 319330

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimatedfor tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

The reported uncertainty of measurement **y** ± **U**, where expanded uncertainty **U** is based on astandard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95**% ◦

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
		1GHz~18GHz	V	3.12
		1GHz~18GHz	H	3.68
		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	LTE CPE	
Brand Name	HUAWEI	
Model Name	B315s-22	
Model Difference	N/A	
Modulation Type	GSM	GMSK
	EDGE	GMSK, 8PSK
Operation Frequency	GSM /EDGE	824.2 ~ 848.8 MHz
Max. ERP Power	GSM	28.40 dBm
	EDGE	25.83 dBm
Antenna Type	Internal Antenna / External Antenna	
Antenna Gain	1.5 dBi / 3 dBi	
Hardware Version	WL1B310I	
Softwarre Version	V100R001	
IMEI No.	86616902	
Power Source	DC voltage supplied from AC Adapter. Brand / Model: HUAWEI / HW-120100U6W	
Power Rating	I/P: 100-240V~50/60Hz 0.5A O/P: 12.0V⎓ 1.0A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

3.2 DESCRIPTION OF TEST MODES AND TEST CONDITION

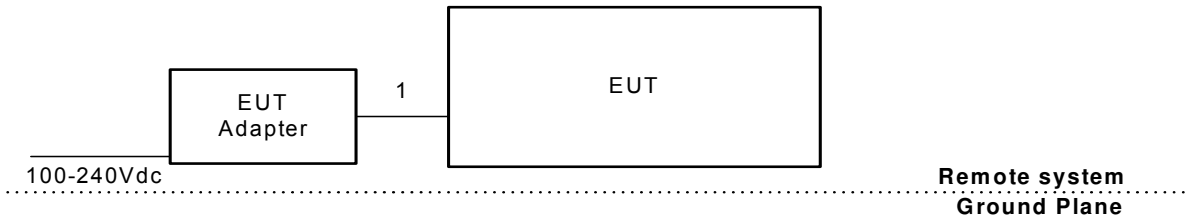
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports
The worst case was found when positioned on X-plane for ERP and X-axis for radiated emission.
Following channel(s) was (were) selected for 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
Condcudeted Emission	128 to 251	190	GSM, EDGE
Radiated Emission	128 to 251	190	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, EDGE

EUT TEST CONDITIONS:

Test Item	Environmental Conditions	Test Voltage
ERP	24°C, 63%RH	AC120V/60Hz
Conducted Output Power	25°C, 65%RH	AC120V/60Hz
Occupied Bandwidth	25°C, 65%RH	AC120V/60Hz
Conducted Emission	25°C, 65%RH	AC120V/60Hz
Radiated Emission	24°C, 63%RH	AC120V/60Hz
Band Edge	25°C, 65%RH	AC120V/60Hz
Peak to Average Ratio	25°C, 65%RH	AC120V/60Hz
Frequency Stability	25°C, 65%RH	AC120V/60Hz

3.3 BLOCKDIGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED



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	Power 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. All measurements were done at low, middle and high operational frequency range. RBW and VBW setting:
   Set the RBW ≥ OBW.
   Set VBW ≥ 3 × RBW.
   Set span ≥ 2 × RBW
   Sweep time=auto couple
   Detector=peak
   Ensure that the number of measurement points ≥ span/RBW
   Trace mode=max hold
   Allow trace to fully stabilize
   Use the peak marker function to detemine the peak amplitude level
2. 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.
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 b. Record the power level of S.G
5. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of Integral, E.R.P power=E.I.P.R power-2.15dBi.

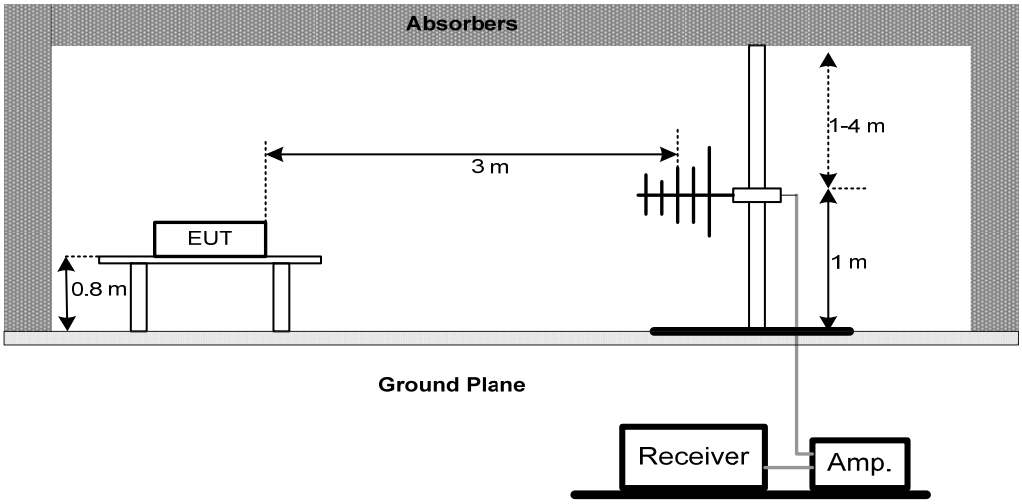
Conducted Power:

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

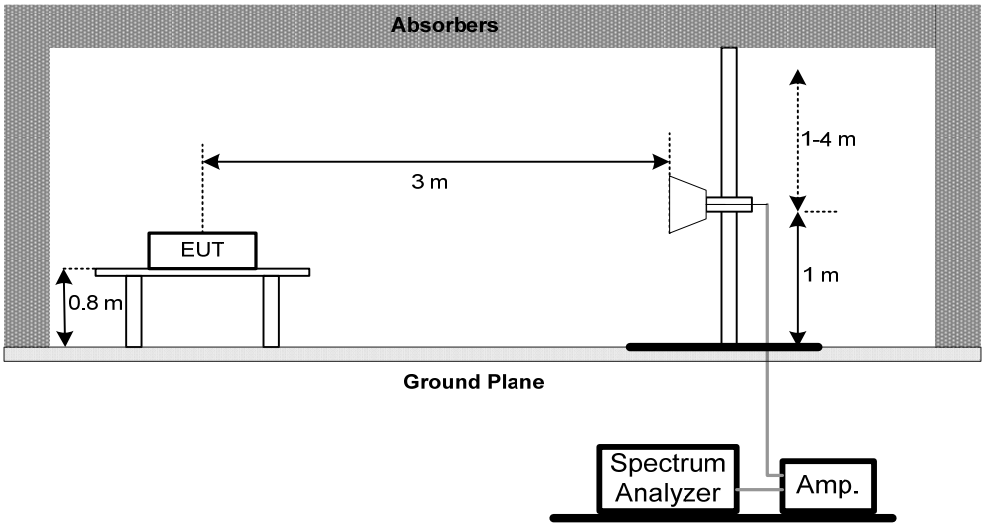
4.1.3 TESTSETUP LAYOUT

ERP Power Measurement

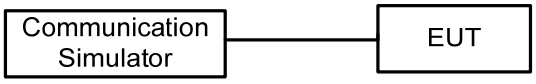
Below 1G



Above 1G



Conducted Power Measurement



4.1.4 TEST DEVIATION

No deviation

4.1.5 TEST RESULTS

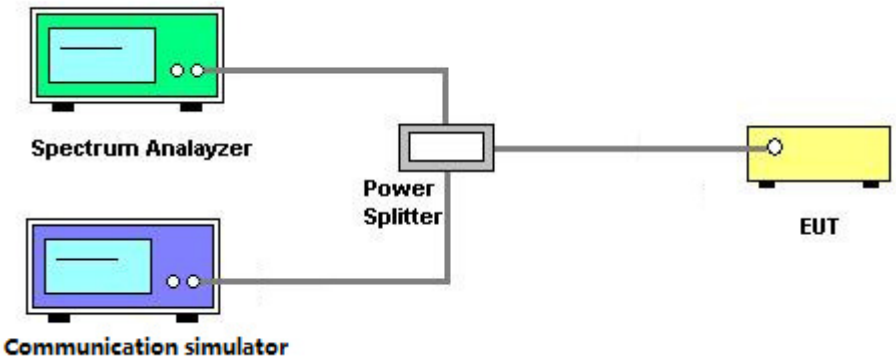
Please refer to the Attachment A.

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 Attachment B.

4.3 CONDUCTED EMISSIONS MEASUREMENT

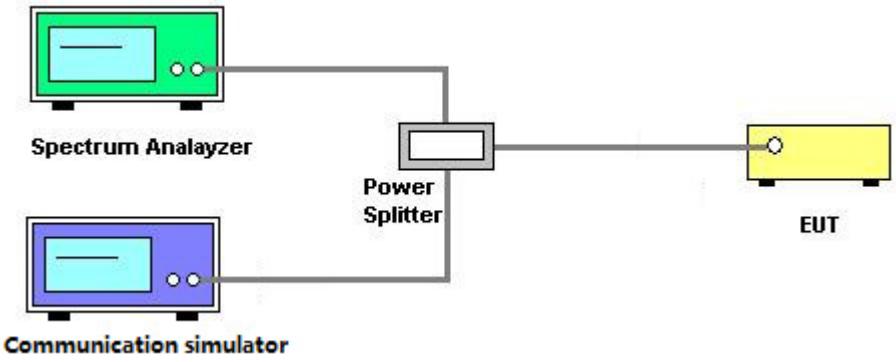
4.3.1 LIMIT

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 v02r02 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>=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+10log(P)dB below the transmitter power P(Watts)
   =P(W)-[43+10log(P)](dB)
   =[30+10log(P)](dBm)-[43+10log(P)](dB)
   =-13dBm

4.3.3 TESTSETUP LAYOUT



4.3.4 TESTDEVIATION

No deviation

4.3.5 TEST RESULTS

Please refer to the Attachment 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.
2. 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
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
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

This test setup layout is the same as that shown in **section 4.1.3.**

4.4.4 TESTDEVIATION

No deviation

4.4.5 TEST RESULTS

Please refer to the Attachment D.

4.5 BAND EDGE MEASUREMENT

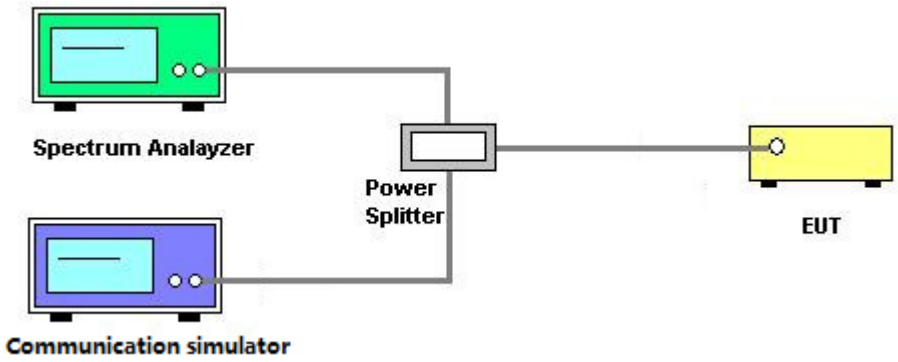
4.5.1 LIMIT

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. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 13kHz and VB of the spectrum is 51kHz (LTE Bandwidth 1.4MHz).
5. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Bandwidth 3MHz).
6. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Bandwidth 5MHz/10MHz).
7. 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 Attachment E.

4.6 PEAK TO AVERAGE RATIO MEASUREMENT

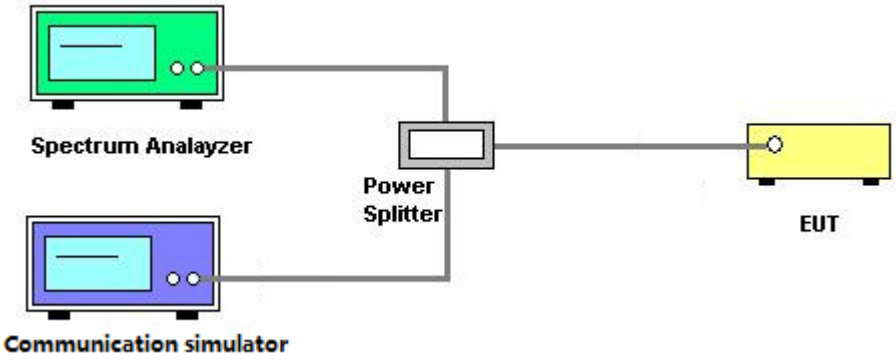
4.6.1 LIMIT

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 ≥ 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 Attachment F.

4.7 FREQUENCY STABILITY MEASUREMENT

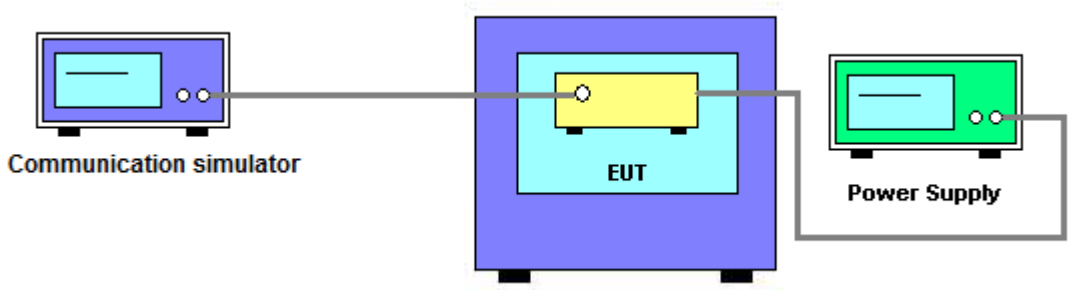
4.7.1 LIMIT

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 ±0.5°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 Attachment G.

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. 28, 2016
2	Amplifier	HP	8447D	2944A09673	Nov. 09, 2016
3	Receiver	AGILENT	N9038A	MY52130039	Oct. 11, 2016
4	Test Cable	emci	LMR-400(30MHz-1GHz)	C-01	Jun. 28, 2016
5	Controller	CT	SC100	N/A	N/A
6	Antenna	ETS	3115	75789	Mar. 28, 2016
7	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2016
8	Test Cable	emci	EMC104-SM-SM-10000(1GHz－26.5GHz)	C-68	Jun. 28, 2016
9	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 28, 2016
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 28, 2016
11	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
12	Wireless Communication Test Set	(8960 Series) Agilent	E5515C	MY48364183	Mar. 28, 2016
13	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Mar. 04, 2016
14	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2016

Conducted Emission & Band Edge & Occupied Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA SpectrumAnalyzer	Agilent	N9010A	MY50520044	Mar. 28, 2016
2	Wireless Communication Test Set	(8960 Series)Agilent	E5515C	MY48364183	Mar. 28, 2016
3	wideband radio communication tester	R&S	CMW500	152372	Mar.30, 2016
4	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 26, 2017
5	Test Cable	N/A	RG316	Cable4-001	Jul. 15, 2016
6	Test Cable	N/A	RG316	Cable4-002	Jul. 15, 2016

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test Set	(8960 Series)Agilent	E5515C	MY48364183	Mar. 28, 2016
2	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 26, 2017
3	Test Cable	N/A	RG316	Cable4-001	Jul. 15, 2016
4	Const Temp. & Humidity Chamber	GIANT FORCE	ITH-225-20-S	IAB0309-001	Dec.04, 2016
5	DC power supply	GW Instek	GPC-3030DN	EK880675	Oct. 13, 2016

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

ATTACHMENT A - OUTPUT POWER

Conducted Power:

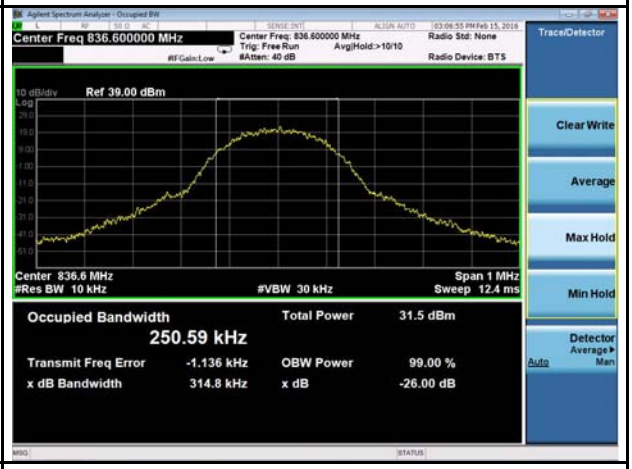
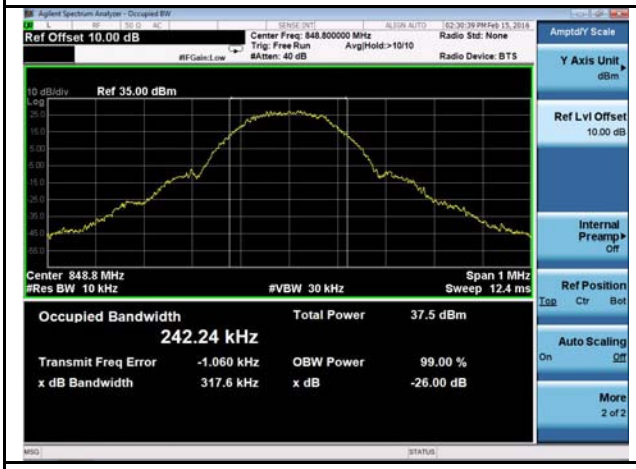
GSM850 (Capsensor Off)	Tune-up	Max Frame Average Power (dBm)		
		128CH	190CH	251CH
		824.2MHz	836.6MHz	848.8MHz
GSM (CS)	33.00	-9.19	-9.19	-9.19
GPRS/EDGE (GMSK)	33.00	22.78	22.62	22.67
	31.50	23.73	23.58	23.62
	29.70	23.39	23.25	23.29
	28.50	22.67	22.56	22.58
EDGE (8PSK)	27.00	17.12	17.25	16.84
	25.50	17.73	17.93	17.79
	23.70	17.50	17.45	17.34
	22.50	16.56	16.73	16.68

E. R.P Power

GSM850					
Plane	Channel	Frequency (MHz)	GSM ERP(dBm)	EDGE ERP(dBm)	Polarization (H/V)
X	128	824.2	20.86	18.19	H
	190	836.6	19.41	17.34	H
	251	848.8	19.02	16.71	H
	128	824.2	27.39	25.83	V
	190	836.6	26.23	25.63	V
	251	848.8	28.40	25.74	V

ATTACHMENT B - OCCUPIED BANDWIDTH

GSM850					
GSM			EDGE		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
128	824.2	0.24	128	824.2	0.25
190	836.6	0.25	190	836.6	0.25
251	848.8	0.24	251	848.8	0.25
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
128	824.2	0.32	128	824.2	0.33
190	836.6	0.31	190	836.6	0.32
251	848.8	0.32	251	848.8	0.31

Spectrum Plot	
GSM -128	GSM-190
	
GSM-251	EDGE-128
	
EDGE-190	EDGE-251
	

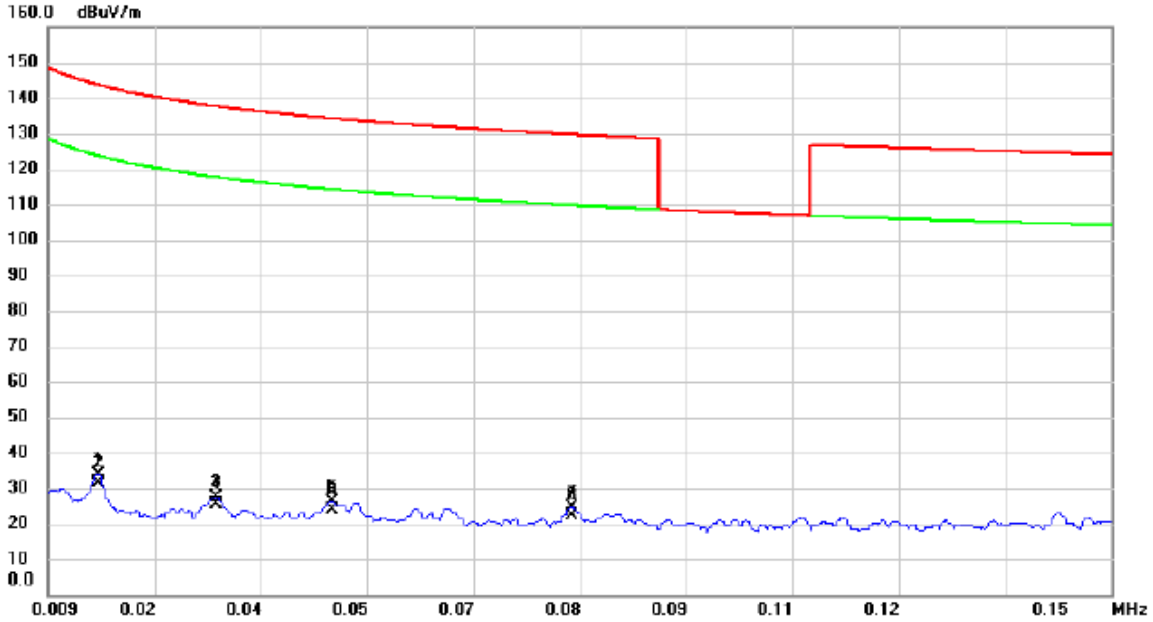
ATTACHMENT C – CONDUCTED EMISSIONS

GSM850	
GSM	
Channel	Frequency(MHz)
190	836.6

EDGE	
Channel	Frequency(MHz)
190	836.6

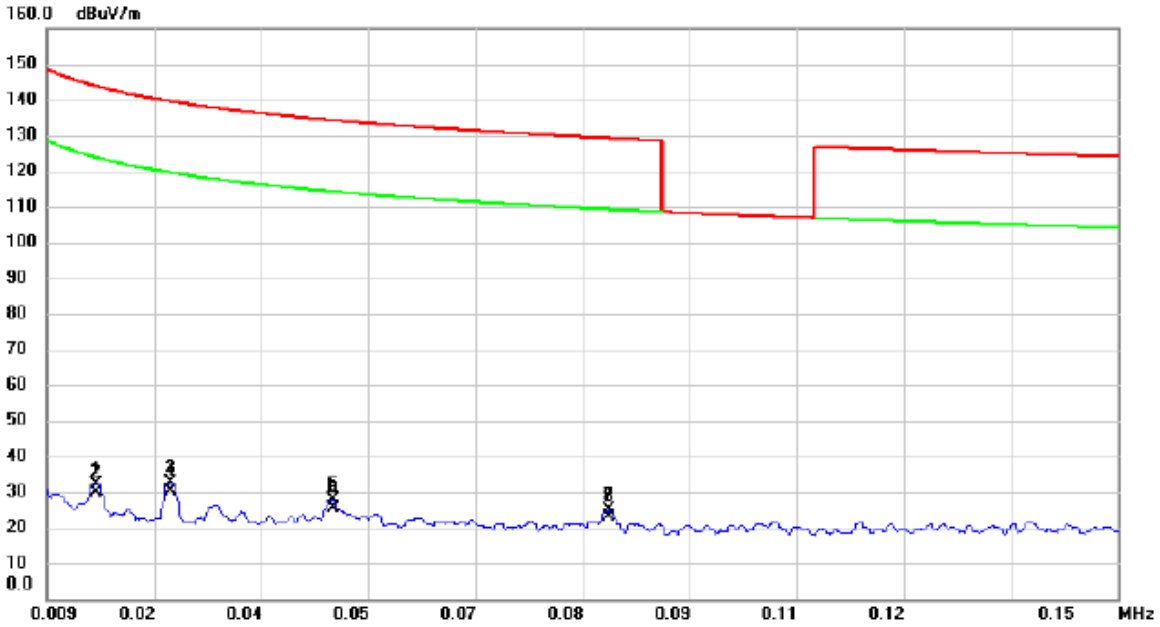
ATTACHMENT D - RADIATED EMISSION

Test Mode:	TX MODE - 0°



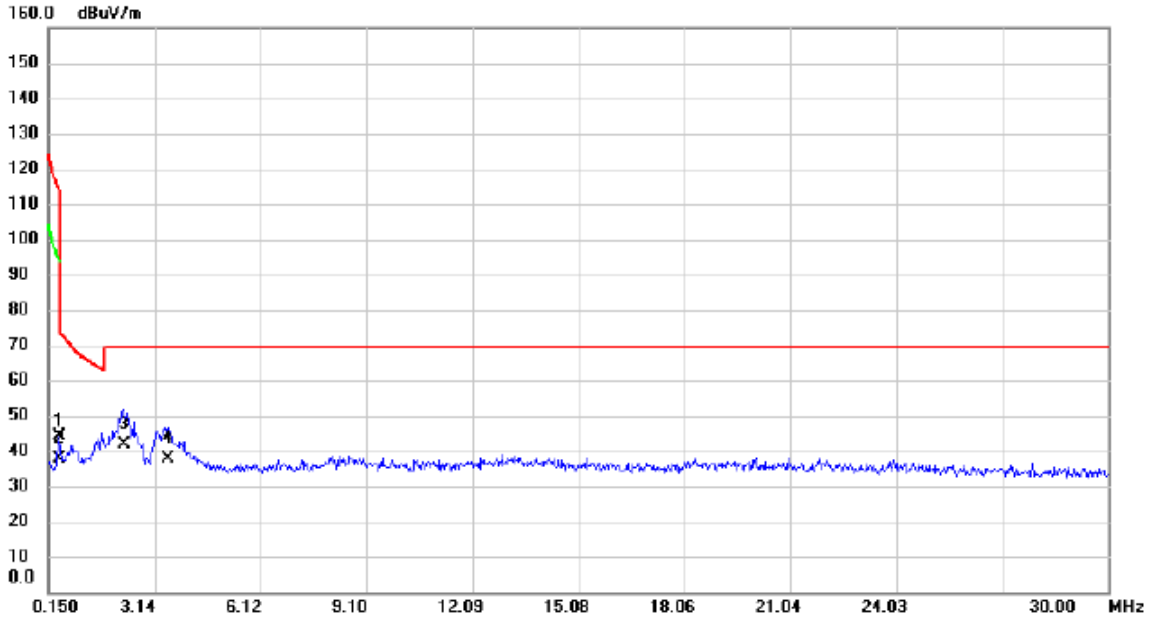
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0156	12.31	21.40	33.71	143.74	-110.03	peak	
2		0.0156	10.05	21.40	31.45	123.74	-92.29	AVG	
3		0.0313	5.97	21.43	27.40	137.69	-110.29	peak	
4		0.0313	3.92	21.43	25.35	117.69	-92.34	AVG	
5		0.0466	4.69	21.59	26.28	134.24	-107.96	peak	
6		0.0466	2.34	21.59	23.93	114.24	-90.31	AVG	
7		0.0784	3.70	20.95	24.65	129.72	-105.07	peak	
8	*	0.0784	1.42	20.95	22.37	109.72	-87.35	AVG	

Test Mode:	TX MODE - 90°



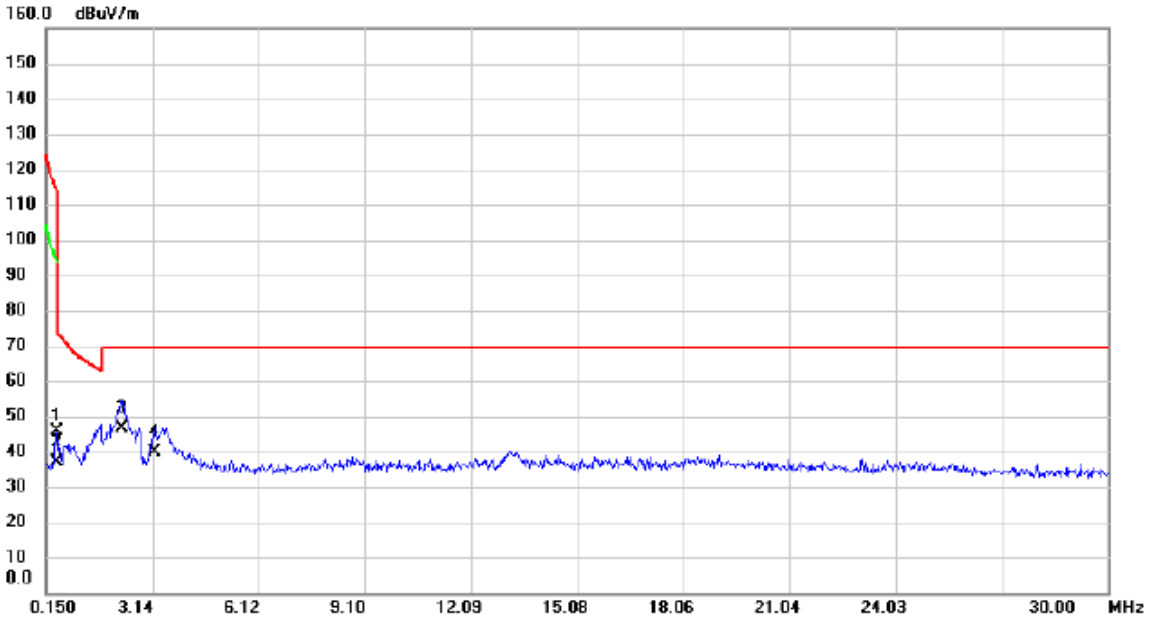
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0155	10.93	21.40	32.33	143.80	-111.47	peak	
2		0.0155	8.43	21.40	29.83	123.80	-93.97	AVG	
3		0.0253	11.17	21.37	32.54	139.54	-107.00	peak	
4		0.0253	8.76	21.37	30.13	119.54	-89.41	AVG	
5		0.0466	6.09	21.59	27.68	134.24	-106.56	peak	
6		0.0466	3.69	21.59	25.28	114.24	-88.96	AVG	
7		0.0830	4.00	20.84	24.84	129.22	-104.38	peak	
8	*	0.0830	2.03	20.84	22.87	109.22	-86.35	AVG	

Test Mode:	TX MODE - 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.4485	23.08	20.98	44.06	114.57	-70.51	peak	
2		0.4485	16.91	20.98	37.89	94.57	-56.68	AVG	
3	*	2.2694	20.02	21.74	41.76	69.54	-27.78	QP	
4		3.5231	16.13	21.67	37.80	69.54	-31.74	QP	

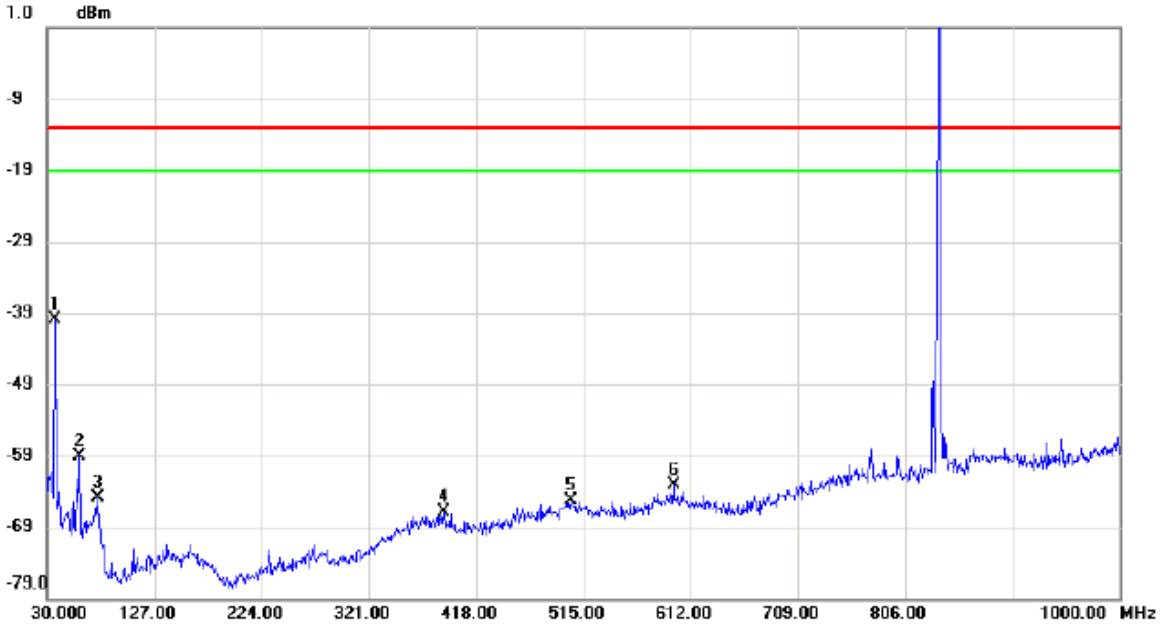
Test Mode:	TX MODE - 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.4485	24.90	20.98	45.88	114.57	-68.69	peak	
2		0.4485	16.10	20.98	37.08	94.57	-57.49	AVG	
3	*	2.2694	24.90	21.74	46.64	69.54	-22.90	QP	
4		3.1947	17.99	21.95	39.94	69.54	-29.60	QP	

Test Mode:	GSM850_TX CH190_GSM

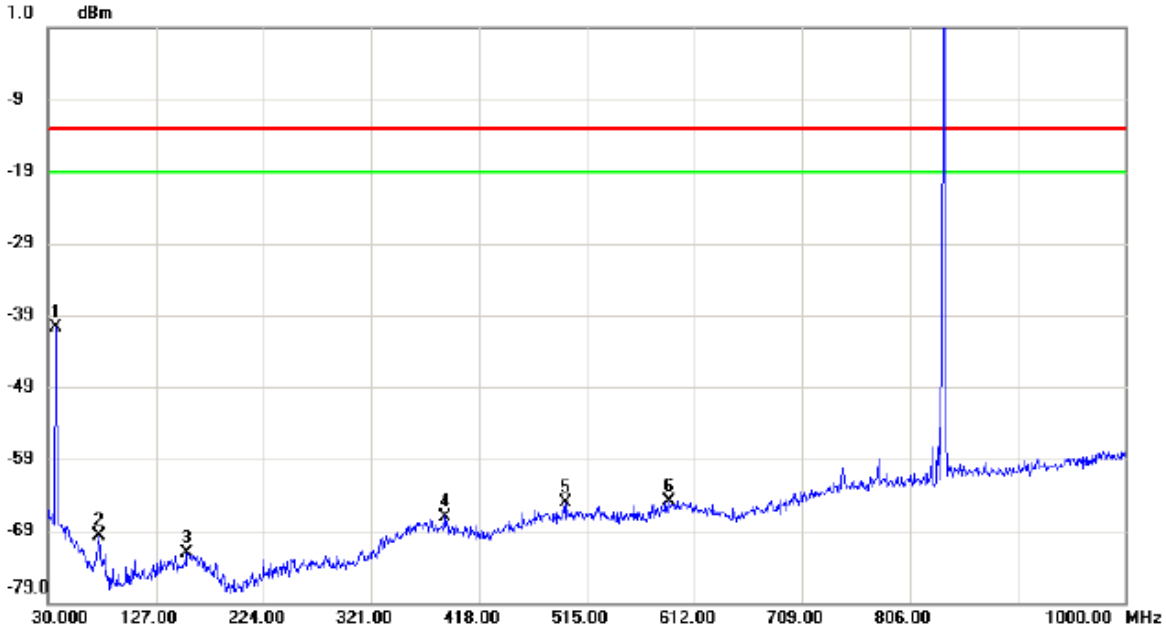
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	36.7900	-40.56	0.57	-39.99	-13.00	-26.99	peak	
2		59.1000	-55.01	-4.05	-59.06	-13.00	-46.06	peak	
3		75.5900	-58.58	-6.23	-64.81	-13.00	-51.81	peak	
4		388.9000	-65.69	-1.14	-66.83	-13.00	-53.83	peak	
5		503.3600	-66.14	0.91	-65.23	-13.00	-52.23	peak	
6		596.4800	-65.53	2.37	-63.16	-13.00	-50.16	peak	

Test Mode:	GSM850_TX CH190_GSM

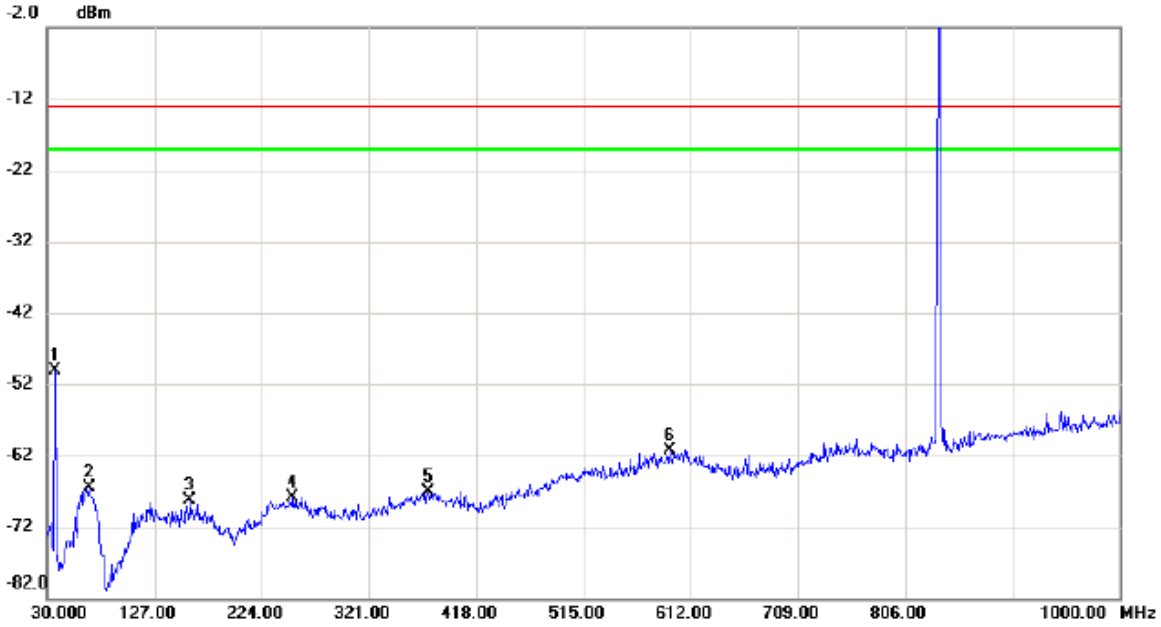
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	36.7900	-41.24	0.57	-40.67	-13.00	-27.67	peak	
2		75.5900	-63.47	-6.23	-69.70	-13.00	-56.70	peak	
3		155.1300	-67.09	-4.95	-72.04	-13.00	-59.04	peak	
4		386.9600	-65.99	-1.01	-67.00	-13.00	-54.00	peak	
5		496.5700	-66.00	0.84	-65.16	-13.00	-52.16	peak	
6		588.7200	-66.92	2.01	-64.91	-13.00	-51.91	peak	

Test Mode:	GSM850_TX CH190_EDGE

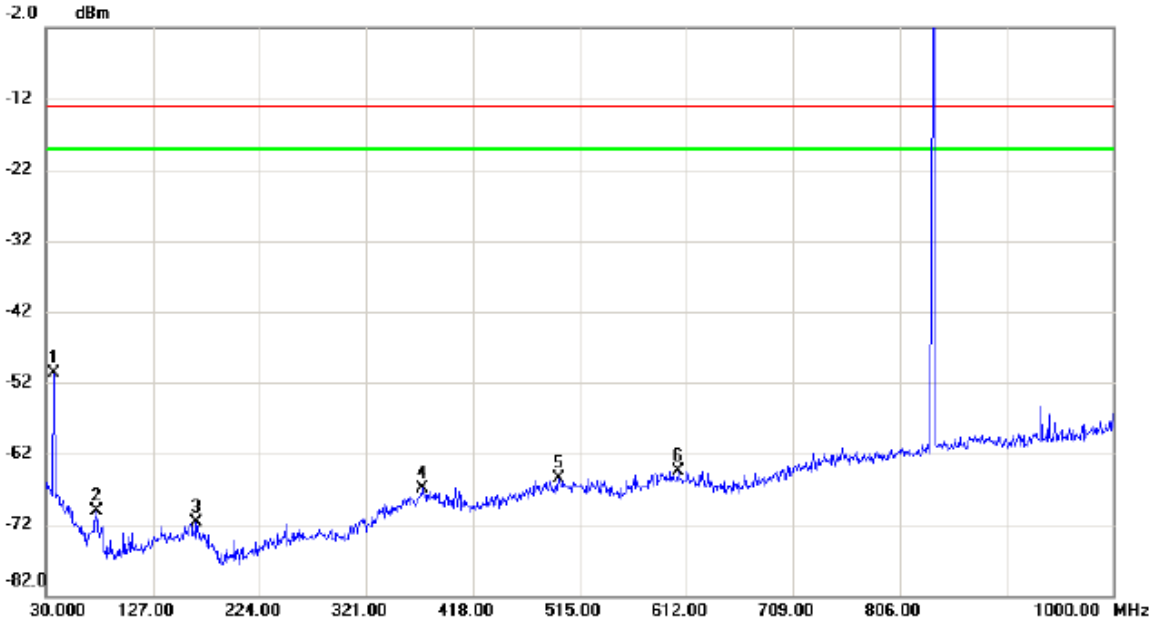
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	36.7900	-40.32	-9.77	-50.09	-13.00	-37.09	peak	
2		67.8300	-62.66	-3.92	-66.58	-13.00	-53.58	peak	
3		159.0100	-66.60	-1.77	-68.37	-13.00	-55.37	peak	
4		252.1300	-67.43	-0.48	-67.91	-13.00	-54.91	peak	
5		374.3500	-67.02	-0.10	-67.12	-13.00	-54.12	peak	
6		592.6000	-66.59	5.25	-61.34	-13.00	-48.34	peak	

Test Mode:	GSM850_TX CH190_EDGE

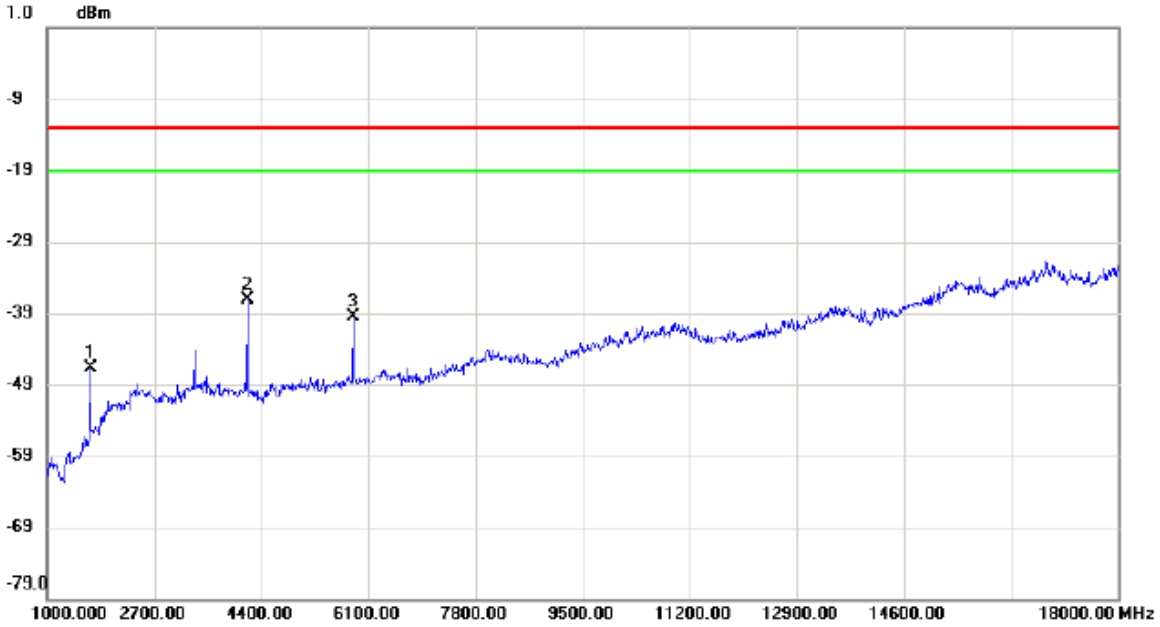
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	36.7900	-51.33	0.57	-50.76	-13.00	-37.76	peak	
2		75.5900	-63.96	-6.23	-70.19	-13.00	-57.19	peak	
3		166.7700	-66.74	-5.00	-71.74	-13.00	-58.74	peak	
4		371.4400	-66.16	-0.65	-66.81	-13.00	-53.81	peak	
5		495.6000	-66.39	0.81	-65.58	-13.00	-52.58	peak	
6		605.2100	-66.87	2.33	-64.54	-13.00	-51.54	peak	

Test Mode:	GSM850_TX CH190_GSM

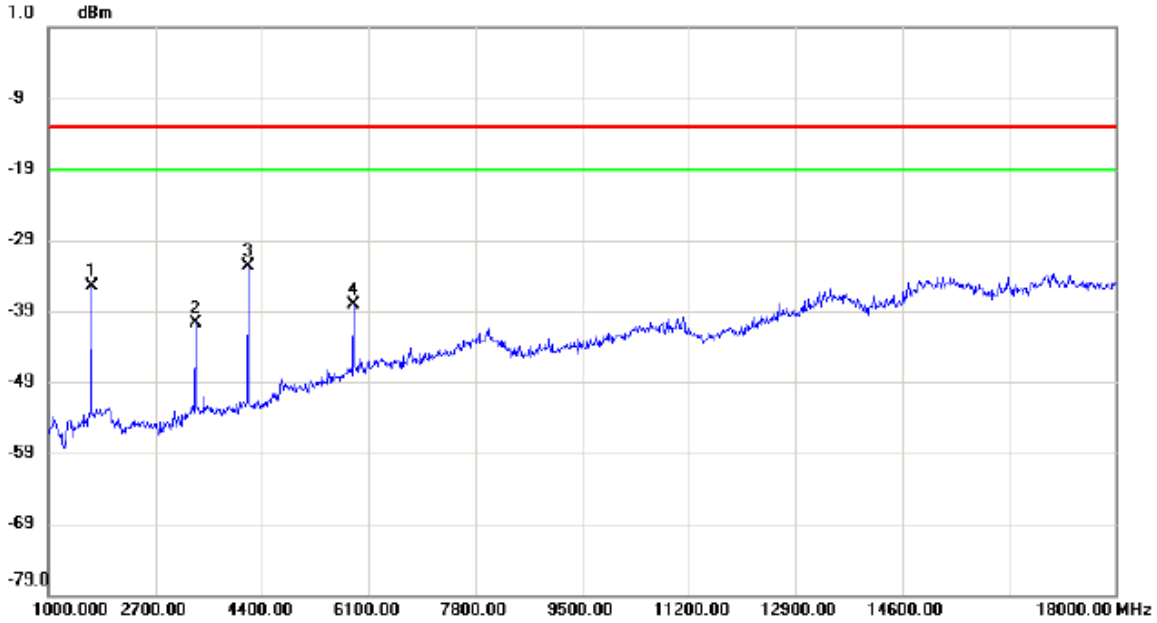
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		1680.000	-53.33	6.59	-46.74	-13.00	-33.74	peak	
2	*	4179.000	-51.68	14.63	-37.05	-13.00	-24.05	peak	
3		5862.000	-56.14	16.69	-39.45	-13.00	-26.45	peak	

Test Mode:	GSM850_TX CH190_GSM

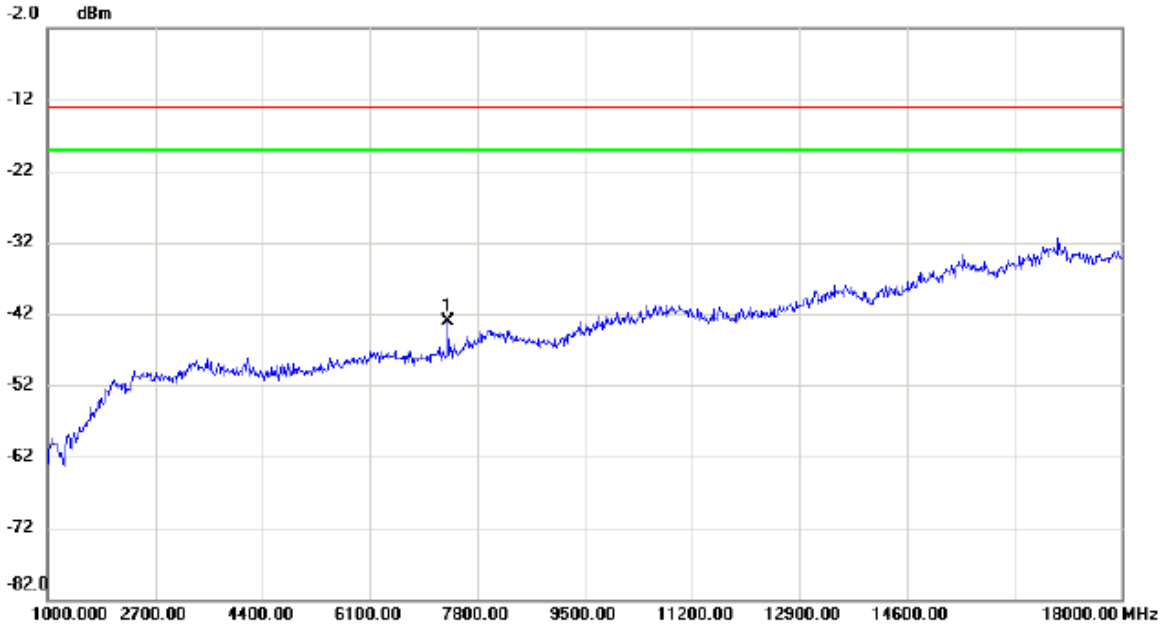
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		1680.000	-43.58	8.17	-35.41	-13.00	-22.41	peak	
2		3346.000	-50.74	10.04	-40.70	-13.00	-27.70	peak	
3	*	4179.000	-45.17	12.39	-32.78	-13.00	-19.78	peak	
4		5862.000	-55.84	17.76	-38.08	-13.00	-25.08	peak	

Test Mode:	GSM850_TX CH190_EDGE

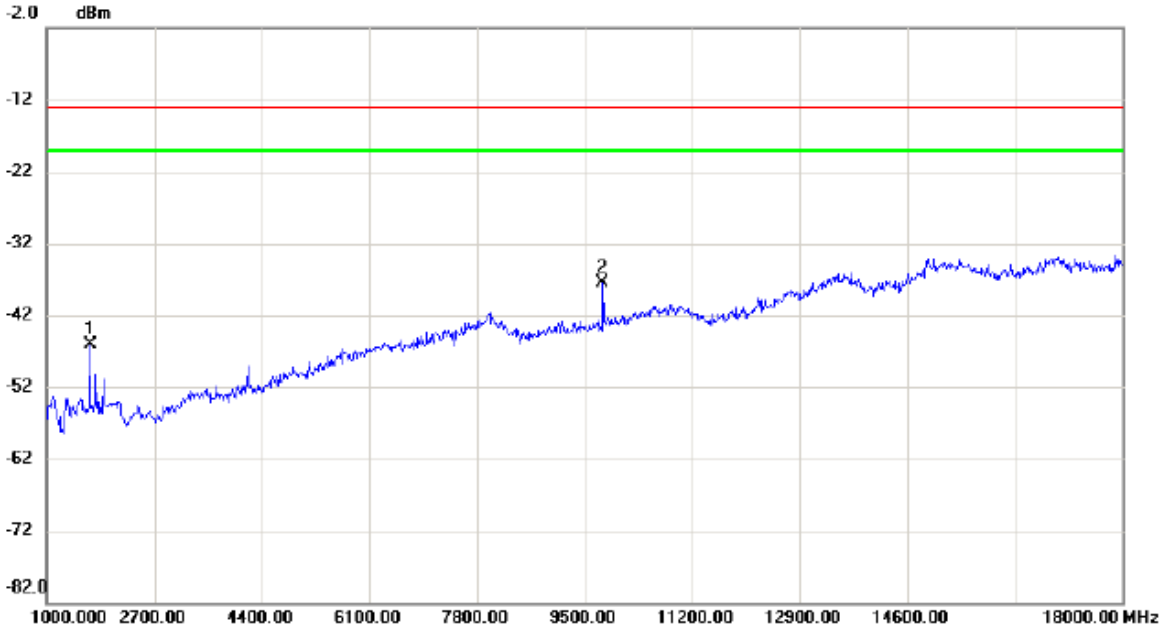
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	7341.000	-60.60	17.47	-43.13	-13.00	-30.13	peak	

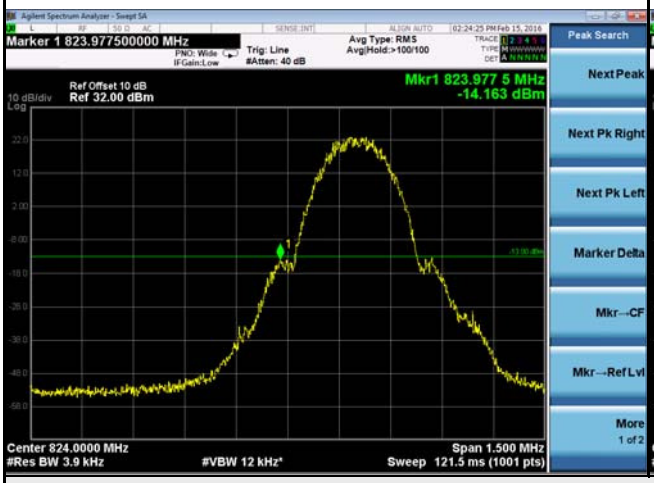
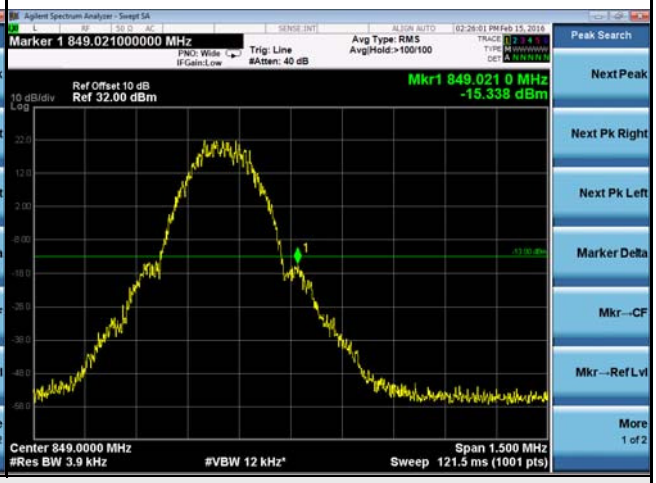
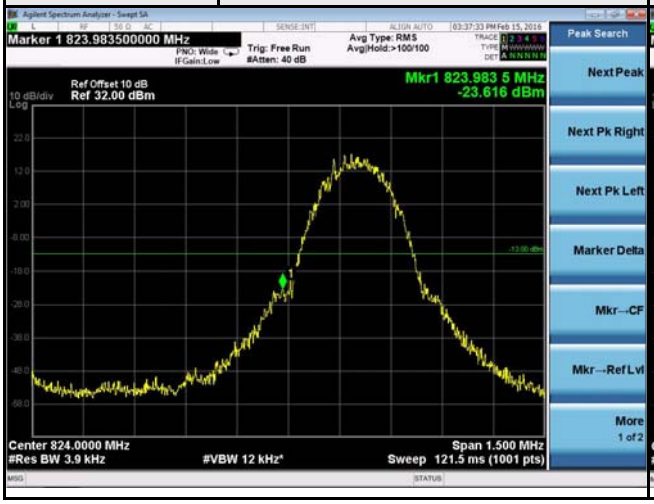
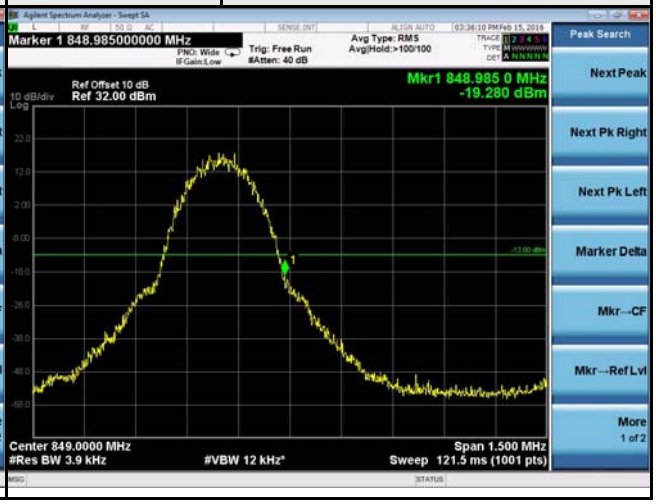
Test Mode:	GSM850_TX CH190_EDGE

Horizontal

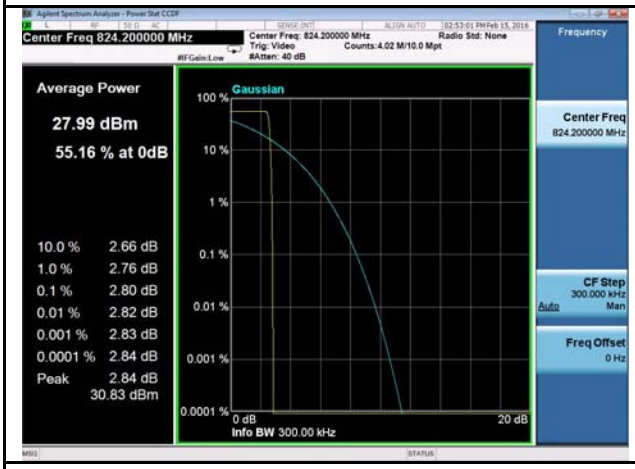
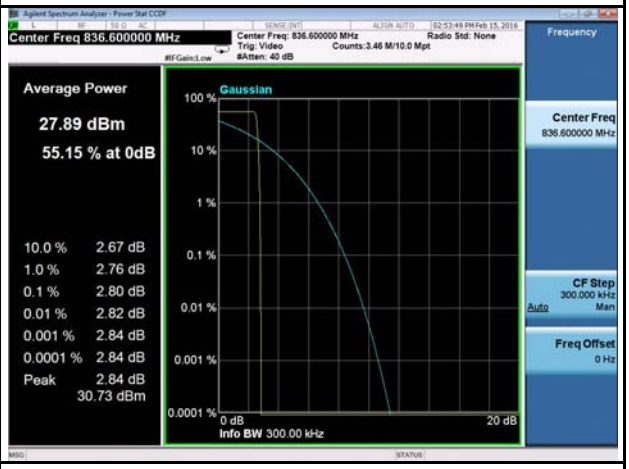
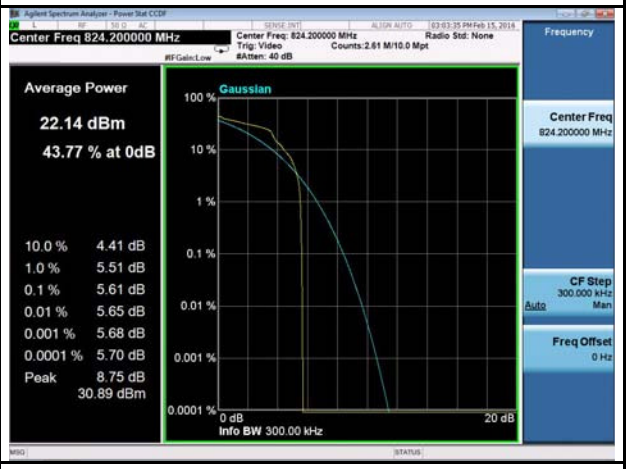
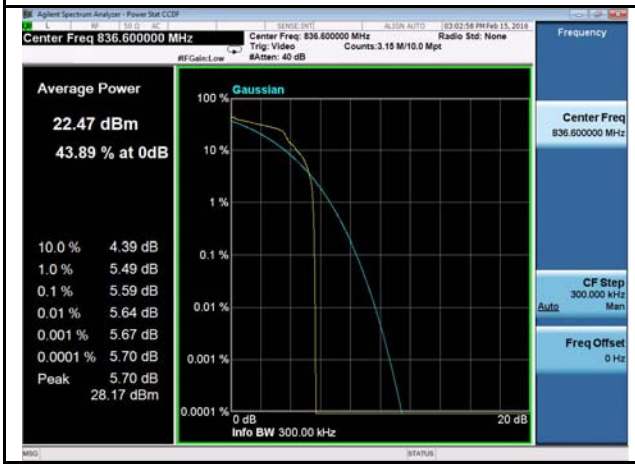
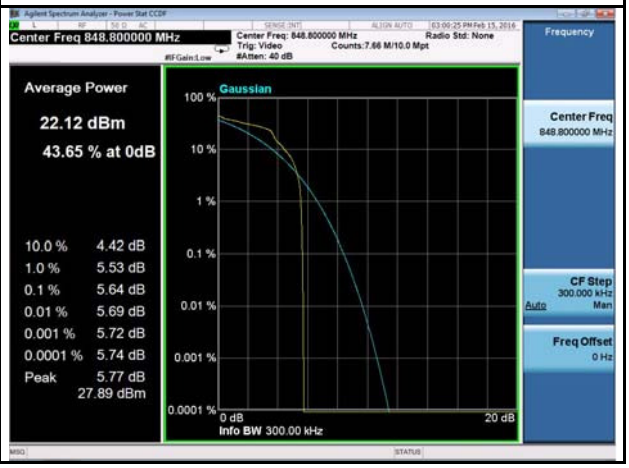


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		1680.000	-54.31	8.17	-46.14	-13.00	-33.14	peak	
2	*	9789.000	-58.36	20.92	-37.44	-13.00	-24.44	peak	

ATTACHMENT E - BAND EDGE

GSM850			
GSM			
Channel	128	Channel	251
			
EDGE			
Channel	128	Channel	251
			

ATTACHMENT F – PEAK TO AVERAGE RATIO

GSM 850 Spectrum Plot	
GSM -128	GSM-190
	
GSM-251	EDGE-128
	
EDGE-190	EDGE-251
	

ATTACHMENT G - FREQUENCY STABILITY

Test Mode:	GSM850_CH190

Temperature vs. Frequency Stabiility

Temperature(℃)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
0	7.21	0.008747877	2.5
10	6.23	0.007558845	2.5
20	4.11	0.004986654	2.5
30	5.85	0.007097792	2.5
40	6.24	0.007570978	2.5
Max. Deviation (ppm)	7.21	0.008747877	2.5

Voltage vs. Frequency Stability

Voltage(Volts)	Frequency Error (Hz)	Frequency Error (ppm)	Limit(ppm)
102	3.14	0.003809755	2.5
108	4.24	0.005144382	2.5
132	0.28	0.000339723	2.5
Max. Deviation (ppm)	4.24	0.005144382	2.5