

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Philips lighting (China) Investment Co., Ltd.

Segment Control Unit

Model No.: LCN7700

FCC ID: 2AGBW-LCN7700

Prepared for : Philips lighting (China) Investment Co., Ltd.
Building 9 #, Lane 888, Tianlin Road, Minhang District,
Shanghai.

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park,
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Report Number : ACS-F16079
Date of Test : Mar.21~Apr.06, 2016
Date of Report : Nov.18, 2016

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FCC ID: 2AGBW-LCN7700

TEST REPORT CERTIFICATION

Applicant : Philips lighting (China) Investment Co., Ltd.
Product : Segment Control Unit
FCC ID : 2AGBW-LCN7700
(A) Model No. : LCN7700
(B) Serial No. : N/A
(C) Power Supply : DC 12V
(D) Test Voltage : DC 12V

Tested for comply with:
FCC part 2, 22H & 24E
Test Method:
KDB971168 D01 v02r02

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC part 2, 22H & 24E requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements.

This Report is made under FCC part 2, 22H & 24E. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

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

Date of Test : Mar.21~Apr.06, 2016 Report of date: Nov.18, 2016

Prepared by : Merica Liu (for) Reviewed by : Sunny Lu
Cindy Zhu / Assistant Sunny Lu / Deputy Manager



Approved & Authorized Signer :

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT has been tested according to the applicable standards as referenced below.

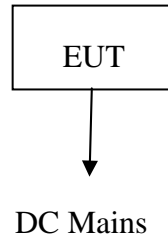
EMISSION		
Description of Test Item	Standard	Results
Effective Isotropic Radiated Power	2.1046(a) 22.913(a) 24.232(b)	PASS
Out of Band Emissions at antenna Terminals and Band Edge	2.1051 22.917(a) 24.238(a)	PASS
99% & 26dB Occupied Bandwidth	2.1049(h)	PASS
RF Output Power	2.1046(a) 22.913(a) 24.232(b)	PASS
Field Strength of Spurious Emissions	2.1053 22.917(a) 24.238(a)	PASS
Frequency Stability vs. Temperature and Voltage	22.355 24.235	PASS
Modulation characteristics	2.1047	PASS

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product	: Segment Control Unit
Model No.	: LCN7700
FCC ID	: 2AGBW-LCN7700
Operating Frequency	: GSM 850: 824-849MHz PCS 1900: 1850-1910MHz
Antenna Type and Gain	: Smart Disc Antenna, 3.15dBi
Applicant	: Philips lighting (China) Investment Co., Ltd. Room 212, Block 2, Nanhai Ecool No.6 Xing Hua Road, She Kou, Shenzhen, China
Manufacturer	: Philips lighting (China) Investment Co., Ltd. Room 212, Block 2, Nanhai Ecool No.6 Xing Hua Road, She Kou, Shenzhen, China
Date of Test	: Mar.21~Apr.06, 2016
Date of Receipt	: Mar.19, 2016
Sample Type	: Prototype production

2.2. Block diagram of connection between the EUT and simulators



(EUT: Segment Control Unit)

2.3. Test Information

TM1: GSM/GPRS mode with GMSK modulation

TM2: Edge mode with 8PSK modulation

TM1 has the Max power compared with TM2. So out of Band Emission at antenna terminals and Band edge. Field strength of Radiated Spurious emission were tested use TM1 mode.

Test Mode	Frequency (MHz)	CH
GSM 850	824.2	128
	836.6	190
	848.8	251
PCS 1900	1850.2	512
	1880.0	661
	1909.8	810

2.4. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology
Park, Nanshan District, Shenzhen,
Guangdong, China

3m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 90454
Valid Date: Jul.12, 2017

3m & 10m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 794232
Valid Date: Jul.12, 2017

RF Anechoic Chamber : Dimensions are:
[L]10m × [W]5.5m × [H]5m

EMC Lab. : Certificated by DAkkS, Germany
Registration No: D-PL-12151-01-00
Valid Date: Dec.15, 2016

Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2017

2.5. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Radiated Spurious Emission test in RF chamber	3.6dB
Uncertainty for Conduction Spurious emission test	2.0dB
Uncertainty for Output power test	0.8dB
Uncertainty for Power density test	2.0dB
Uncertainty for Frequency range test	7×10^{-8}
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.1 %
Uncertainty for test site temperature and humidity	0.6
	3%

3. EFFECTIVE ISOTROPIC RADIATED POWER

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	Apr.28,15	1 Year
2.	Preamplifier	Agilent	8449B	3008A02495	Apr.28,15	1 Year
3.	Preamplifier	Agilent	8447D	2944A11159	Apr.28,15	1Year
4.	Horn Antenna	ETS	3115	9510-4877	Oct.15,15	1 Year
5.	Bi-log Antenna	TESEQ	CBL6112D	25237	Jun.30,15	1 Year
6.	Antenna and turn table controller	CT	SC100	CT-0091	N/A	N/A
7.	RF Cable	Hubersuhner	SUCOFLEX104/102	274094/4+28610/2	Apr.28,15	1 Year
8.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A

Note: N/A means Not applicable.

3.1.Limit

22.913(a) Mobile station are limited to 7W ERP.

Part 24.232(b) Mobile station are Limited to 2W EIRP.

3.2.Test Procedure:

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength(E in dBuV/m) was calculated.

ERP in frequency band 824.2-848.8MHz were measured using substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follow:

EIRP in frequency band 1850.2-1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$

$EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$

$dBd = dBi - 2.15dB$

3.3. Test Results

EUT: Segment Control Unit		
M/N: LCN7700		
Test date: 2016-03-21	Pressure: 102.4±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature: 22.8±0.6

GSM 850

Test Result :

The RBW, VBW of SPA for frequency

Below 1GHz was RBW= 300KHz, VBW=1MHz;

Above 1GHz was RBW=1MHz, VBW=3MHz;

TM1

Test Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuv)	Receive Antenna Factor (dB/m)	Receive Cable Loss (dB)	Field Strength (dBuv/m)
GSM 850	824.2	128	V	120.64	21.14	3.88	145.66
			H	120.64	21.14	3.88	145.66
	836.6	190	V	120.58	21.27	3.88	145.73
			H	120.55	21.27	3.88	145.7
	848.8	251	V	120.68	21.34	3.92	145.94
			H	120.57	21.34	3.92	145.83

S.G.output (dBm)	Antenna Gain (dBd)	Tx Cable loss (dB)	Result ERP/EIRP (dBm)	Limit
				ERP/EIRP(dBm)
37.54	1	3.68	34.86	38.45
37.46	1	3.68	34.78	38.45
37.38	1	3.74	34.64	38.45
37.37	1	3.74	34.63	38.45
38.42	1	3.8	35.62	38.45
37.28	1	3.8	34.48	38.45

TM2

Test Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuv)	Receive Antenna Factor (dB/m)	Receive Cable Loss (dB)	Field Strength (dBuv/m)
GSM 850	824.2	128	V	114.58	21.14	3.88	139.6
			H	114.14	21.14	3.88	139.16
	836.6	190	V	114.38	21.27	3.88	139.53
			H	114.14	21.27	3.88	139.29
	848.8	251	V	114.04	21.34	3.92	139.3
			H	114.11	21.34	3.92	139.37

S.G.output (dBm)	Antenna Gain (dBd)	Tx Cable loss (dB)	Result ERP/EIRP (dBm)	Limit
				ERP/EIRP(dBm)
33.94	1	3.68	31.26	38.45
33.73	1	3.68	31.05	38.45
33.88	1	3.74	31.14	38.45
33.82	1	3.74	31.08	38.45
34.11	1	3.8	31.31	38.45
33.99	1	3.8	31.19	38.45

PCS 1900
 Test Result :
 The RBW, VBW of SPA for frequency
 Below 1GHz was RBW= 300KHz, VBW=1MHz;
 Above 1GHz was RBW=1MHz, VBW=3MHz;

TM1

Test Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuv)	Receive Antenna Factor (dB/m)	Receive Cable Loss (dB)	Field Strength (dBuv/m)
PCS 1900	1850.2	512	V	112.46	27.23	5.9	142.55
			H	115.37	27.23	5.9	146.52
	1880.0	661	V	113.28	27.34	5.93	145.05
			H	114.92	27.34	5.93	145.29
	1909.8	810	V	115.61	27.46	6.00	146.09
			H	117.52	27.46	6.00	147.04

S.G.output (dBm)	Antenna Gain (dBi)	Tx Cable loss (dB)	Result ERP/EIRP (dBm)	Limit
				ERP/EIRP(dBm)
32.60	3.15	6.11	29.64	33
32.35	3.15	6.11	29.39	33
32.93	3.15	6.19	29.89	33
32.79	3.15	6.19	29.75	33
33.90	3.15	6.26	30.79	33
33.65	3.15	6.26	30.54	33

Conclusion: PASS

TM2

Test Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuv)	Receive Antenna Factor (dB/m)	Receive Cable Loss (dB)	Field Strength (dBuv/m)
PCS 1900	1850.2	512	V	107.12	27.23	5.9	139.26
			H	110.07	27.23	5.9	141.22
	1880.0	661	V	107.88	27.34	5.93	140.21
			H	109.37	27.34	5.93	141.06
	1909.8	810	V	110.06	27.46	6.00	141.85
			H	111.22	27.46	6.00	142.25

S.G.output (dBm)	Antenna Gain (dBi)	Tx Cable loss (dB)	Result ERP/EIRP (dBm)	Limit
				ERP/EIRP(dBm)
31.53	3.15	6.11	28.57	33
31.25	3.15	6.11	28.29	33
31.16	3.15	6.19	28.12	33
31.09	3.15	6.19	28.05	33
30.95	3.15	6.26	27.84	33
30.77	3.15	6.26	27.66	33
Conclusion: PASS				

4. OUT OF BAND EMISSIONS AT ANTENNA TERMINALS AND BAND EDGE

4.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.17,15	1 Year
2.	Spectrum	Agilent	E4446A	US44300459	Apr.28,15	1 Year
3.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.28,15	1 Year
4.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	NO.1	Oct.17,15	1 Year
5.	HF Cable	Hubersuhner	Sucoflex104	274094/4	Apr.28,15	1 Year

4.2. Limit

FCC part 22.917(a), 24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specification in the instruction manual and/or alignment procedure, shall not be less than $43+10\log(\text{Mean power in watts})$ dBc below the mean power output outside a license's frequency block(-13dBm).

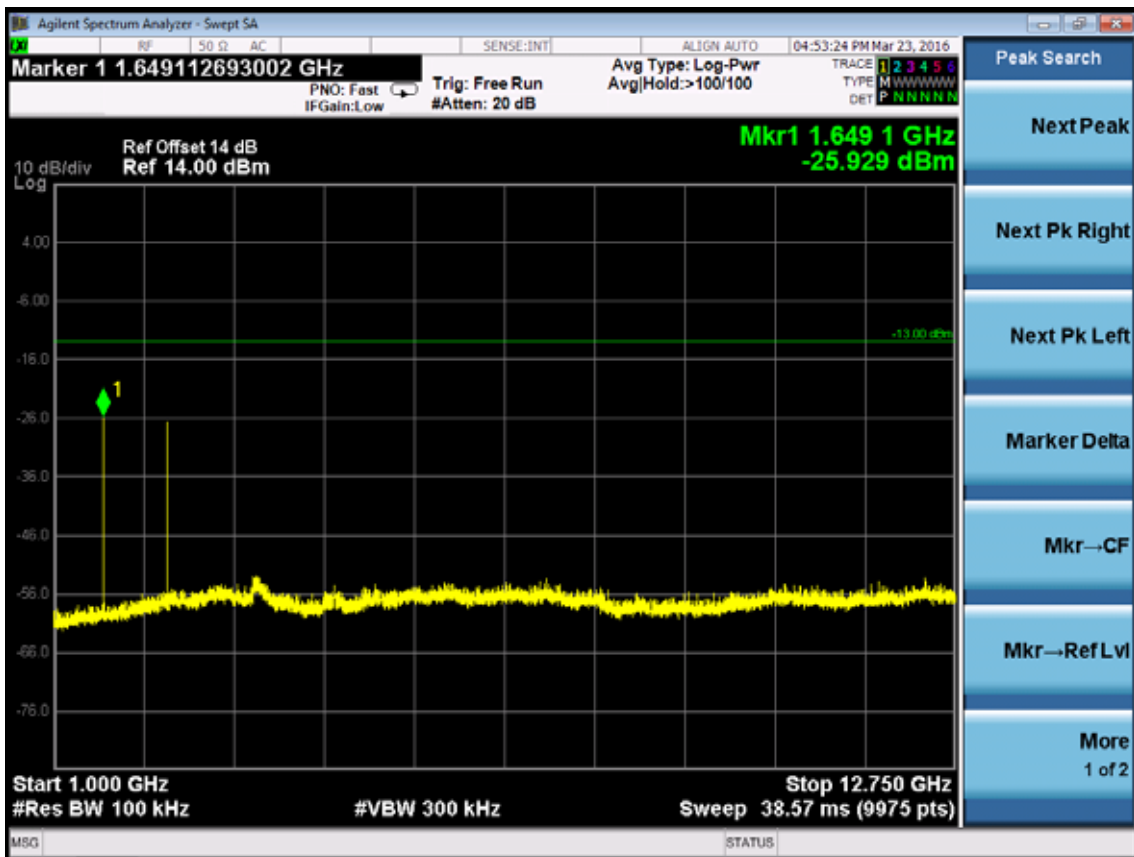
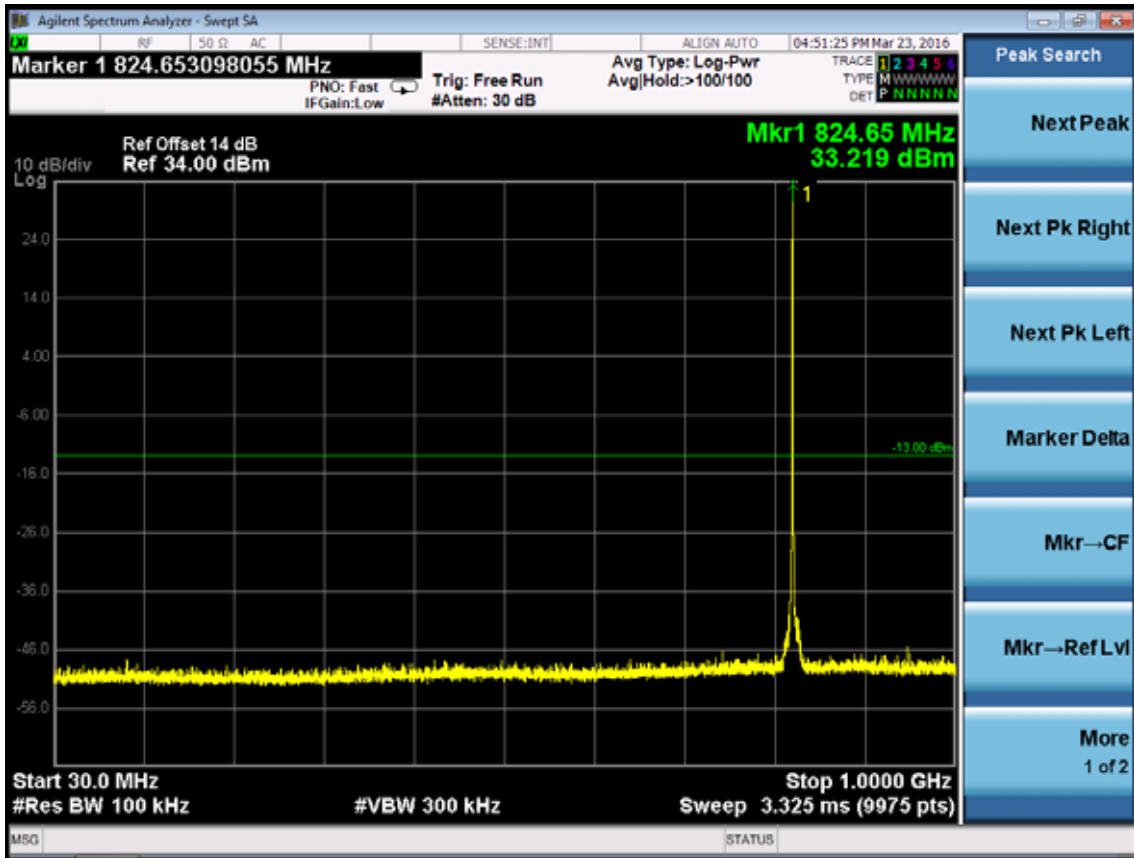
4.3. Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emission is any up to 10th harmonic. For the out of band: set RBW, VBW=1MHz, stat=30MHz, stop= 10 th harmonic. Limit=-13dBm Band Edge requirements: In 1Mhz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 % of bandwidth of fundamental emission of the transmitter any be employed to measure the out of band emission. Limit=-13dBm.

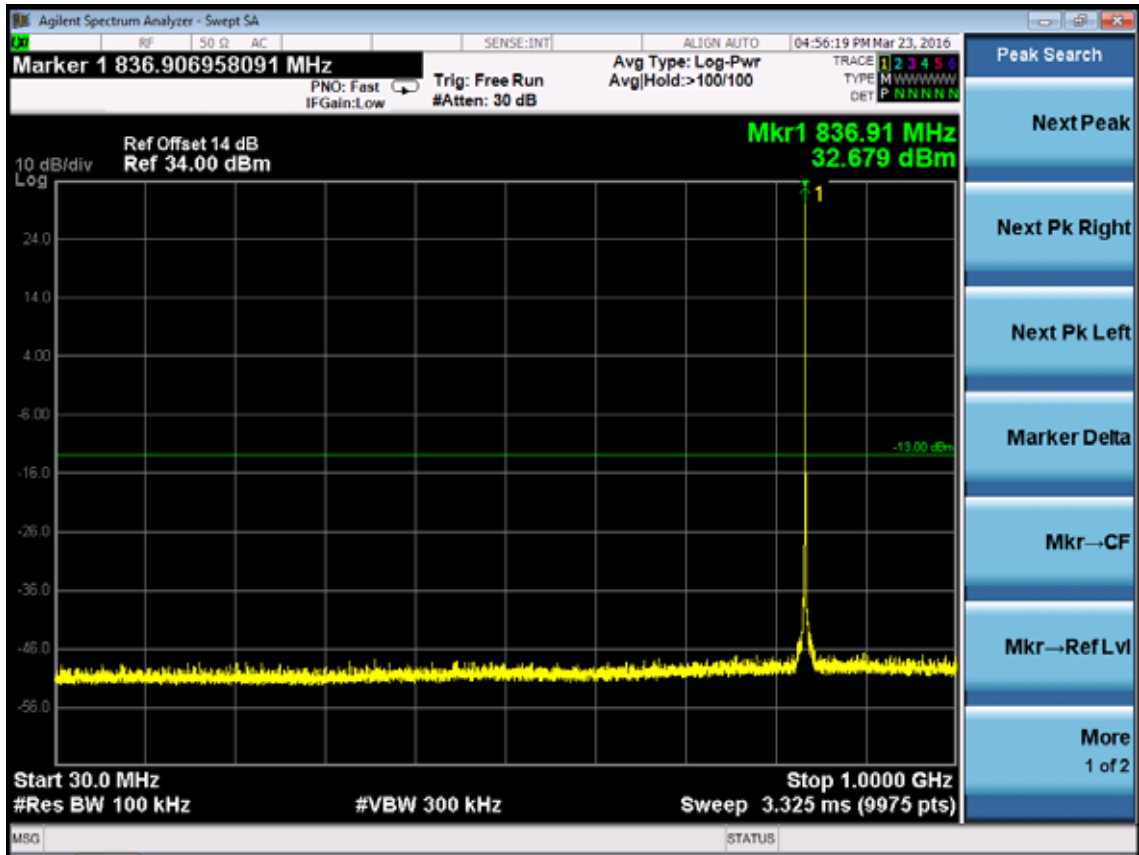
4.4. Test result

PASS (The testing data was attached in the next pages.)

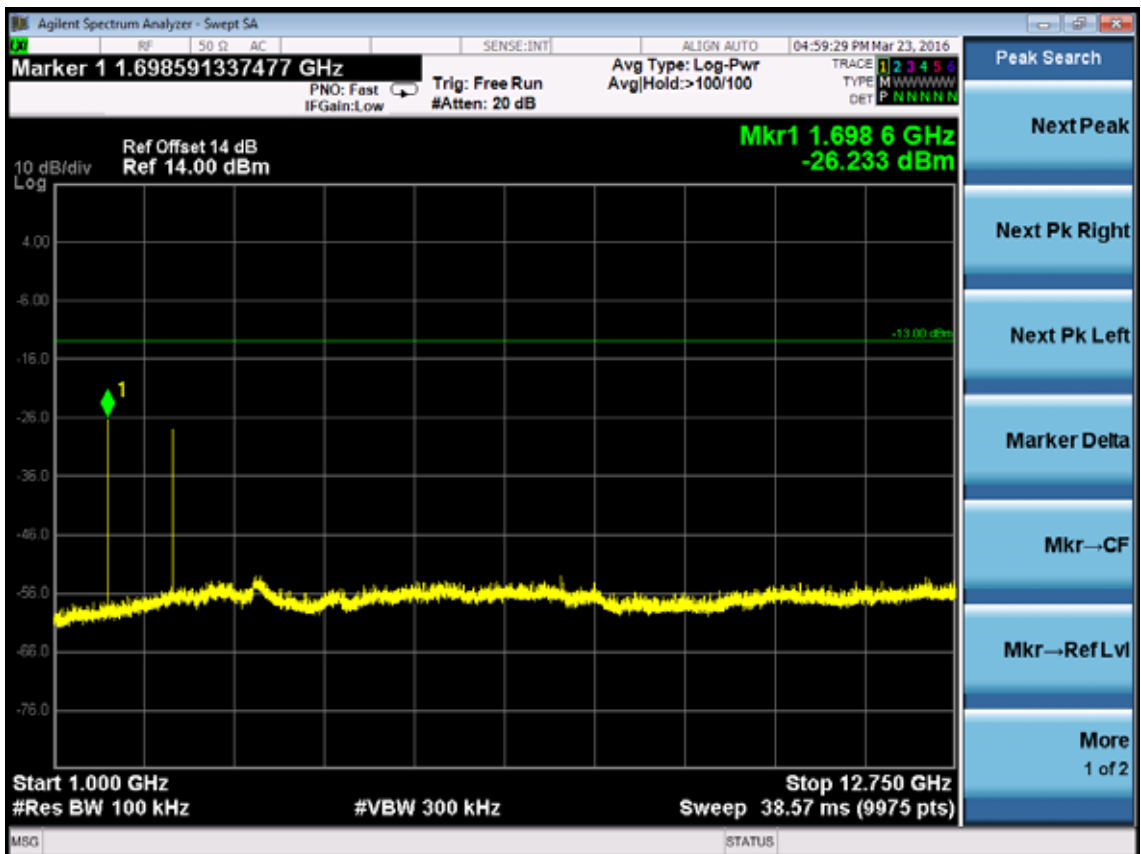
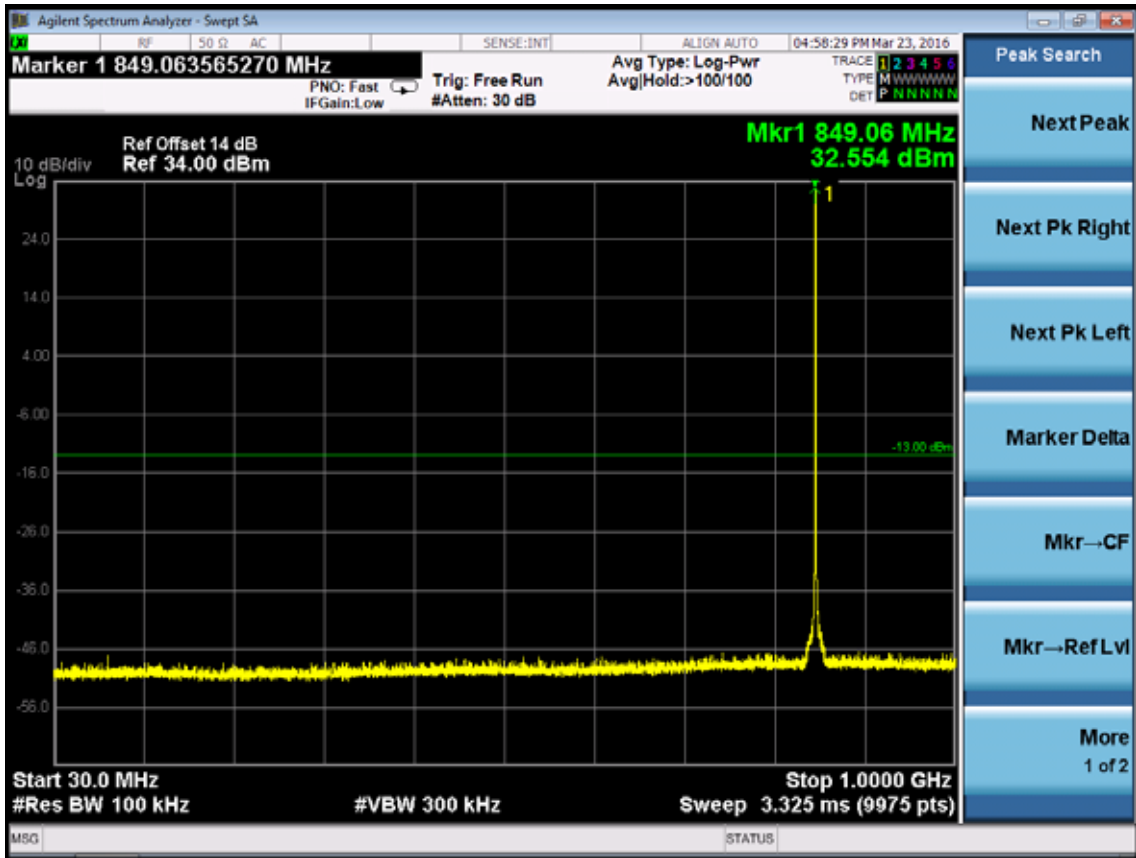
GSM 850MHz
 TM 1
 CH 128



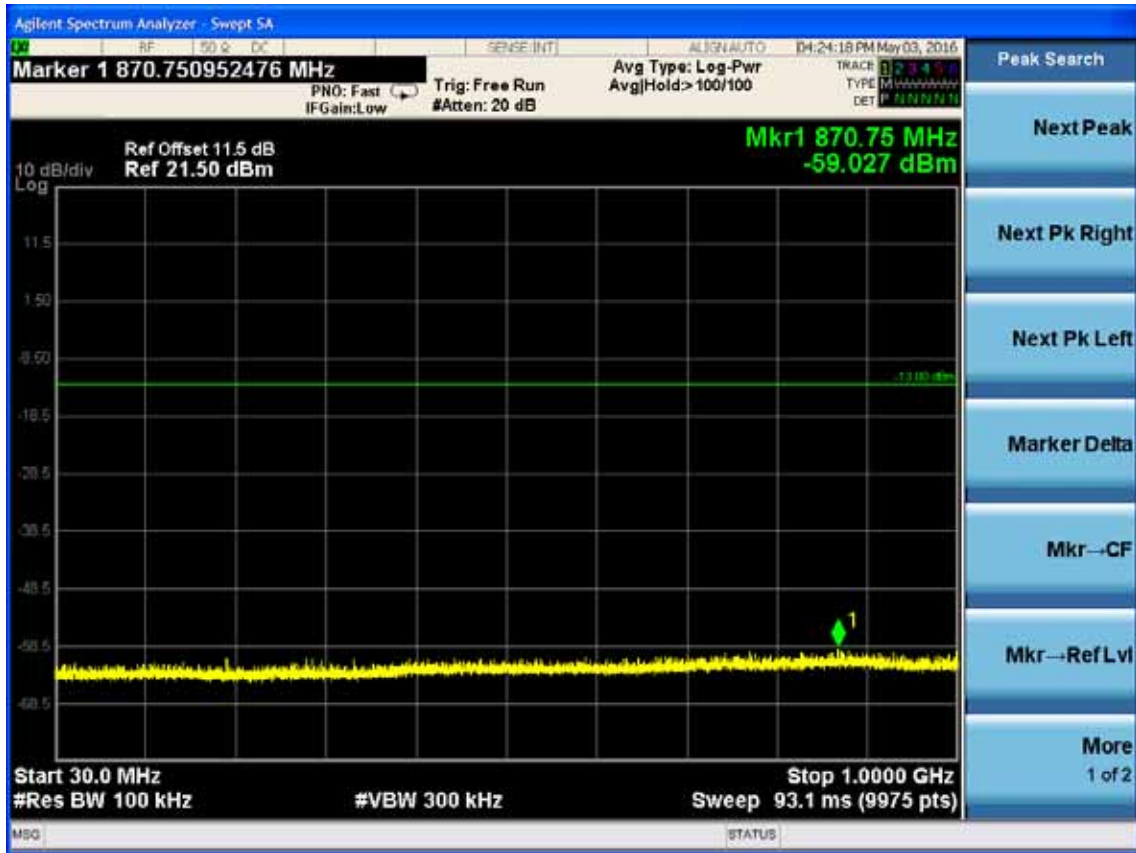
CH 190

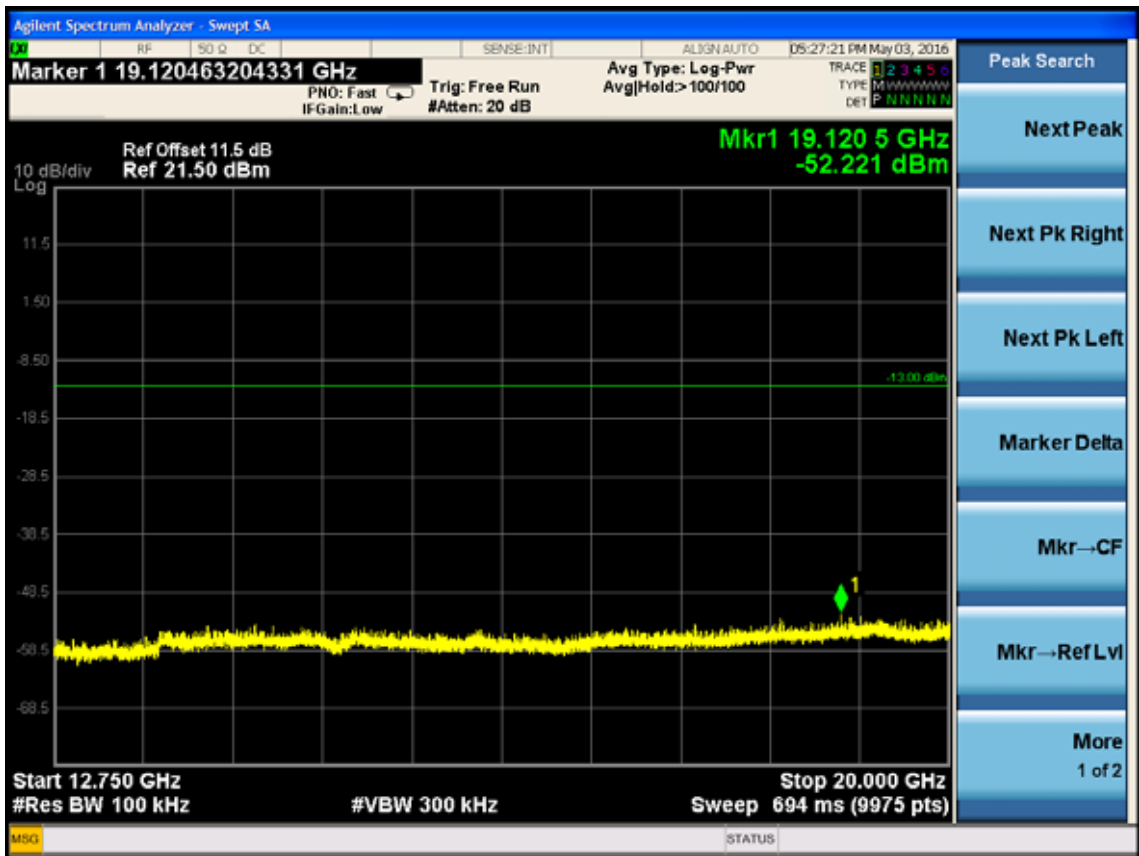


CH 251

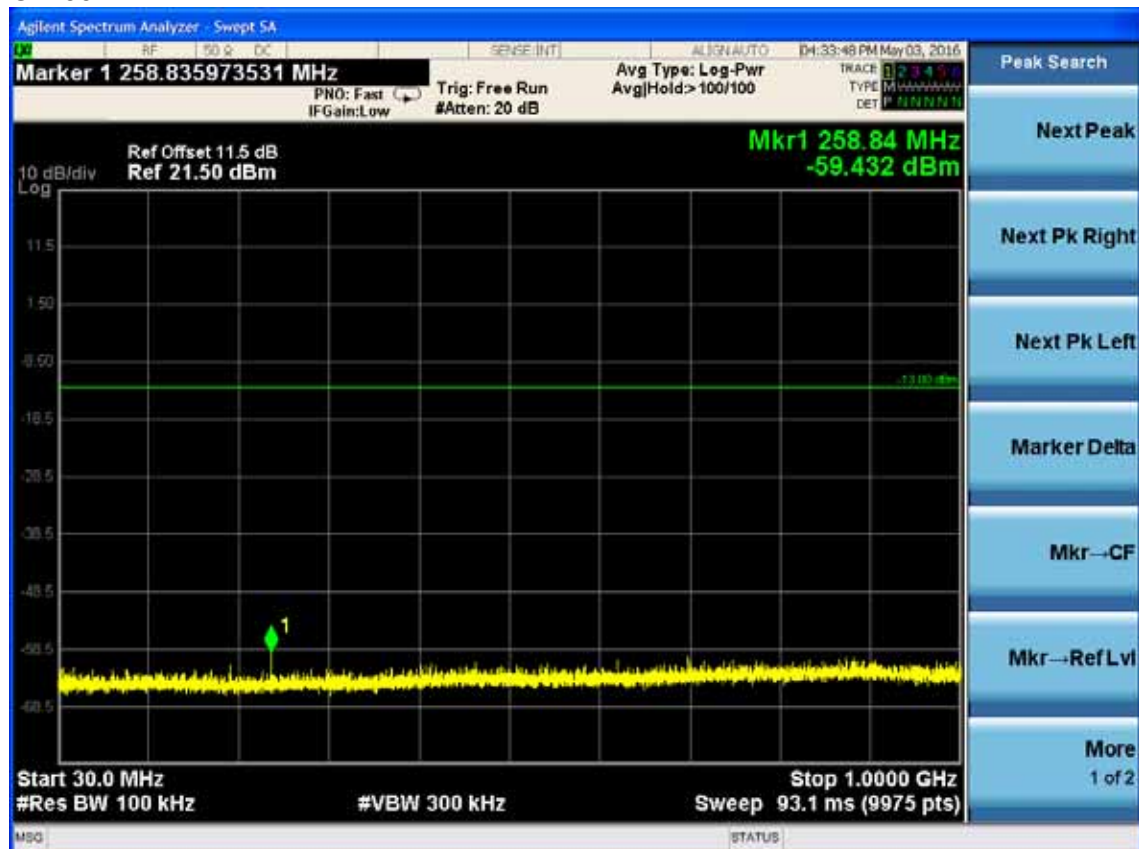


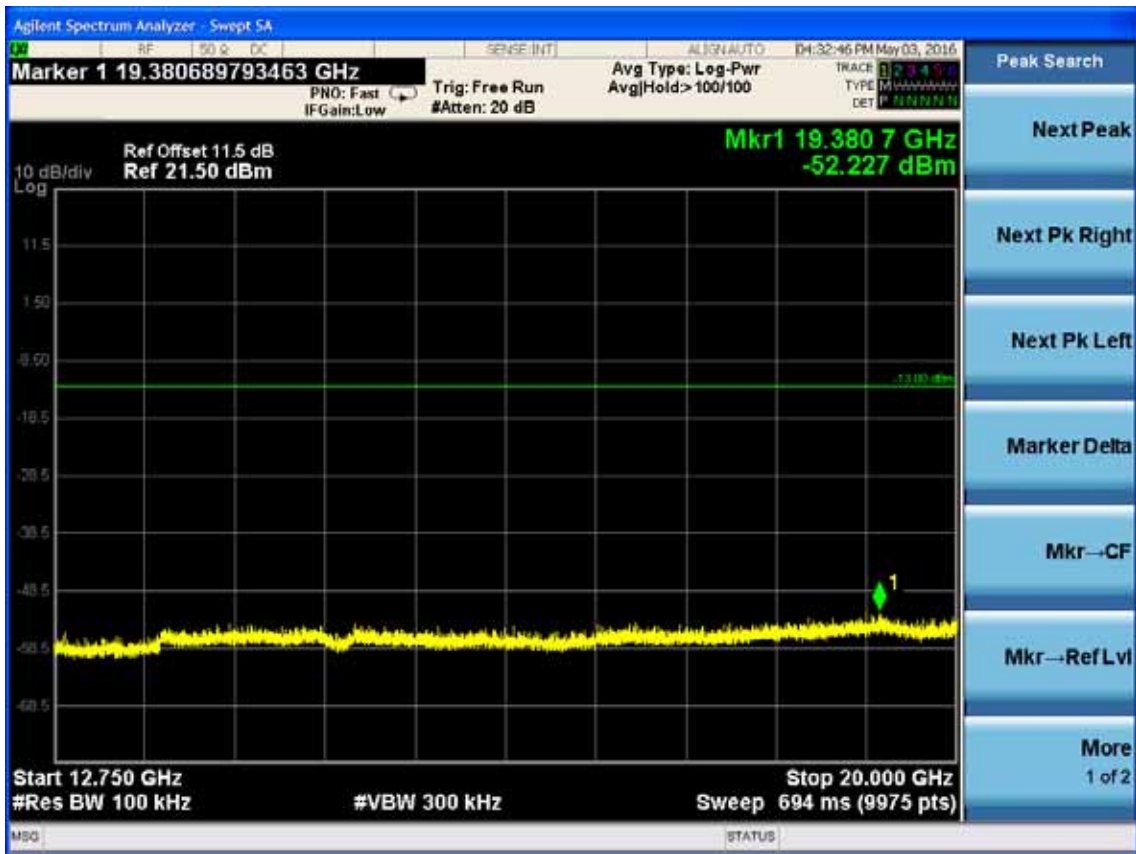
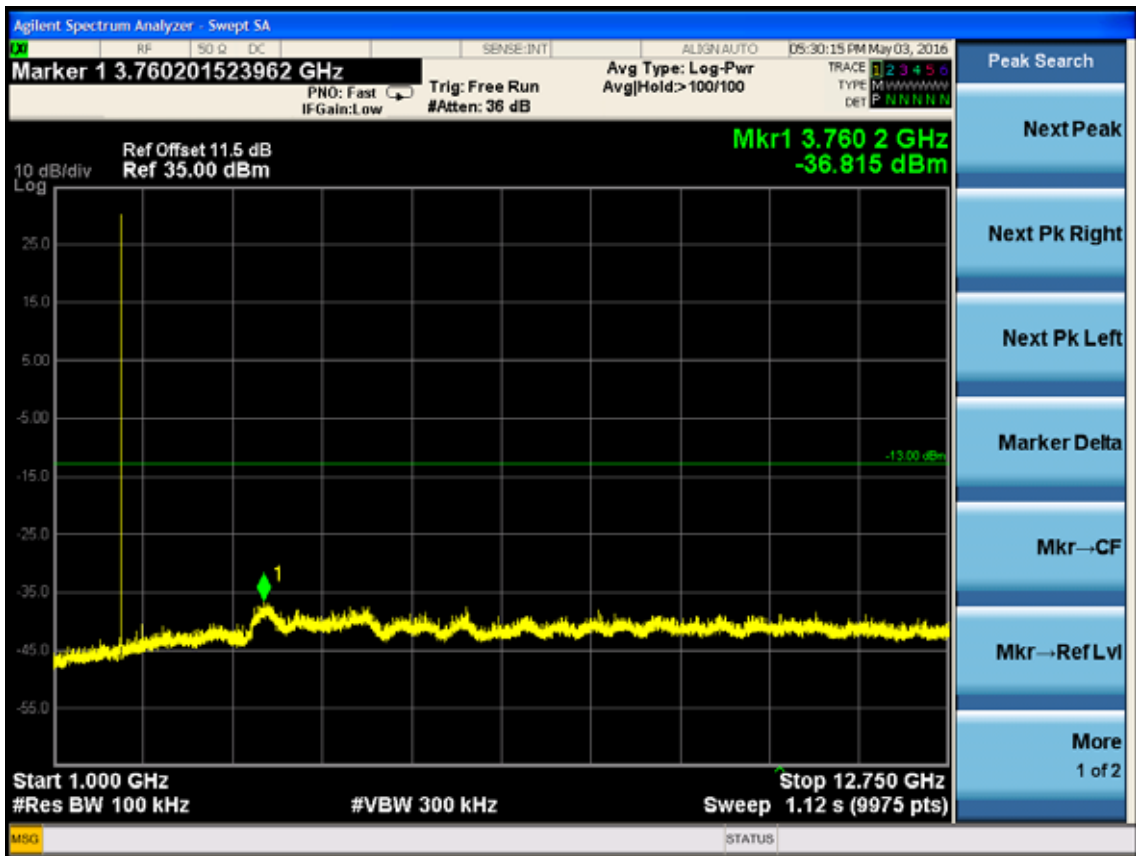
PCS 1900MHz
 TM 1
 CH 512



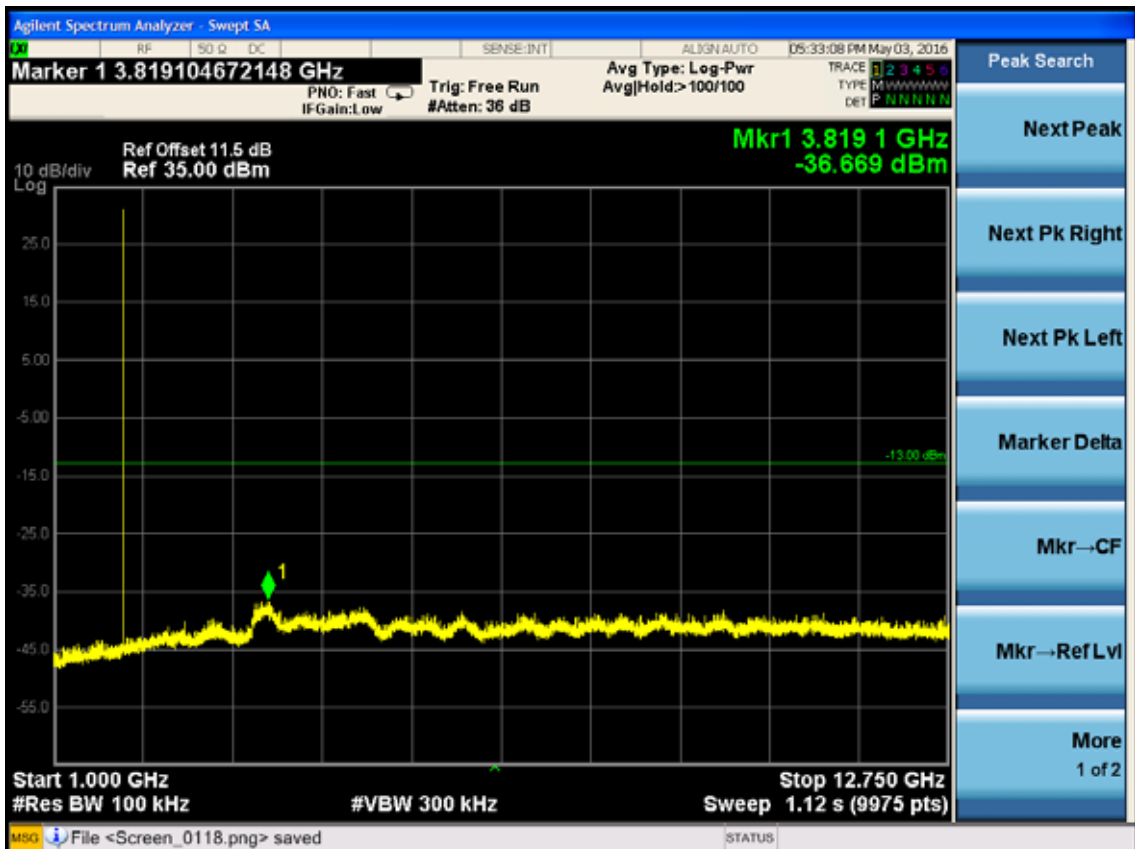
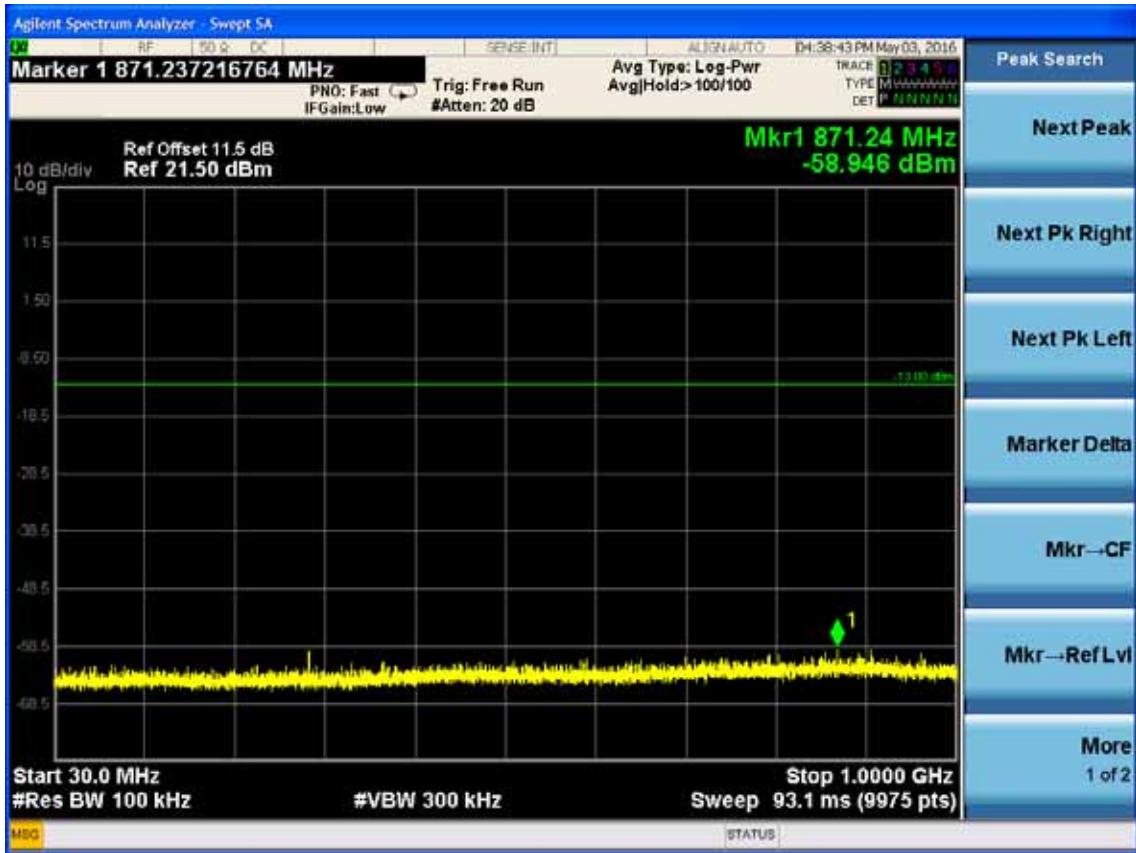


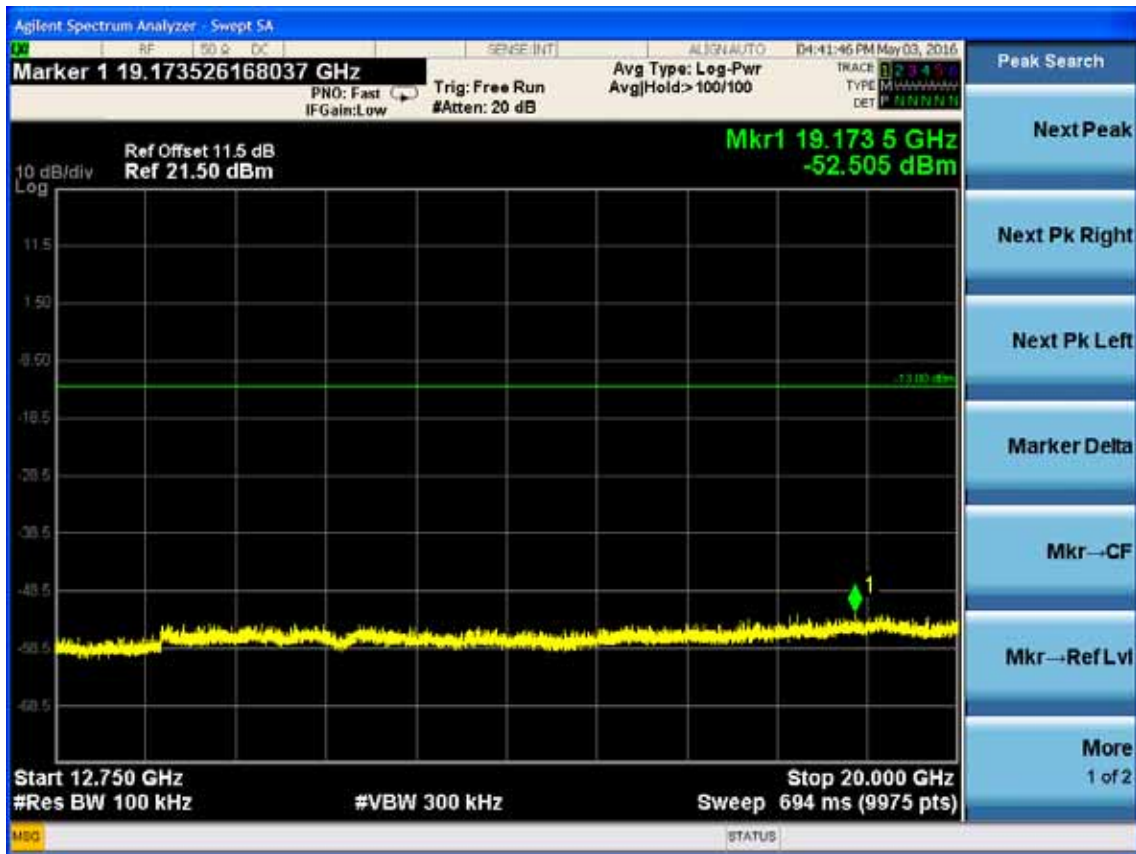
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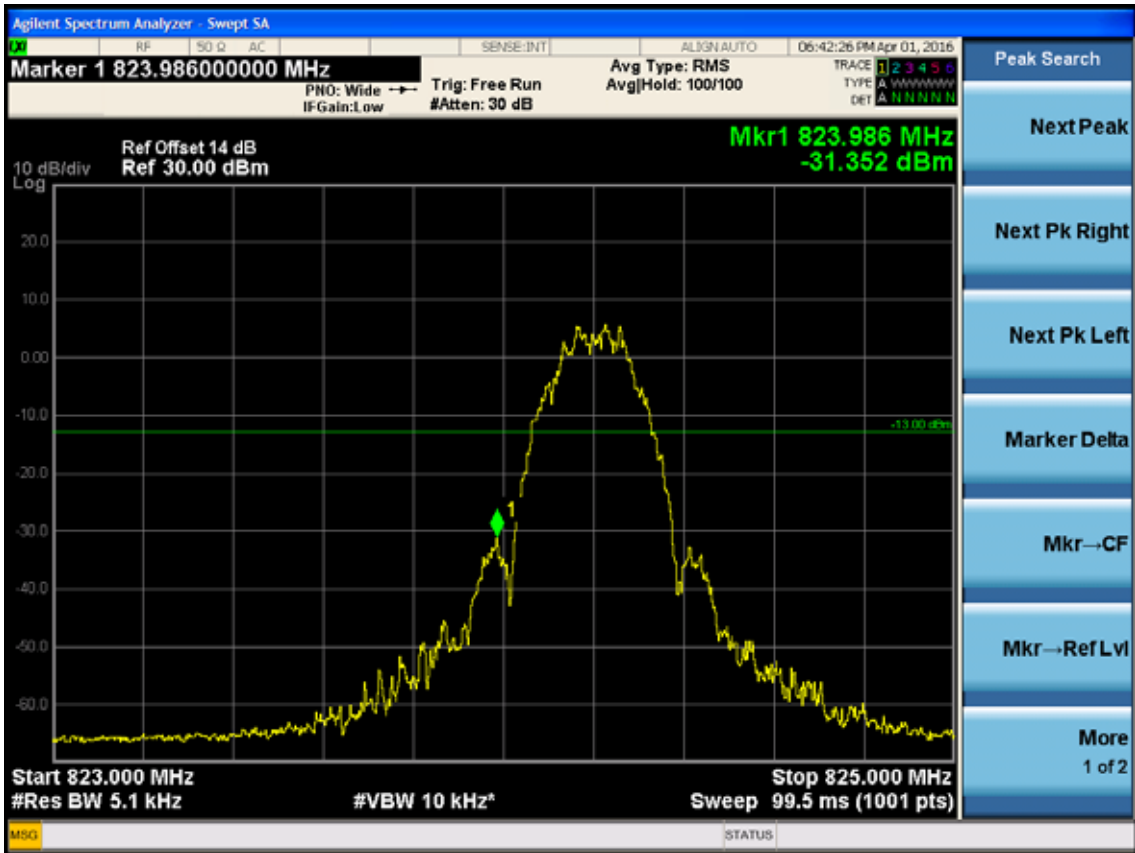


CH 810

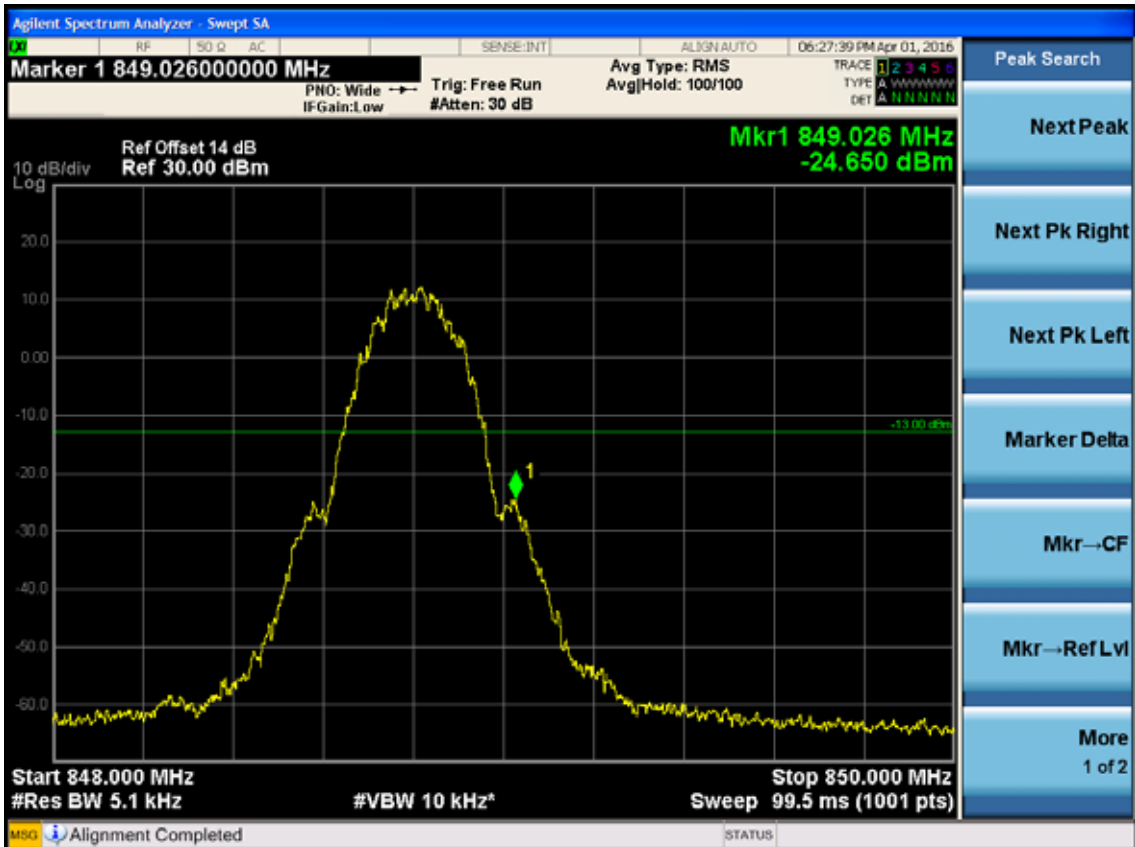




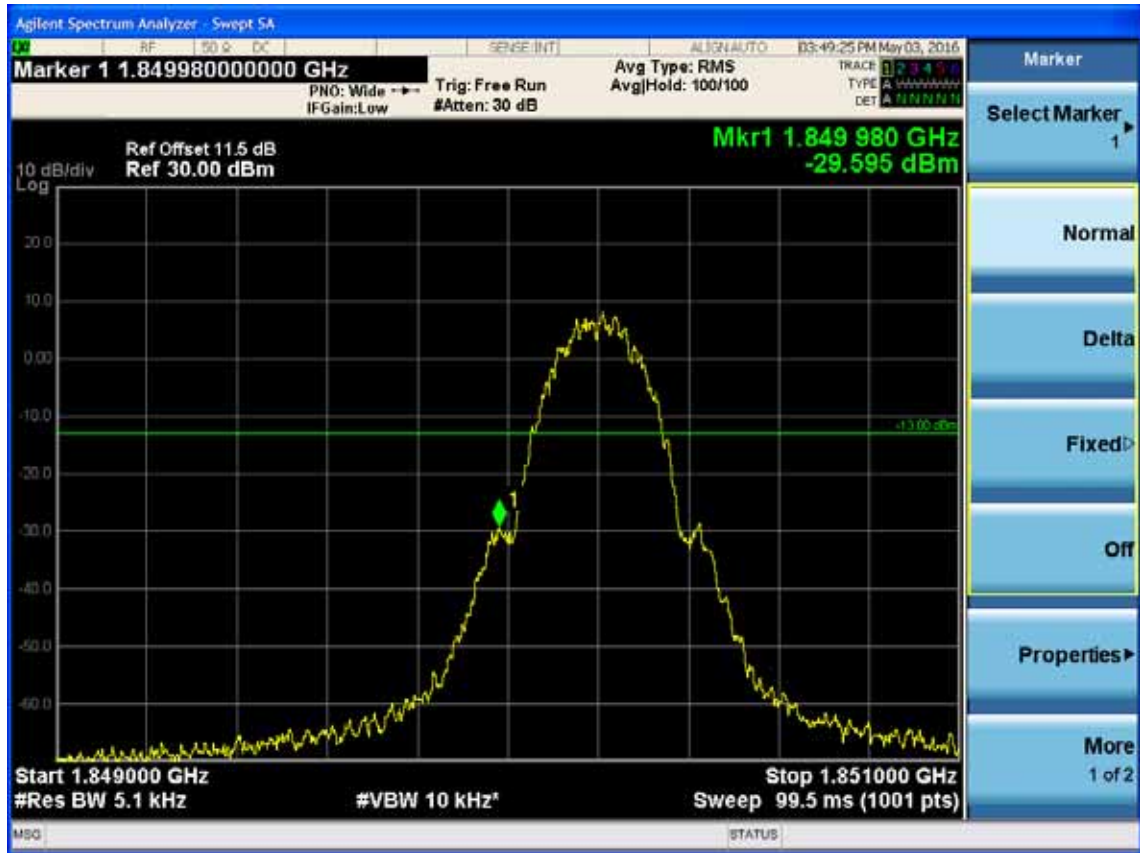
GSM 850MHz
 TM 1
 CH 128



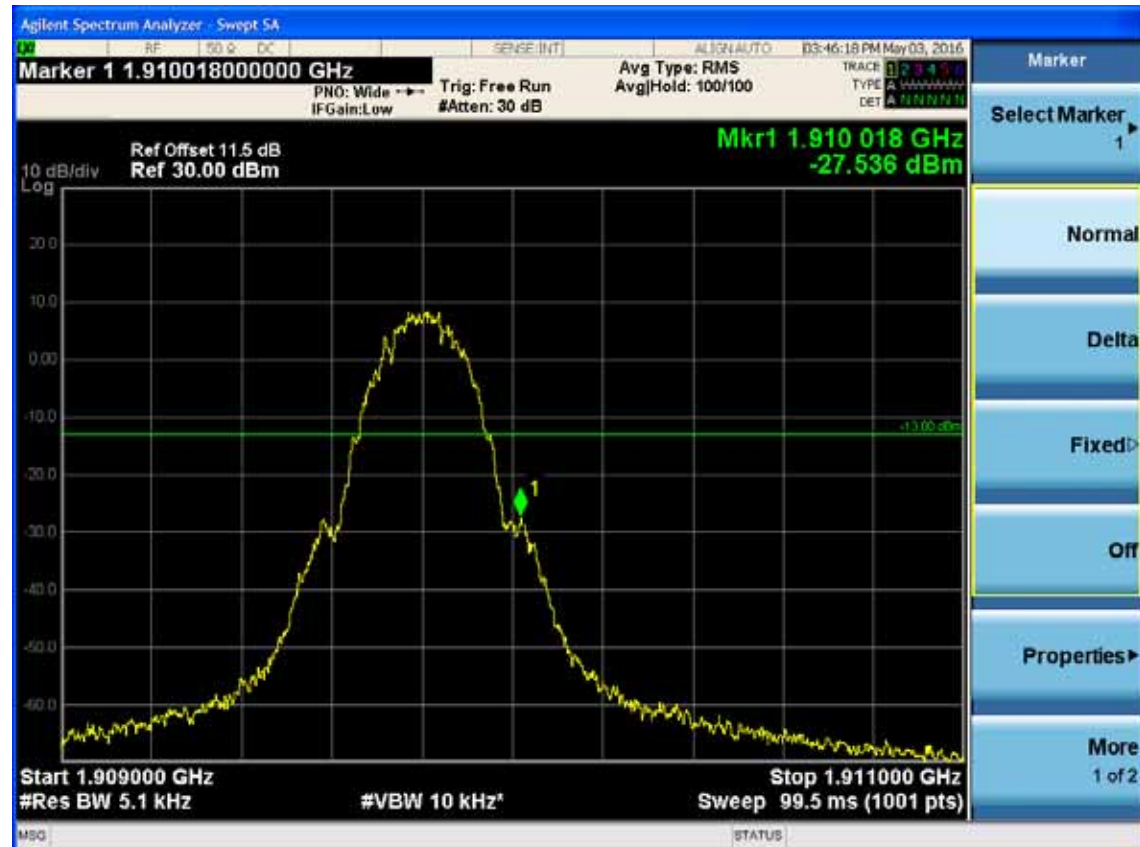
CH 251



PCS 1900MHz
 TM 1
 CH 512



CH 810



5. 99% & 26dB Occupied Bandwidth Test

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	Apr.28,15	1 Year
2.	Spectrum	Agilent	N9030A	MY51380221	Oct.18,15	1 Year
3.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.28,15	1 Year
4.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	NO.1	Oct.17.15	1 Year

5.2. Test Procedure

The EUT output RF connector was connected with a short a cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW>=3 times RBW, 99% bandwidth were measured, the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

5.3. Test Results

99% Bandwidth

EUT: Segment Control Unit		
M/N: LCN7700		
Test date: 2016-03-23	Pressure: 102.7±1.0 kpa	Humidity: 52.8±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.2±0.6

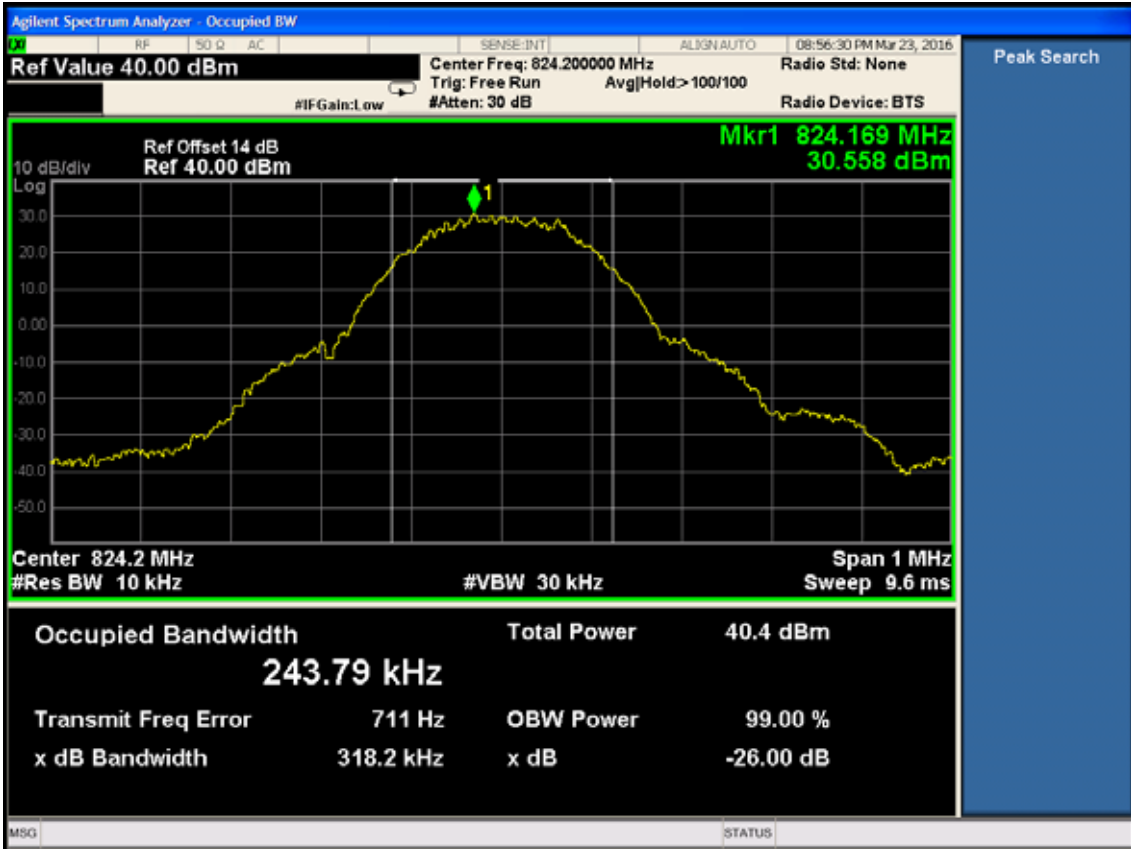
Test Mode	CH	Frequency (MHz)	99% bandwidth (kHz)		Limit (KHz)
			TM 1	TM 2	
GSM 850	CH128	824.2	243.79	246.85	N/A
	CH190	836.6	242.21	234.55	N/A
	CH251	848.8	242.53	243.88	N/A
PCS 1900	CH512	1850.2	243.10	240.66	N/A
	CH661	1880	245.20	236.53	N/A
	CH810	1909.8	242.28	236.28	N/A
Conclusion : PASS					

EUT: Segment Control Unit		
M/N: LCN7700		
Test date: 2016-03-23	Pressure: 102.7±1.0 kpa	Humidity: 52.8±3.0%
Tested by: Alice_Yang	Test site: RF site	Temperature:22.2±0.6

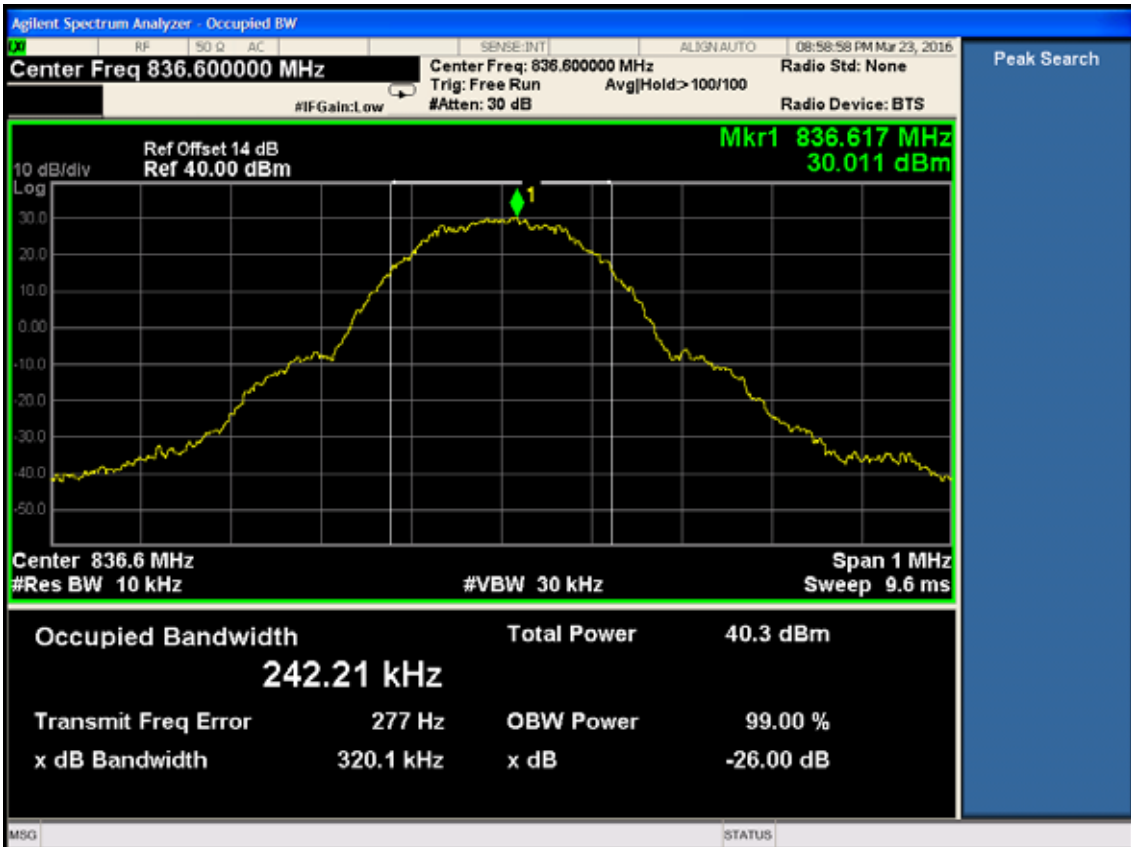
Test Mode	CH	Frequency (MHz)	26dB bandwidth (kHz)		Limit (KHz)
			TM 1	TM 2	
GSM 850	CH128	824.2	318.2	308.5	N/A
	CH190	836.6	320.1	296.2	N/A
	CH251	848.8	315.8	318.2	N/A
GSM 1900	CH512	1850.2	319.1	316.1	N/A
	CH661	1880	319.7	316.8	N/A
	CH810	1909.8	319.1	302.0	N/A

Conclusion : PASS

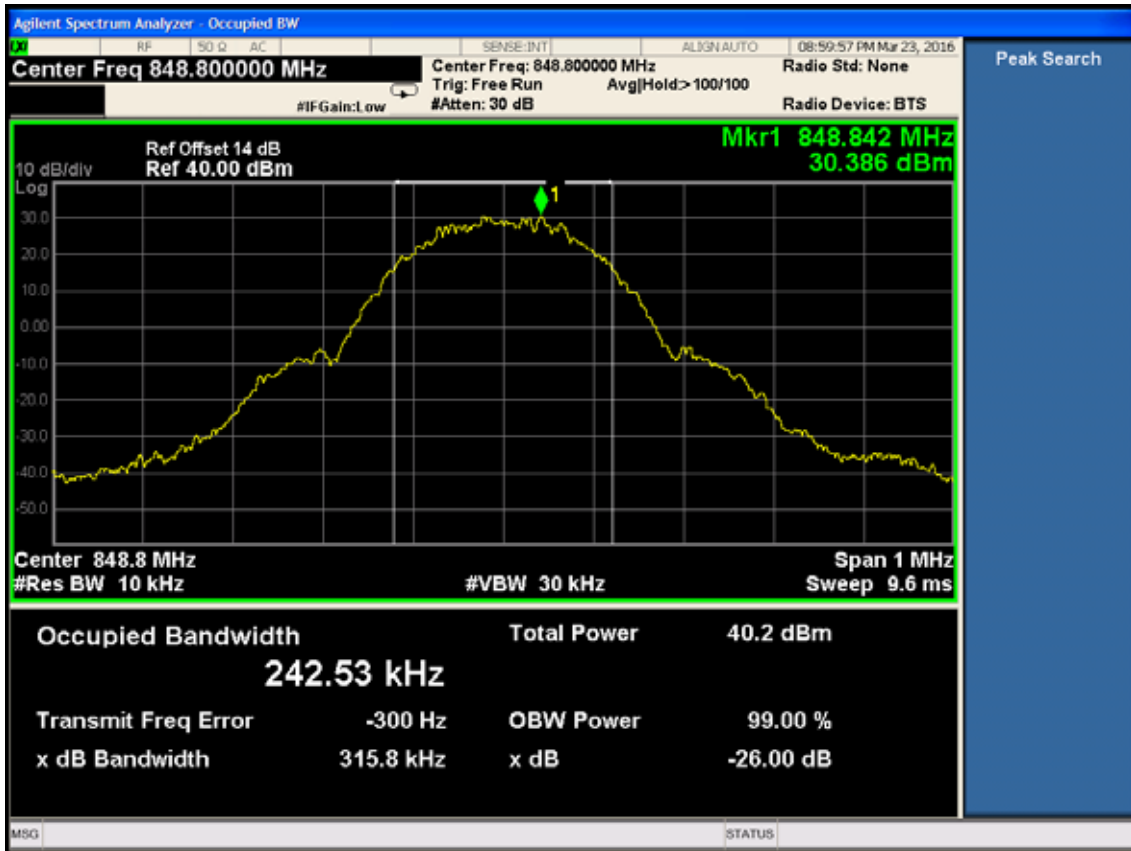
Test GSM 850
TM 1
CH128



CH190

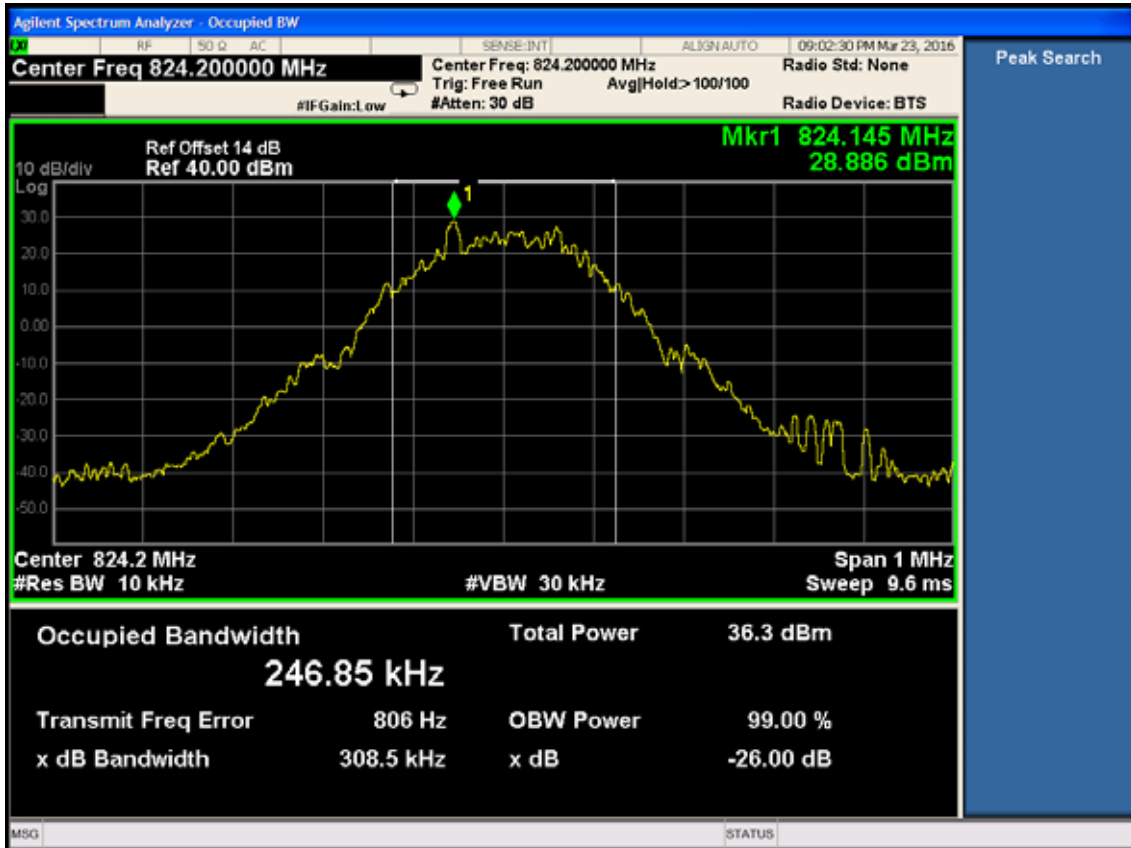


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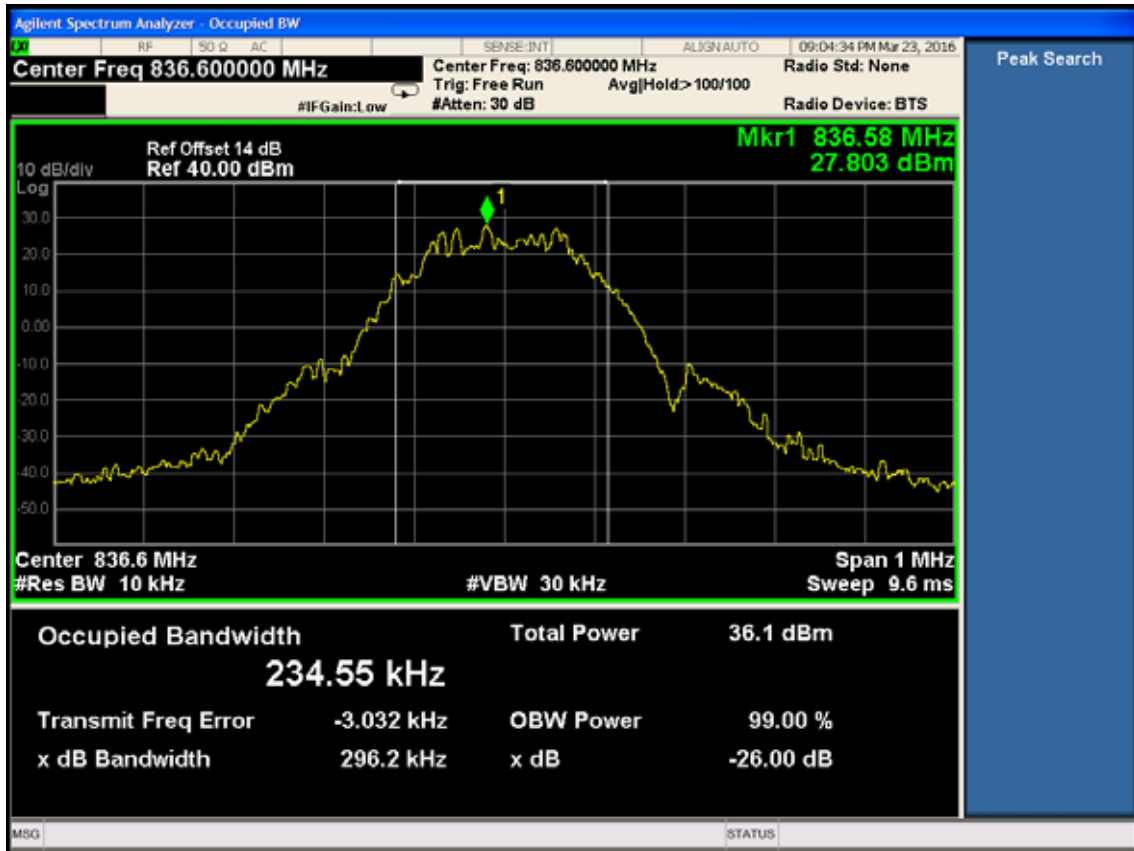


TM 2

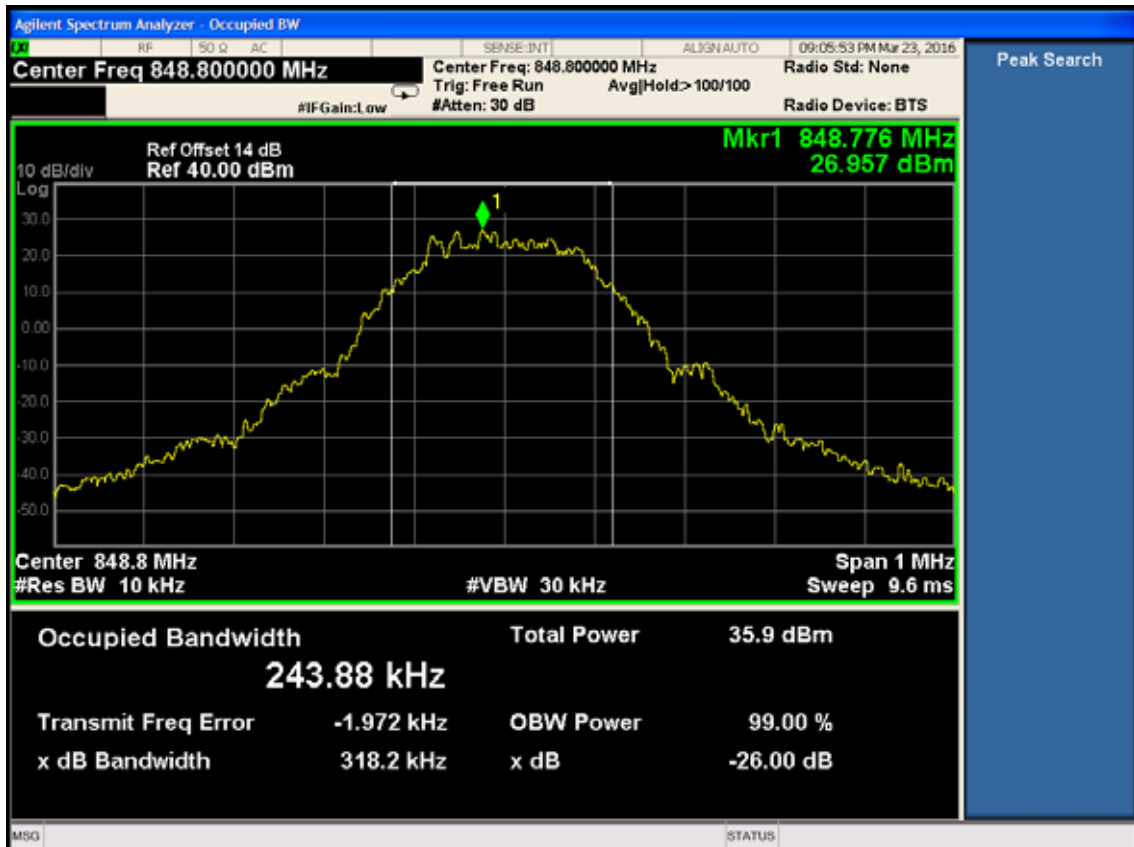
CH128



CH190



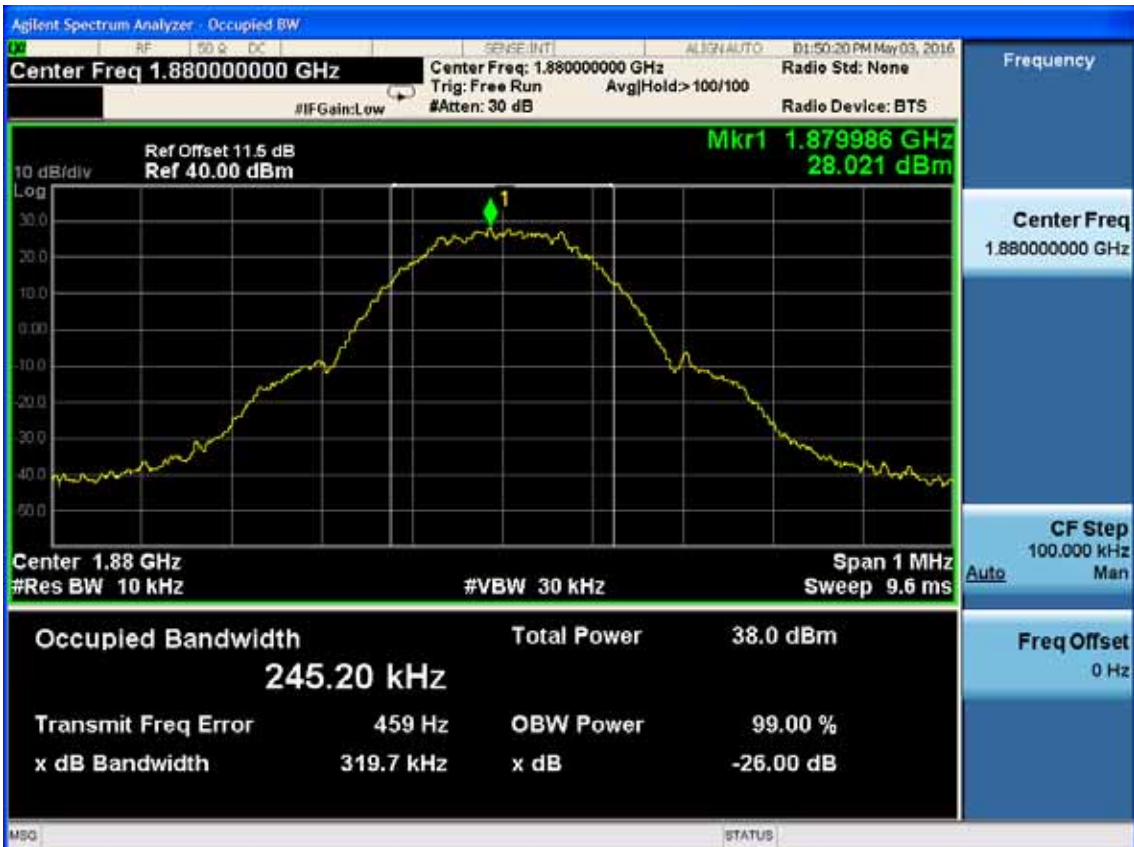
CH251



Test PCS 1900
 TM 1
 CH512



CH661



CH810



TM 2

CH512



CH661



CH810



6. RF POWER OUTPUT TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	Apr.28,15	1 Year
2.	Spectrum	Agilent	N9030A	MY51380221	Oct.18,15	1 Year
3.	Power meter	Anritsu	ML2487A	6K00002472	Aug.21,15	1 Year
4.	Power sensor	Anritsu	MA2491A	0033005	Aug.21,15	1 Year
5.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.28,15	1 Year
6.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	NO.1	Oct.17,15	1 Year

6.2. Limit

1. Part 22.913(a) Mobile station are limited to 7W and for Conducted Power we can use antenna Gain to calculate the limit, so the Conducted Power:

$$\begin{aligned}
 P_{\text{cod.}} \text{ (dBm)} &= \text{EIRP(dBm)} - \text{Gain(dBi)} \\
 &= 7\text{W}(38.5\text{dBm}) - (3.15\text{dBi} - 2.15\text{dBi}) \\
 &= 37.5\text{dBm}
 \end{aligned}$$

2. Part 24.232(b) Peak power measurement, Mobile station are limited to 2W and for conducted Power we can use antenna Gain to calculate the limit, so the

$$\begin{aligned}
 \text{Conducted Power:} \\
 P_{\text{cod.}} \text{ (dBm)} &= \text{EIRP(dBm)} - \text{Gain(dBi)} \\
 &= 2\text{W}(33\text{dBm}) - 3.15\text{dBi} \\
 &= 29.85\text{dBm}
 \end{aligned}$$

6.3. Test Procedure

The transmitter output was connected to calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power in dBm. The power output at the transmitter antenna port was determined by adding the value of attenuator to the power meter reading.

6.4. Test Results

EUT: Segment Control Unit		
M/N: LCN7700		
Test date: 2016-03-23	Pressure: 101.5±1.0 kpa	Humidity: 52.2±3.0%
Tested by: Alice_Yang	Test site: RF Site	Temperature: 22.5±0.6

Mode	Channel	TM1	TM2	Limit
GSM 850	128	34	30.2	37.5
	190	33.5	30.3	37.5
	251	33.4	30.1	37.5
PCS 1900	512	29.3	28.2	29.85
	661	29.6	27.8	29.85
	810	30.3	27.3	29.85

7. FIELD STRENGTH OF RADIATED SPURIOUS EMISSIONS

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	Apr.28,15	1 Year
2.	Preamplifier	Agilent	8449B	3008A02495	Apr.28,15	1 Year
3.	Preamplifier	Agilent	8447D	2944A11159	Apr.28,15	1Year
4.	Horn Antenna	ETS	3115	9510-4877	Oct.15,15	1 Year
5.	Bi-log Antenna	TESEQ	CBL6112D	25237	Jun.30,15	1 Year
6.	Antenna and turn table controller	CT	SC100	CT-0091	N/A	N/A
7.	RF Cable	Hubersuhner	SUCOFLEX104/102	274094/4+28610/2	Apr.28,15	1 Year
8.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A

Note: N/A means Not applicable.

7.2.Limit

FCC part 22.917(a), 24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specification in the instruction manual and/or alignment procedure, shall not be less than $43+10\log(\text{Mean power in watts})$ dBc below the mean power output outside a license's frequency block(-13dBm).

7.3.Test Procedure

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and lowering of the test antenna from 4m to 1m.

ERP in frequency band 824.2-848.8MHz were measured using substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follow: EIRP in frequency band 1850.5-1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$\text{ERP}=\text{S.G. output (dBm)} + \text{Antenna Gain (dBd)}-\text{Cable Loss (dB)}$

$\text{EIRP}=\text{S.G. output (dBm)} + \text{Antenna Gain (dBi)}-\text{Cable Loss (dB)}$

7.4. Test Results

GSM 850 Mode

Spurious emissions								
EUT: Segment Control Unit								
M/N: LCN7700								
Power: DC 12V								
Test Date: 2016-04-06			Test site: RF Chamber			Tested by: Alice_yang		
Temperature: 23.2±0.6			Humidity: 52.1±3.0%			Pressure: 101.6±1.0kpa		
Test result								
Test Mode : GSM 850 TX CH Low Mode 824.2MHz								
Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
191.99	H	-61.55	2.8	1.32	-60.07	-13	47.07	PASS
624.61	H	-58.51	5.2	3.04	-56.35	-13	43.35	PASS
733.25	H	-50.64	5.4	3.39	-48.63	-13	35.63	PASS
869.13	H	-20.92	5.7	3.86	-19.08	-13	6.08	PASS
1648.40	H	-32.60	7.9	5.68	-30.38	-13	17.38	PASS
2472.60	H	-37.63	7.5	7.47	-37.60	-13	24.60	PASS
3296.80	H	-41.73	9.6	8.74	-40.87	-13	27.87	PASS
187.14	V	-63.87	2.6	1.32	-62.59	-13	49.59	PASS
633.34	V	-61.33	5.2	3.10	-59.23	-13	46.23	PASS
733.25	V	-57.65	5.4	3.39	-55.64	-13	42.64	PASS
869.20	V	-30.21	5.7	3.86	-28.37	-13	15.37	PASS
1648.40	V	-33.00	7.9	5.68	-30.78	-13	17.78	PASS
2472.60	V	-40.31	7.5	7.47	-40.28	-13	27.28	PASS
3296.80	V	-42.87	9.6	8.74	-42.01	-13	29.01	PASS

Test Mode : GSM 850 TX CH Mid Mode 836.6MHz								
190.05	H	-58.46	2.6	1.32	-57.18	-13	44.18	PASS
647.89	H	-57.02	5.2	3.10	-54.92	-13	41.92	PASS
745.86	H	-50.62	5.4	3.45	-48.67	-13	35.67	PASS
881.66	H	-20.35	5.7	3.86	-18.51	-13	5.51	PASS
1673.20	H	-29.08	7.9	5.72	-26.90	-13	13.90	PASS
2509.80	H	-40.47	9.6	7.55	-38.42	-13	25.42	PASS
3346.40	H	-43.23	9.6	8.77	-42.40	-13	29.40	PASS
188.11	V	-62.46	2.6	1.32	-61.18	-13	48.18	PASS
647.89	V	-60.27	5.2	3.10	-58.17	-13	45.17	PASS
745.86	V	-56.50	5.4	3.45	-54.55	-13	41.55	PASS
881.66	V	-31.02	5.7	3.86	-29.18	-13	16.18	PASS
1673.20	V	-31.16	7.9	5.72	-28.98	-13	15.98	PASS
2509.80	V	-41.94	9.6	7.55	-39.89	-13	26.89	PASS
3346.40	V	-45.16	9.6	8.77	-44.33	-13	31.33	PASS

Test Mode : GSM 850 TX CH High Mode 848.8MHz								
191.99	H	-57.74	2.8	1.32	-56.26	-13	43.26	PASS
653.71	H	-56.28	5.2	3.15	-54.23	-13	41.23	PASS
759.44	H	-50.68	5.4	3.50	-48.78	-13	35.78	PASS
893.72	H	-21.50	5.7	3.92	-19.72	-13	6.72	PASS
1697.60	H	-26.38	7.9	5.80	-24.28	-13	11.28	PASS
2546.40	H	-39.04	9.6	7.63	-37.07	-13	24.07	PASS
3395.20	H	-43.87	9.6	8.79	-43.06	-13	30.06	PASS
188.11	V	-62.73	2.6	1.32	-61.45	-13	48.45	PASS
648.86	V	-61.27	5.2	3.10	-59.17	-13	46.17	PASS
759.44	V	-55.72	5.4	3.50	-53.82	-13	40.82	PASS
893.30	V	-27.54	5.7	3.92	-25.76	-13	12.76	PASS
1697.60	V	-29.52	7.9	5.80	-27.42	-13	14.42	PASS
2546.40	V	-40.40	9.6	7.63	-38.43	-13	25.43	PASS
3395.20	V	-47.00	9.6	8.79	-46.19	-13	33.19	PASS

Remark: All the emission were detected belong to narrowband spurious emission

PCS 1900 Mode

Spurious emissions

EUT: Segment Control Unit

M/N: LCN7700

Power: DC 12V

Test Date: 2016-04-29	Test site: RF Chamber	Tested by: Alice_yang
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Temperature: 23.5±0.6	Humidity: 52.9±3.0%	Pressure: 102.4±1.0kpa
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Test result

Test Mode : PCS 1900 TX CH Low Mode 1850.2MHz

Frequency (MHz)	Antenna polarization	S.G Output (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Conclusion
194.90	H	-57.85	2.7	1.32	-56.47	-13	43.47	PASS
624.61	H	-61.60	5.2	3.04	-59.44	-13	46.44	PASS
875.84	H	-62.41	5.7	3.86	-60.57	-13	47.57	PASS
959.26	H	-63.08	5.9	4.16	-61.34	-13	48.34	PASS
2108.00	H	-54.18	8.4	6.69	-52.47	-13	39.47	PASS
3264.00	H	-48.48	9.6	8.73	-47.61	-13	34.61	PASS
3700.40	H	-45.28	9.6	8.93	-44.61	-13	31.61	PASS
188.11	V	-61.49	2.6	1.32	-60.21	-13	47.21	PASS
624.61	V	-63.80	5.2	3.04	-61.64	-13	48.64	PASS
875.84	V	-68.24	5.7	3.86	-66.40	-13	53.40	PASS
953.44	V	-66.54	5.9	4.10	-64.74	-13	51.74	PASS
2108.00	V	-52.97	8.4	6.69	-51.26	-13	38.26	PASS
3264.00	V	-46.96	9.6	8.73	-46.09	-13	33.09	PASS
3700.40	V	-44.06	9.6	8.93	-43.39	-13	30.39	PASS

Test Mode : PCS 1900 TX CH Mid Mode 1880.0MHz								
191.99	H	-56.92	2.6	1.32	-55.64	-13	42.64	PASS
624.61	H	-61.48	5.2	3.04	-59.32	-13	46.32	PASS
875.84	H	-62.37	5.7	3.86	-60.53	-13	47.53	PASS
959.26	H	-63.20	5.9	4.16	-61.46	-13	48.46	PASS
2452.00	H	-53.31	9.5	7.43	-51.24	-13	48.24	PASS
2985.00	H	-49.23	9.6	8.56	-48.19	-13	35.19	PASS
3760.00	H	-45.25	9.6	8.96	-44.61	-13	31.61	PASS
190.05	V	-60.47	2.6	1.32	-59.19	-13	46.19	PASS
624.61	V	-63.67	5.2	3.04	-61.51	-13	48.51	PASS
875.84	V	-68.21	5.7	3.86	-66.37	-13	53.37	PASS
953.44	V	-65.95	5.9	4.10	-64.15	-13	51.15	PASS
2452.00	V	-52.34	9.5	7.43	-50.27	-13	37.27	PASS
2985.00	V	-50.59	9.6	8.56	-49.55	-13	36.55	PASS
3760.00	V	-47.11	9.6	8.96	-46.47	-13	33.47	PASS
Test Mode : PCS 1900 TX CH High Mode 1909.8MHz								
194.90	H	-56.62	2.7	1.32	-55.24	-13	42.24	PASS
624.61	H	-61.66	5.2	3.04	-59.50	-13	46.50	PASS
875.84	H	-61.99	5.7	3.86	-60.15	-13	47.15	PASS
959.26	H	-63.30	5.9	4.16	-61.56	-13	48.56	PASS
2394.00	H	-50.85	8.6	7.32	-49.57	-13	36.57	PASS
3108.00	H	-45.19	9.6	8.65	-44.24	-13	31.24	PASS
3819.60	H	-45.96	9.6	8.99	-45.35	-13	32.35	PASS
190.05	V	-59.76	2.6	1.32	-58.48	-13	45.80	PASS
624.61	V	-64.35	5.2	3.04	-62.19	-13	49.19	PASS
875.84	V	-67.97	5.7	3.86	-66.13	-13	53.13	PASS
953.44	V	-65.60	5.9	4.10	-63.80	-13	50.80	PASS
2394.00	V	-53.71	8.6	7.32	-52.43	-13	49.43	PASS
3108.00	V	-46.12	9.6	8.65	-45.17	-13	32.17	PASS
3819.60	V	-47.21	9.6	8.99	-46.60	-13	33.60	PASS
Remark: All the emission were detected belong to narrowband spurious emission								

8. FREQUENCY STABILITY V.S. TEMPERATURE AND VOLTAGE

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.18,15	1 Year
2.	HF Cable	Hubersuhner	Sucoflex104	274094/4	Apr.28,15	1 Year
3.	Attenuator (10dB)	Mini-Circuits	VAT-10+	NO.1	NCR	NCR
4.	Temperature controller	Terchy	MHQ-120cluB	A60223	Apr.24,15	Apr.24,16

Note: NCR means no calibration required(calibrated with system).

8.1. Limit

Frequency Tolerance: +/-2.5ppm for 850MHz band
+/-2.5ppm for 1900MHz band

8.2. Test procedure:

The equipment under test was connected to an external DC power supply and input rated voltage. Reference power supply voltage for these tests is DC 12V. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the Spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25 degree operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -20 degree. After the temperature stabilized for approximately 30 minutes record the frequency. Repeat step measure with 10 degree per stage until the highest temperature of 50 degree reached.

EUT: Segment Control Unit		
M/N: LCN7700		
Test date: 2016-04-01	Pressure: 102.1±1.0 kpa	Humidity: 52.0±3.0%
Tested by: Alice-Yang	Test site: RF site	Temperature: 22.8±0.6

Frequency Error vs ,Voltage

Test Band	Test Mode	Test Channel	Test Temp	Test Volt	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
GSM 850	GSM/TM1	LCH	TN	VL	23	0.027906	Pass
				VN	20	0.024266	Pass
				VH	21	0.025479	Pass
		MCH	TN	VL	4	0.004781	Pass
				VN	3	0.003586	Pass
				VH	2	0.002391	Pass
		HCH	TN	VL	6	0.007069	Pass
				VN	4	0.004713	Pass
				VH	5	0.005891	Pass
	GSM/TM2	LCH	TN	VL	-16	-0.01941	Pass
				VN	-13	-0.01577	Pass
				VH	-11	-0.01335	Pass
		MCH	TN	VL	-12	-0.01434	Pass
				VN	-12	-0.01434	Pass
				VH	-14	-0.01673	Pass
		HCH	TN	VL	-12	-0.01414	Pass
				VN	-13	-0.01532	Pass
				VH	-15	-0.01767	Pass

Frequency Error vs ,Temperature

Test Band	Test Mode	Test Channel	Test Volt	Test Temp	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
GSM 850	GSM/TM1	LCH	VN	-30	25	0.030332	Pass
				-20	20	0.024266	Pass
				-10	15	0.018199	Pass
				0	19	0.023053	Pass
				10	21	0.025479	Pass
				20	20	0.024266	Pass
				30	20	0.024266	Pass
				40	17	0.020626	Pass
				50	19	0.023053	Pass
		MCH	VN	-30	7	0.008367	Pass
				-20	3	0.003586	Pass
				-10	5	0.005977	Pass
				0	4	0.004781	Pass
				10	-1	-0.0012	Pass
				20	3	0.003586	Pass
				30	1	0.001195	Pass
				40	4	0.004781	Pass
				50	2	0.002391	Pass
		HCH	VN	-30	6	0.007069	Pass
				-20	6	0.007069	Pass
				-10	3	0.003534	Pass
				0	5	0.005891	Pass
				10	7	0.008247	Pass
				20	4	0.004713	Pass
				30	3	0.003534	Pass
				40	6	0.007069	Pass
				50	4	0.004713	Pass

GSM 850	GSM/TM2	LCH	VN	-30	-16	-0.01941	Pass
				-20	-17	-0.02063	Pass
				-10	-16	-0.01941	Pass
				0	-10	-0.01213	Pass
				10	-15	-0.0182	Pass
				20	-13	-0.01577	Pass
				30	-12	-0.01456	Pass
				40	-14	-0.01699	Pass
				50	-15	-0.0182	Pass
		MCH	VN	-30	-15	-0.01793	Pass
				-20	-16	-0.01913	Pass
				-10	-12	-0.01434	Pass
				0	-11	-0.01315	Pass
				10	-10	-0.01195	Pass
				20	-12	-0.01434	Pass
				30	-13	-0.01554	Pass
				40	-12	-0.01434	Pass
				50	-9	-0.01076	Pass
		HCH	VN	-30	-18	-0.02121	Pass
				-20	-15	-0.01767	Pass
				-10	-12	-0.01414	Pass
				0	-16	-0.01885	Pass
				10	-12	-0.01414	Pass
				20	-13	-0.01532	Pass
				30	-12	-0.01414	Pass
				40	-11	-0.01296	Pass
				50	-13	-0.01532	Pass

Frequency Error vs ,Voltage

Test Band	Test Mode	Test Channel	Test Temp	Test Volt	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
GSM 1900	GSM/TM1	LCH	TN	VL	15	0.008107	Pass
				VN	17	0.009188	Pass
				VH	19	0.010269	Pass
		MCH	TN	VL	14	0.007447	Pass
				VN	16	0.008511	Pass
				VH	18	0.009574	Pass
		HCH	TN	VL	17	0.008901	Pass
				VN	20	0.010472	Pass
				VH	21	0.010996	Pass
	GSM/TM2	LCH	TN	VL	-15	-0.00811	Pass
				VN	-16	-0.00865	Pass
				VH	-18	-0.00973	Pass
		MCH	TN	VL	-14	-0.00745	Pass
				VN	-17	-0.00904	Pass
				VH	-18	-0.00957	Pass
		HCH	TN	VL	-14	-0.00733	Pass
				VN	-18	-0.00943	Pass
				VH	-21	-0.011	Pass

Frequency Error vs ,Temperature

Test Band	Test Mode	Test Channel	Test Volt	Test Temp	Freq Error (Hz)	Freq .vs.rated (ppm)	Verdict
GSM 1900	GSM/TM1	LCH	VN	-30	19	0.010269	Pass
				-20	16	0.008648	Pass
				-10	17	0.009188	Pass
				0	15	0.008107	Pass
				10	16	0.008648	Pass
				20	17	0.009188	Pass
				30	15	0.008107	Pass
				40	16	0.008648	Pass
				50	14	0.007567	Pass
		MCH	VN	-30	20	0.010638	Pass
				-20	18	0.009574	Pass
				-10	18	0.009574	Pass
				0	17	0.009043	Pass
				10	15	0.007979	Pass
				20	16	0.008511	Pass
				30	16	0.008511	Pass
				40	17	0.009043	Pass
				50	15	0.007979	Pass
		HCH	VN	-30	24	0.012567	Pass
				-20	22	0.01152	Pass
				-10	20	0.010472	Pass
				0	21	0.010996	Pass
				10	18	0.009425	Pass
				20	20	0.010472	Pass
				30	19	0.009949	Pass
				40	20	0.010472	Pass
				50	20	0.010472	Pass

GSM 1900	GSM/TM2	LCH	VN	-30	-20	-0.01081	Pass
				-20	-18	-0.00973	Pass
				-10	-19	-0.01027	Pass
				0	-17	-0.00919	Pass
				10	-16	-0.00865	Pass
				20	-16	-0.00865	Pass
				30	-15	-0.00811	Pass
				40	-13	-0.00703	Pass
				50	-15	-0.00811	Pass
		MCH	VN	-30	-21	-0.01117	Pass
				-20	-19	-0.01011	Pass
				-10	-18	-0.00957	Pass
				0	-15	-0.00798	Pass
				10	-16	-0.00851	Pass
				20	-17	-0.00904	Pass
				30	-14	-0.00745	Pass
				40	-16	-0.00851	Pass
				50	-15	-0.00798	Pass
		HCH	VN	-30	-22	-0.01152	Pass
				-20	-20	-0.01047	Pass
				-10	-21	-0.011	Pass
				0	-20	-0.01047	Pass
				10	-19	-0.00995	Pass
				20	-18	-0.00943	Pass
				30	-17	-0.0089	Pass
				40	-18	-0.00943	Pass
				50	-16	-0.00838	Pass

9. MODULATION CHARACTERISTICS

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Validity Date	Cal. Interval
1.	RF Cable	Mini-Circuits	CBL-1M-SMS M+	99670	Oct.17,15	Oct.16,16	1 Year
2.	Universal Radio Communication Tester	R&S	CMU200	117194	Jan.12,16	Jan.12,17	1 Year
3.	Temperature controller	Terchy	MHQ-120cluB	A60223	Apr.24,15	Apr.24,16	1 Year

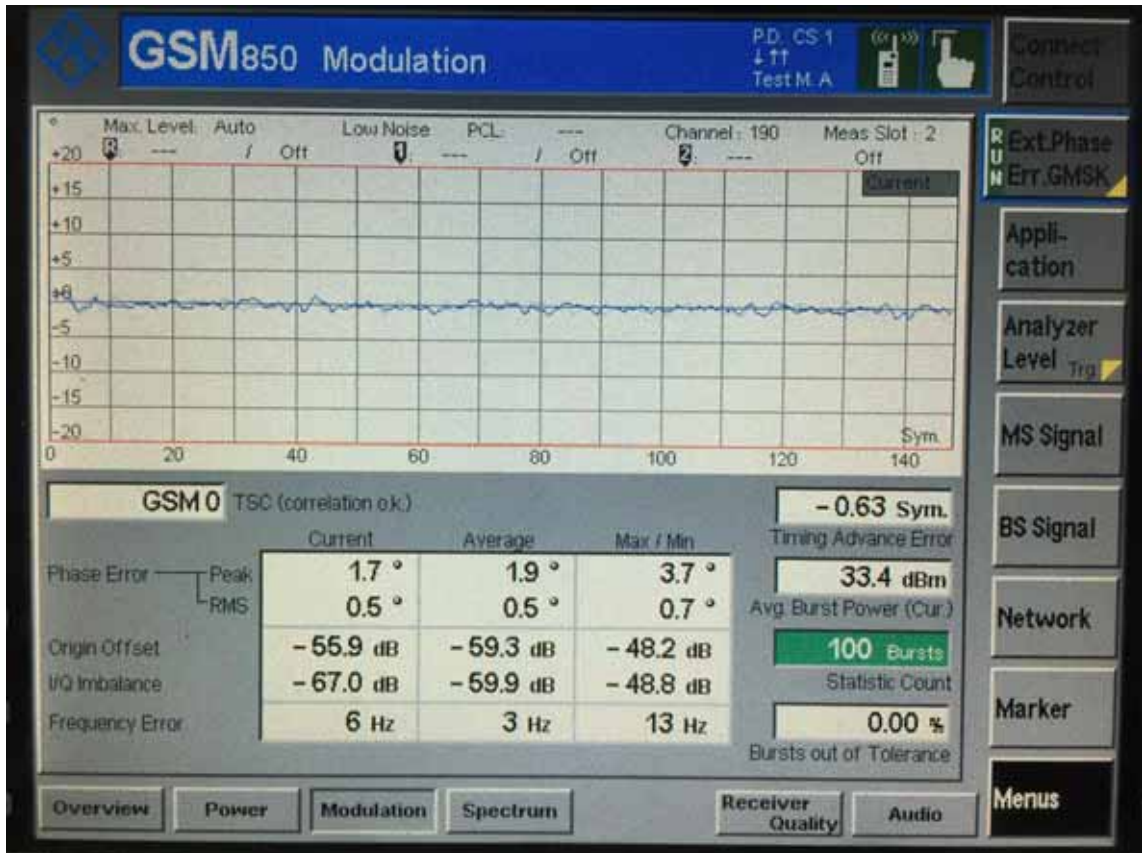
9.2. Limit

N/A

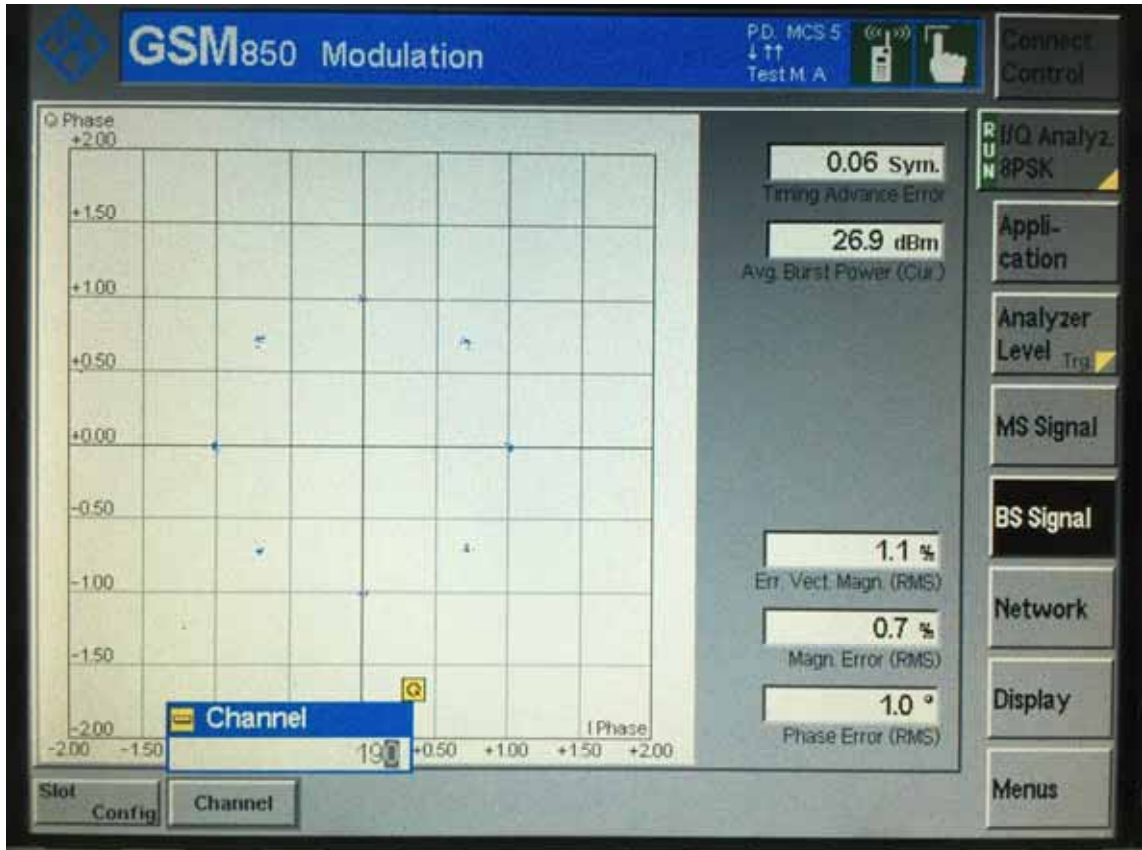
9.3. Test Procedure

1. Connect the RF output port to the wireless communication tester and establish the link
2. Use the “Modulation character” functions of the communication tester performs the test.

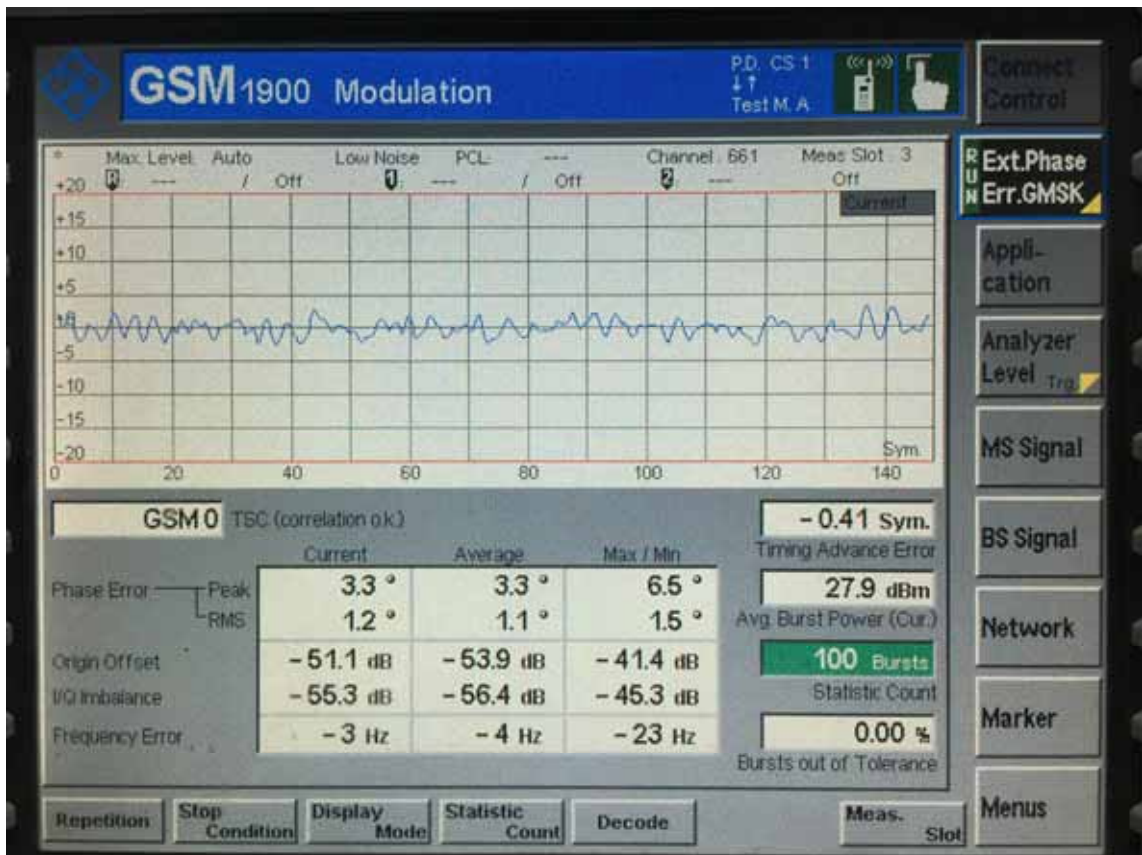
GSM 850
TM 1



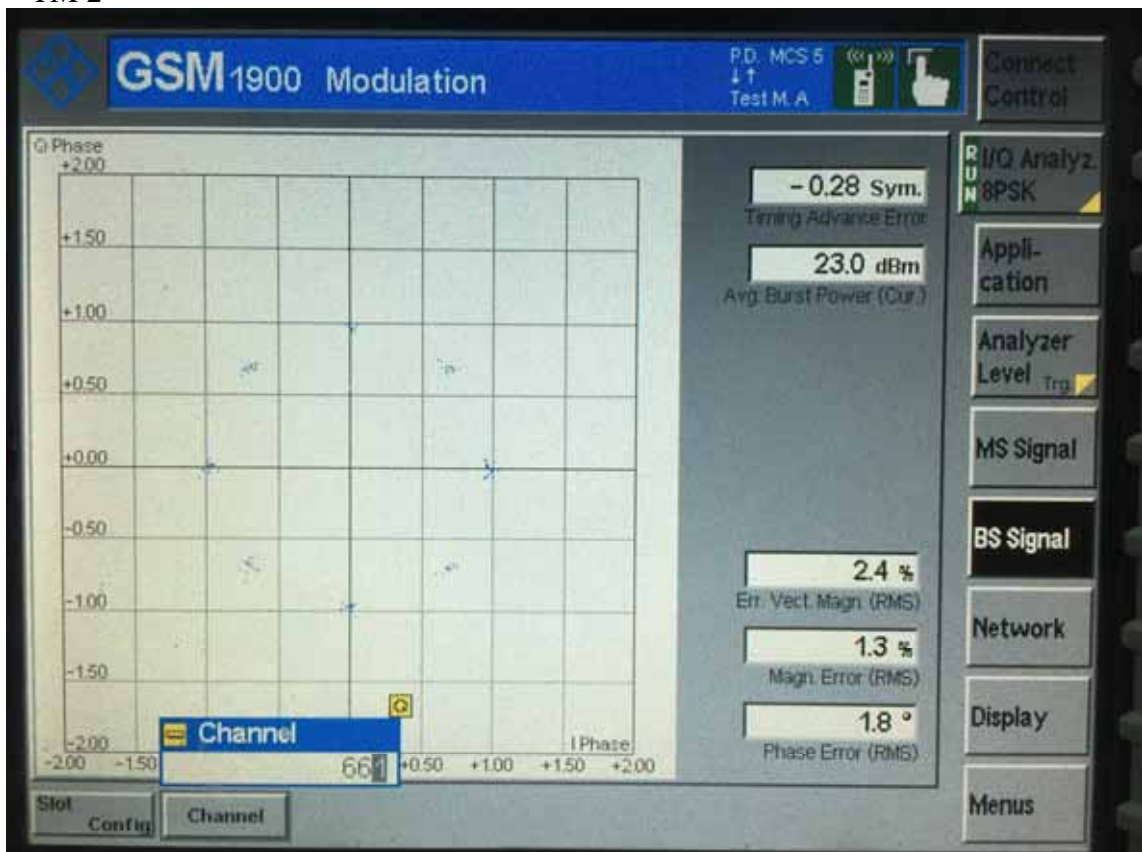
TM 2



GSM 1900
TM 1



TM 2



10.DEVIATION TO TEST SPECIFICATIONS

[NONE]