

FCC Radio Test Report

FCC ID: 2AILG-G3

Original Grant

Report No. : TB-FCC148255
Applicant : NJY Science & Technology Co., Ltd
Equipment Under Test (EUT)
EUT Name : Smart Watch
Model No. : G3
Series No. : G4, G5, G6, D5, D6, D7, D8, Q7, S6
Brand Name : N/A
Receipt Date : 2016-05-13
Test Date : 2016-05-14 to 2016-05-30
Issue Date : 2016-05-31
Standards : FCC Part 2
FCC Part 22 Subpart H, FCC Part 24 Subpart E, 2015
ANSI/TIAC63.26: 2015
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer :

LIWAN SU

Approved& Authorized :

Ray Lai



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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1. General Information about EUT

1.1 Client Information

Applicant : NJY Science & Technology Co., Ltd
Address : 1788, Block A, Modern Window, NO.1050 Huaqiang North Road, Futian District, Shenzhen, China
Manufacturer : NJY Science & Technology Co., Ltd
Address : 1788, Block A, Modern Window, NO.1050 Huaqiang North Road, Futian District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Smart Watch
Models No.	:	G3, G4, G5, G6, D5, D6, D7, D8, Q7, S6
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name for commercial.
Product Description	:	Frequency Bands: GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz Bluetooth3.0: 2402MHz~2480MHz see note(1) Bluetooth4.0(BLE): 2402MHz~2480MHz see note(1)
	:	GSM 850 Power : Cond:33.26 dBm ERP:31.89 dBm
	:	PCS 1900 Power : Cond:28.59 dBm EIRP:27.96 dBm
	:	Antenna Gain: GSM 850:-3.2 dBi PCS 1900: -4.0 dBi
	:	Modulation Type: GSM/GPRS:GMSK EDGE: 8PSK
FCC Operating Frequency	:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
Emission Designator	:	GSM 850: 250KGXW, PCS 1900: 251KGXW GPRS 850: 251KG7W, GPRS 1900: 254KG7W EGPRS 850: 248KG7W, EGPRS 1900: 251KG7W
Power Supply	:	DC Voltage supplied from Host System by USB cable. DC power by Li-ion Battery.
Power Rating	:	DC 5.0V by USB cable. DC 3.7V by 380mAh Li-ion Battery.
Connecting I/O Port(S)	:	Please refer to the User's Manual

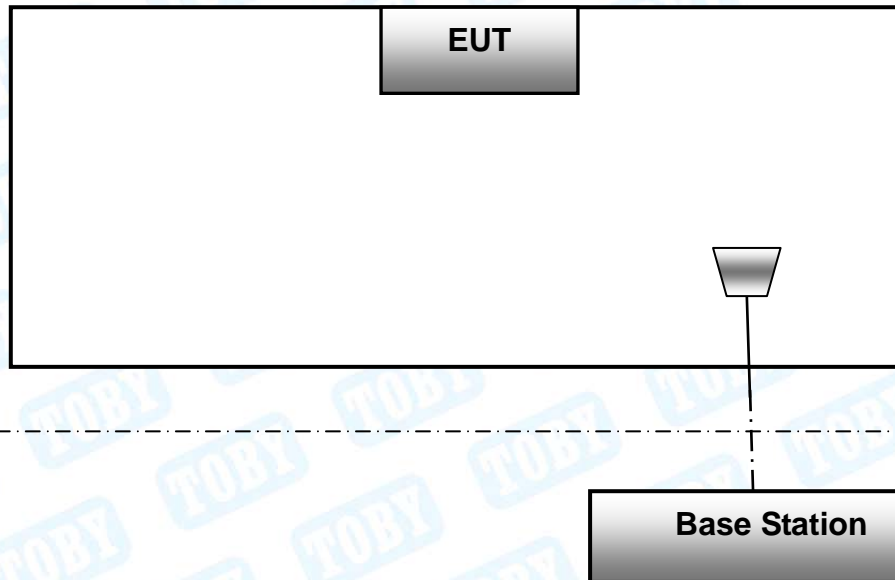
Note:

(1) For a more detailed features description, please refer to the manufacturer's specifications or

the User's Manual. The EUT has also been tested and complied the FCC 15C for Bluetooth function, and recorded in the separate test report.

(2) This test report only product for PCS Licensed Transmitter (PCB).

1.3 Block Diagram Showing the Configuration of System Tested



The above block diagram of setup is the normal mode. And more detail please refer to the test setup of each test item of bellow.

1.4 Description of Support Units

The EUT has been tested as an independent unit.

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

During all testing, EUT is link mode with base station at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range. Frequency range investigated for radiated emission as below:

1. 9kHz~10GHz for GSM850.
2. 9kHz~20GHz for PCS1900.

Test Channel		
Mode	Channel	Frequency(MHz)
GSM 850	128	824.20

PCS 1900	190	836.60
	251	848.80
	512	1850.20
	661	1880.00
	810	1909.80
Pre-scanning test Mode		Description
GSM 850		highest , middle, lowest channels
GPRS 850		highest , middle, lowest channels
GSM 1900		highest , middle, lowest channels
GPRS 1900		highest , middle, lowest channels
Final test Mode		Description
GSM 850		highest , middle, lowest channels
GSM 1900		highest , middle, lowest channels

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) During the testing procedure, the EUT is in link mode with base station emulator at maximum power level in each test mode.
- (3) The EUT has GSM, GPRS, EDGE functions, and after pre-testing, GSM function is the worst case for all the emission tests.
- (4) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on Z-plane as the normal use. Therefore only the test data of this Z-plane was used for radiated emission measurement test.

1.6 Measurement Uncertainty

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz	± 3.42 dB
	150kHz to 30MHz	± 3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.7 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at: 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

2. Test Summary

Test Standards and Test Results			
Standard	Document Title		
FCC Part 2 (10-1-05 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations		
FCC Part 22 (10-1-05 Edition)	Public Mobile Services		
FCC Part 24 (10-1-05 Edition)	Personal Communications Services		
Standard Section	Test Item	Judgment	Remark
2.1046	Conducted RF Output Power	PASS	N/A
24.232(d)	Peak-Average Ratio	PASS	N/A
2.1049; 22.917; 24.238	99% & -26 dB Occupied Bandwidth	PASS	N/A
2.1055; 22.355; 24.235	Frequency Stability	PASS	N/A
2.1051; 2.1057; 22.917; 24.238	Conducted Out of Band Emissions	PASS	N/A
2.1051; 2.1057; 22.917; 24.238	Band Edge	PASS	N/A
22.913; 24.238	Transmitter Radiated Power (EIRP/ERP)	PASS	N/A
2.1053; 2.1057; 22.917; 24.238	Radiated Out of Band Emissions	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.			

3. Test Equipment

AC Main Conducted Emission					
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 07, 2015	Aug. 06, 2016
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 07, 2015	Aug. 06, 2016
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 07, 2015	Aug. 06, 2016
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 08, 2015	Aug. 07, 2016
Radiation Spurious Emission					
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 29, 2015	Aug. 28, 2016
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 26, 2016	Mar. 25, 2017
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 26, 2016	Mar. 25, 2017
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 26, 2016	Mar. 25, 2017
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 26, 2016	Mar. 25, 2017
Pre-amplifier	Sonoma	310N	185903	Mar. 26, 2016	Mar. 25, 2017
Pre-amplifier	HP	8447B	3008A00849	Mar. 26, 2016	Mar. 25, 2017
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 26, 2016	Mar. 25, 2017
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Mar. 26, 2016	Mar. 25, 2017
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jun.24, 2015	Jun.23, 2016
Antenna Conducted Emission					
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 29, 2015	Aug. 28, 2016
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jun.24, 2015	Jun.23, 2016

4. Frequency Stability

4.1 Test Standard and Requirement

4.1.1 Test Standard

FCC Part 2.1055

FCC Part 22.355

FCC Part 24.235

4.1.2 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(1) Temperature:

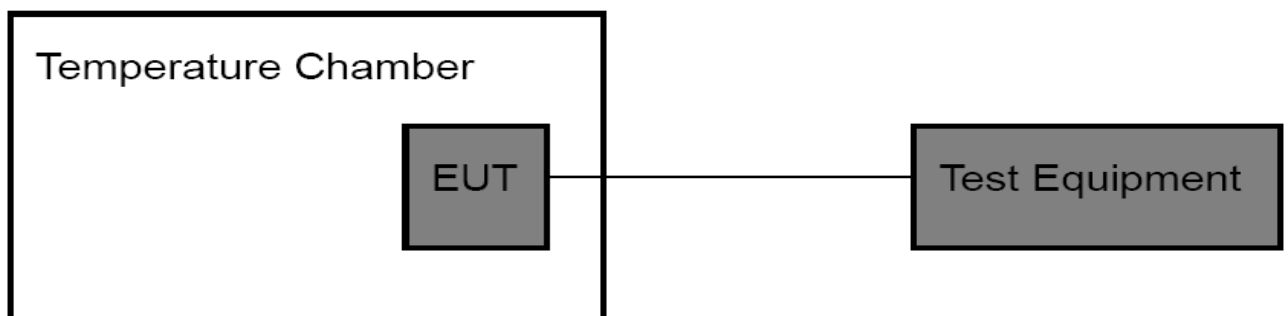
The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .

(2) Primary Supply Voltage:

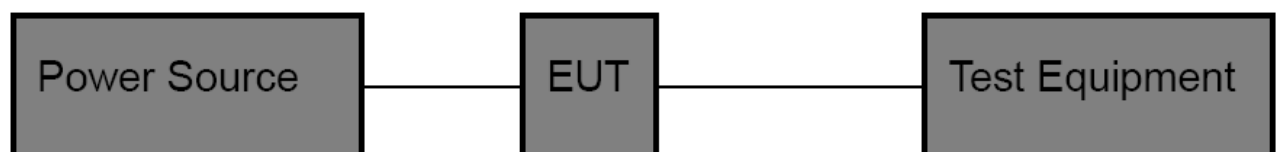
For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at input to the cable normally provide with the equipment, or at the power supply terminals if cables are not normally provided.

4.2 Test Setup

For Temperature Test:



For Voltage Test:



4.3 Test Procedure

Test Procedures for Temperature Variation:

- (1) The EUT was set up in the thermal chamber and connected with the base station.
- (2) With power off, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- (3) With power off, the temperature was raised in 10°C set up to 50°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- (4) If the EUT cannot be turned on at -30°C , the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

Test Procedures for Voltage Variation:

- (1) The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected with the base station.
- (2) Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.
- (3) The variation in frequency was measured for the worst case.

4.4 EUT Operating Condition

The Equipment Under Test was set to Communication with the Base Station.

3.5 Test Data

Please refer the following pages.

Temperature Variation

Temperature Variation GSM 850 (CH190)						
Temperature (°C)	GSM		GPRS		EDGE	
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)
-30	-18	-0.022	-17	-0.020	-9	-0.011
-20	-13	-0.016	-13	-0.016	-12	-0.014
-10	-20	-0.024	-15	-0.018	-8	-0.010
0	-18	-0.022	-18	-0.022	-12	-0.014
10	-19	-0.023	-13	-0.016	-7	-0.008
20	-21	-0.025	-20	-0.024	-9	-0.011
30	-9	-0.011	-15	-0.018	-12	-0.014
40	-14	-0.017	-23	-0.027	-14	-0.017
50	-18	-0.022	-11	-0.013	-10	-0.012
60	-19	-0.023	-9	-0.011	-14	-0.017
Limit	2.5 (ppm)					
Result	PASS					

Temperature Variation GSM 1900 (CH661)						
Temperature (°C)	GSM		GPRS		EDGE	
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)
-30	-10	-0.015	-9	-0.014	-22	-0.033
-20	-9	-0.014	-8	-0.012	-24	-0.036
-10	-12	-0.018	-14	-0.021	-21	-0.032
0	-17	-0.026	-10	-0.015	-19	-0.029
10	-8	-0.012	-8	-0.012	-20	-0.030
20	-13	-0.020	-11	-0.017	-18	-0.027
30	-9	-0.014	-12	-0.018	-23	-0.035
40	-15	-0.023	-10	-0.015	-21	-0.032
50	-12	-0.018	-14	-0.021	-25	-0.038
60	-10	-0.015	-9	-0.014	-19	-0.029
Limit	2.5 (ppm)					
Result	PASS					

Voltage Variation

Voltage Variation GSM 850 (CH190)						
Voltage (V)	GSM		GPRS		EDGE	
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)
3.15	-14	-0.017	-15	-0.018	-10	-0.012
3.70	-19	-0.023	-10	-0.012	-8	-0.010
4.26	-17	-0.020	-13	-0.016	-11	-0.013
Limit	2.5 (ppm)					
Result	PASS					

Voltage Variation GSM 1900 (CH661)						
Voltage (V)	GSM		GPRS		EDGE	
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)
3.15	-12	-0.018	-8	-0.012	-20	-0.030
3.70	-15	-0.023	-13	-0.020	-17	-0.026
4.26	-10	-0.015	-11	-0.017	-21	-0.032
Limit	2.5 (ppm)					
Result	PASS					

5. Conducted RF Output Power

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 2: 2.1046

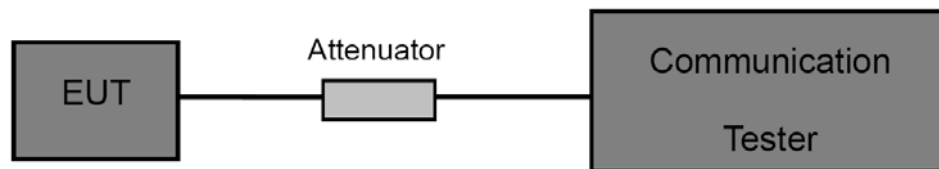
FCC Part 22H : 22.913 (a)

FCC Part 24E: 24.232 (c)

5.1.2 Test Limit

GSM850	PCS 1900
38.5 dBm (ERP)	33 dBm (EIRP)

5.2 Test Setup



5.3 Test Procedure

- (1) The EUT is coupled to the Base Station with the suitable Attenuator, the path loss is calibrated to correct the reading.
- (2) A call is set up by the Base Station to the generic call set up procedure.
- (3) Set EUT at maximum power level through base station by power level command.
- (4) Then read record the power value from the Base Station in dBm.

5.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

5.5 EUT Operating Condition

GSM 850				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GSM 850	128	824.2	33.26	2.118
	190	836.6	33.14	2.061
	251	848.8	33.12	2.051
GPRS 850 (1 Slot)	128	824.2	33.08	2.032
	190	836.6	33.15	2.065
	251	848.8	33.24	2.109
GPRS 850 (2 Slot)	128	824.2	33.16	2.070
	190	836.6	33.09	2.037
	251	848.8	33.11	2.046
GPRS 850 (3 Slot)	128	824.2	33.24	2.109
	190	836.6	32.89	1.945
	251	848.8	32.98	1.986
GPRS 850 (4 Slot)	128	824.2	32.65	1.841
	190	836.6	32.46	1.762
	251	848.8	32.95	1.972
EDGE 850 (1 Slot)	128	824.2	32.96	1.977
	190	836.6	32.75	1.884
	251	848.8	32.64	1.837
EDGE 850 (2 Slot)	128	824.2	32.35	1.718
	190	836.6	32.46	1.762
	251	848.8	32.54	1.795
EDGE 850 (3 Slot)	128	824.2	33.05	2.018
	190	836.6	32.97	1.982
	251	848.8	32.69	1.858
EDGE 850 (4 Slot)	128	824.2	32.46	1.762
	190	836.6	32.24	1.675
	251	848.8	32.86	1.932

PCS 1900				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GSM 1900	512	1850.2	28.59	0.723
	661	1880.0	28.39	0.690
	810	1909.8	28.29	0.675
GPRS 1900 (1 Slot)	512	1850.2	28.12	0.649
	661	1880.0	28.05	0.638
	810	1909.8	28.31	0.678
GPRS 1900 (2 Slot)	512	1850.2	28.13	0.650
	661	1880.0	28.21	0.662
	810	1909.8	28.14	0.652
GPRS 1900 (3 Slot)	512	1850.2	28.09	0.644
	661	1880.0	28.13	0.650
	810	1909.8	28.24	0.667
GPRS 1900 (4 Slot)	512	1850.2	28.42	0.695
	661	1880.0	28.41	0.693
	810	1909.8	28.32	0.679
EDGE 1900 (1 Slot)	512	1850.2	28.51	0.710
	661	1880.0	28.33	0.681
	810	1909.8	28.28	0.673
EDGE 1900 (2 Slot)	512	1850.2	28.15	0.653
	661	1880.0	28.06	0.640
	810	1909.8	28.17	0.656
EDGE 1900 (3 Slot)	512	1850.2	28.22	0.664
	661	1880.0	28.16	0.655
	810	1909.8	28.15	0.653
EDGE 1900 (4 Slot)	512	1850.2	28.35	0.684
	661	1880.0	28.26	0.670
	810	1909.8	28.19	0.659

6. Peak-Average Ratio

6.1 Test Standard and Limit

6.1.1 Test Standard

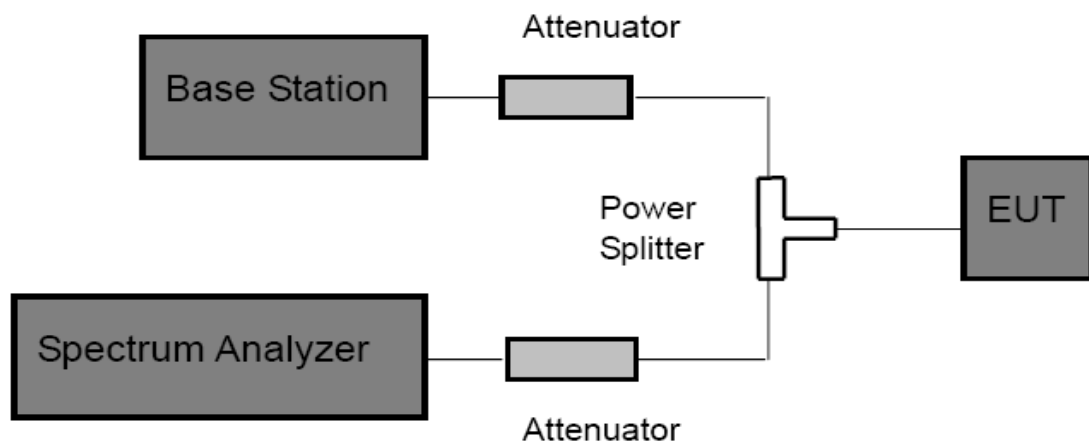
FCC Part 24E: 24.232 (d)

6.1.2 Test Limit

PCS 1900

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

6.2 Test Setup



6.3 Test Procedure

According with KDB 971168

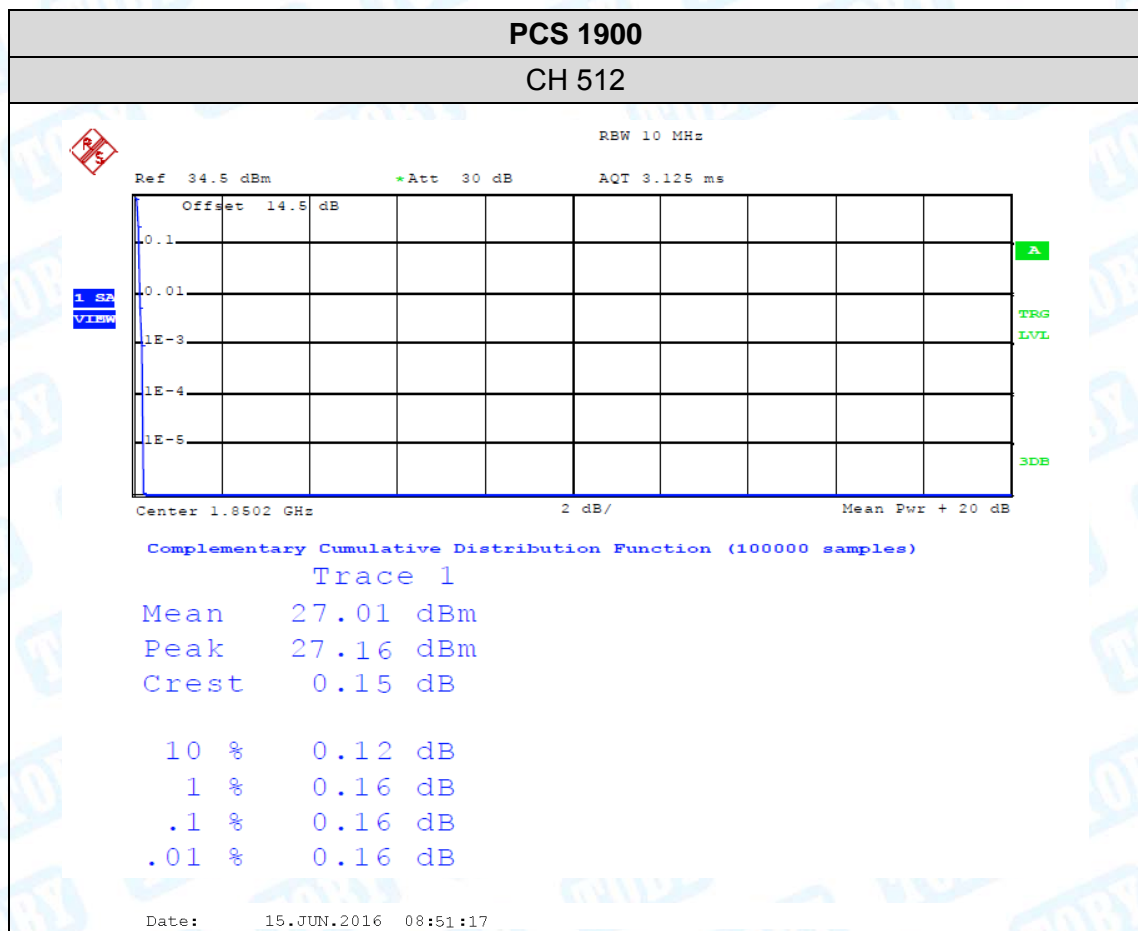
- (1) The signal analyzer's CCDF measurement profile is enabled.
- (2) Frequency = carrier center frequency.
- (3) Measurement BW > Emission bandwidth of signal.
- (4) The signal analyzer was set to collect one million samples to generate the CCDF curve.
- (5) The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which of the transmitter is operating at maximum power.

6.4 EUT Operating Condition

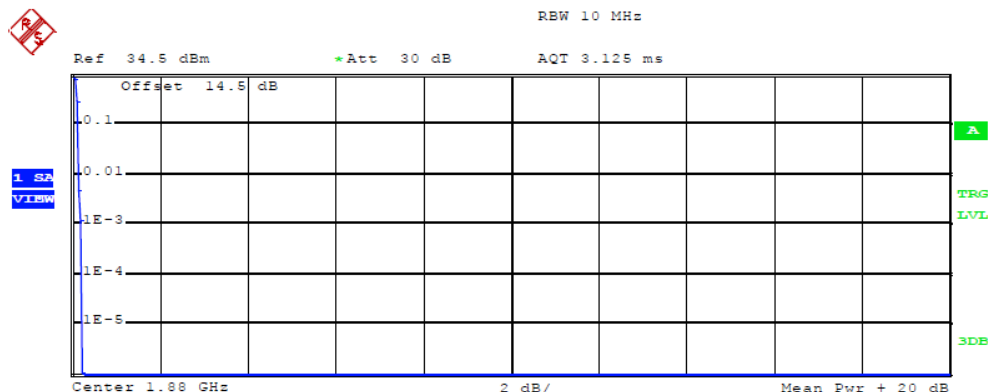
The EUT was continuously connected with the Base station and transmitting in the max power during the test.

6.5 Test Data

PCS 1900					
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)		Peak-Average Ratio (PAR)
			Peak	Average	
PCS 1900	512	1850.2	27.16	27.01	0.16
	661	1880.0	28.17	27.89	0.30
	810	1909.8	27.99	27.77	0.16



CH 661



Complementary Cumulative Distribution Function (100000 samples)

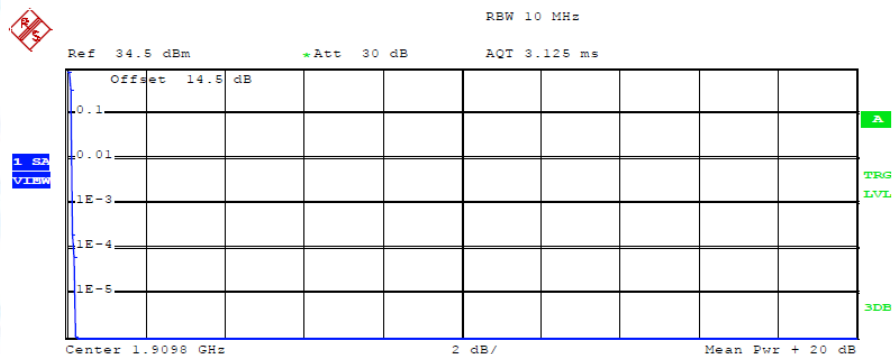
Trace 1

Mean 27.89 dBm
Peak 28.17 dBm
Crest 0.29 dB

10 % 0.24 dB
1 % 0.30 dB
.1 % 0.30 dB
.01 % 0.30 dB

Date: 15.JUN.2016 08:57:20

CH 810



Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean 27.77 dBm
Peak 27.99 dBm
Crest 0.22 dB

10 % 0.16 dB
1 % 0.16 dB
.1 % 0.16 dB
.01 % 0.20 dB

Date: 15.JUN.2016 08:47:53

7. Radiated Output Power

7.1 Test Standard and Limit

7.1.1 Test Standard

FCC Part 22H : 22.913 (a)

FCC Part 24E: 24.232 (c)

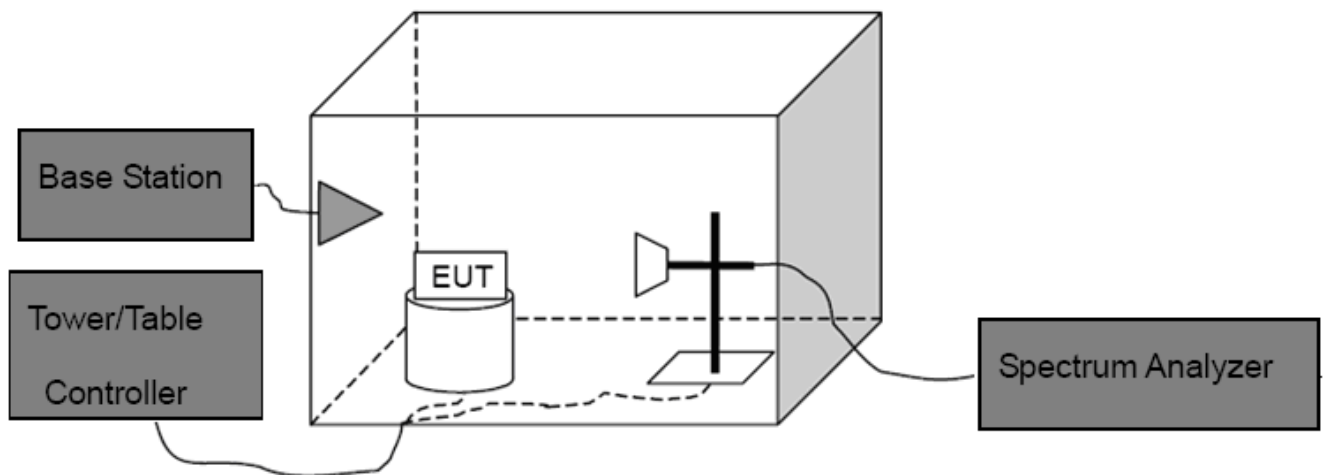
7.1.2 Test Limit

According to FCC Part 22.913 (a), the ERP of Cellular mobile transmitters must not exceed 7 Watts(38.5 dBm).

According to FCC Part 24.232 (c), the Mobile/portable stations are limited to 2 Watts(33 dBm) EIRP peak power.

Cellular Band	PCS Band
GSM850	PCS 1900
38.5 dBm (ERP)	33 dBm (EIRP)

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was placed on an non-conductive rotating platform with 0.8 meter height in an anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW=3 MHz, VBW=3 MHz and peak detector settings.
- (2) During the measurement, the EUT was enforced in maximum power and linked with the Base

Station. The highest was recorded from analyzer power level (LVT) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.

- (3) Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by dipole antenna (for frequency below 1 GHz) or Horn antenna (for frequency above 1 GHz) at same location with same polarize of receiver antenna and then a known power of each measure frequency from S.G. was applied into the dipole antenna or Horn antenna through a TX cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna.

Then the EUT's EIRP and ERP was calculated with the correction factor:

$ERP = S.G. Level + Antenna Gain Cord.(dBd) - Cable Loss(dB)$

$EIRP = S.G. Level + Antenna Gain Cord.(dBi) - Cable Loss(dB)$

7.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

7.5 Test Data

Measurement Data (worst case)

GSM 850								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
GSM 850	128	824.2	H	29.04	3.46	1.26	31.24	1.330
			V	28.14	3.46	1.26	30.34	1.081
	190	836.6	H	28.62	3.82	1.26	31.18	1.312
			V	27.30	3.82	1.26	29.86	0.968
	251	848.8	H	28.99	4.16	1.26	31.89	1.545
			V	25.42	4.16	1.26	28.32	0.679
GPRS 850 (1 Slot)	128	824.2	H	28.52	3.46	1.26	30.72	1.180
			V	26.17	3.46	1.26	28.37	0.687
	190	836.6	H	26.81	3.82	1.26	29.37	0.865
			V	25.40	3.82	1.26	27.96	0.625
	251	848.8	H	25.85	4.16	1.26	28.75	0.750
			V	25.06	4.16	1.26	27.96	0.625
EDGE 850 (1 Slot)	128	824.2	H	26.87	3.46	1.26	29.07	0.807
			V	25.64	3.46	1.26	27.84	0.608
	190	836.6	H	25.40	3.82	1.26	27.96	0.625
			V	23.56	3.82	1.26	26.12	0.409
	251	848.8	H	25.22	4.16	1.26	28.12	0.649
			V	23.44	4.16	1.26	26.34	0.431
Limit						38.5		7

PCS 1900								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP Power (dBm)	EIRP Power (W)
GSM 1900	512	1850.2	H	24.94	5.01	2.59	27.36	0.545
			V	23.89	5.01	2.59	26.31	0.428
	661	1880.0	H	24.49	4.82	2.59	26.72	0.470
			V	23.16	4.82	2.59	25.39	0.346
	810	1909.8	H	26.10	4.45	2.59	27.96	0.625
			V	24.48	4.45	2.59	26.34	0.431
GPRS 1900 (1 Slot)	512	1850.2	H	25.23	5.01	2.59	27.65	0.582
			V	23.43	5.01	2.59	25.85	0.385
	661	1880.0	H	24.66	4.82	2.59	26.89	0.489
			V	22.89	4.82	2.59	25.12	0.325
	810	1909.8	H	25.57	4.45	2.59	27.43	0.553
			V	24.22	4.45	2.59	26.08	0.406
EDGE 1900 (1 Slot)	512	1850.2	H	24.43	5.01	2.59	26.85	0.484
			V	22.69	5.01	2.59	25.11	0.324
	661	1880.0	H	25.63	4.82	2.59	27.86	0.611
			V	23.16	4.82	2.59	25.39	0.346
	810	1909.8	H	25.39	4.45	2.59	27.25	0.531
			V	24.13	4.45	2.59	25.99	0.397
Limit						33		2

8. Occupied Bandwidth

8.1 Test Standard and Limit

8.1.1 Test Standard

FCC Part 2: 2.1049

FCC Part 22H : 22.913 (a)

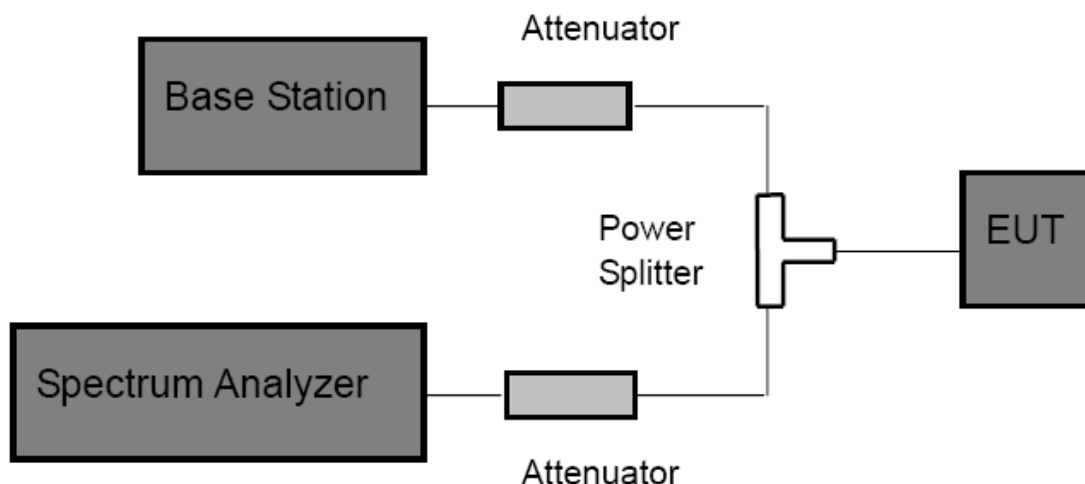
FCC Part 24E: 24.232 (c)

8.1.2 Test Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as 99% power and -26dBC occupied bandwidths.

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- (2) The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth.
- (3) The low, middle and the high channels are selected to perform tests respectively.
- (4) Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.
- (5) Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

8.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

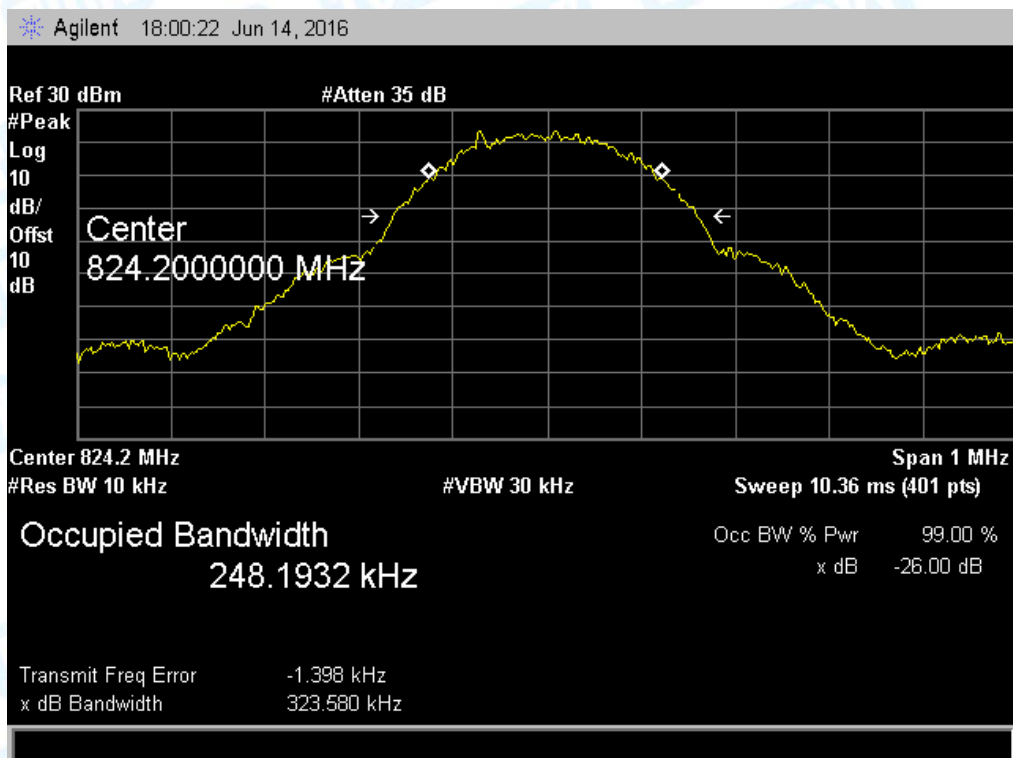
8.5 Test Data

Please refer following pages.

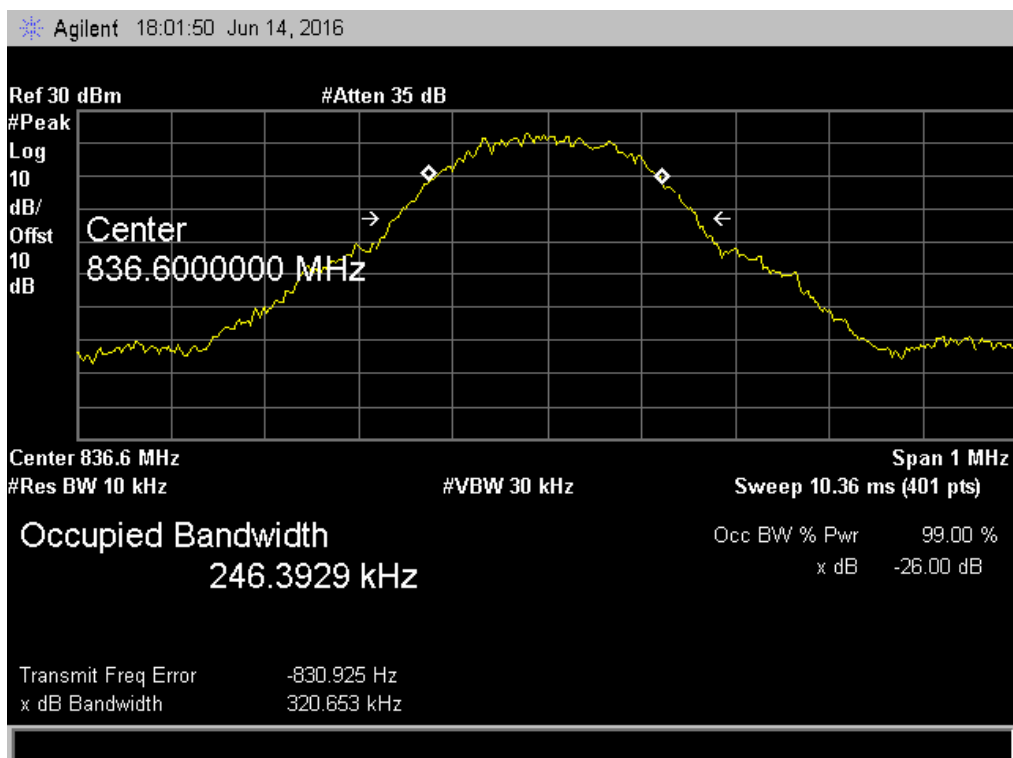
GSM 850				
Mode	Channel	Frequency (MHz)	99% OBW (KHz)	-26dB Bandwidth (kHz)
GSM 850	128	824.2	248.1932	323.580
	190	836.6	246.3929	320.653
	251	848.8	250.3917	328.396
GPRS 850 (1 Slot)	128	824.2	251.2868	316.807
	190	836.6	246.0877	318.418
	251	848.8	250.1525	320.930
EDGE 850 (1 Slot)	128	824.2	241.7398	316.594
	190	836.6	248.0166	322.678
	251	848.8	246.7892	314.845
PCS 1900				
Mode	Channel	Frequency (MHz)	99% OBW (KHz)	-26dB Bandwidth (kHz)
GSM 1900	512	1850.2	245.3702	318.026
	661	1880.0	246.6844	324.681
	810	1909.8	251.3477	322.505
GPRS 1900 (1 Slot)	512	1850.2	248.1977	331.170
	661	1880.0	254.0674	325.378
	810	1909.8	246.8460	326.591
EDGE 1900 (1 Slot)	512	1850.2	250.9083	318.681
	661	1880.0	247.3500	324.871
	810	1909.8	247.9613	315.908

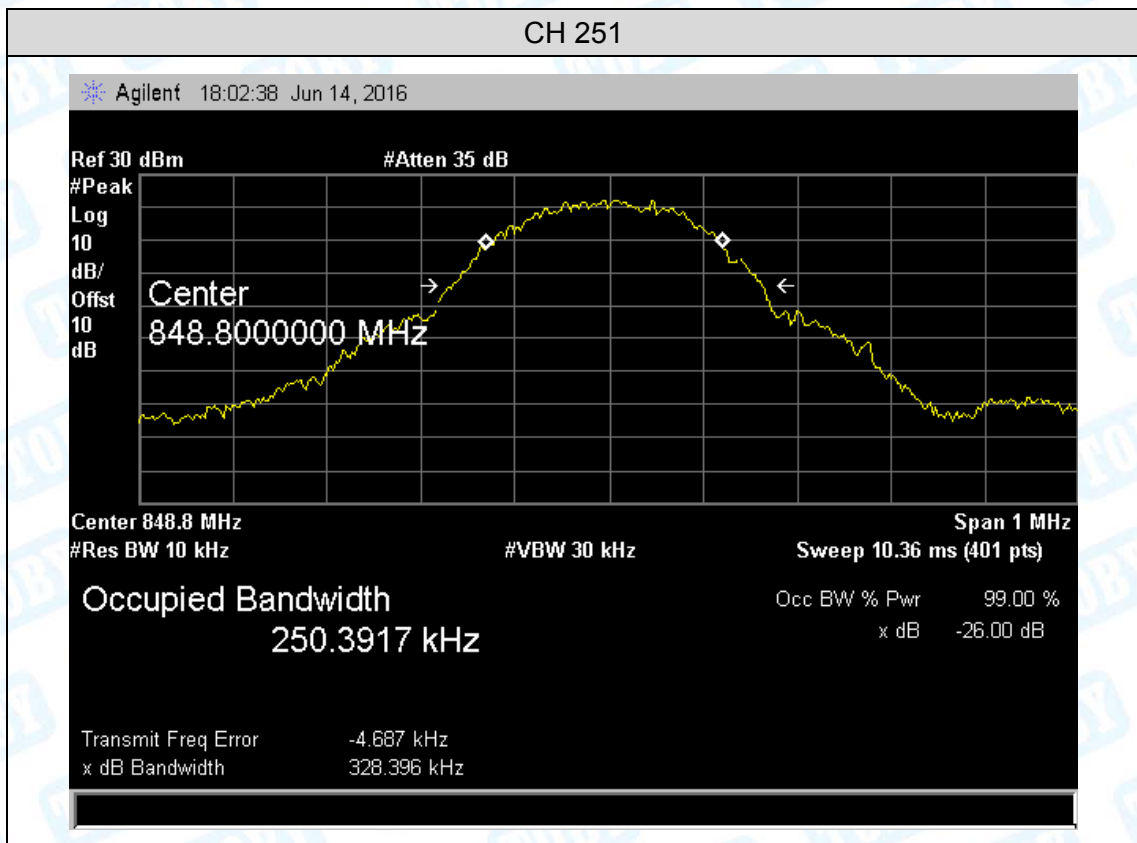
GSM850

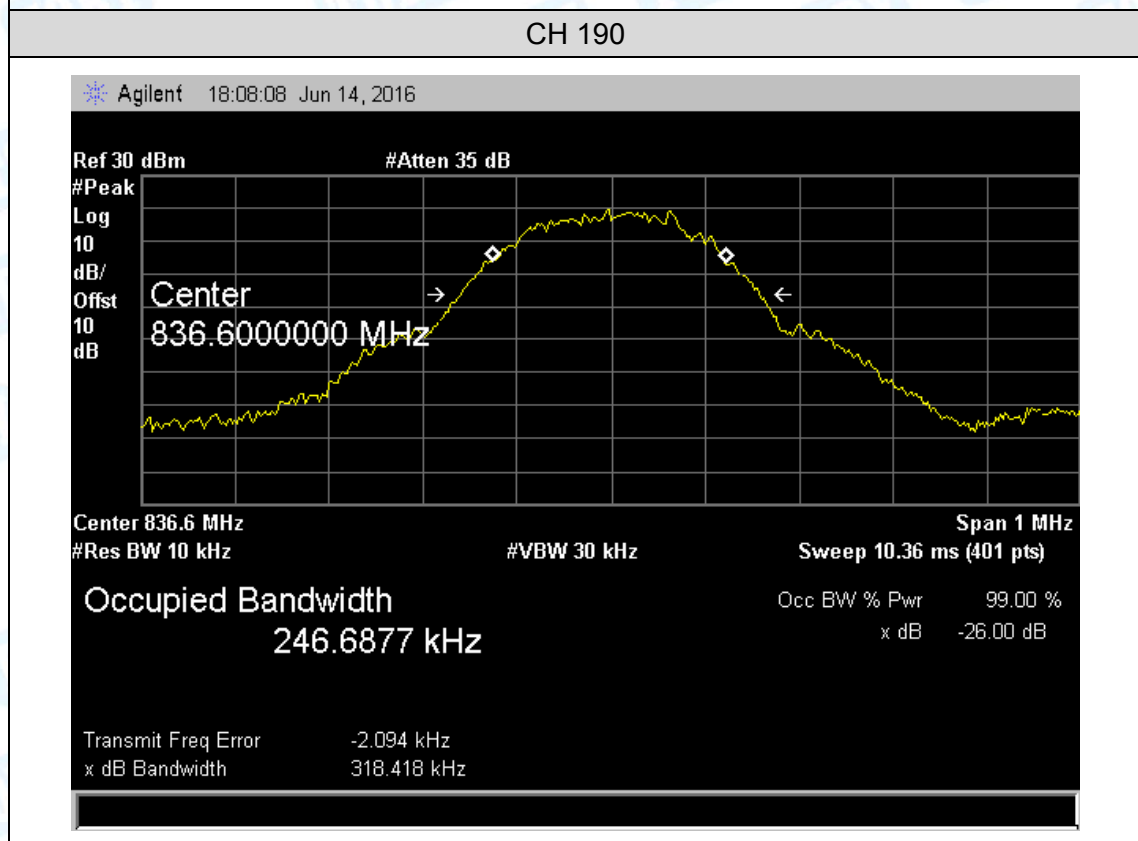
CH 128

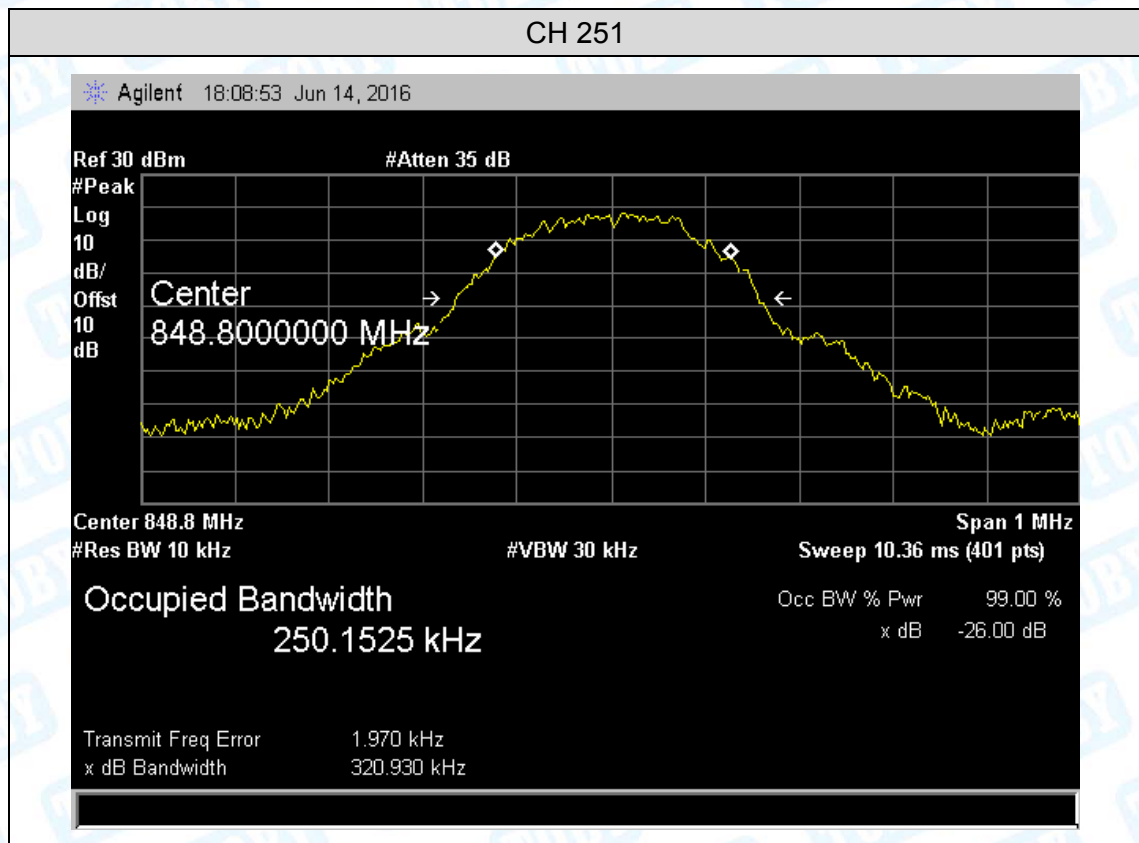


CH 190



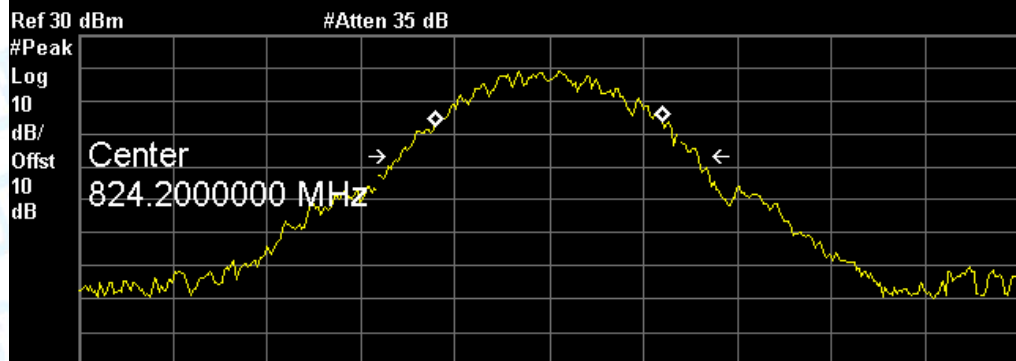






CH 128

Agilent 18:04:54 Jun 14, 2016



Center 824.2 MHz	Span 1 MHz	
#Res BW 10 kHz	#VBW 30 kHz	Sweep 10.36 ms (401 pts)

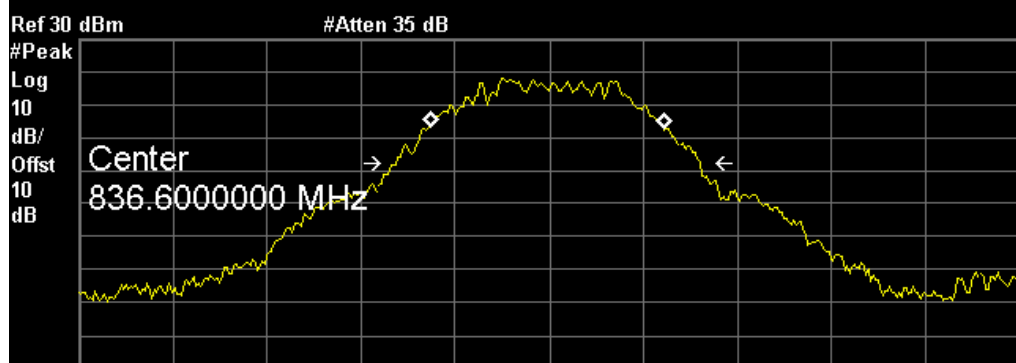
Occupied Bandwidth
241.7398 kHz

Occ BW % Pwr	99.00 %
x dB	-26.00 dB

Transmit Freq Error	-229.802 Hz
x dB Bandwidth	316.594 kHz

CH 190

Agilent 18:05:34 Jun 14, 2016

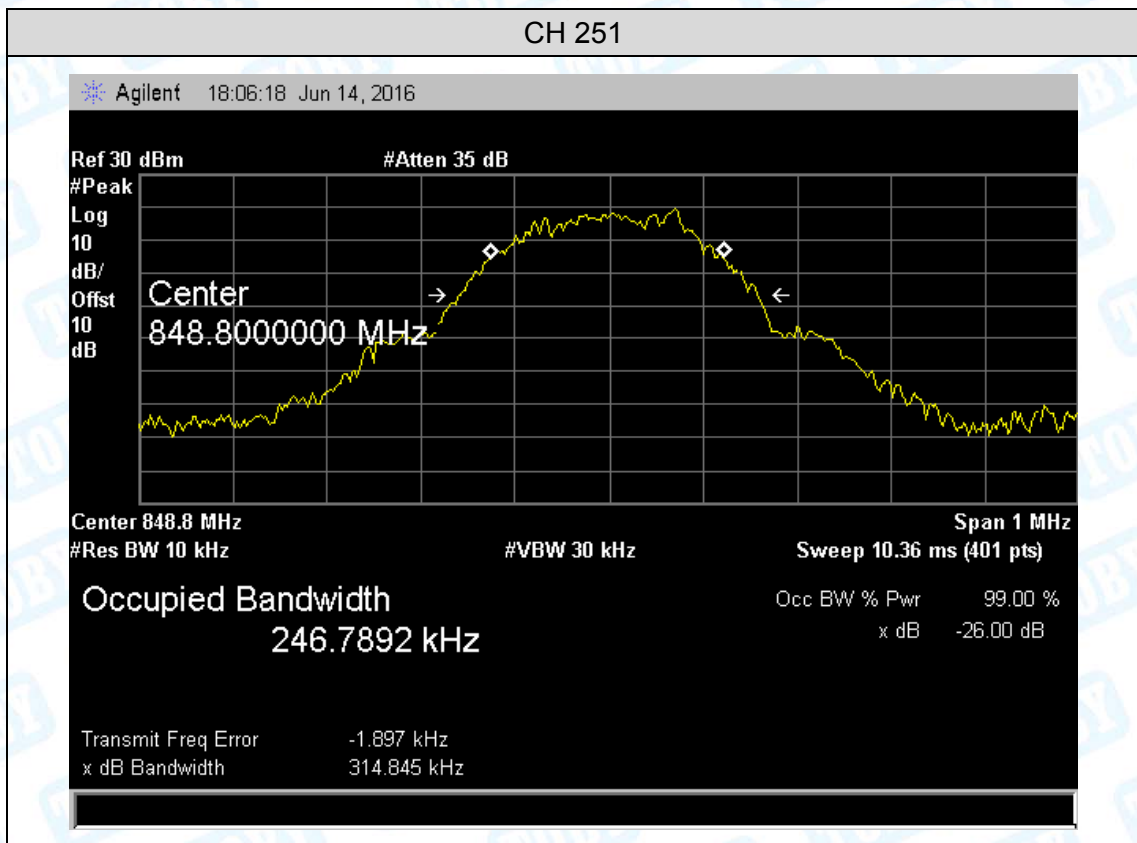


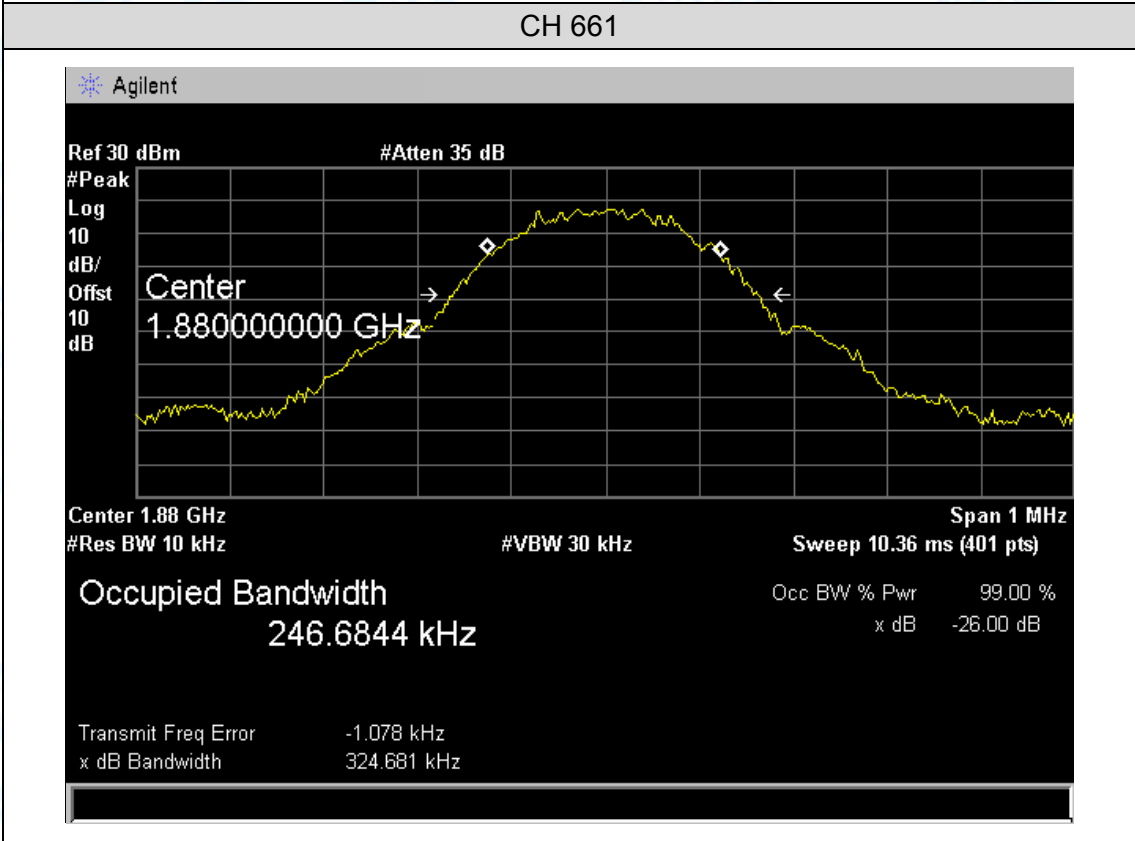
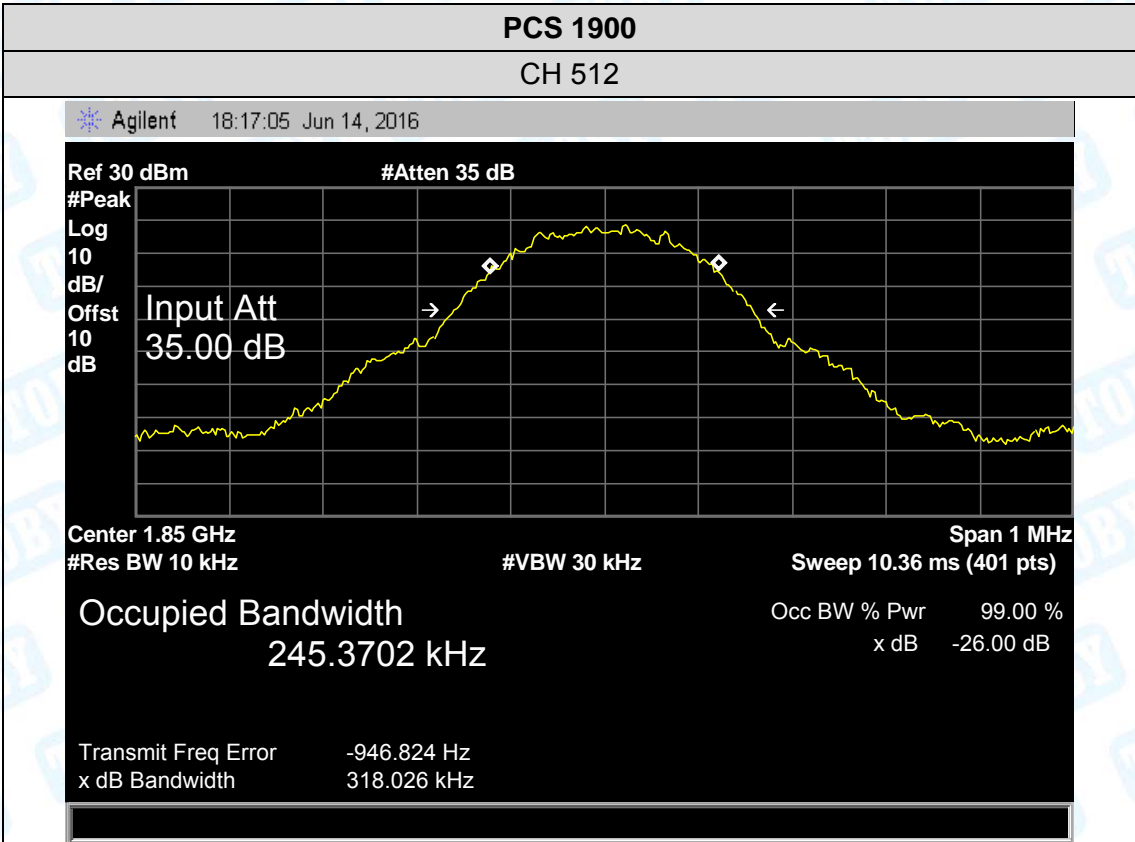
Center 836.6 MHz Span 1 MHz
#Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)

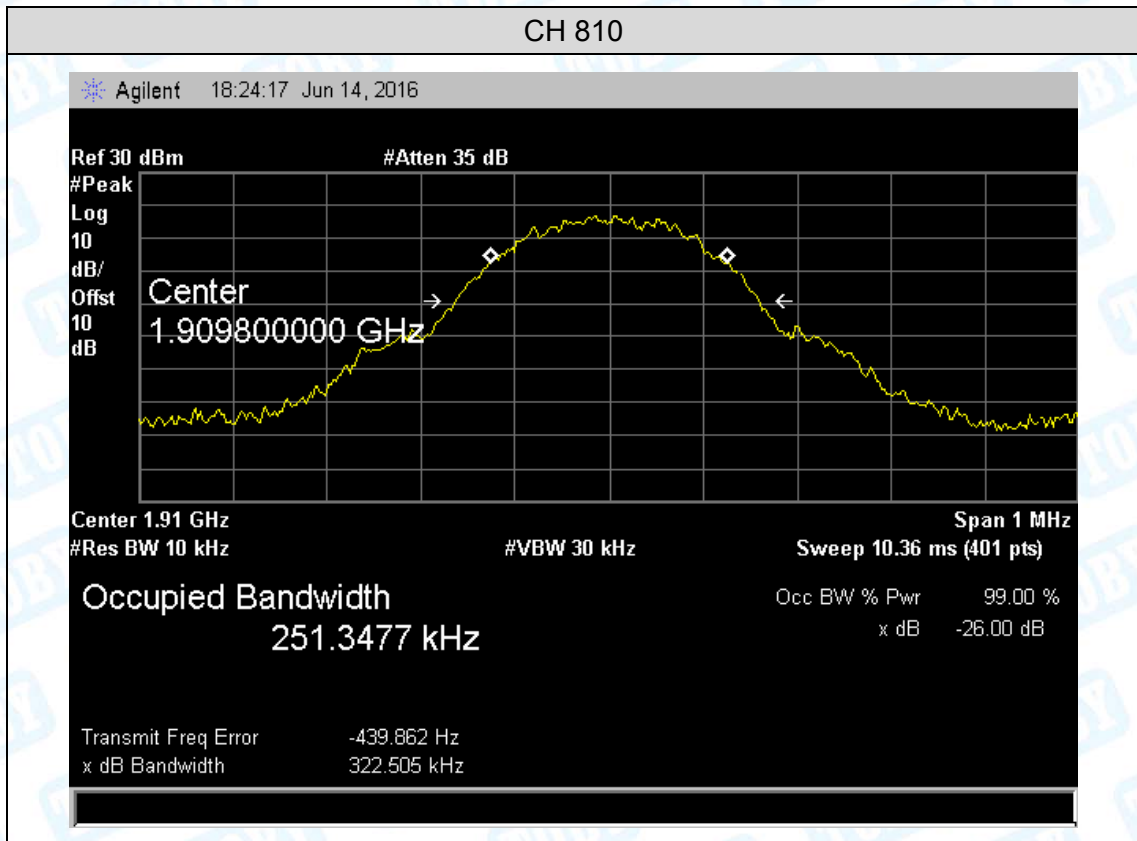
Occupied Bandwidth
248.0166 kHz

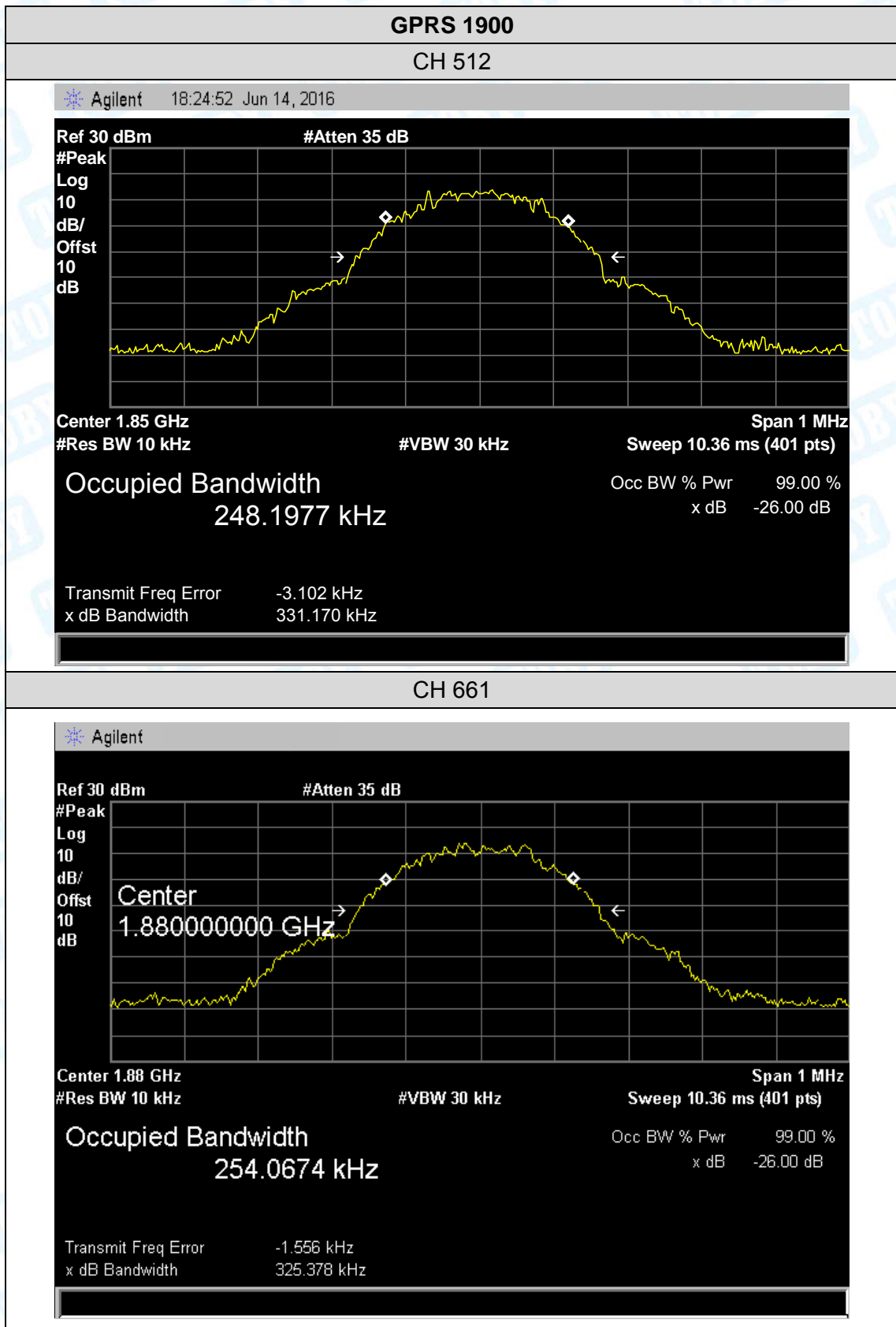
Occ BW % Pwr	99.00 %
x dB	-26.00 dB

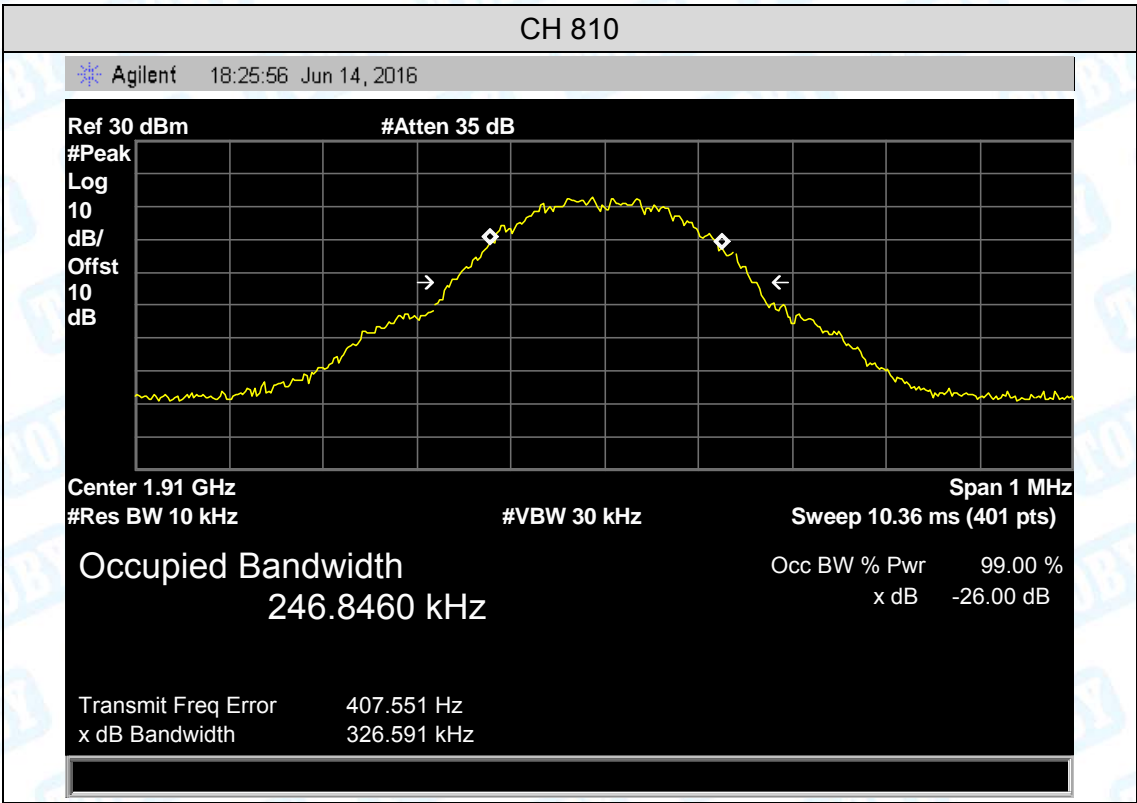
Transmit Freq Error	-2.144 kHz
x dB Bandwidth	322.678 kHz

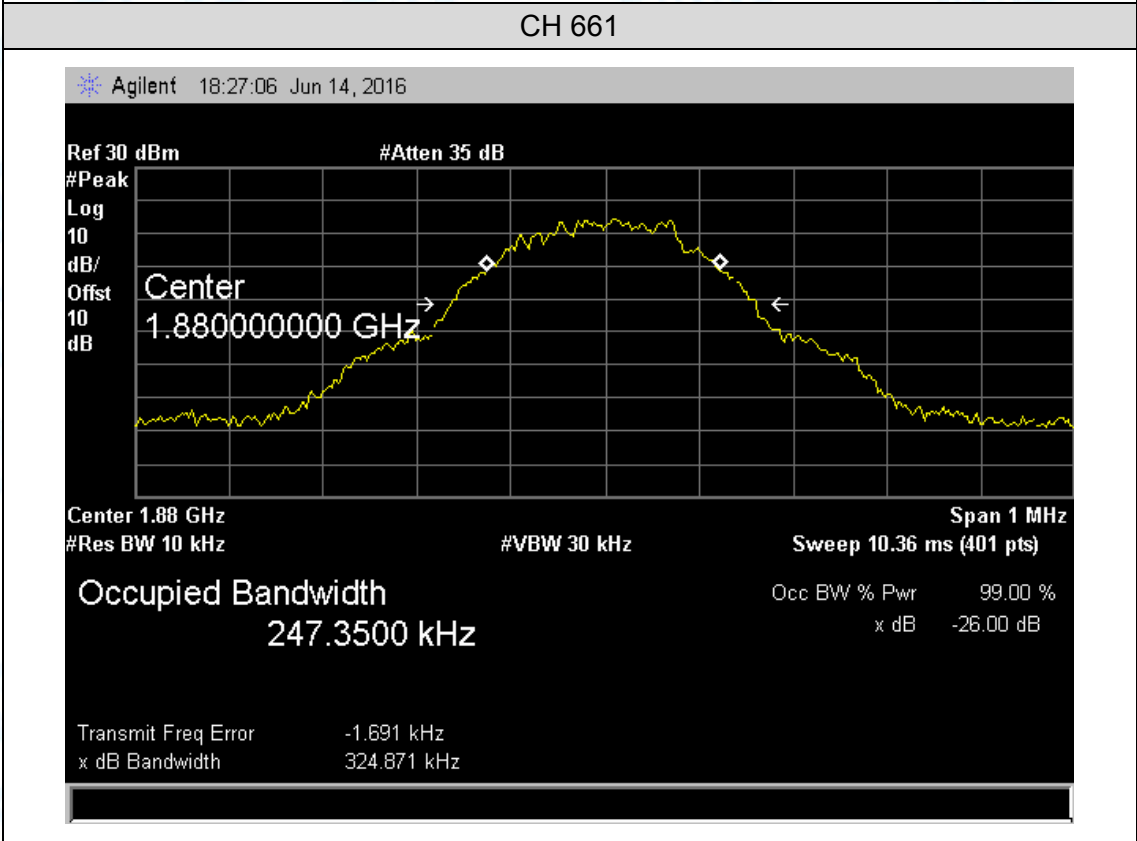
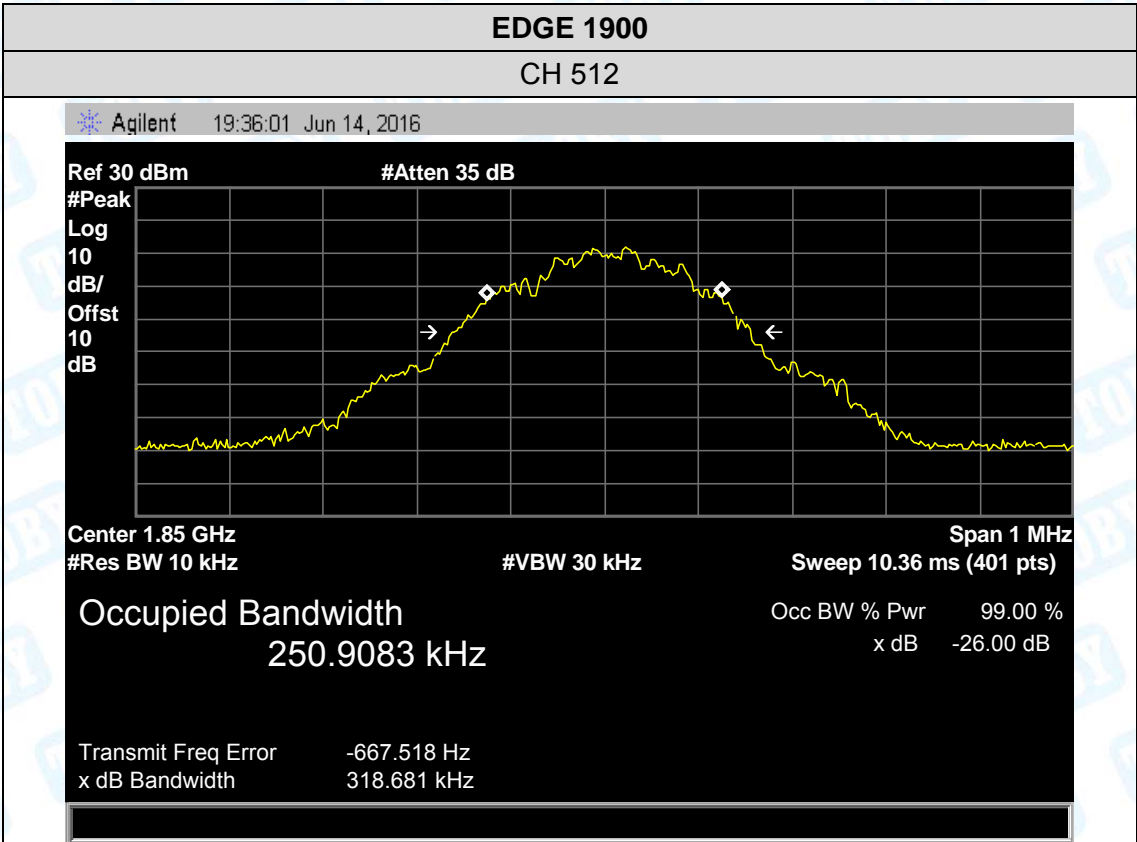


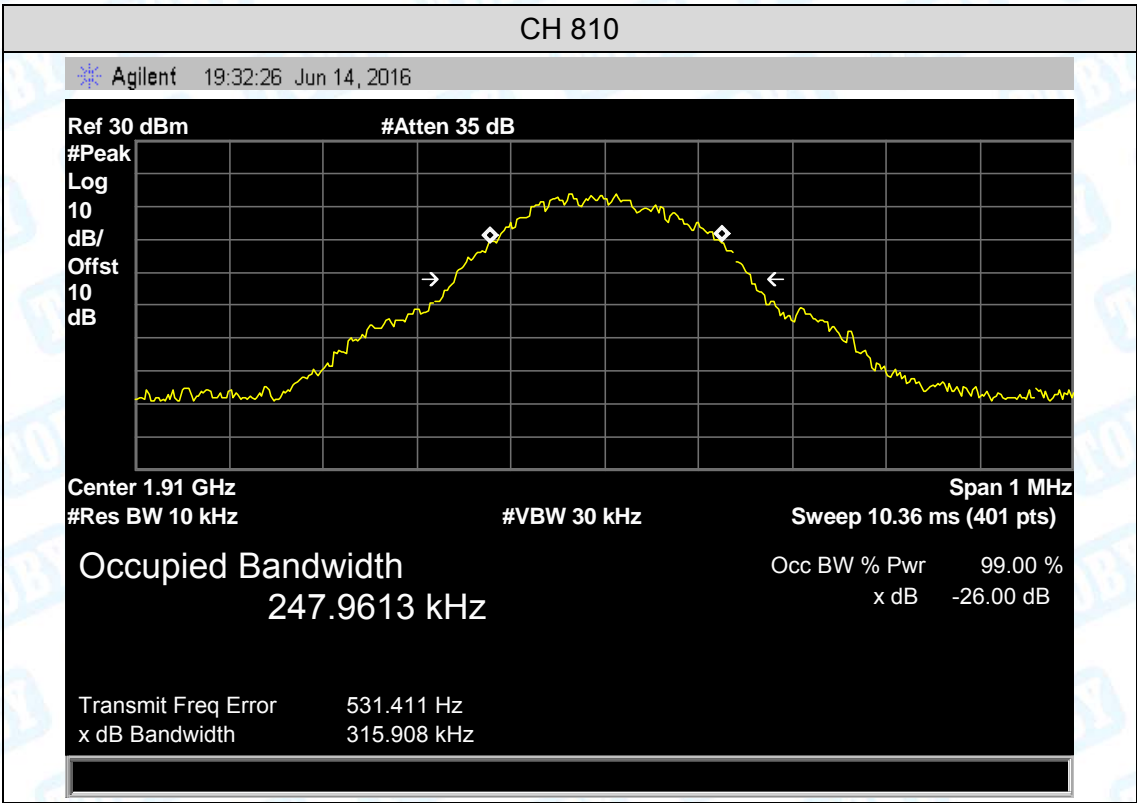












9. Conducted Out of Band Emissions

9.1 Test Standard and Limit

9.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

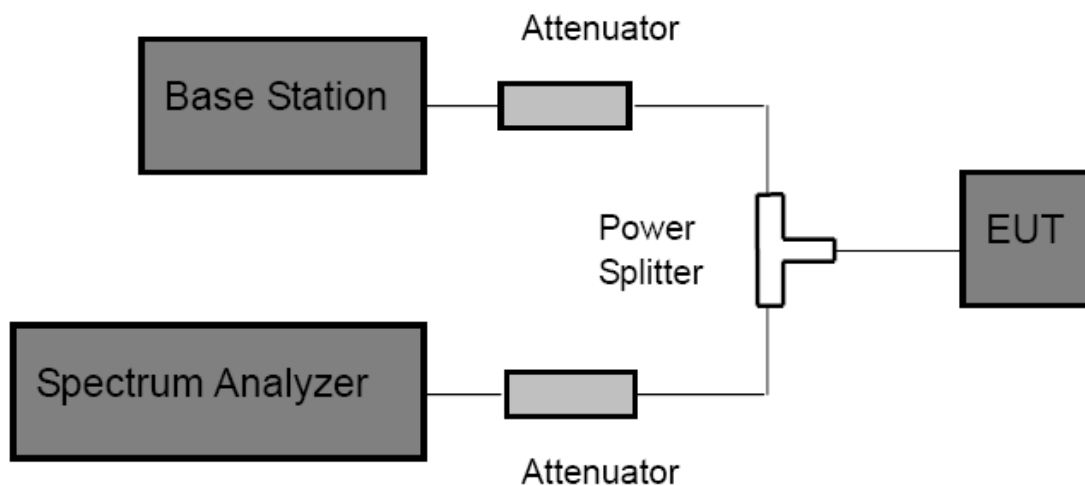
FCC Part 22H: 22.917(a)

FCC Part 24E: 24.238(a)

9.1.2 Test 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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

9.2 Test Setup



9.3 Test Procedure

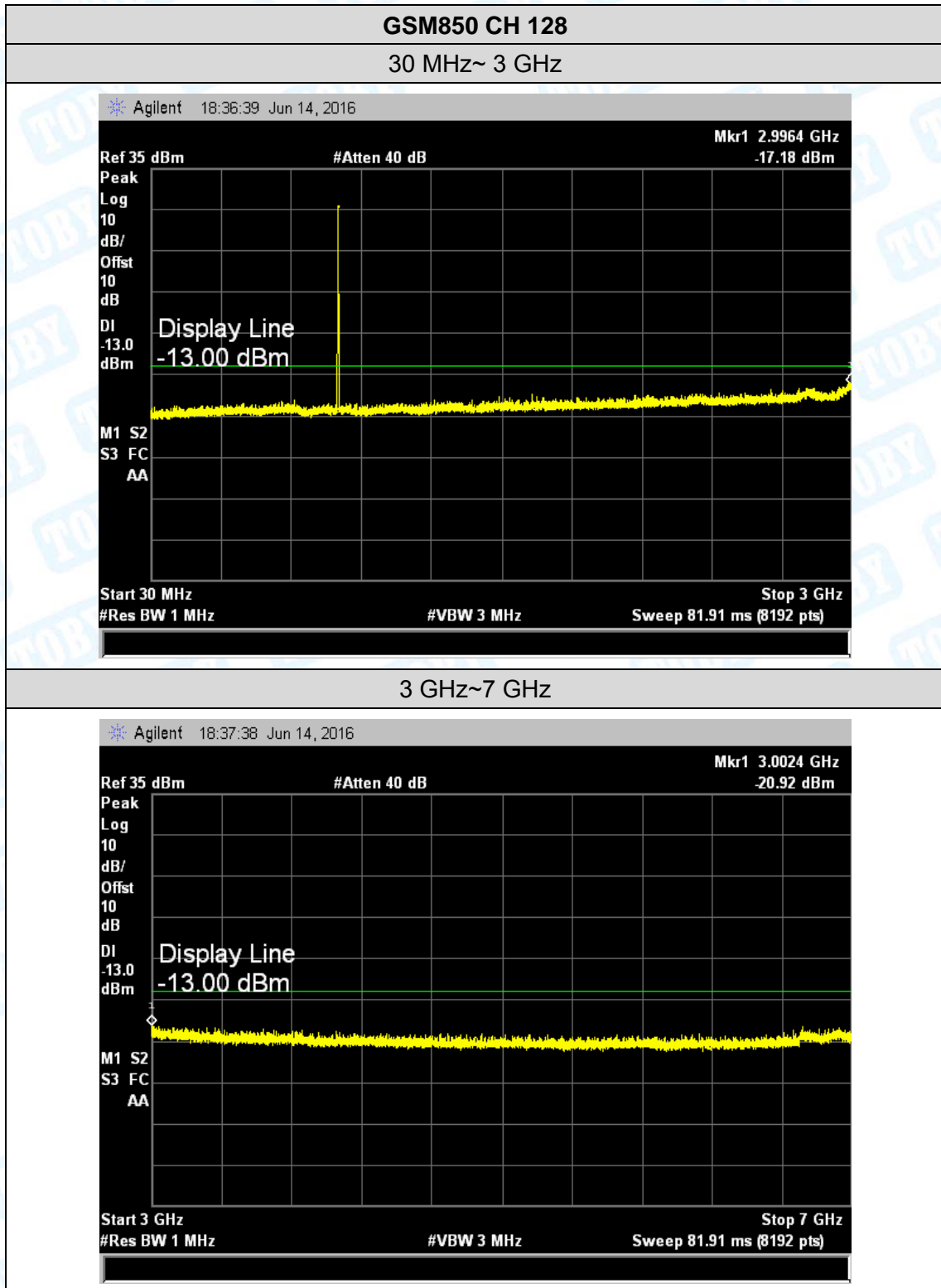
- (1) The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- (2) Spectrum Setting:
Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.
Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.
- (3) The low, middle and high channels of each band and mode's spurious emissions for 30 MHz to 10th Harmonic were measured by Spectrum analyzer.

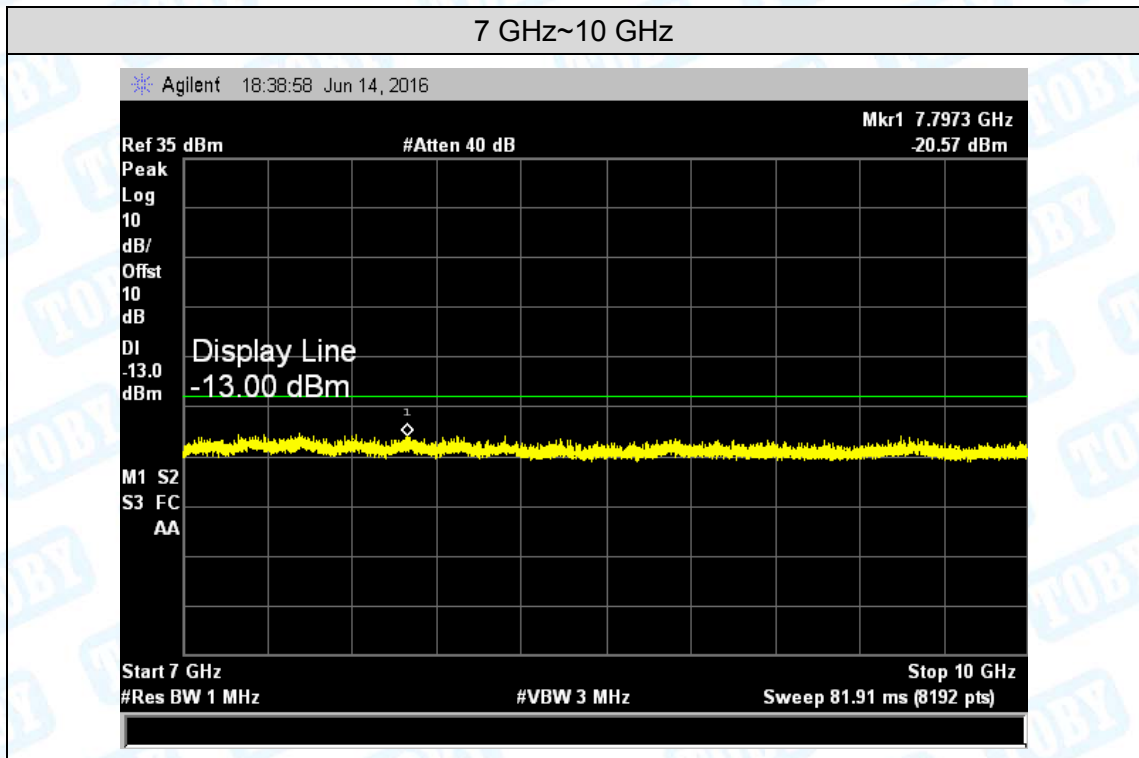
9.4 EUT Operating Condition

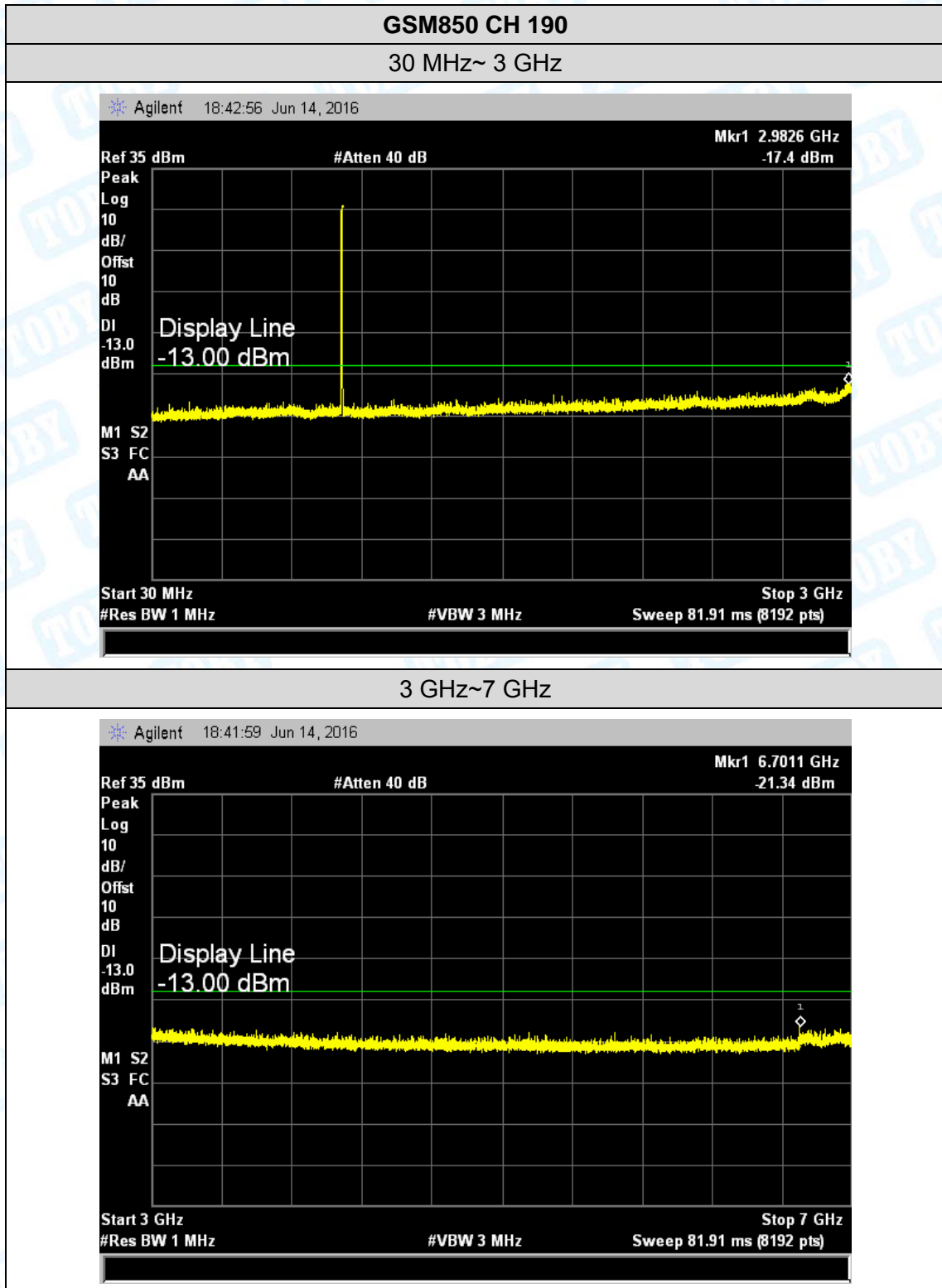
The EUT was continuously connected with the Base station and transmitting in the max power during the test.

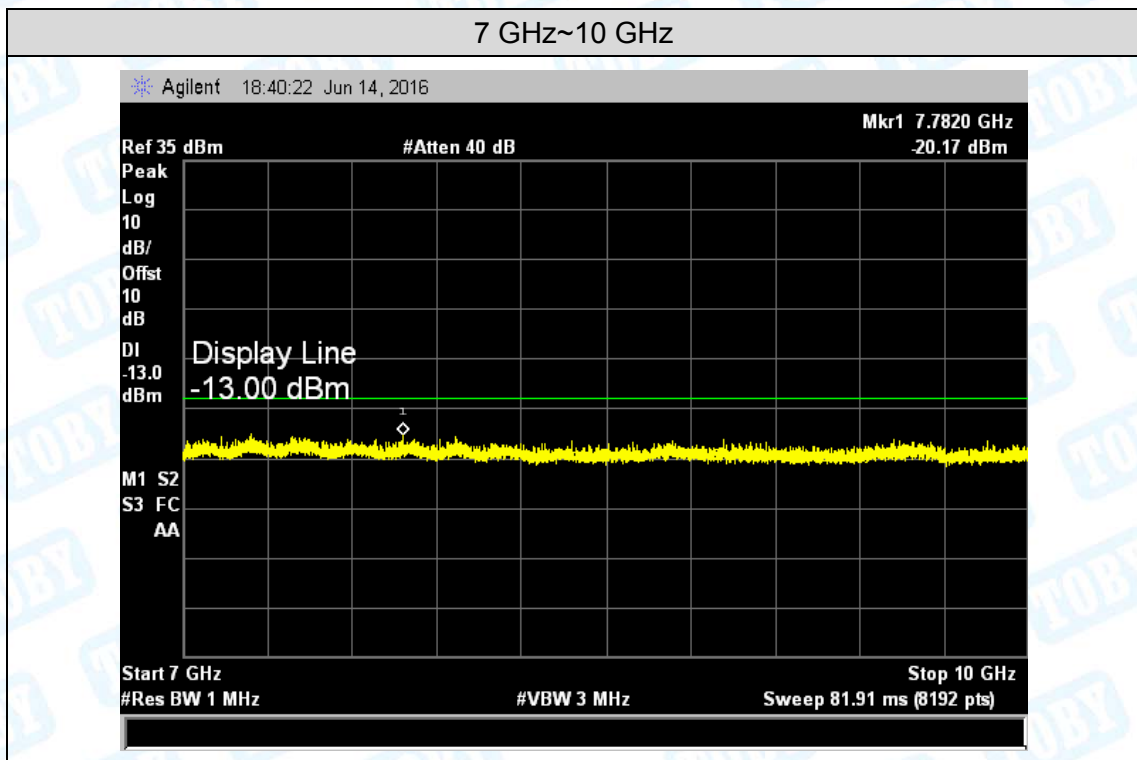
9.5 Test Data

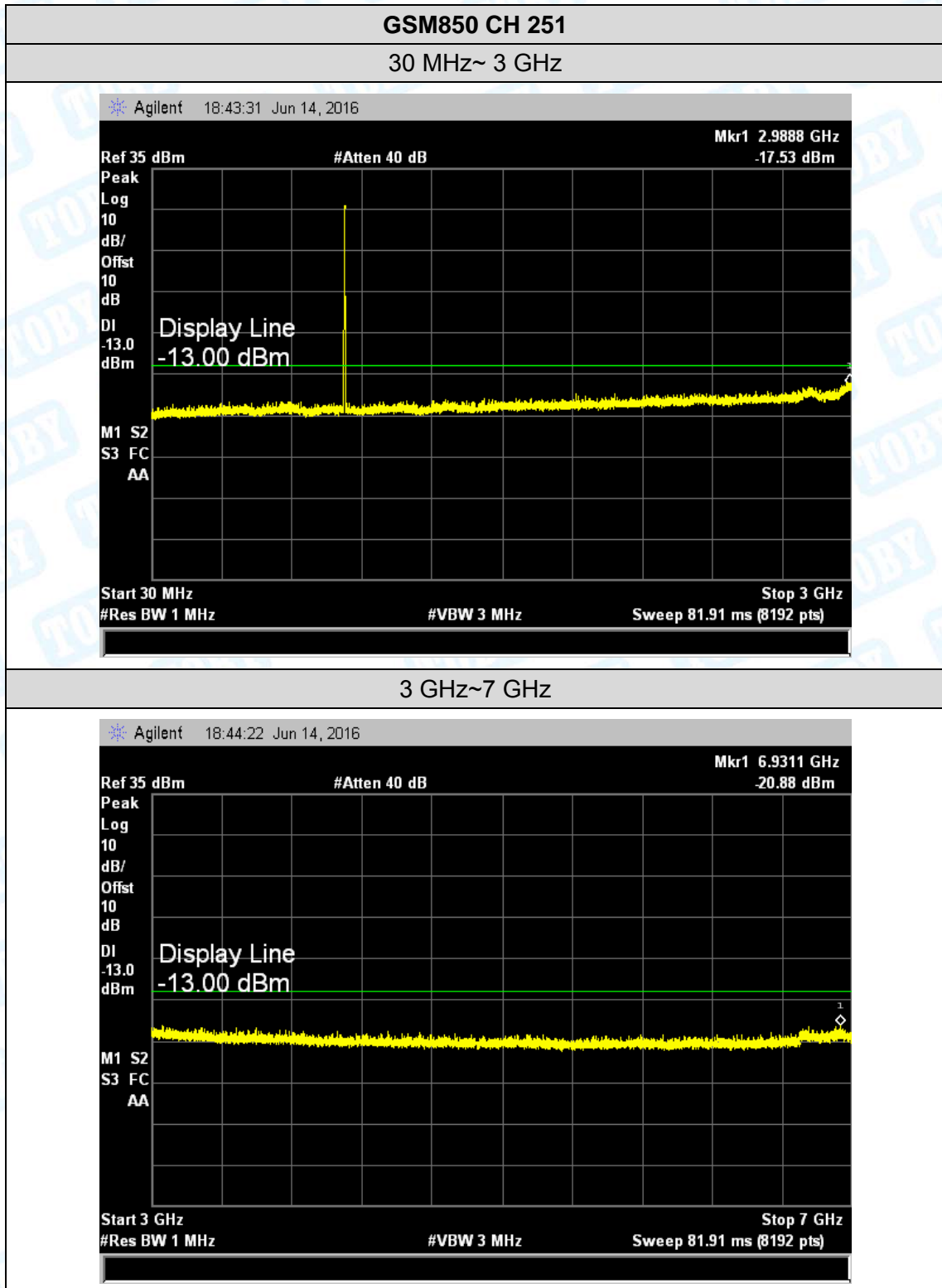
Please refer following plots:

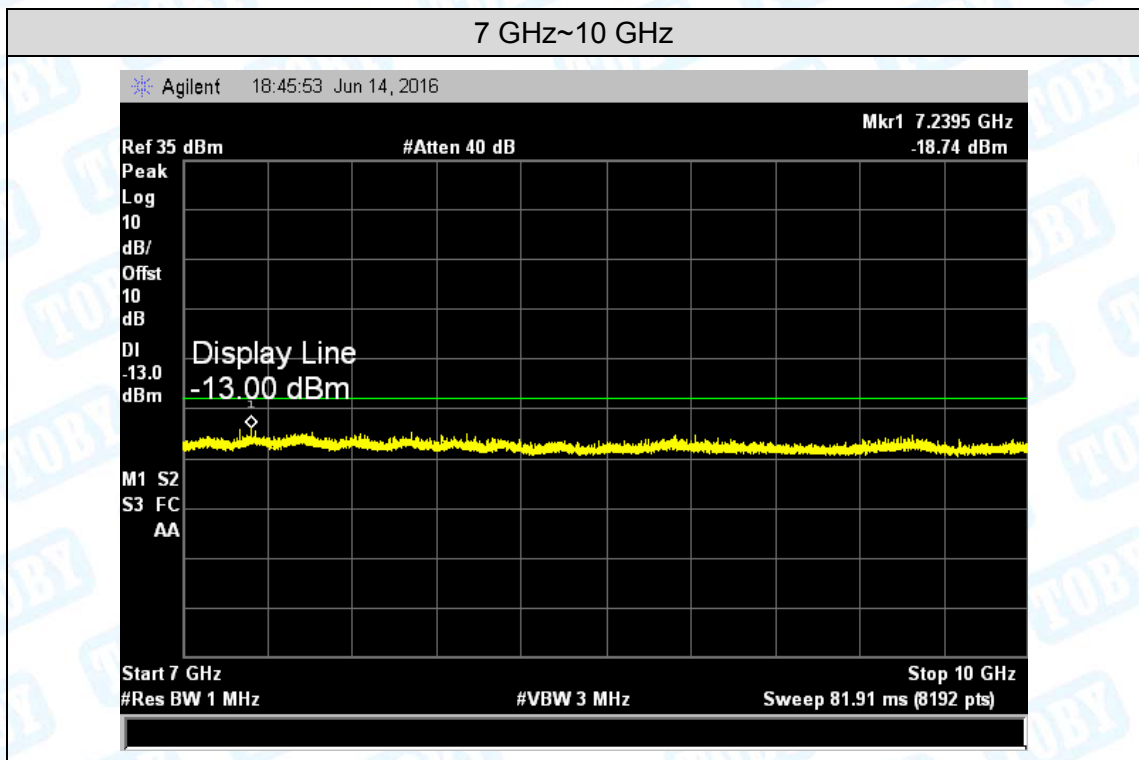


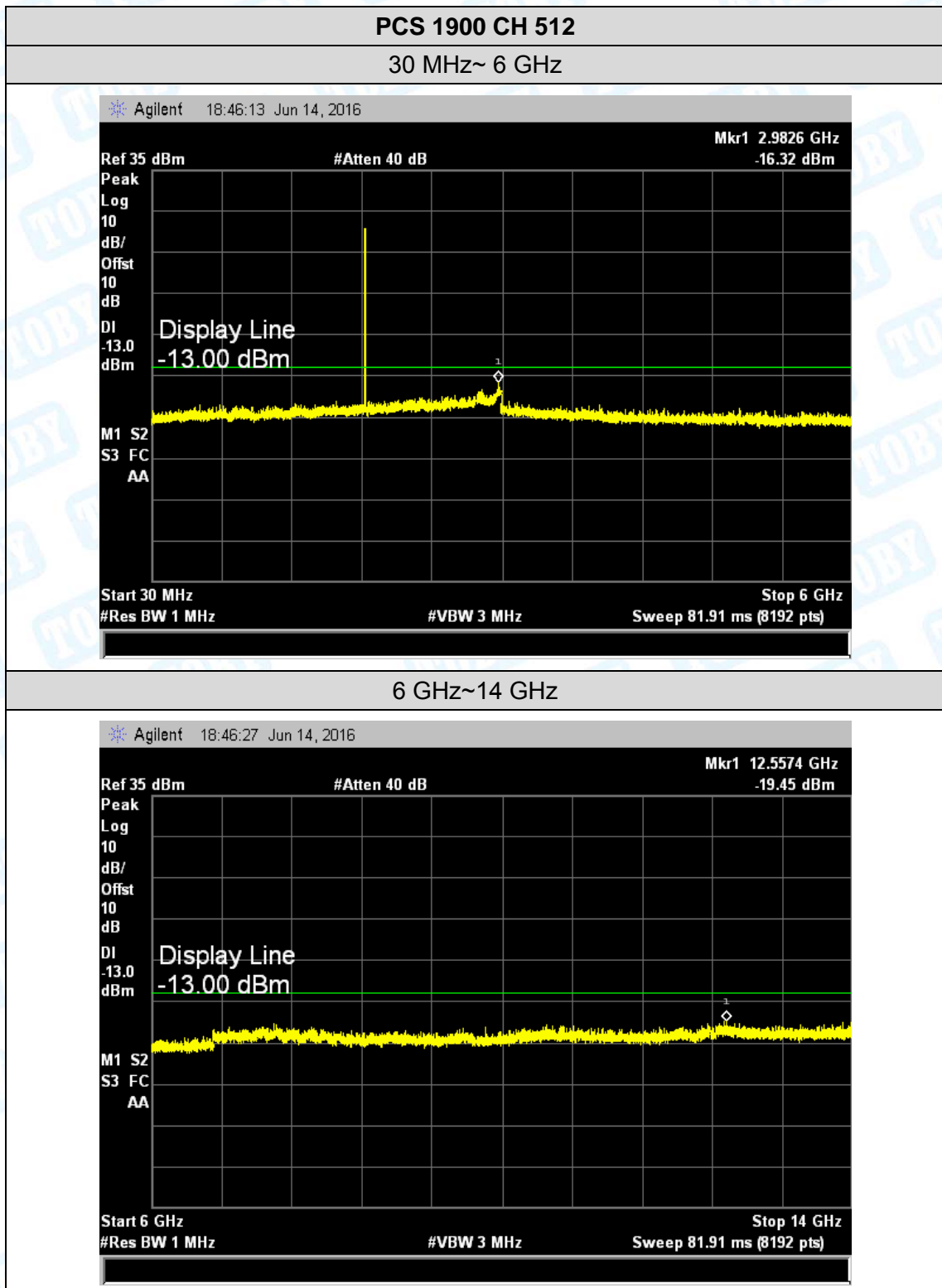


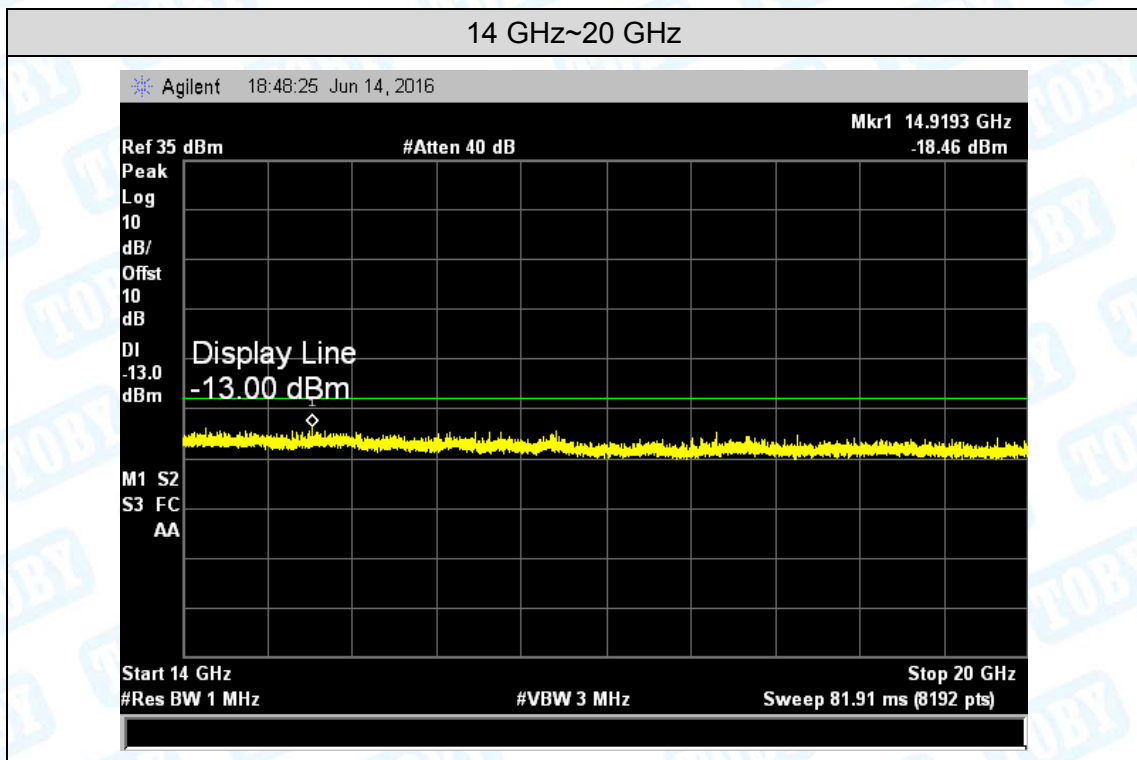


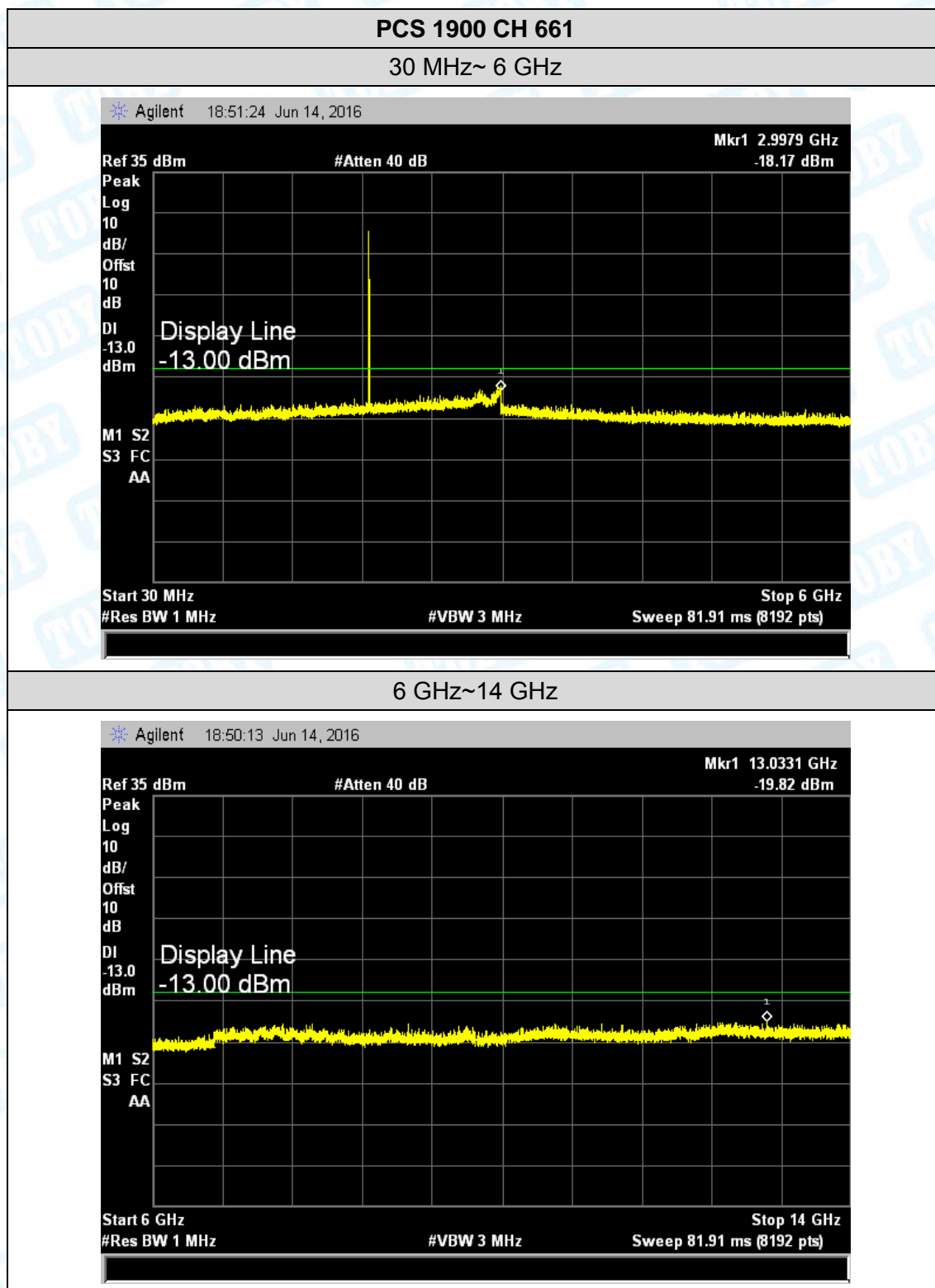


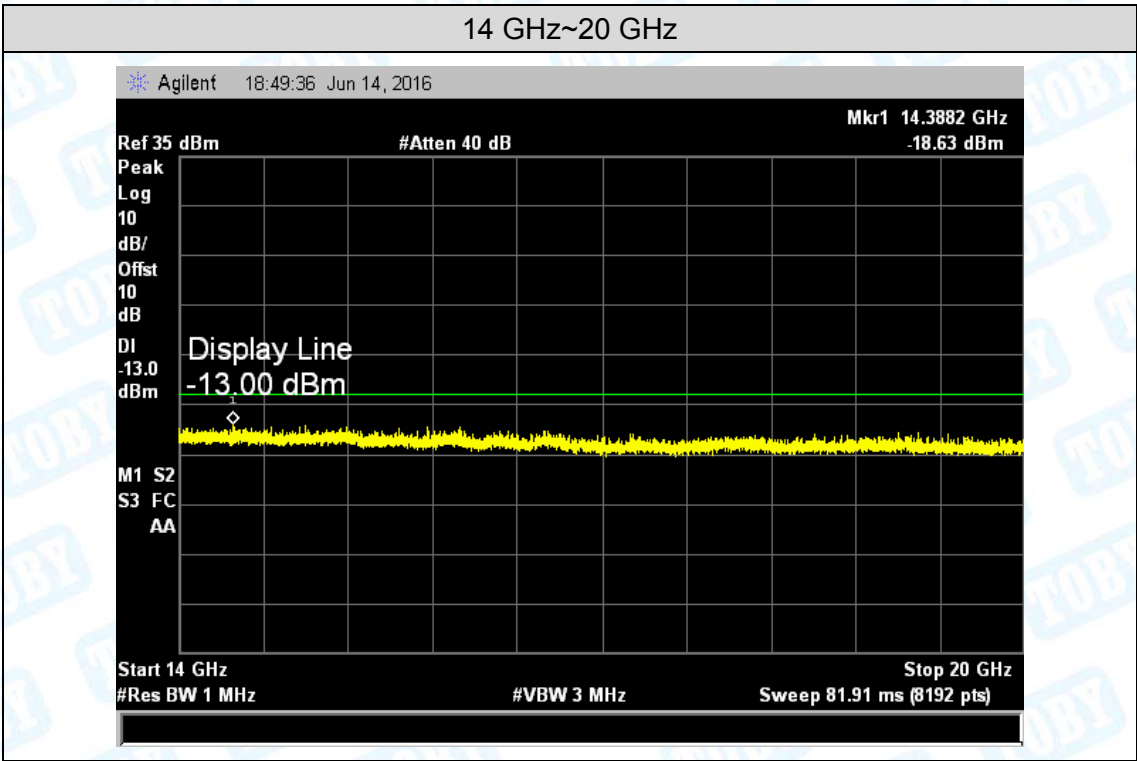


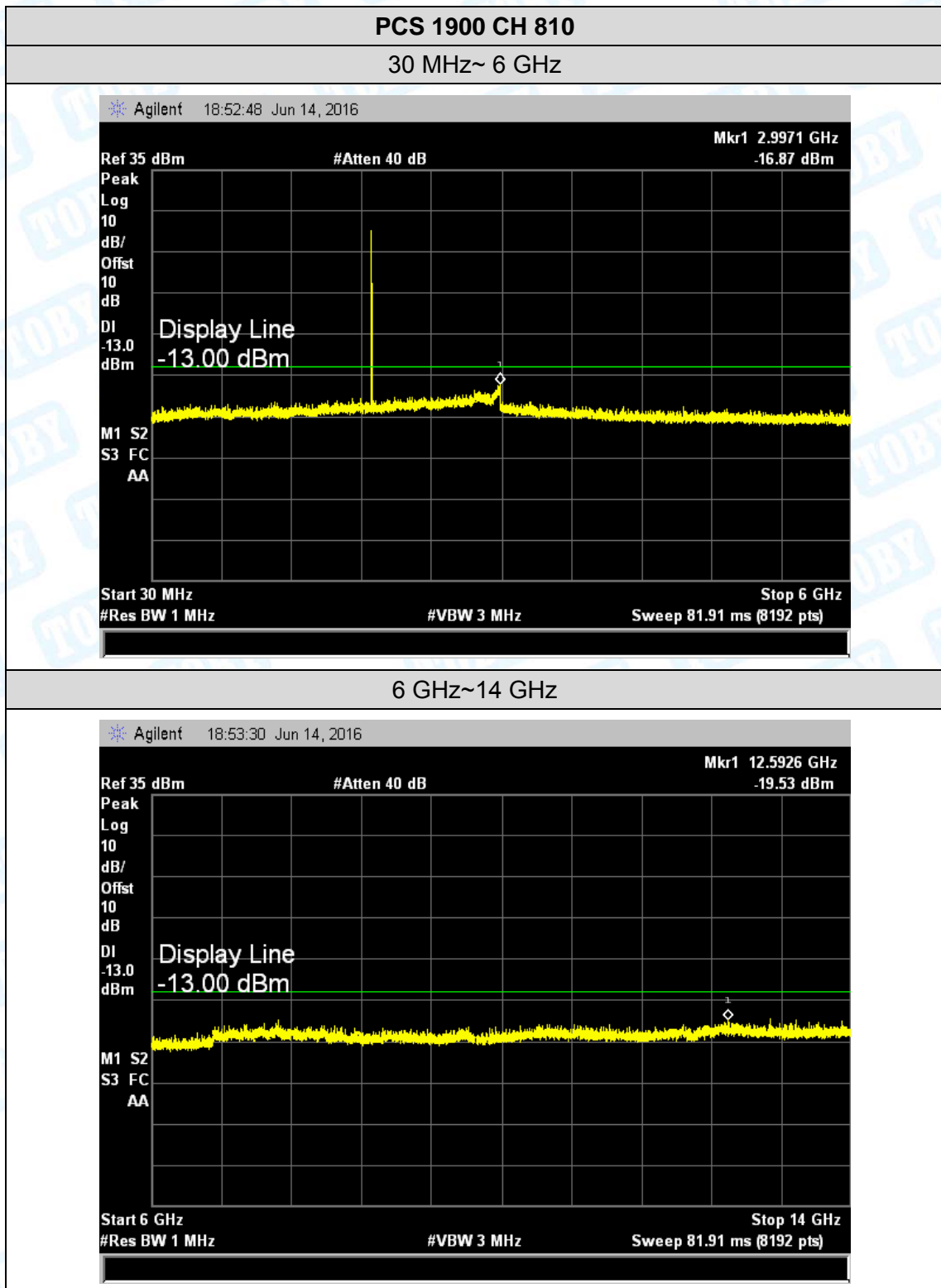


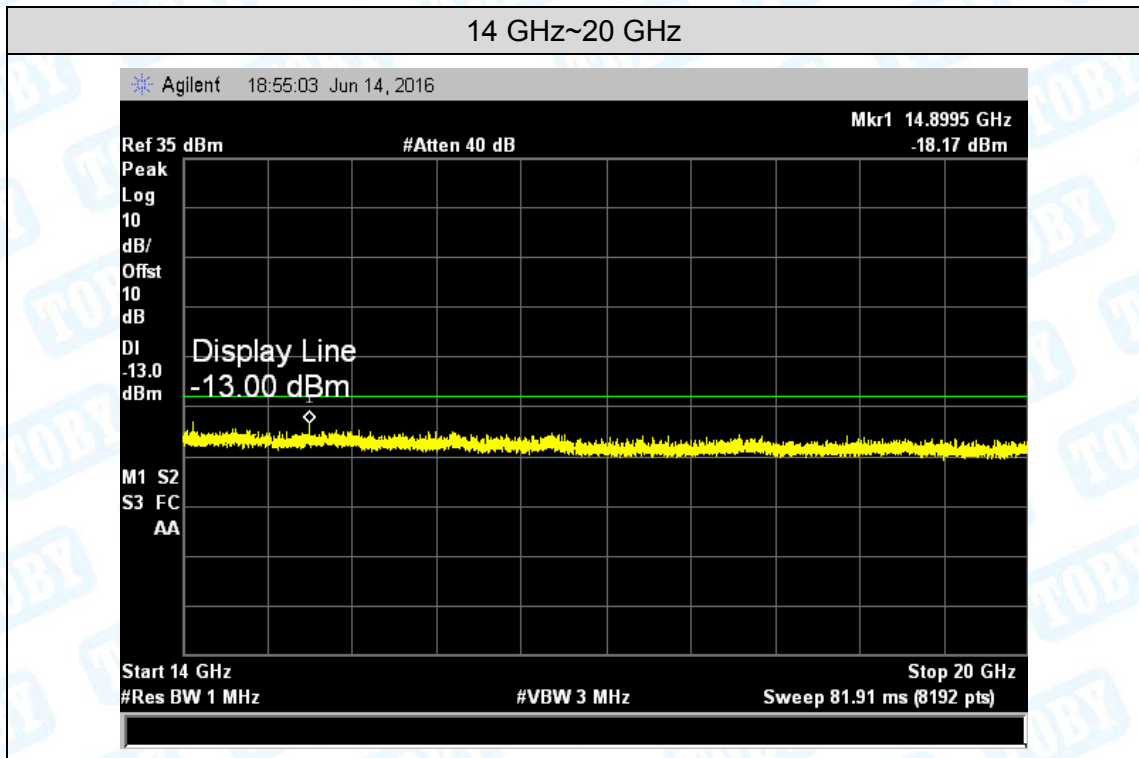












10. Band Edge Test

10.1 Test Standard and Limit

10.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

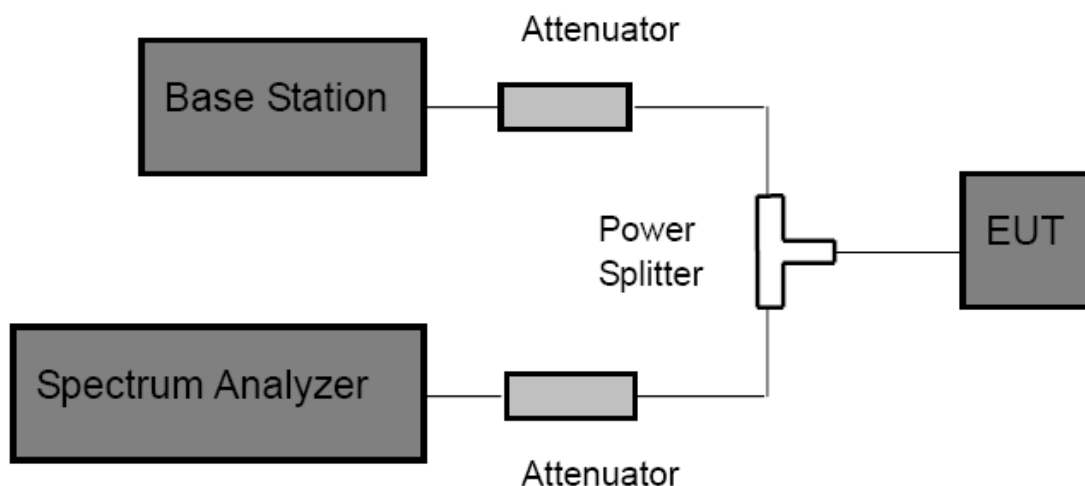
FCC Part 22H: 22.917(a)

FCC Part 24E: 24.238(a)

10.1.2 Test 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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

10.2 Test Setup



10.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- (2) Spectrum Setting:
GSM and PCS: RBW=3 kHz, VBW=10 kHz, Span 1 MHz, Detector: Peak Mode.
WCDMA: RBW=100 kHz, VBW=300 kHz, Span 5 MHz, Detector: Peak Mode.
- (3) The band edges of low and high channels for the highest RF powers were measured.

10.4 EUT Operating Condition

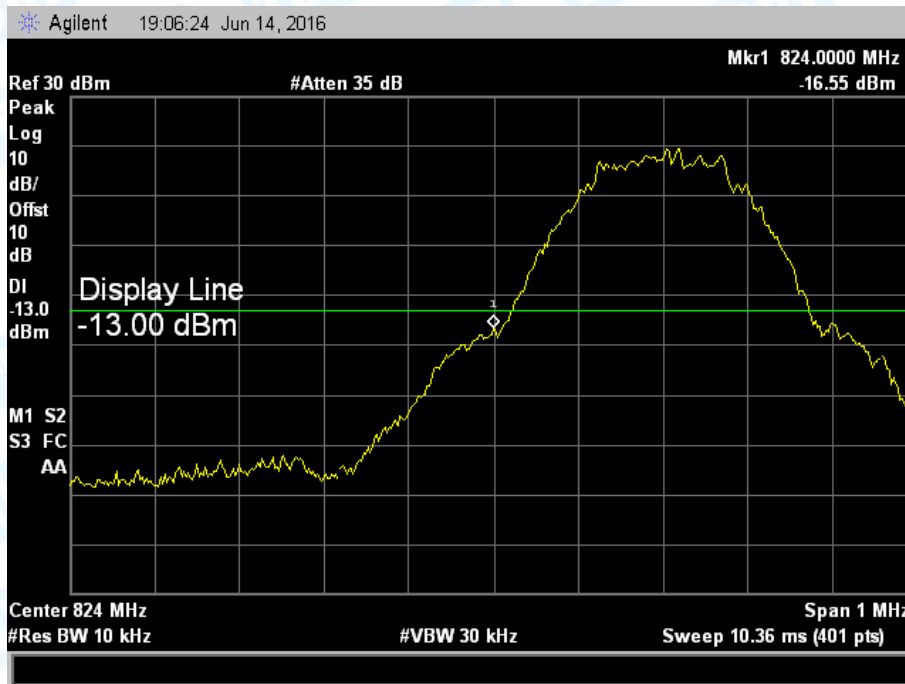
The EUT was continuously connected with the Base station and transmitting in the max power during the test.

10.5 Test Data

Please refer the following plots:

Band edge emission:

Test Mode:	GSM850
------------	--------

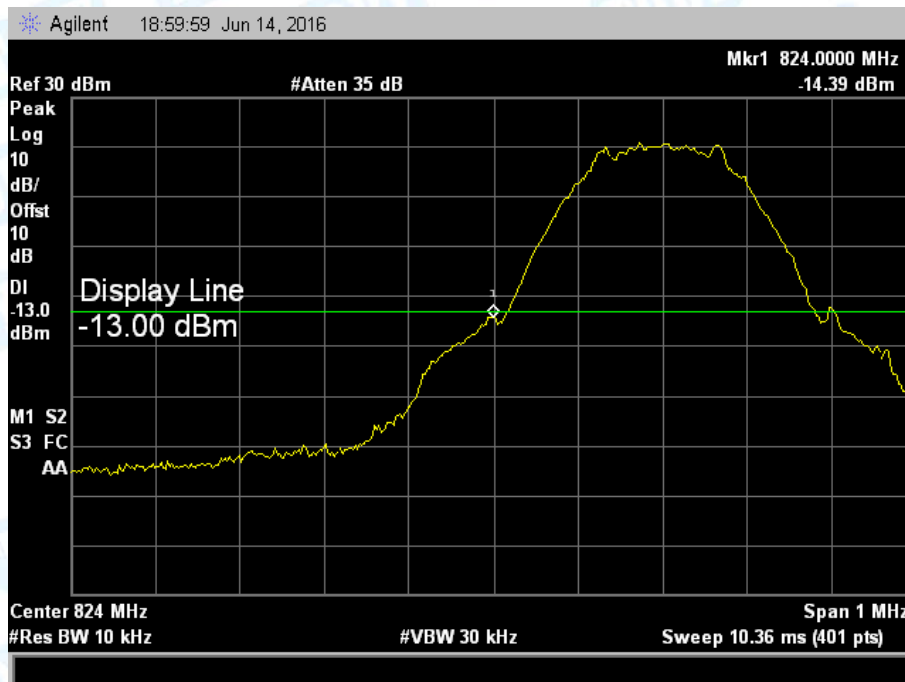


Lowest channel

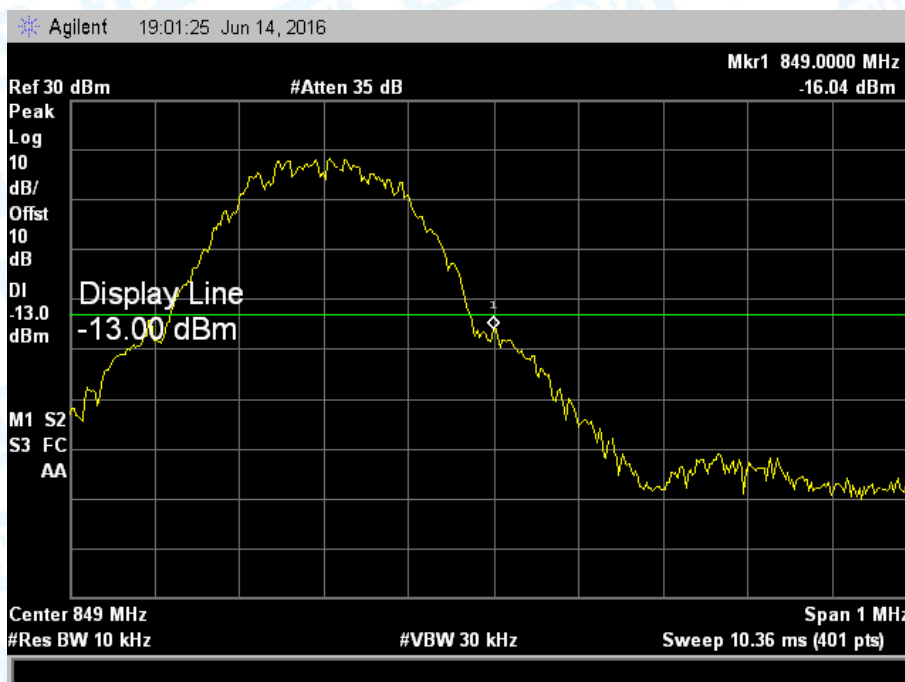


Highest channel

Test Mode:	GPRS850
------------	---------

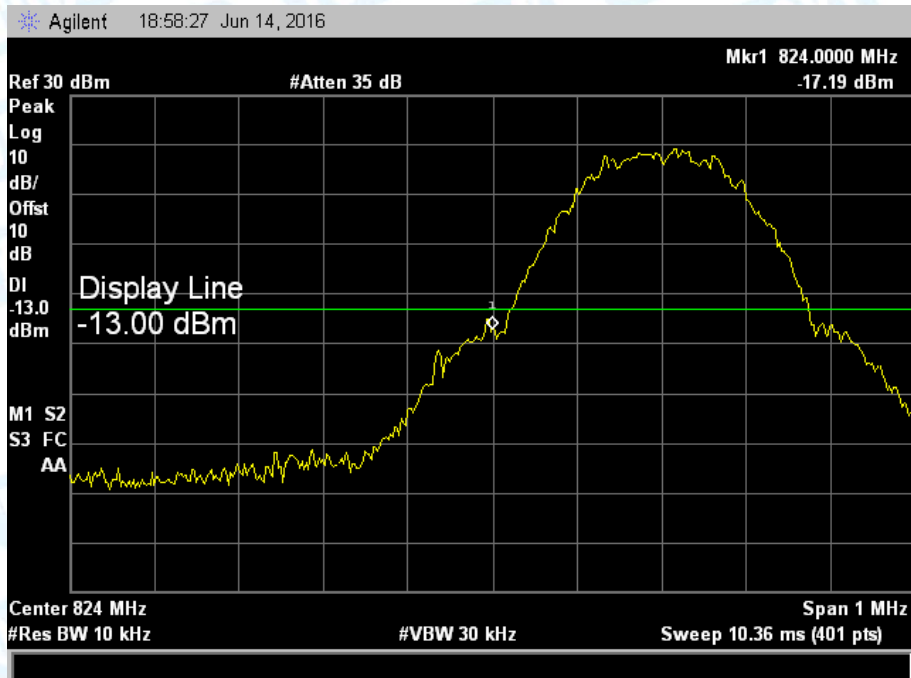


Lowest channel

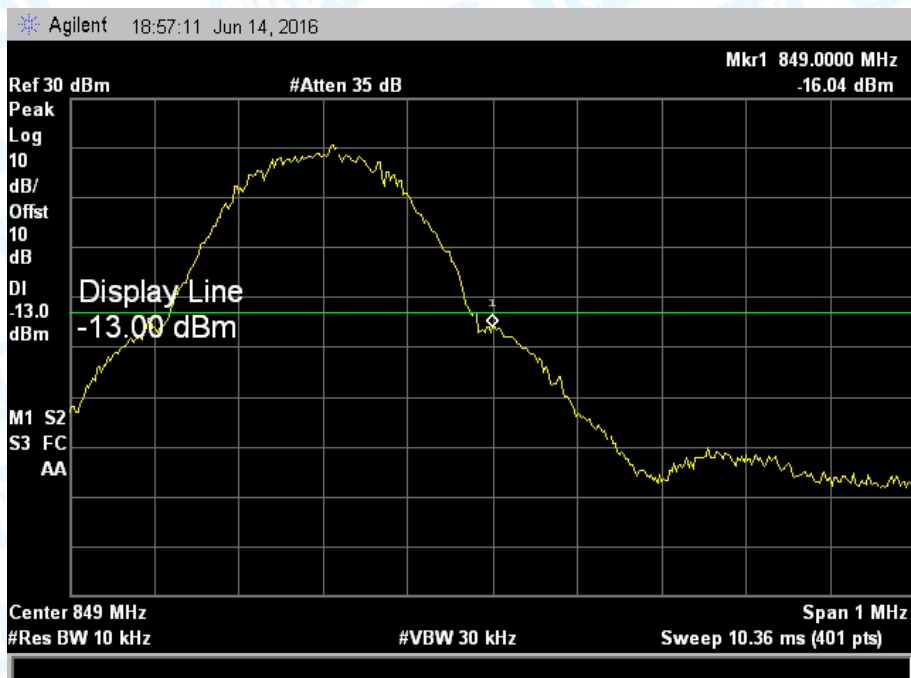


Highest channel

Test Mode:	EGPRS850
------------	----------

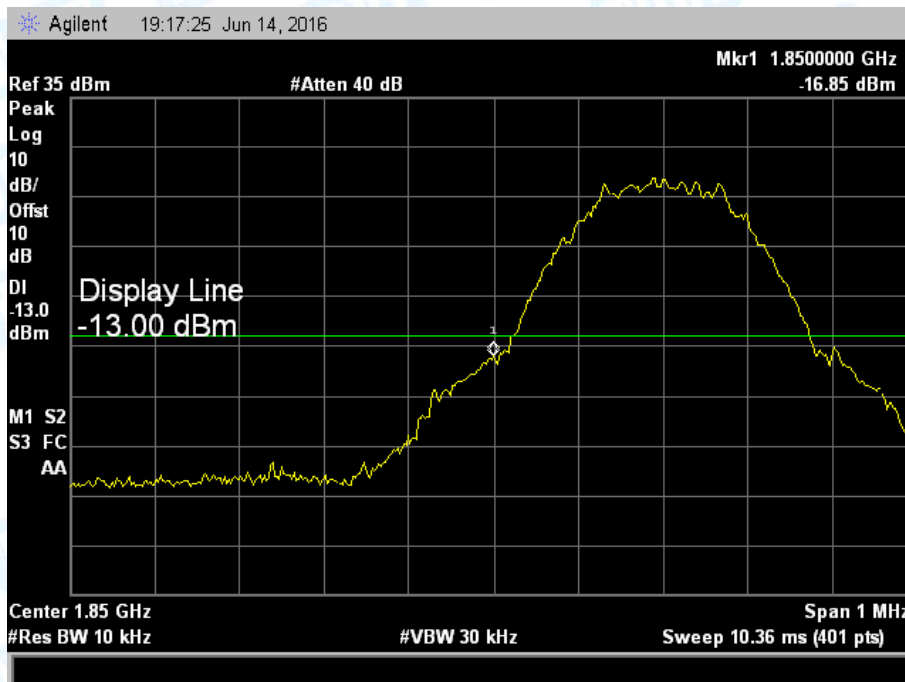


Lowest channel

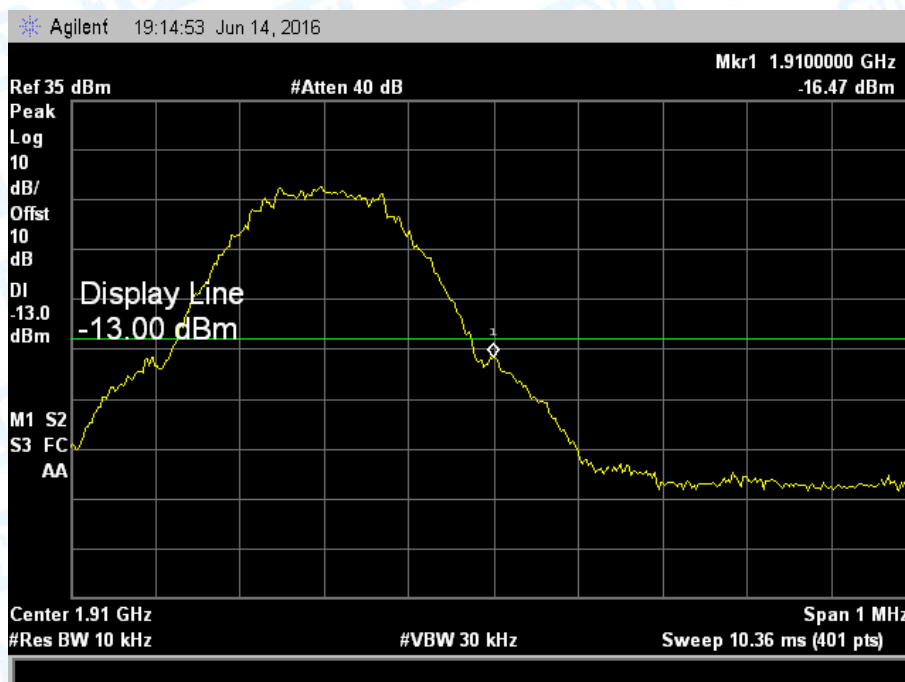


Highest channel

Test Mode:	PCS1900
------------	---------

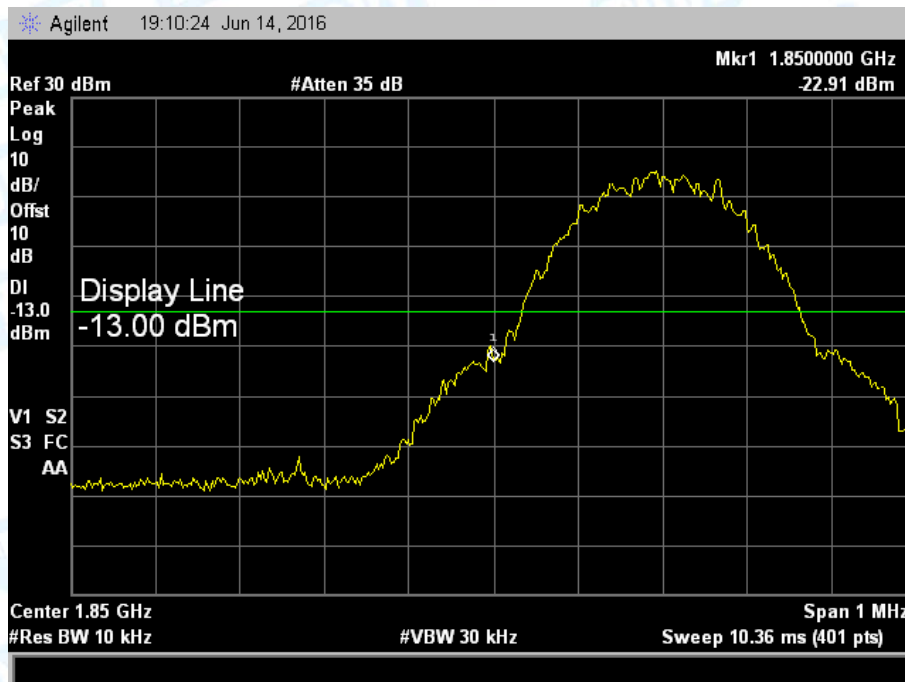


Lowest channel

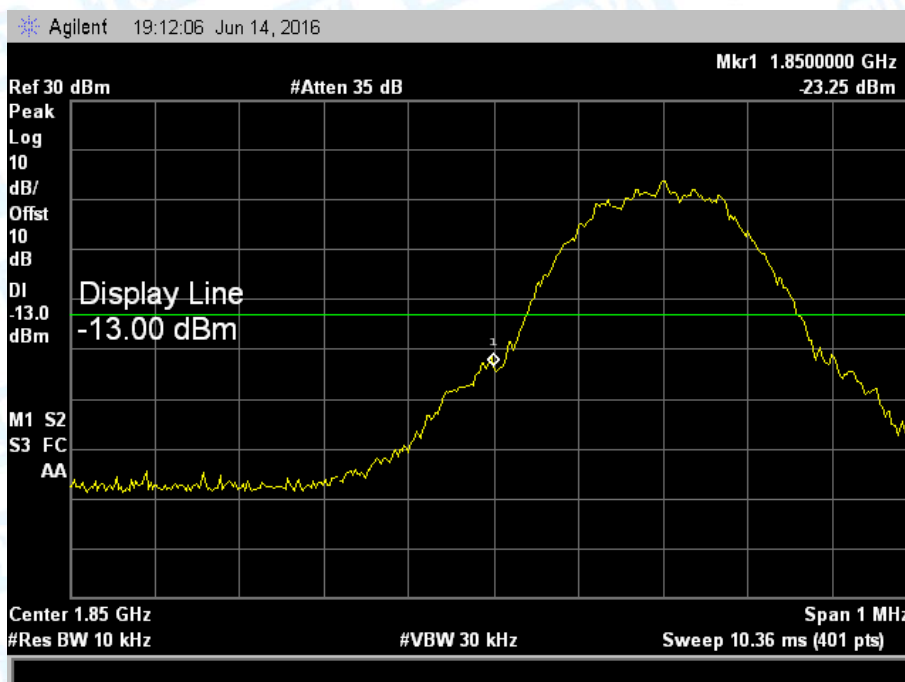


Highest channel

Test Mode:	GPRS1900
------------	----------



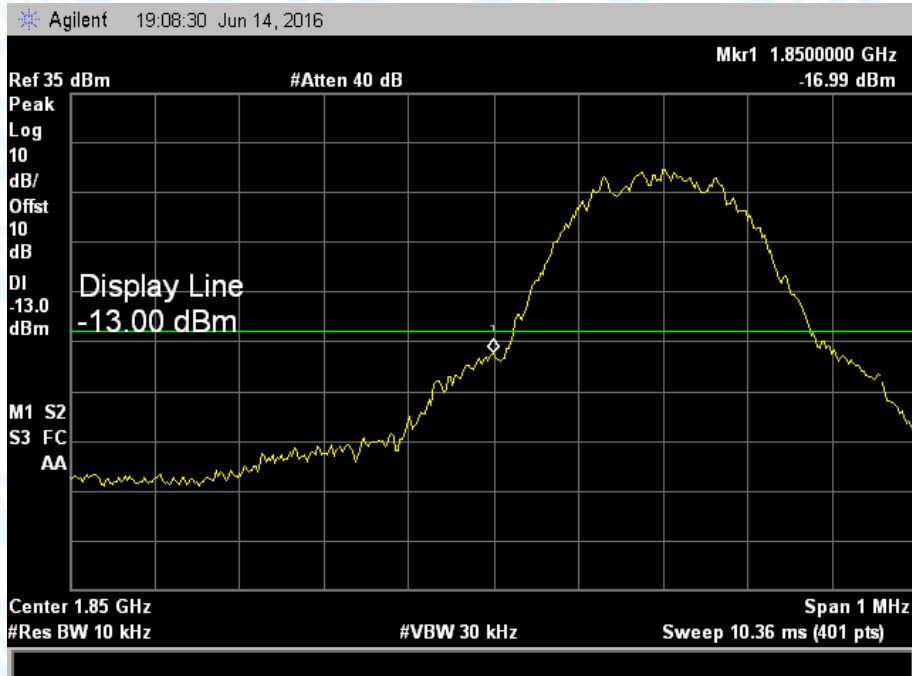
Lowest channel



Highest channel

Test Mode:

EGPRS1900



Lowest channel



Highest channel

11. Radiated Out Band of Emissions

11.1 Test Standard and Limit

11.1.1 Test Standard

FCC Part 2: 2.1053, 2.1057

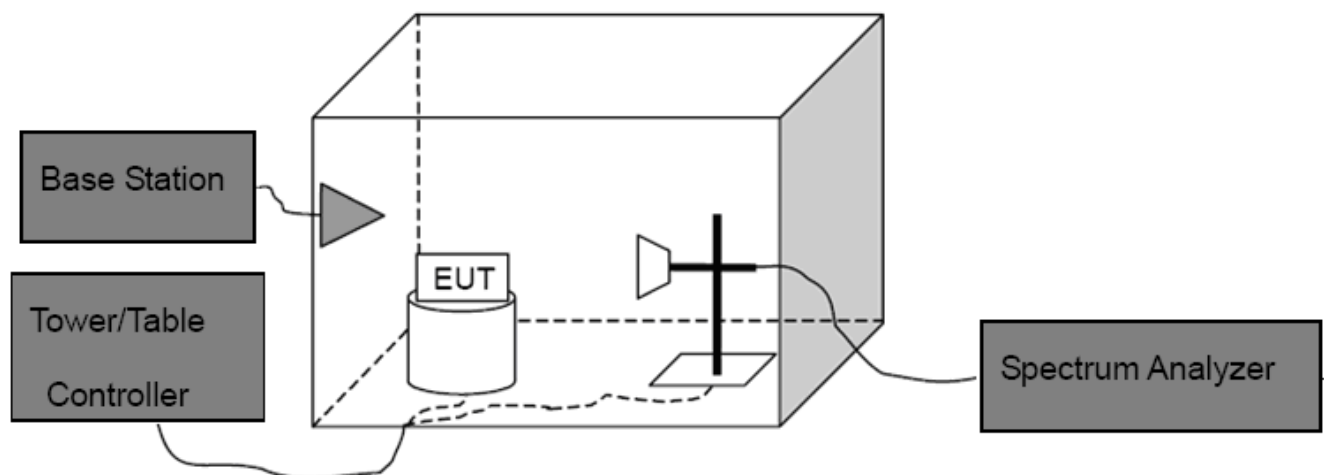
FCC Part 22H: 22.917

FCC Part 24E: 24.238

11.1.2 Test 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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

11.2 Test Setup



11.3 Test Procedure

- (1) The test system setup as show in the block diagram above.
- (2) The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10^{th} harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
- (3) During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
- (4) When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB=10 log(TX power in Watts/0.001)-the absolute level
Spurious attenuation limit in dB=43+10 log(power out in Watts)

11.4 EUT Operating Condition

The EUT was continuously connected with the Base station and transmitting in the max power during the test.

11.5 Test Data

Please refer the following pages.

Measurement Data (worst case)

Test mode:	GSM850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-30.14	-13.00	Pass
2509.80	V	-32.47		
3346.40	V	-41.65		
4183.00	V	---		
5019.60	V	---		
5856.20	V	---		
1673.20	Horizontal	-33.24	-13.00	Pass
2509.80	H	-39.47		
3346.40	H	-40.85		
4183.00	H	---		
5019.60	H	---		
5856.20	H	---		

Remark:

- The testing has been conformed to $10 \times 836.6\text{MHz} = 8,366\text{MHz}$.
- All other emissions more than 30 dB below the limit.

Test mode:	GPRS850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-33.06	-13.00	Pass
2509.80	V	-35.87		
3346.40	V	-43.06		
4183.00	V	---		
5019.60	V	---		
5856.20	V	---		
1673.20	Horizontal	-35.08	-13.00	Pass
2509.80	H	-41.26		
3346.40	H	-43.65		
4183.00	H	---		
5019.60	H	---		
5856.20	H	---		

Remark:

- The testing has been conformed to $10 \times 836.6\text{MHz} = 8,366\text{MHz}$.
- All other emissions more than 30 dB below the limit.

Test mode:	EGPRS850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-33.54	-13.00	Pass
2509.80	V	-36.21		
3346.40	V	-44.36		
4183.00	V	---		
5019.60	V	---		
5856.20	V	---		
1673.20	Horizontal	-36.11	-13.00	Pass
2509.80	H	-42.34		
3346.40	H	-43.87		
4183.00	H	---		
5019.60	H	---		
5856.20	H	---		

Remark:

- The testing has been conformed to $10 \times 836.6\text{MHz} = 8,366\text{MHz}$.
- All other emissions more than 30 dB below the limit.

Test mode:	PCS1900		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-29.81	-13.00	Pass
5640.00	V	-37.63		
7520.00	V	-40.25		
9400.00	V	---		
11280.00	V	---		
13160.00	V	---		
3760.00	Horizontal	-29.37	-13.00	Pass
5640.00	H	-33.57		
7520.00	H	-34.63		
9400.00	H	---		
11280.00	H	---		
13160.00	H	---		

Remark:

- The testing has been conformed to $10 \times 1880.0\text{MHz} = 18,800\text{MHz}$.
- All other emissions more than 30 dB below the limit.

Test mode:	GPRS1900		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-30.45	-13.00	Pass
5640.00	V	-38.62		
7520.00	V	-42.14		
9400.00	V	---		
11280.00	V	---		
13160.00	V	---		
3760.00	Horizontal	-31.06	-13.00	Pass
5640.00	H	-35.44		
7520.00	H	-36.74		
9400.00	H	---		
11280.00	H	---		
13160.00	H	---		

Remark:

- The testing has been conformed to $10 \times 1880.0\text{MHz} = 18,800\text{MHz}$.
- All other emissions more than 30 dB below the limit.

Test mode:	EGPRS1900		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-31.04	-13.00	Pass
5729.40	V	-39.41		
7639.20	V	-42.84		
9549.00	V	---		
11458.80	V	---		
13368.60	V	---		
3819.60	Horizontal	-31.89	-13.00	Pass
5729.40	H	-36.21		
7639.20	H	-38.23		
9549.00	H	---		
11458.80	H	---		
13368.60	H	---		

Remark:

- The testing has been conformed to $10 \times 1880.0\text{MHz} = 18,800\text{MHz}$.
- All other emissions more than 30 dB below the limit.

-----End of Report-----