

FCC Radio Test Report

FCC ID: 2ANEQ-DI05

Original Grant

Report No. : TB-FCC155349
Applicant : Shenzhen CISCOX Technology Co.,Ltd
Equipment Under Test (EUT)
EUT Name : 3G smart watches
Model No. : DI05
Series Model No. : X5S, X5A, LEM5, Q5, Q5A, X5Pro, X5Air
Brand Name : DeaGea
Receipt Date : 2017-06-26
Test Date : 2017-06-27 to 2017-07-05
Issue Date : 2017-07-06
Standards : FCC Part 2
FCC Part 22 Subpart H, FCC Part 24 Subpart E, 2016
ANSI/TIAC63.26: 2015
Conclusions : **PASS**

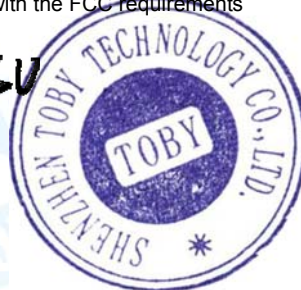
In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

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 : Shenzhen CISCOX Technology Co.,Ltd
Address : Room 522, Hua Feng Xin An Shang Wu Building, 45 District, Baoan District, Shenzhen, Guangdong, China
Manufacturer : Shenzhen CISCOX Technology Co.,Ltd
Address : Room 522, Hua Feng Xin An Shang Wu Building, 45 District, Baoan District, Shenzhen, Guangdong, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	3G smart watches
Models No.	:	DI05, X5S, X5A, LEM5, Q5, Q5A, X5Pro, X5Air
Model Difference	:	All models are identical in the same PCB layout, interior structure and electrical circuits, the only difference is appearance and color.
Product Description	:	Frequency Bands: GSM850; PCS1900; UMTS FDD Band II; UMTS FDD Band V
		GSM 850 Power : Cond:32.59 dBm ERP:31.65 dBm
		PCS 1900 Power : Cond:31.16 dBm EIRP:30.87 dBm
		UMTS Band II Power: Cond:22.75 dBm EIRP:20.73 dBm
		UMTS Band V Power: Cond:22.93 dBm ERP:20.95 dBm
		Antenna Gain: -1.8 dB PIFA Antenna
		Modulation Type: GSM/GPRS:GMSK EDGE: 8PSK UMTS:QPSK
FCC Operating Frequency	:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz UMTS Band II: 1852.40MHz-1907.60MHz UMTS Band V:826.40MHz-846.60MHz
Emission Designator	:	GSM 850: 246KGXW, PCS 1900: 246KGXW GPRS 850: 247KG7W, GPRS 1900: 247KG7W EGPRS 850: 253KG7W, EGPRS 1900: 254KG7W UMTS Band V: 4M18F9W, UMTS Band II: 4M26F9W
Power Supply	:	DC Voltage Supplied by the USB. DC Supply by the Battery.
Power Rating	:	DC 5.0 V by USB. DC 3.7 V by 450mAh Li-Lion Battery.

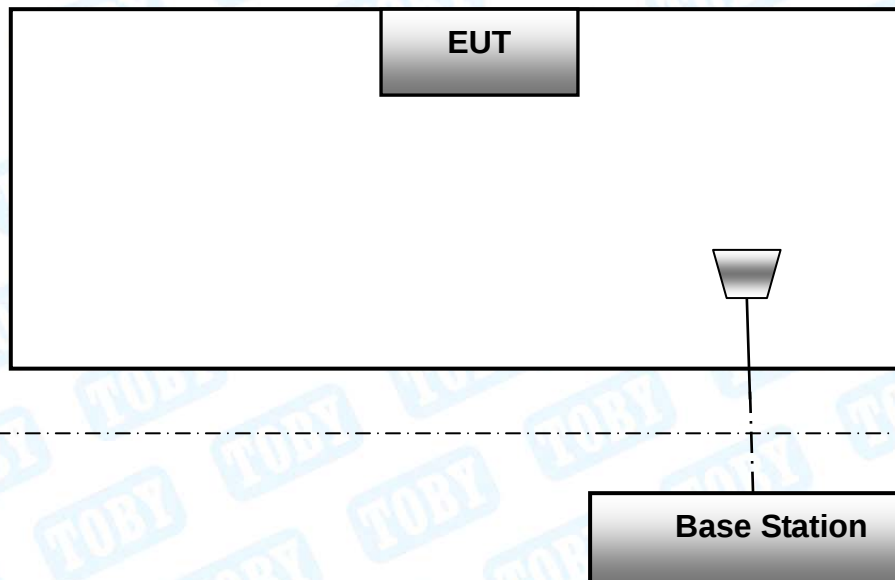
Software Version	:	w618_wgl.q5_ddr3_64g4g.common.80.emmc
Hardware Version	:	W602_MB_V21
Connecting I/O Port(S)	:	Please refer to the User's Manual

Note:

The EUT has also been tested and complied the FCC 15.247 for BLE function, and recorded in the separate test report.

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (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 and UMTS Band V.
2. 9kHz~20GHz for PCS1900 and UMTS Band II.

Test Channel		
Mode	Channel	Frequency(MHz)
GSM 850	128	824.20
	190	836.60
	251	848.80
PCS 1900	512	1850.20
	661	1880.00
	810	1909.80
UMTS Band V	4132	826.40
	4183	836.60
	4233	846.60
UMTS Band II	9262	1852.40
	9400	1880.00
	9538	1907.60
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
RMC UMTS Band V		highest , middle, lowest channels
HSDPA UMTS Band V		highest , middle, lowest channels
HSUPA UMTS Band V		highest , middle, lowest channels
RMC UMTS Band II		highest , middle, lowest channels
HSDPA UMTS Band II		highest , middle, lowest channels
HSUPA UMTS Band II		highest , middle, lowest channels
Final test Mode		Description
GSM 850		highest , middle, lowest channels
GSM 1900		highest , middle, lowest channels
RMC UMTS 850		highest , middle, lowest channels
RMC UMTS Band II		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 has RMC, HSDPA, HSUPA functions in UMTS band II and UMTS band V, and after pre-testing, RMC mode is the worst case for all the emission tests.
- (5) 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	Jul. 22, 2016	Jul. 21, 2017
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Jul. 22, 2016	Jul. 21, 2017
L.I.S.N	Rohde & Schwarz	ENV216	101131	Jul. 22, 2016	Jul. 21, 2017
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 22, 2016	Jul. 21, 2017
Radiation Spurious Emission					
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 22, 2016	Jul. 21, 2017
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Jul. 22, 2016	Jul. 21, 2017
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 25, 2017	Mar. 24, 2018
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 25, 2017	Mar. 24, 2018
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 24, 2017	Mar. 23, 2018
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 24, 2017	Mar. 23, 2018
Pre-amplifier	Sonoma	310N	185903	Mar. 25, 2017	Mar. 24, 2018
Pre-amplifier	HP	8449B	3008A00849	Mar. 24, 2017	Mar. 23, 2018
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 29, 2017	Mar. 28, 2018
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Mar. 29, 2017	Mar. 28, 2018
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jun.23, 2016	Jun.22, 2017
Antenna Conducted Emission					
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 22, 2016	Jul. 21, 2017
Spectrum Analyzer	Rohde & Schwarz	ESCI	100321	Jul. 22, 2016	Jul. 21, 2017
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jun.23, 2016	Jun.22, 2017

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:

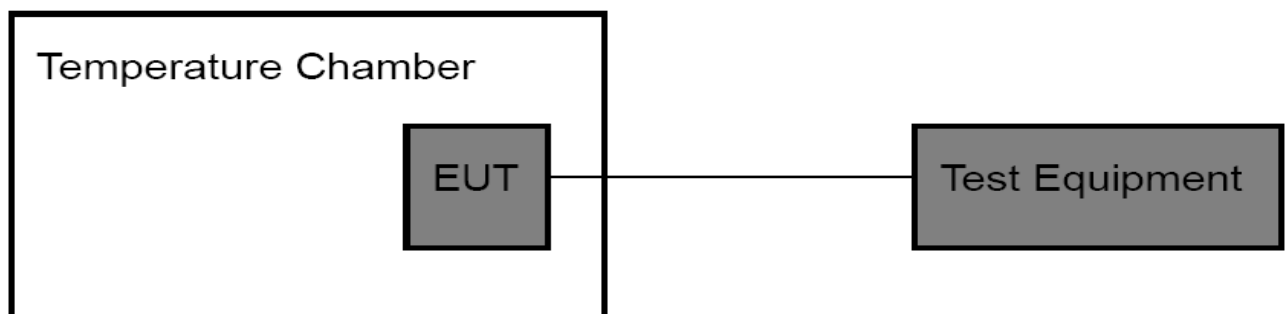
The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .

(2) Primary Supply Voltage:

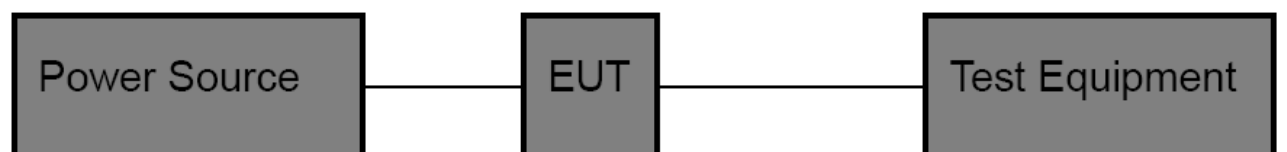
For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at input to the cable normally provide with the equipment, or at the power supply terminals if cables 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	21	0.025	29	0.035	31	0.037
-20	19	0.023	26	0.031	29	0.035
-10	21	0.025	28	0.033	24	0.029
0	22	0.026	30	0.036	32	0.038
10	19	0.023	27	0.032	28	0.033
20	15	0.018	25	0.030	30	0.036
30	14	0.017	23	0.027	29	0.035
40	16	0.019	27	0.032	26	0.031
50	17	0.020	25	0.030	27	0.032
60	18	0.022	24	0.029	30	0.036
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	25	0.038	26	0.039	22	0.033
-20	23	0.035	16	0.024	20	0.030
-10	26	0.039	19	0.029	18	0.027
0	29	0.044	20	0.030	17	0.026
10	26	0.039	20	0.030	16	0.024
20	31	0.047	23	0.035	13	0.020
30	24	0.036	22	0.033	15	0.023
40	28	0.042	27	0.041	17	0.026
50	22	0.033	23	0.035	18	0.027
60	25	0.038	24	0.036	20	0.030
Limit	2.5 (ppm)					
Result	PASS					

Temperature Variation UMTS Band V (CH 4183)		
Temperature (°C)	RMC Mode	
	Freq. Dev. (Hz)	Deviation (ppm)
-30	16	0.019
-20	17	0.020
-10	19	0.023
0	17	0.020
10	20	0.024
20	22	0.026
30	18	0.022
40	22	0.026
50	21	0.025
60	19	0.023
Limit	2.5 (ppm)	
Result	PASS	

Temperature Variation UMTS Band II (CH 9400)		
Temperature (°C)	RMC Mode	
	Freq. Dev. (Hz)	Deviation (ppm)
-30	20	0.011
-20	19	0.010
-10	20	0.011
0	25	0.013
10	20	0.011
20	24	0.013
30	22	0.012
40	16	0.009
50	17	0.009
60	18	0.010
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	17	0.020	9	0.011	13	0.016
3.70	16	0.019	13	0.016	11	0.013
4.26	15	0.018	12	0.014	15	0.018
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	20	0.030	20	0.030	19	0.029
3.70	24	0.036	23	0.035	21	0.032
4.26	25	0.038	24	0.036	17	0.026
Limit	2.5 (ppm)					
Result	PASS					

Voltage Variation UMTS Band V (CH 4182)		
Voltage (V)	RMC Mode	
	Freq. Dev. (Hz)	Deviation (ppm)
3.15	19	0.023
3.70	23	0.027
4.26	21	0.025
Limit	2.5 (ppm)	
Result	PASS	

Voltage Variation UMTS Band II (CH 9400)		
Voltage (V)	RMC Mode	
	Freq. Dev. (Hz)	Deviation (ppm)
3.15	18	0.010
3.70	19	0.010
4.26	22	0.012
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

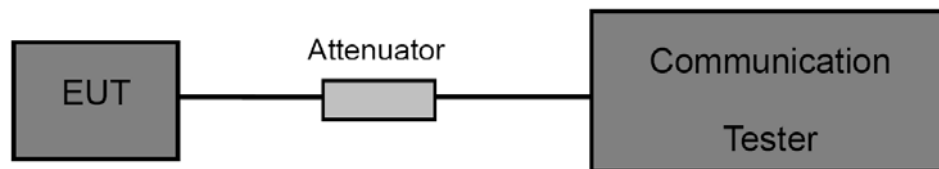
FCC Part 22H : 22.913 (a)

FCC Part 24E: 24.232 (c)

5.1.2 Test Limit

GSM850/UMTS Band V	PCS 1900/UMTS Band II
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	32.59	1.816
	190	836.6	32.53	1.791
	251	848.8	32.50	1.778
GPRS 850 (1 Slot)	128	824.2	30.14	1.033
	190	836.6	30.09	1.021
	251	848.8	30.00	1.000
GPRS 850 (2 Slot)	128	824.2	29.25	0.841
	190	836.6	29.63	0.918
	251	848.8	29.42	0.875
GPRS 850 (3 Slot)	128	824.2	28.63	0.729
	190	836.6	28.41	0.693
	251	848.8	28.53	0.713
GPRS 850 (4 Slot)	128	824.2	27.35	0.543
	190	836.6	27.68	0.586
	251	848.8	27.39	0.548
EDGE 850 (1 Slot)	128	824.2	30.26	1.062
	190	836.6	30.24	1.057
	251	848.8	30.54	1.132
EDGE 850 (2 Slot)	128	824.2	29.25	0.841
	190	836.6	29.48	0.887
	251	848.8	29.56	0.904
EDGE 850 (3 Slot)	128	824.2	28.23	0.665
	190	836.6	28.54	0.714
	251	848.8	28.29	0.675
EDGE 850 (4 Slot)	128	824.2	27.73	0.593
	190	836.6	27.54	0.568
	251	848.8	27.35	0.543

PCS 1900				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GSM 1900	512	1850.2	31.08	1.282
	661	1880.0	31.09	1.285
	810	1909.8	31.16	1.306
GPRS 1900 (1 Slot)	512	1850.2	30.08	1.019
	661	1880.0	30.12	1.028
	810	1909.8	30.22	1.052
GPRS 1900 (2 Slot)	512	1850.2	29.36	0.863
	661	1880.0	29.26	0.843
	810	1909.8	29.14	0.820
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	27.69	0.587
	661	1880.0	27.54	0.568
	810	1909.8	27.49	0.561
EDGE 1900 (1 Slot)	512	1850.2	30.62	1.153
	661	1880.0	30.24	1.057
	810	1909.8	30.21	1.050
EDGE 1900 (2 Slot)	512	1850.2	29.13	0.818
	661	1880.0	29.24	0.839
	810	1909.8	29.34	0.859
EDGE 1900 (3 Slot)	512	1850.2	28.65	0.733
	661	1880.0	28.63	0.729
	810	1909.8	28.34	0.682
EDGE 1900 (4 Slot)	512	1850.2	27.48	0.560
	661	1880.0	27.34	0.542
	810	1909.8	27.25	0.531

UMTS Band V				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
Band V RMC	4132	826.4	22.68	0.185
	4183	836.6	22.75	0.188
	4233	846.6	22.65	0.184
HSDPA Subtest 1	4132	826.4	21.64	0.146
	4183	836.6	21.72	0.149
	4233	846.6	21.78	0.151
HSDPA Subtest 2	4132	826.4	20.54	0.113
	4183	836.6	20.48	0.112
	4233	846.6	20.65	0.116
HSDPA Subtest 3	4132	826.4	20.41	0.110
	4183	836.6	20.15	0.104
	4233	846.6	20.16	0.104
HSDPA Subtest 4	4132	826.4	20.06	0.101
	4183	836.6	19.98	0.100
	4233	846.6	20.05	0.101
HSUPA Subtest 1	4132	826.4	21.65	0.146
	4183	836.6	21.74	0.149
	4233	846.6	21.87	0.154
HSUPA Subtest 2	4132	826.4	20.95	0.124
	4183	836.6	20.89	0.123
	4233	846.6	20.79	0.120
HSUPA Subtest 3	4132	826.4	20.16	0.104
	4183	836.6	20.23	0.105
	4233	846.6	20.42	0.110
HSUPA Subtest 4	4132	826.4	20.13	0.103
	4183	836.6	20.18	0.104
	4233	846.6	20.16	0.104
HSUPA Subtest 5	4132	826.4	19.68	0.093
	4183	836.6	20.02	0.100
	4233	846.6	20.07	0.102

UMTS Band II				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
Band II RMC	9262	1852.4	22.82	0.191
	9400	1880.0	22.65	0.184
	9538	1907.6	22.93	0.196
HSDPA Subtest 1	9262	1852.4	21.77	0.150
	9400	1880.0	21.53	0.142
	9538	1907.6	21.78	0.151
HSDPA Subtest 2	9262	1852.4	20.89	0.123
	9400	1880.0	20.97	0.125
	9538	1907.6	20.88	0.122
HSDPA Subtest 3	9262	1852.4	20.25	0.106
	9400	1880.0	20.36	0.109
	9538	1907.6	20.48	0.112
HSDPA Subtest 4	9262	1852.4	20.12	0.103
	9400	1880.0	20.15	0.104
	9538	1907.6	20.18	0.104
HSUPA Subtest 1	9262	1852.4	21.68	0.147
	9400	1880.0	21.75	0.150
	9538	1907.6	21.56	0.143
HSUPA Subtest 2	9262	1852.4	20.85	0.122
	9400	1880.0	20.78	0.120
	9538	1907.6	20.65	0.116
HSUPA Subtest 3	9262	1852.4	20.15	0.104
	9400	1880.0	20.34	0.108
	9538	1907.6	20.26	0.106
HSUPA Subtest 4	9262	1852.4	20.16	0.104
	9400	1880.0	20.36	0.109
	9538	1907.6	20.35	0.108
HSUPA Subtest 5	9262	1852.4	20.16	0.104
	9400	1880.0	20.08	0.102
	9538	1907.6	20.04	0.101

6. Peak-Average Ratio

6.1 Test Standard and Limit

6.1.1 Test Standard

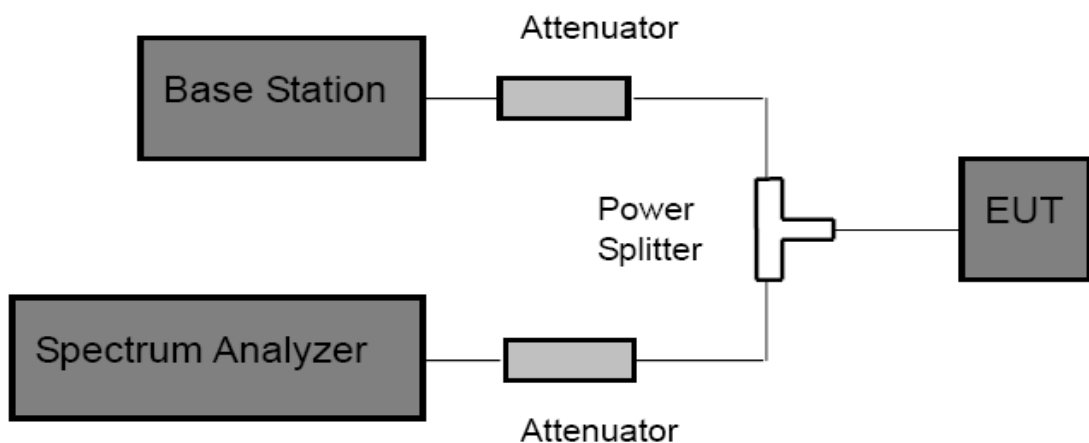
FCC Part 24E: 24.232 (d)

6.1.2 Test Limit

PCS 1900 /UMTS Band II

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.

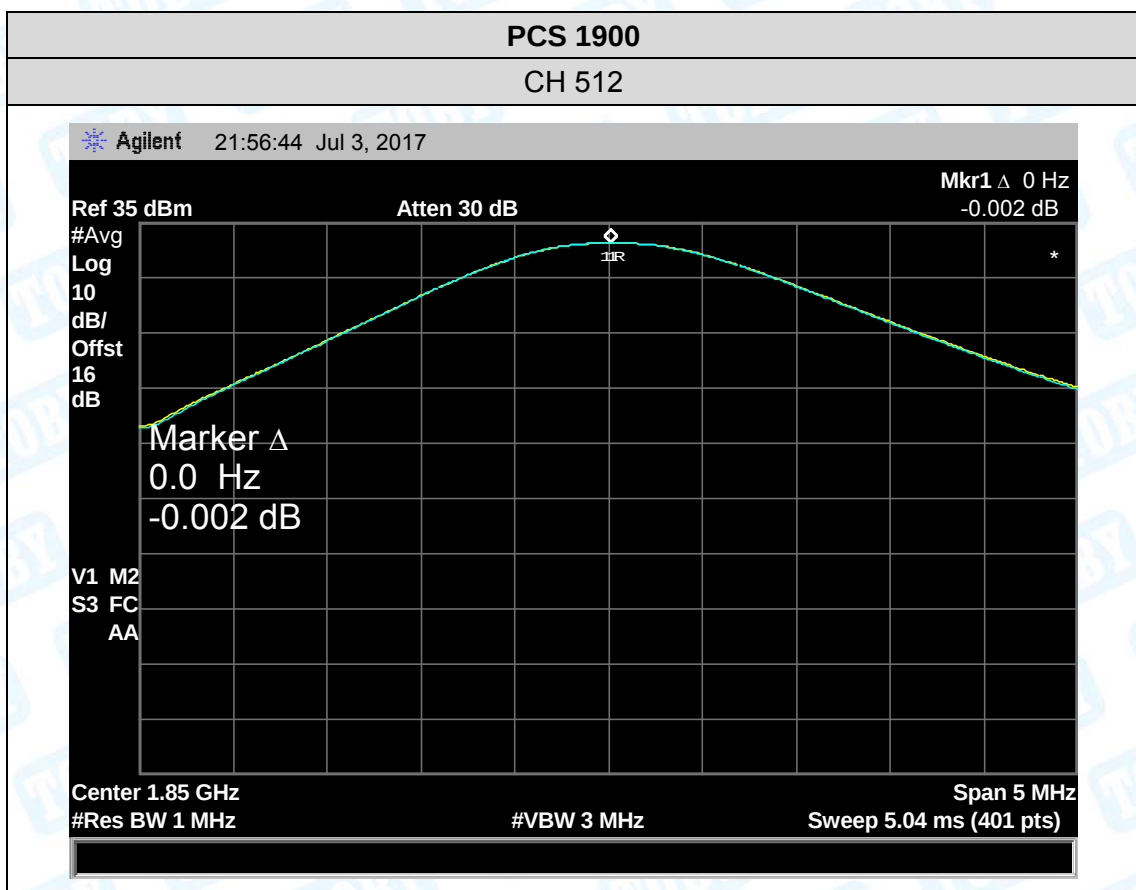
6.4 EUT Operating Condition

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

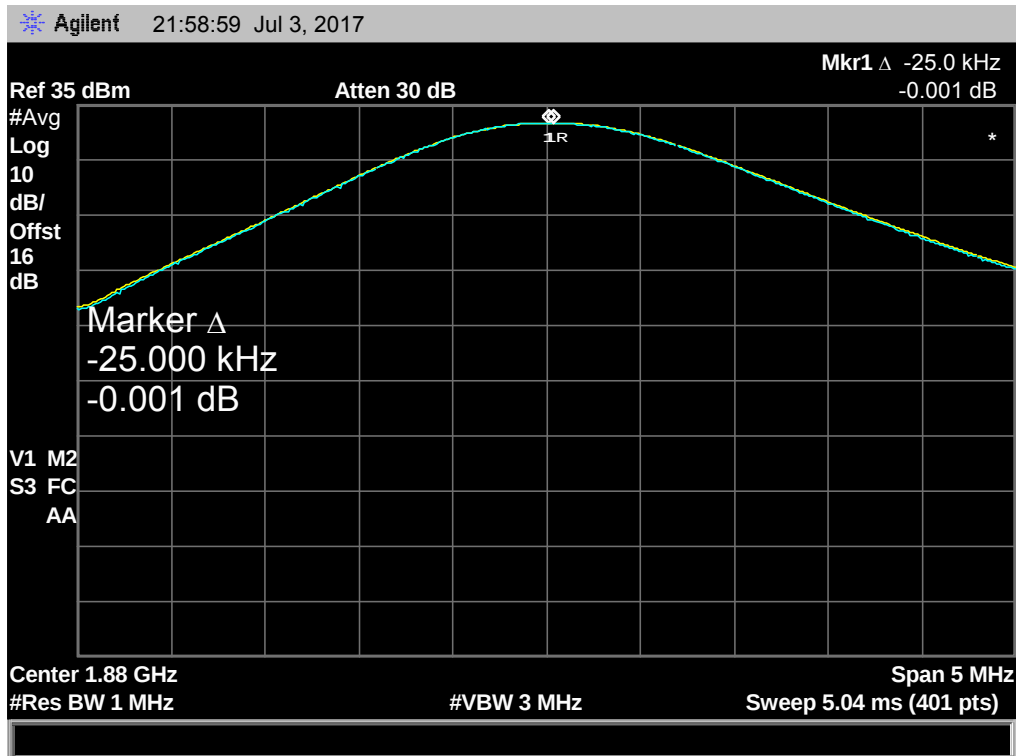
during the test.

6.5 Test Data

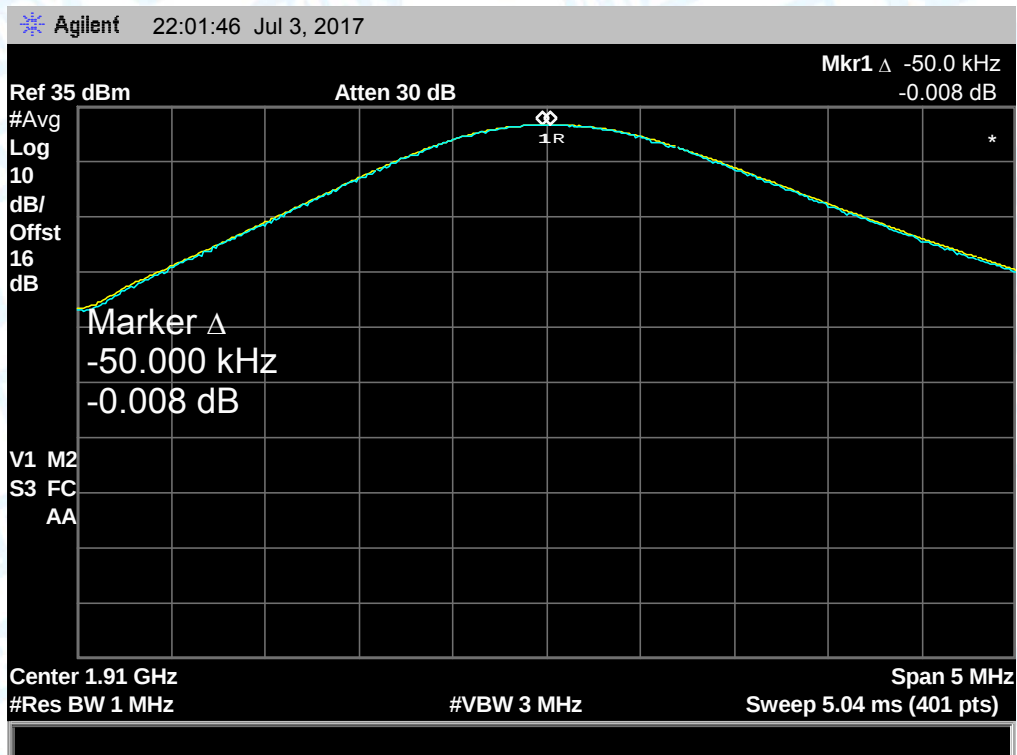
PCS 1900			
Mode	Channel	Frequency (MHz)	Peak-Average Ratio (PAR)
PCS 1900	512	1850.2	0.002
	661	1880.0	0.001
	810	1909.8	0.008



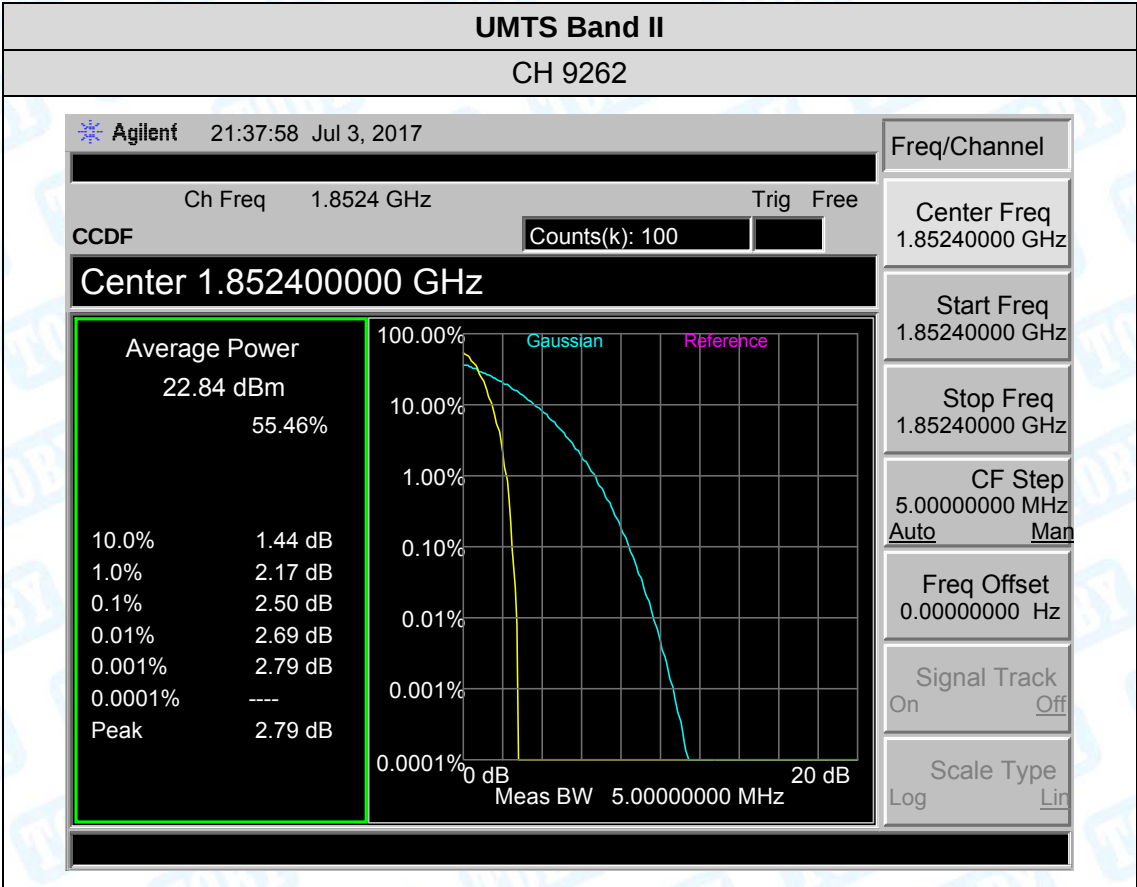
CH 661

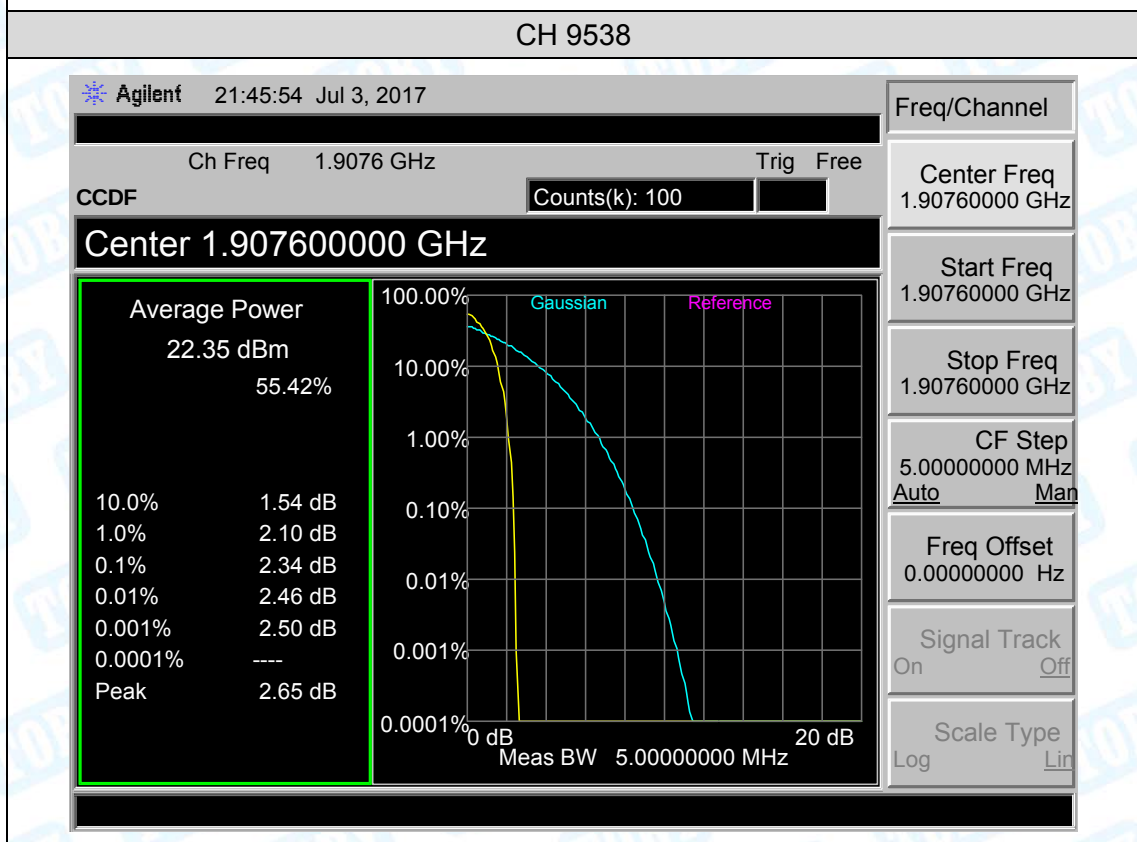
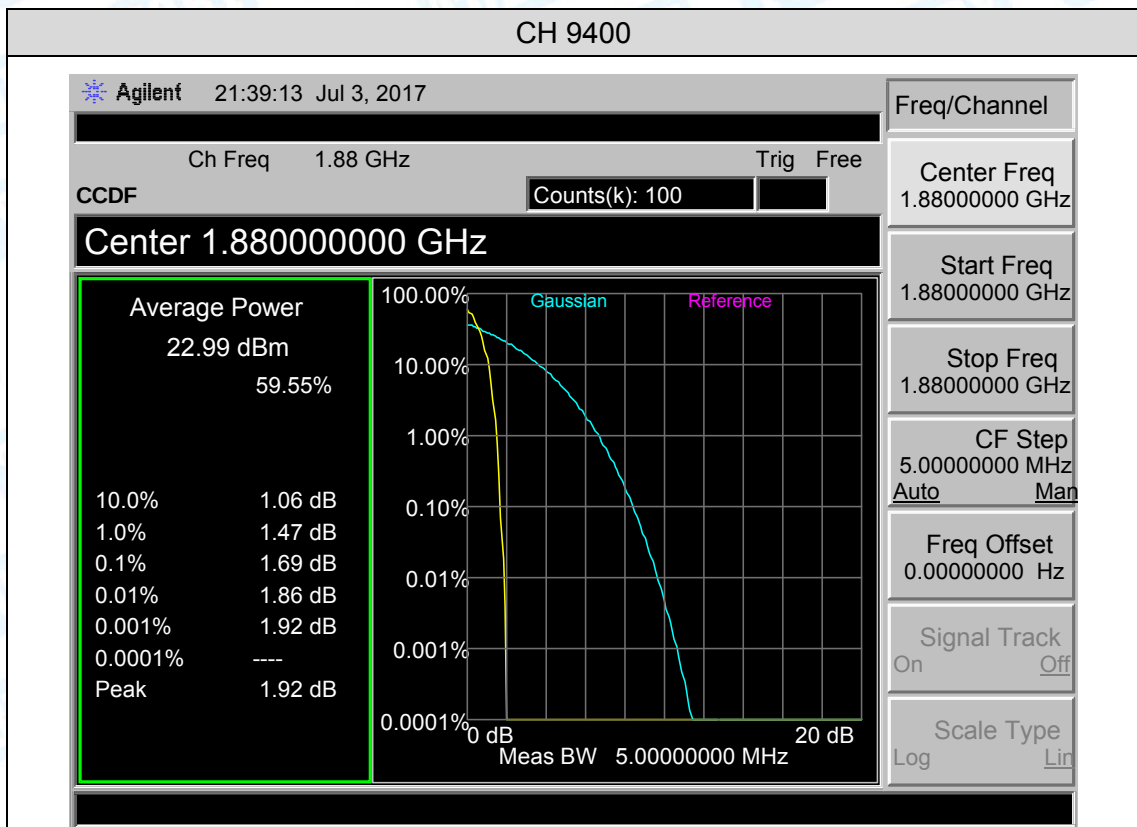


CH 810



UMTS Band II			
Mode	Channel	Frequency (MHz)	Peak-Average Ratio (PAR)
UMTS Band II	9262	1852.4	2.69
	9400	1880.0	1.86
	9538	1907.6	2.46





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)

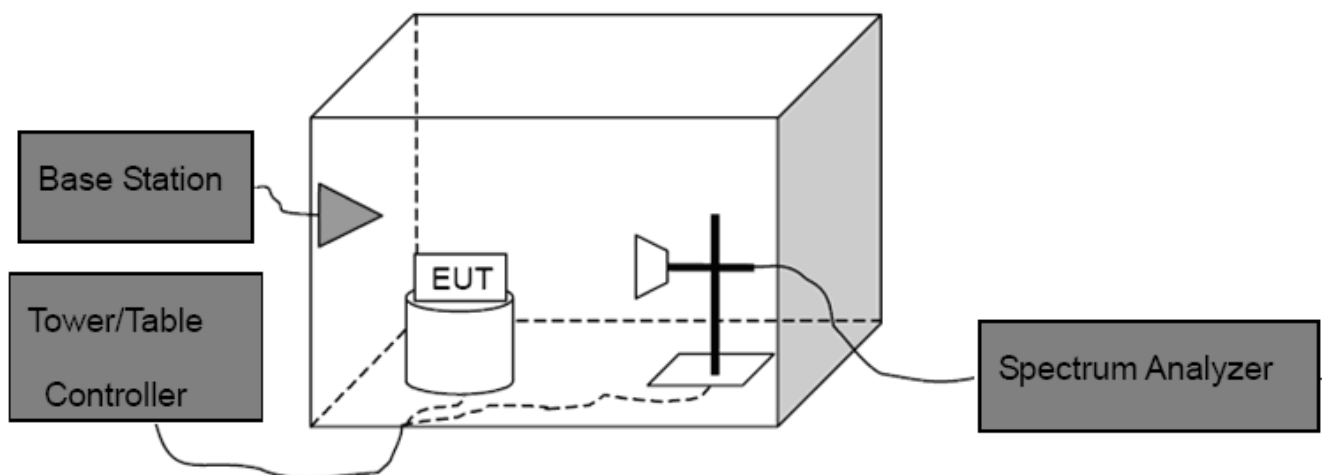
7.1.2 Test Limit

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

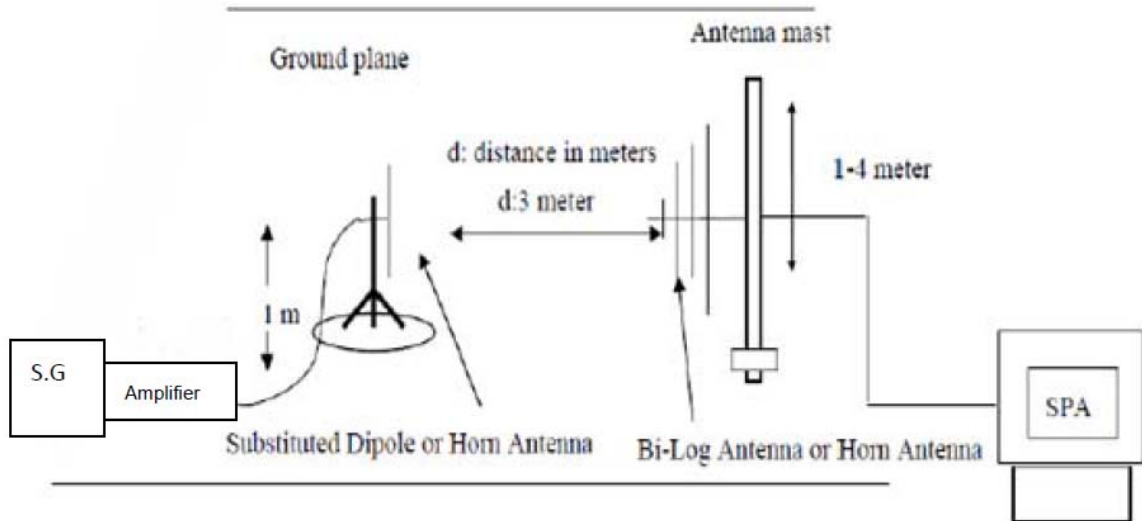
According to FCC Part 24.232 (c), the Mobile/portable stations are limited to 2 Watts(33 dBm) EIRP peak power.

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

7.2 Test Setup



Above 1G



Substituted Method

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 C63.26. 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.

Note: In test, the S.G Connect the Pre-amplifier(Sonoma 310N Pre-amplifier for frequency below 1 GHz, HP 8449B Pre-amplifier for frequency above 1 GHz)

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 Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
GSM 850	128	824.2	H	29.45	3.46	1.26	31.65	1.462
			V	27.47	3.46	1.26	29.67	0.927
	190	836.6	H	28.42	3.82	1.26	30.98	1.253
			V	26.86	3.82	1.26	29.42	0.875
	251	848.8	H	28.13	4.16	1.26	31.03	1.268
			V	26.26	4.16	1.26	29.16	0.824
GPRS 850 (1 Slot)	128	824.2	H	28.47	3.46	1.26	30.67	1.167
			V	25.48	3.46	1.26	27.68	0.586
	190	836.6	H	28.08	3.82	1.26	30.64	1.159
			V	25.09	3.82	1.26	27.65	0.582
	251	848.8	H	26.77	4.16	1.26	29.67	0.927
			V	24.23	4.16	1.26	27.13	0.516
EDGE 850 (1 Slot)	128	824.2	H	27.47	3.46	1.26	29.67	0.927
			V	24.96	3.46	1.26	27.16	0.520
	190	836.6	H	27.11	3.82	1.26	29.67	0.927
			V	24.19	3.82	1.26	26.75	0.473
	251	848.8	H	26.44	4.16	1.26	29.34	0.859
			V	24.74	4.16	1.26	27.64	0.581
Limit							38.5	7

PCS 1900								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBi)	Cable Loss (dB)	EIRP Power (dBm)	EIRP Power (W)
GSM 1900	512	1850.2	H	28.45	5.01	2.59	30.87	1.222
			V	26.25	5.01	2.59	28.67	0.736
	661	1880.0	H	28.41	4.82	2.59	30.64	1.159
			V	26.44	4.82	2.59	28.67	0.736
	810	1909.8	H	28.83	4.45	2.59	30.69	1.172
			V	26.78	4.45	2.59	28.64	0.731
GPRS 1900 (1 Slot)	512	1850.2	H	27.22	5.01	2.59	29.64	0.920
			V	24.05	5.01	2.59	26.47	0.444
	661	1880.0	H	27.36	4.82	2.59	29.59	0.910
			V	24.64	4.82	2.59	26.87	0.486
	810	1909.8	H	26.78	4.45	2.59	28.64	0.731
			V	24.17	4.45	2.59	26.03	0.401
EDGE 1900 (1 Slot)	512	1850.2	H	26.22	5.01	2.59	28.64	0.731
			V	23.92	5.01	2.59	26.34	0.431
	661	1880.0	H	26.25	4.82	2.59	28.48	0.705
			V	24.18	4.82	2.59	26.41	0.438
	810	1909.8	H	26.12	4.45	2.59	27.98	0.628
			V	24.11	4.45	2.59	25.97	0.395
Limit							33	2

UMTS Band V								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBi)	Cable Loss (dB)	EIRP Power (dBm)	EIRP Power (W)
Band V RMC	4132	826.4	H	18.48	3.46	1.26	20.68	0.117
			V	16.44	3.46	1.26	18.64	0.07
	4183	836.6	H	18.17	3.82	1.26	20.73	0.118
			V	16.36	3.82	1.26	18.92	0.078
	4233	846.6	H	17.77	4.16	1.26	20.67	0.117
			V	15.91	4.16	1.26	18.81	0.076
Limit							38.5	7

UMTS Band II								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBi)	Cable Loss (dB)	EIRP Power (dBm)	EIRP Power (W)
Band II RMC	9262	1852.4	H	18.25	5.01	2.59	20.67	0.117
			V	16.32	5.01	2.59	18.74	0.075
	9400	1880.0	H	18.72	4.82	2.59	20.95	0.124
			V	15.75	4.82	2.59	17.98	0.063
	9538	1907.6	H	18.01	4.45	2.59	19.87	0.097
			V	15.98	4.45	2.59	17.84	0.061
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)

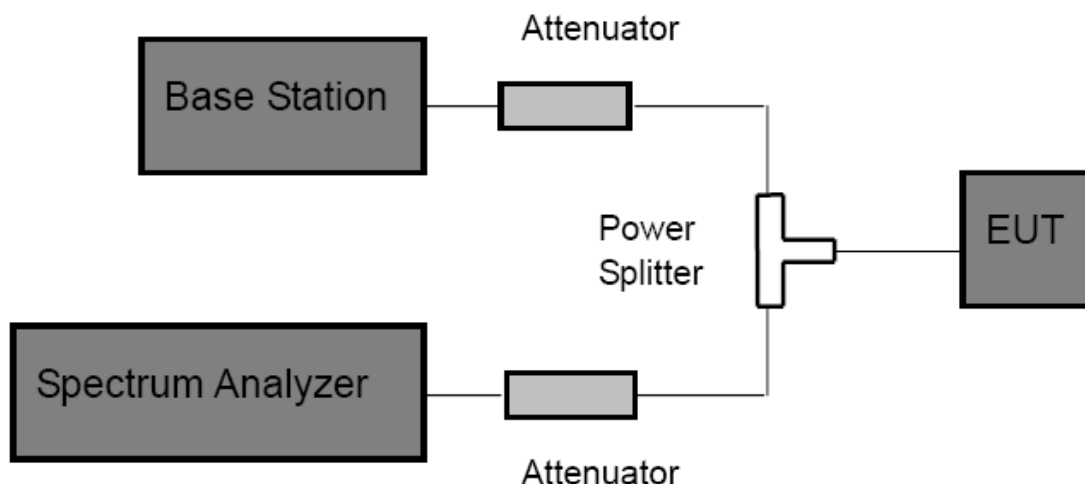
FCC Part 24E: 24.232 (c)

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 -26dB 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.

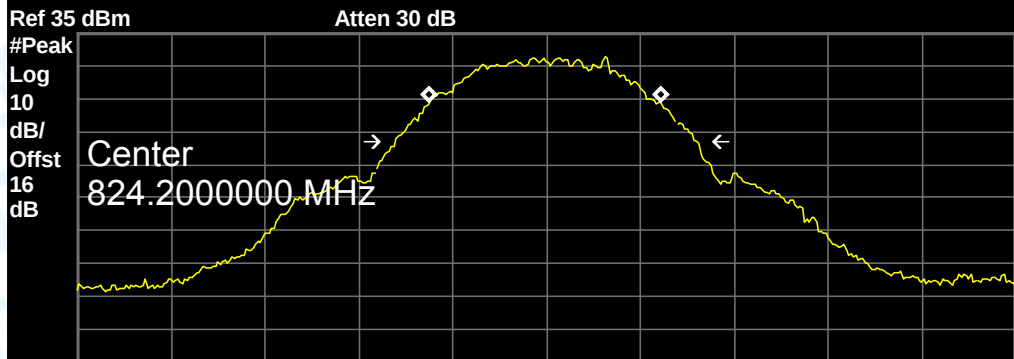
GSM 850				
Mode	Channel	Frequency (MHz)	99% OBW (MHz)	-26dB Bandwidth (kHz)
GSM 850	128	824.2	245.6913	321.455
	190	836.6	246.4723	324.501
	251	848.8	246.4522	319.051
GPRS 850 (1 Slot)	128	824.2	245.1467	317.704
	190	836.6	247.2332	319.097
	251	848.8	246.1168	320.566
EDGE 850 (1 Slot)	128	824.2	246.2374	322.395
	190	836.6	243.3533	315.896
	251	848.8	252.7726	322.693
PCS 1900				
Mode	Channel	Frequency (MHz)	99% OBW (MHz)	-26dB Bandwidth (kHz)
GSM 1900	512	1850.2	246.3397	318.190
	661	1880.0	244.5139	319.913
	810	1909.8	242.1304	312.444
GPRS 1900 (1 Slot)	512	1850.2	246.4899	316.581
	661	1880.0	246.3517	316.057
	810	1909.8	246.8527	317.958
EDGE 1900 (1 Slot)	512	1850.2	249.4670	318.287
	661	1880.0	252.6161	324.755
	810	1909.8	254.0880	321.710

UMTS Band V				
Mode	Channel	Frequency (MHz)	99% OBW (MHz)	-26dB Bandwidth (MHz)
Band V RMC	4132	826.4	4.1678	4.717
	4183	836.6	4.1561	4.704
	4233	846.6	4.1432	4.714
Band V HSDPA	4132	826.4	4.1549	4.687
	4183	836.6	4.1621	4.682
	4233	846.6	4.1478	4.095
Band V HSUPA	4132	826.4	4.1760	4.688
	4183	836.6	4.1567	4.699
	4233	846.6	4.1519	4.700
UMTS Band II				
Mode	Channel	Frequency (MHz)	99% OBW (MHz)	-26dB Bandwidth (MHz)
Band II RMC	9262	1852.4	4.1724	4.740
	9400	1880.0	4.2273	5.884
	9538	1907.6	4.2645	6.713
Band II HSDPA	9262	1852.4	4.1682	4.718
	9400	1880.0	4.2027	4.763
	9538	1907.6	4.2350	5.395
Band II HSUPA	9262	1852.4	4.1600	4.701
	9400	1880.0	4.1818	4.770
	9538	1907.6	4.2172	5.807

GSM850

CH 128

* Agilent 15:21:12 Jul 3, 17

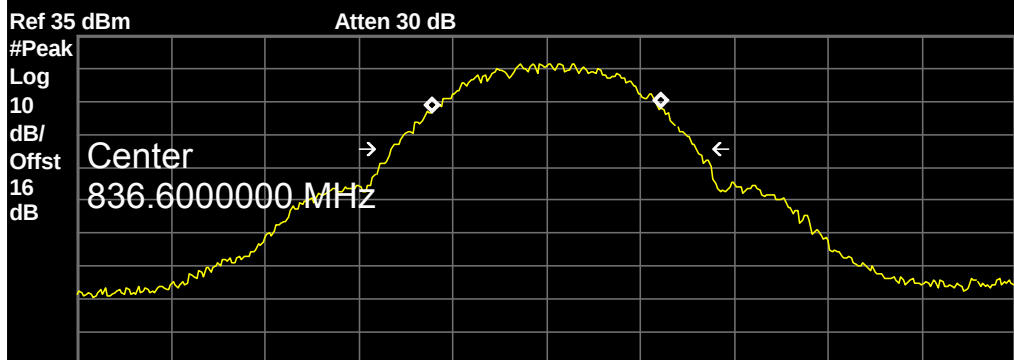


Center 824.2 MHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
 Occupied Bandwidth 245.6913 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -1.179 kHz
 x dB Bandwidth 321.455 kHz

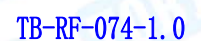
CH 190

* Agilent 15:22:22 Jul 3, 17



Center 836.6 MHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
 Occupied Bandwidth 246.4723 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

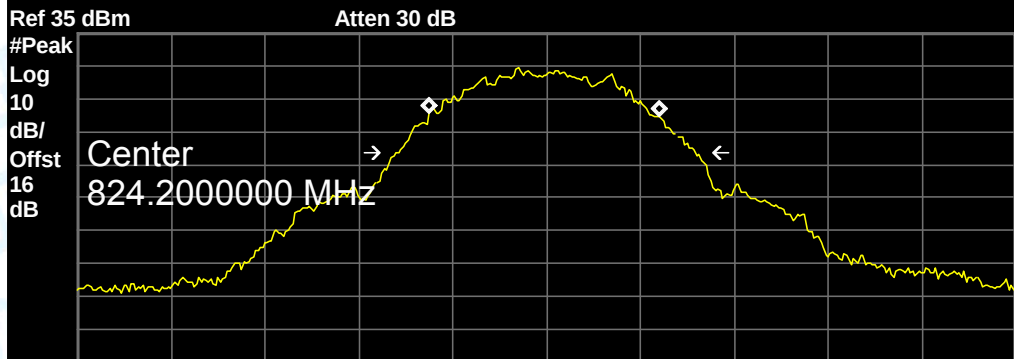
Transmit Freq Error -198.652 Hz
 x dB Bandwidth 324.501 kHz



GPRS 850

CH 128

Agilent 15:33:49 Jul 3, 17

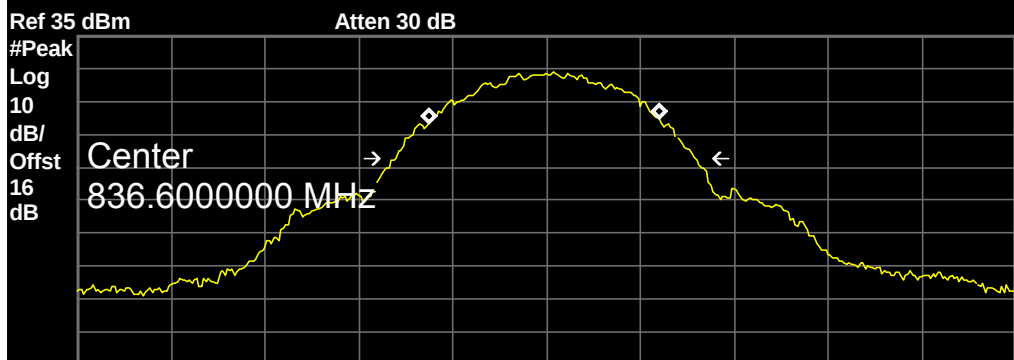


Center 824.2 MHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
 Occupied Bandwidth 245.1467 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -2.473 kHz
 x dB Bandwidth 317.704 kHz

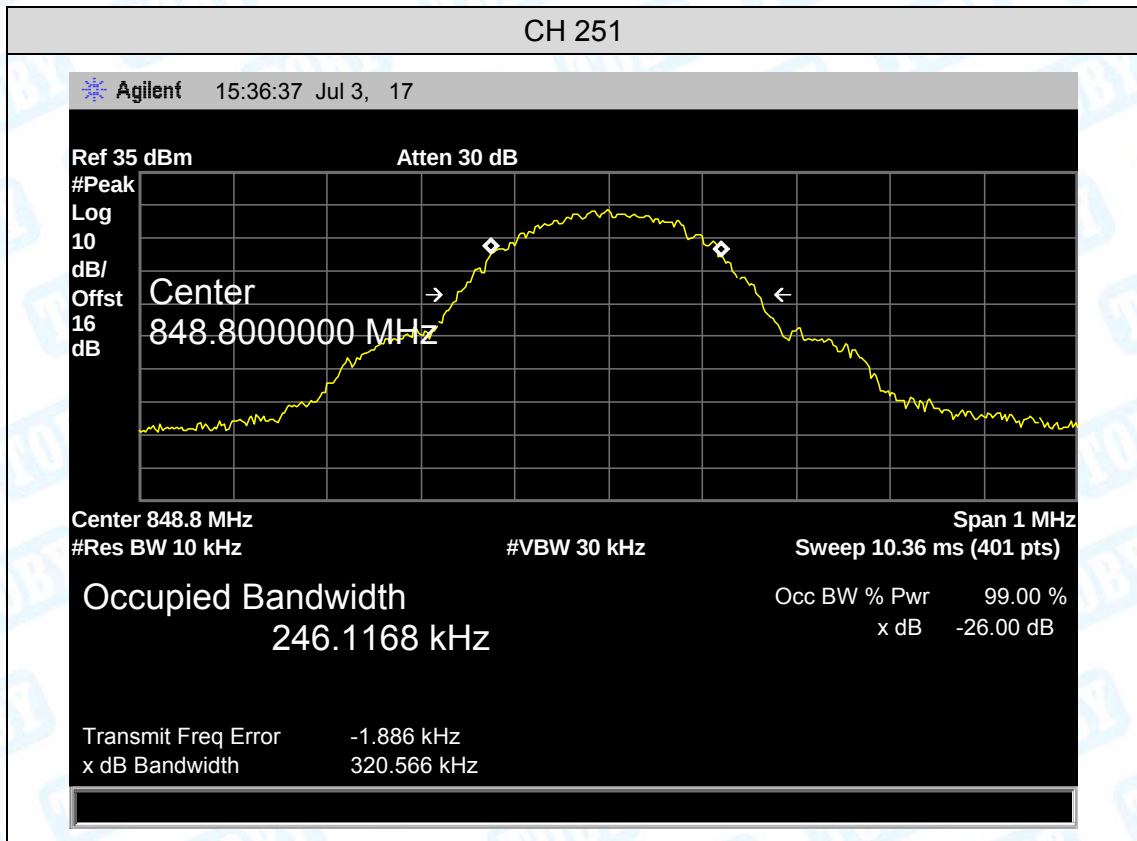
CH 190

Agilent 15:35:28 Jul 3, 17



Center 836.6 MHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
 Occupied Bandwidth 247.2332 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

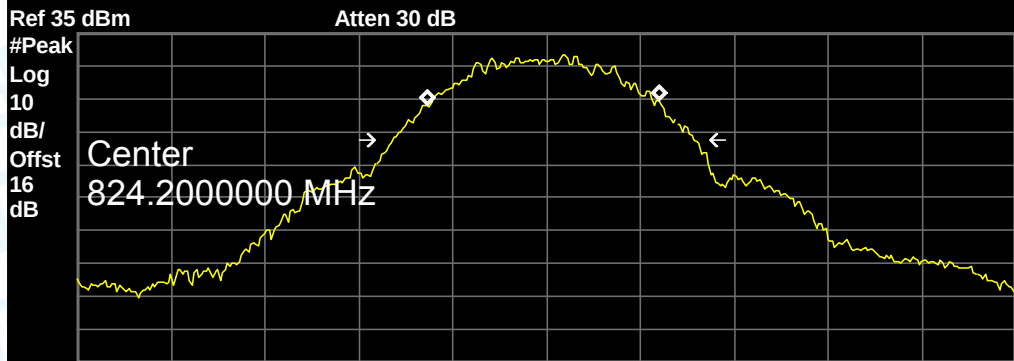
Transmit Freq Error -2.469 kHz
 x dB Bandwidth 319.097 kHz



EDGE 850

CH 128

Agilent 22:31:58 Jul 3, 2017

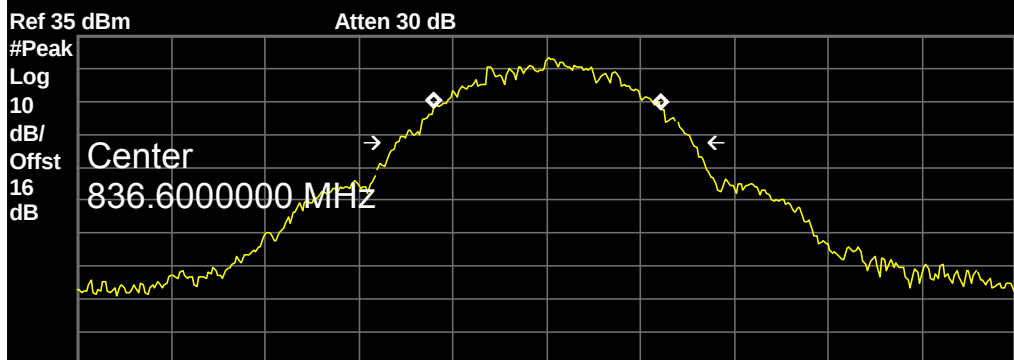


Center 824.2 MHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
Occupied Bandwidth
 246.2374 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -3.524 kHz
 x dB Bandwidth 322.395 kHz

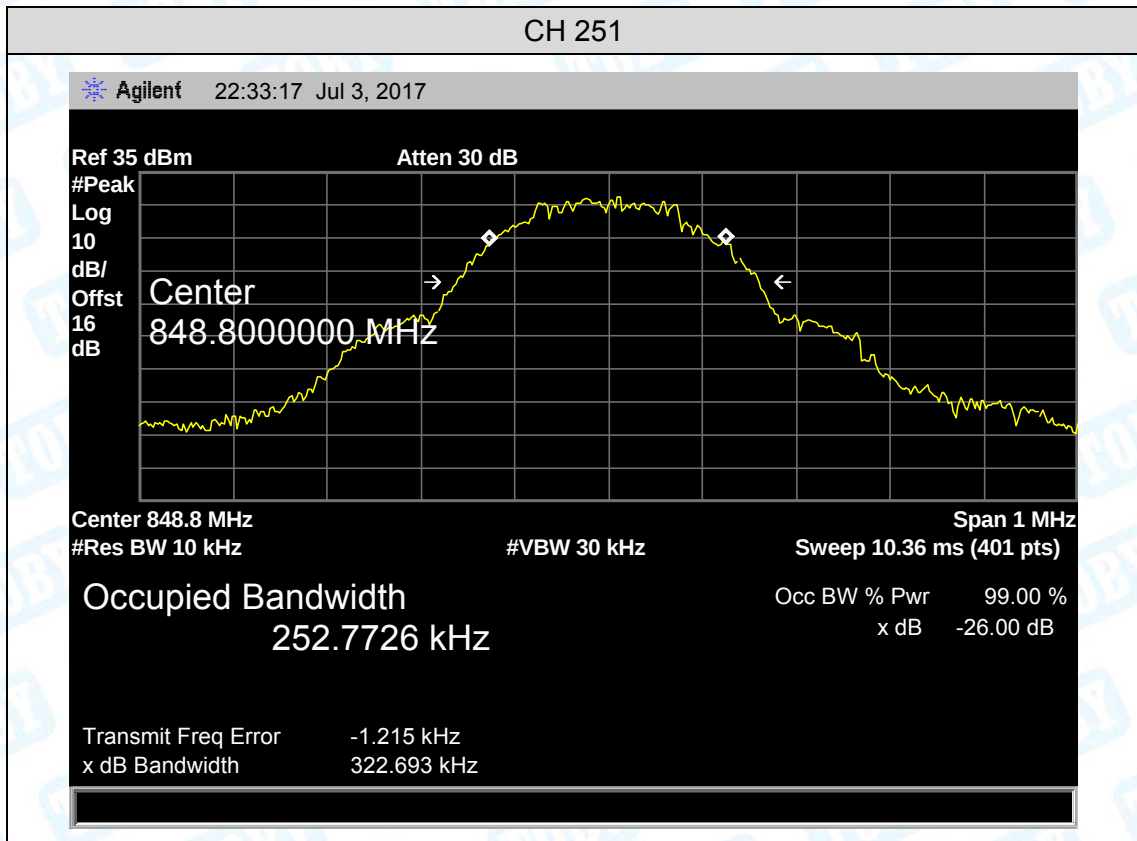
CH 190

Agilent 22:32:33 Jul 3, 2017



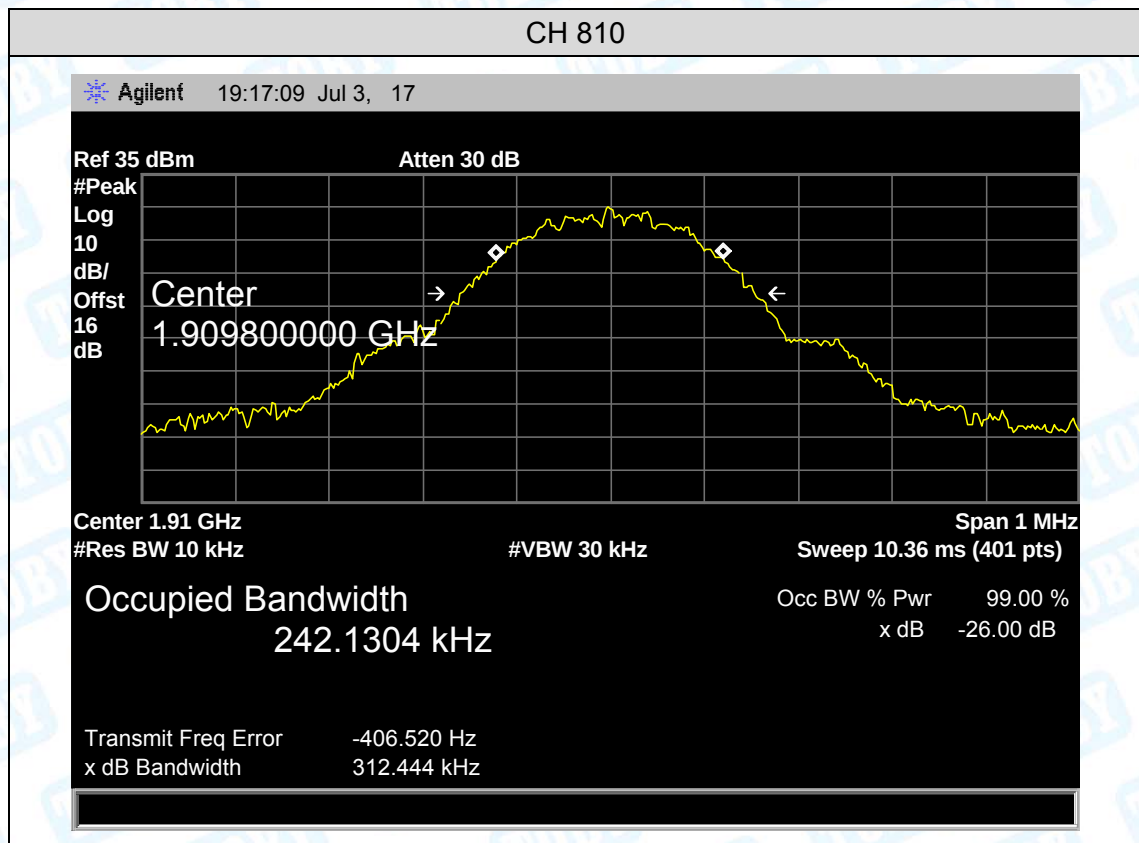
Center 836.6 MHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
Occupied Bandwidth
 243.3533 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error 1.499 kHz
 x dB Bandwidth 315.896 kHz



CH 512

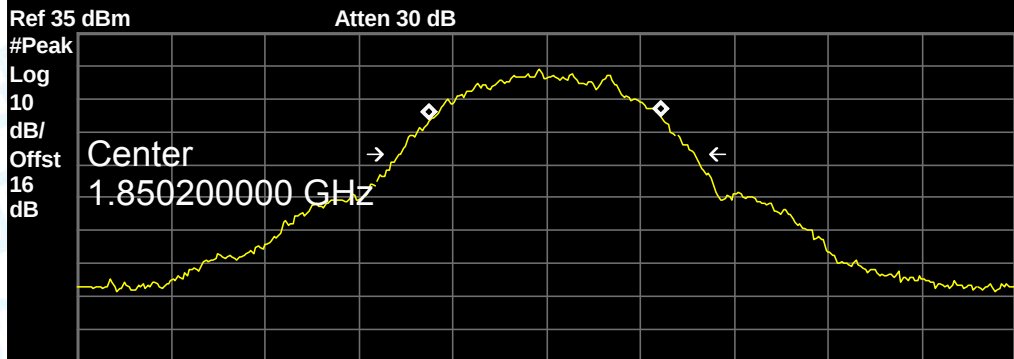
TB-RF-074-1.0



GPRS 1900

CH 512

* Agilent 16:12:25 Jul 3, 17

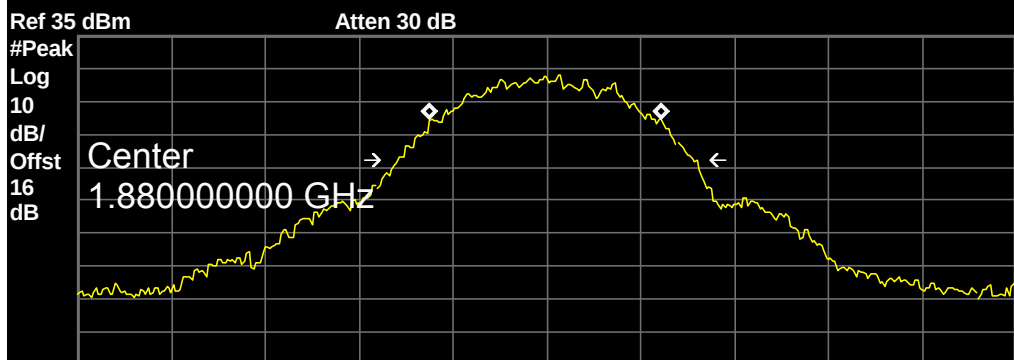


Center 1.85 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
 Occupied Bandwidth 246.4899 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -656.073 Hz
 x dB Bandwidth 316.581 kHz

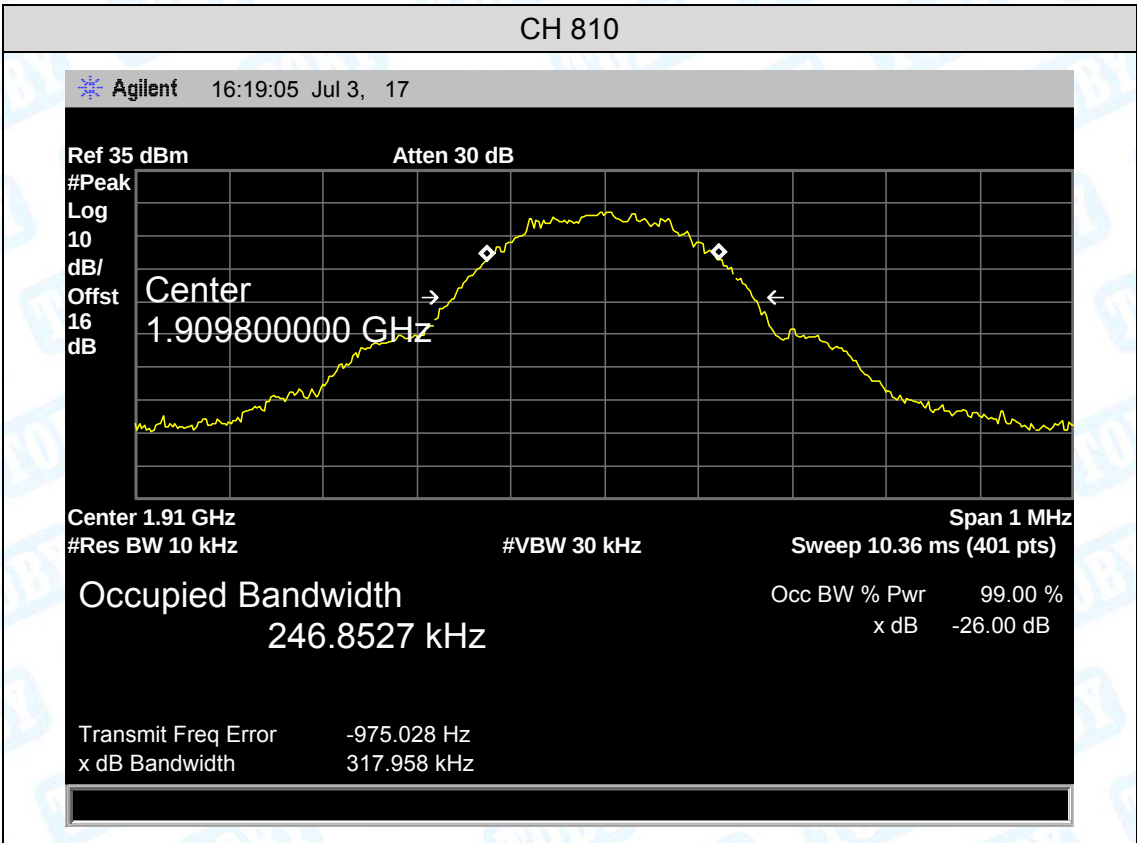
CH 661

* Agilent 16:13:29 Jul 3, 17



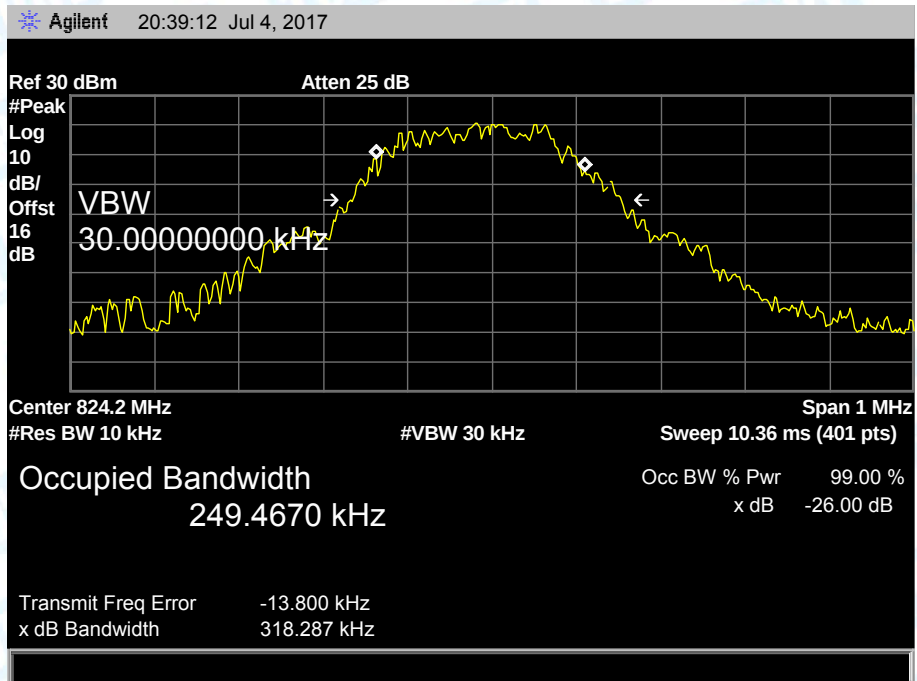
Center 1.88 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 30 kHz Sweep 10.36 ms (401 pts)
 Occupied Bandwidth 246.3517 kHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -623.221 Hz
 x dB Bandwidth 316.057 kHz

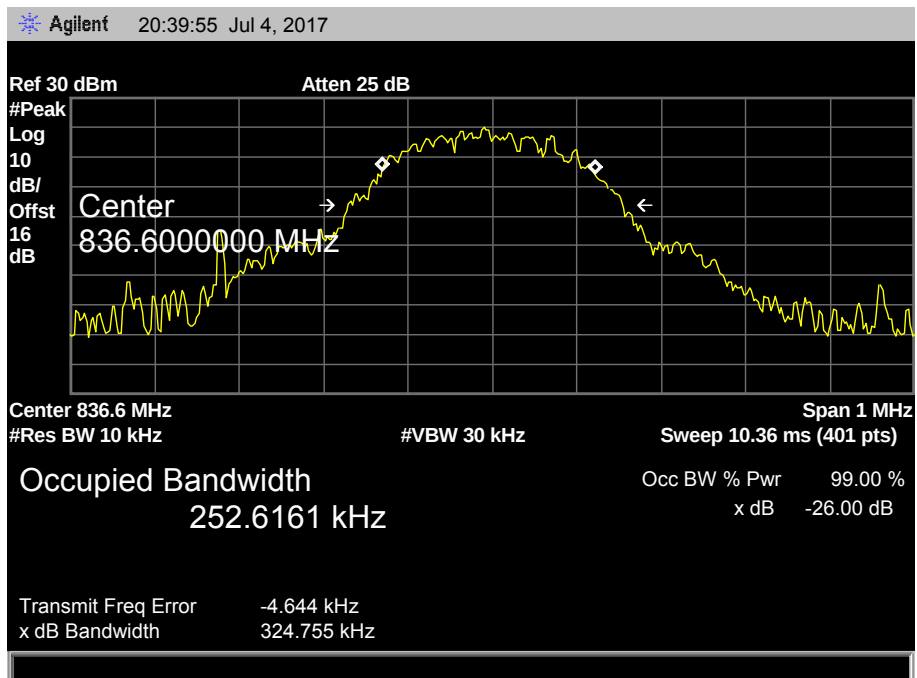


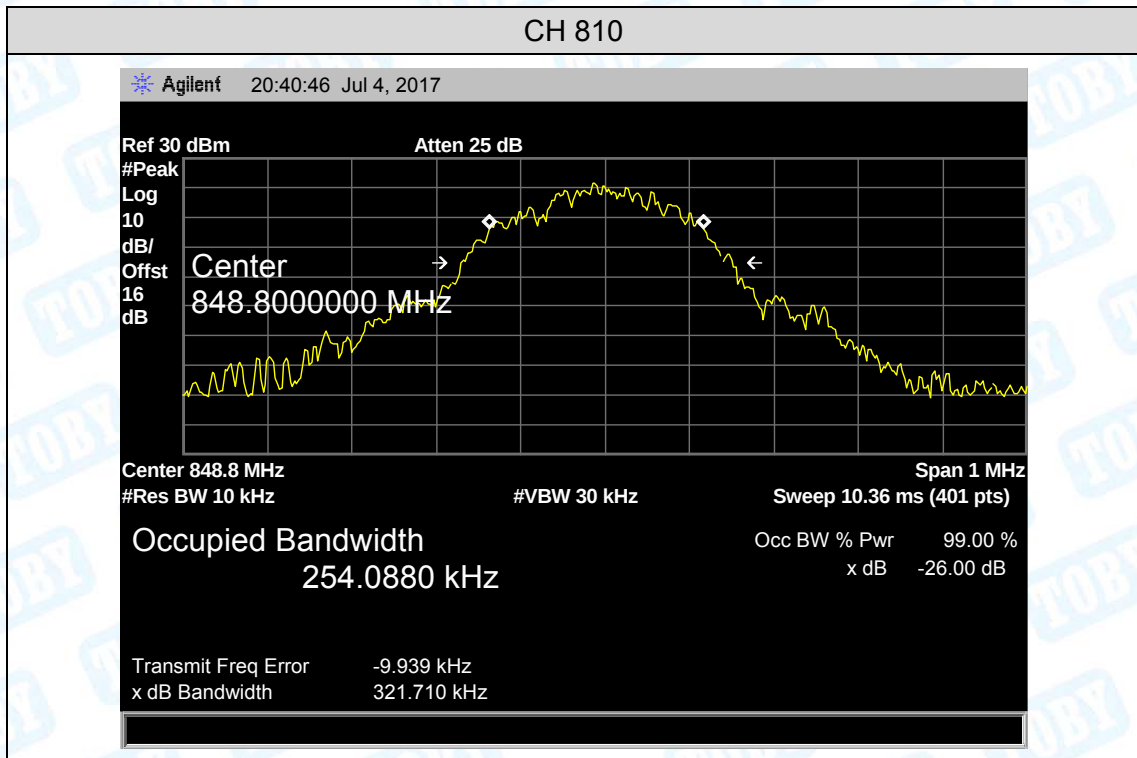
EDGE 1900

CH 512



CH 661

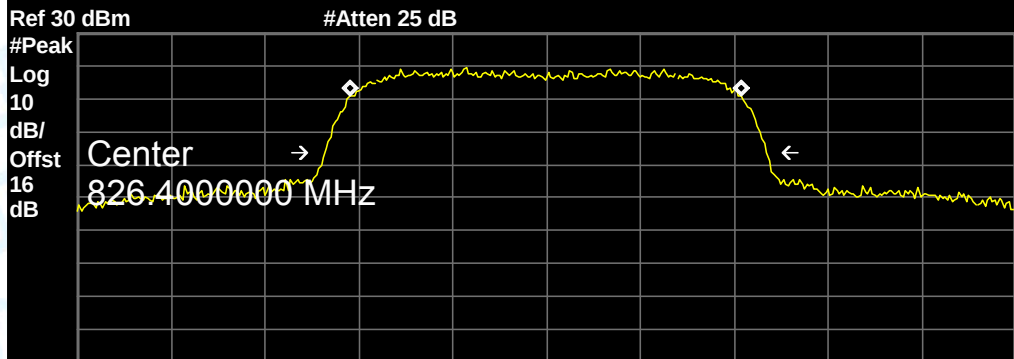




UMTS Band V (RMC)

CH 4132

Agilent 23:22:02 Jul 3, 2017

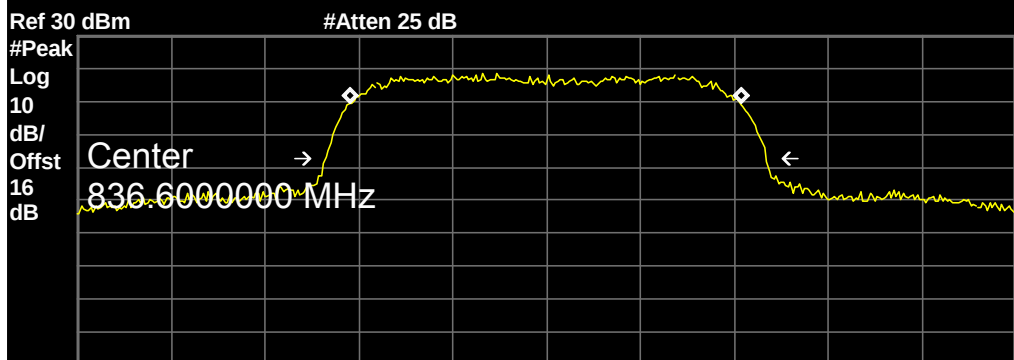


Center 826.4 MHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)
 Occupied Bandwidth 4.1678 MHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -5.811 kHz
 x dB Bandwidth 4.717 MHz

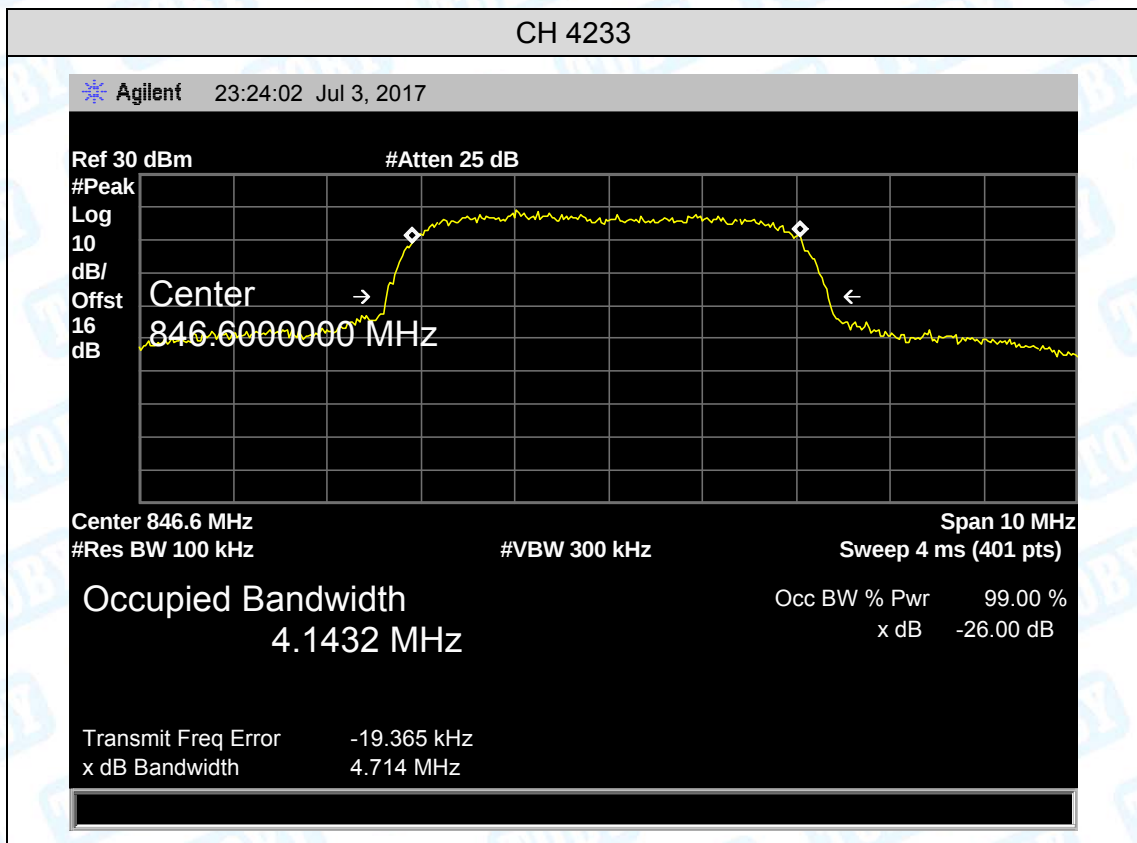
CH 4183

Agilent 23:23:26 Jul 3, 2017



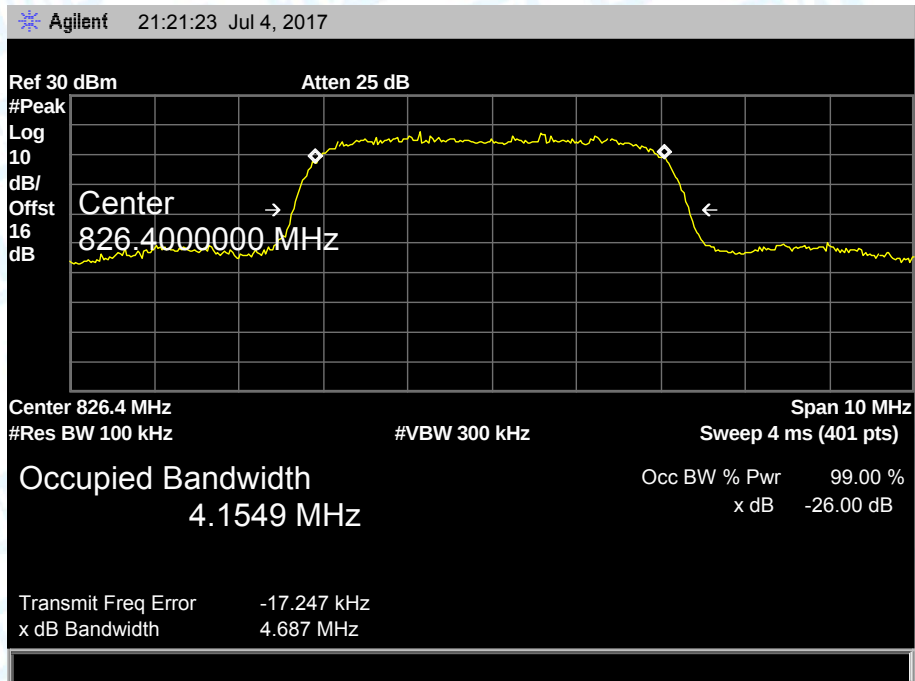
Center 836.6 MHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)
 Occupied Bandwidth 4.1561 MHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -12.976 kHz
 x dB Bandwidth 4.704 MHz

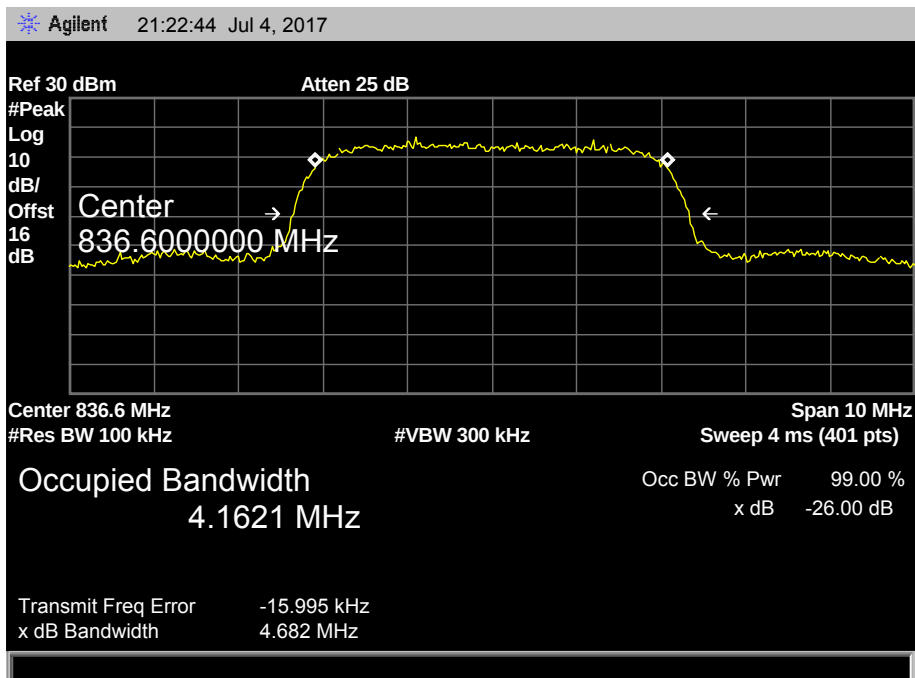


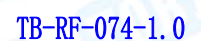
UMTS Band V (HSDPA)

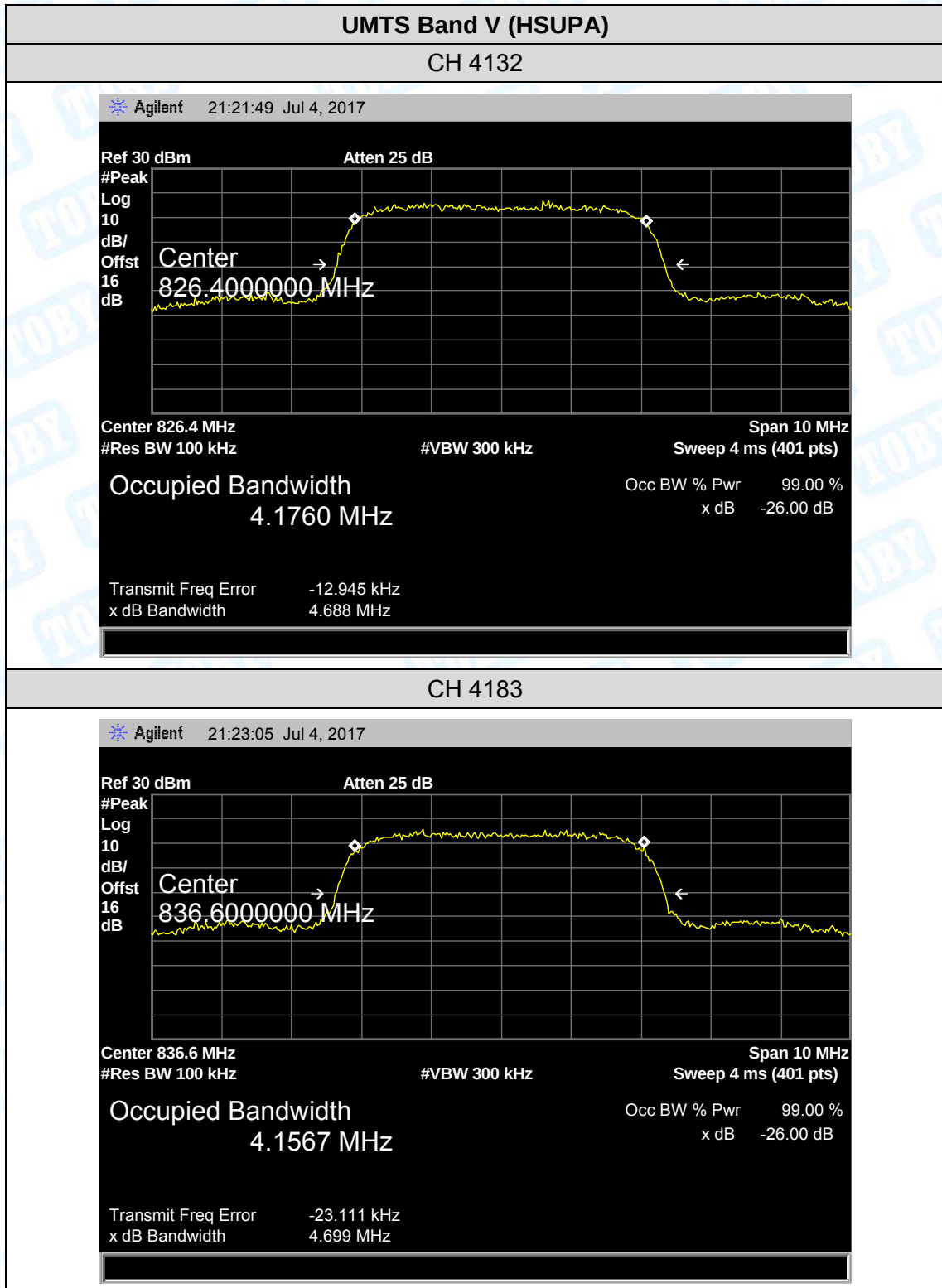
CH 4132

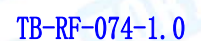


CH 4183





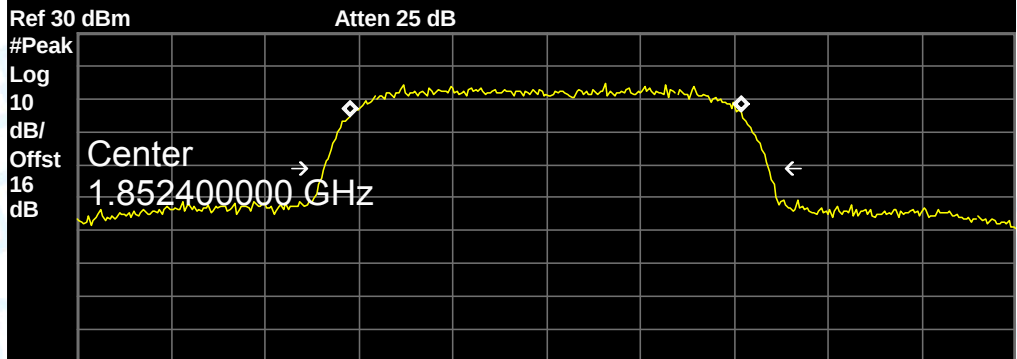




UMTS Band II (RMC)

CH 9262

Agilent 14:43:45 Jun 4, 2017

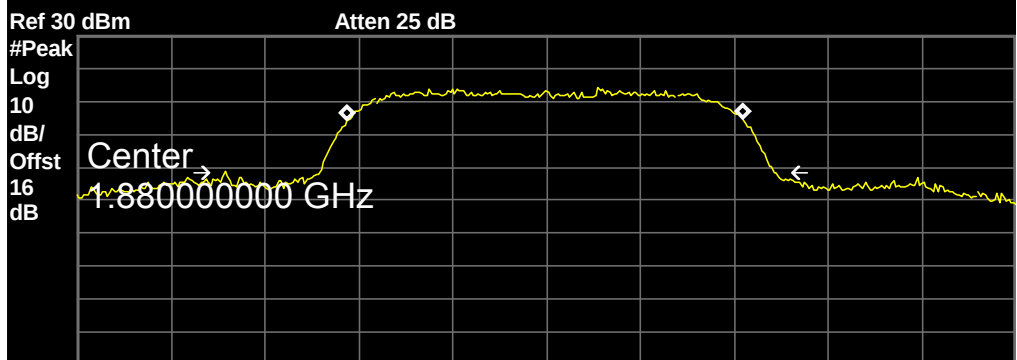


Center 1.852 GHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)
 Occupied Bandwidth 4.1724 MHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -9.133 kHz
 x dB Bandwidth 4.740 MHz

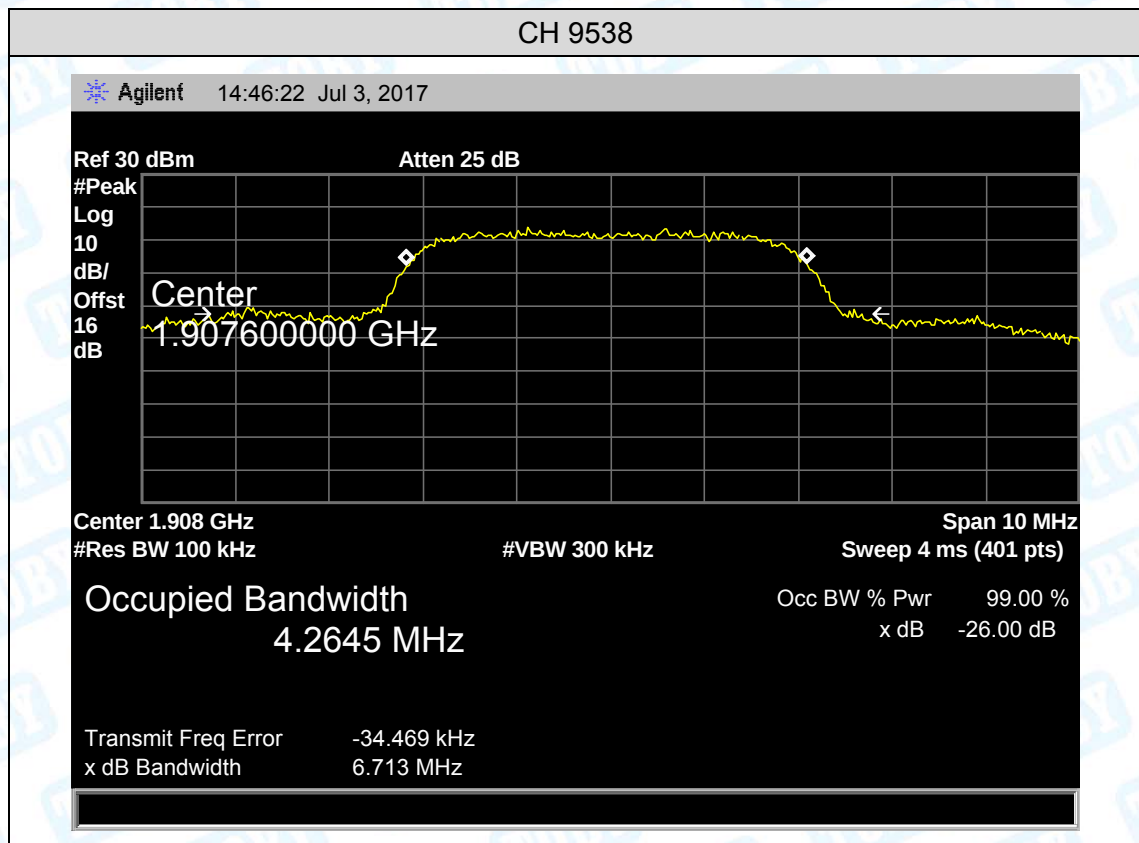
CH 9400

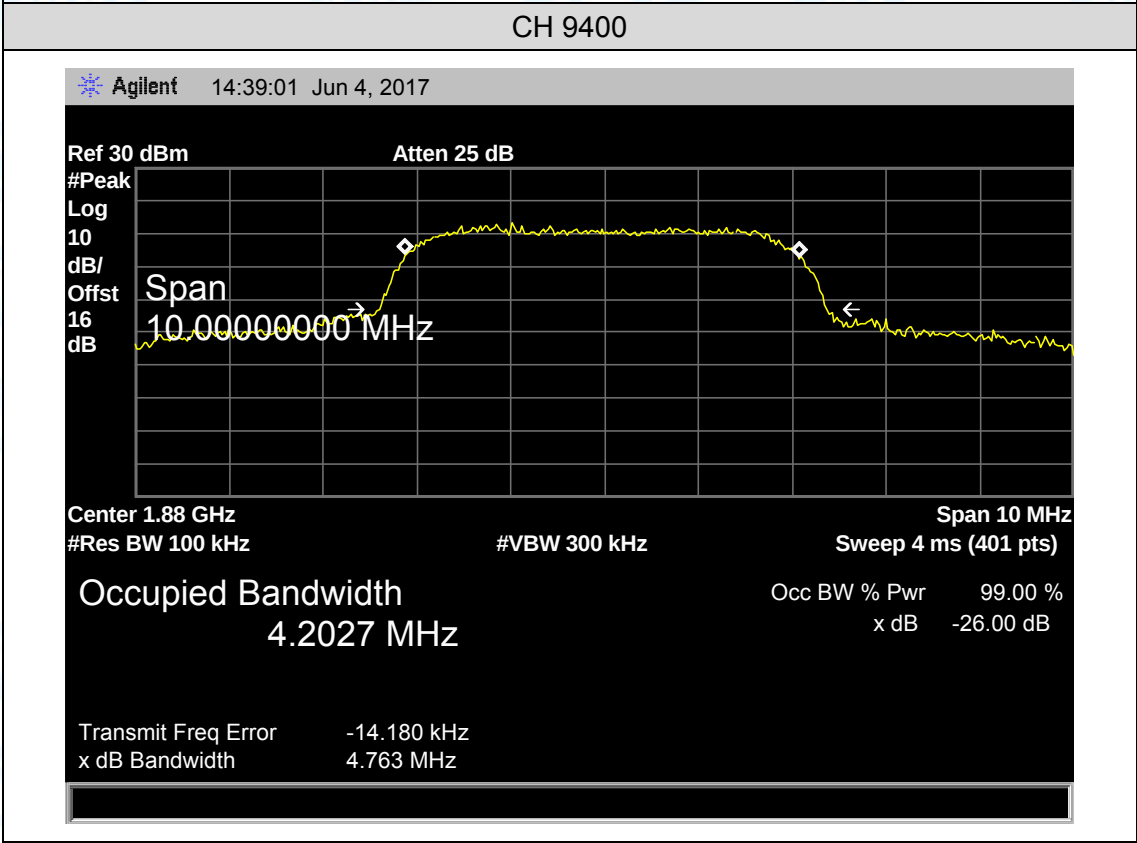
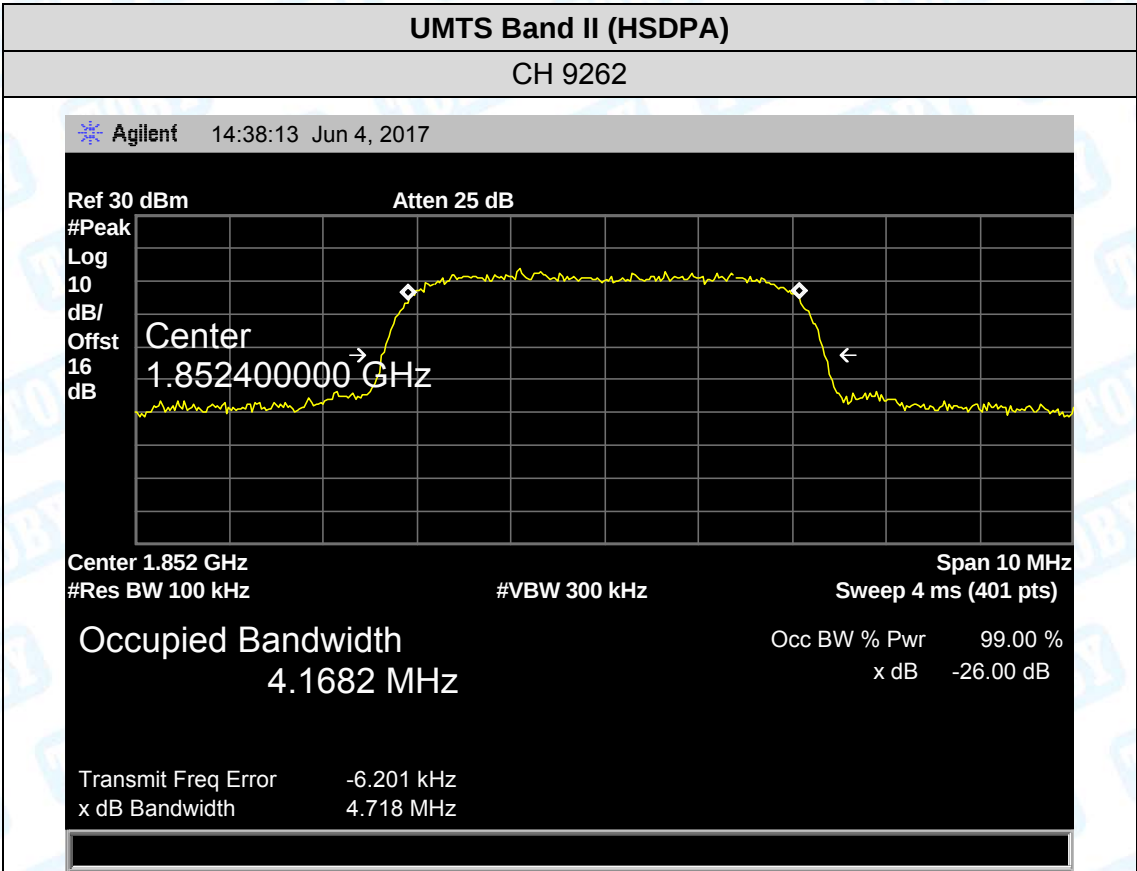
Agilent 14:44:32 Jun 4, 2017

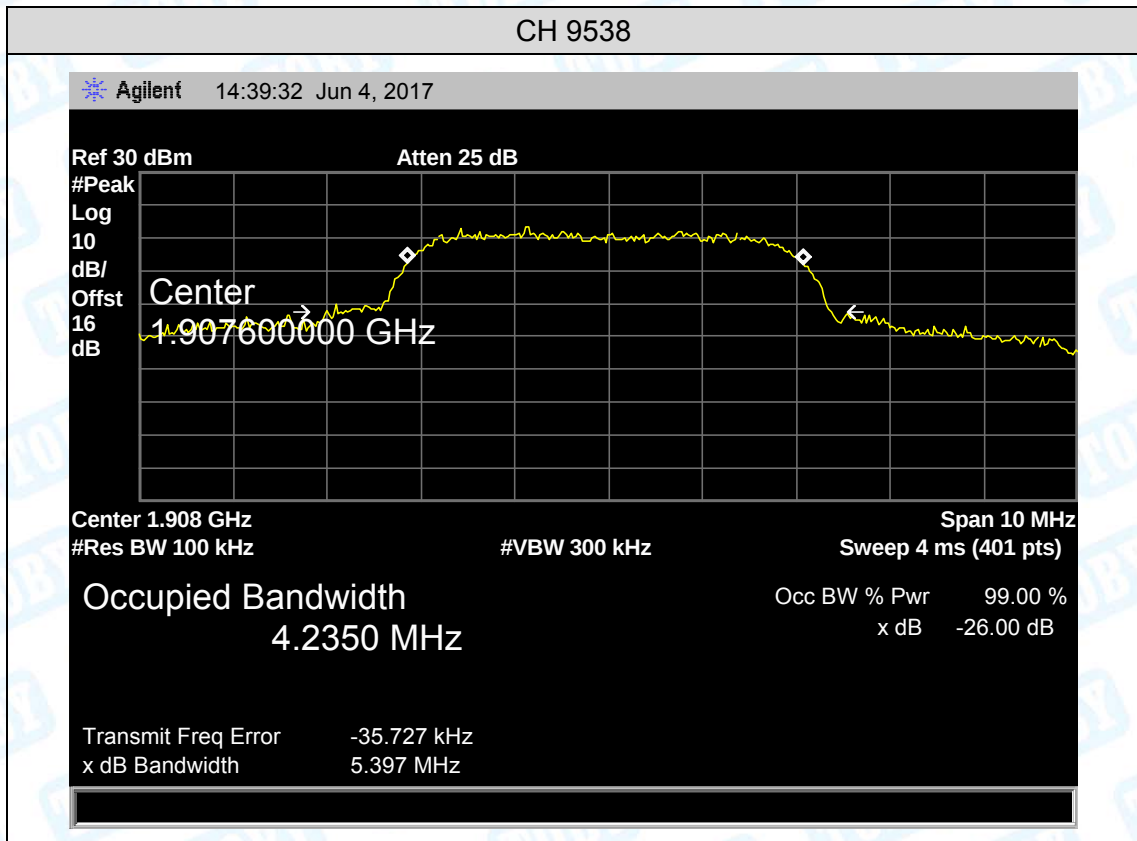


Center 1.88 GHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)
 Occupied Bandwidth 4.2273 MHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -9.322 kHz
 x dB Bandwidth 5.884 MHz



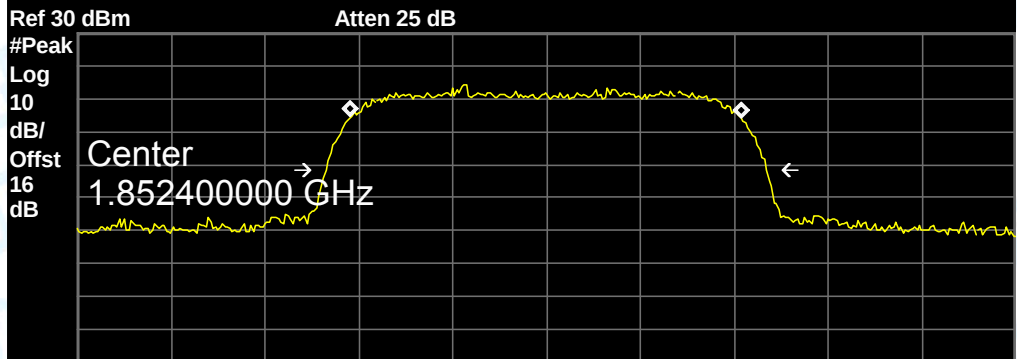




UMTS Band II (HSUPA)

CH 9262

Agilent 14:29:35 Jun 4, 2017

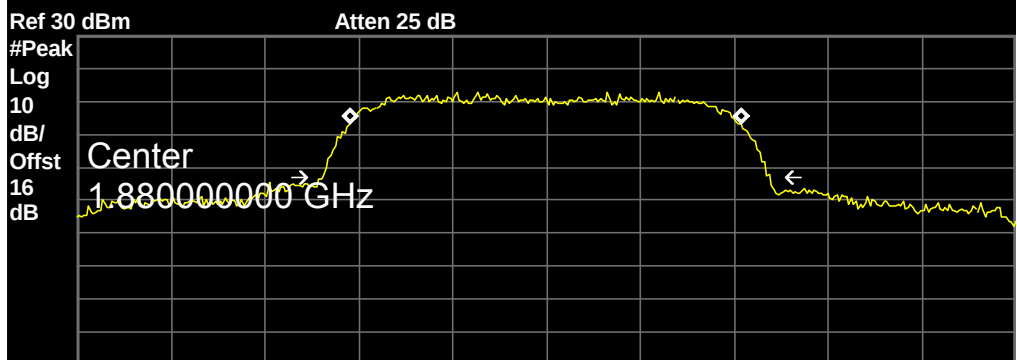


Center 1.852 GHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)
 Occupied Bandwidth 4.1600 MHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -8.589 kHz
 x dB Bandwidth 4.701 MHz

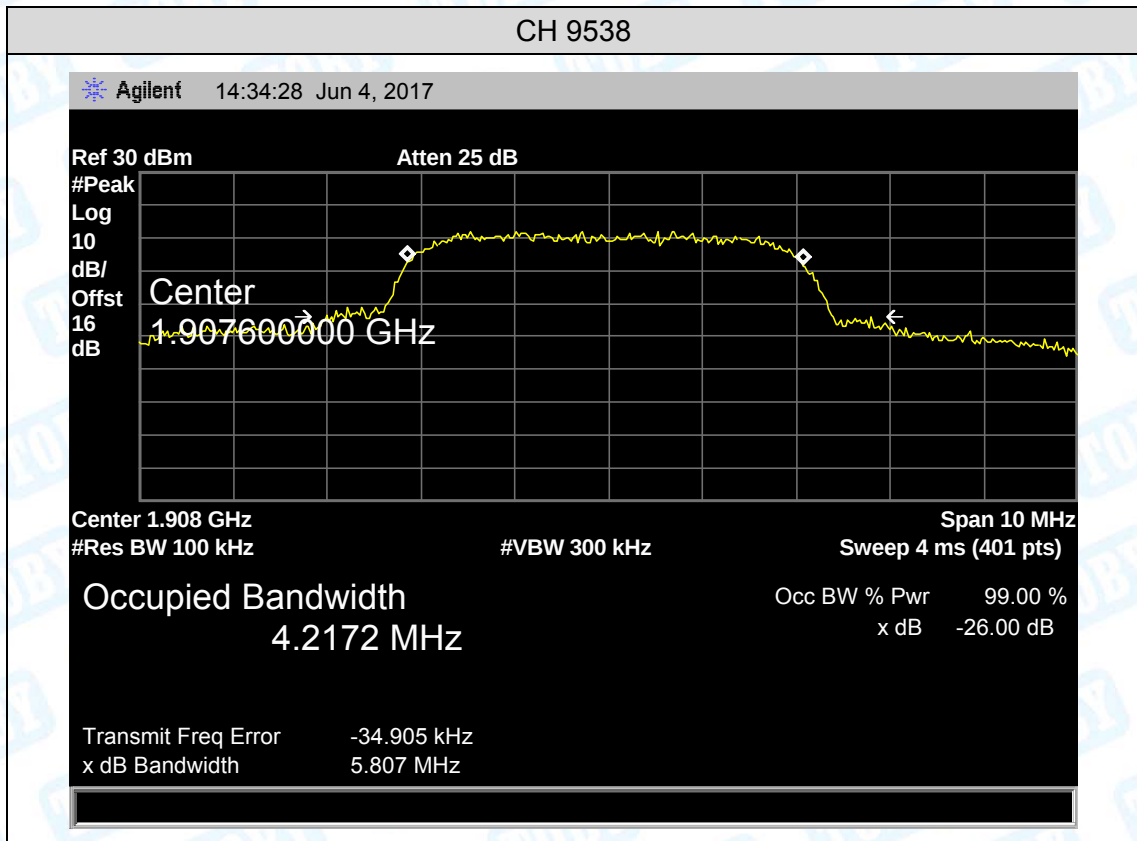
CH 9400

Agilent 14:33:54 Jun 4, 2017



Center 1.88 GHz Span 10 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts)
 Occupied Bandwidth 4.1818 MHz
 Occ BW % Pwr 99.00 %
 x dB -26.00 dB

Transmit Freq Error -13.491 kHz
 x dB Bandwidth 4.770 MHz



9. Conducted Out of Band Emissions

9.1 Test Standard and Limit

9.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

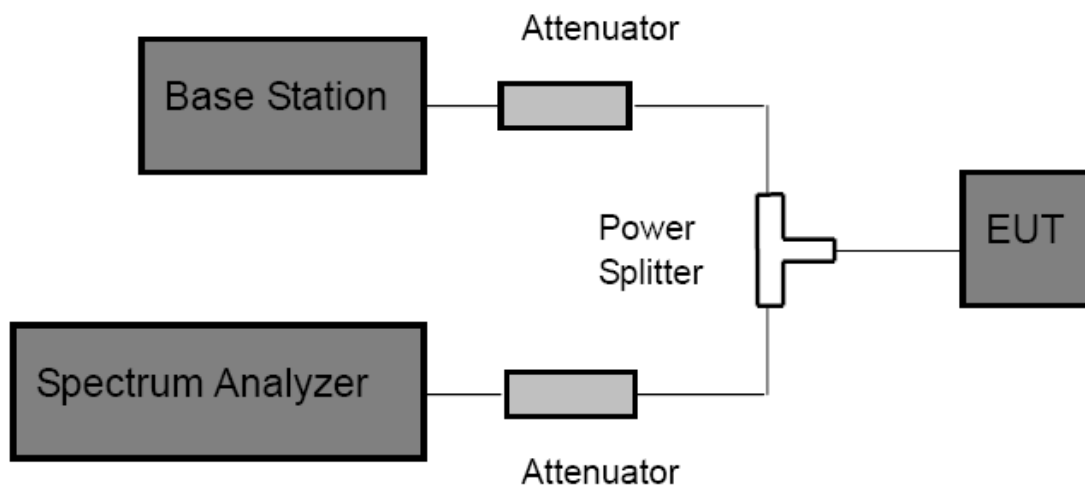
FCC Part 22H: 22.917(a)

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

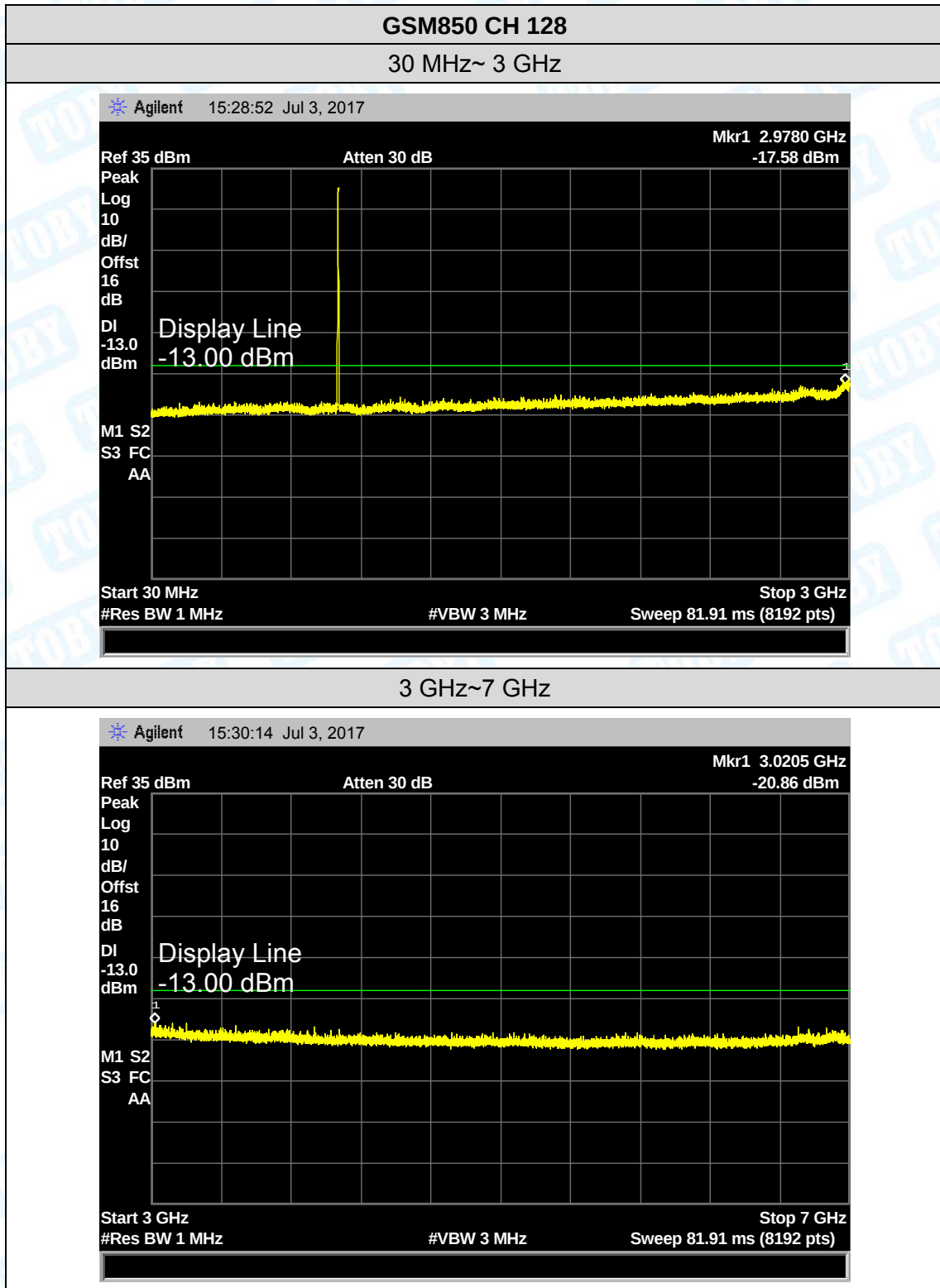
- (1) The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- (2) Spectrum Setting:
Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.
Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.
- (3) The low, middle and high channels of each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

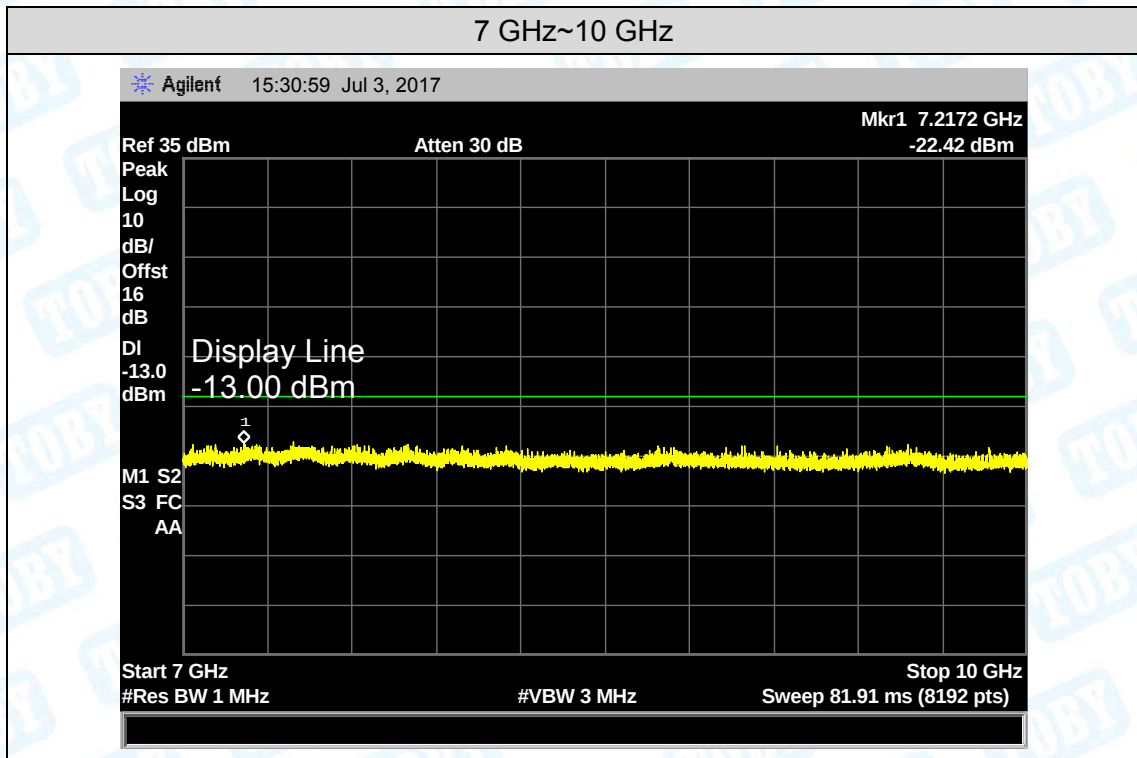
9.4 EUT Operating Condition

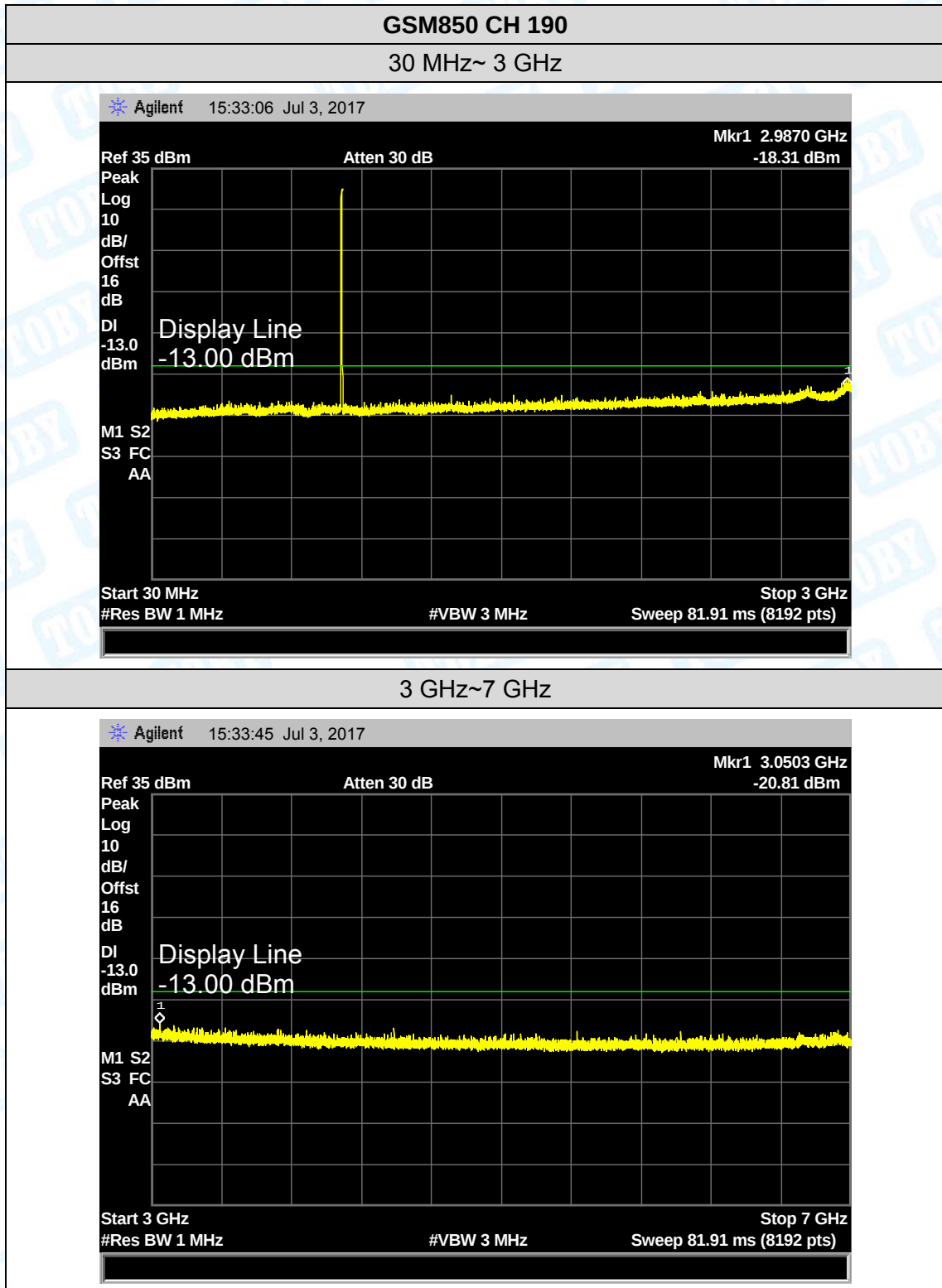
The EUT was continuously connected with the Base station and transmitting in the max power during the test.

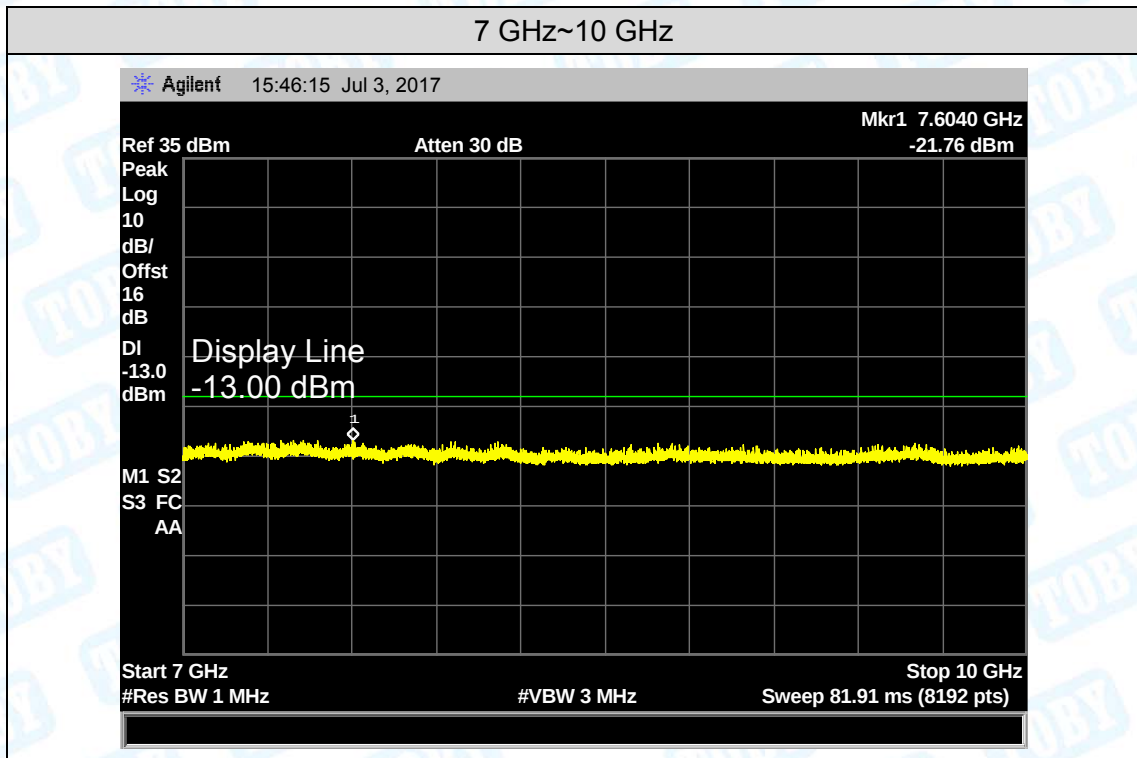
9.5 Test Data

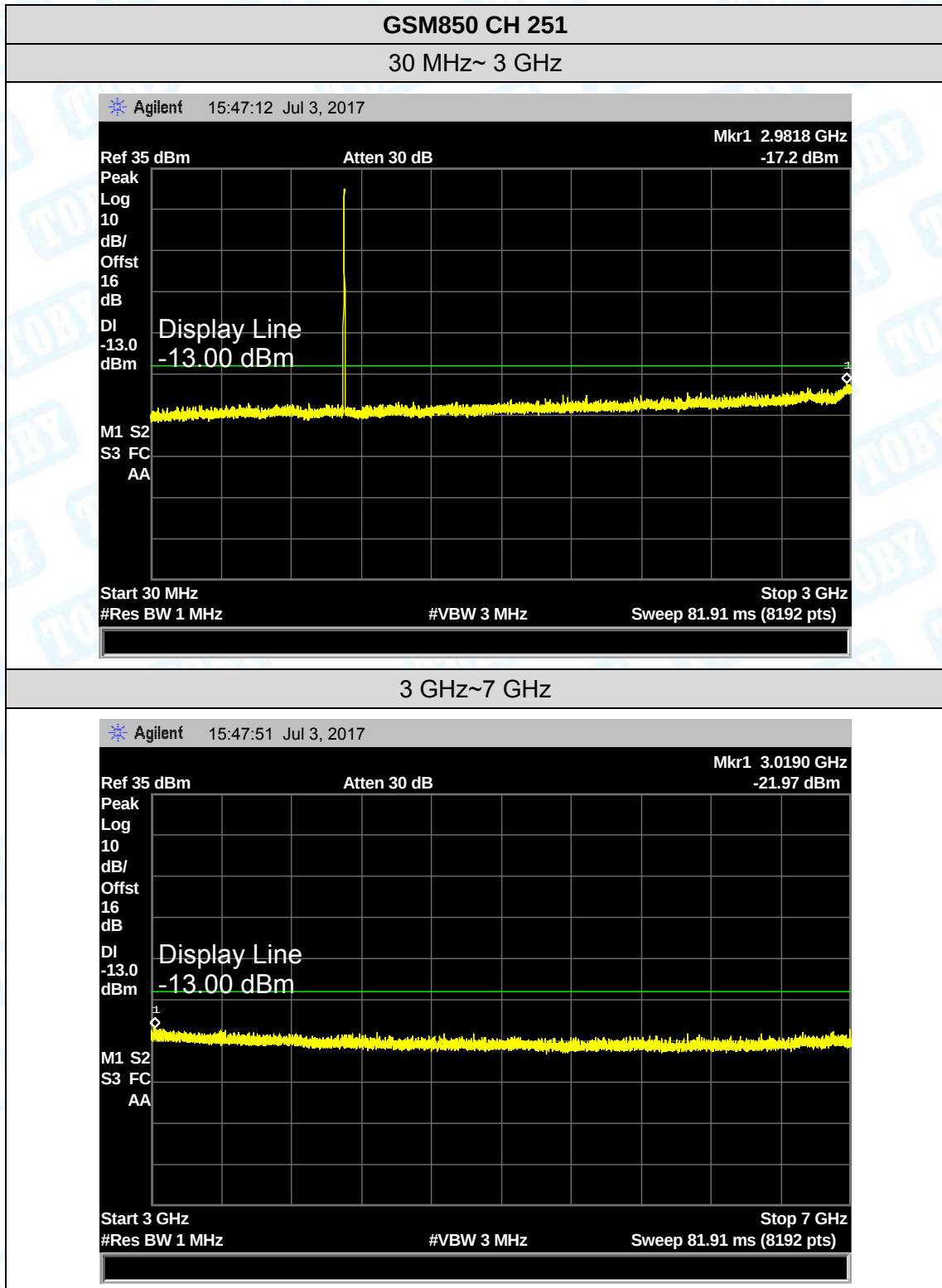
Please refer following plots:

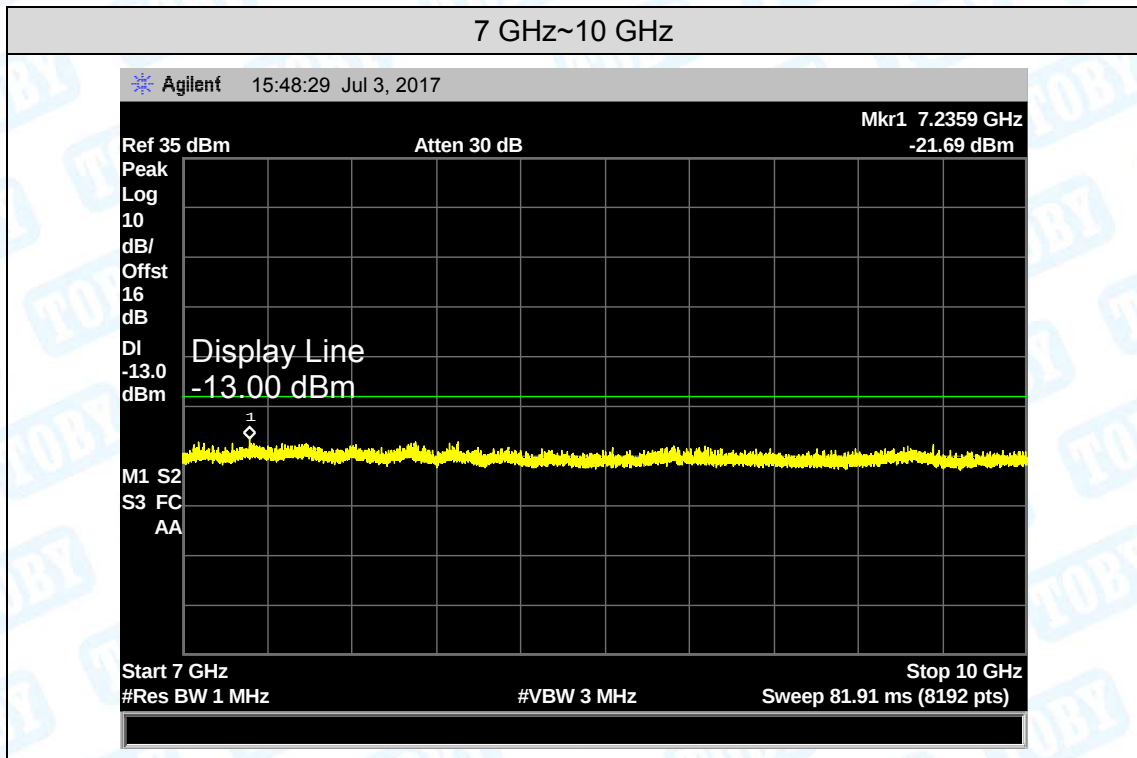


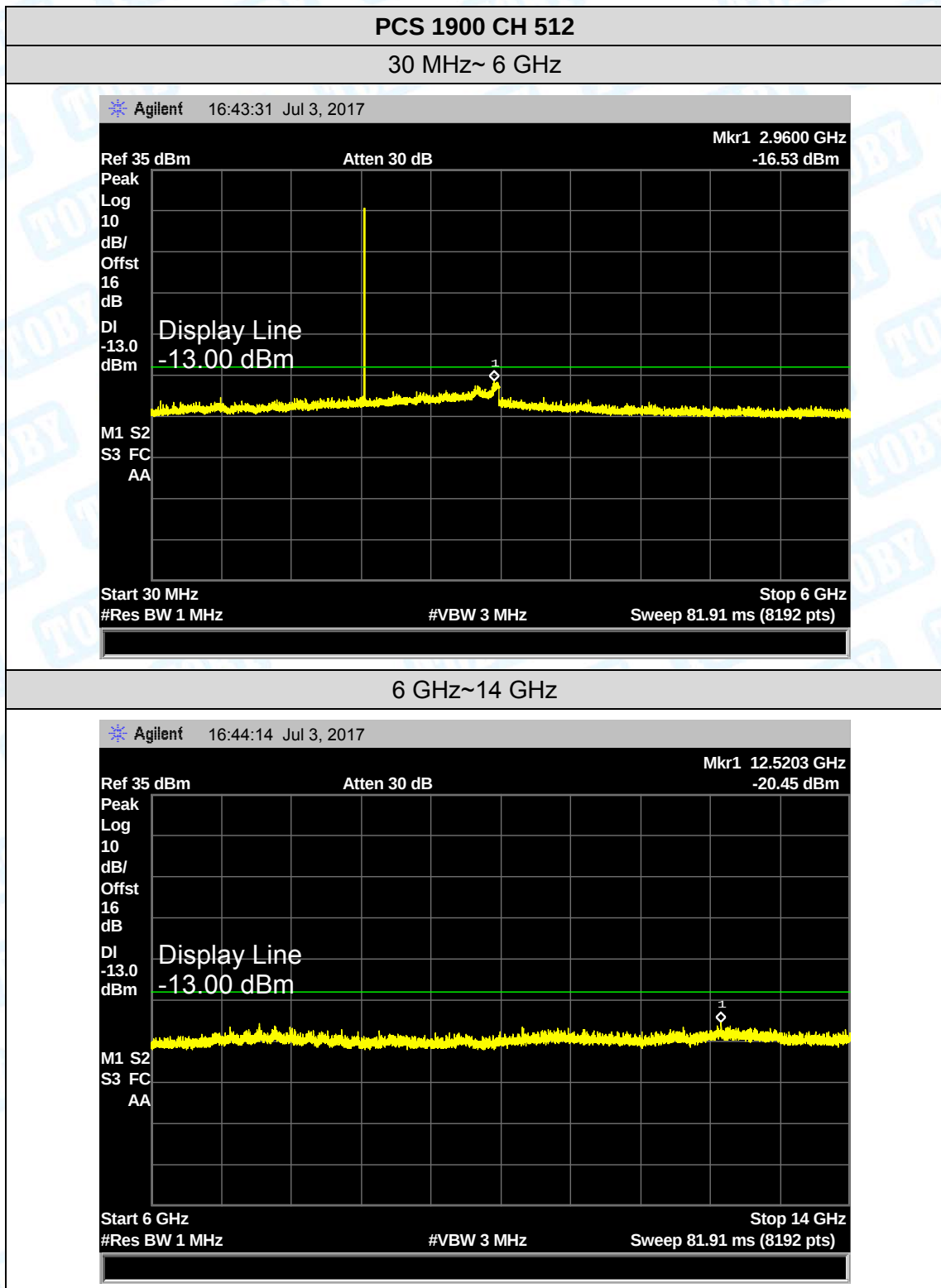


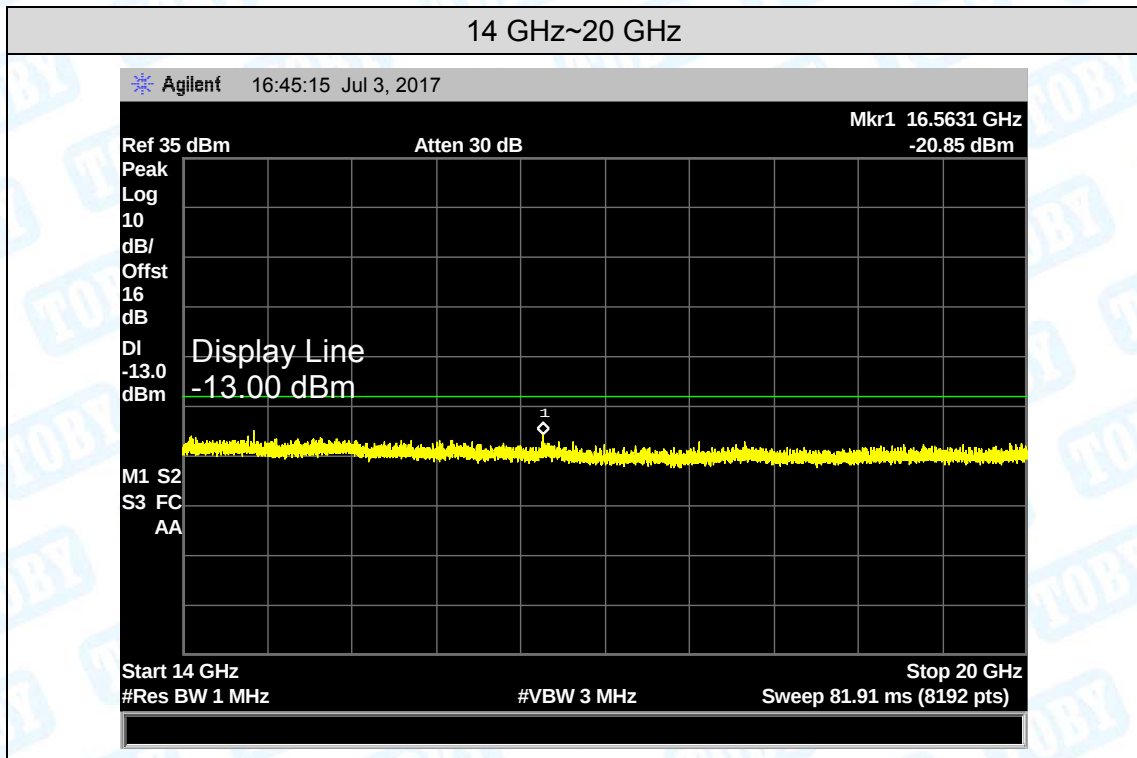






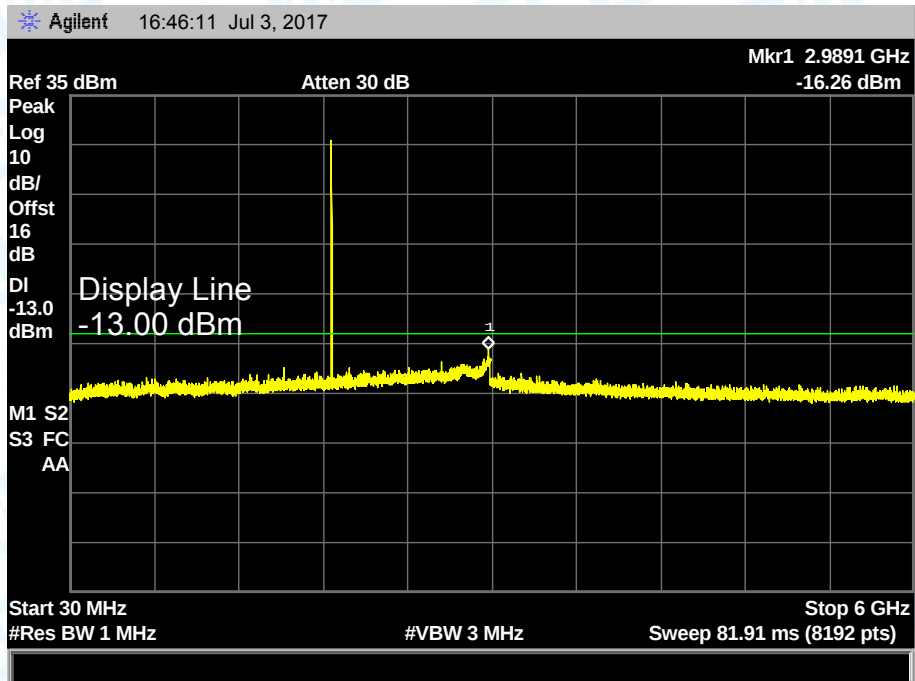




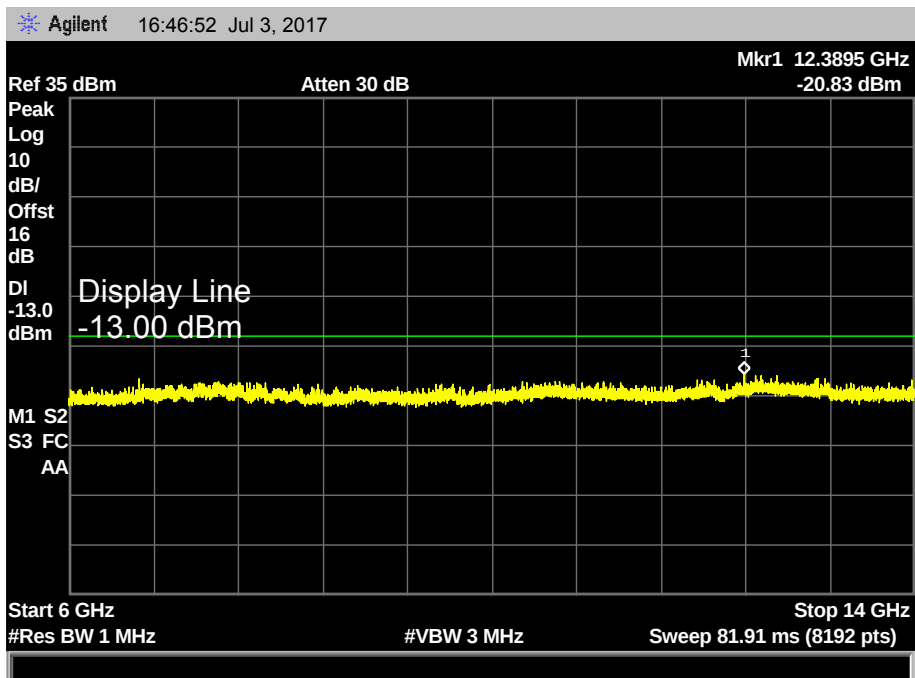


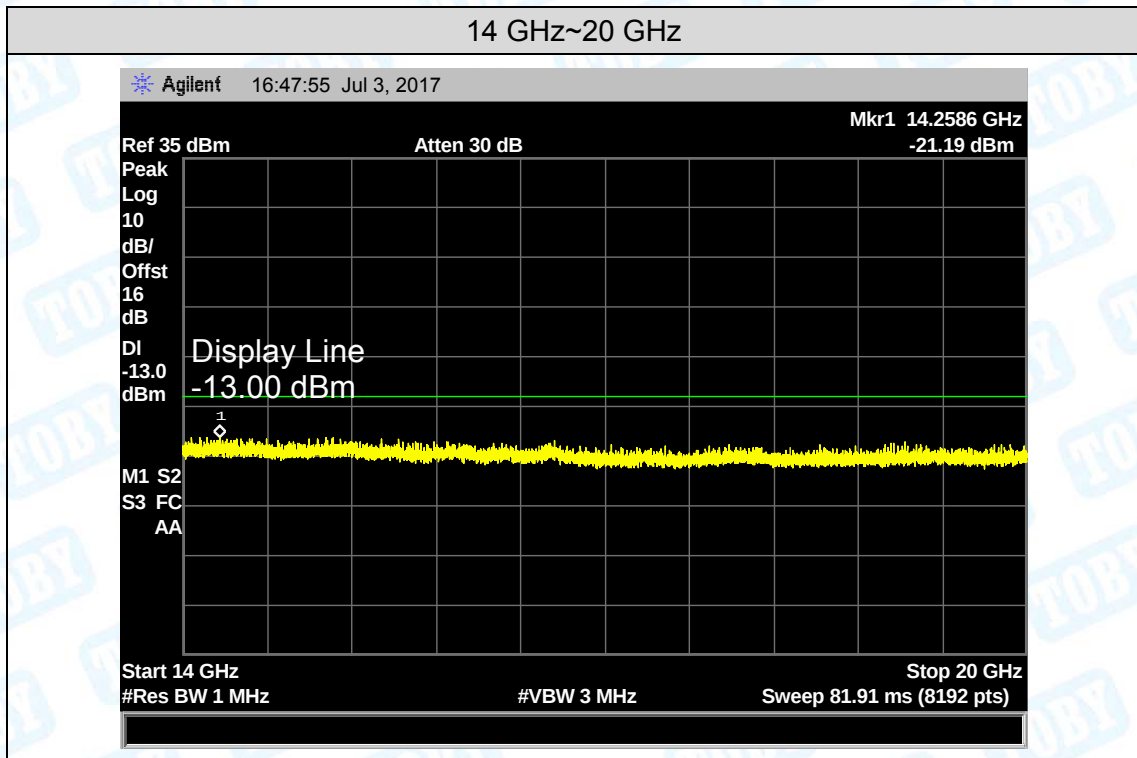
PCS 1900 CH 661

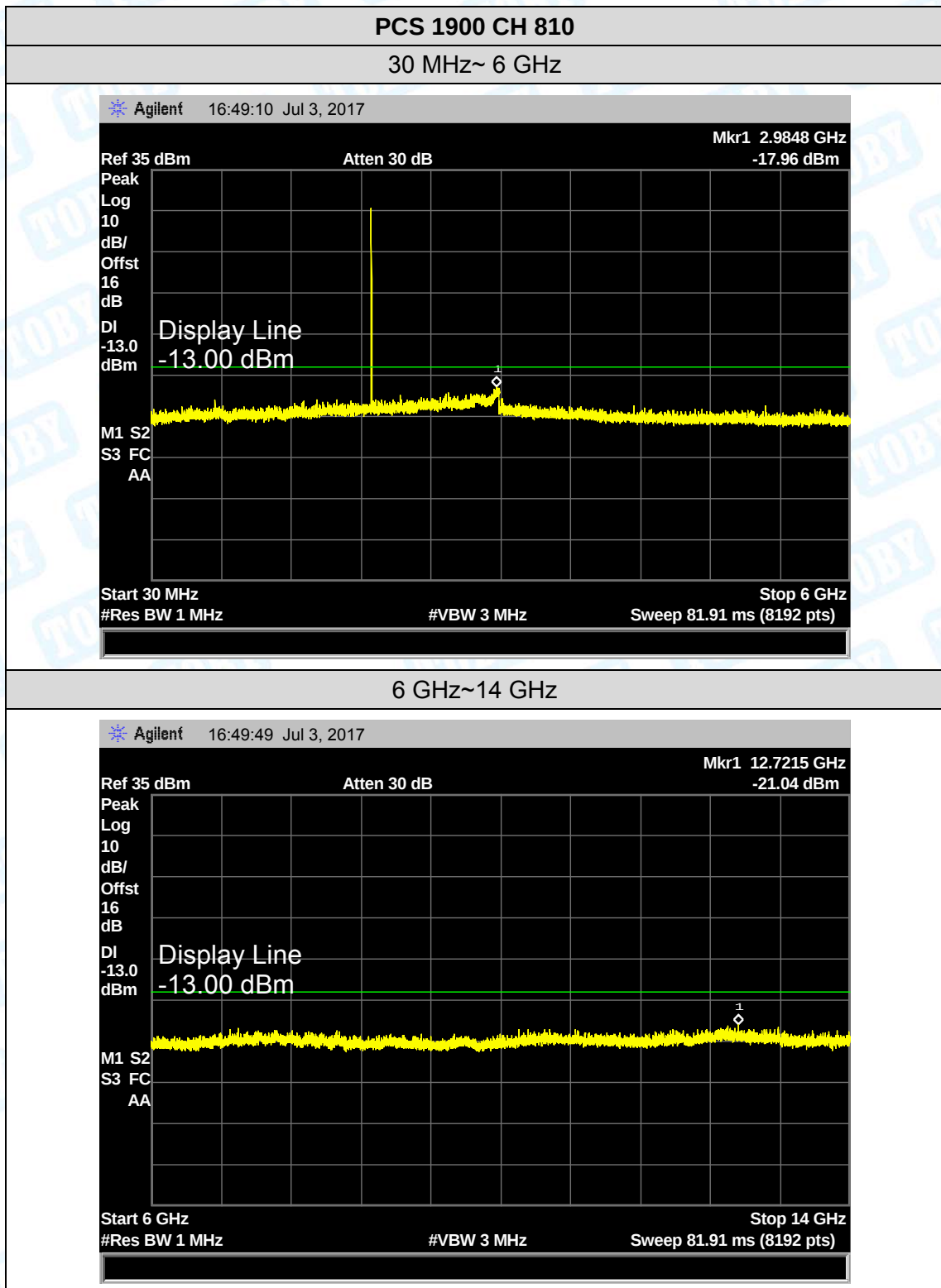
30 MHz~ 6 GHz

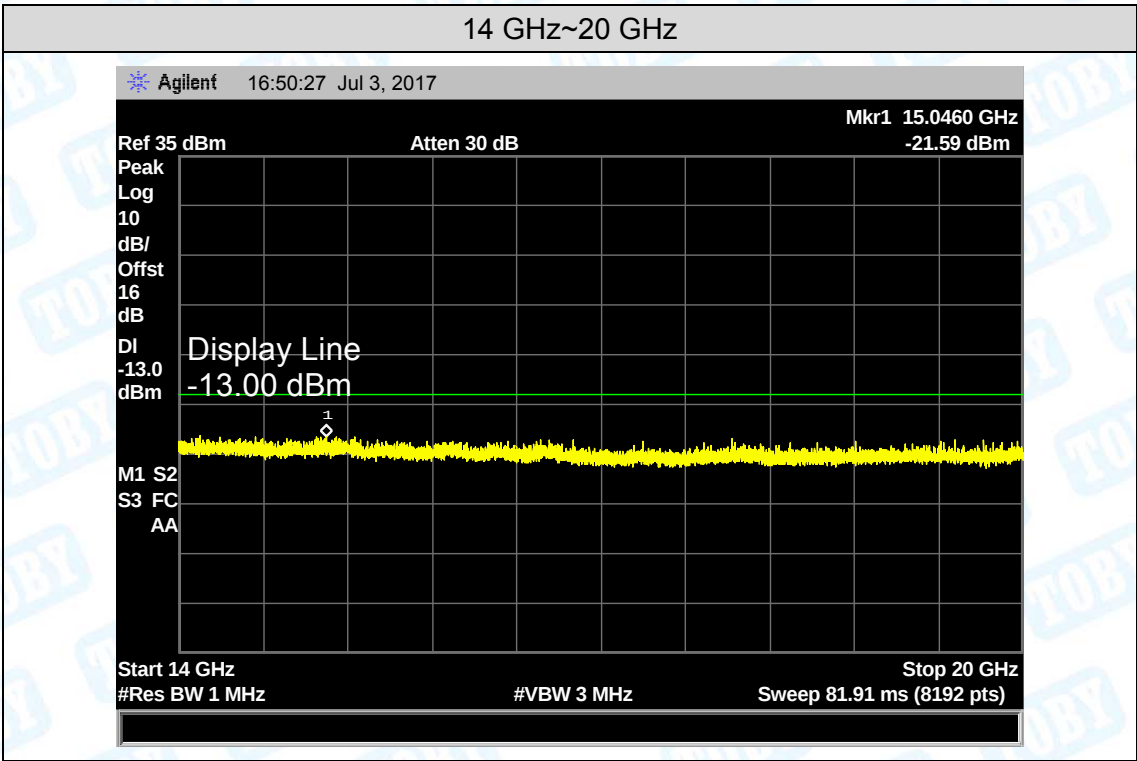


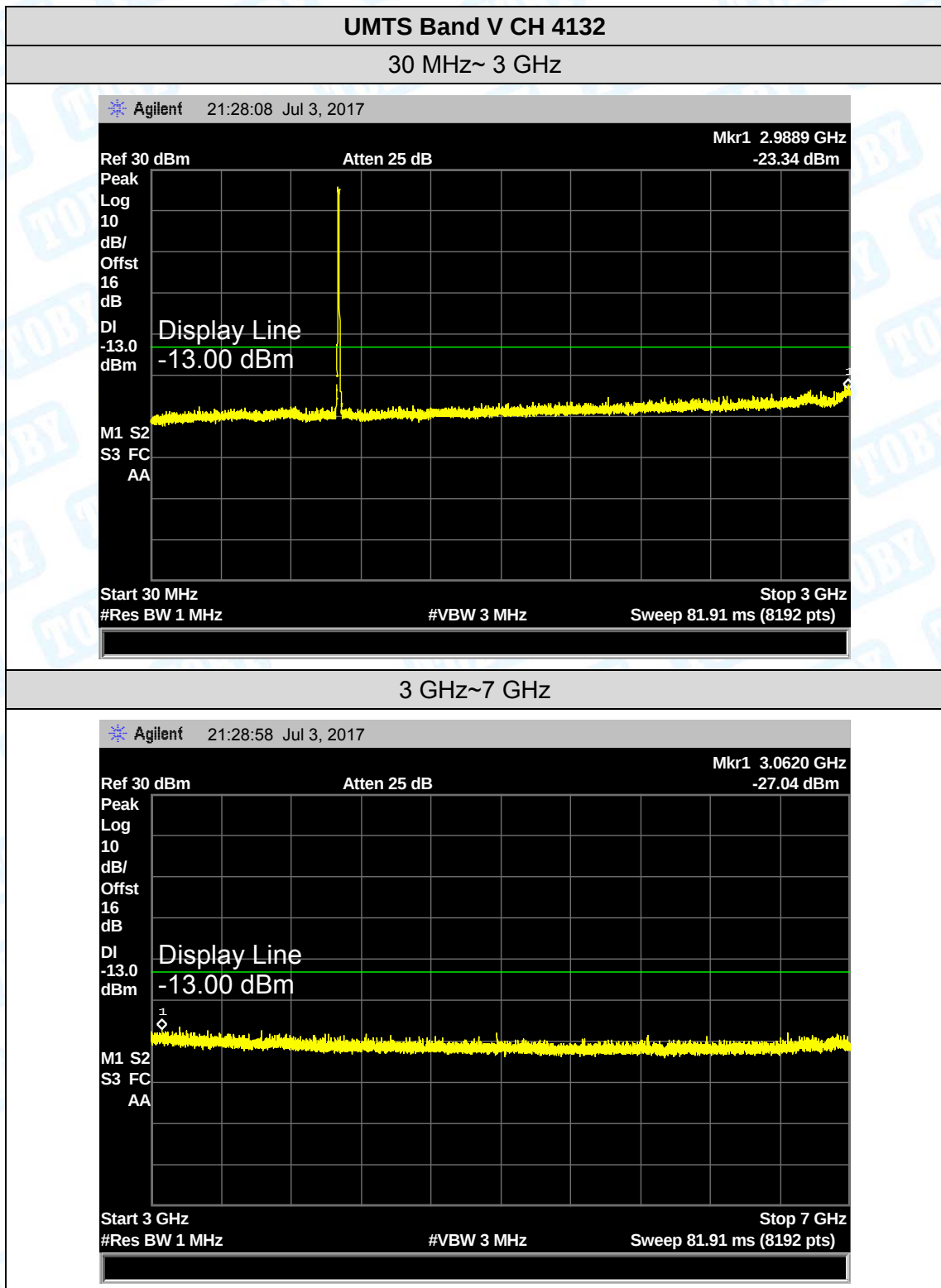
6 GHz~14 GHz

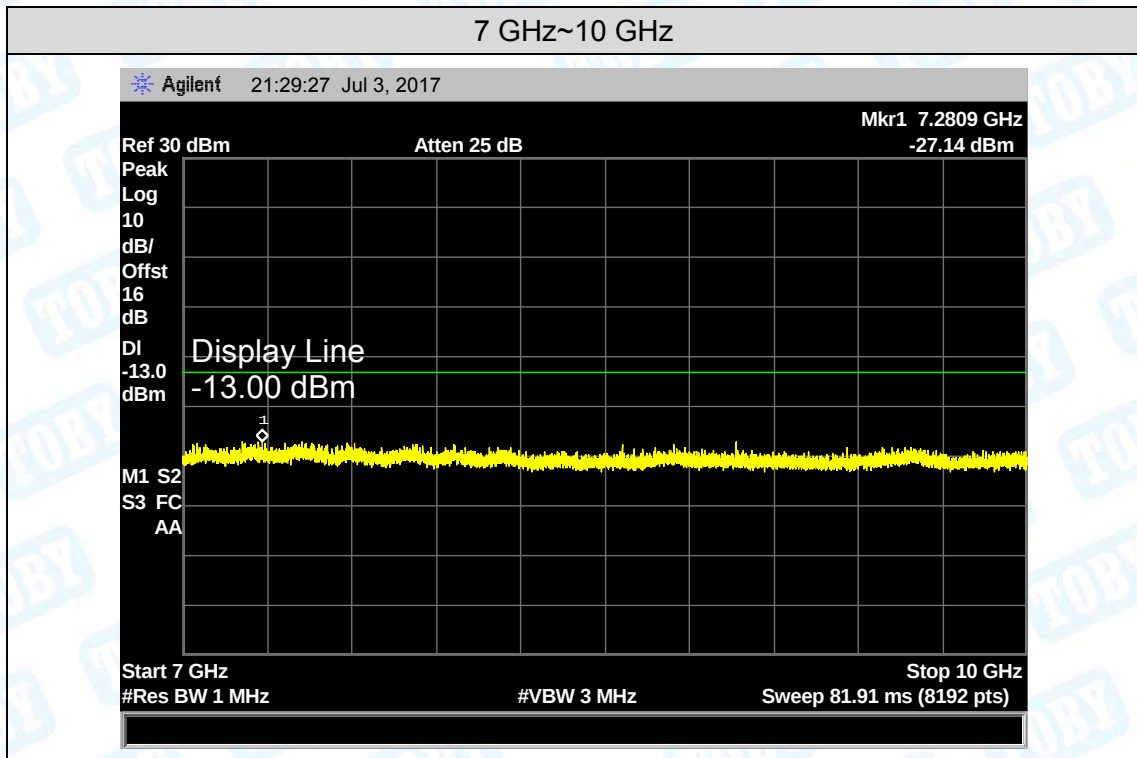


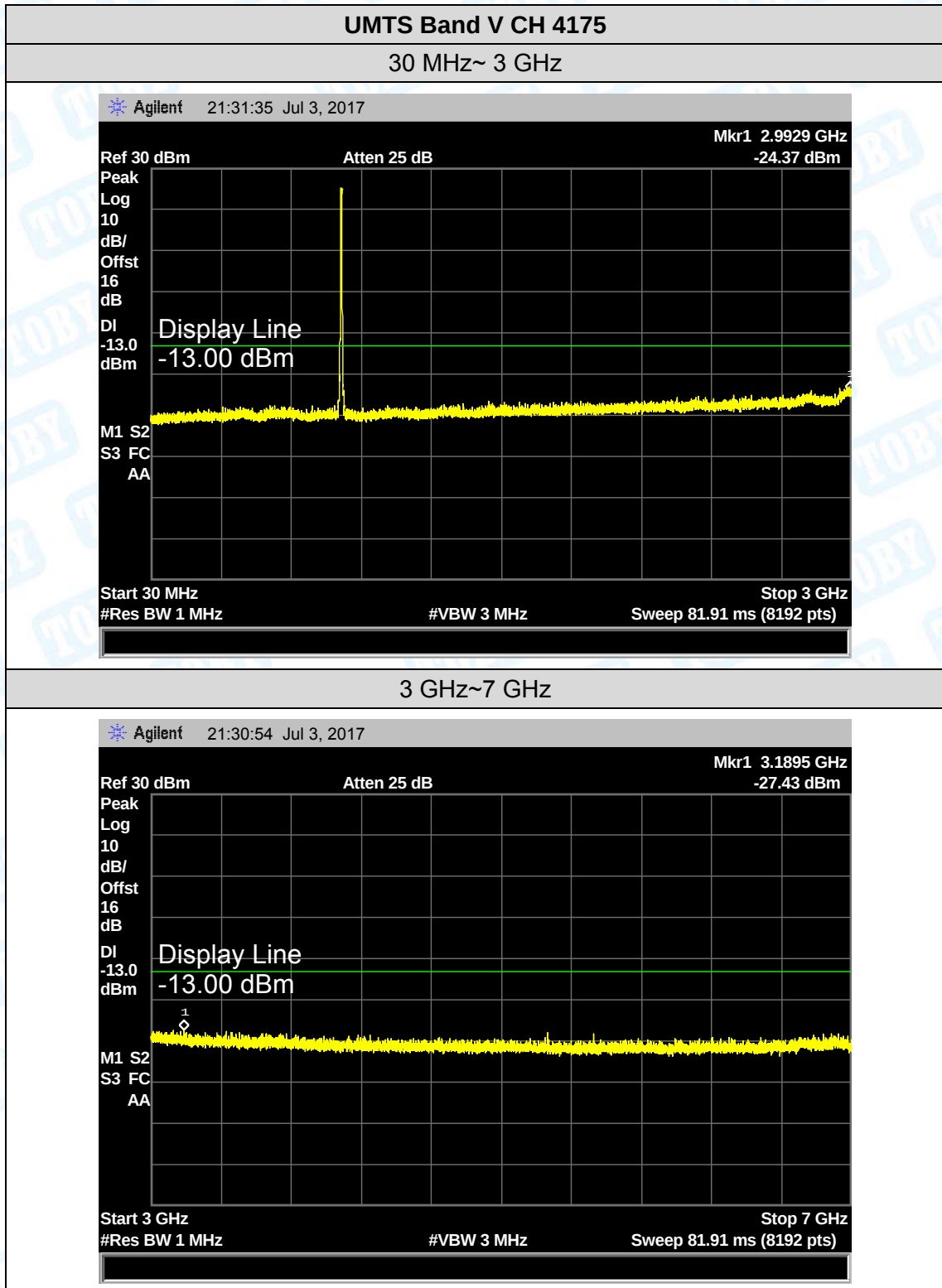


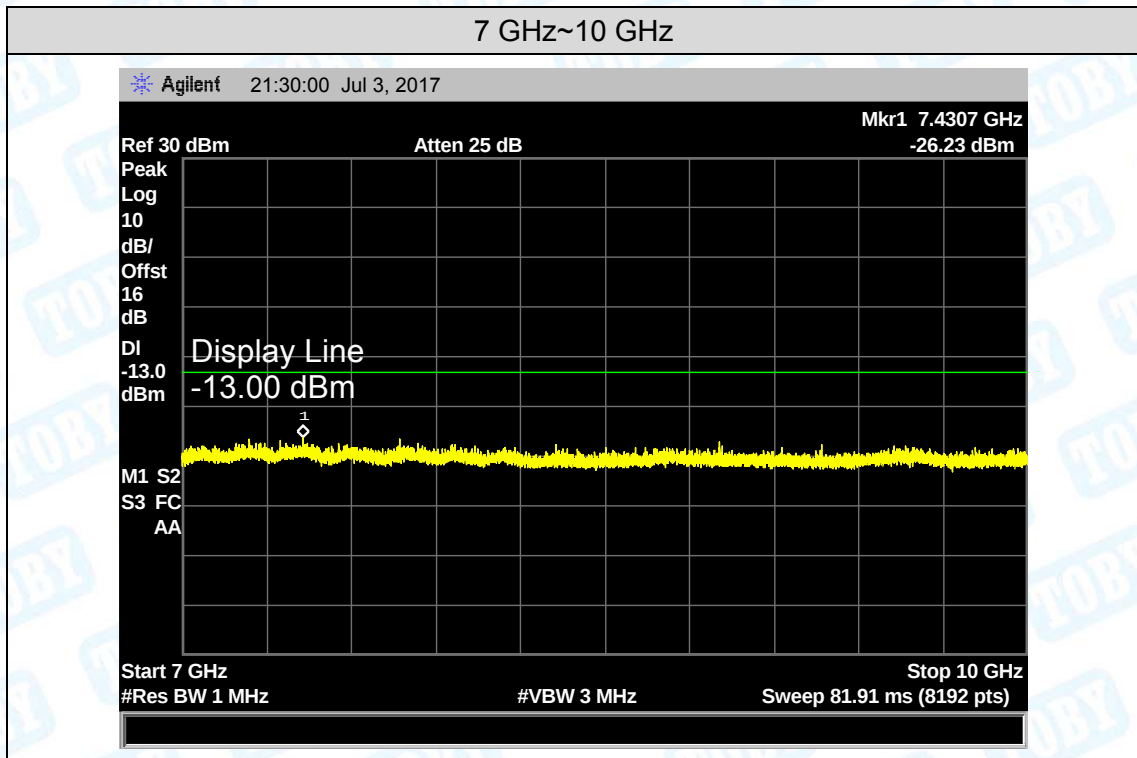


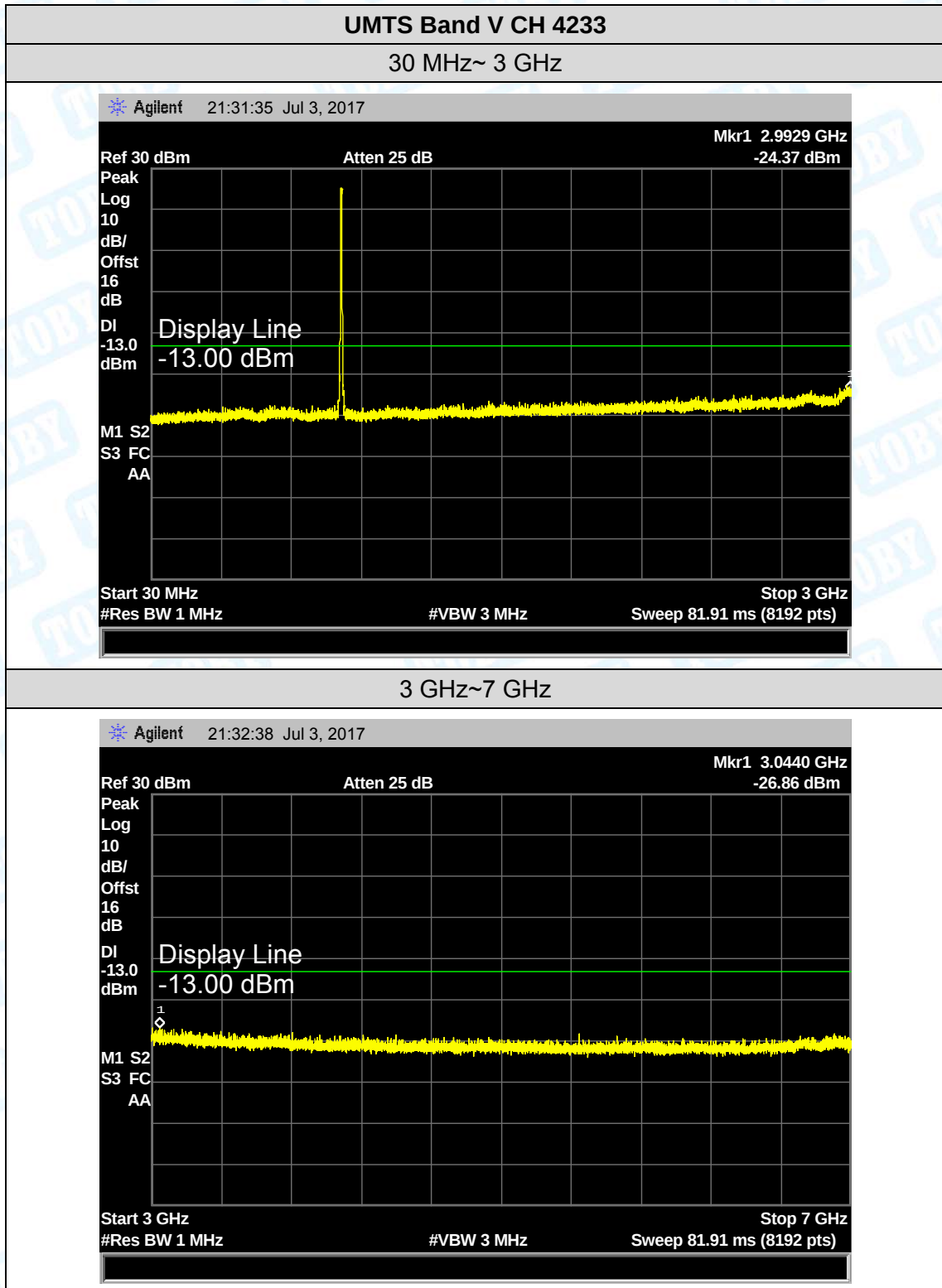


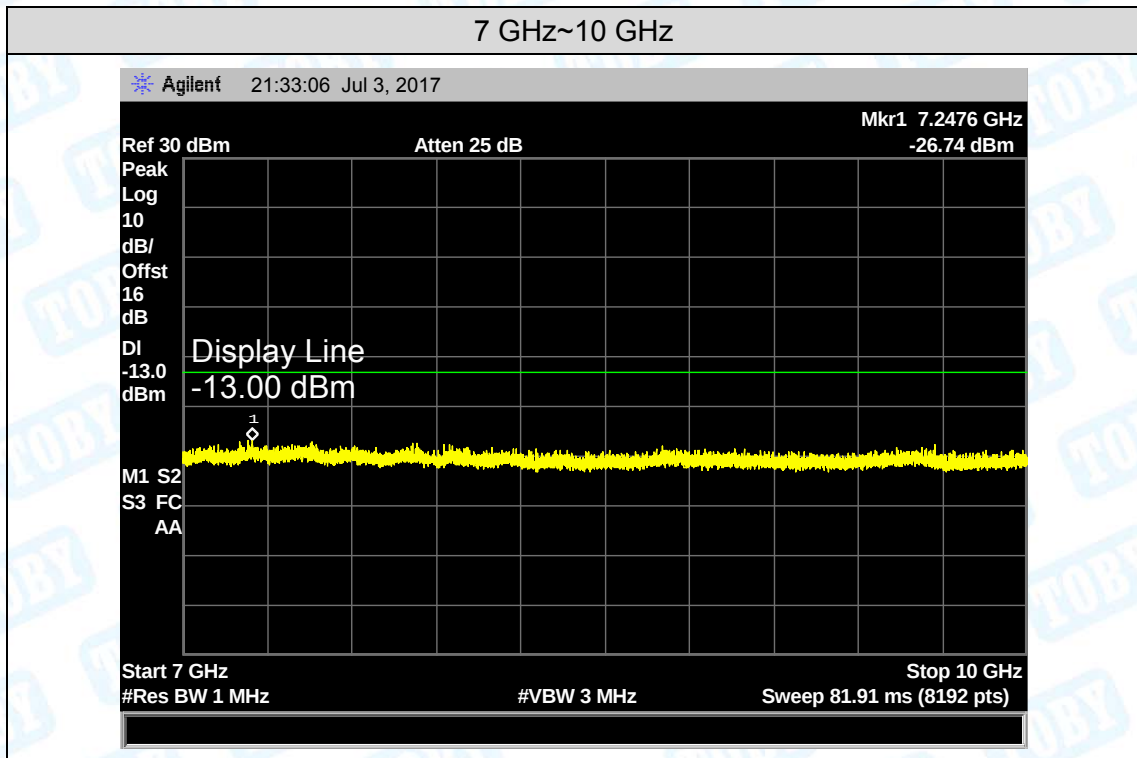






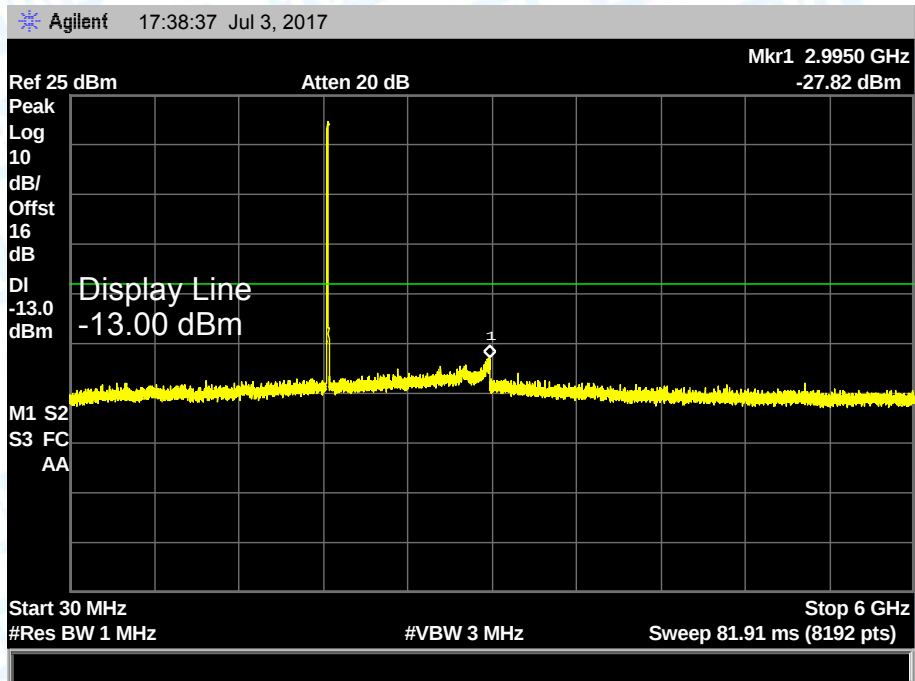




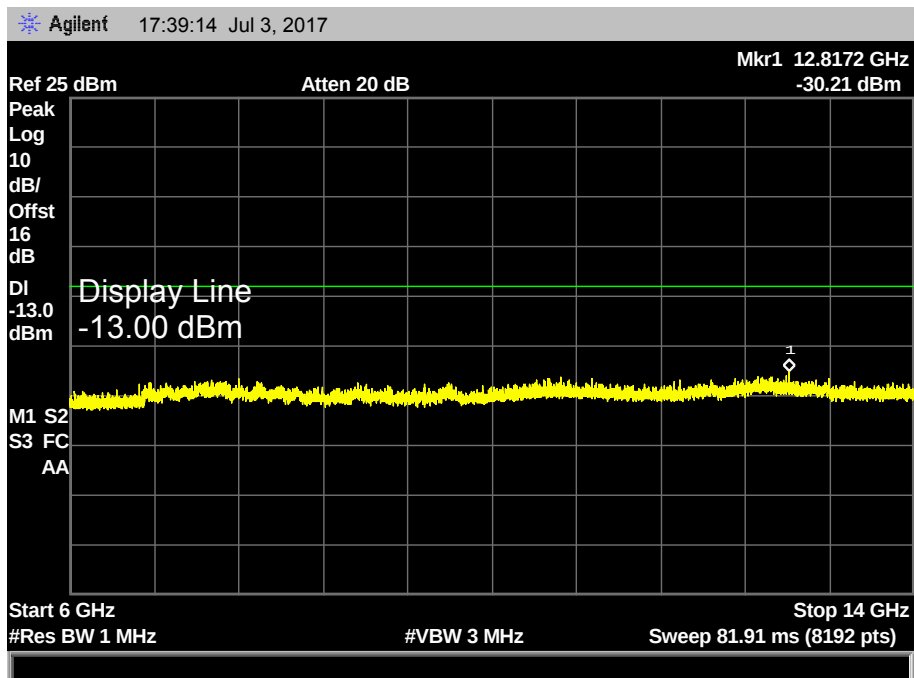


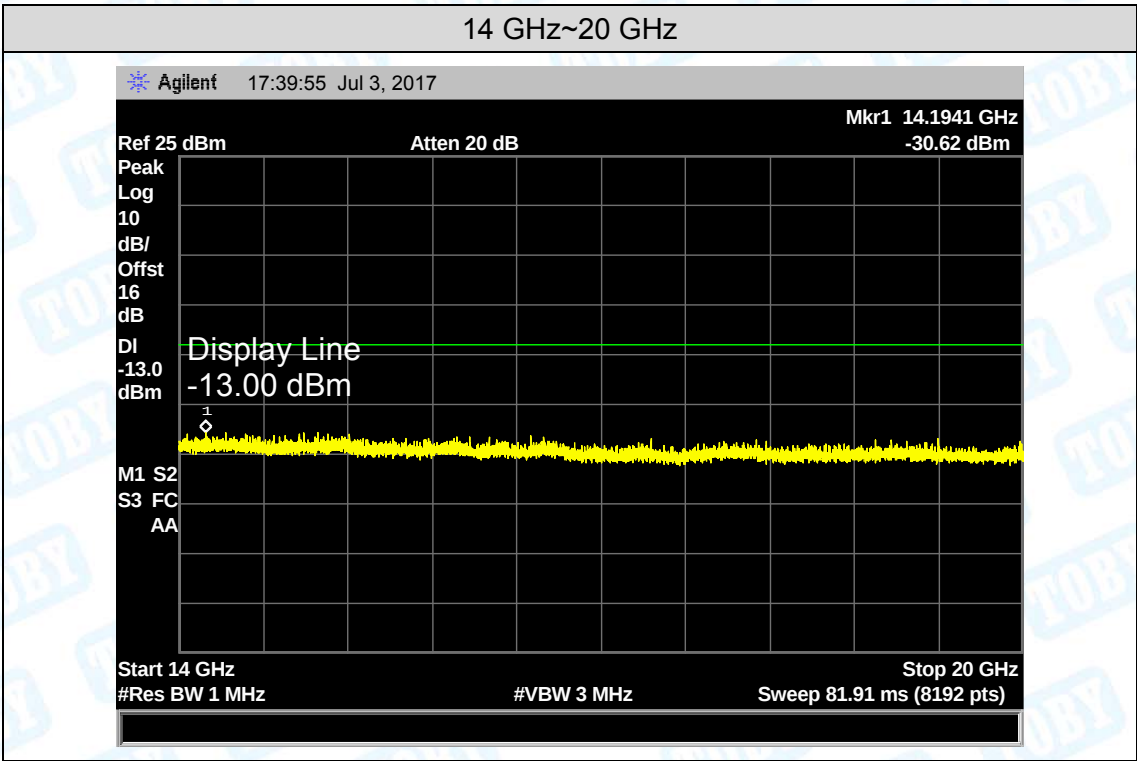
UMTS Band II CH 9262

30 MHz~ 6 GHz



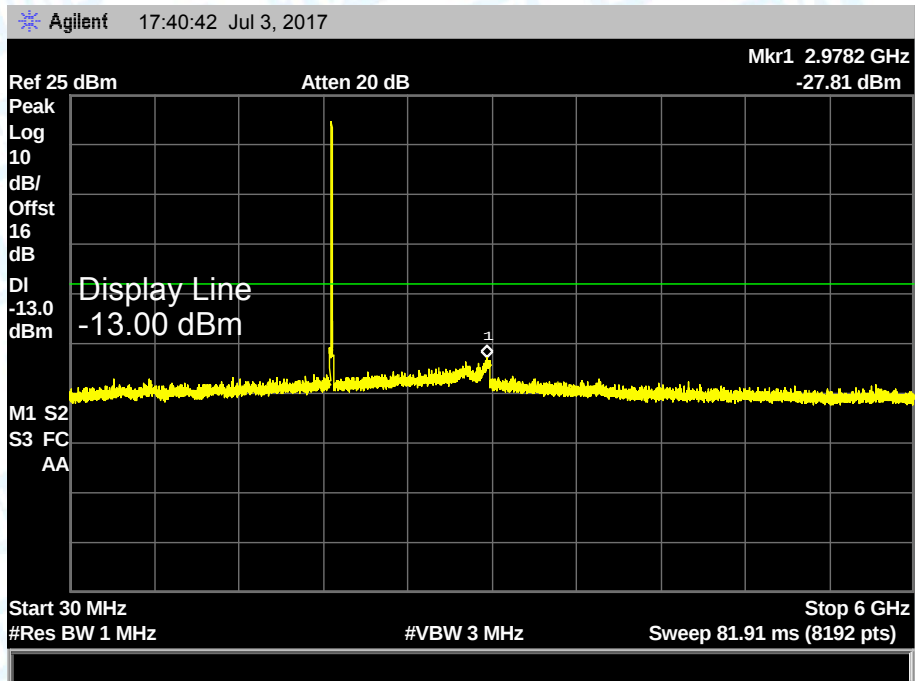
6 GHz~14 GHz



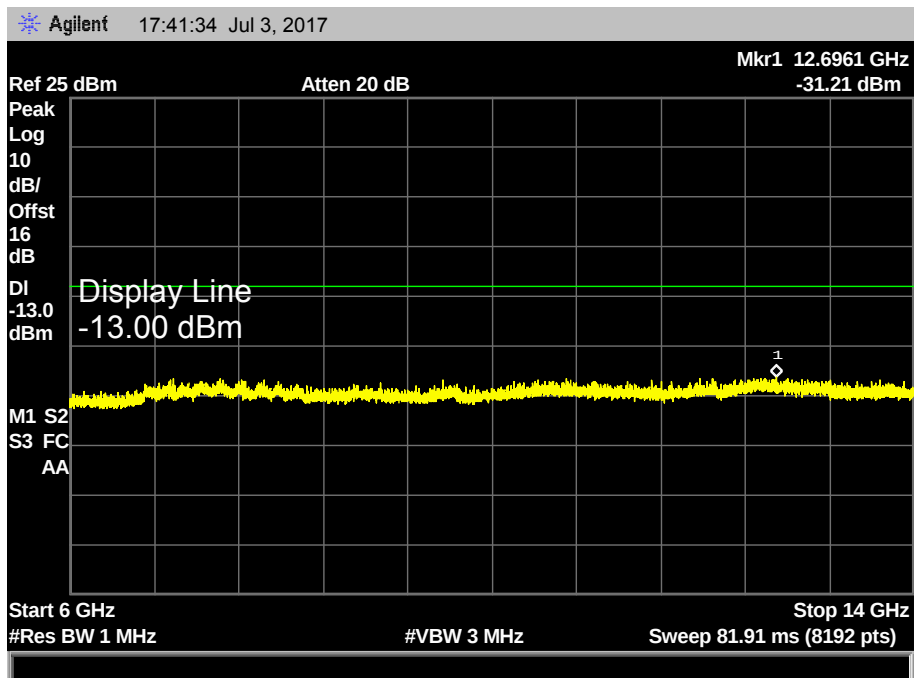


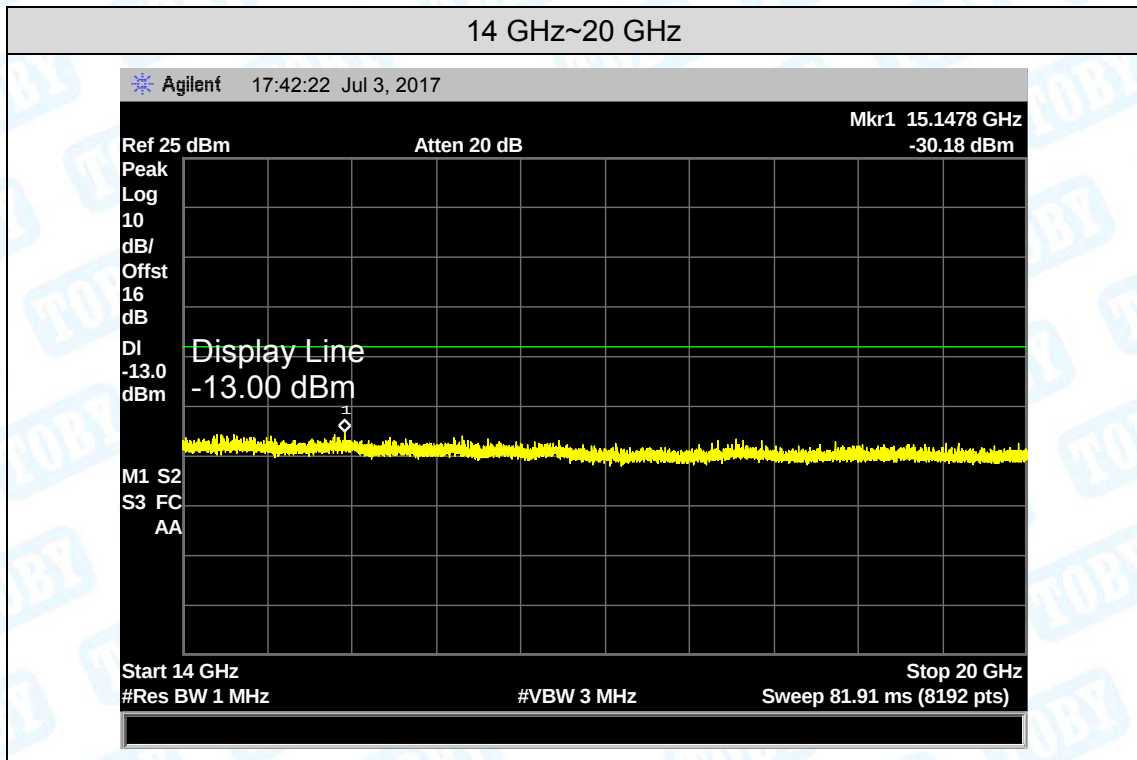
UMTS Band II CH 9400

30 MHz~ 6 GHz



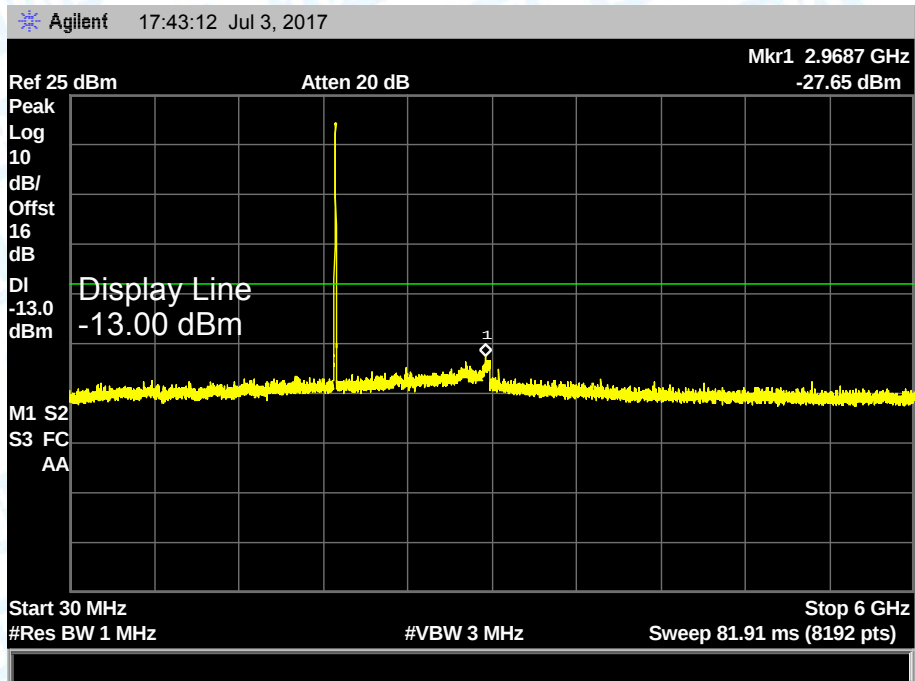
6 GHz~14 GHz



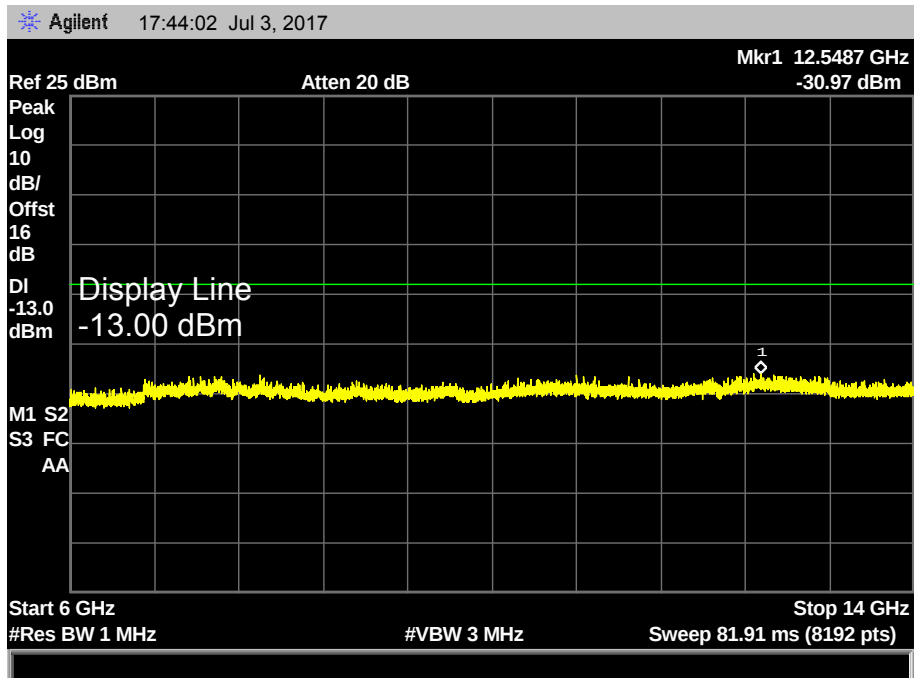


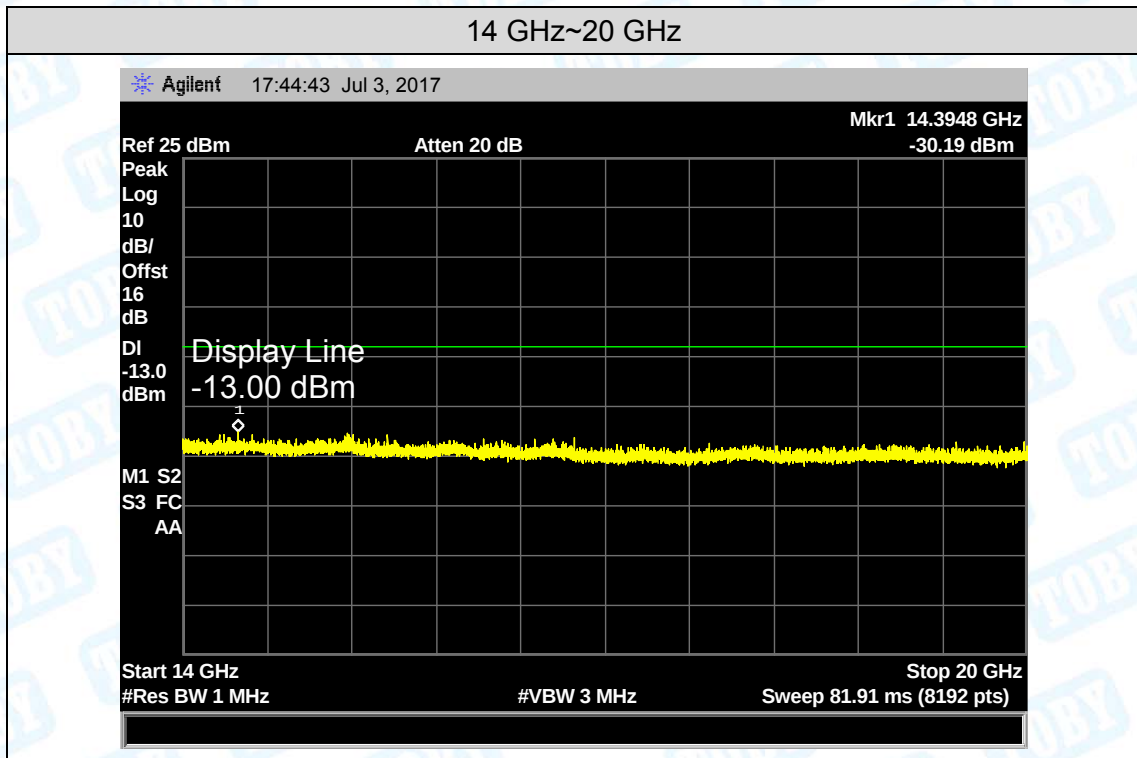
UMTS Band II CH 9538

30 MHz~ 6 GHz



6 GHz~14 GHz





10. Band Edge Test

10.1 Test Standard and Limit

10.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

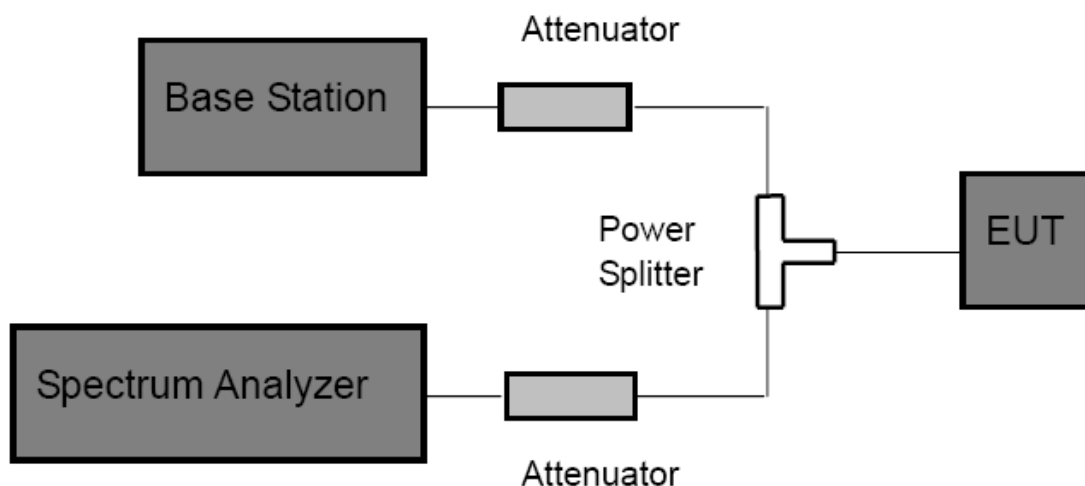
FCC Part 22H: 22.917(a)

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: $RBW \geq 1\%$ 26db bandwidth, VBW=3 RBW, Span 1 MHz, Detector: Peak Mode.
WCDMA: $RBW \geq 1\%$ 26db bandwidth, VBW=3 RBW, Span 10 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

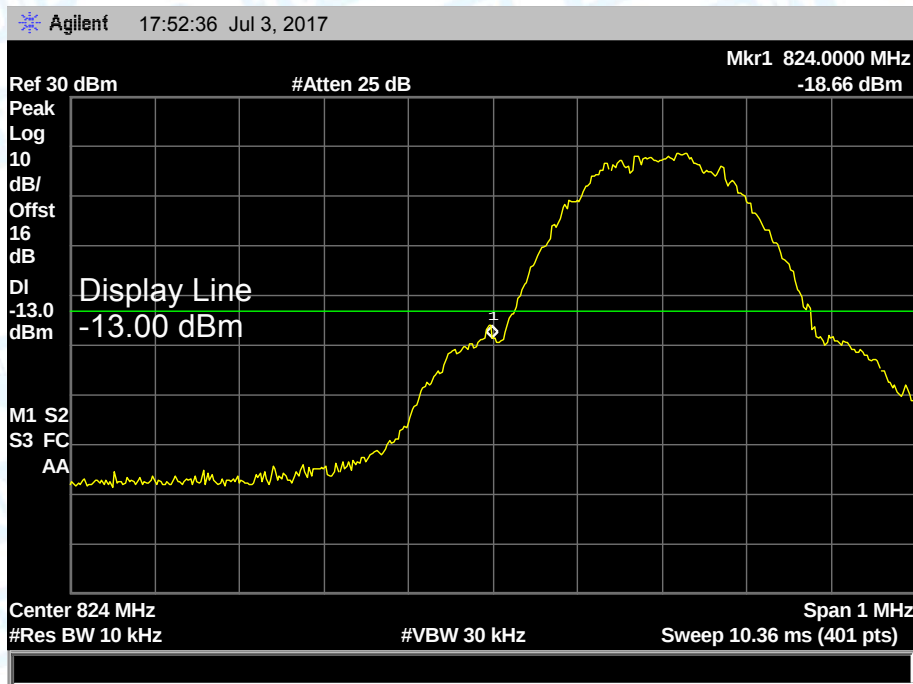
The EUT was continuously connected with the Base station and transmitting in the max power during the test.

10.5 Test Data

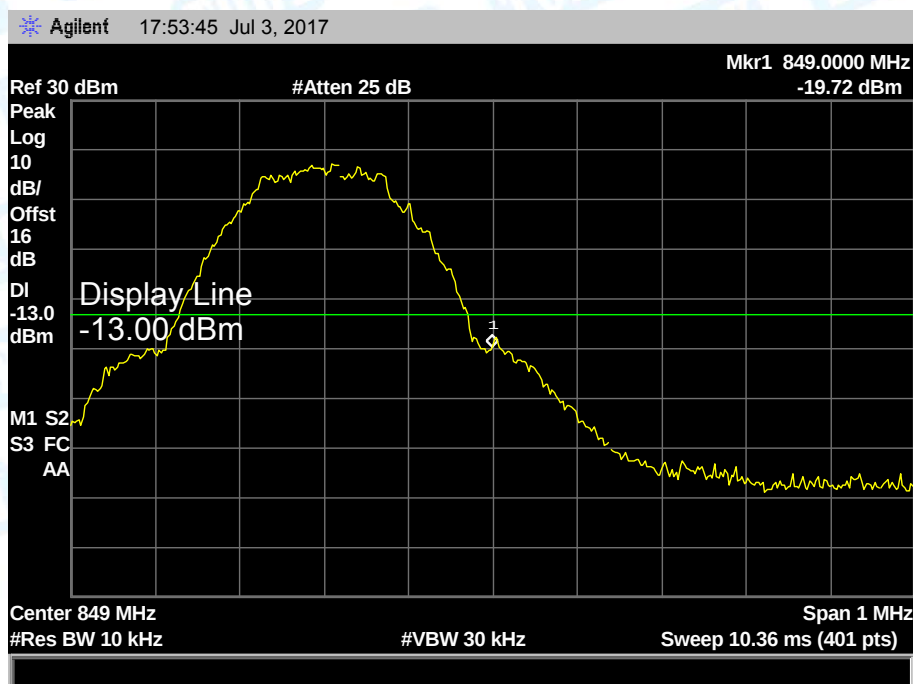
Please refer the following plots:

Band edge emission:

Test Mode:	GSM850
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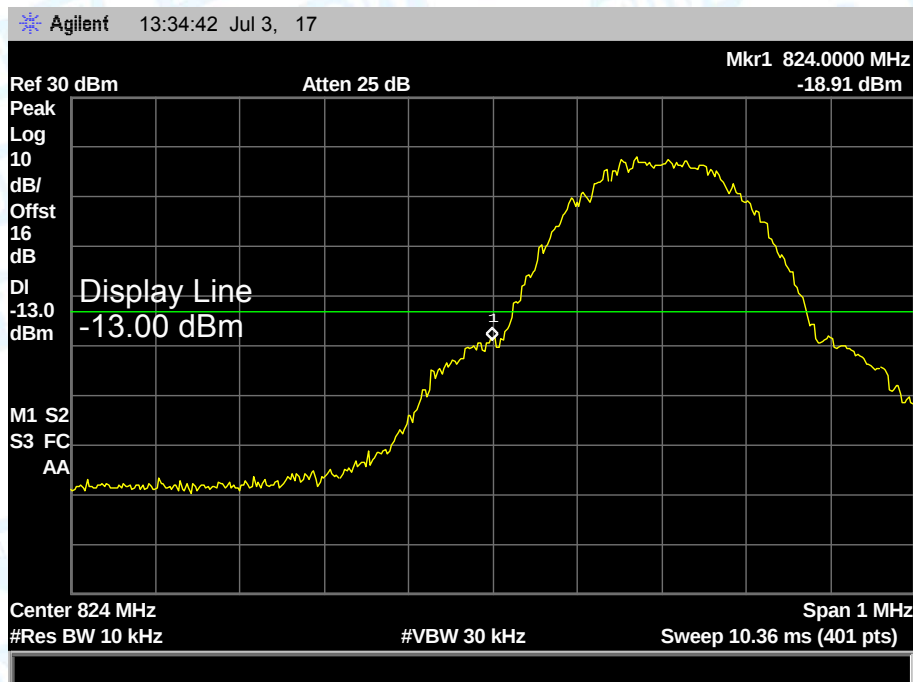


Lowest channel

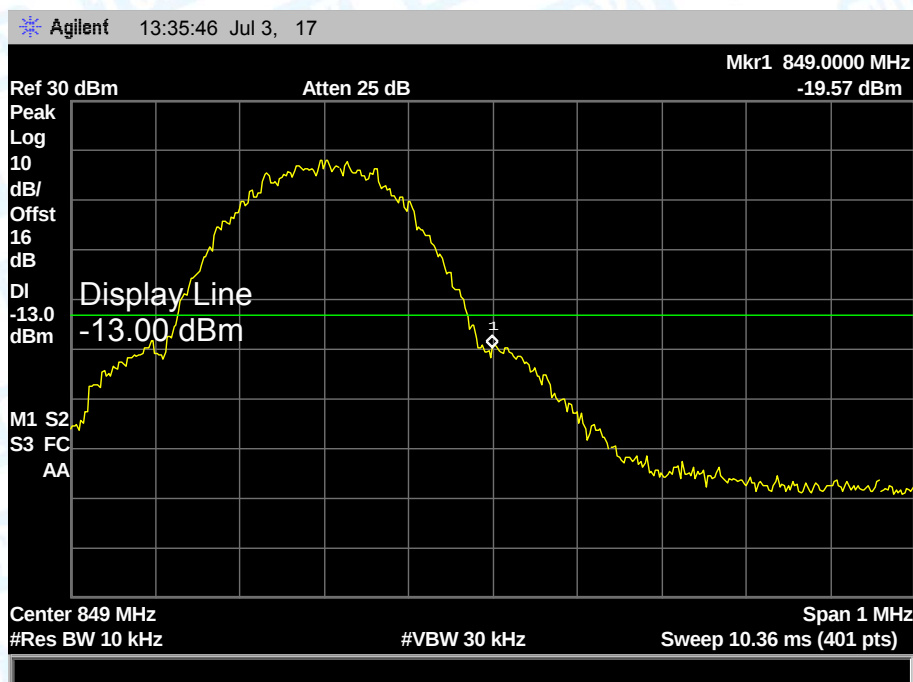


Highest channel

Test Mode:	GPRS850
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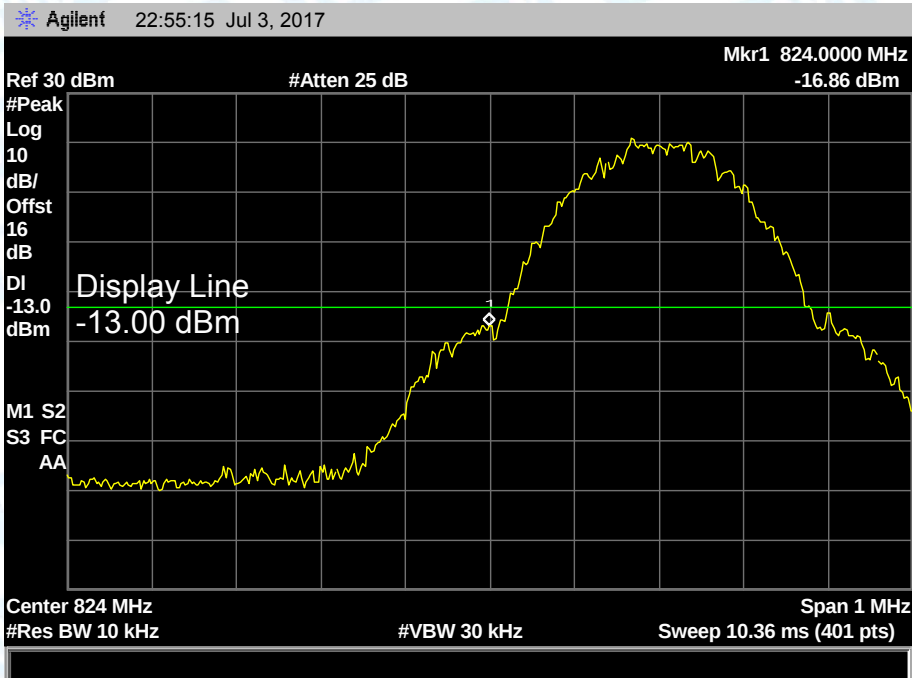
Lowest channel



Highest channel

Test Mode:

EDGE850



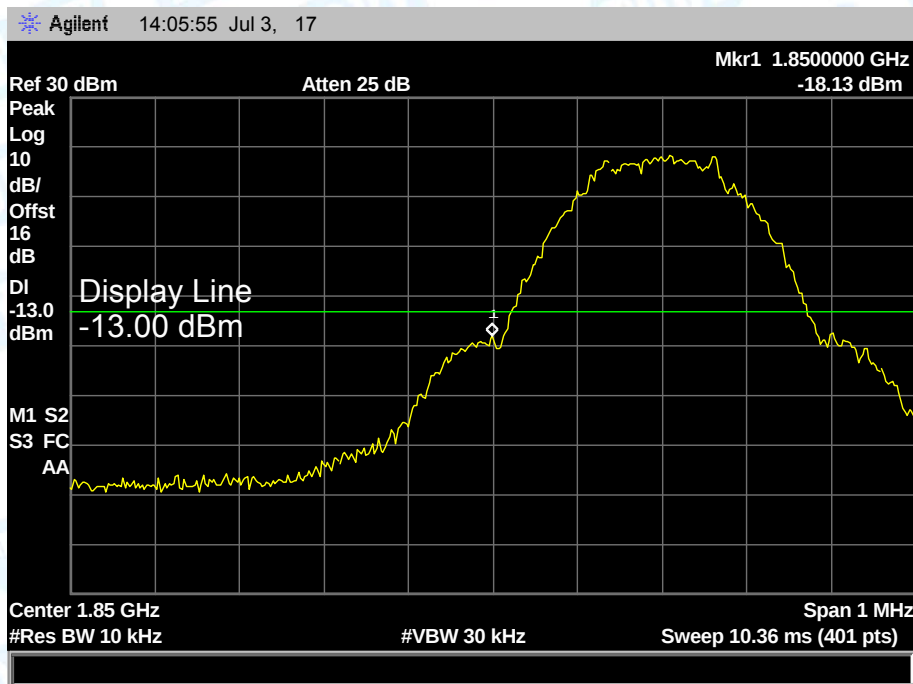
Lowest channel



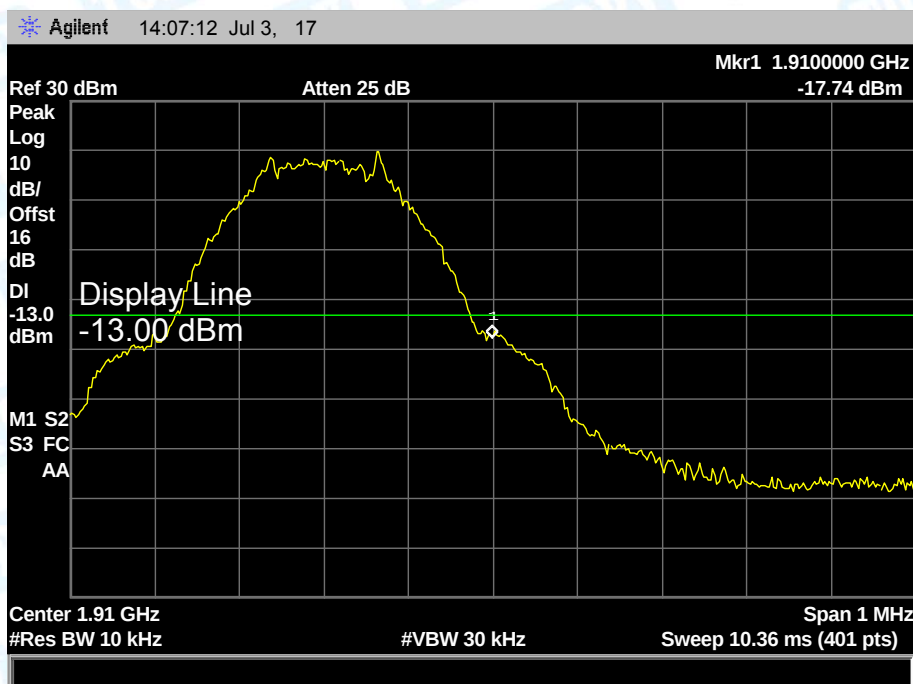
Highest channel

Test Mode:

PCS1900



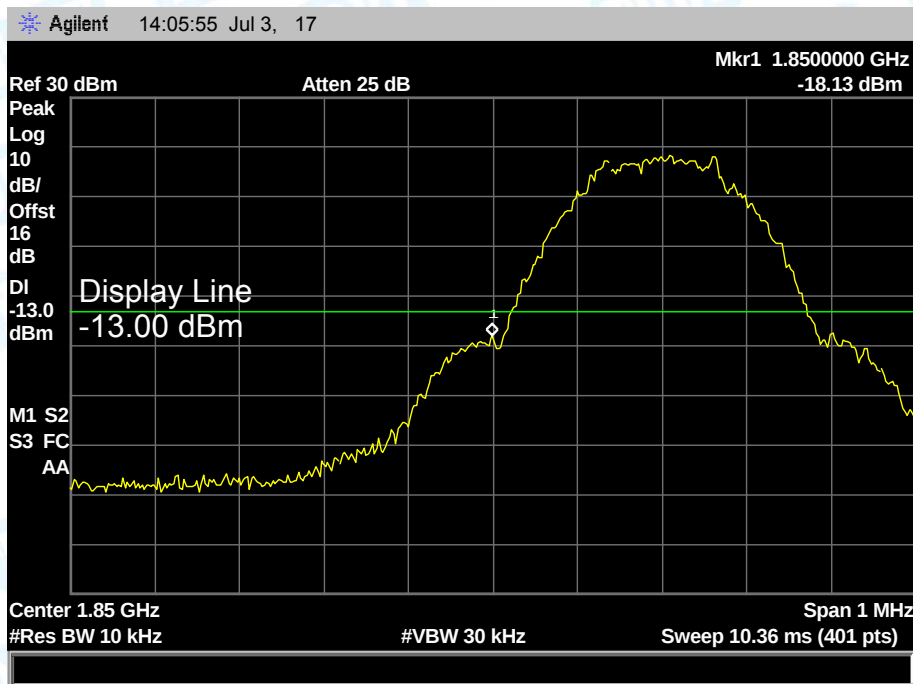
Lowest channel



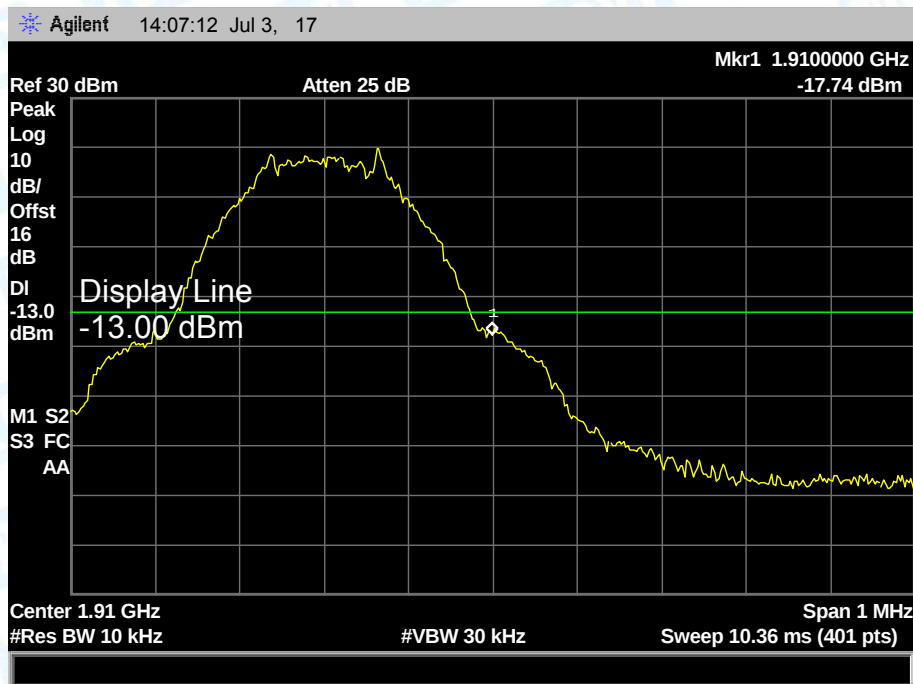
Highest channel

Test Mode:

GPRS1900



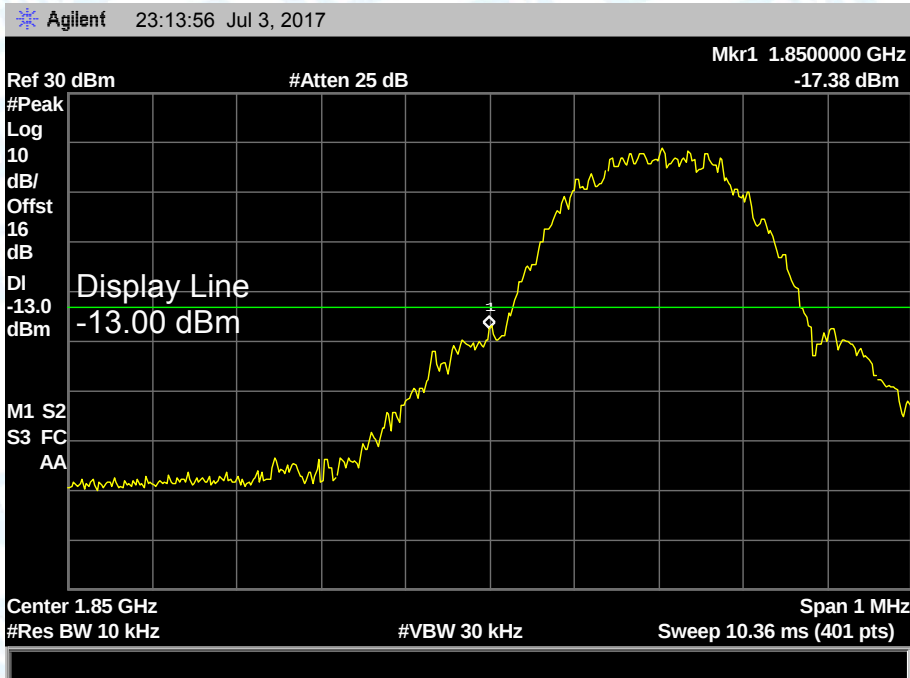
Lowest channel



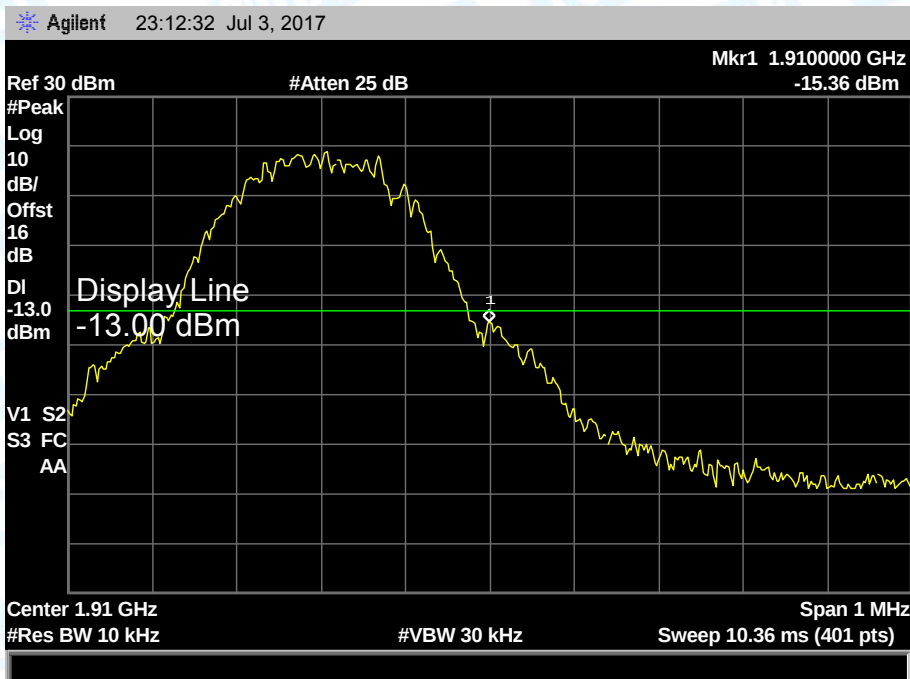
Highest channel

Test Mode:

EDGE1900



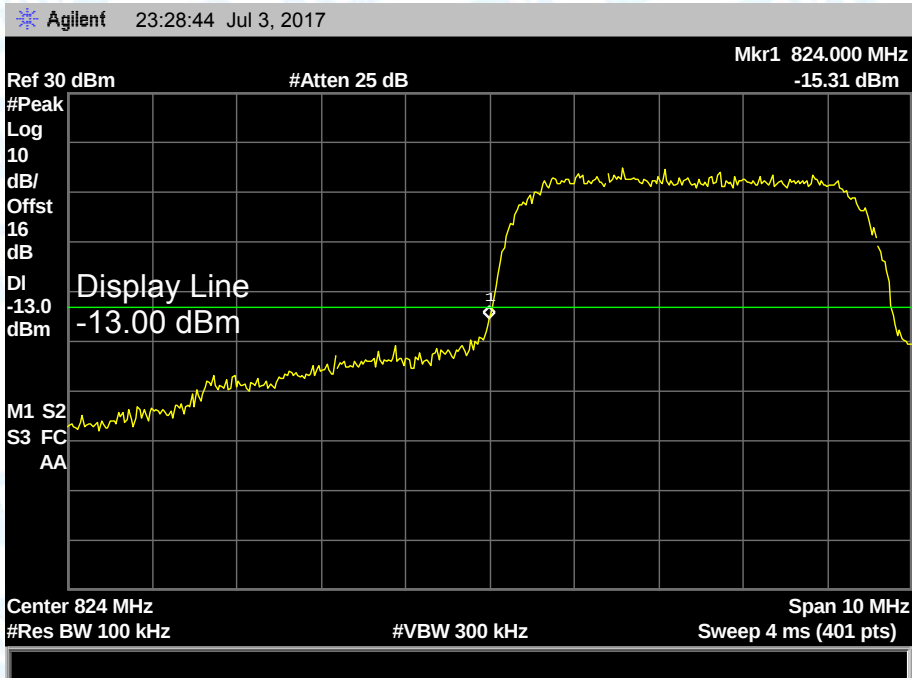
Lowest channel



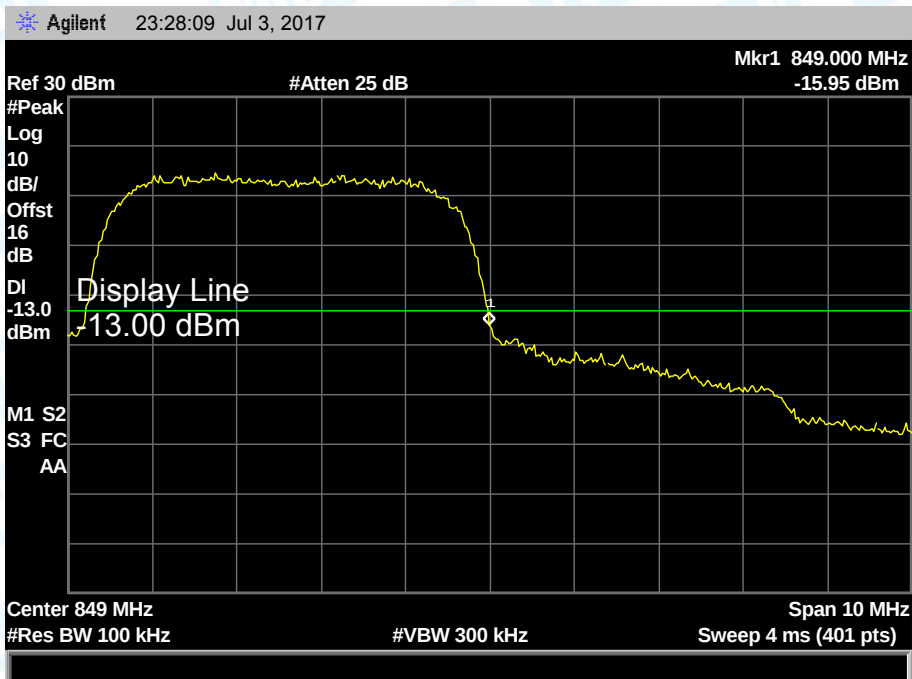
Highest channel

Test Mode:

UMTS Band V 12.2k RMC



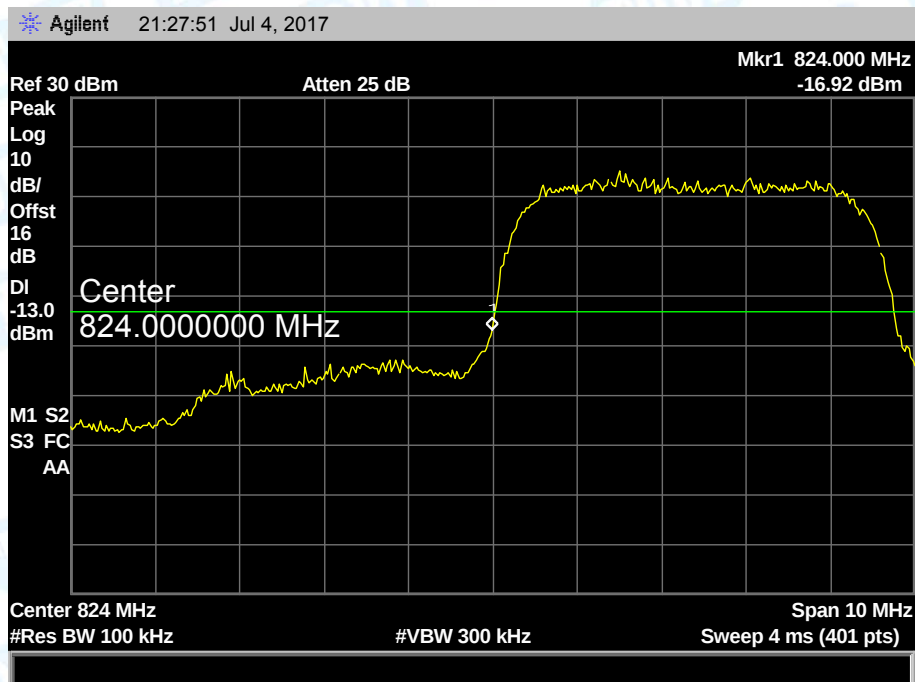
Lowest channel



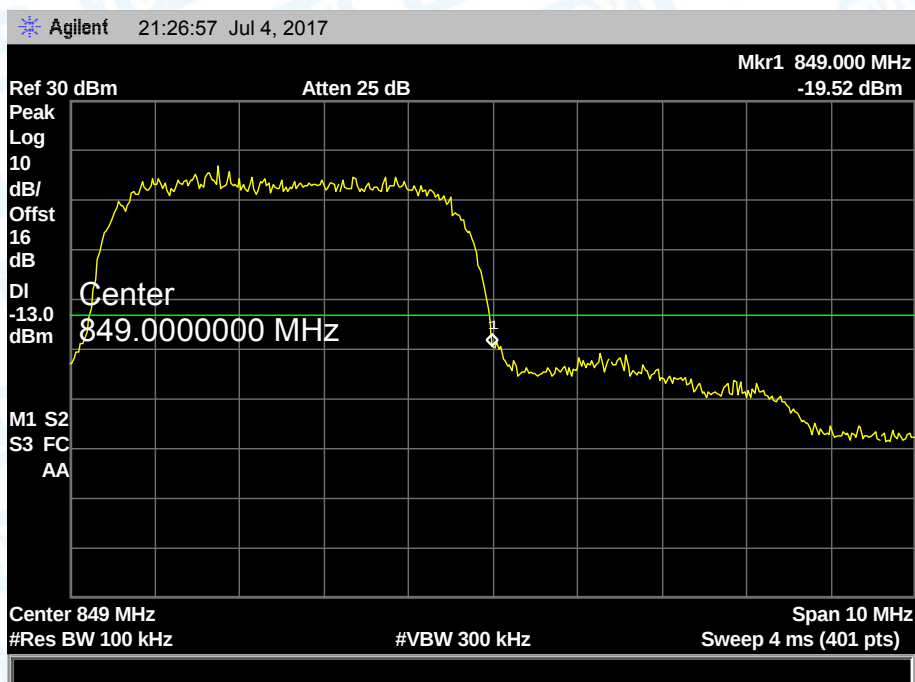
Highest channel

Test Mode:

UMTS Band V 12.2k HSDPA



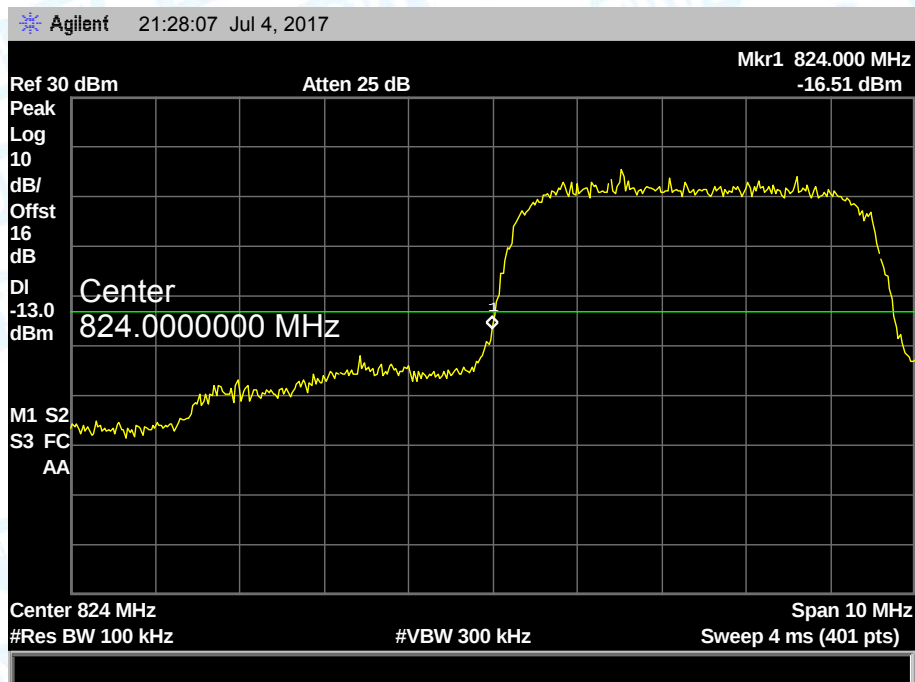
Lowest channel



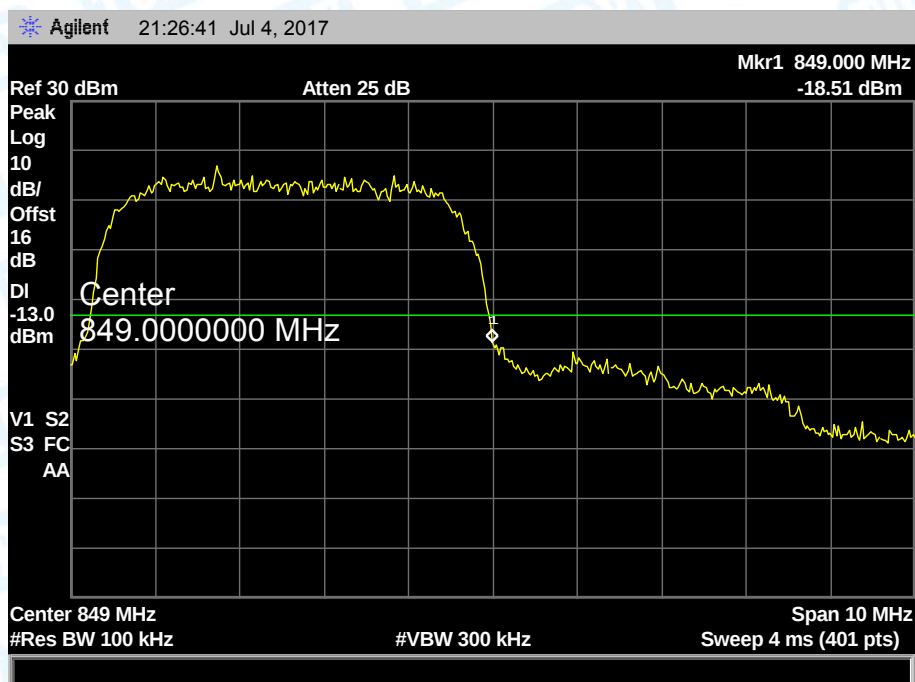
Highest channel

Test Mode:

UMTS Band V 12.2k HSUPA



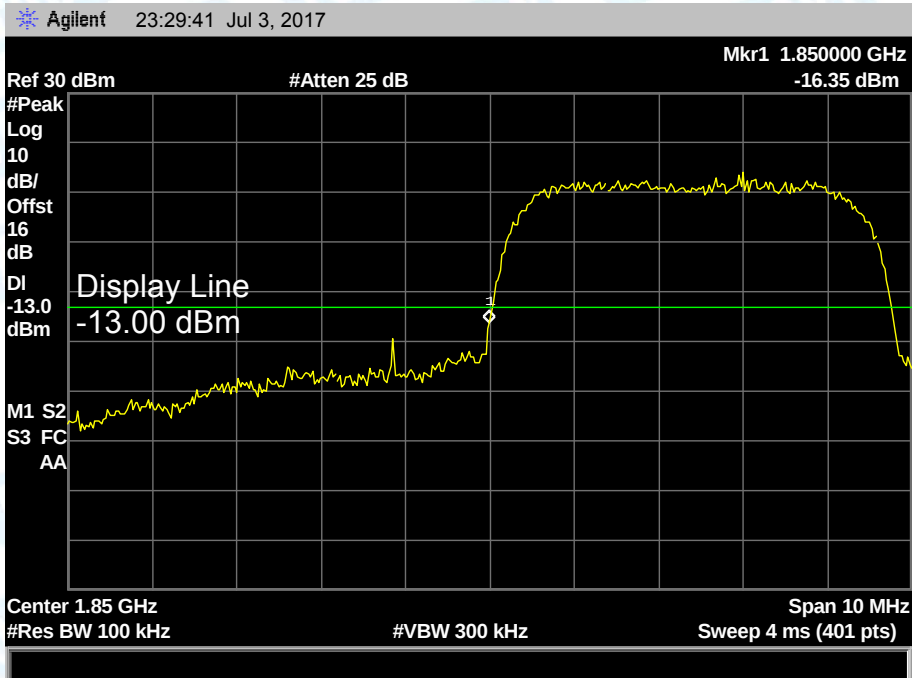
Lowest channel



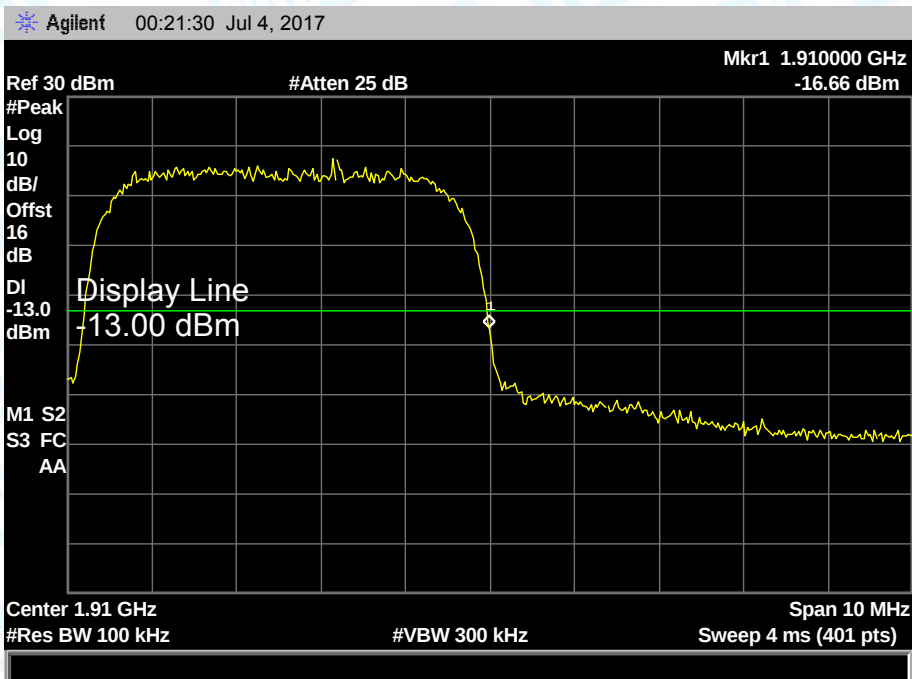
Highest channel

Test Mode:

UMTS Band II 12.2k RMC



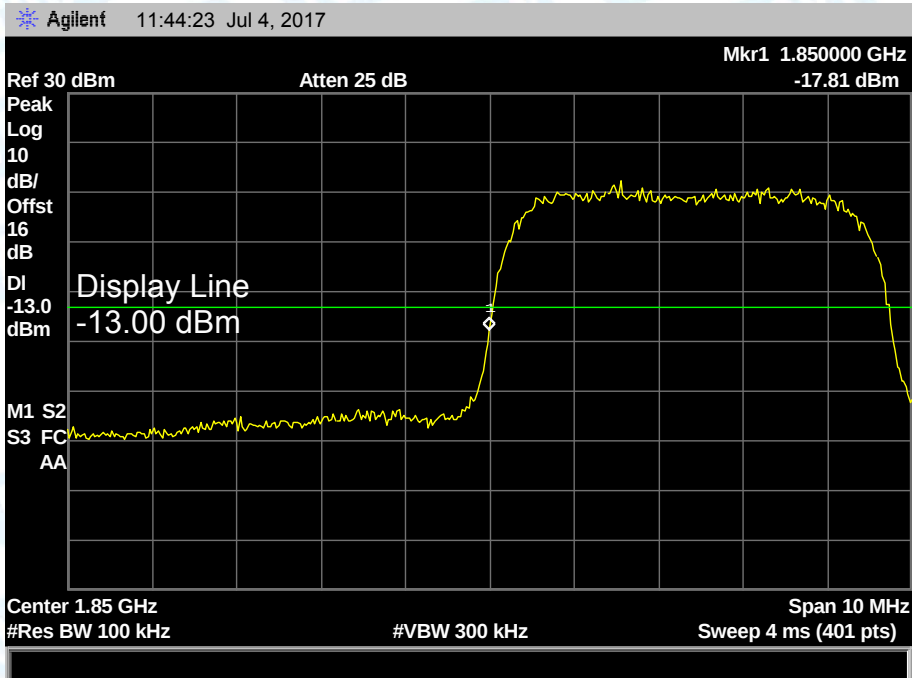
Lowest channel



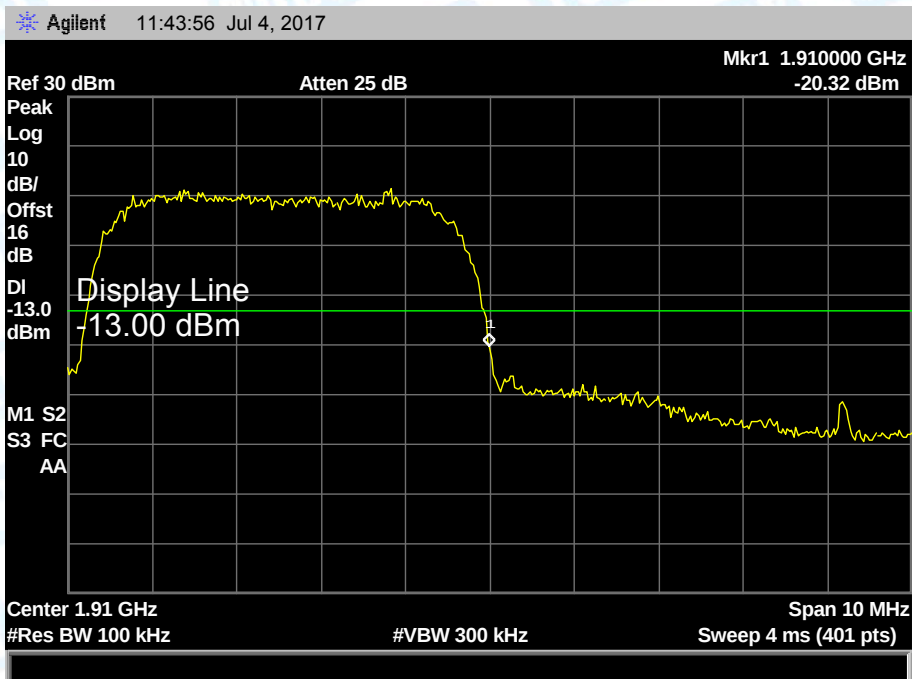
Highest channel

Test Mode:

UMTS Band II 12.2k HSDPA



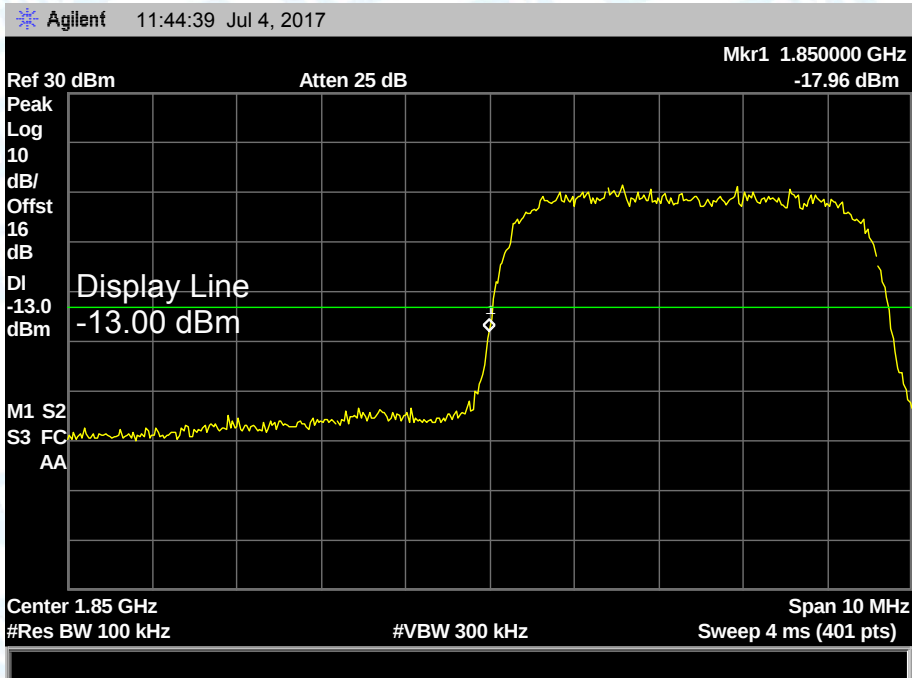
Lowest channel



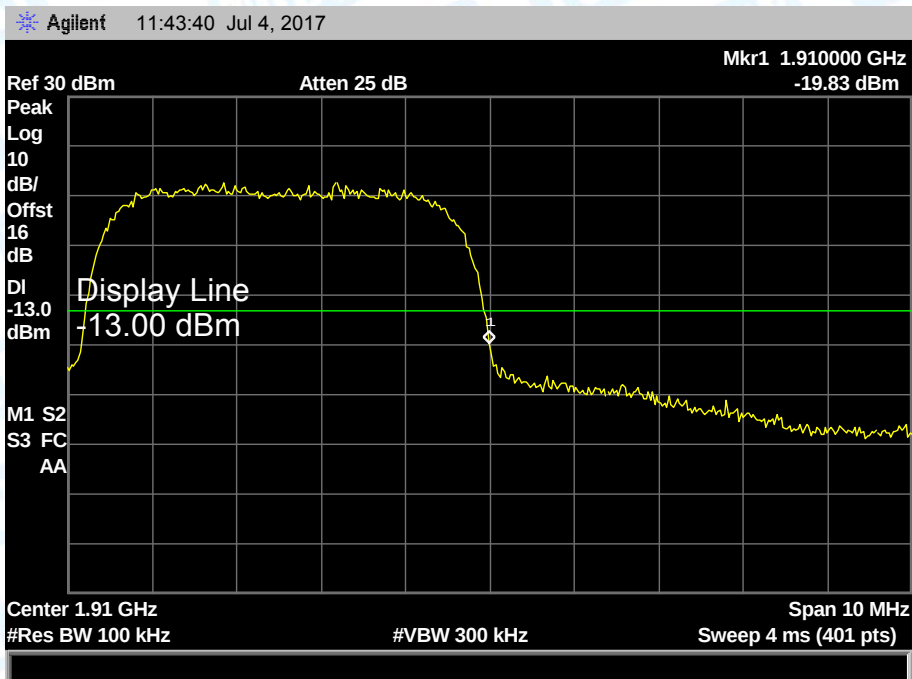
Highest channel

Test Mode:

UMTS Band II 12.2k HSUPA



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

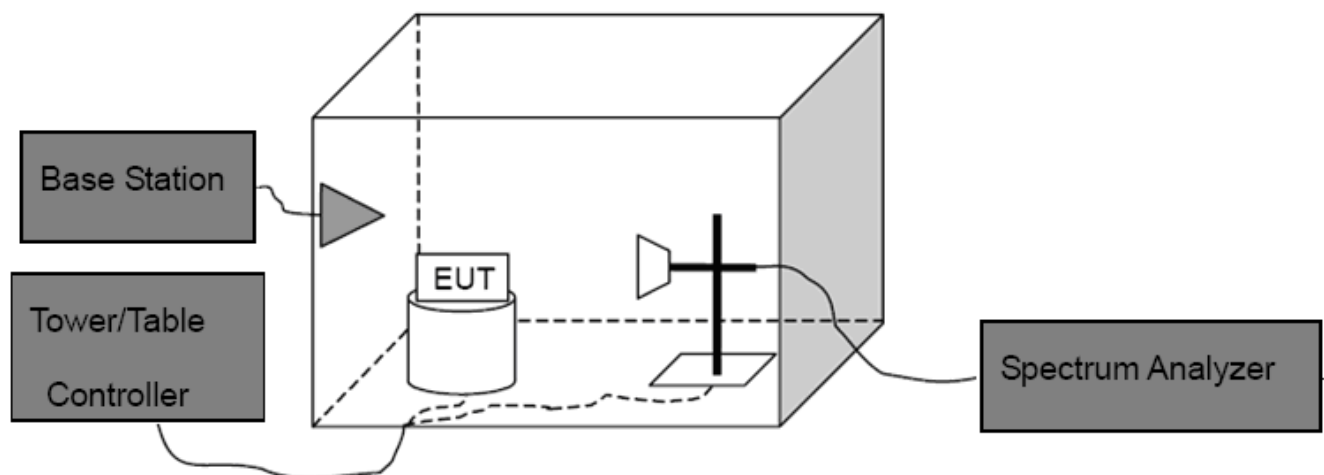
FCC Part 22H: 22.917

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:	GSM 850						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1673.20	Horizontal	-30.56	7.49	3.97	-19.56	-13.00	Pass
2509.80	H	-40.98	7.03	5.05	-23.45		
3346.40	H	-46.87	12.48	5.98	-28.41		
4183.00	H	---	---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-34.78	8.02	3.97	-20.34	-13.00	Pass
2509.80	V	-46.41	10.47	5.05	-24.44		
3346.40	V	-50.66	16.92	5.98	-29.64		
4183.00	V	---	---	---	---		
5019.60	V	---	---	---	---		
5856.20	V	---	---	---	---		
Test mode:	GPRS 850						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1673.20	Horizontal	-31.64	7.49	3.97	-20.64	-13.00	Pass
2509.80	H	-42.12	7.03	5.05	-24.59		
3346.40	H	-47.77	12.48	5.98	-29.31		
4183.00	H	---	---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-35.78	8.02	3.97	-21.34	-13.00	Pass
2509.80	V	-47.61	10.47	5.05	-25.64		
3346.40	V	-50.56	16.92	5.98	-29.54		
4183.00	V	---	---	---	---		
5019.60	V	---	---	---	---		
5856.20	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*836.6MHz=8,366MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	EDGE 850						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1673.20	Horizontal	-30.48	7.49	3.97	-19.48	-13.00	Pass
2509.80	H	-40.99	7.03	5.05	-23.46		
3346.40	H	-47.02	12.48	5.98	-28.56		
4183.00	H		---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-34.57	8.02	3.97	-20.13	-13.00	Pass
2509.80	V	-46.63	10.47	5.05	-24.66		
3346.40	V	-49.51	16.92	5.98	-28.49		
4183.00	V	---	---	---	---		
5019.60	V	---	---	---	---		
5856.20	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*836.6MHz=8,366MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	PCS 1900						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3760.00	Horizontal	-40.56	14.70	6.12	-19.74	-13.00	Pass
5640.00	H	-44.67	13.67	7.86	-23.14		
7520.00	H	-50.26	14.27	9.54	-26.45		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-42.56	15.81	6.12	-20.63	-13.00	Pass
5640.00	V	-46.38	13.80	7.86	-24.72		
7520.00	V	-50.29	13.40	9.54	-27.35		
9400.00	V	---	---	---	---		
11280.00	V	---	---	---	---		
13160.00	V	---	---	---	---		
Test mode:	GPRS 1900						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3760.00	Horizontal	-39.46	14.70	6.12	-18.64	-13.00	Pass
5640.00	H	-45.20	13.67	7.86	-23.67		
7520.00	H	-50.97	14.27	9.54	-27.16		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-41.47	15.81	6.12	-19.54	-13.00	Pass
5640.00	V	-45.52	13.80	7.86	-23.86		
7520.00	V	-49.93	13.40	9.54	-26.99		
9400.00	V	---	---	---	---		
11280.00	V	---	---	---	---		
13160.00	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*1880.0MHz=18,800MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	EDGE 1900						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3760.00	Horizontal	-40.47	14.70	6.12	-19.65	-13.00	Pass
5640.00	H	-45.66	13.67	7.86	-24.13		
7520.00	H	-50.35	14.27	9.54	-26.54		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-42.09	15.81	6.12	-20.16	-13.00	Pass
5640.00	V	-46.53	13.80	7.86	-24.87		
7520.00	V	-49.28	13.40	9.54	-26.34		
9400.00	V	---	---	---	---		
11280.00	V	---	---	---	---		
13160.00	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*1880.0MHz=18,800MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	UMTS Band V 12.2k RMC						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1673.20	Horizontal	-29.65	7.49	3.97	-18.65	-13.00	Pass
2509.80	H	-39.96	7.03	5.05	-22.43		
3346.40	H	-43.72	12.48	5.98	-25.26		
4183.00	H		---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-34.90	8.02	3.97	-20.46	-13.00	Pass
2509.80	V	-45.45	10.47	5.05	-23.48		
3346.40	V	-47.08	16.92	5.98	-26.06		
4183.00	V	---	---	---	---		
5019.60	V	---	---	---	---		
5856.20	V	---	---	---	---		
Test mode:	UMTS Band V HSDPA						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1673.20	Horizontal	-31.42	7.49	3.97	-20.42	-13.00	Pass
2509.80	H	-42.20	7.03	5.05	-24.67		
3346.40	H	-44.58	12.48	5.98	-26.12		
4183.00	H		---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-34.11	8.02	3.97	-19.67	-13.00	Pass
2509.80	V	-46.09	10.47	5.05	-24.12		
3346.40	V	-48.08	16.92	5.98	-27.06		
4183.00	V	---	---	---	---		
5019.60	V	---	---	---	---		
5856.20	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*836.6MHz=8,366MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	UMTS Band V HSUPA						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
1673.20	Horizontal	-30.67	7.49	3.97	-19.67	-13.00	Pass
2509.80	H	-41.65	7.03	5.05	-24.12		
3346.40	H	-45.52	12.48	5.98	-27.06		
4183.00	H		---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-36.07	8.02	3.97	-21.63	-13.00	Pass
2509.80	V	-47.79	10.47	5.05	-25.82		
3346.40	V	-48.68	16.92	5.98	-27.66		
4183.00	V	---	---	---	---		
5019.60	V	---	---	---	---		
5856.20	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*836.6MHz=8,366MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	UMTS Band II 12.2k RMC						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3760.00	Horizontal	-39.78	14.70	6.12	-18.96	-13.00	Pass
5640.00	H	-43.22	13.67	7.86	-21.69		
7520.00	H	-49.49	14.27	9.54	-25.68		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-41.56	15.81	6.12	-19.63	-13.00	Pass
5640.00	V	-45.20	13.80	7.86	-23.54		
7520.00	V	-50.62	13.40	9.54	-27.68		
9400.00	V	---	---	---	---		
11280.00	V	---	---	---	---		
13160.00	V	---	---	---	---		
Test mode:	UMTS Band II HSDPA						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3760.00	Horizontal	-39.47	14.70	6.12	-18.65	-13.00	Pass
5640.00	H	-45.20	13.67	7.86	-23.67		
7520.00	H	-50.62	14.27	9.54	-26.81		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-42.27	15.81	6.12	-20.34	-13.00	Pass
5640.00	V	-46.90	13.80	7.86	-25.24		
7520.00	V	-51.56	13.40	9.54	-28.62		
9400.00	V	---	---	---	---		
11280.00	V	---	---	---	---		
13160.00	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*1880.0MHz=18,800MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

Test mode:	UMTS Band II HSUPA						
Channel:	Middle			Date of Test:	2017-07-03		
Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
	Polarization (H&V)	Read Level (dBm)	Antenna Correct Factor (dBi)	Cable Loss (dB)	Emission Level (dBm)		
3760.00	Horizontal	-40.34	14.70	6.12	-19.52	-13.00	Pass
5640.00	H	-46.00	13.67	7.86	-24.47		
7520.00	H	-49.55	14.27	9.54	-25.74		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-43.45	15.81	6.12	-21.52	-13.00	Pass
5640.00	V	-48.01	13.80	7.86	-26.35		
7520.00	V	-51.72	13.40	9.54	-28.78		
9400.00	V	---	---	---	---		
11280.00	V	---	---	---	---		
13160.00	V	---	---	---	---		
Remark: 1, The testing has been conformed to 10*1880.0MHz=18,800MHz. 2, All other emissions more than 30 dB below the limit. 3, Emission Level= Read Level+ Antenna Correct Factor +Cable Loss							

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