

FCC Radio Test Report

FCC ID: 2ARNVS218

Original Grant

Report No. : TB-FCC1623665
Applicant : Shenzhen Chiteng Technology Co.,LTD
Equipment Under Test (EUT)
EUT Name : Mobile phone
Model No. : Storm 3
Series Model No. : Storm 3X, Storm 3L, Storm 4, Storm 4 Pro
Brand Name : kgtel
Receipt Date : 2018-10-16
Test Date : 2018-10-17 to 2018-11-06
Issue Date : 2018-11-07
Standards : FCC Part 2
FCC Part 22 Subpart H, FCC Part 24 Subpart E, 2017
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 :  Jason Xu
Engineer Supervisor :  Ivan Su
Engineer Manager :  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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Revision History

Report No.	Version	Description	Issued Date
TB-FCC162365	Rev.01	Initial issue of report	2018-11-07

1. General Information about EUT

1.1 Client Information

Applicant	:	Shenzhen Chiteng Technology Co.,LTD
Address	:	2/F, 4A Block, Huiye Technology Park, No.8 Huiye Road, Guang Ming New District, Shenzhen, China
Manufacturer	:	Shenzhen Chiteng Technology Co.,LTD
Address	:	2/F, 4A Block, Huiye Technology Park, No.8 Huiye Road, Guang Ming New District, Shenzhen, China

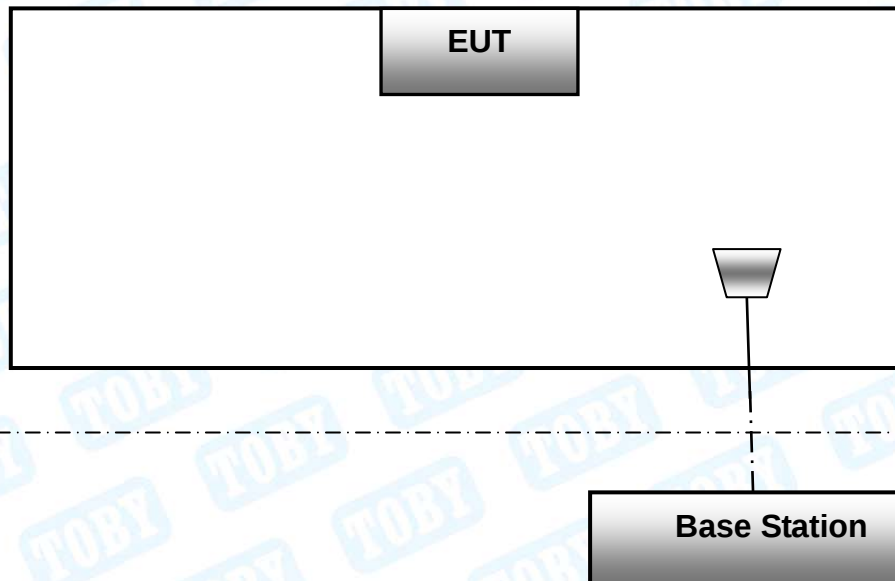
1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Mobile phone
Models No.	:	Storm 3, Storm 3X, Storm 3L, Storm 4, Storm 4 Pro
Model Difference	:	All these models are identical in the same PCB layout and electrical circuit, the only difference is the appearance color.
Product Description	Frequency Bands: GSM850; PCS1900;	
	GSM 850 Power :	Cond:33.33 dBm ERP:32.41 dBm
	PCS 1900 Power :	Cond:29.54 dBm EIRP:27.35 dBm
	Antenna Gain:	-2.8 dB PIFA Antenna
	Modulation Type:	GSM/GPRS:GMSK
FCC Operating Frequency	:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
Emission Designator	:	GSM 850: 328KGXW, GSM 1900: 319KGXW GPRS 850: 324KG7W, GPRS 1900: 322KG7W
Power Rating	:	DC 3.7V by rechargeable Li-ion Battery(800mAh). USB DC 5V from AC/DC Adapter(FSF-01): Input: AC 100-240V, 50/60Hz, 0.25A. Output: DC 5V, 500mA.
Software Version	:	CE218_3232_128160_Q18282L_STORM3_KGTEL
Hardware Version	:	CE218-MAIN_V1.2
Connecting I/O Port(S)	:	Please refer to the User's Manual

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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
	190	836.60
	251	848.80
PCS 1900	512	1850.20
	661	1880.00
	810	1909.80
Test Mode		Description
GPRS 850		highest , middle, lowest channels
GPRS 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 GPRS 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 150kHz to 30MHz	± 3.42 dB ± 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.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

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

Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul.18, 2018	Jul. 17, 2019
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul.18, 2018	Jul. 17, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.16, 2018	Mar. 15, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar.16, 2018	Mar. 15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.16, 2018	Mar. 15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.16, 2018	Mar. 15, 2019
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 03, 2017	Jul. 02, 2018
Pre-amplifier	Sonoma	310N	185903	Mar.17, 2018	Mar. 16, 2019
Pre-amplifier	HP	8449B	3008A00849	Mar.17, 2018	Mar. 16, 2019
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.17, 2018	Mar. 16, 2019
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul.18, 2018	Jul. 17, 2019
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul.18, 2018	Jul. 17, 2019
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 15, 2018	Sep. 14, 2019
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 15, 2018	Sep. 14, 2019
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 15, 2018	Sep. 14, 2019
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 15, 2018	Sep. 14, 2019
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	144382	Sep. 15, 2018	Sep. 14, 2019
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jul.18, 2018	Jul. 17, 2019

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:

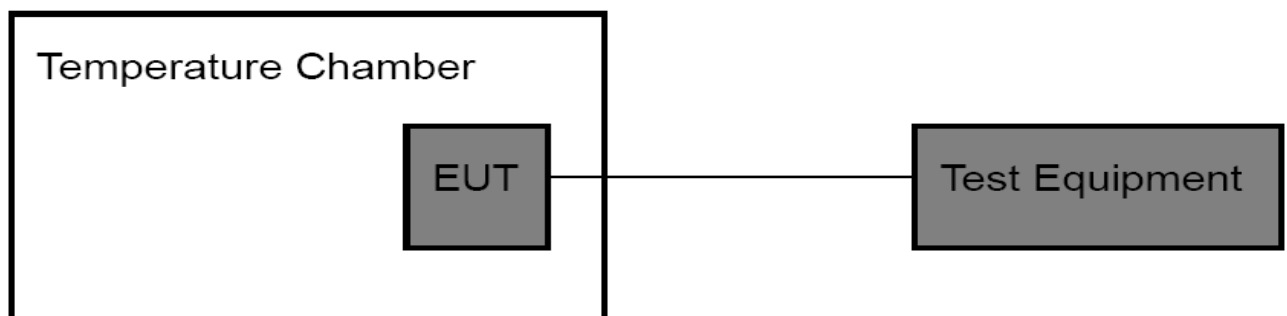
The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .

(2) Primary Supply Voltage:

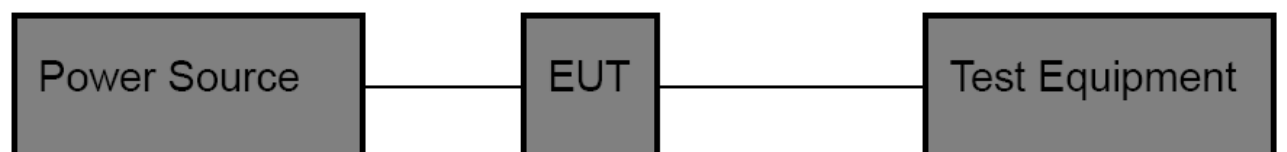
For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at input to the cable normally provide with the equipment, or at the power supply terminals if cables 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.

4.5 Test Data

Please refer to the Attachment A.

5. Conducted RF Output Power

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 2: 2.1046

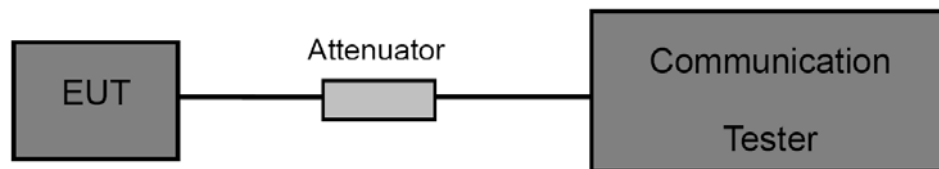
FCC Part 22H : 22.913 (a)

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 Test Data

Please refer to the Attachment B.

6. Peak-Average Ratio

6.1 Test Standard and Limit

6.1.1 Test Standard

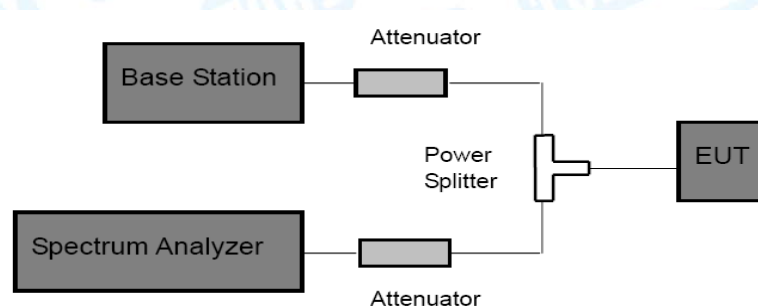
FCC Part 24E: 24.232 (d)

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

Please refer to the Attachment C.

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)

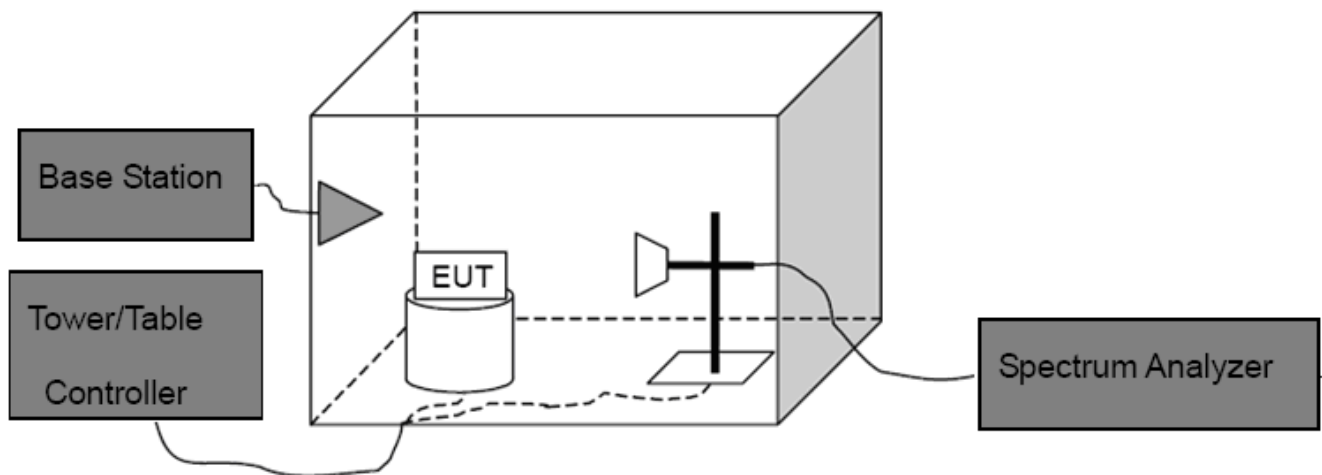
7.1.2 Test Limit

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

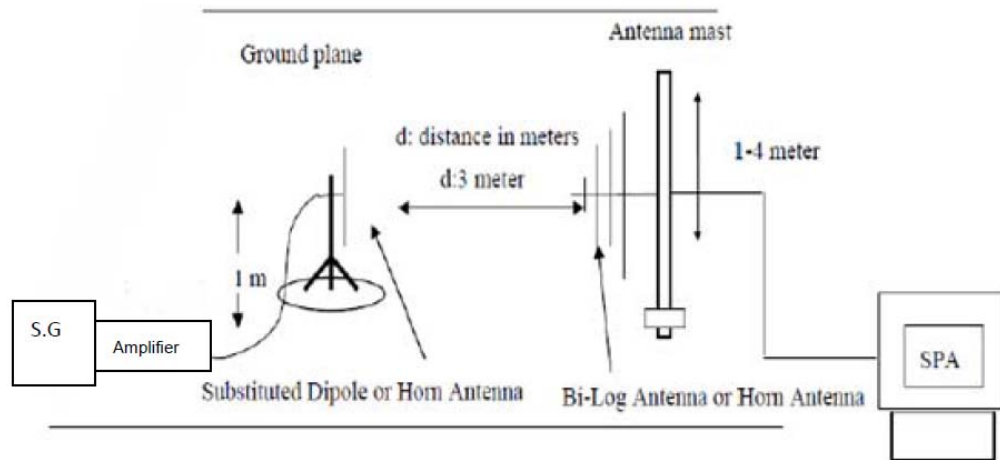
According to FCC Part 24.232 (c), the Mobile/portable stations are limited to 2 Watts(33 dBm) EIRP peak power.

Cellular Band		PCS Band	
GSM 850	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

Please refer to the Attachment D.

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)

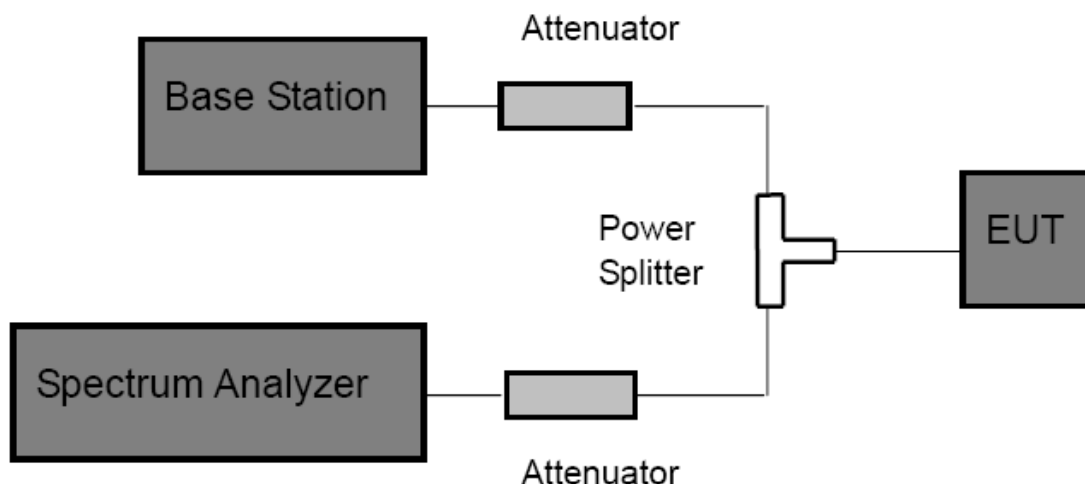
FCC Part 24E: 24.232 (c)

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 to the Attachment E.

9. Conducted Out of Band Emissions

9.1 Test Standard and Limit

9.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

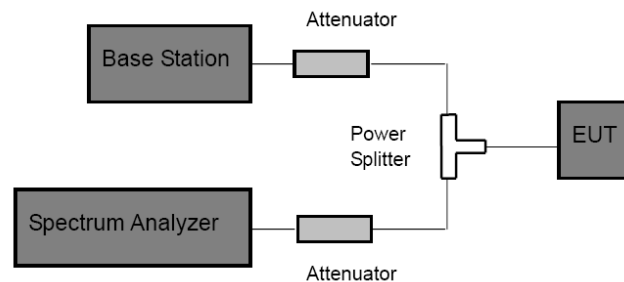
FCC Part 22H: 22.917(a)

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 to the Attachment F.

10. Band Edge Test

10.1 Test Standard and Limit

10.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

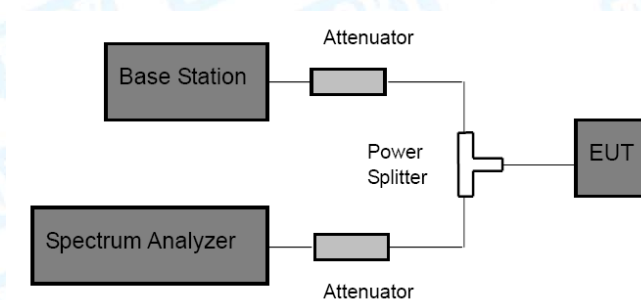
FCC Part 22H: 22.917(a)

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 to the Attachment G.

11. Radiated Out Band of Emissions

11.1 Test Standard and Limit

11.1.1 Test Standard

FCC Part 2: 2.1053, 2.1057

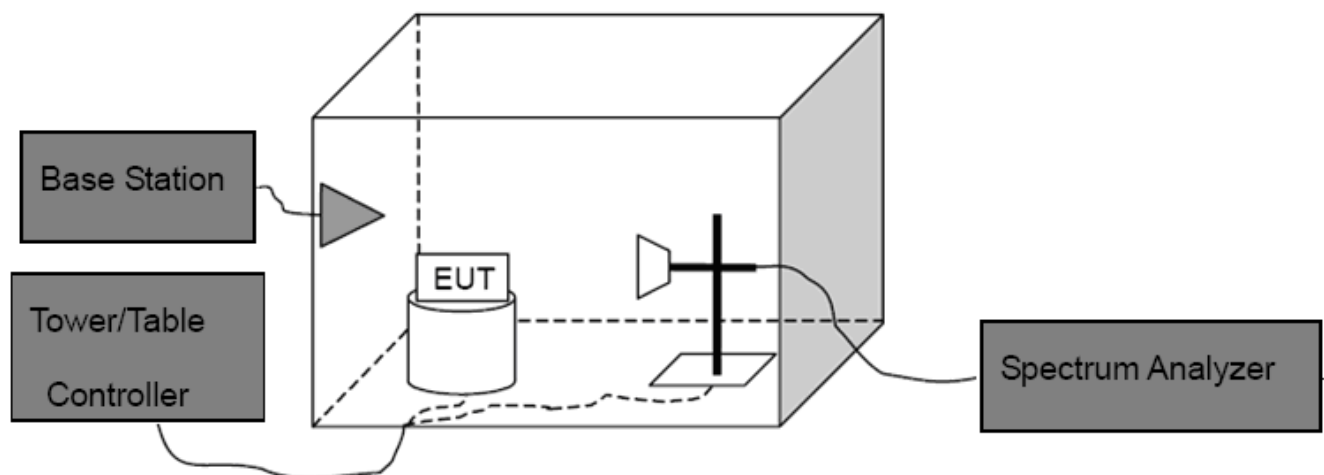
FCC Part 22H: 22.917

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 to the Attachment H.

Attachment A--Frequency Stability

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	23	0.027	18	0.022	/	/
-20	24	0.029	21	0.025	/	/
-10	19	0.023	20	0.024	/	/
0	22	0.026	19	0.023	/	/
10	24	0.029	18	0.022	/	/
20	29	0.035	22	0.026	/	/
30	21	0.025	24	0.029	/	/
40	23	0.027	23	0.027	/	/
50	20	0.024	22	0.026	/	/
60	19	0.023	19	0.023	/	/
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	22	0.033	19	0.029	/	/
-20	25	0.038	23	0.035	/	/
-10	29	0.044	18	0.027	/	/
0	19	0.029	23	0.035	/	/
10	20	0.030	19	0.029	/	/
20	22	0.033	20	0.030	/	/
30	18	0.027	21	0.032	/	/
40	28	0.042	22	0.033	/	/
50	24	0.036	18	0.027	/	/
60	26	0.039	23	0.035	/	/
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	26	0.031	24	0.029	/	/
3.70	27	0.032	22	0.026	/	/
4.26	26	0.031	25	0.030	/	/
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	23	0.035	21	0.032	/	/
3.70	19	0.029	17	0.026	/	/
4.26	20	0.030	19	0.029	/	/
Limit	2.5 (ppm)					
Result	PASS					

Attachment B--Conducted RF Output Power

GSM 850				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GSM 850	128	824.2	33.08	2.032
	190	836.6	33.10	2.042
	251	848.8	33.33	2.153
GPRS 850 (1 Slot)	128	824.2	32.85	1.928
	190	836.6	32.58	1.811
	251	848.8	32.76	1.888
GPRS 850 (2 Slot)	128	824.2	32.12	1.629
	190	836.6	32.25	1.679
	251	848.8	32.08	1.614
GPRS 850 (3 Slot)	128	824.2	31.85	1.531
	190	836.6	31.69	1.476
	251	848.8	31.87	1.538
GPRS 850 (4 Slot)	128	824.2	30.78	1.197
	190	836.6	30.96	1.247
	251	848.8	30.89	1.227

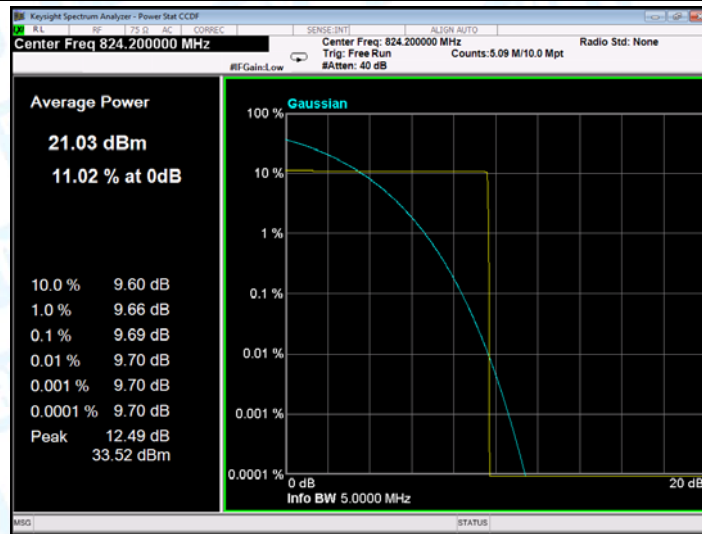
PCS 1900				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GSM 1900	512	1850.2	28.04	0.637
	661	1880.0	28.79	0.757
	810	1909.8	29.54	0.899
GPRS 1900 (1 Slot)	512	1850.2	27.69	0.587
	661	1880.0	27.97	0.627
	810	1909.8	27.58	0.573
GPRS 1900 (2 Slot)	512	1850.2	27.42	0.552
	661	1880.0	27.36	0.545
	810	1909.8	27.25	0.531
GPRS 1900 (3 Slot)	512	1850.2	26.86	0.485
	661	1880.0	26.85	0.484
	810	1909.8	26.74	0.472
GPRS 1900 (4 Slot)	512	1850.2	26.12	0.409
	661	1880.0	26.25	0.422
	810	1909.8	26.35	0.432

Attachment C--Peak-Average Ratio

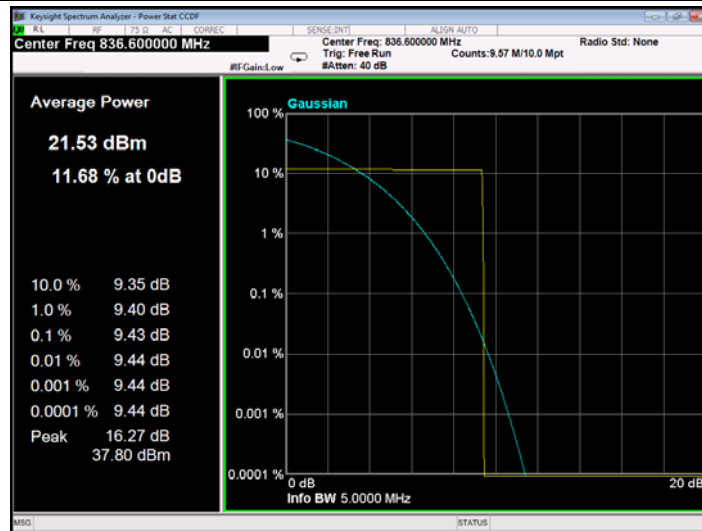
Mode	Channel	Frequency (MHz)	PAR with 0.1% probability (dB)
GSM 850	128	824.2	9.69
	190	836.6	9.43
	251	848.8	9.13
GPRS 850	128	824.2	9.85
	190	836.6	9.33
	251	848.8	9.62
PCS 1900	512	1850.2	9.49
	661	1880.0	8.56
	810	1909.8	9.52
GPRS 1900	512	1850.2	9.99
	661	1880.0	9.22
	810	1909.8	9.69
Limit $\leq$ 13dB			

GSM 850

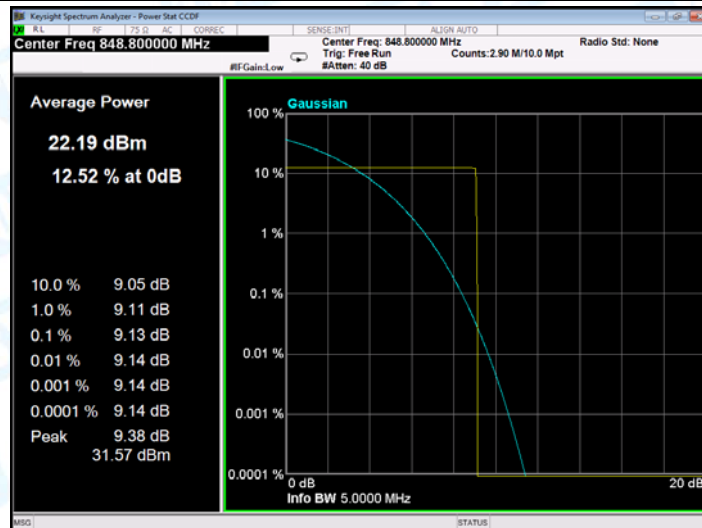
CH 128



CH 190

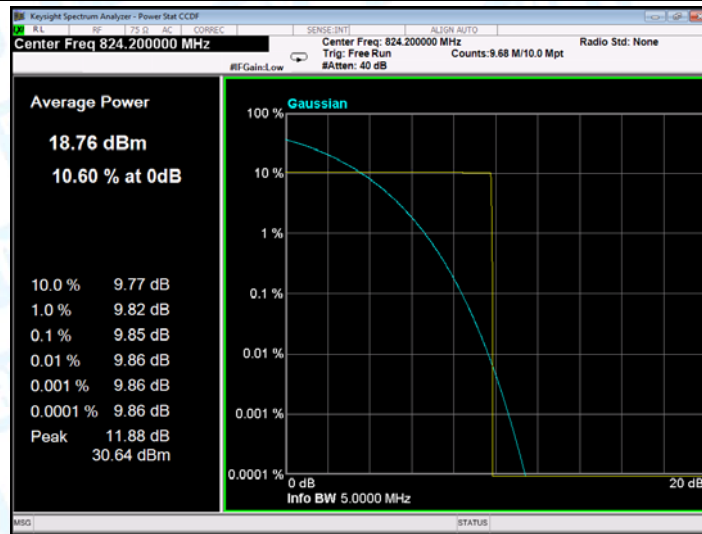


CH 251

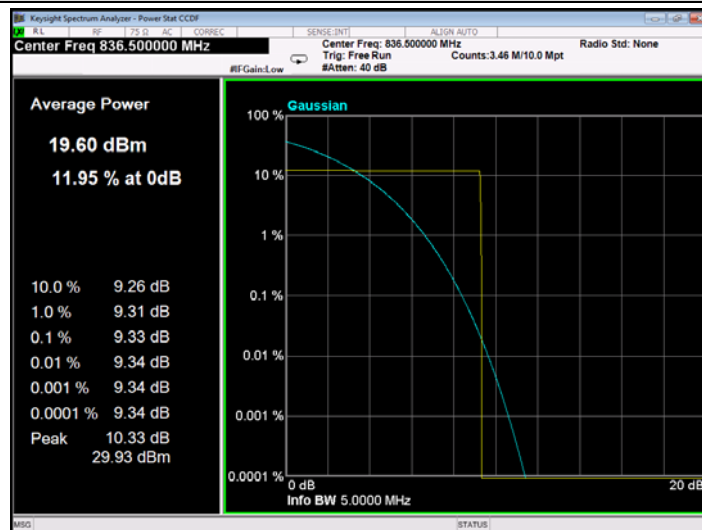


GPRS 850

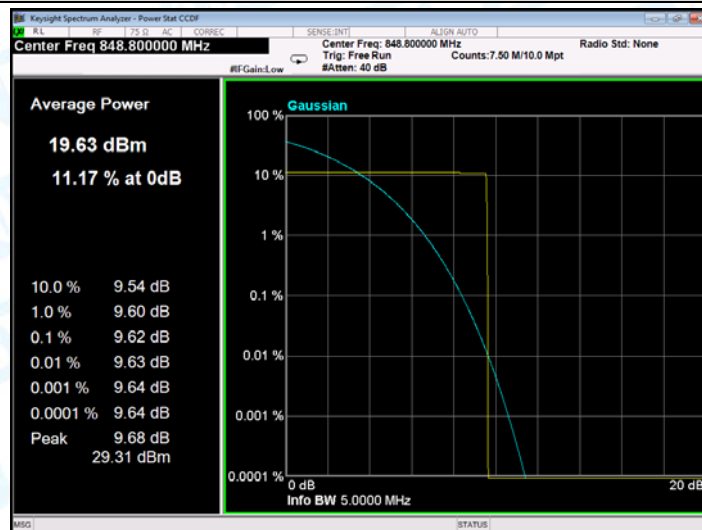
CH 128



CH 190

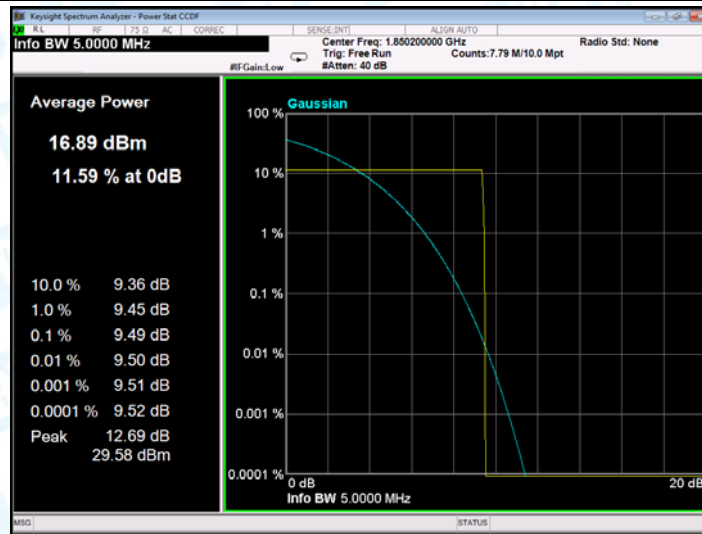


CH 251

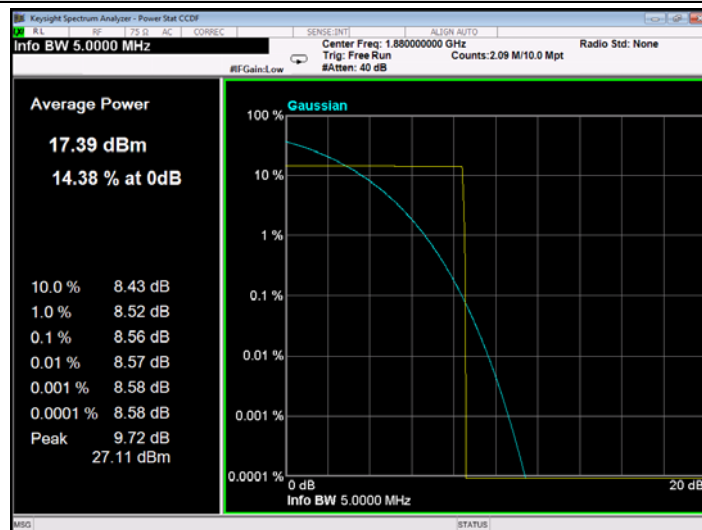


PCS 1900

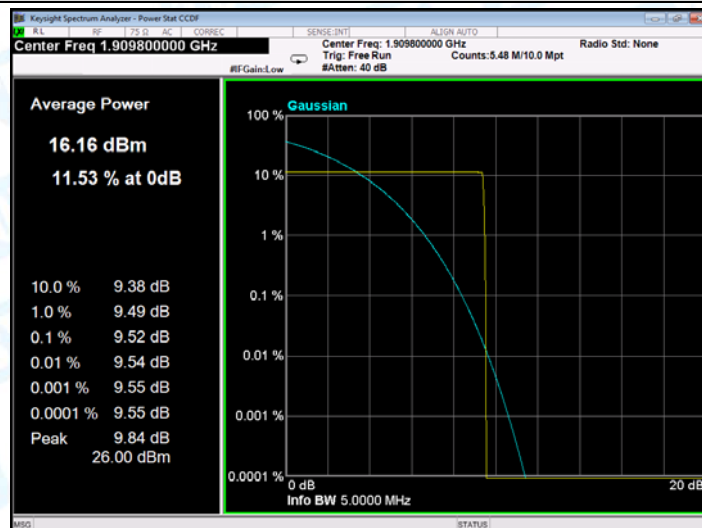
CH 512



CH 661

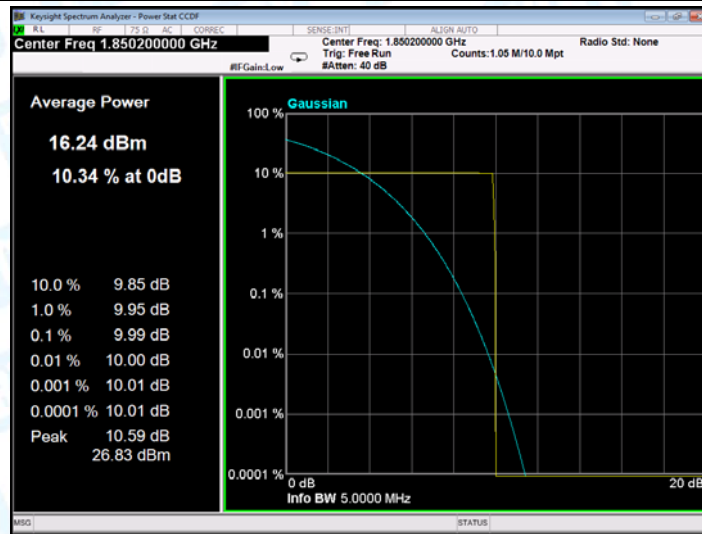


CH 810

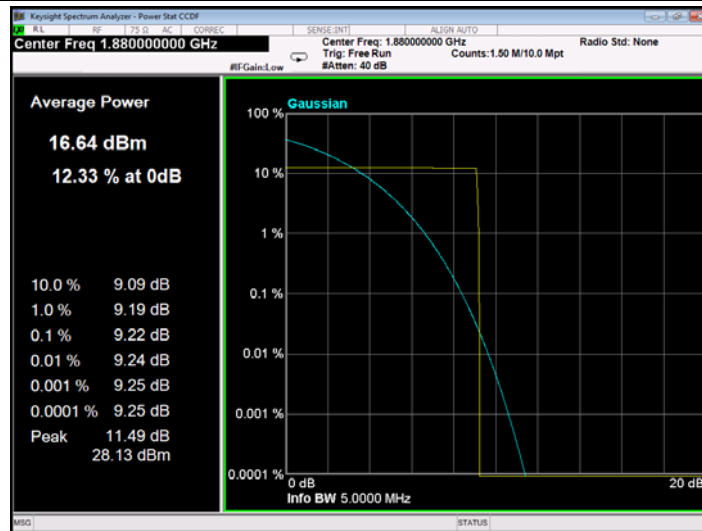


GPRS 1900

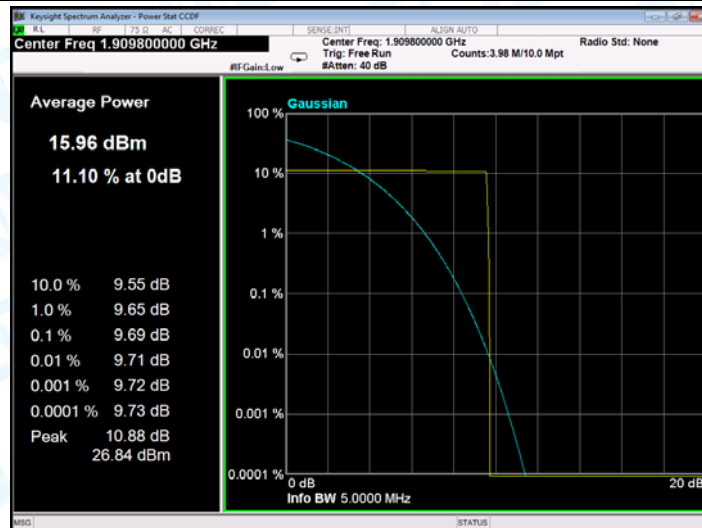
CH 512



CH 661



CH 810



Attachment D-- Radiated Output Power

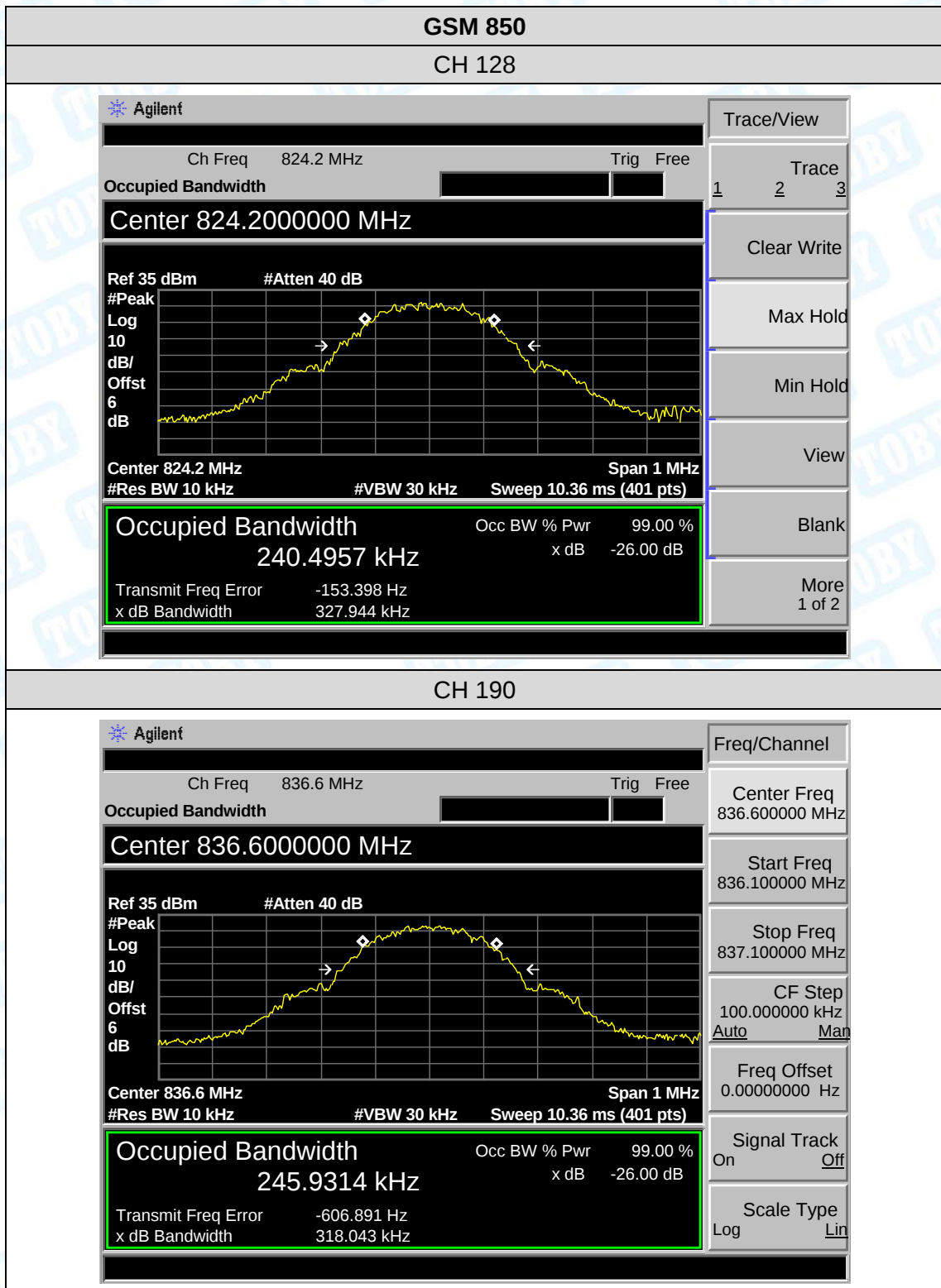
Measurement Data (worst case)

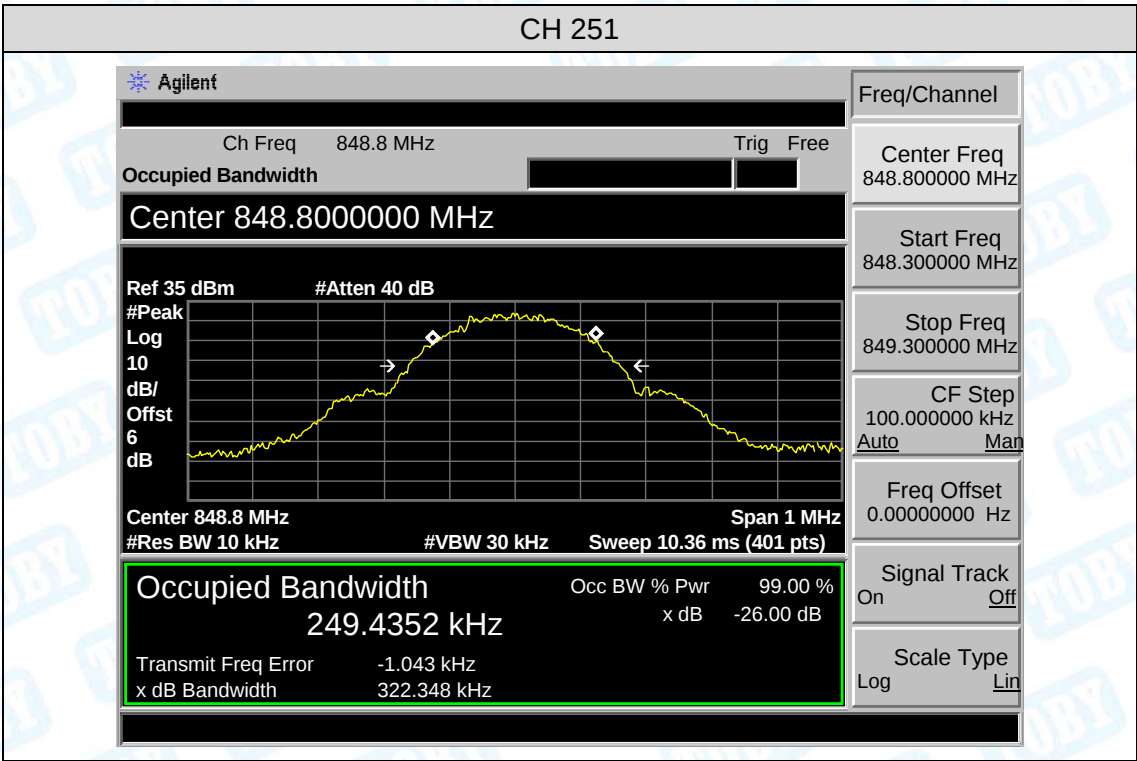
GSM 850								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
GSM 850	128	824.2	H	30.05	3.46	1.26	32.25	1.679
			V	26.12	3.46	1.26	28.32	0.679
	190	836.6	H	29.85	3.82	1.26	32.41	1.742
			V	25.78	3.82	1.26	28.34	0.682
	251	848.8	H	29.36	4.16	1.26	32.26	1.683
			V	25.36	4.16	1.26	28.26	0.670
GPRS 850 (1 Slot)	128	824.2	H	25.25	3.46	1.26	27.45	0.556
			V	22.65	3.46	1.26	24.85	0.305
	190	836.6	H	24.76	3.82	1.26	27.32	0.540
			V	21.87	3.82	1.26	24.43	0.277
	251	848.8	H	24.42	4.16	1.26	27.32	0.540
			V	20.96	4.16	1.26	23.86	0.243
Limit							38.5	7

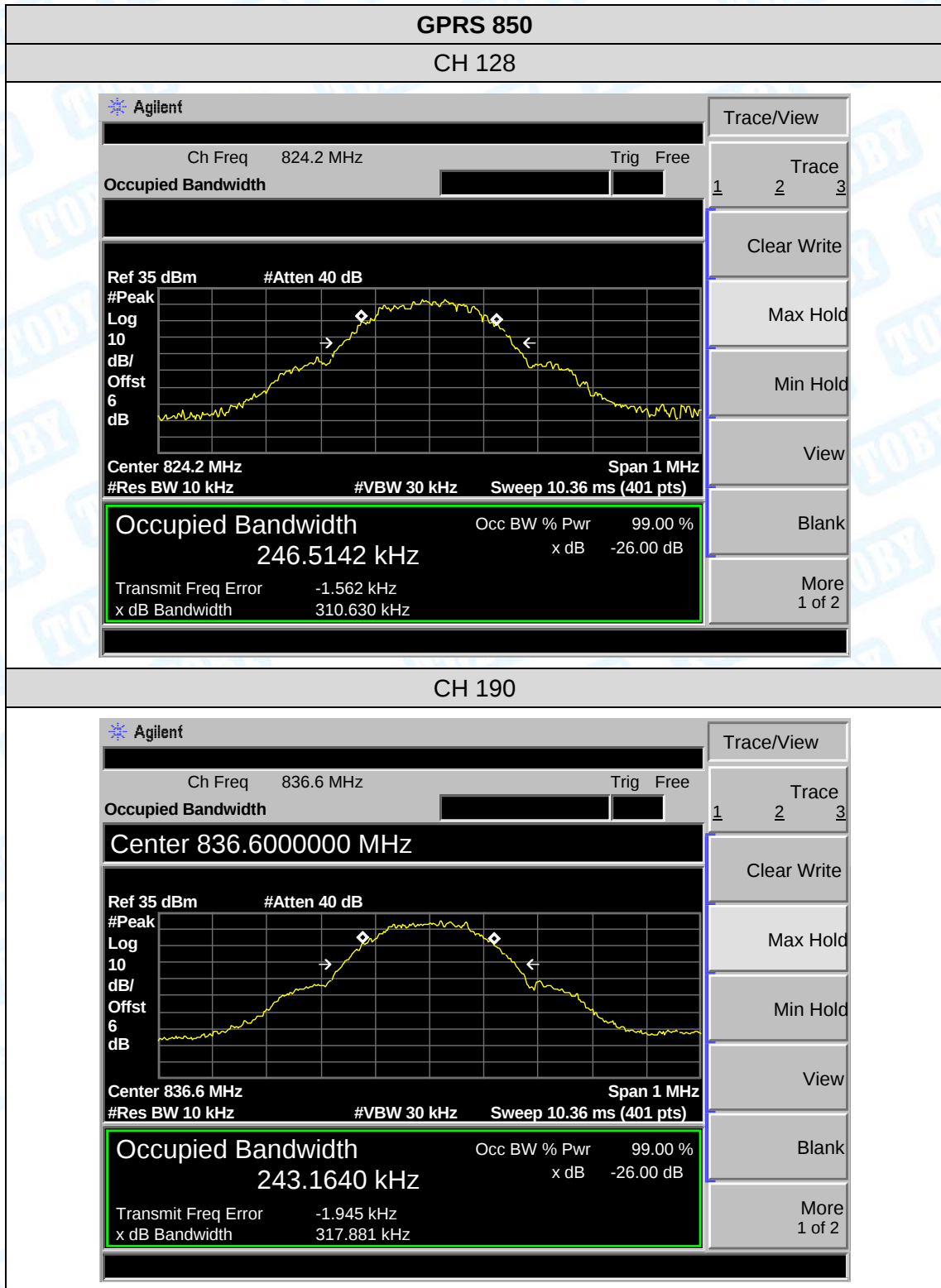
PCS 1900								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBi)	Cable Loss (dB)	EIRP Power (dBm)	EIRP Power (W)
GSM 1900	512	1850.2	H	24.93	5.01	2.59	27.35	0.543
			V	22.16	5.01	2.59	24.58	0.287
	661	1880.0	H	25.01	4.82	2.59	27.24	0.530
			V	22.19	4.82	2.59	24.42	0.277
	810	1909.8	H	25.35	4.45	2.59	27.21	0.526
			V	22.02	4.45	2.59	23.88	0.244
GPRS 1900 (1 Slot)	512	1850.2	H	23.54	5.01	2.59	25.96	0.394
			V	20.99	5.01	2.59	23.41	0.219
	661	1880.0	H	23.64	4.82	2.59	25.87	0.386
			V	21.02	4.82	2.59	23.25	0.211
	810	1909.8	H	24.00	4.45	2.59	25.86	0.385
			V	21.36	4.45	2.59	23.22	0.210
Limit							33	2

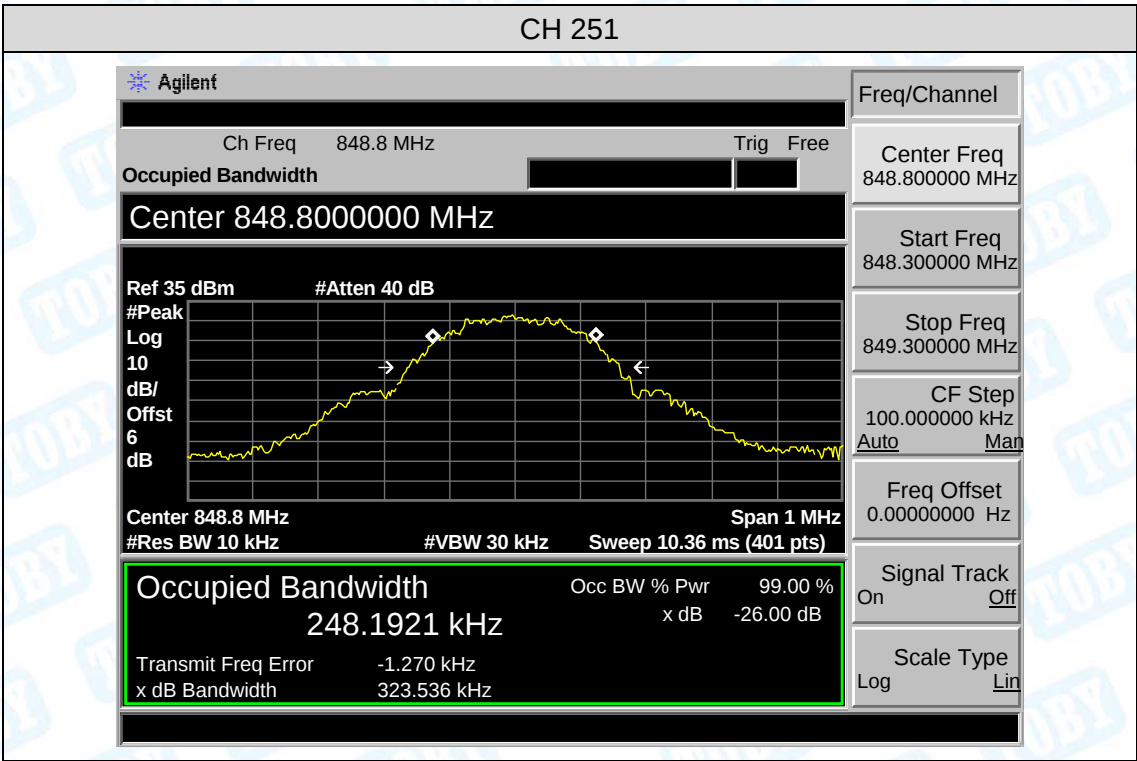
Attachment E--Occupied Bandwidth

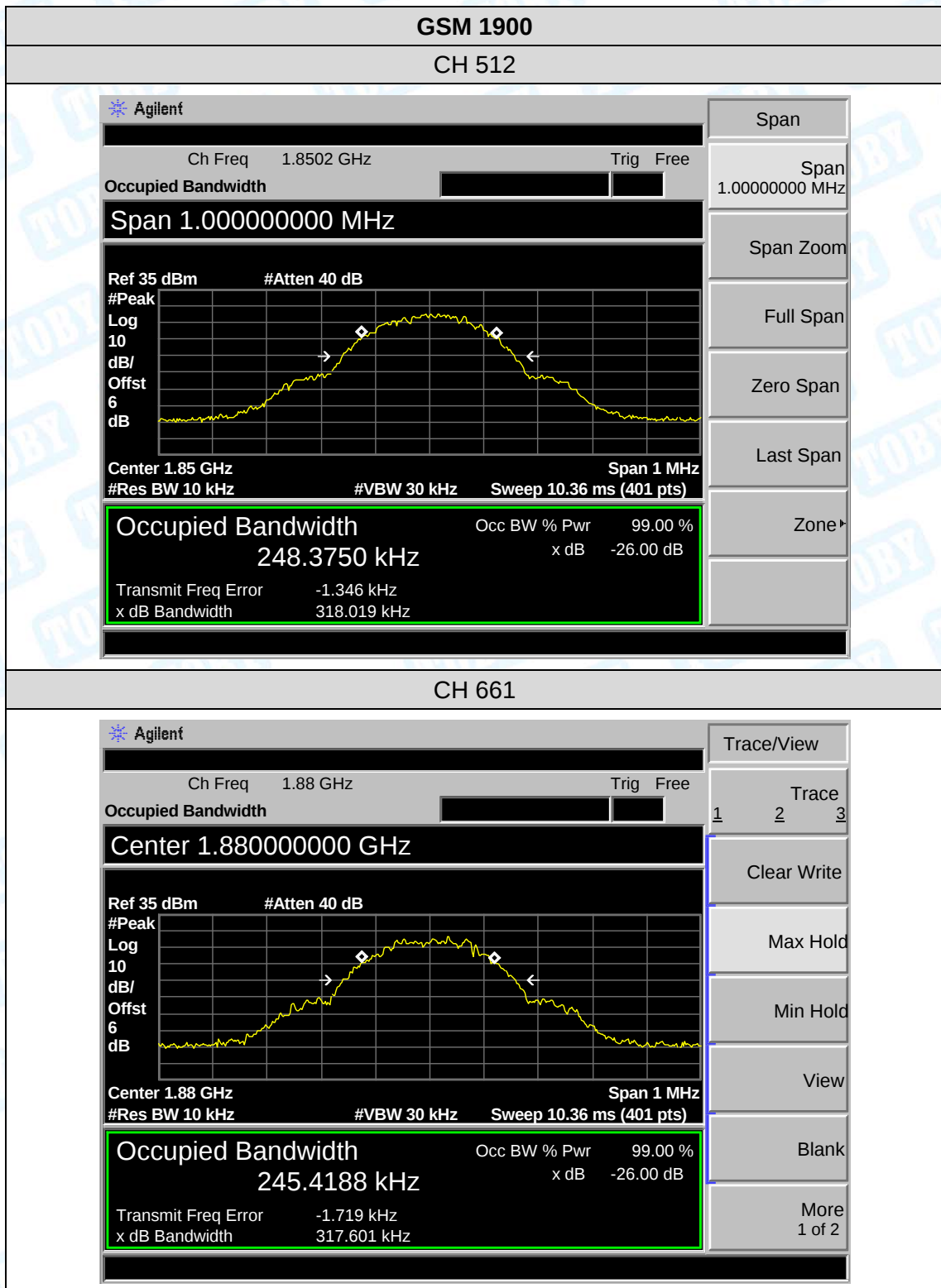
GSM 850				
Mode	Channel	Frequency (MHz)	99% OBW (KHz)	-26dB Bandwidth (kHz)
GSM 850	128	824.2	240.4957	327.944
	190	836.6	245.9314	318.043
	251	848.8	249.4352	322.348
GPRS 850 (1 Slot)	128	824.2	246.5142	310.630
	190	836.6	243.1640	317.881
	251	848.8	248.1921	323.536
PCS 1900				
Mode	Channel	Frequency (MHz)	99% OBW (KHz)	-26dB Bandwidth (kHz)
GSM 1900	512	1850.2	248.3750	318.019
	661	1880.0	245.4188	317.601
	810	1909.8	240.7975	319.113
GPRS 1900 (1 Slot)	512	1850.2	242.6150	321.942
	661	1880.0	248.6499	320.121
	810	1909.8	251.6892	318.737

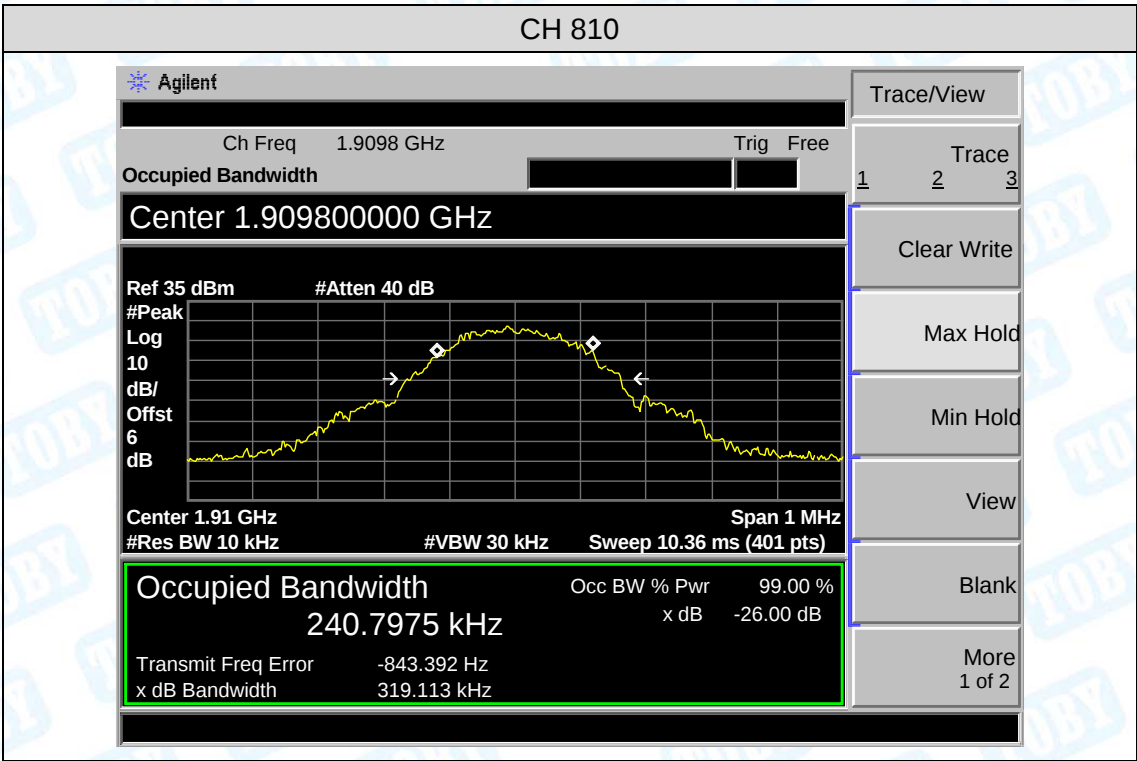


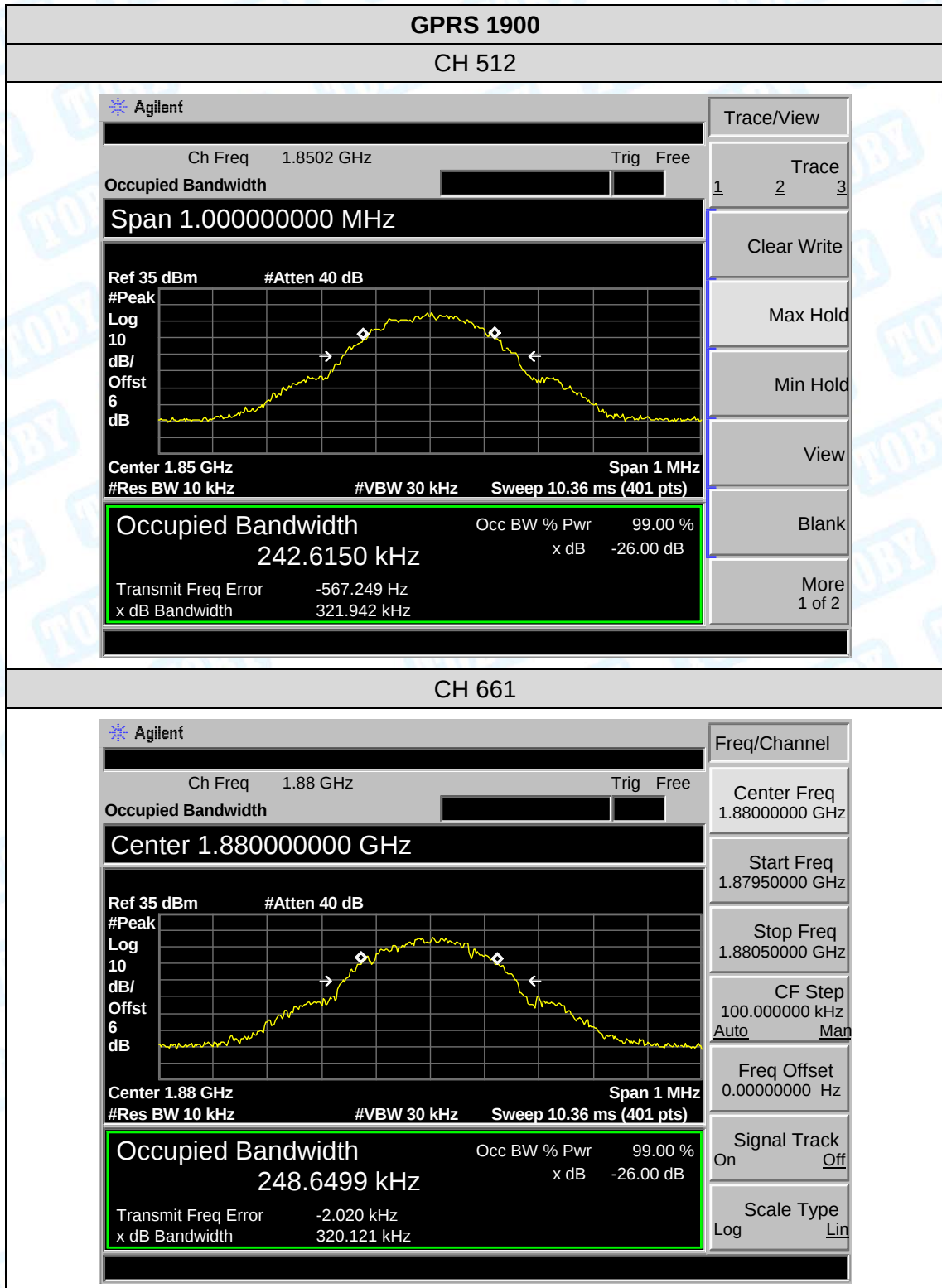


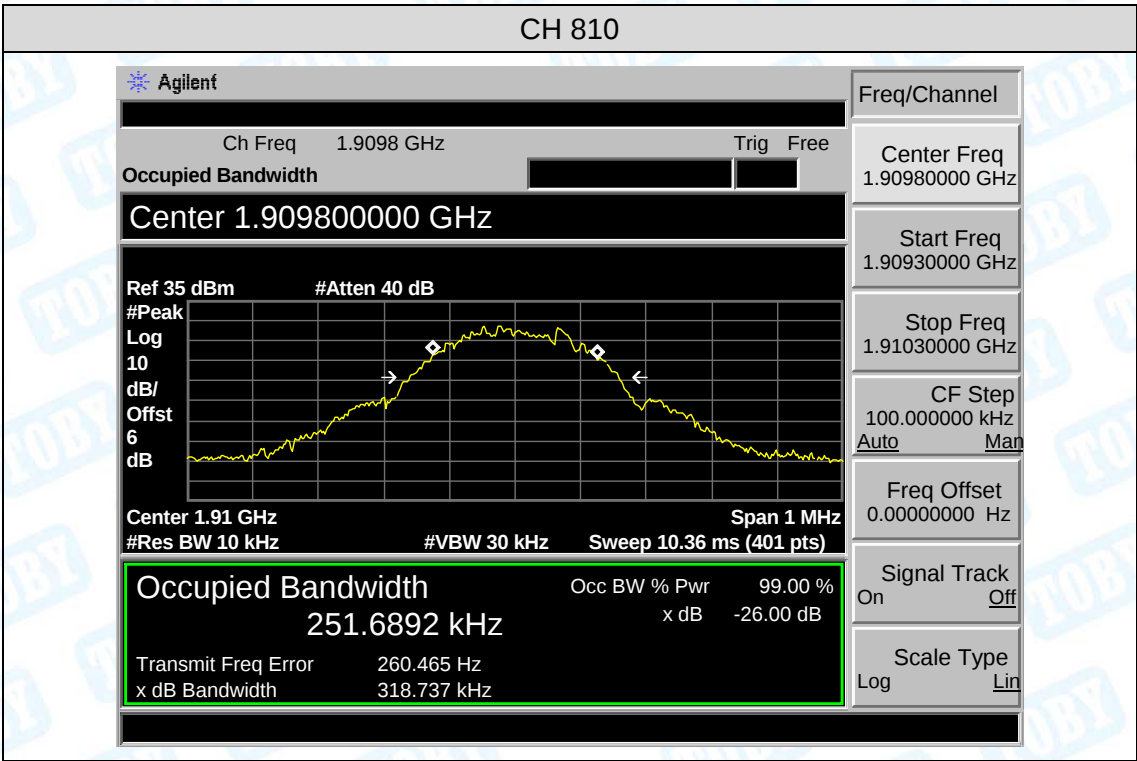




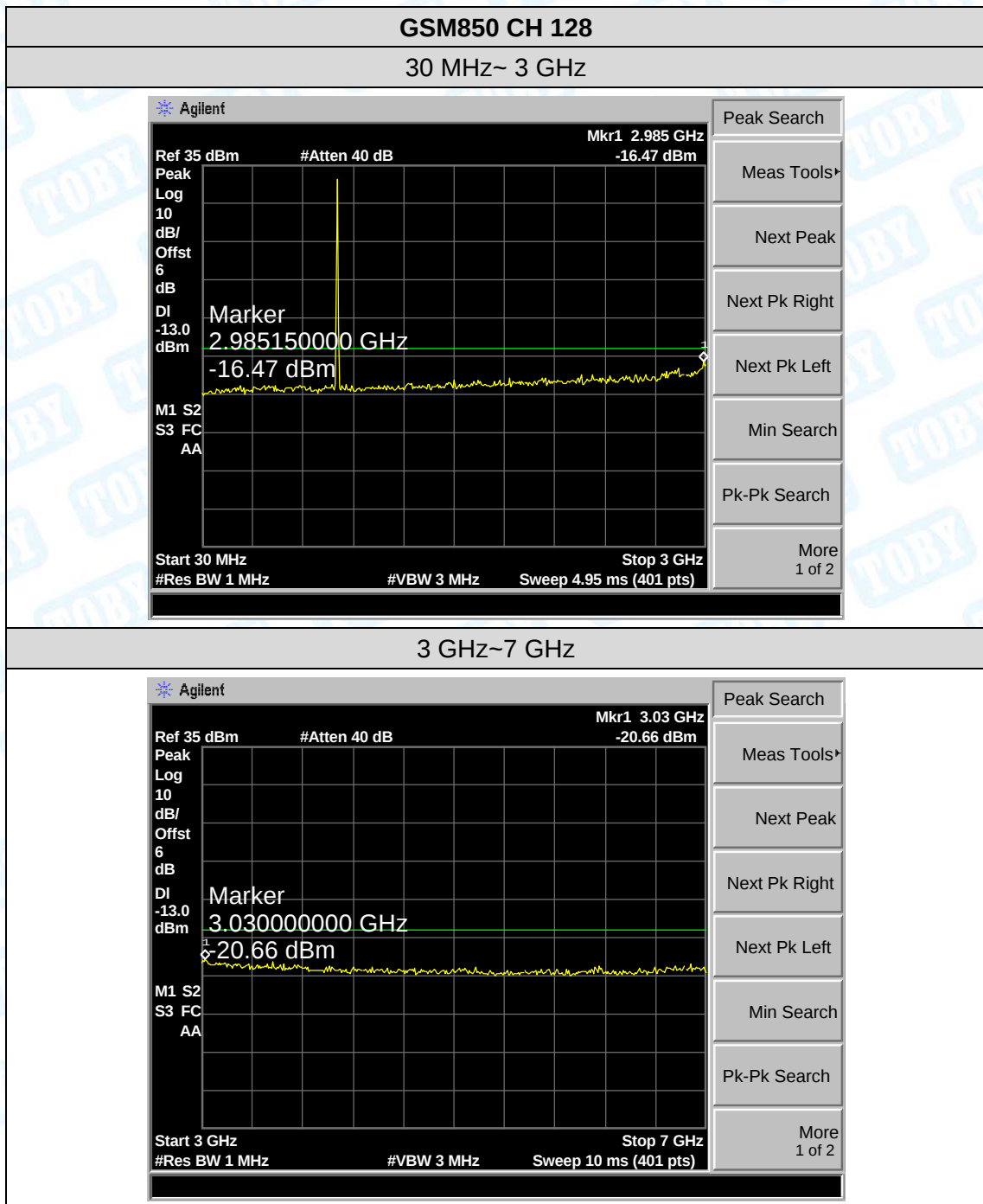


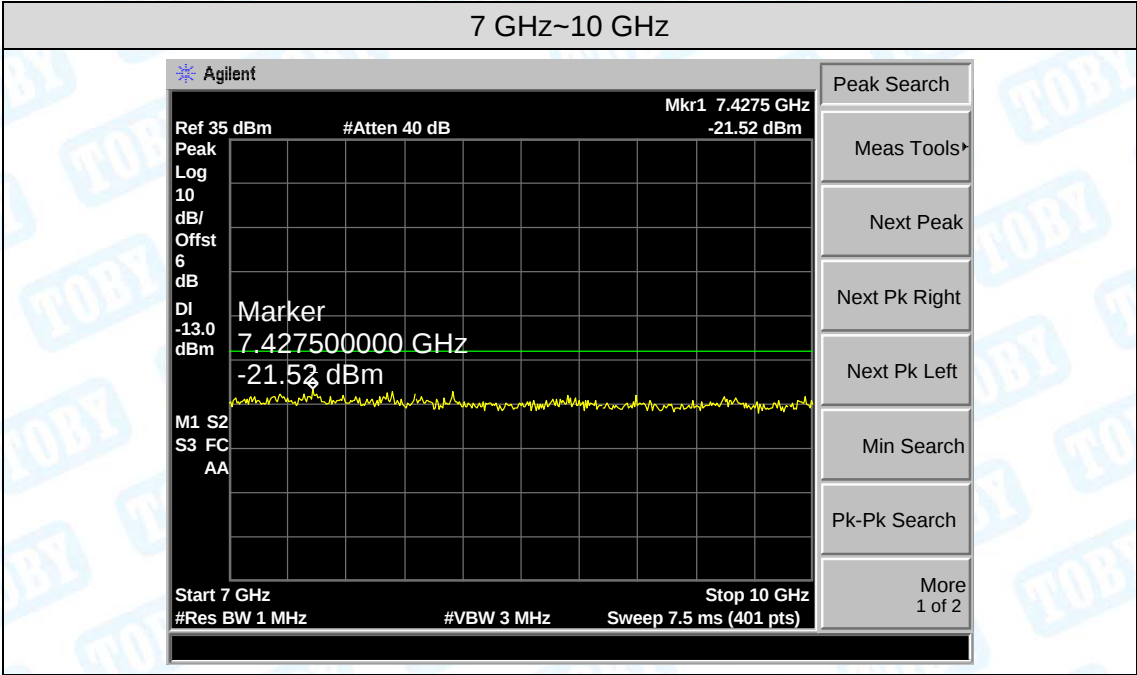


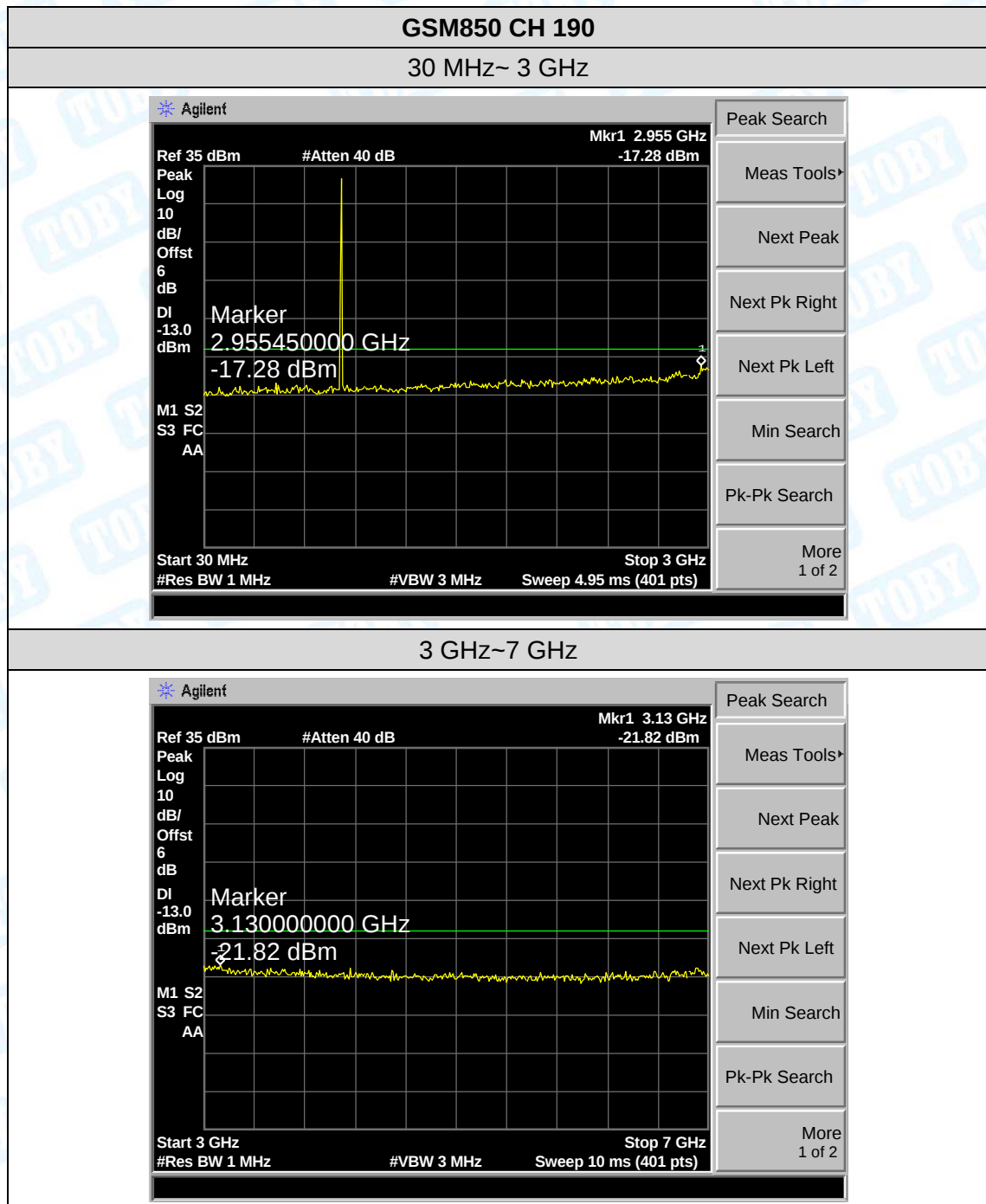


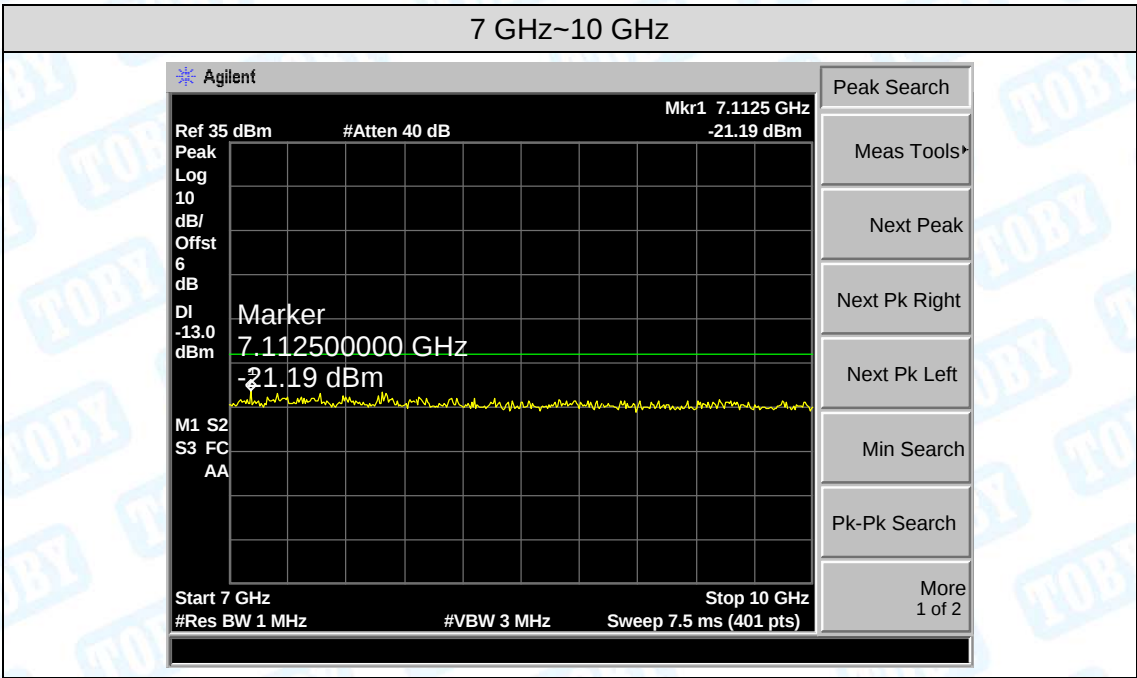


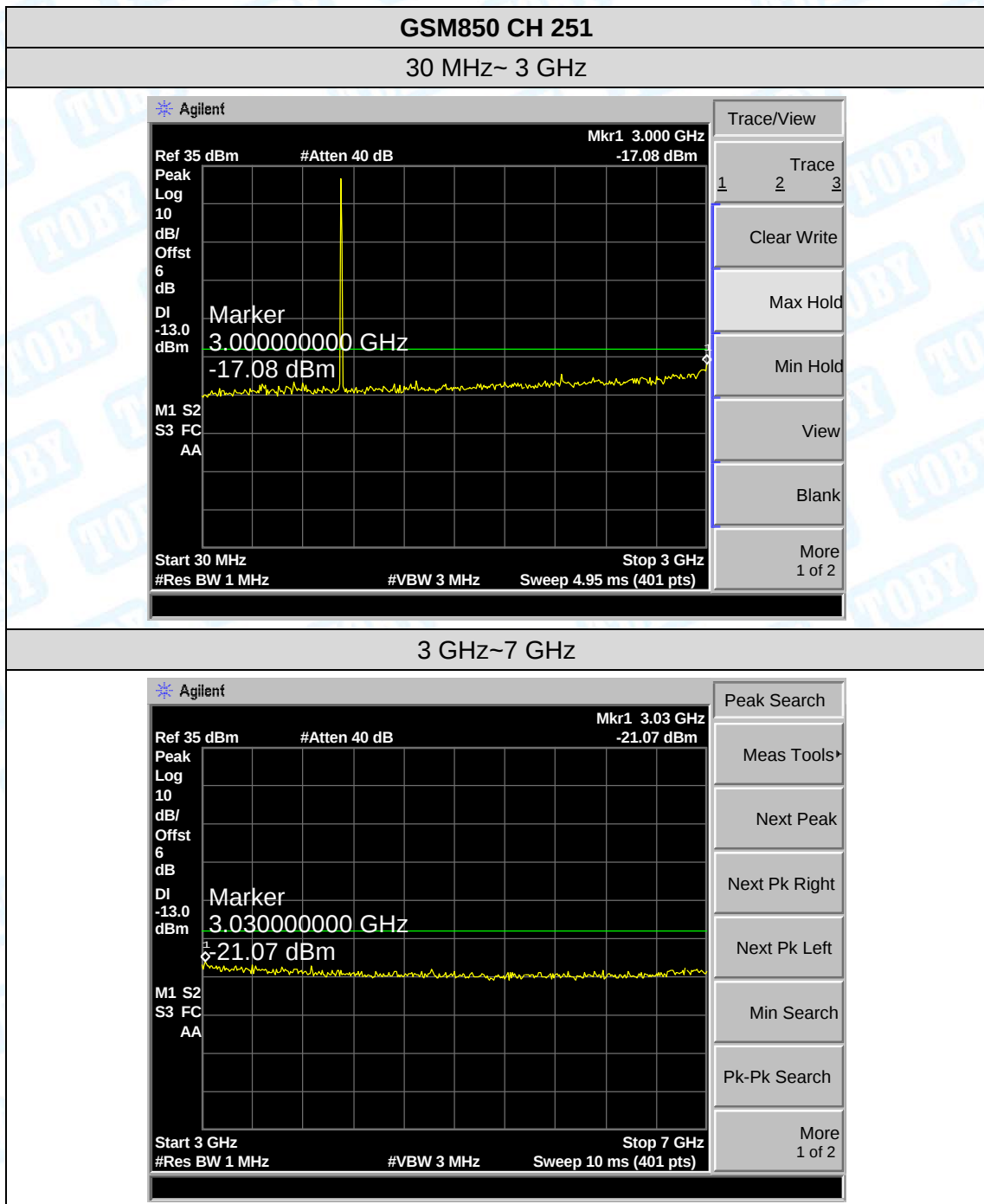
Attachment F--Conducted Out of Band Emissions

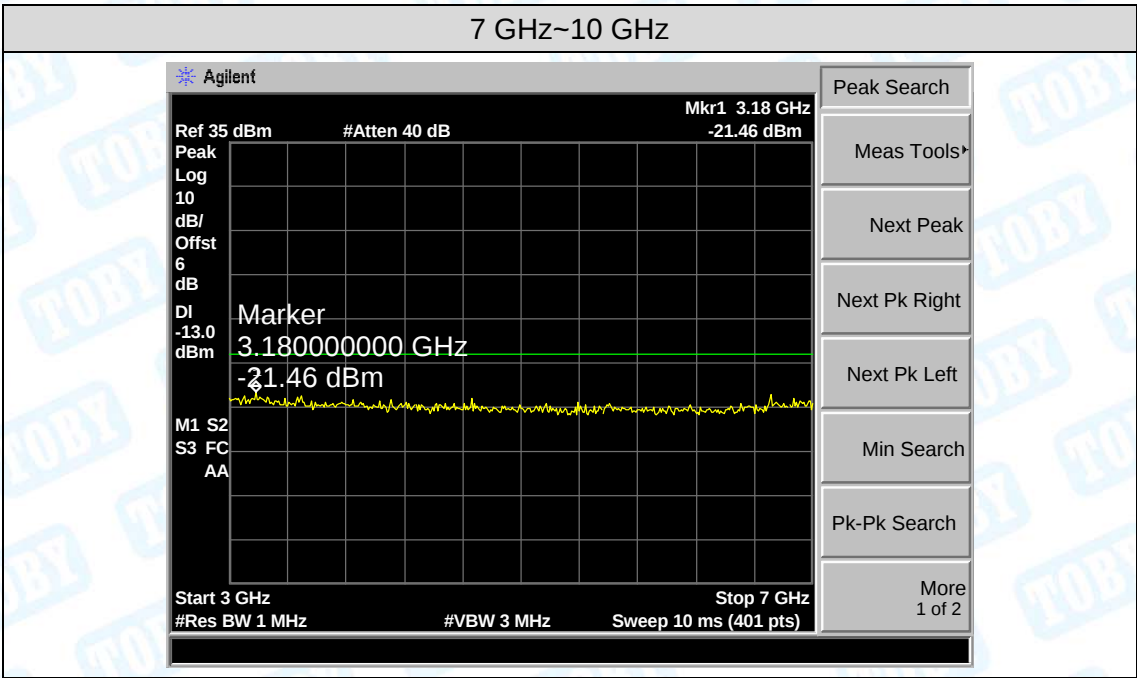


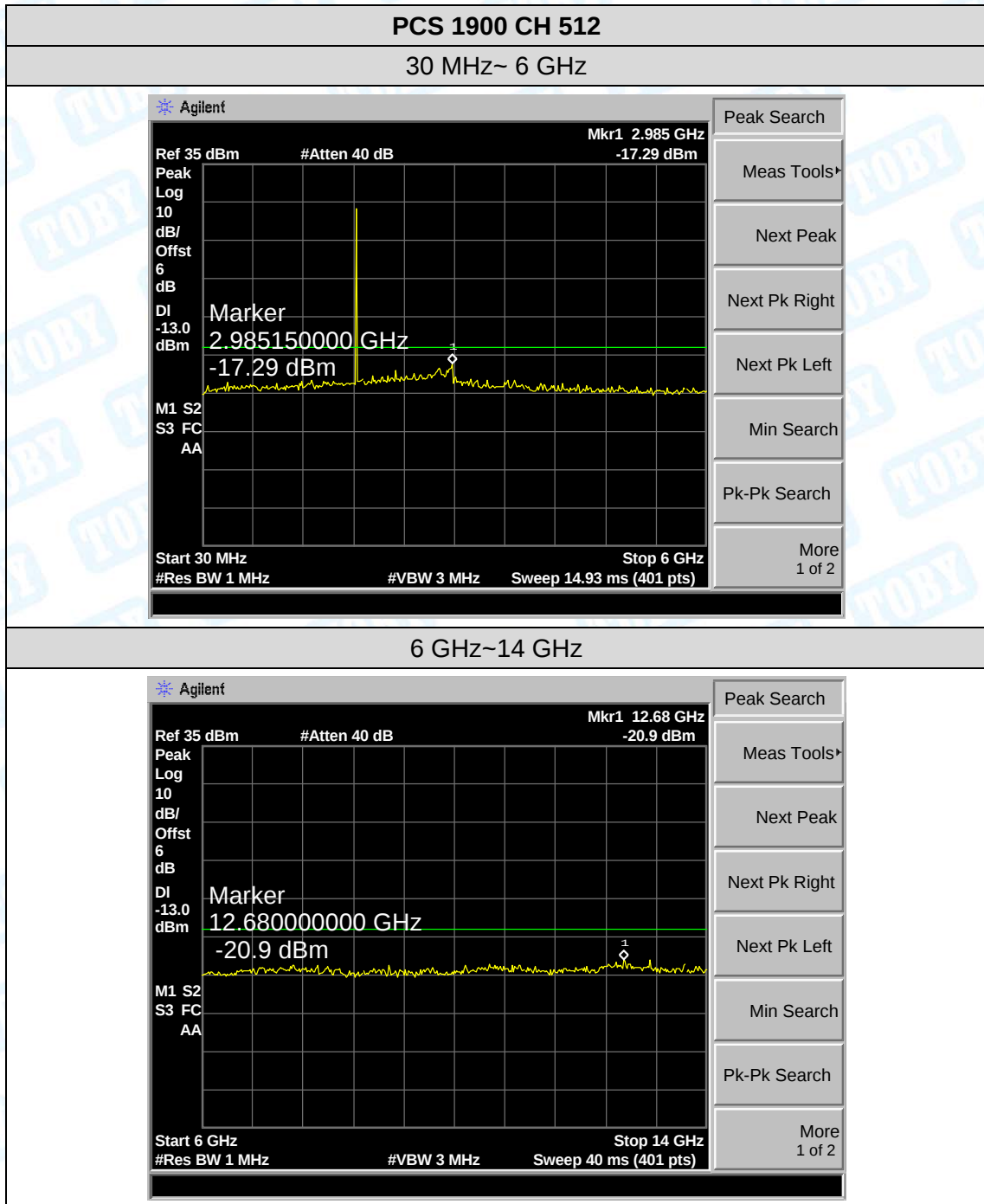


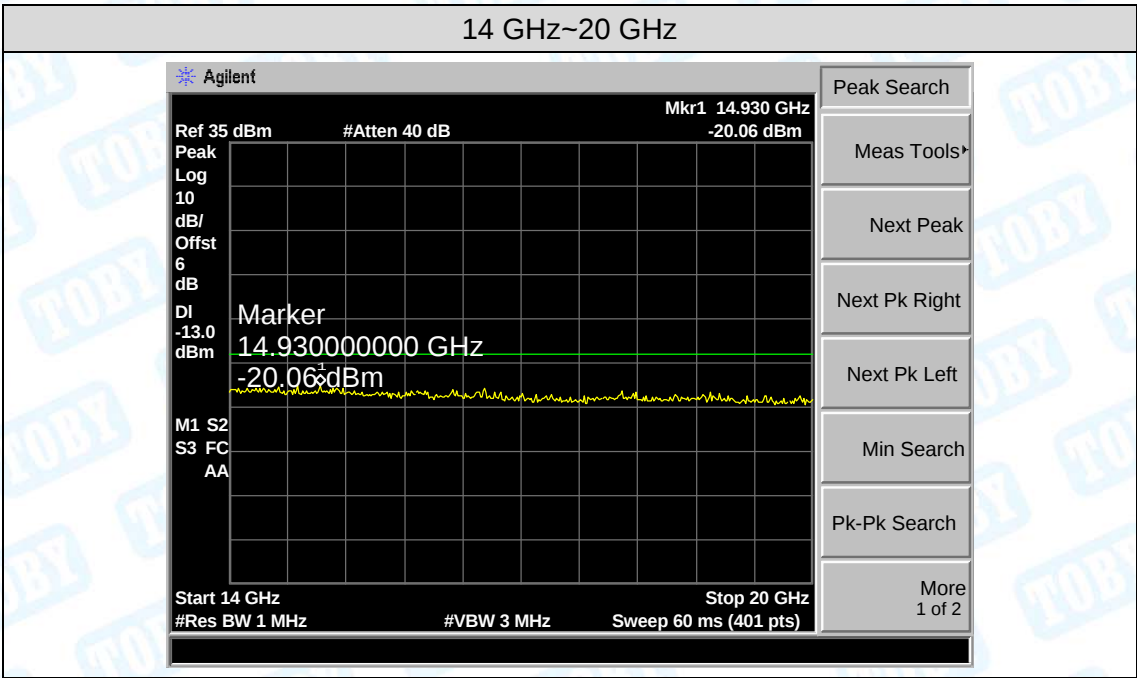


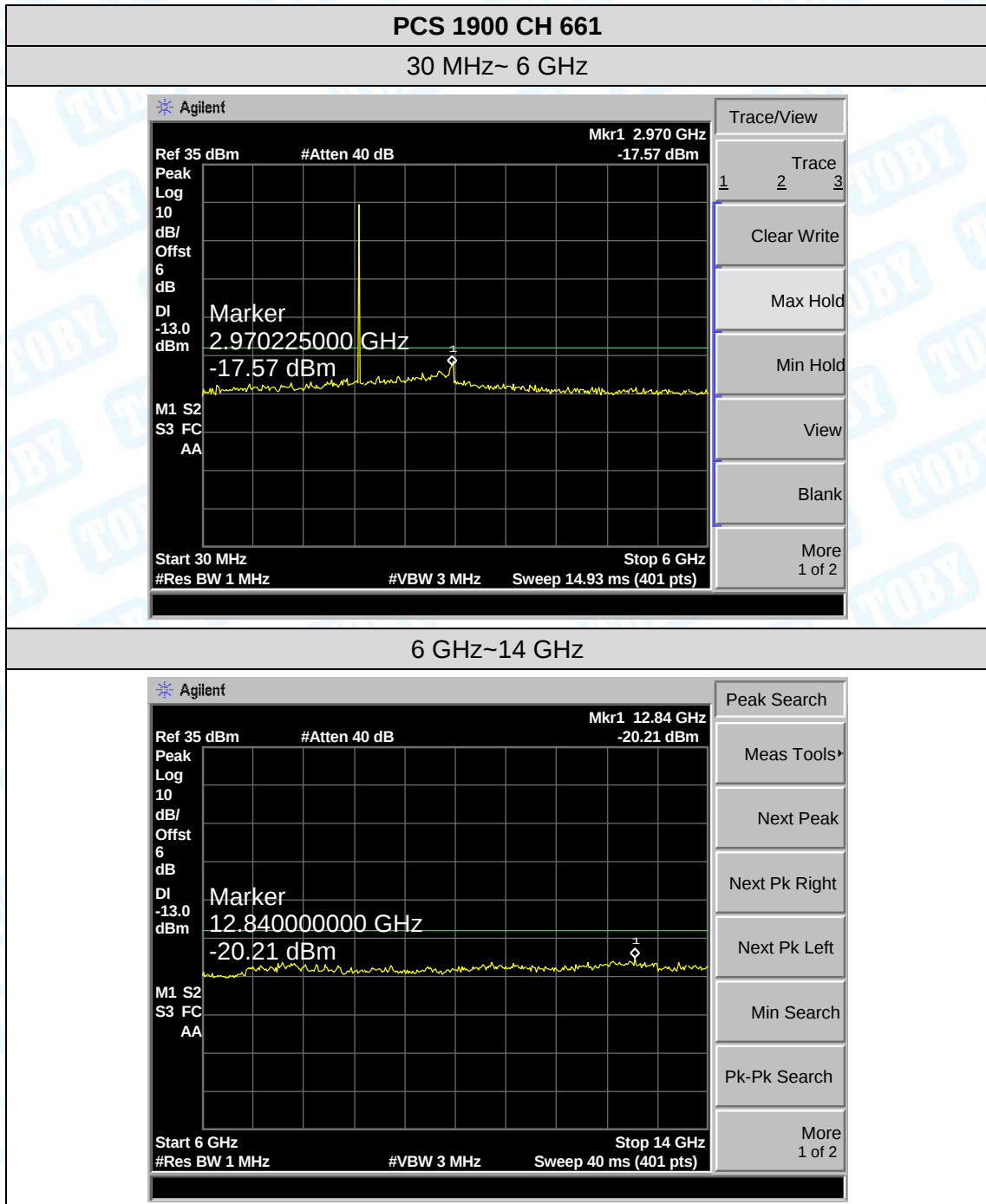


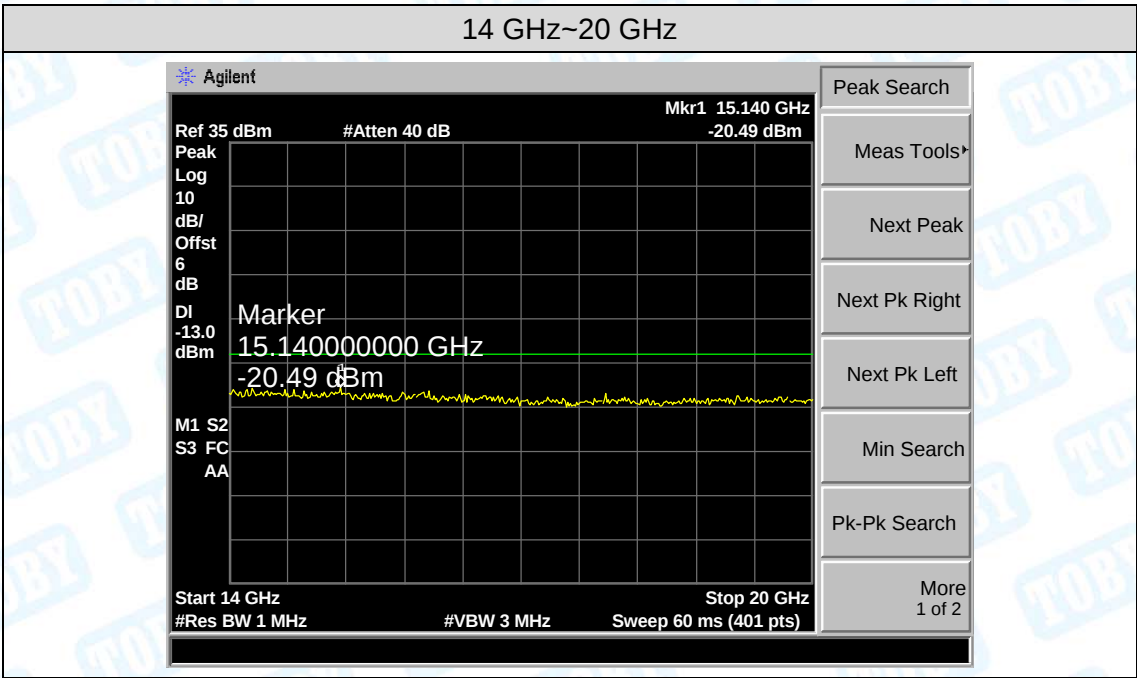


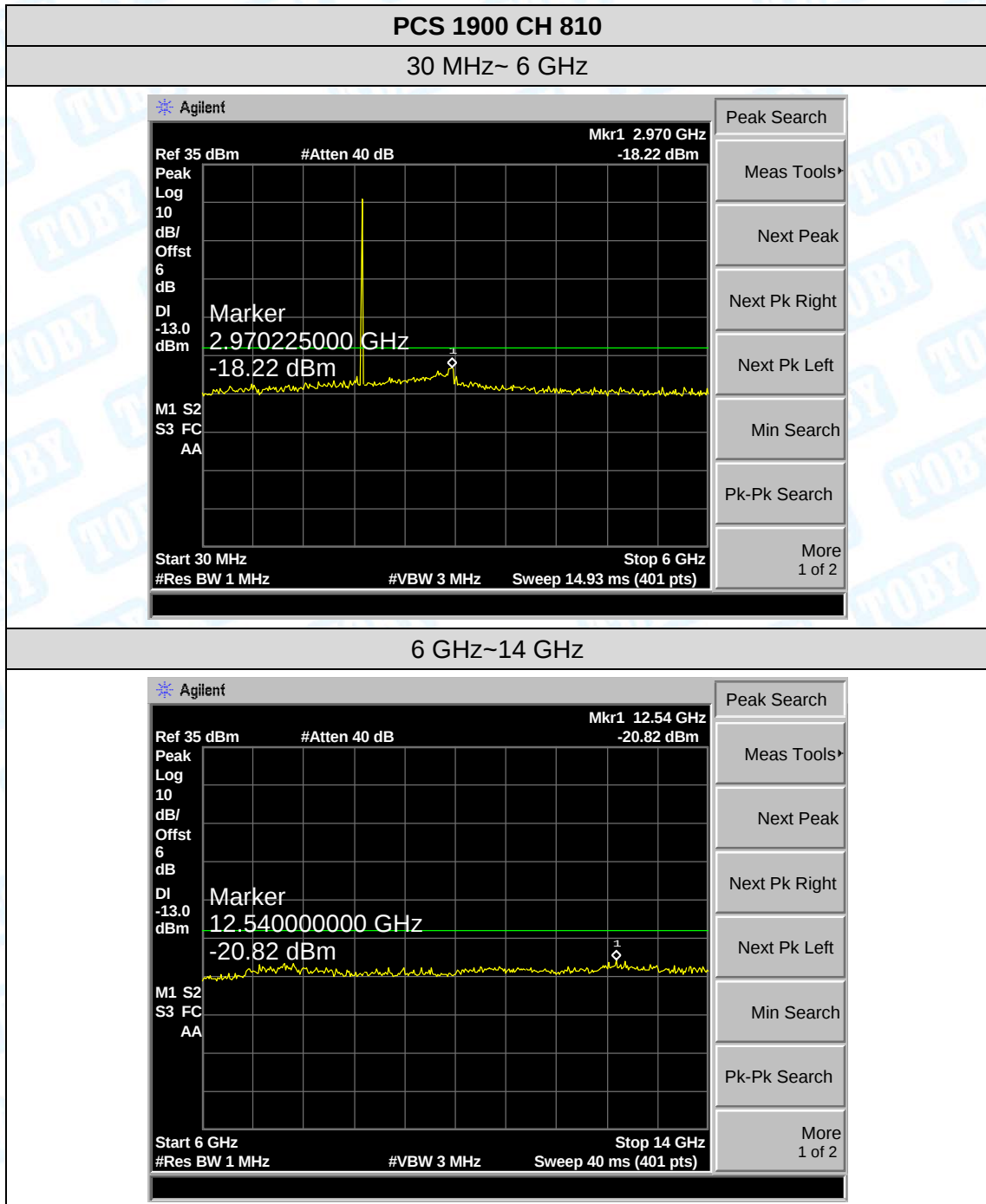


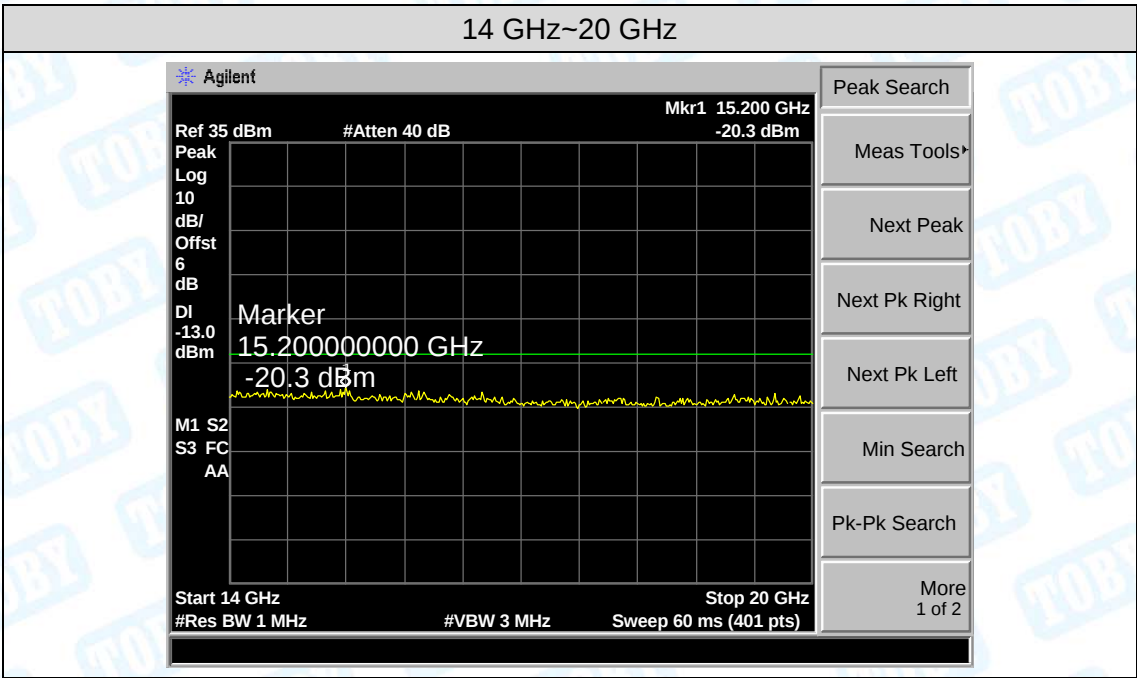






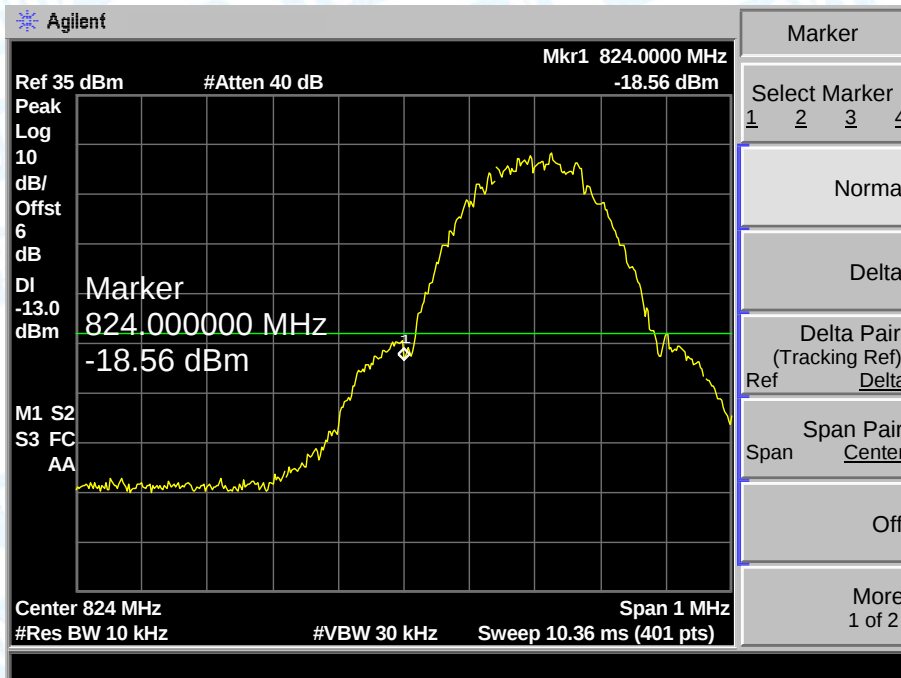




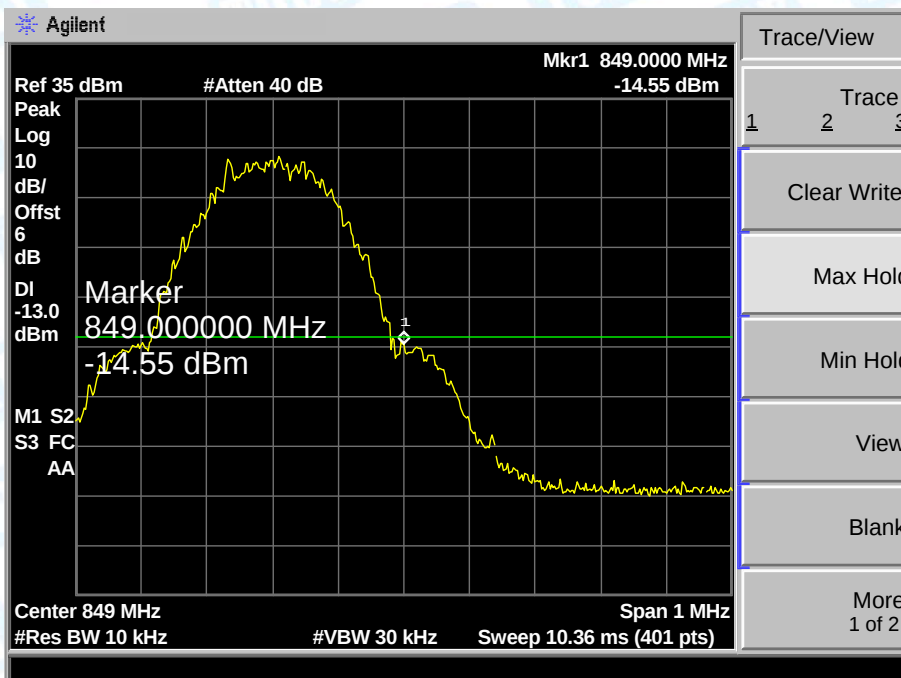


Attachment G--Band Edge Test

Test Mode:	GSM 850
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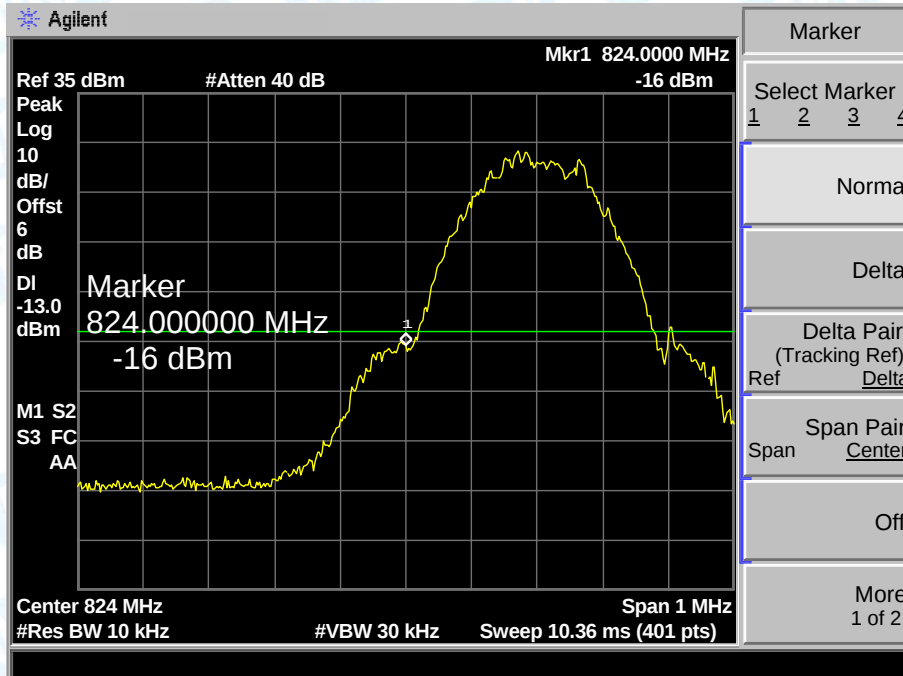


Lowest channel

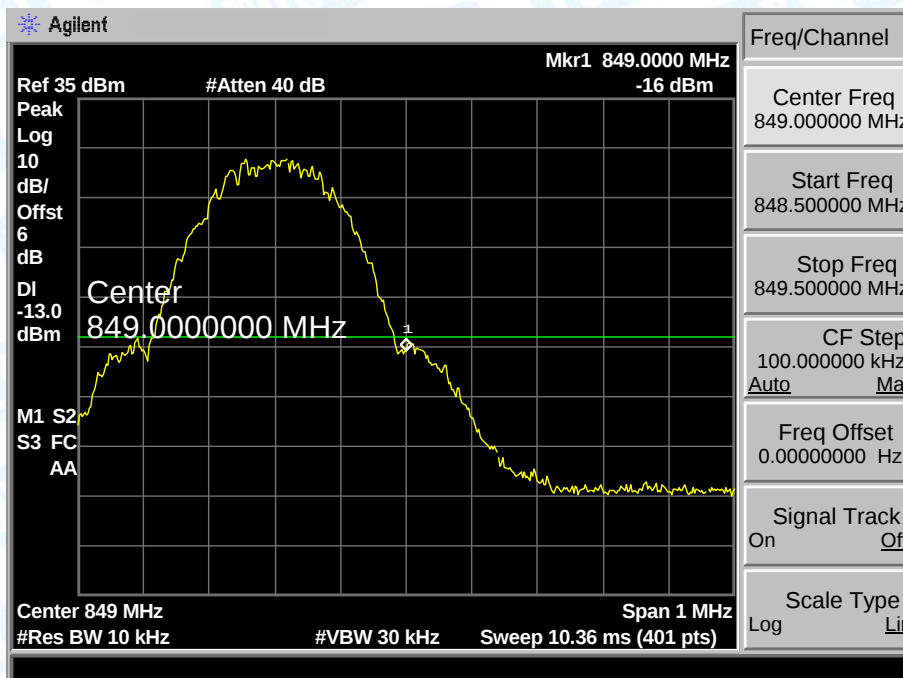


Highest channel

Test Mode:	GPRS 850
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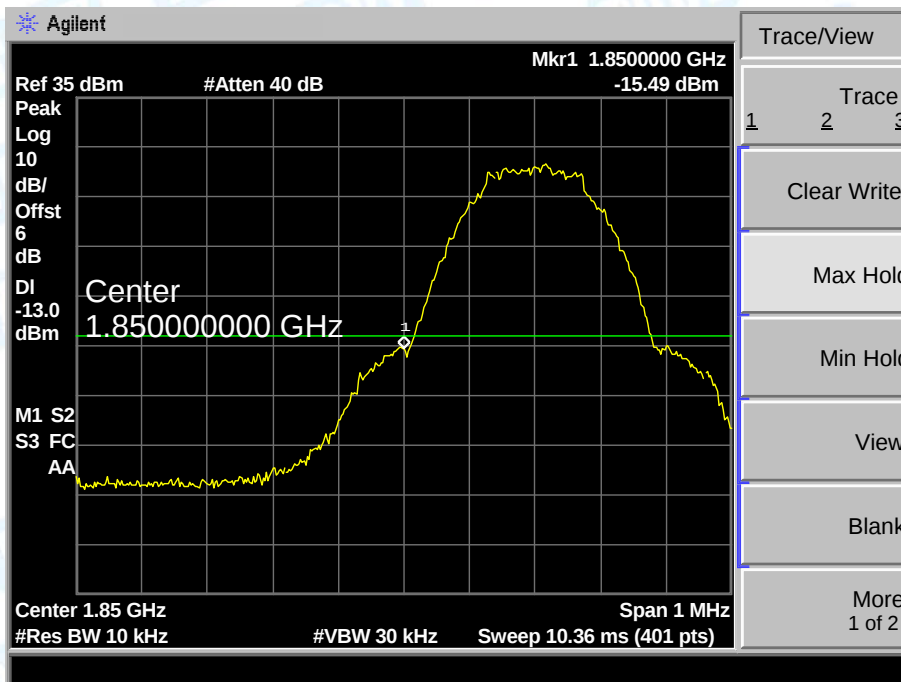


Lowest channel

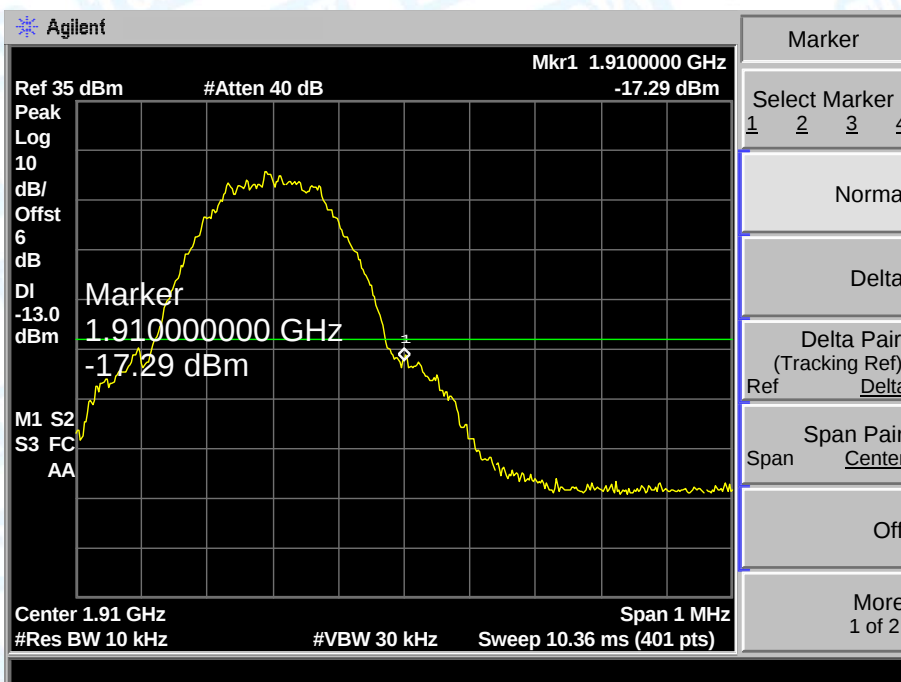


Highest channel

Test Mode:	GSM1900
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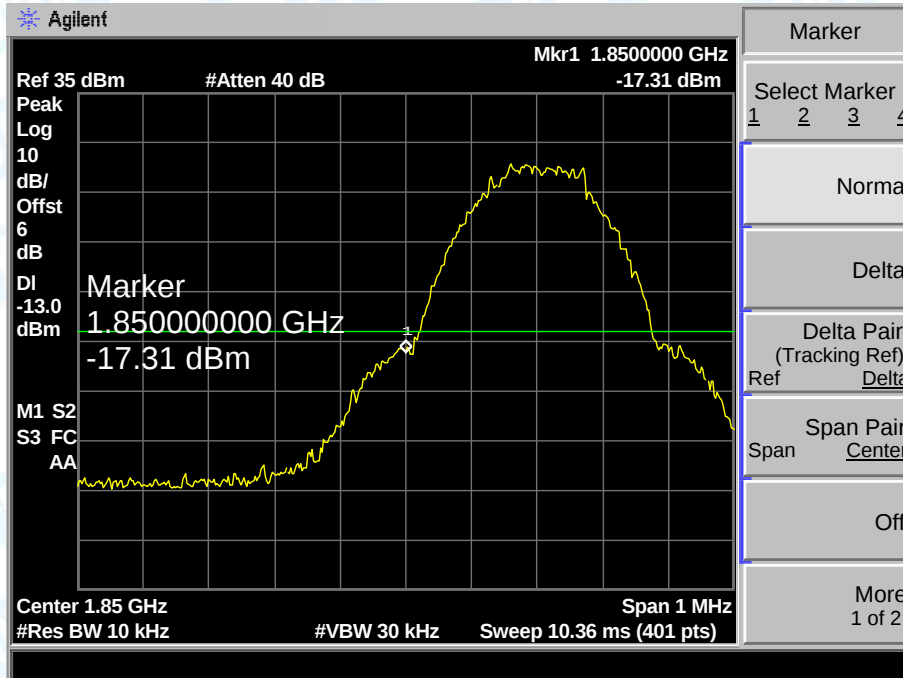


Lowest channel

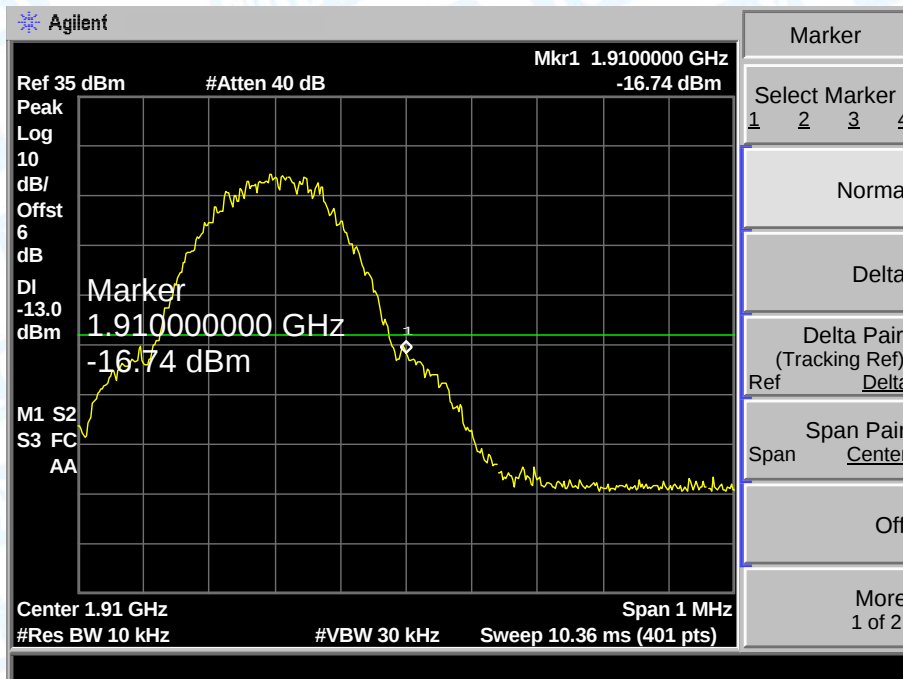


Highest channel

Test Mode:	GPRS1900
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Lowest channel



Highest channel

Attachment H--Radiated Out Band of Emissions

Measurement Data (worst case)

Test mode:	GSM 850						
Channel:	Middle			Date of Test:	2018-10-30		
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	-33.14	7.49	3.97	-21.68	-13.00	Pass
2509.80	H	-37.45	7.03	5.05	-25.37		
3346.40	H	-44.93	12.48	5.98	-26.47		
4183.00	H		---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-31.73	8.02	3.97	-19.74	-13.00	Pass
2509.80	V	-37.93	10.47	5.05	-22.41		
3346.40	V	-48.64	16.92	5.98	-25.74		
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:	GPRS 850						
Channel:	Middle			Date of Test:	2018-10-30		
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	-31.58	7.49	3.97	-20.12	-13.00	Pass
2509.80	H	-35.55	7.03	5.05	-23.47		
3346.40	H	-43.98	12.48	5.98	-25.52		
4183.00	H	---	---	---	---		
5019.60	H	---	---	---	---		
5856.20	H	---	---	---	---		
1673.20	Vertical	-30.74	8.02	3.97	-18.75	-13.00	Pass
2509.80	V	-35.98	10.47	5.05	-20.46		
3346.40	V	-47.42	16.92	5.98	-24.52		
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:	GSM 1900						
Channel:	Middle			Date of Test:	2018-10-30		
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	-39.24	14.70	6.12	-18.42	-13.00	Pass
5640.00	H	-42.88	13.67	7.86	-21.35		
7520.00	H	-48.38	14.27	9.54	-24.57		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---	-13.00	Pass
3760.00	Vertical	-41.17	15.81	6.12	-19.24		
5640.00	V	-43.27	13.80	7.86	-21.61		
7520.00	V	-48.46	13.40	9.54	-25.52		
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:	GPRS 1900						
Channel:	Middle			Date of Test:	2018-10-30		
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	-40.60	14.70	6.12	-19.78	-13.00	Pass
5640.00	H	-43.64	13.67	7.86	-22.11		
7520.00	H	-48.50	14.27	9.54	-24.69		
9400.00	H	---	---	---	---		
11280.00	H	---	---	---	---		
13160.00	H	---	---	---	---		
3760.00	Vertical	-40.68	15.81	6.12	-18.75	-13.00	Pass
5640.00	V	-43.00	13.80	7.86	-21.34		
7520.00	V	-46.68	13.40	9.54	-23.74		
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 the Report-----