

# FCC Radio Test Report

## FCC ID: 2AXBK-SCV500

### Original Grant

**Report No.** : TB-FCC174960  
**Applicant** : SC Soft Pte Ltd  
**Equipment Under Test (EUT)**  
**EUT Name** : Validator SCV500  
**Model No.** : SCV500  
**Series Model No.** : SCV500+,SCV500EMV  
**Brand Name** : SC Soft  
**Sample ID** : TBBJ-20200628-01#  
**Receipt Date** : 2020-08-01  
**Test Date** : 2020-08-01 to 2020-08-18  
**Issue Date** : 2020-08-19  
**Standards** : FCC Part 2  
FCC Part 22 Subpart H, FCC Part 24 Subpart E  
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** :

*Garen*

Garen

**Engineer Supervisor**

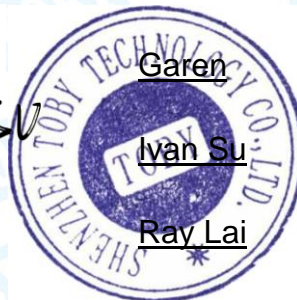
*IVAN SU*

Ivan Su

**Engineer Manager**

*Ray Lai*

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

TB-RF-074-1.0



the report.

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## Revision History

Report No.	Version	Description	Issued Date
TB-FCC174960	Rev.01	Initial issue of report	2020-08-19



# 1. General Information about EUT

## 1.1 Client Information

<b>Applicant</b>	:	SC Soft Pte Ltd
<b>Address</b>	:	438B Alexandra Road, #01-08 Alexandra Technopark, Singapore 119968, Singapore
<b>Manufacturer</b>	:	SC Soft Pte Ltd
<b>Address</b>	:	438B Alexandra Road, #01-08 Alexandra Technopark, Singapore 119968, Singapore

## 1.2 General Description of EUT (Equipment Under Test)

<b>EUT Name</b>	:	Validator SCV500
<b>Models No.</b>	:	SCV500,SCV500+, SCV500EMV
<b>Model Difference</b>	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name for commercial.
<b>Sample ID</b>	:	TBBJ-20200628-01#
<b>Product Description</b>	:	Frequency Bands: GPRS 850; GPRS 1900
	:	GPRS 850 Power : Cond:29.32 dBm ERP:30.67 dBm
	:	GPRS 1900 Power : Cond:27.37 dBm EIRP:28.64 dBm
	:	Antenna Gain: 2dB Internal Antenna
	:	Modulation Type: GPRS:GMSK
<b>FCC Operating Frequency</b>	:	GPRS 850: 824.20MHz-848.80MHz GPRS 1900: 1850.20MHz-1909.80MHz
<b>Emission Designator</b>	:	GPRS 850: 246KGXW, GPRS 1900: 248KGXW
<b>Power Supply</b>	:	DC Voltage Supplied
<b>Power Rating</b>	:	Input Voltage Range: 9 V to 38 V DC
<b>Software Version</b>	:	Android 4.4, Linux 3.4
<b>Hardware Version</b>	:	SCV500+ V2.0.0
<b>Connecting I/O Port(S)</b>	:	Please refer to the User's Manual

### Note:

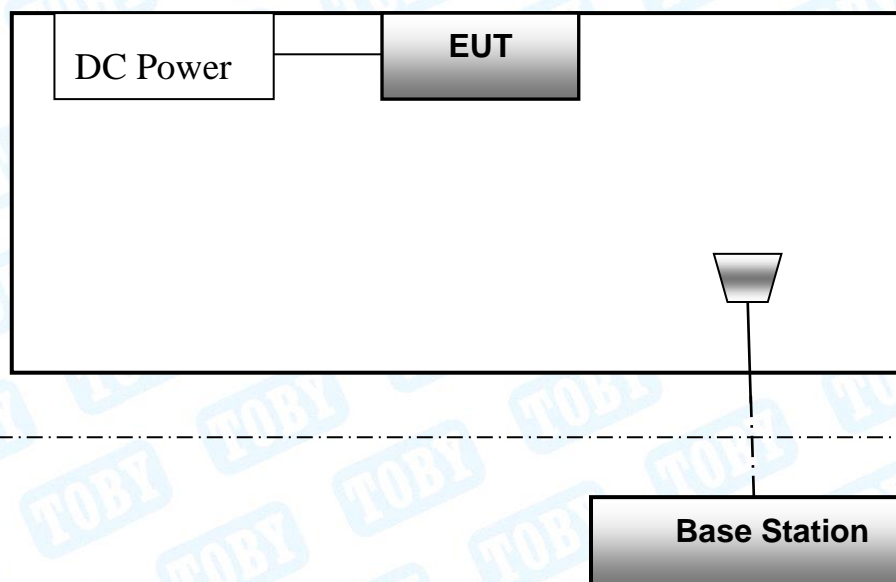
The EUT has also been tested and complied the FCC 15.247 for BLE function, and recorded in the separate test report.

- (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 GPRS 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

Equipment Information				
Name	Model	FCC ID/VOC	Manufacturer	Note
DC Power Supply	MPS-3005L-3	-----	MATRIX	

### 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 GPRS 850.
2. 9kHz~20GHz for GPRS1900 and.



Test Channel		
Mode	Channel	Frequency(MHz)
GPRS 850	128	824.20
	190	836.60
	251	848.80
GPRS 1900	512	1850.20
	661	1880.00
	810	1909.80
Pre-scanning test Mode		Description
GPRS 850		highest , middle, lowest channels
GPRS 1900		highest , middle, lowest channels
Final test Mode		Description
GPRS 850		highest , middle, lowest channels
GPRS 1900		highest , middle, lowest channels
Note : (1)The antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab. (2) For the Conducted Emission and Radiated test used the TBBJ-20200628-01#. For the RF Conduction test used the TBBJ-20200628-01#.		

**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 and after pre-testing, GPRS 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 <sub>Lab</sub> )
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.

### **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
<b>Note: Pass: The EUT complies with the essential requirements in the standard.</b>			

## 3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Radiation Emission	EZ-EMC	EZ	FA-03A2RE



## 4. Test Equipment

Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 12, 2020	Jul. 11, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 12, 2020	Jul. 11, 2021
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 06, 2020	Jul. 05, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Aug.07, 2020	Aug. 06, 2021
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 07, 2020	Jul. 06, 2021
Pre-amplifier	Sonoma	310N	185903	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	HP	8449B	3008A00849	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	SKET	LNPA_1840G-50	SK201904032	Jul. 27, 2020	Jul. 26, 2021
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2020	Mar. 06, 2021
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. 12, 2020	Jul. 11, 2021
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 12, 2020	Jul. 11, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 16, 2019	Sep. 15, 2020
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 16, 2019	Sep. 15, 2020
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 16, 2019	Sep. 15, 2020
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO26	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO29	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO31	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO33	Sep. 16, 2019	Sep. 15, 2020
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	144382	Sep. 16, 2019	Sep. 15, 2020
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	103903	Jul. 12, 2020	Jul. 11, 2021



## 5. 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:

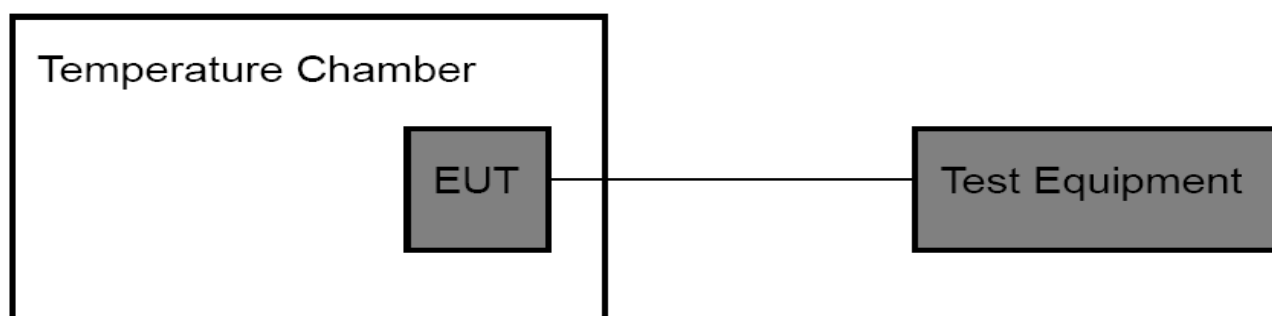
The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(2) Primary Supply Voltage:

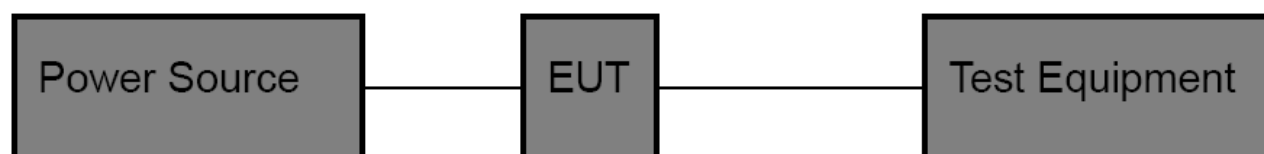
For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at input to the cable normally provide with the equipment, or at the power supply terminals if cables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



## 6. Conducted RF Output Power

### 5.1 Test Standard and Limit

#### 5.1.1 Test Standard

FCC Part 2: 2.1046

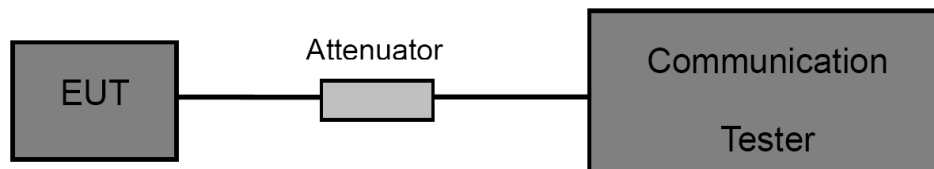
FCC Part 22H : 22.913 (a)

FCC Part 24E: 24.232 (c)

#### 5.1.2 Test Limit

GPRS850	GPRS 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.



## 7. Peak-Average Ratio

### 6.1 Test Standard and Limit

#### 6.1.1 Test Standard

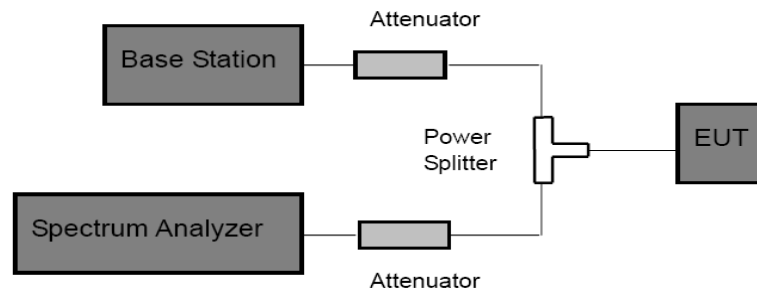
FCC Part 24E: 24.232 (d)

#### 6.1.2 Test Limit

#### GPRS 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

Please refer to the Attachment C.



## 8. 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)

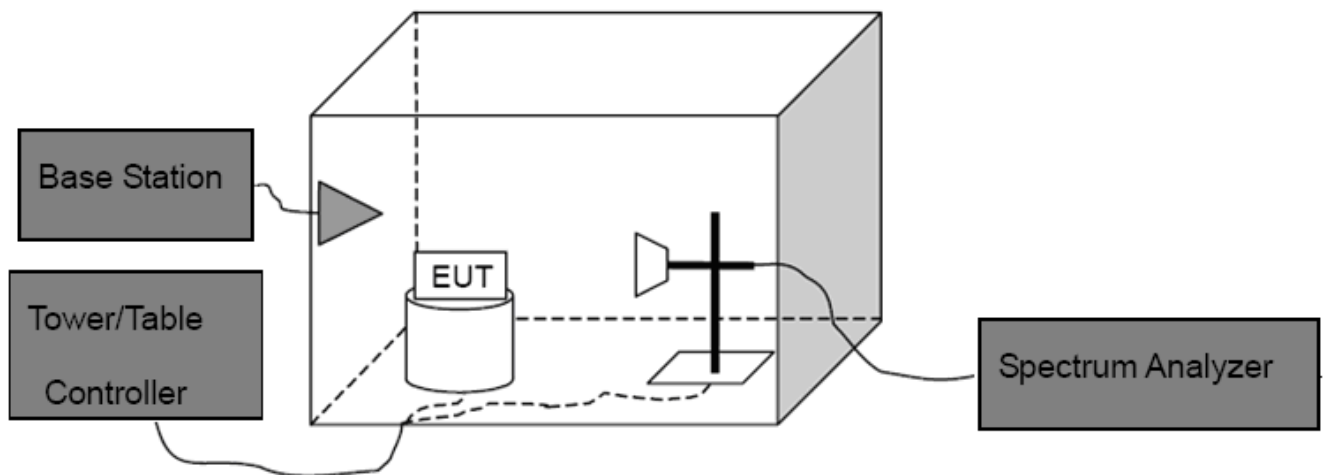
#### 7.1.2 Test Limit

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.

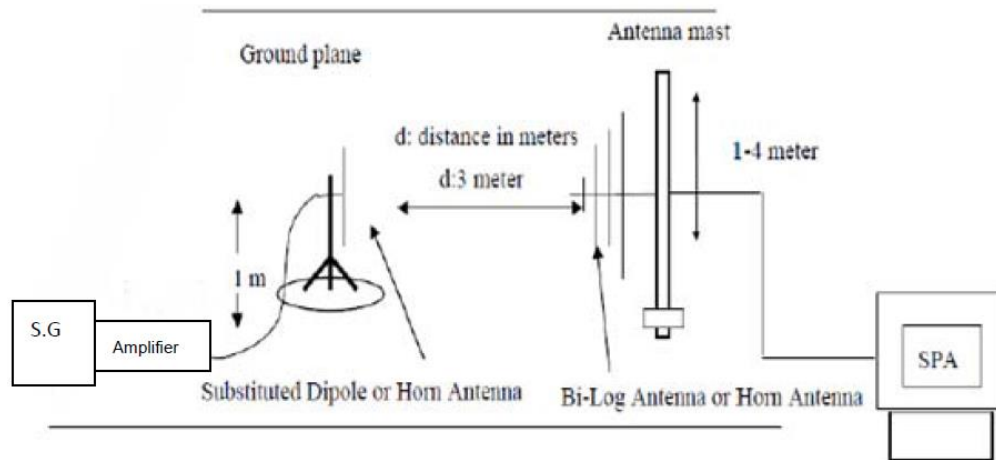
Cellular Band	GPRS Band
GPRS850	GPRS 1900
38.5 dBm (ERP)	33 dBm (EIRP)

### 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:

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

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

### 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.



## 9. Occupied Bandwidth

### 8.1 Test Standard and Limit

#### 8.1.1 Test Standard

FCC Part 2: 2.1049

FCC Part 22H : 22.913 (a)

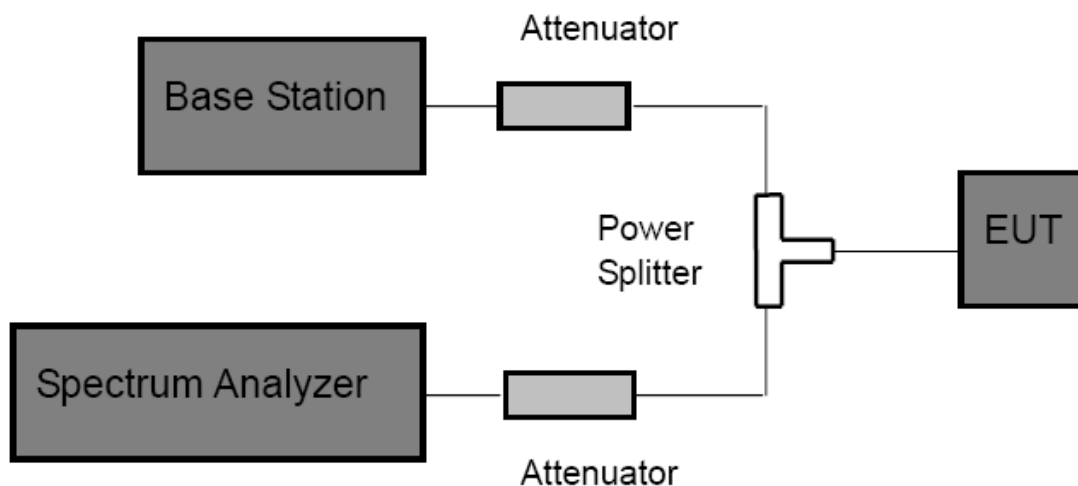
FCC Part 24E: 24.232 (c)

#### 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 to the Attachment E.



## 10. Conducted Out of Band Emissions

### 9.1 Test Standard and Limit

#### 9.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

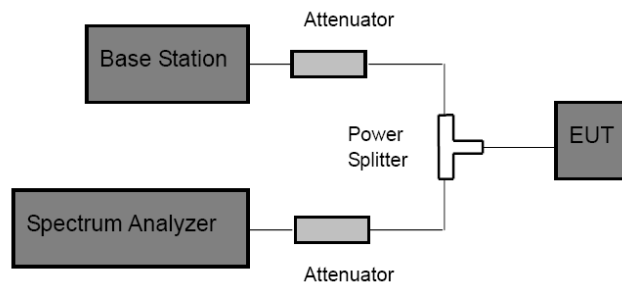
FCC Part 22H: 22.917(a)

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 10<sup>th</sup> 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.



## 11. Band Edge Test

### 10.1 Test Standard and Limit

#### 10.1.1 Test Standard

FCC Part 2: 2.1051, 2.1057

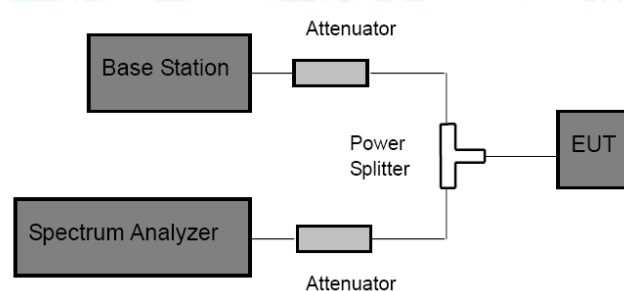
FCC Part 22H: 22.917(a)

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:

GPRS and GPRS:  $RBW \geq 1\%$  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.



## 12. Radiated Out Band of Emissions

### 11.1 Test Standard and Limit

#### 11.1.1 Test Standard

FCC Part 2: 2.1053, 2.1057

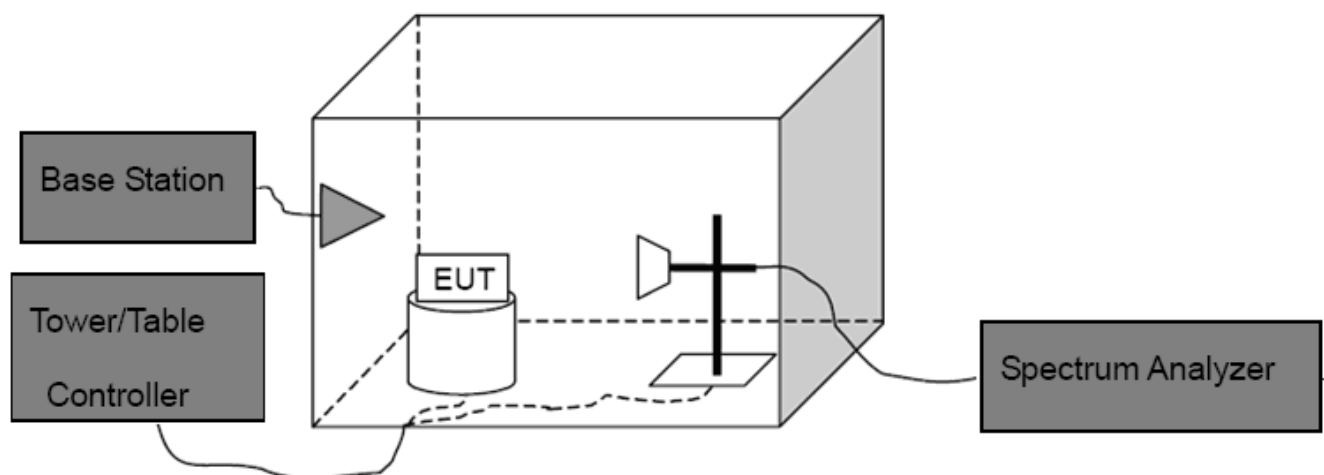
FCC Part 22H: 22.917

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<sup>th</sup> 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 GPRS 850 (CH190)		
Temperature (°C)	GPRS	
	Freq. Dev. (Hz)	Deviation (ppm)
-30	21	0.025
-20	19	0.023
-10	21	0.025
0	22	0.026
10	19	0.023
20	15	0.018
30	14	0.017
40	16	0.019
50	17	0.020
60	18	0.022
Limit	2.5 (ppm)	
Result	PASS	

Temperature Variation GPRS 1900 (CH661)		
Temperature (°C)	GPRS	
	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	



**Voltage Variation**

Voltage Variation GPRS 850 (CH190)		
Voltage (V)	GPRS	
	Freq. Dev. (Hz)	Deviation (ppm)
9	17	0.020
12	16	0.019
38	15	0.018
Limit	2.5 (ppm)	
Result	PASS	

Voltage Variation GPRS 1900 (CH661)		
Voltage (V)	GPRS	
	Freq. Dev. (Hz)	Deviation (ppm)
9	20	0.030
12	24	0.036
38	25	0.038
Limit	2.5 (ppm)	
Result	PASS	



## Attachment B--Conducted RF Output Power

GPRS 850				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GPRS 850 (1 Slot)	128	824.2	29.22	0.8356
	190	836.6	29.25	0.8414
	251	848.8	29.32	0.8551
GPRS 850 (2 Slot)	128	824.2	28.25	0.6683
	190	836.6	28.63	0.7295
	251	848.8	28.42	0.6950
GPRS 850 (3 Slot)	128	824.2	27.63	0.5794
	190	836.6	27.41	0.5508
	251	848.8	27.53	0.5662
GPRS 850 (4 Slot)	128	824.2	26.35	0.4315
	190	836.6	26.68	0.4656
	251	848.8	26.39	0.4355

GPRS 1900				
Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
GPRS 1900 (1 Slot)	512	1850.2	28.21	0.6622
	661	1880.0	28.25	0.6683
	810	1909.8	28.37	0.6871
GPRS 1900 (2 Slot)	512	1850.2	26.36	0.4325
	661	1880.0	26.26	0.4227
	810	1909.8	26.14	0.4111
GPRS 1900 (3 Slot)	512	1850.2	25.09	0.3228
	661	1880.0	25.13	0.3258
	810	1909.8	25.24	0.3342
GPRS 1900 (4 Slot)	512	1850.2	24.69	0.2944
	661	1880.0	24.54	0.2844
	810	1909.8	24.49	0.2812



## Attachment C--Peak-Average Ratio

Mode	Channel	Frequency (MHz)	Peak-to-Average Ratio (dB)	Result
GPRS 850	128	824.2	0.18	PASS
	190	836.6	0.40	
	251	848.8	0.18	
GPRS 1900	512	1850.2	0.38	PASS
	661	1880.0	0.64	
	810	1909.8	0.62	

Note: 1. Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.  
Limit  $\leq$  13dB



## Attachment D-- Radiated Output Power

Measurement Data (worst case)

GPRS 850								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBd)	Cable Loss (dB)	ERP Power (dBm)	ERP Power (W)
GPRS 850 (1 Slot)	128	824.2	H	28.47	3.46	1.26	30.67	1.1668
			V	25.48	3.46	1.26	27.68	0.5861
	190	836.6	H	28.08	3.82	1.26	30.64	1.1588
			V	25.09	3.82	1.26	27.65	0.5821
	251	848.8	H	26.77	4.16	1.26	29.67	0.9268
			V	24.23	4.16	1.26	27.13	0.5164
Limit							38.5	7

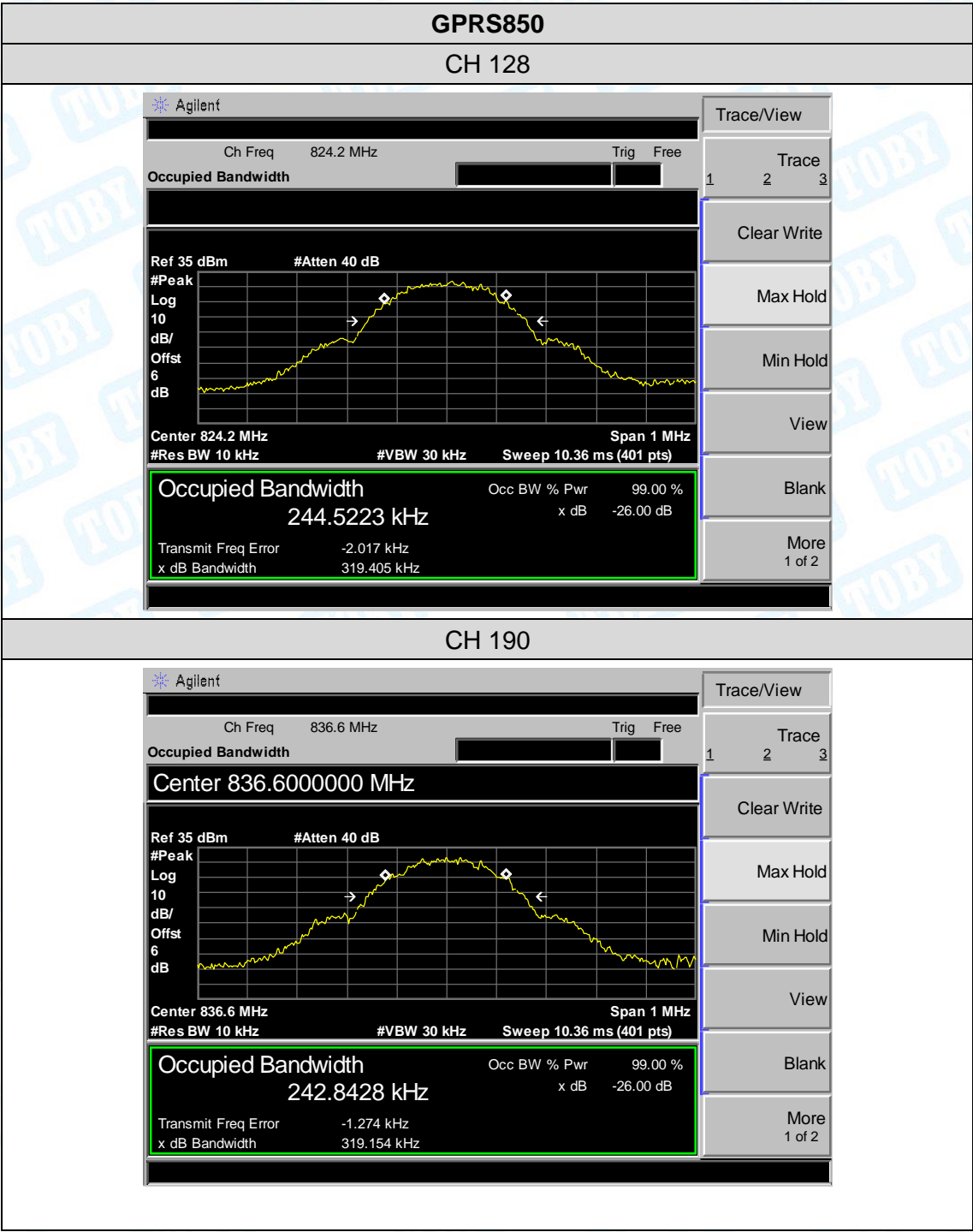
GPRS 1900								
Mode	Channel	Frequency (MHz)	Antenna (H&V)	SG Level (dBm)	Antenna Factor (dBi)	Cable Loss (dB)	EIRP Power (dBm)	EIRP Power (W)
GPRS 1900 (1 Slot)	512	1850.2	H	25.22	5.01	2.59	27.64	0.5808
			V	22.05	5.01	2.59	24.47	0.2799
	661	1880.0	H	25.36	4.82	2.59	27.59	0.5741
			V	22.64	4.82	2.59	24.87	0.3069
	810	1909.8	H	24.78	4.45	2.59	26.64	0.4613
			V	22.17	4.45	2.59	24.03	0.2529
Limit							33	2



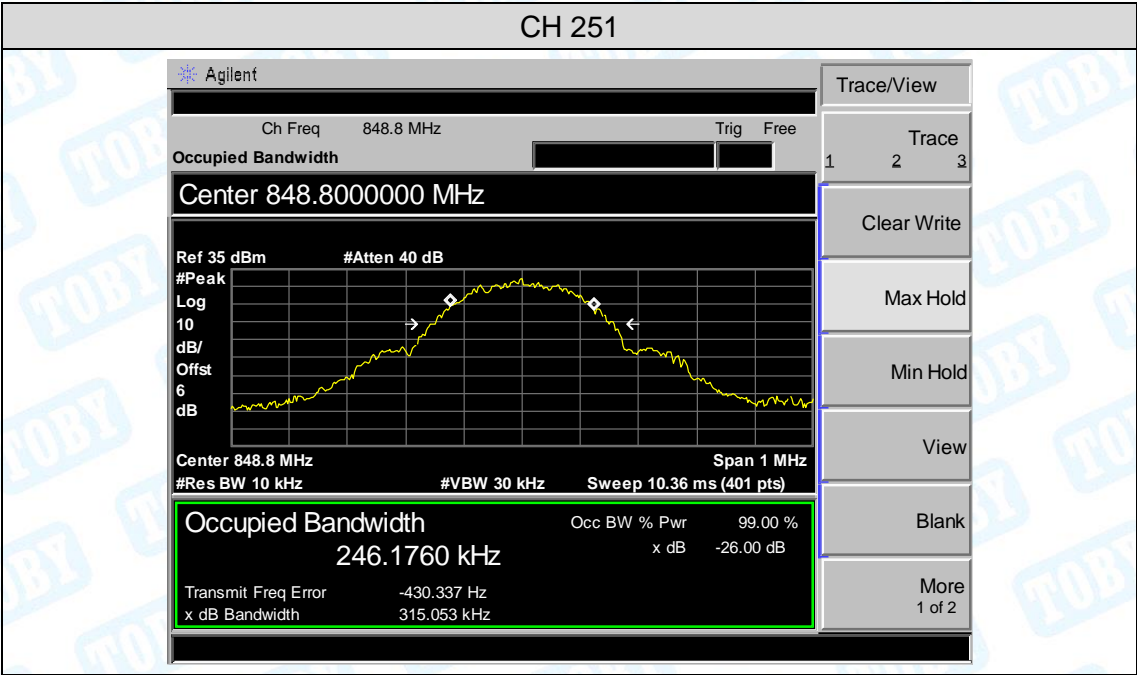
## Attachment E--Occupied Bandwidth

GPRS 850				
Mode	Channel	Frequency (MHz)	99% OBW (MHz)	-26dB Bandwidth (kHz)
GPRS 850 (1 Slot)	128	824.2	244.5223	319.405
	190	836.6	242.8428	319.154
	251	848.8	246.1760	315.053
GPRS 1900				
Mode	Channel	Frequency (MHz)	99% OBW (MHz)	-26dB Bandwidth (kHz)
GPRS 1900 (1 Slot)	512	1850.2	247.6711	322.547
	661	1880.0	246.0242	318.420
	810	1909.8	248.2497	312.875

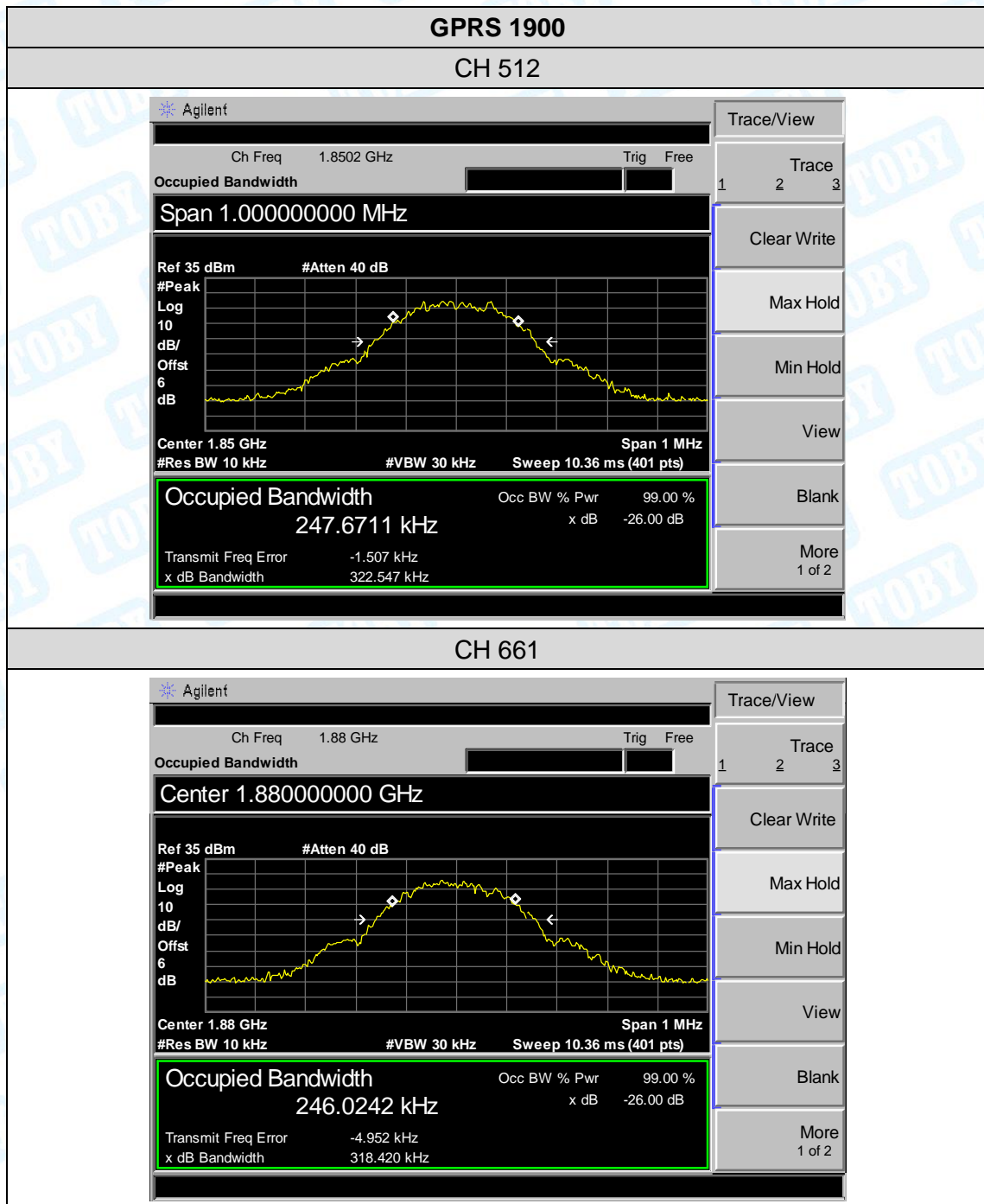




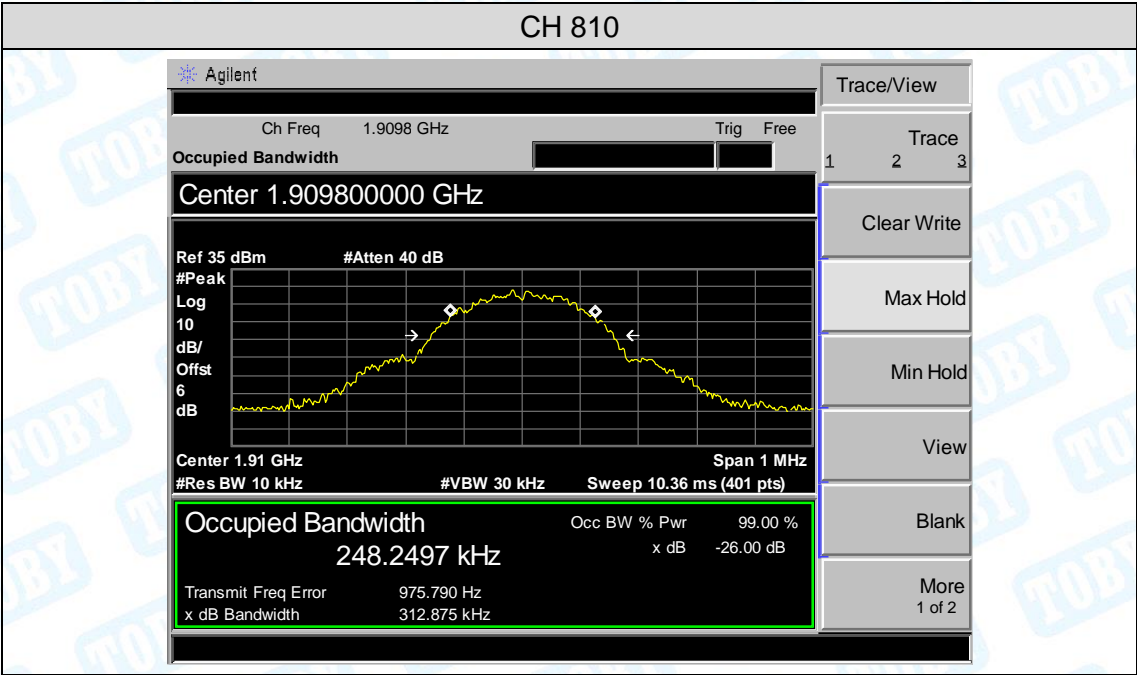






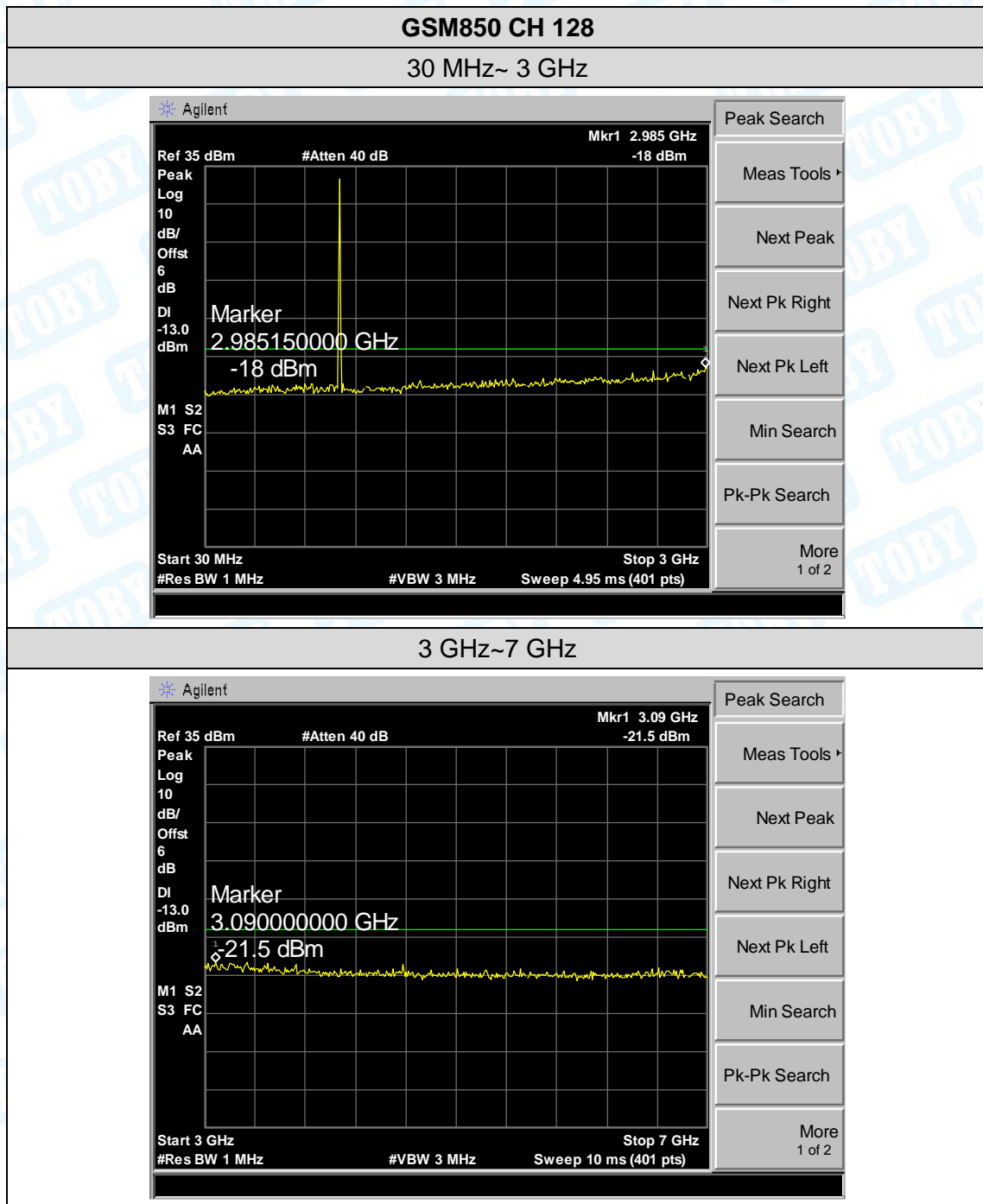




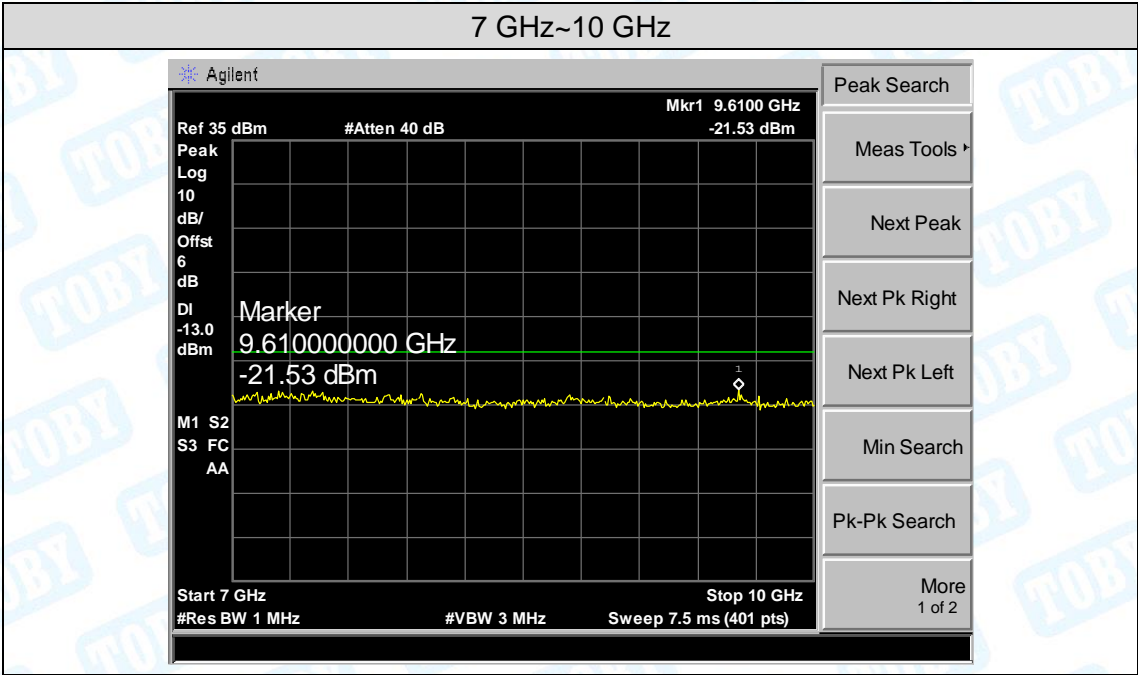




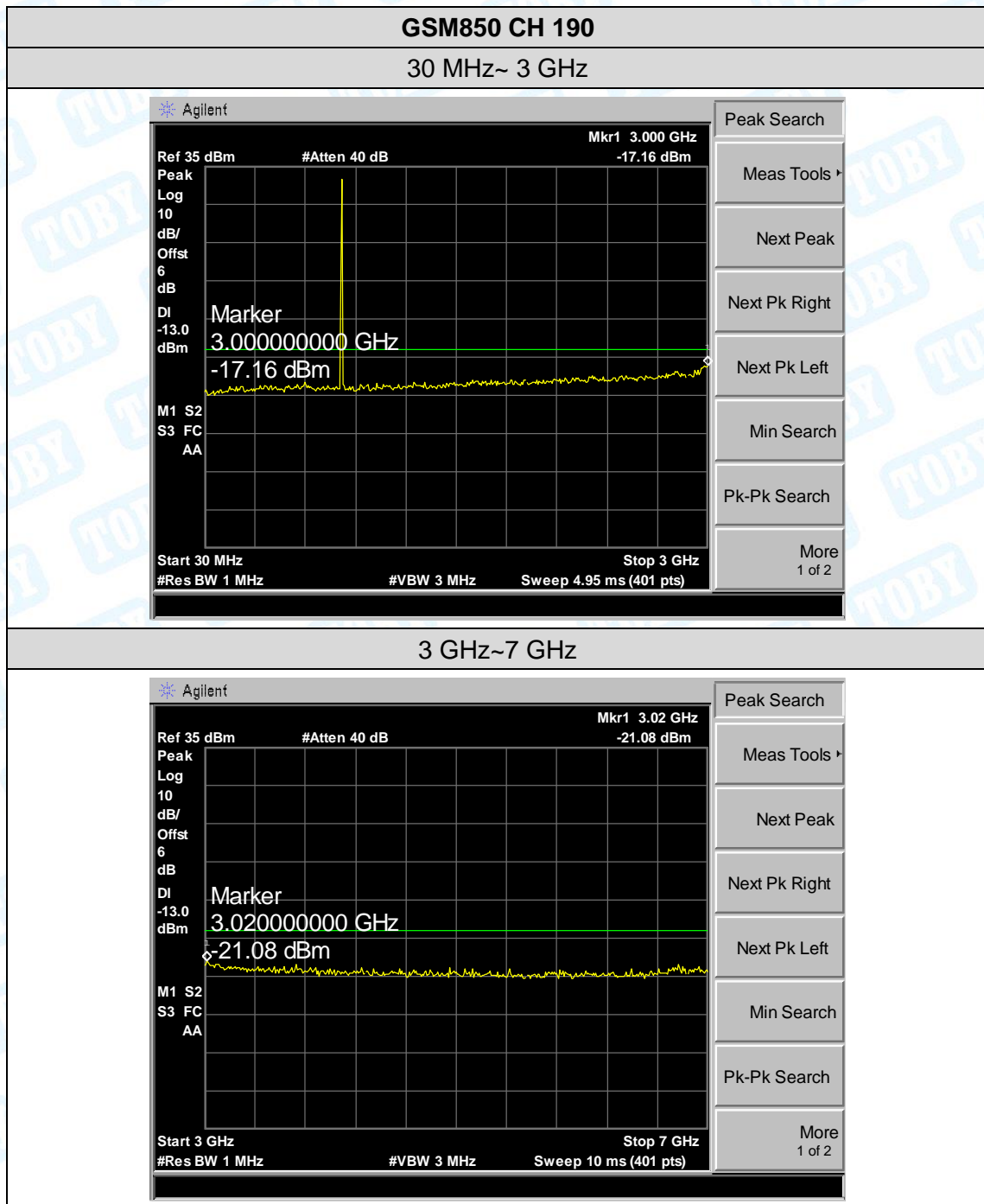
## Attachment F--Conducted Out of Band Emissions



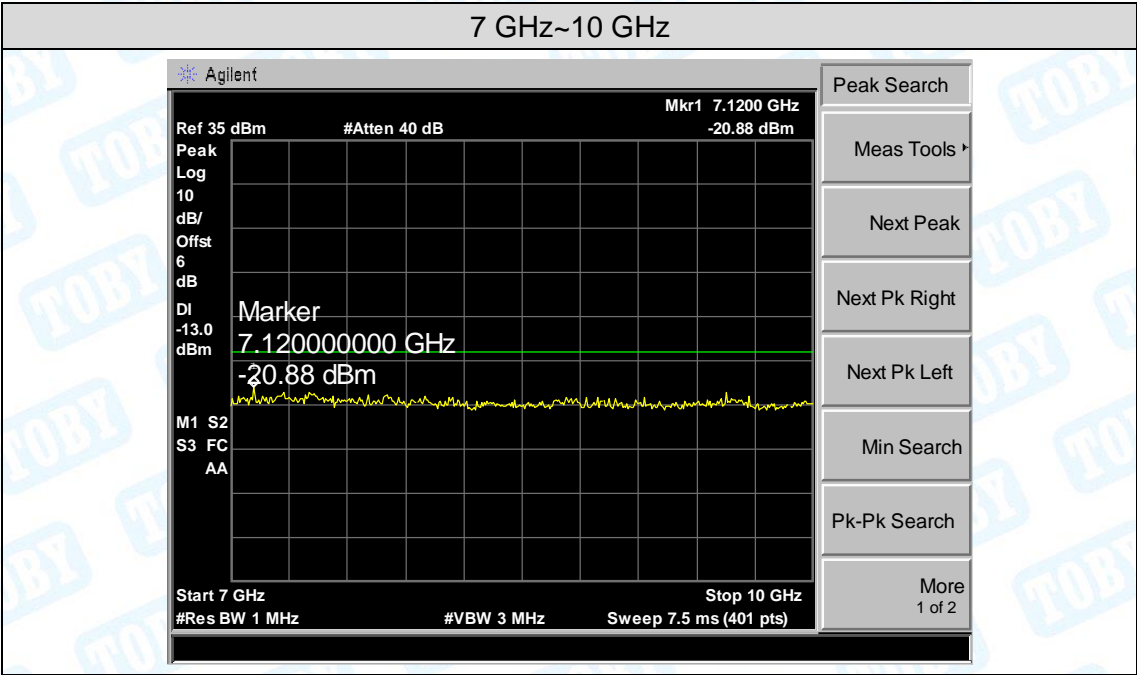




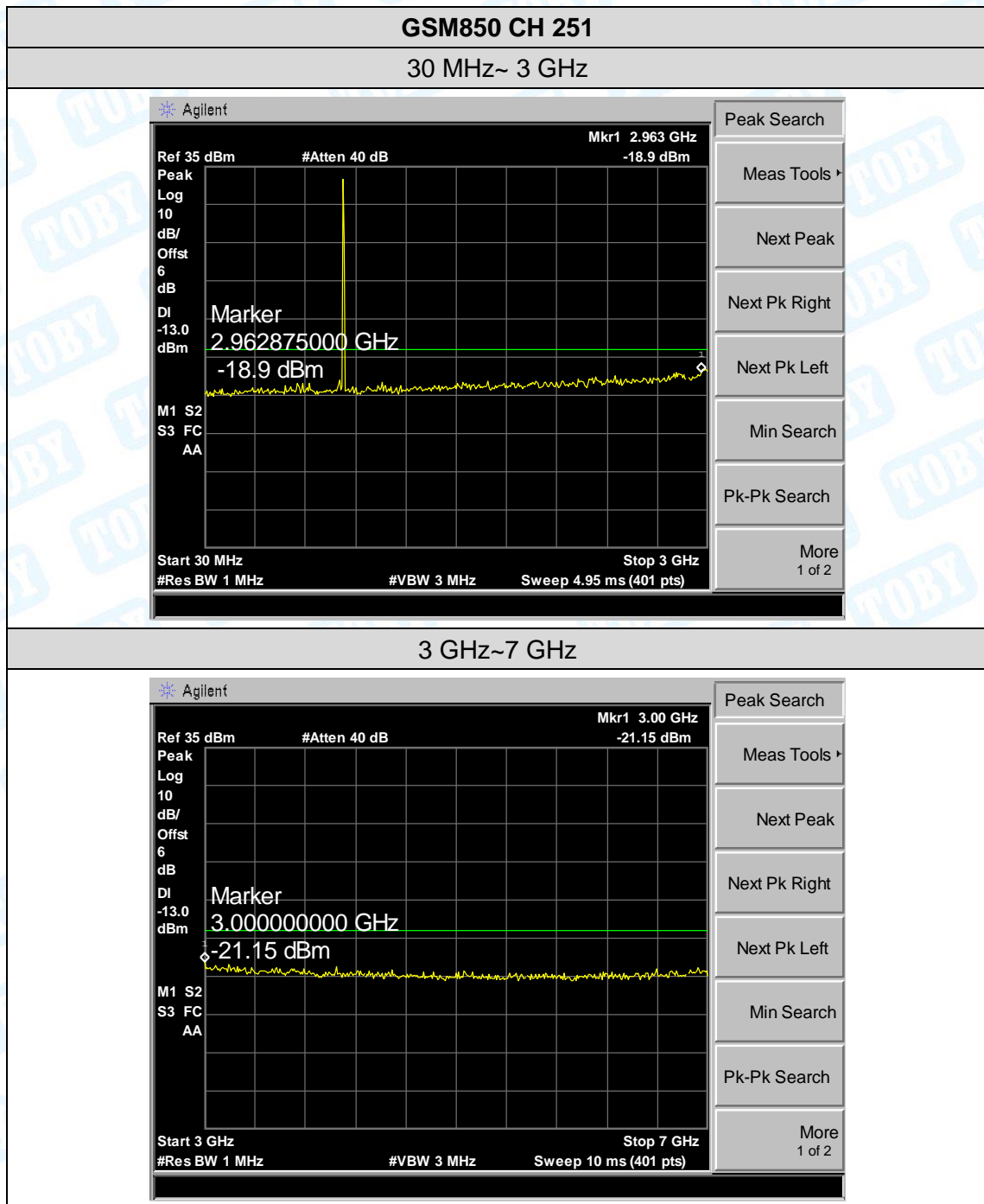




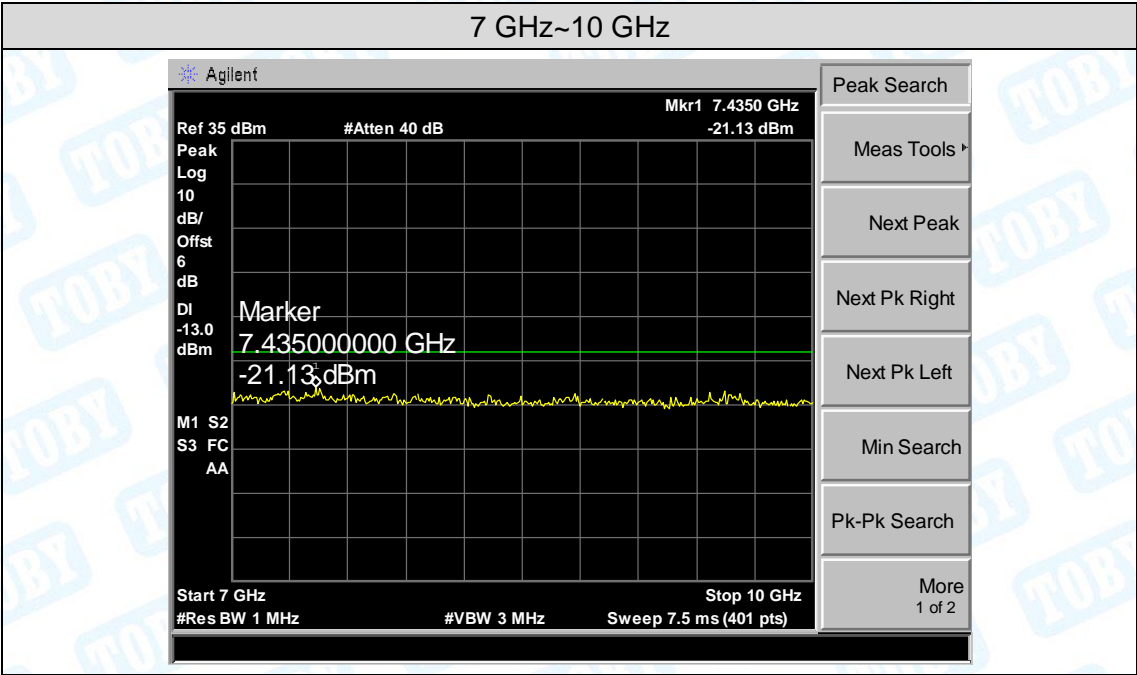




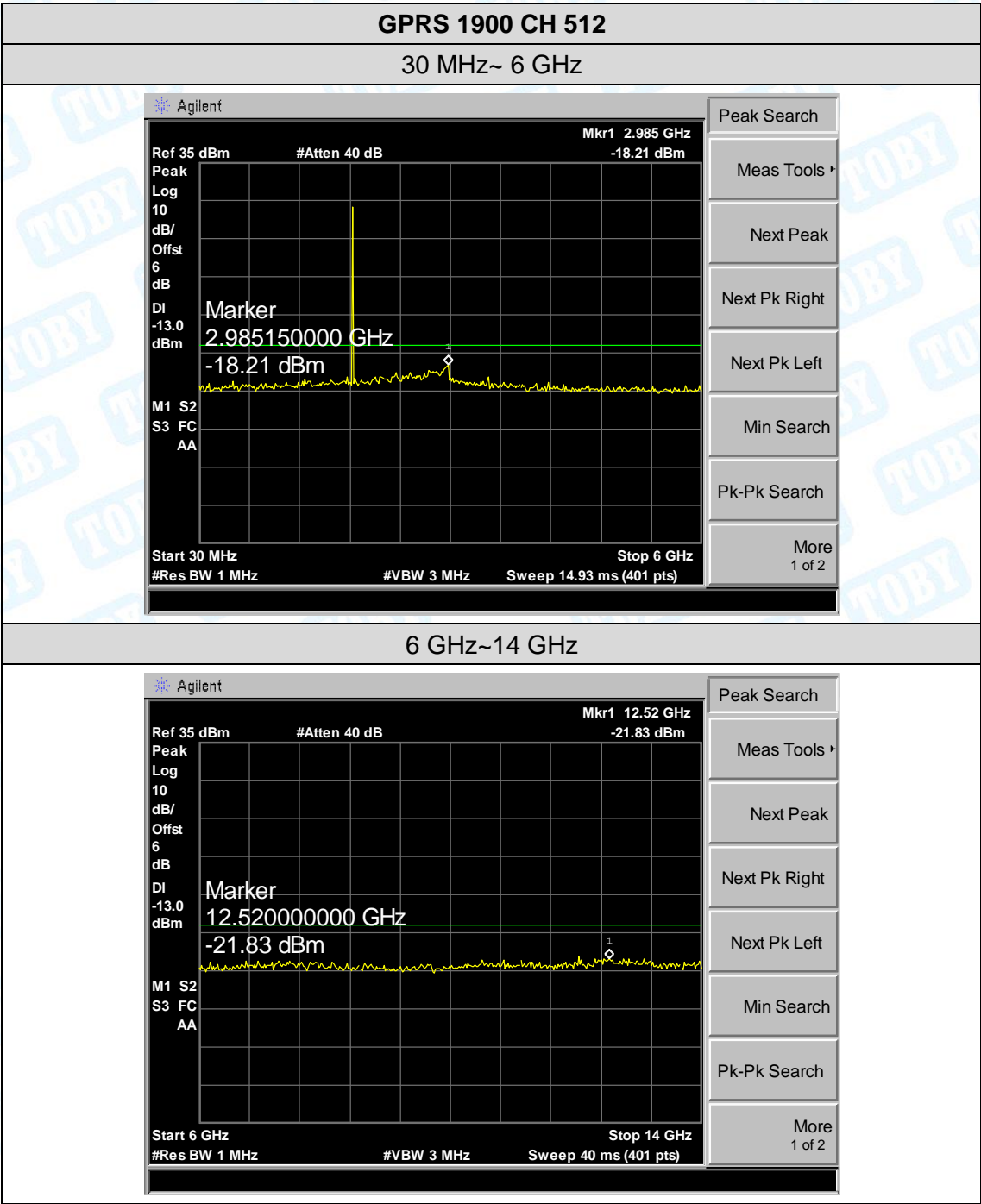


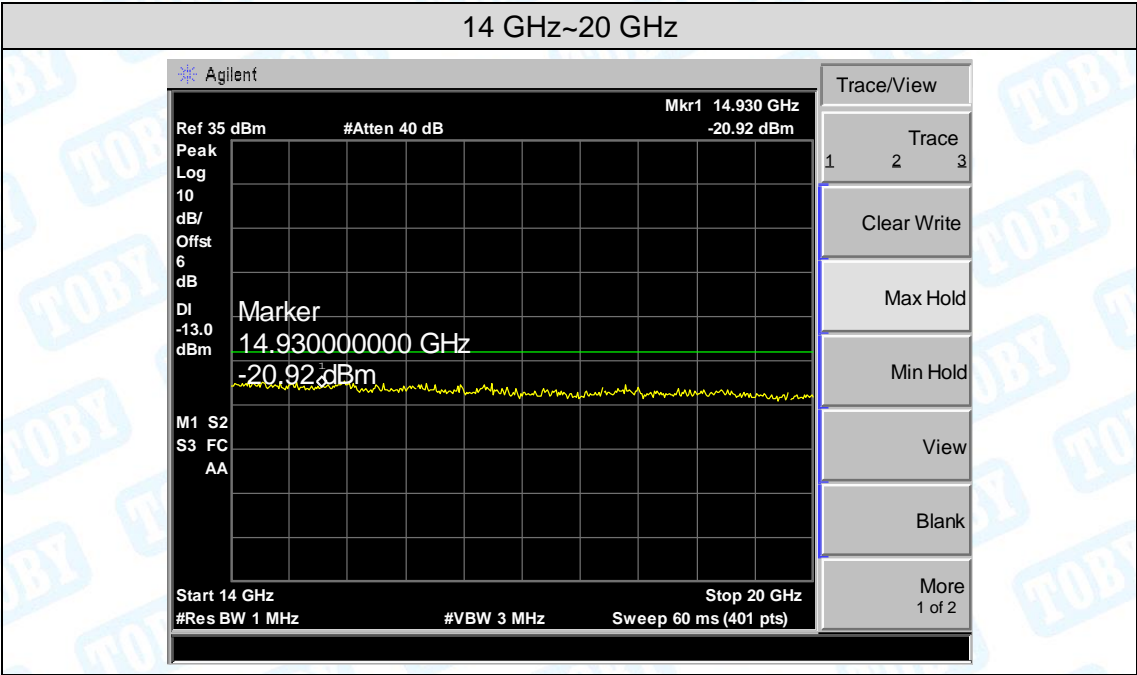




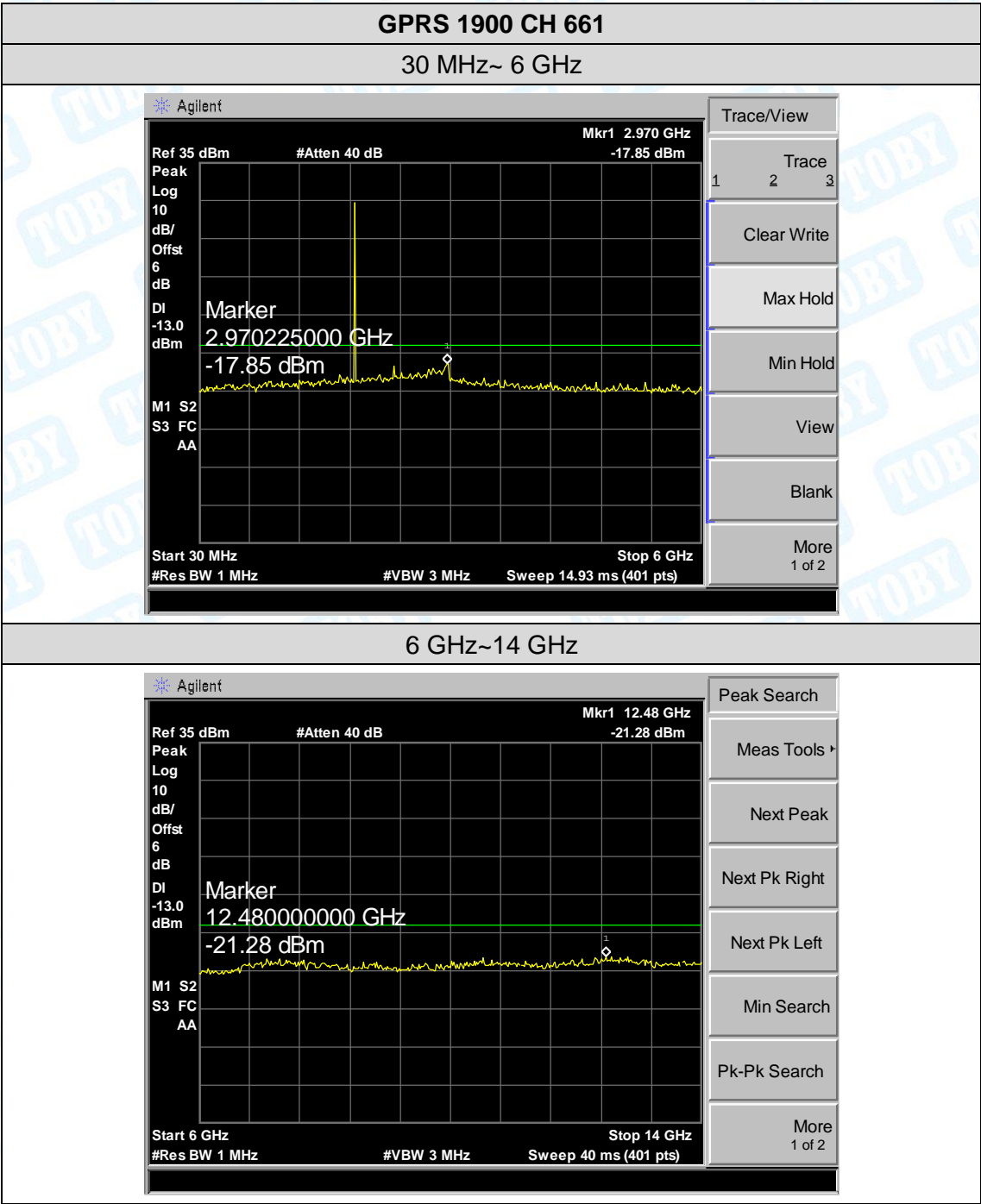


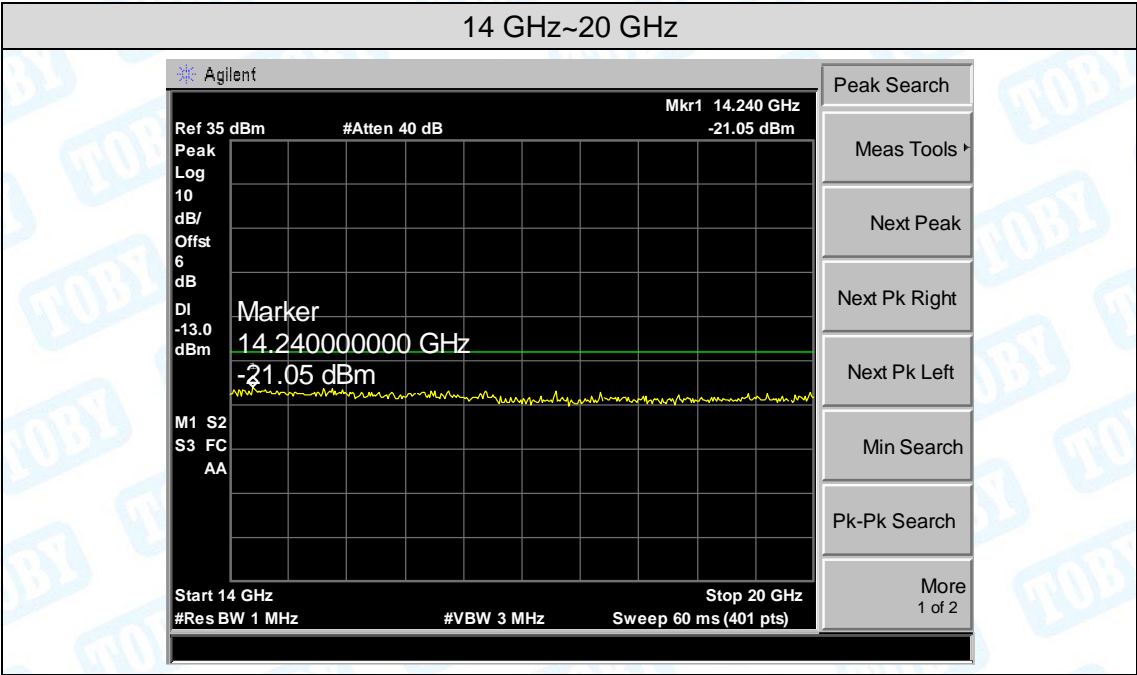




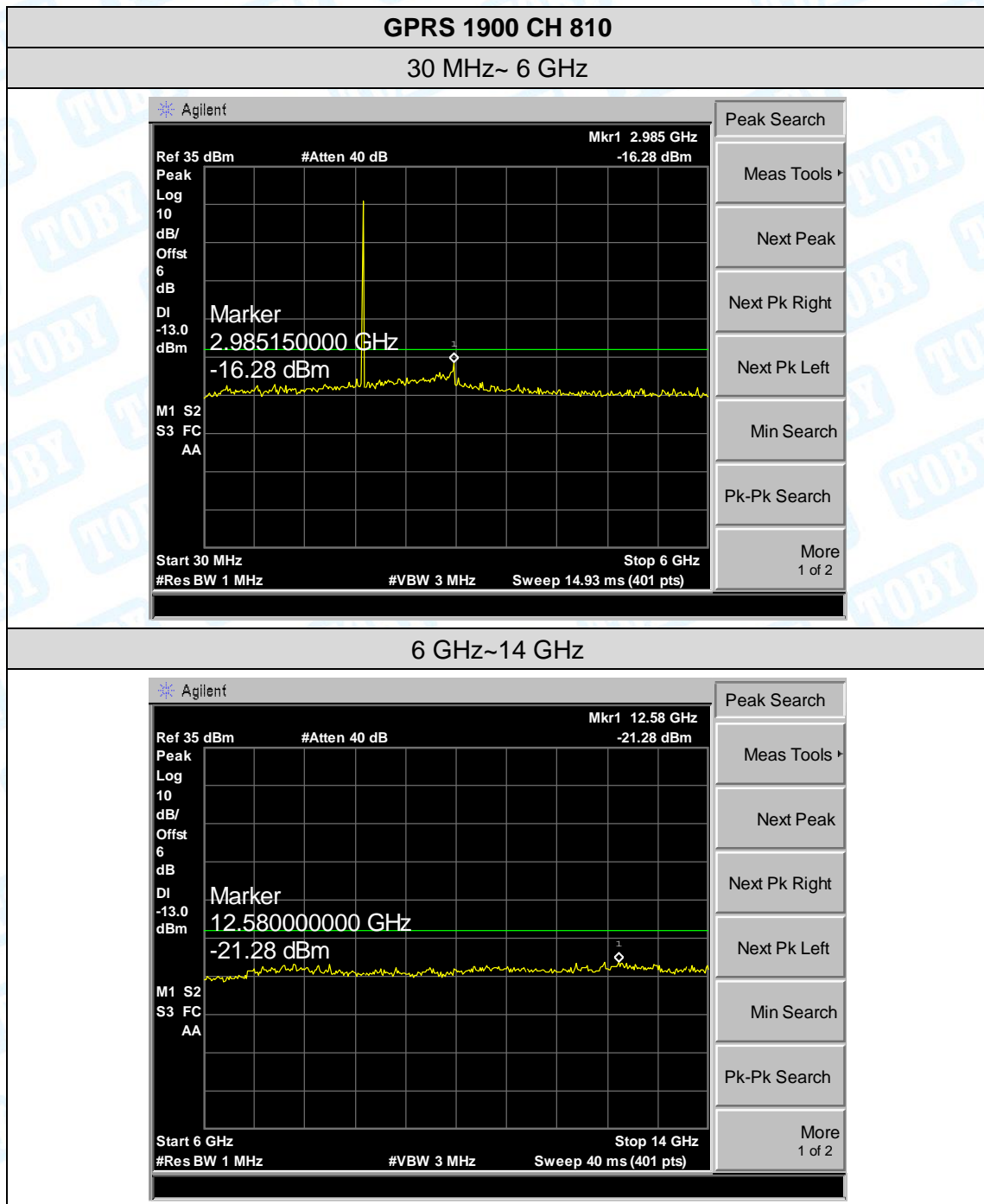


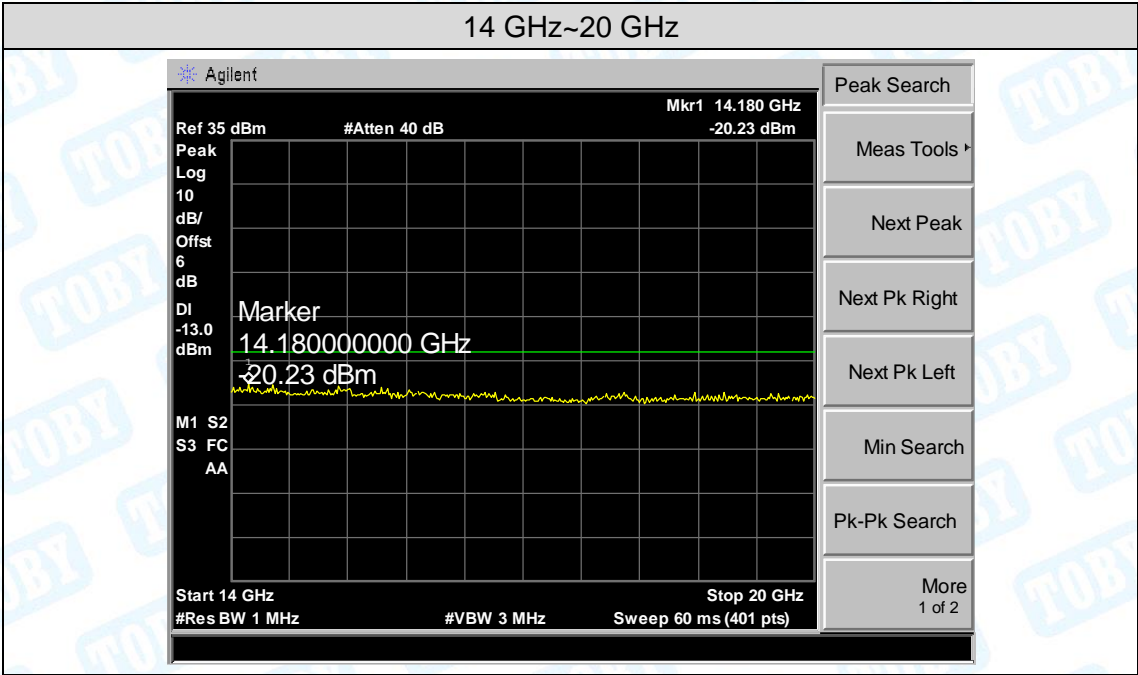








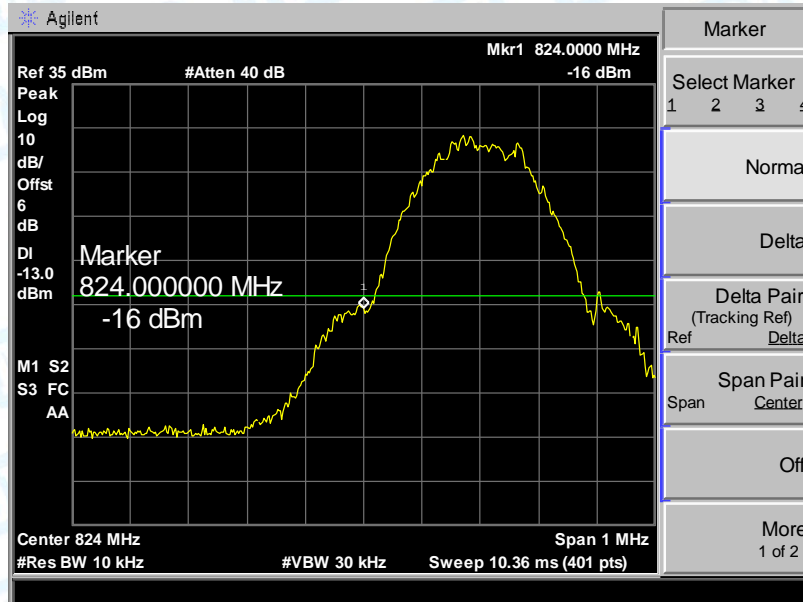




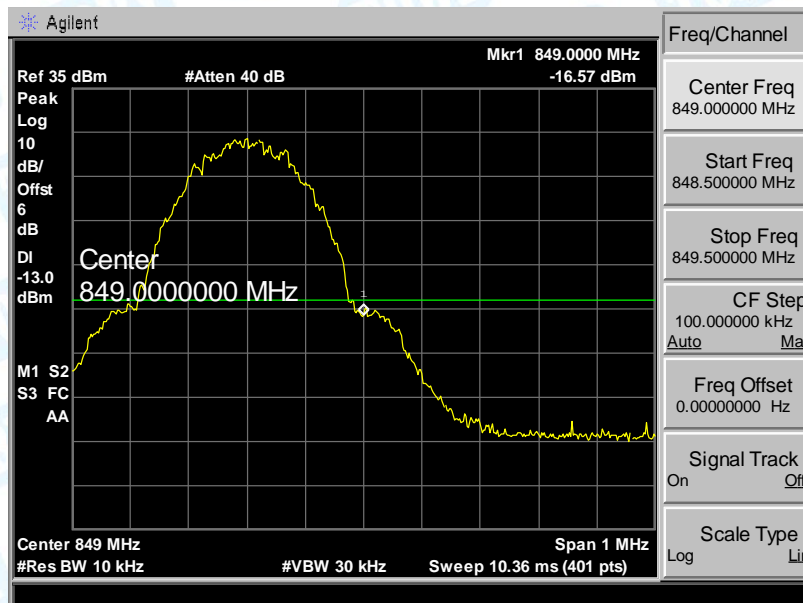


## Attachment G-- Band Edge Test

Test Mode:	GPRS850
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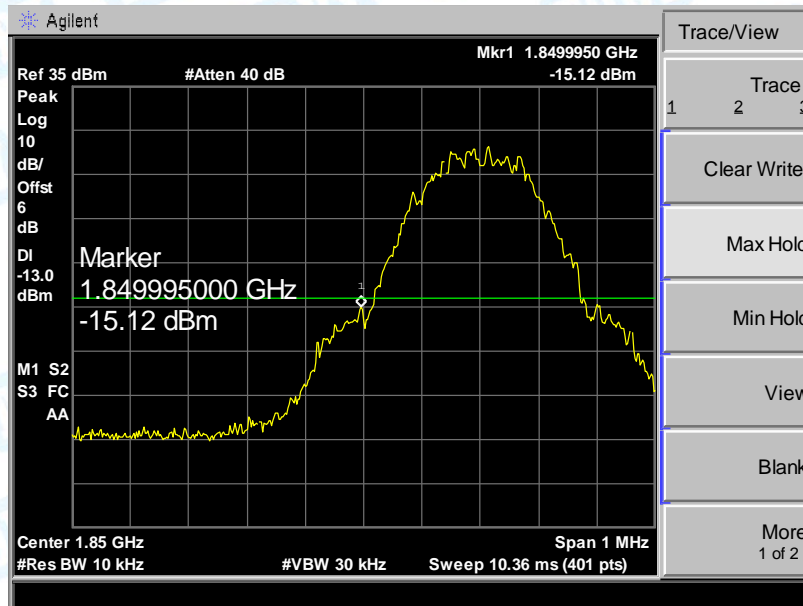


Lowest channel

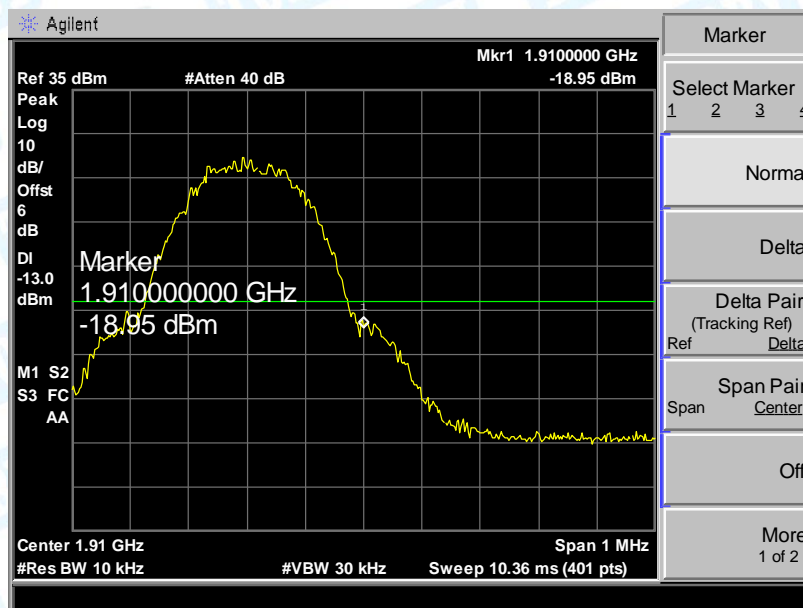


Highest channel

Test Mode:	GPRS1900
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Lowest channel



Highest channel



## Attachment H--Radiated Out Band of Emissions

Measurement Data (worst case)

Test mode:	GPRS 850						
Channel:	Middle						
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	---	---	---	---		
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 1900						
Channel:	Middle						
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	---	---	---	---		
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-----