REPORT No.: SZ18060078W01

TEST REPORT

APPLICANT	:	Shenzhen Concox Information Technology Co.,Ltd
PRODUCT NAME	:	Vehicle GPS tracker
MODEL NAME	:	GT08
BRAND NAME	:	N/A
FCC ID	:	X7IGT08
STANDARD(S)	:	47 CFR Part 22 Subpart H 47 CFR Part 24 Subpart E
TEST DATE	:	2018-06-12 to 2018-07-06
ISSUE DATE	:	2018-07-06

Tested by: Gao Mingzhou

Gao Mingzhou (Test Engineer)

Approved by: Andy Yeh

Andy Yeh (Technical Director)

NOTE: This document is issued by MORLAB, the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525

Http://www.morlab.cn E-mail: service@morlab.cn

DIRECTORY

1. Technical Information ····· 4
1.1. Applicant and Manufacturer Information ····· 4
1.2. Equipment Under Test (EUT) Description ····· 4
1.3. Test Standards and Results ····· 5
1.4. Environmental Conditions ····· 6
2. 47 CFR Part 2, Part 22H & 24E Requirements ····· 7
2.1. Conducted RF Output Power ····· 7
2.2. Peak to Average Radio ····· 9
2.3. 99% Occupied Bandwidth ····· 17
2.4. Frequency Stability ····· 22
2.5. Conducted Out of Band Emissions ····· 24
2.6. Band Edge ····· 32
2.7. Transmitter Radiated Power (EIRP/ERP) ····· 36
2.8. Radiated Out of Band Emissions ····· 40
Annex A Test Uncertainty ····· 49
Annex B Testing Laboratory Information ····· 50

Change History		
Issue	**Date**	**Reason for change**
1.0	2018-07-06	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Shenzhen Concox Information Technology Co.,Ltd
Applicant Address:	Floor 4th, Building B, Gaoxinqi Industrial Park, Liuxian 1st Road, District 67, Bao'an, Shenzhen, China
Manufacturer:	Shenzhen Concox Information Technology Co.,Ltd
Manufacturer Address:	Floor 4th, Building B, Gaoxinqi Industrial Park, Liuxian 1st Road, District 67, Bao'an, Shenzhen, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Vehicle GPS tracker
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	NT11-MB-V1.0
Software Version:	[VERSION]ET310_20_A1D_D23_CTA [BUILD]2018/04/18 17:02
Modulation Type:	GPRS Mode with GMSK Modulation
Operating Frequency Range:	GPRS 850MHz: Tx: 824.20 - 848.80MHz (at intervals of 200kHz); Rx: 869.20 - 893.80MHz (at intervals of 200kHz) GPRS 1900MHz: Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz); Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)
Multi-slot Class:	Class12
Emission Designators:	GPRS 850:253KG7W, GPRS 1900:247KG7W
Antenna Type:	Supported Copper Antenna
Antenna Gain:	-1.0 dBi

Note 1: The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula F(n)=824.2+0.2*(n-128), 128<=n<=251; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128 (824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

Note 2: The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula F(n)=1850.2+0.2*(n-512), 512<=n<=810; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 and Part 24 for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 2 (10-1-12 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-12 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-12 Edition)	Personal Communications Services

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result
1	2.1046	Conducted RF Output Power	Jun 12, 2018	Gao Mingzhou	PASS
2	24.232(d)	Peak to average radio	Jun 12, 2018 Jul 06, 2018	Gao Mingzhou	PASS
3	2.1049,22.917, 24.238,	99% Occupied Bandwidth	Jun 12, 2018 Jul 06, 2018	Gao Mingzhou	PASS
4	2.1055,22.355, 24.235	Frequency Stability	Jun 12, 2018	Gao Mingzhou	PASS
5	2.1051,2.1057, 22.917, 24.238,	Conducted Out of Band Emissions	Jun 12, 2018	Gao Mingzhou	PASS
6	2.1051, 2.1057, 22.917, 24.238	Band Edge	Jun 12, 2018	Gao Mingzhou	PASS
7	22.913, 24.232	Transmitter Radiated Power (EIPR/ERP)	Jun 25, 2018	Wu Junke	PASS
8	2.1053, 2.1057, 22.917, 24.238	Radiated Out of Band Emissions	Jun 12, 2018	Wu Junke	PASS

Note: Measurement method according to TIA/EIA 603.D-2010.

1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR Part 2, Part 22H & 24E Requirements

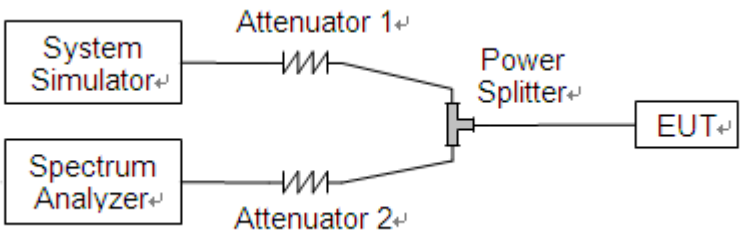
2.1. Conducted RF Output Power

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2. Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.1.3. Test Results

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

Test Verdict:

Band	Channel	Frequency (MHz)	Measured Average Power dBm	Limit dBm	Verdict
GPRS 850MHz	128	824.2	29.77	35	PASS
	190	836.6	29.56		PASS
	251	848.8	29.30		PASS
GPRS 1900MHz	512	1850.2	27.30	32	PASS
	661	1880.0	28.47		PASS
	810	1909.8	25.31		PASS
Note 1: For the GPRS mode, all the slots were tested and just the worst data was record in this report.					

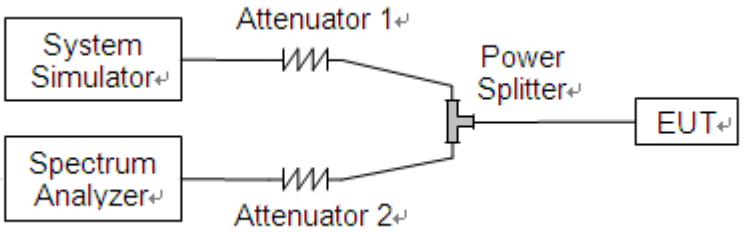
2.2. Peak to Average Radio

2.2.1. Requirement

According to FCC section 2.1049 and FCC 24.232(d) the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2. Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.2.3. Test procedure

For GSM/EGPRS operating mode:

Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.

Set EUT in maximum output power, and triggered the bust signal.

Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

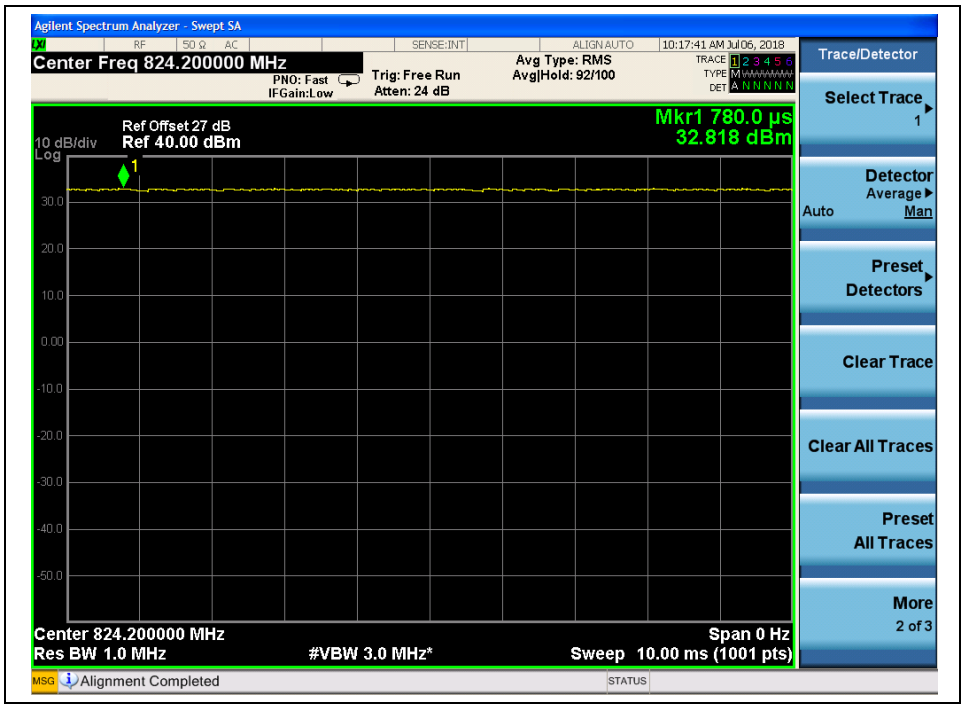
2.2.4. Test Result

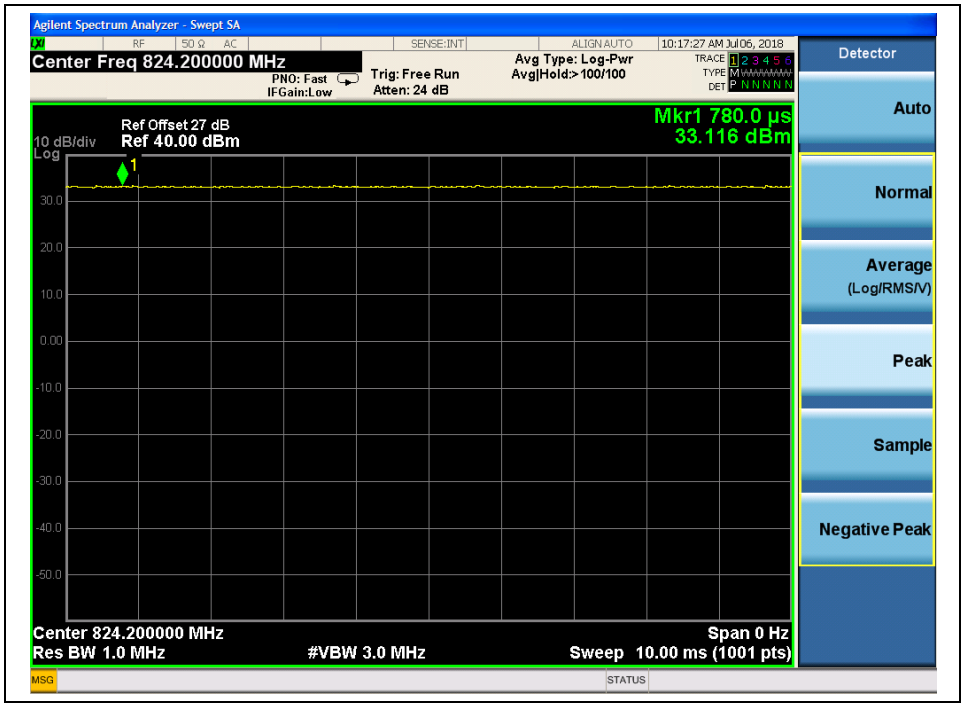
The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

A. Test Verdict:

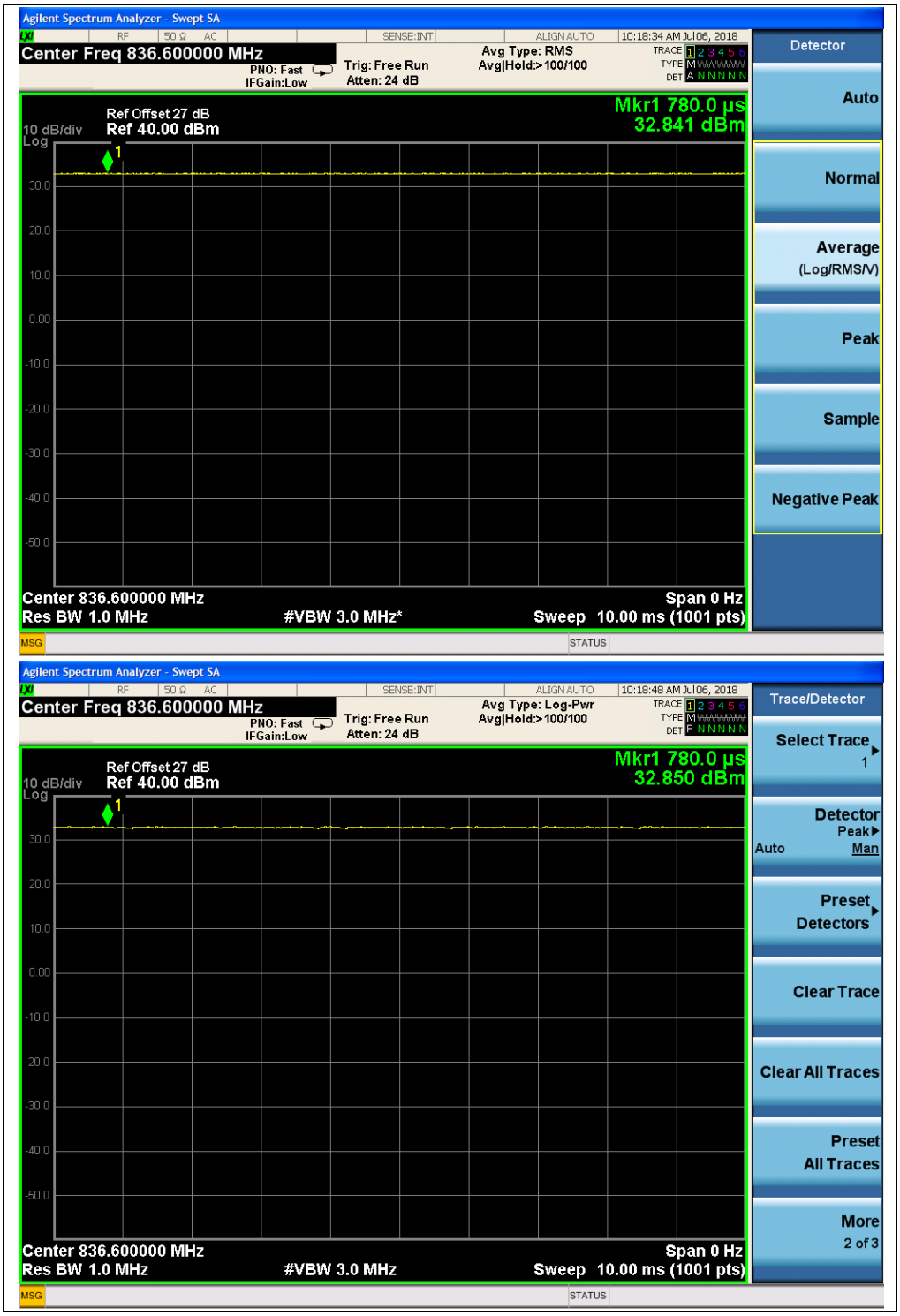
Band	Channel	Frequency (MHz)	Peak to Average radio		Limit	Verdict
			dB	Refer to Plot	dB	
GPRS 850MHz	128	824.2	0.30	Plot A1 to A3	13	PASS
	190	836.6	0.01			PASS
	251	848.8	0.36			PASS
GPRS 1900MHz	512	1850.2	0.12	Plot B1 to B3	13	PASS
	661	1880.0	0.13			PASS
	810	1909.8	0.07			PASS

B. Test Plots:

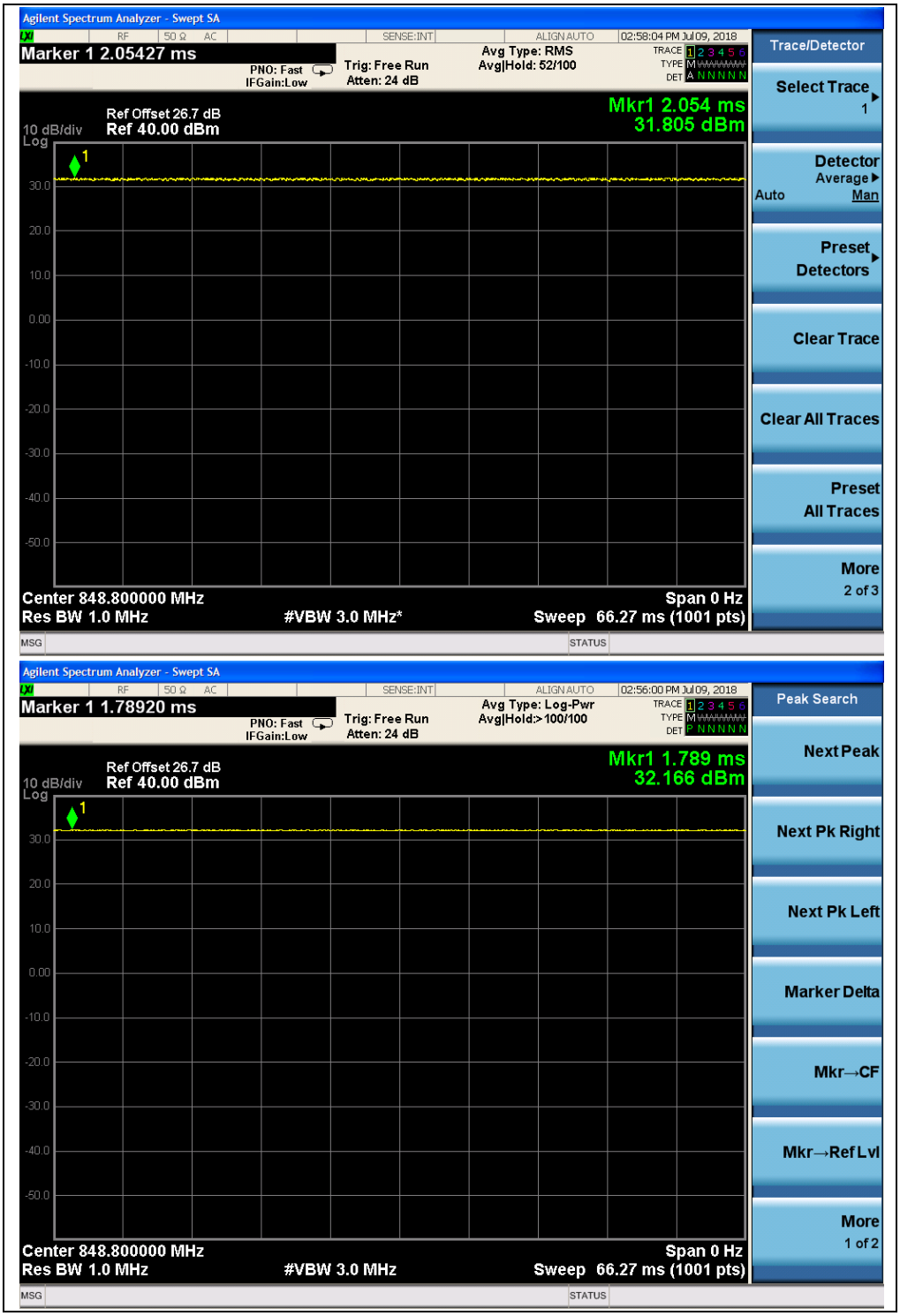




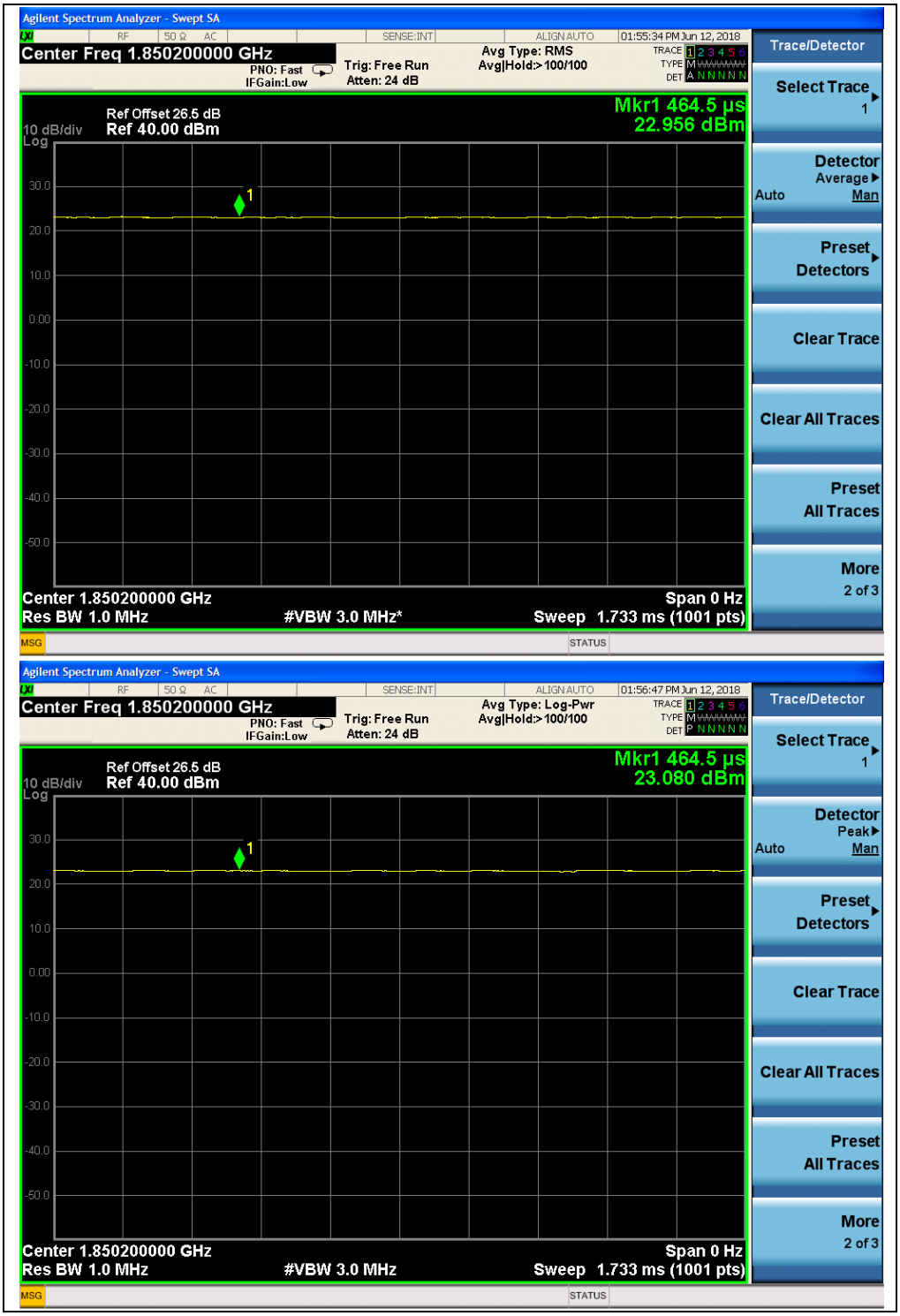
(Plot A1, GPRS 850 MHz, Channel = 128)



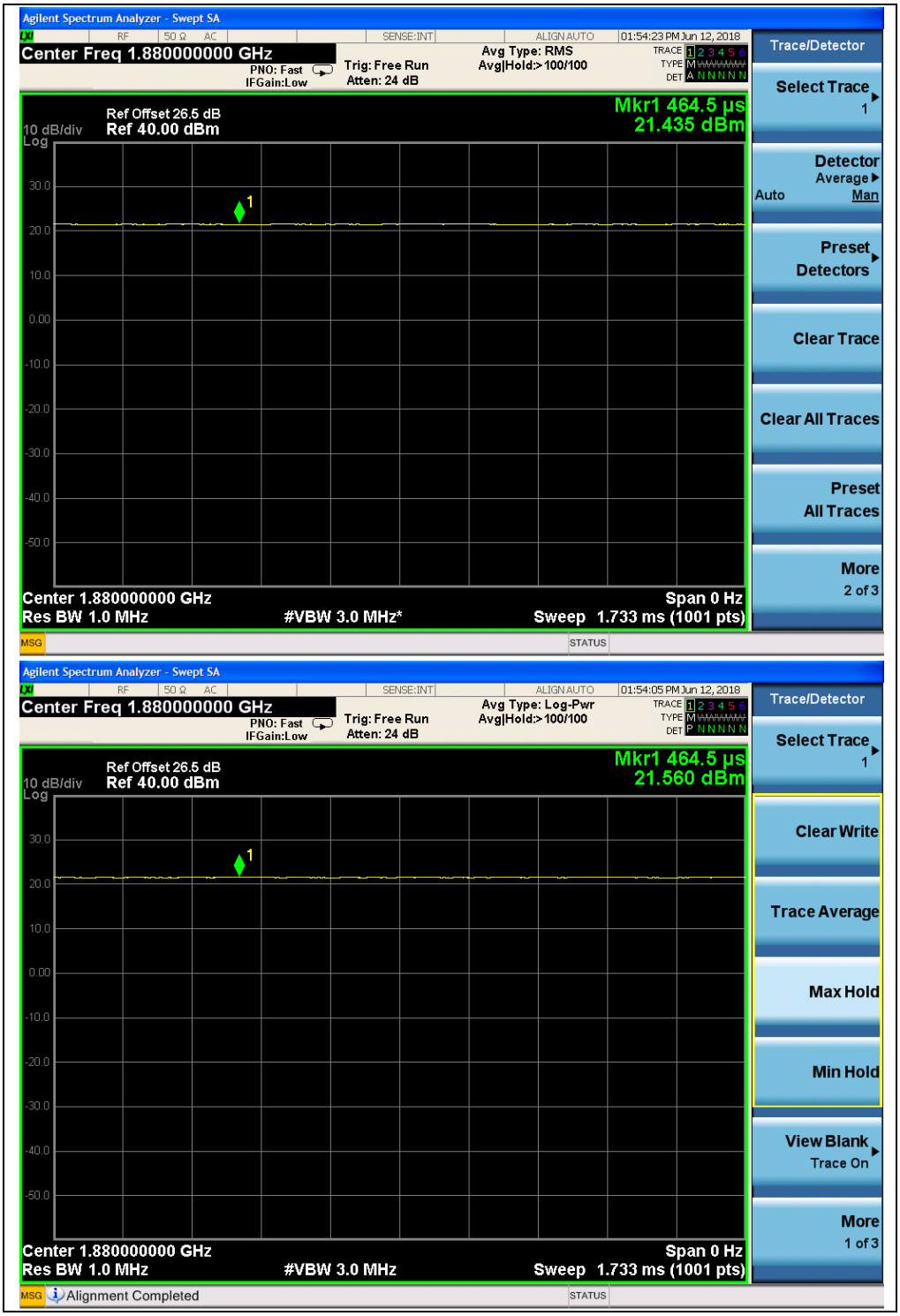
(Plot A2, GPRS 850 MHz, Channel = 190)



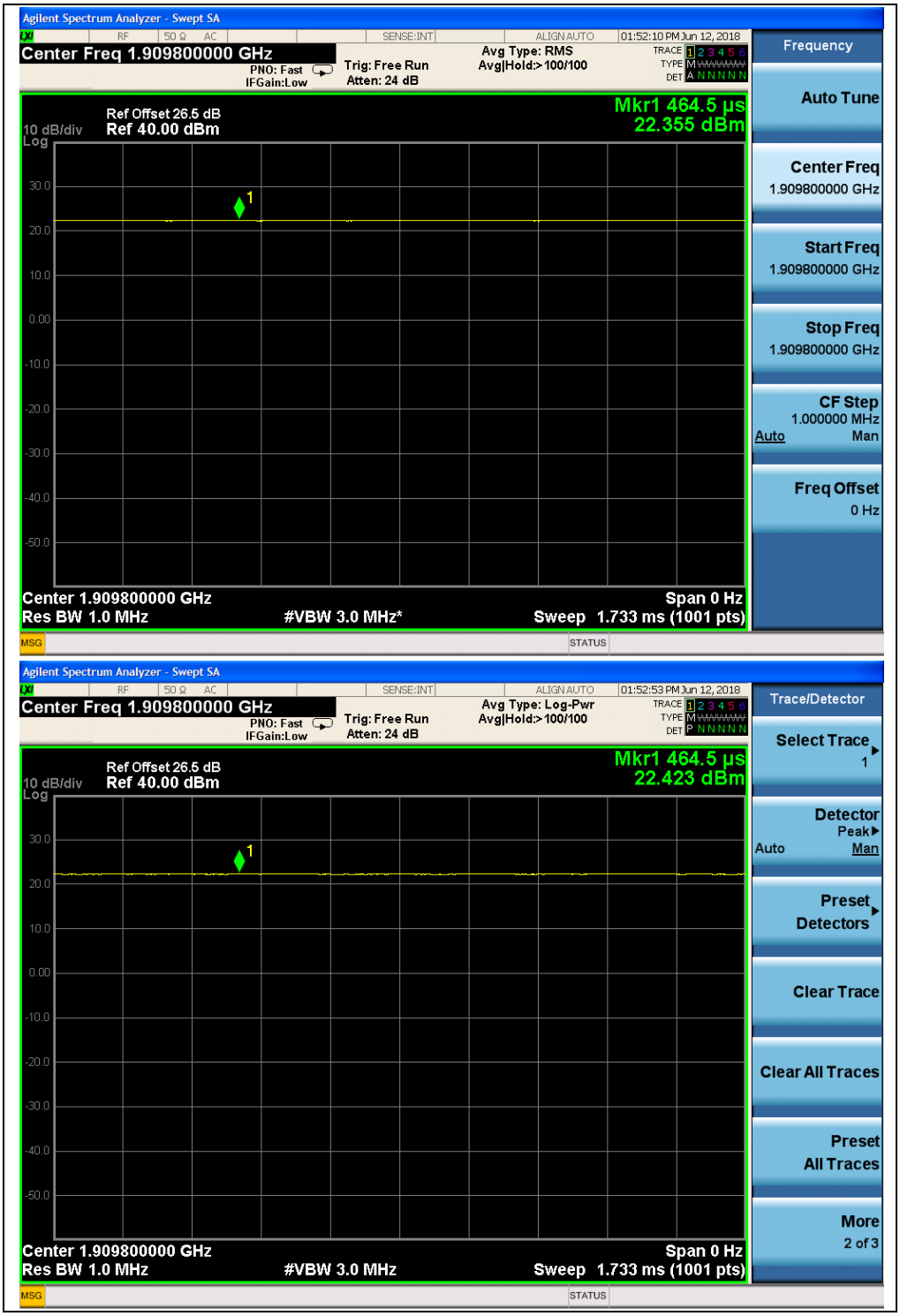
(Plot A3, GPRS 850MHz, Channel = 251)



(Plot B1, GPRS 1900 MHz, Channel = 512)



(Plot B2, GPRS 1900 MHz, Channel = 661)



(Plot B3, GPRS 1900MHz, Channel = 810)

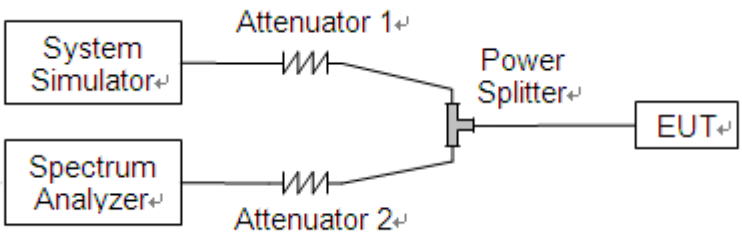
2.3. 99% Occupied Bandwidth

2.3.1. Requirement

According to FCC section 2.1049 and FCC § 22.917 &24.238, 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 the 99% emission bandwidth.

2.3.2. Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

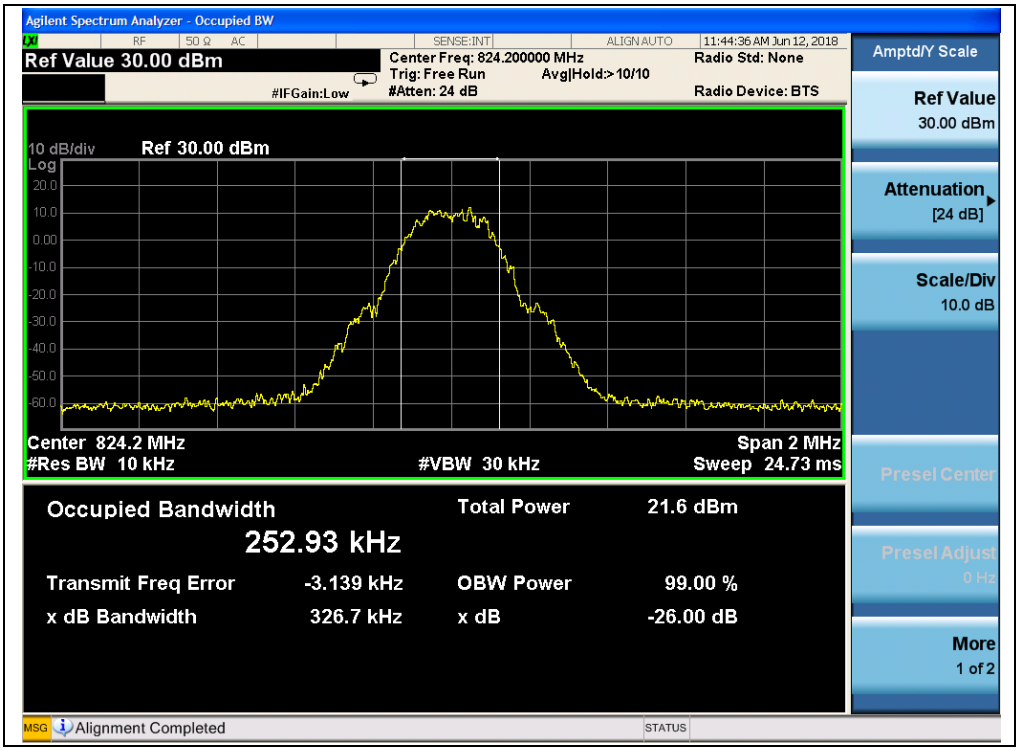
2.3.3. Test Result

The lowest, middle and highest channels are selected to perform testing to record the 99% occupied bandwidth.

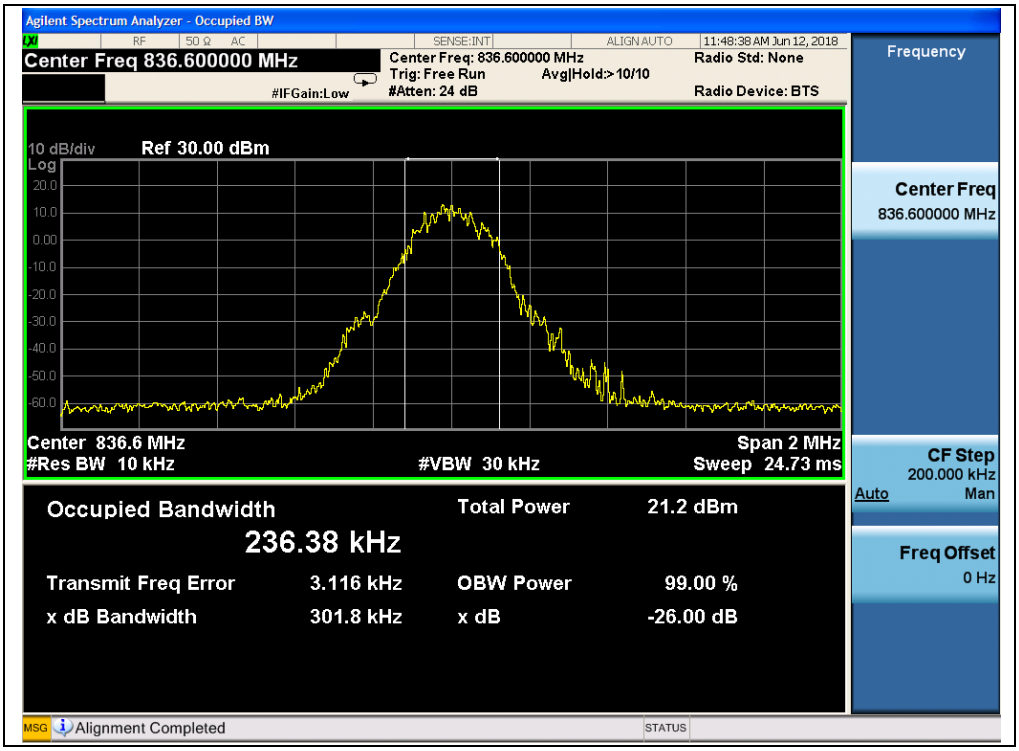
A. Test Verdict:

Band	Channel	Frequency (MHz)	26dB bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Refer to Plot
GPRS 850MHz	128	824.2	326.7	252.93	Plot C1 to C3
	190	836.6	301.8	236.38	
	251	848.8	319.9	248.82	
GPRS 1900MHz	512	1850.2	315.4	247.38	Plot D1 to D3
	661	1880.0	300.7	229.44	
	810	1909.8	321.4	246.77	

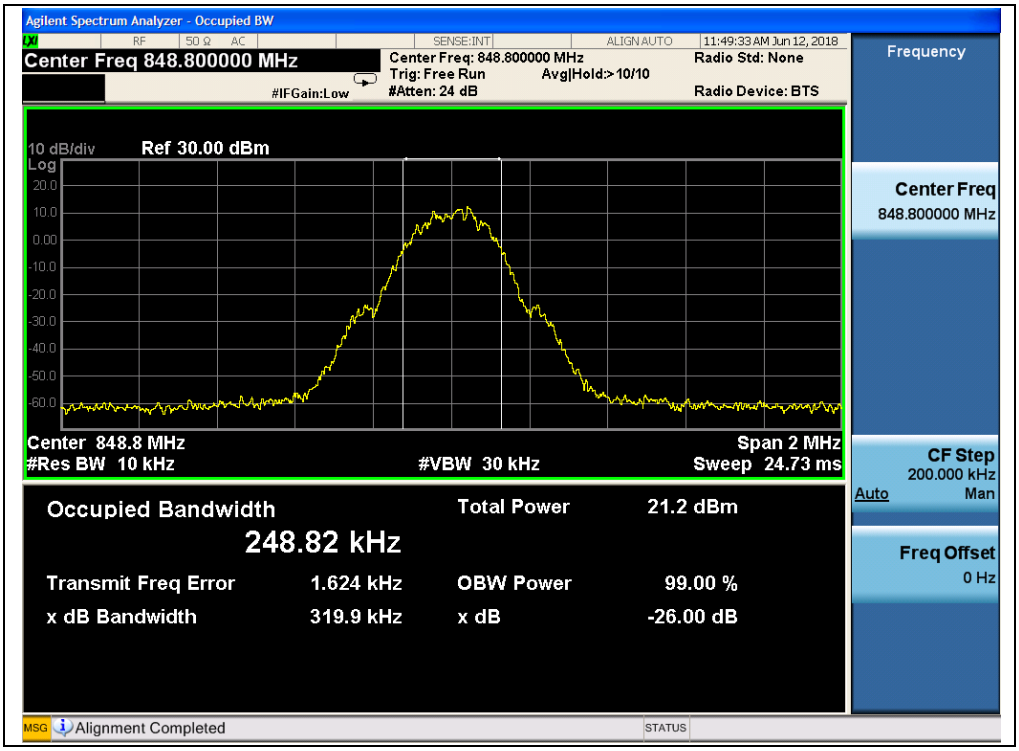
B. Test Plots:



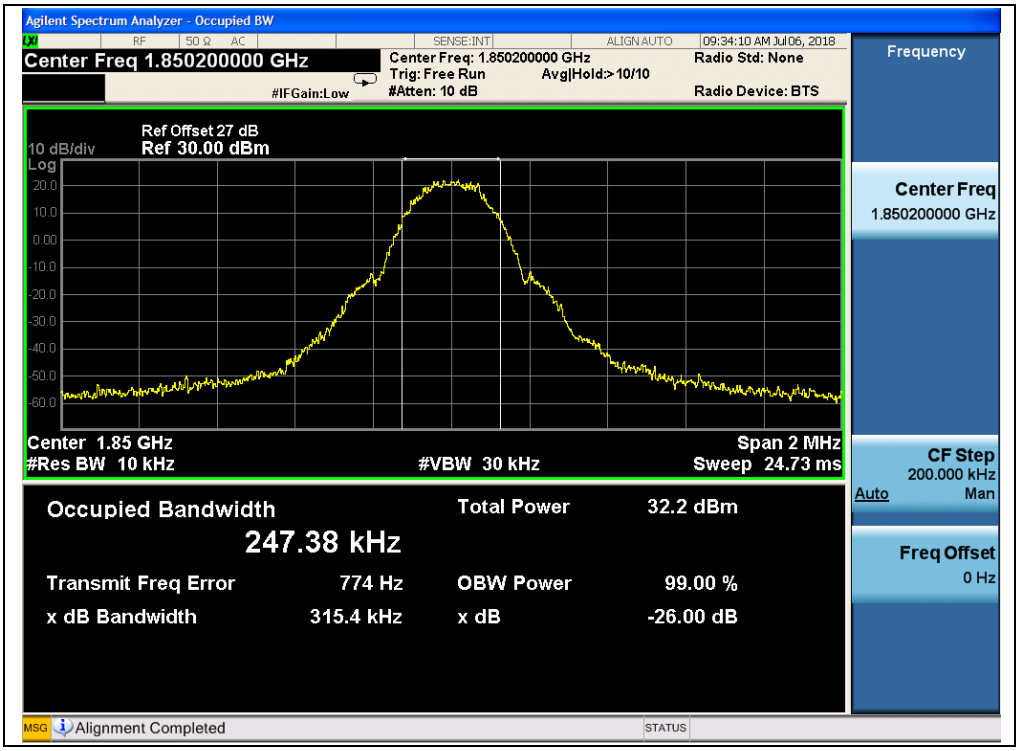
(Plot C1, GPRS 850MHz, Channel = 128)



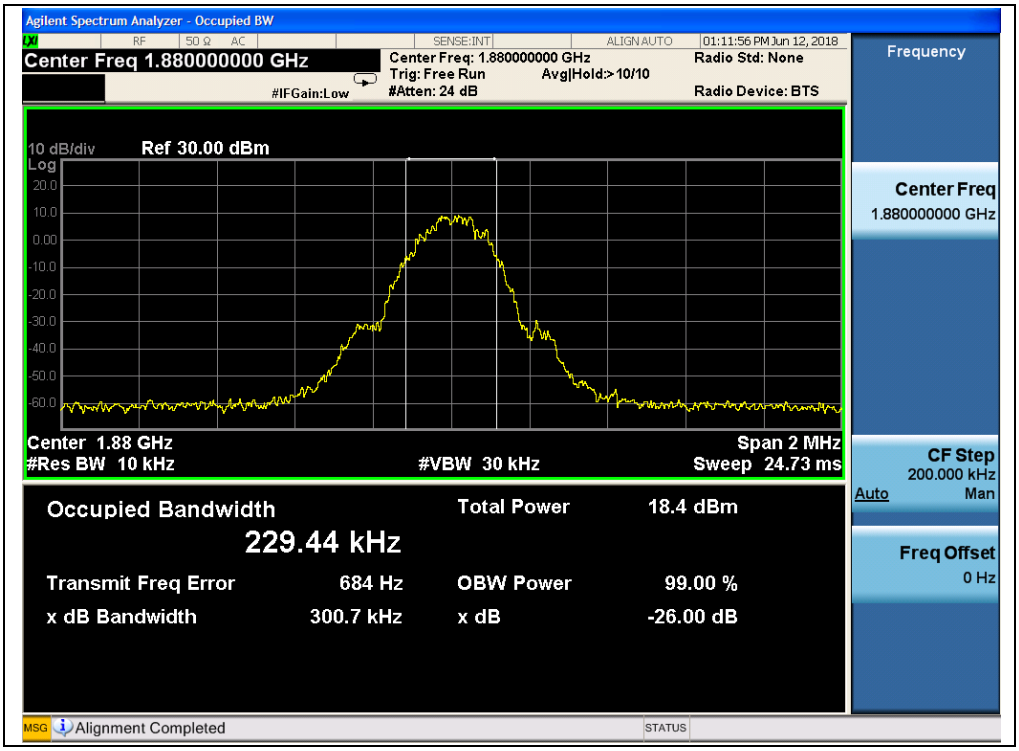
(Plot C2, GPRS 850MHz, Channel = 190)



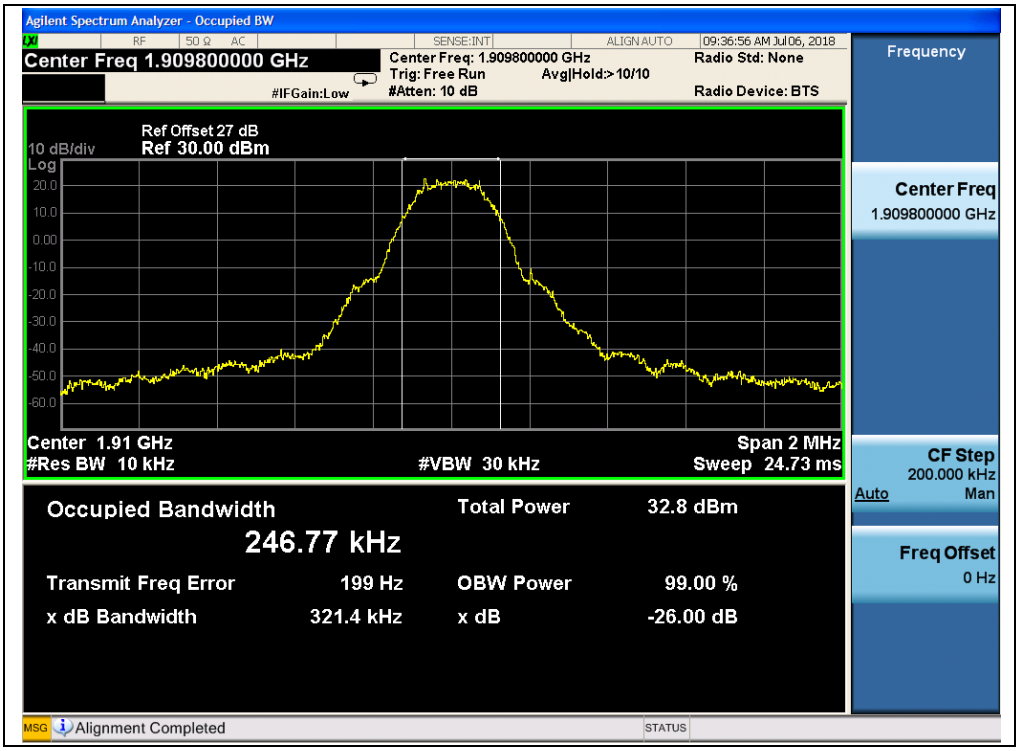
(Plot C3, GPRS 850MHz, Channel = 251)



(Plot D1, GPRS1900MHz, Channel = 512)



(Plot D2, GPRS1900MHz, Channel = 661)



(Plot D3, GPRS 1900MHz, Channel = 810)

2.4. Frequency Stability

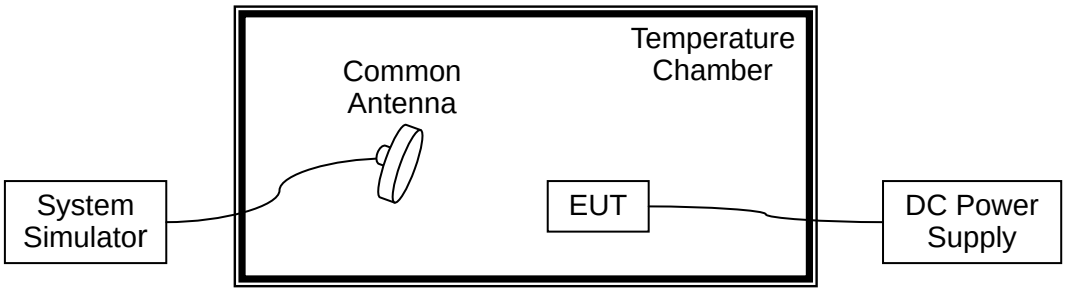
2.4.1. Requirement

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:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
(b) 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 the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.4.2. Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

2.4.3. Test Result

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.2VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 25°C. The frequency deviation limit of 850MHz band is ±2.5ppm, and 1900MHz is ±1ppm.

A. Test Verdict:

GPRS 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 128 (824.2MHz)		Channel = 190 (836.6MHz)		Channel = 251 (848.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-20	2.70	±2060.5	13.53	±2091.5	-12.90	±2122	PASS
	-10	-19.93		12.41		8.94		
	0	-15.42		12.49		-20.20		
	+10	-1.27		16.61		20.53		
	+20	-10.76		9.63		21.94		
	+30	2.66		15.95		-14.19		
	+40	20.63		3.63		20.53		
	+50	-19.43		5.76		15.14		
	+60	-9.74		15.83		-12.83		
3.6	+25	-19.93		17.4		8.94		
4.2	+25	-15.42		19.63		-14.27		

GPRS 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 512 (1850.2MHz)		Channel = 661 (1880.0MHz)		Channel = 810 (1909.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-20	-17.26	±1850.2	13.41	±1880.0	-14.12	±1909.8	PASS
	-10	16.26		23.20		-0.45		
	0	-13.25		-13.14		24.27		
	+10	-18.89		-11.77		22.68		
	+20	-29.25		37.40		-12.53		
	+30	7.91		-6.12		25.27		
	+40	-19.69		-11.73		18.88		
	+50	18.43		16.60		-8.71		
	+60	12.08		23.74		12.89		
3.6	+25	30.29		-22.18		-0.45		
4.2	+25	-23.01		13.21		24.29		

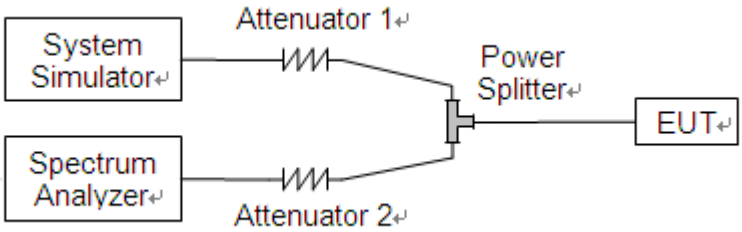
2.5. Conducted Out of Band Emissions

2.5.1. Requirement

According to FCC section 22.917(a) and FCC section 24.238(a) 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. This calculated to be -13dBm.

2.5.2. Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.5.3. Test Result

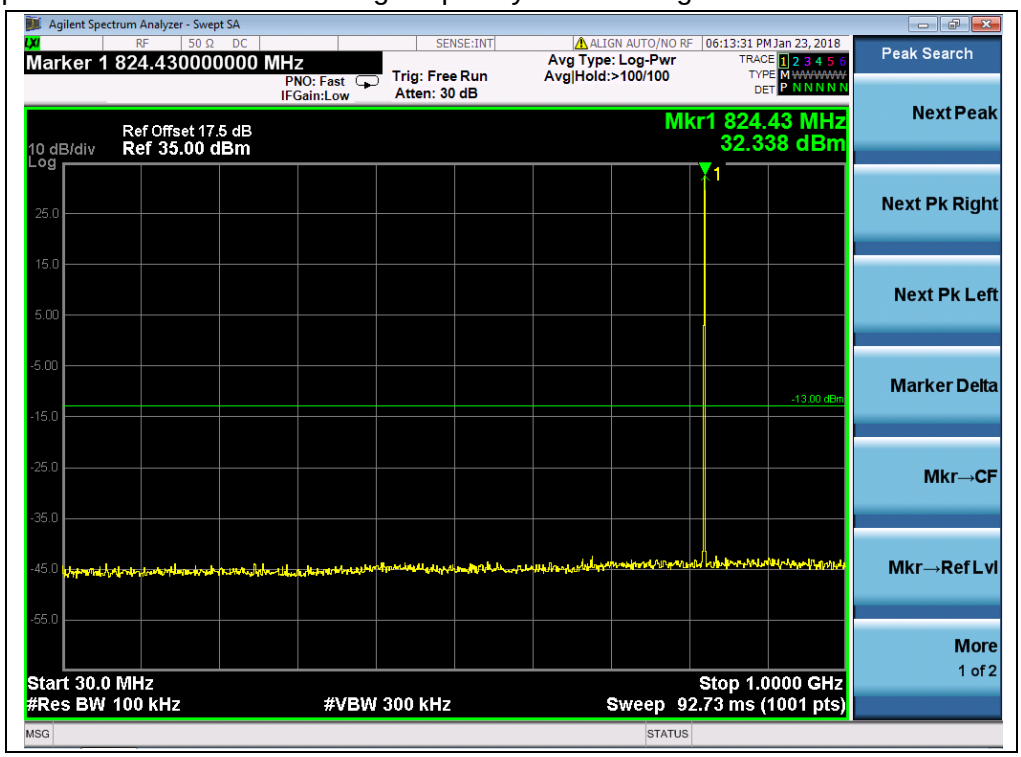
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

A. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GPRS 850MHz	128	824.2	-26.40	Plot E1 to E1.1	-13	PASS
	190	836.6	-27.31	Plot E2 to E2.1		PASS
	251	848.8	-27.78	Plot E3 to E3.1		PASS
GPRS 1900MHz	512	1850.2	-26.19	Plot F1 to F1.1	-13	PASS
	661	1880.0	-26.87	Plot F2 to F2.1		PASS
	810	1909.8	-27.17	Plot F3 to F3.1		PASS

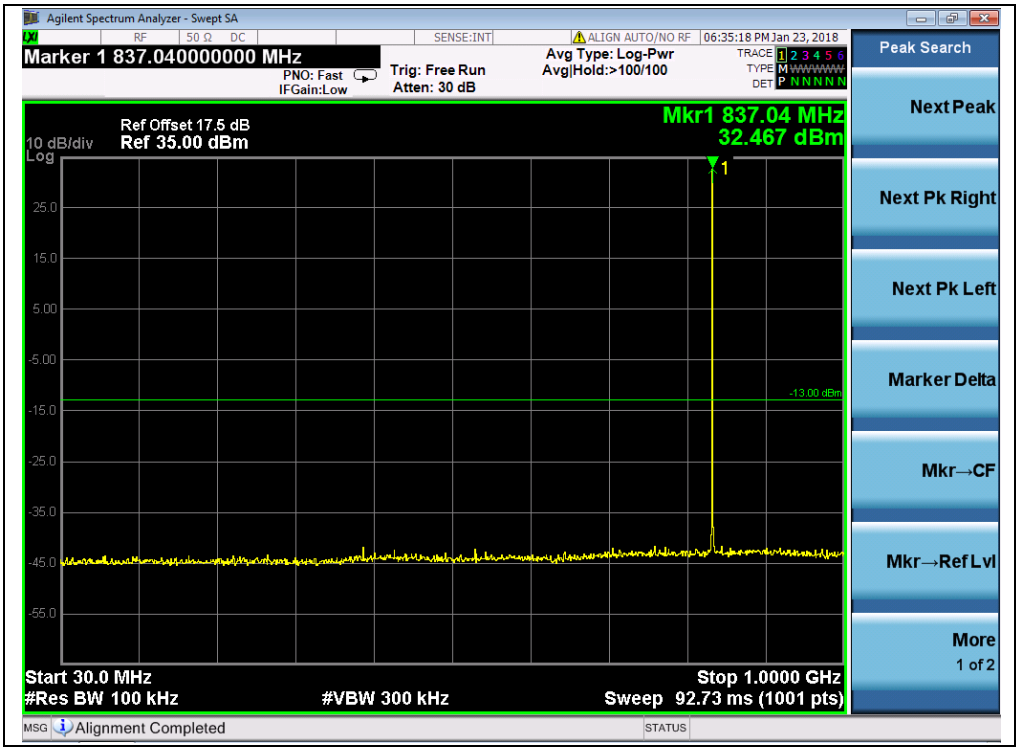
B. Test Plots:

Note: the power of the EUT transmitting frequency should be ignored



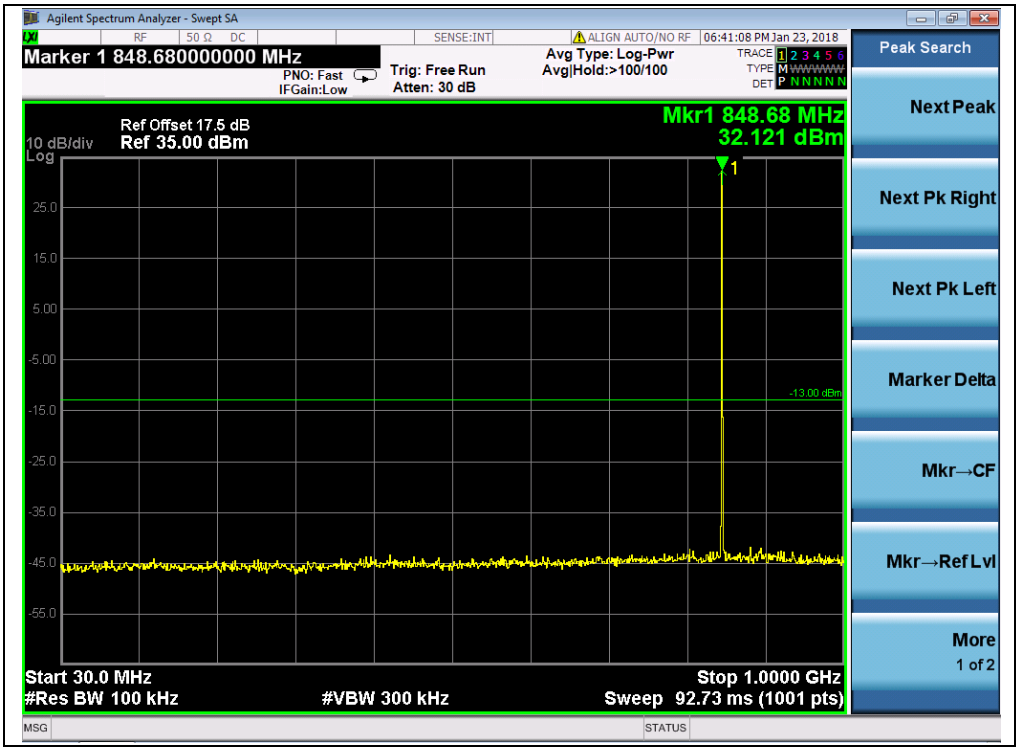
(Plot E1, GPRS 850MHz, Channel = 128, 30MHz to 1GHz)

(Plot E1.1, GPRS 850MHz, Channel = 128, 1GHz to 9GHz)

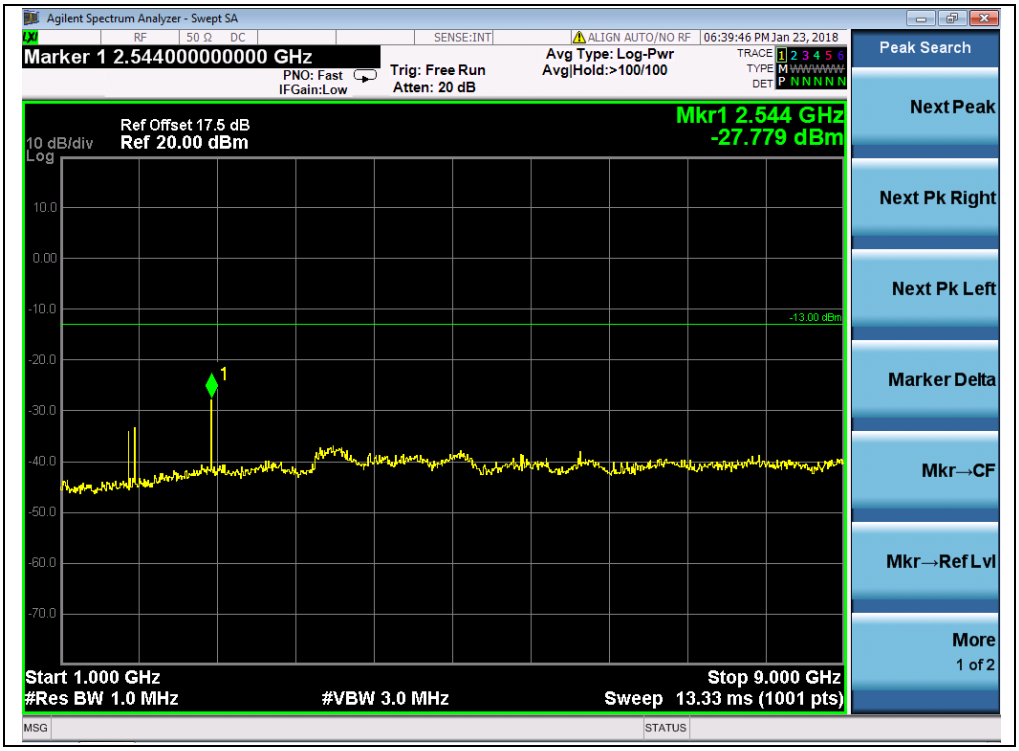


(Plot E2, GPRS 850MHz, Channel = 190, 30MHz to 1GHz)

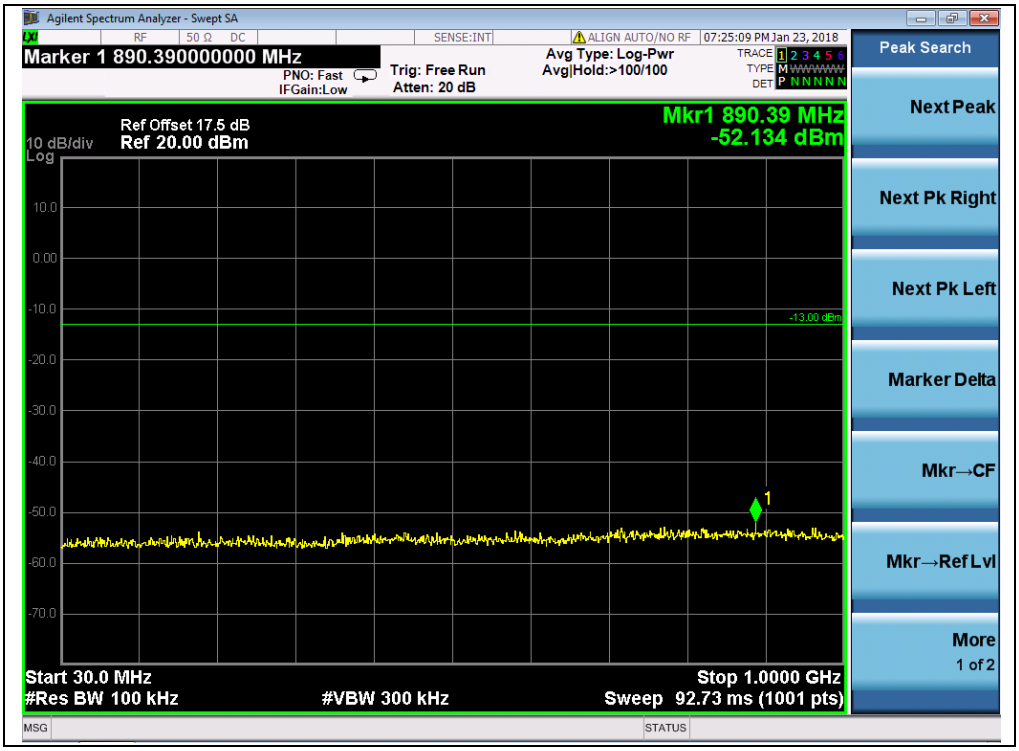
(Plot E2.1, GPRS 850MHz, Channel = 190, 1GHz to 9GHz)



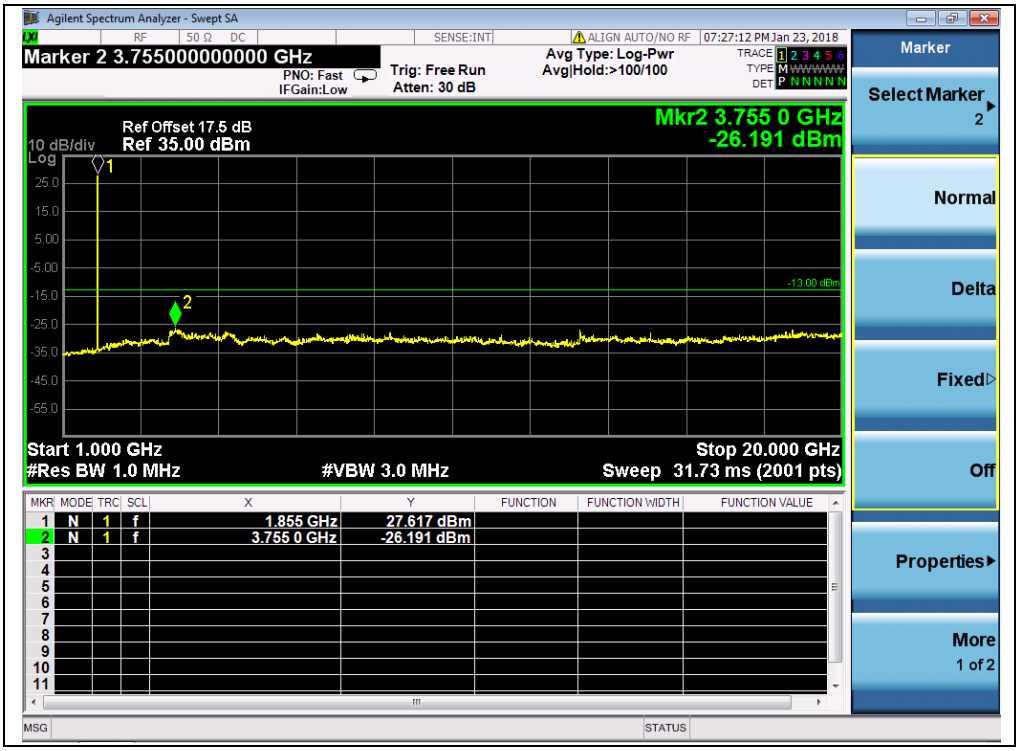
(Plot E3, GPRS 850MHz, Channel = 251, 30MHz to 1GHz)



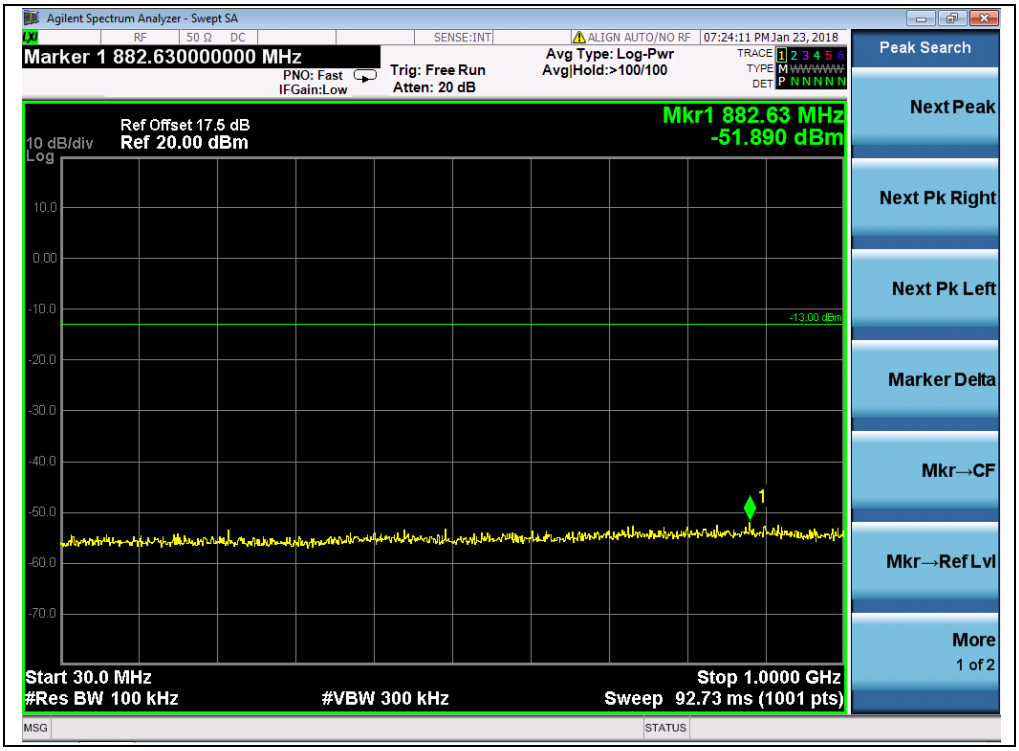
(Plot E3.1, GPRS 850MHz, Channel = 251, 1GHz to 9GHz)



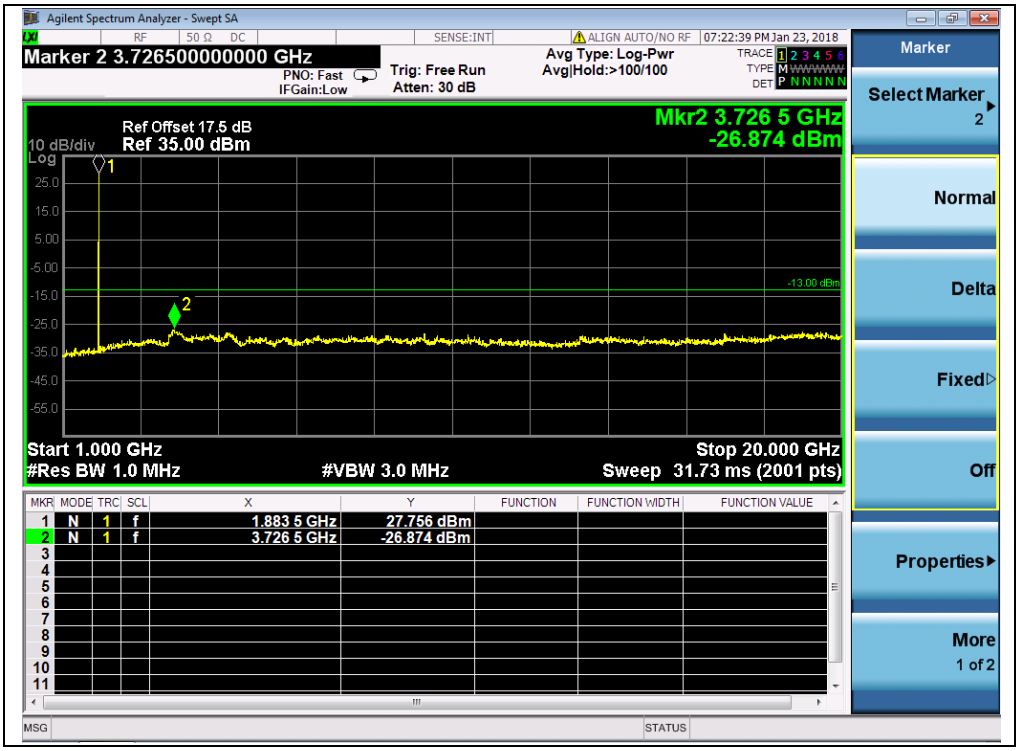
(Plot F1, GPRS 1900MHz, Channel = 512, 30MHz to 1GHz)



(Plot F1.1, GPRS 1900MHz, Channel = 512, 1GHz to 20GHz)

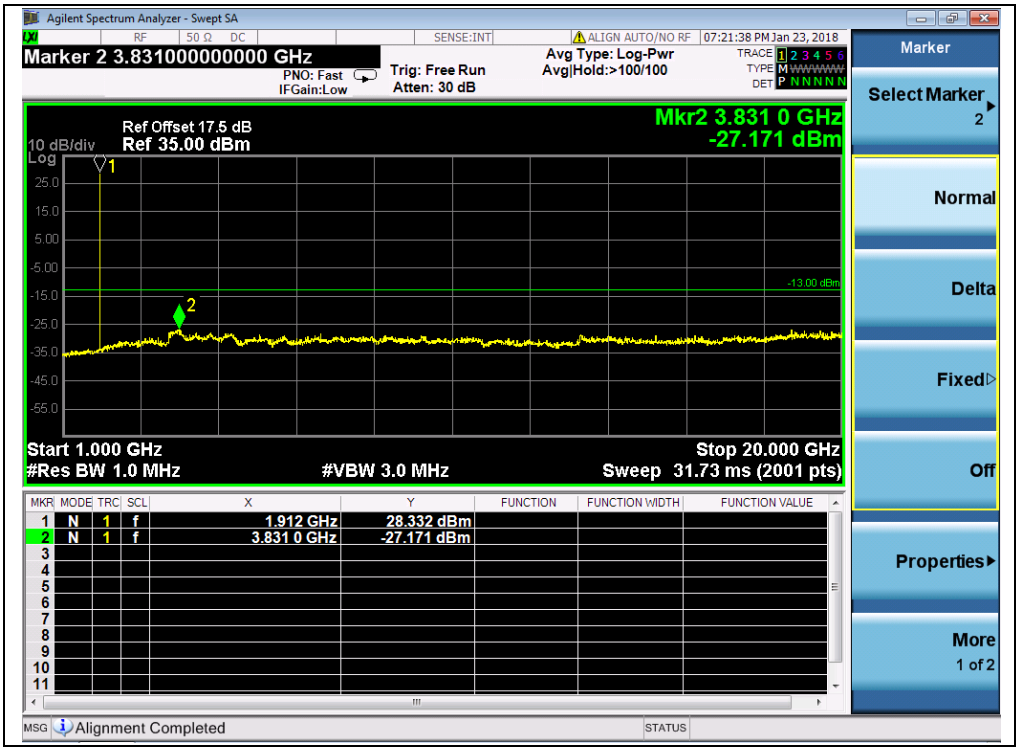


(Plot F2, GPRS 1900MHz, Channel = 661, 30MHz to 1GHz)



(Plot F2.1, GPRS 1900MHz, Channel = 661, 1GHz to 20GHz)

(Plot F3, GPRS 1900MHz, Channel = 810, 30MHz to 1GHz)



(Plot F3.1, GPRS 1900MHz, Channel = 810, 1GHz to 20GHz)

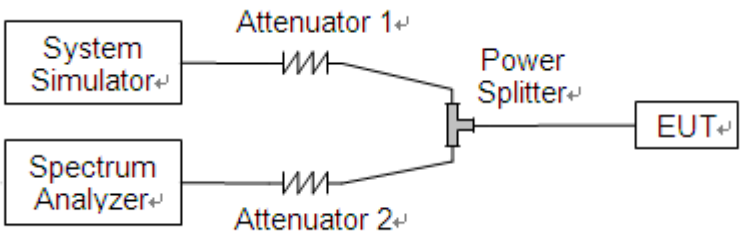
2.6. Band Edge

2.6.1. Requirement

According to FCC section 22.917(b) and FCC section 24.238(b) in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

2.6.2. Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

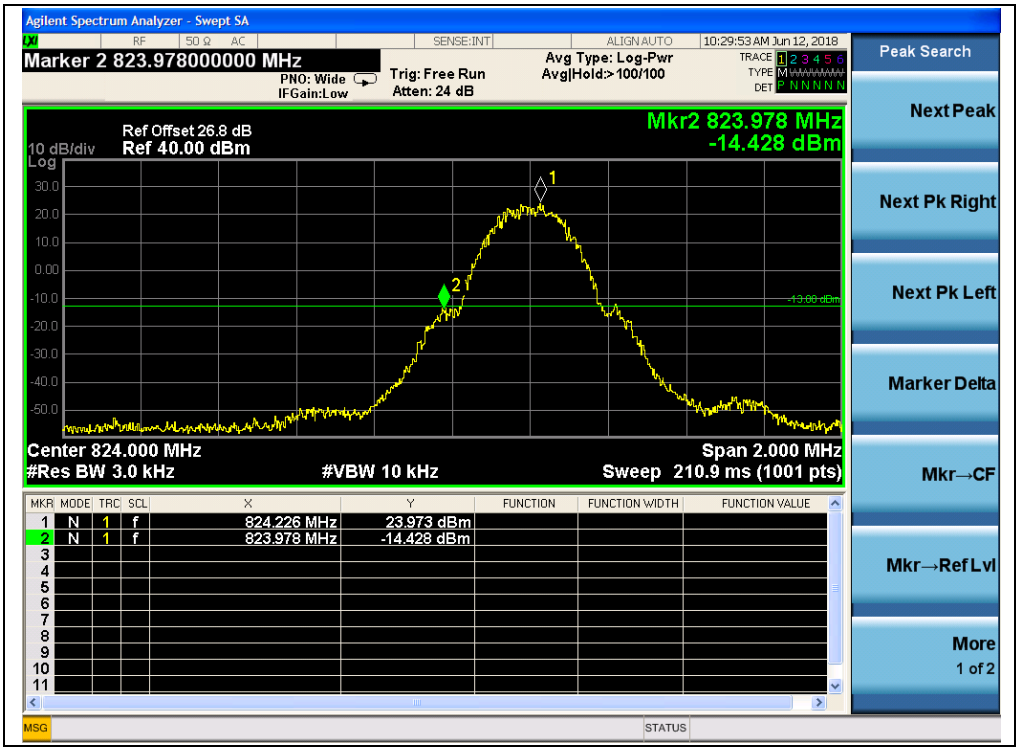
2.6.3. Test Result

The lowest and highest channels are tested to verify the band edge emissions.

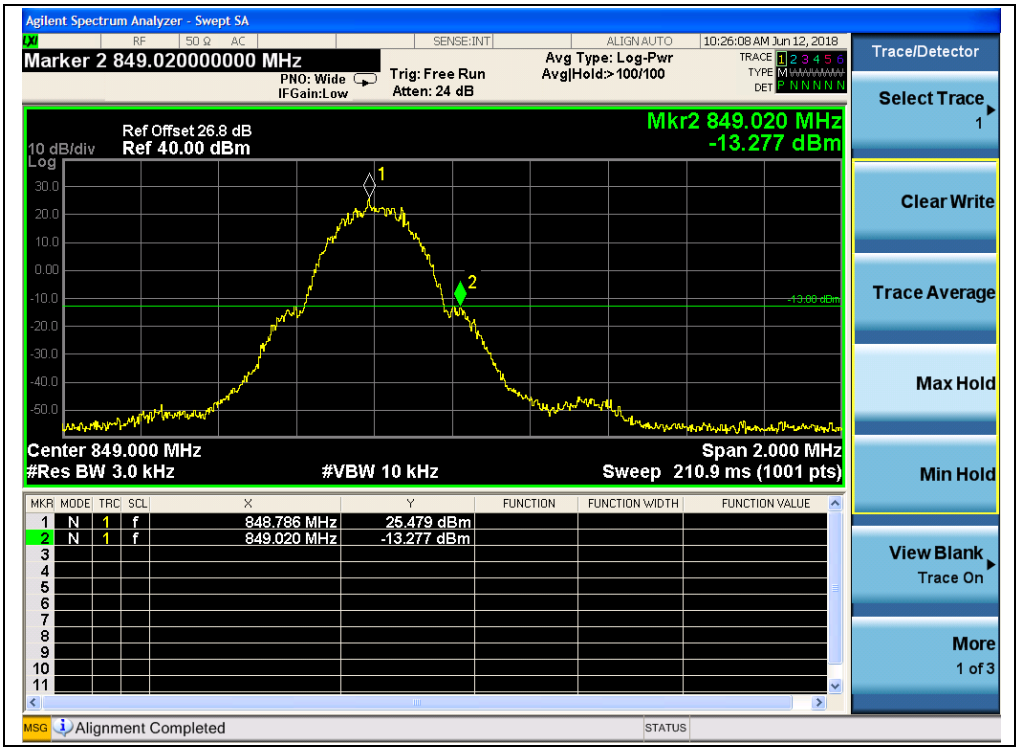
A. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GPRS 850MHz	128	824.2	-14.43	Plat C1	-13	PASS
	251	848.8	-13.28	Plot C2		PASS
GPRS 1900MHz	512	1850.2	-19.53	Plat D1	-13	PASS
	810	1909.8	-19.45	Plot D2		PASS

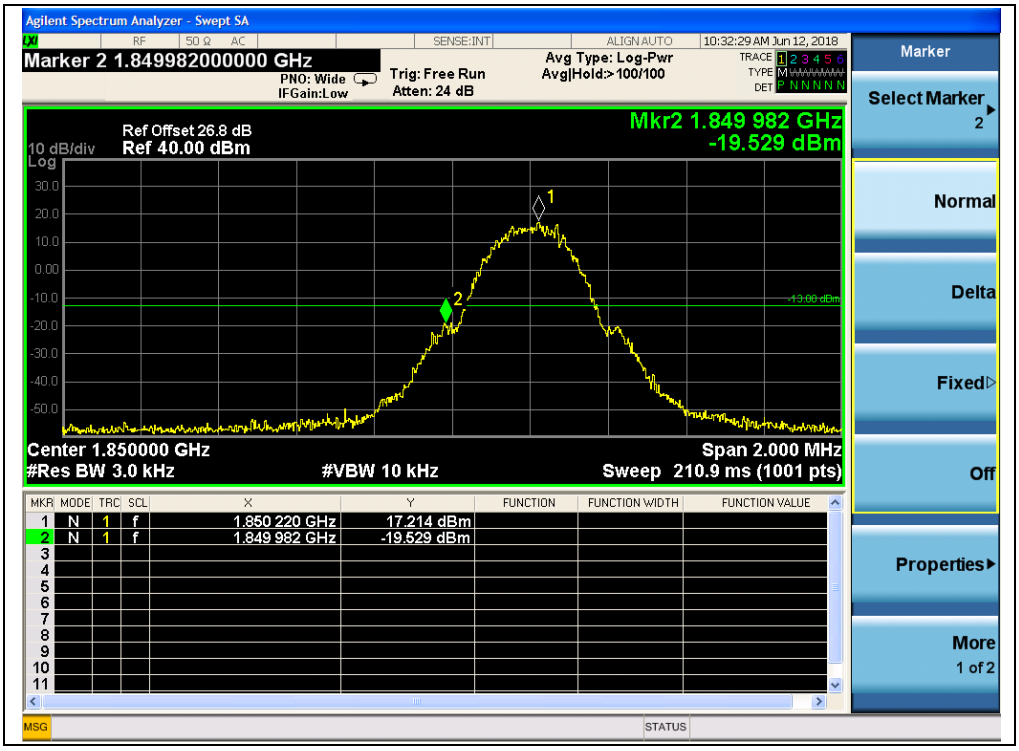
B. Test Plots:



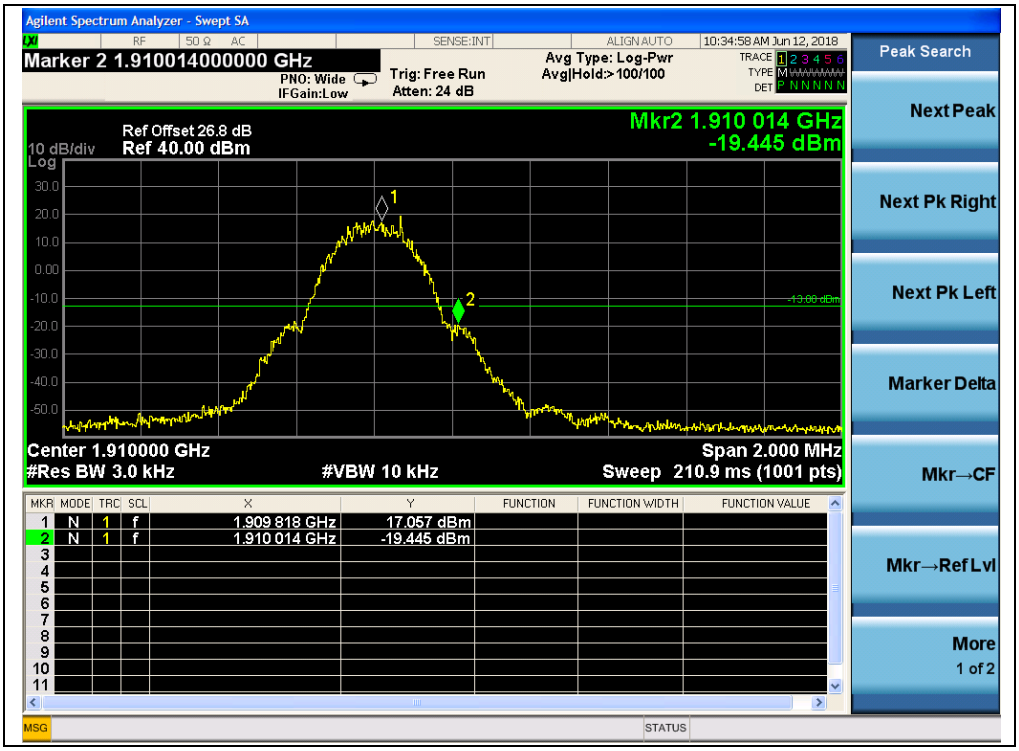
(Plot C1, GPRS 850, Channel = 128)



(Plot C2, GPRS 850, Channel = 251)



(Plot D1, GPRS 1900, Channel = 512)



(Plot D2, GPRS 1900, Channel = 810)

2.7. Transmitter Radiated Power (EIRP/ERP)

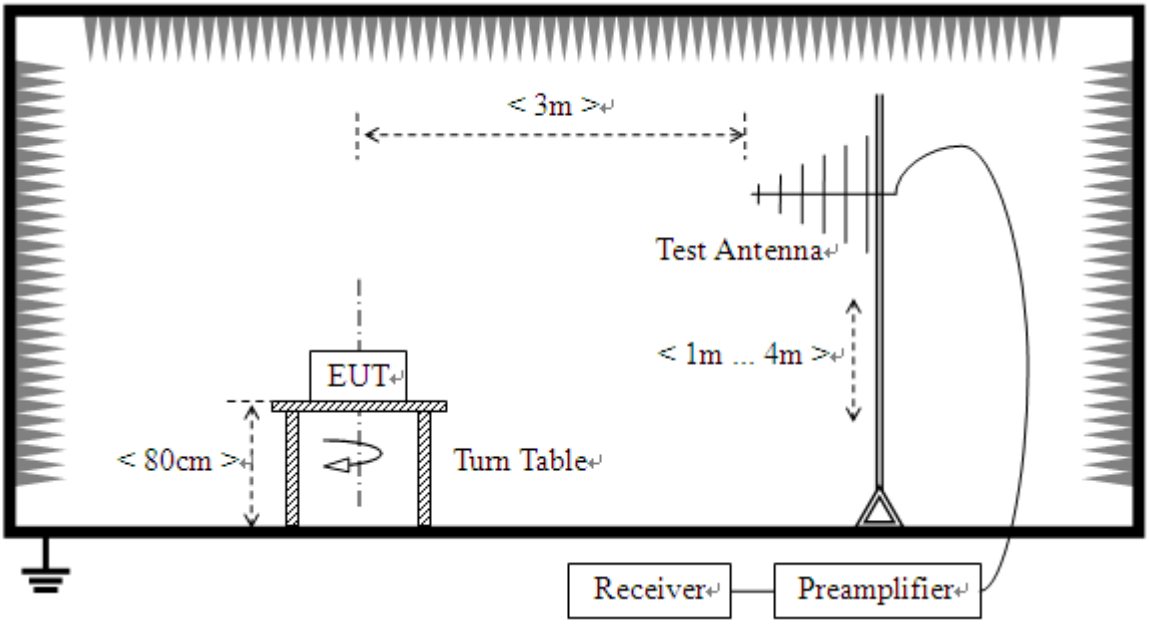
2.7.1. Requirement

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.

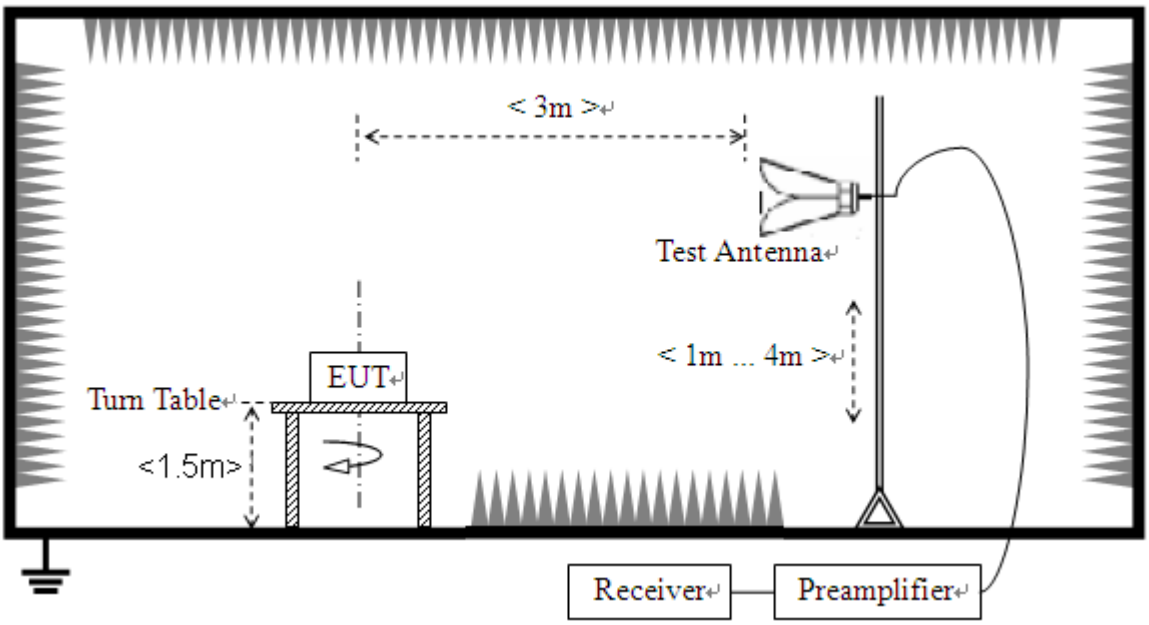
2.7.2. Test Description

Test Setup:

1) Below1GHz



2) Above 1GHz



The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded.

- GSM Maximum RF output power: GPRS 850 29.77dBm, GPRS 1900 28.47dBm.Please refer to section 2.1.3 of this report.
- Step size (dB): 3dB
- Minimum RF power: GPRS 850 29.30dBm, GPRS 1900 25.31dBm. Please refer to section 2.1.3 of this report.

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

2.7.3. Test Result

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST_TX_ANT}$ is substitution antenna gain.

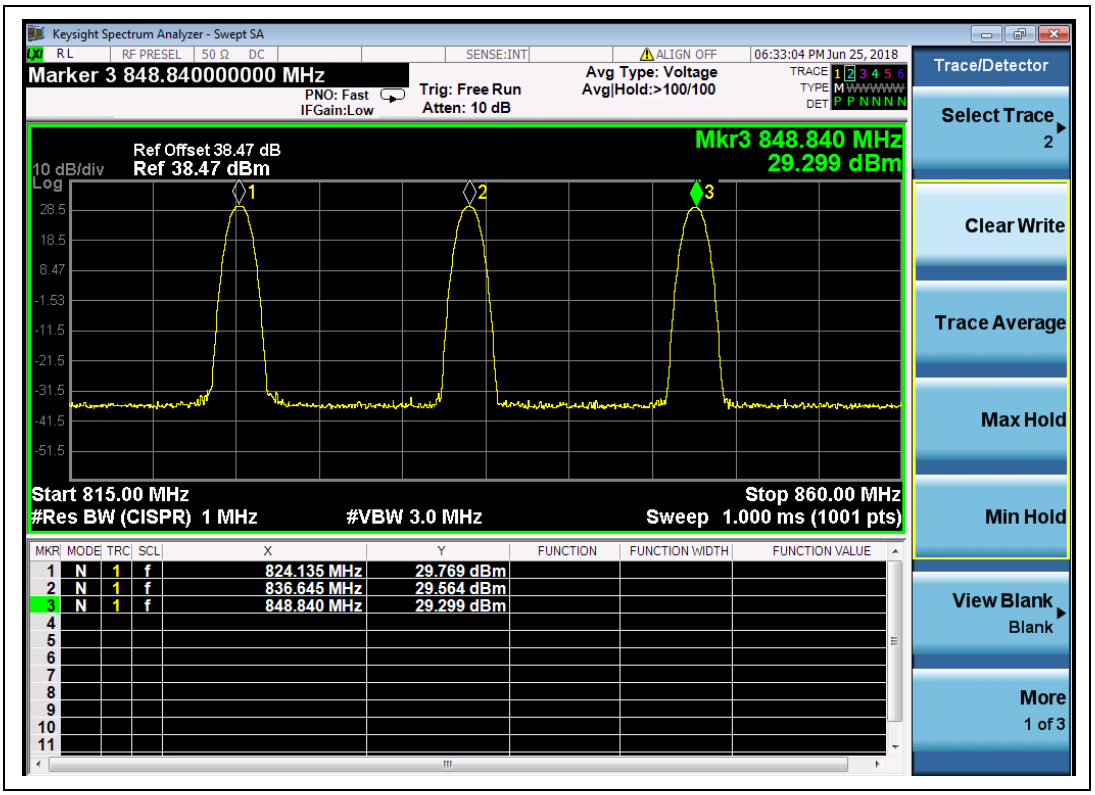
A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the Test Spectrum Analyze, so Spectrum Analyze reading is the final values which contain the data of A_{TOT}.

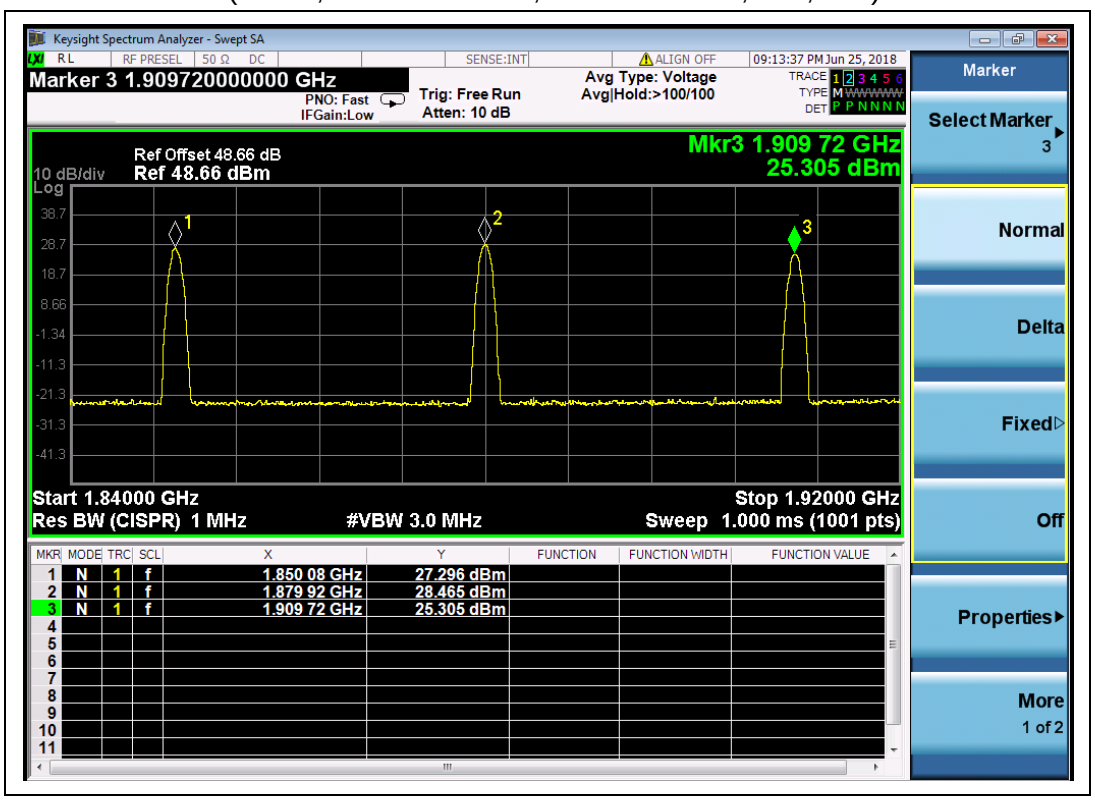
A. Test verdict:

Band	Channel	Frequency (MHz)	PCL	Measured ERP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GPRS 850MHz	128	824.20	5	29.30	0.85	Plot B Note 1	38.5	7	PASS
	190	836.60	5	29.56	0.90				PASS
	251	848.80	5	29.30	0.85				PASS
Band	Channel	Frequency (MHz)	PCL	Measured EIRP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GPRS 1900MHz	512	1850.2	0	27.30	0.54	Plot E Note 1	33	2	PASS
	661	1880.0	0	28.47	0.70				PASS
	810	1909.8	0	25.31	0.34				PASS
Note 1: For the GPRS mode, all the slots were tested and just the worst data was record in this report.									

B. Test Plots:



(Plot B, GPRS 850MHz, Channel = 128, 190, 251)



(Plot E: GPRS 1900MHz Channel = 512, 661, 810)

2.8. Radiated Out of Band Emissions

2.8.1. Requirement

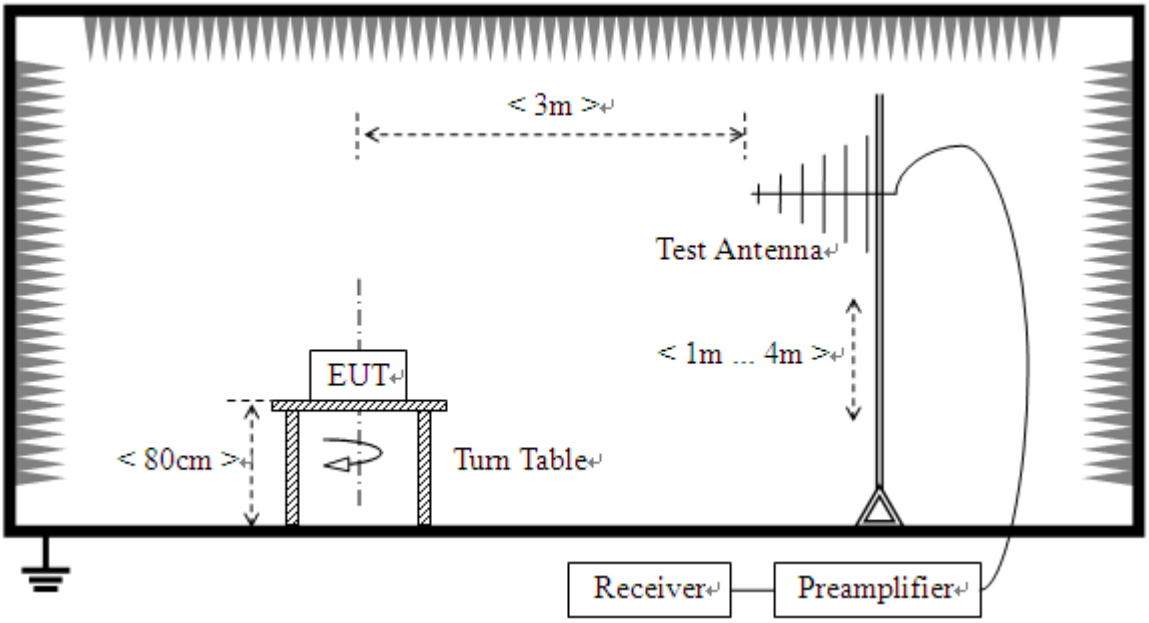
According to FCC section 22.917(a) and section 24.238(a) the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

The spurious emission with frequency band 1900 according to FCC section 2.1057.

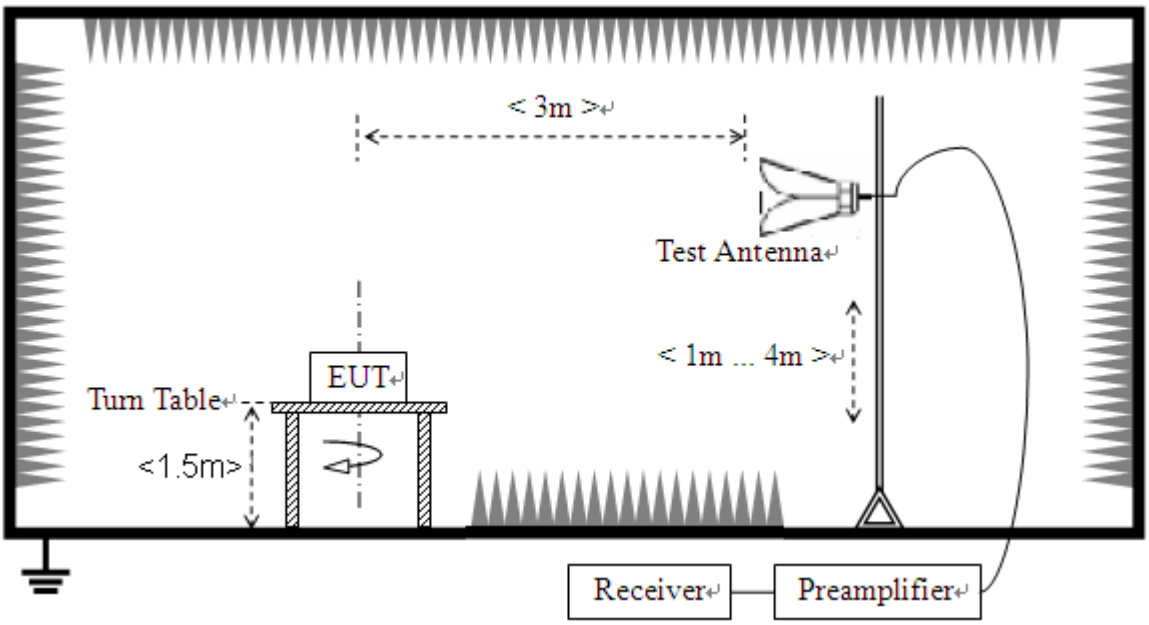
2.8.2. Test Description

Test Setup:

1. Below1GHz



2. Above 1GHz



The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded.

- GSM Maximum RF output power: GPRS 850 29.77dBm, GPRS 1900 28.47dBm.Please refer to section 2.1.3 of this report.
- Step size (dB): 3dB
- Minimum RF power: GPRS 850 29.30dBm, GPRS 1900 25.31dBm. Please refer to section 2.1.3 of this report.

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

2.8.3. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

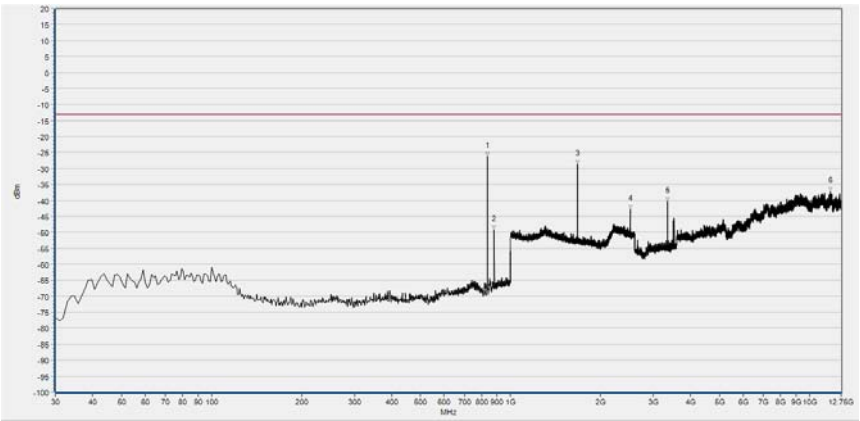
A. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
GPRS 850MHz	128	824.2	< -25	< -25	Plot C1/C2	-13	PASS
	190	836.6	< -25	< -25	Plot C3/C4		PASS
	251	848.8	< -25	< -25	Plot C5/C6		PASS
GPRS 1900MHz	512	1850.2	< -25	< -25	Plot D1/D2	-13	PASS
	661	1880.0	< -25	< -25	Plot D3/D4		PASS
	810	1909.8	< -25	< -25	Plot D5/D6		PASS

B. Test Plots

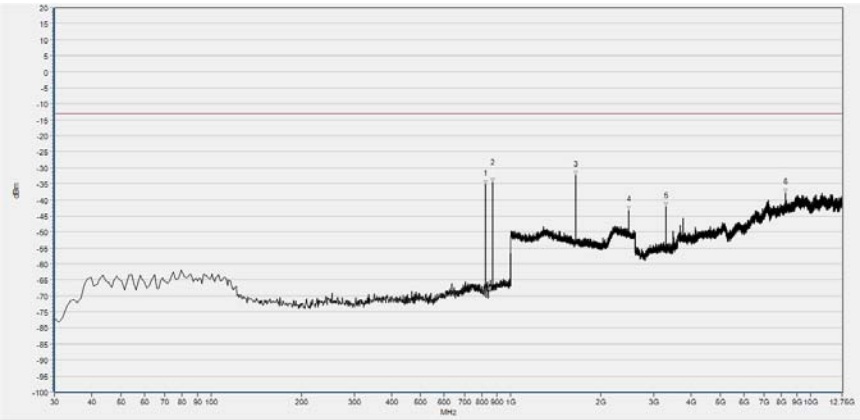
Note1: the power of the EUT transmitting frequency should be ignored.

Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.



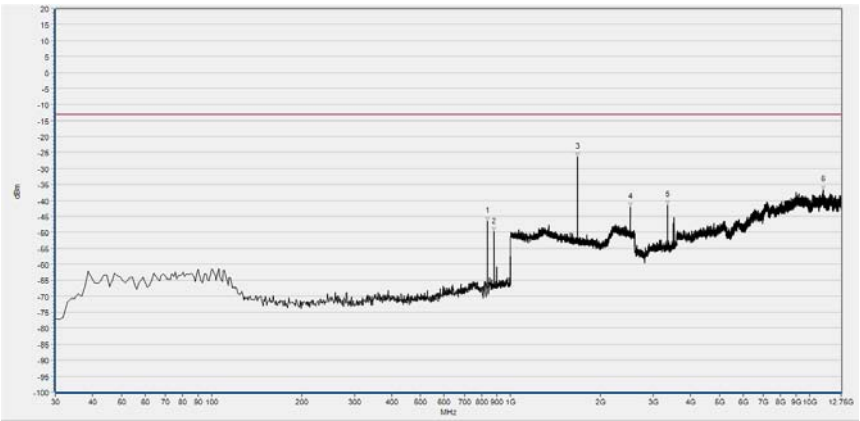
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	836.070	-26.31	-13.00	Horizontal	N/A
2	881.660	-49.26	-13.00	Horizontal	N/A
3	1672.909	-28.70	-13.00	Horizontal	PASS
4	2509.724	-42.87	-13.00	Horizontal	PASS
5	3345.699	-40.39	-13.00	Horizontal	PASS
6	11727.432	-37.31	-13.00	Horizontal	PASS

(Plot C1, GPRS 850MHz, Channel = 128, Horizontal)



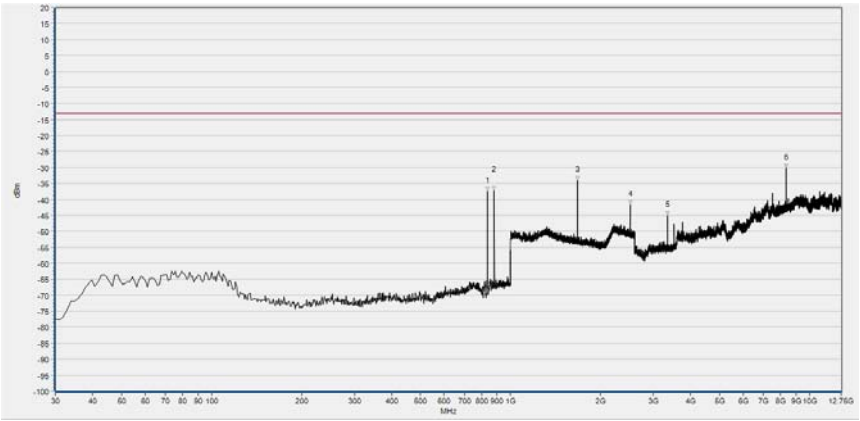
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	824.430	-35.31	-13.00	Vertical	N/A
2	869.050	-34.62	-13.00	Vertical	N/A
3	1647.939	-32.21	-13.00	Vertical	PASS
4	2472.589	-43.28	-13.00	Vertical	PASS
5	3297.709	-42.12	-13.00	Vertical	PASS
6	8240.735	-37.86	-13.00	Vertical	PASS

(Plot C2, GPRS 850MHz, Channel = 128, Vertical)



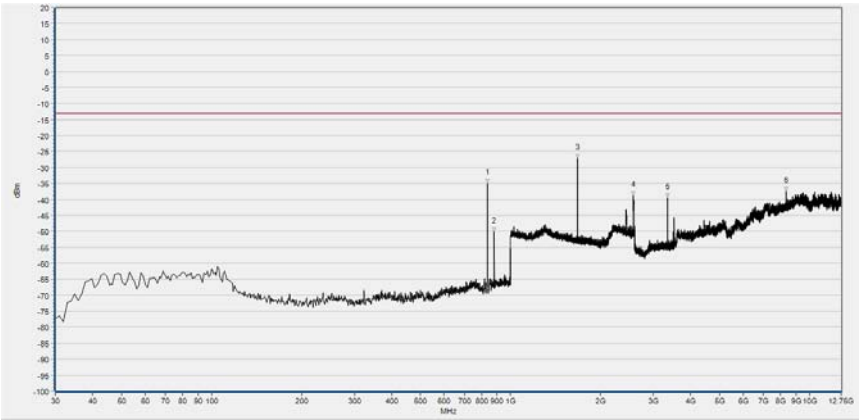
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	837.040	-46.64	-13.00	Horizontal	N/A
2	881.660	-49.81	-13.00	Horizontal	N/A
3	1672.909	-26.49	-13.00	Horizontal	PASS
4	2509.724	-42.13	-13.00	Horizontal	PASS
5	3345.699	-41.45	-13.00	Horizontal	PASS
6	11127.550	-36.77	-13.00	Horizontal	PASS

(Plot C3, GPRS 850MHz, Channel = 190, Horizontal)



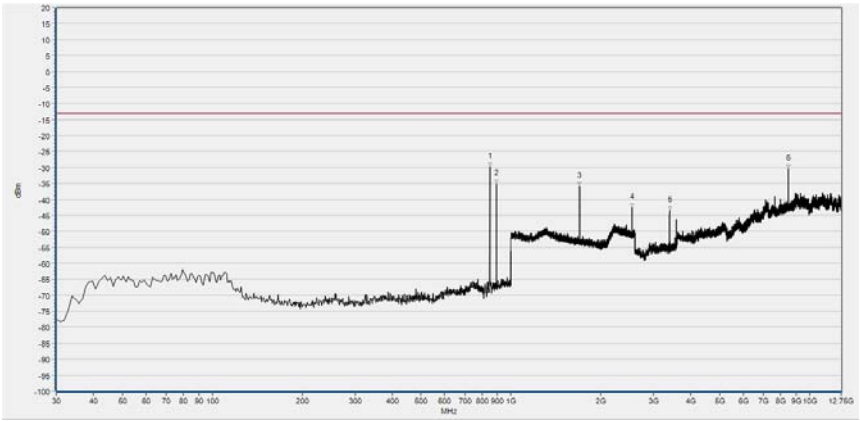
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	836.070	-37.44	-13.00	Vertical	N/A
2	881.660	-37.30	-13.00	Vertical	N/A
3	1672.909	-34.15	-13.00	Vertical	PASS
4	2509.724	-41.66	-13.00	Vertical	PASS
5	3345.699	-45.09	-13.00	Vertical	PASS
6	8364.403	-30.27	-13.00	Vertical	PASS

(Plot C4, GPRS 850MHz, Channel = 190, Vertical)



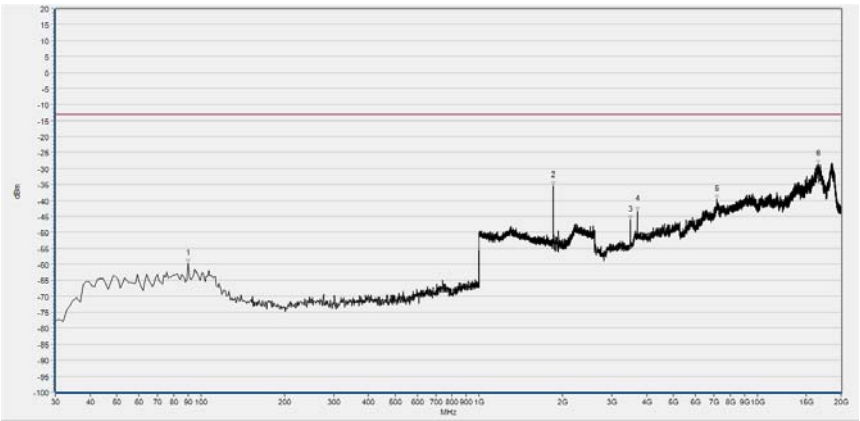
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	836.070	-34.94	-13.00	Horizontal	N/A
2	881.660	-50.21	-13.00	Horizontal	N/A
3	1672.909	-27.19	-13.00	Horizontal	PASS
4	2577.591	-38.83	-13.00	Horizontal	PASS
5	3345.699	-39.53	-13.00	Horizontal	PASS
6	8364.403	-37.36	-13.00	Horizontal	PASS

(Plot C5, GPRS 850MHz, Channel = 251, Test Antenna Horizontal)



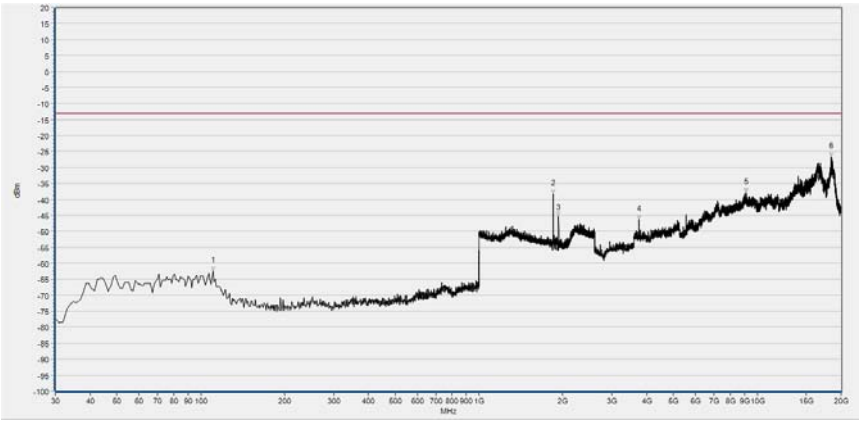
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	848.680	-29.77	-13.00	Vertical	N/A
2	893.300	-35.30	-13.00	Vertical	N/A
3	1697.239	-35.91	-13.00	Vertical	PASS
4	2546.218	-42.66	-13.00	Vertical	PASS
5	3395.536	-43.57	-13.00	Vertical	PASS
6	8486.225	-30.51	-13.00	Vertical	PASS

(Plot C6, GPRS 850MHz, Channel = 251, Vertical)



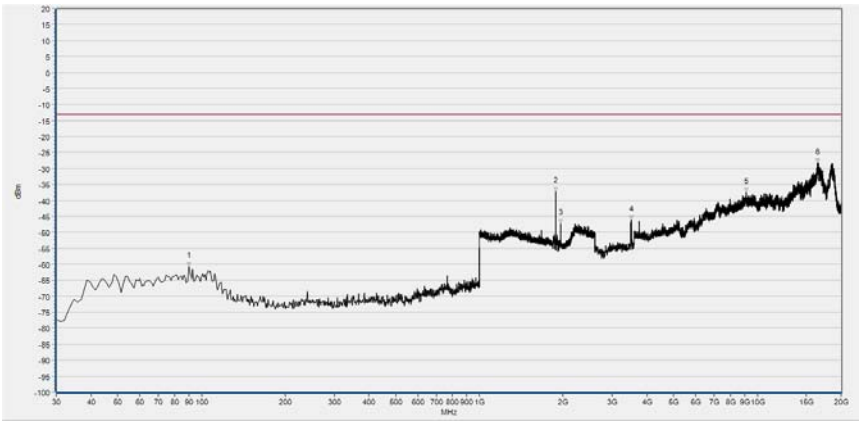
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	90.140	-59.87	-13.00	Horizontal	PASS
2	1850.260	-35.43	-13.00	Horizontal	N/A
3	3492.308	-46.10	-13.00	Horizontal	PASS
4	3701.146	-43.42	-13.00	Horizontal	PASS
5	7162.793	-39.75	-13.00	Horizontal	PASS
6	16557.338	-28.71	-13.00	Horizontal	PASS

(Plot D1, GPRS 1900MHz, Channel = 512, Horizontal)



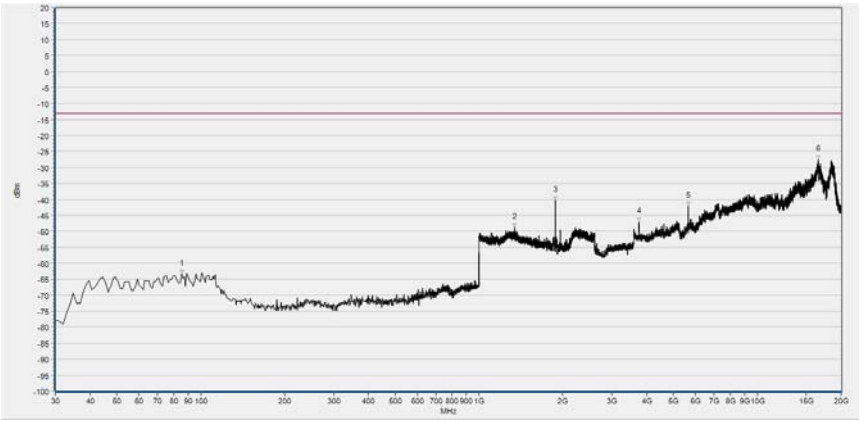
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	110.510	-62.46	-13.00	Vertical	PASS
2	1850.260	-38.28	-13.00	Vertical	N/A
3	1930.292	-45.31	-13.00	Vertical	N/A
4	3754.937	-46.39	-13.00	Vertical	PASS
5	9102.455	-37.87	-13.00	Vertical	PASS
6	18462.193	-26.72	-13.00	Vertical	PASS

(Plot D2, GPRS 1900MHz, Channel = 512, Vertical)



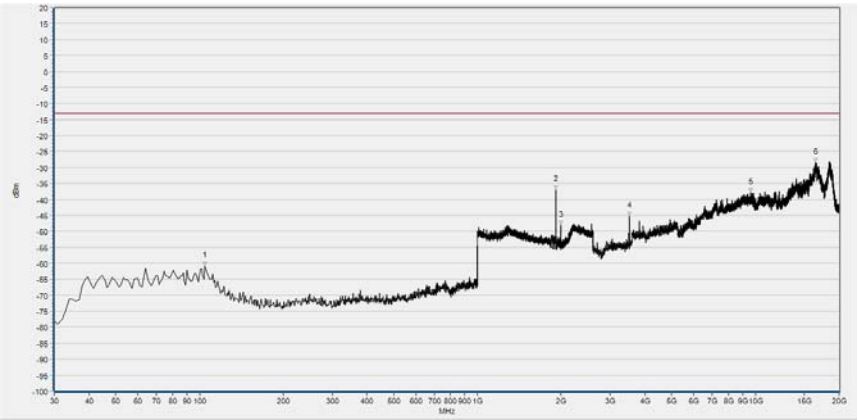
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	90.140	-60.62	-13.00	Horizontal	PASS
2	1879.712	-37.30	-13.00	Horizontal	N/A
3	1959.744	-47.28	-13.00	Horizontal	N/A
4	3527.114	-46.12	-13.00	Horizontal	PASS
5	9108.783	-37.48	-13.00	Horizontal	PASS
6	16427.605	-28.27	-13.00	Horizontal	PASS

(Plot D3, GPRS 1900MHz, Channel = 661, Horizontal)



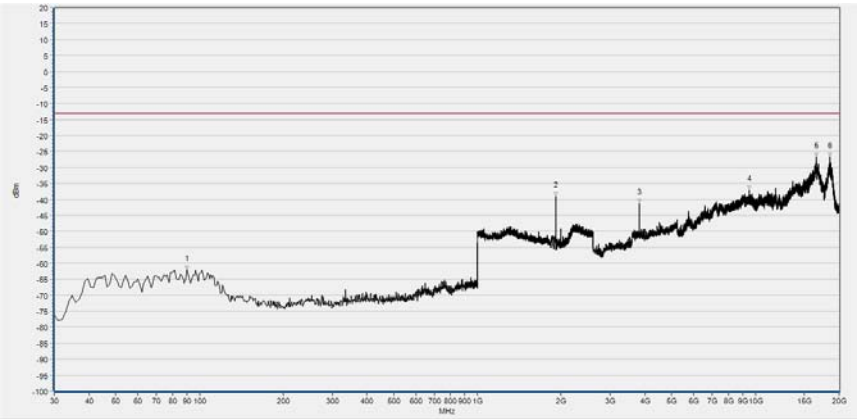
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	85.290	-63.35	-13.00	Vertical	PASS
2	1341.897	-48.83	-13.00	Vertical	PASS
3	1879.712	-40.32	-13.00	Vertical	N/A
4	3754.937	-47.04	-13.00	Vertical	PASS
5	5640.807	-42.13	-13.00	Vertical	PASS
6	16557.338	-27.71	-13.00	Vertical	PASS

(Plot D4, GPRS 1900MHz, Channel = 661, Vertical)



Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	104.690	-60.91	-13.00	Horizontal	PASS
2	1909.804	-36.95	-13.00	Horizontal	N/A
3	1989.836	-48.12	-13.00	Horizontal	N/A
4	3523.950	-45.33	-13.00	Horizontal	PASS
5	9605.565	-37.81	-13.00	Horizontal	PASS
6	16456.083	-28.41	-13.00	Horizontal	PASS

(Plot D5, GPRS 1900MHz, Channel = 810, Horizontal)



Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	90.140	-62.09	-13.00	Vertical	PASS
2	1909.804	-39.04	-13.00	Vertical	N/A
3	3818.221	-41.19	-13.00	Vertical	PASS
4	9478.996	-36.92	-13.00	Vertical	PASS
5	16535.188	-26.65	-13.00	Vertical	PASS
6	18550.791	-26.81	-13.00	Vertical	PASS

(Plot D6, GPRS 1900MHz, Channel = 810, Vertical)

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Output Power	±2.22dB
Bandwidth	±5%
Conducted Spurious Emission	±2.77 dB
Radiated Emission	±2.95dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192.

4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Power Splitter	NW521	1506A	Weinschel	2018.04.17	2019.04.16
Attenuator 1	(N/A.)	10dB	Resnet	2018.04.17	2019.04.16
Attenuator 2	(N/A.)	3dB	Resnet	2018.04.17	2019.04.16
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2017.12.03	2018.12.02
Wireless synthesizer	MY48364176	8960 -E5515C	Agilent	2018.04.17	2019.04.16
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A
Temperature Chamber	(N/A)	HUT705P	CHONGQING HANBA EXPERIMENTAL EQUIPMENT CO.,LTD	2018.04.17	2019.04.16

4.2 Auxiliary Test Equipment

Equipment Name	Model No.	Brand Name	Manufacturer	Cal.Date	Cal. Due
Computer	T430i	Think Pad	Lenovo	N/A	N/A

4.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY54130016	N9038A	Agilent	2018.05.08	2019.05.07
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2018.05.08	2019.05.07
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2017.09.13	2018.09.12
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2018.03.03	2019.03.02
Test Antenna - Horn	01774	BBHA 9120D	Schwarzbeck	2017.09.13	2018.09.12
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2018.05.08	2019.05.07
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2018.05.08	2019.05.07
Anechoic Chamber	N/A	9m*6m*6m	CRT	2017.11.19	2020.11.18

END OF REPORT