

FCC TEST REPORT

For

TOPTEN ELECTRONICS TECHNOLOGY LIMITED

GPS Tracker

Model No.: PT99, NB99, PG99

Prepared For : TOPTEN ELECTRONICS TECHNOLOGY LIMITED

Address : 5/F, Building B, No.3, Tangdong Guangtang West Rd., Tianhe District, Guangzhou, China

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited

Address : 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

Tel: (86) 755-26066440 Fax: (86) 755-26014772

Report Number : SZAWW190125001-01

Date of Receipt : Jan. 25, 2019

Date of Test : Jan. 25~Feb. 21, 2019

Date of Report : Feb. 21, 2019

Contents

1. General Information.....	5
1.1. Client Information.....	5
1.2. Description of Device (EUT).....	5
1.3. Auxiliary Equipment Used During Test.....	6
1.4. Description of Test Modes.....	6
1.5. Description Of Test Setup.....	7
1.6. Test Equipment List.....	9
1.7. Measurement Uncertainty.....	10
1.8. Description of Test Facility.....	10
2. Summary of Test.....	11
2.1. Summary of test result.....	11
2.2. Test mode.....	11
3. RF Output Power Test.....	13
3.1. Test Standard and Limit.....	13
3.2. Test Setup.....	13
3.3. Test Procedure.....	13
3.4. Test Data.....	13
4. Peak-Average Ratio.....	16
4.1. Test Standard and Limit.....	16
4.2. Test Setup.....	16
4.3. Test Procedure.....	16
4.4. Test Data.....	16
5. Modulation Characteristic.....	20
6. Occupied Bandwidth.....	21
6.1. Test Standard and Limit.....	21
6.2. Test Setup.....	21
6.3. Test Procedure.....	21
6.4. Test Data.....	21
7. Spurious Emissions at Antenna Terminals.....	23
7.1. Test Standard and Limit.....	23
7.2. Test Setup.....	23
7.3. Test Procedure.....	23
7.4. Test Data.....	24
8. Spurious Radiated Emissions.....	35
8.1. Test Standard and Limit.....	35
8.2. Test Setup.....	35
8.3. Test Procedure.....	35
8.4. Test Data.....	35
9. Band Edge Compliance.....	37
9.1. Test Standard and Limit.....	37
9.2. Test Setup.....	37
9.3. Test Procedure.....	37

9.4. Test Data.....	37
10. Frequency Stability.....	40
10.1. Test Standard and Limit.....	40
10.2. Test Setup.....	40
10.3. Test Procedure.....	40
10.4. Test Data.....	40
APPENDIX I -- TEST SETUP PHOTOGRAPH.....	42
APPENDIX II -- EXTERNAL PHOTOGRAPH.....	43
APPENDIX III -- INTERNAL PHOTOGRAPH.....	47

TEST REPORT

Applicant : TOPTEN ELECTRONICS TECHNOLOGY LIMITED
Manufacturer : Guangzhou Topten Electronics Factory
Product Name : GPS Tracker
Model No. : PT99, NB99, PG99
Trade Mark : TOPTEN
Rating(s) : Input: DC 5V, 1A (with DC 3.7V, 1500 mAh Battery inside)

Test Standard(s) : FCC PART 2, FCC Part 22(H) :2018, FCC Part 24(E):2018

Test Method(s) : ANSI C63.26-2015, KDB971168 D01 v03

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 22/FCC Part 24 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test :

Jan. 25~Feb. 21, 2019

Prepared by :

(Engineer / Dolly Mo)



Dolly Mo

Reviewer :

(Supervisor / Snowy Meng)

Snowy Meng

Approved & Authorized Signer :

(Manager / Sally Zhang)

Sally Zhang

1. General Information

1.1. Client Information

Applicant	:	TOPTEN ELECTRONICS TECHNOLOGY LIMITED
Address	:	5/F, Building B, No.3, Tangdong Guangtang West Rd., Tianhe District, Guangzhou, China
Manufacturer	:	Guangzhou Topten Electronics Factory
Address	:	5/F, Building B, No.3, Tangdong Guangtang West Rd., Tianhe District, Guangzhou, China
Factory	:	Guangzhou Topten Electronics Factory
Address	:	5/F, Building B, No.3, Tangdong Guangtang West Rd., Tianhe District, Guangzhou, China

1.2. Description of Device (EUT)

Product Name	:	GPS Tracker	
Model No.	:	PT99, NB99, PG99 (Note: All samples are the same except the Shell shape, size and color, so we prepare "PT99" for test only.)	
Trade Mark	:	TOPTEN	
Test Sample NO.	:	S1	
Test Power Supply	:	AC 240V, 60Hz for adapter/ AC 120V, 60Hz for adapter/ DC 3.7V Battery inside	
Product Description	Operation Frequency:	GPRS 850 TX:824.2~848.8 MHz; RX:869.2~893.8 MHz GPRS 1900 TX:1850.2~1909.8 MHz; RX:1930.2~1989.8 MHz	
	GPRS Class	8/10/12	
	Modulation Type:	GPRS: GMSK	
	Antenna Type:	PIFA Antenna	
	Antenna Gain(Peak):	GPRS 850: -4dBi GPRS 1900: -1.5dBi	
	Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

N/A	
-----	--

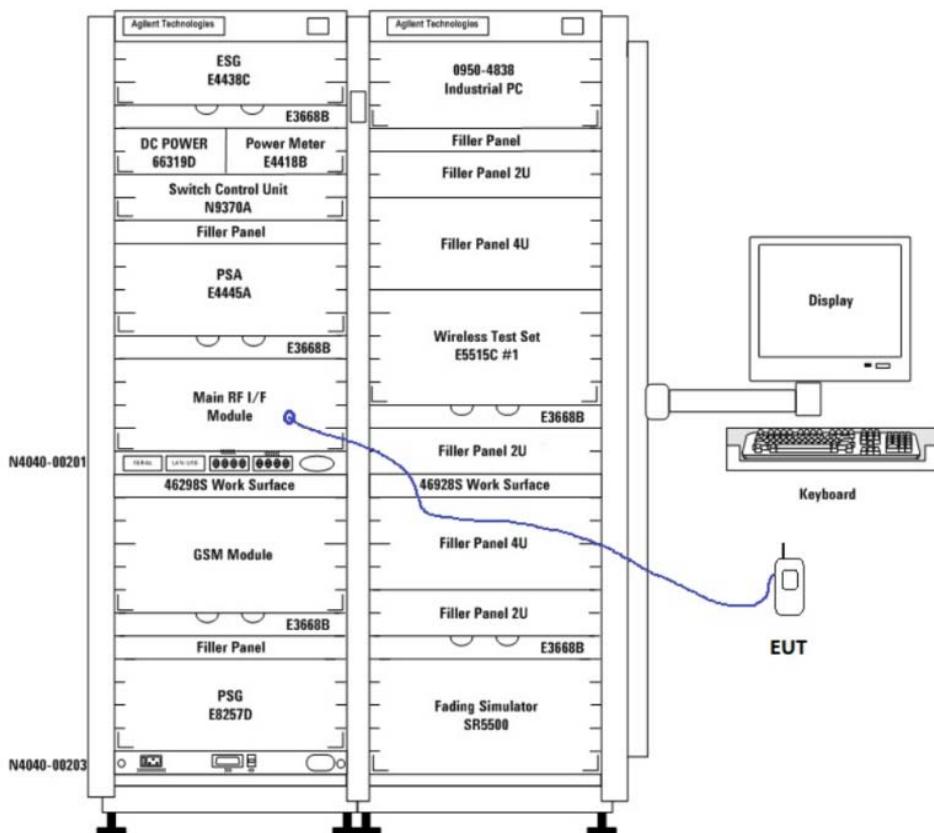
1.4. Description of Test Modes

The following is the description of how the EUT is exercised during testing.

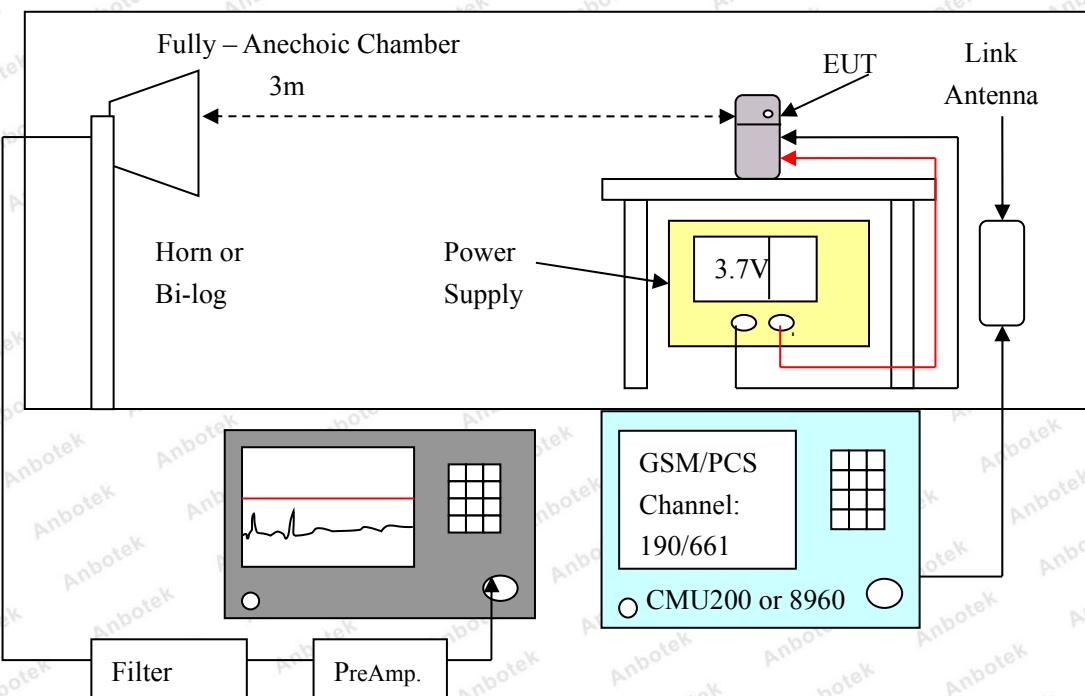
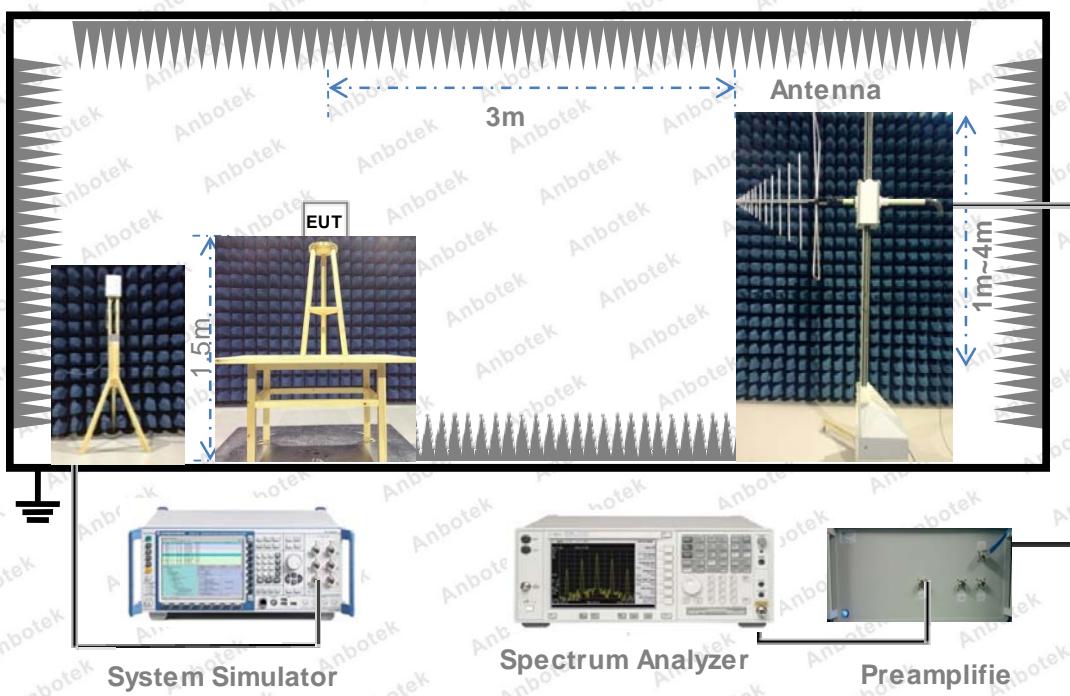
Test	Description Of Operation
Emissions Testing	The EUT was communicating with base station.
Others Testing	The EUT was communicating with base station.

1.5. Description Of Test Setup

1.5.1 Conducted Test Setup



1.5.2 Radiated Test Setup



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
2.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 05, 2018	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 19, 2018	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
6.	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	Nov. 20, 2018	1 Year
7.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
8.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
9.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
10.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
11.	DC Power Supply	IVYTECH	IV3605	1804D360510	Apr. 02, 2018	1 Year
12.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 01, 2018	1 Year
13.	Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	117888	Nov. 05, 2018	1 Year
14.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	104209	Nov. 05, 2018	1 Year
15.	High-Pass Filter	CDKMV	ZHPF-BM1100 -4000-0730	B2015094550	Nov. 08, 2018	1 Year
16.	High-Pass Filter	CDKMV	ZHPF-M3.5-18G-3834	1307006523	Nov. 05, 2018	1 Year
17.	4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063507	Nov. 05, 2018	1 Year
18.	4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063513	Nov. 05, 2018	1 Year

1.7. Measurement Uncertainty

Maximum measurement uncertainty

Parameter	Uncertainty
RF output power, conducted	±1,5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±1 °C
Humidity	±5 %
DC and low frequency voltages	±3 %
Time	±5 %
Confidence interval: 95%. Confidence factor:k=2	

1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test

2.1. Summary of test result

FCC Rules	Description of Test	Result
§2.1046; § 22.913(a); § 24.232(c);	RF Output Power	Compliance
§ 24.232 (d);	Peak-Average Ratio	Compliance
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049; § 22.905; § 22.917; § 24.238;	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051; § 22.917(a); § 24.238(a);	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917(a); § 24.238(a);	Field Strength of Spurious Radiation	Compliance
§ 22.917(a); § 24.238(a);	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235;	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different

2.2. Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level in each test mode and channel as below:

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

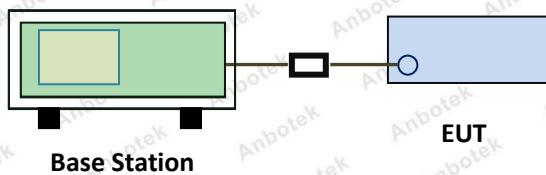
Mode	Channel	Frequency(MHz)
GSM 850	128	824.2
	190	836.6
	251	848.8
PCS 1900	512	1850.2
	661	1880.0
	810	1909.8

3. RF Output Power Test

3.1. Test Standard and Limit

Spec	Item	Requirement
§22.913 (a)	a)	ERP:38.5dBm
§24.232 (c)	b)	EIRP:33dBm

3.2. Test Setup



3.3. Test Procedure

For Conducted Power:

The transmitter output port was connected to base station.

Set EUT at maximum power through base station.

Select lowest, middle, and highest channels for each band and different test mode.

For ERP/EIRP:

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

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 = $10 \log (\text{TX power in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10} (\text{power out in Watts})$

3.4. Test Data

Please to see the following pages

Conducted Power:

Band	Channel	PCL	Slot	Power(dBm)	Limit(dBm)	Verdict
GPRS850	128	3	1	30.83	38.5	PASS
GPRS850	128	3	2	28.44	38.5	PASS
GPRS850	128	3	3	27.04	38.5	PASS
GPRS850	128	3	4	25.70	38.5	PASS
GPRS850	190	3	1	30.98	38.5	PASS
GPRS850	190	3	2	28.62	38.5	PASS
GPRS850	190	3	3	27.16	38.5	PASS
GPRS850	190	3	4	25.86	38.5	PASS
GPRS850	251	3	1	30.99	38.5	PASS
GPRS850	251	3	2	28.62	38.5	PASS
GPRS850	251	3	3	27.27	38.5	PASS
GPRS850	251	3	4	25.96	38.5	PASS
GPRS1900	512	3	1	29.83	33	PASS
GPRS1900	512	3	2	28.46	33	PASS
GPRS1900	512	3	3	28.52	33	PASS
GPRS1900	512	3	4	28.14	33	PASS
GPRS1900	661	3	1	29.39	33	PASS
GPRS1900	661	3	2	28.80	33	PASS
GPRS1900	661	3	3	28.75	33	PASS
GPRS1900	661	3	4	28.25	33	PASS
GPRS1900	810	3	1	29.38	33	PASS
GPRS1900	810	3	2	29.41	33	PASS
GPRS1900	810	3	3	29.66	33	PASS
GPRS1900	810	3	4	29.92	33	PASS

Radiated Output power:
ERP & EIRP
ERP for Cellular Band (Part 22H)
GPRS Mode

Frequen cy (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	23.15	V	6.8	0.53	29.42	38.45
824.2	24.54	H	6.8	0.53	29.16	38.45
836.6	22.98	V	6.8	0.53	29.25	38.45
836.6	22.66	H	6.8	0.53	28.93	38.45
848.8	25.41	V	6.9	0.53	29.81	38.45
848.8	23.37	H	6.9	0.53	29.74	38.45

ERP for PCS Band (Part 24E)
GPRS Mode

Frequen cy (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	20.31	V	7.88	0.85	27.34	33
1850.2	19.89	H	7.88	0.85	26.92	33
1880	21.54	V	7.88	0.85	28.57	33
1880	20.28	H	7.88	0.85	27.31	33
1909.8	19.75	V	7.86	0.85	26.76	33
1909.8	20.13	H	7.86	0.85	27.14	33

Note:

Absolute level=Substituted Level-Cable loss+Antenna Gain

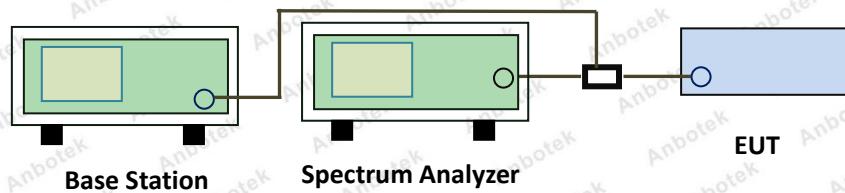
Margin=Limit -Absolute Level

4. Peak-Average Ratio

4.1. Test Standard and Limit

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.2. Test Setup



4.3. Test Procedure

According with KDB 971168

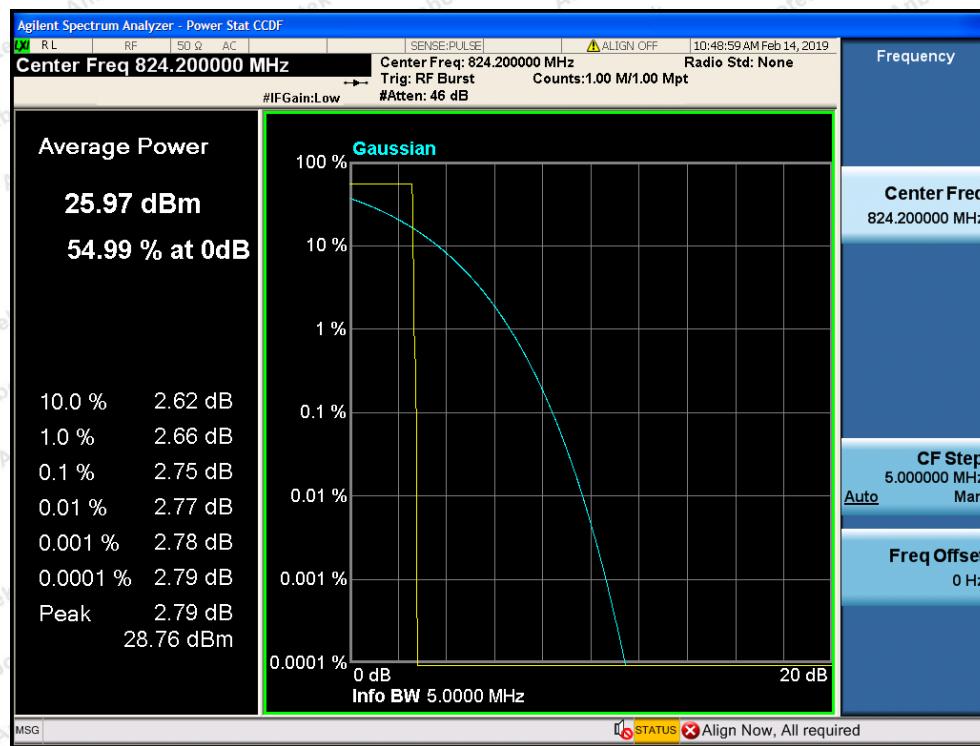
1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal 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 the transmitter is operating at maximum power

4.4. Test Data

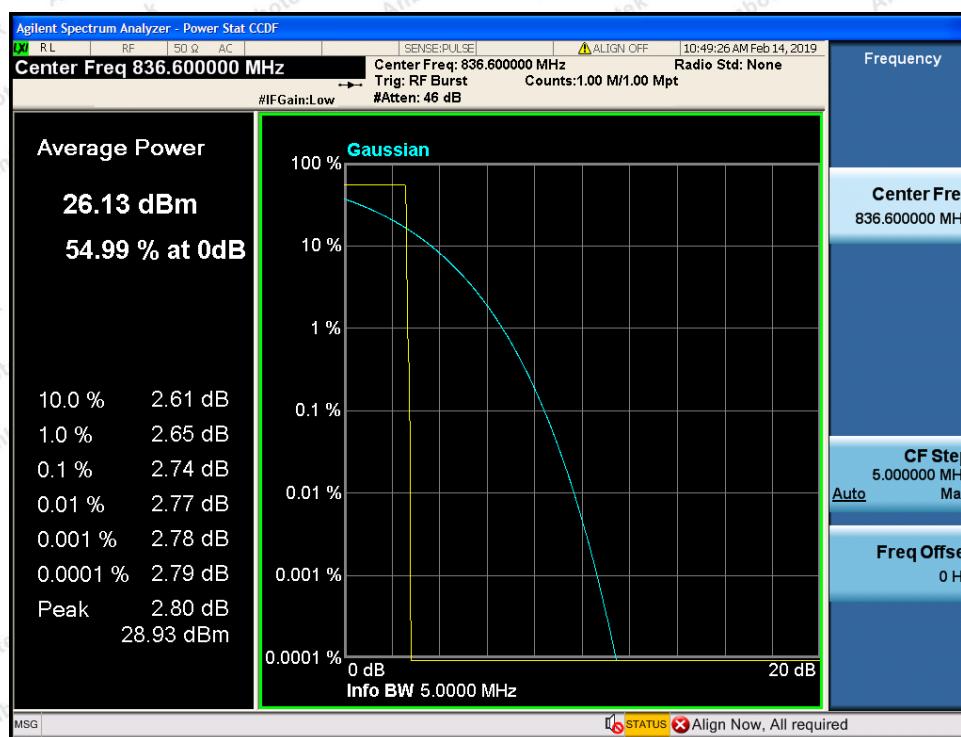
Band	Channel	Peak-to-Average Ratio(dB)	Limit(dBm)	Verdict
GPRS850	128	2.75	13	PASS
GPRS850	190	2.74	13	PASS
GPRS850	251	2.75	13	PASS
GPRS1900	512	3.10	13	PASS
GPRS1900	661	3.00	13	PASS
GPRS1900	810	2.87	13	PASS

Test Plots

GPRS 850, Low Channel



GPRS 850, Middle Channel



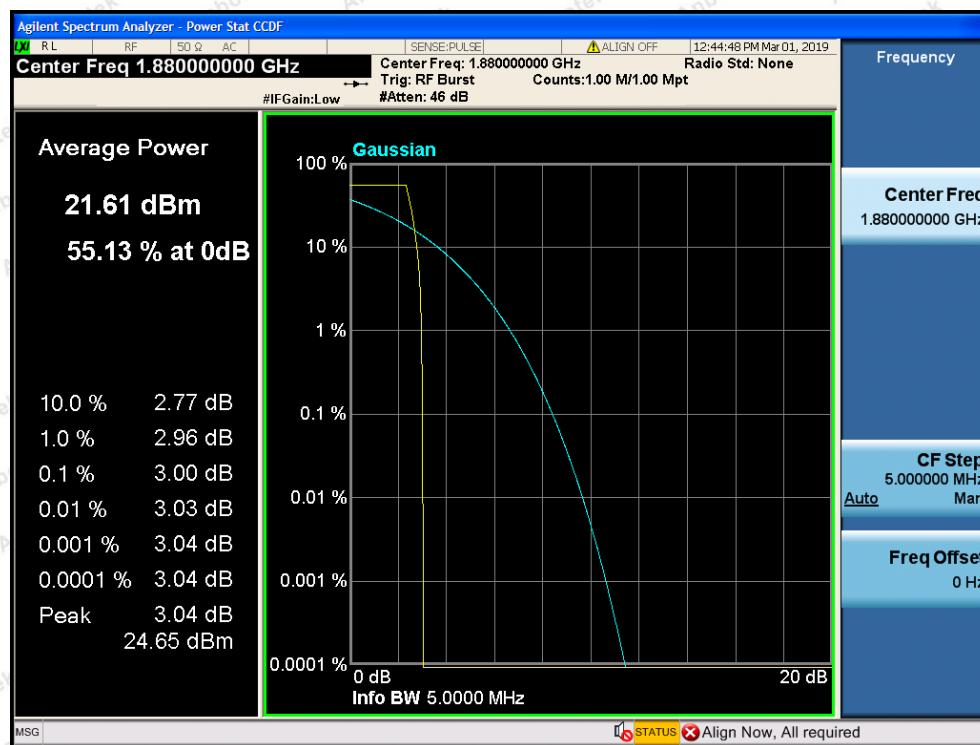
GPRS 850, High Channel



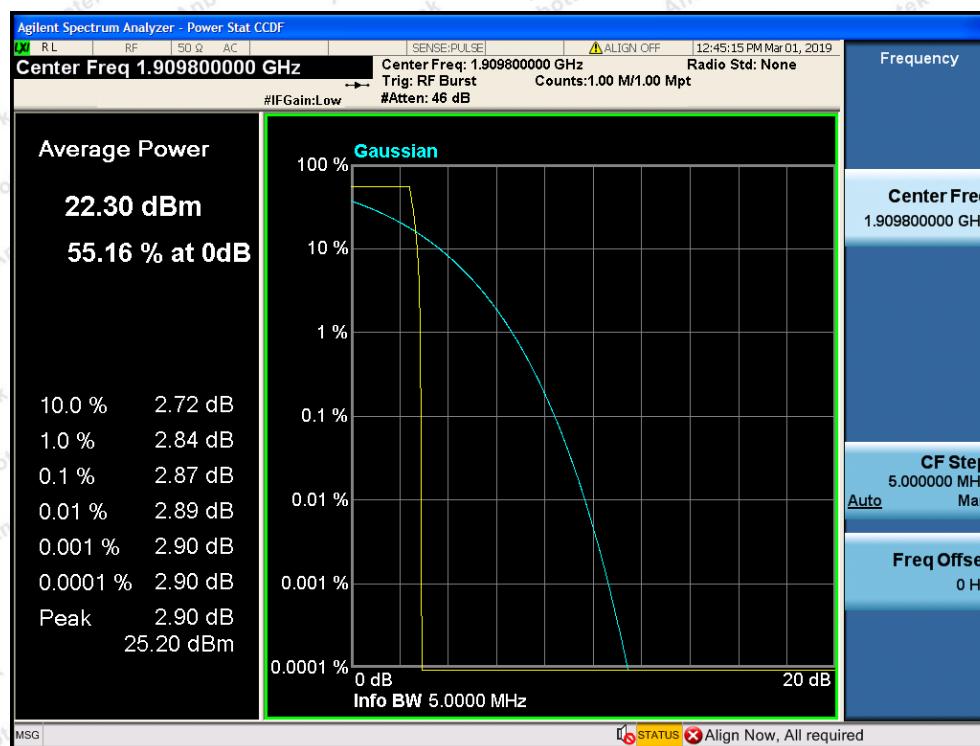
GPRS 1900, Low Channel



GPRS 1900, Middle Channel



GPRS 1900, High Channel



5. Modulation Characteristic

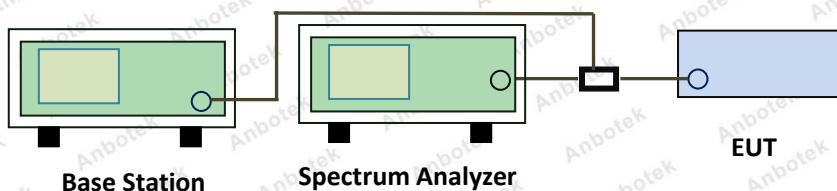
According to FCC § 2.1047(d), Part 22H, 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

6. Occupied Bandwidth

6.1. Test Standard and Limit

Spec	Item	Requirement
§2.1049, §22.917, §22.905 §24.238	a)	99% Occupied Bandwidth(kHz)
	b)	26 dB Bandwidth(kHz)

6.2. Test Setup



6.3. Test Procedure

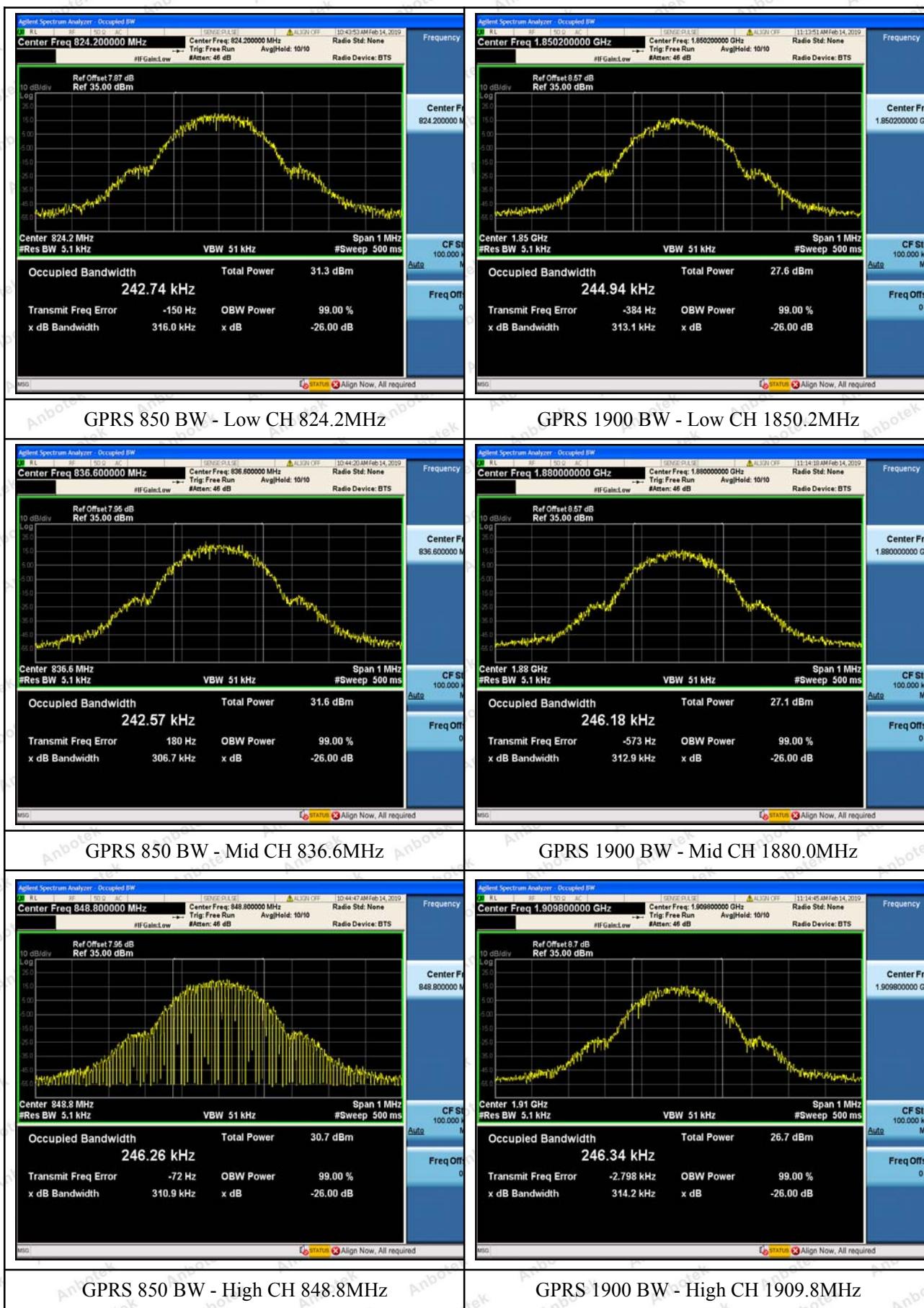
1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW, $VBW \geq 3$ times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

6.4. Test Data

Cellular Band (Part 22H) result/PCS Band (Part 24E) result:

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Verdict
GPRS850	128	242.7	316	PASS
GPRS850	190	242.6	307	PASS
GPRS850	251	246.3	311	PASS
GPRS1900	512	244.9	313	PASS
GPRS1900	661	246.2	313	PASS
GPRS1900	810	246.3	314	PASS

Test Plots

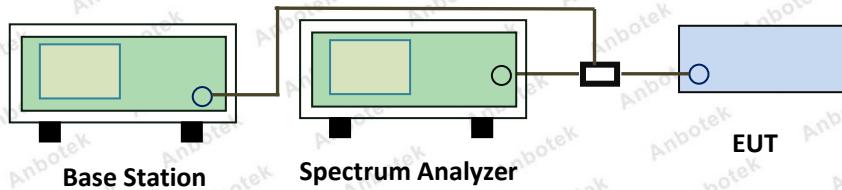


7. Spurious Emissions at Antenna Terminals

7.1. Test Standard and Limit

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least $(43 + 10 \log P)$ dB, in this case, -13dBm.

7.2. Test Setup

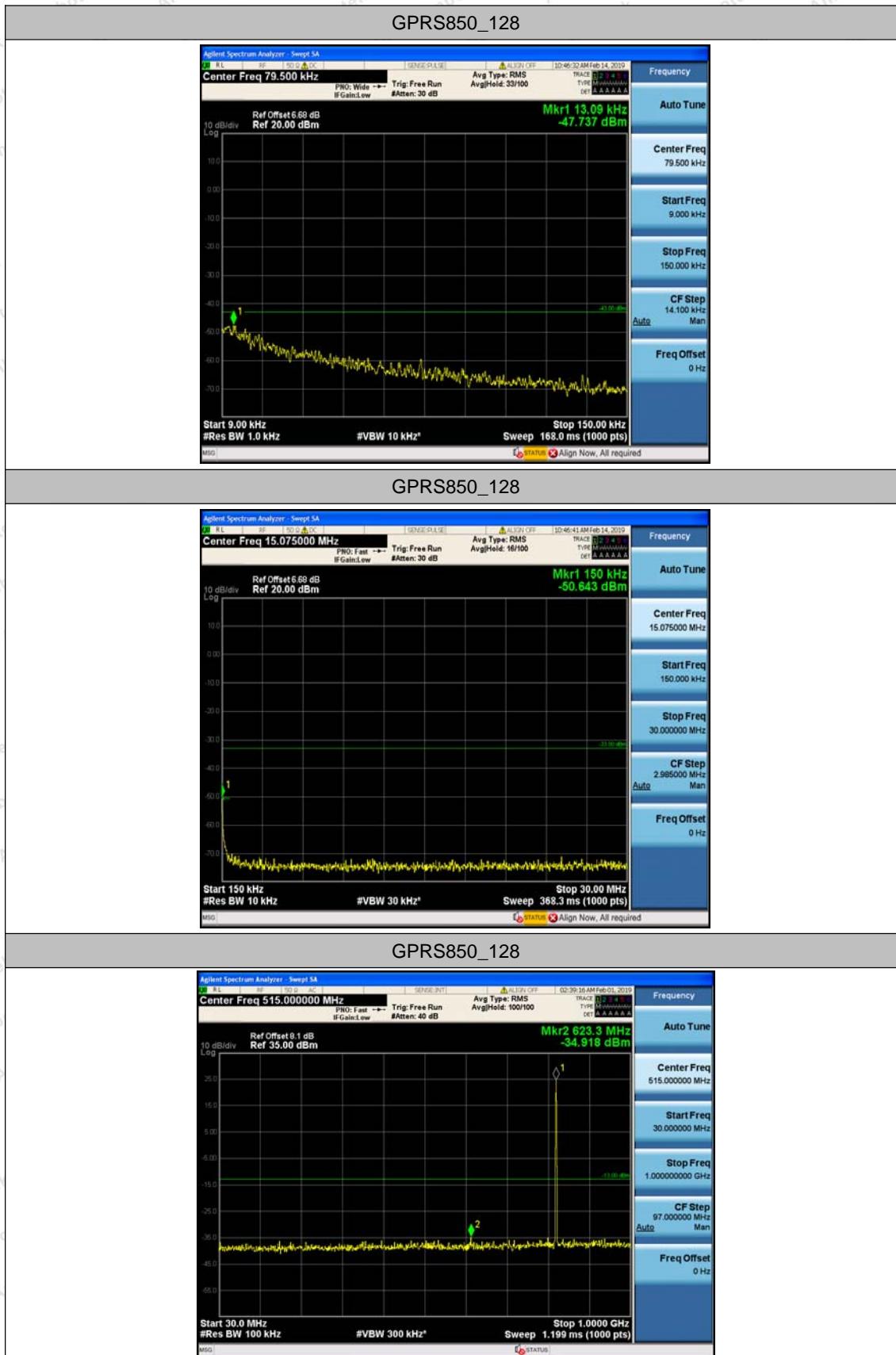


7.3. Test Procedure

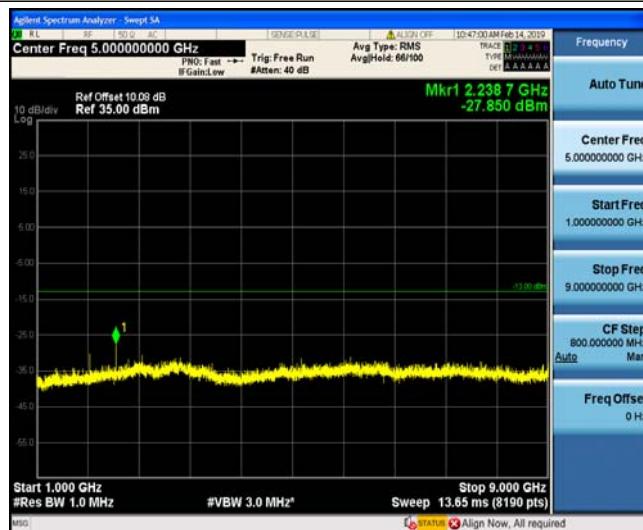
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW= 1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic.

7.4. Test Data

Band	Channel	Frequency Range(Mhz)	Value(dBm)	Limit(dBm)	Verdict
GPRS850	128	0.009~0.15	-47.74	-43	PASS
GPRS850	128	0.15~30	-50.64	-33	PASS
GPRS850	128	30~1000	-35.41	-13	PASS
GPRS850	128	1000~9000	-27.85	-13	PASS
GPRS850	190	0.009~0.15	-47.08	-43	PASS
GPRS850	190	0.15~30	-52.72	-33	PASS
GPRS850	190	30~1000	-34.43	-13	PASS
GPRS850	190	1000~9000	-28.12	-13	PASS
GPRS850	251	0.009~0.15	-45.80	-43	PASS
GPRS850	251	0.15~30	-50.91	-33	PASS
GPRS850	251	30~1000	-35.32	-13	PASS
GPRS850	251	1000~9000	-27.07	-13	PASS
GPRS1900	512	0.009~0.15	-45.34	-43	PASS
GPRS1900	512	0.15~30	-50.58	-33	PASS
GPRS1900	512	30~1000	-35.12	-13	PASS
GPRS1900	512	1000~7000	-27.86	-13	PASS
GPRS1900	512	7000~13600	-31.62	-13	PASS
GPRS1900	512	13600~20000	-27.73	-13	PASS
GPRS1900	661	0.009~0.15	-46.43	-43	PASS
GPRS1900	661	0.15~30	-51.12	-33	PASS
GPRS1900	661	30~1000	-35.26	-13	PASS
GPRS1900	661	1000~7000	-27.82	-13	PASS
GPRS1900	661	7000~13600	-30.46	-13	PASS
GPRS1900	661	13600~20000	-27.55	-13	PASS
GPRS1900	810	0.009~0.15	-45.07	-43	PASS
GPRS1900	810	0.15~30	-51.69	-33	PASS
GPRS1900	810	30~1000	-34.97	-13	PASS
GPRS1900	810	1000~7000	-27.68	-13	PASS
GPRS1900	810	7000~13600	-31.63	-13	PASS
GPRS1900	810	13600~20000	-27.15	-13	PASS



GPRS850_128



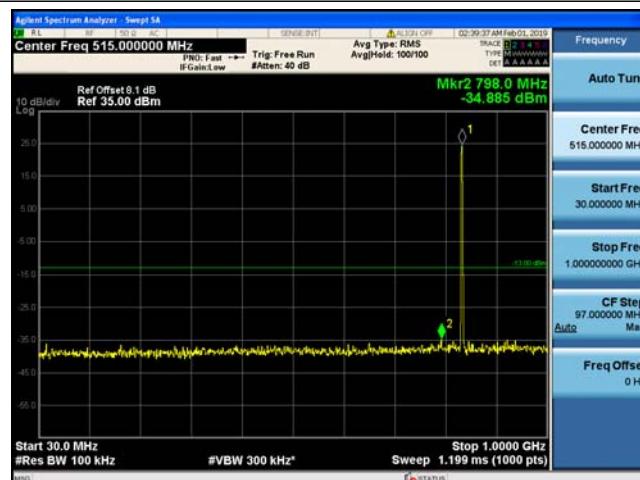
GPRS850_190



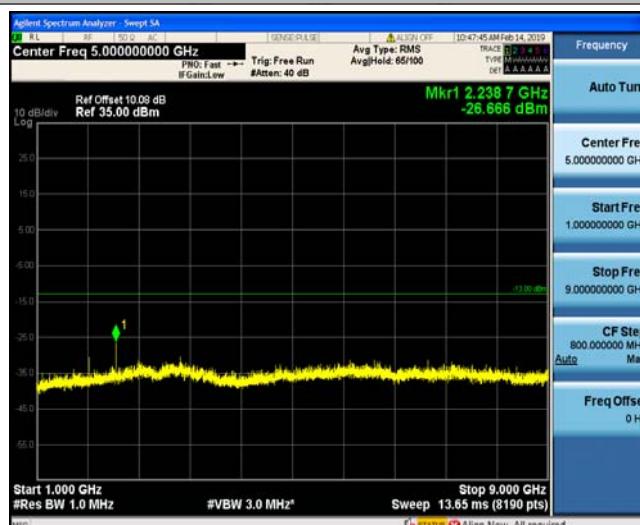
GPRS850_190



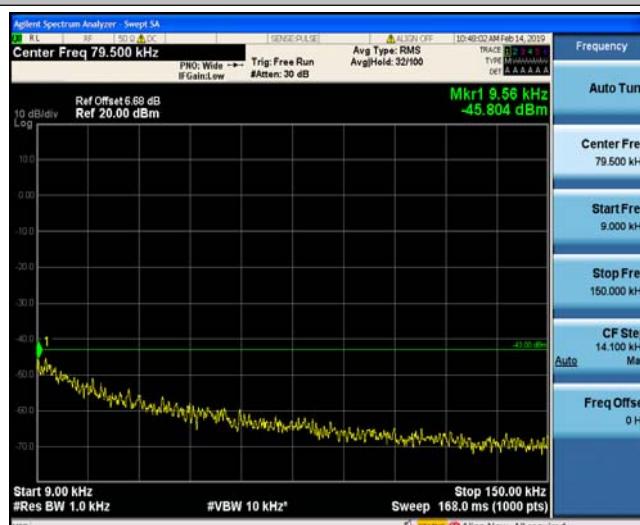
GPRS850_190



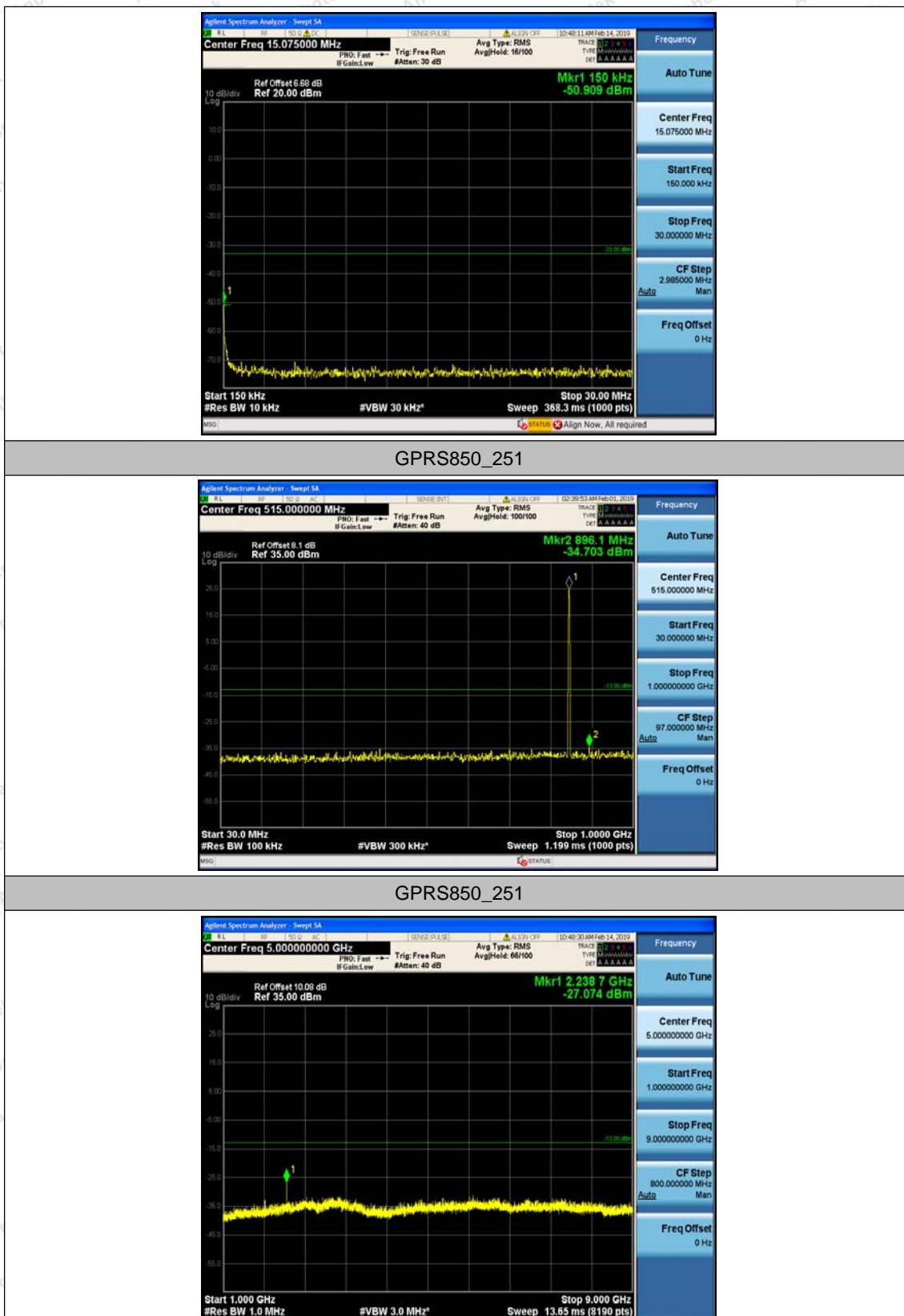
GPRS850_190



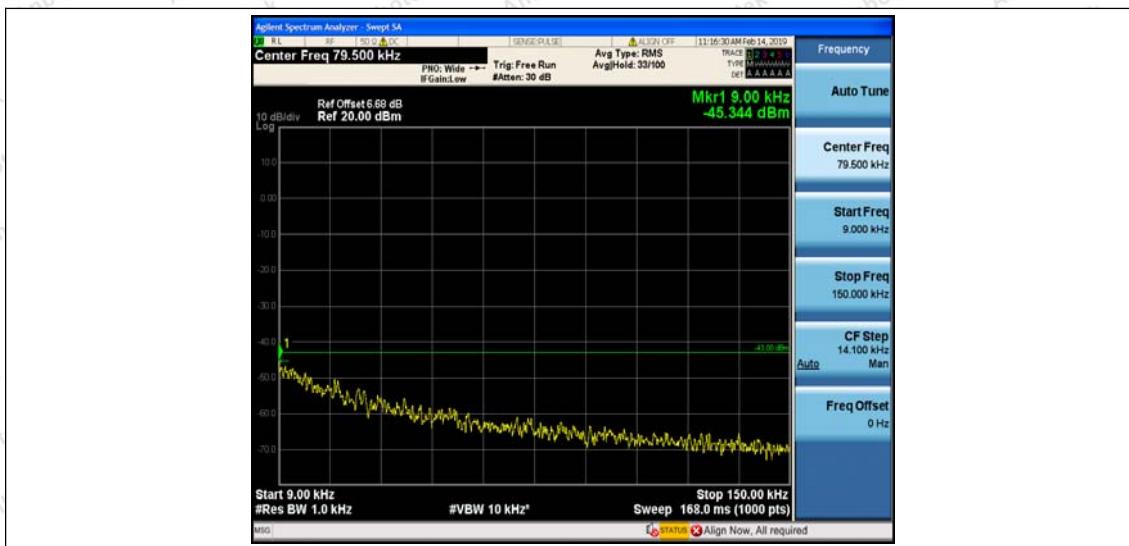
GPRS850_251



GPRS850_251



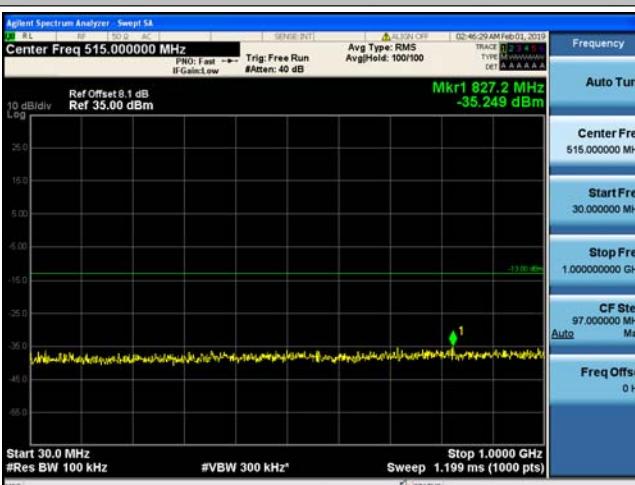
GPRS1900_512



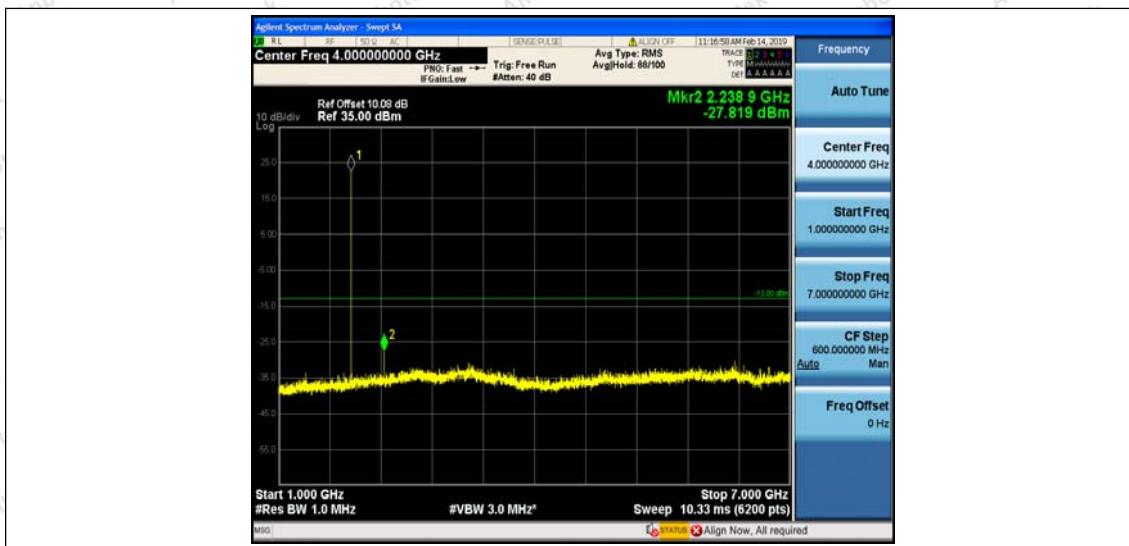
GPRS1900_512



GPRS1900_512



GPRS1900_512



GPRS1900_512



GPRS1900_512



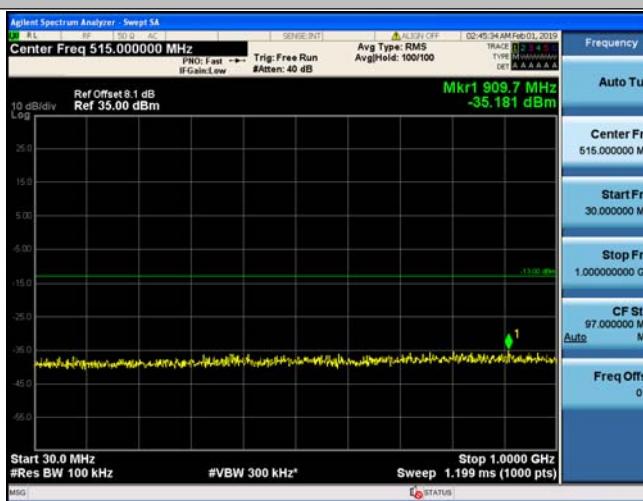
GPRS1900_661



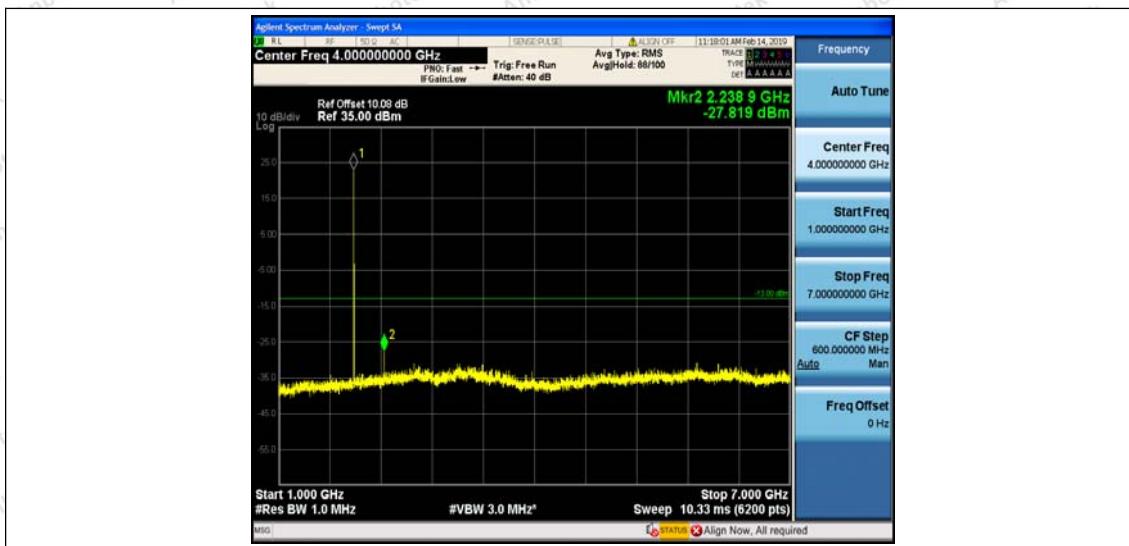
GPRS1900_661



GPRS1900_661



GPRS1900_661



GPRS1900_661



GPRS1900_661



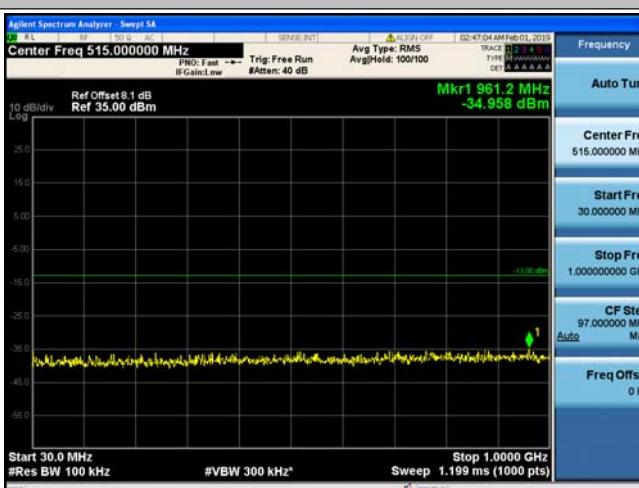
GPRS1900_810



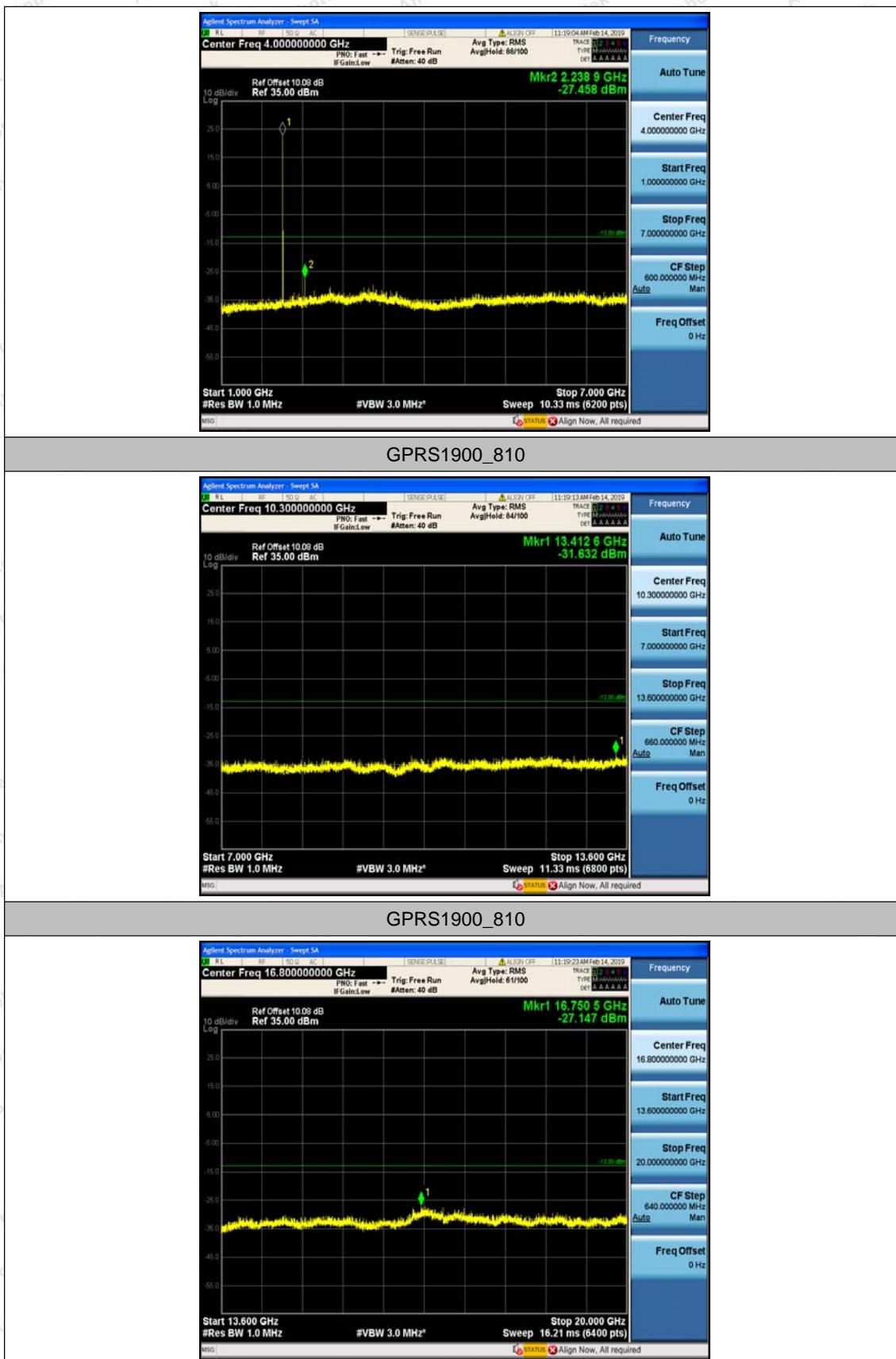
GPRS1900_810



GPRS1900_810



GPRS1900_810

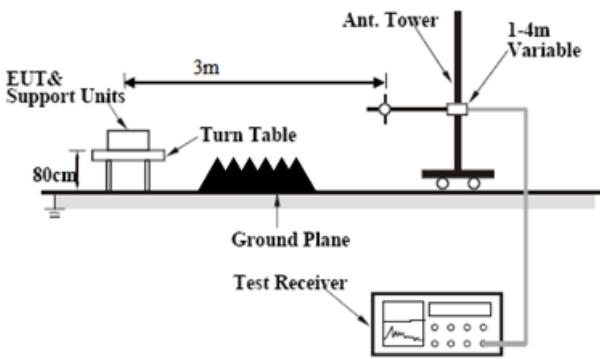


8. Spurious Radiated Emissions

8.1. Test Standard and Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

8.2. Test Setup



8.3. Test Procedure

1. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

3. 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.

Sample Calculation:

EUT Field Strength = Raw Amplitude ($\text{dB}\mu\text{V/m}$) - Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)

8.4. Test Data

Please to see the following pages

GPRS 850,Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
272.4	-50.42	V	5.40	0.24	-45.26	-13	-32.26
272.4	-50.37	H	5.40	0.24	-45.21	-13	-32.37
1673.2	-49.55	V	7.95	0.78	-42.38	-13	-29.03
1673.2	-47.98	H	7.95	0.78	-40.81	-13	-28.65
2509.8	-45.11	V	9.89	2.39	-37.61	-13	-24.00
2509.8	-46.83	H	9.89	2.39	-39.33	-13	-23.76

GPRS 1900,Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
272.4	-48.99	V	5.4	0.24	-43.83	-13	-30.83
272.4	-50.03	H	5.4	0.24	-44.87	-13	-31.87
3760	-48.16	V	10.25	2.73	-40.64	-13	-27.64
3760	-49.34	H	10.25	2.73	-41.82	-13	-28.82

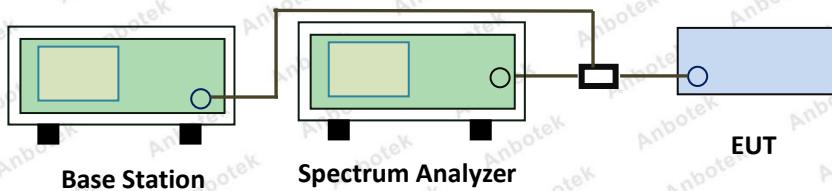
Note: The measurement have been performed for all mode, only report the worst case.

9. Band Edge Compliance

9.1. Test Standard and Limit

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

9.2. Test Setup



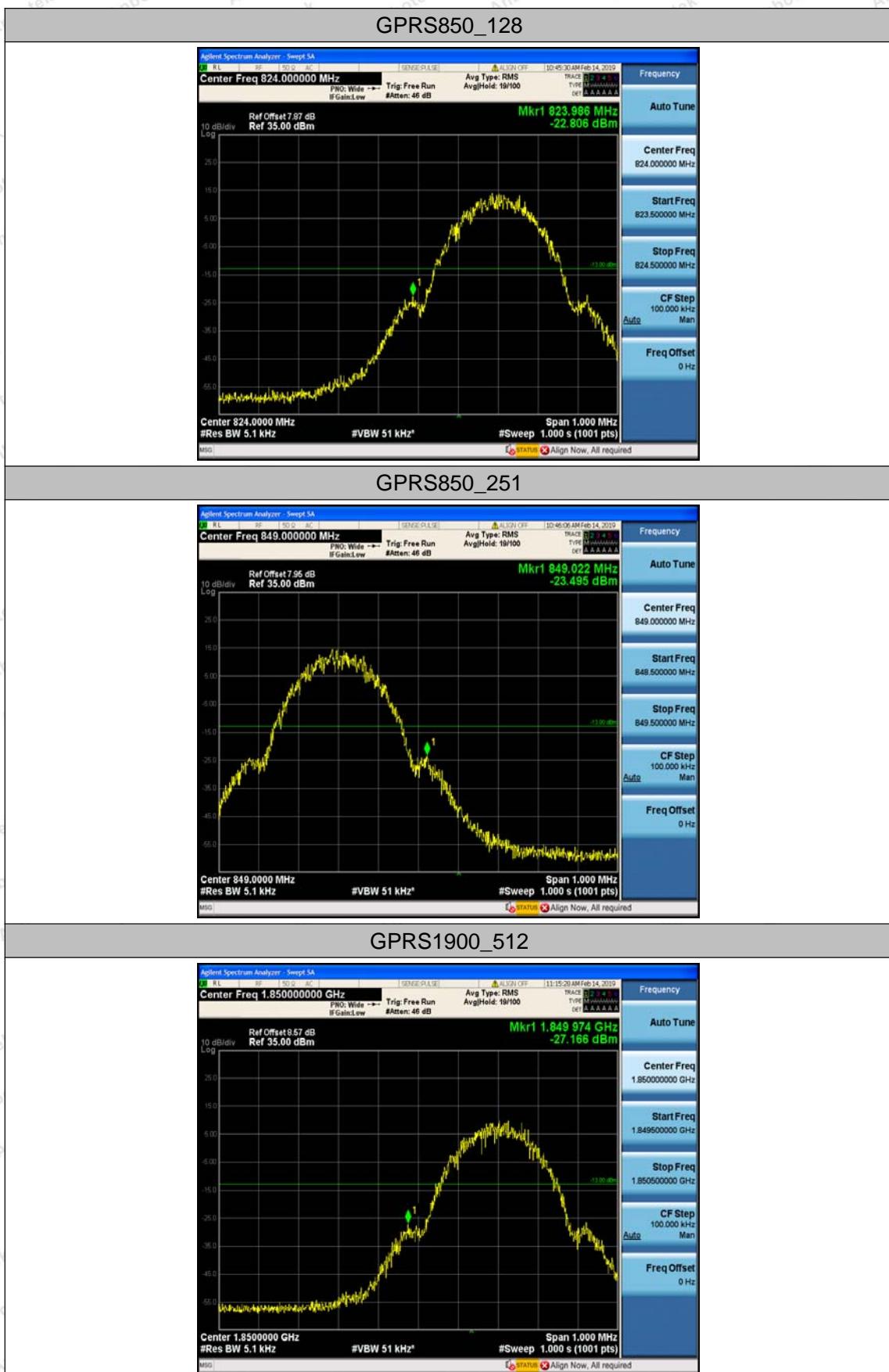
9.3. Test Procedure

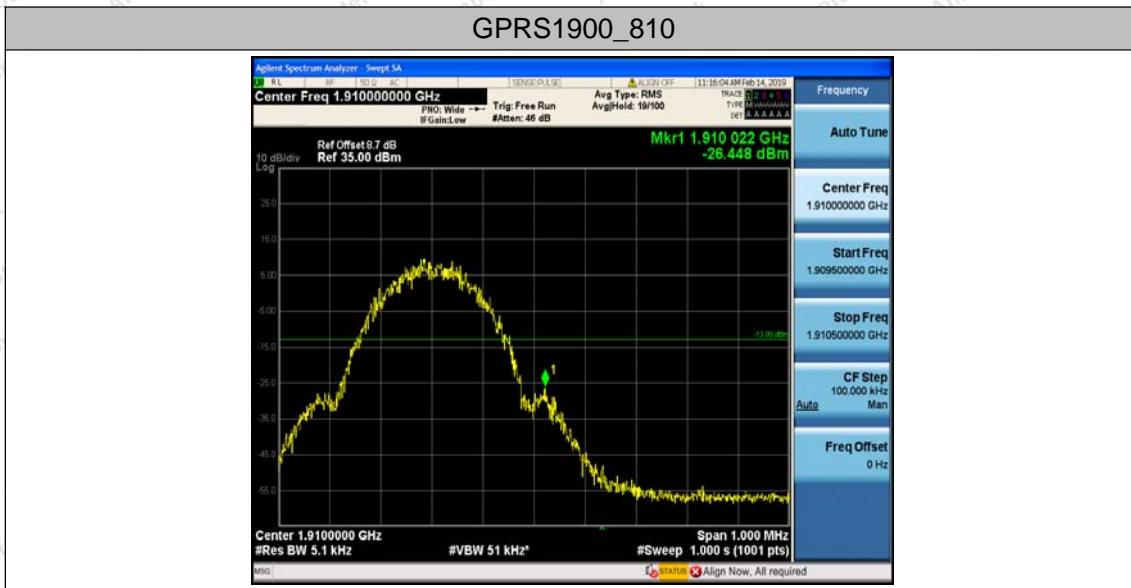
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. For the bandedge: 2G: Set the RBW=5.1KHz, VBW = 51KHz, Sweep time= Auto

9.4. Test Data

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
GPRS850	128	-22.81	-13	PASS
GPRS850	251	-23.50	-13	PASS
GPRS1900	512	-27.17	-13	PASS
GPRS1900	810	-26.45	-13	PASS

Test Plots





10. Frequency Stability

10.1. Test Standard and Limit

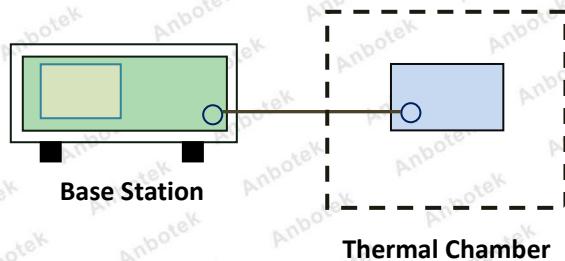
According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.

10.2. Test Setup



10.3. Test Procedure

A communication link was established between EUT and base station. The frequency error was monitored and measured by base station under variation of ambient temperature and variation of primary supply voltage.

Limit: The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

10.4. Test Data

Cellular Band (Part 22H)

GPRS 850 Test Frequency: 836.6MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-5	-0.0060	2.5
-20		-7	-0.0084	2.5
-10		3	0.0036	2.5
0		4	0.0048	2.5
10		2	0.0024	2.5
20		9	0.0108	2.5
30		-6	-0.0072	2.5
40		8	0.0096	2.5
50		5	0.0060	2.5
20	3.3	1	0.0012	2.5
20	4.2	4	0.0048	2.5

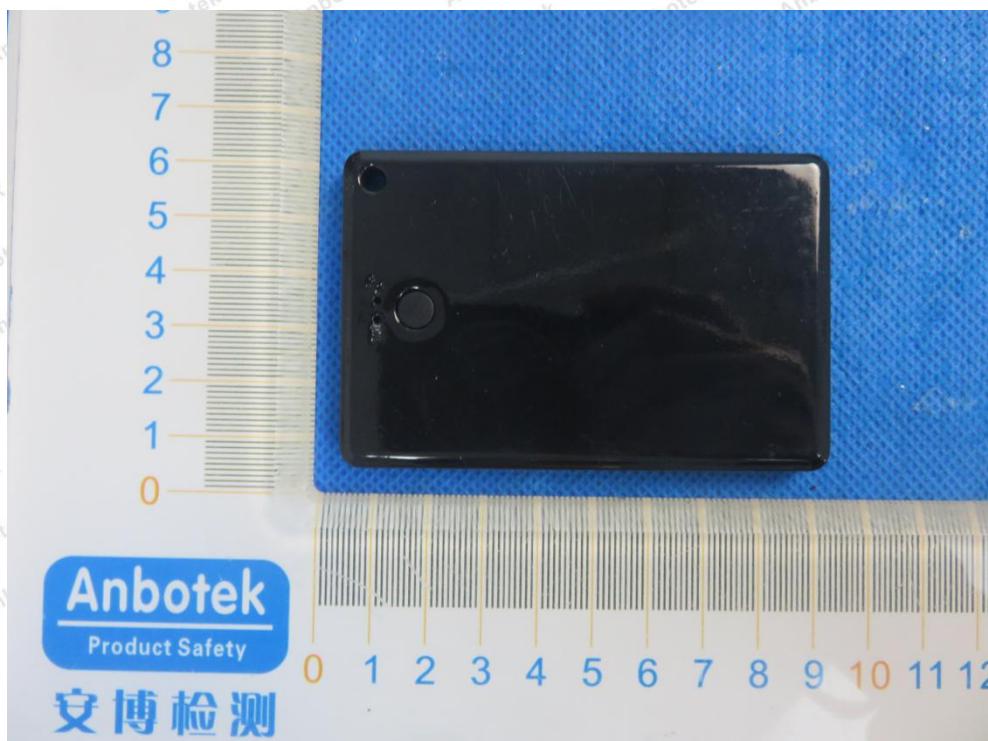
GPRS 1900 Test Frequency: 1880MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-7	-0.0037	2.5
-20		-3	-0.0016	2.5
-10		5	0.0027	2.5
0		2	0.0011	2.5
10		1	0.0005	2.5
20		6	0.0032	2.5
30		-4	-0.0021	2.5
40		3	0.0016	2.5
50		8	0.0043	2.5
20	3.3	3	0.0016	2.5
20	4.2	2	0.0011	2.5

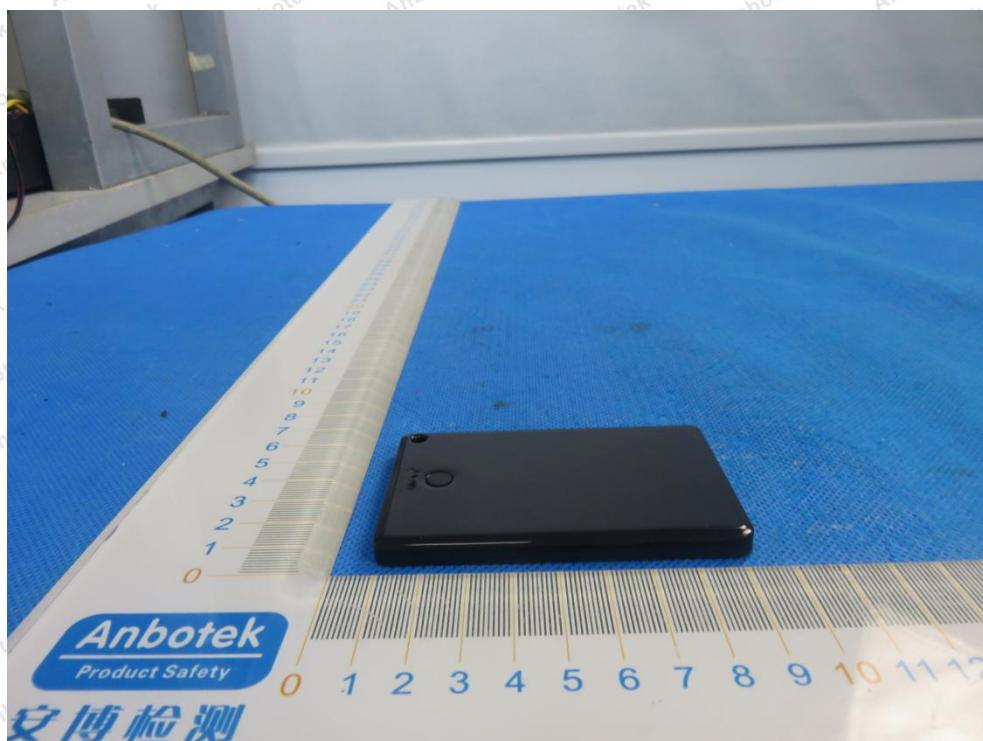
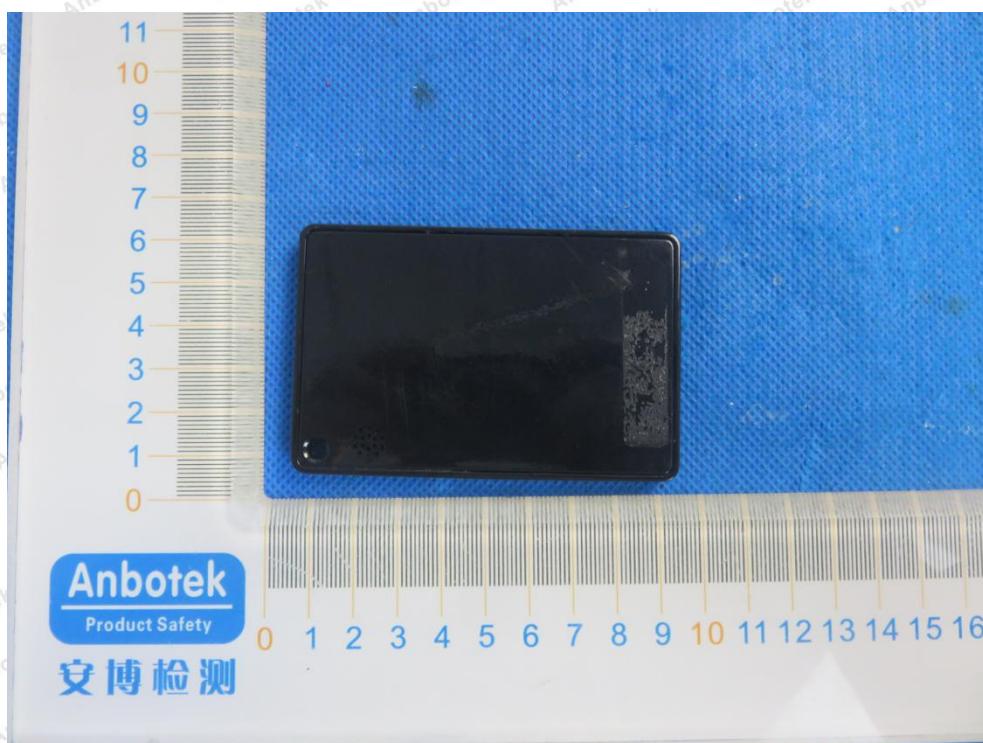
APPENDIX I-- TEST SETUP PHOTOGRAPH

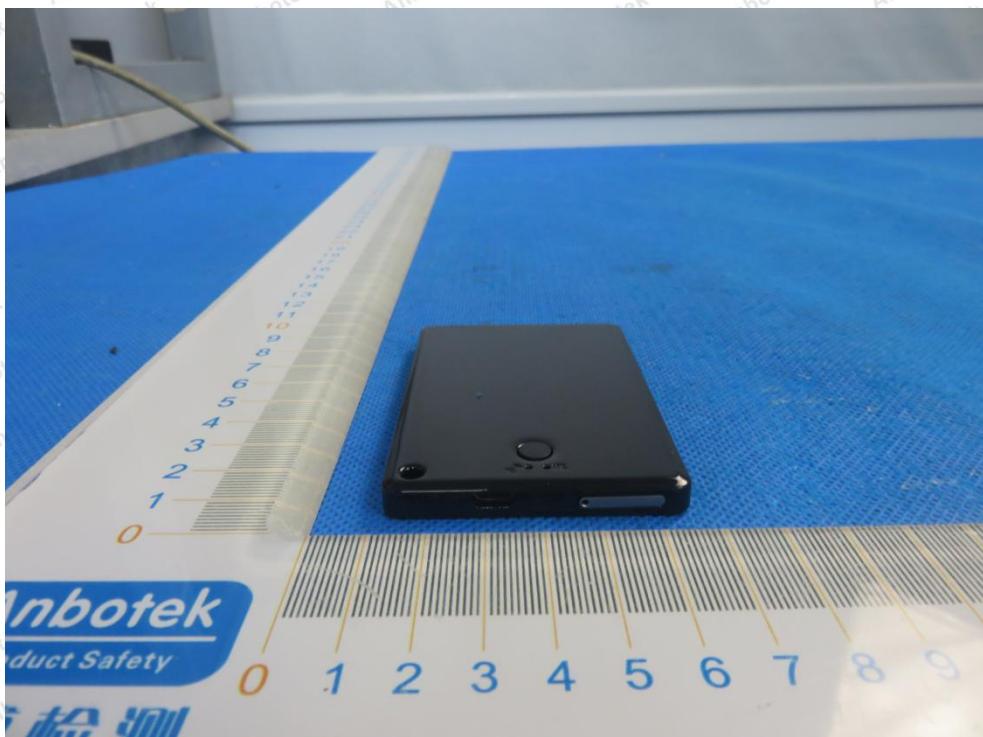
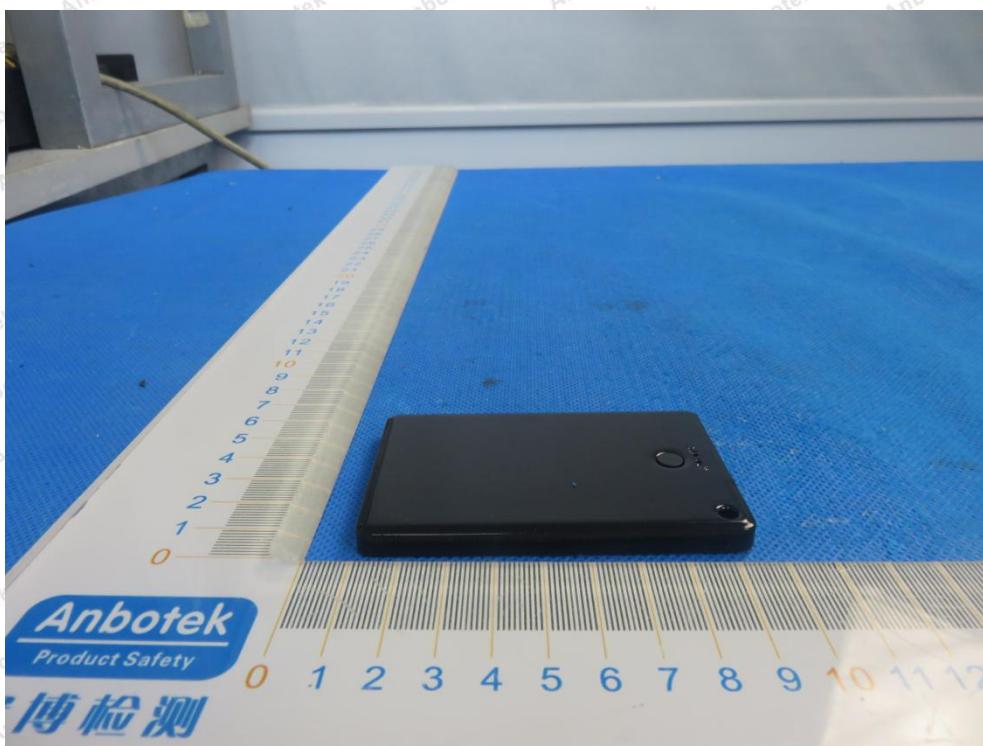
Photo of Radiation Emission Test

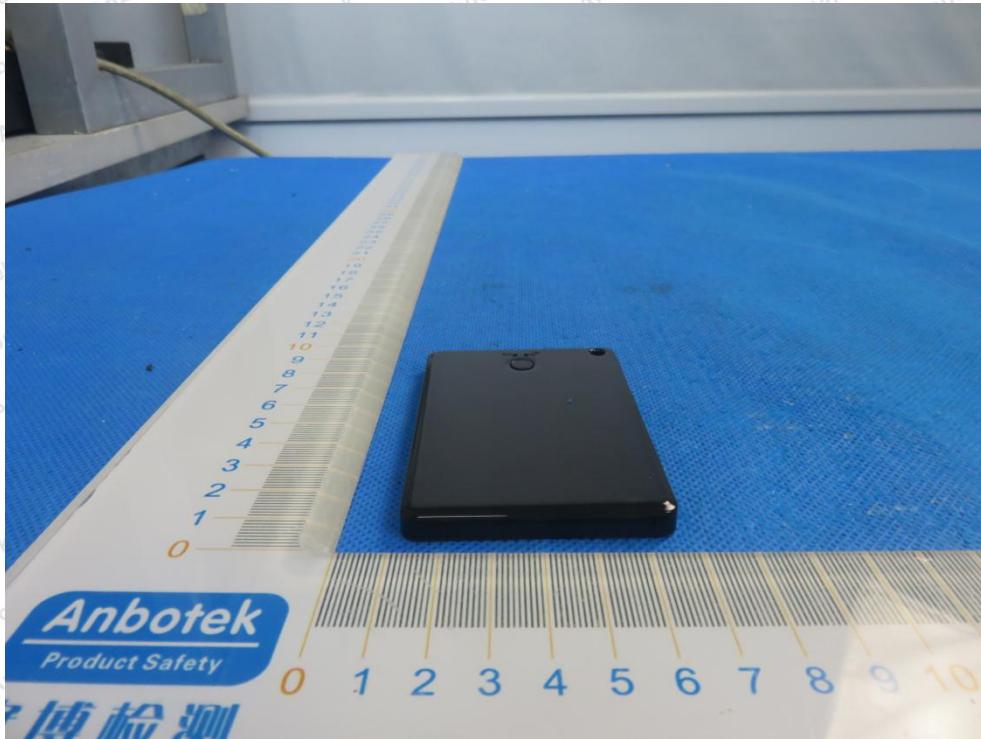


APPENDIX II -- EXTERNAL PHOTOGRAPH



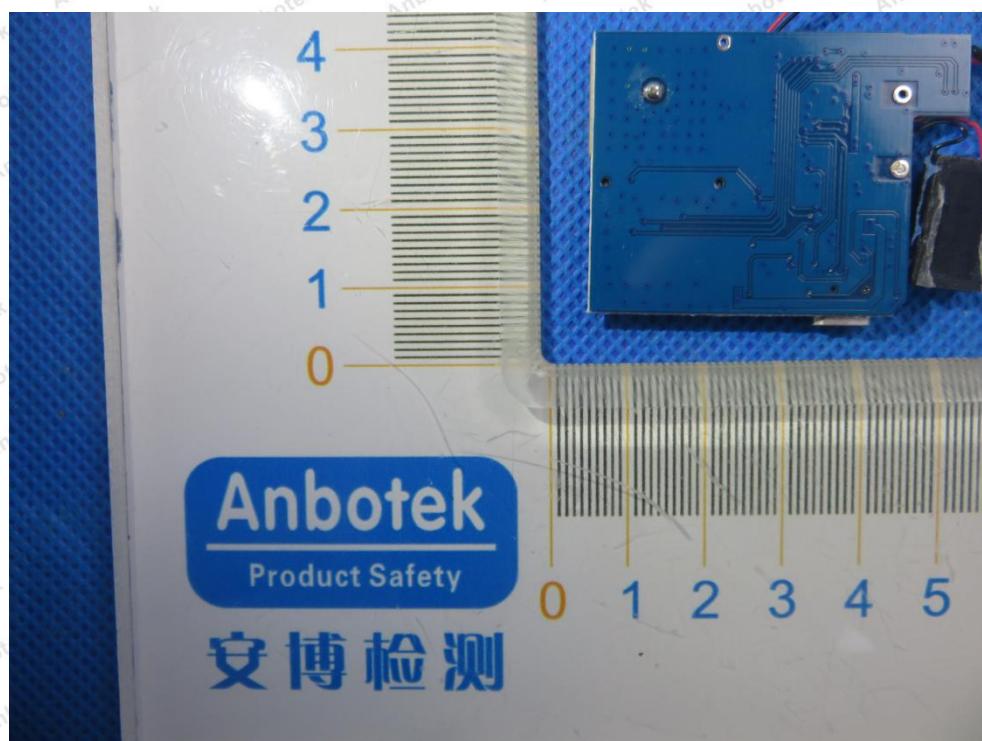
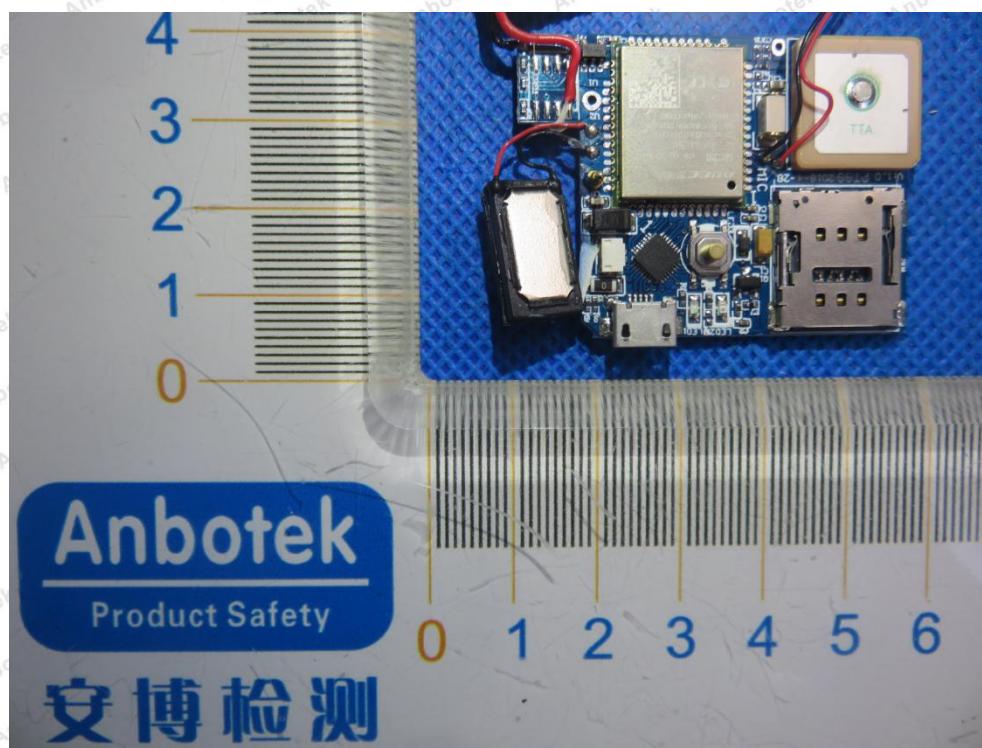


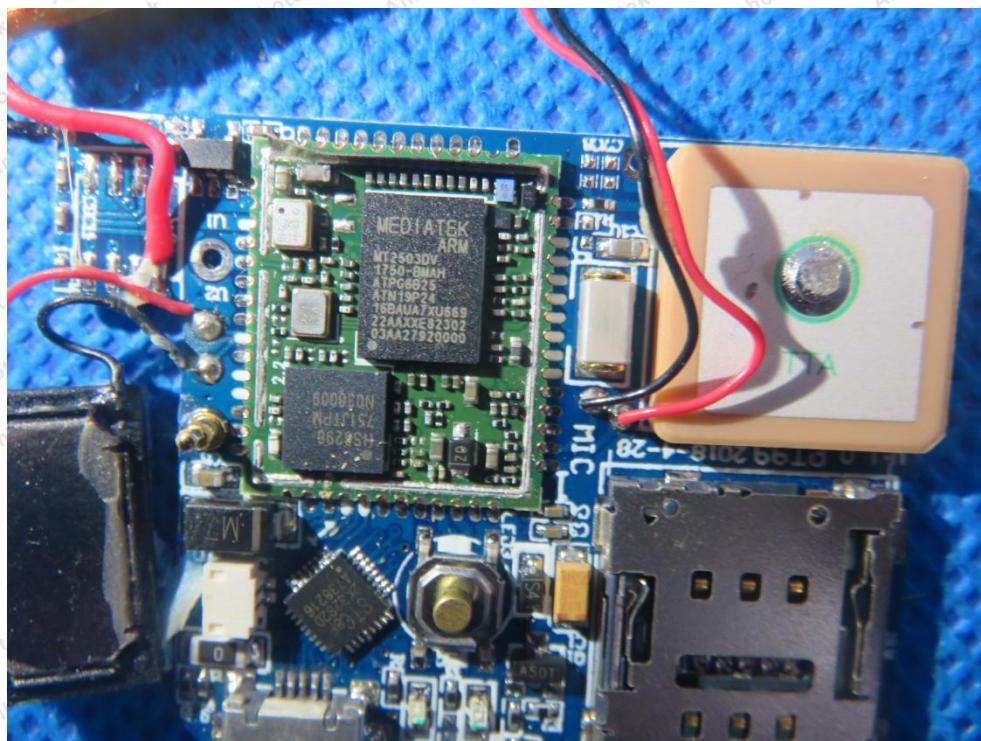
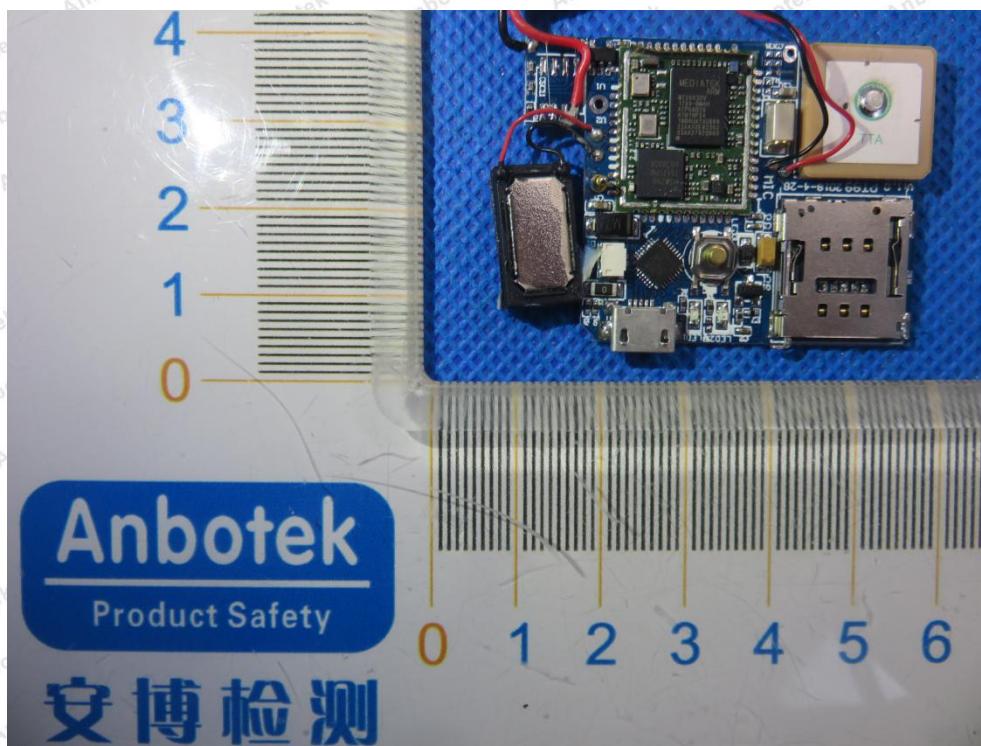


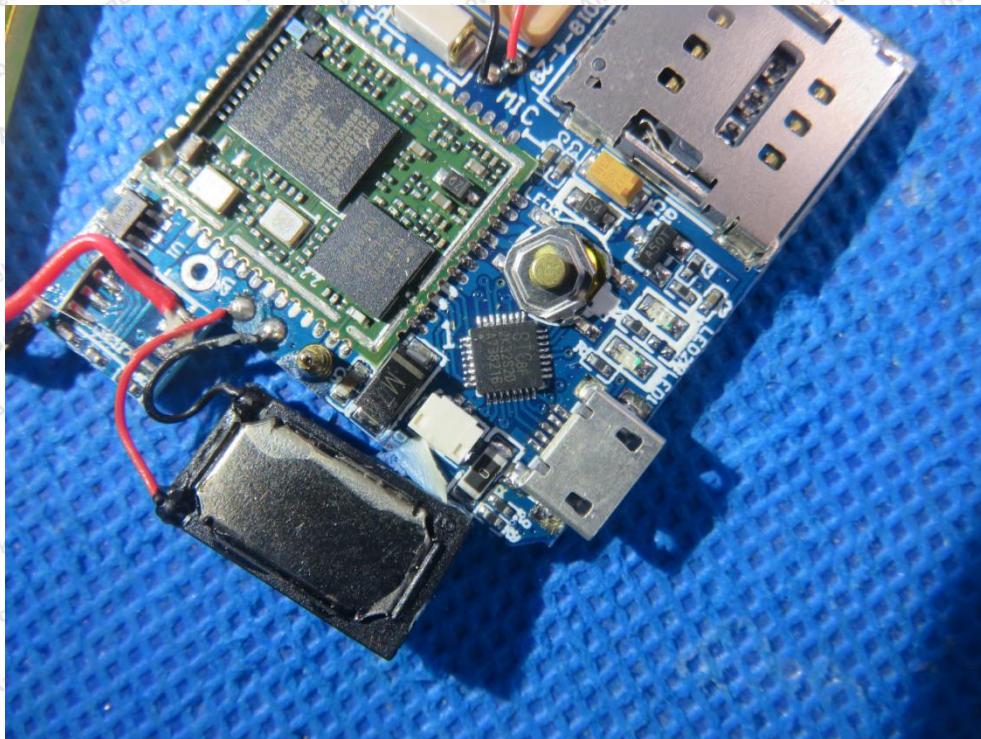


APPENDIX III -- INTERNAL PHOTOGRAPH









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