FCC TEST REPORT

For

Qianhai R-Guardian (Shenzhen) Technology Co., Ltd.

Smart Luggage

Model No.: SL-01

Prepared For	:	Qianhai R-Guardian (Shenzhen) Technology Co., Ltd.
Address	:	Rm 210, Block 5, Qianhai Shenzhen-HK E Hub, Nanshan District, Shenzhen, 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	:	SZAWW180524002-03
Date of Test	:	May 30~ Jun. 27, 2018
Date of Report	:	Jun. 27, 2018

Contents

TEST REPORT

Applicant	:	Qianhai R-Guardian (Shenzhen) Technology Co., Ltd.
Manufacturer	:	Qianhai R-Guardian (Shenzhen) Technology Co., Ltd.
Product Name	:	Smart Luggage
Model No.	:	SL-01
Trade Mark	:	N.A
Rating(s)	:	Input:DC 5V /2A (with DC 3.7V, 5200 mAh Lithium Battery and DC 3.6V, 800mAh Ni-MH batteries inside) Output:DC 5V/2A

Test Standard(s)	**:**	**FCC PART 2, FCC Part 22(H), FCC Part 24(E)**
Test Method(s)	**:**	**ANSI/TIAC603 D: 2010**

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 15 Subpart C 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 : : May 30~ Jun. 23, 2018

Prepared by : (Engineer / Tangcy. T)

Reviewer : : (Supervisor / Calvin Liu)

Approved & Authorized Signer : : (Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Qianhai R-Guardian (Shenzhen) Technology Co., Ltd.
Address	:	Rm 210, Block 5, Qianhai Shenzhen-HK E Hub, Nanshan District, Shenzhen, China
Manufacturer	:	Qianhai R-Guardian (Shenzhen) Technology Co., Ltd.
Address	:	Rm 210, Block 5, Qianhai Shenzhen-HK E Hub, Nanshan District, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Smart Luggage	
Model No.	:	SL-01	
Trade Mark	:	N.A.	
Test Power Supply		DC 3.7V from Battery inside	
Product Description	:	Operation Frequency:	GSM850 TX:824.2~848.8 MHz; RX:869.2~893.8 MHz PCS1900 TX:1850.2~1909.8 MHz; RX:1930.2~1989.8 MHz
		GPRS Class	8/10/12
		Modulation Type:	GPRS: GMSK
		Antenna Type:	PCB Antenna
		Antenna Gain(Peak):	GSM850: -1.3 dBi PCS1900: 1.2 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2)This report is for GPRS			

1.3. Auxiliary Equipment Used During Test

N/A	:	N/A

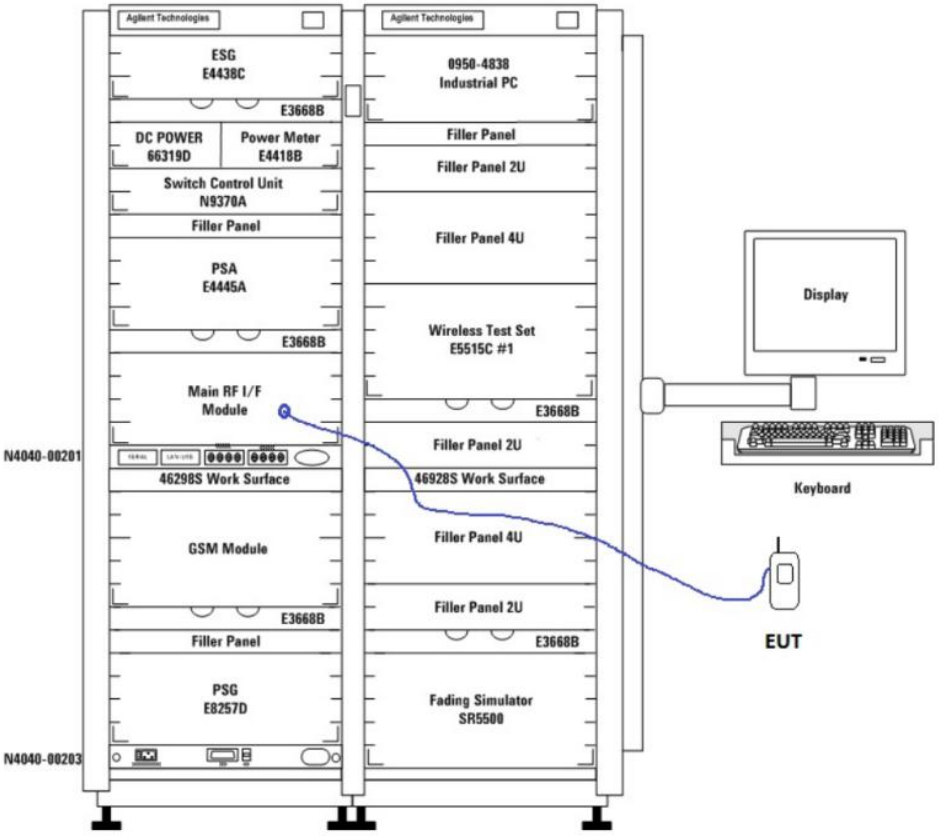
1.4. Description of Test Modes

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

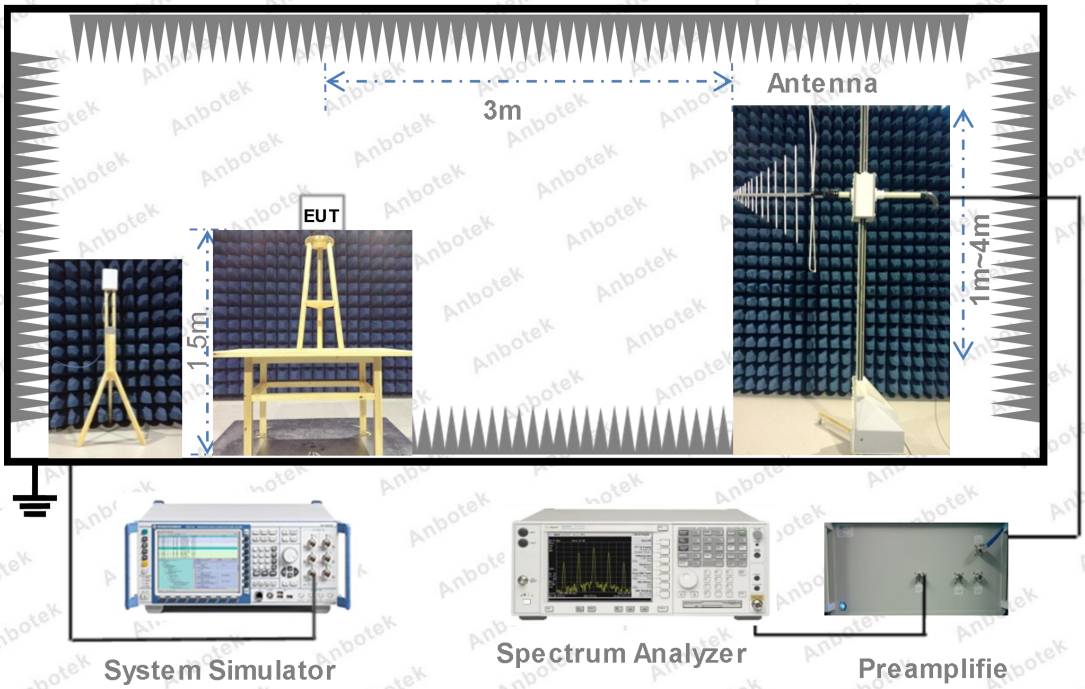
Test	Description Of Operation
Emissions Testing	The EUT was communicating with base station and set to work at maximum output power.
Others Testing	The EUT was communicating with base station and set to work at maximum output power.

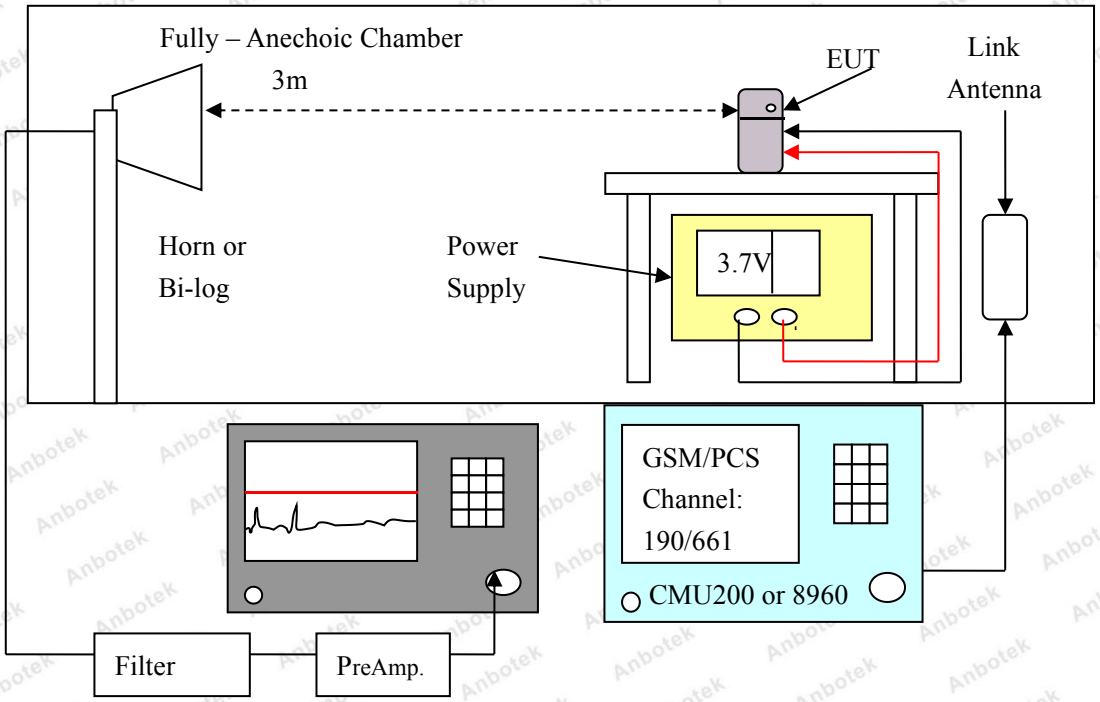
1.5. Description Of Test Setup

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. 17, 2017	1 Year
2.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 17, 2017	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Nov. 17, 2017	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2017	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Nov. 17, 2017	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
8.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 18, 2017	1 Year
9.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 18, 2017	1 Year
10.	DC Power Supply	LW	TPR-6410D	349315	Nov. 01, 2017	1 Year
11.	Constant Temperature Humidity Chamber	Sertep	ZJ-HWHS80B	ZJ-17042804	Nov. 01, 2017	1 Year
12.	Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	117888	Nov. 17, 2017	1 Year
13.	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	1201.0002K50-104209-JC	Nov. 18, 2017	1 Year
14.	High-Pass Filter	CDKMV	ZHPF-BM1100-4000-0730	B2015094550	Nov. 18, 2017	1 Year
15.	High-Pass Filter	CDKMV	ZHPF-M3.5-18G-3834	1307006523	Nov. 17, 2017	1 Year
16.	4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063507	Nov. 17, 2017	1 Year
17.	4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063513	Nov. 17, 2017	1 Year

1.7. Measurement Uncertainty

Maximum measurement uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
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 ℃
Humidity	±5 %
DC and low frequency voltages	±3 %
Time	±5 %
Duty Cycle	±5 %

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 registed 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); § 27.50(c.10); § 27.50(d.4)	RF Output Power	Compliance
§ 24.232 (d); § 27.50(d)	Peak-Average Ratio	Compliance
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049; § 22.905; § 22.917; § 24.238; § 27.53(a.5)	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051; § 22.917(a); § 24.238(a); § 27.53(h)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917(a); § 24.238(a); § 27.53(h)	Field Strength of Spurious Radiation	Compliance
§ 22.917(a); § 24.238(a); § 27.53(h)	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; § 27.5(h); § 27.54	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℃
Humidity range	40-75%
Pressure range	86-106kPa

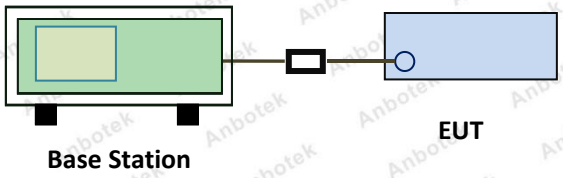
Mode	Channel	Frequency(MHz)
GPRS 850	128	824.2
	190	836.6
	251	848.8
GPRS 1900	512	1850.2
	661	1880.0
	810	1909.8

3. RF Output Power Test

3.1. Test Standard and Limit

Spec	Item	Requirement
§22.913 (a)	a)	ERP:38.45dBm
§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 (TX power in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts.

3.4. Test Data

Please to see the following pages

Conducted Power

GSM Mode:

Maximum transmit power (dBm);								
Band	GSM850				GSM1900			
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GPRS Multi-Slot Class 8 (1 uplink),GMSK	30.55	30.43	**30.58**	30±1	**30.85**	30.58	30.55	30±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	30.09	29.98	30.15	30±1	30.38	30.17	30.04	30±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	29.49	29.49	29.67	29±1	30.01	29.76	29.72	30±1
Remark: GPRS, CS1 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link								

Radiated Output power

ERP & EIRP

ERP for Cellular Band (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	21.49	V	6.8	0.53	27.76	38.45
824.2	21.26	H	6.8	0.53	27.53	38.45
836.6	21.64	V	6.8	0.53	27.91	38.45
836.6	20.78	H	6.8	0.53	27.05	38.45
848.8	21.17	V	6.9	0.53	27.54	38.45
848.8	21.56	H	6.9	0.53	**27.93**	38.45

EIRP for PCS Band (Part 24E)

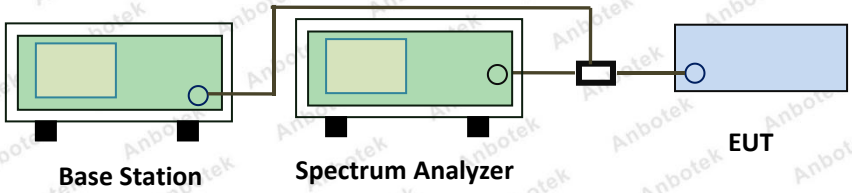
Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	22.18	V	7.88	0.85	29.21	33
1850.2	21.94	H	7.88	0.85	28.97	33
1880	22.42	V	7.88	0.85	**29.45**	33
1880	22.15	H	7.88	0.85	29.18	33
1909.8	22.35	V	7.86	0.85	29.36	33
1909.8	22.43	H	7.86	0.85	29.44	33

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	0.33	13	PASS
GPRS850	190	0.34	13	PASS
GPRS850	251	0.35	13	PASS
GPRS1900	512	0.38	13	PASS
GPRS1900	661	0.38	13	PASS
GPRS1900	810	0.40	13	PASS

5. Modulation Characteristic

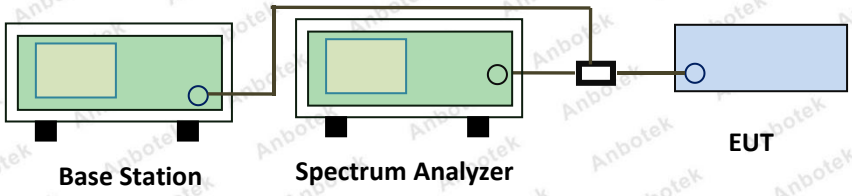
According to FCC § 2.1047(d), Part 22H, 24E there is no specific requirement for digital modulation, thereforemodulation characteristic is not presented.

6. Occupied Bandwidth

6.1. Test Standard and Limit

Spec	Item	Requirement
§2.1049, §22.917, §22.905 §24.238 §27.53(a)	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. RBWwas set to about 1% of emission BW, VBW= 3 times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth isthe delta frequency between the two points where the display line intersects the signal trace.

6.4. Test Data

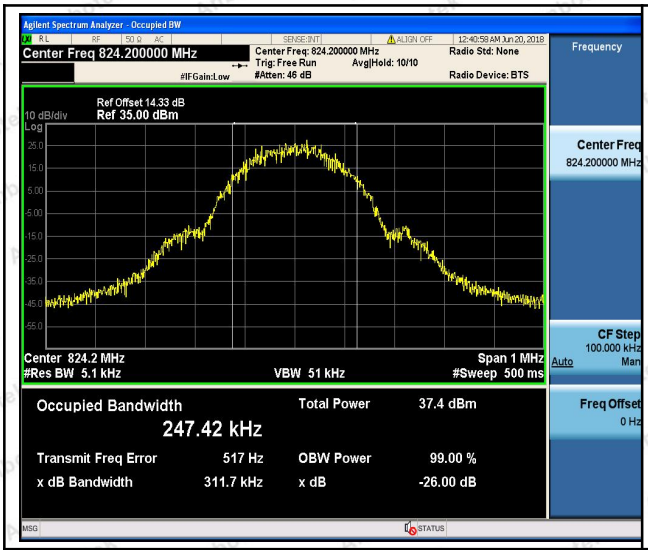
Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	**247.4**	312
190	836.6	244.8	310
251	848.8	246.7	315

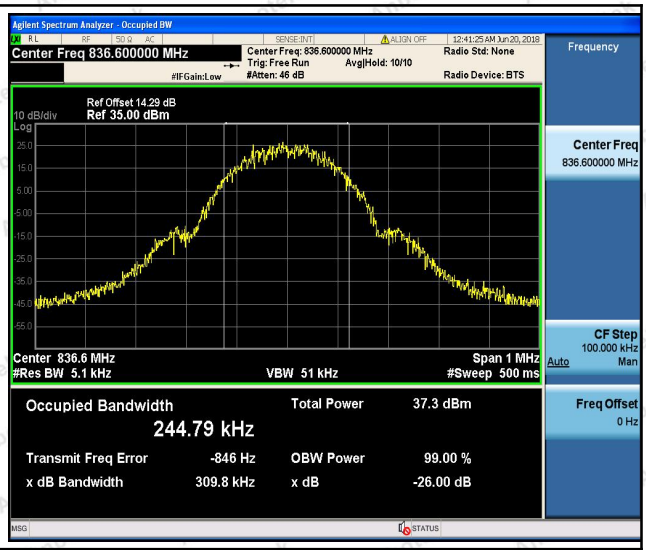
PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	243.2	318
661	1880.0	245.3	314
810	1909.8	**245.6**	316

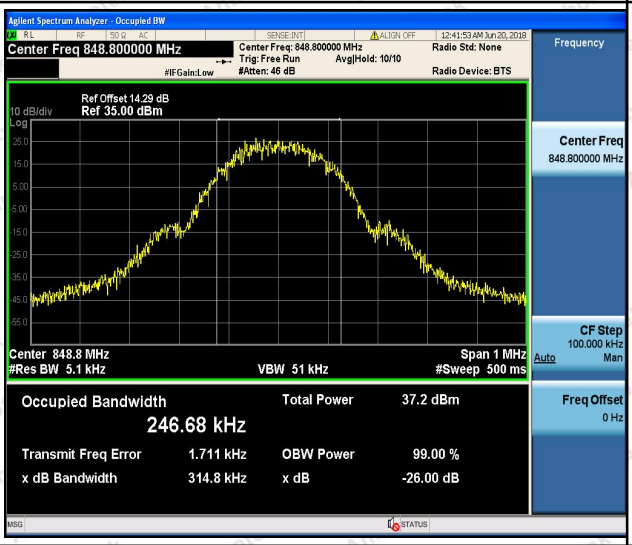
Test Plots



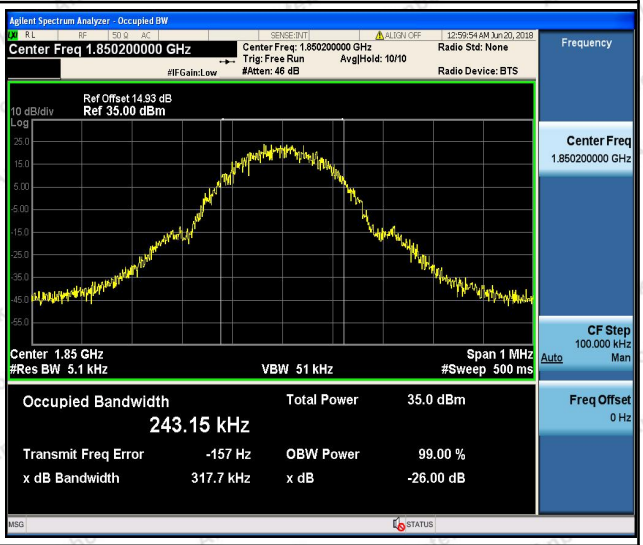
GPRS 850 BW - Low CH 824.2MHz



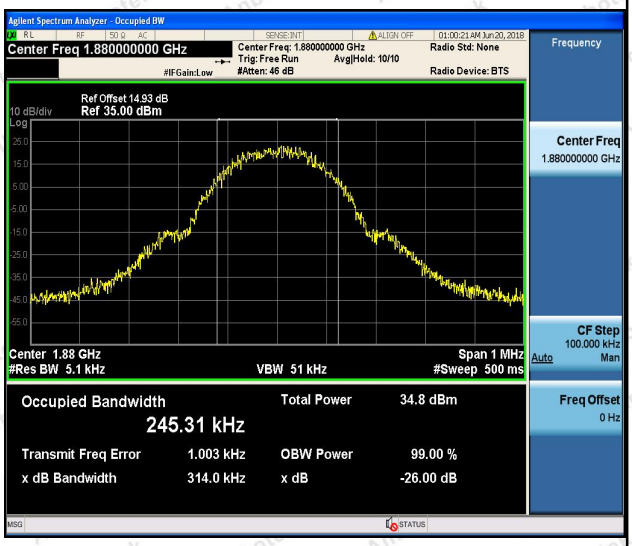
GPRS 850 BW - Mid CH 836.6MHz



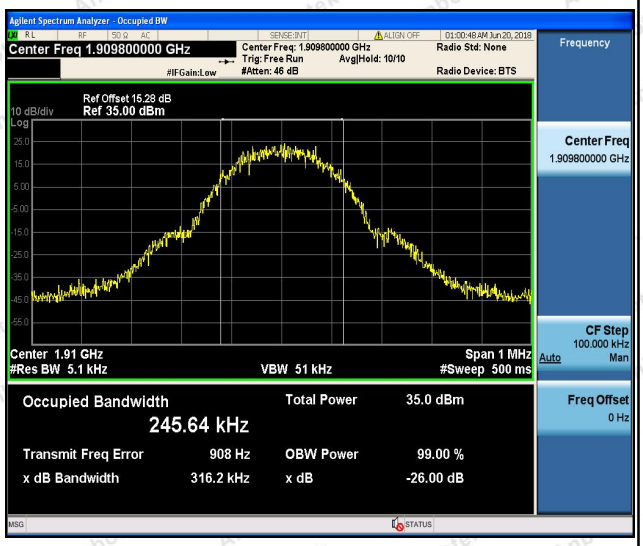
GPRS 850 BW - High CH 848.8MHz



GPRS 1900 BW - Low CH 1850.2MHz



GPRS 1900 BW - Mid CH 1880MHz



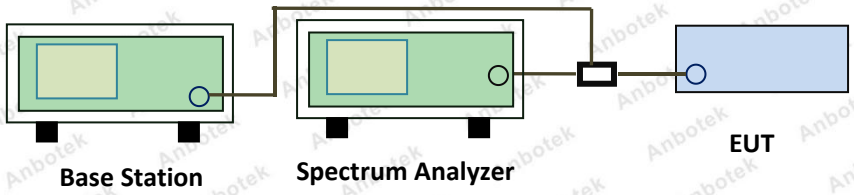
GPRS 1900 BW - High CH 1909.8MHz

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

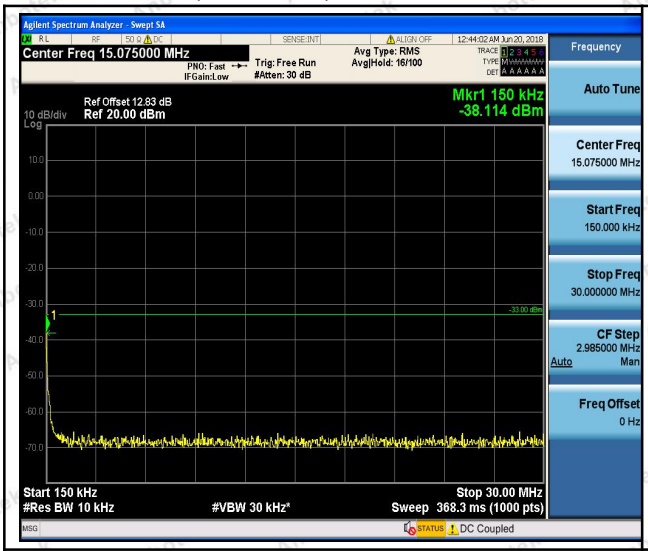
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriateattenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficientscans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW=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

7.4. Test Data

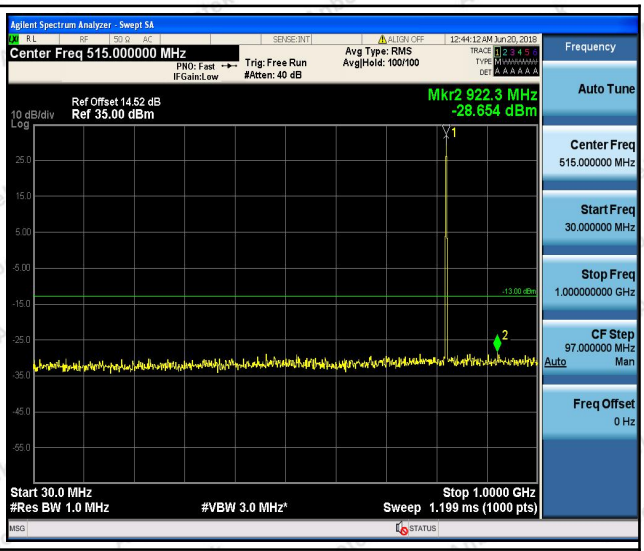
Band	Channel	Frequency Rang(Mhz)	Value(dBm)	Limit(dBm)	Verdict
GPRS850	128	0.15~30	-38.11	-33	PASS
GPRS850	128	30~1000	-28.65	-13	PASS
GPRS850	128	1000~9000	-22.95	-13	PASS
GPRS850	190	0.15~30	-39.00	-33	PASS
GPRS850	190	30~1000	-28.36	-13	PASS
GPRS850	190	1000~9000	-23.85	-13	PASS
GPRS850	251	0.15~30	-39.61	-33	PASS
GPRS850	251	30~1000	-28.61	-13	PASS
GPRS850	251	1000~9000	-23.98	-13	PASS
GPRS1900	512	0.15~30	-38.397	-33	PASS
GPRS1900	512	30~1000	-28.498	-13	PASS
GPRS1900	512	1000~7000	-23.651	-13	PASS
GPRS1900	512	7000~13600	-22.637	-13	PASS
GPRS1900	512	13600~20000	-17.433	-13	PASS
GPRS1900	661	0.15~30	-39.512	-33	PASS
GPRS1900	661	30~1000	-27.390	-13	PASS
GPRS1900	661	1000~7000	-24.132	-13	PASS
GPRS1900	661	7000~13600	-22.460	-13	PASS
GPRS1900	661	13600~20000	-18.002	-13	PASS
GPRS1900	810	0.15~30	-38.122	-33	PASS
GPRS1900	810	30~1000	-29.533	-13	PASS
GPRS1900	810	1000~7000	-23.440	-13	PASS

GPRS1900	810	7000~13600	-22.541	-13	PASS
GPRS1900	810	13600~20000	-17.642	-13	PASS

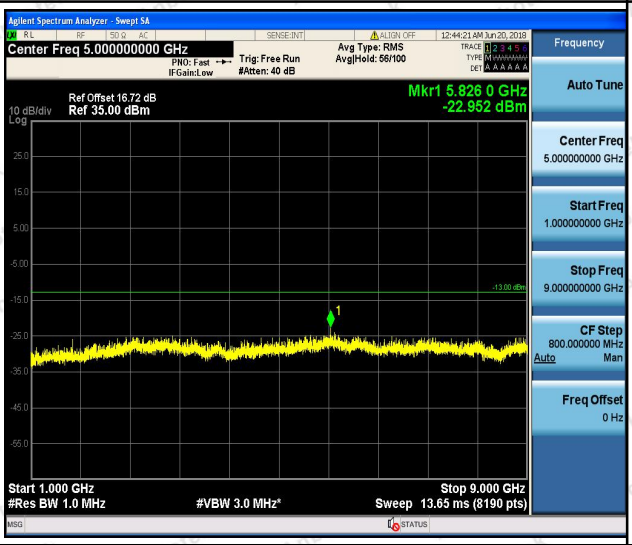
Cellular Band (Part 22H) result



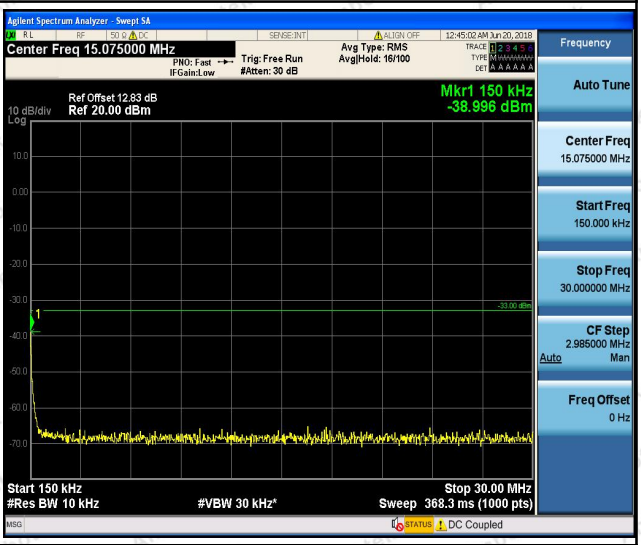
150KHz~30MHz_GPRS_850MHz_Low CH128-824.2



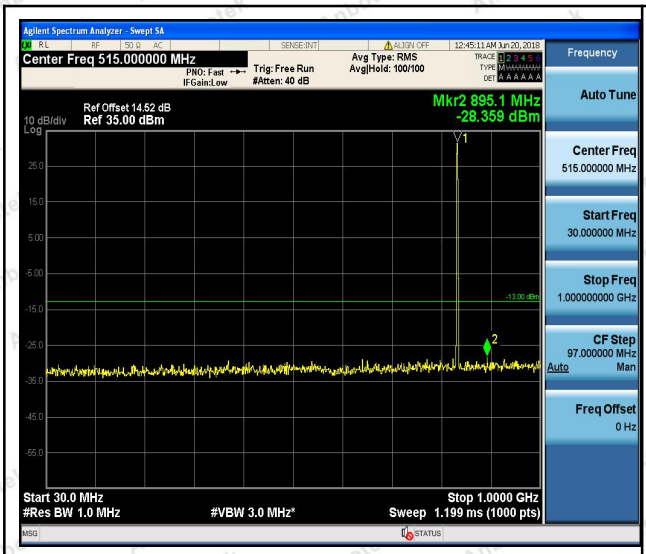
30MHz~1GHz_GPRS_850MHz_Low CH128-824.2



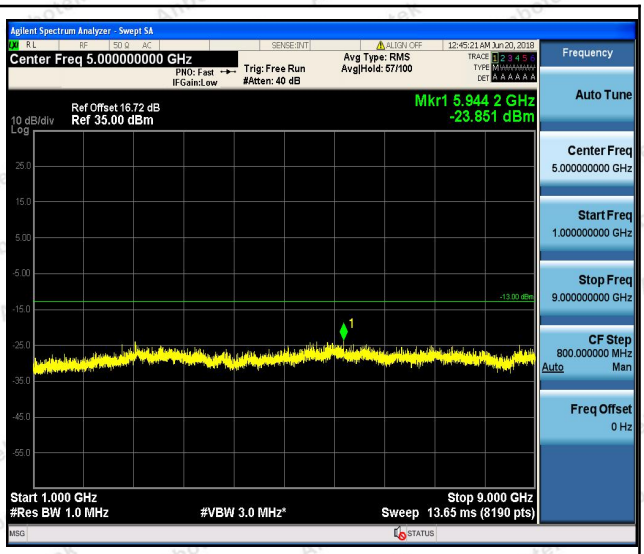
1GHz~9GHz_GPRS_850MHz_Low CH128-824.2



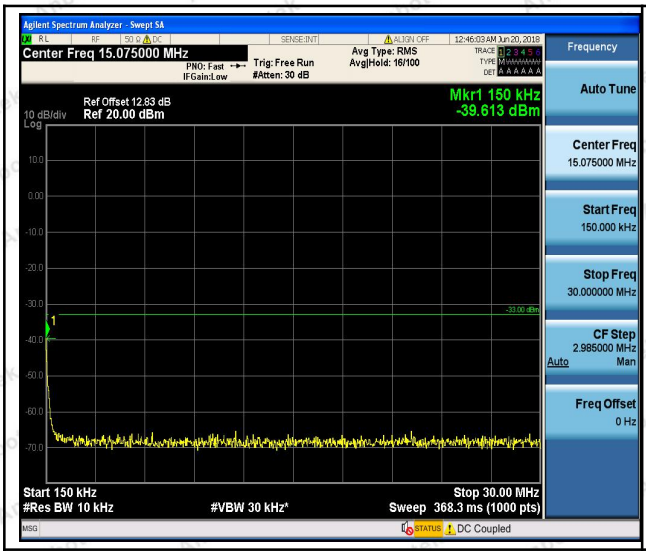
150KHz~30MHz_GPRS_850MHz_Mid CH190-836.6



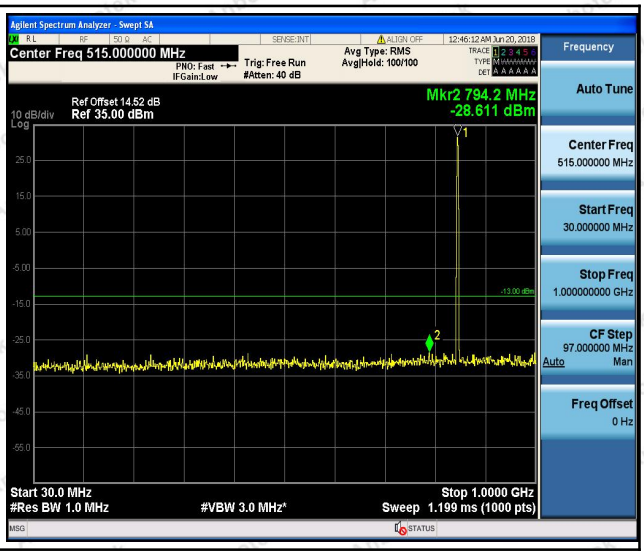
30MHz~1GHz_GPRS_850MHz_Mid CH190-836.6



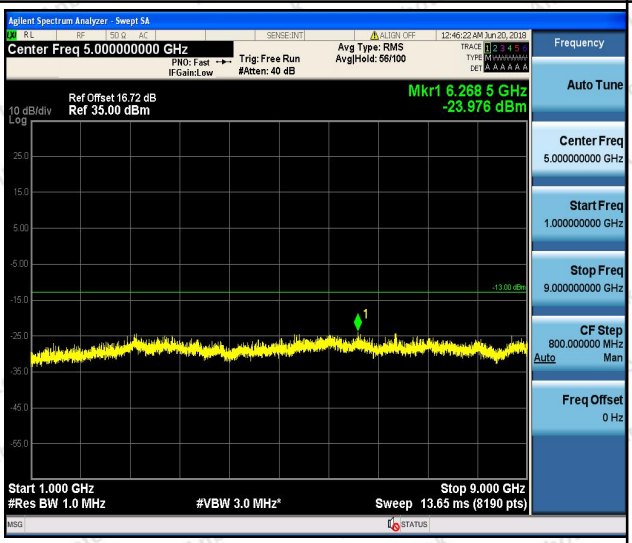
1GHz~9GHz_GPRS_850MHz_Mid CH190-836.6



150KHz~30MHz_GPRS_850MHz_High CH251-848.8

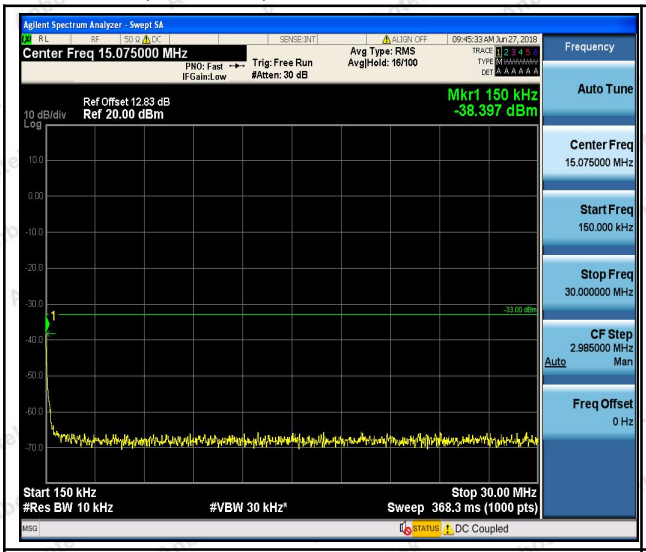


30MHz~1GHz_GPRS_850MHz_High CH251-848.8

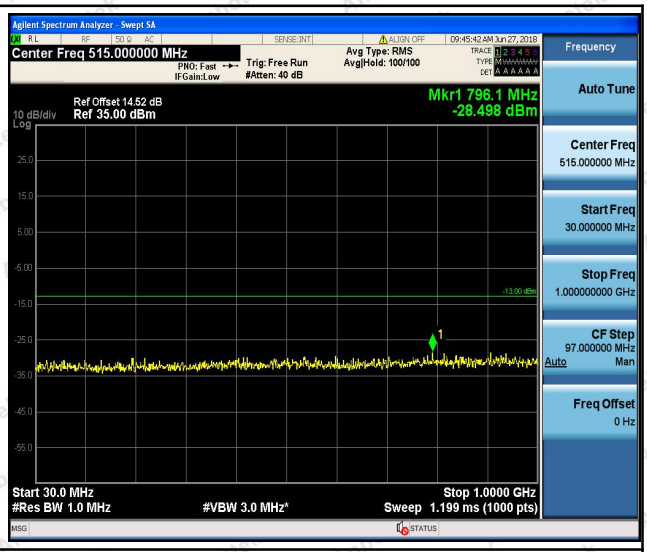


1GHz~9GHz_GPRS_850MHz_High CH251-848.8

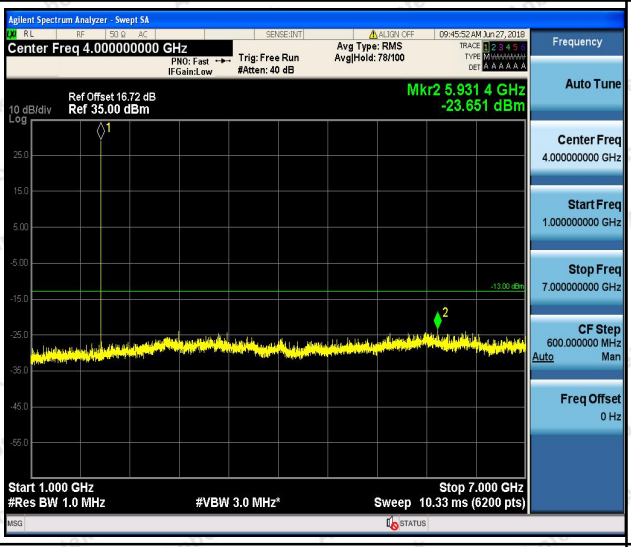
PCS Band (Part24E) result



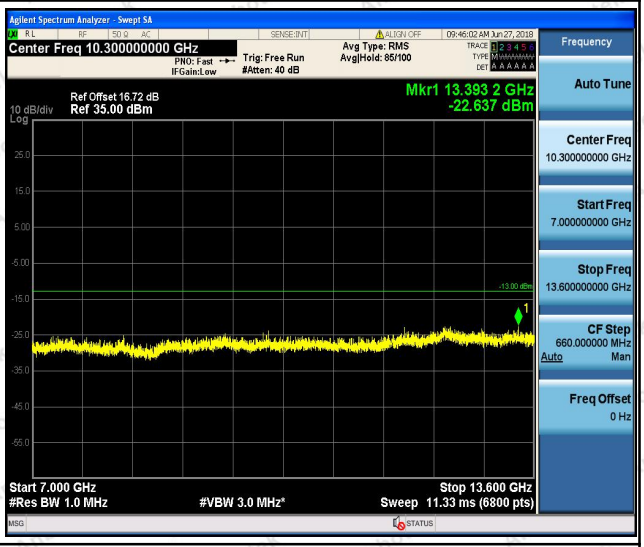
150KHz~30MHz_GPRS_1900MHz_Low CH512-1850.2



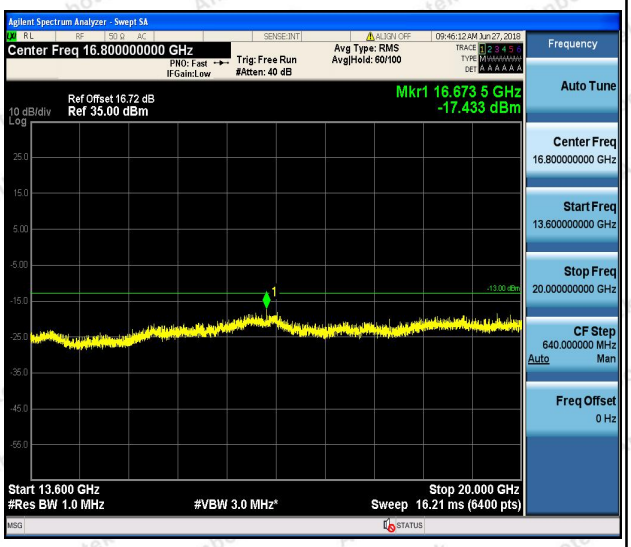
30MHz~1GHz_GPRS_1900MHz_Low CH512-1850.2



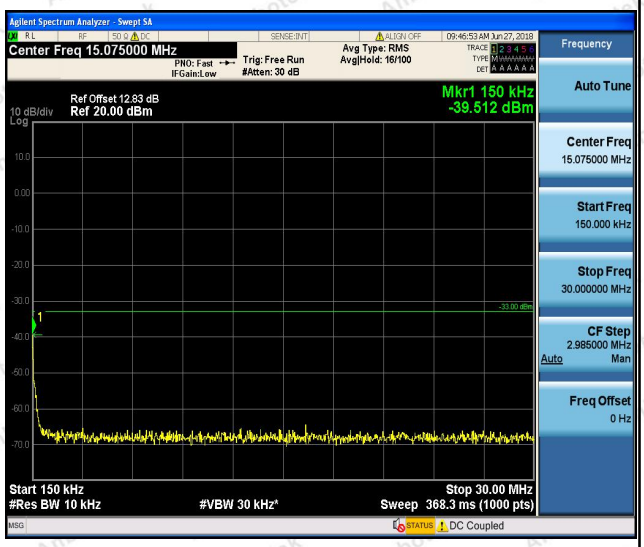
1GHz~7GHz_GPRS_1900MHz_Low CH512-1850.2



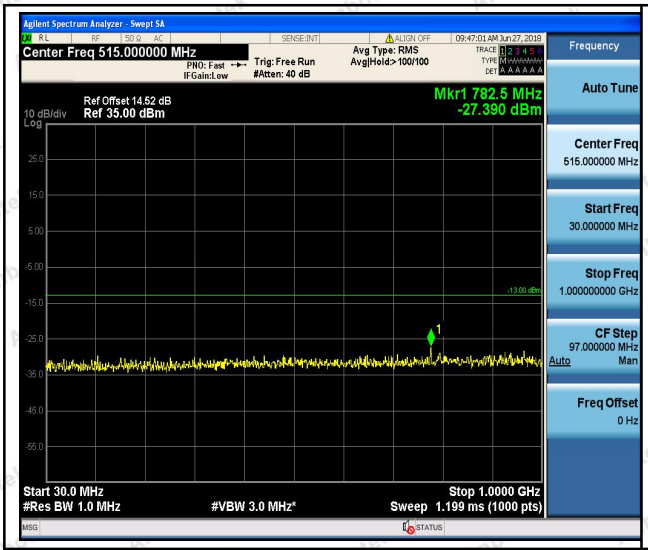
7GHz~13.6GHz_GPRS_1900MHz_Low CH512-1850.2



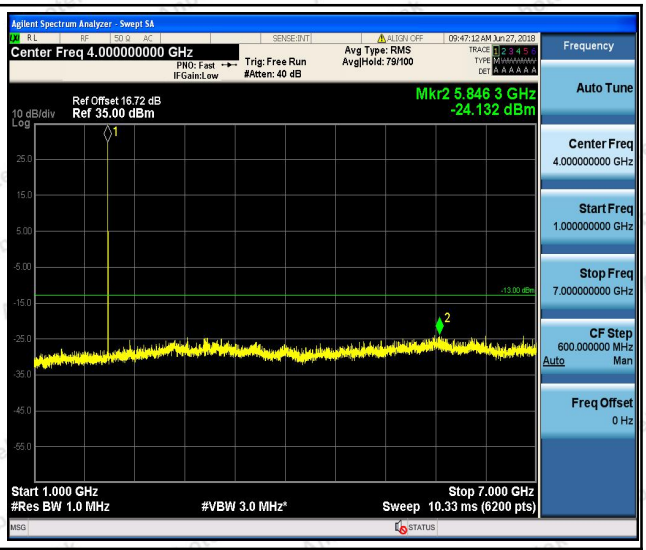
13.6GHz~20GHz_GPRS_1900MHz_Low CH512-1850.2



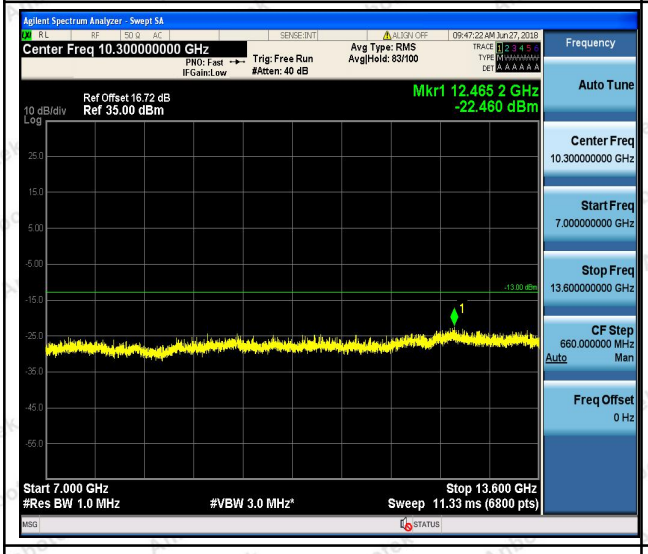
150KHz~30MHz_GPRS_1900MHz_Mid CH661-1880



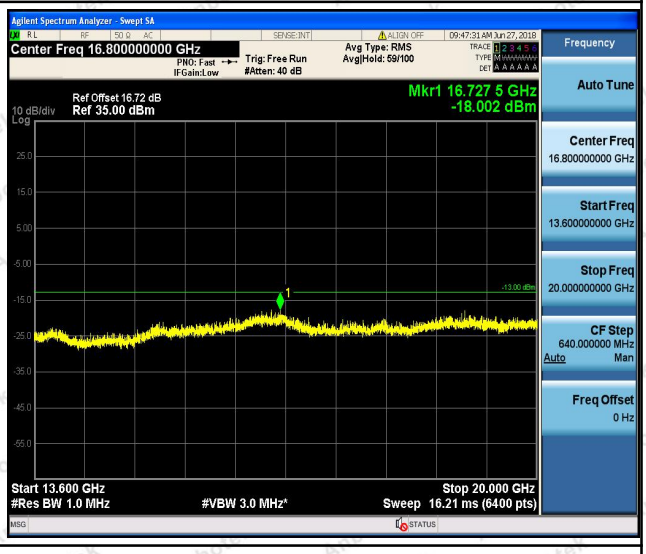
30MHz~1GHz_GPRS_1900MHz_Mid CH661-1880



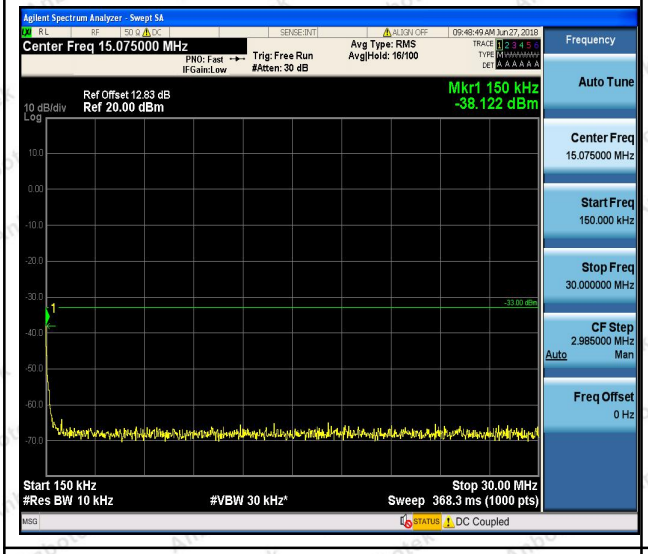
1GHz~7GHz_GPRS_1900MHz_Mid CH661-1880



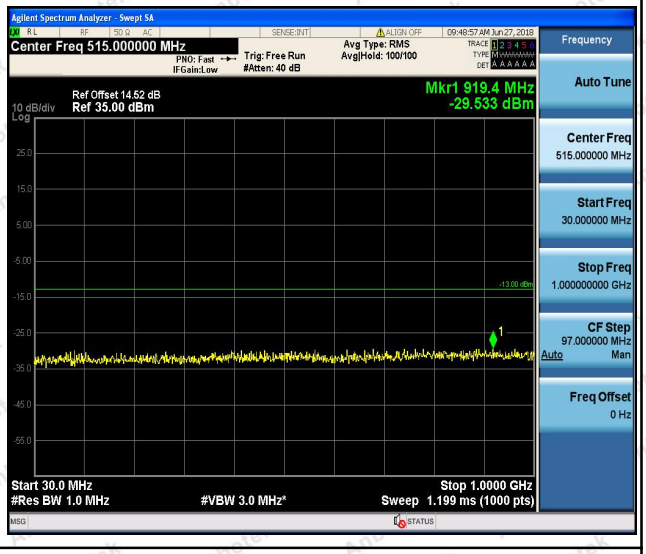
7GHz~13.6GHz_GPRS_1900MHz_Mid CH661-1880



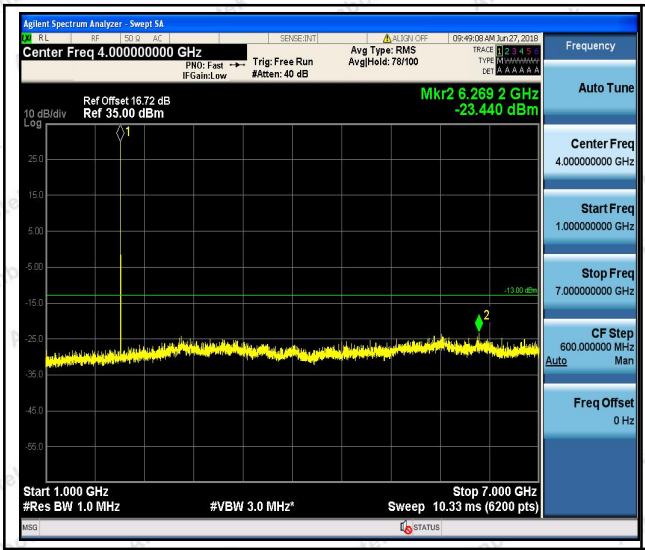
13.6GHz~20GHz_GPRS_1900MHz_Mid CH661-1880



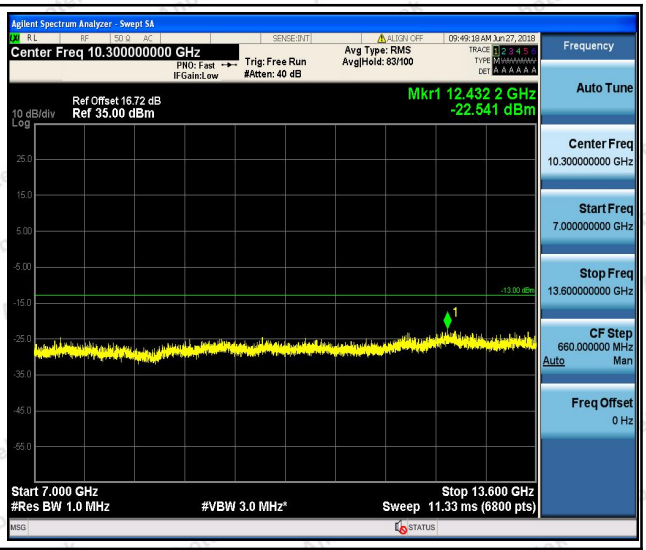
150KHz~30MHz_GPRS_1900MHz_High CH810-1909.8



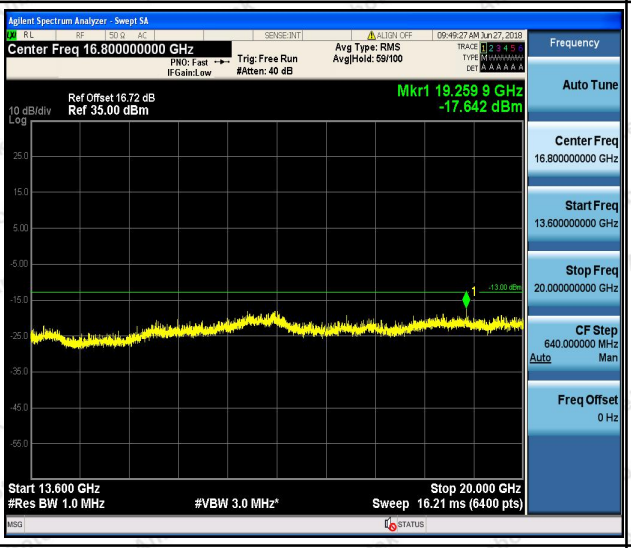
30MHz~1GHz_GPRS_1900MHz_High CH810-1909.8



1GHz~7GHz_GPRS_1900MHz_High CH810-1909.8



7GHz~13.6GHz_GPRS_1900MHz_High CH810-1909.8



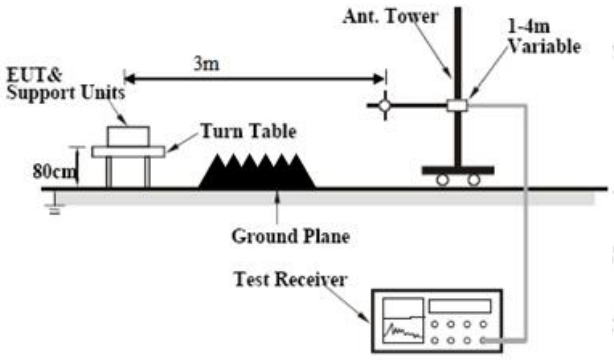
13.6GHz~20GHz_GPRS_1900MHz_High CH810-1909.8

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 (dBμV/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)

8.4. Test Data

Cellular Band (Part 22H) result

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1646.0	-50.76	V	9.76	0.47	-41.47	-13	-28.47
3295.0	-46.15	V	12.75	0.69	-34.09	-13	-21.09
1646.0	-44.27	H	9.76	0.47	-34.98	-13	-21.98
3295.0	-44.10	H	12.75	0.69	-32.04	-13	-19.04

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3346.0	-48.31	V	12.86	0.69	-36.14	-13	-23.14
7528.0	-47.06	V	11.30	1.04	-36.80	-13	-23.80
1671.5	-47.10	H	9.93	0.48	-37.65	-13	-24.65
3346.0	-43.58	H	12.86	0.69	-31.41	-13	-18.41

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3397.0	-49.89	V	12.96	0.69	-37.62	-13	-24.62
7638.5	-49.49	V	11.46	1.07	-39.10	-13	-26.10
1697.0	-48.03	H	10.11	0.48	-38.40	-13	-25.40
3397.0	-46.74	H	12.96	0.69	-34.47	-13	-21.47

PCS Band (Part24E) result

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
7400.5	-35.08	V	11.02	1.02	-25.08	-13	-12.08
9253.5	-37.70	V	11.70	1.14	-27.14	-13	-14.14
7400.5	-35.16	H	11.02	1.02	-25.16	-13	-12.16
9253.5	-42.51	H	11.70	1.14	-31.95	-13	-18.95

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
7519.5	-35.15	V	11.28	1.05	-24.92	-13	-11.92
9398.0	-40.01	V	11.59	1.12	-29.54	-13	-16.54
7519.5	-34.52	H	11.28	1.05	-24.29	-13	-11.29
9398.0	-33.79	H	11.59	1.12	-23.32	-13	-10.32

High channel

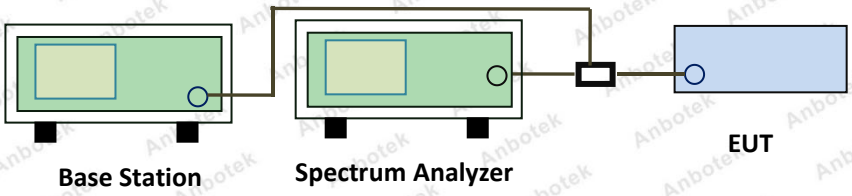
Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
7638.5	-37.78	V	11.46	1.08	-27.40	-13	-14.40
9551.0	-39.87	V	11.85	1.16	-29.18	-13	-16.18
7638.5	-36.67	H	11.46	1.08	-26.29	-13	-13.29
9551.0	-44.18	H	11.85	1.16	-33.49	-13	-20.49

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 appropriateattenuation. 2. For the bandedge: 2G:Set the RBW=5.1KHz, VBW = 10KHz, Sweep time= Auto

9.4. Test Data

Cellular Band (Part 22H) result

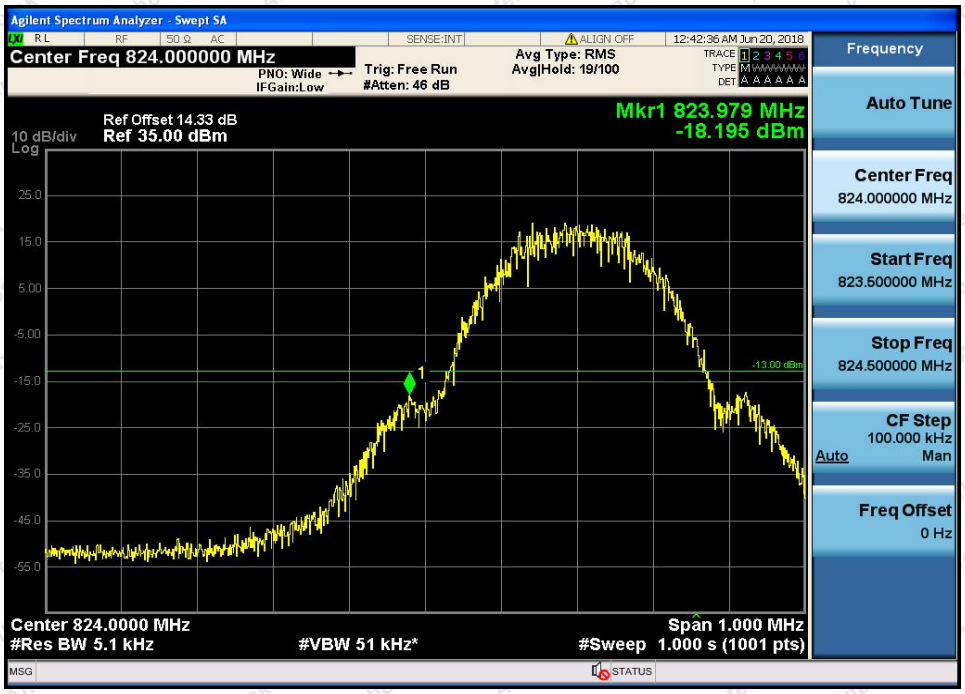
Frequency (MHz)	Emission (dBm)	Limit (dBm)
824	-18.19	-13
849	-17.16	-13

PCS Band (Part24E) result

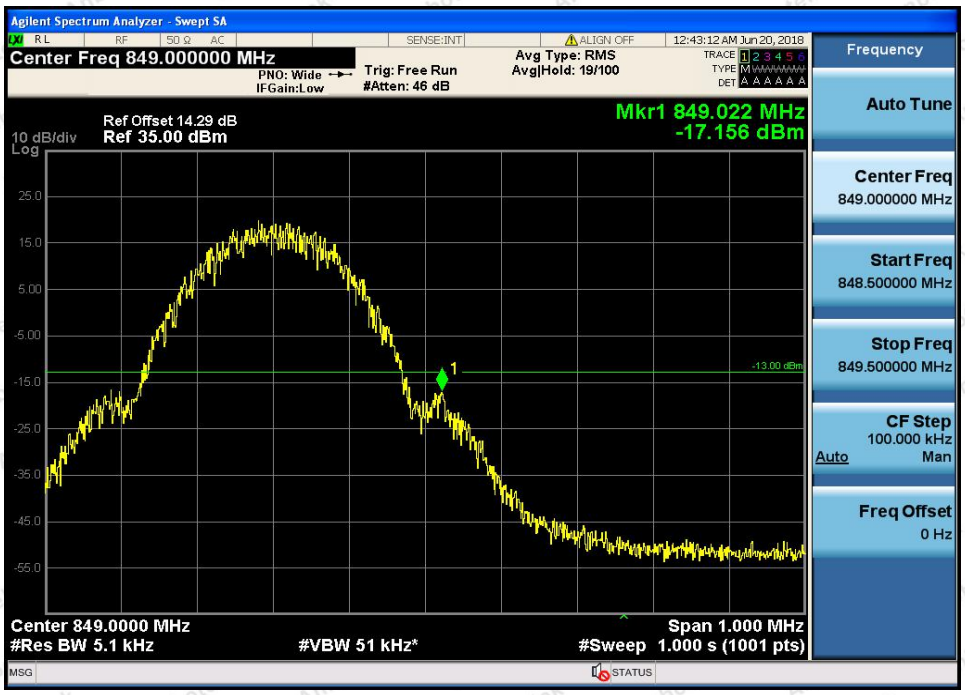
Frequency (MHz)	Emission (dBm)	Limit (dBm)
1850	-19.56	-13
1910	-18.70	-13

Test Plots

Cellular Band (Part 22H) result

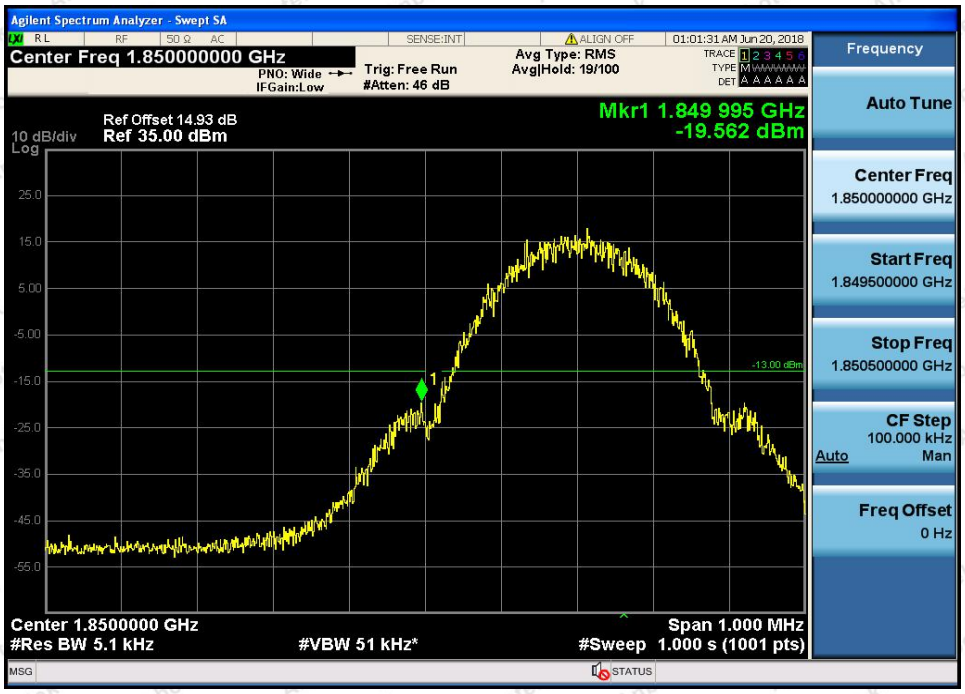


Test Mode: GPRS 850 - Low Channel

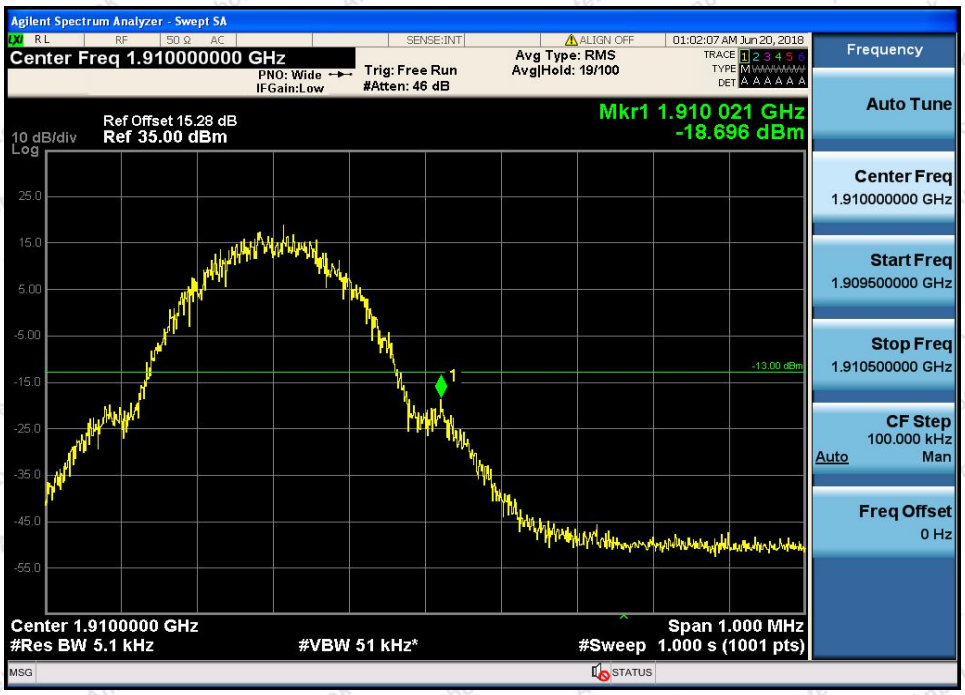


Test Mode: GPRS 850 - High Channel

PCS Band (Part24E) result



Test Mode: GPRS1900 - Low Channel



Test Mode: GPRS1900 - High Channel

10. Frequency Stability

10.1. Test Standard and Limit

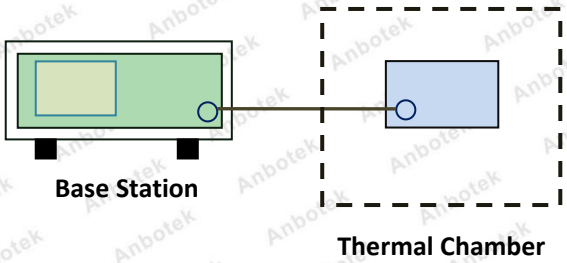
According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

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 ±0.00025% (±2.5ppm) of the center frequency.

10.4. Test Data

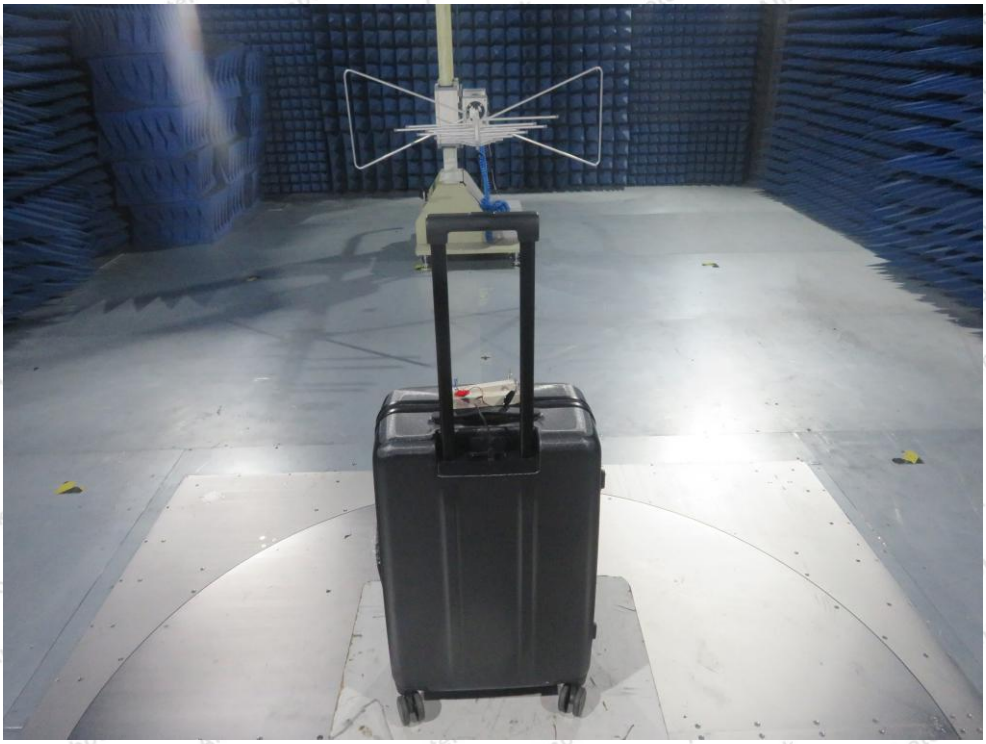
Voltage							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GPRS850	128	VL	TN	15.37	**0.018648**	2.5	PASS
GPRS850	128	VN	TN	14.08	0.017083	2.5	PASS
GPRS850	128	VH	TN	13.82	0.016768	2.5	PASS
GPRS850	190	VL	TN	12.66	0.015133	2.5	PASS
GPRS850	190	VN	TN	13.88	0.016591	2.5	PASS
GPRS850	190	VH	TN	13.24	0.015826	2.5	PASS
GPRS850	251	VL	TN	12.72	0.014986	2.5	PASS
GPRS850	251	VN	TN	11.88	0.013996	2.5	PASS
GPRS850	251	VH	TN	11.04	0.013007	2.5	PASS
GPRS1900	512	VL	TN	5.94	0.003210	2.5	PASS
GPRS1900	512	VN	TN	5.81	0.003140	2.5	PASS
GPRS1900	512	VH	TN	7.04	**0.003805**	2.5	PASS
GPRS1900	661	VL	TN	-1.29	-0.000686	2.5	PASS
GPRS1900	661	VN	TN	-6.65	-0.003537	2.5	PASS
GPRS1900	661	VH	TN	-0.26	-0.000138	2.5	PASS
GPRS1900	810	VL	TN	-3.16	-0.001655	2.5	PASS
GPRS1900	810	VN	TN	-3.42	-0.001791	2.5	PASS
GPRS1900	810	VH	TN	-2.45	-0.001283	2.5	PASS

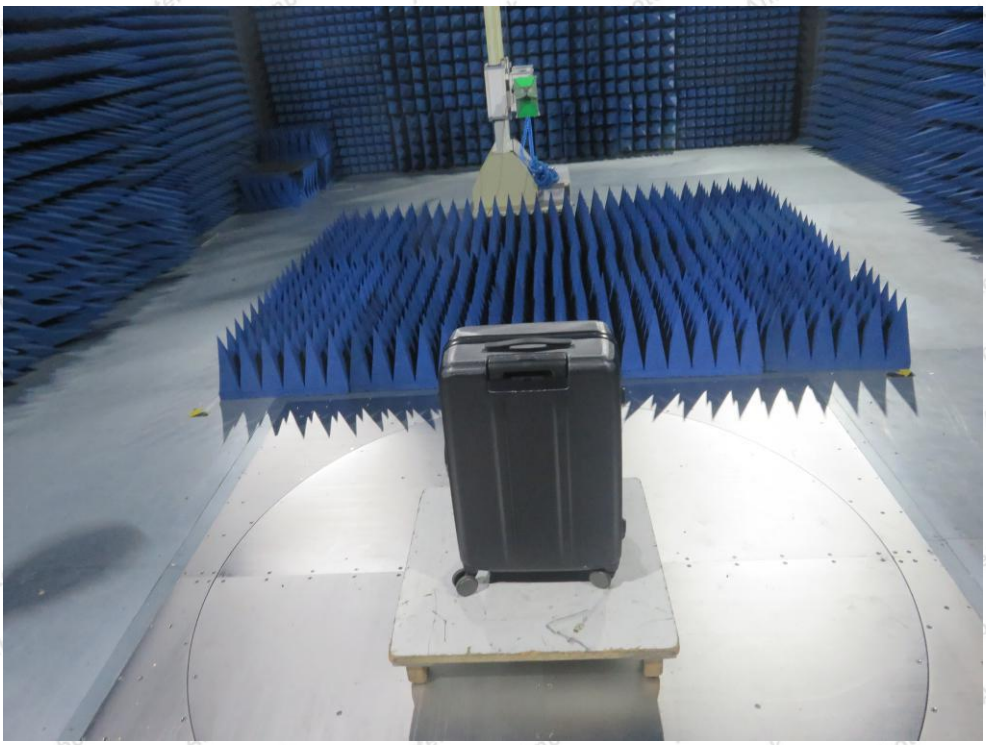
Temperature							
Band	Channel	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GPRS850	128	VN	-30	12.40	0.015045	2.5	PASS
GPRS850	128	VN	-20	12.72	0.015433	2.5	PASS
GPRS850	128	VN	-10	16.47	**0.019983**	2.5	PASS
GPRS850	128	VN	0	11.88	0.014414	2.5	PASS
GPRS850	128	VN	10	11.17	0.013553	2.5	PASS
GPRS850	128	VN	20	13.50	0.016380	2.5	PASS
GPRS850	128	VN	30	13.62	0.016525	2.5	PASS
GPRS850	128	VN	40	11.88	0.014414	2.5	PASS
GPRS850	128	VN	50	11.75	0.014256	2.5	PASS
GPRS850	190	VN	-30	13.56	0.016208	2.5	PASS
GPRS850	190	VN	-20	12.91	0.015432	2.5	PASS
GPRS850	190	VN	-10	11.82	0.014129	2.5	PASS
GPRS850	190	VN	0	13.24	0.015826	2.5	PASS
GPRS850	190	VN	10	15.95	0.019065	2.5	PASS
GPRS850	190	VN	20	15.17	0.018133	2.5	PASS
GPRS850	190	VN	30	12.91	0.015432	2.5	PASS
GPRS850	190	VN	40	11.75	0.014045	2.5	PASS
GPRS850	190	VN	50	13.30	0.015898	2.5	PASS
GPRS850	251	VN	-30	12.66	0.014915	2.5	PASS
GPRS850	251	VN	-20	9.49	0.011180	2.5	PASS
GPRS850	251	VN	-10	10.53	0.012406	2.5	PASS
GPRS850	251	VN	0	10.01	0.011793	2.5	PASS
GPRS850	251	VN	10	12.46	0.014680	2.5	PASS
GPRS850	251	VN	20	12.66	0.014915	2.5	PASS
GPRS850	251	VN	30	10.20	0.012017	2.5	PASS

GPRS850	251	VN	40	10.01	0.011793	2.5	PASS
GPRS850	251	VN	50	14.98	0.017648	2.5	PASS
GPRS1900	512	VN	-30	11.11	**0.006005**	2.5	PASS
GPRS1900	512	VN	-20	6.13	0.003313	2.5	PASS
GPRS1900	512	VN	-10	3.23	0.001746	2.5	PASS
GPRS1900	512	VN	0	6.13	0.003313	2.5	PASS
GPRS1900	512	VN	10	6.84	0.003697	2.5	PASS
GPRS1900	512	VN	20	3.75	0.002027	2.5	PASS
GPRS1900	512	VN	30	7.68	0.004151	2.5	PASS
GPRS1900	512	VN	40	5.94	0.003210	2.5	PASS
GPRS1900	512	VN	50	7.43	0.004016	2.5	PASS
GPRS1900	661	VN	-30	-1.10	-0.000585	2.5	PASS
GPRS1900	661	VN	-20	-0.52	-0.000277	2.5	PASS
GPRS1900	661	VN	-10	0.97	0.000516	2.5	PASS
GPRS1900	661	VN	0	-4.91	-0.002612	2.5	PASS
GPRS1900	661	VN	10	-4.39	-0.002335	2.5	PASS
GPRS1900	661	VN	20	-2.91	-0.001548	2.5	PASS
GPRS1900	661	VN	30	1.42	0.000755	2.5	PASS
GPRS1900	661	VN	40	-1.61	-0.000856	2.5	PASS
GPRS1900	661	VN	50	-1.68	-0.000894	2.5	PASS
GPRS1900	810	VN	-30	-3.62	-0.001895	2.5	PASS
GPRS1900	810	VN	-20	-5.49	-0.002875	2.5	PASS
GPRS1900	810	VN	-10	-3.36	-0.001759	2.5	PASS
GPRS1900	810	VN	0	-2.39	-0.001251	2.5	PASS
GPRS1900	810	VN	10	-5.49	-0.002875	2.5	PASS
GPRS1900	810	VN	20	-7.88	-0.004126	2.5	PASS
GPRS1900	810	VN	30	-3.42	-0.001791	2.5	PASS
GPRS1900	810	VN	40	-1.36	-0.000712	2.5	PASS
GPRS1900	810	VN	50	-7.36	-0.003854	2.5	PASS

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Radiation Emission Test





APPENDIX II -- PHOTOGRAPH

Reference to the test report No. SZAWW180524002-01