

TEST REPORT

Product Name: Pod
FCC ID: 2A2I5-V1
Trademark: SGL Pod. Powered by Sigrow
Model Number: V1
Prepared For: Sigrow B.V.
Address: Nieuwe Kazernelaan 2 D86, 6711 JC Ede, The Netherlands
Manufacturer: Sigrow B.V.
Address: Nieuwe Kazernelaan 2 D86, 6711 JC Ede, The Netherlands
Prepared By: Shenzhen CTB Testing Technology Co., Ltd.
Address: Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China
Sample Received Date: Jun. 10, 2021
Sample tested Date: Jun. 10, 2021 to Jun. 21, 2021
Issue Date: Jun. 21, 2021
Report No.: CTB210622003RFX
Test Standards: FCC Part 22H & 24E
Test Results: PASS
Remark: This is GSM radio test report.

Compiled by:

Arron Liu

Reviewed by:

Bin Mei

Approved by:

Rita Xiao / Director

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

TABLE OF CONTENT

Test Report Declaration	Page
1. VERSION	4
2. TEST SUMMARY	5
3. MEASUREMENT UNCERTAINTY	6
4. PRODUCT INFORMATION AND TEST SETUP	7
4.1 Product Information	7
4.2 Test Setup Configuration	7
4.3 Support Equipment	8
4.4 Channel List	9
4.5 Test Mode	9
4.6 Test Environment	9
5. TEST FACILITY AND TEST INSTRUMENT USED	11
5.1 Test Facility	11
5.2 Test Instrument Used	11
6. RF OUTPUT POWER.....	13
6.1 Standard Applicable	13
6.2 Test Procedure	13
6.3 Environmental Conditions	13
6.4 Summary of Test Results/Plots.....	14
7. PEAK-TO-AVERAGE RATIO(PAR) OF TRANSMITTER.....	17
7.1 Standard Applicable	17
7.2 Test Procedure	17
7.3 Environmental Conditions	17
7.4 Summary of Test Results	18
8. EMISSION BANDWIDTH	20
8.1 Standard Applicable	20
8.2 Test Procedure	20
8.3 Environmental Conditions	20
8.4 Summary of Test Results/Plots.....	21
9. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL	26
9.1 Standard Applicable	26

9.2	Test Procedure	26
9.3	Environmental Conditions	26
9.4	Summary of Test Results/Plots	27
10.	SPURIOUS RADIATED EMISSIONS	35
10.1	Standard Applicable	35
10.2	Test Procedure	35
10.3	Environmental Conditions	35
10.4	Summary of Test Results/Plots	36
11.	FREQUENCY STABILITY	38
11.1	Standard Applicable	38
11.2	Test Procedure	38
11.3	Environmental Conditions	38
11.4	Summary of Test Results/Plots	39
12.	EUT PHOTO	42
13.	EUT TEST PHOTO	43

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB210622003RFX	Jun. 21, 2021	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

FCC Rules	Description of Test Item	Result
§1.1307, §2.1091	RF Exposure	Compliant
§22.913 (a), §24.232 (c)	RF Output Power	Compliant
§24.51	Peak-to-average Ratio(PAR) of Transmitter	Compliant
§22.917 (b), §24.238 (b)	Emission Bandwidth	Compliant
§22.917 (a), §24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§22.917 (a), §24.238 (a)	Spurious Radiation Emissions	Compliant
§22.917 (a), §24.238 (a)	Out of Band Emissions	Compliant
§22.355, §24.235	Frequency Stability	Compliant

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63°C
frequency	1×10^{-7}

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	V1
Model Description:	N/A
Hardware Version:	1.3.6
Software Version:	b43d36d61482534ec136
Operation Frequency:	GPRS/EDGE 850: 824~849MHz GPRS/EDGE 1900: 1850~1910MHz
Max. RF output power:	GSM850: 32.33dBm, GSM1900: 29.63dBm
Type of Modulation:	GMSK, BPSK
Antenna installation:	Internal Antenna
Antenna Gain:	GSM 850: 1dBi GSM 1900: 0dBi
Ratings:	DC 3.7V for battery

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
Note: the transmitter has been tested on the communications mode of GPRS, EDGE compliance test and record the worst case.			

4.5 Test Mode

Test Mode List		
Test Mode	Description	Remark
TM1	GPRS 850	Low, Middle, High Channels
TM2	EDGE 850	Low, Middle, High Channels
TM3	GPRS 1900	Low, Middle, High Channels
TM4	EDGE 1900	Low, Middle, High Channels

4.6 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.7V
Normal Temperature(°C)	25
Low Temperature(°C)	0
High Temperature(°C)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	Sep. 28, 2020	Sep. 28, 2021
2	Power Sensor	Agilent	U2021XA	MY56120032	Sep. 28, 2020	Sep. 28, 2021
3	Power Sensor	Agilent	U2021XA	MY56120034	Sep. 28, 2020	Sep. 28, 2021
4	Communication test set	R&S	CMW500	108058	Sep. 28, 2020	Sep. 28, 2021
5	Spectrum Analyzer	R&S	FSP40	100550	Sep. 28, 2020	Sep. 28, 2021
6	Signal Generator	Agilent	N5181A	MY49060920	Sep. 28, 2020	Sep. 28, 2021
7	Signal Generator	Agilent	N5182A	MY47420195	Sep. 28, 2020	Sep. 28, 2021
8	Communication test set	Agilent	E5515C	MY50102567	Oct. 10, 2020	Oct. 10, 2021
9	band rejection filter	Shenxiang	MSF2400-24 83.5MS-1154	20181015001	Sep. 28, 2020	Sep. 28, 2021
10	band rejection filter	Shenxiang	MSF5150-58 50MS-1155	20181015001	Sep. 28, 2020	Sep. 28, 2021
11	band rejection filter	Xingbo	XBLBQ-DZA 120	190821-1-1	Sep. 28, 2020	Sep. 28, 2021
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	\	\
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	Sep. 28, 2020	Sep. 28, 2021
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	Sep. 28, 2020	Sep. 28, 2021
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	\	\
16	966 chamber	C.R.T.	966 Room	966	Nov. 9, 2019	Nov. 08, 2022
17	Receiver	R&S	ESPI	100362	Sep. 28, 2020	Sep. 28, 2021

18	Amplifier	HP	8447E	2945A02747	Sep. 28, 2020	Sep. 28, 2021
19	Amplifier	Agilent	8449B	3008A01838	Sep. 28, 2020	Sep. 28, 2021
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	Nov. 02, 2020	Nov. 01, 2021
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	Nov. 02, 2020	Nov. 01, 2021
22	Software	Fala	EZ-EMC	FA-03A2 RE	\	\
23	3-Loop Antenna	Daze	ZN30401	17014	Sep. 28, 2020	Sep. 28, 2021
24	loop antenna	ZHINAN	ZN30900A	/	Sep. 28, 2020	Sep. 28, 2021
25	Horn antenna	A/H/System	SAS-574	588	Sep. 28, 2020	Sep. 28, 2021
26	Amplifier	AEROFLEX	/	S/N/ 097	Sep. 28, 2020	Sep. 28, 2021

6. RF OUTPUT POWER

6.1 Standard Applicable

According to §22.913(a)(2), The ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232 (c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

6.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
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. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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.

6.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.4 Summary of Test Results/Plots

Max. Radiated Power

ERP For GPRS Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	33.07	1.5	0	H	1.5	0	31.57	38.45
824.2	33.07	1.5	0	V	1.5	0	31.57	38.45
Middle Channel								
836.6	32.47	1.5	0	H	1.5	0	30.97	38.45
836.6	33.31	1.5	0	V	1.5	0	31.81	38.45
High Channel								
848.8	33.46	1.5	0	H	1.5	0	31.96	38.45
848.8	32.98	1.5	0	V	1.5	0	31.48	38.45

EIRP For GPRS Mode PCS1900

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1850.2	21.86	1.50	0.00	H	1.90	7.70	27.66	33.00
1850.2	21.37	1.50	0.00	V	1.90	7.70	27.17	33.00
Middle Channel								
1880.0	20.89	1.5	0	H	1.9	7.7	26.69	33.00
1880.0	20.04	1.5	0	V	1.9	7.7	25.84	33.00
High Channel								
1909.8	21.86	1.50	0.00	H	1.90	7.70	27.66	33.00
1909.8	21.37	1.50	0.00	V	1.90	7.70	27.17	33.00

ERP For EDGE Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	20.66	1.5	0	H	1.5	0	19.16	38.45
824.2	20.60	1.5	0	V	1.5	0	19.10	38.45
Middle Channel								
836.6	21.97	1.5	0	H	1.5	0	20.47	38.45
836.6	22.15	1.5	0	V	1.5	0	20.65	38.45
High Channel								
848.8	20.84	1.5	0	H	1.5	0	19.34	38.45
848.8	21.10	1.5	0	V	1.5	0	19.60	38.45

EIRP For EDGE Mode PCS1900

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1850.2	18.90	1.50	0.00	H	1.90	7.70	24.70	33.00
1850.2	19.84	1.50	0.00	V	1.90	7.70	25.64	33.00
Middle Channel								
1880.0	18.83	1.50	0.00	H	1.90	7.70	24.63	33.00
1880.0	19.03	1.50	0.00	V	1.90	7.70	24.83	33.00
High Channel								
1909.8	18.74	1.50	0.00	H	1.90	7.70	24.54	33.00
1909.8	19.14	1.50	0.00	V	1.90	7.70	24.94	33.00

Max. Conducted Output Power

For Cellular Band (GSM850)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
GPRS(1 Slot)	Low Channel	824.2	32.17	38.45
	Middle Channel	836.6	32.17	38.45
	High Channel	848.8	32.33	38.45
EDGE(1 Slot)	Low Channel	824.2	26.44	38.45
	Middle Channel	836.6	26.51	38.45
	High Channel	848.8	26.24	38.45

For PCS Band (GSM1900)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
GPRS(1 Slot)	Low Channel	1850.2	29.46	33.0
	Middle Channel	1880.0	29.63	33.0
	High Channel	1909.8	29.47	33.0
EDGE(1 Slot)	Low Channel	1850.2	24.97	33.0
	Middle Channel	1880.0	25.23	33.0
	High Channel	1909.8	24.99	33.0

7. PEAK-TO-AVERAGE RATIO(PAR) OF TRANSMITTER

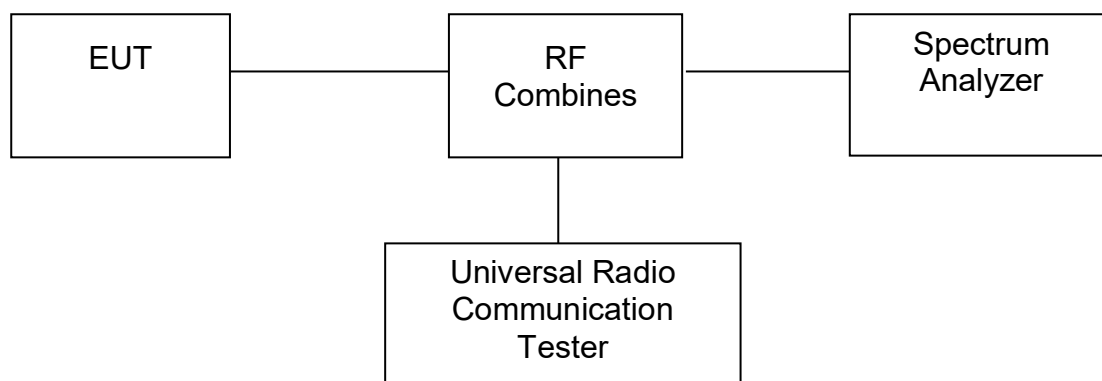
7.1 Standard Applicable

According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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.

7.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAPR level associated with a probability of 0.1%.

Test Configuration for the emission bandwidth testing:



7.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

7.4 Summary of Test Results

Only the worst case was selected to record

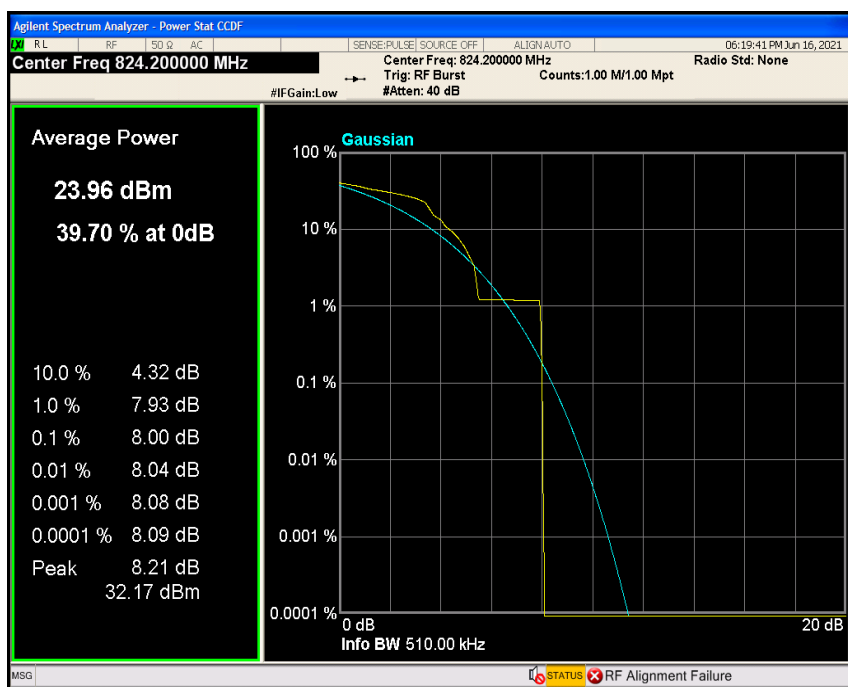
For GSM850

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GPRS(1 Slot)	128	824.2	8.004	13
EDGE(1 Slot)	128	824.2	7.962	13

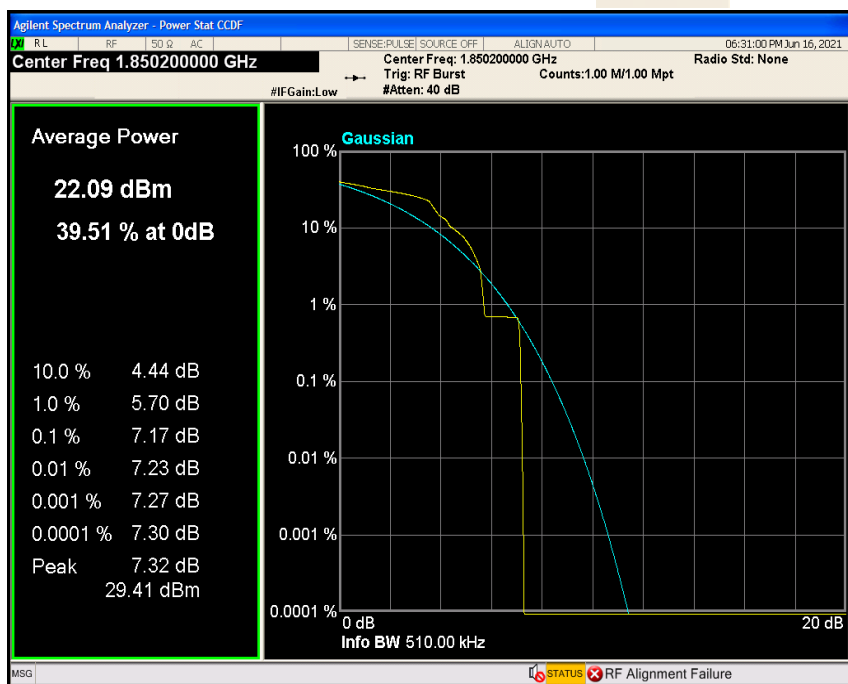
For PCS 1900

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GPRS(1 Slot)	251	1850.2	7.174	13
EDGE(1 Slot)	251	1850.2	7.063	13

GSM 900:



PCS 1800



8. EMISSION BANDWIDTH

8.1 Standard Applicable

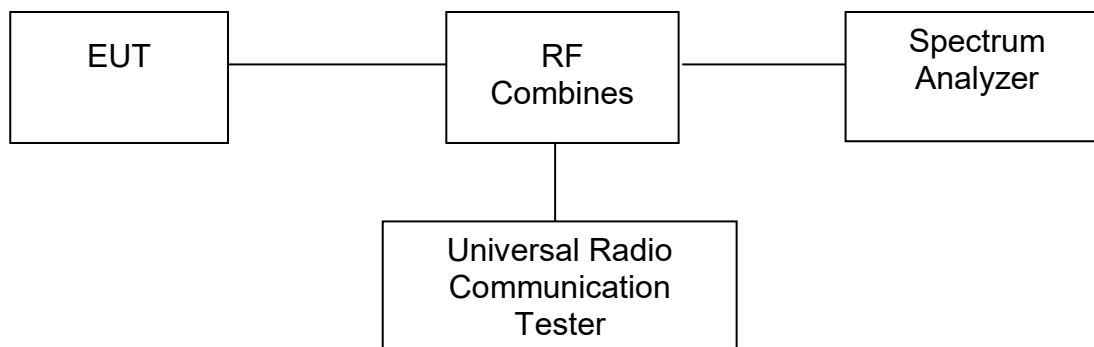
According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



8.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

8.4 Summary of Test Results/Plots

For Cellular Band

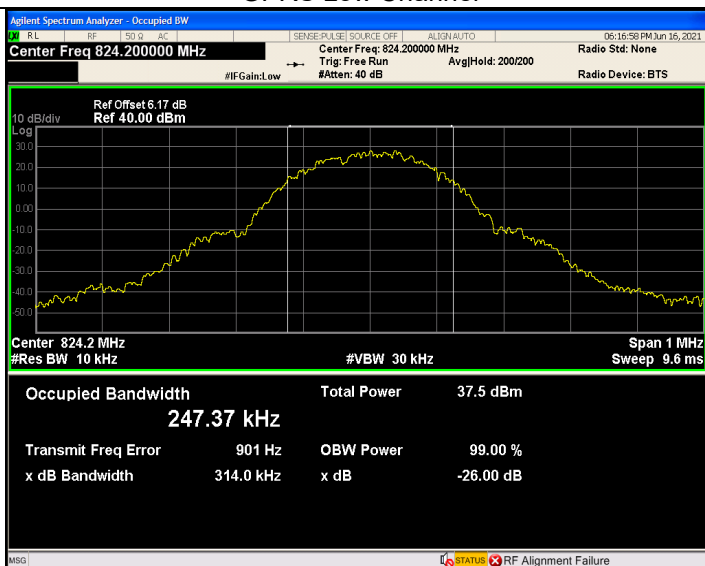
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS	128	824.2	247.369	314.035
	190	836.6	251.640	328.674
	251	848.8	241.753	304.360
EDGE	128	824.2	241.621	315.559
	190	836.6	236.646	287.728
	251	848.8	258.412	314.927

For PCS Band

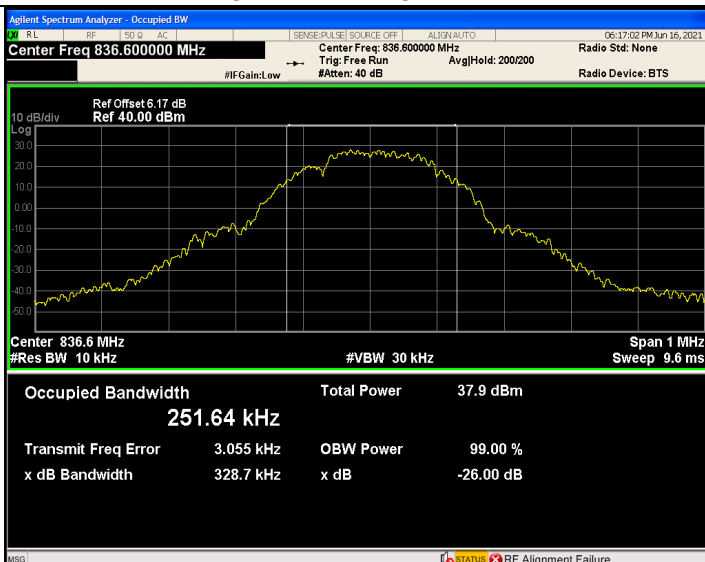
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS	512	1850.2	242.694	316.552
	661	1880.0	248.484	314.235
	810	1909.8	241.692	319.544
EDGE	512	1850.2	247.009	322.253
	661	1880.0	243.244	301.376
	810	1909.8	236.560	309.868

For Cellular Band

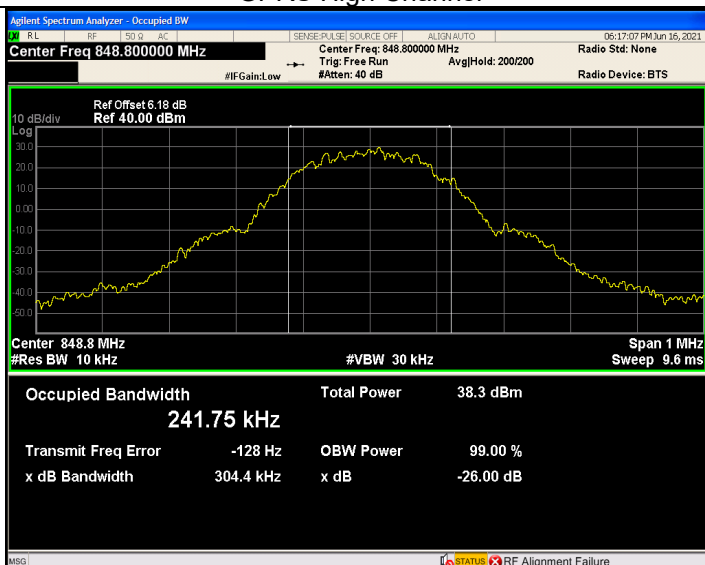
GPRS Low Channel



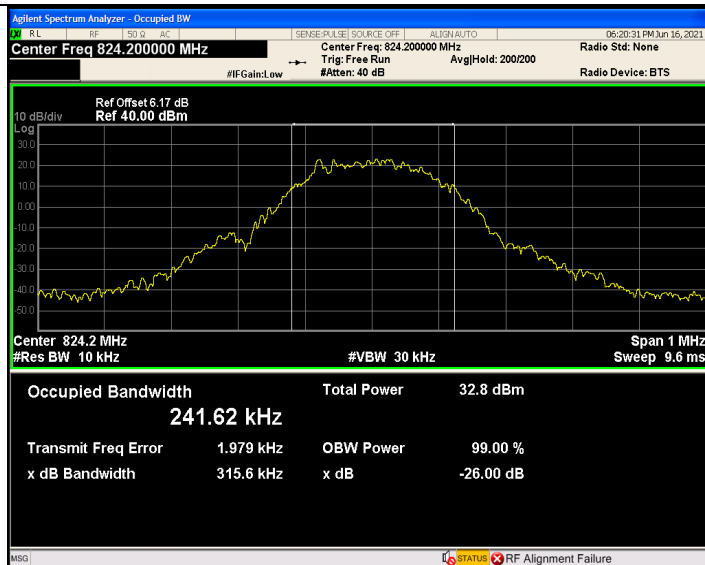
GPRS Middle Channel



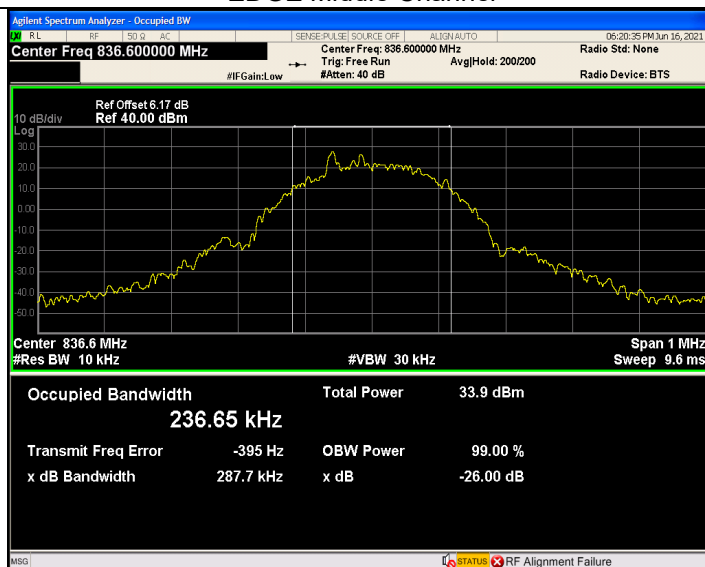
GPRS High Channel



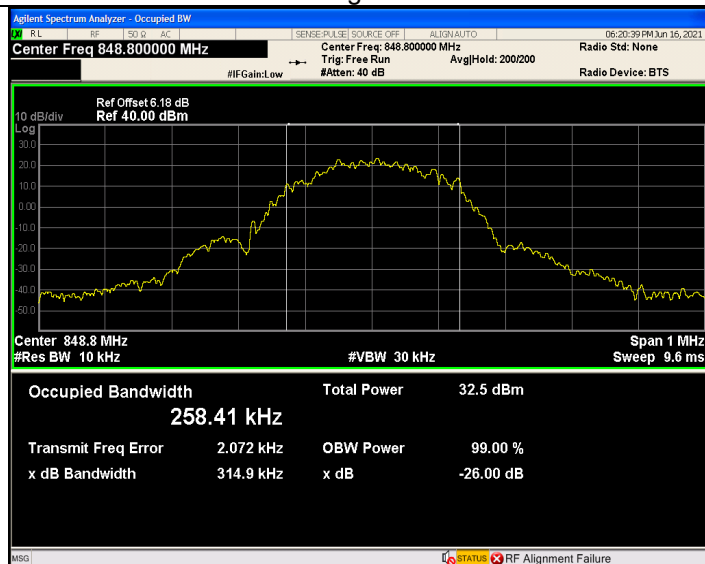
EDGE Low Channel



EDGE Middle Channel

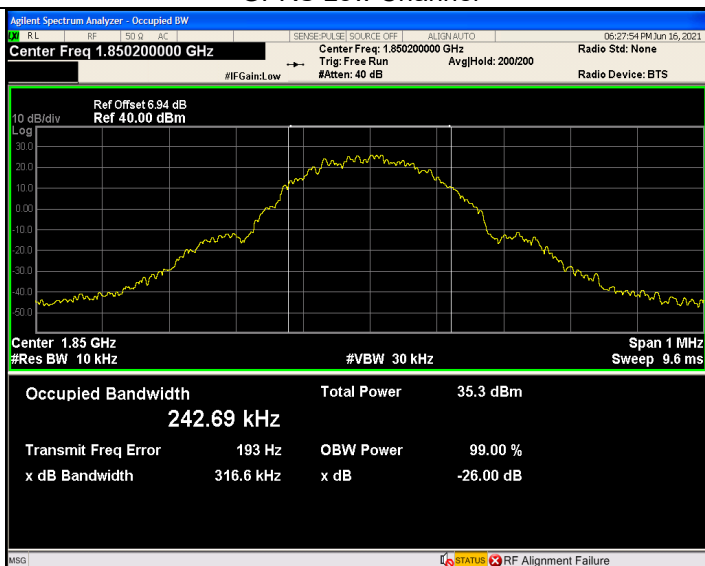


EDGE High Channel

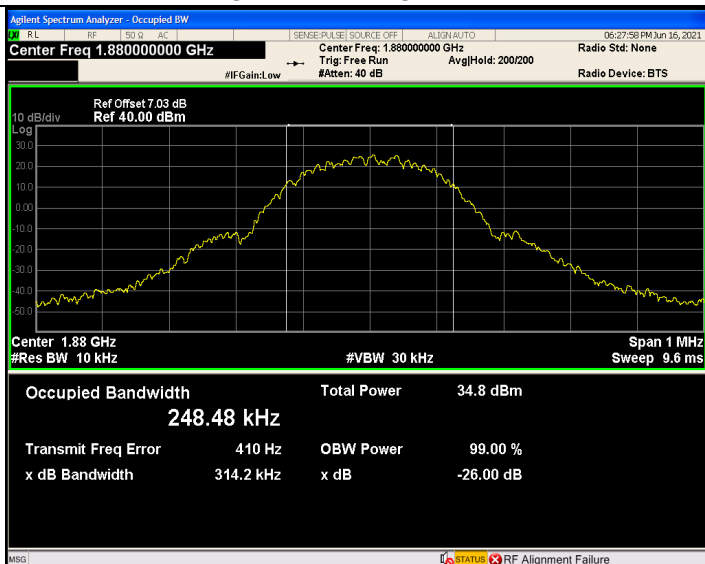


For PCS Band

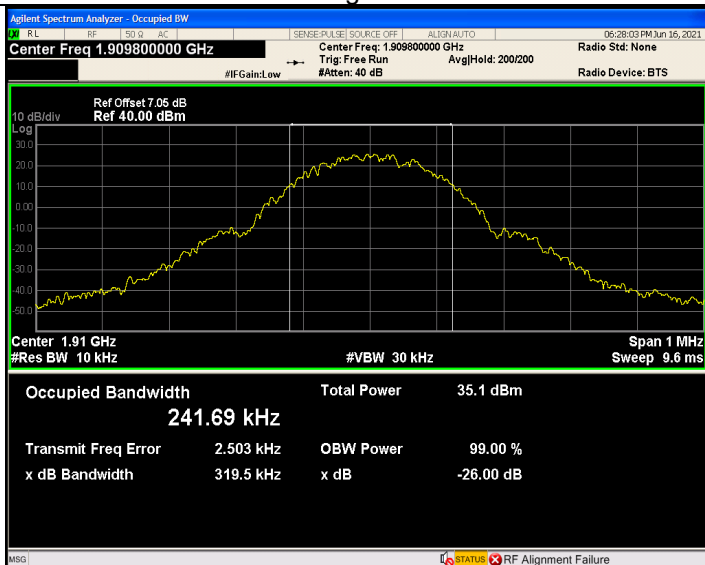
GPRS Low Channel



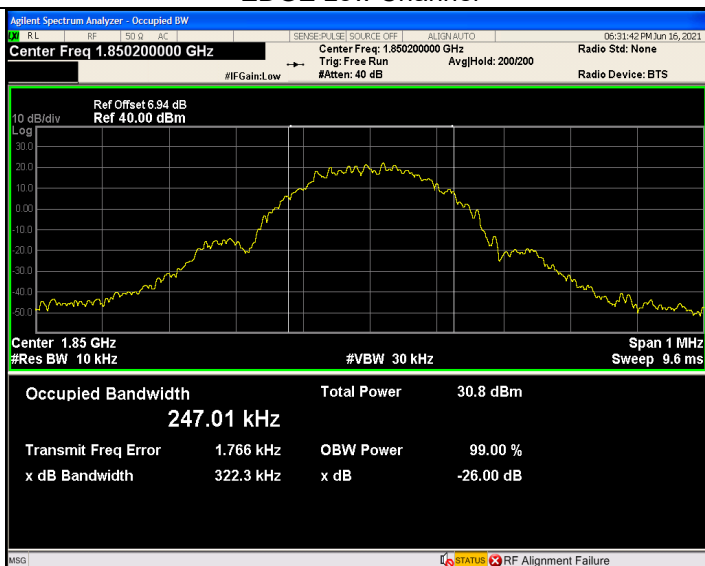
GPRS Middle Channel



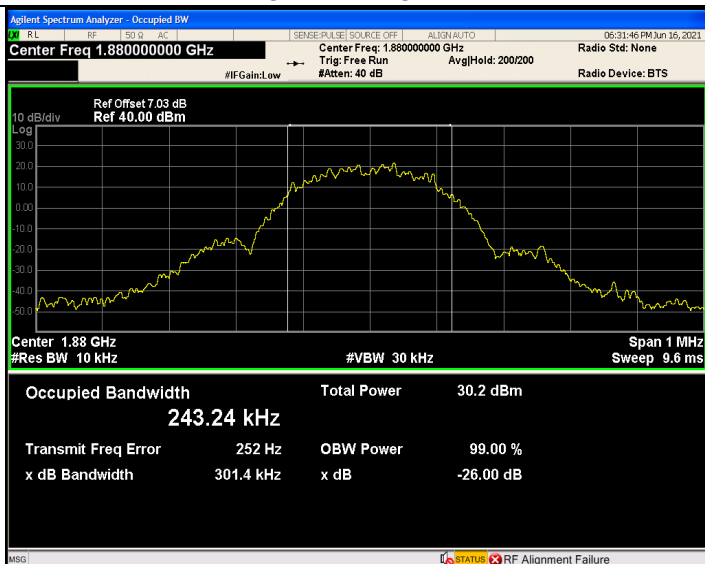
GPRS High Channel



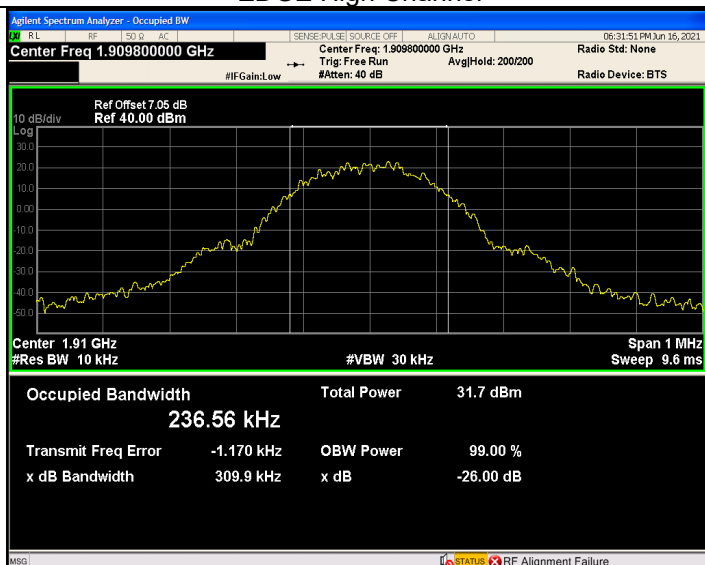
EDGE Low Channel



EDGE Middle Channel



EDGE High Channel



9. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

9.1 Standard Applicable

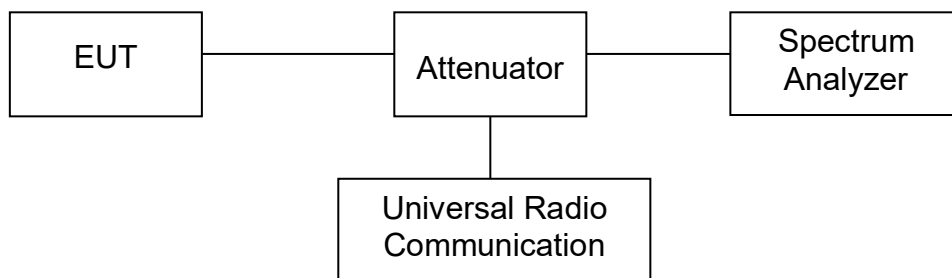
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), the power of any emissions 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.

9.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



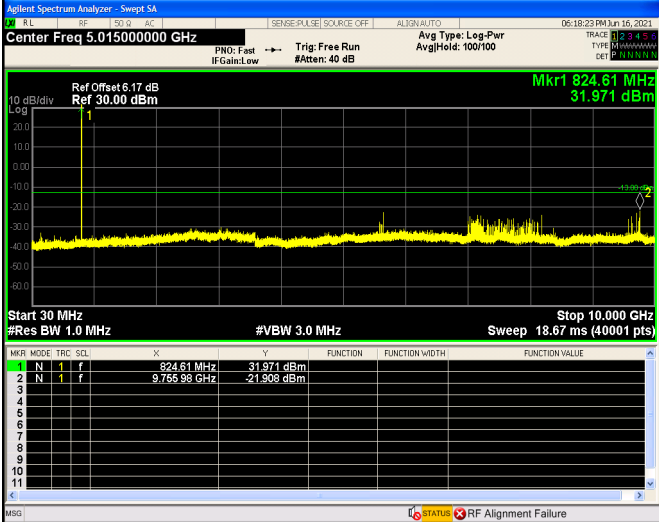
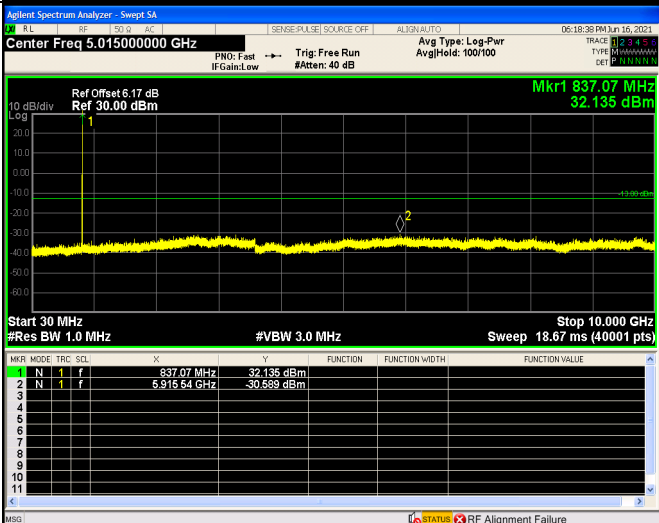
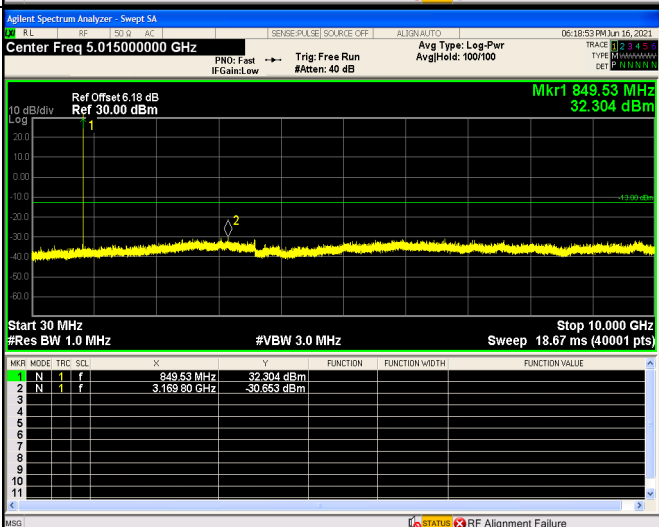
9.3 Environmental Conditions

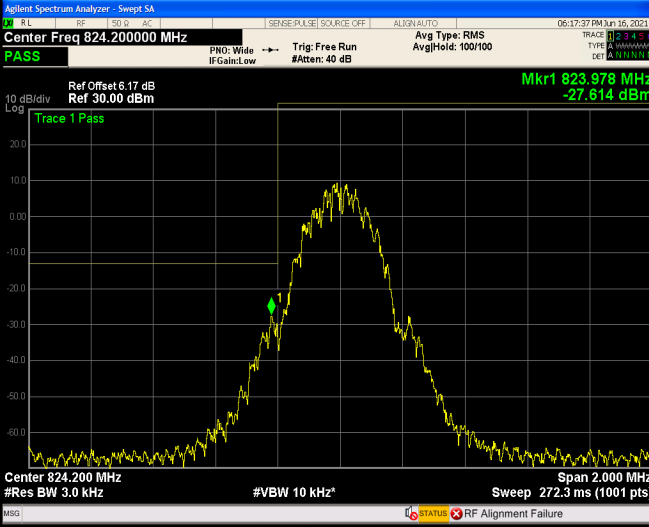
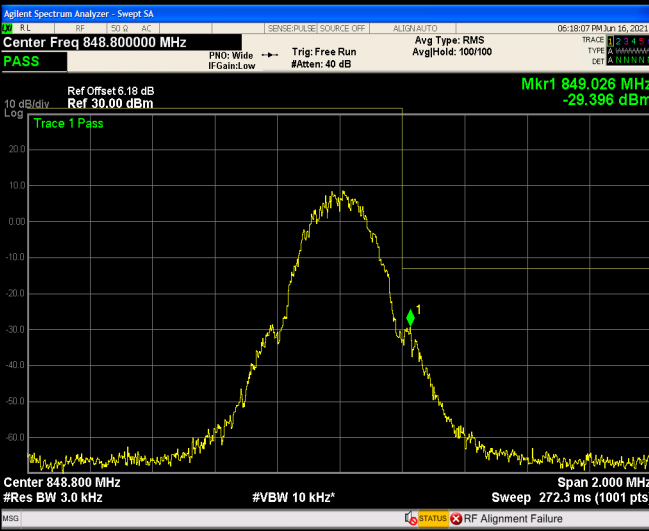
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

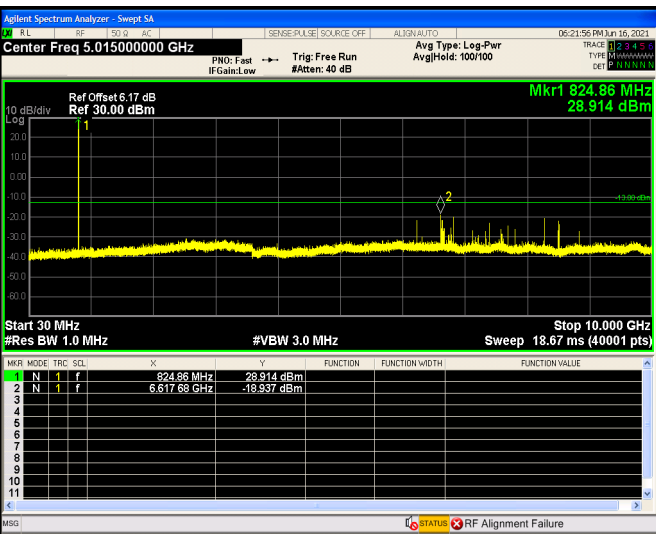
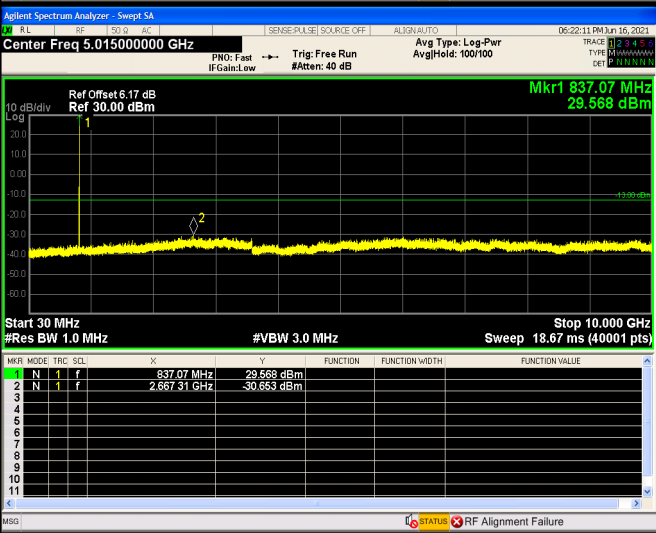
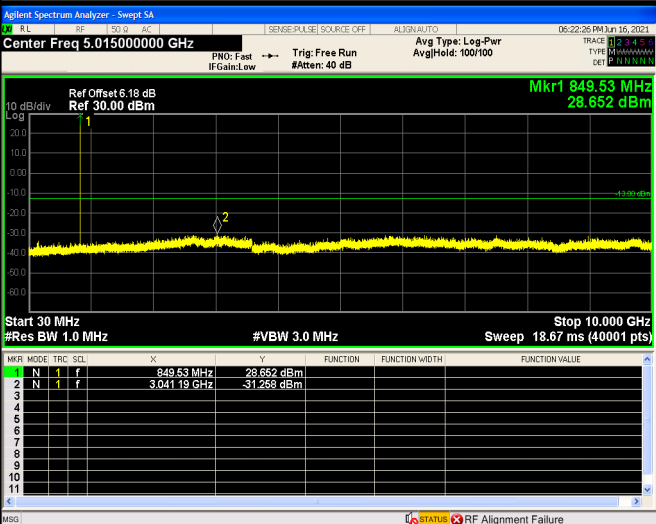
9.4 Summary of Test Results/Plots

Please refer to the following test plots

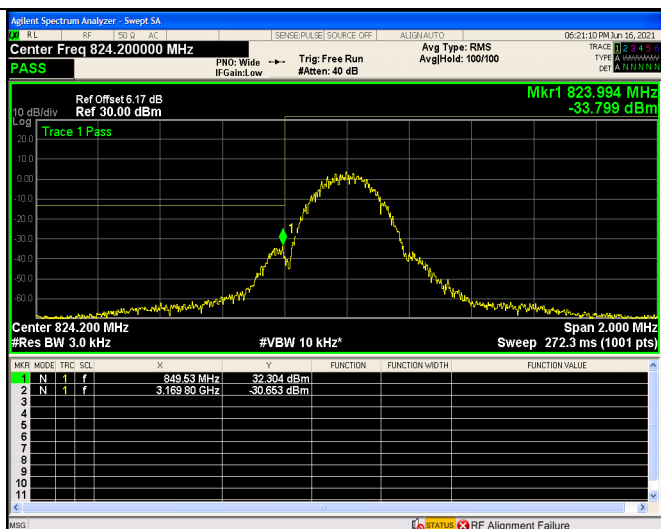
For Cellular Band

GPRS Low Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 5.17 dB Ref 30.00 dBm Mkr1 824.61 MHz 31.971 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>824.61 MHz</td><td>31.971 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>9.755 98 GHz</td><td>-21.908 dBm</td><td></td><td></td><td></td></tr></table> STATUS RF Alignment Failure	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	824.61 MHz	31.971 dBm				2	N	1	f	9.755 98 GHz	-21.908 dBm			
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	824.61 MHz	31.971 dBm																							
2	N	1	f	9.755 98 GHz	-21.908 dBm																							
GPRS Middle Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 5.17 dB Ref 30.00 dBm Mkr1 837.07 MHz 32.135 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>837.07 MHz</td><td>32.135 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>5.915 54 GHz</td><td>-30.589 dBm</td><td></td><td></td><td></td></tr></table> STATUS RF Alignment Failure	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	837.07 MHz	32.135 dBm				2	N	1	f	5.915 54 GHz	-30.589 dBm			
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	837.07 MHz	32.135 dBm																							
2	N	1	f	5.915 54 GHz	-30.589 dBm																							
GPRS High Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 5.18 dB Ref 30.00 dBm Mkr1 849.53 MHz 32.304 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>849.53 MHz</td><td>32.304 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>3.169 80 GHz</td><td>-30.653 dBm</td><td></td><td></td><td></td></tr></table> STATUS RF Alignment Failure	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	849.53 MHz	32.304 dBm				2	N	1	f	3.169 80 GHz	-30.653 dBm			
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	849.53 MHz	32.304 dBm																							
2	N	1	f	3.169 80 GHz	-30.653 dBm																							

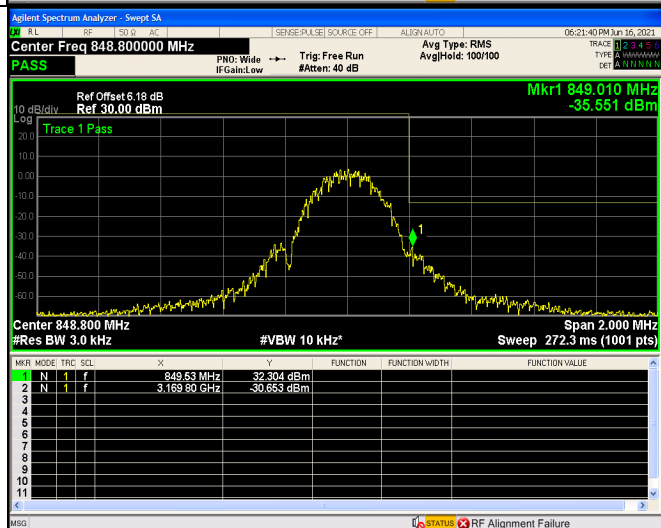
GPRS Low Band Emission			
GPRS High Band Emission			

EDGE Low Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 824.86 MHz 28.914 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>824.86 MHz</td><td>28.914 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>6.617 68 GHz</td><td>-18.937 dBm</td><td></td><td></td><td></td></tr></table> MSG: RF Alignment Failure	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	824.86 MHz	28.914 dBm				2	N	1	f	6.617 68 GHz	-18.937 dBm			
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	824.86 MHz	28.914 dBm																							
2	N	1	f	6.617 68 GHz	-18.937 dBm																							
EDGE Middle Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 837.07 MHz 29.568 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>837.07 MHz</td><td>29.568 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.667 31 GHz</td><td>-30.653 dBm</td><td></td><td></td><td></td></tr></table> MSG: RF Alignment Failure	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	837.07 MHz	29.568 dBm				2	N	1	f	2.667 31 GHz	-30.653 dBm			
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	837.07 MHz	29.568 dBm																							
2	N	1	f	2.667 31 GHz	-30.653 dBm																							
EDGE High Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.18 dB Ref 30.00 dBm Mkr1 849.53 MHz 28.652 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>849.53 MHz</td><td>28.652 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>3.041 19 GHz</td><td>-31.268 dBm</td><td></td><td></td><td></td></tr></table> MSG: RF Alignment Failure	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	849.53 MHz	28.652 dBm				2	N	1	f	3.041 19 GHz	-31.268 dBm			
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	849.53 MHz	28.652 dBm																							
2	N	1	f	3.041 19 GHz	-31.268 dBm																							

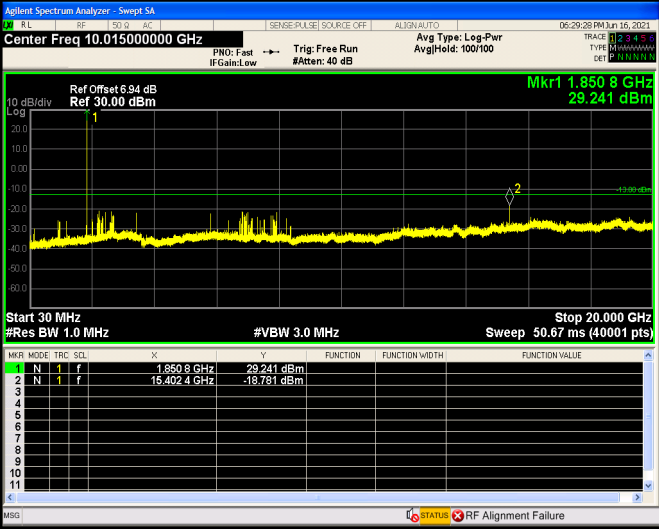
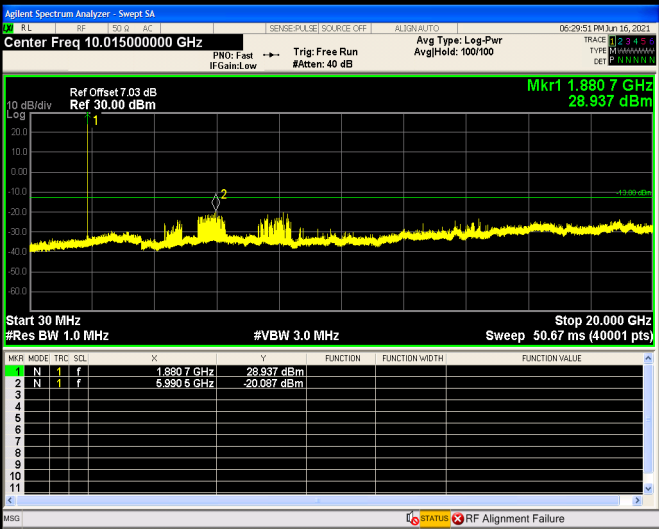
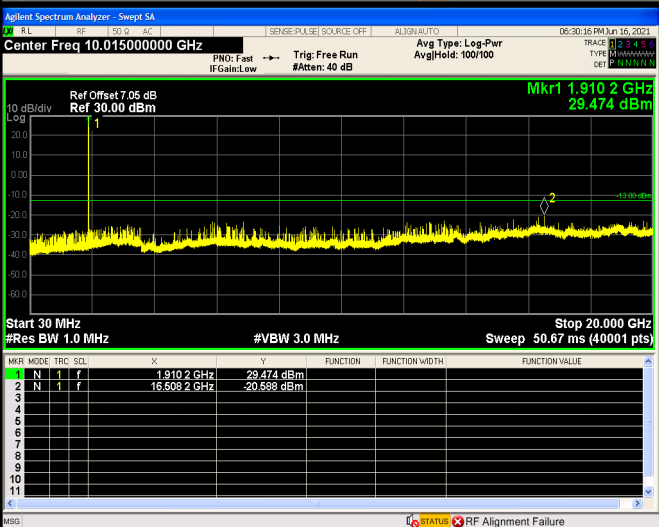
EDGE
Low
Band
Emission

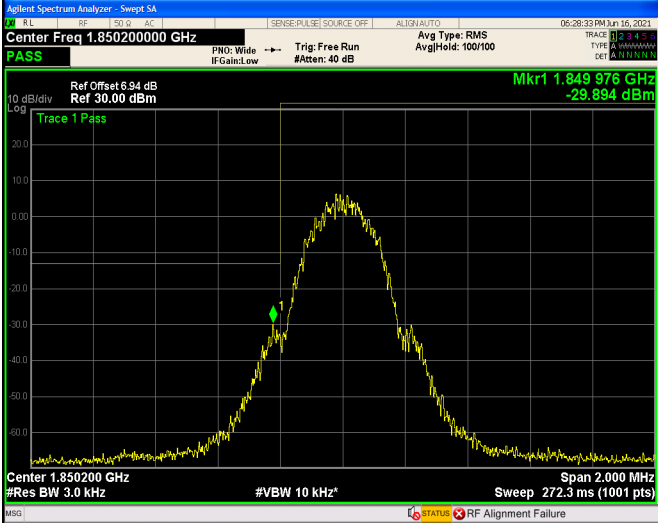
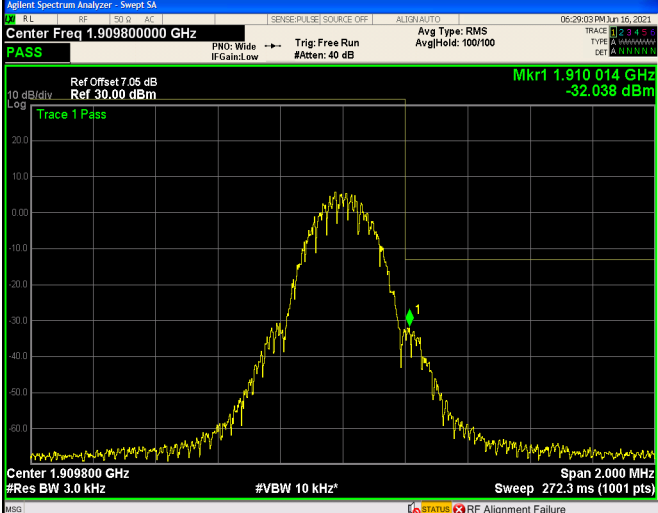


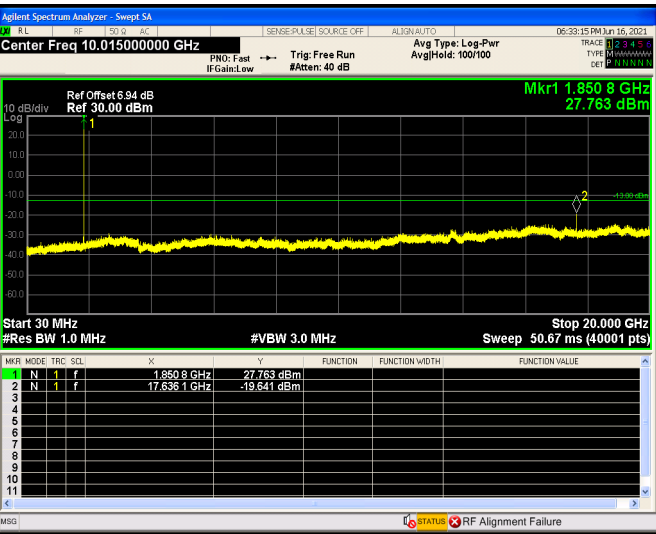
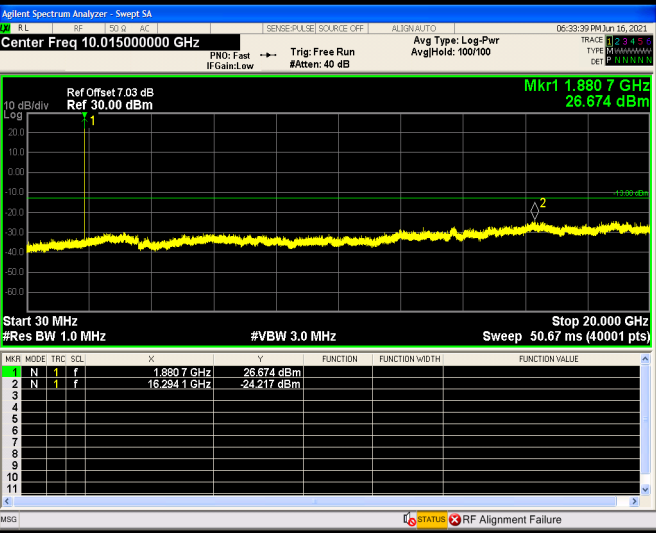
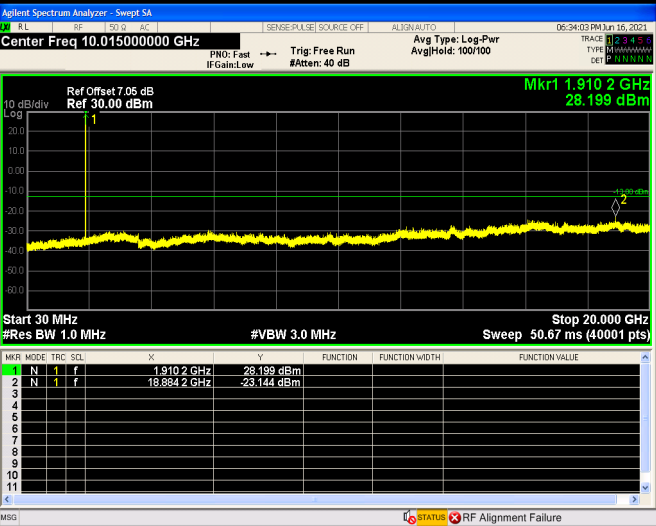
EDGE
High
Band
Emission



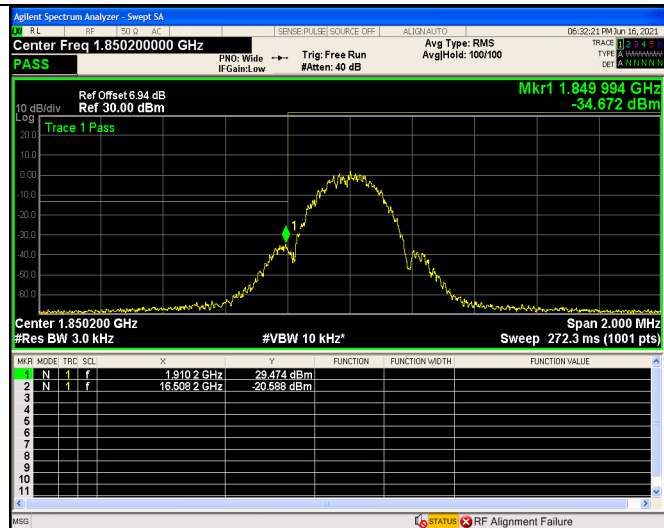
For PCS Band

GPRS Low Channel		
GPRS Middle Channel		
GPRS High Channel		

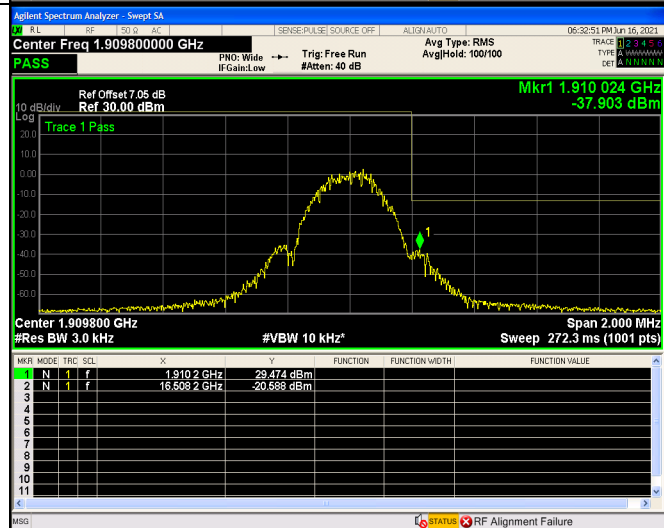
GPRS Low Band Emission		 Agilent Spectrum Analyzer - Sweep SA Center Freq 1.85020000 GHz Ref Offset 6.94 dB Ref 30.00 dBm Mkr1 1.849 976 GHz -29.894 dBm Trace 1 Pass Center 1.850200 GHz #Res BW 3.0 kHz #VBW 10 kHz* Span 2.000 MHz Sweep 272.3 ms (1001 pts) STATUS RF Alignment Failure	
GPRS High Band Emission		 Agilent Spectrum Analyzer - Sweep SA Center Freq 1.90980000 GHz Ref Offset 7.05 dB Ref 30.00 dBm Mkr1 1.910 014 GHz -32.038 dBm Trace 1 Pass Center 1.909800 GHz #Res BW 3.0 kHz #VBW 10 kHz* Span 2.000 MHz Sweep 272.3 ms (1001 pts) STATUS RF Alignment Failure	

EDGE Low Channel		
EDGE Middle Channel		
EDGE High Channel		

EDGE
Low
Band
Emission



EDGE
High
Band
Emission



10. SPURIOUS RADIATED EMISSIONS

10.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

10.2 Test Procedure

- 1.The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
- 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.The frequency range up to tenth harmonic of the fundamental frequency was investigated.
- 4.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 attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

10.3 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	54%
ATM Pressure:	101 kPa
Test Voltage	DC3.7V

10.4 Summary of Test Results/Plots

According to the data below, the FCC Part22.917 and 24.238 standards, and had the worst margin of:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

All test modes are performed, but only the worst case is recorded in this report.

For Cellular Band GSM850 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (824.2MHz)						
46.34	-68.24	4.48	-63.76	-13	-50.76	H
1648.4	-53.15	5.33	-47.82	-13	-34.82	H
2472.6	-51.84	7.77	-44.07	-13	-31.07	H
46.34	-67.96	4.84	-63.12	-13	-50.12	V
1648.4	-58.20	5.21	-53.00	-13	-40.00	V
2472.6	-50.94	7.80	-43.14	-13	-30.14	V
Middle Channel (836.6MHz)						
46.34	-68.61	4.34	-64.27	-13.00	-51.27	H
1673.2	-54.16	5.11	-49.05	-13.00	-36.05	H
2509.8	-52.93	8.54	-44.39	-13.00	-31.39	H
46.34	-68.72	4.34	-64.38	-13.00	-51.38	V
1673.2	-50.38	5.11	-45.27	-13.00	-32.27	V
2509.8	-50.99	8.54	-42.45	-13.00	-29.45	V
High Channel (848.8MHz)						
46.34	-68.24	4.48	-63.76	-13	-50.76	H
1697.6	-53.15	5.33	-47.82	-13	-34.82	H
2546.4	-51.84	7.77	-44.07	-13	-31.07	H
46.34	-67.96	4.84	-63.12	-13	-50.12	V
1697.6	-58.20	5.21	-53.00	-13	-40.00	V
2546.4	-50.94	7.80	-43.14	-13	-30.14	V

For PCS Band GSM1900 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1850.2MHz)						
46.34	-67.89	3.40	-64.49	-13	-51.49	H
3700.4	-52.82	10.09	-42.73	-13	-29.73	H
5550.6	-54.77	12.14	-42.63	-13	-29.63	H
46.34	-68.01	3.77	-64.24	-13	-51.24	V
3700.4	-52.67	10.46	-42.21	-13	-29.21	V
5550.6	-55.85	13.46	-42.39	-13	-29.39	V
Middle Channel (1880MHz)						
46.34	-68.81	4.34	-64.47	-13.00	-51.47	H
3760.0	-51.45	10.64	-40.81	-13.00	-27.81	H
5640.0	-56.51	13.54	-42.97	-13.00	-29.97	H
46.34	-69.14	4.34	-64.80	-13.00	-51.80	V
3760.0	-51.32	10.64	-40.68	-13.00	-27.68	V
5640.0	-56.14	13.54	-42.6	-13.00	-29.60	V
High Channel (1909.8MHz)						
46.34	-67.90	3.02	-64.87	-13	-51.87	H
3819.6	-53.26	10.09	-43.17	-13	-30.17	H
5729.4	-54.96	12.13	-42.83	-13	-29.83	H
46.34	-67.97	3.50	-64.46	-13	-51.46	V
3819.6	-52.64	10.52	-42.12	-13	-29.12	V
5729.4	-55.03	13.70	-41.33	-13	-28.33	V

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

11. FREQUENCY STABILITY

11.1 Standard Applicable

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 Cellular Band

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 emission stays within the authorized frequency block.

According to §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

11.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

11.3 Environmental Conditions

Temperature:	26°C
Relative Humidity:	54%
ATM Pressure:	101kPa

11.4 Summary of Test Results/Plots

For Cellular Band GPRS Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	28.57	0.0342
40	NV	28.63	0.0342
30	NV	28.65	0.0342
20	NV	28.55	0.0341
10	NV	28.56	0.0341
0	NV	28.54	0.0341
-10	NV	28.53	0.0341
-20	NV	28.51	0.0341
-30	NV	28.50	0.0341

For PCS Band GPRS Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	19.02	0.0227
40	NV	19.01	0.0227
30	NV	18.91	0.0226
20	NV	18.96	0.0227
10	NV	18.93	0.0226
0	NV	18.94	0.0226
-10	NV	18.92	0.0226
-20	NV	18.90	0.0226
-30	NV	18.87	0.0226

For Cellular Band EDGE Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	33.16	0.0396
40	NV	32.16	0.0384
30	NV	31.11	0.0372
20	NV	30.16	0.0361
10	NV	31.15	0.0372
0	NV	32.14	0.0384
-10	NV	30.16	0.0361
-20	NV	31.16	0.0372
-30	NV	31.14	0.0372

For PCS Band EDGE Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	30.96	0.0370
40	NV	29.96	0.0358
30	NV	29.92	0.0358
20	NV	29.86	0.0357
10	NV	29.85	0.0357
0	NV	29.83	0.0357
-10	NV	29.67	0.0355
-20	NV	29.84	0.0357
-30	NV	29.80	0.0356

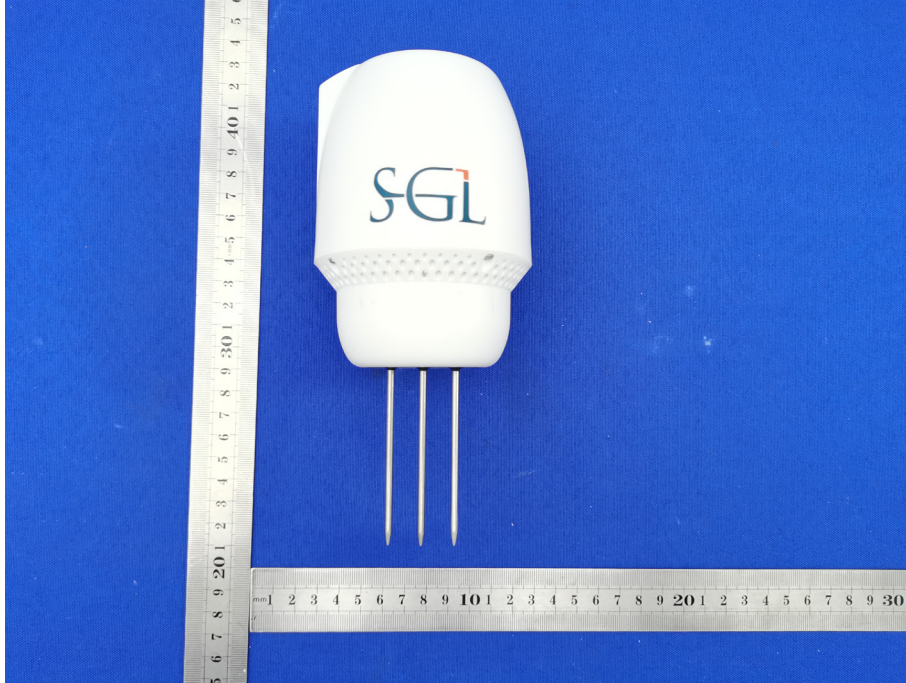
So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): GPRS 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	28.55	0.0341
	NV	28.44	0.0340
	HV	28.51	0.0341
Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	18.96	0.0227
	NV	18.94	0.0226
	HV	18.93	0.0226

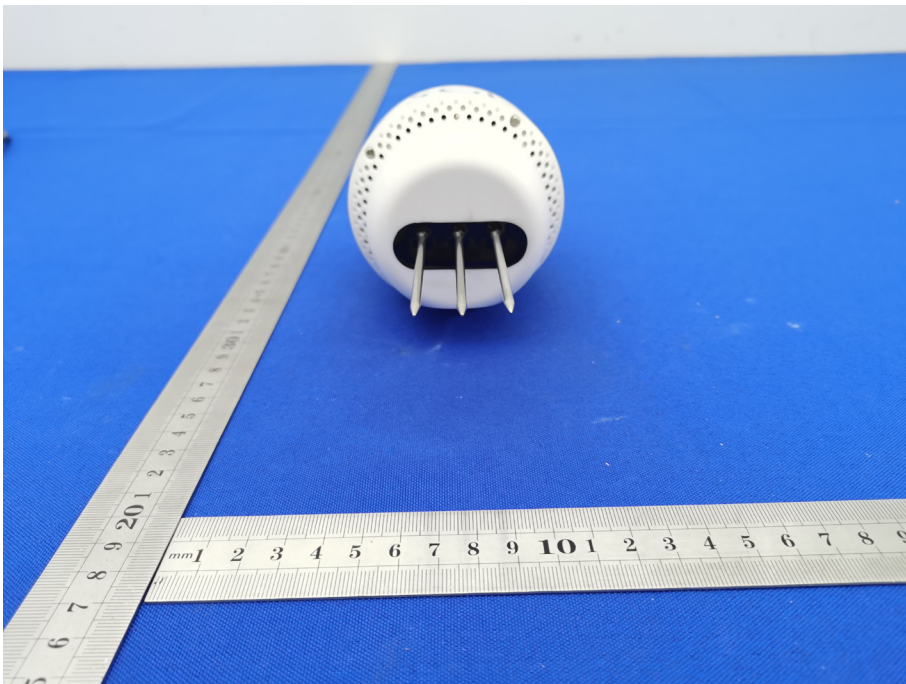
Reference Frequency(Middle Channel): EDGE 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	30.16	0.0361
	NV	30.15	0.0360
	HV	30.12	0.0360
Reference Frequency(Middle Channel): EDGE 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	29.86	0.0357
	NV	29.84	0.0357
	HV	29.81	0.0356

12. EUT PHOTO

EUT Photo 1



EUT Photo 2



13. EUT TEST PHOTO

Radiated Emission



***** END OF REPORT *****