TEST REPORT

Product Name:	Swittons IoT Edge cellular
FCC ID:	2AUJP-SWIT500C-R
Trademark:	Swittons Better Everything.
Model Number:	SWIT500C-R, SWIT500C-N
Prepared For:	OPTIKS SOLUTIONS, INC
Address:	15 CORPORATE PLACE SOUTH SUITE 105 PISCATAWAY NJ 08854, USA
Manufacturer:	OPTIKS SOLUTIONS, INC
Address:	15 CORPORATE PLACE SOUTH SUITE 105 PISCATAWAY NJ 08854, USA
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong China
Sample Received Date:	Jul. 16, 2021
Sample tested Date:	Jul. 16, 2021 to Jul. 31, 2021
Issue Date:	Aug. 5, 2021
Report No.:	CTB210731029RFX
Test Standards	FCC Part 22H & 24E
Test Results	PASS
Remark:	This is GSM radio test report.

Compiled by:	Reviewed by:	Approved by:
Arron Liu	Bin Mei	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.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB210731029RFX	Aug. 5, 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

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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℃
frequency	1×10-7

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	SWIT500C-R, SWIT500C-N
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: SWIT500C-R
Hardware Version:	V3.0
Software Version:	V1.0.19
Operation Frequency:	GPRS/EDGE 850: 824~849MHz GPRS/EDGE 1900: 1850~1910MHz
Max. RF output power:	GSM850: 33.38dBm, GSM1900: 30.13dBm
Type of Modulation:	GMSK, BPSK
Antenna installation:	Internal Antenna
Antenna Gain:	GSM 850:1.43dBi GSM 1900:1.43dBi
Ratings:	DC 5.0V charging from adapter DC 3.7V from 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 GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA 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(NV):	3.70V
Low Voltage(LV):	3.15V
High Voltage(HV):	4.23V
Normal Temperature(NT)	25℃
Low Temperature(LT)	0℃
High Temperature(HT)	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

No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2021.09.27
2	Power Sensor	Agilent	U2021XA	MY56120032	2021.09.27
3	Power Sensor	Agilent	U2021XA	MY56120034	2021.09.27
4	Communication test set	R&S	CMW500	108058	2021.09.27
5	Spectrum Analyzer	R&S	FSP40	100550	2021.09.27
6	Signal Generator	Agilent	N5181A	MY49060920	2021.09.27
7	Signal Generator	Agilent	N5182A	MY47420195	2021.09.27
8	Communication test set	Agilent	E5515C	MY50102567	2021.09.27
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	2018101500 1	2021.09.27
10	band rejection filter	Shenxiang	MSF5150-5850 MS-1155	2018101500 1	2021.09.27
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	2021.09.27
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	2021.09.27
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2021.09.27
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2021.09.27
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	2021.09.27
16	966 chamber	C.R.T.	966 Room	966	2021.09.27
17	Receiver	R&S	ESPI	100362	2021.09.27
18	Amplifier	HP	8447E	2945A02747	2021.09.27
19	Amplifier	Agilent	8449B	3008A01838	2021.09.27
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	2021.09.27

21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2021.09.27
22	Software	Fala	EZ-EMC	FA-03A2 RE	2021.09.27
23	3-Loop Antenna	Daze	ZN30401	17014	2021.09.27
24	loop antenna	ZHINAN	ZN30900A	/	2021.09.27
25	Horn antenna	A/H/System	SAS-574	588	2021.09.27
26	Amplifier	AEROFLEX	/	S/N/ 097	2021.09.27

6. RF OUTPUT POWER

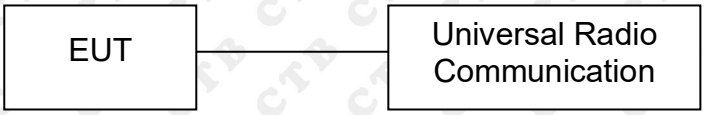
6.1 Standard Applicable

According to §22.913(a)(2),The ERP of mobileand 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	Substitude 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	31.06	1.5	0	H	1.5	1.43	30.99	38.45
824.2	30.67	1.5	0	V	1.5	1.43	30.60	38.45
Middle Channel								
836.6	28.89	1.5	0	H	1.5	1.43	28.82	38.45
836.6	28.90	1.5	0	V	1.5	1.43	28.83	38.45
High Channel								
848.8	29.09	1.5	0	H	1.5	1.43	29.02	38.45
848.8	31.15	1.5	0	V	1.5	1.43	31.08	38.45

EIRP For GPRS Mode PCS1900

Frequency	Substitude 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	26.84	1.5	0	H	1.9	1.43	26.37	33.00
1850.2	27.42	1.5	0	V	1.9	1.43	26.95	33.00
Middle Channel								
1880.0	25.89	1.5	0	H	1.9	1.43	25.42	33.00
1880.0	25.76	1.5	0	V	1.9	1.43	25.29	33.00
High Channel								
1909.8	26.49	1.5	0	H	1.9	1.43	26.02	33.00
1909.8	26.68	1.5	0	V	1.9	1.43	26.21	33.00

ERP For EDGE Mode GSM850

Frequency	Substitude 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	23.62	1.5	0	H	1.5	1.43	23.55	38.45
824.2	21.06	1.5	0	V	1.5	1.43	20.99	38.45
Middle Channel								
836.6	23.60	1.5	0	H	1.5	1.43	23.53	38.45
836.6	20.68	1.5	0	V	1.5	1.43	20.61	38.45
High Channel								
848.8	23.38	1.5	0	H	1.5	1.43	23.31	38.45
848.8	24.31	1.5	0	V	1.5	1.43	24.24	38.45

EIRP For EDGE Mode PCS1900

Frequency	Substitude 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	23.68	1.50	0.00	H	1.90	1.43	23.21	33.00
1850.2	23.72	1.50	0.00	V	1.90	1.43	23.25	33.00
Middle Channel								
1880.0	23.78	1.50	0.00	H	1.90	1.43	23.31	33.00
1880.0	23.83	1.50	0.00	V	1.90	1.43	23.36	33.00
High Channel								
1909.8	22.93	1.50	0.00	H	1.90	1.43	22.46	33.00
1909.8	24.00	1.50	0.00	V	1.90	1.43	23.53	33.00

Note: Result = Substitude - Cable loss + Antenna Gain

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	33.24	38.45
	Middle Channel	836.6	33.32	38.45
	High Channel	848.8	33.38	38.45
EDGE(1 Slot)	Low Channel	824.2	25.00	38.45
	Middle Channel	836.6	25.14	38.45
	High Channel	848.8	24.88	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	30.13	33.0
	Middle Channel	1880.0	29.54	33.0
	High Channel	1909.8	29.34	33.0
EDGE(1 Slot)	Low Channel	1850.2	25.36	33.0
	Middle Channel	1880.0	25.72	33.0
	High Channel	1909.8	25.90	33.0

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

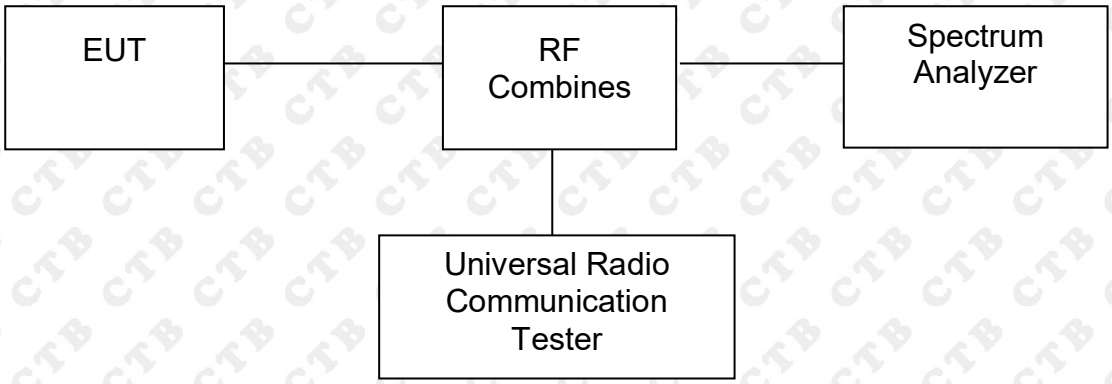
7.1 Standard Applicable

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

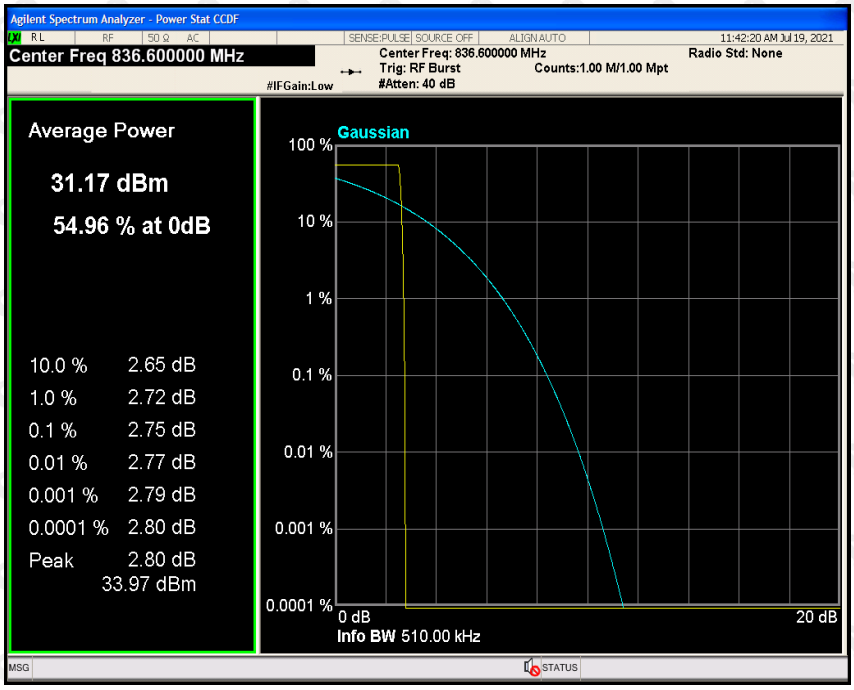
For GSM850

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GPRS(1 Slot)	190	836.6	2.75	13
EDGE(1 Slot)	190	836.6	2.70	13

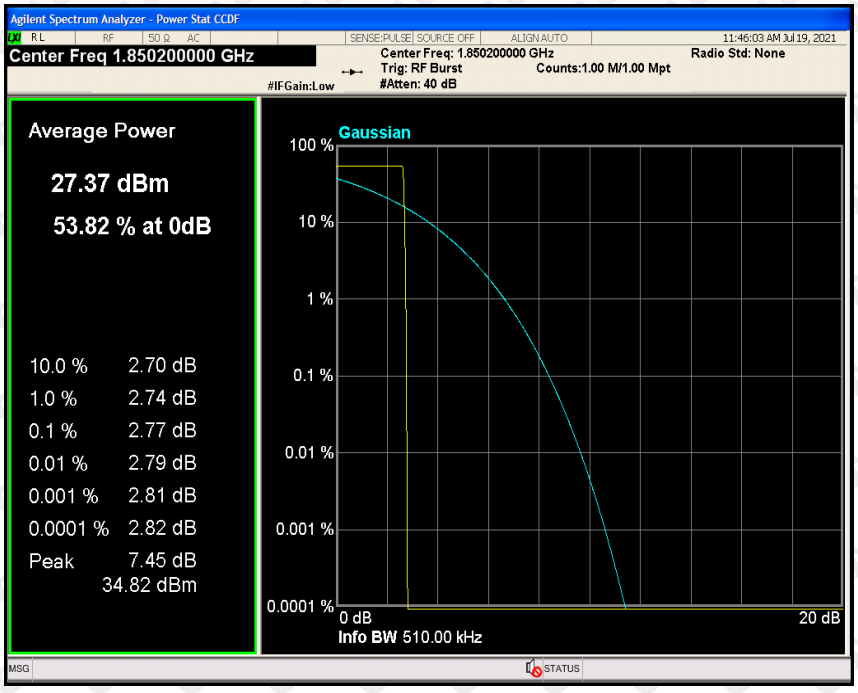
For PCS 1900

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GPRS(1 Slot)	512	1850.2	2.77	13
EDGE(1 Slot)	512	1850.2	2.69	13

GSM 900:



GSM 1800:



8. EMISSION BANDWIDTH

8.1 Standard Applicable

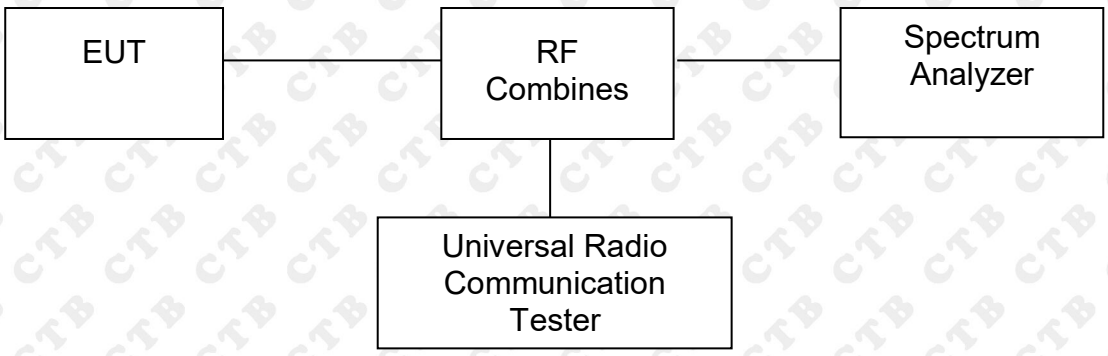
According to §22.917(b),The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

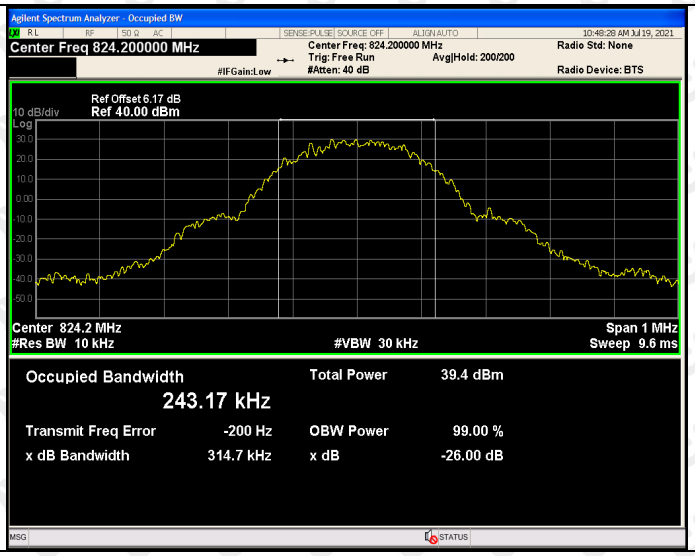
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS	128	824.2	243.173	314.652
	190	836.6	238.903	324.408
	251	848.8	245.985	306.317
EDGE	128	824.2	264.647	311.157
	190	836.6	235.139	296.273
	251	848.8	243.279	315.116

For PCS Band

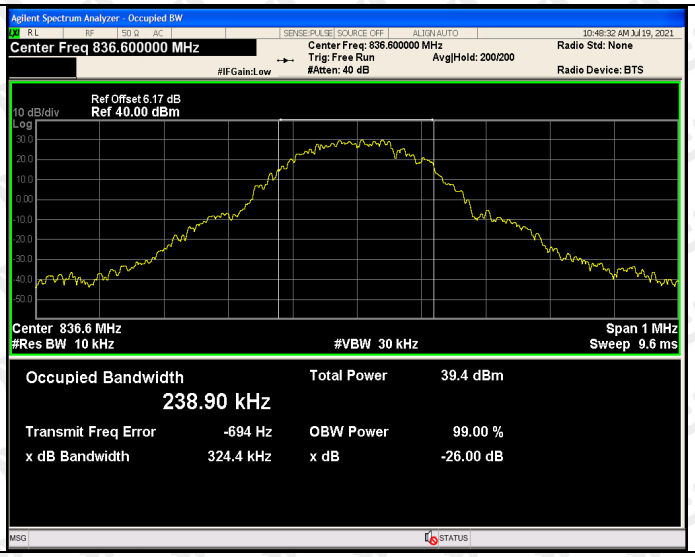
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS	512	1850.2	243.687	309.722
	661	1880.0	248.358	308.341
	810	1909.8	248.335	317.623
EDGE	512	1850.2	250.541	312.961
	661	1880.0	237.773	301.929
	810	1909.8	244.639	303.310

For Cellular Band

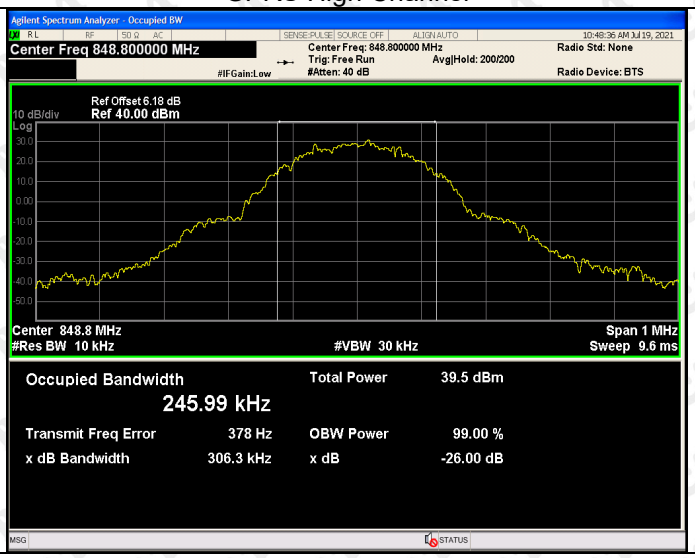
GPRS Low Channel



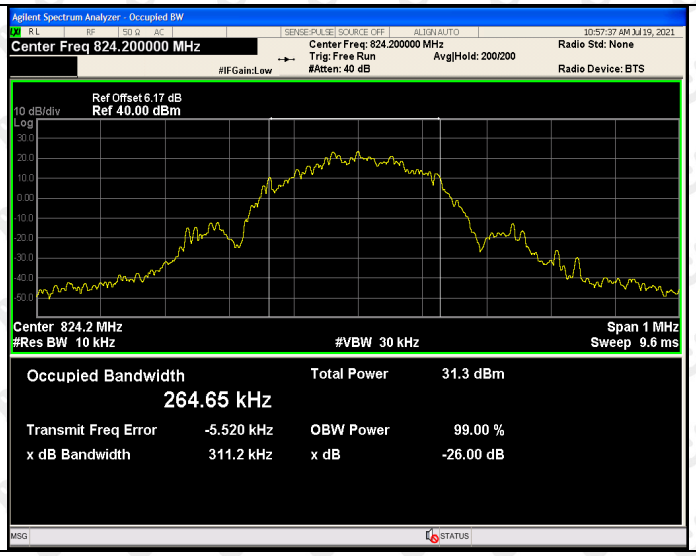
GPRS Middle Channel



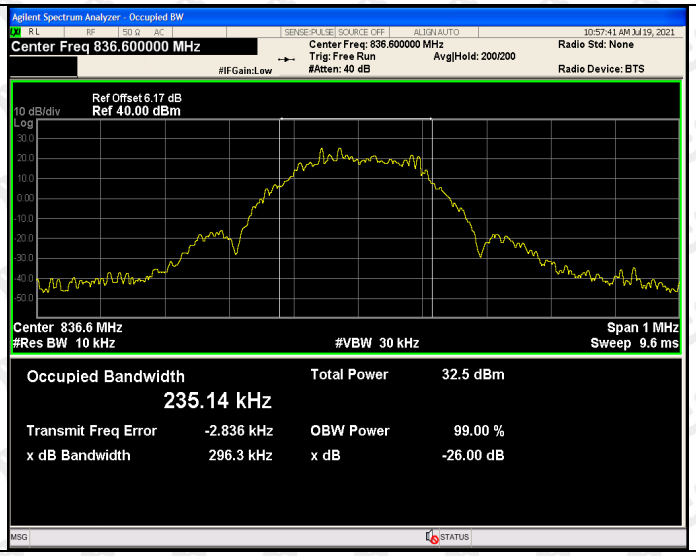
GPRS High Channel



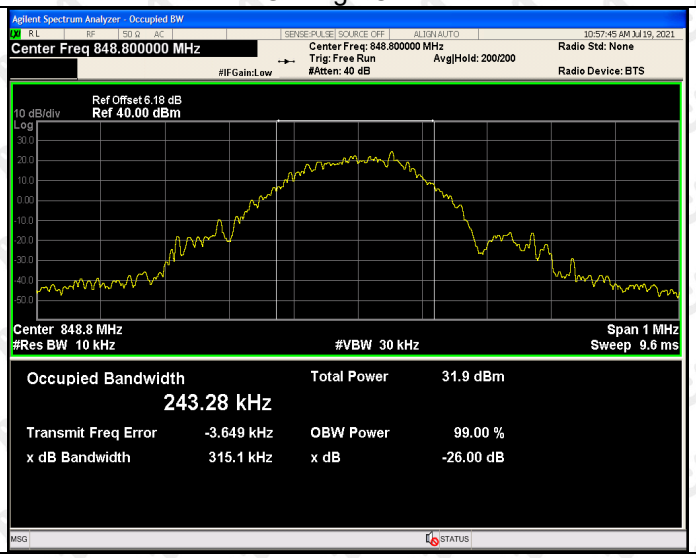
EDGE Low Channel



EDGE Middle Channel

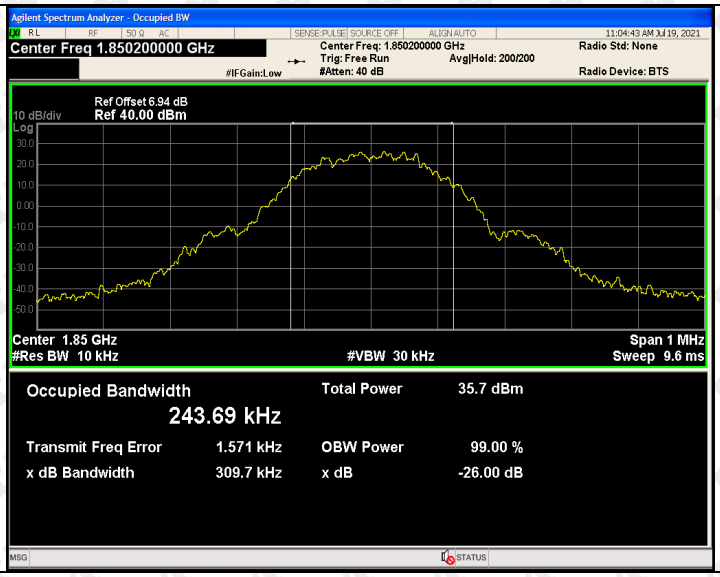


EDGE High Channel

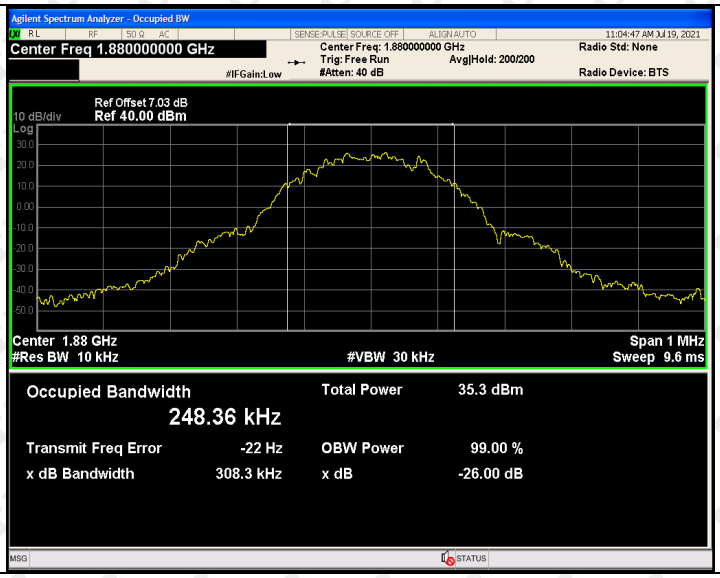


For PCS Band

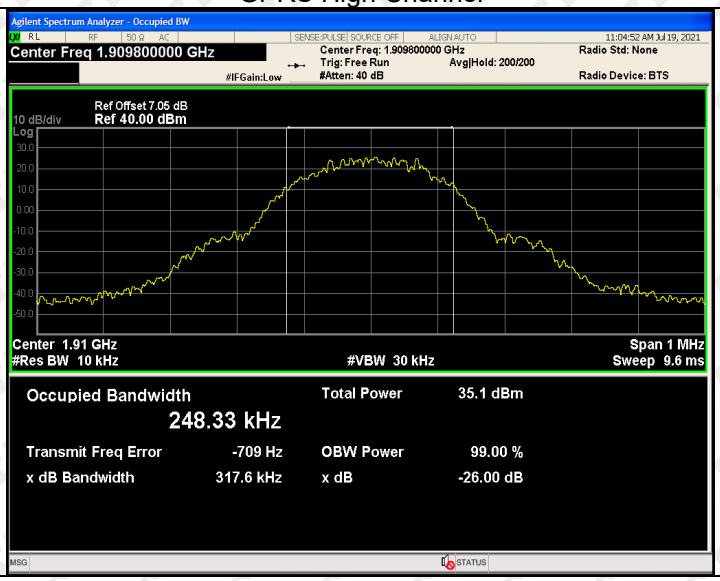
GPRS Low Channel



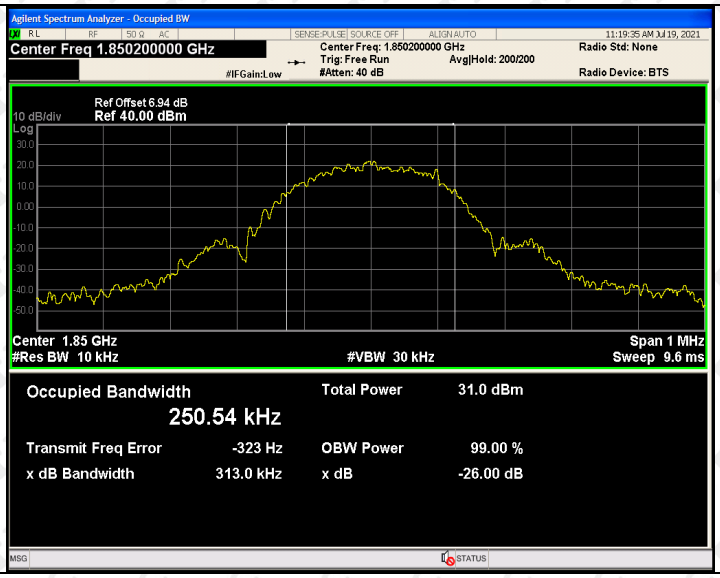
GPRS Middle Channel



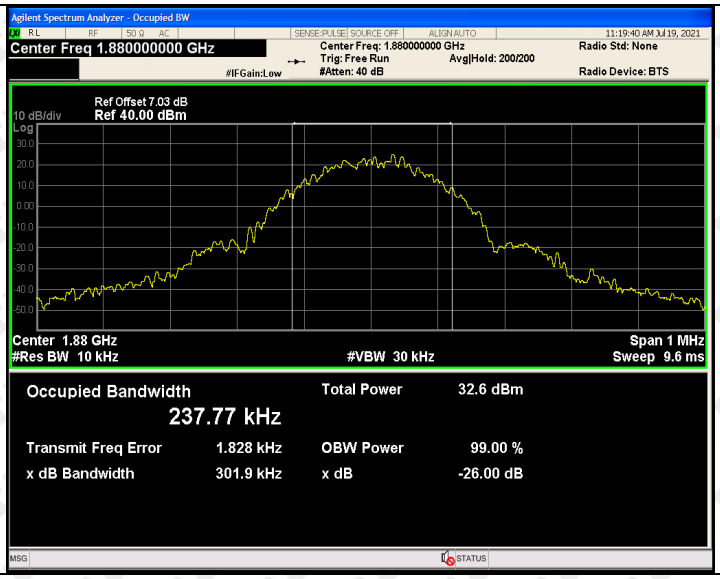
GPRS High Channel



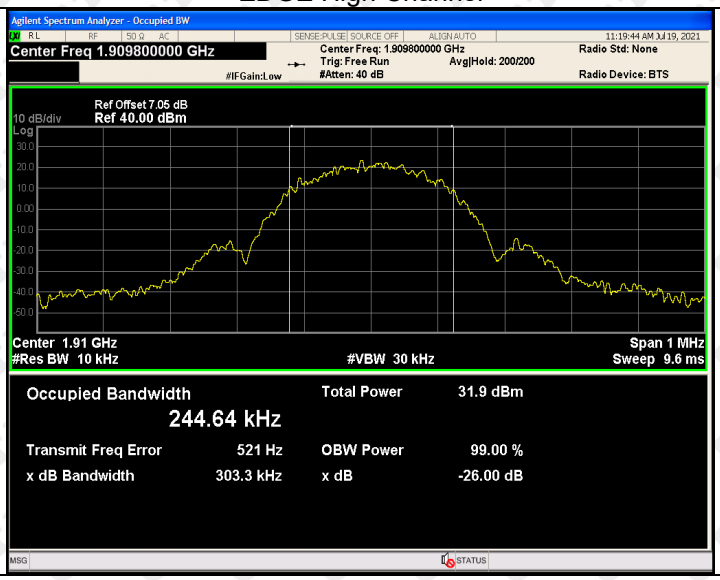
EDGE Low Channel



EDGE Middle Channel



EDGE High Channel



9. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

9.1 Standard Applicable

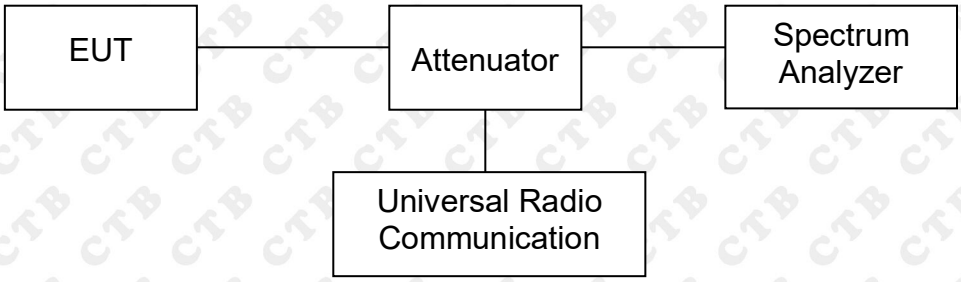
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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:



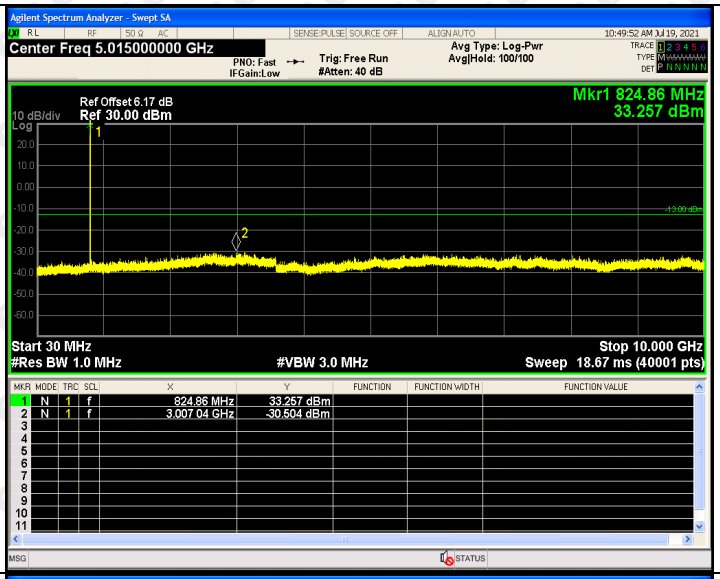
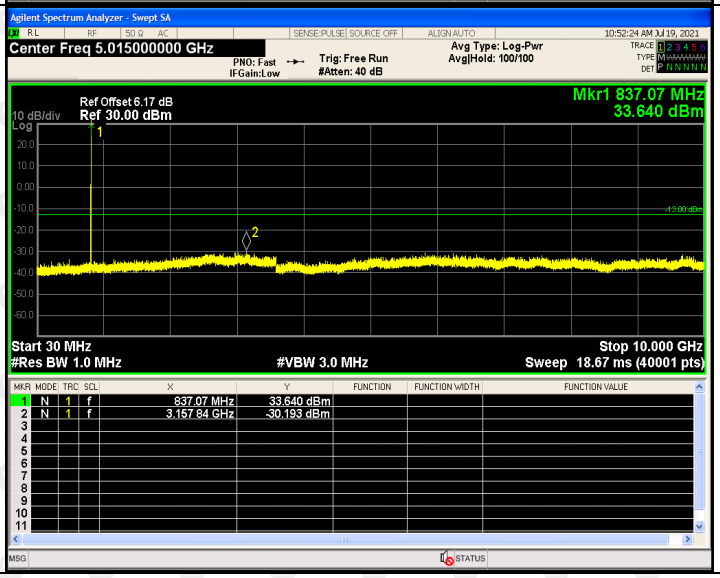
9.3 Environmental Conditions

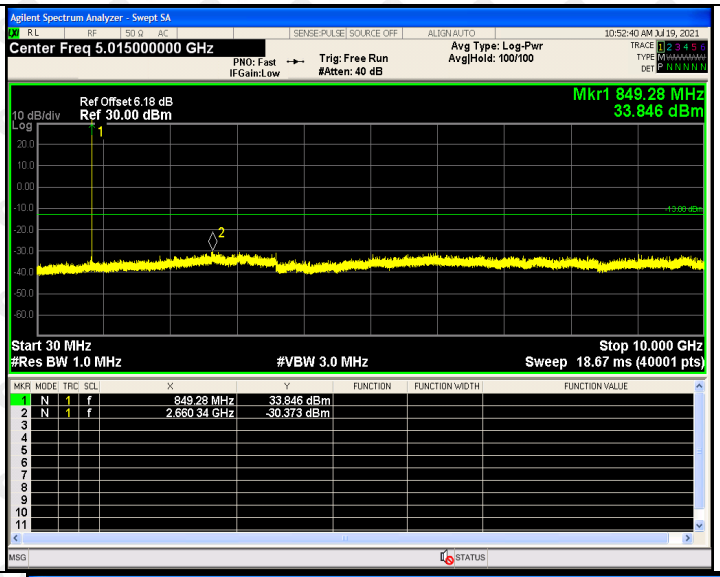
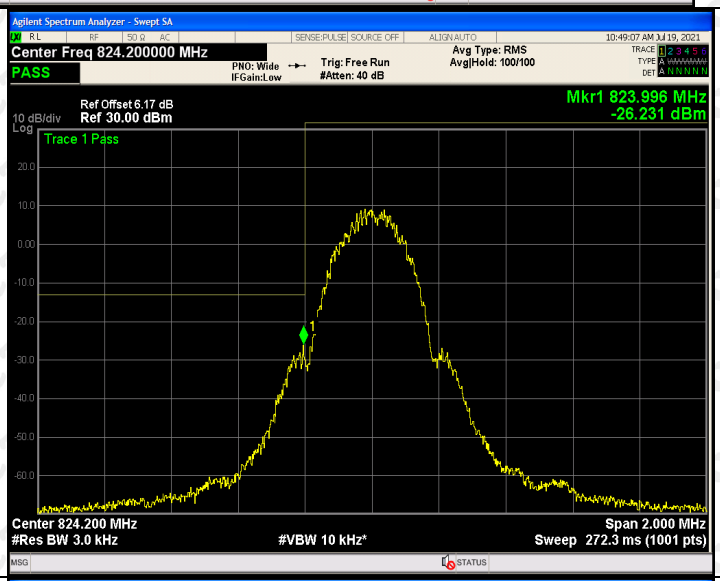
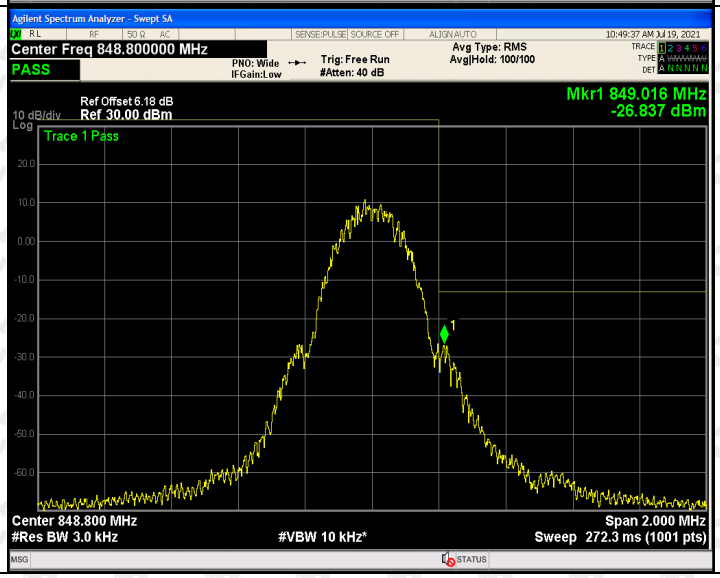
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

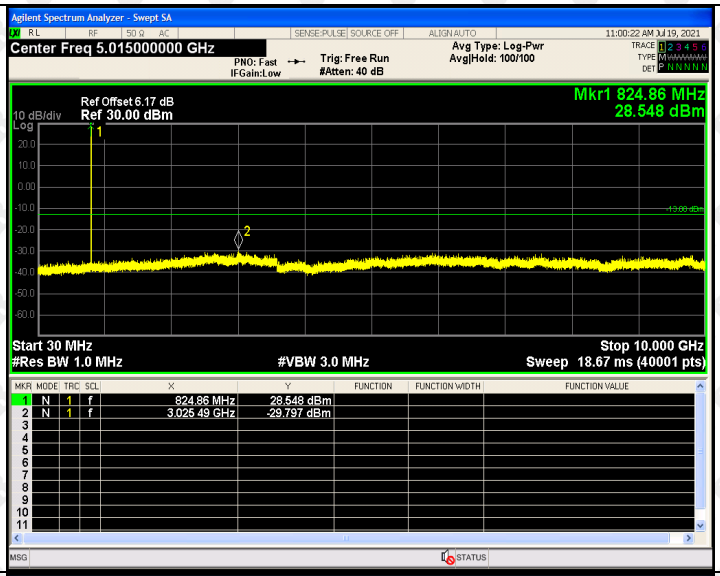
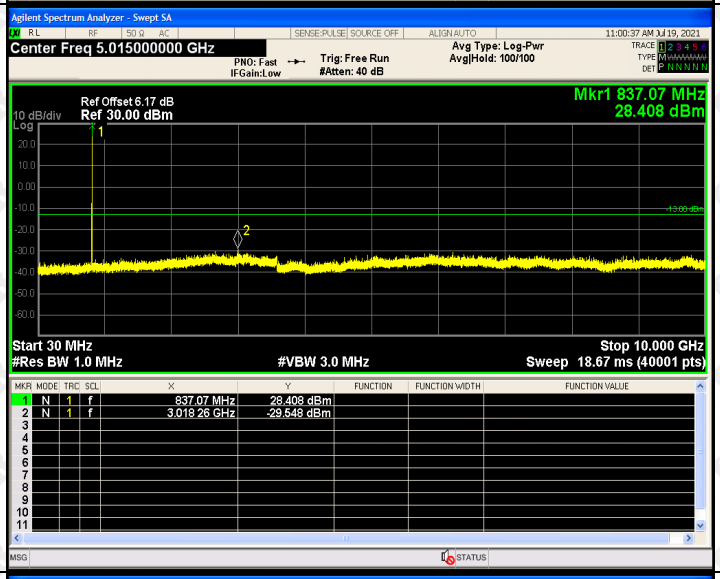
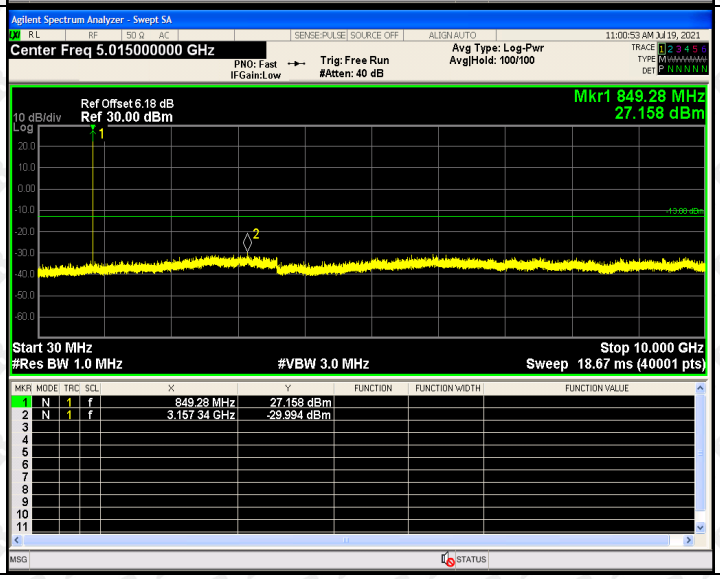
9.4 Summary of Test Results/Plots

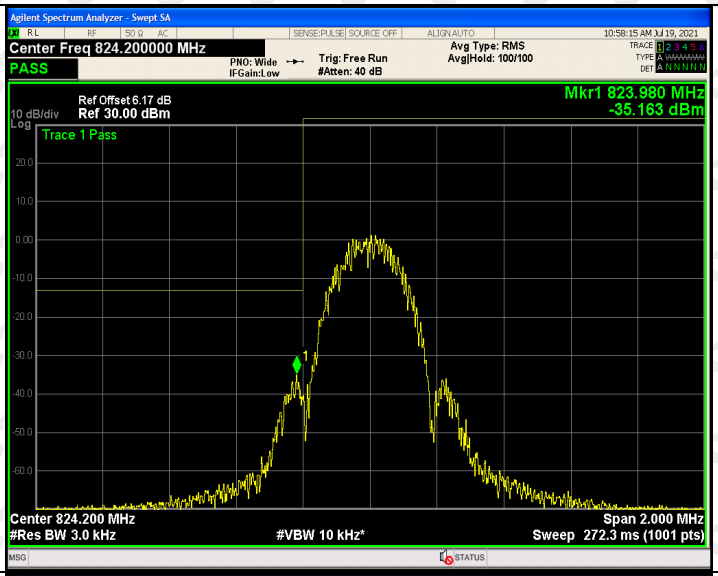
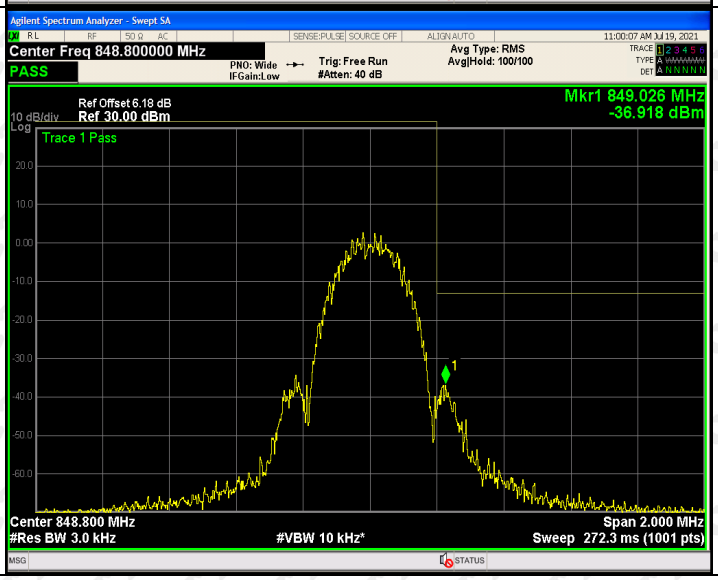
Please refer to the following test plots

For Cellular Band

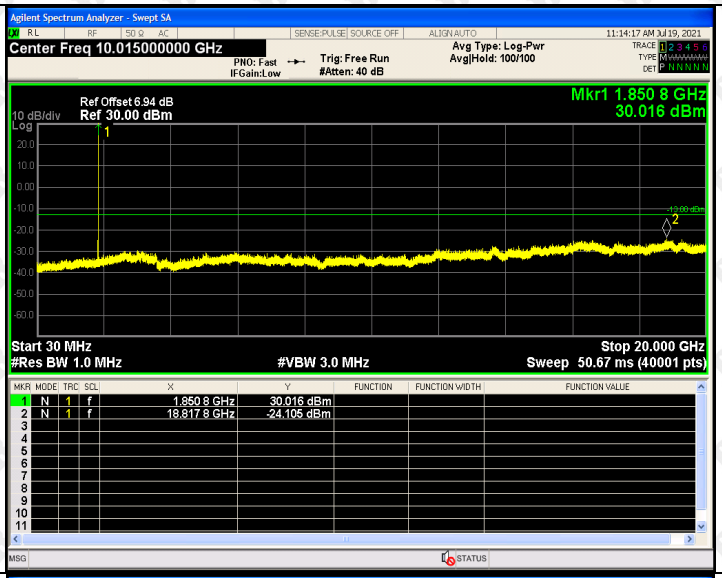
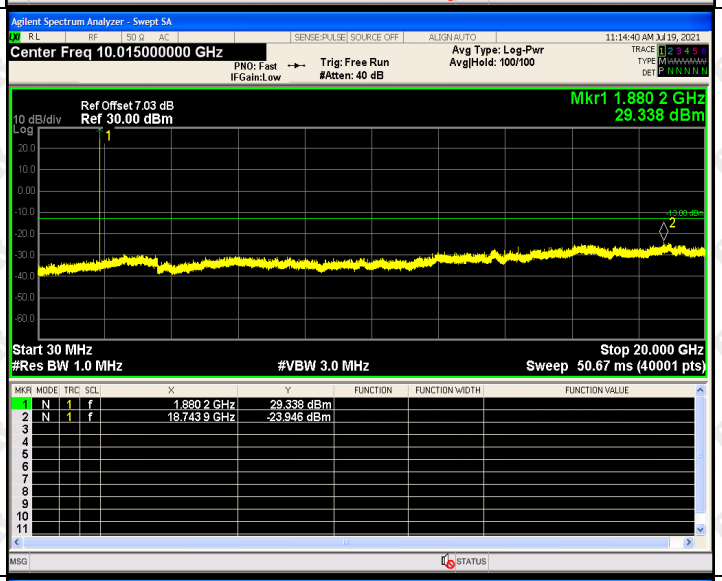
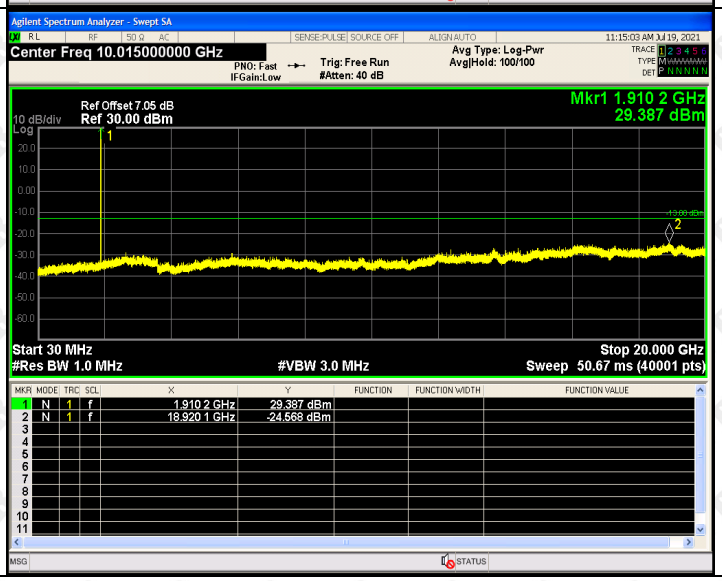
GPRS Low Channel			
GPRS Middle Channel			

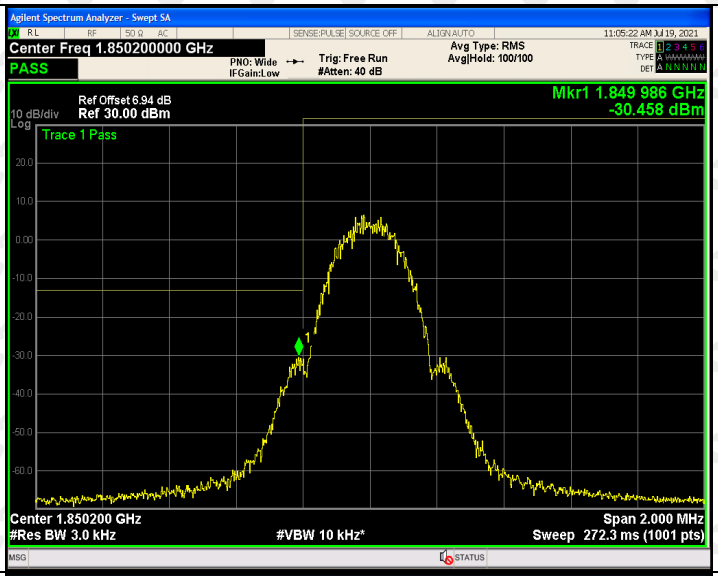
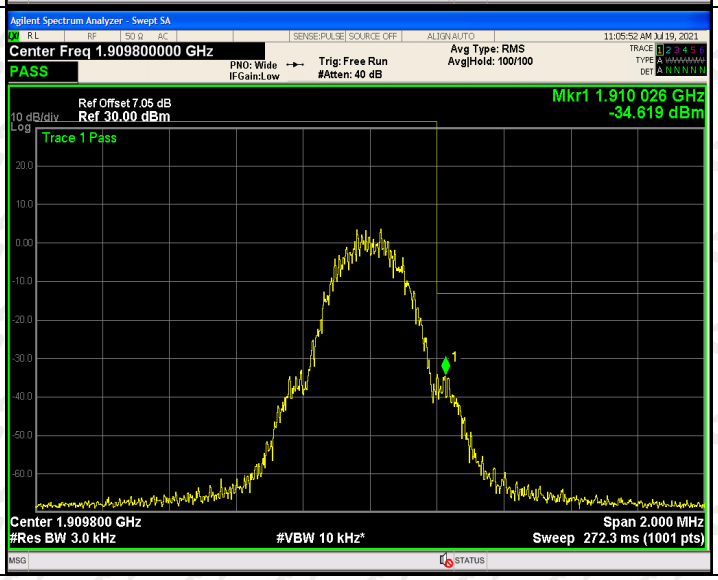
GPRS High Channel		
GPRS Low Band Emission		
GPRS High Band Emission		

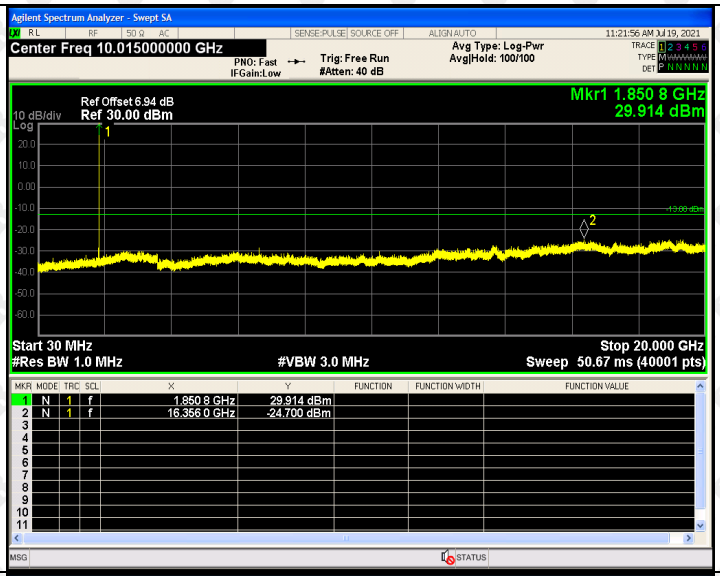
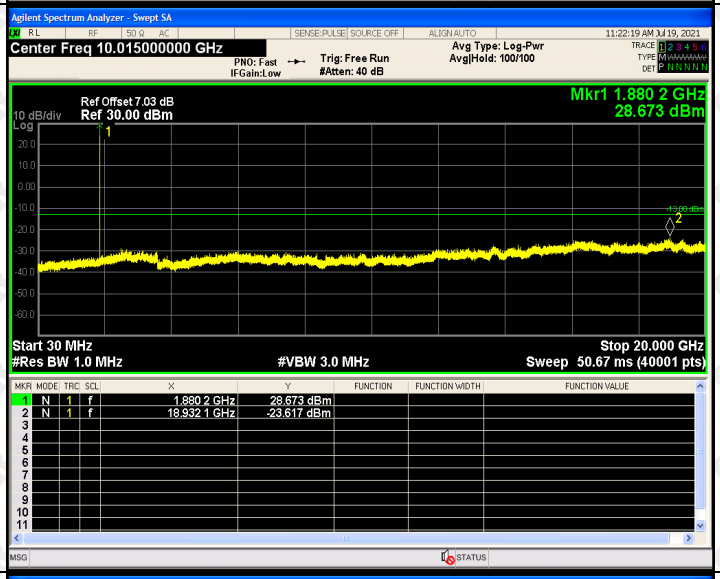
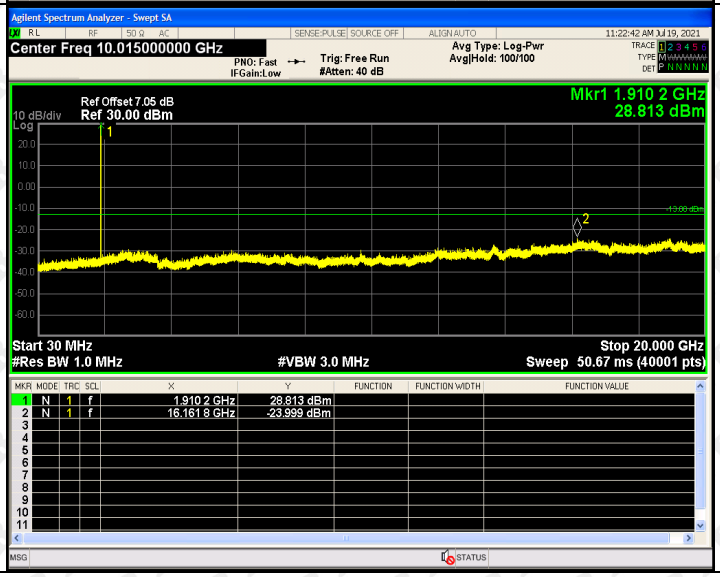
EDGE Low Channel		
EDGE Middle Channel		
EDGE High Channel		

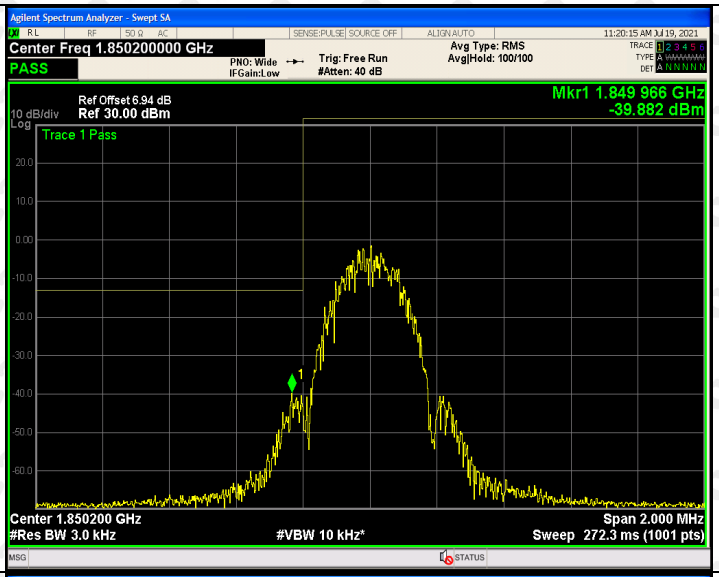
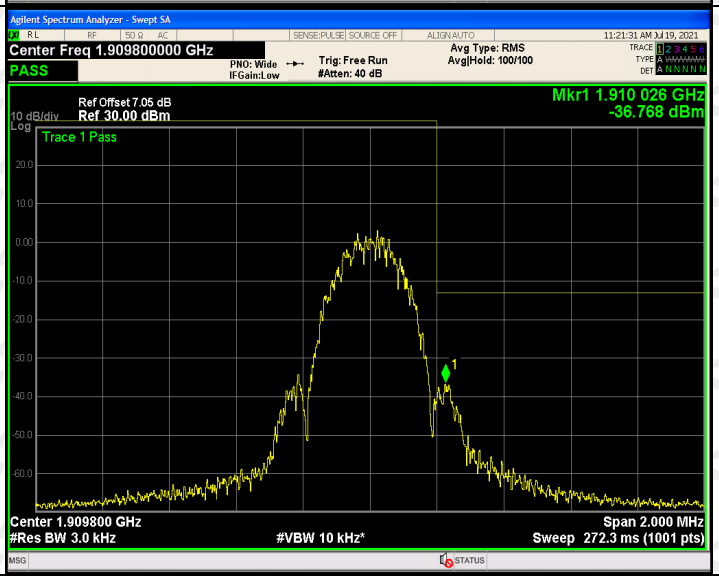
EDGE Low Band Emission			
EDGE High Band Emission			

For PCS Band

GPRS Low Channel		
GPRS Middle Channel		
GPRS High Channel		

GPRS Low Band Emission			
GPRS High Band Emission			

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} (power out in Watts)

10.3 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	54%
ATM Pressure:	101 kPa
Test Voltage	DC 3.7V

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	-69.70	4.09	-65.61	-13.00	-52.61	H
1648.4	-53.75	10.96	-42.80	-13.00	-29.80	H
2472.6	-56.36	13.81	-42.55	-13.00	-29.55	H
46.34	-68.68	4.02	-64.67	-13.00	-51.67	V
1648.4	-53.11	10.08	-43.04	-13.00	-30.04	V
2472.6	-56.76	13.13	-43.63	-13.00	-30.63	V
Middle Channel (836.6MHz)						
46.34	-69.58	3.94	-65.65	-13.00	-52.65	H
1673.2	-53.47	10.83	-42.64	-13.00	-29.64	H
2509.8	-56.49	13.86	-42.63	-13.00	-29.63	H
46.34	-68.64	4.07	-64.56	-13.00	-51.56	V
1673.2	-52.94	10.29	-42.65	-13.00	-29.65	V
2509.8	-56.63	12.88	-43.74	-13.00	-30.74	V
High Channel (848.8MHz)						
46.34	-69.42	3.91	-65.51	-13.00	-52.51	H
1697.6	-53.84	10.77	-43.07	-13.00	-30.07	H
2546.4	-56.58	13.46	-43.12	-13.00	-30.12	H
46.34	-68.77	4.13	-64.64	-13.00	-51.64	V
1697.6	-52.96	10.30	-42.66	-13.00	-29.66	V
2546.4	-56.51	12.96	-43.54	-13.00	-30.54	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	-69.22	4.34	-64.88	-13.00	-51.88	H
3700.4	-53.35	10.54	-42.81	-13.00	-29.81	H
5550.6	-56.25	13.37	-42.88	-13.00	-29.88	H
46.34	-68.54	4.34	-64.20	-13.00	-51.20	V
3700.4	-52.76	10.54	-42.22	-13.00	-29.22	V
5550.6	-56.32	13.37	-42.95	-13.00	-29.95	V
Middle Channel (1880MHz)						
46.34	-69.45	3.93	-65.52	-13.00	-52.52	H
3760.0	-53.84	10.85	-42.99	-13.00	-29.99	H
5640.0	-56.34	13.45	-42.88	-13.00	-29.88	H
46.34	-68.83	4.17	-64.65	-13.00	-51.65	V
3760.0	-53.15	10.18	-42.97	-13.00	-29.97	V
5640.0	-56.43	12.92	-43.51	-13.00	-30.51	V
High Channel (1909.8MHz)						
46.34	-69.62	4.24	-65.38	-13.00	-52.38	H
3819.6	-53.43	10.59	-42.84	-13.00	-29.84	H
5729.4	-56.71	13.41	-43.31	-13.00	-30.31	H
46.34	-68.78	4.31	-64.47	-13.00	-51.47	V
3819.6	-53.16	10.37	-42.79	-13.00	-29.79	V
5729.4	-56.62	13.00	-43.63	-13.00	-30.63	V

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

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listedin 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	19.76	0.0236
40	NV	19.8	0.0237
30	NV	20.2	0.0241
20	NV	20.6	0.0246
10	NV	20.8	0.0249
0	NV	21.1	0.0252
-10	NV	21.4	0.0256
-20	NV	21.6	0.0258
-30	NV	22.0	0.0263

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	14.98	0.0080
40	NV	15.1	0.0080
30	NV	15.5	0.0083
20	NV	15.6	0.0083
10	NV	15.6	0.0083
0	NV	15.7	0.0084
-10	NV	16.1	0.0086
-20	NV	16.4	0.0087
-30	NV	16.5	0.0088

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	27.34	0.0327
40	NV	27.7	0.0331
30	NV	27.9	0.0334
20	NV	28.0	0.0334
10	NV	28.4	0.0340
0	NV	28.5	0.0341
-10	NV	29.0	0.0347
-20	NV	29.4	0.0351
-30	NV	29.6	0.0354

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	10.69	0.0057
40	NV	10.8	0.0057
30	NV	10.8	0.0058
20	NV	11.2	0.0060
10	NV	11.5	0.0061
0	NV	11.7	0.0062
-10	NV	12.0	0.0064
-20	NV	12.3	0.0066
-30	NV	12.8	0.0068

So, Frequency Stability Versus Input Voltage is:

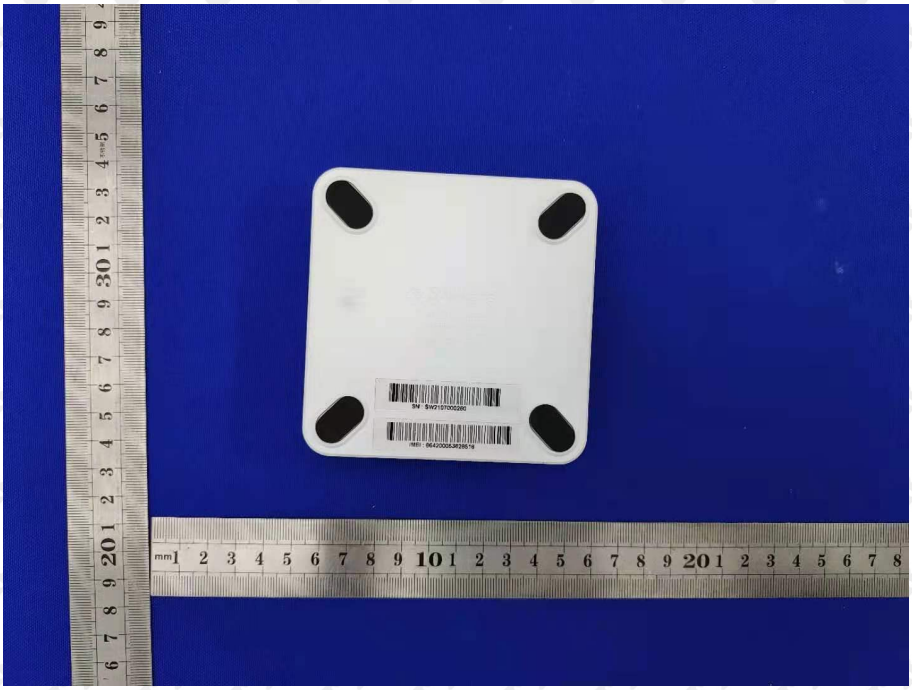
Reference Frequency(Middle Channel): GPRS 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	22	0.0263
	NV	22.2	0.0265
	HV	22.3	0.0266
Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	16.5	0.0088
	NV	16.7	0.0089
	HV	17.1	0.0091

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	29.6	0.0354
	NV	29.9	0.0357
	HV	30.4	0.0363
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	12.8	0.0068
	NV	13.0	0.0069
	HV	13.1	0.0070

12. EUT PHOTO

EUT Photo 1

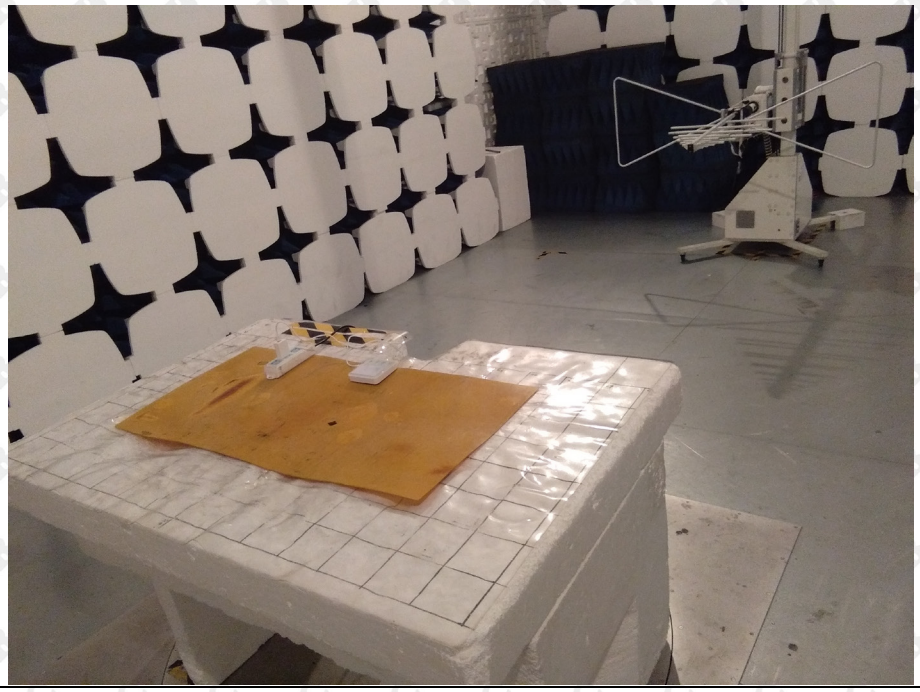
EUT Photo 2



13. EUT TEST PHOTO

Radiated Emission

Below 1G



Above 1G

Conducted Emission

※※※※※ END OF REPORT ※※※※※