TEST REPORT

Product Name:	Tablet PC(Notebook)
FCC ID:	2AWWW-MB01
Product Name:	N/A
Model Number:	MB01, the additional models refer to 4.1
Prepared For:	Creature Information(Guangzhou)Technology Co., Limited
Address:	Room B4A05, Block B, 203 Changfu Road, Tianhe district, Guangzhou, China
Manufacturer:	Creature Information(Guangzhou)Technology Co., Limited
Address:	Room B4A05, Block B, 203 Changfu Road, Tianhe district, Guangzhou, China
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:	Mar. 31, 2021
Sample tested Date:	Mar. 31, 2021 to Apr. 8, 2021
Issue Date:	Apr. 8, 2021
Report No.:	CTB210331030RFX
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
CTB210331030RFX	Apr. 8, 2021	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

FCC Rules	Description of Test Item	Result
§2.1093	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℃
frequency	1×10-7

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	MB01, I8, I8 Plus, I8 Pro, I8 Power, I8 A, I8 A Plus, I8 A Pro, I8 A Power, I8 S, I8 S Plus, I8 S Pro, I8 S Power, I9, I9 Plus, I9 Pro, I9 Power, I9 A, I9 A Plus, I9 A Pro, I9 A Power, I9 S, I9 S Plus, I9 S Pro, I9 S Power, I10, I10 Plus, I10 Pro, I10 Power, I10 A, I10 A Plus, I10 A Pro, I10 A Power, I10 S, I10 S Plus, I10 S Pro, I10 S Power, I11, I11 Plus, I11 Pro, I11 Power, I11 A, I11 A Plus, I11 A Pro, I11 A Power, I11 S, I11 S Plus, I11 S Pro, I11 S Power, I12, I12 Plus, I12 Pro, I12 Power, I12 A, I12 A Plus, I12 A Pro, I12 A Power, I12 S, I12 S Plus, I12 S Pro, I12 S Power, I6, I7, I13, M11, M12, M13, M14, M15, M17, S1, S2, S3, S4, S5, S6, S7, S8, S9, Y11, Y13, Y14, Y15, X13, X14, X15, X17, S13, S14, S15, S17, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10
Model Description:	All the model are the same circuit and RF module, only for model name.Test sample model: MB01
Hardware Version:	V2.0
Software Version:	V1.00_20210331
Operation Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz WCDMA Band 5: 824~849MHz
Max. RF output power:	GSM850: 32.90dBm, GSM1900: 30.06dBm WCDMA Band 5: 22.38dBm
Type of Modulation:	GMSK, BPSK
Antenna installation:	Internal Antenna
Antenna Gain:	GSM 850 0.27dBi GSM 1900 0.59dBi WCDMA BAND V 0.57dBi
Ratings:	DC 5V, 2A, charging from adapter Battery DC3.8V, 6000mAh

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	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
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	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band 5	Low, Middle, High Channels
TM8	HSDPA Band 5	Low, Middle, High Channels
TM9	HSUPA Band 5	Low, Middle, High Channels

4.6 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.8V
Normal Temperature(℃)	25
Low Temperature(℃)	0
High Temperature(℃)	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	MSF2400-2483.5MS-1154	20181015001	Sep. 28, 2020	Sep. 28, 2021
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	Sep. 28, 2020	Sep. 28, 2021
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	Sep. 28, 2020	Sep. 28, 2021
12	BT&WI-FI Automatic test software	Micowave	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	Micowave	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

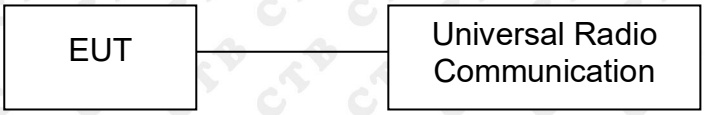
6.1 Standard Applicable

According to §22.913(a)(2),The ERP of 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 GSM 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	32.57	1.5	0	H	1.5	0	31.07	38.45
824.2	32.05	1.5	0	V	1.5	0	30.55	38.45
Middle Channel								
836.4	32.27	1.5	0	H	1.5	0	30.77	38.45
836.4	32.11	1.5	0	V	1.5	0	30.61	38.45
High Channel								
848.8	31.84	1.5	0	H	1.5	0	30.34	38.45
848.8	32.58	1.5	0	V	1.5	0	31.08	38.45

EIRP For GSM 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	21.39	1.5	0	H	1.9	7.7	27.19	33.00
1850.2	20.37	1.5	0	V	1.9	7.7	26.17	33.00
Middle Channel								
1880.0	20.60	1.5	0	H	1.9	7.7	26.40	33.00
1880.0	20.20	1.5	0	V	1.9	7.7	26.00	33.00
High Channel								
1909.8	20.13	1.5	0	H	1.9	7.7	25.93	33.00
1909.8	20.72	1.5	0	V	1.9	7.7	26.52	33.00

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	32.97	1.5	0	H	1.5	0	31.47	38.45
824.2	32.97	1.5	0	V	1.5	0	31.47	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	33.16	1.5	0	H	1.5	0	31.66	38.45
848.8	32.09	1.5	0	V	1.5	0	30.59	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	20.92	1.5	0	H	1.9	7.7	26.72	33.00
1850.2	21.45	1.5	0	V	1.9	7.7	27.25	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	20.55	1.5	0	H	1.9	7.7	26.35	33.00
1909.8	21.14	1.5	0	V	1.9	7.7	26.94	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	22.02	1.5	0	H	1.5	0	20.52	38.45
824.2	22.41	1.5	0	V	1.5	0	20.91	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	23.05	1.5	0	H	1.5	0	21.55	38.45
848.8	22.06	1.5	0	V	1.5	0	20.56	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	18.45	1.5	0	H	1.9	7.7	24.253	33.00
1850.2	17.96	1.5	0	V	1.9	7.7	23.755	33.00
Middle Channel								
1880.0	17.55	1.5	0	H	1.9	7.7	23.348	33.00
1880.0	17.63	1.5	0	V	1.9	7.7	23.434	33.00
High Channel								
1909.8	18.24	1.5	0	H	1.9	7.7	24.041	33.00
1909.8	18.41	1.5	0	V	1.9	7.7	24.209	33.00

ERP For WCDMA Mode Band 5

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	22.24	1.5	0	H	1.5	0	20.74	38.45
826.4	21.94	1.5	0	V	1.5	0	20.44	38.45
Middle Channel								
836.6	22.75	1.5	0	H	1.5	0	21.25	38.45
836.6	22.85	1.5	0	V	1.5	0	21.35	38.45
High Channel								
846.6	22.32	1.5	0	H	1.5	0	20.82	38.45
846.6	22.37	1.5	0	V	1.5	0	20.87	38.45

ERP For HSDPA Mode Band 5

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	22.36	1.5	0	H	1.5	0	20.86	38.45
826.4	22.75	1.5	0	V	1.5	0	21.25	38.45
Middle Channel								
836.6	22.39	1.5	0	H	1.5	0	20.89	38.45
836.6	21.85	1.5	0	V	1.5	0	20.35	38.45
High Channel								
846.6	22.29	1.5	0	H	1.5	0	20.79	38.45
846.6	21.73	1.5	0	V	1.5	0	20.23	38.45

ERP For HSUPA Mode Band 5

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	22.01	1.5	0	H	1.5	0	20.51	38.45
826.4	21.91	1.5	0	V	1.5	0	20.41	38.45
Middle Channel								
836.6	22.51	1.5	0	H	1.5	0	21.01	38.45
836.6	21.68	1.5	0	V	1.5	0	20.18	38.45
High Channel								
846.6	22.47	1.5	0	H	1.5	0	20.97	38.45
846.6	23.14	1.5	0	V	1.5	0	21.64	38.45

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)
GSM	Low Channel	824.2	32.25	38.45
	Middle Channel	836.6	32.54	38.45
	High Channel	848.8	32.83	38.45
GPRS(1 Slot)	Low Channel	824.2	32.36	38.45
	Middle Channel	836.6	32.64	38.45
	High Channel	848.8	32.90	38.45
EDGE(1 Slot)	Low Channel	824.2	24.55	38.45
	Middle Channel	836.6	25.78	38.45
	High Channel	848.8	25.56	38.45

For PCS Band (GSM1900)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
GSM	Low Channel	1850.2	27.47	33.0
	Middle Channel	1880.0	27.97	33.0
	High Channel	1909.8	27.96	33.0
GPRS(1 Slot)	Low Channel	1850.2	27.49	33.0
	Middle Channel	1880.0	28.06	33.0
	High Channel	1909.8	28.01	33.0
EDGE(1 Slot)	Low Channel	1850.2	24.85	33.0
	Middle Channel	1880.0	24.88	33.0
	High Channel	1909.8	25.51	33.0

For WCDMA Band 5

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
WCDMA	Low Channel	826.4	21.03	38.45
	Middle Channel	836.6	20.76	38.45
	High Channel	846.6	20.48	38.45
HSDPA	Low Channel	826.4	22.38	38.45
	Middle Channel	836.6	22.33	38.45
	High Channel	846.6	22.30	38.45
HSUPA	Low Channel	826.4	20.92	38.45
	Middle Channel	836.6	20.97	38.45
	High Channel	846.6	20.60	38.45

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

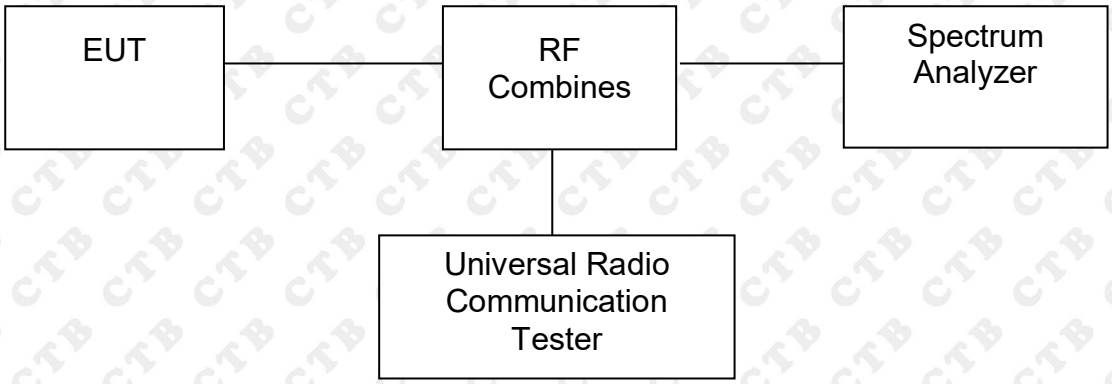
7.1 Standard Applicable

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

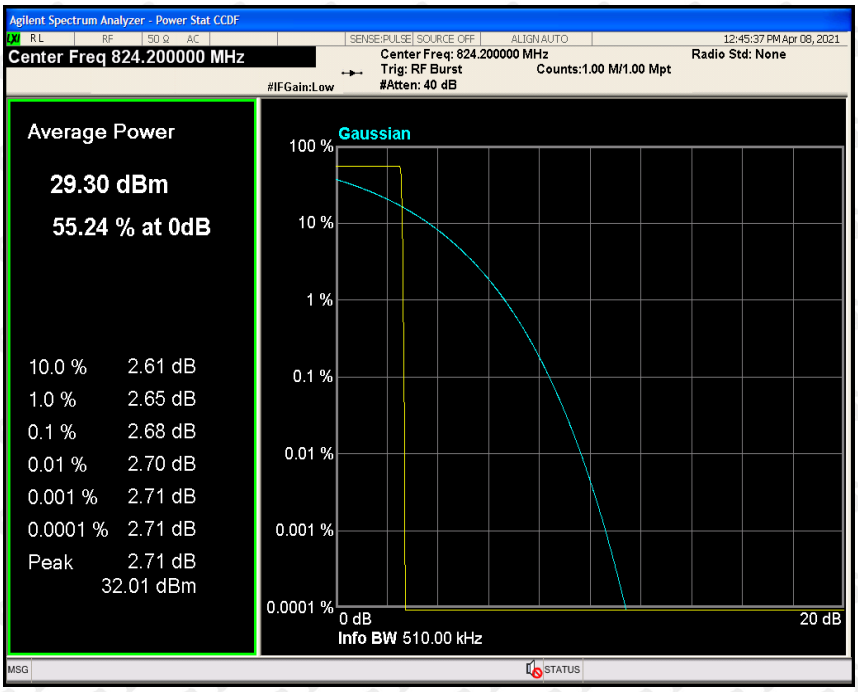
For PCS 850

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	128	824.2	2.68	13
GPRS(1 Slot)	128	824.2	2.67	13
EDGE(1 Slot)	128	824.2	2.68	13

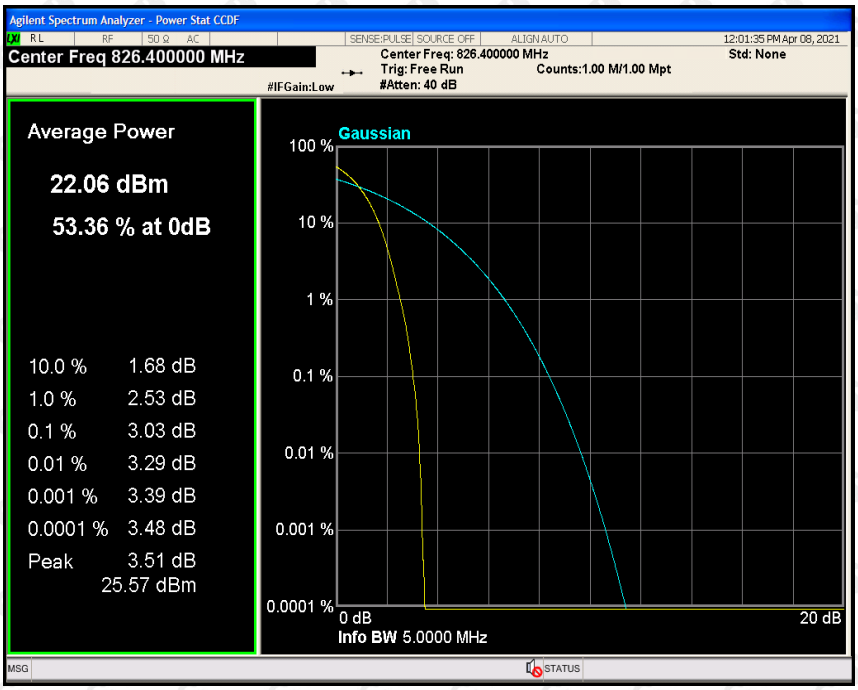
For WCDMA Band 5

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	4312	826.4	3.03	13
HSDPA	4312	826.4	2.99	13
HSUPA	4312	826.4	3.06	13

GSM :


Agilent Spectrum Analyzer - Power Stat CCDF
Center Freq 824.200000 MHz
Center Freq: 824.200000 MHz
Trig: RF Burst
#Atten: 40 dB
Counts:1.00 M/1.00 Mpt
Radio Std: None
12:45:37 PM Apr 08, 2021
Average Power
29.30 dBm
55.24 % at 0dB
10.0 % 2.61 dB
1.0 % 2.65 dB
0.1 % 2.68 dB
0.01 % 2.70 dB
0.001 % 2.71 dB
0.0001 % 2.71 dB
Peak 2.71 dB
32.01 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 510.00 kHz

WCDMA:


Agilent Spectrum Analyzer - Power Stat CCDF
Center Freq 826.400000 MHz
Center Freq: 826.400000 MHz
Trig: Free Run
#Atten: 40 dB
Counts:1.00 M/1.00 Mpt
Std: None
12:01:35 PM Apr 08, 2021
Average Power
22.06 dBm
53.36 % at 0dB
10.0 % 1.68 dB
1.0 % 2.53 dB
0.1 % 3.03 dB
0.01 % 3.29 dB
0.001 % 3.39 dB
0.0001 % 3.48 dB
Peak 3.51 dB
25.57 dBm
Gaussian
100 %
10 %
1 %
0.1 %
0.01 %
0.001 %
0.0001 %
0 dB
20 dB
Info BW 5.0000 MHz

8. EMISSION BANDWIDTH

8.1 Standard Applicable

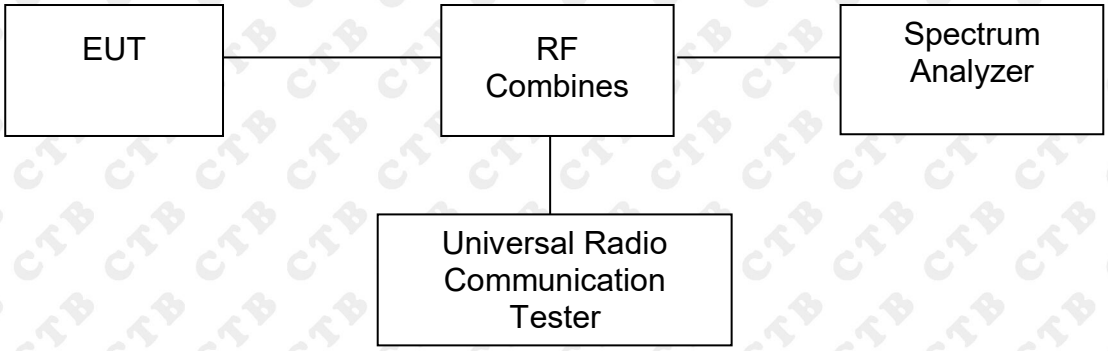
According to §22.917(b),The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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)
GSM	128	824.2	247.333	321.406
	190	836.6	240.335	309.843
	251	848.8	241.177	306.391
GPRS	128	824.2	239.732	317.041
	190	836.6	243.569	312.861
	251	848.8	239.732	314.766
EDGE	128	824.2	231.420	280.199
	190	836.6	260.171	319.094
	251	848.8	246.760	286.212

For PCS Band

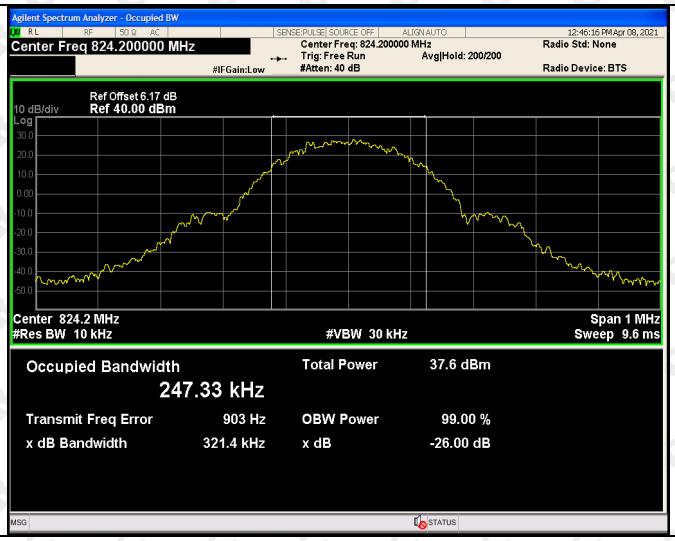
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	512	1850.2	243.221	312.389
	661	1880.0	246.013	313.543
	810	1909.8	244.054	313.240
GPRS	512	1850.2	246.432	314.534
	661	1880.0	248.100	321.767
	810	1909.8	248.022	310.433
EDGE	512	1850.2	244.654	312.638
	661	1880.0	245.998	304.272
	810	1909.8	245.798	310.514

For Band 5

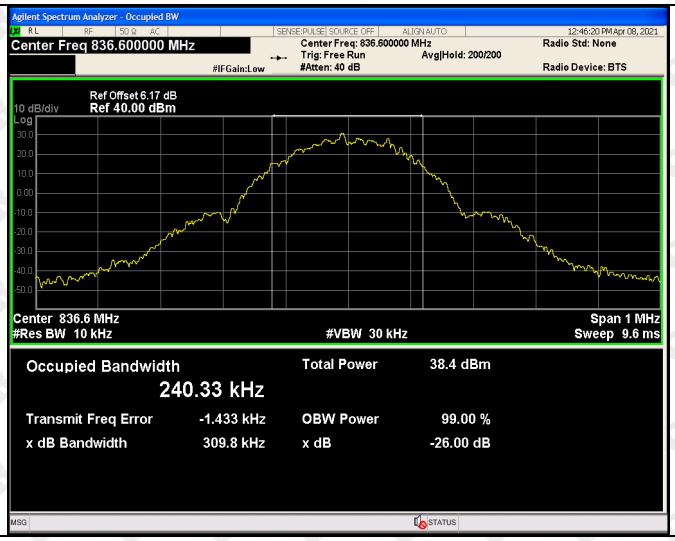
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	4132	826.4	4170.256	4673.049
	4183	836.6	4154.394	4684.514
	4233	846.6	4156.854	4676.380
HSDPA	4132	826.4	4151.194	4667.296
	4183	836.6	4143.690	4691.877
	4233	846.6	4158.553	4679.075
HSUPA	4132	826.4	4161.399	4699.230
	4183	836.6	4145.902	4701.178
	4233	846.6	4166.544	4674.554

For Cellular Band

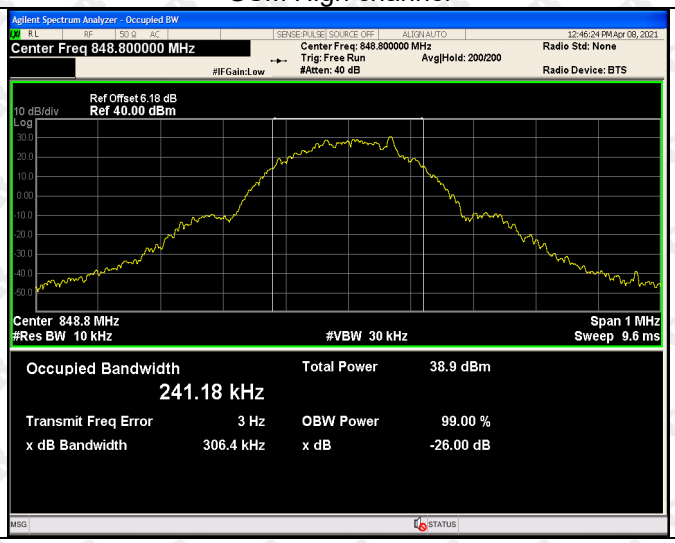
GSM Low Channel



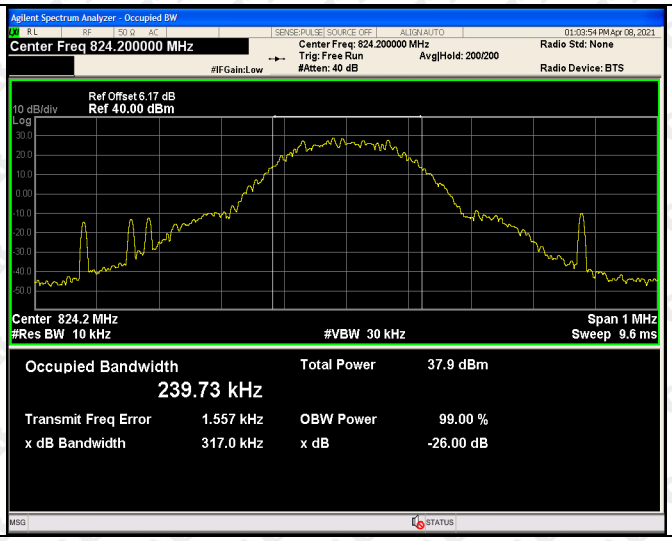
GSM Middle Channel



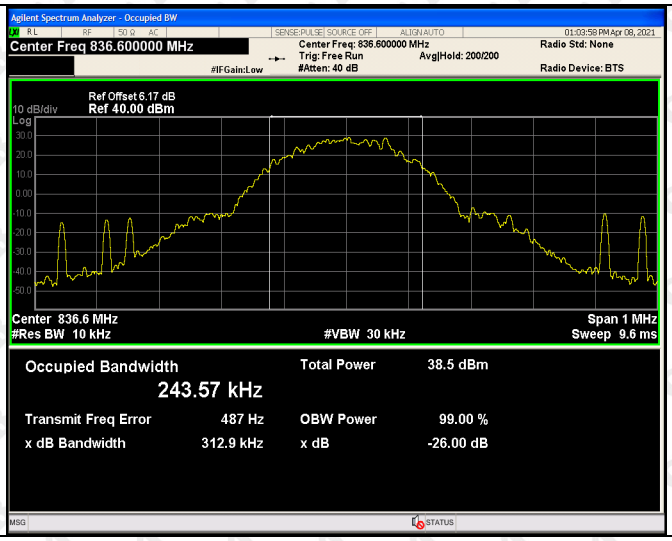
GSM High channel



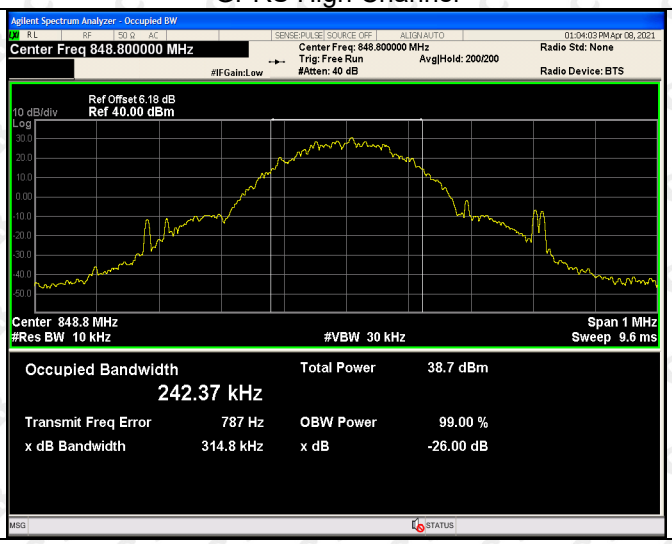
GPRS Low Channel



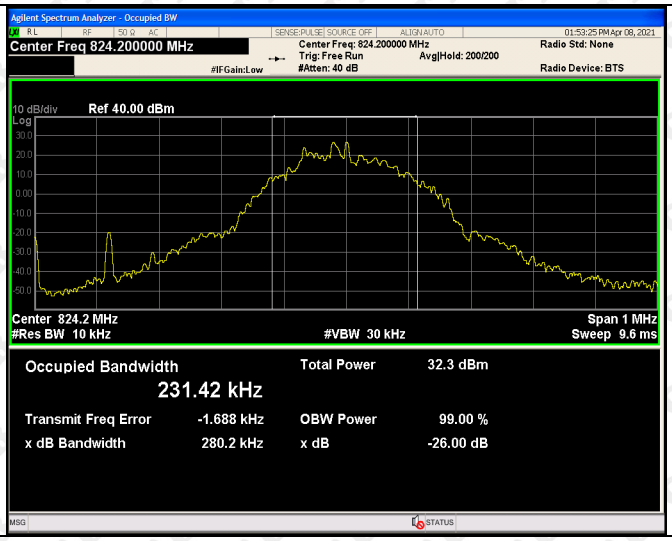
GPRS Middle Channel



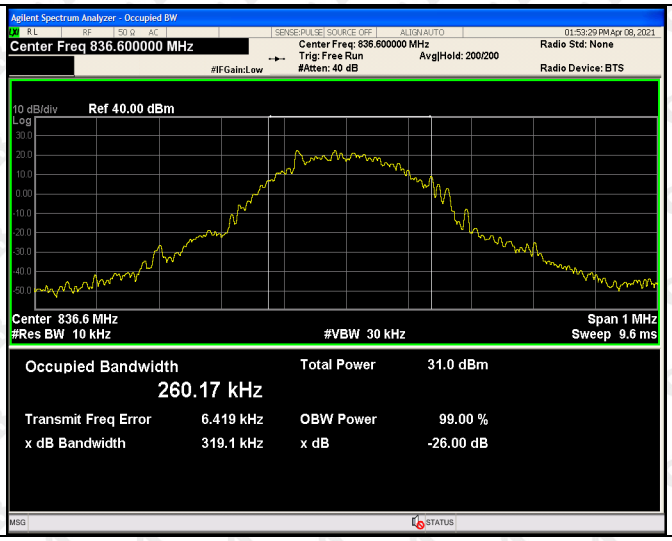
GPRS High Channel



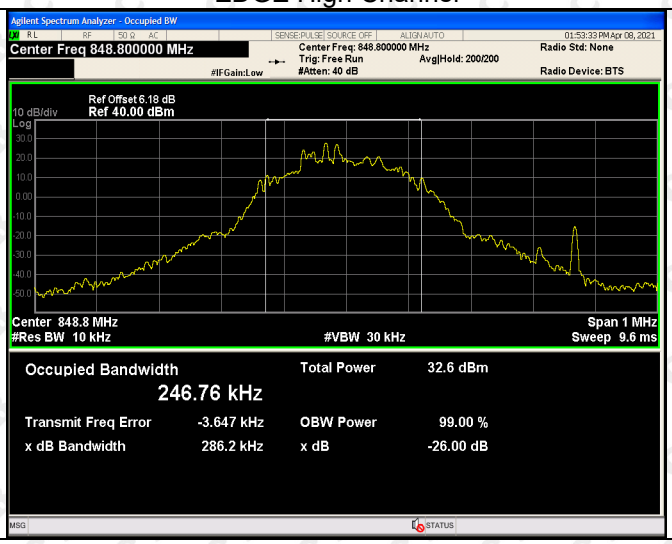
EDGE Low Channel



EDGE Middle Channel

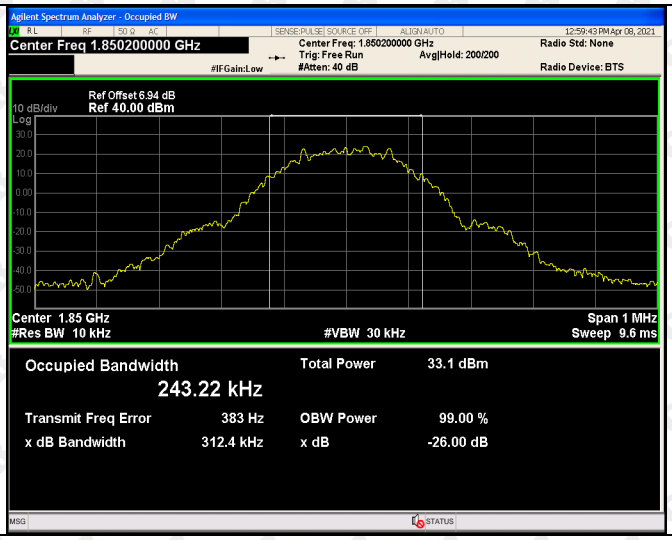


EDGE High Channel

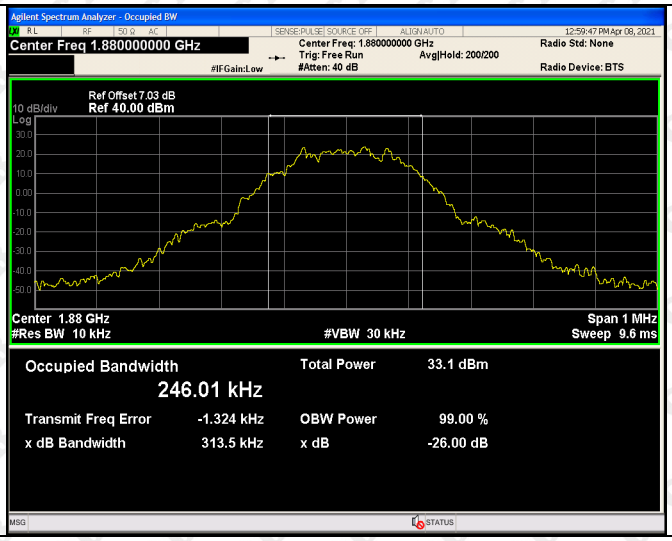


For PCS Band

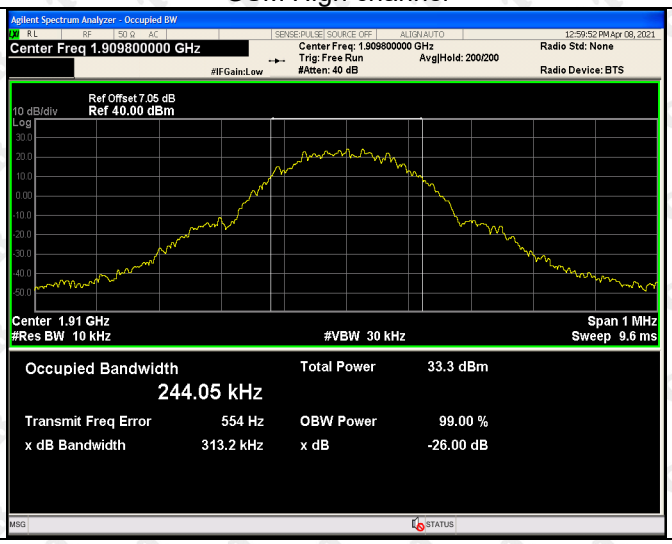
GSM Low Channel



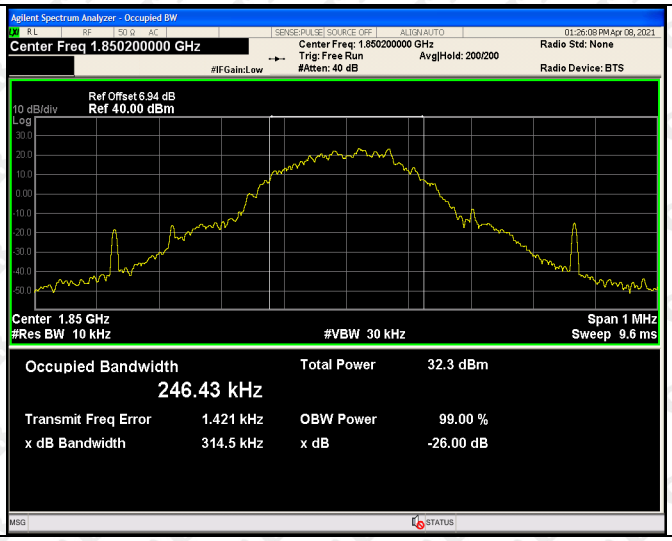
GSM Middle Channel



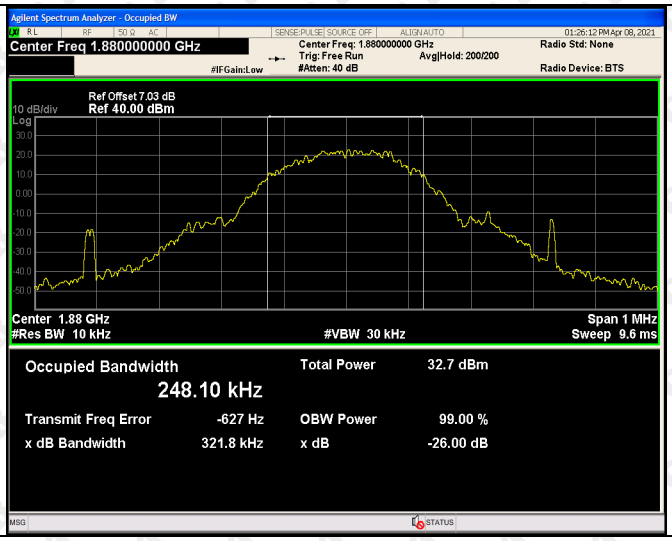
GSM High channel



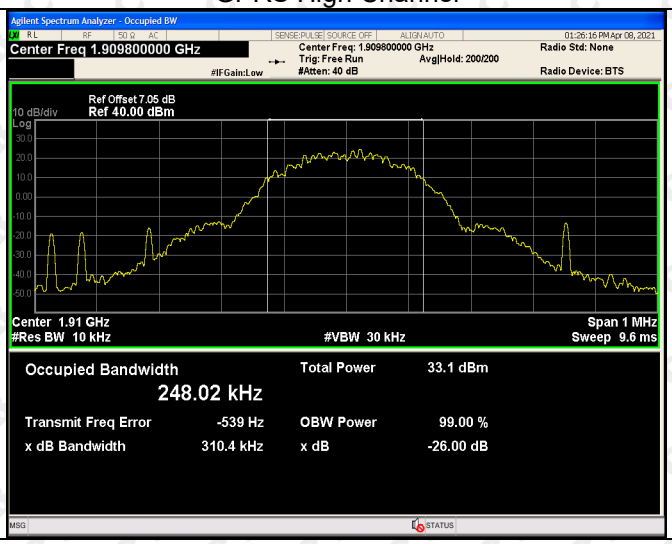
GPRS Low Channel



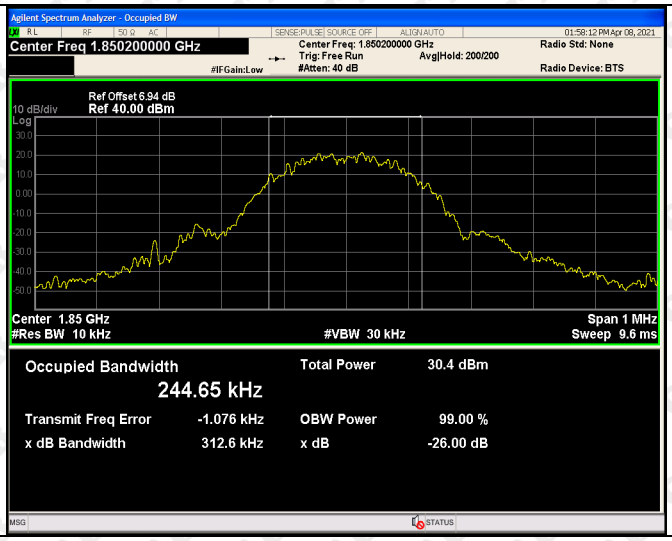
GPRS Middle Channel



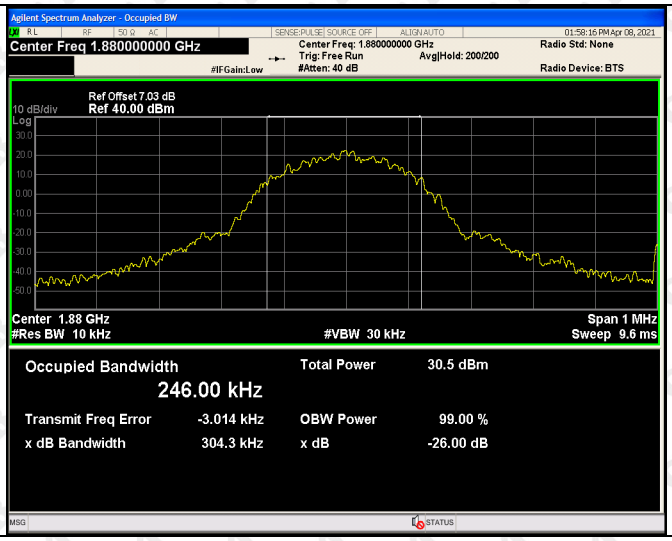
GPRS High Channel



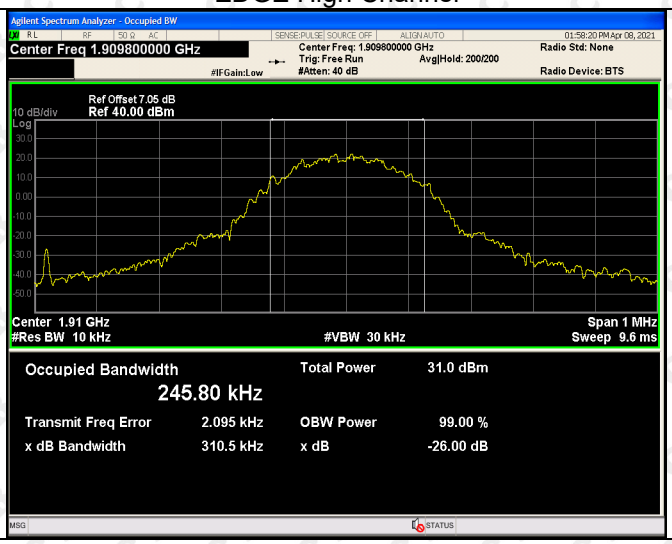
EDGE Low Channel



EDGE Middle Channel

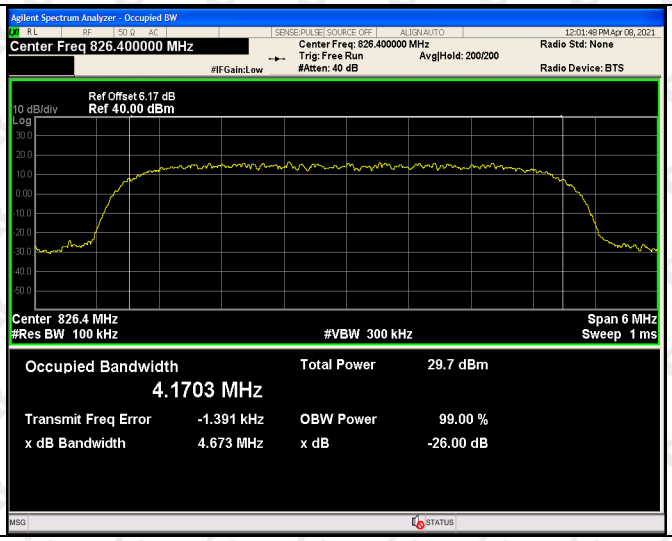


EDGE High Channel

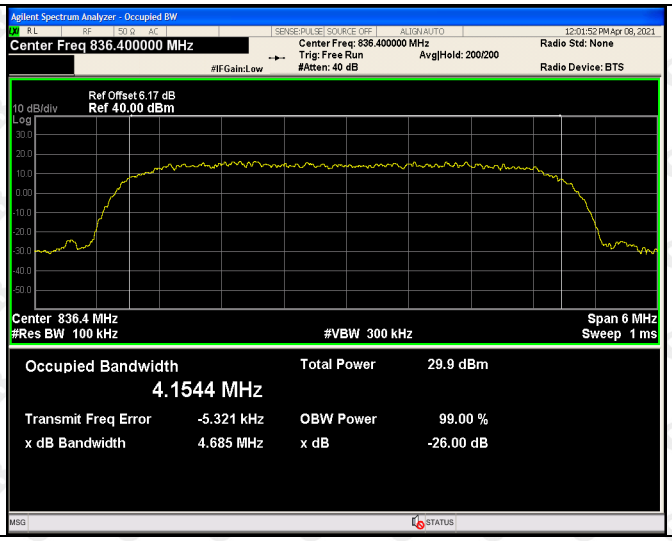


For Band V

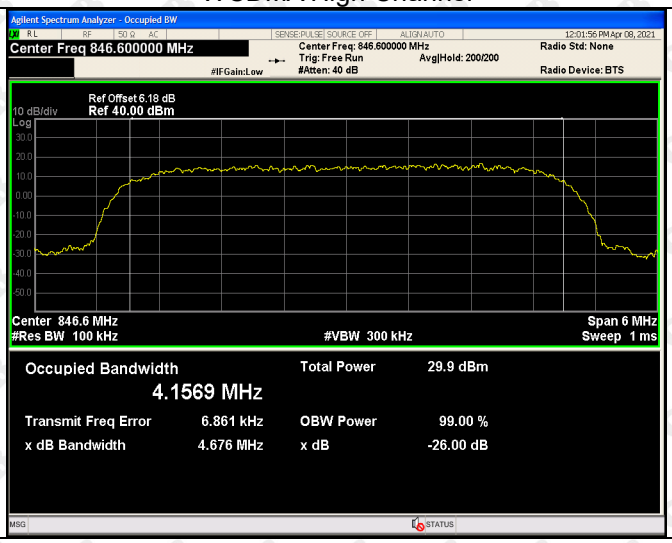
WCDMA Low Channel



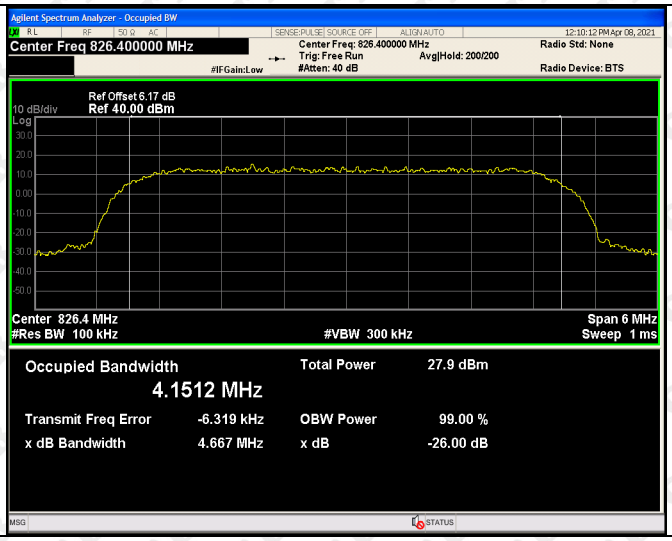
WCDMA Middle Channel



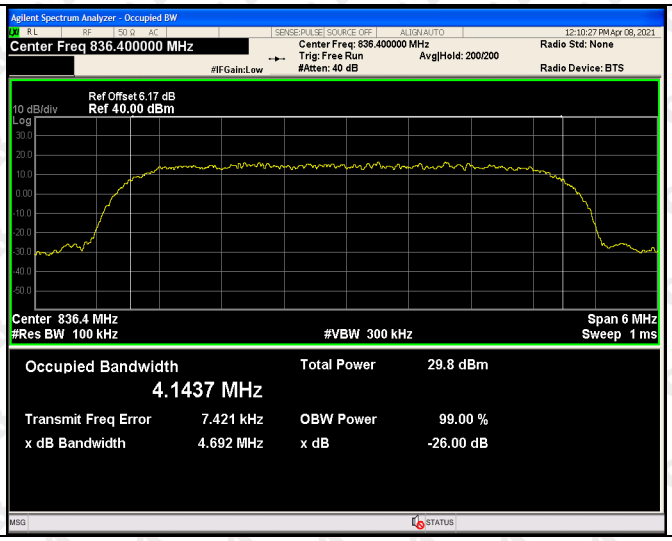
WCDMA High Channel



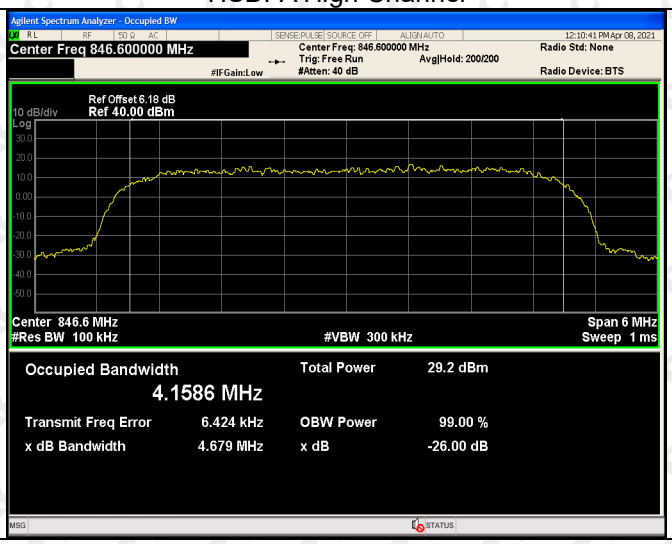
HSDPA Low Channel



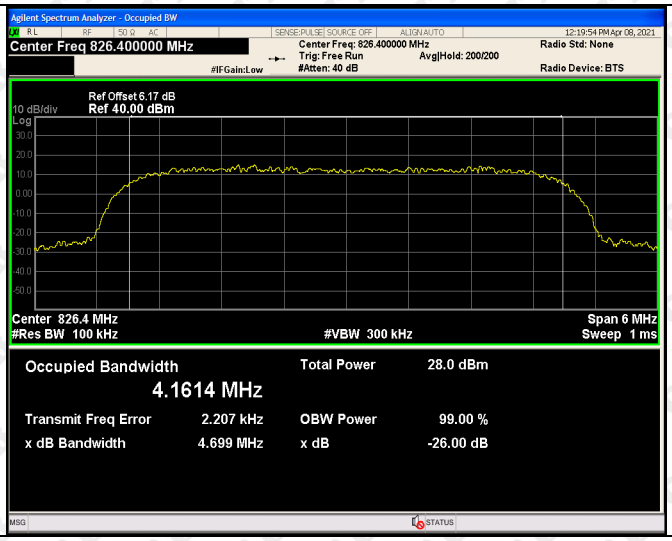
HSDPA Middle Channel



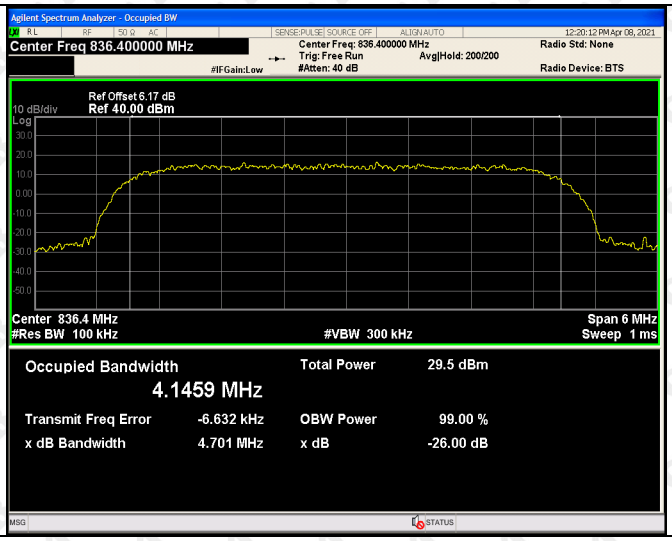
HSDPA High Channel



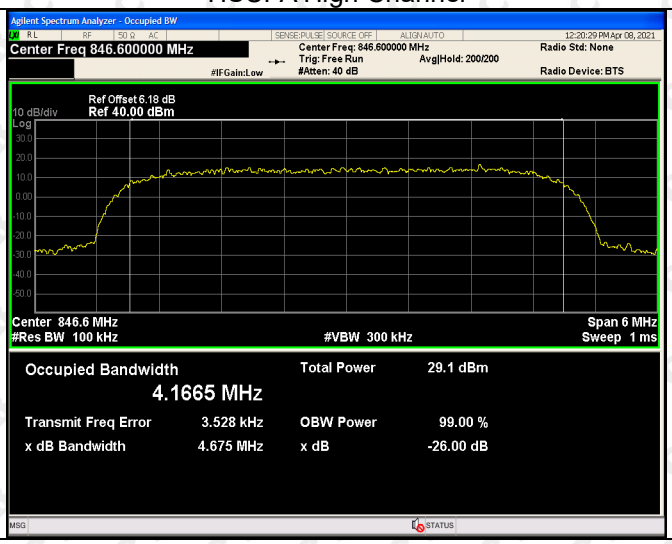
HSUPA Low Channel



HSUPA Middle Channel



HSUPA High Channel



9. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

9.1 Standard Applicable

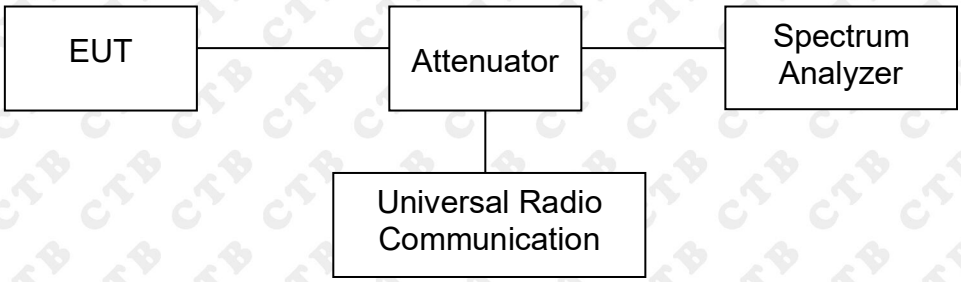
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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:



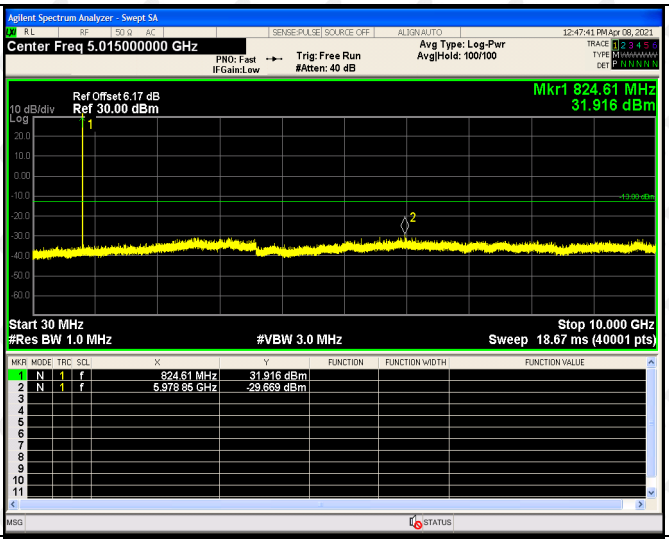
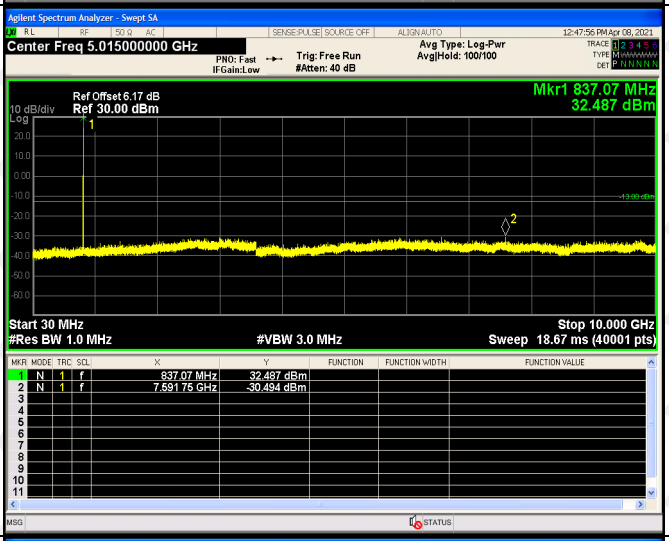
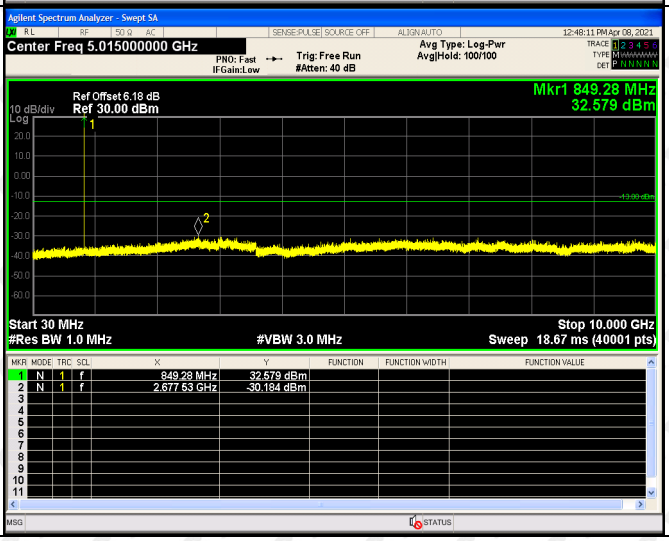
9.3 Environmental Conditions

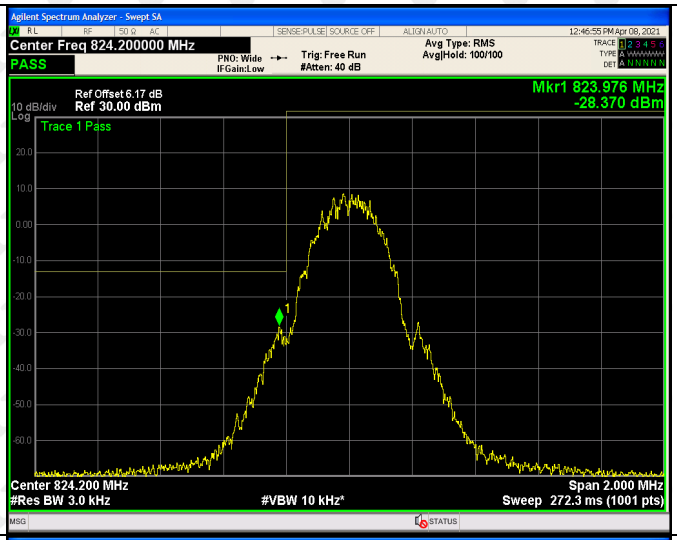
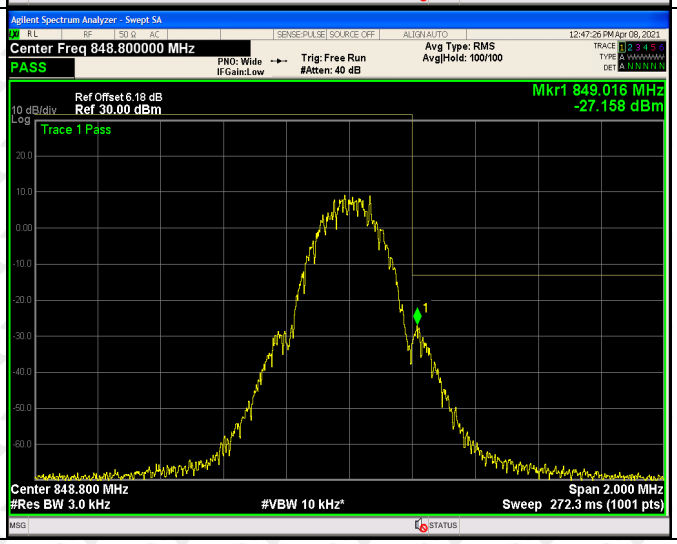
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

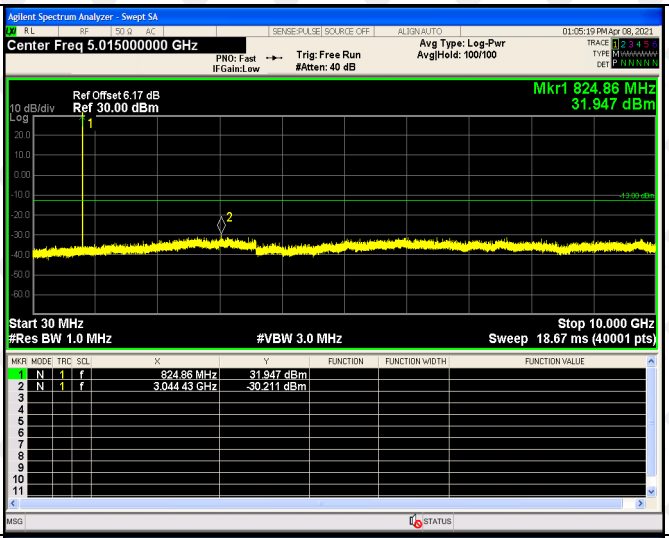
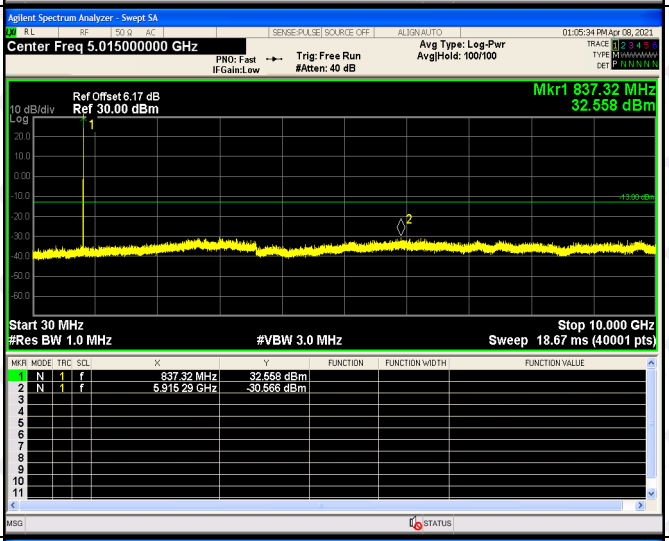
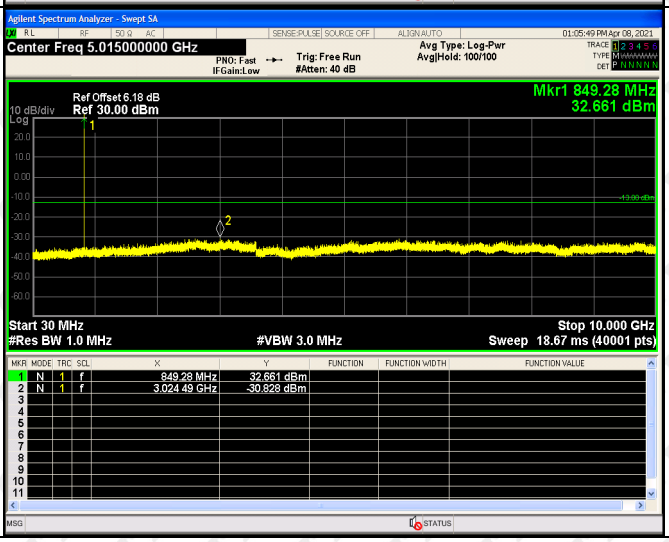
9.4 Summary of Test Results/Plots

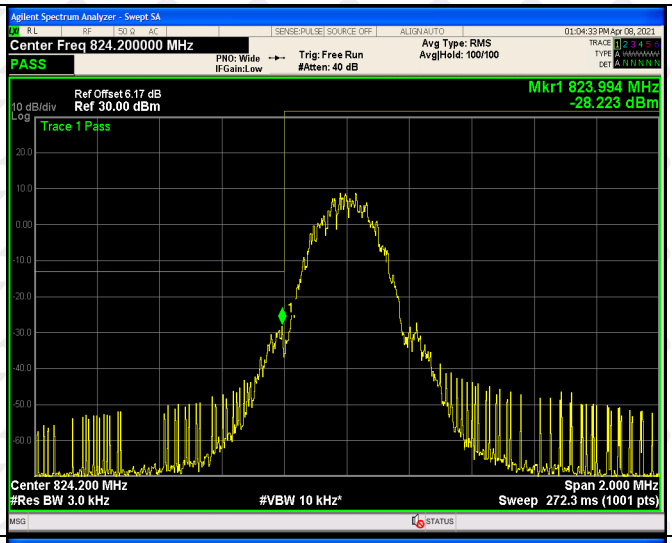
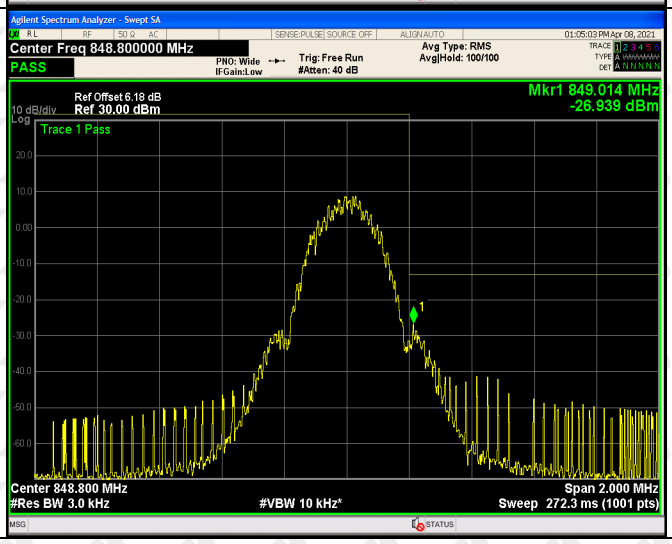
Please refer to the following test plots

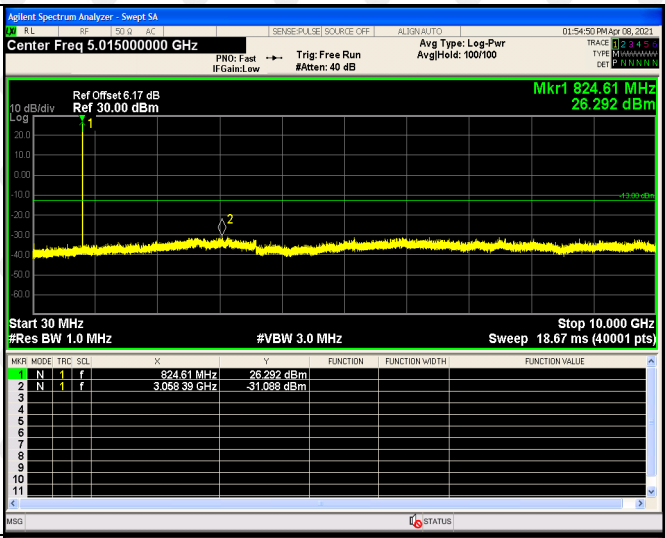
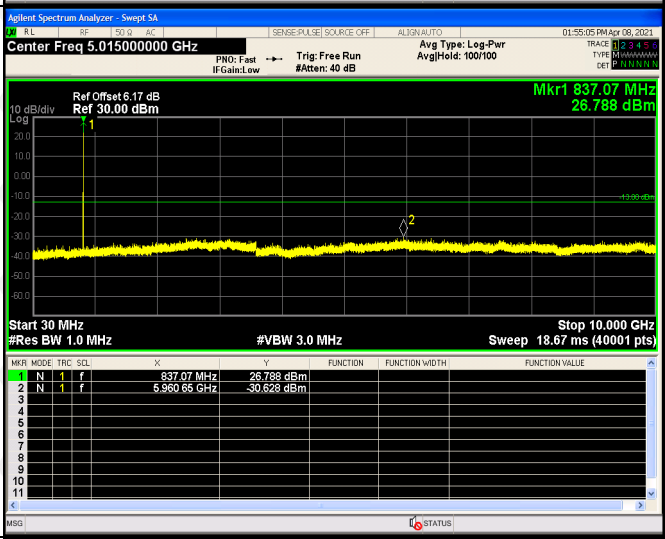
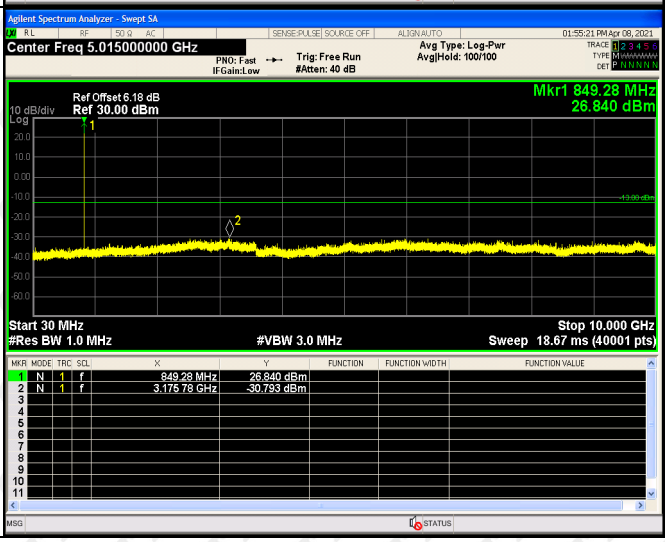
For Cellular Band

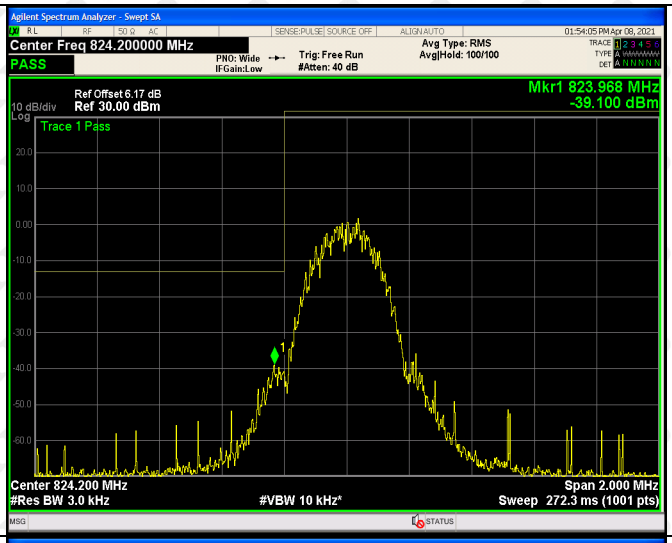
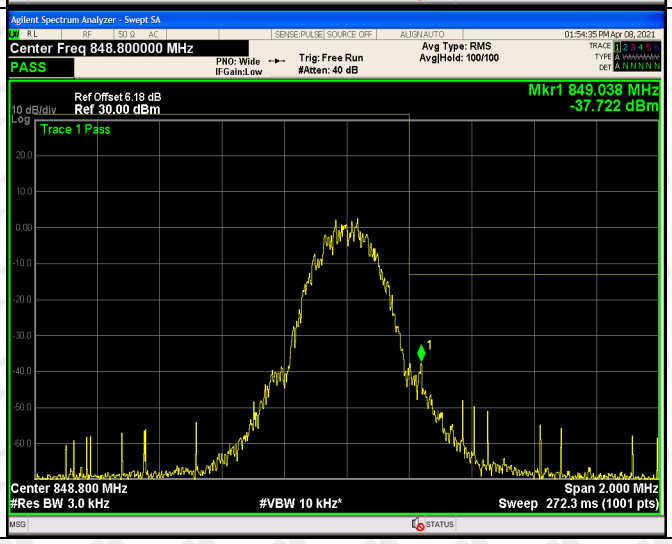
GSM Low Channel			
GSM Middle Channel			
GSM High Channel			

GSM Low Band Emission			
GSM High Band Emission			

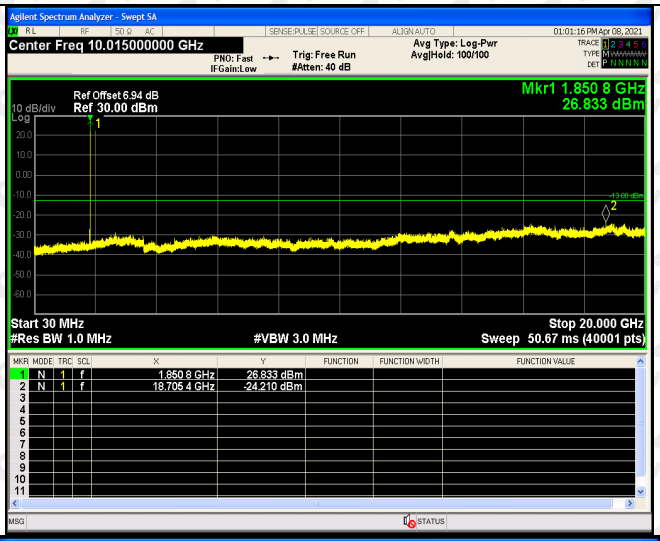
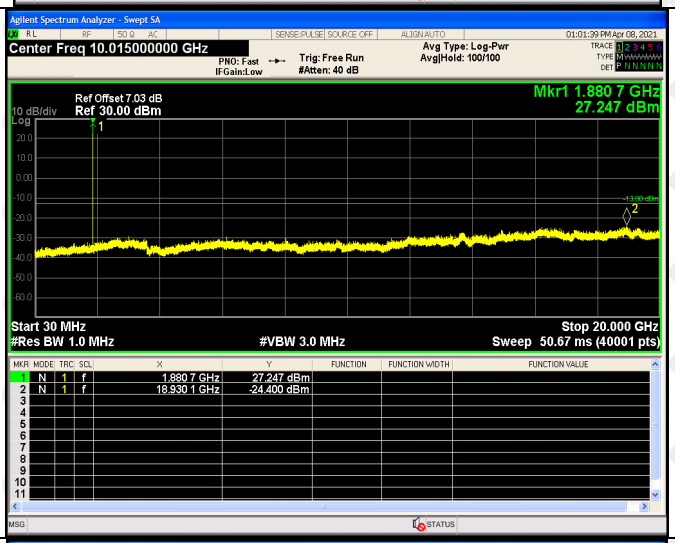
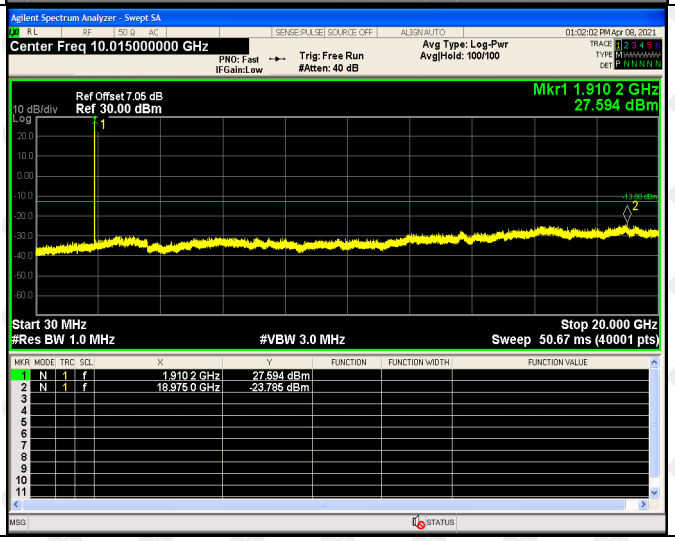
GPRS Low Channel			
GPRS Middle Channel			
GPRS High Channel			

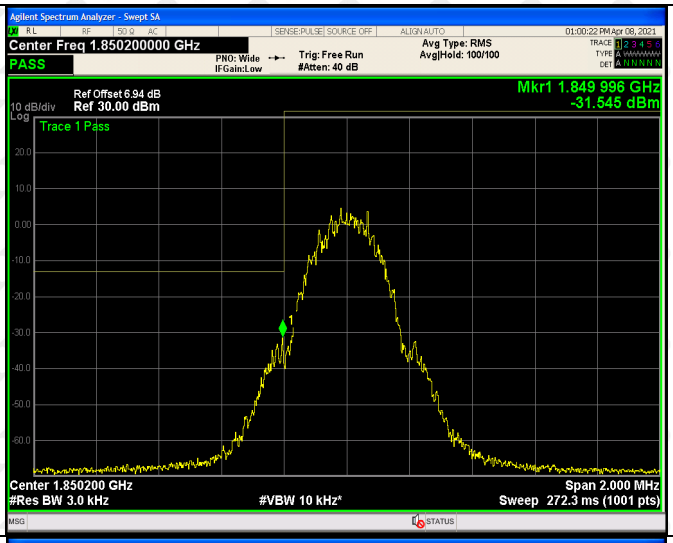
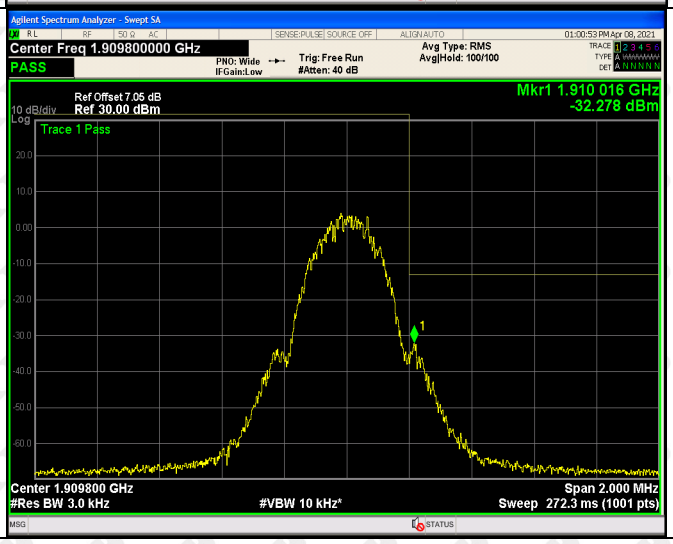
GPRS Low Band Emission			
GPRS High Band Emission			

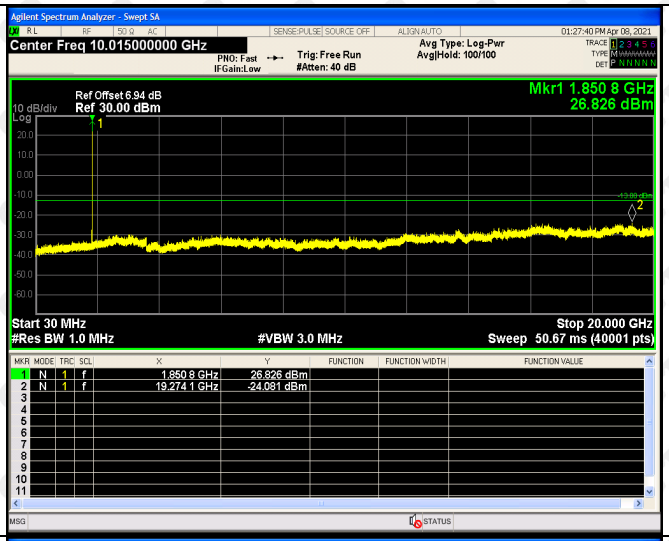
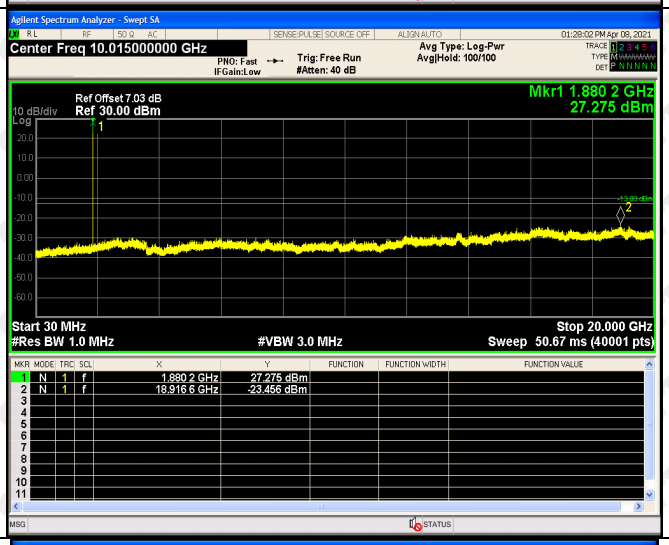
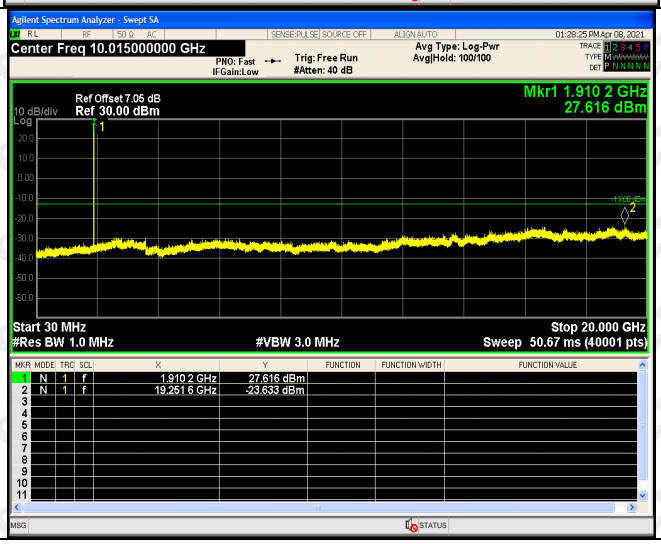
EDGE Low Channel			
EDGE Middle Channel			
EDGE High Channel			

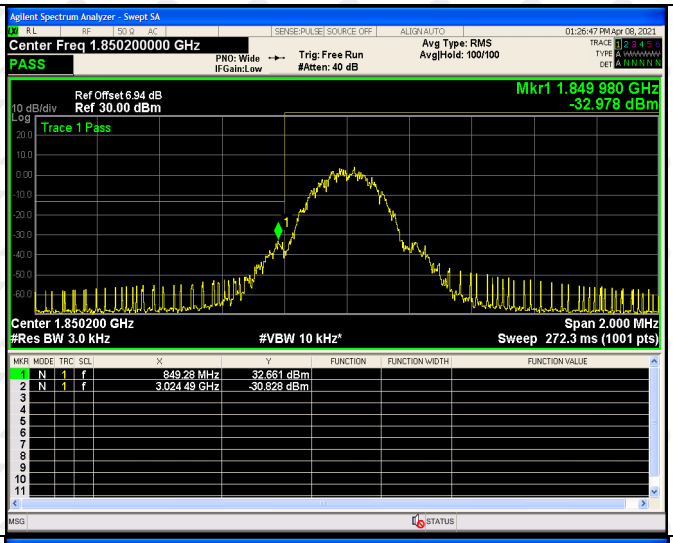
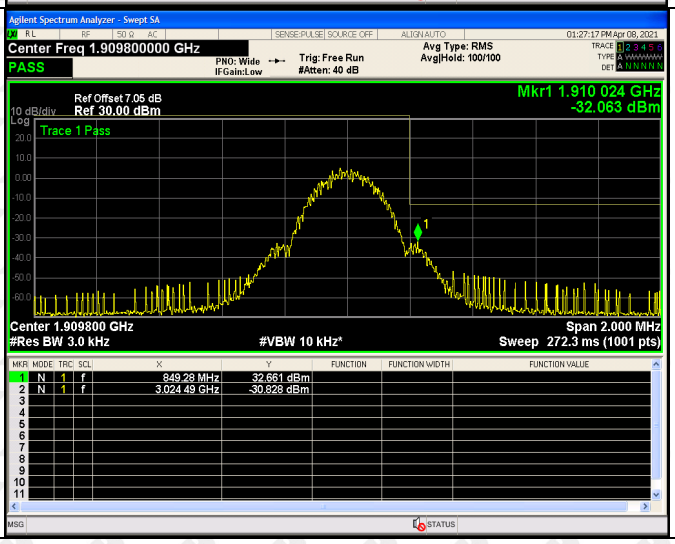
EDGE Low Band Emission			
EDGE High Band Emission			

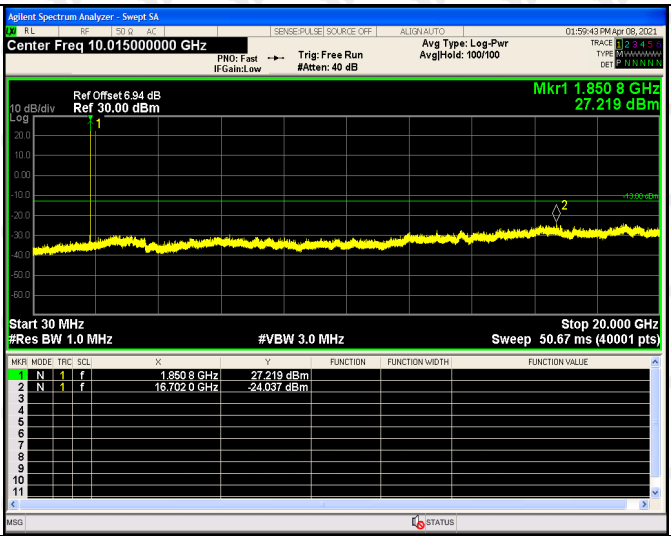
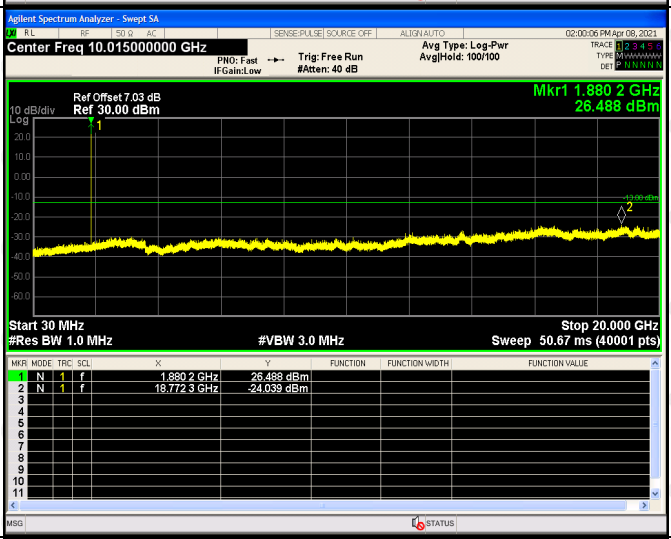
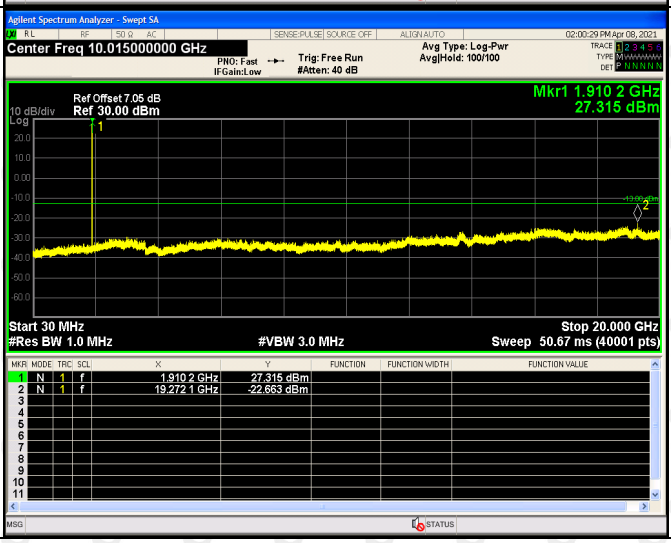
For PCS Band

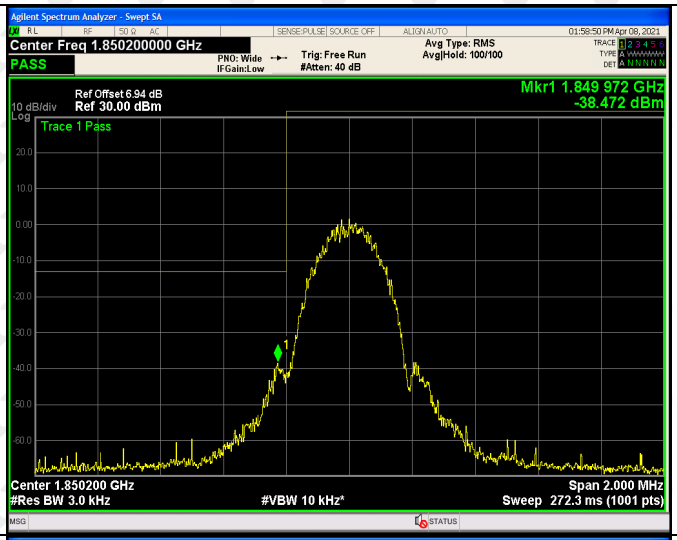
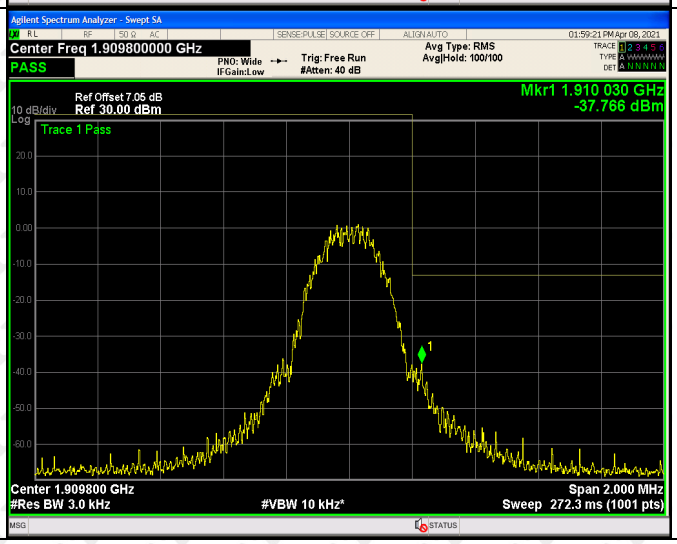
GSM Low Channel			
GSM Middle Channel			
GSM High Channel			

GSM Low Band Emission			
GSM High Band Emission			

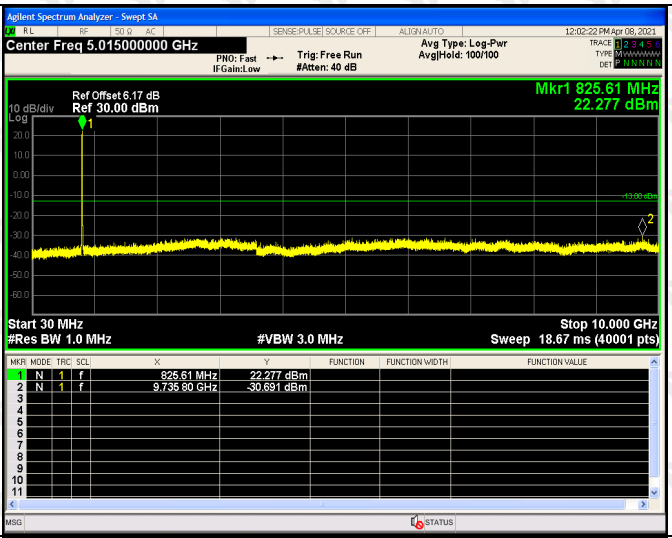
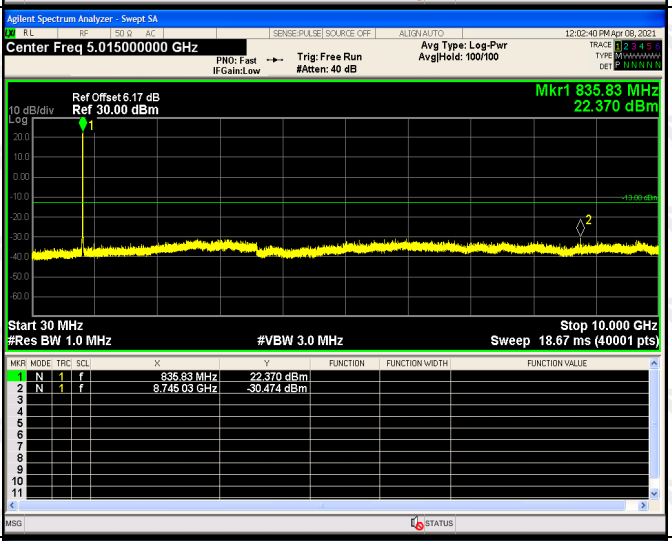
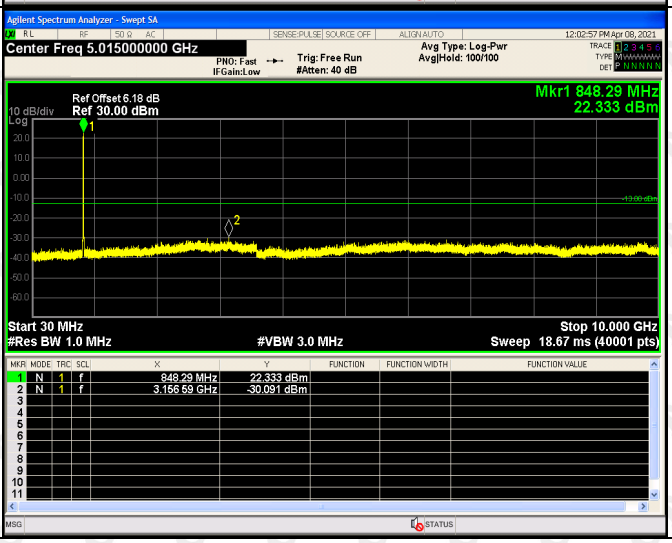
GPRS Low Channel			
GPRS Middle Channel			
GPRS High Channel			

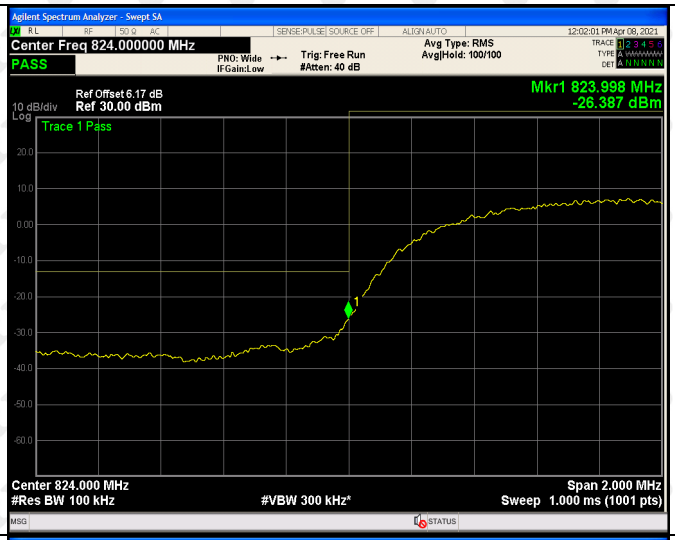
GPRS Low Band Emission			
GPRS High Band Emission			

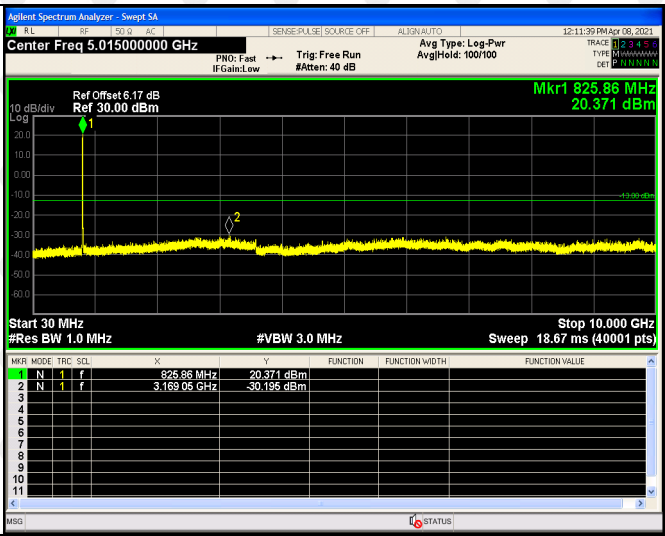
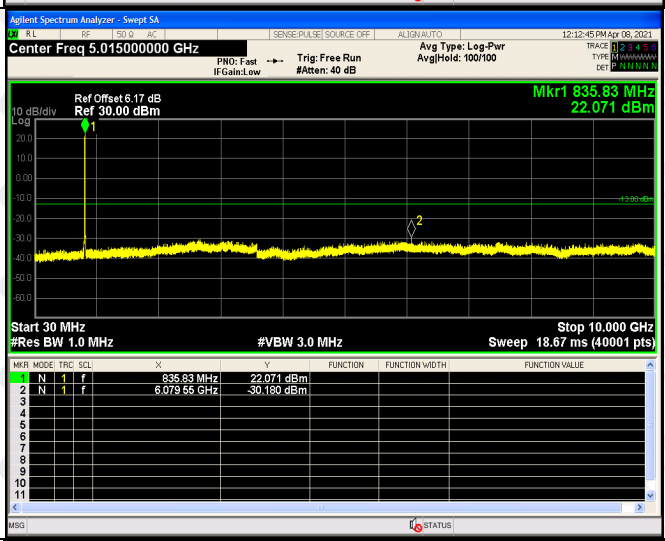
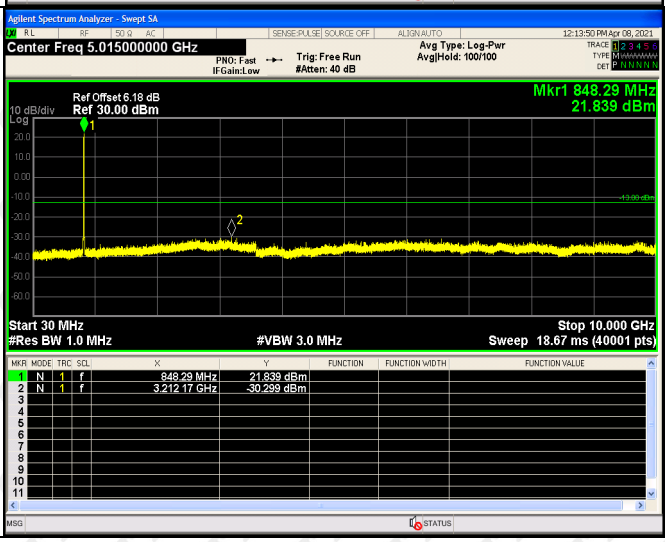
EDGE Low Channel			
EDGE Middle Channel			
EDGE High Channel			

EDGE Low Band Emission			
EDGE High Band Emission			

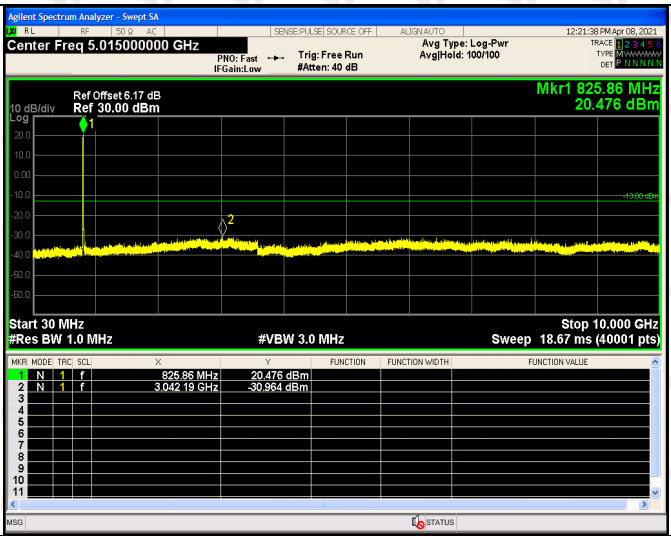
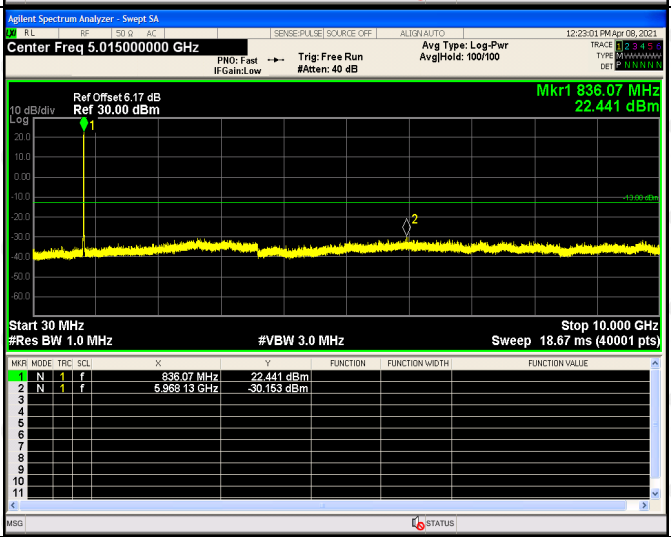
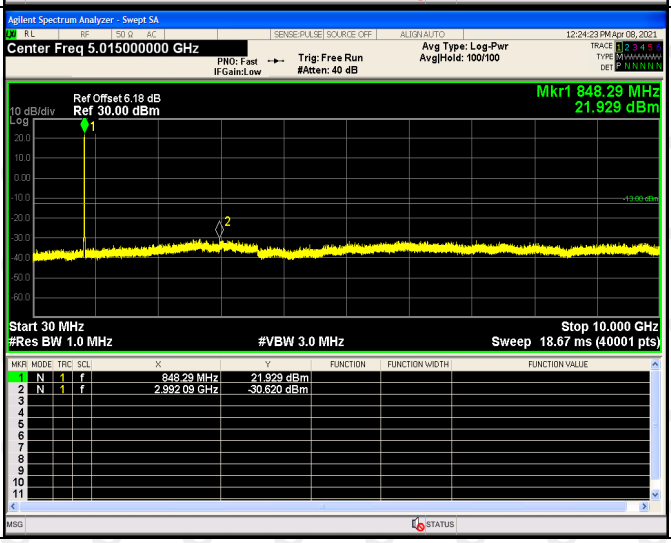
For Band V

WCDMA Low Channel			
WCDMA Middle Channel			
WCDMA High Channel			

WCDMA Low Band Spurious Emission			
WCDMA High Band Spurious Emission			

HSDPA Low Channel			
HSDPA Middle Channel			
HSDPA High Channel			

HSDPA Low Band Spurious Emission			
HSDPA High Band Spurious Emission			

HSUPA Low Channel			
HSUPA Middle Channel			
HSUPA High Channel			

HSUPA Low Band Spurious Emission			
HSUPA High Band Spurious 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	DC6.4V

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	-69.29	4.34	-64.95	-13.00	-51.95	H
1648.4	-54.15	4.94	-49.21	-13.00	-36.21	H
2472.6	-52.93	8.46	-44.47	-13.00	-31.47	H
46.34	-69.17	4.34	-64.83	-13.00	-51.83	V
1648.4	-50.38	4.94	-45.44	-13.00	-32.44	V
2472.6	-50.94	8.46	-42.48	-13.00	-29.48	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	-69.15	4.34	-64.81	-13.00	-51.81	H
1697.6	-49.13	5.29	-43.84	-13.00	-30.84	H
2546.4	-51.42	8.59	-42.83	-13.00	-29.83	H
46.34	-69.20	4.34	-64.86	-13.00	-51.86	V
1697.6	-49.36	5.29	-44.07	-13.00	-31.07	V
2546.4	-51.73	8.59	-43.14	-13.00	-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	-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	-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	-69.50	4.34	-65.16	-13.00	-52.16	H
3819.6	-53.18	10.74	-42.44	-13.00	-29.44	H
5729.4	-56.65	13.71	-42.94	-13.00	-29.94	H
46.34	-68.88	4.34	-64.54	-13.00	-51.54	V
3819.6	-53.25	10.74	-42.51	-13.00	-29.51	V
5729.4	-56.11	13.71	-42.4	-13.00	-29.40	V

For Band 5 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (826.4MHz)						
46.34	-67.77	4.88	-62.89	-13	-49.89	H
1652.8	-57.77	5.29	-52.48	-13	-39.48	H
2479.2	-58.38	8.10	-50.28	-13	-37.28	H
46.34	-68.01	4.95	-63.06	-13	-50.06	V
1652.8	-58.59	5.81	-52.78	-13	-39.78	V
2479.2	-57.78	8.01	-49.77	-13	-36.77	V
Middle Channel (836.6MHz)						
46.34	-69.13	4.66	-64.47	-13	-51.47	H
1672.8	-58.41	5.62	-52.79	-13	-39.79	H
2509.2	-56.96	7.44	-49.52	-13	-36.52	H
46.34	-68.52	5.21	-63.31	-13	-50.31	V
1672.8	-57.64	5.84	-51.80	-13	-38.80	V
2509.2	-57.85	7.64	-50.21	-13	-37.21	V
High Channel (846.6MHz)						
46.34	-68.92	5.22	-63.70	-13	-50.70	H
1693.2	-57.79	5.85	-51.94	-13	-38.94	H
2539.8	-57.76	7.36	-50.40	-13	-37.40	H
46.34	-68.55	4.71	-63.84	-13	-50.84	V
1693.2	-58.23	5.95	-52.27	-13	-39.27	V
2539.8	-58.85	7.27	-51.59	-13	-38.59	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 GSM Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	6.52	0.0078
40	NV	6.73	0.0080
30	NV	6.44	0.0078
20	NV	6.32	0.0076
10	NV	6.71	0.0080
0	NV	6.65	0.0079
-10	NV	6.50	0.0078
-20	NV	6.61	0.0079
-30	NV	6.58	0.0079

For PCS Band GSM 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	15.05	0.0080
40	NV	16.21	0.0086
30	NV	15.95	0.0085
20	NV	15.38	0.0082
10	NV	16.32	0.0087
0	NV	15.46	0.0082
-10	NV	15.09	0.0080
-20	NV	15.59	0.0083
-30	NV	15.64	0.0083

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	26.19	0.0313
40	NV	27.59	0.0330
30	NV	26.55	0.0317
20	NV	26.73	0.0320
10	NV	28.03	0.0335
0	NV	27.06	0.0323
-10	NV	26.96	0.0322
-20	NV	28.14	0.0336
-30	NV	26.44	0.0316

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	24.66	0.0131
40	NV	24.69	0.0131
30	NV	25.34	0.0135
20	NV	24.99	0.0133
10	NV	24.71	0.0131
0	NV	25.74	0.0137
-10	NV	25.69	0.0137
-20	NV	24.83	0.0132
-30	NV	24.58	0.0131

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	21.29	0.0254
40	NV	21.61	0.0258
30	NV	22.56	0.0270
20	NV	21.55	0.0257
10	NV	21.59	0.0258
0	NV	22.54	0.0269
-10	NV	22.38	0.0268
-20	NV	21.51	0.0257
-30	NV	22.46	0.0268

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	15.10	0.0080
40	NV	15.64	0.0083
30	NV	15.91	0.0085
20	NV	14.69	0.0078
10	NV	14.66	0.0078
0	NV	15.39	0.0082
-10	NV	15.75	0.0084
-20	NV	14.55	0.0077
-30	NV	15.96	0.0085

For WCDMA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	1.28	0.0015
40	NV	1.56	0.0019
30	NV	1.60	0.0019
20	NV	2.58	0.0031
10	NV	1.65	0.0019
0	NV	1.57	0.0019
-10	NV	2.43	0.0029
-20	NV	1.53	0.0018
-30	NV	1.50	0.0018

For HSDPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	-14.00	-0.0167
40	NV	-12.54	-0.0150
30	NV	-11.08	-0.0132
20	NV	-15.05	-0.0180
10	NV	-15.69	-0.0188
0	NV	-14.62	-0.0175
-10	NV	-14.43	-0.0172
-20	NV	-15.54	-0.0186
-30	NV	-15.49	-0.0185

For HSUPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	-7.51	-0.0089
40	NV	-4.96	-0.0059
30	NV	-5.96	-0.0071
20	NV	-6.73	-0.0080
10	NV	-7.69	-0.0092
0	NV	-6.62	-0.0079
-10	NV	-7.40	-0.0088
-20	NV	-6.54	-0.0078
-30	NV	-5.48	-0.0066

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): GSM 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	6.71	0.0080
	NV	6.32	0.0076
	HV	6.67	0.0080
Reference Frequency(Middle Channel): GSM 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	15.53	0.0083
	NV	15.38	0.0082
	HV	15.52	0.0083
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	26.48	0.0316
	NV	26.73	0.0320

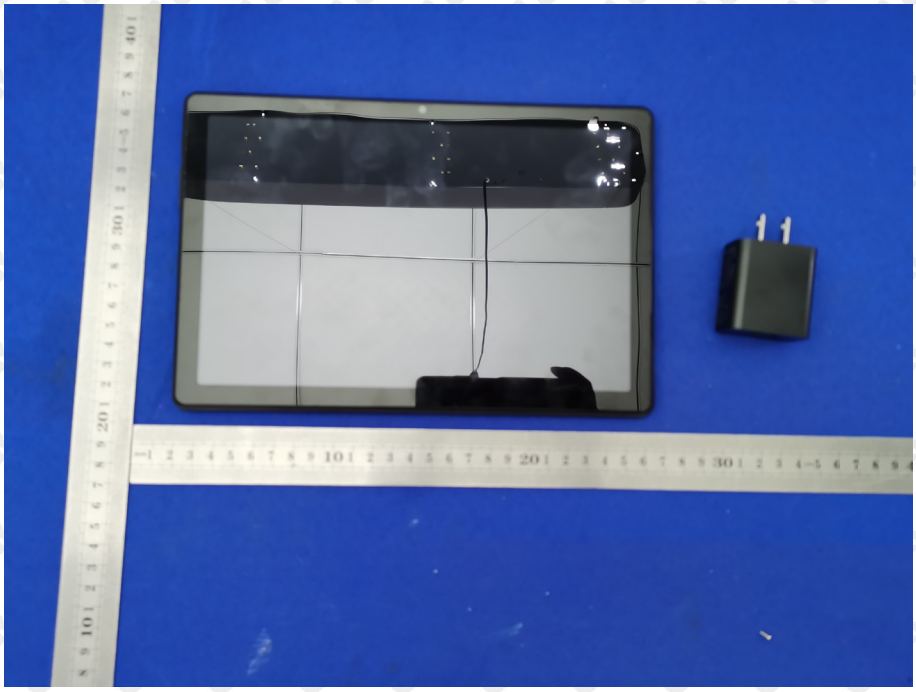
	HV	26.51	0.0141
Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	24.76	0.0132
	NV	24.99	0.0133
	HV	24.74	0.0132

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	21.55	0.0257
	NV	21.52	0.0257
	HV	21.53	0.0257
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	14.67	0.0078
	NV	14.69	0.0078
	HV	14.71	0.0078
Reference Frequency(Middle Channel): WCDMA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	2.22	0.0026
	NV	2.55	0.0031
	HV	2.69	0.0032
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-10.85	-0.0058
	NV	-10.56	-0.0056
	HV	-10.57	-0.0056

Reference Frequency(Middle Channel): HSDPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-15.55	-0.0185
	NV	-15.05	-0.0180
	HV	-15.50	-0.0186
Reference Frequency(Middle Channel): HSUPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-6.66	-0.0079
	NV	-6.72	-0.0080
	HV	-6.61	-0.0080

12. EUT PHOTO

EUT Photo 1



EUT Photo 2

13. EUT TEST PHOTO

Radiated Emission

Below 1G

Above 1G

Conducted Emission

※※※※※ END OF REPORT ※※※※※