

TEST REPORT

Product Name: Your Phone
FCC ID: 2A593-W8
Trademark: N/A
Model Number: W8, Reno4pro, S18, N25, N93, F17pro, Y99, Y77, Y300, X33, X10, X11
Prepared For: Shenzhen Ai Di Er Technology Co., Ltd.
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Manufacturer: aderroo
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Sample Received Date: Mar. 10, 2022
Sample tested Date: Mar. 10, 2022 to Mar. 26, 2022
Issue Date: Mar. 26, 2022
Report No.: CTB220326009RFX
Test Standards: FCC Part 22H & 24E
Test Results: PASS
Remark: This is GSM WCDMA radio test report.

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Approved by:



Rita Xiao / Director

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB220326009RFX	Mar. 26, 2022	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):	W8, Reno4pro, S18, N25, N93, F17pro, Y99, Y77, Y300, X33, X10, X11
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: W8
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz WCDMA Band 5: 824~849MHz
Max. RF output power:	GSM850: 32.89dBm, GSM1900: 28.86dBm WCDMA Band 5: 23.84dBm
Type of Modulation:	GMSK, BPSK
Antenna installation:	Internal antenna
Antenna Gain:	GSM850: 0.4dBi, GSM1900: 0.8dBi WCDMA Band 5: 0.4 dBi
Ratings:	DC 5V charging from adapter Battery DC 3.7V

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
1.	AC adapter	SHENZHEN ENGINE ELECTRONIC CO.,LTD	EE-0501000E	N/A	AE

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
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):	3.7V
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

No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated date	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2021.09.27	2022.08.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2021.09.27	2022.08.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2021.09.27	2022.08.05
4	Communication test set	R&S	CMW500	108058	2021.09.27	2022.08.05
5	Spectrum Analyzer	R&S	FSP40	100550	2021.09.27	2022.08.05
6	Signal Generator	Agilent	N5181A	MY49060920	2021.09.27	2022.08.16
7	Signal Generator	Agilent	N5182A	MY47420195	2021.09.27	2022.08.05
8	Communication test set	Agilent	E5515C	MY50102567	2021.09.27	2022.08.16
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2021.09.27	2022.08.05
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	2021.09.27	2022.08.05
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	2021.09.27	2022.08.05
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	2021.09.27	2022.08.05
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2021.09.27	2022.08.05
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2021.09.27	2022.08.05
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	2021.09.27	2022.08.05

16	966 chamber	C.R.T.	966 Room	966	2021.09.27	2024.08.11
17	Receiver	R&S	ESPI	100362	2021.09.27	2022.08.05
18	Amplifier	HP	8447E	2945A02747	2021.09.27	2022.08.05
19	Amplifier	Agilent	8449B	3008A01838	2021.09.27	2022.08.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	2021.09.27	2022.08.07
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2021.09.27	2022.08.08
22	Software	Fala	EZ-EMC	FA-03A2 RE	2021.09.27	2022.08.05
23	3-Loop Antenna	Daze	ZN30401	17014	2021.09.27	2022.08.05
24	loop antenna	ZHINAN	ZN30900A	/	2021.09.27	2022.08.05
25	Horn antenna	A/H/System	SAS-574	588	2021.09.27	2022.08.05
26	Amplifier	AEROFLEX	/	S/N/ 097	2021.09.27	2022.08.05

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 GSM 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	29.90	1.5	0	H	1.5	0.4	28.80	38.45
824.2	29.98	1.5	0	V	1.5	0.4	28.88	38.45
Middle Channel								
836.6	30.30	1.5	0	H	1.5	0.4	29.20	38.45
836.6	29.56	1.5	0	V	1.5	0.4	28.46	38.45
High Channel								
848.8	29.43	1.5	0	H	1.5	0.4	28.33	38.45
848.8	29.97	1.5	0	V	1.5	0.4	28.87	38.45

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	29.70	1.5	0	H	1.5	0.4	28.60	38.45
824.2	29.54	1.5	0	V	1.5	0.4	28.44	38.45
Middle Channel								
836.6	30.00	1.5	0	H	1.5	0.4	28.90	38.45
836.6	29.53	1.5	0	V	1.5	0.4	28.43	38.45
High Channel								
848.8	29.44	1.5	0	H	1.5	0.4	28.34	38.45
848.8	30.00	1.5	0	V	1.5	0.4	28.90	38.45

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	23.37	1.5	0	H	1.5	0.4	22.27	38.45
824.2	23.29	1.5	0	V	1.5	0.4	22.19	38.45
Middle Channel								
836.6	22.97	1.5	0	H	1.5	0.4	21.87	38.45
836.6	23.22	1.5	0	V	1.5	0.4	22.12	38.45
High Channel								
848.8	23.73	1.5	0	H	1.5	0.4	22.63	38.45
848.8	23.57	1.5	0	V	1.5	0.4	22.47	38.45

EIRP For GSM 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	27.51	1.5	0	H	1.9	0.8	26.41	33
1850.2	27.31	1.5	0	V	1.9	0.8	26.21	33
Middle Channel								
1880	28.74	1.5	0	H	1.9	0.8	27.64	33
1880	28.61	1.5	0	V	1.9	0.8	27.51	33
High Channel								
1909.8	27.80	1.5	0	H	1.9	0.8	26.70	33
1909.8	28.63	1.5	0	V	1.9	0.8	27.53	33

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	26.30	1.5	0	H	1.9	0.8	25.20	33
1850.2	26.71	1.5	0	V	1.9	0.8	25.61	33
Middle Channel								
1880	27.78	1.5	0	H	1.9	0.8	26.68	33
1880	26.91	1.5	0	V	1.9	0.8	25.81	33
High Channel								
1909.8	26.63	1.5	0	H	1.9	0.8	25.53	33
1909.8	27.20	1.5	0	V	1.9	0.8	26.10	33

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	22.69	1.5	0	H	1.9	0.8	21.59	33
1850.2	22.91	1.5	0	V	1.9	0.8	21.81	33
Middle Channel								
1880	22.73	1.5	0	H	1.9	0.8	21.63	33
1880	23.68	1.5	0	V	1.9	0.8	22.58	33
High Channel								
1909.8	22.87	1.5	0	H	1.9	0.8	21.77	33
1909.8	22.80	1.5	0	V	1.9	0.8	21.70	33

ERP For WCDMA Mode Band 5

Frequency	Substitute 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	21.54	1.5	0	H	1.5	0.4	20.44	38.45
826.4	21.47	1.5	0	V	1.5	0.4	20.37	38.45
Middle Channel								
836.6	21.48	1.5	0	H	1.5	0.4	20.38	38.45
836.6	21.60	1.5	0	V	1.5	0.4	20.50	38.45
High Channel								
846.6	21.53	1.5	0	H	1.5	0.4	20.43	38.45
846.6	21.01	1.5	0	V	1.5	0.4	19.91	38.45

ERP For HSDPA Mode Band 5

Frequency	Substitute 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	20.56	1.5	0	H	1.5	0.4	19.46	38.45
826.4	21.30	1.5	0	V	1.5	0.4	20.20	38.45
Middle Channel								
836.6	21.03	1.5	0	H	1.5	0.4	19.93	38.45
836.6	20.70	1.5	0	V	1.5	0.4	19.60	38.45
High Channel								
846.6	21.28	1.5	0	H	1.5	0.4	20.18	38.45
846.6	21.06	1.5	0	V	1.5	0.4	19.96	38.45

ERP For HSUPA Mode Band 5

Frequency	Substitute 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	19.97	1.5	0	H	1.5	0.4	27.14	38.45
826.4	19.73	1.5	0	V	1.5	0.4	21.6	38.45
Middle Channel								
836.6	20.28	1.5	0	H	1.5	0.4	20.16	38.45
836.6	19.98	1.5	0	V	1.5	0.4	20.75	38.45
High Channel								
846.6	19.53	1.5	0	H	1.5	0.4	26.76	38.45
846.6	19.60	1.5	0	V	1.5	0.4	21.43	38.45

Note: Result = Substitute - 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	32.89	38.45
	Middle Channel	836.6	32.85	38.45
	High Channel	848.8	32.64	38.45
GPRS(1 Slot)	Low Channel	824.2	32.84	38.45
	Middle Channel	836.6	32.79	38.45
	High Channel	848.8	32.64	38.45
EDGE(1 Slot)	Low Channel	824.2	25.93	38.45
	Middle Channel	836.6	26.07	38.45
	High Channel	848.8	25.32	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	28.86	33.0
	Middle Channel	1880.0	28.49	33.0
	High Channel	1909.8	28.27	33.0
GPRS(1 Slot)	Low Channel	1850.2	28.84	33.0
	Middle Channel	1880.0	28.46	33.0
	High Channel	1909.8	28.22	33.0
EDGE(1 Slot)	Low Channel	1850.2	25.91	33.0
	Middle Channel	1880.0	25.62	33.0
	High Channel	1909.8	25.73	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	23.79	38.45
	Middle Channel	836.6	23.84	38.45
	High Channel	846.6	23.71	38.45
HSDPA	Low Channel	826.4	22.82	38.45
	Middle Channel	836.6	22.88	38.45
	High Channel	846.6	22.73	38.45
HSUPA	Low Channel	826.4	21.82	38.45
	Middle Channel	836.6	22.69	38.45
	High Channel	846.6	22.53	38.45

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

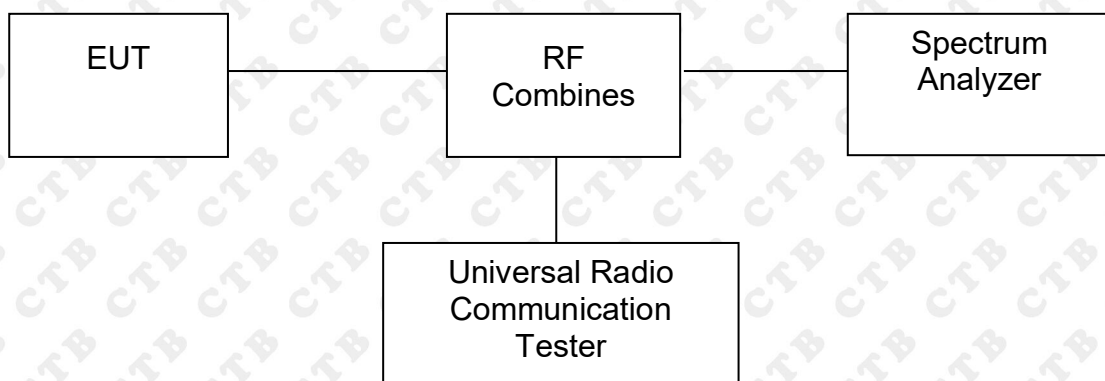
7.1 Standard Applicable

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 GSM850

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	190	836.6	2.69	13
GPRS(1 Slot)	190	836.6	2.55	13
EDGE(1 Slot)	190	836.6	2.56	13

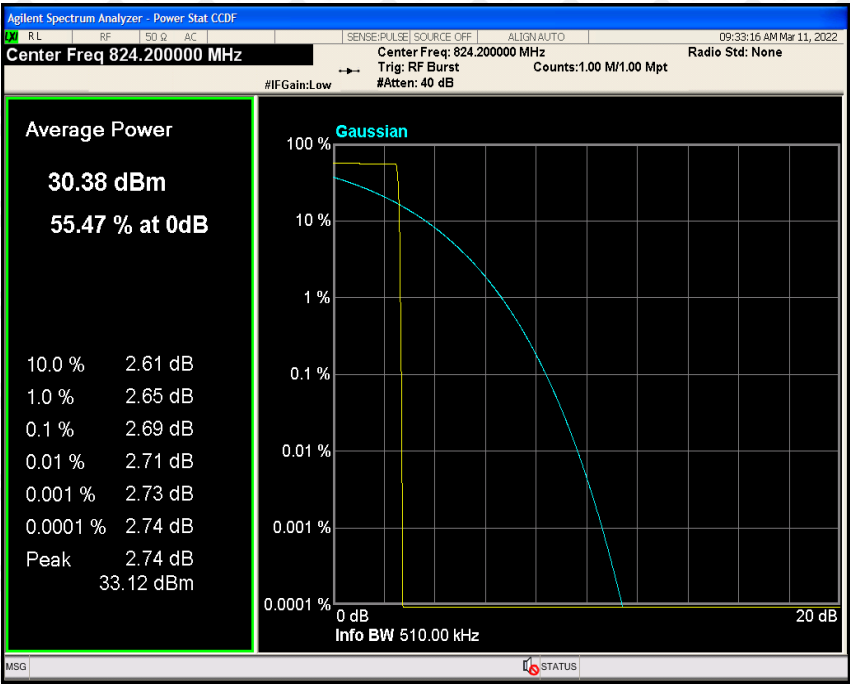
For PCS 1900

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	512	1850.2	2.69	13
GPRS(1 Slot)	512	1850.2	2.38	13
EDGE(1 Slot)	512	1850.2	2.23	13

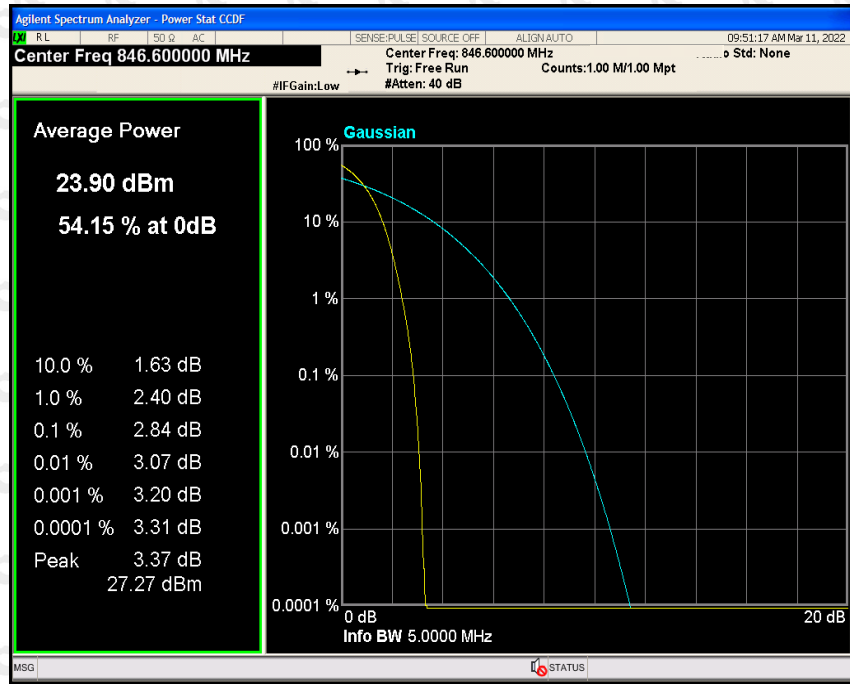
For WCDMA Band 5

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	4182	836.4	2.92	13
HSDPA	4182	836.4	2.80	13
HSUPA	4182	836.4	2.81	13

GSM :



WCDMA:



8. EMISSION BANDWIDTH

8.1 Standard Applicable

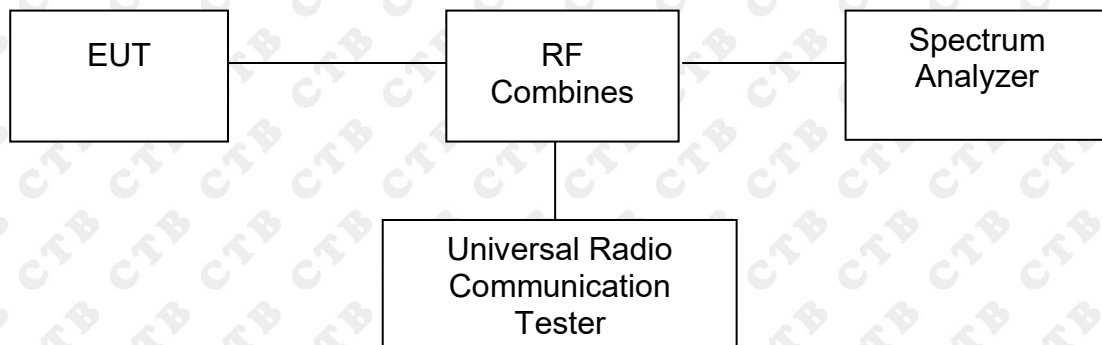
According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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	248.044	309.916
	190	836.6	245.742	313.795
	251	848.8	250.061	318.685
GPRS	128	824.2	255.041	319.922
	190	836.6	246.054	314.825
	251	848.8	240.630	312.125
EDGE	128	824.2	349.753	475.109
	190	836.6	352.038	472.553
	251	848.8	348.708	470.026

For PCS Band

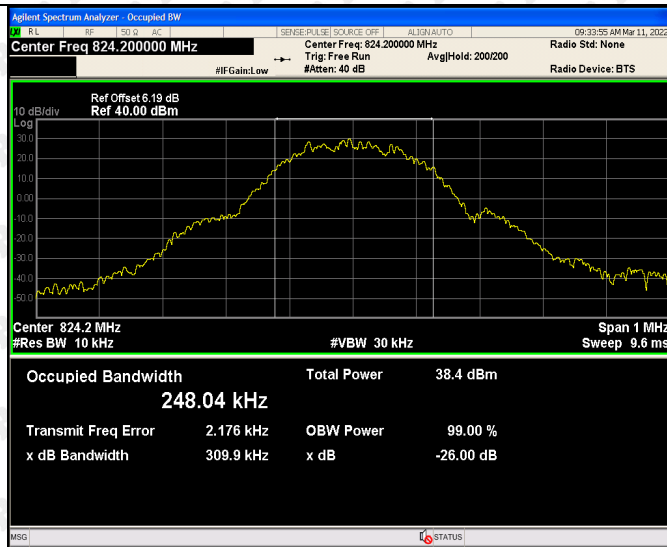
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	512	1850.2	247.337	323.545
	661	1880.0	246.634	315.744
	810	1909.8	243.337	316.653
GPRS	512	1850.2	243.084	320.645
	661	1880.0	248.170	321.142
	810	1909.8	247.380	316.413
EDGE	512	1850.2	223.498	271.067
	661	1880.0	268.722	321.434
	810	1909.8	218.605	244.315

For Band 5

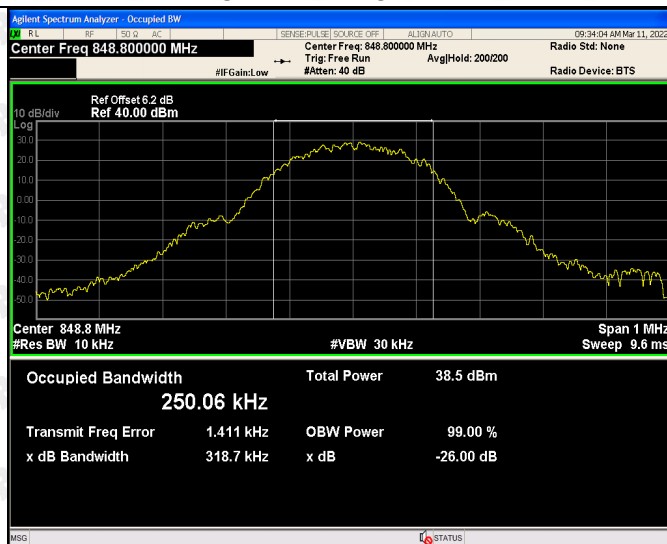
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
WCDMA	4132	826.4	4148.977	4692.508
	4183	836.6	4165.695	4691.635
	4233	846.6	4149.265	4682.818
HSDPA	4132	826.4	4173.739	4699.089
	4183	836.6	4150.651	4659.347
	4233	846.6	4172.037	4698.054
HSUPA	4132	826.4	4162.704	4702.725
	4183	836.6	4145.328	4662.198
	4233	846.6	4156.074	4687.130

For Cellular Band

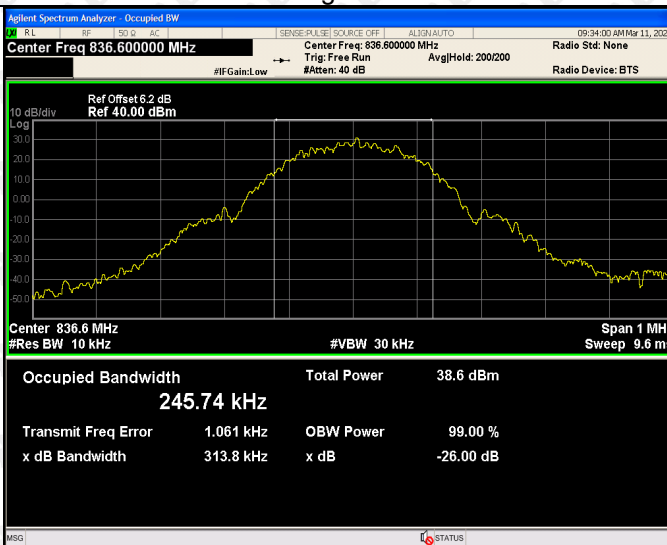
GSM Low Channel



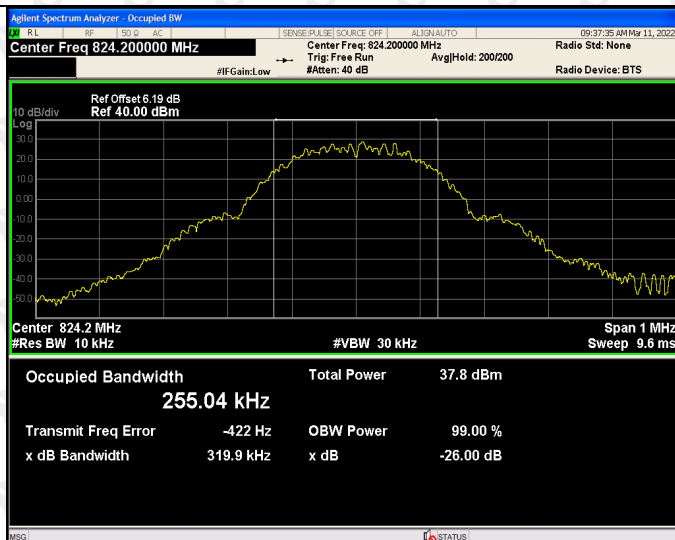
GSM Middle Channel



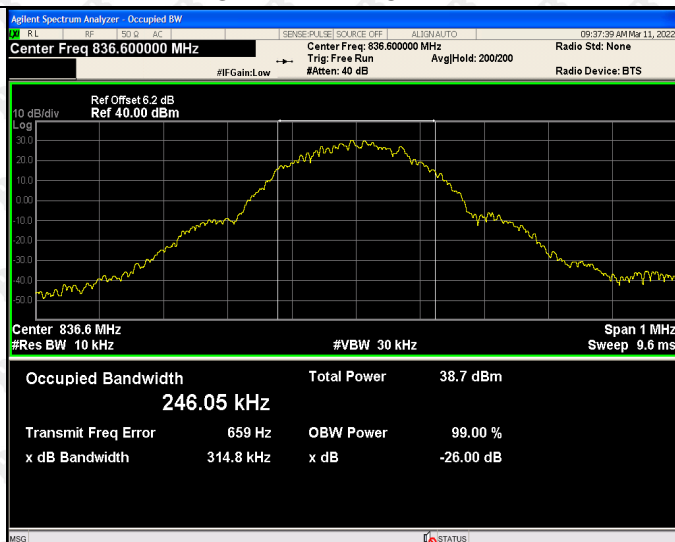
GSM High Channel



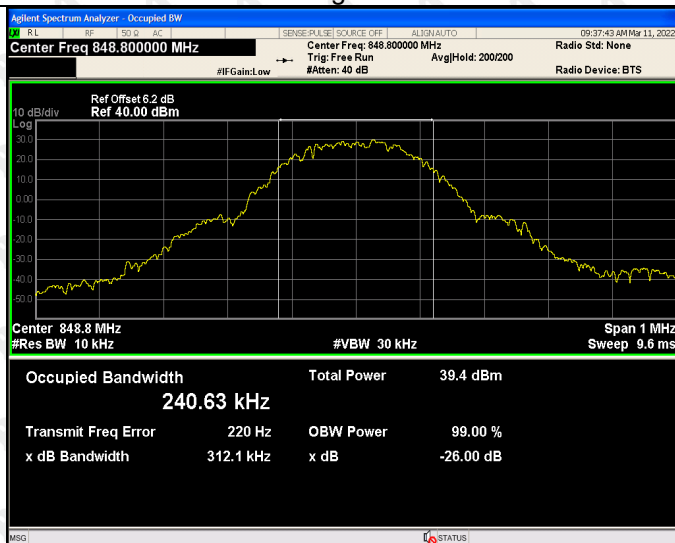
GPRS Low Channel



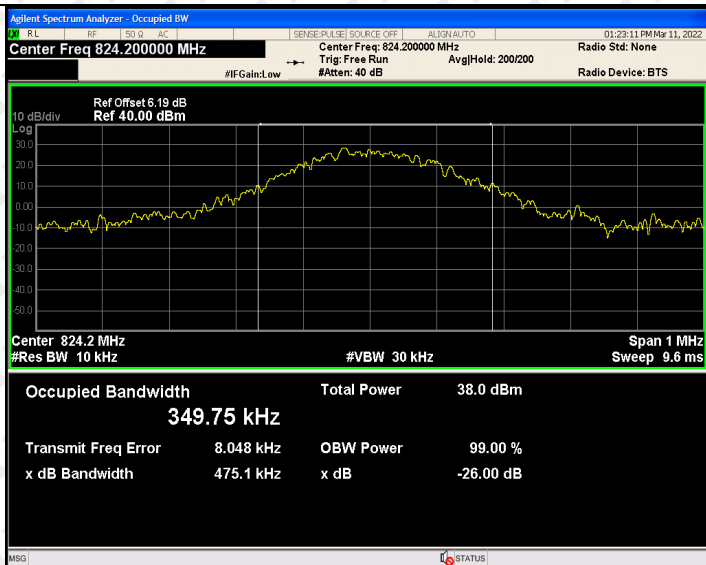
GPRS Middle Channel



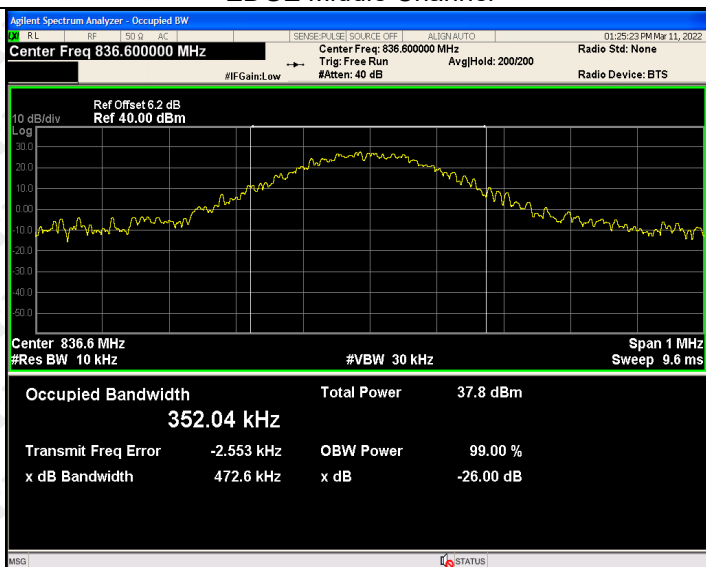
GPRS High Channel



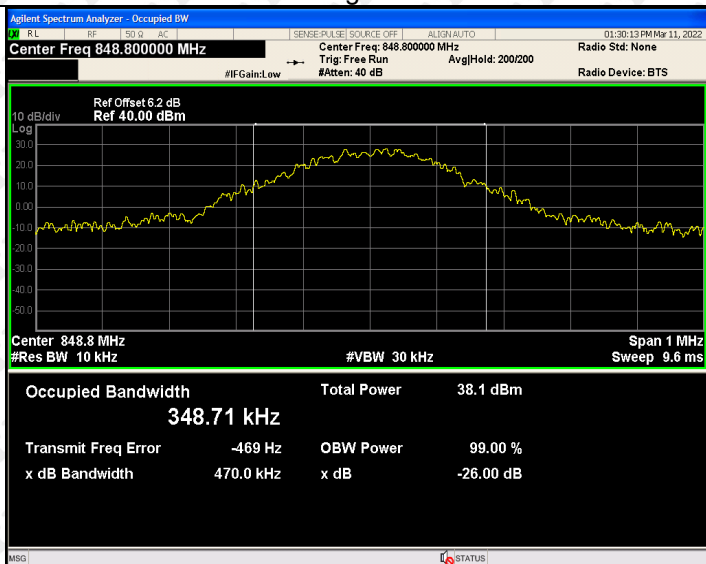
EDGE Low Channel



EDGE Middle Channel

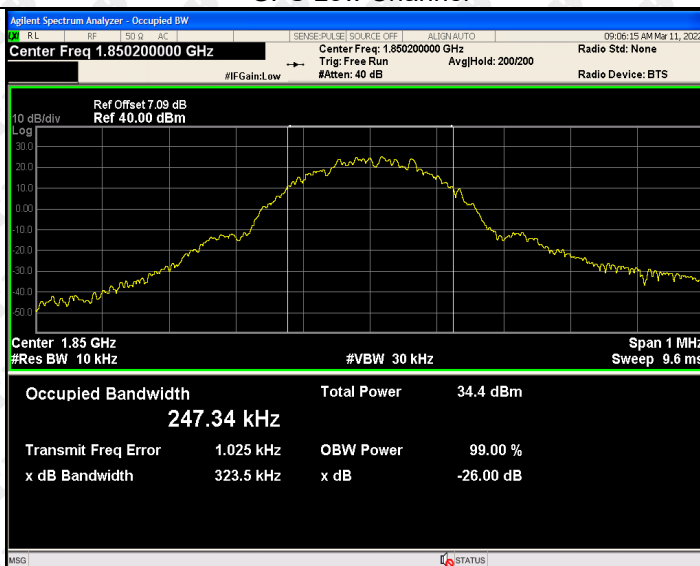


EDGE High Channel

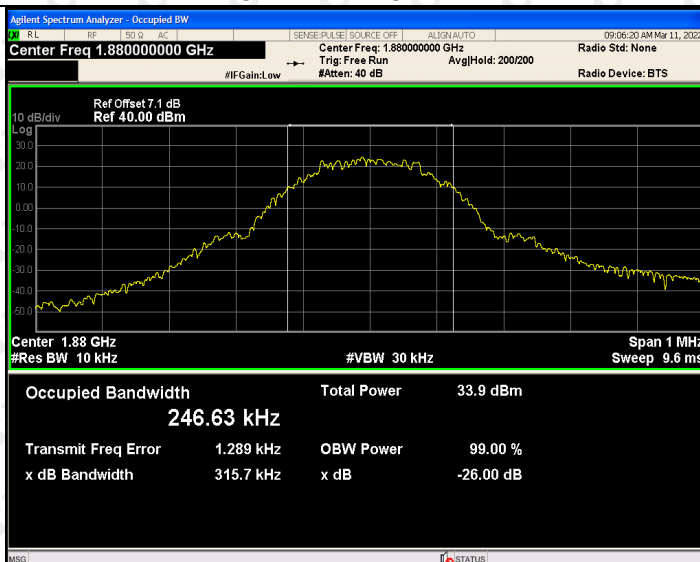


For PCS Band

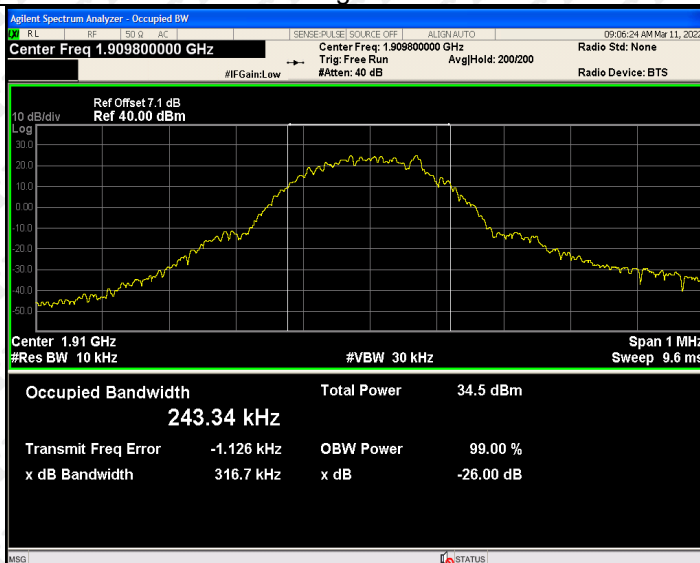
GPS Low Channel



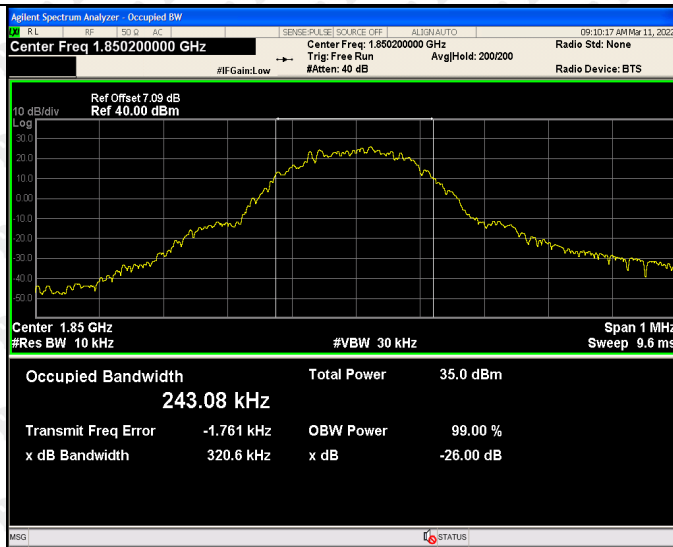
GPS Middle Channel



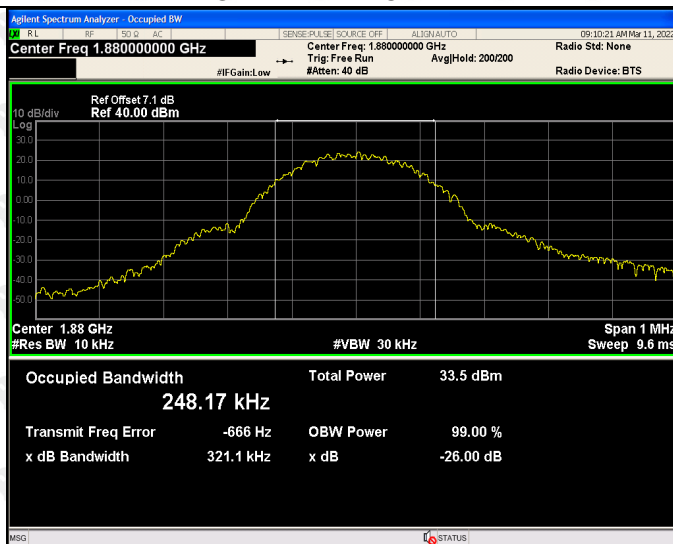
GPS High Channel



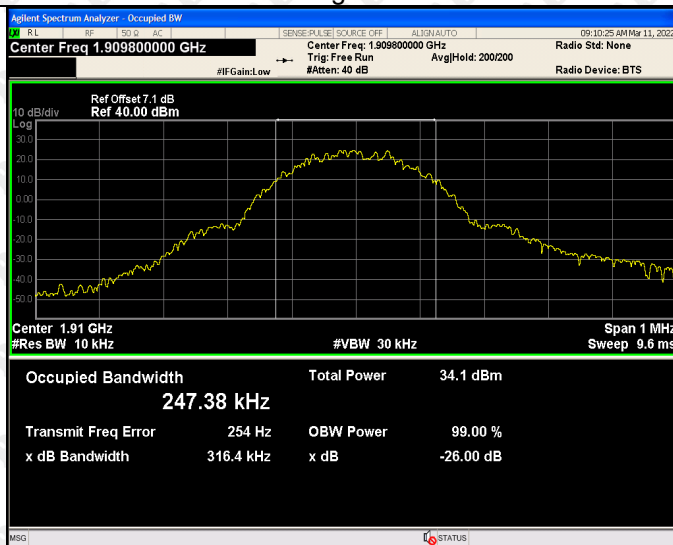
GPRS Low Channel



GPRS Middle Channel



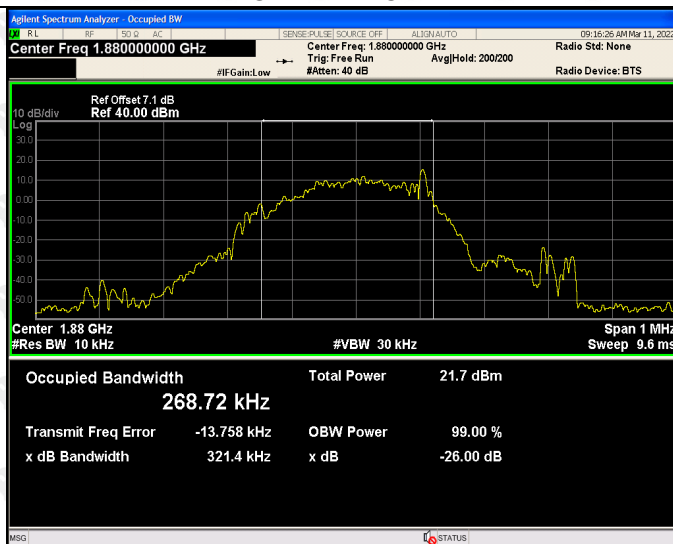
GPRS High Channel



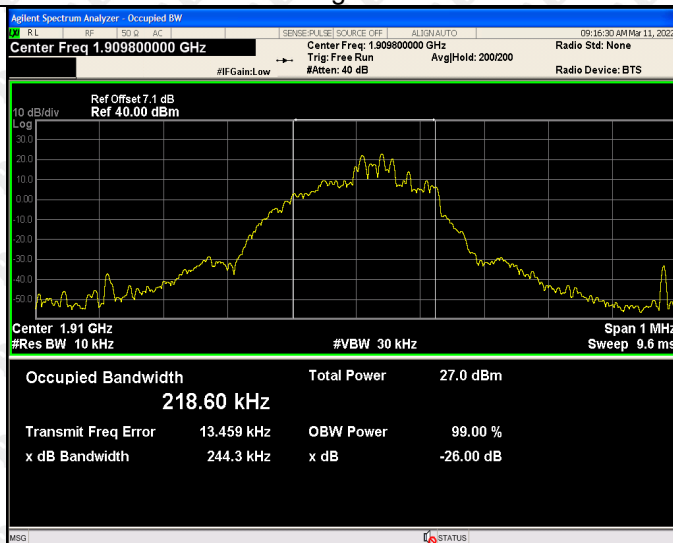
EDGE Low Channel



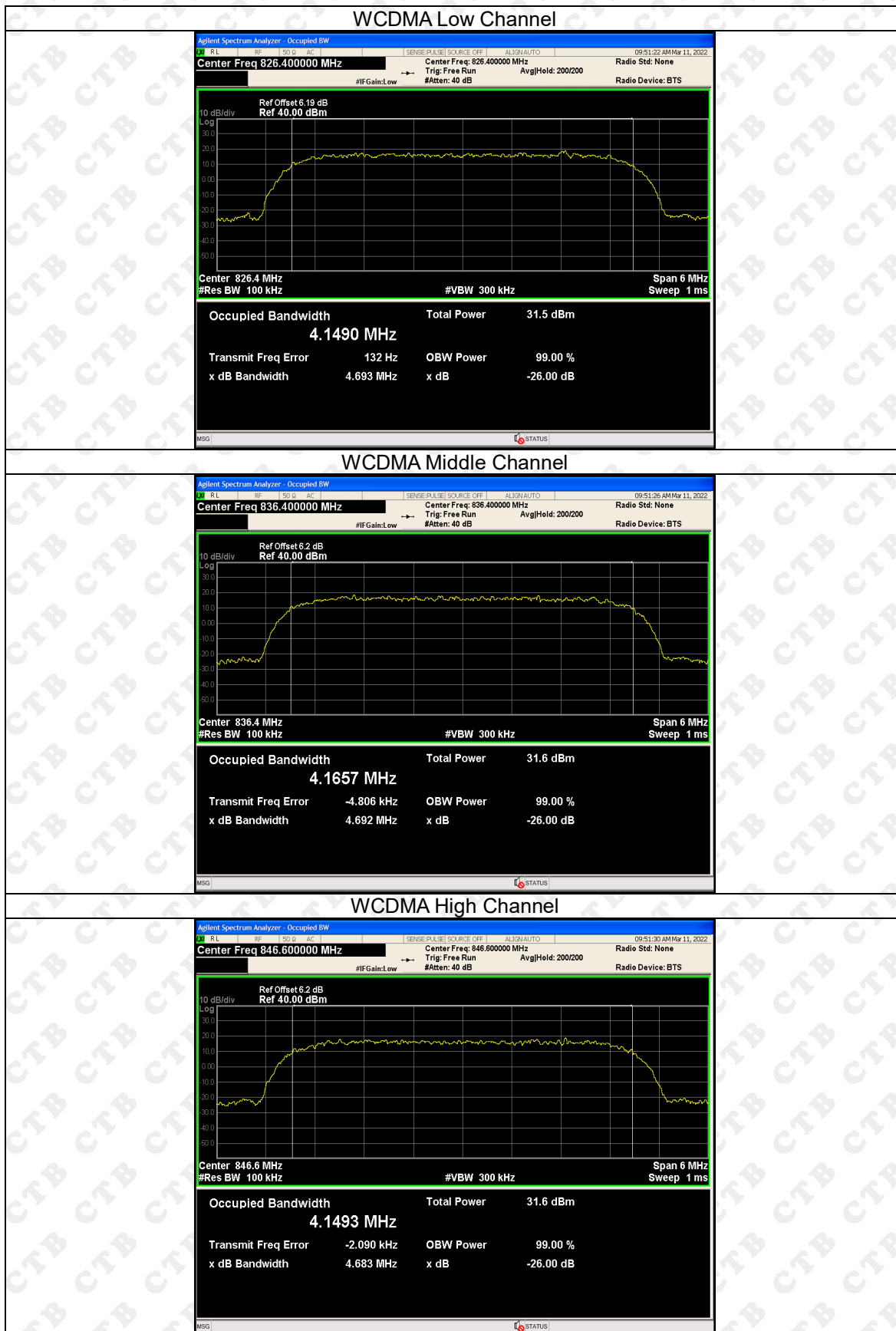
EDGE Middle Channel



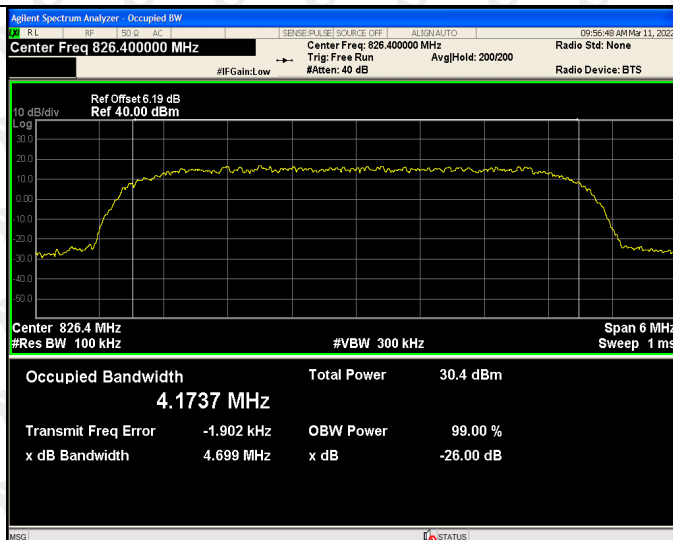
EDGE High Channel



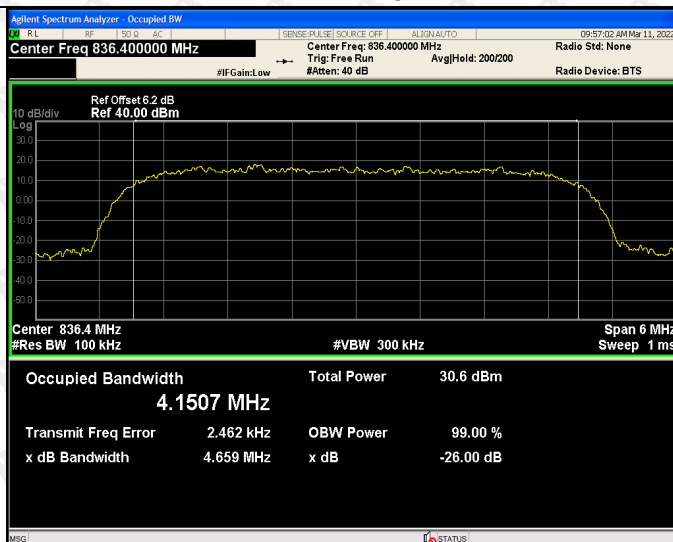
For Band V



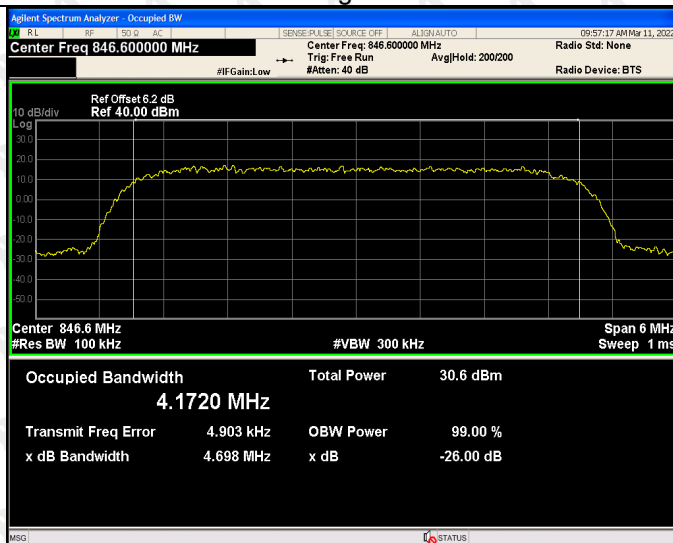
HSDPA Low Channel



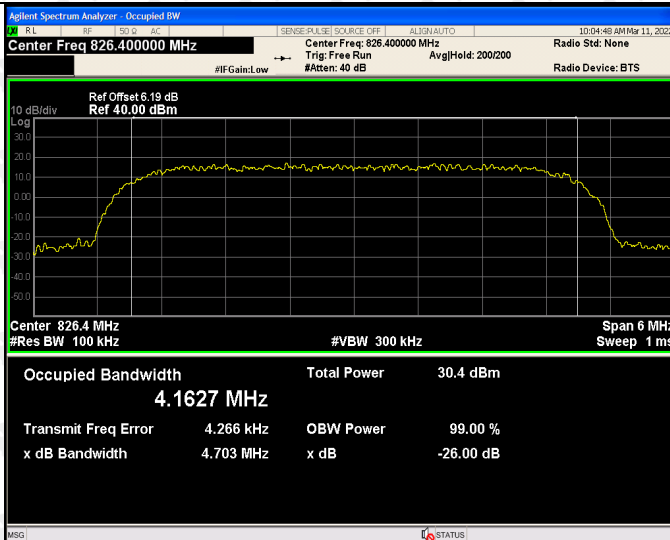
HSDPA Middle Channel



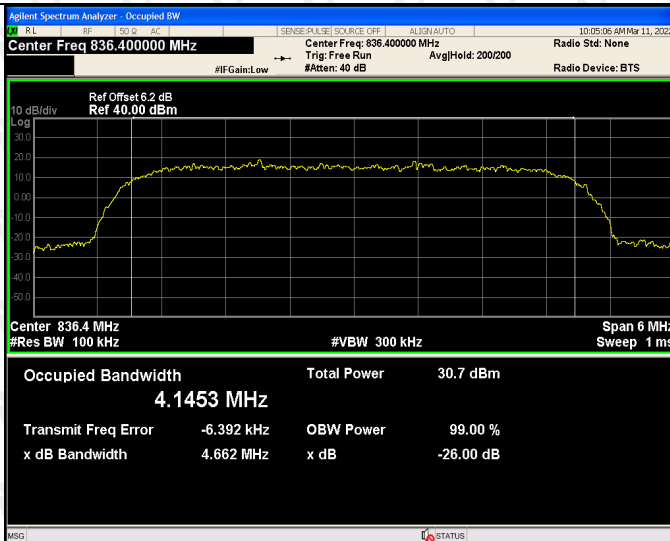
HSDPA High Channel



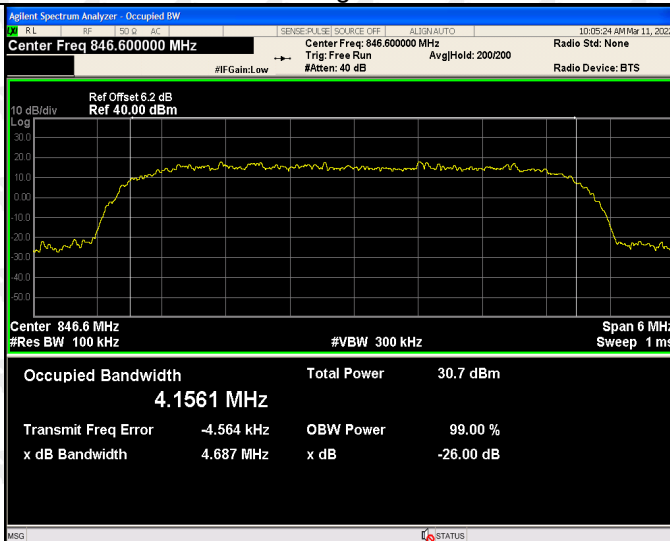
HSUPA Low Channel



HSUPA Middle Channel



HSUPA High Channel



9. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

9.1 Standard Applicable

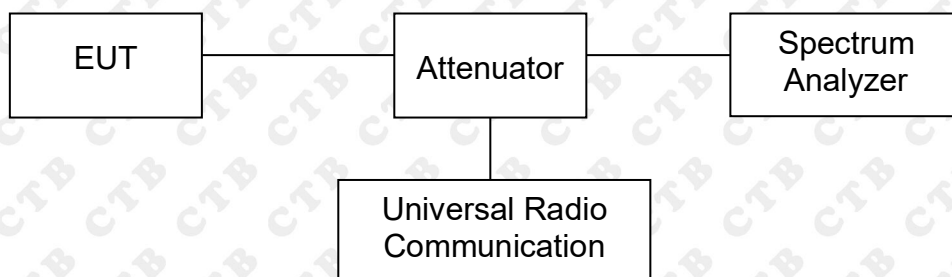
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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:

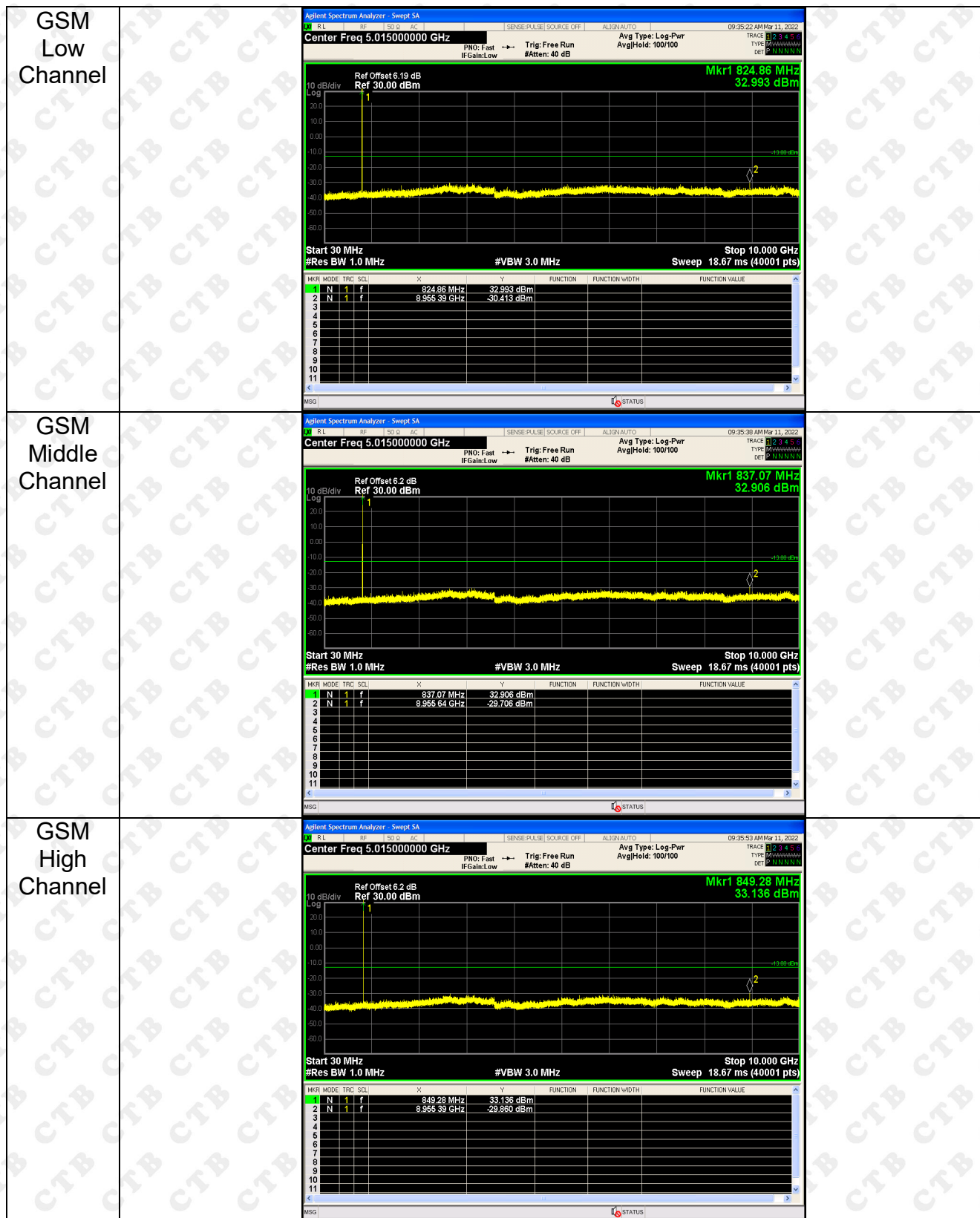


9.3 Environmental Conditions

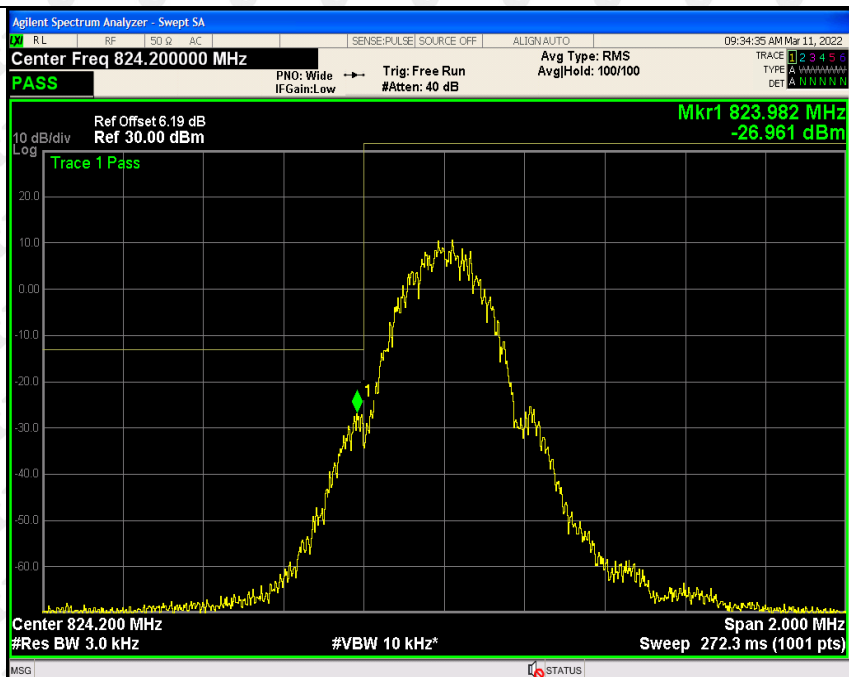
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

9.4 Summary of Test Results/Plots

Please refer to the following test plots
For Cellular Band

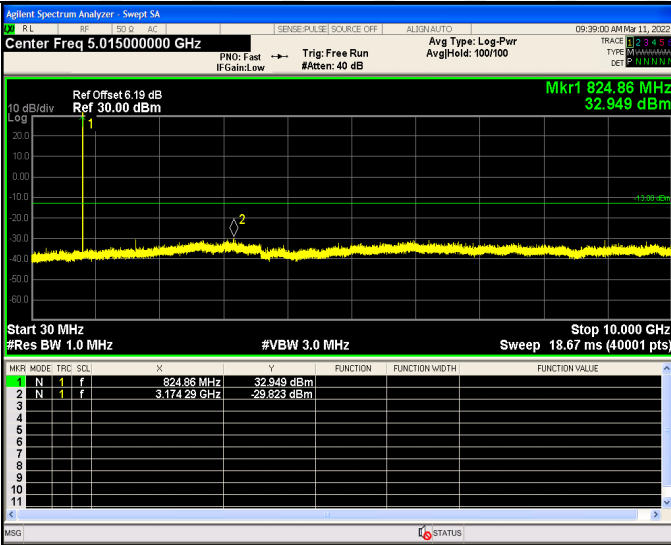
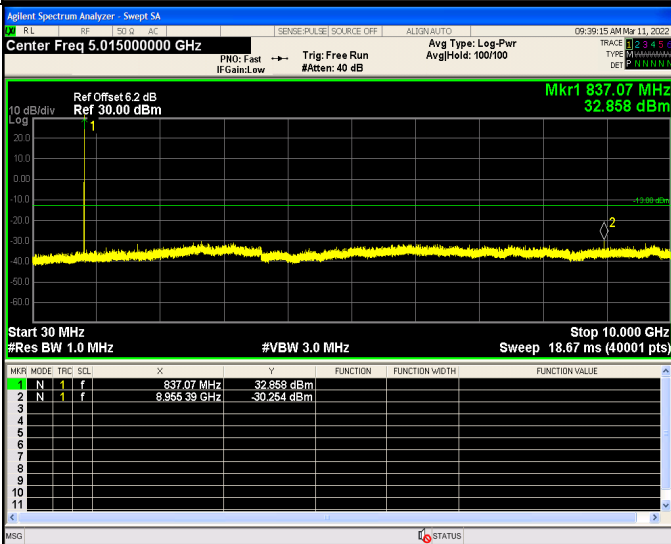
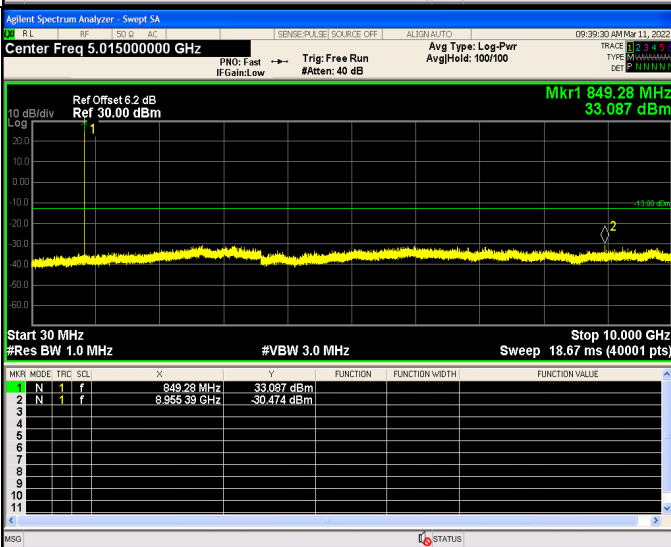


GSM
Low
Band
Emission

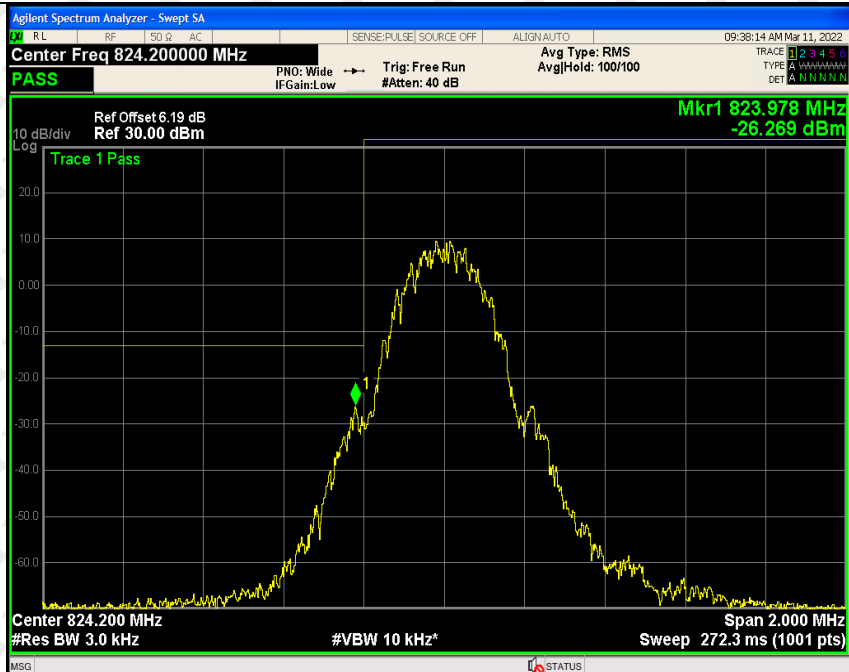


GSM
High
Band
Emission

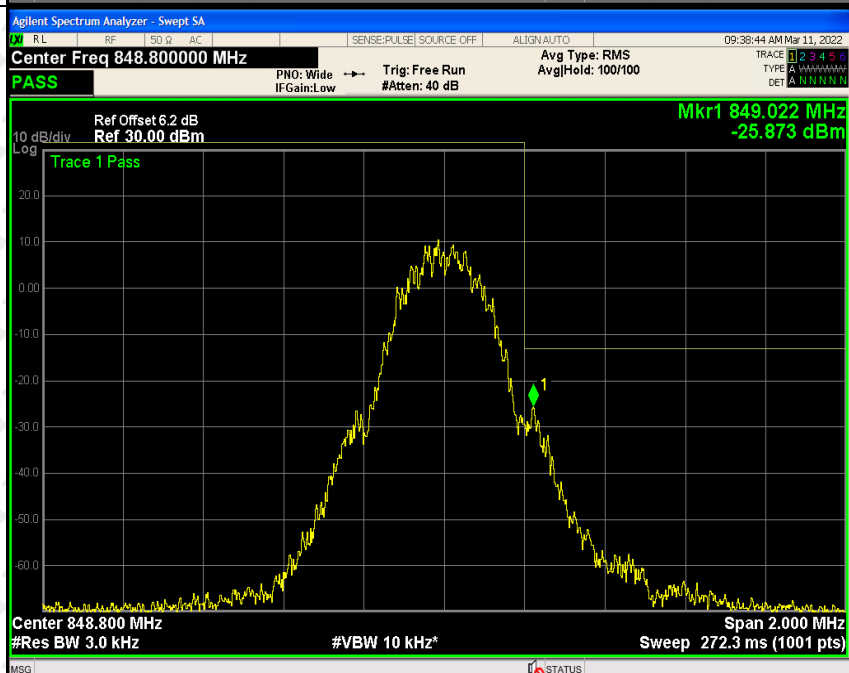


GPRS Low Channel		
GPRS Middle Channel		
GPRS High Channel		

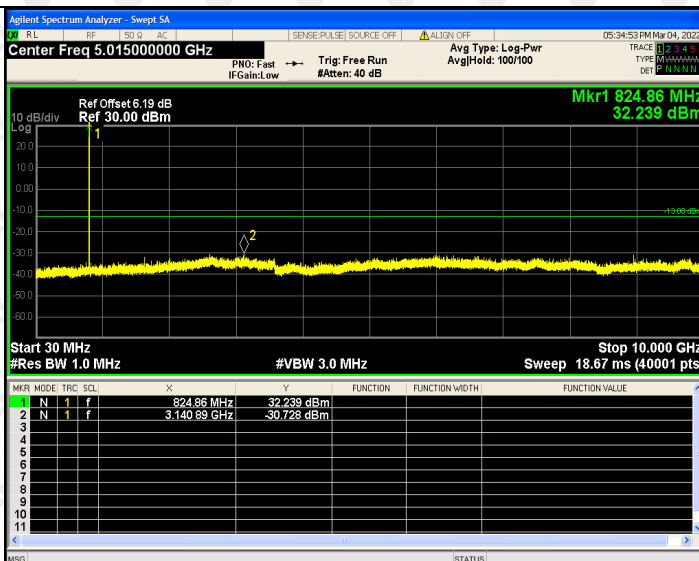
GPRS Low Band Emission



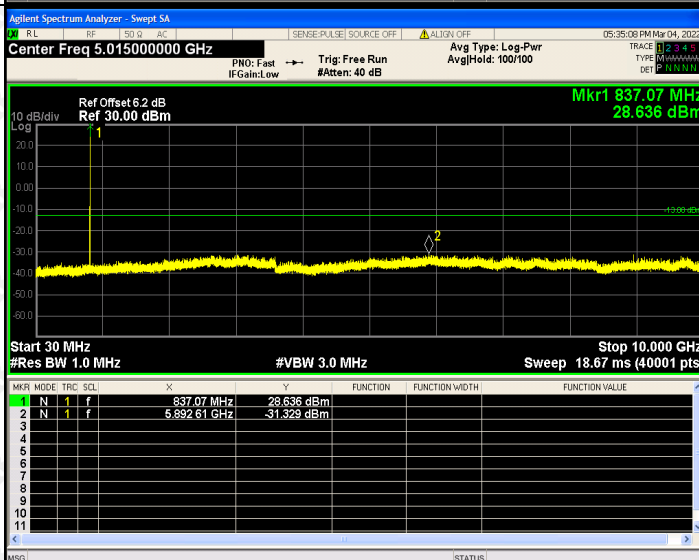
GPRS High Band Emission



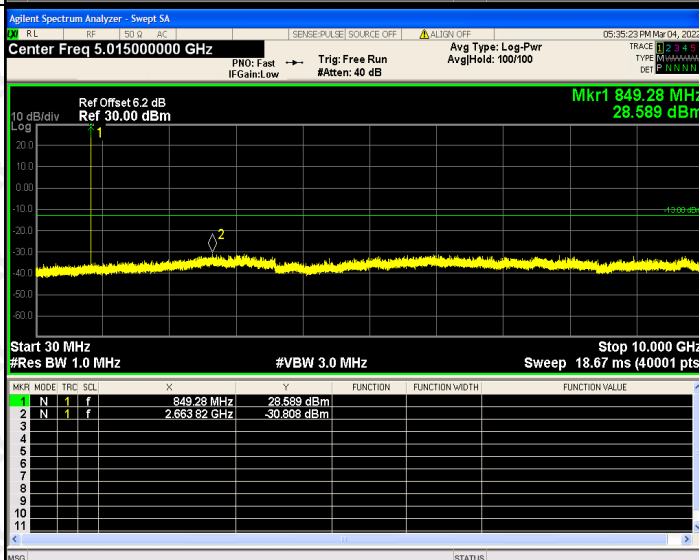
EDGE Low Channel



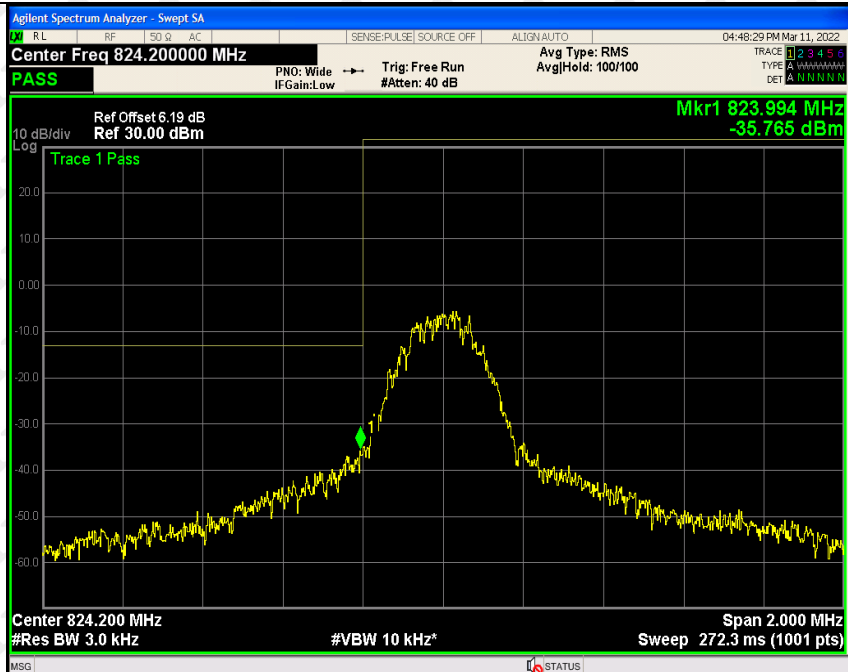
EDGE Middle Channel



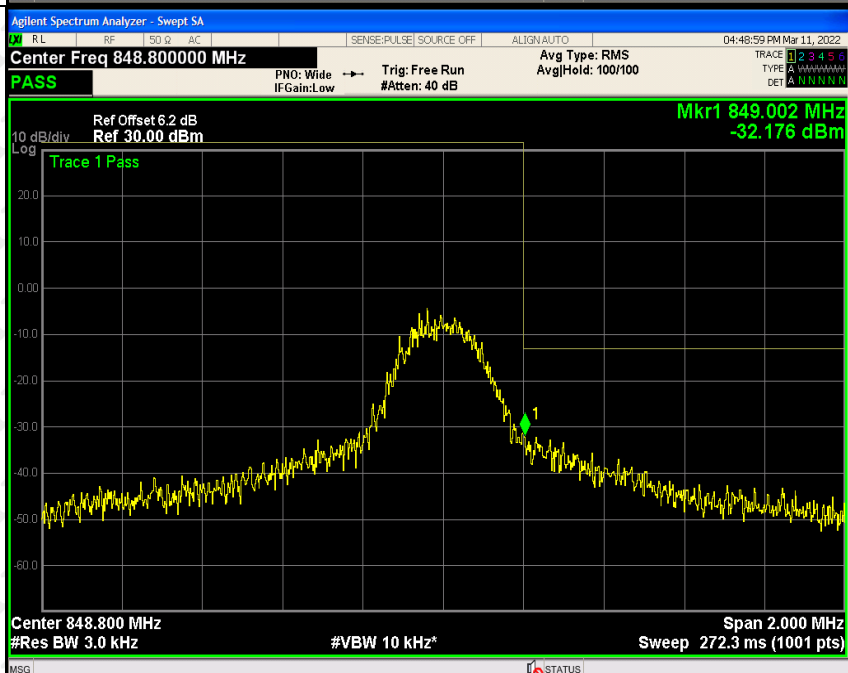
EDGE High Channel



EDGE Low Band Emission



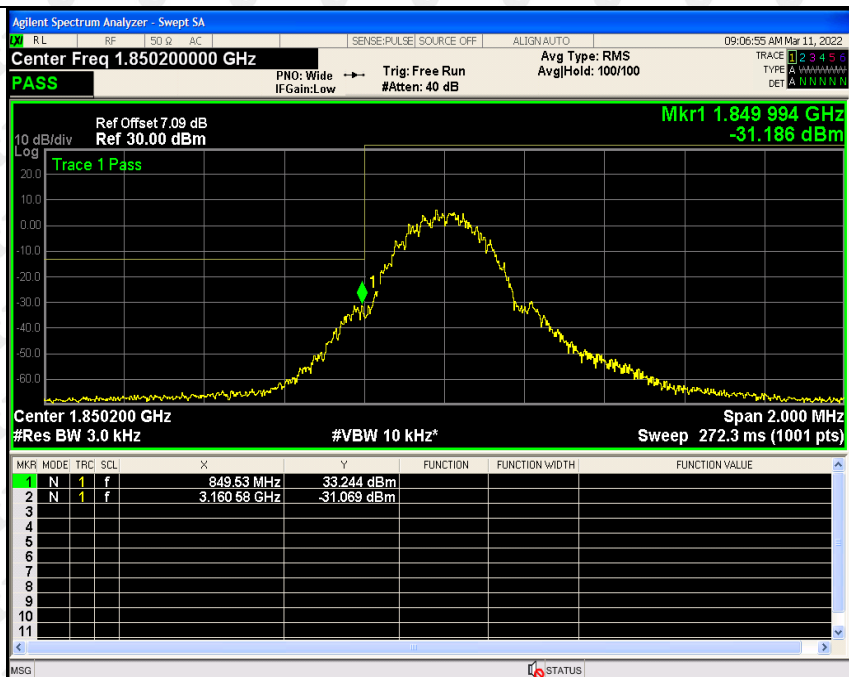
EDGE High Band Emission



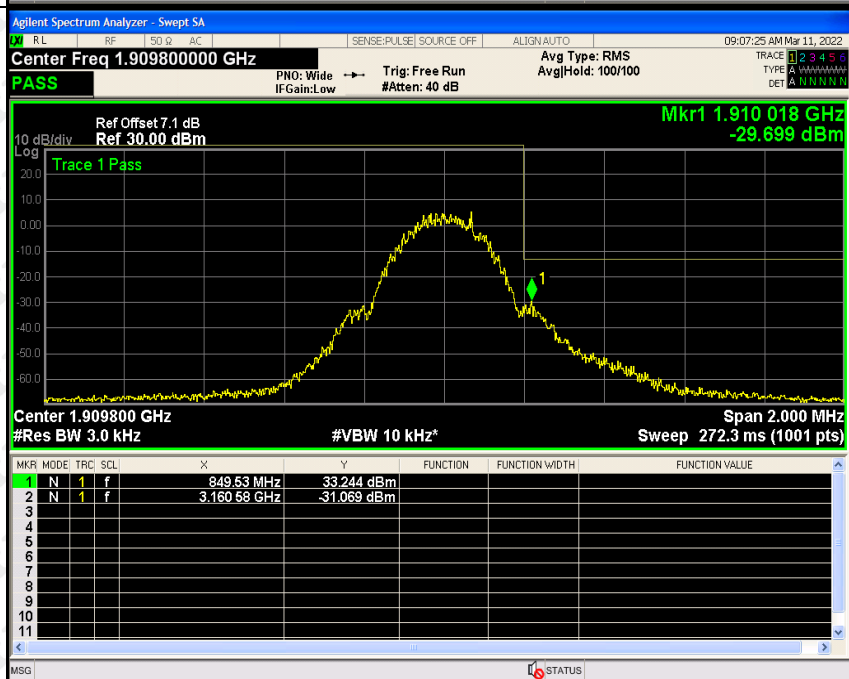
For PCS Band

GSM Low Channel	Agilent Spectrum Analyzer - Swept SA Center Freq 10.015000000 GHz Ref Offset 7.09 dB Ref 30.00 dBm Mkr1 1.850 8 GHz 28.918 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 20.000 GHz Sweep 50.67 ms (40001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>1.850 8 GHz</td><td>28.918 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>16.166 3 GHz</td><td>-24.293 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	1.850 8 GHz	28.918 dBm				2	N	1	f	16.166 3 GHz	-24.293 dBm				3									4									5									6									7									8									9									10									11								
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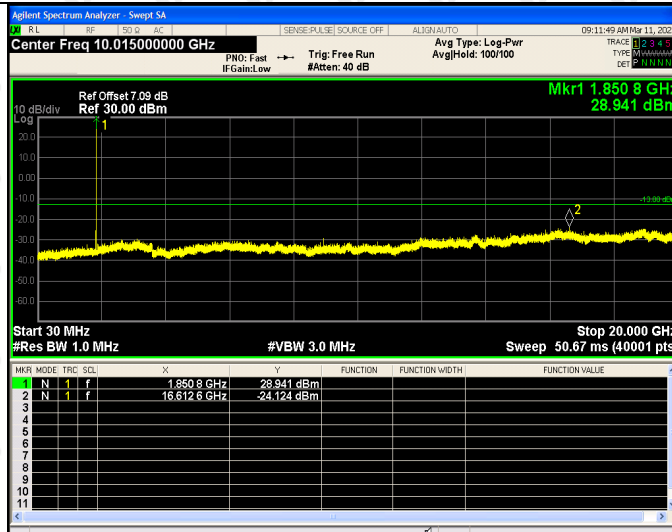
GSM Low Band Emission



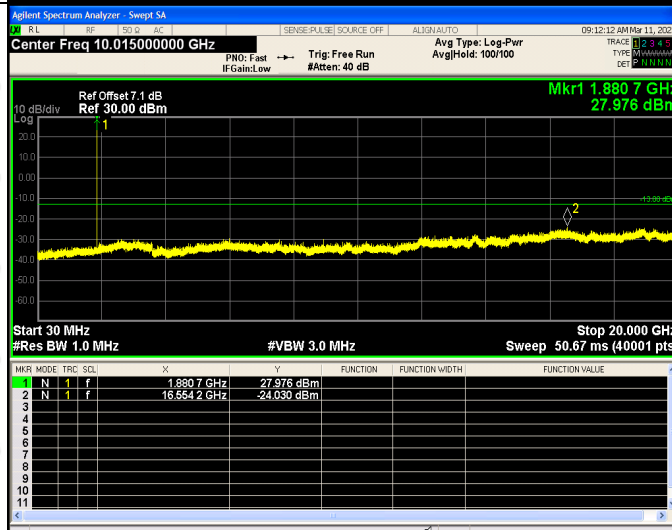
GSM High Band Emission



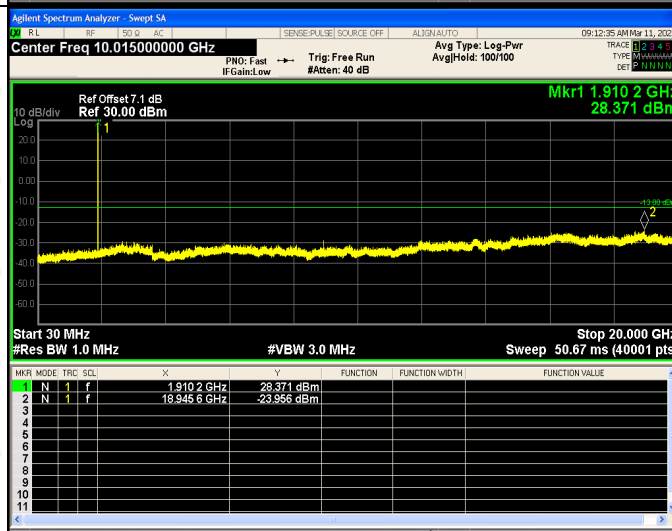
GPRS
Low
Channel



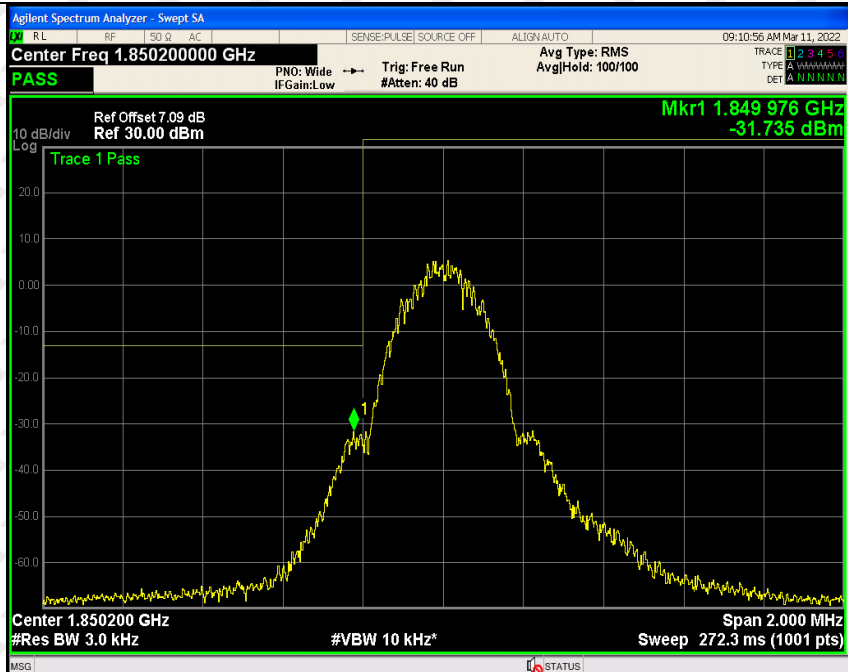
GPRS
Middle
Channel



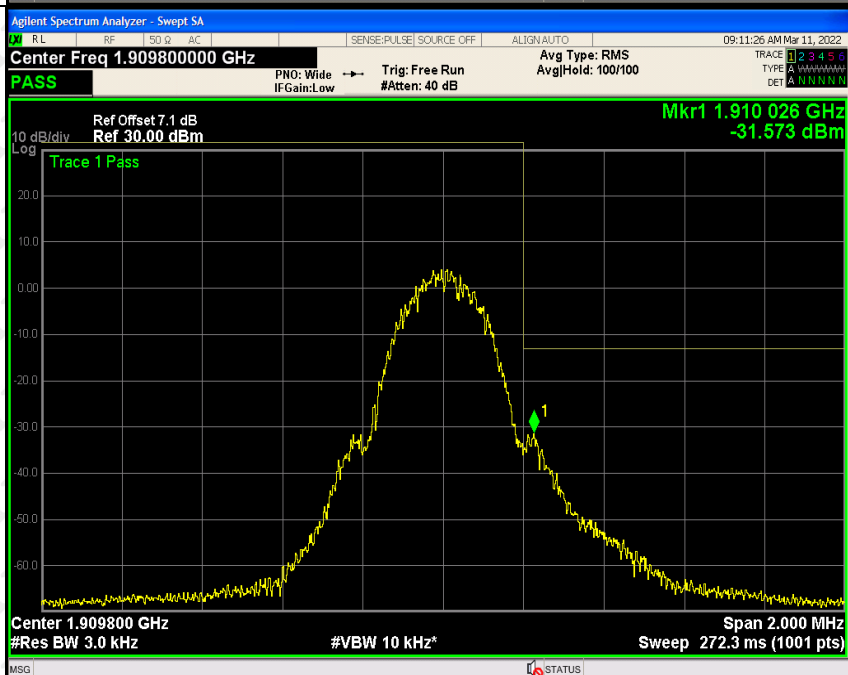
GPRS
High
Channel



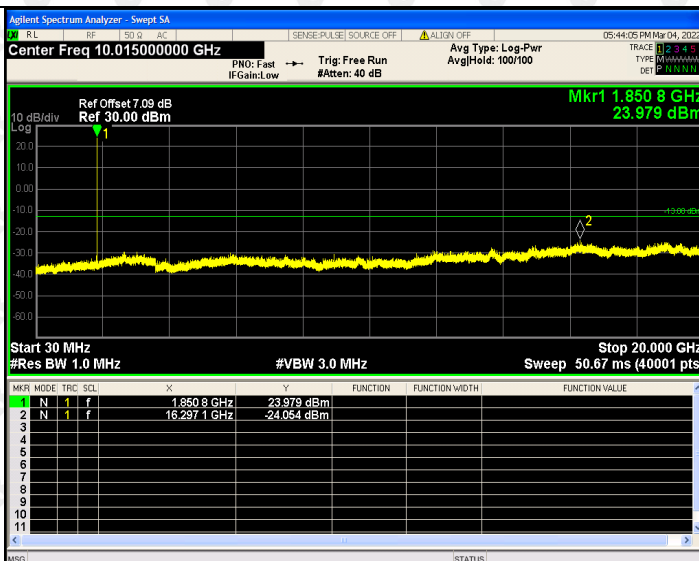
GPRS
 Low
 Band
 Emission



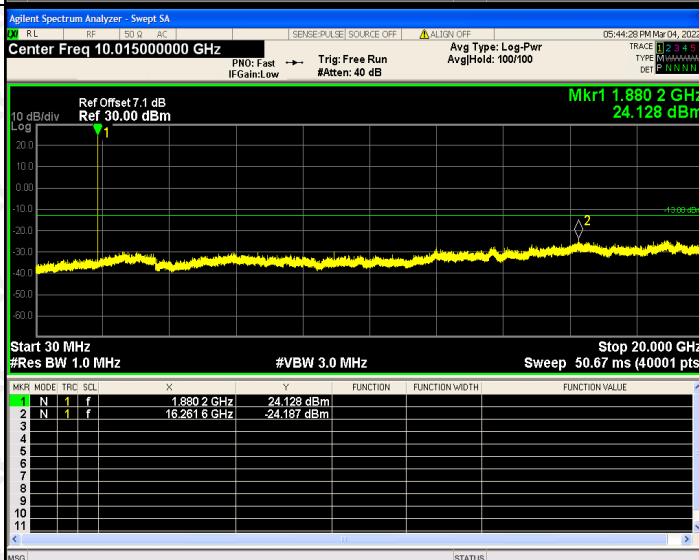
GPRS
 High
 Band
 Emission



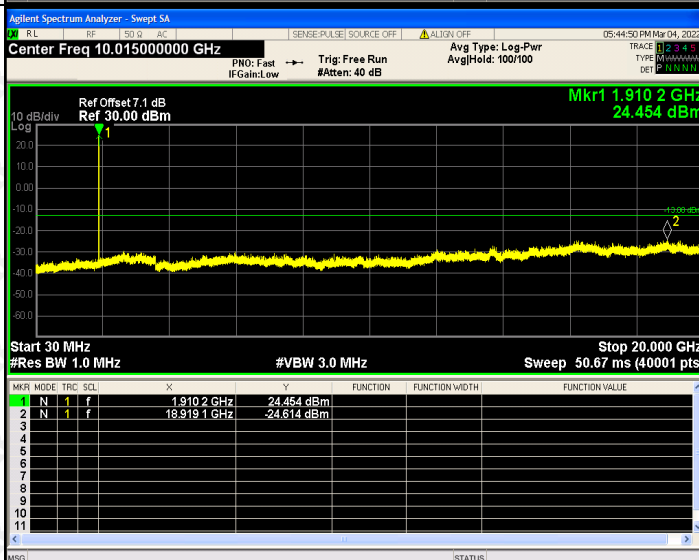
EDGE Low Channel



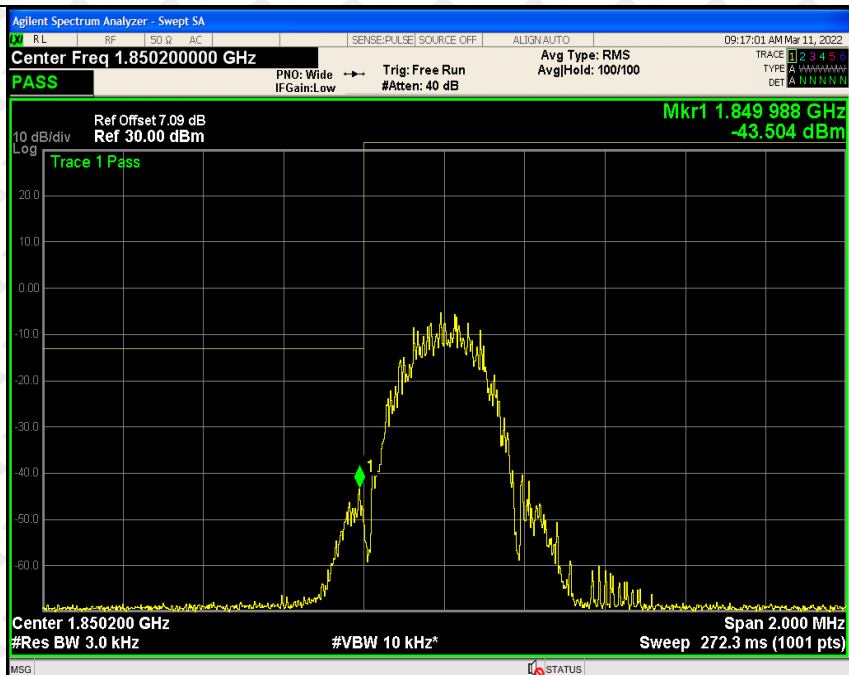
EDGE Middle Channel



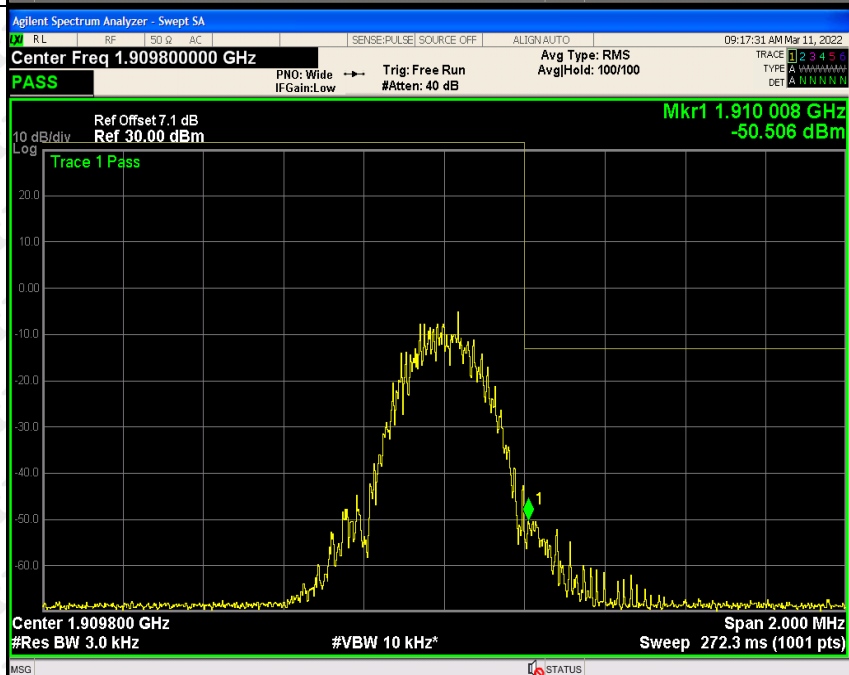
EDGE High Channel



EDGE Low Band Emission



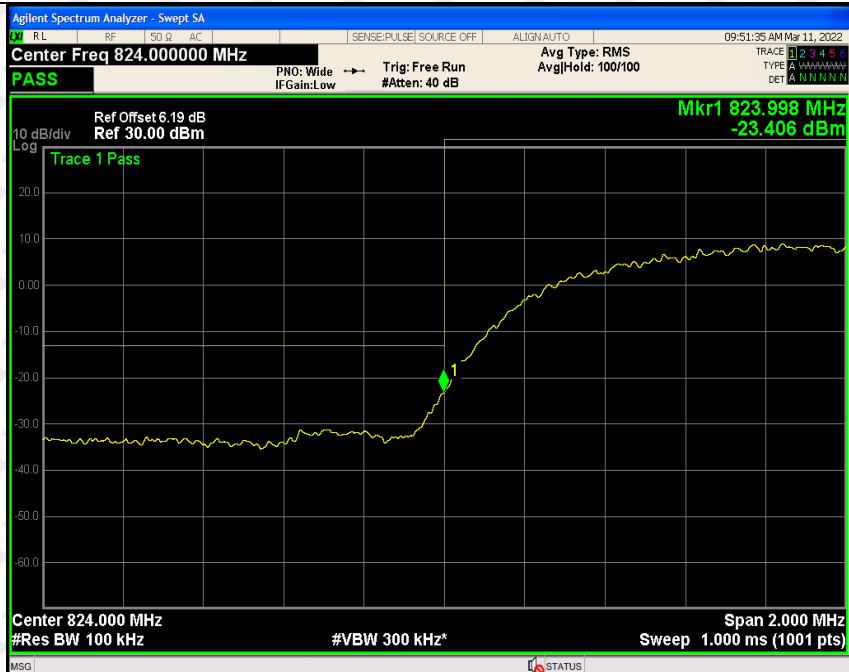
EDGE High Band Emission



For Band V

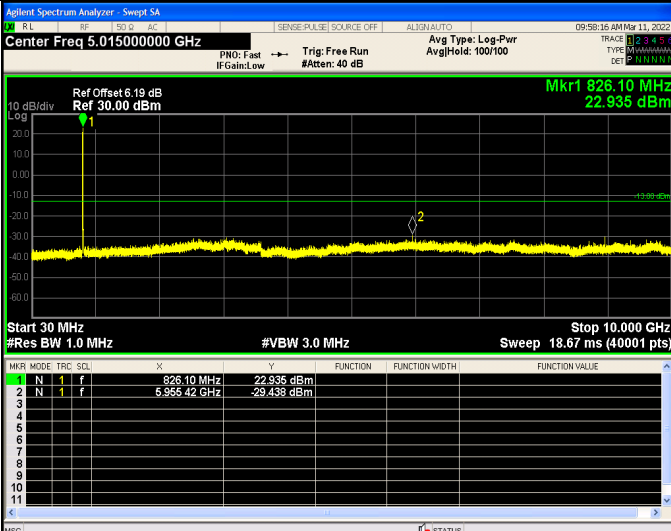
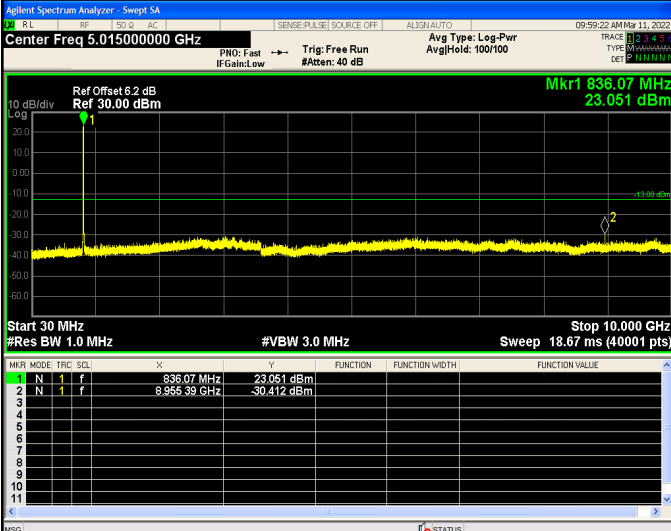
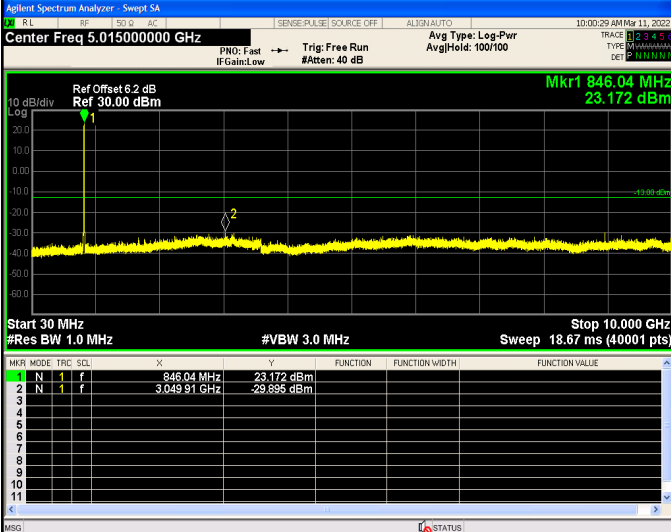
WCDMA Low Channel	Agilent Spectrum Analyzer - Swept SA Center Freq 5.015000000 GHz Ref Offset 6.19 dB Ref 30.00 dBm Mkr1 827.85 MHz 23.732 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>827.85 MHz</td><td>23.732 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>8.955 39 GHz</td><td>-31.078 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	827.85 MHz	23.732 dBm				2	N	1	f	8.955 39 GHz	-31.078 dBm				
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2	N	1	f	8.955 39 GHz	-31.078 dBm																								
WCDMA Middle Channel	Agilent Spectrum Analyzer - Swept SA Center Freq 5.015000000 GHz Ref Offset 6.2 dB Ref 30.00 dBm Mkr1 835.83 MHz 24.005 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><thead><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></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>835.83 MHz</td><td>24.005 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>8.955 39 GHz</td><td>-29.768 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	835.83 MHz	24.005 dBm				2	N	1	f	8.955 39 GHz	-29.768 dBm				
MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	N	1	f	835.83 MHz	24.005 dBm																								
2	N	1	f	8.955 39 GHz	-29.768 dBm																								
WCDMA High Channel	Agilent Spectrum Analyzer - Swept SA Center Freq 5.015000000 GHz Ref Offset 6.2 dB Ref 30.00 dBm Mkr1 846.04 MHz 24.070 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><thead><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></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>846.04 MHz</td><td>24.070 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>8.955 64 GHz</td><td>-30.628 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MKR	MODE	TRC	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	846.04 MHz	24.070 dBm				2	N	1	f	8.955 64 GHz	-30.628 dBm				
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1	N	1	f	846.04 MHz	24.070 dBm																								
2	N	1	f	8.955 64 GHz	-30.628 dBm																								

WCDMA
Low
Band
Spurious
Emission



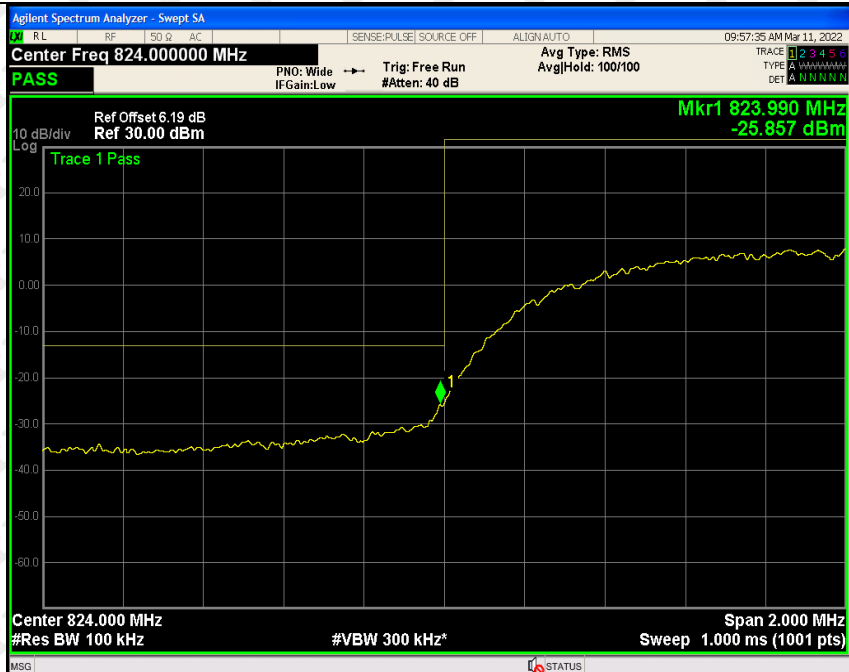
WCDMA
High
Band
Spurious
Emission



HSDPA Low Channel		
HSDPA Middle Channel		
HSDPA High Channel		

HSDPA	
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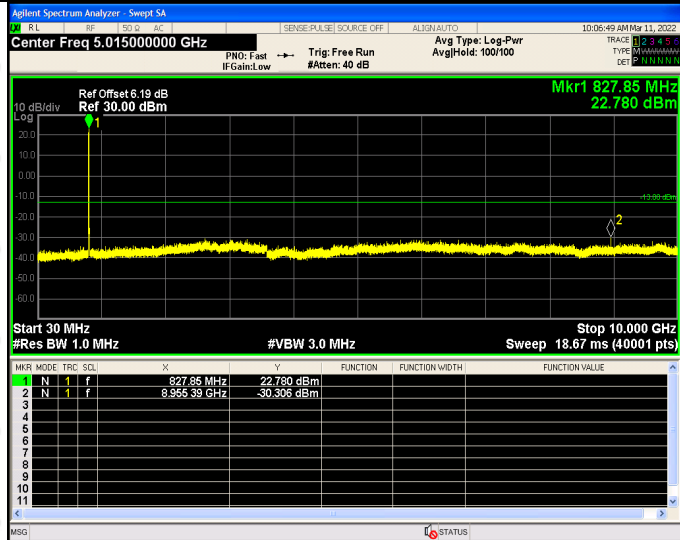
Low
Band
Spurious
Emission



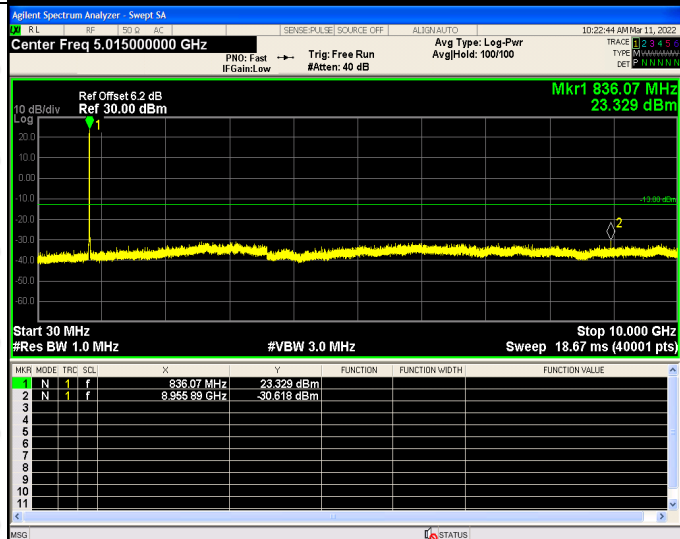
HSDPA
High
Band
Spurious
Emission



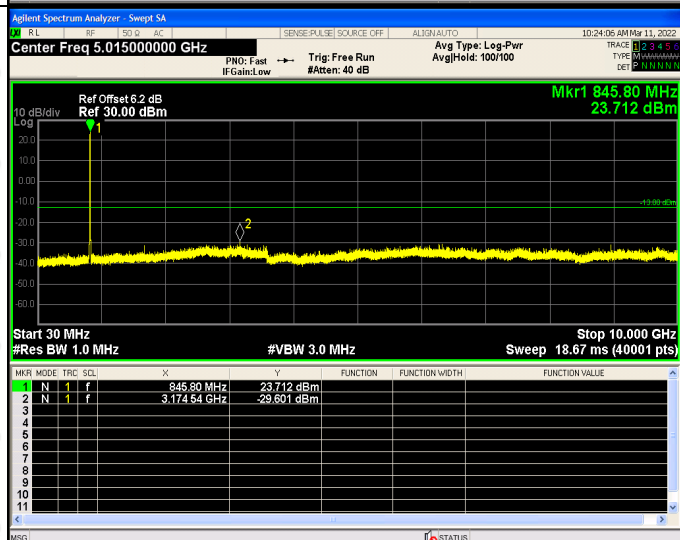
HSUPA Low Channel



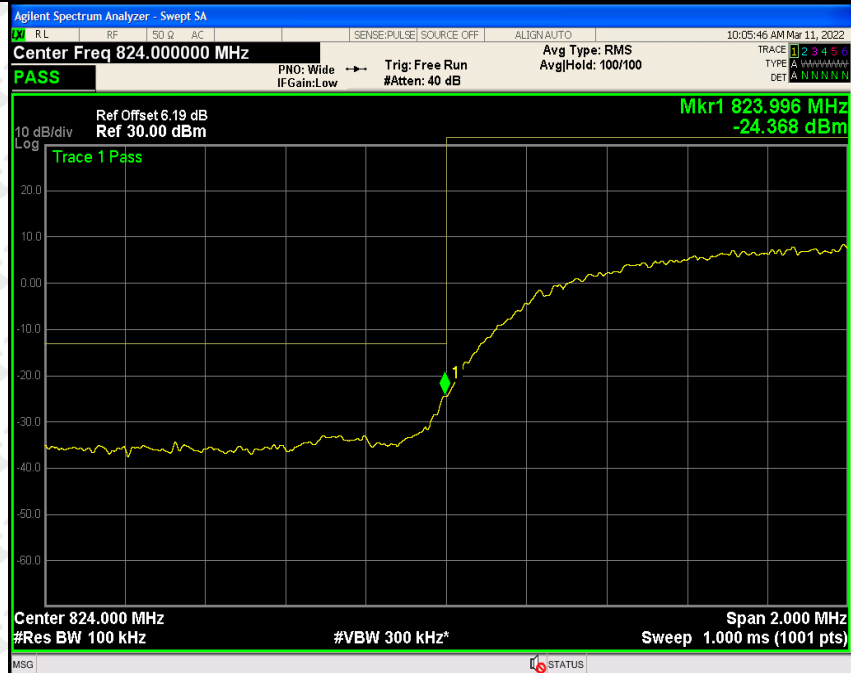
HSUPA Middle Channel



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	-69.73	3.90	-65.83	-13	-52.83	H
1648.4	-54.20	4.83	-49.37	-13	-36.37	H
2472.6	-53.29	8.08	-45.20	-13	-32.20	H
46.34	-69.32	4.02	-65.30	-13	-52.30	V
1648.4	-50.60	4.48	-46.11	-13	-33.11	V
2472.6	-51.30	8.20	-43.10	-13	-30.10	V
Middle Channel (836.6MHz)						
46.34	-69.76	3.84	-65.92	-13	-52.92	H
1673.2	-54.49	4.62	-49.87	-13	-36.87	H
2509.8	-53.04	8.25	-44.78	-13	-31.78	H
46.34	-69.27	4.25	-65.02	-13	-52.02	V
1673.2	-50.45	4.54	-45.91	-13	-32.91	V
2509.8	-51.11	8.35	-42.75	-13	-29.75	V
High Channel (848.8MHz)						
46.34	-69.79	4.22	-65.57	-13	-52.57	H
1697.6	-54.65	4.87	-49.77	-13	-36.77	H
2546.4	-53.06	8.38	-44.68	-13	-31.68	H
46.34	-69.41	4.02	-65.40	-13	-52.40	V
1697.6	-50.45	4.56	-45.89	-13	-32.89	V
2546.4	-51.24	8.41	-42.83	-13	-29.83	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	-69.51	4.02	-65.48	-13.00	-52.48	H
3760.0	-53.49	10.71	-42.78	-13.00	-29.78	H
5640.0	-56.69	13.73	-42.96	-13.00	-29.96	H
46.34	-68.55	4.14	-64.41	-13.00	-51.41	V
3760.0	-53.20	10.22	-42.98	-13.00	-29.98	V
5640.0	-56.41	13.16	-43.25	-13.00	-30.25	V
High Channel (1909.8MHz)						
46.34	-69.67	4.02	-65.65	-13.00	-52.65	H
3819.6	-57.62	4.90	-52.72	-13.00	-39.72	H
5729.4	-44.90	8.09	-36.81	-13.00	-23.81	H
46.34	-58.00	4.25	-53.75	-13.00	-40.75	V
3819.6	-58.74	4.93	-53.81	-13.00	-40.81	V
5729.4	-59.89	8.43	-51.47	-13.00	-38.47	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	-69.55	3.91	-65.64	-13.00	-52.64	H
1652.8	-53.45	10.56	-42.89	-13.00	-29.89	H
2479.2	-56.73	13.50	-43.23	-13.00	-30.23	H
46.34	-68.74	3.93	-64.81	-13.00	-51.81	V
1652.8	-53.13	10.41	-42.72	-13.00	-29.72	V
2479.2	-56.73	13.16	-43.57	-13.00	-30.57	V
Middle Channel (836.6MHz)						
46.34	-69.62	4.02	-65.60	-13.00	-52.60	H
1672.8	-57.86	4.66	-53.20	-13.00	-40.20	H
2509.2	-44.64	8.34	-36.30	-13.00	-23.30	H
46.34	-57.64	4.17	-53.47	-13.00	-40.47	V
1672.8	-58.44	4.94	-53.49	-13.00	-40.49	V
2509.2	-59.80	8.19	-51.61	-13.00	-38.61	V
High Channel (846.6MHz)						
46.34	-69.61	3.87	-65.74	-13.00	-52.74	H
1693.2	-57.81	4.89	-52.92	-13.00	-39.92	H
2539.8	-44.76	8.42	-36.34	-13.00	-23.34	H
46.34	-57.87	3.95	-53.92	-13.00	-40.92	V
1693.2	-58.76	4.99	-53.77	-13.00	-40.77	V
2539.8	-59.55	8.12	-51.44	-13.00	-38.44	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 GSM 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	9.27	0.0111
40	NV	9.7	0.0116
30	NV	9.9	0.0119
20	NV	10.0	0.0120
10	NV	10.5	0.0125
0	NV	10.8	0.0129
-10	NV	10.8	0.0129
-20	NV	11.2	0.0134
-30	NV	11.4	0.0136

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	12.95	0.0069
40	NV	13.2	0.0070
30	NV	13.2	0.0070
20	NV	13.3	0.0071
10	NV	13.7	0.0073
0	NV	14.1	0.0075
-10	NV	14.5	0.0077
-20	NV	14.6	0.0078
-30	NV	14.9	0.0079

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	11.56	0.0138
40	NV	12.0	0.0143
30	NV	12.1	0.0144
20	NV	12.2	0.0146
10	NV	12.3	0.0147
0	NV	12.3	0.0148
-10	NV	12.6	0.0150
-20	NV	13.0	0.0155
-30	NV	13.4	0.0160

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	-9.81	-0.0052
40	NV	-9.3	-0.0050
30	NV	-9.2	-0.0049
20	NV	-8.8	-0.0047
10	NV	-8.4	-0.0045
0	NV	-8.3	-0.0044
-10	NV	-8.1	-0.0043
-20	NV	-7.7	-0.0041
-30	NV	-7.5	-0.0040

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	0.44	0.0005
40	NV	0.6	0.0007
30	NV	0.9	0.0011
20	NV	1.2	0.0015
10	NV	1.3	0.0016
0	NV	1.4	0.0017
-10	NV	1.4	0.0017
-20	NV	1.5	0.0018
-30	NV	1.6	0.0020

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	0.34	0.0004
40	NV	0.4	0.0005
30	NV	0.8	0.0009
20	NV	0.9	0.0011
10	NV	1.3	0.0015
0	NV	1.4	0.0017
-10	NV	1.5	0.0018
-20	NV	2.0	0.0023
-30	NV	2.2	0.0027

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	1.02	0.0012
40	NV	1.2	0.0014
30	NV	1.3	0.0015
20	NV	1.4	0.0017
10	NV	1.8	0.0021
0	NV	2.1	0.0025
-10	NV	2.2	0.0027
-20	NV	2.6	0.0031
-30	NV	2.9	0.0035

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	11.4	0.0136
	NV	11.8	0.0141
	HV	12.1	0.0144
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	15.2	0.0079
	NV	15.2	0.0081
	HV	15.2	0.0081

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	13.4	0.0160
	NV	13.4	0.0160
	HV	13.9	0.0166
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	-7.5	-0.0040
	NV	-7.1	-0.0038
	HV	-6.8	-0.0036
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	1.6	0.0019
	NV	2.0	0.0024
	HV	2.1	0.0025

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	2.2	0.0026
	NV	2.4	0.0029
	HV	2.6	0.0031
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	2.9	0.0035
	NV	3.4	0.0040
	HV	3.6	0.0043

12. EUT PHOTO

EUT Photo 1

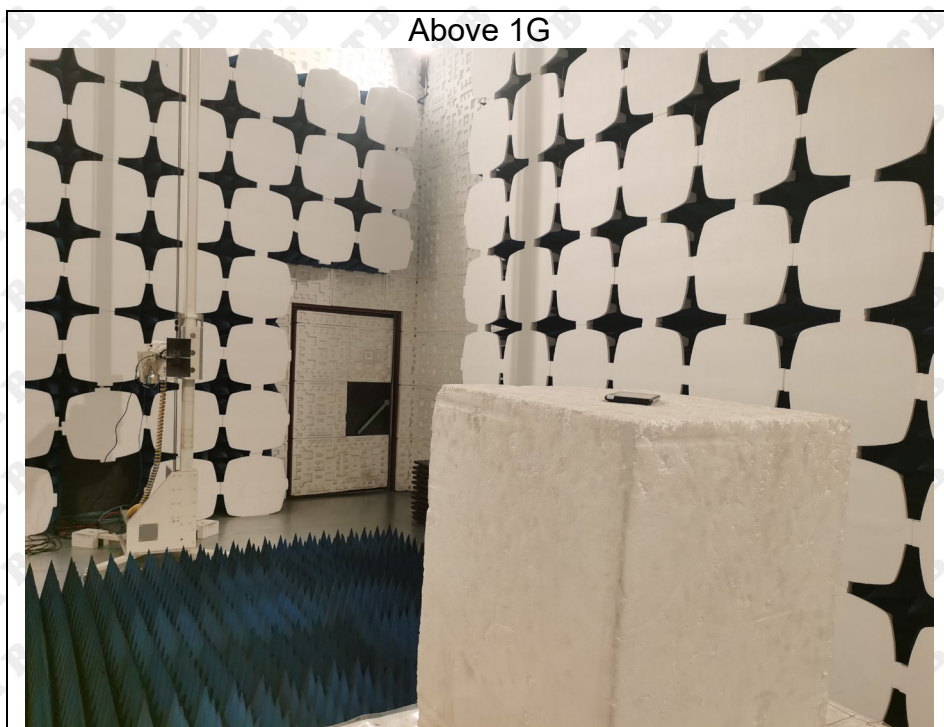


EUT Photo 2



13. EUT TEST PHOTO

Radiated Emission



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