

TEST REPORT

Product Name: Smart watch
FCC ID: 2A3MS-DM20
Product Name: N/A
Model Number: DM20, DM101, DM100, DM30, DM28, DM19
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Sample Received Date: Oct. 20, 2021
Sample tested Date: Oct. 20, 2021 to Nov. 16, 2021
Issue Date: Nov. 16, 2021
Report No.: CTB211030005RF
Test Standards FCC Part 22H & 24E
Test Results PASS
Remark: This is GSM radio test report.

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(Note: N/A means not applicable)



1. VERSION

Report No.	Issue Date	Description	Approved
CTB211030005RF	Nov. 16, 2021	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

FCC Rules	Description of Test Item	Result
§1.1307, §2.1093	RF Exposure	Compliant
§22.913 (a), §24.232 (c)	RF Output Power	Compliant
§24.232	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 chamber 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):	DM20, DM101, DM100, DM30, DM28, DM19
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: DM20
Hardware Version:	C10-MB-V1.2
Software Version:	DM20A_C10_EN_V1.2_20210706
Operation Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz WCDMA Band 5: 824~849MHz WCDMA Band 2: 1850~1910MHz
Max. RF output power:	GSM850: 32.42dBm GSM1900: 30.08dBm WCDMA Band 2: 23.16dBm WCDMA Band 5: 23.26dBm
Type of Modulation:	GMSK, BPSK
Antenna installation:	Internal Antenna
Antenna Gain:	GSM900: -11.71dBi DCS1800: -5.94dBi WCDMA Band II: -7.23dBi WCDMA Band V: -11.17dBi
Ratings:	DC 5V charging from adapter DC 3.8V from battery 1200mAh 3.8V 4.560Wh

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	SHENZEHN 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	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
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4 MHz	9262
		1880.0 MHz	9400
		1907.6 MHz	9538
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	WCDMA Band 2	Low, Middle, High Channels
TM9	HSDPA Band 5	Low, Middle, High Channels
TM10	HSUPA Band 5	Low, Middle, High Channels
TM11	HSDPA Band 2	Low, Middle, High Channels
TM12	HSUPA Band 2	Low, Middle, High Channels

4.6 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.8V
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 Xinghe Road, Xingqiao 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	2022.10.30
7	Signal Generator	Agilent	N5182A	MY47420195	2021.09.27	2022.08.16
8	Communication test set	Agilent	E5515C	MY50102567	2021.09.27	2022.08.05
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2021.09.27	2022.08.16
10	band rejection filter	Shenxiang	MSF5150-5850 MS-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	2022.08.05
17	Receiver	R&S	ESPI	100362	2021.09.27	2024.08.11
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	Schwarzbeck	VULB 9163	869	2021.09.27	2022.08.05

	Antenna					
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2021.09.27	2022.08.07
22	Software	Fala	EZ-EMC	FA-03A2 RE	2021.09.27	2022.08.08
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	2022.10.30
26	Amplifier	AEROFLEX	/	S/N/ 097	2021.09.27	2022.10.30

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	ERP	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm	dBm
Low Channel									
824.2	33.71	1.50	0.00	H	1.50	-11.71	20.50	18.35	38.45
824.2	33.79	1.50	0.00	V	1.50	-11.71	20.58	18.43	38.45
Middle Channel									
836.6	33.64	1.50	0.00	H	1.50	-11.71	20.43	18.28	38.45
836.6	33.53	1.50	0.00	V	1.50	-11.71	20.32	18.17	38.45
High Channel									
848.8	33.69	1.50	0.00	H	1.50	-11.71	20.48	18.33	38.45
848.8	33.69	1.50	0.00	V	1.50	-11.71	20.48	18.33	38.45

ERP=EIRP-2.15.

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	28.86	1.50	0.00	H	1.90	-5.94	21.02	33.00
1850.2	28.36	1.50	0.00	V	1.90	-5.94	20.52	33.00
Middle Channel								
1880.0	28.96	1.50	0.00	H	1.90	-5.94	21.12	33.00
1880.0	28.37	1.50	0.00	V	1.90	-5.94	20.53	33.00
High Channel								
1909.8	28.85	1.50	0.00	H	1.90	-5.94	21.01	33.00
1909.8	28.73	1.50	0.00	V	1.90	-5.94	20.89	33.00

ERP For GPRS Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	ERP	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm	dBm
Low Channel									
824.2	33.33	1.50	0.00	H	1.50	-11.71	20.12	17.97	38.45
824.2	33.32	1.50	0.00	V	1.50	-11.71	20.11	17.96	38.45
Middle Channel									
836.6	33.23	1.50	0.00	H	1.50	-11.71	20.02	17.87	38.45
836.6	33.27	1.50	0.00	V	1.50	-11.71	20.06	17.91	38.45
High Channel									
848.8	33.32	1.50	0.00	H	1.50	-11.71	20.11	17.96	38.45
848.8	33.38	1.50	0.00	V	1.50	-11.71	20.17	18.02	38.45

ERP=EIRP-2.15.

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	28.70	1.50	0.00	H	1.90	-5.94	20.86	33.00
1850.2	27.97	1.50	0.00	V	1.90	-5.94	20.13	33.00
Middle Channel								
1880.0	28.40	1.50	0.00	H	1.90	-5.94	20.56	33.00
1880.0	28.20	1.50	0.00	V	1.90	-5.94	20.36	33.00
High Channel								
1909.8	28.40	1.50	0.00	H	1.90	-5.94	20.56	33.00
1909.8	28.31	1.50	0.00	V	1.90	-5.94	20.47	33.00

ERP For EDGE Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	ERP	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm	dBm
Low Channel									
824.2	30.10	1.50	0.00	H	1.50	-11.71	16.89	14.74	38.45
824.2	31.03	1.50	0.00	V	1.50	-11.71	17.82	15.67	38.45
Middle Channel									
836.6	29.74	1.50	0.00	H	1.50	-11.71	16.53	14.38	38.45
836.6	30.23	1.50	0.00	V	1.50	-11.71	17.02	14.87	38.45
High Channel									
848.8	29.64	1.50	0.00	H	1.50	-11.71	16.43	14.28	38.45
848.8	30.33	1.50	0.00	V	1.50	-11.71	17.12	14.97	38.45

ERP=EIRP-2.15.

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	26.20	1.50	0.00	H	1.90	-5.94	18.36	33.00
1850.2	26.34	1.50	0.00	V	1.90	-5.94	18.50	33.00
Middle Channel								
1880.0	26.26	1.50	0.00	H	1.90	-5.94	18.42	33.00
1880.0	26.21	1.50	0.00	V	1.90	-5.94	18.37	33.00
High Channel								
1909.8	25.73	1.50	0.00	H	1.90	-5.94	17.89	33.00
1909.8	25.90	1.50	0.00	V	1.90	-5.94	18.06	33.00

ERP For WCDMA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	ERP	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm	dBm
Low Channel									
826.4	25.24	1.50	0.00	H	1.50	-11.17	12.57	10.42	38.45
826.4	24.04	1.50	0.00	V	1.50	-11.17	11.37	9.22	38.45
Middle Channel									
836.6	24.72	1.50	0.00	H	1.50	-11.17	12.05	9.90	38.45
836.6	24.49	1.50	0.00	V	1.50	-11.17	11.82	9.67	38.45
High Channel									
846.6	24.72	1.50	0.00	H	1.50	-11.17	12.05	9.90	38.45
846.6	24.43	1.50	0.00	V	1.50	-11.17	11.76	9.61	38.45

ERP For HSDPA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	ERP	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm	dBm
Low Channel									
826.4	26.23	1.50	0.00	H	1.50	-11.17	13.56	11.41	38.45
826.4	26.92	1.50	0.00	V	1.50	-11.17	14.25	12.10	38.45
Middle Channel									
836.6	26.65	1.50	0.00	H	1.50	-11.17	13.98	11.83	38.45
836.6	25.25	1.50	0.00	V	1.50	-11.17	12.58	10.43	38.45
High Channel									
846.6	25.23	1.50	0.00	H	1.50	-11.17	12.56	10.41	38.45
846.6	24.26	1.50	0.00	V	1.50	-11.17	11.59	9.44	38.45

ERP For HSUPA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	ERP	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm	dBm
Low Channel									
826.4	25.35	1.50	0.00	H	1.50	-11.17	12.68	10.53	38.45
826.4	26.41	1.50	0.00	V	1.50	-11.17	13.74	11.59	38.45
Middle Channel									
836.6	25.72	1.50	0.00	H	1.50	-11.17	13.05	10.90	38.45
836.6	25.54	1.50	0.00	V	1.50	-11.17	12.87	10.72	38.45
High Channel									
846.6	25.60	1.50	0.00	H	1.50	-11.17	12.93	10.78	38.45
846.6	24.79	1.50	0.00	V	1.50	-11.17	12.12	9.97	38.45

ERP=EIRP-2.15.

EIRP For WCDMA Mode Band 2

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								
1852.4	24.82	1.50	0.00	H	1.90	-7.23	15.69	33
1852.4	25.11	1.50	0.00	V	1.90	-7.23	15.98	33
Middle Channel								
1880.0	25.16	1.50	0.00	H	1.90	-7.23	16.03	33
1880.0	25.28	1.50	0.00	V	1.90	-7.23	16.15	33
High Channel								
1907.6	25.11	1.50	0.00	H	1.90	-7.23	15.98	33
1907.6	24.96	1.50	0.00	V	1.90	-7.23	15.83	33

EIRP For HSDPA Mode Band 2

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								
1852.4	24.16	1.50	0.00	H	1.90	-7.23	15.03	33
1852.4	24.02	1.50	0.00	V	1.90	-7.23	14.89	33
Middle Channel								
1880.0	24.26	1.50	0.00	H	1.90	-7.23	15.13	33
1880.0	24.35	1.50	0.00	V	1.90	-7.23	15.22	33
High Channel								
1907.6	24.18	1.50	0.00	H	1.90	-7.23	15.05	33
1907.6	23.94	1.50	0.00	V	1.90	-7.23	14.81	33

EIRP For HSUPA Mode Band 2

Frequency MHz	Substitute SG dBm	Height Meter	Table Degree	Polar H / V	Cable loss dB	Antenna Gain dB	Result dBm	FCC Part 24E Limit dBm
Low Channel								
1852.4	24.09	1.50	0.00	H	1.90	-7.23	14.96	33
1852.4	23.89	1.50	0.00	V	1.90	-7.23	14.76	33
Middle Channel								
1880.0	24.08	1.50	0.00	H	1.90	-7.23	14.95	33
1880.0	24.19	1.50	0.00	V	1.90	-7.23	15.06	33
High Channel								
1907.6	24.02	1.50	0.00	H	1.90	-7.23	14.89	33
1907.6	23.90	1.50	0.00	V	1.90	-7.23	14.77	33

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	32.42	38.45
	Middle Channel	836.6	32.32	38.45
	High Channel	848.8	32.21	38.45
GPRS(1 Slot)	Low Channel	824.2	32.40	38.45
	Middle Channel	836.6	32.29	38.45
	High Channel	848.8	32.21	38.45
EDGE(1 Slot)	Low Channel	824.2	25.55	38.45
	Middle Channel	836.6	26.02	38.45
	High Channel	848.8	26.16	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	30.08	33.0
	Middle Channel	1880.0	30.05	33.0
	High Channel	1909.8	29.96	33.0
GPRS(1 Slot)	Low Channel	1850.2	30.02	33.0
	Middle Channel	1880.0	30.03	33.0
	High Channel	1909.8	29.96	33.0
EDGE(1 Slot)	Low Channel	1850.2	25.93	33.0
	Middle Channel	1880.0	25.71	33.0
	High Channel	1909.8	25.81	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	23.26	38.45
	Middle Channel	836.6	23.15	38.45
	High Channel	846.6	23.21	38.45
HSDPA	Low Channel	826.4	22.08	38.45
	Middle Channel	836.6	22.17	38.45
	High Channel	846.6	21.75	38.45
HSUPA	Low Channel	826.4	21.23	38.45
	Middle Channel	836.6	21.41	38.45
	High Channel	846.6	21.08	38.45

For WCDMA Band 2

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
WCDMA	Low Channel	1852.4	23.08	33.00
	Middle Channel	1880.0	23.11	33.00
	High Channel	1907.6	23.16	33.00
HSDPA	Low Channel	1852.4	22.27	33.00
	Middle Channel	1880.0	21.88	33.00
	High Channel	1907.6	21.94	33.00
HSUPA	Low Channel	1852.4	21.25	33.00
	Middle Channel	1880.0	21.17	33.00
	High Channel	1907.6	21.26	33.00

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

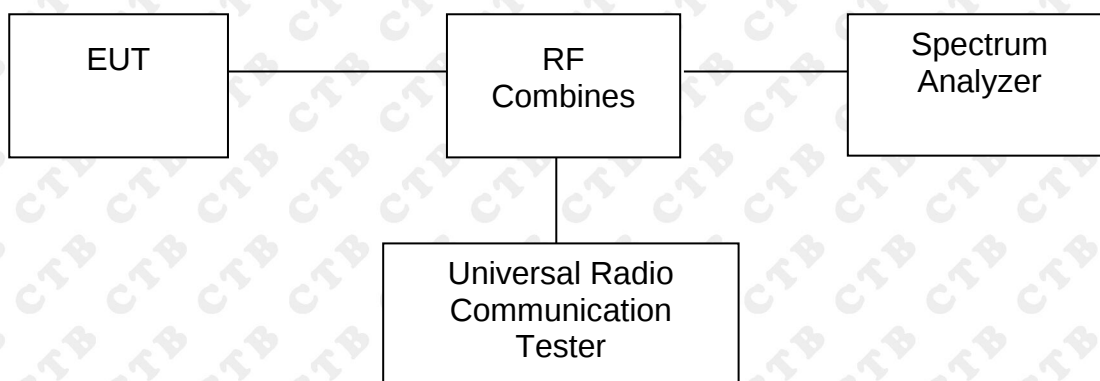
7.1 Standard Applicable

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	2.65	13
GPRS(1 Slot)	190	836.6	2.61	13
EDGE(1 Slot)	190	836.6	2.29	13

For PCS 1900

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	512	1850.2	2.67	13
GPRS(1 Slot)	512	1850.2	2.65	13
EDGE(1 Slot)	512	1850.2	2.38	13

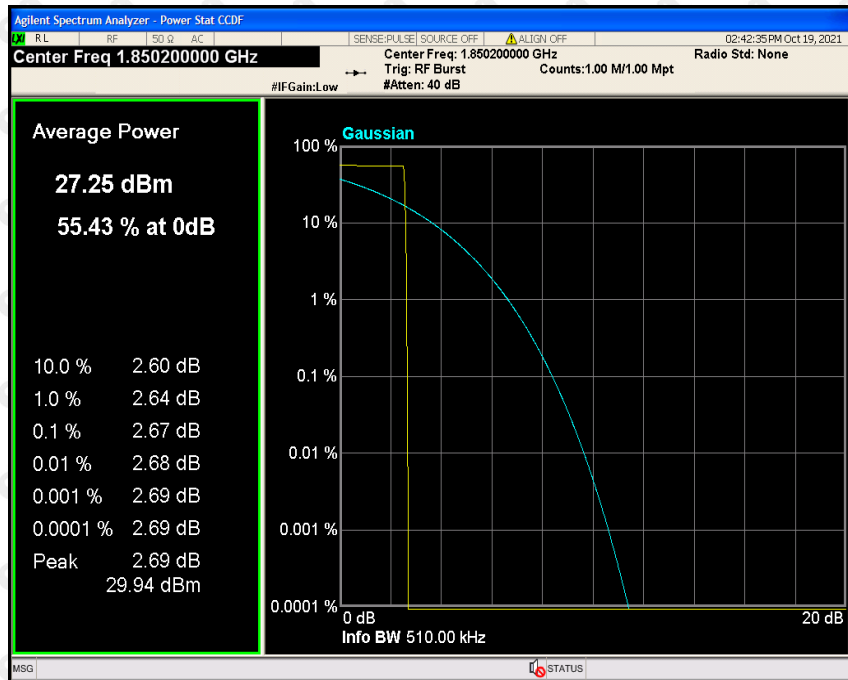
For WCDMA Band 5

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	4182	836.6	1.98	13
HSDPA	4182	836.6	1.97	13
HSUPA	4182	836.6	1.29	13

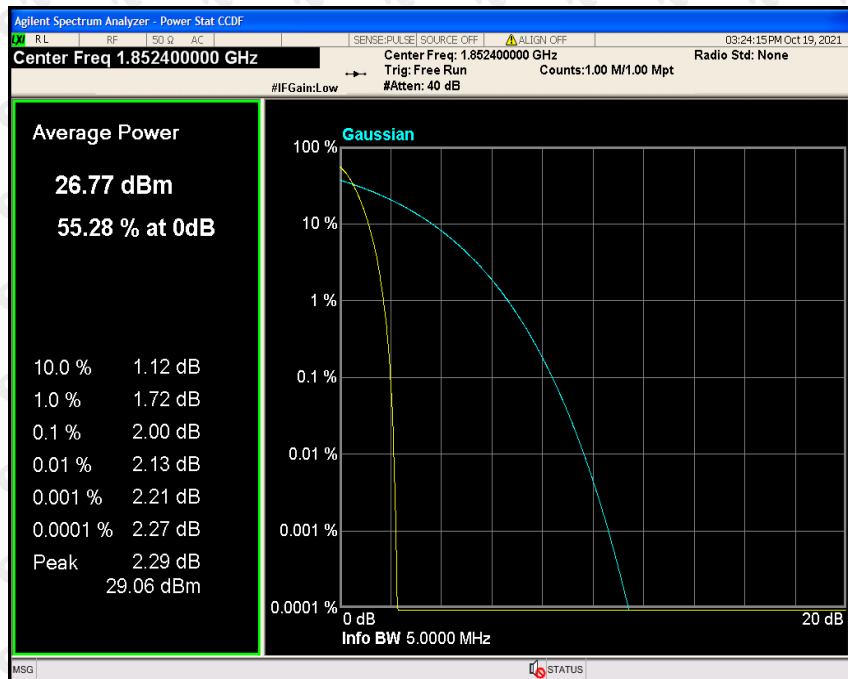
For WCDMA Band 2

Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	9262	1852.4	2.13	13
HSDPA	9400	1852.4	1.95	13
HSUPA	9400	1852.4	1.17	13

GSM :



WCDMA:



8. EMISSION BANDWIDTH

8.1 Standard Applicable

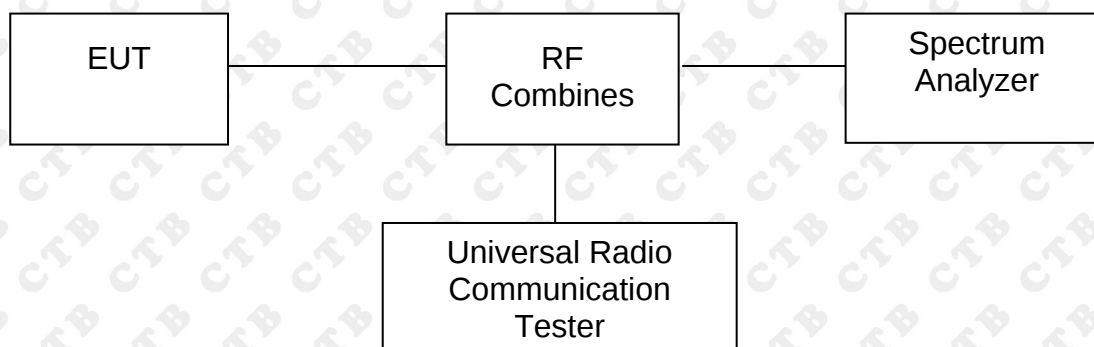
According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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	248.655	314.445
	190	836.6	245.553	312.911
	251	848.8	251.395	318.381
GPRS	128	824.2	249.238	319.044
	190	836.6	243.472	310.243
	251	848.8	241.336	320.915
EDGE	128	824.2	148.353	190.893
	190	836.6	187.153	220.313
	251	848.8	264.540	295.725

For PCS Band

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	512	1850.2	242.905	309.731
	661	1880.0	249.733	318.554
	810	1909.8	249.942	321.084
GPRS	512	1850.2	248.031	313.363
	661	1880.0	245.960	314.010
	810	1909.8	250.566	310.875
EDGE	512	1850.2	243.121	306.687
	661	1880.0	250.595	300.615
	810	1909.8	240.007	298.359

For Band 5

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	4132	826.4	4130.304	4711.216
	4183	836.6	4129.293	4689.787
	4233	846.6	4109.332	4677.519
HSDPA	4132	826.4	4116.172	4673.990
	4183	836.6	4106.085	4691.265
	4233	846.6	4104.308	4648.336
HSUPA	4132	826.4	4130.474	4692.886
	4183	836.6	4115.364	4702.114
	4233	846.6	4140.304	5869.051

For Band 2

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	9262	1852.4	4109.459	4683.869
	9400	1880.0	4128.425	4679.387
	9538	1907.6	4106.356	4705.956
HSDPA	9262	1852.4	4131.486	4669.081
	9400	1880.0	4112.379	4677.214
	9538	1907.6	4117.407	4656.352
HSUPA	9262	1852.4	4116.317	4686.249
	9400	1880.0	4096.449	4700.755
	9538	1907.6	4123.082	4694.717

For Cellular Band

GSM Low Channel



GSM Middle Channel



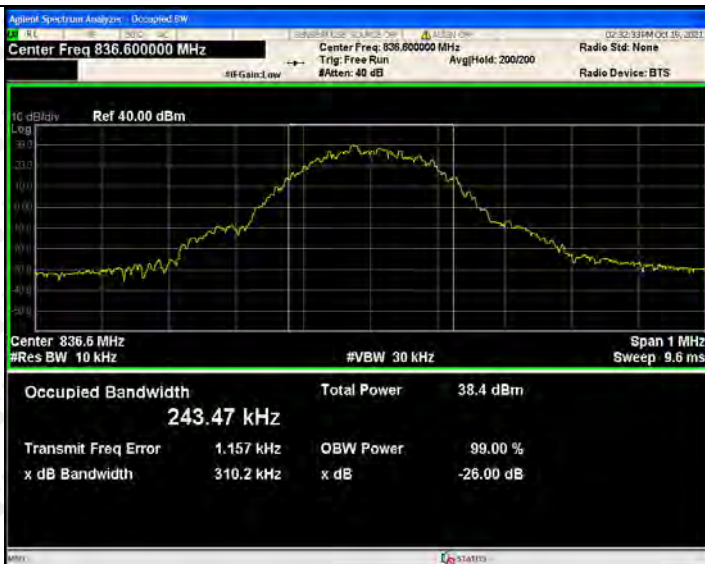
GSM High channel



GPRS Low Channel



GPRS Middle Channel



GPRS High Channel



EDGE Low Channel



EDGE Middle Channel

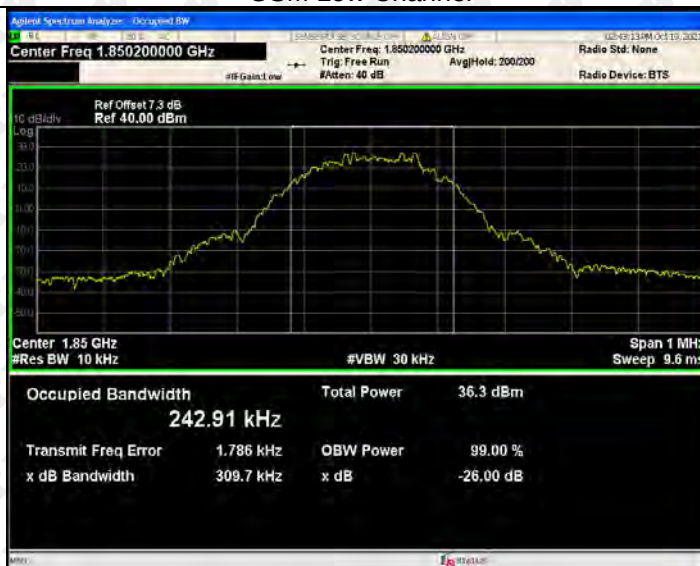


EDGE High Channel



For PCS Band

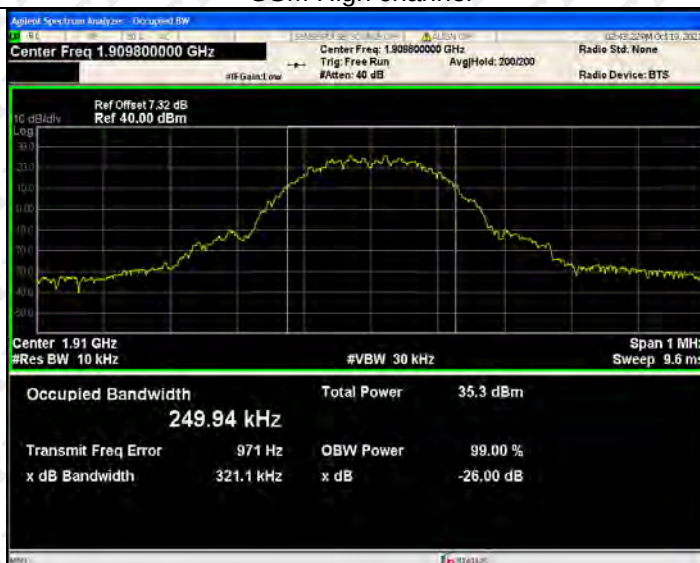
GSM Low Channel



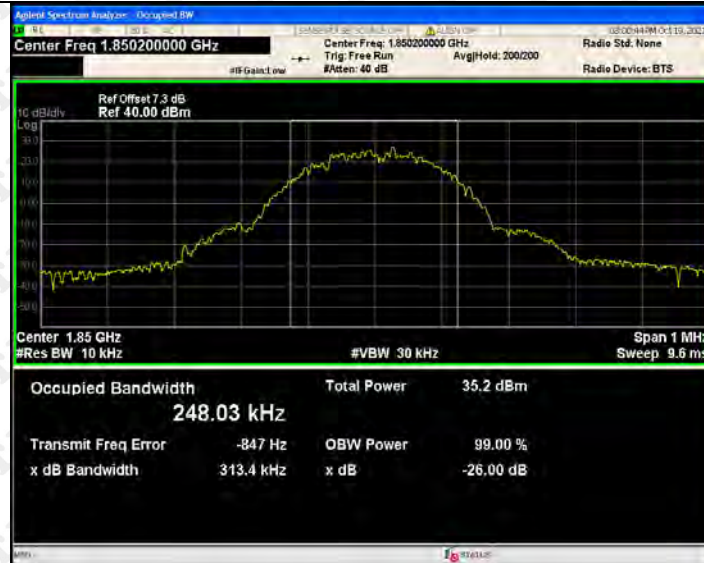
GSM Middle Channel



GSM High channel



GPRS Low Channel



GPRS Middle Channel



GPRS High Channel



EDGE Low Channel



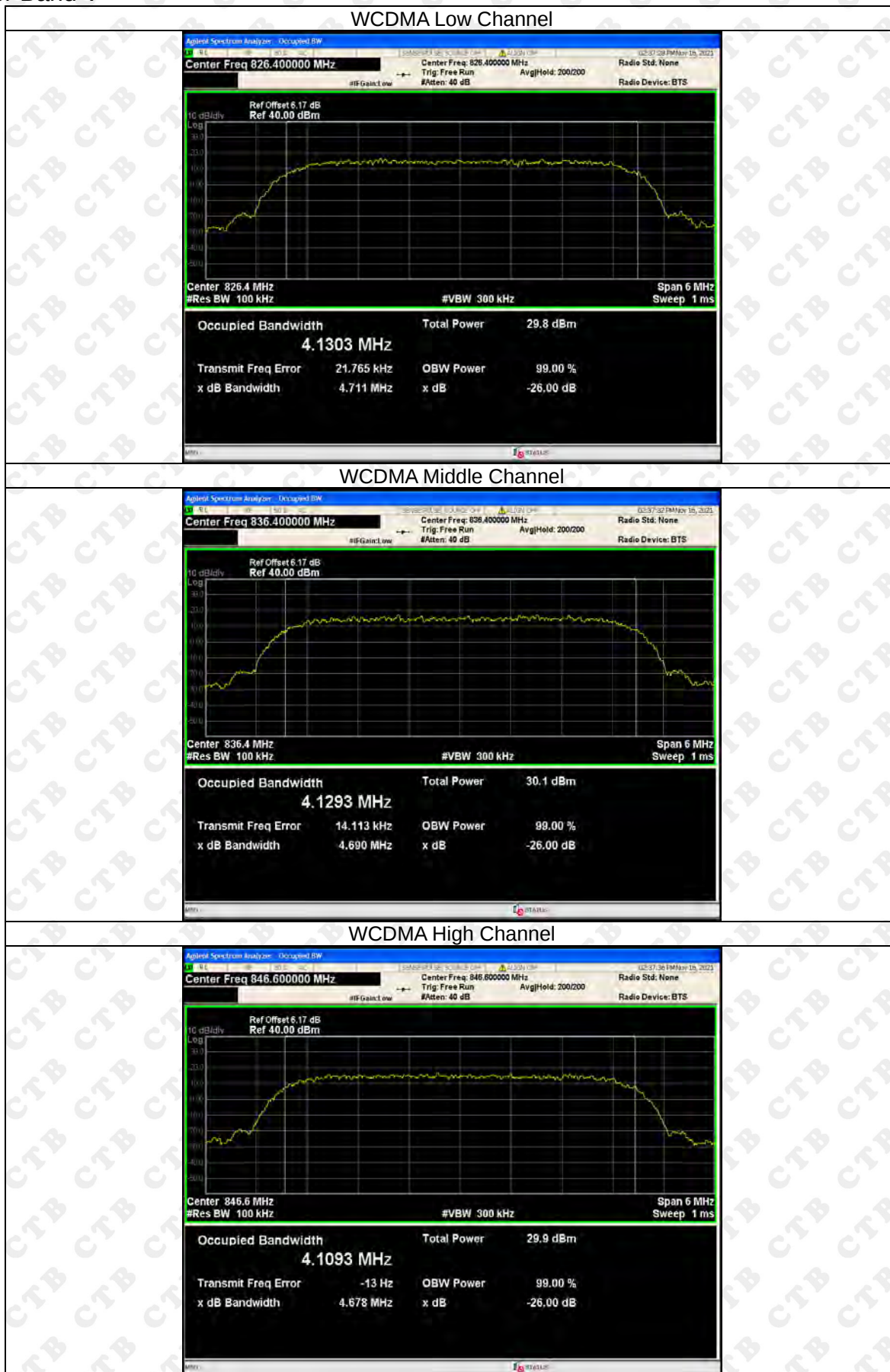
EDGE Middle Channel



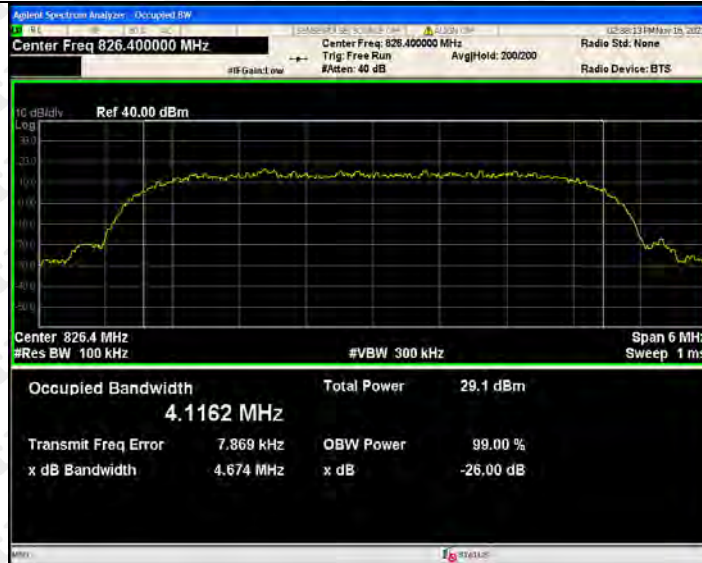
EDGE High Channel



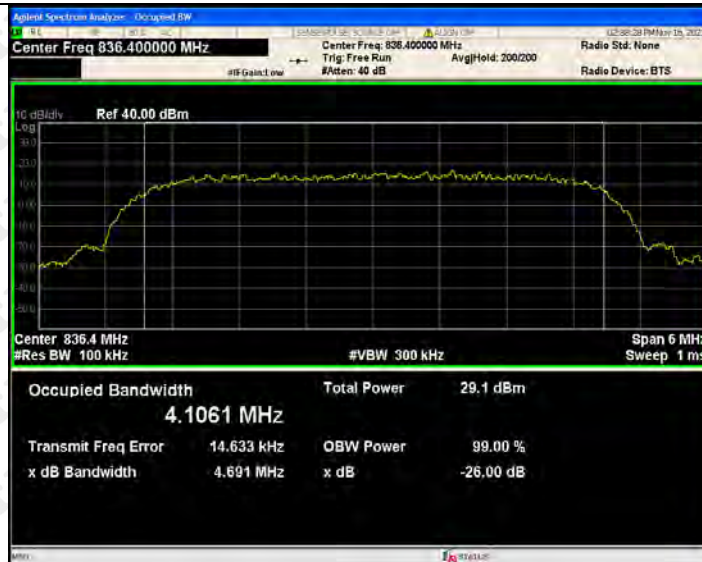
For Band V



HSDPA Low Channel



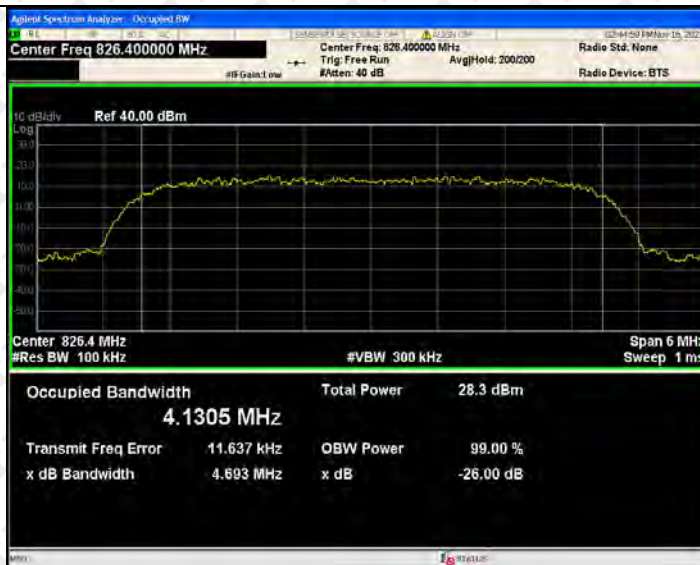
HSDPA Middle Channel



HSDPA High Channel



HSUPA Low Channel



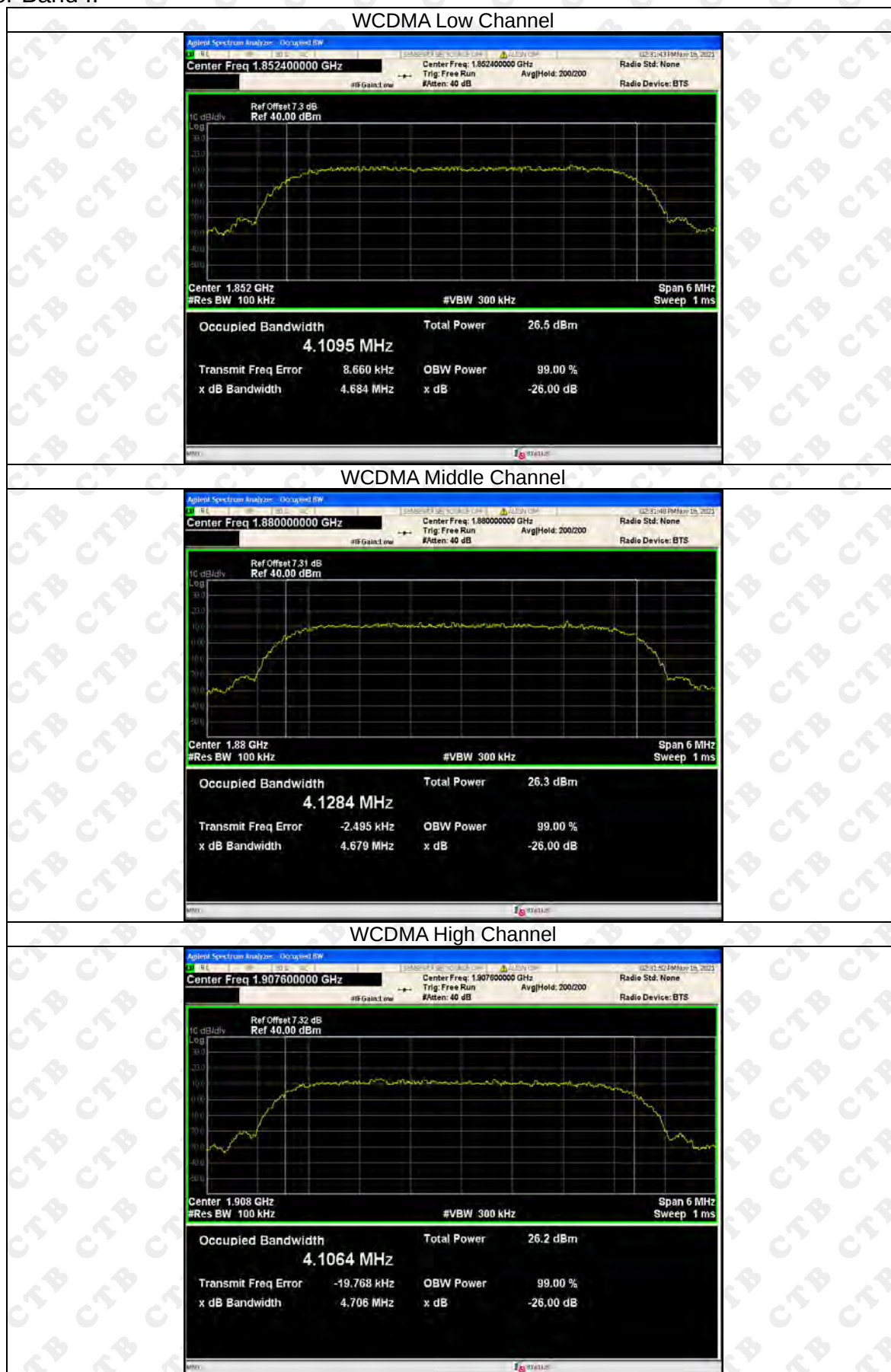
HSUPA Middle Channel



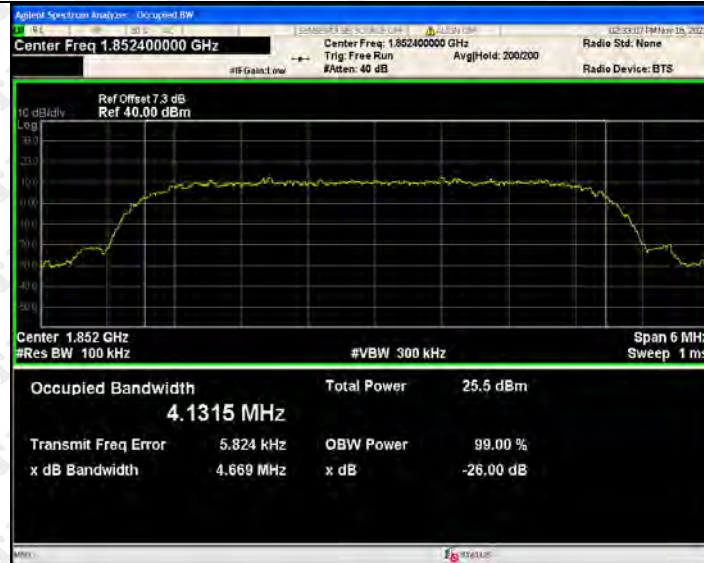
HSUPA High Channel



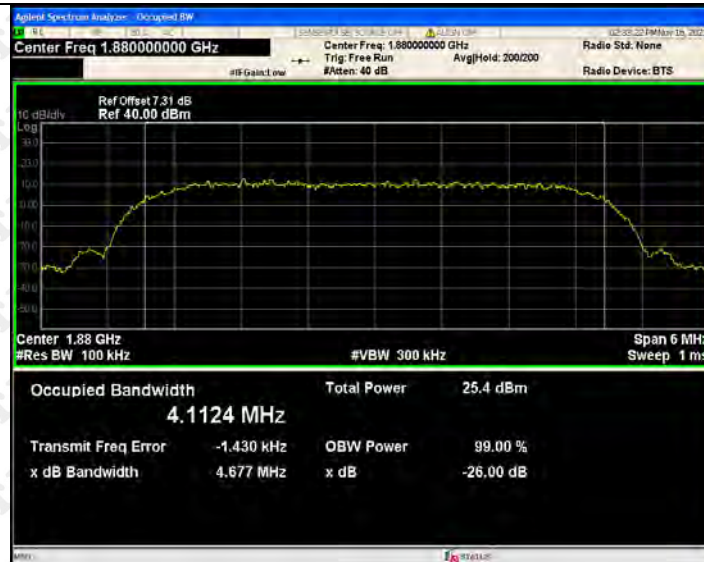
For Band II



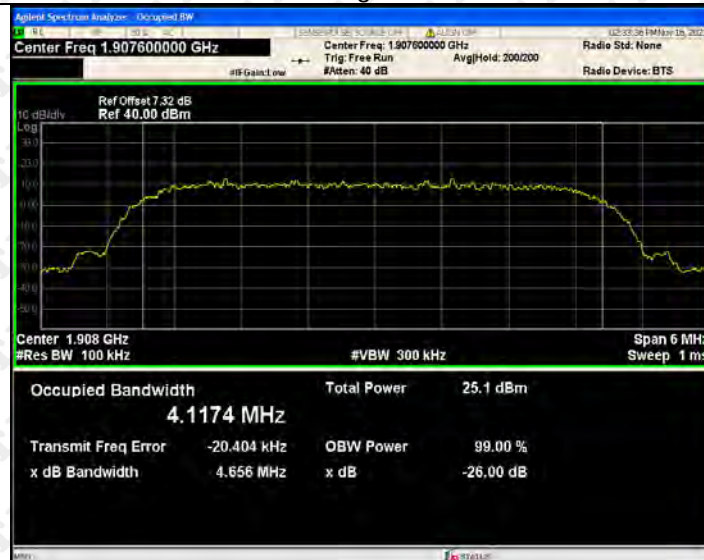
HSDPA Low Channel



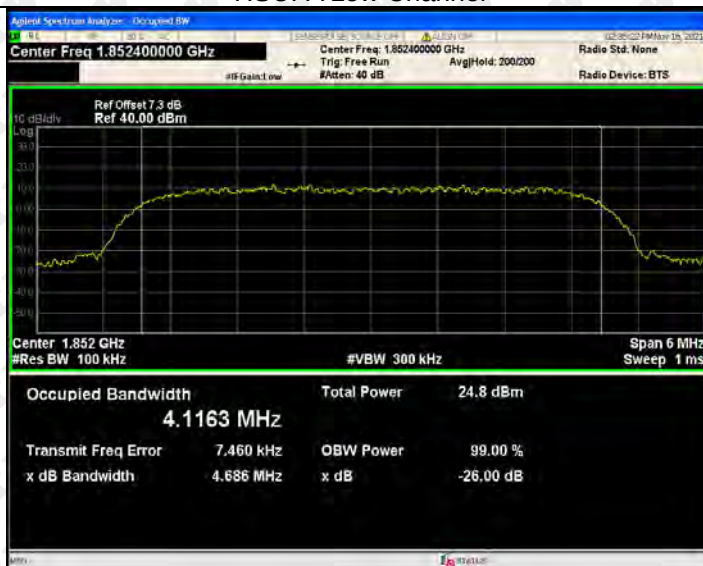
HSDPA Middle Channel



HSDPA High Channel



HSUPA Low Channel



HSUPA Middle Channel



HSUPA High Channel



9. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

9.1 Standard Applicable

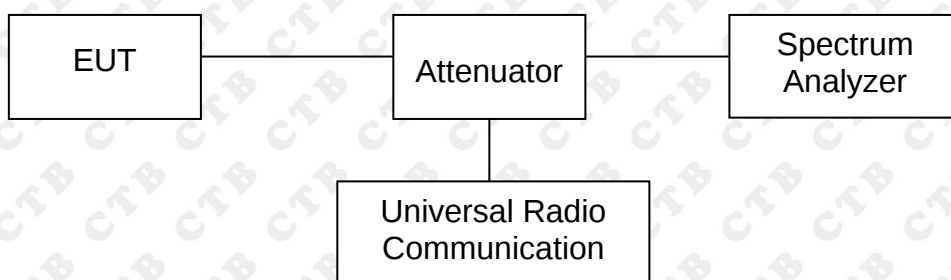
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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:



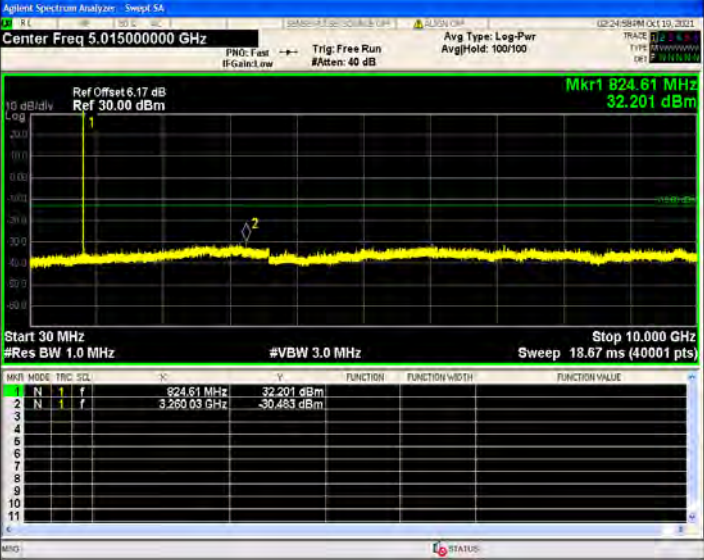
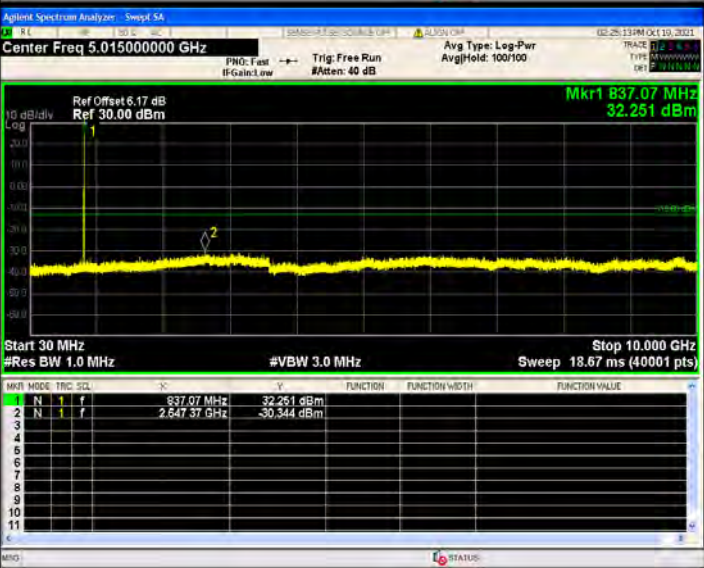
9.3 Environmental Conditions

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

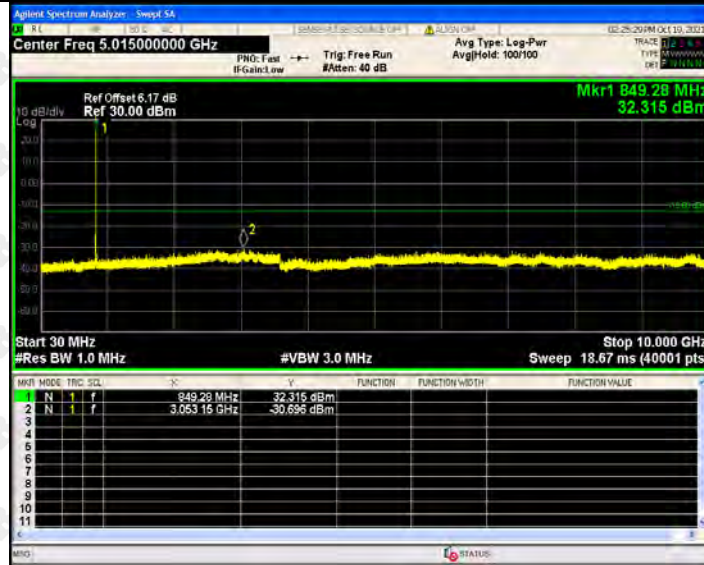
9.4 Summary of Test Results/Plots

Please refer to the following test plots

For Cellular Band

GSM Low Channel	
GSM Middle Channel	

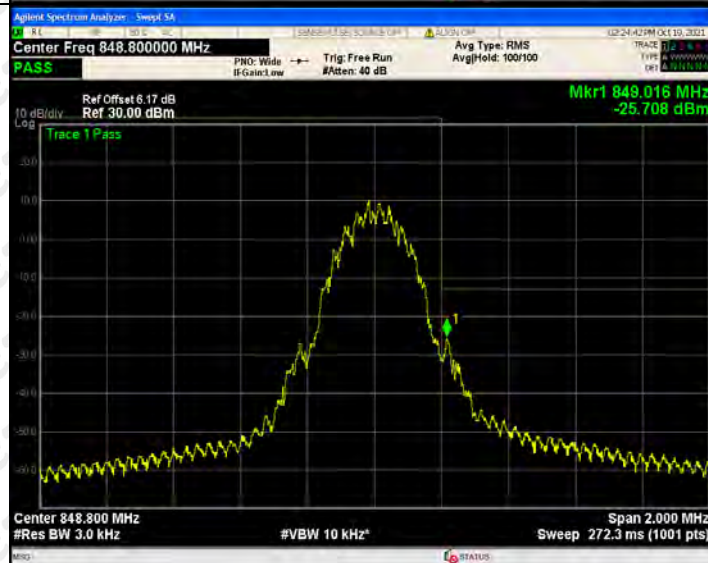
GSM
High
Channel



GSM
Low
Band
Emission



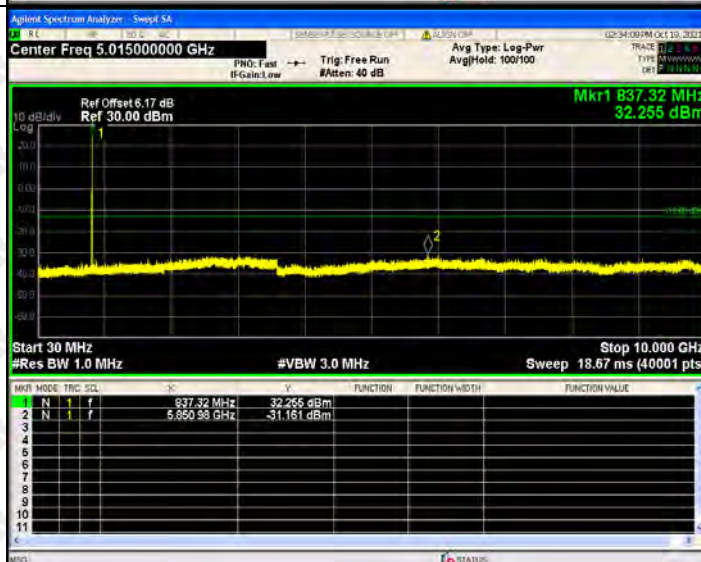
GSM
High
Band
Emission



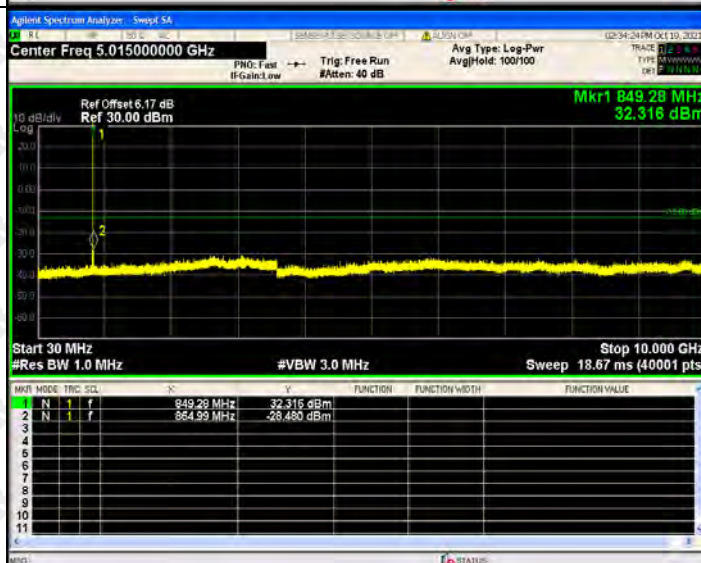
GPRS
Low
Channel



GPRS
Middle
Channel



GPRS
High
Channel

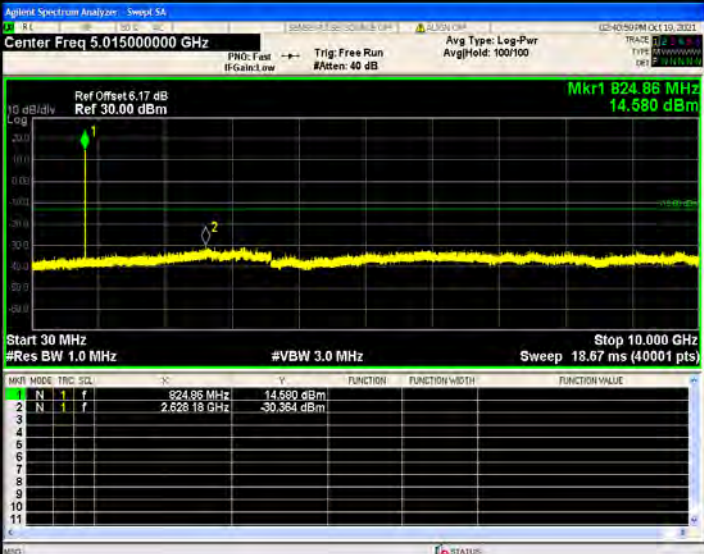
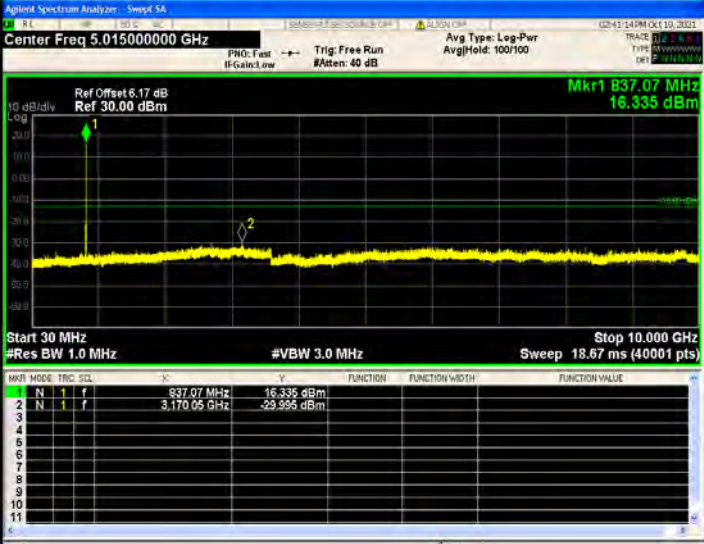
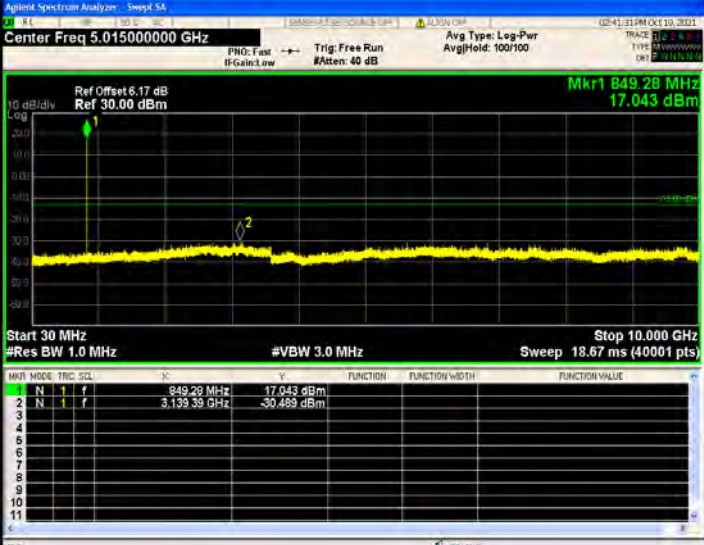


GPRS
Low
Band
Emission

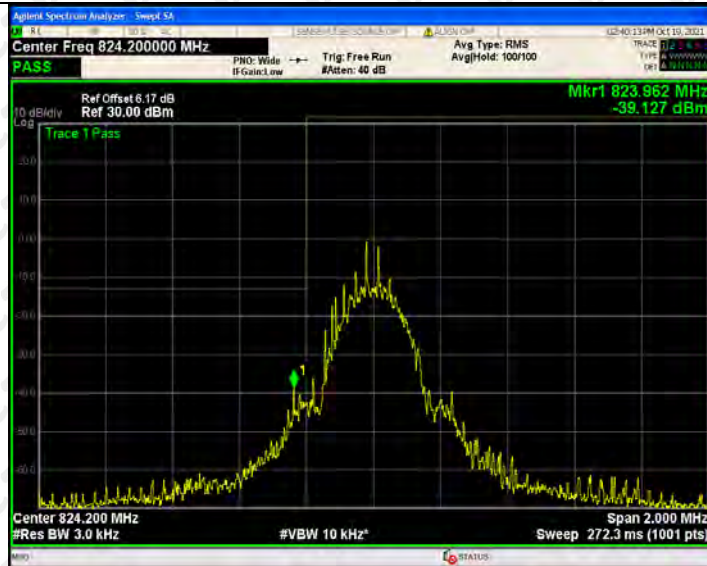


GPRS
High
Band
Emission



EDGE Low Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 824.86 MHz 14.580 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRIG</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>824.86 MHz</td><td>14.580 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.628 18 GHz</td><td>-30.364 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRIG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	824.86 MHz	14.580 dBm				2	N	1	f	2.628 18 GHz	-30.364 dBm			
MKR	MODE	TRIG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	824.86 MHz	14.580 dBm																							
2	N	1	f	2.628 18 GHz	-30.364 dBm																							
EDGE Middle Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 837.07 MHz 16.335 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRIG</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>837.07 MHz</td><td>16.335 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>3.170 05 GHz</td><td>-29.995 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRIG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	837.07 MHz	16.335 dBm				2	N	1	f	3.170 05 GHz	-29.995 dBm			
MKR	MODE	TRIG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	837.07 MHz	16.335 dBm																							
2	N	1	f	3.170 05 GHz	-29.995 dBm																							
EDGE High Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 849.28 MHz 17.043 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRIG</th><th>SOL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>849.28 MHz</td><td>17.043 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>3.139 39 GHz</td><td>-30.469 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRIG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	849.28 MHz	17.043 dBm				2	N	1	f	3.139 39 GHz	-30.469 dBm			
MKR	MODE	TRIG	SOL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	849.28 MHz	17.043 dBm																							
2	N	1	f	3.139 39 GHz	-30.469 dBm																							

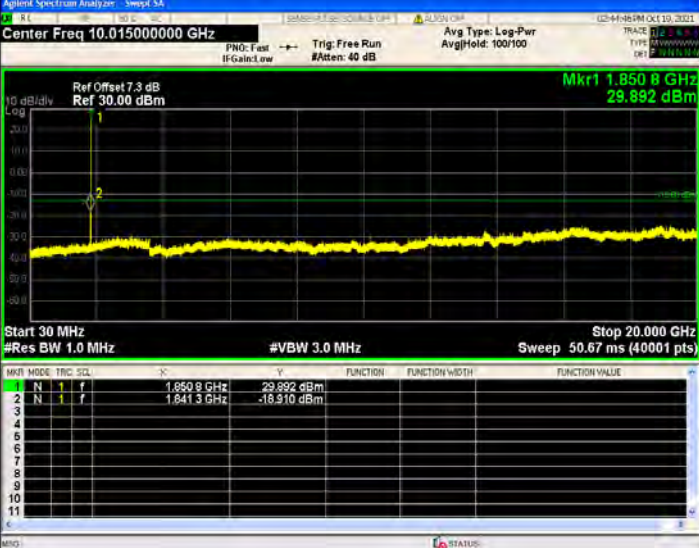
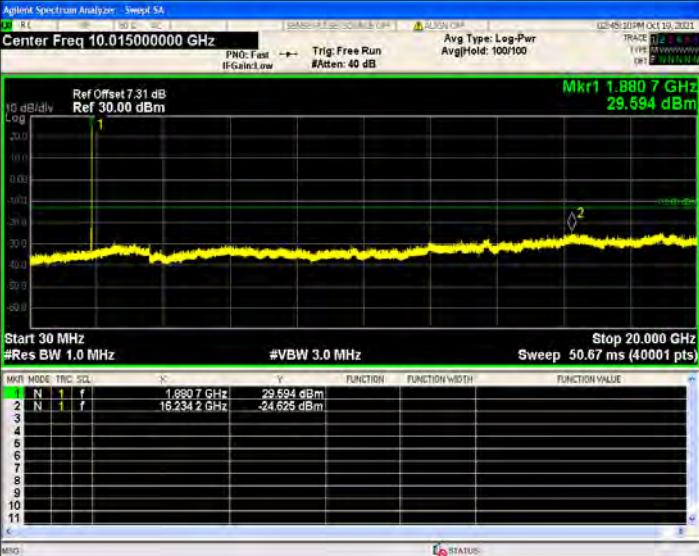
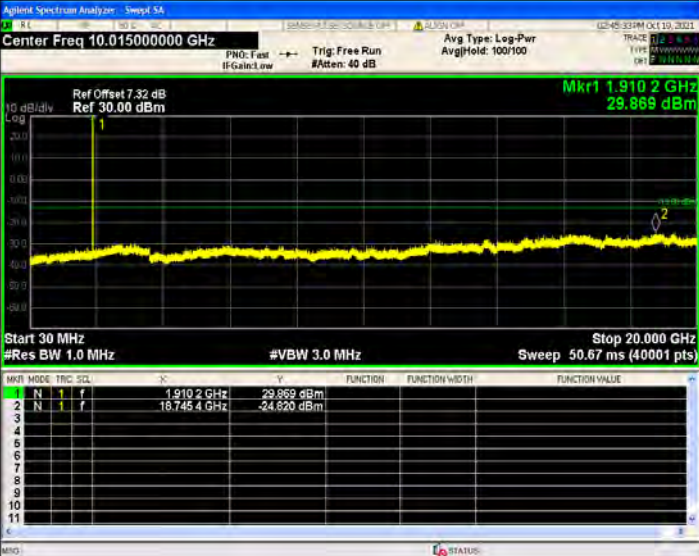
EDGE
Low
Band
Emission



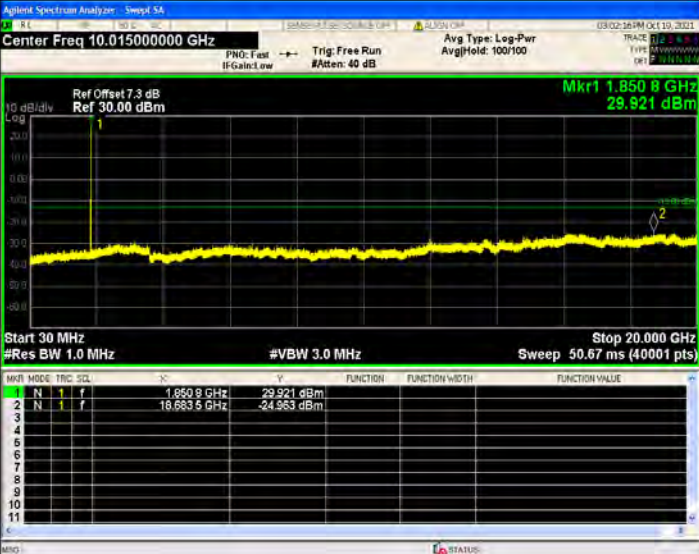
EDGE
High
Band
Emission



For PCS Band

GSM Low Channel		
GSM Middle Channel		
GSM High Channel		

GSM Low Band Emission	 Agilent Spectrum Analyzer - Sweep SA Center Freq 1.850200000 GHz PNO: Wide IF Gain: Low Trig: Free Run Avg Type: RMS PASS Ref Offset: 7.3 dB Ref: 30.00 dBm Avg Hold: 100/100 Mkr1 1.849 980 GHz -30.183 dBm Trace 1 Pass Center 1.850200 GHz #VBW 10 kHz* Span 2.000 MHz #Res BW 3.0 kHz Sweep 272.3 ms (1001 pts)	
GSM High Band Emission	 Agilent Spectrum Analyzer - Sweep SA Center Freq 1.909800000 GHz PNO: Wide IF Gain: Low Trig: Free Run Avg Type: RMS PASS Ref Offset: 7.32 dB Ref: 30.00 dBm Avg Hold: 100/100 Mkr1 1.910 016 GHz -28.544 dBm Trace 1 Pass Center 1.909800 GHz #VBW 10 kHz* Span 2.000 MHz #Res BW 3.0 kHz Sweep 272.3 ms (1001 pts)	

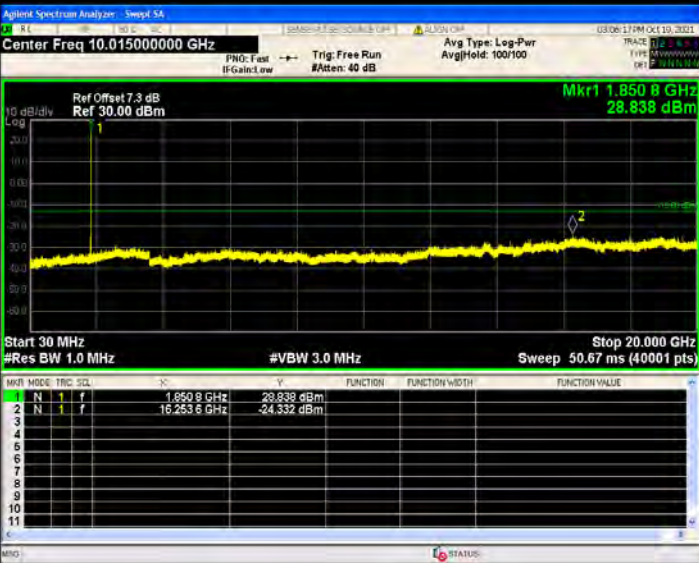
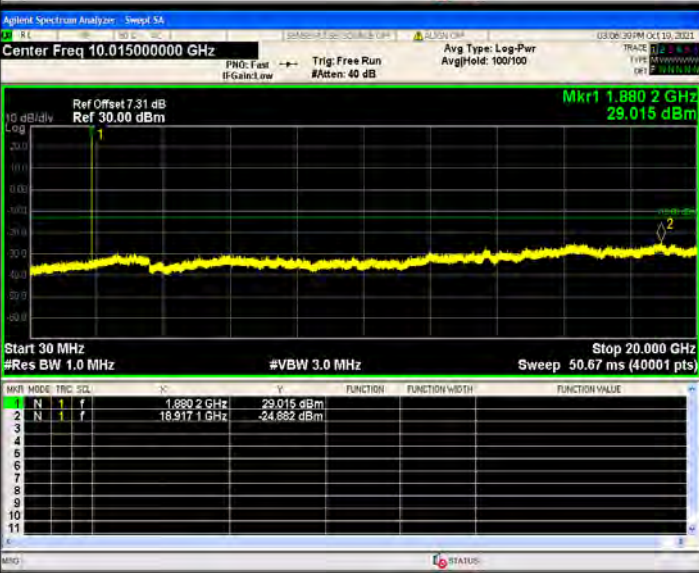
GPRS Low Channel		
GPRS Middle Channel		
GPRS High Channel		

GPRS
Low
Band
Emission



GPRS
High
Band
Emission



EDGE Low Channel		
EDGE Middle Channel		
EDGE High Channel		

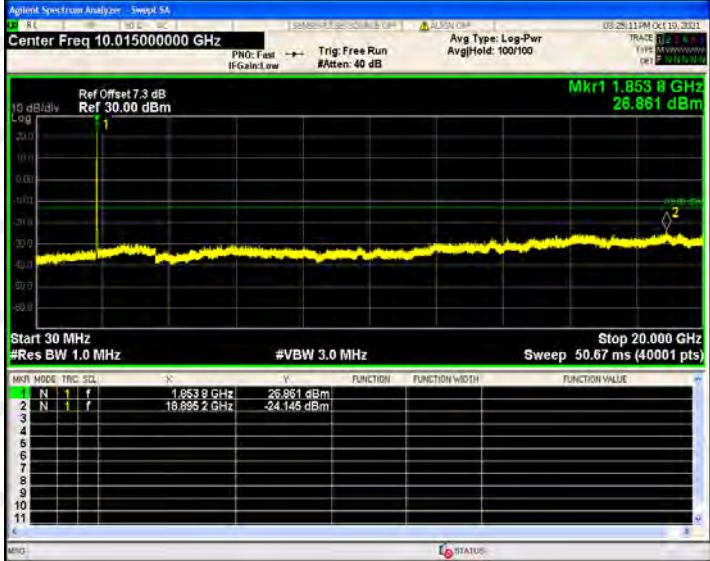
EDGE
Low
Band
Emission



EDGE
High
Band
Emission



For Band II

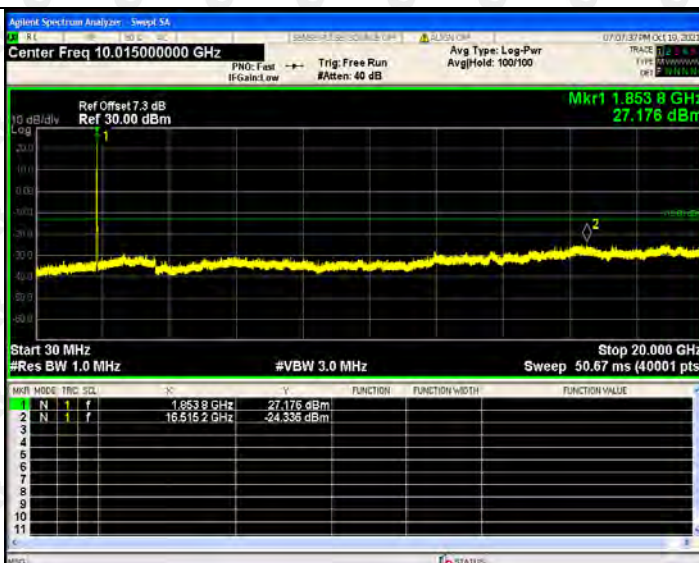
WCDMA Low Channel	
WCDMA Middle Channel	
WCDMA High Channel	

WCDMA
Low
Band
Spurious
Emission



WCDMA
High
Band
Spurious
Emission

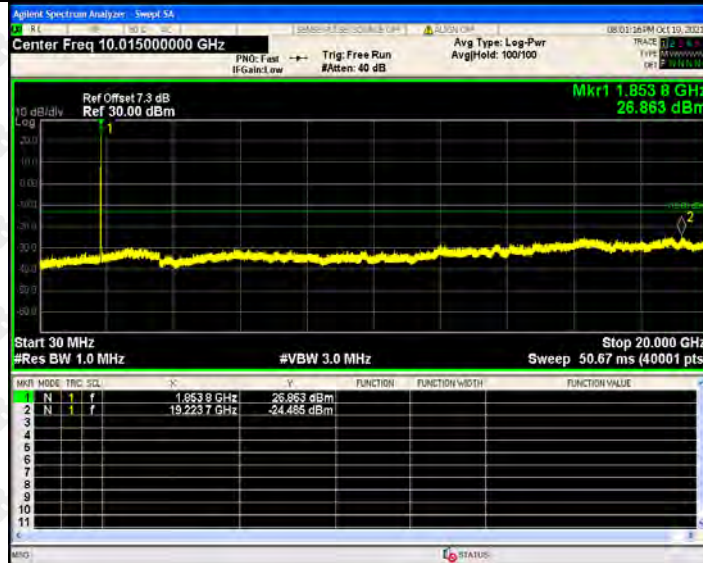


HSDPA
Low
Channel

HSDPA
Middle
Channel

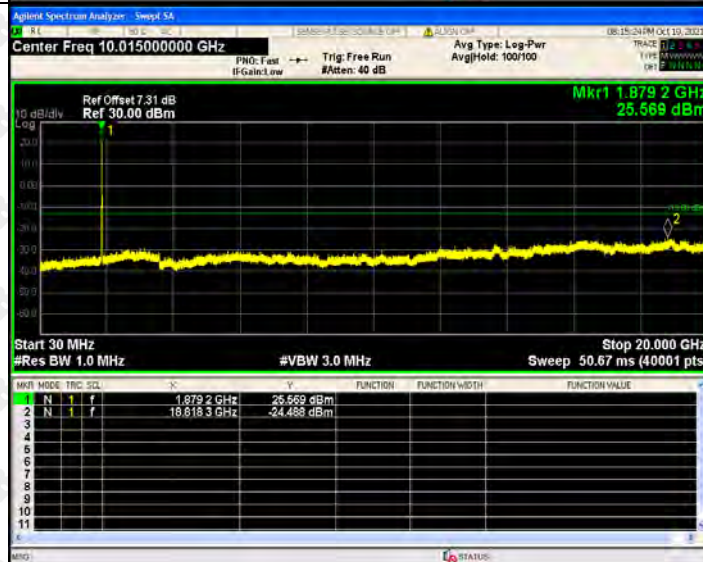
HSDPA
High
Channel


HSDPA Low Band Spurious Emission		
HSDPA High Band Spurious Emission		

HSUPA
Low
Channel



HSUPA
Middle
Channel



HSUPA
High
Channel



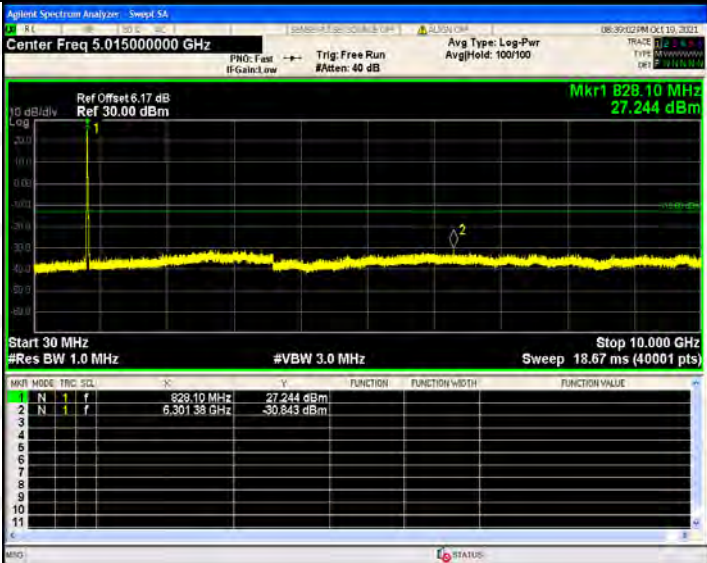
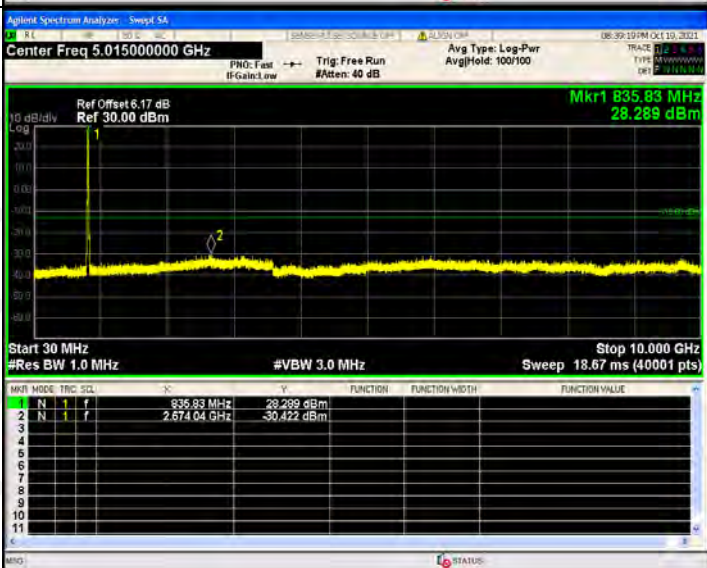
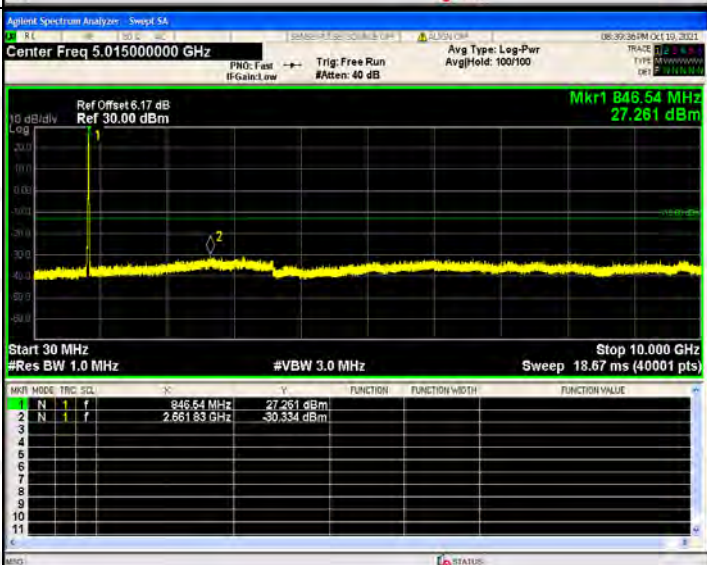
HSUPA
Low
Band
Spurious
Emission



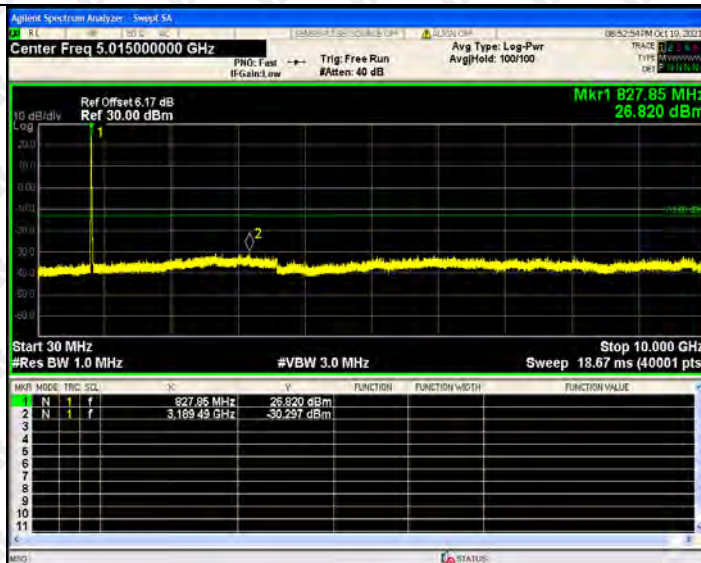
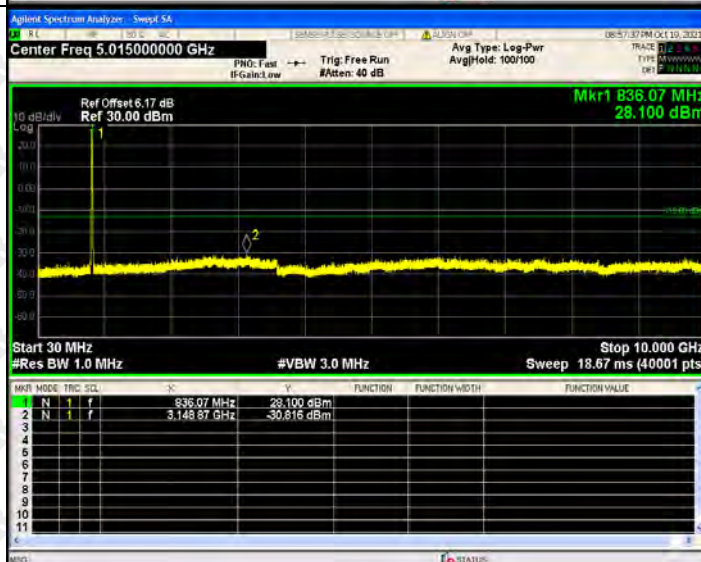
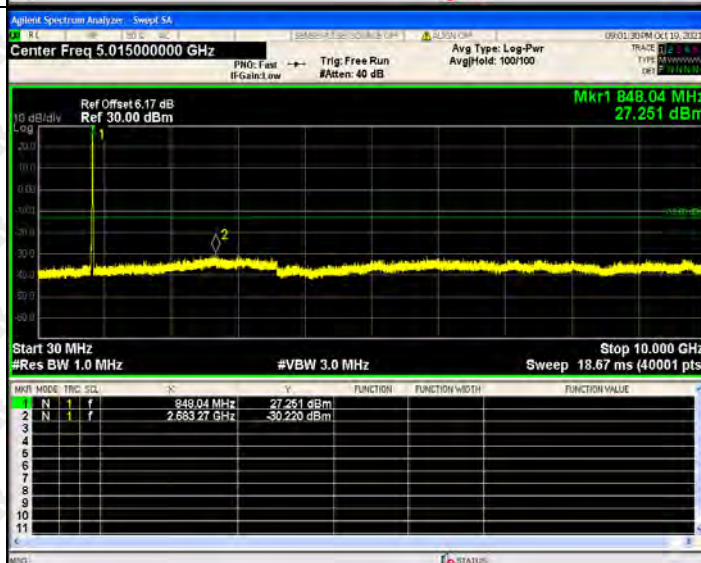
HSUPA
High
Band
Spurious
Emission



For Band V

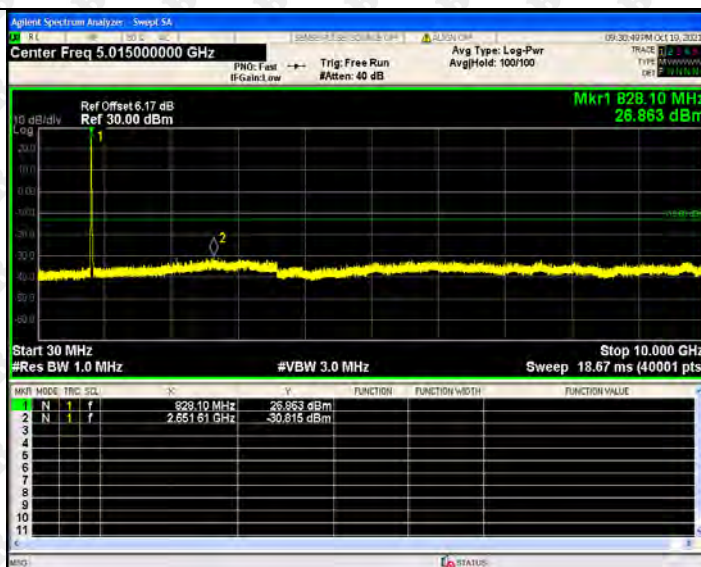
WCDMA Low Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 828.10 MHz 27.244 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts) <table><tr><th>Mkr</th><th>Mode</th><th>Trig</th><th>SQL</th><th>X</th><th>Y</th><th>Function</th><th>Function Width</th><th>Function Value</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>828.10 MHz</td><td>27.244 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>6.30138 GHz</td><td>-30.843 dBm</td><td></td><td></td><td></td></tr></table>	Mkr	Mode	Trig	SQL	X	Y	Function	Function Width	Function Value	1	N	1	f	828.10 MHz	27.244 dBm				2	N	1	f	6.30138 GHz	-30.843 dBm			
Mkr	Mode	Trig	SQL	X	Y	Function	Function Width	Function Value																				
1	N	1	f	828.10 MHz	27.244 dBm																							
2	N	1	f	6.30138 GHz	-30.843 dBm																							
WCDMA Middle Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 835.83 MHz 28.289 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts) <table><tr><th>Mkr</th><th>Mode</th><th>Trig</th><th>SQL</th><th>X</th><th>Y</th><th>Function</th><th>Function Width</th><th>Function Value</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>835.83 MHz</td><td>28.289 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.67404 GHz</td><td>-30.422 dBm</td><td></td><td></td><td></td></tr></table>	Mkr	Mode	Trig	SQL	X	Y	Function	Function Width	Function Value	1	N	1	f	835.83 MHz	28.289 dBm				2	N	1	f	2.67404 GHz	-30.422 dBm			
Mkr	Mode	Trig	SQL	X	Y	Function	Function Width	Function Value																				
1	N	1	f	835.83 MHz	28.289 dBm																							
2	N	1	f	2.67404 GHz	-30.422 dBm																							
WCDMA High Channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 5.015000000 GHz Ref Offset 6.17 dB Ref 30.00 dBm Mkr1 846.54 MHz 27.261 dBm Start 30 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts) <table><tr><th>Mkr</th><th>Mode</th><th>Trig</th><th>SQL</th><th>X</th><th>Y</th><th>Function</th><th>Function Width</th><th>Function Value</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>846.54 MHz</td><td>27.261 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.66183 GHz</td><td>-30.334 dBm</td><td></td><td></td><td></td></tr></table>	Mkr	Mode	Trig	SQL	X	Y	Function	Function Width	Function Value	1	N	1	f	846.54 MHz	27.261 dBm				2	N	1	f	2.66183 GHz	-30.334 dBm			
Mkr	Mode	Trig	SQL	X	Y	Function	Function Width	Function Value																				
1	N	1	f	846.54 MHz	27.261 dBm																							
2	N	1	f	2.66183 GHz	-30.334 dBm																							

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-603E and ANSI C63.26-2015 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	DC3.8V

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	-69.19	4.34	-64.85	-13.00	-51.85	H
1652.8	-58.43	4.94	-53.49	-13.00	-40.49	H
2479.2	-58.45	8.46	-49.99	-13.00	-36.99	H
46.34	-69.24	4.34	-64.90	-13.00	-51.90	V
1652.8	-57.12	4.94	-52.18	-13.00	-39.18	V
2479.2	-58.53	8.46	-50.07	-13.00	-37.07	V
Middle Channel (836.6MHz)						
46.34	-69.47	4.34	-65.13	-13.00	-52.13	H
1672.8	-57.47	5.11	-52.36	-13.00	-39.36	H
2509.2	-57.54	8.54	-49.00	-13.00	-36.00	H
46.34	-69.17	4.34	-64.83	-13.00	-51.83	V
1672.8	-58.32	5.11	-53.21	-13.00	-40.21	V
2509.2	-59.47	8.54	-50.93	-13.00	-37.93	V
High Channel (846.6MHz)						
46.34	-69.45	4.34	-65.11	-13.00	-52.11	H
1693.2	-56.43	5.29	-51.14	-13.00	-38.14	H
2539.8	-59.23	8.59	-50.64	-13.00	-37.64	H
46.34	-68.81	4.34	-64.47	-13.00	-51.47	V
1693.2	-57.11	5.29	-51.82	-13.00	-38.82	V
2539.8	-58.32	8.59	-49.73	-13.00	-36.73	V

For Band 2 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1852.4MHz)						
46.34	-69.29	4.34	-64.95	-13.00	-51.95	H
3704.8	-57.43	10.17	-47.26	-13.00	-34.26	H
5557.2	-58.17	14.69	-43.48	-13.00	-30.48	H
46.34	-68.83	4.34	-64.49	-13.00	-51.49	V
3704.8	-58.54	10.17	-48.37	-13.00	-35.37	V
5557.2	-58.56	14.69	-43.87	-13.00	-30.87	V
Middle Channel (1880MHz)						
46.34	-68.94	4.34	-64.60	-13.00	-51.60	H
3760.8	-58.46	10.26	-48.20	-13.00	-35.20	H
5640.0	-57.46	14.78	-42.68	-13.00	-29.68	H
46.34	-68.72	4.34	-64.38	-13.00	-51.38	V
3760.8	-57.87	10.26	-47.61	-13.00	-34.61	V
5640.0	-58.12	14.78	-43.34	-13.00	-30.34	V
High Channel (1907.6MHz)						
46.34	-69.42	4.34	-65.08	-13.00	-52.08	H
3815.2	-58.25	10.59	-47.66	-13.00	-34.66	H
5722.8	-58.14	15.03	-43.11	-13.00	-30.11	H
46.34	-69.15	4.34	-64.81	-13.00	-51.81	V
3815.2	-58.38	10.59	-47.79	-13.00	-34.79	V



5722.8	-57.62	15.03	-42.59	-13.00	-29.59	V
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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): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	0.26	0.0003
40	NV	0.26	0.0003
30	NV	0.7	0.0009
20	NV	1.0	0.0012
10	NV	1.3	0.0016
0	NV	1.8	0.0021
-10	NV	1.8	0.0022
-20	NV	2.2	0.0026
-30	NV	2.3	0.0027

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	14.11	0.0075
40	NV	14.5	0.0077
30	NV	14.5	0.0077
20	NV	15.0	0.0080
10	NV	15.2	0.0081
0	NV	15.4	0.0082
-10	NV	15.5	0.0083
-20	NV	15.8	0.0084
-30	NV	15.9	0.0084

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	-0.55	-0.0007
40	NV	-0.4	-0.0004
30	NV	-0.2	-0.0002
20	NV	0.2	0.0002
10	NV	0.2	0.0002
0	NV	0.6	0.0007
-10	NV	0.9	0.0011
-20	NV	1.1	0.0013
-30	NV	1.1	0.0014

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	-0.81	-0.0004
40	NV	-0.7	-0.0004
30	NV	-0.3	-0.0002
20	NV	0.0	0.0000
10	NV	0.4	0.0002
0	NV	0.8	0.0004
-10	NV	0.8	0.0004
-20	NV	1.2	0.0006
-30	NV	1.5	0.0008

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	5.00	0.0060
40	NV	5.0	0.0060
30	NV	5.5	0.0066
20	NV	5.9	0.0070
10	NV	5.9	0.0071
0	NV	6.4	0.0077
-10	NV	6.7	0.0081
-20	NV	7.2	0.0086
-30	NV	7.5	0.0090

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	14.077	0.0075
40	NV	14.4	0.0076
30	NV	14.4	0.0077
20	NV	14.9	0.0079
10	NV	15.2	0.0081
0	NV	15.2	0.0081
-10	NV	15.6	0.0083
-20	NV	15.9	0.0085
-30	NV	16.0	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	-9.31	-0.0111
40	NV	-9.1	-0.0109
30	NV	-9.0	-0.0107
20	NV	-8.6	-0.0103
10	NV	-8.3	-0.0100
0	NV	-8.0	-0.0096
-10	NV	-7.6	-0.0090
-20	NV	-7.4	-0.0089
-30	NV	-7.0	-0.0084

For WCDMA Band 2 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	-40.55	-0.0216
40	NV	-40.2	-0.0214
30	NV	-39.8	-0.0212
20	NV	-39.7	-0.0211
10	NV	-39.4	-0.0210
0	NV	-39.2	-0.0209
-10	NV	-39.2	-0.0209
-20	NV	-39.0	-0.0208
-30	NV	-38.8	-0.0206

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	-7.62	-0.0091
40	NV	-7.3	-0.0087
30	NV	-7.0	-0.0084
20	NV	-6.8	-0.0081
10	NV	-6.5	-0.0078
0	NV	-6.1	-0.0073
-10	NV	-6.1	-0.0072
-20	NV	-6.0	-0.0072
-30	NV	-5.7	-0.0068

For HSDPA Band 2 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	-7.78	-0.0041
40	NV	-5.87	-0.0031
30	NV	-6.31	-0.0034
20	NV	-7.96	-0.0042
10	NV	-7.49	-0.0040
0	NV	-7.26	-0.0039
-10	NV	-6.72	-0.0036
-20	NV	-6.55	-0.0035
-30	NV	-7.43	-0.0040

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	-15.44	-0.0185
40	NV	-15.0	-0.0179
30	NV	-14.9	-0.0178
20	NV	-14.4	-0.0172
10	NV	-14.0	-0.0167
0	NV	-13.8	-0.0165
-10	NV	-13.5	-0.0161
-20	NV	-13.2	-0.0158
-30	NV	-13.1	-0.0156

For HSUPA Band 2 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	-26.01	-0.0138
40	NV	-25.9	-0.0138
30	NV	-25.7	-0.0137
20	NV	-25.7	-0.0137
10	NV	-25.3	-0.0135
0	NV	-25.0	-0.0133
-10	NV	-24.5	-0.0130
-20	NV	-24.5	-0.0130
-30	NV	-24.4	-0.0130

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	2.3	0.0027
	NV	2.5	0.0030
	HV	3.0	0.0036
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	15.9	0.0085
	NV	16.0	0.0085
	HV	16.3	0.0087
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	1.1	0.0013
	NV	1.6	0.0019
	HV	1.9	0.0023
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	1.5	0.0008
	NV	1.7	0.0009
	HV	2.2	0.0012

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	7.5	0.0090
	NV	8.0	0.0095
	HV	8.2	0.0098
Reference Frequency(Middle Channel): EDGE 1880 MHz, Limit: 2.5ppm			
Environment	Power Supplied	Frequency Measure with Time Elapsed	

Temperature (°C)	(VDC)	Frequency (Hz)	Error (ppm)
20	LV	16	0.0191
	NV	14.14	0.0075
	HV	15.08	0.0080
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	-7	-0.0084
	NV	-6.9	-0.0083
	HV	-6.7	-0.0080
Reference Frequency(Middle Channel): WCDMA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-38.8	-0.021
	NV	-38.4	-0.020
	HV	-37.9	-0.020

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	-5.7	-0.0068
	NV	-5.3	-0.0064
	HV	-5.0	-0.0060
Reference Frequency(Middle Channel): HSDPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-5.87	-0.0031
	NV	-5.7	-0.0030
	HV	-5.6	-0.0030

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	-13.1	-0.0157
	NV	-12.9	-0.0154
	HV	-12.5	-0.0150
Reference Frequency(Middle Channel): HSUPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-24.4	-0.013
	NV	-24.2	-0.0128
	HV	-24.1	-0.0128

12. EUT PHOTO

EUT Photo 1



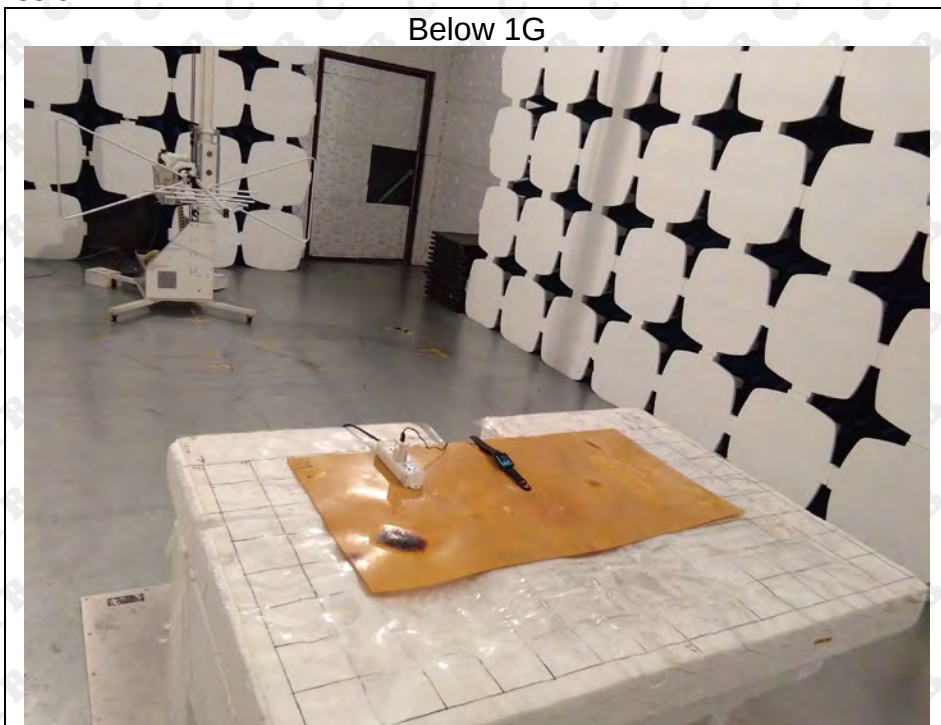
EUT Photo 2



13. EUT TEST PHOTO

Radiated Emission

Below 1G



Above 1G



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