FCC TEST REPORT

Product Name:	Mobile Phone
Trade Mark:	BLU
Model No.:	C5 PLUS
Add. Model No.:	J4
Report Number:	190806001RFM-1
Test Standards:	FCC 47 CFR Part 22 Subpart H FCC 47 CFR Part 24 Subpart E
FCC ID:	YHLBLUC5PLUS
Test Result:	PASS
Date of Issue:	August 28, 2019

Prepared for:

BLU Products, Inc.
10814 NW 33rd St # 100 Doral, FL 33172, USA

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6, Baoneng Science and Technology Park,
Qingxiang Road No.1, Longhua New District, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Prepared by: Tony Kang, Project Engineer

Reviewed by: Kevin Liang, Assistant Manager

Approved by: Billy Li, Technical Director

Date: August 28, 2019

Version

Version No.	Date	Description
V1.0	August 28, 2019	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	BLU Products, Inc.
Address of Applicant:	10814 NW 33rd St # 100 Doral, FL 33172, USA
Manufacturer:	BLU Products, Inc.
Address of Manufacturer:	10814 NW 33rd St # 100 Doral, FL 33172, USA

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Mobile Phone	
Model No.:	C5 PLUS	
Add. Model No.:	J4	
Trade Mark:	BLU	
DUT Stage:	Identical Prototype	
EUT Supports Function:	GSM Bands:	GSM850/1900
	UTRA Bands:	Band II/ Band V
	2.4 GHz ISM Band:	IEEE 802.11b/g/n
		Bluetooth V2.1 + EDR + BLE Concurrent
Hardware Version:	FS275-MB-V0.2A	
Software Version:	7731E_FS275_0000477_128x8_V1_128X8_GPS_PLS_2SIM_20190808_1944_CAM	
Sample Received Date:	August 7, 2019	
Sample Tested Date:	August 7, 2019 to August 23, 2019	
Note: The additional model J4 is identical with the test model C5 PLUS except the model number and ROM Capability.		

1.2.2 Description of Accessories

Adapter	
Model No.:	US-WW-1003
Input:	100-240 V~50/60 Hz 0.2 A
Output:	5.0 V ⎓ 1A

Battery	
Model No.:	C835842220L
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Rated Capacity:	2200 mAh

Cable	
Description:	USB Micro-B Plug Cable
Cable Type:	Unshielded without ferrite
Length:	1.00 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	GSM, GPRS, WCDMA, HSDPA, HSUPA	
Type of Modulation:	GSM/GPRS:	GMSK
	WCDMA	BPSK
	HSDPA:	QPSK
	HSUPA:	QPSK
Frequency Range:	GSM/GPRS 850:	824.2-848.8 MHz
	GSM/GPRS 1900:	1850.2-1909.8 MHz
	WCDMA Band II:	1852.4-1907.6 MHz
	WCDMA Band V:	826.4-846.6 MHz
Max RF Output Power:	GSM/GPRS 850:	32.91dBm
	GSM/GPRS 1900:	29.01dBm
	WCDMA Band II:	22.96dBm
	WCDMA Band V:	23.13dBm
Emission Designator:	GSM/GPRS 850:	247KGXW
	GSM/GPRS 1900:	247KGXW
	WCDMA Band II:	4M15F9W
	WCDMA Band V:	4M14F9W
IEMI:	Radiation: 869181029951462, 869181029951470	
	Conducted: 869181029951488, 869181029951496	
Antenna Type:	FPC Antenna	
Antenna Gain:	GSM 850:	1 dBi
	PCS 1900:	1 dBi
	WCDMA Band II:	1 dBi
	WCDMA Band V:	1 dBi
GPRS Class:	Class 12	
Normal Test Voltage:	3.7 Vdc	
Extreme Test Voltage:	3.5 to 4.35Vdc	
Extreme Test Temperature:	-10 °C to +50 °C	

1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested independently

1.5 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.6 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.7 DEVIATION FROM STANDARDS

None.

1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.10 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.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 22 Subpart H Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 22.917(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 22.355	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 24 Subpart E Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 24.232(d)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 24.238(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
☐	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 18, 2019	May 18, 2020
☐	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jun. 23, 2019	Jun. 23, 2020
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 2020
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160333		

RF Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Nov. 24, 2018	Nov. 24, 2019
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019
☒	Wideband Radio Communication Tester	R&S	CMW500	119583	Jun. 07, 2019	Jun. 07, 2020
☐	Universal Radio Communication Tester	R&S	CMU200	114713	Nov. 24, 2018	Nov. 24, 2019
☒	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 18, 2018	Sep. 18, 2019
☐	Temp & Humidity chamber	Espec	GL(U)04K A(W)	16921H201P3	Sep. 20, 2018	Sep. 20, 2019
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290 020	Jun. 05, 2018	Jun. 05, 2020

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.7	20 to 75
TL/VL	-10	3.5	20 to 75
TH/VL	+50	3.5	20 to 75
TL/VH	-10	4.35	20 to 75
TH/VH	+50	4.35	20 to 75

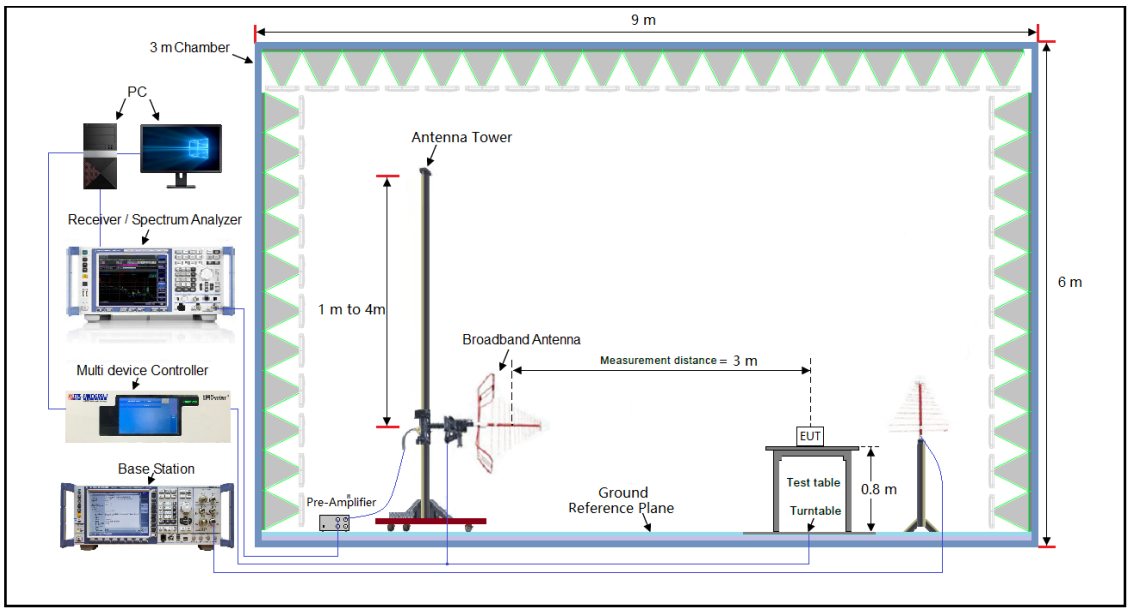
Remark:

1) The EUT just work in such extreme temperature of -10 °C to +50 °C and the extreme voltage of 3.5 V to 4.35 V, so here the EUT is tested in the temperature of -10 °C to +50 °C and the voltage of 3.5 V to 4.35 V.
2) VN: Normal Voltage; TN: Normal Temperature;
TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

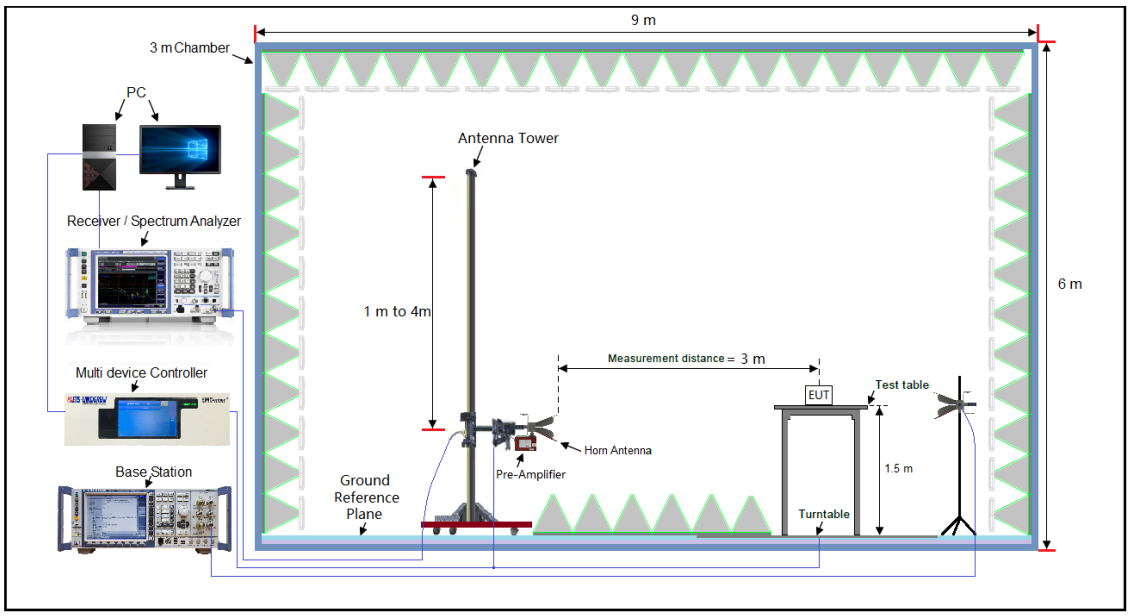
4.2 TEST SETUP

4.2.1 For Radiated Emissions test setup

Radiated Emissions 30MHz to 1GHz Test setup

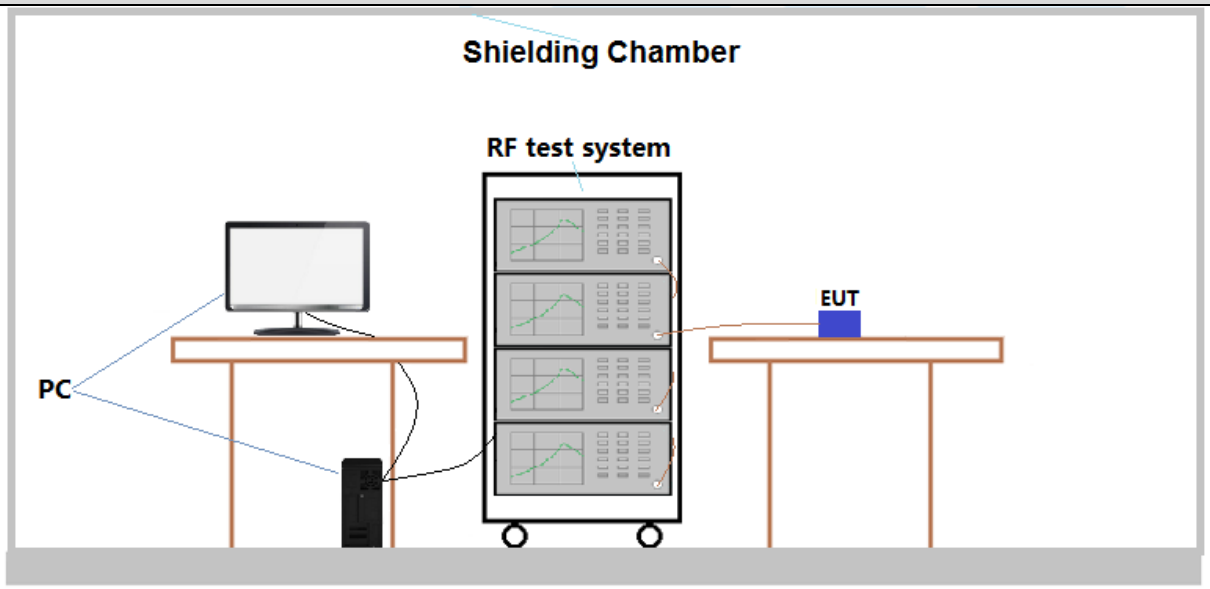


Radiated Emissions Above 1GHz Test setup

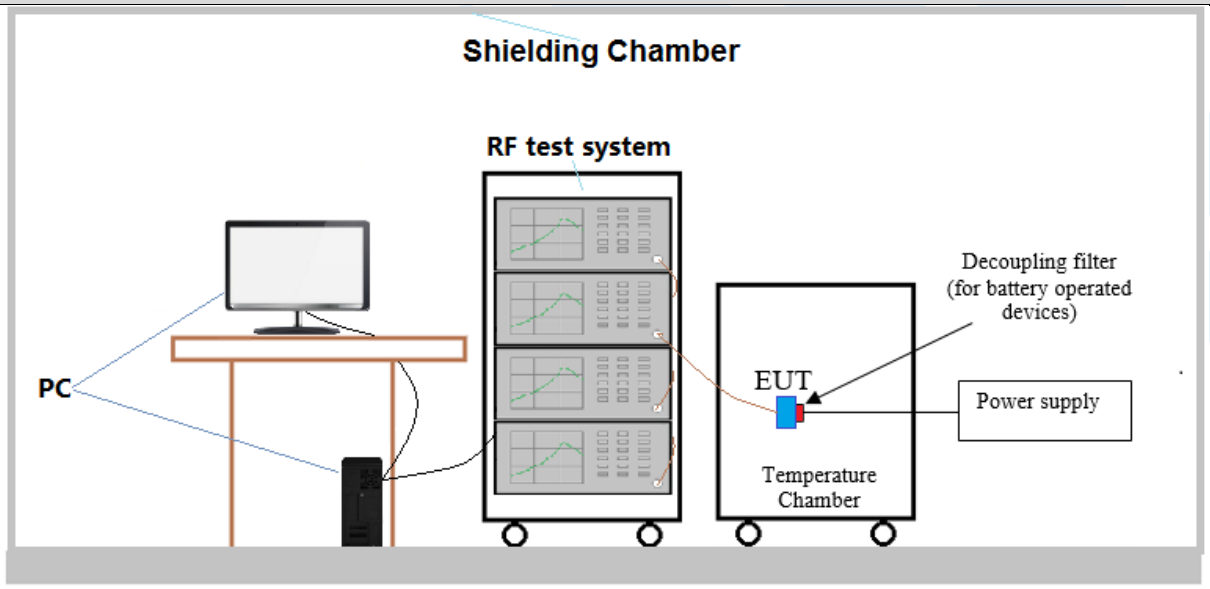


4.2.2 For Conducted RF test setup

Normal Environment



Extreme Environment



4.3 TEST CHANNELS

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS 850	Tx (824 MHz ~ 849 MHz)	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
WCDMA band V	Tx (824 MHz ~ 849 MHz)	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS 1900	Tx (1850 MHz-1910 MHz)	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
WCDMA Band II	Tx (1850 MHz-1910 MHz)	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz

4.4 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.8Vdc rechargeable Li-on battery. Only the worst case data were recorded in this test report.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X/Y/Z axis, and antenna ports.
The worst case was found when positioned as the table below.

Bands	Mode	Antenna Port	Worst-case axis positioning
GSM 850	1TX	Chain 0	Y axis
PCS 1900	1TX	Chain 0	Y axis
WCDMA Band II	1TX	Chain 0	Y axis
WCDMA Band IV	1TX	Chain 0	Y axis
WCDMA Band V	1TX	Chain 0	Y axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.5 PRE-SCAN

Pre-scan under all rate at lowest middle and highest channel, find the transmitter power as below:
SIM 1 Card Conducted transmitter power measurement result.

GSM 850 Maximum Average Power (dBm)			
Channel	**128**	**190**	**251**
Frequency(MHz)	**824.2 MHz**	**836.6 MHz**	**848.8 MHz**
GSM (GMSK, 1Tx-slot)	32.82	32.71	32.72
GPRS (GMSK, 1Tx-slot)	32.91	32.81	32.82
GPRS (GMSK, 2Tx-slot)	30.97	30.89	30.80
GPRS (GMSK, 3Tx-slot)	29.37	29.26	29.15
GPRS (GMSK, 4Tx-slot)	27.67	27.56	27.45

PCS 1900 Maximum Average Power (dBm)			
Channel	**512**	**661**	**810**
Frequency(MHz)	**1850.2 MHz**	**1880.0 MHz**	**1909.8 MHz**
GSM (GMSK, 1Tx-slot)	28.84	28.89	29.01
GPRS (GMSK, 1Tx-slot)	28.87	28.94	29.00
GPRS (GMSK, 2Tx-slot)	26.71	26.65	26.71
GPRS (GMSK, 3Tx-slot)	25.17	24.85	25.11
GPRS (GMSK, 4Tx-slot)	23.43	23.33	23.36

WCDMA Band II Maximum Average Power (dBm)			
Channel	**9262**	**9400**	**9538**
Frequency(MHz)	**1852.4 MHz**	**1880.0 MHz**	**1907.6 MHz**
RMC 12.2kbps	22.60	22.63	22.96
HSDPA Subtest-1	22.46	21.81	21.51
HSDPA Subtest-2	21.95	21.31	21.24
HSDPA Subtest-3	21.39	20.74	20.66
HSDPA Subtest-4	21.42	20.73	20.67
HSUPA Subtest-1	21.27	20.45	20.38
HSUPA Subtest-2	19.23	18.45	18.48
HSUPA Subtest-3	19.09	18.42	18.47
HSUPA Subtest-4	19.52	18.80	18.76
HSUPA Subtest-5	21.76	21.15	21.06

WCDMA Band V Maximum Average Power (dBm)			
Channel	**4132**	**4182**	**4233**
Frequency(MHz)	**826.4 MHz**	**836.4 MHz**	**846.6 MHz**
RMC 12.2kbps	23.13	23.01	22.83
HSDPA Subtest-1	21.70	21.73	21.35
HSDPA Subtest-2	22.02	22.06	21.76
HSDPA Subtest-3	21.13	21.19	20.90
HSDPA Subtest-4	21.14	21.22	20.92
HSUPA Subtest-1	20.69	20.79	20.38
HSUPA Subtest-2	18.30	18.29	18.06
HSUPA Subtest-3	18.59	18.70	18.21
HSUPA Subtest-4	18.44	18.58	18.35
HSUPA Subtest-5	21.46	21.55	21.25

Pre-scan all bandwidth and RB, find worse case mode are chosen to the report, the worse mode applicability and tested channel detail as below:

Band	Radiated	Conducted
GSM/GPRS 850/1900	1) GSM (GMSK, 1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link	1) GSM (GMSK,1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link
WCDMA Band II/V	RMC 12.2kbps Link	RMC 12.2kbps Link

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 22	Public Mobile Services
3	FCC 47 CFR Part 24	Personal Communications Services
4	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
5	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

5.2 MAXIMUM ERP/EIRP

Test Requirement: FCC 47 CFR Part 2.1046(a),
FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),

Test Method: KDB 971168 D01v03r01 Section 5.6 & ANSI C63.26-2015

Limit:

FCC 47 CFR Part 22.913(a)

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 47 CFR Part 24.232(c)

Mobile and portable stations are limited to 2 watts EIRP.

Test Procedure:

$$\textbf{ERP or EIRP} = P_{Meas} + G_T - L_C$$

where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

Test Setup: Refer to section 4.2.1 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: See table below

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	ERP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
GSM 850 (824-849 MHz)	GPRS	32.91	1.00	7.0	33.91	2.460368	Pass
WCDMA Band V (824-849 MHz)	RMC 12.2kbps	23.13	1.00	7.0	24.13	0.258821	Pass
	HSUPA	21.55	1.00		22.55	0.179887	Pass
	HSDPA	22.06	1.00		23.06	0.202302	Pass

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	EIRP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
PCS 1900 (1850-1910 MHz)	GPRS	29.00	1.00	2.0	30.00	1.000000	Pass
WCDMA Band II (1850-1910 MHz)	RMC 12.2kbps	22.96	1.00	2.0	23.96	0.248886	Pass
	HSUPA	21.76	1.00		22.76	0.188799	Pass
	HSDPA	22.46	1.00		23.46	0.221820	Pass

5.3 CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 2.1046(a),
FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),

Test Method: KDB 971168 D01v03r01 & ANSI C63.26-2015

Limit:

FCC 47 CFR Part 22.913(a)

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 47 CFR Part 24.232(c)

Mobile and portable stations are limited to 2 watts EIRP.

Test Procedure:

The EUT was set up for the maximum power with GSM, GPRS, WCDMA, CDMA2000, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: The full result refer to section 4.5 for details.

5.4 PEAK-TO-AVERAGE RATIO

Test Requirement: FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),

Test Method: KDB 971168 D01v03r01 Section 5.7

Limit: 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

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

a) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth
b) Set the number of counts to a value that stabilizes the measured CCDF curve
c) Record the maximum PAPR level associated with a probability of 0.1 %

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: See table below

Bands	Modulation	Peak-to-average ratio (dB)			Limit	Result
		Lowest	Middle	Highest	(dB)	
GSM 850	GPRS	0.29	0.29	0.38	13	Pass
PCS 1900	GPRS	0.31	0.32	0.32	13	Pass
WCDMA Band II	RMC 12.2kbps	2.64	2.70	2.55	13	Pass
WCDMA Band V	RMC 12.2kbps	3.01	3.04	3.04	13	Pass

The test plots as follows:

GSM 850	
GPRS	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	

PCS 1900	
GPRS	
Lowest Channel	Middle Channel
	
Highest Channel	
	

WCDMA Band II_RMC 12.2kbps	WCDMA Band V_RMC 12.2kbps
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

5.5 99%&26DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 2.1049(h), FCC 47 CFR Part 22.917(b), FCC 47 CFR Part 24.238(b),

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 4

Limit: No Limit, for reporting purposes only.

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

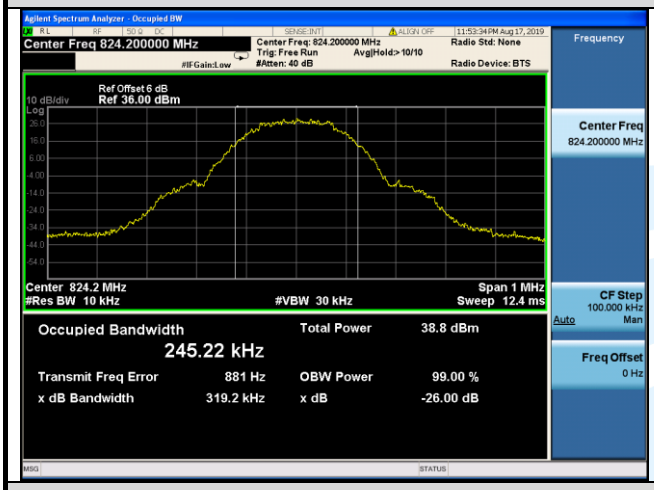
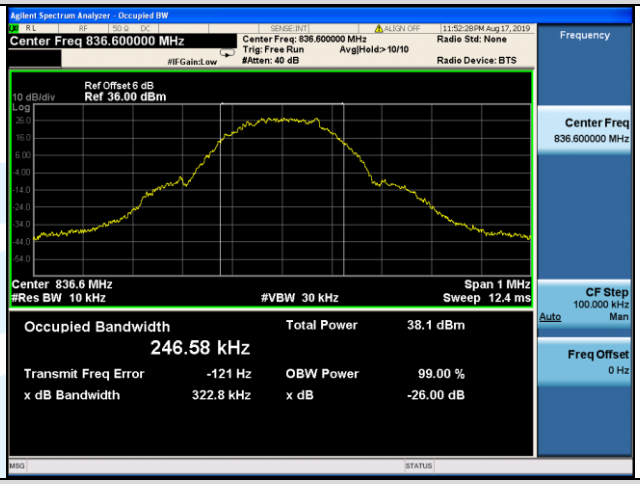
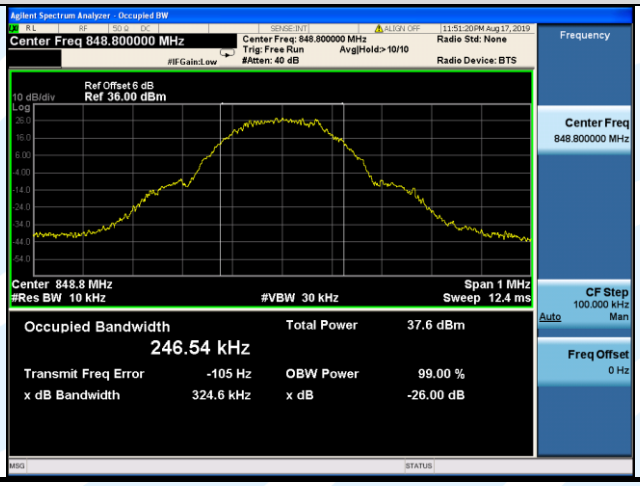
Test Mode: Link mode

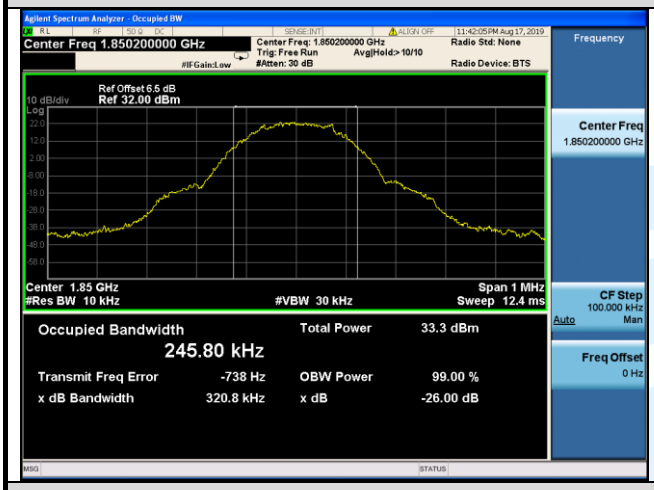
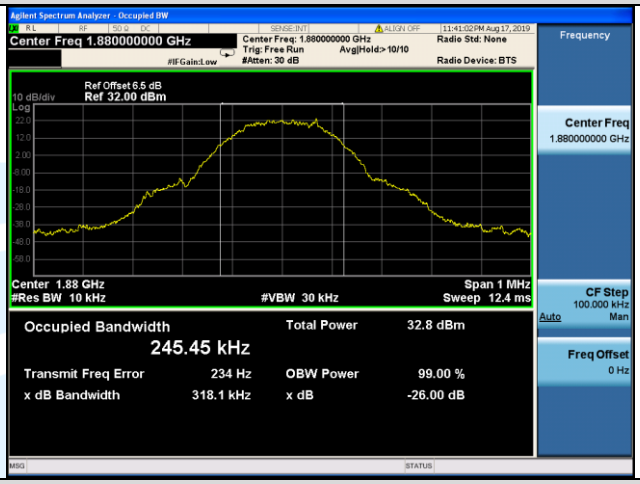
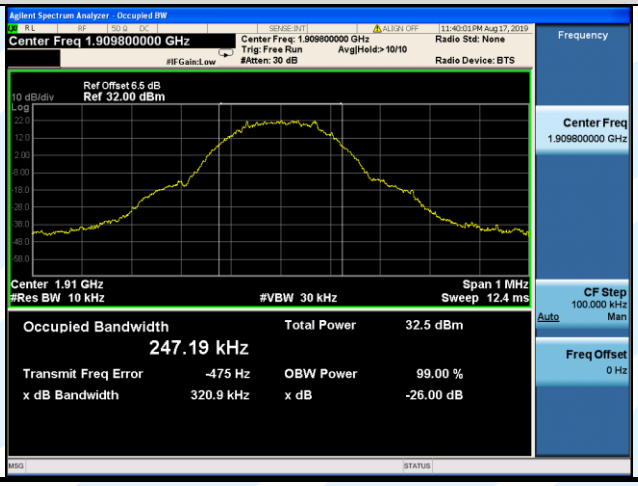
Test Results: Pass

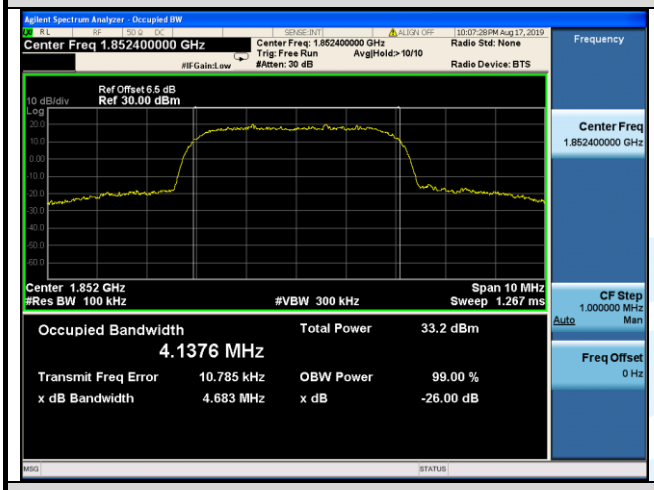
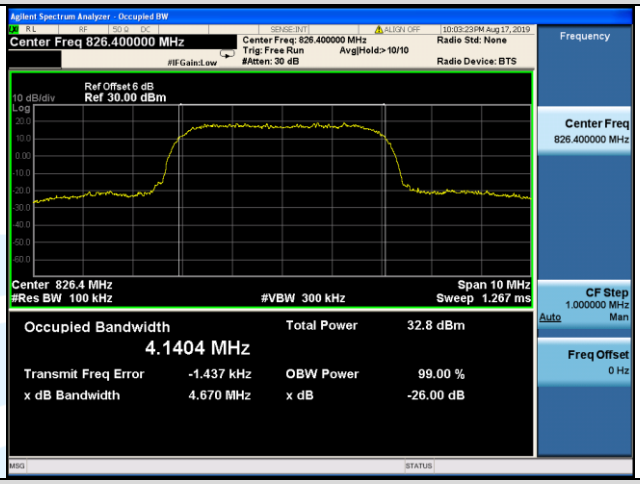
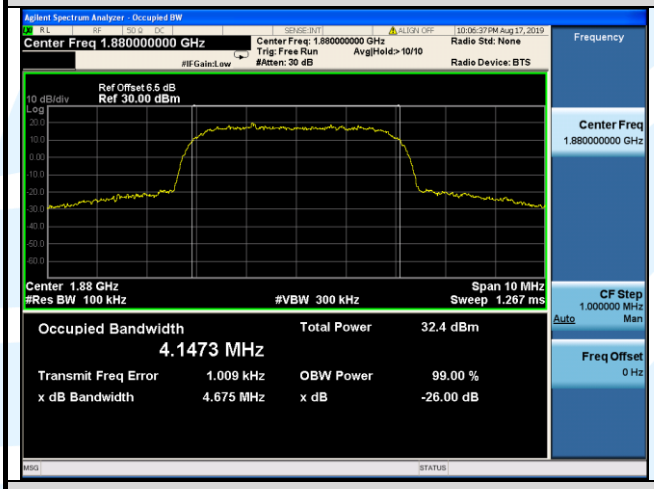
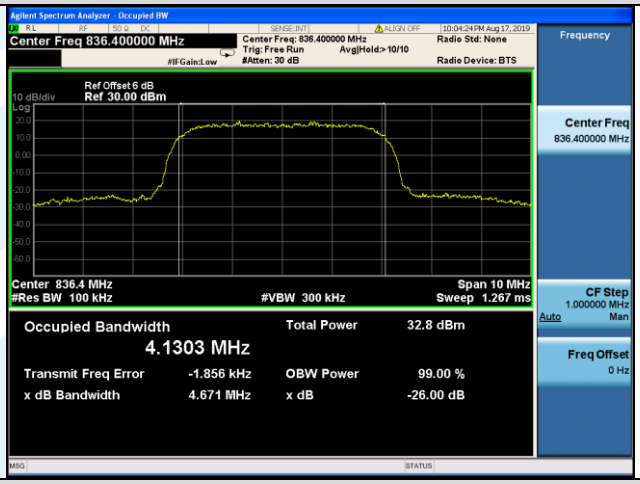
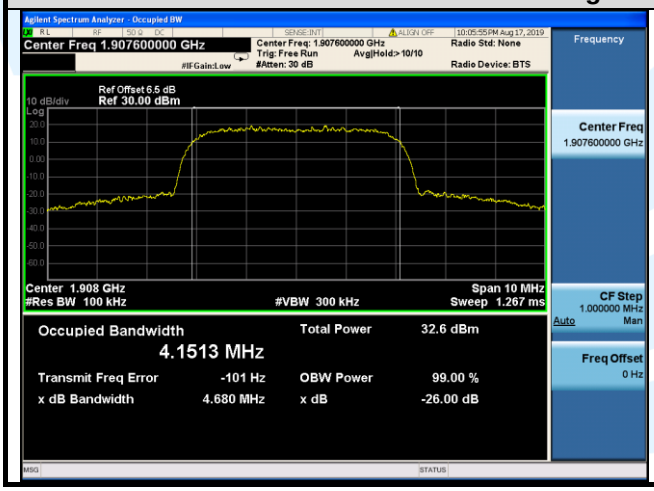
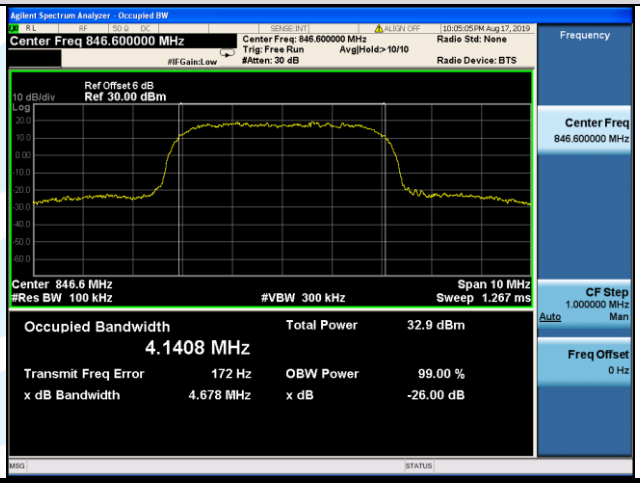
Test Data: See table below

Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (kHz)	99% BW (kHz)
GSM 850	GPRS	128	824.2	319.2	245.22
		190	836.6	322.8	246.58
		251	848.8	324.6	246.54
PCS 1900	GPRS	512	1850.2	320.8	245.80
		661	1880.0	318.1	245.45
		810	1909.8	320.9	247.19
Bands	**Modulation**	**Channel**	**Frequency (MHz)**	**26 dB BW (MHz)**	**99% BW (MHz)**
WCDMA Band II	RMC 12.2kbps	9262	1852.4	4.683	4.1376
		9400	1880.0	4.675	4.1473
		9538	1907.6	4.680	4.1513
WCDMA Band V	RMC 12.2kbps	4132	826.4	4.670	4.1404
		4182	836.4	4.671	4.1303
		4233	846.6	4.678	4.1408

The test plots as follows:

GSM 850	
GPRS	
Lowest Channel	**Middle Channel**
	
Highest Channel	
	

PCS 1900	
GPRS	
Lowest Channel	Middle Channel
	
Highest Channel	
	

WCDMA Band II_RMC 12.2kbps	WCDMA Band V_RMC 12.2kbps
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

5.6 BAND EDGE AT ANTENNA TERMINALS

Test Requirement: FCC 47 CFR Part 2.1051,
FCC 47 CFR Part 22.917(a),
FCC 47 CFR Part 24.238(a),

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

The power of any emission 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. The emission limit equal to -13 dBm.

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

For each band edge measurement:

1) Set the spectrum analyzer span to include the block edge frequency.
2) Set a marker to point the corresponding band edge frequency in each test case.
3) Set display line at -13 dBm
4) Set resolution bandwidth to at least 1% of emission bandwidth.
5) Set spectrum analyzer with RMS detector.
6) Record the max trace plot into the test report

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

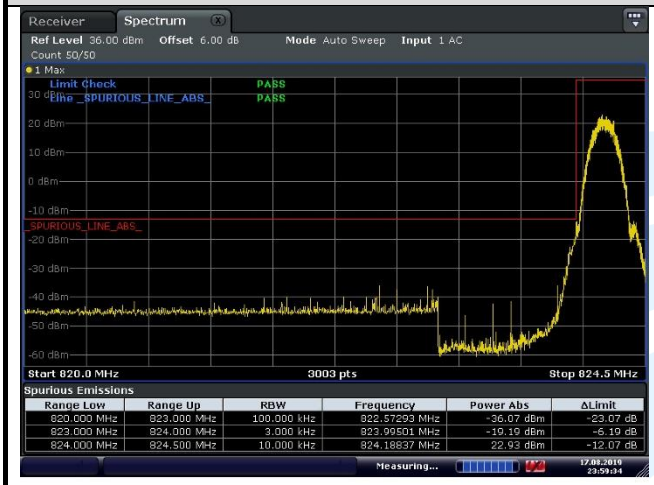
Instruments Used: Refer to section 3 for details

Test Mode: Link mode

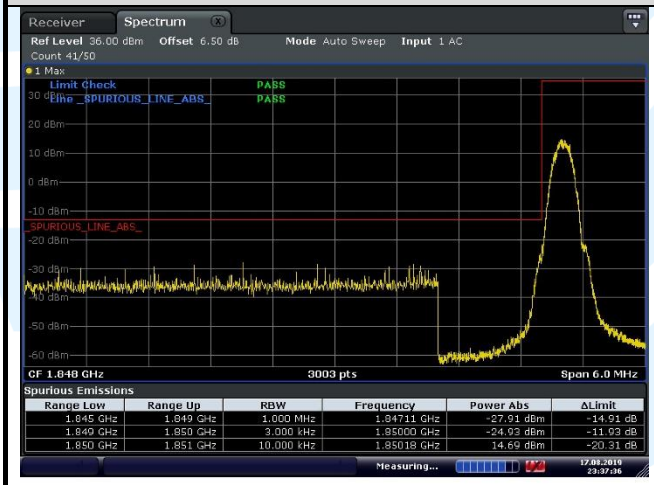
Test Results: Pass

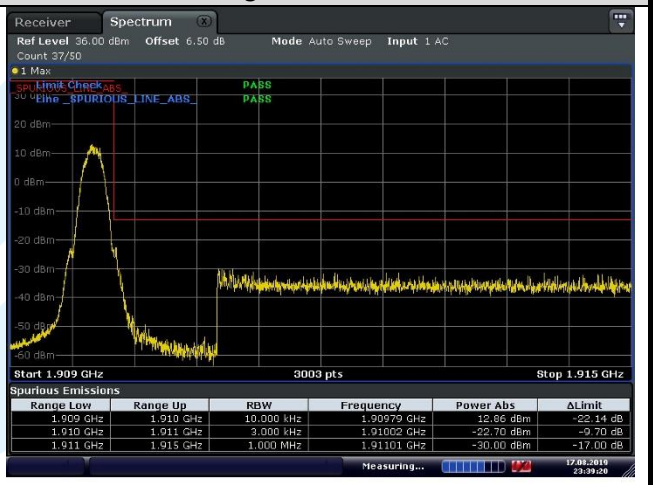
The test plots as follows:

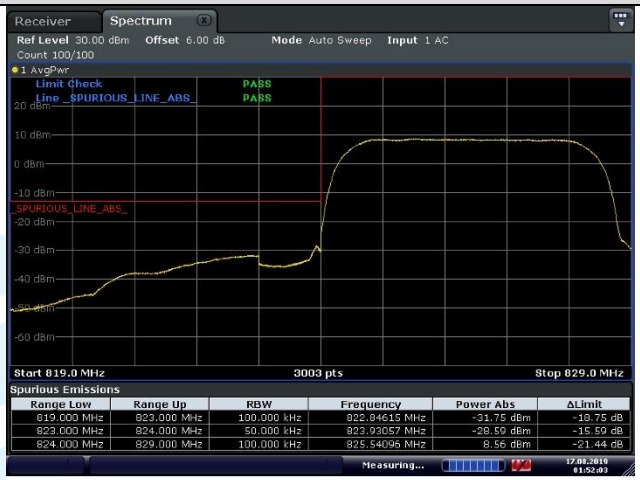
GSM 850	
GPRS	
Lowest Channel	Highest Channel



PCS 1900	
GPRS	
Lowest Channel	Highest Channel





WCDMA Band II_RMC 12.2kbps	WCDMA Band V_RMC 12.2kbps
Lowest Channel	
	
Highest Channel	
	

5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: FCC 47 CFR Part 2.1051,
FCC 47 CFR Part 22.917(a)(b),
FCC 47 CFR Part 24.238(a)(b),

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

The power of any emission 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. The emission limit equal to -13 dBm.

Test Procedure:

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

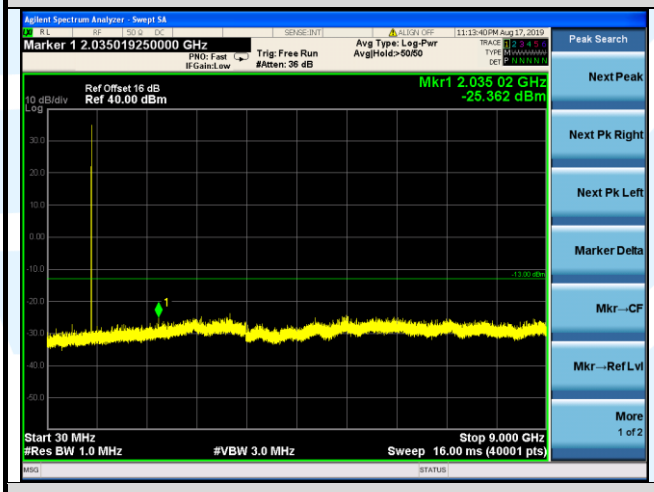
Test Results: Pass

The test plots as follows:

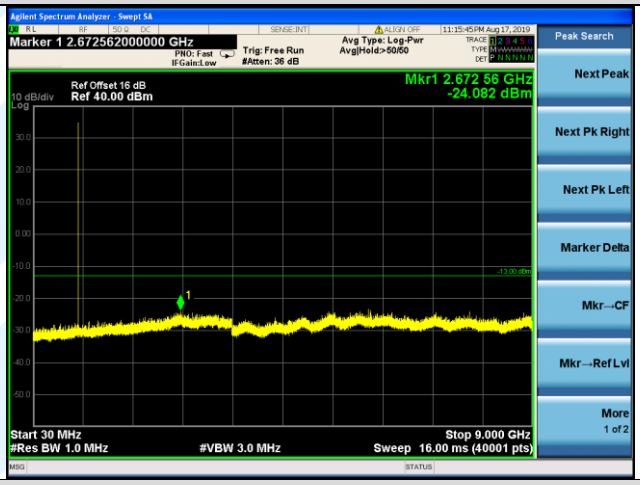
GSM 850

GPRS

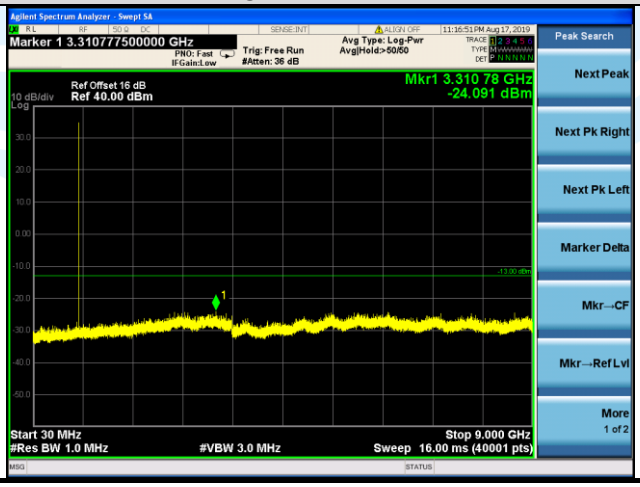
Lowest Channel

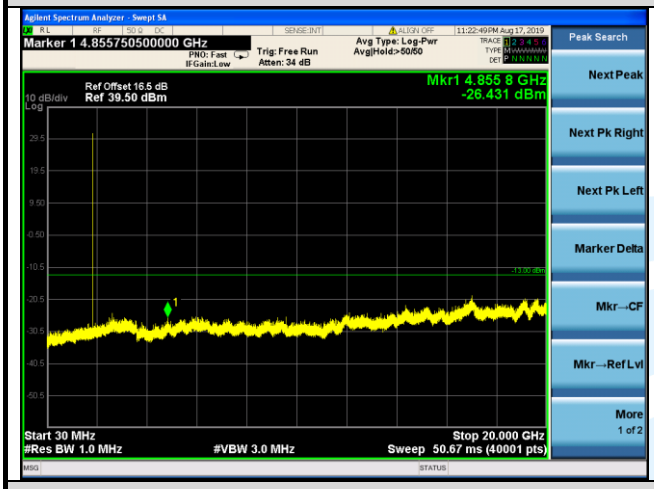
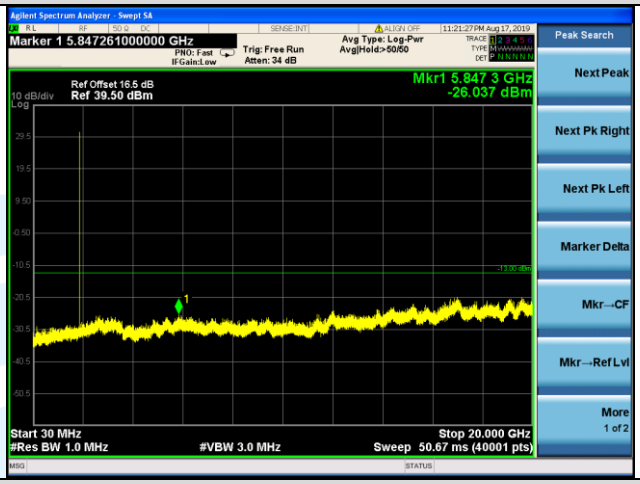
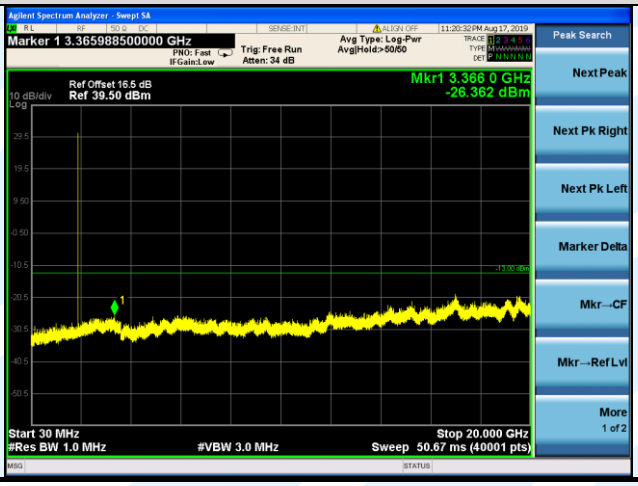


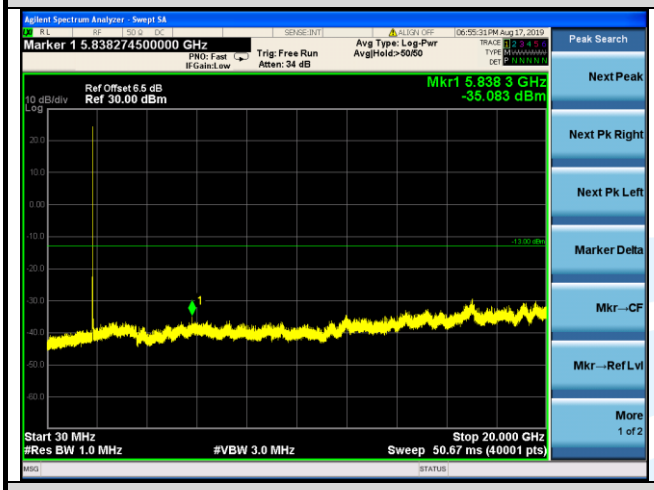
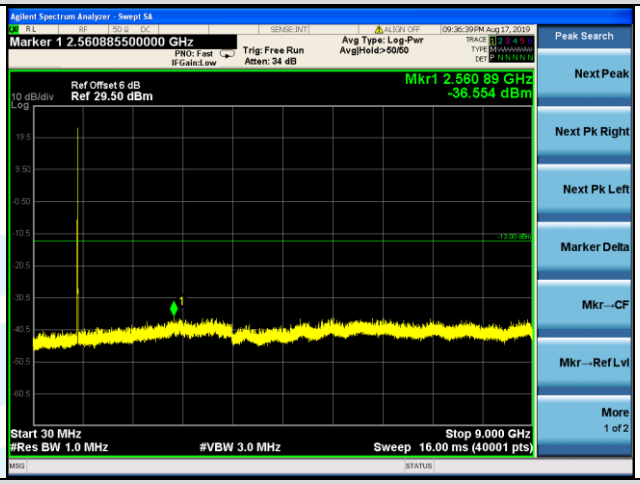
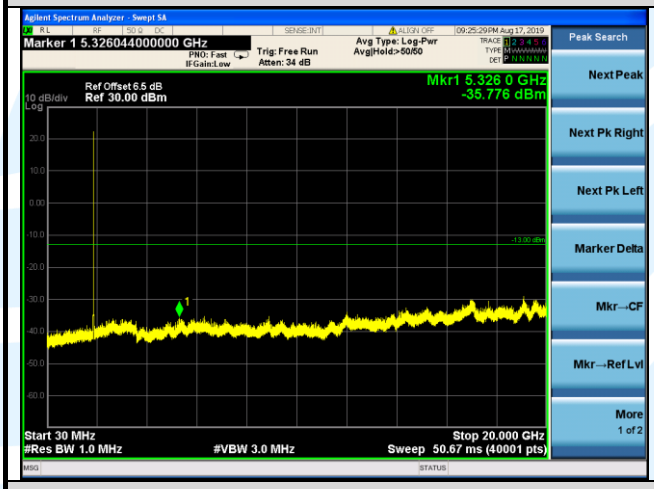
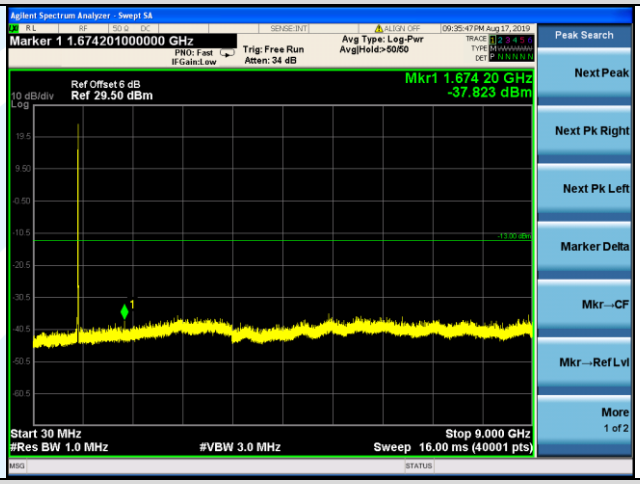
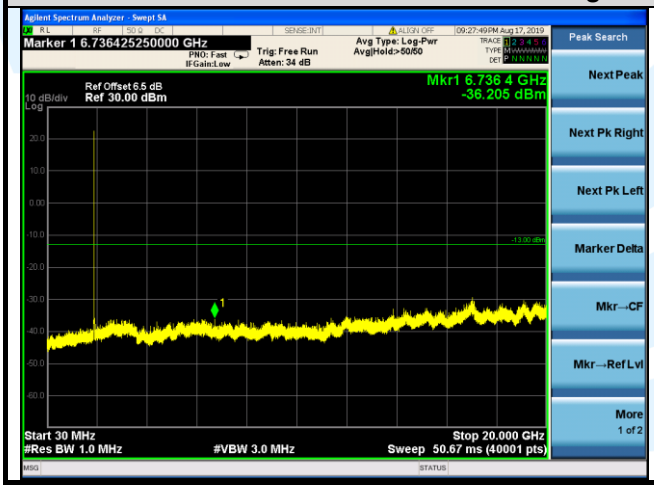
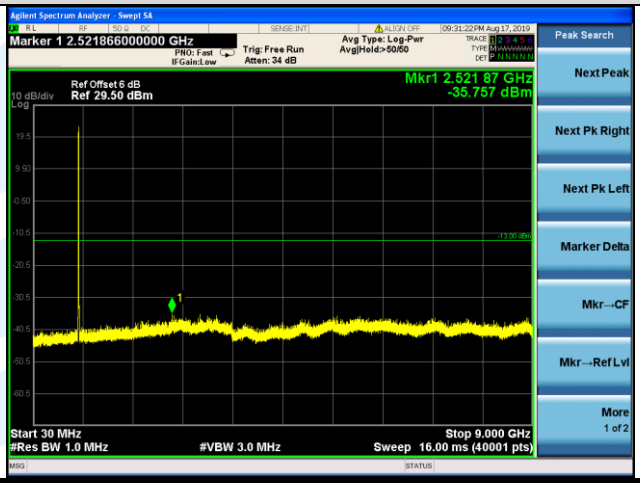
Middle Channel



Highest Channel



PCS 1900	
GPRS	
Lowest Channel	Middle Channel
	
Highest Channel	
	

WCDMA Band II_RMC 12.2kbps	WCDMA Band V_RMC 12.2kbps
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

5.8 FIELD STRENGTH OF SPURIOUS RADIATION

Test Requirement: FCC 47 CFR Part 2.1053,
FCC 47 CFR Part 22.917(a)(b),
FCC 47 CFR Part 24.238(a)(b),

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 7

Limits:

The power of any emission 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. The emission limit equal to -13 dBm.

Test Setup: Refer to section 4.2.1 for details.

Test Procedures: KDB 971168 D01v03r01 Section 7

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

GSM 850							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
GPRS_ Lowest Channel							
1	97.002	-73.16	26.48	-46.68	-13.00	-33.68	Horizontal
2	1648.400	-58.44	2.39	-56.05	-13.00	-43.05	Horizontal
3	2472.600	-53.87	9.16	-44.71	-13.00	-31.71	Horizontal
4	31.959	-79.13	33.13	-46.00	-13.00	-33.00	Vertical
5	1648.400	-64.29	4.03	-60.26	-13.00	-47.26	Vertical
6	2472.600	-55.29	11.49	-43.80	-13.00	-30.80	Vertical
GPRS_ Middle Channel							
1	32.184	-75.37	32.93	-42.44	-13.00	-29.44	Horizontal
2	1673.200	-61.38	2.59	-58.79	-13.00	-45.79	Horizontal
3	2509.800	-60.53	9.17	-51.36	-13.00	-38.36	Horizontal
4	97.002	-72.59	26.48	-46.11	-13.00	-33.11	Vertical
5	1673.200	-63.66	4.31	-59.35	-13.00	-46.35	Vertical
6	2509.800	-56.55	11.46	-45.09	-13.00	-32.09	Vertical
GPRS_ Highest Channel							
1	97.002	-72.69	26.48	-46.21	-13.00	-33.21	Horizontal
2	1697.600	-52.47	2.78	-49.69	-13.00	-36.69	Horizontal
3	2546.400	-58.20	9.22	-48.98	-13.00	-35.98	Horizontal
4	32.184	-78.27	32.93	-45.34	-13.00	-32.34	Vertical
5	1697.600	-56.36	4.59	-51.77	-13.00	-38.77	Vertical
6	2546.400	-59.12	11.45	-47.67	-13.00	-34.67	Vertical

PCS 1900							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
GPRS_ Lowest Channel							
1	97.002	-72.37	-2.23	-74.60	-13.00	-61.60	Horizontal
2	3700.400	-42.21	13.77	-28.44	-13.00	-15.44	Horizontal
3	5550.400	-68.29	16.02	-52.27	-13.00	-39.27	Horizontal
4	430.305	-77.36	5.18	-72.18	-13.00	-59.18	Vertical
5	3700.400	-44.96	15.13	-29.83	-13.00	-16.83	Vertical
6	5550.600	-66.76	16.91	-49.85	-13.00	-36.85	Vertical
GPRS_ Middle Channel							
1	140.777	-70.48	-1.48	-71.96	-13.00	-58.96	Horizontal
2	3760.000	-40.94	13.87	-27.07	-13.00	-14.07	Horizontal
3	5640.000	-57.52	16.10	-41.42	-13.00	-28.42	Horizontal
4	430.305	-77.82	5.18	-72.64	-13.00	-59.64	Vertical
5	3760.000	-38.70	15.28	-23.42	-13.00	-10.42	Vertical
6	5640.000	-63.56	16.97	-46.59	-13.00	-33.59	Vertical
GPRS_ Highest Channel							
1	95.649	-67.31	-2.34	-69.65	-13.00	-56.65	Horizontal
2	3819.600	-44.80	13.98	-30.82	-13.00	-17.82	Horizontal
3	5729.400	-57.86	16.37	-41.49	-13.00	-28.49	Horizontal
4	679.435	-80.33	9.55	-70.78	-13.00	-57.78	Vertical
5	3819.600	-36.38	15.44	-20.94	-13.00	-7.94	Vertical
6	5729.400	-63.78	17.23	-46.55	-13.00	-33.55	Vertical

WCDMA Band II							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
RMC 12.2kbps_ Lowest Channel							
1	95.649	-71.63	-2.34	-73.97	-13.00	-60.97	Horizontal
2	3704.800	-52.27	13.78	-38.49	-13.00	-25.49	Horizontal
3	5557.200	-69.49	16.01	-53.48	-13.00	-40.48	Horizontal
4	433.340	-77.62	5.20	-72.42	-13.00	-59.42	Vertical
5	3704.800	-55.47	15.14	-40.33	-13.00	-27.33	Vertical
6	9262.000	-59.22	19.86	-39.36	-13.00	-26.36	Vertical
RMC 12.2kbps_ Middle Channel							
1	59.732	-69.60	-4.76	-74.36	-13.00	-61.36	Horizontal
2	3760.000	-49.63	13.87	-35.76	-13.00	-22.76	Horizontal
3	9400.000	-63.71	21.19	-42.52	-13.00	-29.52	Horizontal
4	430.305	-77.28	5.18	-72.10	-13.00	-59.10	Vertical
5	3760.000	-54.74	15.28	-39.46	-13.00	-26.46	Vertical
6	9400.000	-59.74	19.91	-39.83	-13.00	-26.83	Vertical
RMC 12.2kbps_ Highest Channel							
1	97.002	-72.19	-2.23	-74.42	-13.00	-61.42	Horizontal
2	3815.200	-48.98	13.97	-35.01	-13.00	-22.01	Horizontal
3	9538.000	-60.96	21.24	-39.72	-13.00	-26.72	Horizontal
4	430.305	-76.02	5.18	-70.84	-13.00	-57.84	Vertical
5	3815.200	-51.87	15.43	-36.44	-13.00	-23.44	Vertical
6	9538.000	-56.66	19.87	-36.79	-13.00	-23.79	Vertical

WCDMA Band V							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
RMC 12.2kbps_ Lowest Channel							
1	97.002	-72.36	26.48	-45.88	-13.00	-32.88	Horizontal
2	1652.800	-61.64	2.43	-59.21	-13.00	-46.21	Horizontal
3	2479.200	-64.98	9.16	-55.82	-13.00	-42.82	Horizontal
4	97.002	-72.65	26.48	-46.17	-13.00	-33.17	Vertical
5	1652.800	-71.96	4.08	-67.88	-13.00	-54.88	Vertical
6	2479.200	-66.90	11.48	-55.42	-13.00	-42.42	Vertical
RMC 12.2kbps_ Middle Channel							
1	32.184	-78.31	32.93	-45.38	-13.00	-32.38	Horizontal
2	1672.800	-57.69	2.59	-55.10	-13.00	-42.10	Horizontal
3	2509.200	-57.16	9.17	-47.99	-13.00	-34.99	Horizontal
4	31.959	-78.56	33.13	-45.43	-13.00	-32.43	Vertical
5	1672.800	-60.62	4.31	-56.31	-13.00	-43.31	Vertical
6	2509.200	-58.26	11.46	-46.80	-13.00	-33.80	Vertical
RMC 12.2kbps_ Highest Channel							
1	97.002	-73.17	26.48	-46.69	-13.00	-33.69	Horizontal
2	1693.200	-51.64	2.75	-48.89	-13.00	-35.89	Horizontal
3	2539.800	-56.99	9.22	-47.77	-13.00	-34.77	Horizontal
4	32.184	-77.13	32.93	-44.20	-13.00	-31.20	Vertical
5	1693.200	-63.88	4.54	-59.34	-13.00	-46.34	Vertical
6	2539.800	-64.04	11.45	-52.59	-13.00	-39.59	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

5.9 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 2.1055 &
FCC 47 CFR Part 22.355 &
FCC 47 CFR Part 24.235 &

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limits:

FCC 47 CFR Part 22.355,

The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

FCC 47 CFR Part 24.235,

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Setup: Refer to section 4.2.2 for details.

Test Procedures:

1) Use CMW 500 with Frequency Error measurement capability.
   a) Temp. = −30° to + 50°C
   b) Voltage =low voltage, 3.5 Vdc, Normal, 3.7 Vdc and High voltage, 4.35 Vdc.
2) Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

3) Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

Equipment Used: Refer to section 3 for details.

Test Result: Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850							
GPRS	190 / 836.6	VL	TN	-10	-0.0120	± 2.5	Pass
		VN		5	0.0060	± 2.5	Pass
		VH		-4	-0.0048	± 2.5	Pass
		VN	50	-9	-0.0108	± 2.5	Pass
			40	3	0.0036	± 2.5	Pass
			30	-7	-0.0084	± 2.5	Pass
			20	5	0.0060	± 2.5	Pass
			10	12	0.0143	± 2.5	Pass
			0	-4	-0.0048	± 2.5	Pass
			-10	-15	-0.0179	± 2.5	Pass
			-20	-5	-0.0060	± 2.5	Pass
			-30	3	0.0036	± 2.5	Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
PCS 1900							
GPRS	661 / 1880.0	VL	TN	-3	-0.0016	N/A	Pass
		VN		12	0.0064		Pass
		VH		-19	-0.0101		Pass
		VN	50	-7	-0.0037		Pass
			40	5	0.0027		Pass
			30	17	0.0090		Pass
			20	4	0.0021		Pass
			10	2	0.0011		Pass
			0	-3	-0.0016		Pass
			-10	-9	-0.0048		Pass
			-20	-15	-0.0080		Pass
			-30	16	0.0085		Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band II							
RMC 12.2kbps	9400 / 1880.0	VL	TN	8	0.0043	N/A	Pass
		VN		11	0.0059		Pass
		VH		12	0.0064		Pass
		VN	50	-6	-0.0032		Pass
			40	-11	-0.0059		Pass
			30	-5	-0.0027		Pass
			20	-10	-0.0053		Pass
			10	8	0.0043		Pass
			0	5	0.0027		Pass
			-10	-8	-0.0043		Pass
			-20	19	0.0101		Pass
			-30	-3	-0.0016		Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band V							
RMC 12.2kbps	4182 / 836.4	VL	TN	-12	-0.0143	± 2.5	Pass
		VN		6	0.0072	± 2.5	Pass
		VH		2	0.0024	± 2.5	Pass
		VN	50	12	0.0143	± 2.5	Pass
			40	13	0.0155	± 2.5	Pass
			30	7	0.0084	± 2.5	Pass
			20	-3	-0.0036	± 2.5	Pass
			10	-14	-0.0167	± 2.5	Pass
			0	-11	-0.0132	± 2.5	Pass
			-10	-4	-0.0048	± 2.5	Pass
			-20	-10	-0.0120	± 2.5	Pass
			-30	18	0.0215	± 2.5	Pass

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***