FCC TEST REPORT

Product Name:	Tablet
Trade Mark:	
Model No.:	T8
Report Number:	200402011RFM-1
Test Standards:	FCC 47 CFR Part 22 Subpart H FCC 47 CFR Part 24 Subpart E FCC 47 CFR Part 27 Subpart L
FCC ID:	2AUOUT8
Test Result:	PASS
Date of Issue:	July 28, 2020

Prepared for:

Rhino Mobility LLC
8 The Green, Suite A, Dover, Delaware, 19901, USA

Prepared by:

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Date: July 28, 2020

Version

Version No.	Date	Description
V1.0	July 28, 2020	Original

CONTENTS

1. GENERAL INFORMATION 4
1.1 CLIENT INFORMATION 4
1.2 EUT INFORMATION 4
1.2.1 GENERAL DESCRIPTION OF EUT 4
1.2.2 DESCRIPTION OF ACCESSORIES 5
1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD 6
1.4 DESCRIPTION OF SUPPORT UNITS 7
1.5 TEST LOCATION 7
1.6 TEST FACILITY 7
1.7 DEVIATION FROM STANDARDS 7
1.8 ABNORMALITIES FROM STANDARD CONDITIONS 7
1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER 8
1.10 MEASUREMENT UNCERTAINTY 8
2. TEST SUMMARY 9
3. EQUIPMENT LIST 11
4. TEST CONFIGURATION 12
4.1 ENVIRONMENTAL CONDITIONS FOR TESTING 12
4.2 TEST SETUP 13
4.2.1 FOR RADIATED EMISSIONS TEST SETUP 13
4.2.2 FOR CONDUCTED RF TEST SETUP 14
4.3 TEST CHANNELS 15
4.4 SYSTEM TEST CONFIGURATION 16
4.5 PRE-SCAN 16
5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION 19
5.1 REFERENCE DOCUMENTS FOR TESTING 19
5.2 MAXIMUM ERP/EIRP 19
5.3 CONDUCTED OUTPUT POWER 21
5.4 PEAK-TO-AVERAGE RATIO 22
5.5 99%&26DB BANDWIDTH 27
5.6 BAND EDGE AT ANTENNA TERMINALS 32
5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS 36
5.8 FIELD STRENGTH OF SPURIOUS RADIATION 41
5.9 FREQUENCY STABILITY 49
APPENDIX 1 PHOTOS OF TEST SETUP 52
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS 52

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Rhino Mobility LLC
Address of Applicant:	8 The Green, Suite A, Dover, Delaware, 19901, USA
Manufacturer:	Rhino Mobility LLC
Address of Manufacturer:	8 The Green, Suite A, Dover, Delaware, 19901, USA

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Tablet		
Model No.:	T8		
Trade Mark:			
DUT Stage:	Identical Prototype		
EUT Supports Function:	GSM Bands:	GSM850/1900	
	UTRA Bands:	Band II/ Band IV/ Band V	
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7/ Band 12/ Band 17/Band 25/ Band 26/ Band 30/Band 66/ Band 71	
		TDD Band 41	
	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth 5.0	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n
	RNSS Bands:	1559 MHz to 1610 MHz	GPS/ GNSS/ GLONASS/ BDS
	NFC:	13.553 MHz to 13.567 MHz	
Sample Received Date:	April 3, 2020		
Sample Tested Date:	April 3, 2020 to July 20, 2020		

1.2.2 Description of Accessories

Adapter	
Model No.:	TPA-10120150UU
Input:	100-240 V~50/60 Hz 0.6A Max
Output:	3.6-6.0V ⎓ 3.0A 18.0W/6.0-9.0V ⎓ 2.0A 18.0W /9.0-12.0V ⎓ 1.5A
DC Cable:	1.0 Meter, Unshielded without ferrite
Manufacturer:	SHENZHEN TIANYIN ELECTRONICS CO., LTD

Battery	
Model No.:	BPT8
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.8 Vdc
Limited Charge Voltage:	4.35 Vdc
Rated Capacity:	5100 mAh
Manufacturer:	Dongguan Hongde Battery Co., Ltd.

Cable	
Description:	USB Type-C Plug Cable
Cable Type:	Unshielded without ferrite
Length:	1.0 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA	
Type of Modulation:	GSM/GPRS:	GMSK
	EDGE:	GMSK, 8PSK
	WCDMA	BPSK
	HSDPA	QPSK
	HSUPA:	QPSK
Frequency Range:	GSM/GPRS/EDGE 850:	824.2-848.8 MHz
	GSM/GPRS/EDGE 1900:	1850.2-1909.8 MHz
	WCDMA Band II:	1852.4-1907.6 MHz
	WCDMA Band IV:	1712.4-1752.6 MHz
	WCDMA Band V:	826.4-846.6 MHz
Max RF Output Power:	GSM/GPRS 850:	30.93dBm
	EDGE 850:	24.03dBm
	GSM/GPRS 1900:	32.16dBm
	EDGE 1900:	29.09dBm
	WCDMA Band II:	25.75dBm
	WCDMA Band IV:	25.71dBm
	WCDMA Band V:	22.11dBm
Emission Designator:	GSM/GPRS 850:	246KGXW
	EDGE 850:	246KG7W
	GSM/GPRS 1900:	245KGXW
	EDGE 1900:	245KG7W
	WCDMA Band II:	4M19F9W
	WCDMA Band IV:	4M17F9W
	WCDMA Band V:	4M16F9W
Antenna Type:	FPCB Antenna	
Antenna Gain:	GSM 850:	0.3 dBi
	PCS 1900:	2.2 dBi
	WCDMA Band II:	2.2 dBi
	WCDMA Band IV:	1.7 dBi
	WCDMA Band V:	0.3 dBi
Normal Test Voltage:	3.8 Vdc	
Extreme Test Voltage:	3.5 to 4.2Vdc	
Extreme Test Temperature:	-20 °C to +55 °C	

1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	E450	SL10G10780	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust

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	±3.2 dB
2	Conducted emission 150KHz-30MHz	±2.7 dB
3	Radiated spurious emissions 30MHz-1GHz	± 4.9 dB
4	Radiated spurious emissions 1GHz-18GHz	± 4.8 dB
5	Radiated spurious emissions 18GHz-40GHz	± 5.1 dB
6	Occupied Bandwidth	± 1.86 %
7	DC Supply Voltages	± 0.68 %
8	Temperature	± 0.62 °C
9	Humidity	± 3.9 %
10	Conducted spurious emissions	± 2.7 dB
11	DC Supply Voltages	± 0.68 %
12	AC Supply Voltages	± 1.2 %
13	Radio Frequency	± 6.5 x 10^{-8}
14	RF Power, Conducted	± 0.9 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

FCC 47 CFR Part 27 Subpart L 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 27.50(d)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(h)(1)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	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, 2019	Nov. 23, 2020
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	Nov. 24, 2019	Nov. 23, 2020
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 16, 2019	Nov. 15, 2020
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 16, 2019	Nov. 15, 2020
☒	Preamplifier	HP	8447F	2805A02960	Nov. 16, 2019	Nov. 15, 2020
☐	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	Nov. 24, 2019	Nov. 23, 2020
☐	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2019	Nov. 23, 2020
☐	Horn Antenna	ETS-LINDGREN	3117	00164202	Nov. 24, 2019	Nov. 23, 2020
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	Nov. 16, 2019	Nov. 15, 2020
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 16, 2019	Nov. 15, 2020
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

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, 2019	Nov. 23, 2020
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2019	Nov. 23, 2020
☒	Wideband Radio Communication Tester	R&S	CMW500	119583	Jul. 31, 2019	Jul. 31, 2020
☒	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 09, 2019	Sep. 08, 2020
☐	Temp & Humidity chamber	Espec	GL(U)04KA(W)	16921H201P3	Sep. 09, 2019	Sep. 08, 2020
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290020	May 11, 2020	May 11, 2021

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	3.8	20 to 75
TL/VL	-20	3.5	20 to 75
TH/VL	+55	3.5	20 to 75
TL/VH	-20	4.2	20 to 75
TH/VH	+55	4.2	20 to 75

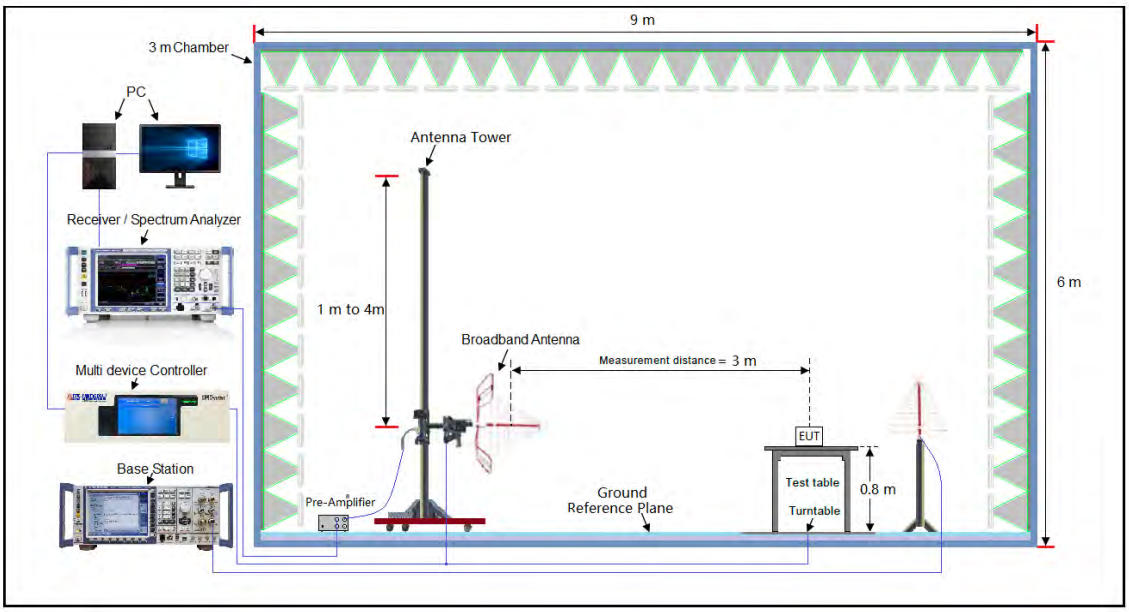
Remark:

1) The EUT just work in such extreme temperature of -20 °C to +55 °C and the extreme voltage of 3.5 V to 4.2 V, so here the EUT is tested in the temperature of -20 °C to +55 °C and the voltage of 3.5 V to 4.2 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.

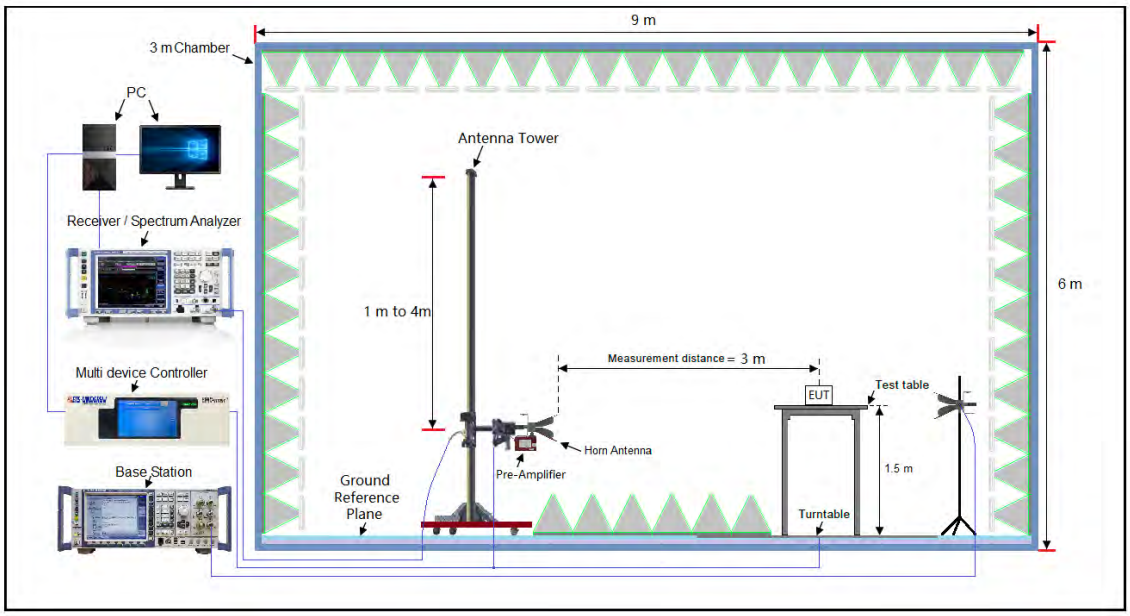
4.2 TEST SETUP

4.2.1 For Radiated Emissions test setup

Radiated Emissions 30MHz to 1GHz Test setup

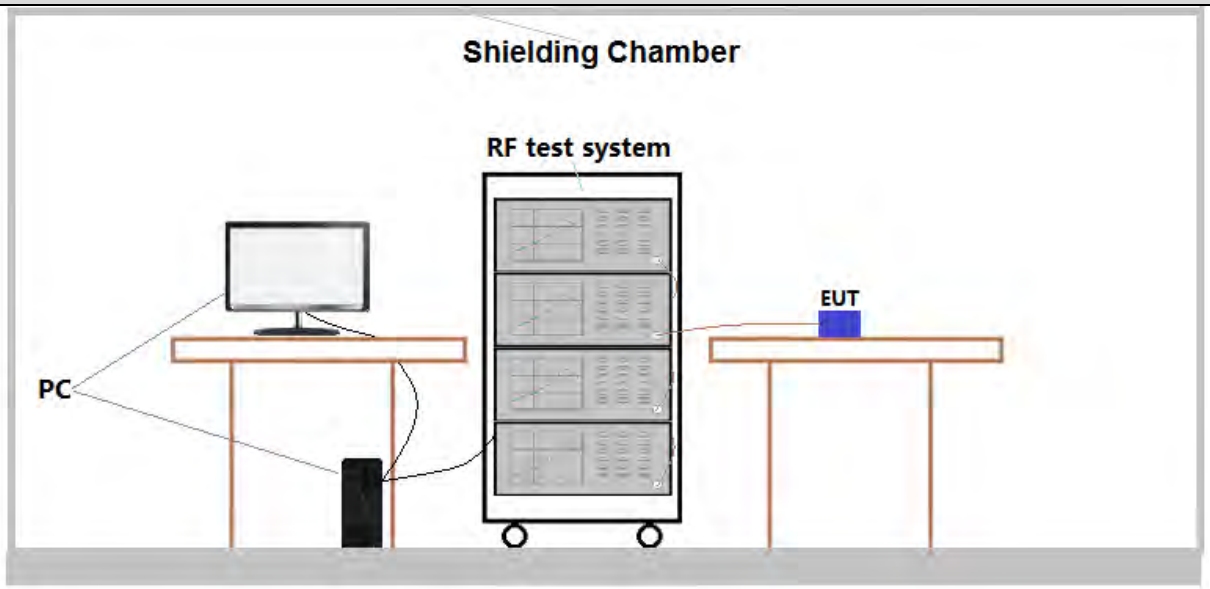


Radiated Emissions Above 1GHz Test setup

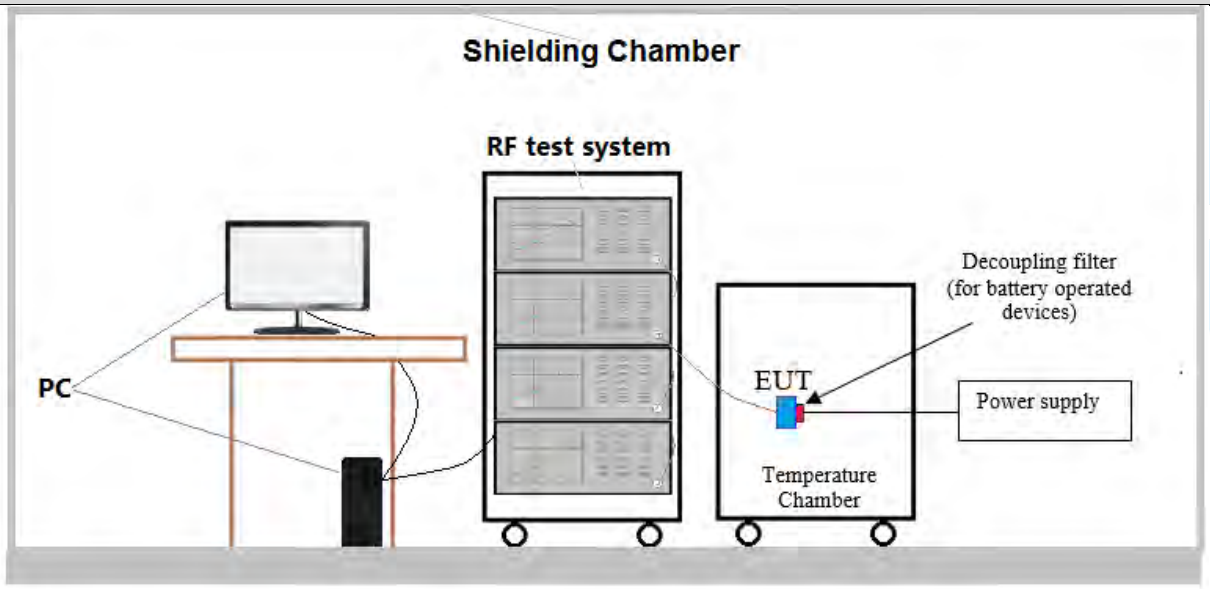


4.2.2 For Conducted RF test setup

Normal Environment



Extreme Environment



4.3 TEST CHANNELS

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS/ EDGE850	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/ EDGE1900	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

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
WCDMA Band IV	Tx (1710 MHz-1755 MHz)	Channel 1312	Channel 1412	Channel 1513
		1712.4 MHz	1732.4 MHz	1752.6 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 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	X axis
PCS 1900	1TX	Chain 0	X axis
WCDMA Band II	1TX	Chain 0	X axis
WCDMA Band IV	1TX	Chain 0	X axis
WCDMA Band V	1TX	Chain 0	X 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)	32.72	32.70	32.66
GPRS (GMSK, 1Tx-slot)	**32.78**	32.73	32.71
GPRS (GMSK, 2Tx-slot)	32.07	31.99	31.93
GPRS (GMSK, 3Tx-slot)	30.12	30.03	29.98
GPRS (GMSK, 4Tx-slot)	29.08	28.99	28.94
EDGE (8PSK, 1Tx-slot)	25.88	25.77	25.61
EDGE (8PSK, 2Tx-slot)	24.83	24.75	24.53
EDGE (8PSK, 3Tx-slot)	22.85	22.64	22.25
EDGE (8PSK, 4Tx-slot)	21.26	21.08	20.88

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)	**29.96**	29.93	29.80
GPRS (GMSK, 1Tx-slot)	29.95	29.92	29.81
GPRS (GMSK, 2Tx-slot)	29.11	29.08	28.96
GPRS (GMSK, 3Tx-slot)	27.23	27.20	27.10
GPRS (GMSK, 4Tx-slot)	26.14	26.11	26.02
EDGE (8PSK, 1Tx-slot)	26.89	26.72	26.53
EDGE (8PSK, 2Tx-slot)	26.00	25.81	25.63
EDGE (8PSK, 3Tx-slot)	24.06	23.90	23.67
EDGE (8PSK, 4Tx-slot)	22.84	22.62	22.24

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	**23.55**	23.41	23.26
HSDPA Subtest-1	22.58	22.43	22.31
HSDPA Subtest-2	22.53	22.38	22.24
HSDPA Subtest-3	22.12	21.96	21.84
HSDPA Subtest-4	22.08	21.92	21.81
HSUPA Subtest-1	20.59	20.45	20.30
HSUPA Subtest-2	20.61	20.46	20.43
HSUPA Subtest-3	21.68	21.56	21.45
HSUPA Subtest-4	20.21	20.06	19.96
HSUPA Subtest-5	22.16	22.06	21.96

WCDMA Band IV Maximum Average Power (dBm)			
Channel	**1312**	**1412**	**1513**
Frequency(MHz)	**1712.4 MHz**	**1732.4 MHz**	**1752.6 MHz**
RMC 12.2kbps	23.85	23.95	**24.01**
HSDPA Subtest-1	22.84	22.93	23.03
HSDPA Subtest-2	22.82	22.89	23.02
HSDPA Subtest-3	22.34	22.46	22.59
HSDPA Subtest-4	22.33	22.41	22.46
HSUPA Subtest-1	20.85	20.92	21.02
HSUPA Subtest-2	20.85	20.90	21.02
HSUPA Subtest-3	21.85	21.94	21.97
HSUPA Subtest-4	20.33	20.41	20.44
HSUPA Subtest-5	22.34	22.39	22.41

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	23.90	23.94	**23.96**
HSDPA Subtest-1	22.92	22.95	22.94
HSDPA Subtest-2	22.89	22.92	22.86
HSDPA Subtest-3	22.47	22.55	22.57
HSDPA Subtest-4	22.45	22.51	22.46
HSUPA Subtest-1	20.95	20.96	20.98
HSUPA Subtest-2	21.00	20.99	20.98
HSUPA Subtest-3	21.99	22.01	22.03
HSUPA Subtest-4	20.52	20.51	20.55
HSUPA Subtest-5	22.53	22.49	22.47

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/ EDGE 850/1900	1) GSM (GMSK, 1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link	1) GSM (GMSK,1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link
WCDMA Band II/IVV	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 27	Miscellaneous Wireless Communications Services
4	FCC 47 CFR Part 24	Personal Communications Services
5	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
6	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),
FCC 47 CFR Part 27.50(d)(4)

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.

FCC 47 CFR Part 27.50(d)(4)

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt 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	32.78	0.30	7.0	30.93	1.238797	Pass
	EDGE	25.88	0.30		24.03	0.252930	Pass
WCDMA Band V (824-849 MHz)	RMC 12.2kbps	23.96	0.30	7.0	22.11	0.162555	Pass
	HSUPA	22.95	0.30		21.10	0.128825	Pass
	HSDPA	22.53	0.30		20.68	0.116950	Pass
Bands	**Modulation**	**Max. Conducted Avg. Power**	**Ant. Gain**	**Limit**	**EIRP**		**Result**
		(dBm)	**(dBi)**	**(W)**	**(dBm)**	**(W)**	
PCS 1900 (1850-1910 MHz)	GPRS	29.96	2.20	2.0	32.16	1.644372	Pass
	EDGE	26.89	2.20		29.09	0.810961	Pass
WCDMA Band II (1850-1910 MHz)	RMC 12.2kbps	23.55	2.20	2.0	25.75	0.375837	Pass
	HSUPA	22.58	2.20		24.78	0.300608	Pass
	HSDPA	22.16	2.20		24.36	0.272898	Pass
WCDMA Band IV (1710-1755 MHz)	RMC 12.2kbps	24.01	1.70	1.0	25.71	0.372392	Pass
	HSUPA	23.03	1.70		24.73	0.297167	Pass
	HSDPA	22.41	1.70		24.11	0.257632	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),
FCC 47 CFR Part 27.50(d)(4)

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.

FCC 47 CFR Part 27.50(d)(4)

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Test Procedure:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, 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), FCC 47 CFR Part 27.50(d)(5)

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 EUT was connected to Spectrum Analyzer and Base Station via power divider. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Some regulatory requirements specify a PAPR limit when the output power limits are specified in terms of average power. If it becomes necessary to provide measurement data to demonstrate compliance to a PAPR limit, then the appropriate procedure from those provided in 5.2.3 shall be utilized to determine the peak power (or peak PSD) and the appropriate procedure from those provided in 5.2.4 shall be used to determine the average power (or average PSD). The data from these measurements is then used in Equation (2) to determine the PAPR of a narrowband CW-like signal. See 5.2.3.4 for guidance on determining the PAPR of a broadband noise-like signal.

PAPR (dB) = PPk (dBm or dBW)-PAvg (dBm or dBW)

where:

PAPR peak-to-average power ratio, in dB;

PPk measured peak power or peak PSD level, in dBm or dBW;

PAvg measured average power or average PSD level, in dBm or dBW.

OR

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

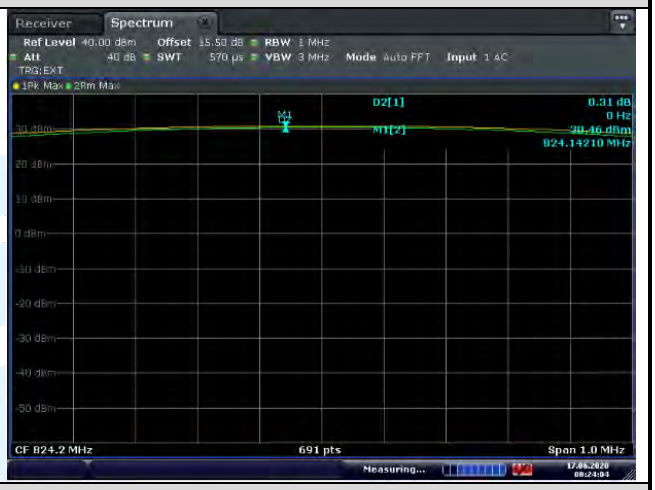
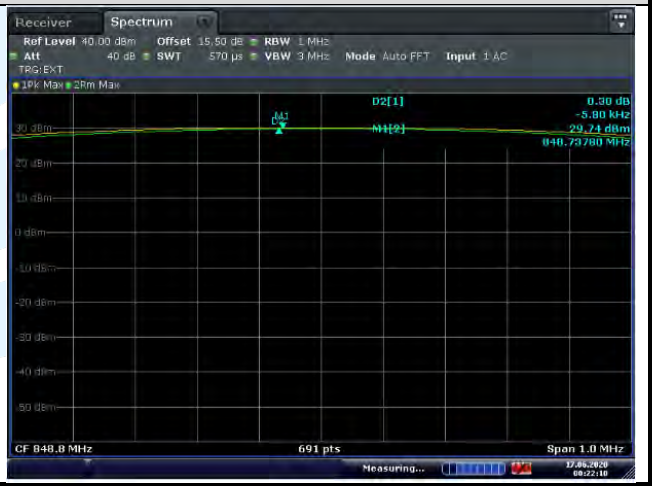
Test Mode: Link mode

Test Results: Pass

Test Data: See table below

Bands	Modulation	Peak-to-average ratio (dB)			Limit	Result
		Lowest	Middle	Highest	(dB)	
GSM 850	GSM	0.35	0.33	0.34	13	Pass
	EDGE	0.31	0.31	0.30	13	Pass
PCS 1900	GSM	0.31	0.32	0.31[i]	13	Pass
	EDGE	0.32	0.29	0.31	13	Pass
WCDMA Band II	RMC 12.2kbps	3.34	3.38	3.35	13	Pass
WCDMA Band IV	RMC 12.2kbps	3.24	3.13	3.32	13	Pass
WCDMA Band V	RMC 12.2kbps	3.47	3.31	3.16	13	Pass

The test plots as follows:

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

PCS 1900	
GSM	EDGE
Lowest Channel	
Middle Channel	
Highest Channel	

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

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),
FCC 47 CFR Part 27.53(h)

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

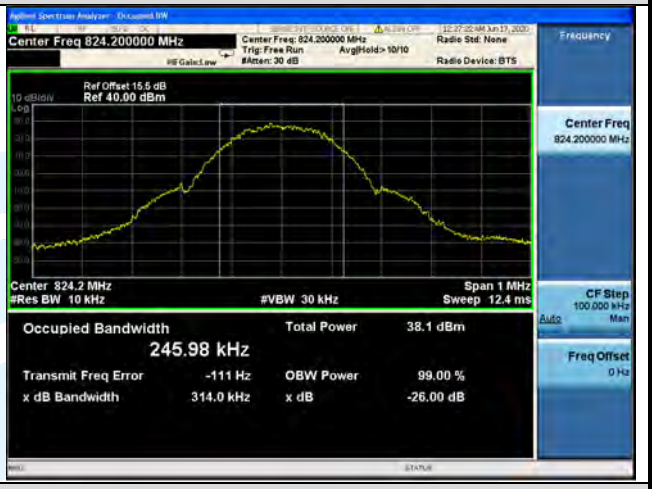
Test Results: Pass

Test Data: See table below

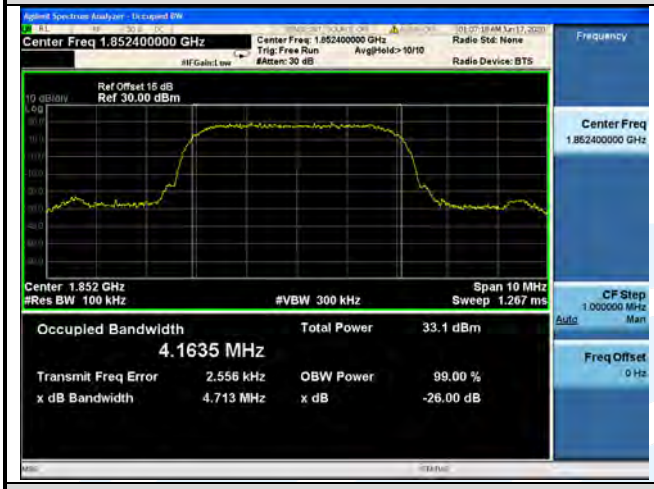
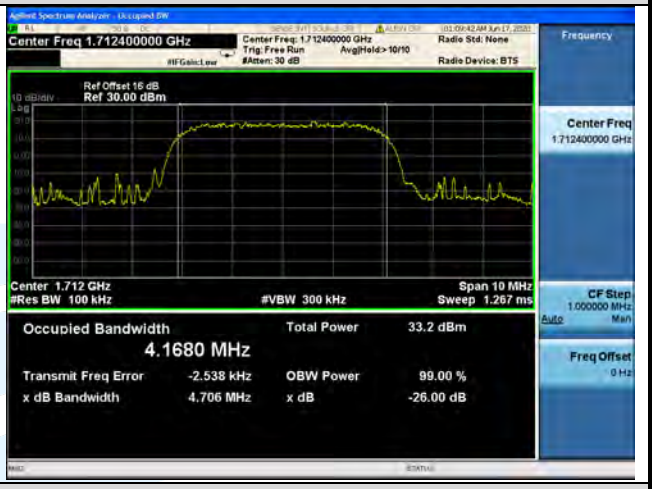
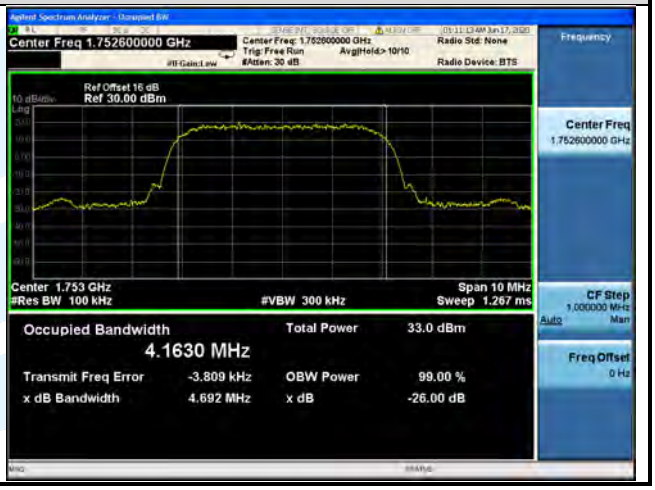
Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (kHz)	99% BW (kHz)
GSM 850	GSM	128	824.2	316.00	244.27
		190	836.6	318.10	244.89
		251	848.8	322.20	245.72
	EDGE	128	824.2	314.00	245.98
		190	836.6	315.00	245.98
		251	848.8	320.50	243.31
PCS 1900	GSM	512	1850.2	315.50	244.99
		661	1880.0	320.30	241.14
		810	1909.8	314.30	245.37
	EDGE	512	1850.2	310.70	245.18
		661	1880.0	313.50	243.42
		810	1909.8	315.50	245.36

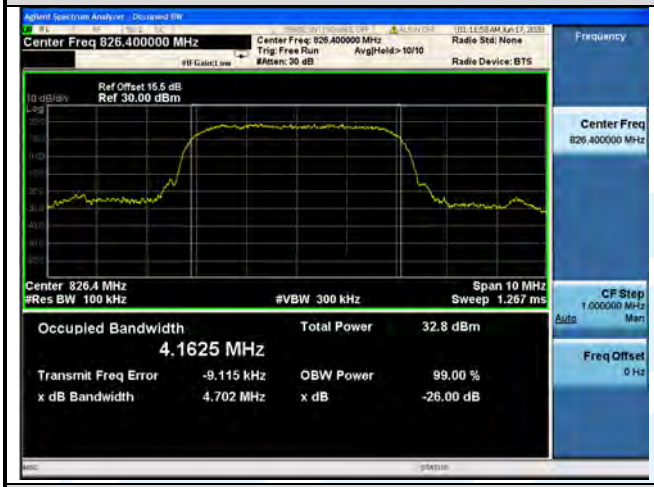
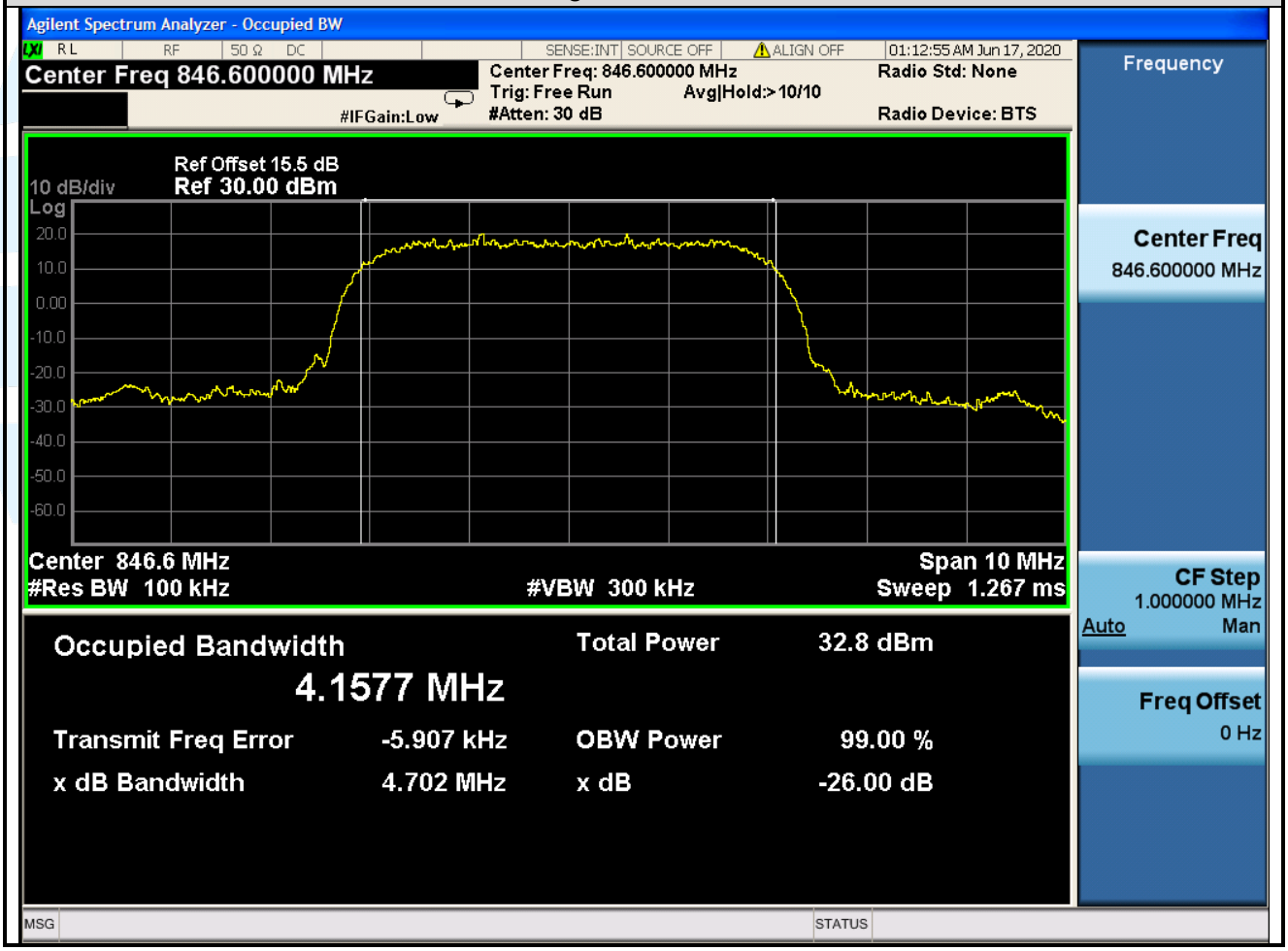
Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
WCDMA Band II	RMC 12.2kbps	9262	1852.4	4.713	4.1635
		9400	1880.0	4.715	4.1908
		9538	1907.6	4.692	4.1783
WCDMA Band IV	RMC 12.2kbps	1312	1712.4	4.706	4.1680
		1412	1732.4	4.710	4.1731
		1513	1752.6	4.692	4.1630
WCDMA Band V	RMC 12.2kbps	4132	826.4	4.702	4.1625
		4182	836.4	4.697	4.1641
		4233	846.6	4.702	4.1577

The test plots as follows:

GSM 850	
GSM	**EDGE**
Lowest Channel	
	
Middle Channel	
Highest Channel	

PCS 1900	
GSM	EDGE
Lowest Channel	
Middle Channel	
Highest Channel	

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

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), FCC 47 CFR Part 27.53(h)(1)
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.

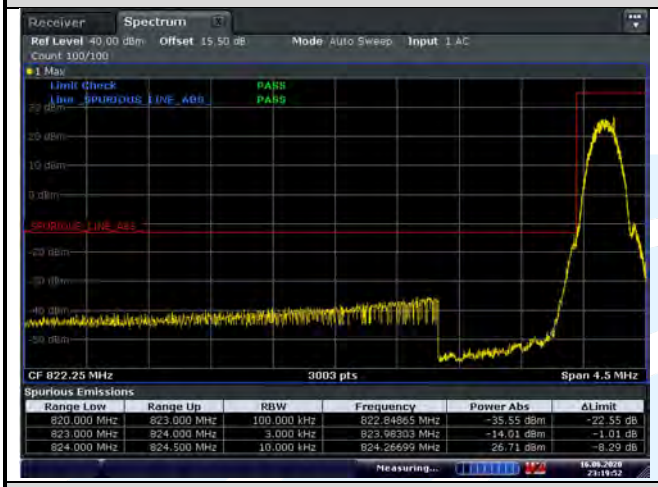
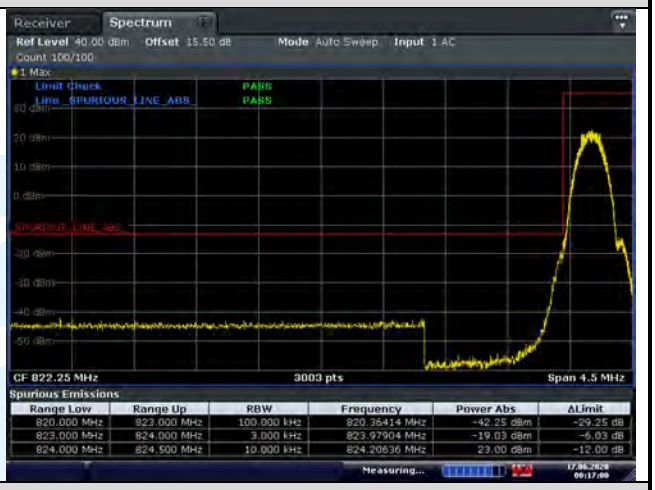
For each band edge measurement:

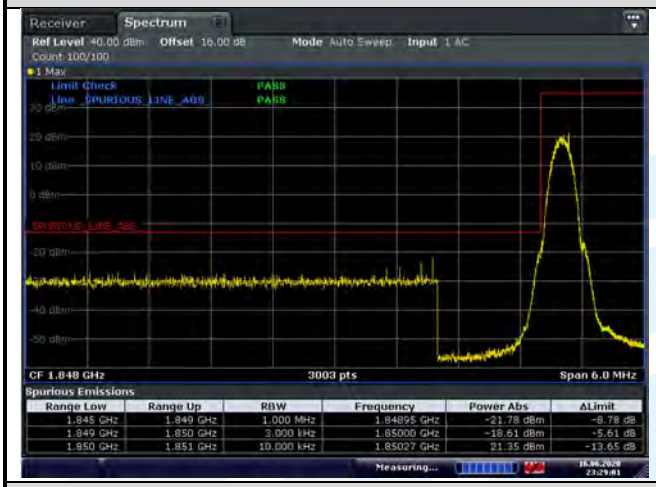
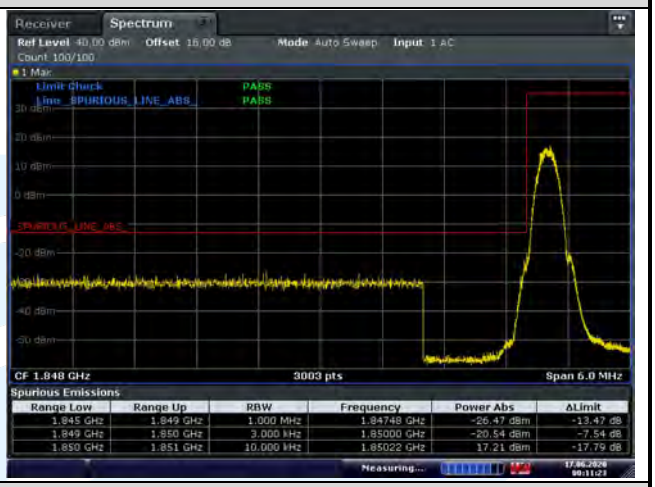
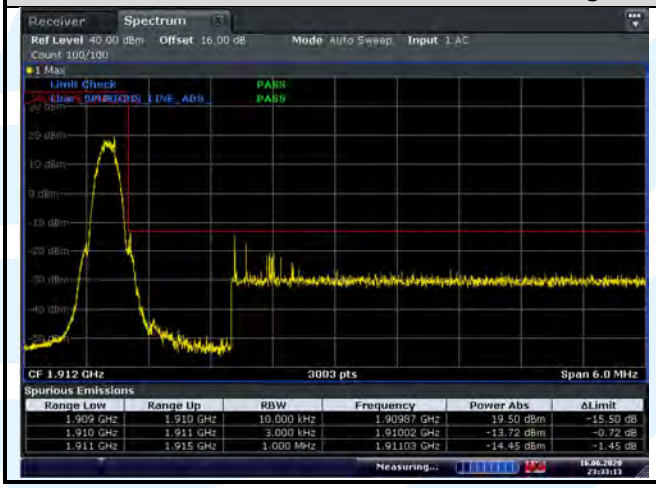
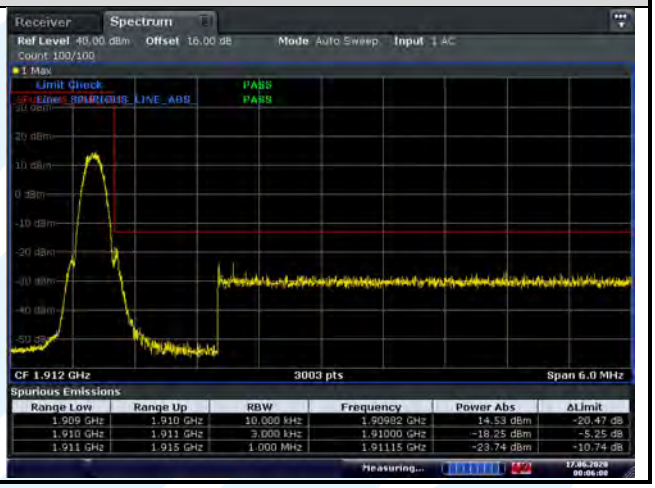
1) Set the spectrum analyzer span to include the block edge frequency.
2) Set a marker to point the corresponding band edge frequency in each test case.
3) Set display line at -13 dBm
4) Set resolution bandwidth to at least 1% of emission bandwidth.
5) Set spectrum analyzer with RMS detector.
6) Record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

PCS 1900	
GSM	EDGE
Lowest Channel	
	
Highest Channel	
	

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

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), FCC 47 CFR Part 27.53(h)(1)
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.

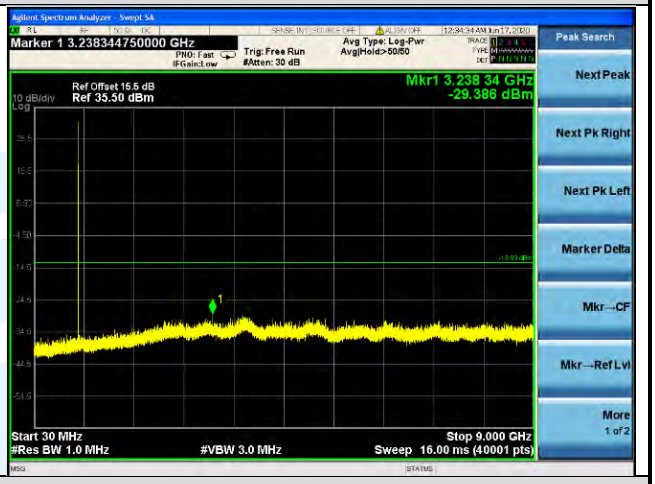
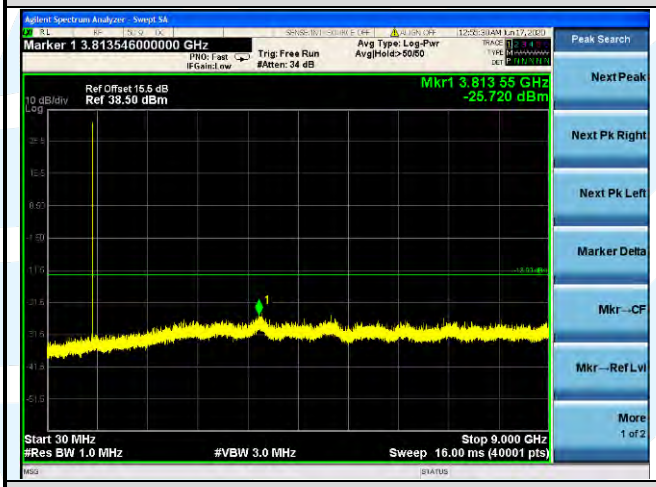
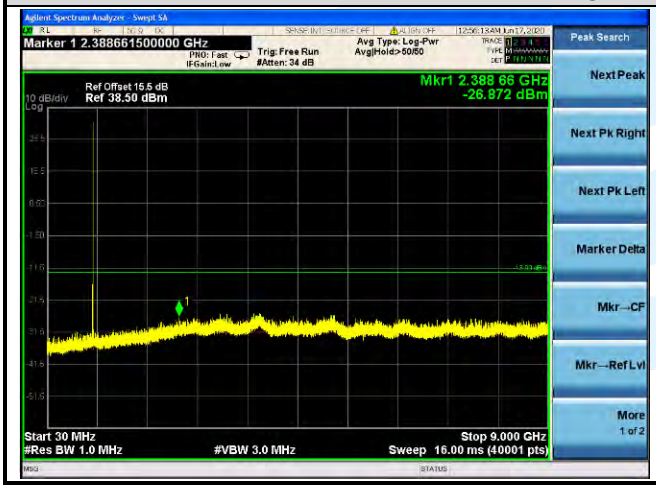
Test Procedure:

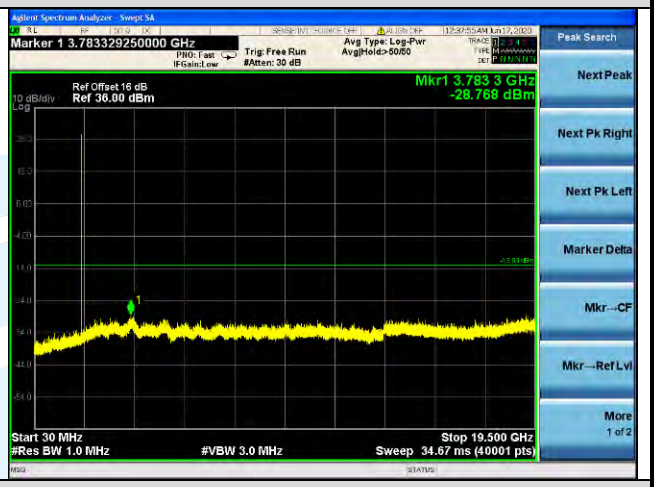
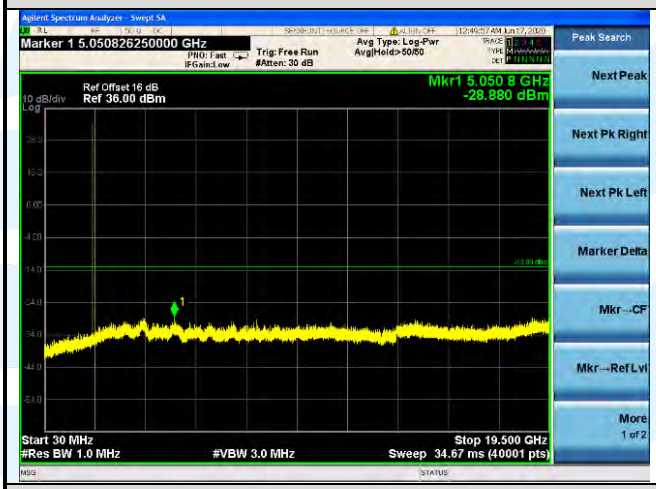
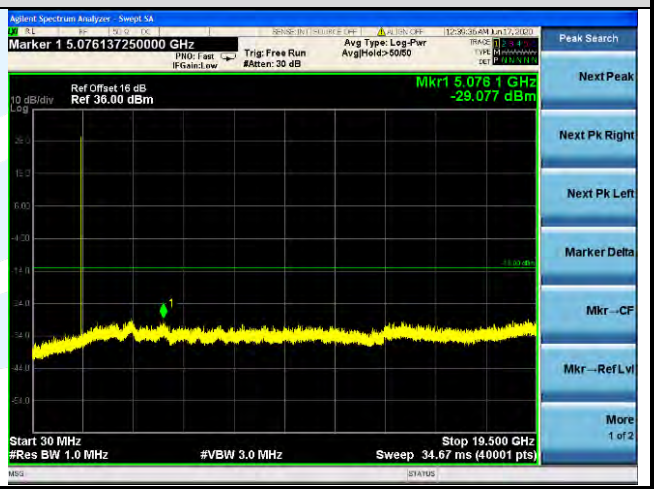
The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz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

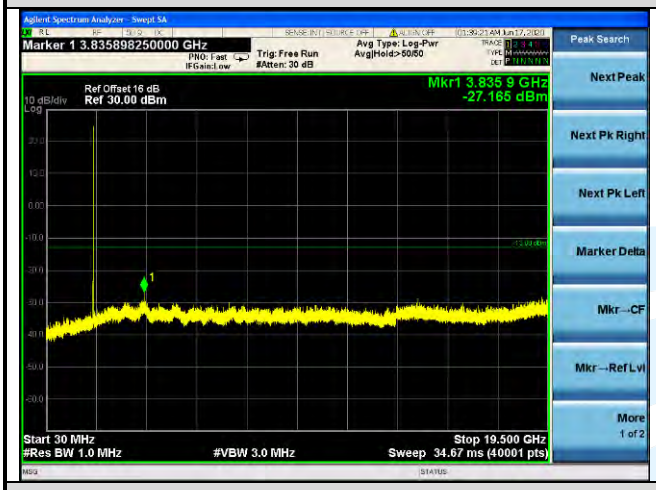
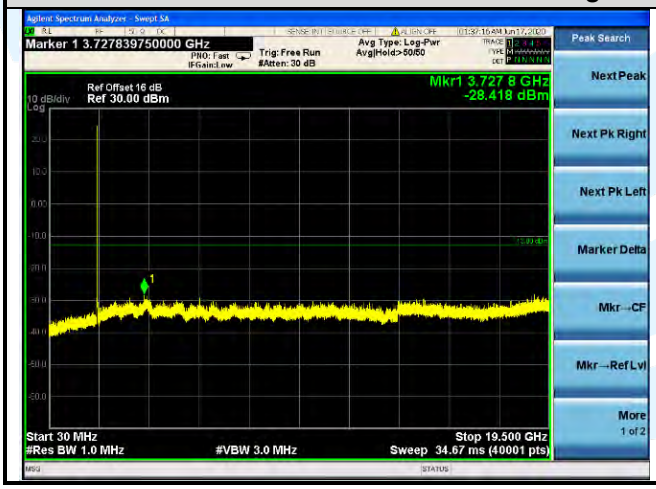
Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

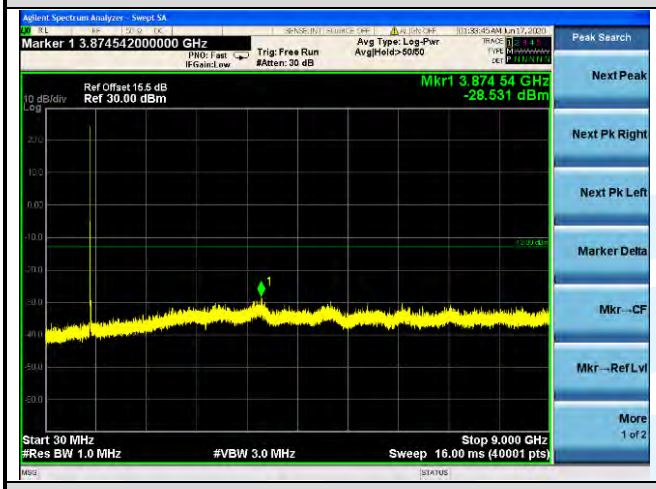
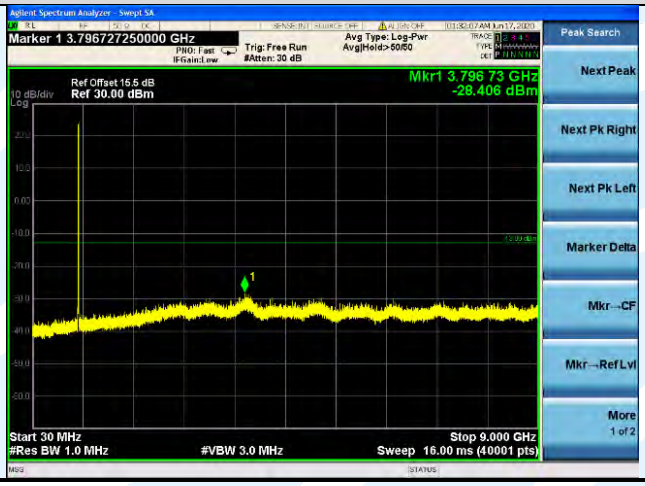
Test Setup:	Refer to section 4.2.2 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Link mode
Test Results:	Pass

The test plots as follows:

GSM 850	
GSM	EDGE
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

PCS 1900	
GSM	EDGE
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

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

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

Remark:

1) All the above radiation data, the fundamental frequency is not marked, it may exceed the limit, please ignore it.

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),
FCC 47 CFR Part 27.53(h)(1)

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:

Below 1G

GSM 850							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
GPRS_ Lowest Channel							
1	39.737	-90.59	33.60	-56.99	-13.00	-43.99	Horizontal
2	298.593	-88.81	37.22	-51.59	-13.00	-38.59	Horizontal
3	689.051	-87.96	47.33	-40.63	-13.00	-27.63	Horizontal
4	30.425	-92.48	38.68	-53.80	-13.00	-40.80	Vertical
5	182.578	-88.90	33.49	-55.41	-13.00	-42.41	Vertical
6	703.731	-88.22	46.44	-41.78	-13.00	-28.78	Vertical
GPRS_ Middle Channel							
1	32.411	-91.58	37.40	-54.18	-13.00	-41.18	Horizontal
2	189.108	-89.98	33.32	-56.66	-13.00	-43.66	Horizontal
3	804.252	-88.57	48.11	-40.46	-13.00	-27.46	Horizontal
4	31.292	-92.23	38.12	-54.11	-13.00	-41.11	Vertical
5	358.450	-89.04	39.38	-49.66	-13.00	-36.66	Vertical
6	554.171	-88.40	44.51	-43.89	-13.00	-30.89	Vertical
GPRS_ Middle Channel							
1	32.411	-92.25	37.40	-54.85	-13.00	-41.85	Horizontal
2	202.875	-90.12	33.85	-56.27	-13.00	-43.27	Horizontal
3	821.387	-87.87	47.99	-39.88	-13.00	-26.88	Horizontal
4	34.527	-91.57	36.01	-55.56	-13.00	-42.56	Vertical
5	144.790	-88.45	32.12	-56.33	-13.00	-43.33	Vertical
6	713.692	-89.02	46.32	-42.70	-13.00	-29.70	Vertical

PCS 1900							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
GPRS_ Lowest Channel							
1	47.703	-73.31	1.57	-71.74	-13.00	-58.74	Horizontal
2	101.893	-76.55	2.97	-73.58	-13.00	-60.58	Horizontal
3	952.000	-81.74	22.57	-59.17	-13.00	-46.17	Horizontal
4	36.014	-79.62	6.05	-73.57	-13.00	-60.57	Vertical
5	204.305	-79.85	5.48	-74.37	-13.00	-61.37	Vertical
6	986.044	-82.70	22.15	-60.55	-13.00	-47.55	Vertical
GPRS_ Middle Channel							
1	47.703	-73.39	1.57	-71.82	-13.00	-58.82	Horizontal
2	69.230	-73.81	0.81	-73.00	-13.00	-60.00	Horizontal
3	945.334	-81.96	22.27	-59.69	-13.00	-46.69	Horizontal
4	31.292	-81.19	9.08	-72.11	-13.00	-59.11	Vertical
5	158.640	-79.91	4.23	-75.68	-13.00	-62.68	Vertical
6	804.252	-81.97	18.04	-63.93	-13.00	-50.93	Vertical
GPRS_ Highest Channel							
1	51.900	-71.64	0.56	-71.08	-13.00	-58.08	Horizontal
2	104.798	-77.44	2.93	-74.51	-13.00	-61.51	Horizontal
3	787.475	-80.39	18.47	-61.92	-13.00	-48.92	Horizontal
4	35.016	-79.35	6.69	-72.66	-13.00	-59.66	Vertical
5	427.292	-79.48	12.81	-66.67	-13.00	-53.67	Vertical
6	965.474	-82.07	21.49	-60.58	-13.00	-47.58	Vertical

WCDMA Band II							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	47.703	-72.85	1.57	-71.28	-13.00	-58.28	Horizontal
2	104.064	-77.09	2.94	-74.15	-13.00	-61.15	Horizontal
3	938.714	-80.95	21.86	-59.09	-13.00	-46.09	Horizontal
4	31.073	-81.28	9.21	-72.07	-13.00	-59.07	Vertical
5	159.759	-80.07	4.26	-75.81	-13.00	-62.81	Vertical
6	703.731	-81.41	17.01	-64.40	-13.00	-51.40	Vertical
RMC 12.2kbps_ Middle Channel							
1	47.703	-73.28	1.57	-71.71	-13.00	-58.71	Horizontal
2	103.335	-76.48	2.94	-73.54	-13.00	-60.54	Horizontal
3	938.714	-81.21	21.86	-59.35	-13.00	-46.35	Horizontal
4	32.640	-80.37	8.21	-72.16	-13.00	-59.16	Vertical
5	278.331	-81.03	8.61	-72.42	-13.00	-59.42	Vertical
6	938.714	-82.36	20.77	-61.59	-13.00	-48.59	Vertical
RMC 12.2kbps_ Highest Channel							
1	54.135	-71.90	0.40	-71.50	-13.00	-58.50	Horizontal
2	105.537	-77.30	2.92	-74.38	-13.00	-61.38	Horizontal
3	693.910	-81.08	18.00	-63.08	-13.00	-50.08	Horizontal
4	33.807	-80.51	7.46	-73.05	-13.00	-60.05	Vertical
5	124.925	-78.76	2.68	-76.08	-13.00	-63.08	Vertical
6	833.013	-81.55	18.46	-63.09	-13.00	-50.09	Vertical

WCDMA Band IV							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	47.703	-72.76	1.57	-71.19	-13.00	-58.19	Horizontal
2	101.893	-76.49	2.97	-73.52	-13.00	-60.52	Horizontal
3	809.924	-81.11	18.69	-62.42	-13.00	-49.42	Horizontal
4	153.163	-79.19	4.08	-75.11	-13.00	-62.11	Vertical
5	424.300	-81.84	12.84	-69.00	-13.00	-56.00	Vertical
6	798.620	-81.57	17.87	-63.70	-13.00	-50.70	Vertical
RMC 12.2kbps_ Middle Channel							
1	47.703	-72.77	1.57	-71.20	-13.00	-58.20	Horizontal
2	164.313	-79.04	4.65	-74.39	-13.00	-61.39	Horizontal
3	708.694	-81.35	17.94	-63.41	-13.00	-50.41	Horizontal
4	30.425	-82.05	9.63	-72.42	-13.00	-59.42	Vertical
5	158.640	-79.86	4.23	-75.63	-13.00	-62.63	Vertical
6	698.804	-80.77	16.98	-63.79	-13.00	-50.79	Vertical
RMC 12.2kbps_ Highest Channel							
1	47.703	-72.29	1.57	-70.72	-13.00	-57.72	Horizontal
2	104.798	-76.59	2.93	-73.66	-13.00	-60.66	Horizontal
3	833.013	-80.52	18.53	-61.99	-13.00	-48.99	Horizontal
4	43.845	-76.24	2.27	-73.97	-13.00	-60.97	Vertical
5	171.389	-79.40	4.35	-75.05	-13.00	-62.05	Vertical
6	809.924	-81.49	18.17	-63.32	-13.00	-50.32	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	30.212	-91.86	38.54	-53.32	-13.00	-40.32	Horizontal
2	175.040	-88.40	33.19	-55.21	-13.00	-42.21	Horizontal
3	689.051	-89.00	47.33	-41.67	-13.00	-28.67	Horizontal
4	40.017	-90.85	32.45	-58.40	-13.00	-45.40	Vertical
5	172.598	-89.33	32.99	-56.34	-13.00	-43.34	Vertical
6	698.804	-89.82	46.41	-43.41	-13.00	-30.41	Vertical
RMC 12.2kbps_ Middle Channel							
1	30.855	-91.77	38.21	-53.56	-13.00	-40.56	Horizontal
2	248.732	-90.13	36.07	-54.06	-13.00	-41.06	Horizontal
3	787.475	-88.56	47.87	-40.69	-13.00	-27.69	Horizontal
4	31.959	-92.07	37.68	-54.39	-13.00	-41.39	Vertical
5	171.389	-89.58	32.90	-56.68	-13.00	-43.68	Vertical
6	776.485	-88.20	46.29	-41.91	-13.00	-28.91	Vertical
RMC 12.2kbps_ Highest Channel							
1	30.855	-92.48	38.21	-54.27	-13.00	-41.27	Horizontal
2	148.917	-89.09	32.51	-56.58	-13.00	-43.58	Horizontal
3	827.179	-88.07	47.94	-40.13	-13.00	-27.13	Horizontal
4	250.486	-89.03	36.16	-52.87	-13.00	-39.87	Vertical
5	424.300	-89.18	41.81	-47.37	-13.00	-34.37	Vertical
6	698.804	-88.65	46.41	-42.24	-13.00	-29.24	Vertical

Above 1G

GSM 850							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
GPRS_ Lowest Channel							
1	4121.000	-64.13	15.62	-48.51	-13.00	-35.51	Horizontal
2	5769.400	-63.75	17.12	-46.63	-13.00	-33.63	Horizontal
3	4121.000	-62.26	16.14	-46.12	-13.00	-33.12	Vertical
4	5769.400	-59.82	17.46	-42.36	-13.00	-29.36	Vertical
GPRS_ Middle Channel							
1	4183.000	-66.88	15.69	-51.19	-13.00	-38.19	Horizontal
2	6692.800	-64.50	18.51	-45.99	-13.00	-32.99	Horizontal
3	4183.000	-61.37	16.18	-45.19	-13.00	-32.19	Vertical
4	6692.800	-61.49	18.58	-42.91	-13.00	-29.91	Vertical
GPRS_ Highest Channel							
1	4244.000	-65.39	15.74	-49.65	-13.00	-36.65	Horizontal
2	6790.400	-64.87	18.44	-46.43	-13.00	-33.43	Horizontal
3	4244.000	-61.13	15.70	-45.43	-13.00	-32.43	Vertical
4	6790.400	-62.25	18.62	-43.63	-13.00	-30.63	Vertical

PCS 1900							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
GPRS_ Lowest Channel							
1	5550.600	-64.58	16.38	-48.20	-13.00	-35.20	Horizontal
2	7400.800	-63.99	18.12	-45.87	-13.00	-32.87	Horizontal
3	5550.600	-55.15	16.87	-38.28	-13.00	-25.28	Vertical
4	7400.800	-56.48	18.22	-38.26	-13.00	-25.26	Vertical
GPRS_ Middle Channel							
1	5640.000	-64.73	16.56	-48.17	-13.00	-35.17	Horizontal
2	7520.000	-62.52	18.11	-44.41	-13.00	-31.41	Horizontal
3	5640.000	-50.44	17.04	-33.40	-13.00	-20.40	Vertical
4	7520.000	-54.25	18.21	-36.04	-13.00	-23.04	Vertical
GPRS_ Highest Channel							
1	5729.400	-58.02	16.95	-41.07	-13.00	-28.07	Horizontal
2	7639.200	-60.44	18.30	-42.14	-13.00	-29.14	Horizontal
3	5729.400	-52.62	17.40	-35.22	-13.00	-22.22	Vertical
4	7639.200	-56.77	18.40	-38.37	-13.00	-25.37	Vertical

WCDMA Band II							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	5557.200	-68.24	16.38	-51.86	-13.00	-38.86	Horizontal
2	7409.600	-64.84	18.11	-46.73	-13.00	-33.73	Horizontal
3	5557.200	-66.29	16.87	-49.42	-13.00	-36.42	Vertical
4	7409.600	-59.21	18.21	-41.00	-13.00	-28.00	Vertical
RMC 12.2kbps_ Middle Channel							
1	5640.000	-68.19	16.56	-51.63	-13.00	-38.63	Horizontal
2	7520.000	-62.49	18.11	-44.38	-13.00	-31.38	Horizontal
3	5640.000	-65.10	17.04	-48.06	-13.00	-35.06	Vertical
4	7520.000	-58.74	18.21	-40.53	-13.00	-27.53	Vertical
RMC 12.2kbps_ Highest Channel							
1	5722.800	-67.23	16.92	-50.31	-13.00	-37.31	Horizontal
2	7630.400	-62.79	18.28	-44.51	-13.00	-31.51	Horizontal
3	5722.800	-66.65	17.37	-49.28	-13.00	-36.28	Vertical
4	7630.400	-59.01	18.38	-40.63	-13.00	-27.63	Vertical

WCDMA Band IV							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	5137.200	-66.22	15.82	-50.40	-13.00	-37.40	Horizontal
2	6849.600	-62.63	18.41	-44.22	-13.00	-31.22	Horizontal
3	5137.200	-65.93	16.17	-49.76	-13.00	-36.76	Vertical
4	6849.600	-61.24	18.57	-42.67	-13.00	-29.67	Vertical
RMC 12.2kbps_ Middle Channel							
1	5197.200	-66.83	16.02	-50.81	-13.00	-37.81	Horizontal
2	6929.600	-63.92	18.35	-45.57	-13.00	-32.57	Horizontal
3	5197.200	-66.46	16.40	-50.06	-13.00	-37.06	Vertical
4	6929.600	-62.91	18.47	-44.44	-13.00	-31.44	Vertical
RMC 12.2kbps_ Highest Channel							
1	5257.800	-68.23	16.12	-52.11	-13.00	-39.11	Horizontal
2	7010.400	-63.60	18.26	-45.34	-13.00	-32.34	Horizontal
3	5257.800	-66.88	16.52	-50.36	-13.00	-37.36	Vertical
4	7010.400	-58.32	18.36	-39.96	-13.00	-26.96	Vertical

WCDMA Band V							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	1652.800	-65.90	4.54	-61.36	-13.00	-48.36	Horizontal
2	2479.200	-67.95	10.87	-57.08	-13.00	-44.08	Horizontal
3	1652.800	-65.93	3.76	-62.17	-13.00	-49.17	Vertical
4	2479.200	-66.88	10.47	-56.41	-13.00	-43.41	Vertical
RMC 12.2kbps_ Middle Channel							
1	1672.800	-66.36	4.68	-61.68	-13.00	-48.68	Horizontal
2	2509.200	-65.47	10.87	-54.60	-13.00	-41.60	Horizontal
3	1672.800	-66.14	3.92	-62.22	-13.00	-49.22	Vertical
4	2509.200	-65.19	10.46	-54.73	-13.00	-41.73	Vertical
RMC 12.2kbps_ Highest Channel							
1	1693.200	-66.76	4.83	-61.93	-13.00	-48.93	Horizontal
2	2539.800	-67.90	10.91	-56.99	-13.00	-43.99	Horizontal
3	1693.200	-65.53	4.08	-61.45	-13.00	-48.45	Vertical
4	2539.800	-67.94	10.48	-57.46	-13.00	-44.46	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
4. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different modulations in exploratory test. Subsequently, only the worst case emissions are reported.

5.9 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 2.1055 &
FCC 47 CFR Part 22.355 &
FCC 47 CFR Part 24.235 &
FCC 47 CFR Part 27.54

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, FCC 47 CFR Part 27.54

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, 3.8 Vdc and High voltage, 4.2 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)	Pass/ Fail
GSM 850 1Tx-slot							
GMSK	190 / 836.6	VL	TN	-14	-0.0167	± 2.5	Pass
		VN		9	0.0108	± 2.5	Pass
		VH		14	0.0167	± 2.5	Pass
		VN	50	9	0.0108	± 2.5	Pass
			40	-6	-0.0072	± 2.5	Pass
			30	-10	-0.0120	± 2.5	Pass
			20	9	0.0108	± 2.5	Pass
			10	10	0.0120	± 2.5	Pass
			0	14	0.0167	± 2.5	Pass
			-10	10	0.0120	± 2.5	Pass
			-20	21	0.0251	± 2.5	Pass
			-30	10	0.0120	± 2.5	Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
EDGE 850 1Tx-slot							
8PSK	190 / 836.6	VL	TN	11	0.0131	± 2.5	Pass
		VN		10	0.0120	± 2.5	Pass
		VH		-11	-0.0131	± 2.5	Pass
		VN	50	9	0.0108	± 2.5	Pass
			40	-8	-0.0096	± 2.5	Pass
			30	14	0.0167	± 2.5	Pass
			20	11	0.0131	± 2.5	Pass
			10	10	0.0120	± 2.5	Pass
			0	-6	-0.0072	± 2.5	Pass
			-10	14	0.0167	± 2.5	Pass
			-20	11	0.0131	± 2.5	Pass
			-30	13	0.0155	± 2.5	Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
WCDMA Band V RMC 12.2Kbps							
BPSK	4182 / 836.4	VL	TN	13	0.0155	± 2.5	Pass
		VN		11	0.0132	± 2.5	Pass
		VH		10	0.0120	± 2.5	Pass
		VN	50	9	0.0108	± 2.5	Pass
			40	8	0.0096	± 2.5	Pass
			30	11	0.0132	± 2.5	Pass
			20	14	0.0167	± 2.5	Pass
			10	9	0.0108	± 2.5	Pass
			0	12	0.0143	± 2.5	Pass
			-10	14	0.0167	± 2.5	Pass
			-20	13	0.0155	± 2.5	Pass
			-30	-10	-0.0120	± 2.5	Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
GSM 1900 1Tx-slot							
GMSK	661 / 1880.0	VL	TN	13	0.0069	Note 1	Pass
		VN		10	0.0053		Pass
		VH		12	0.0064		Pass
		VN	50	9	0.0048		Pass
			40	13	0.0069		Pass
			30	12	0.0064		Pass
			20	11	0.0059		Pass
			10	10	0.0053		Pass
			0	14	0.0074		Pass
			-10	9	0.0048		Pass
			-20	13	0.0069		Pass
			-30	14	0.0074		Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
EDGE 1900 1Tx-slot							
8PSK	661 / 1880.0	VL	TN	13	0.0069	Note 1	Pass
		VN		11	0.0059		Pass
		VH		11	0.0059		Pass
		VN	50	8	0.0043		Pass
			40	12	0.0064		Pass
			30	9	0.0048		Pass
			20	11	0.0059		Pass
			10	8	0.0043		Pass
			0	14	0.0074		Pass
			-10	11	0.0059		Pass
			-20	8	0.0043		Pass
			-30	14	0.0074		Pass
Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
WCDMA Band II RMC 12.2Kbps							
BPSK	9400 / 1880.0	VL	TN	-11	-0.0059	Note 1	Pass
		VN		-14	-0.0074		Pass
		VH		-8	-0.0043		Pass
		VN	50	-18	-0.0096		Pass
			40	-9	-0.0048		Pass
			30	-9	-0.0048		Pass
			20	-12	-0.0064		Pass
			10	-14	-0.0074		Pass
			0	-8	-0.0043		Pass
			-10	-8	-0.0043		Pass
			-20	-9	-0.0048		Pass
			-30	-12	-0.0064		Pass
Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
WCDMA Band IV RMC 12.2Kbps							
BMSK	1412 / 1732.4	VL	TN	11	0.0063	Note 1	Pass
		VN		13	0.0075		Pass
		VH		5	0.0029		Pass
		VN	50	9	0.0052		Pass
			40	10	0.0058		Pass
			30	7	0.0040		Pass
			20	-8	-0.0046		Pass
			10	11	0.0063		Pass
			0	13	0.0075		Pass
			-10	16	0.0092		Pass
			-20	9	0.0052		Pass
			-30	10	0.0058		Pass

Note1: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 ***

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