FCC Test Report

Report No.: AGC01826170501FE02

FCC ID	:	2AI62T71V3
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	rugged tablet
BRAND NAME	:	HUGEROCK
MODEL NAME	:	T70,T71,T70V2,T71V3
CLIENT	:	SOTEN TECHNOLOGY (HONGKONG) CO., LIMITED
DATE OF ISSUE	:	June 29, 2017
STANDARD(S)	:	FCC Part 22H & 24E&27(L) Rules
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd.

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	June 29, 2017	Valid	Original Report

TABLE OF CONTENTS

TABLE OF CONTENTS 3

1. VERIFICATION OF COMPLIANCE 5

2. GENERAL INFORMATION 6

2.1 PRODUCT DESCRIPTION 6
2.2 RELATED SUBMITTAL(S) / GRANT (S) 8
2.3 TEST METHODOLOGY 8
2.4 TEST FACILITY 8
2.5 MEASUREMENT INSTRUMENTS 8
2.6 SPECIAL ACCESSORIES 10
2.7 EQUIPMENT MODIFICATIONS 10

3. SYSTEM TEST CONFIGURATION 11

3.1 EUT CONFIGURATION 11
3.2 EUT EXERCISE 11
3.3 GENERAL TECHNICAL REQUIREMENTS 11
3.4 CONFIGURATION OF EUT SYSTEM 12

4. SUMMARY OF TEST RESULTS 13

5. DESCRIPTION OF TEST MODES 13

6. OUTPUT POWER 14

6.1 CONDUCTED OUTPUT POWER 14
6.2 RADIATED OUTPUT POWER 21
6.3. PEAK-TO-AVERAGE RATIO 25

7. OCCUPIED BANDWIDTH 27

7.1 MEASUREMENT METHOD 27
7.2 PROVISIONS APPLICABLE 27
7.3 MEASUREMENT RESULT 28
APPENDIX A:BANDWIDTH 28

8. BAND EDGE 33

8.1 MEASUREMENT METHOD 33

8.2 PROVISIONS APPLICABLE 33
8.3 MEASUREMENT RESULT 33
APPENDIX B: BAND EDGES COMPLIANCE 33
9. SPURIOUS EMISSION 36
9.1 CONDUCTED SPURIOUS EMISSION 36
APPENDIX C: SPURIOUS EMISSION AT ANTENNA TERMINAL 38
9.2 RADIATED SPURIOUS EMISSION 45
MEASUREMENT PROCEDURE 45
11.2. TEST SETUP 46
10. FREQUENCY STABILITY 50
10.1 MEASUREMENT METHOD 50
10.2 PROVISIONS APPLICABLE 50
10.3 MEASUREMENT RESULT 52
Appendix D:Frequency Stability 52
PHOTOGRAPHS OF TEST SETUP 61
CONDUCTED EMISSION 61

1. VERIFICATION OF COMPLIANCE

Applicant	SOTEN TECHNOLOGY (HONGKONG) CO., LIMITED
Address	FLAT/RM A10 9/F SILVERCORP INTERNATIONAL TOWER 707713 NATHAN ROAD MONGKOK KL Hong Kong
Manufacturer	Shenzhen SOTEN Technology Co., Ltd.
Address	10th Floor, 2nd Building, BaiWang Research and Development Building, No. 5308 Shahe west Road, Xili, Nanshan District, ShenZhen, China
Product Designation	rugged tablet
Brand Name	HUGEROCK
Test Model	T71V3
Series Model	T70,T71,T70V2
Difference Description	All the same except the model name.
Date of test	June 15, 2017~June 29, 2017
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA- 603-D-2010. The sample tested as described in this report is in compliance with the FCC Rules Part 22H and 24E and 27(L).

The test results of this report relate only to the tested sample identified in this report.

Tested By	Dota Zhang(Zhang Jianfeng)	June 29, 2017
Reviewed By	Bart Xie(Xie Xiaobin)	June 29, 2017
Approved By	Solger Zhang(Zhang Hongyi) Authorized Officer	June 29, 2017

2. GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	rugged tablet
Hardware version:	M6035-71-SUBBoard-V3
Software version:	T71V3-20170210-EN
Frequency Bands:	☒GSM 850 ☒PCS 1900 (U.S. Bands) ☒GSM 900 ☒DCS 1800 (Non-U.S. Bands) ☒UMTS FDD Band II ☒UMTS FDD Band V ☐UMTS FDD Band IV (U.S. Bands) ☒UMTS FDD Band I ☒UMTS FDD Band VIII (Non-U.S. Bands)
Antenna Type	PIFA Antenna
Type of Modulation	GSM / GPRS : GMSK EDGE : GMSK/8PSK WCDMA : QPSK
Antenna gain(GSM):	GSM850: -0.9dBi; PCS1900: -1.5dBi; WCDMA850: -0.9dBi; WCDMA21900:-1.5dBi
Power Supply:	DC 3.7V by battery
Battery parameter:	DC3.7V/10000mAh
Single Card:	WCDMA / GSM Card Slot
GPRS Class	12
Extreme Vol. Limits:	DC3.4 V to 4.2 V (Normal: DC3.7 V)
Extreme Temp. Tolerance	-10℃ to +50℃
*** Note: 1. The High Voltage DC4.2V and Low Voltage DC3.4V were declared by manufacturer 2. The EUT couldn't be operating normally with higher or lower voltage. 3. Other functions have been performed according to verification procedure except for MS function.	

***** Note:** 1.The maximum power levels are GSM for MCS-4: GMSK link, and RMC 12.2kbps mode for WCDMA band II, WCDMA band V, only these modes were used for all tests.

2. We found out the test mode with the highest power level after we analyze all the data rates. So we chose worst case as a representative.

GSM/WCDMA Card Slot:

	Maximum ERP/EIRP (dBm)	Max. Conducted Power (dBm)	Max. Average Burst Power (dBm)
GSM 850	30.46	32.85	30.82
PCS 1900	26.66	28.82	26.89
WCDMA BAND II	21.40	23.64	21.54
WCDMA BAND V	21.30	23.63	21.55

2.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AI62T71V3**, filing to comply with the FCC Part 22H&24E &27L requirements.

2.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-D-2010, and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.
KDB 971168 D01 Power Meas License Digital Systems v02r02

2.4 TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents of ANSI/TIA-603-D-2010.

2.5 MEASUREMENT INSTRUMENTS

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9168	D69250	Mar 1, 2016	Feb 28, 2018
Trilog Broadband Antenna(substituted antenna) (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96221	July 3, 2016	July 2, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 2, 2017	June 1, 2018
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 2, 2017	June 1, 2018
Spectrum analyzer	Agilent	E4407B	MY46185649	June 2, 2017	June 1, 2018
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 10, 2016	July 9, 2017
Horn Antenna(substituted antenna) (1G-18GHz)	ETS LINDGREN	3117	00034609	Mar 1, 2016	Feb 28, 2018

Spectrum Analyzer	Agilent	E4411B	MY4511453	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 6, 2016	July 5, 2017
RF Cable	SCHWARZBECK	AK9515H	96220	July 7, 2016	July 6, 2017
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 2, 2017	June 1, 2018
Artificial Mains Network	Narda	L2-16B	000WX31025	July 7, 2016	July 6, 2017
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 7, 2016	July 6, 2017
RF Cable	SCHWARZBECK	AK9515E	96222	July 3, 2016	July 2, 2017
Shielded Room	CHENGYU	843	PTS-002	June 2, 2017	June 1, 2018
COMMUNICATION TESTER	AGILENT	8960	GB46490550	July 24,2016	July 23, 2017
RF attenuator	N/A	RFA20db	68	N/A	N/A
Signal Generator	AGILENT	N5182A	MY50140530	Oct 15,2016	Oct 14,2017
Signal Generator(substituted equipment)	AGILENT	E8257D	MY45141029	Oct 15,2016	Oct 14,2017

2.6 SPECIAL ACCESSORIES

The battery was supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

3.3 GENERAL TECHNICAL REQUIREMENTS

Item Number	Item Description		FCC Rules
1	Output Power	Conducted output power	2.1046/22.913(a) (2) / 24.232 (c) /27.50(d)(2)
		Radiated output power	
2	Peak-to-Average Ratio	Peak-to-Average Ratio	24.232(d)/27.50(d)(5)
3	Spurious Emission	Conducted spurious emission	2.1051 / 22.917 / 24.238/27.53(h)
		Radiated spurious emission	
4	Frequency Stability		2.1055/22.355 /24.235 /27.54
5	Occupied Bandwidth		2.1049 (h)(i)
6	Emission Bandwidth		22.917(a)/24.238(a) /27.53(h)
7	Band Edge		22.917(a)/24.238(a) /27.53(h)

3.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Remark
1	rugged tablet	T71V3	FCC ID: 2AI62T71V3	EUT
2	Adapter	8395-UW01-1070	DC 5.3V/2A	Accessory
3	Battery	8070120	DC3.7V/ 1000mAh	Accessory
4	USB Cable	N/A	N/A	Accessory

****Note: All the accessories have been used during the test. The following "EUT" in setup diagram means EUT system.*

4. SUMMARY OF TEST RESULTS

Item Number	Item Description		FCC Rules	Result
1	Output Power	Conducted Output Power	2.1046/22.913(a) (2) / 24.232 (c)/ 27.50(d)(2)	Pass
		Radiated Output Power		
2	Peak-to-Average Ratio	Peak-to-Average Ratio	24.232(d)/27.50(d)(5)	Pass
3	Spurious Emission	Conducted Spurious Emission	2.1051/22.917/24.238/27.53(h)	Pass
		Radiated Spurious Emission		
4	Frequency Stability		2.1055/22.355/24.235/27.54	Pass
5	Occupied Bandwidth		2.1049 (h)(i)	Pass
6	Emission Bandwidth		22.917(a)/24.238(a)/27.53(h)	Pass
7	Band Edge		22.917(a)/24.238(a)/27.53(h)	Pass
8	Mains Conducted Emission		15.107 / 15.207	Pass

5. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both GSM and PCS frequency band.

*****Note:** GSM/GPRS/EGPRS 850, GSM/GPRS/EGPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band V, mode have been tested during the test.

The worst condition was recorded in the test report if no other modes test data.

6. OUTPUT POWER

6.1 CONDUCTED OUTPUT POWER

6.1.1 MEASUREMENT METHOD

The transmitter output port was connected to base station.

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.

Measure the maximum burst average power and average power for other modulation signal.

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes (GSM/GPRS/EGPRS 850, GSM/GPRS/EGPRS1900, WCDMA/HSPA band II, WCDMA/HSPA band V) at 3 typical channels (the Top Channel, the Middle Channel and the Bottom Channel) for each band.

6.1.2 MEASUREMENT RESULT

Conducted Output Power Limits for GPRS/EDGE 850 band		
Mode	**Nominal Peak Power**	**Tolerance(dB)**
GSM	33 dBm (2W)	- 2
EDGE	27 dBm(0.5W)	±2
Conducted Output Power Limits for GPRS/EDGE 1900 band		
Mode	**Nominal Peak Power**	**Tolerance(dB)**
GSM	30 dBm (1W)	- 2
EDGE	26 dBm (0.4W)	±2
Conducted Output Power Limits for UMTS band II		
Mode	**Nominal Peak Power**	**Tolerance(dB)**
WCDMA	24 dBm (0.25W)	- 2
Conducted Output Power Limits for UMTS band V		
Mode	**Nominal Peak Power**	**Tolerance(dB)**
WCDMA	24 dBm (0.25W)	- 2

GSM 850:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance	Avg.Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)
GSM850	824.2	33	**32.85**	-0.15	**30.82**	-9	21.82
	836.6	33	32.72	-0.28	30.65	-9	21.65
	848.8	33	32.46	-0.54	30.31	-9	21.31
GPRS850 (1 Slot)	824.2	33	32.58	-0.42	30.12	-9	21.12
	836.6	33	32.32	-0.68	30.29	-9	21.29
	848.8	33	32.31	-0.69	30.09	-9	21.09
GPRS850 (2 Slot)	824.2	30	29.23	-0.77	27.27	-6	21.27
	836.6	30	29.17	-0.83	27.20	-6	21.20
	848.8	30	29.05	-0.95	27.15	-6	21.15
GPRS850 (3 Slot)	824.2	28.23	27.61	-0.62	25.46	-4.26	21.20
	836.6	28.23	27.50	-0.73	25.41	-4.26	21.15
	848.8	28.23	27.34	-0.89	25.22	-4.26	20.96
GPRS850 (4 Slot)	824.2	27	26.46	-0.54	24.31	-3	21.31
	836.6	27	26.49	-0.51	24.63	-3	21.63
	848.8	27	26.27	-0.73	24.25	-3	21.25

Mode	Channel	Frequency (MHz)	Peak Power (dBm)	Avg.Burst Power (dBm)
EDGE (1 Slot)	128	824.2	26.63	23.52
	189	836.6	26.71	23.33
	251	848.8	26.14	23.41
EDGE (2 Slot)	128	824.2	23.72	20.55
	189	836.6	23.20	20.34
	251	848.8	23.36	20.40
EDGE (3 Slot)	128	824.2	22.70	19.27
	189	836.6	22.44	19.28
	251	848.8	22.97	19.41
EDGE (4 Slot)	128	824.2	22.03	18.23
	189	836.6	21.62	18.12
	251	848.8	21.97	18.35

PCS 1900:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance	Avg.Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)
GSM1900	1850.2	30	**28.82**	-1.18	**26.89**	-9	17.89
	1880	30	28.75	-1.25	26.73	-9	17.73
	1909.8	30	28.74	-1.26	26.68	-9	17.68
GPRS1900 (1 Slot)	1850.2	30	28.31	-1.69	26.29	-9	17.29
	1880	30	28.19	-1.81	26.33	-9	17.33
	1909.8	30	28.21	-1.79	26.26	-9	17.26
GPRS1900 (2 Slot)	1850.2	27	25.42	-1.58	23.24	-6	17.24
	1880	27	25.11	-1.89	23.18	-6	17.18
	1909.8	27	25.49	-1.51	23.40	-6	17.40
GPRS1900 (3 Slot)	1850.2	25.23	23.54	-1.69	20.79	-4.26	16.53
	1880	25.23	23.41	-1.82	20.85	-4.26	16.59
	1909.8	25.23	23.30	-1.93	20.83	-4.26	16.57
GPRS1900 (4 Slot)	1850.2	24	22.13	-1.87	20.12	-3	17.12
	1880	24	22.13	-1.87	20.06	-3	17.06
	1909.8	24	22.03	-1.97	20.07	-3	17.07

Mode	Channel	Frequency (MHz)	Peak Power (dBm)	Avg.Burst Power (dBm)
EDGE (1 Slot)	512	1850.2	25.55	22.26
	661	1880	25.19	22.28
	810	1909.8	25.64	22.49
EDGE (2 Slot)	512	1850.2	23.52	20.58
	661	1880	23.76	20.62
	810	1909.8	23.51	20.60
EDGE (3 Slot)	512	1850.2	23.35	20.34
	661	1880	23.24	20.30
	810	1909.8	23.32	20.29
EDGE (4 Slot)	512	1850.2	22.35	19.25
	661	1880	22.23	19.17
	810	1909.8	22.43	19.09

UMTS BAND II

Mode	Frequency (MHz)	Reference power	Peak Power	Tolerance	Avg.Burst Power
WCDMA 1900 RMC	1852.6	24	**23.64**	-0.36	**21.54**
	1880	24	23.37	-0.63	21.22
	1907.4	24	23.28	-0.72	21.32
WCDMA 1900 AMR	1852.6	24	23.31	-0.69	21.00
	1880	24	23.21	-0.79	20.93
	1907.4	24	23.27	-0.73	21.08
HSDPA Subtest 1	1852.6	24	22.85	-1.15	20.62
	1880	24	22.76	-1.24	20.21
	1907.4	24	22.70	-1.30	20.32
HSDPA Subtest 2	1852.6	24	22.52	-1.48	20.53
	1880	24	22.51	-1.49	20.29
	1907.4	24	22.41	-1.59	20.27
HSDPA Subtest 3	1852.6	24	22.53	-1.47	20.31
	1880	24	22.41	-1.59	20.01
	1907.4	24	22.51	-1.49	20.37
HSDPA Subtest 4	1852.6	24	22.58	-1.42	20.36
	1880	24	22.35	-1.65	19.92
	1907.4	24	22.75	-1.25	20.26
HSUPA Subtest 1	1852.6	24	22.66	-1.34	20.53
	1880	24	22.68	-1.32	20.39
	1907.4	24	22.59	-1.41	20.06
HSUPA Subtest 2	1852.6	24	22.61	-1.39	20.51
	1880	24	22.65	-1.35	20.54
	1907.4	24	22.56	-1.44	20.59
HSUPA Subtest 3	1852.6	24	22.83	-1.17	20.70
	1880	24	22.84	-1.16	20.87
	1907.4	24	22.57	-1.43	20.65
HSUPA Subtest 4	1852.6	24	22.47	-1.53	20.40
	1880	24	22.45	-1.55	20.52
	1907.4	24	22.74	-1.26	20.30
HSUPA Subtest 5	1852.6	24	22.69	-1.31	20.42
	1880	24	22.67	-1.33	20.61
	1907.4	24	22.38	-1.62	20.32

MTS BAND V

Mode	Frequency (MHz)	Reference power	Peak Power	Tolerance	Avg.Burst Power
WCDMA 850 RMC	826.6	24	23.45	-0.55	21.24
	836.4	24	**23.63**	-0.37	**21.55**
	846.4	24	23.50	-0.50	21.30
WCDMA 850 AMR	826.6	24	23.27	-0.73	21.31
	836.4	24	23.43	-0.57	21.27
	846.4	24	23.25	-0.75	21.14
HSDPA Subtest 1	826.6	24	22.54	-1.46	20.82
	836.4	24	22.49	-1.51	20.38
	846.4	24	22.17	-1.83	20.73
HSDPA Subtest 2	826.6	24	22.37	-1.63	20.23
	836.4	24	22.48	-1.52	20.20
	846.4	24	22.67	-1.33	20.66
HSDPA Subtest 3	826.6	24	22.00	-2.00	20.01
	836.4	24	22.02	-1.98	20.09
	846.4	24	22.12	-1.88	20.28
HSDPA Subtest 4	826.6	24	22.34	-1.66	20.48
	836.4	24	22.44	-1.56	20.18
	846.4	24	22.69	-1.31	20.20
HSUPA Subtest 1	826.6	24	22.62	-1.38	20.25
	836.4	24	22.46	-1.54	20.37
	846.4	24	22.66	-1.34	20.22
HSUPA Subtest 2	826.6	24	22.00	-2.00	20.36
	836.4	24	22.37	-1.63	20.45
	846.4	24	22.61	-1.39	20.13
HSUPA Subtest 3	826.6	24	22.44	-1.56	20.40
	836.4	24	22.63	-1.37	20.22
	846.4	24	22.43	-1.57	20.32
HSUPA Subtest 4	826.6	24	22.07	-1.93	20.72
	836.4	24	22.56	-1.44	20.40
	846.4	24	22.82	-1.18	20.47
HSUPA Subtest 5	826.6	24	22.33	-1.67	20.20
	836.4	24	22.31	-1.69	20.27
	846.4	24	22.30	-1.70	20.35

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	0≤ CM≤3.5	MAX(CM-1,0)
Note: CM=1 for β_c/β_d=12/15, β_{hs}/β_c=24/15.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensate for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

6.2 RADIATED OUTPUT POWER

6.2.1 MEASUREMENT METHOD

The measurements procedures specified in ANSI/TIA-603-D-2010 were applied.

1. Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signal operating below 1GHz are performed using dipole antennas. Measurements on signals operating above 1GHz are performed using broadband horn antennas. All measurements are performed as RMS average measurements while the EUT operating at its maximum duty cycle, at maximum power, and at the approximate frequencies.
2. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
3. The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. The ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl
4. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
5. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
6. The EUT is then put into continuously transmitting mode at its maximum power level.
7. Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
8. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).
9. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi...

6.2.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) and 27.50(d)(4) specifies, “Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power” and 24.232(c) and 27.50(d)(4) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.” Rule Part 22.913(a) specifies “Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

Mode	Nominal Peak Power
GPRS/EDGE 850	<=38.45 dBm (7W)
GPRS/EDGE 1900	<=33 dBm (2W)
UMTS BAND II	<=33 dBm (2W)
UMTS BAND V	<=38.45 dBm (7W)

6.2.3 MEASUREMENT RESULT

Radiated Power (ERP) for GPRS/EDGE 850				
Mode	**Frequency**	**Result**		**Conclusion**
		Max. Peak ERP (dBm)	**Polarization Of Max. ERP**	
GSM	824.2	30.31	Horizontal	Pass
	836.6	**30.46**	Horizontal	Pass
	848.8	30.37	Horizontal	Pass
	824.2	27.74	Vertical	Pass
	836.6	27.75	Vertical	Pass
	848.8	28.16	Vertical	Pass
EDGE	824.2	24.49	Horizontal	Pass
	836.6	24.11	Horizontal	Pass
	848.8	23.99	Horizontal	Pass
	824.2	22.52	Vertical	Pass
	836.6	22.68	Vertical	Pass
	848.8	21.99	Vertical	Pass

Radiated Power (E.I.R.P) for GPRS/EDGE 1900				
Mode	**Frequency**	**Result**		**Conclusion**
		Max. Peak E.I.R.P.(dBm)	**Polarization Of Max. E.I.R.P.**	
GSM	1850.2	26.61	Horizontal	Pass
	1880.0	26.32	Horizontal	Pass
	1909.8	**26.66**	Horizontal	Pass
	1850.2	24.03	Vertical	Pass
	1880.0	23.44	Vertical	Pass
	1909.8	23.54	Vertical	Pass
EDGE	1850.2	23.72	Horizontal	Pass
	1880.0	23.53	Horizontal	Pass
	1909.8	24.58	Horizontal	Pass
	1850.2	24.16	Vertical	Pass
	1880.0	23.28	Vertical	Pass
	1909.8	23.93	Vertical	Pass

Radiated Power (E.I.R.P) for UMTS band II				
Mode	**Frequency**	**Result**		**Conclusion**
		Max. Peak E.I.R.P (dBm)	**Polarization Of Max. E.I.R.P**	
UMTS	1852.6	**21.40**	Horizontal	Pass
	1880	21.38	Horizontal	Pass
	1907.4	20.93	Horizontal	Pass
	1852.6	18.72	Vertical	Pass
	1880	19.08	Vertical	Pass
	1907.4	18.40	Vertical	Pass

Radiated Power (ERP) for UMTS band V				
Mode	**Frequency**	**Result**		**Conclusion**
		Max. Peak ERP (dBm)	**Polarization Of Max. E.I.R.P.**	
UMTS	826.6	21.09	Horizontal	Pass
	836.4	**21.30**	Horizontal	Pass
	846.4	20.94	Horizontal	Pass
	826.6	18.73	Vertical	Pass
	836.4	19.09	Vertical	Pass
	846.4	18.80	Vertical	Pass

Note: Above is the worst mode data.

6.3. PEAK-TO-AVERAGE RATIO

6.3.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

PAPR (dB) = PPk (dBm) - PAvg (dBm).

6.3.2 PROVISIONS APPLICABLE

This is the test for the Peak-to-Average Ratio from the EUT.

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

6.3.3 MEASUREMENT RESULT

Modes	**GSM 850(GSM)**		
Channel	**128**	**190**	**251**
	(Low)	**(Mid)**	**(High)**
Frequency (MHz)	**824.2**	**836.6**	**848.8**
Peak-To-Average Ratio (dB)/GPRS	2.05	2.08	2.10
Peak-To-Average Ratio (dB)/EDGE	3.15	3.26	3.11

Modes	**GSM 1900 (GSM)**		
Channel	**512**	**661**	**810**
	(Low)	**(Mid)**	**(High)**
Frequency (MHz)	**1850.2**	**1880**	**1909.8**
Peak-To-Average Ratio (dB)/GPRS	2.03	2.05	2.06
Peak-To-Average Ratio (dB)/EDGE	3.20	3.05	3.13

Modes	UMTS BAND II		
Channel	9663	9800	9937
	(Low)	(Mid)	(High)
Frequency (MHz)	1852.6	1880	1907.4
Peak-To-Average Ratio (dB)	2.11	2.13	2.07

Modes	UMTS BAND V		
Channel	4358	4407	4457
	(Low)	(Mid)	(High)
Frequency (MHz)	826.6	836.6	846.4
Peak-To-Average Ratio (dB)	2.18	2.13	2.17

7. OCCUPIED BANDWIDTH

7.1 MEASUREMENT METHOD

1. The Occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper Frequency limits, the mean power radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

2. RBW=1~5% of the expected OBW, VBW>=3 x RBW, Detector=Peak, Trace mode=max hold, Sweep=auto couple, and the trace was allowed to stabilize.

7.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

7.3 MEASUREMENT RESULT

APPENDIX A:BANDWIDTH

Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
GSM850	GSM	LCH	247.34	315.18	PASS
		MCH	247.70	308.23	PASS
		HCH	245.46	312.37	PASS
	EDGE	LCH	247.10	313.48	PASS
		MCH	249.49	309.60	PASS
		HCH	246.54	315.59	PASS

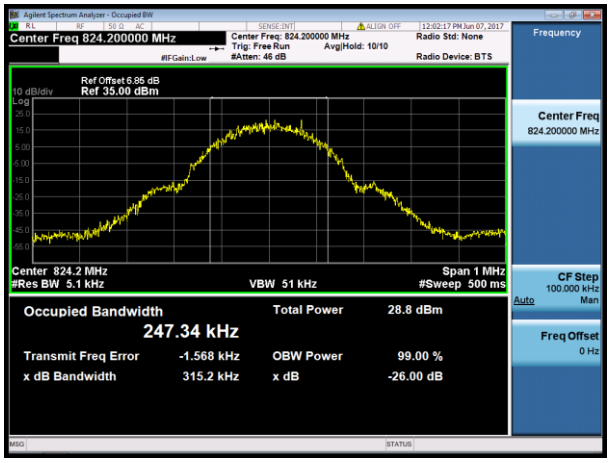
Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
GSM1900	GSM	LCH	243.44	312.80	PASS
		MCH	247.35	313.88	PASS
		HCH	245.90	309.40	PASS
	EDGE	LCH	245.54	301.76	PASS
		MCH	247.34	314.94	PASS
		HCH	249.04	307.57	PASS

For GSM

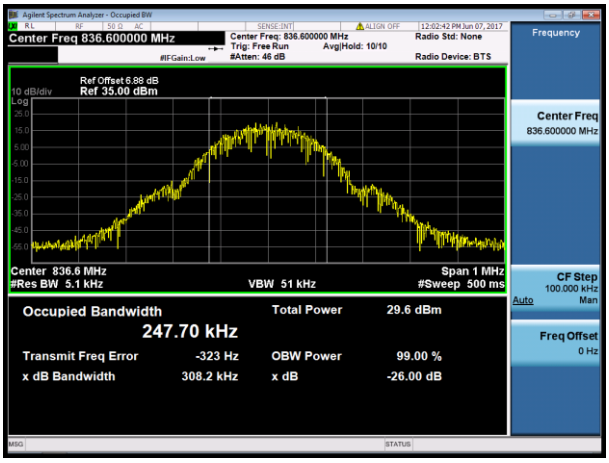
Test Band=GSM850/GSM1900

Test Mode=GSM/ EDGE

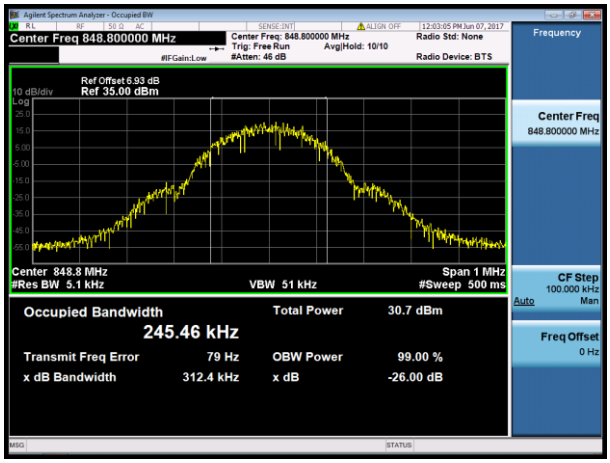
GSM 850-LCH-GSM



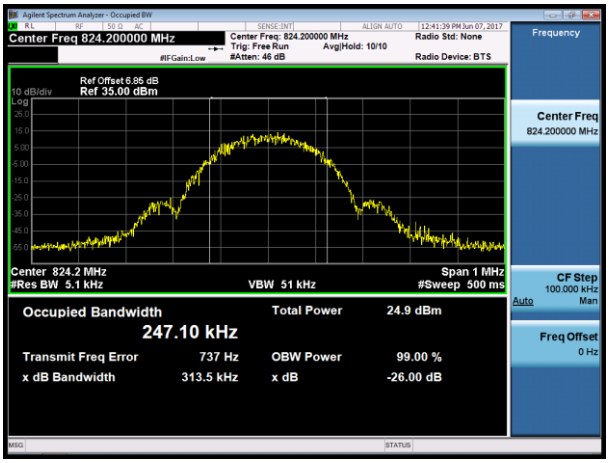
GSM 850-MCH-GSM



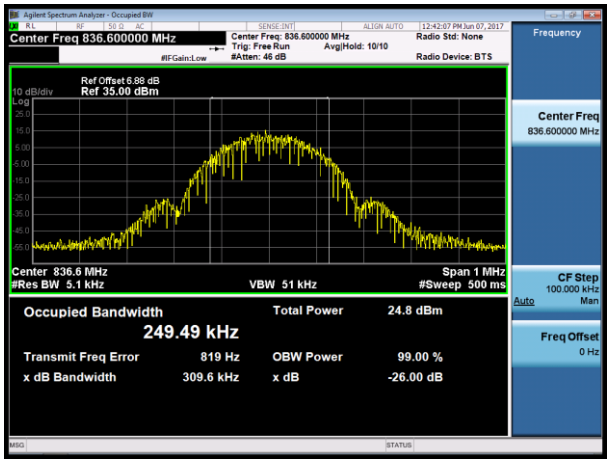
GSM 850-HCH-GSM



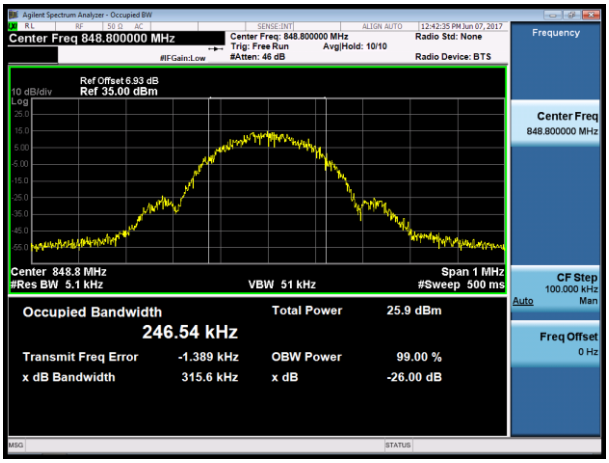
GSM 850-LCH-EDGE



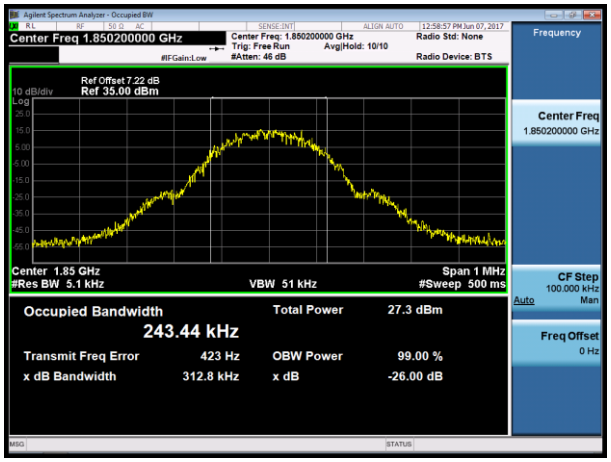
GSM 850-MCH-EDGE



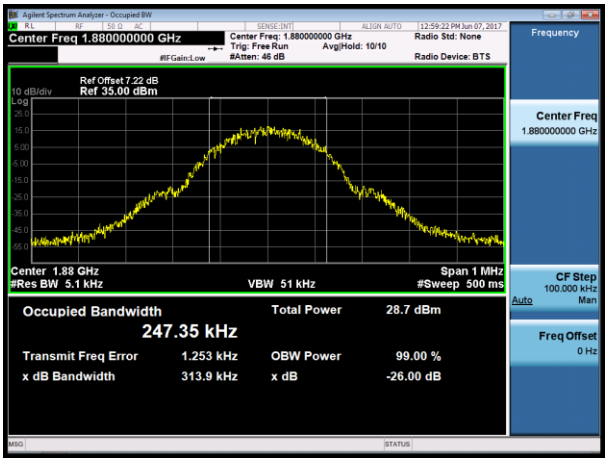
GSM 850-HCH-EDGE



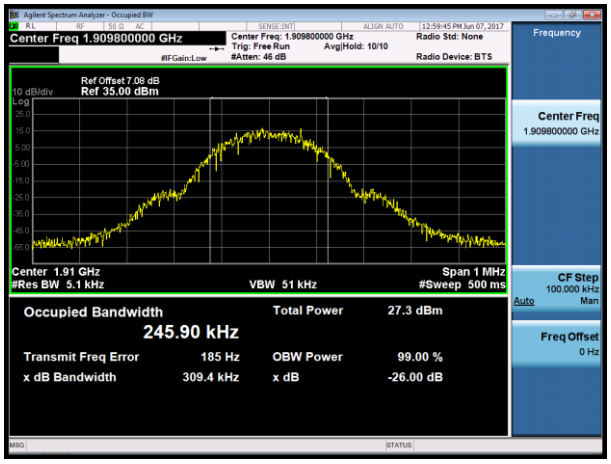
GSM 1900-LCH-GSM



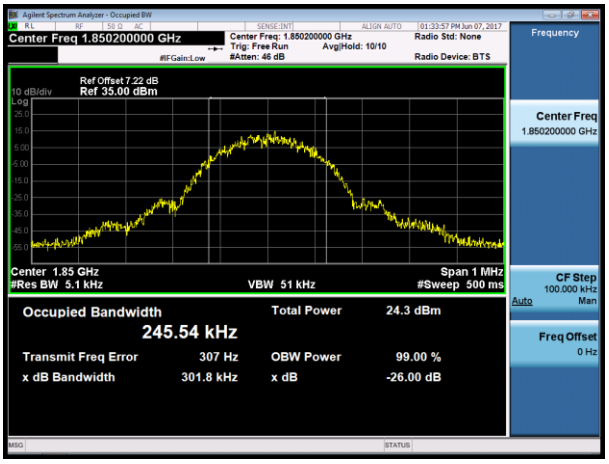
GSM 1900-MCH-GSM



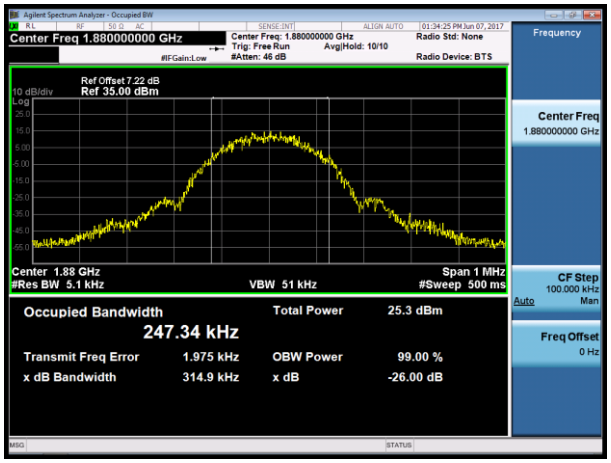
GSM 1900-HCH-GSM



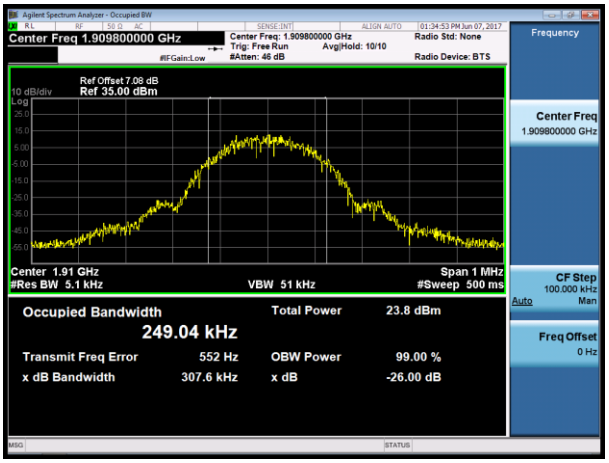
GSM 1900-LCH-EDGE



GSM 1900-MCH-EDGE



GSM 1900-HCH-EDGE



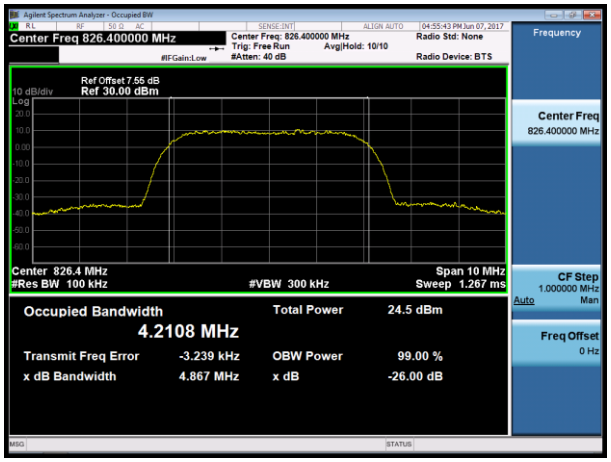
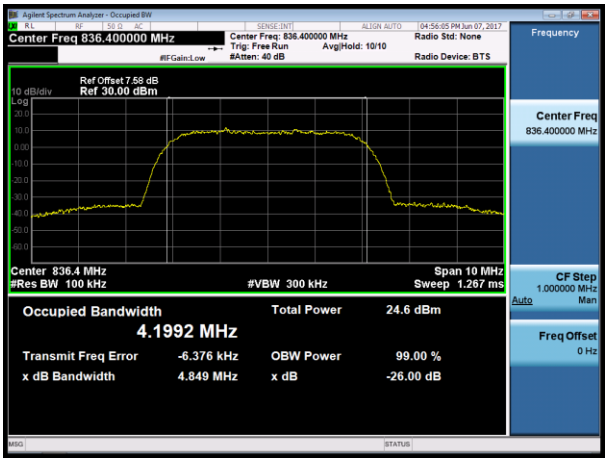
Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA 850	UMTS	LCH	4210.8	4867	PASS
		MCH	4199.2	4849	PASS
		HCH	4205.9	4857	PASS

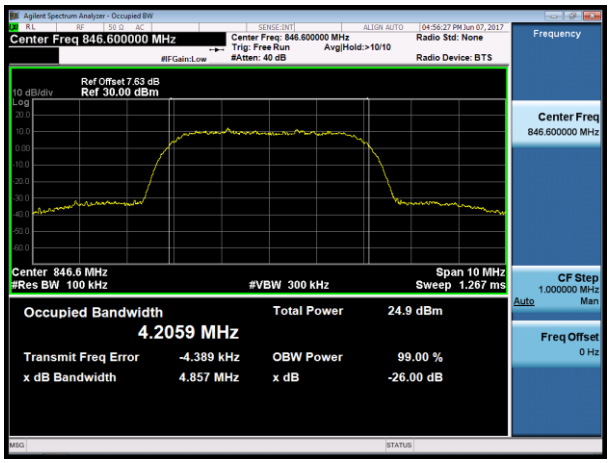
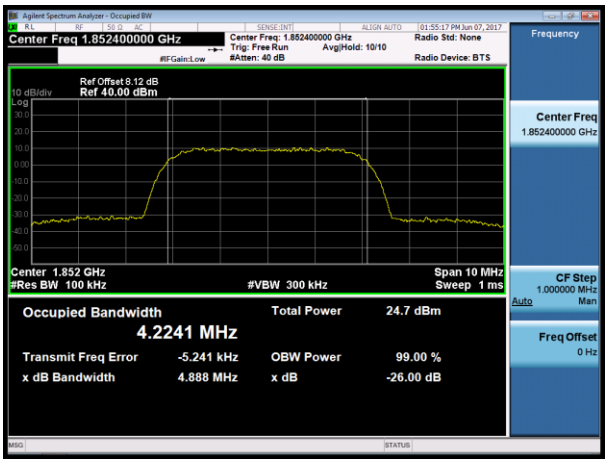
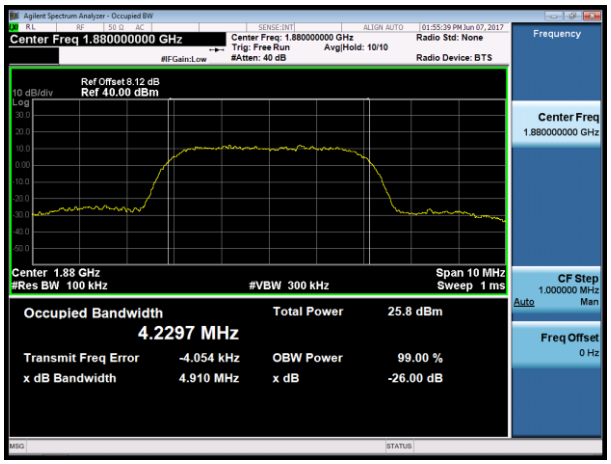
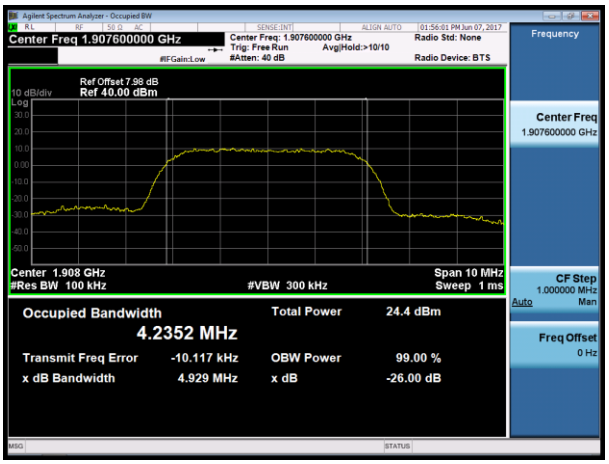
Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA 1900	UMTS	LCH	4224.1	4888	PASS
		MCH	4229.7	4910	PASS
		HCH	4235.2	4929	PASS

For WCDMA

Test Band=WCDMA850/WCDMA1900

Test Mode=UMTS

WCDMA 850-LCH	WCDMA 850-MCH
	

WCDMA 850-HCH	WCDMA 1900-LCH
	
WCDMA 1900-MCH	**WCDMA 1900-HCH**
	

8. BAND EDGE

8.1 MEASUREMENT METHOD

1. All out of band emissions are measured with an analyzer spectrum connected to the antenna terminal of the EUT while the EUT at its maximum duty cycle, at maximum power, and at the approximate frequencies. All data rates were investigated to determine the worst case configuration

2. The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

3. Start and stop frequency were set such that the band edge would be placed in the center of the plot.

4. Span was set large enough so as to capture all out of band emissions near the band edge.

5. RBW>1% of the emission bandwidth, VBW >=3 x RBW, Detector=RMS, Number of points>=2 x Span/RBW, Trace mode=max hold, Sweep time=auto couple, and the trace was allowed to stabilize

8.2 PROVISIONS APPLICABLE

As Specified in FCC rules of 22.917(a) 、24.238(a) and KDB 971168 V02r02

8.3 MEASUREMENT RESULT

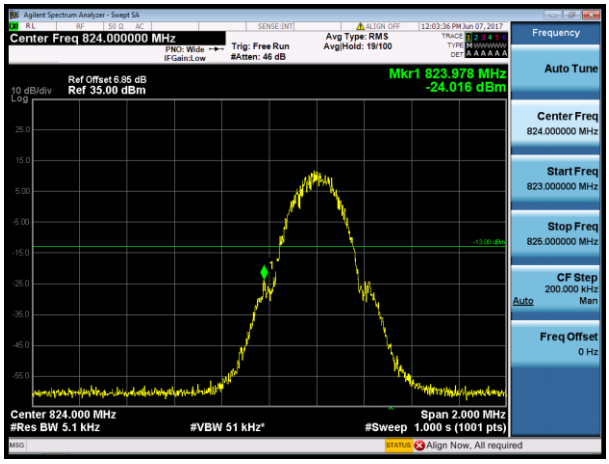
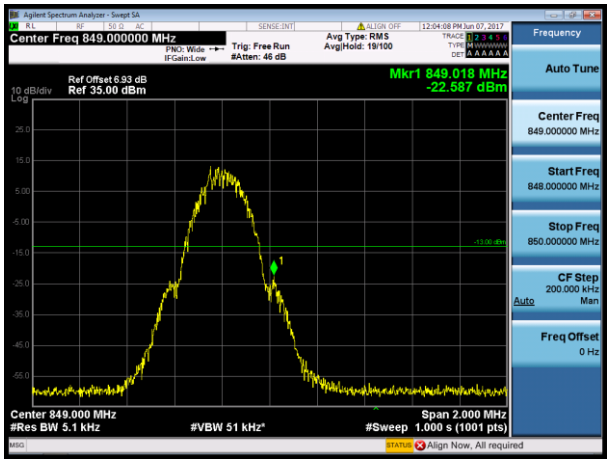
APPENDIX B: BAND EDGES COMPLIANCE

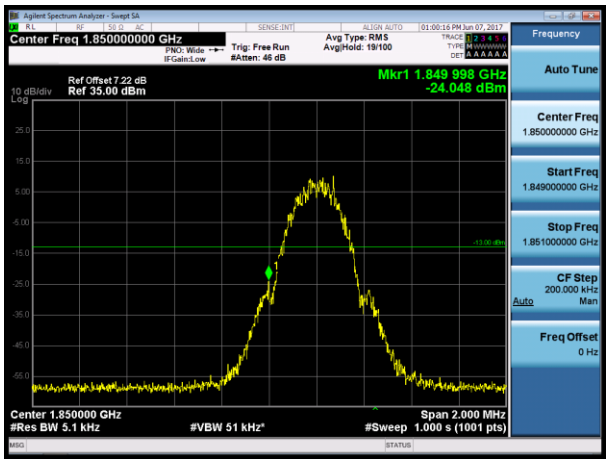
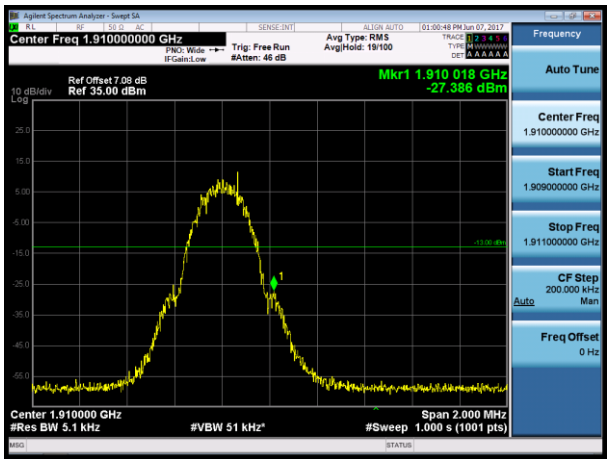
Test Results

For GSM

Test Band=GSM850/GSM1900

Test Mode=GSM

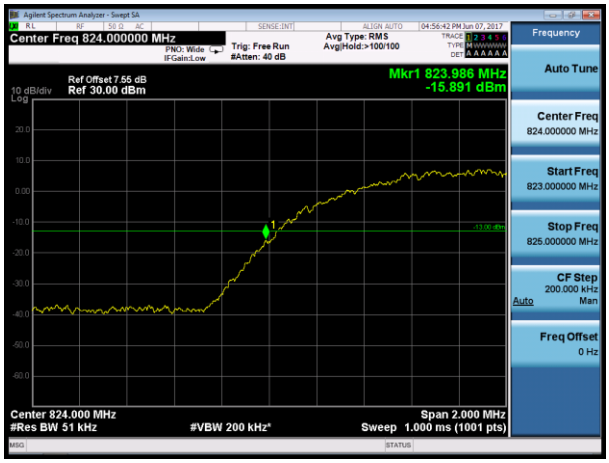
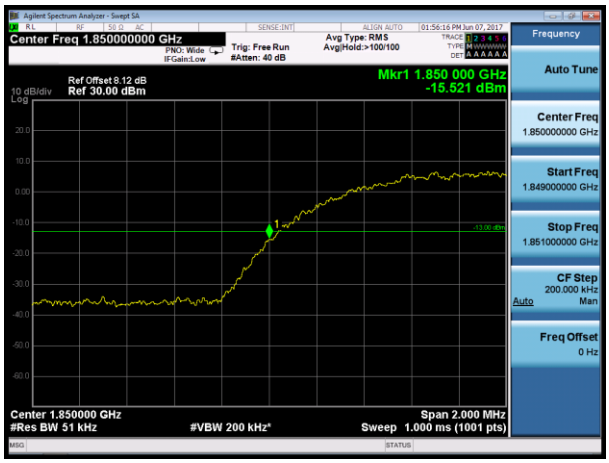
GSM 850-LCH-GSM	GSM 850-HCH-GSM
	

GSM 1900-LCH-GSM	GSM 1900-HCH-GSM
	

For WCDMA

Test Band=WCDMA850/WCDMA1900

Test Mode=UMTS

WCDMA 850-LCH	WCDMA 850-HCH
	

WCDMA 1900-LCH	WCDMA 1900-HCH