FCC Test Report

Report No.: AGC00065201101FE02

FCC ID	:	2AYETMT-10
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Tablet PC
BRAND NAME	:	TJD
MODEL NAME	:	MT-1010OF, MT-705QW, MT-707OF, MT-710OF, MT-717OF, MT-718OF, MT-719OF, MT-792OF, MT-805QW, MT-815QW , MT-816OF, MT-817OF, MT-818OF, MT-970OF, MT-972OF, MT-1011OF, MT-1008QW, MT-1018QW, MT-1019QW, MT-1020QW, MT-1021QW,MT-1025OF, MT-1026OF, MT-1027OF, MT-1028OF, MT-1029OF, MT-1030OF
APPLICANT	:	Shenzhen Mingzhi Integrated Corporation Co., Ltd.
DATE OF ISSUE	:	Dec. 30, 2020
STANDARD(S)	:	FCC Part 22H & 24E Rules
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 30, 2020	Valid	Initial Release

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VERIFICATION OF COMPLIANCE

Applicant	Shenzhen Mingzhi Integrated Corporation Co., Ltd.
Address	516 Building C, New Retail Digital Industrial Park, Nanchang Community, Xixiang Street,Baoan District,Shenzhen.
Manufacturer	DongGuan Mingzhi Precision Manufacturing Co.,LTD
Address	NO.4 3th floor North JiZhi Road JiZhi High-Tech Park HuMen DongGuan GuangDong China
Factory	DongGuan Mingzhi Precision Manufacturing Co.,LTD
Address	No.4 3th floor North Jizhi Road JiZhi High-Tech Park HuMen DongGuan GuangDong China
Product Designation	Tablet PC
Brand Name	TJD
Test Model	MT-1010OF
Serial Number	201123039
Series Model	MT-705QW, MT-707OF, MT-710OF, MT-717OF, MT-718OF, MT-719OF, MT-792OF, MT-805QW, MT-815QW , MT-816OF, MT-817OF, MT-818OF, MT-970OF, MT-972OF, MT-1011OF, MT-1008QW, MT-1018QW, MT-1019QW, MT-1020QW, MT-1021QW,MT-1025OF, MT-1026OF, MT-1027OF, MT-1028OF, MT-1029OF, MT-1030OF
Difference Description	All the same except the model name
Date of test	Oct. 10, 2020~Dec. 30, 2020
Deviation	No any deviation from the test method.
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance(Shenzhen) 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-E-2016. The sample tested as described in this report is in compliance with the FCC Rules Part 22H, 24E and 27L.The test results of this report relate only to the tested sample identified in this report.

Prepared By

Donjon Huang
(Project Engineer)

Dec. 30, 2020

Reviewed By

Calvin Liu
(Reviewer)

Dec. 30, 2020

Approved By

Forrest Lei
Authorized Officer

Dec. 30, 2020

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1. GENERAL TECHNICAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Tablet PC	
Hardware Version:	S863-9863A-V1.0	
Software Version:	ANDROID 10	
Support Networks:	GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA	
Frequency Bands:	☒GPRS 850 ☒PCS1900 (U.S. Bands) ☐GSM 900 ☐DCS 1800 (Non-U.S. Bands) ☒UMTS FDD Band II ☐UMTS FDD Band IV ☒UMTS FDD Band V (U.S. Bands) ☐UMTS FDD Band I ☐UMTS FDD Band VIII (Non-U.S. Bands)	
Type of Modulation:	GMSK,8PSK Modulation For GSM/GPRS/EDGE	
	BPSK,QPSK Modulation For WCDMA/HSDPA/HSUPA	
Frequency Range:	GSM/GPRS/EDGE 850: 824.2MHz-848.8 MHz	
	GSM/GPRS/EDGE 1900: 1850.2MHz-1909.8 MHz	
	WCDMA Band II: 1852.4MHz-1907.6 MHz	
	WCDMA Band V: 826.4-846.6 MHz	
Emission Designator:	GSM/GPRS 850:	245KGXW
	EDGE 850:	246KG7W
	GSM/GPRS 1900:	250KGXW
	EDGE 1900:	249KG7W
	WCDMA Band II:	4M18F9W
	WCDMA Band V:	4M15F9W
Antenna Type:	PIFA Antenna	
Antenna gain:	GSM850:0.55dBi PCS1900: 1.46dBi	
	WCDMA850:0.55dBi WCDMA1900:1.46dBi	
Power Supply:	DC 3.7V by Built-in Li-ion Battery	
Battery parameter:	DC 3.7V 5000mAh	
Dual Card:	GSM /WCDMA Card Slot	
Extreme Vol. Limits:	DC3.15V to 4.2V (Normal: DC 3.7V)	
Extreme Temp. Tolerance	-10 °C to +40 °C	

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GSM/WCDMA SLOT :

	Maximum ERP/EIRP (dBm)	Max. Average Burst Power (dBm)
GSM 850	31.77	33.55
PCS 1900	27.23	29.21
UMTS BAND V	20.44	22.22
UMTS BAND II	19.68	21.36

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1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AYETMT-10** , filing to comply with the FCC Part 22H&24E&27L requirements.

1.3 TEST METHODOLOGY

The tests were performed according to following standards:

FCC Part 22 Public Mobile Services.

FCC Part 24 Personal Communications Services.

FCC Part 2 Frequency allocations and radio treaty matters, general rules and regulations.

TIA/EIA 603 E: March 2016 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI-C63.26:2015 American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

KDB971168 D01 v03r01 Measurement Guidance For Certification Of Licensed Digital Transmitters

1.4 ADDRESS OF THE TEST LABORATORY

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1.5 TEST FACILITY

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

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

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FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842

1.6 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS
Temperature range	15~35℃	-10℃~40℃
Humidty range	20 % to 75 %.	20 % to 75 %.
Pressure range	86-106kPa	86-106kPa
Power supply	--	--
Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.		

1.7 MEASUREMENT UNCERTAINTY

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)
Radio Frequency	± 6.5 x 10-8	(1)
RF Power, Conducted	± 0.9 dB	(1)

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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1.8 SPECIAL ACCESSORIES

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

1.9 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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2. SYSTEM TEST CONFIGURATION

2.1 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.

2.2 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.

2.3 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	Tablet PC	MT-1010OF	2AYETMT-10	EUT
2	Adapter	K-T100502000U	DC 5V 2A	AE
3	Battery	HBT-3070190	DC 3.7V 5000mAh	AE
4	USB Cable	N/A	N/A	AE

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

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3.SUMMARY OF TEST RESULTS

3.1 TEST CONDITION : CONDUCTED TEST

Item	Test Description	FCC Rules	Result
1	Occupied Bandwidth	§2.1049	Pass
2	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal	§2.1051, §22.917(a), §24.238(a)	Pass
5	Conducted Output Power	§2.1046	Pass
6	Frequency stability / variation of ambient temperature	§2.1055, § 22.355	Pass
7	Peak- to- Average Ratio	§24.232(d), §24.235	Pass

3.2 TEST CONDITION : RADIATED TEST

Item	Test Description	FCC Rules	Result
1	Effective Radiated Power	§22.913(a)(5)	Pass
2	Equivalent Isotropic Radiated Power	§24.232(c)	Pass
3	Radiated Spurious and Harmonic Emissions	§2.1053, §22.917(a), §24.238(a)	Pass

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4. DESCRIPTION OF TEST MODES

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

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	GSM (GMSK, 1Tx-slot) Link GPRS (GMSK, 1Tx-slot) Link EDGE (8PSK, 1Tx-slot) Link	GSM (GMSK,1Tx-slot) Link GPRS (GMSK, 1Tx-slot) Link EDGE (8PSK, 1Tx-slot) Link
WCDMA Band II/V	RMC 12.2kbps Link	RMC 12.2kbps Link

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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.

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4.2 EMISSION DESIGNATOR

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

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5. LIST OF TEST EQUIPMENT

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03, 2020	Jul. 02, 2021
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 10, 2020	Dec. 09, 2021
Horn antenna	SCHWARZBECK	BBHA 9170	768	Oct. 09, 2019	Oct. 08, 2021
preamplifier	ChengYi	EMC184045SE	980508	Sep. 21, 2020	Sep. 20, 2021
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 17, 2019	May. 16, 2021
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.10, 2020	Jun.09, 2021
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.20, 2019	Sep.19, 2021
SIGNAL ANALYZER	Agilent	N9020A	MY52090123	Sep. 03, 2020	Sep. 02, 2021
USB Wideband Power Sensor	Agilent	U2021XA	MY54110007	Jun. 08, 2020	Jun. 07, 2021
Universal Radio Communication Tester	R&S	CMU200	120237	Jul. 03, 2020	Jul. 02, 2022
Universal Radio Communication Tester	Agilent	8960	GB46200384	Aug. 20, 2020	Aug. 21, 2021
Power Splitter	Agilent	11636A	34	Jun.10, 2020	Jun.09, 2021
Attenuator	JFW	50FHC-006-50	N/A	Jun.10, 2020	Jun.09, 2021
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170		Sep. 21, 2019	Sep. 20, 2021
Horn Ant (18G-40GHz)	ETS	QWH_SL_18_40_K_SG		Sep. 21, 2019	Sep. 20, 2021
Power Splitter	Agilent	11636A	/	Sep.16, 2020	Sep.15, 2021
CMU200	R&S	120237	/	July 03, 2020	July 02, 2022
Artificial Mains Network ENV216	R&S	101242	/	July 03, 2020	July 02, 2022

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Filter Bank Notch 1(880-915MHz)	MICRO-TRONICS	010	/	Feb. 25, 2020	Feb. 24, 2021
Filter Bank Notch 2 (1710-1785MHz)	MICRO-TRONICS	009	/	Feb. 25, 2020	Feb. 24, 2021
Filter Bank Notch 3 (1920-1980MHz)	MICRO-TRONICS	008	/	Feb. 25, 2020	Feb. 24, 2021

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6. CONDUCTED OUTPUT POWER

6.1 MEASUREMENT OVERVIEW

The conduction test is carried out in a shielded room.

According to the test, connect the device under test to the antenna port on the non-conductive platform directly to the test device for evaluation and measurement (ANSI-C63.26-2015 Clause 5.4)

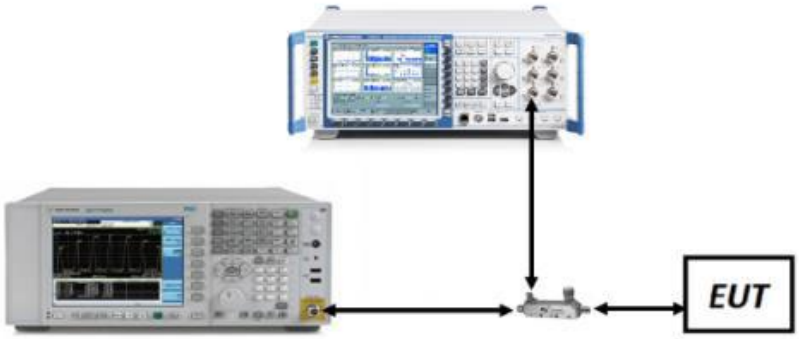
6.2 MEASUREMENT METHOD

- 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 mode (GSM/EGPRS 850, GSM/EGPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band IV ,WCDMA/HSPA band V)at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

6.3 MEASUREMENT SETUP



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6.4 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)	33.47	33.27	33.19
GPRS (GMSK, 1Tx-slot)	**33.55**	33.30	33.21
GPRS (GMSK, 2Tx-slot)	30.74	30.69	30.75
GPRS (GMSK, 3Tx-slot)	29.23	28.51	28.34
GPRS (GMSK, 4Tx-slot)	26.61	26.53	26.68
EDGE (8PSK, 1Tx-slot)	24.90	25.67	25.59
EDGE (8PSK, 2Tx-slot)	23.36	23.01	23.22
EDGE (8PSK, 3Tx-slot)	21.79	21.67	21.53
EDGE (8PSK, 4Tx-slot)	20.25	20.23	20.15

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)	29.16	29.15	28.57
GPRS (GMSK, 1Tx-slot)	**29.21**	29.15	28.59
GPRS (GMSK, 2Tx-slot)	27.32	27.40	27.35
GPRS (GMSK, 3Tx-slot)	26.47	26.38	25.29
GPRS (GMSK, 4Tx-slot)	24.13	24.31	24.24
EDGE (8PSK, 1Tx-slot)	24.00	24.89	24.64
EDGE (8PSK, 2Tx-slot)	23.25	23.44	23.27
EDGE (8PSK, 3Tx-slot)	22.42	22.19	22.34
EDGE (8PSK, 4Tx-slot)	20.29	20.34	19.21

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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	21.13	21.28	**21.36**
HSDPA Subtest-1	20.90	20.77	20.80
HSDPA Subtest-2	20.36	20.31	20.29
HSDPA Subtest-3	20.46	20.43	20.42
HSDPA Subtest-4	20.05	20.10	20.09
HSUPA Subtest-1	17.91	18.59	18.56
HSUPA Subtest-2	18.80	18.45	18.37
HSUPA Subtest-3	18.96	18.90	18.92
HSUPA Subtest-4	18.87	18.80	18.73
HSUPA Subtest-5	19.10	19.12	19.00

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	22.07	22.21	**22.22**
HSDPA Subtest-1	21.17	21.55	21.74
HSDPA Subtest-2	20.73	21.06	21.25
HSDPA Subtest-3	20.38	20.71	20.88
HSDPA Subtest-4	20.24	20.54	20.74
HSUPA Subtest-1	18.89	19.98	20.15
HSUPA Subtest-2	19.52	19.51	19.58
HSUPA Subtest-3	19.78	20.08	20.17
HSUPA Subtest-4	18.98	19.38	19.64
HSUPA Subtest-5	20.14	20.49	20.94

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7. RADIATED OUTPUT POWER

7.1 MEASUREMENT OVERVIEW

The radiation test is carried out in a semi-anechoic chamber.

According to the test, put the device under test on a non-conductive platform 3 meters away from the receiving antenna (ANSI/TIA-603-E-2016 Article 2.2.17).

The following rules are for the maximum radiated power limit requirements of the product:

Mode	Nominal Peak Power
GSM 850	< 7 Watts max. ERP (38.45dBm)
PCS 1900	< 2 Watts max. EIRP (33dBm)
WCDMA Band II	< 2 Watts max. EIRP (33dBm)
WCDMA Band V	< 7 Watts max. ERP (38.45dBm)

7.2 MEASUREMENT METHOD

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize.

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Radiation Construction Method:

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

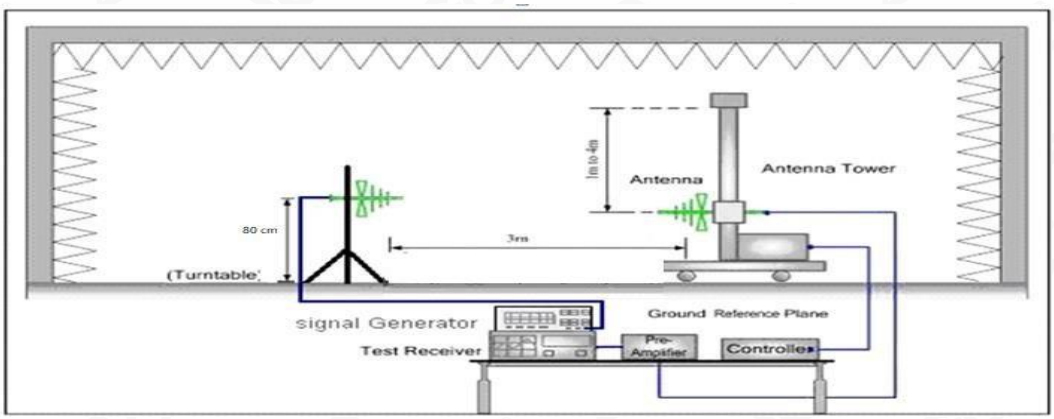
   The power is calculated by the following formula:

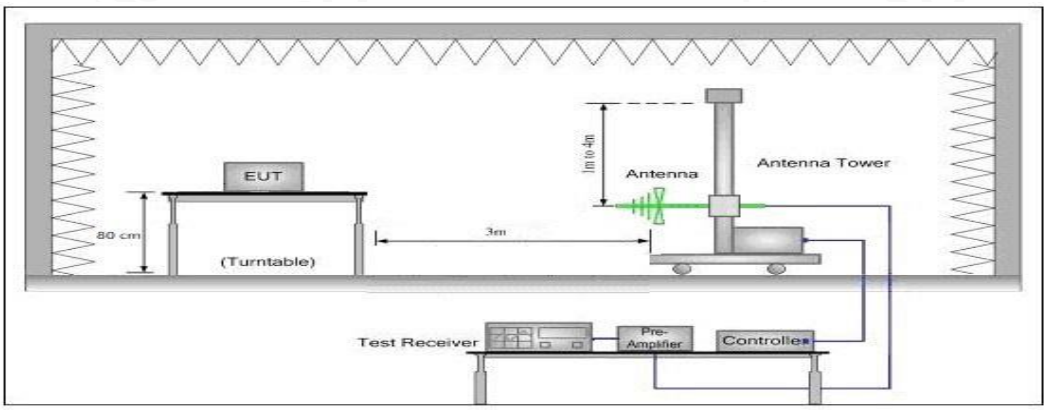
   Pd(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dB)

   Where: Pd is the dipole equivalent power and Pg is the generator output power into the substitution antenna.
3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration
4. The EUT was tested in three orthogonal planes (X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

7.3 MEASUREMENT SETUP

Radiated Below 1 GHz





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presented in the report ap test report.
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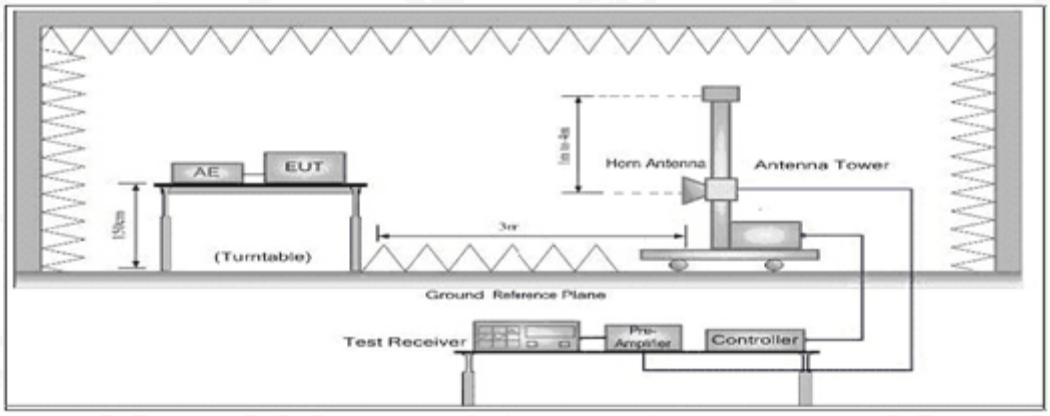
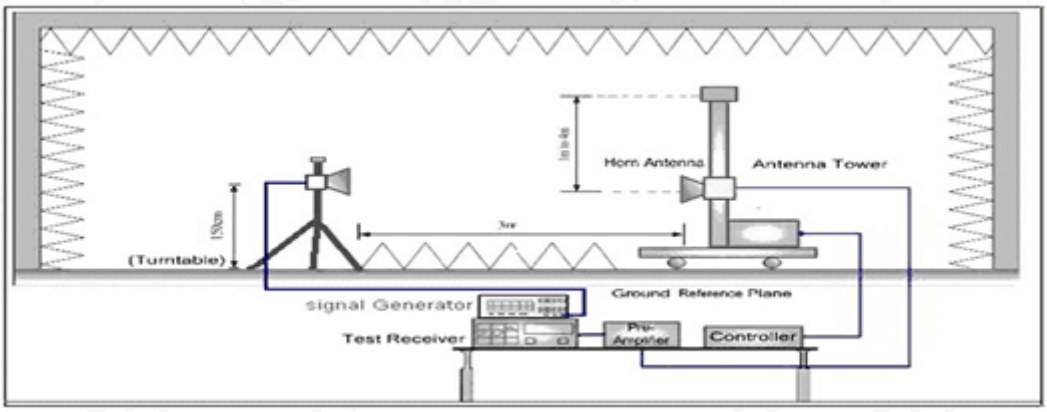
Radiated Above 1 GHz





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7.4 MEASUREMENT RESULT

Mode	Ch./ Freq.		Substitute	Ant.	C.L	Pol.	Limit	ERP	
	channel	Freq. (MHz)	LEVEL (dBm)	Gain (dBd)			W	W	dBm
GSM850	128	824.2	36.46	5.90	1.21	H	< 7.00	1.503	**31.77**
	190	836.6	36.26	5.90	1.22	H		1.439	31.58
	251	848.8	36.34	5.90	1.25	H		1.476	31.69
EDGE	128	824.2	29.02	5.90	1.21	H		0.271	24.33
	190	836.6	29.09	5.90	1.22	H		0.276	24.41
	251	848.8	28.94	5.90	1.25	H		0.269	24.29
WCDMA850	4132	826.4	24.95	5.90	1.21	H		0.106	20.26
	4183	836.6	25.00	5.90	1.25	H		0.108	20.35
	4233	846.6	25.10	5.90	1.24	H		0.111	20.44
HSPA	4132	826.4	23.48	5.90	1.21	H		0.076	18.79
	4183	836.6	23.40	5.90	1.25	H		0.075	18.75
	4233	846.6	23.51	5.90	1.24	H		0.077	18.85

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Mode	Ch./ Freq.		Substitute	Ant.	C.L	Pol.	Limit	EIRP	
	channel	Freq. (MHz)	LEVEL (dBm)	Gain (dBi)			W	W	dBm
PCS1900	512	1850.2	33.68	8.6	2.11	H	< 2.00	0.524	27.19
	661	1880.0	33.67	8.6	2.15	H		0.527	27.22
	810	1909.8	33.68	8.6	2.15	H		0.528	**27.23**
EDGE	512	1850.2	29.36	8.6	2.11	H		0.194	22.87
	661	1880.0	29.34	8.6	2.15	H		0.195	22.89
	810	1909.8	29.36	8.6	2.15	H		0.195	22.91
WCDMA 1900	9262	1852.4	26.17	8.6	2.11	H		0.128	**19.68**
	9400	1880.0	25.98	8.6	2.15	H		0.130	19.53
	9538	1907.6	25.94	8.6	2.15	H		0.130	19.49
HSPA	9262	1852.4	25.74	8.6	2.11	H		0.097	19.25
	9400	1880.0	25.82	8.6	2.15	H		0.098	19.37
	9538	1907.6	25.67	8.6	2.15	H		0.098	19.22

Note:1. EIRP/ERP = Substitute LEVEL (dBm) + Ant. Gain – C.L (Cable Loss)

2. All polarizations and modes have been tested, only the worst mode is recorded in the report

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8. PEAK-TO-AVERAGE RATIO

8.1 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.

8.2 MEASUREMENT METHOD

① CCDF Procedure for PAPR :

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:

-for continuous transmissions, set to 1 ms,

-or burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.

4. Record the maximum PAPR level associated with a probability of 0.1%.

② Alternate Procedure for PAPR:

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as PPk. Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and recordas PAvg. Determine the P.A.R. from:

P.A.R(dB) = PPk (dBm) – PAvg (dBm) (PAvg = Average Power + Duty cycle Factor)

Allow trace to fully stabilize.

Use the peak marker function to determine the peak amplitude level.

Test Settings(Peak Power):

The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).

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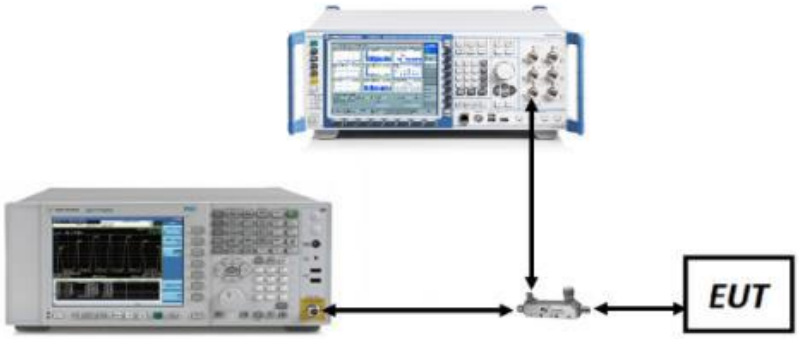
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to 2 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time: Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25%.

8.3 MEASUREMENT SETUP



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8.4 MEASUREMENT RESULT

Bands	Modulation	Peak-to-average ratio (dB)			Limit	Result
		Lowest	Middle	Highest	(dB)	
GSM 850	GSM	2.63	2.63	2.62	13	Pass
	EDGE	5.47	5.43	5.48	13	Pass
PCS 1900	GSM	2.66	2.67	2.66	13	Pass
	EDGE	5.88	5.90	5.88	13	Pass
WCDMA Band II	RMC 12.2kbps	2.83	2.84	2.84	13	Pass
WCDMA Band V	RMC 12.2kbps	5.56	4.38	3.53	13	Pass

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9. OCCUPIED BANDWIDTH

9.1 PROVISIONS APPLICABLE

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

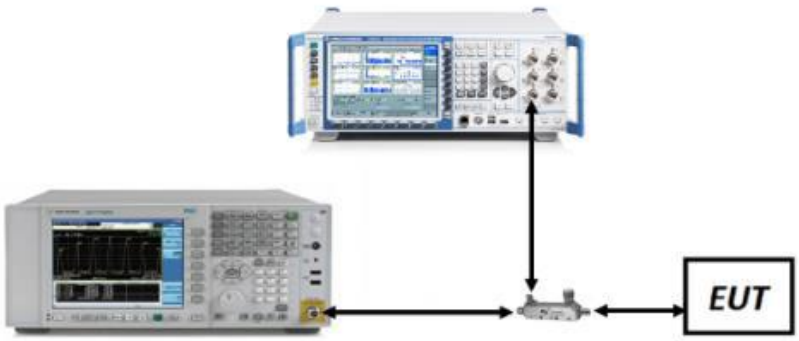
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

9.2 MEASUREMENT METHOD

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

9.3 MEASUREMENT SETUP



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9.4 MEASUREMENT RESULT

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHz)	Emission Bandwidth (KHz)	Verdict
GSM 850	GSM	LCH	244.2	316	PASS
		MCH	244.8	311	PASS
		HCH	242.6	314	PASS
	EDGE	LCH	246.0	305	PASS
		MCH	247.4	310	PASS
		HCH	245.7	308	PASS

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHz)	Emission Bandwidth (KHz)	Verdict
PCS 1900	GSM	LCH	245.6	310	PASS
		MCH	241.8	306	PASS
		HCH	245.1	314	PASS
	EDGE	LCH	243.7	305	PASS
		MCH	243.4	306	PASS
		HCH	242.4	309	PASS

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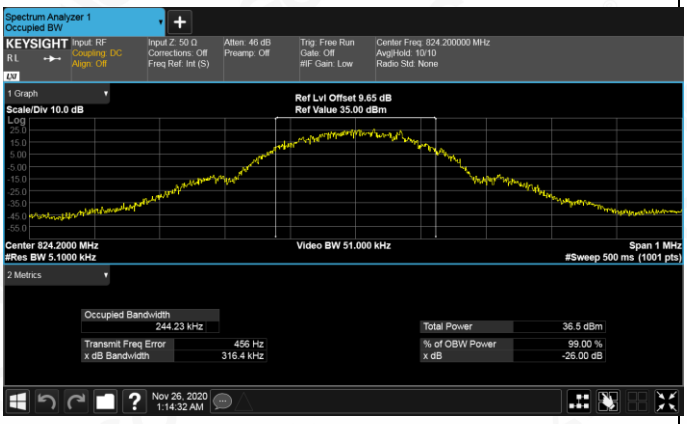
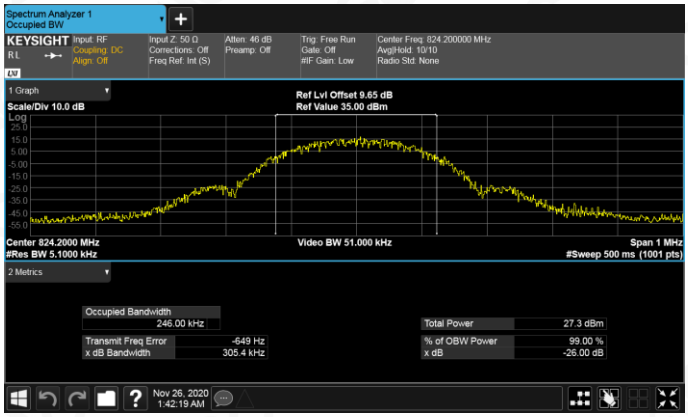
GSM 850_LCH_GSM	GSM 850_LCH_EDGE
	

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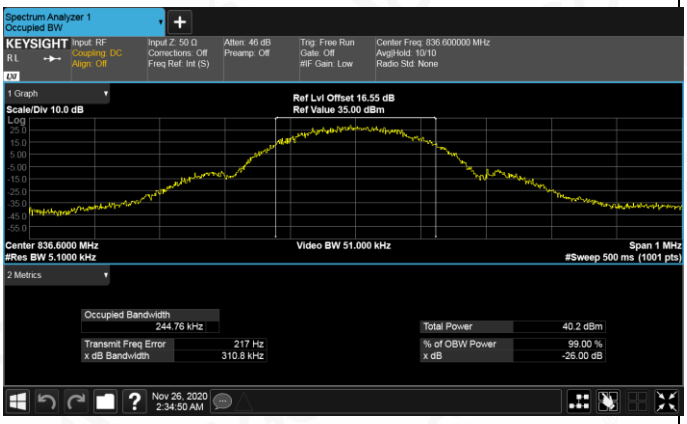
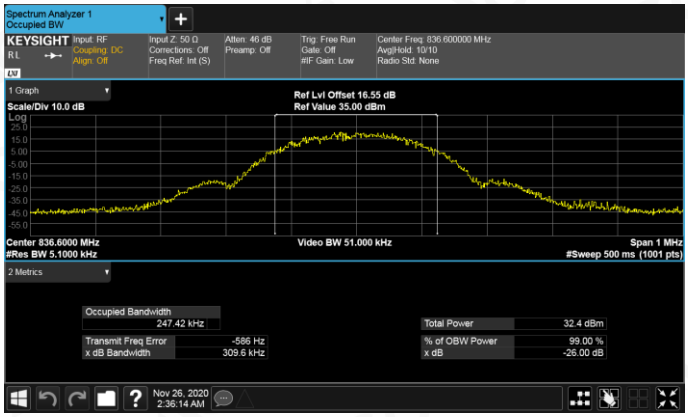
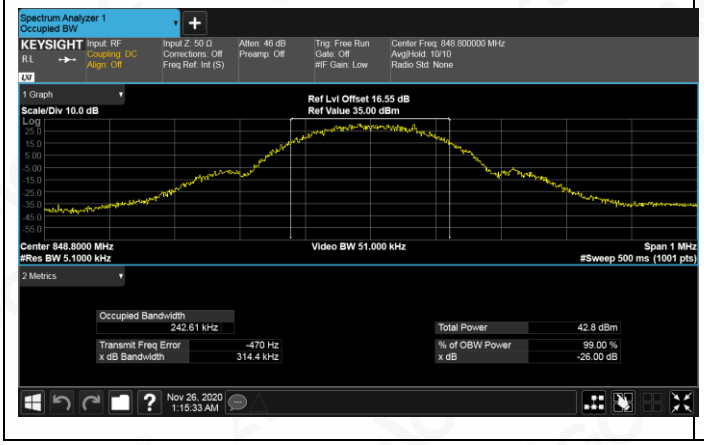
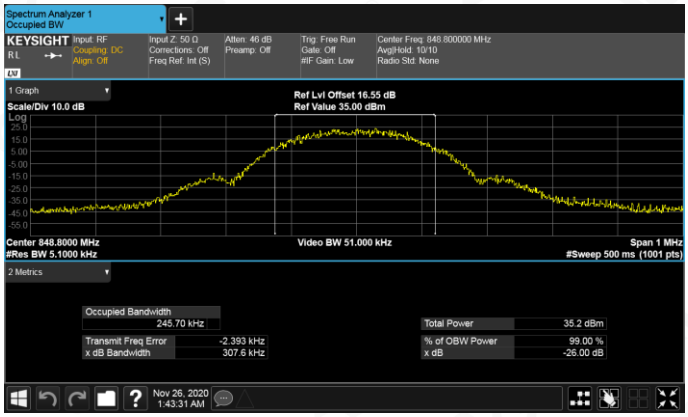
	

GSM 850_HCH_GSM	GSM 850_HCH_EDGE
	

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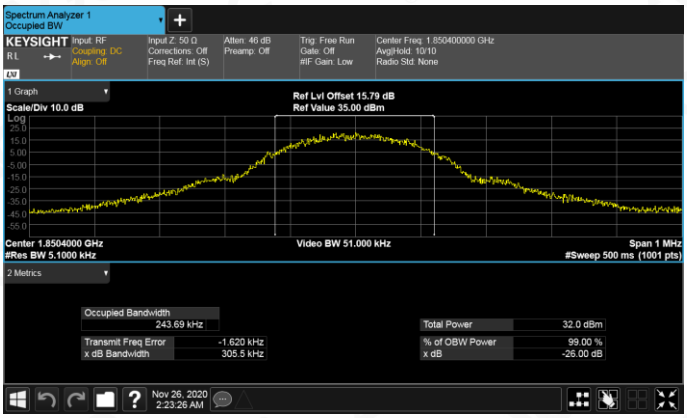
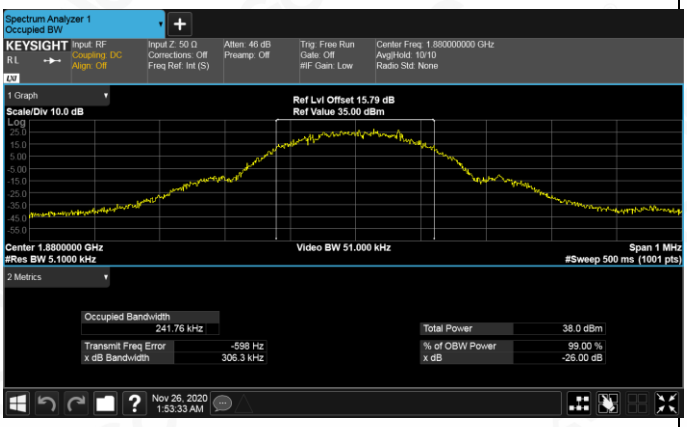
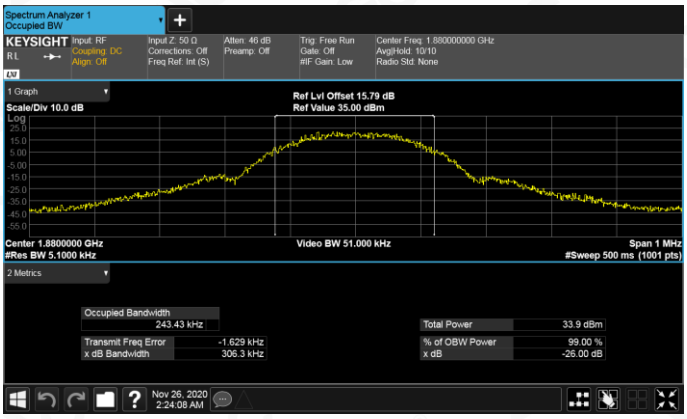
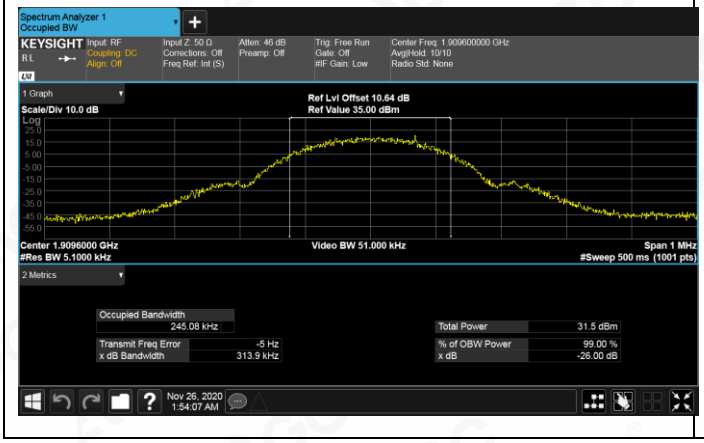
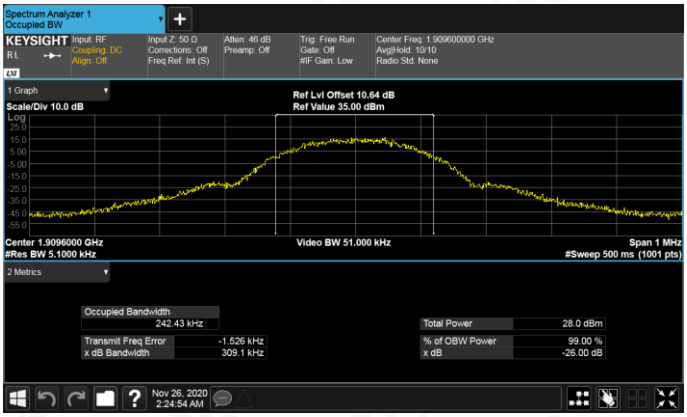
PCS 1900_LCH_GSM	PCS 1900_LCH_EDGE
	

PCS 1900-MCH-GSM	PCS 1900_MCH_EDGE
	

PCS 1900-HCH-GSM	PCS 1900_HCH_EDGE
	

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Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHz)	Emission Bandwidth (KHz)	Verdict
WCDMA 850	UMTS	LCH	4134.5	4652	PASS
		MCH	4142.3	4668	PASS
		HCH	4150.4	4672	PASS

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHz)	Emission Bandwidth (KHz)	Verdict
WCDMA 1900	UMTS	LCH	4158.2	4684	PASS
		MCH	4158.0	4693	PASS
		HCH	4150.4	4679	PASS

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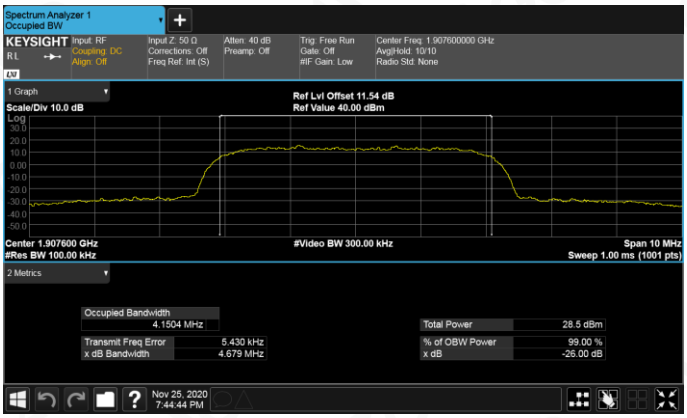
WCDMA 850_LCH	WCDMA 1900_LCH
WCDMA 850_MCH	WCDMA 1900_MCH
WCDMA 850_HCH	WCDMA 1900_HCH
	

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Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/

10. BAND EDGE

10.1 MEASUREMENT OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

10.2 MEASUREMENT METHOD

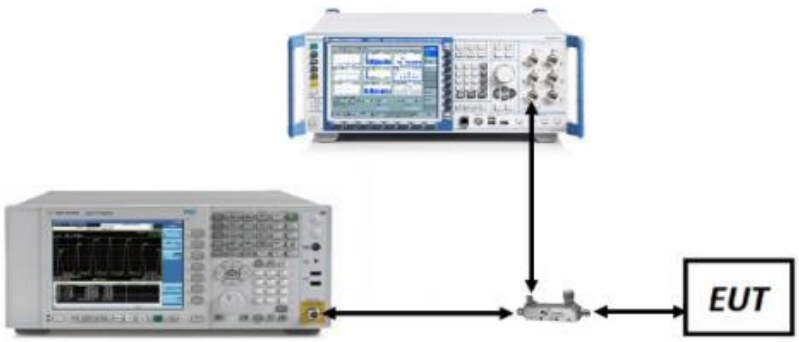
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1% of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

TEST NOTE

According to FCC 22.917, 24.238, 27.53 specified that 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.In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. All measurements were done at 2 channels(low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

10.3 MEASUREMENT METHOD



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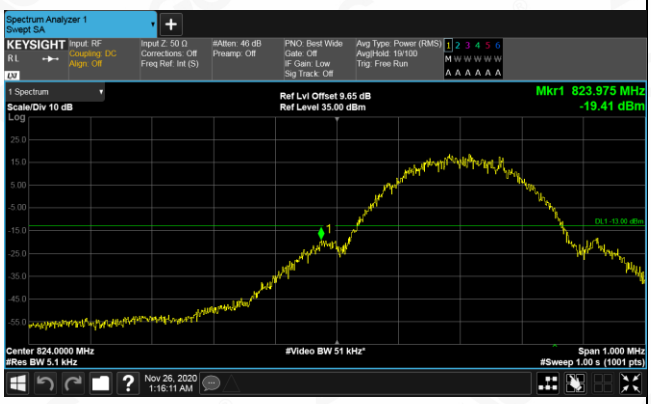
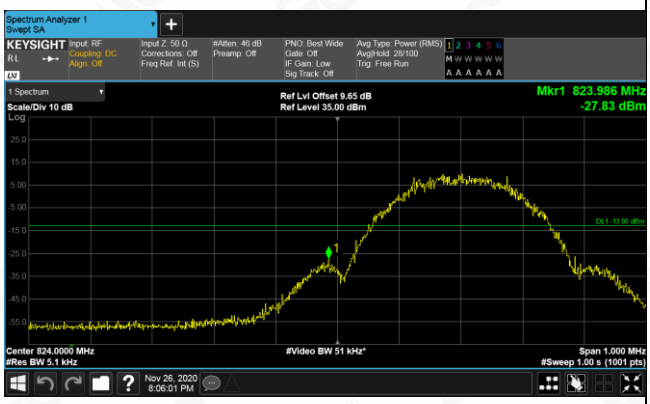
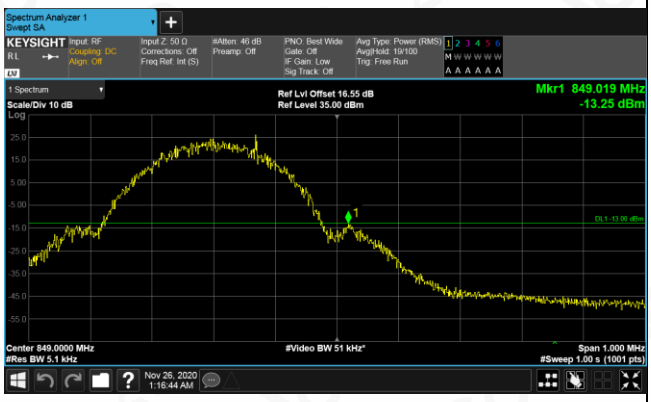
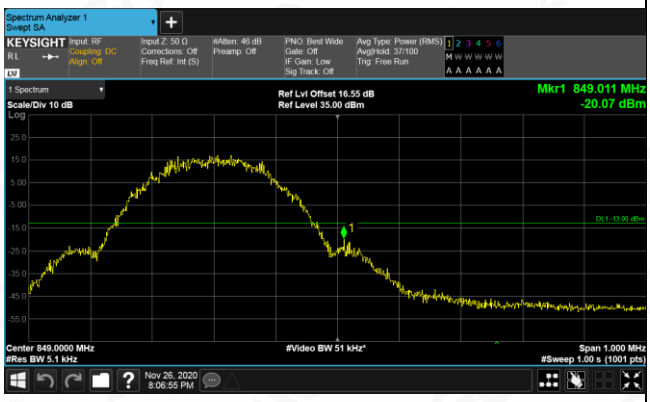
10.4 MEASUREMENT RESULT

GSM 850	
GSM	EDGE
Lowest Channel	
	
Highest Channel	
	

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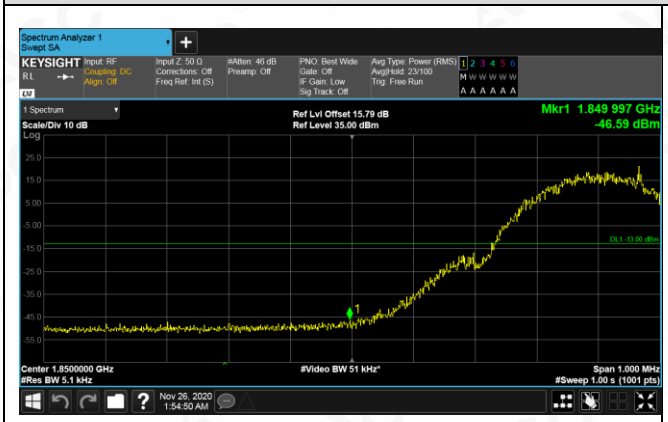
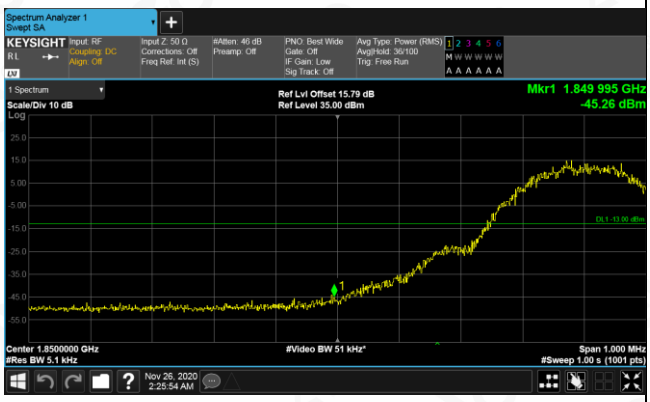
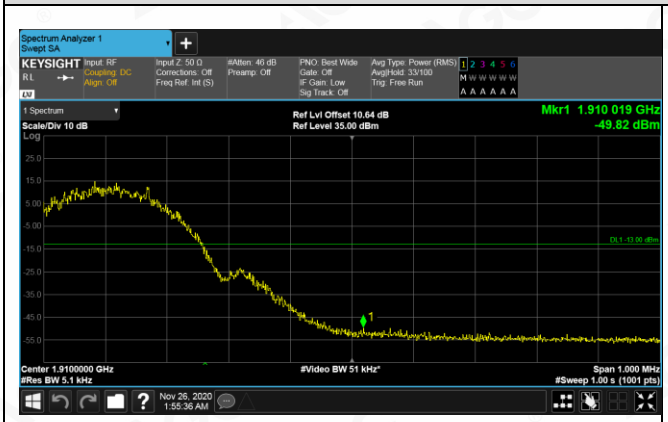
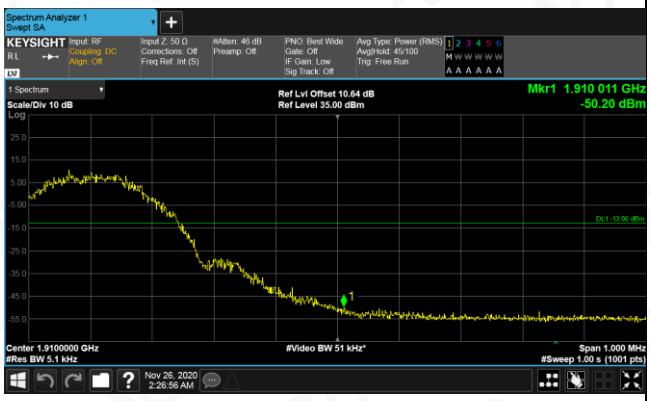
PCS 1900	
GSM	EDGE
Lowest Channel	
	
Highest Channel	
	

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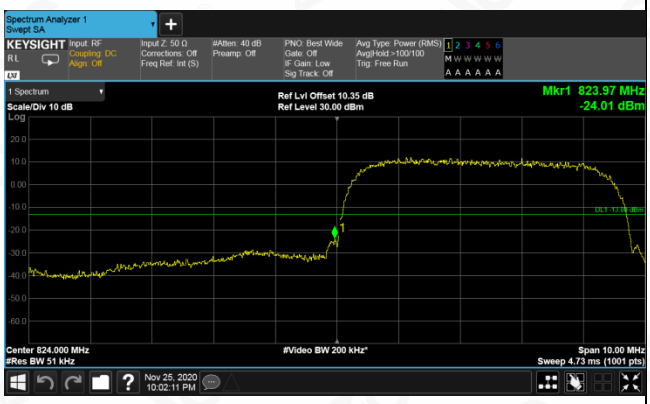
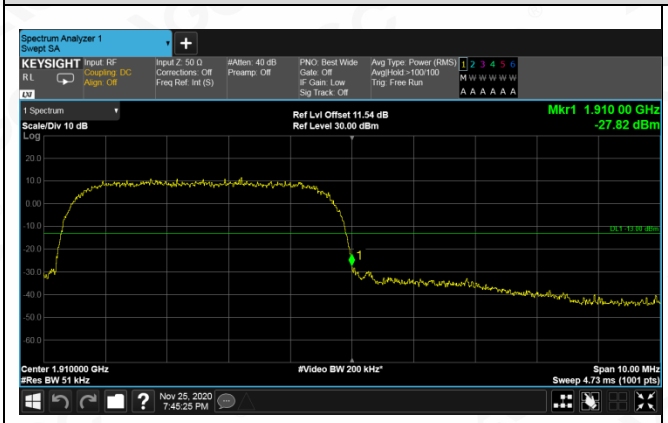
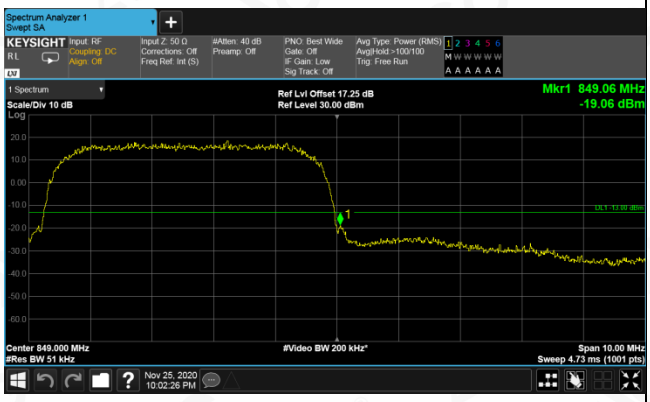
WCDMA Band II_RMC 12.2kbps	WCDMA Band V_RMC 12.2kbps
Lowest Channel	
	
Highest Channel	
	

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11. SPURIOUS EMISSIONS AT ANTENNA TERMINAL

11.1 PROVISIONS APPLICABLE

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

11.2 MEASUREMENT METHOD

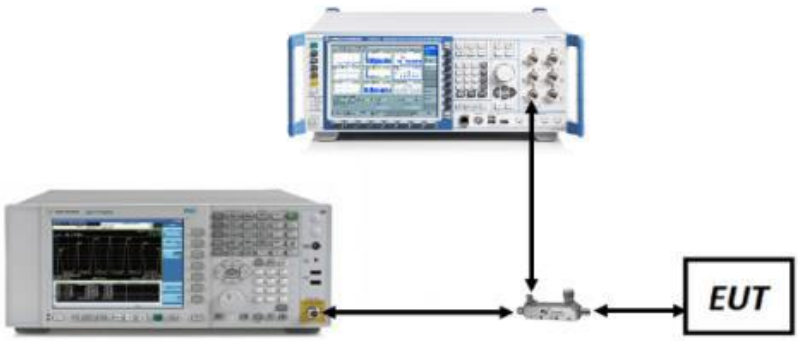
Test Settings (GSM)

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = Peak
4. Trace Mode = max hold
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

Test Settings (WCDMA)

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

11.3 MEASUREMENT SETUP



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