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TEST REPORT

FCC Part 22 Subpart H / Part 24 Subpart E

Report Reference No.: CTL1601120121-WF-01

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Product Name.....: Smart POS

Model/Type reference: WIZARHAND Q1

List Model(s).....: /

Trade Mark: **wizarPOS**

FCC ID: 2AG97-Q1

Applicant's name: WizarPos International Co., Ltd.

Address of applicant: 3F, D5, JBC, 808 HONGQIAO RD., SHANGHAI, CHINA

Test Firm: Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Test specification

Standard.....: FCC CFR Title 47 Part 2, Part 22H and Part 24E
EIA/TIA 603-D: 2010
KDB 971168 D01

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

Date of Receipt.....: Jan. 12, 2016

Date of Test Date.....: Jan. 13, 2016–Jan. 27, 2016

Data of Issue.....: Jan. 28, 2016

Result.....: Positive

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TEST REPORT

Test Report No. :	CTL1601120121-WF-01	Jan. 28, 2016
		Date of issue

Equipment under Test : Smart POS

Model /Type : WIZARHAND Q1

Listed Models : /

Applicant : **WizarPos International Co.,Ltd.**

Address : 3F, D5, JBC, 808 HONGQIAO RD., SHANGHAI, CHINA

Manufacturer : **WizarPos International Co.,Ltd.**

Address : 3F, D5, JBC, 808 HONGQIAO RD., SHANGHAI, CHINA

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

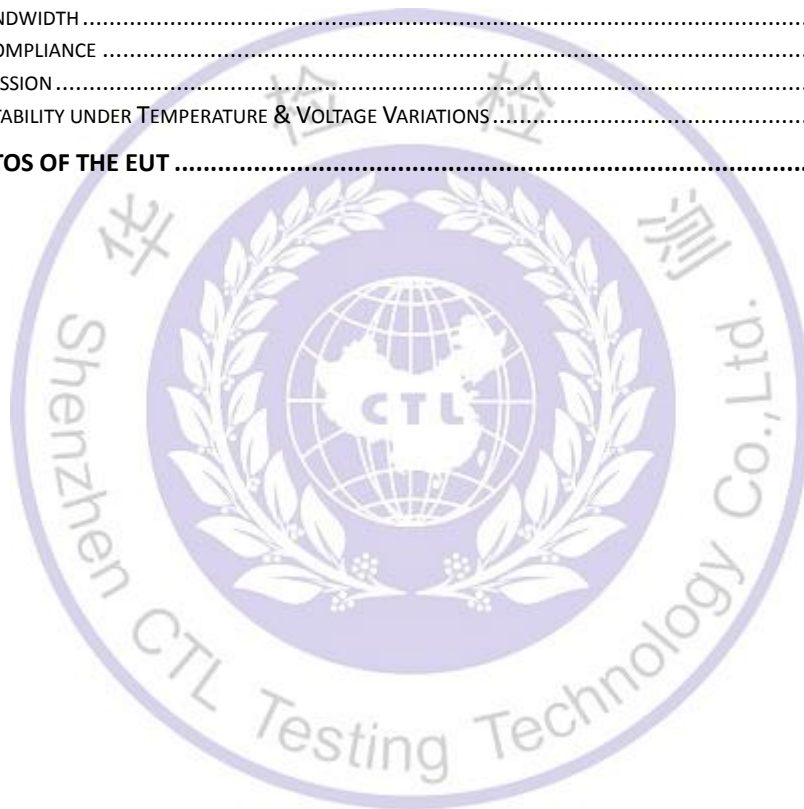
**** Modified History ****

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2016-01-28	CTL1601120121-WF-01	Tracy Qi



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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 22](#): PRIVATE LAND MOBILE RADIO SERVICES.

[FCC Part 24](#): PUBLIC MOBILE SERVICES

[TIA/EIA 603 D June 2010](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[KDB971168 D01:v02r02](#) MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

[ANSI C63.10-2013](#) Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 ©	Pass
Peak-to-Average Ratio	Part 24.232 (d)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability	Part 2.1055 Part 22.355 Part 24.235	Pass

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology 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. Registration 970318, December 19, 2013.

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. Quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	Smart POS
Model/Type reference:	WIZARHAND Q1
Power supply:	DC 7.4V from battery
Adapter information:	Model:SK02G-0900200U Input:AC100-240V 50/60Hz 0.6A Max Output:9V---2A
Hardware version:	1.0.0
Software version:	1.0.0
2G	
Operation Band:	GSM850, GSM900, DCS1800, PCS1900
Supported type:	GPRS, EGPRS
Power Class:	GSM850,GSM900:Power Class 4 DCS1800, PCS1900:Power Class 1
Modulation Type:	GMSK for GPRS, 8-PSK for EGPRS
GSM Release Version	R99
GPRS Multisport Class	12
EGPRS Multislot Class	12
Antenna type:	PFC antenna
Antenna gain:	0.70dBi
WCDMA	
Operation Band:	FDD Band I , FDD Band II, FDD Band V, FDD Band VIII
Power Class:	Power Class 3
Modulation Type:	QPSK for HSUPA/HSDPA
HSDPA Release Version:	Release 7, CAT14
HSUPA Release Version:	Release 6, CAT6
DC-HSUPA Release Version:	Not Supported
Antenna type:	PFC antenna
Antenna gain:	1.30dBi

Note: For more details, refer to the user's manual of the EUT.

Remark: The GPRS/ EGPRS frequency band includes GSM850, GSM900, DCS1800 and PCS1900, but only GSM850 and PCS1900 bands test data included in this report. The HSPA frequency band support Band I, FDD Band II, FDD Band V, and FDD Band VIII but only Band II and Band V bands test data included in this report, since other bands are non-US bands.

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM200 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Test Frequency:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
190	836.60	661	1880.00
251	848.80	810	1909.80

FDD Band II		FDD Band V	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
9262	1852.4	4132	826.40
9400	1880.0	4182	836.60
9538	1907.6	4233	846.60

Test Modes:

The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
Mode 1	GSM system, GPRS, GMSK modulation
Mode 2	GSM system, EDGE, 8PSK modulation
Mode 3	WCDMA system, RMC
Mode 4	WCDMA system, HSDPA and HSUPA

Note:

1. As HSDPA and HSUPA with the same emission designator, test result recorded in this report at the worst case Mode 3 with RCM 12.2 Kbps only after exploratory scan.

2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061714	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	N9020	US46220290	2016/1/17	2017/1/16
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062014	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBEC K	FMZB1519	1519-037	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
Radio Communication Tester	R&S	CMU200	115419	2015/05/22	2016/05/21
High-Pass Filter	K&L	9SH10-2700/X1 2750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U1 2750-O/O	N/A	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2015/05/20	2016/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2015/05/20	2016/05/19
Directional Coupler	Agilent	87300B	3116A03638	2015/05/20	2016/05/19

2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2AG97-Q1 filing to comply with of the FCC Part 22 and Part 24 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

3 TEST CONDITIONS AND RESULTS

3.1 Output Power

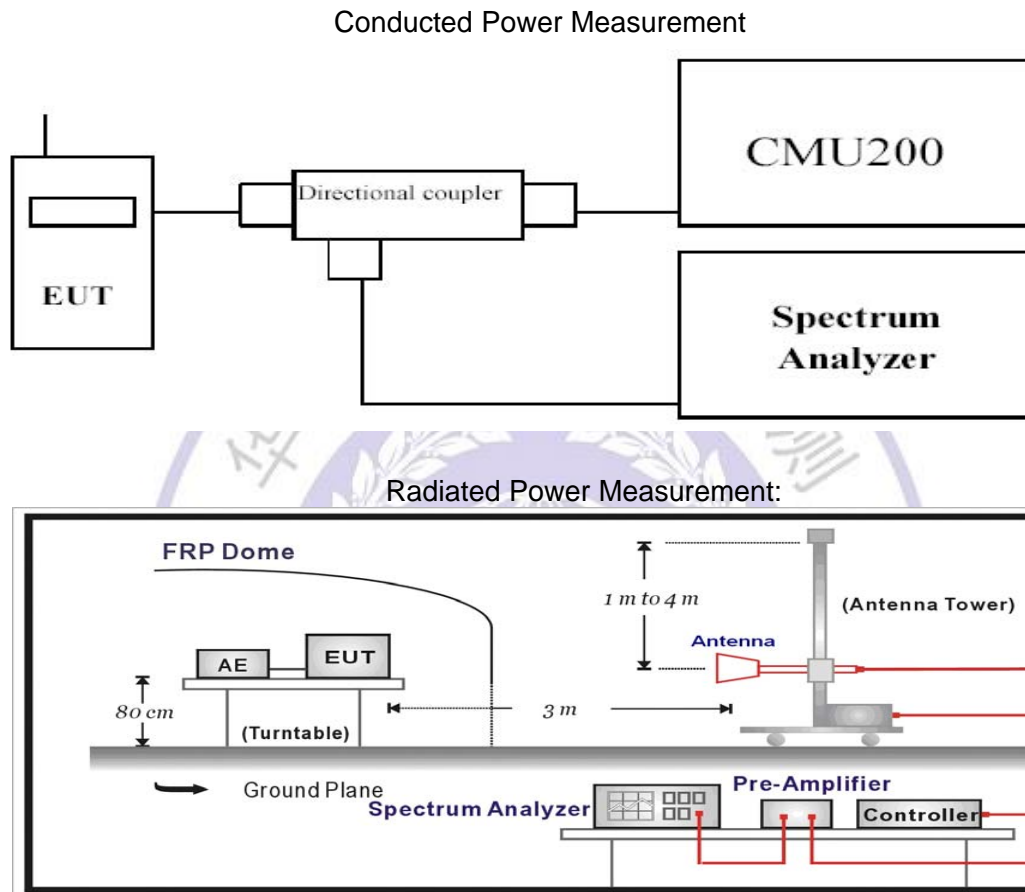
LIMIT

GSM850/WCDMA Band V: 7W

PCS1900/WCDMA Band II: 2W

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

Conducted Power Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200 then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter

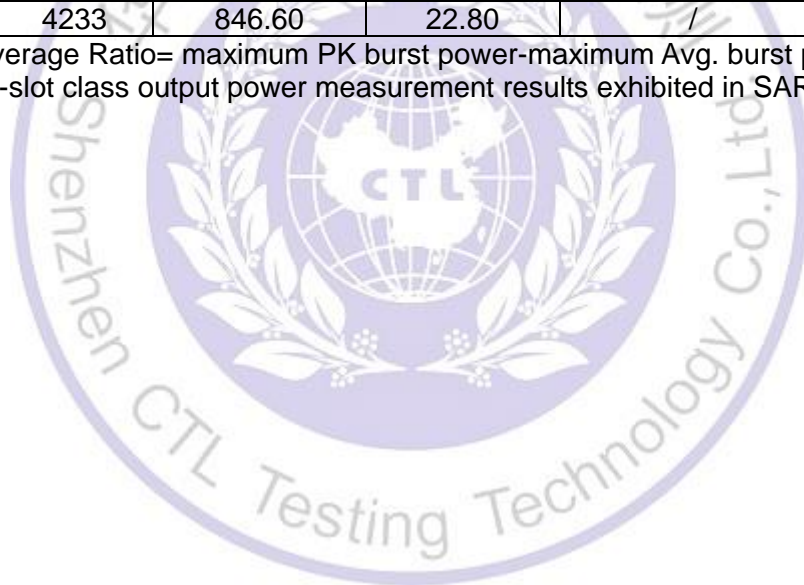
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

TEST RESULTS**Conducted Measurement:**

EUT Mode	Channel	Frequency (MHz)	Avg.Burst Power (dBm)	Peak-to-Average Ratio (dB)	Limit (dBm)	Result
GPRS850 (GMSK,1Slot)	128	824.20	32.54	/	38.45	Pass
	190	836.60	32.74	/		
	251	848.80	32.14	/		
EGPRS850 (8PSK,1Slot)	128	824.20	27.55	/	38.45	Pass
	190	836.60	27.55	/		
	251	848.80	27.25	/		
GPRS1900 (GMSK,1Slot)	512	1850.20	29.65	0.33	33.01	Pass
	661	1880.00	29.78	0.74		
	810	1909.80	29.15	0.65		
EGPRS1900 (8PSK,1Slot)	512	1850.20	24.74	3.22	33.01	Pass
	661	1880.00	24.85	3.41		
	810	1909.80	24.22	3.36		
WCDMA Band II RMC	9262	1852.40	22.74	3.58	33.01	Pass
	9400	1880.00	22.78	3.42		
	9538	1907.60	22.73	3.37		
WCDMA Band V RMC	4132	826.40	22.82	/	38.45	Pass
	4183	836.60	22.85	/		
	4233	846.60	22.80	/		

Note: 1. Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.

2. Other Multi-slot class output power measurement results exhibited in SAR report.



Radiated Measurement:

Note: 1. The field strength of radiation emission was measured in the following position: EUT stand-up position (Zaxis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis was reported.

Note: 2 We test the H direction and V direction and V direction is worse.

GPRS850 (GMSK, 1Slot)

Channel	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
128	-10.05	2.42	8.45	2.15	36.82	30.65	38.45	7.80	V
190	-9.22	2.46	8.45	2.15	36.82	31.44	38.45	7.01	V
251	-10.28	2.53	8.36	2.15	36.82	30.22	38.45	8.23	V

EGPRS850 (8PSK, 1Slot)

Channel	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
128	-15.34	2.42	8.45	2.15	36.82	25.36	38.45	13.09	V
190	-14.52	2.46	8.45	2.15	36.82	26.14	38.45	12.31	V
251	-15.03	2.53	8.36	2.15	36.82	25.47	38.45	12.98	V

GPRS1900 (GMSK, 1Slot)

Channel	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
512	-11.8	3.41	10.24	33.6	28.63	33.01	4.38	V
661	-11.61	3.49	10.24	33.6	28.74	33.01	4.27	V
810	-11.94	3.55	10.23	33.6	28.34	33.01	4.67	V

EGPRS1900 (8PSK, 1Slot)

Channel	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
512	-16.89	3.41	10.24	33.6	23.54	33.01	9.47	V
661	-16.79	3.49	10.24	33.6	23.56	33.01	9.45	V
810	-17.14	3.55	10.23	33.6	23.14	33.01	9.87	V

WCDMA BAND II (RMC)

Channel	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
9262	-19.01	3.42	10.24	33.6	21.41	33.01	11.60	V
9400	-19.79	3.49	10.24	33.6	20.56	33.01	12.45	V
9538	-19.93	3.54	10.23	33.6	20.36	33.01	12.65	V

WCDMA BAND V (RMC)

Channel	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
4132	-20.44	2.43	8.45	2.15	36.82	20.25	38.45	18.20	V
4183	-19.12	2.46	8.45	2.15	36.82	21.54	38.45	16.91	V
4233	-19.83	2.52	8.36	2.15	36.82	20.68	38.45	17.77	V

Remark:

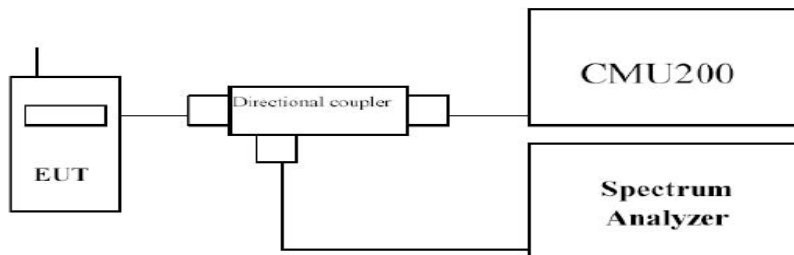
1. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$
2. $ERP = EIRP - 2.15dBi$ as EIRP by subtracting the gain of the dipole.

3.2 Occupied Bandwidth

LIMIT

N/A

TEST CONFIGURATION



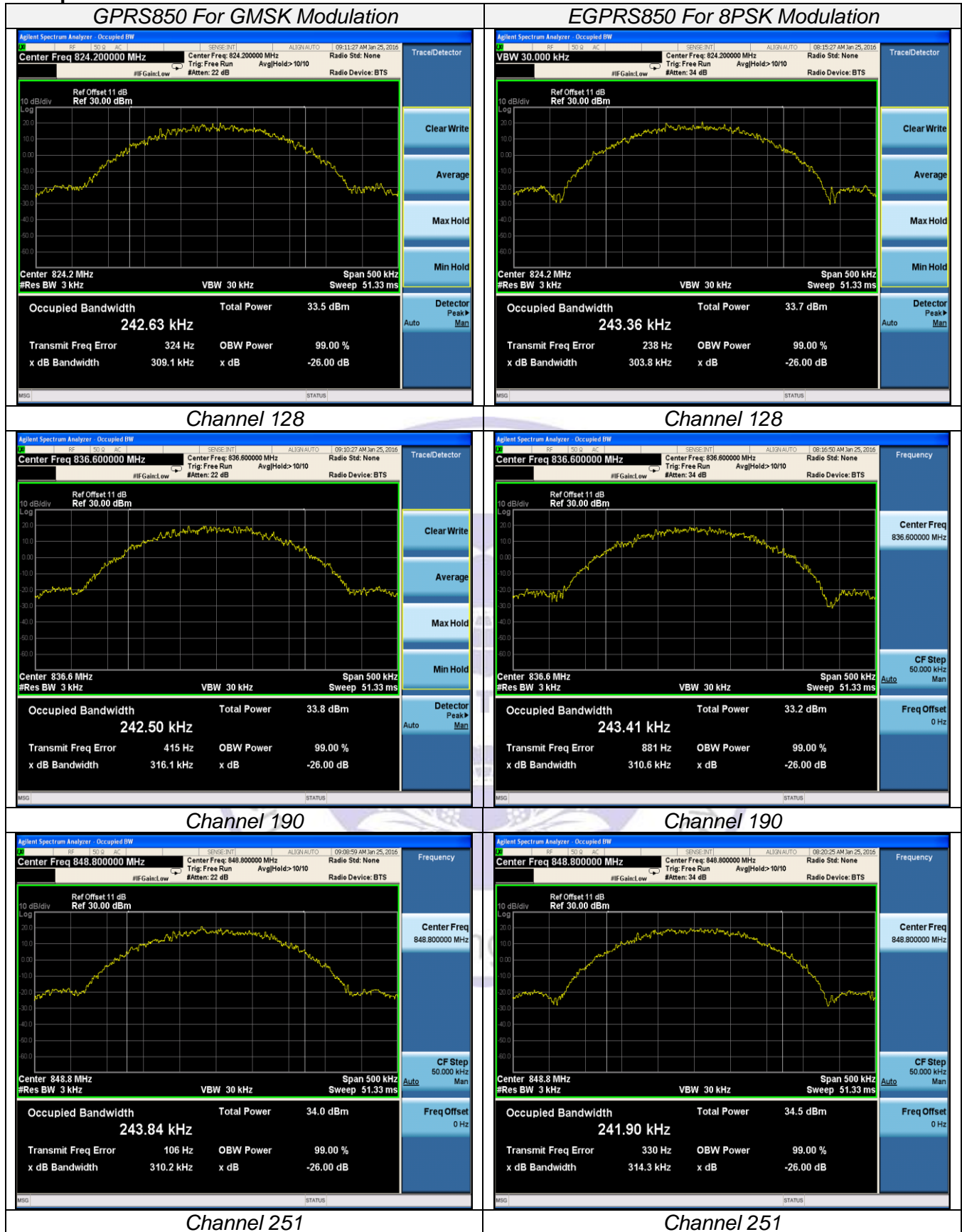
TEST PROCEDURE

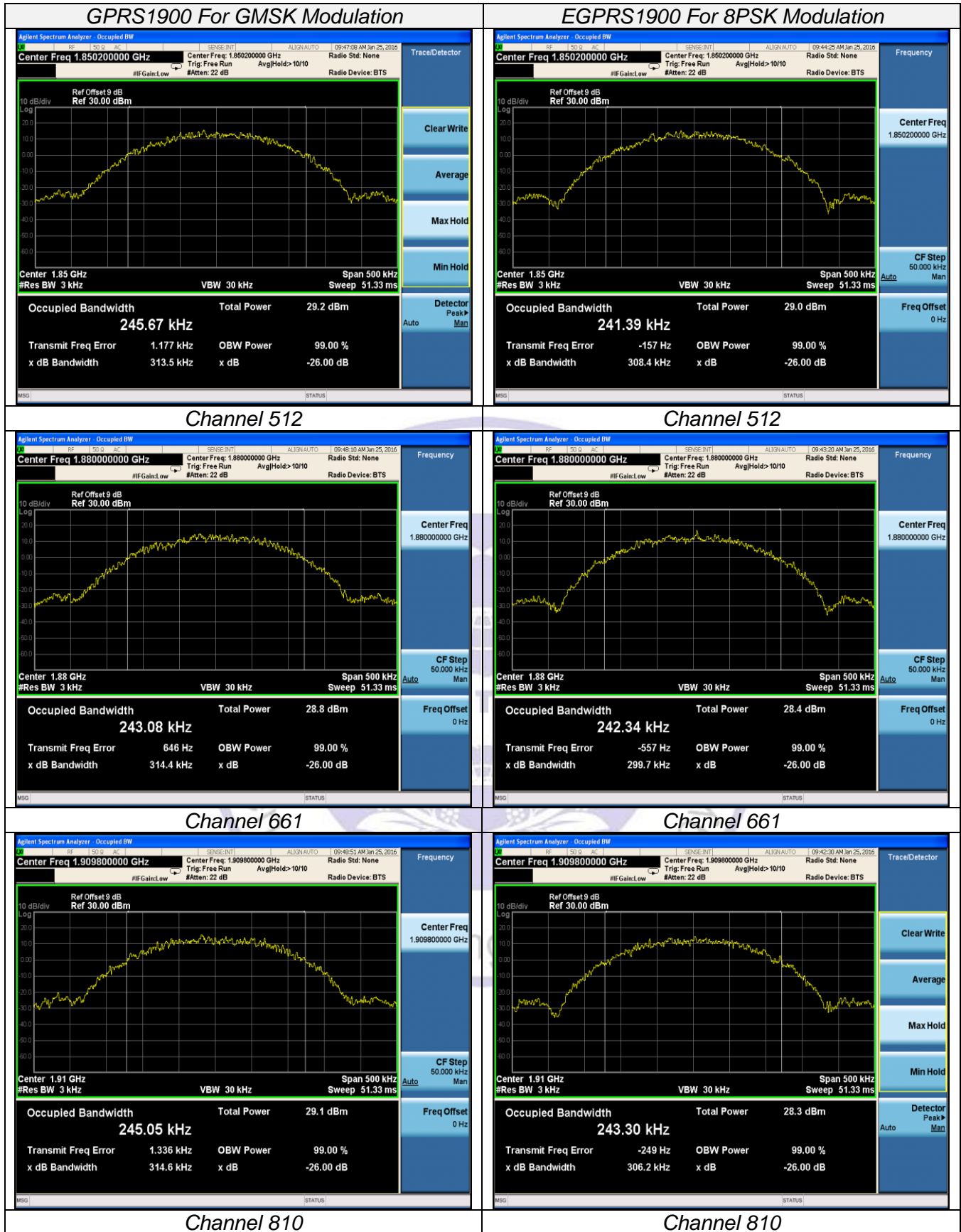
1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW, VBW \geq 3 times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

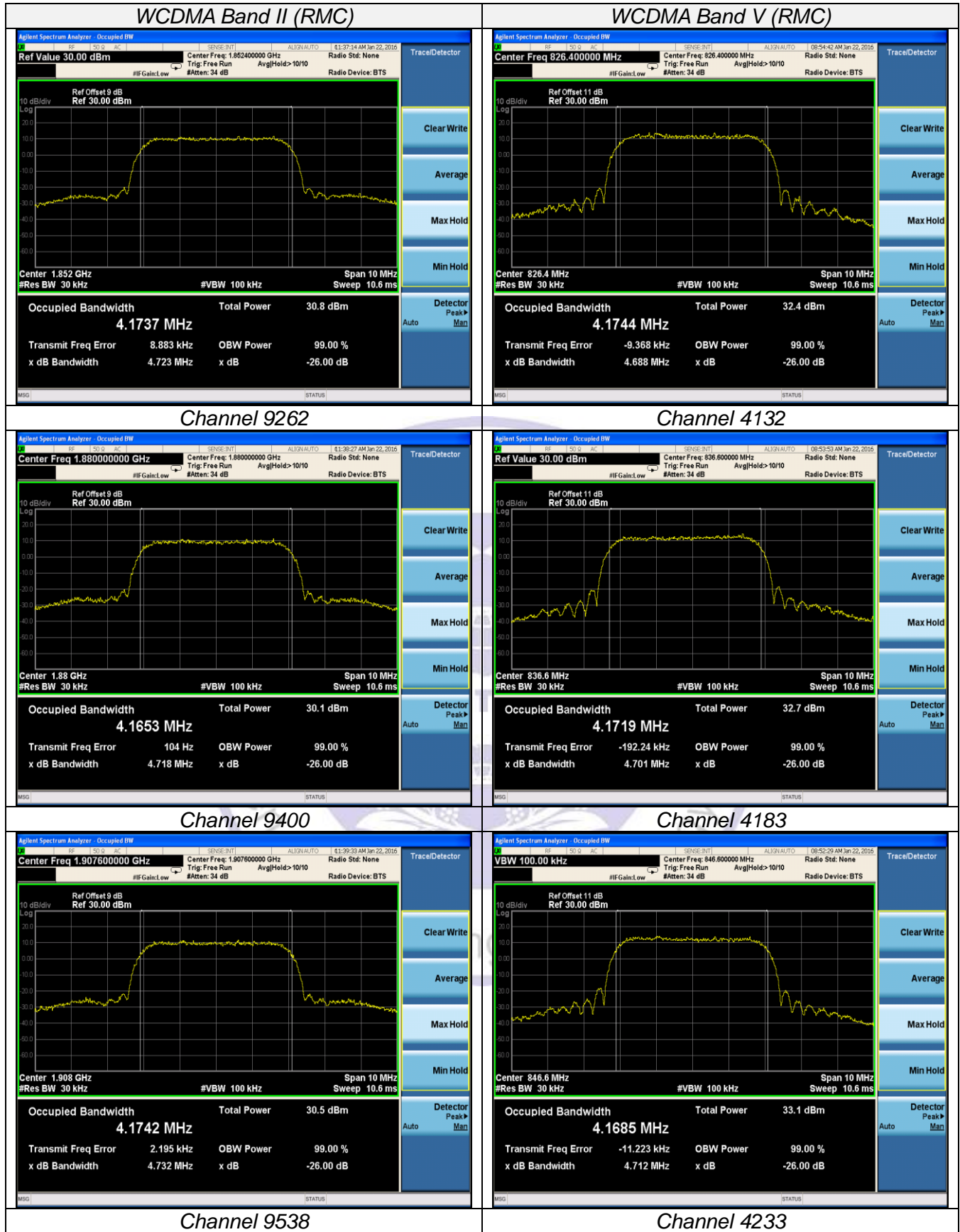
TEST RESULTS

EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
GPRS850 (GMSK,1Slot)	128	824.20	242.63	309.10
	190	836.60	242.50	316.10
	251	848.80	243.84	310.20
EGPRS850 (8PSK,1Slot)	128	824.20	243.36	303.80
	190	836.60	243.41	310.60
	251	848.80	241.90	314.30
GPRS1900 (GMSK,1Slot)	512	1850.20	245.67	313.50
	661	1880.00	243.08	314.40
	810	1909.80	245.05	314.60
EGPRS1900 (8PSK,1Slot)	512	1850.20	241.39	308.40
	661	1880.00	242.34	299.70
	810	1909.80	243.30	306.20
WCDMA Band II (RMC)	9262	1852.4	4173.70	4723.00
	9400	1880.0	4165.30	4718.00
	9538	1907.6	4174.20	4732.00
WCDMA Band V (RMC)	4132	826.4	4174.40	4688.00
	4183	836.6	4171.90	4701.00
	4233	846.6	4168.50	4712.00

Test plots as follow:





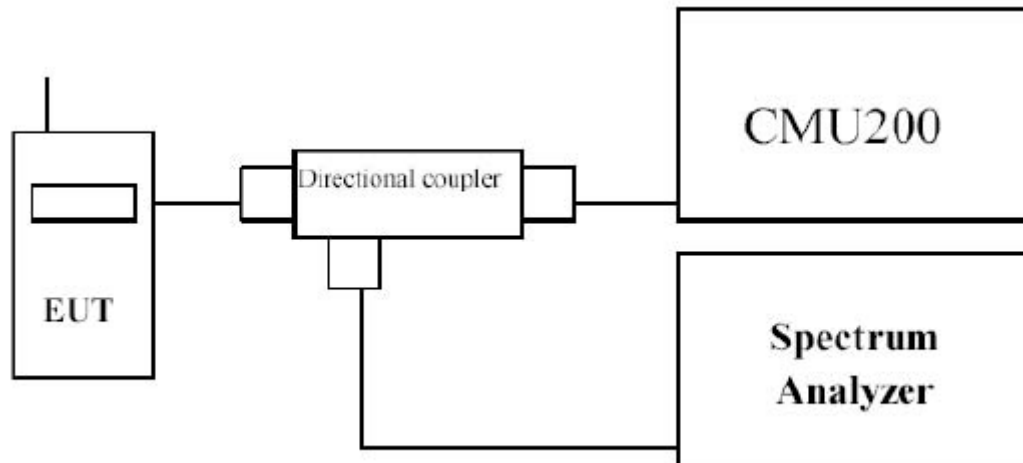


3.3 Band Edge compliance

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.

TEST CONFIGURATION

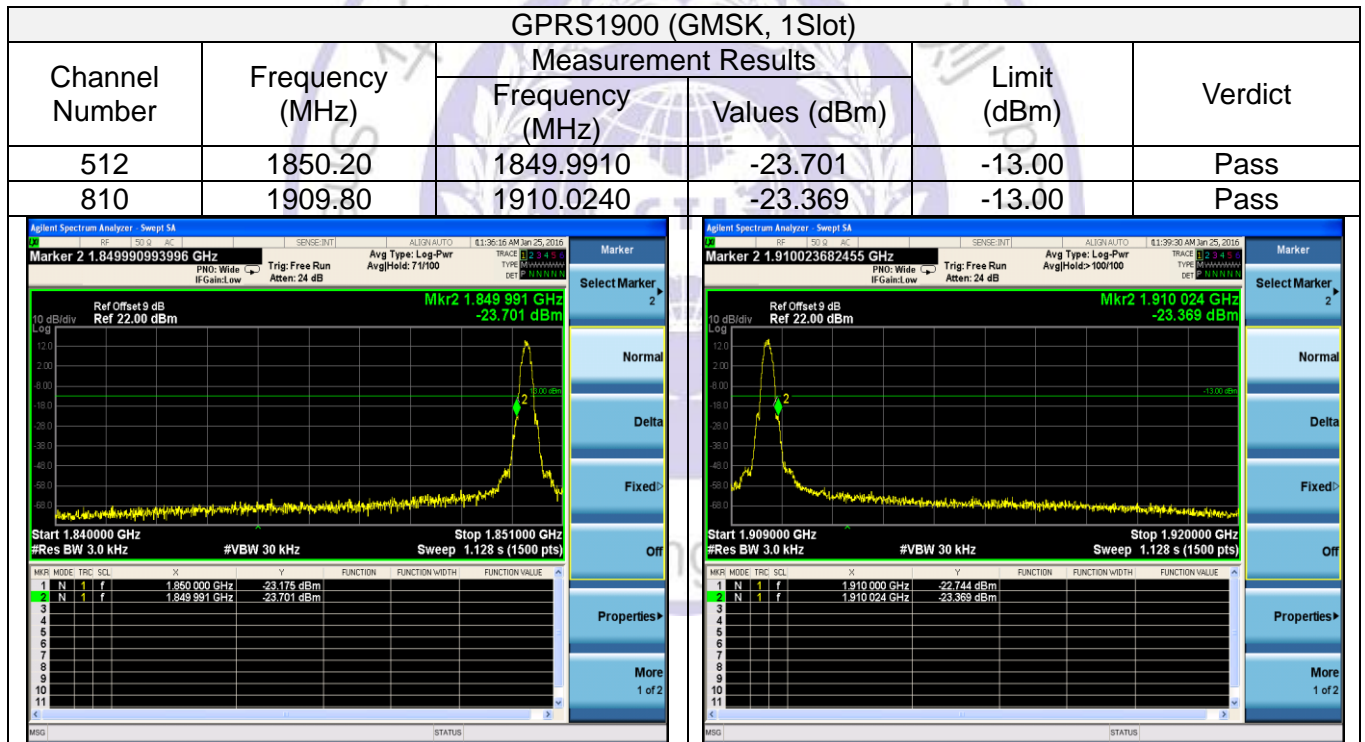
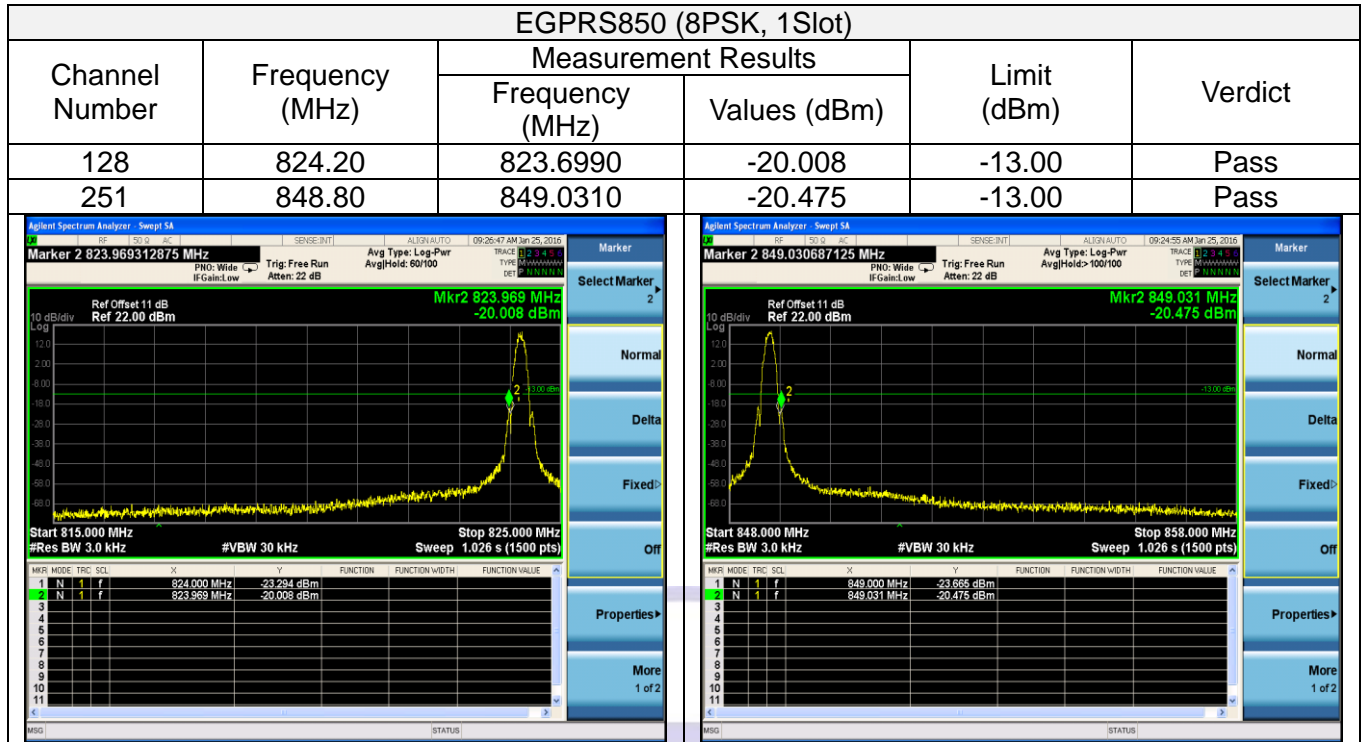


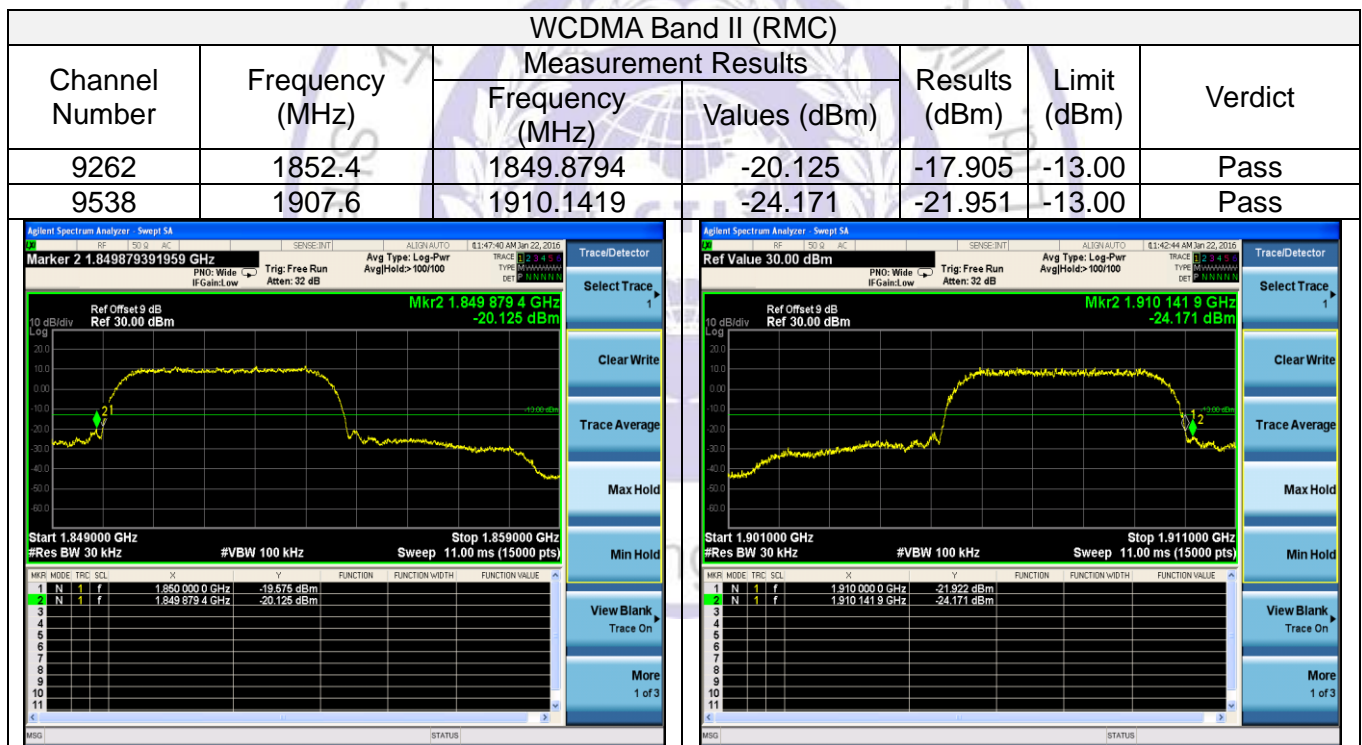
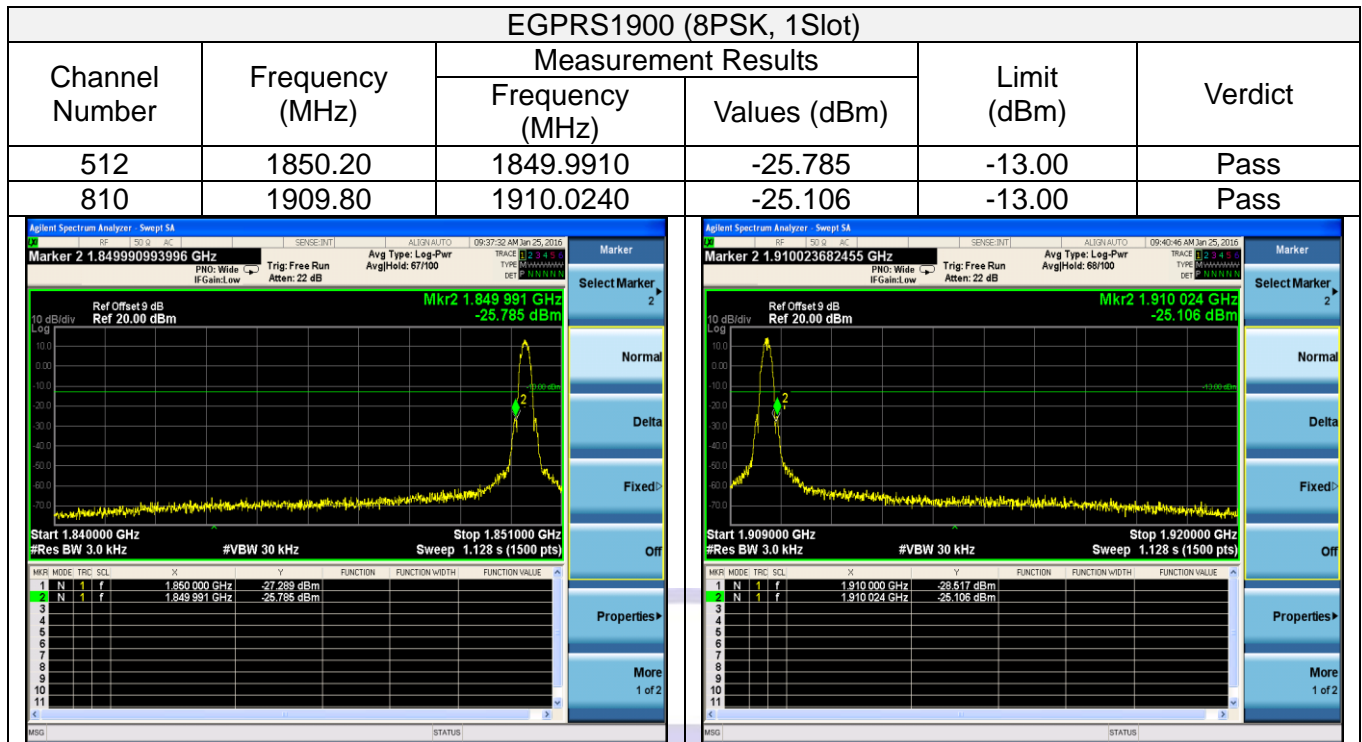
TEST PROCEDURE

In the 1MHz 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 to measure the out of band Emissions.

TEST RESULTS

GPRS850 (GMSK, 1Slot)					
Channel Number	Frequency (MHz)	Max Measurement Results		Limit (dBm)	Verdict
		Frequency (MHz)	Values (dBm)		
128	824.20	823.9960	-20.528	-13.00	Pass
251	848.80	849.0070	-18.170	-13.00	Pass





RBW compensate factor (30 kHz to 50 kHz): $10 \cdot \log(50/30) = 2.22$ dB

