TEST REPORT

Reference No......	:	WTS16S0961012-3E V1
FCC ID	:	2AJVK-SP5014
Applicant.....	:	Foto Electric Supply Co., INC.
Address.....	:	1 Rewe St. Brooklyn, New York, 11211, USA
Manufacturer	:	Foto Electric Supply Co., INC.
Address.....	:	1 Rewe St. Brooklyn, New York, 11211, USA
Product Name.....	:	Smart Phone
Model No.	:	SP5014, CBP4105
Brand……	:	SLIDE, COBY
Standards.....	:	FCC CFR47 Part 22 Subpart H: 2015 FCC CFR47 Part 24 Subpart E: 2015
Date of Receipt sample	:	Sep. 19, 2016
Date of Test	:	Sep. 20 – Nov. 17, 2016
Date of Issue.....	:	Nov. 29, 2016
Test Result.....	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2 Laboratories Introduction

Waltek Services Test Group Ltd is a professional third-party testing and certification organization with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by CNAS (China National Accreditation Service for Conformity Assessment) AQSIQ, CMA and IECEE for CBTL. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc.

Waltek Services Test Group Ltd. is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen and have branches in Foshan, Dongguan, Zhongshan, Suzhou,Ningbo and Hong Kong, Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), reliablity and energy performance, Chemical test. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S0961012-3E	Sep. 19, 2016	Sep.20 –Nov. 17, 2016	Nov. 18, 2016	original	-	Replaced
WTS16S0961012-3E V1	Sep. 19, 2016	Sep.20 –Nov. 17, 2016	Nov. 29, 2016	Revised	Updated EDGE1900 mode 26dB value	Valid

5 General Information

5.1 General Description of E.U.T.

Product Name:	Smart Phone
Model No.:	SP5014, CBP4105
Model Description:	Only the model names and brand names are different.
GSM Band(s):	GSM 850/900/1800/1900MHz
GPRS/EGPRS Class:	12
WCDMA Band(s):	FDD Band II/V
LTE Band(s):	FDD Band 2/4/5/7/17
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40
Bluetooth Version:	Bluetooth v4.0 with BLE
GPS:	Support
NFC:	N/A
Hardware Version:	AL_X5S_MB_V11
Software Version:	1471835842
Highest frequency (Exclude Radio):	26MHz
Storage Location:	Internal Storage
Note:	This EUT has two SIM card slots, and use same one RF module. We found that RF parameters are the same, when we insert the card 1 and card 2. So we usually performed the test under main card slot 1.

5.2 Details of E.U.T.

Operation Frequency:	GSM/GPRS/ EGPRS 850: 824~849MHz PCS/GPRS/ EGPRS 1900: 1850~1910MHz WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz LTE Band 2: 1850~1910MHz LTE Band 4: 1710~1755MHz LTE Band 5: 824~849MHz LTE Band 7: 2500-2570MHz LTE Band 17: 704-716MHz WiFi: 802.11b/g/n HT20: 2412~2462MHz 802.11n HT40: 2422~2452MHz Bluetooth: 2402~2480MHz
Max. RF output power:	GSM 850: 32.82dBm PCS1900: 29.86dBm WCDMA Band II: 22.47dBm

	WCDMA Band V: 22.18dBm LTE Band 2: 23.24dBm LTE Band 4: 22.28dBm LTE Band 5: 23.08dBm LTE Band 7: 22.50dBm LTE Band 17: 23.16dBm WiFi(2.4G): 9.44dBm Bluetooth: 6.38dBm
Type of Modulation:	GSM,GPRS: GMSK EDGE: GMSK, 8PSK WCDMA: BPSK LTE: QPSK, 16QAM WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK
Antenna installation:	GSM/WCDMA/LTE: internal permanent antenna WiFi/Bluetooth: internal permanent antenna
Antenna Gain:	GSM 850: 0.5dBi PCS1900: 1.0dBi WCDMA Band II: 1.0dBi WCDMA Band V: 0.5dBi LTE Band 2: 1.0dBi LTE Band 4: 0.8dBi LTE Band 5: 0.5dBi LTE Band 7: 1.0dBi LTE Band 17: 0.6dBi WiFi(2.4G): 1.0dBi Bluetooth: 1.0dBi
Technical Data:	Battery DC 3.7V, 2000mAh DC 5V, 1.0A, charging from adapter (Adapter Input: 100-240V~50/60Hz 0.2A
Adapter:	Manufacture: XINYU EAGLETRON ELECTRONIC CO.LTD. Model No.: SWN006S050100U1
Type of Emission:	GSM850: 247KGXW, GPRS850: 241KGXW, EGPRS850: 259KG7W PCS1900: 246KGXW, GPRS1900: 241KGXW, EGPRS1900: 244KG7W WCDMA850: 4M22F9W, WCDMA1900: 4M22F9W

5.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Support Band	Test Mode	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band V	WCDMA/HSUPA/HSDPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
WCDMA Band II	WCDMA/HSUPA/HSDPA	1852.4MHz	9262
		1880.0MHz	9400
		1907.6MHz	9538
Remark: All mode(s) were tested and the worst data was recorded.			

5.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A**

  Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(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. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(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. Registration 328995, December 3, 2014.

6 Test Summary

Test Items	Test Requirement	Result
RF Output Power	2.1046 22.913 (a) 24.232 (c)	PASS
Peak-to-Average Ratio	24.232 (d)	PASS
Bandwidth	2.1049 22.905 22.917 24.238	PASS
Spurious Emissions at Antenna Terminal	2.1051 22.917 (a) 24.238 (a)	PASS
Field Strength of Spurious Radiation	2.1053 22.917 (a) 24.238 (a)	PASS
Out of band emission, Band Edge	22.917 (a) 24.238 (a)	PASS
Frequency Stability	2.1055 22.355 24.235	PASS
Maximum Permissible Exposure (SAR)	1.1307 2.1093	PASS

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.12,2016	Sep.11,2017
2.	LISN	R&S	ENV216	101215	Sep.12,2016	Sep.11,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.12,2016	Sep.11,2017
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.12,2016	Sep.11,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12,2016	Sep.11,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12,2016	Sep.11,2017
4.	Cable	LARGE	RF300	-	Sep.12,2016	Sep.11,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	Apr.29, 2016	Apr.28, 2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Apr.09,2016	Apr.08,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.09,2016	Apr.08,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12,2016	Sep.11,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09,2016	Apr.08,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09,2016	Apr.08,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13,2016	Apr.12,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.13,2016	Apr.12,2017
9	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.13,2016	Apr.12,2017
10	Signal Generator	R&S	SMR20	100046	Sep.12,2016	Sep.11,2017
11	Smart Antenna	SCHWARZBECK	HA08	-	Apr.09,2016	Apr.08,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**

1	Test Receiver	R&S	ESCI	101296	Apr.13,2016	Apr.12,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09,2016	Apr.08,2017
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Apr.13,2016	Apr.12,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr.13,2016	Apr.12,2017
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.12,2016	Sep.11,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.12,2016	Sep.11,2017
3.	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.13,2016	Apr.12,2017
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12,2016	Sep.11,2017

7.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)
Confidence interval：95%. Confidence factor:k=2	

7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 RF OUTPUT POWER

Test Requirement:	FCC Part 2.1046,22.913 (a),24.232 (c)
Test Method:	TIA/EIA-603-D:2010
	KDB971168 D01 v02r02
Test Mode:	TX transmitting

8.1 EUT Operation

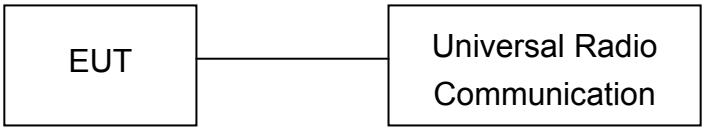
Operating Environment **:**

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

8.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



Radiated method:

1. The setup of EUT is according with per TIA/EIA Standard 603D.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

8.3 Test Result

Conducted Power

GSM - Burst Average Power (dBm)						
Band	**GSM850**			**PCS1900**		
Channel	**128**	**190**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.6**	**848.8**	**1850.2**	**1880**	**1909.8**
GSM	32.80	32.68	32.38	29.73	29.85	29.47
GPRS (1 slot)	32.85	33.00	33.02	29.74	29.88	29.48
GPRS (2 slots)	31.59	31.47	31.58	28.56	28.47	28.59
GPRS (3 slots)	30.25	30.58	30.54	27.32	27.48	27.65
GPRS (4 slots)	29.65	29.31	29.58	27.59	27.65	27.58
EGPRS (1 slot)	27.07	27.01	26.70	25.94	25.91	25.90
EGPRS (2 slots)	25.36	25.89	25.48	24.65	24.78	24.39
EGPRS (3 slots)	24.65	24.78	24.32	23.65	23.47	23.69
EGPRS (4 slots)	23.69	23.65	23.48	22.58	22.36	22.45

WCDMA - Average Power (dBm)						
Band	**WCDMA Band II**			**WCDMA Band V**		
Channel	**9262**	**9400**	**9538**	**4132**	**4183**	**4233**
Frequency (MHz)	**1852.4**	**1880**	**1907.6**	**826.4**	**836.6**	**846.6**
RMC 12.2k	22.02	22.37	22.47	22.18	22.08	22.16
HSDPA Subtest-1	21.10	21.20	21.27	21.37	21.13	21.20
HSDPA Subtest-2	21.67	21.47	21.25	21.48	21.47	21.65
HSDPA Subtest-3	21.36	21.21	21.34	21.35	21.47	21.58
HSDPA Subtest-4	21.35	21.14	21.58	21.47	21.65	21.35
HSUPA Subtest-1	21.11	21.26	21.38	21.30	21.16	21.22
HSUPA Subtest-2	21.47	21.59	21.35	21.47	21.35	21.48
HSUPA Subtest-3	21.47	21.36	21.47	21.35	21.36	21.47
HSUPA Subtest-4	21.52	21.31	21.17	21.58	21.36	21.31
HSUPA Subtest-5	21.47	21.58	21.47	21.29	21.24	21.37

Radiated Power

ERP and EIRP

Cellular Band 850 (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 22H	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
GSM 850 Channel 128										
824.20	92.09	345	1.6	H	25.06	0.20	0.00	24.86	38.45	-13.59
824.20	97.83	59	1.3	V	30.73	0.20	0.00	30.53	38.45	-7.92
GSM 850 Channel 190										
836.60	90.16	111	1.7	H	23.13	0.20	0.00	22.93	38.45	-15.52
836.60	97.28	274	1.9	V	30.18	0.20	0.00	29.98	38.45	-8.47
GSM 850 Channel 251										
848.80	91.21	171	2.2	H	24.18	0.20	0.00	23.98	38.45	-14.47
848.80	97.42	240	1.1	V	30.32	0.20	0.00	30.12	38.45	-8.33
GPRS 850 Channel 128										
824.20	93.95	252	1.1	H	26.92	0.20	0.00	26.72	38.45	-11.73
824.20	97.92	277	1.4	V	30.82	0.20	0.00	30.62	38.45	-7.83
GPRS 850 Channel 190										
836.60	90.17	258	2.2	H	23.14	0.20	0.00	22.94	38.45	-15.51
836.60	97.16	243	2.3	V	30.06	0.20	0.00	29.86	38.45	-8.59
GPRS 850 Channel 251										
848.80	90.79	184	2.4	H	23.76	0.20	0.00	23.56	38.45	-14.89
848.80	97.89	22	1.3	V	30.79	0.20	0.00	30.59	38.45	-7.86
EGPRS 850 Channel 128										
824.20	87.06	173	1.9	H	20.03	0.20	0.00	19.83	38.45	-18.62
824.20	92.42	103	1.6	V	25.32	0.20	0.00	25.12	38.45	-13.33
EGPRS 850 Channel 190										
836.60	86.20	200	2.2	H	19.17	0.20	0.00	18.97	38.45	-19.48
836.60	92.51	326	1.8	V	25.41	0.20	0.00	25.21	38.45	-13.24
EGPRS 850 Channel 251										
848.80	86.33	170	1.1	H	19.30	0.20	0.00	19.10	38.45	-19.35
848.80	92.03	154	1.9	V	24.93	0.20	0.00	24.73	38.45	-13.72

Cellular Band 1900 (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 24E	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
PCS 1900 Channel 512										
1850.20	84.59	256	1.8	H	10.62	0.31	10.40	20.71	33	-12.29
1850.20	92.67	328	2.3	V	19.39	0.31	10.40	29.48	33	-3.52
PCS 1900 Channel 661										
1880.00	84.97	258	2.0	H	11.12	0.31	10.40	21.21	33	-11.79
1880.00	92.68	12	1.6	V	19.56	0.31	10.40	29.65	33	-3.35
PCS 1900 Channel 810										
1909.80	86.71	120	2.1	H	12.98	0.32	10.40	23.06	33	-9.94
1909.80	92.70	150	1.8	V	19.74	0.32	10.40	29.82	33	-3.18
GPRS 1900 Channel 512										
1850.20	87.55	207	1.8	H	13.58	0.31	10.40	23.67	33	-9.33
1850.20	92.87	103	1.1	V	19.59	0.31	10.40	29.68	33	-3.32
GPRS 1900 Channel 661										
1880.00	86.42	246	1.2	H	12.57	0.31	10.40	22.66	33	-10.34
1880.00	92.84	204	1.4	V	19.72	0.31	10.40	29.81	33	-3.19
GPRS 1900 Channel 810										
1909.80	85.95	57	2.5	H	12.22	0.32	10.40	22.30	33	-10.70
1909.80	92.17	207	1.2	V	19.21	0.32	10.40	29.29	33	-3.71
EGPRS 1900 Channel 512										
1850.20	82.93	319	1.8	H	8.96	0.31	10.40	19.05	33	-13.95
1850.20	88.23	97	1.1	V	14.95	0.31	10.40	25.04	33	-7.96
EGPRS 1900 Channel 661										
1880.00	84.67	56	1.9	H	10.82	0.31	10.40	20.91	33	-12.09
1880.00	88.23	91	1.9	V	15.11	0.31	10.40	25.20	33	-7.80
EGPRS 1900 Channel 810										
1909.80	82.08	266	2.3	H	8.35	0.32	10.40	18.43	33	-14.57
1909.80	88.65	195	1.4	V	15.69	0.32	10.40	25.77	33	-7.23

WCDMA Band V (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 22H	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
WCDMA Band V Voice Channel 4132										
826.40	76.08	15	2.3	H	9.05	0.20	0.00	8.85	38.45	-29.60
826.40	84.17	25	1.1	V	17.07	0.20	0.00	16.87	38.45	-21.58
WCDMA Band V Voice Channel 4183										
836.60	76.93	205	1.5	H	9.90	0.20	0.00	9.70	38.45	-28.75
836.60	84.03	179	1.2	V	16.93	0.20	0.00	16.73	38.45	-21.72
WCDMA Band V Voice Channel 4233										
846.60	77.00	114	2.4	H	9.97	0.20	0.00	9.77	38.45	-28.68
846.60	84.25	14	1.8	V	17.15	0.20	0.00	**16.95**	38.45	-21.50
WCDMA Band V HSDPA Channel 4132										
826.40	76.74	286	1.8	H	9.71	0.20	0.00	9.51	38.45	-28.94
826.40	84.56	296	1.3	V	17.46	0.20	0.00	17.26	38.45	-21.19
WCDMA Band V HSDPA Channel 4183										
836.60	79.01	14	1.0	H	11.98	0.20	0.00	11.78	38.45	-26.67
836.60	84.38	54	1.1	V	17.28	0.20	0.00	17.08	38.45	-21.37
WCDMA Band V HSDPA Channel 4233										
846.60	78.67	35	1.2	H	11.64	0.20	0.00	11.44	38.45	-27.01
846.60	84.88	128	1.1	V	17.78	0.20	0.00	**17.58**	38.45	-20.87
WCDMA Band V HSUPA Channel 4132										
826.40	78.80	135	1.2	H	11.77	0.20	0.00	11.57	38.45	-26.88
826.40	84.45	139	1.7	V	17.35	0.20	0.00	17.15	38.45	-21.30
WCDMA Band V HSUPA Channel 4183										
836.60	79.61	319	1.3	H	12.58	0.20	0.00	12.38	38.45	-26.07
836.60	84.09	145	1.5	V	16.99	0.20	0.00	16.79	38.45	-21.66
WCDMA Band V HSUPA Channel 4233										
846.60	77.01	211	1.8	H	9.98	0.20	0.00	9.78	38.45	-28.67
846.60	84.57	295	2.0	V	17.47	0.20	0.00	**17.27**	38.45	-21.18

WCDMA Band II (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Part 24E	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
WCDMA Band II Voice Channel 9262										
1852.40	78.84	288	1.1	H	4.87	0.31	10.40	14.96	33	-18.04
1852.40	84.76	352	1.1	V	11.48	0.31	10.40	21.57	33	-11.43
WCDMA Band II Voice Channel 9400										
1880.00	76.73	261	1.4	H	2.88	0.31	10.40	12.97	33	-20.03
1880.00	84.90	126	2.3	V	11.78	0.31	10.40	21.87	33	-11.13
WCDMA Band II Voice Channel 9538										
1907.60	79.96	81	1.1	H	6.23	0.32	10.40	16.31	33	-16.69
1907.60	84.89	175	1.5	V	11.93	0.32	10.40	22.01	33	-10.99
WCDMA Band II HSDPA Channel 9262										
1852.40	79.80	43	1.9	H	5.83	0.31	10.40	15.92	33	-17.08
1852.40	84.93	205	2.1	V	11.65	0.31	10.40	21.74	33	-11.26
WCDMA Band II HSDPA Channel 9400										
1880.00	77.27	180	2.1	H	3.42	0.31	10.40	13.51	33	-19.49
1880.00	84.44	264	2.5	V	11.32	0.31	10.40	21.41	33	-11.59
WCDMA Band II HSDPA Channel 9538										
1907.60	76.24	146	2.2	H	2.51	0.32	10.40	12.59	33	-20.41
1907.60	84.92	22	1.7	V	11.96	0.32	10.40	22.04	33	-10.96
WCDMA Band II HSUPA Channel 9262										
1852.40	76.77	190	1.8	H	2.80	0.31	10.40	12.89	33	-20.11
1852.40	84.78	272	2.2	V	11.50	0.31	10.40	21.59	33	-11.41
WCDMA Band II HSUPA Channel 9400										
1880.00	79.29	318	1.9	H	5.44	0.31	10.40	15.53	33	-17.47
1880.00	84.48	277	1.4	V	11.36	0.31	10.40	21.45	33	-11.55
WCDMA Band II HSUPA Channel 9538										
1907.60	77.77	354	1.8	H	4.04	0.32	10.40	14.12	33	-18.88
1907.60	84.04	87	1.9	V	11.08	0.32	10.40	21.16	33	-11.84

9 Peak-to-Average Ratio

Test Requirement: 24.232 (d)

Test Method: N/A

Test Mode: TX transmitting

9.1 EUT Operation

Operating Environment **:**

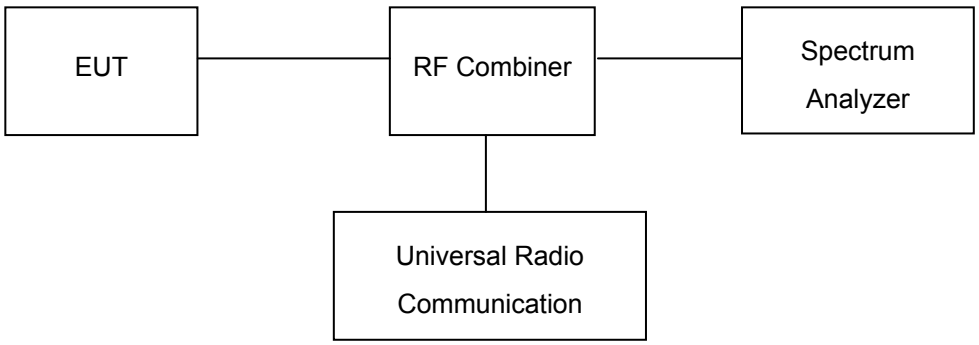
Temperature: 22.5 °C

Humidity: 52.3% RH

Atmospheric Pressure: 101.2kPa

9.2 Test Procedure

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. Set EUT to transmit at maximum output power.
3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.



9.3 Test Result

Cellular Band (Part 24E)

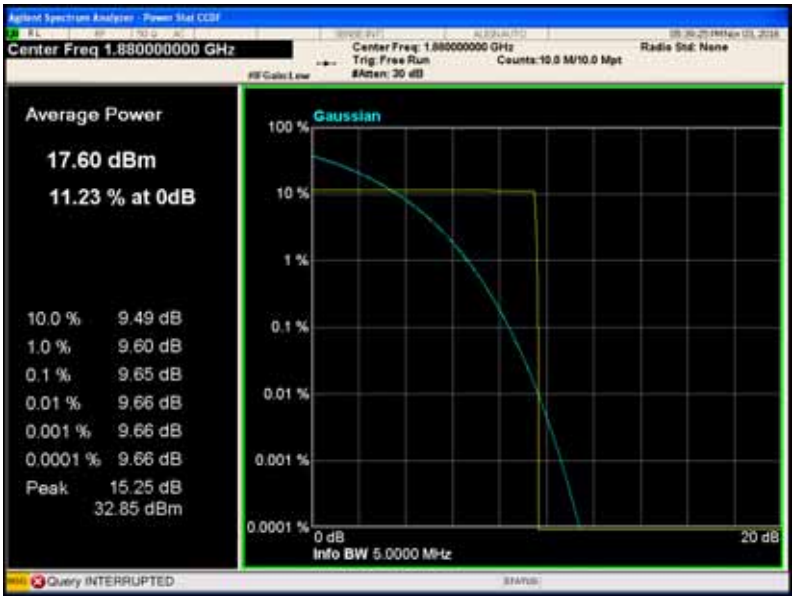
Remark: Only the worst case (middle channel mode) were reported.

Mode	PCS 1900			GPRS 1900			EDGE 1900			Limit (dB)
Channel	512	661	810	512	661	810	512	661	810	
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8	
Peak-to-Average Ratio (dB)	9.60	9.65	9.51	10.26	10.47	10.43	12.51	12.59	12.36	13

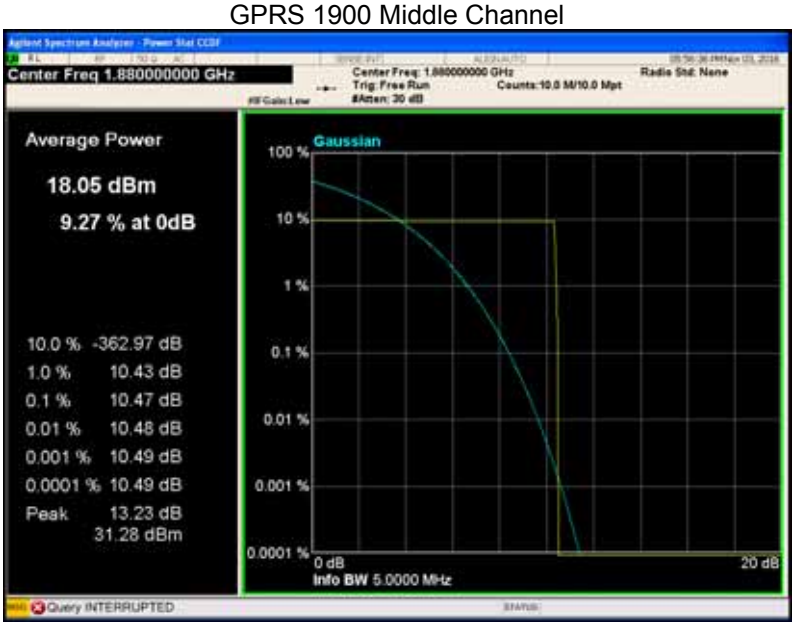
Mode	WCDMA Band II			Limit (dB)
Channel	512	661	810	
Frequency (MHz)	1850.2	1880.0	1909.8	
Peak-to-Average Ratio (dB)	2.46	2.51	2.39	13

Test Plots (Part 24E)

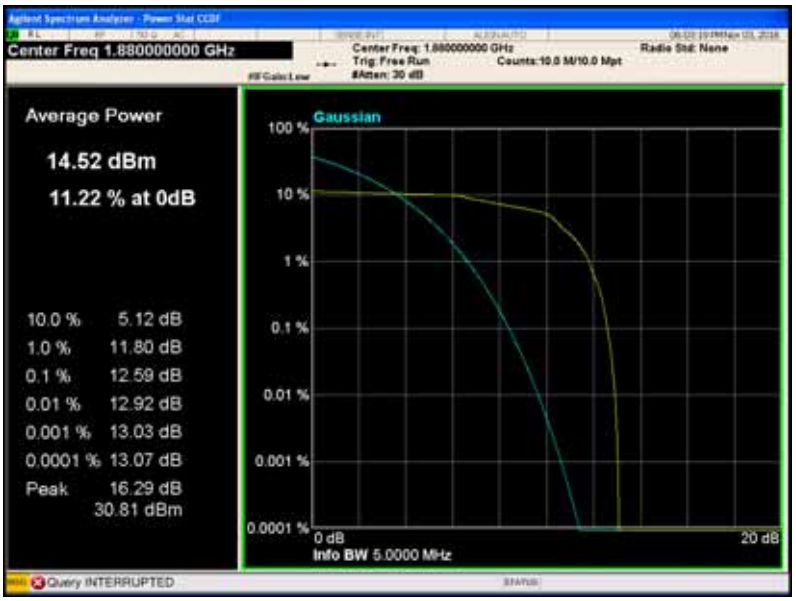
PCS1900 Middle Channel



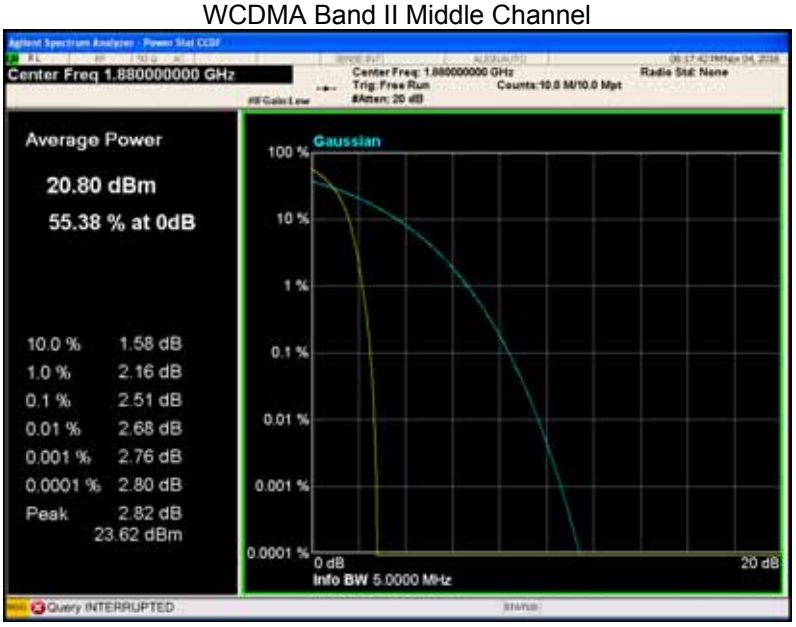
GPRS 1900 Middle Channel



EDGE 1900 Middle Channel



WCDMA Band II Middle Channel



10 BANDWIDTH

Test Requirement:	FCC Part 2.1049,22.917,22.905,24.238
Test Method:	TIA/EIA-603-D:2010
	KDB971168 D01 v02r02
Test Mode:	TX transmitting

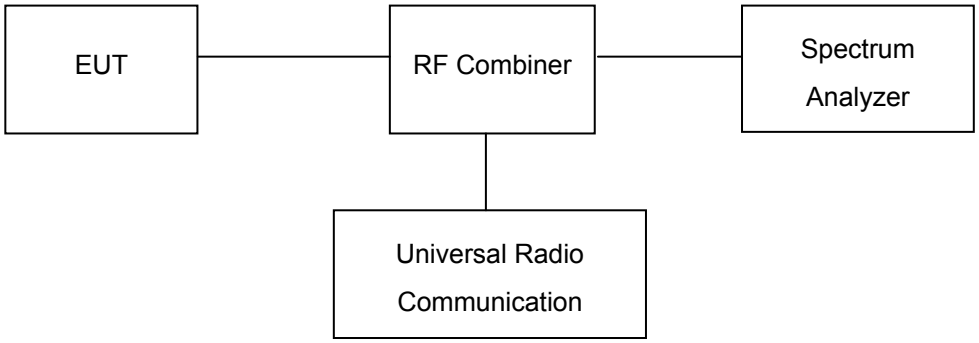
10.1 EUT Operation

Operating Environment **:**

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

10.2 Test Procedure

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.
The resolution bandwidth of the spectrum analyzer was set at 3 kHz (Cellular /PCS) and the 26 dB & 99%bandwidth was recorded.



10.3 Test Result

Remark: Only the worst case (middle channel mode) were reported.

Cellular Band (Part 22H)

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)	26 dB Emission Bandwidth(kHz)
GSM 850	128	824.2	246.66	314.65
	190	836.6	246.70	314.70
	251	848.8	246.63	314.61
GPRS 850	128	824.2	241.40	311.16
	190	836.6	241.43	311.20
	251	848.8	241.36	311.18
EGPRS 850	128	824.2	258.96	319.10
	190	836.6	259.03	319.20
	251	848.8	258.99	319.13

Test Mode		Channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)	26 dB Emission Bandwidth(MHz)
WCDMA Band V	RMC12.2k	4132	826.4	4.09	4.75
		4183	836.6	4.22	4.87
		4233	846.6	4.09	4.83
	HSDPA(16QAM)	4132	826.4	4.20	4.70
		4183	836.6	4.21	4.85
		4233	846.6	4.05	4.73
	HSUPA(BPSK)	4132	826.4	4.12	4.70
		4183	836.6	4.21	4.86
		4233	846.6	4.12	4.79

Cellular Band (Part 24E)

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)	26 dB Emission Bandwidth(kHz)
PCS 1900	512	1850.2	245.60	309.64
	661	1880.0	245.68	309.80
	810	1909.8	245.54	309.74
GPRS 1900	512	1850.2	240.86	313.76
	661	1880.0	240.97	313.90
	810	1909.8	240.95	313.85
EGPRS 1900	512	1850.2	243.48	310.71
	661	1880.0	243.59	310.80
	810	1909.8	243.50	310.70

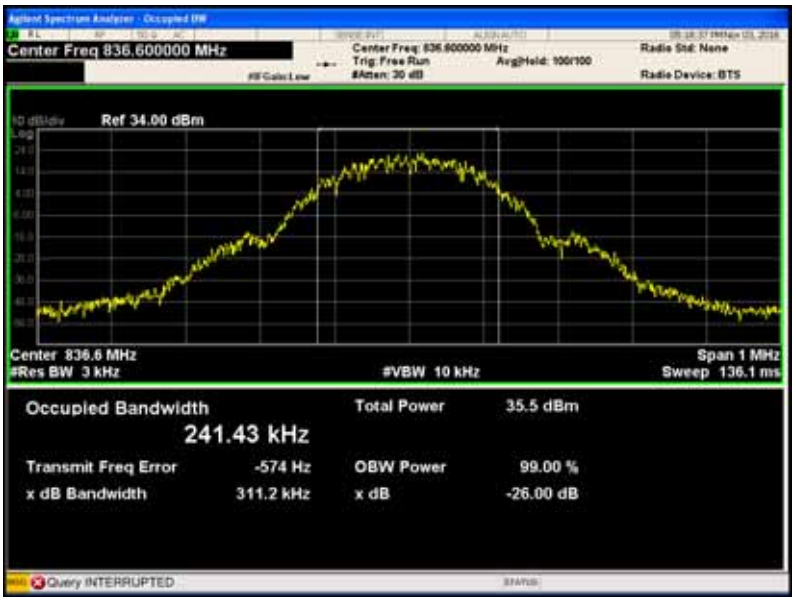
Test Mode		Channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)	26 dB Emission Bandwidth(MHz)
WCDMA Band II	RMC12.2k	9262	1852.4	4.19	4.83
		9400	1880.0	4.22	4.90
		9538	1907.6	4.22	4.90
	HSDPA(16QAM)	9262	1852.4	4.11	4.81
		9400	1880.0	4.21	4.87
		9538	1907.6	4.11	4.73
	HSUPA(BPSK)	9262	1852.4	4.13	4.82
		9400	1880.0	4.22	4.87
		9538	1907.6	4.06	4.87

Test Plots (worst case)

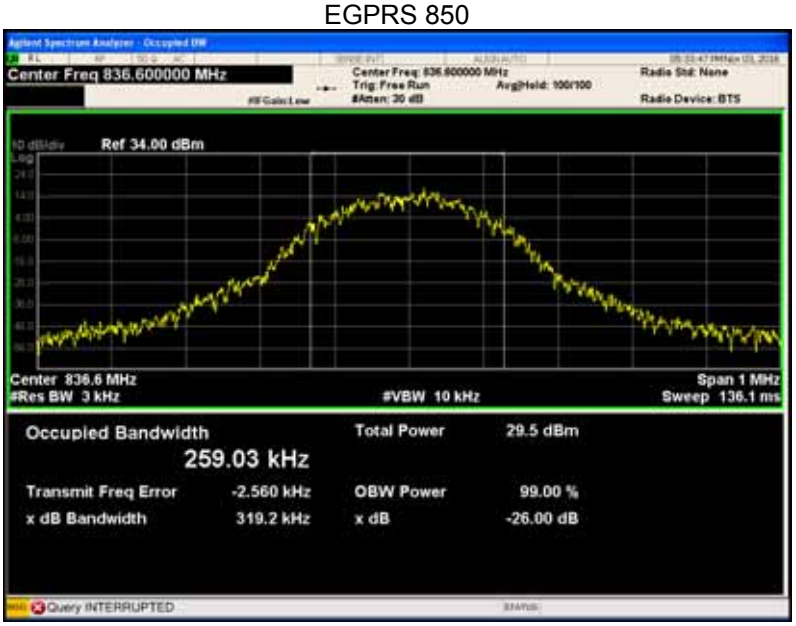
Cellular Band (Part 22H)

GSM 850

GPRS 850

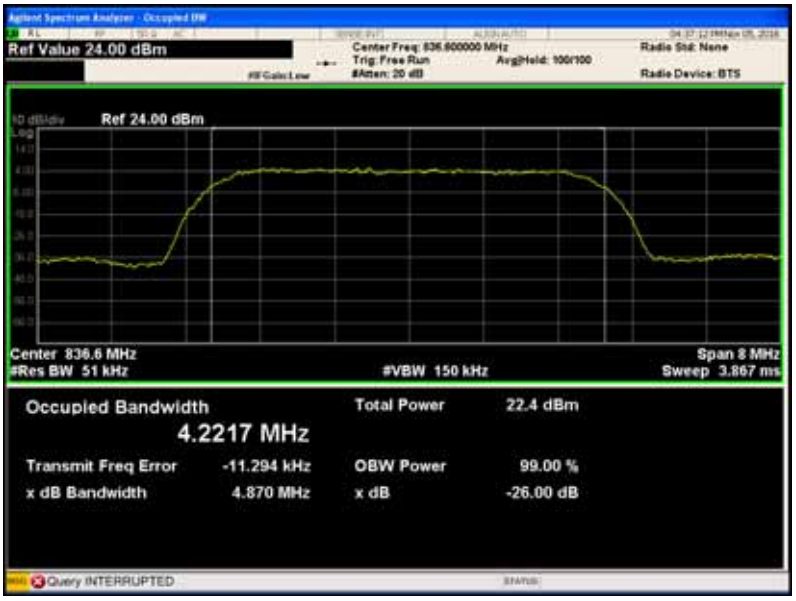


EGPRS 850

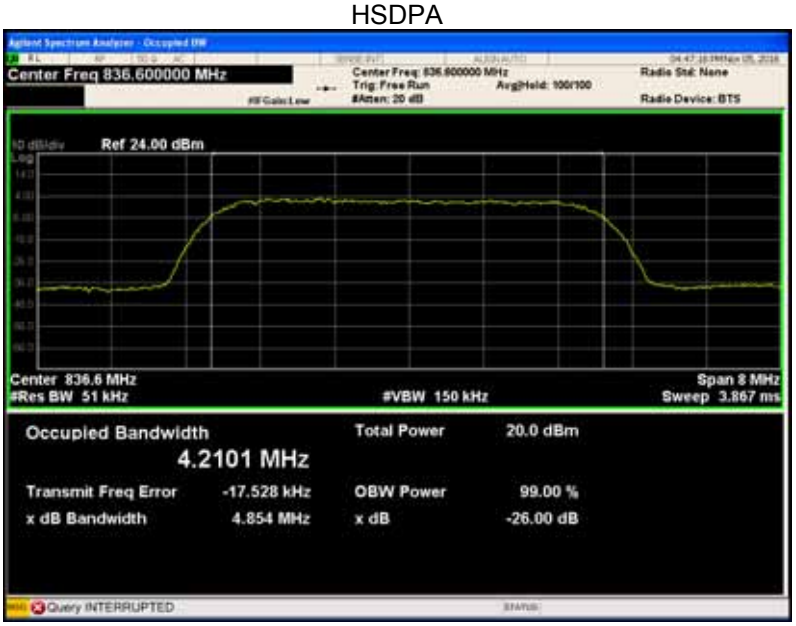


WCDMA band V

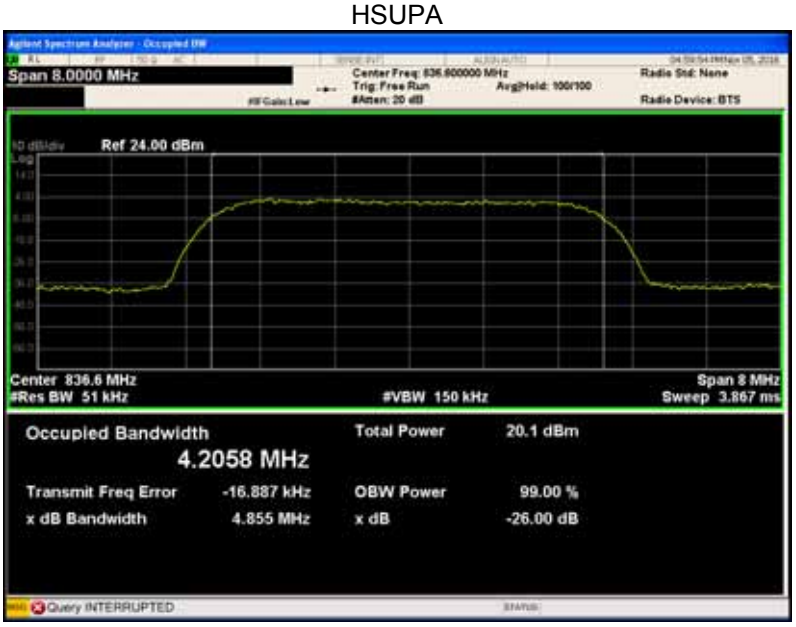
RMC12.2k



HSDPA

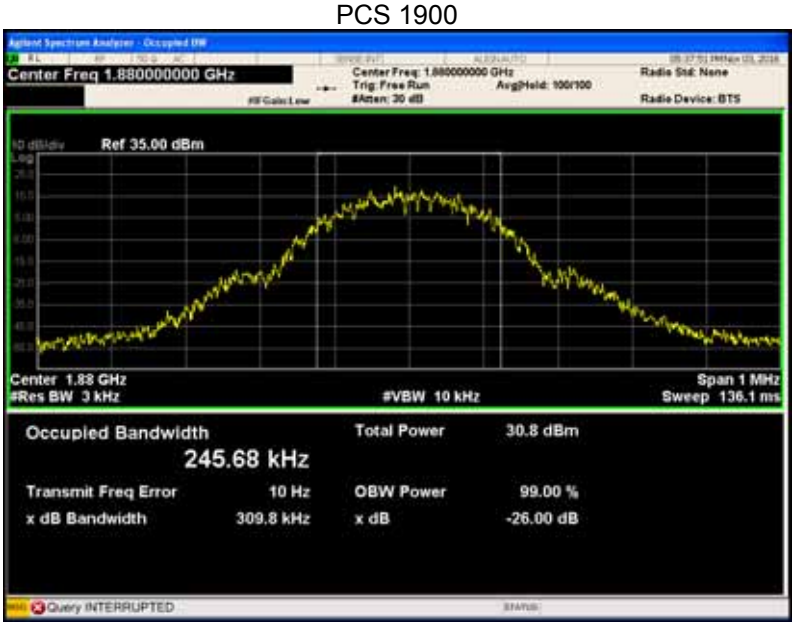

Center Freq 836.600000 MHz
Ref 24.00 dBm
Center 836.6 MHz
#Res BW 51 kHz
#VBW 150 kHz
Span 8 MHz
Sweep 3.867 ms
Occupied Bandwidth
4.2101 MHz
Total Power 20.0 dBm
Transmit Freq Error -17.528 kHz
OBW Power 99.00 %
x dB Bandwidth 4.854 MHz
x dB -26.00 dB
Query INTERRUPTED

HSUPA

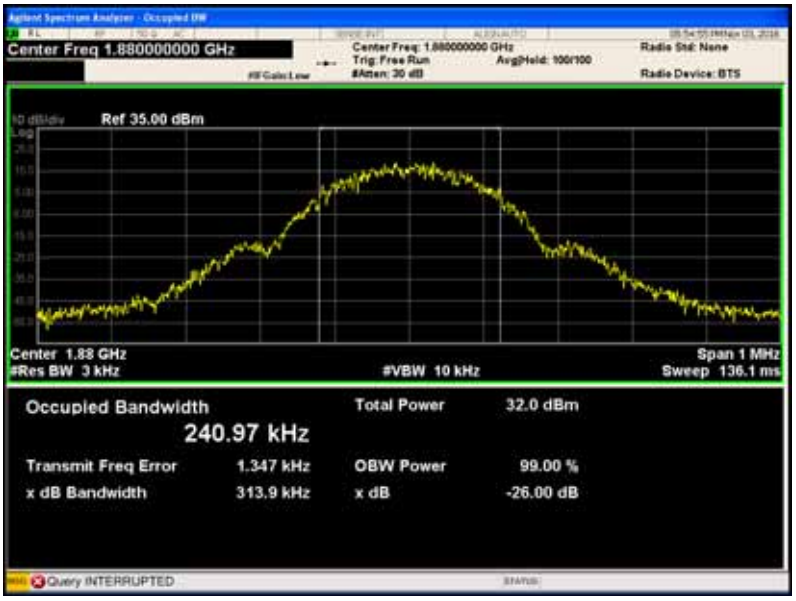

Span 8.0000 MHz
Ref 24.00 dBm
Center 836.6 MHz
#Res BW 51 kHz
#VBW 150 kHz
Span 8 MHz
Sweep 3.867 ms
Occupied Bandwidth
4.2058 MHz
Total Power 20.1 dBm
Transmit Freq Error -16.887 kHz
OBW Power 99.00 %
x dB Bandwidth 4.855 MHz
x dB -26.00 dB
Query INTERRUPTED

Cellular Band (Part 24E)

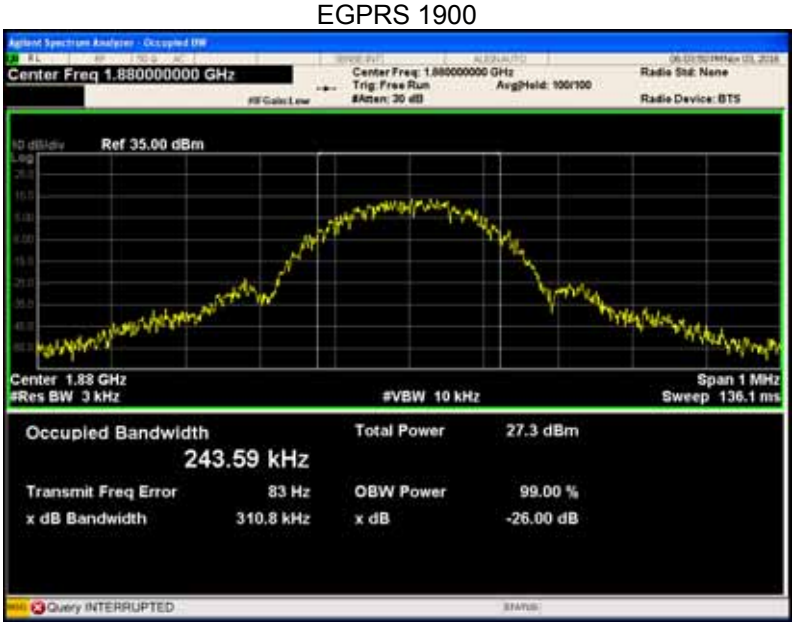
PCS 1900



GPRS 1900

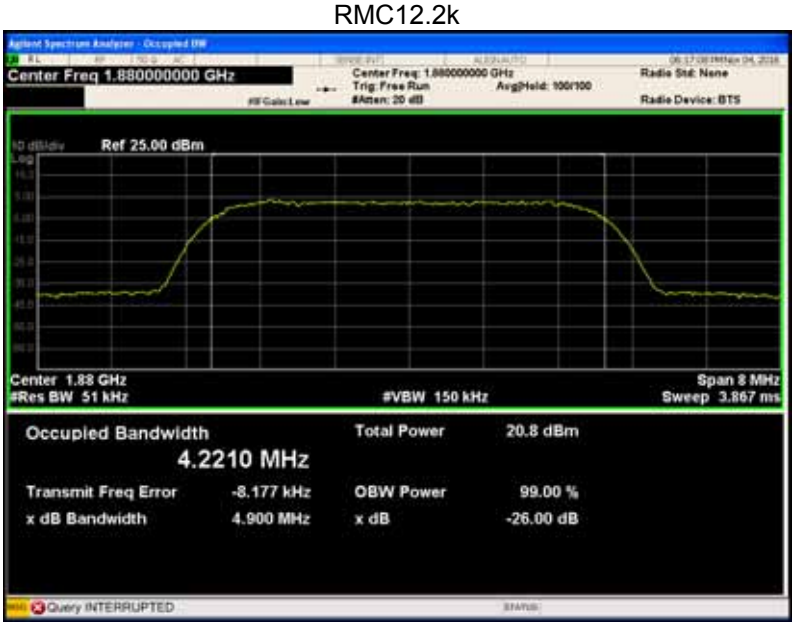


EGPRS 1900

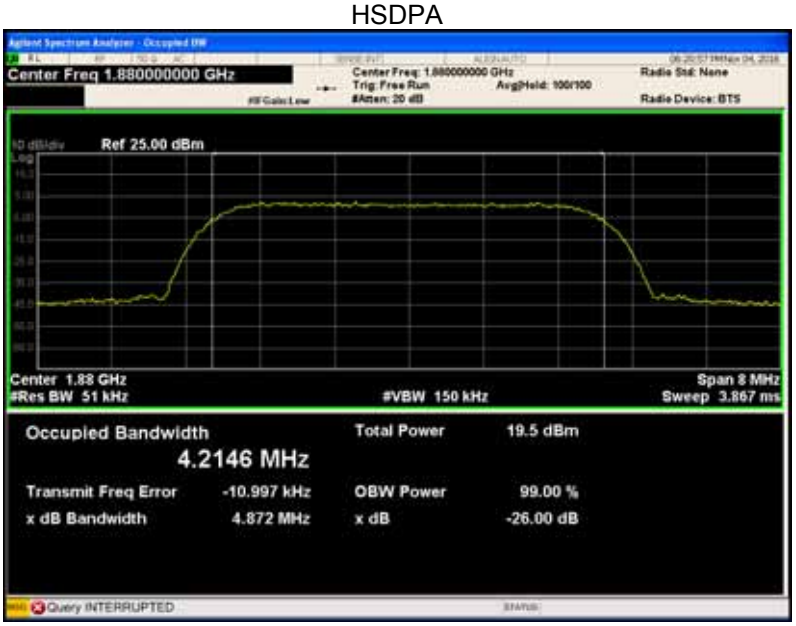


WCDMA band II

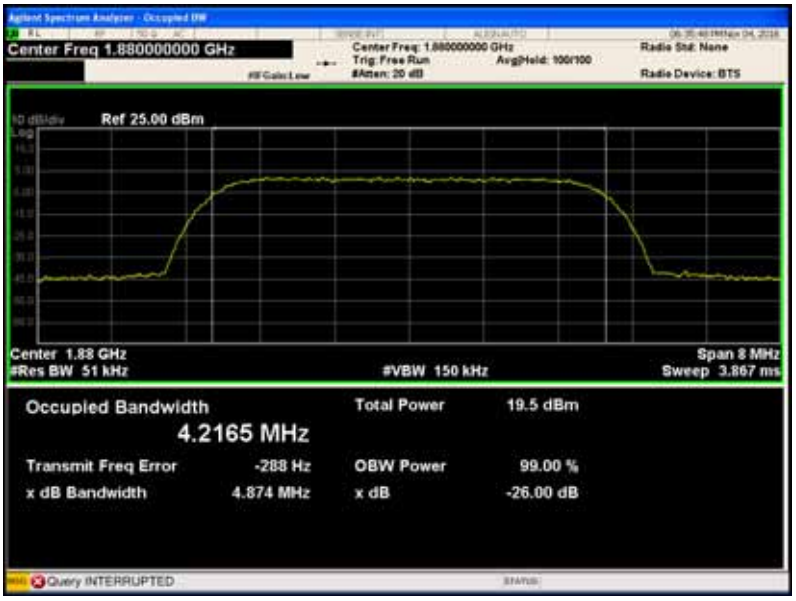
RMC12.2k



HSDPA


Center Freq 1.880000000 GHz
Center Freq: 1.880000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Ref 25.00 dBm
Center 1.88 GHz
#Res BW 51 kHz
#VBW 150 kHz
Span 8 MHz
Sweep 3.867 ms
Occupied Bandwidth
4.2146 MHz
Total Power 19.5 dBm
Transmit Freq Error -10.997 kHz
OBW Power 99.00 %
x dB Bandwidth 4.872 MHz
x dB -26.00 dB
Query INTERRUPTED

HSUPA


Center Freq 1.880000000 GHz
Center Freq: 1.880000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Ref 25.00 dBm
Center 1.88 GHz
#Res BW 51 kHz
#VBW 150 kHz
Span 8 MHz
Sweep 3.867 ms
Occupied Bandwidth
4.2165 MHz
Total Power 19.5 dBm
Transmit Freq Error -288 Hz
OBW Power 99.00 %
x dB Bandwidth 4.874 MHz
x dB -26.00 dB
Query INTERRUPTED

11 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	TIA/EIA-603-D:2010
	KDB971168 D01 v02r02
Test Mode:	TX transmitting

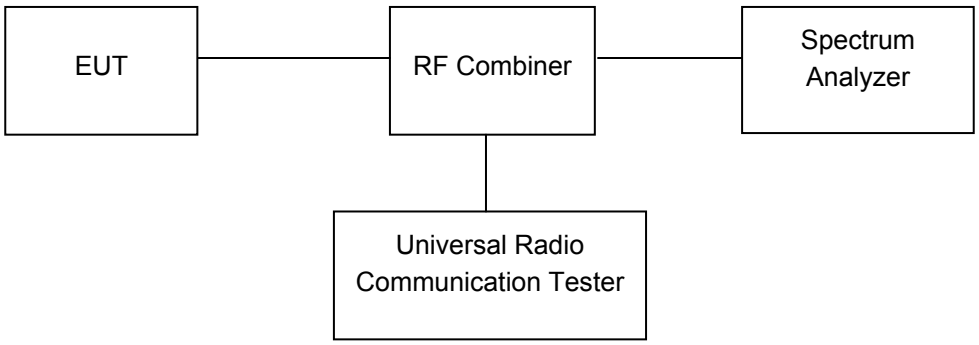
11.1 EUT Operation

Operating Environment **:**

Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.3kPa

11.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonics.



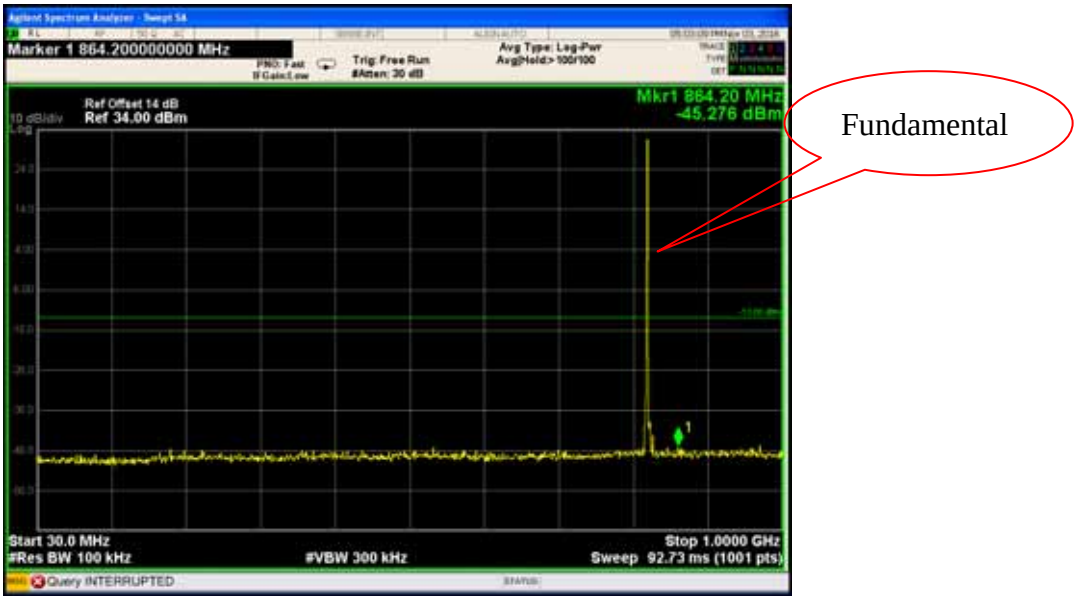
11.3 Test Result

Remark: only the worst data were recorded.

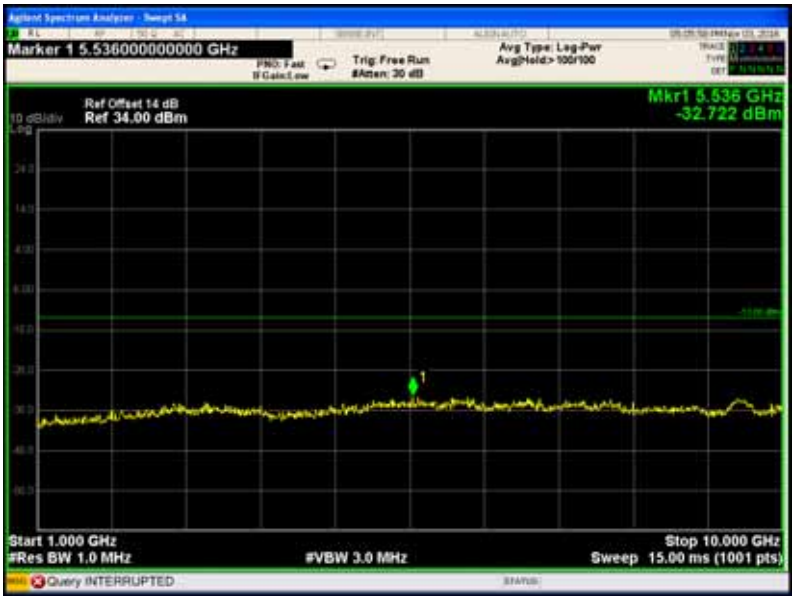
Cellular Band (Part 22H)

GSM 850 - channel 128

30MHz-1GHz



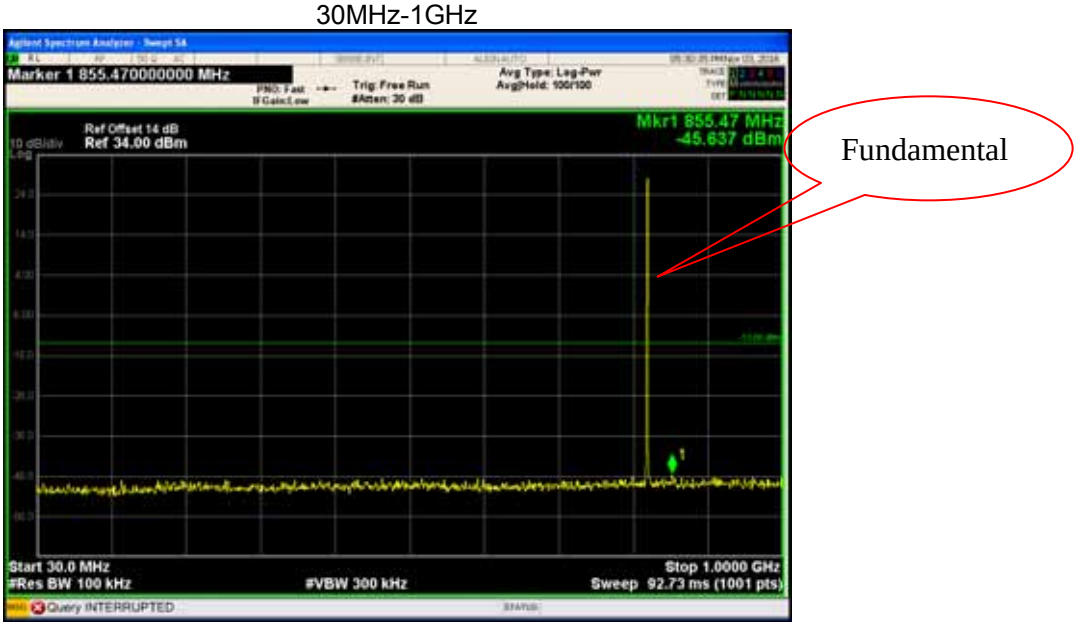
Above 1GHz



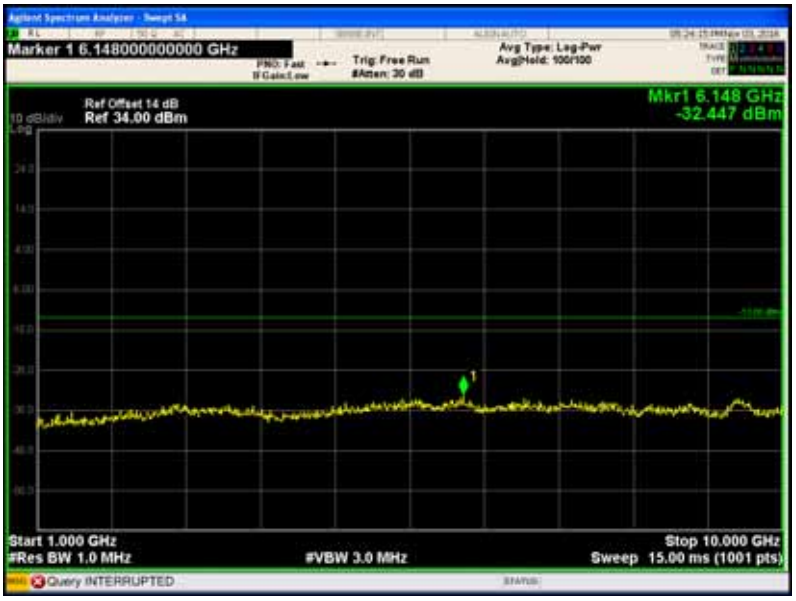
Cellular Band (Part 22H)

GPRS 850 - channel 128

30MHz-1GHz



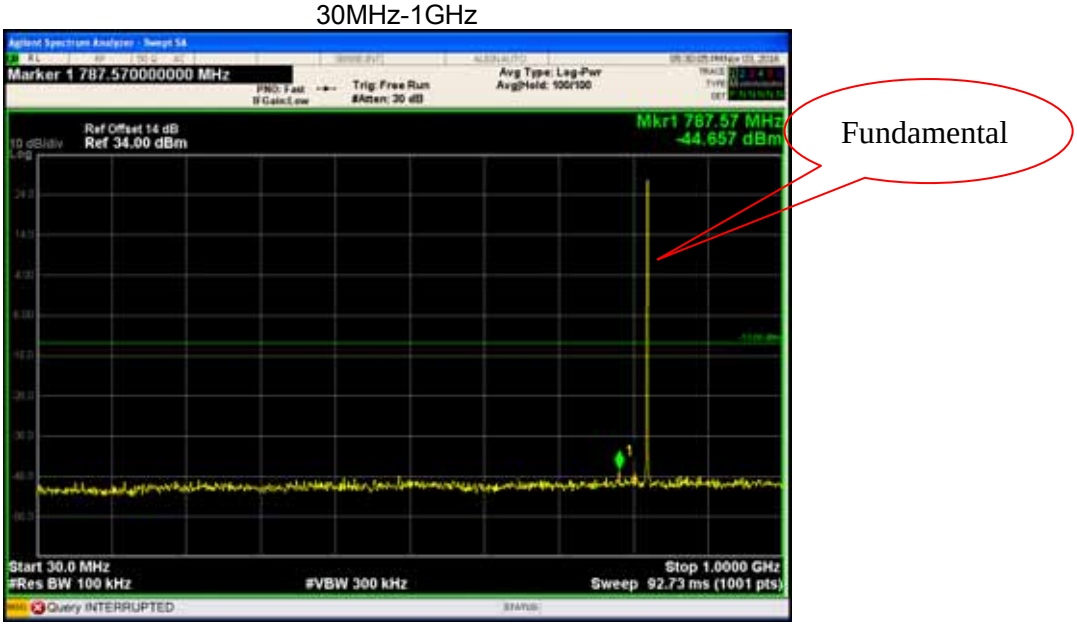
Above 1GHz



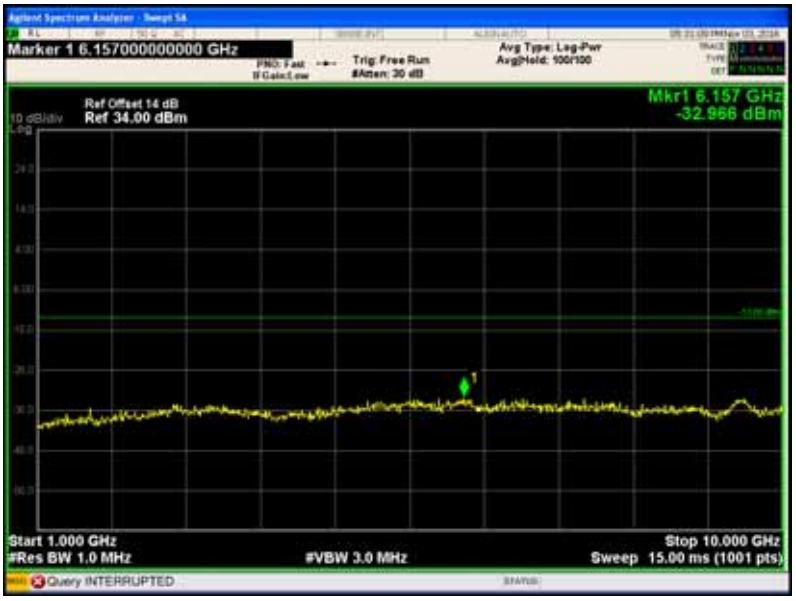
Cellular Band (Part 22H)

EGPRS 850 - channel 128

30MHz-1GHz



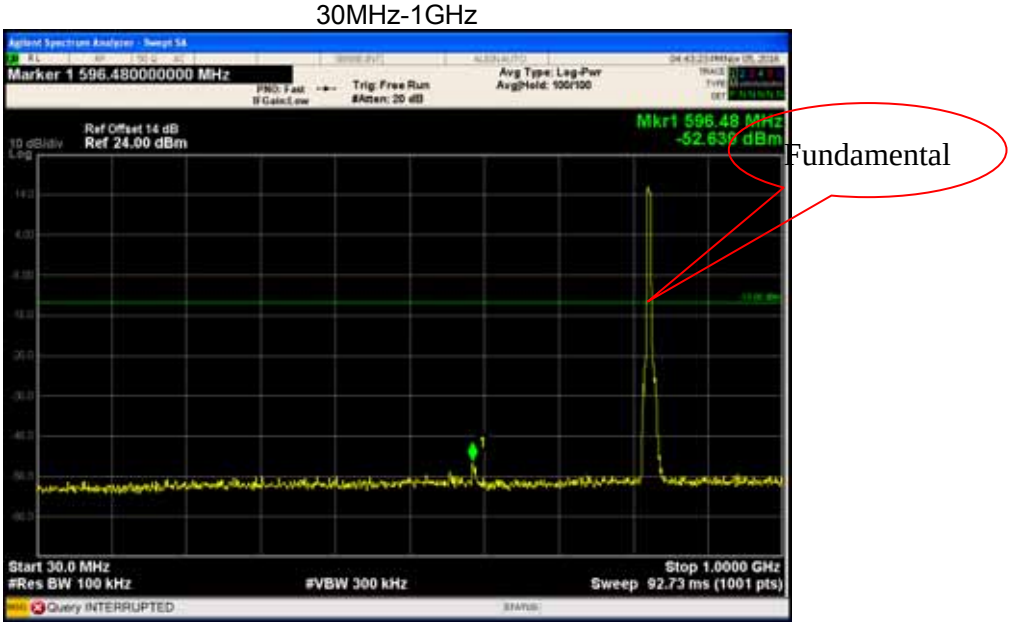
Above 1GHz



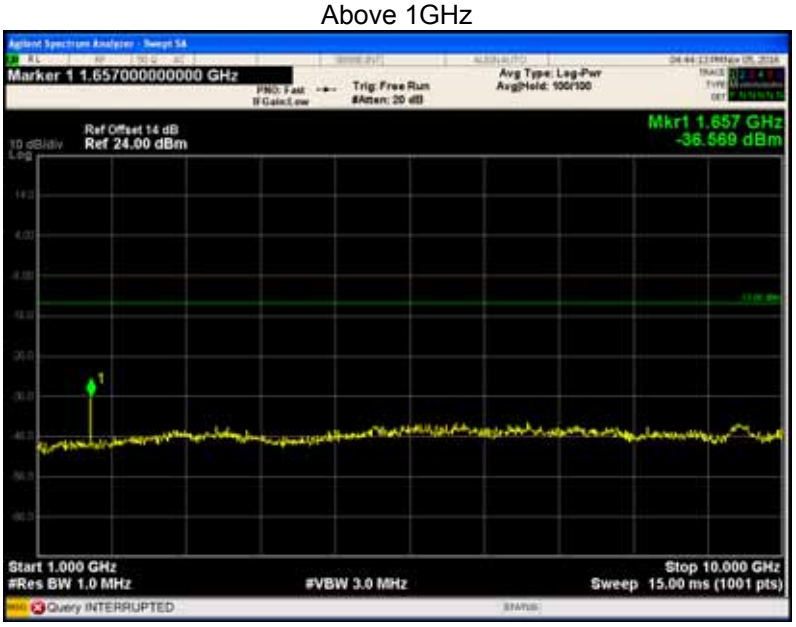
Cellular Band (Part 22H)

WCDMA band V - channel 4233

30MHz-1GHz



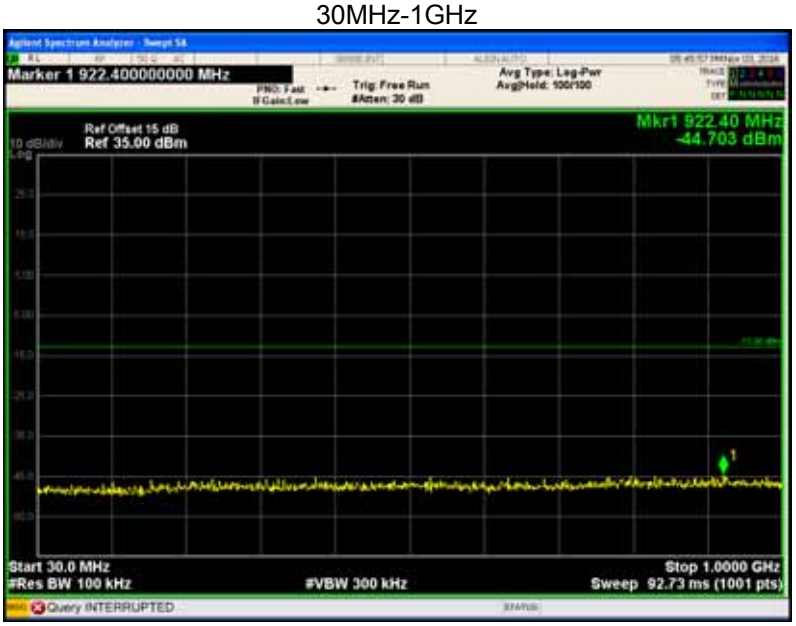
Above 1GHz



Cellular Band (Part 24E)

PCS 1900 - channel 512

30MHz-1GHz

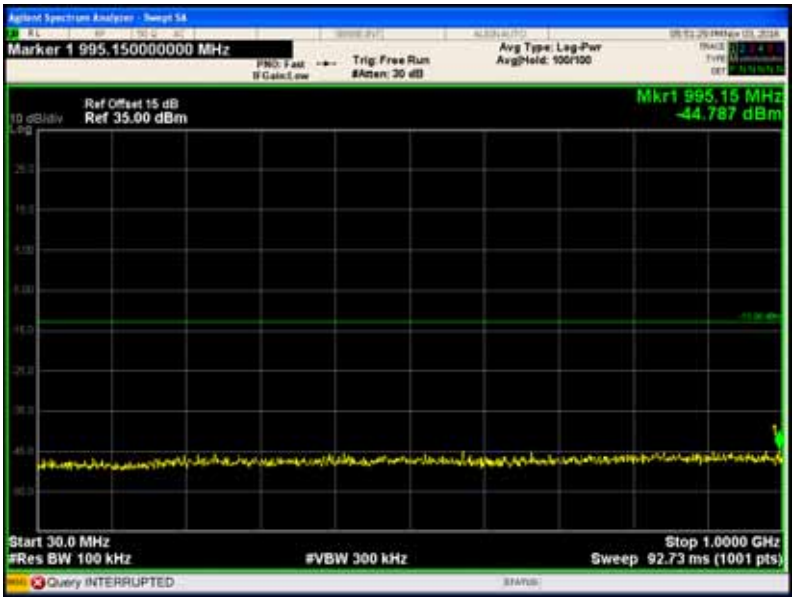


Above 1GHz

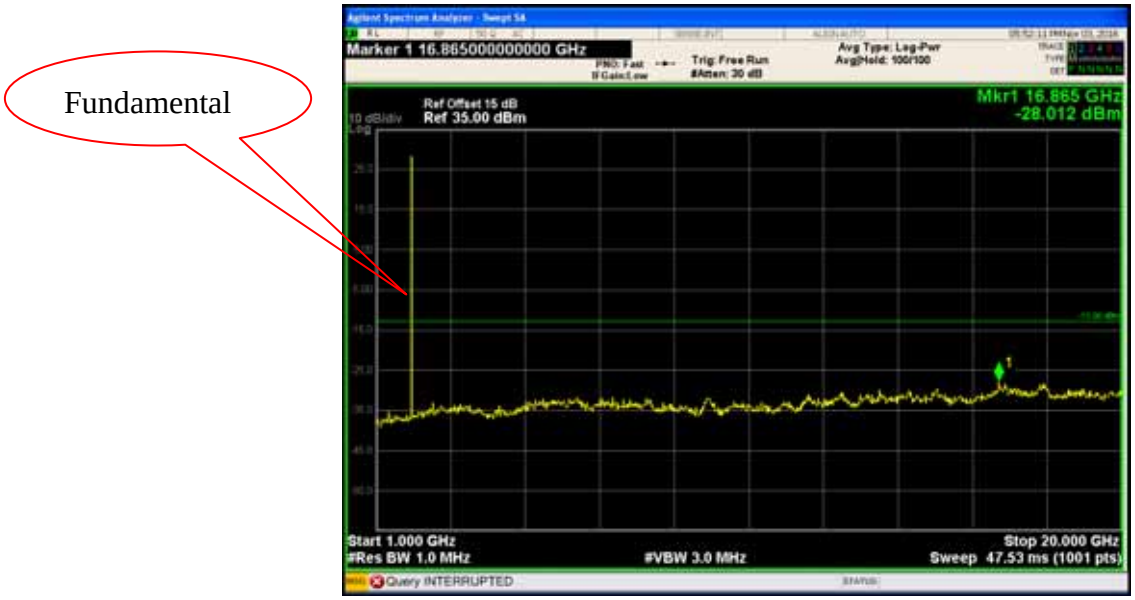
Cellular Band (Part 24E)

GPRS 1900 - channel 512

30MHz-1GHz



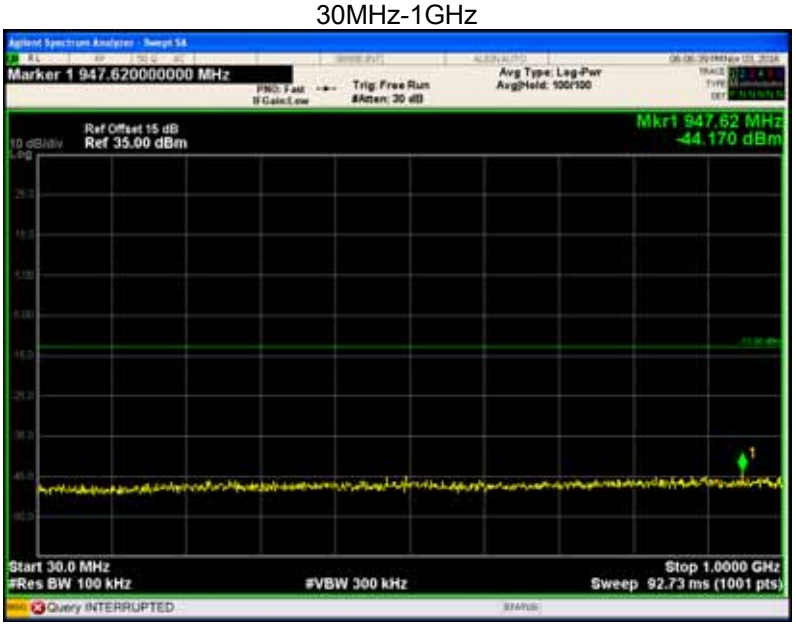
Above 1GHz



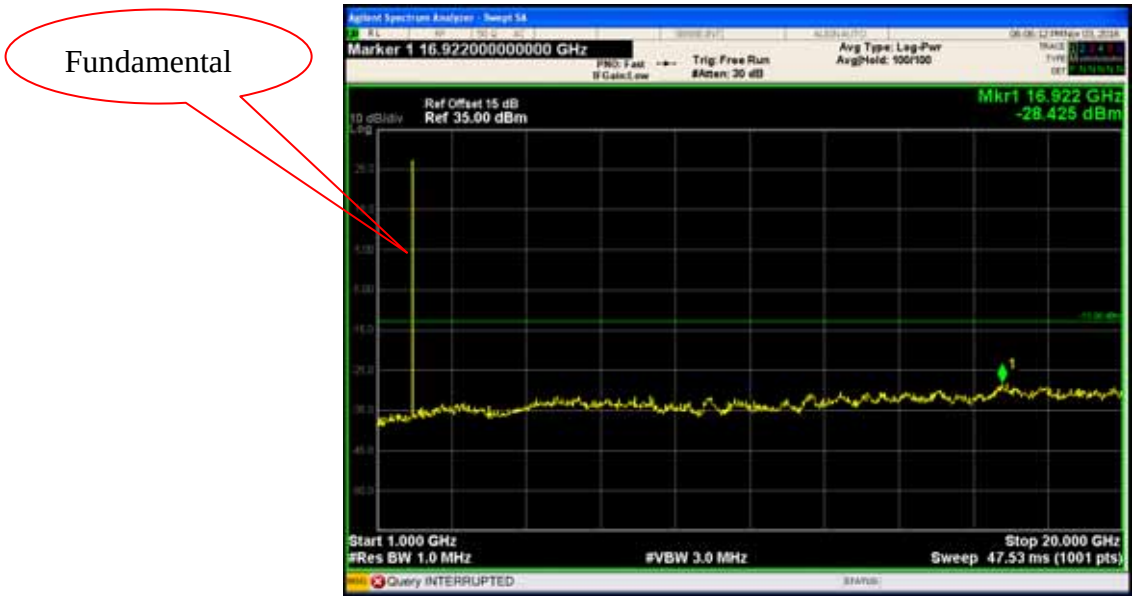
Cellular Band (Part 24E)

EGPRS 1900 - channel 512

30MHz-1GHz

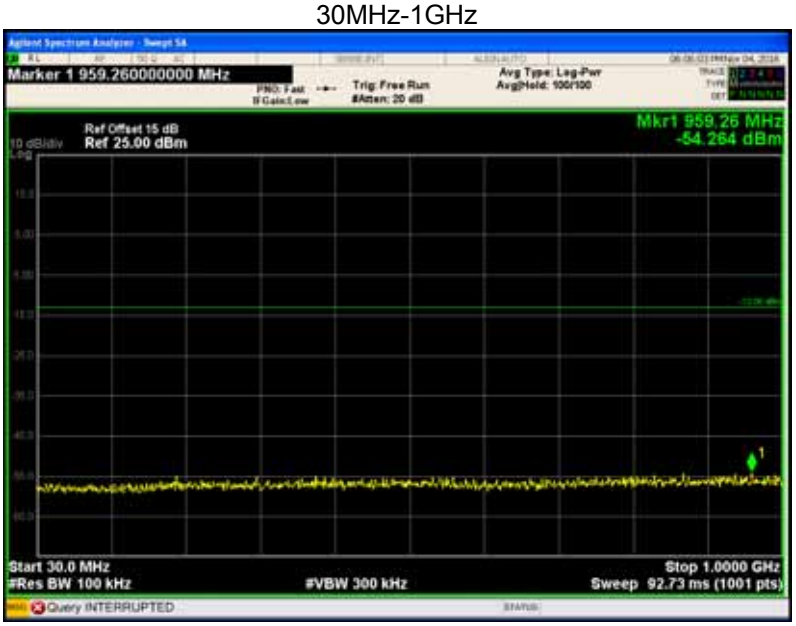


Above 1GHz

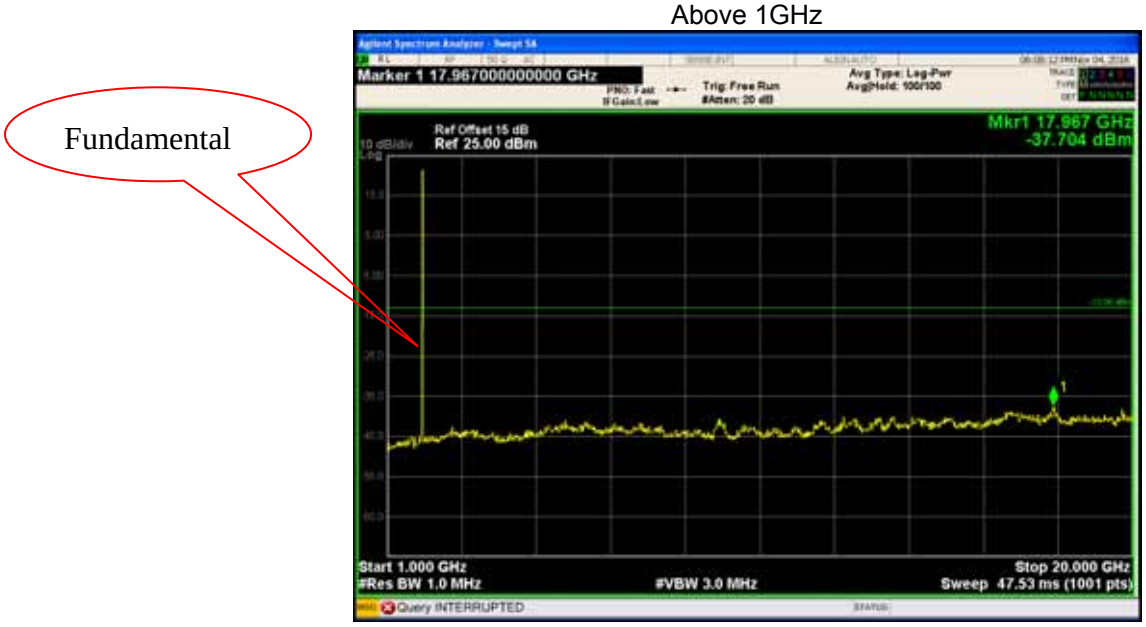


WCDMA band II - channel 9400

30MHz-1GHz



Above 1GHz



12 SPURIOUS RADIATED EMISSIONS

Test Requirement:	FCC Part 2.1053,22.917,24.238
Test Method:	TIA/EIA-603-D:2010
	KDB971168 D01 v02r02
Test Mode:	TX transmitting

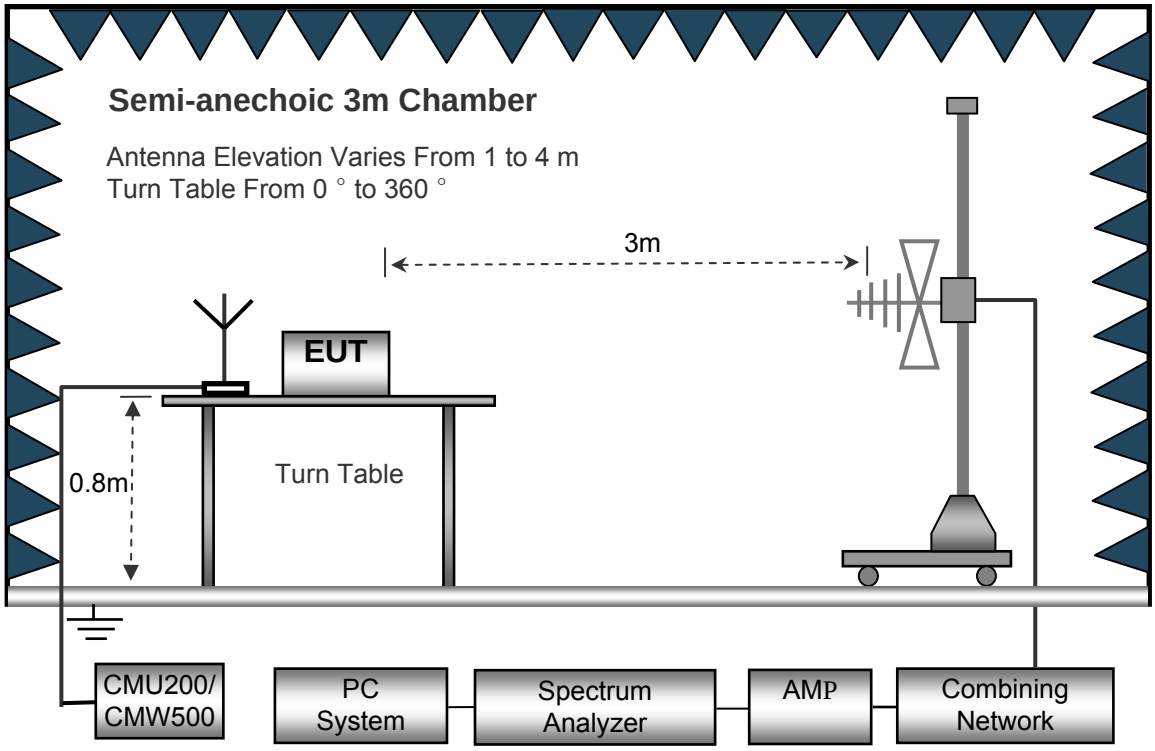
12.1 EUT Operation

Operating Environment **:**

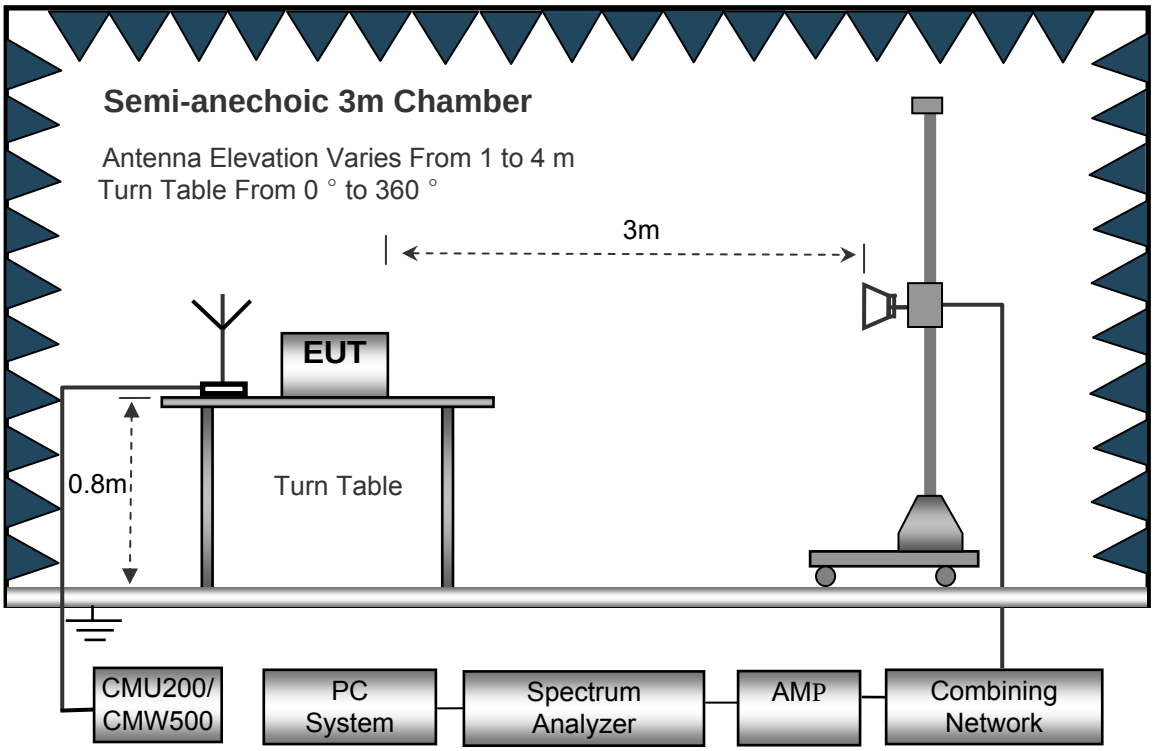
Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

12.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site.
The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



12.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector ..... Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

12.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.
   Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level
   Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts)
8. Repeat above procedures until the measurements for all frequencies are completed.

12.5 Summary of Test Results

For 26MHz~30MHz,

The measurements were more than 20 dB below the limit and not reported.

Remark: Test performed from 30MHz to 10th harmonics with low/middle/high channels, only the worst data were recorded.

Cellular Band (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
GSM 850 Channel 128										
216.37	41.36	357	1.0	H	-69.15	0.15	0.00	-69.30	-13.00	-56.30
216.37	43.17	292	1.4	V	-64.42	0.15	0.00	-64.57	-13.00	-51.57
1648.40	66.43	209	1.3	H	-47.54	0.30	9.40	-38.44	-13.00	-25.44
1648.40	58.33	161	1.9	V	-55.20	0.30	9.40	-46.10	-13.00	-33.10
2472.60	59.13	325	1.1	H	-54.87	0.43	10.60	-44.70	-13.00	-31.70
2472.60	48.94	289	2.1	V	-61.34	0.43	10.60	-51.17	-13.00	-38.17
WCDMA Band V Channel 4233										
216.37	40.88	205	1.2	H	-69.63	0.15	0.00	-69.78	-13.00	-56.78
216.37	43.70	135	1.7	V	-63.89	0.15	0.00	-64.04	-13.00	-51.04
1652.80	58.42	185	1.0	H	-55.55	0.30	9.40	-46.45	-13.00	-33.45
1652.80	49.10	253	2.2	V	-64.43	0.30	9.40	-55.33	-13.00	-42.33
2479.20	51.05	335	1.9	H	-62.95	0.43	10.60	-52.78	-13.00	-39.78
2479.20	40.07	74	1.4	V	-70.21	0.43	10.60	-60.04	-13.00	-47.04

Cellular Band (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
PCS 1900 Channel 512										
216.37	50.29	192	1.9	H	-60.22	0.15	0.00	-60.37	-13.00	-47.37
216.37	39.93	158	1.5	V	-67.66	0.15	0.00	-67.81	-13.00	-54.81
3700.40	65.95	309	1.3	H	-45.59	2.37	12.50	-35.46	-13.00	-22.46
3700.40	59.98	169	1.6	V	-49.83	2.37	12.50	-39.70	-13.00	-26.70
5550.60	53.58	338	1.2	H	-56.03	2.86	12.90	-45.99	-13.00	-32.99
5550.60	44.73	57	1.1	V	-64.15	2.86	12.90	-54.11	-13.00	-41.11
WCDMA Band II Channel 9400										
216.37	50.66	180	2.1	H	-59.85	0.15	0.00	-60.00	-13.00	-47.00
216.37	40.83	263	2.1	V	-66.76	0.15	0.00	-66.91	-13.00	-53.91
3704.80	58.45	292	1.5	H	-53.09	2.37	12.50	-42.96	-13.00	-29.96
3704.80	52.35	333	1.2	V	-57.46	2.37	12.50	-47.33	-13.00	-34.33
5557.20	47.35	124	1.8	H	-62.26	2.86	12.90	-52.22	-13.00	-39.22
5557.20	37.78	28	1.2	V	-71.10	2.86	12.90	-61.06	-13.00	-48.06

Note: 1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

13 Band Edge Measurement

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	TIA/EIA-603-D:2010
	KDB971168 D01 v02r02
Test Mode:	TX transmitting

13.1 EUT Operation

Operating Environment **:**

Temperature:	23.5 °C
Humidity:	52.3 % RH
Atmospheric Pressure:	101.3kPa

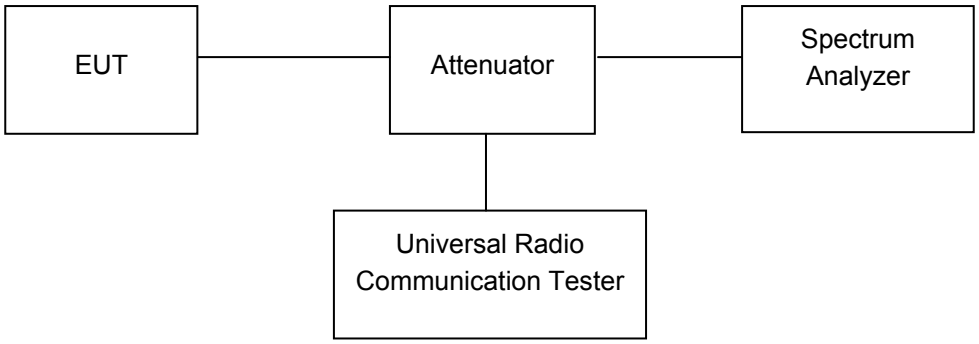
13.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

According to FCC Part 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the TX transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC Part 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the TX transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The center of the spectrum analyzer was set to block edge frequency



13.3 Test Result

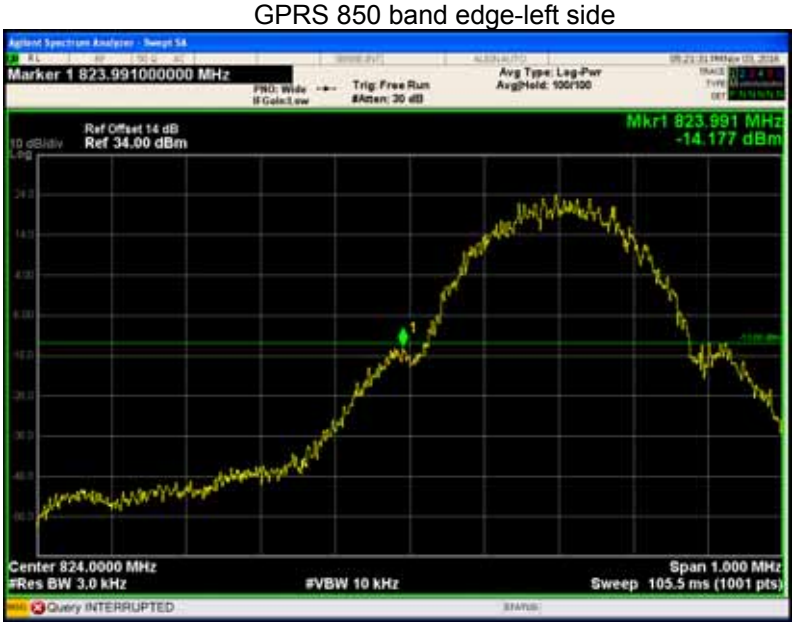
Test plots

Cellular Band (Part 22H)

GSM 850 band edge-left side

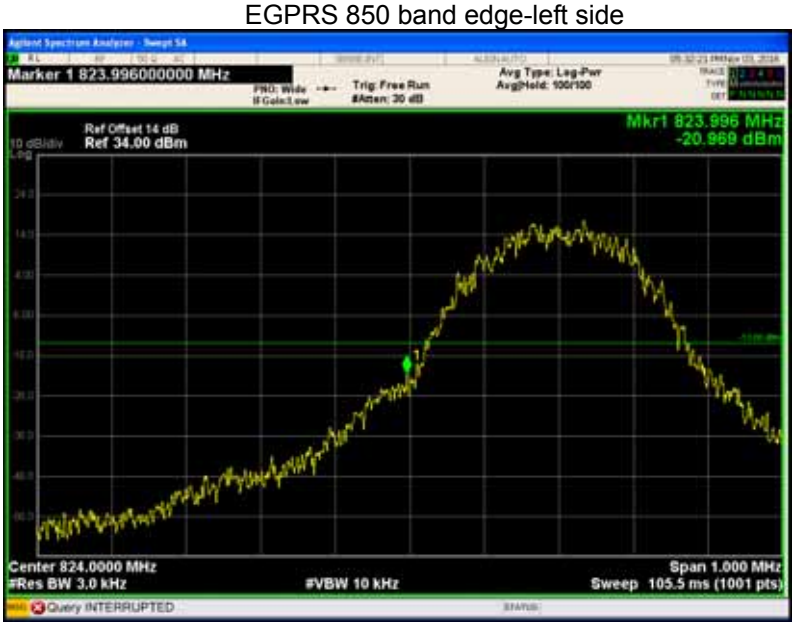
GSM 850 band edge-right side

GPRS 850 band edge-left side

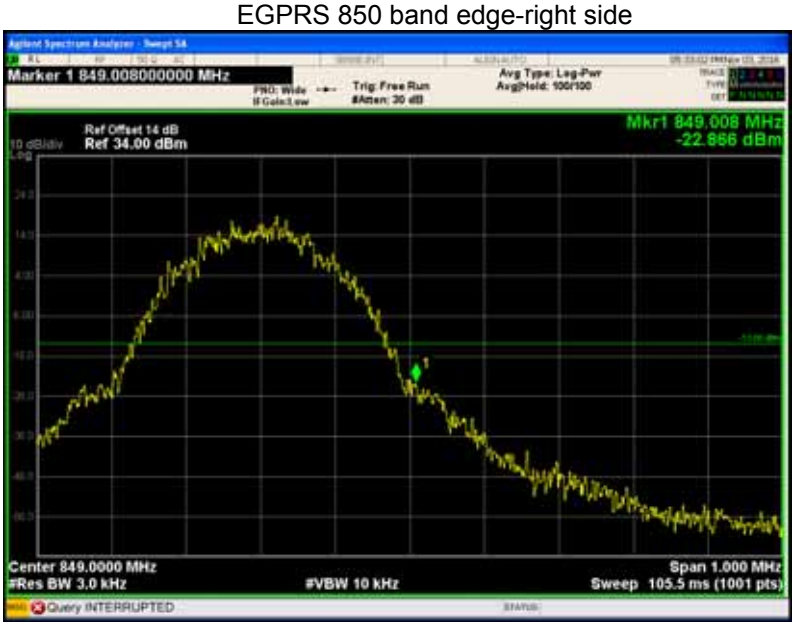


GPRS 850 band edge-right side

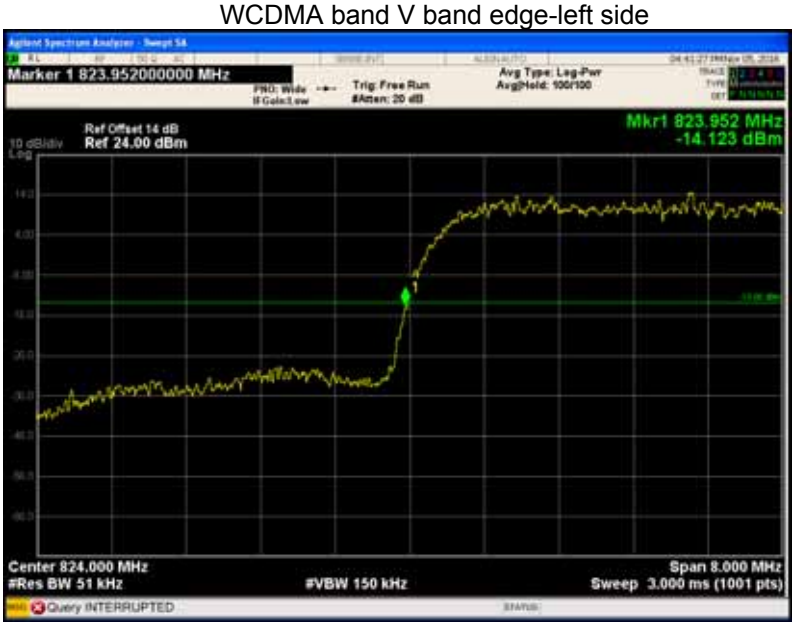
EGPRS 850 band edge-left side



EGPRS 850 band edge-right side



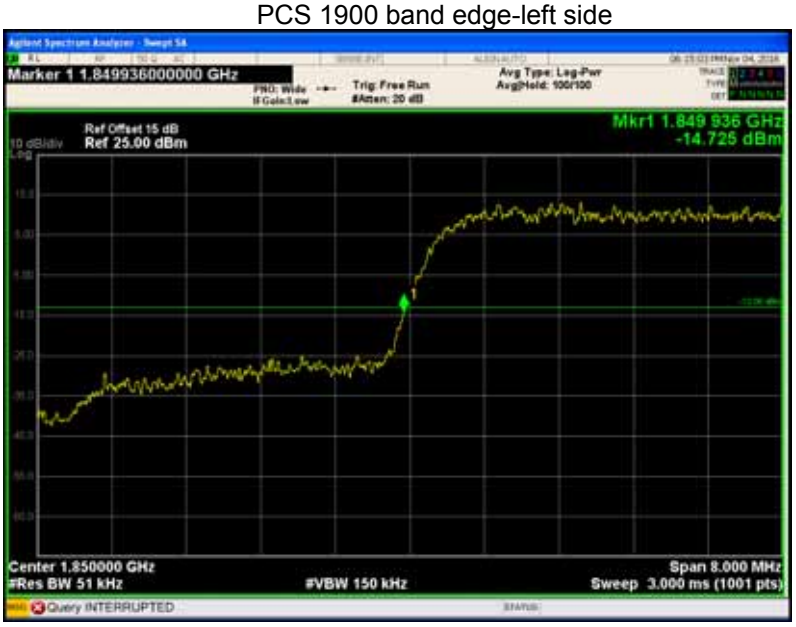
WCDMA band V band edge-left side



WCDMA band V band edge-right side

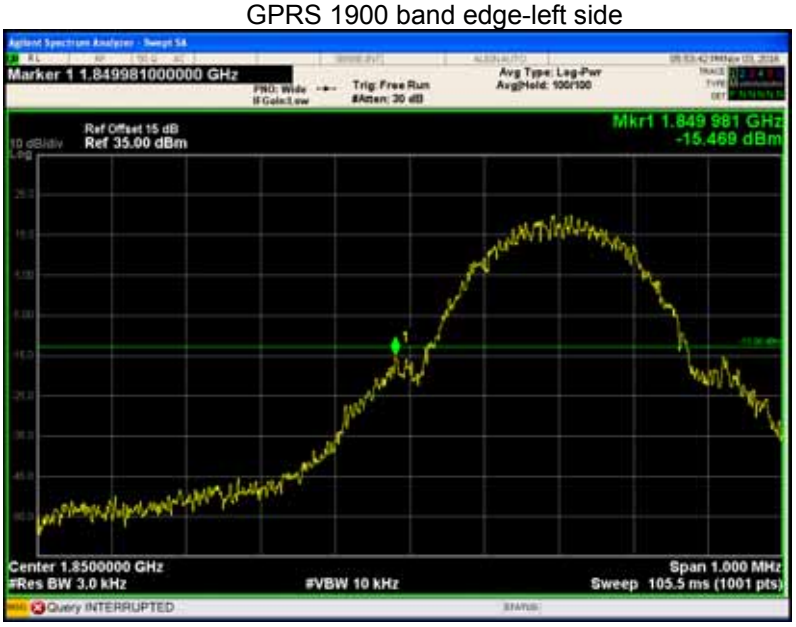
Cellular Band (Part 24E)

PCS 1900 band edge-left side



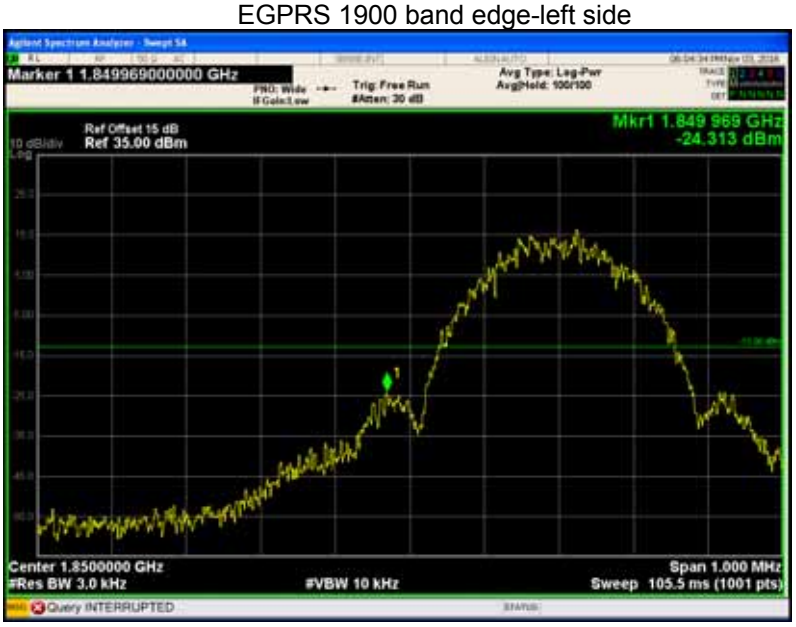
PCS 1900 band edge-right side

GPRS 1900 band edge-left side



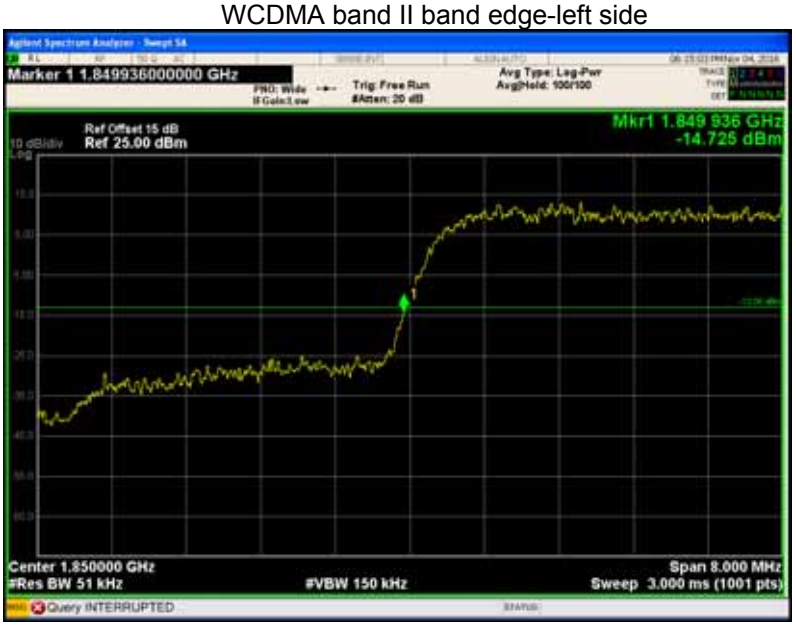
GPRS 1900 band edge-right side

EGPRS 1900 band edge-left side



EGPRS 1900 band edge-right side

WCDMA band II band edge-left side



WCDMA band II band edge-right side

14 FREQUENCY STABILITY

Test Requirement: FCC Part 2.1055,22.355,24.235

Test Method: TIA/EIA-603-D:2010

KDB971168 D01 v02r02

Test Mode: TX transmitting

14.1 EUT Operation

Operating Environment **:**

Temperature: 22.9 °C

Humidity: 52.0 % RH

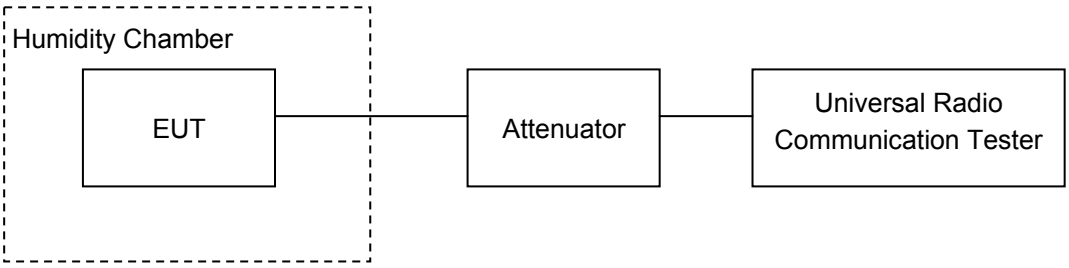
Atmospheric Pressure: 101.3kPa

14.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



14.3 Test Result

Cellular Band (Part 22H)

GSM 850 Test Frequency:836.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	8	0.0096	2.5
40		-3	-0.0036	2.5
30		11	0.0131	2.5
20		2	0.0024	2.5
10		8	0.0096	2.5
0		11	0.0131	2.5
-10		10	0.0120	2.5
-20		-6	-0.0072	2.5
-30		10	0.0120	2.5
20	3.3	-6	-0.0072	2.5
20	4.2	1	0.0012	2.5

GPRS 850 Test Frequency:836.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-8	-0.0096	2.5
40		-8	-0.0096	2.5
30		-8	-0.0096	2.5
20		-1	-0.0012	2.5
10		6	0.0072	2.5
0		-2	-0.0024	2.5
-10		-1	-0.0012	2.5
-20		-3	-0.0036	2.5
-30		-5	-0.0060	2.5
20	3.3	-2	-0.0024	2.5
20	4.2	7	0.0084	2.5

EGPRS 850 Test Frequency:836.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-7	-0.0084	2.5
40		3	0.0036	2.5
30		9	0.0108	2.5
20		2	0.0024	2.5
10		6	0.0072	2.5
0		0	0.0000	2.5
-10		-5	-0.0060	2.5
-20		5	0.0060	2.5
-30		3	0.0036	2.5
20	3.3	7	0.0084	2.5
20	4.2	7	0.0084	2.5

WCDMA Band V Test Frequency:836.6MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-9	-0.0108	2.5
40		7	0.0084	2.5
30		-2	-0.0024	2.5
20		0	0.0000	2.5
10		-6	-0.0072	2.5
0		5	0.0060	2.5
-10		-4	-0.0048	2.5
-20		4	0.0048	2.5
-30		-5	-0.0060	2.5
20	3.3	3	0.0036	2.5
20	4.2	-6	-0.0072	2.5

PCS Band (Part 24E)

PCS 1900 Test Frequency:1880.0MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	13	0.0069	2.5
40		7	0.0037	2.5
30		3	0.0016	2.5
20		4	0.0021	2.5
10		1	0.0005	2.5
0		13	0.0069	2.5
-10		-1	-0.0005	2.5
-20		4	0.0021	2.5
-30		-3	-0.0016	2.5
20	3.3	3	0.0016	2.5
20	4.2	3	0.0016	2.5

GPRS 1900 Test Frequency:1880.0MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	1	0.0005	2.5
40		-5	-0.0027	2.5
30		7	0.0037	2.5
20		3	0.0016	2.5
10		-1	-0.0005	2.5
0		7	0.0037	2.5
-10		-3	-0.0016	2.5
-20		-4	-0.0021	2.5
-30		6	0.0032	2.5
20	3.3	-3	-0.0016	2.5
20	4.2	2	0.0011	2.5

EGPRS 1900 Test Frequency:1880.0MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	-14	-0.0074	2.5
40		-7	-0.0037	2.5
30		-2	-0.0011	2.5
20		-8	-0.0043	2.5
10		-1	-0.0005	2.5
0		-1	-0.0005	2.5
-10		-7	-0.0037	2.5
-20		-15	-0.0080	2.5
-30		-1	-0.0005	2.5
20	3.3	-4	-0.0021	2.5
20	4.2	-14	-0.0074	2.5

WCDMA Band II Test Frequency:1880.0MHz				
Temperature (℃)	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	3	0.0016	2.5
40		10	0.0053	2.5
30		-3	-0.0016	2.5
20		2	0.0011	2.5
10		3	0.0016	2.5
0		-2	-0.0011	2.5
-10		-2	-0.0011	2.5
-20		0	0.0000	2.5
-30		-5	-0.0027	2.5
20	3.3	-2	-0.0011	2.5
20	4.2	7	0.0037	2.5

15 RF Exposure

Remark: refer to SAR test report: WTS16S0961011E.

16 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS16S0961012E_Photo.

====== End of Report ======