FCC TEST REPORT

FCC ID : YM2FWT

Applicant : Navitel Incorporated
Address of Applicant : 138 Mountain Brook Drive Canton,GA 30115 U.S.A

Equipment Under Test (EUT) :

Product description : Fixed Wireless Terminal
Model No. : G4000 Series FWT
Frequency Range : TX: 824.2 ~ 848.8 MHz / 1850.2 ~ 1909.8 MHz
RX: 869.2 ~ 893.8 MHz / 1930.2 ~ 1989.8 MHz

Standards : FCC 47 CFR PART 22 SUBPART H
FCC 47 CFR PART 24 SUBPART E

Date of Test : July 10~20, 2010

Tested By : Zero Zhou/

Reviewed By : Philo Zhong/

Test Result :	**PASS ***

PERPARED BY:
Waltek Services (Shenzhen) Co., Ltd.
1/F, Fukangtai Building,West Baima Rd.,Songgang Street, Baoan District, Shenzhen 518105,China

Tel :86-755-27553488

Fax: 86-755-27553868

The sample detailed above has been tested to compliance with FCC 47 CFR Part22 and Part24 of the FCC rules. The test results have been reviewed against the rules above and found to meet their essential requirements.

2 Contents

3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Spurious Radiation Emissions	§ 2.1053, § 22.917(a), § 24.238(a)	ANSI/TIA-603-C: 2004	N/A	PASS
RF Output Power	§ 2.1046, § 22.913(a), § 24.232(c)	ANSI/TIA-603-C: 2004	N/A	PASS
Emission Bandwidth	§ 2.1049, § 22.917(b), § 24.238(b)	ANSI/TIA-603-C: 2004	N/A	PASS
Spurious Emissions at Antenna Terminal	§ 2.1051, § 22.917(a), § 24.238(a)	ANSI/TIA-603-C: 2004	N/A	PASS
Out of Band Emissions	§ 22.917(a), § 24.238(a)	ANSI/TIA-603-C: 2004	N/A	PASS
Frequency Stability	§ 2.1055, § 22.355, § 24.235	ANSI/TIA-603-C: 2004	N/A	PASS
RF Exposure	§ 2.1091	ANSI/TIA-603-C: 2004	N/A	PASS

4 General Information

4.1 Client Information

Applicant:	Navitel Incorporated
Address of Applicant:	138 Mountain Brook Drive Canton,GA 30115 U.S.A
Manufacturer Name:	FUNCTION ATI(HUIHZOU) TELECOMMUNICATION CO.,LTD.
Address of Manufacturer:	No. 6, Huifeng East 2 Road,Zhongkai Hi-Tech Industrial Development Zone,Huizhou,Guangdong,China

4.2 General Description of E.U.T.

Product description:	Fixed Wireless Terminal
Model No.:	G4000 Series FWT
Model Description:	The circuit diagram and components of PCB of all models are identical except model name.G4000 is the test sample.

Model List:

G4000	G4001	G4002	G4003	G4004
G4005	G4006	G4007	G4008	G4009

4.3 Details of E.U.T.

Power Supply:	DC 12V 1A powered by SWITCHING POWER SUPPLY (INPUT:100-240V~ 47-63Hz 1.5A)

4.4 Description of Support Units

The EUT has been tested as an independent unit. The EUT is subscriber equipment in the GSM system.The GSM frequency band includes 850M and PCS 1900M, and implements such functions as RF signal receiving/transmitting,GSM protocol processing etc.Externally it provides a interface(for updating its software version by the manufacturer),SIM card interface.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Fixed Wireless Terminal. The standards used were FCC PART 22 Subpart H and PART 24 Subpart E.

4.6 Test Facility

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

- **FCC – 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,June 24， 2008.
- **IC – Registration No.: 7760A**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory 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 No.:7760A,August 3, 2010.

4.7 Test Location

All Emission tests were performed at:-
1/F, Fukangtai Building,West Baima Rd.,Songgang Street, Baoan District, Shenzhen 518105, Guangdong, China.

5 Equipment Used during Test

Equipment	Brand Name	Model	Related standards	Due date	Last Cal. Date	Serial No
3m Semi-anechoic chamber						
EMC Analyzer	Agilent	E7405A	ISO9001:2000	Jan-2011	Jan-2010	MY45114943
Trilog Broadband Antenne 30-3000 MHz	SCHWARZBECK MESS-ELEKTROM	VULB9163	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	336
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM	BBHA 9120 D	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	667
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM	BBV 9718	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	9718-148
10m Coaxial Cable with N-male Connectors usable	SCHWARZBECK MESS-ELEKTROM	AK 9515 H	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	-
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM	AK 9513	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	-
Positioning Controller	C&C LAB	CC-C-IF	ISO9001	Jan-2011	Jan-2010	MF7802108
Color Monitor	SUNSPO	SP-14C	ISO9001	Jan-2011	Jan-2010	-
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	W2005002
Universal Radio Communication Tester	Rohde&Schwarz	CMU200	ISO9001 EN/ISO/IEC 17025	Jan-2011	Jan-2010	112012
EMI Shielded Room						
Test Receiver	ROHDE&SCHWARZ	ESPI	ISO9001	Jan-2011	Jan-2010	101155
Two-Line V-Network	ROHDE&SCHWARZ	ENV216	ISO9001 EN/ISO/IEC 17025	Jan-2011	Jan-2010	100115
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	ISO9001 EN/ISO/IEC 17025	Jan-2011	Jan-2010	100205
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM	AK 9514	EN/ISO/IEC 17025 DIN EN ISO9001	Jan-2011	Jan-2010	-

6 Spurious Radiation Emissions Test

Test Requirement:	CFR47 § 2.1053, § 22.917 and § 24.238
Test Method:	ANSI/TIA-603-C: 2004
Test Result:	PASS
Frequency Range:	up to tenth harmonics of the fundamental frequency
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

Operating Environment:

Temperature:	25.0 °C
Humidity:	55 % RH
Barometric Pressure:	1012 mbar

6.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at WALTEK SERVICES EMC Lab is ±5.03 dB.

6.2 Test Procedure

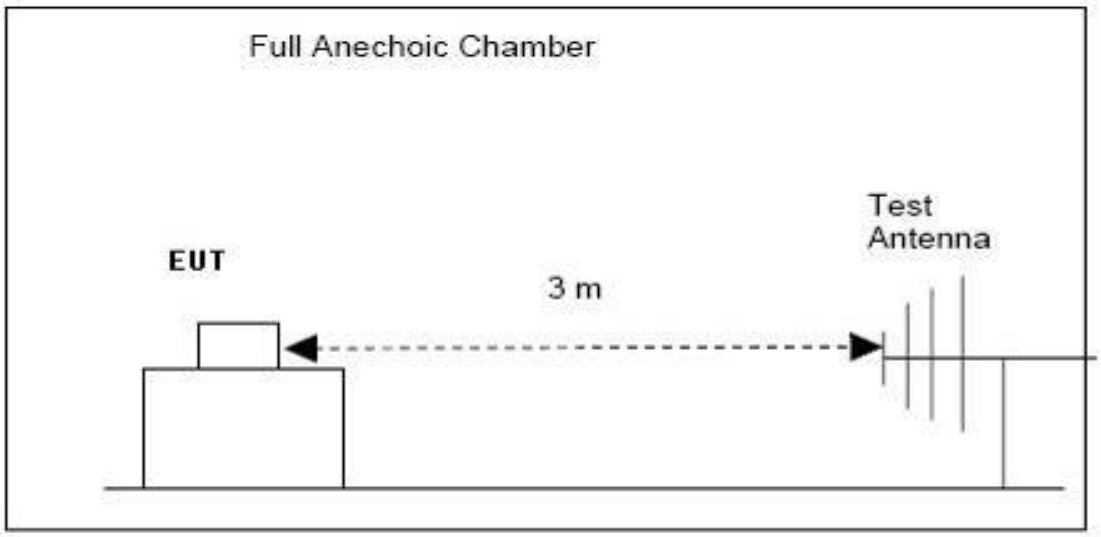
1. The setup of EUT is according with per TIA/EIA Standard 603C and ANSI C63.4-2003 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the test ,the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum 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 harmonics 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.

Spurious attenuation limit in dB=$43+10\log_{10}$(power out in Watts)

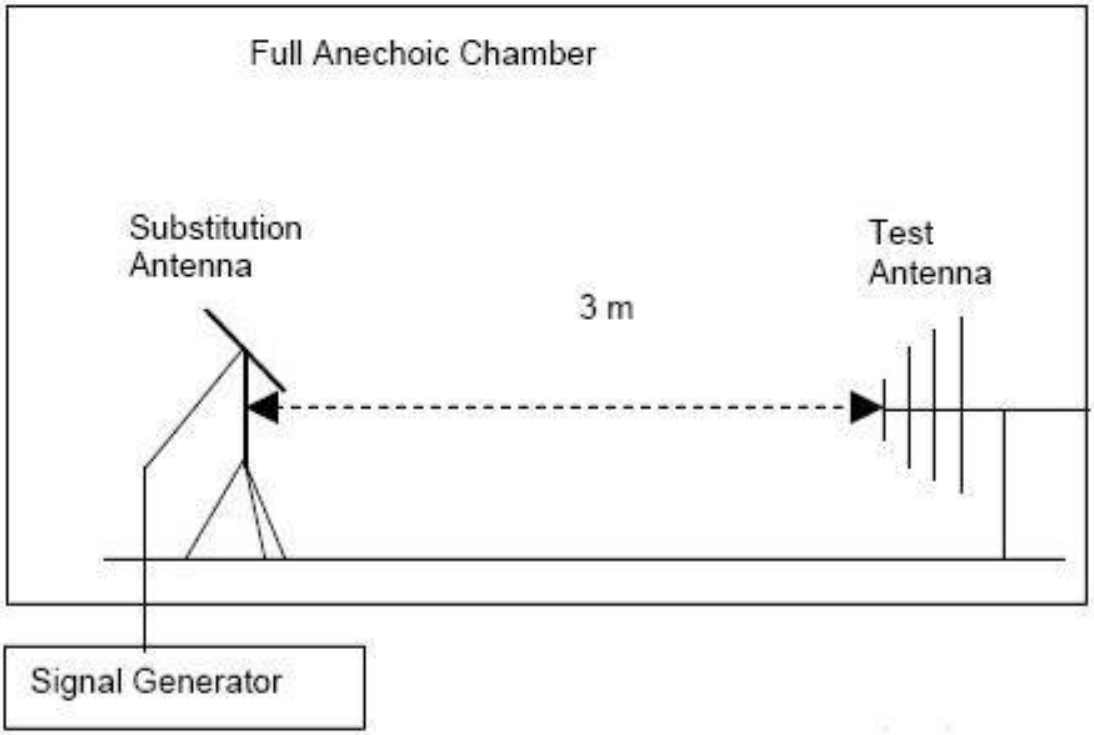
6.3 Test Setup

The radiated emission tests were performed in the 3m Anechoic Chamber test site, using the setup accordance with the ANSI/TIA-603-C: 2004.

Step 1:Pretest



Step 2:Substitution method to verify the maximum ERP



6.4 Spectrum Analyzer Setup

Below 1GHz
Sweep Speed.....Auto
IF Bandwidth.....120 kHz
Video Bandwidth.....100kHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 100kHz

Above 1GHz
Sweep Speed.....Auto
IF Bandwidth.....120 kHz
Video Bandwidth.....1MHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 1MHz

6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor – Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

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)

6.6 Spurious Radiation Emissions Test Result

Substitution method

GSM 850MHz

Below 1GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

Above 1GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
Lowest Channel											
1646.58	57.33	210	1.0	H	1646.58	-42.3	2.03	0.6	-42.9	-13	27.87
1650.00	55.16	226	1.2	V	1650.00	-41.2	2.03	0.6	-41.8	-13	26.77
Middle Channel											
1671.42	57.55	224	1.0	H	1671.42	-41.1	2.03	0.6	-41.7	-13	26.67
1670.18	55.27	233	1.2	V	1670.18	-41.8	2.03	0.6	-42.4	-13	27.37
Highest Channel											
1696.63	57.48	229	1.0	H	1696.63	-42.6	2.03	0.6	-43.2	-13	28.17
1696.54	55.21	227	1.2	V	1696.54	-42.4	2.03	0.6	-43.0	-13	27.97

GPRS 850MHz

Below 1GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

Above 1GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
Lowest Channel											
1646.54	57.68	216	1.0	H	1646.54	-42.8	2.03	0.6	-43.4	-13	28.37
1650.01	56.39	221	1.2	V	1650.01	-41.7	2.03	0.6	-42.3	-13	27.27
Middle Channel											
1671.47	57.27	228	1.0	H	1671.47	-41.6	2.03	0.6	-42.2	-13	27.17
1670.12	55.15	236	1.2	V	1670.12	-42.1	2.03	0.6	-42.7	-13	27.67
Highest Channel											
1696.65	57.31	222	1.0	H	1696.65	-41.3	2.03	0.6	-41.9	-13	26.87
1696.59	55.86	224	1.2	V	1696.59	-42.1	2.03	0.6	-42.7	-13	27.67

GSM 1900MHz

Below 1GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

Above 1 GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
Lowest Channel											
3701.55	68.14	44	1.1	V	3701.55	-32.0	7.3	0.8	-25.50	-13	12.50
5552.63	52.35	124	1.2	V	5552.63	-45.7	6.2	1.2	-40.70	-13	27.70
7404.52	45.25	304	1.1	V	7404.52	-49.3	6.7	1.4	-44.00	-13	31.00
3698.55	71.67	63	1.3	H	3698.55	-30.1	7.3	0.8	-23.60	-13	10.60
5551.67	55.58	115	1.3	H	5551.67	-42.0	6.2	1.2	-37.00	-13	24.00
7403.28	48.36	220	1.5	H	7403.28	-45.2	6.7	1.4	-39.90	-13	26.90
Middle Channel											
3758.62	67.35	49	1.1	V	3758.62	-33.7	7.2	0.9	-27.40	-13	14.40
5639.87	53.93	128	1.2	V	5639.87	-46.8	6.1	1.3	-42.00	-13	29.00
7519.93	44.16	301	1.1	V	7519.93	-50.6	6.6	1.5	-45.50	-13	32.50
3759.68	69.83	67	1.3	H	3759.68	-31.3	7.2	0.9	-25.00	-13	12.00
5639.38	55.01	118	1.3	H	5639.38	-43.7	6.1	1.3	-38.90	-13	25.90
7519.57	47.66	227	1.5	H	7519.57	-46.5	6.6	1.5	-41.40	-13	28.40
Highest Channel											
3818.71	67.67	46	1.1	V	3818.71	-33.6	7.5	1.1	-27.20	-13	14.20
5728.41	51.38	127	1.2	V	5728.41	-46.3	6.4	1.4	-41.30	-13	28.30
7637.33	44.95	309	1.1	V	7637.33	-49.7	6.6	1.6	-44.70	-13	31.70
3818.01	70.09	68	1.3	H	3818.01	-31.6	7.5	1.1	-25.20	-13	12.20
5728.76	54.61	119	1.3	H	5728.76	-43.8	6.4	1.4	-38.80	-13	25.80
7637.29	47.02	227	1.5	H	7637.29	-46.1	6.6	1.6	-41.10	-13	28.10

GPRS 1900MHz

Below 1GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

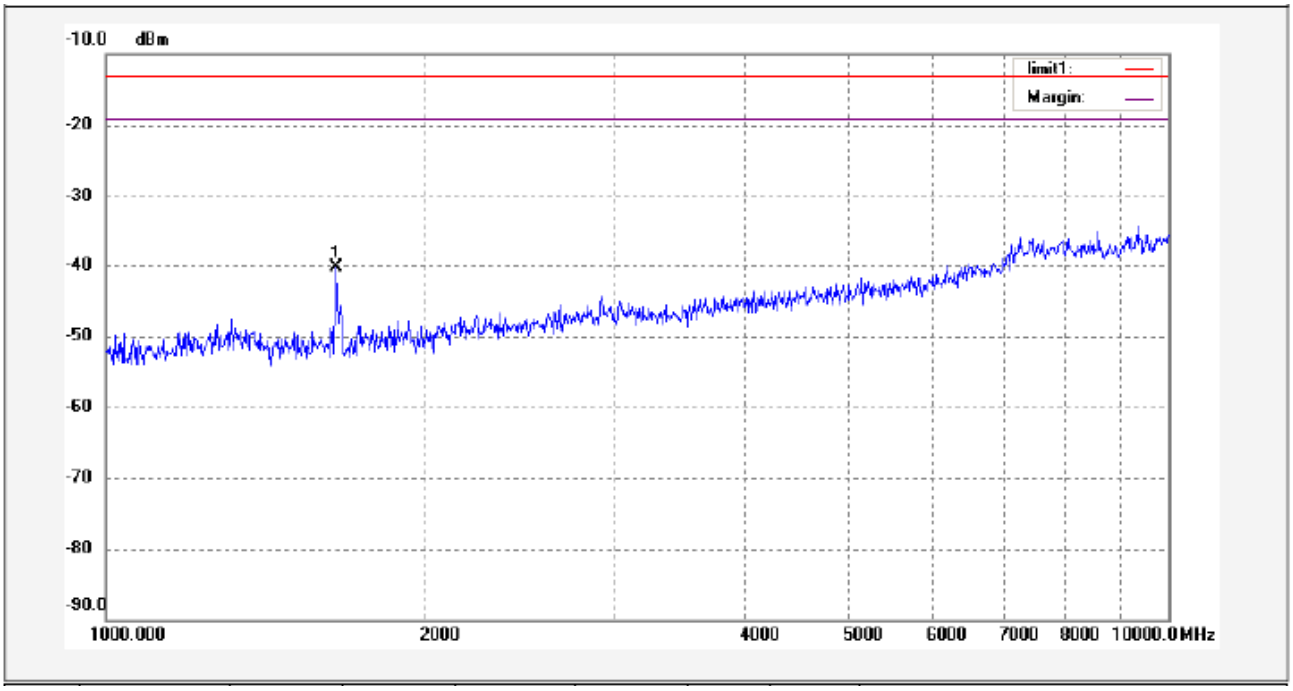
Above 1 GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
Lowest Channel											
3700.88	67.78	51	1.1	V	3700.88	-33.8	7.3	0.8	-27.30	-13	14.30
5551.54	51.63	131	1.2	V	5551.54	-46.3	6.2	1.2	-41.30	-13	28.30
7403.73	44.86	312	1.1	V	7403.73	-48.7	6.7	1.4	-43.40	-13	30.40
3699.61	70.53	58	1.3	H	3699.61	-31.6	7.3	0.8	-25.10	-13	12.10
5552.85	54.99	126	1.3	H	5552.85	-41.5	6.2	1.2	-36.50	-13	23.50
7402.27	47.01	237	1.5	H	7402.27	-44.1	6.7	1.4	-38.80	-13	25.80
Middle Channel											
3759.03	67.92	55	1.1	V	3759.03	-33.1	7.2	0.9	-26.80	-13	13.80
5638.87	53.37	136	1.2	V	5638.87	-46.4	6.1	1.3	-41.60	-13	28.60
7518.18	44.64	315	1.1	V	7518.18	-50.5	6.6	1.5	-45.40	-13	32.40
3758.56	69.31	59	1.3	H	3758.56	-31.7	7.2	0.9	-25.40	-13	12.40
5638.84	55.69	128	1.3	H	5638.84	-43.6	6.1	1.3	-38.80	-13	25.80
7518.65	47.88	236	1.5	H	7518.65	-46.8	6.6	1.5	-41.70	-13	28.70
Highest Channel											
3818.66	66.17	53	1.1	V	3818.66	-34.8	7.5	1.1	-28.40	-13	15.40
5728.58	50.25	138	1.2	V	5728.58	-47.2	6.4	1.4	-42.20	-13	29.20
7637.19	43.66	316	1.1	V	7637.19	-50.3	6.6	1.6	-45.30	-13	32.30
3818.47	69.53	53	1.3	H	3818.47	-32.1	7.5	1.1	-25.70	-13	12.70
5728.32	53.71	126	1.3	H	5728.32	-44.7	6.4	1.4	-39.70	-13	26.70
7637.07	46.54	233	1.5	H	7637.07	-47.3	6.6	1.6	-42.30	-13	29.30

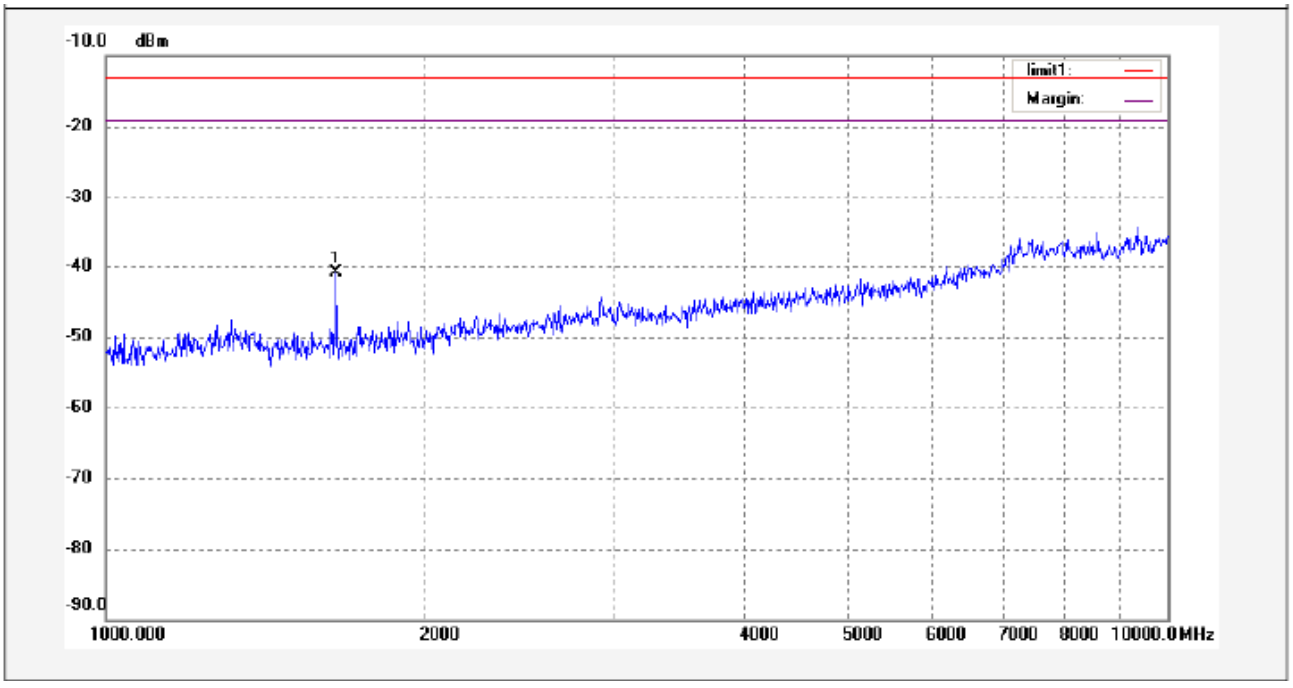
Graphs of Spurious radiation emissions

GSM850 mode Lowest Channel

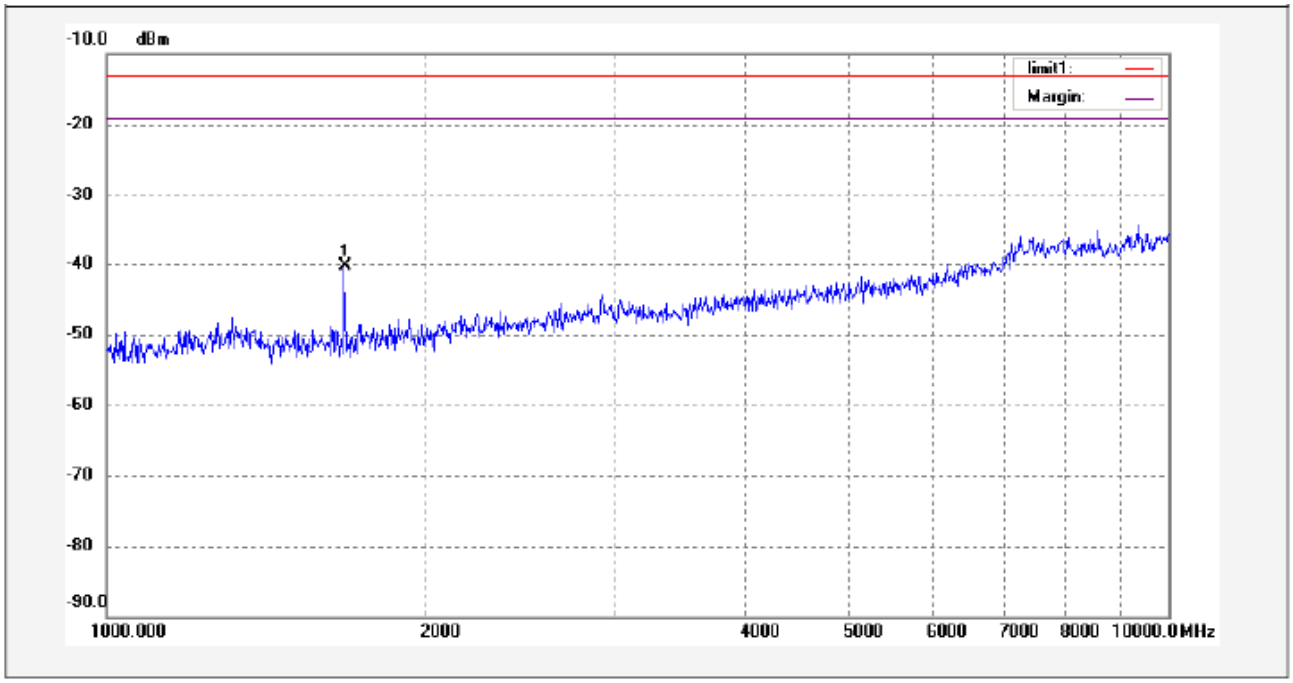
Antenna Polarization:Horizontal



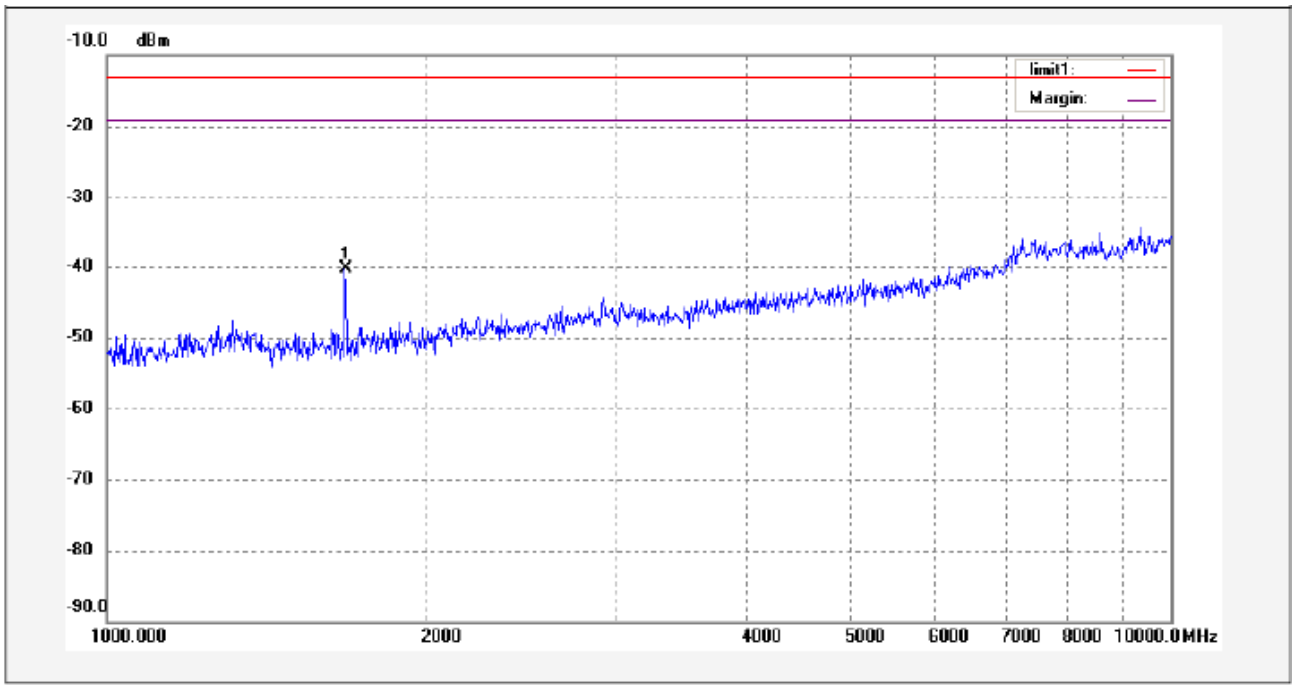
Antenna Polarization:Vertical



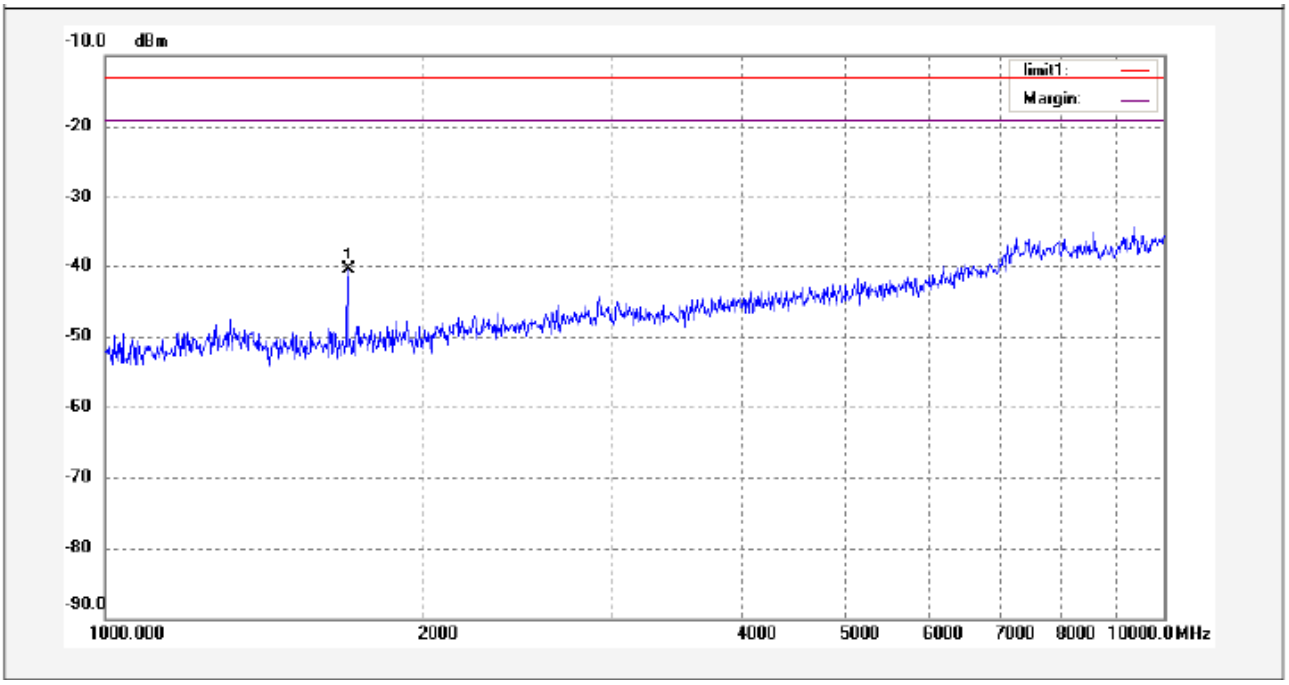
GSM850 mode middle Channel
Antenna Polarization:Horizontal



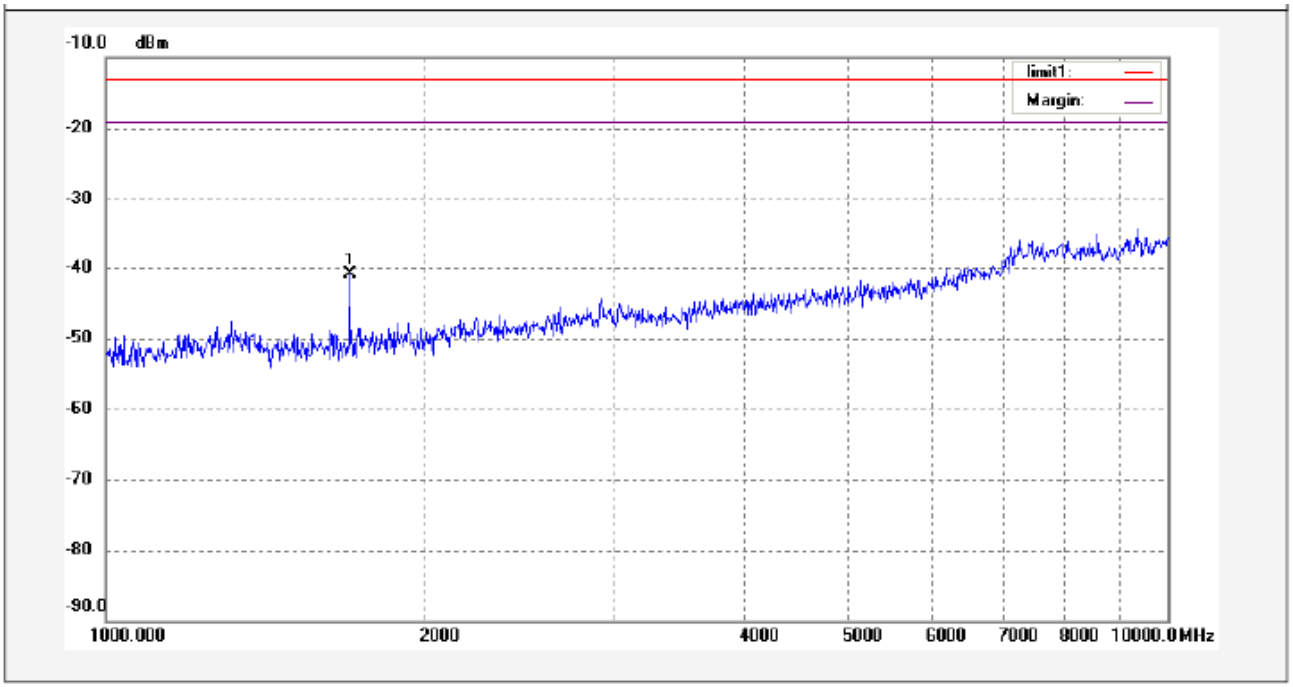
Antenna Polarization:Vertical



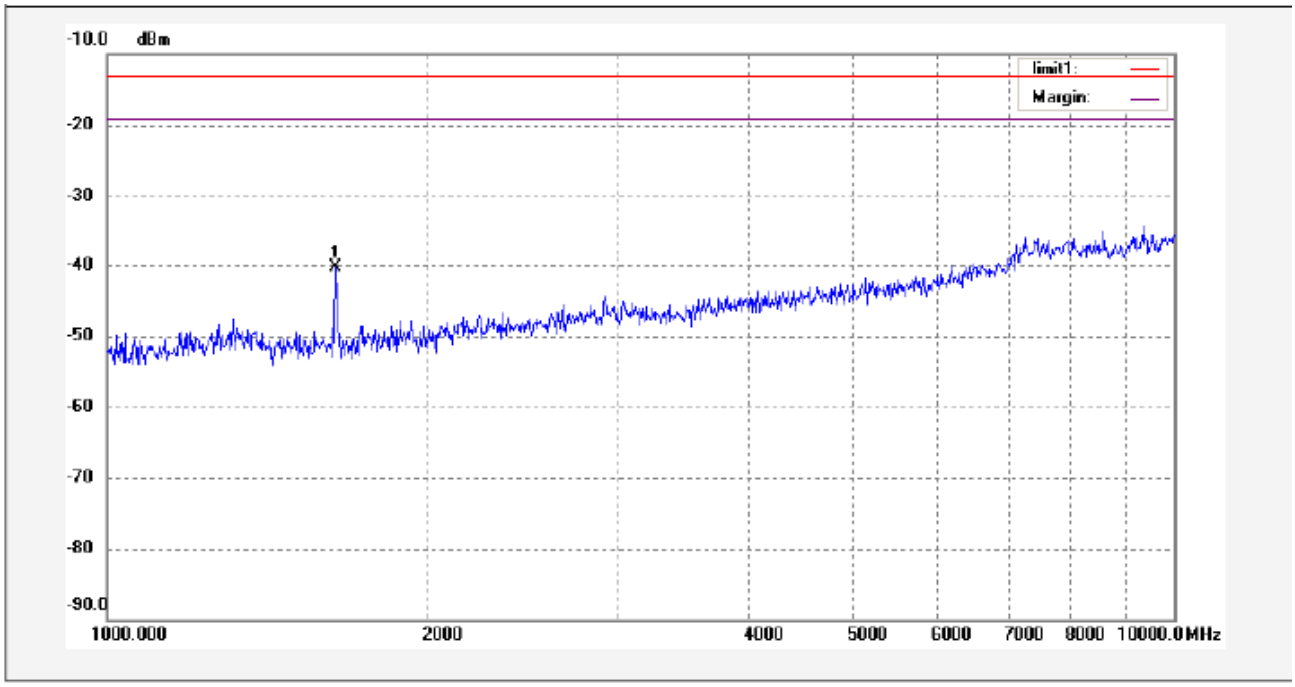
GSM850 mode Highest Channel
Antenna Polarization:Horizontal



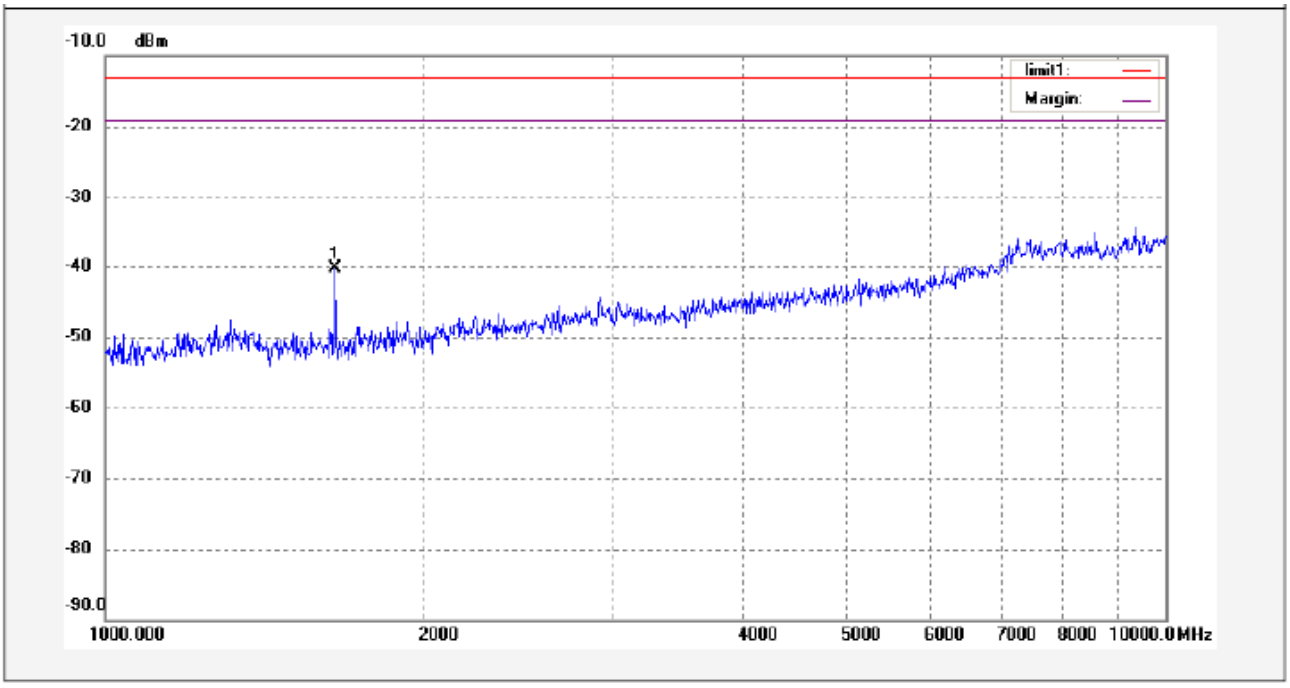
Antenna Polarization:Vertical



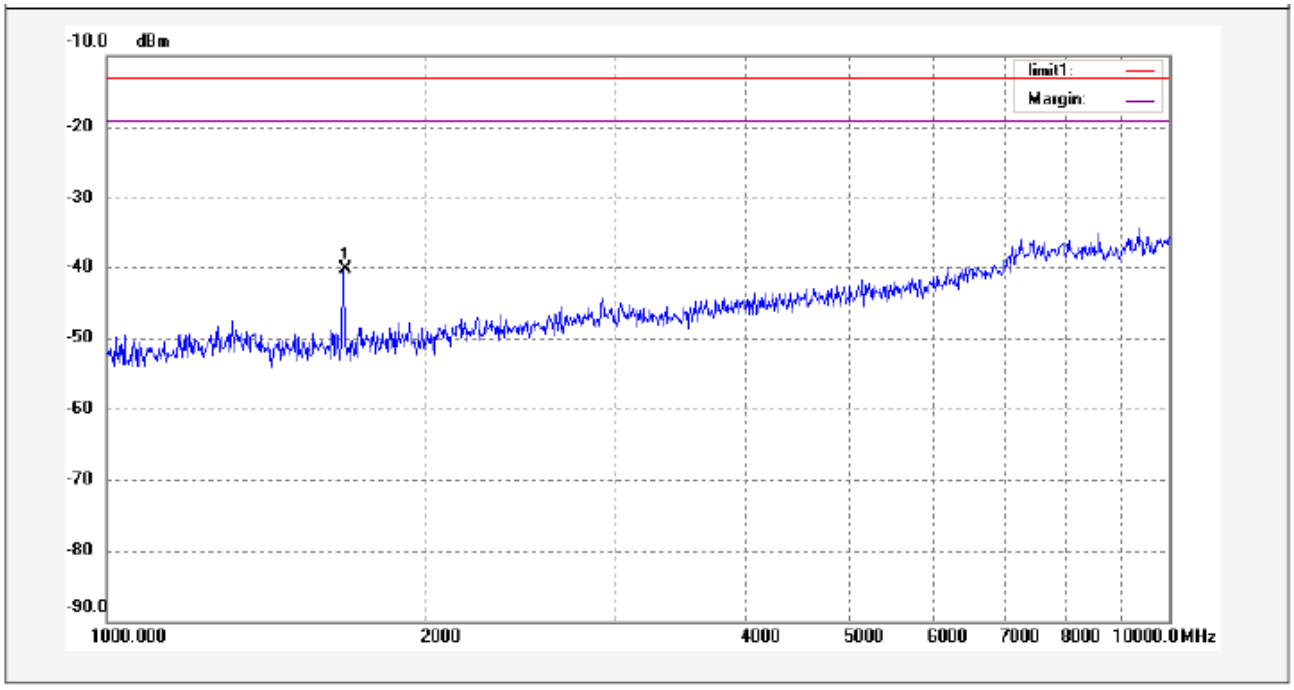
GPRS850 mode Lowest Channel
Antenna Polarization:Horizontal



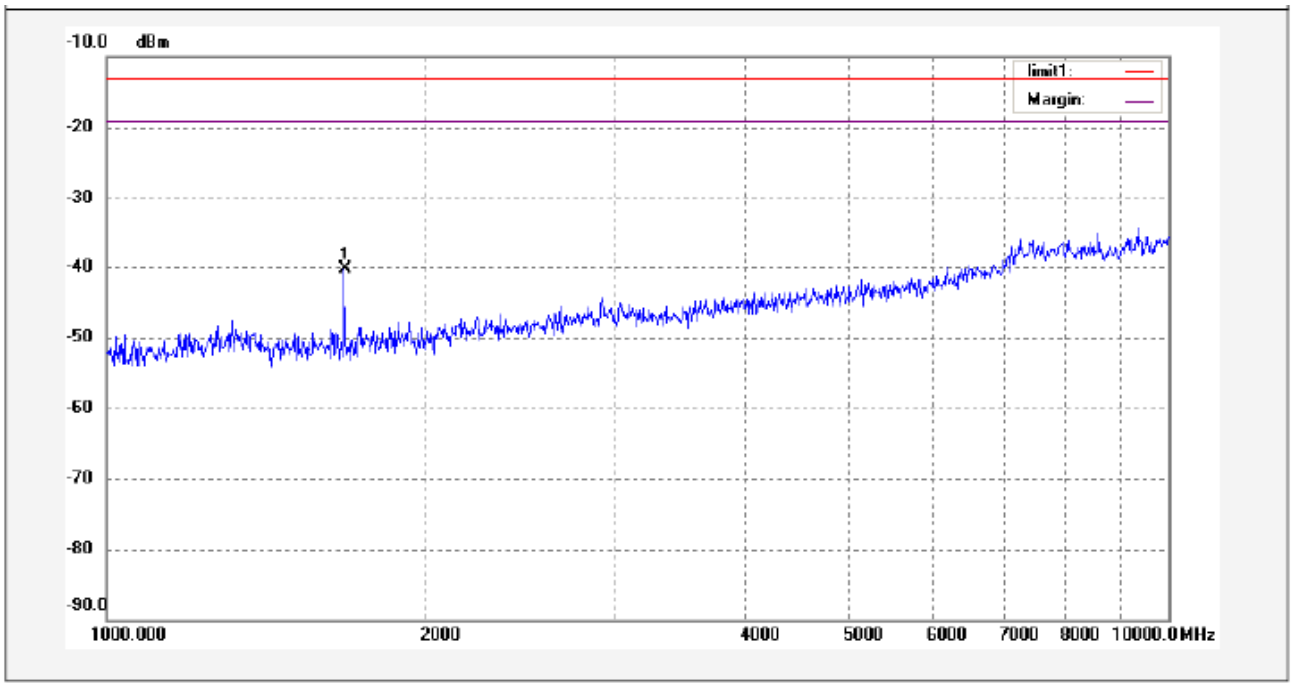
Antenna Polarization:Vertical



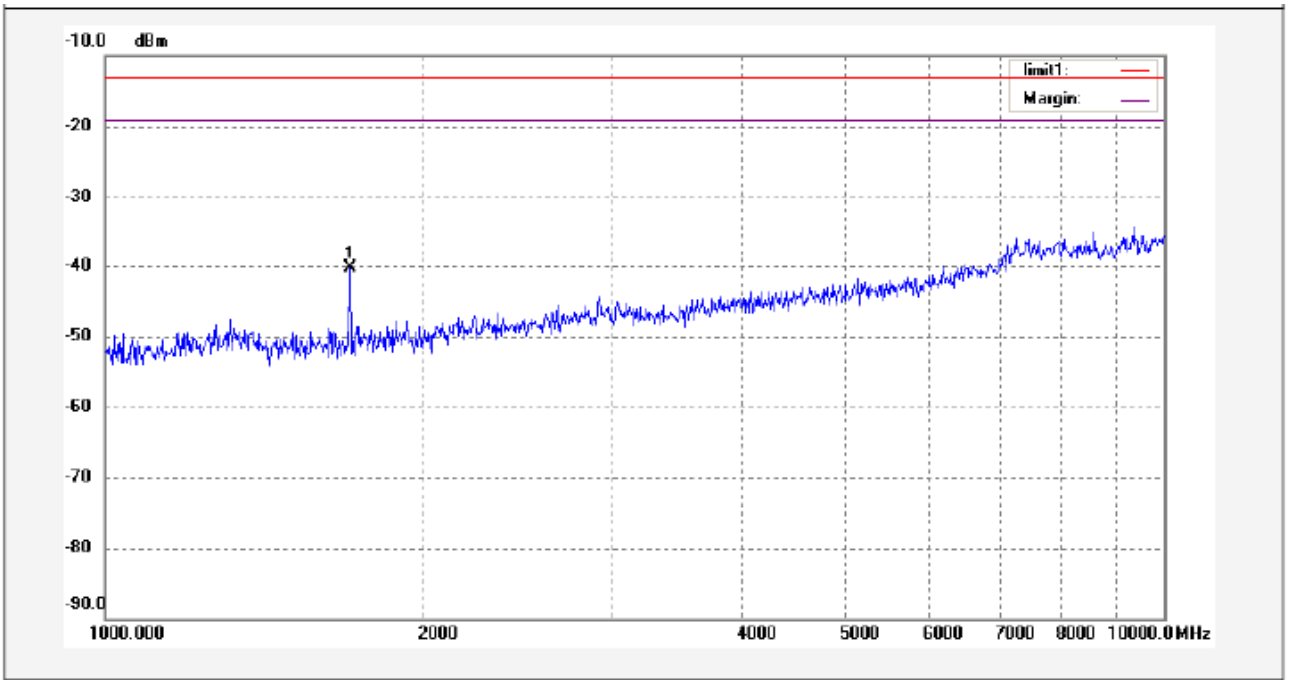
GPRS850 mode Middle Channel
Antenna Polarization:Horizontal



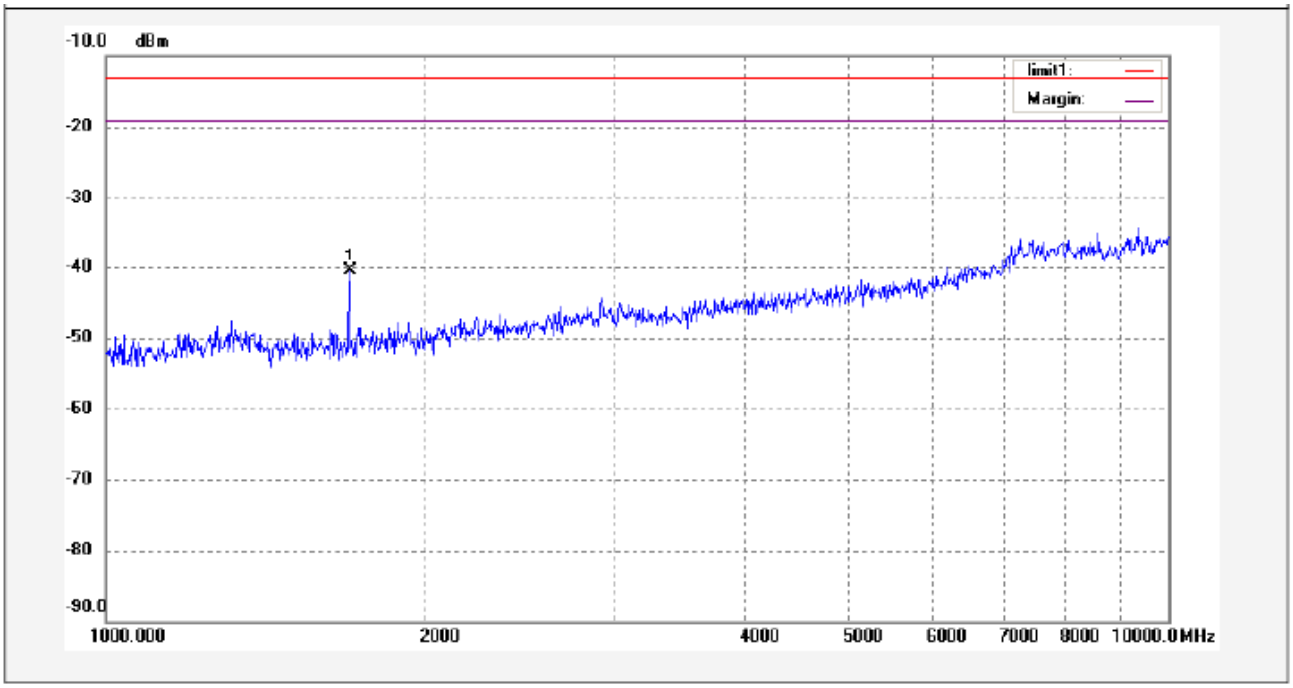
Antenna Polarization:Vertical



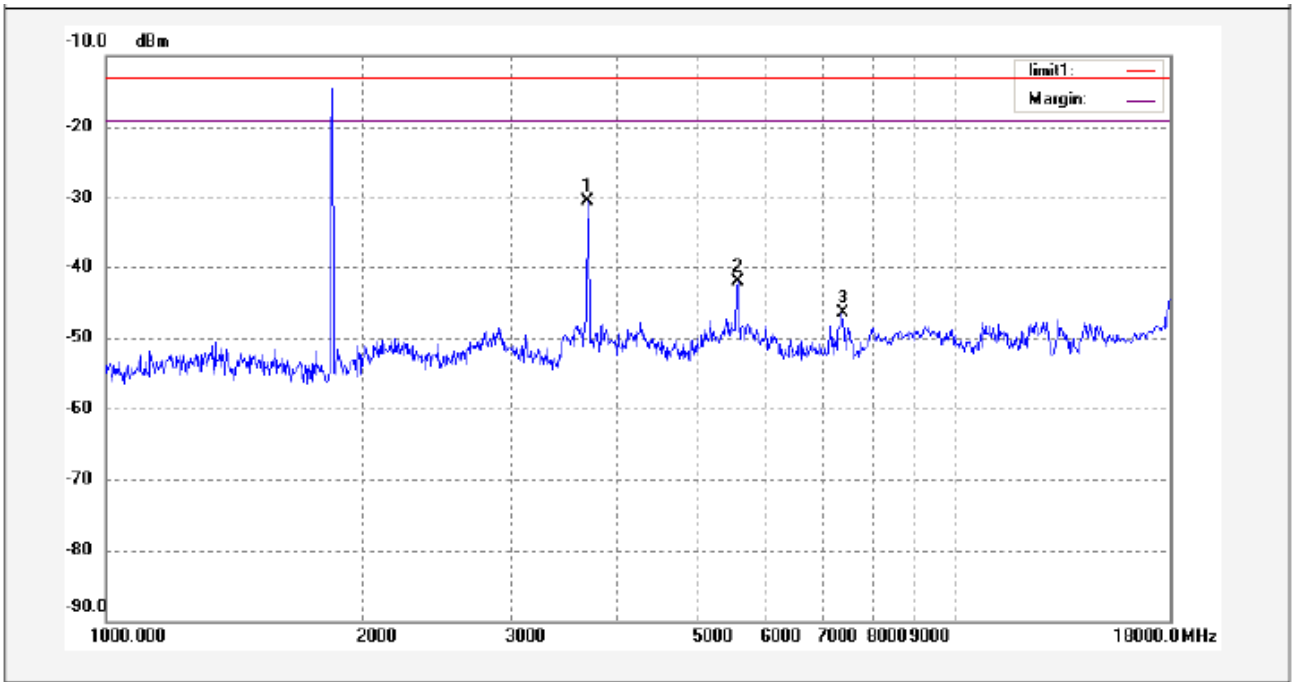
GPRS850 mode Highest Channel
Antenna Polarization:Horizontal



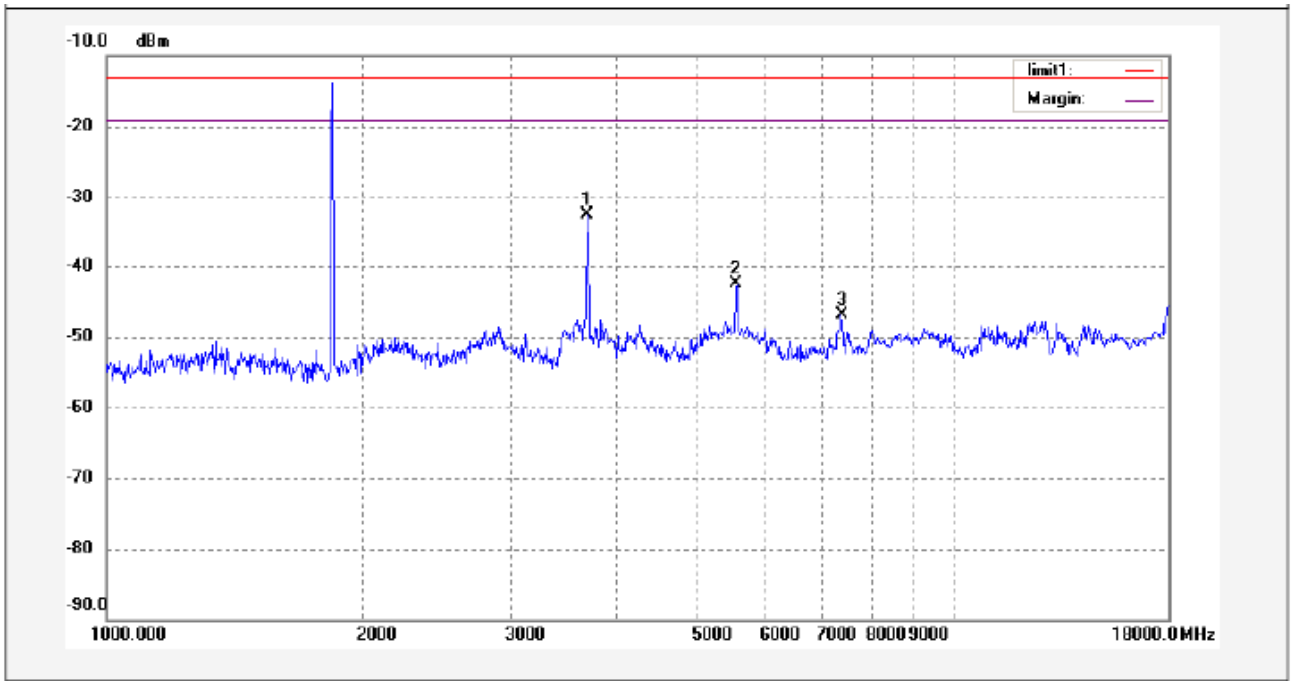
Antenna Polarization:Vertical



GSM1900 mode Lowest Channel
Antenna Polarization:Horizontal

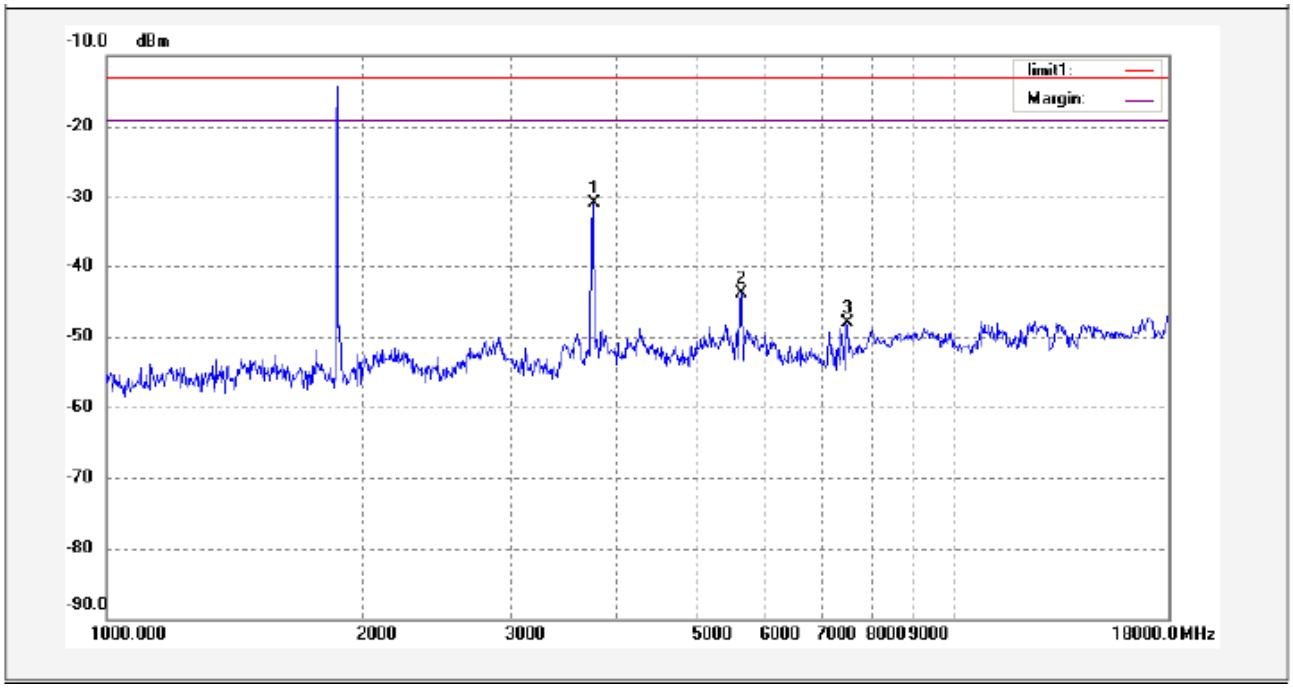


Antenna Polarization:Vertical

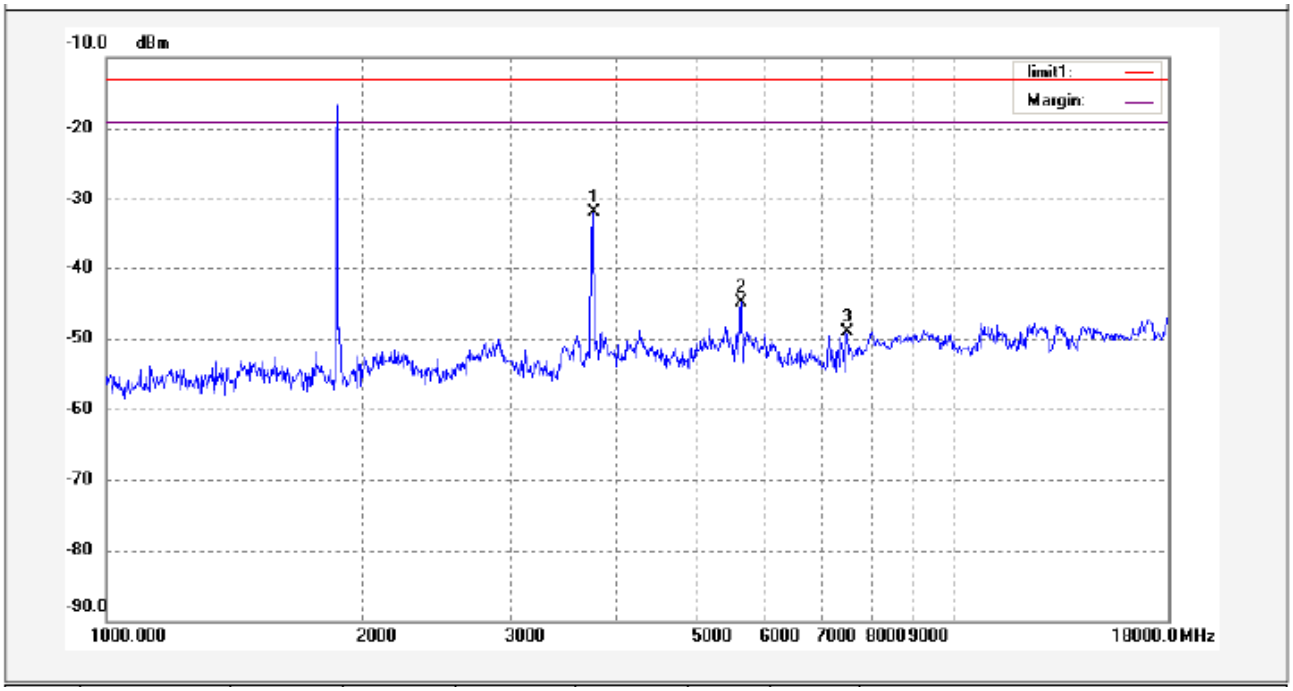


Remark:18G-20GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

GSM1900 mode Middle Channel
Antenna Polarization:Horizontal

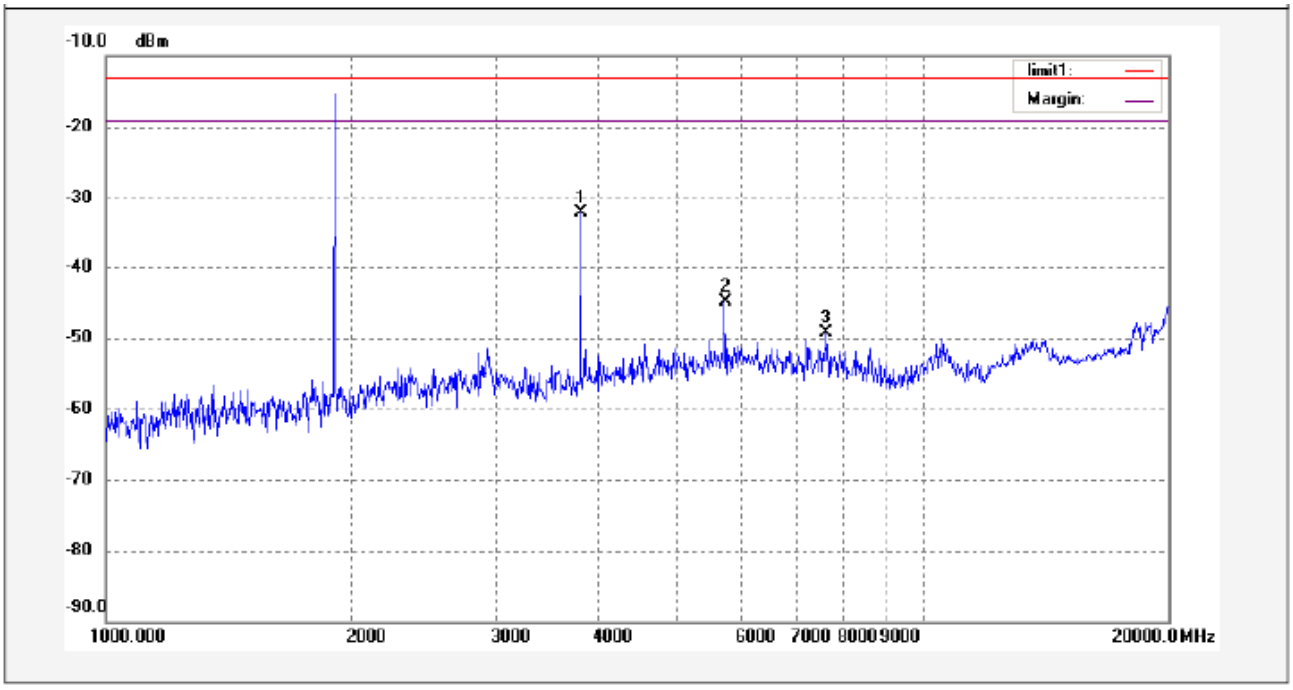


Antenna Polarization:Vertical

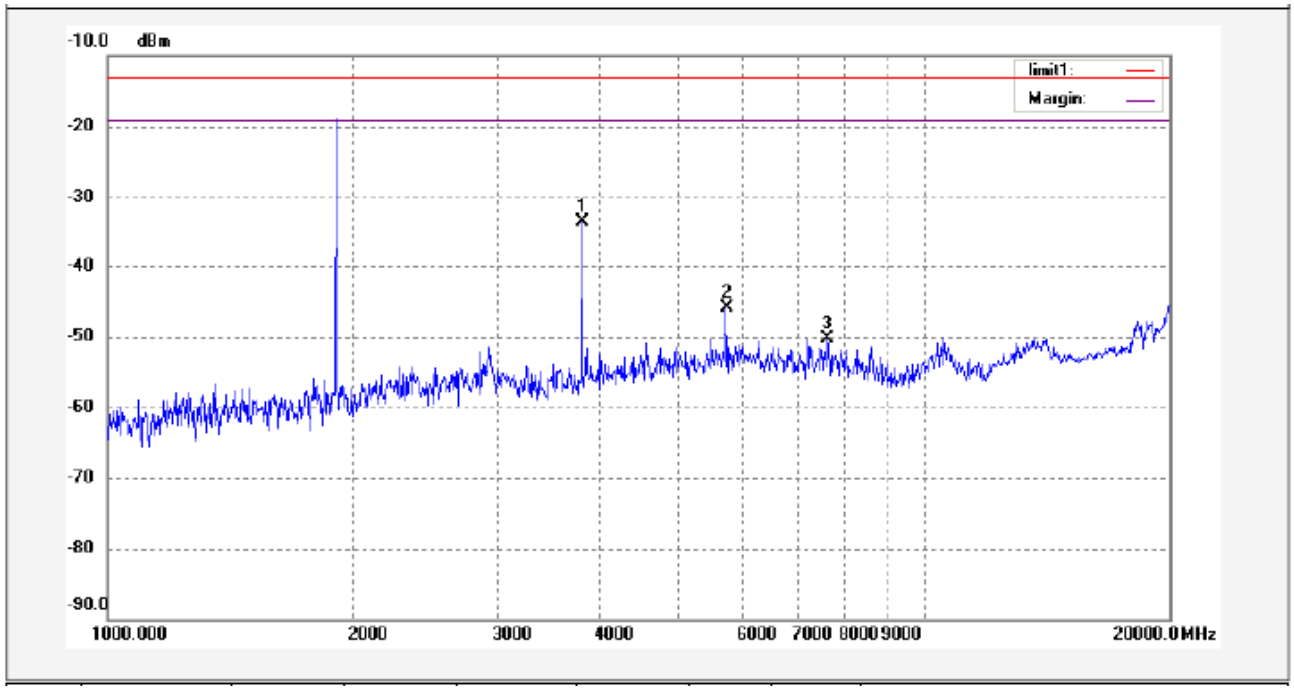


Remark:18G-20GHz:No emissions to be recorded, since no specific emission noted beyond the background noise floor.

GSM1900 mode Highest Channel
Antenna Polarization:Horizontal

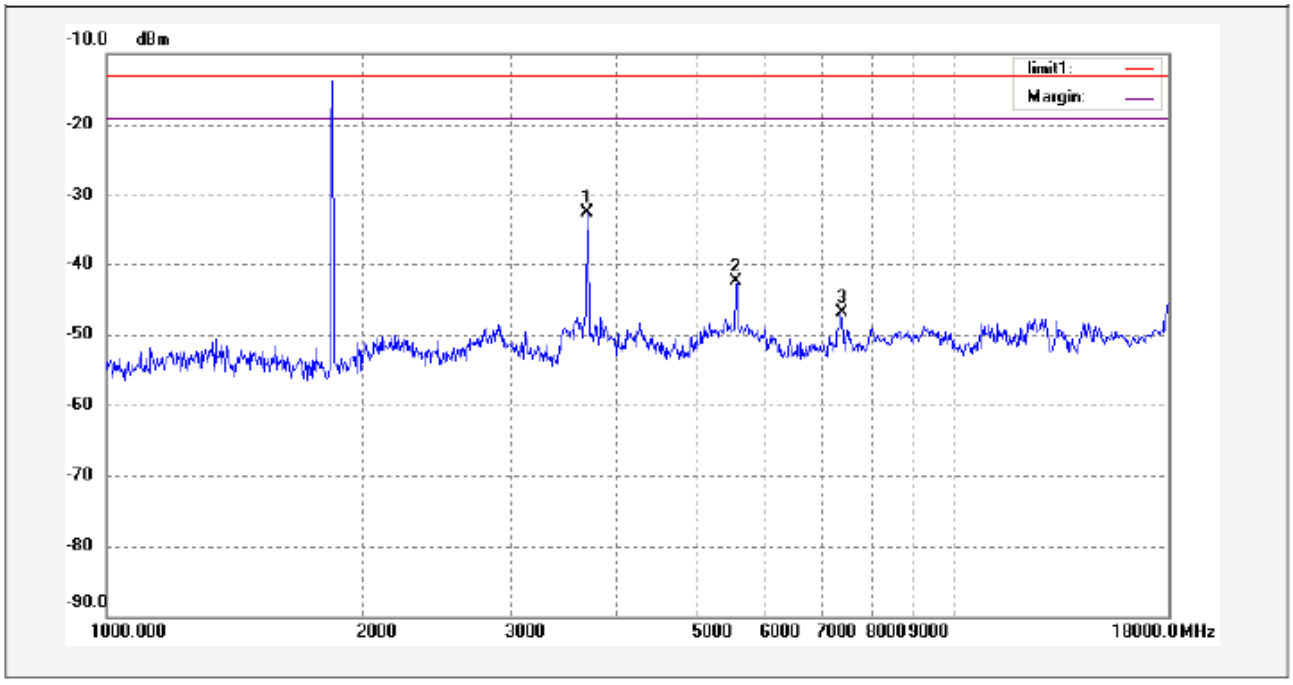


Antenna Polarization:Vertical

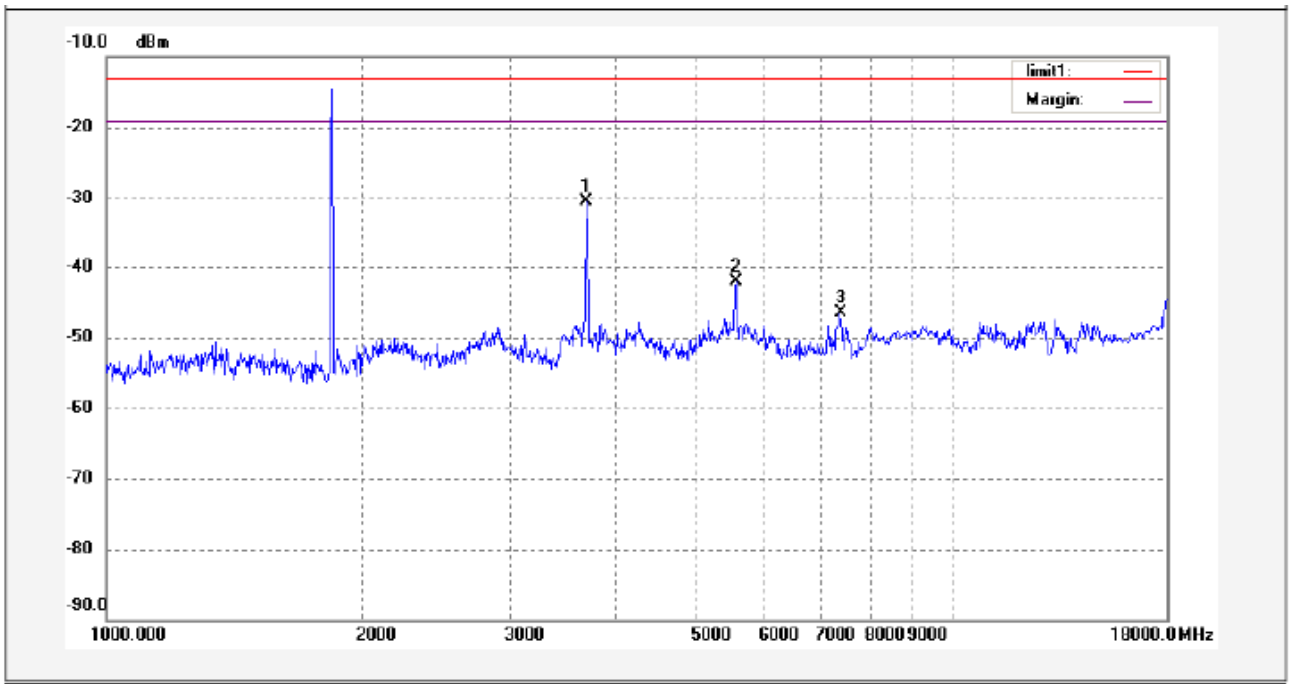


Remark:18G-20GHz:No emissions to be recorded, since no specific emission noted beyond the background noise floor.

GPRS1900 mode Lowest Channel
Antenna Polarization:Horizontal

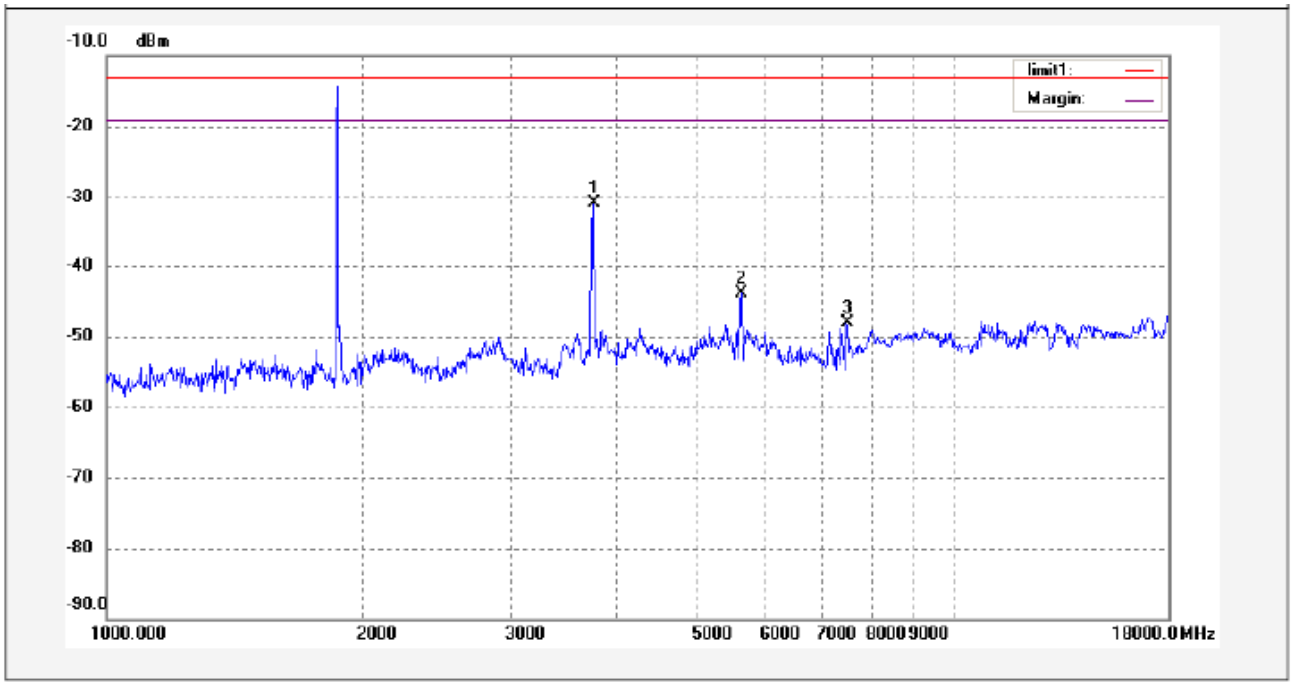


Antenna Polarization:Vertical

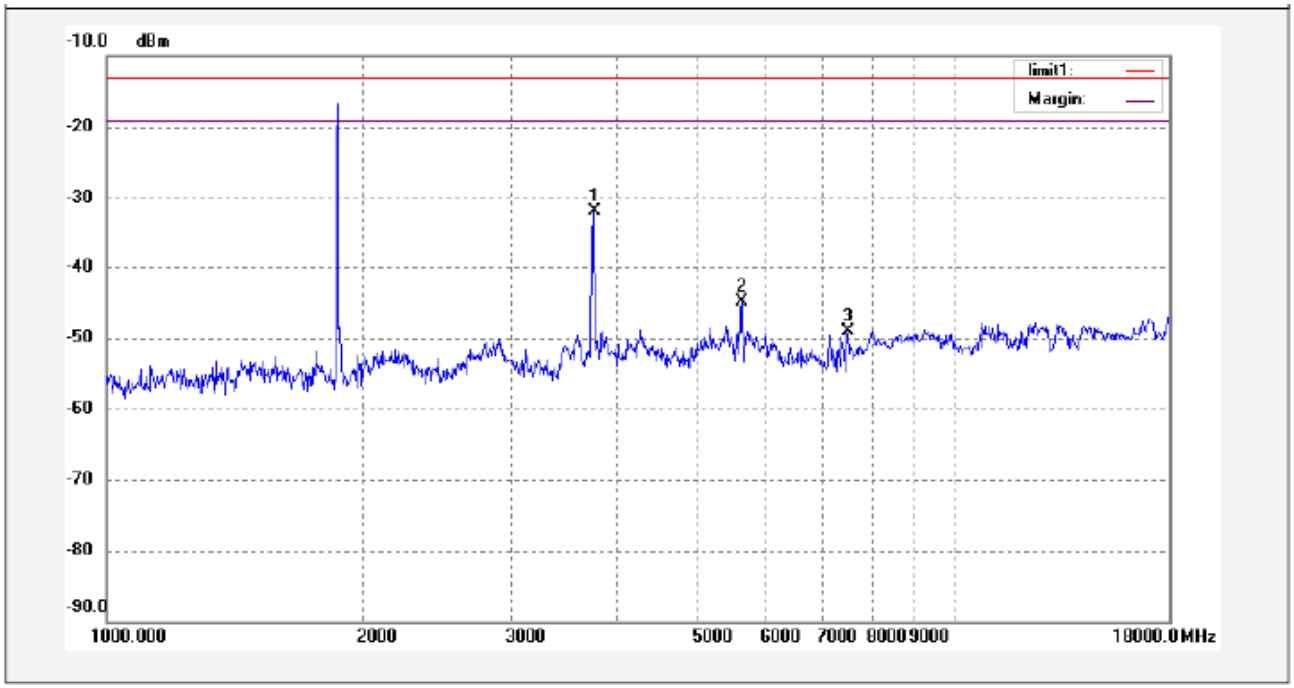


Remark:18G-20GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

GPRS1900 mode Middle Channel
Antenna Polarization:Horizontal

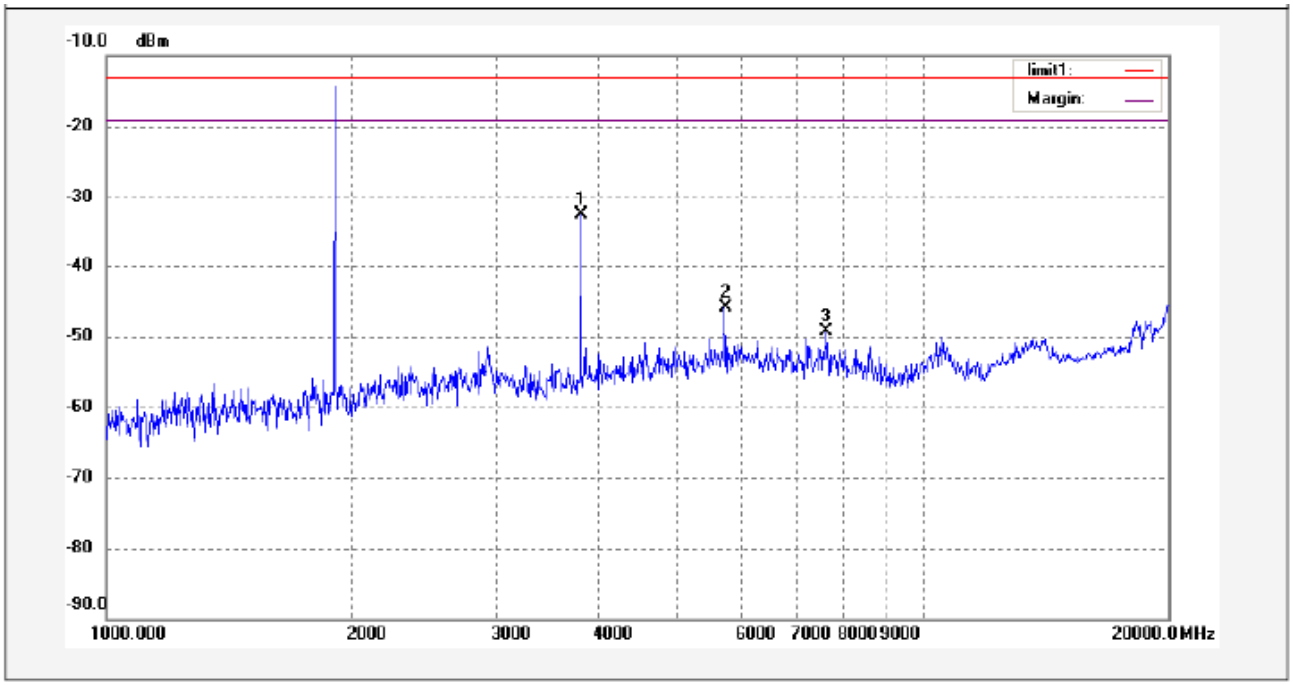


Antenna Polarization:Vertical

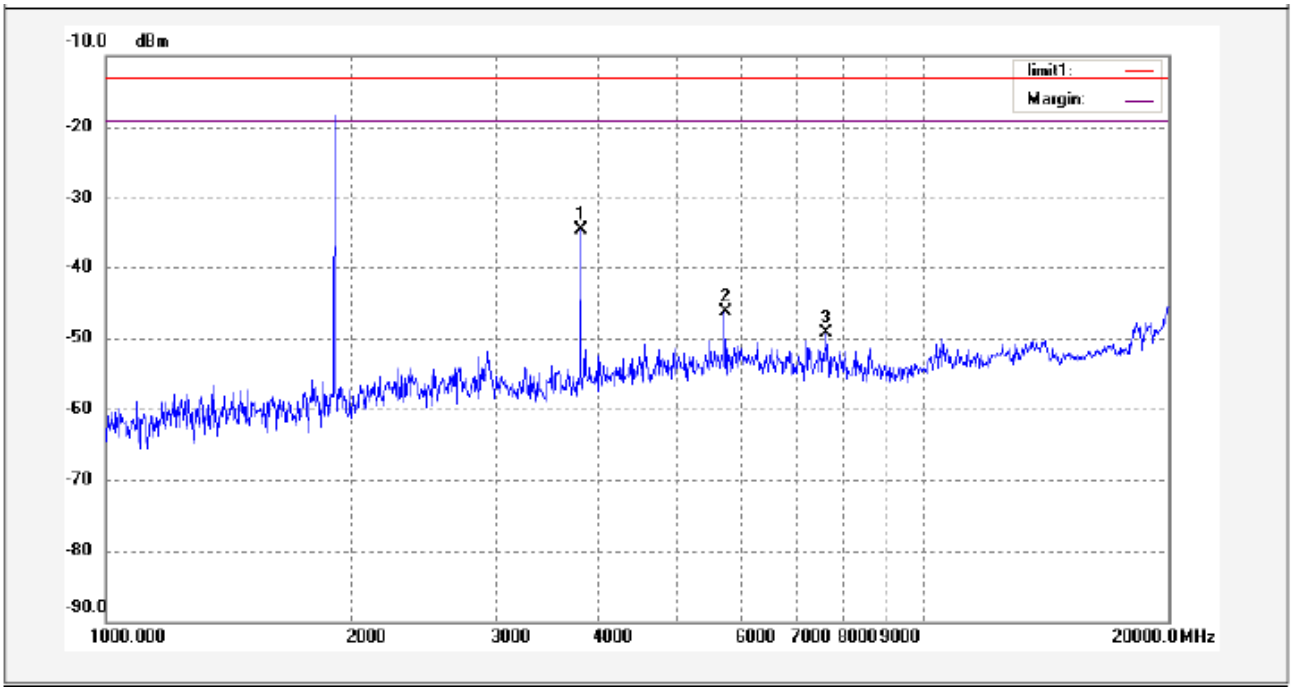


Remark:18G-20GHz:No emissions to be recorded,since no specific emission noted beyond the background noise floor.

GPRS1900 mode Highest Channel
Antenna Polarization:Horizontal



Antenna Polarization:Vertical



Remark:18G-20GHz:No emissions to be recorded, since no specific emission noted beyond the background noise floor.

7 Maximum Peak Output Power

Test Requirement:	CFR47 § 2.1046, § 22.913 (a), & § 24.232 (c)
Test Method:	ANSI/TIA-603-C: 2004
Test Result:	PASS
Test mode:	Compliance test in the worse case: Tx Lower/Tx Middle/Tx Upper Channel

Requirements:
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), in no case may the peak output power of a base station transmitter exceed 2 watt EIRP.

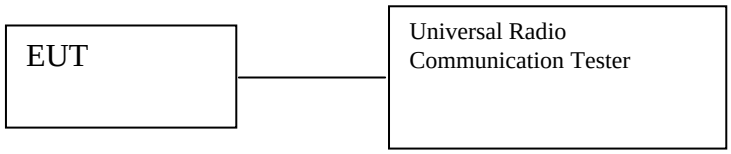
Operating Environment:

Temperature:	25.0 °C
Humidity:	55 % RH
Barometric Pressure:	1012 mbar

7.1 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:

ANSI/TIA 603-C section 2.2.17

7.2 Test Results

Conducted output power

Test Mode	Channel	Frequency(MHz)	Output Power(dBm)	Limit(dBm)
GSM850MHz	Lowest Channel	824.2	31.53	38.45
	Middle Channel	836.6	31.53	38.45
	Highest Channel	848.8	31.53	38.45
GSM1900MHz	Lowest Channel	1850.2	28.87	33
	Middle Channel	1880.0	28.18	33
	Highest Channel	1909.8	28.20	33

Test Mode	Channel	Frequency(MHz)	Output Power(dBm)	Limit(dBm)
GPRS850MHz	Lowest Channel	824.2	31.49	38.45
	Middle Channel	836.6	31.42	38.45
	Highest Channel	848.8	31.43	38.45
GPRS1900MHz	Lowest Channel	1850.2	29.40	33
	Middle Channel	1880.0	28.98	33
	Highest Channel	1909.8	28.38	33

Radiated Power (ERP and EIRP)

GSM:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Part 22H
Frequency (MHz)	Ampl (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Polar (H/V)				Limit (dBm)
Lowest Channel											
824.2	88.97	211	2.3	H	824.2	16.8	H	2.05	0.9	13.85	38.45
824.2	102.05	230	1.5	V	824.2	29.7	V	2.05	0.9	26.75	38.45
Middle Channel											
836.6	88.54	184	2.2	H	836.6	16.4	H	2.05	0.9	13.45	38.45
836.6	101.71	355	2.1	V	836.6	29.4	V	2.05	0.9	26.45	38.45
Highest Channel											
848.8	89.54	199	2.1	H	848.8	17.3	H	2.05	0.9	14.35	38.45
848.8	101.86	143	1.7	V	848.8	29.5	V	2.05	0.9	26.55	38.45

GPRS:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Part 22H
Frequency (MHz)	Ampl (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Polar (H/V)				Limit (dBm)
Lowest Channel											
824.2	88.31	276	2.2	H	824.2	16.2	H	2.05	0.9	13.25	38.45
824.2	101.51	186	1.5	V	824.2	29.2	V	2.05	0.9	26.25	38.45
Middle Channel											
836.6	88.37	82	2.7	H	836.6	16.2	H	2.05	0.9	13.25	38.45
836.6	101.21	221	1.5	V	836.6	28.9	V	2.05	0.9	25.95	38.45
Highest Channel											
848.8	90.28	200	2.2	H	848.8	17.8	H	2.05	0.9	14.85	38.45
848.8	101.03	16	1.5	V	848.8	29.7	V	2.05	0.9	26.75	38.45

GSM:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Part 24E
Frequency (MHz)	Ampl (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Polar (H/V)				Limit (dBm)
Lowest Channel											
1850.2	86.21	0	2.5	H	1850.2	15.3	H	6.2	1.1	20.4	33
1850.2	90.78	256	2.4	V	1850.2	21.5	V	6.2	1.1	26.6	33
Middle Channel											
1880.0	84.66	0	1.0	H	1880.0	13.8	H	6.2	1.1	18.9	33
1880.0	91.30	254	1.0	V	1880.0	22.1	V	6.2	1.1	27.2	33
Highest Channel											
1909.8	83.05	315	1.3	H	1909.8	12.3	H	6.2	1.2	17.3	33
1909.8	90.36	323	1.1	V	1909.8	21.1	V	6.2	1.2	26.1	33

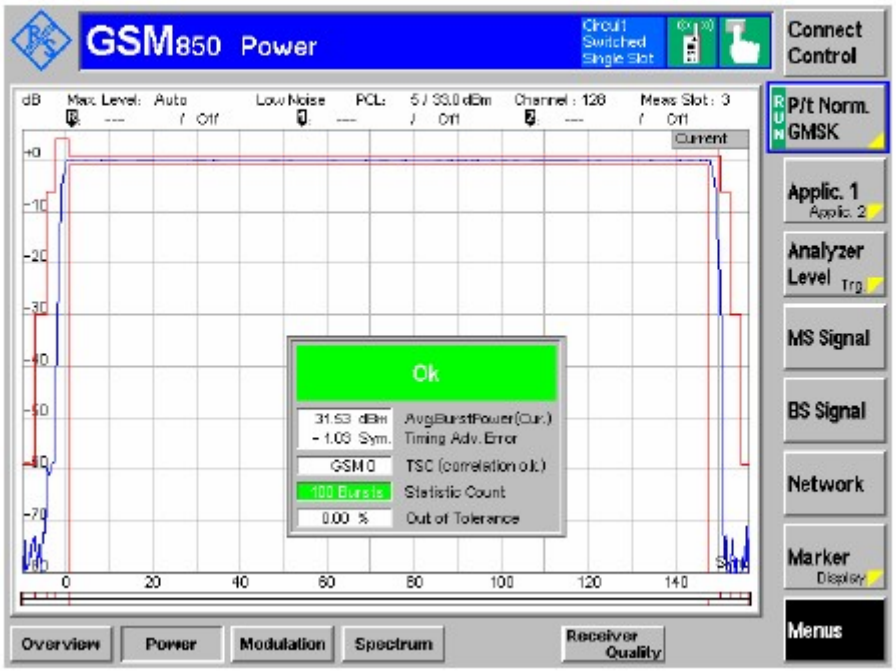
GPRS:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Part 24E
Frequency (MHz)	Ampl (dBμV/m)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Polar (H/V)				Limit (dBm)
Lowest Channel											
1850.2	87.58	0	1.1	H	1850.2	14.7	H	6.2	1.1	19.8	33
1850.2	91.51	260	1.0	V	1850.2	22.3	V	6.2	1.1	27.4	33
Middle Channel											
1880.0	86.78	360	3.0	H	1880.0	13.9	H	6.2	1.1	19.0	33
1880.0	91.43	266	1.1	V	1880.0	22.2	V	6.2	1.1	27.3	33
Highest Channel											
1909.8	85.55	0	3.0	H	1909.8	14.7	H	6.2	1.2	19.7	33
1909.8	90.63	52	1.0	V	1909.8	21.4	V	6.2	1.2	26.4	33

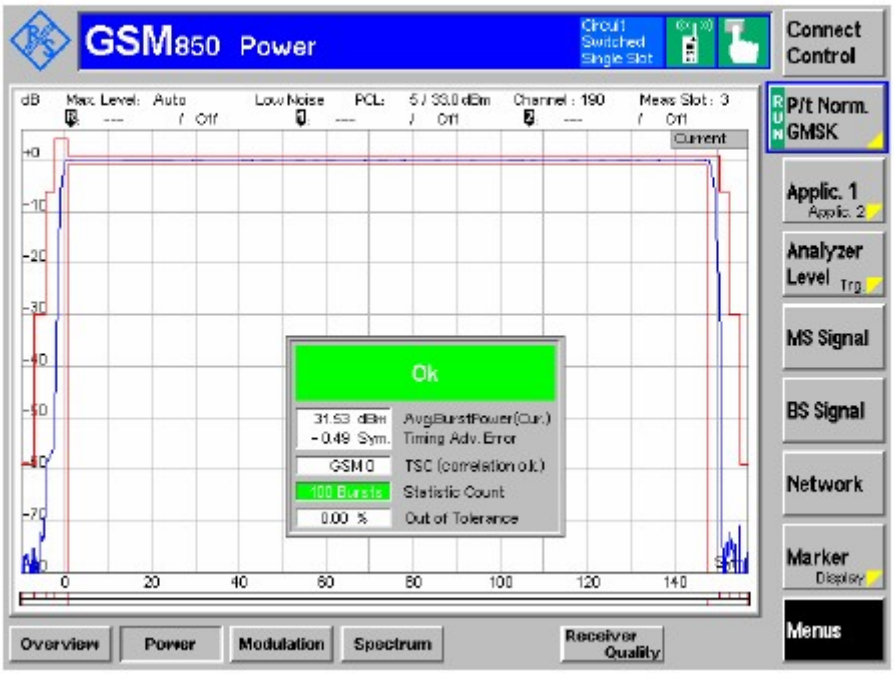
Graphs of Conducted Output Power

GSM850MHz

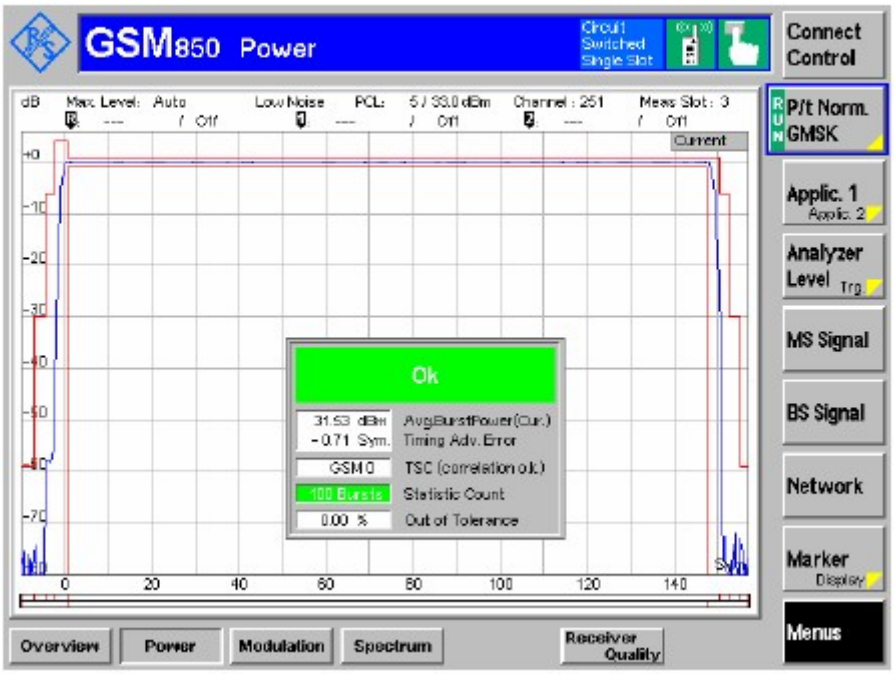
Low Channel (GSM)



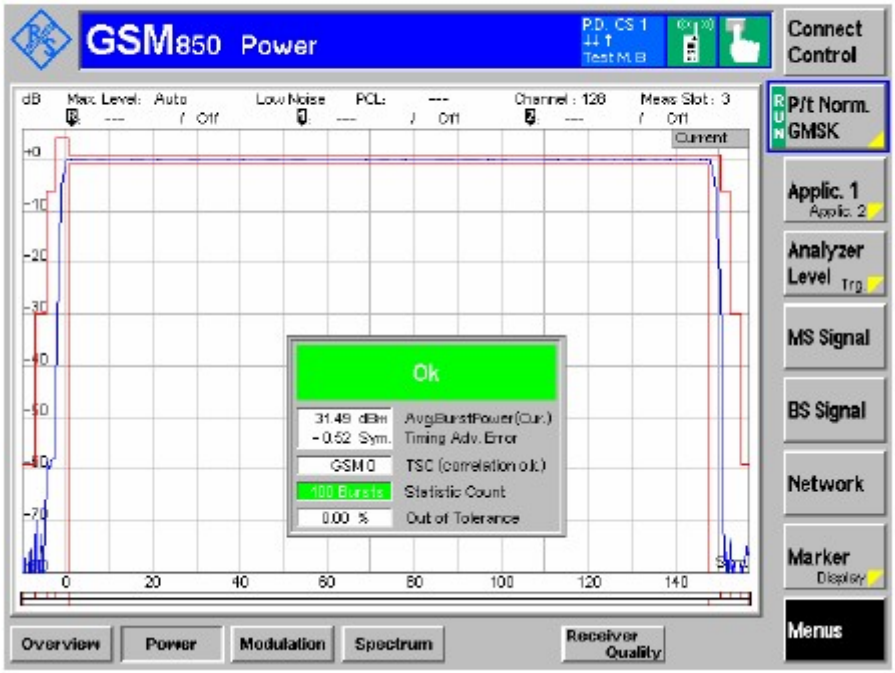
Middle Channel (GSM)



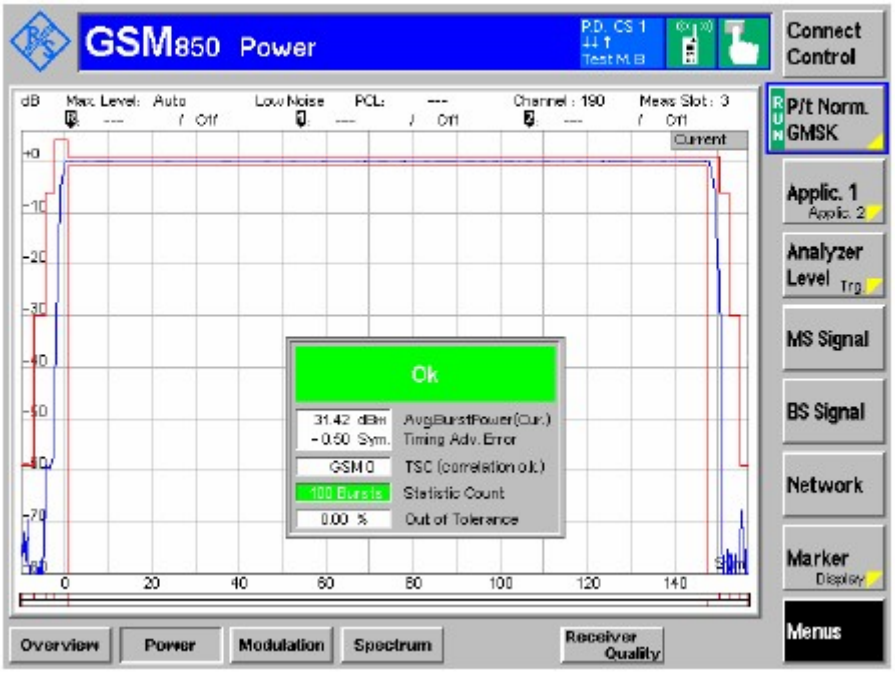
High Channel (GSM)



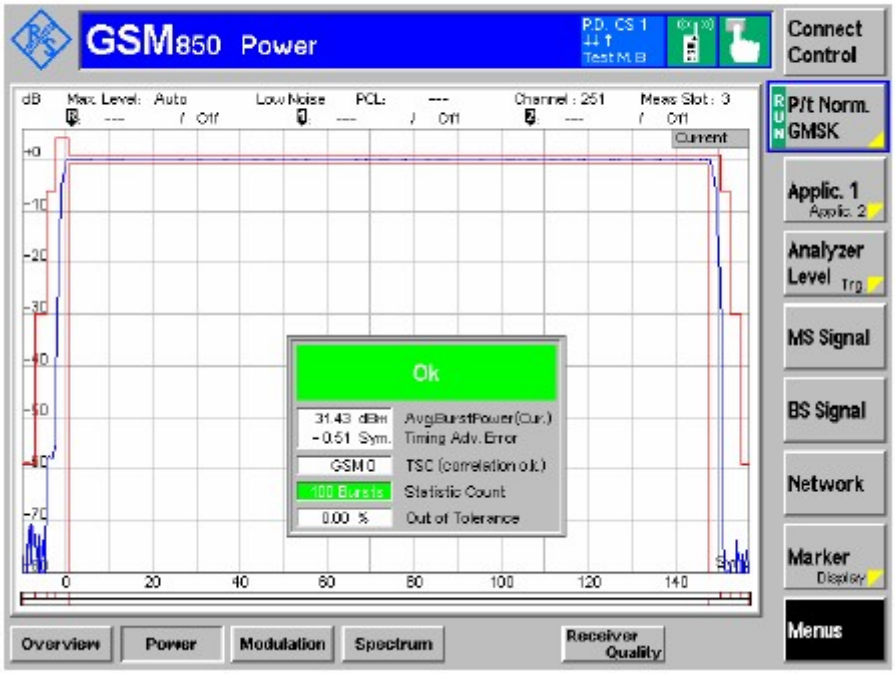
Low Channel (GPRS)



Middle Channel (GPRS)

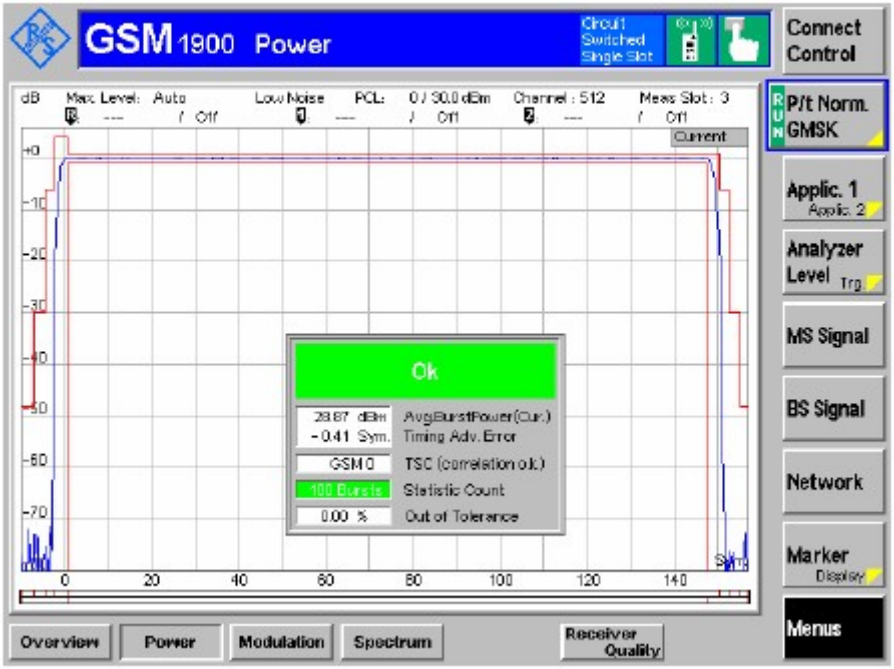


High Channel (GPRS)

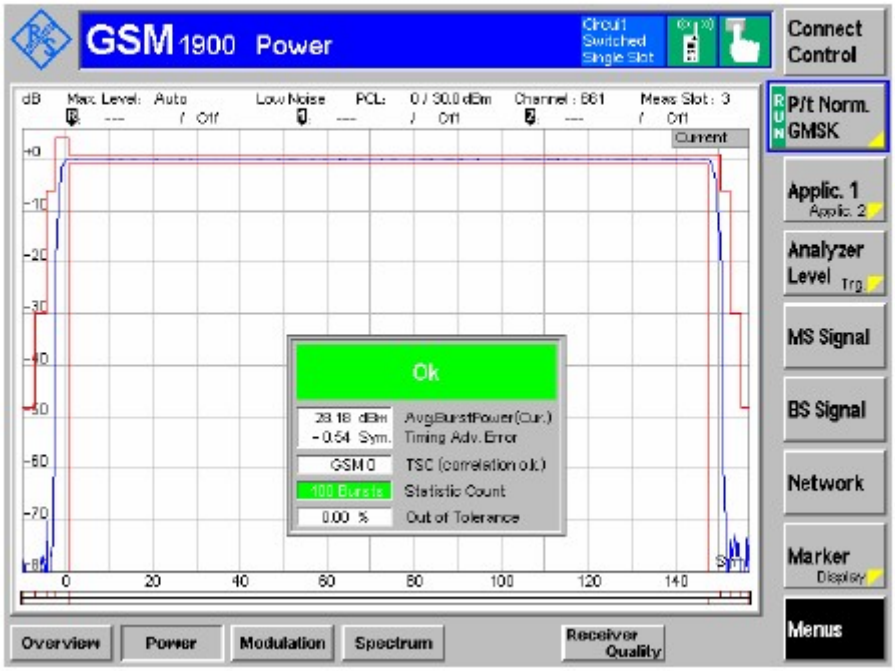


GSM1900MHz

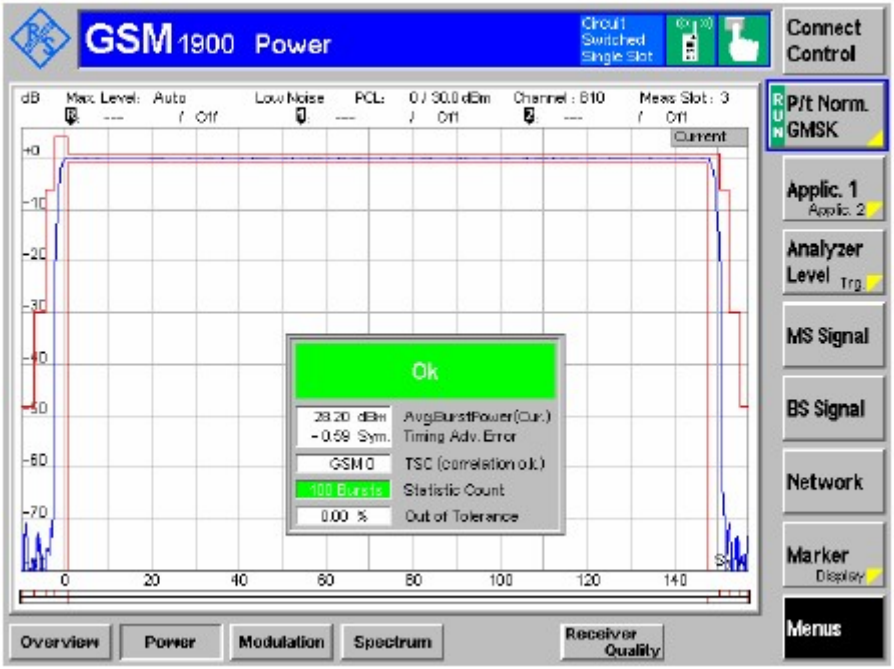
Low Channel (GSM)



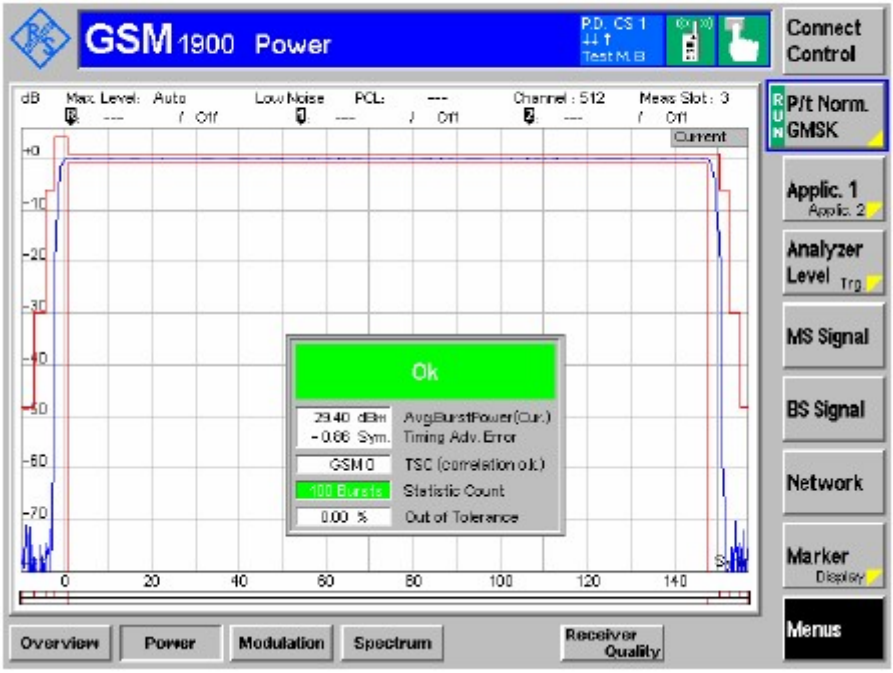
Middle Channel (GSM)



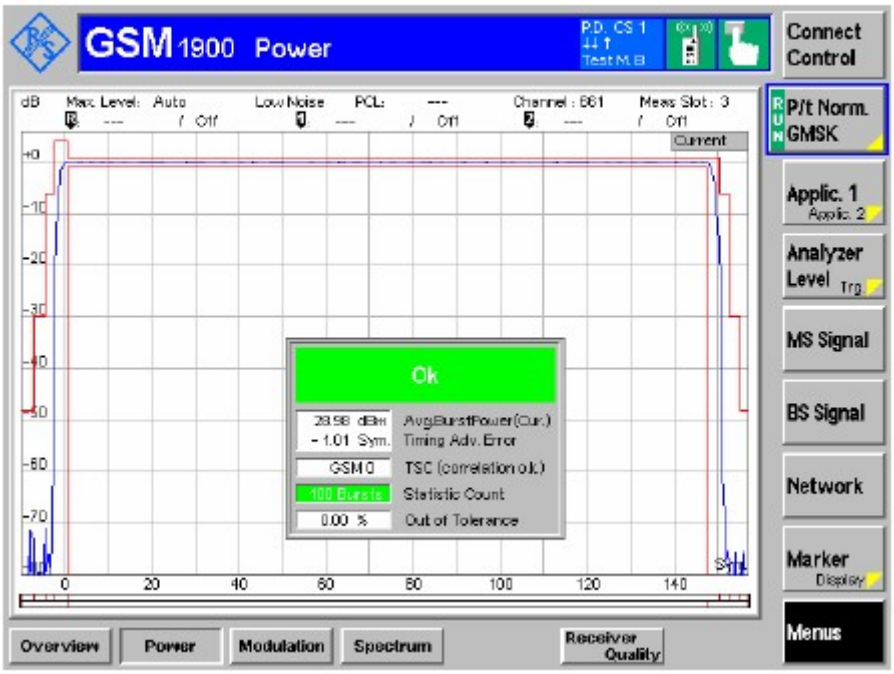
High Channel (GSM)



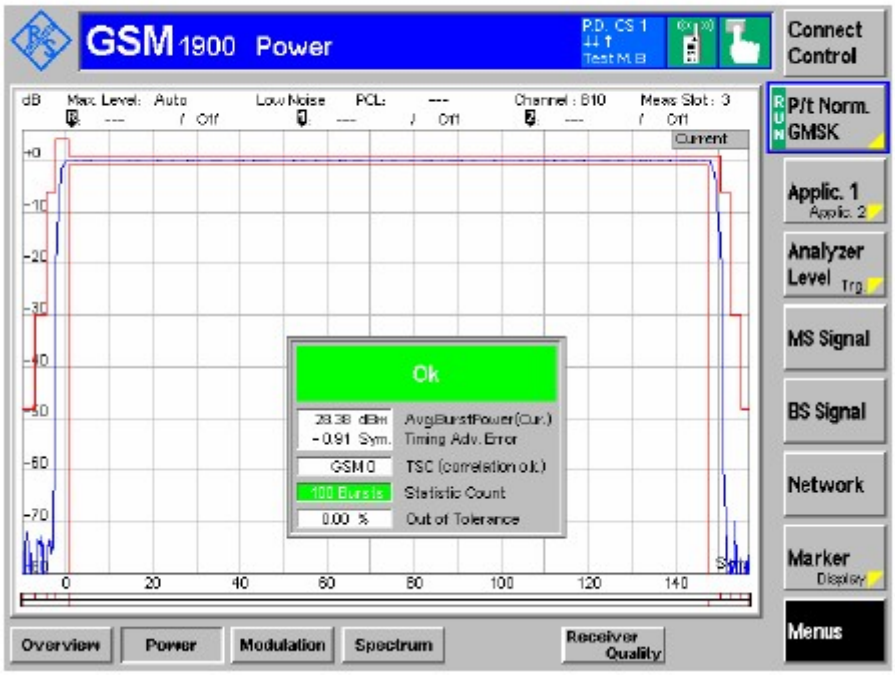
Low Channel (GPRS)



Middle Channel (GPRS)



High Channel (GPRS)



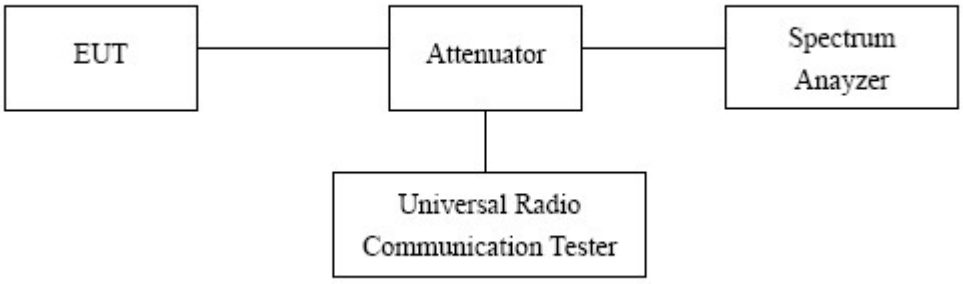
8 OCCUPIED BANDWIDTH

Test Requirement: § 2.1049, §22.917, §22.905 and §24.238
Test Method: ANSI/TIA-603-C: 2004
Test Result: PASS
Test mode: The EUT work in test mode(Tx) and test it
Operating Environment:

Temperature: 25.0 °C
Humidity: 55 % RH
Barometric Pressure: 1012 mbar

8.1 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.
The resolution bandwidth of the spectrum analyzer was set at 30kHz and the 26dB& 99% bandwidth was recorded.

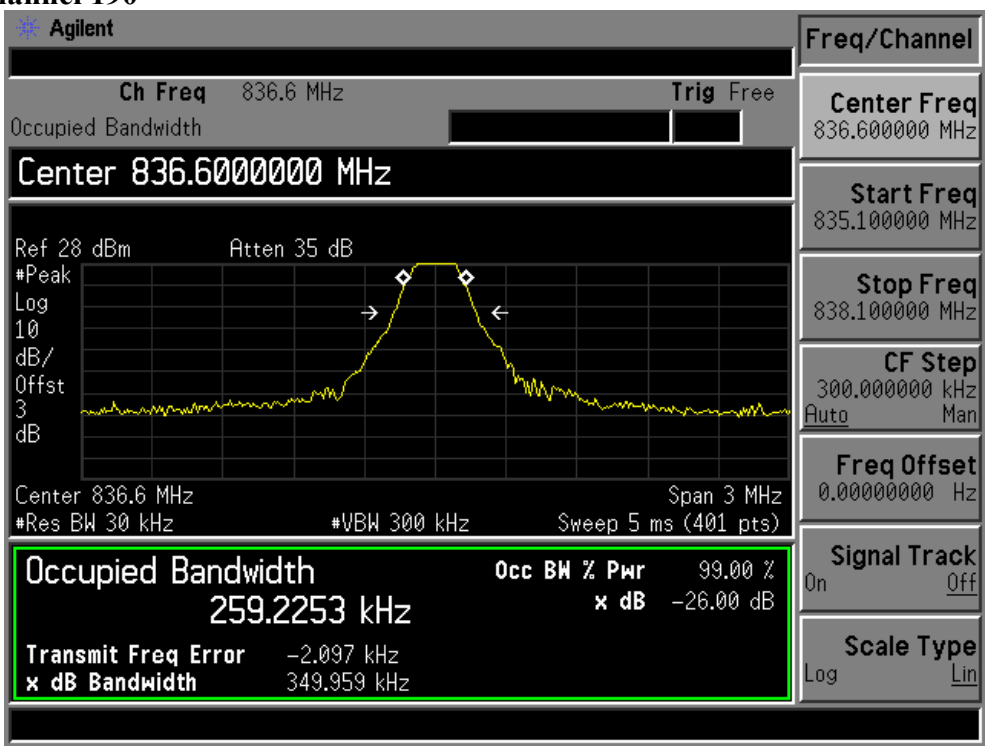


8.2 Test data

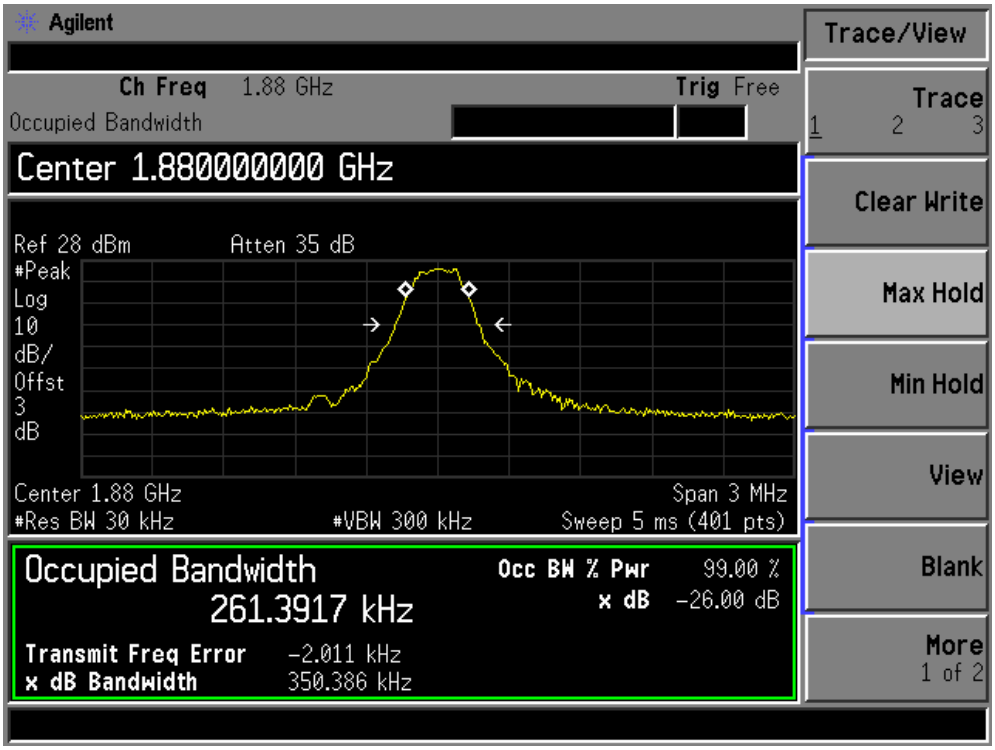
GSM			
Channel	Frequency(MHz)	99% Emission Bandwidth (kHz)	26dB Emission Bandwidth (kHz)
190	836.6	259.2253	349.959
661	1880.0	261.3917	350.386
GPRS			
190	836.6	259.2333	349.552
661	1880.0	261.2709	350.511

Graphs of OCCUPIED BANDWIDTH

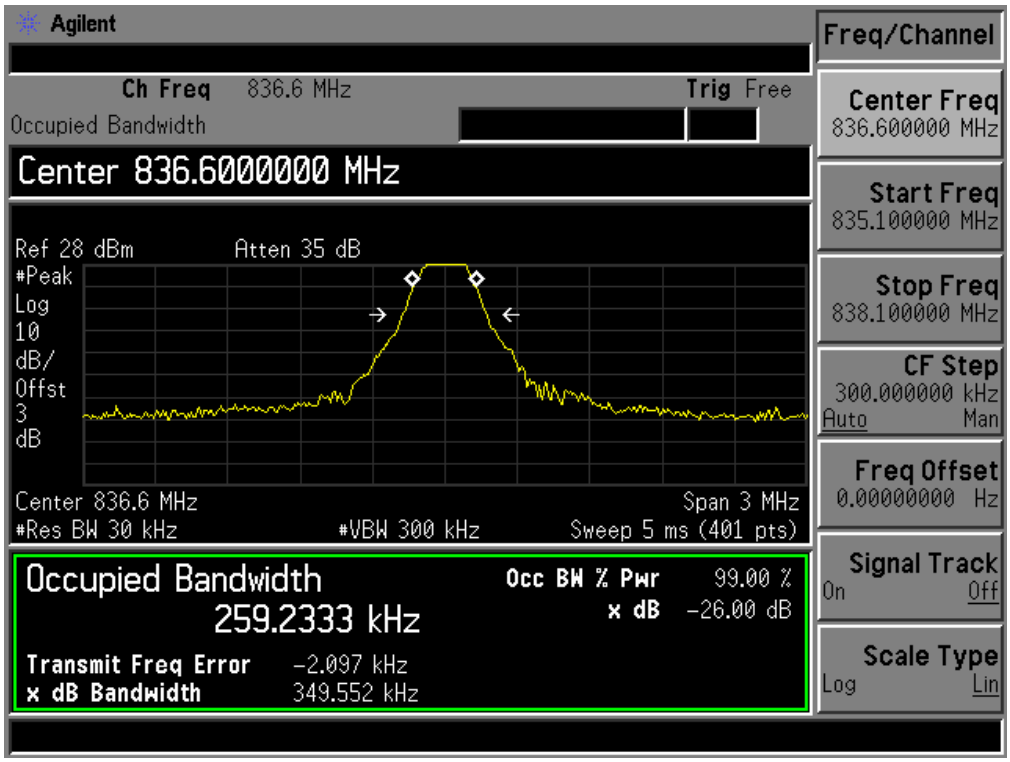
GSM Channel 190



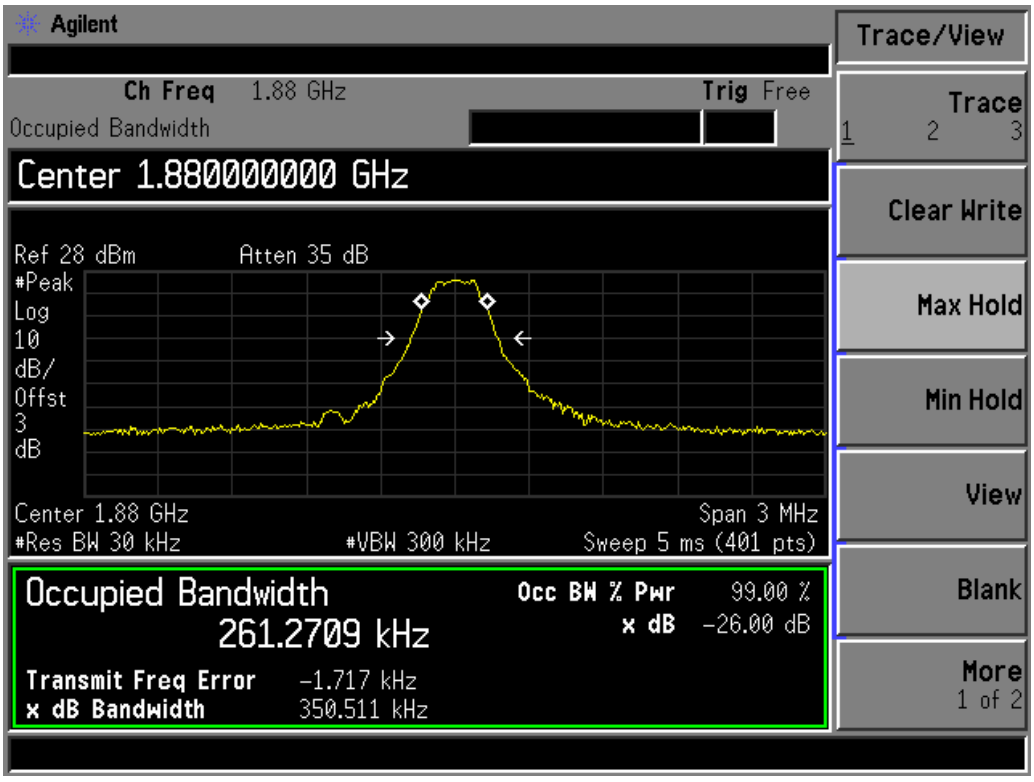
GSM Channel 661



GPRS Channel 190



GPRS Channel 661



9 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement:	§ 2.1051, §22.917(a) and §24.238(a)
Test Method:	ANSI/TIA-603-C: 2004
Test Result:	PASS
Test mode:	The EUT work in test mode(Tx) and test it

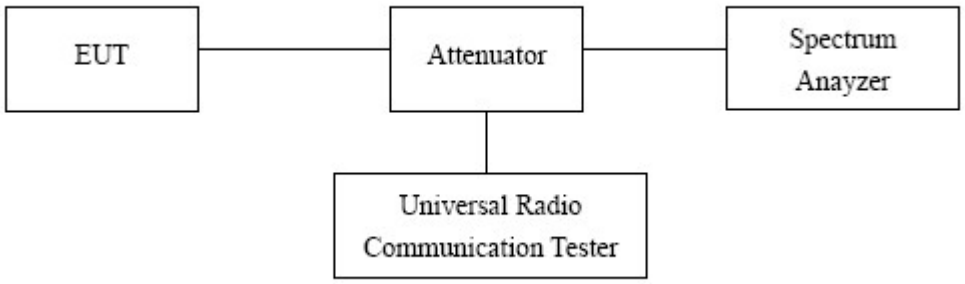
Requirement:
According to § 22.917(a) and §24.238(a),the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power(P) by a factor of at least 43+10log(P)dB.

Operating Environment:

Temperature:	25.0 °C
Humidity:	55 % RH
Barometric Pressure:	1012 mbar

9.1 Test Procedure

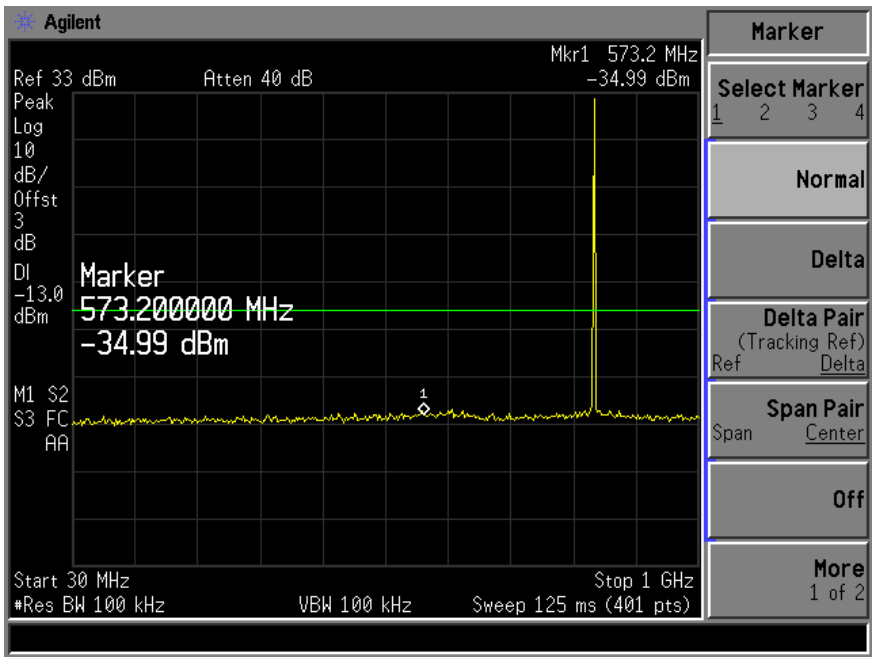
The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation.The RBW of the spectrum analyzer was set to 100KHz for the scan frequency from 30MHz to 1GHz,and 1MHz for the scan frequency from 1GHz up to 10th harmonics.



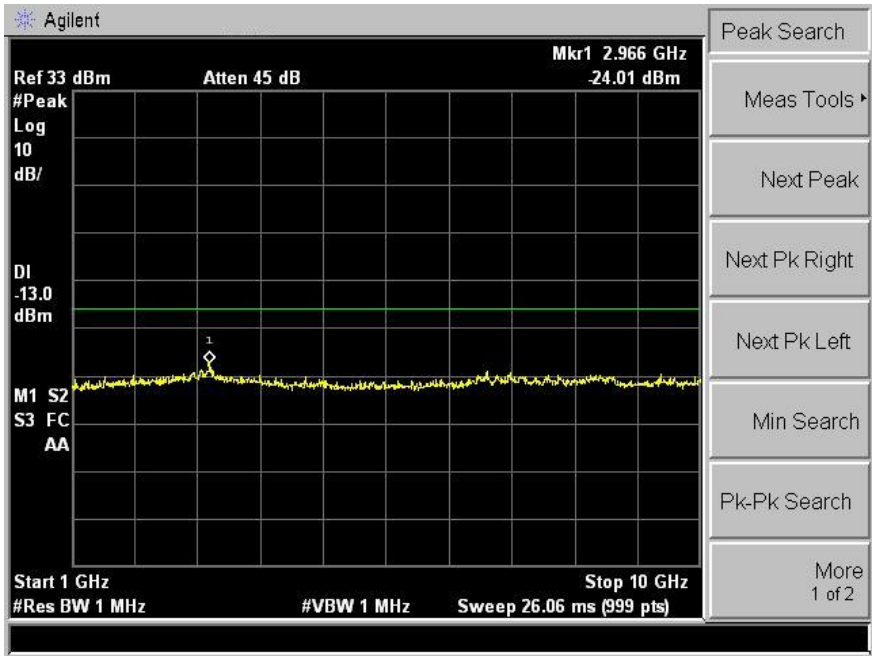
9.2 Test data

Please refer to the below graphs for more details

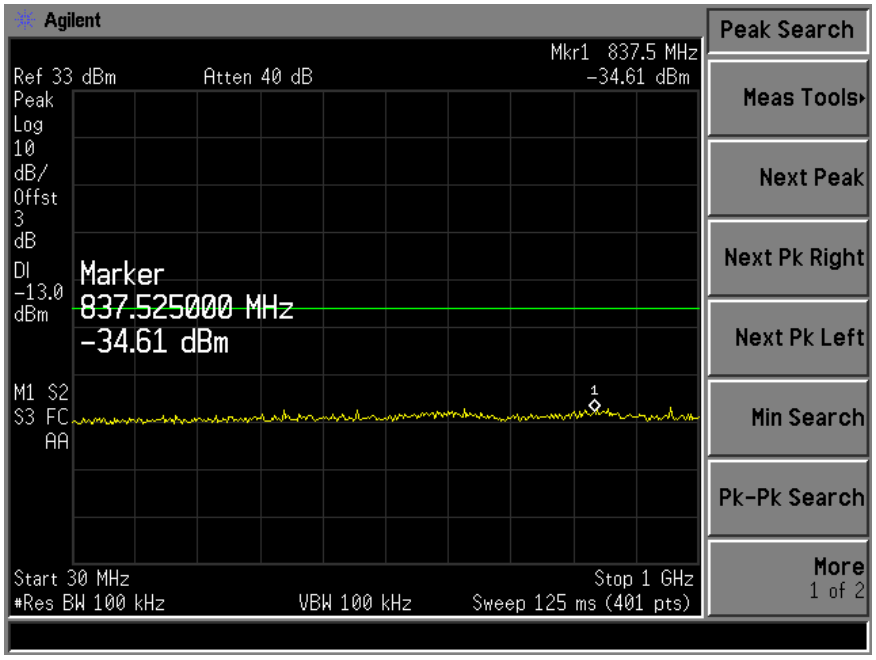
GSM Mode
30-1000MHz-Middle Channel(850MHz)



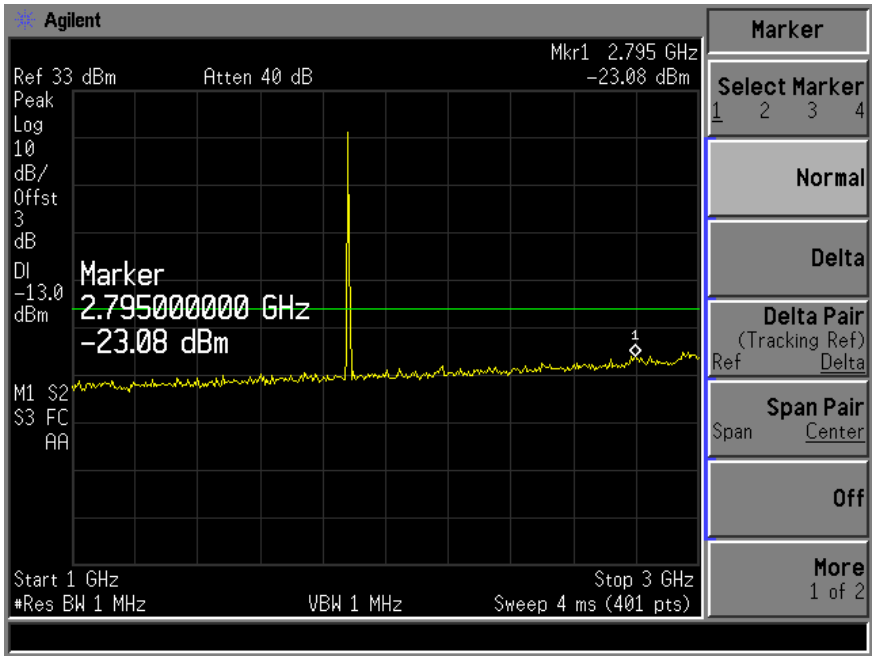
1-10GHz-Middle Channel(850MHz)



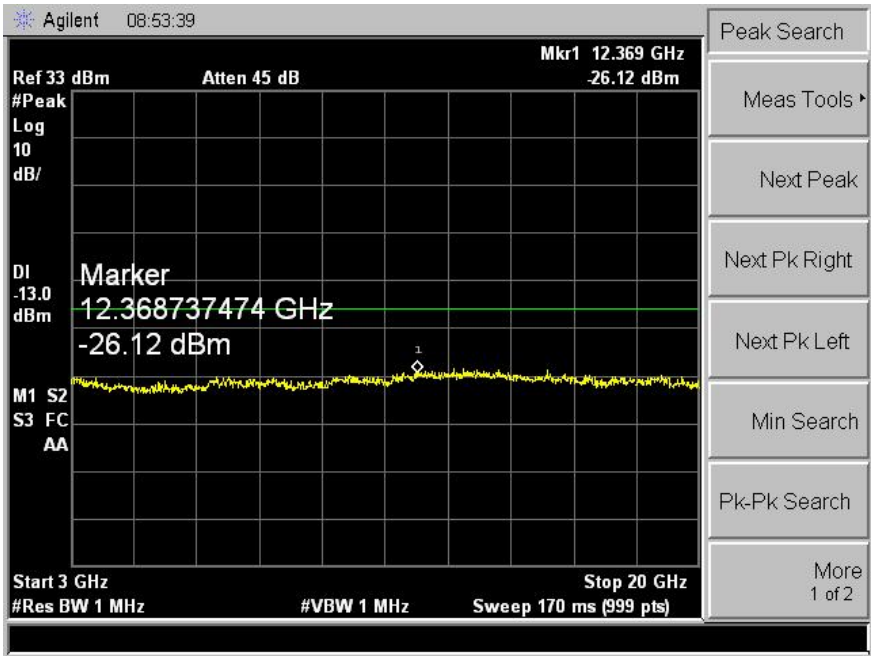
30-1000MHz-Middle Channel(1900MHz)



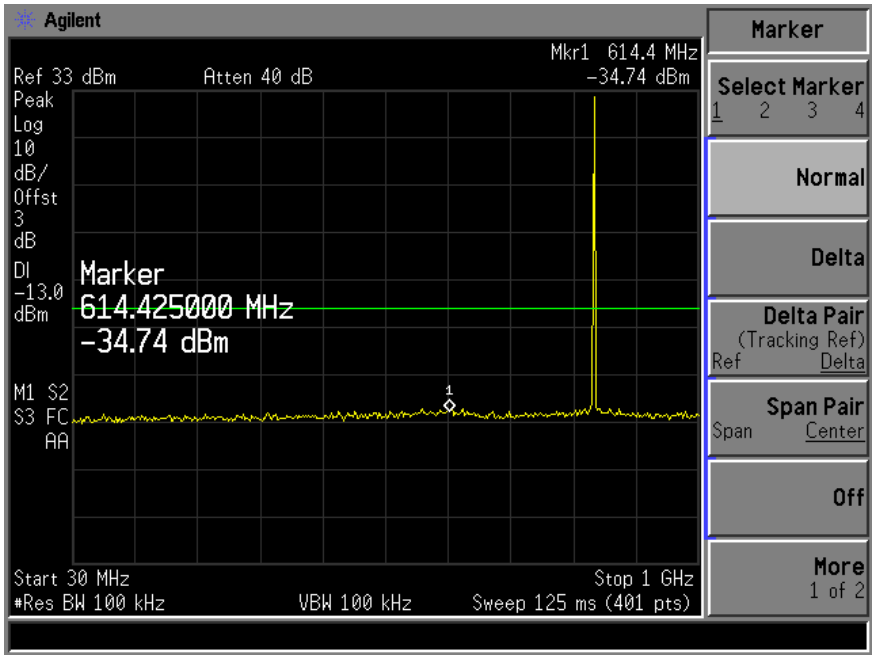
1-3GHz-Middle Channel(1900MHz)



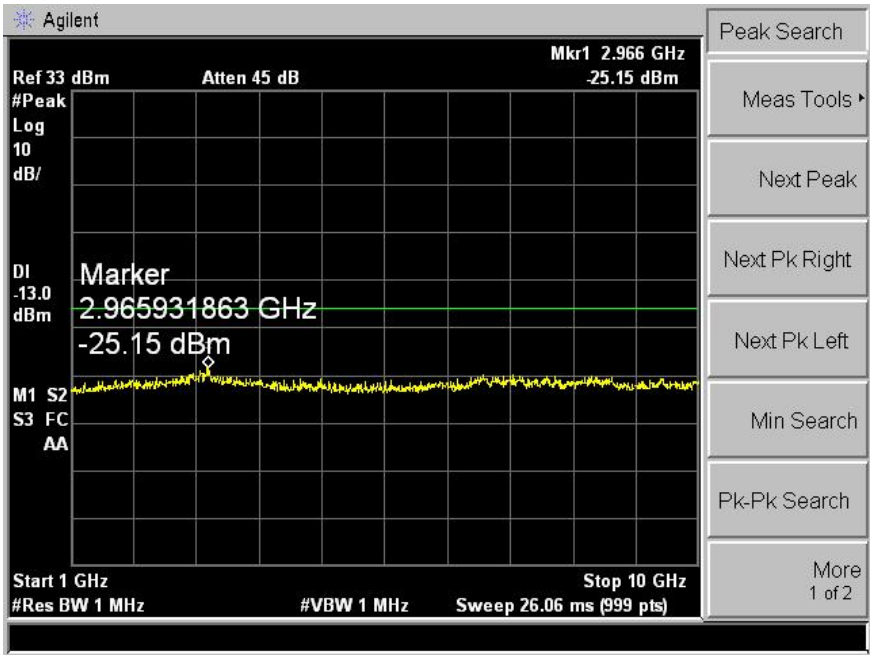
3-20GHz-Middle Channel(1900MHz)



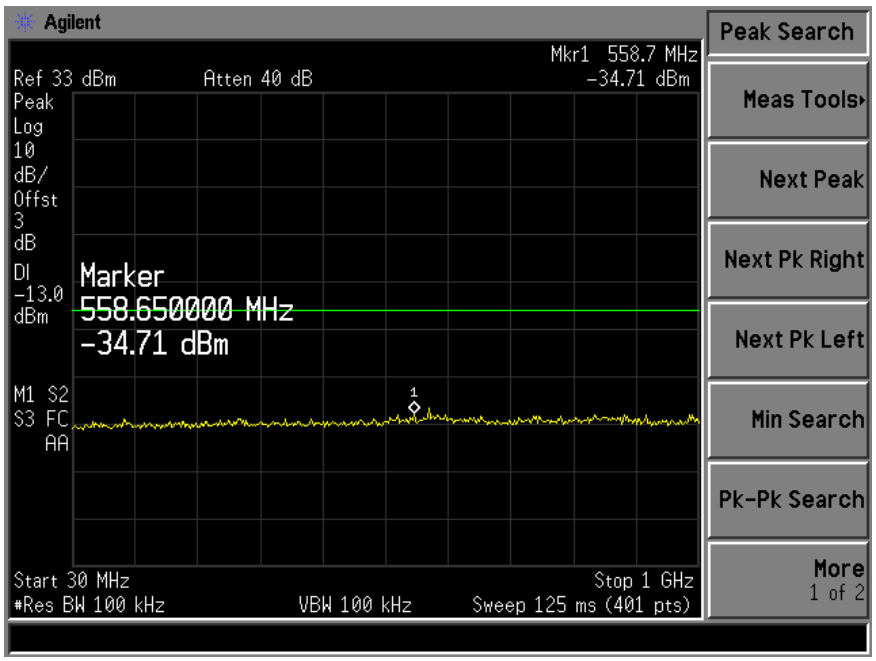
GPRS Mode
30-1000MHz-Middle Channel(850MHz)



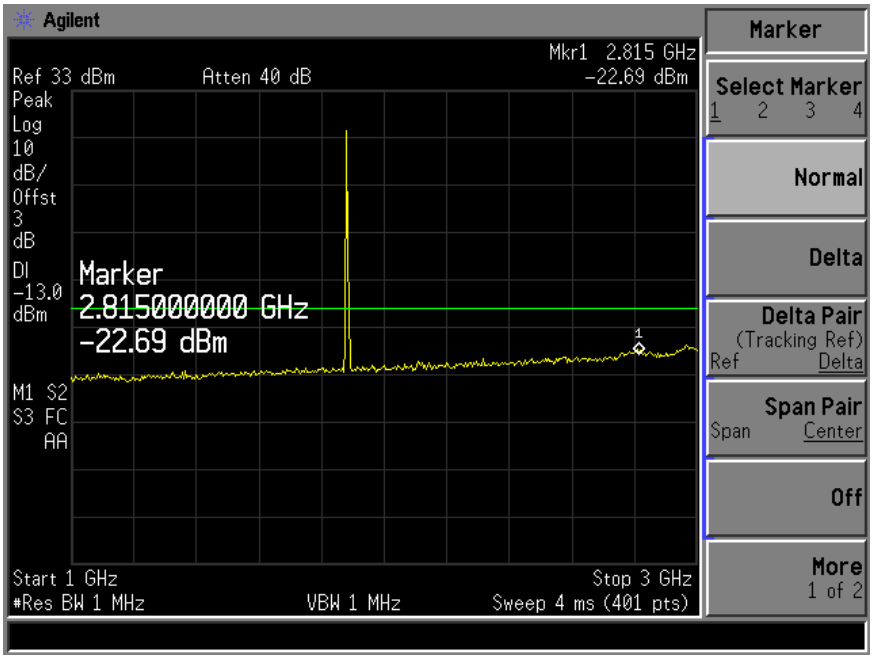
1-10GHz-Middle Channel(850MHz)



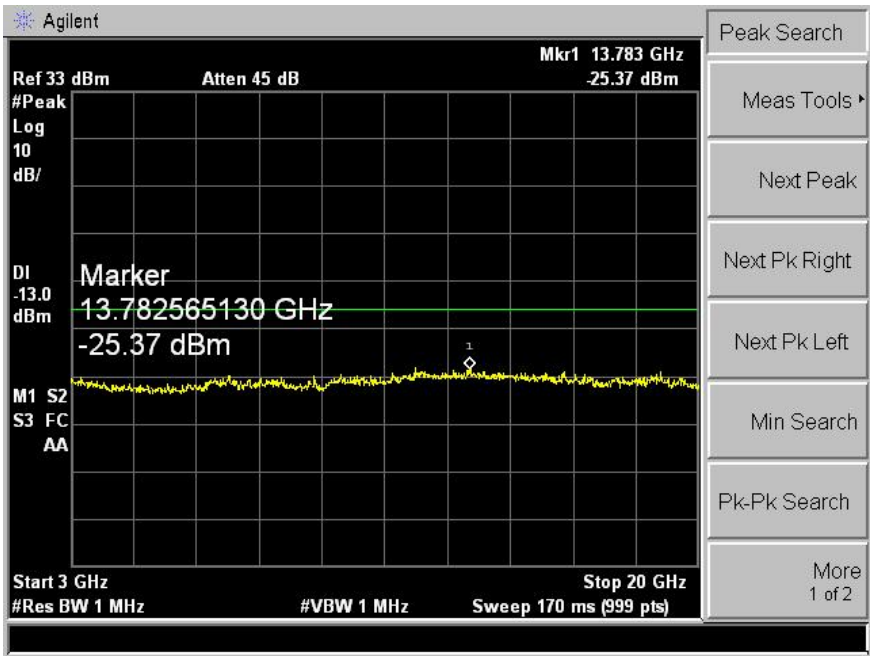
30-1000MHz-Middle Channel(1900MHz)



1-3GHz-Middle Channel(1900MHz)



3-20GHz-Middle Channel(1900MHz)



10 BAND EDGES

Test Requirement: § 22.917(a) & §24.238(a)
Test Method: ANSI/TIA-603-C: 2004
Test Result: PASS
Test mode: The EUT work in test mode(Tx) and test it

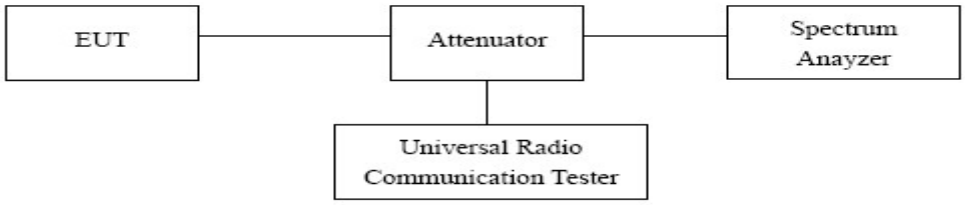
Requirement:
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Operating Environment:

Temperature: 22.0 °C
Humidity: 55 % RH
Barometric Pressure: 1012 mbar

10.1 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation.The RBW of the spectrum analyzer was set to 100KHz for the scan frequency from 30MHz to 1GHz,and 1MHz for the scan frequency from 1GHz up to 10th harmonics.



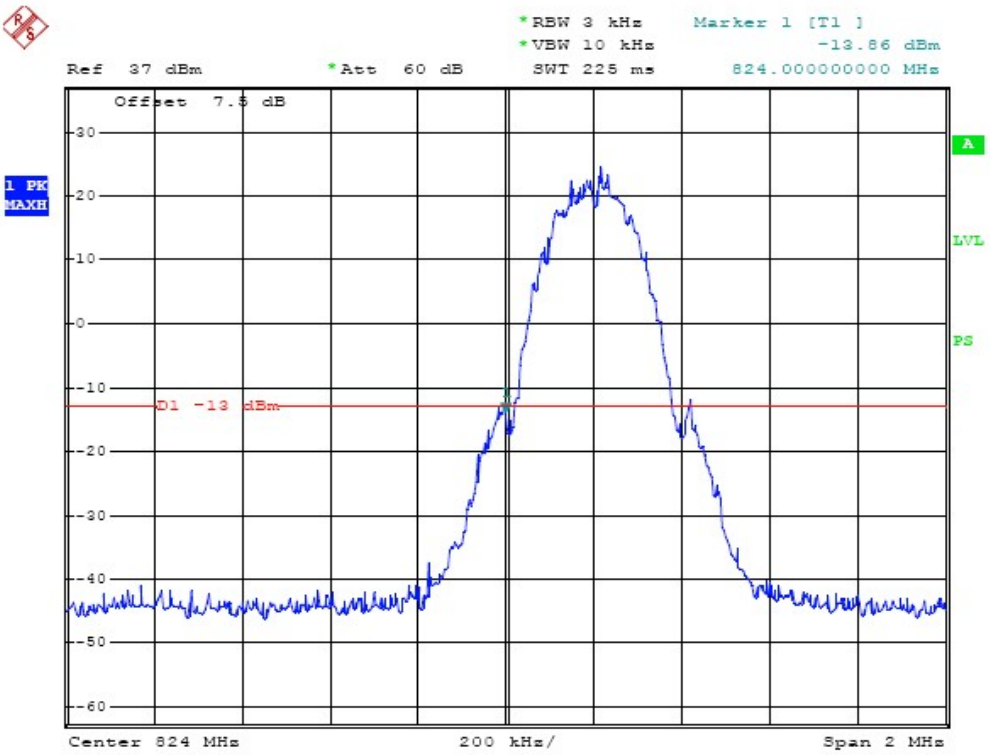
10.2 Test Data

Mode	Frequency(MHz)	Emission(dBm)	Limit(dBm)
GSM	824.2	-13.86	-13
	848.8	-15.49	-13
	1850.2	-13.29	-13
	1909.8	-19.70	-13
GPRS	824.2	-13.68	-13
	848.8	-15.64	-13
	1850.2	-13.72	-13
	1909.8	-18.03	-13

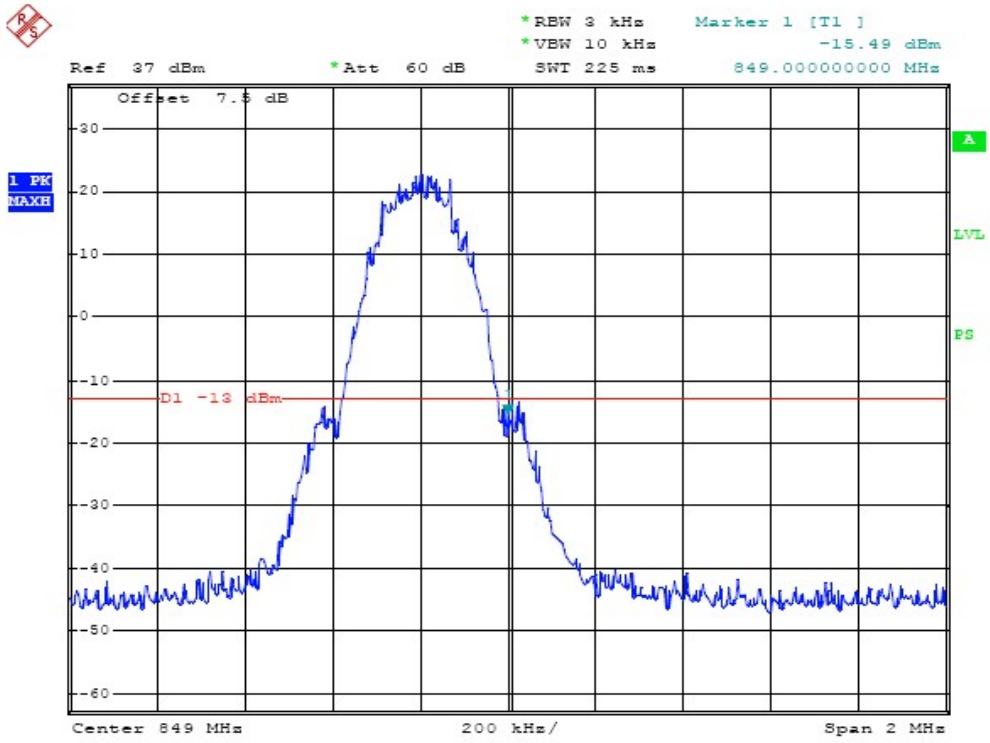
Please refer to the below graphs for more details.

GSM Mode

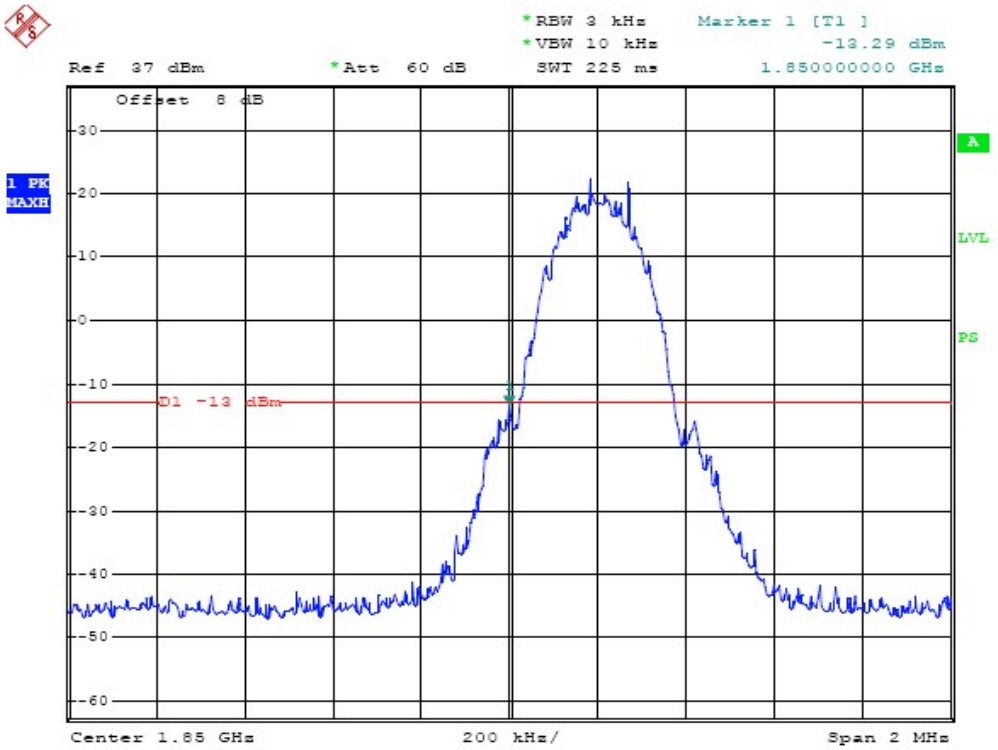
Lowest Channel(850MHz)



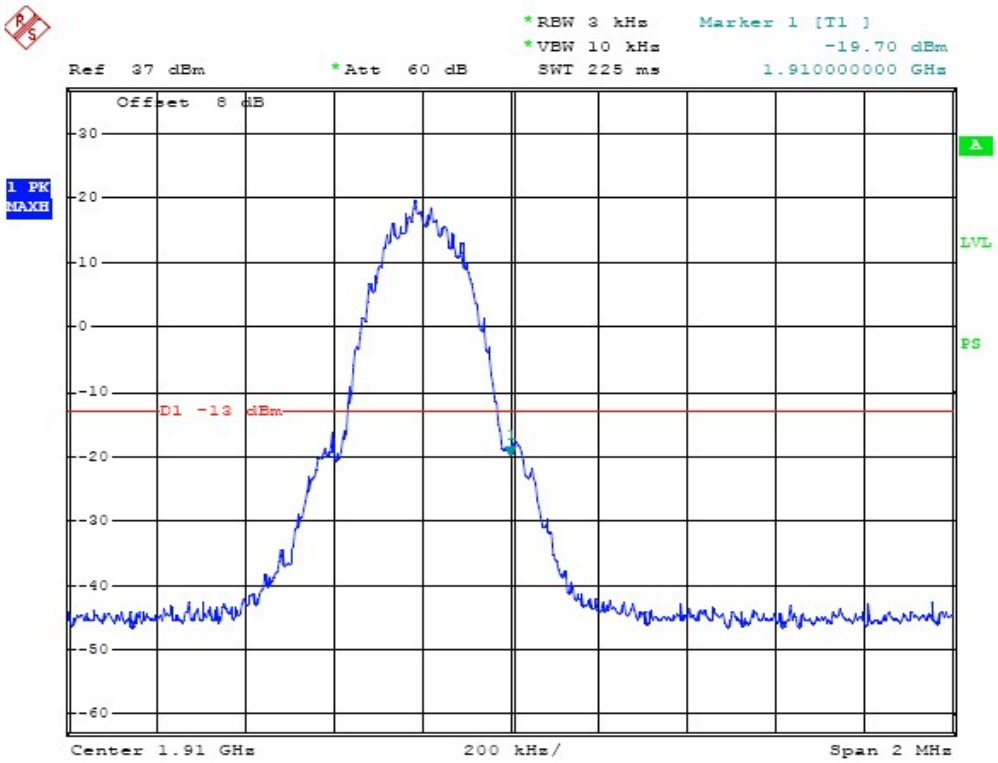
Highest Channel(850MHz)



Lowest Channel(1900MHz)

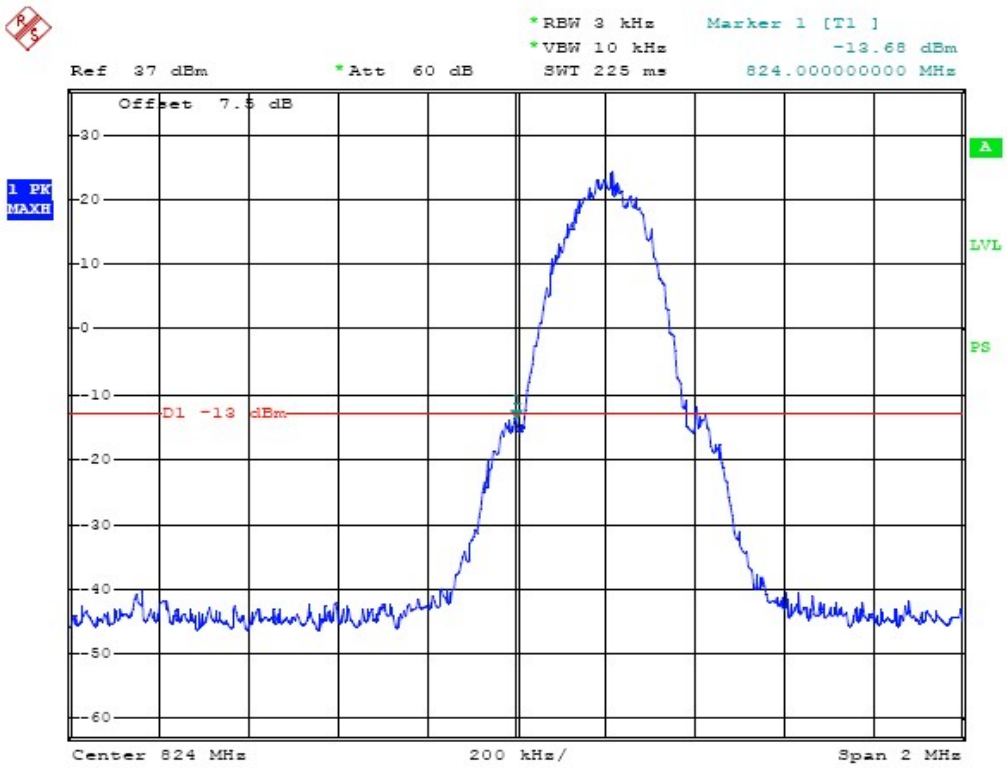


Highest Channel(1900MHz)

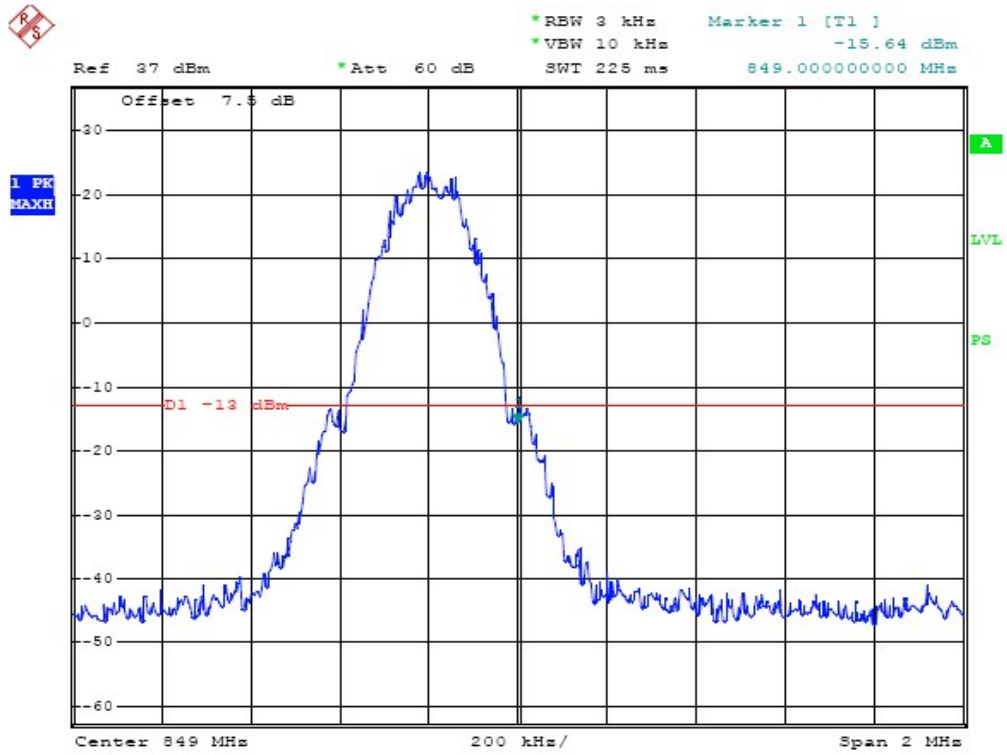


GPRS Mode

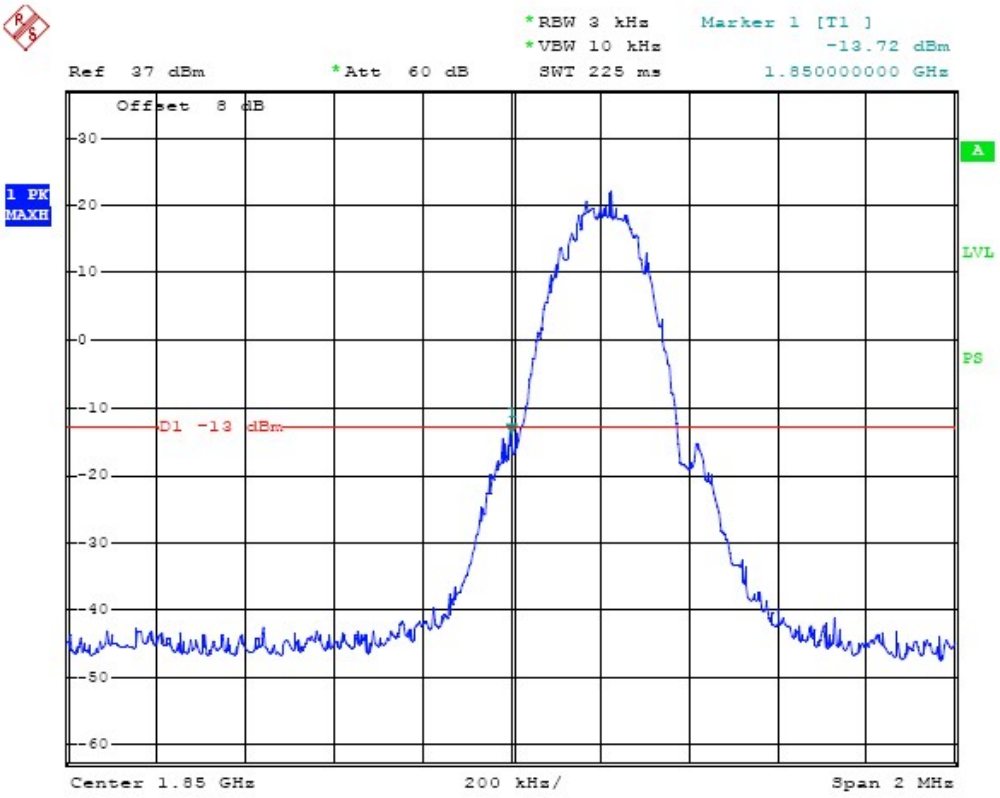
Lowest Channel(850MHz)



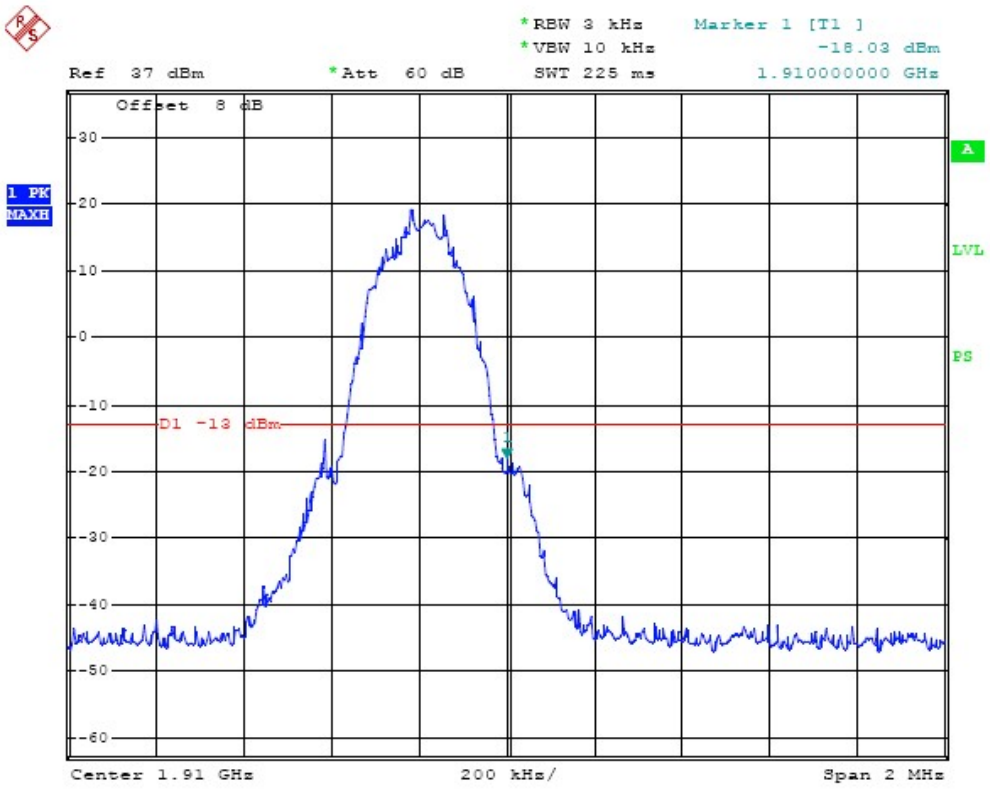
Highest Channel(850MHz)



Lowest Channel(1900MHz)



Highest Channel(1900MHz)



11 FREQUENCY STABILITY

Test Requirement: § 2.1055, §22.355, §24.235
Test Method: ANSI/TIA-603-C: 2004
Test Result: PASS
Test mode: The EUT work in test mode(Tx) and test it

Requirement:
According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

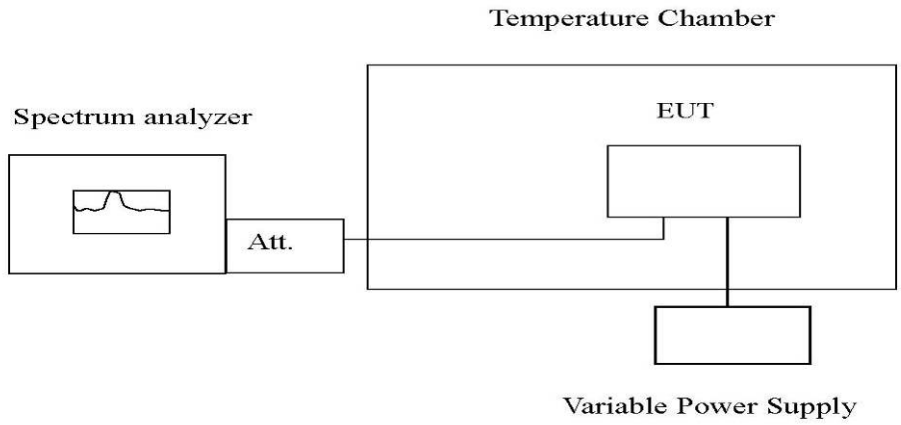
Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

11.1 Test Procedure

The Frequency Stability is measured directly with a Frequency Domain Analyzer.Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.



Remark: Measurement setup for testing on Antenna connector

11.2 Test Data

Temperature:	Supply Voltage
25℃	85-115% of declared normal voltage
-30℃ to +50℃	DC 12V (Normal)

Middle Channel,F=836.6MHz GSM Mode				
Temperature(℃)	**Supply Voltage (Vdc)**	**Frequency Error(Hz)**	**Frequency Error(ppm)**	**Limit(ppm)**
-30	**12**	**-9**	**0.01076**	**2.5**
-20		**-9**	**0.01076**	**2.5**
-10		**-7**	**0.00837**	**2.5**
0		**-11**	**0.01315**	**2.5**
20		**-9**	**0.01076**	**2.5**
40		**-10**	**0.01195**	**2.5**
50		**-10**	**0.01195**	**2.5**
25	**10**	**-12**	**0.01434**	**2.5**
	12	**-10**	**0.01195**	**2.5**
	14	**-11**	**0.01315**	**2.5**

Middle Channel,F=1880.0MHz GSM Mode				
Temperature(℃)	**Supply Voltage (Vdc)**	**Frequency Error(Hz)**	**Frequency Error(ppm)**	**Limit(ppm)**
-30	**12**	**38**	**0.020213**	**2.5**
-20		**37**	**0.019681**	**2.5**
-10		**35**	**0.018617**	**2.5**
0		**37**	**0.019681**	**2.5**
20		**40**	**0.021277**	**2.5**
40		**38**	**0.020213**	**2.5**
50		**40**	**0.021277**	**2.5**
25	**10**	**41**	**0.021809**	**2.5**
	12	**37**	**0.019681**	**2.5**
	14	**37**	**0.019681**	**2.5**

Middle Channel,F=836.6MHz GPRS Mode				
Temperature(℃)	Supply Voltage (Vdc)	Frequency Error(Hz)	Frequency Error(ppm)	Limit(ppm)
-30	12	-10	-0.01195	2.5
-20		-8	-0.00956	2.5
-10		-9	-0.01076	2.5
0		-7	-0.00837	2.5
20		-8	-0.00956	2.5
40		-10	-0.01195	2.5
50		-11	-0.01315	2.5
25	10	-8	-0.00956	2.5
	12	-7	-0.00837	2.5
	14	-10	-0.01195	2.5

Middle Channel,F=1880.0MHz GPRS Mode				
Temperature(℃)	Supply Voltage (Vdc)	Frequency Error(Hz)	Frequency Error(ppm)	Limit(ppm)
-30	12	41	0.021809	2.5
-20		41	0.021809	2.5
-10		37	0.019681	2.5
0		39	0.020745	2.5
20		37	0.019681	2.5
40		37	0.019681	2.5
50		38	0.020213	2.5
25	10	39	0.020745	2.5
	12	37	0.019681	2.5
	14	37	0.019681	2.5

12 RF Exposure Test

Test Requirement:	§ 1.1307 and §2.1093
Test Method:	ANSI/TIA-603-C: 2004
Test Result:	PASS
Requirements:	The EUT work in test mode(Tx) and test it

Requiments:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

Operating Environment:

Temperature:	22.0 °C
Humidity:	55 % RH
Barometric Pressure:	1012 mbar

12.1 The procedure and limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

MPE Calculation Method

$S = (P*G) / (4*\Pi*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

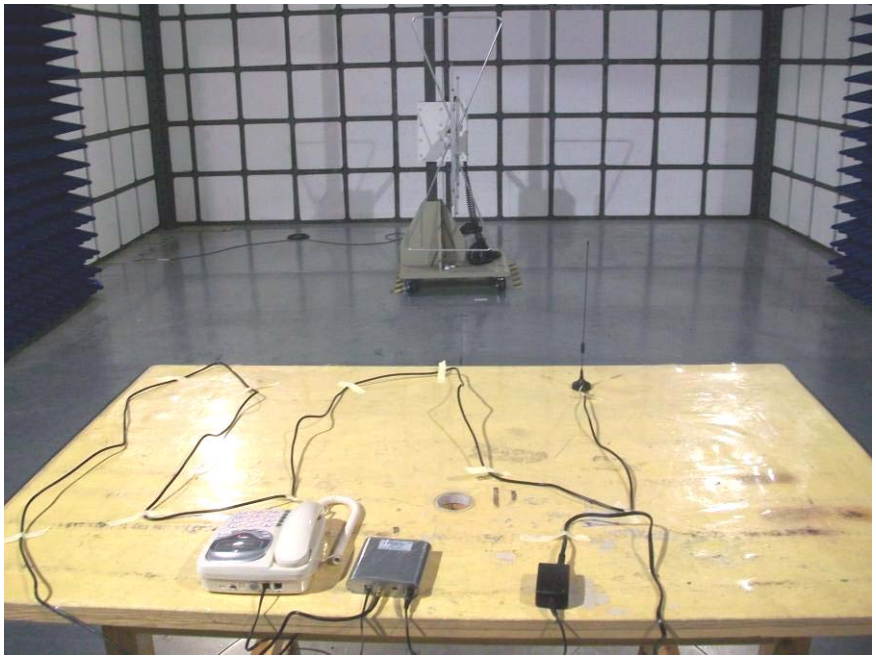
From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

12.2 Test Data

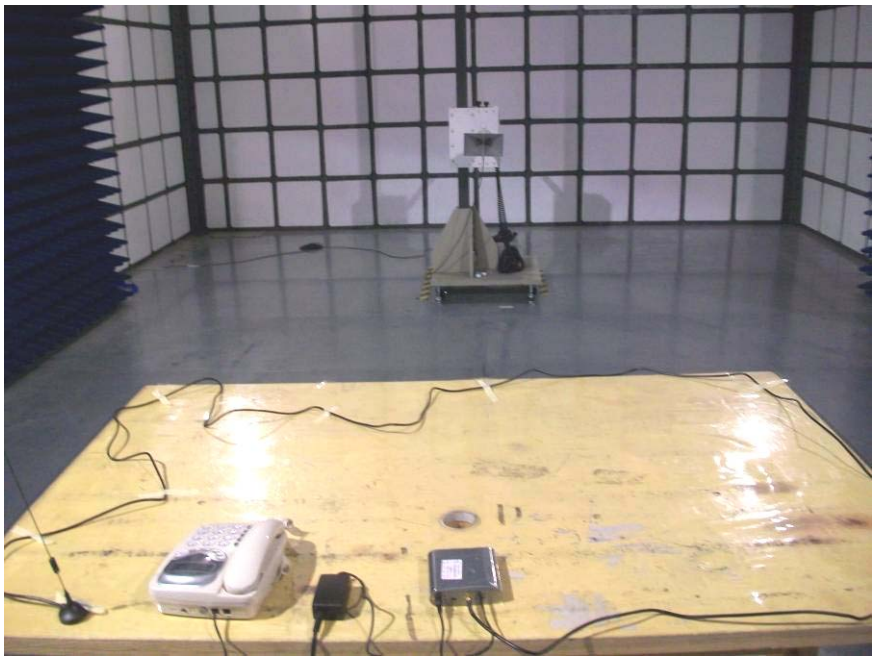
Mode	Antenna Gain (dBi)	Antenna Gain (numeric)	Max.Peak Output Power (dBm)	Max.Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)
GSM(850MHz)	1	1.2589	31.53	1422.3	0.356	1
GSM(1900MHz)	1	1.2589	28.87	770.9	0.193	1
GPRS(850MHz)	1	1.2589	31.49	1409.3	0.353	1
GPRS(1800MHz)	1	1.2589	29.40	871.0	0.218	1

13 Photographs of Testing

Radiated Emission Test View
Below 1GHz



Radiated Emission Test View
Above 1GHz



14 Photographs - Constructional Details

14.1 EUT - Components View

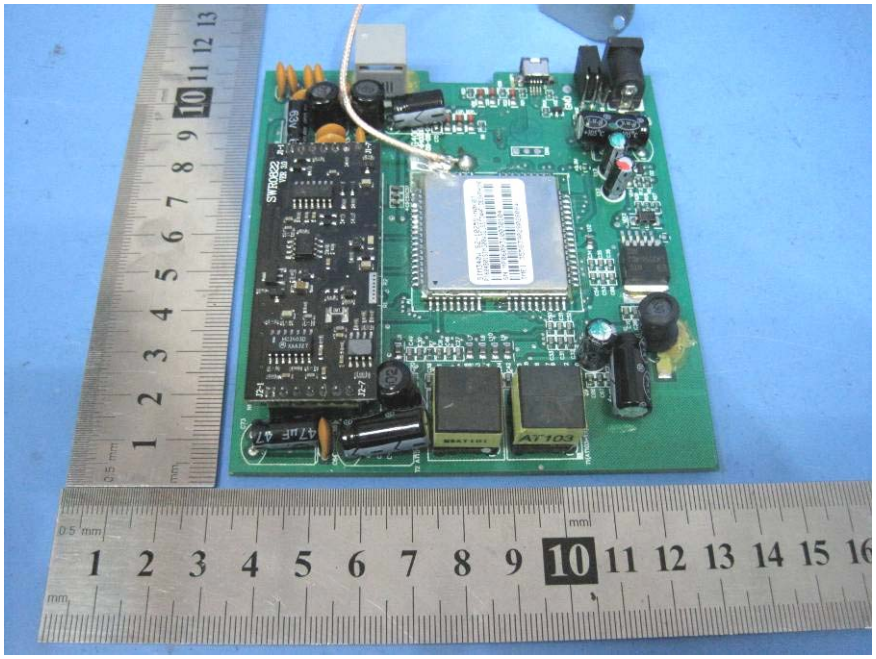
14.2 EUT - Front View

14.3 EUT - Back View

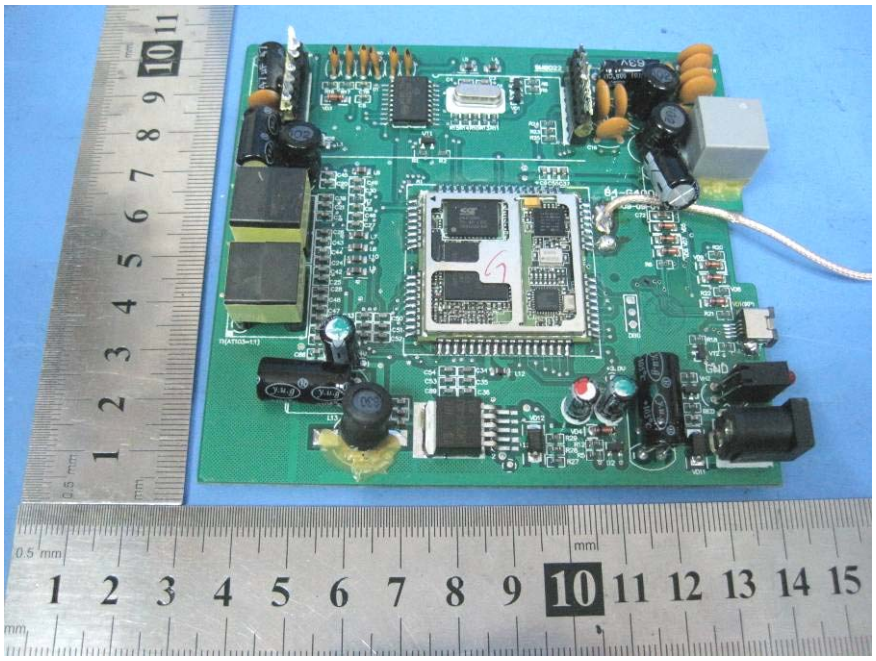
14.4 Adapter - Front View

14.5 Adapter - Back View

14.6 EUT – Open View



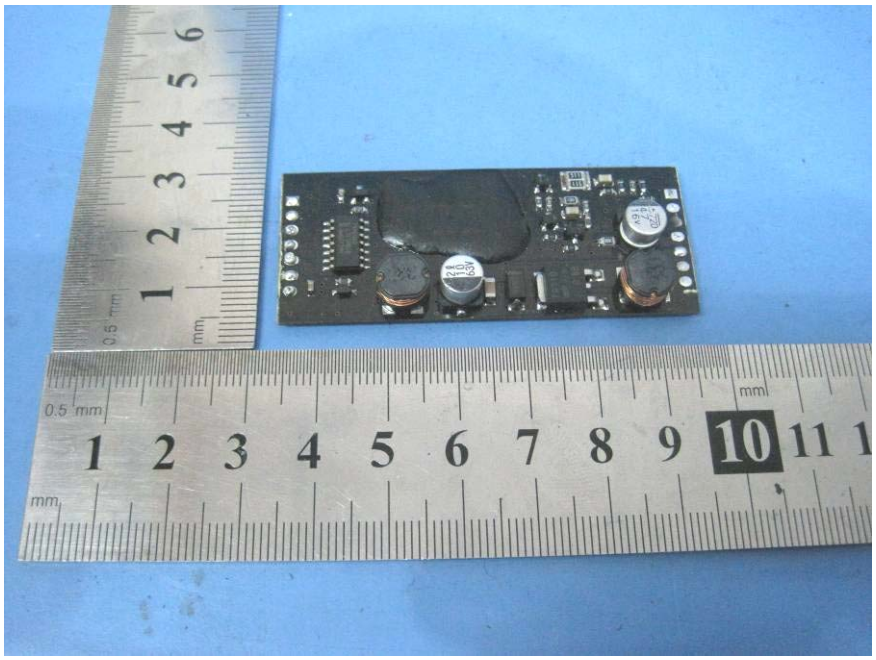
14.7 EUT – PCB1 Front View



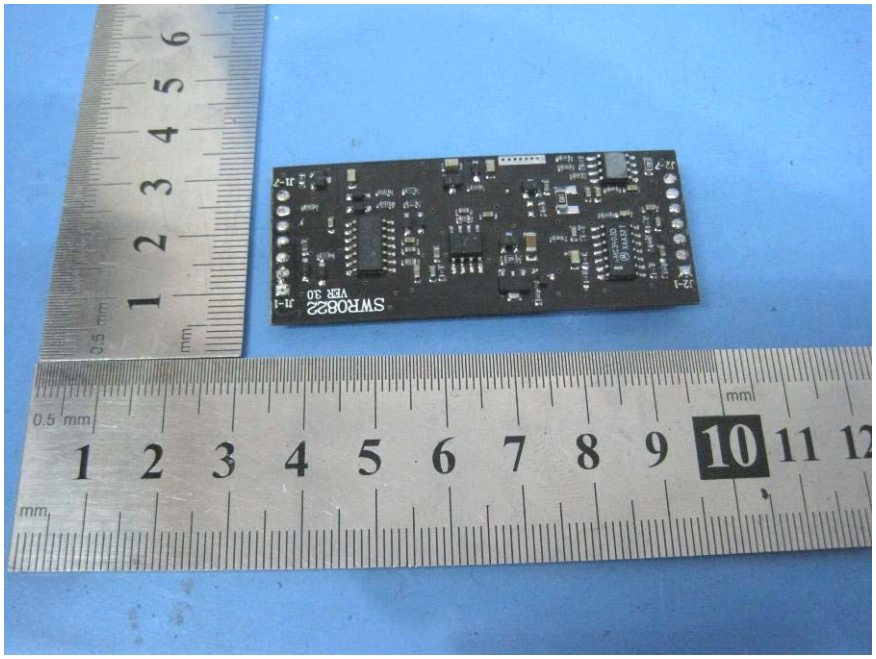
14.8 EUT – PCB1 Back View

14.9 EUT – PCB1 Module View

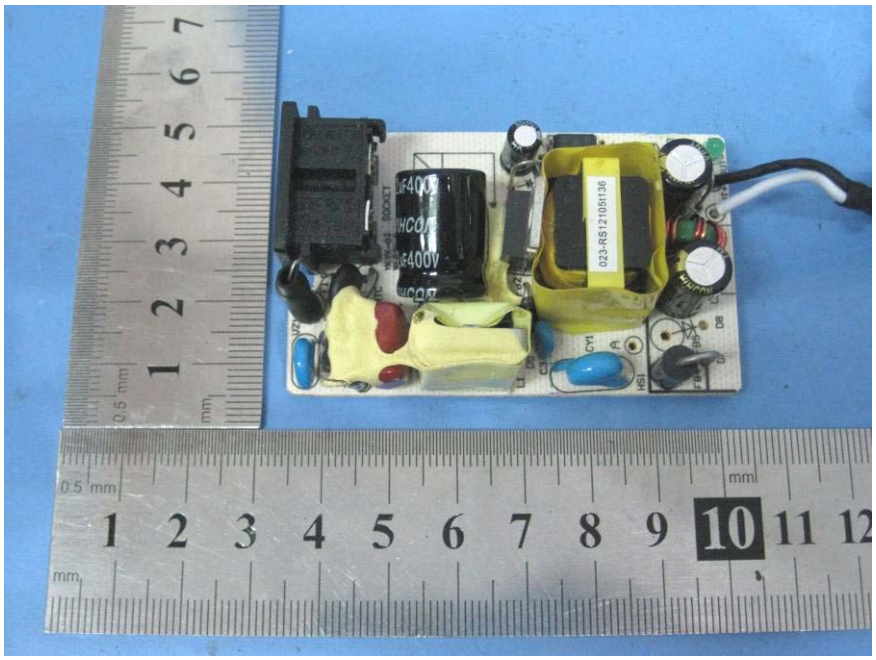
14.10 EUT – PCB2 Front View



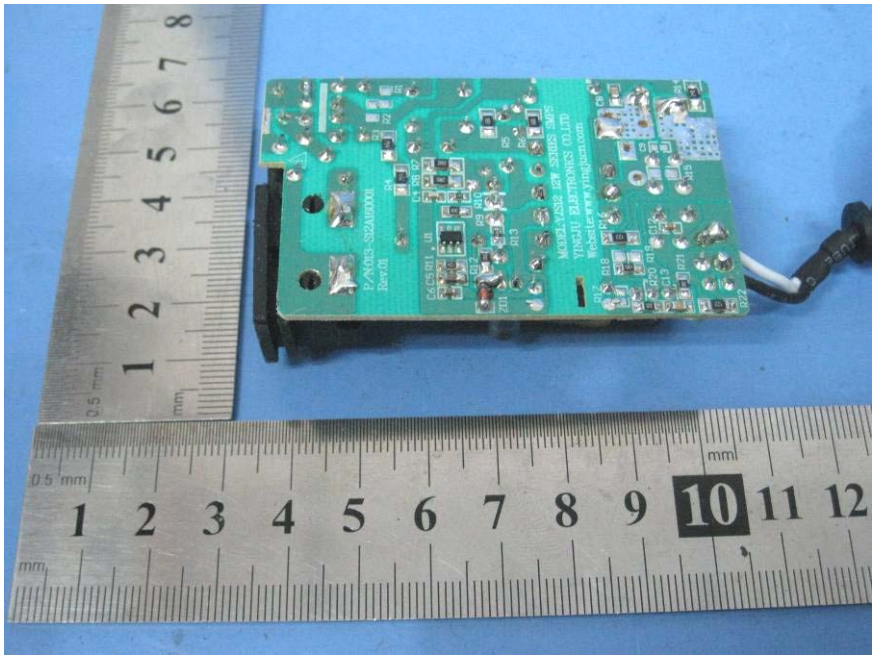
14.11 EUT – PCB2 Back View



14.12 Adapter – PCB Front View



14.13 Adapter – PCB Back View



15 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation.
The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT
EUT Bottom View/proposed FCC Mark Location