

FCC 47 CFR PART 22H and 24E**Test Report**

Product Type : Wearable Watch Tracker
Applicant : GlobalSat WorldCom Corporation
Address : 16F., No.186, Jian 1st Rd. Zhonghe Dist., New Taipei City 23553
Taiwan
Trade Name : GlobalSat
Model Number : TW-100
Test Specification : FCC 47 CFR PART 22H
FCC 47 CFR PART 24E
ANSI/TIA-603-D 2010
Application Purpose : Original
Receive Date : Nov. 18, 2015
Test Period : Nov. 23 ~ 27, 2015
Issue Date : Dec. 09, 2015

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Dec. 09, 2015	Initial Issue	

Verification of Compliance

Issued Date: 12/09/2015

Product Type : Wearable Watch Tracker
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Address : 16F., No.186, Jian 1st Rd. Zhonghe Dist., New Taipei City 23553
Taiwan
Trade Name : GlobalSat
Model Number : TW-100
FCC ID : RID-TW100
EUT Rated Voltage : DC 5.0V, 1.0A
Test Voltage : 120 Vac / 60 Hz
Applicable Standard : FCC 47 CFR PART 22H
FCC 47 CFR PART 24E
ANSI/TIA-603-D 2010
Application Purpose : Original
Test Result : Complied
Performing Lab. : A Test Lab Techno Corp.

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<http://www.atl-lab.com.tw/e-index.htm>

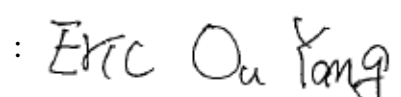
A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By :



(Manager)

Reviewed By :



(Testing Engineer)

(Eric Ou Yang)

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1 General Information

1.1. EUT Description

Applicant		GlobalSat WorldCom Corporation			
Applicant Address		16F., No.186, Jian 1st Rd. Zhonghe Dist., New Taipei City 23553 Taiwan			
Manufacturer		GlobalSat WorldCom Corporation			
Manufacturer Address		16F., No.186, Jian 1st Rd. Zhonghe Dist., New Taipei City 23553 Taiwan			
Product Type		Wearable Watch Tracker			
Trade Name		GlobalSat			
Model Number		TW-100			
FCC ID		RID-TW100			
IMEI No.		357325031693450			
Mode	GSM/GPRS	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
		850	824.2 ~ 848.8	869.2 ~ 893.8	GMSK
		1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8	GMSK
Channel Control		Auto			
Type of Antenna		Monopole Type			
Antenna Gain (dBi)		GSM/GPRS 850		:	-0.4 dBi
		GSM/GPRS 1900		:	-0.4 dBi
Max. RF Output power		GSM 850		:	33.20 dBm / 2.089 W
		GSM 1900		:	29.62 dBm / 0.916 W
Max. ERP/EIRP		GSM 850		:	30.79 dBm / 1.199 W
		GSM 1900		:	28.33 dBm / 0.681 W
Emission Designator		GSM 850: 247KG7W			
		GSM 1900: 245KG7W			

1.2. Mode of Operation

ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: GSM 850 Link Mode
Mode 2: GSM 1900 Link Mode

Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

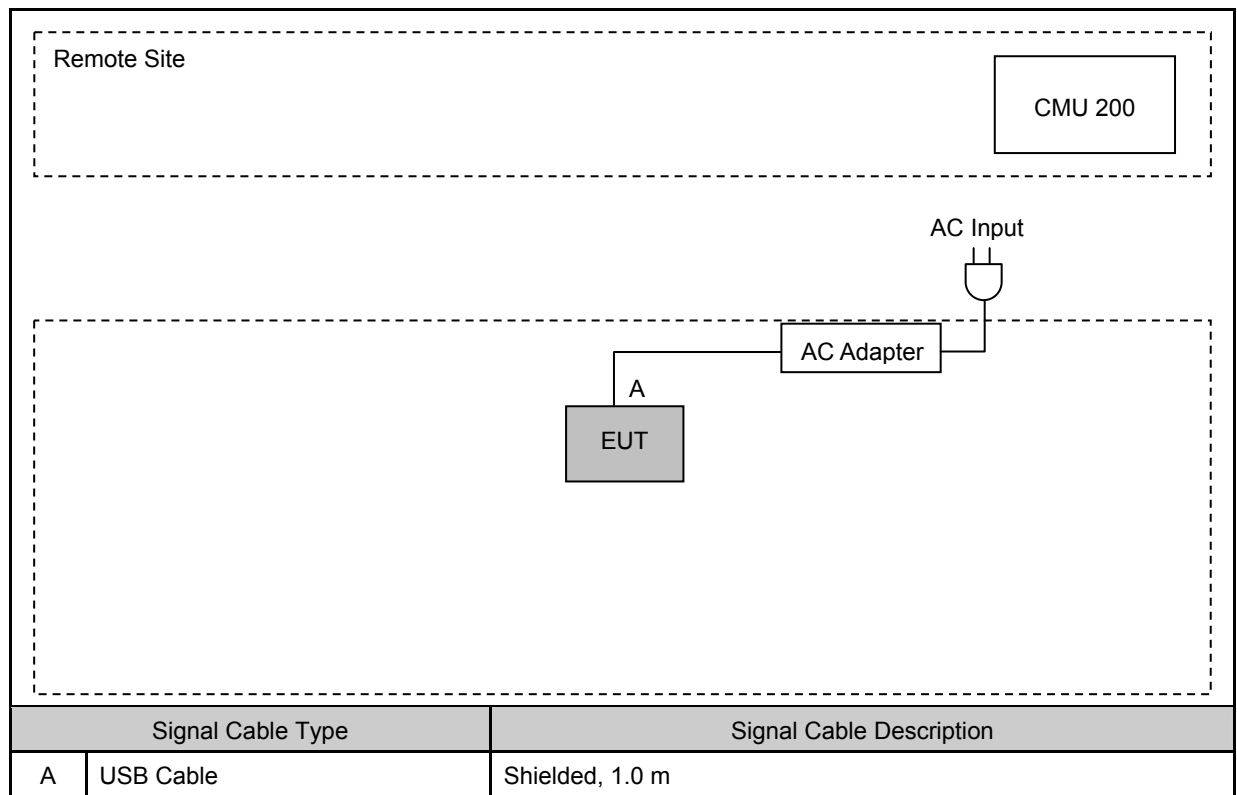
By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

Preliminary tests were performed in different modulation to find the worst case. The modulation has shown the worst-case in section 2.6. Investigation has been done on all the possible configurations for searching the worst cases.

1.3. EUT Exercise Software

1	Setup the EUT and Base Station (CMU200) as shown on 1.4.
2	Turn on the power of all equipment.

1.4. Configuration of Test System Details



Devices Description					
	Product	Manufacturer	Model Number	Serial Number	Power Cord
1.	-----	-----	-----	-----	-----

1.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

1.6. Summary of Test Result

Description	FCC Rule	Limit	Result
Conducted Output Power	§2.1046	N/A	Pass
Effective Radiated Power	§22.913(a)(2)	< 7 Watts	Pass
Equivalent Isotropic Radiated Power	§24.232(c)	≤ 2 Watts	Pass
Emission Bandwidth & Occupied Bandwidth	§2.1049 §22.917(a) §24.238(a)	N/A	Pass
Band Edge Measurement	§2.1051 §22.917(a) §24.238(a)	< 43+10log ₁₀ (P[Watts])	Pass
Conducted Spurious Emission	§2.1051 §22.917(a) §24.238(a)	< 43+10log ₁₀ (P[Watts])	Pass
Field Strength of Spurious Radiation	§2.1053 §22.917(a) §24.238(a)	< 43+10log ₁₀ (P[Watts])	Pass
Frequency Stability for Temperature & Voltage	§2.1055 §22.355 §24.235	< 2.5 ppm	Pass

2 RF Output Power Test

2.1. Limit

N/A

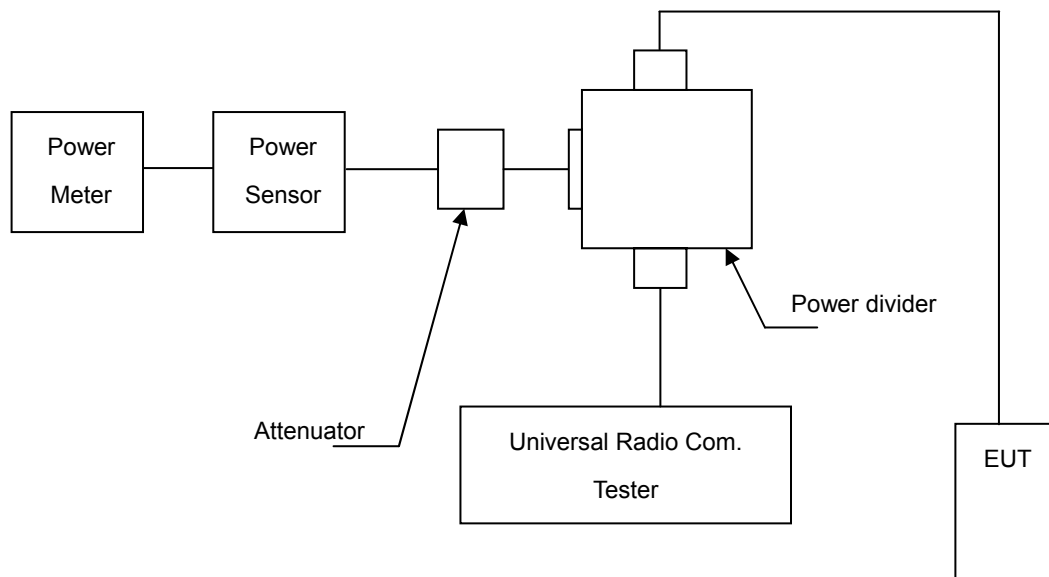
2.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	10/21/2014	(2)
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/15/2014	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/15/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

2.3. Test Setup



2.4. Test Procedure

The measurement is made according to as follows:

1. The transmitter output was connected to power meter and base station through Power Divider.
2. Set base station for EUT at GSM 850: PCL=5 and PCS 1900: PCL=0.
3. Set base station for EUT at WCDMA Band V and WCDMA Band II, power level was set to maximum.
4. Select lowest, middle, and highest channels for each band.

2.5. Uncertainty

The measurement uncertainty is defined as for RF output power measurement is 1.2 dB.

2.6. Test Result

Model Number	TW-100						
Test Item	RF Output Power						
Date of Test	11/23/2015			Test Site		TE05	
Bands	Modulation Type	Data Rate	Frequency (MHz)	Burst Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
GSM 850	GMSK	-----	824.2	32.82	1.914	33.01	2.000
			836.6	32.94	1.968	33.13	2.056
			848.8	33.01	2.000	33.20	2.089
GRRS 850 Multi Class :12 Max Up:4 Max Down:4 Sum:5	GMSK	4Down1Up (Duty Factor 1/8)	824.2	32.76	1.888	32.93	1.963
			836.6	32.87	1.936	33.04	2.014
			848.8	32.93	1.963	33.10	2.042
		3Down2Up (Duty Factor 2/8)	824.2	32.12	1.629	32.30	1.698
			836.6	32.27	1.687	32.45	1.758
			848.8	32.38	1.730	32.56	1.803
		2Down3Up (Duty Factor 3/8)	824.2	30.62	1.153	30.78	1.197
			836.6	30.79	1.199	30.95	1.245
			848.8	30.92	1.236	31.08	1.282
		1Down4Up (Duty Factor 4/8)	824.2	29.77	0.948	29.95	0.989
			836.6	29.97	0.993	30.15	1.035
			848.8	30.13	1.030	30.31	1.074

Note: The peak power testing result was used peak detector.

Model Number	TW-100						
Test Item	RF Output Power						
Date of Test	11/23/2015			Test Site		TE05	
Bands	Modulation Type	Data Rate	Frequency (MHz)	Burst Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
GSM 1900	GMSK	-----	1850.20	29.43	0.877	29.62	0.916
			1880.00	29.32	0.855	29.51	0.893
			1909.80	29.28	0.847	29.47	0.885
GRRS 1900 Multi Class :12 Max Up:4 Max Down:4 Sum:5	GMSK	4Down1Up (Duty Factor 1/8)	1850.20	29.36	0.863	29.54	0.899
			1880.00	29.26	0.843	29.44	0.879
			1909.80	29.21	0.834	29.39	0.869
		3Down2Up (Duty Factor 2/8)	1850.20	28.83	0.764	28.99	0.793
			1880.00	28.74	0.748	28.90	0.776
			1909.80	28.67	0.736	28.83	0.764
		2Down3Up (Duty Factor 3/8)	1850.20	27.63	0.579	27.80	0.603
			1880.00	27.55	0.569	27.72	0.592
			1909.80	27.48	0.560	27.65	0.582
		1Down4Up (Duty Factor 4/8)	1850.20	26.85	0.484	27.00	0.501
			1880.00	26.79	0.478	26.94	0.494
			1909.80	26.71	0.469	26.86	0.485

Note: The peak power testing result was used peak detector.

3 Effective Radiated Power / Equivalent Isotropic Radiated Power Test

3.1. Limit

For FCC Part 22.913(a)(2): The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC Part 24.232(c): The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

3.2. Test Instruments

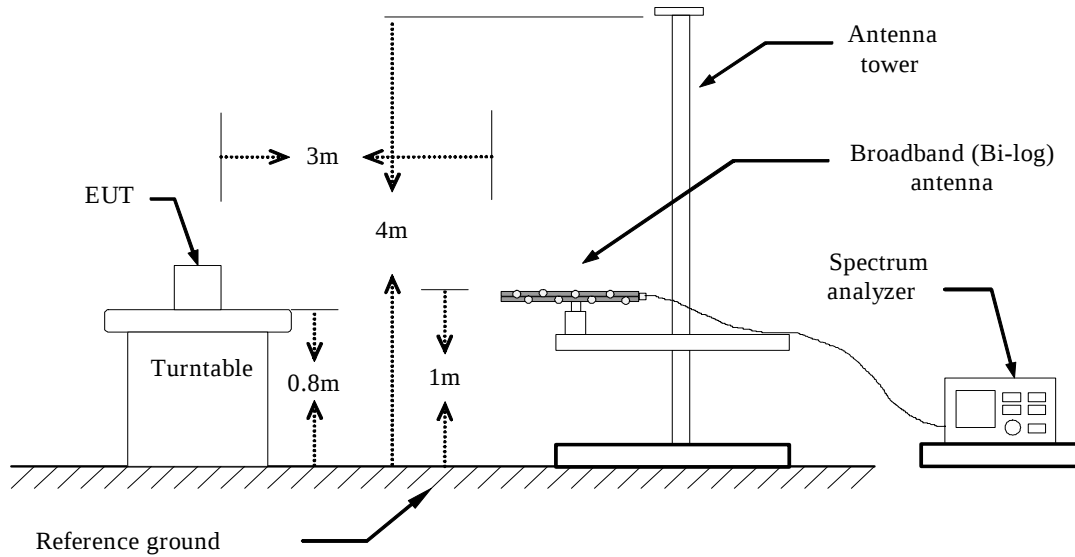
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/24/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/24/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	08/11/2015	(1)
Sleeve Dipole(CF880) (780-980MHz)	ETS	3126-880	00064344	10/06/2014	(2)
Sleeve Dipole(CF1845) (1695-1995MHz)	ETS	3126-1845	00083335	10/06/2014	(2)
Horn Antenna (1~18GHz)	ETS	3117	00152321	08/14/2015	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/12/2015	(1)
Horn Antenna (18~40GHz)	ETS	3116	00086467	09/01/2015	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	(1)
Test Site	ATL	TE01	888001	08/27/2015	(1)

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

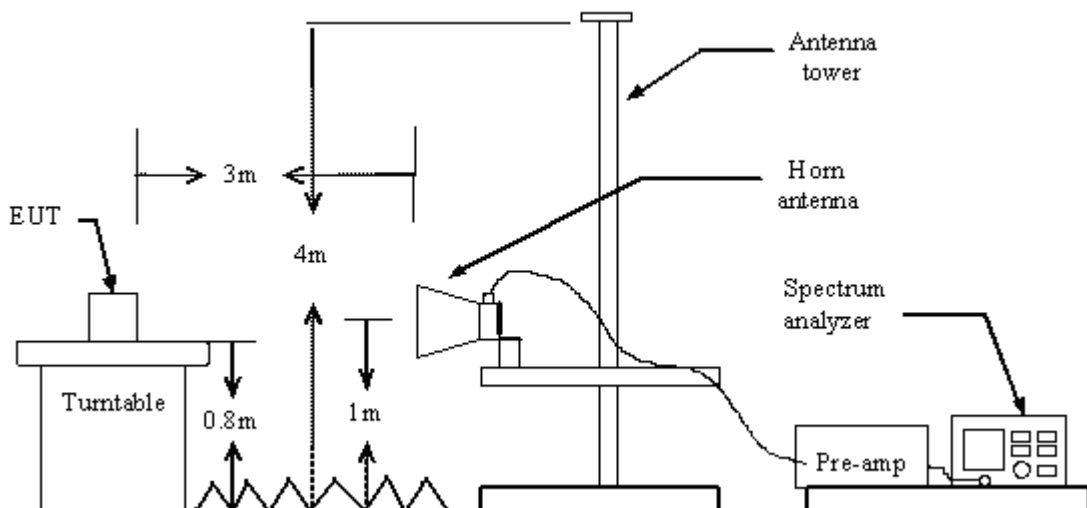
Note: N.C.R. = No Calibration Request.

3.3. Setup

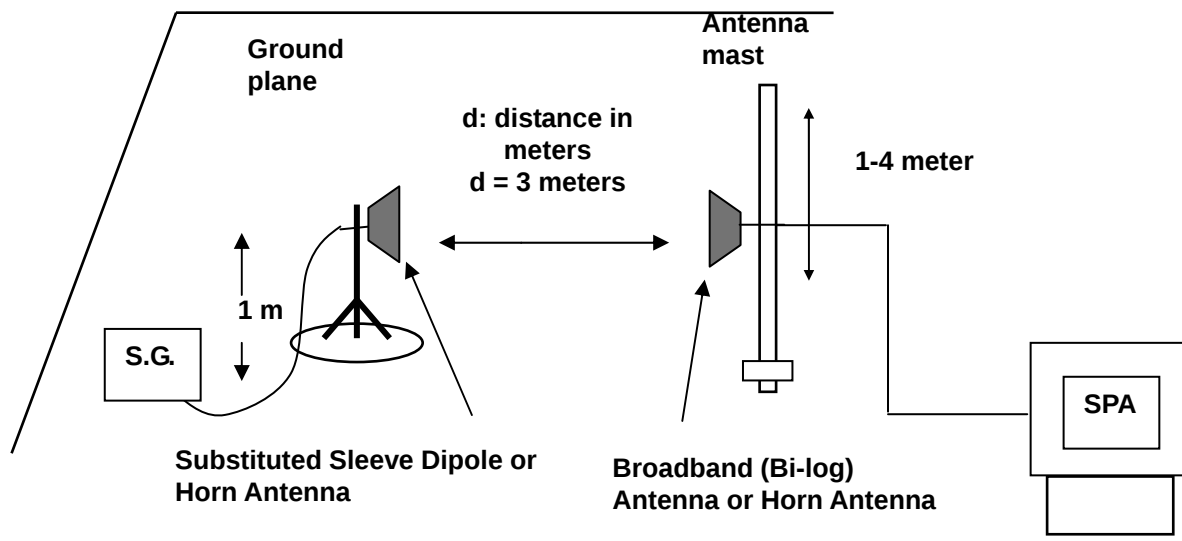
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



3.4. Test Procedure

- The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range).
- Radiation Emission measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The substitution antenna (Note:3 & 4) is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- $E.I.R.P. = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- $E.R.P. = E.I.R.P. - 2.15 \text{ dB}$

Note: 1. For WCDMA and CDMA signals, a peak detector is used with RBW = VBW = 5MHz.

2. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW= 1 MHz.

3. Below 1 GHz Substituted Method Test : Sleeve dipole antenna to Bi-Log Antenna

4. Above 1 GHz Substituted Method Test : Horn antenna to Horn Antenna

3.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is $\pm 3.072 \text{ dB}$.

3.6. Test Result

Model Number	TW-100							
Test Item	ERP/EIRP							
Date of Test	11/23/2015					Test Site	TE01	
Bands	Modulation Type	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	ERP		Limit
						(dBm)	(W)	
GSM 850	GMSK	824.2	H	14.62	12.84	27.46	0.557	< 7W
			V	18.61	12.18	30.79	1.199	< 7W
		836.6	H	14.29	12.97	27.26	0.532	< 7W
			V	18.19	12.24	30.43	1.104	< 7W
		848.8	H	14.09	13.42	27.51	0.564	< 7W
			V	17.68	12.38	30.06	1.014	< 7W

Model Number	TW-100							
Test Item	ERP/EIRP							
Date of Test	11/23/2015					Test Site	TE01	
Bands	Modulation Type	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	EIRP		Limit
						(dBm)	(W)	
GSM 1900	GMSK	1850.20	H	14.39	11.90	26.29	0.426	< 2W
			V	16.42	11.90	28.32	0.679	< 2W
		1880.00	H	14.17	11.94	26.11	0.408	< 2W
			V	16.11	11.94	28.05	0.638	< 2W
		1909.80	H	14.22	11.95	26.17	0.414	< 2W
			V	16.38	11.95	28.33	0.681	< 2W

Note: 1. ERP/EIRP = Read Level + Correction factor.

2. For WCDMA and CDMA signals, a peak detector is used with RBW = VBW = 5MHz.

3. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW= 1 MHz.

4 Emission Bandwidth & Occupied Bandwidth Test

4.1. Limit

The Occupied Bandwidth Limit:

N/A.

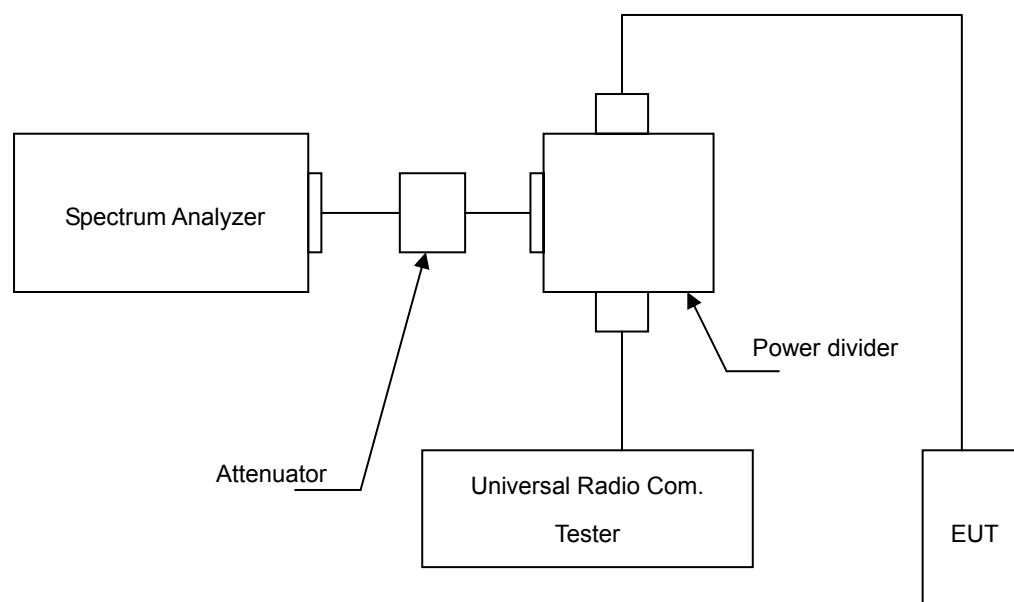
4.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	10/21/2014	(2)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/14/2015	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

4.3. Setup



4.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The occupied bandwidth of middle channel for the highest and lowest RF powers was measured.

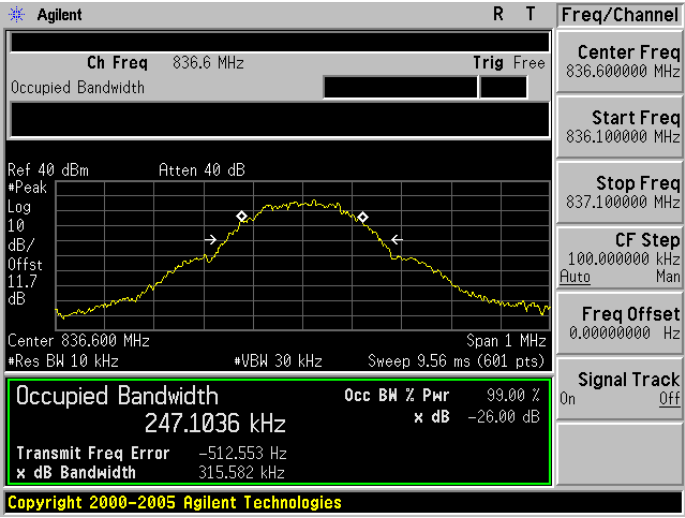
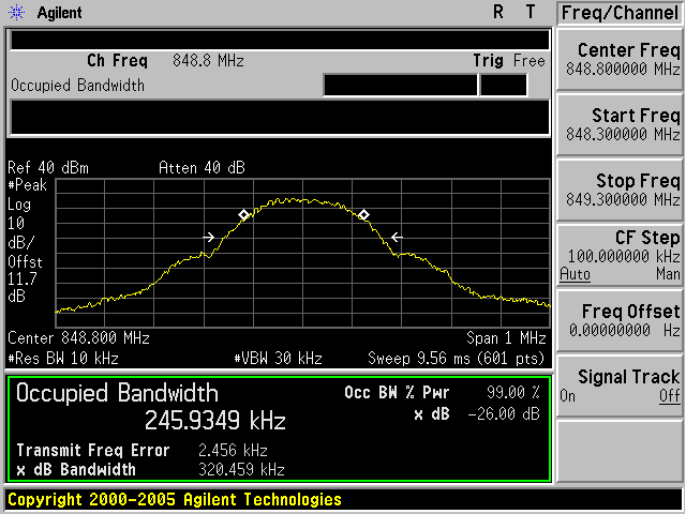
4.5. Uncertainty

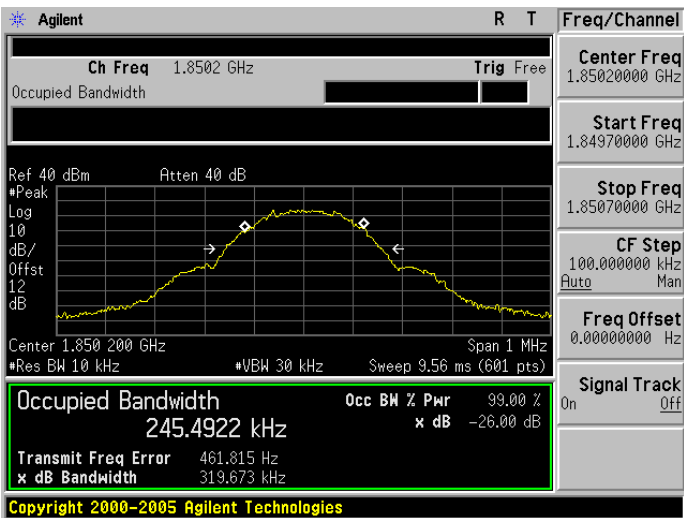
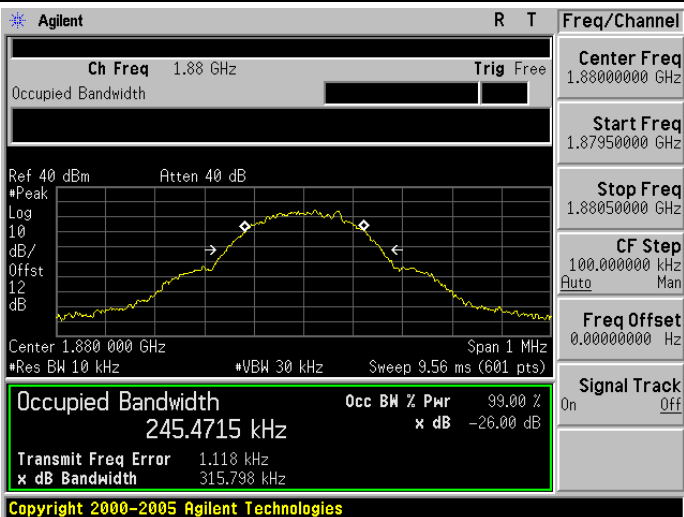
The measurement uncertainty is defined as $\pm 10\text{Hz}$

4.6. Test Result

Model Number	TW-100				
Test Item	Emission Bandwidth & Occupied Bandwidth				
Date of Test	11/23/2015			Test Site	TE05
Bands	Channel	Frequency (MHz)	-26dB Bandwidth (kHz)	99% Bandwidth (kHz)	Note
GSM 850	128	824.2	316.662	245.3221	RBW:10KHz , VBW:30KHz
	190	836.6	315.582	247.1036	RBW:10KHz , VBW:30KHz
	251	848.8	320.459	245.9349	RBW:10KHz , VBW:30KHz
GSM 1900	512	1850.20	319.673	245.4922	RBW:10KHz , VBW:30KHz
	661	1880.00	315.798	245.4715	RBW:10KHz , VBW:30KHz
	810	1909.80	313.643	245.9194	RBW:10KHz , VBW:30KHz

4.7. Test Graphs

Mode 1: GSM 850 Link Mode	
824.2 MHz	 Agilent R T Freq/Channel Ch Freq 824.2 MHz Trig Free Occupied Bandwidth Ref 40 dBm Atten 40 dB #Peak Log 10 dB/ Offst 11.7 dB Center 824.200 MHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 9.56 ms (601 pts) Occupied Bandwidth 245.3221 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 1.527 kHz x dB Bandwidth 316.662 kHz Copyright 2000-2005 Agilent Technologies Freq/Channel Center Freq 824.200000 MHz Start Freq 823.700000 MHz Stop Freq 824.700000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off
836.6 MHz	 Agilent R T Freq/Channel Ch Freq 836.6 MHz Trig Free Occupied Bandwidth Ref 40 dBm Atten 40 dB #Peak Log 10 dB/ Offst 11.7 dB Center 836.600 MHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 9.56 ms (601 pts) Occupied Bandwidth 247.1036 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -512.553 Hz x dB Bandwidth 315.582 kHz Copyright 2000-2005 Agilent Technologies Freq/Channel Center Freq 836.600000 MHz Start Freq 836.100000 MHz Stop Freq 837.100000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off
848.8 MHz	 Agilent R T Freq/Channel Ch Freq 848.8 MHz Trig Free Occupied Bandwidth Ref 40 dBm Atten 40 dB #Peak Log 10 dB/ Offst 11.7 dB Center 848.800 MHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 9.56 ms (601 pts) Occupied Bandwidth 245.9349 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 2.456 kHz x dB Bandwidth 320.459 kHz Copyright 2000-2005 Agilent Technologies Freq/Channel Center Freq 848.800000 MHz Start Freq 848.300000 MHz Stop Freq 849.300000 MHz CF Step 100.000000 kHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off

Mode 2: GSM 1900 Link Mode	
1850.20 MHz	 Agilent R T Freq/Channel Ch Freq 1.8502 GHz Trig Free Occupied Bandwidth Ref 40 dBm Atten 40 dB #Peak Log 10 dB/Offst 12 dB Center 1.850 200 GHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 9.56 ms (601 pts) Occupied Bandwidth 245.4922 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 461.815 Hz x dB Bandwidth 319.673 kHz Copyright 2000-2005 Agilent Technologies Freq/Channel Center Freq 1.85020000 GHz Start Freq 1.84970000 GHz Stop Freq 1.85070000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
1880.00 MHz	 Agilent R T Freq/Channel Ch Freq 1.88 GHz Trig Free Occupied Bandwidth Ref 40 dBm Atten 40 dB #Peak Log 10 dB/Offst 12 dB Center 1.880 000 GHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 9.56 ms (601 pts) Occupied Bandwidth 245.4715 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 1.118 kHz x dB Bandwidth 315.798 kHz Copyright 2000-2005 Agilent Technologies Freq/Channel Center Freq 1.88000000 GHz Start Freq 1.87950000 GHz Stop Freq 1.88050000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
1909.80 MHz	 Agilent R T Freq/Channel Ch Freq 1.9098 GHz Trig Free Occupied Bandwidth Ref 40 dBm Atten 40 dB #Peak Log 10 dB/Offst 12 dB Center 1.909 800 GHz Span 1 MHz #Res BW 10 kHz #VBW 30 kHz Sweep 9.56 ms (601 pts) Occupied Bandwidth 245.9194 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 1.866 kHz x dB Bandwidth 313.643 kHz Copyright 2000-2005 Agilent Technologies Freq/Channel Center Freq 1.90980000 GHz Start Freq 1.90930000 GHz Stop Freq 1.91030000 GHz CF Step 100.000000 kHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

5 Band Edge Test

5.1. Limit

The Band Edge Limit:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

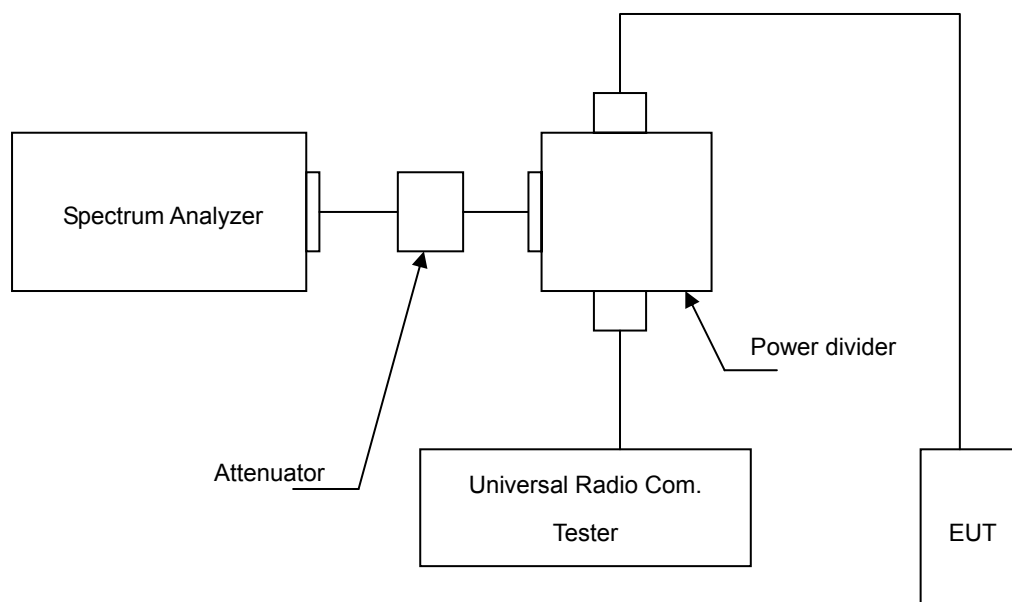
5.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	10/21/2014	(2)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/14/2015	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

5.3. Setup



5.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The band edge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly BW/100.
3. The band edge setting:
 - a. RB=10 kHz; VB=30 kHz for GSM 850 and PCS 1900.
 - b. RB=51 kHz; VB=160 kHz for WCDMA Band V and WCDMA Band II.

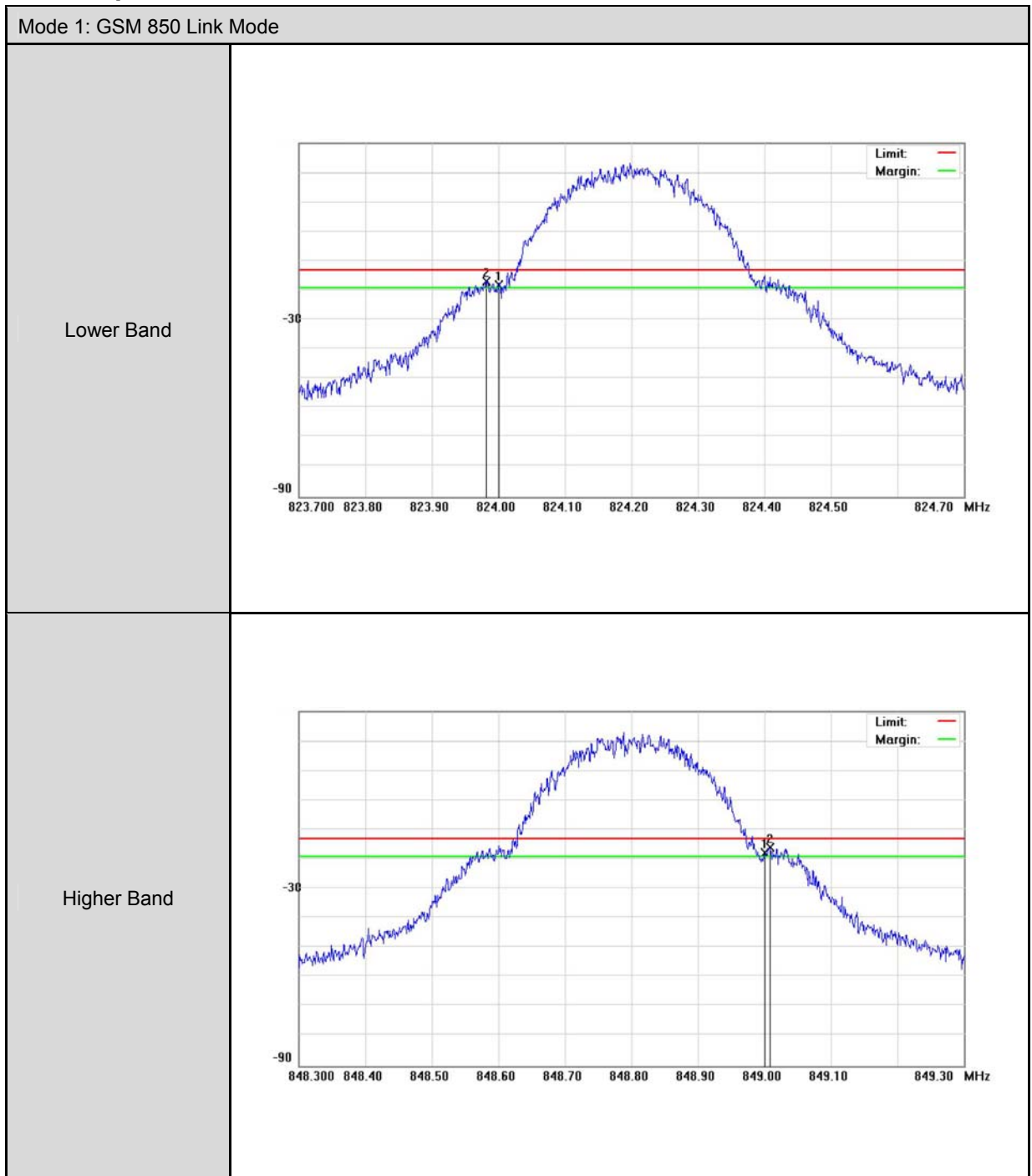
5.5. Uncertainty

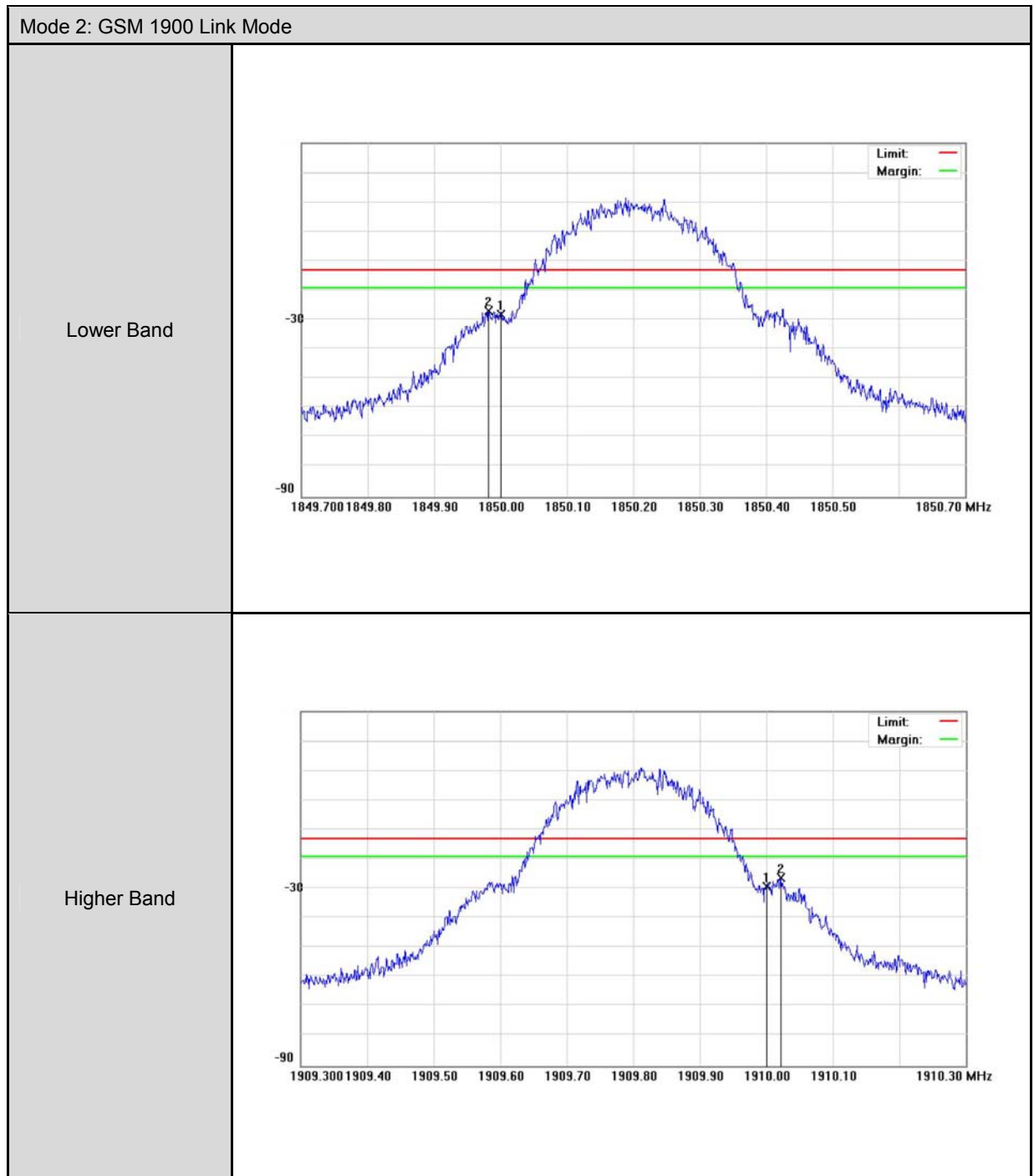
The measurement uncertainty is defined as $\pm 10\text{Hz}$

5.6. Test Result

Model Number		TW-100				
Test Item		Band Edge				
Date of Test		11/27/2015			Test Site	TE05
Bands		Channel	Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Result
GSM 850	Lower	128	824.0000	-16.96	-13	Pass
	Higher	251	849.0000	-16.17	-13	Pass
GSM 1900	Lower	512	1850.000	-26.96	-13	Pass
	Higher	810	1910.000	-26.24	-13	Pass

5.7. Test Graphs





6 Conducted Spurious Emission Test

6.1. Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

6.2. Test Instruments

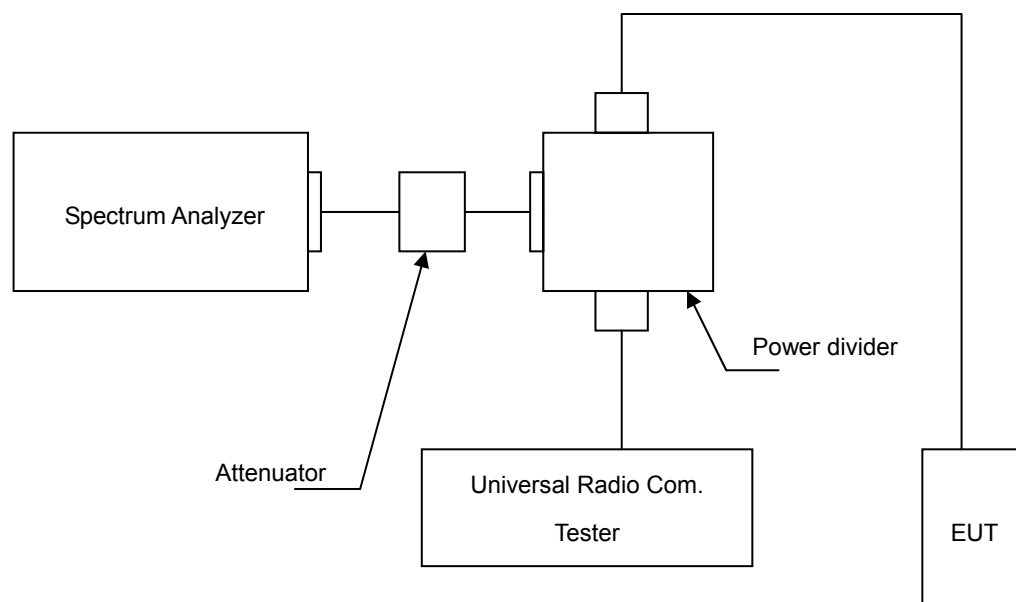
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	10/21/2014	(2)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/14/2015	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

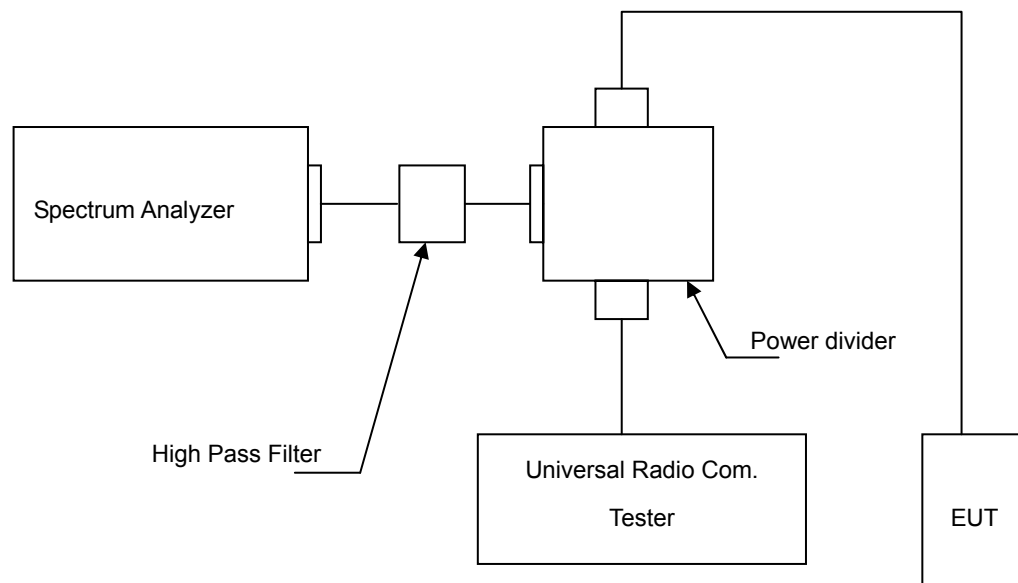
Note: N.C.R. = No Calibration Request.

6.3. Setup

Below 2.8GHz



Above 2.8GHz



6.4. Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

6.5. Uncertainty

The measurement uncertainty is evaluated as ± 2.24 dB.

6.6. Test Result

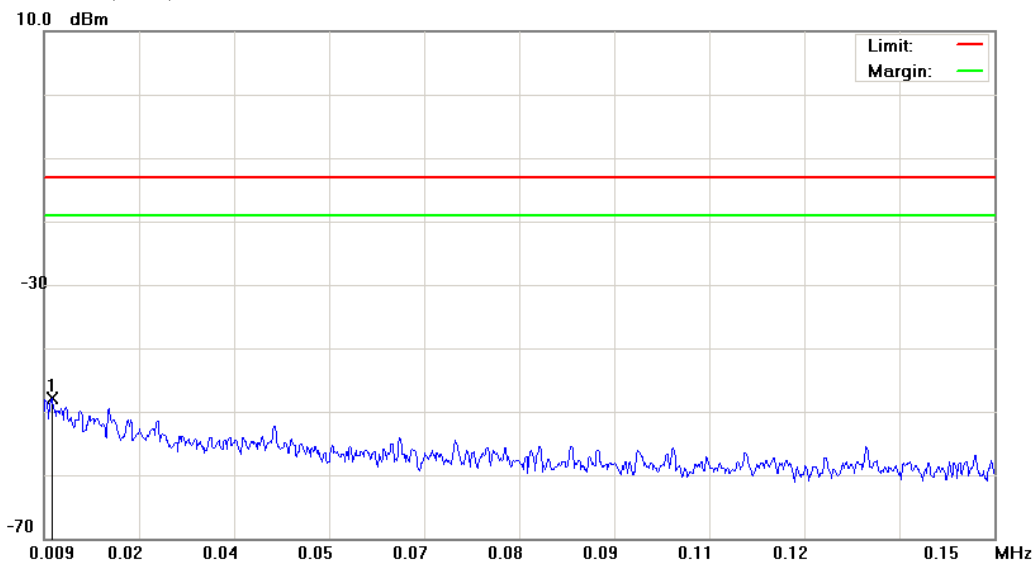
Model Number	TW-100		
Test Item	Conducted Spurious Emission		
Test Mode	Mode 1 / Mode 2		
Date of Test	11/27/2015	Test Site	TE05

File :TW-100(CH128)

Data :#1

Date: 2015/11/27

Time: 下午 04:50:06



Site: site #1

Polarization: **Conducted**

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1 KHz VBW: 3 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.0101	-78.42	30.57	-47.85	-13.00	-34.85	peak		Comment

*:Maximum data x:Over limit !:over margin

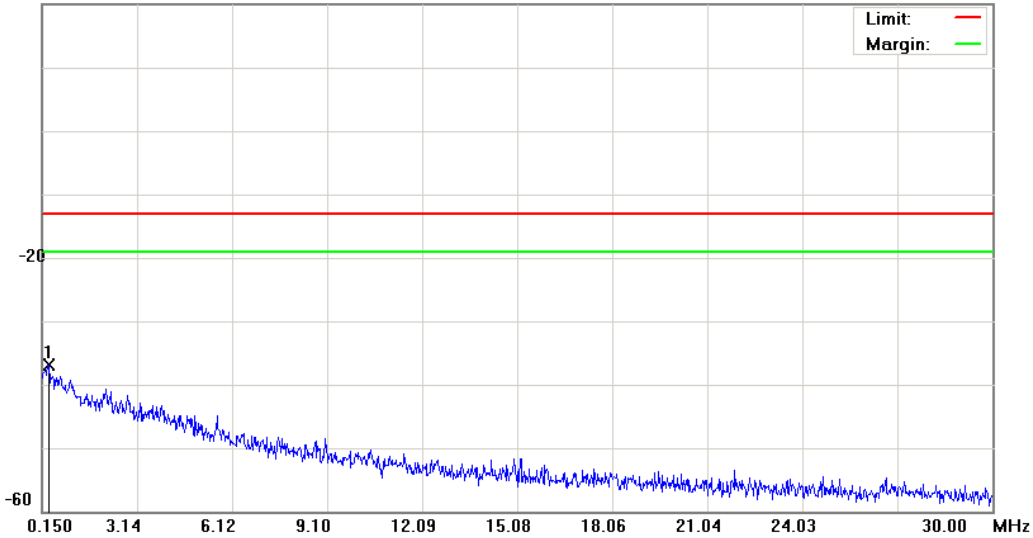
File :TW-100(CH128)

Data :#2

Date: 2015/11/27

Time: 下午 04:50:30

20.0 dBm



Site: site #1

Limit: FCC Part 22 conducted(9k-12.75G)

EUT:

M/N:

Mode: GSM 850

Note:

Polarization: **Conducted**

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 10 KHz VBW: 30 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.3440	-68.76	31.85	-36.91	-13.00	-23.91	peak		Comment

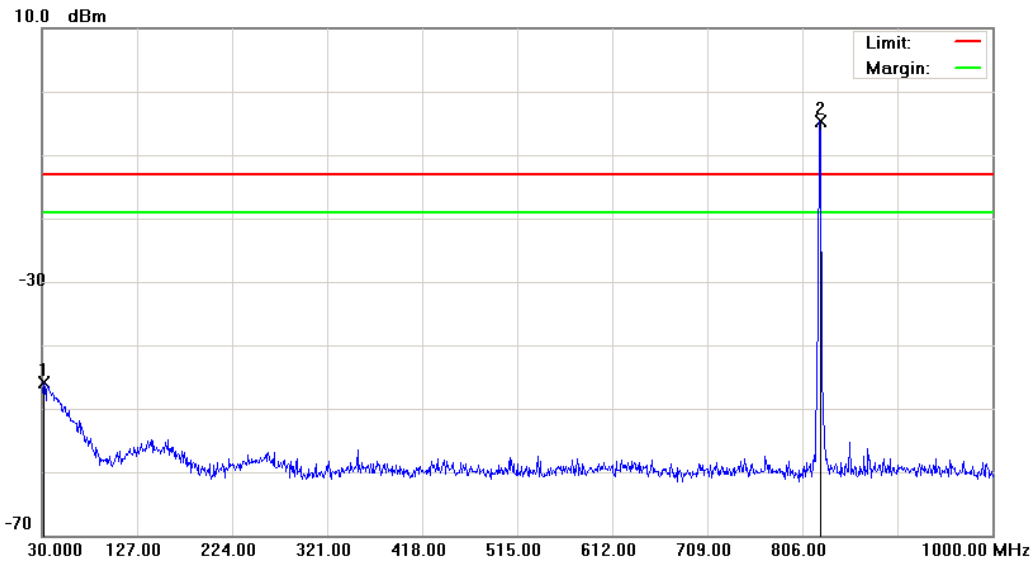
*:Maximum data x:Over limit !:over margin

File :TW-100(CH128)

Data :#3

Date: 2015/11/27

Time: 下午 04:50:54



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 100 KHz VBW: 300 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1		31.9400	-62.97	16.99	-45.98	-13.00	-32.98	peak		
2	*	823.9450	-8.53	3.83	-4.70	-13.00	8.30	peak		Tx

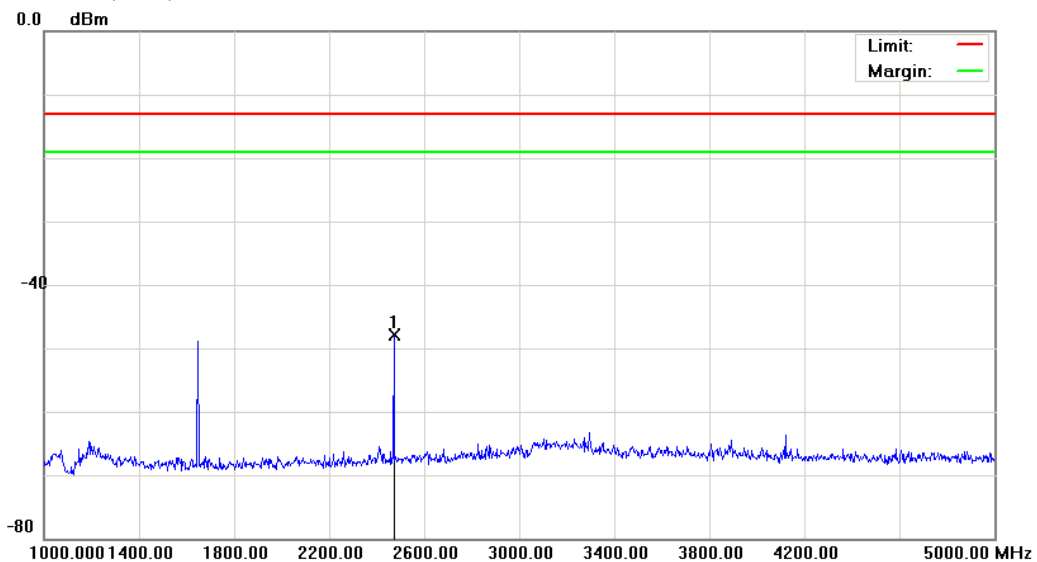
*:Maximum data x:Over limit !:over margin

File :TW-100(CH128)

Data :#4

Date: 2015/11/27

Time: 下午 05:08:09



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

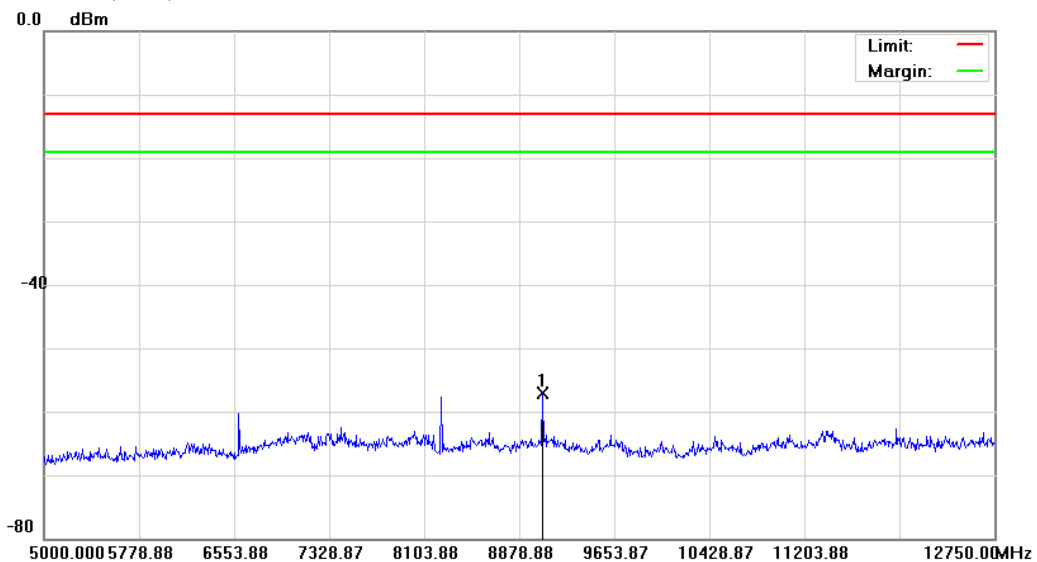
Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	2472.000	-52.26	4.45	-47.81	-13.00	-34.81	peak		

*:Maximum data x:Over limit !:over margin

File :TW-100(CH128) Data :#5 Date: 2015/11/27 Time: 下午 05:08:33

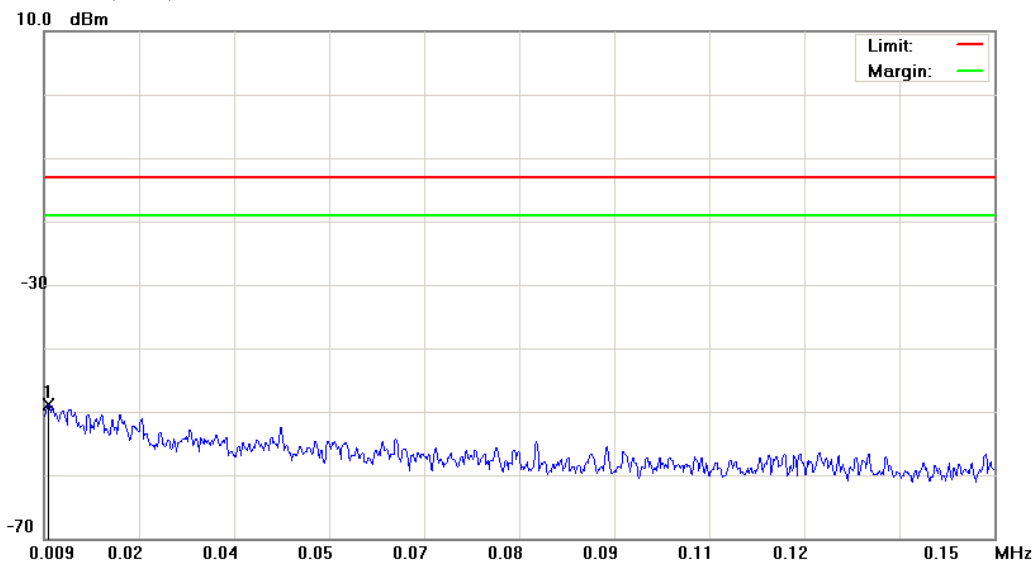


Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 22 conducted(9k-12.75G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 1000 KHz VBW: 3000 KHz
M/N:		
Mode: GSM 850		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	9064.875	-62.61	5.43	-57.18	-13.00	-44.18	peak		

*:Maximum data x:Over limit l:over margin

File :TW-100(CH190) Data :#1 Date: 2015/11/27 Time: 下午 04:57:08

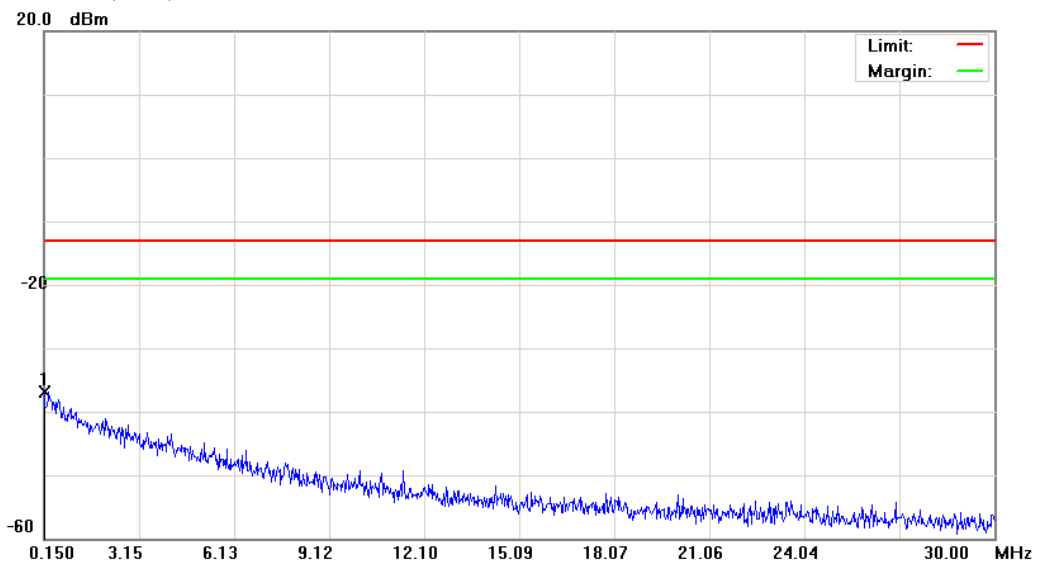


Site: site #1 Polarization: **Conducted** Temperature: 26 °C
 Limit: FCC Part 22 conducted(9k-12.75G) Power: DC 3.8V Humidity: 55 %
 EUT: Distance: RBW: 1 KHz VBW: 3 KHz
 M/N:
 Mode: GSM 850
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.0096	-79.51	30.58	-48.93	-13.00	-35.93	peak		Comment

*:Maximum data x:Over limit !:over margin

File :TW-100(CH190) Data :#2 Date: 2015/11/27 Time: 下午 04:57:32

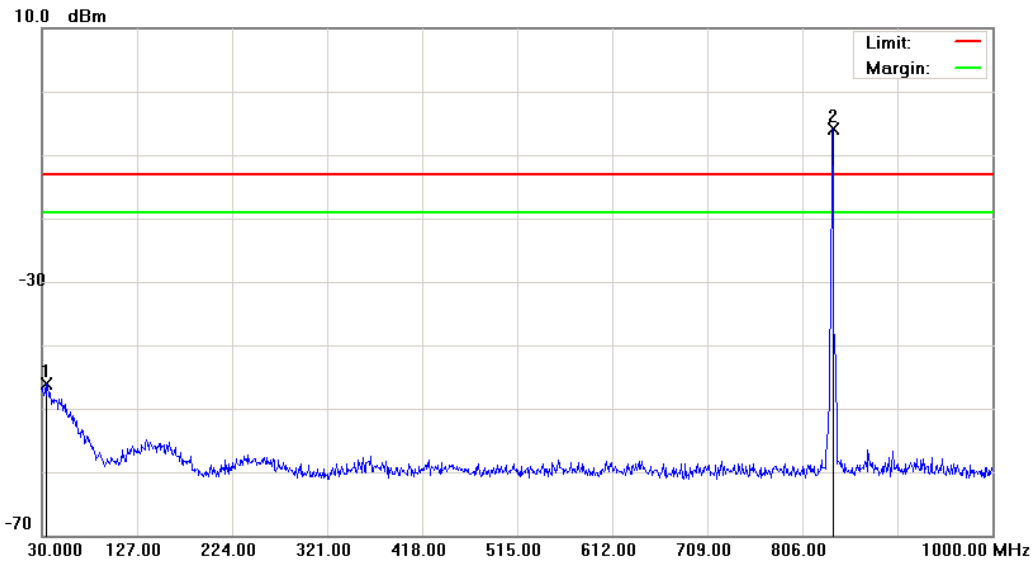


Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 22 conducted(9k-12.75G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 10 KHz VBW: 30 KHz
M/N:		
Mode: GSM 850		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.1650	-67.51	30.63	-36.88	-13.00	-23.88	peak		Comment

*:Maximum data x:Over limit !:over margin

File :TW-100(CH190) Data :#3 Date: 2015/11/27 Time: 下午 04:57:56



Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 22 conducted(9k-12.75G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 100 KHz VBW: 300 KHz
M/N:		
Mode: GSM 850		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1		33.8800	-62.85	16.77	-46.08	-13.00	-33.08			peak
2	*	836.5550	-9.78	3.96	-5.82	-13.00	7.18			peak
										Tx

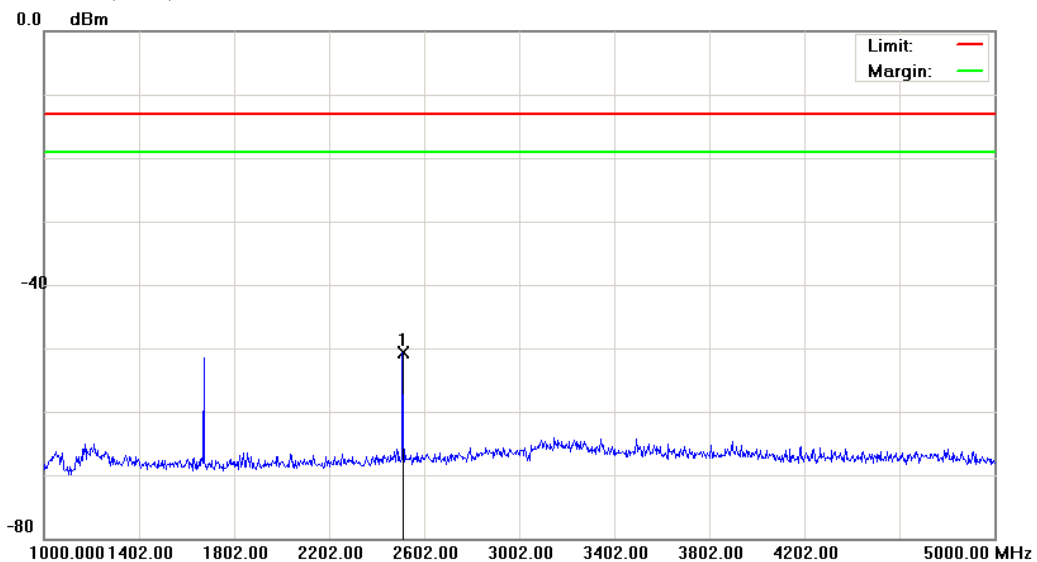
*:Maximum data x:Over limit !:over margin

File :TW-100(CH190)

Data :#4

Date: 2015/11/27

Time: 下午 05:11:11



Site: site #1

Polarization: **Conducted**

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	2510.000	-55.01	4.36	-50.65	-13.00	-37.65	peak		

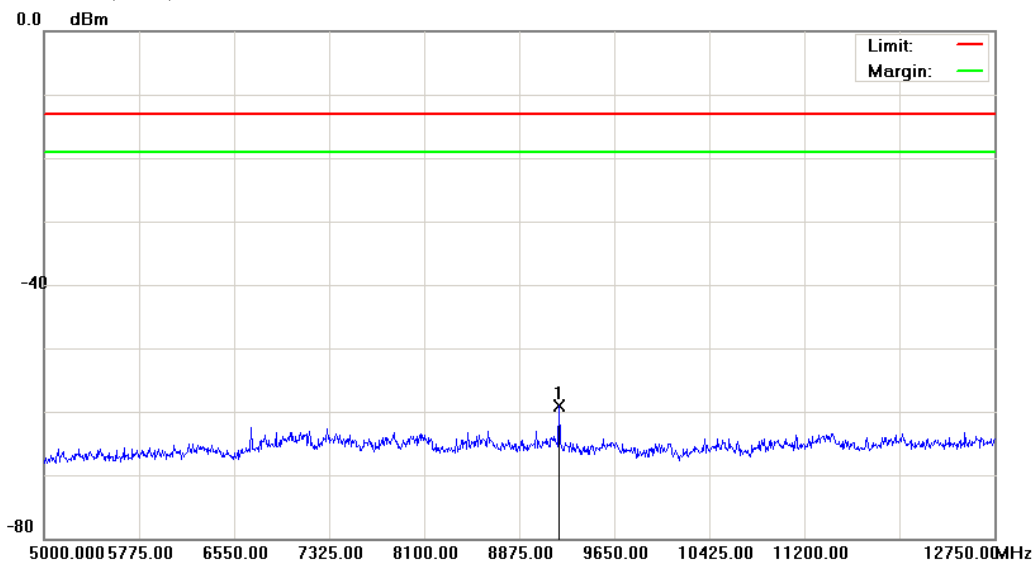
*:Maximum data x:Over limit !:over margin

File :TW-100(CH190)

Data :#5

Date: 2015/11/27

Time: 下午 05:11:34



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	9200.500	-64.55	5.50	-59.05	-13.00	-46.05	peak		Comment

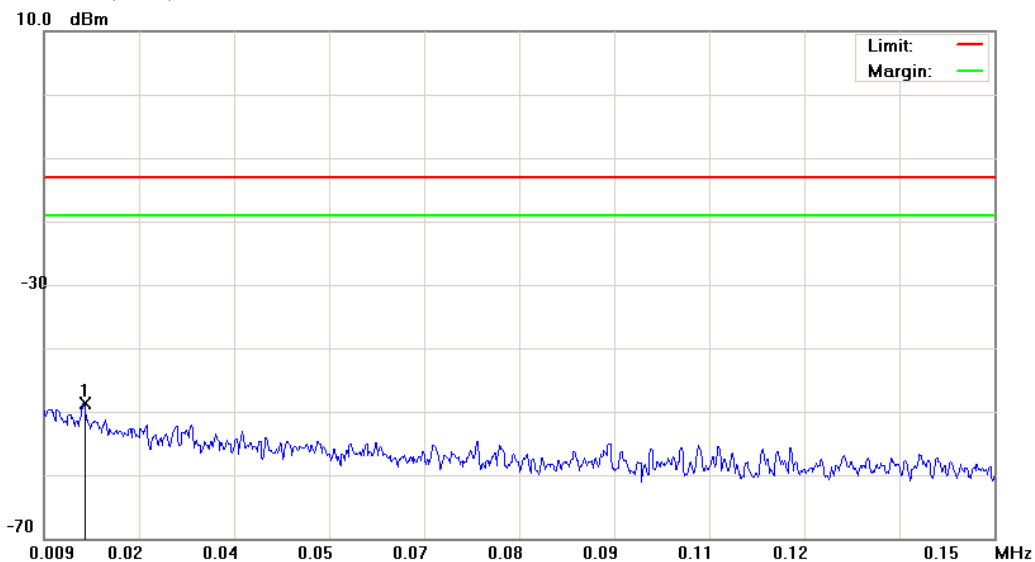
*:Maximum data x:Over limit !:over margin

File :TW-100(CH251)

Data :#1

Date: 2015/11/27

Time: 下午 05:01:28



Site: site #1

Limit: FCC Part 22 conducted(9k-12.75G)

EUT:

M/N:

Mode: GSM 850

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 1 KHz VBW: 3 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	0.0150	-79.24	30.55	-48.69	-13.00	-35.69	peak		

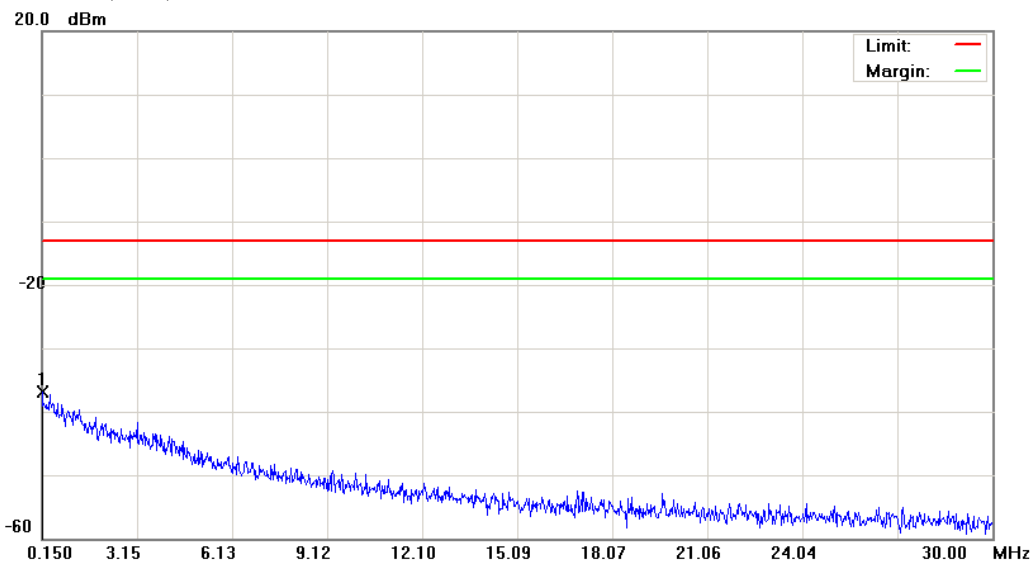
*:Maximum data x:Over limit !:over margin

File :TW-100(CH251)

Data :#2

Date: 2015/11/27

Time: 下午 05:01:52



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 10 KHz VBW: 30 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.1650	-67.51	30.63	-36.88	-13.00	-23.88	peak		Comment

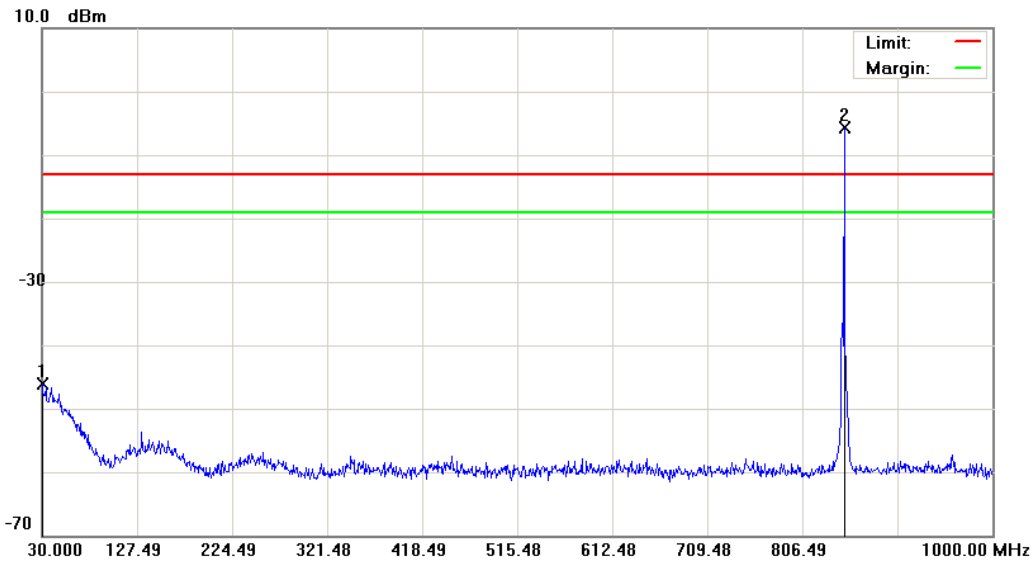
*:Maximum data x:Over limit !:over margin

File :TW-100(CH251)

Data :#3

Date: 2015/11/27

Time: 下午 05:02:16



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 100 KHz VBW: 300 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1		30.4850	-63.34	17.16	-46.18	-13.00	-33.18	peak		
2	*	848.6800	-9.73	3.98	-5.75	-13.00	7.25	peak		Tx

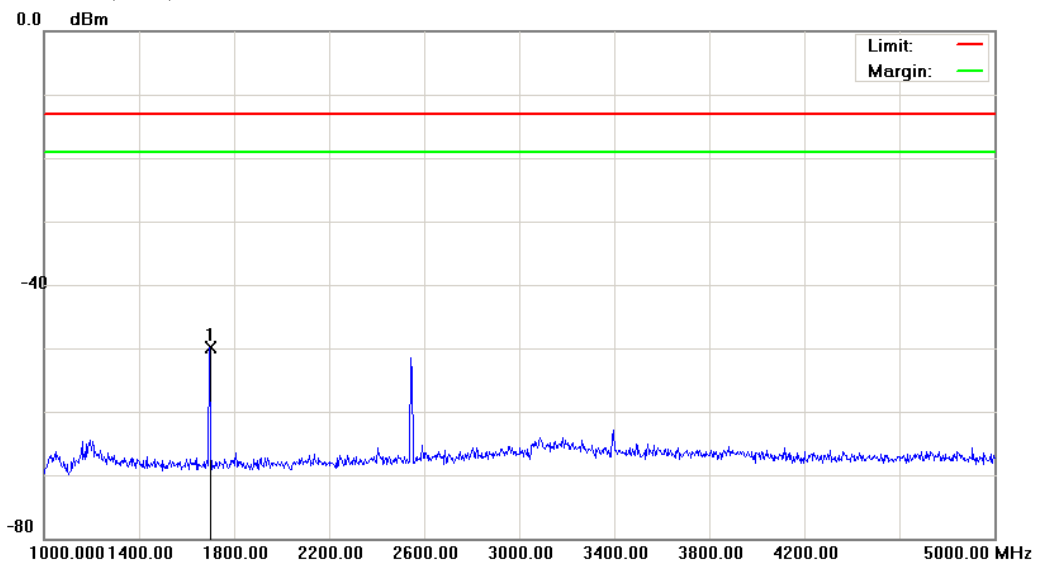
*:Maximum data x:Over limit !:over margin

File :TW-100(CH251)

Data :#4

Date: 2015/11/27

Time: 下午 05:12:06



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	1698.000	-54.39	4.48	-49.91	-13.00	-36.91	peak		Comment

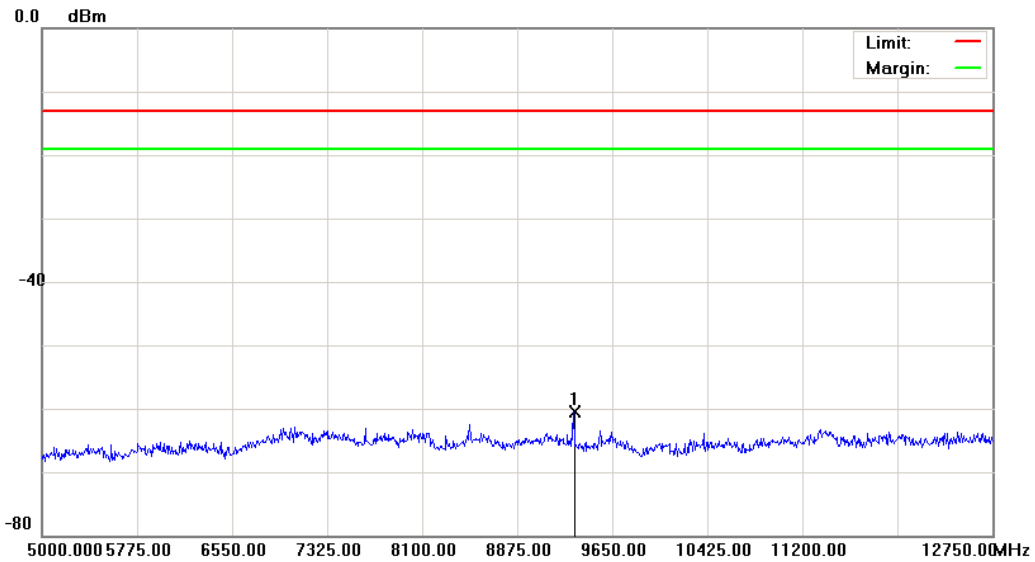
*:Maximum data x:Over limit !:over margin

File :TW-100(CH251)

Data :#5

Date: 2015/11/27

Time: 下午 05:12:29



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 22 conducted(9k-12.75G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 850

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	9336.125	-65.68	5.15	-60.53	-13.00	-47.53	peak		Comment

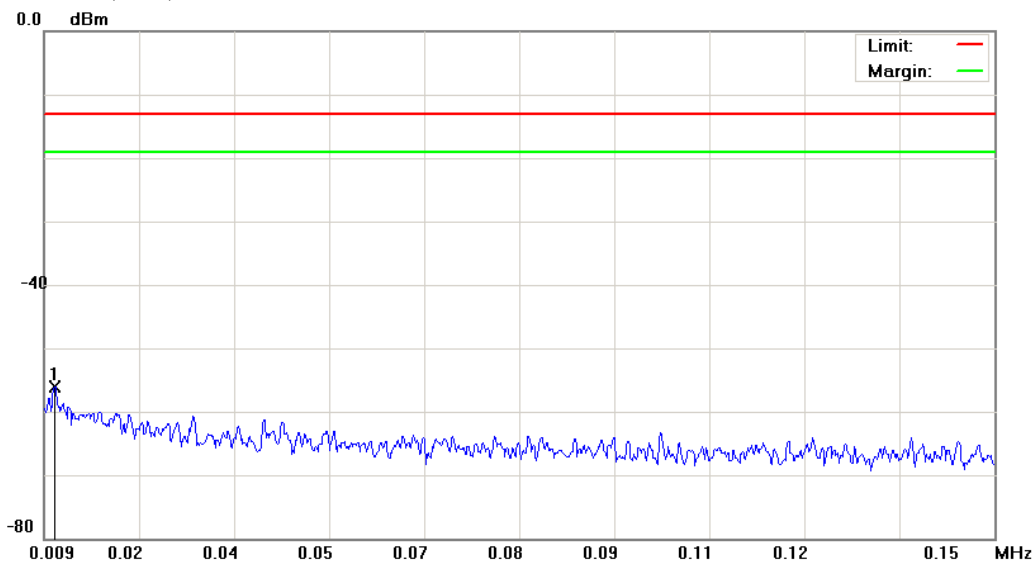
*:Maximum data x:Over limit !:over margin

File :TW-100(CH512)

Data :#1

Date: 2015/11/27

Time: 下午 04:09:07



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: **Conducted**

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 1 KHz VBW: 3 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.0106	-67.43	11.34	-56.09	-13.00	-43.09	peak		Comment

*:Maximum data x:Over limit !:over margin

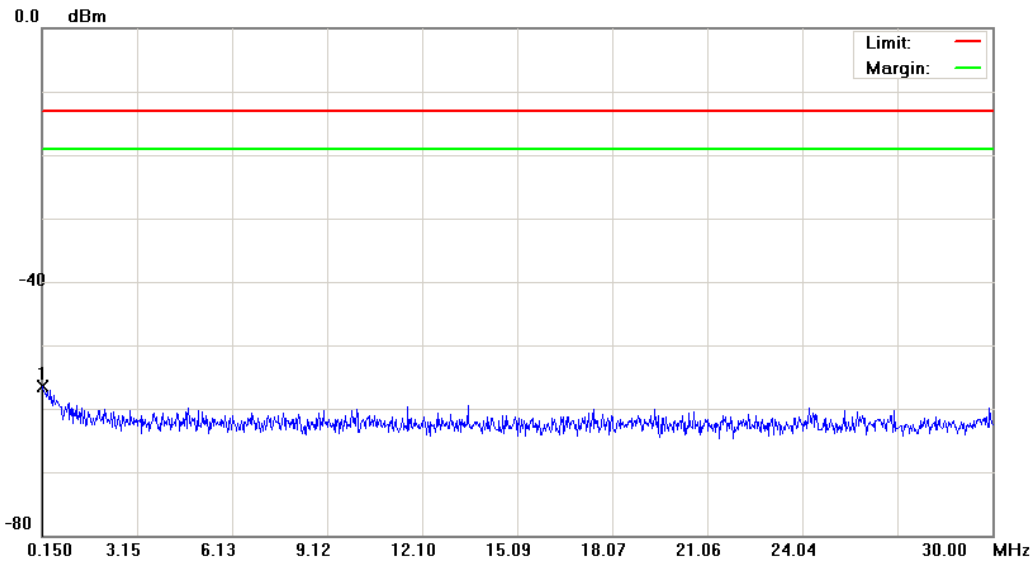


File :TW-100(CH512)

Data :#2

Date: 2015/11/27

Time: 下午 04:09:31



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

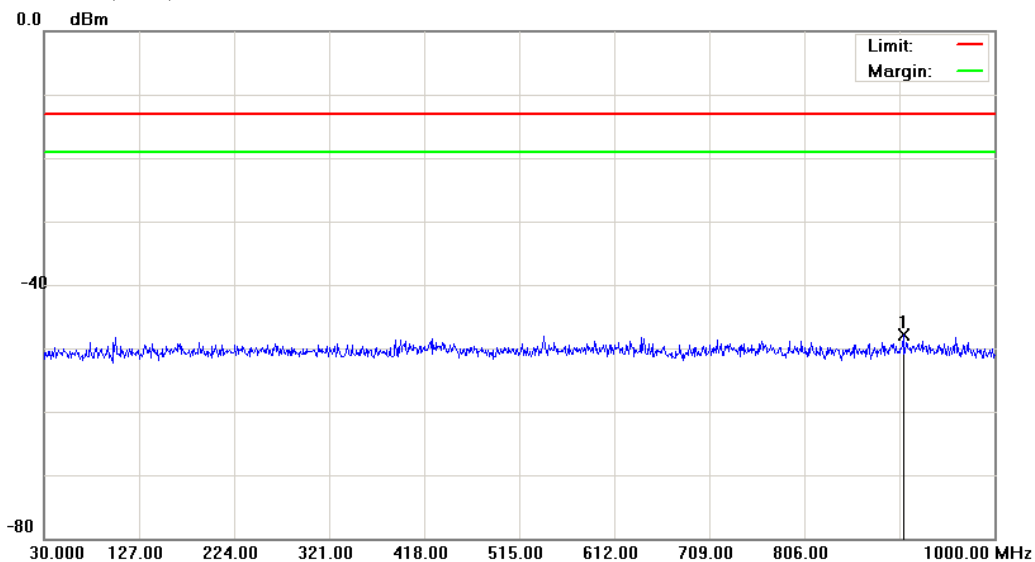
Humidity: 55 %

RBW: 10 KHz VBW: 30 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.1650	-68.95	12.46	-56.49	-13.00	-43.49	peak		Comment

*:Maximum data x:Over limit !:over margin

File :TW-100(CH512) Data :#3 Date: 2015/11/27 Time: 下午 04:09:55



Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 24 conducted(9k-26.5G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 100 KHz VBW: 300 KHz
M/N:		
Mode: GSM 1900		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	907.3650	-61.21	13.23	-47.98	-13.00	-34.98	peak		

*:Maximum data x:Over limit !:over margin

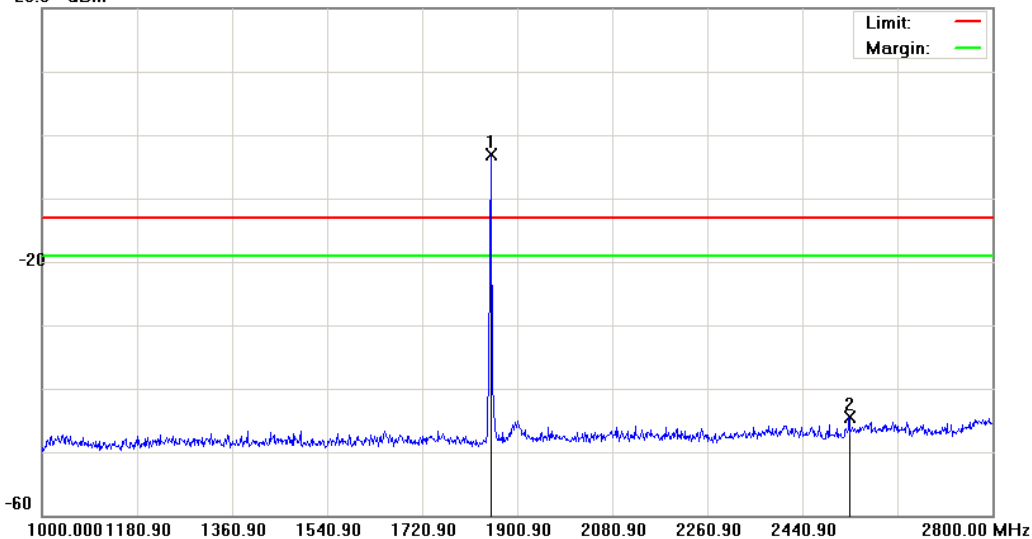
File :TW-100(CH512)

Data :#4

Date: 2015/11/27

Time: 下午 04:41:13

20.0 dBm



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: **Conducted**

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 1000 KHz VBW: 3000 KHz

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1	*	1850.500	-7.39	4.26	-3.13	-13.00	9.87	peak		Tx
2		2529.100	-49.13	4.70	-44.43	-13.00	-31.43	peak		

*:Maximum data x:Over limit !:over margin

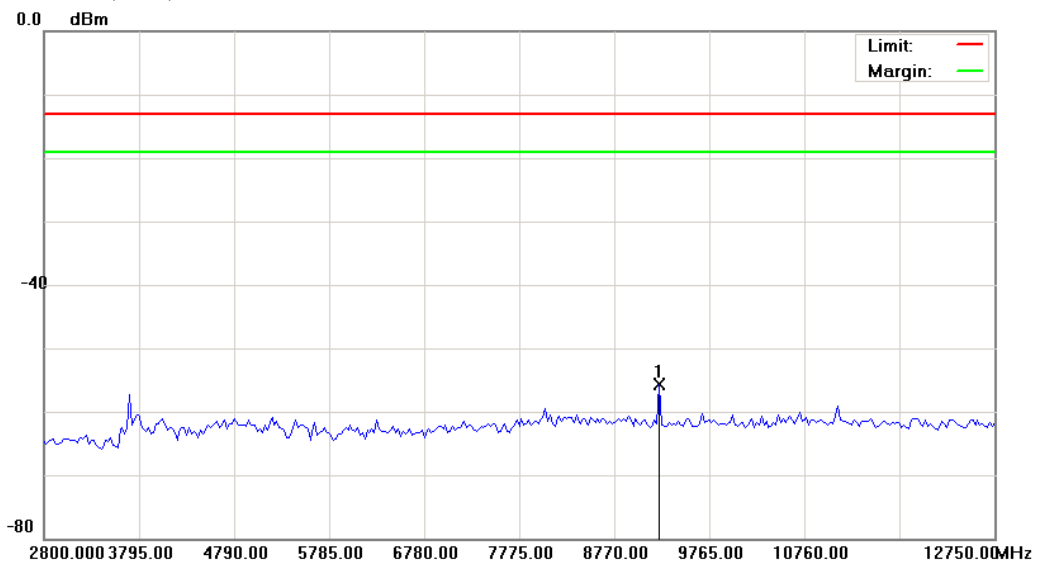


File :TW-100(CH512)

Data :#5

Date: 2015/11/27

Time: 下午 05:18:08



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 24 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 1900

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	9242.625	-61.36	5.59	-55.77	-13.00	-42.77	peak		Comment

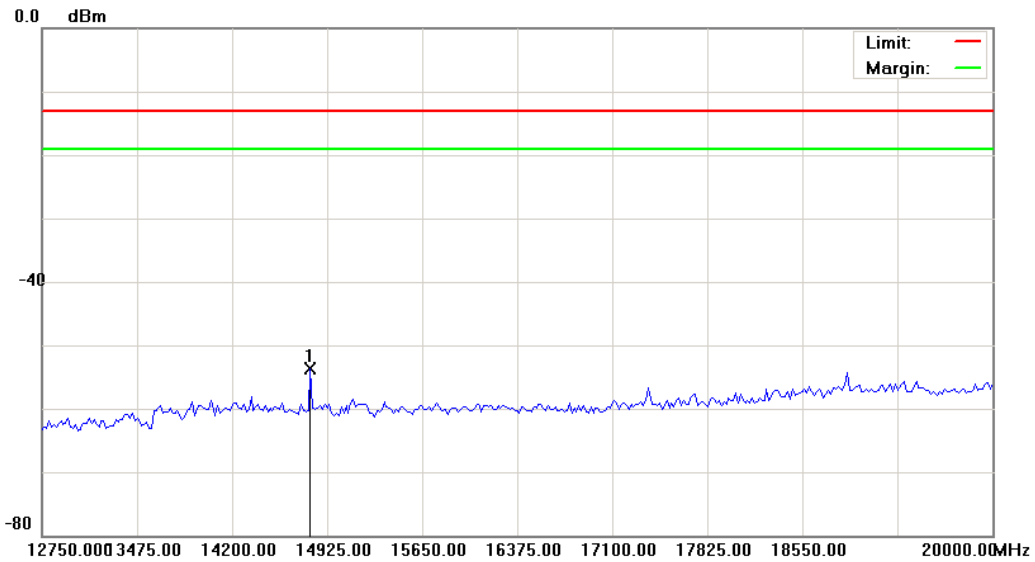
*:Maximum data x:Over limit !:over margin

File :TW-100(CH512)

Data :#6

Date: 2015/11/27

Time: 下午 05:18:26



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 1000 KHz VBW: 3000 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	14798.125	-59.74	5.95	-53.79	-13.00	-40.79	peak		Comment

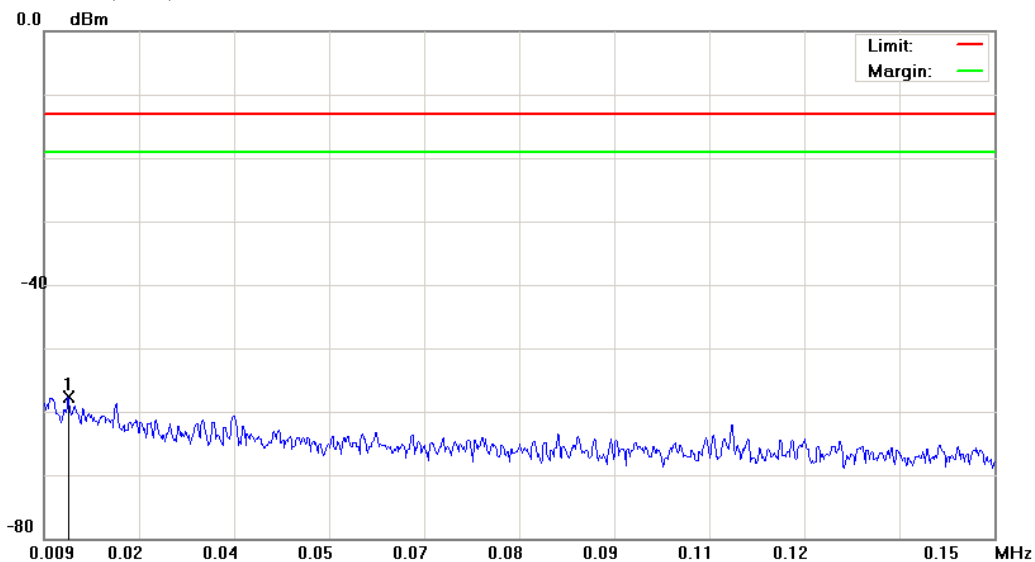
*:Maximum data x:Over limit !:over margin

File :TW-100(CH661)

Data :#1

Date: 2015/11/27

Time: 下午 04:10:42



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

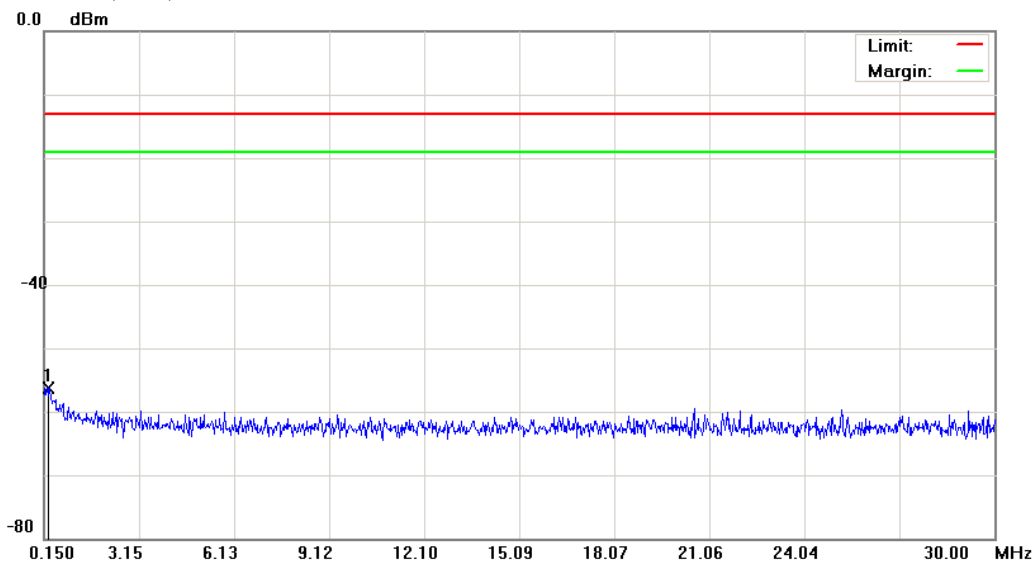
Humidity: 55 %

RBW: 1 KHz VBW: 3 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.0126	-69.15	11.36	-57.79	-13.00	-44.79	peak		Comment

*:Maximum data x:Over limit !:over margin

File :TW-100(CH661) Data :#2 Date: 2015/11/27 Time: 下午 04:11:06

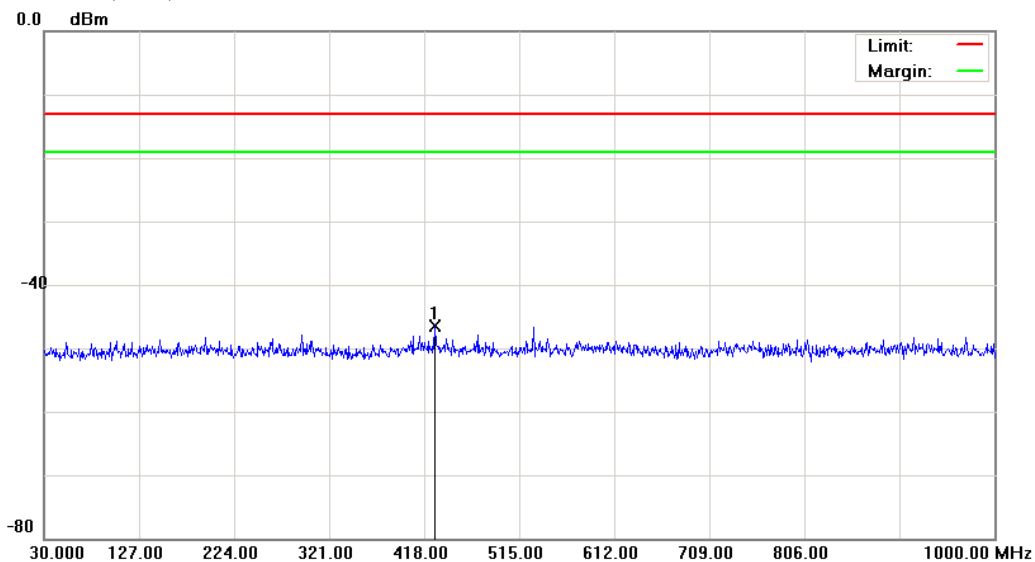


Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 24 conducted(9k-26.5G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 10 KHz VBW: 30 KHz
M/N:		
Mode: GSM 1900		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.2545	-68.73	12.53	-56.20	-13.00	-43.20	peak		Comment

*:Maximum data x:Over limit !:over margin

File :TW-100(CH661) Data :#3 Date: 2015/11/27 Time: 下午 04:11:31



Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 24 conducted(9k-26.5G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 100 KHz VBW: 300 KHz
M/N:		
Mode: GSM 1900		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	428.6700	-59.82	13.25	-46.57	-13.00	-33.57	peak		Comment

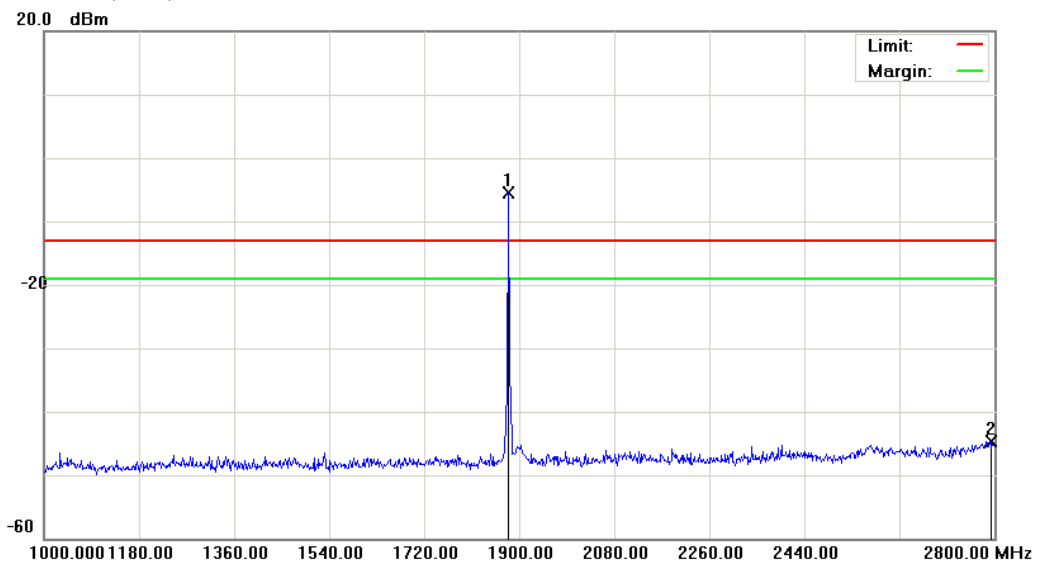
*:Maximum data x:Over limit !:over margin

File :TW-100(CH661)

Data :#4

Date: 2015/11/27

Time: 下午 04:43:34



Site: site #1

Polarization: **Conducted**

Temperature: 26 °C

Limit: FCC Part 24 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 1900

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	1880.200	-10.21	4.65	-5.56	-13.00	7.44	peak		Tx
2		2792.800	-50.50	5.90	-44.60	-13.00	-31.60	peak		

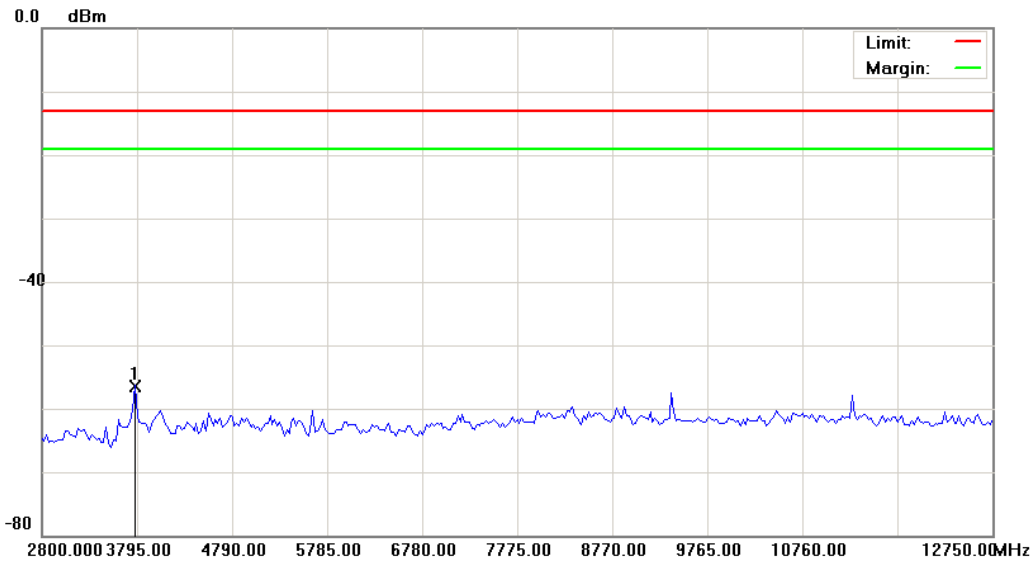
*:Maximum data x:Over limit !:over margin

File :TW-100(CH661)

Data :#5

Date: 2015/11/27

Time: 下午 05:18:56



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 24 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 1900

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	3770.125	-61.33	4.93	-56.40	-13.00	-43.40	peak		Comment

*:Maximum data x:Over limit !:over margin

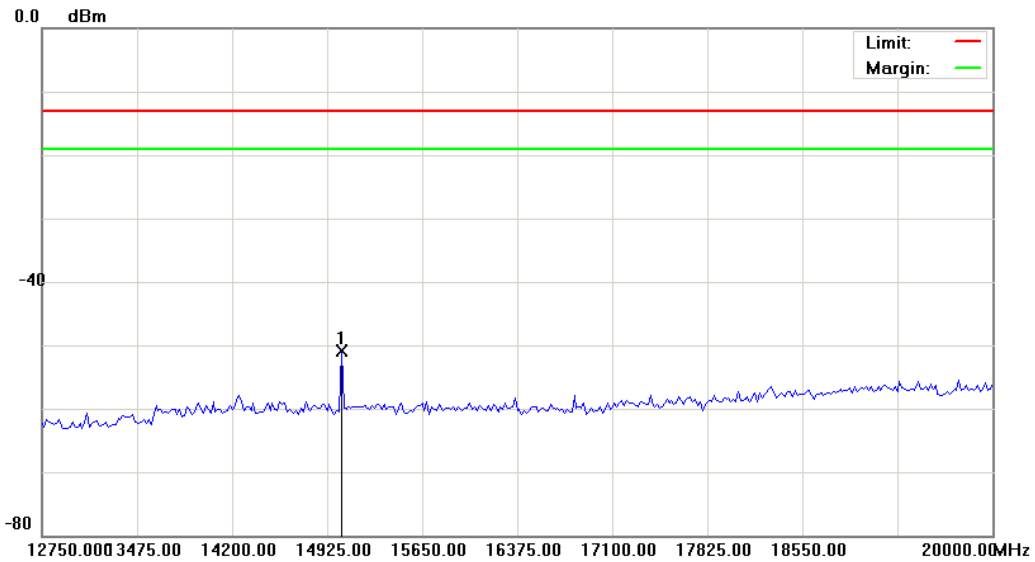


File :TW-100(CH661)

Data :#6

Date: 2015/11/27

Time: 下午 05:19:15



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 1000 KHz VBW: 3000 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	15033.750	-56.93	6.02	-50.91	-13.00	-37.91	peak		

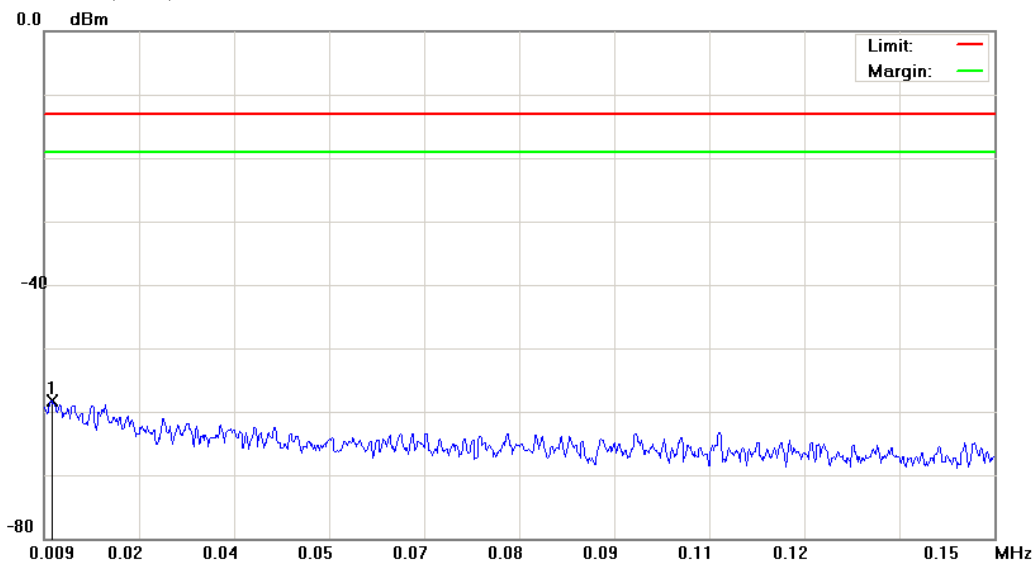
*:Maximum data x:Over limit !:over margin

File :TW-100(CH810)

Data :#1

Date: 2015/11/27

Time: 下午 04:13:31



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

Humidity: 55 %

RBW: 1 KHz VBW: 3 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.0101	-69.62	11.34	-58.28	-13.00	-45.28	peak		Comment

*:Maximum data x:Over limit !:over margin

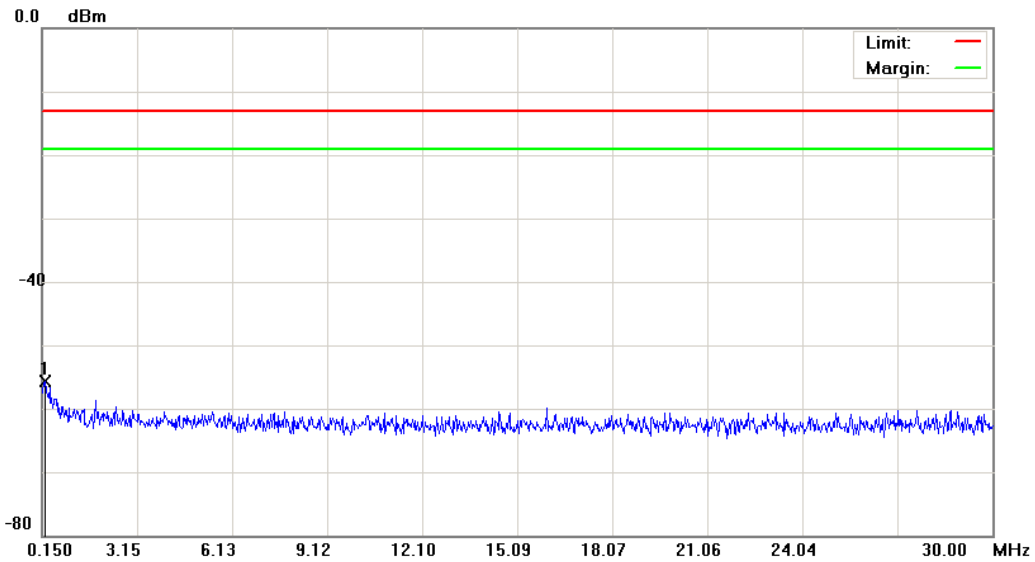


File :TW-100(CH810)

Data :#2

Date: 2015/11/27

Time: 下午 04:13:55



Site: site #1

Limit: FCC Part 24 conducted(9k-26.5G)

EUT:

M/N:

Mode: GSM 1900

Note:

Polarization: Conducted

Power: DC 3.8V

Distance:

Temperature: 26 °C

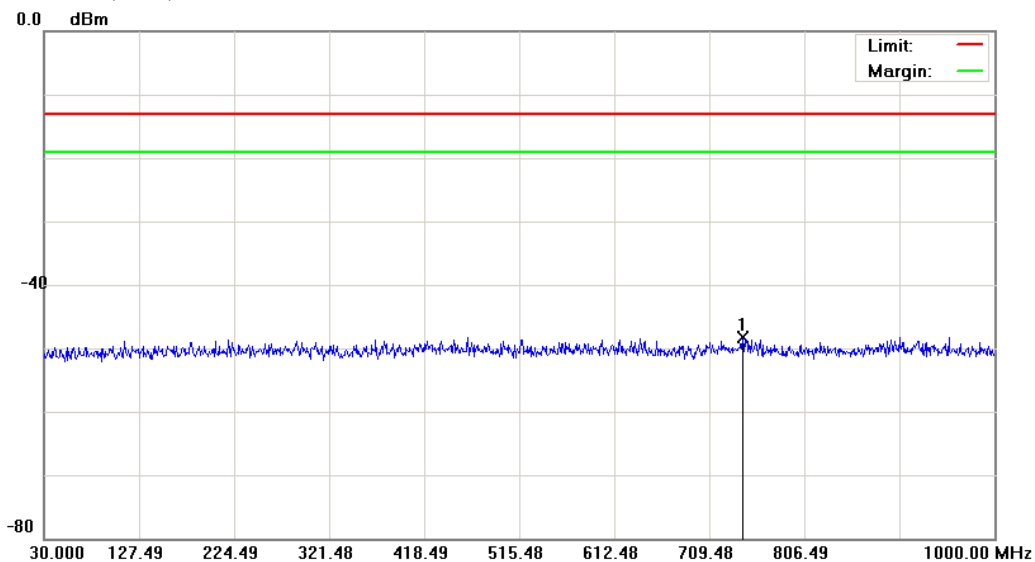
Humidity: 55 %

RBW: 10 KHz VBW: 30 KHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	0.2395	-68.24	12.50	-55.74	-13.00	-42.74	peak		Comment

*:Maximum data x:Over limit l:over margin

File :TW-100(CH810) Data :#3 Date: 2015/11/27 Time: 下午 04:14:19

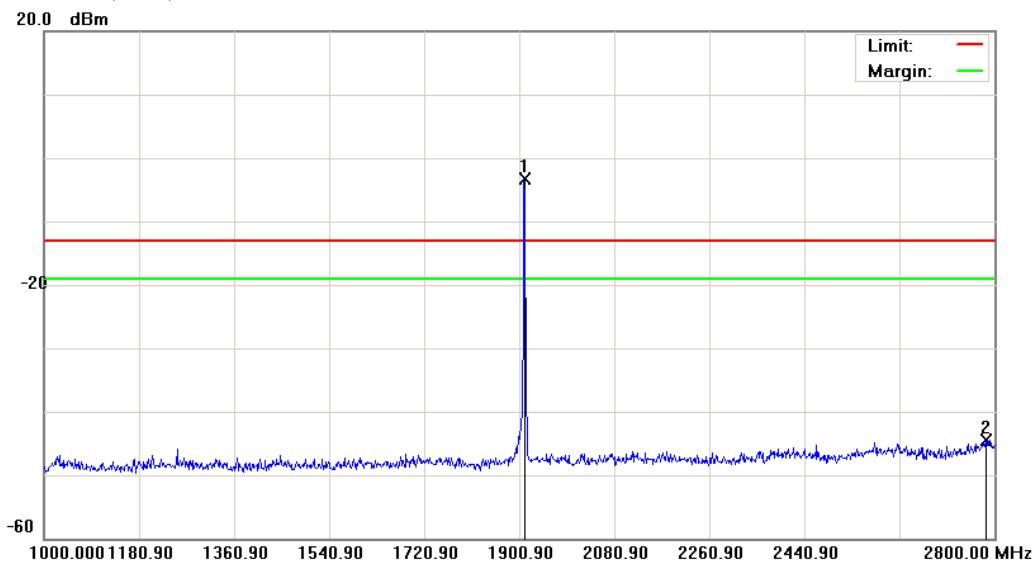


Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 24 conducted(9k-26.5G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 100 KHz VBW: 300 KHz
M/N:		
Mode: GSM 1900		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	742.9500	-61.38	13.15	-48.23	-13.00	-35.23	peak		Comment

*:Maximum data x:Over limit l:over margin

File :TW-100(CH810) Data :#4 Date: 2015/11/27 Time: 下午 04:46:20



Site: site #1	Polarization: Conducted	Temperature: 26 °C
Limit: FCC Part 24 conducted(9k-26.5G)	Power: DC 3.8V	Humidity: 55 %
EUT:	Distance:	RBW: 1000 KHz VBW: 3000 KHz
M/N:		
Mode: GSM 1900		
Note:		

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1	*	1909.900	-8.95	5.71	-3.24	-13.00	9.76	peak		Tx
2		2783.800	-50.32	5.89	-44.43	-13.00	-31.43	peak		

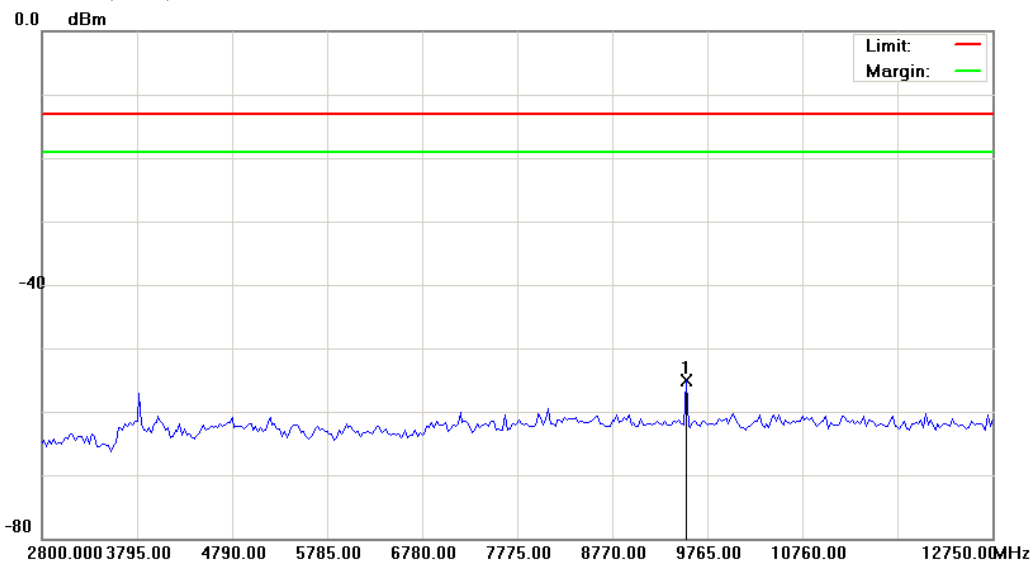
*:Maximum data x:Over limit l:over margin

File :TW-100(CH810)

Data :#5

Date: 2015/11/27

Time: 下午 05:23:24



Site: site #1

Polarization: Conducted

Temperature: 26 °C

Limit: FCC Part 24 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 1900

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	9541.125	-60.42	5.31	-55.11	-13.00	-42.11	peak		Comment

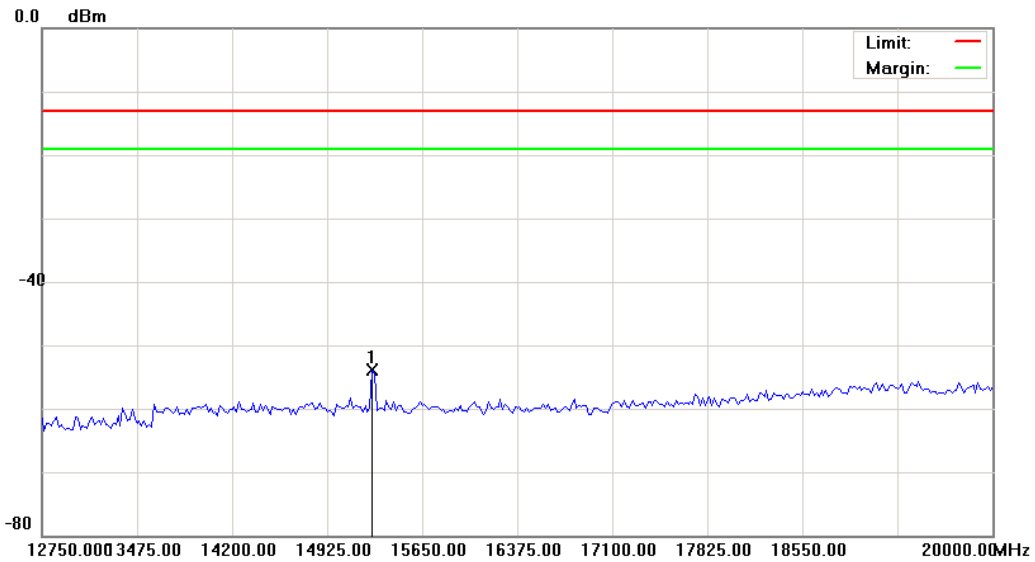
*:Maximum data x:Over limit !:over margin

File :TW-100(CH810)

Data :#6

Date: 2015/11/27

Time: 下午 05:23:42



Site: site #1

Polarization: **Conducted**

Temperature: 26 °C

Limit: FCC Part 24 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55 %

EUT:

Distance:

RBW: 1000 KHz VBW: 3000 KHz

M/N:

Mode: GSM 1900

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	15269.375	-60.02	6.09	-53.93	-13.00	-40.93	peak		

*:Maximum data x:Over limit !:over margin

7 Field Strength of Spurious Radiation Test

7.1. Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

7.2. Test Instruments

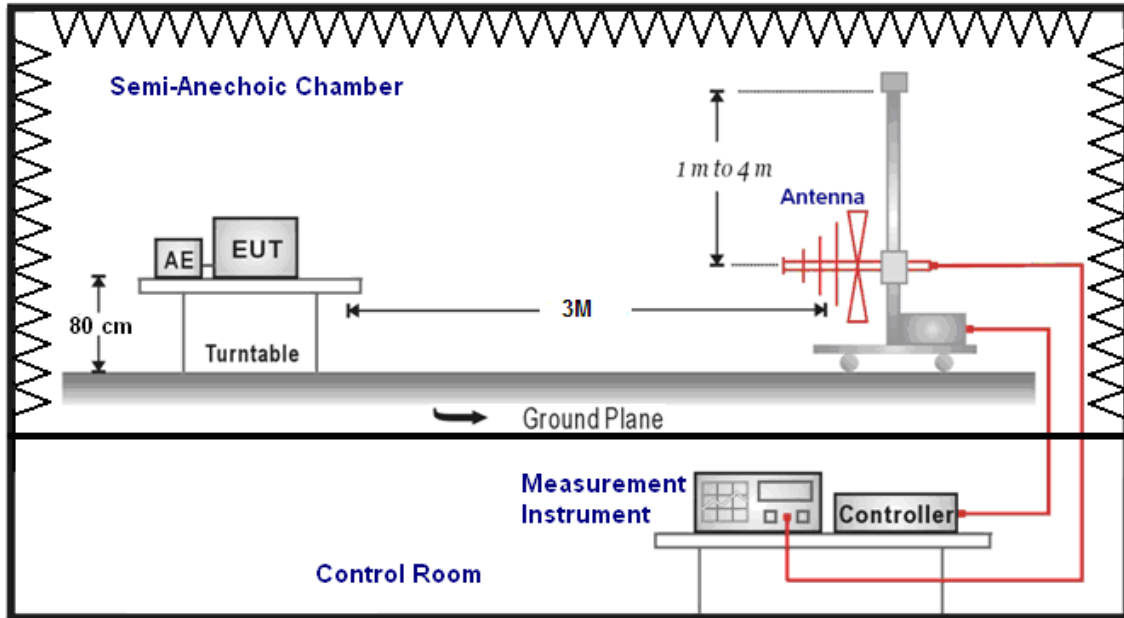
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/24/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/24/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	08/11/2015	(1)
Sleeve Dipole(CF880) (780-980MHz)	ETS	3126-880	00064344	10/06/2014	(2)
Sleeve Dipole(CF1845) (1695-1995MHz)	ETS	3126-1845	00083335	10/06/2014	(2)
Horn Antenna (1~18GHz)	ETS	3117	00152321	08/14/2015	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/12/2015	(1)
Horn Antenna (18~40GHz)	ETS	3116	00086467	09/01/2015	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	(1)
Test Site	ATL	TE01	888001	08/27/2015	(1)

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

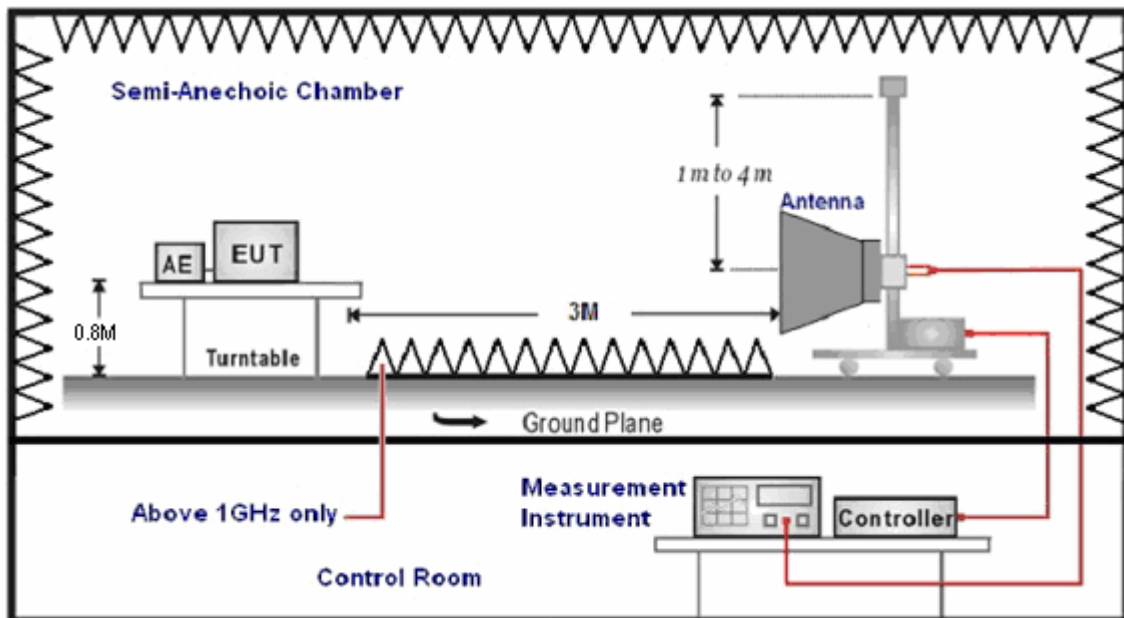
Note: N.C.R. = No Calibration Request.

7.3. Setup

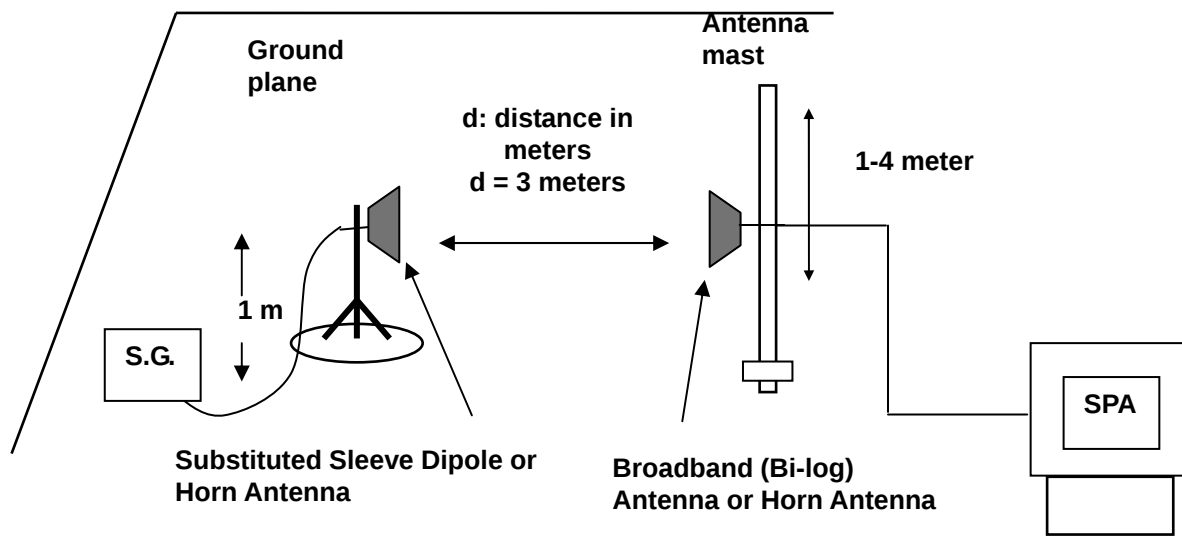
Below 1GHz



Above 1GHz



For Substituted Method Test Set-UP



7.4. Test Procedure

- The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RWB and VBW is 1MHz.
- Radiation Emission measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The substitution antenna (Note:1 & 2) is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- $E.I.R.P. = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- $E.R.P. = E.I.R.P. - 2.15 \text{ dB}$

Note: 1. Below 1 GHz Substituted Method Test : Sleeve dipole antenna to Bi-Log Antenna

2. Above 1 GHz Substituted Method Test : Horn antenna to Horn Antenna

7.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is $\pm 3.072 \text{ dB}$.

7.6. Test Result

Standard:	FCC Part 22	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TW-100	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	11/23/2015
Frequency:	824.2 MHz	Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
5584.000	-81.40	24.05	-57.35	-13.00	-44.35	peak	H
6100.000	-79.98	26.27	-53.71	-13.00	-40.71	peak	V

Standard:	FCC Part 22	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TW-100	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	11/23/2015
Frequency:	836.6 MHz	Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
5836.000	-79.85	25.04	-54.81	-13.00	-41.81	peak	H
6028.000	-81.02	25.84	-55.18	-13.00	-42.18	peak	V

Standard:	FCC Part 22	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TW-100	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	11/23/2015
Frequency:	848.8 MHz	Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
7156.000	-79.02	30.61	-48.41	-13.00	-35.41	peak	H
6880.000	-78.38	29.74	-48.64	-13.00	-35.64	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TW-100	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	11/23/2015
Frequency:	1850.2 MHz	Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
7276.000	-77.98	31.03	-46.95	-13.00	-33.95	peak	H
6880.000	-78.24	29.74	-48.50	-13.00	-35.50	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TW-100	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	11/23/2015
Frequency:	1880.0 MHz	Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
7708.000	-77.92	32.07	-45.85	-13.00	-32.85	peak	H
6268.000	-80.51	27.27	-53.24	-13.00	-40.24	peak	V

Standard:	FCC Part 24	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TW-100	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	11/23/2015
Frequency:	1909.8 MHz	Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
6256.000	-80.59	27.21	-53.38	-13.00	-40.38	peak	H
6940.000	-77.90	29.90	-48.00	-13.00	-35.00	peak	V

8 Frequency Stability (Temperature & Voltage Variation) Test

8.1. Limit

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

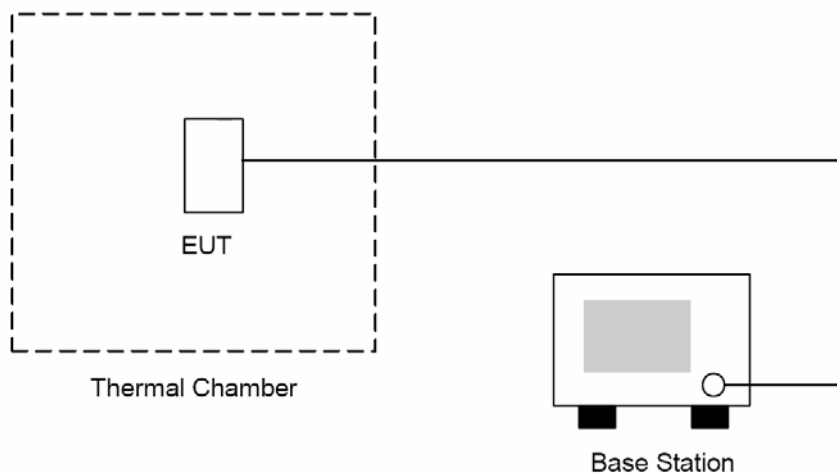
8.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	10/21/2015	(2)
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	04/27/2015	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

8.3. Setup



8.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was note within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as the following section.
5. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
6. The temperature tests were performed for the worst case.
7. Test data was recorded.

8.5. Uncertainty

The measurement uncertainty is defined as for Frequency Stability (Temperature Variation) measurement is $\pm 10\text{Hz}$.

8.6. Test Result

Model Number	TW-100					
Test Item	Frequency Stability (Temperature & Voltage Variation)					
Test Mode	Mode 1					
Date of Test	11/27/2015				Test Site	TE05
Level	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	3.70	-20	1.08	0.001	±2.5	Pass
Normal	3.70	-10	-2.23	-0.003	±2.5	Pass
Normal	3.70	0	4.31	0.005	±2.5	Pass
Normal	3.70	10	-7.25	-0.009	±2.5	Pass
Battery full point	4.20	20	6.50	0.008	±2.5	Pass
Normal	3.70	20	-9.64	-0.012	±2.5	Pass
Battery cut-off point	3.60	20	5.51	0.007	±2.5	Pass
Normal	3.70	30	11.06	0.013	±2.5	Pass
Normal	3.70	40	16.09	0.019	±2.5	Pass
Normal	3.70	45	12.03	0.014	±2.5	Pass

Note: The manufacturer declared that the EUT could work properly between temperatures -20°C~45°C

Model Number	TW-100					
Test Item	Frequency Stability (Temperature & Voltage Variation)					
Test Mode	Mode 2					
Date of Test	11/27/2015				Test Site	TE05
Level	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	3.70	-20	0.58	0.000	±2.5	Pass
Normal	3.70	-10	1.22	0.001	±2.5	Pass
Normal	3.70	0	7.09	0.004	±2.5	Pass
Normal	3.70	10	-0.84	0.000	±2.5	Pass
Battery full point	4.20	20	7.69	0.004	±2.5	Pass
Normal	3.70	20	3.87	0.002	±2.5	Pass
Battery cut-off point	3.60	20	11.54	0.006	±2.5	Pass
Normal	3.70	30	5.32	0.003	±2.5	Pass
Normal	3.70	40	7.21	0.004	±2.5	Pass
Normal	3.70	45	2.03	0.001	±2.5	Pass

Note: The manufacturer declared that the EUT could work properly between temperatures -20°C~45°C