FCC TEST REPORT

Product Name	CDMA Gateway
Model Name	H3G-800
Applicant	H3 SYSTEM Co., Ltd.
FCC ID	X59-H3G-800

ESTECH CO., LTD

Rm. 1015 World Venture Center, 426-5 Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea. Tel:82-2-867-3201, Fax:82-2-867-3204

FCC Test Report

Report Number	ESTR1505-001			
Applicant	Company Name	H3 SYSTEM Co., Ltd.		
	Address	(Tamnip-dong), 283, Baeul 1-ro, Yuseong-gu, Daejeon, Korea		
Product	Product Name	CDMA Gateway		
	Model No.	H3G-800	Manufacturer	H3 SYSTEM Co., Ltd.
	Serial No.	NONE	Country of origin	KOREA
Other	Issued Date	2015-05-07	Tested Date	2015-04-20 ~ 2015-04-27
Measurement facility registration number			915135	
Test Result	**Pass**			
Standard	**FCC PART 22 Subpart H / 24 Subpart E**			
Tested by	S.D. Hong/ Engineer (Signature)			
Approved by	K.B. Lee/Engineering manager (Signature)			

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Contents

1. General Information

1.1 EUT Description

FCC ID	**X59-H3G-800**
Product Name	**CDMA Gateway**
Model Name	**H3G-800**
Frequency	**Tx 824MHz ~ 849MHz**
	Rx 869MHz ~ 894MHz
	Tx 1850MHz ~ 1910MHz
	Rx 1930MHz ~ 1990MHz
Channel	**Celluar 1013/384/777 PCS 25/600/1175**
Modulation Type	**CDMA**
Power Rating	**Input: 110~240VAC 50~60Hz**
Test Power	**Input: 120 VAC 60Hz**

2. Laboratory Information

2.1 Laboratory Name Estech Co., Ltd.

2.2 Location

Head Office Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, R.O. Korea

EMC Lab(Yanggi) 97-1, Hoeeok-ri, Majang-myun, Ichion-city, Gyonggi-do, R.O. Korea

2.3 Quality System Accredited by KOLAS(ISO/IEC 17025)

2.4 Major Accredited Mark

3. Summary of Test Results

Test Item	Standard	Result
RF Output Power	22.913 24.232	PASS
Occupied Bandwidth	2.1049	PASS
Band Edge	2.1051 22.917 24.238	PASS
Spurious and Harmonic Emission at Antenna Terminal	22.917 24.238	PASS
Field Strength of Spurious Radiation	2.1053 22.917 24.238	PASS
Frequency stability	2.1055 22.355 24.235	PASS
Peak to Average Ratio	27.50	PASS

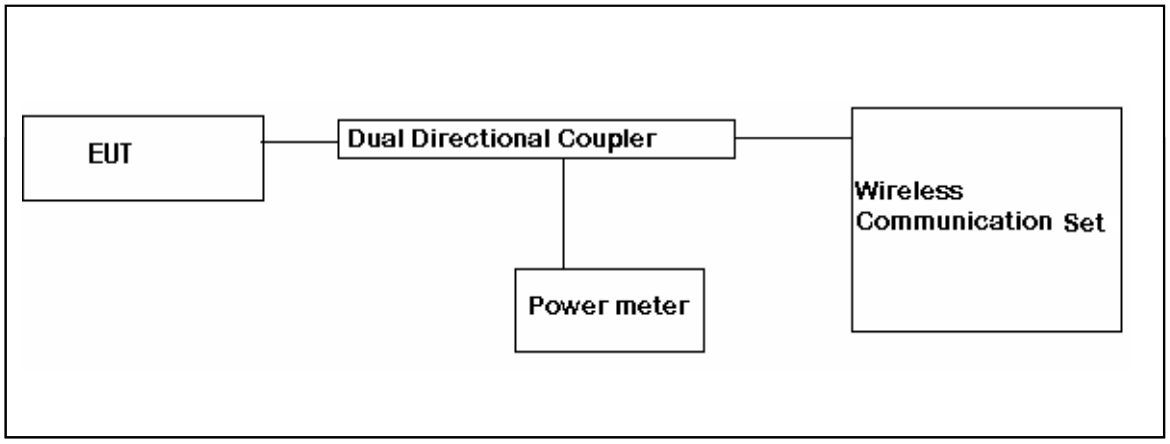
4. RF Output Power

4.1 Test Procedure

1. The EUT was placed on a wooden turn table 3 meters from the receive antenna. The receive antenna height and turn table rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1MHz, A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For reading 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

2. The RF output port of the EUT was connected to the
dual directional coupler and Wireless communications test set connected dual directional coupler
The RF Power is measured Power matter This test was performed three channels (Low, High, Middle)

3. Test setup for RF Conducted measurement



4.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2016-01-15
Wireless Communications Tet set	Agilent	E5515C	2016-01-15
Dual Directional Couple	HP	778D	2016-01-15

4.3.1 Test Results-CDMA_Cellular Band

Frequency	Ch No.	Test Mode	Power Output (dBm)
824.70	1013	RC1/SO2	24.26
		RC1/SO55	24.31
		RC2/SO9	24.34
		RC2/SO55	24.36
		RC3/SO55	24.40
		RC3/SO32	24.42
836.52	384	RC1/SO2	24.44
		RC1/SO55	24.47
		RC2/SO9	24.50
		RC2/SO55	24.49
		RC3/SO55	24.51
		RC3/SO32	24.53
848.31	777	RC1/SO2	24.24
		RC1/SO55	24.27
		RC2/SO9	24.28
		RC2/SO55	24.28
		RC3/SO55	24.30
		RC3/SO32	24.33

* Max output power is blue line

4.3.2 Test Results-CDMA_PCS Band

Frequency	Ch No.	Test Mode	Power Output (dBm)
1851.25	25	RC1/SO2	24.22
		RC1/SO55	24.25
		RC2/SO9	24.27
		RC2/SO55	24.32
		RC3/SO55	24.33
		RC3/SO32	24.35
1880.00	600	RC1/SO2	24.22
		RC1/SO55	24.21
		RC2/SO9	24.18
		RC2/SO55	24.2
		RC3/SO55	24.21
		RC3/SO32	24.26
1908.75	1175	RC1/SO2	24.04
		RC1/SO55	24.08
		RC2/SO9	24.16
		RC2/SO55	24.13
		RC3/SO55	24.22
		RC3/SO32	24.25

* Max output power is blue line

4.3.3 Test Results

4.3.3.1 CDMA_Cellular Band

FREQ (MHz)	Receiver Reading (dBuV)	Correction Factor (dB)		SG Reading (dBm)	ERP (dBm)	Limit (dBm)	POL (H/V)
		Antenna gain(dBi)	Cable Loss (dB)				
824.70	92.80	1.00	8.90	31.70	23.80	38.5	V
836.52	91.90	1.29	9.10	30.70	22.89	38.5	V
848.31	92.40	1.61	9.20	28.99	21.40	38.5	V

4.3.3.2 CDMA_PCS Band

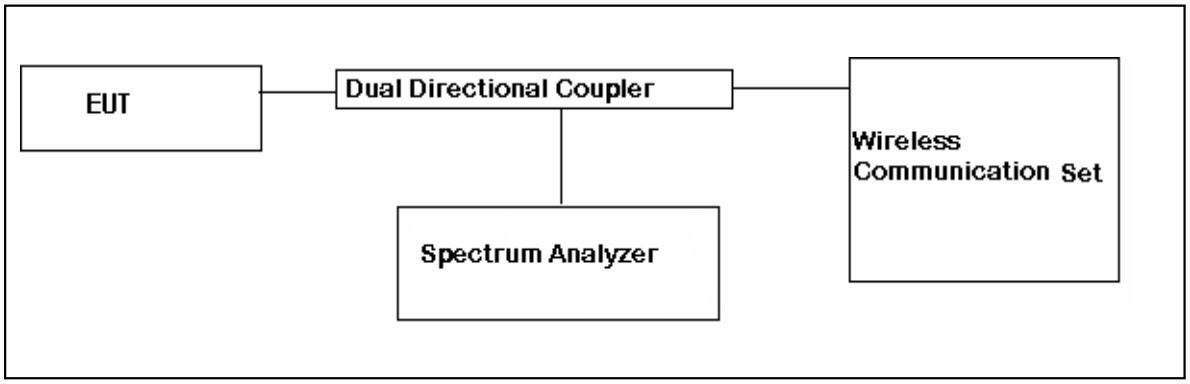
FREQ (MHz)	Receiver Reading (dBuV)	Correction Factor (dB)		SG Reading (dBm)	EIRP (dBm)	Limit (dBm)	POL (H/V)
		Antenna gain(dBd)	Cable Loss (dB)				
1851.25	84.30	10.40	12.50	25.40	23.30	33	V
1880.00	84.33	10.43	12.60	25.20	23.03	33	V
1908.75	83.90	10.44	12.70	25.20	22.94	33	V

5. Occupied Bandwidth

5.1 Test Procedure

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth.

The VBW is set to 3 times the RBW. The sweep time is coupled.



5.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2016-01-15
Wireless Communications Tet set	Agilent	E5515C	2016-01-15
Dual Directional Coupler	HP	778D	2016-01-15

5.3 Test Results

Test Results-CDMA_Cellular Band

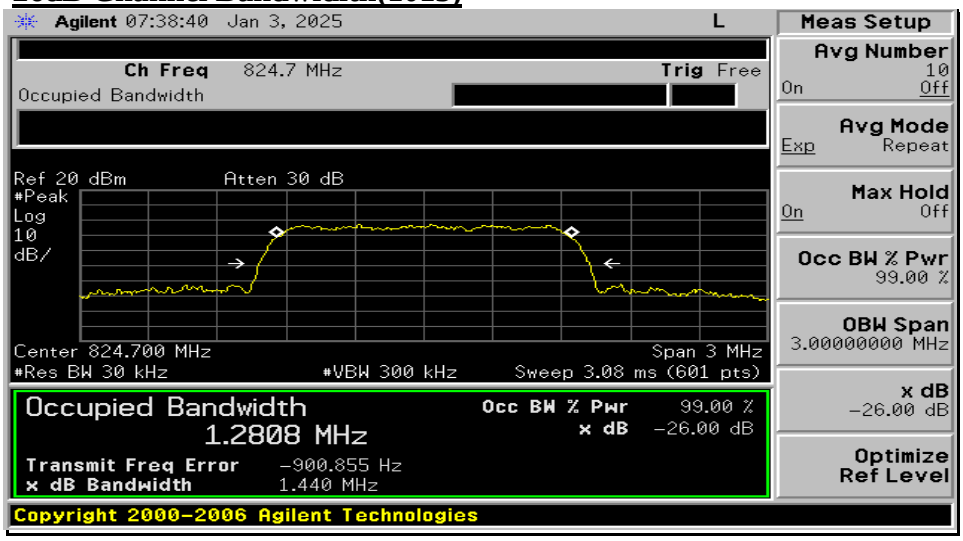
Channel	Frequency(MHz)	Bandwidth(MHz)
1013	824.70	1.281
384	836.52	1.271
777	848.31	1.274

Test Results-CDMA_PCS Band

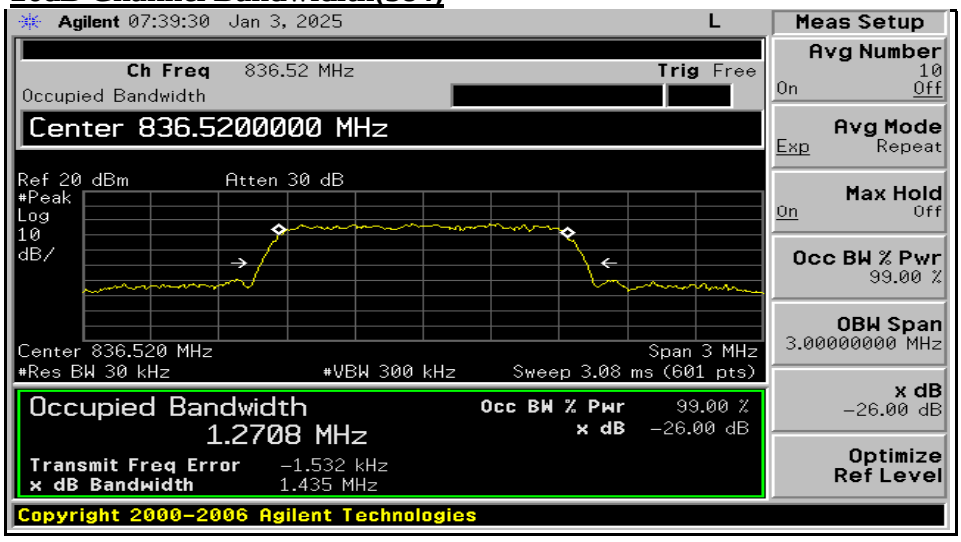
Channel	Frequency(MHz)	26dB Bandwidth(MHz)
25	1851.25	1.273
600	1880.00	1.270
1175	1908.75	1.273

5.4 Test Plot

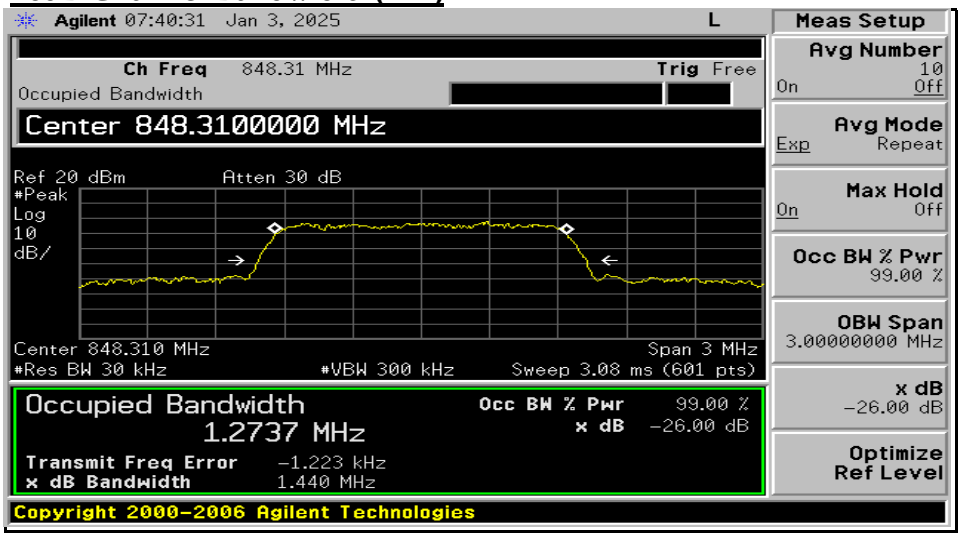
26dB Channel Bandwidith(1013)



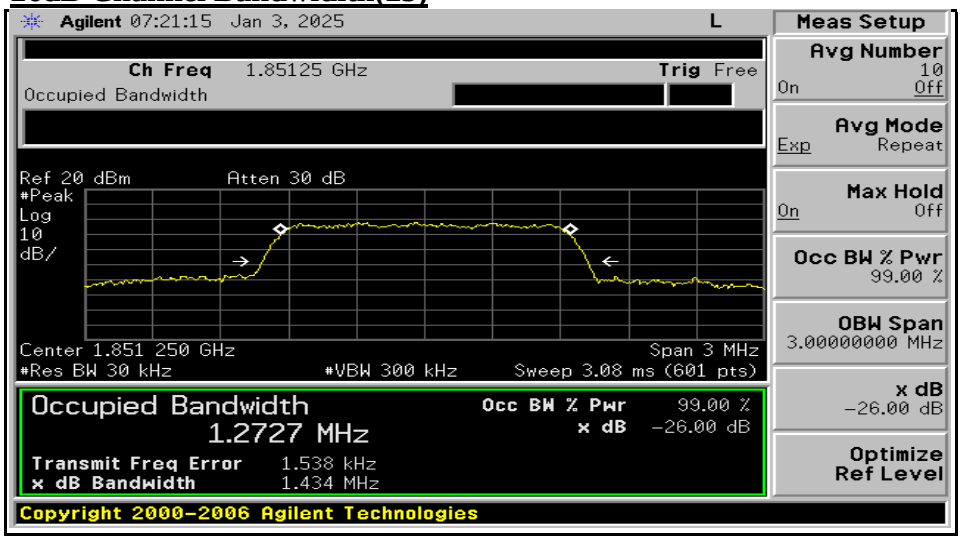
26dB Channel Bandwidith(384)



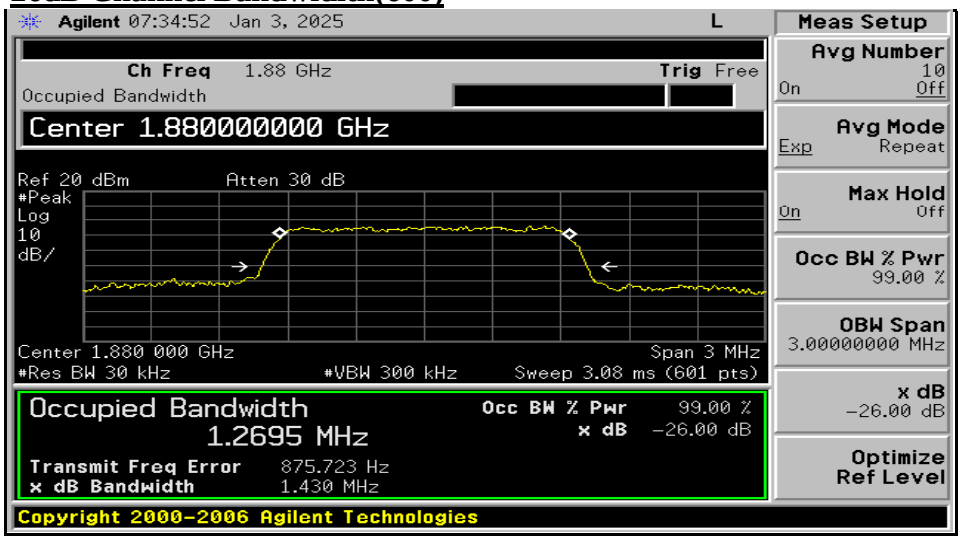
26dB Channel Bandwidith(777)



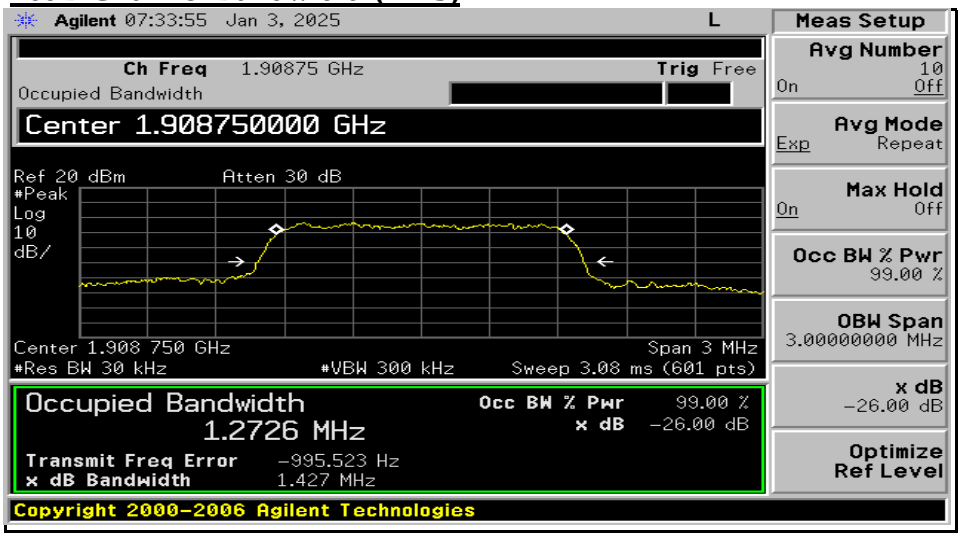
26dB Channel Bandwidith(25)



26dB Channel Bandwidith(600)



26dB Channel Bandwidith(1175)



6. Spurious and Harmonic Emission at Antenna Terminal

6.1 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm, limit, in the 1MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, and harmonics.

22.917(f): Mobile emission in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed -80dBm at the transmit antenna connector.

6.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2016-01-15
Wireless Communications Tet set	Agilent	E5515C	2016-01-15
Dual Directional Coupler	HP	778D	2016-01-15

6.3 Test Results

CDMA(Spurious Emission: Band Edge)-Cellular Band

Channel	Frequency	Result	Limit	Margin
1013	824.70	-15.86	-13.00	2.86
777	848.31	-14.33	-13.00	1.33

CDMA (Spurious Emission: Out of Band)-Cellular Band

Channel	Frequency	Result	Limit	Margin
1013	824.70	-21.82	-13.00	8.82
384	836.52	-23.09	-13.00	10.09
777	848.31	-23.82	-13.00	10.82

6.4 Test Results

CDMA(Spurious Emission: Band Edge)-PCS Band

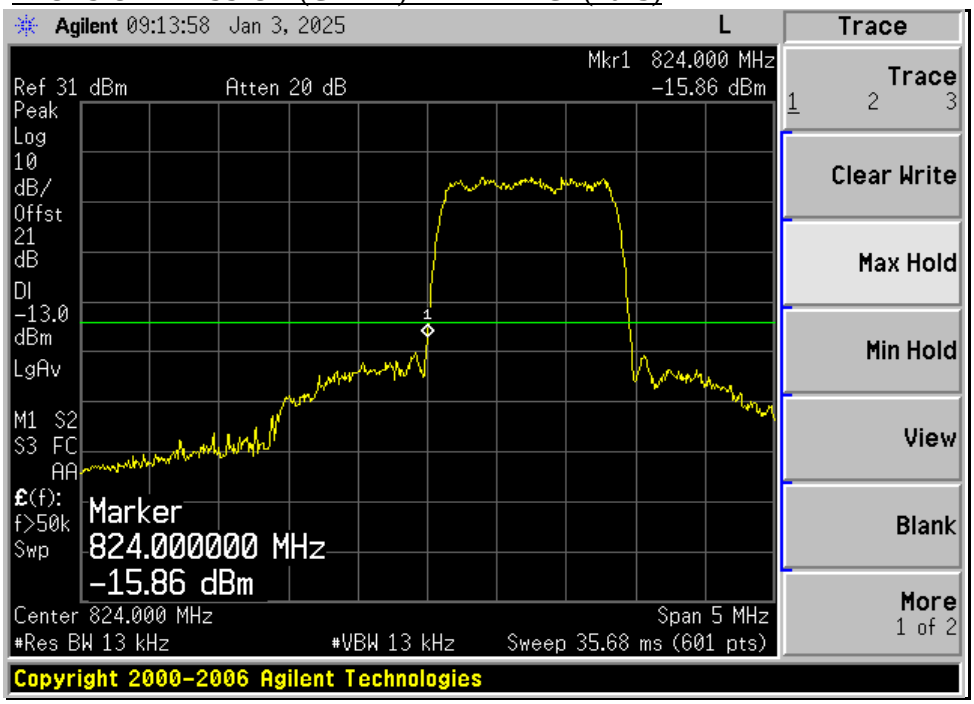
Channel	Frequency	Result	Limit	Margin
1013	1931.25	-22.32	-13.00	9.32
777	1988.75	-28.30	-13.00	15.30

CDMA (Spurious Emission: Out of Band)-PCS Band

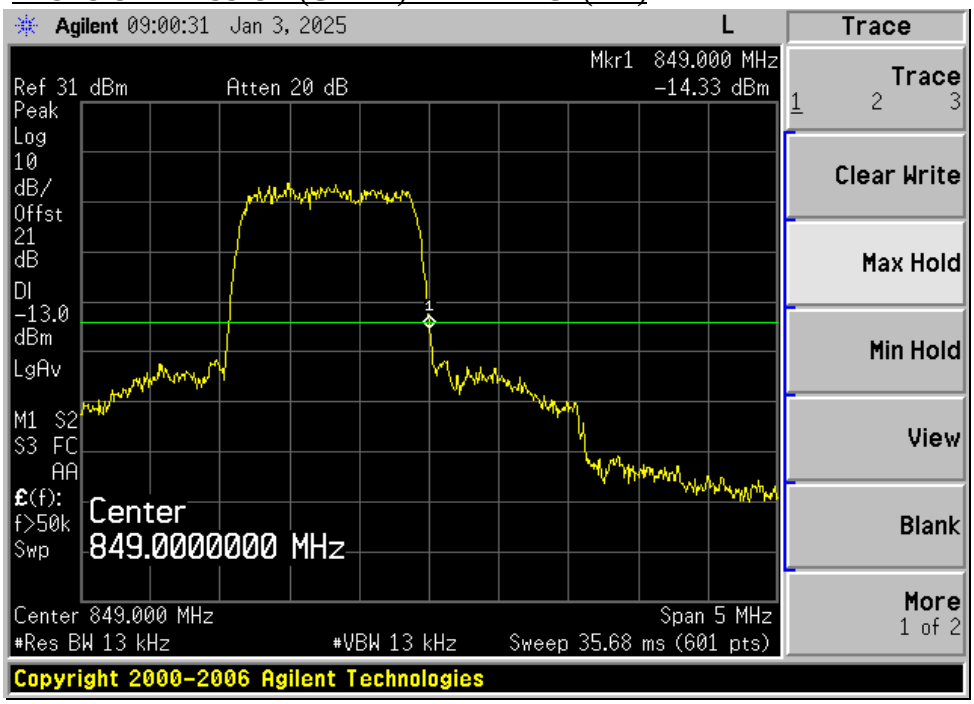
Channel	Frequency	Result	Limit	Margin
1013	1931.25	-23.60	-13.00	10.60
363	1960.00	-22.77	-13.00	9.77
777	1988.75	-23.23	-13.00	10.23

6.5 Test Plot

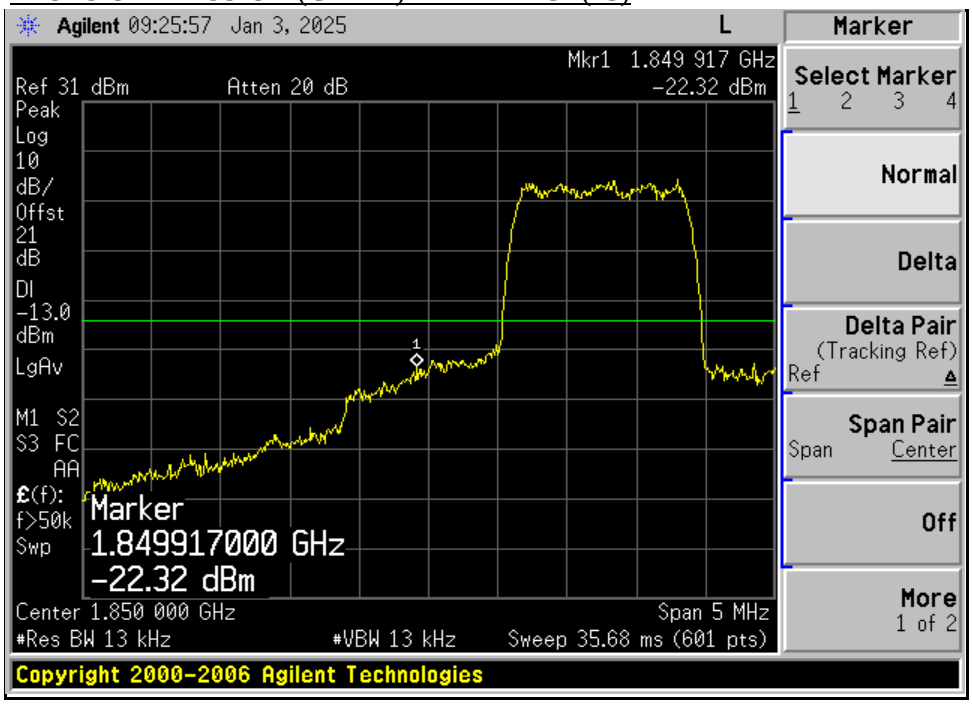
PLOTS OF EMISSION (CDMA) BAND EDGE(1013)



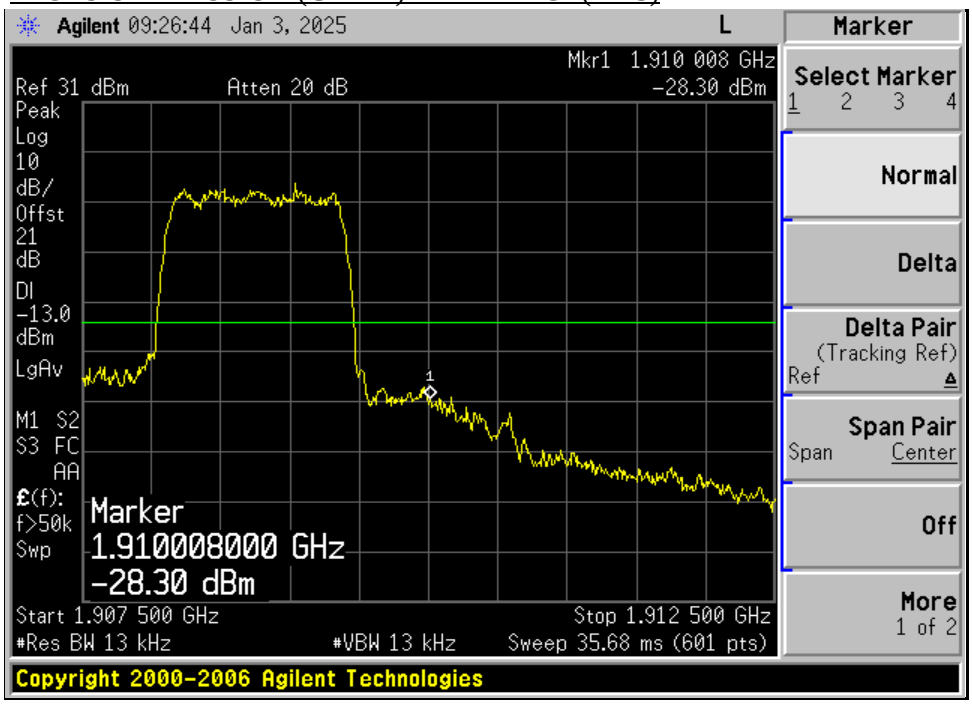
PLOTS OF EMISSION (CDMA) BAND EDGE(777)



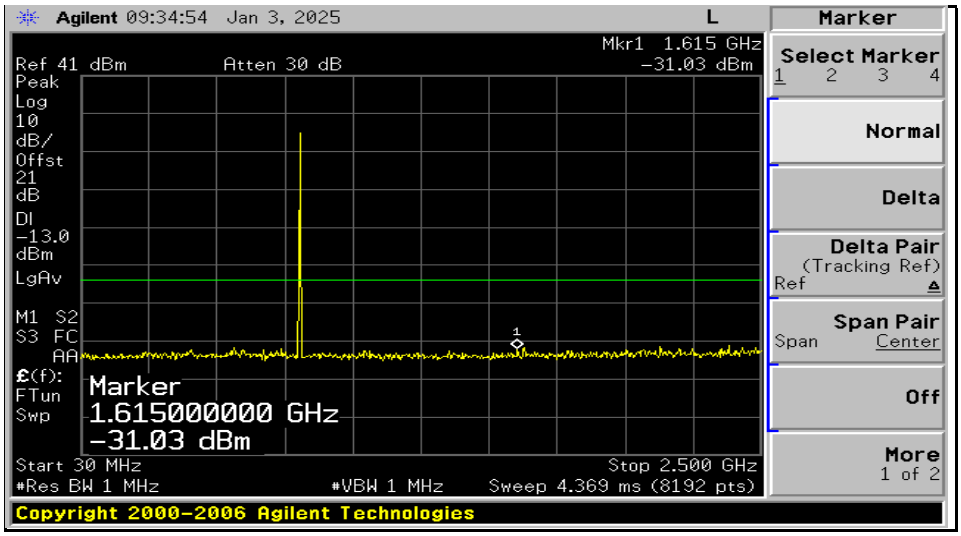
PLOTS OF EMISSION (CDMA) BAND EDGE(25)



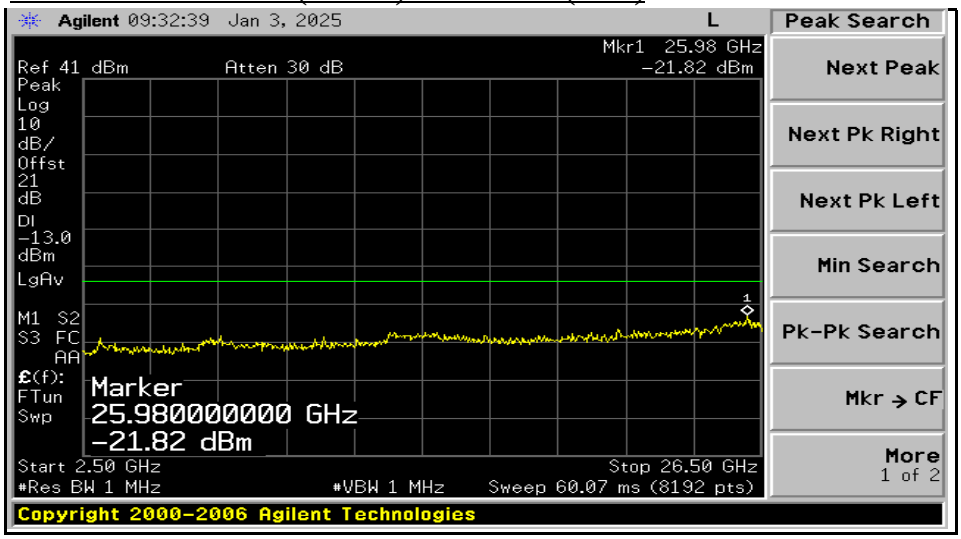
PLOTS OF EMISSION (CDMA) BAND EDGE(1175)



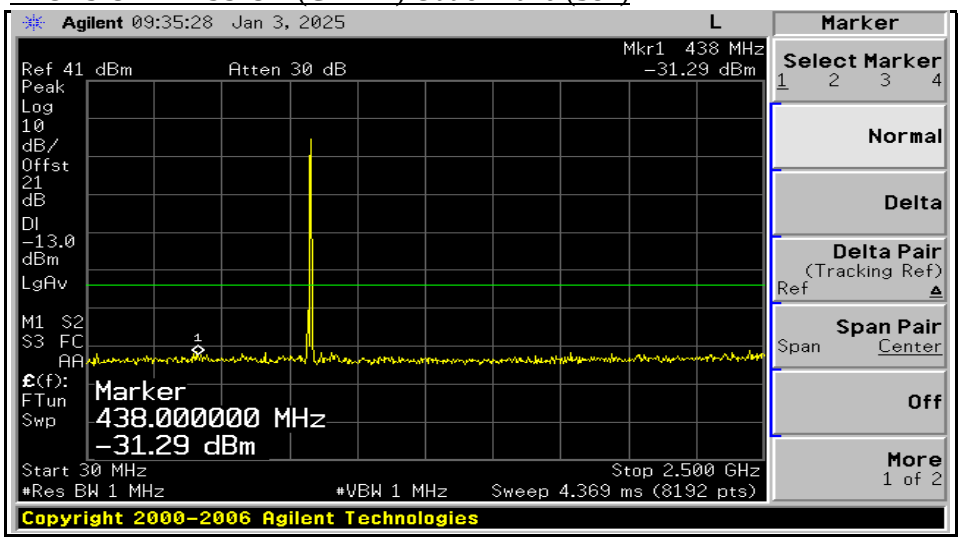
PLOTS OF EMISSION (CDMA) Out of Band (1013)



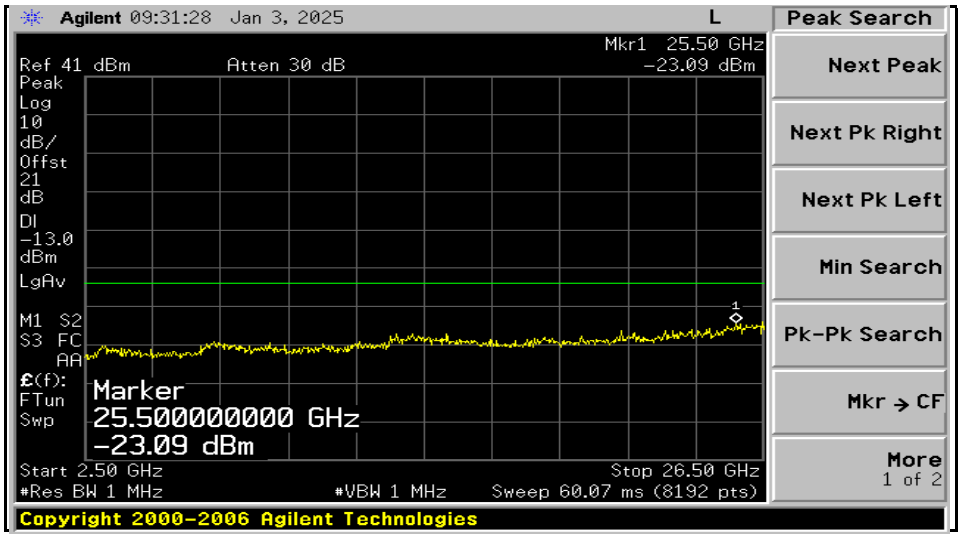
PLOTS OF EMISSION (CDMA) Out of Band (1013)



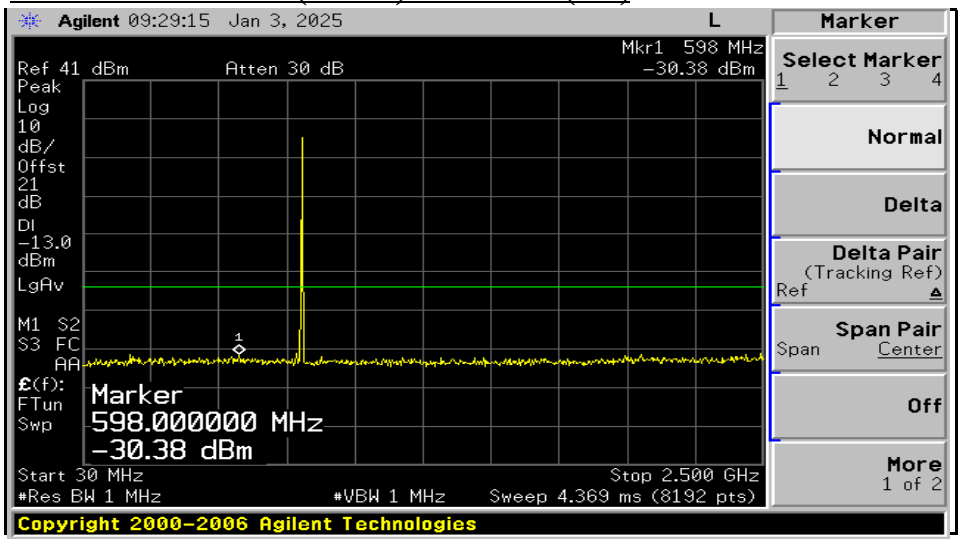
PLOTS OF EMISSION (CDMA) Out of Band (384)



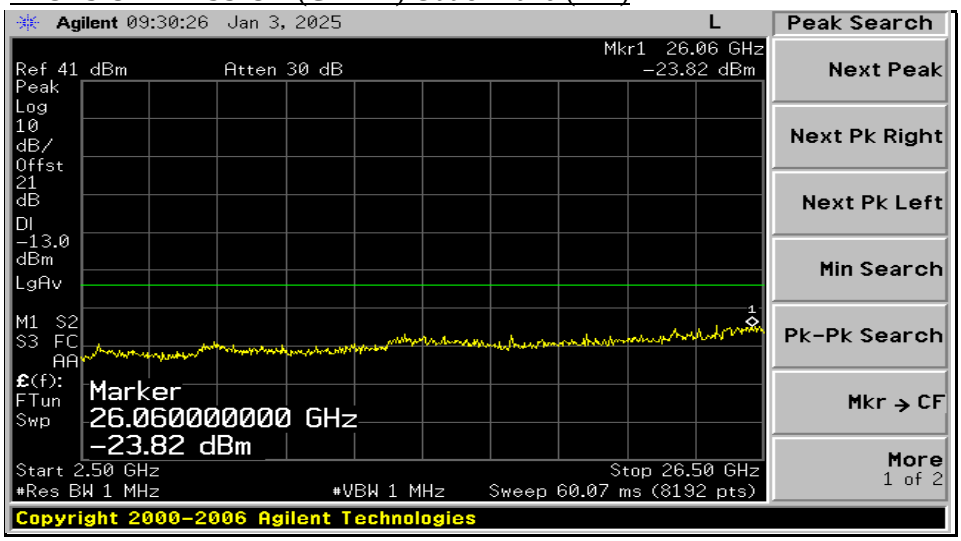
PLOTS OF EMISSION (CDMA) Out of Band (384)



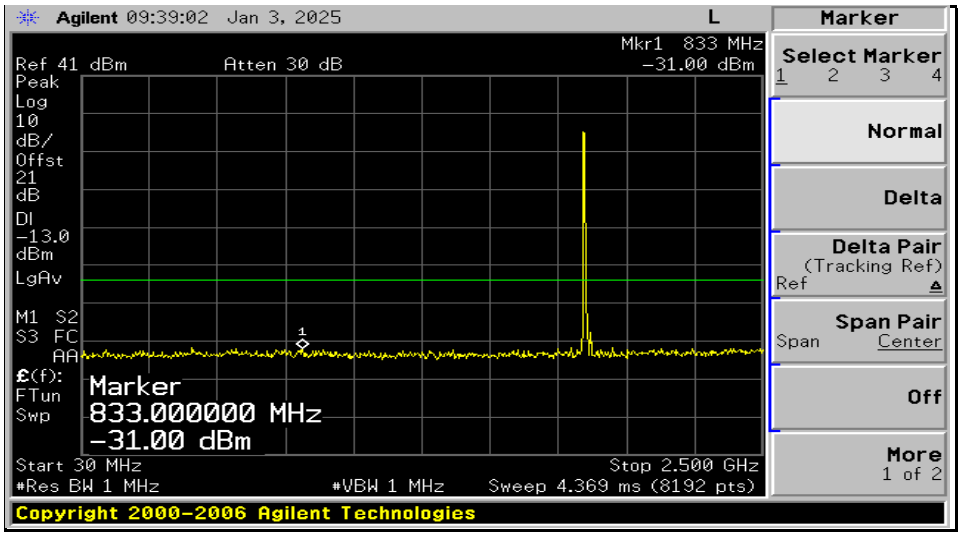
PLOTS OF EMISSION (CDMA) Out of Band (777)



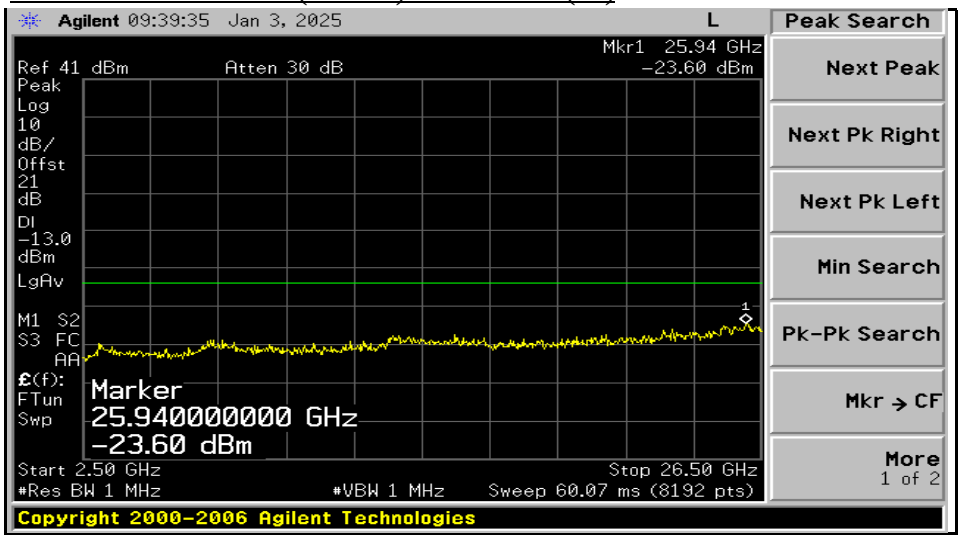
PLOTS OF EMISSION (CDMA) Out of Band (777)



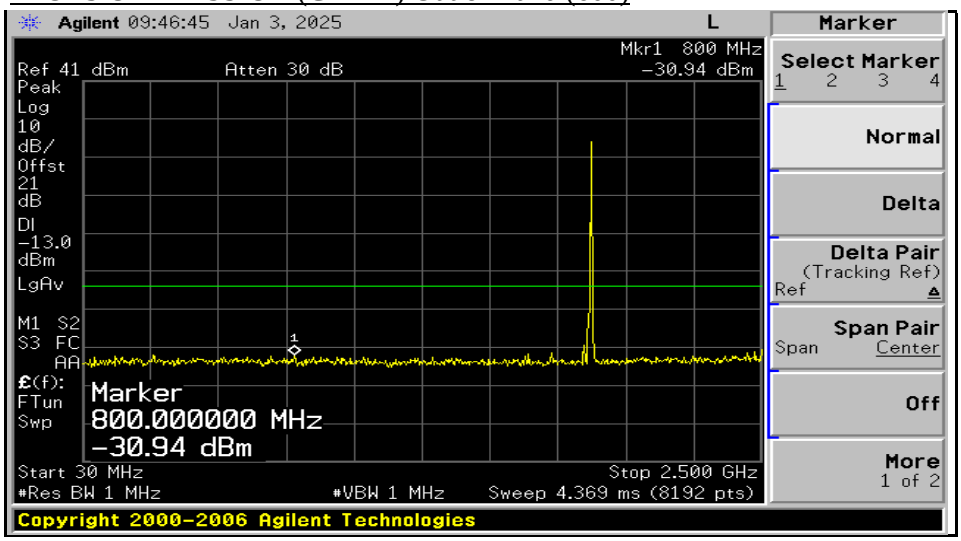
PLOTS OF EMISSION (CDMA) Out of Band (25)



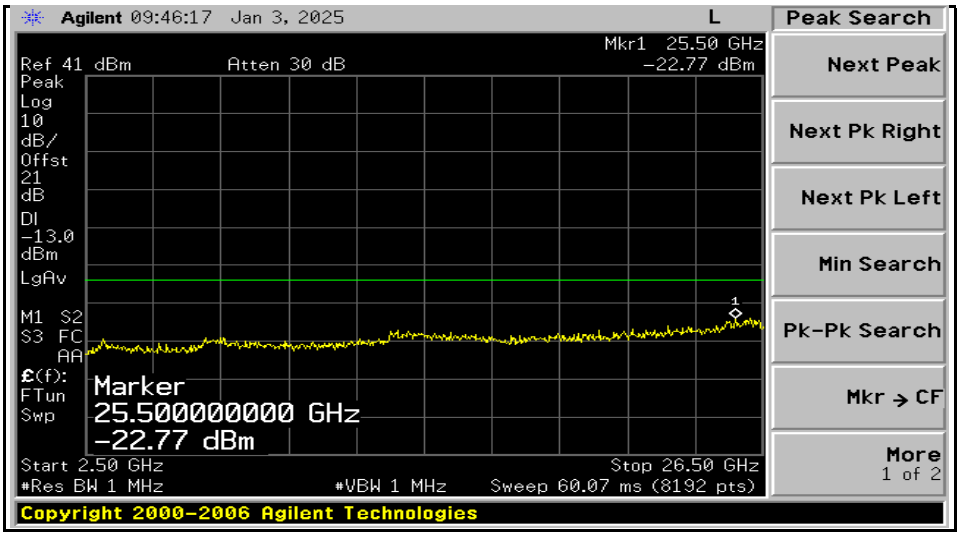
PLOTS OF EMISSION (CDMA) Out of Band (25)



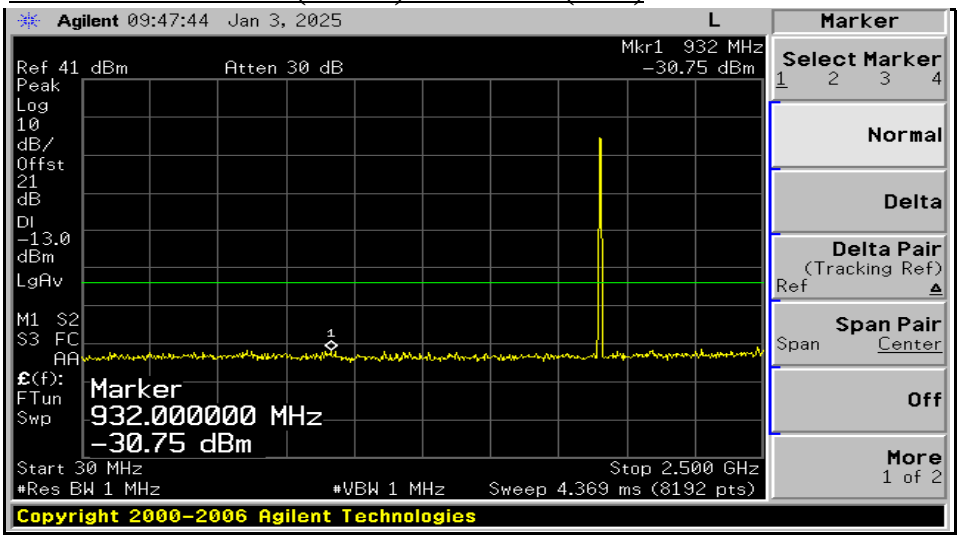
PLOTS OF EMISSION (CDMA) Out of Band (600)



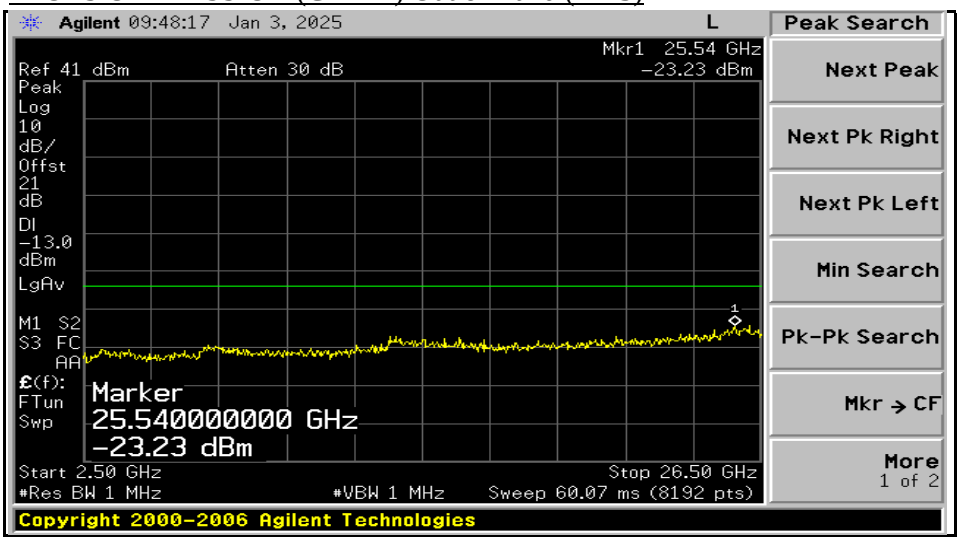
PLOTS OF EMISSION (CDMA) Out of Band (600)



PLOTS OF EMISSION (CDMA) Out of Band (1175)



PLOTS OF EMISSION (CDMA) Out of Band (1175)



7. Field Strength of Spurious Radiation

7.1 Test Procedure according to ANSI/TIA/EIA 603 Clause 3.2.12 & FCC 22.917(h)

Radiation and harmonic emission are measured outdoors at our 3 meters test range. The equipment under test is placed on a wooden turntable 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer (or receiver). A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

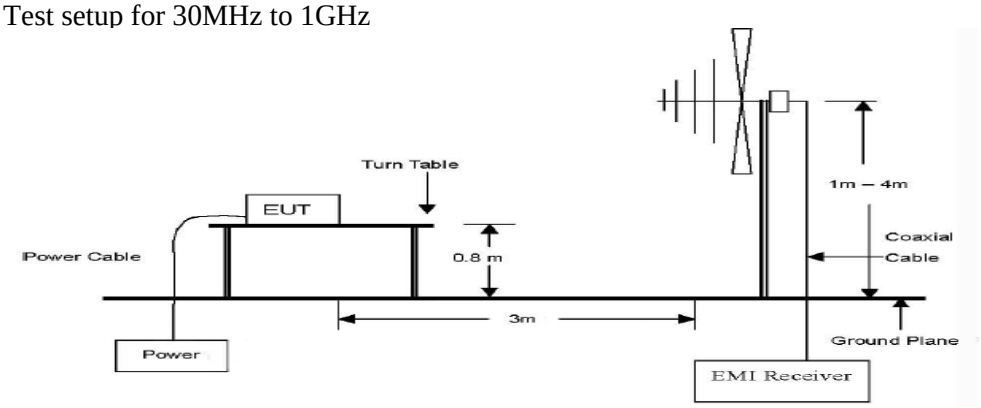
7.2 Test Equipments

The following test equipments are used during tests

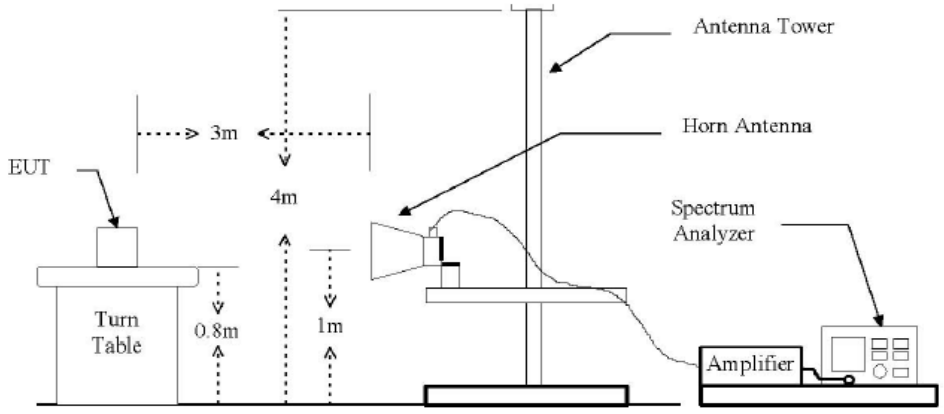
Equipment	Manufacturer	Model	Next Cal.
Test Receiver	Rohde & Schwarz	ESPI7	2016-01-13
Signal Generator	ROHDE&SCHWARZ	SMB 100A	2016-01-12
PREAMPLIFIER	HP	8449B	2016-01-13
Attenuator	JFW	50FH-010-5	2016-01-16
Attenuator	HP	8491B	2015-12-24
Horn Antenna	SCHWARZBECK	BBHA9120D	2015-10-16
Logbicon Antenna	SCHWARZBECK	VULB 9168	2015-09-18

7.3 Test Setup

Test setup for 30MHz to 1GHz



Test setup for above1GHz



7.4 Test Results

CDMA(Ch1013)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
1649.40	47.70	7.52	11.60	-47.20	-51.28	-13.00	V

CDMA(Ch384)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
1671.78	48.10	7.82	11.70	-47.00	-50.88	-13.00	V

CDMA(Ch777)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		ERP(dBm)		Limit(dBm)	Polarity
		AG(dBd)	CL(dB)	SG Reading	Result		
1696.62	46.10	7.97	11.80	-48.10	-51.93	-13.00	V

Remark

*** The TX signal isn't detected from 3nd harmonics.**

*** EIRP = SG Reading + AG(dBi)-CL(dB)**

*** ERP = SG Reading + AG(dBi)-CL(dB)+2.15(dB)**

PCS(Ch25)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3702.50	54.10	12.69	19.10	-24.60	-31.01	-13.00	V

PCS(Ch600)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3760.00	53.40	12.73	19.50	-24.80	-31.57	-13.00	V

PCS(Ch1175)

Frequency (MHz)	Receiver Reading(dBuV)	Correction Factor(dB)		EIRP(dBm)		Limit(dBm)	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3817.50	52.10	12.73	19.50	-25.40	-32.17	-13.00	V

Remark

*** The TX signal isn't detected from 3nd harmonics.**

*** EIRP = SG Reading + AG(dBi)-CL(dB)**

*** ERP = SG Reading + AG(dBi)-CL(dB)+2.15(dB)**

8. Frequency stability

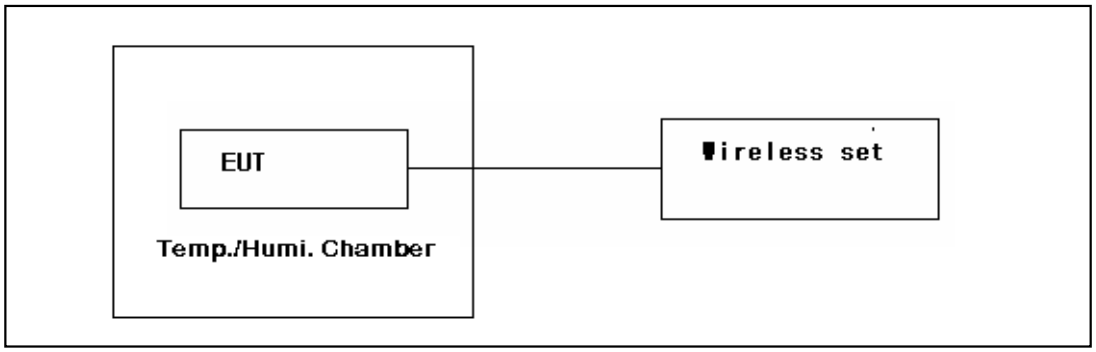
8.1 Test Procedure

The frequency stability of the transmitter is measured by:

a) Temperature: The temperature is varied from -30℃ to +60℃ using an environmental chamber.

b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

※ The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±2.5ppm of the center frequency.



8.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2016-01-15
Wireless Communications Tet set	Agilent	E5515C	2016-01-15
DC Power Supply	INTERACT	AK-5007	2016-01-15
Tem/Hum Chamber	TABAI ESPEC CORP	PSL-2GT	2016-01-13

8.3 Test Results

Cellural band

Operting Frequency :	836,520,000	
Channel :	384	
Reference Voltage :	110.00	VAC
Deviatin Limit :	±0.00025% or 2.5ppm	

Voltage (%)	Power (VAC)	Temperature (℃)	Frequency (Hz)	Deviation %	ppm
100	110.0	+20℃(Ref)	836,520,017	0.000002	0.020
100		-30	836,520,022	0.000002	0.026
100		-20	836,520,019	0.000002	0.023
100		-10	836,520,022	0.000002	0.026
100		**0**	836,520,029	0.000003	0.035
100		10	836,520,057	0.000006	0.068
100		20	836,520,050	0.000005	0.060
100		25	836,520,029	0.000003	0.035
100		30	836,520,051	0.000005	0.061
100		40	836,520,049	0.000005	0.059
100		50	836,520,037	0.000004	0.044
100		60	836,520,040	0.000004	0.048
85	93.5	20	836,520,041	0.000004	0.049
115	126.5	20	836,520,032	0.000003	0.038
EndPoint	85.0	20	836,520,036	0.000004	0.043

PCS band

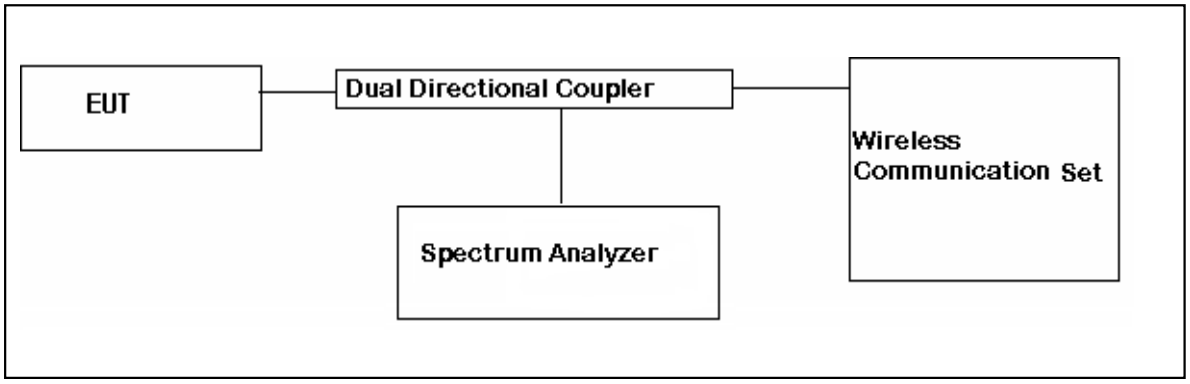
Operting Frequency :	1,880,000,000	
Channel :	600	
Reference Voltage :	110.00	VAC
Deviatin Limit :	±0.00025% or 2.5ppm	

Voltage (%)	Power (VAC)	Temperature (℃)	Frequency (Hz)	Deviation %	ppm
100	110.0	+20℃(Ref)	1,880,000,027	0.000003	0.014
100		-30	1,880,000,025	0.000003	0.013
100		-20	1,880,000,023	0.000002	0.012
100		-10	1,880,000,032	0.000003	0.017
100		**0**	1,880,000,027	0.000003	0.014
100		10	1,880,000,022	0.000002	0.012
100		20	1,880,000,022	0.000002	0.012
100		25	1,880,000,019	0.000002	0.010
100		30	1,880,000,022	0.000002	0.012
100		40	1,880,000,023	0.000002	0.012
100		50	1,880,000,024	0.000002	0.013
100		60	1,880,000,025	0.000003	0.013
85	93.5	20	1,880,000,023	0.000002	0.012
115	126.5	20	1,880,000,026	0.000003	0.014
EndPoint	85.0	20	1,880,000,022	0.000002	0.012

9. Peak to Average Ratio

9.1 Test Procedure

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.



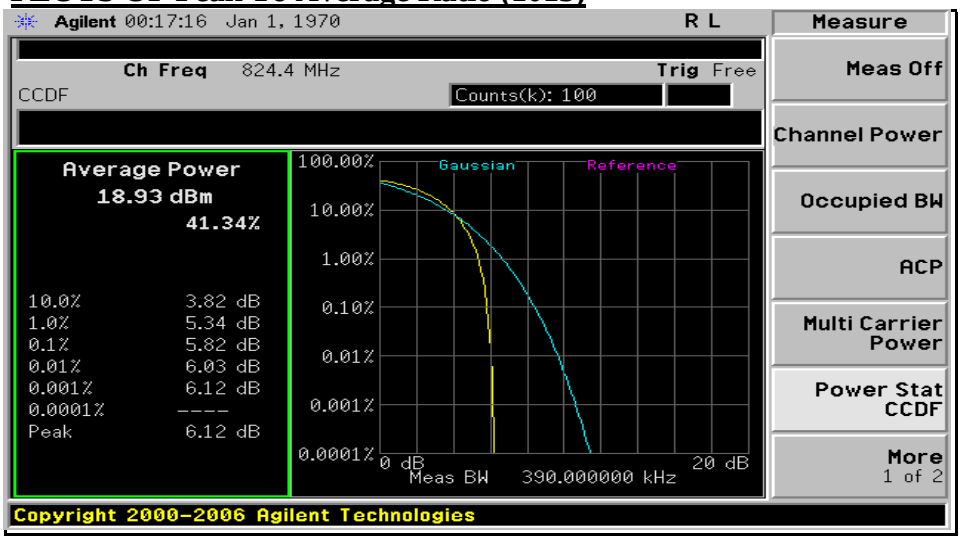
9.2 Test Equipments

The following test equipments are used during tests

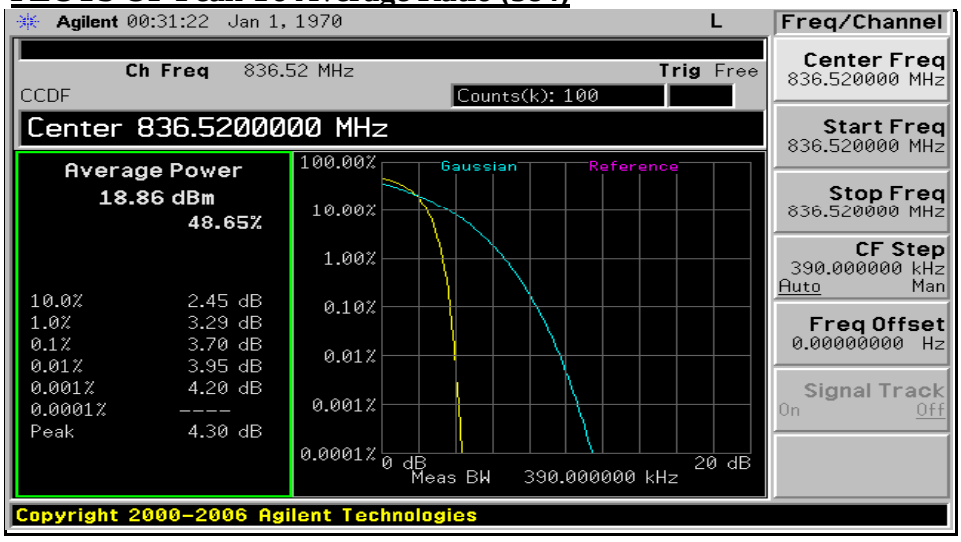
Equipment	Manufacturer	Model	Next Cal.
Spectrum Analyzer	Agilent	E4440A	2016-01-15
Wireless Communications Tet set	Agilent	E5515C	2016-01-15
Dual Directional Coupler	HP	778D	2016-01-15

5.3 Test Plot

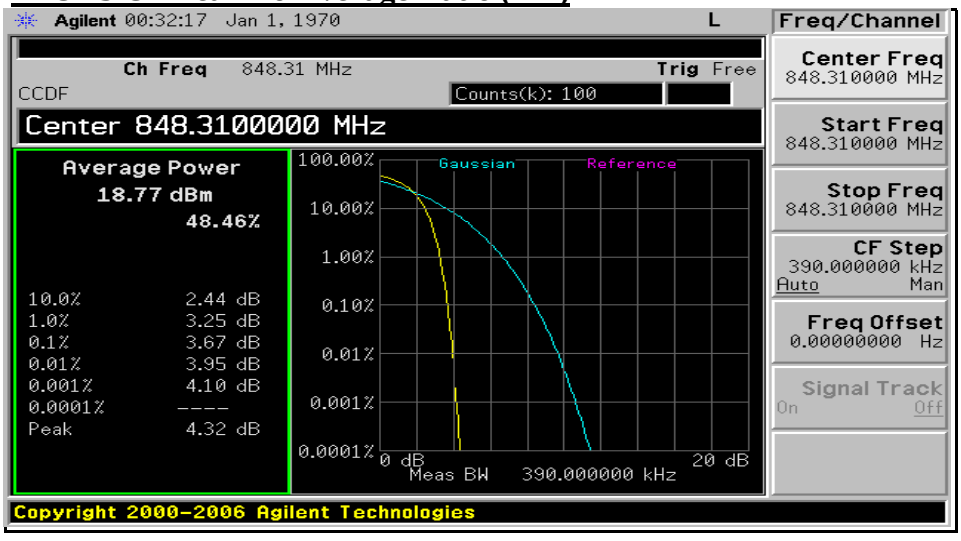
PLOTS OF Peak To Average Ratio (1013)



PLOTS OF Peak To Average Ratio (384)

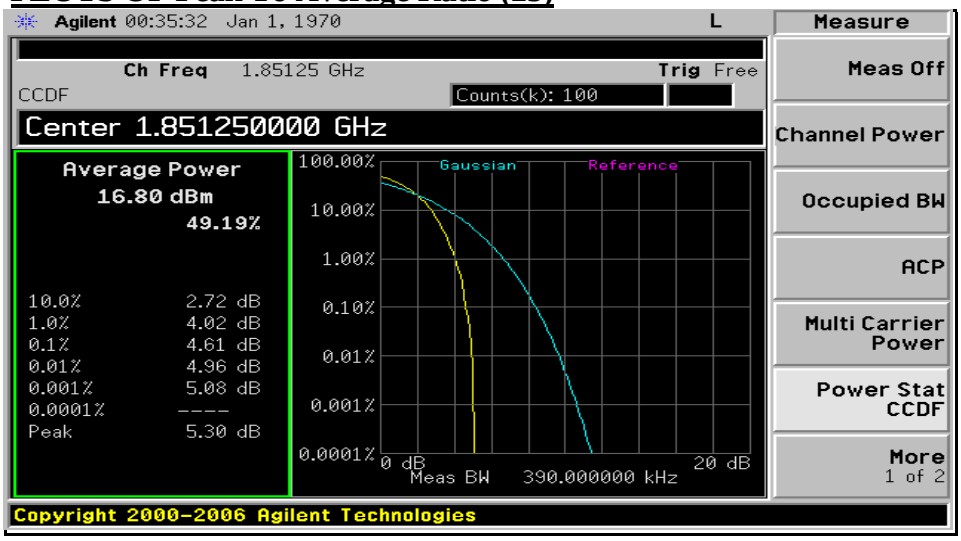


PLOTS OF Peak To Average Ratio (777)

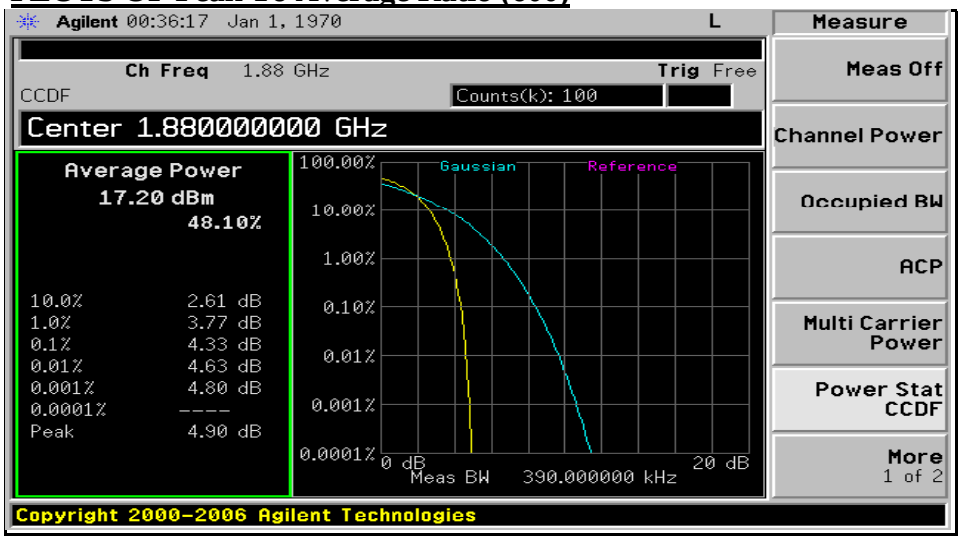


5.3 Test Plot

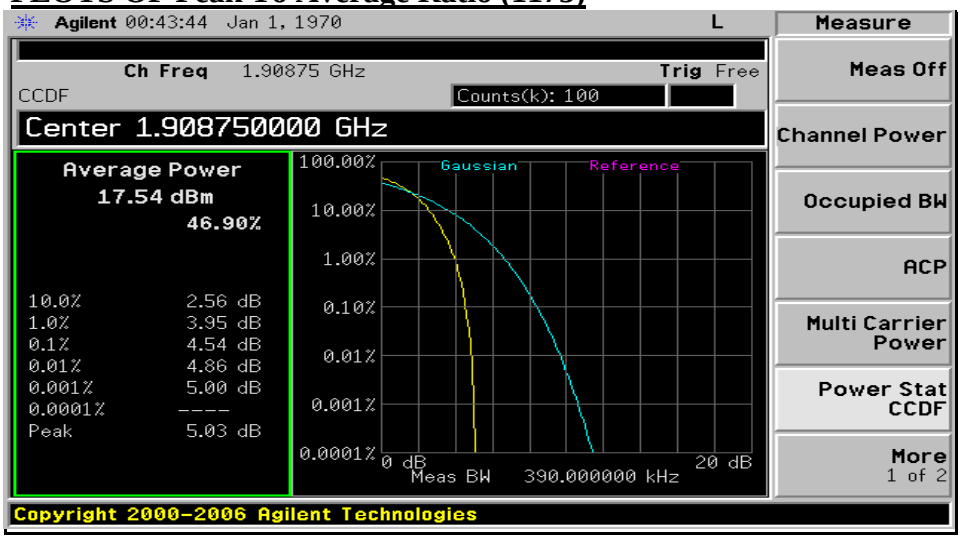
PLOTS OF Peak To Average Ratio (25)



PLOTS OF Peak To Average Ratio (600)

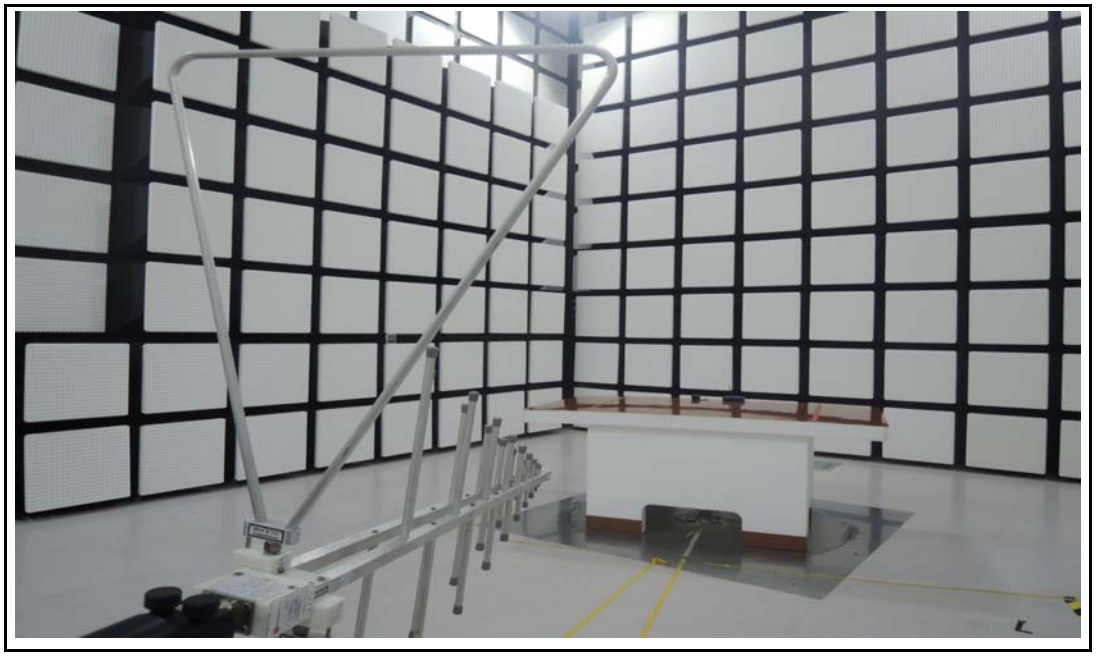


PLOTS OF Peak To Average Ratio (1175)



Attachment 1 : EUT Test Photographs

30MHz to 1GHz



above1GHz