Report No: SYBH(E) 30062007

FCC ID: QISC228S

FCC TEST REPORT OF HUAWEI 1900MHz CDMA 1X Digital Mobile Phone

M/N: HUAWEI C228s

June. 28, 2007

Reliability Laboratory of Huawei Technologies Co., Ltd.

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2.	The laboratory has obtained the accreditation of THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION (A2LA), and Accreditation Council Certificate Number: 2174.01.
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REPORT ON	**FCC Test of HUAWEI CDMA Mobile Phone** M/N: HUAWEI C228s Report No: SYBH (E) 30062007
REGULATION	**FCC CFR47 Part 2: Subpart J;** **FCC CFR47 Part 24: Subpart E;** **FCC CFR47 Part 15: Subpart B;**
CONCLUSION	There are 9 items need to be tested, 9 items have been tested. The sample of the model completely meets the requirements **Final Judgement: Pass**

General Manager	**2007.06.28**	**Guo Xiaoqi**	
	Date	Name	signature
Technical Responsibility For Area of Testing	**2007.06.28**	**Zhang Xinghai**	
	Date	Name	signature
Test Lab Engineer	**2007.06.28**	**HuJun**	
	Date	Name	signature

Contents

1 Summary

The table below summarizes the measurements and results for the CDMA 1X Digital Mobile Phone HUAWEI C228s. Detailed results and descriptions are shown in the following pages.

Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	24.232	Effective Radiated Power of Transmitter	PASS
2.1046	24.232	Conducted Power of Transmitter	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	24.238	Band Edges compliance	PASS
2.1051	24.238	Spurious Emission at Antenna Terminal	PASS
2.1053	24.238	Radiated Spurious Emission	PASS
2.1055	24.235	Frequency Stability	PASS
-	15.107	Conducted Emission at Power Port	PASS
-	15.109	Radiated Emission of Enclosure in Idle Mode	PASS

2 Product Description

2.1 Production Information

2.1.1 General Description

CDMA 1X Digital Mobile Phone HUAWEI C228s is subscriber equipment in the CDMA system. The frequency band is PCS. The Mobile Phone implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice and SMS service etc. The Mobile Phone uses MSM6000 chipset and Zero-IF technologies.

2.1.2 Support function and Service

The CDMA 1X Digital Mobile Phone HUAWEI C228s support the function and service as follows:

Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
voice and SMS	Modulation: QPSK	TM1*	
voice and SMS	Modulation: HPSK	TM3*	

Note: * Refer to ANSI/TIA-98-E section 1.3 for the information of TM (Test Mode).

2.2 Modification Information

For original equipment, following table is not application.

Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information

Not applicable!

3 Test Site Description

The test site of:

Huawei Technologies Co. Ltd.
P.O. Box 518129
Huawei base, bantian,
Longgang District, Shenzhen, China

The test site description has been submitted to FCC and registration granted under the registration number **97456** on March 11. 2003. The test site has been accredited by and the accredited number is **2174.01** in Jan of 2004.

3.1 Testing Period

The test have been performed during the period of

Jun. 04, 2007 to Jun. 25, 2007

3.2 General Set up Description

CDMA 1X Digital Mobile Phone HUAWEI C228s can only support CDMA mode and PCS Band. During this measurement, the Mobile Phone just works in CDMA mode and PCS Band.

TM1: Forward Traffic Channel Radio Configuration 1, Reverse Traffic Channel Radio Configuration 1
TM3: Forward Traffic Channel Radio Configuration 3, Reverse Traffic Channel Radio Configuration 3

Parameter	Units	Value
$\hat{I}or$	dBm/1.23 MHz	-104
$\frac{\text{Pilot Ec}}{I_{or}}$	dB	-7
$\frac{\text{Traffic Ec}}{I_{or}}$	dB	-7.4

4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Frequency Range

Uplink band:	1850 to 1910 MHz
Downlink band:	1930 to 1990 MHz

4.1.2 Channel Spacing / Separation

Channel Spacing / Separation

Channel spacing:	50 KHz
Channel separation:	1.25 MHz

4.1.3 Type of Emission

Type of Emission

Emission Designation:	**1M25F9W**

According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Environmental Requirements

Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Nominal temperature	+ 25 °C
Relative Humidity:	5%-95%RH

4.1.5 Power Source

Power Source

AC voltage nominal:	~220V
AC input voltage range	~100V-240V
AC current maximal:	200mA

4.1.6 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

4.1.7 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Applied DC Voltages and Currents

Voltage:	⎓ +2.85V
Current:	150mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)

4.2 EUT Identification List

4.2.1 Board Information

Board Information

1900MHz CDMA 1X Digital Mobile Phone		
HUAWEI C228s		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
-Main board	020EQV9M75003196	HC1C228sM
-LCD	TM128128A7KFWG1	B-3A
-Battery	HGY740438879	HBC80S

4.2.2 Adapter Technical Data

Table11 Adapter Technical Data

AC/DCAdapter Model : TPCA-053065E
Manufacturer : TECH-POWER ELECTRONICS（SHENZHEN） CO.,LTD
Input Voltage : 100-240V ~50/60Hz
Output Voltage : ⎓ 5.3V

Rated Power : 4W
S/N : TPI721295894

4.2.3 Battery Technical Data

Table 12 Battery Technical Data

Battery Model: HBC80S
Rated capacity: 800mAh
Nominal Voltage: ⎓ +3.7V
Charging Voltage: ⎓ +5.0V

4.2.4 FCC Identification

Grantee Code: QIS
Product Code: C228s
FCC Identification: QISC228S

5 Main Test Instruments

Table 13 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
3m Semi Anechoic Chamber	S+M	N/A	N/A	12.24.2007
3m Full Anechoic Chamber	S+M	N/A	N/A	12.05.2007
Signal Analyzer	R&S	FSQ 26	100266	03.20.2008
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	03.20.2008
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	03.20.2008
Receiver	R&S	ESIB 26	100318	08.17.2007
Receiver	R&S	ESCS30	830245/018	03.20.2008
Pre-Amplifier	Agilent	8447D	2944A10146	03.20.2008
Pre-Amplifier	Agilent	83017A	3950M00246	03.20.2008
Loop Antenna	Schwarzbeck	FMZB1516	1516115	03.20.2008
BiLog Antenna	Schaffner	CBL 6112B	2747	08.30.2007
BiLog Antenna	Schaffner	CBL 6112B	2536	08.30.2007
Horn Antenna	R&S	HF906 4044.4507.02	359287/005	12.05.2007
Horn Antenna	R&S	HF906 4044.4507.02	359287/006	12.05.2007
Horn Antenna	ETS-Lindgren	3117	00062533	03.20.2008
Horn Antenna	ETS-Lindgren	3117	00062549	03.20.2008
Horn Antenna	ETS-Lindgren	3116	00031541	03.20.2008
Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	08.28.2007
Signal Generator	R&S	SMT06	830264/009	03.20.2008
Signal Generator	R&S	SMR 40	100325	12.09.2007
Artificial Mains Network	Schwarzbeck	NNLK8121	8121416	03.20.2008
Power Supply	Keithley	2306	1045337	03.20.2008
Climate Chamber	WEISS	ACS-1	3604040034	03.20.2008
Universal Radio Communication Tester	R&S	CMU200	108035	03.20.2008
Wireless communication test set	Agilent	8960	GB43461081	03.13.2008
Spectrum Analyzer	Agilent	PSA E4445A	MY42510100	03.13.2008

6 Transmitter Measurements

6.1 Effective Isotropically Radiated Power of Transmitter (EIRP)

6.1.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	+25°C
Relative humidity:	55%
Test Configurations:	TM1 and TM3 at frequency B、M、T

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24.232

6.1.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones

6.1.2.3 Limits

Compliance with part 24.232, in no any case may the peak power of a mobile phone transmitter exceed 2 W. The calculated longitude EIRP by following formula：EIRP(dBm)= 10*log ($EIRP_{in\ watts}$).

Limits

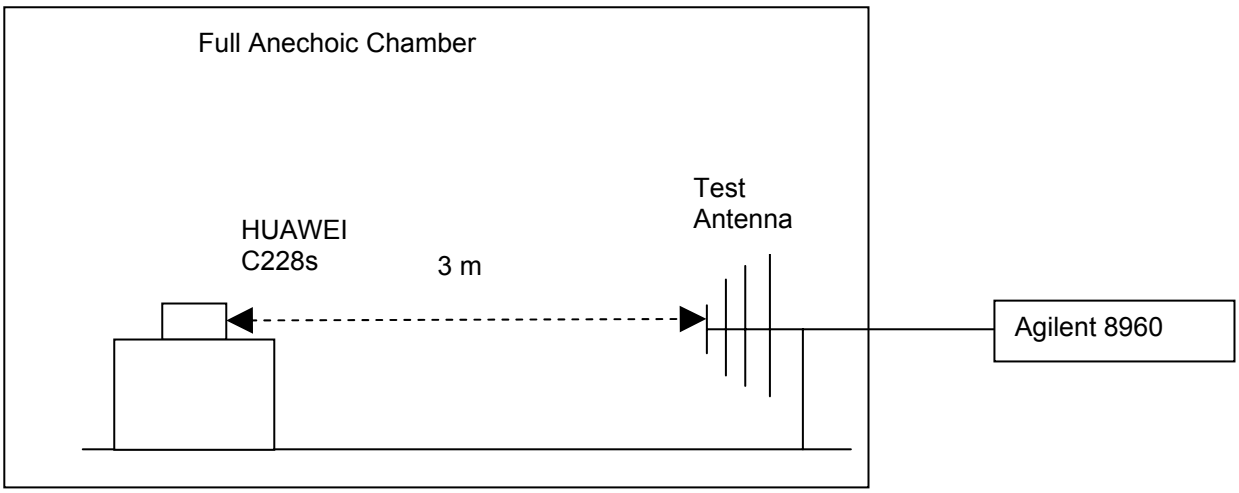
Maximum Output Power (Watts)	< 2 Watts
Maximum Output Power (dBm)	< 33 dBm

6.1.3 Test Method and Setup

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, ERP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the Mobile Phone to the wireless communication tester Agilent 8960 via the air interface. The band class is set as PCS.
(b) Test the Radiated maximum output power by the Agilent 8960 received from test antenna.
(c) Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step (b) on Agilent 8960, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

Test setup

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP

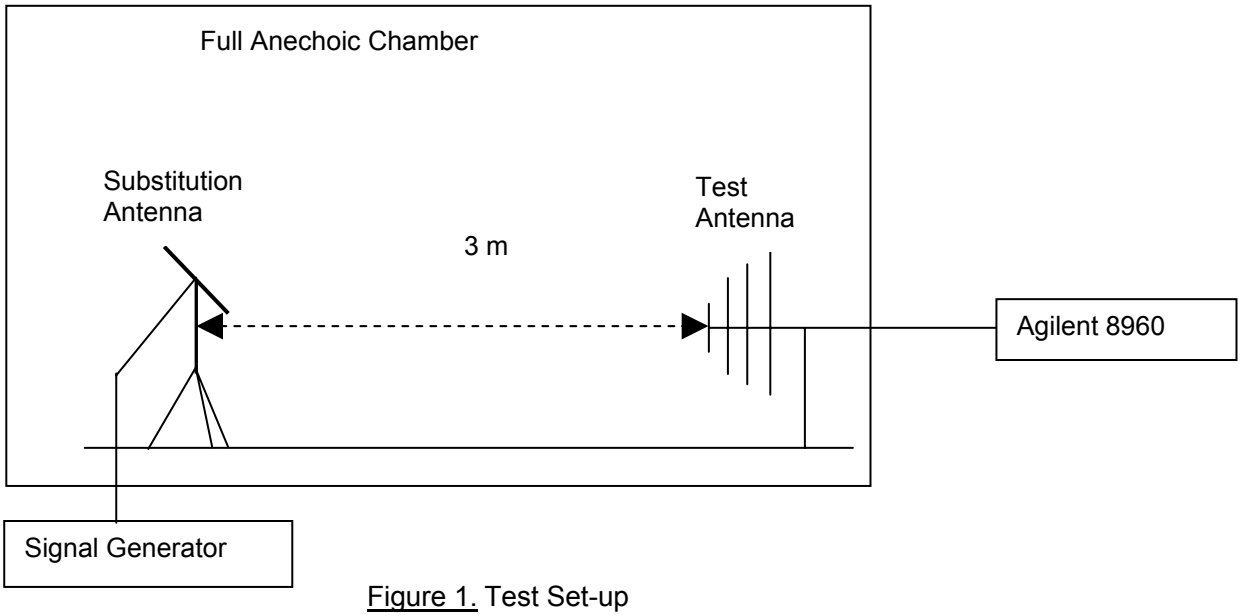


Figure 1. Test Set-up

NOTE: Effective radiated power (EIRP) refers to the radiation power output of the EUT, assuming all emissions are radiated from isotropic antennas.

6.1.4 Measurement Results

Measurement Results

TEST CONDITIONS	RF Output Power					
	Channel 25 (B) 1851.25MHz		Channel 600(M) 1880.00Mhz		Channel 1175(T) 1908.75MHz	
	dBm		dBm		dBm	
	Measured	Limit	Measured	Limit	Measured	Limit

TM1	T_{nom} (+25 °C) V_{nom} (3.7 V)	21.02	33	21.03	33	21.09	33
TM3	T_{nom} (+25 °C) V_{nom} (3.7 V)	21.10	33	21.07	33	21.16	33

6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix A.

6.2 Conducted Power of Transmitter

6.2.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	23.5°C
Relative humidity:	55%
Test Configurations:	CDMA TM1 and TM3 at channel No.25、600、1175

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24.232

6.2.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations

6.2.2.3 Limits

Compliance with part 24.232, in no any case may the peak power of a mobile station transmitter exceed 2 W. The calculated longitude EIRP by following formula:

EIRP(dBm)= 10*log ($EIRP_{in\ watts}$).

And for conducted power, we can use Antenna Gain to calculate the limit. So the conducted power:

P_{cod}.(dBm)=EIRP(dBm)- Gain(dBi).
and Gain (dBi)= Gain(dBd)+ 2.15dB

Limits

Maximum Output Power (Watts)	< 2 Watts=33 dBm
Antenna Gain(dBi):	0dBi（Peak）
Maximum Conducted Output Power (dBm)	< 33dBm

6.2.3 Test Method and Setup

(a)For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, Conducted maximum power shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the Mobile Phone to the wireless communication tester Agilent 8960 via the antenna connector. The band class is set as PCS Band.
(b)Test the Conducted maximum output power by the Agilent 8960.

Test setup

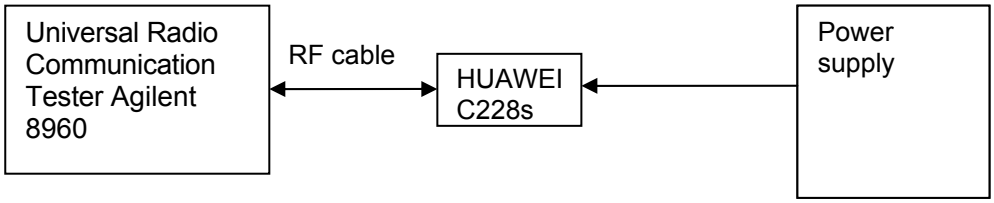


Figure 2. Test Set-up

6.2.4 Measurement Results

Measurement Results

TEST CONDITIONS		RF Output Power					
		Channel 25(B) 1851.25MHz		Channel 600(M) 1880.00MHz		Channel 1175(T) 1908.75MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T_{nom} (25 °C) V_{nom} (3.8 V)	21.12	33	21.07	33	21.14	33
TM3	T_{nom} (25 °C) V_{nom} (3.8 V)	21.09	33	21.10	33	21.02	33

6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.

6.3 Modulation Characteristics

6.3.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	+25 °C
Relative humidity:	47 %
Test Configurations:	TM1 and TM3 at frequency M

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 2.1047 and part 24 subpart E.

6.3.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones.

6.3.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and part 22 subpart H.

Limits

Limits	Not applicable

6.3.3 Test Method and Setup

Connect the Mobile Phone to Universal Radio Communication Tester CMU200 via the antenna connector. The band class is set as PCS; the Mobile Phone's output is matched with 50 Ω load, test method was according to ANSI/TIA-98-E. The waveform quality and constellation of the Mobile Phone were tested.

Test setup

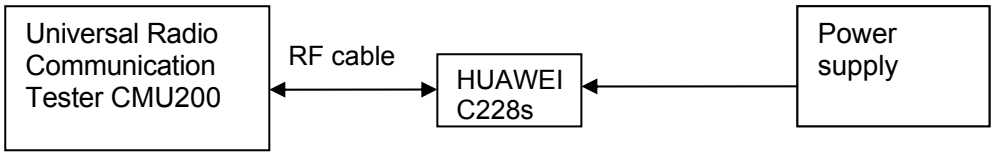


Figure 3. Test Set-up

6.3.4 Measurement Results

Measurement Results

TEST CONDITIONS		Modulation Characteristic	
		Channel 600(M) 1880.00Mhz	
		Measured	
		TM1	TM3
T_{nom} (+25 °C)	V_{nom} (3.7V)	Refer to Appendix B	Refer to Appendix B

6.3.5 Conclusion

The equipment **PASSED** the requirement of this clause.

For the measurement results refer to appendix B.

6.4 Occupied Bandwidth

6.4.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	+25 °C
Relative humidity:	55 %
Test Configurations:	TM1 and TM3 at frequency B、M、T

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 2.1049 and part 22 subpart H.

6.4.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones.

6.4.2.3 Limits

No specific occupied bandwidth requirement in part 24 subpart E, but the occupied bandwidth was defined in part 2.1049: the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

Limits

Upper /lower frequency limits	0.5% of the mean power

6.4.3 Test Method and Setup

Mobile Phone was connected to the wireless signal analyzer R&S FSU26 via the one RF connector. The band class is set as PCS; Mobile Phone was controlled to transmit maximum power. Measure and record the occupied bandwidth of the Mobile Phone by the R&S FSU26.

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

Refer to 47CFR part2.1049 section (g)&(h).
(g) Transmitter in which the modulating base band comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer’s maximum rated condition.

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudorandom generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

Measurement bandwidth (RBW): 30 kHz (Resolution bandwidth)
Video bandwidth (VBW): 100 kHz

Test Set-up

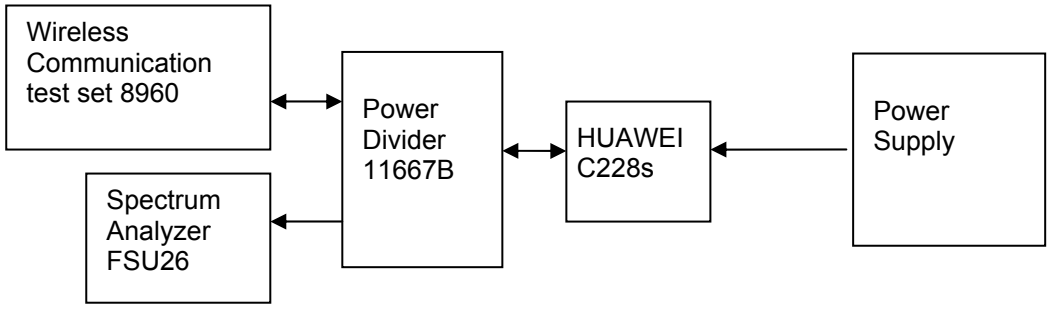


Figure 4. Test Set-up

6.4.4 Measurement Results

Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel 25 (B) 1851.25MHz		Channel 600 (M) 1880.00Mhz		Channel 1175(T) 1908.75MHz	
		Measured (MHz)		Measured (MHz)		Measured (MHz)	
		TM1	TM3	TM1	TM3	TM1	TM3
T_{nom} (+25 °C)	V_{nom} (3.7V)	1.2740	1.2660	1.2740	1.2660	1.2740	1.2660

6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix C .

6.5 Band Edges Compliance

6.5.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	+25°C
Relative humidity:	55 %
Test Configurations:	TM1 and TM3 at frequency B、T

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.5.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones.

6.5.2.3 Limits

Compliance with 24.238, all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P. (Whereas P is the rated power of the EUT).

Limits

Rated Power:	21.0 dBm
Required attenuation:	43+10log (0.125) = 34.0 , 21.0 dBm – 34.0 dB
Absolute level	- 13 dBm

6.5.3 Test Method and Setup

Mobile Phone was connected to the wireless signal analyzer R&S FSU26 via the one RF connector, the band class is set as PCS. Mobile Phone was controlled to transmit maximum power. Measure and record Band edge compliance of the Mobile Phone by the R&S FSU26.

RBW of 20 kHz (1% of 2MHz) was used up to 5MHz away from the band edge. So the FCC rules specify that RBW of 100kHz for measurements of emissions >1MHz away from the band edges ,the limit was adjusted with -13dBm to -20dBm to compensate for the reduced measurement bandwidth.

Test Set-up

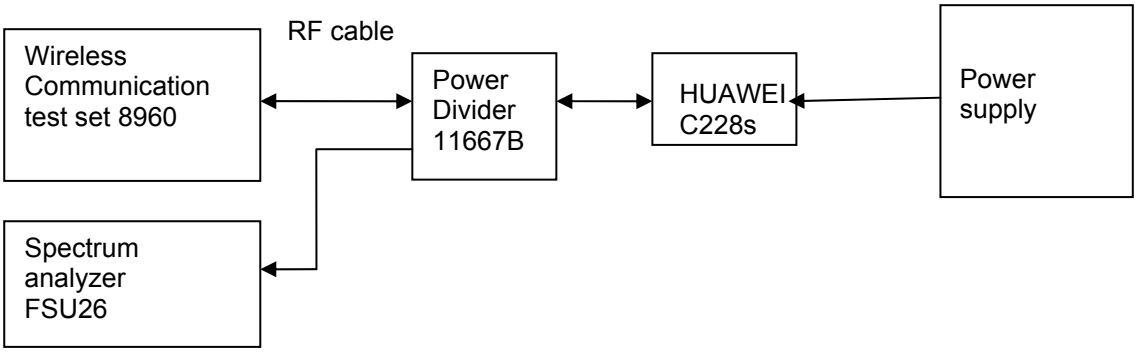


Figure 5. Test Set-up

6.5.4 Measurement Results

Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
US PCS	T_{nom} (+25 °C), V_{nom} (3.7V)						
	1850	25 (B)	TM1 & TM3	21.0	<-13(See appendix D)	- 13 dBm	Pass
	1910	1175 (T)	TM1 & TM3	21.0	<-13(See appendix D)	- 13 dBm	Pass

6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix D.

6.6 Spurious Emission at Antenna Terminal

6.6.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	+25°C
Relative humidity:	50 %
Test Configurations:	TM1 and TM3 at frequency B、M、T

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.6.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones.

6.6.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P. (Whereas P is the rated power of the EUT).

Limits

Rated Power:	21.0 dBm
Required attenuation:	43+10log (0.125) = 34.0 , 21.0 dBm – 34.0 dB
Absolute level	- 13 dBm

6.6.3 Test Method and Setup

Mobile Phone was connected to the wireless signal analyzer R&S FSU26 via the one RF connector, the band class is set as PCS. Mobile Phone was controlled to transmit maximum power.
Measure and record the Conducted Spurious Emission of the Mobile Phone by the R&S FSU26.

According to part 24.238, the defined measurement bandwidth as following:

24.238(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 1 GHz: 1MHz;
Measurement bandwidth (RBW) for 1GHz up to 20GHz: 1MHz;

Test Set-up

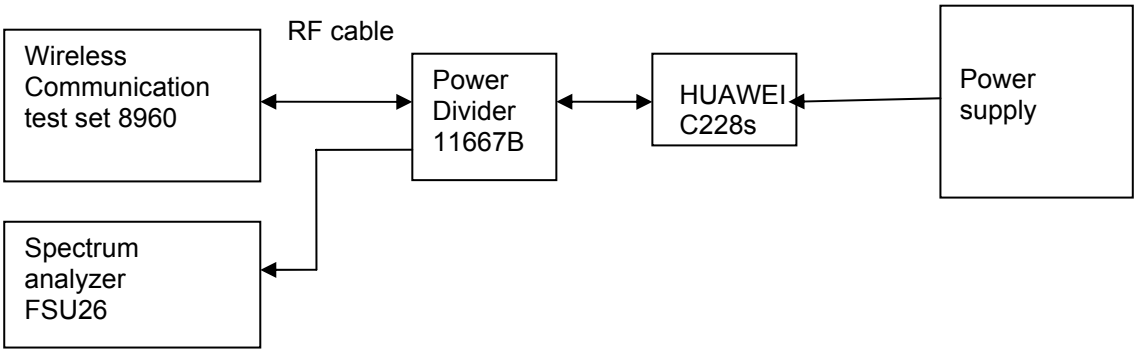


Figure 6. Test Set-up

6.6.4 Measurement Results

Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Conducted Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 25(B)	TM1	9 kHz ~20GHz	21.1	<- 13 dBm (See appendix E)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	21.0	<- 13 dBm (See appendix E)	- 13 dBm	Pass
Channel 600(M)	TM1	9 kHz ~20GHz	21.0	<- 13 dBm (See appendix E)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	21.1	<- 13 dBm (See appendix E)	- 13 dBm	Pass
Channel 1175(T)	TM1	9 kHz ~20GHz	21.0	<- 13 dBm (See appendix E)	- 13 dBm	Pass
	TM3	9 kHz ~20GHz	21.1	<- 13 dBm (See appendix E)	- 13 dBm	Pass

6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix E.

6.7 Radiated Spurious Emission

6.7.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	+25 °C
Relative humidity:	53 %
Test Configurations:	TM1 at frequency M

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 2.1053 and part 24.238

6.7.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones.

6.7.2.3 Limits

Compliance with 24.238, all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P. (Whereas P is the rated power of the EUT).

Limits

Rated Power:	21.0 dBm (0.125W)
Required attenuation:	43 +10 $\log_{10}$ (0.125W) = 34.0 dB
Absolute level	21.0 dBm – 34.0 dB= - 13 dBm

6.7.3 Test Method and Setup

(a) Measurements were made to detect spurious emissions radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data were supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph 2.1049(c) as appropriate. For equipment operating on frequencies below 890 MHz, an Open Field Test is normally required with the measuring instrument antenna located in the far field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurement will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections, which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with the reference to the

rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.
(b) Measurements specified in paragraph (a) of this section shall be made for the following equipment:
(1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.
(2) All equipment operating on frequencies higher than 25 MHz
(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
(4) Other types of equipment as required, when deemed necessary by the Commission.

CDMA 1X Digital Mobile Phone HUAWEI C228s is equipment with non-integral antenna. And it should test according to part (b) of above section.

BTS simulator is connected to a communication antenna, by which communicate with the CDMA 1X Digital Mobile Phone HUAWEI C228s inside the test site. The BTS simulator controls the Mobile Phone to transmit at maximum power which defined in specification of product when in traffic mode, field strength of spurious emission in idle mode were also tested. The CDMA 1X Digital Mobile Phone HUAWEI C228s operates on a typical channel.

The test procedure:

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, ERP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the Mobile Phone to the BTS simulator via the air interface. The band class is set as PCS.
(b) Test the Radiated maximum output power by the Rohde and Schwarz ESMI Test Receiver from test antenna.
(c) Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step (b) on ESMI Test Receiver, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

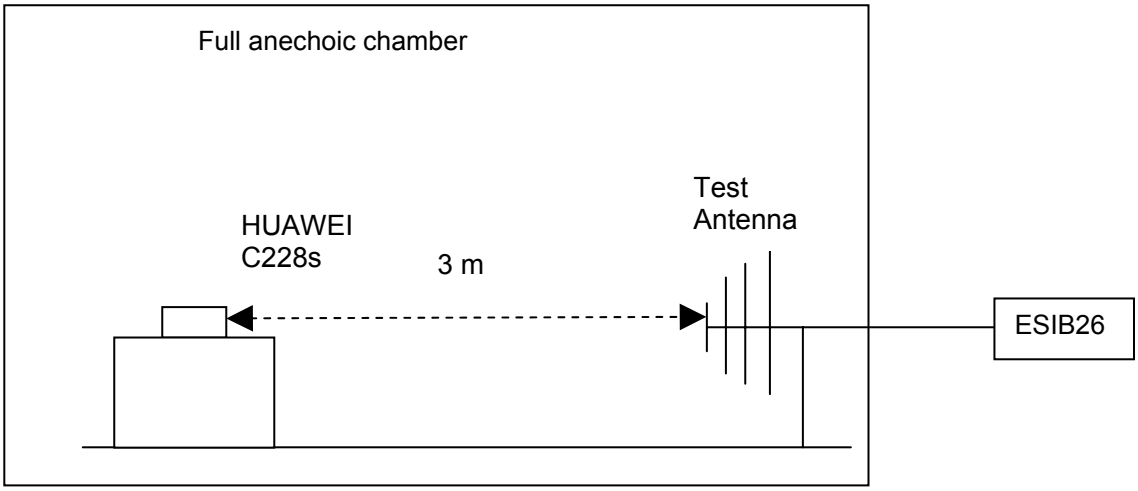
According to part 24.238, the defined measurement bandwidth as following:

24.238(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 1 GHz: 100 kHz;
Measurement bandwidth (RBW) for 1GHz up to 26.5 GHz: 1MHz;

Test setup

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP

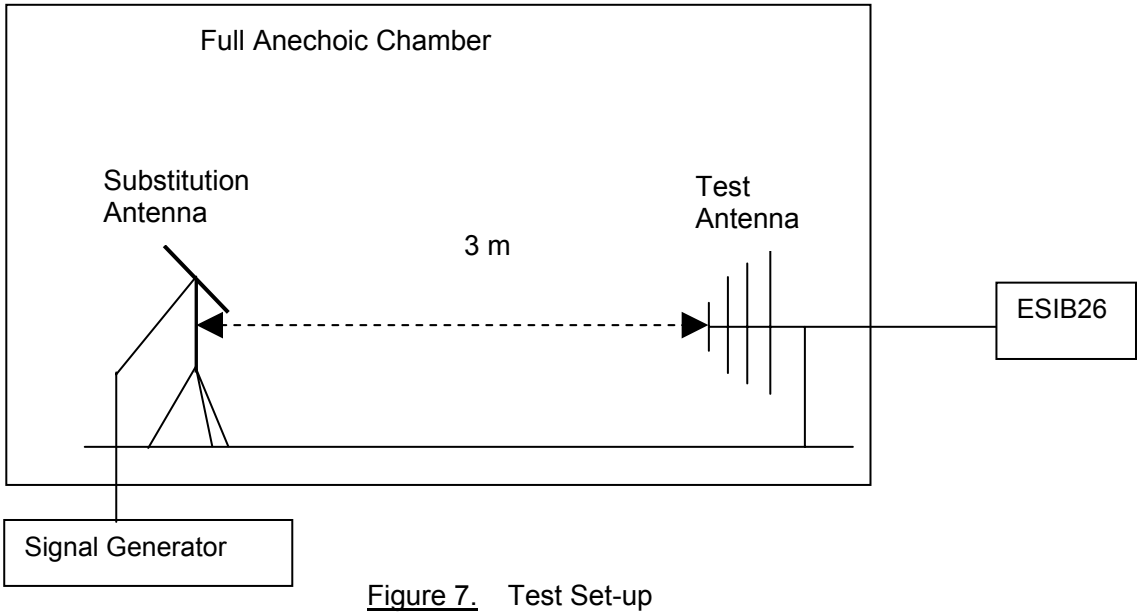


Figure 7. Test Set-up

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

6.7.4 Measurement Results

6.7.4.1 Pre-test Measurement Results

Measurement Results

Channel Number	Test Range (Frequency)	Rated Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
600	9 kHz ~26.5GHz	21.0	<- 13 dBm (See appendix F)	- 13 dBm	Pass

6.7.4.2 Substitution Results

No peak found in pre- test. All test results of spurious emissions were attenuated more than 20 dB below the permissible value.

Calculation Sample:

Substitution Results

Freq. [MHz]	Measurement Value [dBm]	Substitution Antenna Type	Gain [dBd]	Cable Loss [dB]	Signal Generator Level [dBm]	Substitution Level [dBm]	FCC limit [dBm]	Result

Note: For get the ERP (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

ERP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBd]

NOTE: SGP- Signal Generator Level

6.7.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix F.

6.8 Frequency Stability

6.8.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 % at 25 °C
Test Configurations:	TM1 and TM3 at frequency M

6.8.2 Test Specifications and Limits

6.8.2.1 Specification

CFR 47 (FCC) part 2.1055 and part 24.235

6.8.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Phones.

6.8.2.3 Limits

No specific frequency stability requirement in part 2.1055 and part 24.235.

6.8.3 Test Method and Setup

The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From –30 ° to +50 ° centigrade for all equipment except that specified in subparagraphs
(2) and (3) of paragraph 2.1055

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10^{o} centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.
(e) When deemed necessary, the Commission may require tests of frequency stability under conditions

in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

Test Set up

Connect the Mobile Phone to the Wireless Communication test set 8960 via the connector. Then measure the frequency error by the Wireless Communication test set 8960. The Mobile Phone's output is matched with a 50 Ω load.

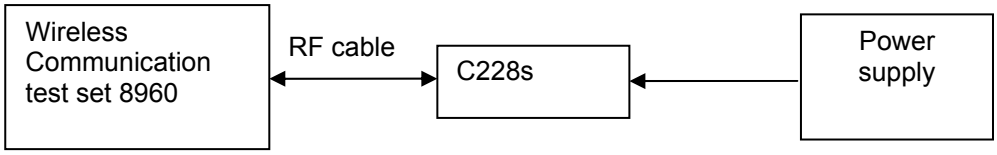


Figure 8. Test Set up

6.8.4 Measurement Results

6.8.4.1 Measurement Results vs. Variation of Temperature

- TM1, 3.7V DC Channel No.**600(1880.00MHz)**

Measurement Results vs. Variation of Temperature—TM1

Temperature	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	21.1	1880.0	5.7	Pass
-20 °C	21.2	1880.0	0.3	Pass
-10 °C	21.0	1880.0	2.4	Pass
0 °C	21.1	1880.0	-3.5	Pass
+10 °C	21.0	1880.0	12.0	Pass
+20 °C	21.0	1880.0	-3.6	Pass
+30 °C	21.0	1880.0	0.1	Pass
+40 °C	21.0	1880.0	7.2	Pass
+50 °C	20.9	1880.0	-10.2	Pass

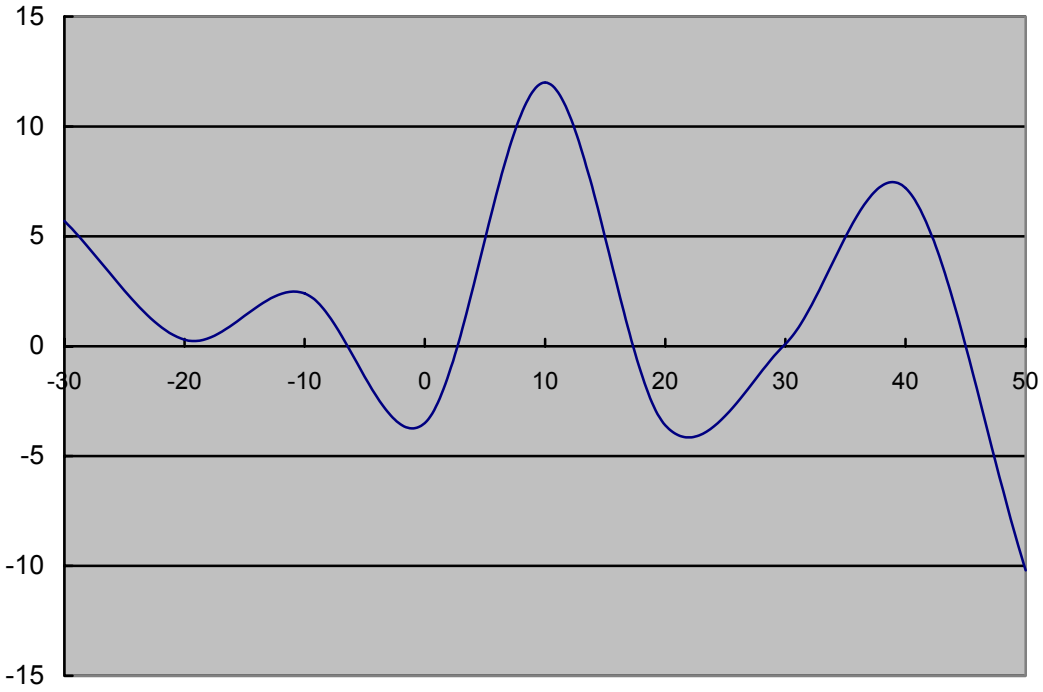


Figure 9. TM1 Test Graph

- TM3, 3.7V DC Channel No.**600(1880.00MHz)**

Measurement Results vs. Variation of Temperature—TM3

Temperature	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	21.0	1880.0	-0.6	Pass
-20 °C	21.0	1880.0	9.1	Pass
-10 °C	21.0	1880.0	3.1	Pass
0 °C	20.9	1880.0	6.5	Pass
+10 °C	21.0	1880.0	-1.8	Pass
+20 °C	21.0	1880.0	-15.6	Pass
+30 °C	21.1	1880.0	-7.4	Pass
+40 °C	20.9	1880.0	5.9	Pass
+50 °C	21.0	1880.0	1.2	Pass

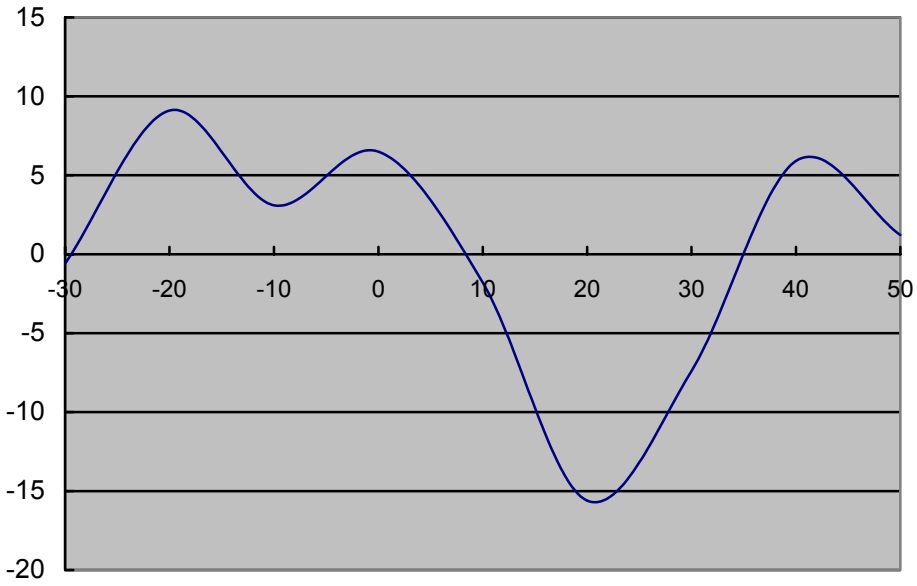


Figure 10. TM3 Test Graph

6.8.4.2 Measurement Results vs. Variation of Voltage

- TM1, 25 °C ,Channel No. **600(1880.00MHz)**

Measurement Results vs. Variation of Voltage—TM1

Voltage	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.4	21.0	1880.0	-15.6	Pass
3.7	21.0	1880.0	6.5	Pass
4.2	21.1	1880.0	14.2	Pass

- TM3, 25 °C ,Channel No. **600(1880.00MHz)**

Measurement Results vs. Variation of Voltage—TM3

Voltage	Conducted Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.4	21.0	1880.0	7.6	Pass
3.7	20.9	1880.0	5.5	Pass
4.2	21.0	1880.0	-5.7	Pass

6.8.5 Conclusion

The equipment **PASSED** the requirement of this clause.

7 EMC Test

7.1 Conducted Emission at Power Port

7.1.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	+25°C
Relative humidity:	52 %
Test Configurations:	TM1 at frequency M

7.1.2 Test Specifications and Limits

7.1.2.1 Specification

CFR 47 (FCC) part 15.107

7.1.2.2 Supporting Standards

Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

7.1.2.3 Limits

Compliance with part 15.107, conducted emission must meet the requirement of following table.

Limits

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: * Decreases with the logarithm of the frequency.

7.1.3 Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

CDMA 1X Digital Mobile Phone HUAWEI C228s was communicated with the BTS simulator through Air interface, the BTS simulator controls the HUAWEI C228s to transmitter the maximum power which defined in specification of product. The Mobile Phone operated on the typical channel.

Measurement bandwidth (RBW) for 150kz to 30 MHz: 9 kHz;

Test Set-up

The Mobile Phone was setup in the screened chamber and operated under nominal conditions.

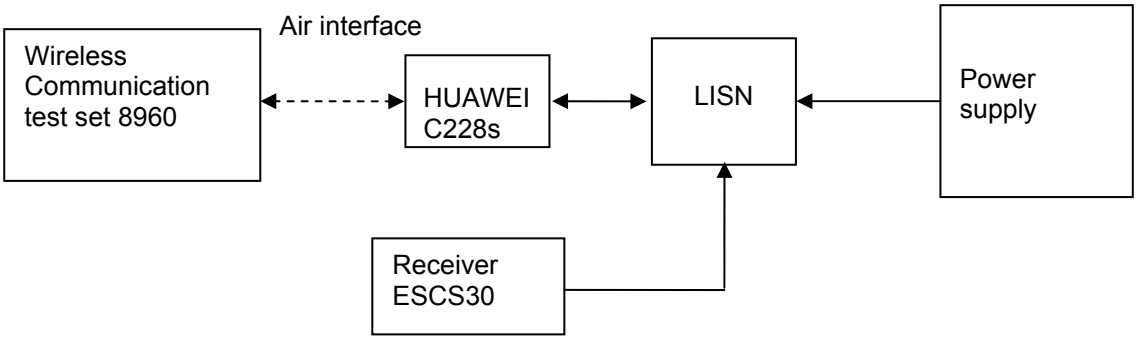


Figure 11. Test Set-up

7.1.4 Measurement Results

MEASUREMENT RESULT:QP DECTER

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.343500	45.80	10.2	59	13.2	L3	FLO
0.460500	48.50	10.0	57	8.5	L3	FLO
0.964500	42.40	9.9	56	13.6	L3	FLO
2.247000	39.50	10.1	56	16.5	L3	FLO
5.397000	35.00	10.1	60	25.0	L3	FLO
22.308000	31.10	15.0	60	28.9	L3	FLO

MEASUREMENT RESULT:AV DECTER

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.330000	35.00	10.2	49	14.0	L3	FLO
0.451500	37.40	10.0	47	9.6	L3	FLO
0.960000	30.70	9.9	46	15.3	L3	FLO
2.287500	27.70	10.1	46	18.3	L3	FLO
5.523000	24.20	10.2	50	25.8	L3	FLO
24.036000	17.60	15.2	50	32.4	N	FLO

7.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix G.

7.2 Radiated Emission of Enclosure in Idle Mode

7.2.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	+25 °C
Relative humidity:	51 %
Test Configurations:	TM1 at frequency M

7.2.2 Test Specifications and Limits

7.2.2.1 Specification

CFR 47 (FCC) part 15.109

7.2.2.2 Supporting Standards

Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

7.2.2.3 Limits

The Radiated Emission of enclosure of EUT should compliance with the requirement of part15.109. The limit showed in following table.

Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit(μ v/m)	Unit(dB μ V/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
960-1000	500	54

7.2.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The test distance was 3m.The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.The Radiated Disturbance measurements were made using a Rohde and Schwarz ESMI Test Receiver and control software ES-K1.
A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using a Quasi-Peak Detector. The maximal emission

value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0°to 360°, The receive antenna has two polarizations V and H.

CDMA 1X Digital Mobile Phone HUAWEI C228s was communicated with the BTS simulator through Air interface. The mobile phone operated on the typical channel and the Mobile Phone worked in idle mode, transmitter was not work in this test.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 k Hz

Test set up

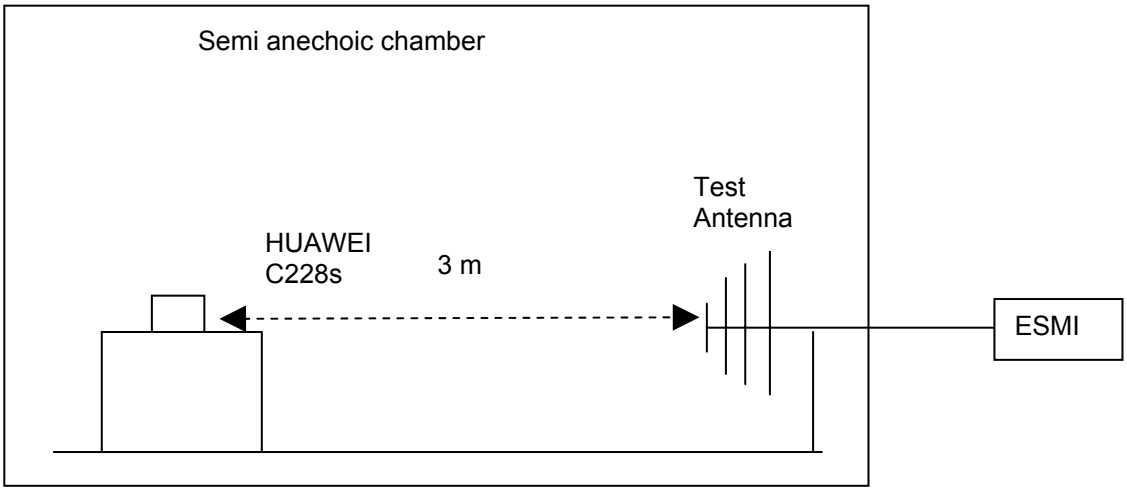


Figure 12. Test set up

7.2.4 Measurement Results

MEASUREMENT RESULT: QP DECTER

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
41.700000	32.80	-10.6	40.0	7.2	105.0	336.00	VERTICAL
45.180000	30.90	-12.2	40.0	9.1	105.0	225.00	VERTICAL
130.800000	29.00	-10.0	43.5	14.5	237.0	0.00	HORIZONTAL
236.760000	27.30	-9.5	46.0	18.7	154.0	227.00	HORIZONTAL
548.700000	26.70	-1.7	46.0	19.3	112.0	132.00	VERTICAL
979.500000	29.70	2.3	54.0	24.3	105.0	124.00	VERTICAL

7.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix H.

8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

System Measurement Uncertainty

Items		Extended Uncertainty
Effective Radiated Power of Transmitter	ERP(dBm)	U=3dB; k=2
Band Width	Magnitude (%)	U＝0.2%; k=2
Band Edge Compliance	Disturbance Power （dBm）	U＝2.0dB; k=2
Conducted Spurious Emission at Antenna Terminal	Disturbance Power （dBm）	U＝2.0dB; k=2
Frequency Stability	Frequency Accuracy(ppm)	U＝0.21ppm; k=2
Field Strength of Spurious Radiation	ERP(dBm)	U=2.2dB; k=2.2
Conducted Output Power	Power(dBm)	U=0.39dB; k=2
Conducted Emission at Power Port	Disturbance Voltage （dBμV）	U=4dB; k=2
Radiated Emission of enclosure at ideal mode	Field strength （dBμV/m）	U=5dB; k=2.2

9 Appendixes

Appendix A	Measurement Results Effective Radiated Power of Transmitter	7 pages
Appendix B	Measurement Results Modulation Characteristics	3 pages
Appendix C	Measurement Results Occupied Bandwidth	7 pages
Appendix D	Measurement Results Band Edges	5 pages
Appendix E	Measurement Results Spurious Emission at Antenna Terminal	19 pages
Appendix F	Measurement Results Radiated Spurious Emission	5pages
Appendix G	Measurement Results Conducted Emission at Power Port	2 pages
Appendix H	Measurement Results Radiated Emission of Enclosure at Ideal Mode	2 pages
Appendix I	Photos of Test Setup	4 pages

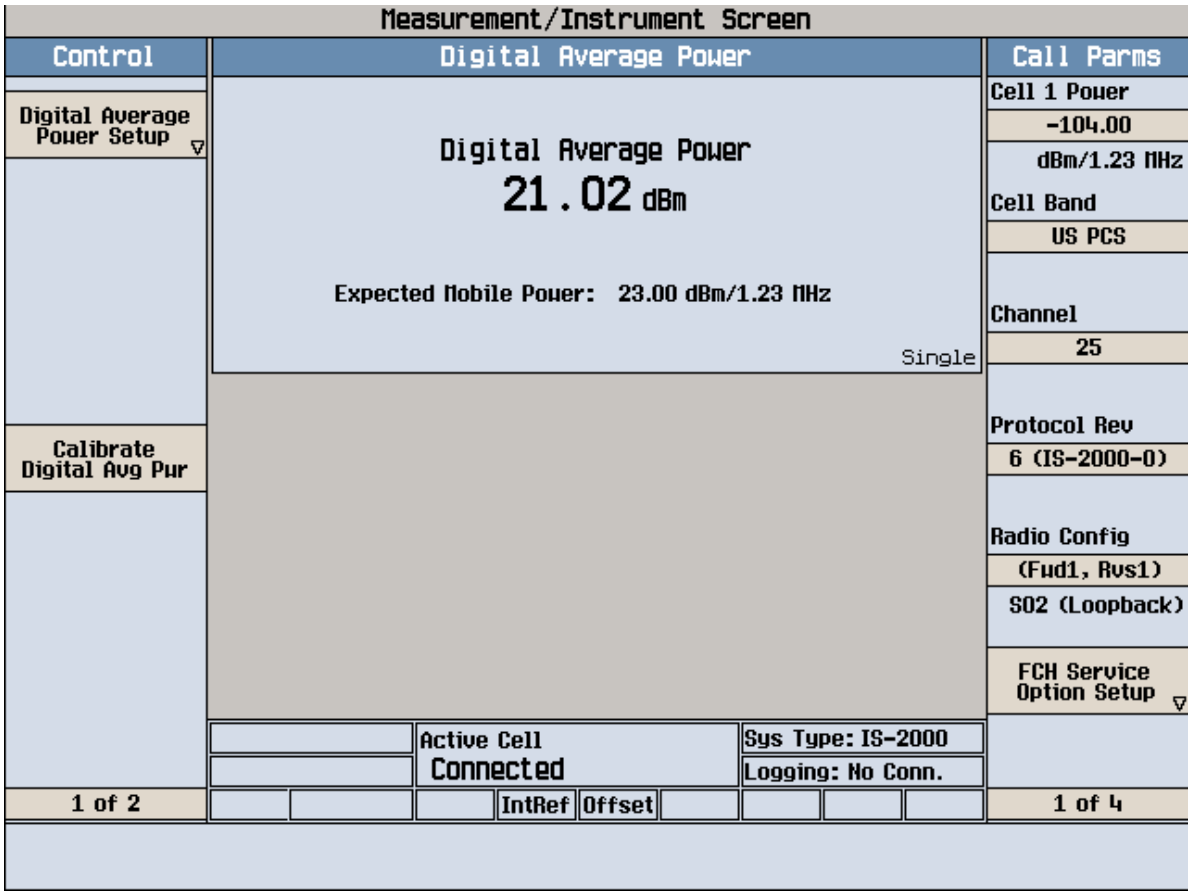
Appendix A

Effective Isotropically Radiated Power of Transmitter

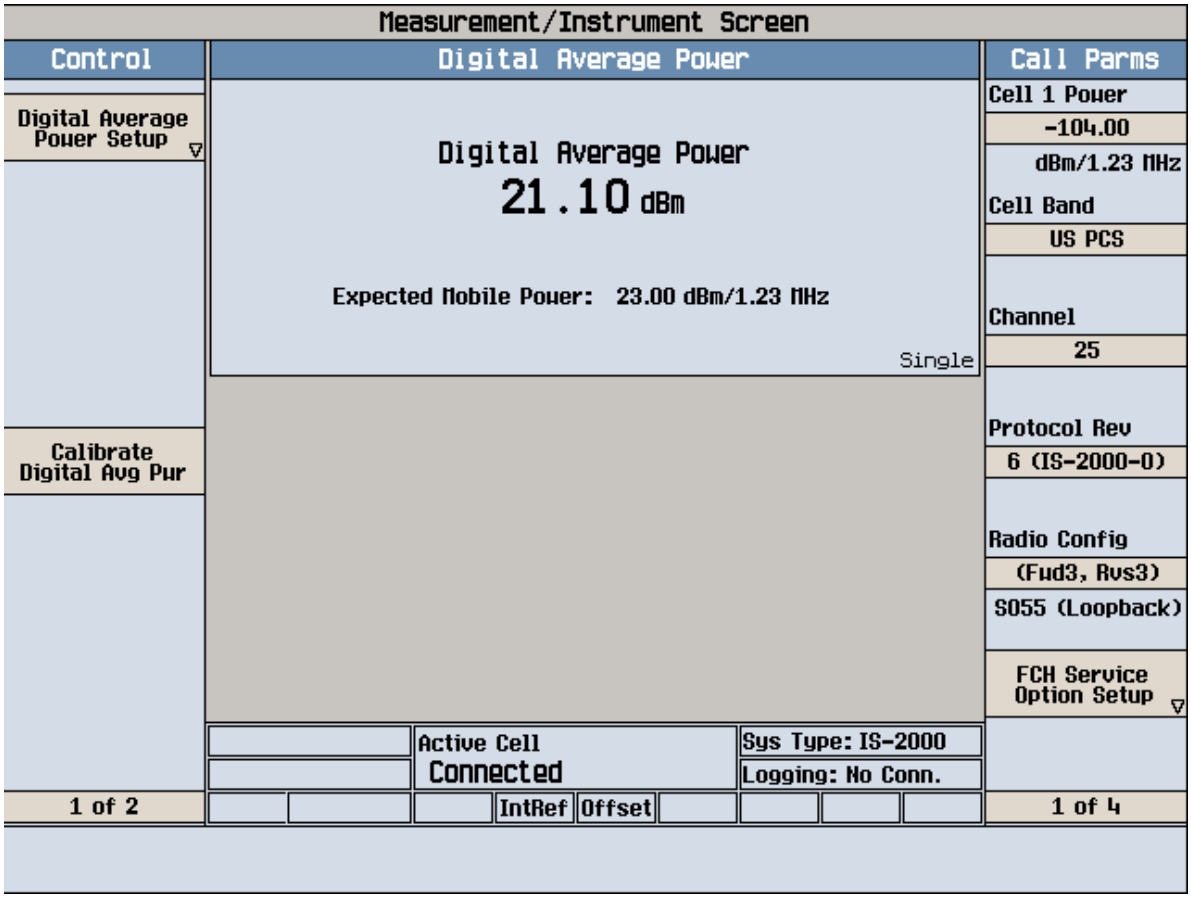
According to FCC Part 2.1046 & 24.232

Channel 25

TM1:

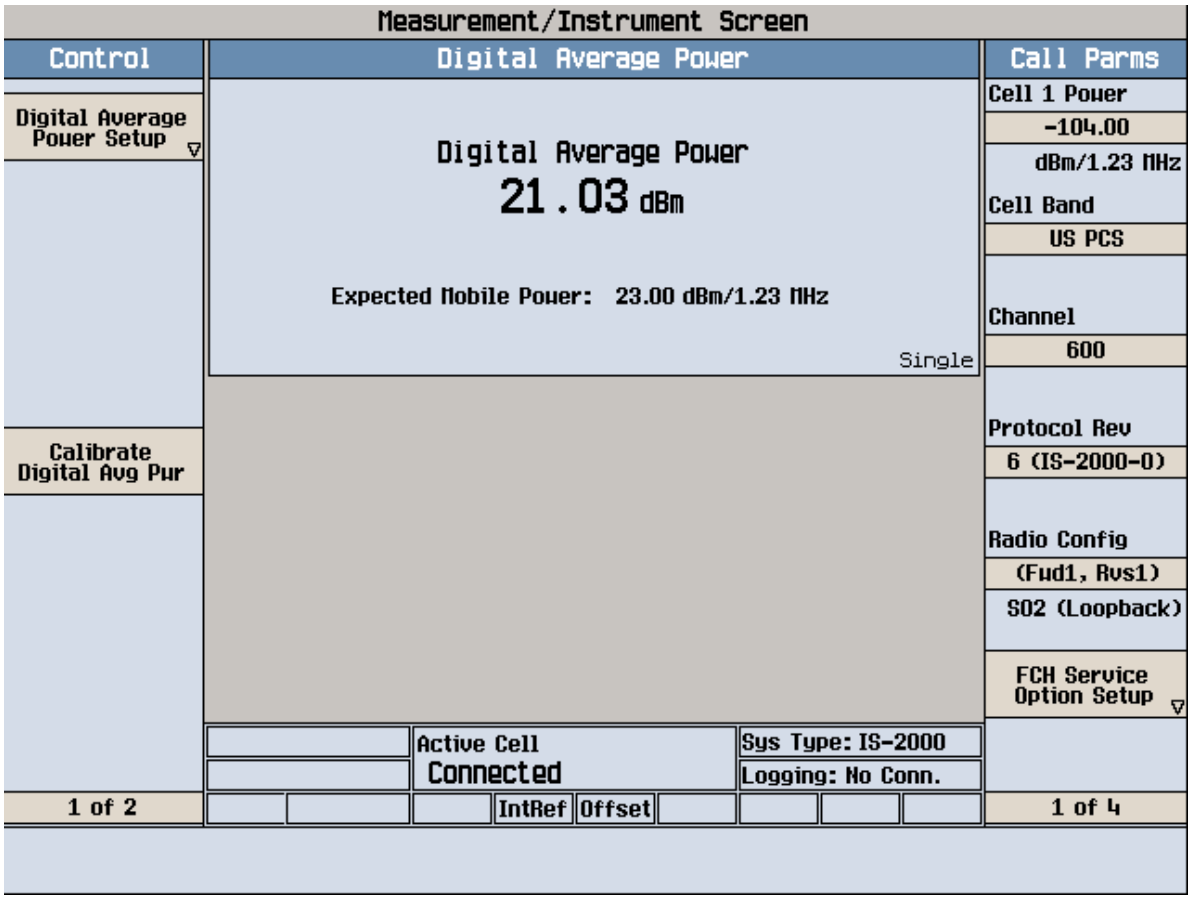


TM3:

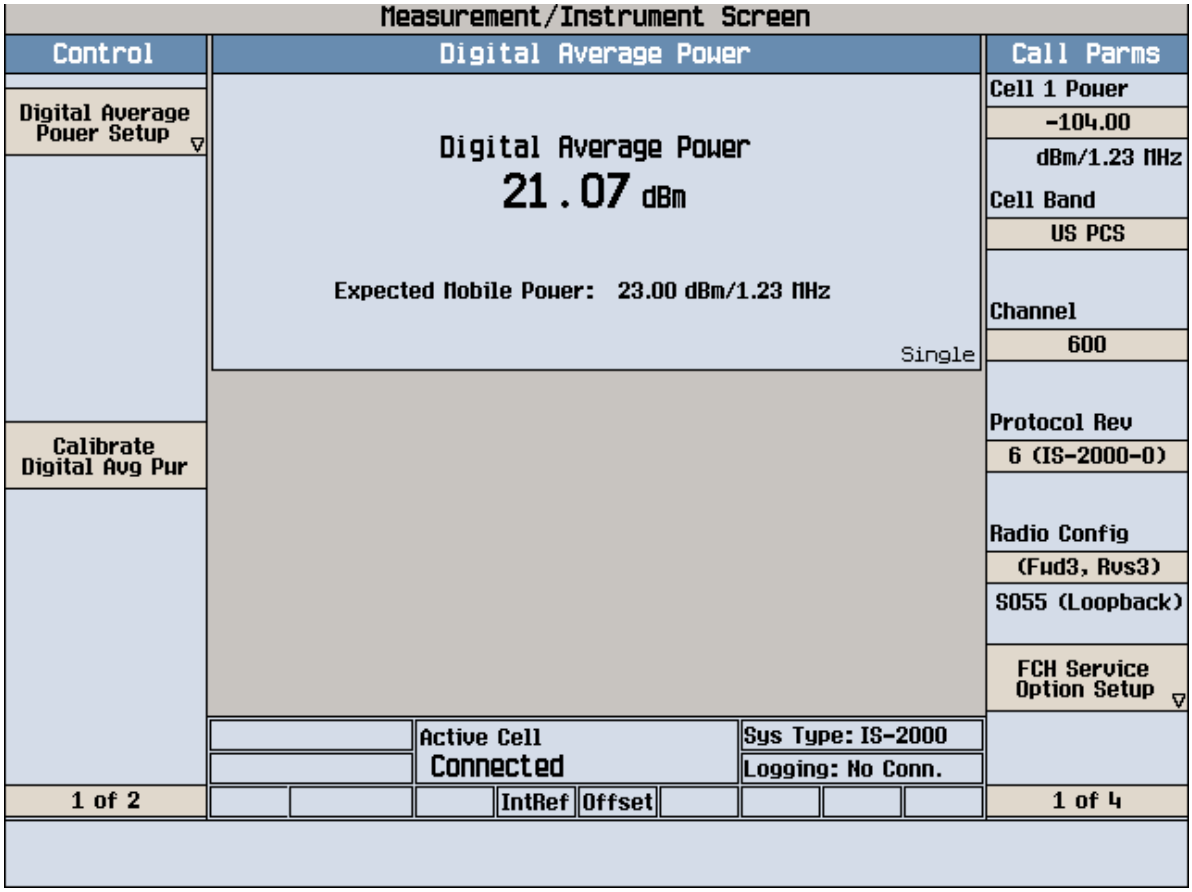

Measurement/Instrument Screen
Control
Digital Average Power
Call Parms
Digital Average Power Setup
Digital Average Power
21.10 dBm
Expected Mobile Power: 23.00 dBm/1.23 MHz
Single
Cell 1 Power
-104.00
dBm/1.23 MHz
Cell Band
US PCS
Channel
25
Protocol Rev
6 (IS-2000-0)
Calibrate Digital Avg Pwr
Radio Config
(Fwd3, Rvs3)
S055 (Loopback)
FCH Service Option Setup
Active Cell
Connected
Sys Type: IS-2000
Logging: No Conn.
1 of 2
IntRef
Offset
1 of 4

Channel 600

TM1:

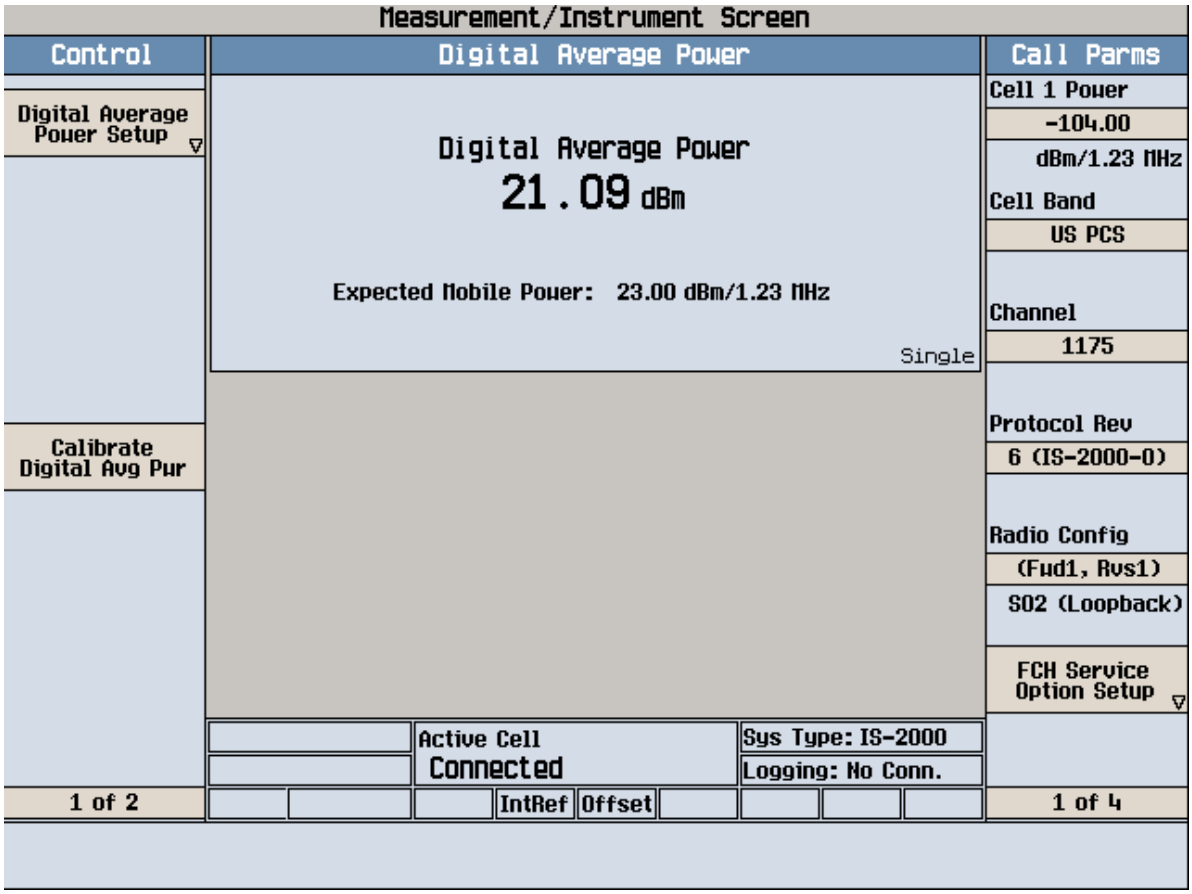


TM3:

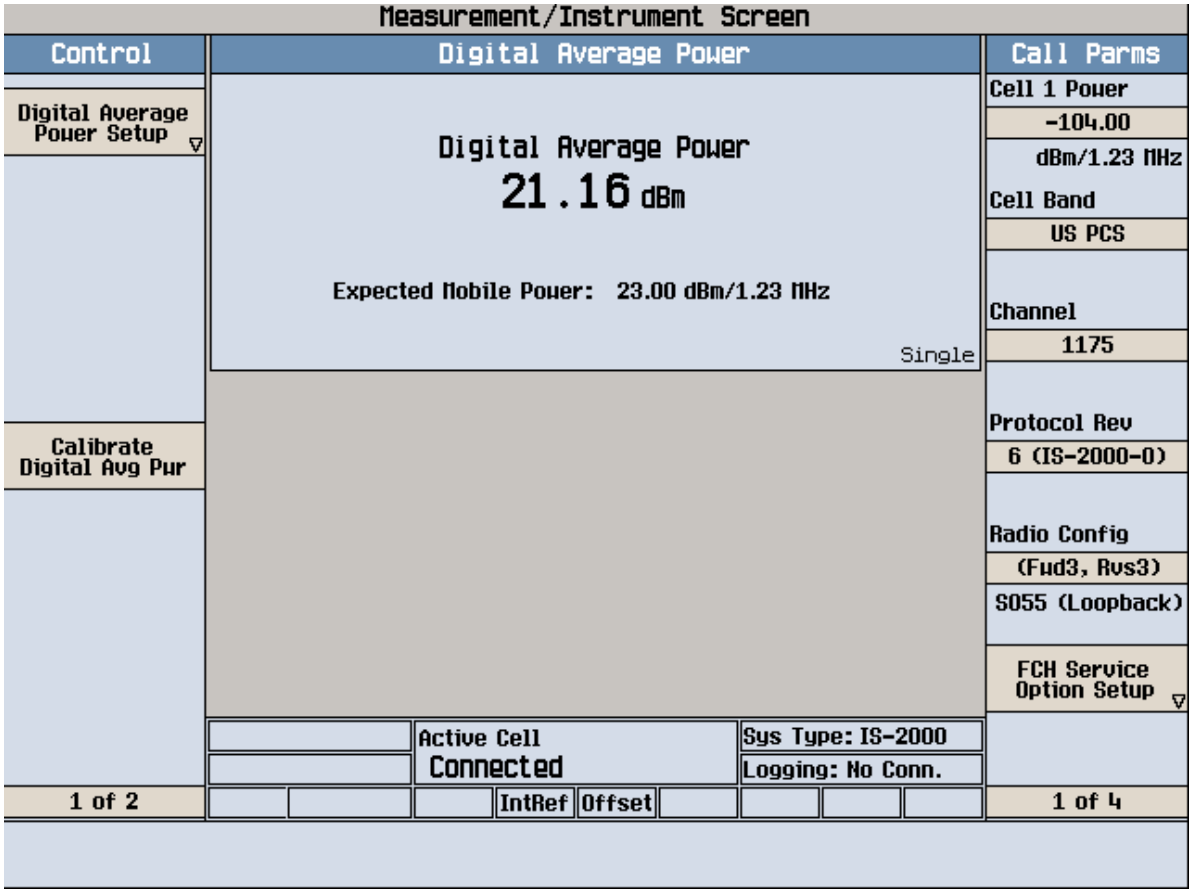

Measurement/Instrument Screen
Control
Digital Average Power
Call Parms
Digital Average Power Setup
Digital Average Power
21.07 dBm
Expected Mobile Power: 23.00 dBm/1.23 MHz
Single
Cell 1 Power
-104.00
dBm/1.23 MHz
Cell Band
US PCS
Channel
600
Protocol Rev
6 (IS-2000-0)
Radio Config
(Fwd3, Rvs3)
S055 (Loopback)
FCH Service Option Setup
Calibrate Digital Avg Pwr
Active Cell
Connected
Sys Type: IS-2000
Logging: No Conn.
IntRef
Offset
1 of 2
1 of 4

Channel 1175

TM1:



TM3:

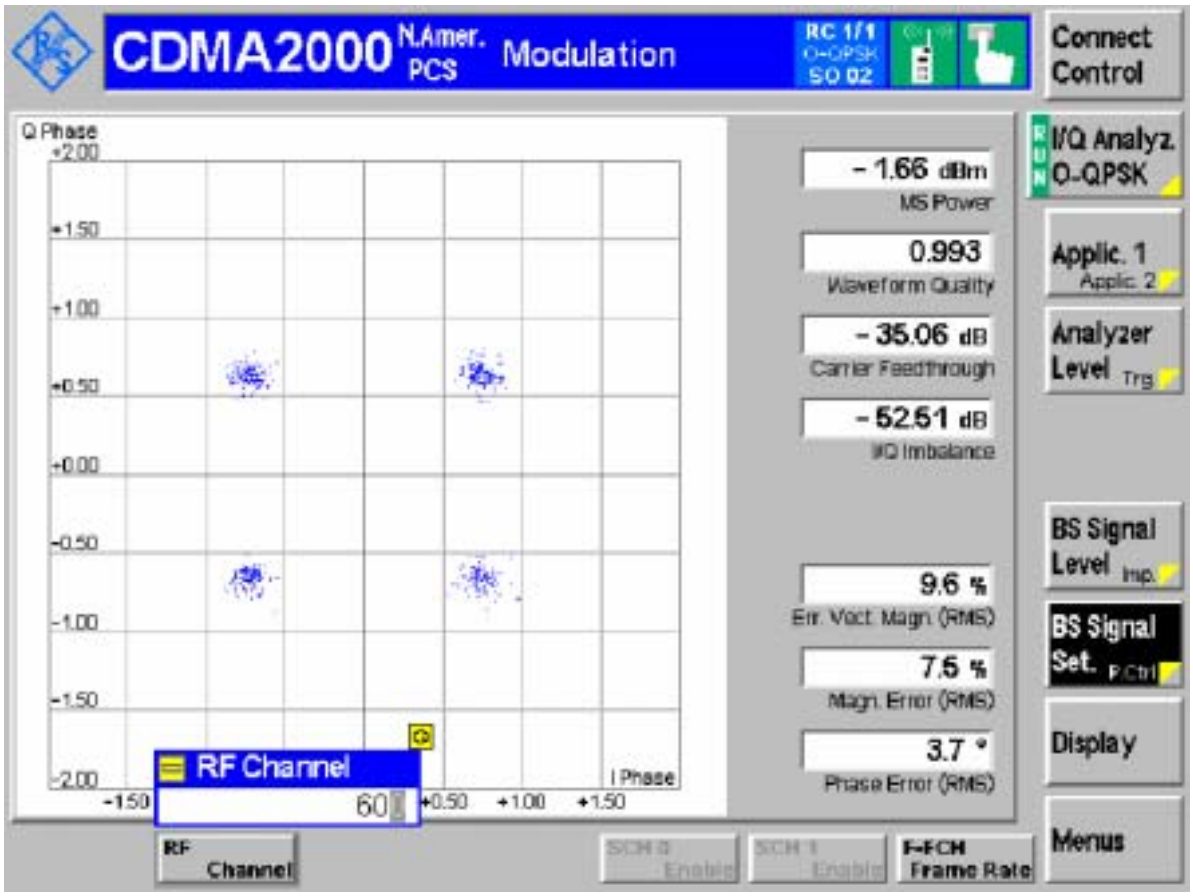

Measurement/Instrument Screen
Control
Digital Average Power
Call Parms
Digital Average Power Setup
Digital Average Power
21.16 dBm
Expected Mobile Power: 23.00 dBm/1.23 MHz
Single
Cell 1 Power
-104.00
dBm/1.23 MHz
Cell Band
US PCS
Channel
1175
Protocol Rev
6 (IS-2000-0)
Radio Config
(Fwd3, Rvs3)
S055 (Loopback)
FCH Service Option Setup
Calibrate Digital Avg Pwr
Active Cell
Connected
Sys Type: IS-2000
Logging: No Conn.
IntRef
Offset
1 of 2
1 of 4

Appendix B

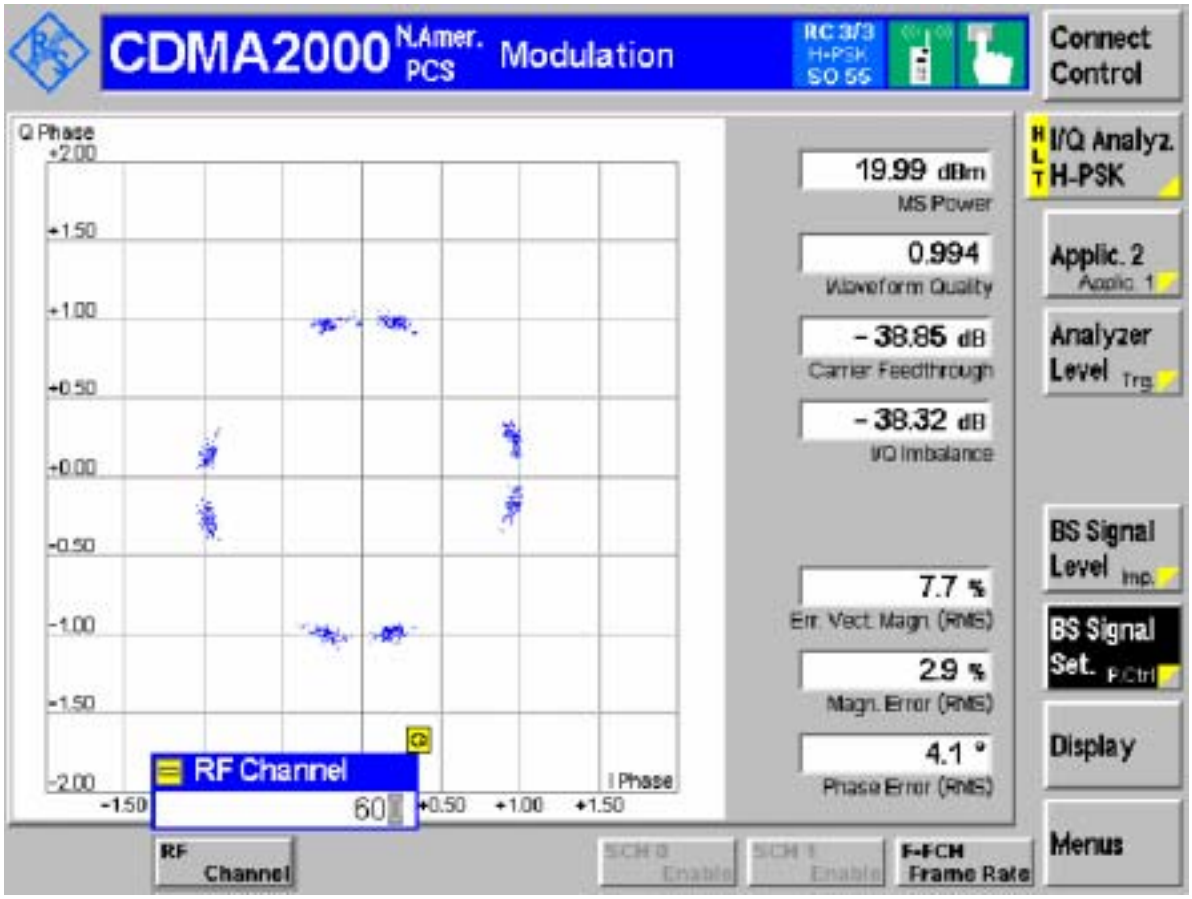
Modulation Characteristics

According to FCC Part 2.1047 & Part24 Subpart E

Channel 600（TM1）



Channel 600（TM3）

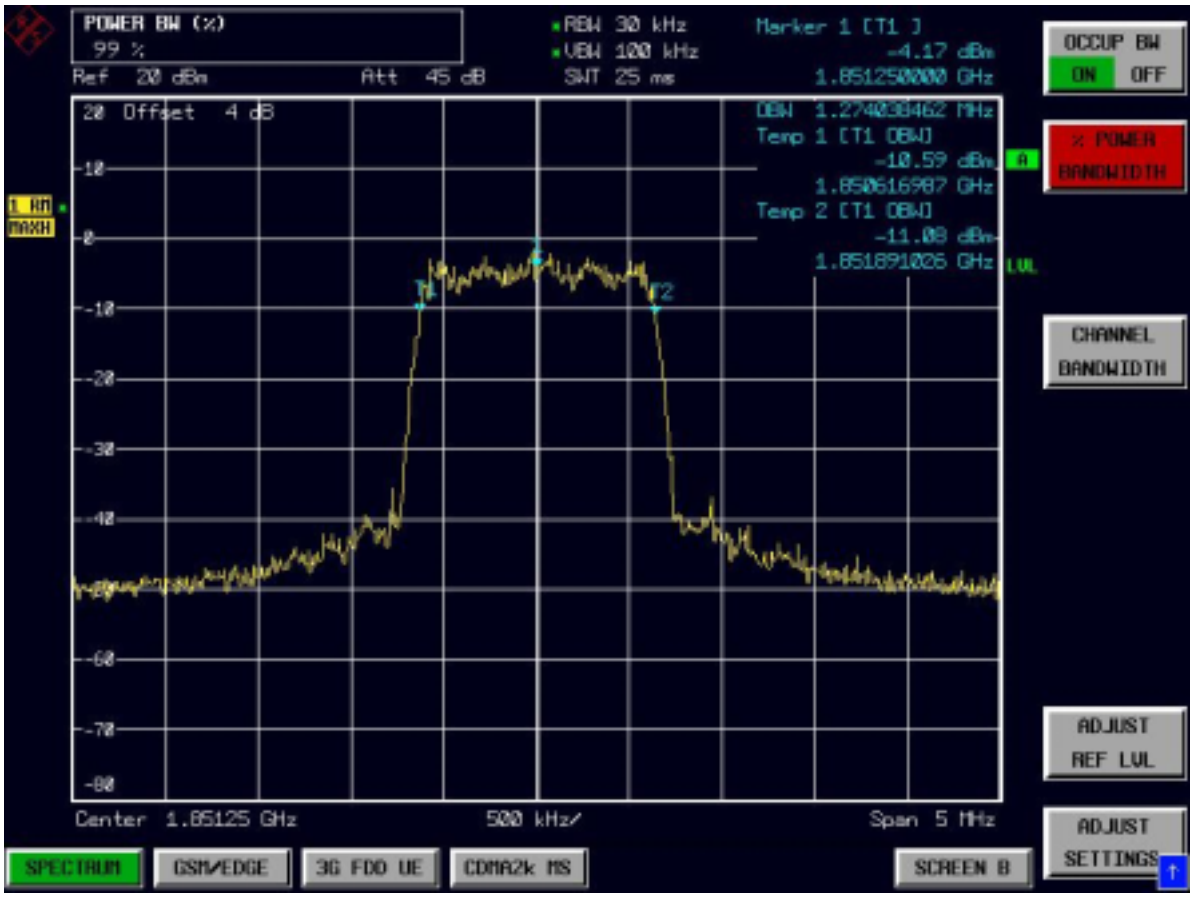


Appendix C

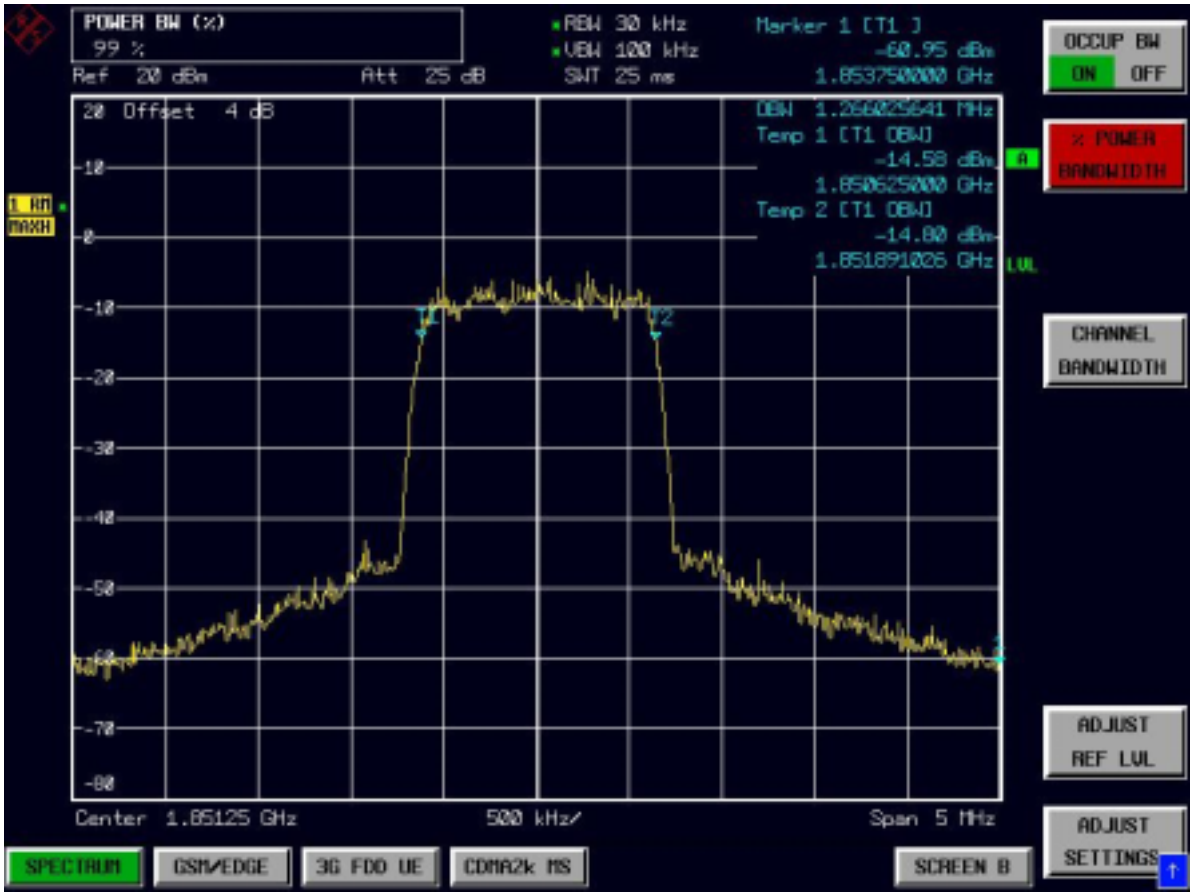
Occupied Bandwidth

According to FCC Part 2.1049 & Part 24 Subpart E

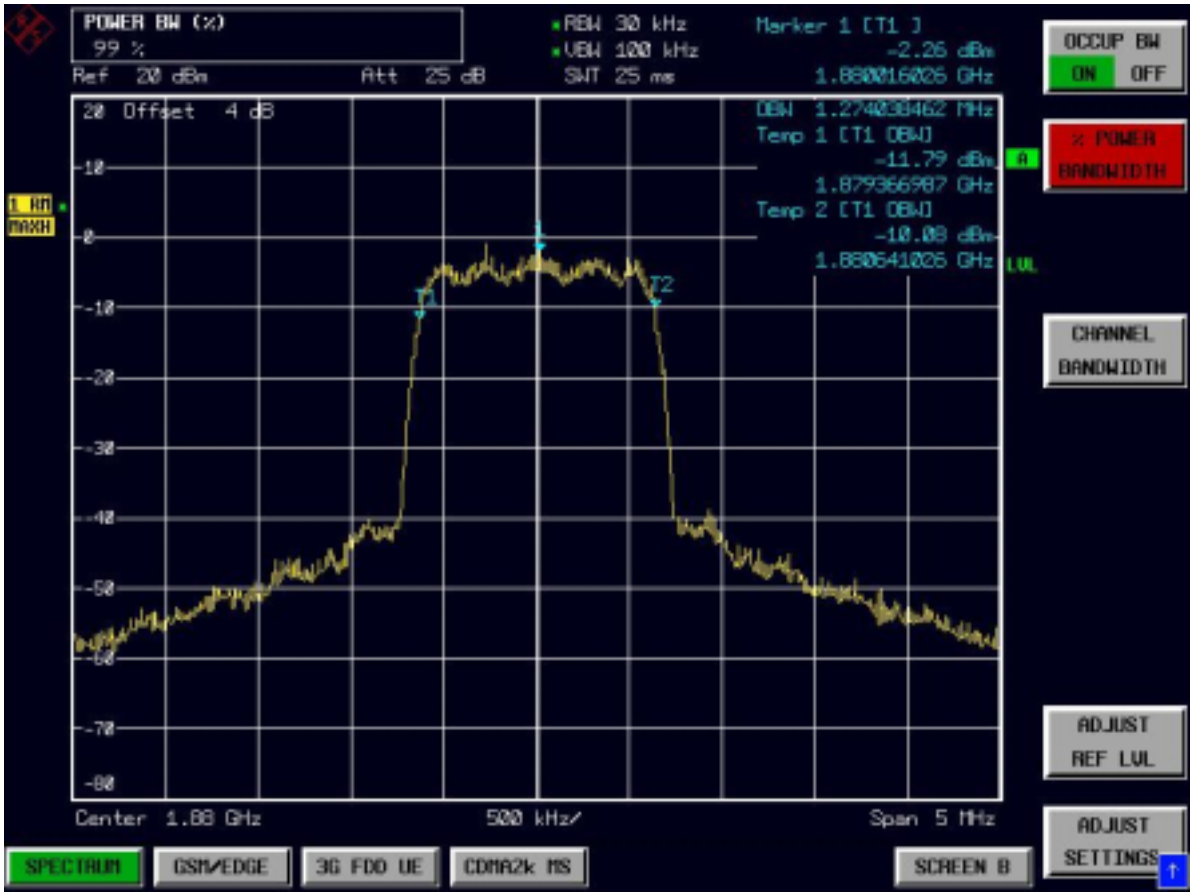
Channel 25（TM1）



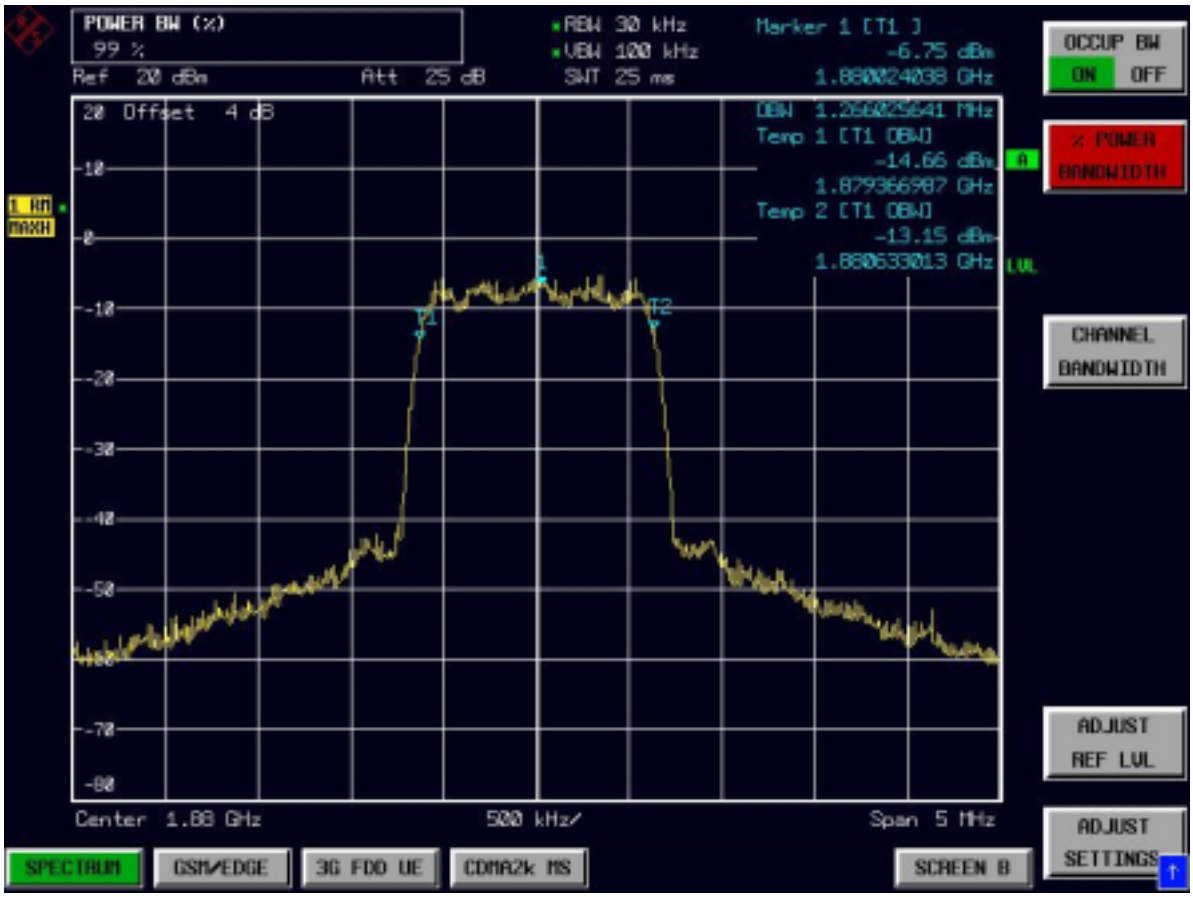
Channel 25（TM3）



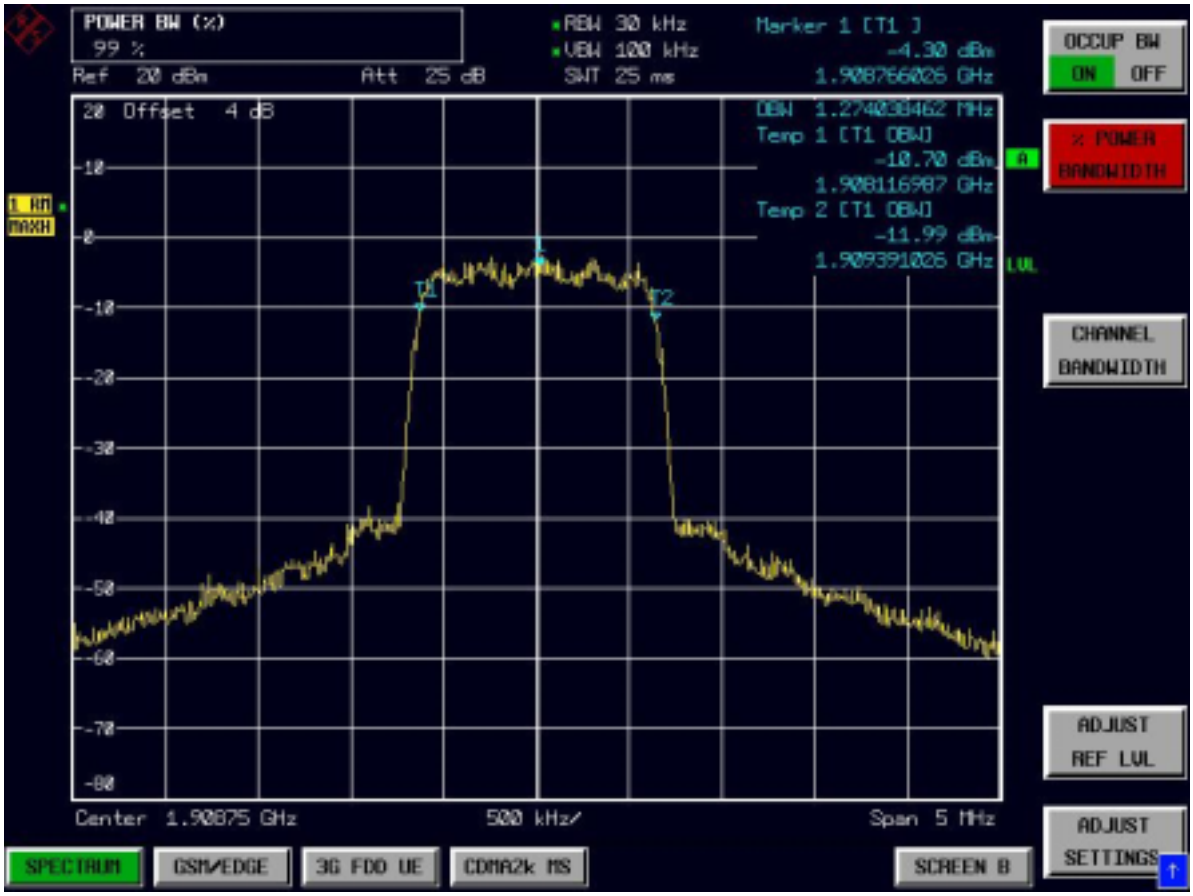
Channel 600（TM1）



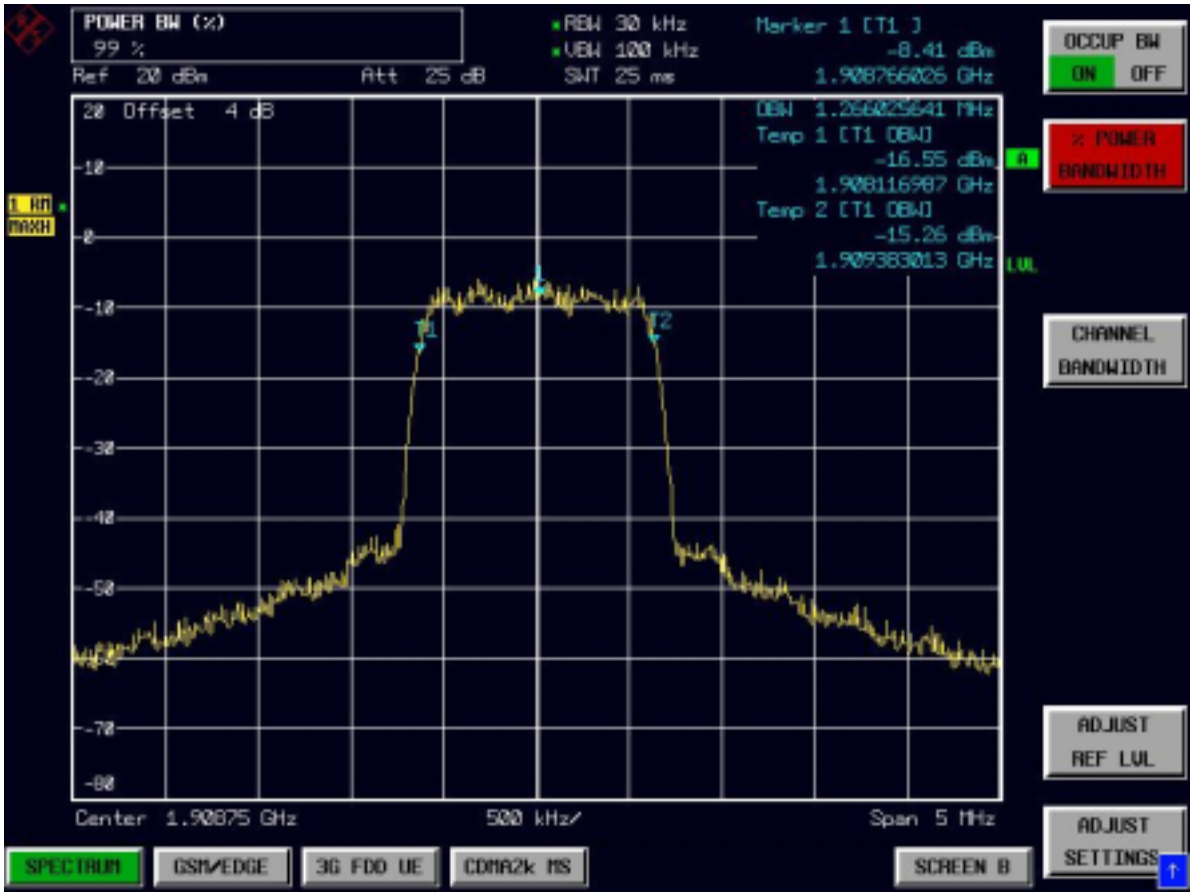
Channel 600（TM3）



Channel 1175（TM1）



Channel 1175（TM3）



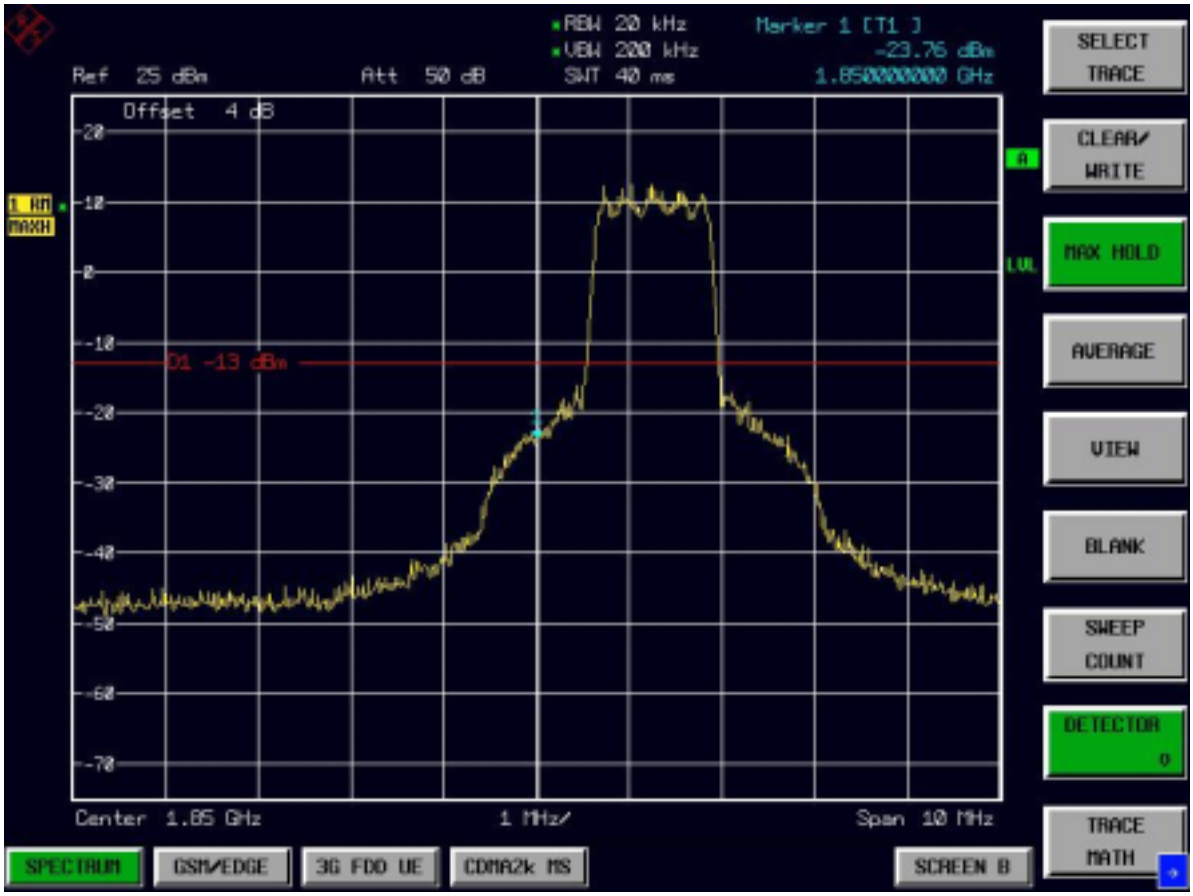
Appendix D

Band Edges Compliance

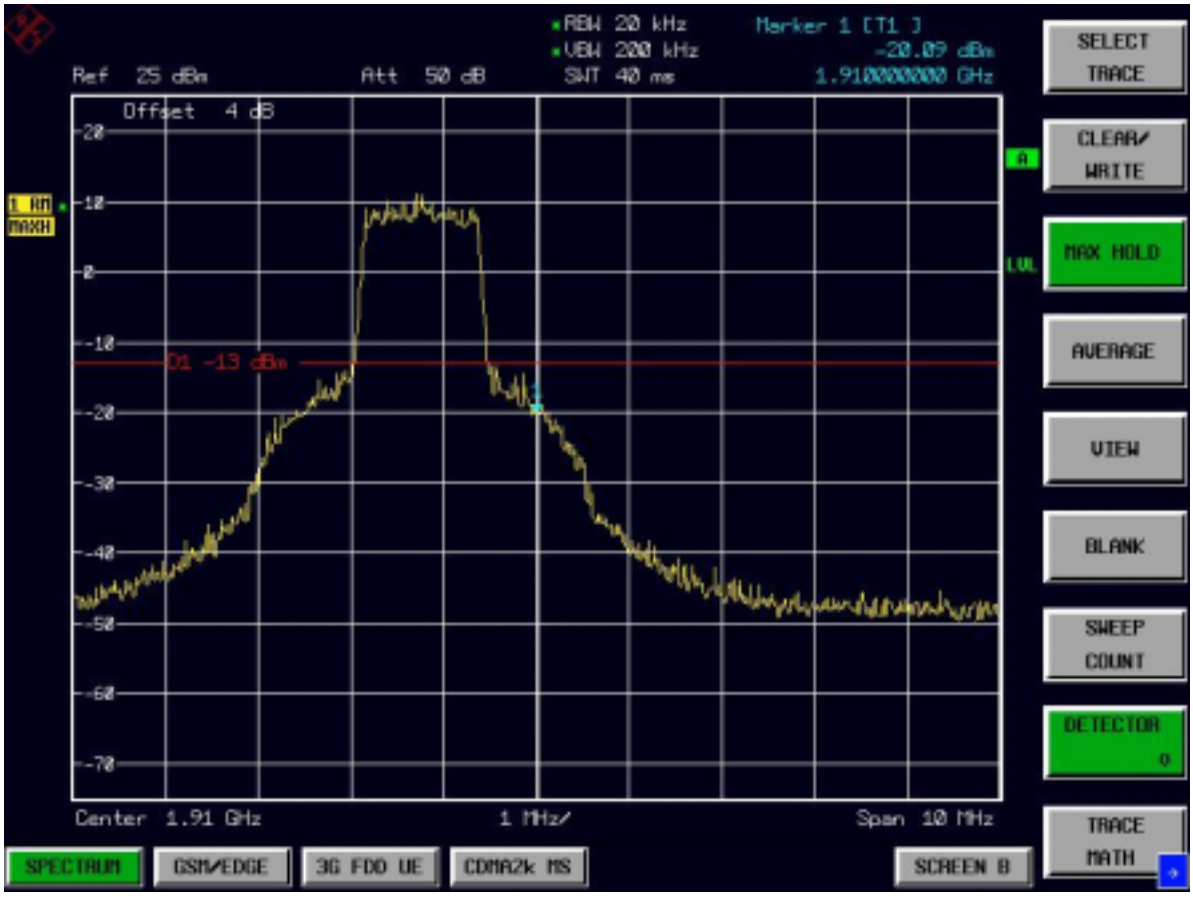
According to FCC Part 2.1051 & 24.238

TM1

Left Edge (1850 MHz)
Channel 25

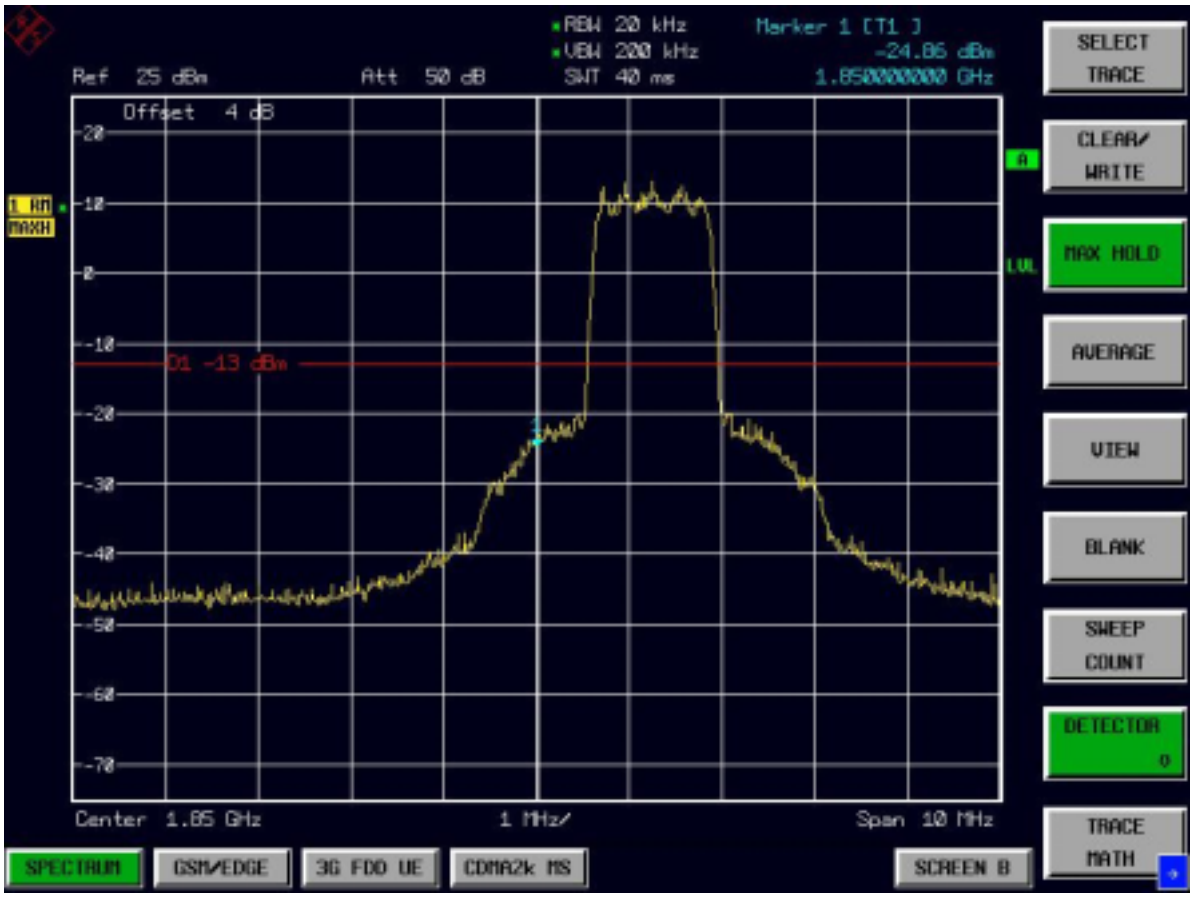


Right Edge (1910MHz)
Channel 1175

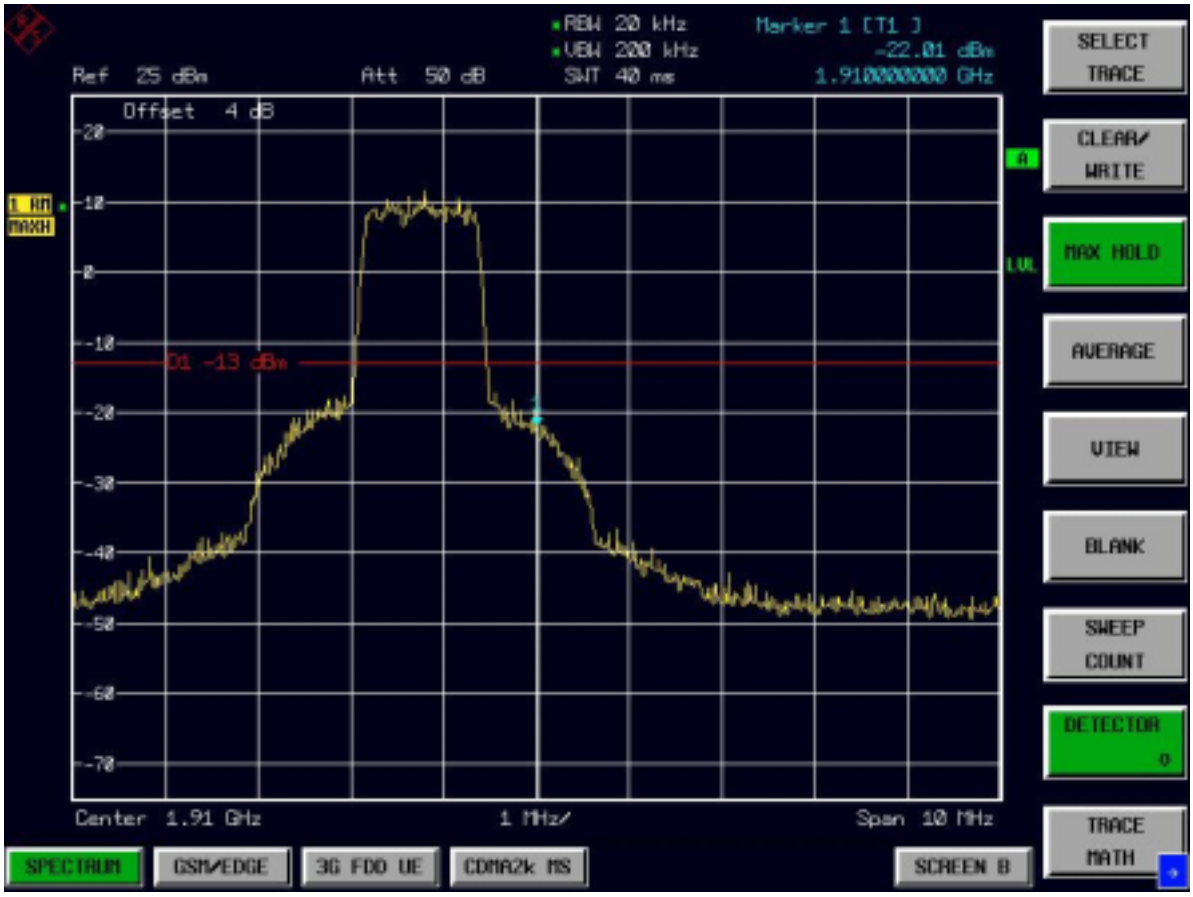


TM3

Left Edge (1850 MHz)
Channel 25



Right Edge (1910MHz)
Channel 1175



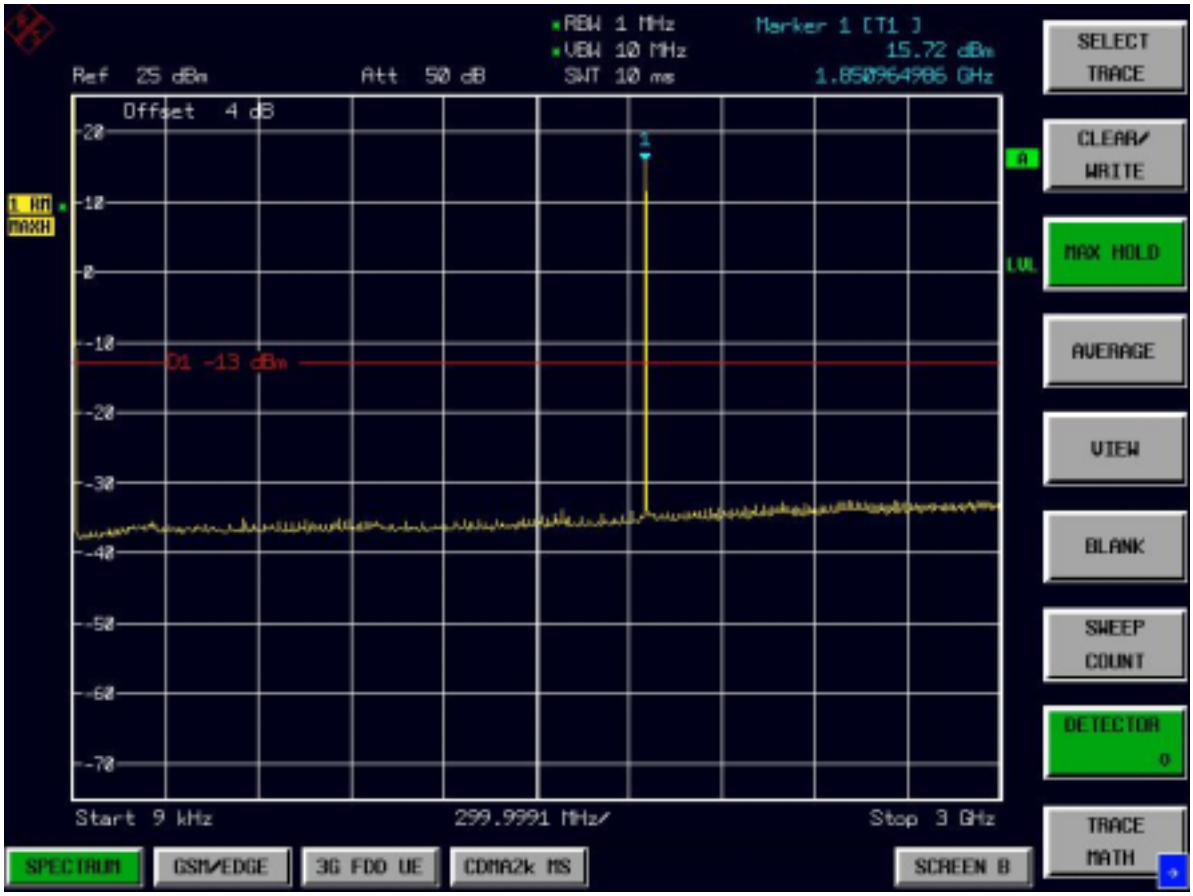
Appendix E

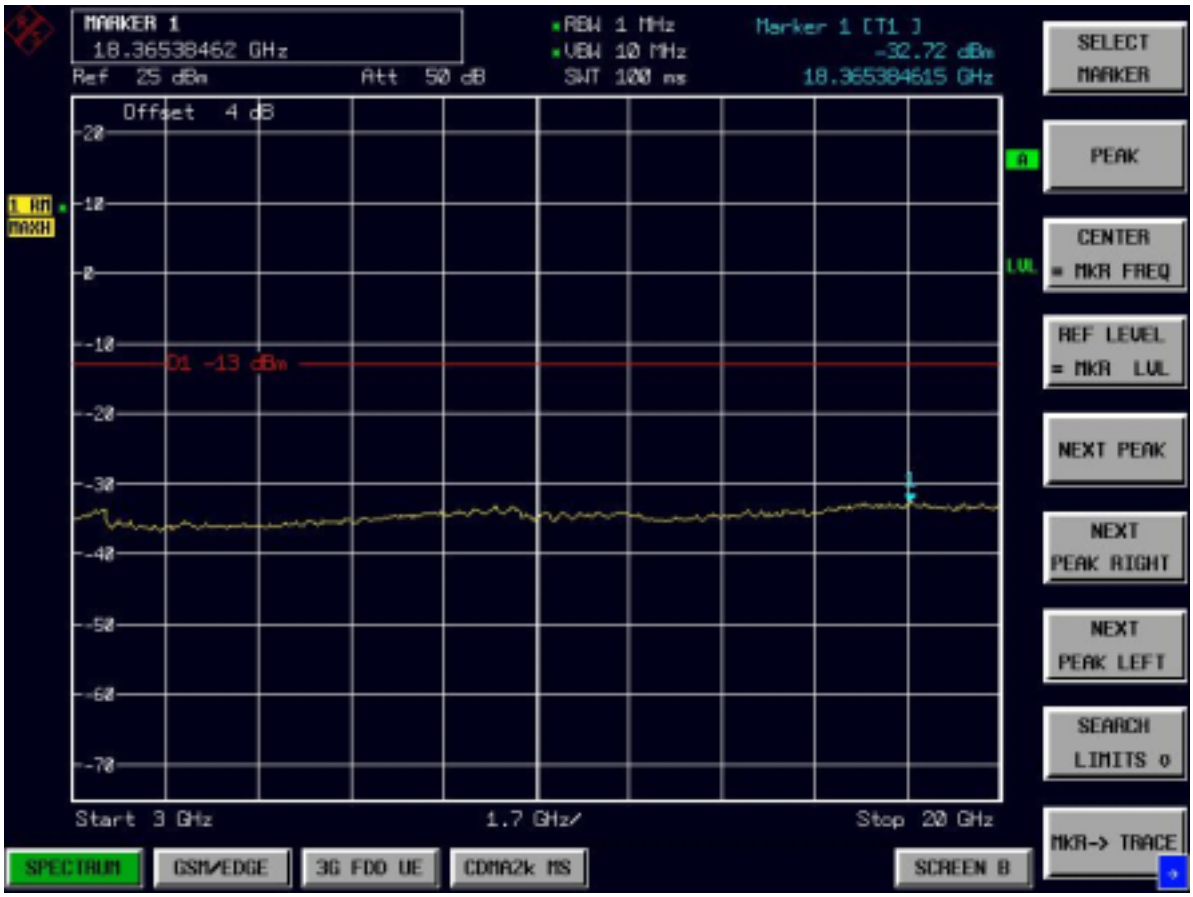
Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & 24.238

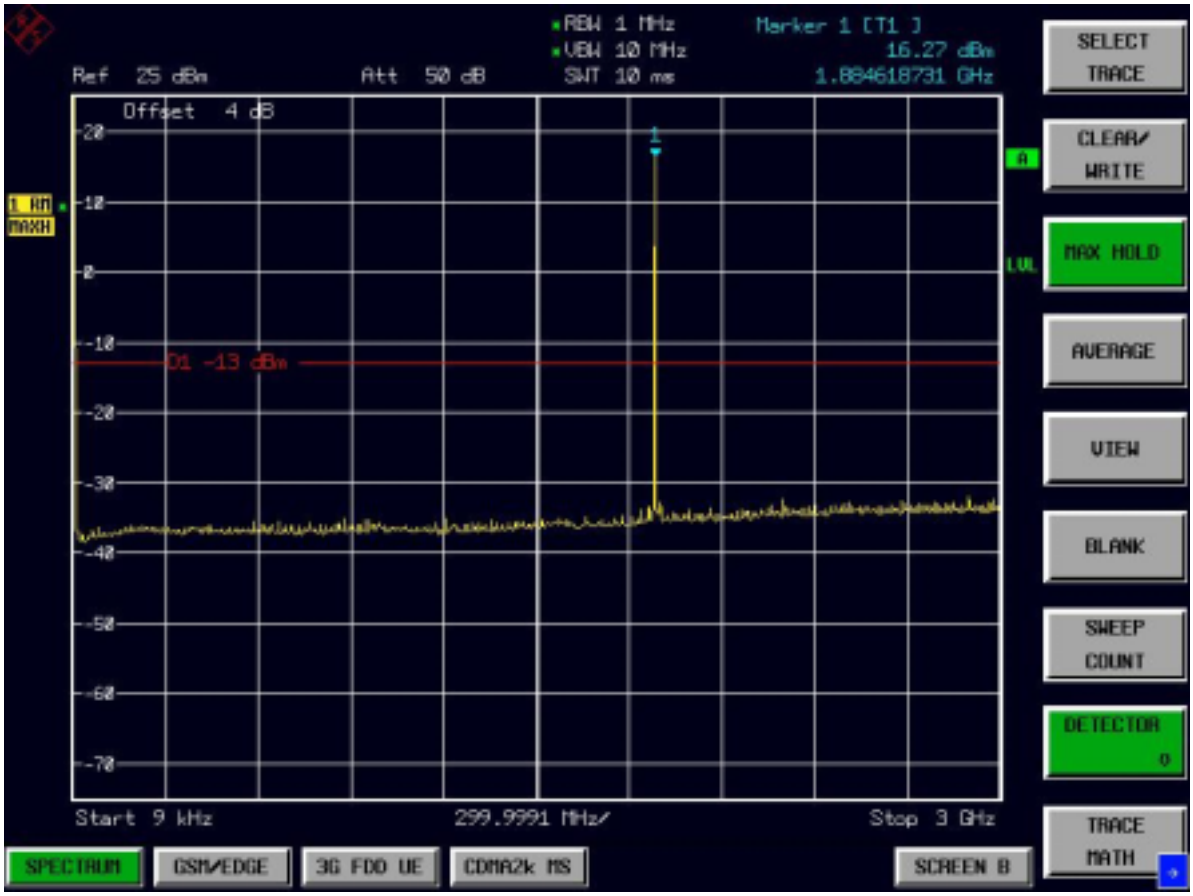
TM1

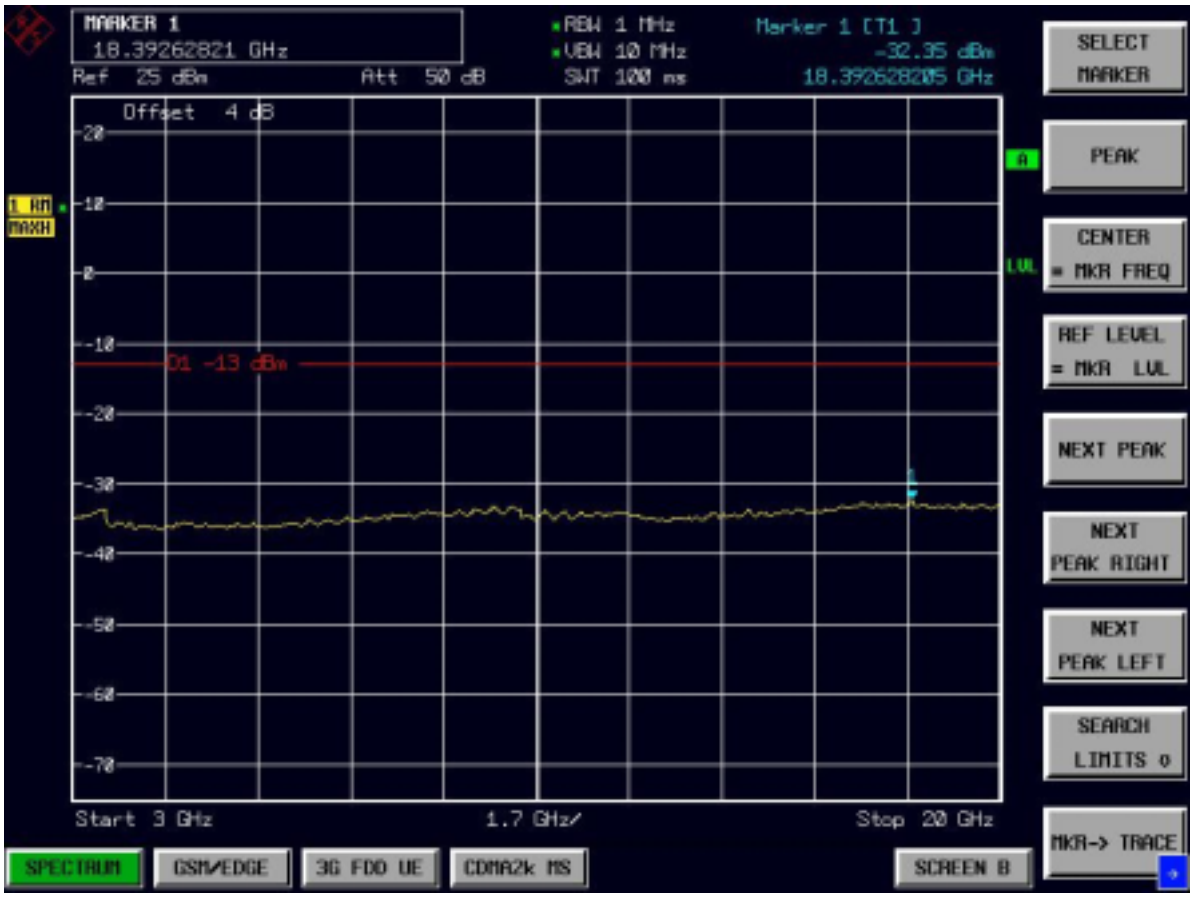
Channel 25



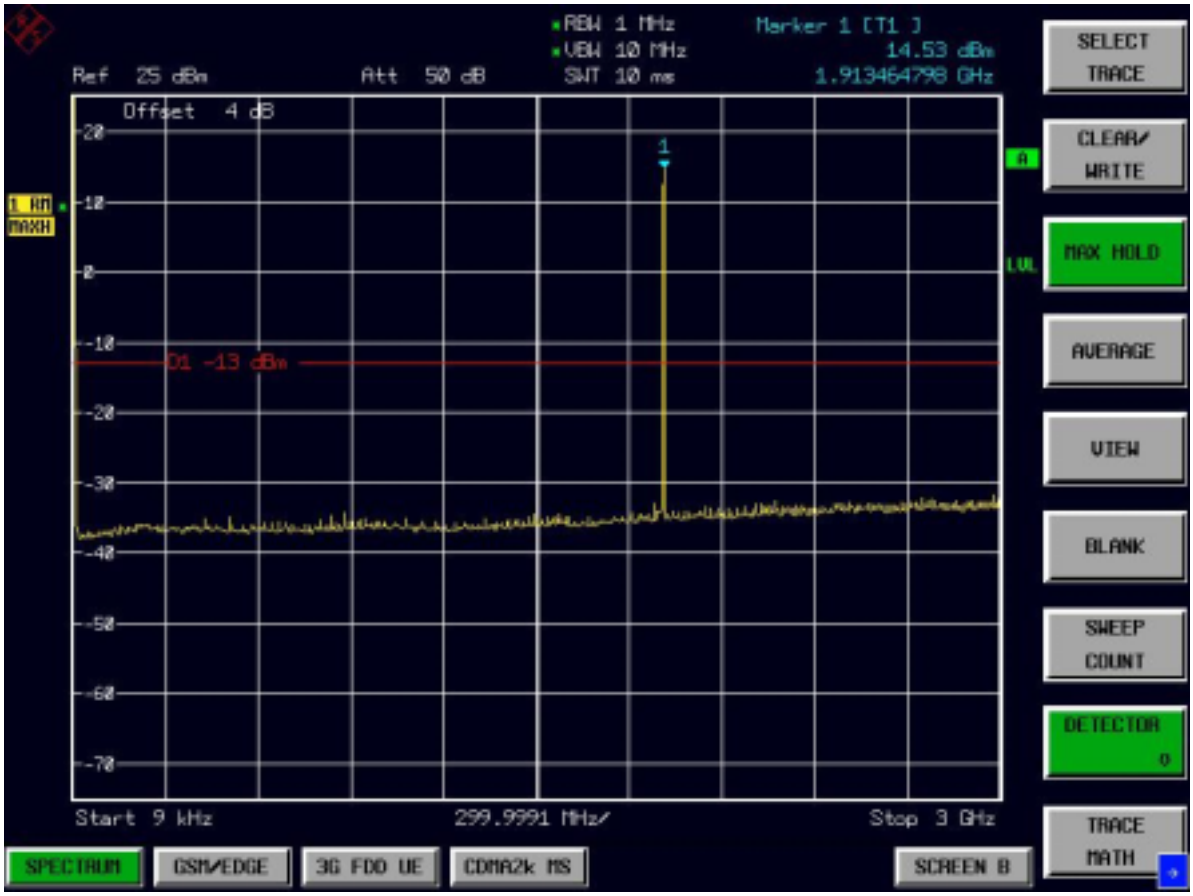

MARKER 1
18.36538462 GHz
Ref 25 dBm
Att 50 dB
RBW 1 MHz
VBW 10 MHz
SWT 100 ms
Marker 1 [T1]
-32.72 dBm
18.365384615 GHz
Offset 4 dB
D1 -13 dBm
Start 3 GHz
1.7 GHz/
Stop 20 GHz
SELECT MARKER
PEAK
CENTER = MKR FREQ
REF LEVEL = MKR LVL
NEXT PEAK
NEXT PEAK RIGHT
NEXT PEAK LEFT
SEARCH LIMITS o
MKR-> TRACE
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B

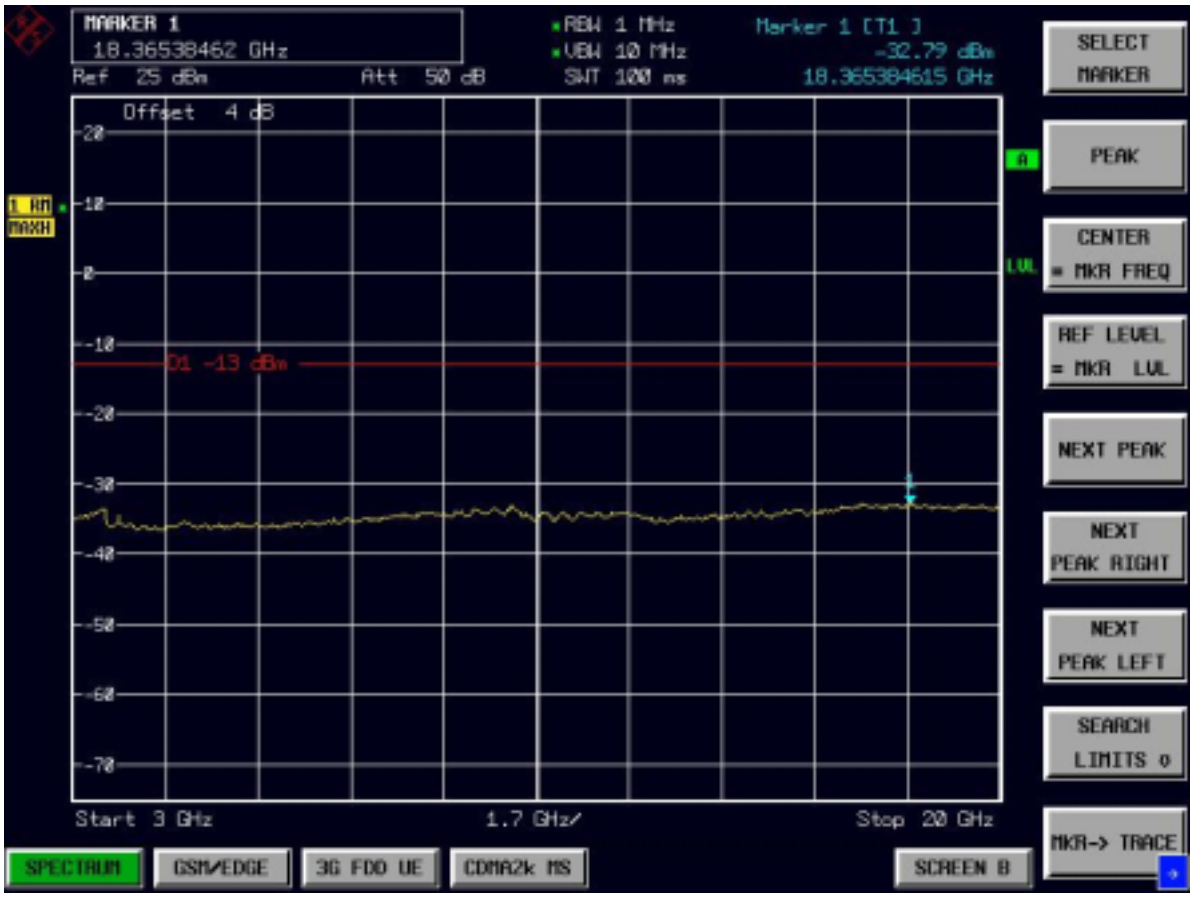
Channel 600


RBW 1 MHz
VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
16.27 dBm
1.884618731 GHz
Ref 25 dBm
Att 50 dB
Offset 4 dB
D1 -13 dBm
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
SELECT TRACE
CLEAR/ WRITE
MAX HOLD
AVERAGE
VIEW
BLANK
SWEEP COUNT
DETECTOR
TRACE MATH
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B


MARKER 1
18.39262821 GHz
Ref 25 dBm
Att 50 dB
RBW 1 MHz
VBW 10 MHz
SWT 100 ms
Marker 1 [T1]
-32.35 dBm
18.39262805 GHz
Offset 4 dB
D1 -13 dBm
Start 3 GHz
1.7 GHz/
Stop 20 GHz
SELECT MARKER
PEAK
CENTER = MKR FREQ
REF LEVEL = MKR LVL
NEXT PEAK
NEXT PEAK RIGHT
NEXT PEAK LEFT
SEARCH LIMITS o
MKR-> TRACE
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B

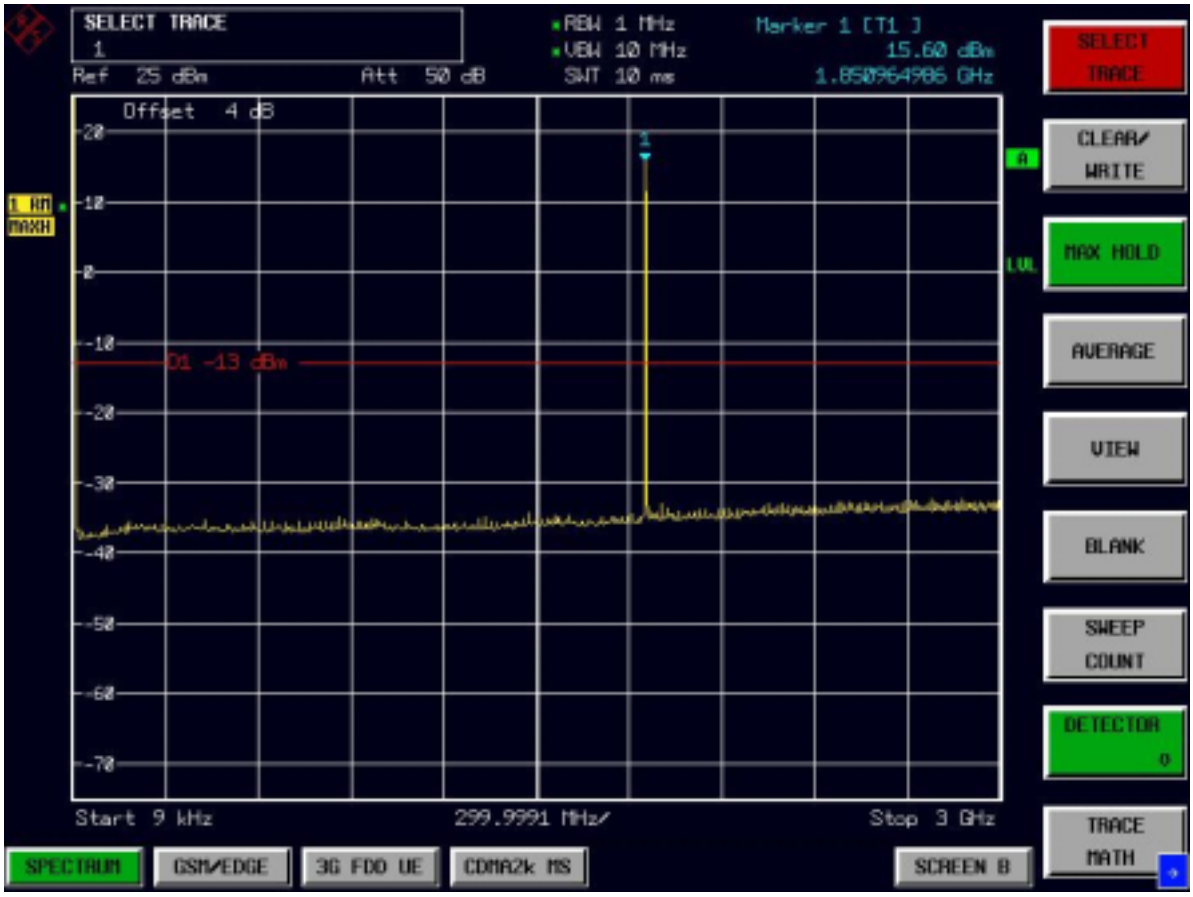
Channel 1175

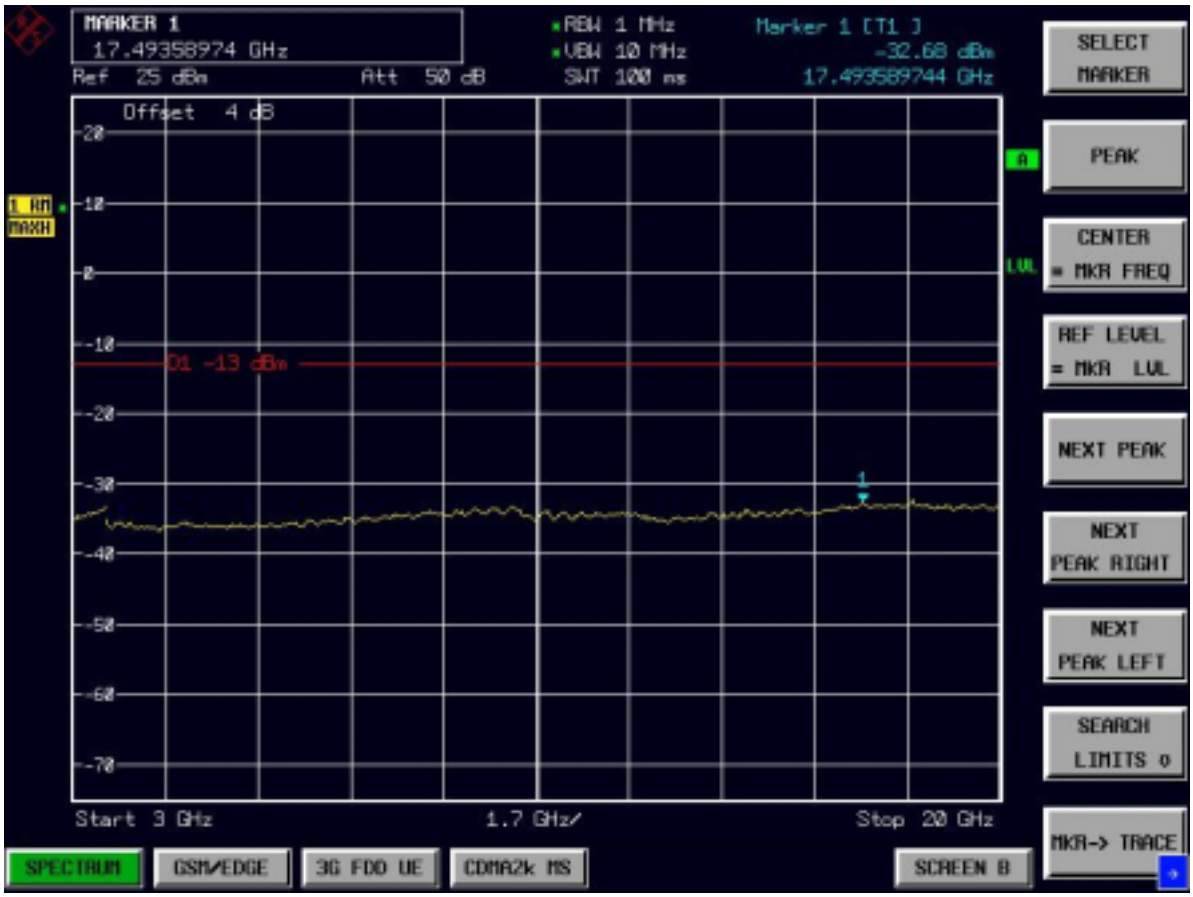



MARKER 1
18.36538462 GHz
Ref 25 dBm
Att 50 dB
RBW 1 MHz
VBW 10 MHz
SWT 100 ms
Marker 1 [T1]
-32.79 dBm
18.365384615 GHz
Offset 4 dB
D1 -13 dBm
Start 3 GHz
1.7 GHz/
Stop 20 GHz
SELECT MARKER
PEAK
CENTER = MKR FREQ
REF LEVEL = MKR LVL
NEXT PEAK
NEXT PEAK RIGHT
NEXT PEAK LEFT
SEARCH LIMITS o
MKR-> TRACE
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B

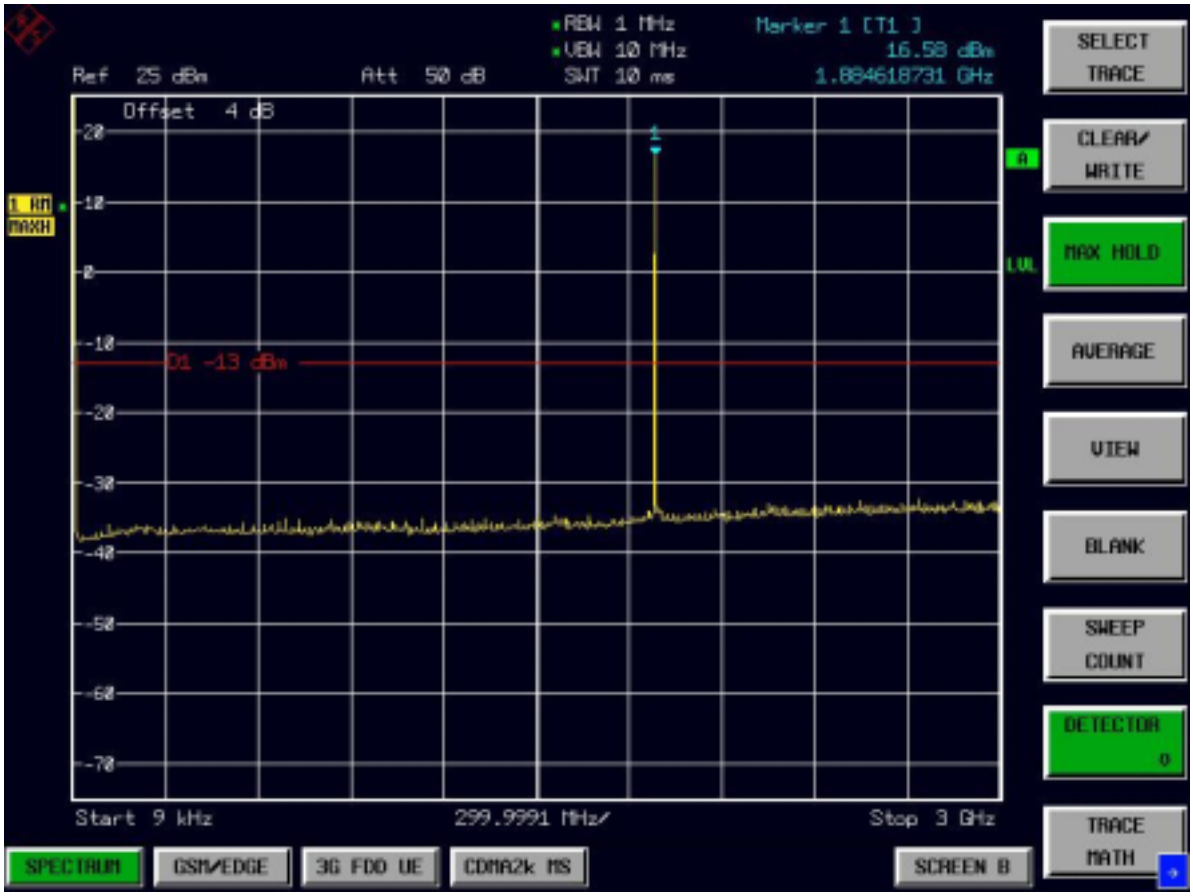
TM3

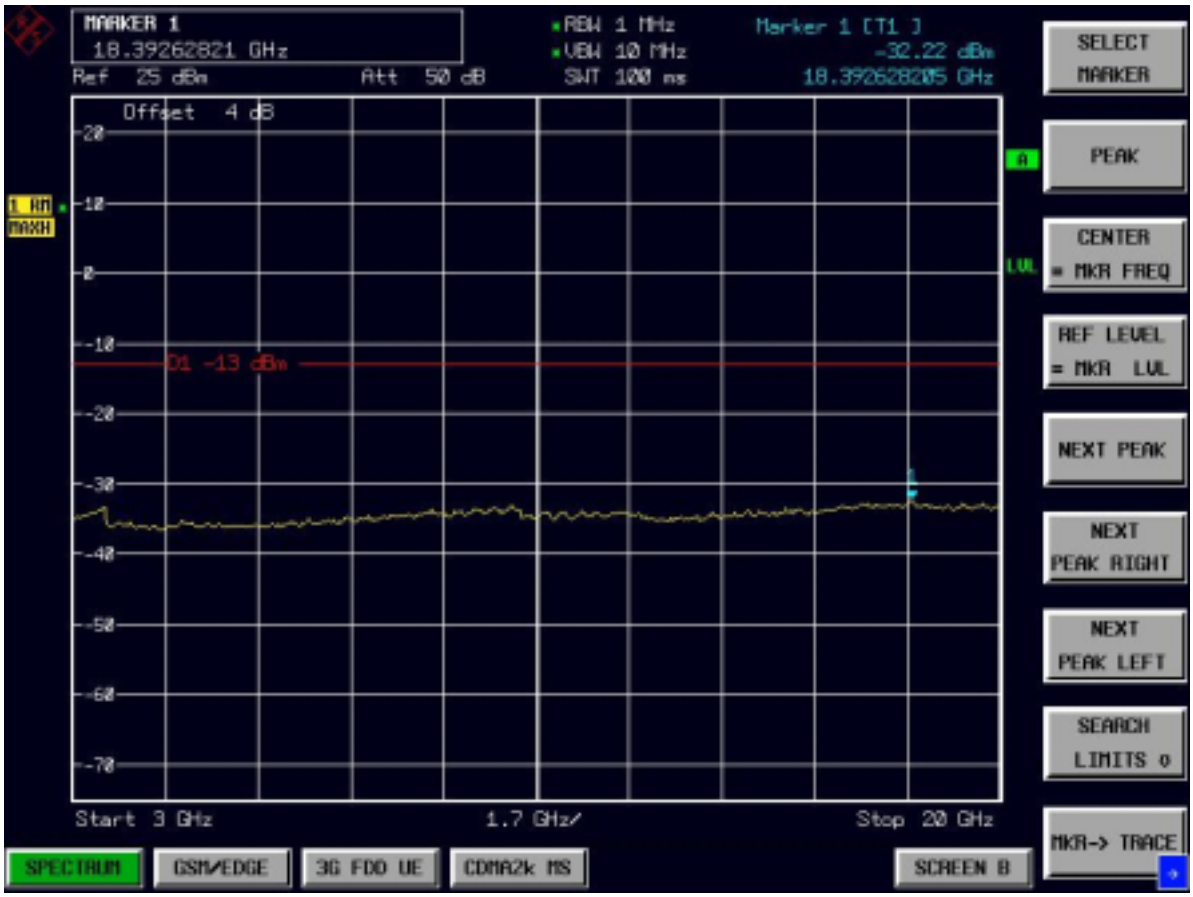
Channel 25



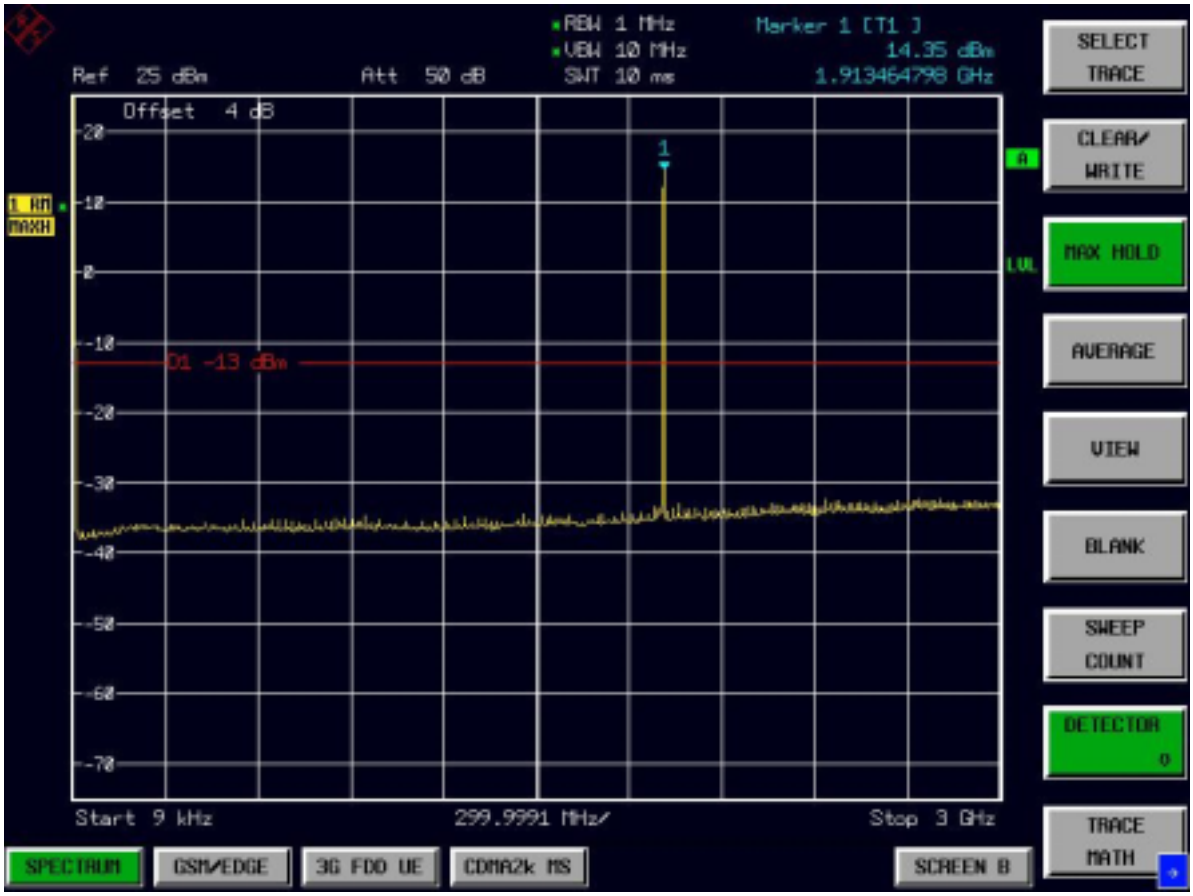

MARKER 1
17.49358974 GHz
Ref 25 dBm
Att 50 dB
RBW 1 MHz
VBW 10 MHz
SWT 100 ms
Marker 1 [T1]
-32.68 dBm
17.493589744 GHz
Offset 4 dB
D1 -13 dBm
Start 3 GHz
1.7 GHz/
Stop 20 GHz
SELECT MARKER
PEAK
CENTER = MKR FREQ
REF LEVEL = MKR LVL
NEXT PEAK
NEXT PEAK RIGHT
NEXT PEAK LEFT
SEARCH LIMITS o
MKR-> TRACE
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B

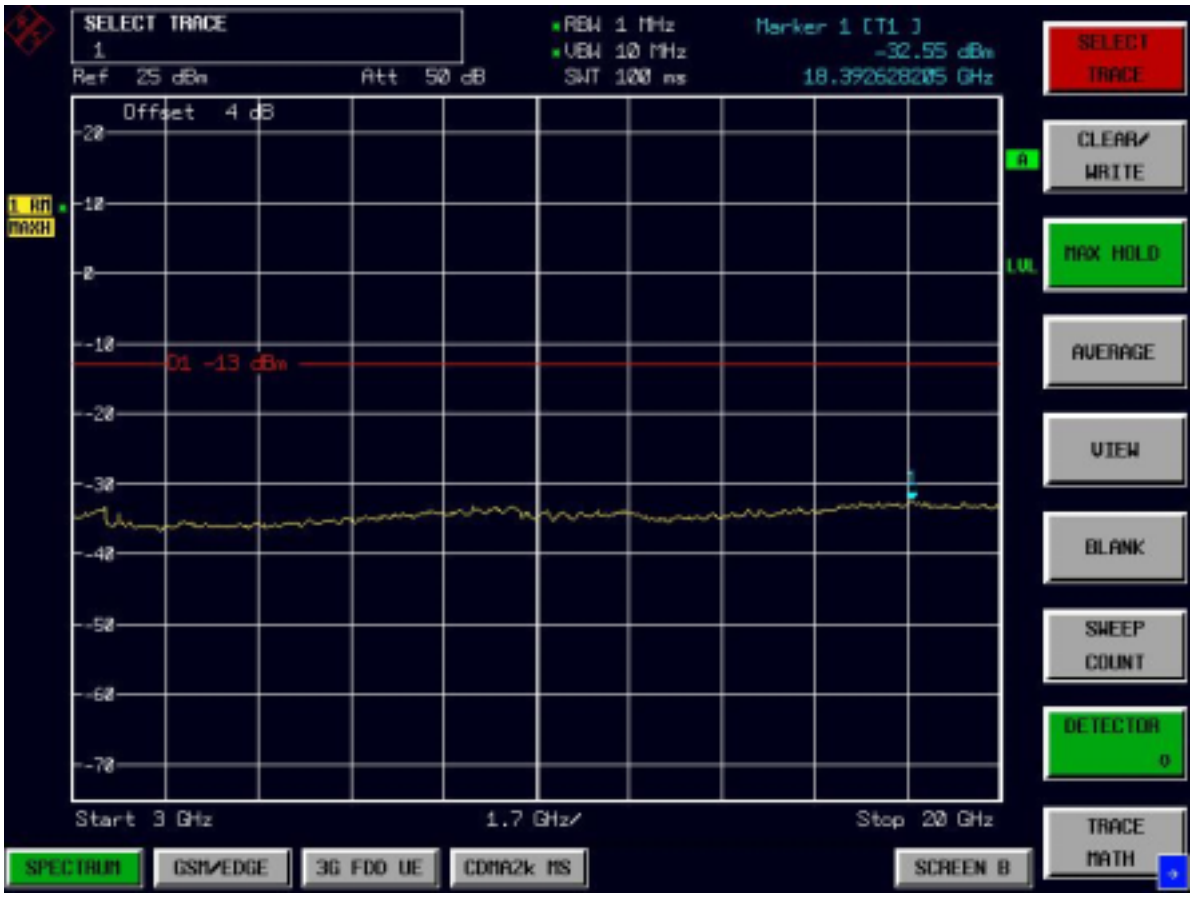
Channel 600


RBW 1 MHz
VBW 10 MHz
SWT 10 ms
Marker 1 [T1]
16.58 dBm
1.884618731 GHz
Ref 25 dBm
Att 50 dB
Offset 4 dB
D1 -13 dBm
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
SELECT TRACE
CLEAR/ WRITE
MAX HOLD
AVERAGE
VIEW
BLANK
SWEEP COUNT
DETECTOR
TRACE MATH
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B


MARKER 1
18.39262821 GHz
Ref 25 dBm
Att 50 dB
RBW 1 MHz
VBW 10 MHz
SWT 100 ms
Marker 1 [T1]
-32.22 dBm
18.392628205 GHz
Offset 4 dB
D1 -13 dBm
Start 3 GHz
1.7 GHz/
Stop 20 GHz
SELECT MARKER
PEAK
CENTER = MKR FREQ
REF LEVEL = MKR LVL
NEXT PEAK
NEXT PEAK RIGHT
NEXT PEAK LEFT
SEARCH LIMITS o
MKR-> TRACE
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B

Channel 1175



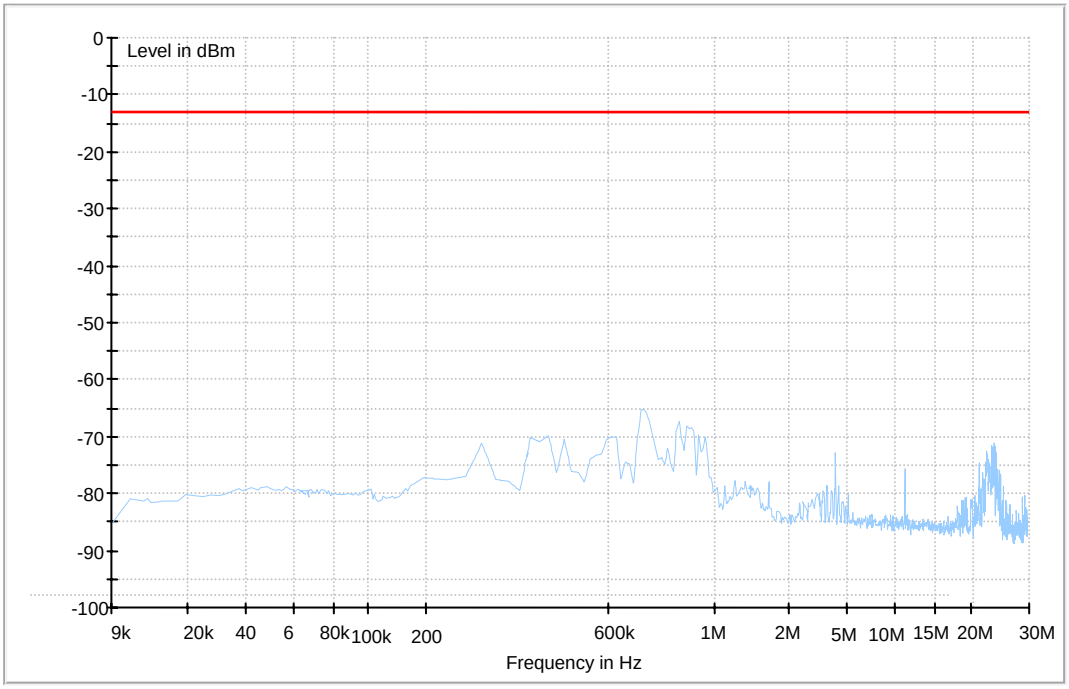

SELECT TRACE
1
RBW 1 MHz
VBW 10 MHz
SWT 100 ms
Marker 1 [T1]
-32.55 dBm
18.392628205 GHz
Ref 25 dBm
Att 50 dB
Offset 4 dB
D1 -13 dBm
Start 3 GHz
1.7 GHz/
Stop 20 GHz
SELECT TRACE
CLEAR/ WRITE
MAX HOLD
AVERAGE
VIEW
BLANK
SWEEP COUNT
DETECTOR
TRACE MATH
SPECTRUM
GSM/EDGE
3G FDD UE
CDMA2k MS
SCREEN B

Appendix E

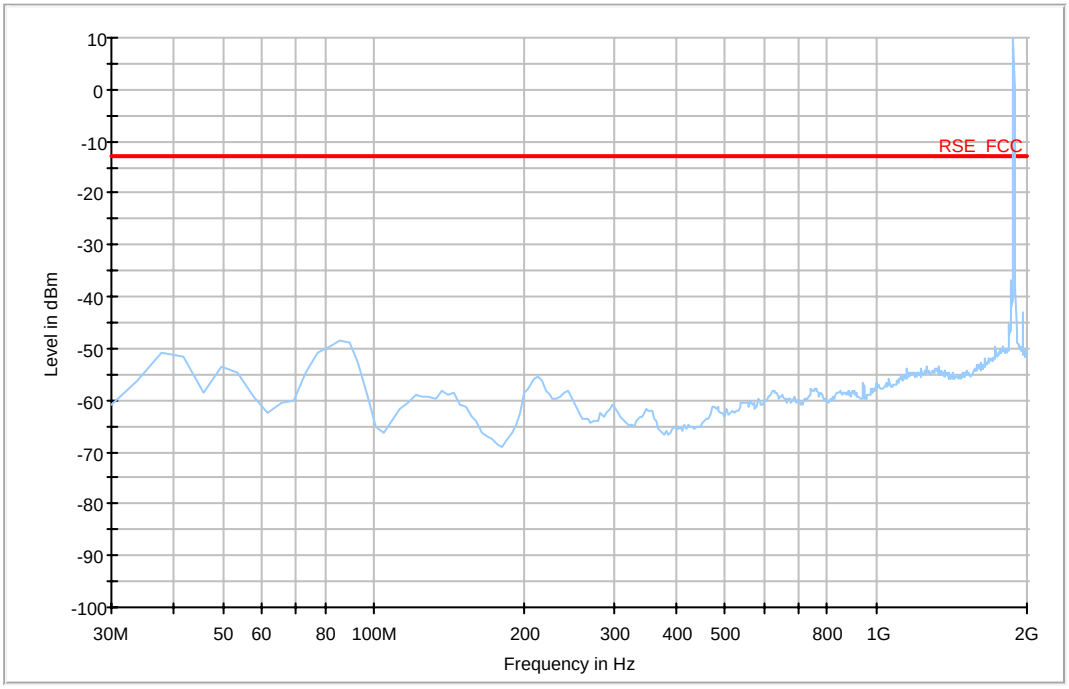
Radiated Spurious Emission

According to FCC Part 2.1053 & 24.238

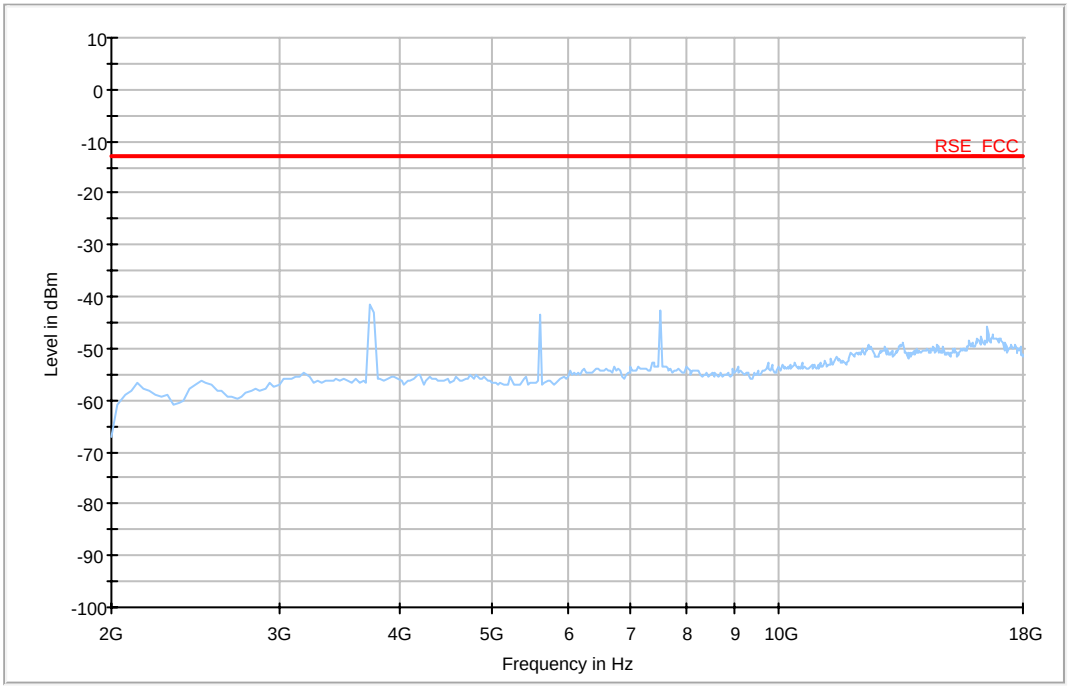
Traffic Mode (9kHz-30MHz)



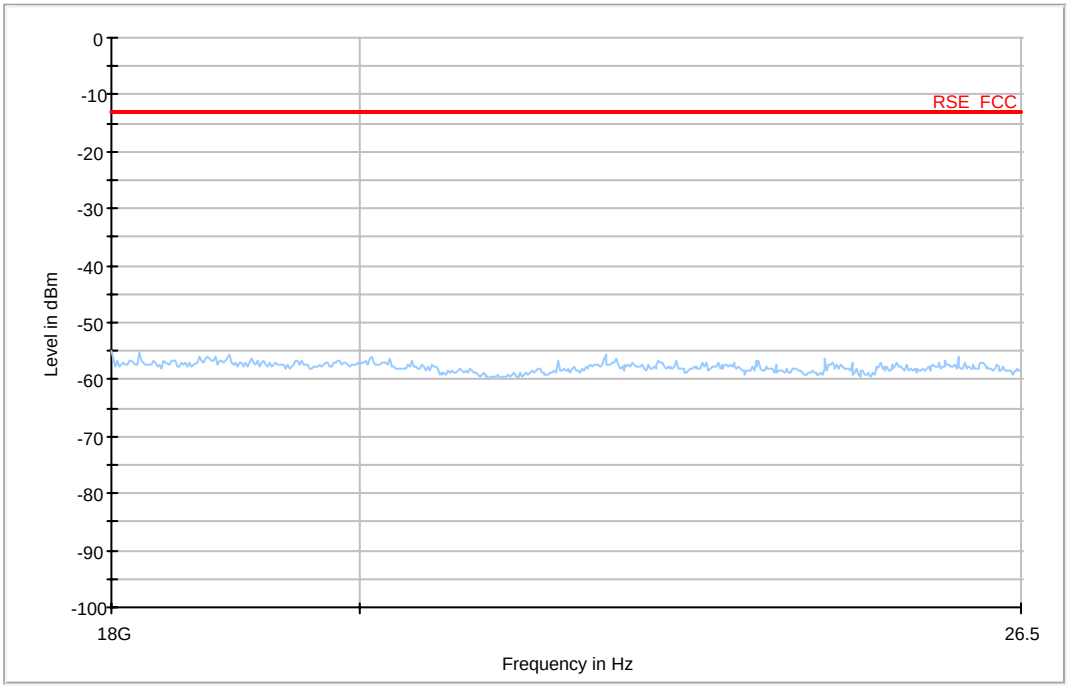
Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)



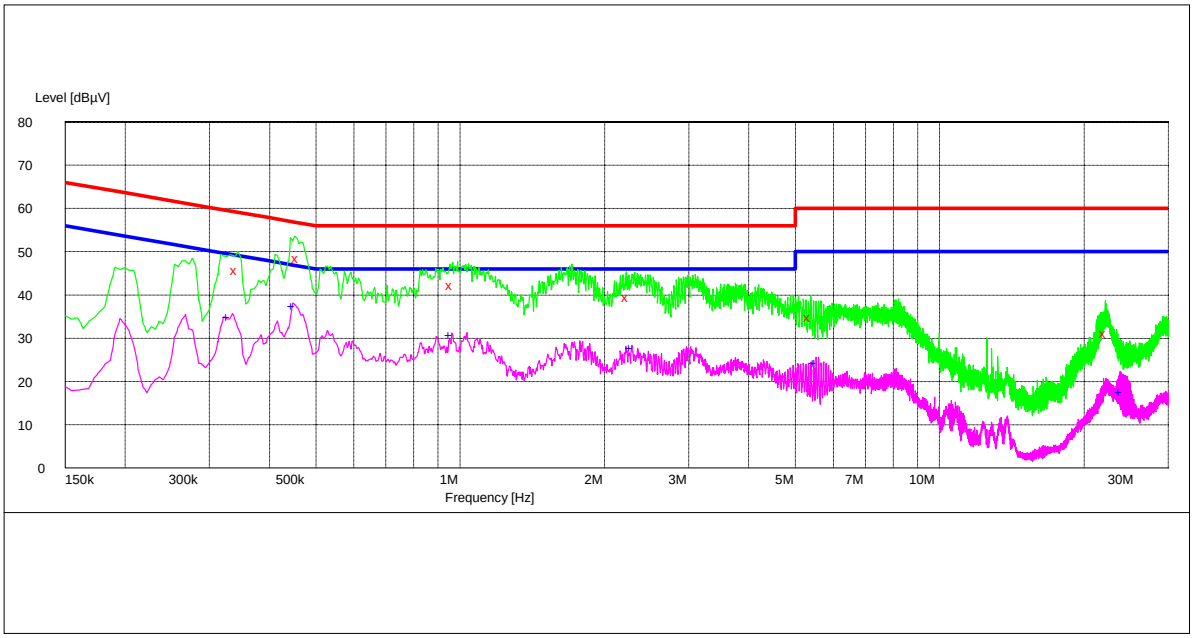
Traffic Mode (18GHz-26GHz)



Appendix F

Conducted Emission at Power Port

According to FCC Part 15.107



MEASUREMENT RESULT:QP DECTER

Frequency (MHz)	Level (dBµV)	Transd (dB)	Limit (dBµV)	Margin (dB)	Line	PE
0.343500	45.80	10.2	59	13.3	L3	FLO
0.460500	48.50	10.0	57	8.2	L3	FLO
0.964500	42.40	9.9	56	13.6	L3	FLO
2.247000	39.50	10.1	56	16.5	L3	FLO
5.397000	35.00	10.1	60	25.0	L3	FLO
22.308000	31.10	15.0	60	28.9	L3	FLO

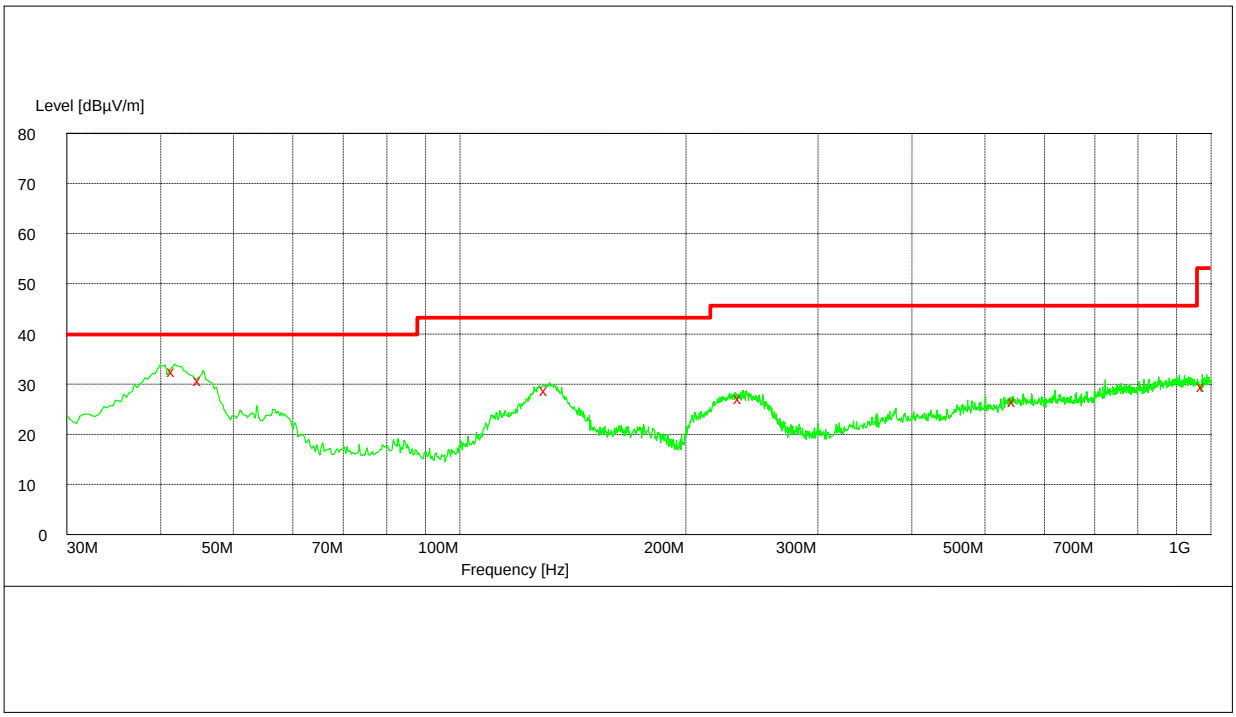
MEASUREMENT RESULT:AV DECTER

Frequency (MHz)	Level (dBµV)	Transd (dB)	Limit (dBµV)	Margin (dB)	Line	PE
0.330000	35.00	10.2	49	14.4	L3	FLO
0.451500	37.40	10.0	47	9.5	L3	FLO
0.960000	30.70	9.9	46	15.3	L3	FLO
2.287500	27.70	10.1	46	18.3	L3	FLO
5.523000	24.20	10.2	50	25.8	L3	FLO
24.036000	17.60	15.2	50	32.4	N	FLO

Appendix G

Radiated Emission of Enclosure in Idle Mode

According to FCC Part 15.109



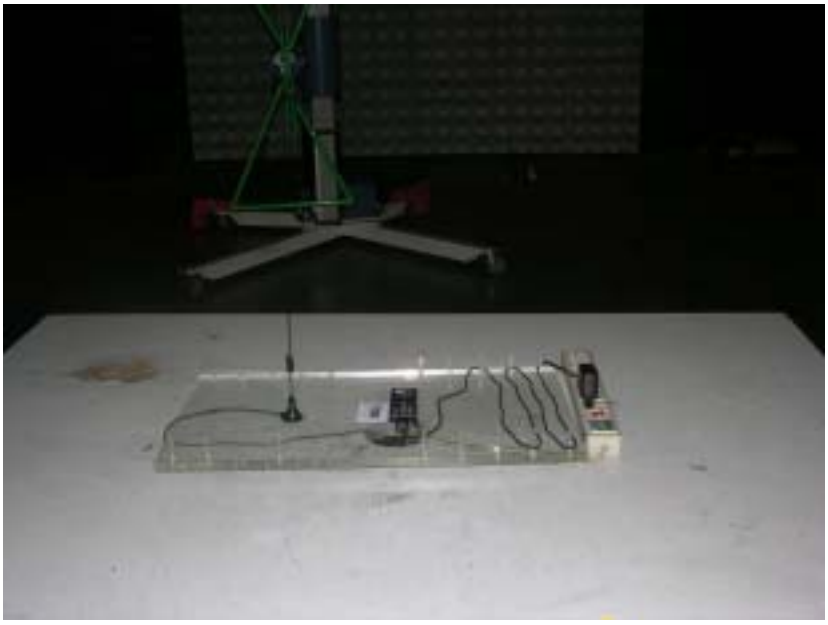
MEASUREMENT RESULT: QP DECTER

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
41.700000	32.80	-10.6	40.0	7.2	105.0	336.00	VERTICAL
45.180000	30.90	-12.2	40.0	9.1	105.0	225.00	VERTICAL
130.800000	29.00	-10.0	43.5	14.5	237.0	0.00	HORIZONTAL
236.760000	27.30	-9.5	46.0	18.7	154.0	227.00	HORIZONTAL
548.700000	26.70	-1.7	46.0	19.3	112.0	132.00	VERTICAL
979.500000	29.70	2.3	54.0	24.3	105.0	124.00	VERTICAL

Appendix H

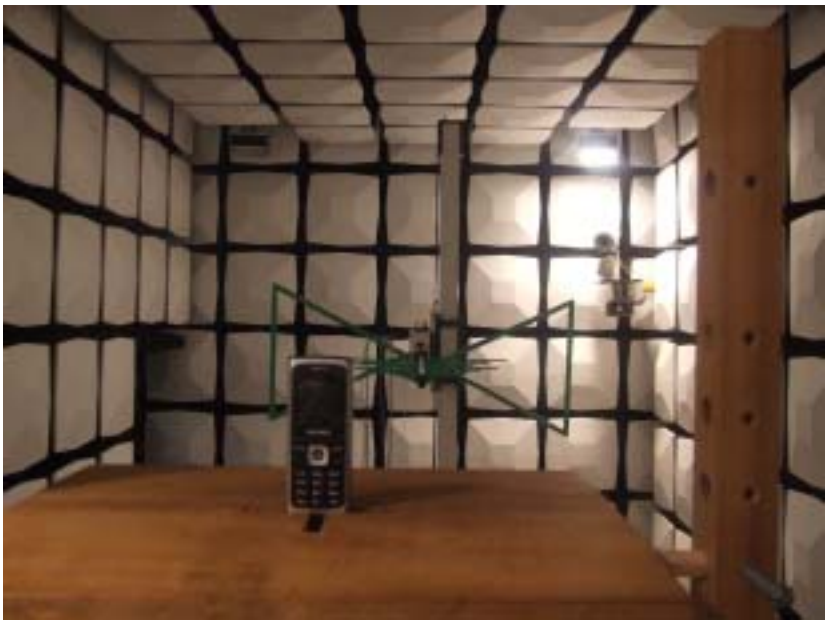
Photos of Test Setup

1 Radiated Emissions



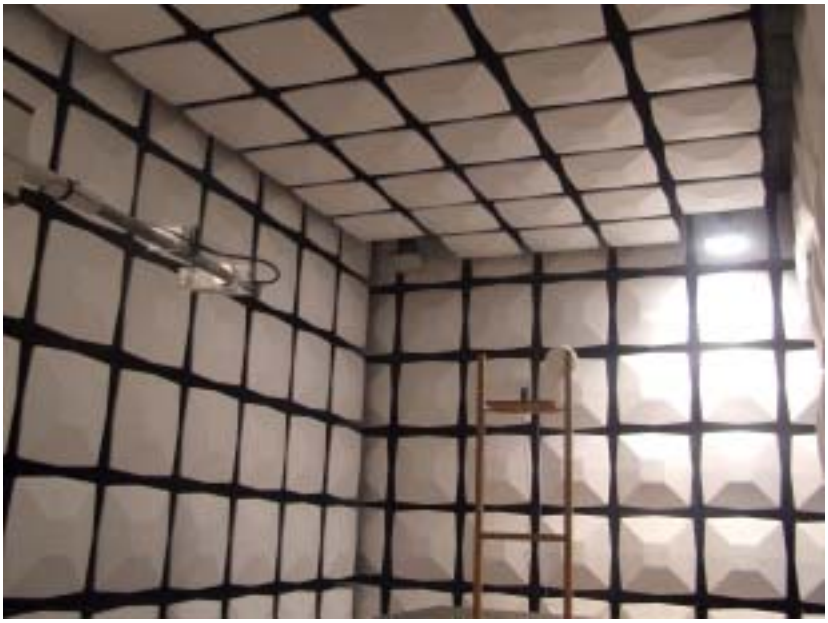
Radiated Disturbance

2 Radiated Spurious Emissions



Radiated Spurious Emission (below 2GHz)

Radiated Spurious Emission (2GHz to 18GHz)



Radiated Spurious Emission (above 18GHz)

3 Conducted Emissions

Conducted Emissions for AC Ports