Report No: GTSE12030021501

FCC REPORT

Applicant:	Bravo Tech(shenzhen)Co.Ltd
Address of Applicant:	No. 8 Building, The 3rd Zone, Tangtou Industrial P Shiyan, Baoan District, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	mBSC-040 DAS System
Model No.:	mBSC1900-040-RU
Trade mark:	
FCC ID:	WBKMBSC1900-040
Applicable standards:	FCC CFR Title 47 Part 2:2012 FCC CFR Title 47 Part24 Subpart E:2012
Date of sample receipt:	Mar. 12, 2012
Date of Test:	Mar. 13-20, 2012
Date of report issued:	Mar. 21, 2012
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Stephen Guo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*Mar. 21, 2012*	*Original*

Prepared By: Collin. He ***Date:*** *Mar. 21, 2012*

Project Engineer

Check By: Hans. Hu ***Date:*** *Mar. 22, 2012*

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Maximum Permissible exposure(MPE)	§ 1.1307(b)(1), § 2.1091	PASS* (Please refer to MPE Report)
RF Output Power	§ 2.1046(a); § 24.232(a)	PASS
Modulation Characteristics	§ 2.1047	N/A*
99% Occupied Bandwidth	§ 2.1049 § 24.238	PASS
Spurious Emissions at Antenna Terminal	§ 2.1051; § 24.238(a)	PASS
Intermodulation	§ 2.1051; § 24.238(a)	PASS
Field Strength of Spurious Radiation	§ 2.1053 § 24.238 (a)	PASS
Out of band emission, Band Edge	§ 24.238 (a)	PASS
Frequency stability vs. temperature Frequency stability vs. voltage	§ 2.1055 § 24.235	PASS
Out-of-Band Rejection	--	PASS

Remark:

N/A*:According to FCC § 2.1047(d), 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

5 General Information

5.1 Client Information

Applicant:	Bravo Tech (ShenZhen) Co., Ltd.
Address of Applicant:	No. 8 Building, The 3rd Zone, Tangtou Industrial P Shiyan, Baoan District, Shenzhen, China
Manufacturer/Factory:	Bravo Tech (ShenZhen) Co., Ltd.
Address of Manufacturer/Factory :	No. 8 Building, The 3rd Zone, Tangtou Industrial P Shiyan, Baoan District, Shenzhen, China

5.2 General Description of E.U.T.

Product Name:	mBSC-040 DAS System	
Model No.:	mBSC1900-040-RU	
Power supply:	Remote Unit: Input: AC 110-220V, 50/60Hz Normal test voltage: 120V AC 60Hz	
Operating Temperature:	Remote Unit: -40℃ to + 55℃	
Operating Humidity:	up to 95%	
Technical Parameter:		
Frequency Range	Downlink	1930MHz~1990MHz
	Uplink	1850MHz~1910MHz
Operating Bandwidth	60MHz	
Multiple Carrier Supported	4	
Channel Spacing(s) / Bandwidth(s)	GSM / EDGE: 200KHz CDMA / EVDO: 1.25MHz	
Maximun Output Power	Downlink: 46dBm±1dB Uplink: N/A Note: The EUT does not transmit over the air in the uplink direction.	
Max Gain	Downlink: 56dB±1dB ; Uplink: 30dB±1dB ;	
Type of modulation and Designator	GSM(GXW); EDGE(G7W);CDMA(F9W); EVDO(F9W)	
Antenna Type	External antenna (“7/16 DIN” type)	
Software Version:	RU:RU_1.0.1.1_20110530 PA:PA2_2.0.0.2_20110518	
Hardware Version:	V1.0	

5.3 Related Submittal(s) / Grant (s)

47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
47 CFR Part 24	Personal Communications Services

5.4 Test Methodology

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
ANSI/TIA-603-C 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
KDB	AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET

5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● FCC —Registration No.: 600491

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

● Industry Canada (IC)

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

5.6 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-27798480 Fax: 0755-27798960

5.7 Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 30 2011	Mar. 30 2012
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 04 2011	Jul. 03 2012
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 25 2012	Feb. 24 2013
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 30 2011	June 29 2012
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS210	Apr. 01 2011	Mar. 31 2012
8	Coaxial Cable	GTS	N/A	GTS211	Apr. 01 2011	Mar. 31 2012
9	Coaxial cable	GTS	N/A	GTS212	Apr. 01 2011	Mar. 31 2012
10	Coaxial Cable	GTS	N/A	GTS213	Apr. 01 2011	Mar. 31 2012
11	Coaxial Cable	GTS	N/A	GTS214	Apr. 01 2011	Mar. 31 2012
12	Amplifier(10KHz-5GHz)	HP	8347A	GTS204	Jul. 04 2011	Jul. 03 2012
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 04 2011	Jul. 03 2012
14	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS206	May 11 2011	May 11 2012
15	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS208	Sept. 14 2011	Sept. 14 2012
16	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS209	Sept. 14 2011	Sept. 14 2012
17	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS207	May. 14 2011	May. 14 2012
18	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 11 2011	May 11 2012
19	Spectrum Analyzer	Rohde & Schwarz	ESU26	GTS203	Sept. 10 2011	Sept. 10 2012
20	Spectrum Analyzer	Rohde & Schwarz	FSEA	DE31309	Sept. 10 2011	Sept. 10 2012
21	Splitter	Agilent	11636B	GTS237	May 11 2011	May 11 2012
22	Signal Generator	AEROFLEX	IFR3413	341001/232	Sept. 10 2011	Sept. 10 2012
23	Signal Generator	AEROFLEX	IFR3414	341300/019	Sept. 10 2011	Sept. 10 2012
24	Power Meter	Giga-tronics	8541C	1831177	Sept. 10 2011	Sept. 10 2012
25	Power Sensor	Giga-tronics	80601A	1831785	Sept. 10 2011	Sept. 10 2012
26	Power Attenuator	BTI	30dB/250W	040706090	Sept. 10 2011	Sept. 10 2012
27	Power Attenuator	BTI	30dB/250W	040706089	Sept. 10 2011	Sept. 10 2012

6 TEST CONFIGURATION AND CONDITIONS

6.1 EUT Configuration

This mBSC1900-040-RU is the Remote Unit on BTI DAS system. This remote unit supports PCS1900 band with the air standard GSM, EDGE, CDMA, and CDMA EV-DO. The unit consists of Power Amplifier, Duplexer, RF Transmitter, Optic Transceiver and AC-DC Converter for AC 110V to 220V range. This product is designed to operate in an outdoor environment. The output power of the RU on Antenna interface port is 40W for Downlink path.

The only different between the Master Remote Unit and Slave Remote Unit is Optic Transceiver, the Master Remote Unit have the optic transceiver to transfer the RF signal from Host Unit by optic cable.

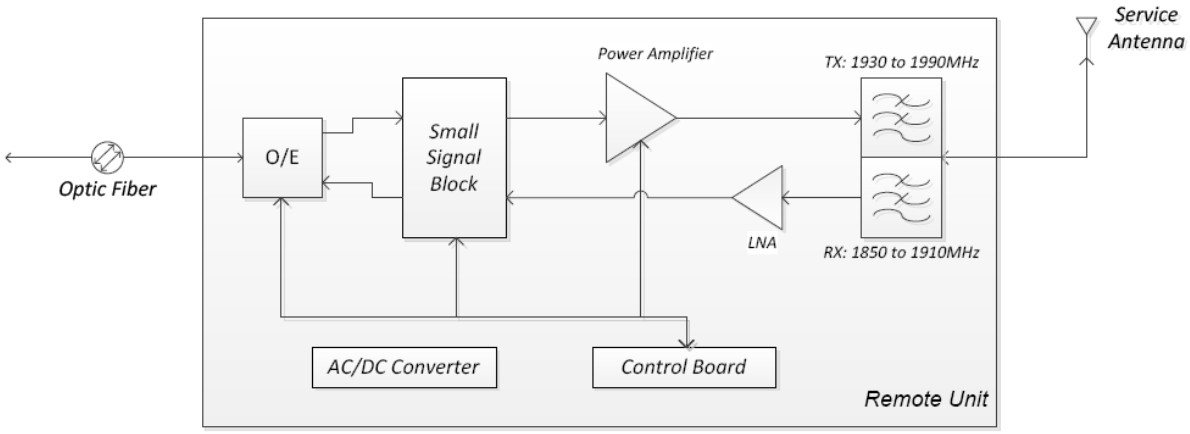


Figure 1: The Master Remote Unit block diagram

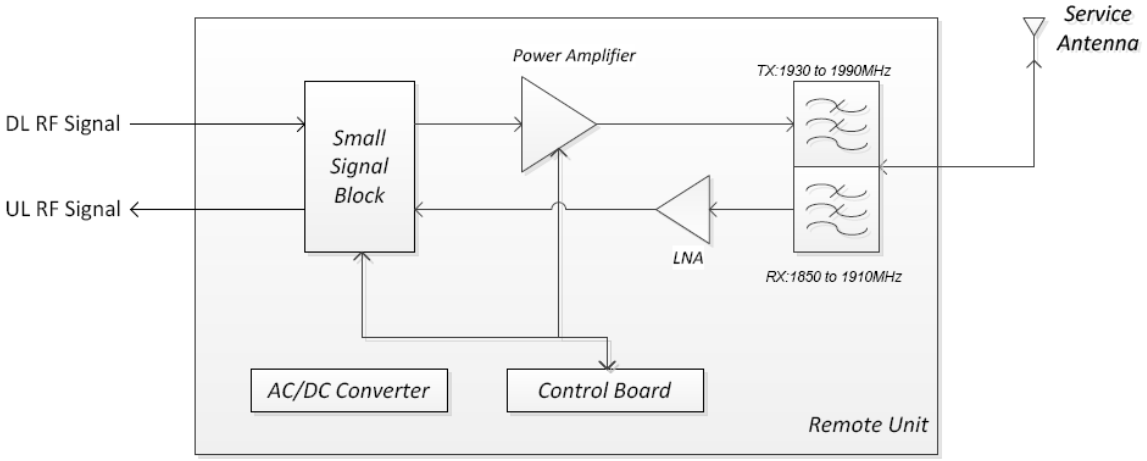
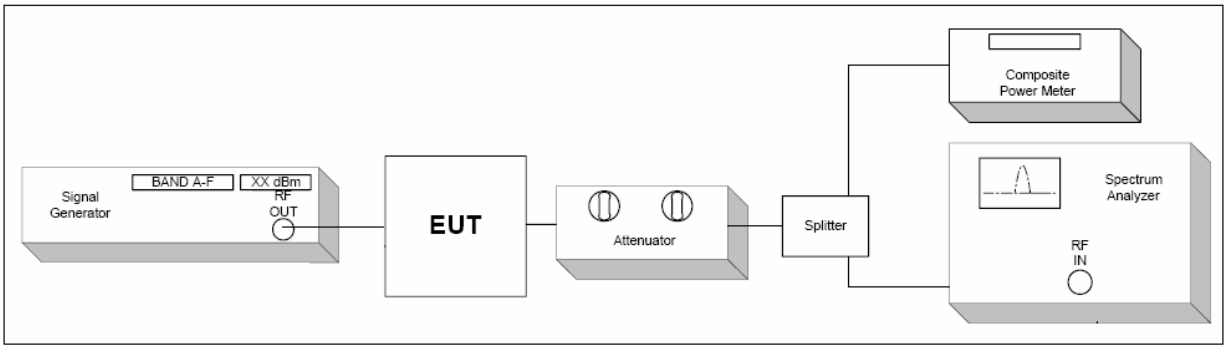


Figure 2: The Slave Remote Unit block diagram

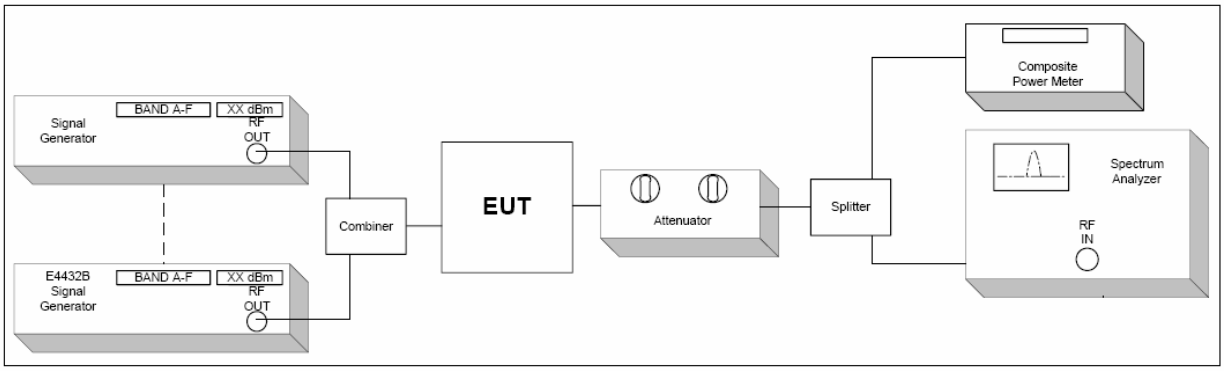
For details, refer to technical document and the user manual.

6.2 Configuration of Tested System

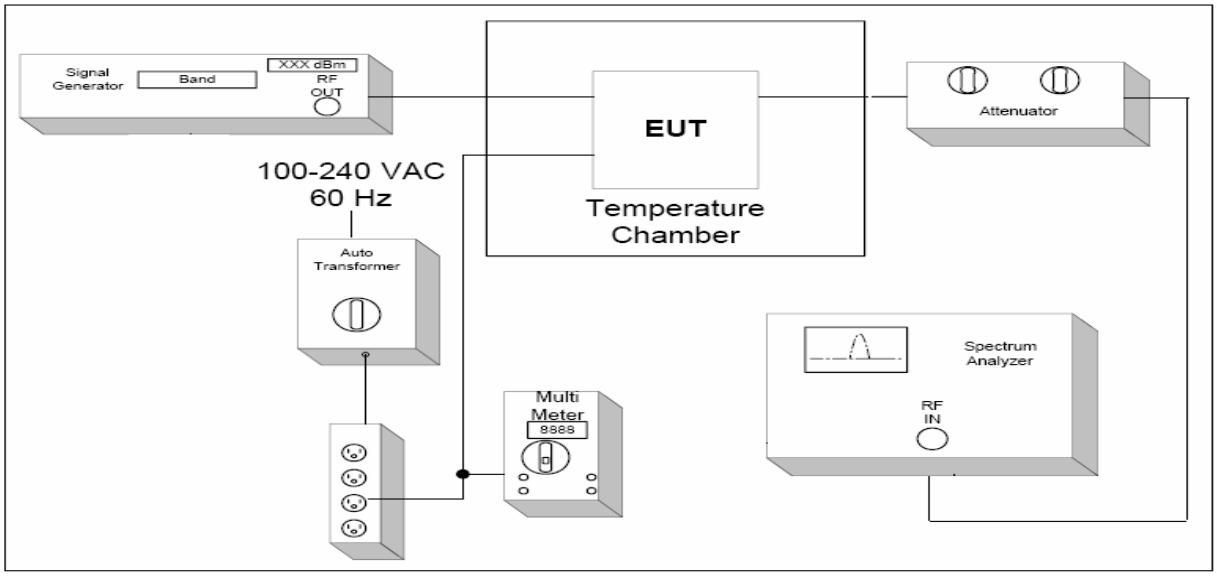
(A) RF Output Power, Occupied Bandwidth, Spurious Emissions at Antenna Terminal, Band Edge, Test Set-UP



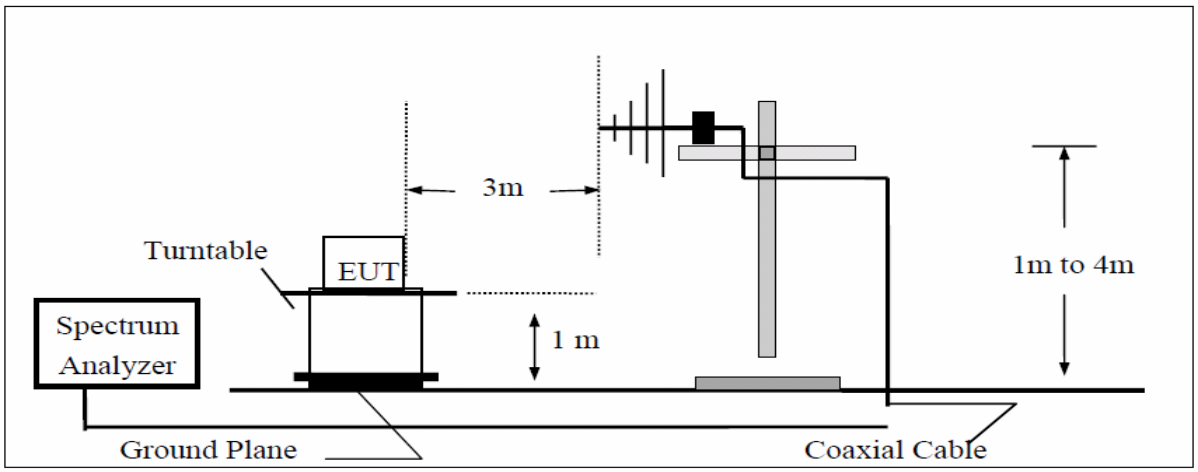
(B) Intermodulation Test Set-UP



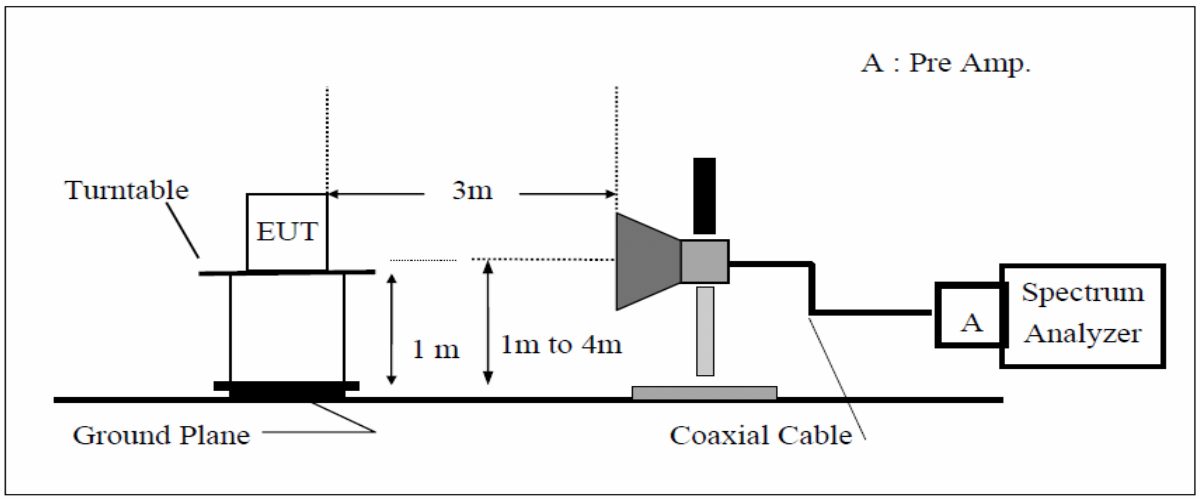
(C)Frequency stability Test Set-UP



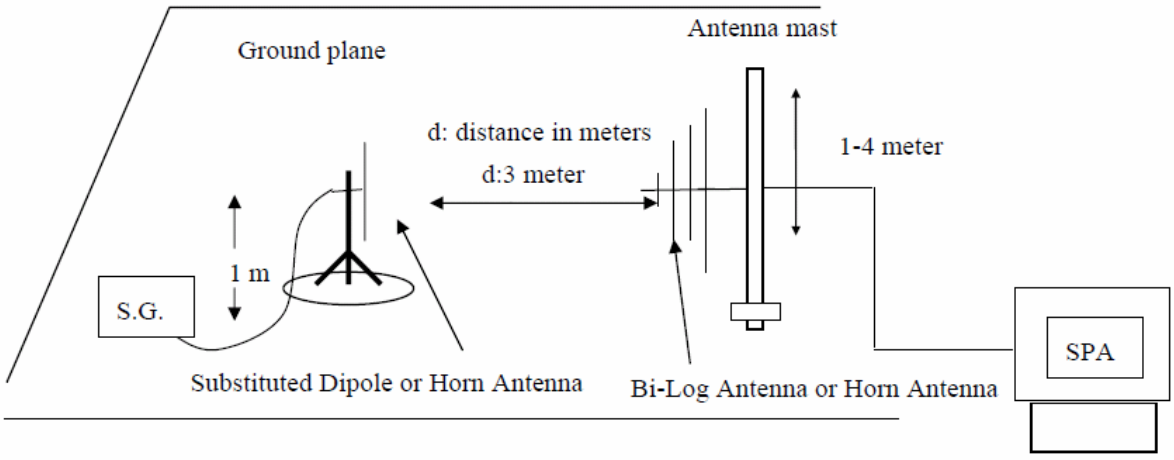
(D) Radiated Emission Test Set-Up, Frequency below 1000MHz



(E) Radiated Emission Test Set-UP Frequency over 1 GHz



(F) Substituted Method Test Set-UP



6.3 Test Environments

Condition	Minimum value	Maximum value
Barometric pressure	86 kPa	106 kPa
Temperature	15°C	30°C
Relative Humidity	20 %	75 %
Power supply range	±5% of rated voltages	
Normal Test Condition	(1).Temperature: +15 °C to +30 °C; (2).voltage is 120VAC.60Hz	
Extreme Test Conditions:	(1). Temperatures: -40°C to +55°C. (2). Voltages: 102 VAC to 138V AC.	

6.4 Test signal

1:Test signal GSM

Signal waveform with GMSK modulation in all time slots according to 3GPP TS45.004

2: Test signal GSM EDGE:

Signal waveform with 8-PSK modulation in all time slots according to 3GPP TS45.004

3: Test signal CDMA

Signal waveform according to table 6.2-1 of standard specification 3GPP2 C.P0051-0

pilot, sync, paging, 37 traffics, which is equal to the table 6.5.2.1 of 3GPP2 C.S0010-C

6.5 Test frequency selection

Operating Mode(TX)	Channels No. / Multi- Carriers	Channels frequency (MHz)		
		Low Ch.	Mid Ch.	High Ch.
GSM/ EDGE	Single Carrier	1930.2	1960	1989.8
	Two Carriers	1930.5	1960	1989.5
	Three Carrier	1930.8	1960	1989.2
	Four Carrier	1931.1	1960	1988.9
CDMA/ EVDO	Single Carrier	1931.25	1960	1988.75
	Two Carriers	1931.875	1960	1988.125
	Three Carrier	1932.5	1960	1987.5
	Four Carrier	1933.125	1960	1986.875

6.6 DESCRIPTION OF TEST MODES

Test mode	Detail description of the test mode
Downlink	Downlink (Low channel; middle channel; high channel)
Uplink	N/A
Multi-carrier	Single Carrier; two carrier; three carrier; four carrier
Multi-bandwidth	GSM/EDGE: 200kHz ; CDMA/EVDO: 1.25MHz;
Modulation type	GSM/EDGE/CDMA/EVDO

Remark:

1: The EUT was powered by 120VAC.

2: The EUT was configured for maximum gain and maximum ouput power. The input power was the maximum declared by the manufacturer.This is to ensure that the equipment is operating in the linear output range.

3: Signal generator was used to provide the input signals to the EUT. Tests were performed with GSM/EDGE/CDMA/EVDO signal input and multi-carrier signal mode input.

4: Pre-test all test modes as above, only the worst case and typical mode is list in report it.

5: N/A: The EUT does not transmit over the air in the uplink direction.

7 RF POWER OUTPUT MEASUREMENT

7.1 Standard Applicable

According to FCC §2.1046. § 24.232 (a).

(a)(1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

Table 1—Reduced Power for Base Station Antenna Heights Over 300 Meters

HAAT in meters	Maximum EIRP Watts
≤300	1640
≤500	1070
≤1000	490
≤1500	270
≤2000	160

7.2 Test setup

Please refer the section § 6.2 Configuration of Tested System.

7.3 Measurement Procedure

1. The output from the EUT antenna connector was connected to the power meter.

2. The power meter level was offset by 54.5 dB to compensate for attenuators and cable loss between the EUT and the power meter.

3. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached. The input signal level is – 10dBm.

4. The carrier output, below, was conducted using a single GSM, EDGE, CDMA, and EVDO signal generator.

5. The RF output power was measured at low, middle and high channel of each type of modulation and each type of carrier.

7.4 Test Result

Test mode	Carrier Conf.	Channel	Average Power （dBm）	Average Power （W）	Result
GSM	Single Carrier	Low	45.67	36.90	Compliant
		Middle	46.34	43.06	Compliant
		High	46.00	39.81	Compliant
	Two Carriers	Low	45.58	36.14	Compliant
		Middle	46.24	42.07	Compliant
		High	45.88	38.73	Compliant
	Three Carriers	Low	45.86	38.55	Compliant
		Middle	46.50	44.67	Compliant
		High	46.12	40.93	Compliant
	Four Carriers	Low	46.10	40.74	Compliant
		Middle	46.40	43.65	Compliant
		High	46.21	41.78	Compliant
EDGE	Single Carrier	Low	46.02	40.00	Compliant
		Middle	46.66	46.34	Compliant
		High	46.28	42.46	Compliant
	Two Carriers	Low	46.04	40.18	Compliant
		Middle	46.71	46.88	Compliant
		High	46.38	43.45	Compliant
	Three Carriers	Low	45.98	39.63	Compliant
		Middle	46.65	46.24	Compliant
		High	46.34	43.06	Compliant
	Four Carriers	Low	46.35	43.15	Compliant
		Middle	46.43	43.95	Compliant
		High	46.12	40.93	Compliant

Test mode	Carrier Conf.	Channel	Average Power （dBm）	Average Power （W）	Result
CDMA	Single Carrier	Low	46.09	40.64	Compliant
		Middle	45.98	39.63	Compliant
		High	46.19	41.59	Compliant
	Two Carriers	Low	46.11	40.83	Compliant
		Middle	46.36	43.25	Compliant
		High	46.21	41.78	Compliant
	Three Carriers	Low	46.10	40.74	Compliant
		Middle	46.38	43.45	Compliant
		High	46.09	40.64	Compliant
	Four Carriers	Low	46.21	41.78	Compliant
		Middle	46.45	44.16	Compliant
		High	46.14	41.11	Compliant
EVDO 0%	Single Carrier	Low	45.59	36.22	Compliant
		Middle	45.98	39.63	Compliant
		High	46.03	40.09	Compliant
	Two Carriers	Low	46.10	40.74	Compliant
		Middle	45.99	39.72	Compliant
		High	46.01	39.90	Compliant
	Three Carriers	Low	45.67	36.90	Compliant
		Middle	46.02	40.00	Compliant
		High	45.95	39.36	Compliant
	Four Carriers	Low	46.01	39.90	Compliant
		Middle	45.96	39.45	Compliant
		High	46.10	40.74	Compliant

Test mode	Carrier Conf.	Channel	Average Power （dBm）	Average Power （W）	Result
EVDO 50%	Single Carrier	Low	45.72	37.33	Compliant
		Middle	46.02	40.00	Compliant
		High	46.10	40.74	Compliant
	Two Carriers	Low	46.09	40.64	Compliant
		Middle	45.97	39.54	Compliant
		High	46.12	40.93	Compliant
	Three Carriers	Low	46.00	39.81	Compliant
		Middle	46.08	40.55	Compliant
		High	45.97	39.54	Compliant
	Four Carriers	Low	46.04	40.18	Compliant
		Middle	46.10	40.74	Compliant
		High	46.16	41.30	Compliant
EVDO 100%	Single Carrier	Low	46.03	40.09	Compliant
		Middle	46.11	40.83	Compliant
		High	46.13	41.02	Compliant
	Two Carriers	Low	46.09	40.64	Compliant
		Middle	46.12	40.93	Compliant
		High	46.17	41.40	Compliant
	Three Carriers	Low	46.05	40.27	Compliant
		Middle	46.06	40.36	Compliant
		High	45.99	39.72	Compliant
	Four Carriers	Low	46.12	40.93	Compliant
		Middle	46.10	40.74	Compliant
		High	46.15	41.21	Compliant

7.5 Peak to Average Ratio:

Test mode	Carrier Conf.	Channel	Average Power (dBm)	Power Power (dBm)	Result
GSM	Single Carrier	Low	45.67	48.52	Compliant
		Middle	46.34	49.05	Compliant
		High	46.00	48.95	Compliant
	Two Carriers	Low	45.58	48.48	Compliant
		Middle	46.24	49.02	Compliant
		High	45.88	48.35	Compliant
	Three Carriers	Low	45.86	48.74	Compliant
		Middle	46.50	48.31	Compliant
		High	46.12	49.01	Compliant
	Four Carriers	Low	46.10	48.98	Compliant
		Middle	46.40	49.50	Compliant
		High	46.21	49.12	Compliant
EDGE	Single Carrier	Low	46.02	49.00	Compliant
		Middle	46.66	49.57	Compliant
		High	46.28	49.24	Compliant
	Two Carriers	Low	46.04	49.02	Compliant
		Middle	46.71	49.64	Compliant
		High	46.38	49.21	Compliant
	Three Carriers	Low	45.98	48.32	Compliant
		Middle	46.65	48.65	Compliant
		High	46.34	49.23	Compliant
	Four Carriers	Low	46.35	49.25	Compliant
		Middle	46.43	49.35	Compliant
		High	46.12	49.02	Compliant

Test mode	Carrier Conf.	Channel	Average Power (dBm)	Power Power (dBm)	Result
CDMA	Single Carrier	Low	46.09	48.64	Compliant
		Middle	45.98	49.00	Compliant
		High	46.19	49.25	Compliant
	Two Carriers	Low	46.11	49.26	Compliant
		Middle	46.36	49.34	Compliant
		High	46.21	49.14	Compliant
	Three Carriers	Low	46.10	49.02	Compliant
		Middle	46.38	49.43	Compliant
		High	46.09	49.01	Compliant
	Four Carriers	Low	46.21	49.10	Compliant
		Middle	46.45	49.54	Compliant
		High	46.14	49.32	Compliant
EVDO 0%	Single Carrier	Low	45.59	48.45	Compliant
		Middle	45.98	48.90	Compliant
		High	46.03	49.01	Compliant
	Two Carriers	Low	46.10	49.05	Compliant
		Middle	45.99	48.96	Compliant
		High	46.01	48.97	Compliant
	Three Carriers	Low	45.67	48.45	Compliant
		Middle	46.02	48.99	Compliant
		High	45.95	48.92	Compliant
	Four Carriers	Low	46.01	48.98	Compliant
		Middle	45.96	48.95	Compliant
		High	46.10	49.11	Compliant

Test mode	Carrier Conf.	Channel	Average Power （dBm）	Peak Power （dBm）	Result
EVDO 50%	Single Carrier	Low	45.72	48.24	Compliant
		Middle	46.02	48.95	Compliant
		High	46.10	49.05	Compliant
	Two Carriers	Low	46.09	49.02	Compliant
		Middle	45.97	48.93	Compliant
		High	46.12	49.05	Compliant
	Three Carriers	Low	46.00	48.96	Compliant
		Middle	46.08	49.00	Compliant
		High	45.97	48.92	Compliant
	Four Carriers	Low	46.04	48.98	Compliant
		Middle	46.10	49.02	Compliant
		High	46.16	49.03	Compliant
EVDO 100%	Single Carrier	Low	46.03	48.96	Compliant
		Middle	46.11	49.02	Compliant
		High	46.13	49.06	Compliant
	Two Carriers	Low	46.09	49.01	Compliant
		Middle	46.12	49.03	Compliant
		High	46.17	49.10	Compliant
	Three Carriers	Low	46.05	49.01	Compliant
		Middle	46.06	49.01	Compliant
		High	45.99	48.95	Compliant
	Four Carriers	Low	46.12	49.04	Compliant
		Middle	46.10	49.02	Compliant
		High	46.15	49.07	Compliant

8 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

9 OCCUPIED BANDWIDTH

9.1 Standard Applicable

CFR 47 §2.1049

The occupied bandwidth, 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 (as 99% Bandwidth)

9.2 Test setup

Please refer the section § 6.2 Configuration of Tested System.

9.3 Test Procedure

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached. The input signal level is – 10dBm.
3. The spectrum analyzer was setup to measure the Occupied Bandwidth (defined as the 99% Power Bandwidth).
4. The Occupied Bandwidth was measured at the input and output ports of the EUT at low, middle and high channel of each type of modulation and each type of carrier signal.

9.4 Test Result

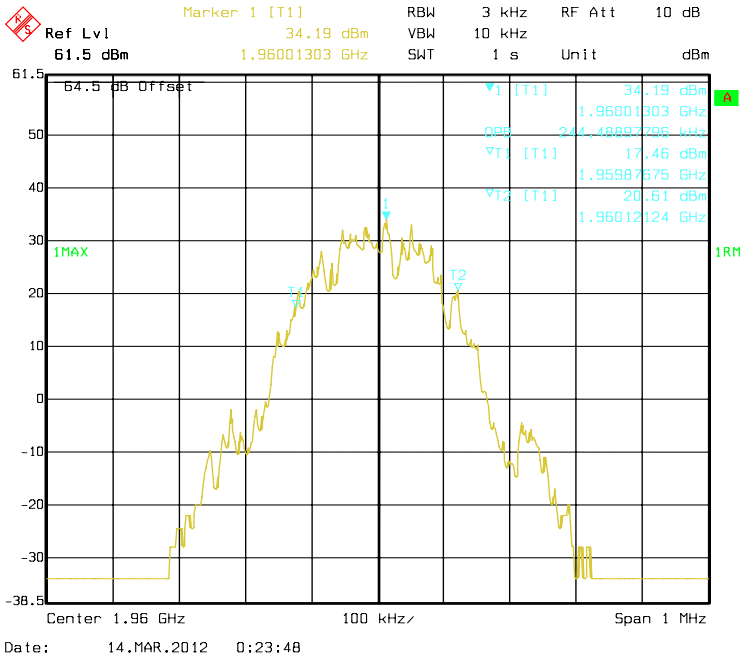
Remark:

only middle channel of comparison of input/output is list in the following pages.

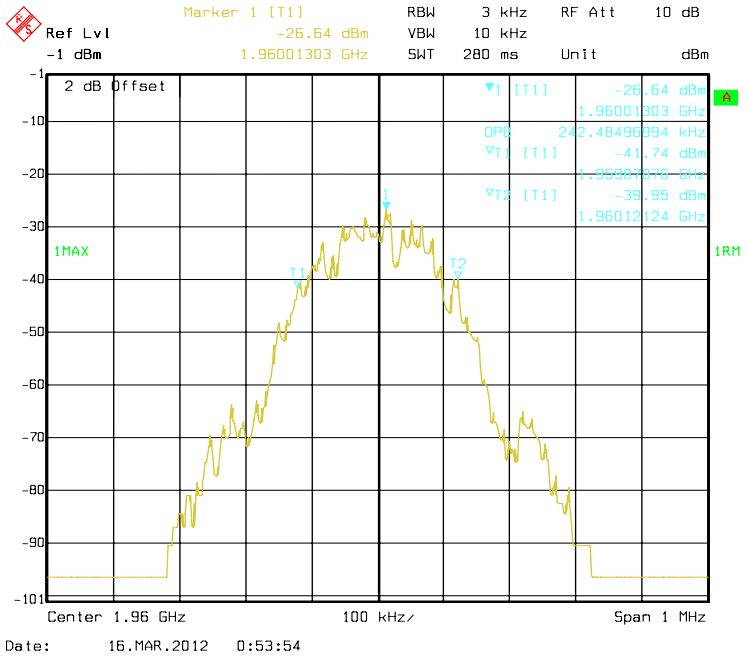
Input/output Bandwidth Comparison for GSM

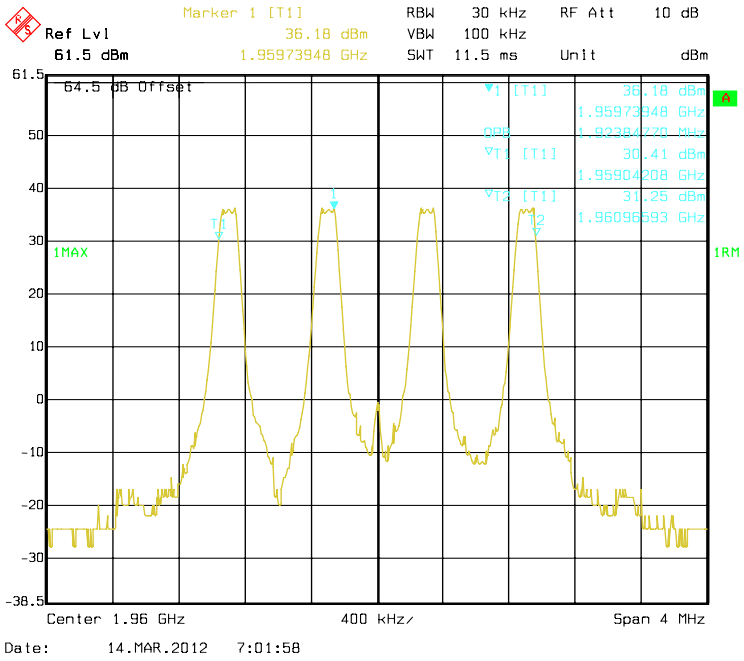
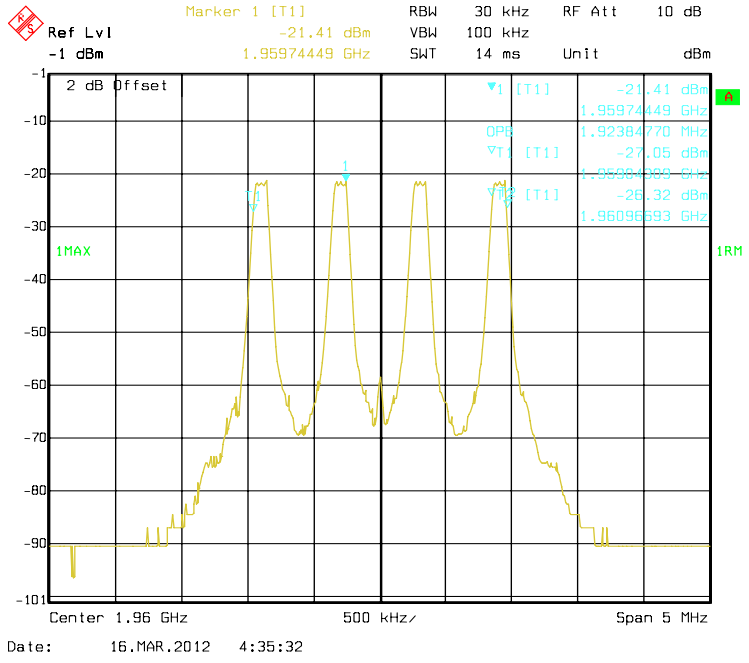
1. Number of Carriers: Single carrier

Output(Middle channel)



Input(Middle channel)

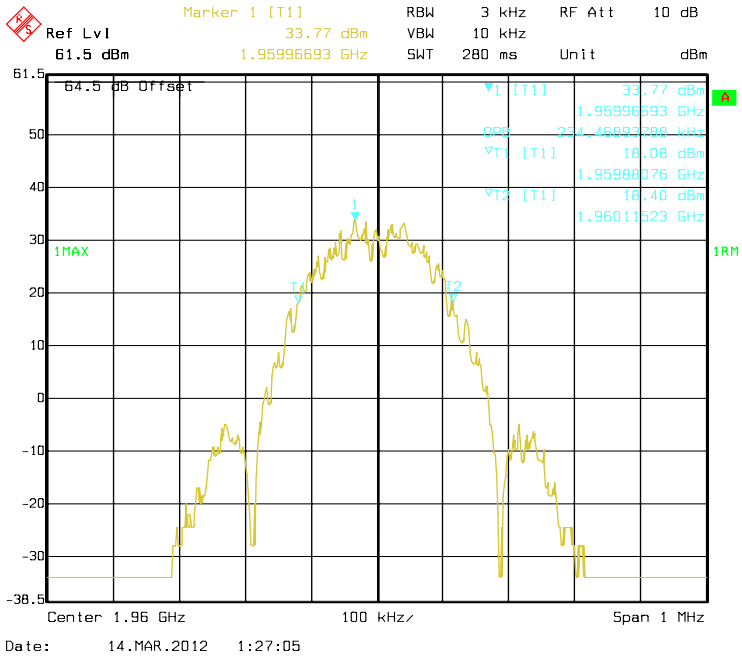


2. Number of Carriers: Four carriers
Output(Middle channel)

Input(Middle channel)


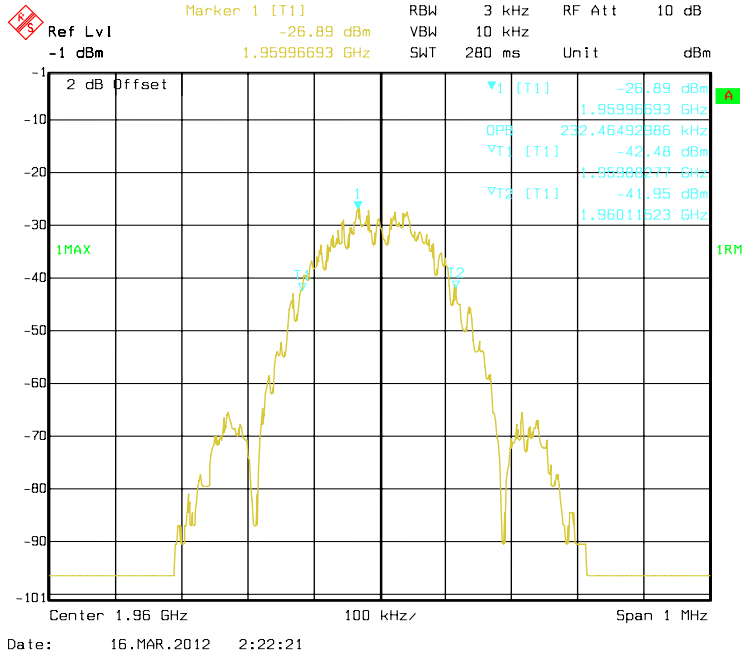
Input/output Bandwidth Comparison for EDGE

1. Number of Carriers: Single carrier

Output(Middle channel)

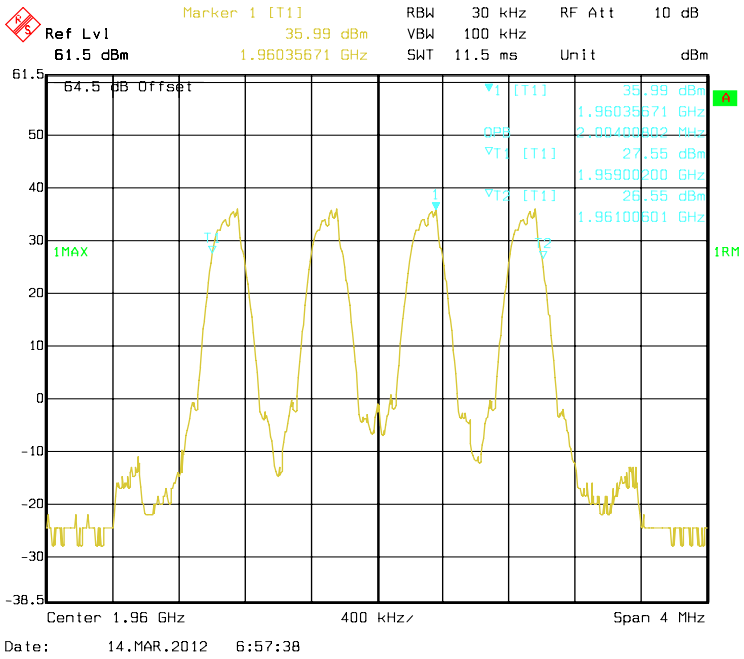


Input(Middle channel)

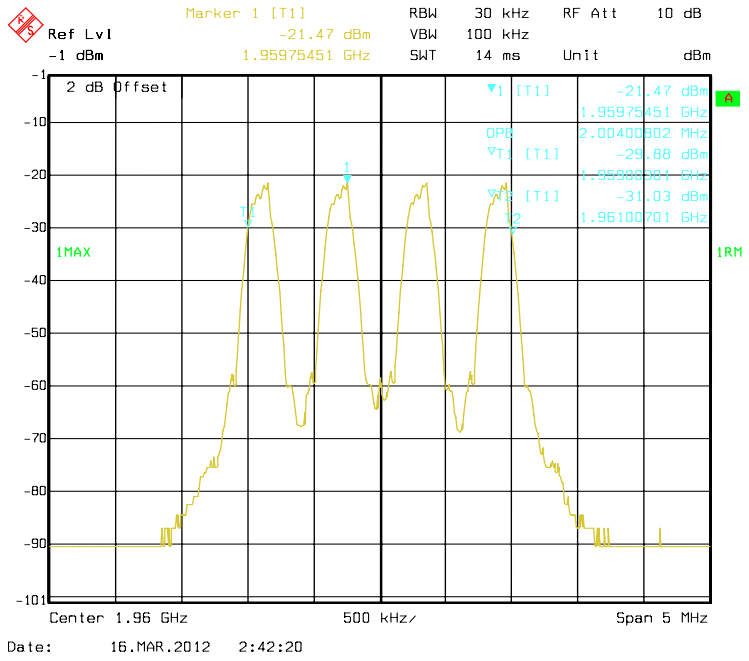


2. Number of Carriers: Four carriers

Output(Middle channel)



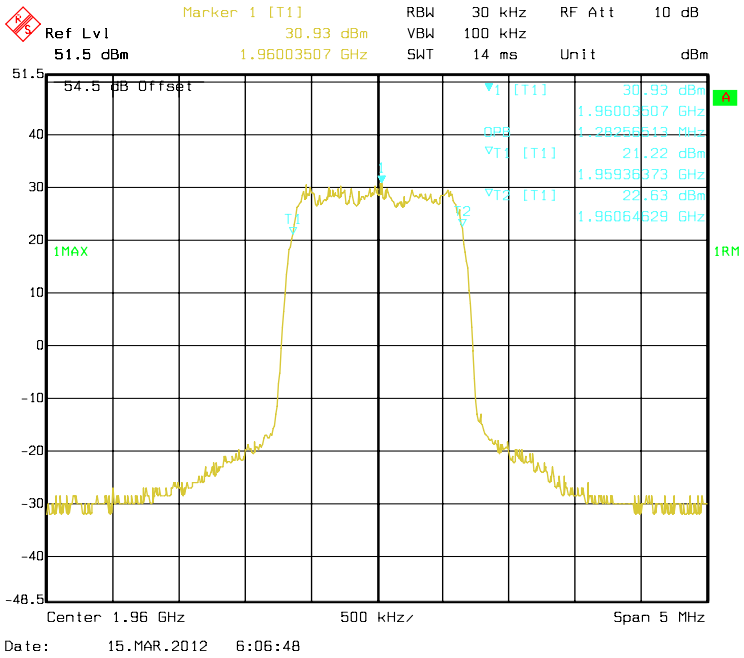
Input(Middle channel)



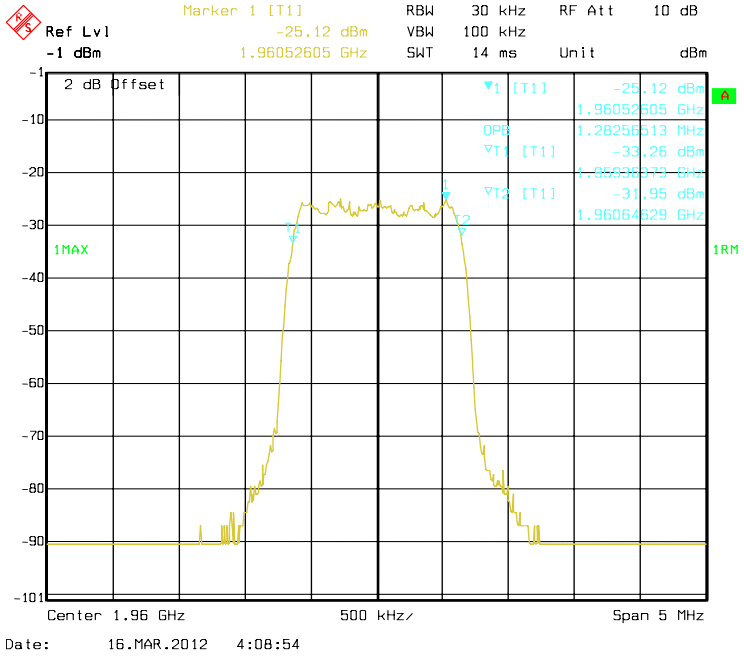
Input/output Bandwidth Comparison for CDMA

1. Number of Carriers: Single carrier

Output(Middle channel)

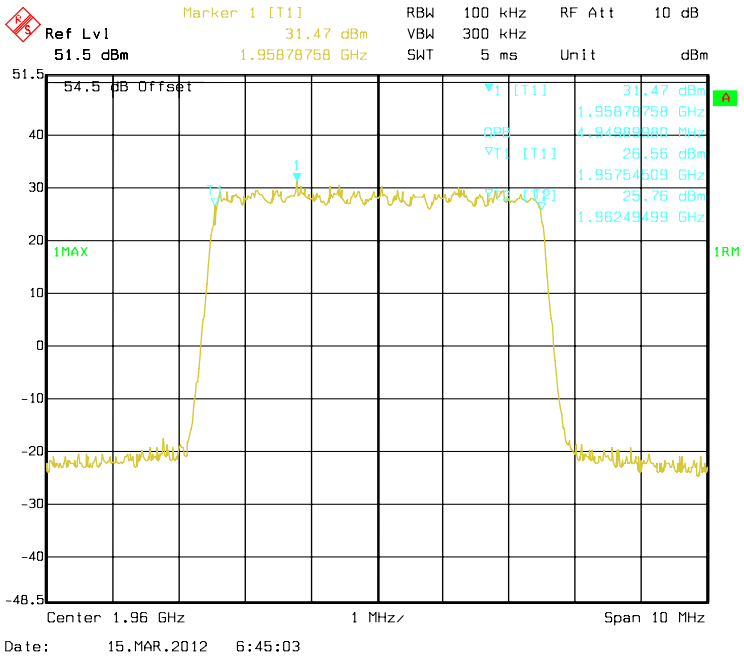


Input(Middle channel)

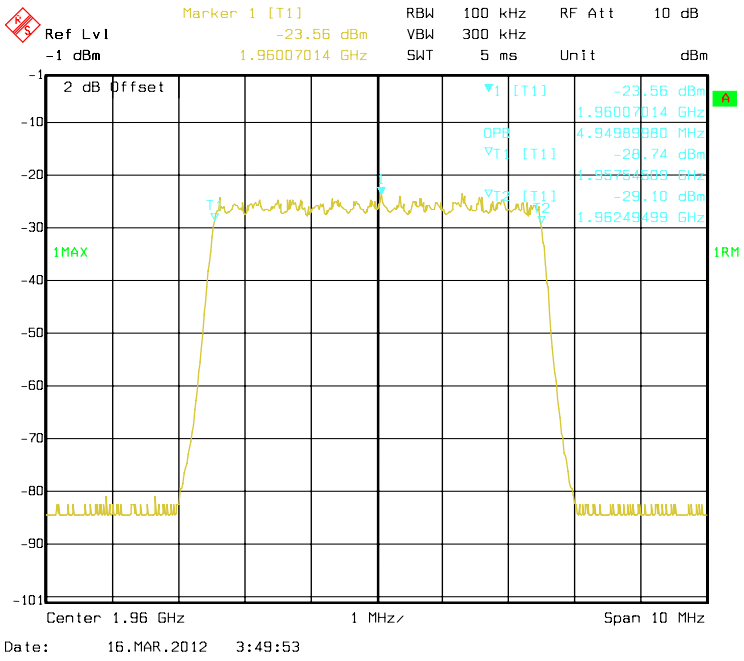


2. Number of Carriers: Four carriers

Output(Middle channel)



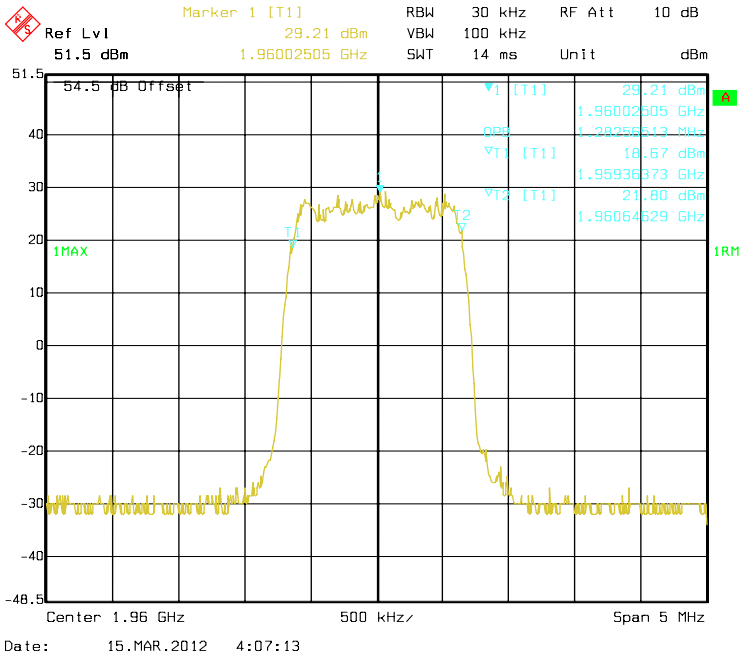
Input(Middle channel)



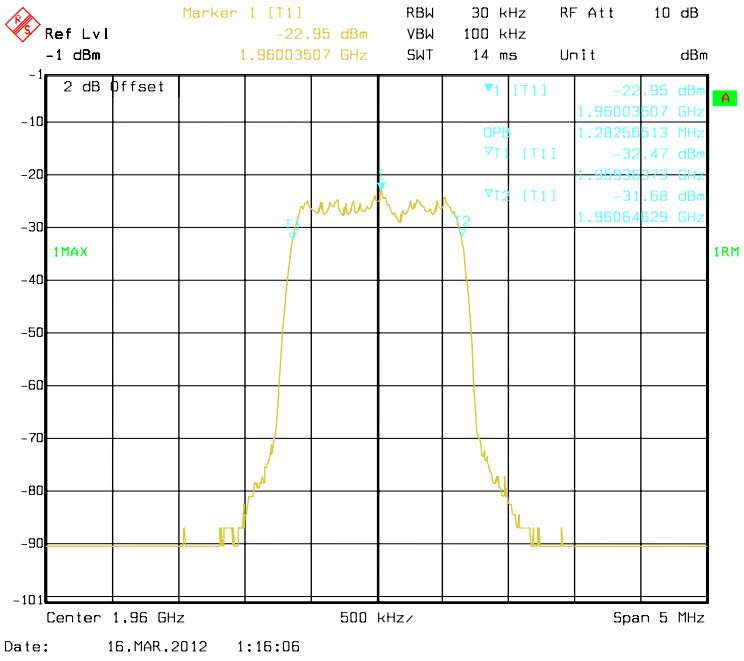
Input/output Bandwidth Comparison for EVDO(0%)

1. Number of Carriers: Single carrier

Output(Middle channel)

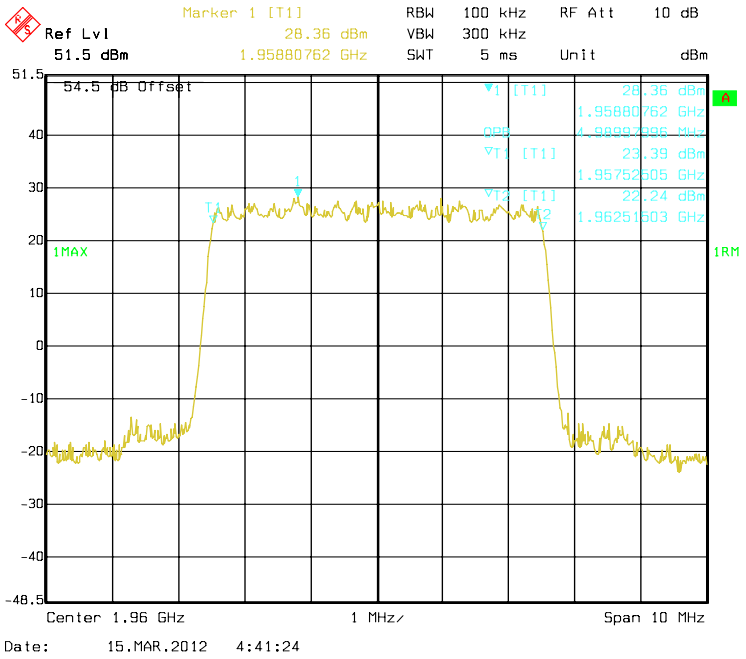


Input(Middle channel)

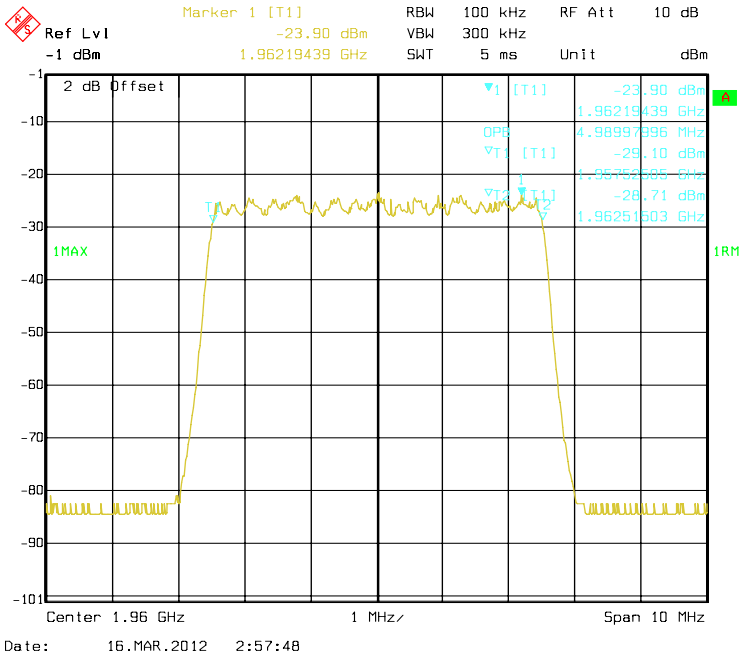


2. Number of Carriers: Four carriers

Output(Middle channel)



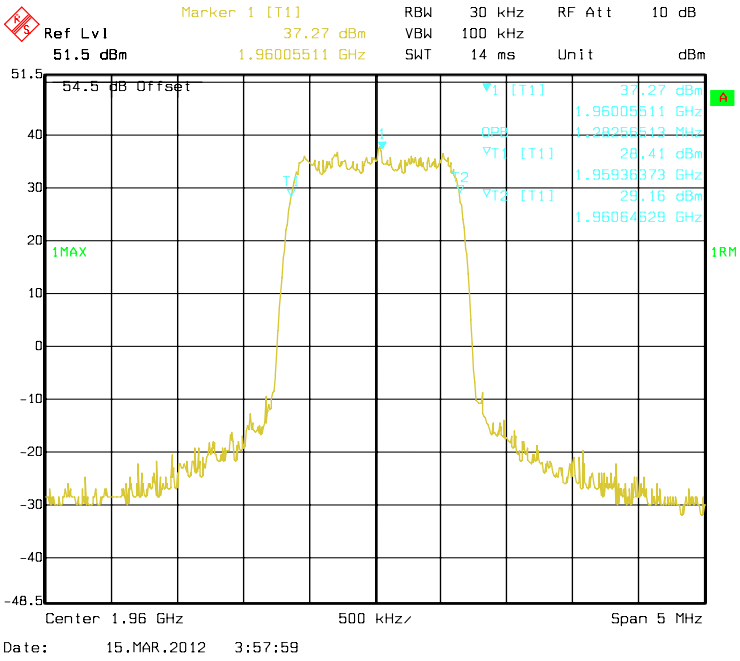
Input(Middle channel)



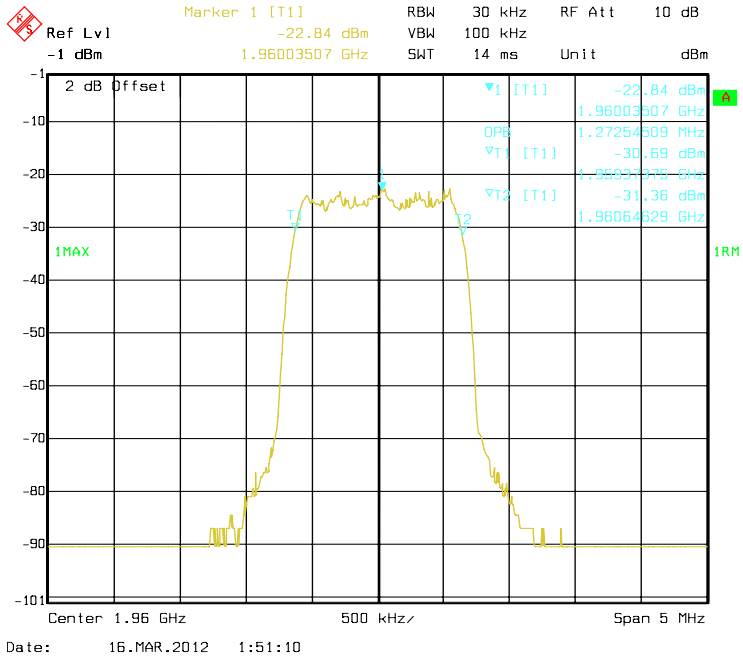
Input/output Bandwidth Comparison for EVDO(50%)

1. Number of Carriers: Single carrier

Output(Middle channel)

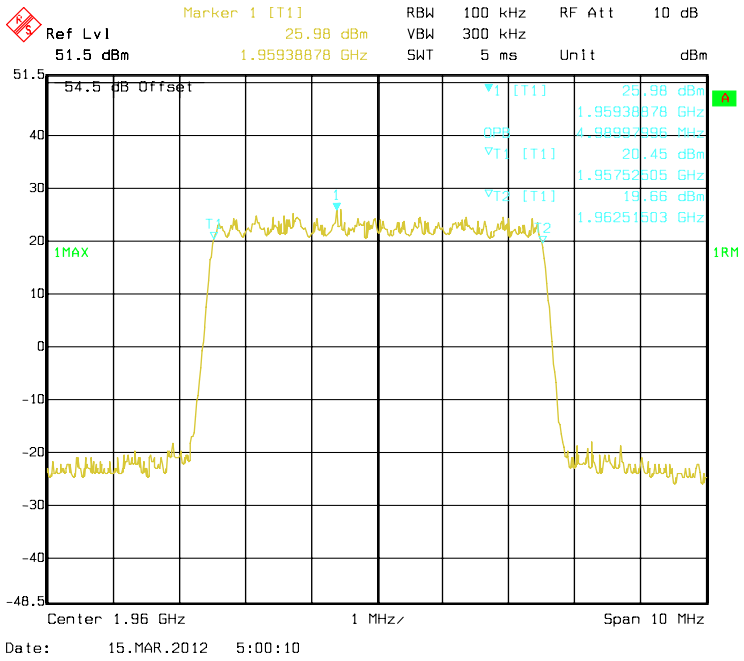


Input(Middle channel)

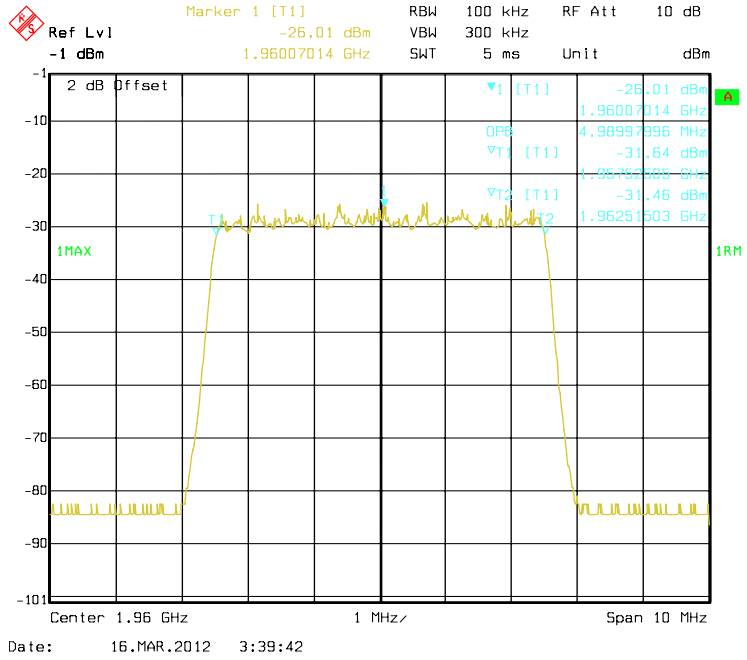


2. Number of Carriers: Four carriers

Output(Middle channel)



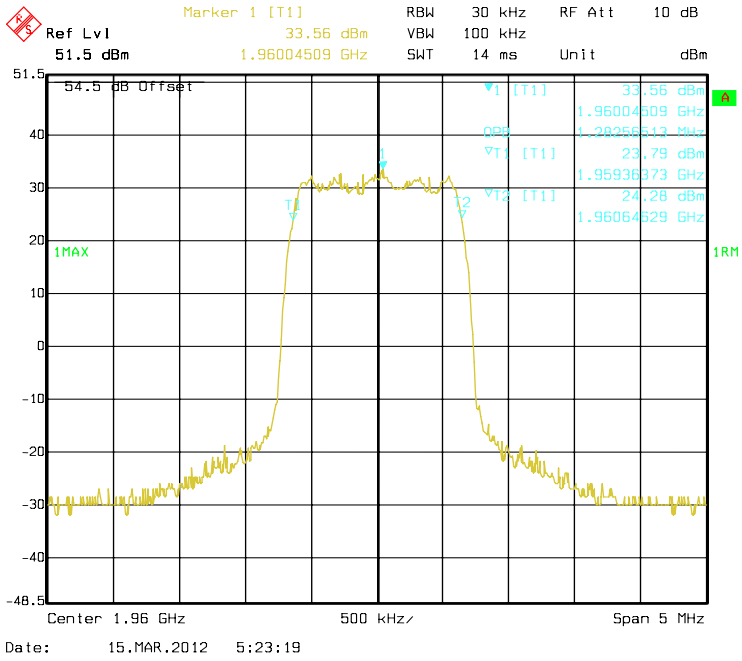
Input(Middle channel)



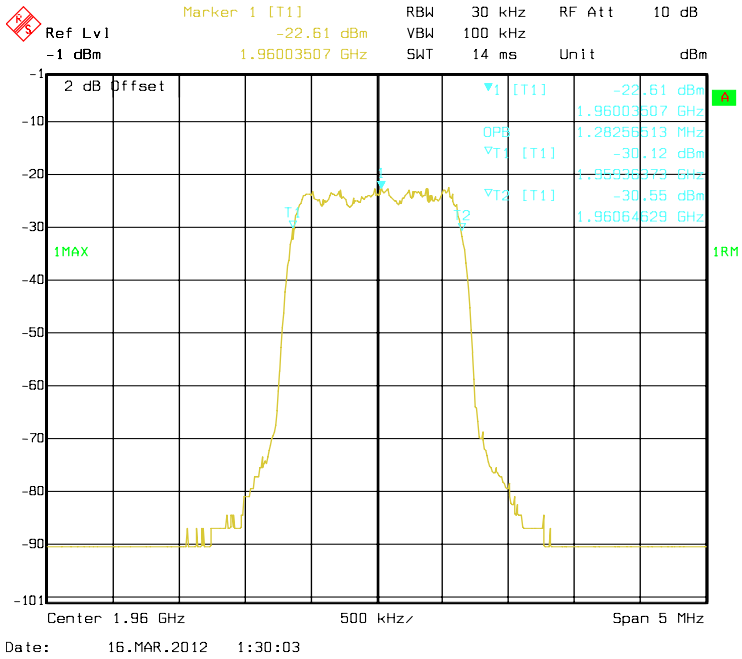
Input/output Bandwidth Comparison for EVDO(100%)

1. Number of Carriers: Single carrier

Output(Middle channel)

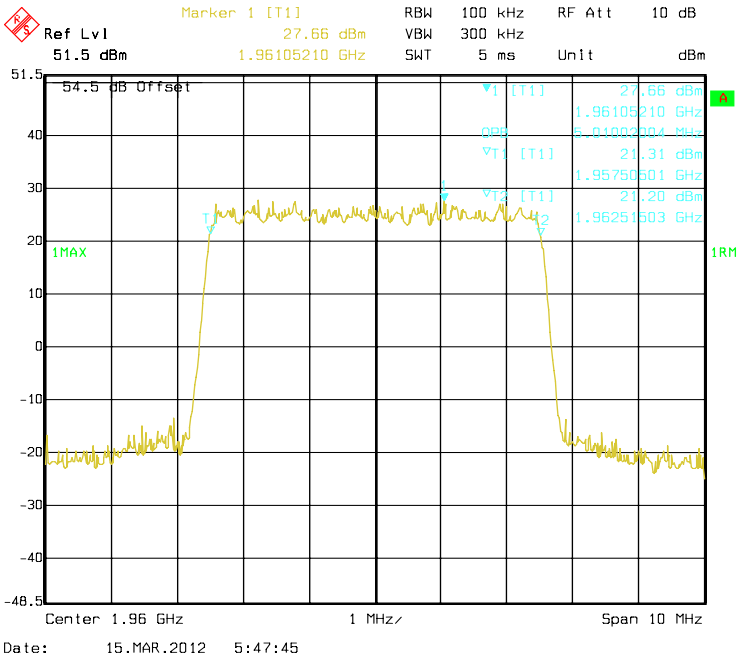


Input(Middle channel)

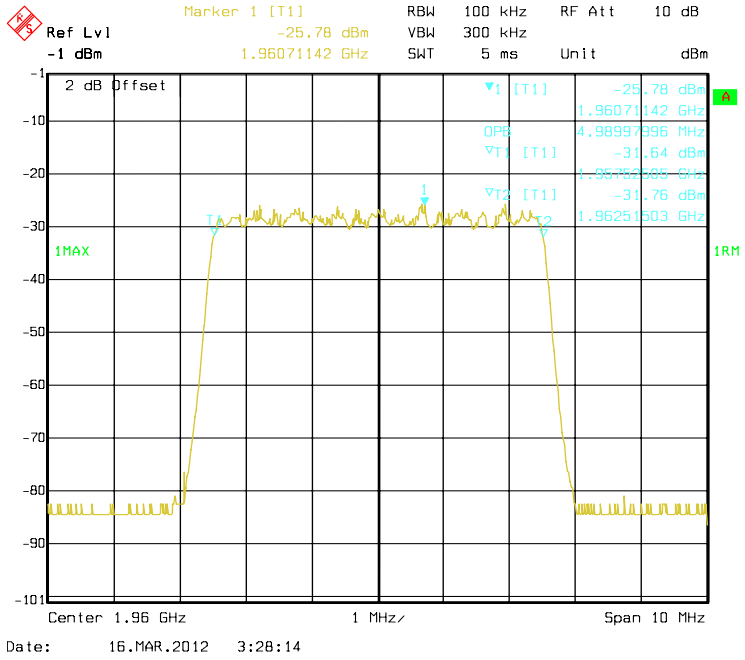


2. Number of Carriers: Four carriers

Output(Middle channel)



Input(Middle channel)



10 OUT OF BAND EMISSION AT ANTENNA TERMINALS

10.1 Standard Applicable

According to FCC §2.1051.and FCC §24.238(a),

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.

The following method was used to determine the Limit for Spurious Emissions:

Maximum output power in watts: P (W).

The emission must be reduced by 43+10Log(P) dB

Therefore, the Emission Limit equals:

10Log(P) dBW + 30dB – (43+10Log(P) dB) = – 13 dBm

10.2 Test setup

Please refer the section § 6.2 Configuration of Tested System.

10.3 Measurement Procedure

The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10th harmonic of the highest carrier frequency. Test signals used are GSM, EDGE, CDMA, and EVDO. The different signals were input one at a time to the EUT. Tests were performed with GSM/EDGE/CDMA/EVDO signal input and multi-carrier signal mode input.

Band edge compliance is also demonstrated using a GSM, EDGE, CDMA, and EVDO signal at the upper and lower limits of the band.

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
3. The spurious emissions at antenna were measured at the RF output port of the EUT at middle channel of each type of modulation.
4. The spectrum analyzer resolution bandwidth (RBW) was set to 1 MHz for above 1 GHz and 100 kHz for the below 1GHz.

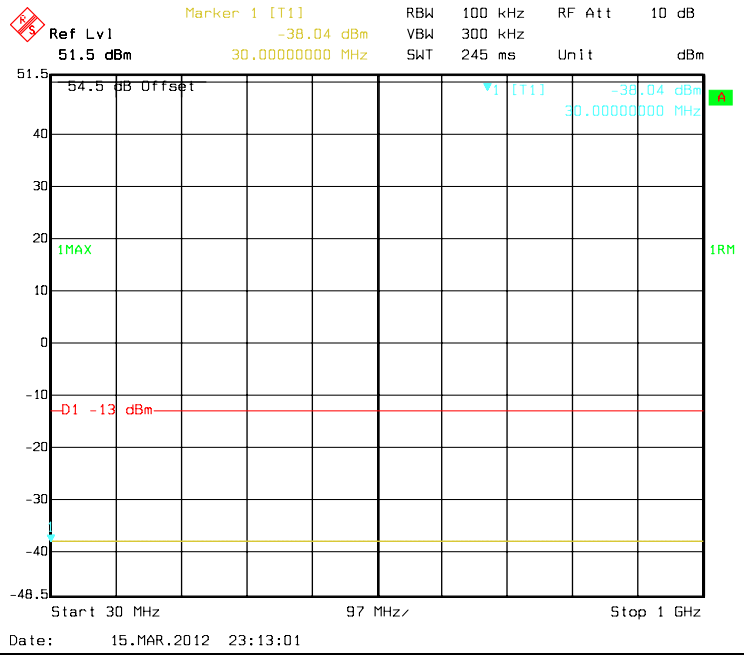
10.4 Measurement Result

10.4.1 Spurious emission

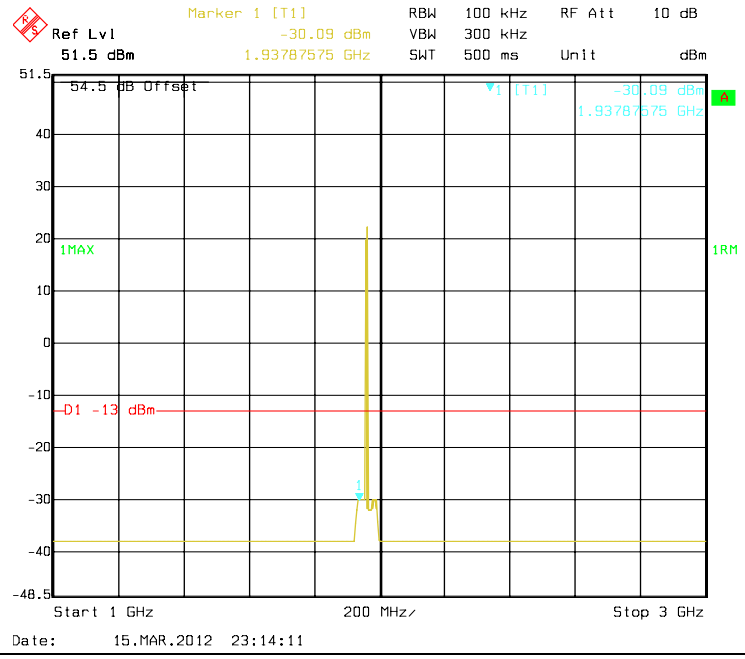
Spurious emission of GSM

1. Number of Carriers: Single carrier (Middle channel)

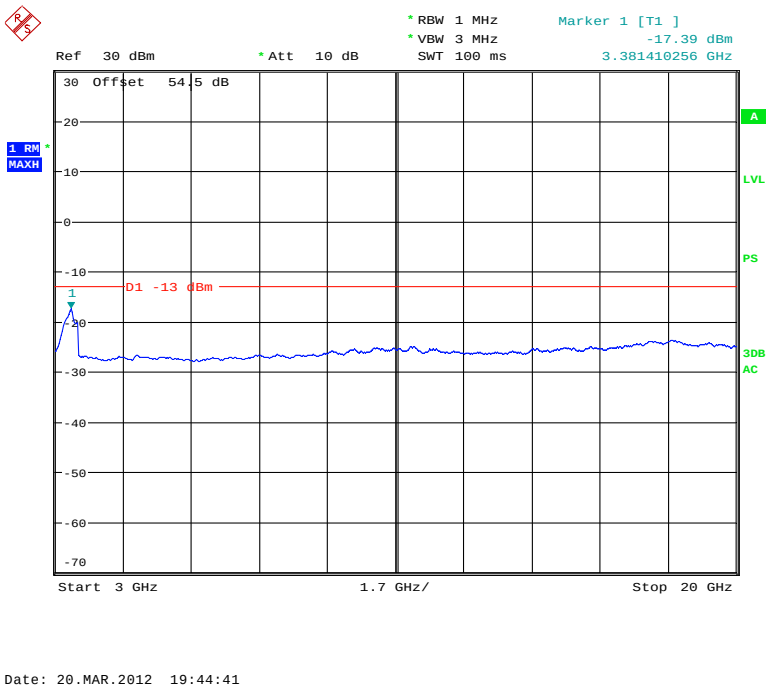
30MHz-1000MHz



1000MHz-3000MHz

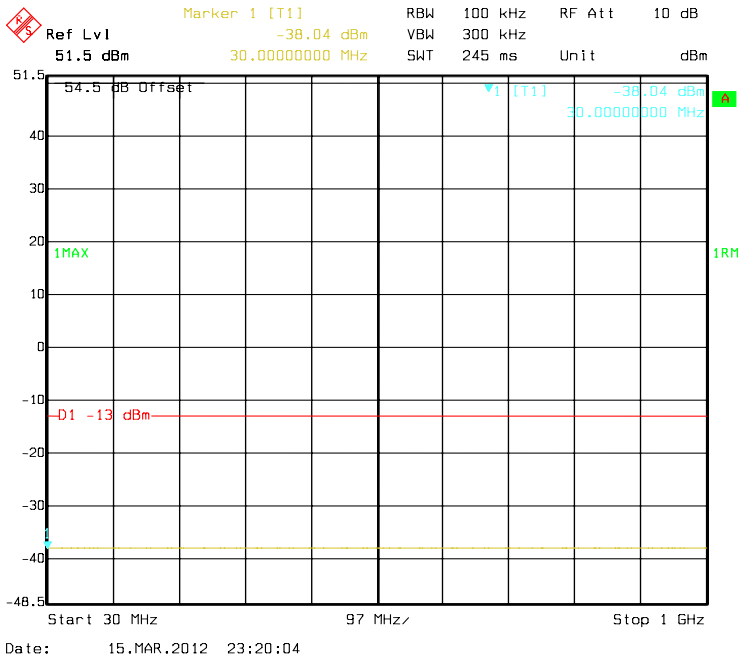


3000MHz-20000MHz

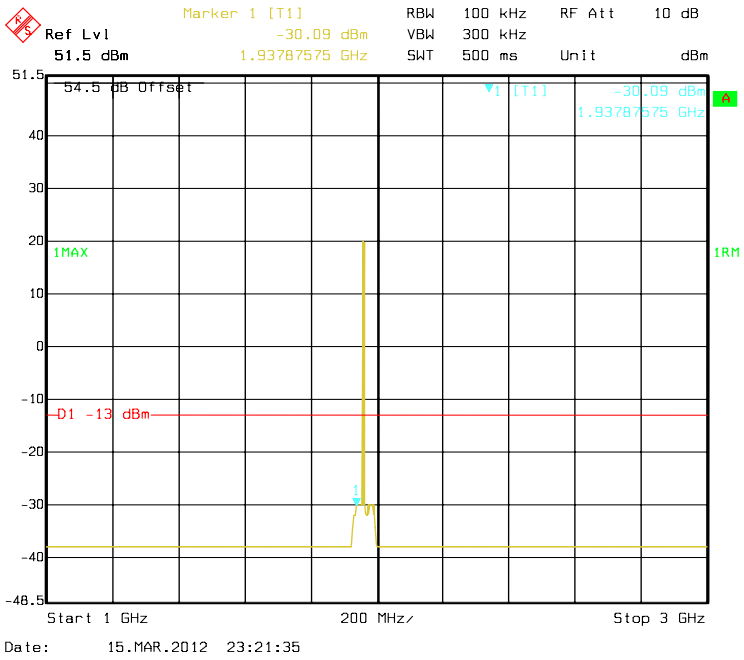


2. Number of Carriers: Four carriers (Middle channel)

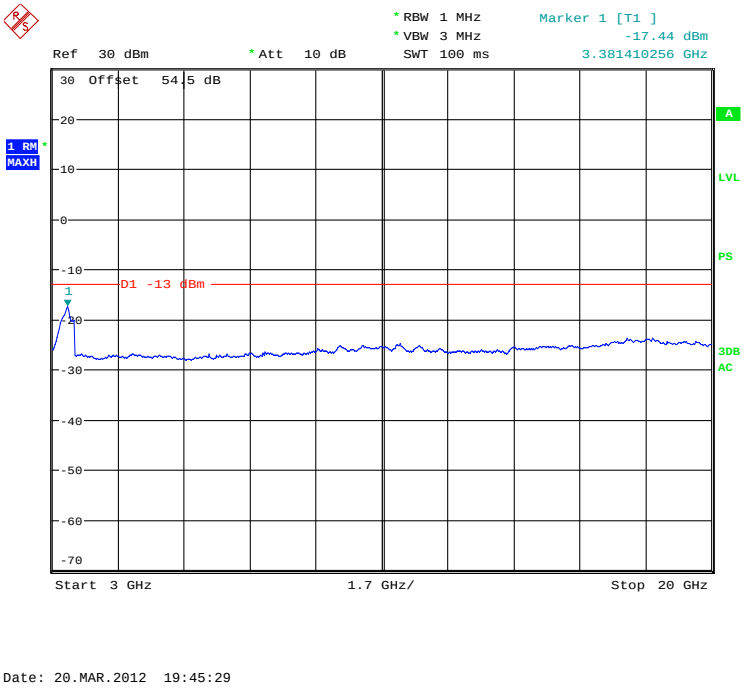
30MHz-1000MHz



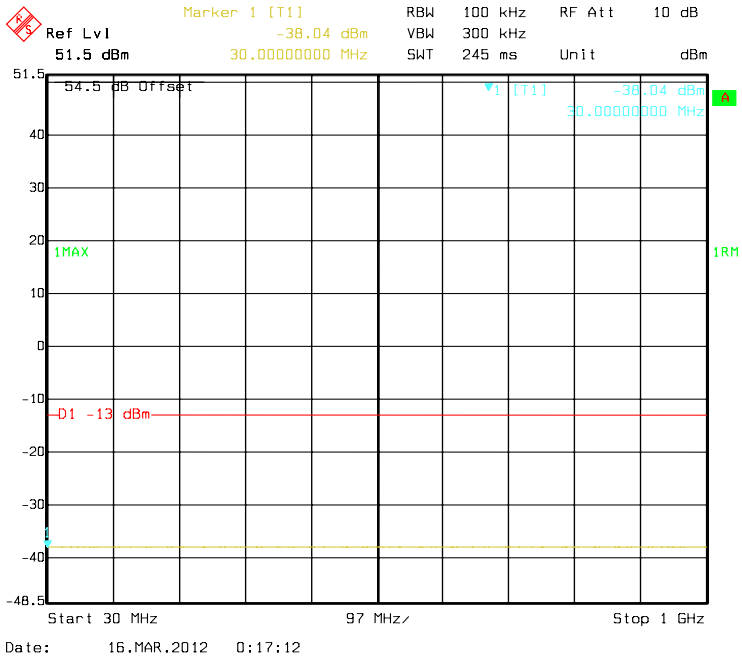
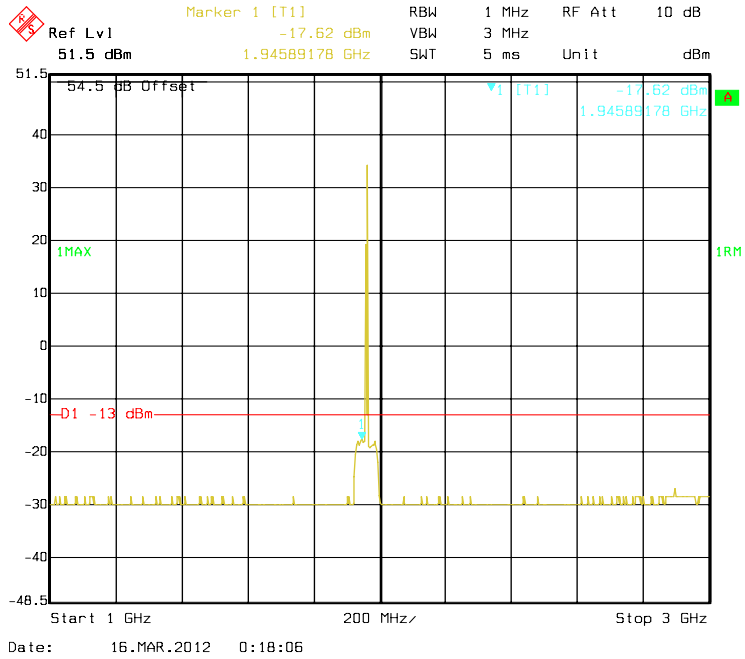
1000MHz-3000MHz



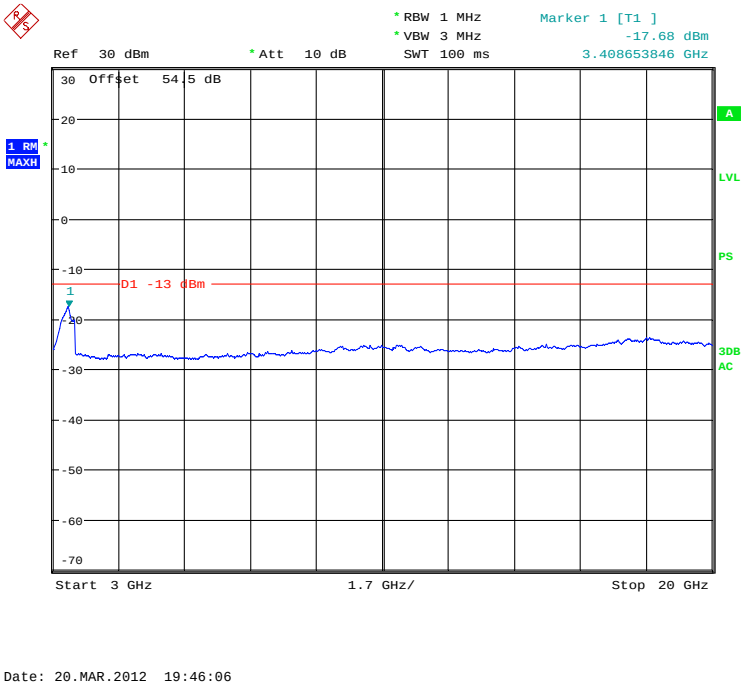
3000MHz-20000MHz



Spurious emission of EDGE

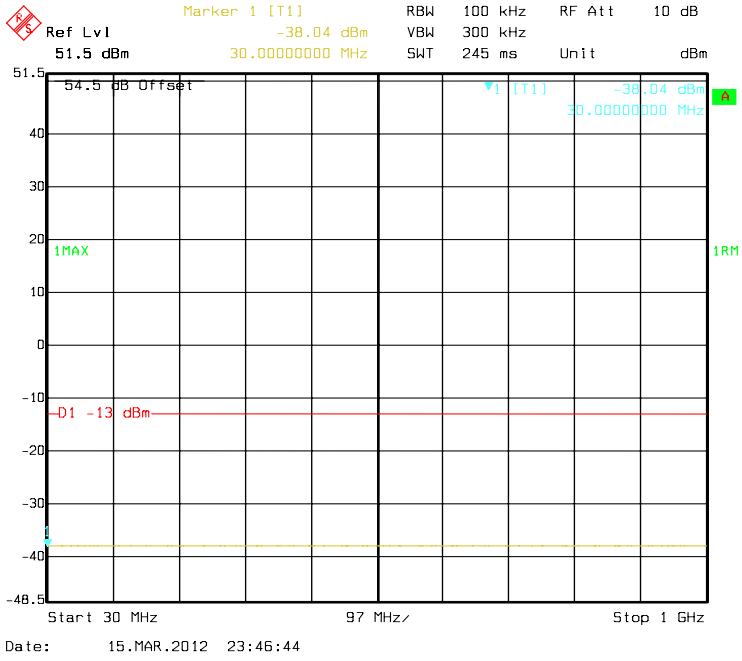
1. Number of Carriers: Single carrier (Middle channel)
30MHz-1000MHz

1000MHz-3000MHz


3000MHz-20000MHz

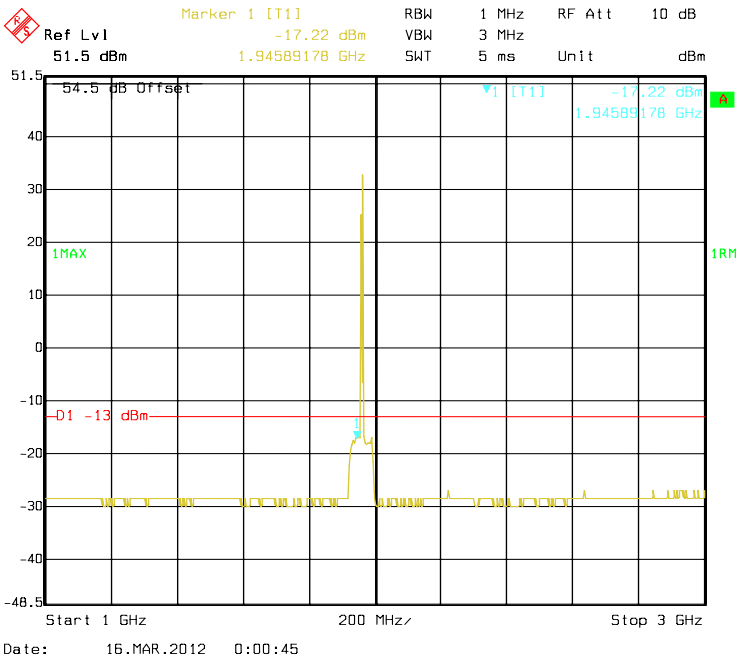


2. Number of Carriers: Four carriers (Middle channel)

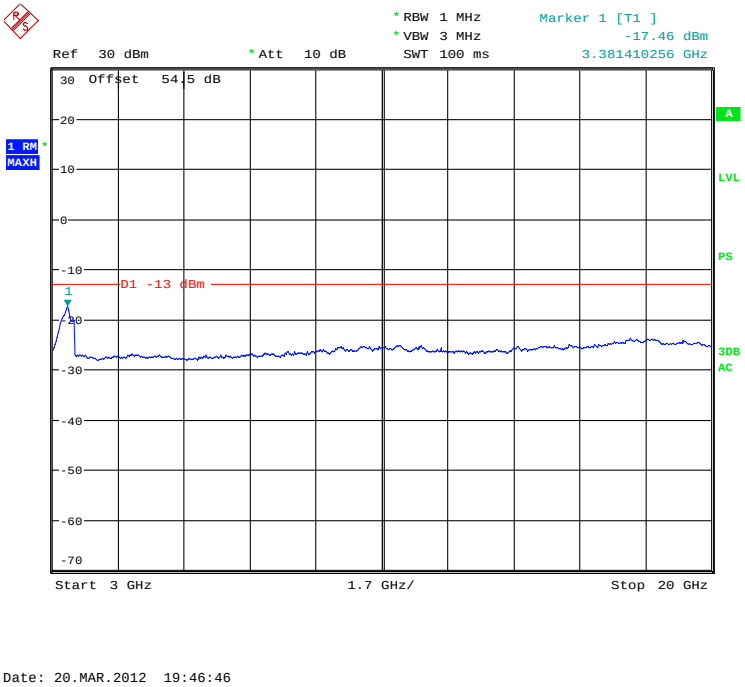
30MHz-1000MHz



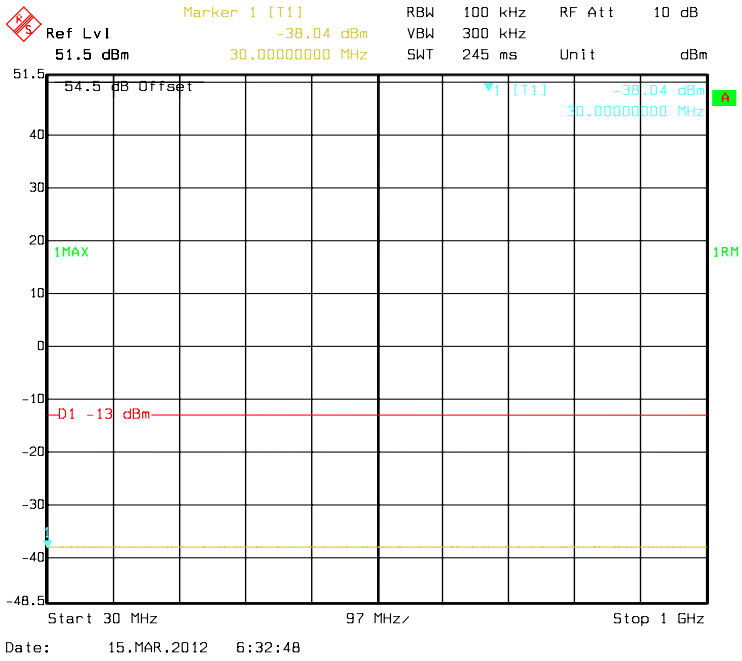
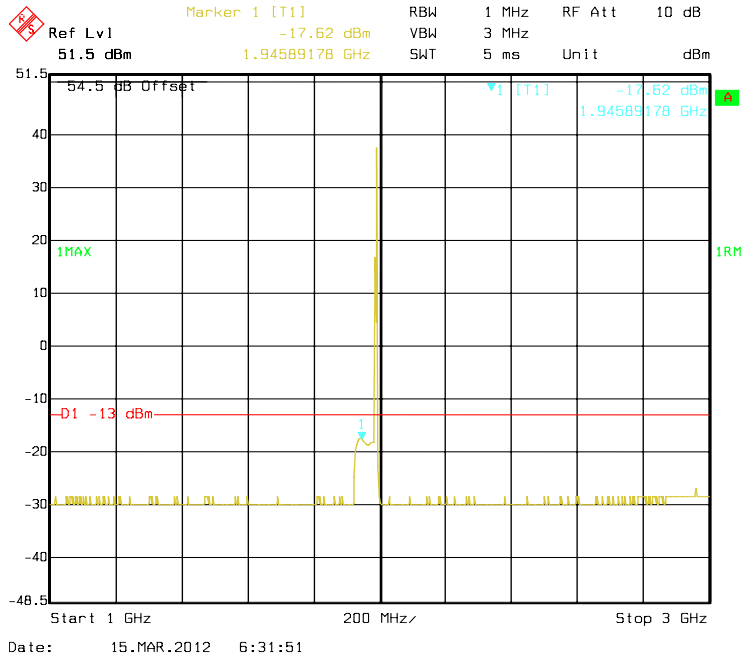
1000MHz-3000MHz



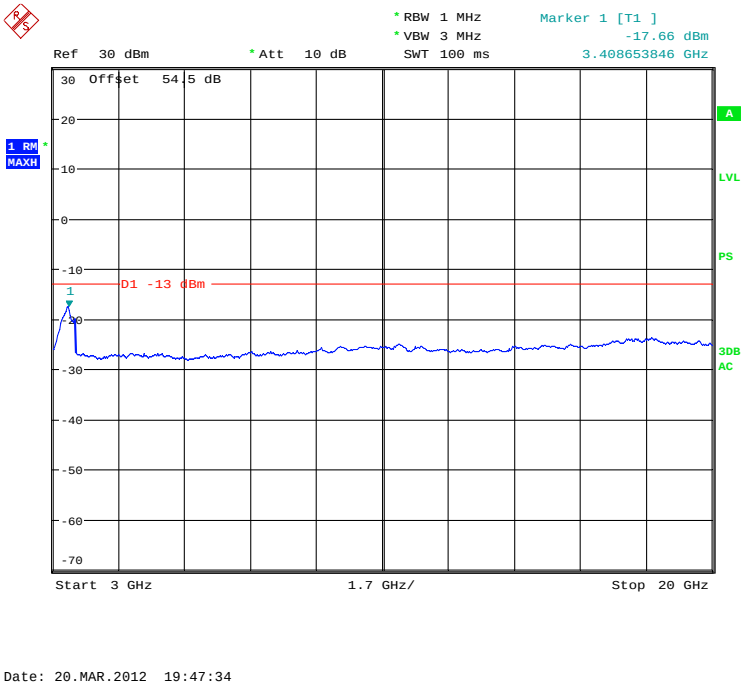
3000MHz-20000MHz



Spurious emission of CDMA

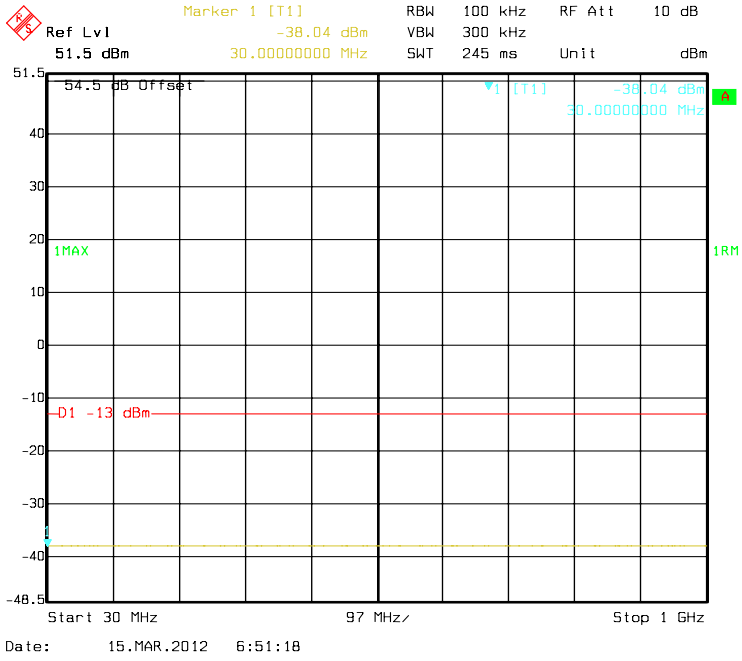
1. Number of Carriers: Single carrier (Middle channel)
30MHz-1000MHz

1000MHz-3000MHz


3000MHz-20000MHz

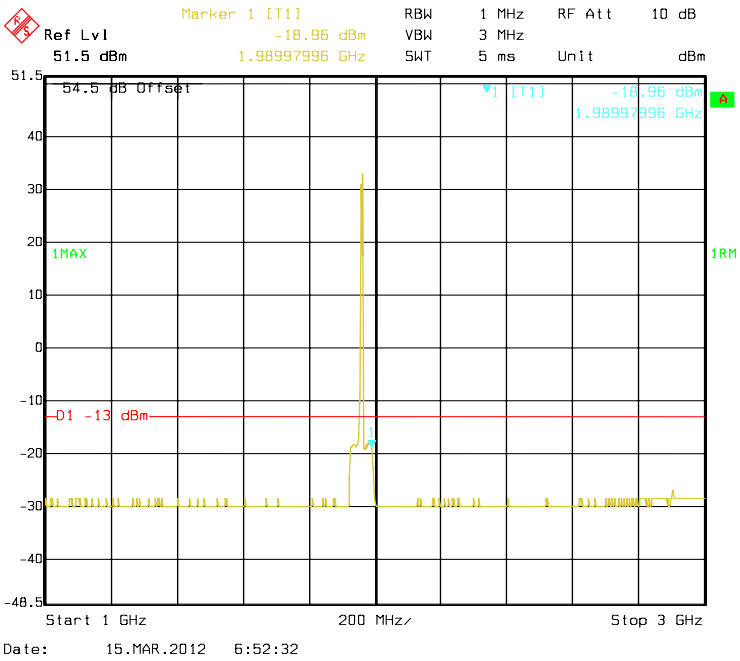


2. Number of Carriers: Four carriers (Middle channel)

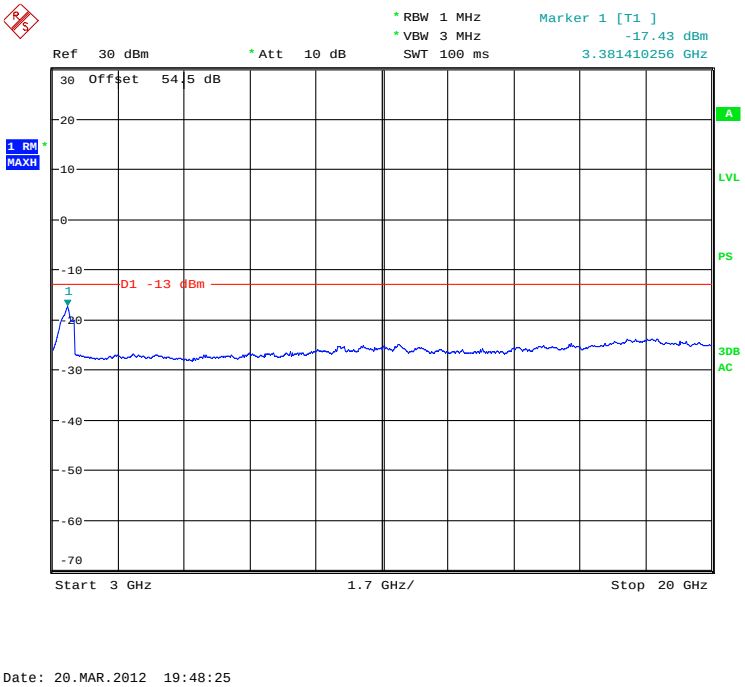
30MHz-1000MHz



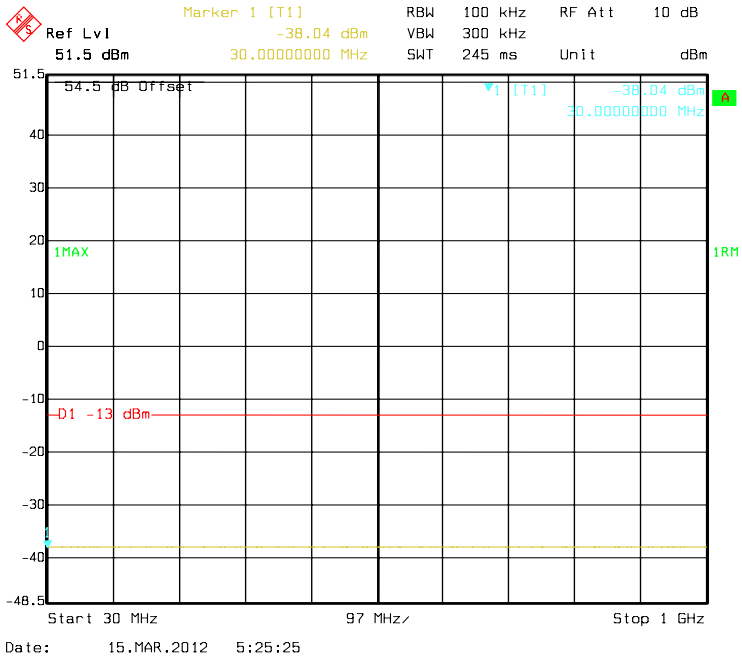
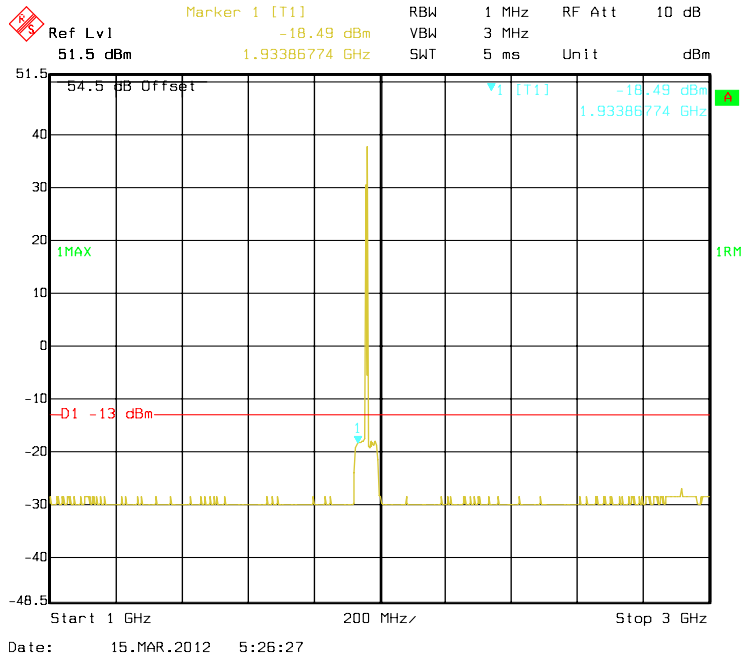
1000MHz-3000MHz



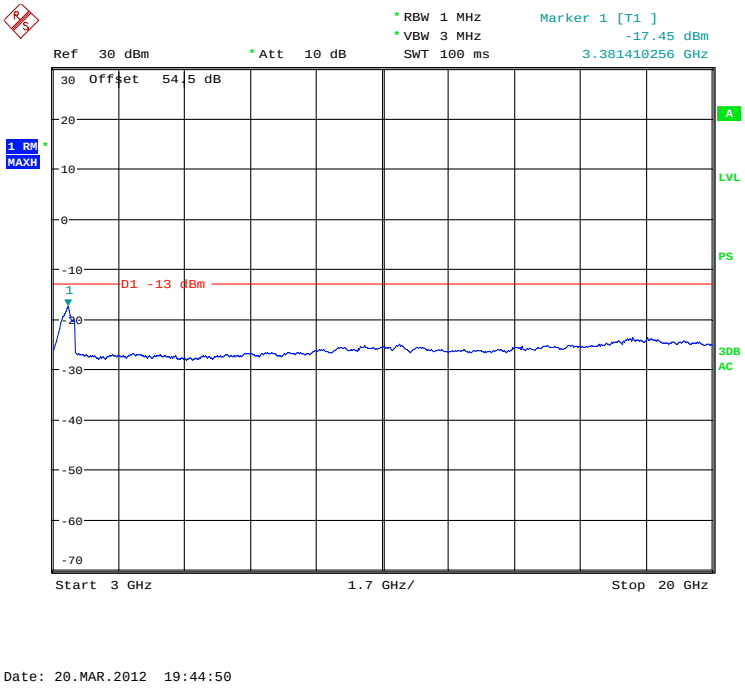
3000MHz-20000MHz



Spurious emission of EVDO (100%)

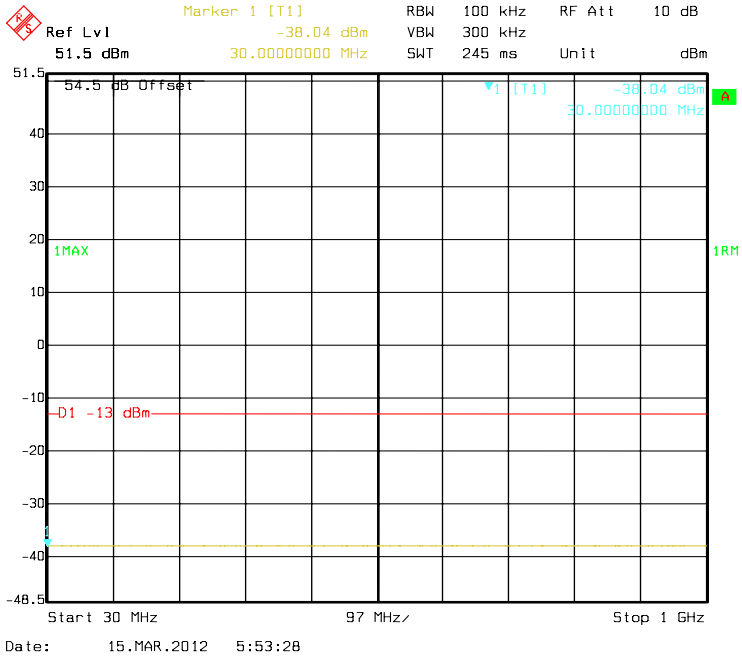
1. Number of Carriers: Single carrier (Middle channel)
30MHz-1000MHz

1000MHz-3000MHz


3000MHz-20000MHz

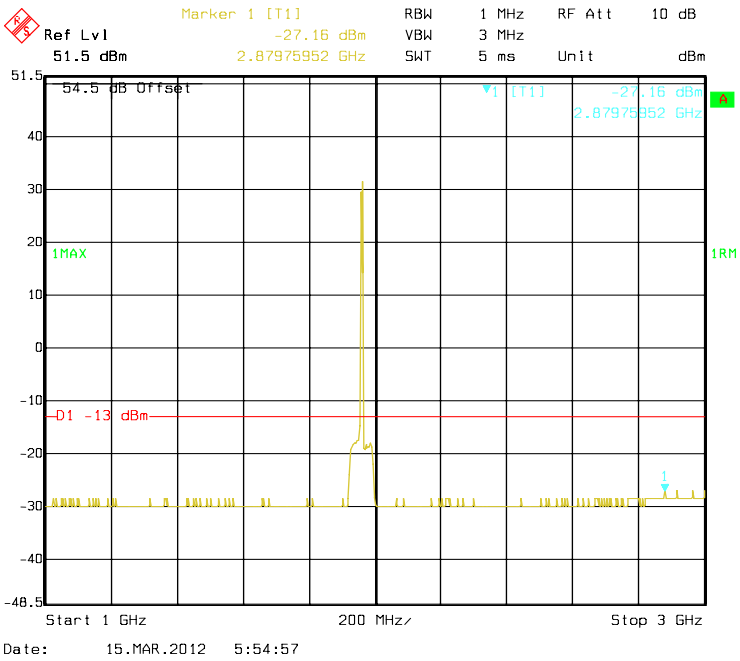


2. Number of Carriers: Four carriers (Middle channel)

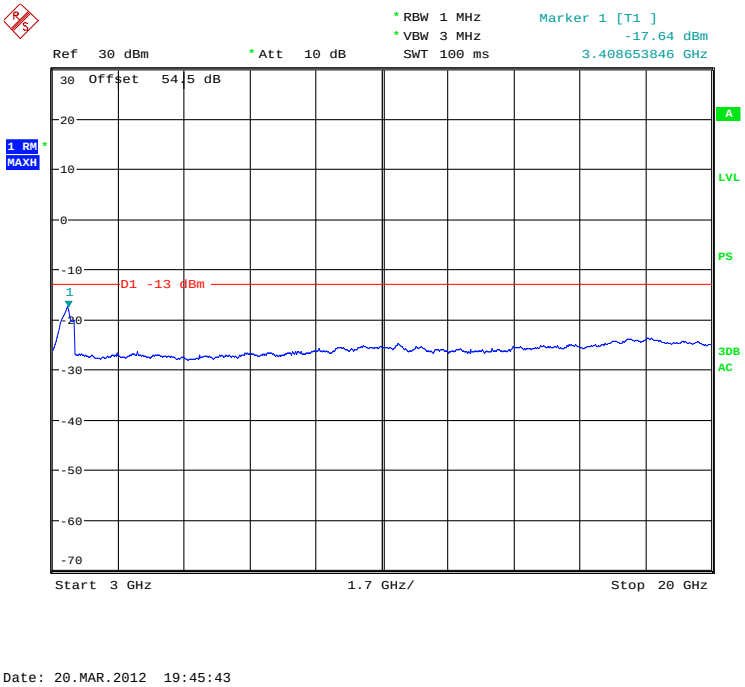
30MHz-1000MHz



1000MHz-3000MHz



3000MHz-20000MHz

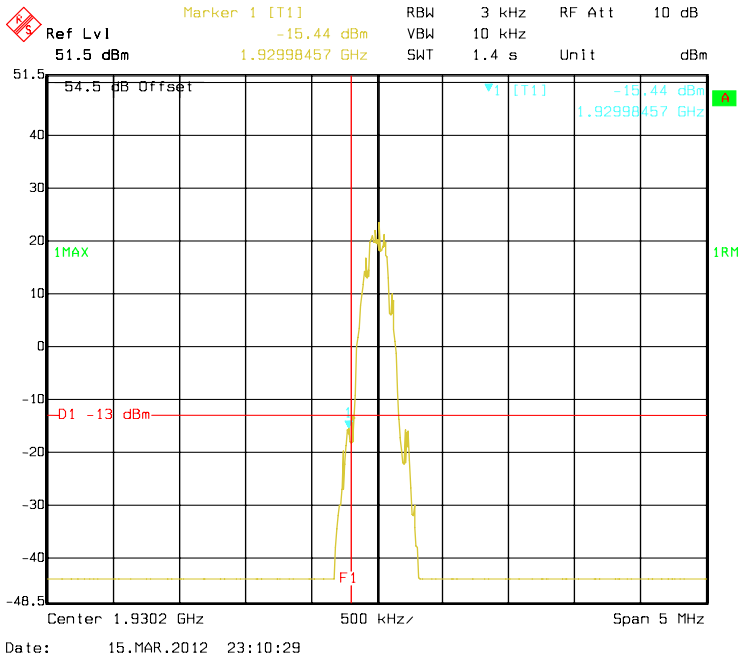


10.4.2 Band edge emission

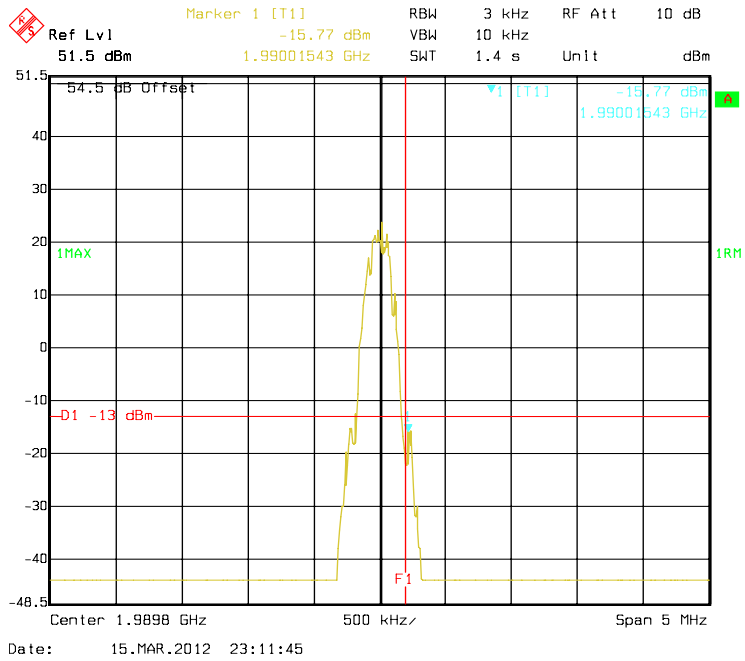
Band edge of GSM

1. Number of Carriers: Single carrier

Left edge of band

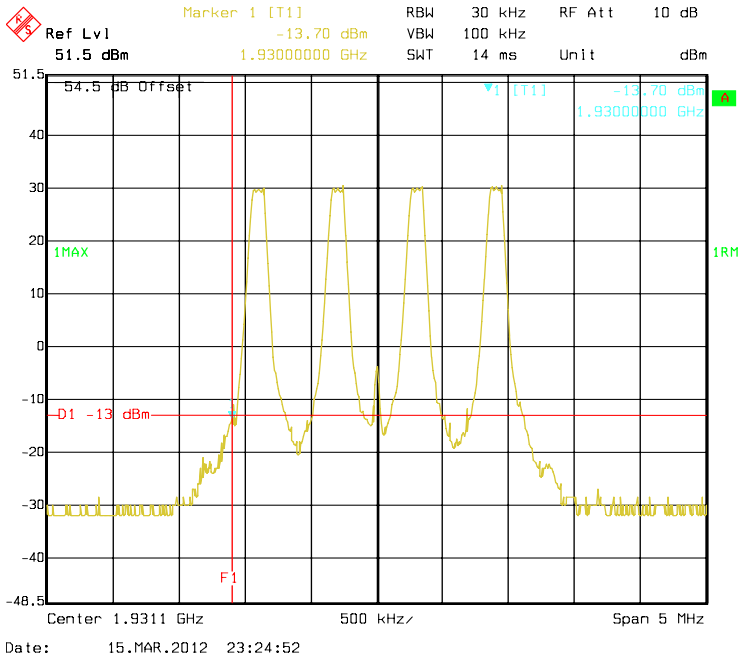


Right edge of band

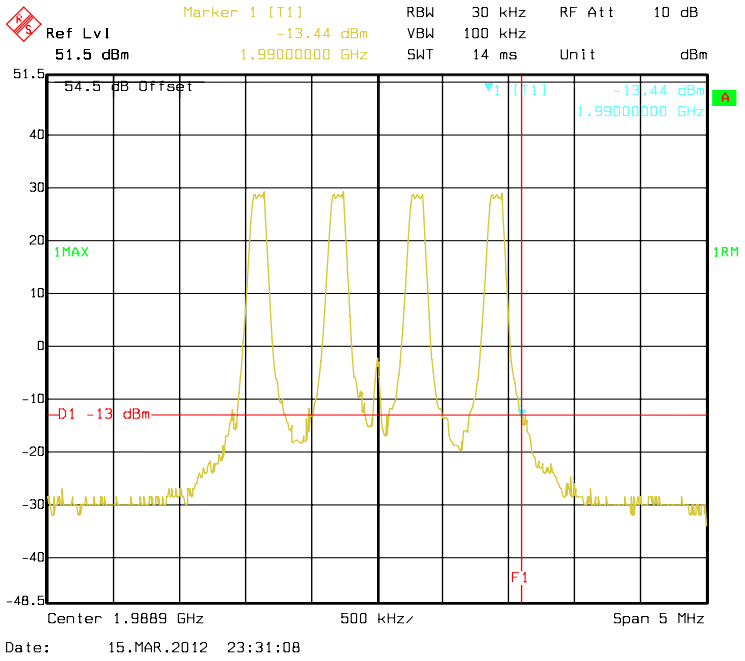


2. Number of Carriers: Four carriers

Left edge of band



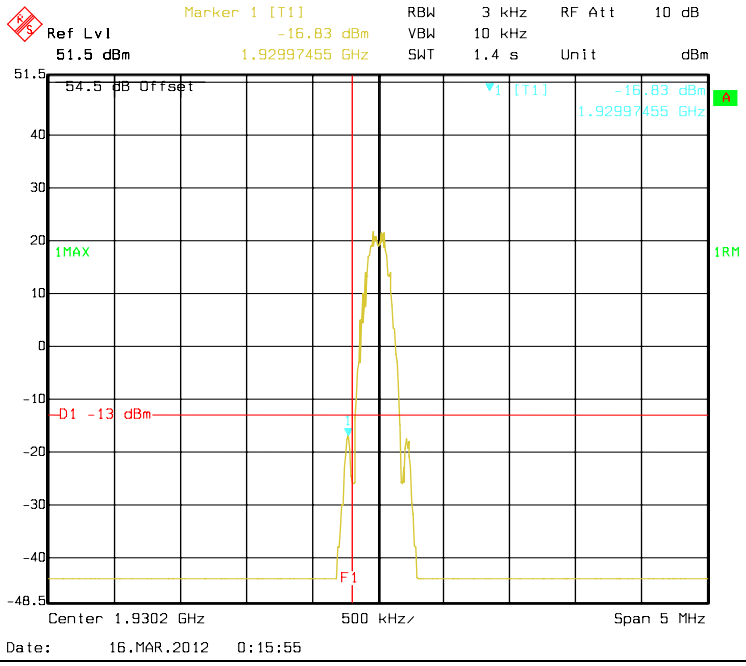
Right edge of band



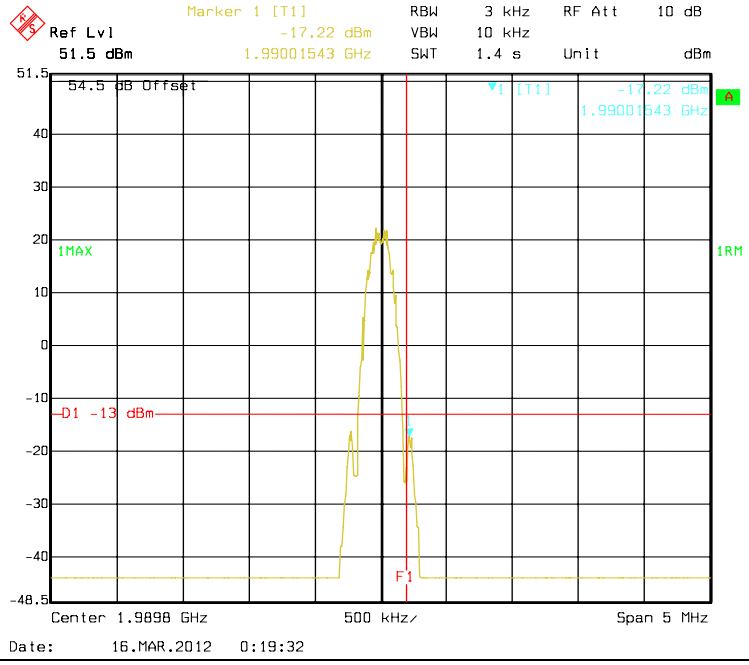
Band edge of EDGE

1. Number of Carriers: Single carrier

Left edge of band

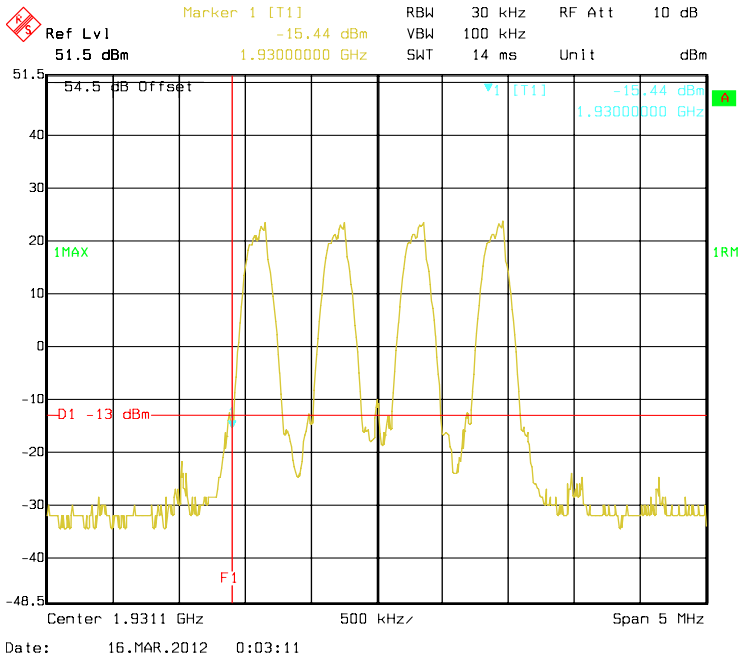


Right edge of band

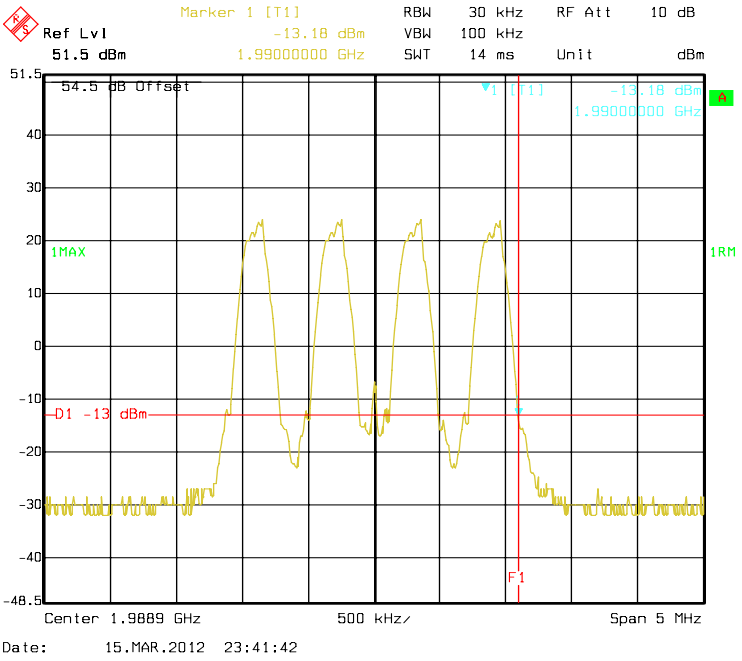


2. Number of Carriers: Four carriers

Left edge of band



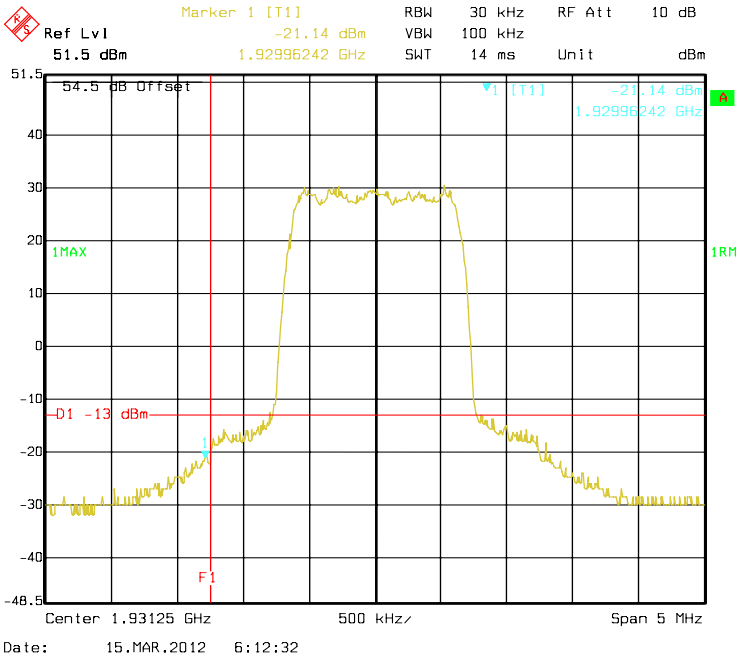
Right edge of band



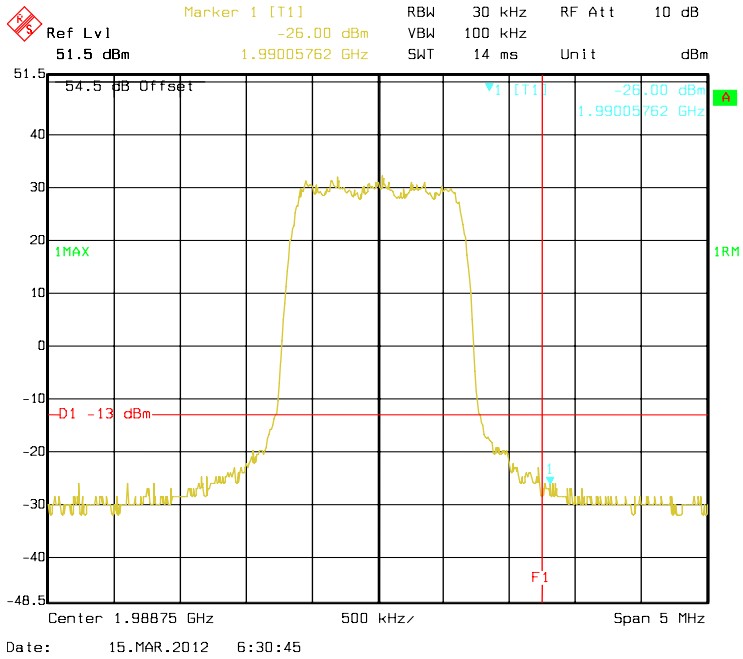
Band edge of CDMA

1. Number of Carriers: Single carrier

Left edge of band

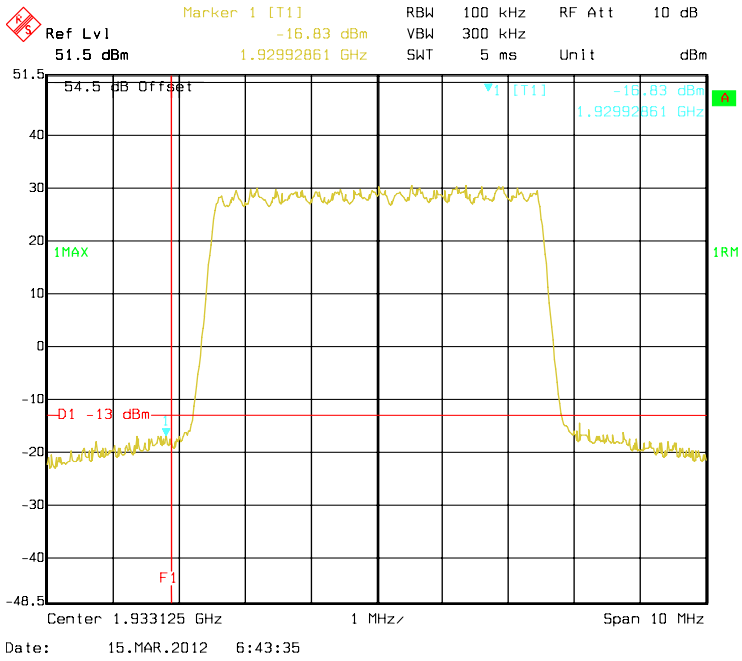


Right edge of band

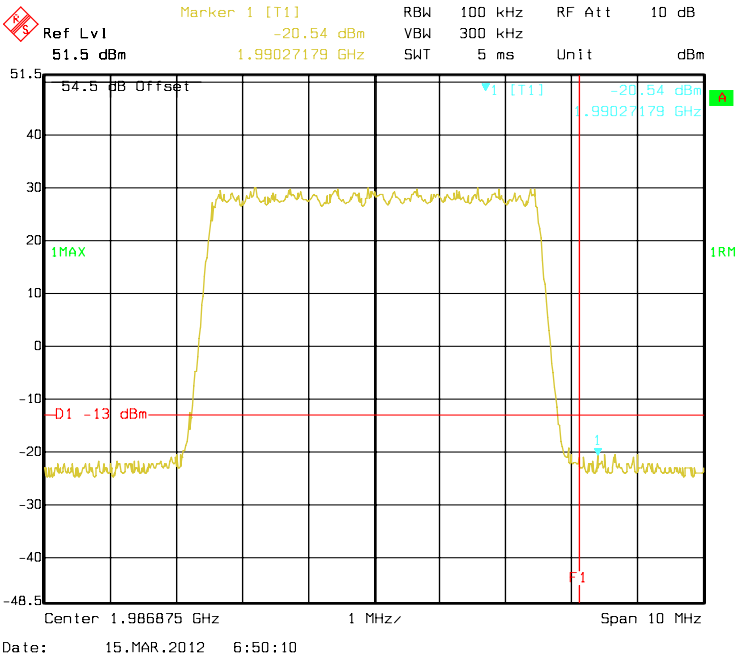


2. Number of Carriers: Four carriers

Left edge of band



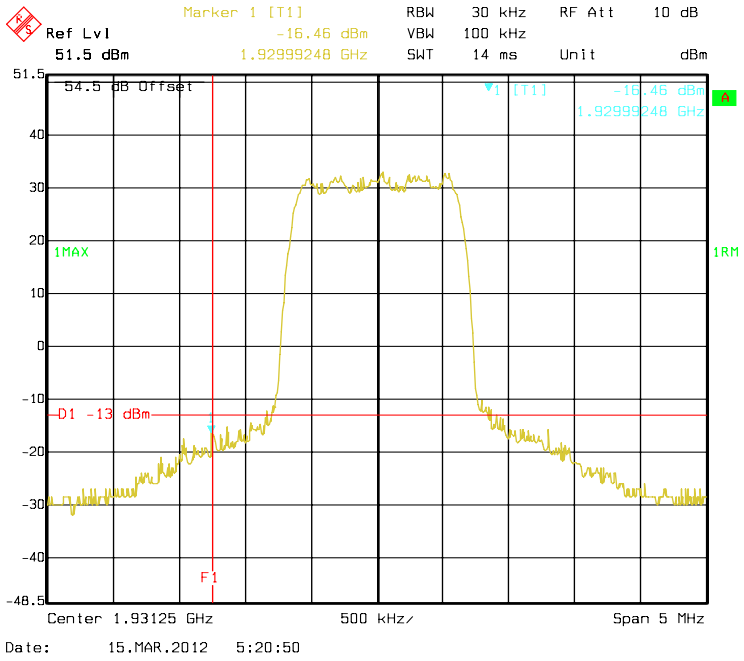
Right edge of band



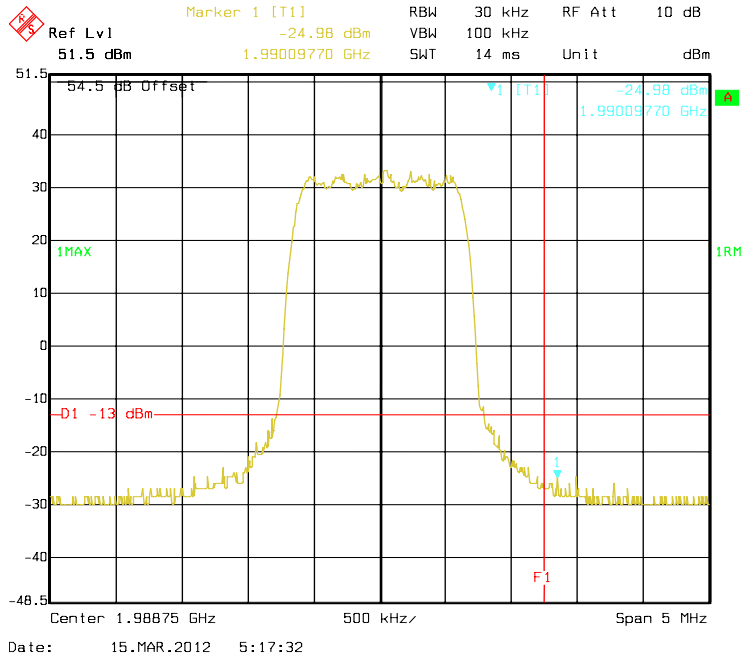
Band edge of EVDO (100%)

1. Number of Carriers: Single carrier

Left edge of band

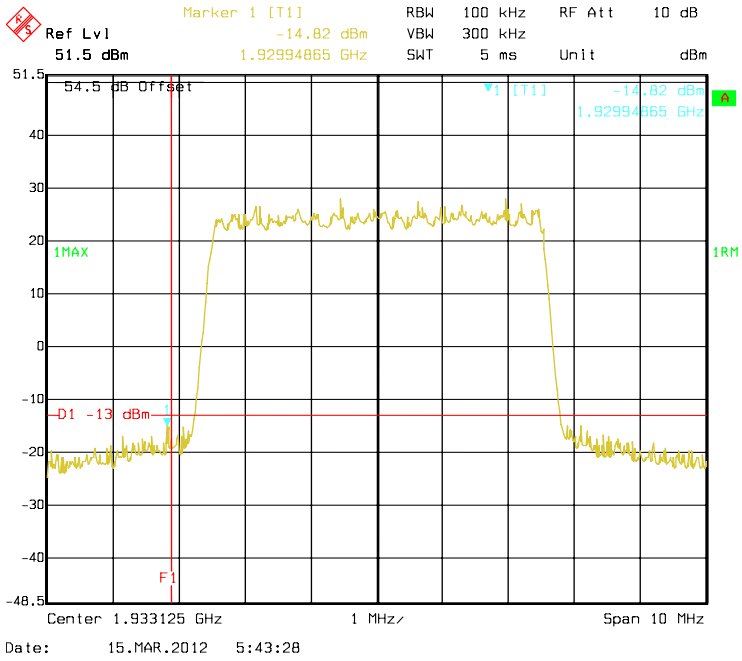


Right edge of band

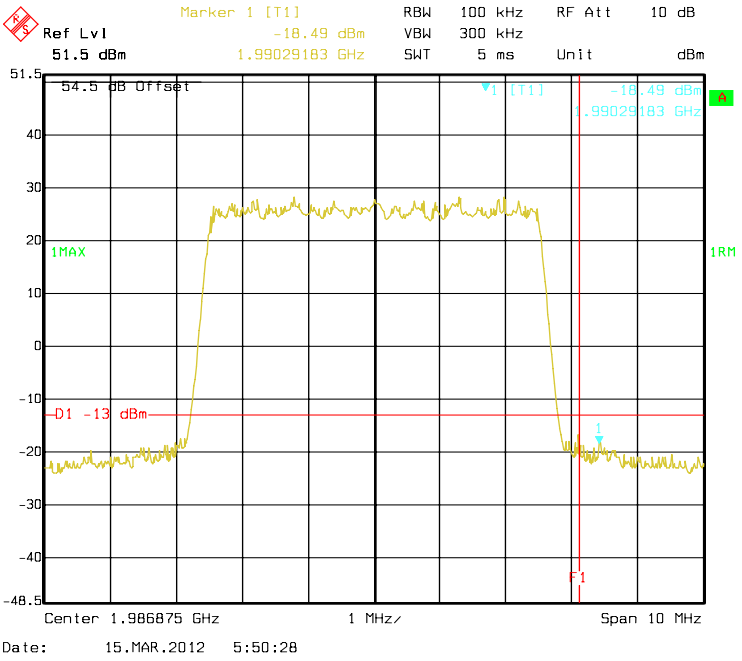


2. Number of Carriers: Four carriers

Left edge of band



Right edge of band



11 INTERMODULATION

11.1 Standard Applicable

According to FCC §2.1051.and FCC §24.238(a),

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.

The emission must be reduced by 43+10Log(P) dB.

Therefore, the Emission Limit equals:

10Log(P) dBW + 30dB – (43+10Log(P) dB) = – 13 dBm

11.2 Test setup

Please refer the section § 6.2 Configuration of Tested System.

11.3 Measurement Procedure

1. The EUT RF output port was connected to spectrum analyzer. The EUT shall be set to maximum gain and maximum rated output power per channel.
2. Two continuous sinusoidal RF signals shall be fed to the input antenna port of the repeater using a combining device. The two channels near each other should be separated by at least one operating channel width.
3. The spurious emissions at antenna were measured at the RF output port of the EUT.
4. The modulation types tested were GSM, EDGE, CDMA, and EVDO.
5. Spectrum analyzer settings:

   Detector: RMS.

   Intermodulation:

   GSM/EDGE: RBW=3 kHz; VBW≥ RBW

   CDMA/EVDO: RBW=30 kHz; VBW≥ RBW

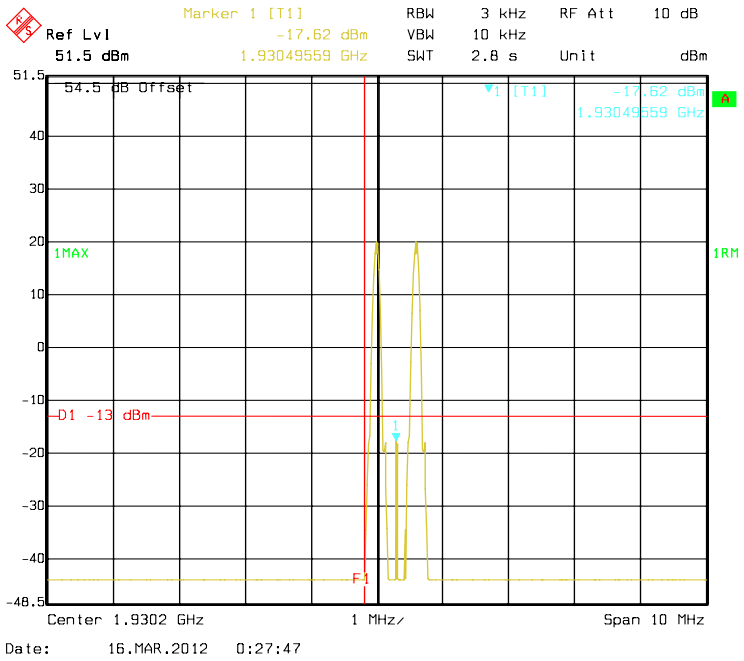
   Spurious emissions:

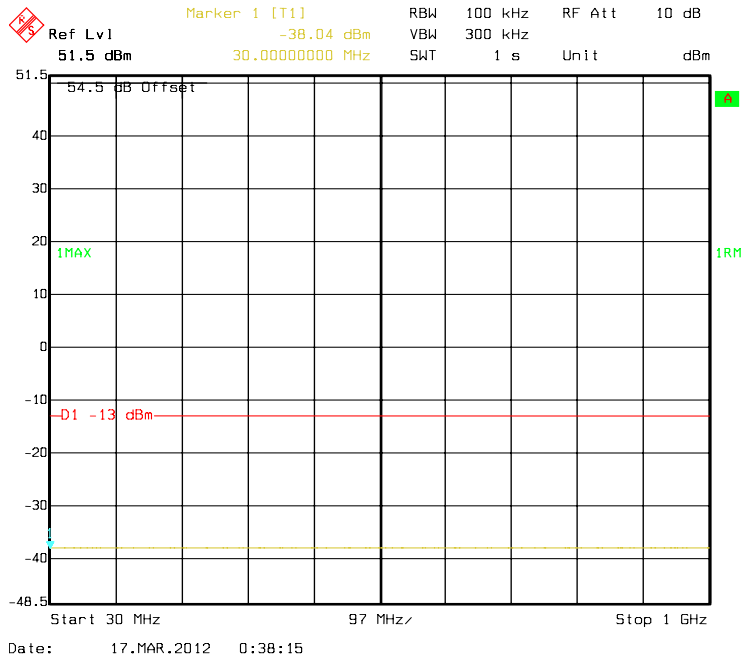
   Below 1G: RBW=100kHz; Above 1G: RBW=1 MHz ; VBW≥ RBW

11.4 Test Result

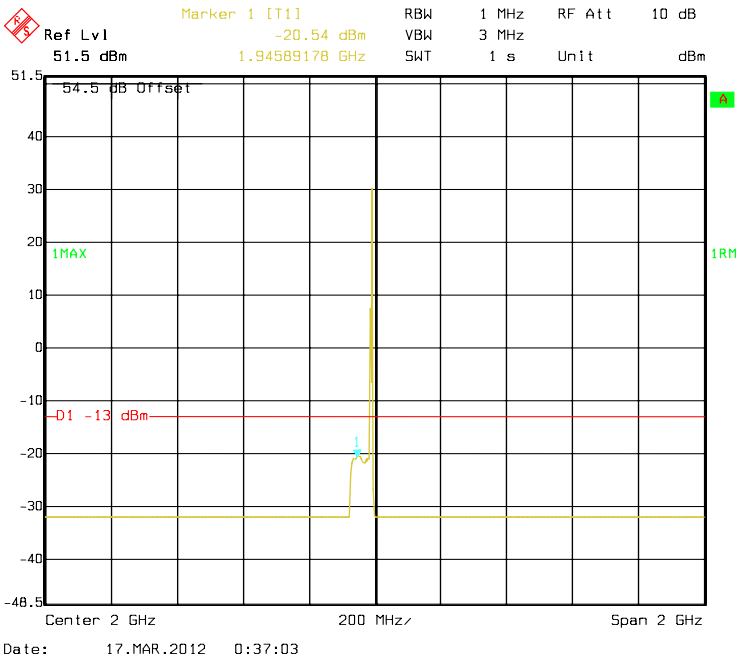
Passed.

Intermodulation of GSM

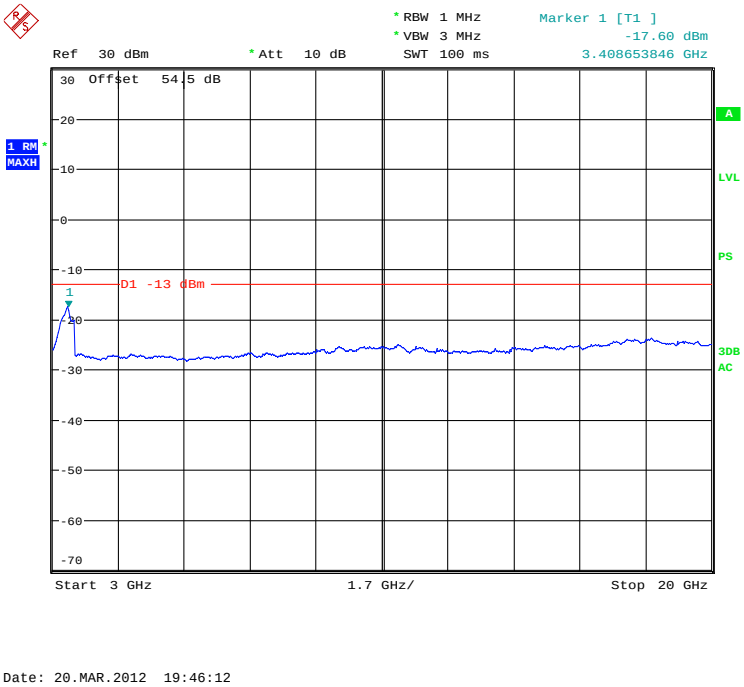
Intermodulation - Low part of band


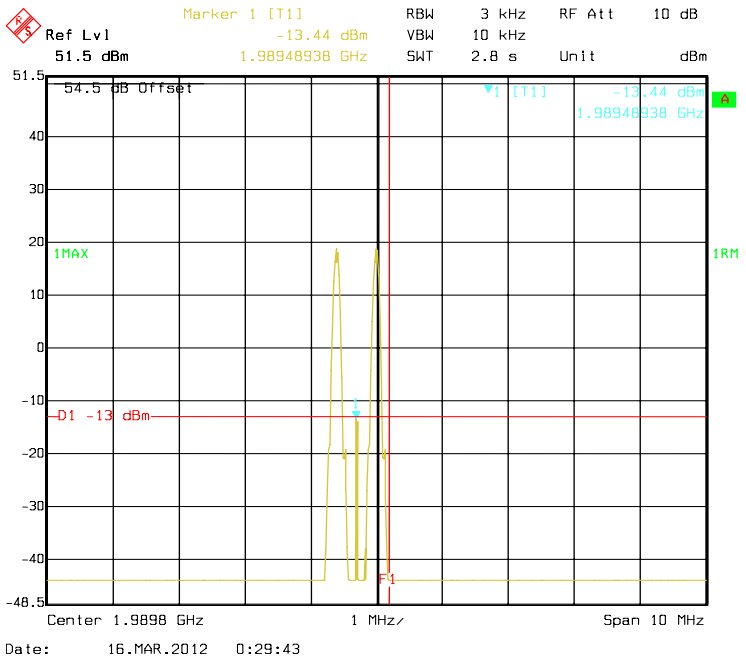
30MHz-1000MHz spurious emissions


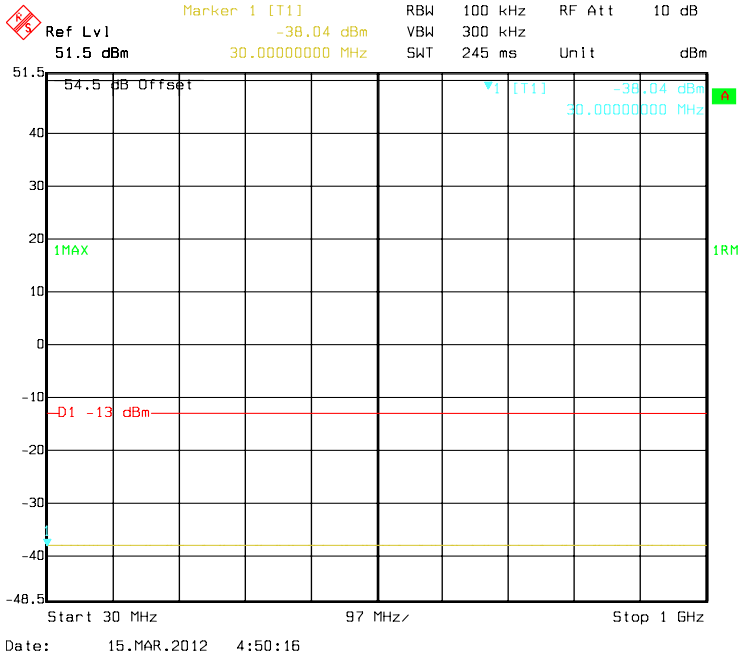
1000MHz-3000MHz spurious emissions



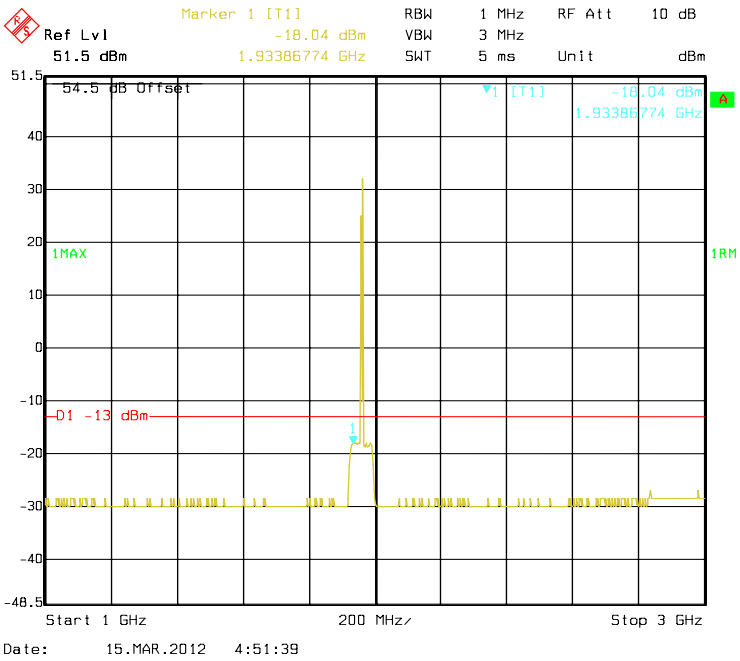
3000MHz-20000MHz spurious emissions



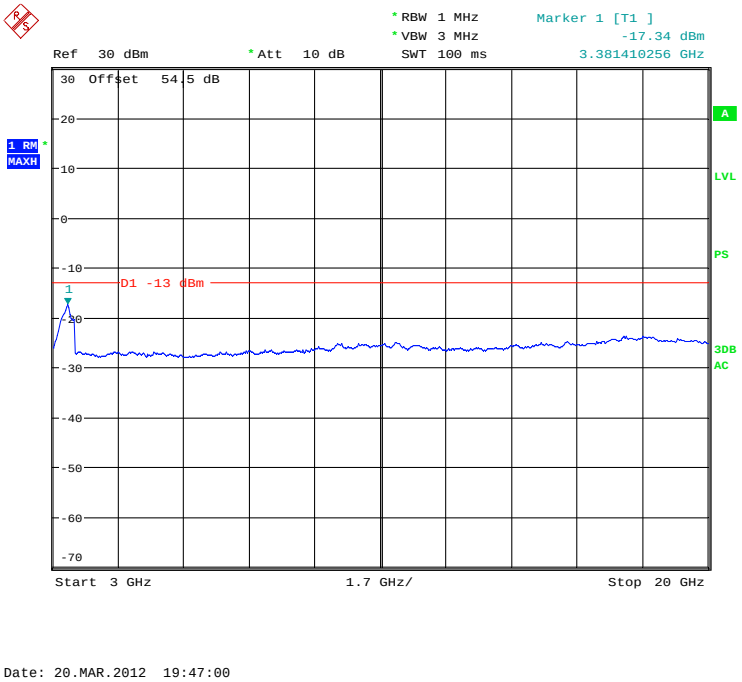
Intermodulation - High part of band


30MHz-1000MHz spurious emissions


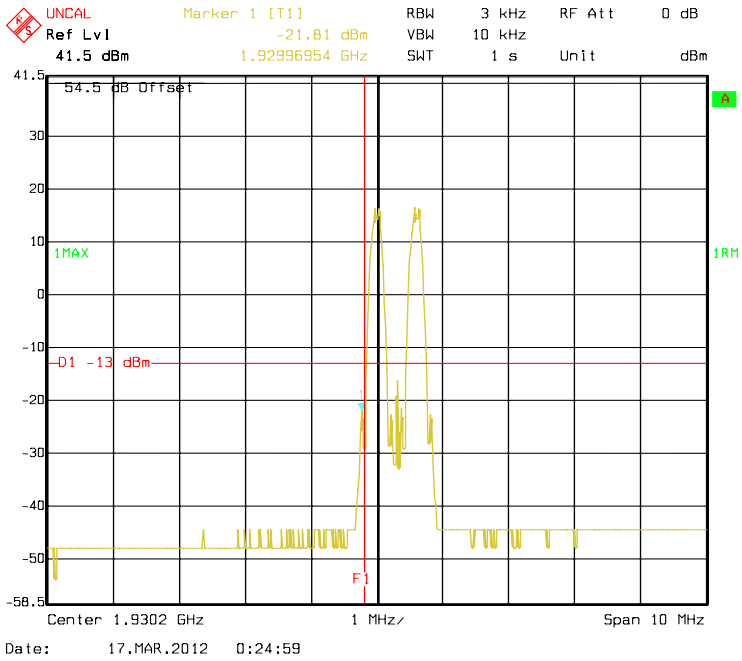
1000MHz-3000MHz spurious emissions

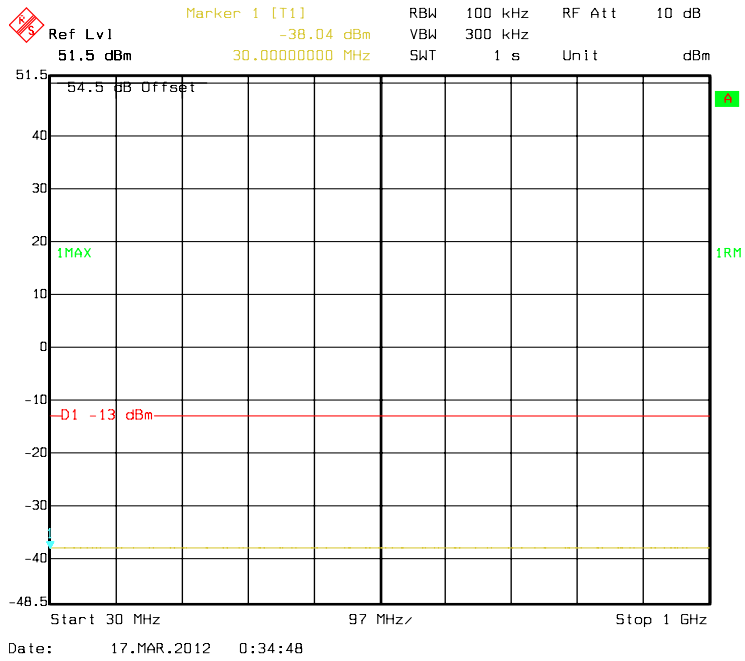


3000MHz-20000MHz spurious emissions

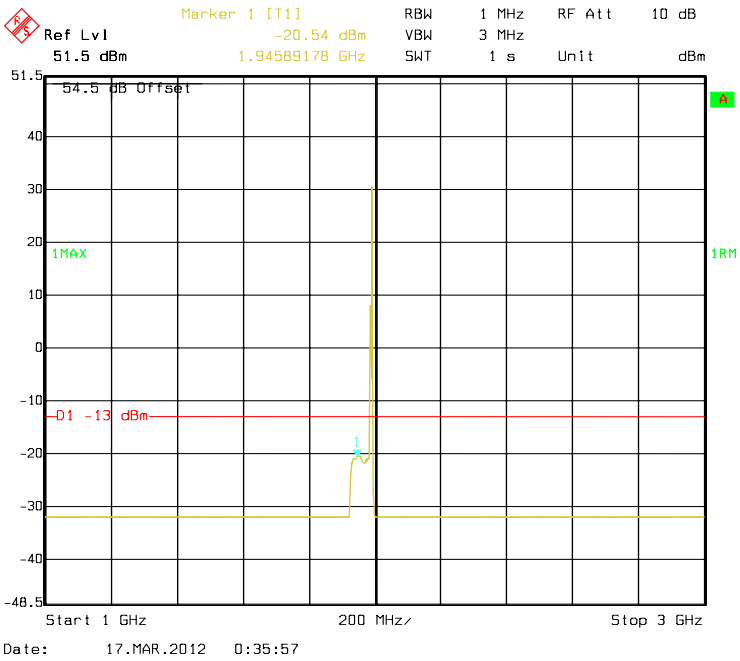


Intermodulation of EDGE

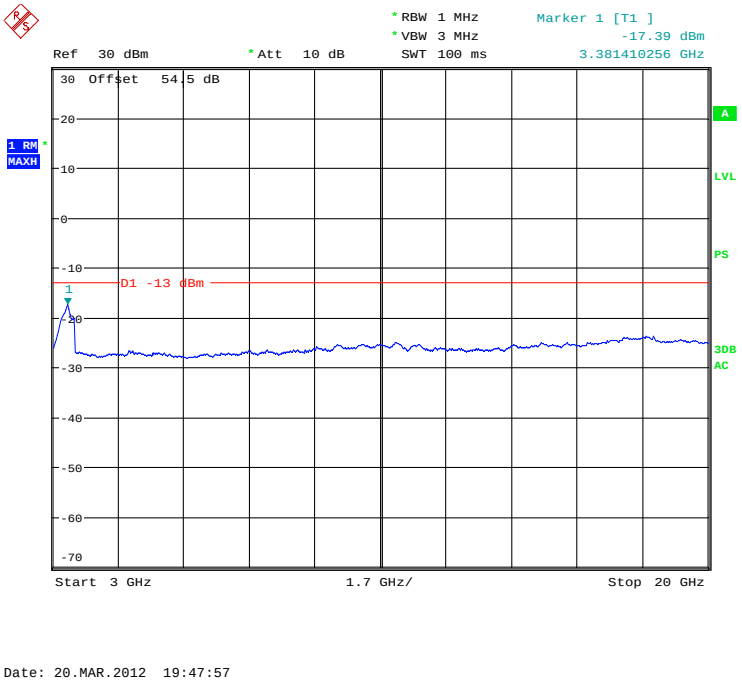
Intermodulation - Low part of band


30MHz-1000MHz spurious emissions


1000MHz-3000MHz spurious emissions



3000MHz-20000MHz spurious emissions



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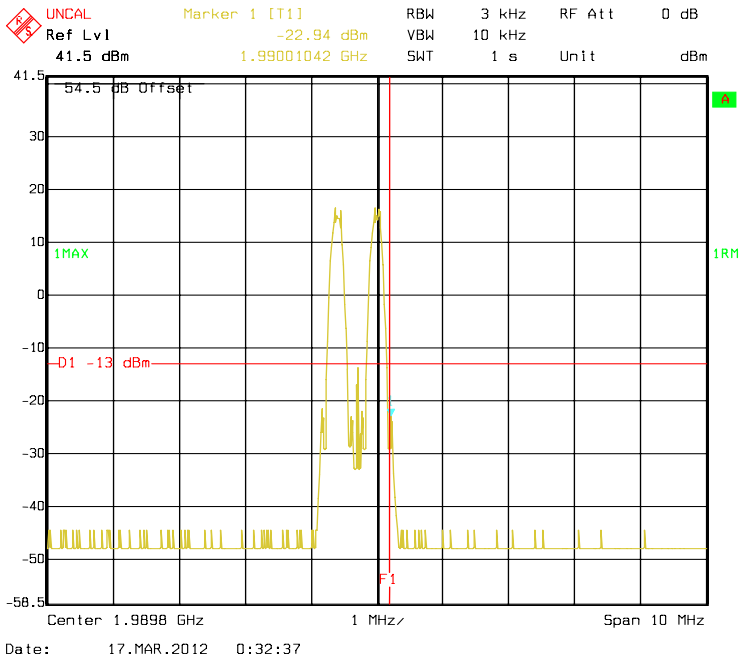
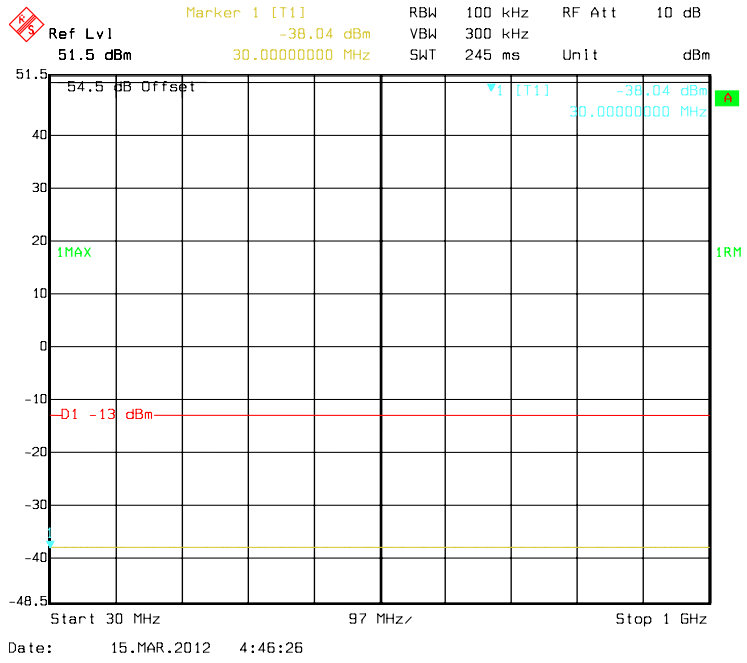
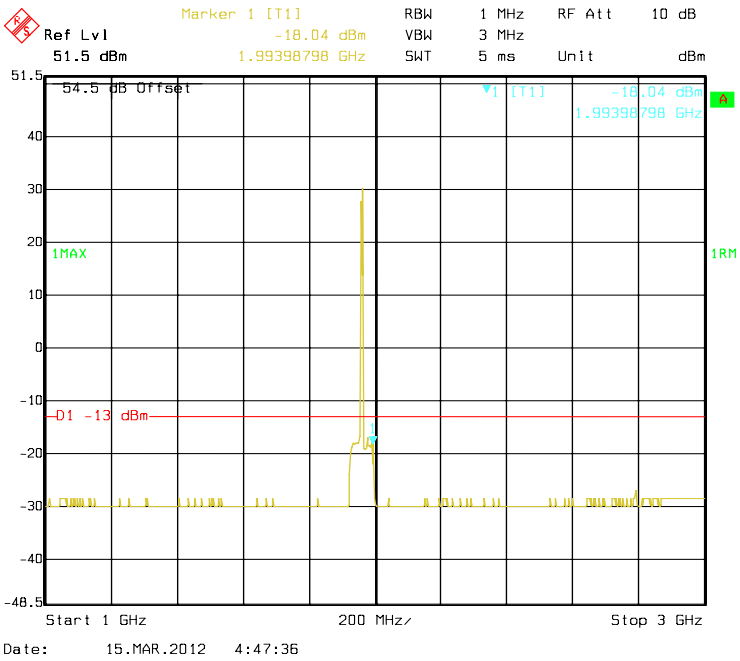
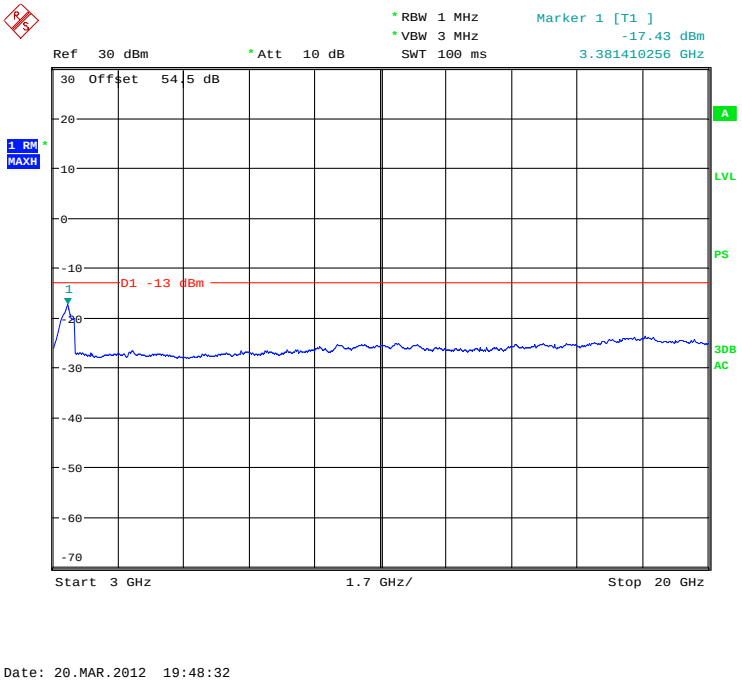
Intermodulation - High part of band


30MHz-1000MHz spurious emissions


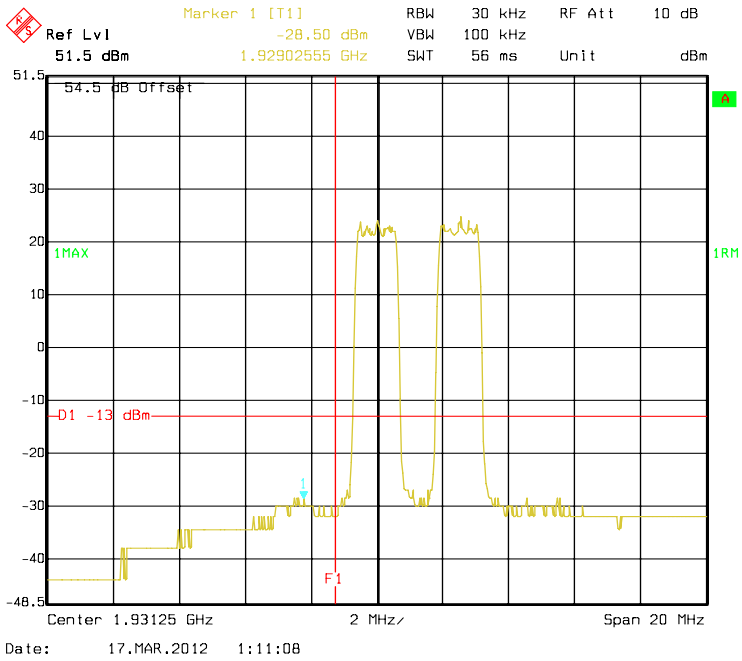
1000MHz-3000MHz spurious emissions

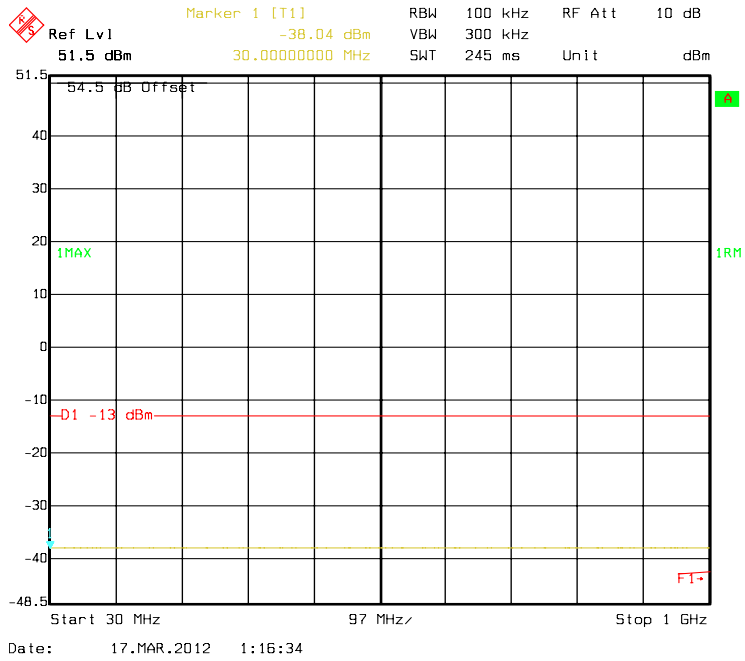


3000MHz-20000MHz spurious emissions

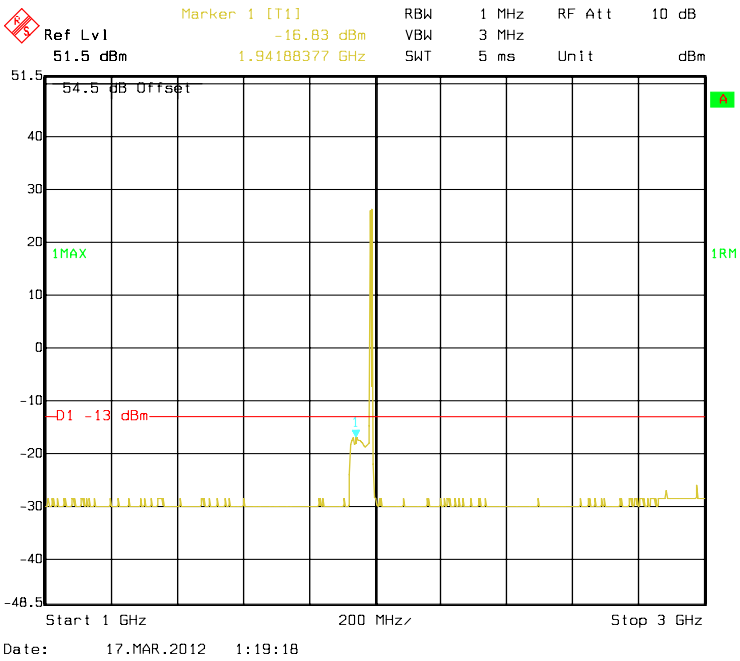


Intermodulation of CDMA

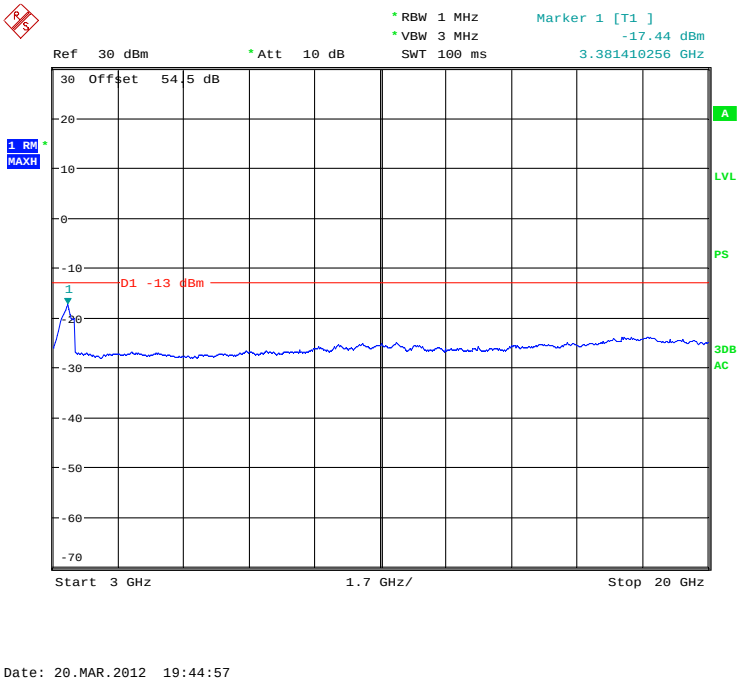
Intermodulation - Low part of band


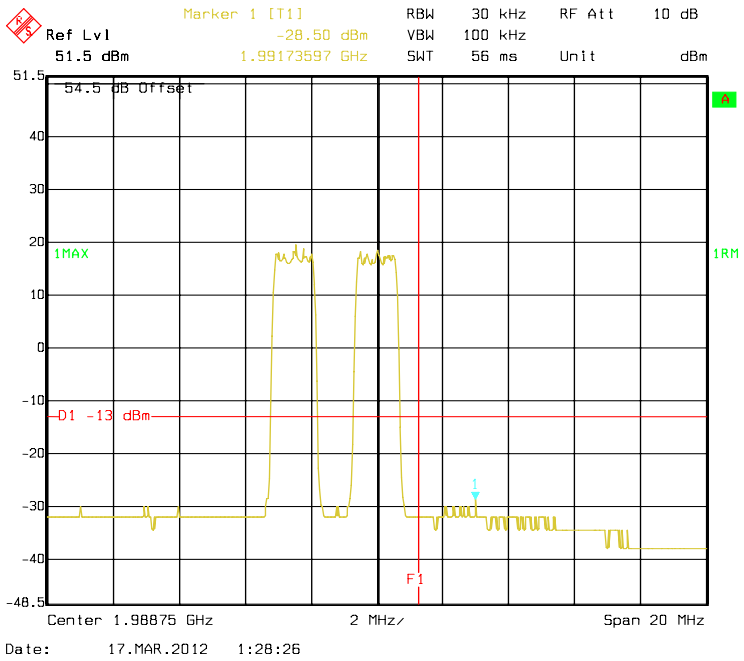
30MHz-1000MHz spurious emissions


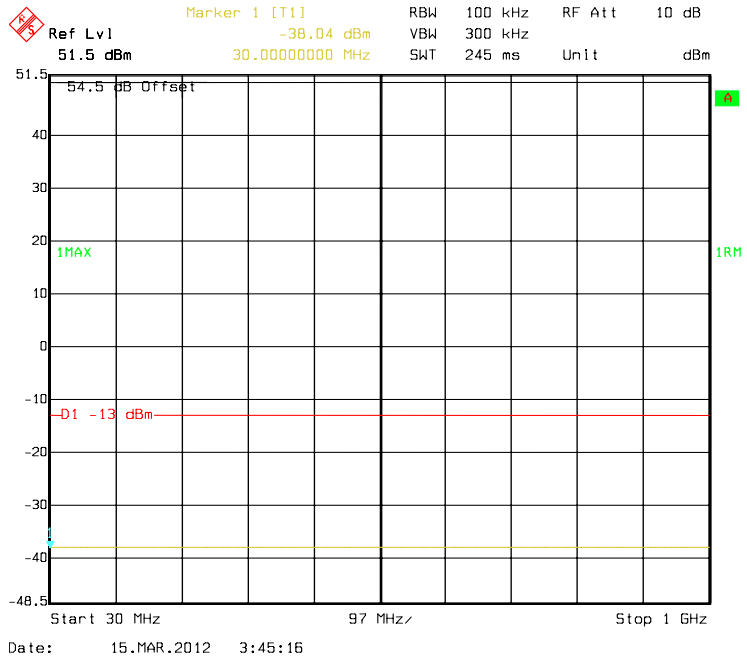
1000MHz-3000MHz spurious emissions



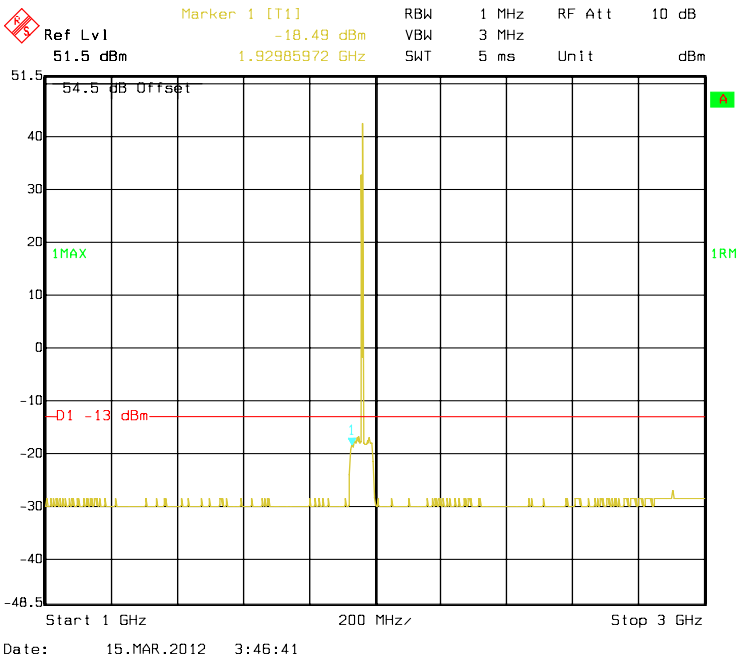
3000MHz-20000MHz spurious emissions



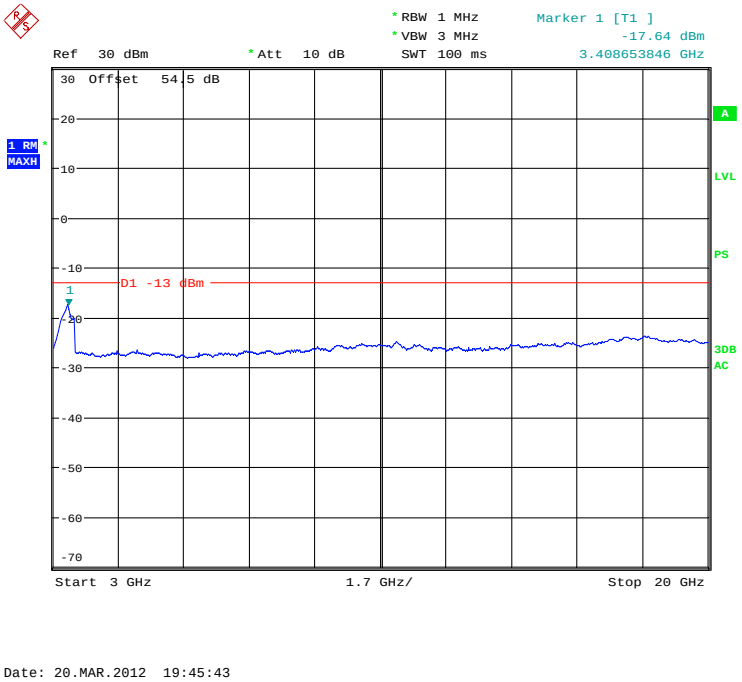
Intermodulation - High part of band


30MHz-1000MHz spurious emissions


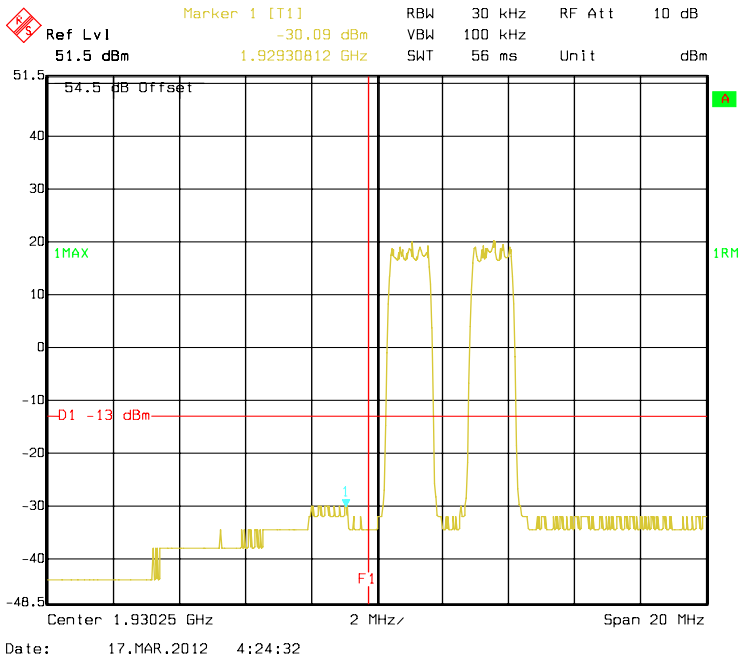
1000MHz-3000MHz spurious emissions

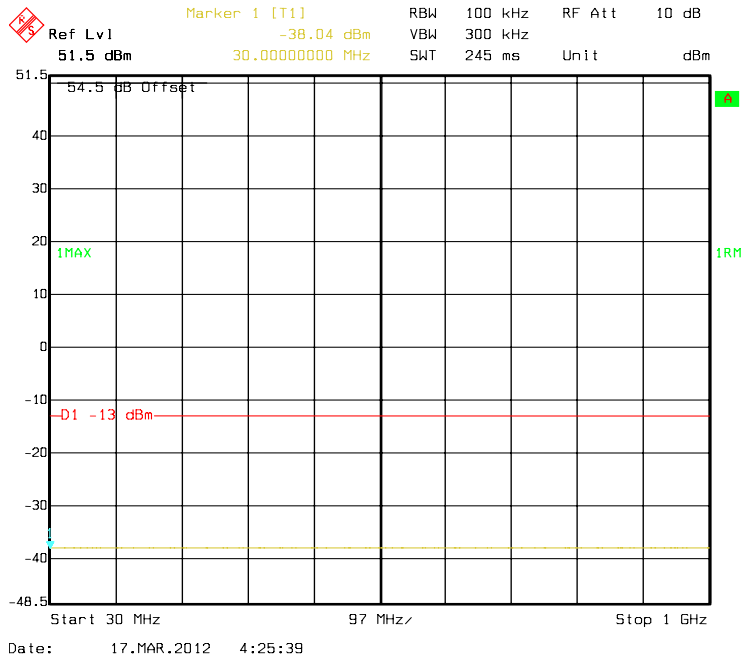


3000MHz-20000MHz spurious emissions

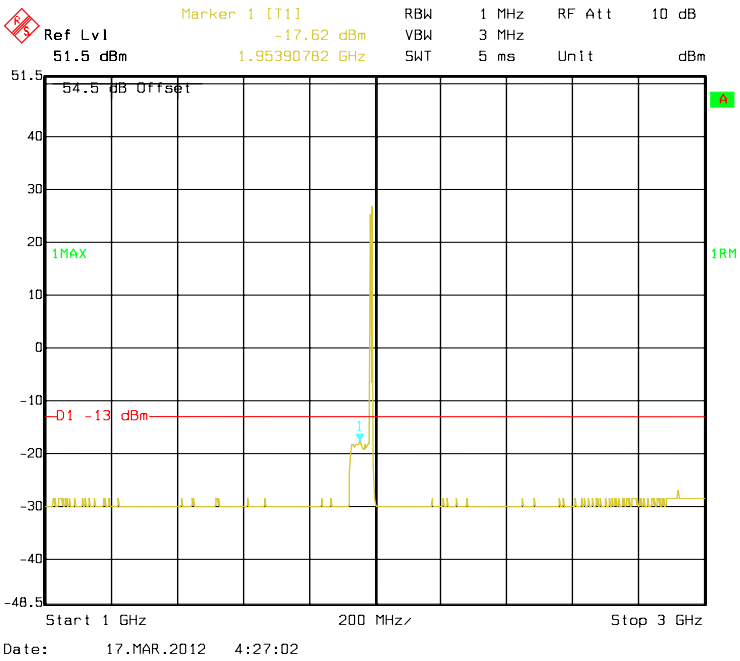


Intermodulation of EVDO(100%)

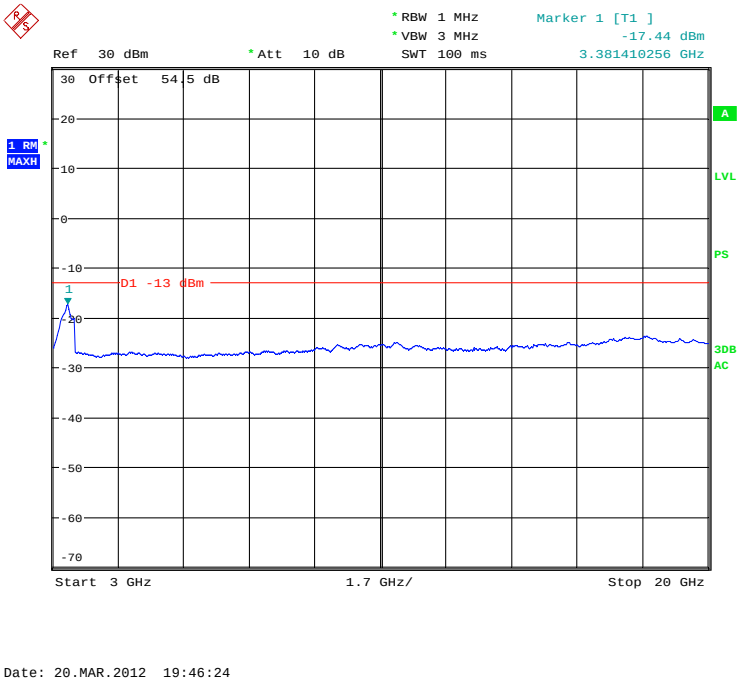
Intermodulation - Low part of band


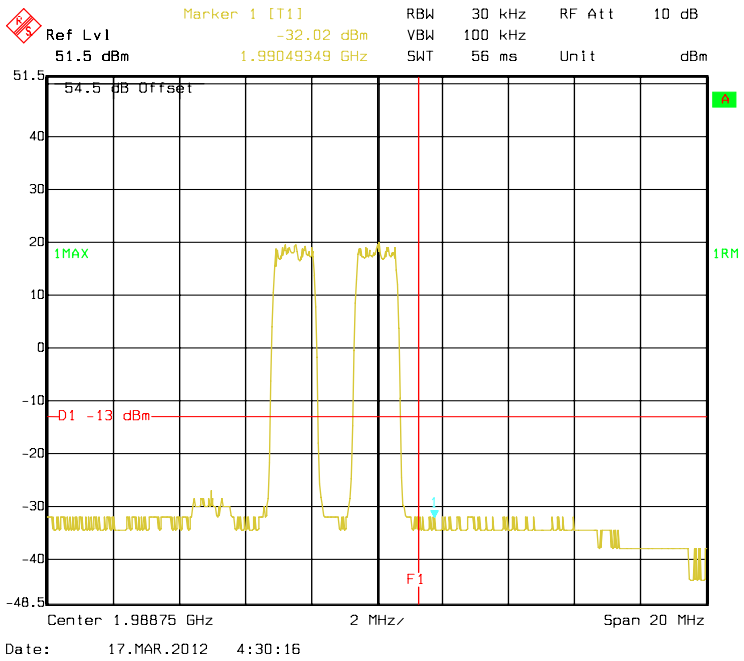
30MHz-1000MHz spurious emissions


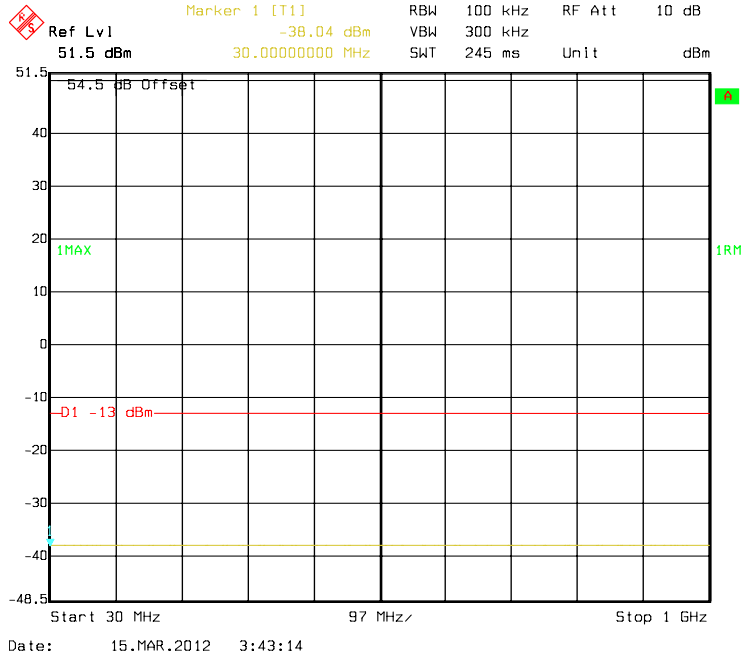
1000MHz-3000MHz spurious emissions



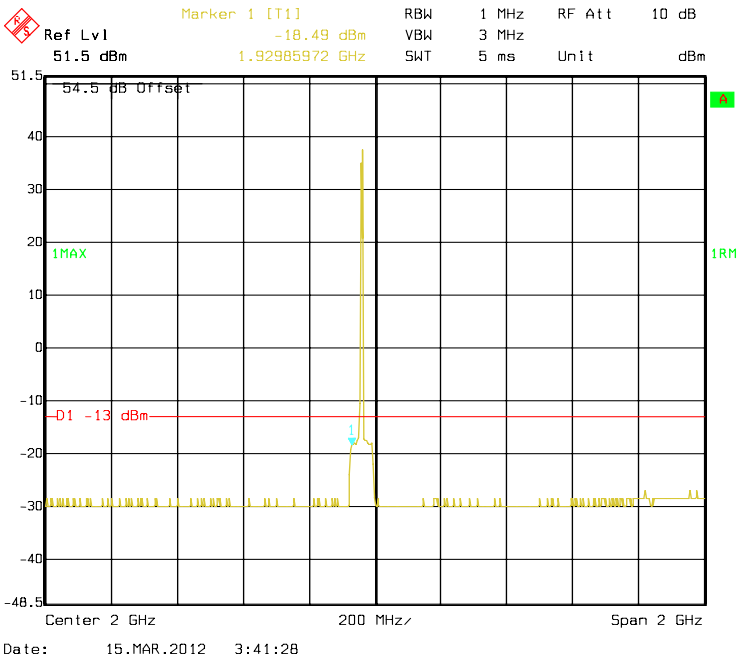
3000MHz-20000MHz spurious emissions



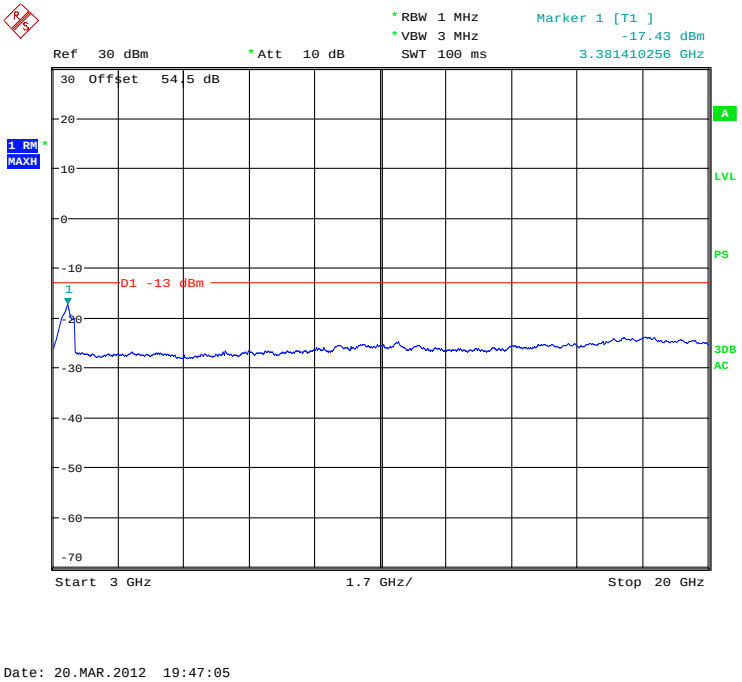
Intermodulation - High part of band


30MHz-1000MHz spurious emissions


1000MHz-3000MHz spurious emissions



3000MHz-20000MHz spurious emissions



12 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

12.1 Standard Applicable

According to FCC §2.1053,

FCC §24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

According the limit specified in § 24.238(a) :

The following method was used to determine the Limit for Spurious Emissions:

Maximum output power in watts: P (W).

The emission must be reduced by 43+10Log(P) Db

Therefore, the Emission Limit equals:

10Log(P) dBW + 30dB – (43+10Log(P) dB) = – 13 dBm

12.2 EUT Setup (Block Diagram of Configuration)

Please refer the section § 6.2 Configuration of Tested System.

12.3 Measurement Procedure

1. The EUT RF output port was connected to 50 ohm RF load.
2. The EUT input port was connected to signal generator and was setup to transmit maximum power.
3. The measurement antenna was placed at a distance of 3 meters from the EUT.
4. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from EUT.
5. The frequency range up to 10-th harmonic of each of the three fundamental frequencies (low, middle and high channels) was investigated. The worst case of emissions was reported.
6. For spurious emissions attenuation, the substitution method was used.
7. The EUT was substituted by a reference antenna (half-wave dipole – below 1 GHz, or Horn antenna – above 1 GHz), connected to a signal generator.
8. The signal generator output level was adjusted to obtain the same reading as from EUT. The EIRP at the spurious emissions frequency was calculated as follows:

   EIRP = S.G. output (dBm) + Antenna Gain(dBi) – Cable Loss (dB)

9. The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic dipole
10. From KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET): Radiated spurs (enclosure) – Use of CW signal (low, mid. and high freq.) is acceptable rather than all modulations.
11. The maximum RFI field strength was determined during the measurement by rotating the turntable (±180 degrees) and varying the height of the receive antenna (h = 1 ... 4 m) as like defined in ANSI C63.4. A measurement receiver has been used with a RBW 120 kHz up to 1 GHz and 1 MHz above 1 GHz. Steps with during pre measurement was half the RBW.
12. Both, the Fully Anechoic Chamber (FAC) and the Semi Anechoic Chamber (SAC) fulfil the requirements of ANSI C63.4 and CISPR 16-1-4 with regards to NSA and SVSWR.

12.4 Test Result

Passed.

Test mode:	GSM		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
37.28	Vertical	-23.06	-13.00	Pass
58.81	V	-25.85		
2472.6	V	-40.03		
4296.8	V	-36.24		
5121.0	V	---		
7945.2	V	---		
56.99	Horizontal	-24.02	-13.00	Pass
159.22	H	-23.01		
2472.6	H	-42.36		
3296.8	H	-38.43		
5121.0	H	---		
7945.2	H	---		
Test mode:	**EDGE**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
58.40	Vertical	-25.05	-13.00	Pass
158.66	V	-29.00		
2509.8	V	-41.93		
3346.4	V	-38.71		
4183.0	V	---		
5019.6	V	---		
56.99	Horizontal	-24.19	-13.00	Pass
158.66	H	-25.33		
2509.8	H	-42.55		
3346.4	H	-35.03		
4183.0	H	---		
5019.6	H	---		

Test mode:	CDMA		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
57.79	Vertical	-23.06	-13.00	Pass
160.34	V	-25.85		
2472.6	V	-38.03		
3296.8	V	-35.24		
5121.0	V	---		
7945.2	V	---		
56.99	Horizontal	-24.02	-13.00	Pass
158.66	H	-23.01		
2472.6	H	-36.36		
3296.8	H	-38.43		
5121.5	H	---		
7945.2	H	---		
Test mode:	**EVDO**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
58.67	Vertical	-23.95	-13.00	Pass
158.66	V	-25.00		
2509.8	V	-38.93		
3346.4	V	-35.71		
5183.0	V	---		
7019.6	V	---		
56.99	Horizontal	-24.19	-13.00	Pass
158.66	H	-25.33		
2509.8	H	-40.55		
3346.4	H	-33.03		
5183.0	H	---		
7019.6	H	---		

Remark：

1. Remark”---“ means that the emission level is too low to be measured
2. 18GHz-22GHz: No substitution measurement has been performed, because there were no emissions detected during the pre measurement other than noise.

13 FREQUENCY STABILITY

13.1 Standard Applicable

According to FCC §2.1055, FCC part 24.235

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.

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

In addition, In accordance with the technical requirements of the EUT,The frequency stability of the transmitter shall be maintained within ± 0.000 25 %(± 2.5 ppm) of the center frequency.

13.2 Test setup

Please refer the section § 6.2 Configuration of Tested System.

13.3 Test Procedure

1. The EUT was placed inside the temperature chamber.
2. The RF output port was connected to a spectrum analyzer.
3. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
4. After the temperature stabilized for approximately 20 min, the transmitting frequency was measured by the spectrum analyzer and recorded.
5. At room temperature, the frequency was measured when EUT was powered with the nominal voltage and with 85% and 115% of the nominal voltage.

13.4 Test Result

Passed.

GSM mode					
Reference Frequency: Middle channel=1960MHz					
Voltage with nominal Voltage	Power Supplied (VAC)	Temperature (℃)	Measured Max. Frequency Error		Result
			(Hz)	(ppm)	
100%	120V	-40	11	0.0056	Passed
100%		-30	10	0.0051	Passed
100%		-20	13	0.0066	Passed
100%		-10	12	0.0061	Passed
100%		0	16	0.0082	Passed
100%		10	12	0.0061	Passed
100%		20	16	0.0082	Passed
100%		30	18	0.0092	Passed
100%		40	19	0.0097	Passed
100%		50	21	0.0107	Passed
100%		55	19	0.0097	Passed
85%	102V	20	18	0.0092	Passed
115%	138V	20	12	0.0061	Passed

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

EDGE mode					
Reference Frequency: Middle channel=1960MHz					
Voltage with nominal Voltage	Power Supplied (VAC)	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	Result
100%	120V	-40	8	0.0041	Passed
100%		-30	11	0.0056	Passed
100%		-20	12	0.0061	Passed
100%		-10	10	0.0051	Passed
100%		0	14	0.0071	Passed
100%		10	11	0.0056	Passed
100%		20	15	0.0077	Passed
100%		30	13	0.0066	Passed
100%		40	16	0.0082	Passed
100%		50	18	0.0092	Passed
100%		55	17	0.0087	Passed
85%	102V	20	20	0.0102	Passed
115%	138V	20	15	0.0077	Passed

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

CDMA mode					
Reference Frequency: Middle channel=1960MHz					
Voltage with nominal Voltage	Power Supplied (VAC)	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	Result
100%	120V	-40	10	0.0051	Passed
100%		-30	9	0.0046	Passed
100%		-20	10	0.0051	Passed
100%		-10	13	0.0066	Passed
100%		0	9	0.0046	Passed
100%		10	7	0.0036	Passed
100%		20	11	0.0056	Passed
100%		30	14	0.0071	Passed
100%		40	15	0.0077	Passed
100%		50	13	0.0066	Passed
100%		55	16	0.0082	Passed
85%	102V	20	14	0.0071	Passed
115%	138V	20	17	0.0087	Passed

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

EVDO mode					
Reference Frequency: Middle channel=1960MHz					
Voltage with nominal Voltage	Power Supplied (VAC)	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)	Result
100%	120V	-40	8	0.0041	Passed
100%		-30	7	0.0036	Passed
100%		-20	10	0.0051	Passed
100%		-10	12	0.0061	Passed
100%		0	9	0.0046	Passed
100%		10	6	0.0031	Passed
100%		20	10	0.0051	Passed
100%		30	13	0.0066	Passed
100%		40	16	0.0082	Passed
100%		50	16	0.0082	Passed
100%		55	14	0.0071	Passed
85%	102V	20	12	0.0061	Passed
115%	138V	20	16	0.0082	Passed

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

14 OUT-OF-BAND REJECTION

14.1 Standard Applicable

According to KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET):

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

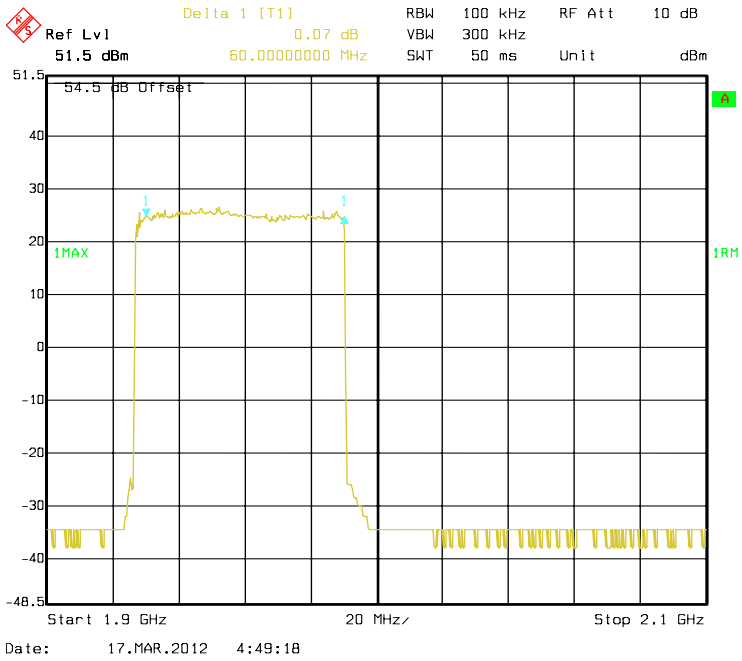
14.2 Test setup

Please refer the section § 6.2 Configuration of Tested System.

14.3 Test Procedure

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
3. A continuous sinusoidal RF signal shall be fed successively at frequency offsets 100 MHz from the edges of the relevant MS or BTS transmit frequency band into the relevant input port of the repeater.
4. The RF output curve was recorded by spectrum analyzer.

14.4 Test Result

Out-of-Band Rejection


15 AC POWER LINE CONDUCTED EMISSION TEST

15.1 Standard Applicable

According to FCC §15.107. The emission value for frequency within 150KHz to 30MHz shall not Exceed criteria of below chart.

Frequency range (MHz)	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

15.2 Test setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2001.
2. The EUT was plug-in DC power adaptort and was placed on the center of the back edge on the test table. The peripherals like earphone was placed on the side of the EUT. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The Power adaptor was connected with 110Vac/60Hz power source.

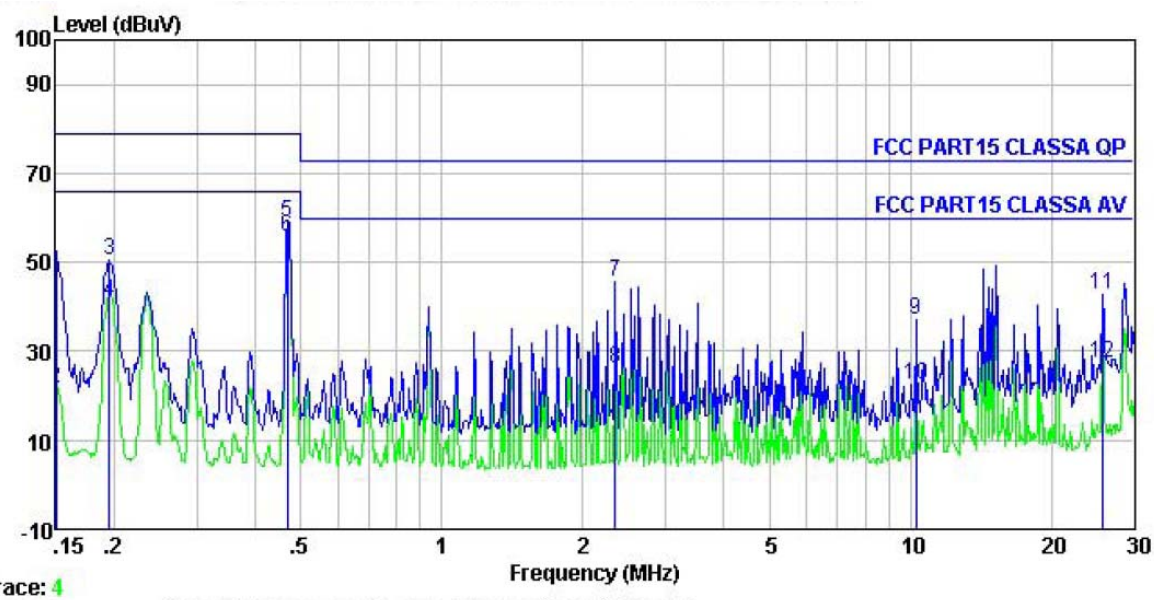
15.3 Test Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

15.4 Measurement Result

Test mode: GSM

Line:

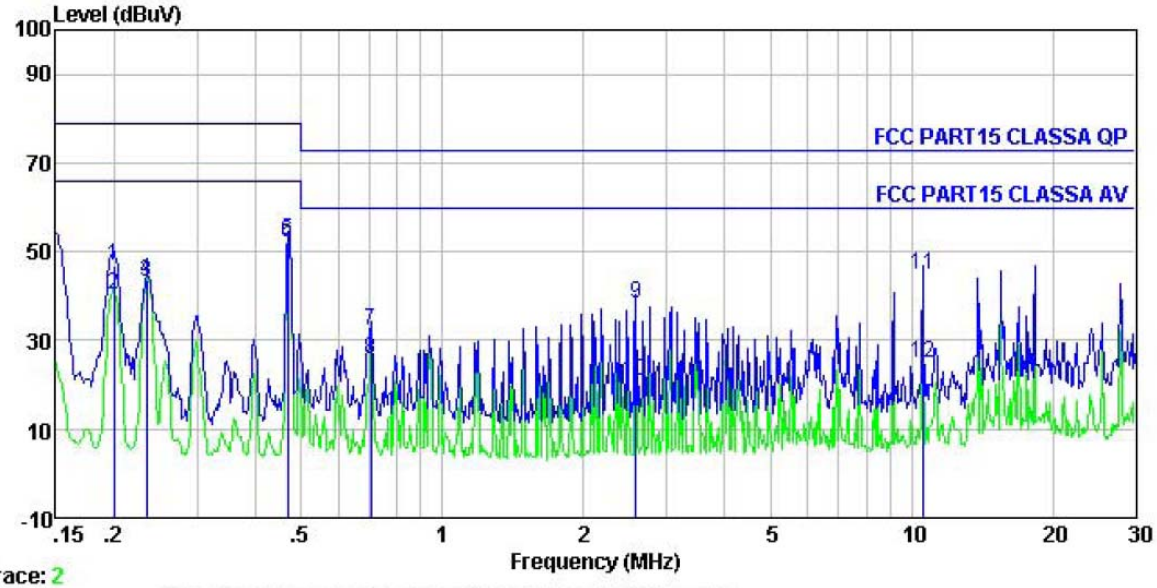


Trace: 4

Condition : FCC PART15 CLASSA QP LISN(2011) LINE
Job No. : 215RF
Test Mode : GSM
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	51.88	0.69	0.10	52.67	79.00	-26.33	QP
2	0.150	20.93	0.69	0.10	21.72	66.00	-44.28	Average
3	0.195	49.82	0.66	0.10	50.58	79.00	-28.42	QP
4	0.195	40.31	0.66	0.10	41.07	66.00	-24.93	Average
5	0.469	58.48	0.56	0.10	59.14	79.00	-19.86	QP
6	0.469	55.19	0.56	0.10	55.85	66.00	-10.15	Average
7	2.346	44.94	0.38	0.10	45.42	73.00	-27.58	QP
8	2.346	25.62	0.38	0.10	26.10	60.00	-33.90	Average
9	10.288	36.53	0.22	0.20	36.95	73.00	-36.05	QP
10	10.288	22.12	0.22	0.20	22.54	60.00	-37.46	Average
11	25.727	42.41	0.12	0.21	42.74	73.00	-30.26	QP
12	25.727	27.12	0.12	0.21	27.45	60.00	-32.55	Average

Neutral:



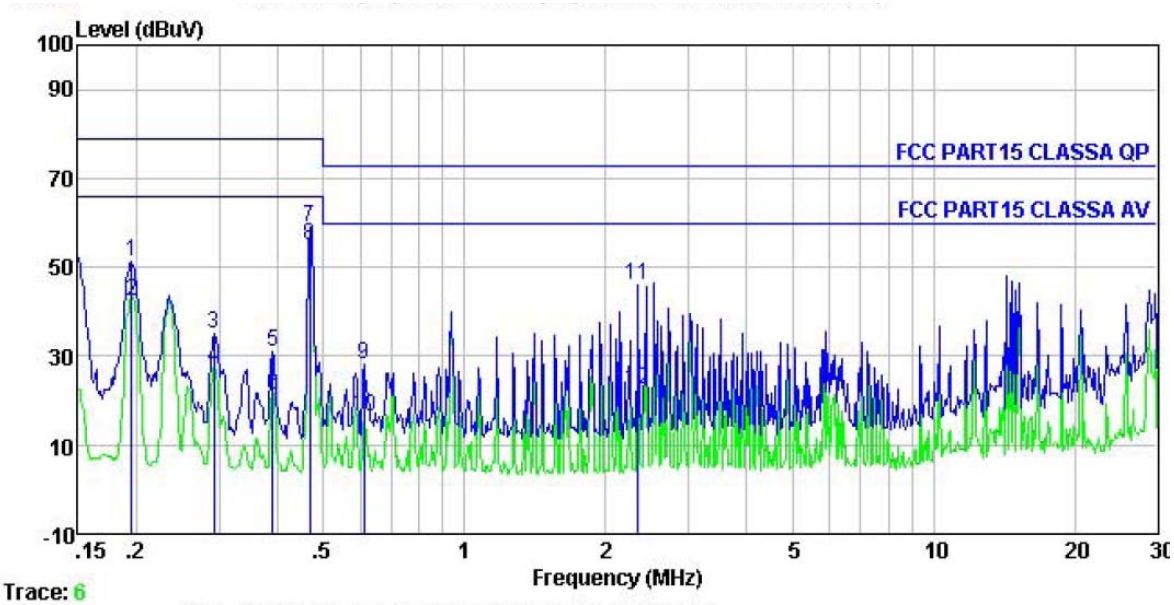
Trace: 2

Condition : FCC PART15 CLASSA QP LISN(2011) NEUTRAL
Job No. : 215RF
Test Mode : GSM
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.200	46.18	0.66	0.10	46.94	79.00	-32.06	QP
2	0.200	39.54	0.66	0.10	40.30	66.00	-25.70	Average
3	0.234	42.63	0.64	0.10	43.37	79.00	-35.63	QP
4	0.234	42.81	0.64	0.10	43.55	66.00	-22.45	Average
5	0.469	51.82	0.56	0.10	52.48	79.00	-26.52	QP
6	0.469	51.55	0.56	0.10	52.21	66.00	-13.79	Average
7	0.705	31.62	0.52	0.10	32.24	73.00	-40.76	QP
8	0.705	24.94	0.52	0.10	25.56	60.00	-34.44	Average
9	2.581	37.71	0.37	0.10	38.18	73.00	-34.82	QP
10	2.581	20.51	0.37	0.10	20.98	60.00	-39.02	Average
11	10.564	44.47	0.22	0.20	44.89	73.00	-28.11	QP
12	10.564	24.30	0.22	0.20	24.72	60.00	-35.28	Average

Test mode: EDGE

Line:

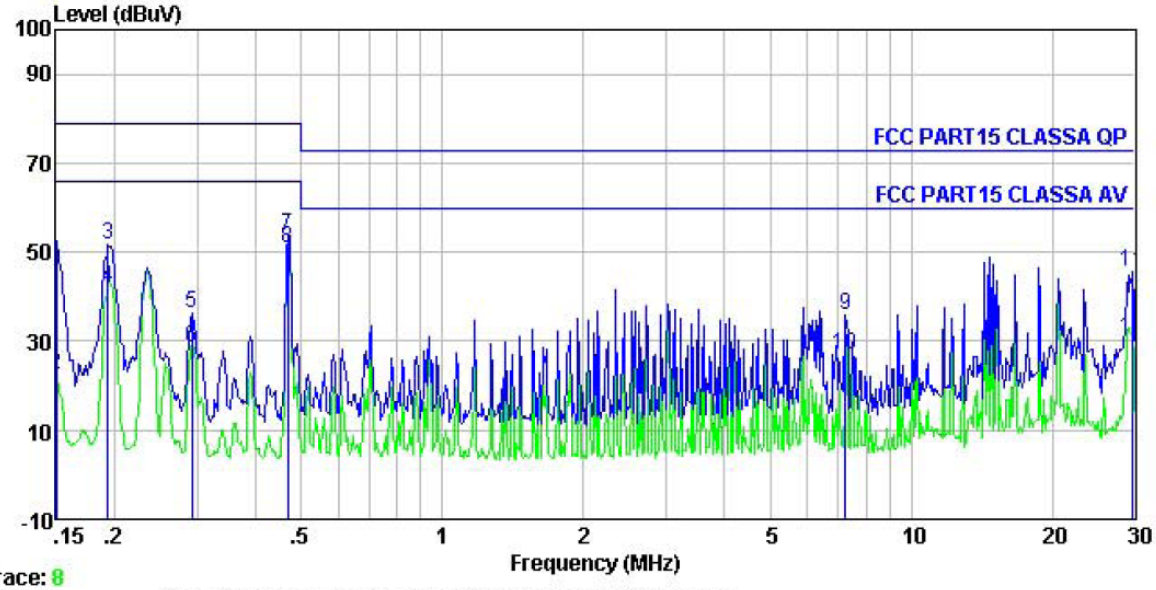


Trace: 6

Condition : FCC PART15 CLASSA QP LISN(2011) LINE
Job No. : 215RF
Test Mode : EDGE
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.195	50.70	0.66	0.10	51.46	79.00	-27.54	QP
2	0.195	41.74	0.66	0.10	42.50	66.00	-23.50	Average
3	0.292	34.54	0.61	0.10	35.25	79.00	-43.75	QP
4	0.292	26.70	0.61	0.10	27.41	66.00	-38.59	Average
5	0.389	30.28	0.58	0.10	30.96	79.00	-48.04	QP
6	0.389	20.62	0.58	0.10	21.30	66.00	-44.70	Average
7	0.469	58.30	0.56	0.10	58.96	79.00	-20.04	QP
8	0.469	54.31	0.56	0.10	54.97	66.00	-11.03	Average
9	0.611	27.62	0.53	0.10	28.25	73.00	-44.75	QP
10	0.611	15.58	0.53	0.10	16.21	60.00	-43.79	Average
11	2.346	45.73	0.38	0.10	46.21	73.00	-26.79	QP
12	2.346	22.13	0.38	0.10	22.61	60.00	-37.39	Average

Neutral:



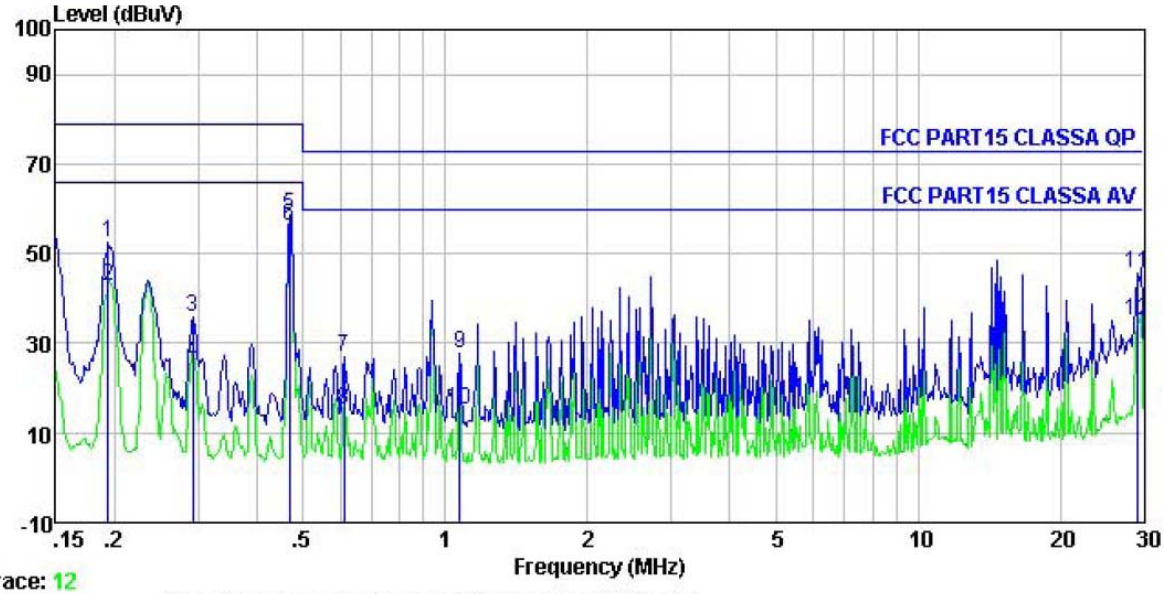
Trace: 8

Condition : FCC PART15 CLASSA QP LISN(2011) NEUTRAL
Job No. : 215RF
Test Mode : EDGE
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	51.25	0.69	0.10	52.04	79.00	-26.96	QP
2	0.150	21.86	0.69	0.10	22.65	66.00	-43.35	Average
3	0.193	50.84	0.66	0.10	51.60	79.00	-27.40	QP
4	0.193	41.21	0.66	0.10	41.97	66.00	-24.03	Average
5	0.292	35.46	0.61	0.10	36.17	79.00	-42.83	QP
6	0.292	27.87	0.61	0.10	28.58	66.00	-37.42	Average
7	0.469	53.26	0.56	0.10	53.92	79.00	-25.08	QP
8	0.469	50.21	0.56	0.10	50.87	66.00	-15.13	Average
9	7.252	35.60	0.26	0.16	36.02	73.00	-36.98	QP
10	7.252	26.46	0.26	0.16	26.88	60.00	-33.12	Average
11	29.684	45.43	0.10	0.23	45.76	73.00	-27.24	QP
12	29.684	30.12	0.10	0.23	30.45	60.00	-29.55	Average

Test mode: CDMA

Line:

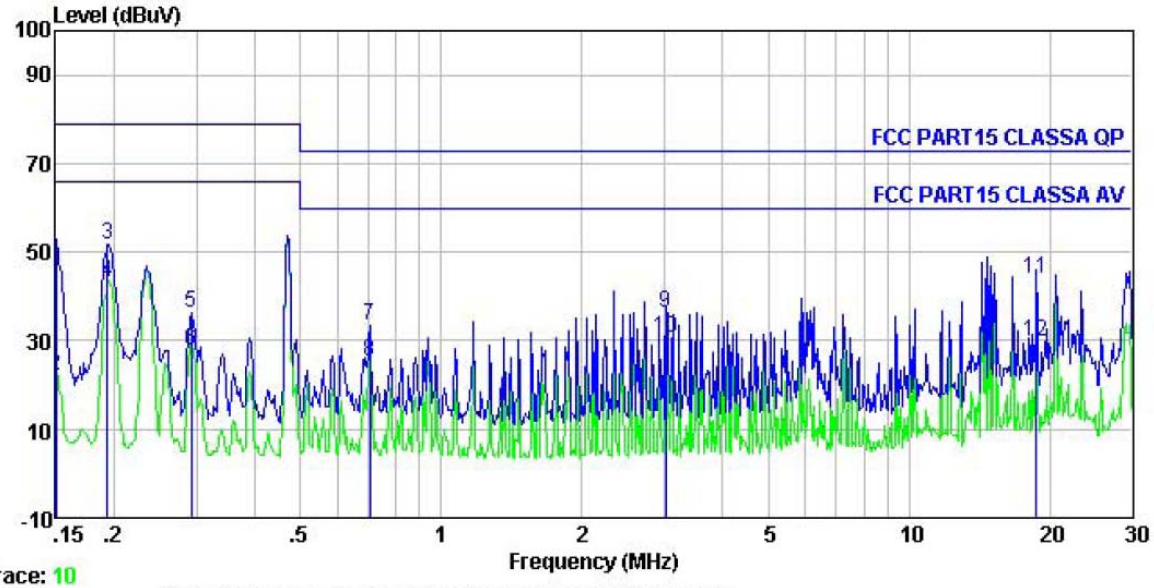


Trace: 12

Condition : FCC PART15 CLASSA QP LISN(2011) LINE
Job No. : 215RF
Test Mode : CDMA
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.193	51.64	0.66	0.10	52.40	79.00	-26.60	QP
2	0.193	41.98	0.66	0.10	42.74	66.00	-23.26	Average
3	0.292	35.00	0.61	0.10	35.71	79.00	-43.29	QP
4	0.292	25.20	0.61	0.10	25.91	66.00	-40.09	Average
5	0.469	57.91	0.56	0.10	58.57	79.00	-20.43	QP
6	0.469	55.45	0.56	0.10	56.11	66.00	-9.89	Average
7	0.611	26.50	0.53	0.10	27.13	73.00	-45.87	QP
8	0.611	14.42	0.53	0.10	15.05	60.00	-44.95	Average
9	1.071	27.04	0.47	0.10	27.61	73.00	-45.39	QP
10	1.071	14.50	0.47	0.10	15.07	60.00	-44.93	Average
11	29.216	45.34	0.10	0.23	45.67	73.00	-27.33	QP
12	29.216	34.61	0.10	0.23	34.94	60.00	-25.06	Average

Neutral:



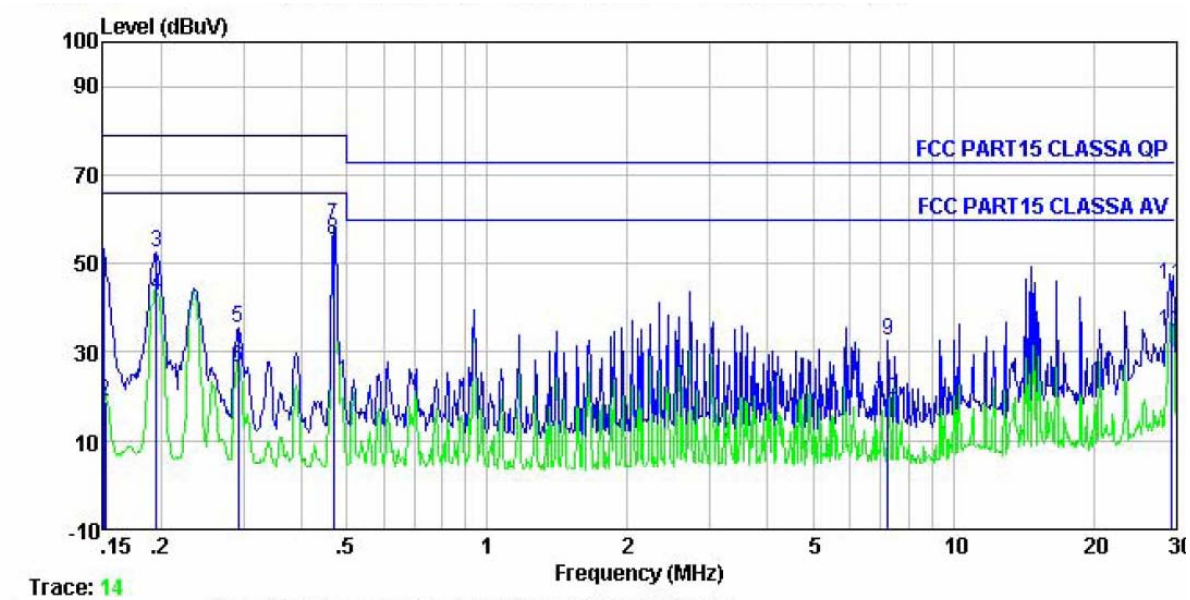
Trace: 10

Condition : FCC PART15 CLASSA QP LISN(2011) NEUTRAL
Job No. : 215RF
Test Mode : CDMA
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	51.98	0.69	0.10	52.77	79.00	-26.23	QP
2	0.150	21.23	0.69	0.10	22.02	66.00	-43.98	Average
3	0.193	51.04	0.66	0.10	51.80	79.00	-27.20	QP
4	0.193	42.30	0.66	0.10	43.06	66.00	-22.94	Average
5	0.292	35.52	0.61	0.10	36.23	79.00	-42.77	QP
6	0.292	27.12	0.61	0.10	27.83	66.00	-38.17	Average
7	0.705	32.94	0.52	0.10	33.56	73.00	-39.44	QP
8	0.705	24.64	0.52	0.10	25.26	60.00	-34.74	Average
9	3.025	35.87	0.35	0.10	36.32	73.00	-36.68	QP
10	3.025	30.14	0.35	0.10	30.59	60.00	-29.41	Average
11	18.721	43.51	0.15	0.21	43.87	73.00	-29.13	QP
12	18.721	29.31	0.15	0.21	29.67	60.00	-30.33	Average

Test mode: EVDO

Line:

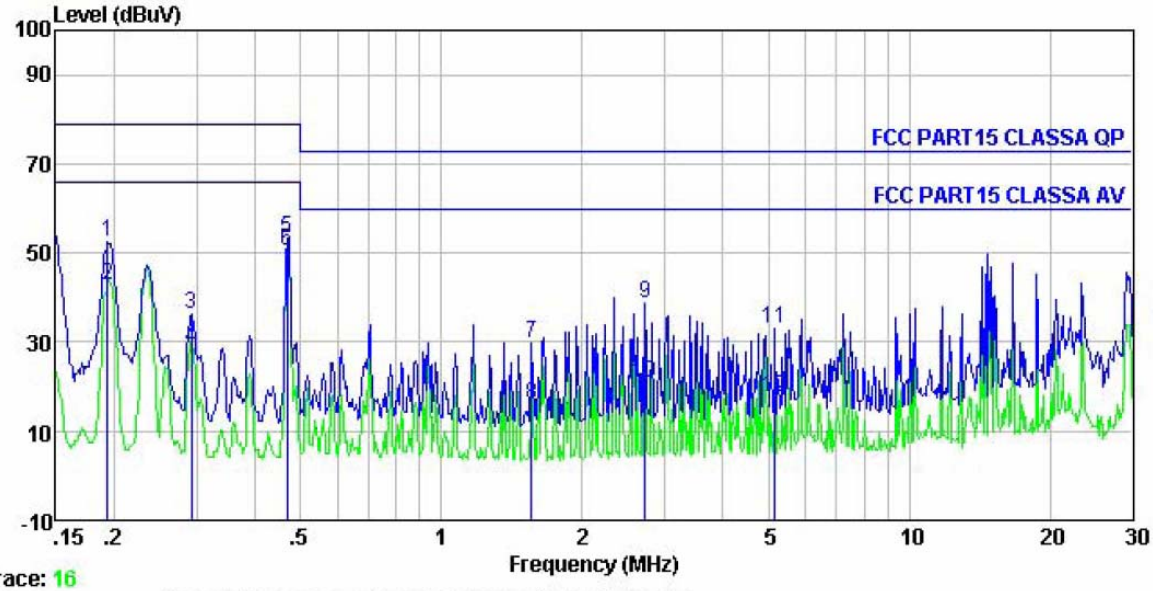


Trace: 14

Condition : FCC PART15 CLASSA QP LISN(2011) LINE
Job No. : 215RF
Test Mode : EVDO
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	52.44	0.69	0.10	53.23	79.00	-25.77	QP
2	0.152	18.13	0.69	0.10	18.92	66.00	-47.08	Average
3	0.195	51.62	0.66	0.10	52.38	79.00	-26.62	QP
4	0.195	42.01	0.66	0.10	42.77	66.00	-23.23	Average
5	0.292	34.88	0.61	0.10	35.59	79.00	-43.41	QP
6	0.292	25.66	0.61	0.10	26.37	66.00	-39.63	Average
7	0.469	57.77	0.56	0.10	58.43	79.00	-20.57	QP
8	0.469	54.88	0.56	0.10	55.54	66.00	-10.46	Average
9	7.252	32.32	0.26	0.16	32.74	73.00	-40.26	QP
10	7.252	19.01	0.26	0.16	19.43	60.00	-40.57	Average
11	29.371	44.99	0.10	0.23	45.32	73.00	-27.68	QP
12	29.371	34.32	0.10	0.23	34.65	60.00	-25.35	Average

Neutral:



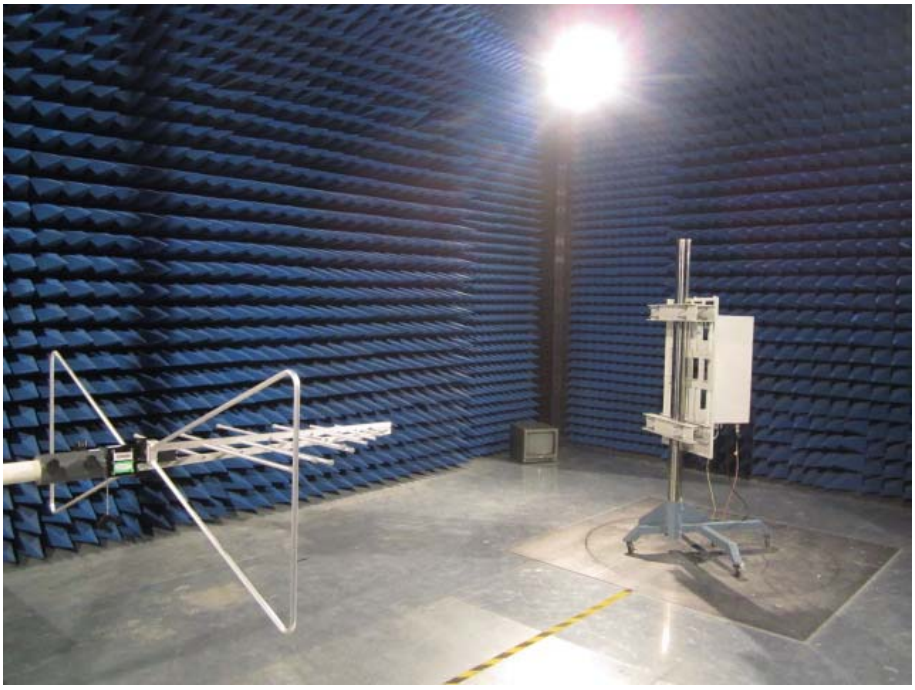
Trace: 16

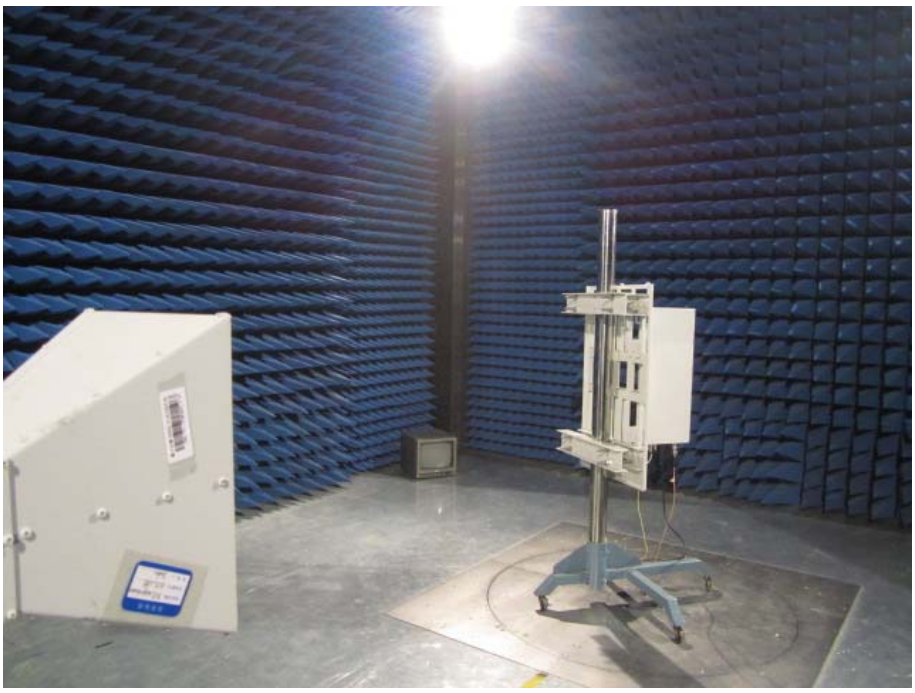
Condition : FCC PART15 CLASSA QP LISN(2011) LINE
Job No. : 215RF
Test Mode : EVDO
Test Engineer: Sam

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.193	51.64	0.66	0.10	52.40	79.00	-26.60	QP
2	0.193	42.01	0.66	0.10	42.77	66.00	-23.23	Average
3	0.292	35.60	0.61	0.10	36.31	79.00	-42.69	QP
4	0.292	27.82	0.61	0.10	28.53	66.00	-37.47	Average
5	0.469	52.63	0.56	0.10	53.29	79.00	-25.71	QP
6	0.469	49.91	0.56	0.10	50.57	66.00	-15.43	Average
7	1.560	29.33	0.43	0.10	29.86	73.00	-43.14	QP
8	1.560	15.65	0.43	0.10	16.18	60.00	-43.82	Average
9	2.721	38.35	0.37	0.10	38.82	73.00	-34.18	QP
10	2.721	20.45	0.37	0.10	20.92	60.00	-39.08	Average
11	5.166	32.65	0.30	0.10	33.05	73.00	-39.95	QP
12	5.166	17.01	0.30	0.10	17.41	60.00	-42.59	Average

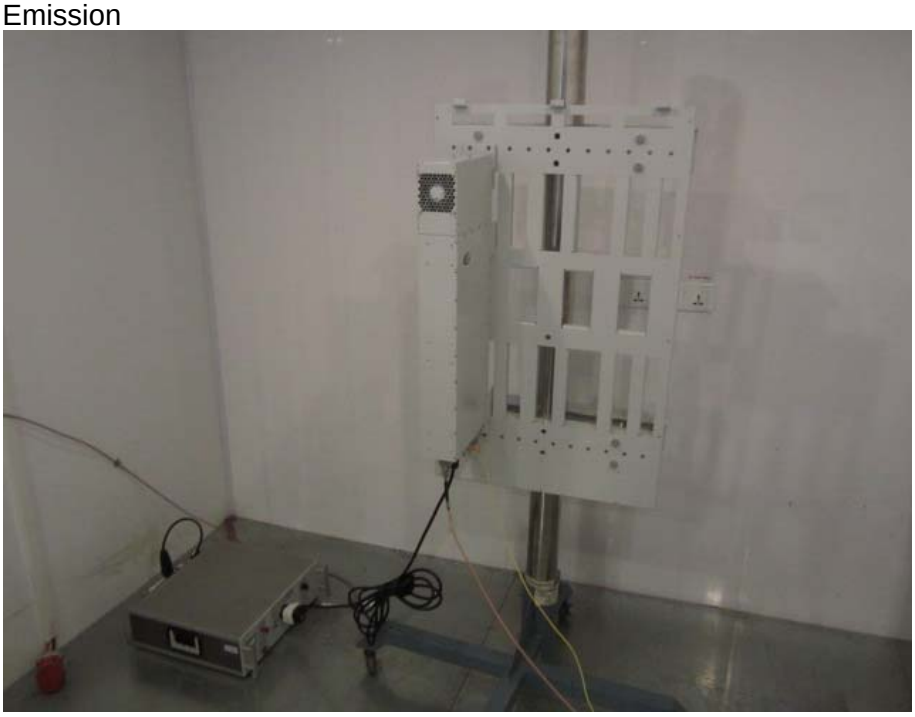
16 Test Setup Photo

Radiated Emission





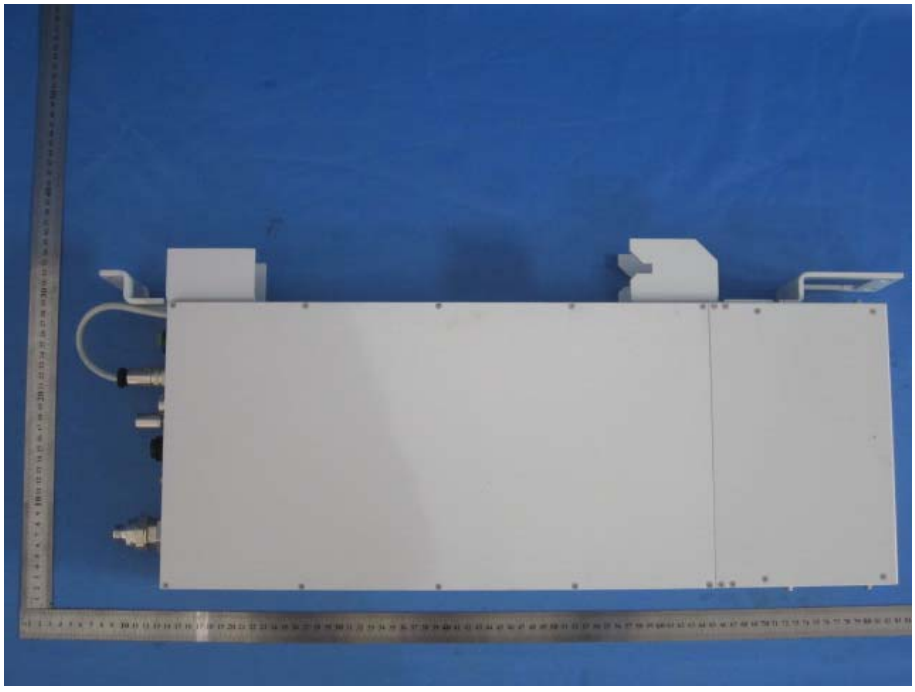
Conducted Emission



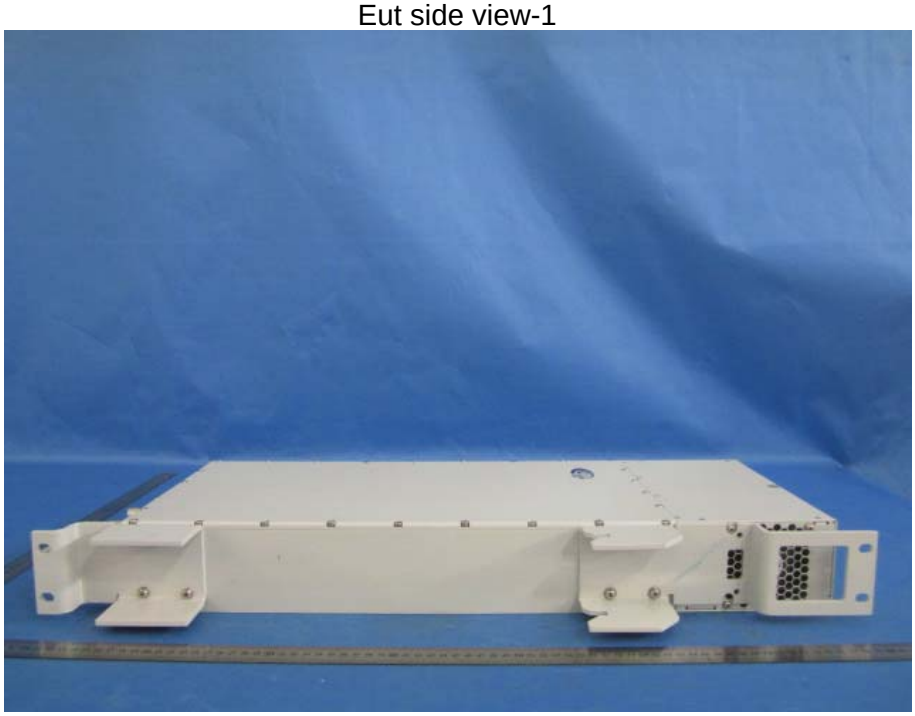
17 EUT Constructional Details

EUT front view

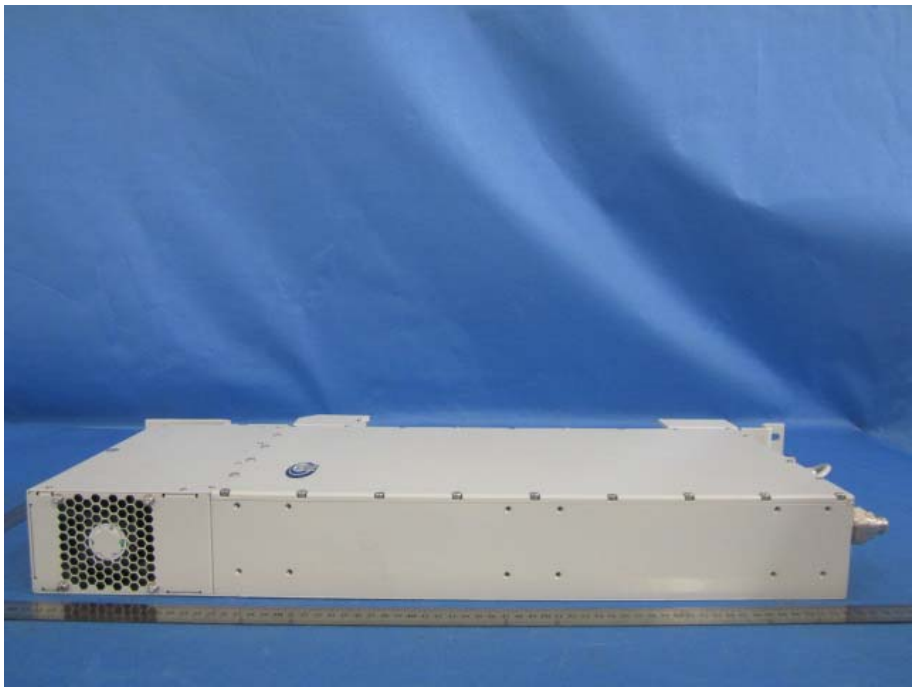
Eut back view



Eut side view-1

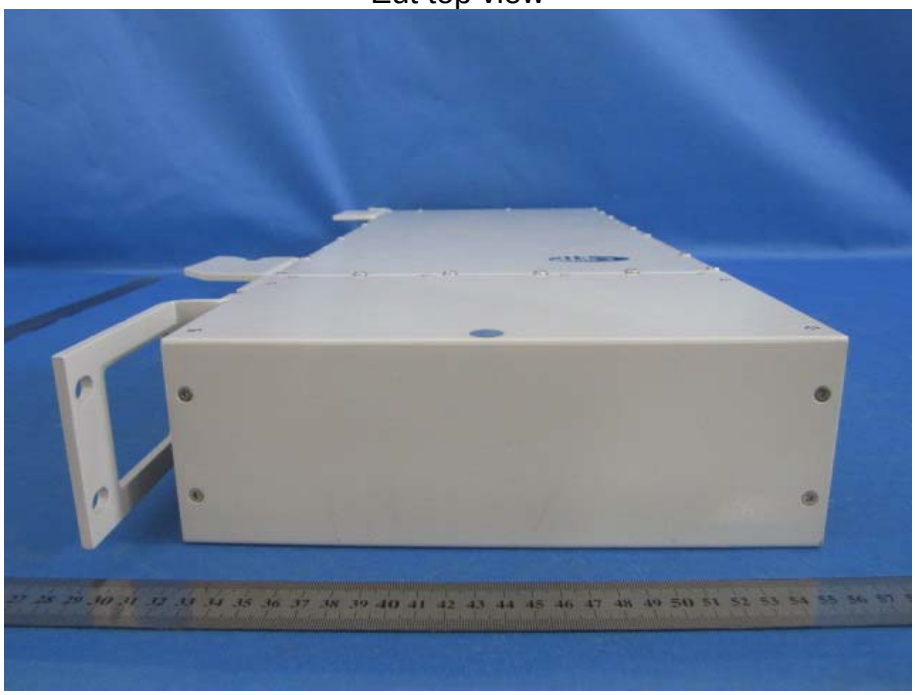


Eut side view-2

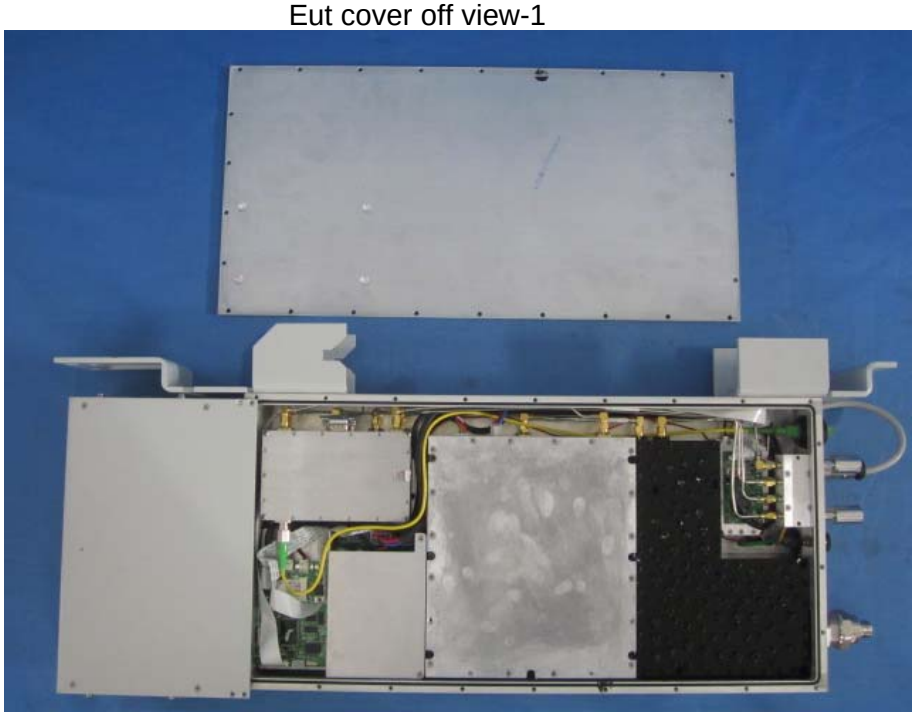


Eut port view

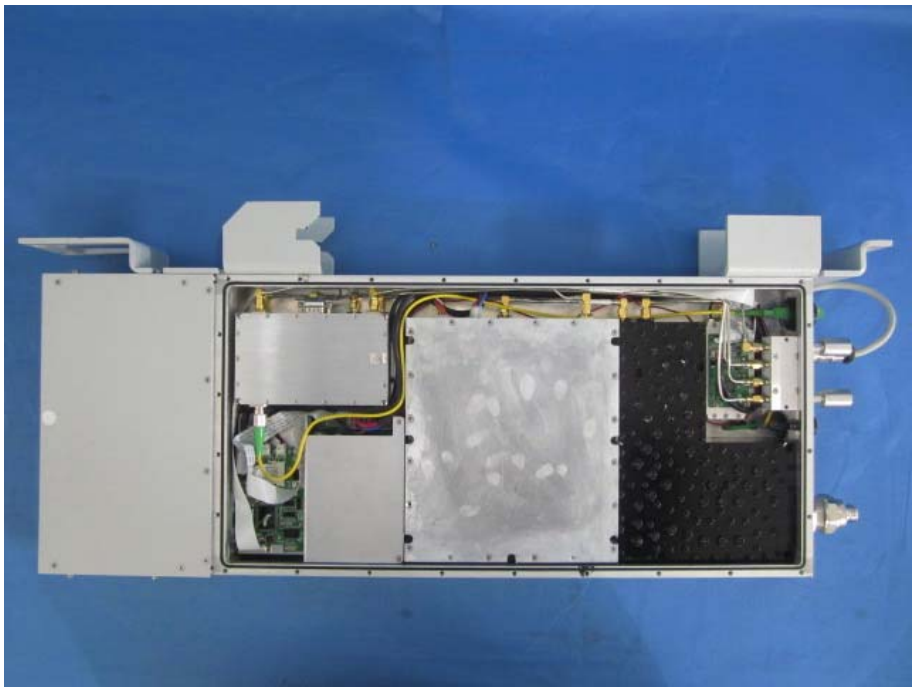
Eut top view



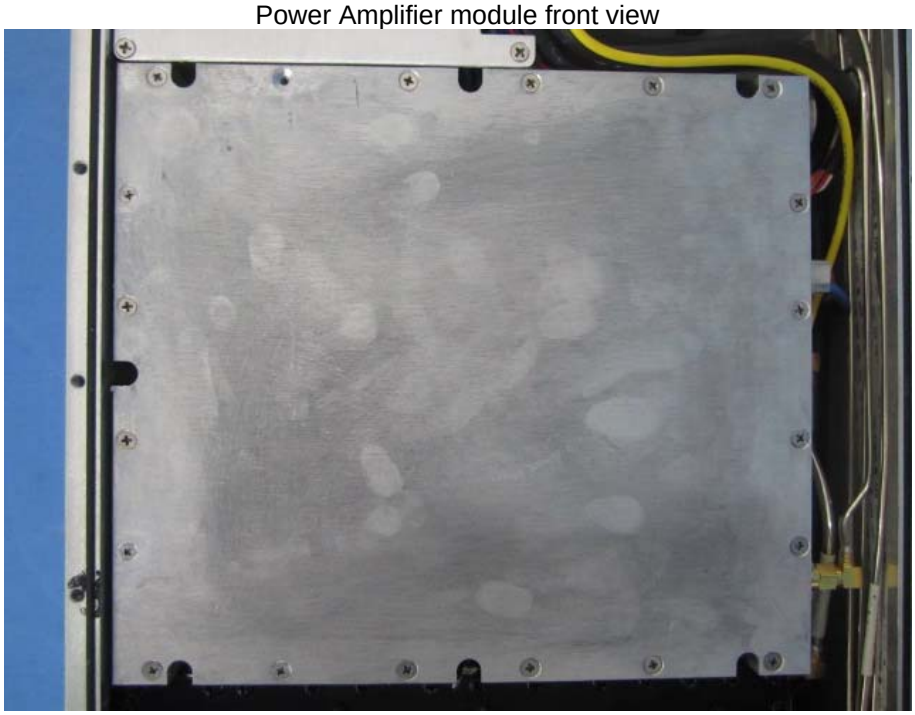
Eut cover off view-1



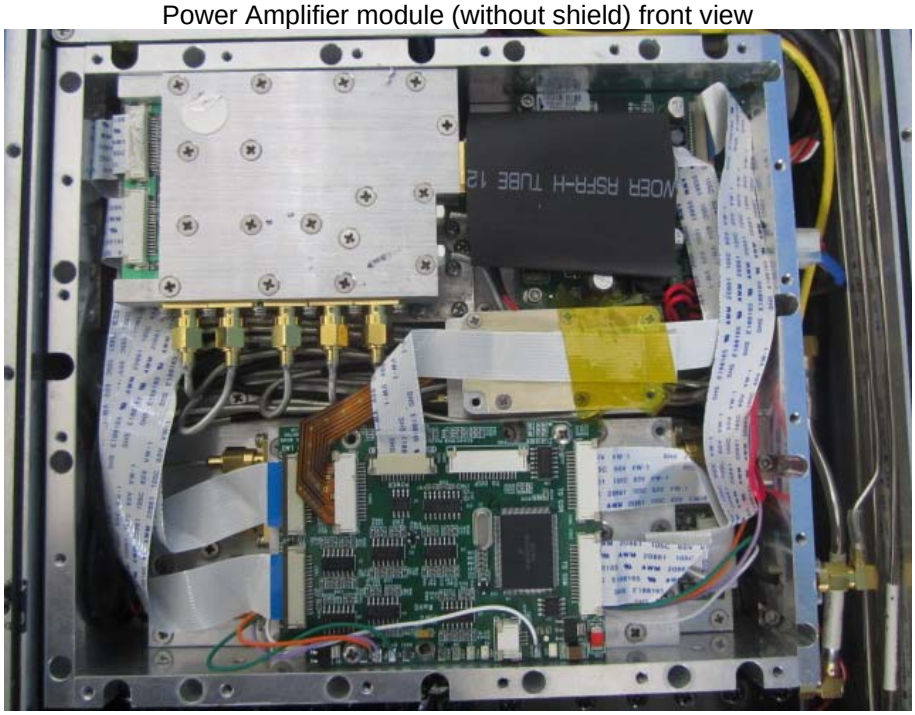
Eut cover off view-2



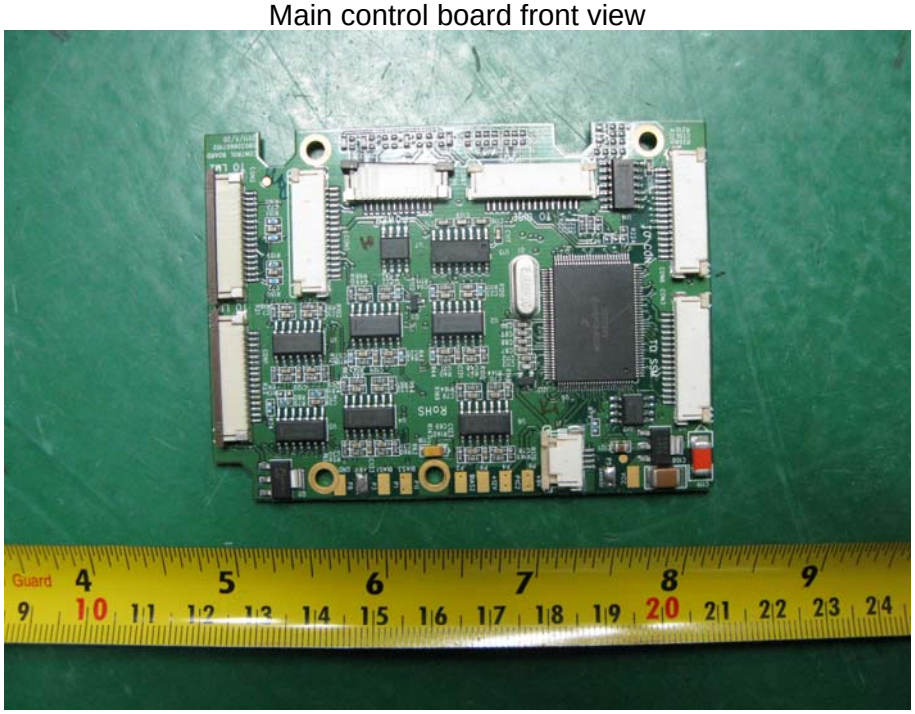
Power Amplifier module front view



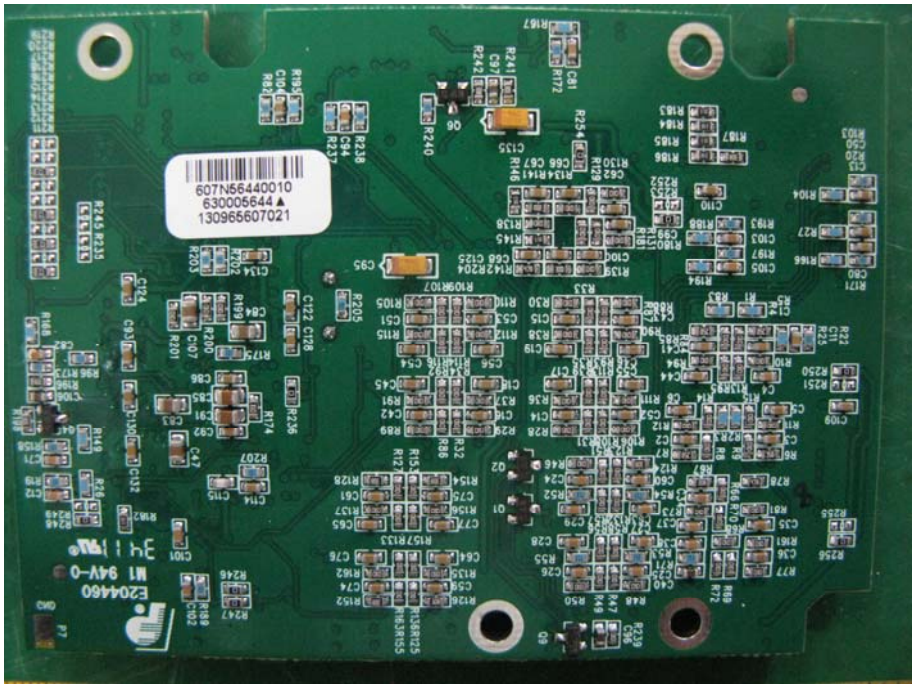
Power Amplifier module (without shield) front view



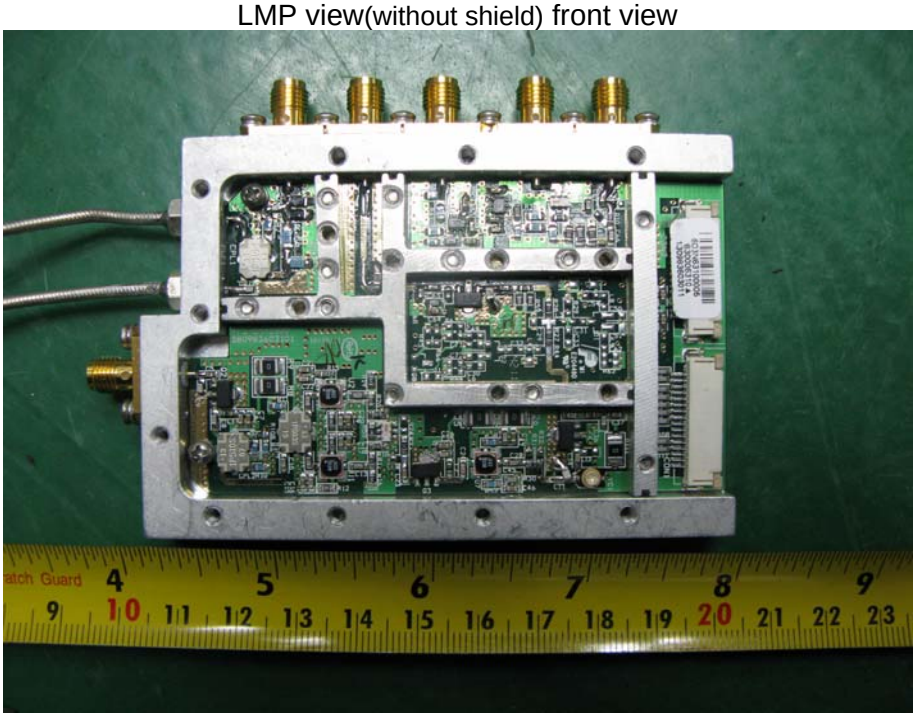
Main control board front view



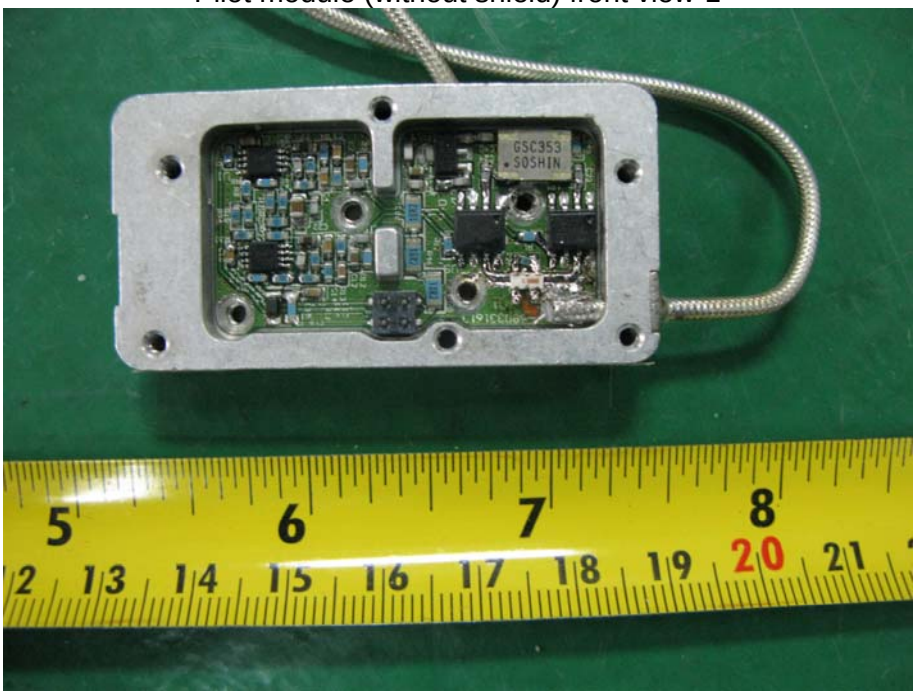
Main control board back view



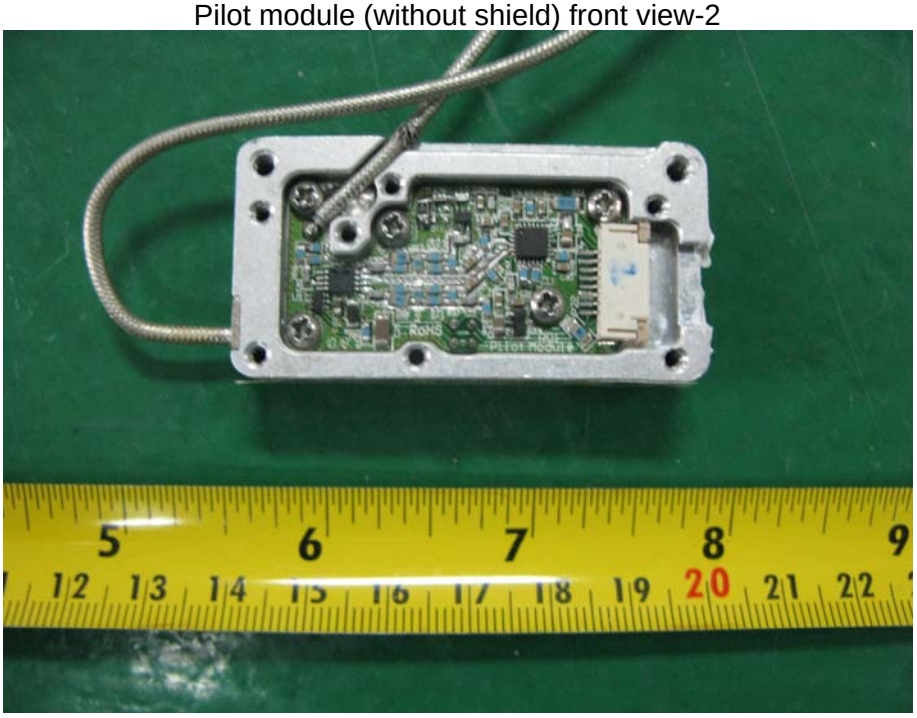
LMP view(without shield) front view



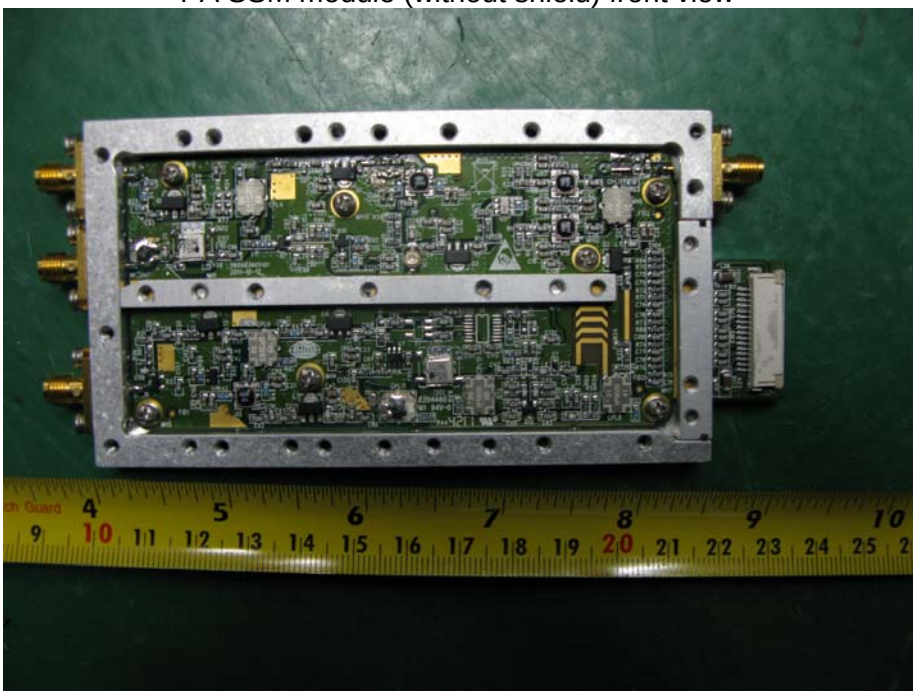
Pilot module (without shield) front view-1



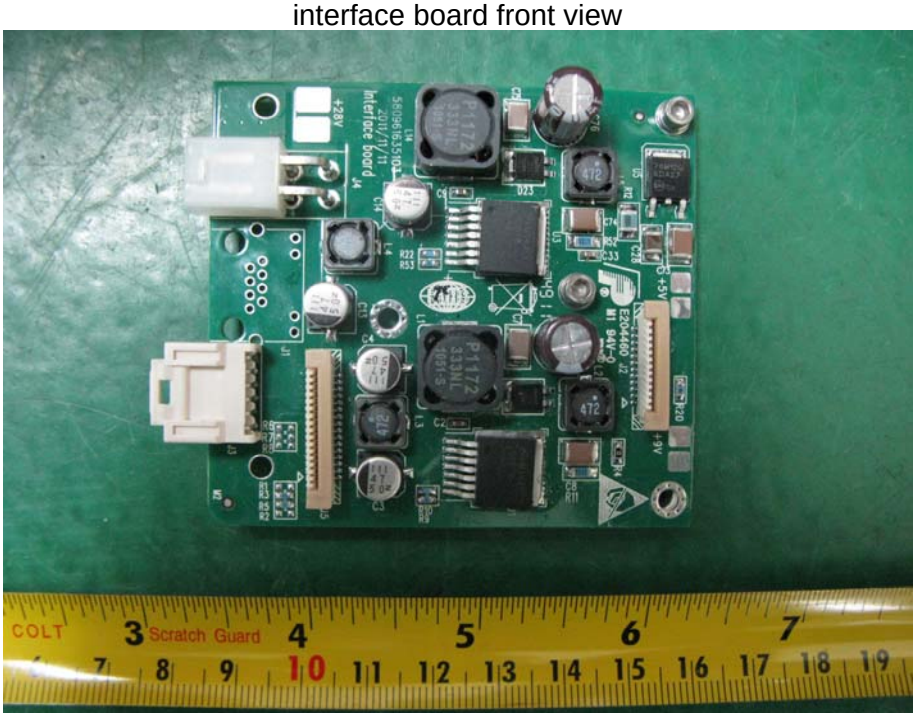
Pilot module (without shield) front view-2



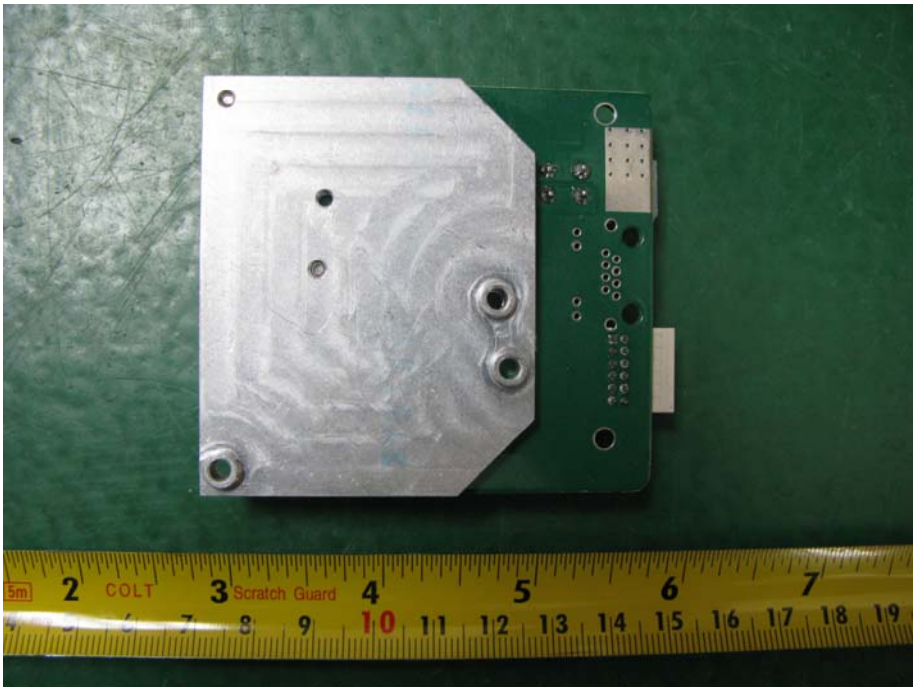
PA SSM module (without shield) front view



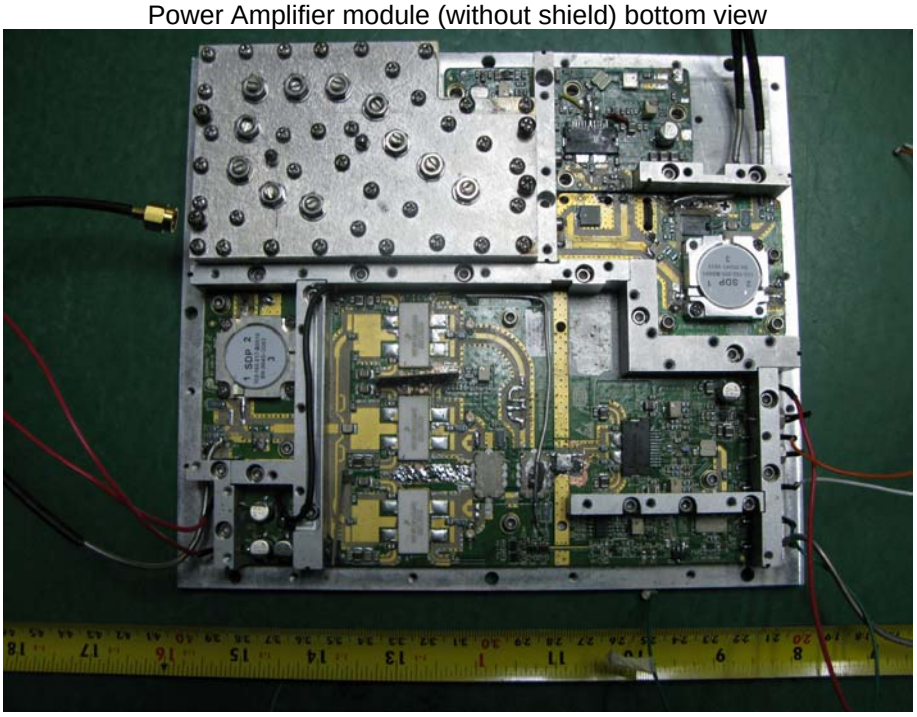
interface board front view



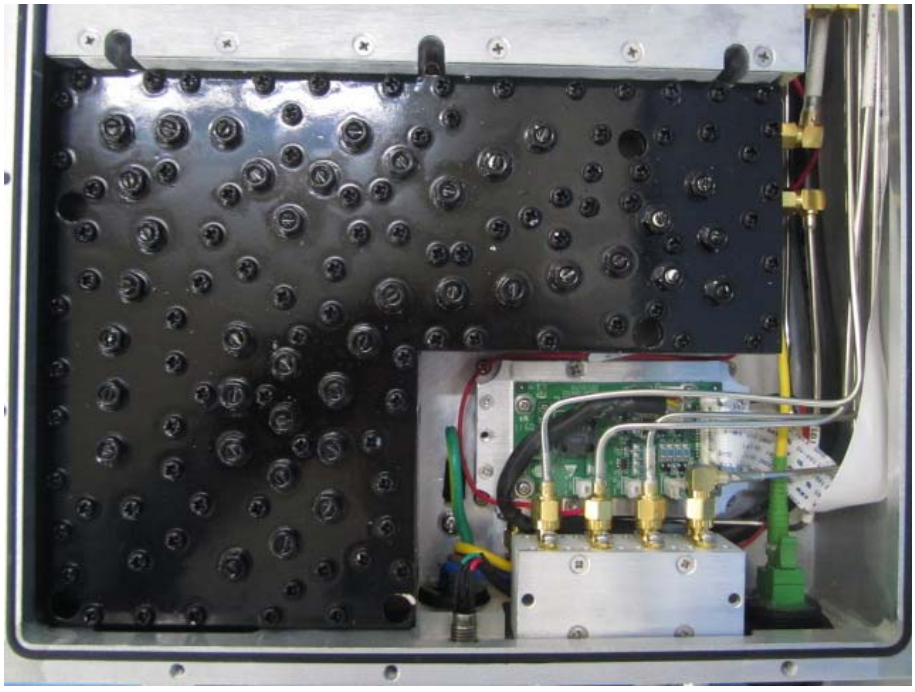
interface board back view



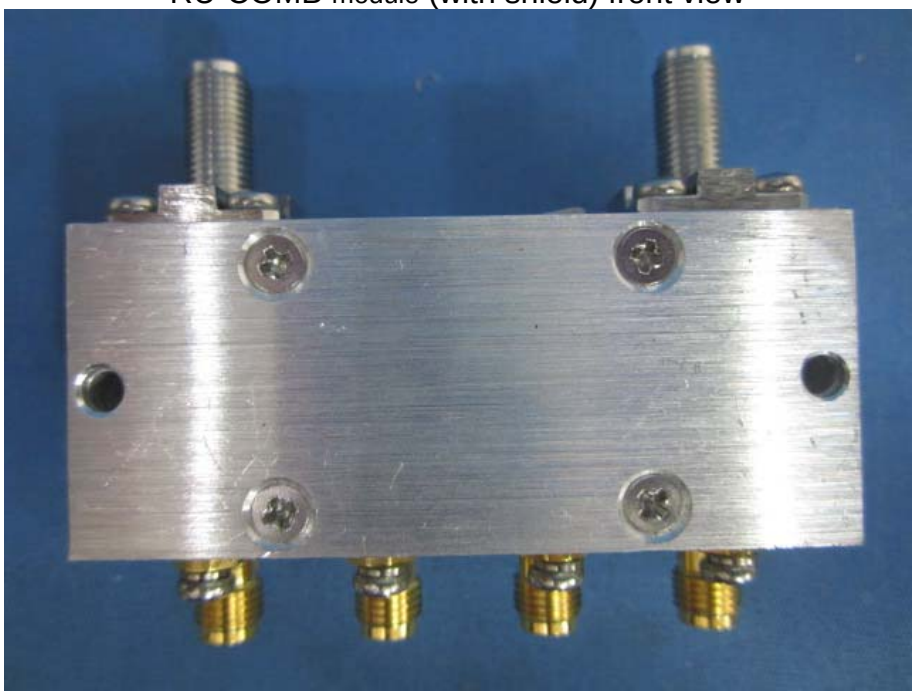
Power Amplifier module (without shield) bottom view



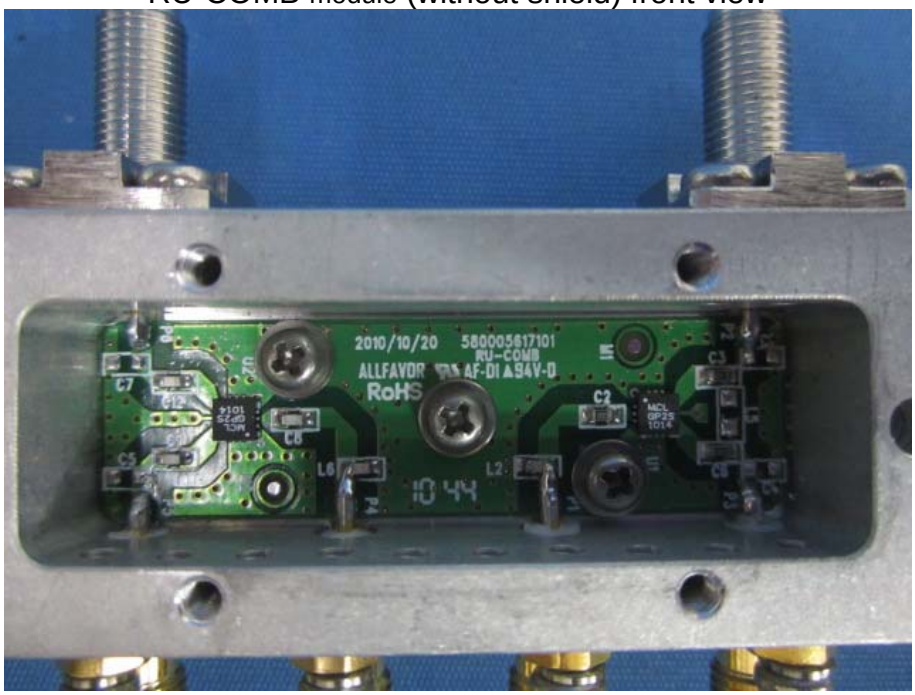
Internal Constructional view-1



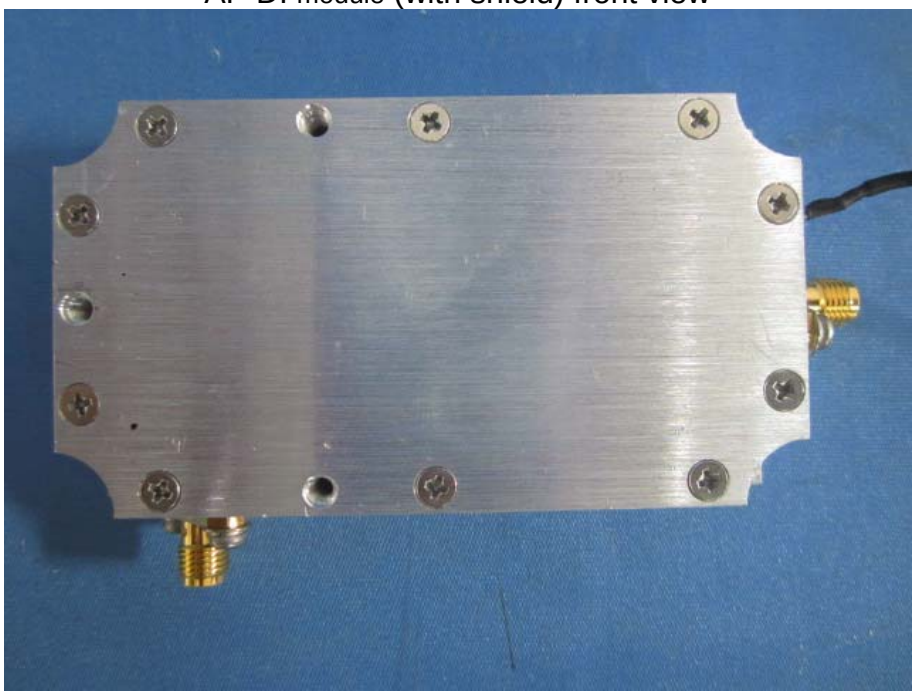
RU-COMB module (with shield) front view



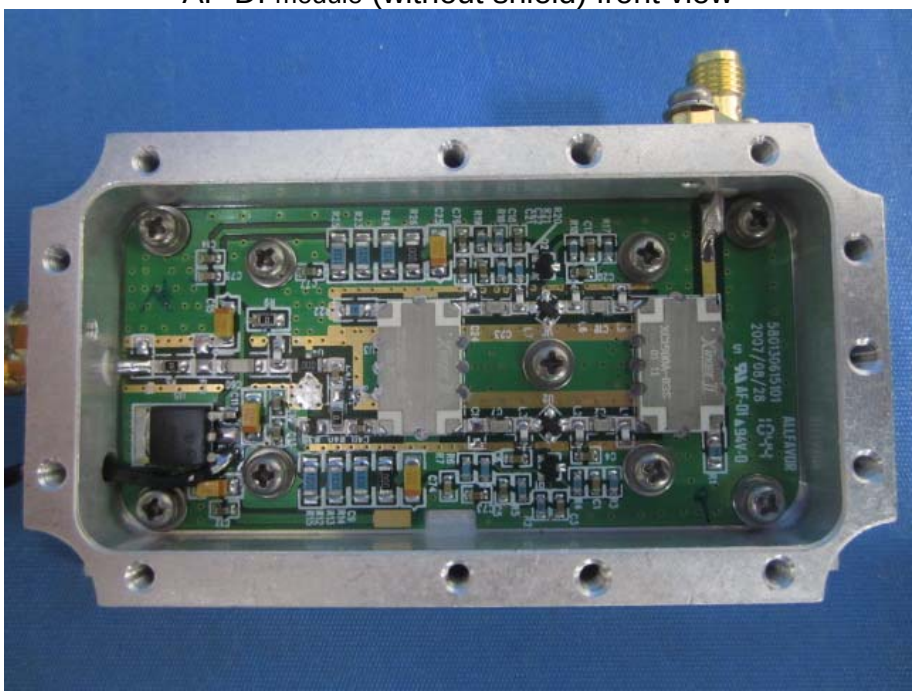
RU-COMB module (without shield) front view



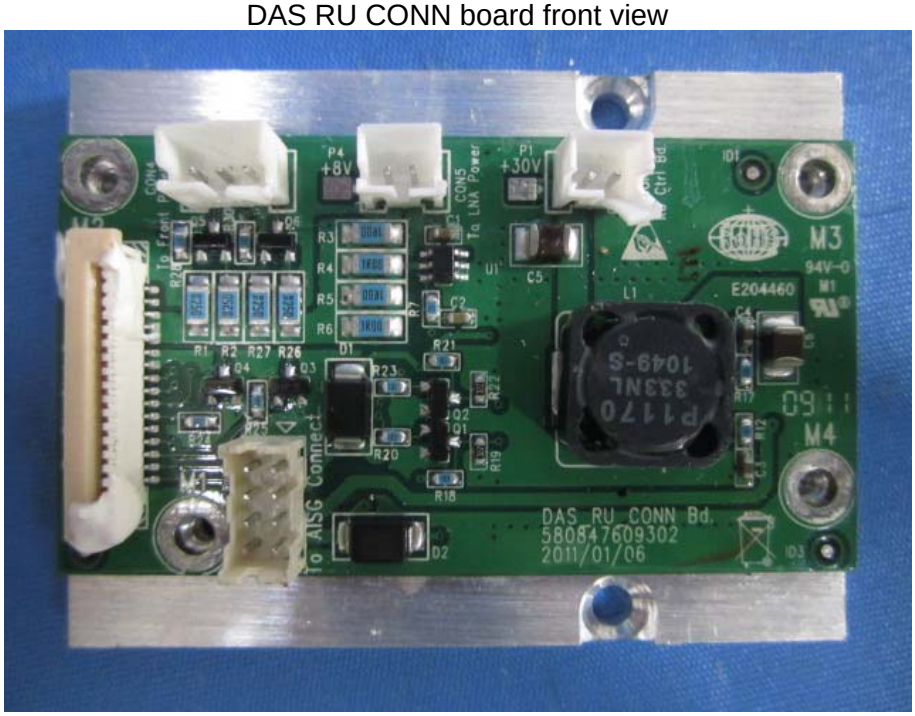
AF-DI module (with shield) front view



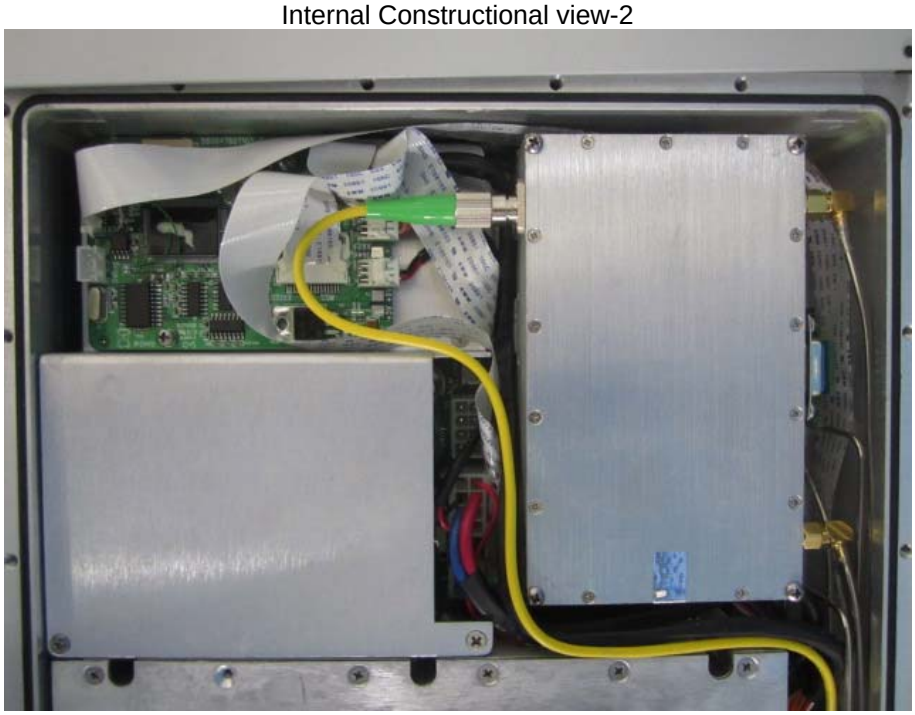
AF-DI module (without shield) front view



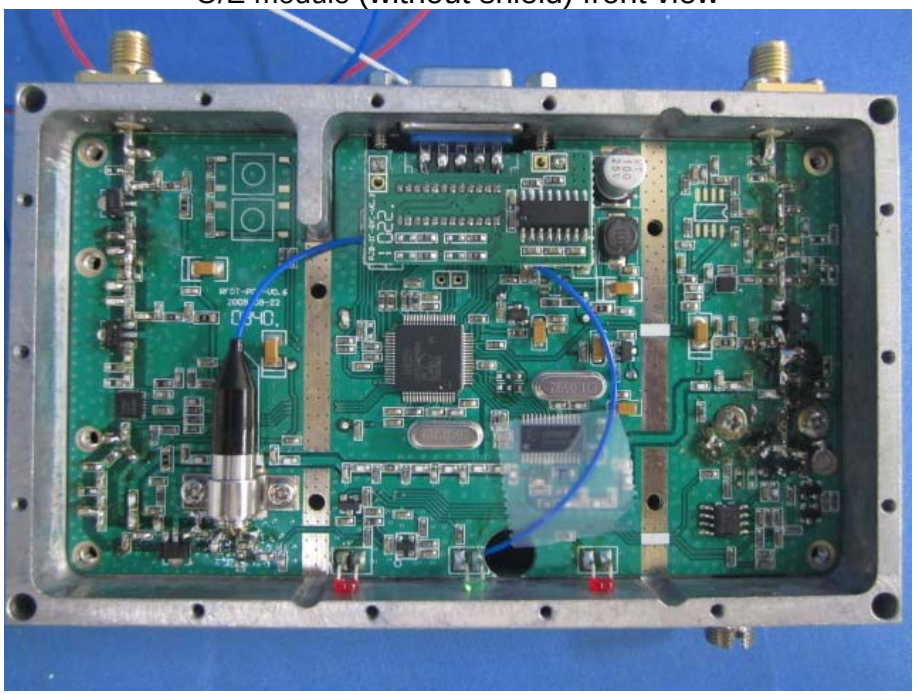
DAS RU CONN board front view



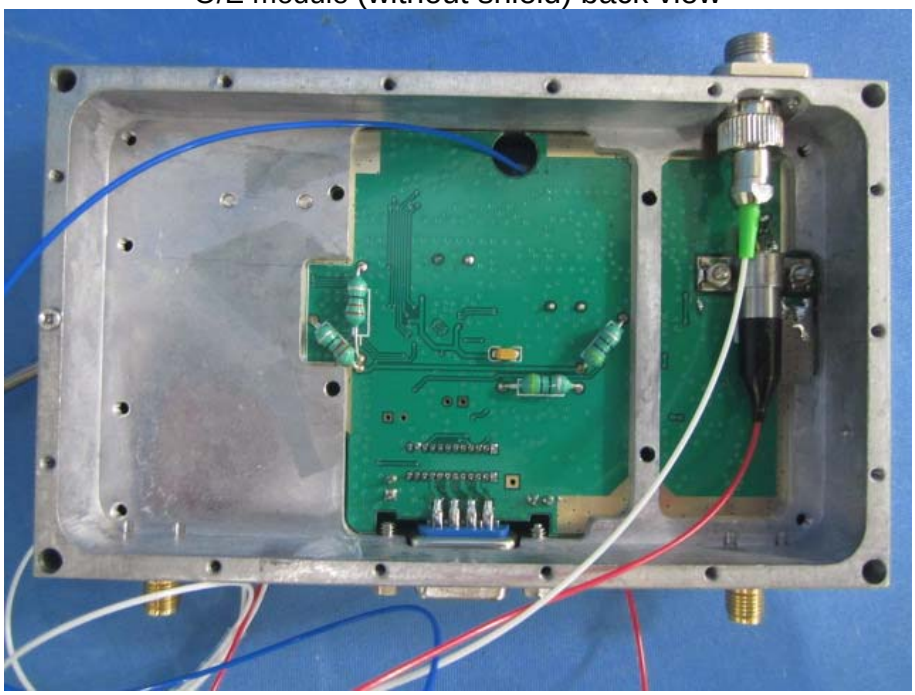
Internal Constructional view-2



O/E module (without shield) front view

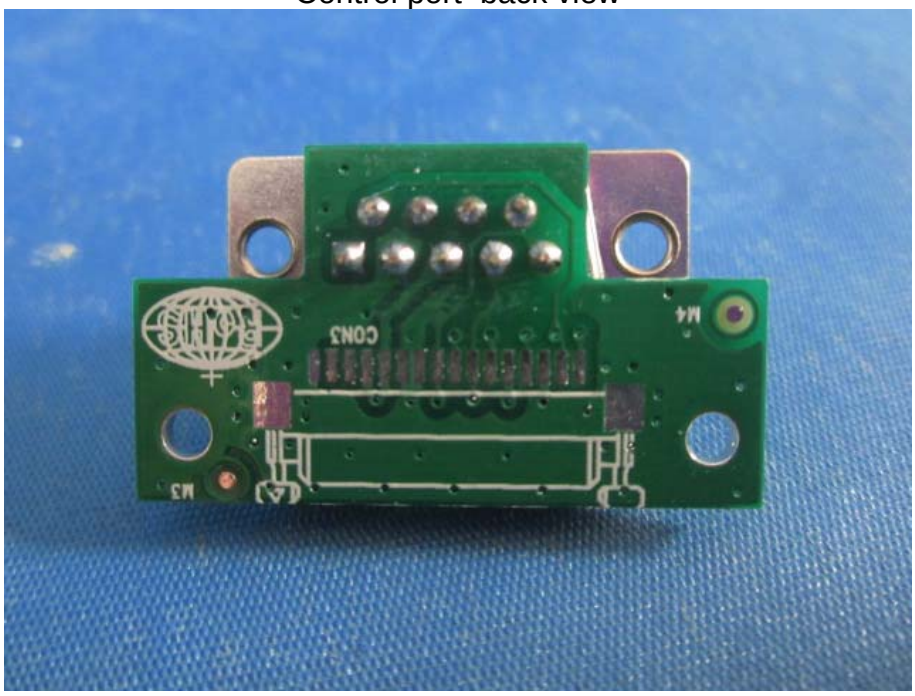


O/E module (without shield) back view

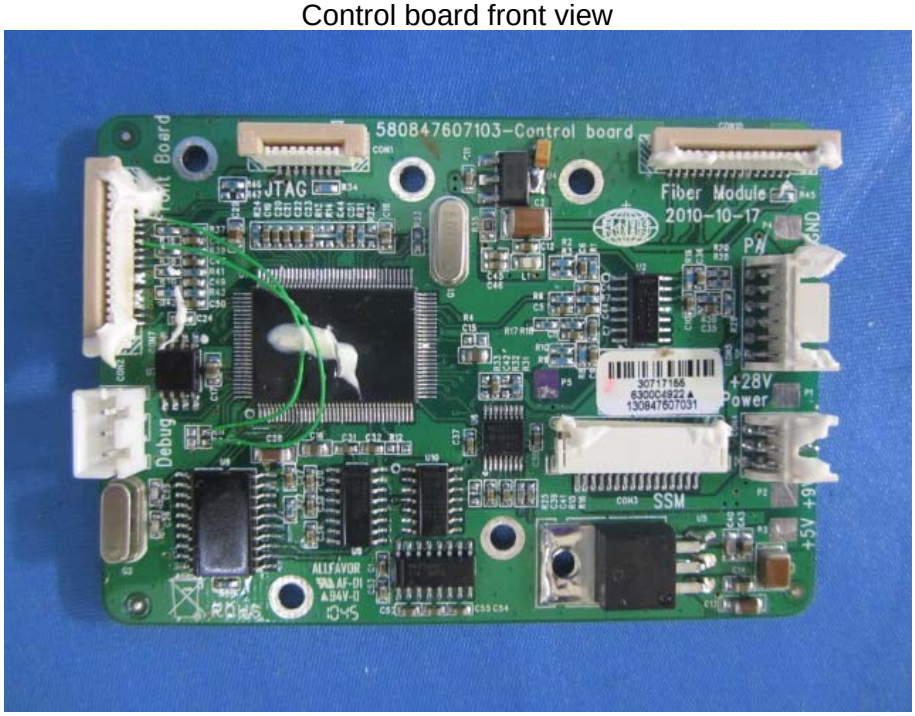


Control port front view

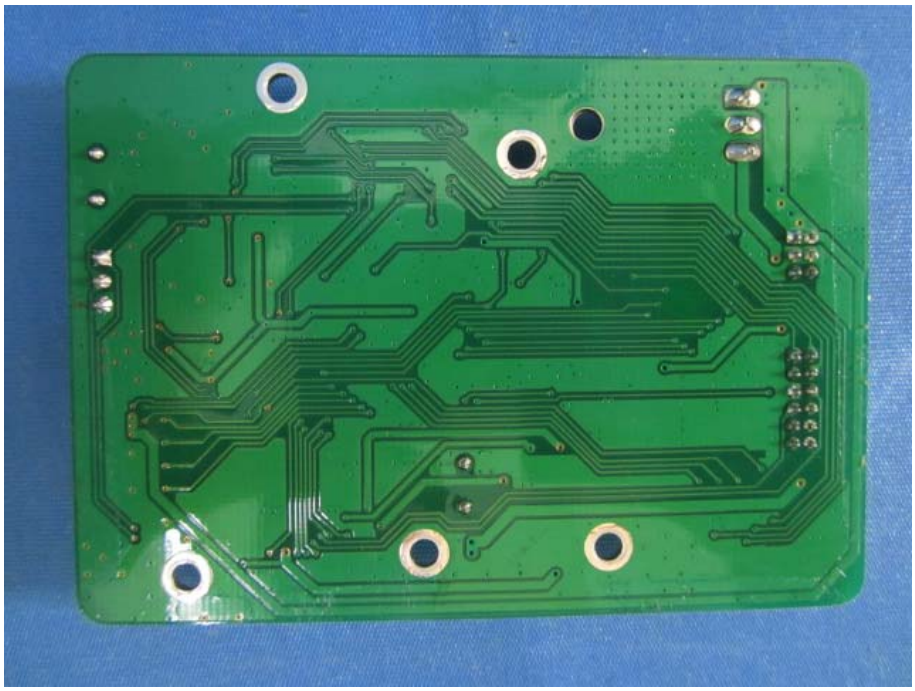
Control port back view



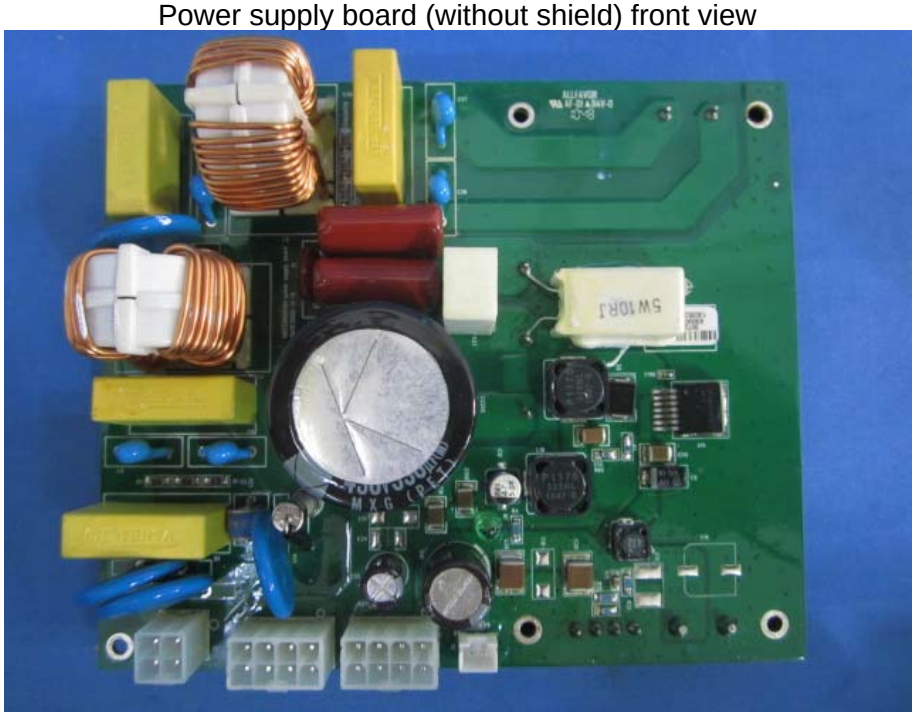
Control board front view



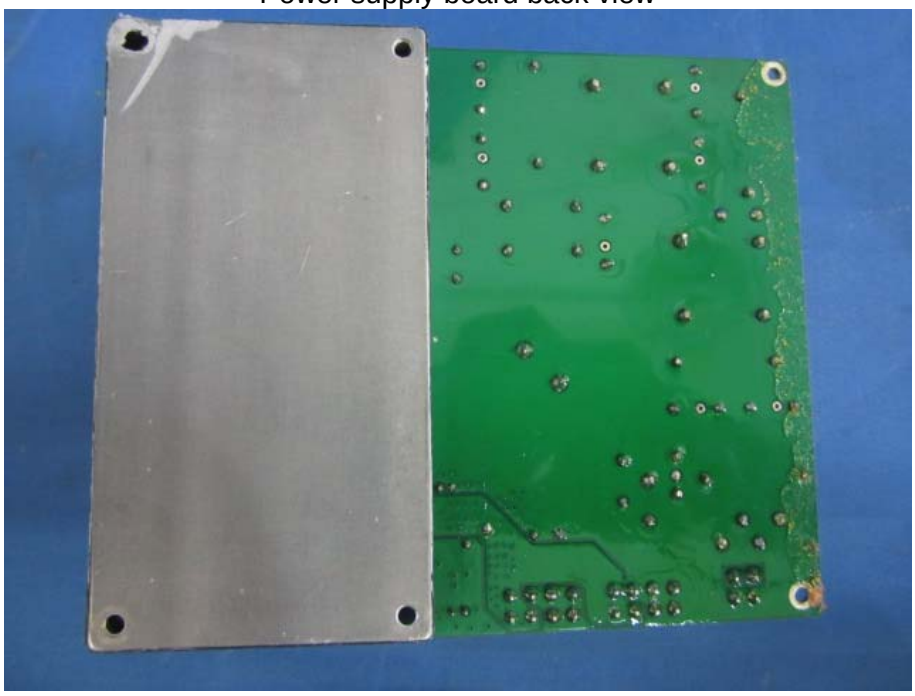
Control board back view



Power supply board (without shield) front view

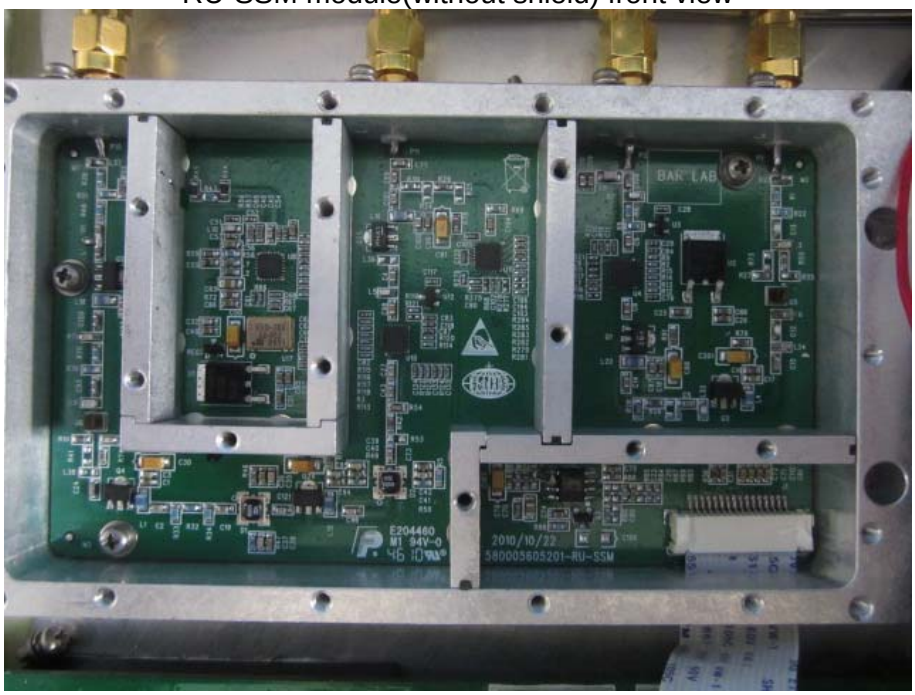


Power supply board back view



RU-SSM module(with shield) front view

RU-SSM module(without shield) front view



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