6.9. TRANSMITTER ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS @ FCC 90.210

6.9.1. Limits @ 90.210

Emissions shall be attenuated below the mean output power of the transmitter as follows:

Frequency Band	Frequency Range	Attenuation Limit (dBc)
896-901MHz	10 MHz to Lowest frequency of the radio to 10th harmonic of the highest frequency of the radio	50+10*log(P) or -20 dBm or 70 dBc whichever is less

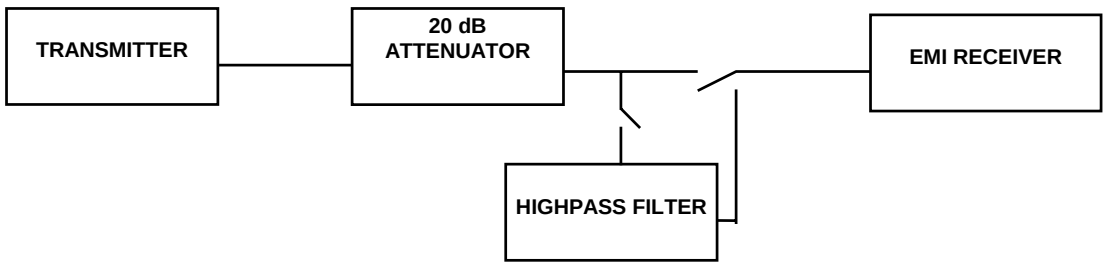
6.9.2. Method of Measurements

Refer to Exhibit 8 § 8.5 of this report for measurement details

6.9.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
EMI Receiver/ EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Attenuator(s)	Bird	..	…	DC – 22 GHz
Audio Oscillator	Hewlett Packard	HP 204C	0989A08798	DC to 1.2 MHz
Highpass Filter, Microphase	Microphase	CR220HID	IITI11000AC	Cut-off Frequency at 600 MHz, 1.3 GHz or 4 GHz

6.9.4. Test Arrangement



6.9.5. Test Data

6.9.5.1. High Power Setting (2 Watts) at Lowest Frequency (896 MHz)

Fundamental Frequency:	896 MHz
RF Output Power:	33.3 dBm (Conducted)
Modulation:	2 level 8kbps GMSK

FREQUENCY (MHz)	TRANSMITTER CONDUCTED ANTENNA EMISSIONS (dBm)	(dBc)	LIMIT (dBc)	MARGIN (dB)	PASS/ FAIL
4480.9	-37.4	-70.7	-53.3	-17.4	PASS
5382.7	-27.8	-61.1	-53.3	-7.8	PASS
6266.5	-31.6	-64.9	-53.3	-11.6	PASS

- ** The emissions were scanned from 10 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Please refer to plots # 11 & 12 for details of measurement.

6.9.5.2. High Power Setting (2 Watts) at Middle Frequency (898.5 MHz)

Fundamental Frequency:	898.5 MHz
RF Output Power:	33.3 dBm (Conducted)
Modulation:	2 level 8kbps GMSK

FREQUENCY (MHz)	TRANSMITTER CONDUCTED ANTENNA EMISSIONS (dBm)	(dBc)	LIMIT (dBc)	MARGIN (dB)	PASS/ FAIL
4499.0	-37.4	-70.7	-53.3	-17.4	PASS
5382.7	-28.0	-61.3	-53.3	-8.0	PASS
6284.5	-31.5	-64.8	-53.3	-11.5	PASS

- ** The emissions were scanned from 10 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Please refer to plots # 13 & 14 for details of measurement.

6.9.5.3. High Power Setting (2 Watts) at Highest Frequency (901 MHz)

Fundamental Frequency:	901 MHz
RF Output Power:	33.3 dBm (Conducted)
Modulation:	2 level 8kbps GMSK

FREQUENCY (MHz)	TRANSMITTER CONDUCTED ANTENNA EMISSIONS (dBm)	(dBc)	LIMIT (dBc)	MARGIN (dB)	PASS/ FAIL
4499.0	-37.7	-71.0	-53.3	-17.7	PASS
5400.8	-27.6	-60.9	-53.3	-7.6	PASS
6302.6	-31.6	-64.9	-53.3	-11.6	PASS

- ** The emissions were scanned from 10 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Please refer to plots # 15 & 16 for details of measurement.

6.9.5.4. Low Power Setting (0.033 Watts) at Lowest Frequency (896 MHz)

Fundamental Frequency:	896 MHz
RF Output Power:	15.2 dBm (Conducted)
Modulation:	2 level 8kbps GMSK

FREQUENCY (MHz)	TRANSMITTER CONDUCTED ANTENNA EMISSIONS (dBm)	(dBc)	LIMIT (dBc)	MARGIN (dB)	PASS/ FAIL
1793.6	-42.6	-57.8	-35.2	-22.6	PASS
6266.5	-38.1	-53.3	-35.2	-18.1	PASS

- ** The emissions were scanned from 10 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Please refer to plots # 17 & 18 for details of measurement.

6.9.5.5. Low Power Setting (0.033 Watts) at Middle Frequency (898.5 MHz)

Fundamental Frequency:	898.5 MHz
RF Output Power:	15.2 dBm (Conducted)
Modulation:	2 level 8kbps GMSK

FREQUENCY (MHz)	TRANSMITTER CONDUCTED ANTENNA EMISSIONS (dBm)	(dBc)	LIMIT (dBc)	MARGIN (dB)	PASS/ FAIL
1793.6	-41.7	-56.9	-35.2	-21.7	PASS
6284.5	-38.3	-53.5	-35.2	-18.3	PASS

- ** The emissions were scanned from 10 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Please refer to plots # 19 & 20 for details of measurement.

6.9.5.6. Low Power Setting (0.033 Watts) at Highest Frequency (901 MHz)

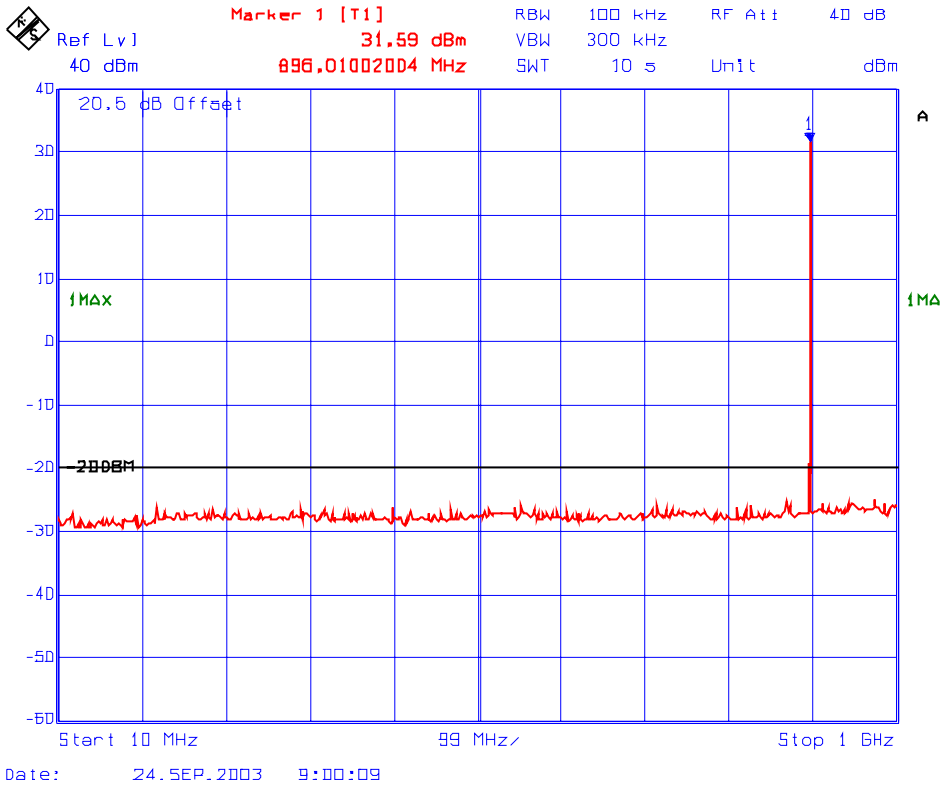
Fundamental Frequency:	901 MHz
RF Output Power:	15.2 dBm (Conducted)
Modulation:	2 level 8kbps GMSK

FREQUENCY (MHz)	TRANSMITTER CONDUCTED ANTENNA EMISSIONS (dBm)	(dBc)	LIMIT (dBc)	MARGIN (dB)	PASS/ FAIL
1793.6	-40.5	-55.7	-35.2	-20.5	PASS
6302.6	-39.1	-54.3	-35.2	-19.1	PASS

- ** The emissions were scanned from 10 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Please refer to plots # 21 & 22 for details of measurement.

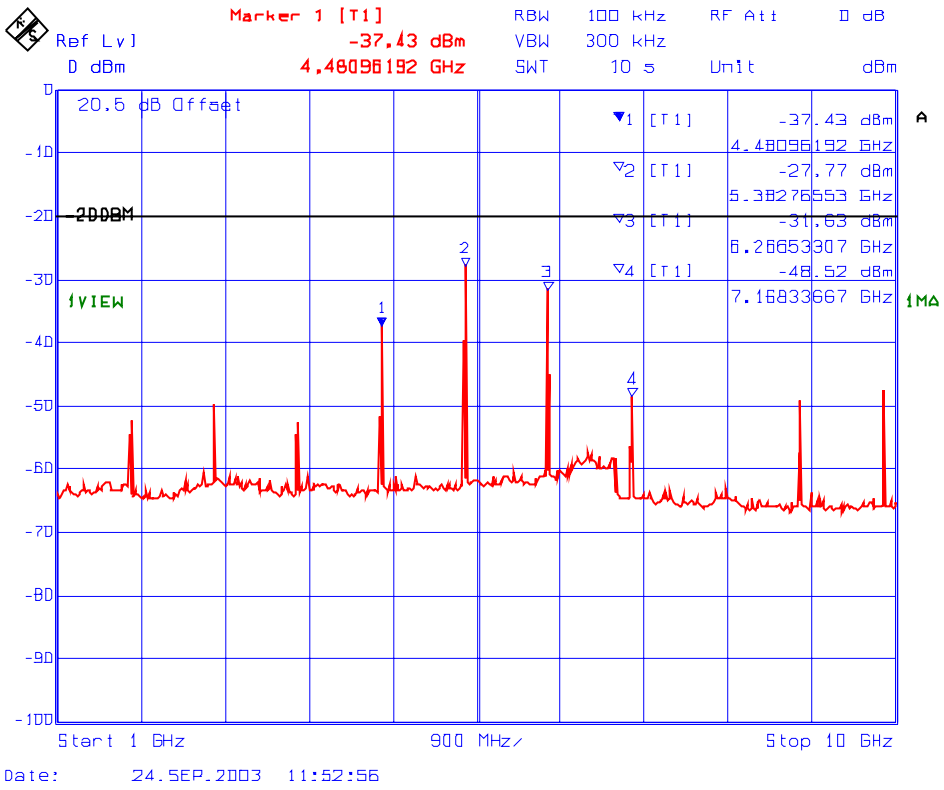
Plot # 11 : Spurious Emission Conducted at Antenna terminal, High power setting

Frequency: 896 MHz, Modulation: 2-Level 8kbps GMSK



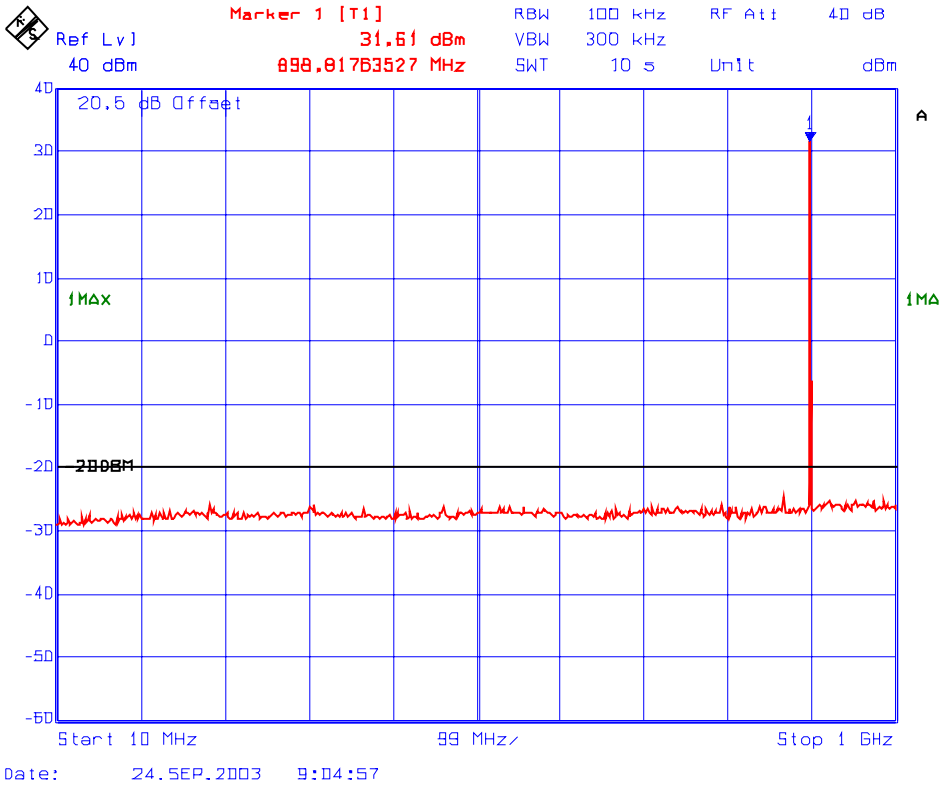
Plot # 12 : Spurious Emission Conducted at Antenna terminal, High power setting

Frequency: 896 MHz, Modulation: 2-Level 8kbps GMSK



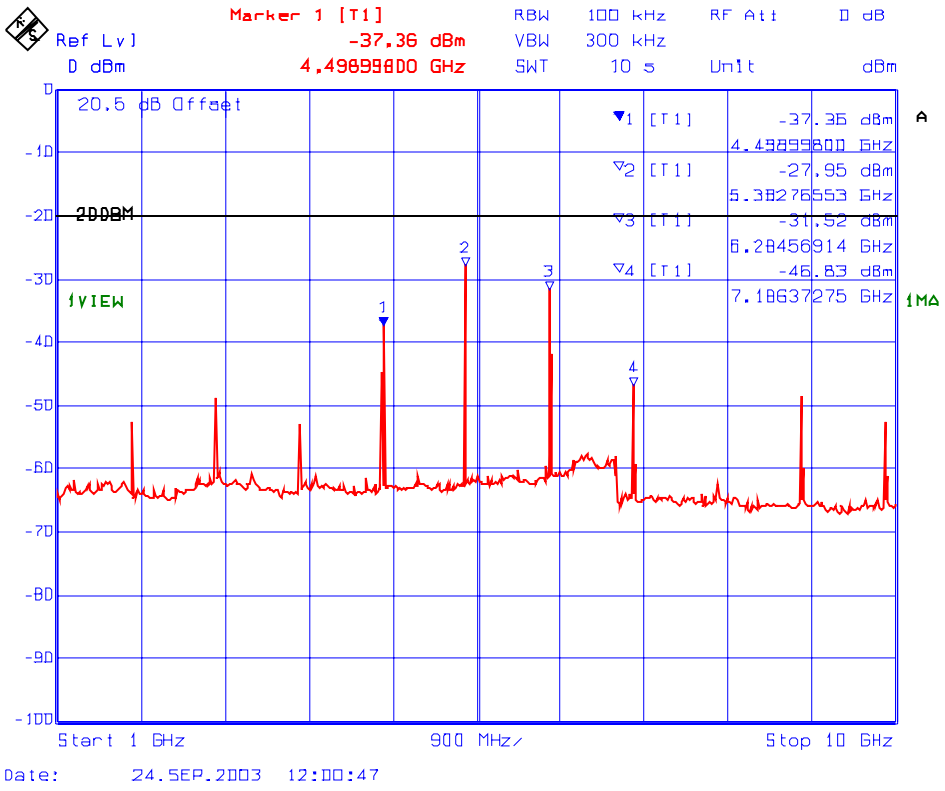
Plot # 13 : Spurious Emission Conducted at Antenna terminal, High power setting

Frequency: 898.5 MHz, Modulation: 2-Level 8kbps GMSK



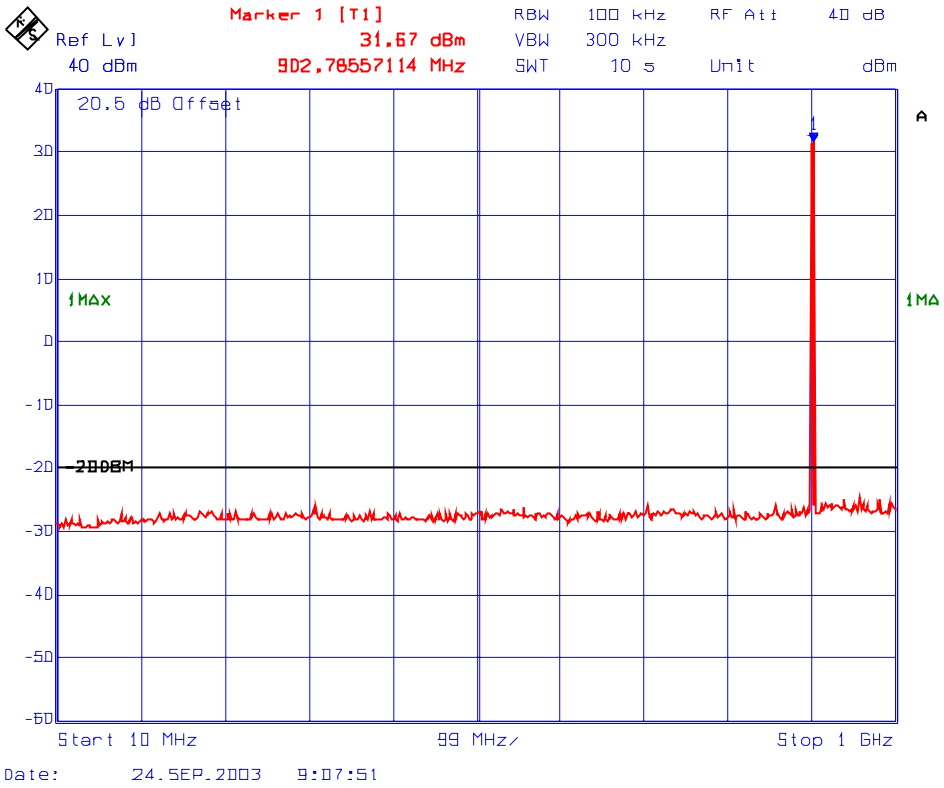
Plot # 14 : Spurious Emission Conducted at Antenna terminal, High power setting

Frequency: 898.5 MHz, Modulation: 2-Level 8kbps GMSK



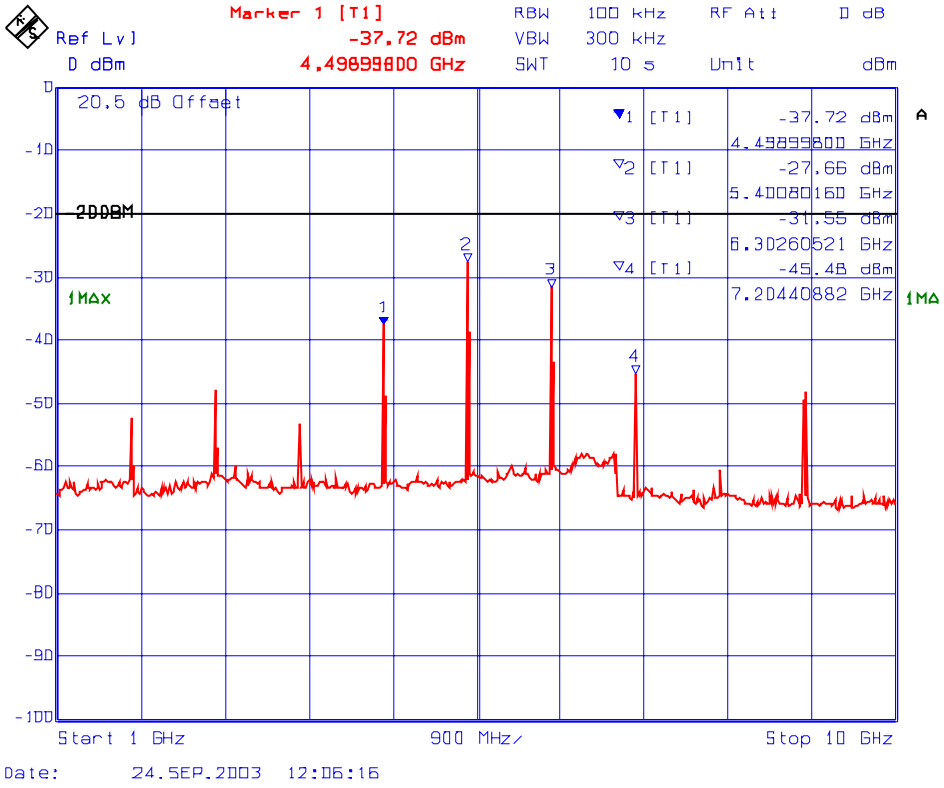
Plot # 15 : Spurious Emission Conducted at Antenna terminal, High power setting

Frequency: 901 MHz, Modulation: 2-Level 8kbps GMSK



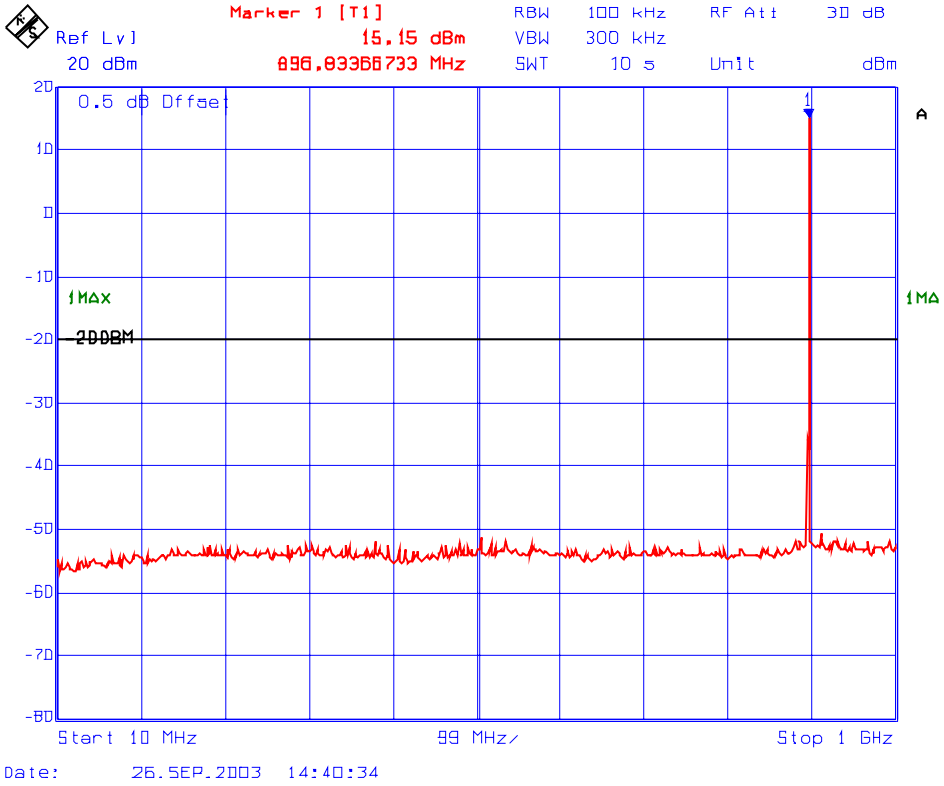
Plot # 16 : Spurious Emission Conducted at Antenna terminal, High power setting

Frequency: 901 MHz, Modulation: 2-Level 8kbps GMSK



Plot # 17 : Spurious Emission Conducted at Antenna terminal, Low power setting

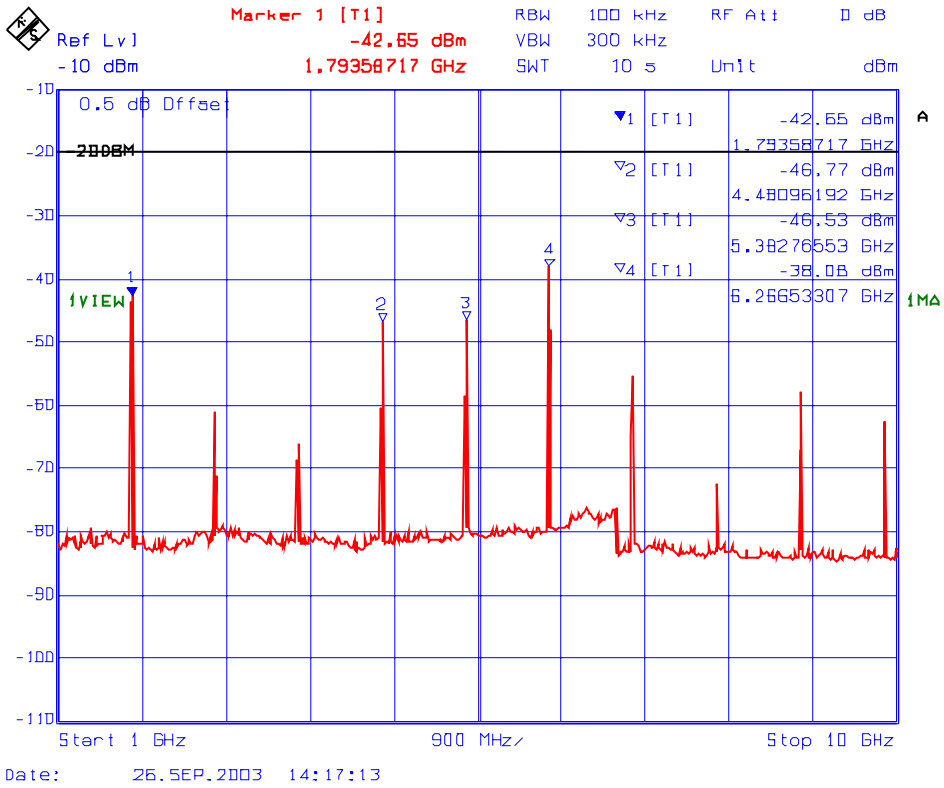
Frequency: 896 MHz, Modulation: 2-Level 8kbps GMSK



- *All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*

Plot # 18 : Spurious Emission Conducted at Antenna terminal, Low power setting

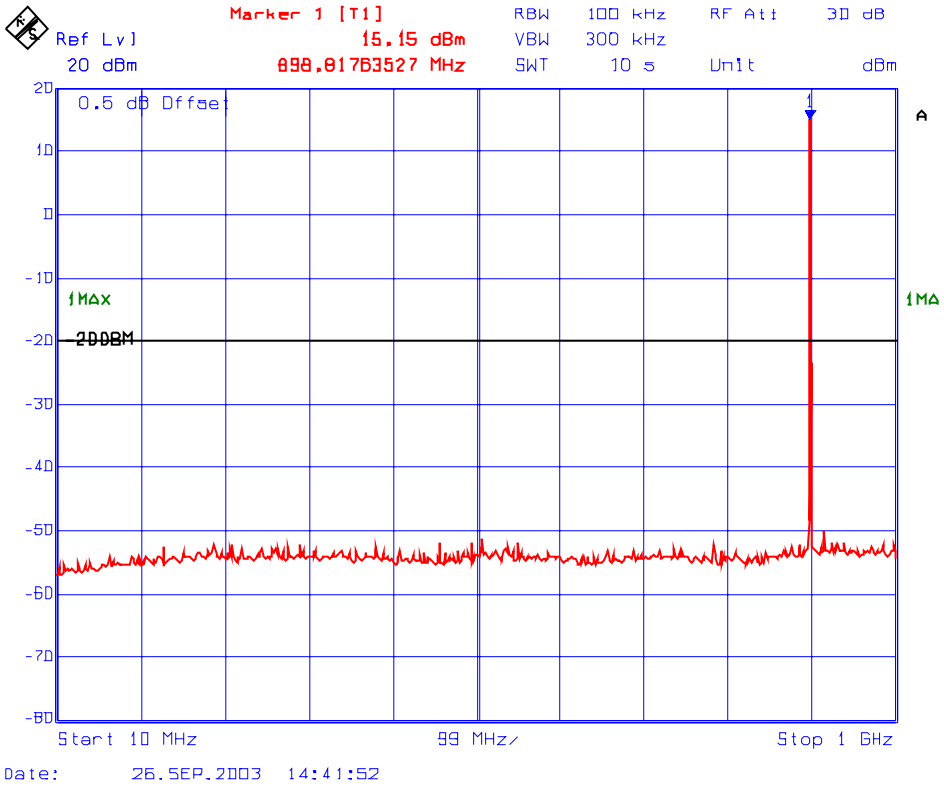
Frequency: 896 MHz, Modulation: 2-Level 8kbps GMSK



- *All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*

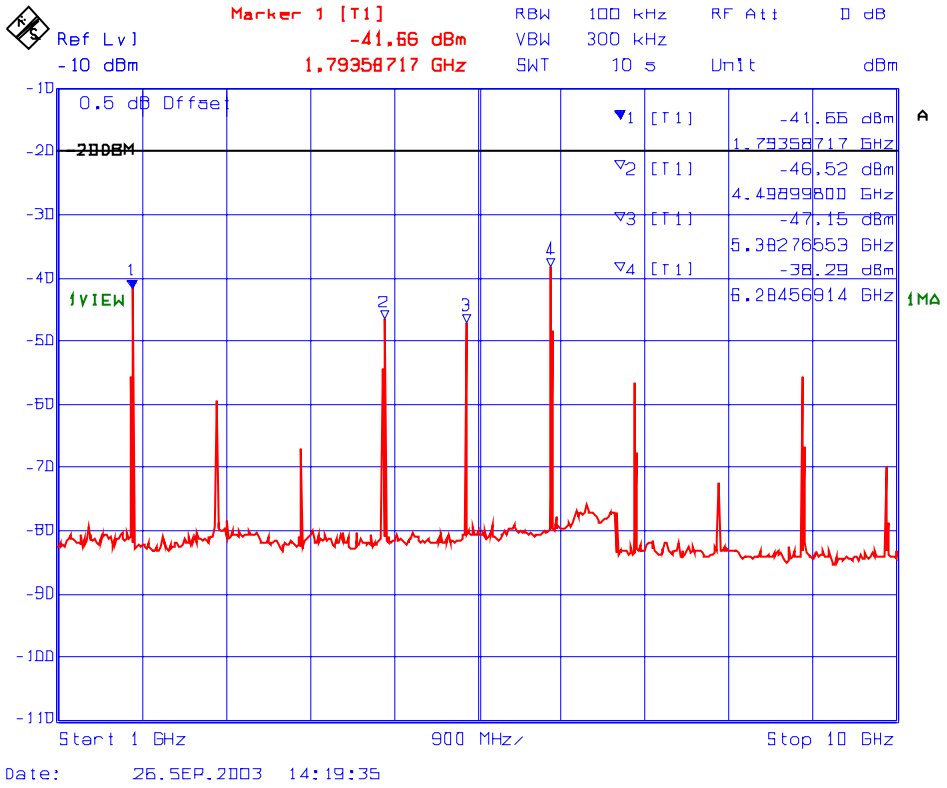
Plot # 19 : Spurious Emission Conducted at Antenna terminal, Low power setting

Frequency: 898.5 MHz, Modulation: 2-Level 8kbps GMSK



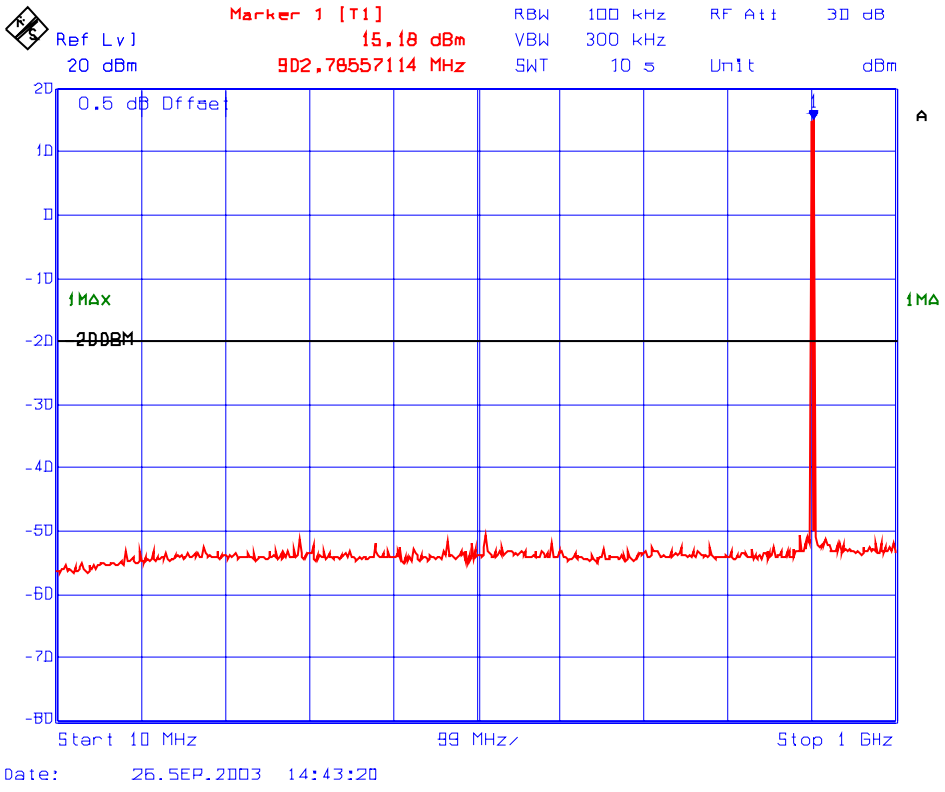
Plot # 20 : Spurious Emission Conducted at Antenna terminal, Low power setting

Frequency: 898.5 MHz, Modulation: 2-Level 8kbps GMSK



Plot # 21 : Spurious Emission Conducted at Antenna terminal, Low power setting

Frequency: 901 MHz, Modulation: 2-Level 8kbps GMSK



Plot # 22 : Spurious Emission Conducted at Antenna terminal, Low power setting

Frequency: 901 MHz, Modulation: 2-Level 8kbps GMSK