FCC Test Report

FCC Part 22, 24

for

Ingenitech (NZ) Ltd

TMU-1000

Model Number: TMU-1000

FCC ID: WJYTMU1000

TEST REPORT #: EMC_INGE1_001_FCC22_24_Rev1
DATE: 2008-09-10

ilac-MRA ACCREDITED Certificate # 2135.01

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab LAB CODE 20020328-00

FCC listed
A2LA certified

IC recognized # 3462B

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

Table of Contents

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations.

Company	Description	Model #
Ingenitech (NZ) Ltd	**In-Vehicle Telematic Computer**	**TMU-1000**

This test report reviewed by:

Date	Section	Name	Signature
2008-09-10	**EMC & Radio**	**Peter Mu (Project Engineer)**	Peter Mu

Project Leader:

Date	Section	Name	Signature
2008-09-10	**EMC & Radio**	**Marc Douat (Project Engineer)**	Marc Douat I am the author of this document

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Lothar Schmidt

2.2 Identification of the Client

Applicant's Name:	Ingenitech (NZ) Ltd
Address:	214 Kepa Road, Mission Bay Auckland 1071, New Zealand
Contact Person:	Ben Martel
Phone No.	+64 9 9400410
Fax:	
e-mail:	benm@ingenitech.co.nz

2.3 Identification of the Manufacturer

Manufacturer's Name:	Ingenitech (NZ) Ltd
Manufacturer's Address:	214 Kepa Road, Mission Bay Auckland 1071 New Zealand

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Product Type	In-Vehicle Telematic Computer.
Marketing Name:	TMU-1000
Model No:	TMU-1000
Hardware Revision :	N/A
Software Revision :	N/A
FCC-ID:	WJYTMU1000
IC-ID :	N/A
Frequency Range:	824 MHz to 849 MHz, 1850 MHz to 1910 MHz
Number of Channels	124-GSM850, 299-GSM1900
Type(s) of Modulation:	GMSK
Antenna Type:	External and Internal
Radiated Output Power:	848.8MHz 27.61 dBm (0.577 W) 1880MHz 24.01 dBm (0.252 W)

3.2 Identification of Accessory equipment

AE #	TYPE	MANUFACTURE	MODEL	SERIAL #
1	GPS Antenna	GPS Active Antenna	N/A	0710000159

4 Subject of Investigation

Data presented in this test report only includes Radiated emissions and Radiated power. AC conducted emissions is not applicable since the device is powered by a battery. Testing was done with external antenna since the external antenna has highest gain.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

5 Measurements

5.1 RF Power Output

5.1.1 FCC 2.1046 Measurements required: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

5.1.2 Limits:

5.1.2.1 §22.913(a) & RSS-129 (9.1) Effective radiated power limits.

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

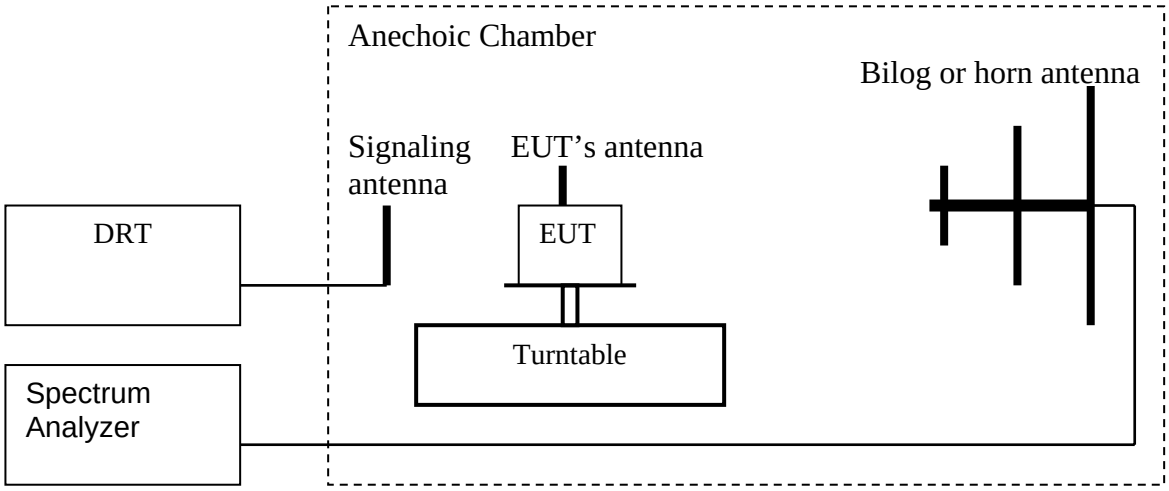
5.1.2.2 §24.232(b)(c) & RSS-133 (4.3) & (6.4) Power limits.

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

5.1.3 Radiated Output Power measurement procedure:

Based on TIA-603C 2004

2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) - 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band. **Spectrum analyzer settings = rbw=vbw=3MHz**

(**note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

5.1.4 ERP Results 850 MHz band:

Power Control Level	Burst Peak ERP
5	≤38.45dBm (7W)

Frequency (MHz)	Effective Radiated Power (dBm) Note 1	
	GSM	
824.2	23.49	
836.6	26.61	
848.8	27.61	

Note 1: Measurements were obtained in EIRP (Refer to plots) and converted EIRP to ERP by subtracting 2.14dB from EIRP.

5.1.5 EIRP Results 1900 MHz band:

Power Control Level	Burst Peak EIRP
0	≤33dBm (2W)

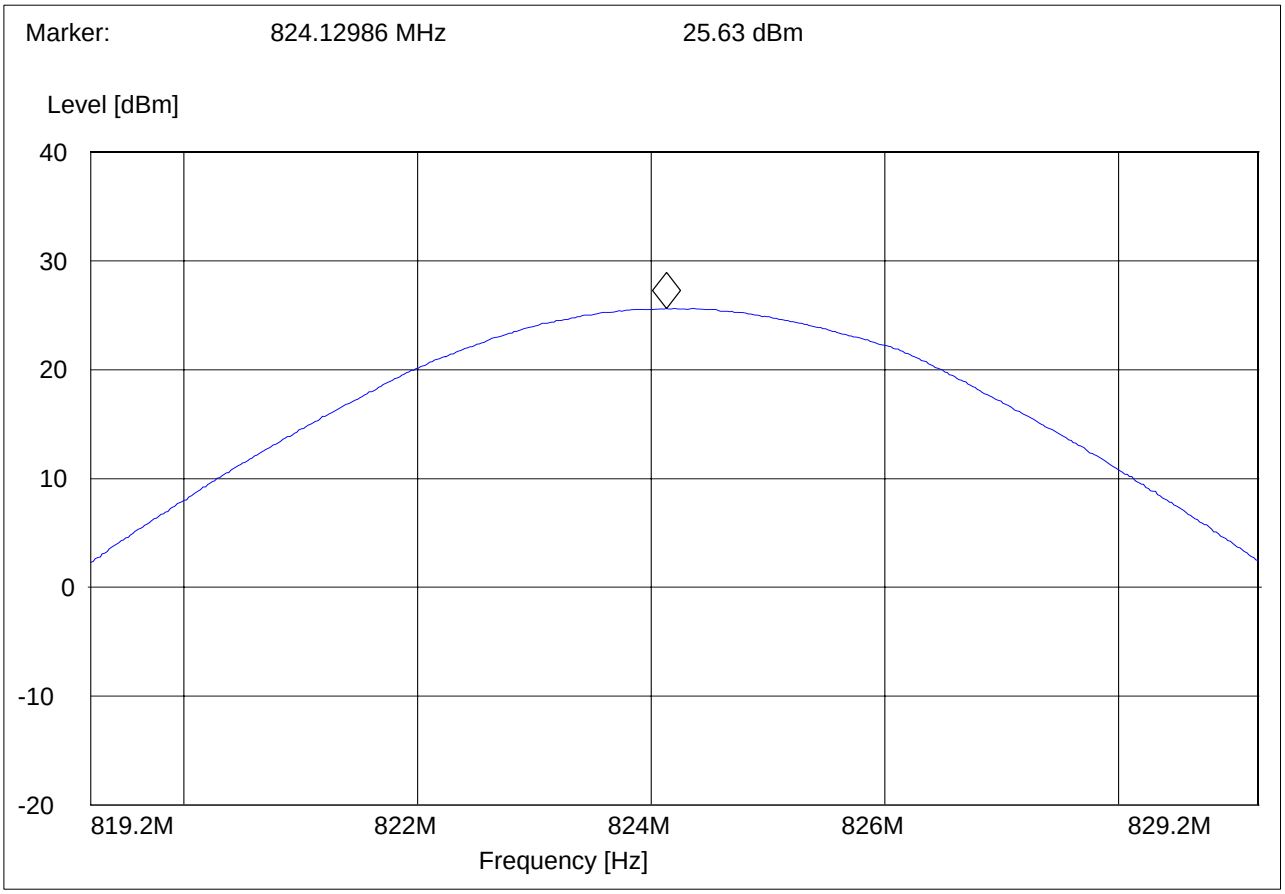
Frequency (MHz)	Effective Isotropic Radiated Power (dBm)	
	GSM	
1850.2	23.09	
1880.0	24.01	
1909.8	23.07	

EIRP (GSM 850) **§22.913(a) & RSS-129 (9.1)**
RF OUTPUT POWER (GSM-850)
CHANNEL 128 GPRS

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 128)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "EIRP 850 CH 128 V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
819.2 MHz	829.2 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM MaxPeak

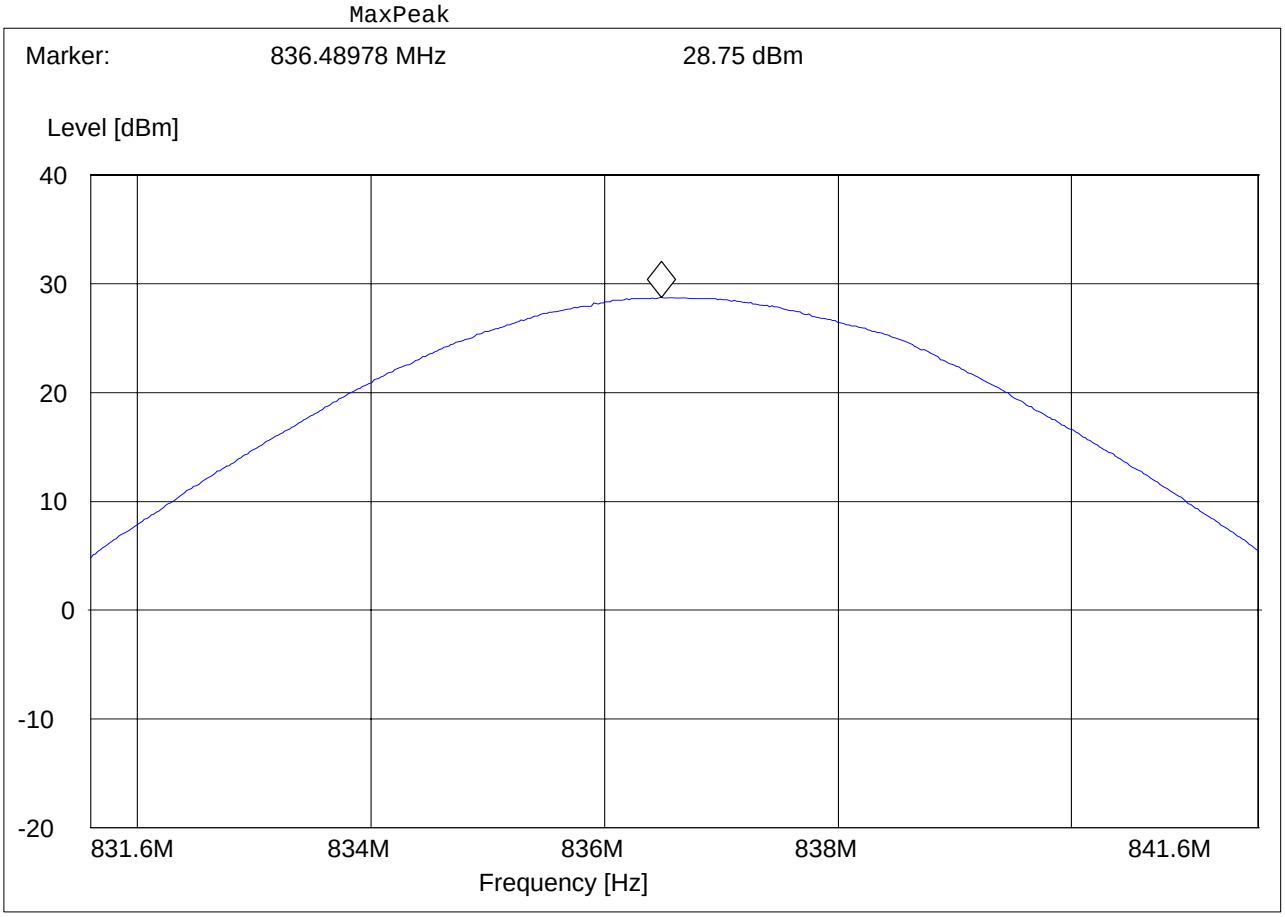


RF OUTPUT POWER (GSM-850) §22.913(a) & RSS-129 (9.1)
CHANNEL 190 GPRS

```
EUT:             04GK00l
Customer::       Ingenitech
Test Mode:       GSM 850 (channel 190)
ANT Orientation: V
EUT Orientation: H
Test Engineer:   Sam
Voltage:         12 VDC
Comments:        TT@253°
```

SWEEP TABLE: "EIRP 850 CH 190 V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
831.6 MHz	841.6 MHz	MaxPeak MaxPeak	Coupled	3 MHz	DUMMY-DBM

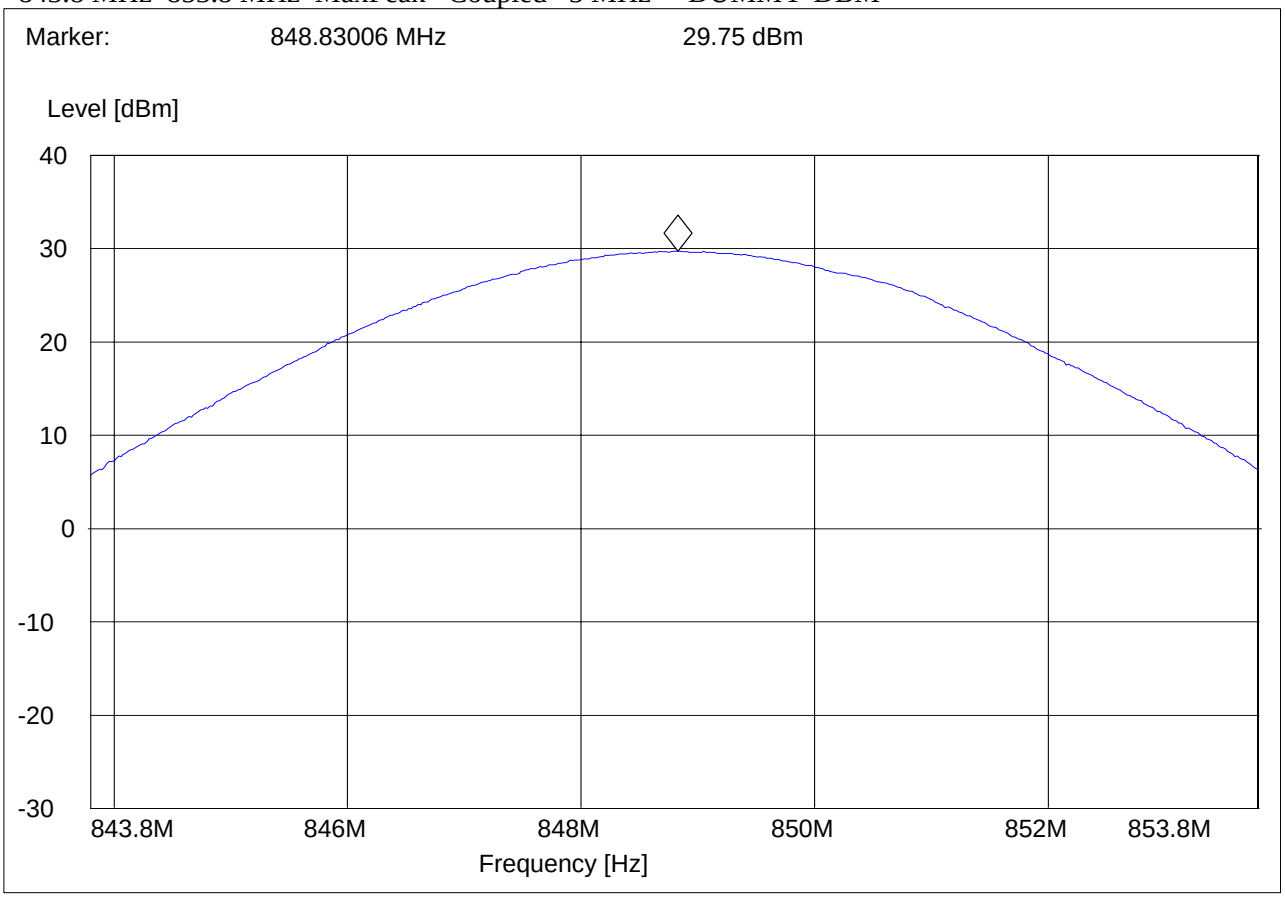


RF OUTPUT POWER (GSM-850) **§22.913(a) & RSS-129 (9.1)**
CHANNEL 251 GPRS

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 251)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "EIRP 850 CH 251 V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
843.8 MHz	853.8 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM



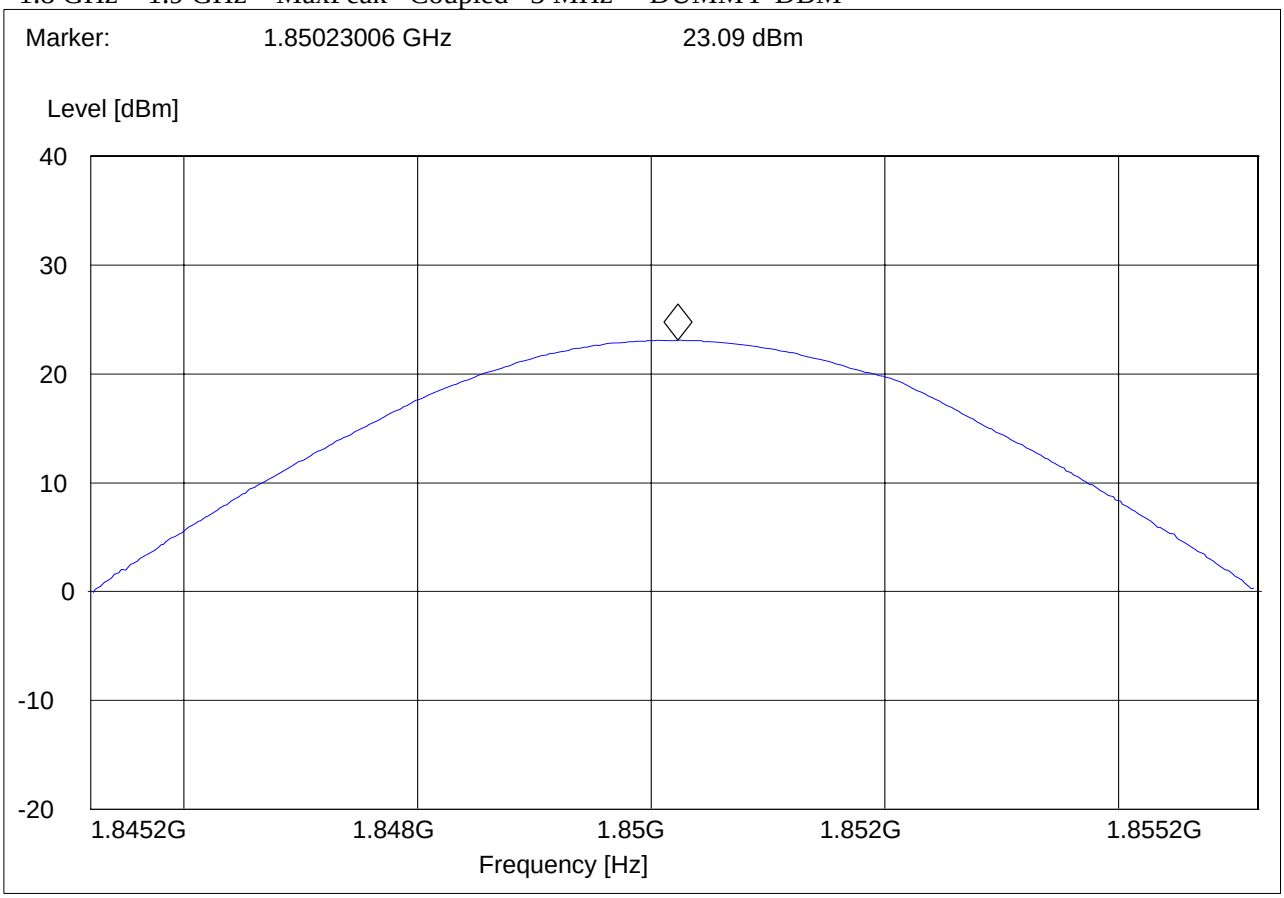
RF OUTPUT POWER (PCS-1900) **§24.232(b)(c) & RSS-133 (4.3) & (6.4)**
CHANNEL 512 GPRS

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH512
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "EIRP 1900 CH512"

Short Description: EIRP PCS 1900 for channel-512

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.8 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM



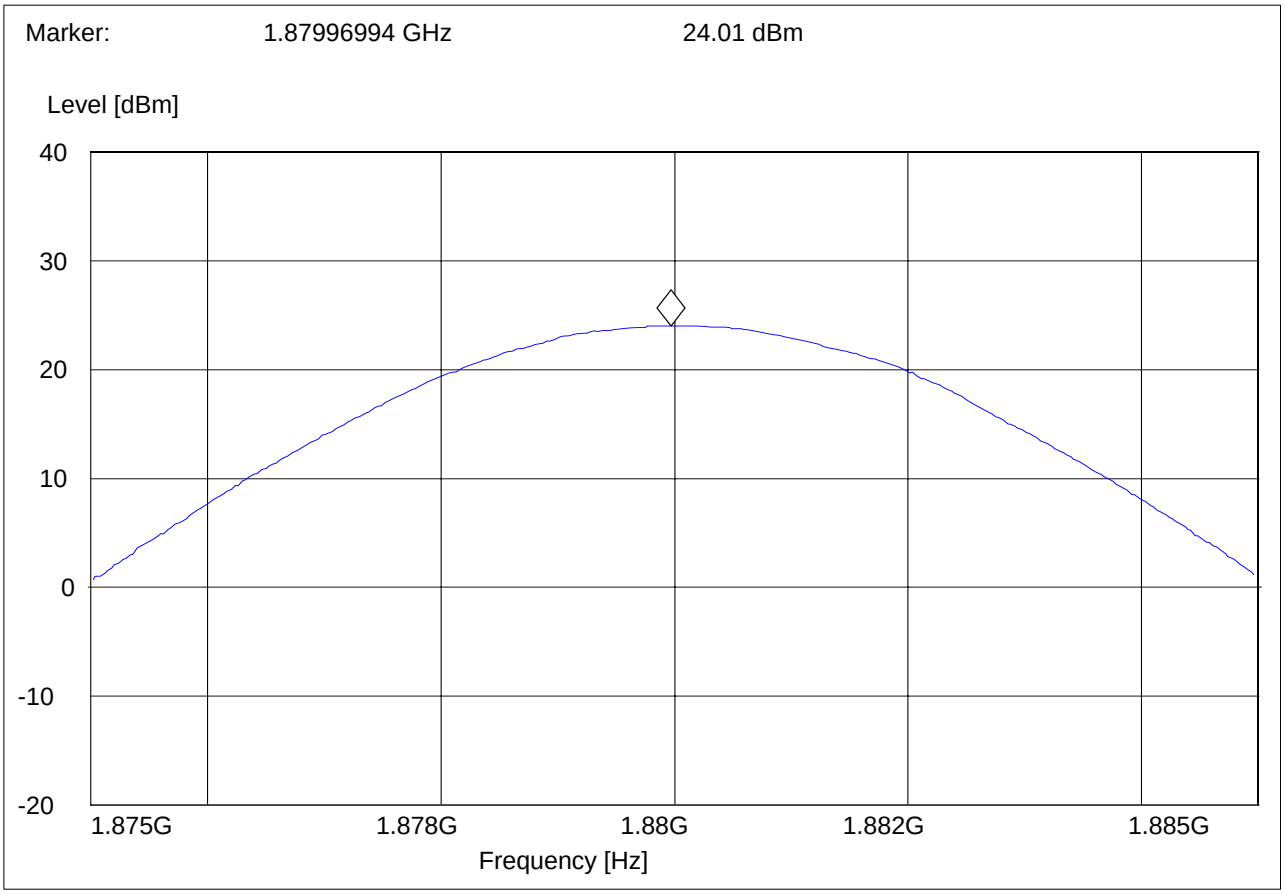
RF OUTPUT POWER (PCS-1900) **§24.232(b)(c) & RSS-133 (4.3) & (6.4)**
CHANNEL 661 GPRS

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH661
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "EIRP 1900 CH661"

Short Description: EIRP PCS 1900 for channel-661

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			



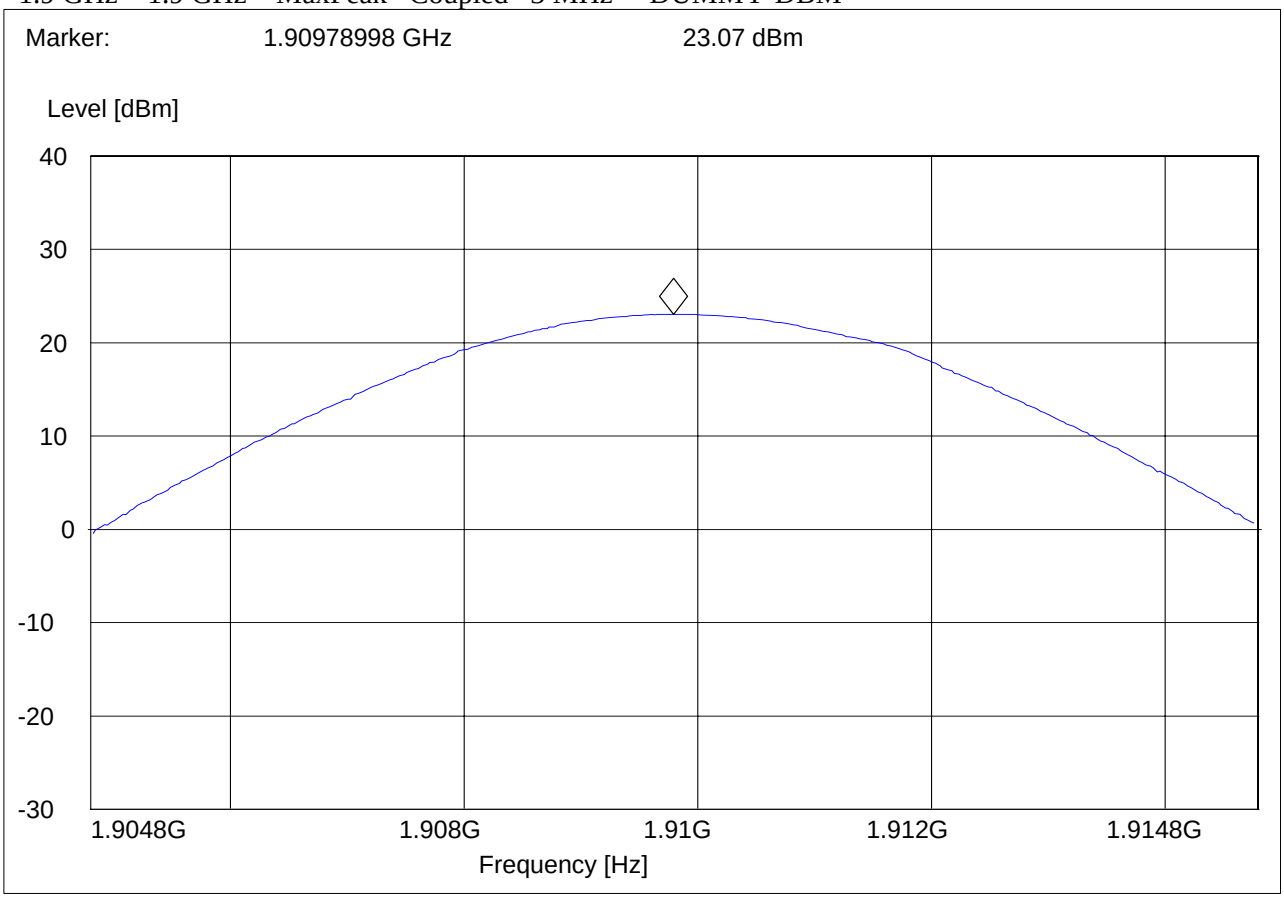
RF OUTPUT POWER (PCS-1900) **§24.232(b)(c) & RSS-133 (4.3) & (6.4)**
CHANNEL 810 GPRS

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH810
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "EIRP 1900 CH810"

Short Description: EIRP PCS 1900 for channel-810

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM



5.2 Transmitter Spurious Emissions Radiated

5.2.1 FCC 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

5.2.2 Limits:

5.2.2.1 §22.917 & RSS-129 (8.1.2) Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) *Out of band emissions.* 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.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2.2.2 §24.238 & RSS-133 (4.4) & (6.5) Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(a) *Out of band emissions.* 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.

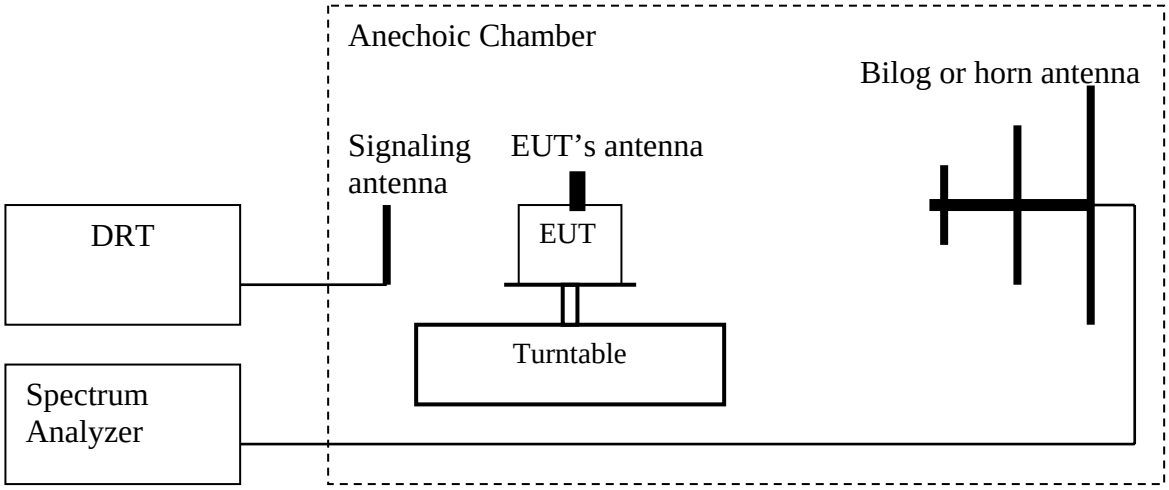
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the

carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2.3 Radiated out of band measurement procedure:

Based on TIA-603C 2004

2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(**note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings:

Res B/W: 1 MHz
VID B/W: 1 MHz

Measurement Survey:

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the GSM-850 & PCS-1900 bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the GSM-850 & PCS-1900 band into any of the other blocks respectively. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

5.2.4 Radiated out of band emissions results on EUT:

5.2.4.1 RESULTS OF RADIATED TESTS GSM-850:

Harmonics	Tx ch-8 Freq. (MHz)	Level (dBm)	Tx ch-383 Freq. (MHz)	Level (dBm)	Tx ch-758 Freq. (MHz)	Level (dBm)
2	**1648.4**	NF	**1673.2**	NF	**1697.6**	NF
3	**2472.6**	NF	**2509.8**	NF	**2546.4**	NF
4	**3296.8**	NF	**3346.4**	NF	**3395.2**	NF
5	**4121**	NF	**4183**	NF	**4244**	NF
6	**4945.2**	NF	**5019.6**	NF	**5092.8**	NF
7	**5769.4**	NF	**5856.2**	NF	**5941.6**	NF
8	**6593.6**	NF	**6692.8**	NF	**6790.4**	NF
9	**7417.8**	NF	**7529.4**	NF	**7639.2**	NF
10	**8242**	NF	**8366**	NF	**8488**	NF
NF = NOISE FLOOR						

5.2.4.2 RADIATED SPURIOUS EMISSIONS (GSM-850)

TX: 30MHz - 1GHz

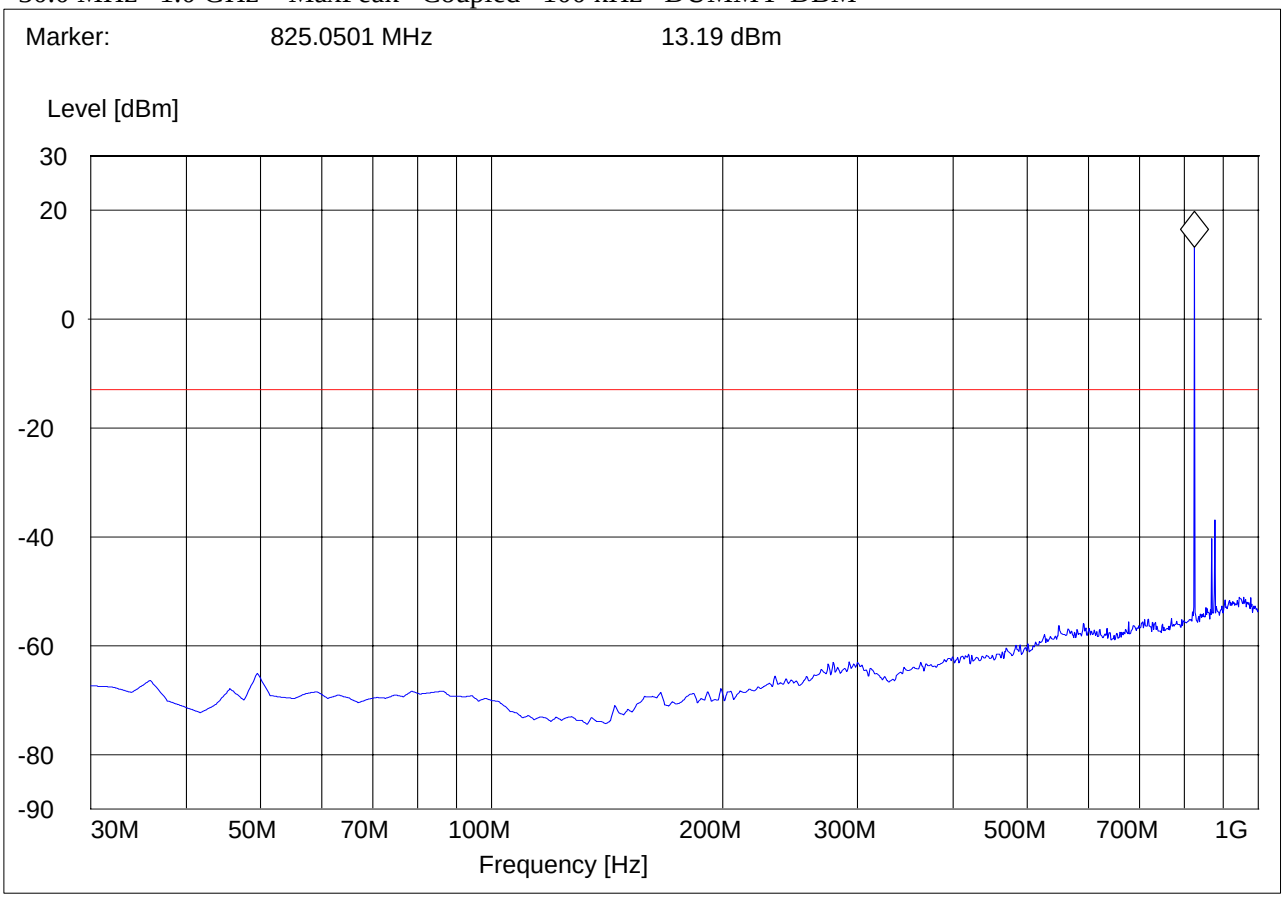
Spurious emission limit –13dBm

Note: 1.The peak above the limit line is the carrier freq.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 128)
ANT Orientation: H
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 24 Spur 30M-1G_H"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	DUMMY-DBM

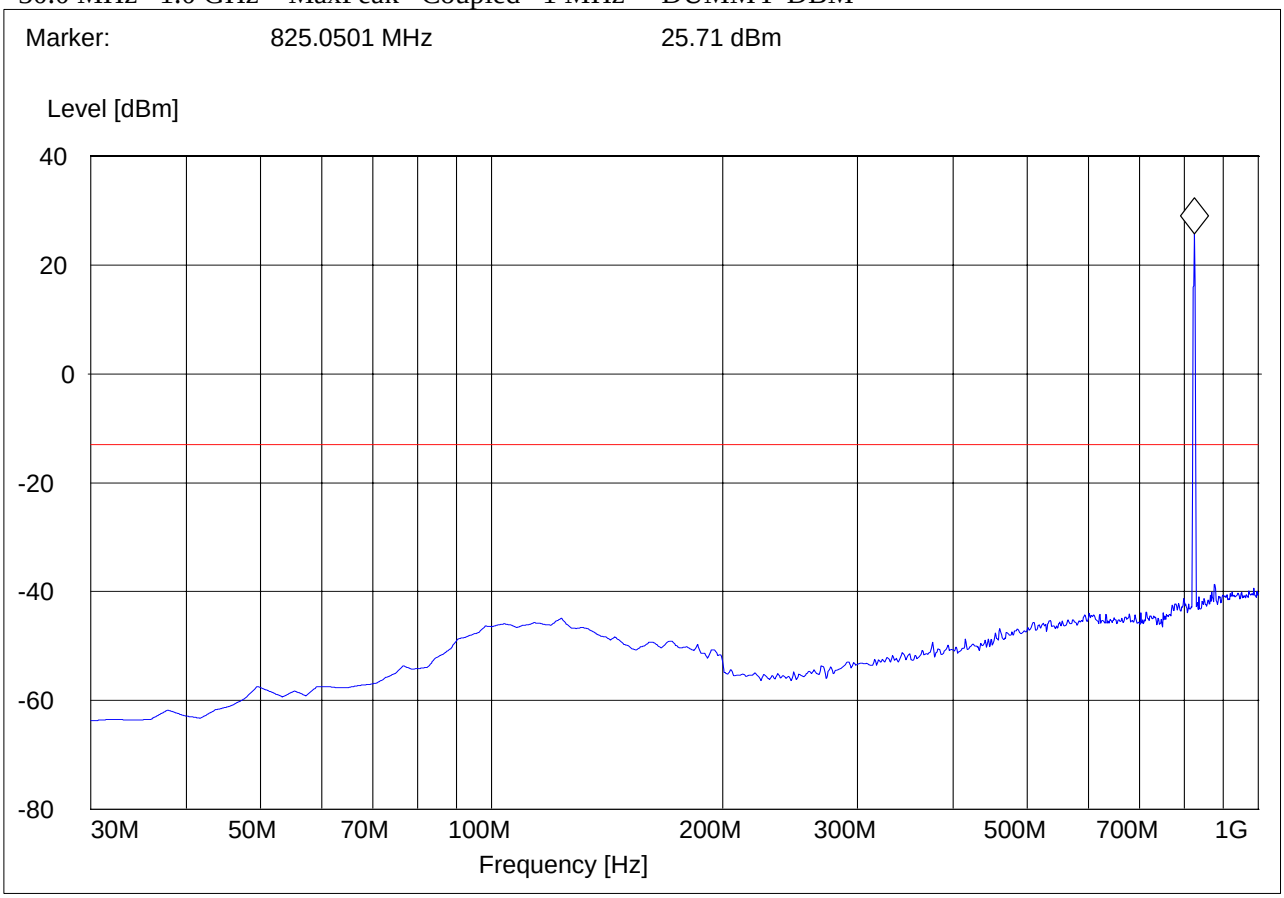


TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Note: 1.The peak above the limit line is the carrier freq.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 128)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

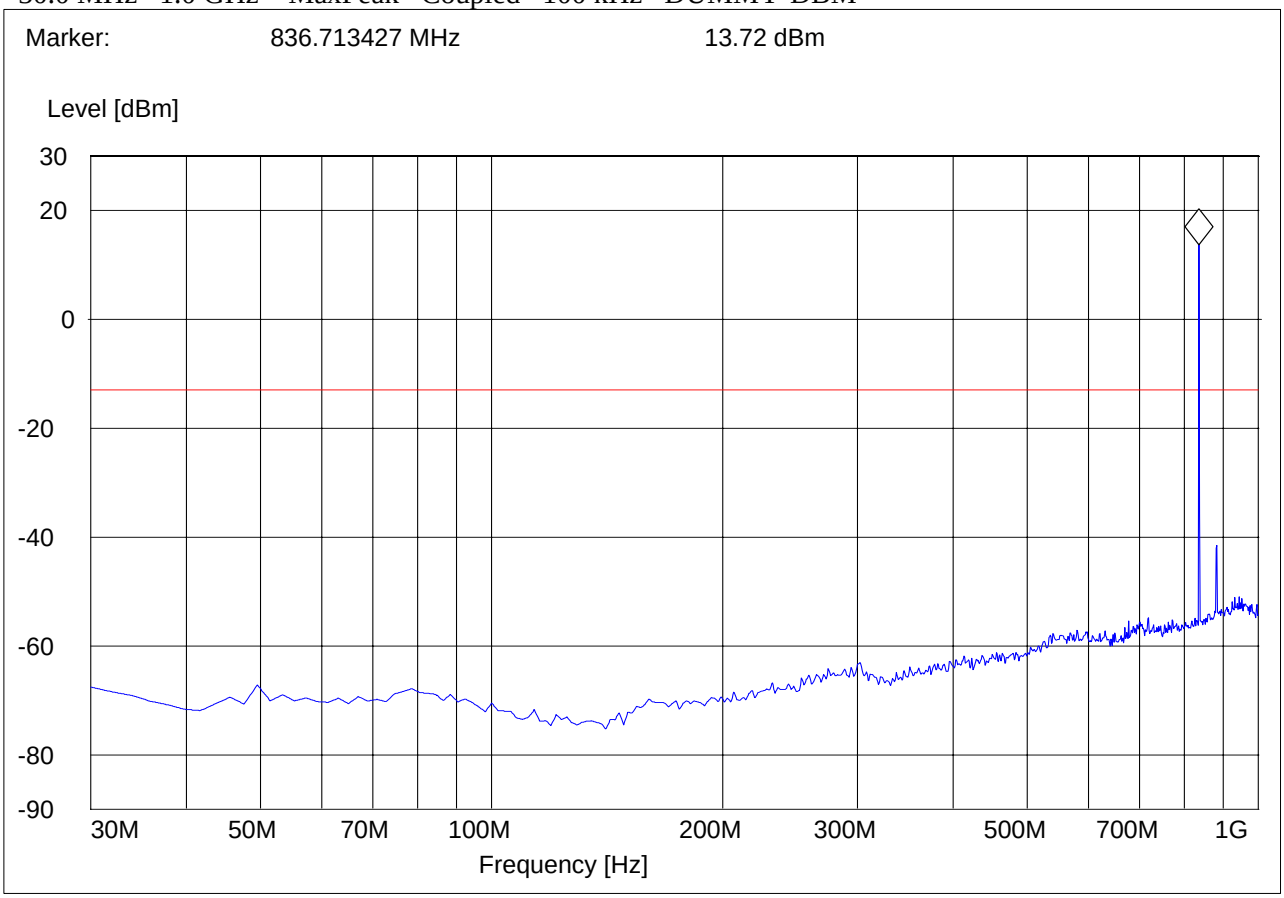


TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Note: 1.The peak above the limit line is the carrier freq.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 190)
ANT Orientation: H
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 24 Spur 30M-1G_H"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	DUMMY-DBM

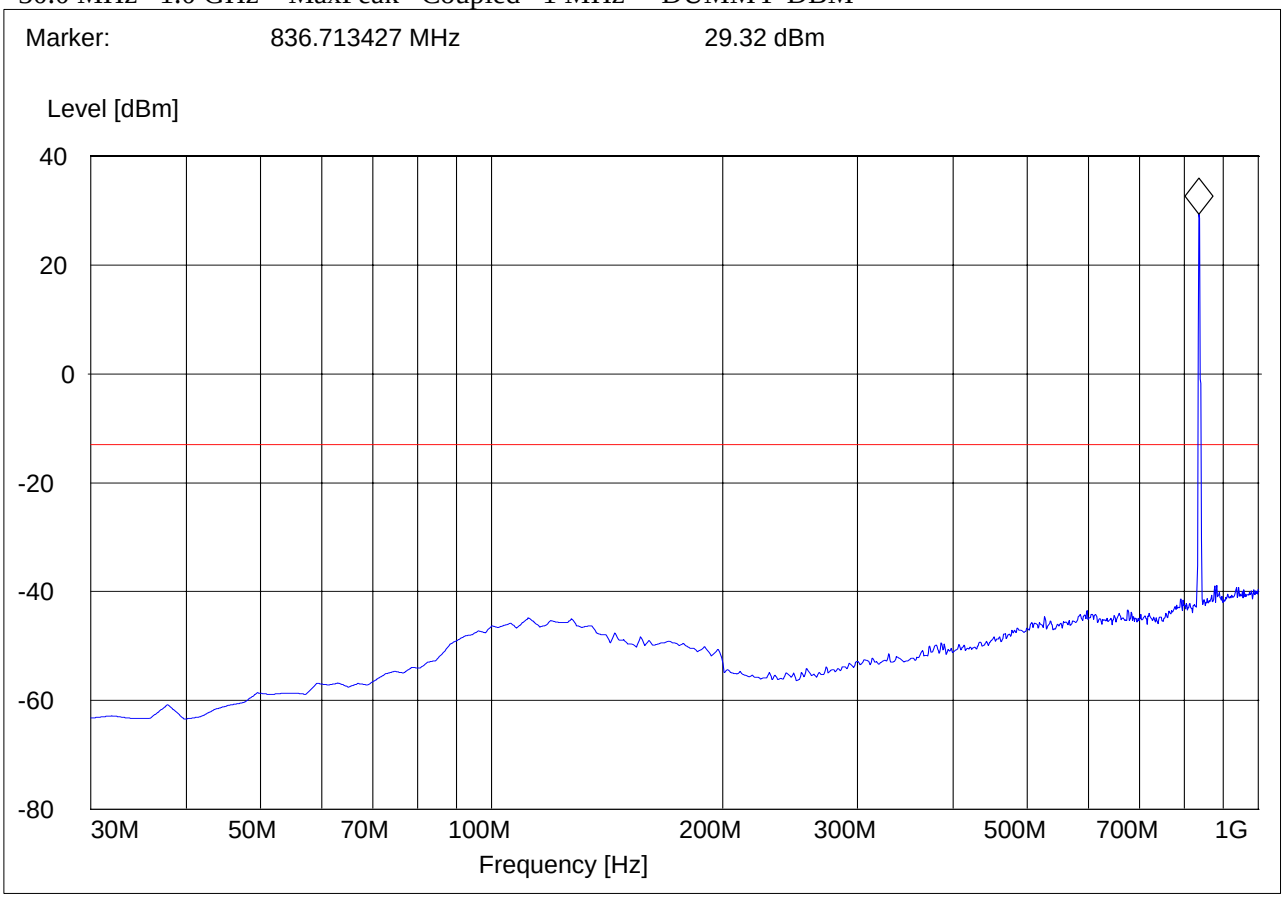


TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Note: 1.The peak above the limit line is the carrier freq.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 190)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

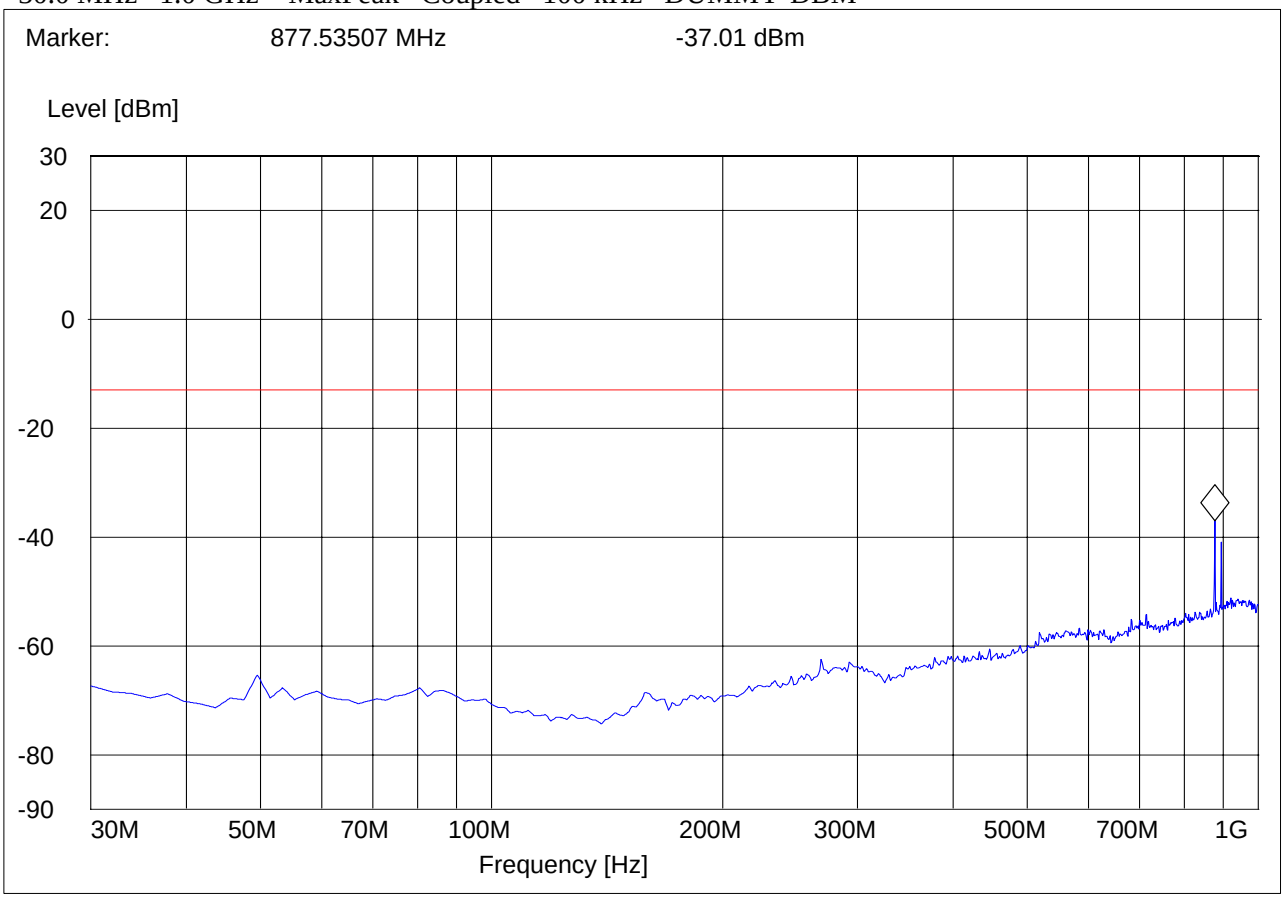


TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Note: 1.The peak above the limit line is the carrier freq.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 251)
ANT Orientation: H
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 24 Spur 30M-1G_H"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	DUMMY-DBM

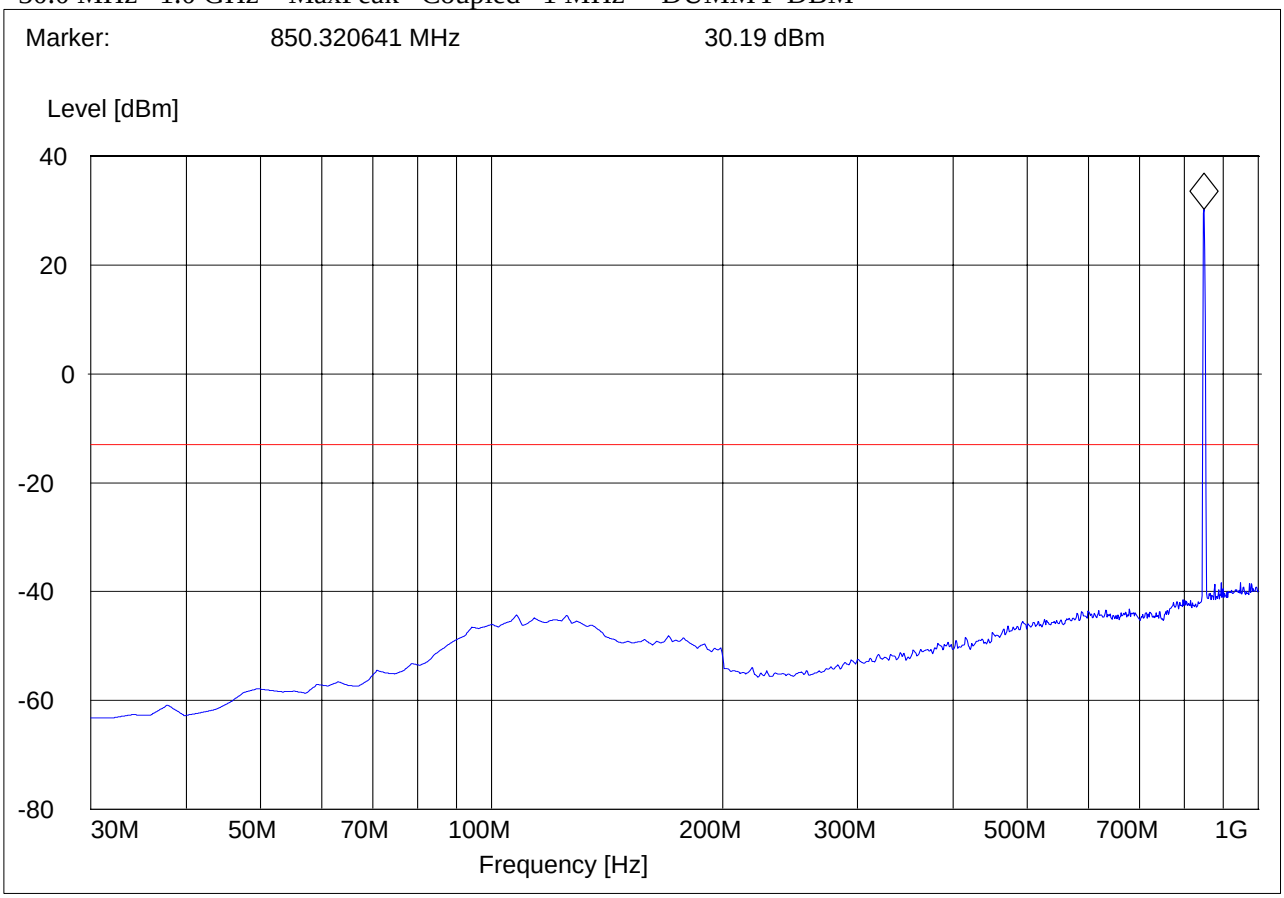


TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Note: 1.The peak above the limit line is the carrier freq.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 251)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

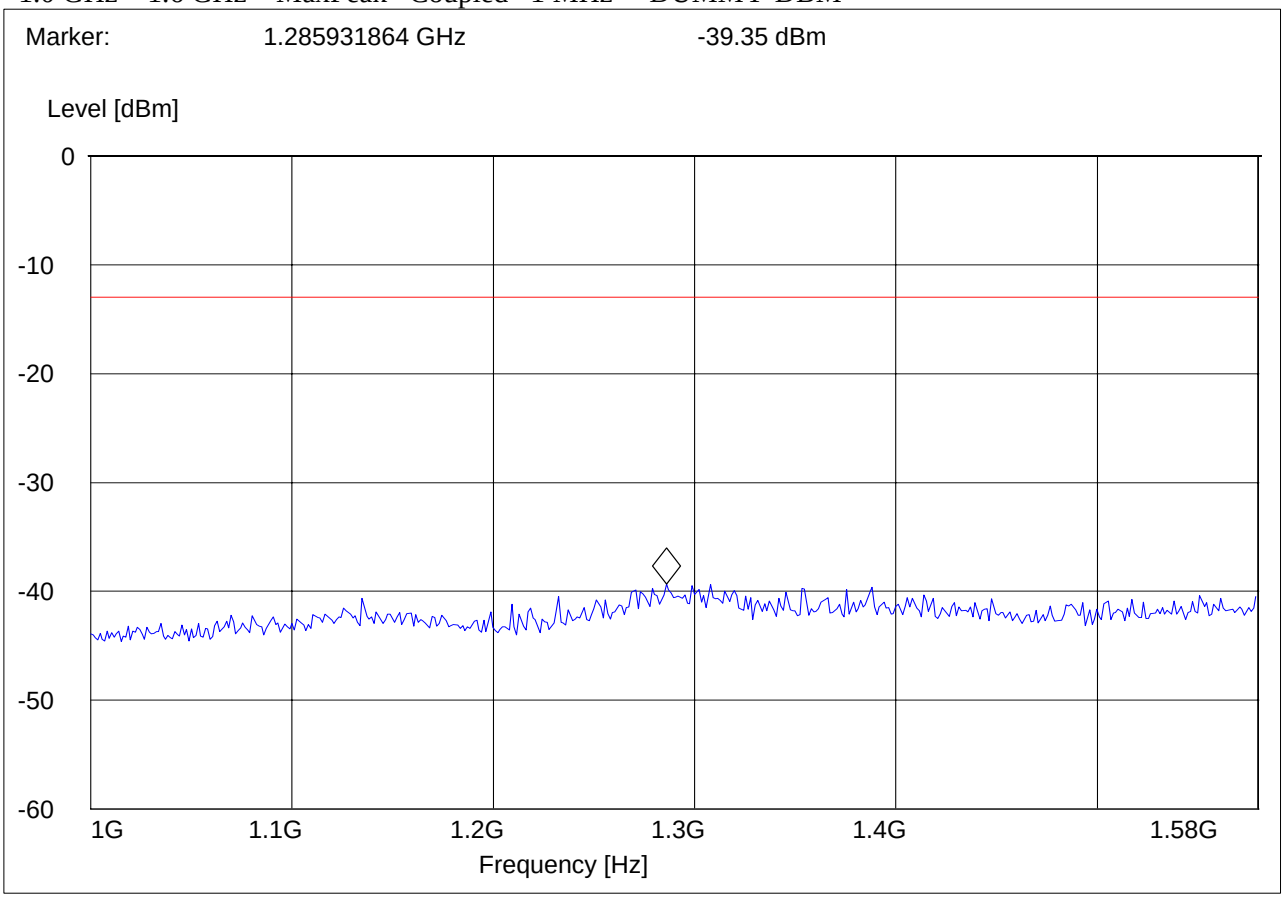


RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 824.2MHz: 1GHz – 1.58GHz
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 128)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 1-1.58G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

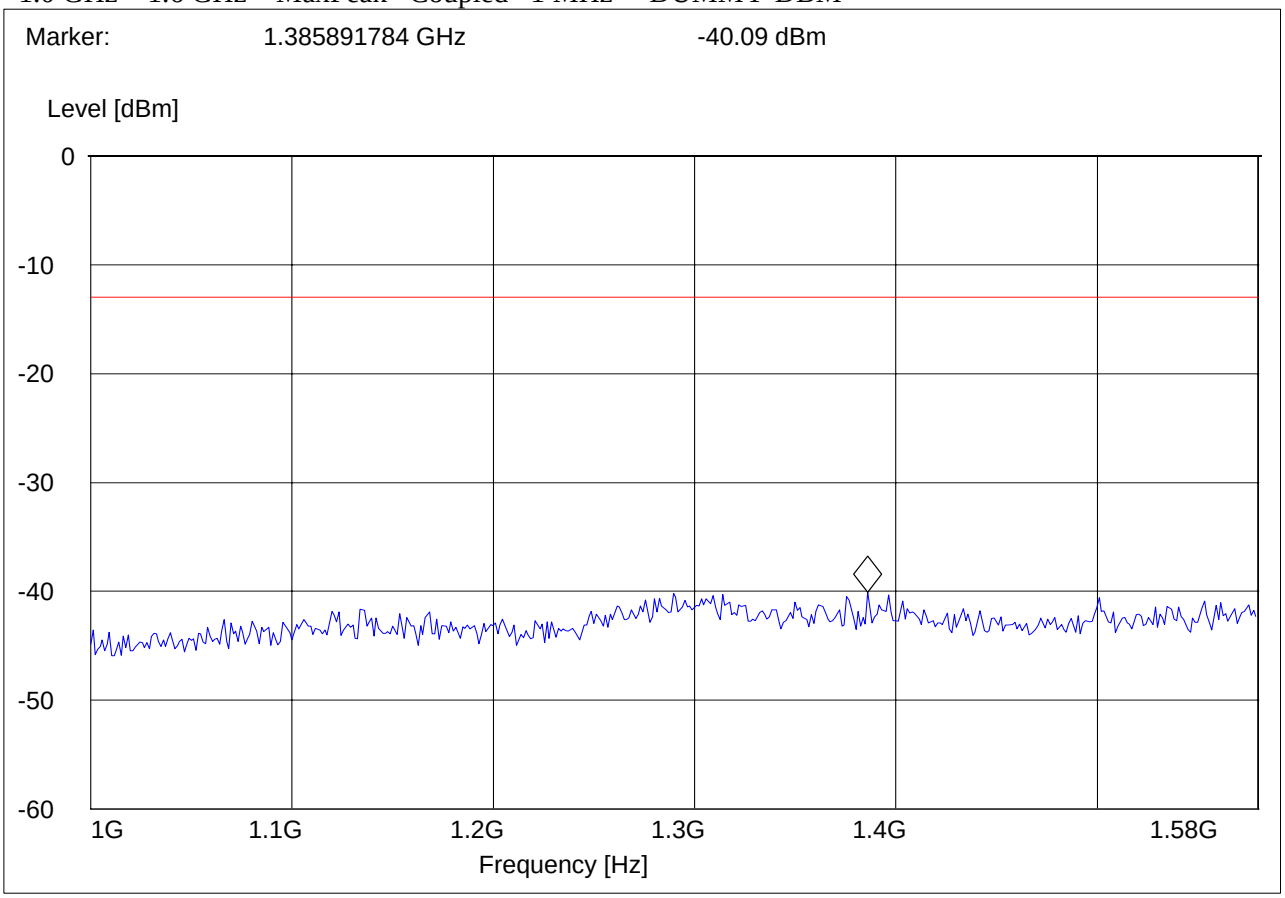


RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 836.6MHz: 1GHz – 1.58GHz
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 190)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 1-1.58G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

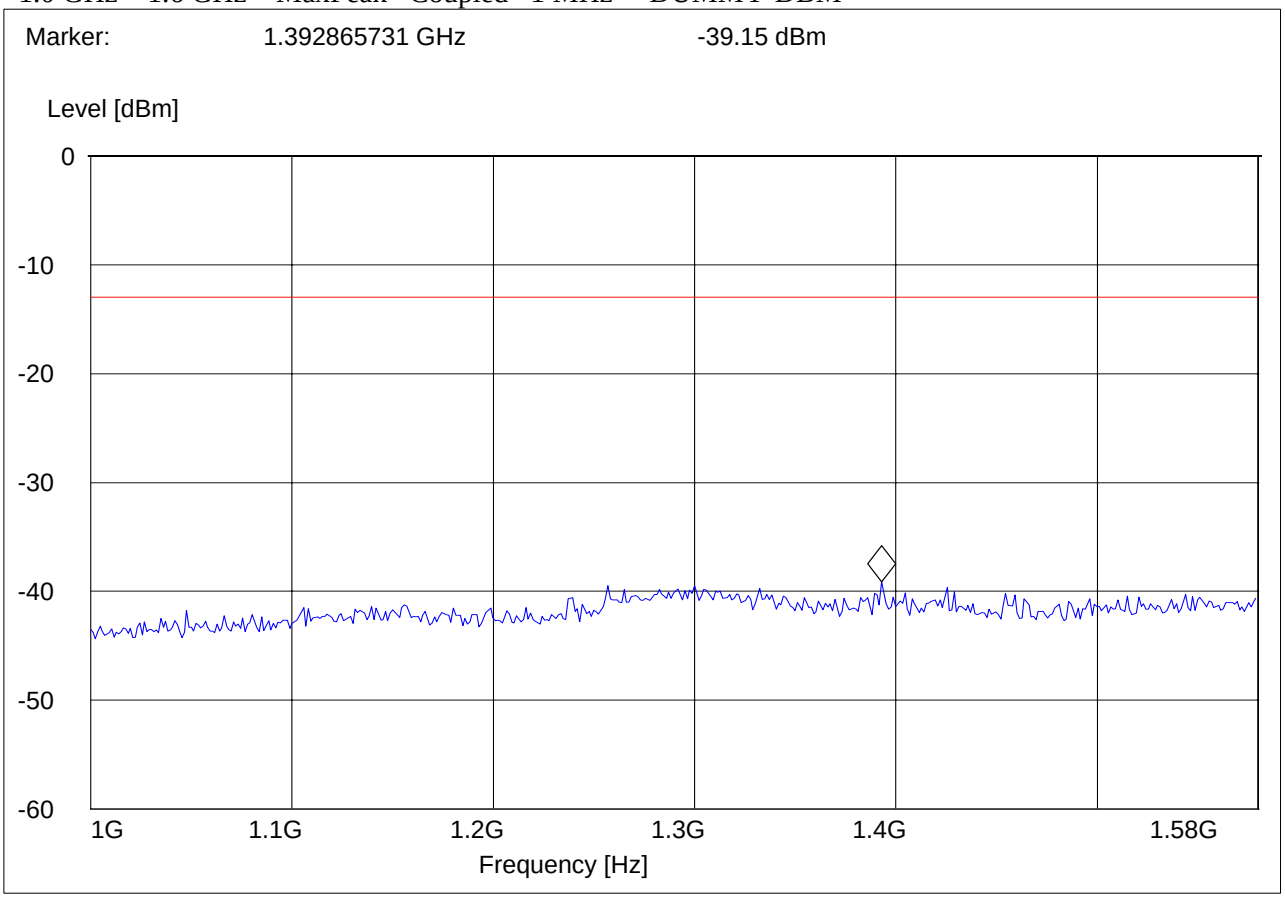


RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 848.8MHz: 1GHz – 1.58GHz
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 251)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 1-1.58G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

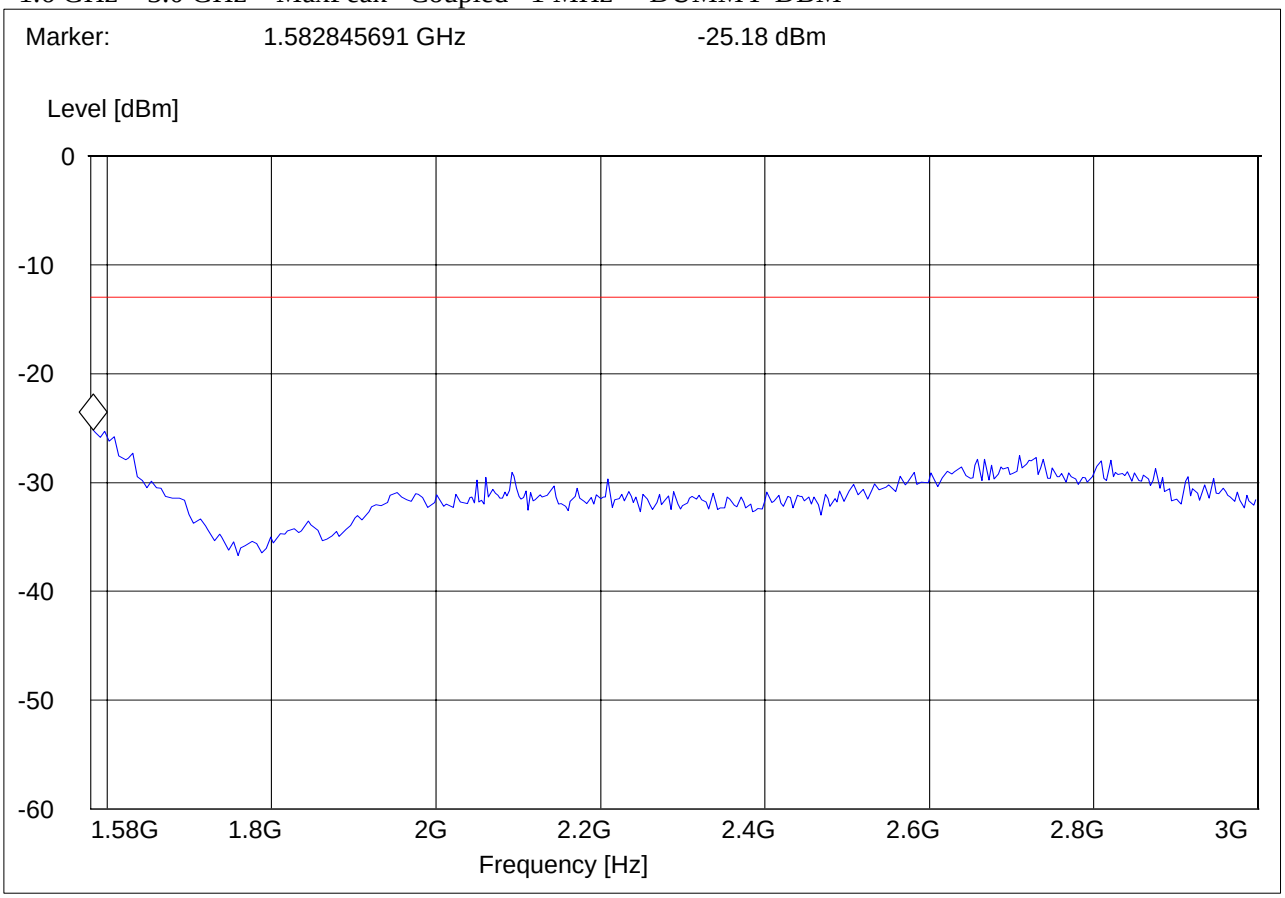


RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 824.2MHz: 1.58GHz – 3GHz
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 128)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 1.58-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

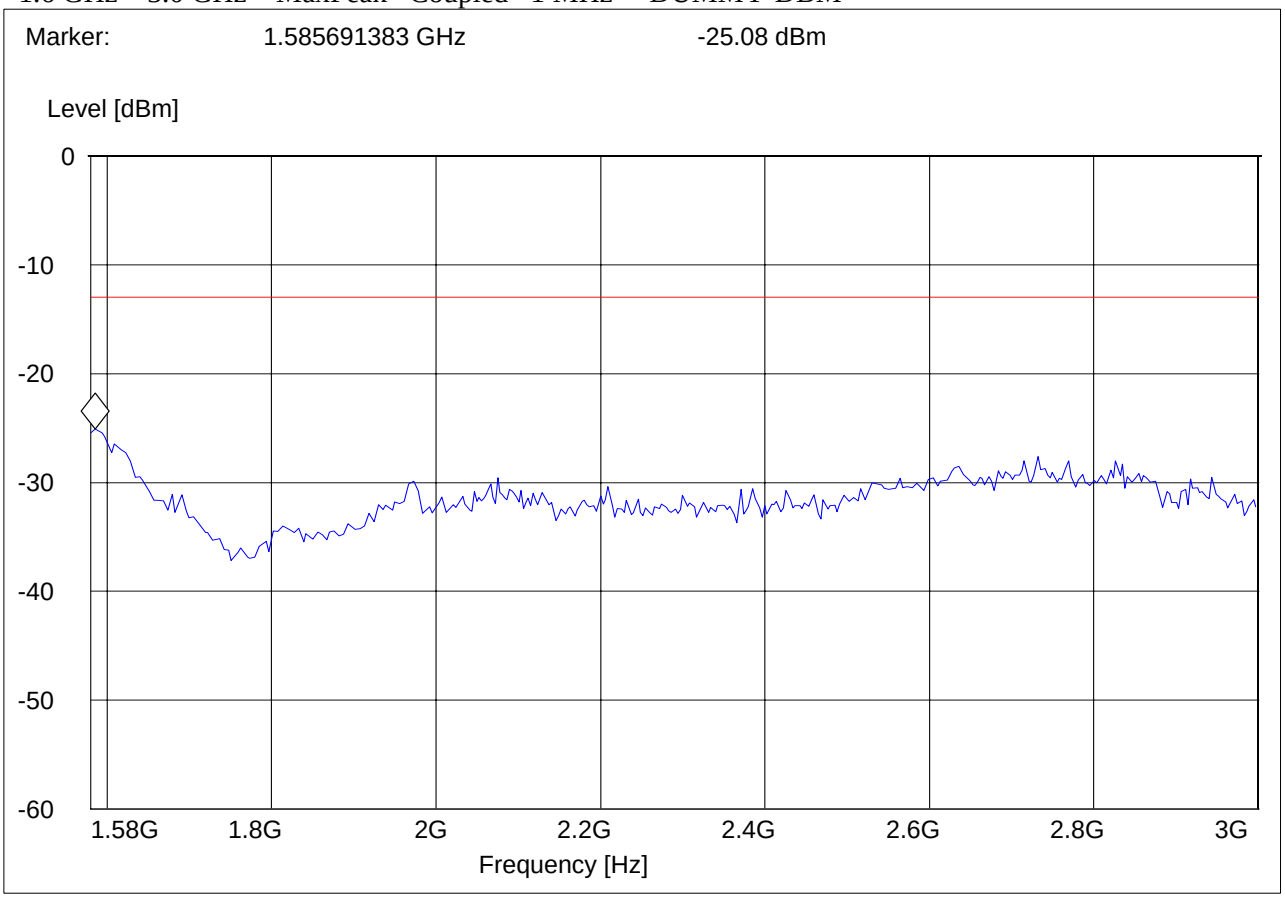


RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 836.6MHz: 1.58GHz – 3GHz
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 190)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 1.58-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

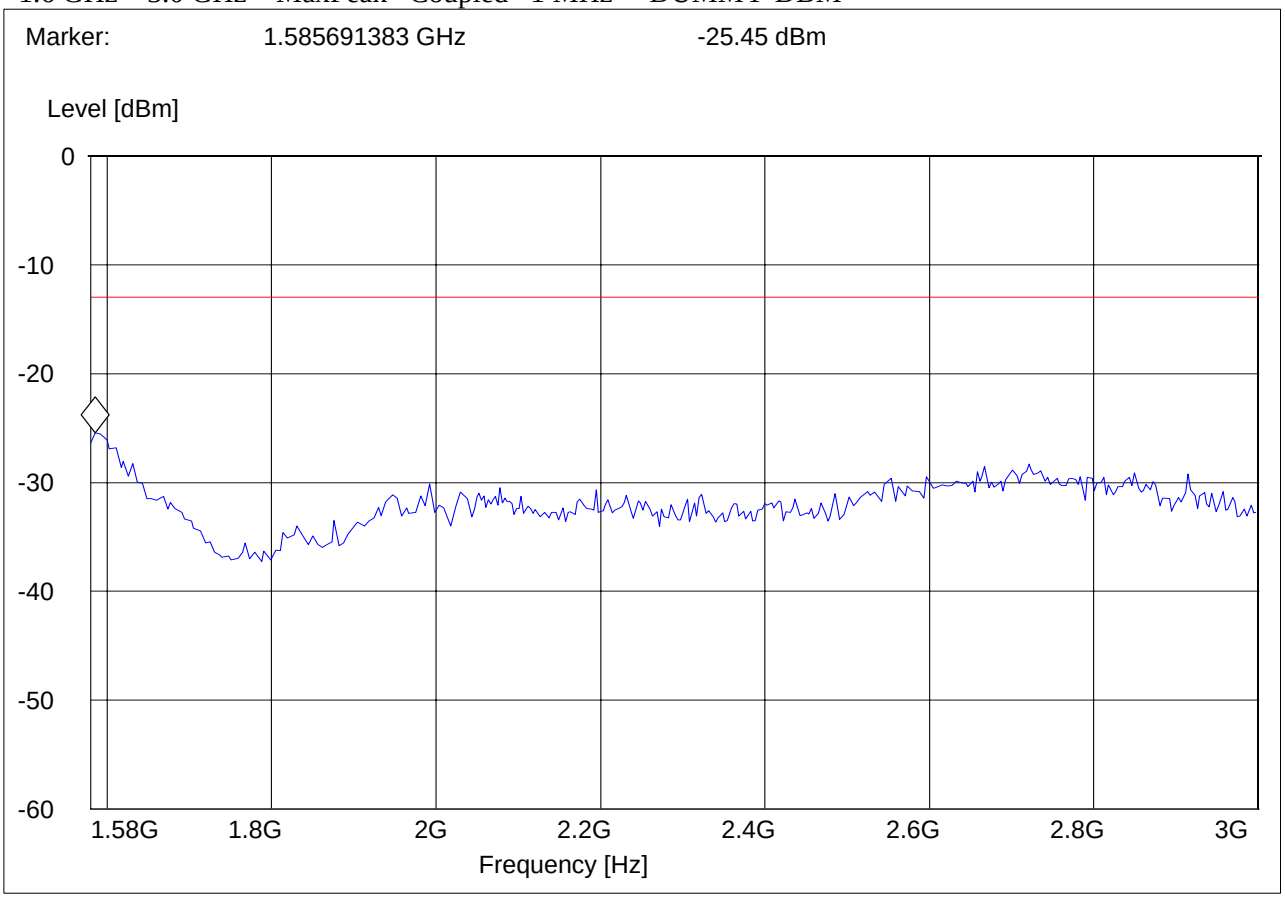


RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 848.8MHz: 1.58GHz – 3GHz
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 251)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 1.58-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



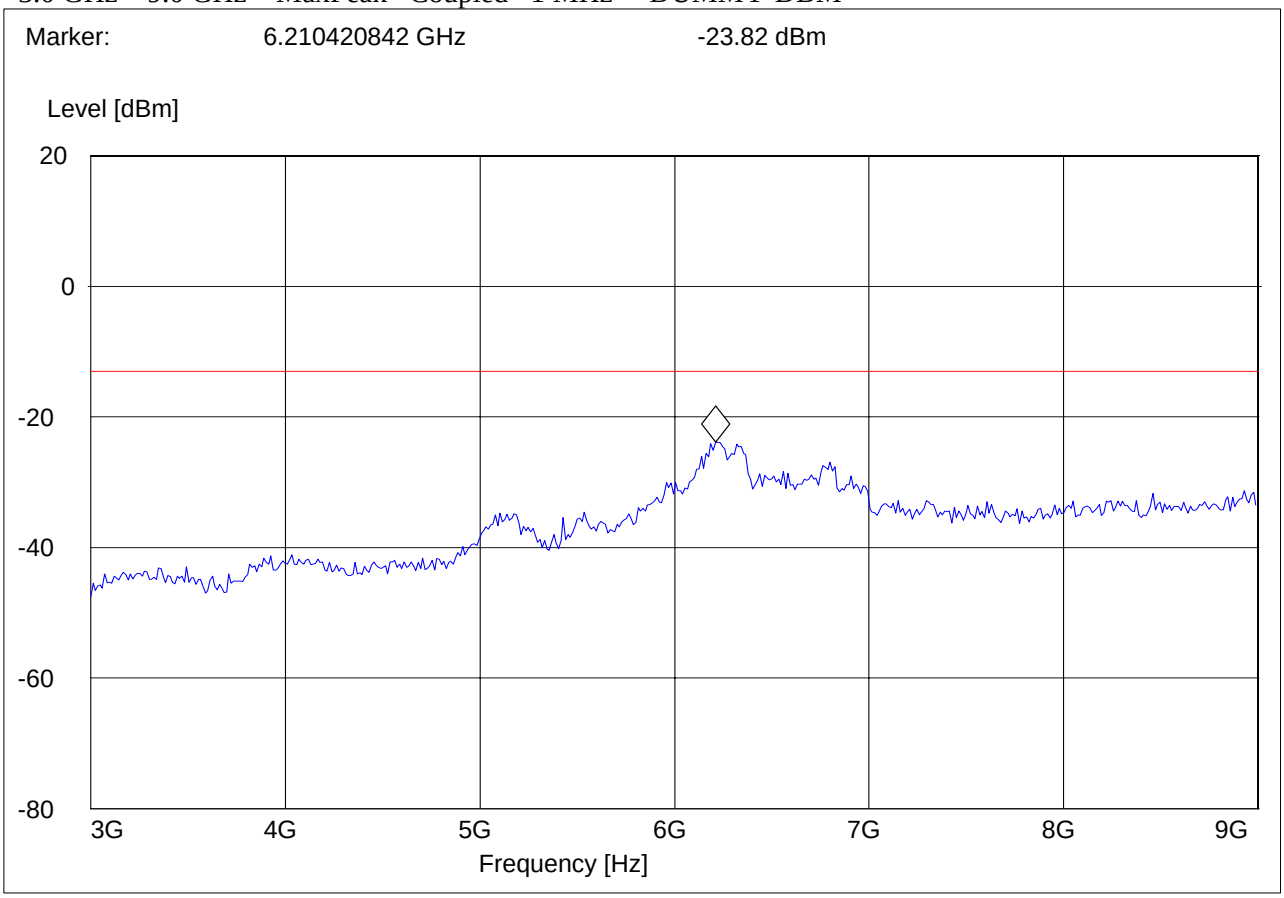
RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 824.2MHz: 3 – 9**GHz**
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 128)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 3-9G"

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



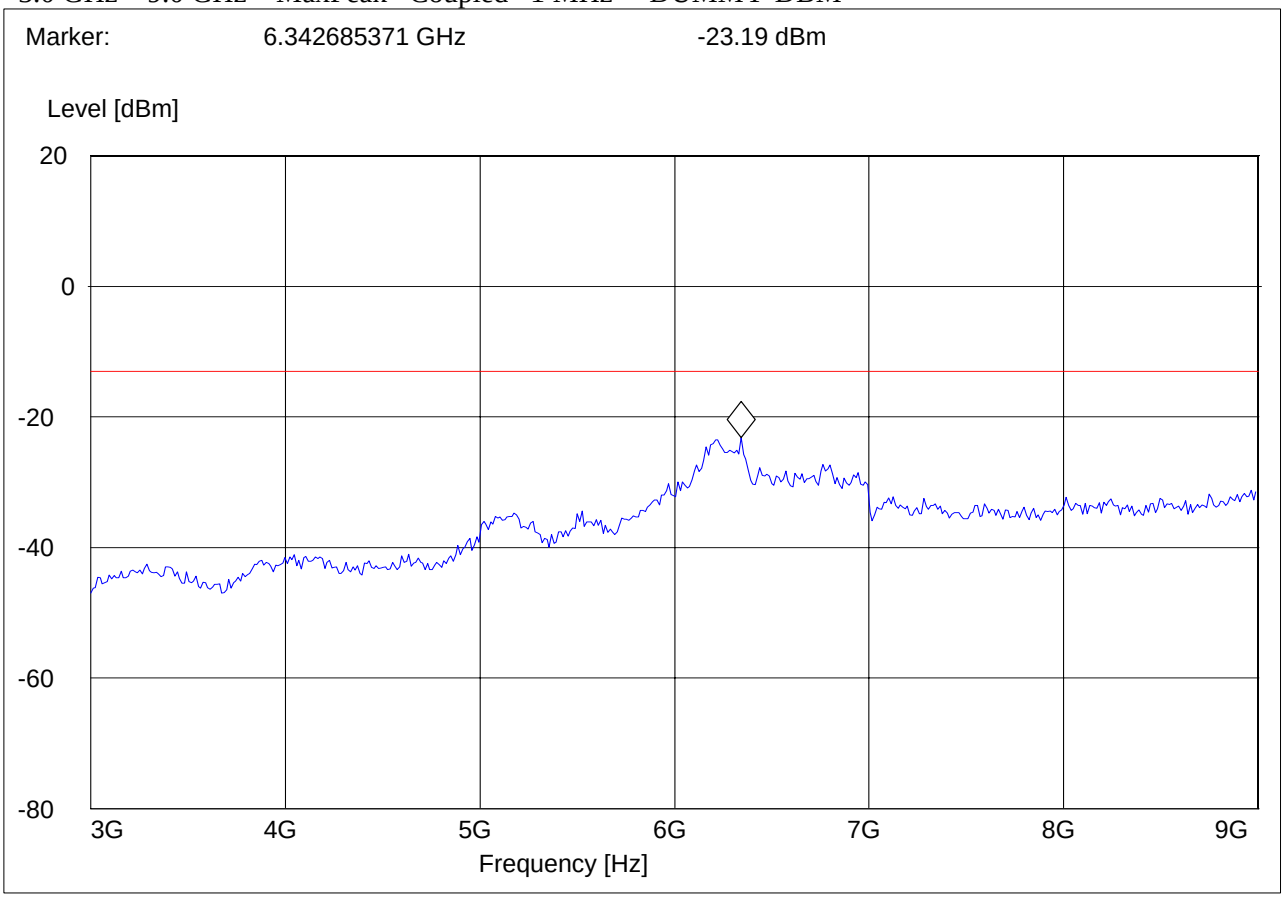
RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 836.6MHz: 3 – 9**GHz**
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 190)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 3-9G"

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



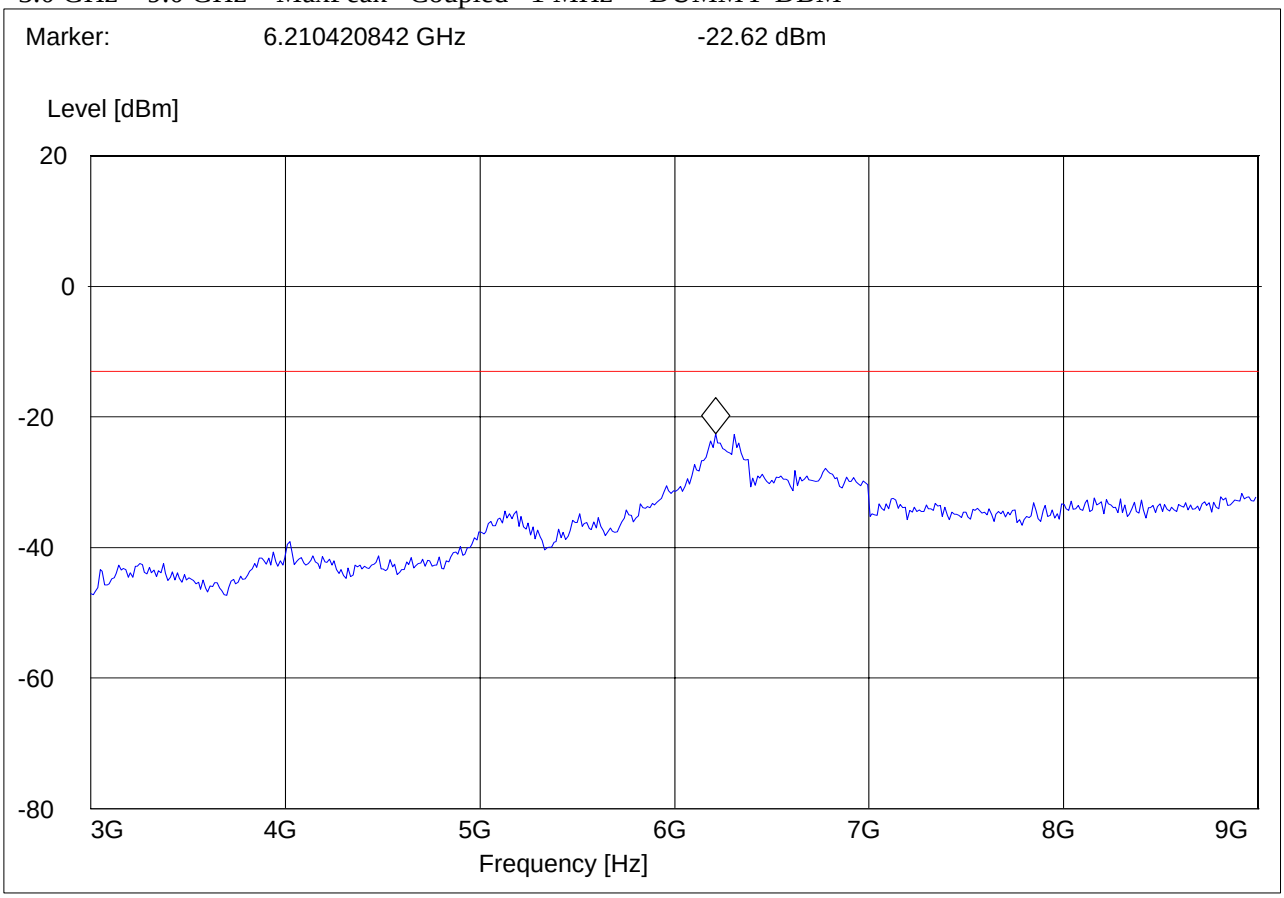
RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 848.8MHz: 3 – 9**GHz**
Spurious emission limit –13dBm
Note: **This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 850 (channel 251)
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@253°

SWEEP TABLE: "FCC 22Spuri 3-9G"

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



5.2.4.3 RESULTS OF RADIATED TESTS PCS-1900:

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
2	**3700.4**	NF	**3760**	NF	**3819.6**	NF
3	**5550.6**	NF	**5640**	NF	**5729.4**	NF
4	**7400.8**	NF	**7520**	NF	**7639.2**	NF
5	**9251**	NF	**9400**	NF	**9549**	NF
6	**11101.2**	NF	**11280**	NF	**11458.8**	NF
7	**12951.4**	NF	**13160**	NF	**13368.6**	NF
8	**14801.6**	NF	**15040**	NF	**15278.4**	NF
9	**16651.8**	NF	**16920**	NF	**17188.2**	NF
10	**18502**	NF	**18800**	NF	**19098**	NF
NF = NOISE FLOOR						

5.2.4.4 RADIATED SPURIOUS EMISSIONS (PCS 1900)

TX: 30MHz - 1GHz

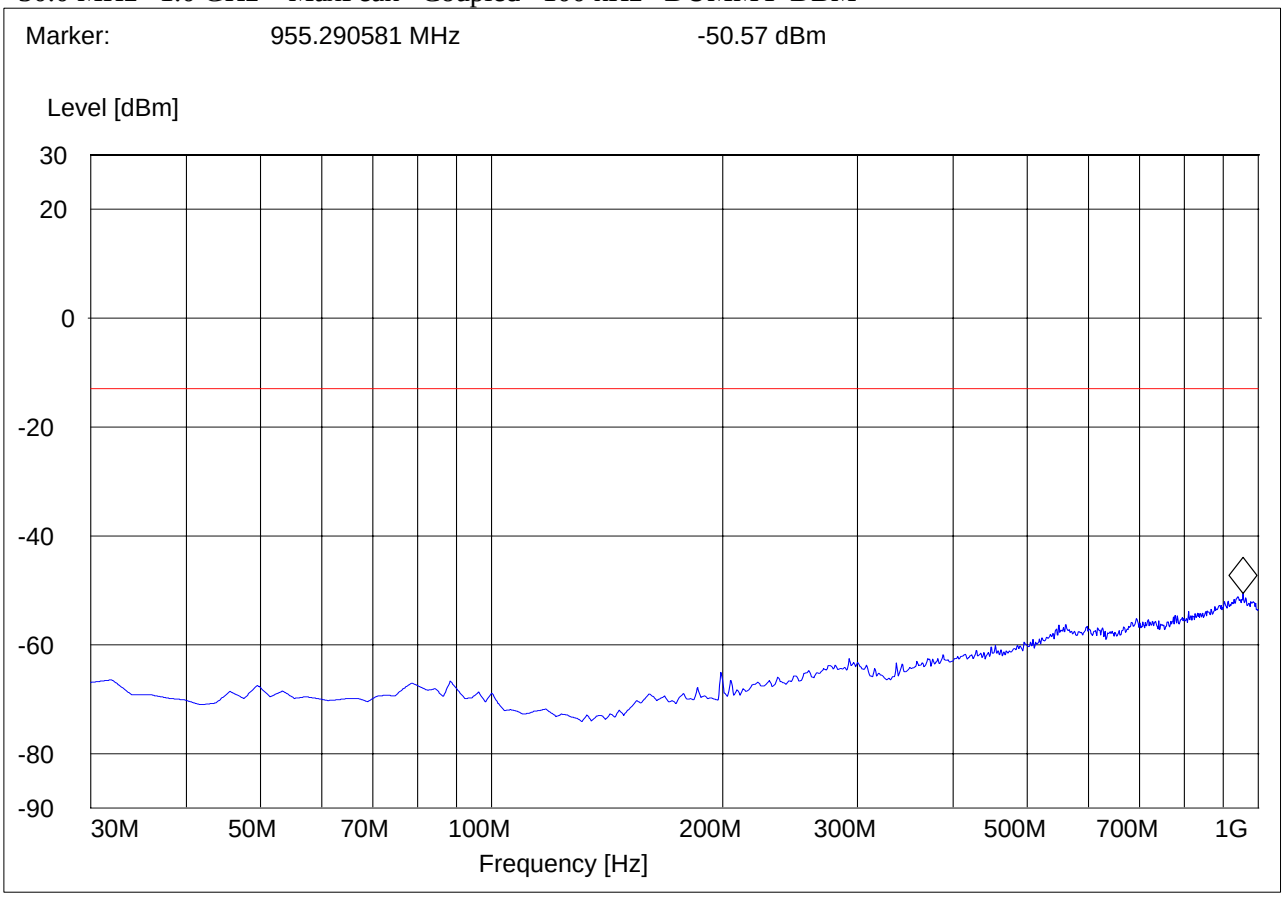
Spurious emission limit –13dBm

Note: This plot is valid for low, mid & high channels (worst-case plot)

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH661
ANT Orientation: H
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments:

SWEEP TABLE: "FCC 24 Spur 30M-1G_H"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	DUMMY-DBM

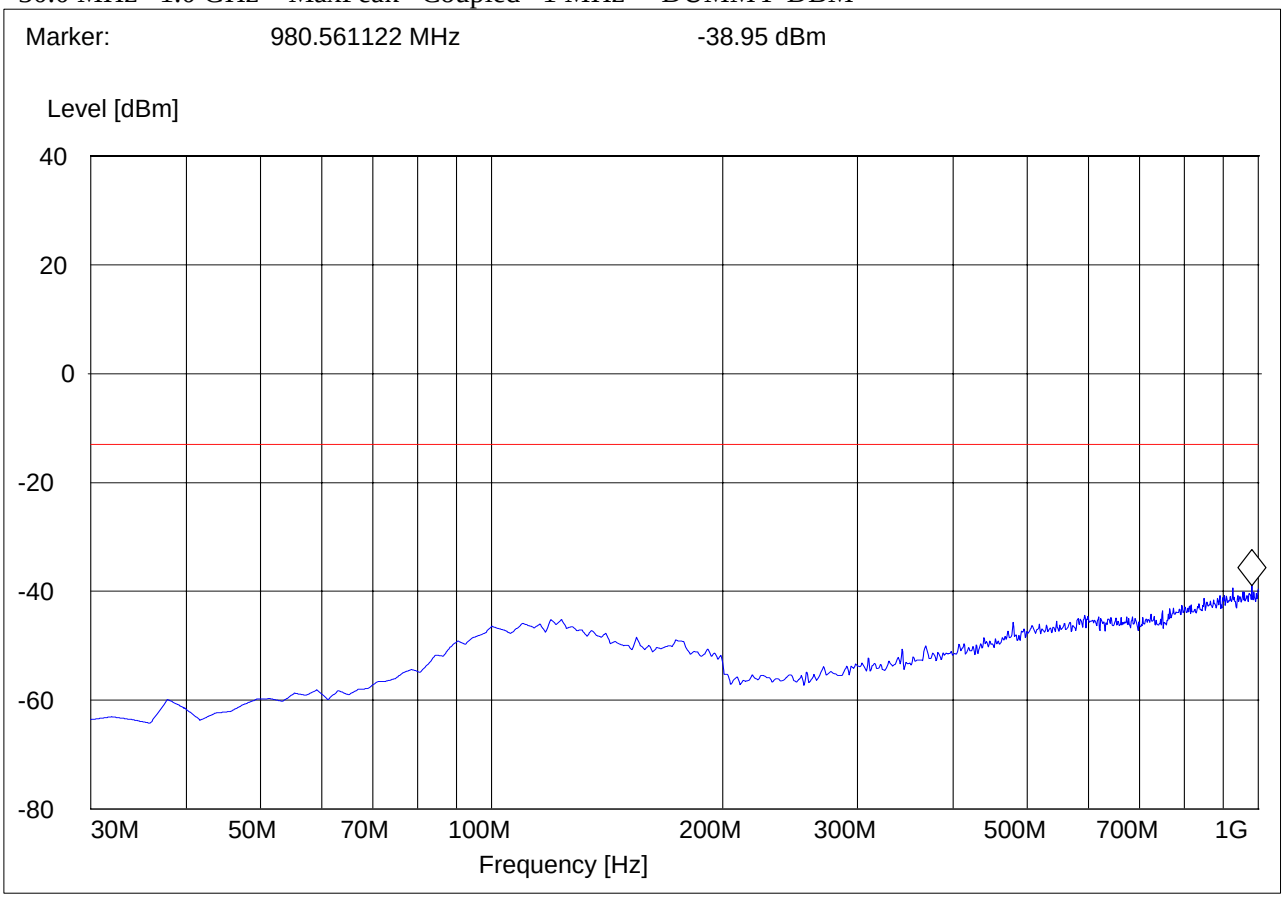


RADIATED SPURIOUS EMISSIONS (PCS 1900)
TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Note: This plot is valid for low, mid & high channels (worst-case plot).

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH661
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments:

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

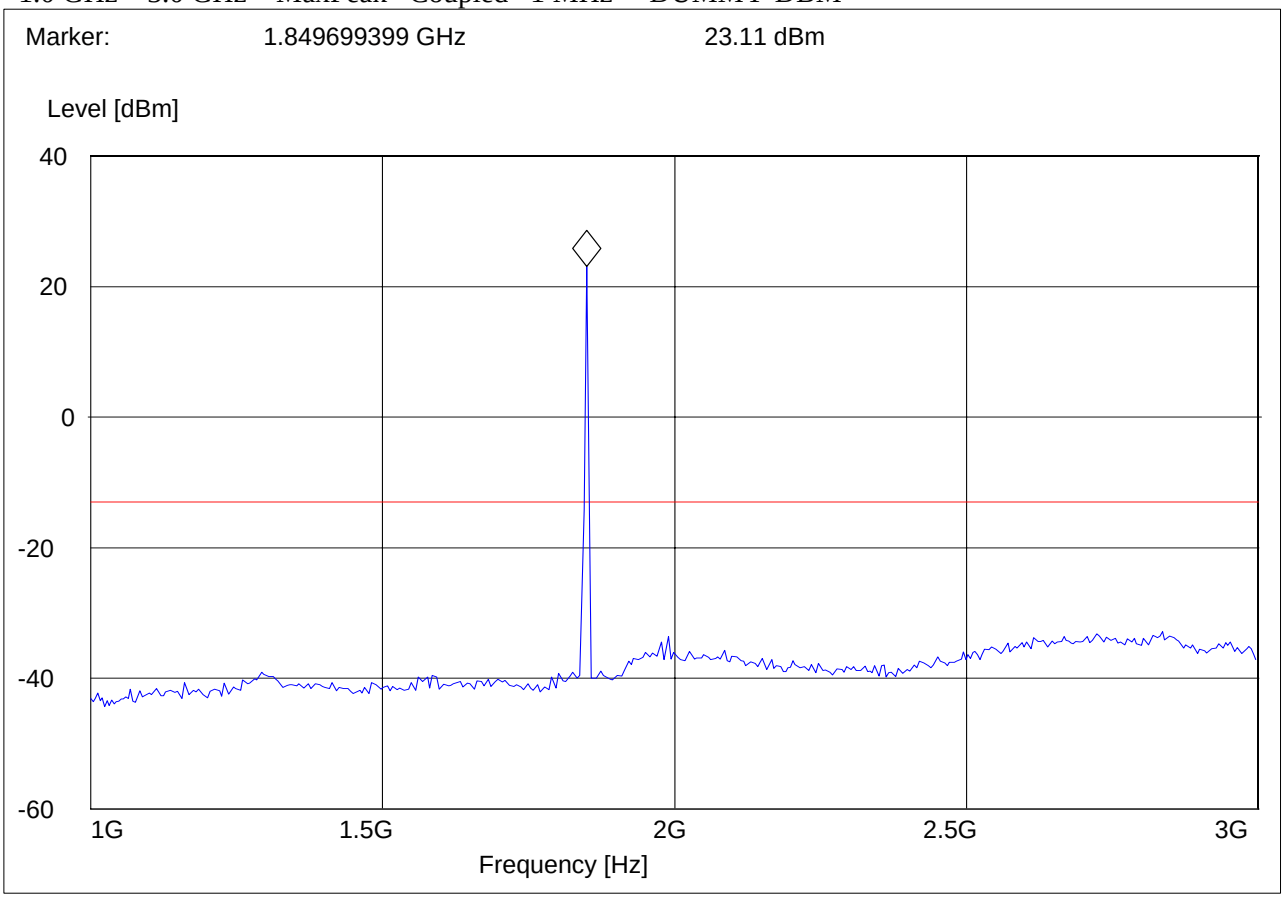


RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx @ 1850.2 MHz: 1GHz – 3GHz
Spurious emission limit –13dBm
Note: The peak above the limit line is the carrier freq. at ch-512.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH512
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24Spuri 1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

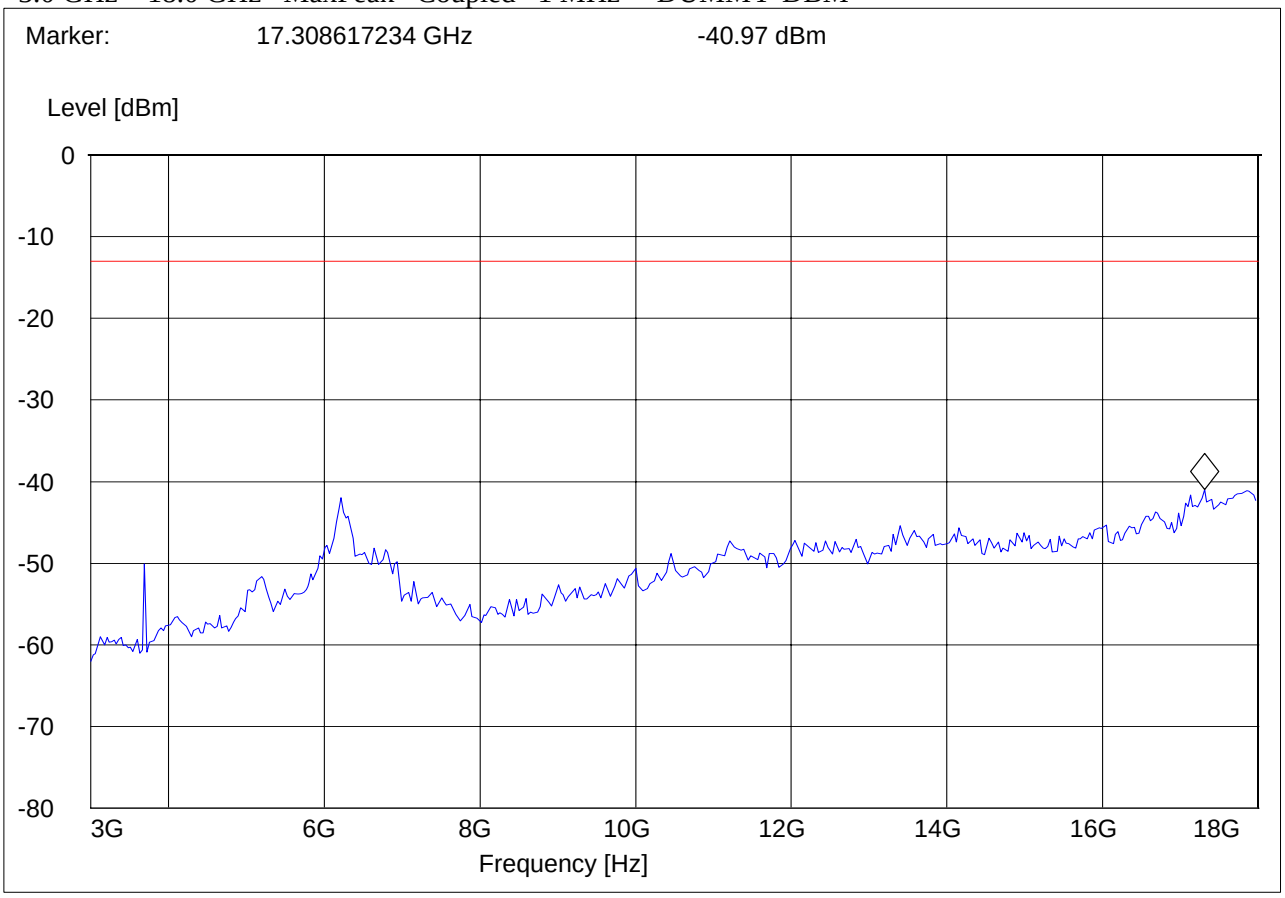


RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx @ 1850.2 MHz: 3GHz – 18GHz

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH512
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24Spuri 3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

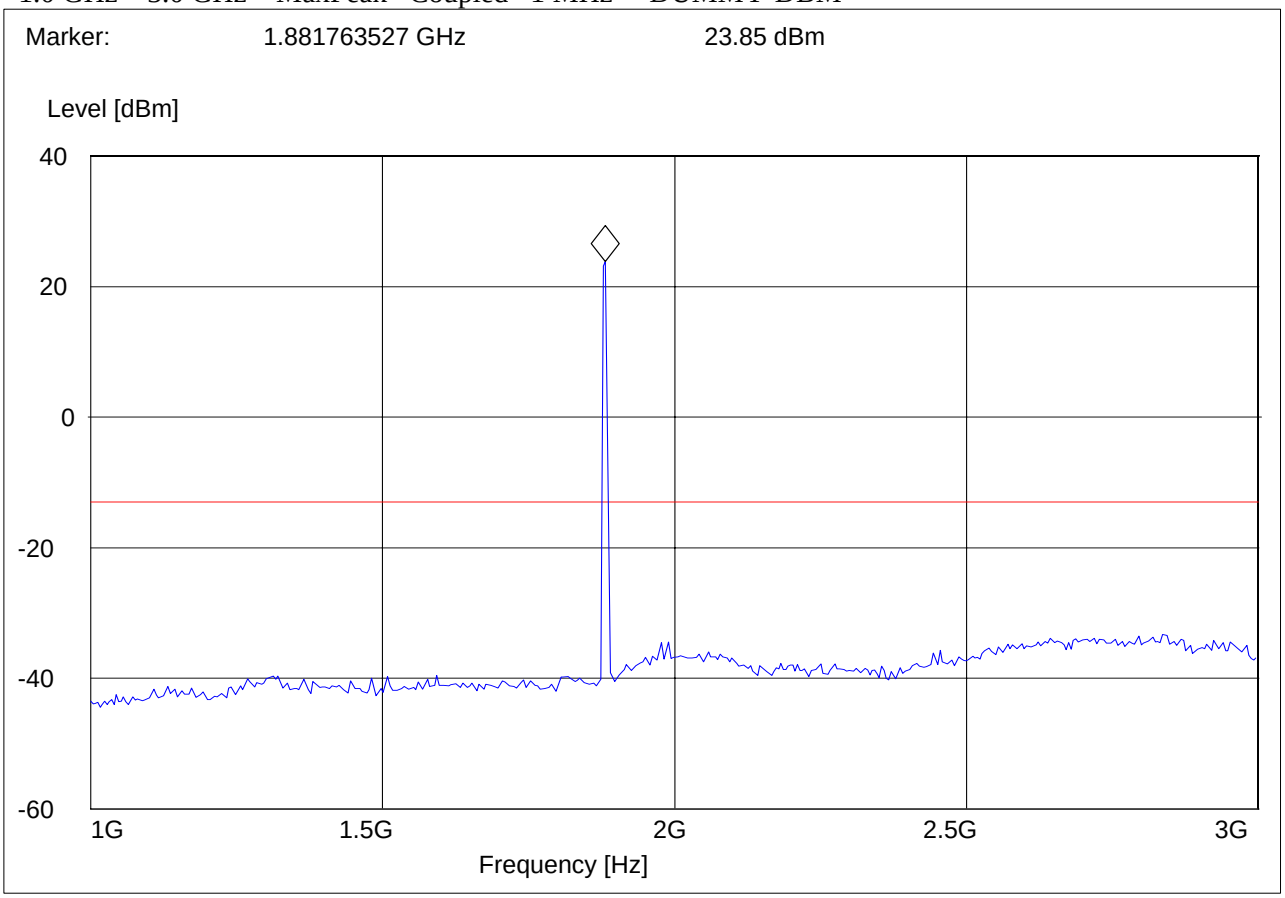


RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx @ 1880.0MHz: 1GHz – 3GHz
Spurious emission limit –13dBm
Note: The peak above/close to the limit line is the carrier freq. at ch-661.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH661
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24Spuri 1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

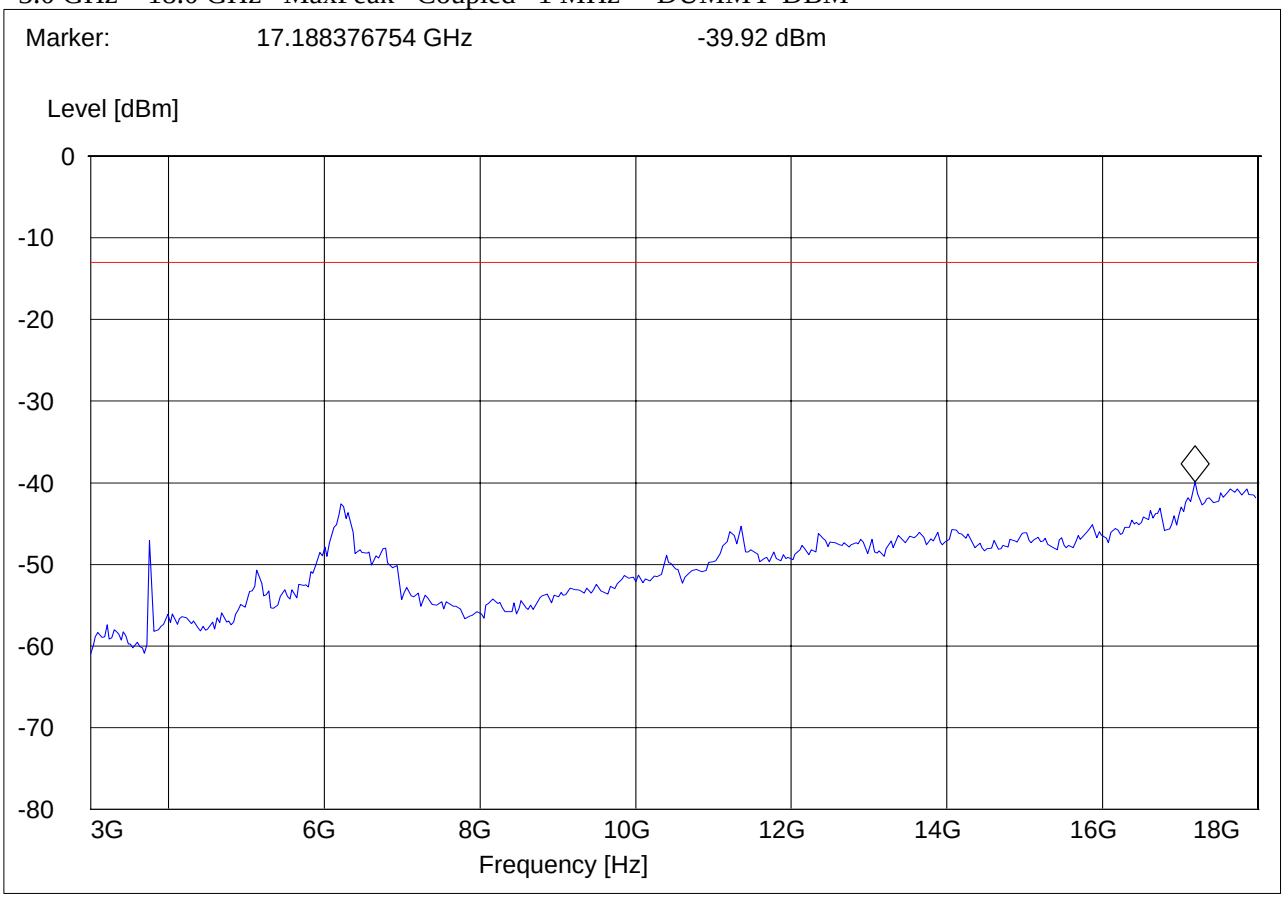


RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx @ 1880.0MHz: 3GHz – 18GHz
Spurious emission limit –13dBm

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH661
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24Spuri 3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



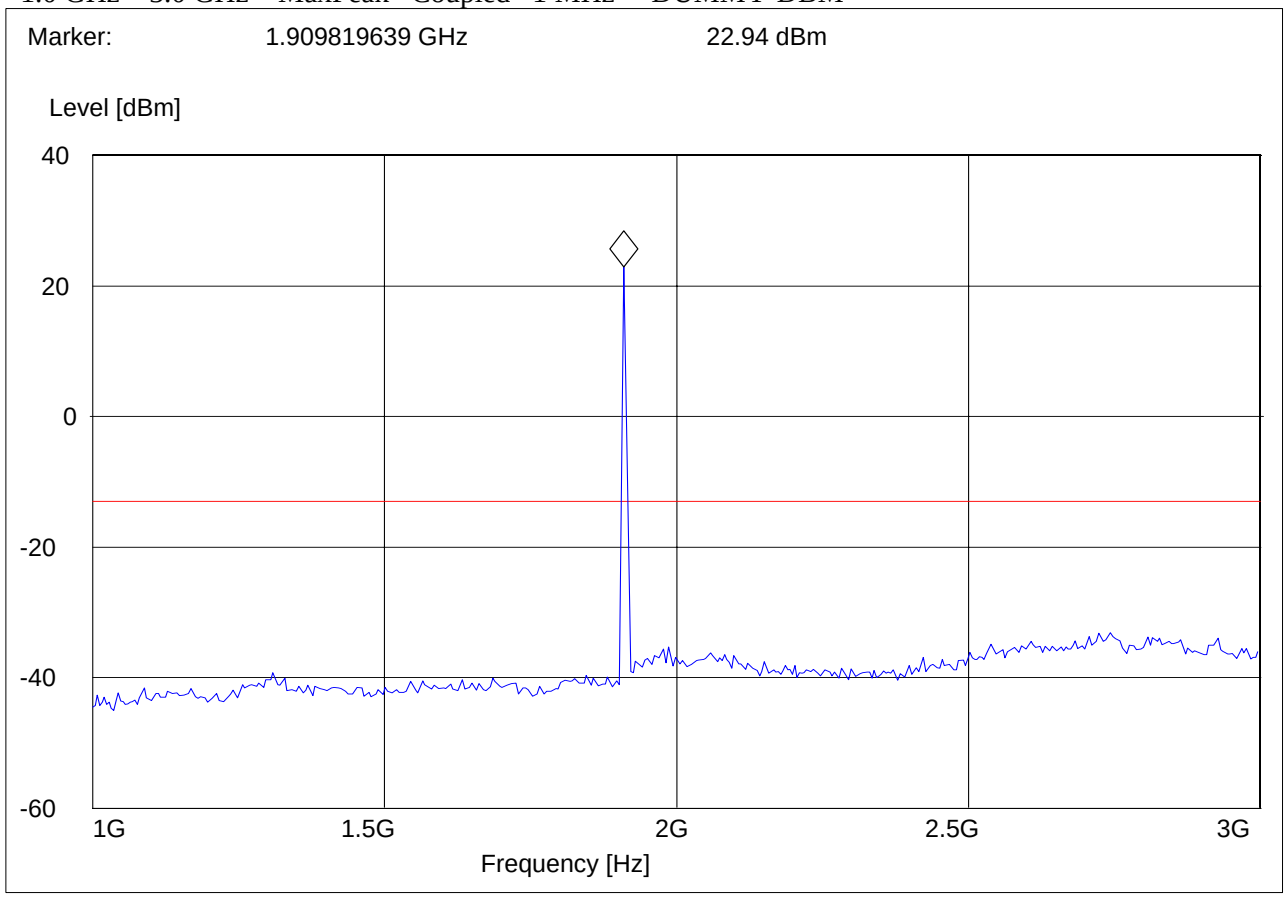
RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx @ 1909.8 MHz: 1GHz – 3GHz
Spurious emission limit –13dBm

Note: The peak above the limit line is the carrier freq. at ch-810.

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH810
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24Spuri 1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

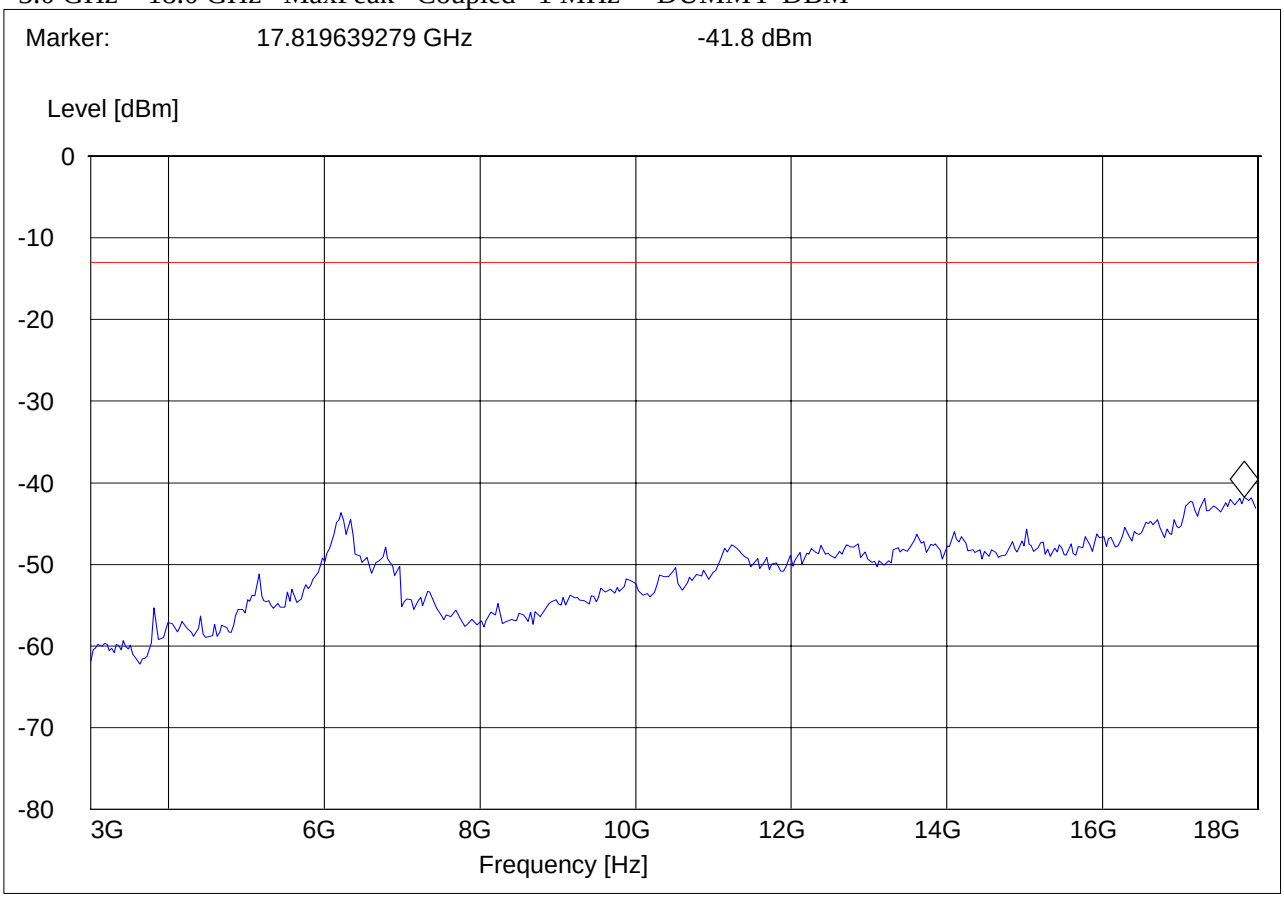


RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx @ 1909.8 MHz: 3GHz – 18GHz
Spurious emission limit –13dBm

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH810
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24Spuri 3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

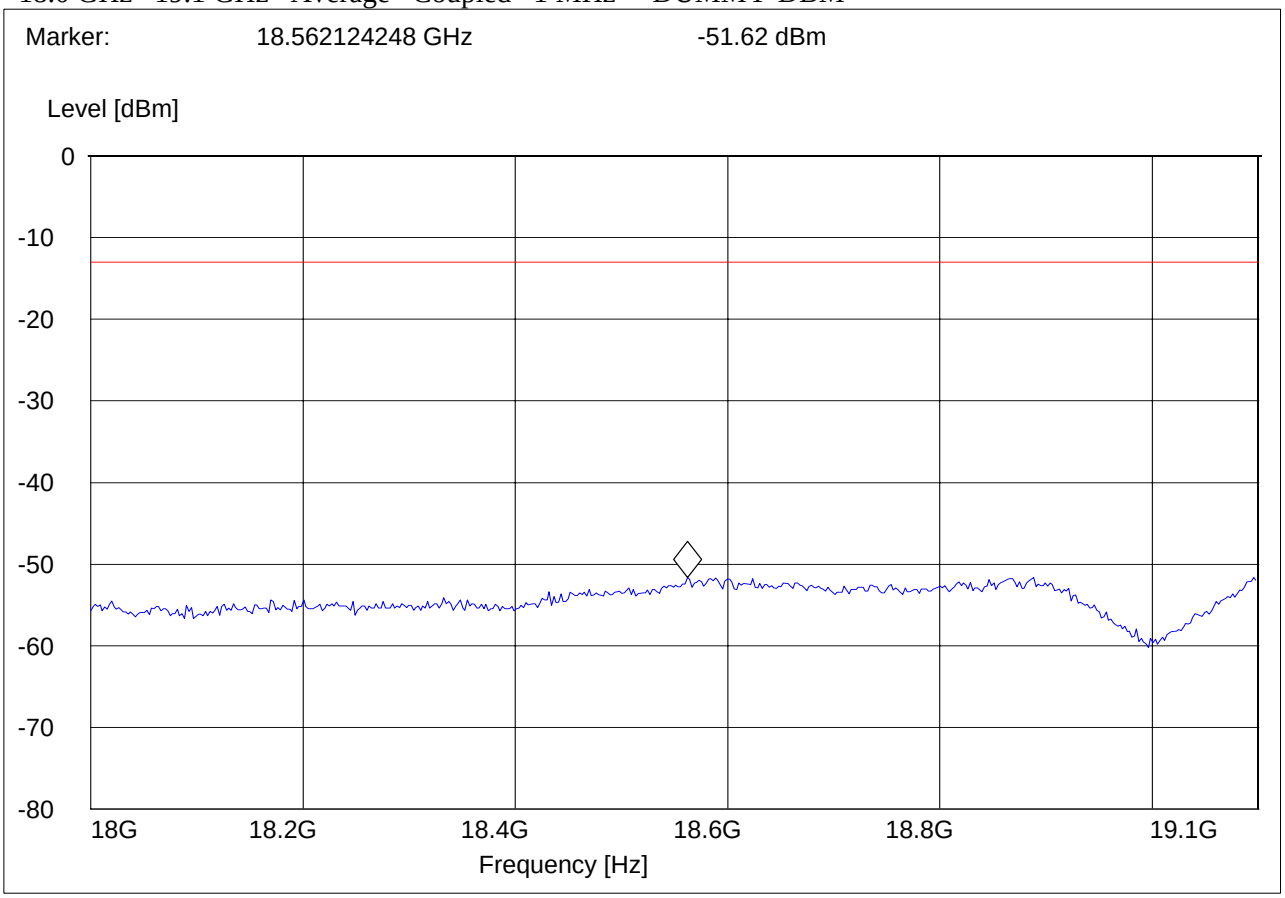


RADIATED SPURIOUS EMISSIONS (PCS 1900)
Tx mode: 18GHz – 19.1GHz
Spurious emission limit –13dBm
Note: This plot is valid for low, mid & high channels (worst-case plot).

EUT: 04GK00l
Customer:: Ingenitech
Test Mode: GSM 1900 CH661
ANT Orientation: V
EUT Orientation: H
Test Engineer: Sam
Voltage: 12 VDC
Comments: TT@348°

SWEEP TABLE: "FCC 24spuri 18-19.1G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	19.1 GHz	Average	Coupled	1 MHz	DUMMY-DBM

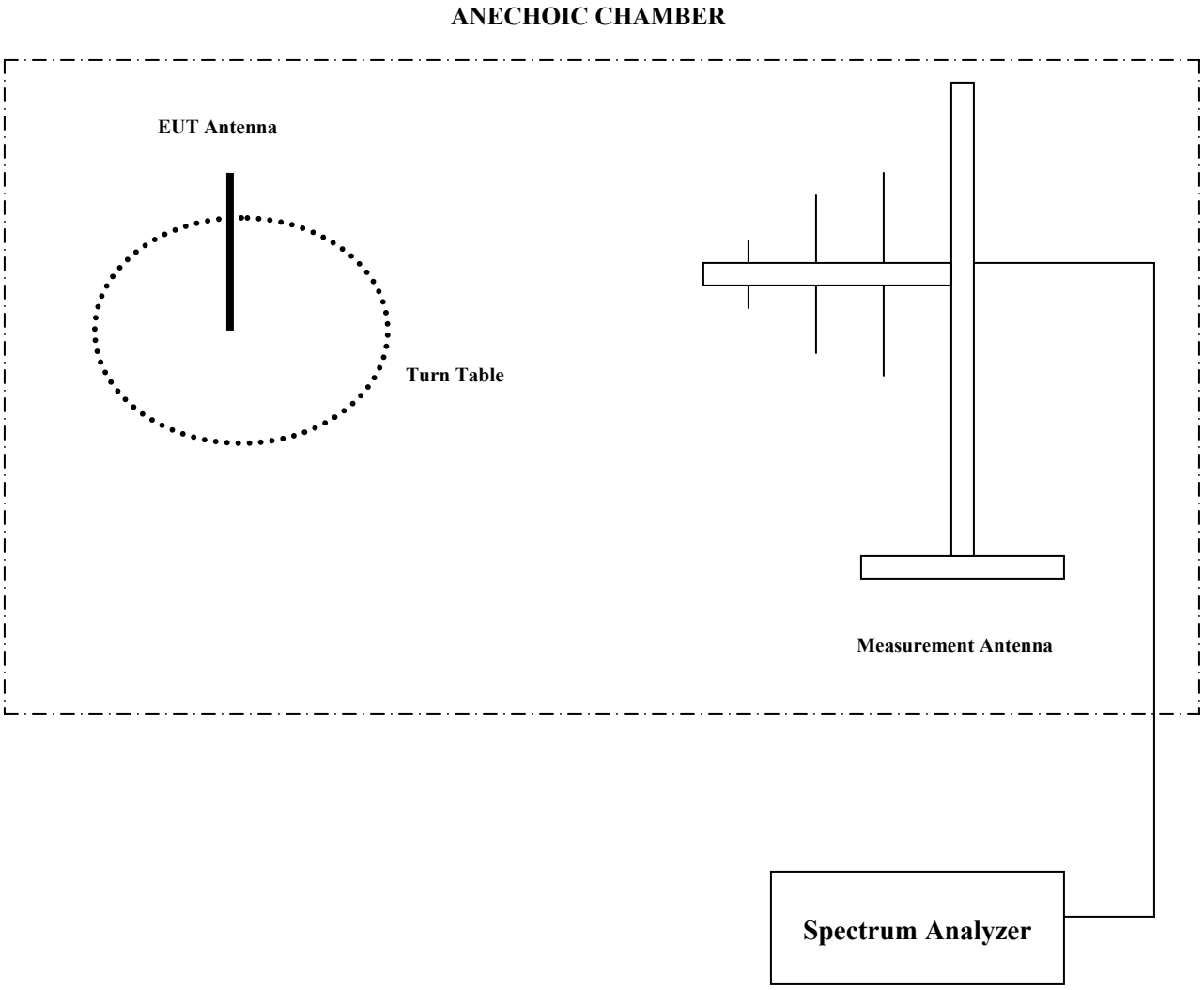


6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

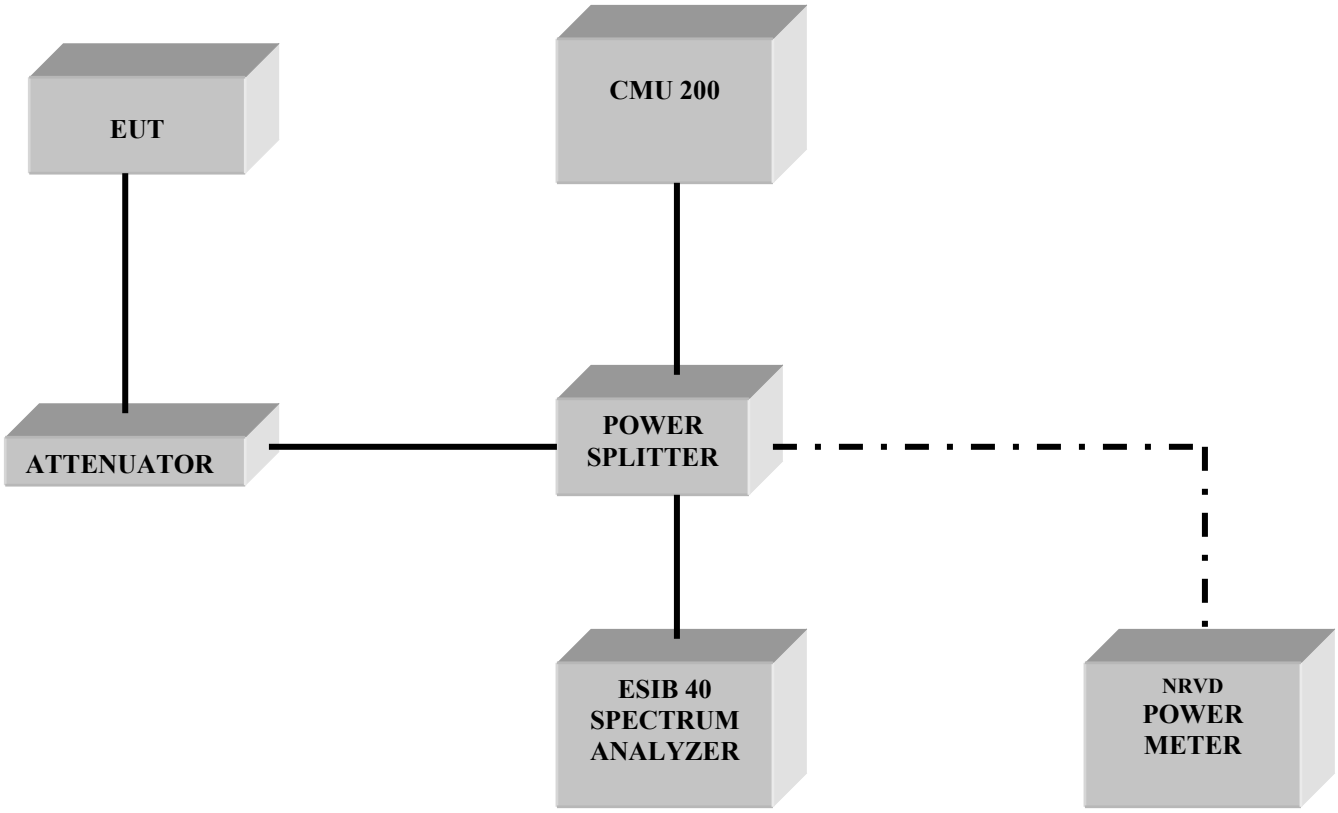
No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Anechoic Chamber	3 meter	Euroshield	NA	NA	In house
02	Receiver / Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100017	May 2009	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	July 2009	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Turn table	2088	EMCO/ETS	NA	NA	In house
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	340125	May 2009	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
14	MAPS Position Controller	2092	ETS-Lindgren	0004-1510	NA	In house
15	Universal Radio Comm. Tester	CMU 200 #2	Rohde & Schwarz	109879	May 2009	1 year
16	EMC Software	ESK1	Rohde & Schwarz	NA	NA	NA

7 BLOCK DIAGRAMS

Radiated Testing



Conducted Testing



8 Report History

2008-9-03 Original Report
2008-9-10 Added statement to section 4.