



FCC Test Report

FCC Part 22, 24

for

SmartSynch, Inc.

SSI I210 GPRS SmartMeter

Model Number: GEI210GPRSV1.0

FCC ID: QHC-I210GPRS

IC No.: 4393B-I210GPRS

TEST REPORT #: EMC_SMAR1_016_FCC22_24
DATE: 2009-4-16



FCC listed
A2LA certified
IC recognized #
3462B

CETECOM Inc.

411 Dixon Landing Road ♦ Milpitas, CA 95035 ♦ U.S.A.

Phone: + 1 (408) 586 6200 ♦ Fax: + 1 (408) 586 6299 ♦ E-mail: info@cetecomusa.com ♦ <http://www.cetecom.com>

CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686

Board of Directors: Dr. Harald Ansoerge, Dr. Klaus Matkey, Hans Peter May

Table of Contents

1	ASSESSMENT	3
	<i>EMC & Radio.....</i>	<i>3</i>
	<i>EMC & Radio.....</i>	<i>3</i>
2	ADMINISTRATIVE DATA.....	4
2.1	IDENTIFICATION OF THE TESTING LABORATORY ISSUING THE EMC ASSESSMENT REPORT	4
2.2	IDENTIFICATION OF THE CLIENT	4
2.3	IDENTIFICATION OF THE MANUFACTURER	4
3	EQUIPMENT UNDER TEST (EUT).....	5
3.1	SPECIFICATION OF THE EQUIPMENT UNDER TEST	5
	SUBJECT OF INVESTIGATION.....	6
4	MEASUREMENTS.....	7
4.1	RF POWER OUTPUT	7
4.1.1	<i>FCC 2.1046 Measurements required: RF power output.....</i>	<i>7</i>
4.1.2	<i>Limits:</i>	<i>7</i>
4.1.2.1	§22.913(a) Effective radiated power limits.....	7
4.1.2.2	§24.232(b)(c) Power limits.	7
4.1.3	<i>Radiated Output Power measurement procedure:</i>	<i>8</i>
4.1.4	<i>ERP Results 850 MHz band:</i>	<i>9</i>
4.1.5	<i>EIRP Results 1900 MHz band:.....</i>	<i>9</i>
4.2	TRANSMITTER SPURIOUS EMISSIONS RADIATED	16
4.2.1	<i>FCC 2.1053 Measurements required: Field strength of spurious radiation.....</i>	<i>16</i>
4.2.2	<i>Limits:</i>	<i>16</i>
4.2.2.1	§22.917 & RSS-129 (8.1.2) Emission limitations for cellular equipment.	16
4.2.2.2	§24.238 & RSS-133 (4.4) & (6.5) Emission limitations for Broadband PCS equipment.	16
4.2.3	<i>Radiated out of band measurement procedure:</i>	<i>17</i>
4.2.4	<i>Radiated out of band emissions results on EUT:</i>	<i>19</i>
4.2.4.1	RESULTS OF RADIATED TESTS GSM-850:	19
4.2.4.2	RADIATED SPURIOUS EMISSIONS (GSM-850)	20
4.2.4.3	RESULTS OF RADIATED TESTS PCS-1900:.....	29
4.2.4.4	RADIATED SPURIOUS EMISSIONS (PCS 1900)	30
4.3	AC LINE CONDUCTED EMISSIONS	37
5	TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS	42
6	BLOCK DIAGRAMS	43

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 #
SmartSynch, Inc.	Wireless Utility Meter	GEI210GPRSV1.0

This test report reviewed by:

2009-4-16	<u>EMC & Radio</u>	Satya Radhakrishna (Project Engineer)
-----------	------------------------	--

Date	Section	Name	Signature
------	---------	------	-----------

Project Leader:

2009-4-16	<u>EMC & Radio</u>	Marc Douat (Test Lab Manager)
-----------	------------------------	----------------------------------

Date	Section	Name	Signature
------	---------	------	-----------

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 Issuing the EMC Assessment Report

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:	Marc Douat

2.2 Identification of the Client

Applicant's Name:	SmartSynch, Inc.
Address:	4400 Old Canton Road Suite 300 Jackson MS 39211, USA
Contact Person:	Mike Mathis
Phone No.	+1 601 362 1780
Fax:	+1 601 362 1787
e-mail:	mmathis@smartsynch.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as above
Manufacturer's Address:	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Product Type	Wireless Utility Meter.
Marketing Name:	SSI I210 GPRS SmartMeter
Model No:	GEI210GPRSV1.0
Hardware Revision :	55M-I21002C-001 Rev2
Software Revision :	660-040001-P00
FCC-ID:	QHC-I210GPRS
IC-ID :	4393B-I210GPRS
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:	Integral
Radiated Output Power:	ERP 29.15dBm (0.822W) @ 824.2 MHz EIRP 29.94dBm (0.986W) @ 1909.8 MHz

Subject of Investigation

Data presented in this test report only includes Radiated emissions, Radiated power and AC conducted emissions.

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.

4 Measurements

4.1 RF Power Output

4.1.1 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.

4.1.2 Limits:

4.1.2.1 §22.913(a) Effective radiated power limits.

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

4.1.2.2 §24.232(b)(c) Power limits.

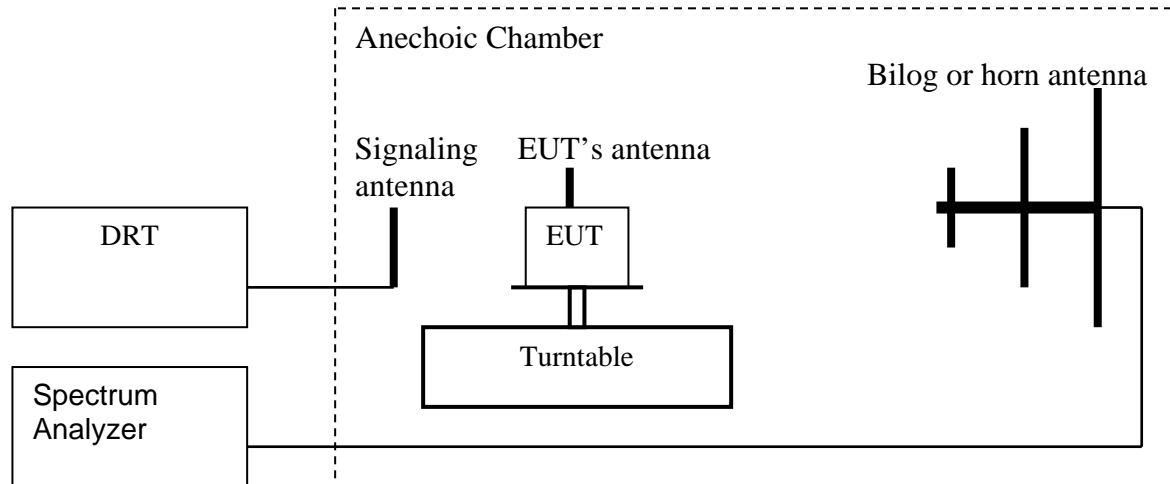
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).

(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.

4.1.3 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:

$$\mathbf{ERP\ (dBm) = LVL\ (dBm) + LOSS\ (dB)}$$
 8. Determine the EIRP using the following equation:

$$\mathbf{EIRP\ (dBm) = ERP\ (dBm) - 2.14\ (dB)}$$
 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.)

4.1.4 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	29.15	
836.6	28.59	
848.8	26.37	

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

4.1.5 EIRP Results 1900 MHz band:

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

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)	
	GSM	
1850.2	28.57	
1880.0	29.62	
1909.8	29.94	

4.1.6 Peak to Average Ratio

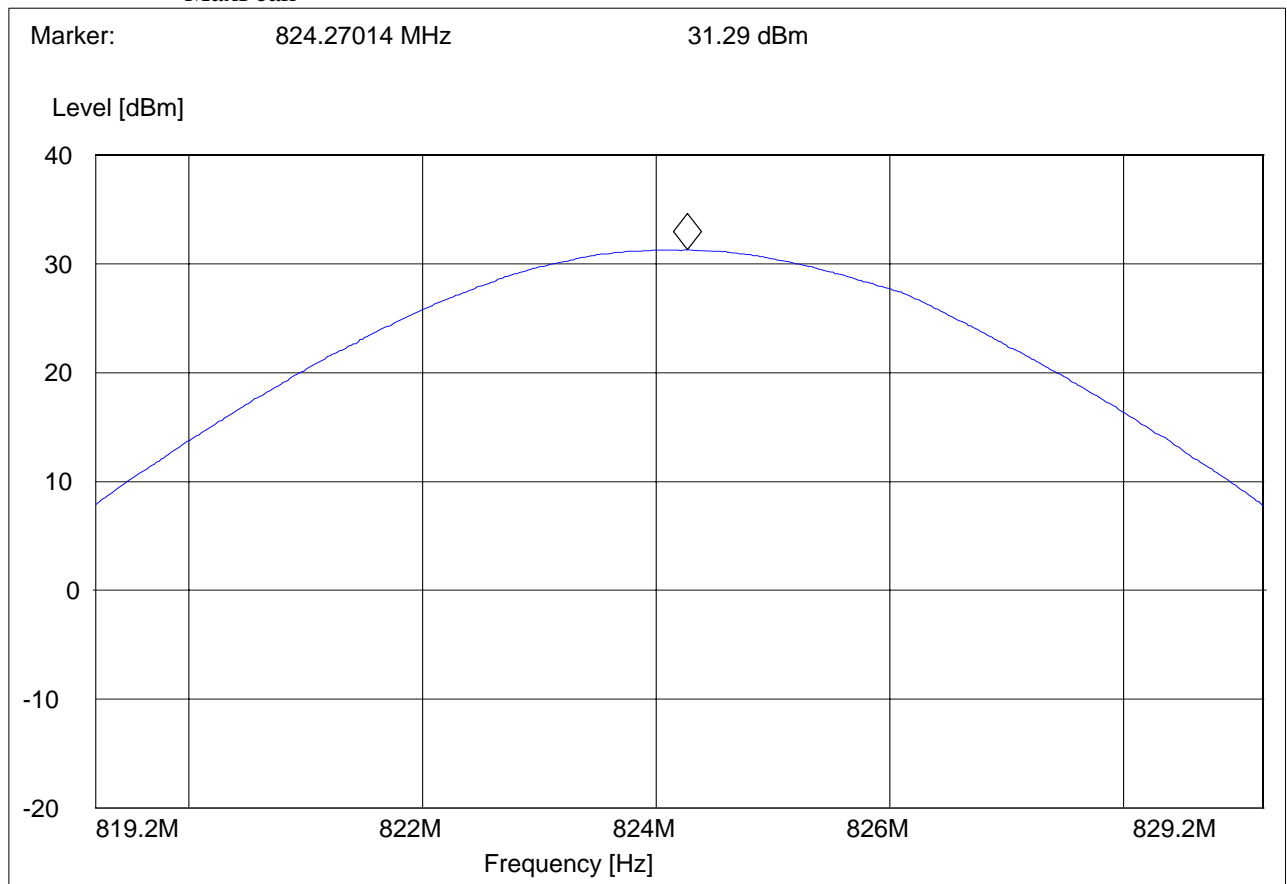
Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)	PAR (dB)
1850.2	30.4	30.2	0.2
1880	30.3	30.2	0.1
1909.8	30.4	30.2	0.2

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

EUT: i210
Customer:: SmarySynch
Test Mode: GSM 850
ANT Orientation: V
EUT Orientation: V
Test Engineer: Chris
Voltage: AC + Internal Battery
Comments: TT@288°; ANT @148cm

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



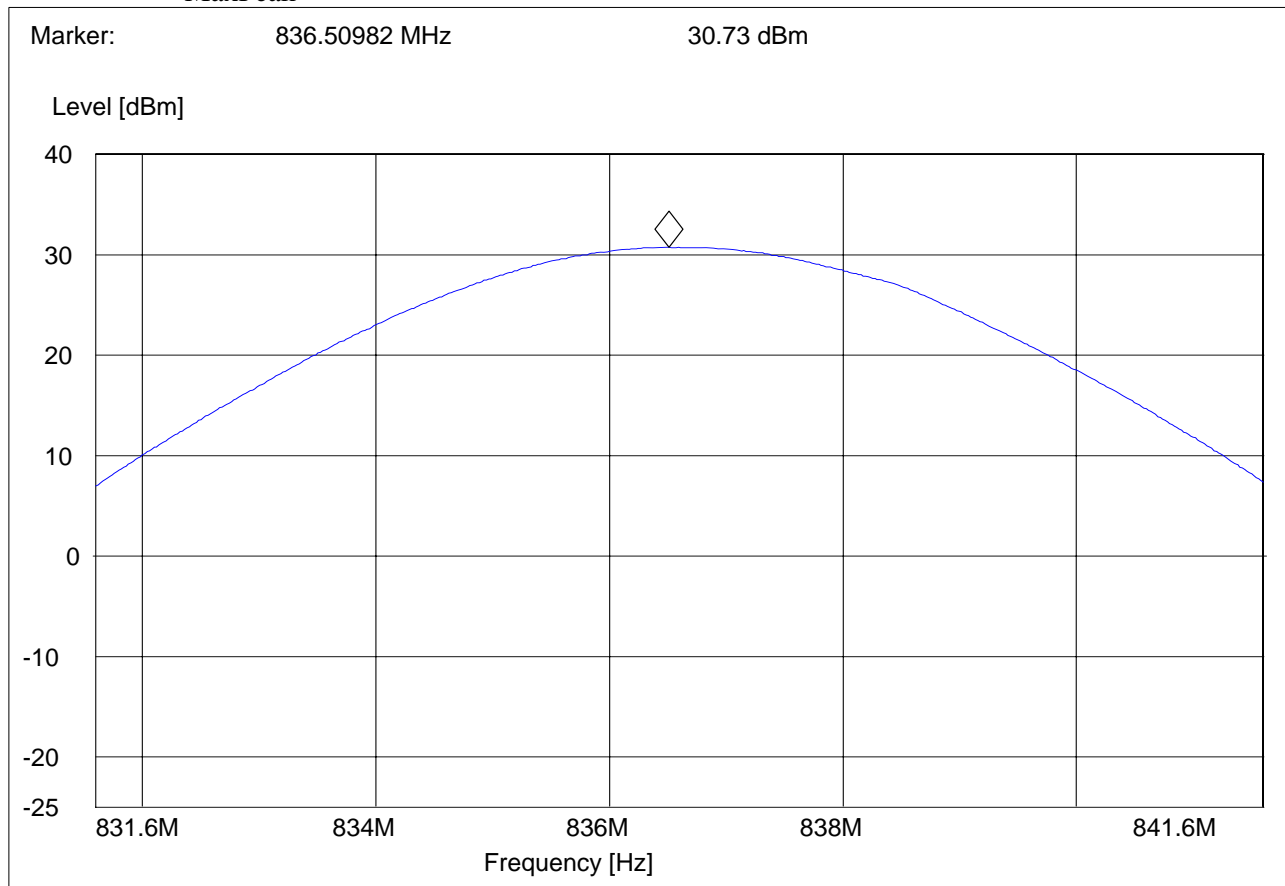
**RF OUTPUT POWER (GSM-850)
CHANNEL 190 GPRS**

§22.913(a) & RSS-129 (9.1)

EUT: i210
 Customer:: SmarySynch
 Test Mode: GSM 850
 ANT Orientation: V
 EUT Orientation: V
 Test Engineer: Chris
 Voltage: AC + Internal Battery
 Comments: TT@288°; ANT @148cm

SWEEP TABLE: "EIRP 850 CH 190 V"

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

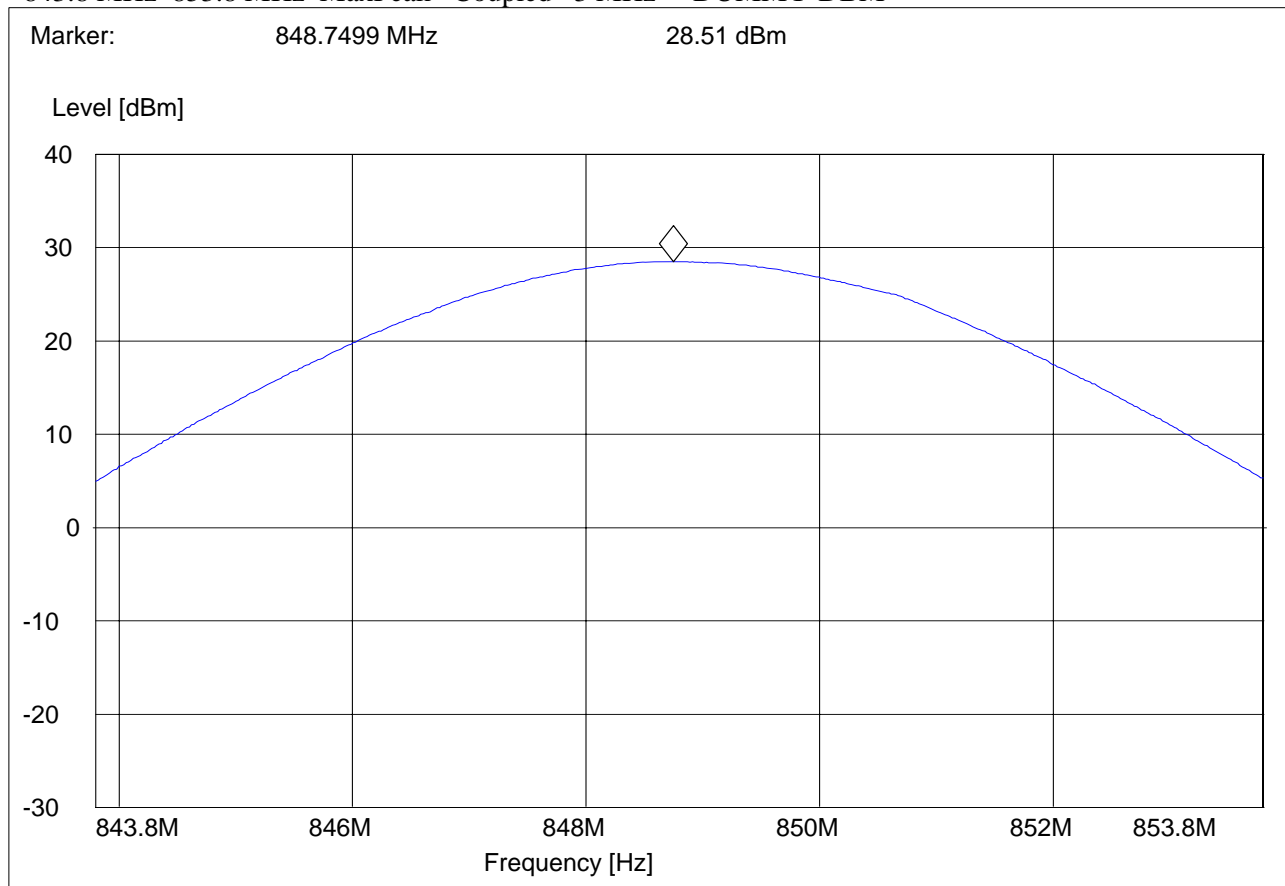


**RF OUTPUT POWER (GSM-850)
CHANNEL 251 GPRS****§22.913(a) & RSS-129 (9.1)**

EUT: i210
Customer:: SmarySynch
Test Mode: GSM 850
ANT Orientation: V
EUT Orientation: V
Test Engineer: Chris
Voltage: AC + Internal Battery
Comments: TT@288°; ANT @148cm

SWEEP TABLE: "EIRP 850 CH 251 V"

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



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

EUT: i210
Customer:: SmartSynch
Test Mode: GSM 1900
ANT Orientation: V
EUT Orientation: V
Test Engineer: Marc
Voltage: AC + Internal Battery
Comments:

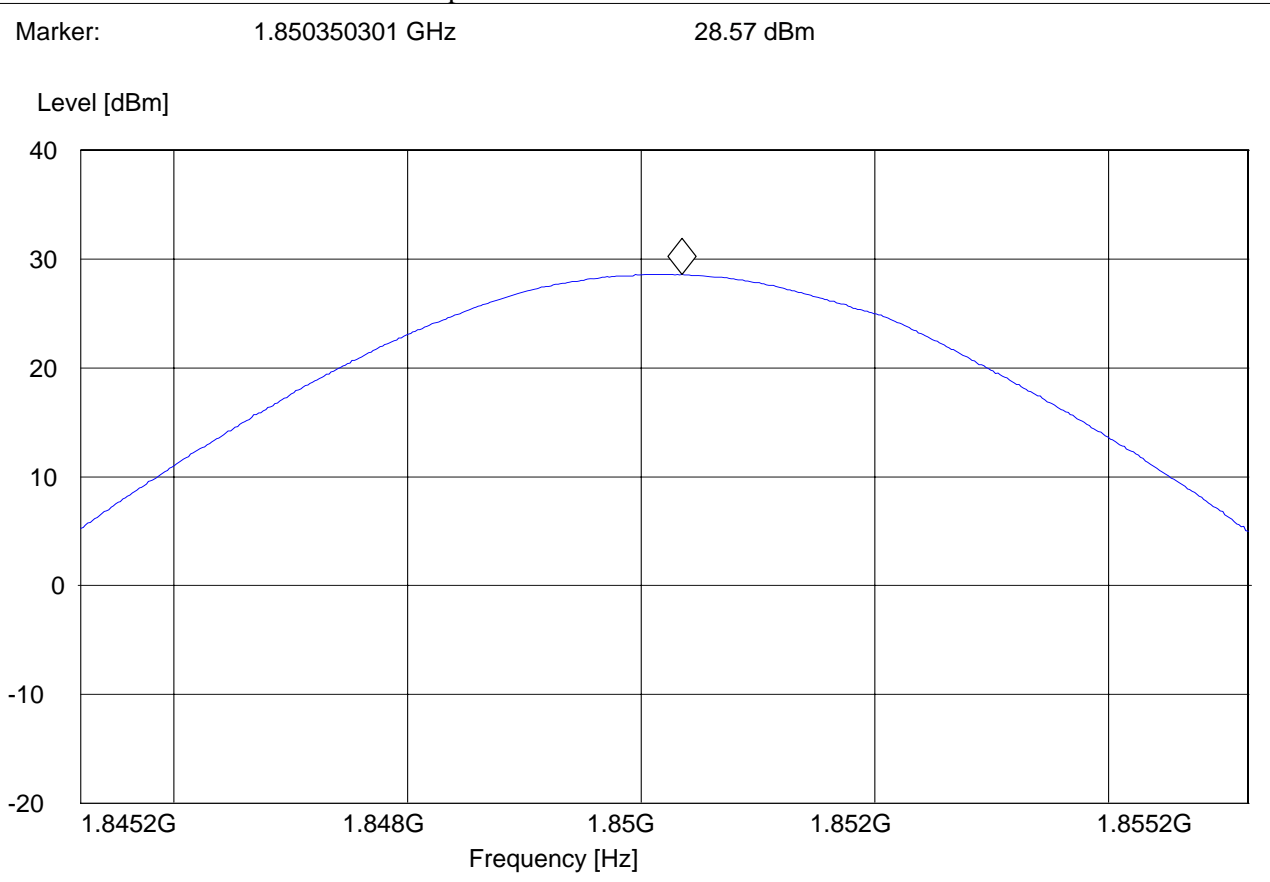
SWEEP TABLE: "EIRP 1900 CH512"

Short Description: EIRP PCS 1900 for channel-512

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.8 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM



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

EUT: i210
Customer:: SmartSynch
Test Mode: GSM 1900
ANT Orientation: V
EUT Orientation: V
Test Engineer: Marc
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "EIRP 1900 CH661"

Short Description: EIRP PCS 1900 for channel-661

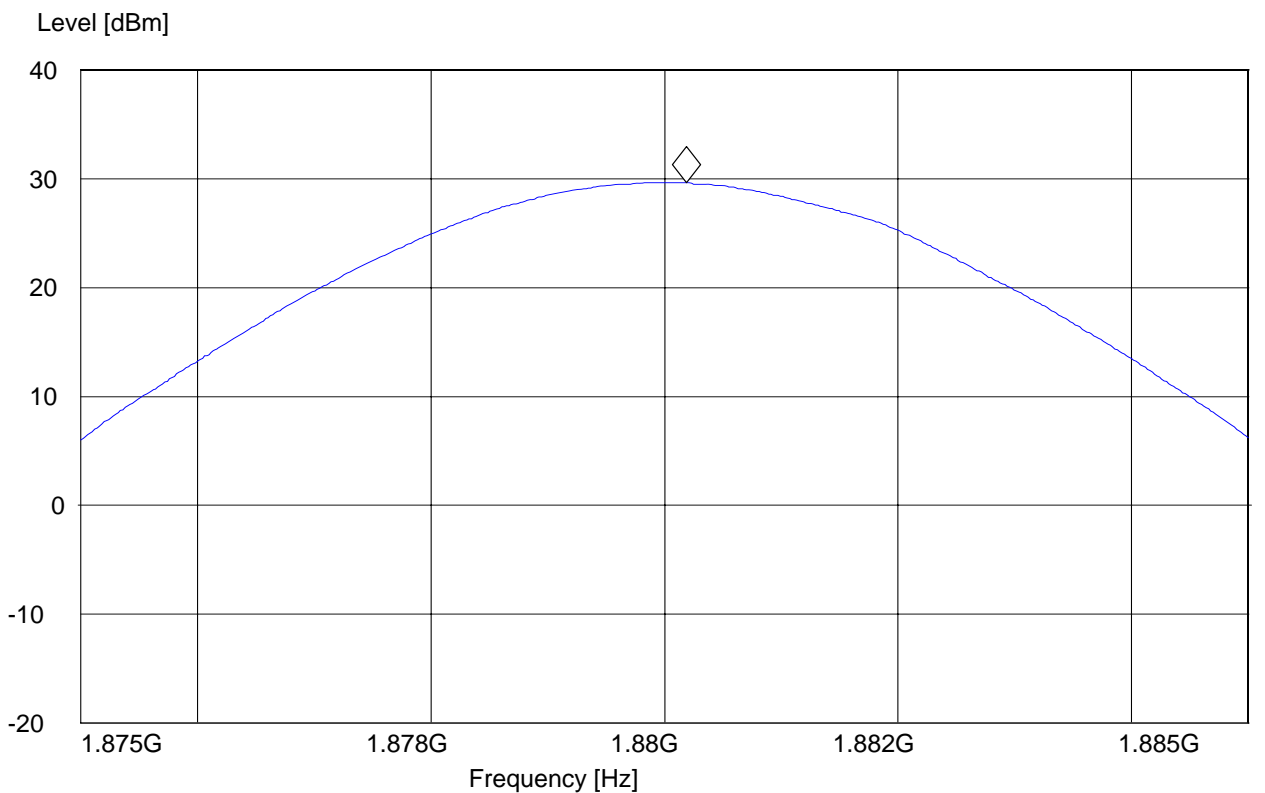
Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

MaxPeak

Marker: 1.880190381 GHz 29.62 dBm



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

EUT: i210
Customer:: SmartSynch
Test Mode: GSM 1900
ANT Orientation: V
EUT Orientation: V
Test Engineer: Marc
Voltage: AC + Internal Battery
Comments:

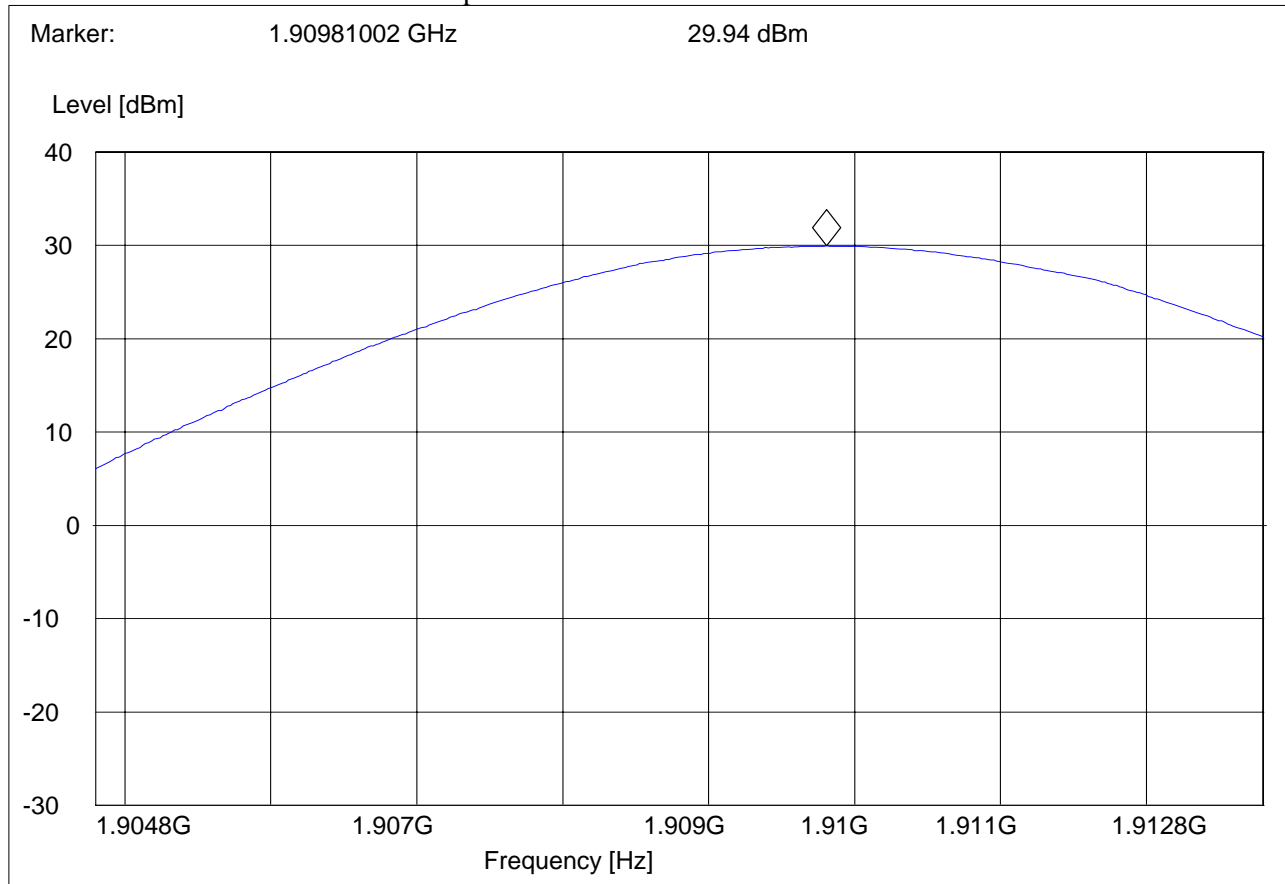
SWEEP TABLE: "EIRP 1900 CH810"

Short Description: EIRP PCS 1900 for channel-810

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM



4.2 Transmitter Spurious Emissions Radiated

4.2.1 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.

4.2.2 Limits:

4.2.2.1 §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.

4.2.2.2 §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.

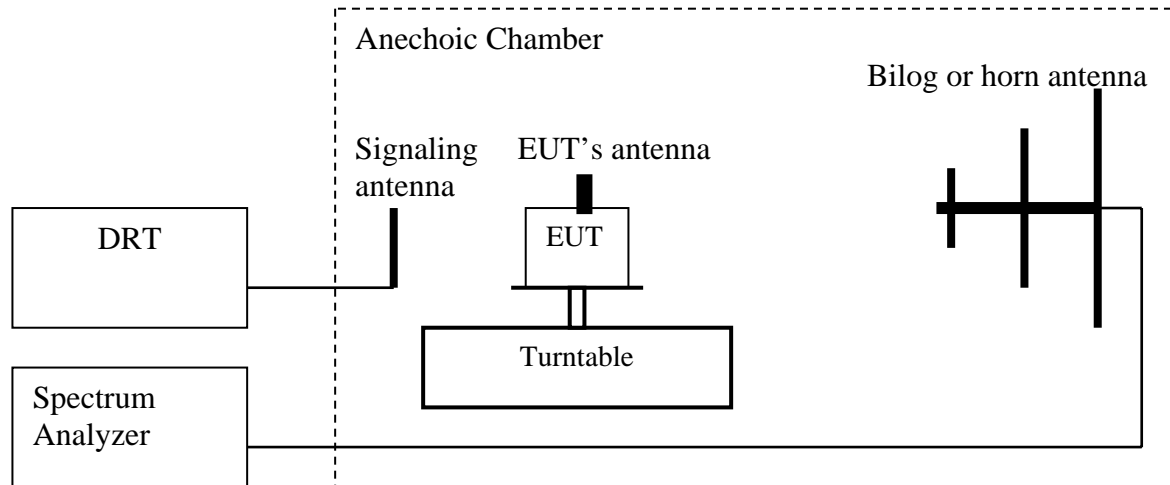
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of 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.

4.2.3 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**). $\text{LOSS} = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$.
7. Determine the level of spurious emissions using the following equation:
 $\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:
 $\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$
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.

4.2.4 Radiated out of band emissions results on EUT:

4.2.4.1 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						

4.2.4.2 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: i210

Customer:: SmarySynch

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

Test Engineer: Chris

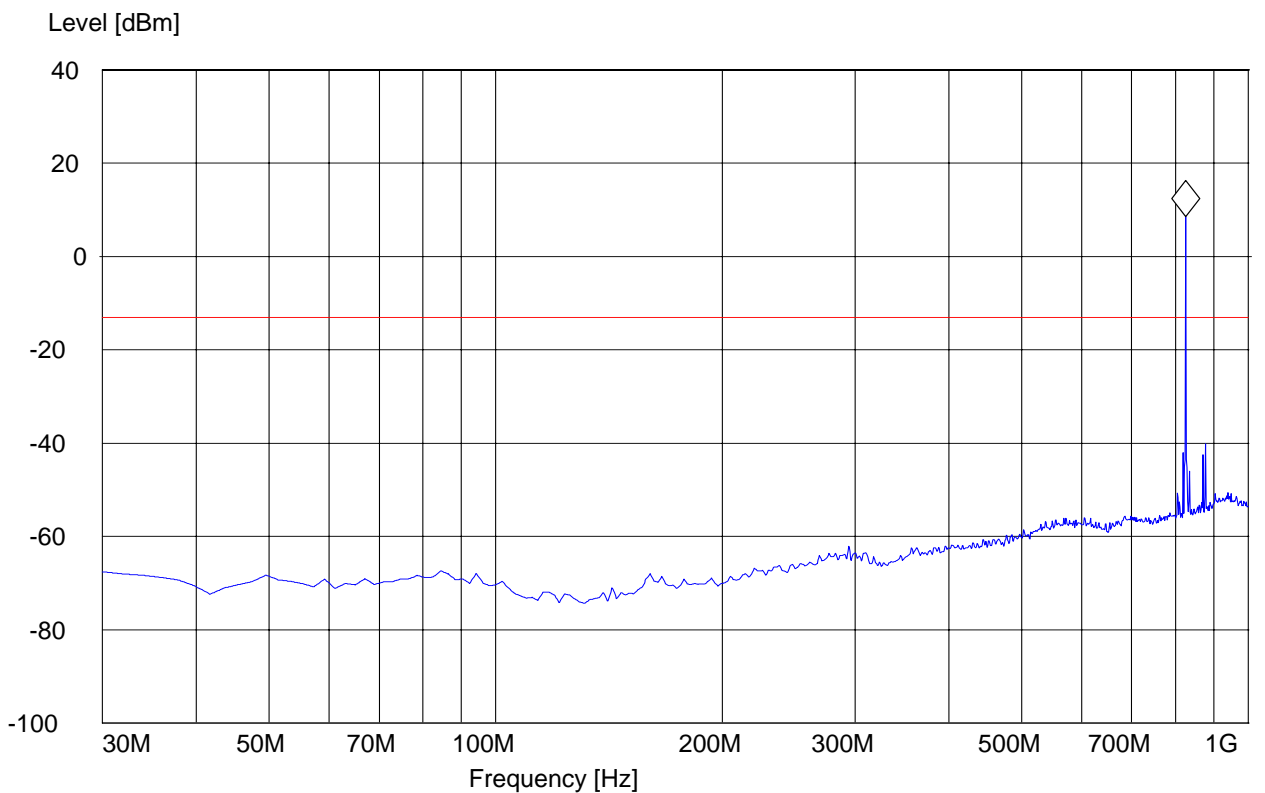
Voltage: AC + Internal Battery

Comments: TT@288°; ANT @148cm

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

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

Marker: 825.0501 MHz 8.58 dBm



TX: 30MHz - 1GHz

Spurious emission limit -13dBm

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

EUT: i210

Customer:: SmarySynch

Test Mode: GSM 850

ANT Orientation: V

EUT Orientation: V

Test Engineer: Chris

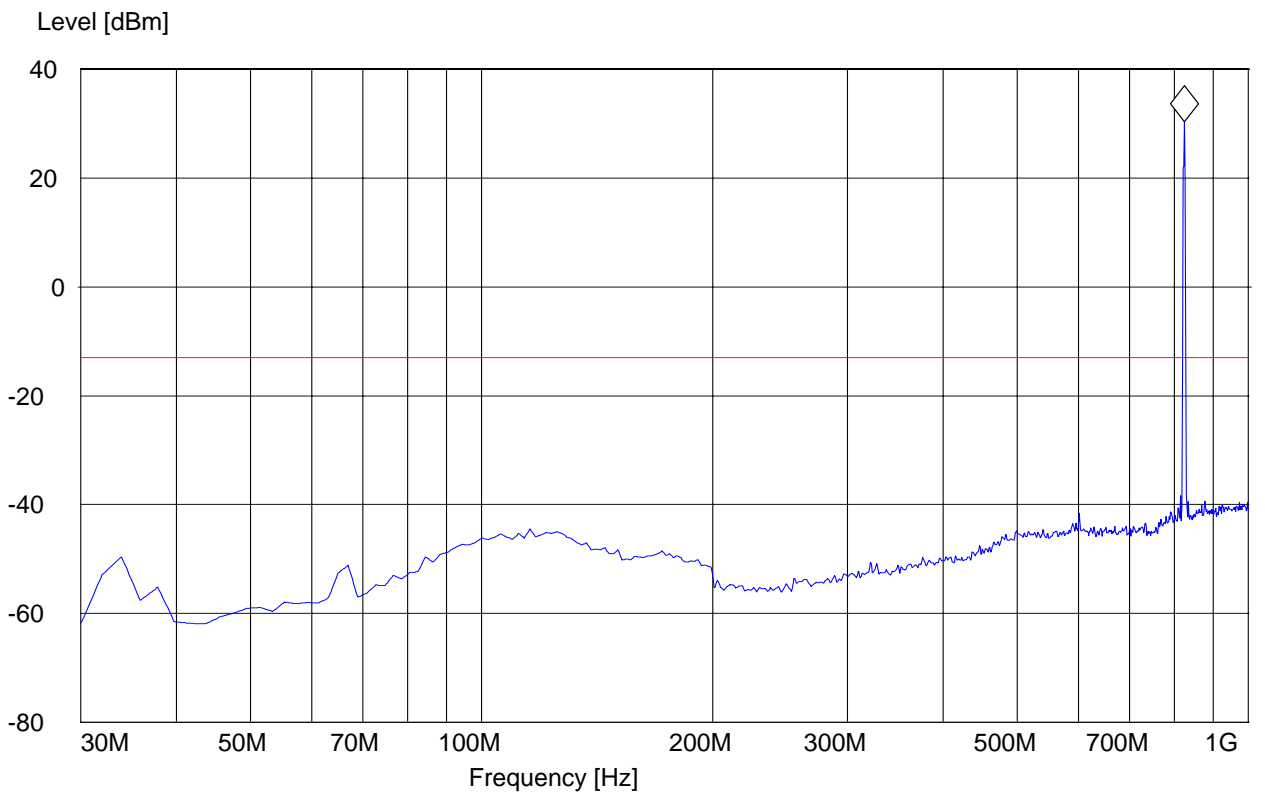
Voltage: AC + Internal Battery

Comments: TT@288°; ANT @148cm

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

Marker: 825.0501 MHz 30.3 dBm



TX: 30MHz - 1GHz

Spurious emission limit -13dBm

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

EUT: i210

Customer:: SmarySynch

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

Test Engineer: Chris

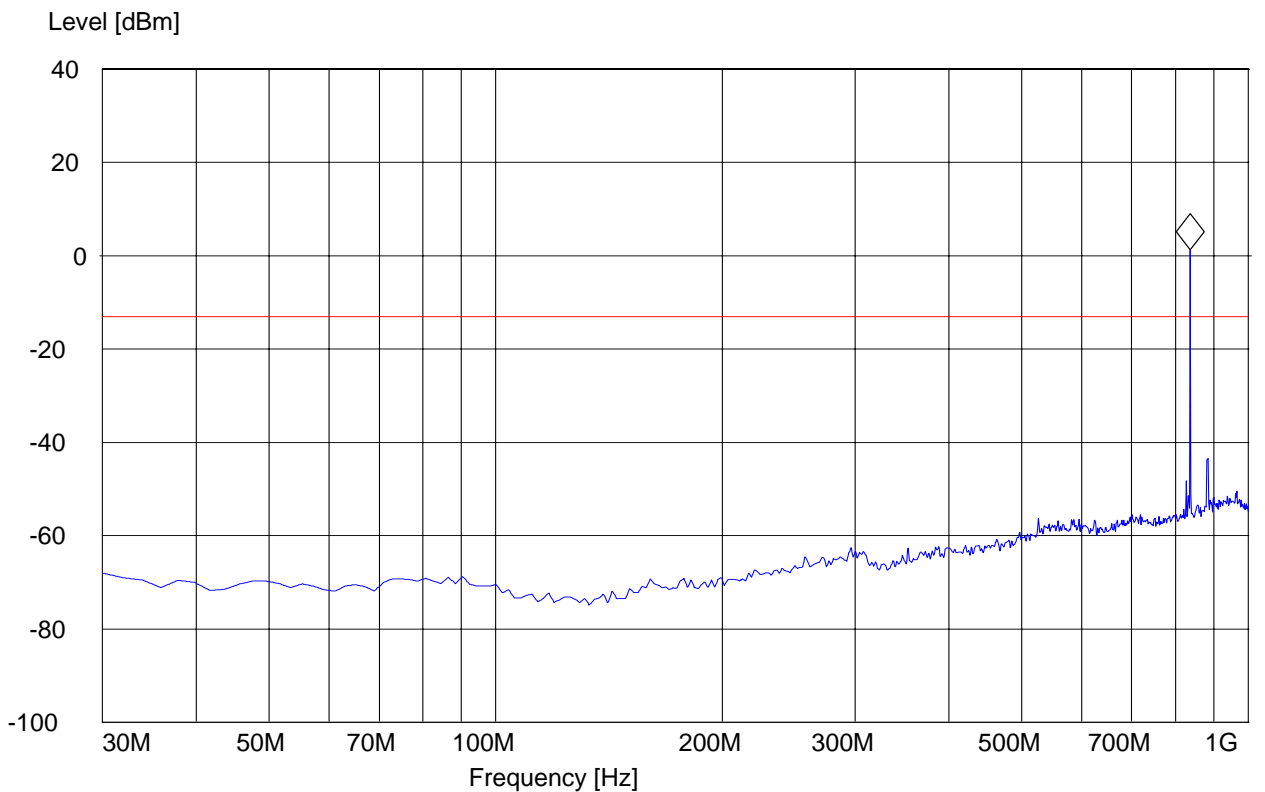
Voltage: AC + Internal Battery

Comments: TT@288°; ANT @148cm

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

Marker: 836.713427 MHz 1.3 dBm



TX: 30MHz - 1GHz

Spurious emission limit -13dBm

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

EUT: i210

Customer:: SmarySynch

Test Mode: GSM 850

ANT Orientation: V

EUT Orientation: V

Test Engineer: Chris

Voltage: AC + Internal Battery

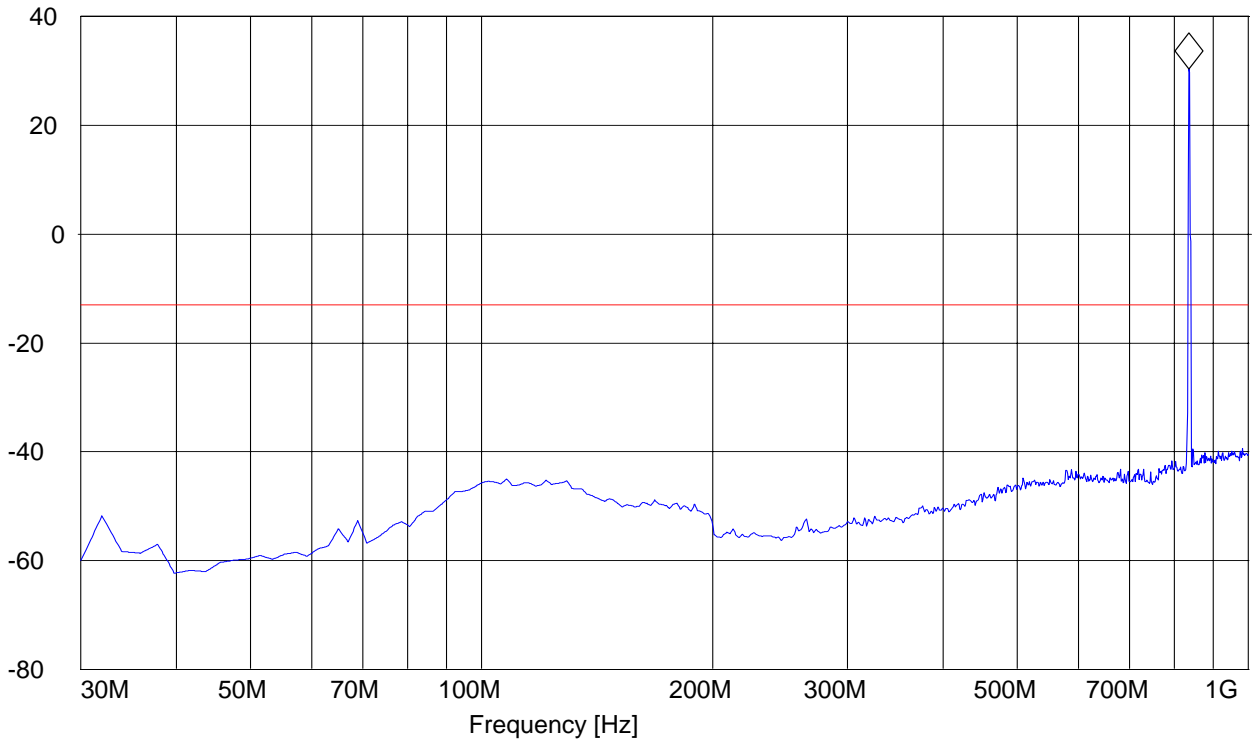
Comments: TT@288°; ANT @148cm

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

Marker: 836.713427 MHz 30.37 dBm

Level [dBm]



TX: 30MHz - 1GHz

Spurious emission limit -13dBm

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

EUT: i210

Customer:: SmarySynch

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

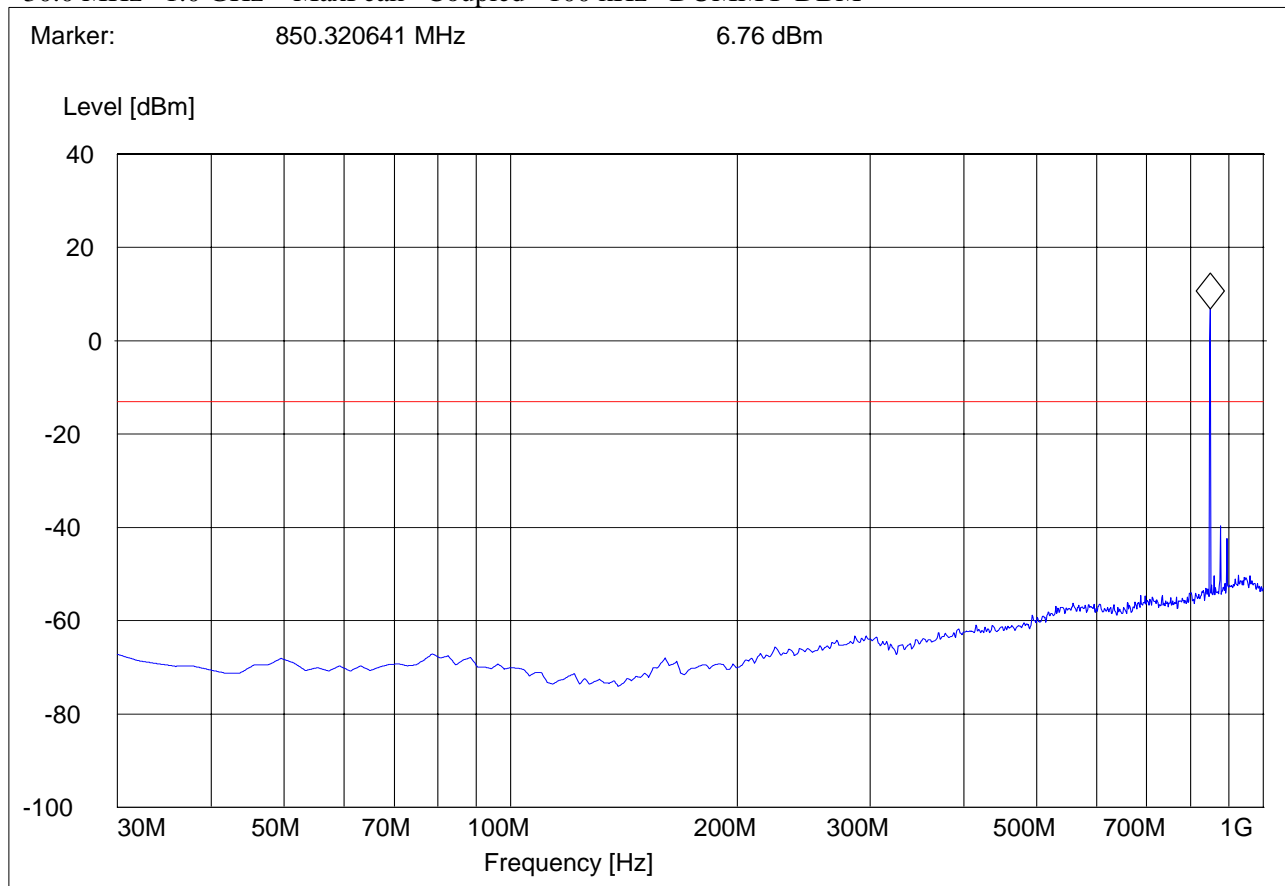
Test Engineer: Chris

Voltage: AC + Internal Battery

Comments: TT@288°; ANT @148cm

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: i210

Customer:: SmarySynch

Test Mode: GSM 850

ANT Orientation: V

EUT Orientation: V

Test Engineer: Chris

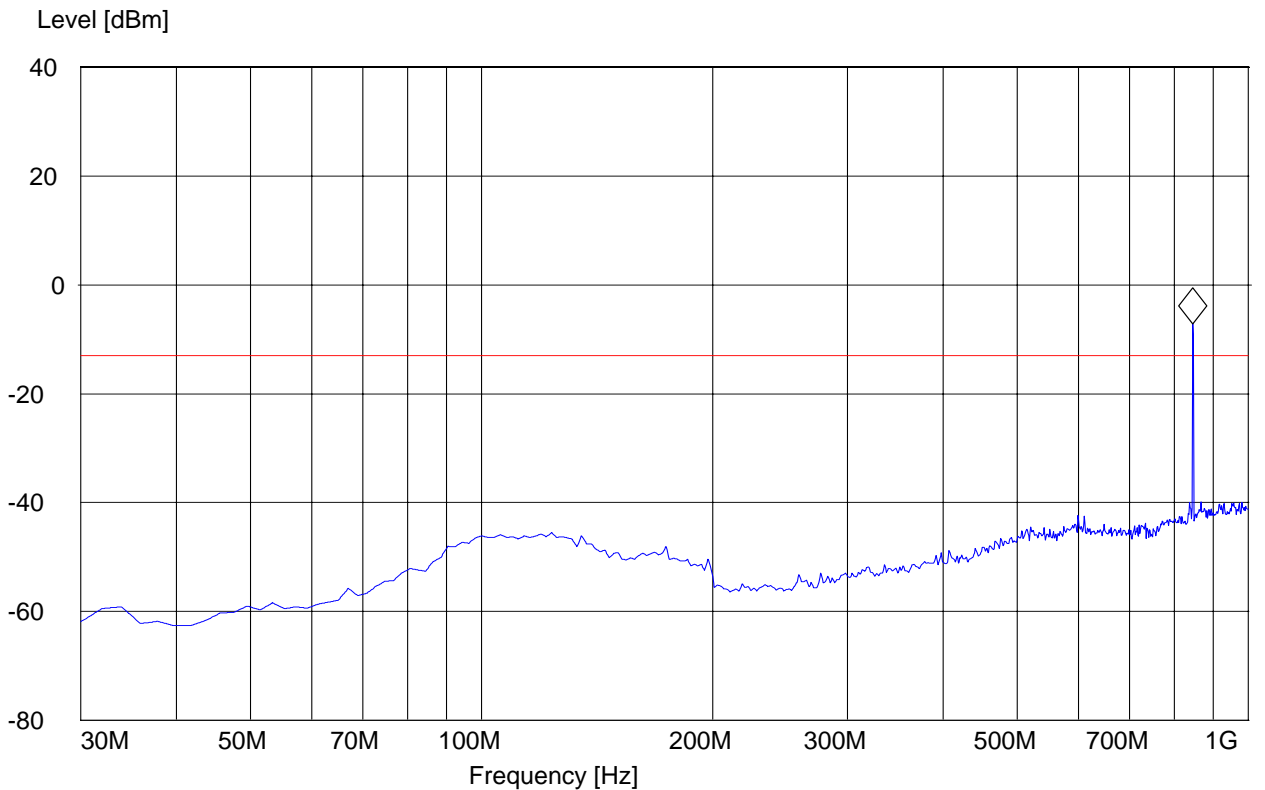
Voltage: AC + Internal Battery

Comments: TT@288°; ANT @148cm

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

Marker: 846.432866 MHz -7.14 dBm



RADIATED SPURIOUS EMISSIONS (GSM-850)**1GHz – 1.58GHz**

Spurious emission limit –13dBm

Note: This plot is valid for horizontal, vertical polarization and channels(worst-case plot)

EUT: i210

Customer:: SmartSynch

Test Mode: GSM 850

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

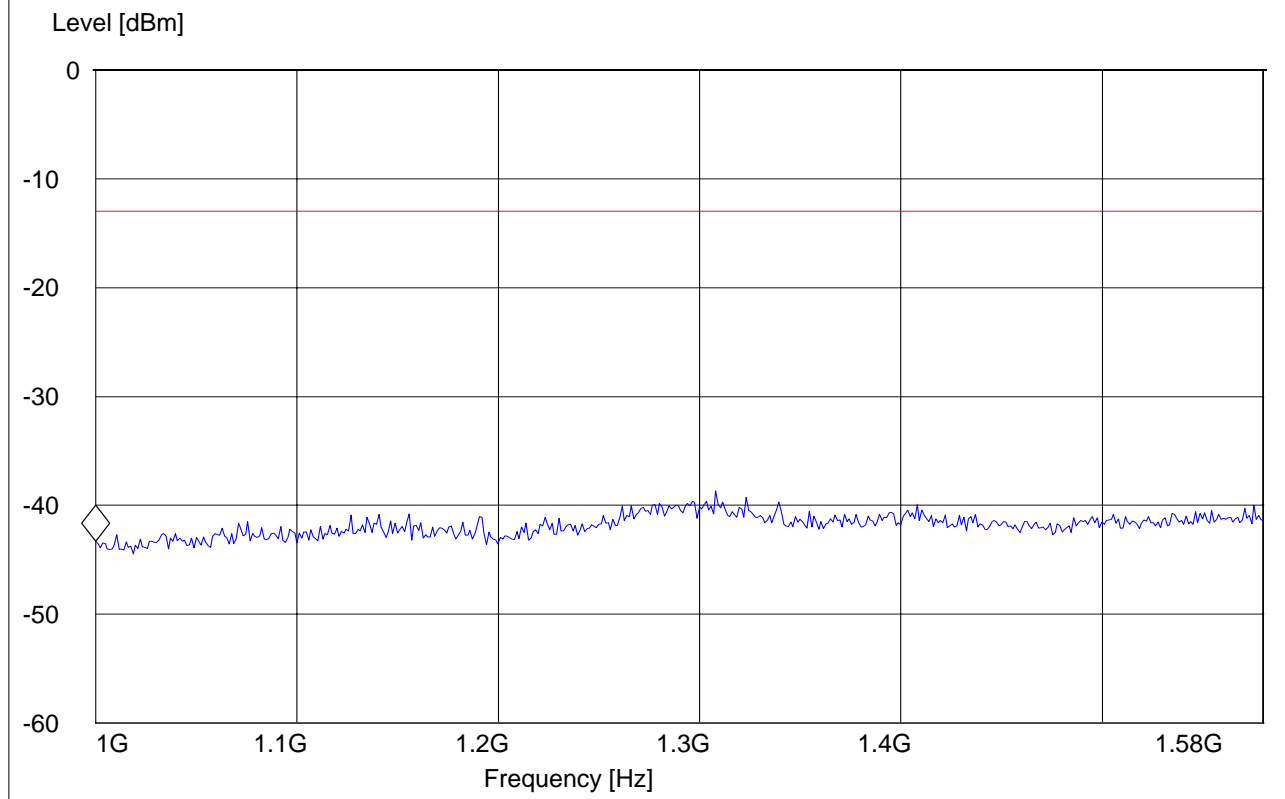
Voltage: AC + Internal Battery

Comments:

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

Marker: 1 GHz -43.31 dBm



RADIATED SPURIOUS EMISSIONS (GSM-850)**1.58GHz – 3GHz**

Spurious emission limit –13dBm

Note: This plot is valid for horizontal, vertical polarization and channels (worst-case plot)

EUT: i210

Customer:: SmartSynch

Test Mode: GSM 850

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

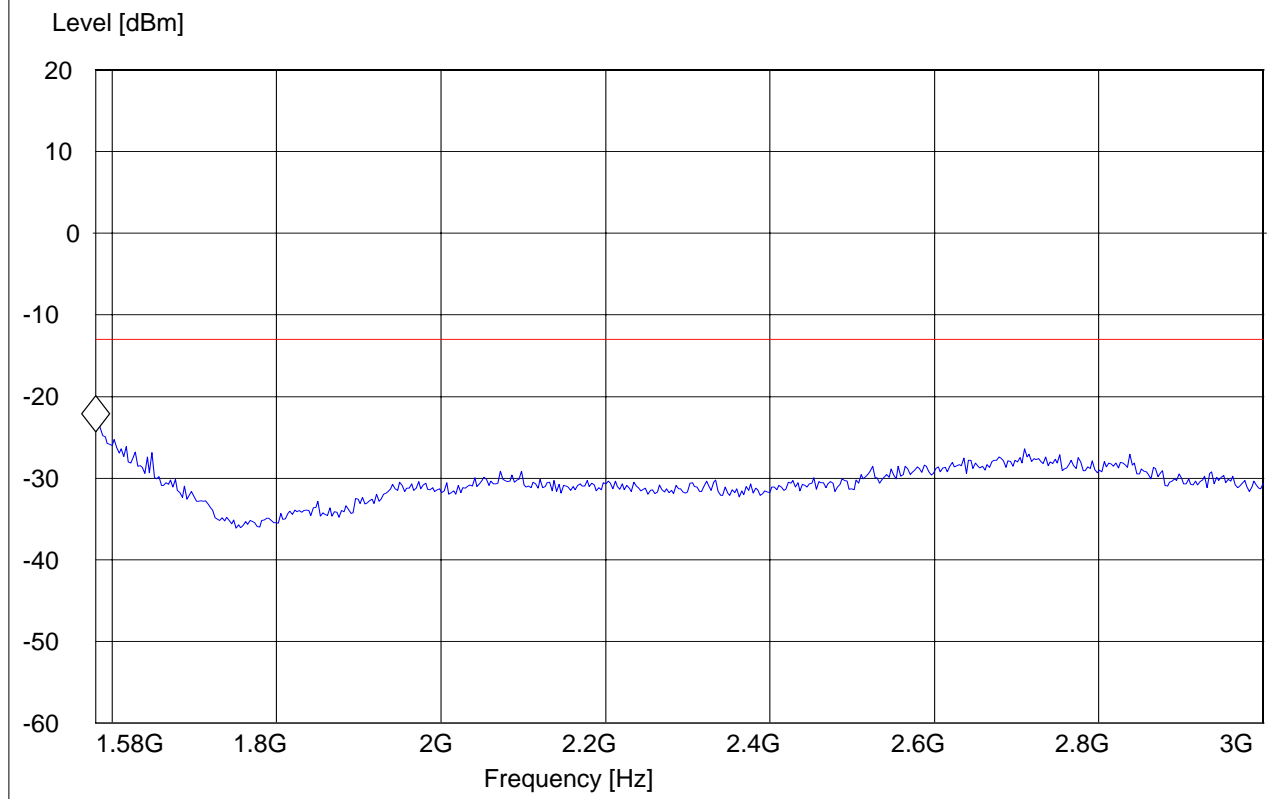
Voltage: AC + Internal Battery

Comments:

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

Marker: 1.58 GHz -24.29 dBm



RADIATED SPURIOUS EMISSIONS (GSM-850)**3 – 9GHz**

Spurious emission limit –13dBm

Note: This plot is valid for horizontal, vertical polarization and channels(worst-case plot)

EUT: i210

Customer:: SmartSynch

Test Mode: GSM 850

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

Voltage: AC + Internal Battery

Comments:

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

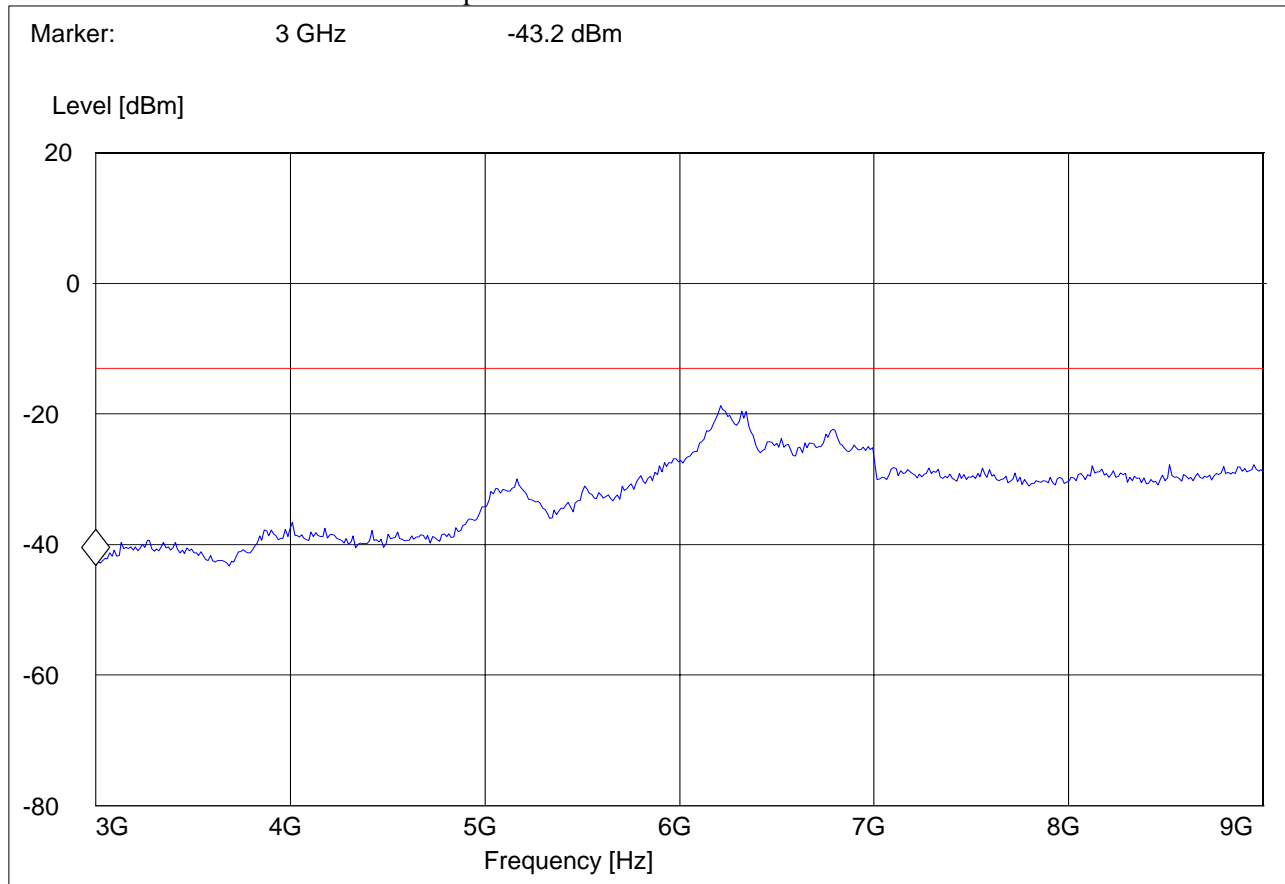
Short Description: FCC 24 1GHz-8GHz

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

3.0 GHz 9.0 GHz MaxPeak Coupled 1 MHz DUMMY-DBM

Marker: 3 GHz -43.2 dBm



4.2.4.3 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						

4.2.4.4 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: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: H

EUT Orientation: V

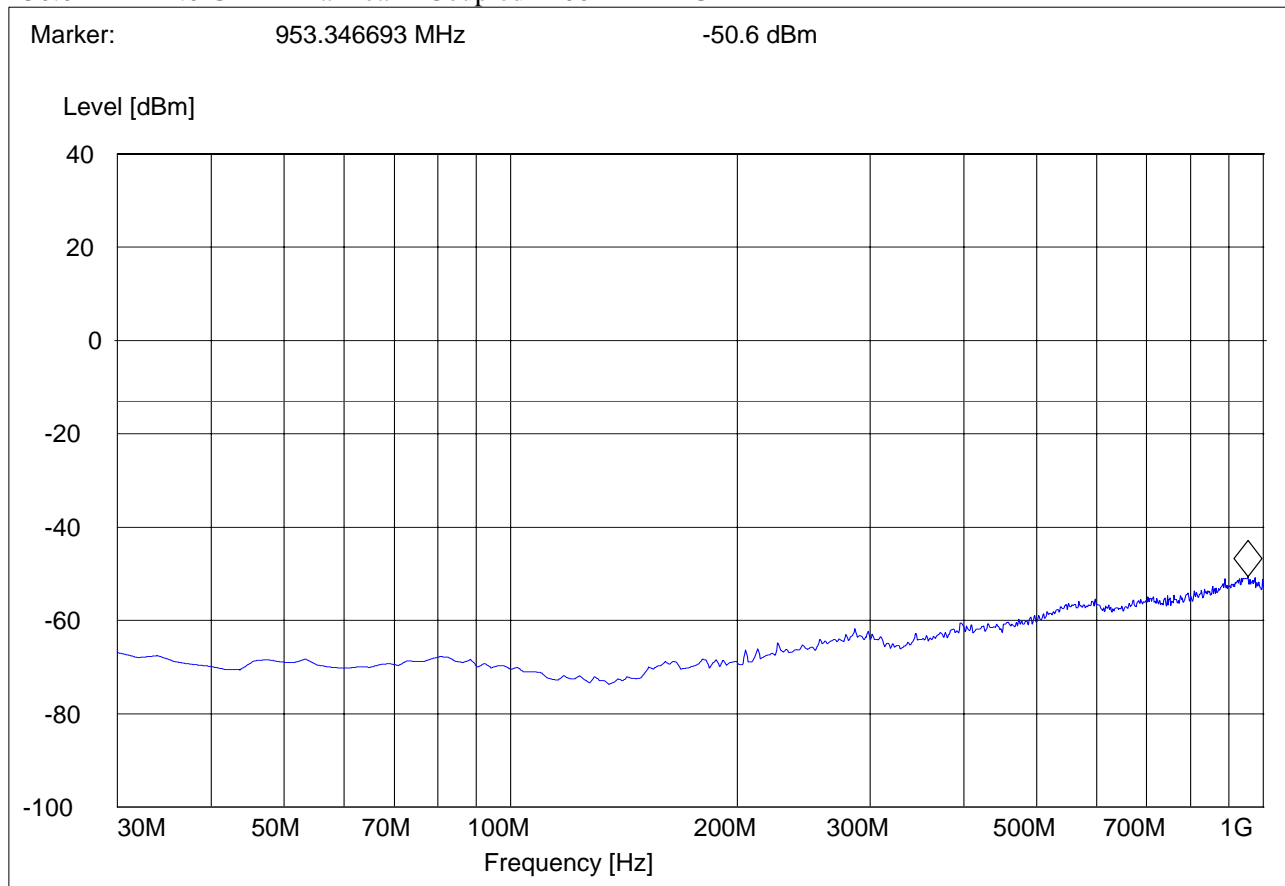
Test Engineer: Marc

Voltage: AC + Internal Battery

Comments:

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

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
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: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

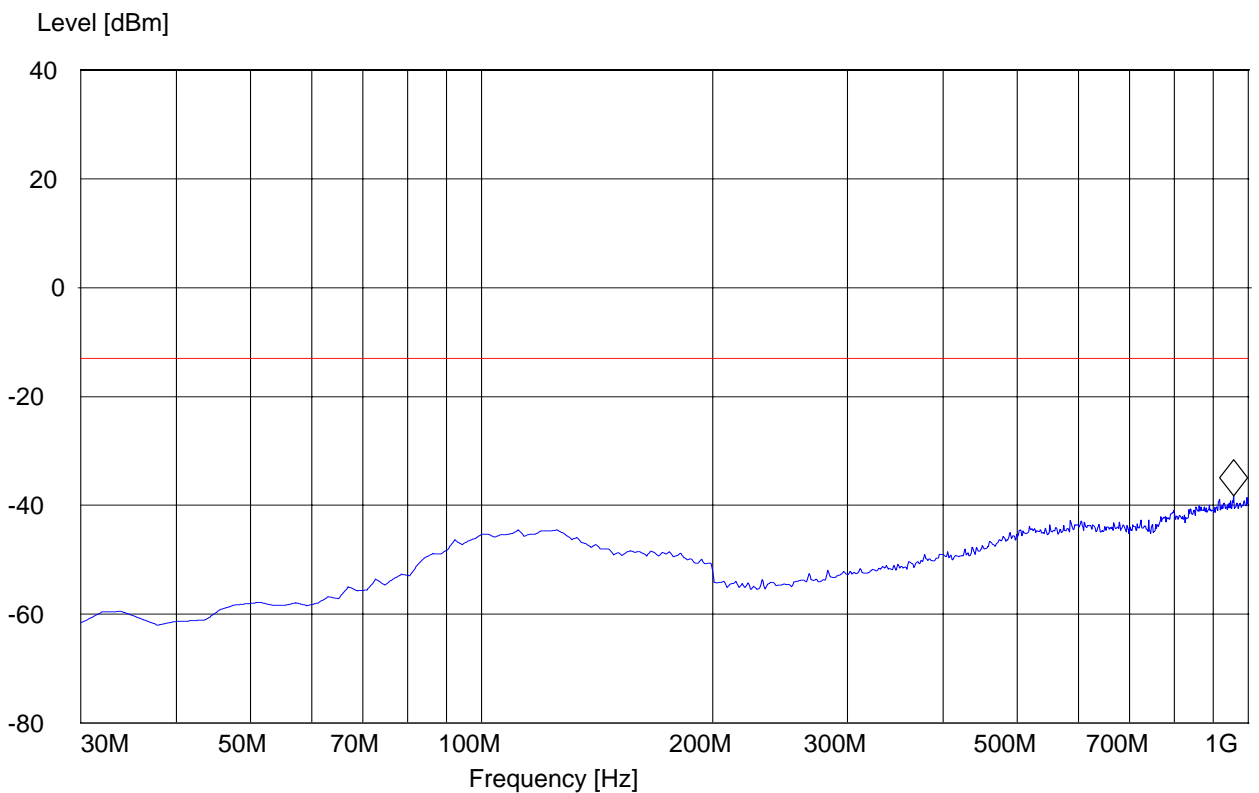
Voltage: AC + Internal Battery

Comments:

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

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

Marker: 957.234469 MHz -38.23 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: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

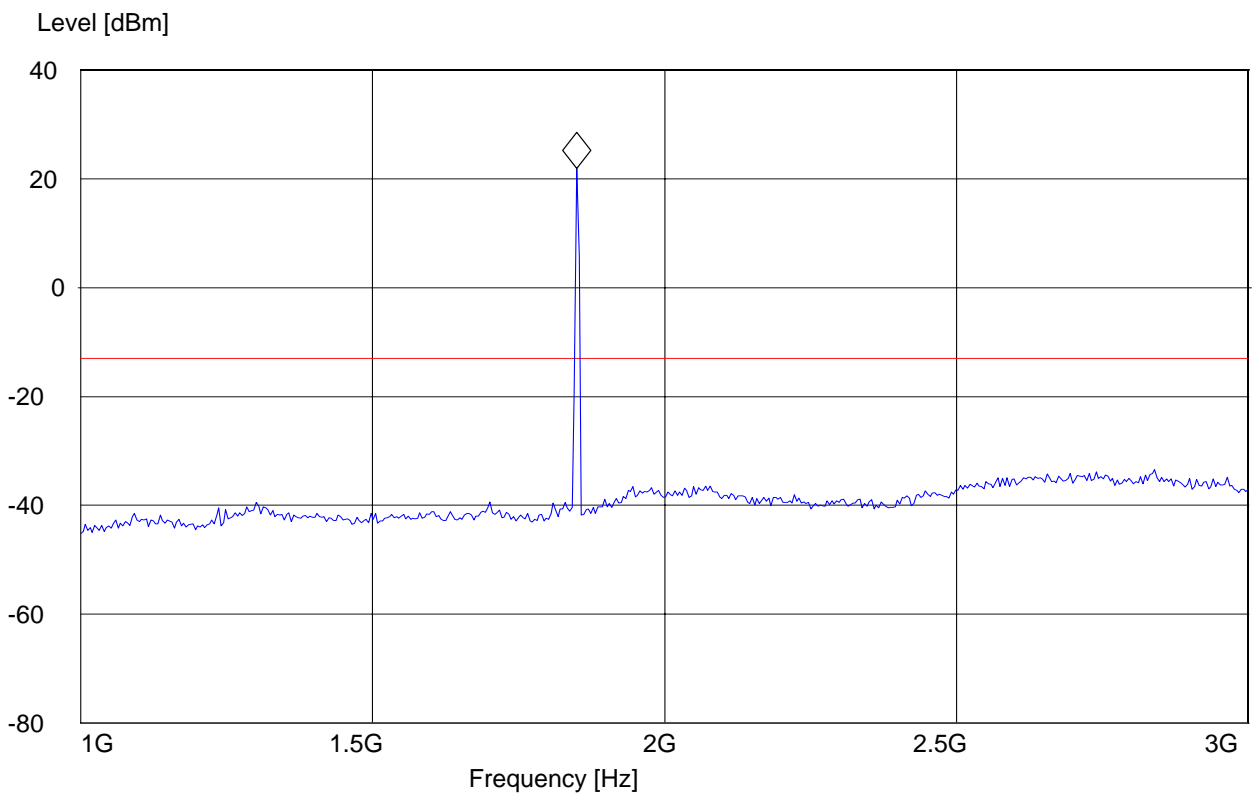
Voltage: AC + Internal Battery

Comments:

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

Marker: 1.849699399 GHz 21.93 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: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

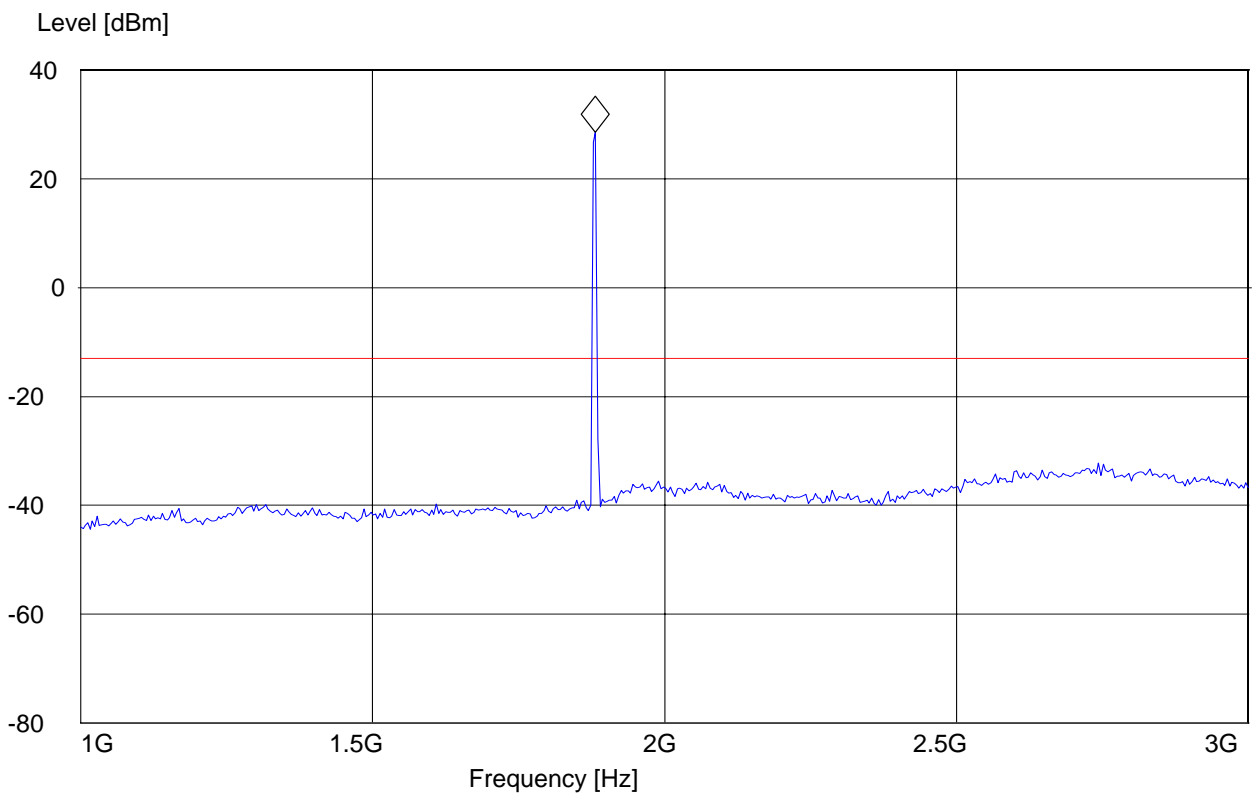
Voltage: AC + Internal Battery

Comments:

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

Marker: 1.881763527 GHz 28.54 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: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

Voltage: AC + Internal Battery

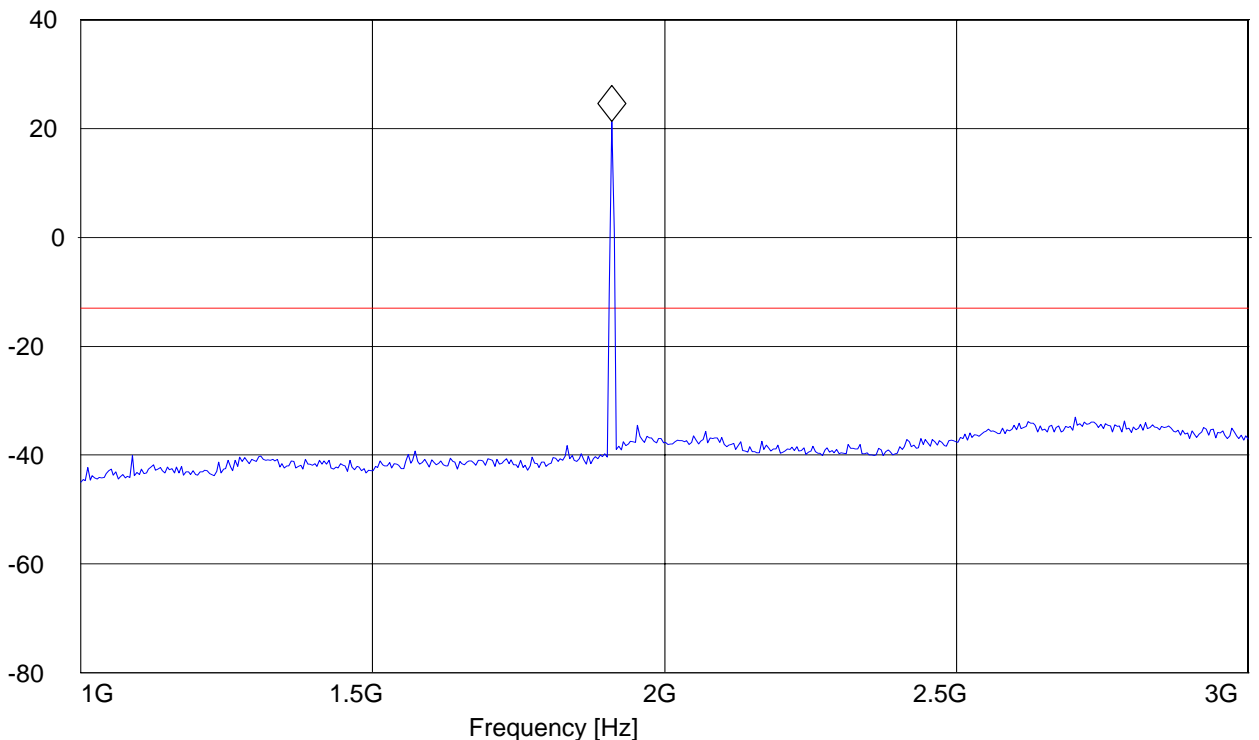
Comments:

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

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

Marker: 1.909819639 GHz 21.25 dBm

Level [dBm]



RADIATED SPURIOUS EMISSIONS (PCS 1900)**3GHz – 18GHz**

Spurious emission limit –13dBm

EUT: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

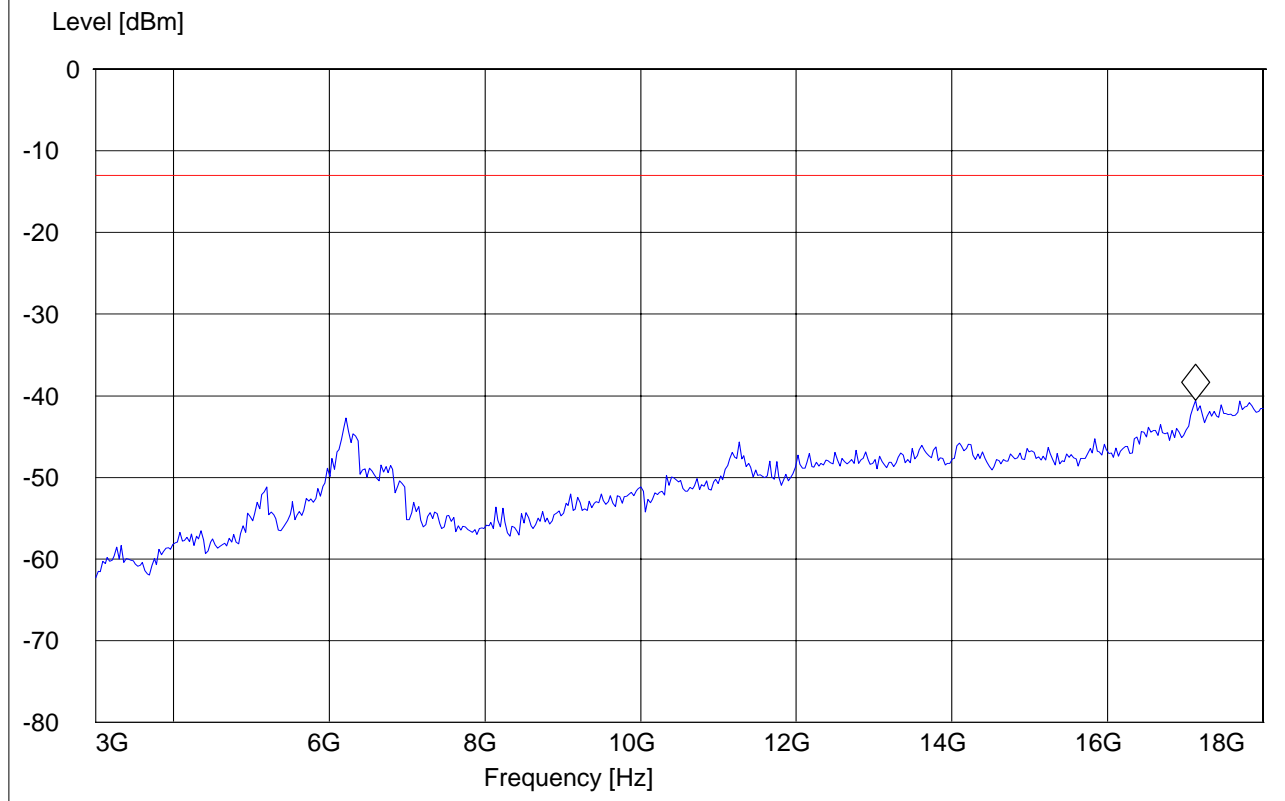
Voltage: AC + Internal Battery

Comments:

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

Marker: 17.128256513 GHz -40.57 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: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

Test Engineer: Marc

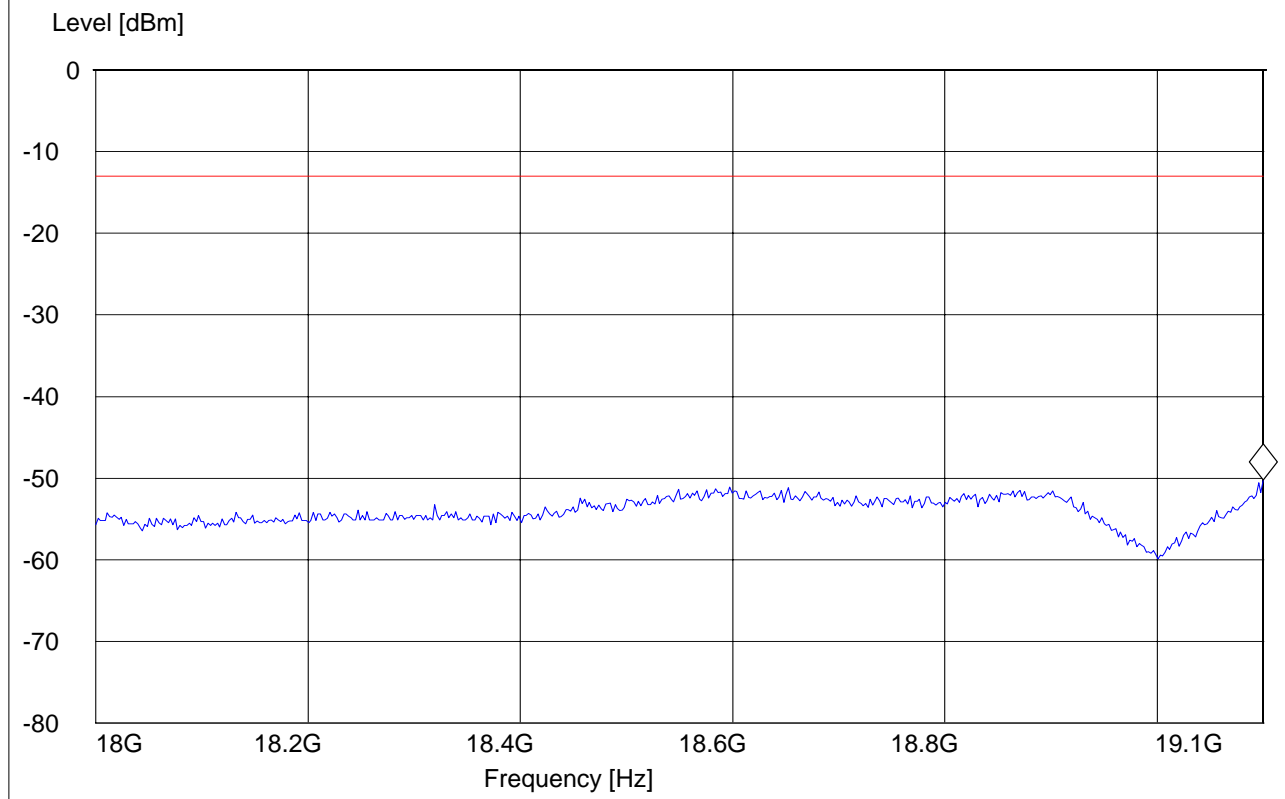
Voltage: AC + Internal Battery

Comments:

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

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

Marker: 19.1 GHz -50.2 dBm



4.3 AC LINE CONDUCTED EMISSIONS

§15.207 revised as of Aug. 20, 2002

NOTE: Test setup should be according ANSI C63.4 (Page 30/36). Both transmit and receive must be tested. For transmit test the channel with the highest power. For receive test the channel that produce worst radiated emission level only.

(Please do not repeat if already covered under part 24 or 15.247)

	Frequency (MHz)	
Frequency Range	150KHz – 30MHz	
LISN Setting	Result Saved	Result (Fail/Pass)
TRANSMIT MODE		
Line	TXLISN-L	Pass
Neutral	TXLISN-N	Pass

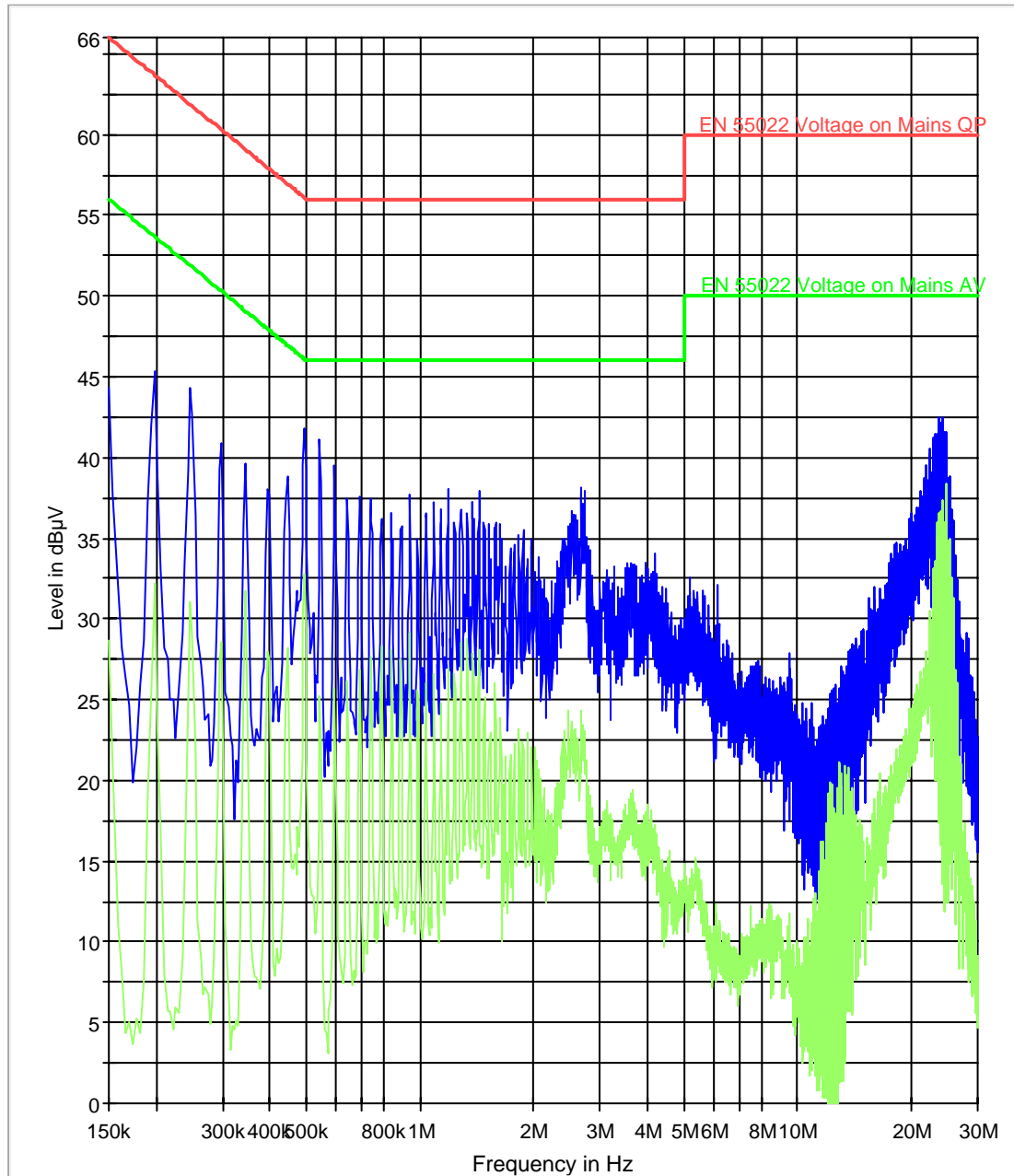
Technical specification : 15.107 & RSS-GEN (7.2.2) Limit

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 to .5	66 to 56	56 to 46
.5 to 5	56	46
5 to 30	60	50

Note: Per Section 15.107(d) only performed if device is normally connected to the AC mains either by an external AC adaptor or DC supply. In this case AC conducted emissions is to be performed on the external AC adaptor or DC supply. If the device uses a rechargeable adaptor and the device could be used while charging, conducted measurements must be perform. If the device receives its power from a host device, conducted measurements are to be performed on the host device. Battery operated devices are exempt from testing even if an external DC supply is being used.

GSM 850**Line**

CISPR 22 Mains Conducted - L



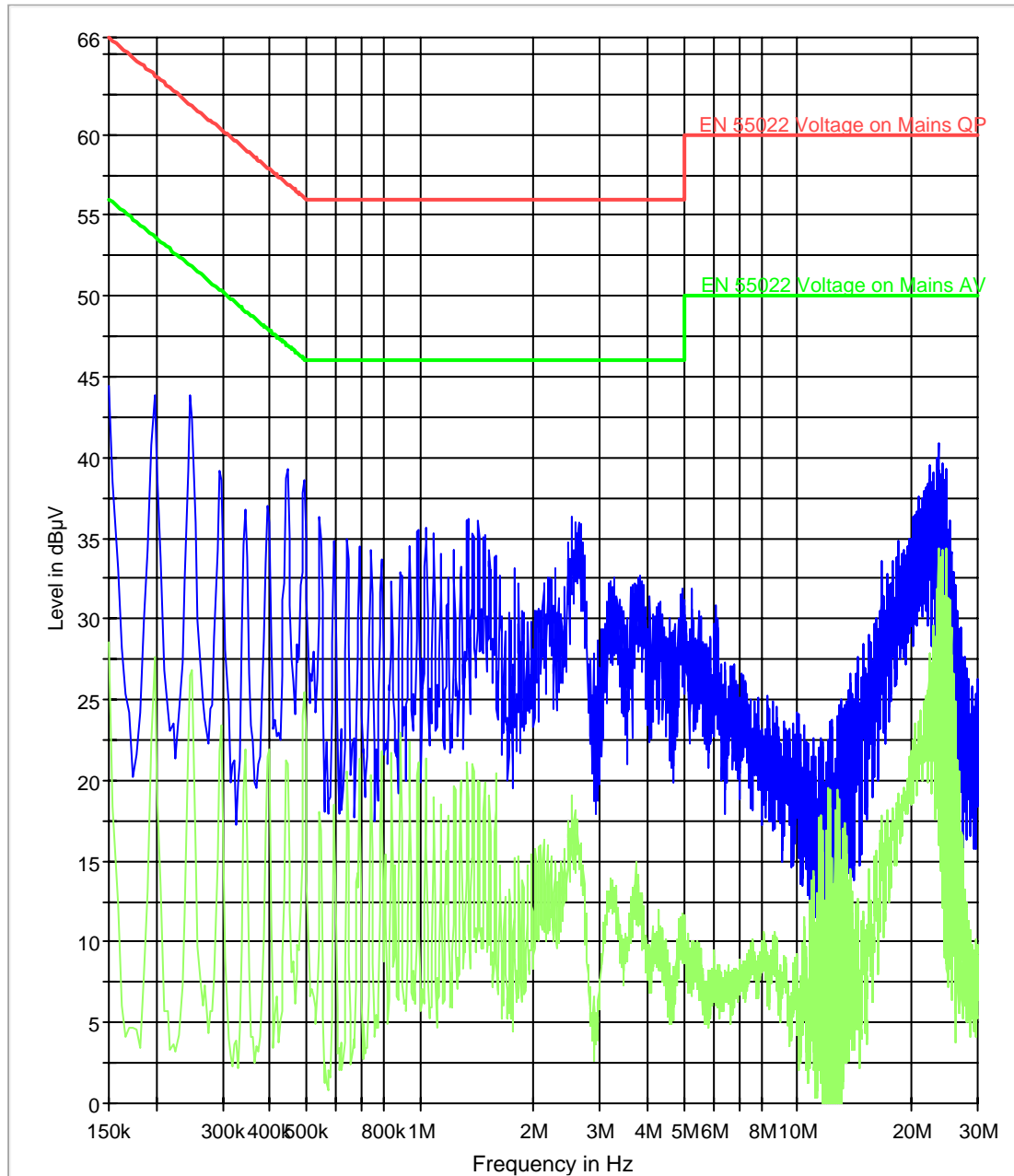
EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2

GSM 850

Neutral

CISPR 22 Mains Conducted - N

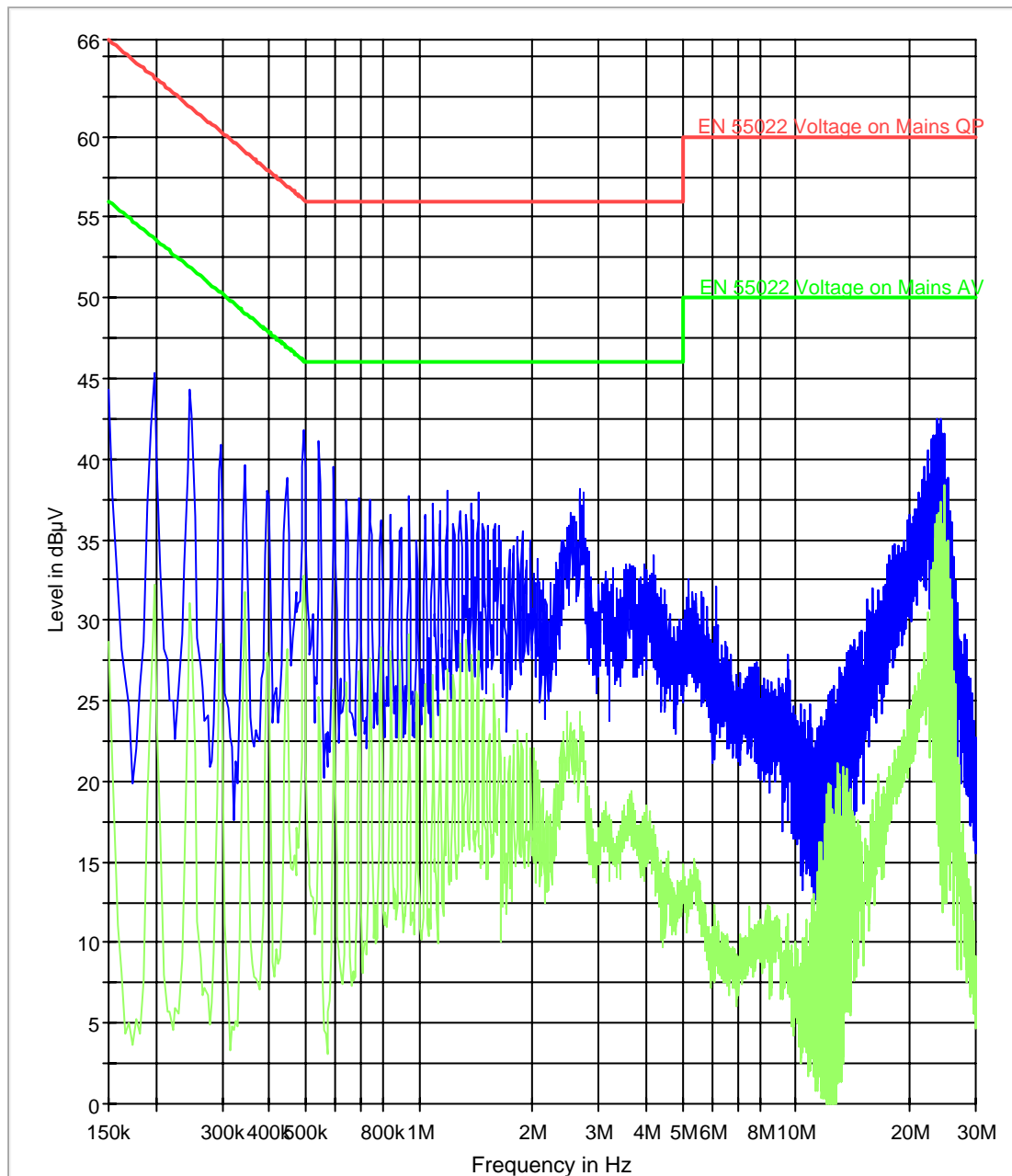


— EN 55022 Voltage on Mains QP.LimitLine
— Preview Result 1

— EN 55022 Voltage on Mains AV.LimitLine
— Preview Result 2

GSM 1900**Line**

CISPR 22 Mains Conducted - L



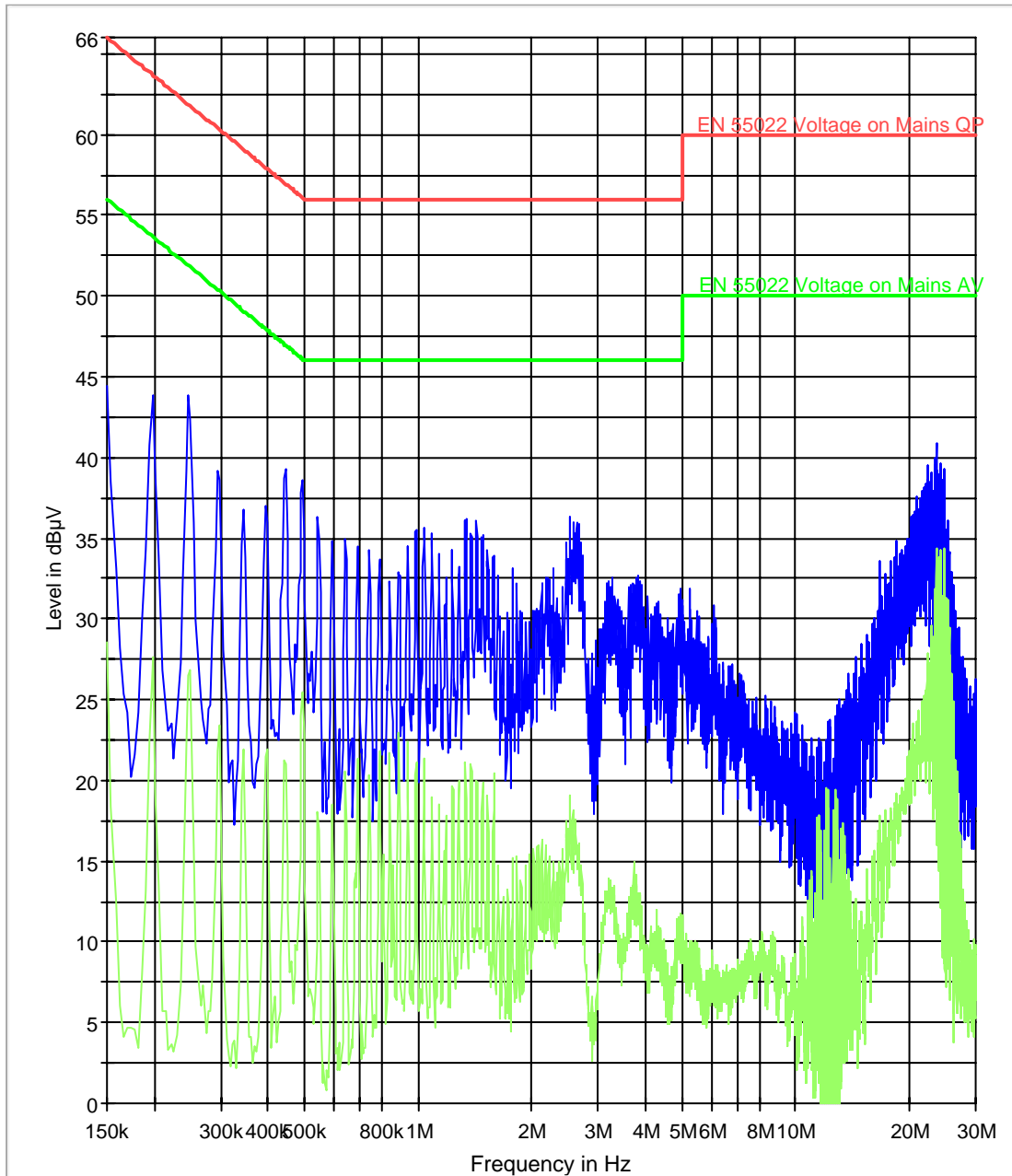
EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2

GSM 1900

Neutral

CISPR 22 Mains Conducted - N



EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2

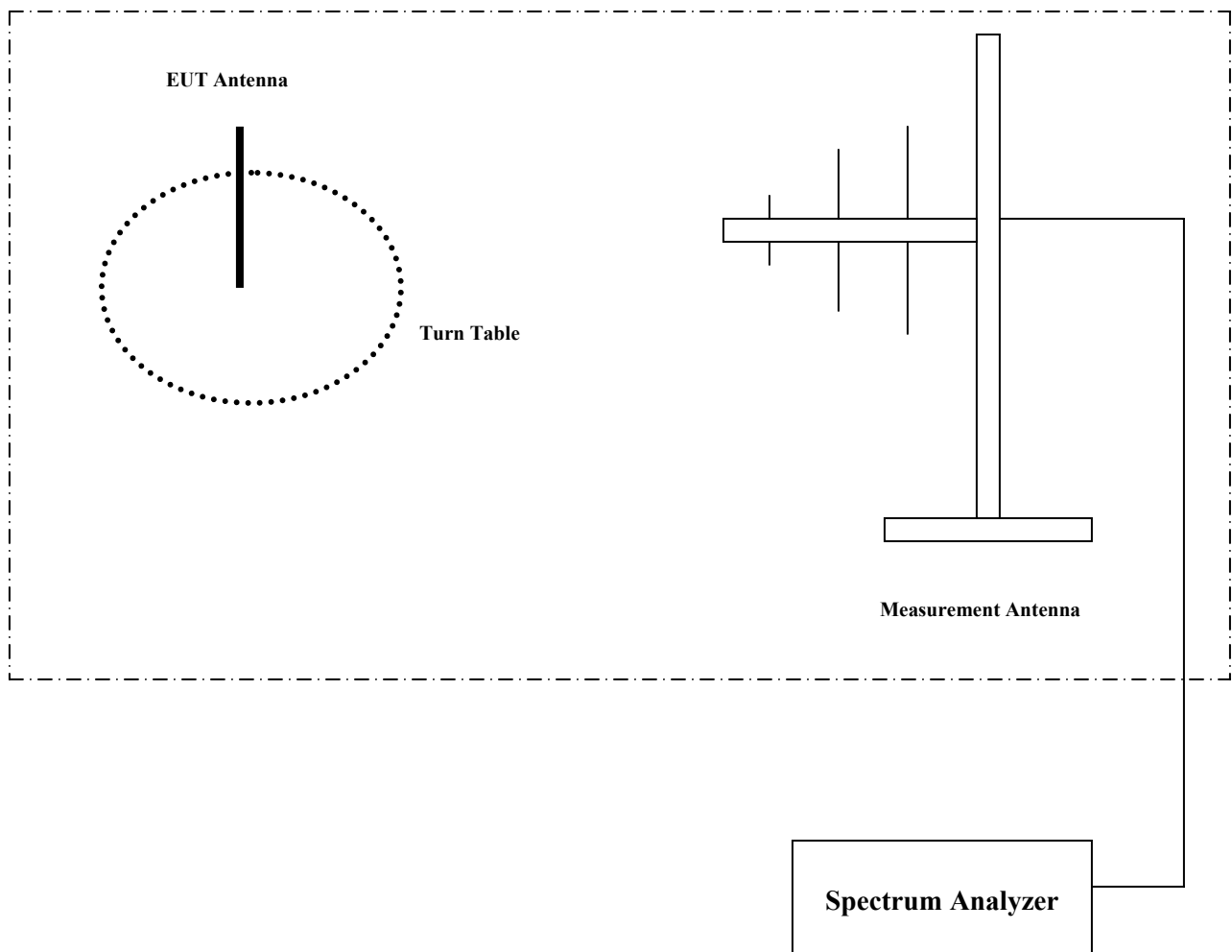
5 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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 2010	2 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

6 BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER



Conducted Testing