



FCC Test Report

For
Sentrilock, LLC

Model:
Remote Access Device 3G

Product Description:
Cellular-enabled Wireless Smartcard Reader

FCC ID: W9T-P10305

47 CFR Part 22, 24

TEST REPORT #: EMC-SENTR-002-16001-FCC-22-24-Rev1
DATE: Nov. 30, 2016



FCC Recognized

A2LA Accredited

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1 Assessment

The following equipment as further described in section 3 of this test report was evaluated against the applicable criteria specified in FCC CFR47 Parts 22 and 24.

No deviations were ascertained during the course of the tests performed.

Company	Description	Model
SentriLock, LLC	Cellular-enabled Wireless Smartcard Reader	Remote Access Device 3G

Report reviewed by:

Nov 30, 2016	Compliance	Kris Lazarov (EMC Engineer)	Kris Lazarov	Digitally signed by Kris Lazarov DN: cn=Kris Lazarov, o, ou, email=kris.lazarov@cetecom.c om, c=US
Date	Section	Name	Signature	

Responsible for the Report:

Nov 30, 2016	Compliance	James Donnellan (Sr. EMC Engineer)	James Donnellan	Digitally signed by James Donnellan DN: cn=James Donnellan, c=US, o=Cetecom Inc., ou=Compliance, email=james.donnellan@cetecom. com Date: 2016.11.30 13:27:29 -08'00'
Date	Section	Name	Signature	

The test results of this test report relate exclusively to the test item specified in Section 3.
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 CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
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Telephone:	+1 (408) 586 6200
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Compliance Manager:	Franz Engert
Responsible Project Leader	Laith Raman

2.2 Identification of the Client

Client Firm/Name:	Sentrilock, LLC
Street Address:	7701 Service Center Dr
City/Zip Code	West Chester, OH 45069
Country	USA
Contact Person:	Cris Hunt
Phone No.	513-644-1715
e-mail:	chunt@sentrilock.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name / Description:	Cellular-enabled Wireless Smartcard Reader
Model Number:	Remote Access Device 3G
FCC-ID :	W9T-P10305
Product Description:	Cellular-enabled Wireless Smartcard Reader
Technology / Type(s) of Modulation:	GSM/(E)GPRS 850/1900 WCDMA FDD II/V
Integrated Module Info:	Cinterion EHS5-US (FCC ID: QIPEHS5-US/ IC ID: 7830A-EHS5US) GSM/GPRS/EDGE/UMTS/HSPA Module
Operating Frequency Ranges (MHz)	GSM 850: 824-849 MHz GSM 1900: 1850-1910 MHz WCDMA FDD II: 824-849 MHz WCDMA FDD V: 1850-1910 MHz
Antenna info:	Internal antenna. Antenova Reflexus Documented Maximum Antenna Gain obtained from Antenna Manufacturer datasheet: 2.0 dBi @ 850 MHz, 3.7 dBi @ 1900 MHz
Max. Output Powers:	Manufacturer Declared Maximum RMS powers at antenna port. Based on the operational description and Tune Up procedure. GPRS850 = 35 dBm ERP (3.16 Watts) GPRS1900 = 33.7 dBm EIRP (2.34 Watts) FDD V = 26.5 dBm (0.45 Watts) FDD II = 28.2 dBm (0.66 Watts)
Rated Operating Voltage Range:	3.0 V (Low) / 3.7 V (Nom) / 4.2 V (High)
Rated Operating Temperature Range:	-40°C to 85°C
Test Sample Status:	Production

3.2 Identification of the Equipment under Test (EUT)

EUT #	Identification (IMEI #)	HW Version	SW Version	Notes/Comments
1	357330051688653	.0	02.03.00	Radiated Sample
2	357330051688315	.0	02.03.00	Conducted Sample

3.3 Identification of Accessory equipment

AE #	Type	Model	Manufacturer	Serial Number	Notes
1	5V USB Power Adapter	SKB0501000PU	-	-	Used to charge internal battery when needed

3.4 Dates of Testing:

June 19, 2016 – Aug, 5 2016

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to evaluate the compliance of the EUT against the relevant requirements specified in the Code of Federal Regulations Title 47 parts 22, 24 while leveraging the modular grant FCC ID: QIPEHS5-US.

5 Measurements

5.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=1.

Radiated measurement

9 kHz to 30MHz	±2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	±2.0 dB (Biconilog Antenna)
1 GHz to 40 GHz	±2.3 dB (Horn Antenna)

Conducted measurement

150 kHz to 30 MHz	±0.7 dB (LISN)
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RF conducted measurement	±0.5 dB
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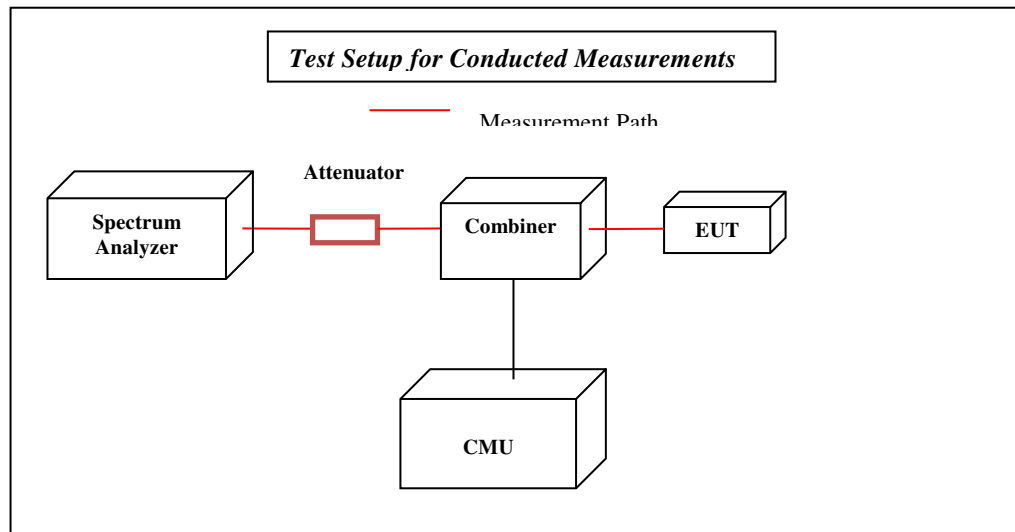
5.2 Environmental Conditions during Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25°C
- Relative humidity: 40-60%

5.3 Conducted measurements

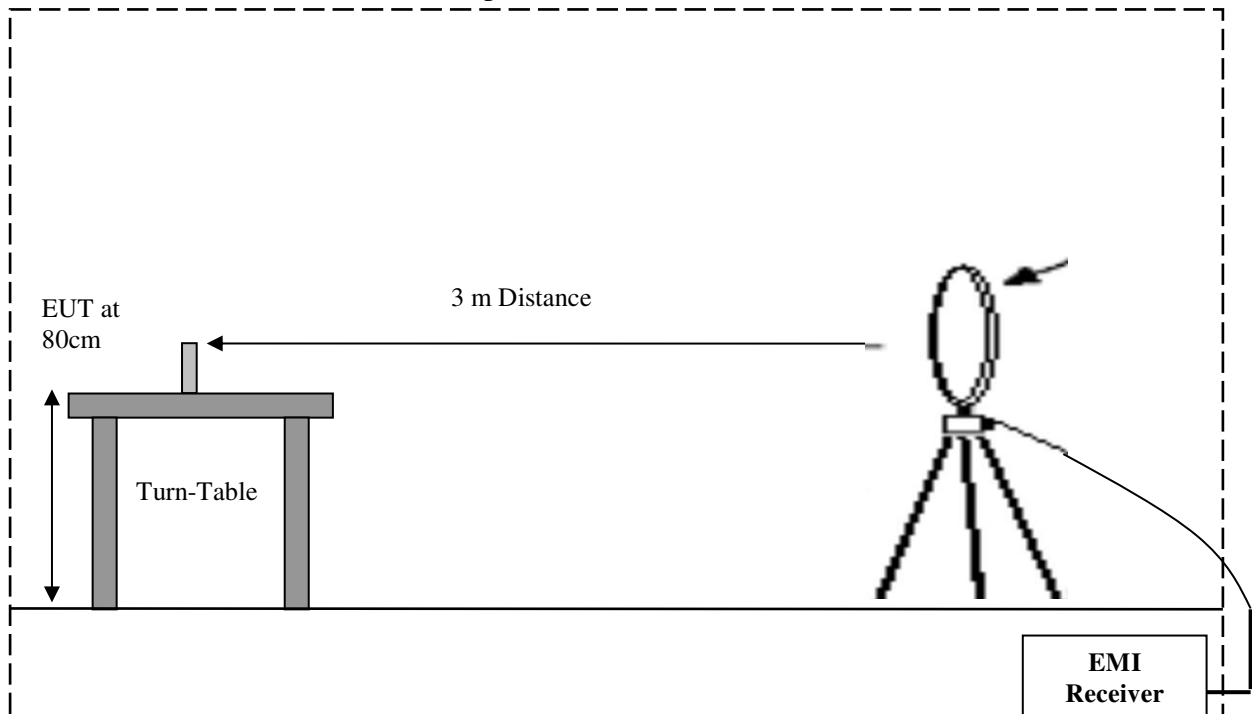
Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v02r02 – “Measurement Guidance for Certification of Licensed Digital Transmitters” and according to relevant parts of TIA-603C 2004 as detailed below.



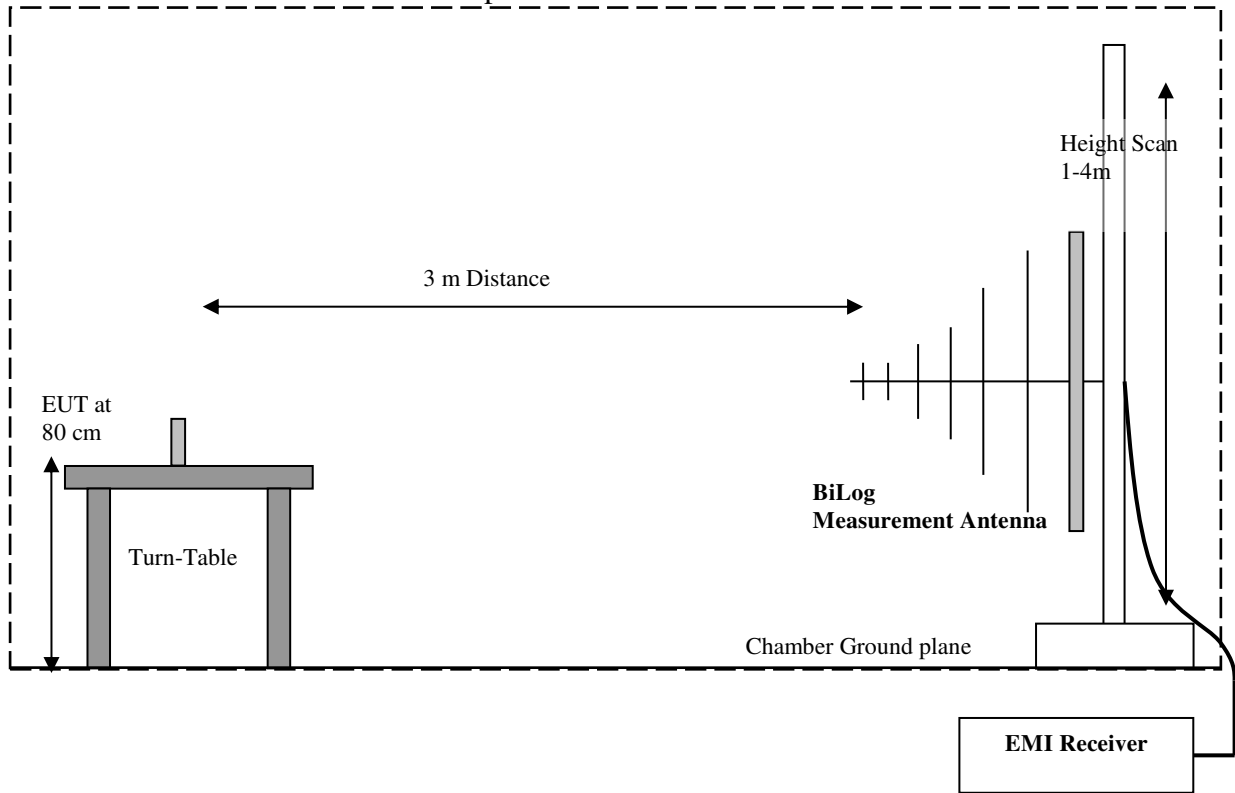
5.4 Radiated Measurement

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

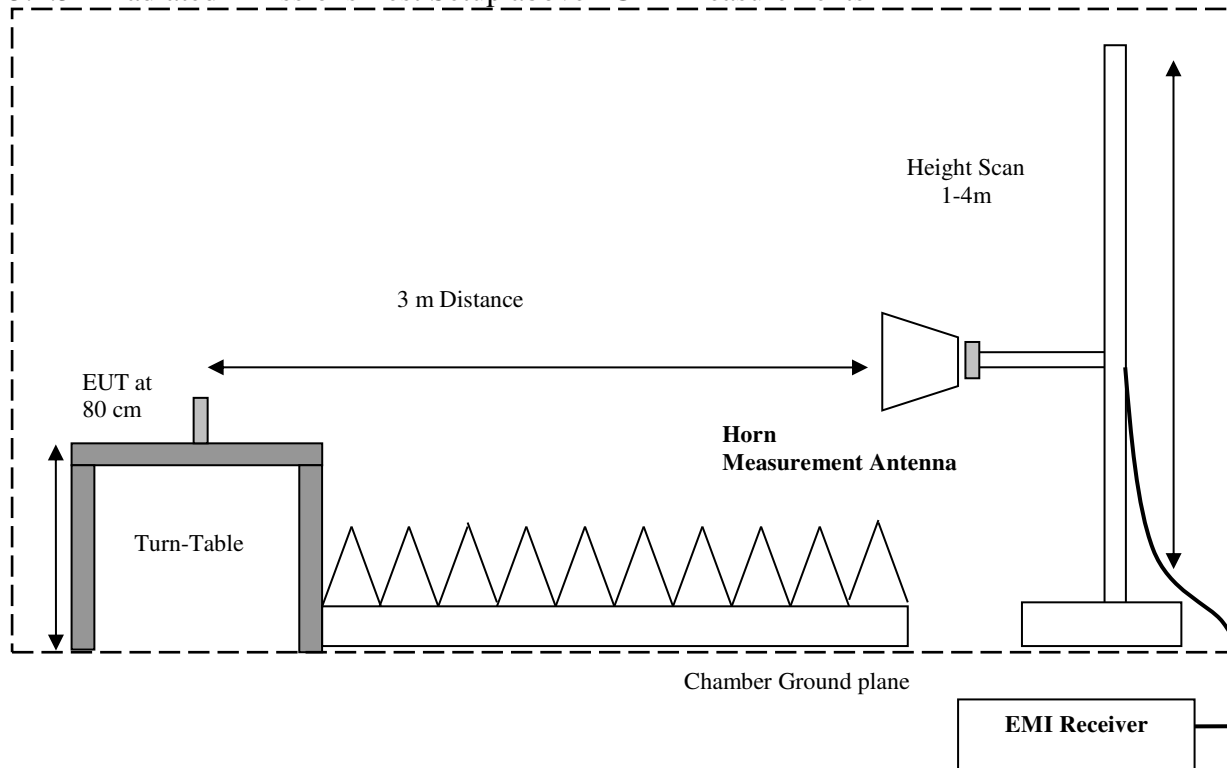
5.4.1 Radiated Emissions Test Setup below 30MHz Measurements



5.4.2 Radiated Emissions Test Setup 30MHz-1GHz Measurements



5.4.3 Radiated Emissions Test Setup above 1GHz Measurements



5.5 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

- Measured reading in dB μ V
- Cable Loss between the receiving antenna and SA in dB and
- Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

$$\text{FS (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} - \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

6 Summary of Measurement Results

6.1 FCC 22: 850MHz Band

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §22.913 (a)	RF Output Power	Nominal	GSM & UMTS	■	□	□	□	Complies (See Note 1)
§2.1055 §22.355	Frequency Stability	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1049 §22.917(b)	Occupied Bandwidth	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1051 §22.917	Band Edge Compliance	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1051 §22.917	Conducted Spurious Emissions	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1053 §22.917	Radiated Spurious Emissions	Nominal	GSM & UMTS	■	□	□	□	Complies

Note: NA= Not Applicable; NP= Not Performed.

Note 1: Verification done on mid channel for each band, low and high channel measurements leveraged from module certification.

Note 2: Leveraged from module certification.

6.2 FCC 24: 1900 MHz Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §24.232 (a)	RF Output Power	Nominal	GSM & UMTS	■	□	□	□	Complies (See Note 1)
§2.1055 §24.235	Frequency Stability	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1049 §24.238(b)	Occupied Bandwidth	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1051 §24.238	Band Edge Compliance	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1051 §24.238	Conducted Spurious Emissions	Nominal	GSM & UMTS	□	□	□	■	Note 2
§2.1053 §24.238	Radiated Spurious Emissions	Nominal	GSM & UMTS	■	□	□	□	Complies

Note: NA= Not Applicable; NP= Not Performed.

Note 1: Verification done on mid channel for each band, low and high channel measurements leveraged from module certification.

Note 2: Leveraged from module certification.

6.3 Dates of Testing:

June 19, 2016 – Aug, 5 2016

7 RF Power Output Verification (Conducted)

7.1 Reference:

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232

7.2 Limits:

FCC Part 22.913 (a)

(a) The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts (38.45dBm).

FCC Part 24.232 (c),(d),(e)

(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

(d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

(e) 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 instrument 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 for the emission in question over the full bandwidth of the channel.

7.3 Measurement Data:

GSM / UMTS

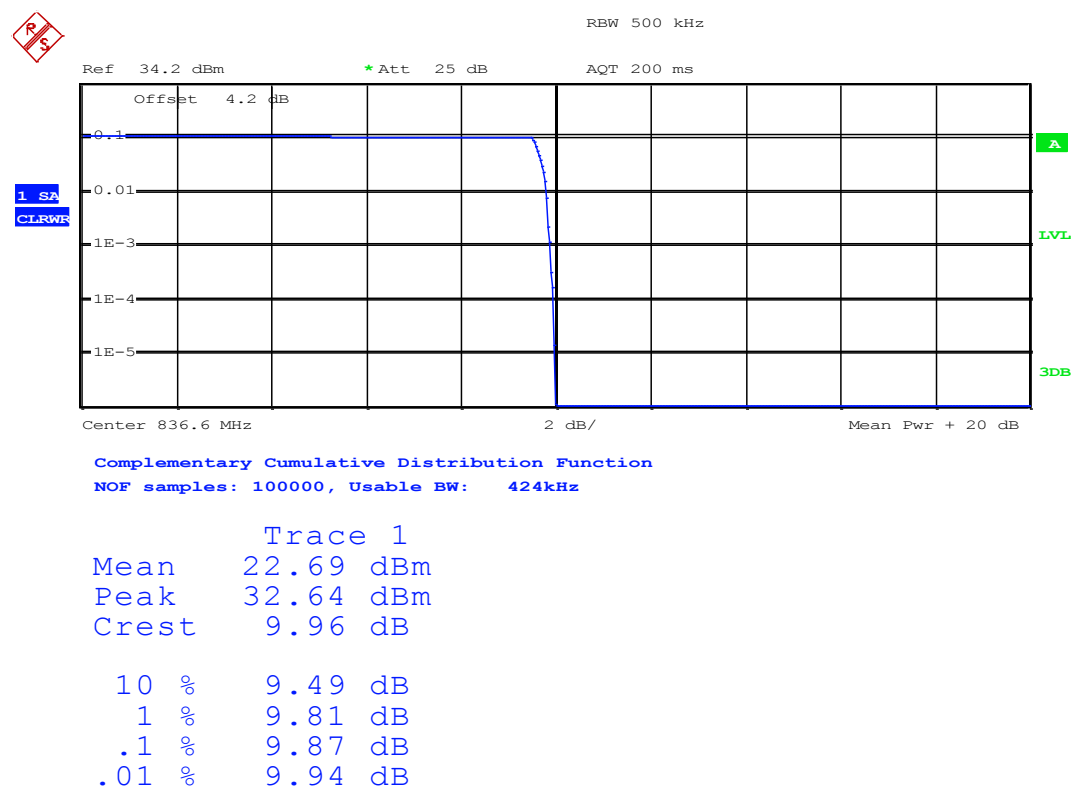
Frequency (MHz)	Modulation	Conducted Average Output Power at antenna port Per Data Sheet 1	Measured Conducted Burst Average 2 Output Power to Antenna Port	ERP / EIRP Calculated (2.0 dBi Gain at 850MHz / 3.7 dBi Gain at 1900MHz)
GSM 850 GPRS				
836.6 MHz	GMSK	33.0	31.7	33.7
GSM 1900 GPRS				
1880 MHz	GMSK	30	29.2	32.9
UMTS FDD II				
1880 MHz	QPSK	24.0	22.4	26.1
UMTS FDD V				
836.6 MHz	QPSK	24.0	23.5	25.5

Note: 1: Per EHS5-E/EHS5-US Hardware Interface Description EHS5_HID_v01.007c Date 2013-08-29

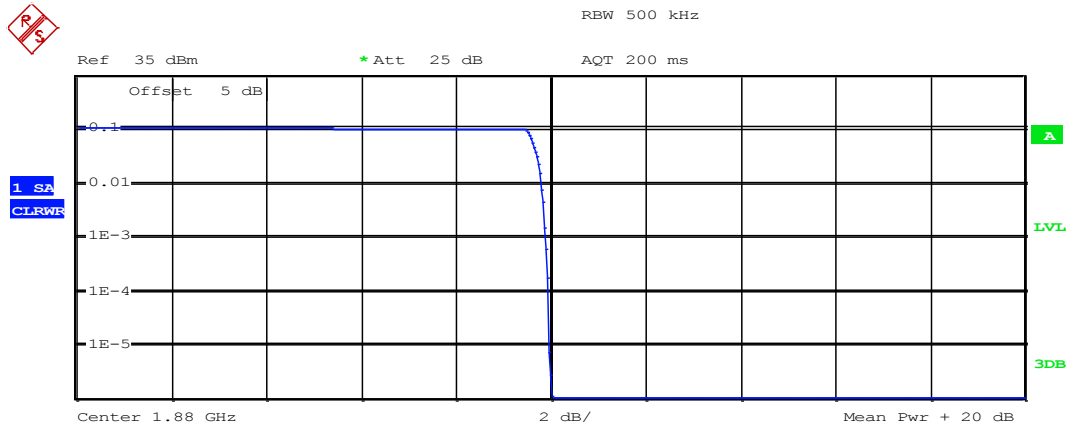
Note: 2: As the GPRS measurements below was done on 1 timeslot 9 dB is added to get the Burst Average Power.

7.4 Measurement Plots:

GSM850 Mid channel



GSM 1900 Mid Channel

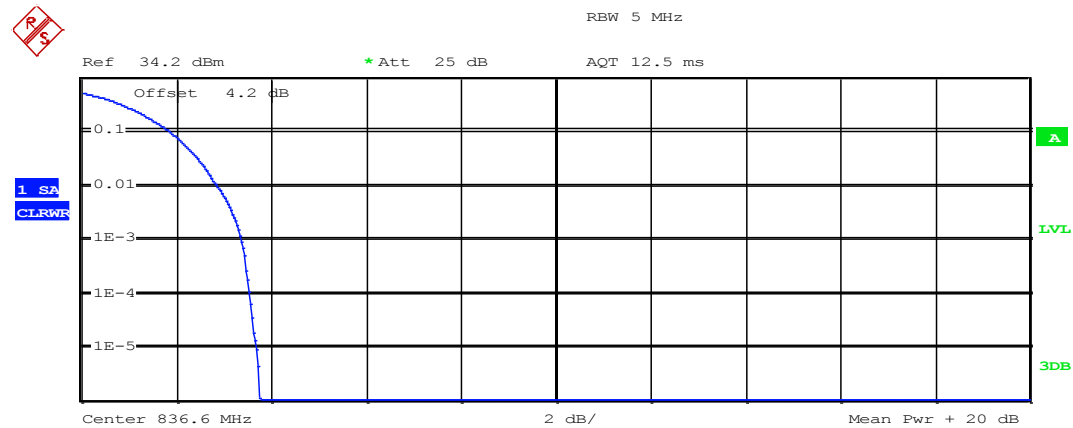


Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 424kHz

Trace 1
Mean 20.20 dBm
Peak 30.20 dBm
Crest 10.00 dB

10 % 9.49 dB
1 % 9.81 dB
.1 % 9.90 dB
.01 % 9.94 dB

FDD V Mid channel

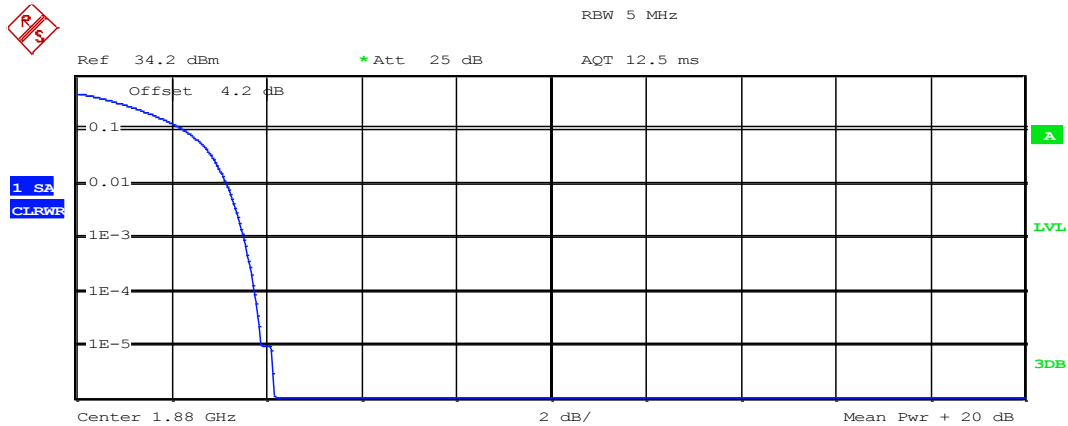


Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 7.1MHz

Trace 1
Mean 23.54 dBm
Peak 27.28 dBm
Crest 3.74 dB

10 % 1.83 dB
1 % 2.82 dB
.1 % 3.37 dB
.01 % 3.53 dB

FDD II Mid Channel



Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 7.1MHz

Trace 1
 Mean 22.36 dBm
 Peak 26.51 dBm
 Crest 4.15 dB

10 % 2.24 dB
 1 % 3.14 dB
 .1 % 3.53 dB
 .01 % 3.75 dB

8 Radiated Spurious Emissions

8.1 Reference

Measurement according to FCC: CFR 47 Part 2.1053; CFR Part 22.917; Part 24.238; Part 27.53; RSS-132 5.5; RSS-133 6.5; RSS-139 6.6, utilizing KDB 971168 D01 Power Meas License Digital Systems v02r02, and according to TIA-603C 2004- 2.2.12

Spectrum Analyzer Settings for FCC 22

Frequency Range	30MHz – 1 GHz	1 – 1.58 GHz	1.58 – 9 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

Spectrum Analyzer Settings for FCC 24 and 27

Frequency Range	30MHz – 1 GHz	1 – 2.7 GHz	2.7 – 18 GHz	18 – 19.1 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto	Auto

8.2 Limits:

FCC Part 22.917 (a) and Part 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 = (-13dBm)

8.3 Test conditions and setup:

Ambient Temperature (C)	EUT Set-Up #	EUT Operating Mode	Power Input
22.3	1	GPRS class 12	03 on 850MHz, 05 on 1900MHz
22.3	2	UMTS RMC 12.2k	All 1

8.4 Test plan

GPRS: maximum power measured on class 8 GPRS according to report on file for FCC-ID.

UMTS: maximum power measured on RMC12.2k according to report on file for FCC-ID.

Frequencies below 30MHz and frequencies above 18GHz have only been investigated for mid channel. For the frequency range between 1GHz and 18GHz low mid and high channel have been investigated.

8.5 Summary Measurement result:

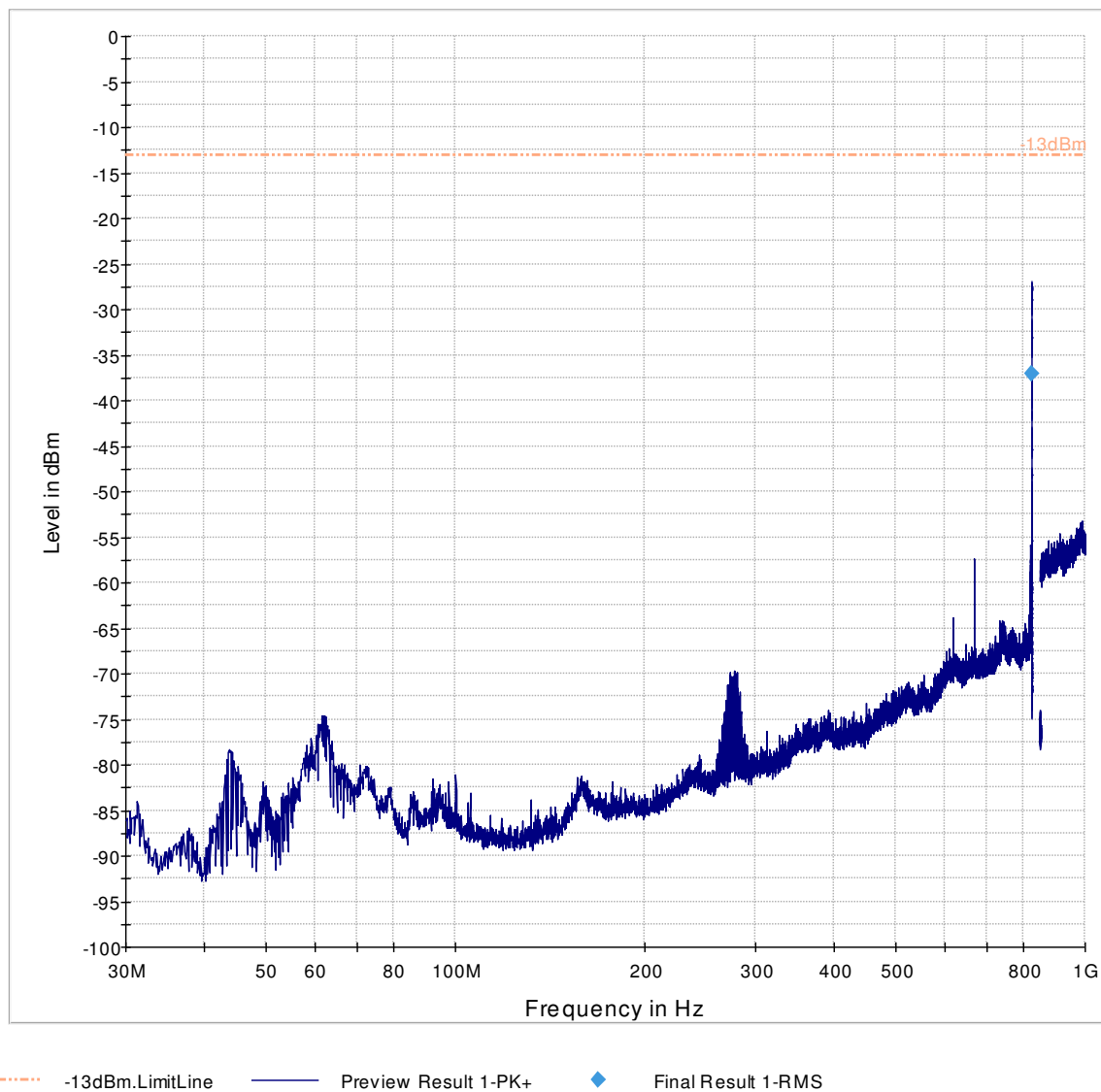
Channel	EUT Operating Mode	Scan Frequency	Limit [dBm]	Result	Frequency of highest emission [MHz]	Highest Emission [dBm]
Mid	WCDMA II RMC 12.2k	9kHz – 30MHz	-13	Pass	0.070	-23.8
Low	WCDMA II RMC 12.2k	30MHz – 1 GHz	-13	Pass	-	NF
Mid	WCDMA II RMC 12.2k	30MHz – 1 GHz	-13	Pass	-	NF
High	WCDMA II RMC 12.2k	30MHz – 1 GHz	-13	Pass	-	NF
Low	WCDMA II RMC 12.2k	1GHz – 18GHz	-13	Pass	3703	-34.3
Mid	WCDMA II RMC 12.2k	1GHz – 18GHz	-13	Pass	3762	-49.3
High	WCDMA II RMC 12.2k	1GHz – 18GHz	-13	Pass	3818	-39.5
Mid	WCDMA II RMC 12.2k	18GHz – 22GHz	-13	Pass	-	NF
Mid	WCDMA V RMC 12.2k	9kHz – 30MHz	-13	Pass	0.07	-24.6
Low	WCDMA V RMC 12.2k	30MHz – 1 GHz	-13	Pass	-	NF
Mid	WCDMA V RMC 12.2k	30MHz – 1 GHz	-13	Pass	-	NF
High	WCDMA V RMC 12.2k	30MHz – 1 GHz	-13	Pass	-	NF
Low	WCDMA V RMC 12.2k	1GHz – 9GHz	-13	Pass	-	NF
Mid	WCDMA V RMC 12.2k	1GHz – 9GHz	-13	Pass	3351	-43
High	WCDMA V RMC 12.2k	1GHz – 9GHz	-13	Pass	-	NF
Mid	GPRS 1900 class8	9kHz – 30MHz	-13	Pass	0.070	-23.8
Low	GPRS 1900 class8	30MHz – 1 GHz	-13	Pass	-	NF
Mid	GPRS 1900 class8	30MHz – 1 GHz	-13	Pass	-	NF
High	GPRS 1900 class8	30MHz – 1 GHz	-13	Pass	-	NF
Low	GPRS 1900 class8	1GHz – 18GHz	-13	Pass	5551	-24.7
Mid	GPRS 1900 class8	1GHz – 18GHz	-13	Pass	3760	-49.6
High	GPRS 1900 class8	1GHz – 18GHz	-13	Pass	3820	-28
Mid	GPRS 1900 class8	18GHz – 22GHz	-13	Pass	18200	-35
Mid	GPRS 850 class8	9kHz – 30MHz	-13	Pass	0.701	-24.7
Low	GPRS 850 class8	30MHz – 1 GHz	-13	Pass	-	NF
Mid	GPRS 850 class8	30MHz – 1 GHz	-13	Pass	665	-56.4
High	GPRS 850 class8	30MHz – 1 GHz	-13	Pass	-	NF
Low	GPRS 850 class8	1GHz – 9GHz	-13	Pass	1648	-29.1
Mid	GPRS 850 class8	1GHz – 9GHz	-13	Pass	1673	-28.7
High	GPRS 850 class8	1GHz – 9GHz	-13	Pass	1693	-30.0

NF – Noise Floor

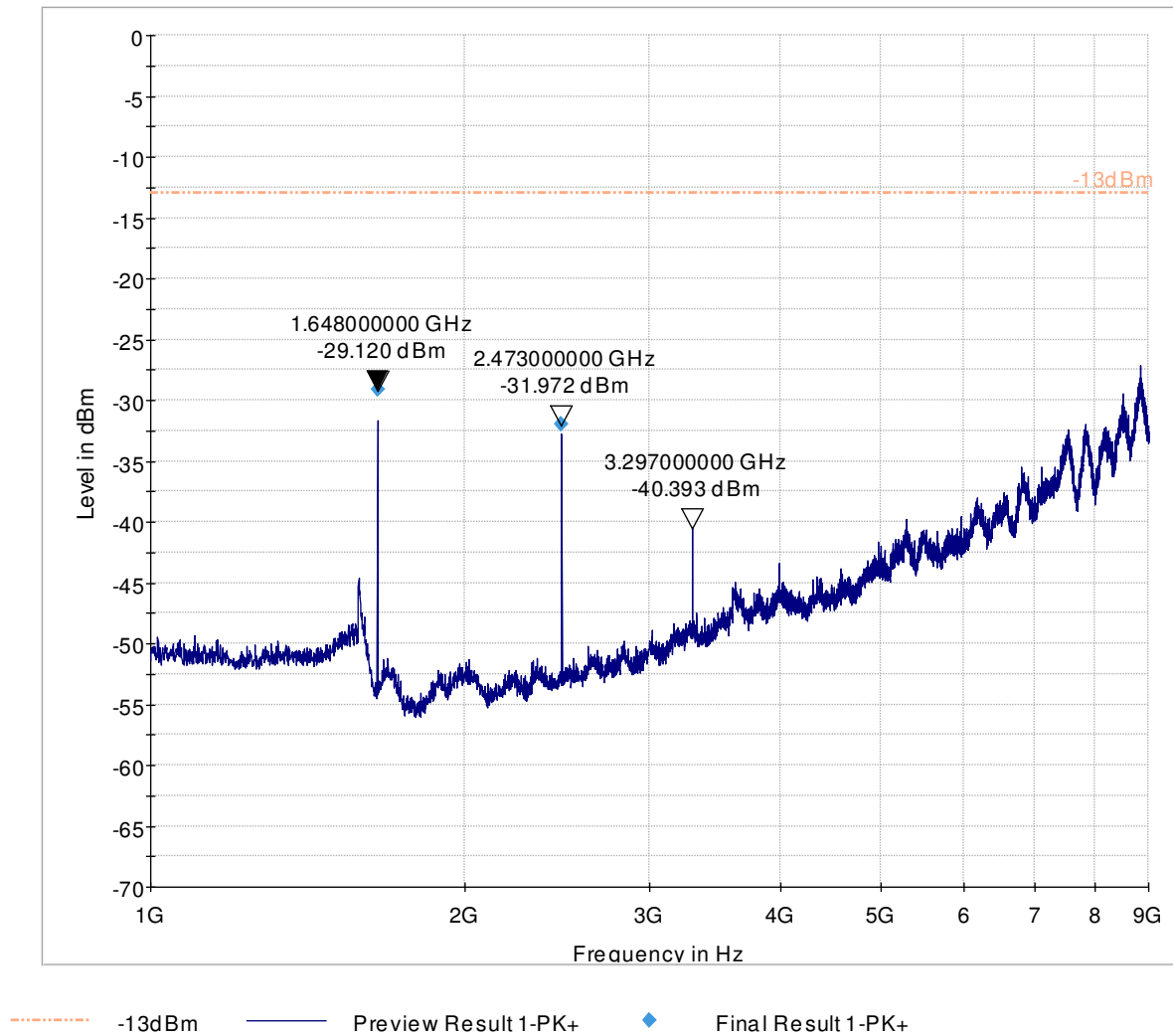
8.6 Measurement Plots:

8.6.1 GSM 850

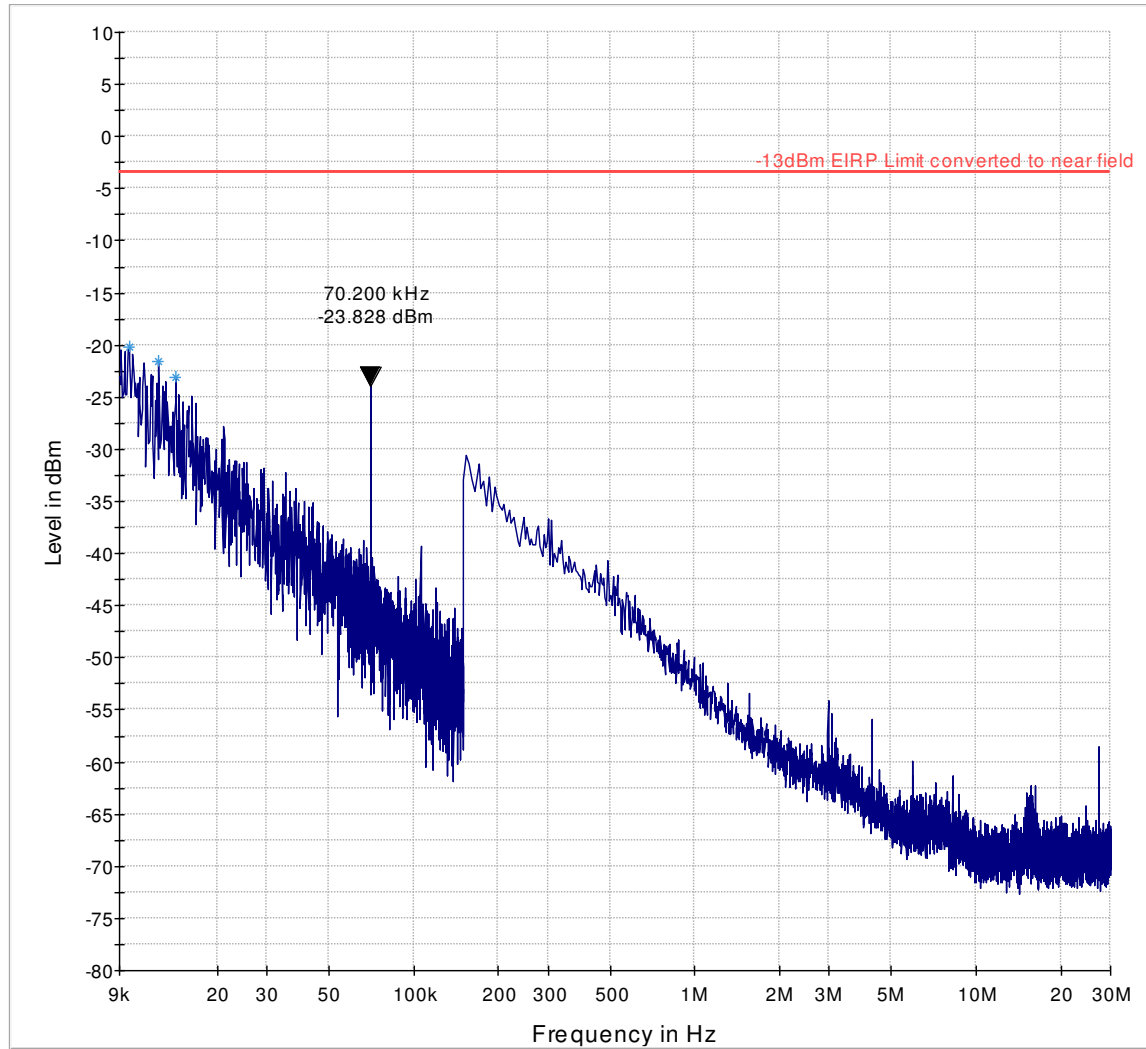
30 MHz – 1 GHz, GSM 850, Tx: Ch. Low



1 GHz – 9 GHz, GSM 850, Tx: Ch. Low

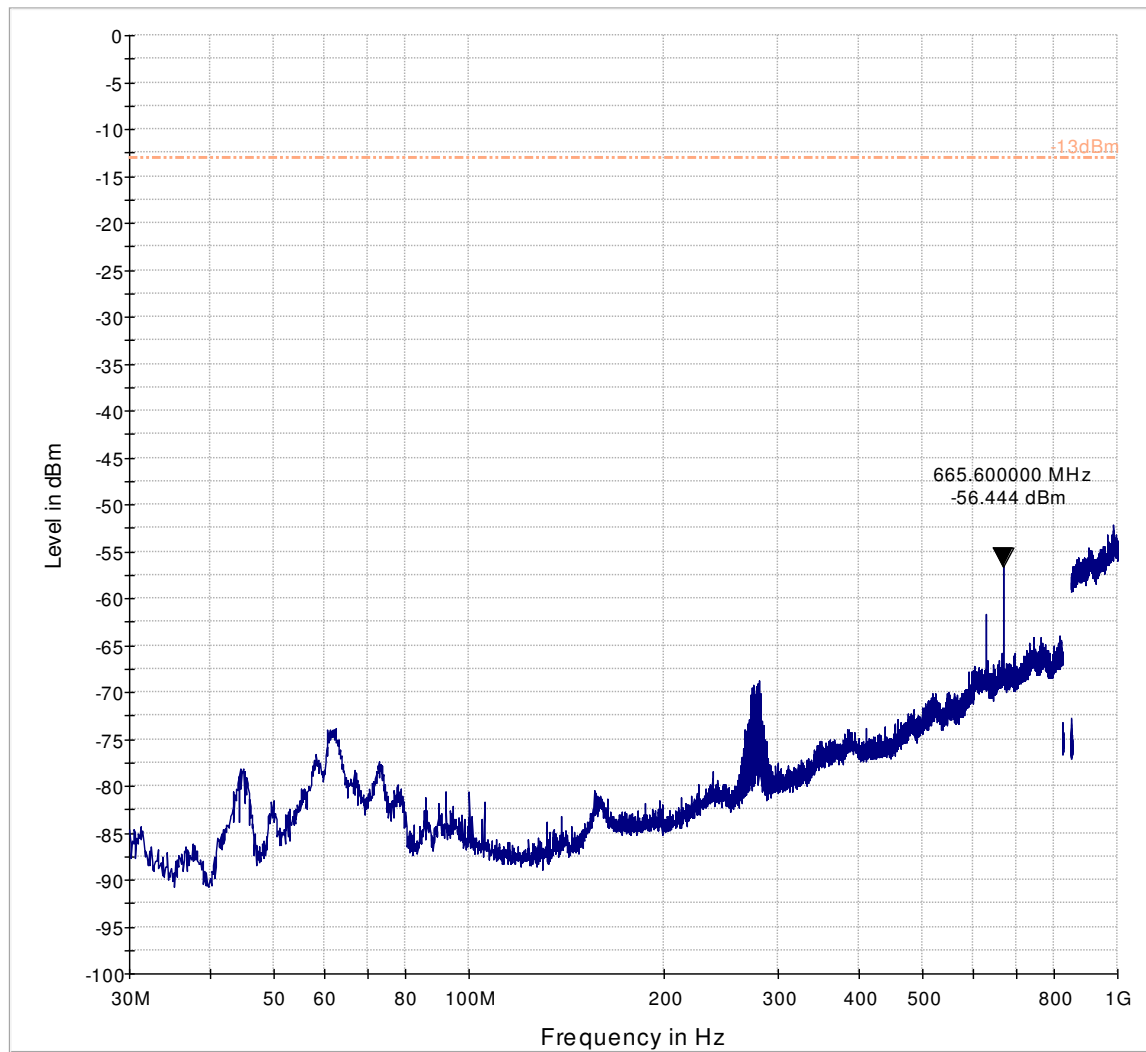


9KHz – 30 MHz, GSM 850, Tx: Ch. Mid



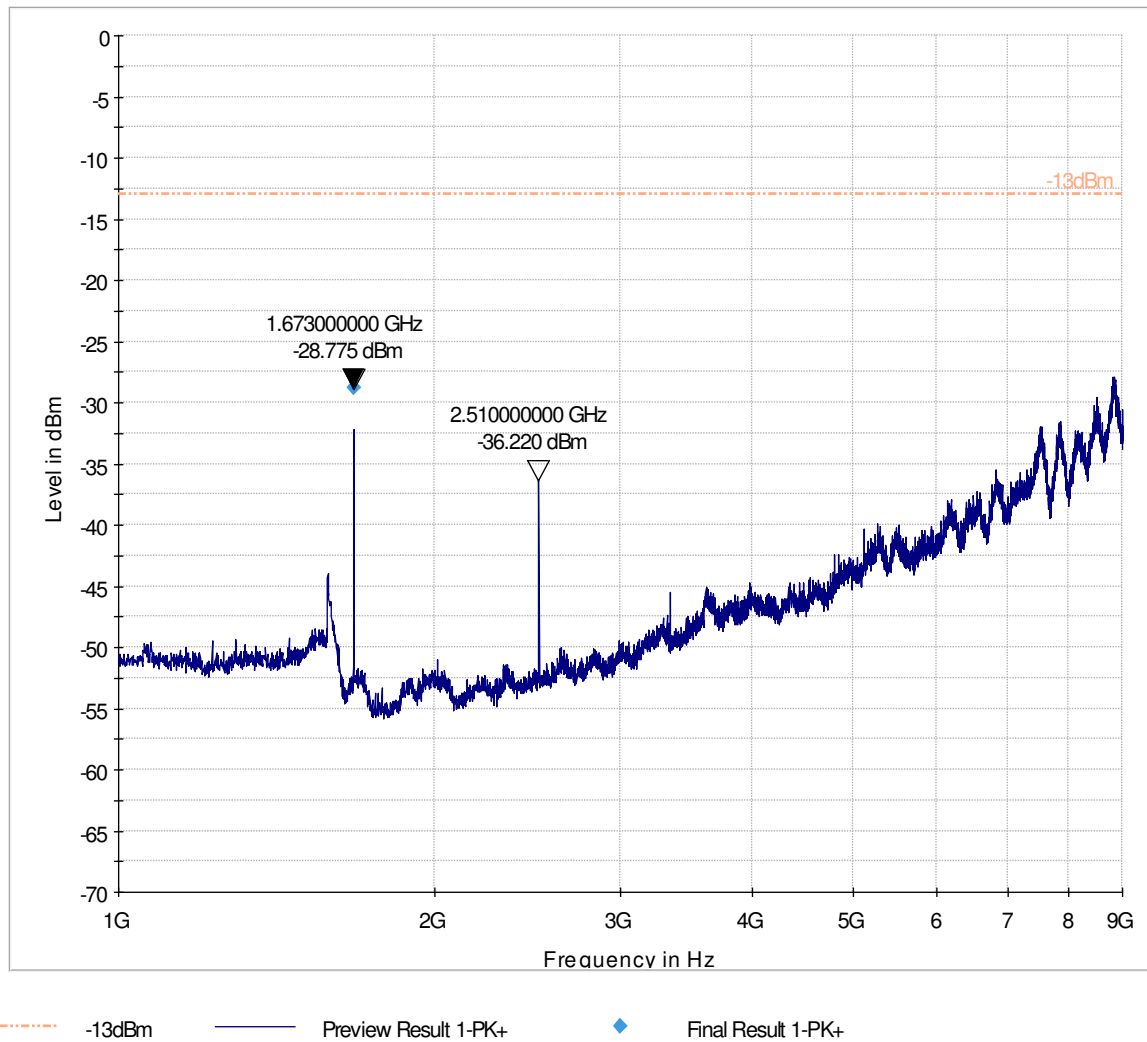
— -13dBm EIRP Limit converted to near field — Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

30 MHz – 1 GHz, GSM 850, Tx: Ch. Mid

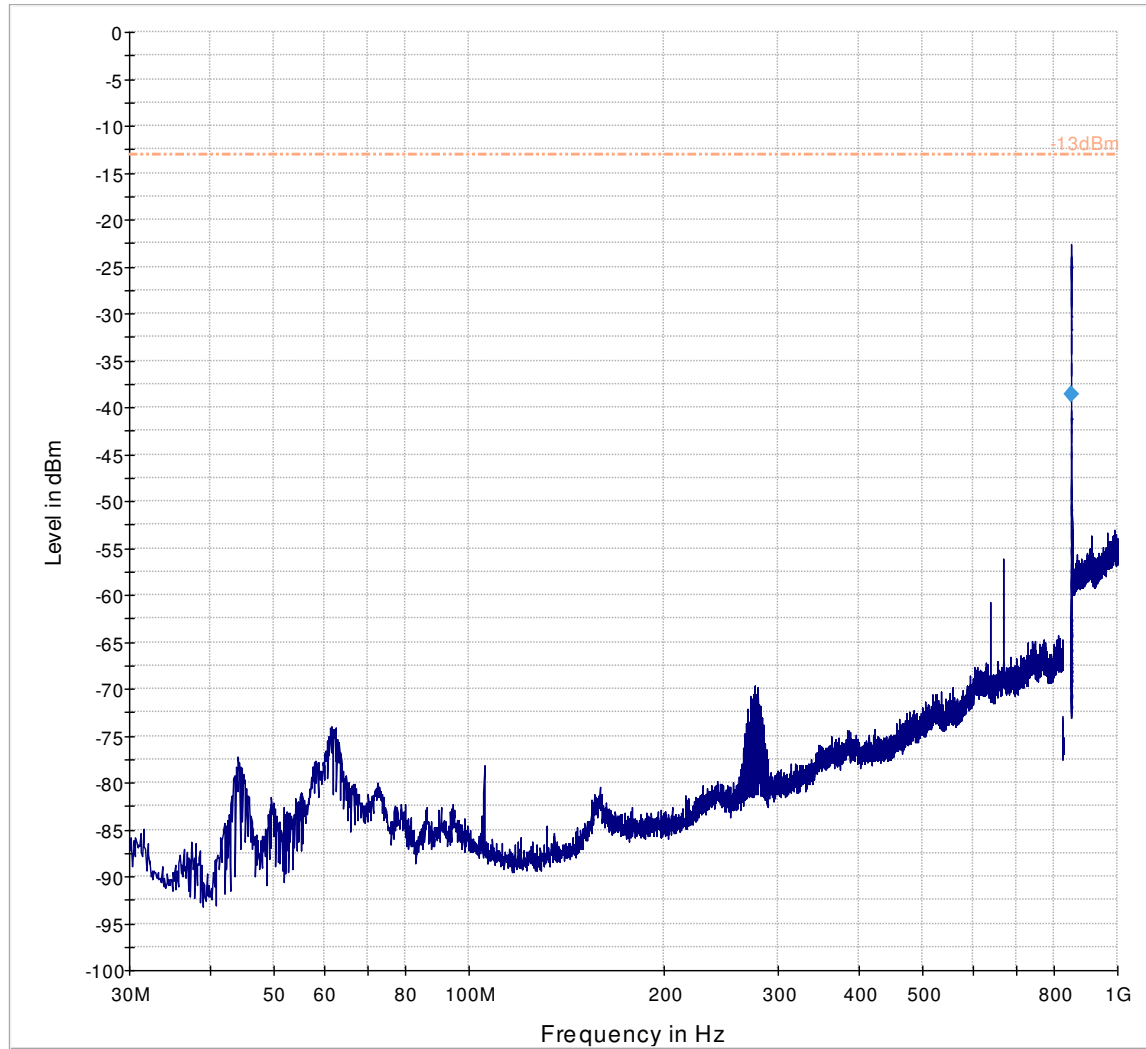


----- -13dBm.LimitLine Preview Result 1-PK+

1 GHz – 9 GHz, GSM 850, Tx: Ch. Mid

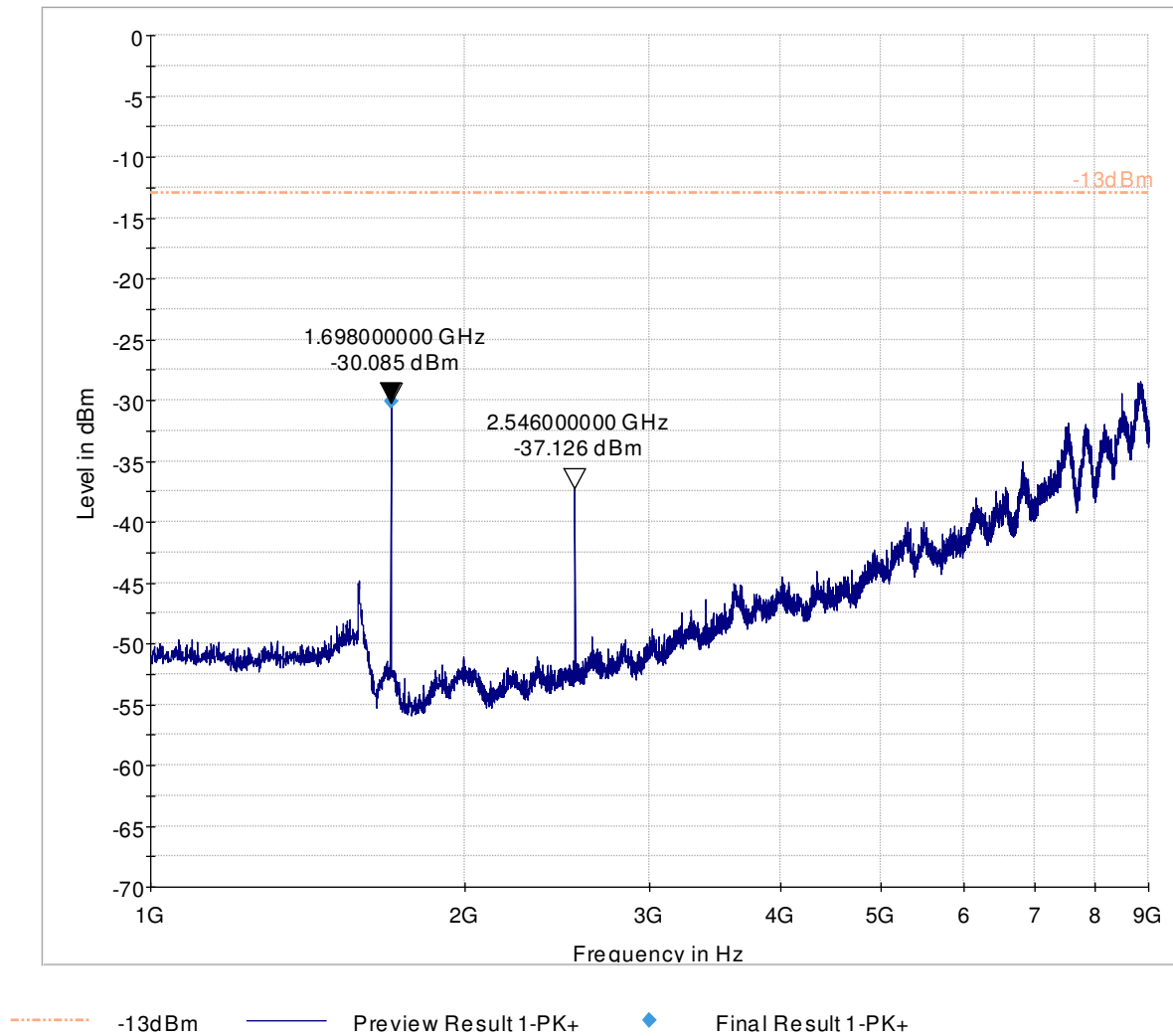


30 MHz – 1 GHz, GSM 850, Tx: Ch. High



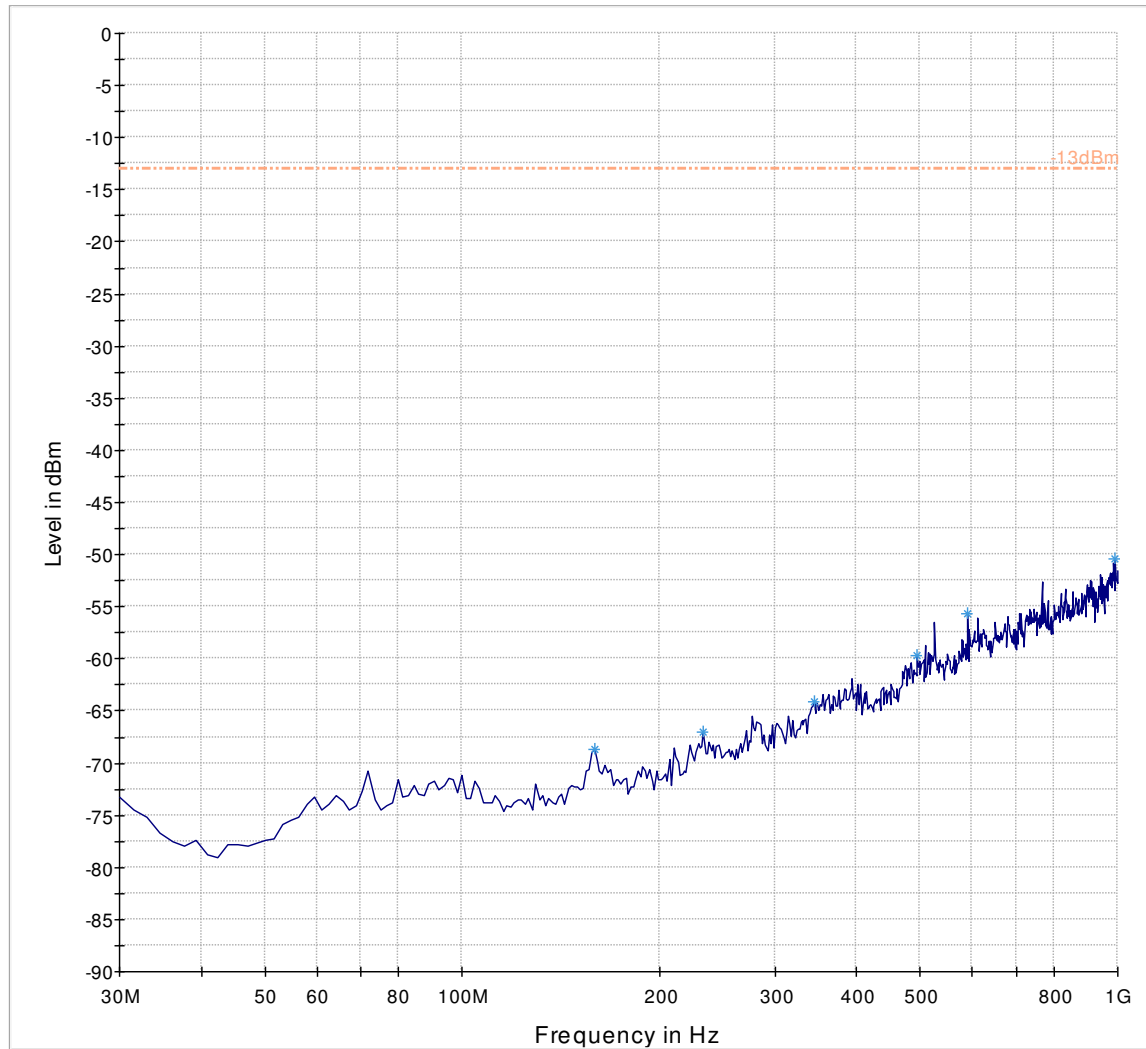
----- -13dBm.LimitLine — Preview Result 1-PK+ ◆ Final Result 1-RMS

1 GHz – 9 GHz, GSM 850, Tx: Ch. High



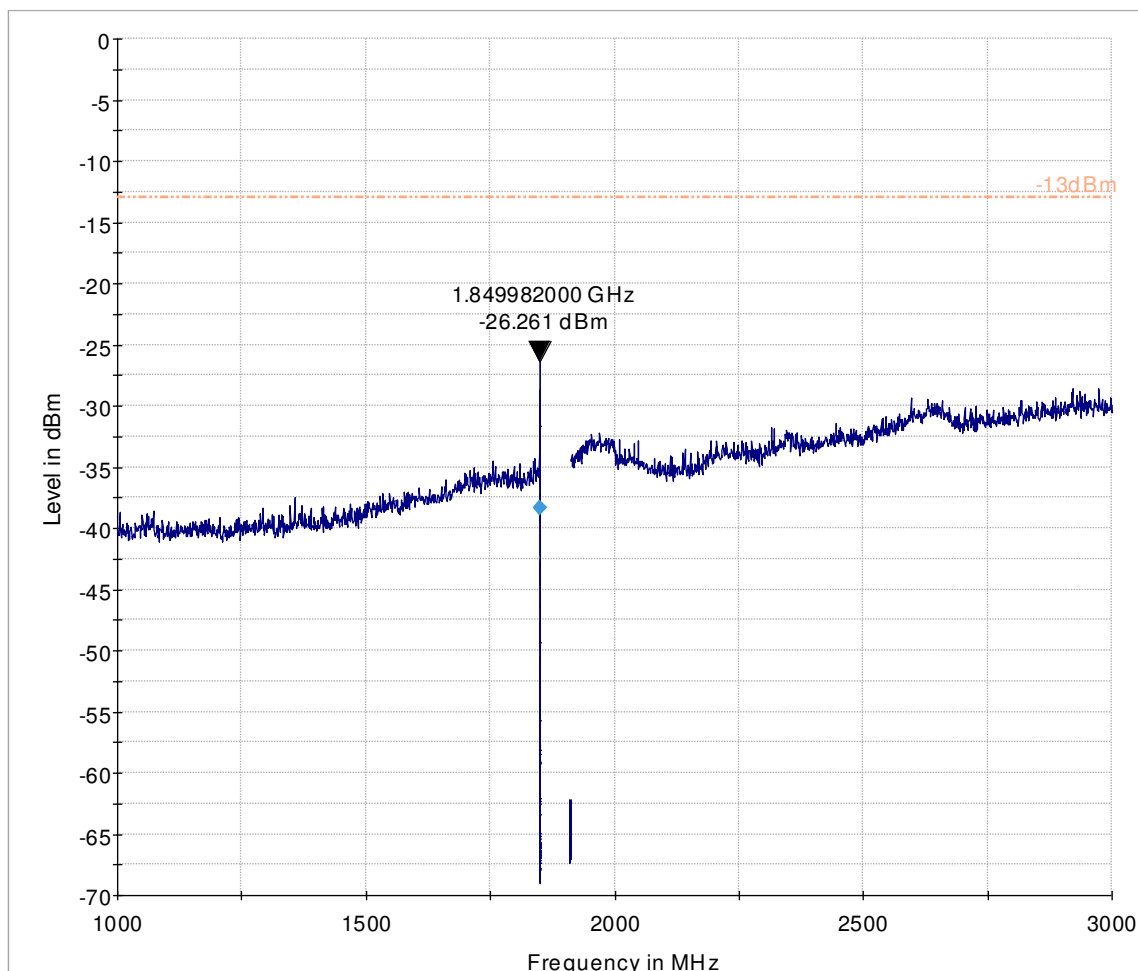
8.6.2 GSM 1900

30 MHz – 1 GHz, GSM 1900, Tx: Ch. Low



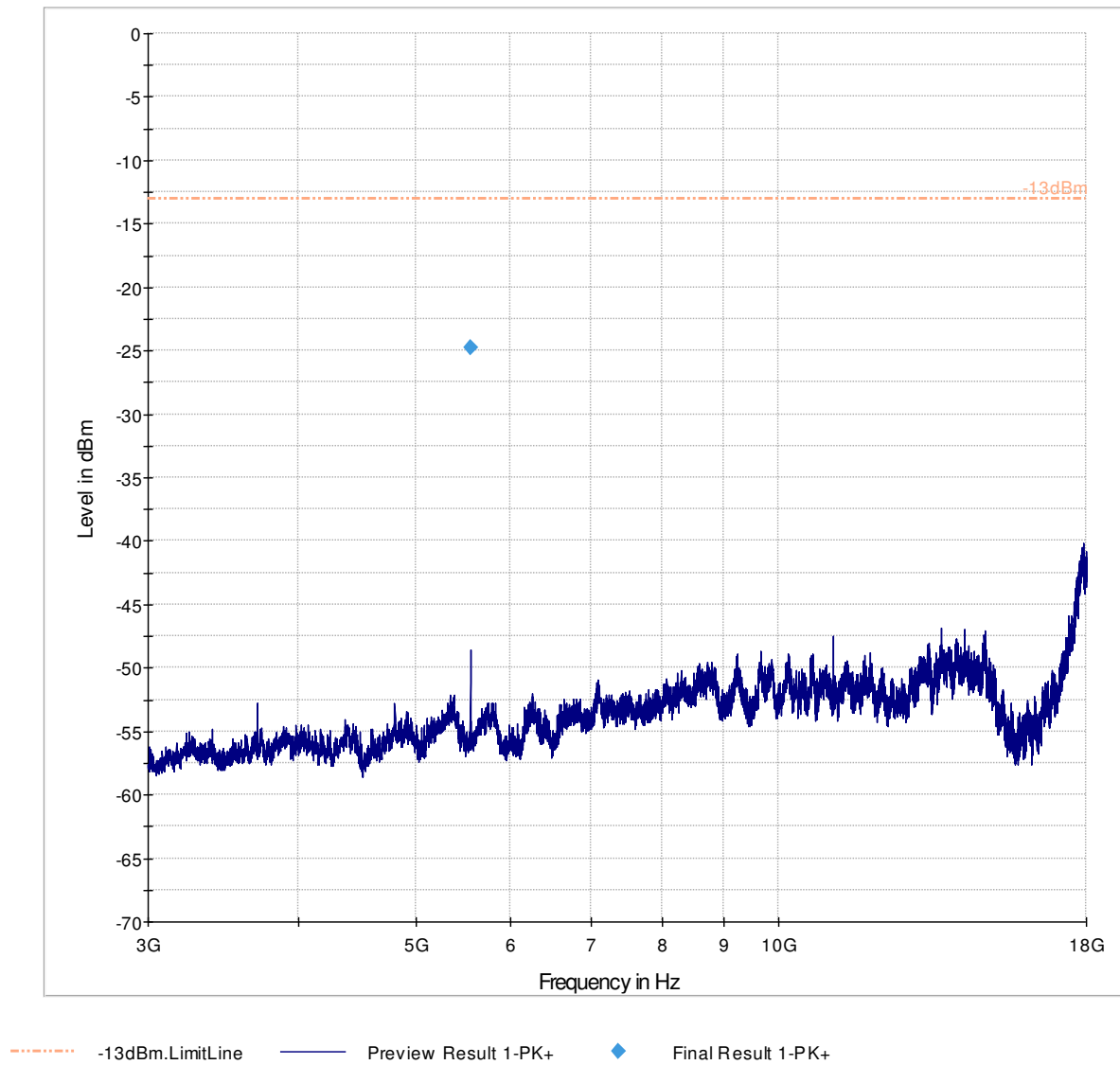
----- -13dBm.LimitLine Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

1 GHz – 3 GHz, GSM 1900, Tx: Ch. Low

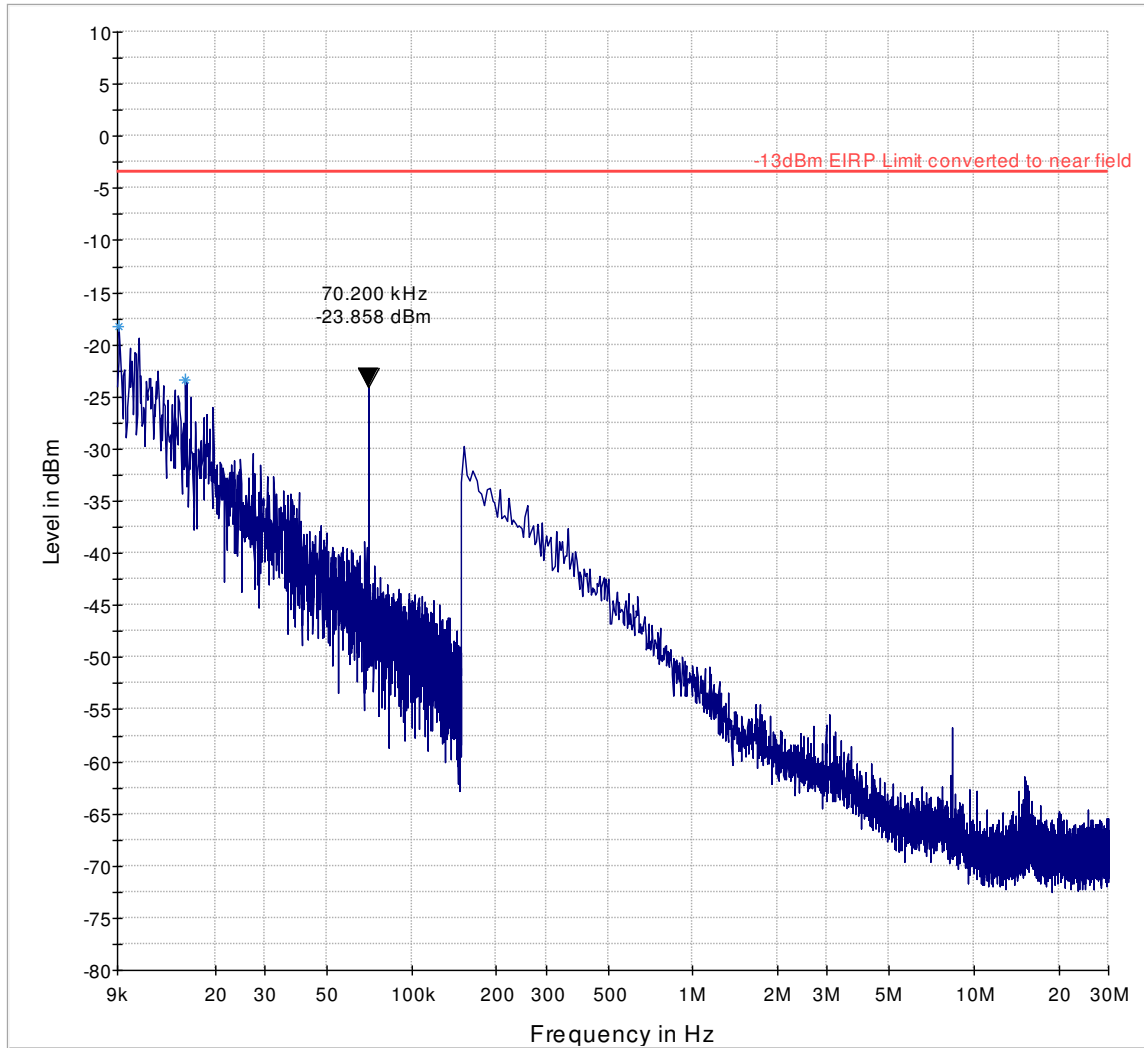


----- -13dBm.LimitLine Preview Result 1-PK+ ♦ Final Result 1-RMS

3 GHz – 18 GHz, GSM 1900, Tx: Ch. Low

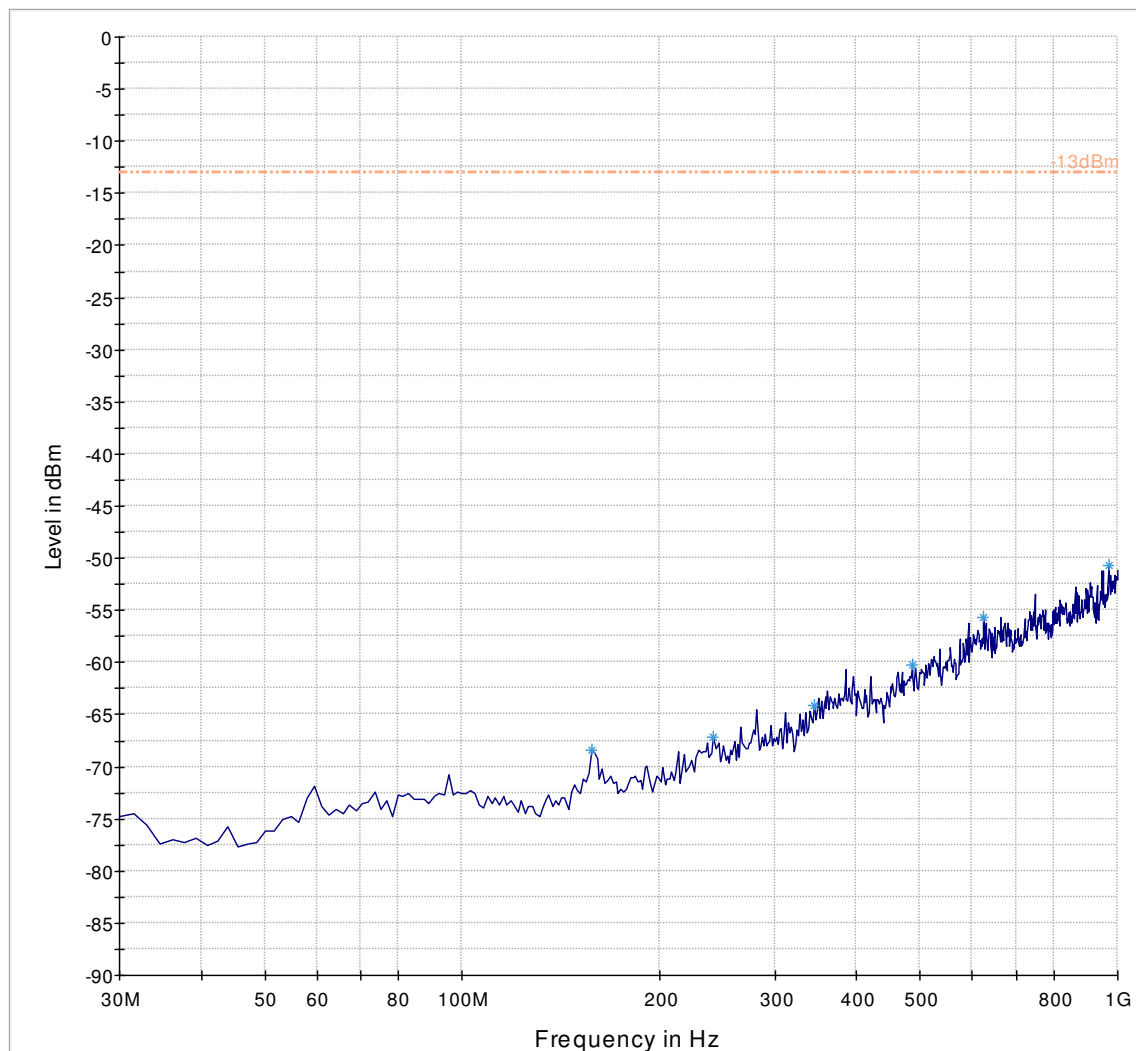


9 KHz – 30 MHz, GSM 1900, Tx: Ch. Mid



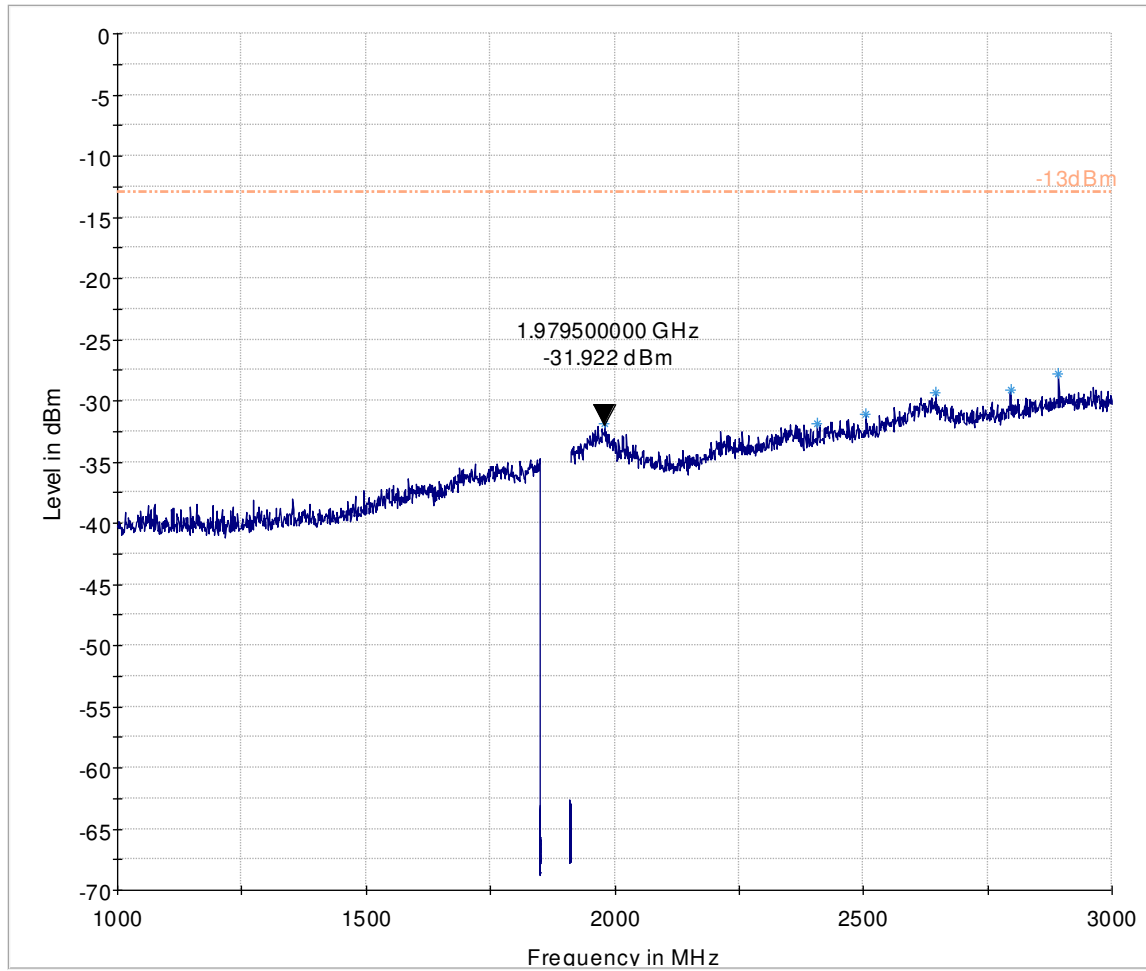
— -13dBm EIRP Limit converted to near field — Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

30 MHz – 1 GHz, GSM 1900, Tx: Ch. Mid



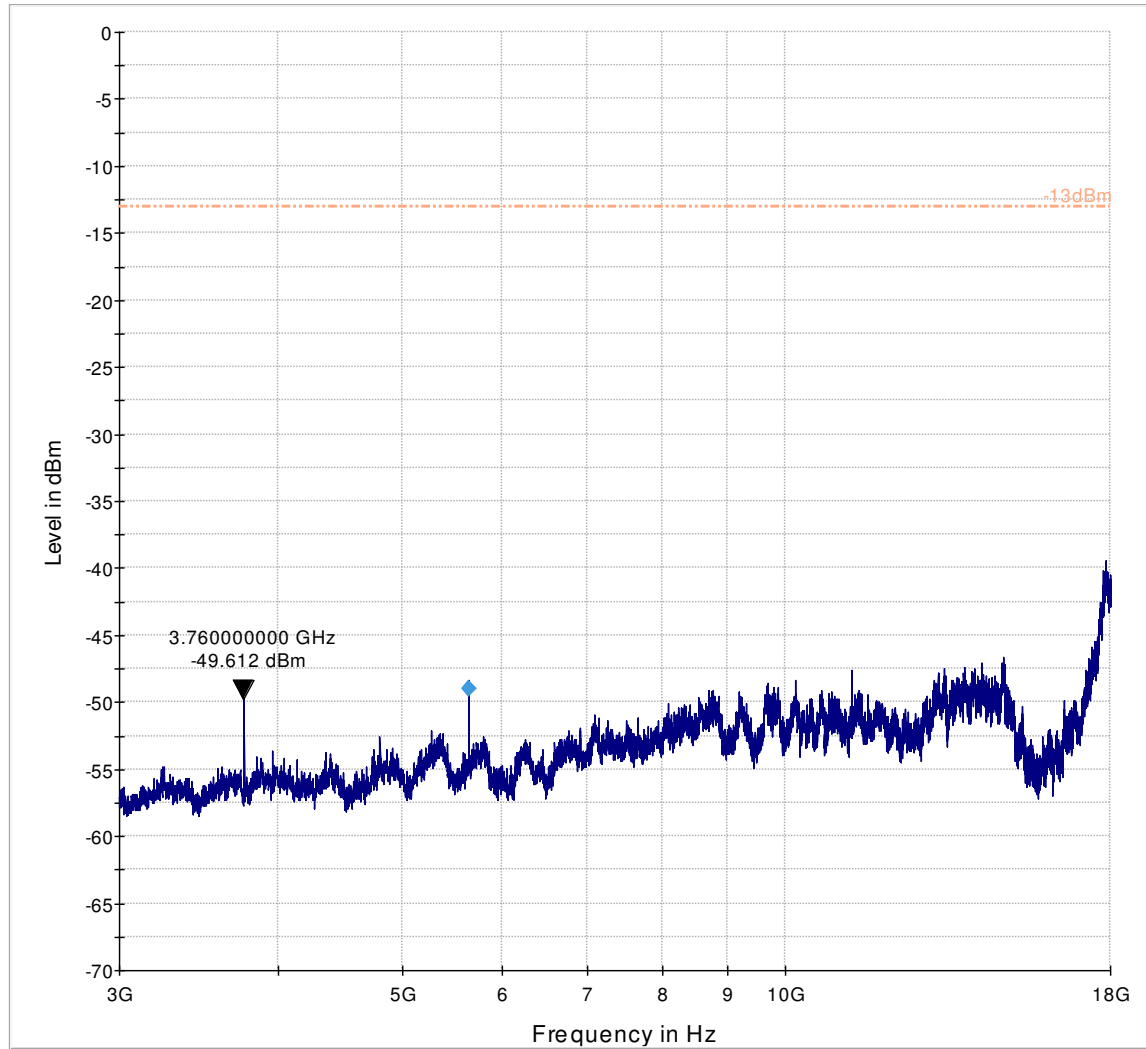
----- -13dBm.LimitLine — Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

1 GHz - 3 GHz, GSM 1900, Tx: Ch. Mid



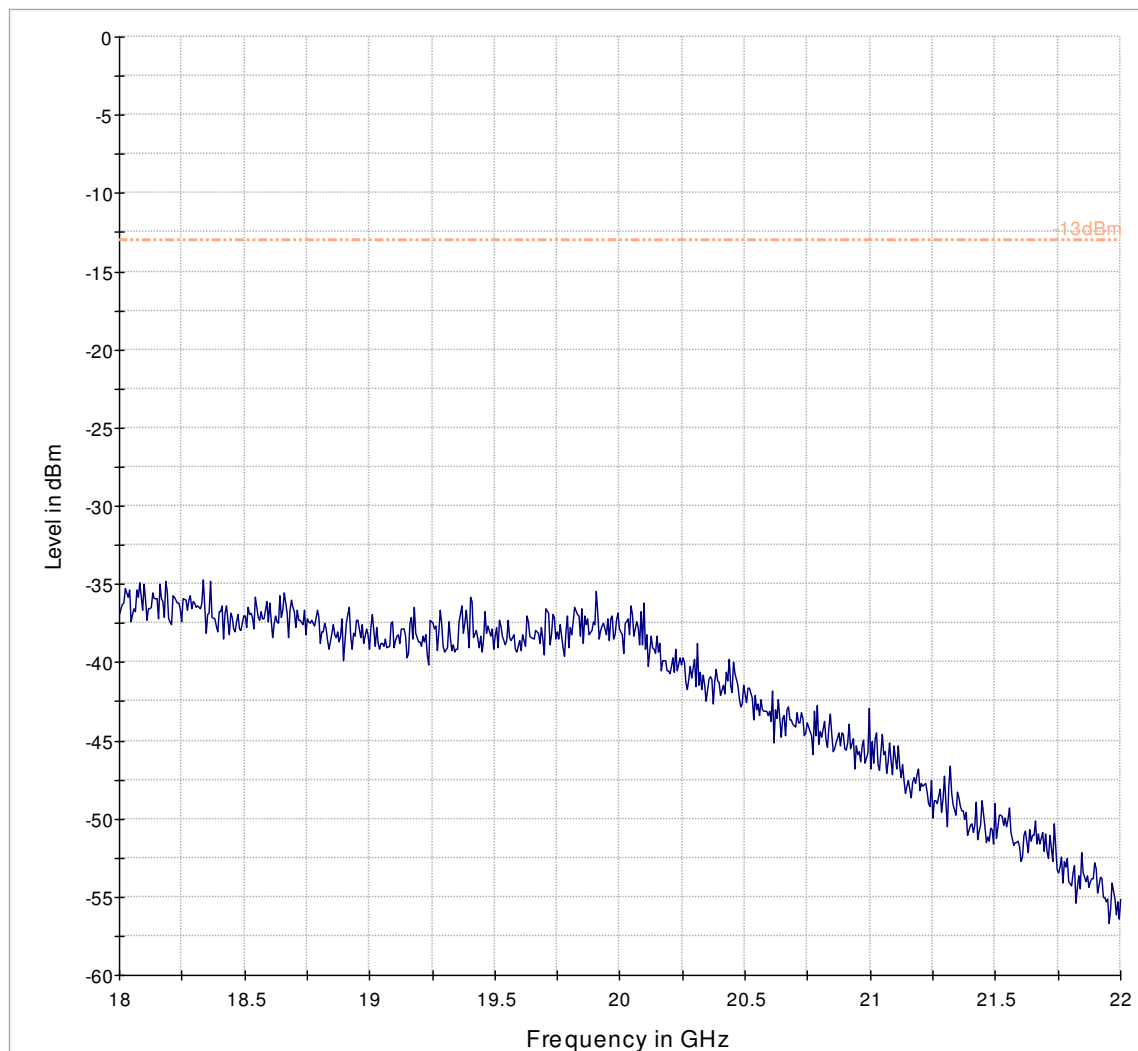
----- -13dBm.LimitLine Preview Result 1-PK+ * Data Reduction Result 1 [2]-PK+

3 GHz – 18 GHz, GSM 1900, Tx: Ch. Mid



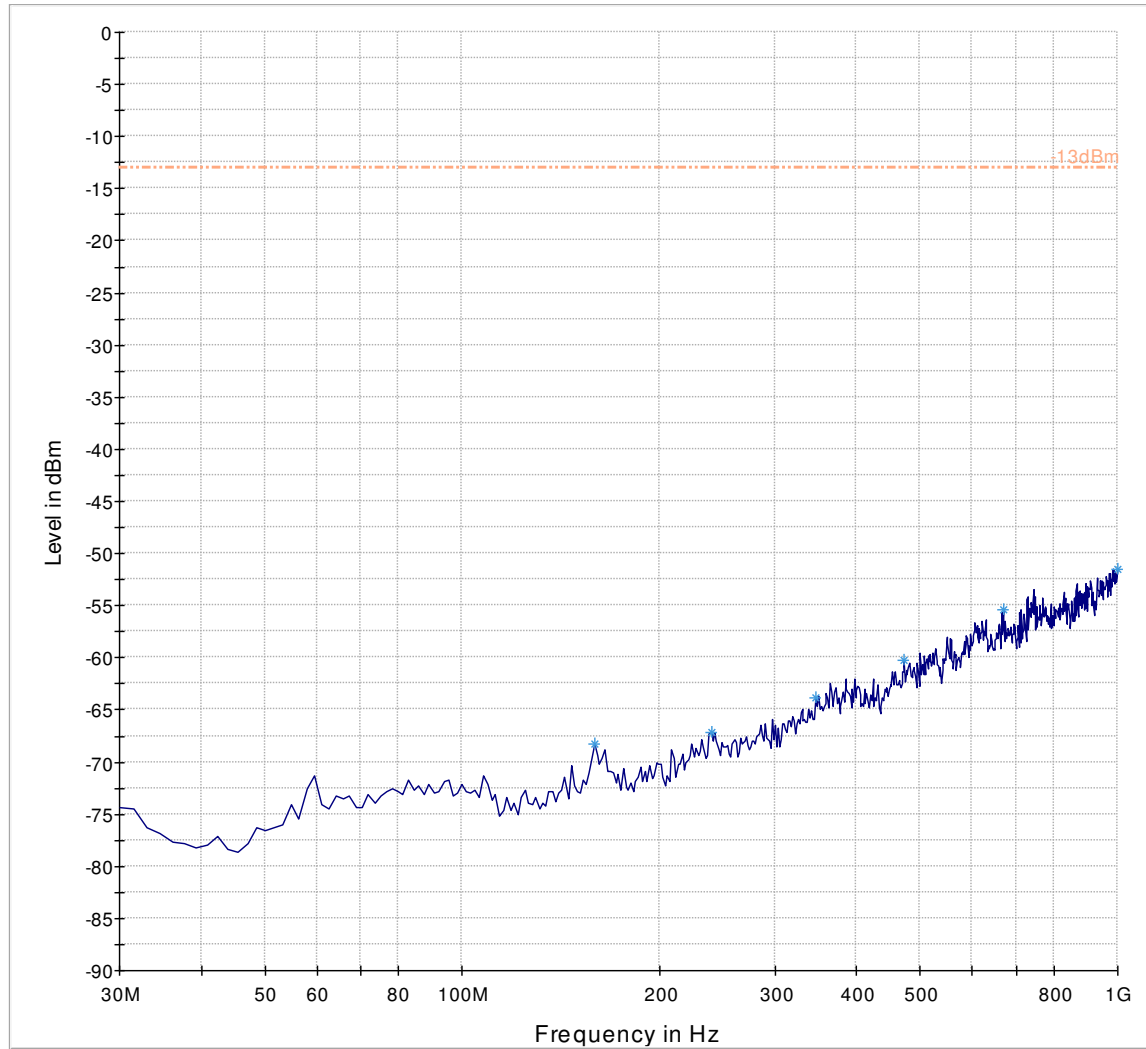
----- -13dBm.LimitLine Preview Result 1-PK+ ◆ Final Result 1-PK+

18 GHz -22 GHz, GSM 1900, Tx: Ch. Mid



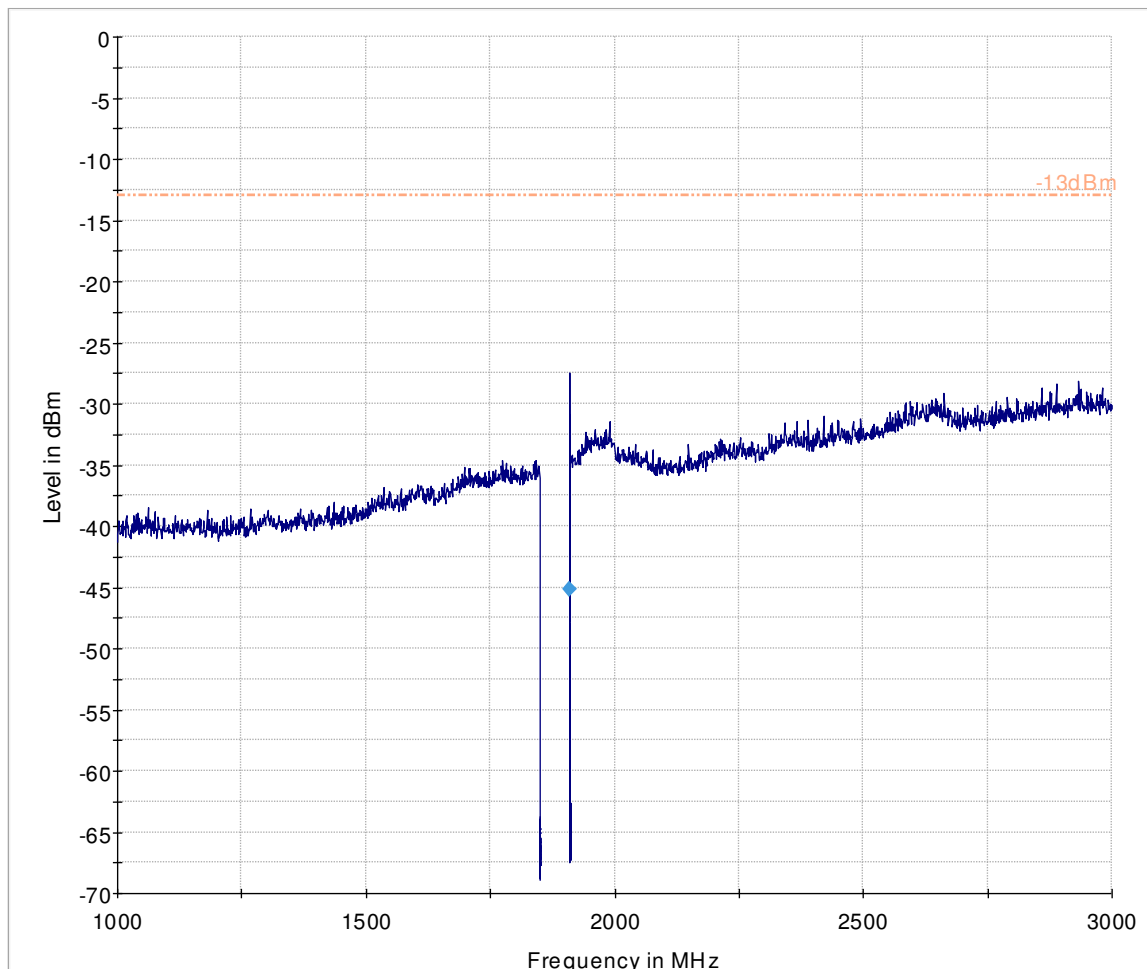
----- -13dBm — Preview Result 1-PK+

30 MHz – 1 GHz, GSM 1900, Tx: Ch. High



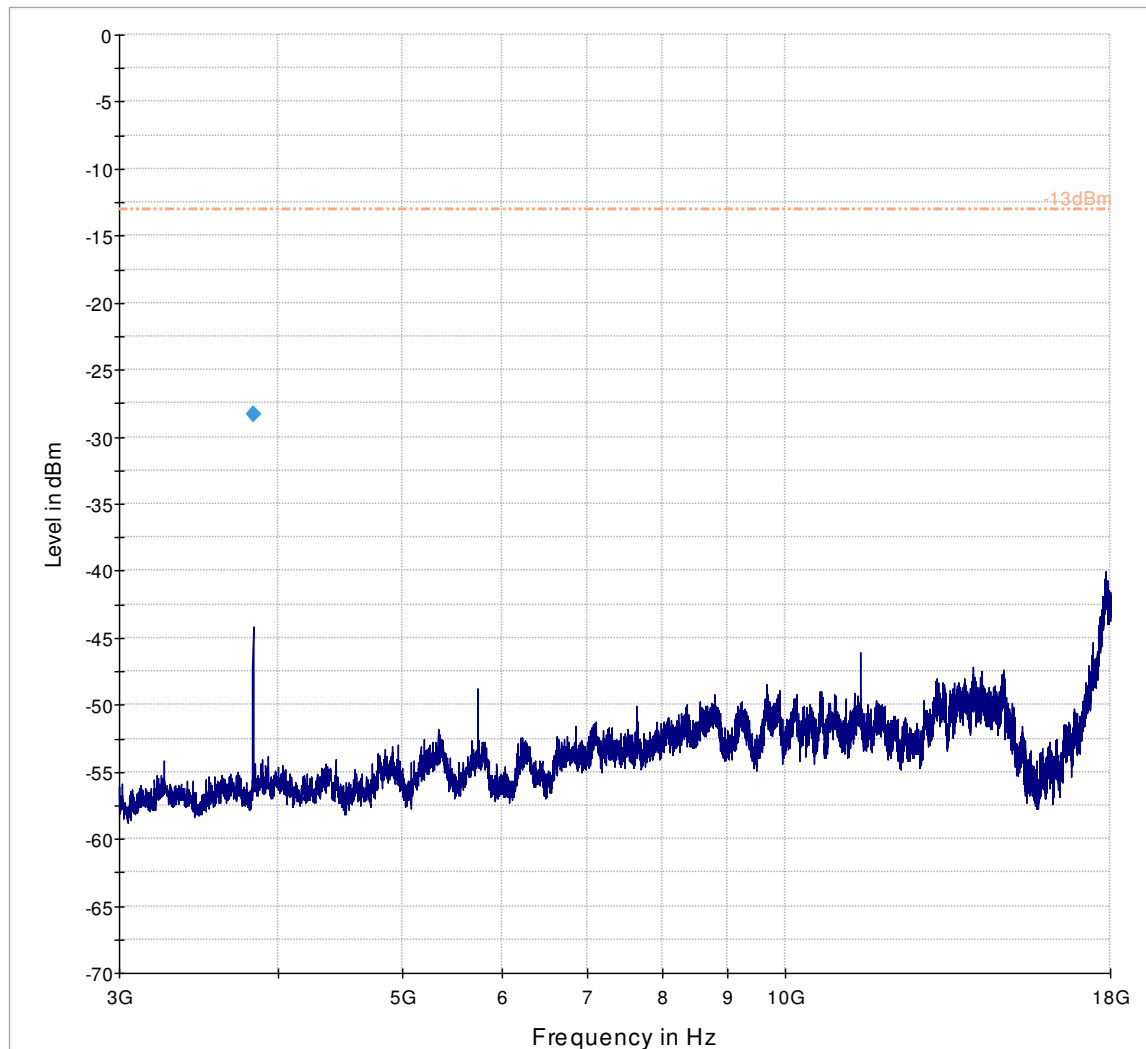
----- -13dBm.LimitLine Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

1 GHz – 3 GHz, GSM 1900, Tx: Ch. High



-13dBm.LimitLine Preview Result 1-PK+ Final Result 1-RMS

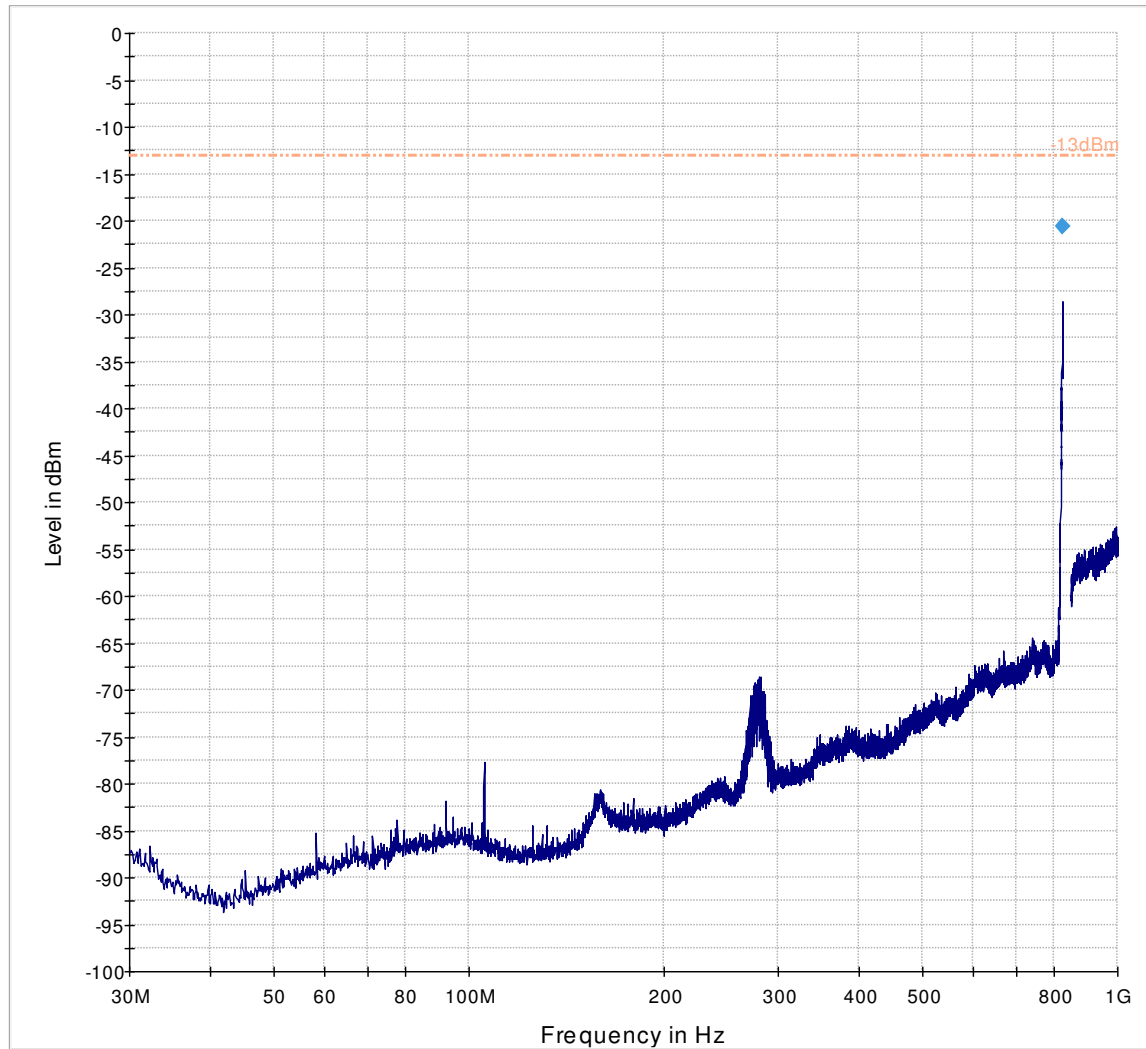
3 GHz – 18 GHz, GSM 1900, Tx: Ch. High



----- -13dBm.LimitLine Preview Result 1-PK+ ◆ Final Result 1-PK+

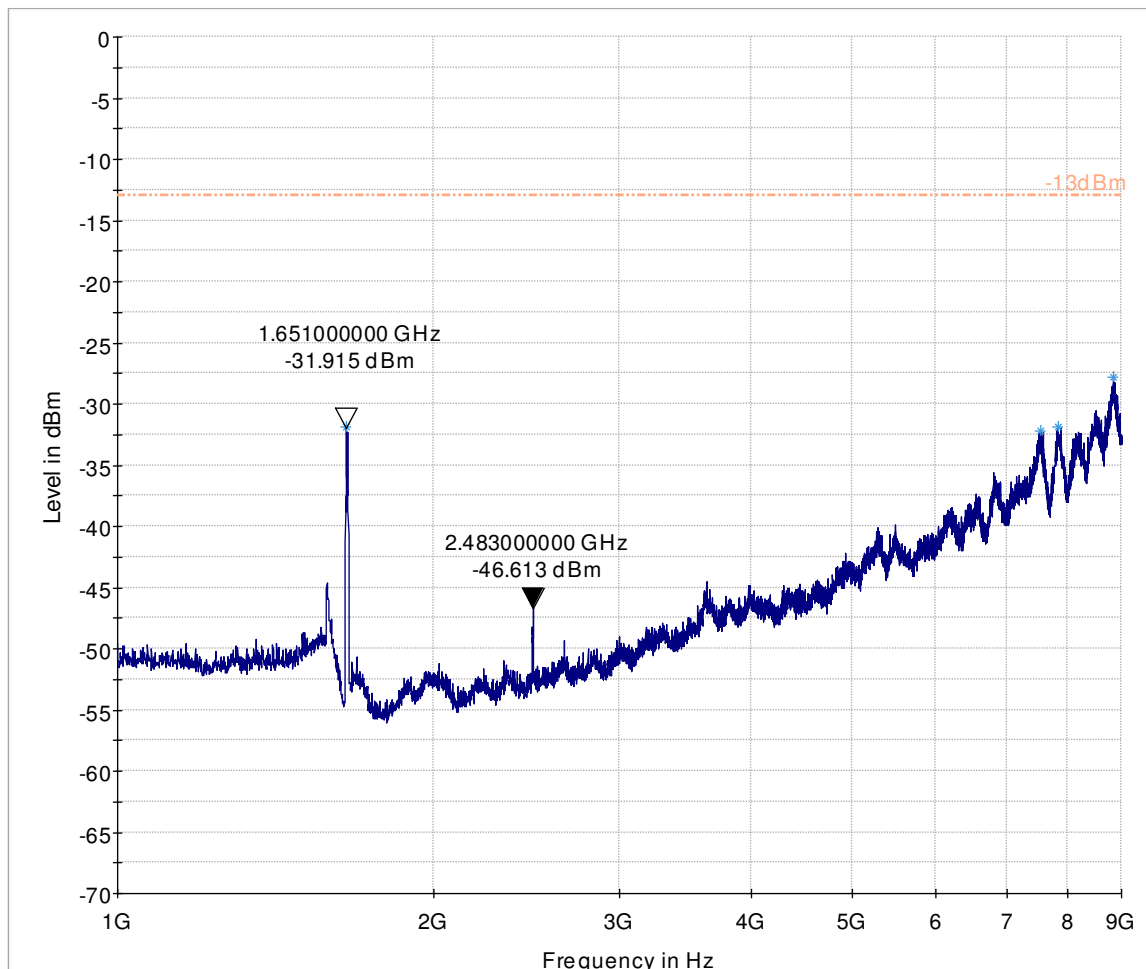
8.6.3 FDD V Plots

30 MHz – 1 GHz, UMTS FDD V, Tx: Ch. Low



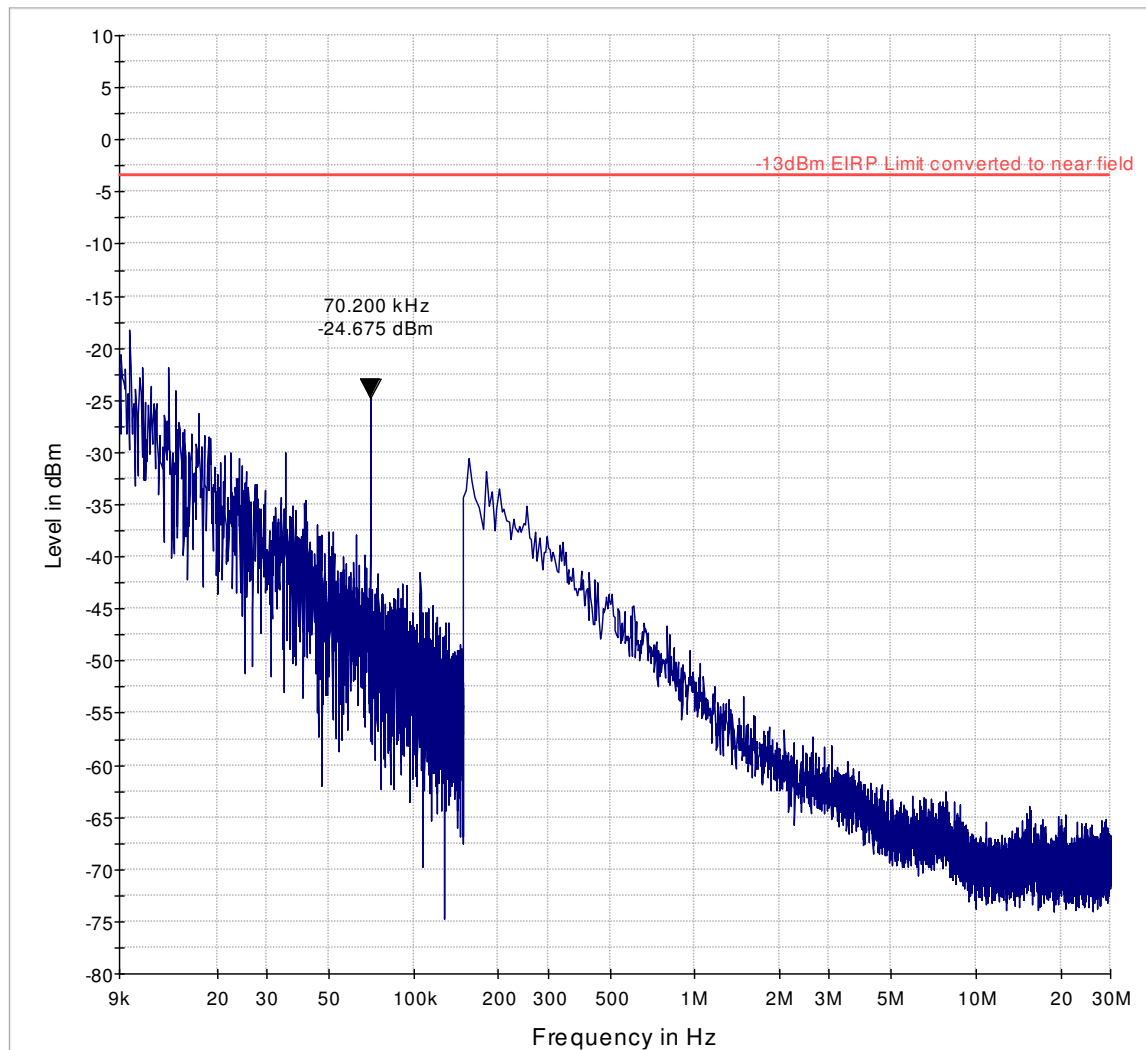
----- -13dBm.LimitLine ——— Preview Result 1-PK+ ◆ Final Result 1-PK+

1 GHz – 9 GHz, UMTS FDD V, Tx: Ch. Low



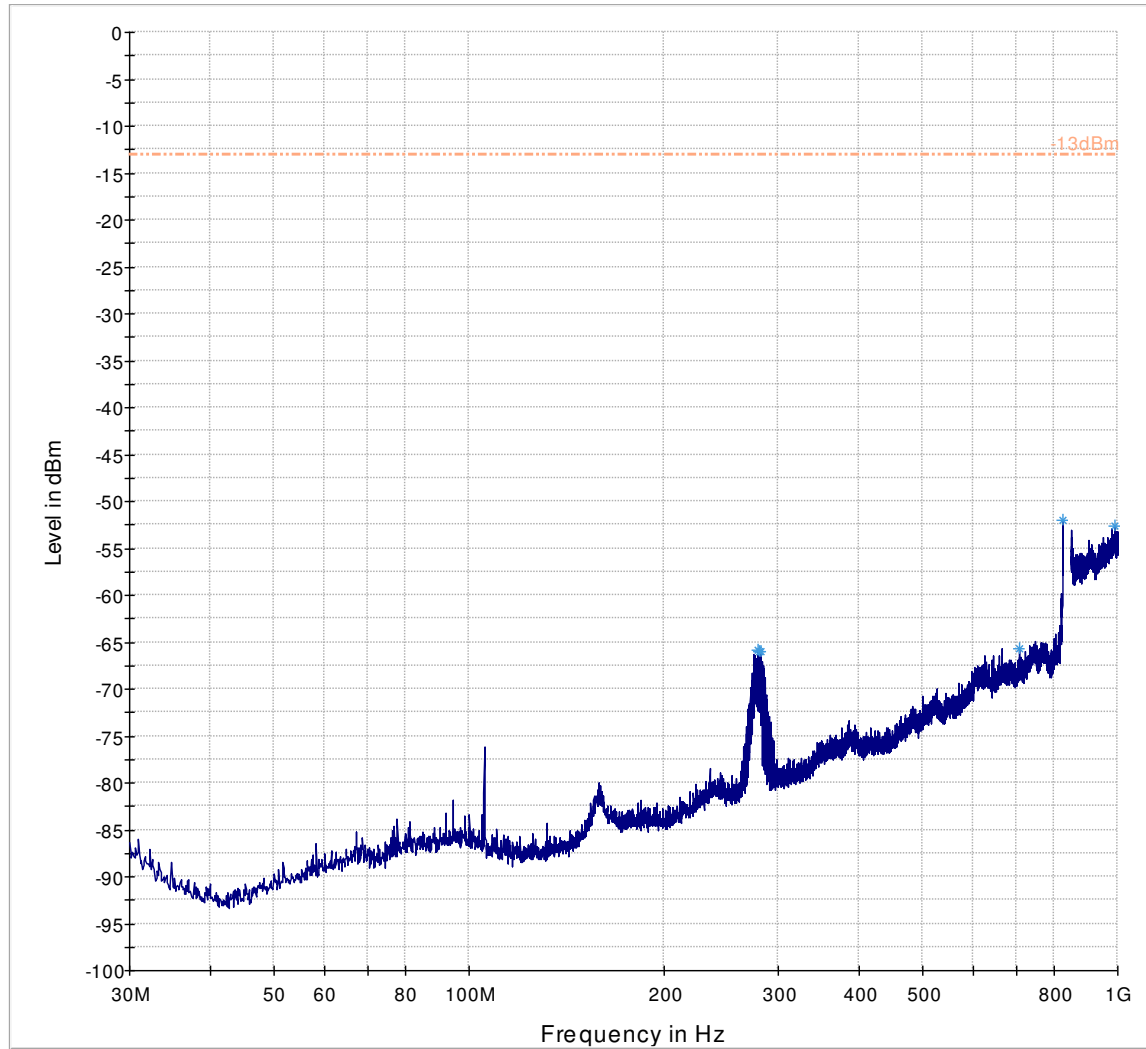
----- -13dBm ——— Preview Result 1-PK+ * Data Reduction Result 1 [2]-PK+

9 KHz – 30 MHz, UMTS FDD V, Tx: Ch. Mid



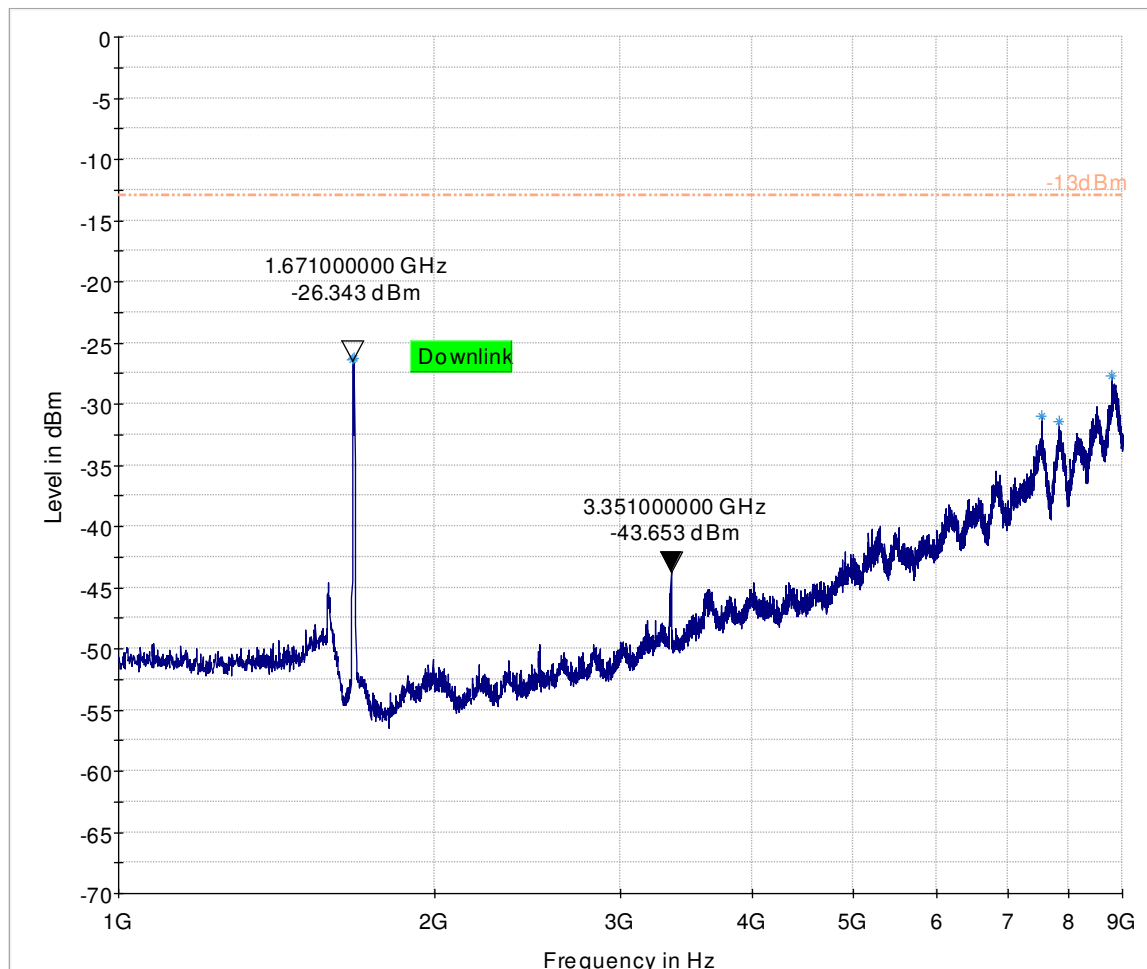
— -13dBm EIRP Limit converted to near field — Preview Result 1-PK+

30 MHz – 1 GHz, UMTS FDD V, Tx: Ch. Mid



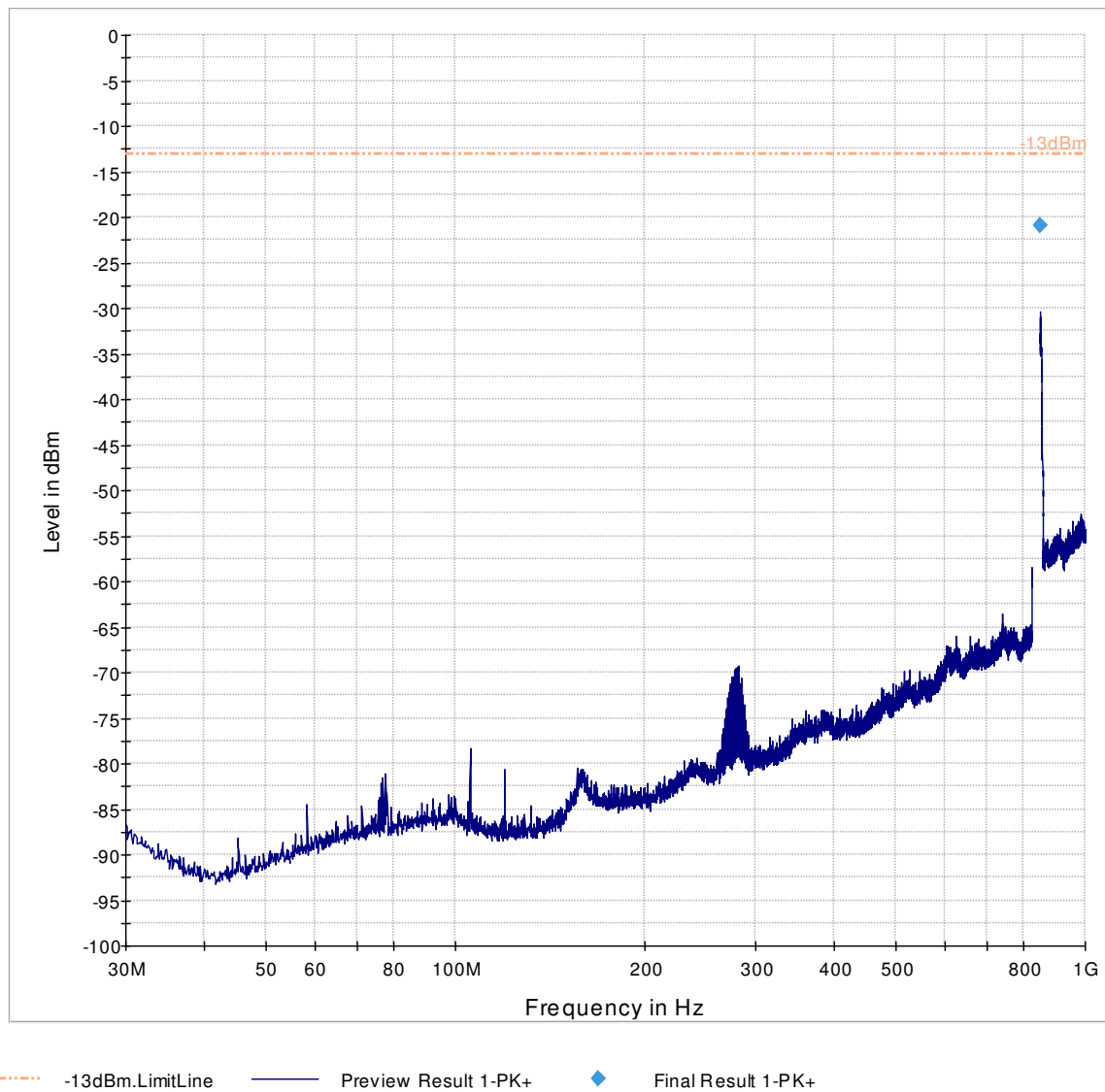
----- -13dBm.LimitLine Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

1 GHz – 9 GHz, UMTS FDD V, Tx: Ch. Mid

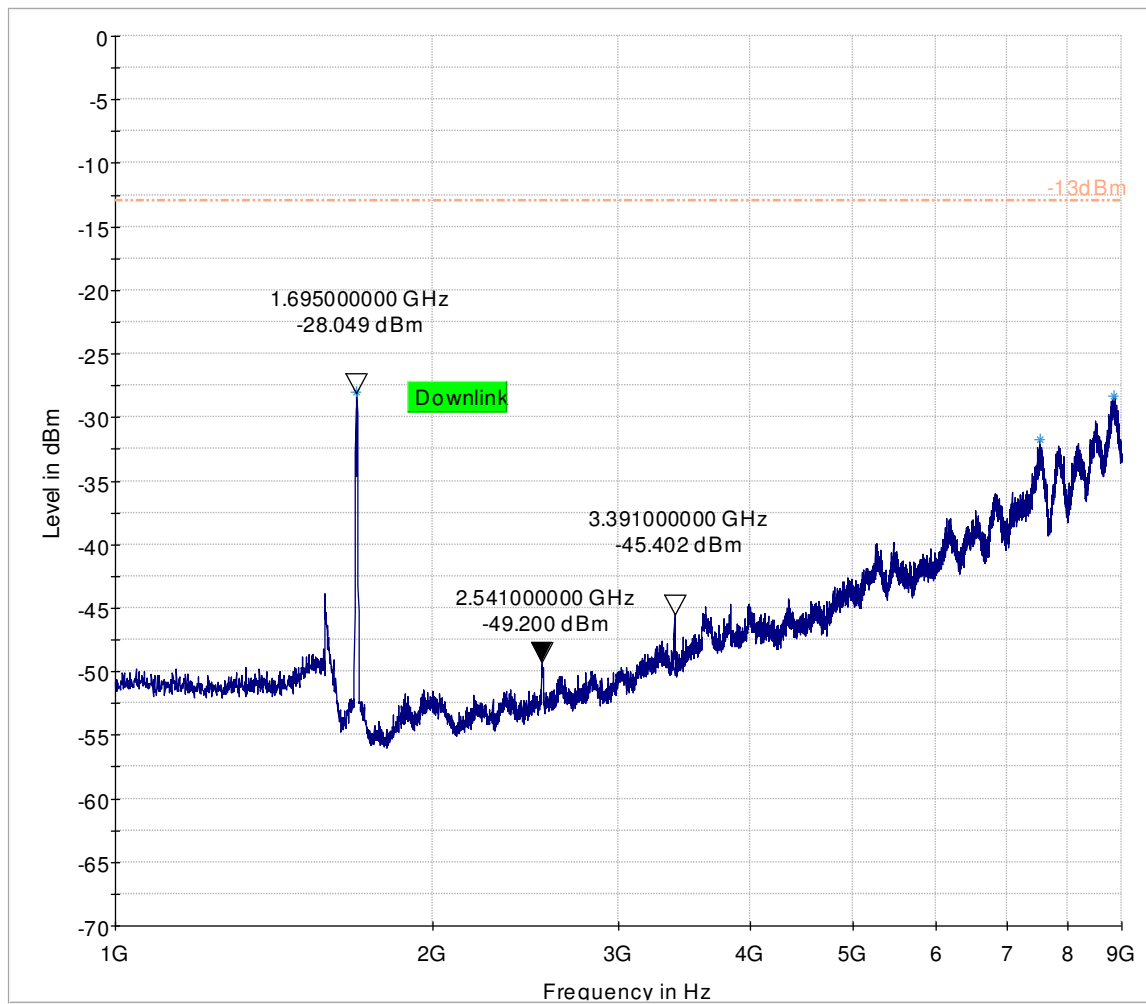


----- -13dBm Preview Result 1-PK+ * Data Reduction Result 1 [2]-PK+

30 MHz – 1 GHz, UMTS FDD V, Tx: Ch. High



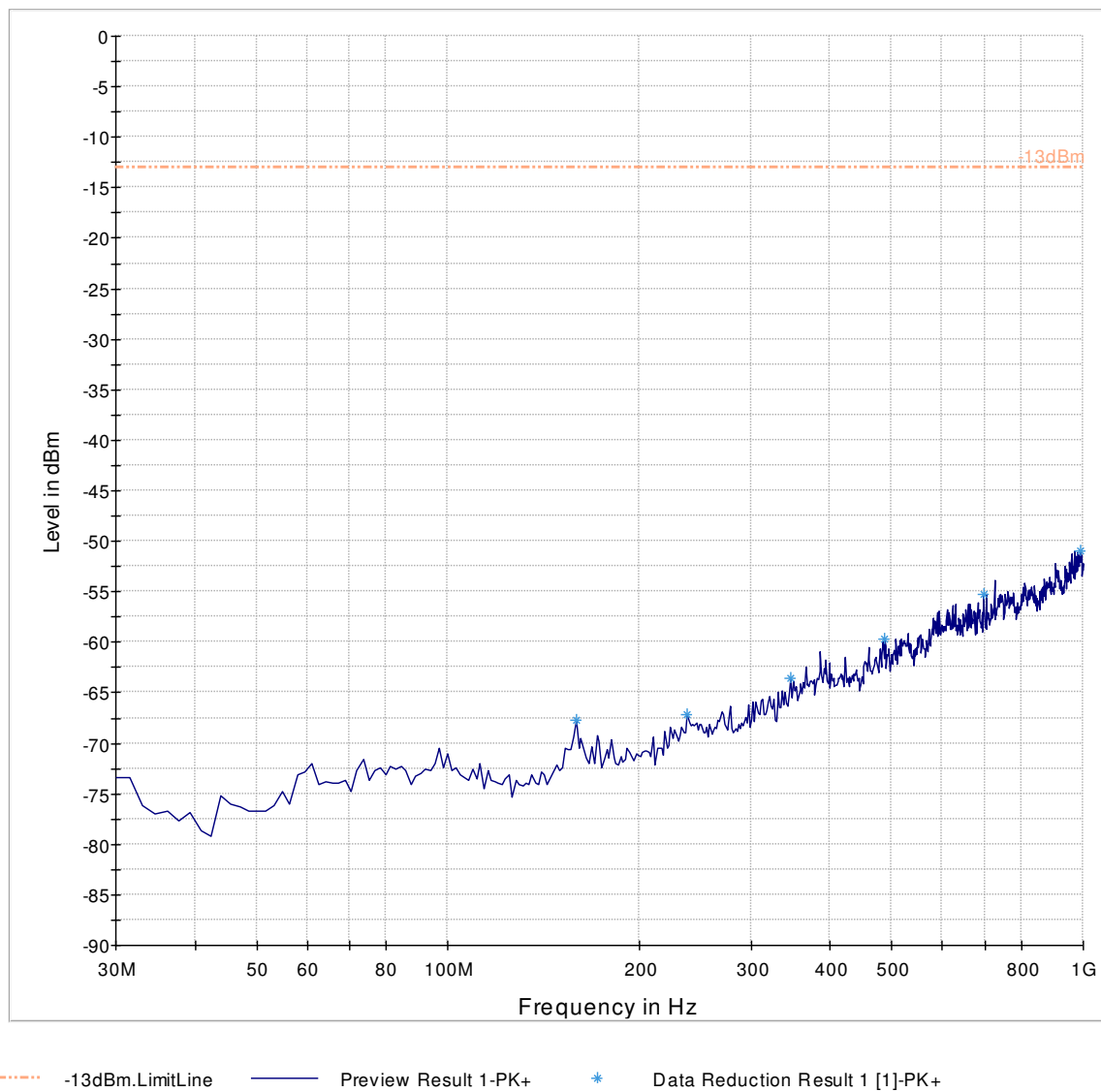
1 GHz – 9 GHz, UMTS FDD V, Tx: Ch. High



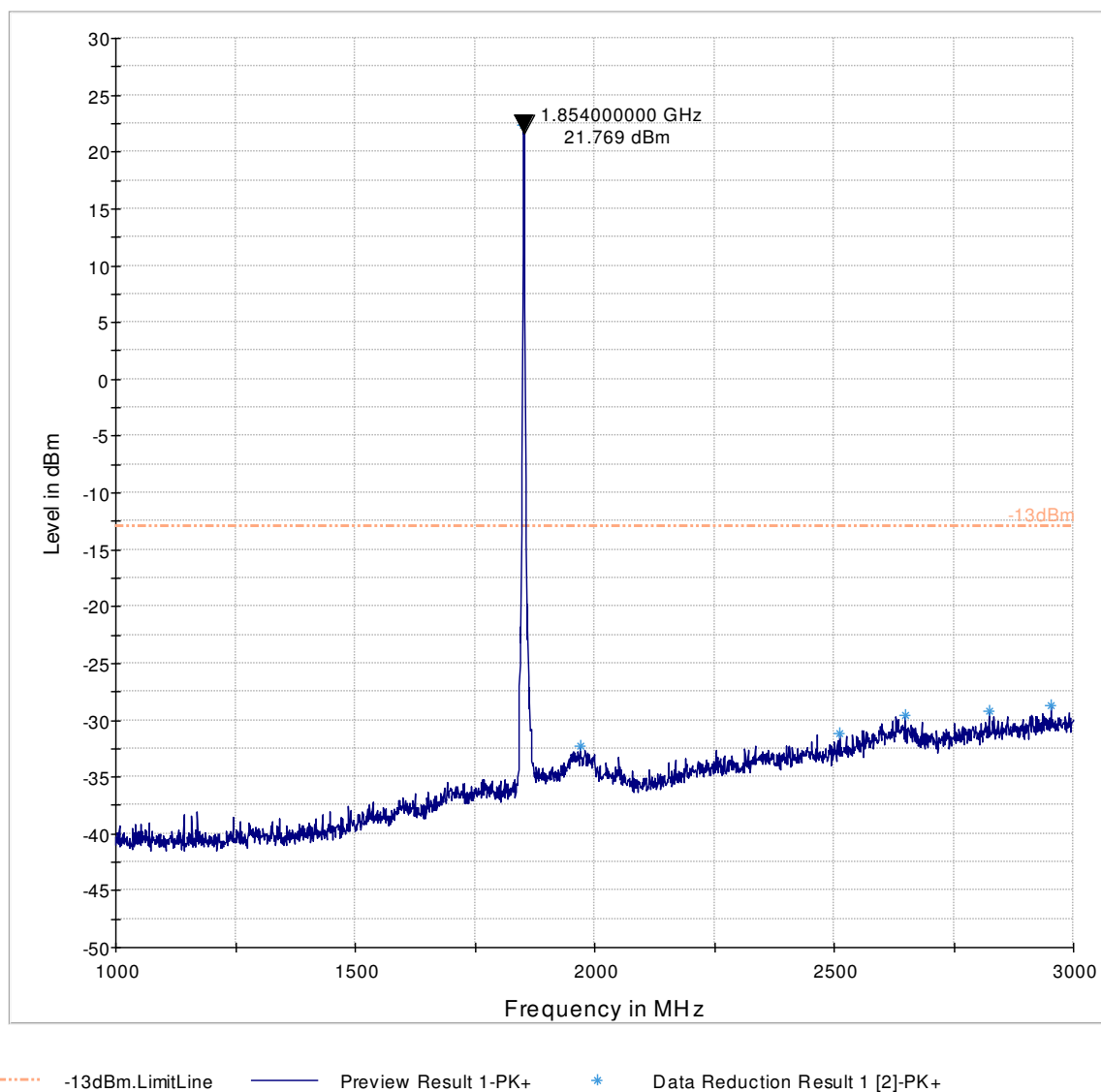
----- -13dBm ——— Preview Result 1-PK+ * Data Reduction Result 1 [2]-PK+

8.6.4 FDD II Plots

30 MHz – 1 GHz, UMTS FDD II, Tx: Ch. Low

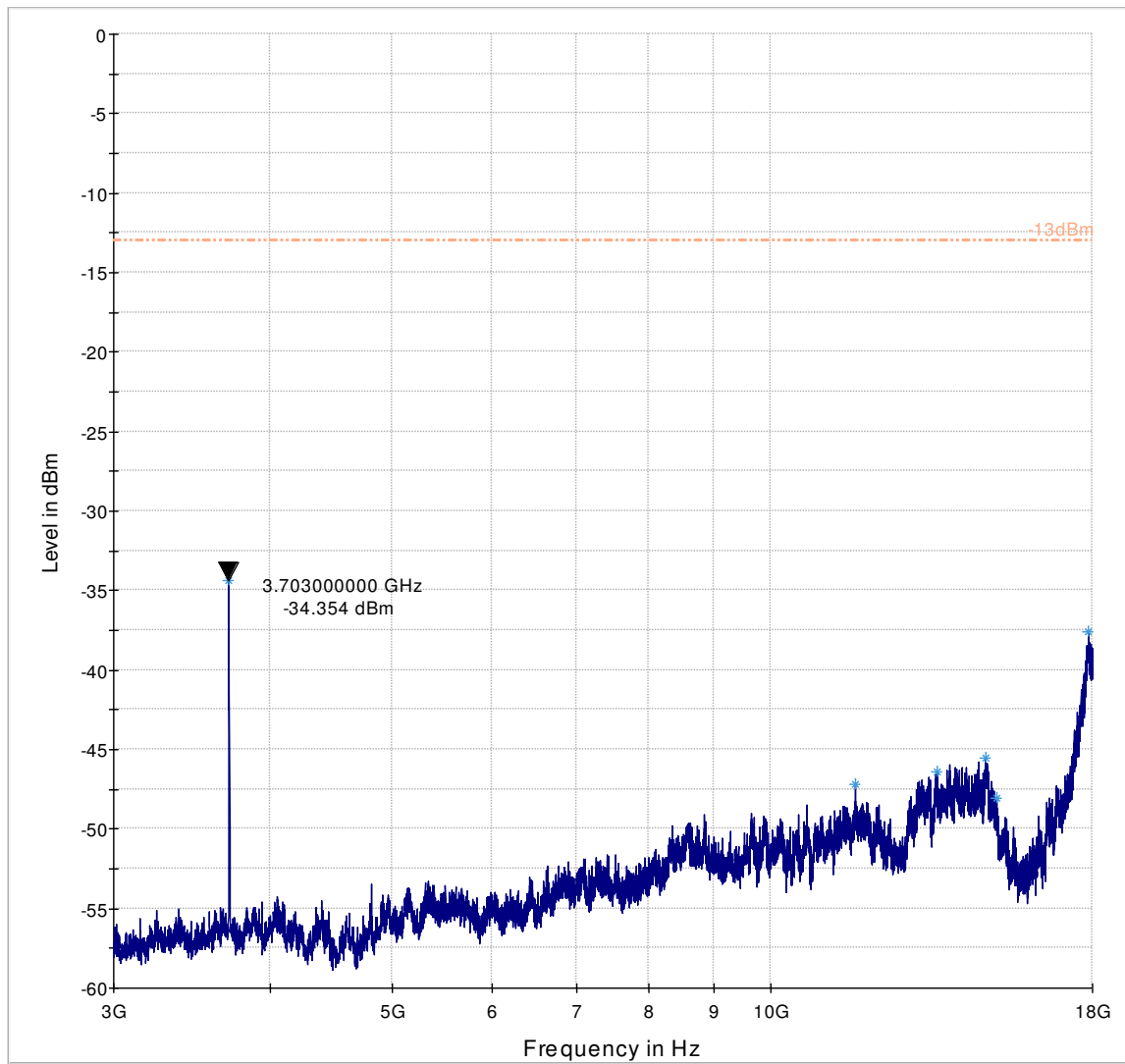


1 GHz – 3 GHz, UMTS FDD II, Tx: Ch. Low



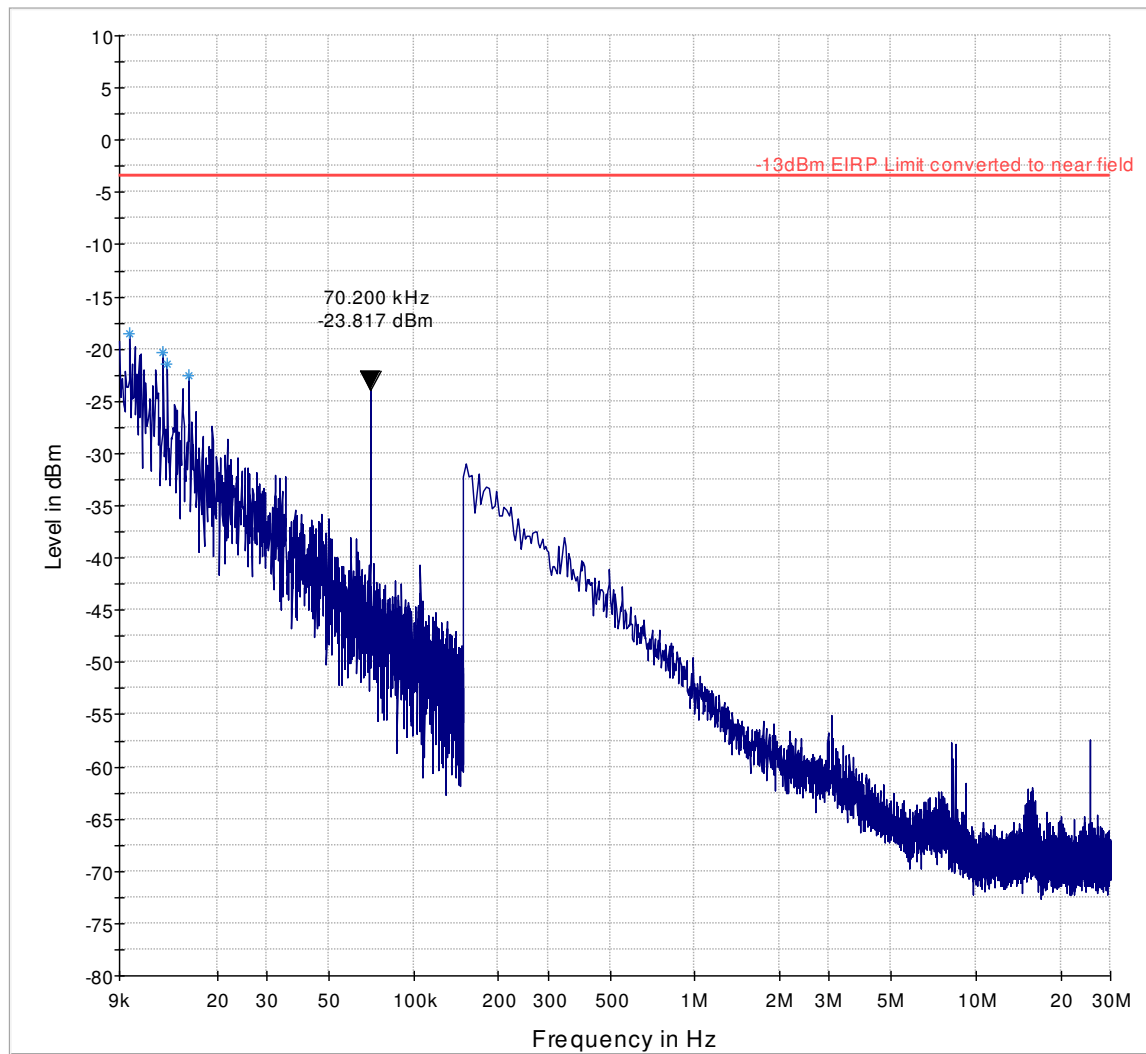
Note: The emission above the limit is the Transmit signal.

3 GHz – 18 GHz, UMTS FDD II, Tx: Ch. Low



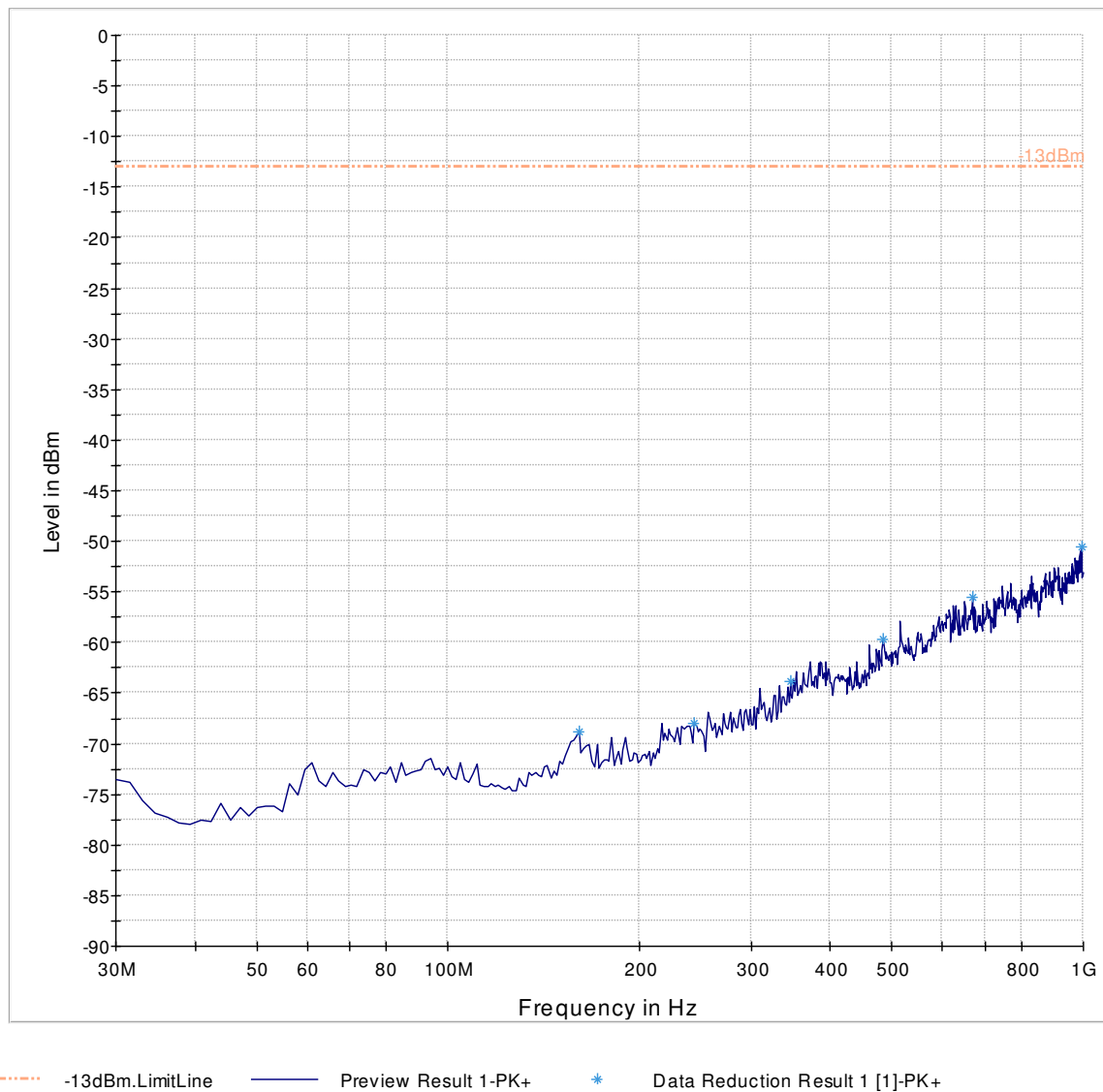
----- -13dBm.LimitLine Preview Result 1-PK+ * Data Reduction Result 1 [3]-PK+

9 KHz – 30 MHz, UMTS FDD II, Tx: Ch. Mid

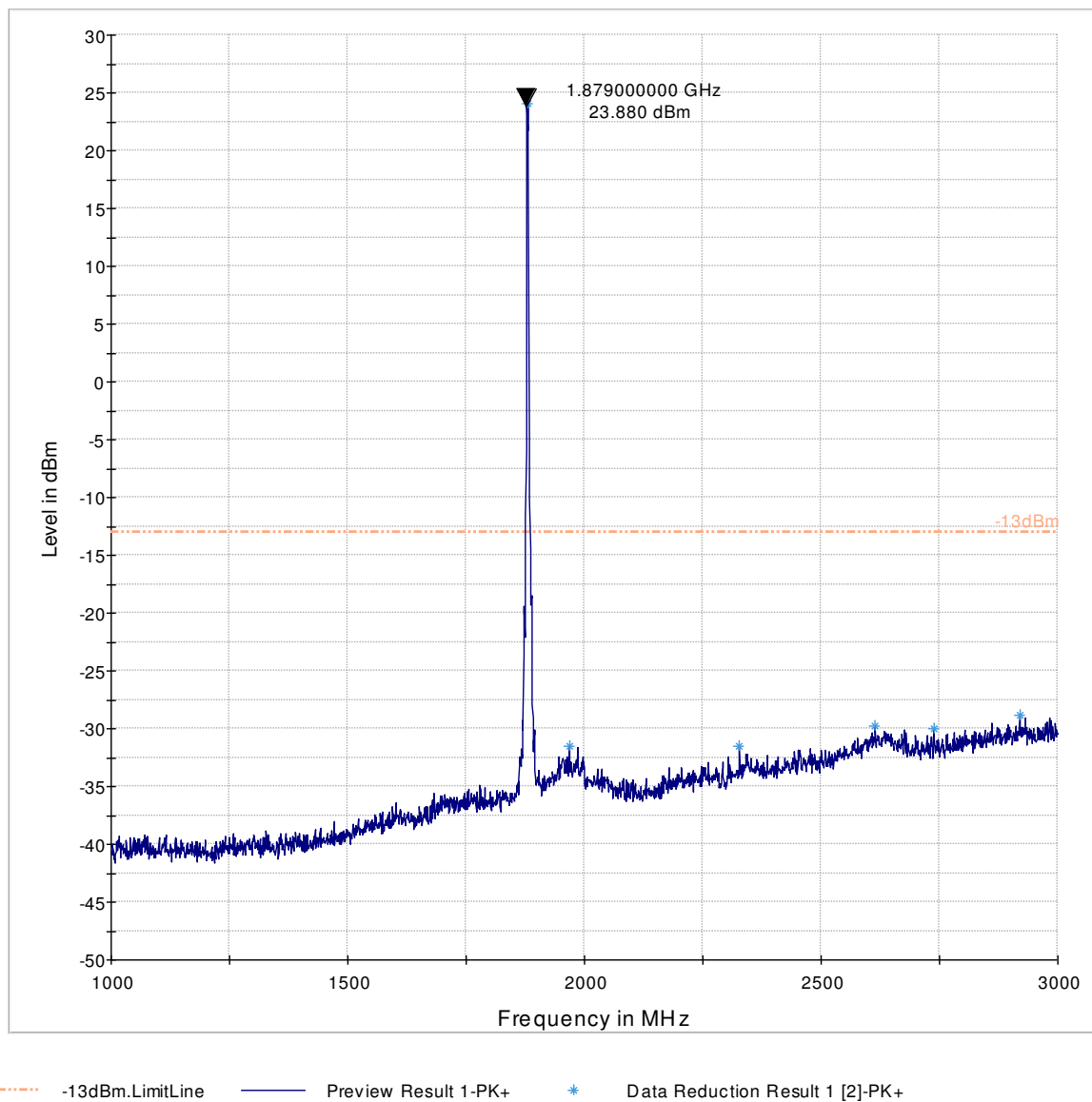


— -13dBm EIRP Limit converted to near field — Preview Result 1-PK+ * Data Reduction Result 1 [1]-PK+

30 MHz – 1 GHz, UMTS FDD II, Tx: Ch. Mid

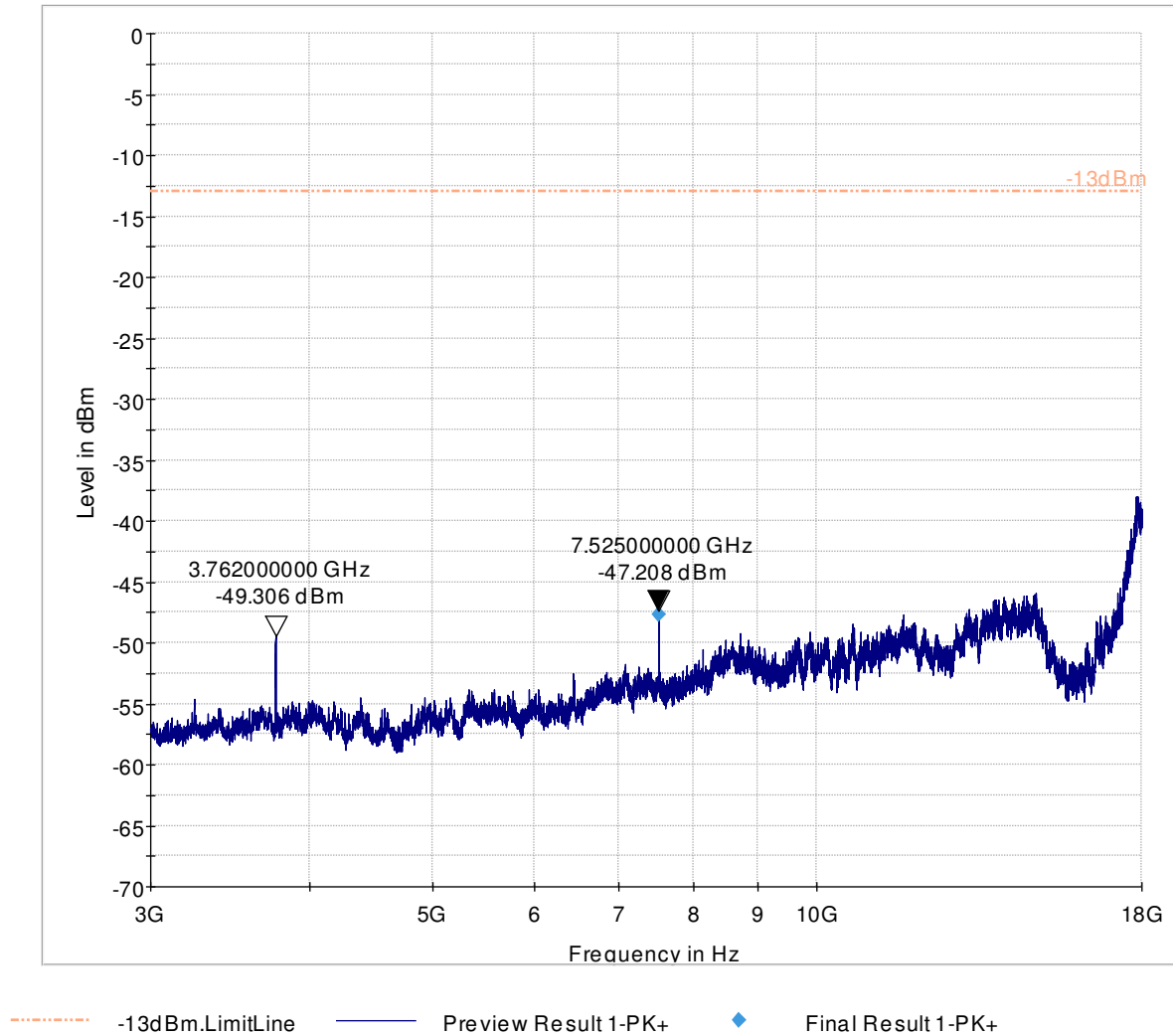


1 GHz – 3 GHz, UMTS FDD II, Tx: Ch. Mid

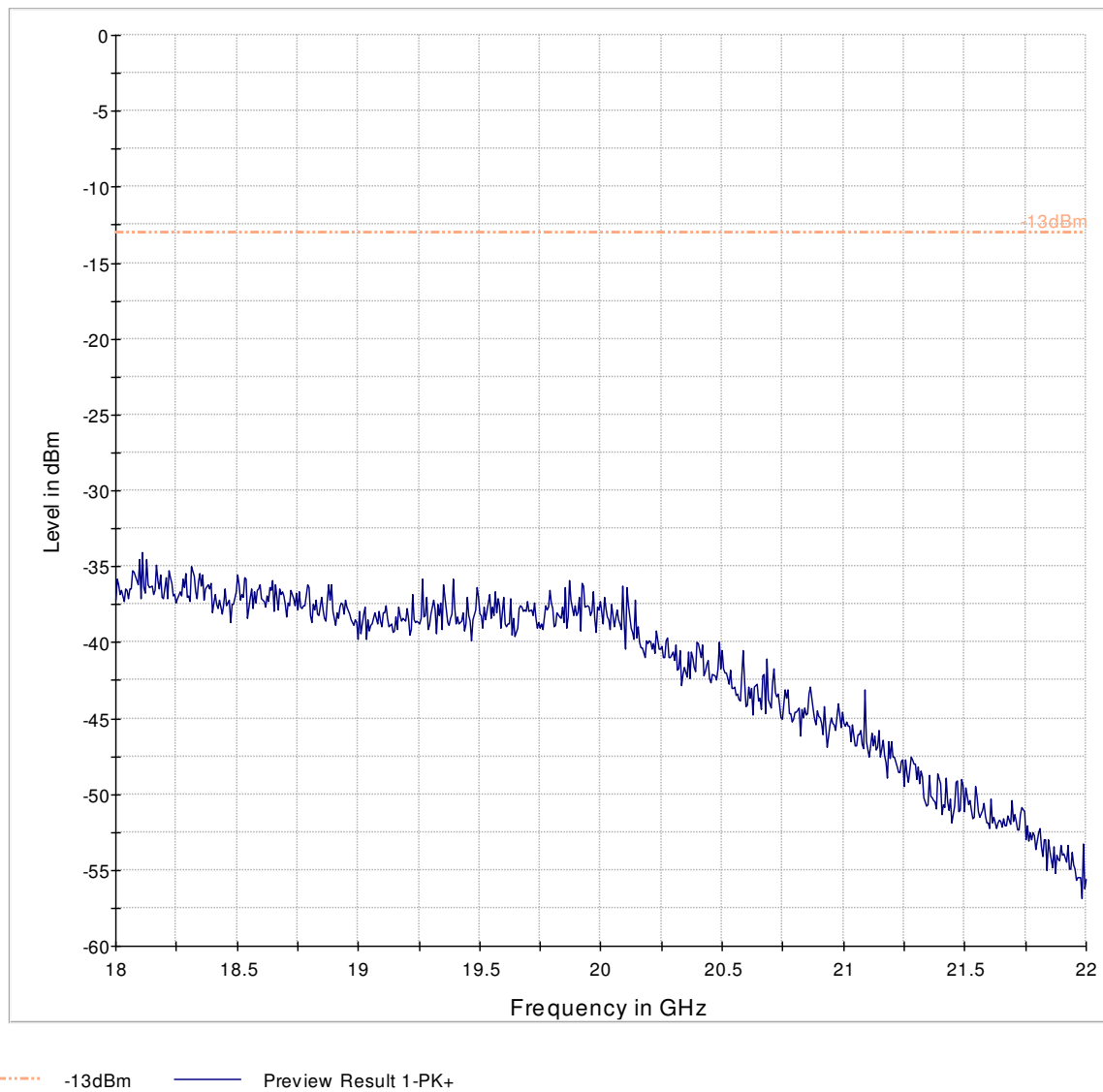


Note: The emission above the limit is the Transmit signal.

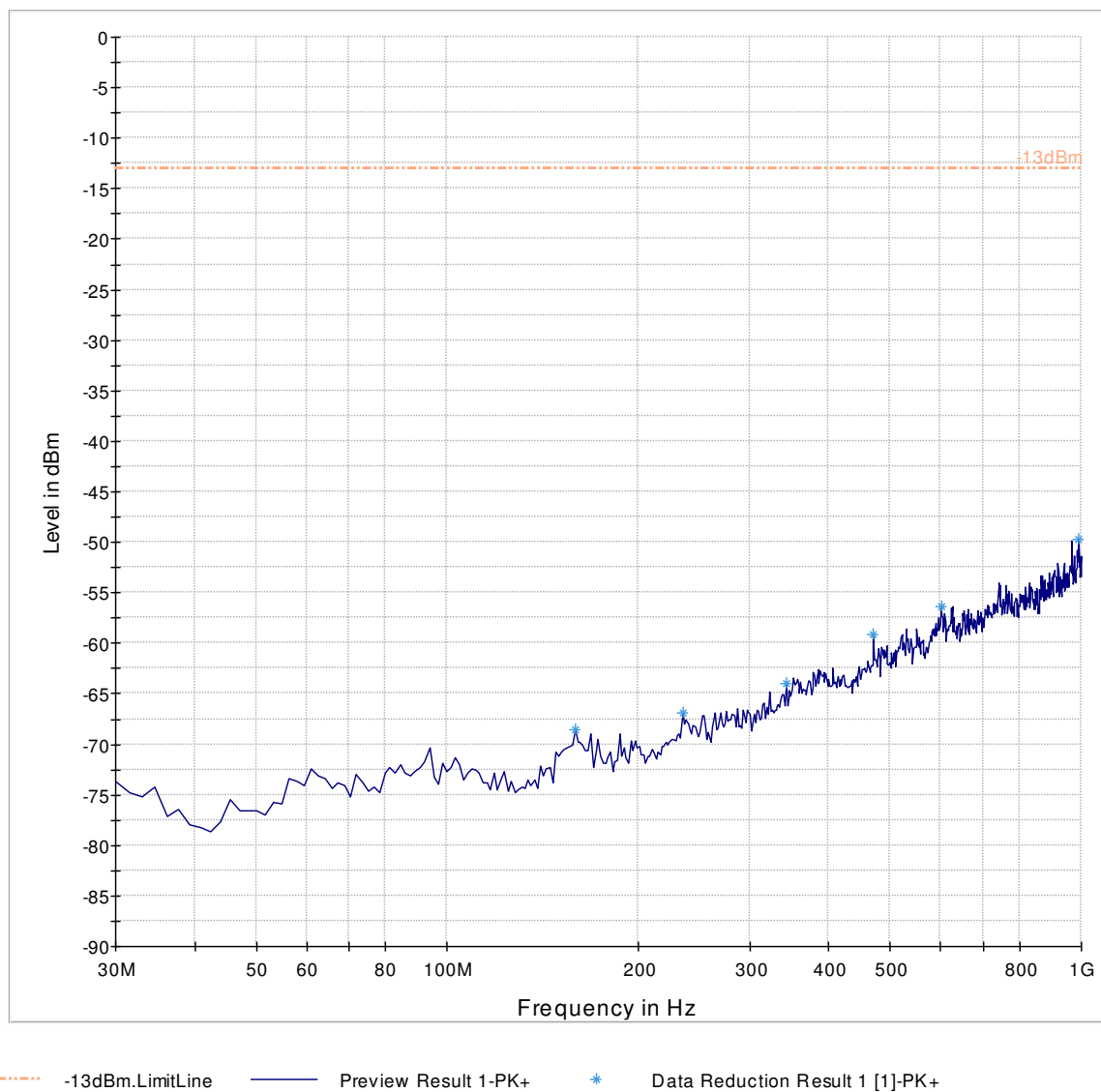
3 GHz – 18 GHz, UMTS FDD II, Tx: Ch. Mid



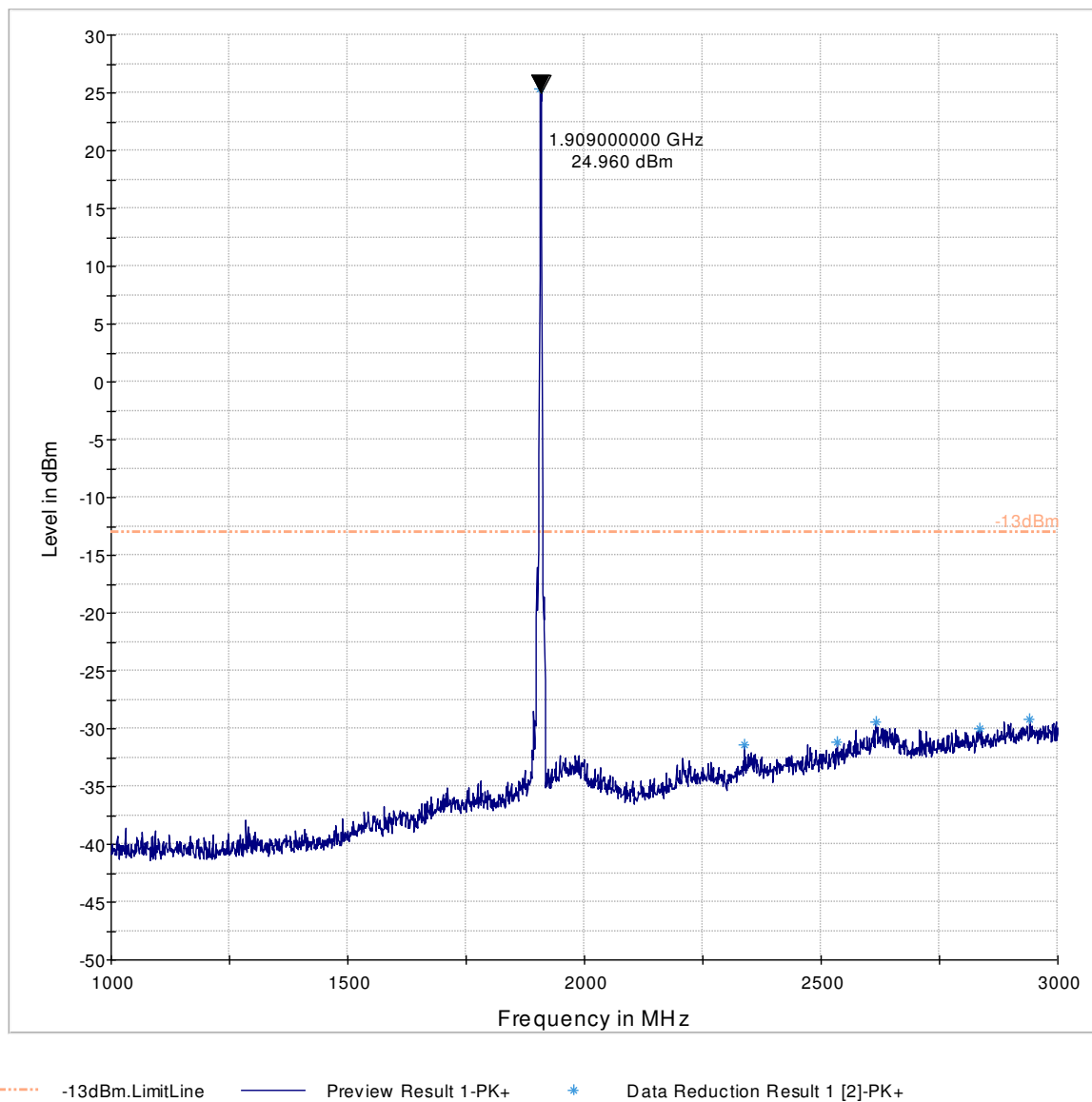
18 GHz -22 GHz, UMTS FDD II, Tx: Ch. Mid



30 MHz – 1 GHz, UMTS FDD II, Tx: Ch. High

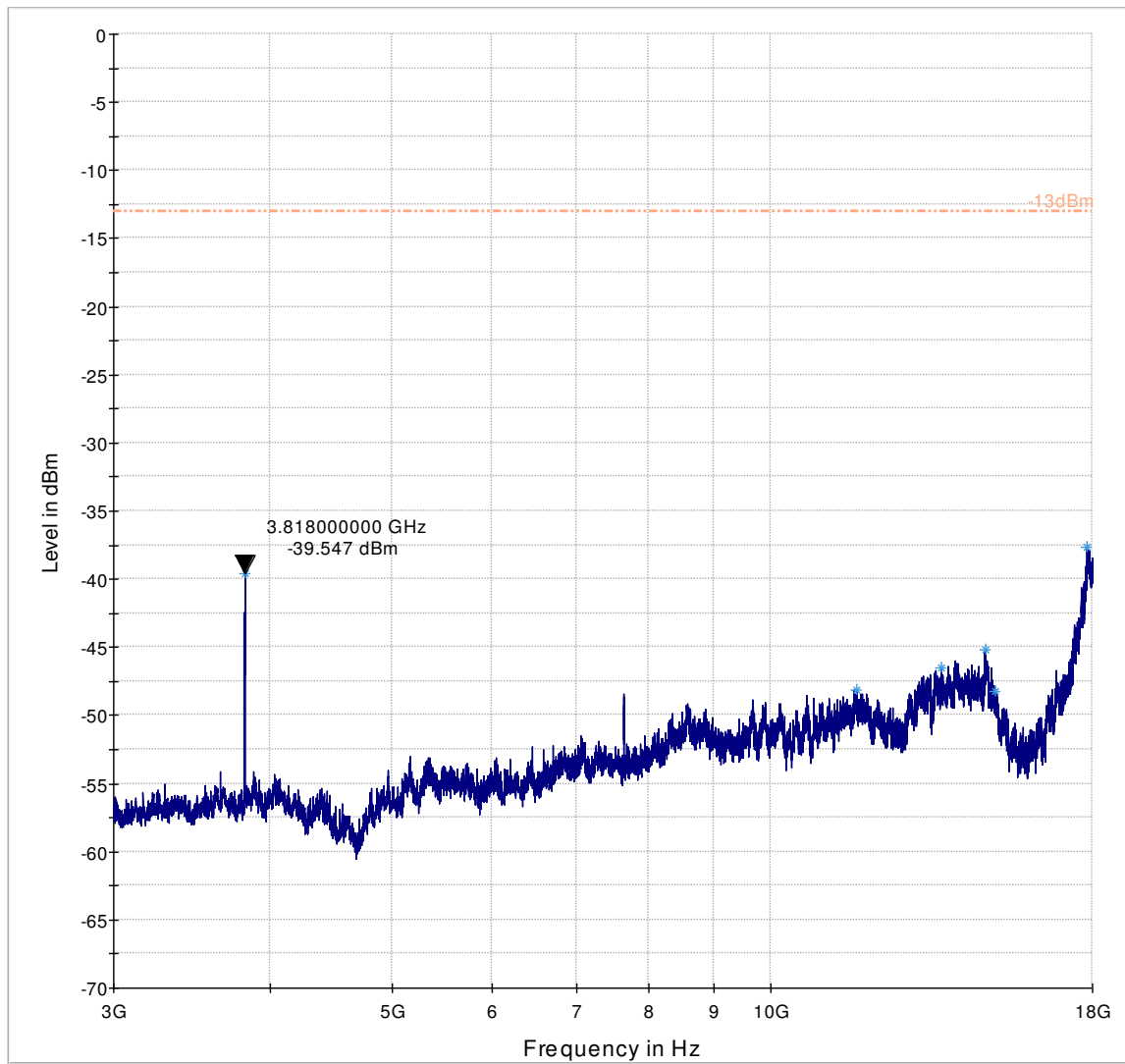


1 GHz – 3 GHz, UMTS FDD II, Tx: Ch. High



Note: The emission above the limit is the Transmit signal.

3 GHz – 18 GHz, UMTS FDD II, Tx: Ch. High



----- -13dBm.LimitLine — Preview Result 1-PK+ * Data Reduction Result 1 [3]-PK+

9 EUT Setup Pictures

Please refer to EMC-SENTR-002-16001-FCC-TestSetupPhotos.pdf

10 Test Equipment and Ancillaries used for tests.

No.	Equipment Name	Manufacturer	Type/model	Serial No.	Cal Date	Cal Interval
3m Semi- Anechoic Chamber:						
	Digital Radio Comm. Tester	Rohde&Schwarz	CMU 200	101821	July 2015	2 Years
	EMC32 Measurement Software	Rohde&Schwarz	8.52.0	N/A	N/A	N/A
	Turn table	EMCO	2075	N/A	N/A	N/A
	MAPS Position Controller	ETS Lindgren	2092	0004-1510	N/A	N/A
	Antenna Mast	EMCO	2075	N/A	N/A	N/A
	Relay Switch Unit	Rohde&Schwarz	RSU	338964/001	N/A	N/A
	EMI Receiver/Analyzer	Rohde&Schwarz	ESU 40	100251	Sep 2015	2 Year
	1500MHz HP Filter	Filtek	HP12/1700	14c48	N/A	N/A
	2800 MHz HP Filter	Filtek	HP12/2800	14C47	N/A	N/A
	Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
	Binconilog Antenna	EMCO	3141	0005-1186	Apr 2015	3 Years
	Horn Antenna	EMCO	3115	35114	Mar 2015	3 Years
	Horn Antenna	ETS Lindgren	3116	70497	Mar 2015	3 Years
	Spectrum Analyzer	Rohde&Schwarz	FSU	100189	Jun 2015	2 Years
	Loop Antenna 6512	ETS Lindgren	6512	49838	Mar 2014	3 Years
Ancillary equipment						
	Humidity Temperature Logger	Dickson	TM320	03280063	Apr 2015	2 Year
	Communication Antenna	IBP5-900/1940	Kathrein	N/A	N/A	N/A

11 Revision History

Date	Report Name	Changes to Report	Report prepared by
Oct. 20, 2016	EMC-SENTR-002-16001-FCC-22-24	First Version	James Donnellan
Nov 30, 2016	EMC-SENTR-002-16001-FCC-22-24-Rev1	Updated approver	James Donnellan