FCC/ISED Test Report

FOR:
Telular Corporation

Model Name:
SCR GXT5002C

Product Description:
The GXT5002C is a solar powered GPS asset management solution that provides enhanced asset utilization and cargo visibility

FCC ID: MTFGXT5002C
IC ID: 2175D-GXT5002C

Per:
47 CFR: Part 22, Part 24, Part 27
RSS-130; RSS-132 Issue 3; RSS-133 Issue 6; RSS-139 Issue 3

REPORT #: EMC_TELUL-076-19001_FCC_22_24_27_ISED

DATE: 2019-08-29

A2LA Accredited

IC recognized # 3462B-2

***CETECOM* Inc.**
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1 Assessment

The following device as further described in section 3 of this report was evaluated for radiated spurious emissions in simultaneous transmission of cellular and unlicensed radios according to criteria specified in the Code of Federal Regulations Title 47 parts 22, 24, 27 and Industry Canada Radio Standard Specifications RSS: 130, 132 Issue 3, 133 Issue 6 and 139 Issue3.

Company	Description	Model #
Telular Corporation	The GXT5002C is a solar powered GPS asset management solution that provides enhanced asset utilization and cargo visibility	GXT5002C

No deficiencies were ascertained.

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2019-08-29	Compliance	Cindy Li (Lab Manager)	Cindy Li Digitally signed by cindy.li@cetecom.com DN: CN=cindy.li@cetecom.com Reason: I am approving this document Location: Date: 2019-08-29 15:53:29

Responsible for the Report:

Date	Section	Name	Signature
2019-08-29	Compliance	Chin Ming Lui (Associate EMC Engineer)	Chin Ming Lui Digitally signed by: Chin Ming Lui DN: CN = Chin Ming Lui email = ChinMing.Lui@cetecom.com C = US O = CETECOM Date: 2019.08.29 15:44:46 -07'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Lab Manager:	Cindy Li
Responsible Project Leader:	Cathy Palacios

2.2 Identification of the Client

Applicant's Name:	Telular Corporation
Street Address:	3225 Cumberland Blvd, Suite 300
City/Zip Code	Atlanta, GA 30339
Country	USA

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 EUT Specifications

Firmware Version Identification Number (FVIN):	CM.00.01.1025
Hardware Version Identification Number (HVIN):	REV C
Product Marketing Name (PMN):	Falcon GXT5002C
Antenna (Primary & Diversity) Information as declared:	Ethertronics P822601, Gain: 2 dBi
Other Radios included in the device:	❖ ISM • Module: SiLab EFR32 • Model Number: EFR32FG1P131F256GM32 • Modulation: 2GFSK • Main Antenna: ▪ Type: Small Helix ▪ Location: Internal ▪ Gain: 0.8 dBi ▪ Operating Frequency: 902 – 928 MHz ❖ GPS • Module: Quectel L80 • Antenna location: Internal
Power Supply/ Rated Operating Voltage Range:	Battery / Low 6.2 VDC, Nominal 12 VDC, High 17 VDC
Operating Temperature Range:	Low -30º C, High 70º C
Sample Revision	☐Prototype Unit; ■Production Unit; ☐Pre-Production
EUT Dimensions(inches):	1.5” (H) x 3.75” (W) x 21.5” (L)
Weight(lbs):	3 lbs
EUT Diameter	■ < 60 cm ☐ Other _____

Module Information	
Module Name:	Sierra Wireless
Model Number:	HL7688
FCC/IC ID:	FCC ID: N7NHL7688 IC ID: 2417C-HL7688
Frequency Band of Operation:	FDD LTE 2, 4, 5, 17 FDD UMTS II, V
Main Antenna:	Type: Ethertronics P822601 Location: Internal Gain: 2 dBi

3.2 EUT Sample details

EUT #	IMEI number	HW Version	SW Version	Notes/Comments
1	GXL7ESPD180464594	REV C	CM.00.01.1025	Radiated Measurement
2	GXL7ESPD180464717	REV C	CM.00.01.1025	Radiated Measurement

3.3 Support Equipment

SE #	Type	Model	Manufacturer	Serial Number
1	DC Power Supply	1672	BK PRECISION	1672002260611085
2	Debug Board and Cable	Interposer Rev XA	Telular Corporation	IMAG 94V-0 BD02 3616

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT# 1 or EUT #2	Radiated RF measurements were performed with these units configured via customer provided SW and instructions

3.5 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	Cellular and ISM Co-Transmission	Cellular was tested on Low, Mid, High Channels at the maximum power in a co-transmission mode ISM radio was configured to Low channel using special commands through command window provided by the client that will not be available to the end user

3.6 Justification for Worst Case Mode of Operation

During the testing process the EUT was tested with transmitter sets on low, mid and high channels at the maximum power simultaneous transmission with ISM radio Low channel, which is the worst case of the radios supported, based on the maximum average conducted output power from the reports.

For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

4 Subject of Investigation

The objective of the evaluation conducted by CETECOM Inc. is to support a request for new equipment authorization under **FCC ID:** MTFGXT5002C / **IC ID**: 2175D-GXT5002C.

The pre-certified module to be integrated (Sierra Wireless HL7688) as described in Section 3, Radiated Spurious Emissions test was performed. Results have been checked to meet limits per Code of Federal Regulations Title 47 parts 22, 24, 27 and Industry Canada Radio Standard Specifications RSS: 130, 132 Issue 3, 133 Issue 6 and 139 Issue 3.

4.1 Dates of Testing:

08/16/2019 – 08/22/2019

4.2 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)

4.3 Environmental Conditions during Testing:

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

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

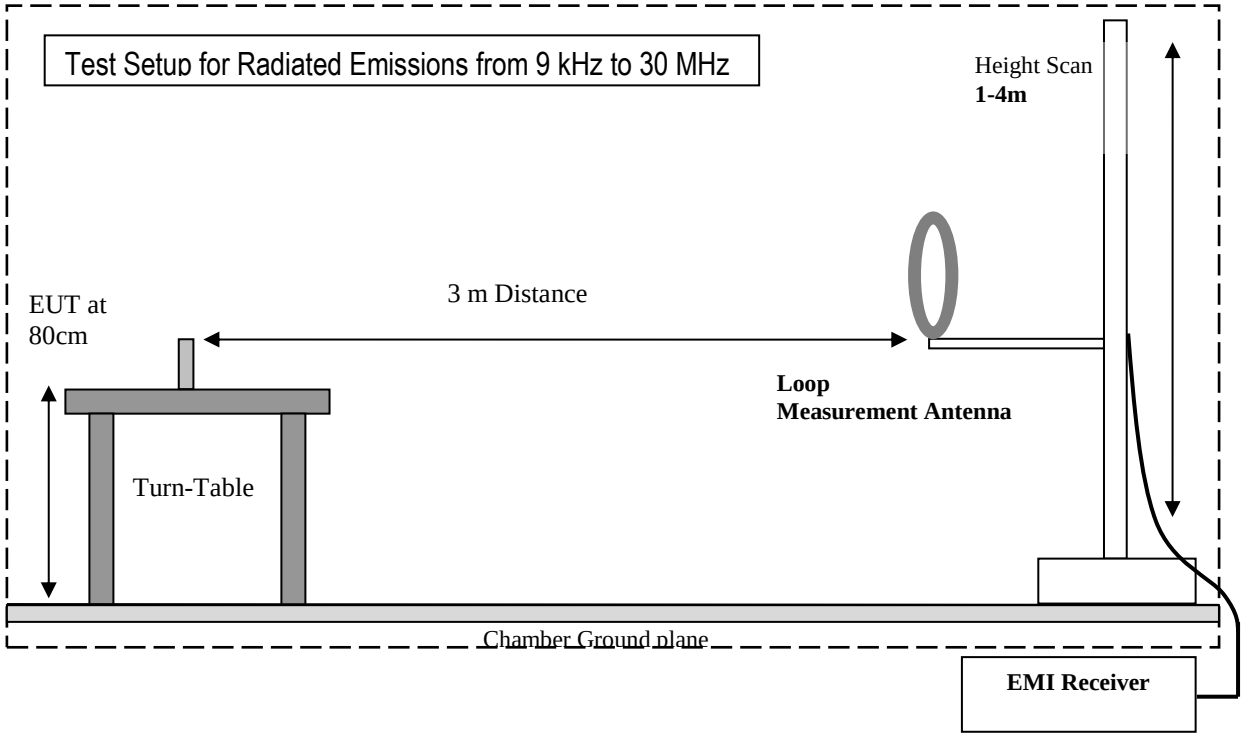
Deviating test conditions are indicated at individual test description where applicable.

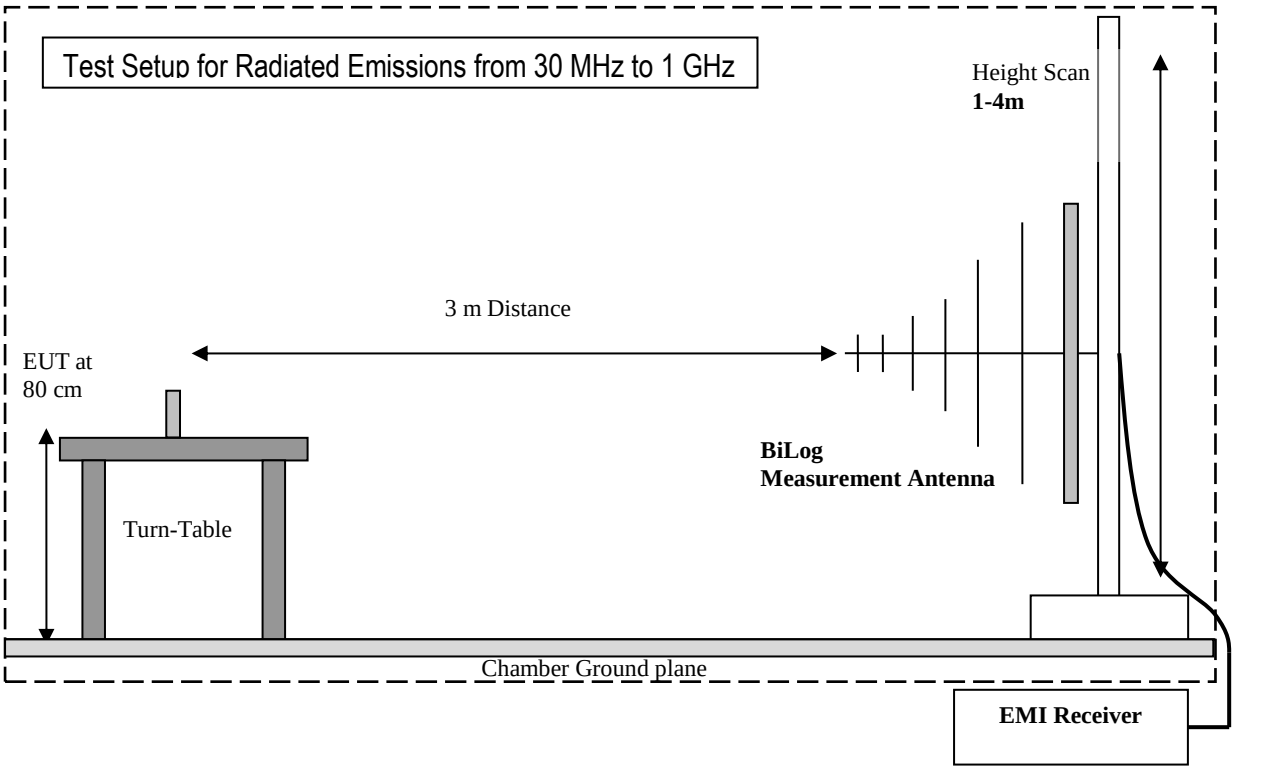
5 Measurement Procedures

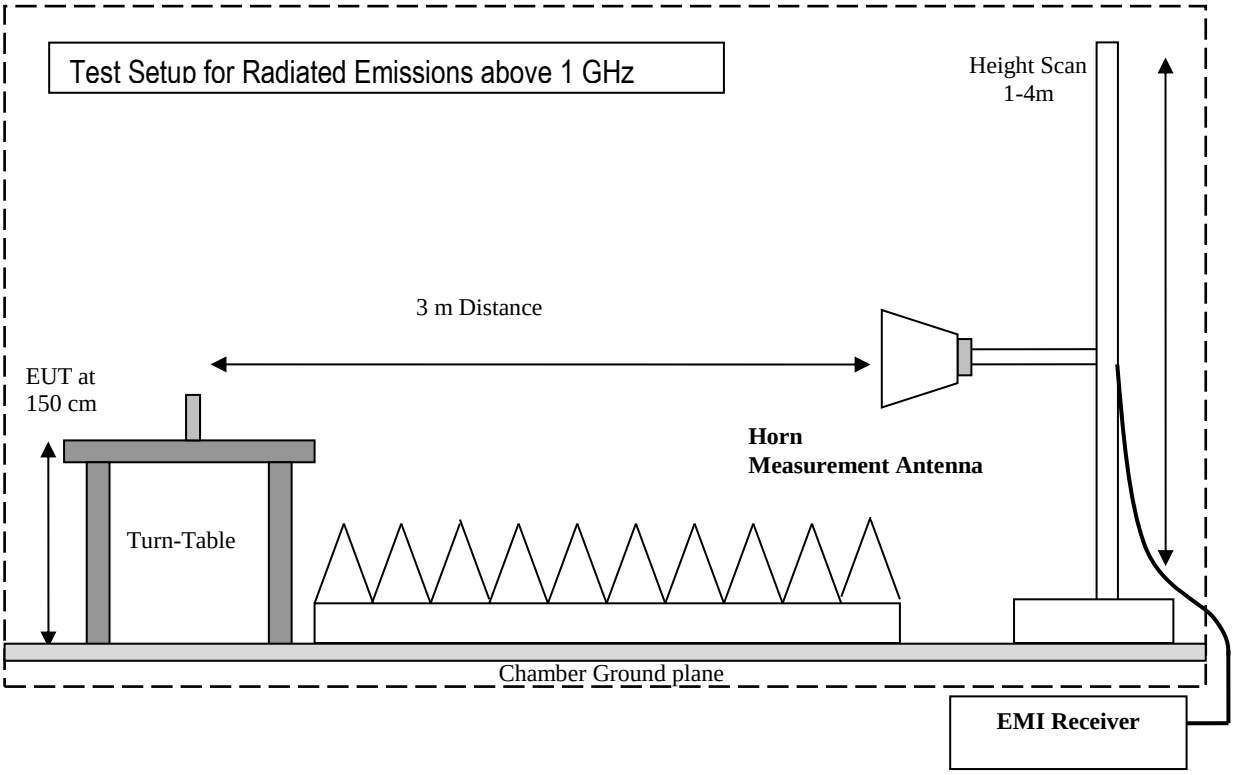
Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v03 – "Measurement Guidance for Certification of Licensed Digital Transmitters" and according to ANSI C63.26 as detailed below.

5.1 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.




Test Setup for Radiated Emissions from 30 MHz to 1 GHz
Height Scan
1-4m
3 m Distance
EUT at
80 cm
BiLog
Measurement Antenna
Turn-Table
Chamber Ground plane
EMI Receiver


Test Setup for Radiated Emissions above 1 GHz
Height Scan
1-4m
3 m Distance
EUT at
150 cm
Horn
Measurement Antenna
Turn-Table
Chamber Ground plane
EMI Receiver

5.2 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 dBµV
- 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:

FS (dBµV/m) = Measured Value on SA (dBµV)- Cable Loss (dB)+ Antenna Factor (dB/m)

Example:

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

6 Measurement Results Summary

6.1 FCC 22, RSS-132:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §22.913 (a)	RF Output Power	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1055; §22.355	Frequency Stability	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1049; §22.917	Occupied Bandwidth	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1051; §22.917	Band Edge Compliance	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1051; §22.917	Conducted Spurious Emissions	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1053; §22.917(a); RSS-132 Issue 3-5.5;	Radiated Spurious Emissions	Nominal	Op.1	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.
Note 2: Leveraged from module certification Sierra Wireless HL7688 (FCC ID: N7NHL7688, IC ID: 2417C-HL7688)

6.2 FCC 24, RSS-133:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §24.232 (a)	RF Output Power	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1055; §24.235	Frequency Stability	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1049; §24.238	Occupied Bandwidth	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1051; §24.238	Band Edge Compliance	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1051; §24.238	Conducted Spurious Emissions	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1053; §24.238(a); RSS-133 Issue 6-6.5.1;	Radiated Spurious Emissions	Nominal	Op.1	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.
Note 2: Leveraged from module certification Sierra Wireless HL7688 (FCC ID: N7NHL7688, IC ID: 2417C-HL7688)

6.3 FCC 27, RSS-130, RSS-139:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §27.50 (d)	RF Output Power	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1055; §27.54	Frequency Stability	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1049; §27.53	Occupied Bandwidth	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1051; §27.53	Band Edge Compliance	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1051; §27.53	Conducted Spurious Emissions	Nominal	-	☐	☐	☐	■	Complies Note 1 Note 2
§2.1053; §27.53(g); §27.53(h); RSS-130 Issue 1-4.6; RSS-139 Issue 3-6.6;	Radiated Spurious Emissions	Nominal	Op.1	■	☐	☐	☐	Complies

Note 1: NA= Not Applicable; NP= Not Performed.
Note 2: Leveraged from module certification Sierra Wireless HL7688 (FCC ID: N7NHL7688, IC ID: 2417C-HL7688)

7 Test Result Data

7.1 ERP/EIRP

FCC Rule Parts	Band	Frequency Range (MHz)	Power conducted (W)	Gain (dBi)	Gain Linear	EIRP (W)	ERP (W)	Frequency deviation (ppm)	Emission Designator	Limit EIRP (W)	Limit ERP (W)
24E	UMTS II	1852.4 – 1907.6	0.247	2	1.585	0.391	-	0.013	4M10F9W	2	-
24E	LTE 2	1850 – 1910	0.239	2	1.585	0.378	-	0.013	13M5G7D	2	-
27	LTE 4	1710 – 1755	0.223	2	1.585	0.353	-	0.014	13M5G7D	1	-
22H	UMTS V	826.4 – 846.6	0.216	2	1.585	0.343	0.209	0.022	4M10F9W	-	7
22H	LTE 5	824 – 849	0.201	2	1.585	0.318	0.194	0.03	1M09G7D	-	7
27	LTE 17	704 – 716	0.192	2	1.585	0.304	0.185	0.032	4M52G7D	-	3

Note: ERP/EIRP are based on calculations for highest emissions from maximum conducted output power in grant of cellular module Sierra Wireless HL7688 (FCC ID: N7NHL7688 / IC ID: 2417C-HL7688) by adding the declared maximum gain of the utilized cellular antenna per operational description.

7.2 Radiated Spurious Emissions

7.2.1 Measurement according to FCC: CFR 47 Part 2.1053; CFR Part 22.917; CFR Part 24.238, Part 27.53 utilizing KDB 971168 D01 Power Meas License Digital Systems v03, and according to ANSI C63.26 2017

Spectrum Analyzer Settings for FCC 22

Frequency Range	30 MHz – 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

7.2.2 Limits:

- **FCC Part 22.917(a) and Part 24.238(a), Part 27.53 (g), and Part 27.53 (h)**
- **RSS-130-4.6, RSS-132 Issue 3 5.5, RSS-133 Issue 6 6.5.1, RSS-139 Issue 3 6.6**

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)

7.2.3 Test conditions and setup:

Ambient Temperature (°C)	**EUT operating mode**	**Power Input**
24.3	Op. 1	12 VDC

7.2.4 Measurement result:

Plot #	Cellular Channel	EUT operating mode	Scan Frequency	Critical Frequency [MHz]	Emission level [dBm]	Limit [dBm]	Result
1 – 3	Low	UMTS II	30 MHz – 18 GHz	2759.093	-24.772	-13	Pass
4 – 8	Mid	UMTS II	9 kHz – 26 GHz	2786.036	-29.907	-13	Pass
9 – 11	High	UMTS II	30 MHz – 18 GHz	2814.165	-26.789	-13	Pass
12 – 14	Low	LTE 2	30 MHz – 18 GHz	2756.295	-27.946	-13	Pass
15 – 19	Mid	LTE 2	9 kHz – 26 GHz	2781.639	-27.547	-13	Pass
20 – 22	High	LTE 2	30 MHz – 18 GHz	2818.304	-26.347	-13	Pass
23 – 25	Low	LTE 4	30 MHz – 18 GHz	1725.590	-32.680	-13	Pass
26 – 29	Mid	LTE 4	9 kHz – 18 GHz	2640.455	-27.108	-13	Pass
30 – 32	High	LTE 4	30 MHz – 18 GHz	2658.362	-30.615	-13	Pass
33 – 35	Low	UMTS V	30 MHz – 9 GHz	1810.150	-32.183	-13	Pass
36 – 39	Mid	UMTS V	9 kHz – 9 GHz	1809.805	-32.227	-13	Pass
40 – 42	High	UMTS V	30 MHz – 9 GHz	1809.440	-33.906	-13	Pass
43 – 45	Low	LTE 5	30 MHz – 9 GHz	1810.290	-32.664	-13	Pass
46 – 49	Mid	LTE 5	9 kHz – 9 GHz	1810.140	-32.462	-13	Pass
50 – 52	High	LTE 5	30 MHz – 9 GHz	1810.430	-33.762	-13	Pass
53 – 55	Low	LTE 17	30 MHz – 9 GHz	1809.590	-33.470	-13	Pass
56 – 59	Mid	LTE 17	9 kHz – 9 GHz	0.944	-23.793	-13	Pass
60 – 62	High	LTE 17	30 MHz – 9 GHz	1810.345	-32.647	-13	Pass

7.2.5 Measurement Plots:

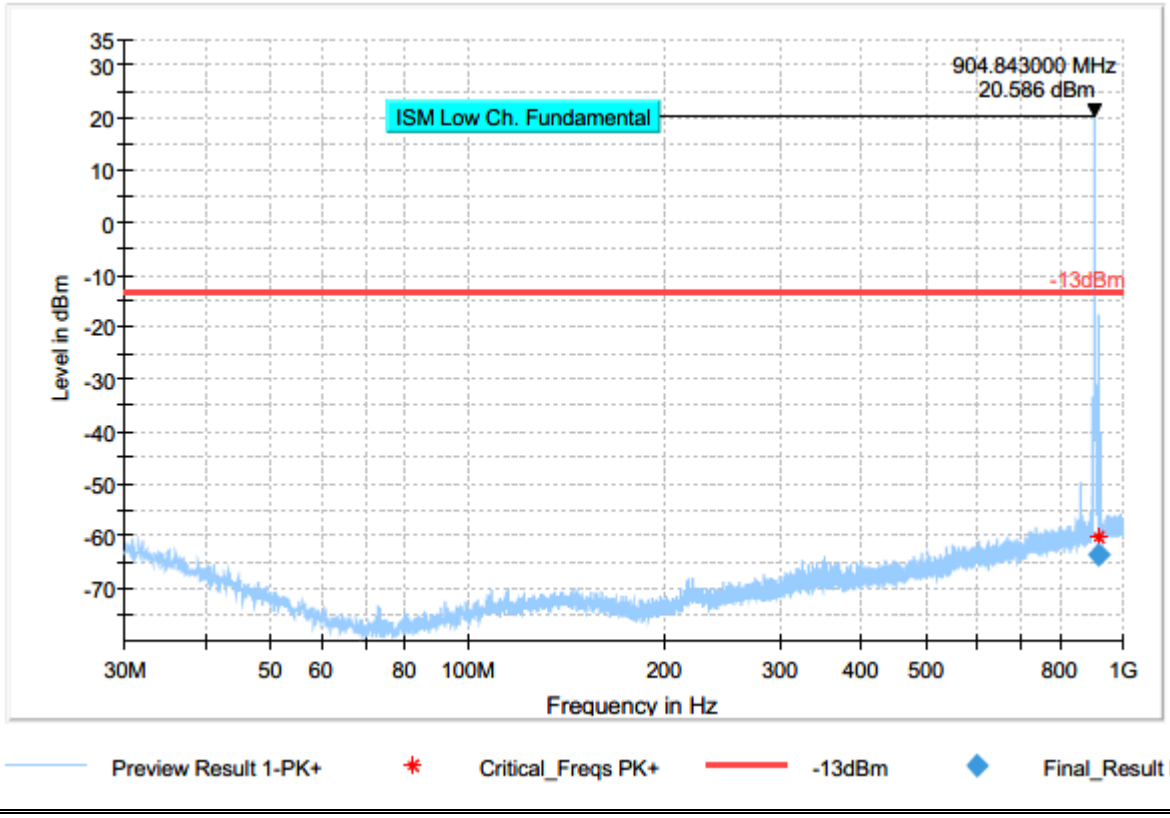
UMTS II

Plot # 1 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.668	-63.417	-13.00	50.42	200.0	100.000	188.0	H	27.0	-88.9	3:27:58 PM - 8/22/2019

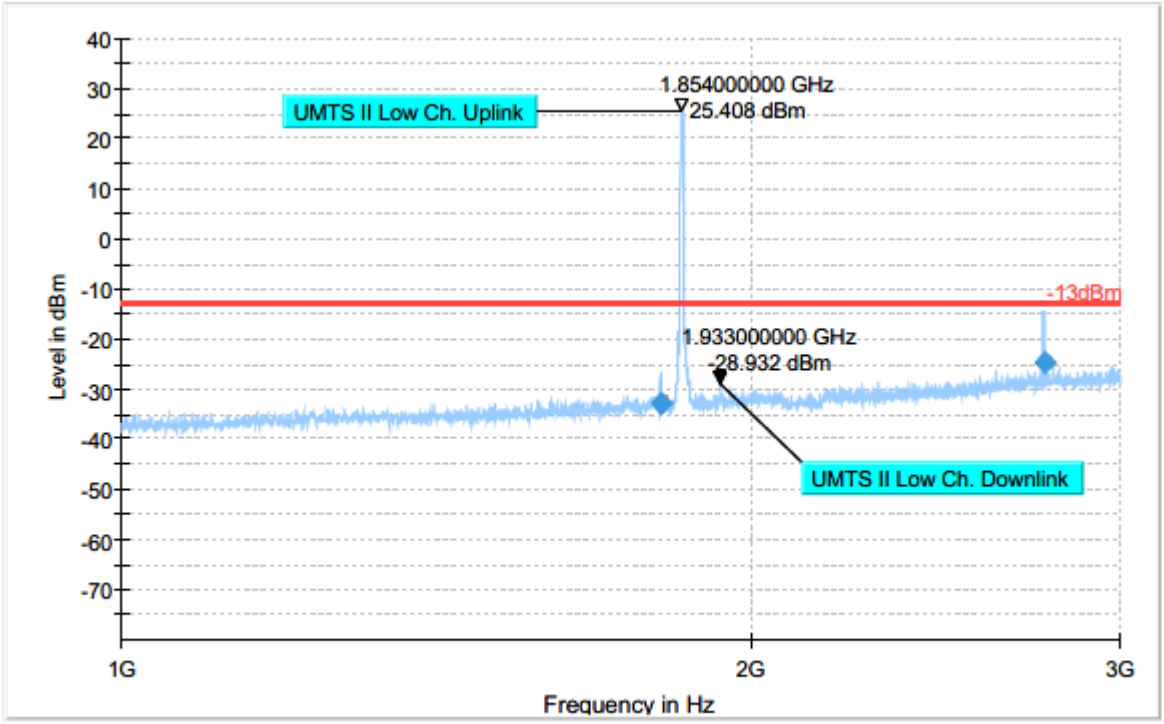


Plot # 2 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.208	-32.880	-13.00	19.88	500.0	1000.000	191.0	H	-36.0	-90.8	3:55:41 PM - 8/21/2019
2759.093	-24.772	-13.00	11.77	500.0	1000.000	171.0	H	-31.0	-87.9	3:59:01 PM - 8/21/2019

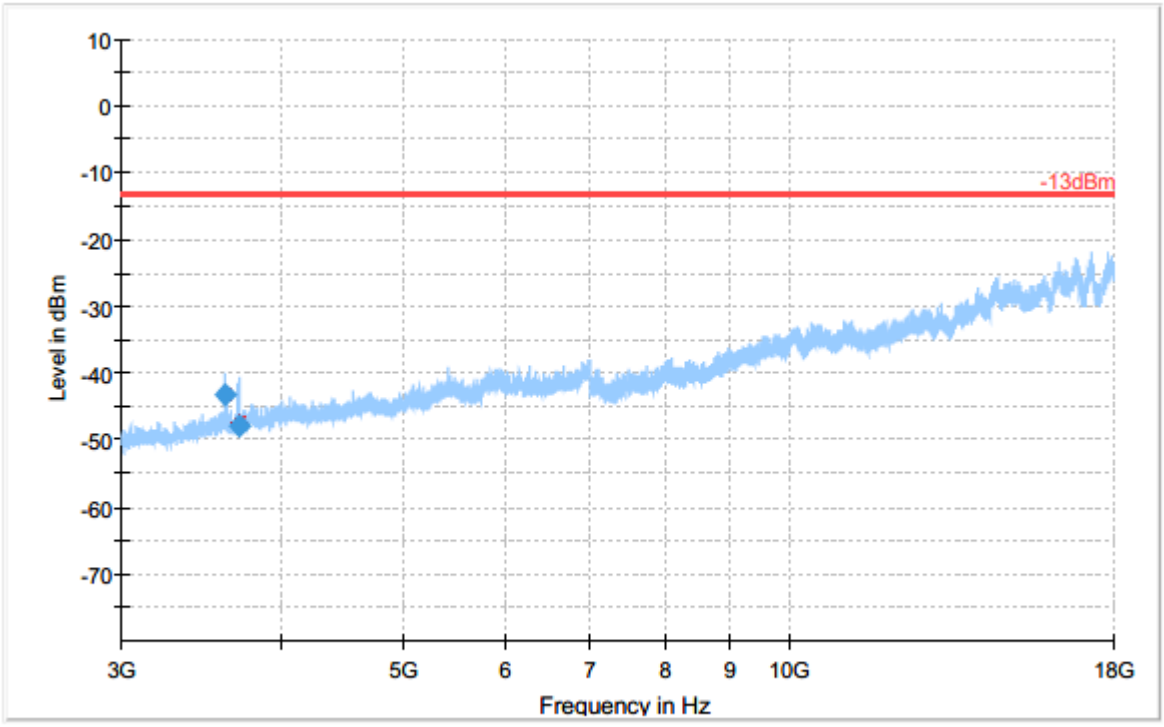


Plot # 3 Radiated Emissions: 3 GHz - 18 GHz

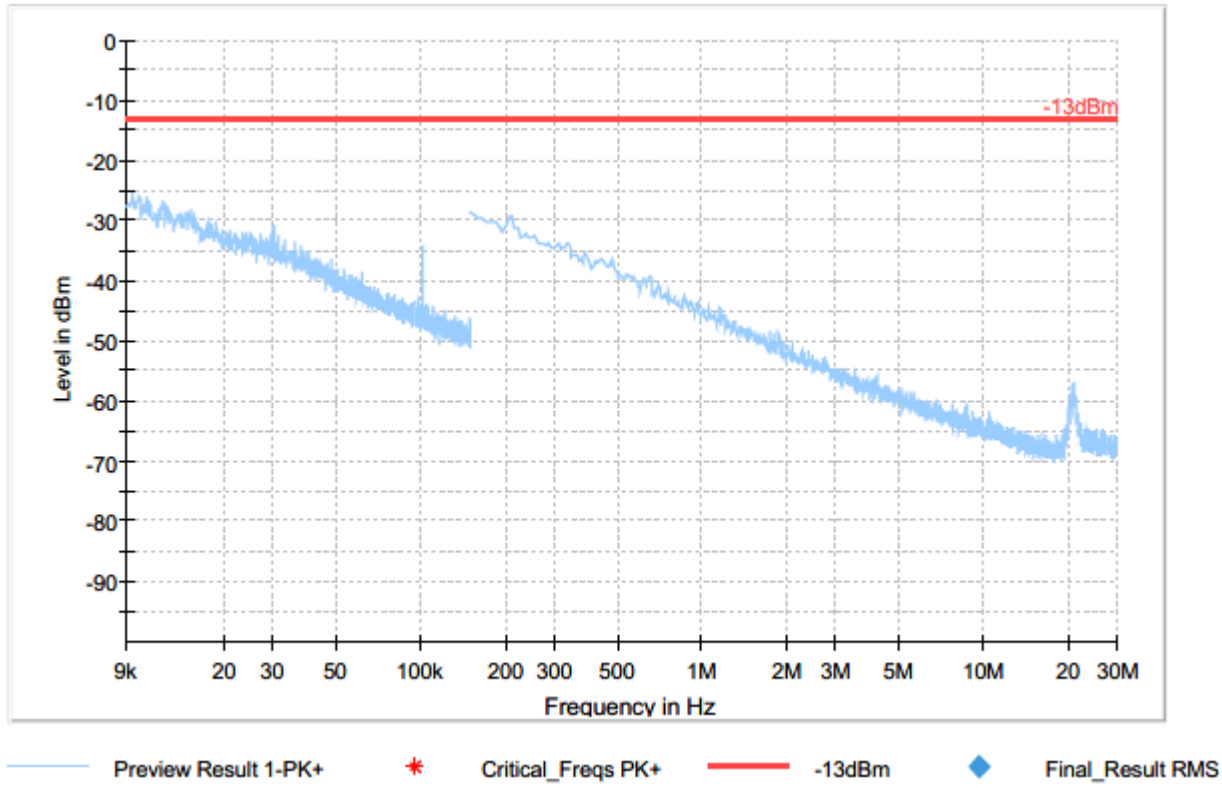
Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.677	-43.304	-13.00	30.30	200.0	1000.000	204.0	V	89.0	-102.8	8:09:22 PM - 8/21/2019
3707.045	-47.782	-13.00	34.78	200.0	1000.000	145.0	H	272.0	-102.9	8:13:05 PM - 8/21/2019



Plot # 4 Radiated Emissions: 9 kHz - 30 MHz
Channel: Mid

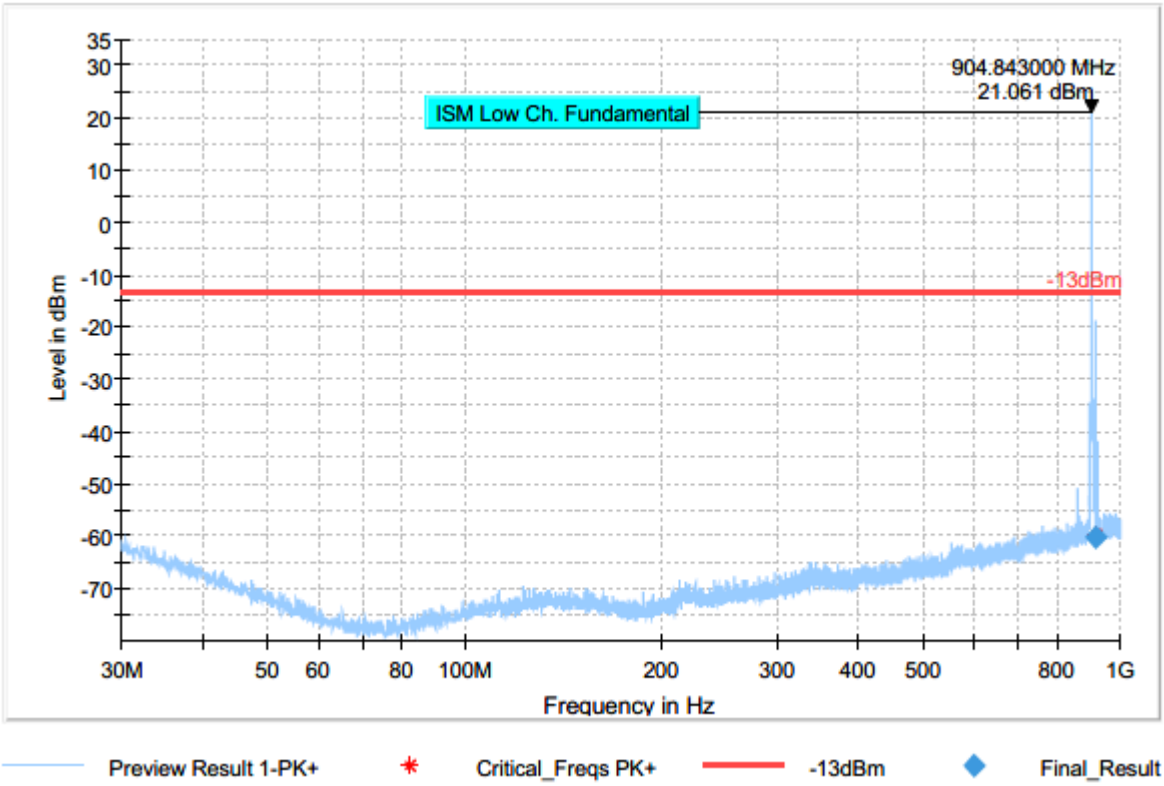


Plot # 5 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.631	-60.200	-13.00	47.20	200.0	100.000	100.0	H	28.0	-88.9	3:17:18 PM - 8/22/2019

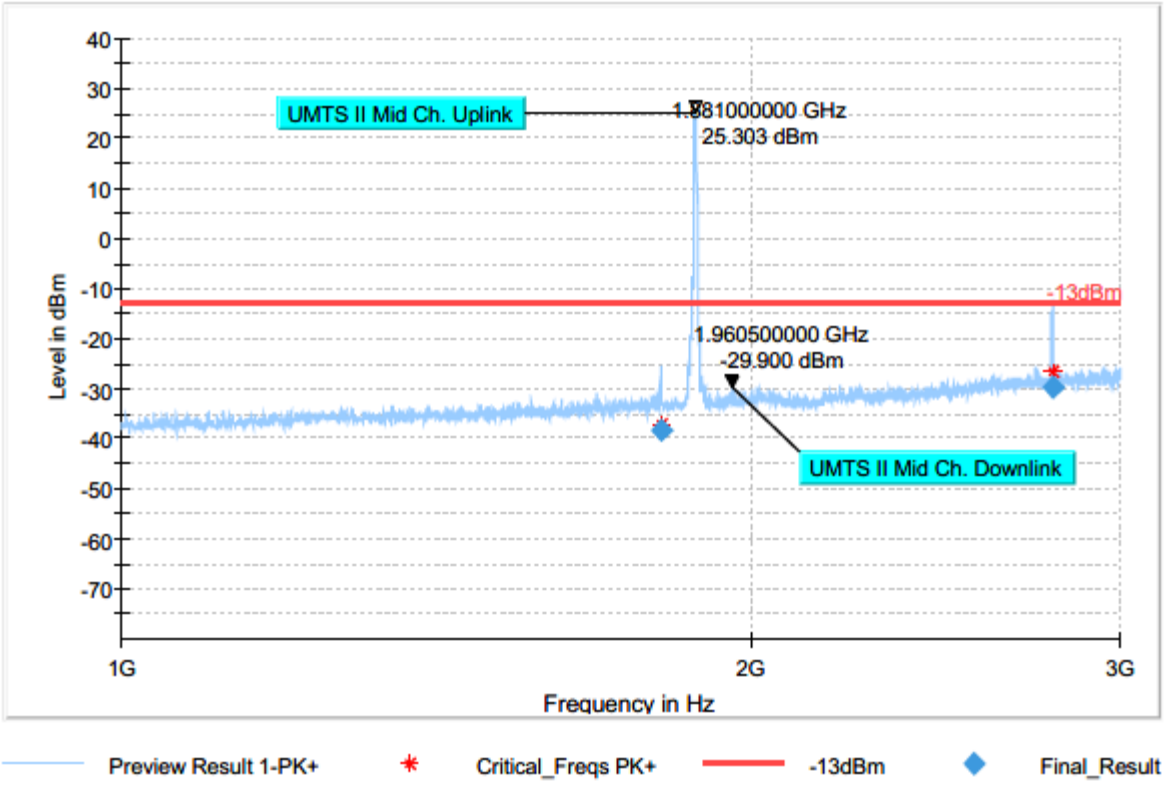


Plot # 6 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.080	-38.390	-13.00	25.39	500.0	1000.000	315.0	H	6.0	-90.8	3:43:33 PM - 8/21/2019
2786.036	-29.907	-13.00	16.91	500.0	1000.000	189.0	H	4.0	-87.4	3:40:23 PM - 8/21/2019

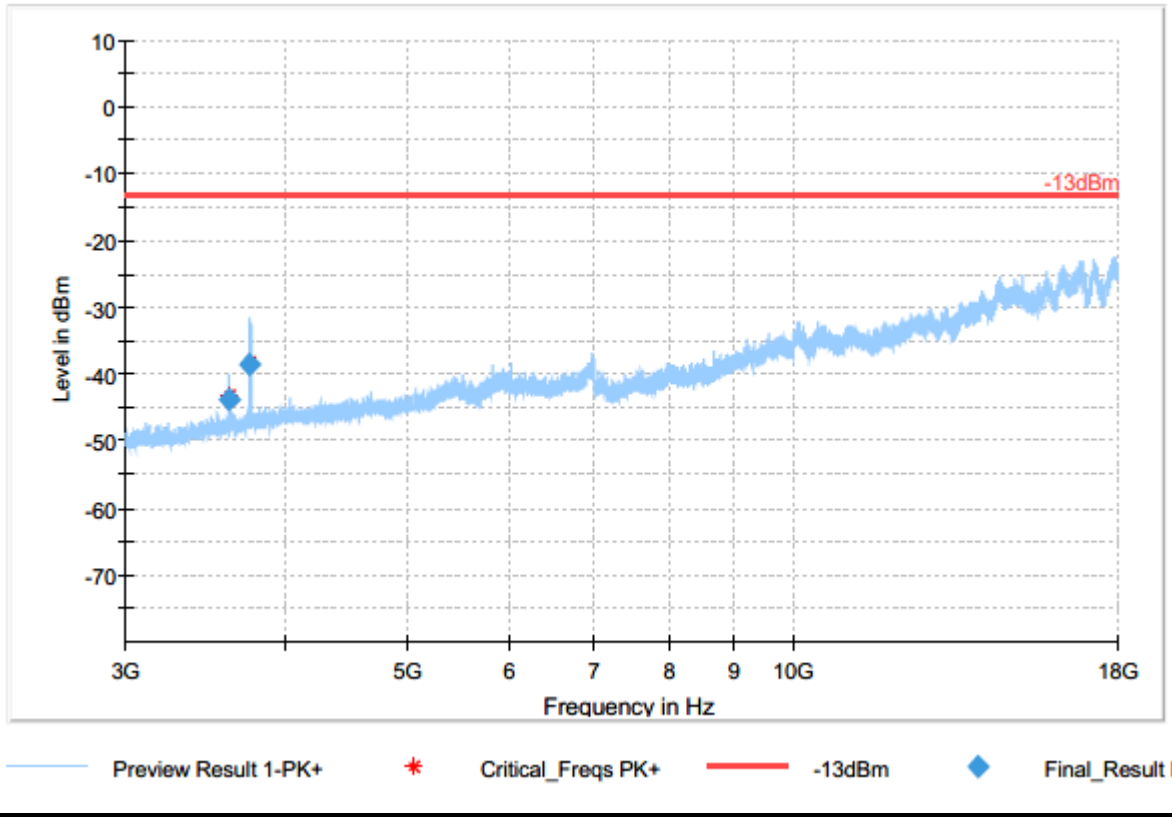


Plot # 7 Radiated Emissions: 3 GHz – 18 GHz

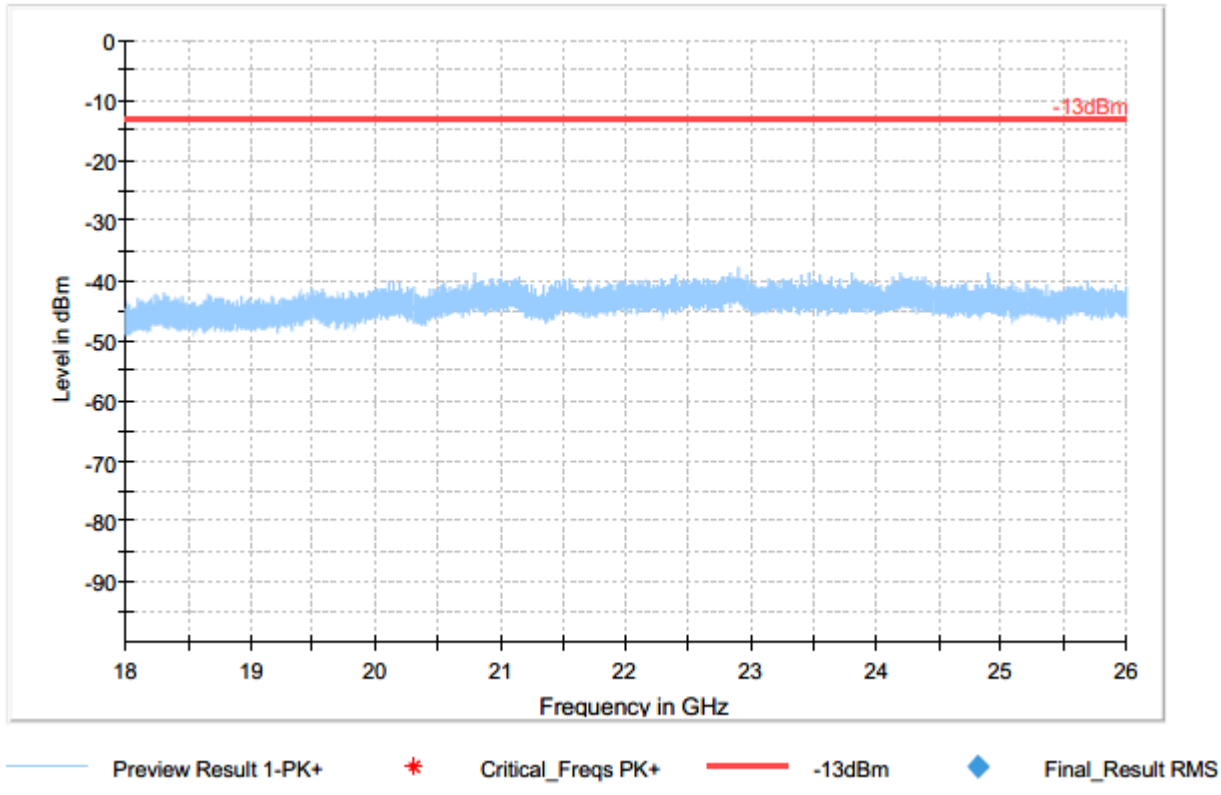
Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.522	-43.892	-13.00	30.89	200.0	1000.000	200.0	V	89.0	-102.8	7:52:46 PM - 8/21/2019
3757.497	-38.548	-13.00	25.55	200.0	1000.000	151.0	H	284.0	-102.4	7:56:29 PM - 8/21/2019



Plot # 8 Radiated Emissions: 18 GHz – 26 GHz
Channel: Mid

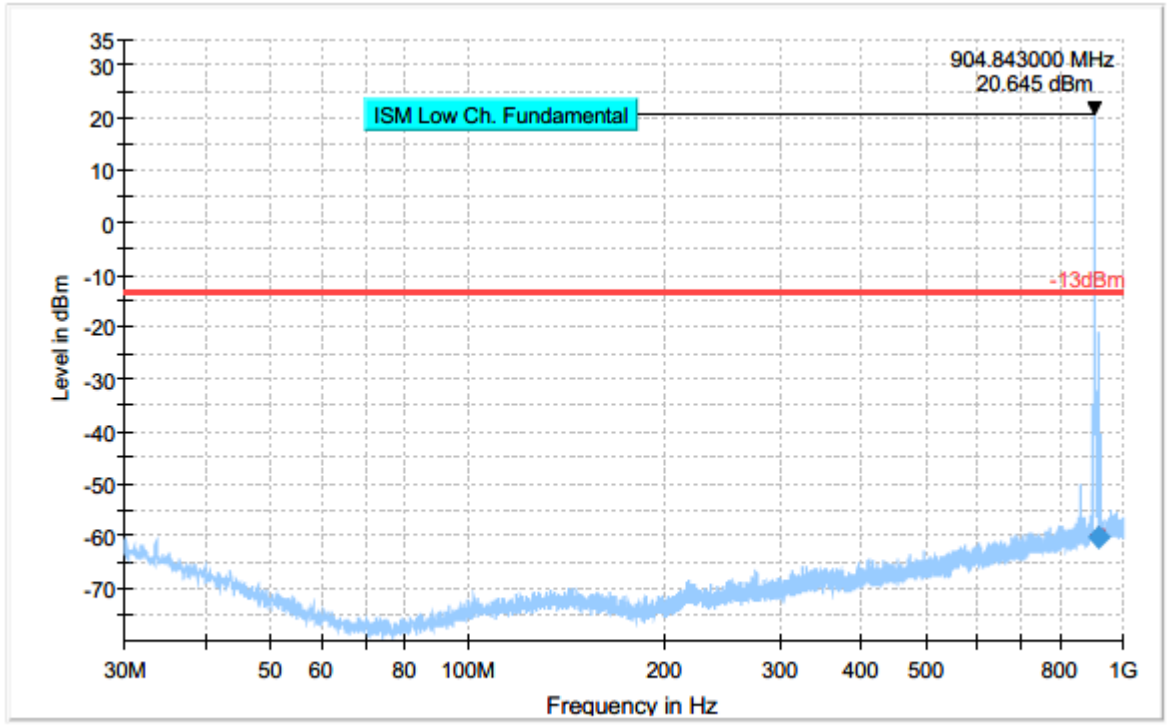


Plot # 9 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.871	-60.098	-13.00	47.10	200.0	100.000	100.0	H	28.0	-88.9	3:38:35 PM - 8/22/2019

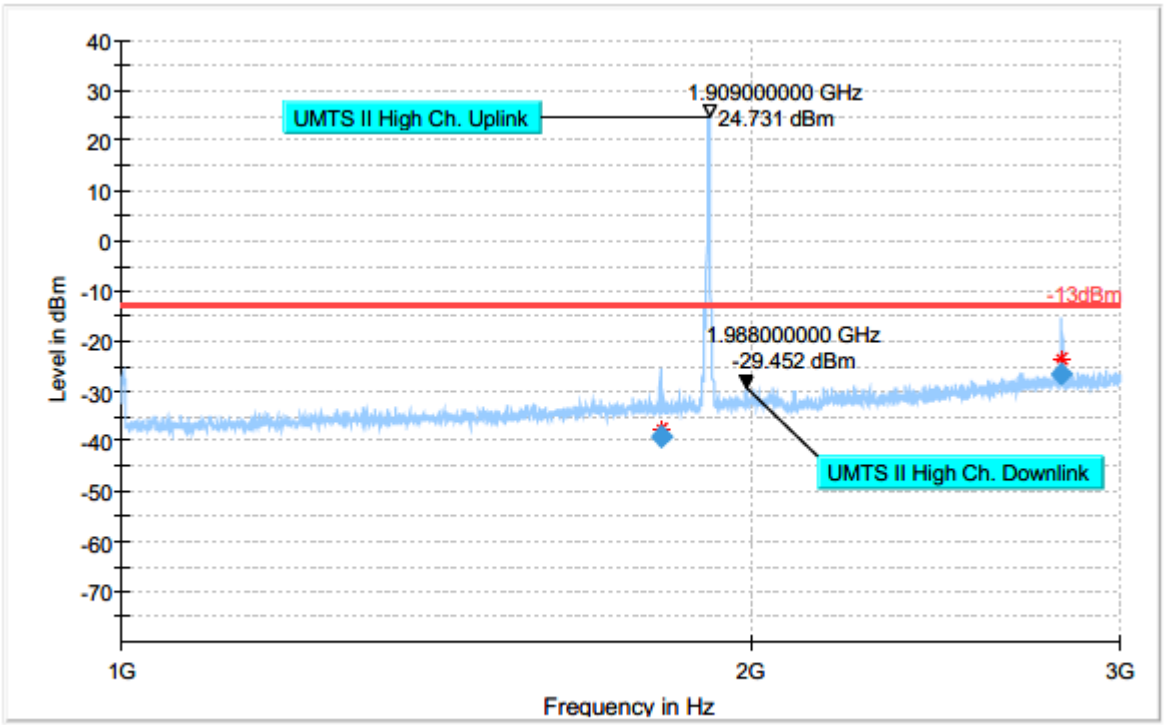


Plot # 10 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.876	-38.981	-13.00	25.98	500.0	1000.000	314.0	H	6.0	-90.8	4:17:46 PM - 8/21/2019
2814.165	-26.789	-13.00	13.79	500.0	1000.000	116.0	H	-45.0	-87.5	4:14:31 PM - 8/21/2019

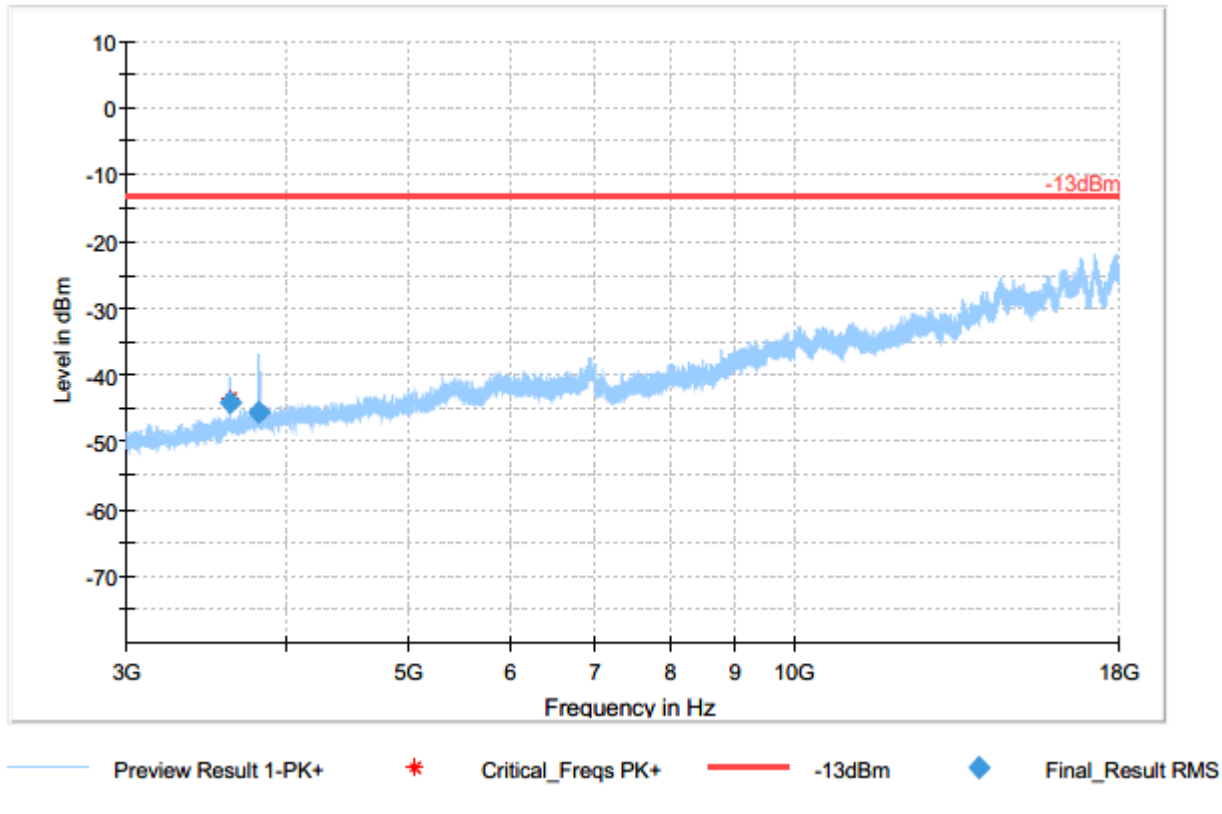


Plot # 11 Radiated Emissions: 3 GHz - 18 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.727	-44.171	-13.00	31.17	200.0	1000.000	201.0	V	88.0	-102.8	8:25:03 PM - 8/21/2019
3812.623	-45.506	-13.00	32.51	200.0	1000.000	152.0	H	279.0	-102.3	8:28:45 PM - 8/21/2019



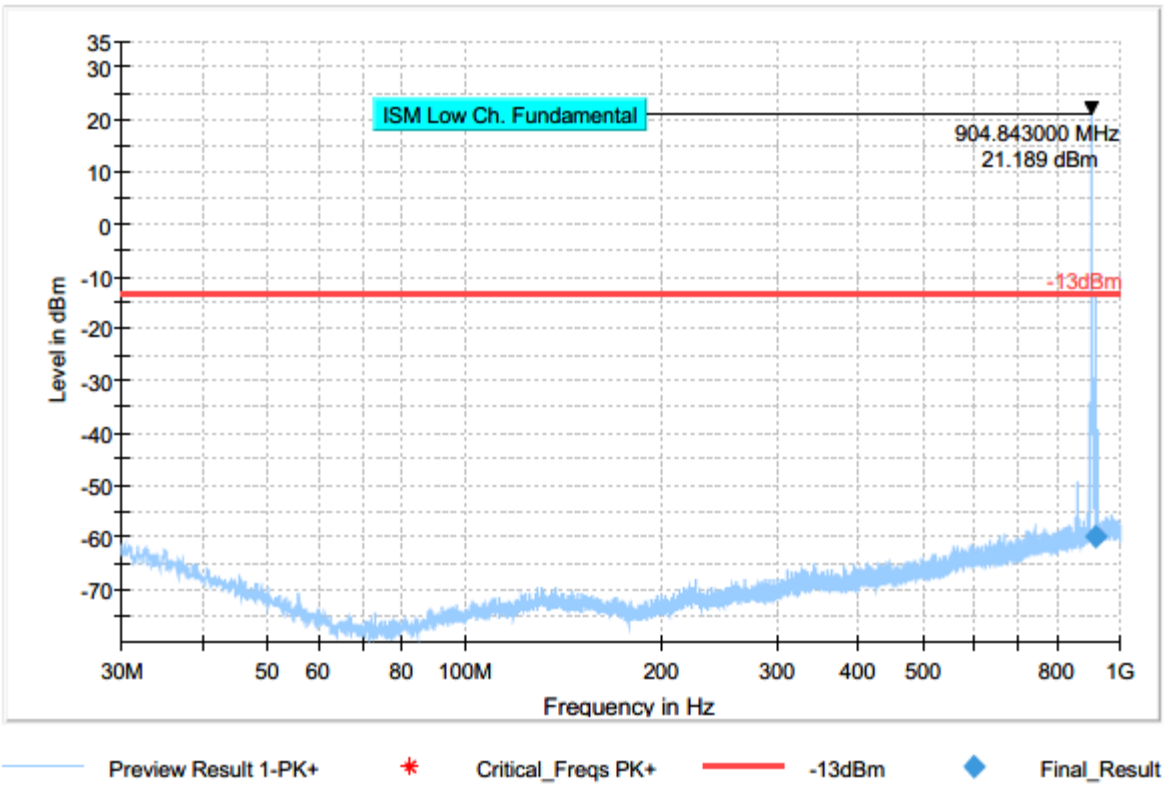
LTE Band 2

Plot # 12 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.660	-59.699	-13.00	46.70	200.0	100.000	100.0	H	122.0	-88.9	4:36:53 PM - 8/19/2019

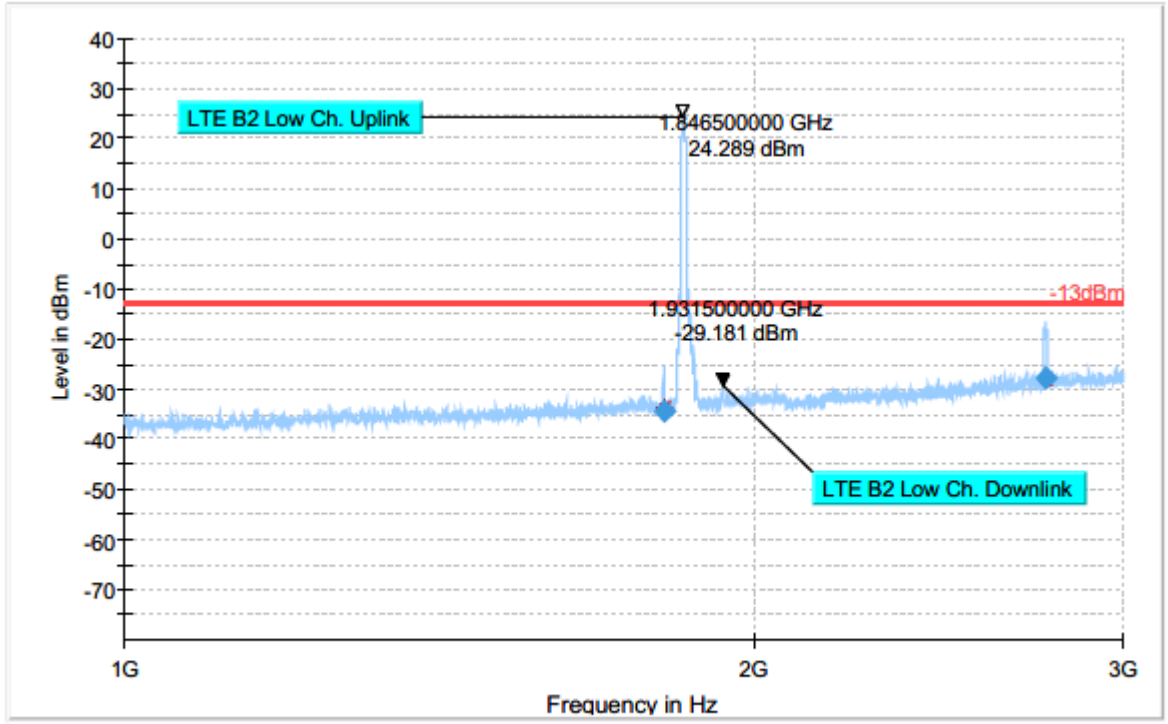


Plot # 13 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.549	-34.321	-13.00	21.32	500.0	1000.000	189.0	H	-33.0	-90.8	2:20:26 PM - 8/21/2019
2756.295	-27.946	-13.00	14.95	500.0	1000.000	173.0	H	-32.0	-87.9	2:17:07 PM - 8/21/2019

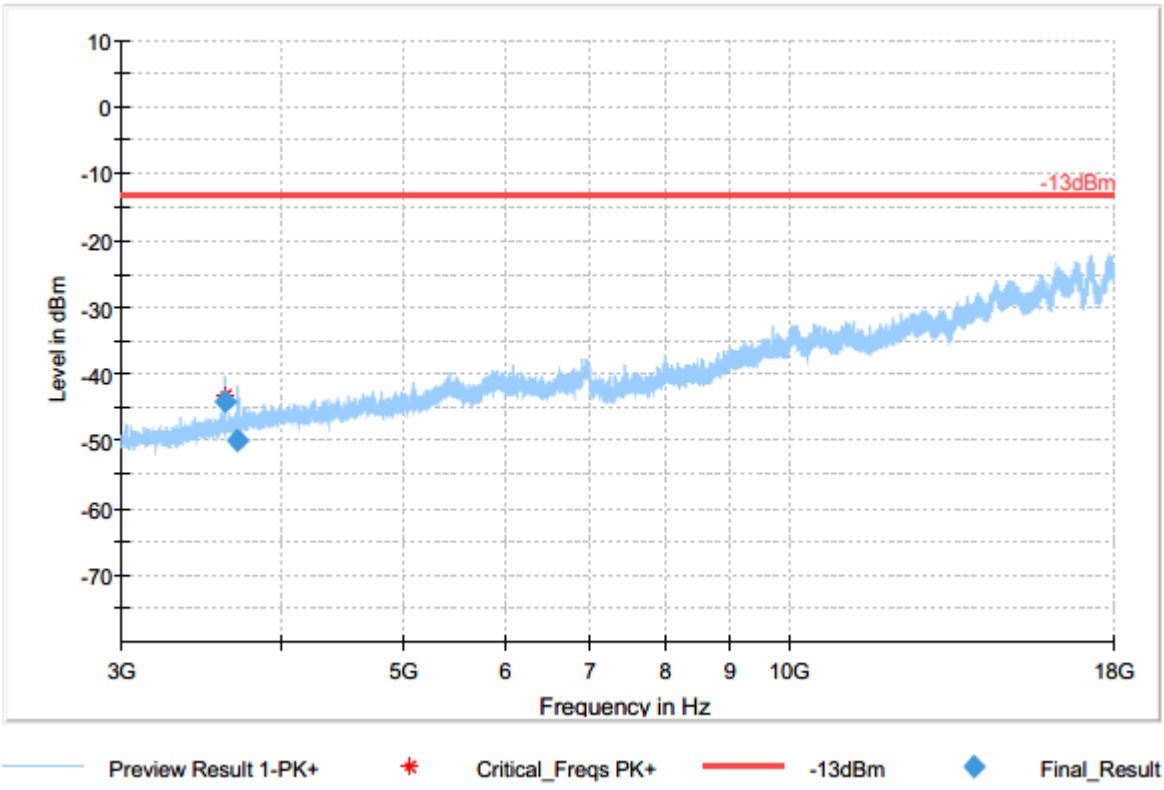


Plot # 14 Radiated Emissions: 3 GHz - 18 GHz

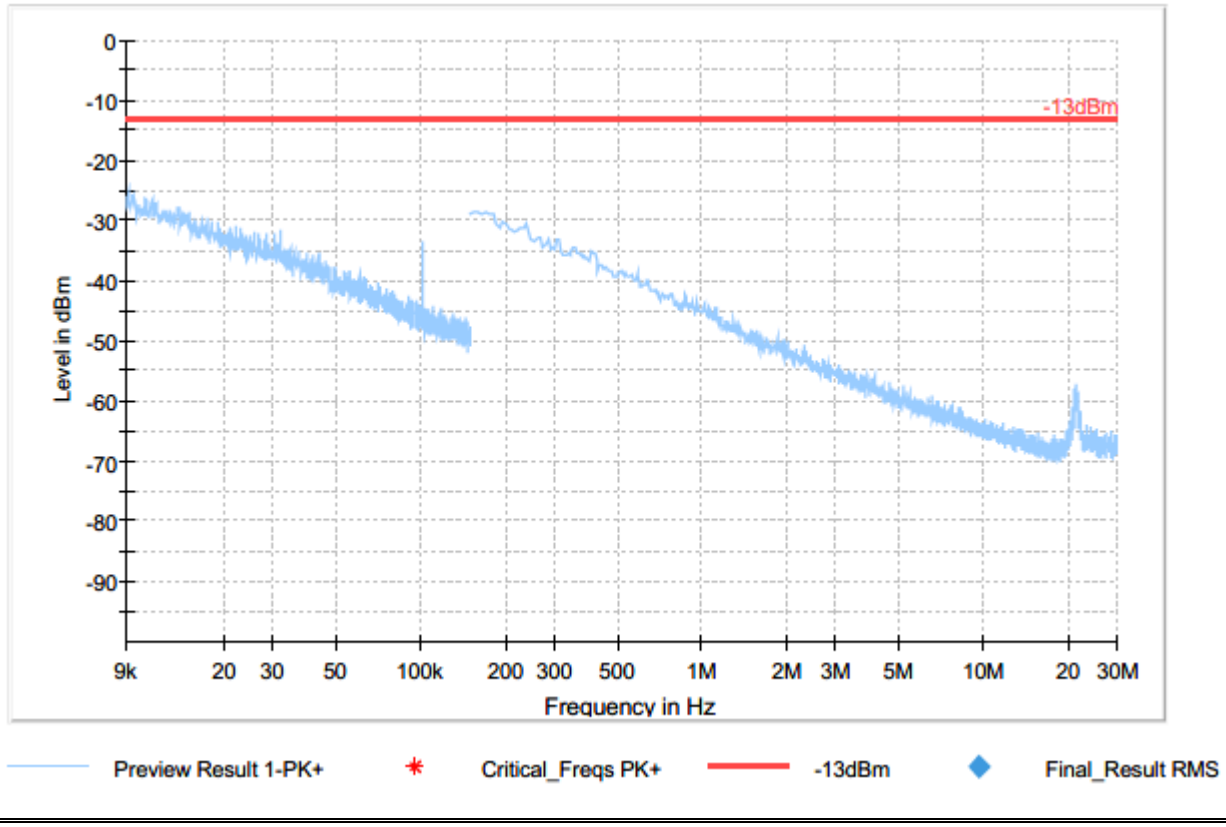
Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.441	-43.934	-13.00	30.93	200.0	1000.000	201.0	V	90.0	-102.8	6:56:58 PM - 8/21/2019
3699.807	-49.999	-13.00	37.00	200.0	1000.000	100.0	H	271.0	-102.9	7:00:41 PM - 8/21/2019



Plot # 15 Radiated Emissions: 9 kHz - 30 MHz
Channel: Mid

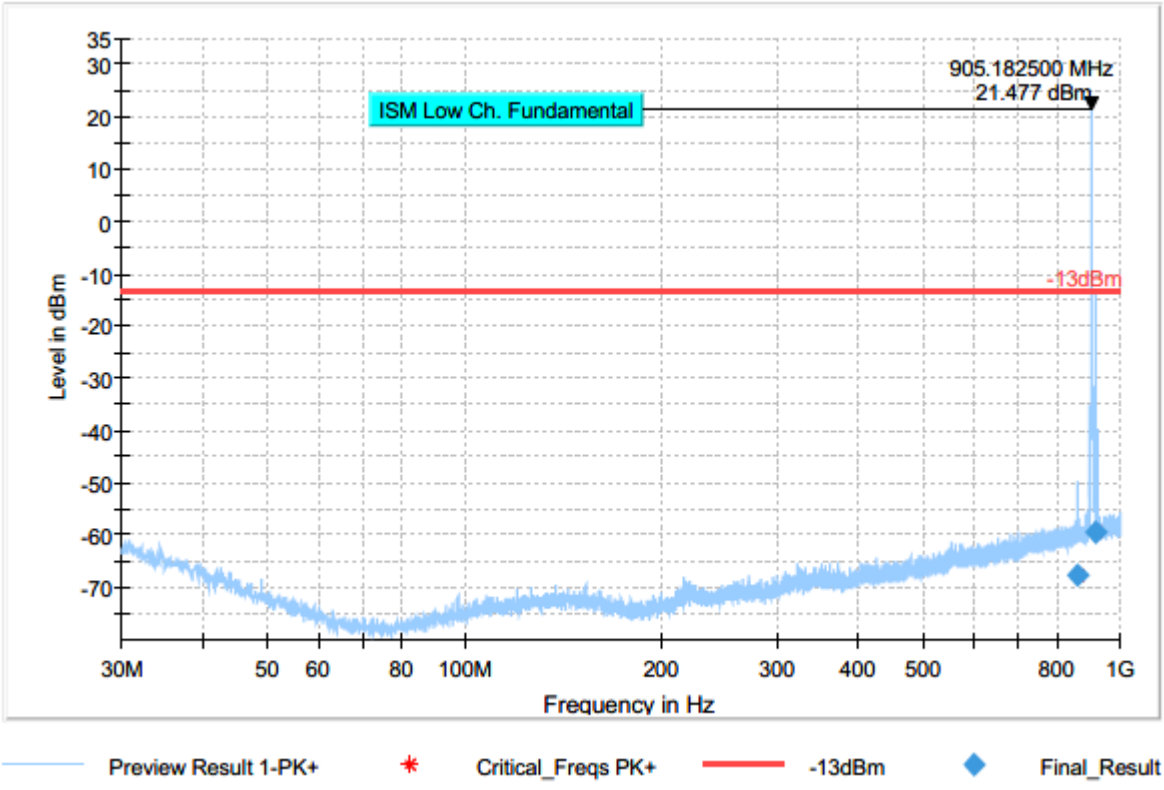


Plot # 16 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
859.478	-67.833	-13.00	54.83	200.0	100.000	145.0	H	222.0	-89.3	4:21:53 PM - 8/19/2019
916.786	-59.408	-13.00	46.41	200.0	100.000	100.0	H	123.0	-88.9	4:25:01 PM - 8/19/2019

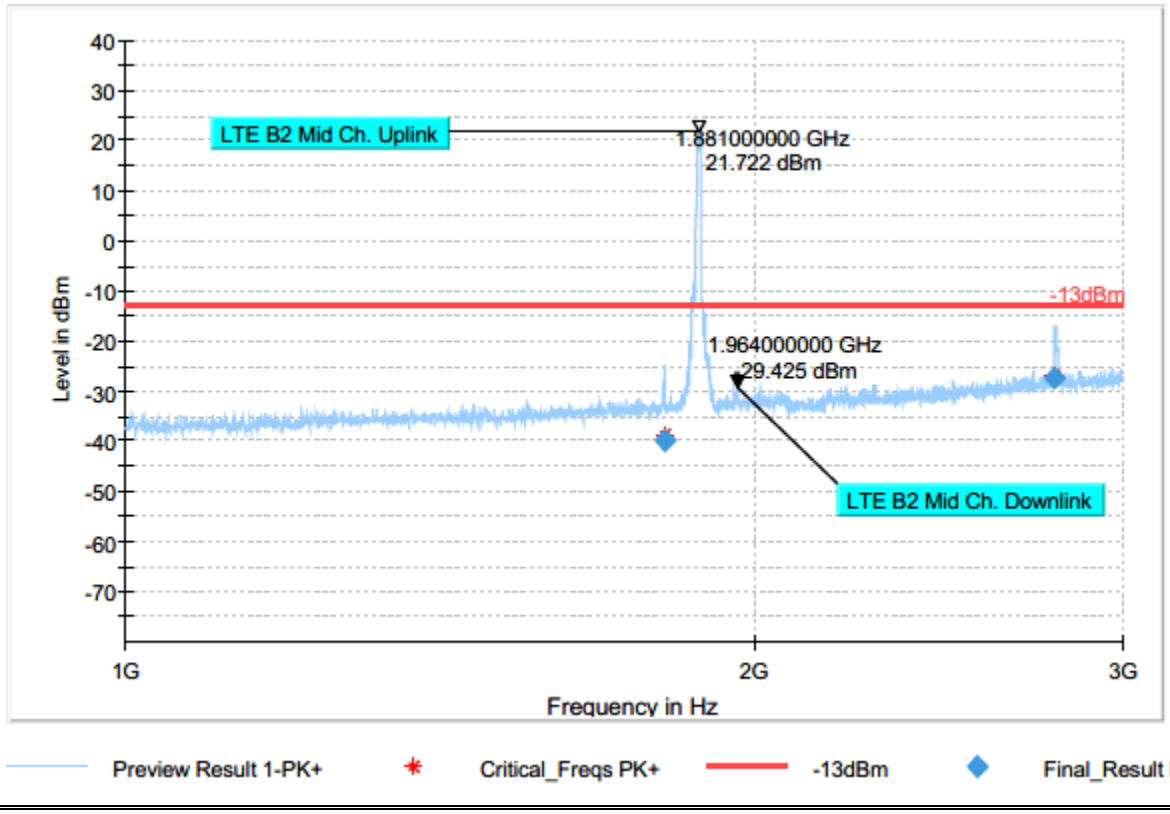


Plot # 17 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.523	-39.972	-13.00	26.97	500.0	1000.000	314.0	H	6.0	-90.8	2:03:04 PM - 8/21/2019
2781.639	-27.547	-13.00	14.55	500.0	1000.000	191.0	H	28.0	-87.5	2:00:01 PM - 8/21/2019

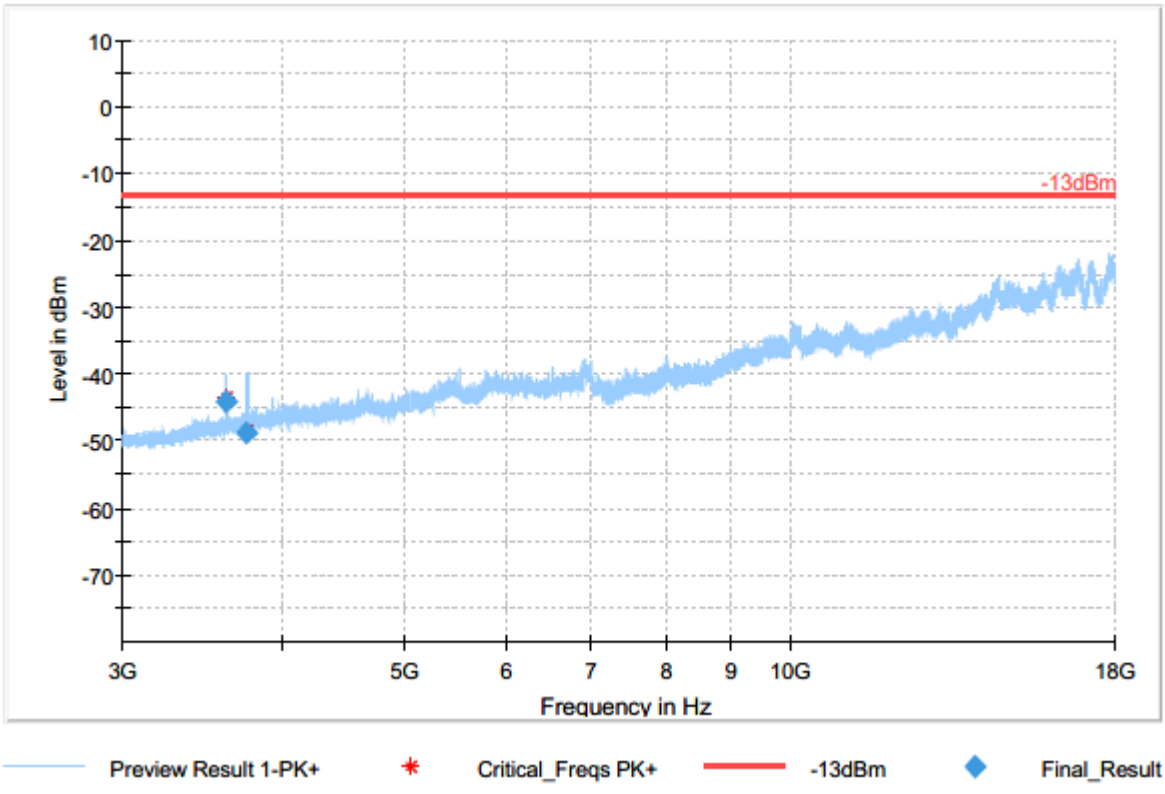


Plot # 18 Radiated Emissions: 3 GHz – 18 GHz

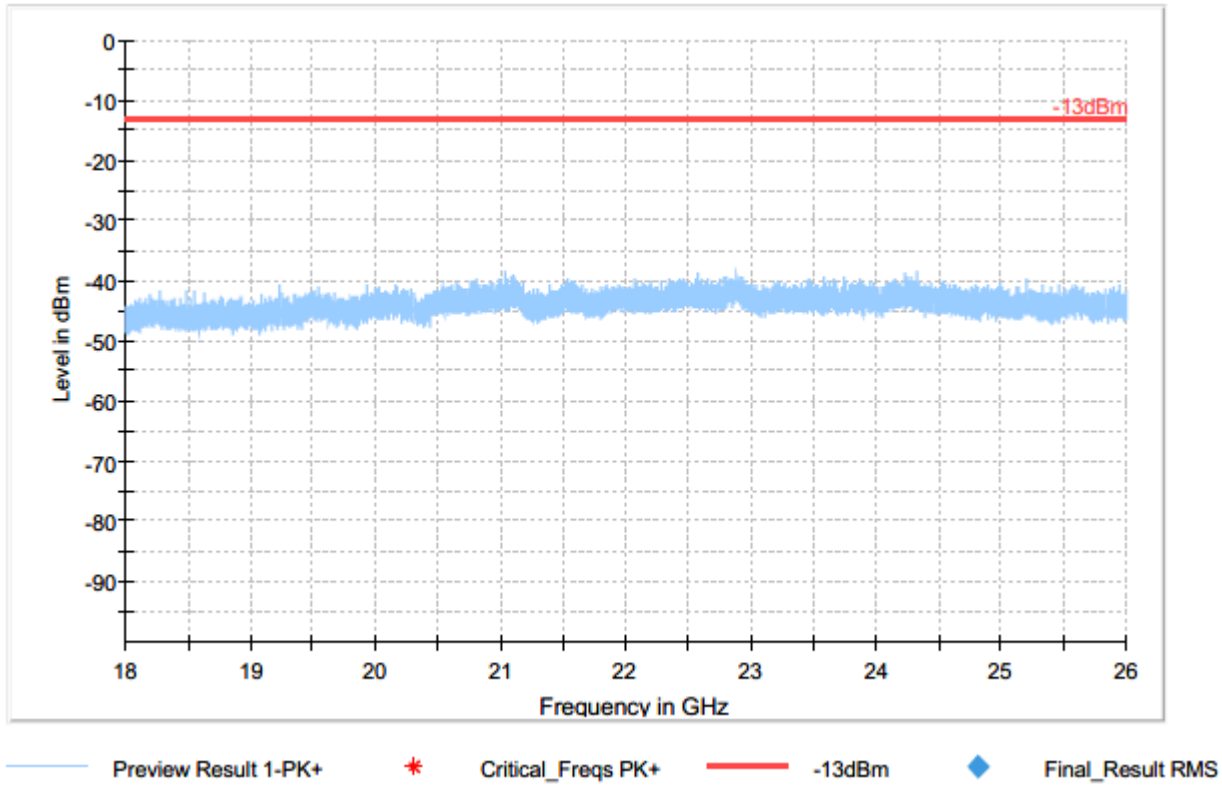
Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.339	-44.010	-13.00	31.01	200.0	1000.000	192.0	V	90.0	-102.8	6:41:24 PM - 8/21/2019
3755.113	-48.617	-13.00	35.62	200.0	1000.000	150.0	H	283.0	-102.4	6:45:04 PM - 8/21/2019



Plot # 19 Radiated Emissions: 18 GHz – 26 GHz
Channel: Mid

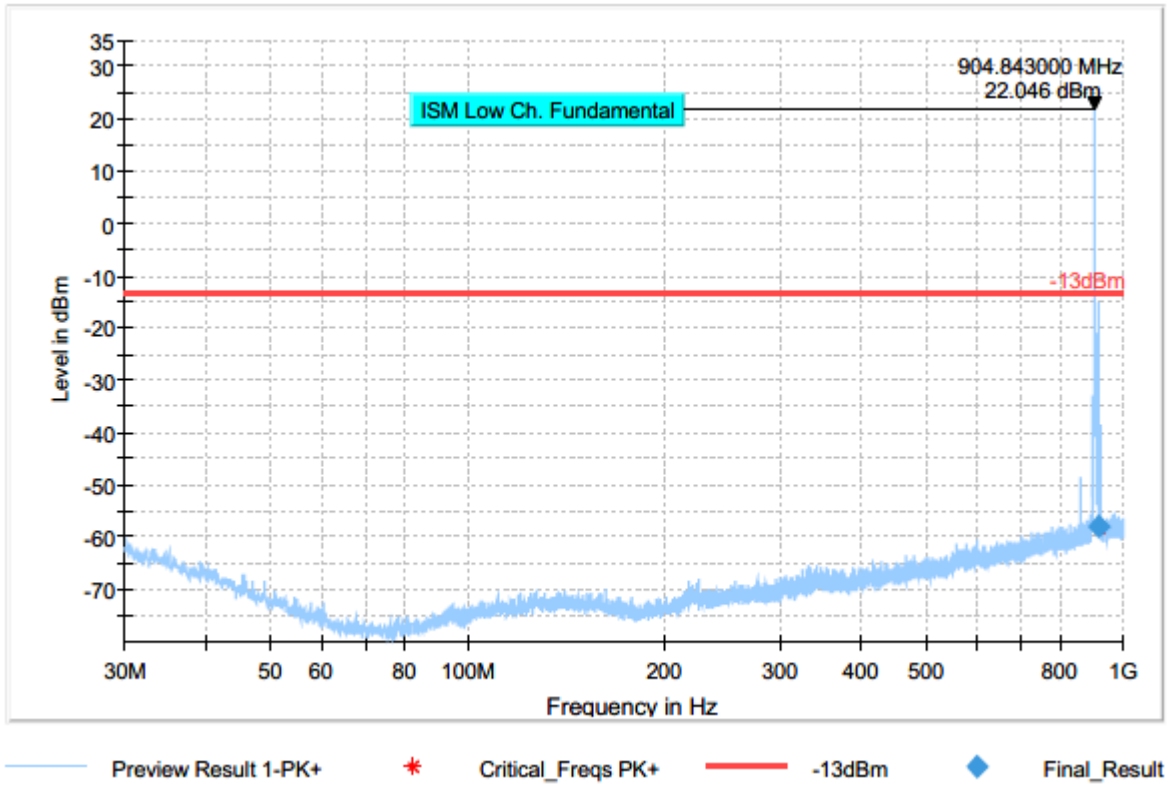


Plot # 20 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.938	-57.920	-13.00	44.92	200.0	100.000	100.0	H	27.0	-88.9	5:20:31 PM - 8/19/2019

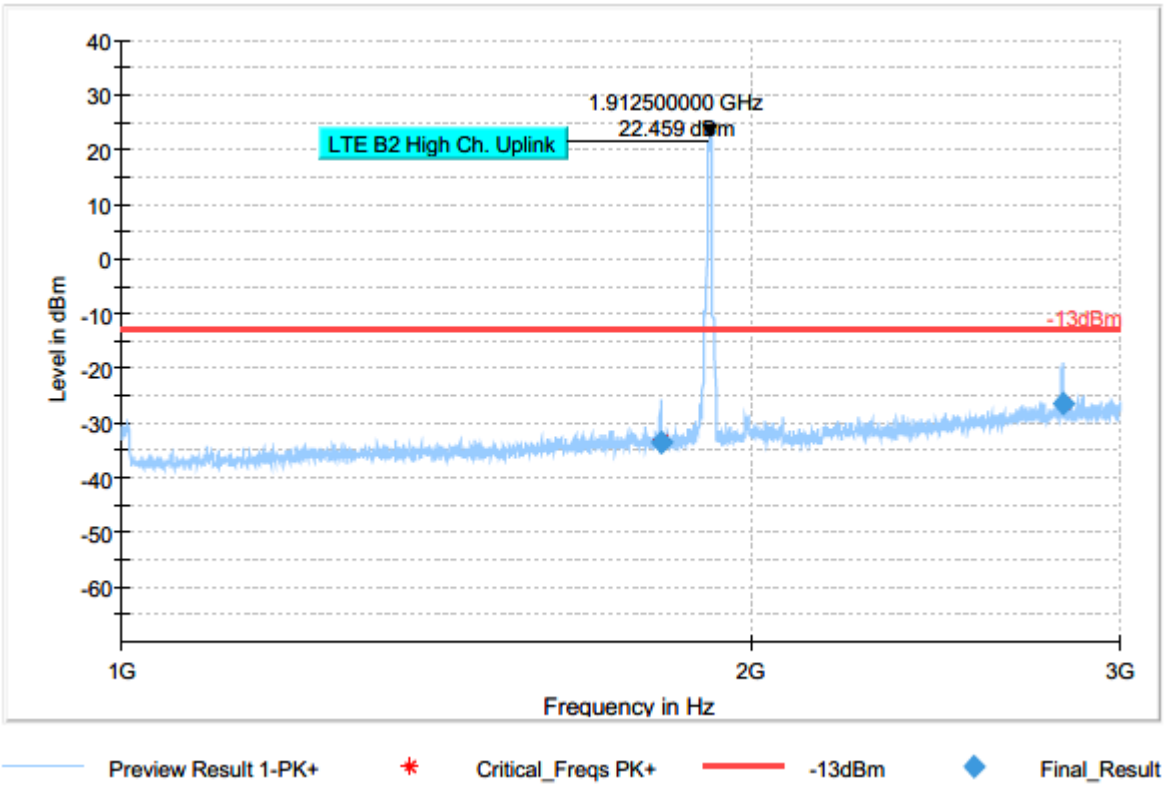


Plot # 21 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.101	-33.551	-13.00	20.55	500.0	1000.000	215.0	H	18.0	-90.8	2:37:27 PM - 8/21/2019
2818.304	-26.347	-13.00	13.35	500.0	1000.000	125.0	H	-47.0	-87.4	2:34:12 PM - 8/21/2019

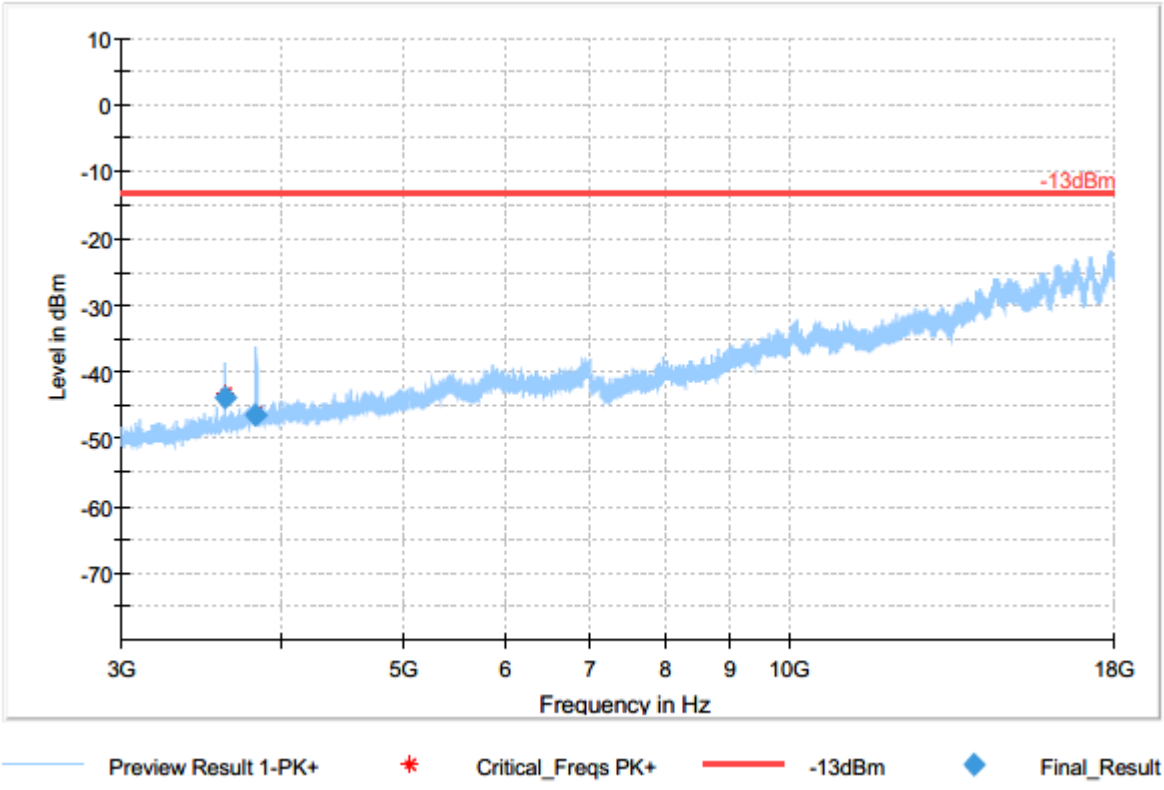


Plot # 22 Radiated Emissions: 3 GHz - 18 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.397	-43.763	-13.00	30.76	200.0	1000.000	202.0	V	90.0	-102.8	6:25:43 PM - 8/21/2019
3827.282	-46.323	-13.00	33.32	200.0	1000.000	194.0	H	279.0	-102.5	6:29:20 PM - 8/21/2019



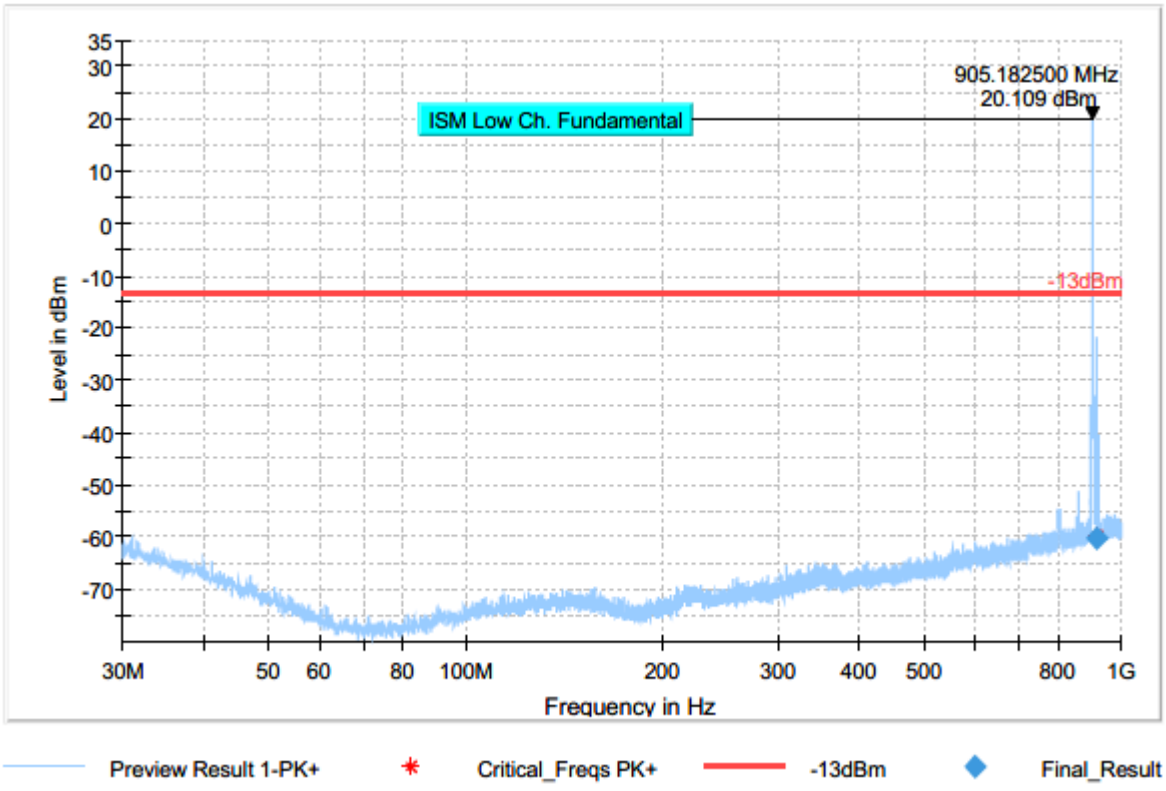
LTE Band 4

Plot # 23 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.390	-60.107	-13.00	47.11	200.0	100.000	221.0	H	22.0	-88.9	10:48:57 AM - 8/20/2019

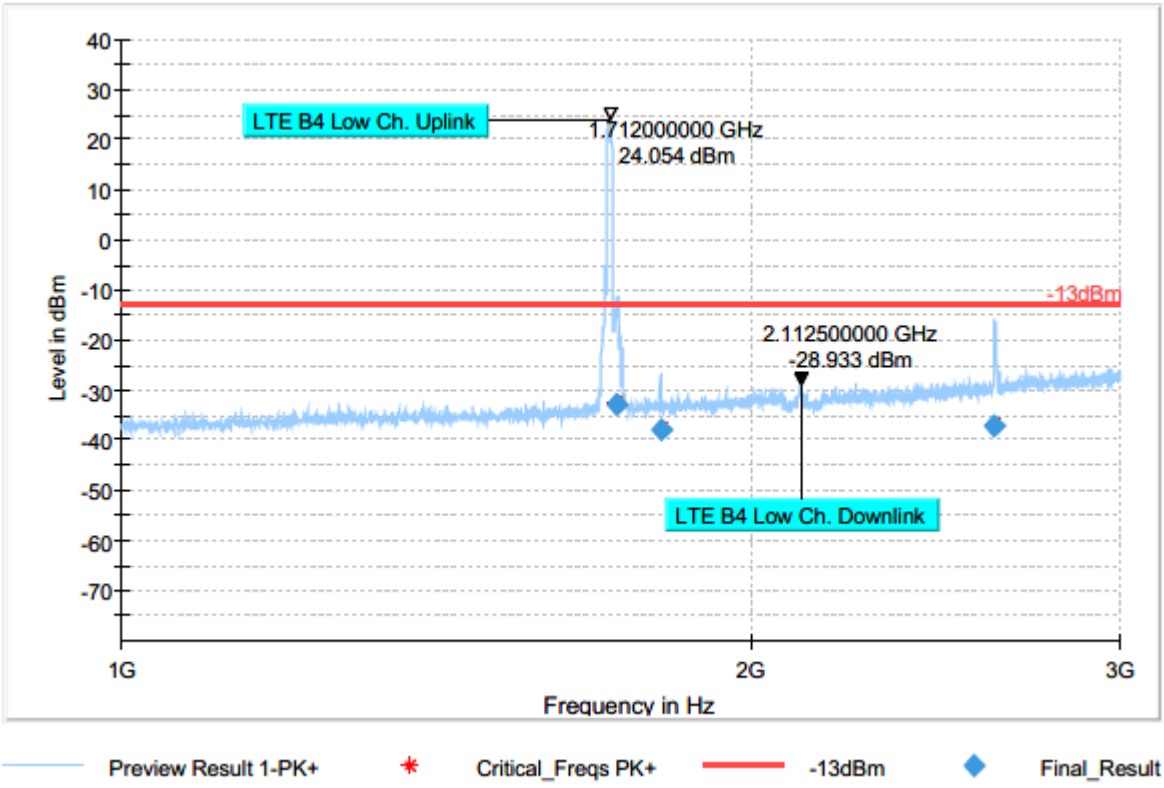


Plot # 24 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1725.590	-32.680	-13.00	19.68	500.0	1000.000	116.0	H	-16.0	-91.2	5:20:24 PM - 8/21/2019
1810.355	-37.974	-13.00	24.97	500.0	1000.000	175.0	H	78.0	-90.8	5:23:57 PM - 8/21/2019
2611.421	-37.042	-13.00	24.04	500.0	1000.000	183.0	H	-4.0	-88.6	5:16:57 PM - 8/21/2019

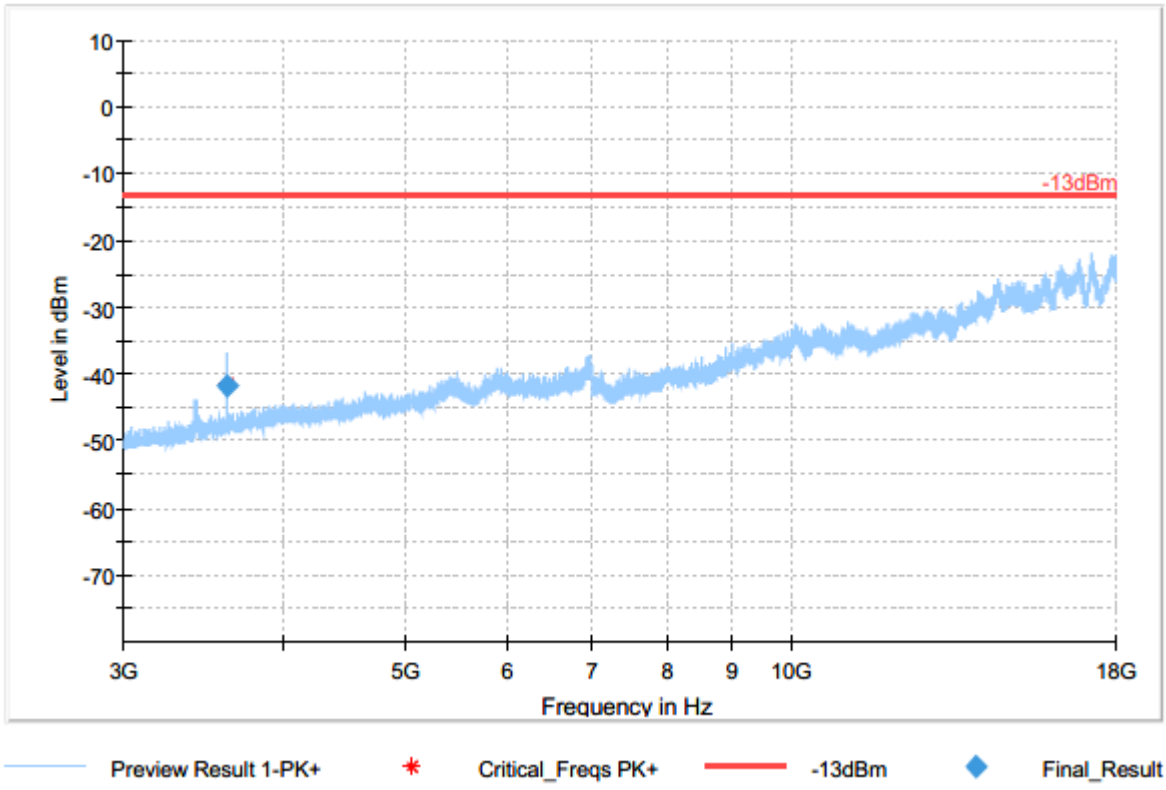


Plot # 25 Radiated Emissions: 3 GHz - 18 GHz

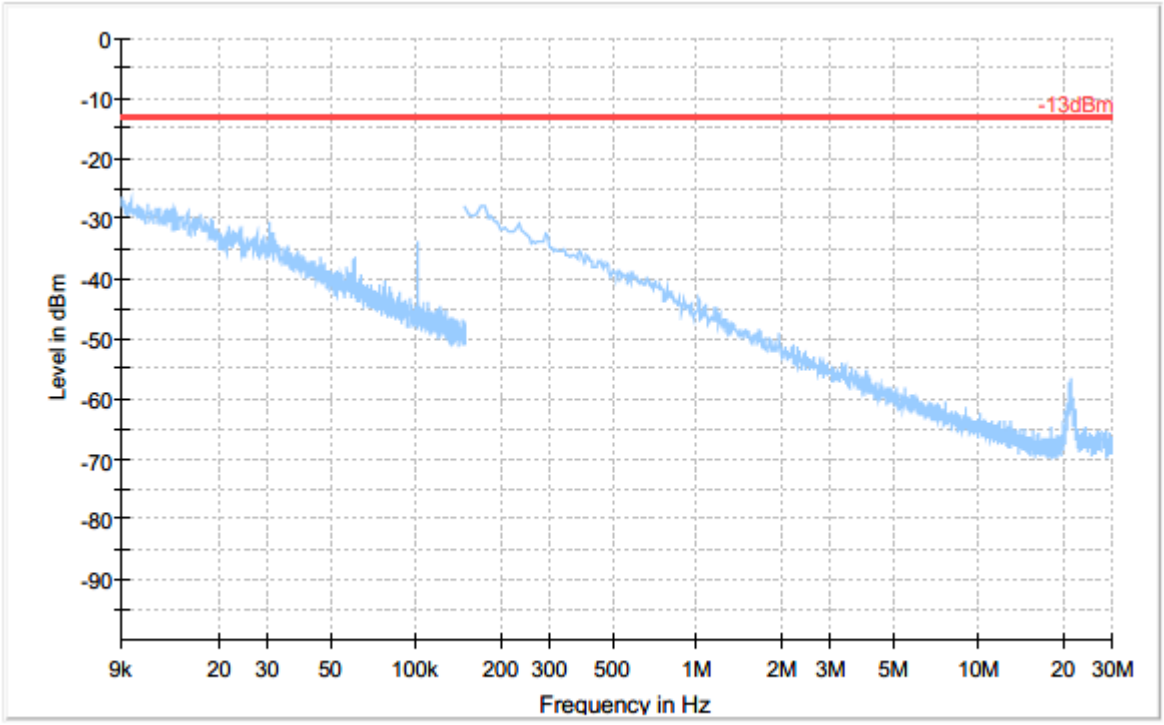
Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.779	-41.622	-13.00	28.62	200.0	1000.000	114.0	V	276.0	-102.8	7:28:03 PM - 8/16/2019



Plot # 26 Radiated Emissions: 9 kHz - 30 MHz
Channel: Mid

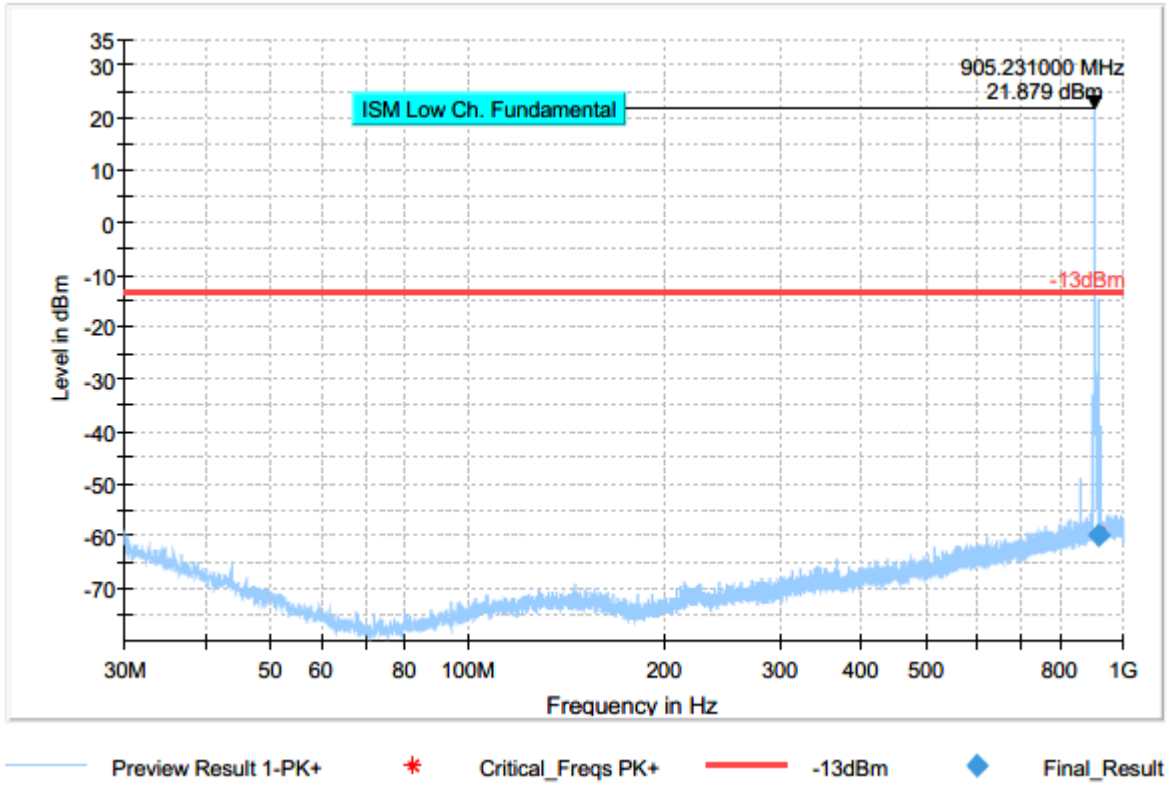


Plot # 27 Radiated Emissions: 30 MHz – 1 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.607	-59.714	-13.00	46.71	200.0	100.000	218.0	H	16.0	-88.9	5:30:33 PM - 8/19/2019

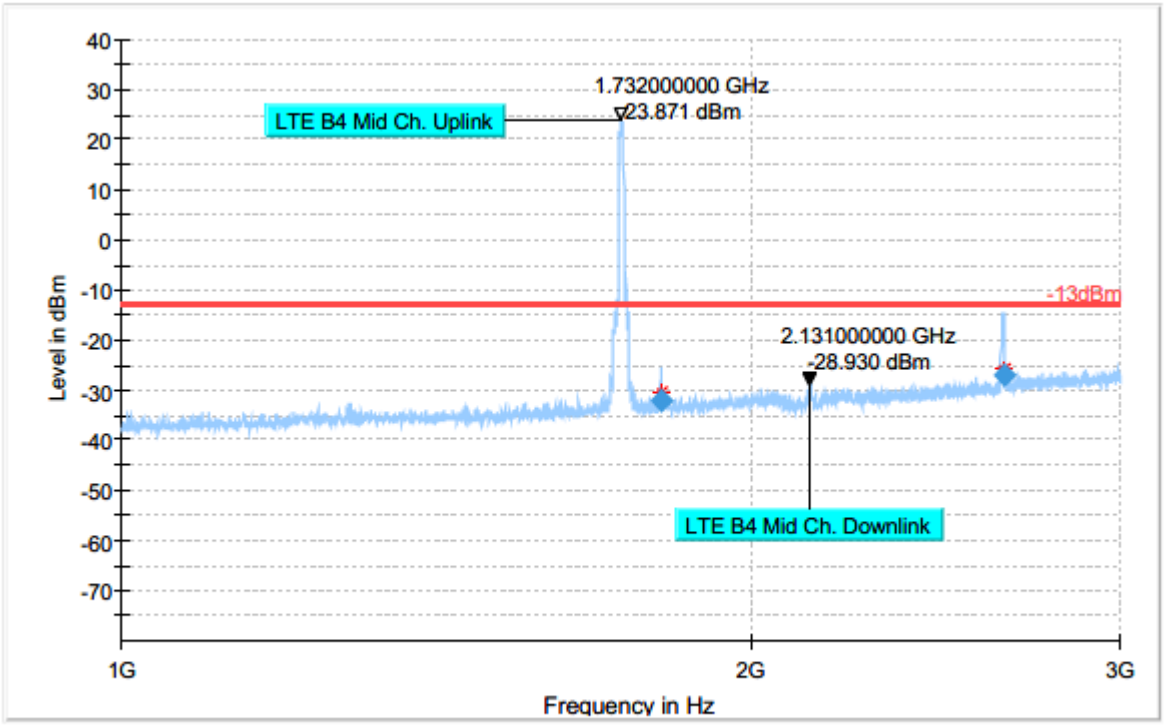


Plot # 28 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.651	-31.964	-13.00	18.96	500.0	1000.000	329.0	H	57.0	-90.8	5:39:49 PM - 8/21/2019
2640.455	-27.108	-13.00	14.11	500.0	1000.000	120.0	H	30.0	-88.4	5:36:30 PM - 8/21/2019

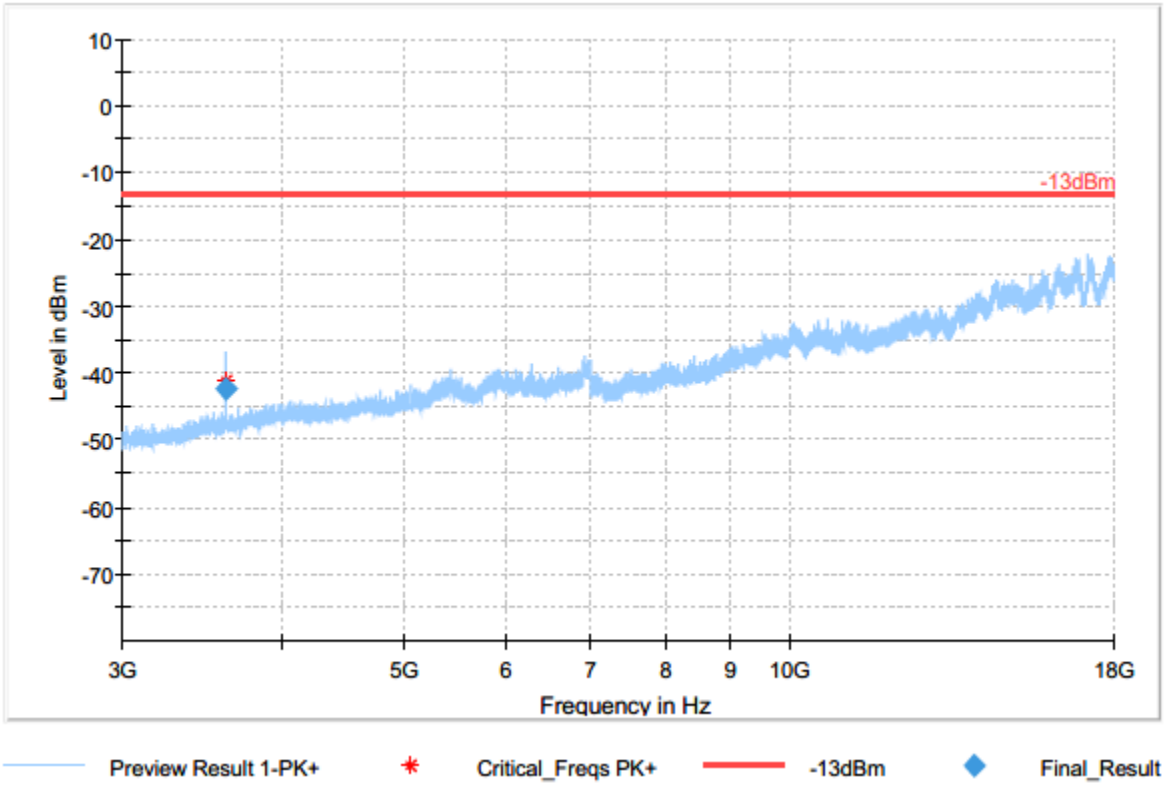


Plot # 29 Radiated Emissions: 3 GHz – 18GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.445	-42.270	-13.00	29.27	200.0	1000.000	107.0	V	276.0	-102.8	7:12:32 PM - 8/16/2019

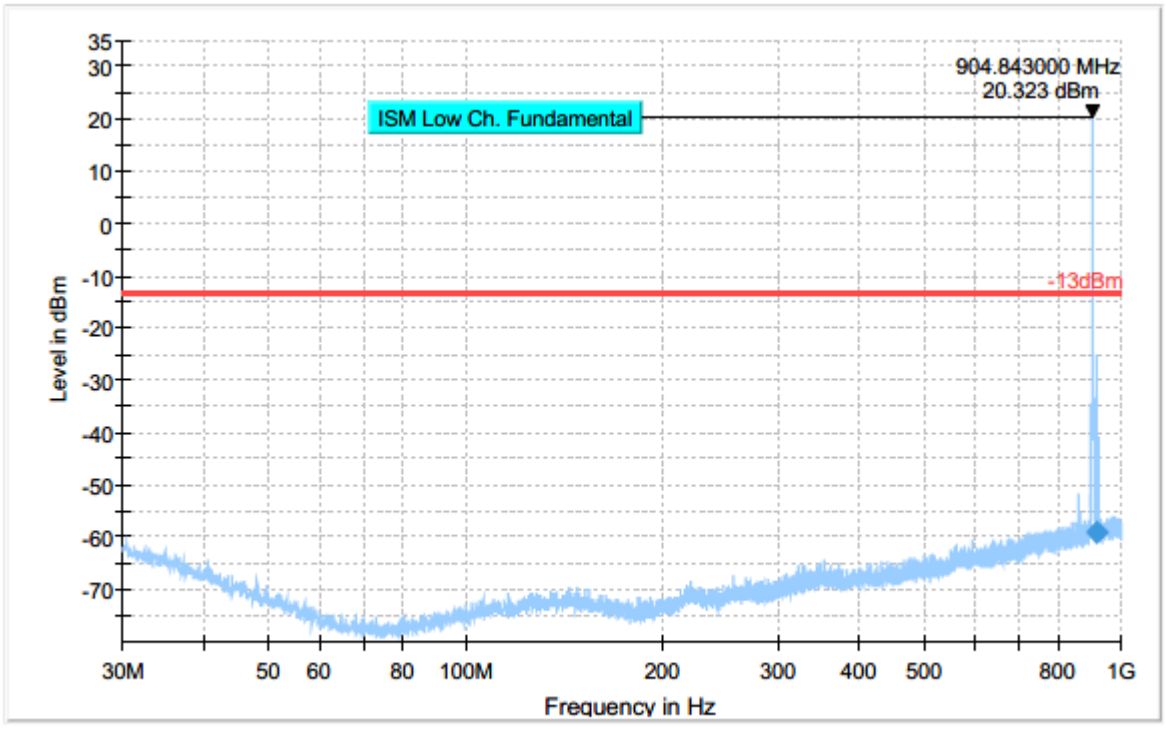


Plot # 30 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
916.704	-59.087	-13.00	46.09	200.0	100.000	220.0	H	22.0	-88.9	10:59:59 AM - 8/20/2019

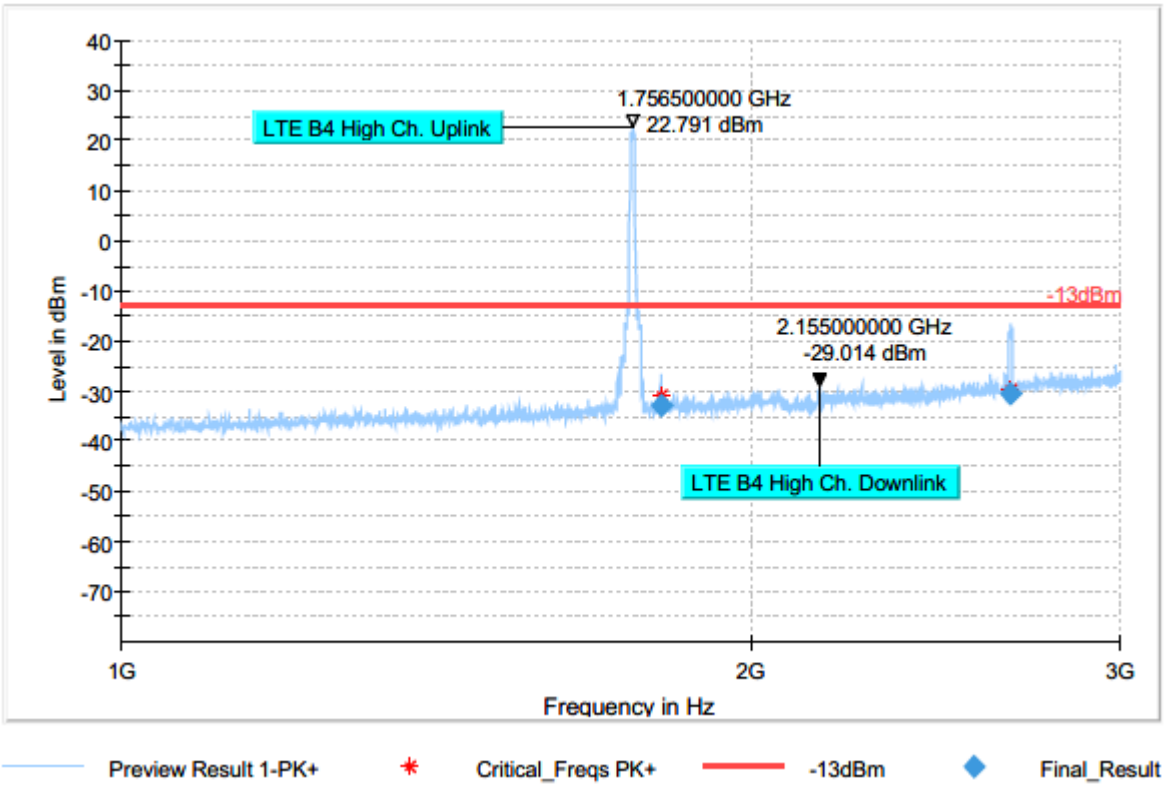


Plot # 31 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.742	-32.920	-13.00	19.92	500.0	1000.000	329.0	H	60.0	-90.8	5:52:03 PM - 8/21/2019
2658.362	-30.615	-13.00	17.62	500.0	1000.000	107.0	H	59.0	-88.4	5:55:41 PM - 8/21/2019

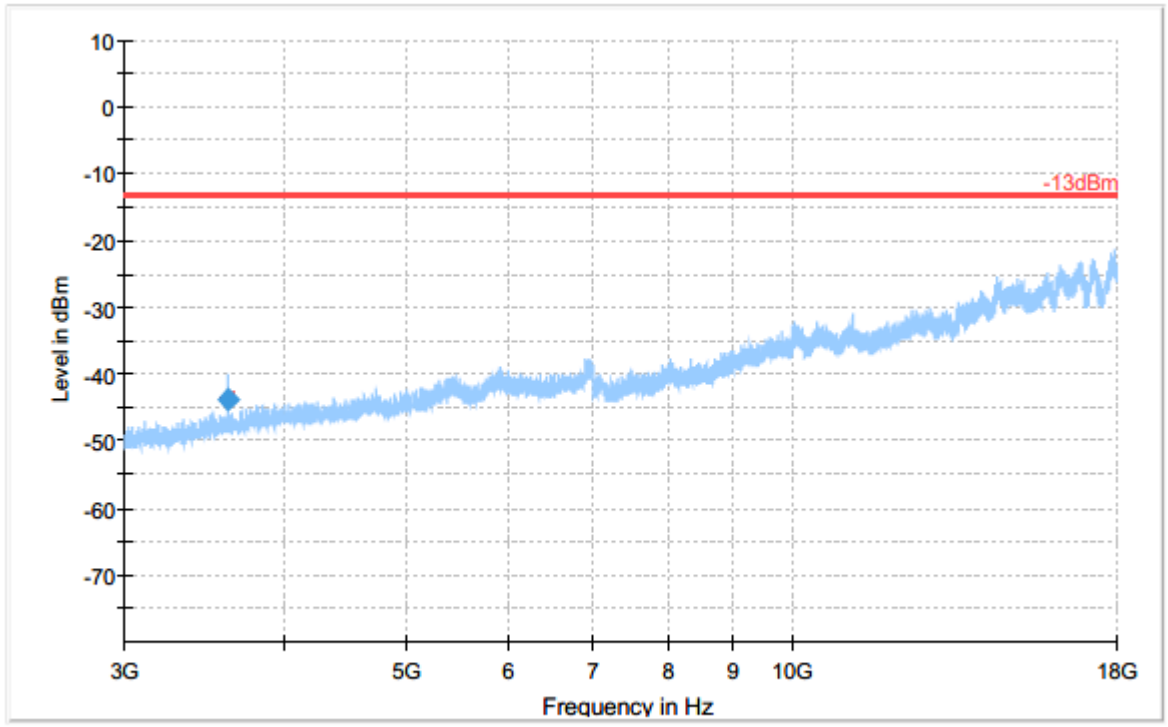


Plot # 32 Radiated Emissions: 3 GHz - 18 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.100	-43.864	-13.00	30.86	200.0	1000.000	194.0	V	90.0	-102.8	6:13:29 PM - 8/21/2019



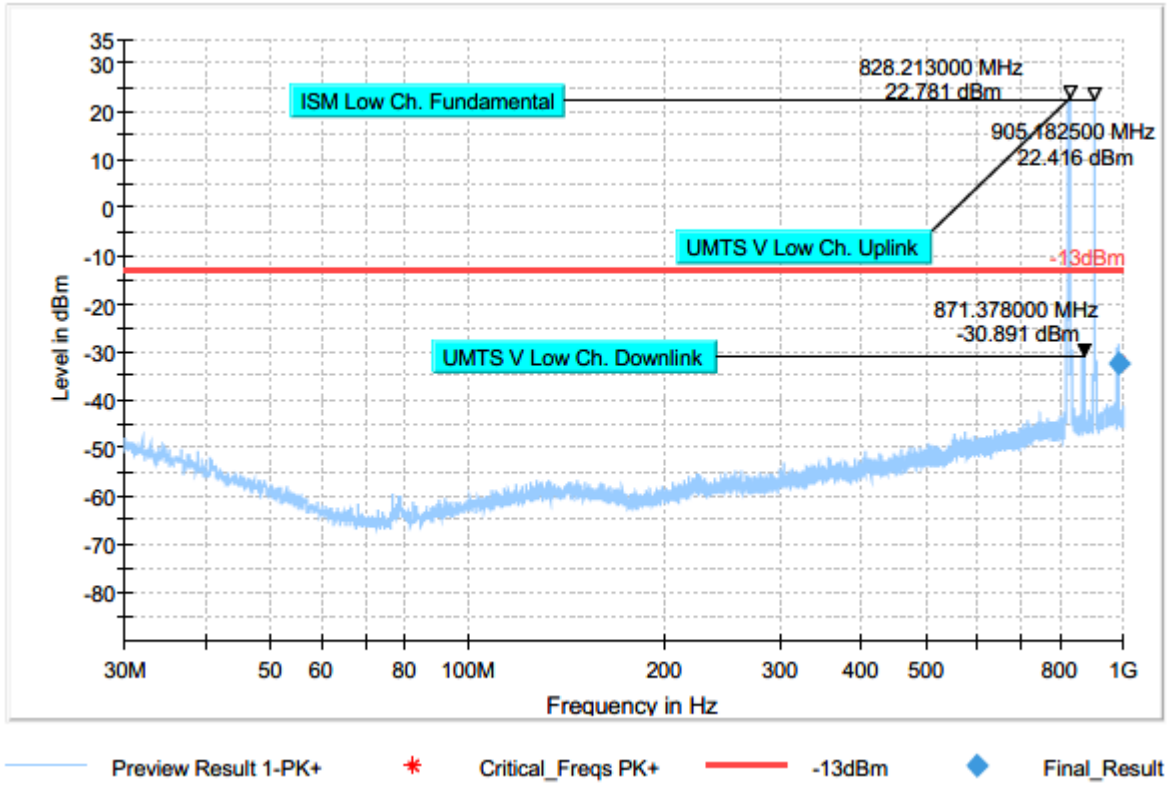
UMTS V

Plot # 33 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
982.886	-32.222	-13.00	19.22	500.0	100.000	175.0	H	123.0	-66.8	2:20:50 PM - 8/22/2019

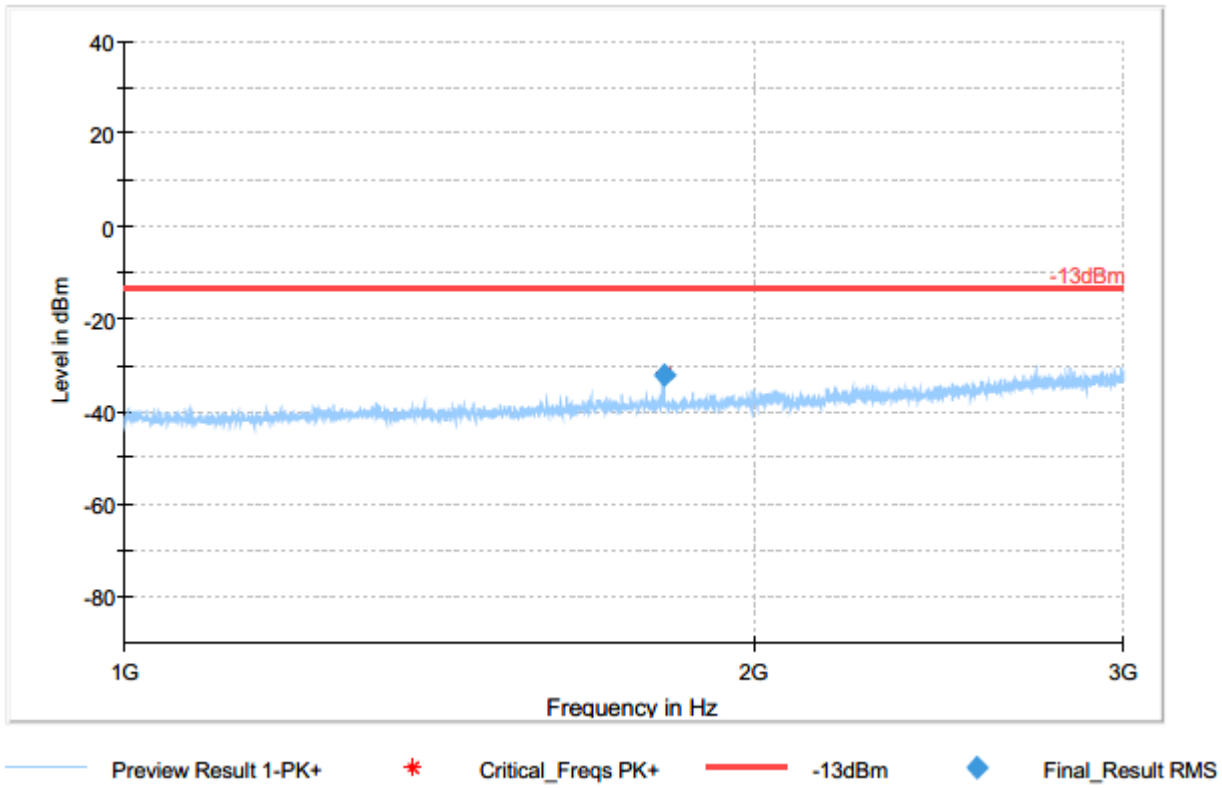


Plot # 34 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.150	-32.183	-13.00	19.18	500.0	1000.000	153.0	H	122.0	-90.3	3:29:02 PM - 8/21/2019

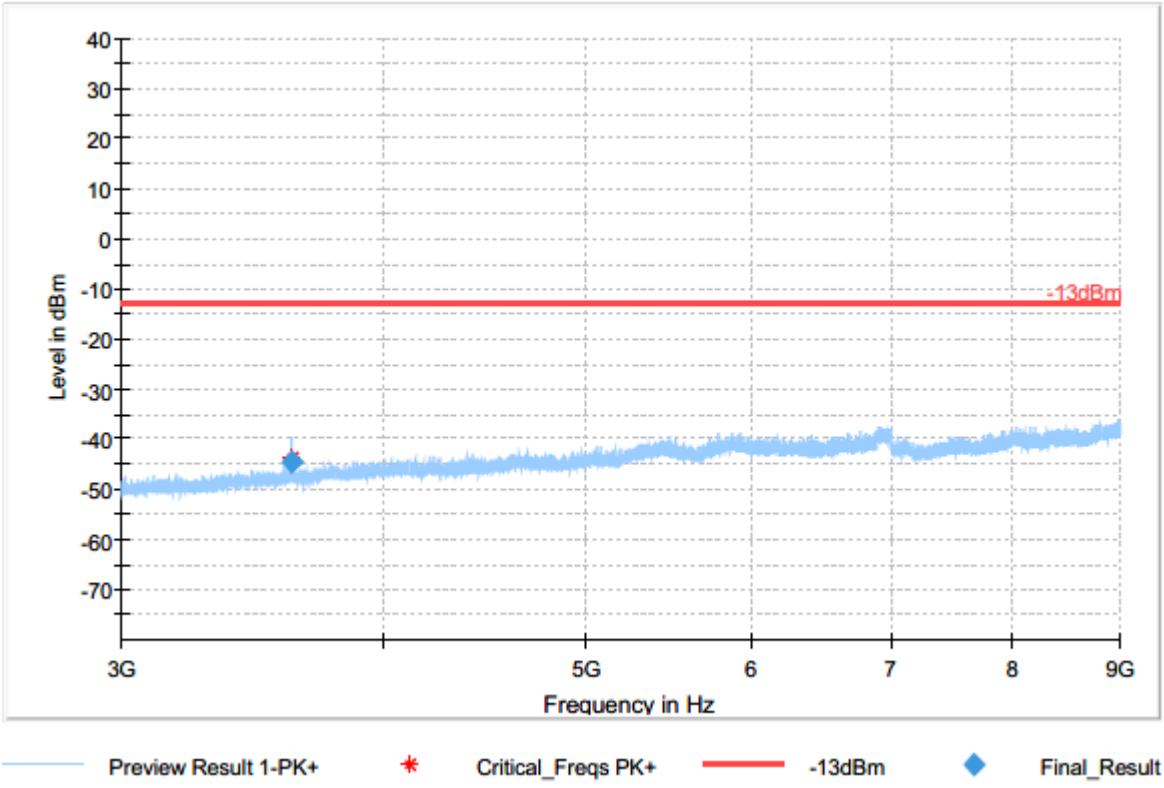


Plot # 35 Radiated Emissions: 3 GHz - 9 GHz

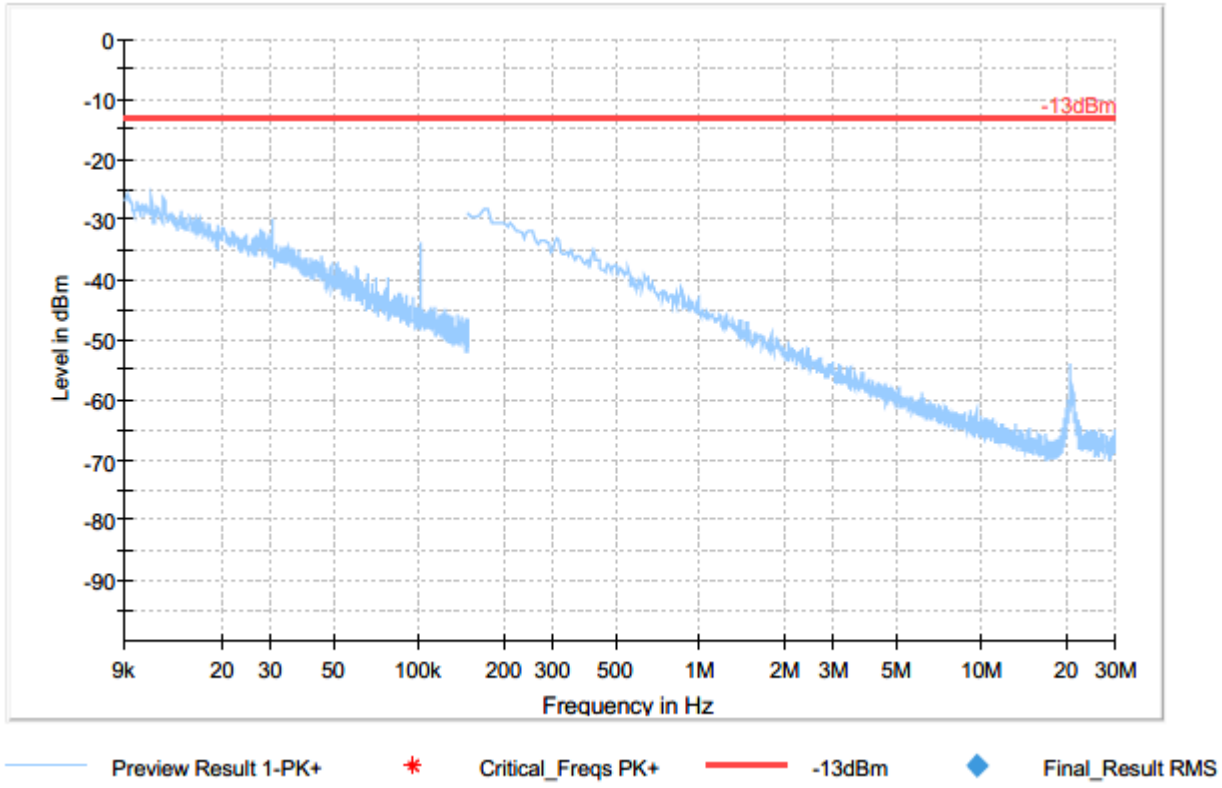
Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.245	-44.401	-13.00	31.40	500.0	1000.000	202.0	V	90.0	-102.8	7:29:00 PM - 8/21/2019



Plot # 36 Radiated Emissions: 9 kHz - 30 MHz
Channel: Mid

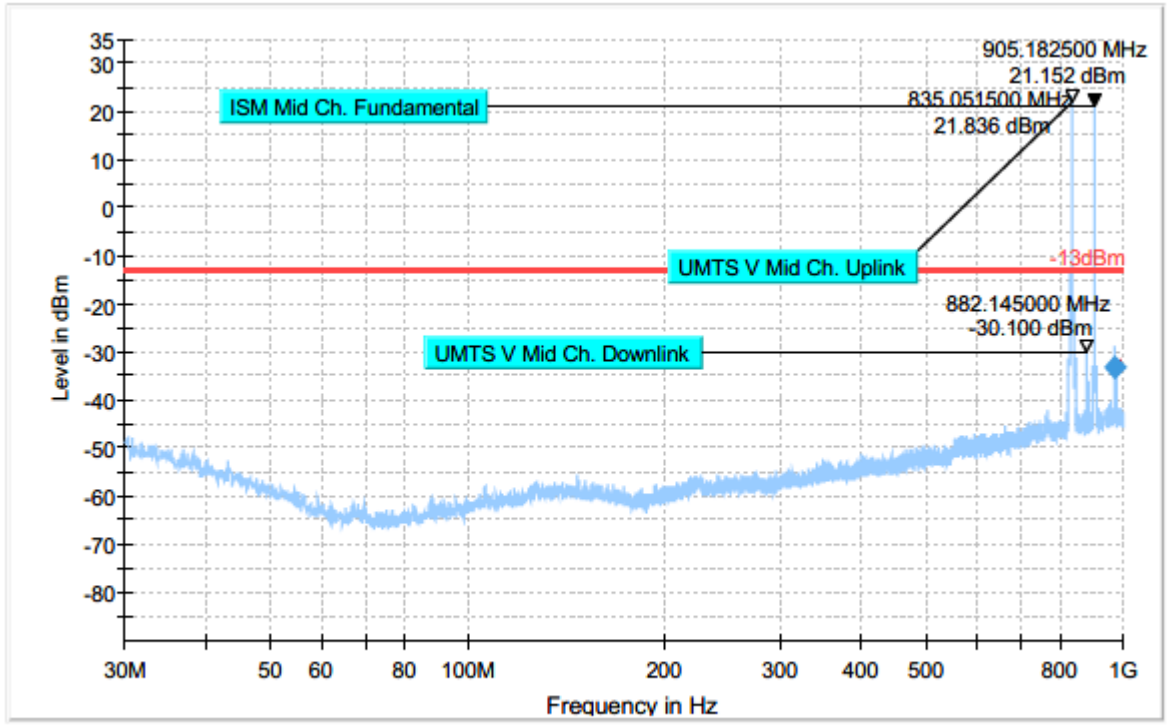


Plot # 37 Radiated Emissions: 30 MHz – 1 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
972.409	-33.215	-13.00	20.21	500.0	100.000	173.0	H	127.0	-66.4	2:09:36 PM - 8/22/2019

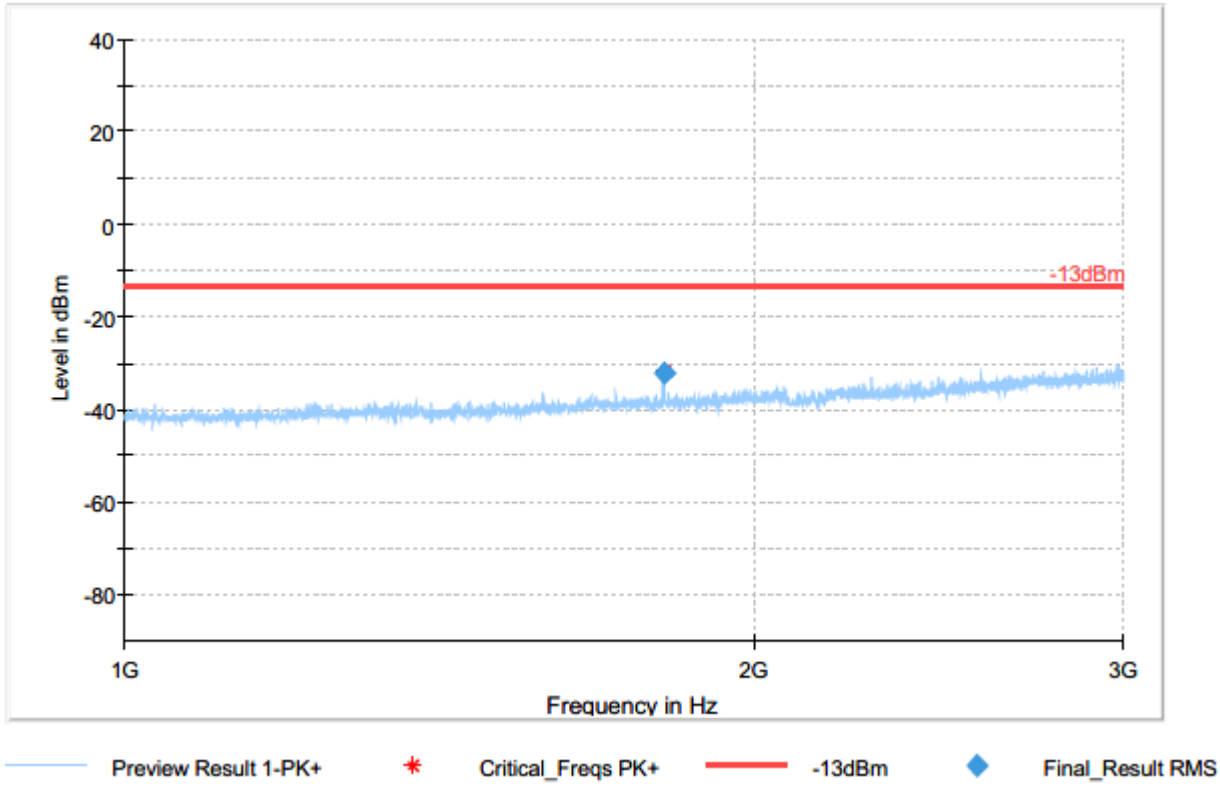


Plot # 38 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.805	-32.227	-13.00	19.23	500.0	1000.000	153.0	H	122.0	-90.3	3:18:41 PM - 8/21/2019

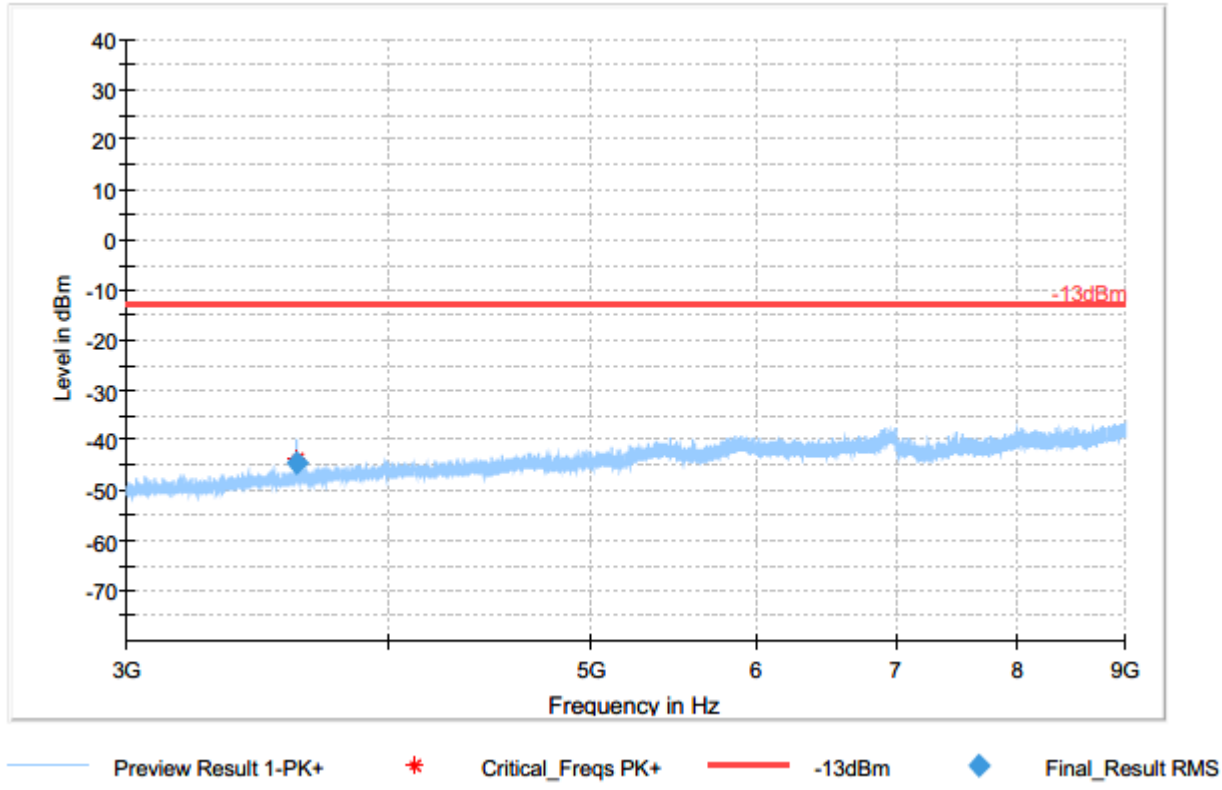


Plot # 39 Radiated Emissions: 3 GHz – 9 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.149	-44.523	-13.00	31.52	500.0	1000.000	199.0	V	90.0	-102.8	7:16:39 PM - 8/21/2019

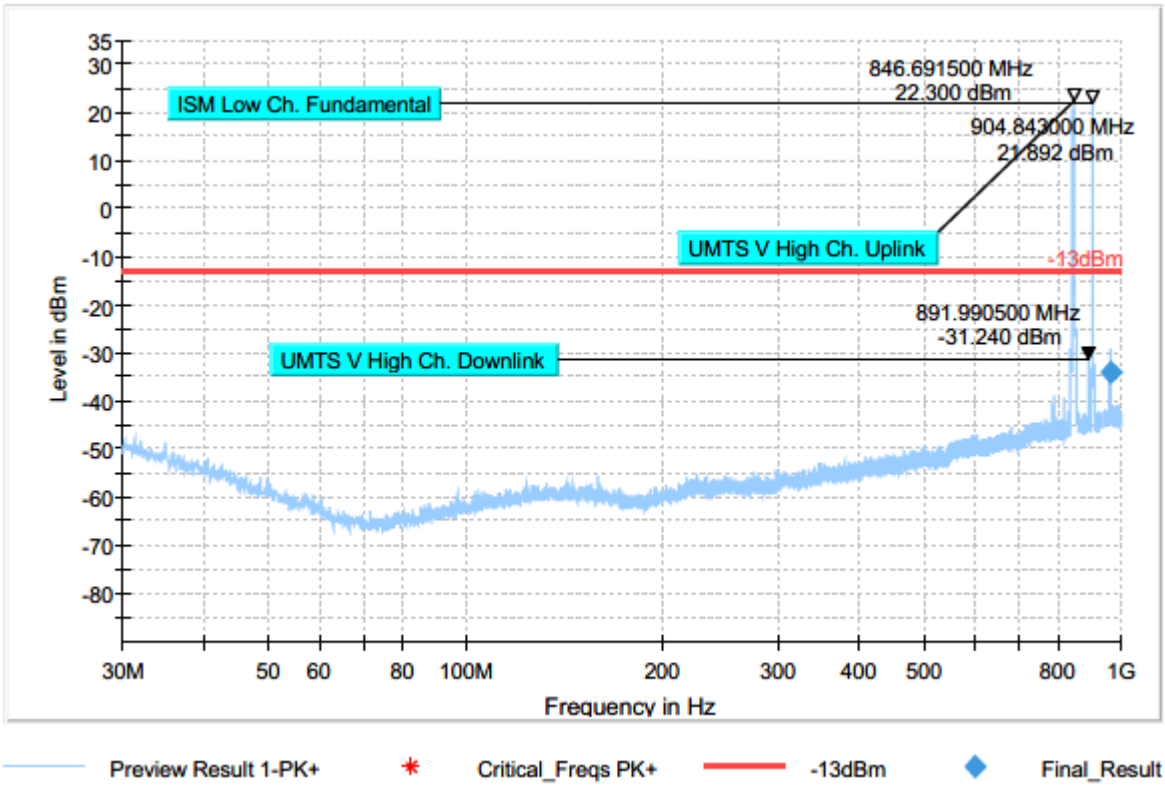


Plot # 40 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
962.048	-34.109	-13.00	21.11	500.0	100.000	179.0	H	119.0	-66.8	2:40:48 PM - 8/22/2019

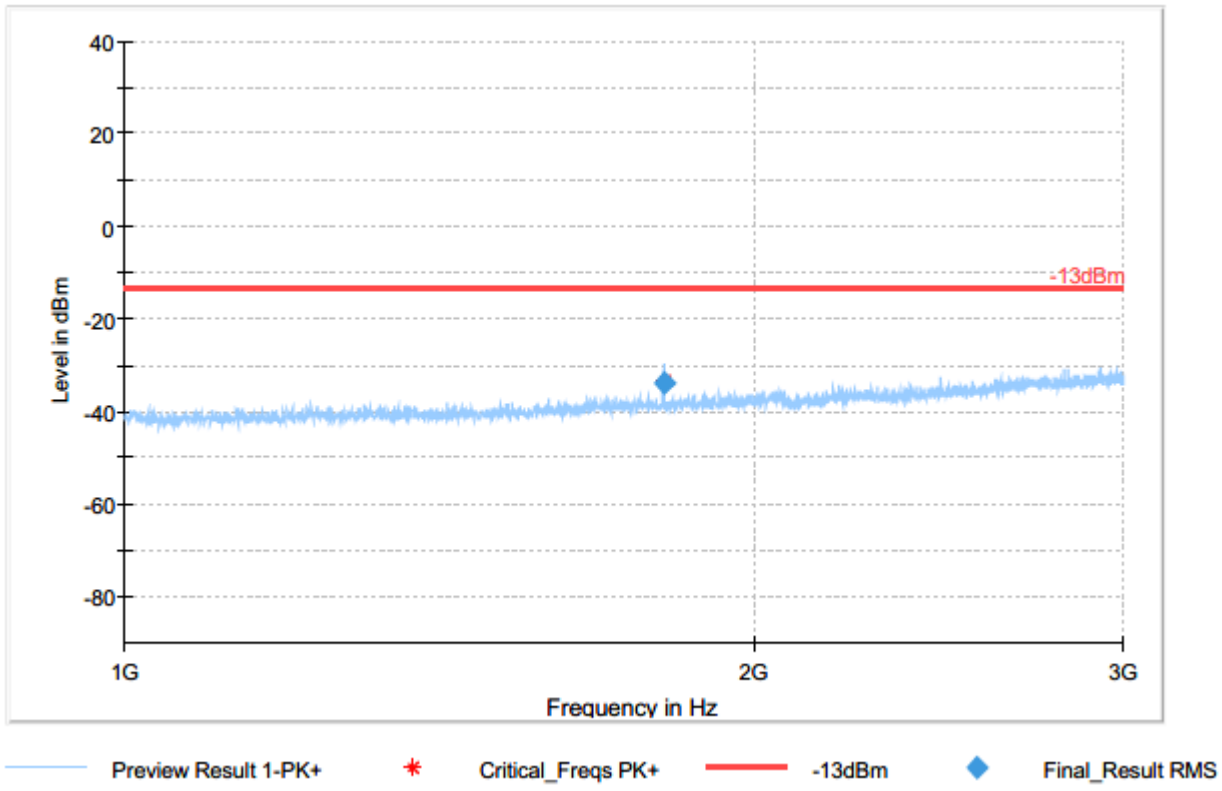


Plot # 41 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.440	-33.906	-13.00	20.91	500.0	1000.000	153.0	H	122.0	-90.3	3:07:22 PM - 8/21/2019

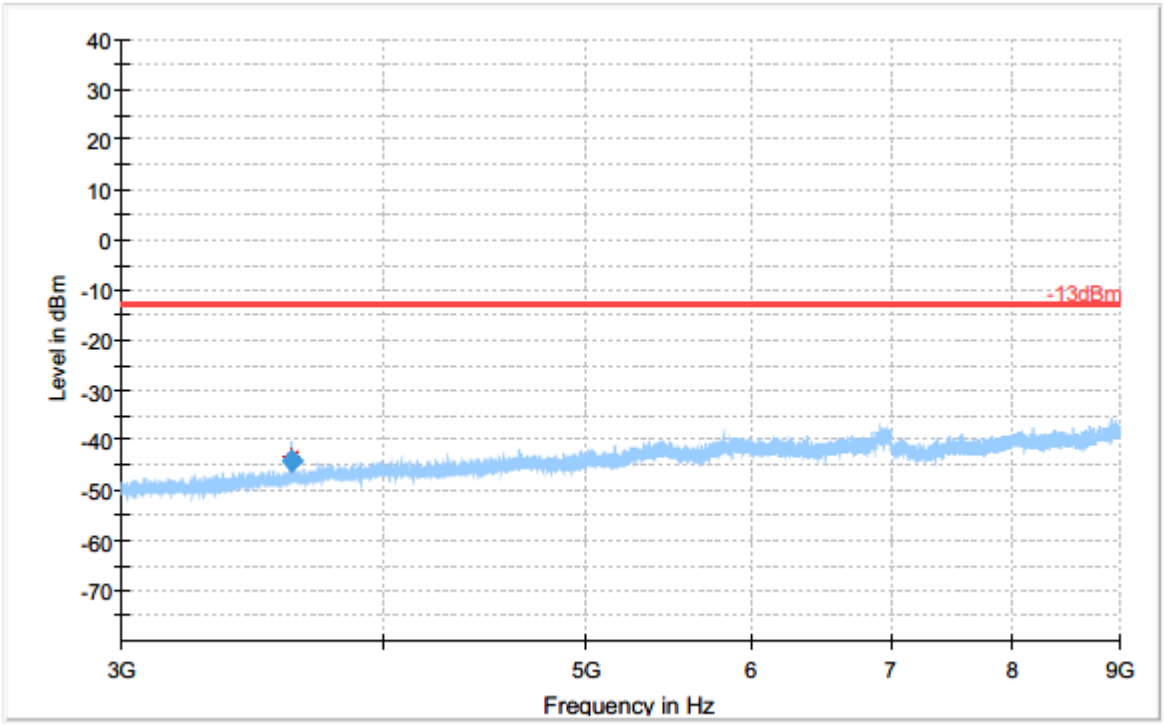


Plot # 42 Radiated Emissions: 3 GHz - 9 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.468	-44.240	-13.00	31.24	500.0	1000.000	199.0	V	87.0	-102.8	7:40:50 PM - 8/21/2019



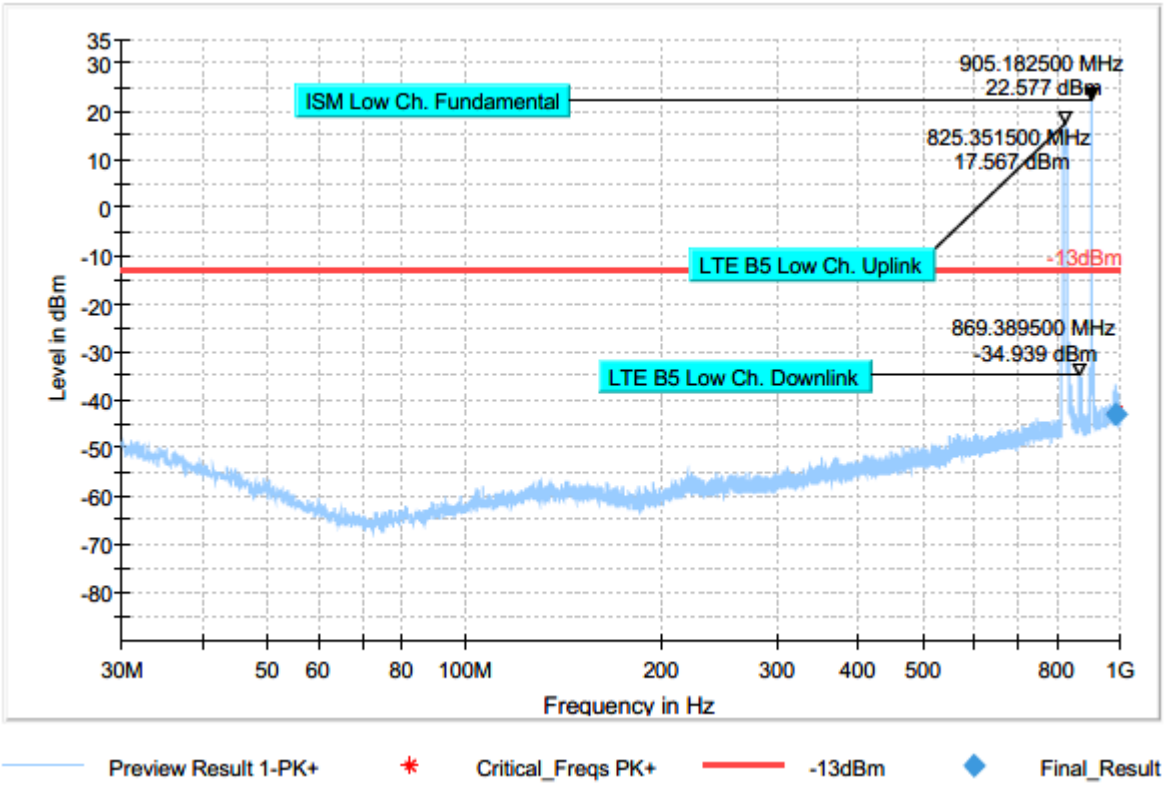
LTE Band 5

Plot # 43 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
983.331	-42.750	-13.00	29.75	500.0	100.000	191.0	H	128.0	-66.8	11:32:53 AM - 8/19/2019

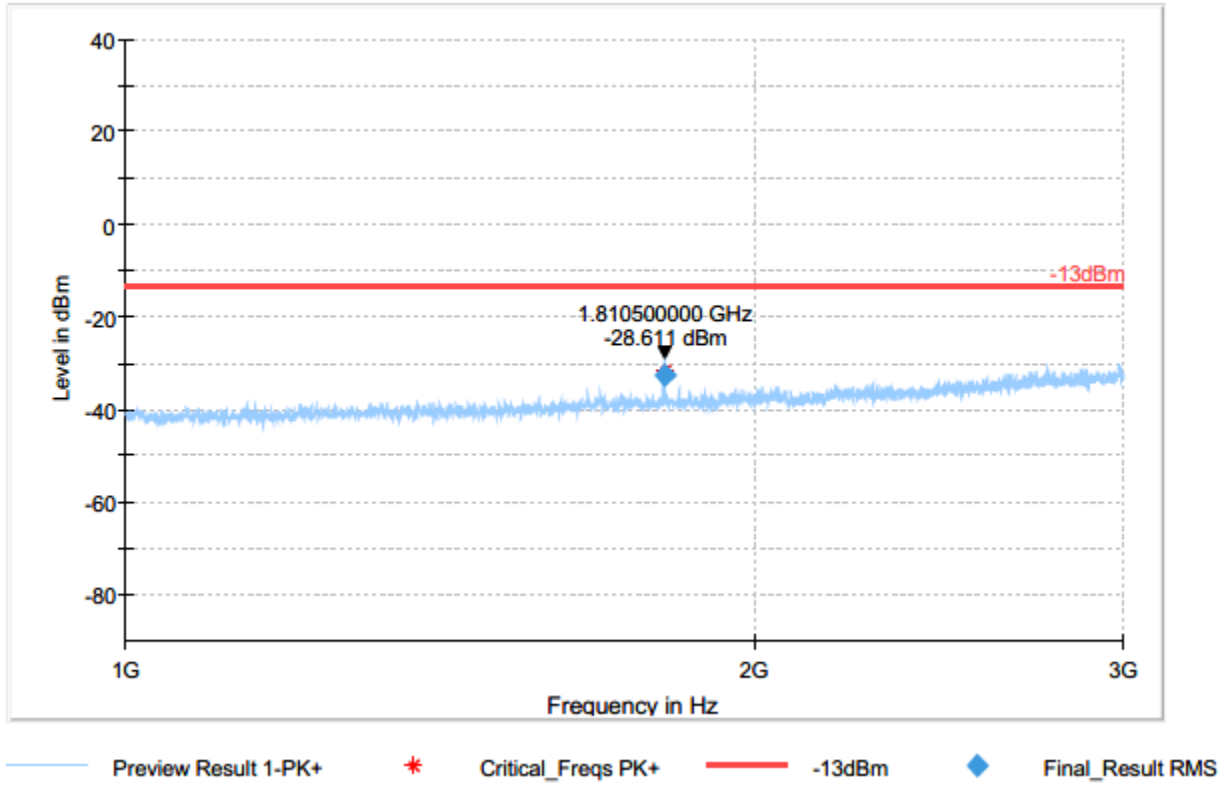


Plot # 44 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.290	-32.664	-13.00	19.66	500.0	1000.000	164.0	H	54.0	-90.3	1:08:41 PM - 8/21/2019

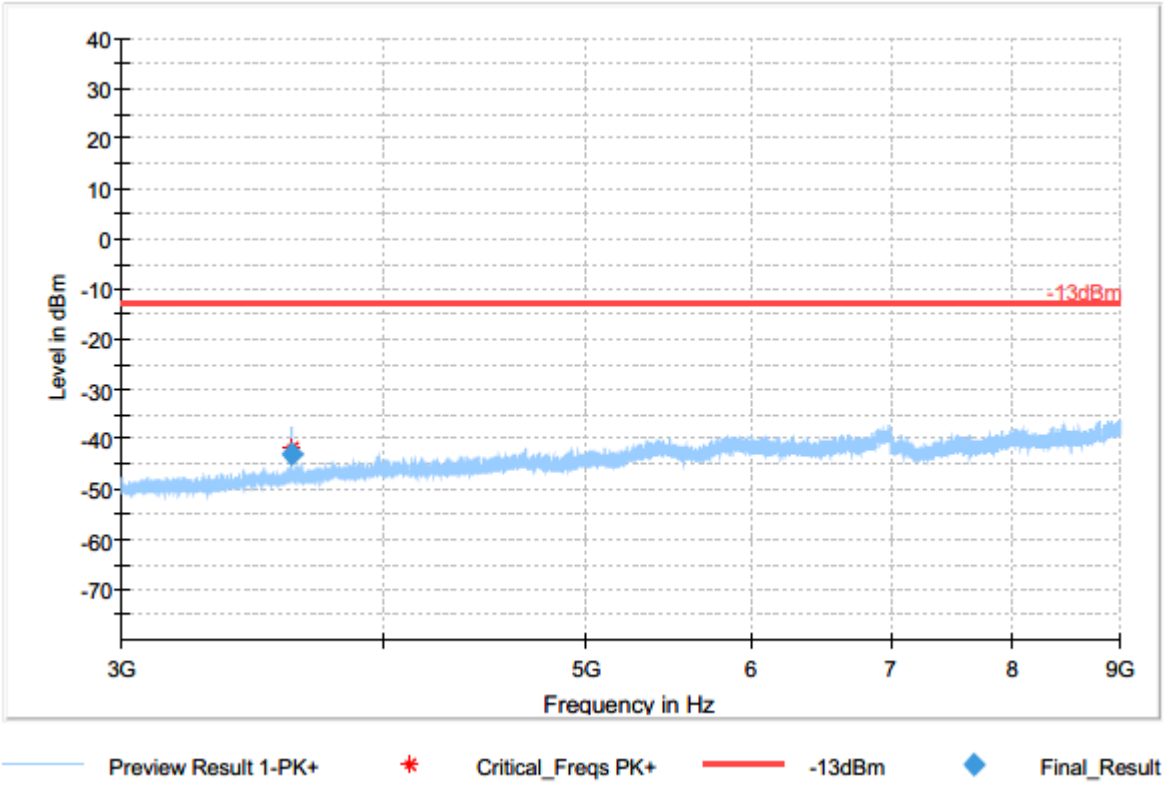


Plot # 45 Radiated Emissions: 3 GHz - 9 GHz

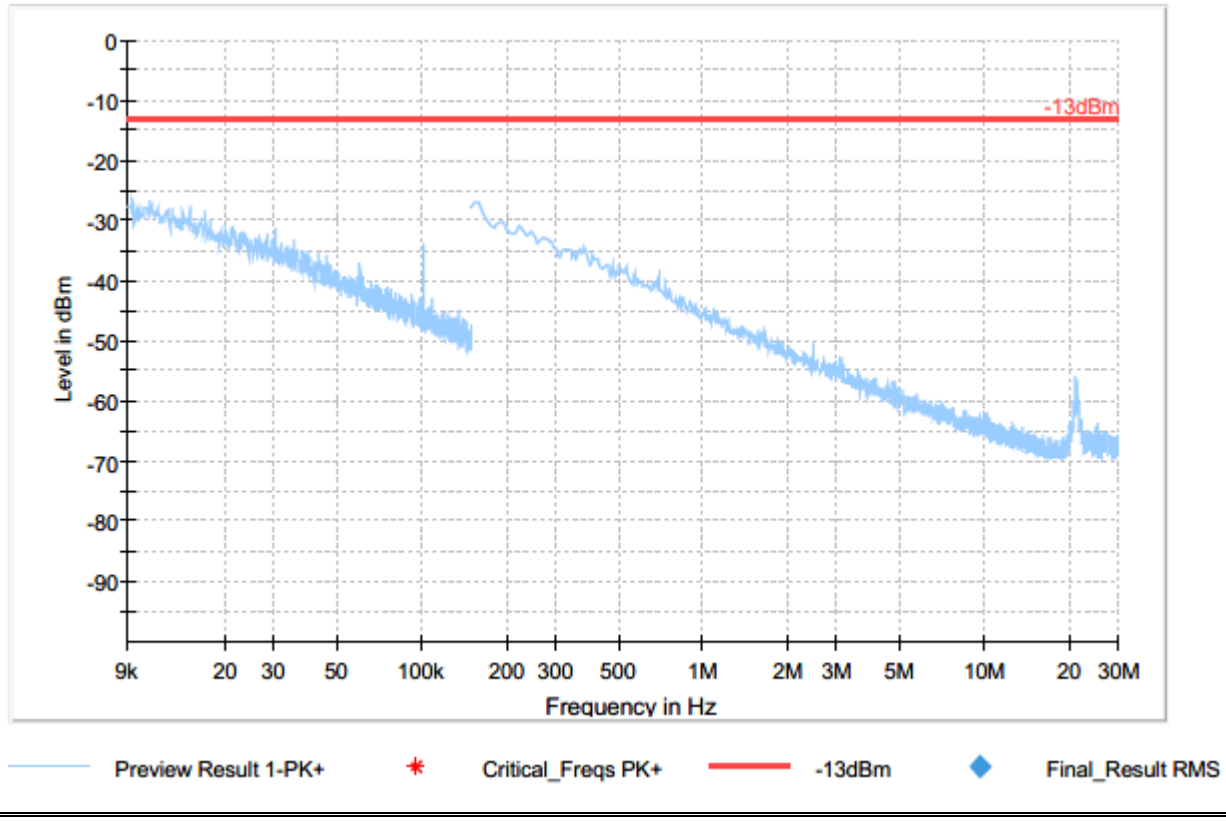
Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.720	-42.796	-13.00	29.80	500.0	1000.000	158.0	V	275.0	-102.8	6:08:55 PM - 8/16/2019



Plot # 46 Radiated Emissions: 9 kHz - 30 MHz
Channel: Mid

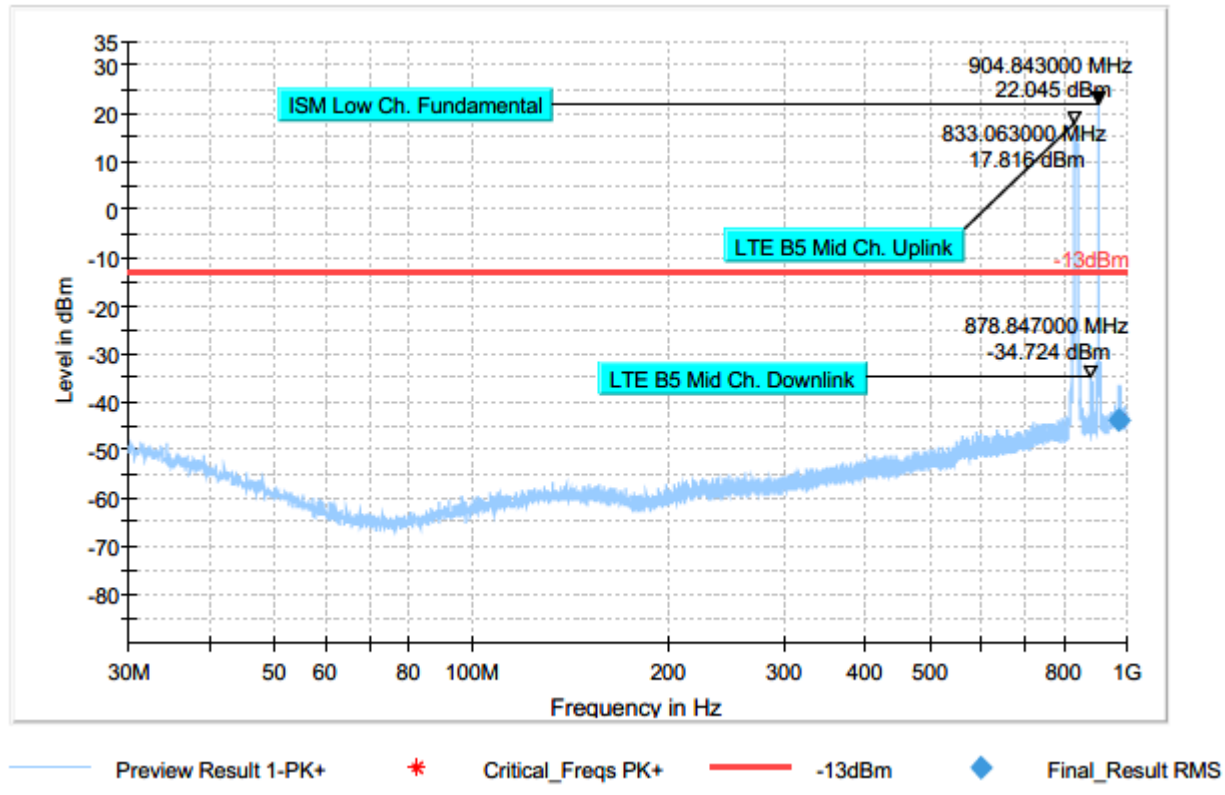


Plot # 47 Radiated Emissions: 30 MHz – 1 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
975.100	-43.730	-13.00	30.73	500.0	100.000	194.0	H	130.0	-66.4	11:13:55 AM - 8/19/2019

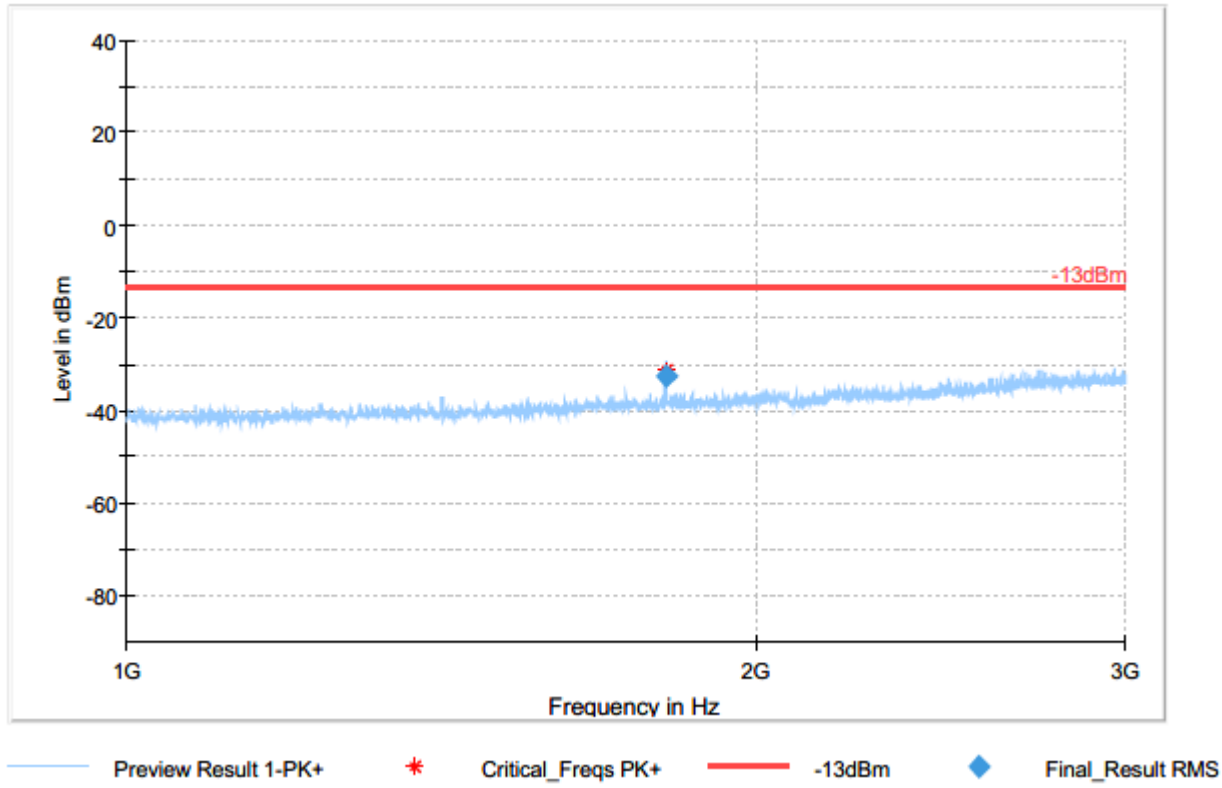


Plot # 48 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.140	-32.462	-13.00	19.46	500.0	1000.000	142.0	V	270.0	-90.3	12:43:31 PM - 8/21/2019

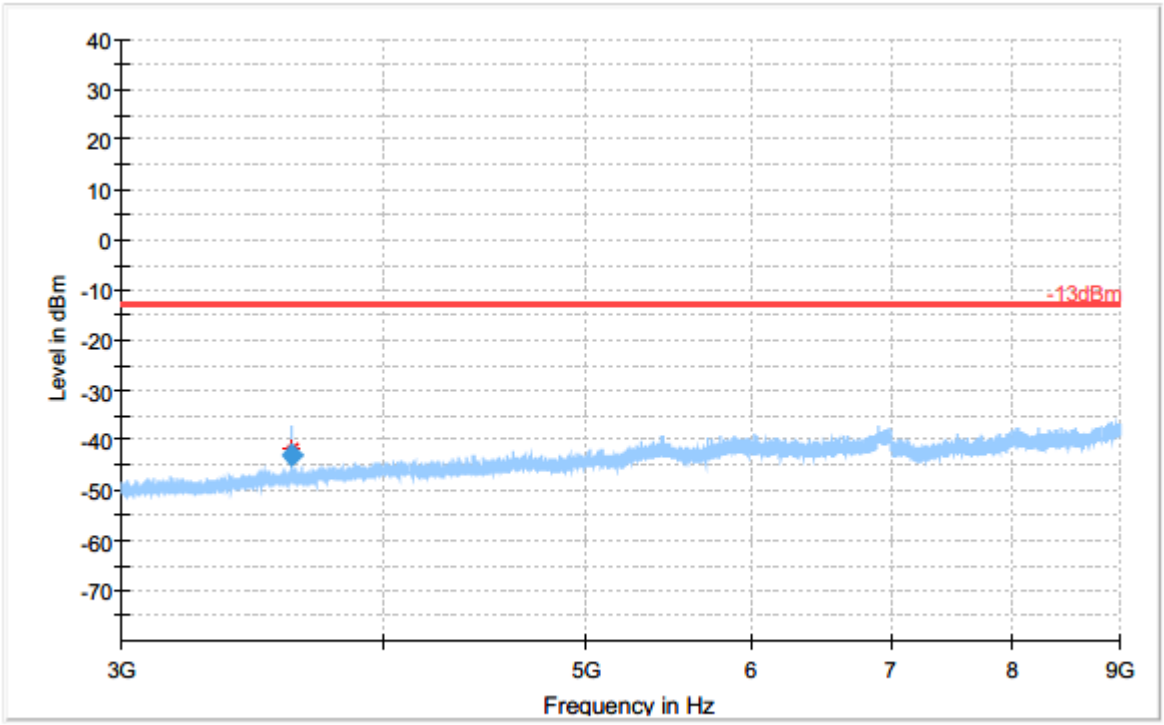


Plot # 49 Radiated Emissions: 3 GHz – 9 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3620.760	-43.022	-13.00	30.02	500.0	1000.000	159.0	V	273.0	-102.8	5:55:05 PM - 8/16/2019

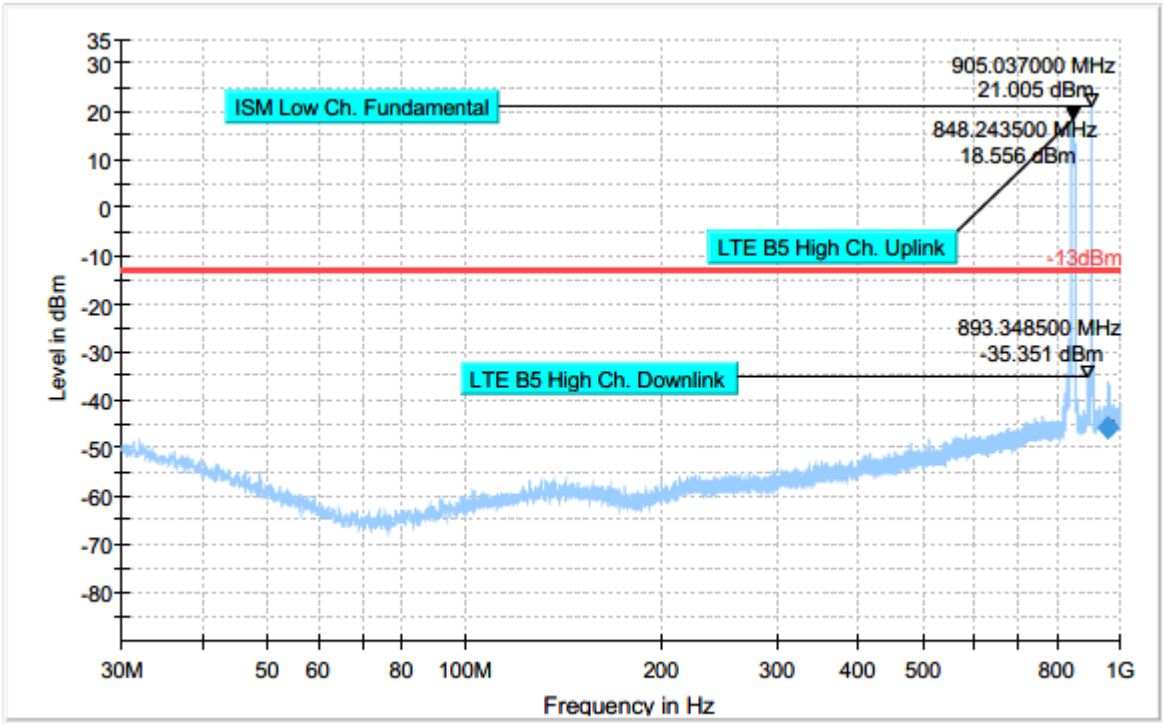


Plot # 50 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
960.339	-45.569	-13.00	32.57	500.0	100.000	183.0	H	117.0	-66.8	11:45:56 AM - 8/19/2019

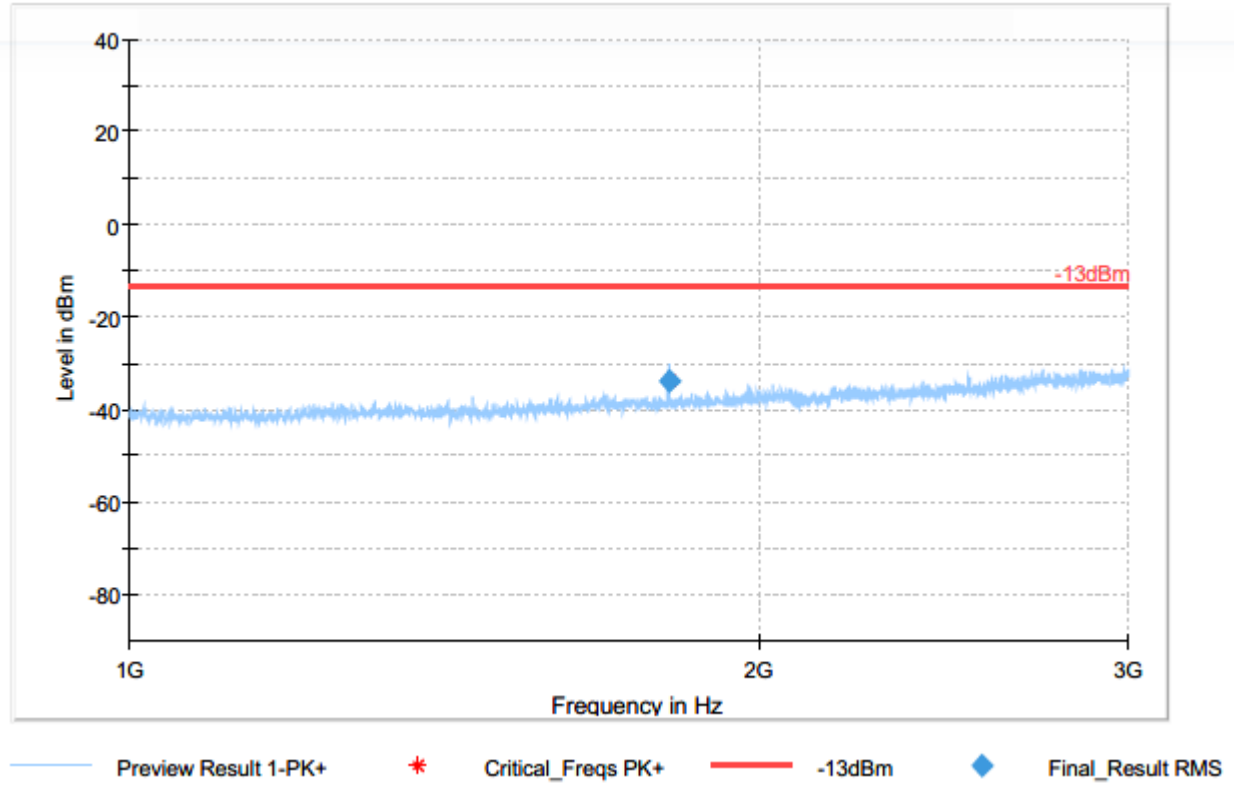


Plot # 51 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.430	-33.762	-13.00	20.76	500.0	1000.000	318.0	V	271.0	-90.3	1:44:49 PM - 8/21/2019

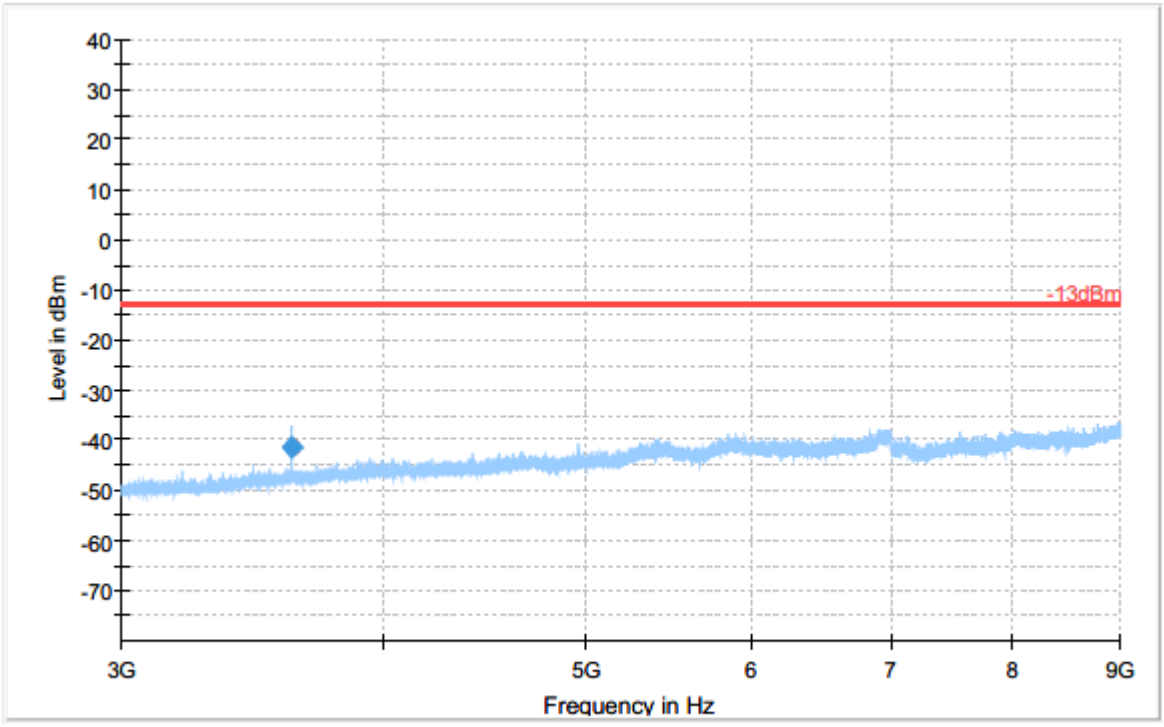


Plot # 52 Radiated Emissions: 3 GHz - 9 GHz

Channel: High

Final Result

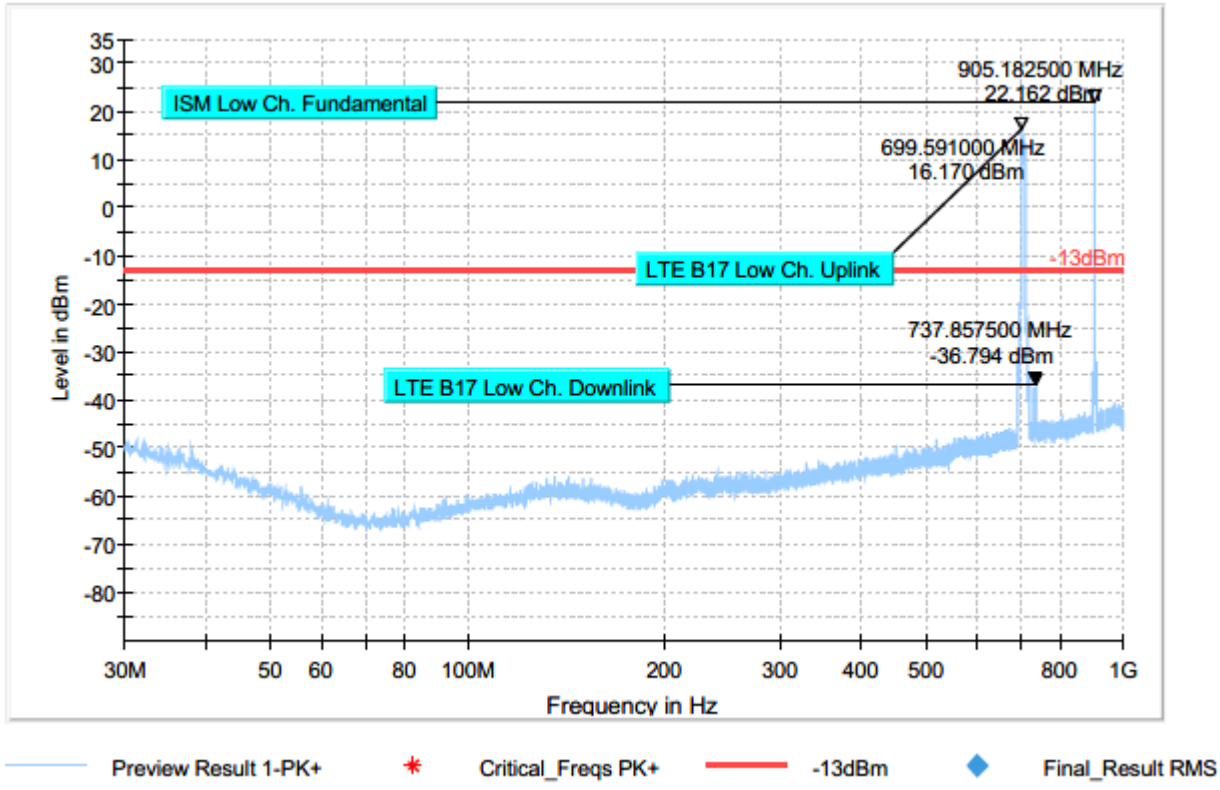
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.474	-41.463	-13.00	28.46	500.0	1000.000	116.0	V	274.0	-102.8	6:19:28 PM - 8/16/2019



LTE Band 17

Plot # 53 Radiated Emissions: 30 MHz – 1GHz

Channel: Low

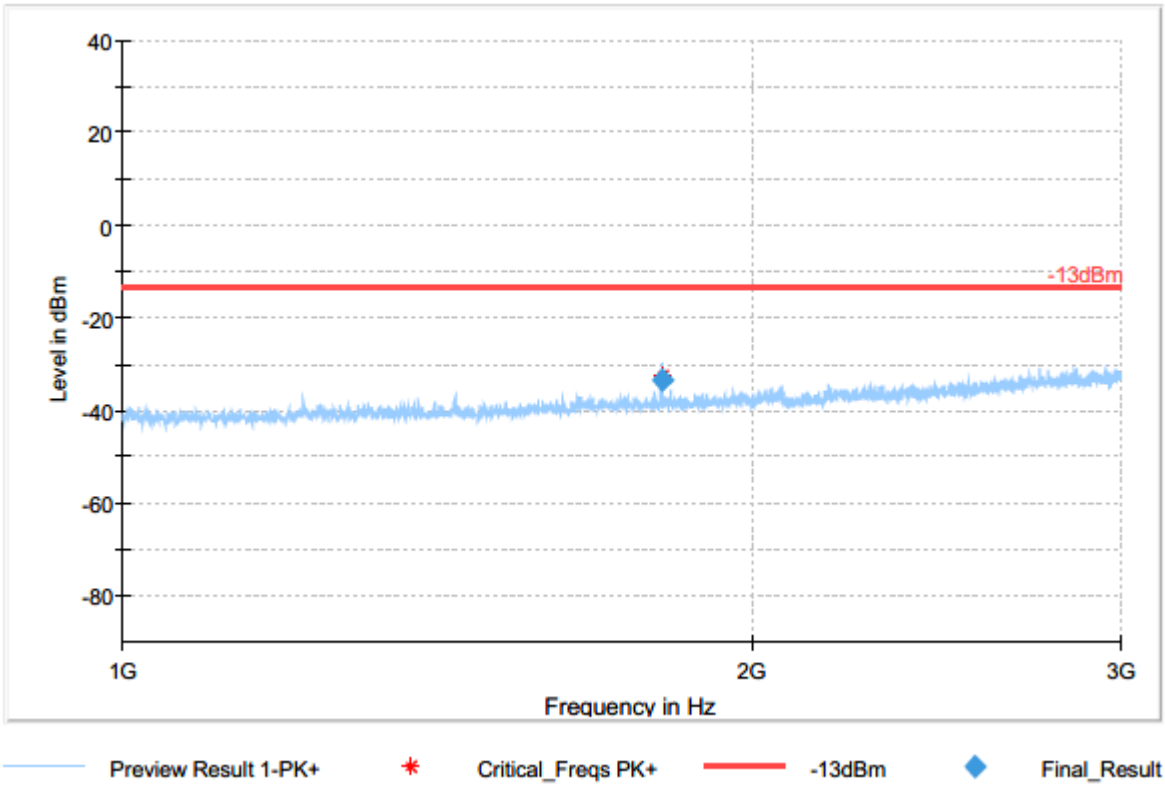


Plot # 54 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.590	-33.470	-13.00	20.47	500.0	1000.000	153.0	H	118.0	-90.3	4:44:21 PM - 8/21/2019

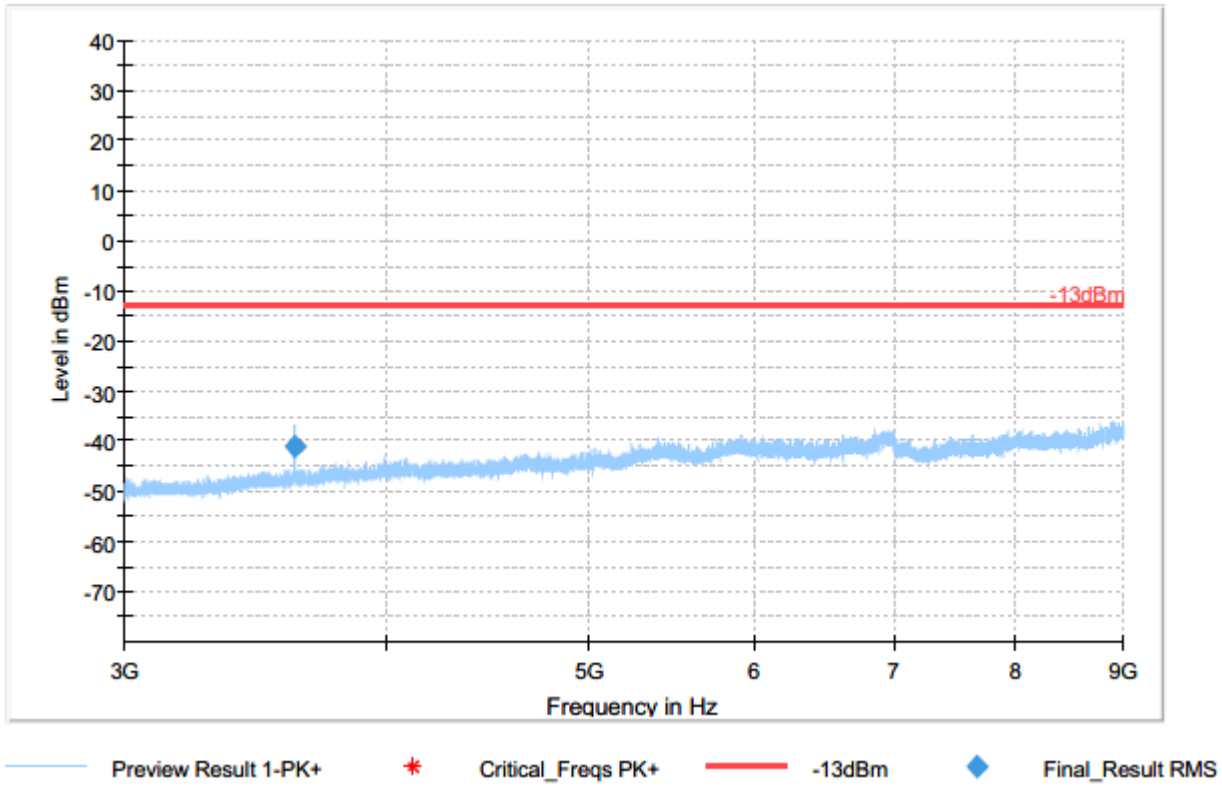


Plot # 55 Radiated Emissions: 3 GHz – 9 GHz

Channel: Low

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.267	-41.228	-13.00	28.23	500.0	1000.000	116.0	V	276.0	-102.8	6:42:52 PM - 8/16/2019

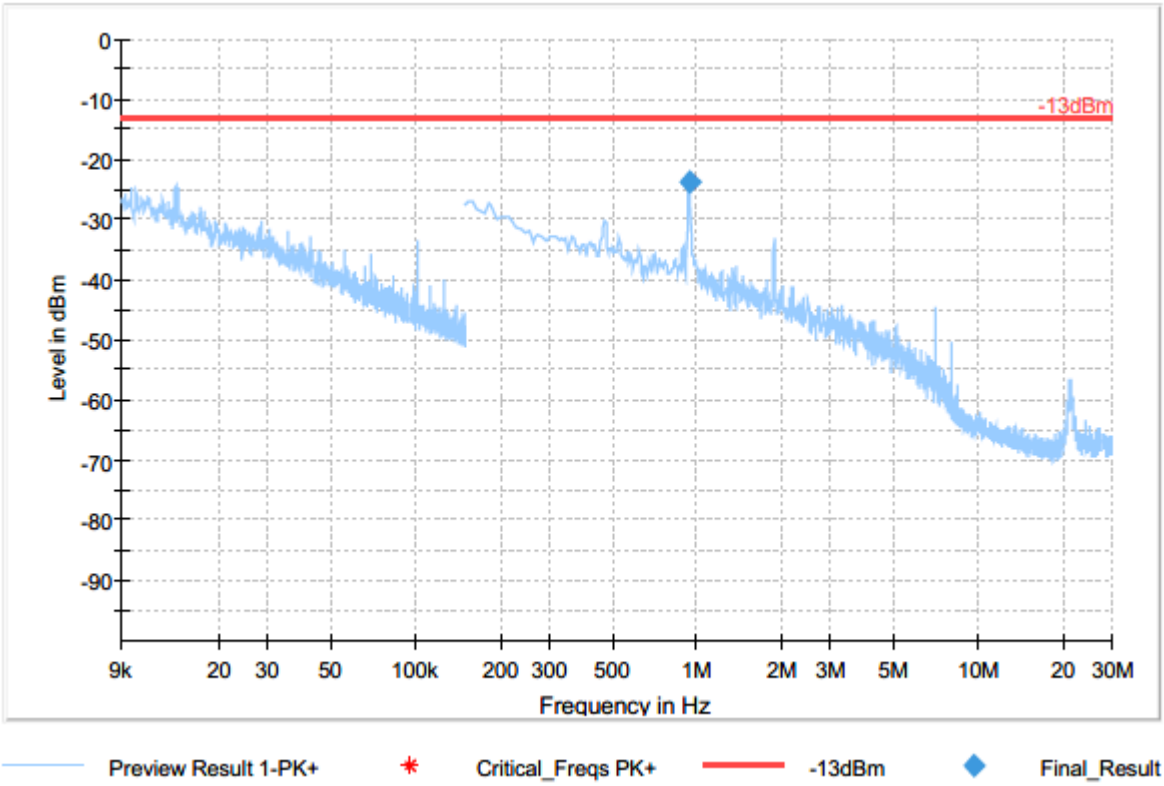


Plot # 56 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
0.944	-23.793	-13.00	10.79	500.0	9.000	249.0	H	83.0	-79.6	12:22:28 PM - 8/22/2019

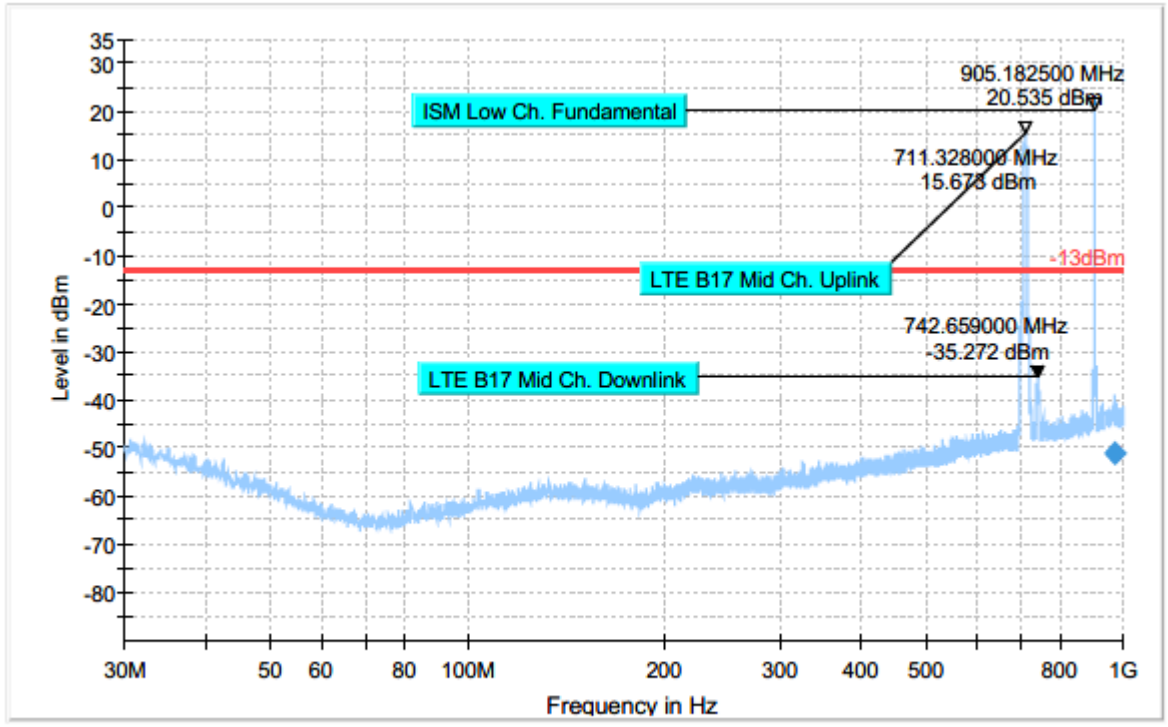


Plot # 57 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
971.366	-51.037	-13.00	38.04	500.0	100.000	191.0	H	-75.0	-66.4	12:00:49 PM - 8/19/2019

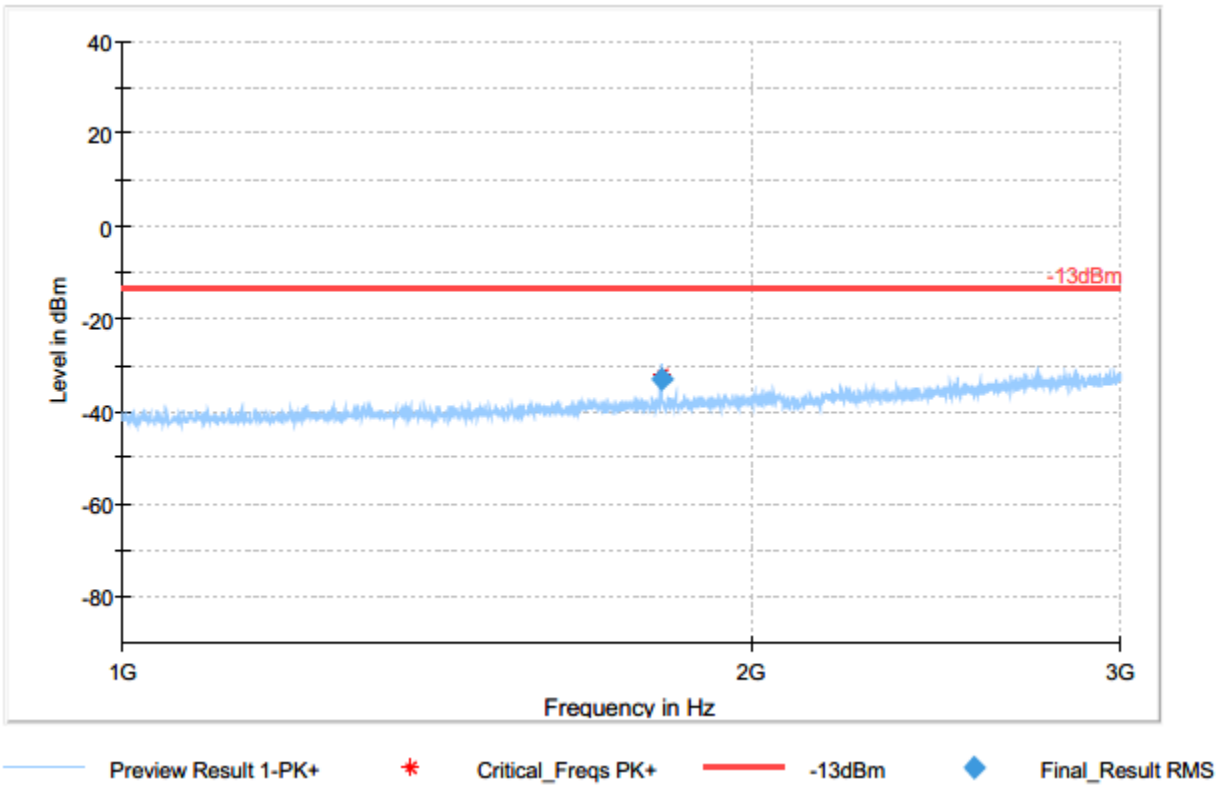


Plot # 58 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1809.640	-32.841	-13.00	19.84	500.0	1000.000	153.0	H	122.0	-90.3	4:33:52 PM - 8/21/2019

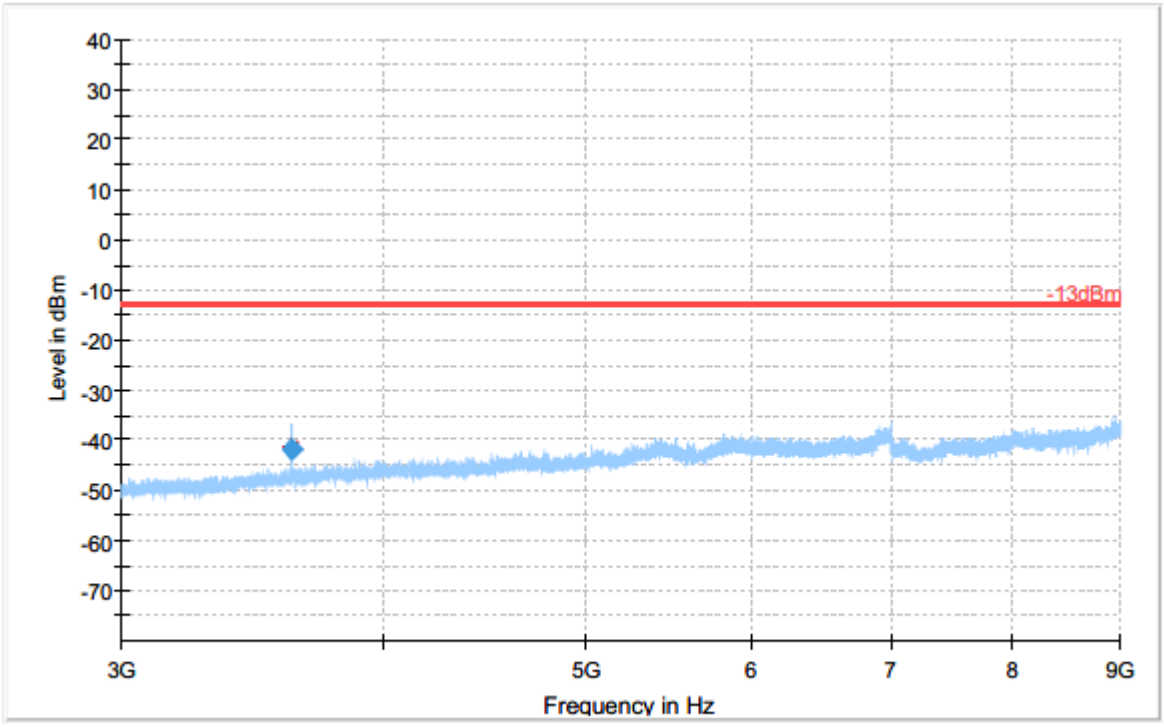


Plot # 59 Radiated Emissions: 3 GHz – 9 GHz

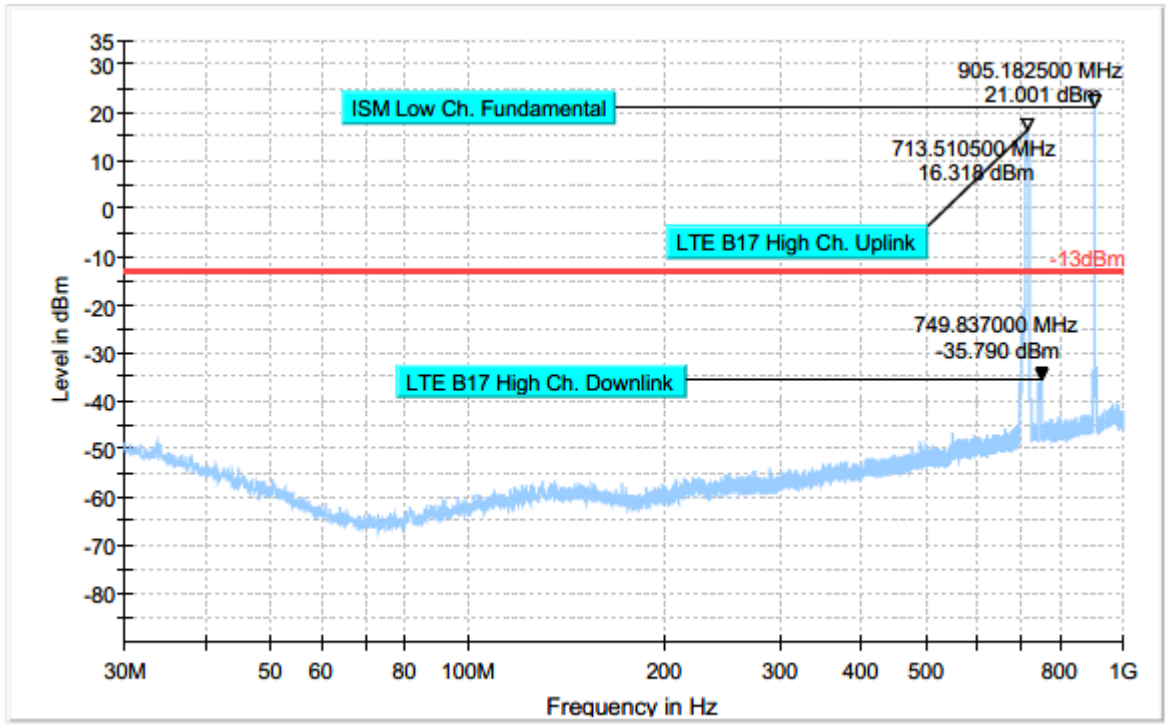
Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.325	-41.873	-13.00	28.87	500.0	1000.000	137.0	V	274.0	-102.8	6:31:53 PM - 8/16/2019



Plot # 60 Radiated Emissions: 30 MHz – 1GHz
Channel: High

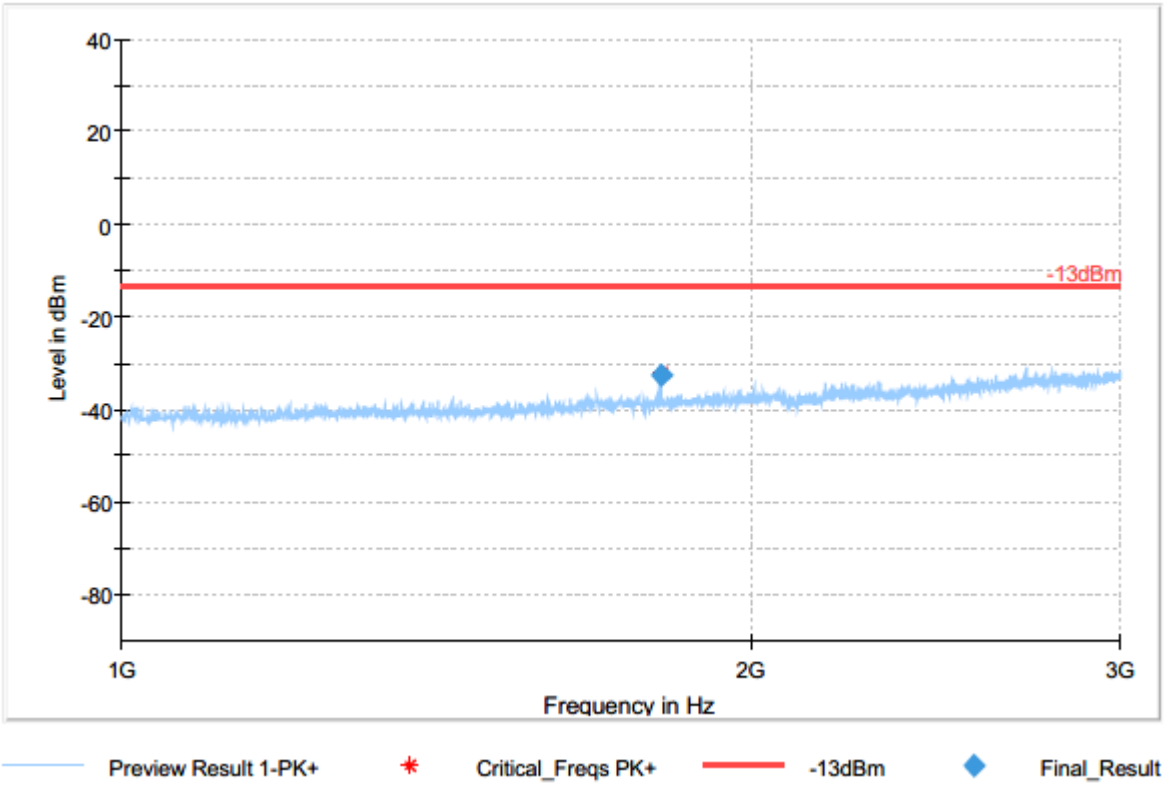


Plot # 61 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
1810.345	-32.647	-13.00	19.65	500.0	1000.000	154.0	H	121.0	-90.3	5:01:00 PM - 8/21/2019

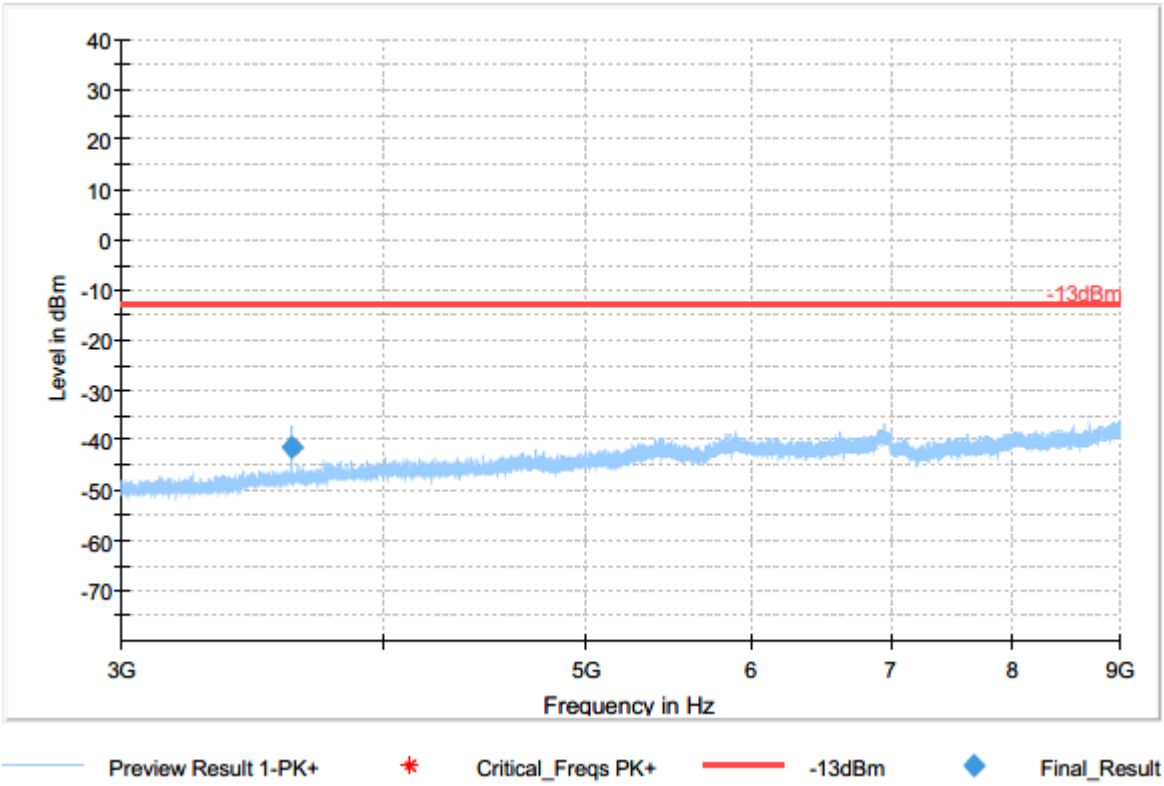


Plot # 62 Radiated Emissions: 3 GHz – 9 GHz

Channel: High

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
3619.295	-41.242	-13.00	28.24	500.0	1000.000	116.0	V	275.0	-102.8	6:54:50 PM - 8/16/2019



8 Test setup photos

Setup photos are included in supporting file name: "EMC_TELUL_076_19001_FCC_22_24_27_ISED _Setup_Photos.pdf"

9 Test Equipment And Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
Active Loop Antenna	ETS LINDGREN	6507	00161344	3 years	10/26/2017
Biconlog Antenna	TESEO	CBL 6141B	41106	3 years	11/01/2017
Horn Antenna	EMCO	3115	00035111	3 years	04/17/2019
Horn Antenna	ETS LINDGREN	3117	00167061	3 years	08/08/2017
Horn Antenna	ETS LINDGREN	3116C	00166821	3 years	09/24/2017
Wideband Radio Communication	R&S	CMW500	127068	2 years	07/19/2019
Signal Analyzer	R&S	FSV 40	101022	3 years	07/15/2019
Thermometer Humidity Monitor	CONTROL COMPANY	36934-164	191871994	2 years	01/10/2019
DC Power Supply	BK PRECISION	1672	1672002260611085	N/A	N/A

Note: Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels. Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

10 Revision History

Date	Report Name	Changes to report	Report prepared by
2019-08-29	EMC_TELUL-076-19001_FCC_22_24_27_ISED	Initial version	Chin Ming Lui