



FCC Test Report

FOR:
Philips Respiration

Model Number:
DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C

Product Description:

Continuous Airway Pressure Device with integrated Bluetooth (LE) and Cellular Radios (LTE Cat M1) that sends and receives data.

FCC ID: TH01141623

Per:
47 CFR: Part 22, Part 24, Part 27

REPORT #: EMC_PHIL4-064-20001_FCC_22_24_27

DATE: 2020-04-09



A2LA Accredited

IC recognized #
3462B-2

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TABLE OF CONTENTS

1 ASSESSMENT	3
2 ADMINISTRATIVE DATA.....	4
2.1 IDENTIFICATION OF THE TESTING LABORATORY ISSUING THE EMC TEST REPORT.....	4
2.2 IDENTIFICATION OF THE CLIENT	4
2.3 IDENTIFICATION OF THE MANUFACTURER.....	4
3 EQUIPMENT UNDER TEST (EUT).....	5
3.1 EUT SPECIFICATIONS	5
3.2 EUT SAMPLE DETAILS.....	6
3.3 ACCESSORY EQUIPMENT (AE) DETAILS.....	6
3.4 SUPPORT EQUIPMENT.....	6
3.5 TEST SAMPLE CONFIGURATION.....	6
3.6 MODE OF OPERATION DETAILS.....	7
3.7 JUSTIFICATION FOR WORST CASE MODE OF OPERATION.....	7
4 SUBJECT OF INVESTIGATION	8
4.1 DATES OF TESTING:	8
4.2 MEASUREMENT UNCERTAINTY	8
4.3 ENVIRONMENTAL CONDITIONS DURING TESTING:	8
5 MEASUREMENT PROCEDURES.....	9
5.1 RADIATED MEASUREMENT	9
5.2 SAMPLE CALCULATIONS FOR FIELD STRENGTH MEASUREMENTS	11
6 MEASUREMENT RESULTS SUMMARY.....	12
6.1 FCC 22 :.....	12
6.2 FCC 24:.....	13
6.3 FCC 27:.....	14
7 TEST RESULT DATA.....	15
7.1 ERP	15
7.2 RADIATED SPURIOUS EMISSIONS	16
8 TEST SETUP PHOTO	69
9 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTING	69
10 REVISION HISTORY	69

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.

Company	Description	Model #
Philips Respironics	Continuous Airway Pressure Device with integrated Bluetooth (LE) and Cellular Radios (LTE Cat M1) that sends and receives data	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C

No deficiencies were ascertained.

Responsible for Testing Laboratory:

2020-04-09	Compliance	Cindy Li (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2020-04-09	Compliance	Yuchan Lu (Test Engineer)	
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 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

Client's Name:	Philips Respiration
Street Address:	1740 Golden Mile Highway
City/Zip Code	Monroeville, PA 15146
Country	USA

2.3 Identification of the Applicant

Applicant's Name:	Philips Respiration
Street Address:	1001 Murry Ridge Lane
City/Zip Code:	Murrysville, PA 15668
Country:	USA

2.4 Identification of the Manufacturer

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

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Model No:	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C
Firmware Version Identification Number (FVIN):	N/A
Hardware Version Identification Number (HVIN):	DSX510H11C, DSX510T11C, DSX520H11C, DSX520T11C
Product Marketing Name (PMN):	DreamStation 2 Advanced Auto CPAP
Hardware Version:	05
Software Version:	D1.0.0.1524
Antenna Information as declared:	<ul style="list-style-type: none">● Flexible Polymer Antenna● Max peak gain 4dBi
Other Radios included in the device:	❖ <u>BLE</u> <ul style="list-style-type: none">● Module name: Dialog● Module number: DA14585
Power Supply/ Rated Operating Voltage Range:	Low 10.8 VDC, Nominal 12 VDC, High 13.2 VDC
Operating Temperature Range:	Low 5° C, Nominal 21° C, High 35° C
Sample Revision	<input type="checkbox"/> Prototype Unit; <input type="checkbox"/> Production Unit; <input checked="" type="checkbox"/> Pre-Production
EUT Dimensions(mm):	274 x 158 x 85
Weight(grams):	5060
EUT Diameter	<input checked="" type="checkbox"/> < 60 cm <input type="checkbox"/> Other _____

Module Information	
Module Name:	u-blox
Model Number:	SARA-R410M-02B
FCC ID:	XPY2AGQN4NNN

3.2 EUT Sample details

EUT #	IMEI number	HW Version	SW Version	Notes/Comments
1	3592151008148413	05	D1.0.0.1524	Radiated Measurement

3.3 Accessory Equipment (AE) Details

AE #	Type	Model	Manufacturer	Serial Number
1	80W DreamStation Power Supply	MDS-080AAS12 A	Delta Electronics Inc.	70HW93S0BRX

3.4 Support Equipment

SE #	Comments
1	Segger J-Link, Part No: 8.08.00, S/N: 50129736
2	USB Cable – A to Micro B (11mm Length Micro B)
3	Bluetooth USB-to-UART Cable
4	USB Cable – A to B (for Segger J-Link)
5	Laptop

3.5 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT# 1 + AE# 1	Worst Case

3.6 Mode of Operation details

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	Cellular and BLE Co-Transmission	<p>Cellular was tested on Low, Mid, High Channels at the maximum power in a co-transmission mode.</p> <p>Special commands through command window used to configure the BLE Mid channel provided by the client that will not be available to the end user</p> <p>For radiated measurements: The internal antenna was connected.</p>

3.7 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 BLE Mid channel. Which it 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: TH01141623**.

The pre-certified module to be integrated (SARA-R410M-02B) 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.

The conducted module test data that can be obtained under the **FCC Filing ID: XPY2AGQN4NNN** is applicable for the host described in section 3.

4.1 Dates of Testing:

02/06/2020 – 02/10/2020

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%

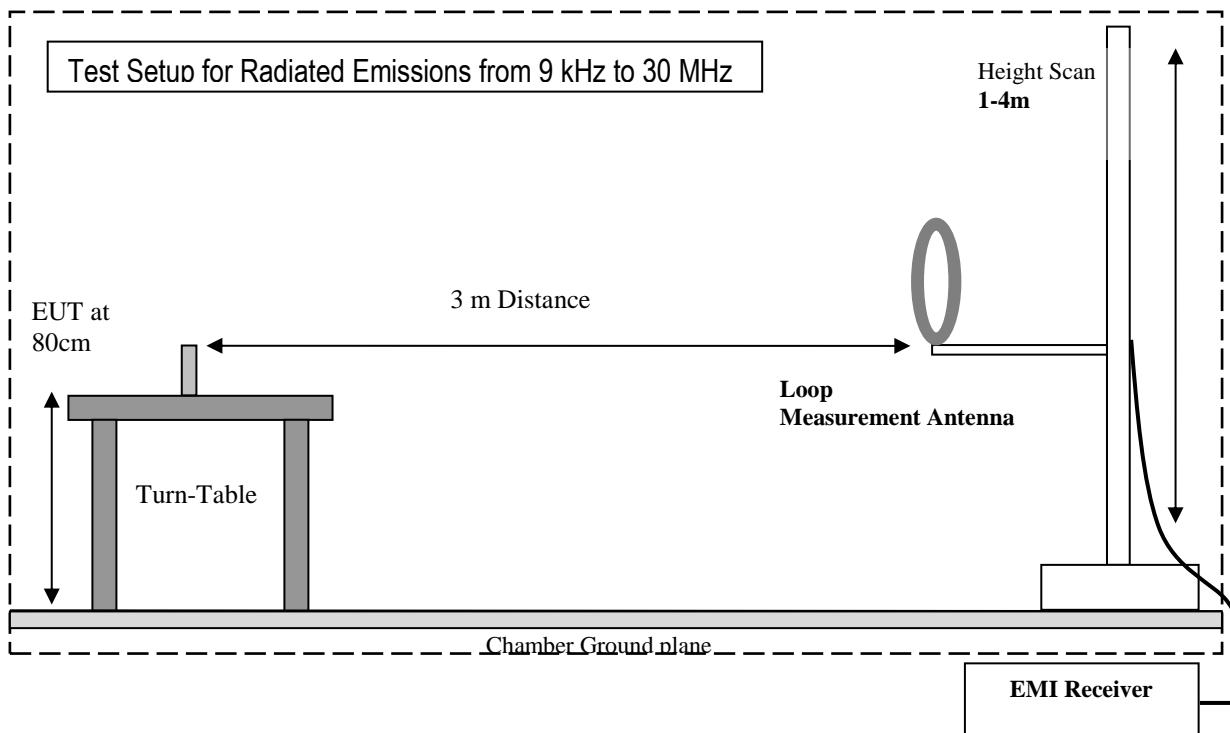
Deviating test conditions are indicated at individual test description where applicable.

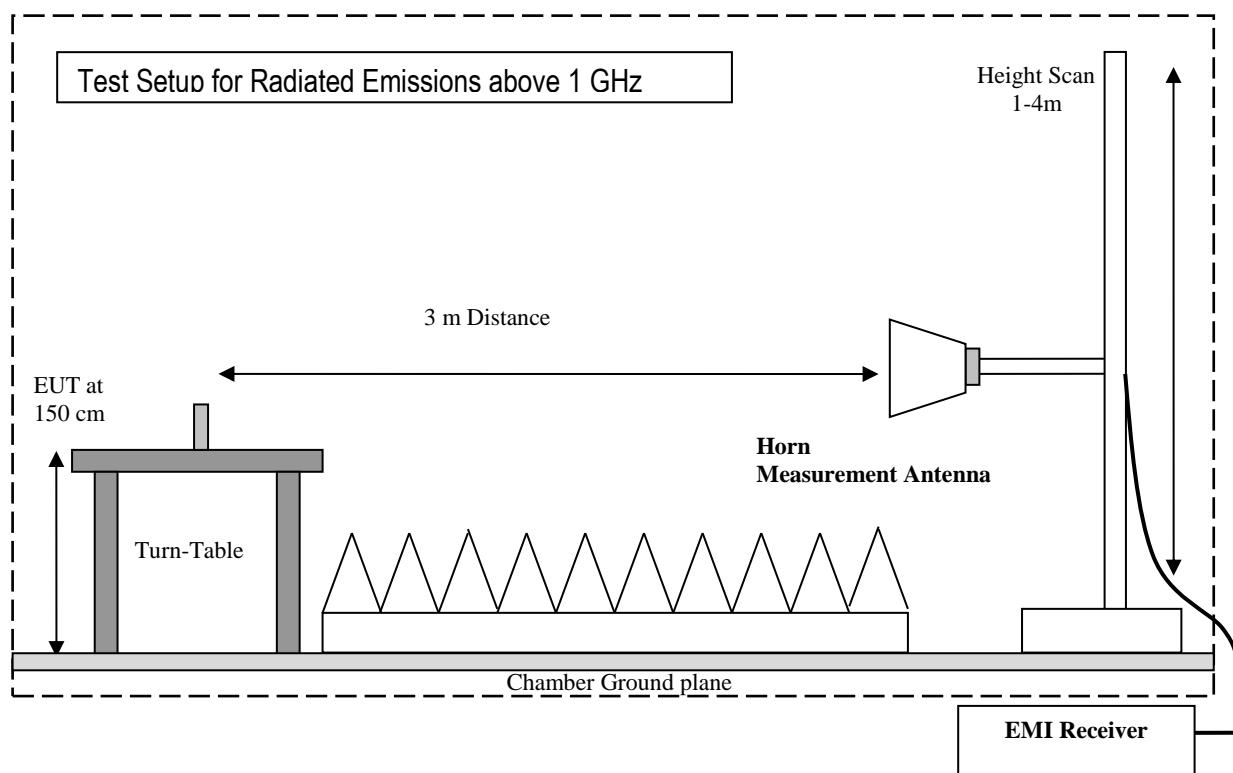
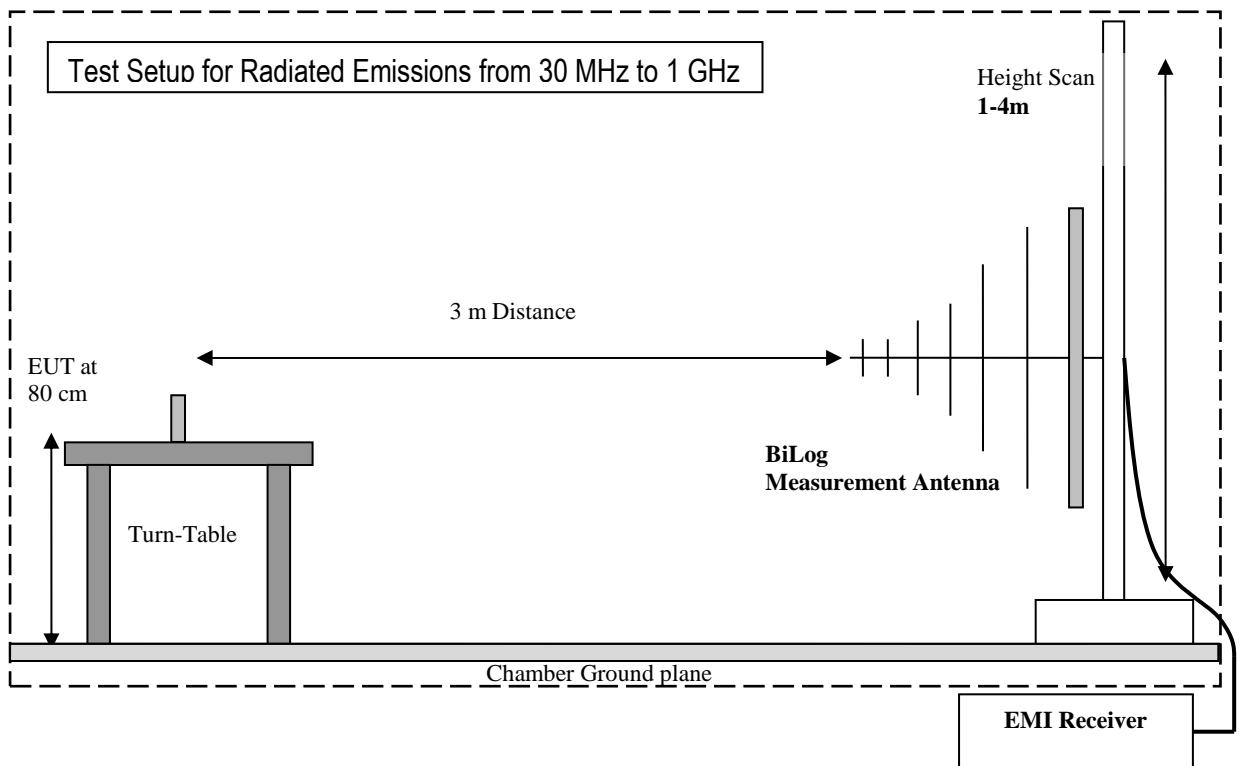
5 Measurement Procedures

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.





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 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:

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

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 Measurement Results Summary

6.1 FCC 22 :

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §22.913 (a)	RF Output Power	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1055; §22.355	Frequency Stability	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1049; §22.917	Occupied Bandwidth	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1051; §22.917	Band Edge Compliance	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1051; §22.917	Conducted Spurious Emissions	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1053; §22.917(a)	Radiated Spurious Emissions	Nominal	Op.1	■	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: Leveraged from module certification FCC ID: XPY2AGQN4NNN

6.2 FCC 24:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §24.232 (a)	RF Output Power	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1055; §24.235	Frequency Stability	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1049; §24.238	Occupied Bandwidth	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1051; §24.238	Band Edge Compliance	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1051; §24.238	Conducted Spurious Emissions	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1053; §24.238(a)	Radiated Spurious Emissions	Nominal	Op.1	■	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: Leveraged from module certification FCC ID: XPY2AGQN4NNN

6.3 FCC 27:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §27.50 (d)	RF Output Power	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1055; §27.54	Frequency Stability	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1049; §27.53	Occupied Bandwidth	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1051; §27.53	Band Edge Compliance	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1051; §27.53	Conducted Spurious Emissions	Nominal	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■	Note 1 Note 2
§2.1053; §27.53(g); §27.53(h)	Radiated Spurious Emissions	Nominal	Op.1	■	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: Leveraged from module certification FCC ID: XPY2AGQN4NNN

7 Test Result Data

7.1 ERP

Band	Frequency Range (MHz)	Power conducted (W)	Emission Designator	Antenna Gain (dBi)	gain linear	EIRP ¹ (W)	ERP ¹ (W)	Frequency deviation (ppm)	Limit ERP (W)
LTE 2	1850 – 1910	0.302	1M12G7D	4	2.512	0.759	-	1.0	2
LTE 2	1850 – 1910	0.302	1M12W7D	4	2.512	0.759	-	1.0	2
LTE 4	1710 – 1755	0.245	1M24G7D	4	2.512	0.615	-	1.0	1
LTE 5	824 – 849	0.316	1M11G7D	4	2.512	0.794	0.484	1.0	7
LTE 5	824 – 849	0.316	1M11W7D	4	2.512	0.794	0.484	1.0	7
LTE 12	699 – 716	0.269	1M11W7D	4	2.512	0.676	0.412	1.0	3
LTE 13	777 – 787	0.275	1M21W7D	4	2.512	0.691	0.421	1.0	3
LTE 13	779.5 – 784.5	0.173	1M34W7D	4	2.512	0.435	0.265	0.002	3

Note 1: ERP are calculated from maximum power in grant of cellular module SARA-R410M-02B adding the 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

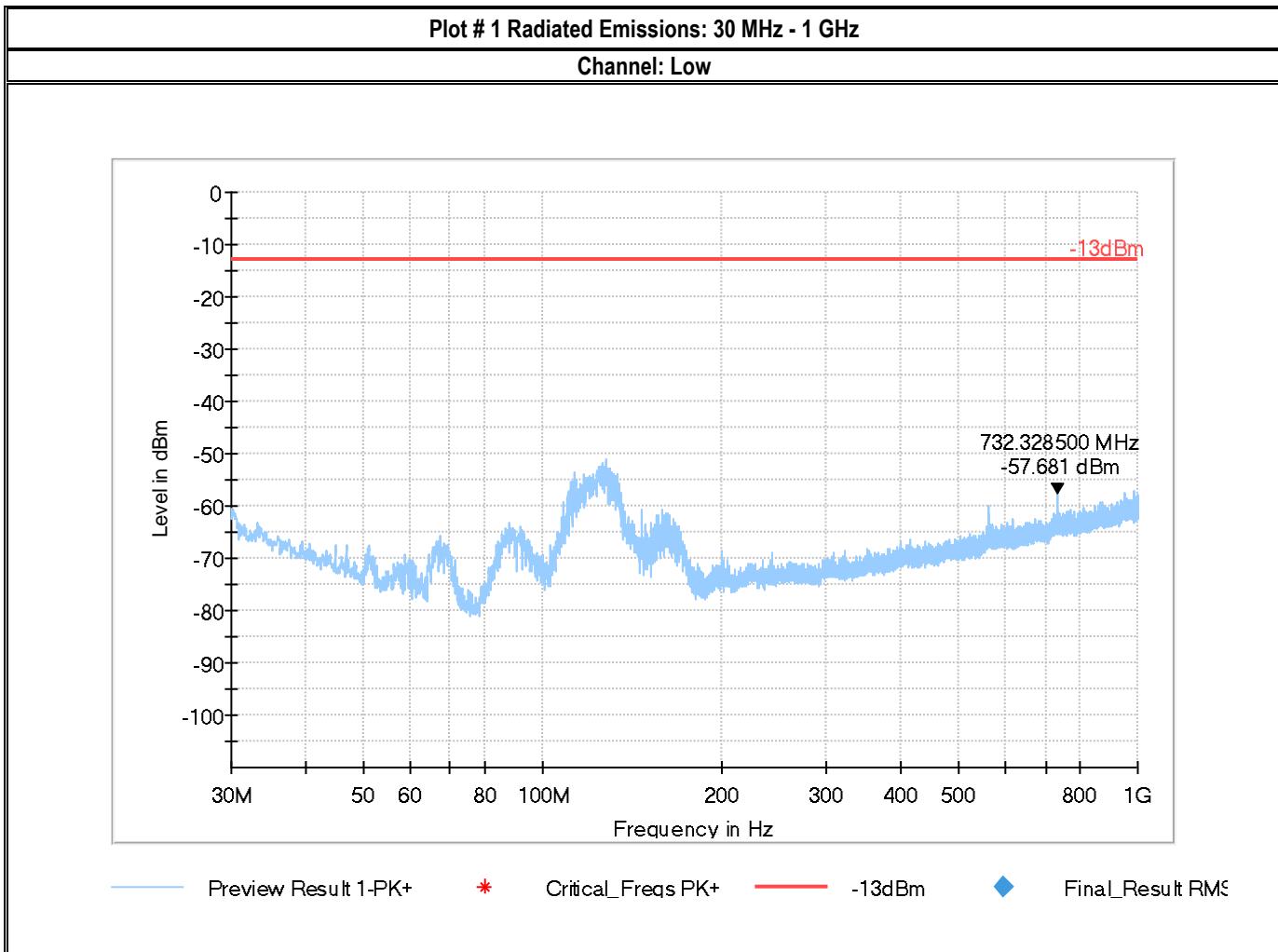
7.2.2 Limits:

- FCC Part 22.917(a) and Part 24.238(a), Part 27.53 (g), and Part 27.53 (h)

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 $43 + 10 \log(P) \text{ dB} = (-13 \text{ dBm})$

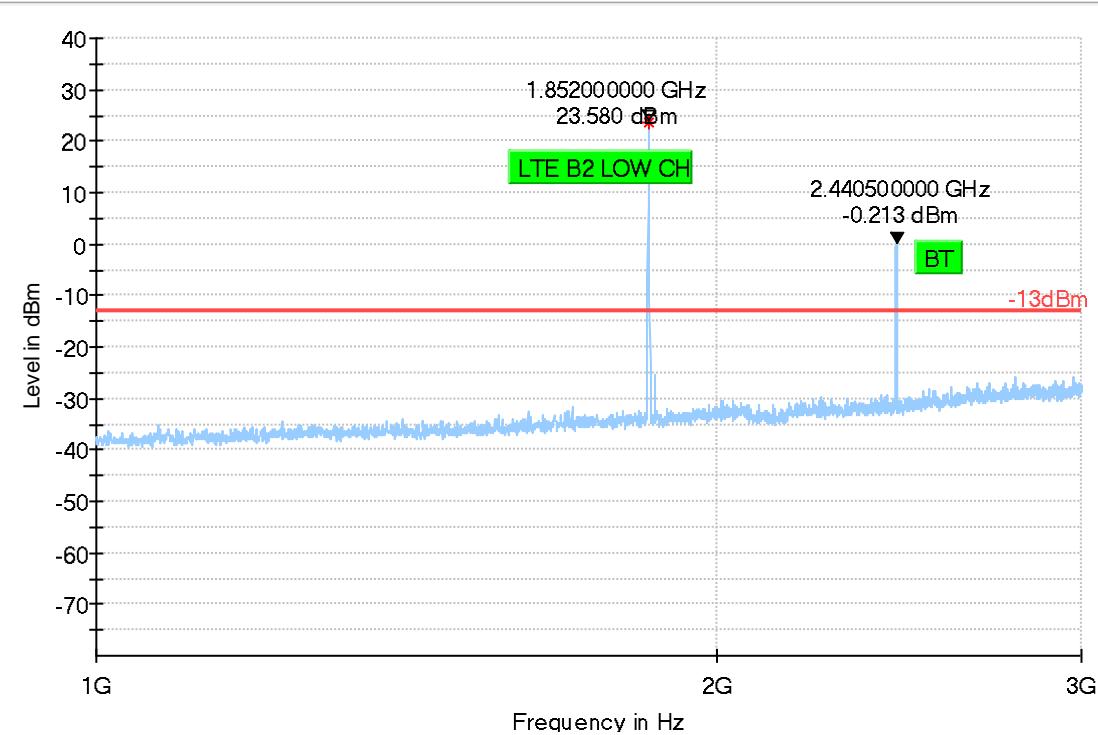
7.2.3 Test conditions and setup:

Ambient Temperature (C)	EUT operating mode	Power Input
22	Op. 1	110 VAC

7.2.4 Measurement Plots:**LTE Band 2**

Plot # 2 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

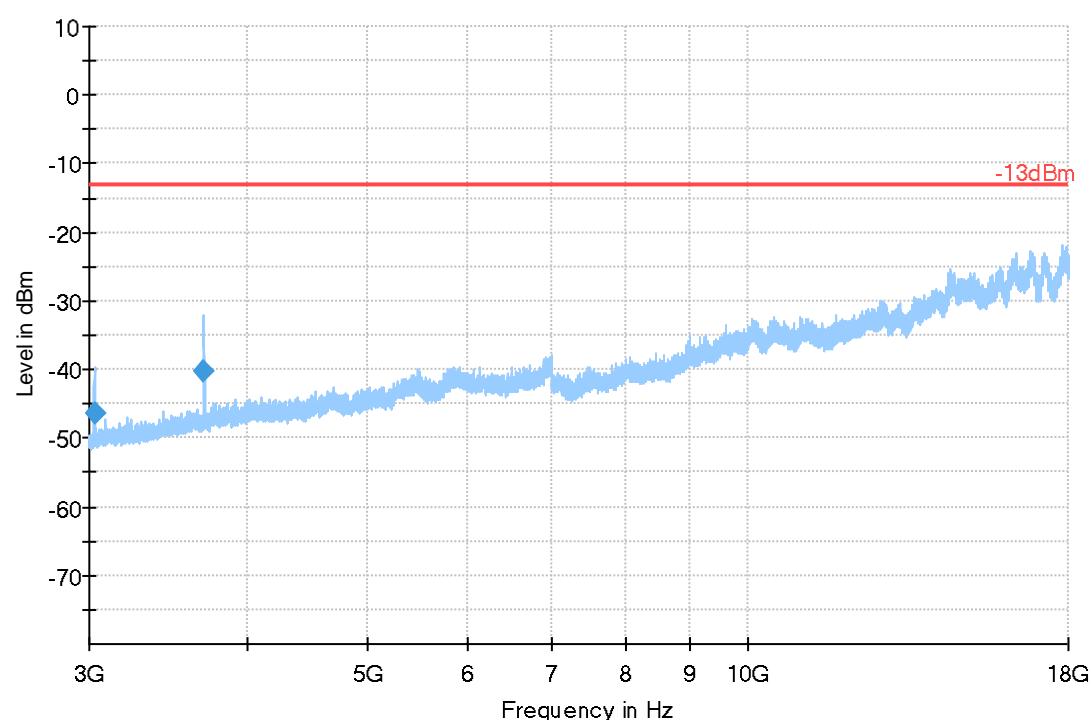


Plot # 3 Radiated Emissions: 3 GHz - 18 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3029.506	-46.479	-13.00	33.48	200.0	1000.000	319.0	H	340.0	-104.7	11:03:56 AM - 2/7/2020
3702.735	-40.322	-13.00	27.32	200.0	1000.000	126.0	V	246.0	-102.9	11:00:45 AM - 2/7/2020

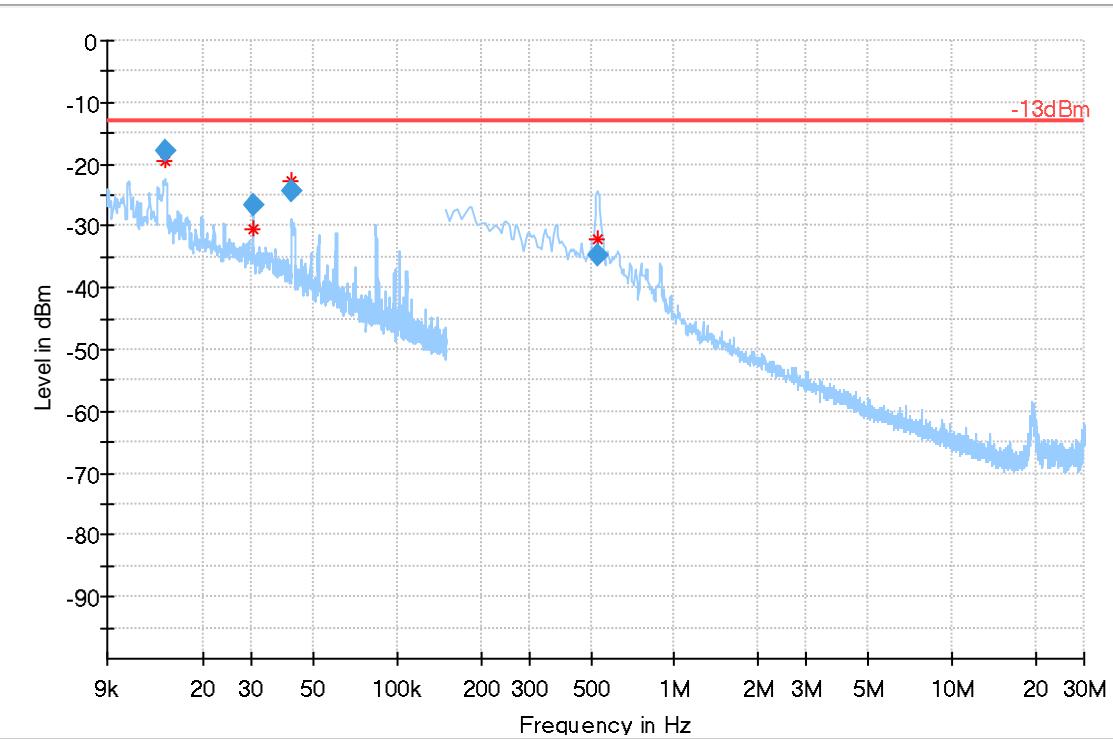


Plot # 4 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

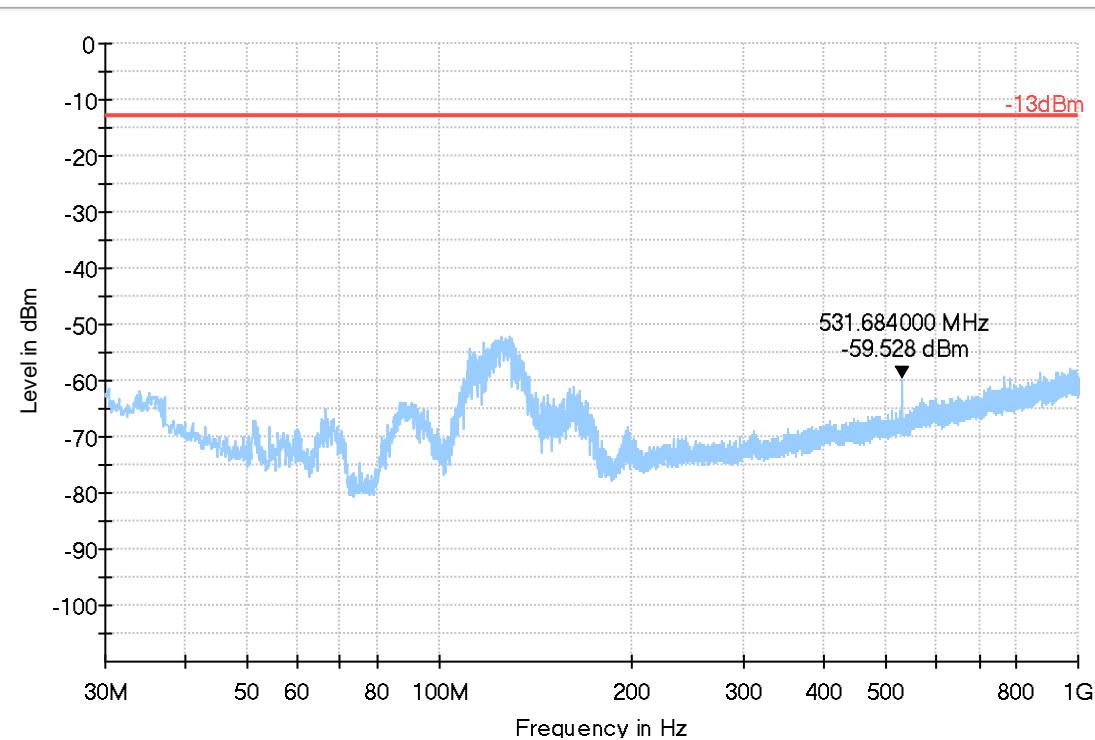
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
0.015	-17.896	-13.00	4.90	100.0	0.100	113.0	V	140.0	-71.7	1:53:46 PM - 2/10/2020
0.030	-26.617	-13.00	13.62	100.0	0.100	100.0	H	280.0	-75.8	1:56:46 PM - 2/10/2020
0.042	-24.382	-13.00	11.38	100.0	0.100	118.0	V	138.0	-77.3	2:00:02 PM - 2/10/2020
0.528	-34.640	-13.00	21.64	500.0	9.000	107.0	V	139.0	-79.7	2:02:53 PM - 2/10/2020



Plot # 5 Radiated Emissions: 30 MHz – 1GHz

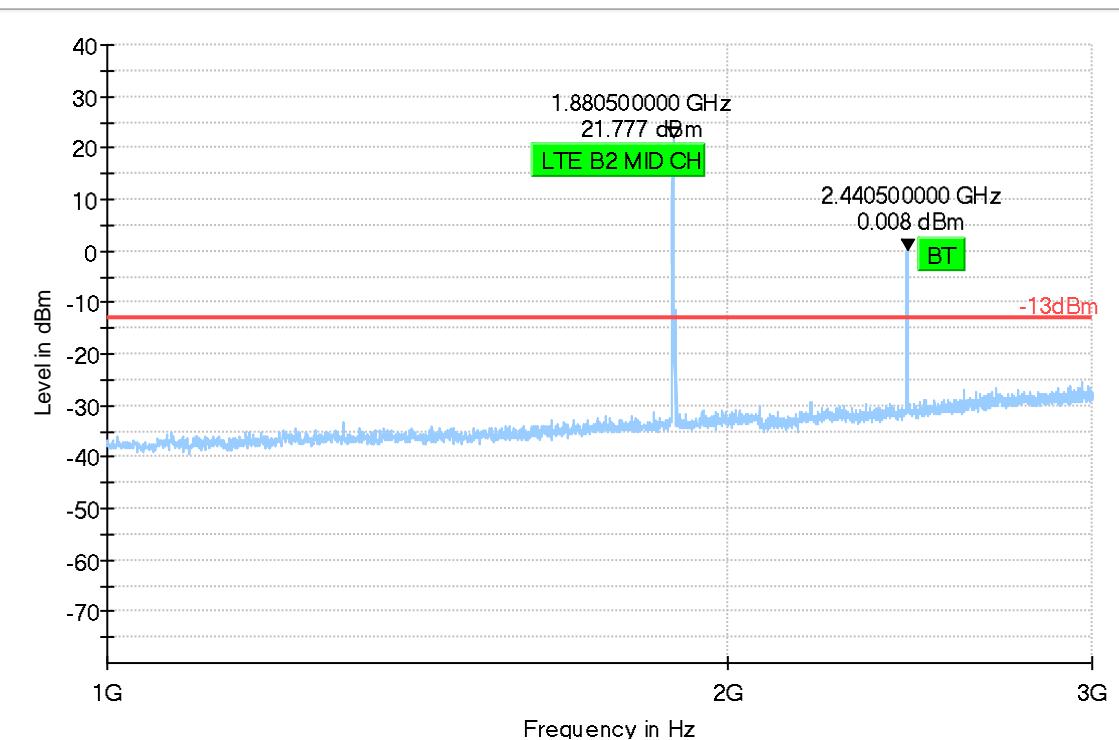
Channel: Mid



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 6 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid



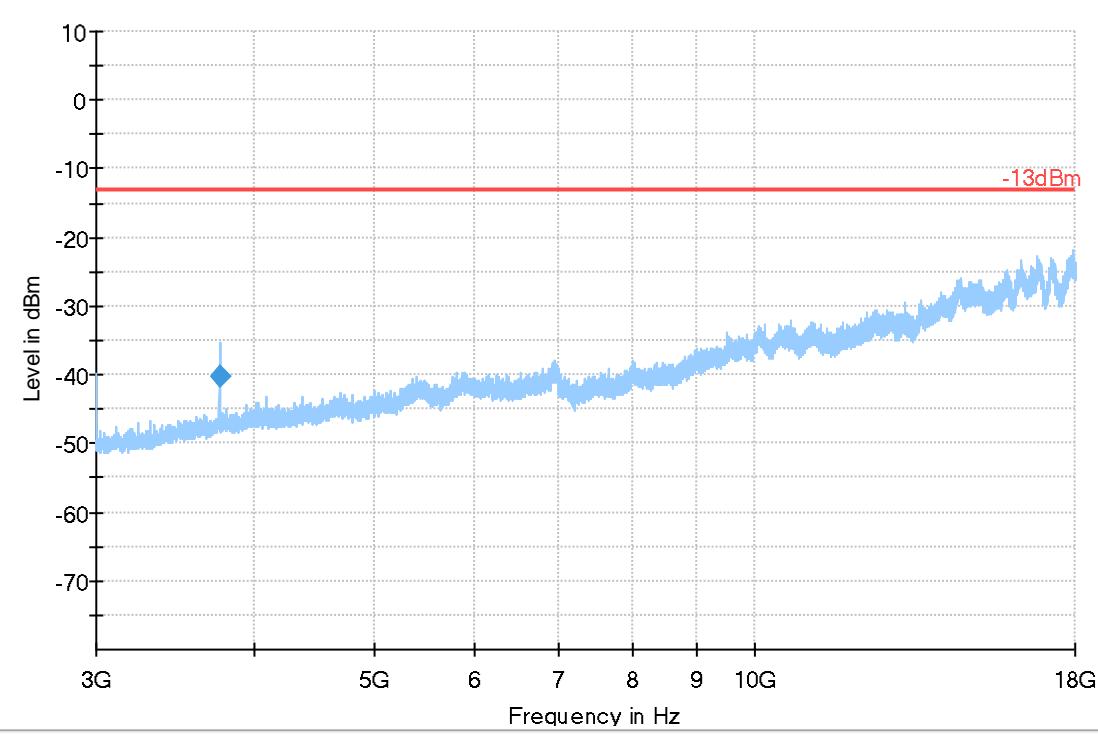
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 7 Radiated Emissions: 3 GHz – 18 GHz

Channel: Mid

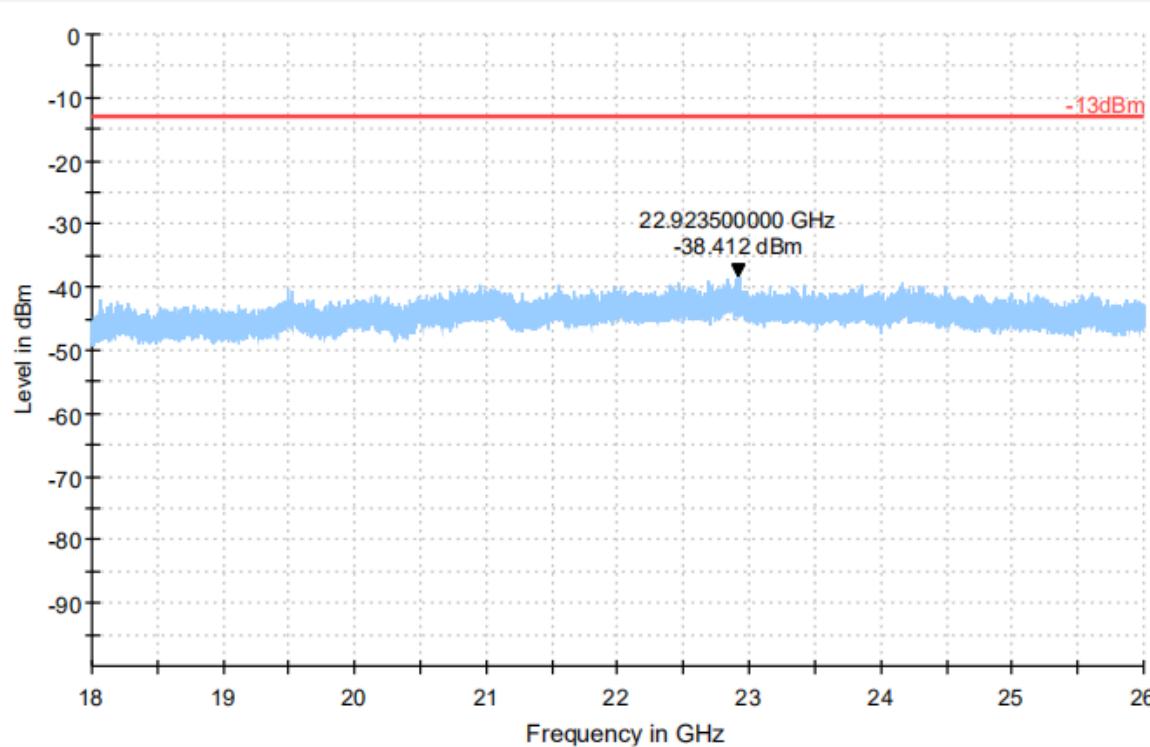
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3760.096	-40.367	-13.00	27.37	200.0	1000.000	239.0	H	224.0	-102.3	10:47:37 AM - 2/7/2020



Plot # 8 Radiated Emissions: 18 GHz – 26 GHz

Channel: Mid



Preview Result 1-PK+

*

Critical_Freqs PK+

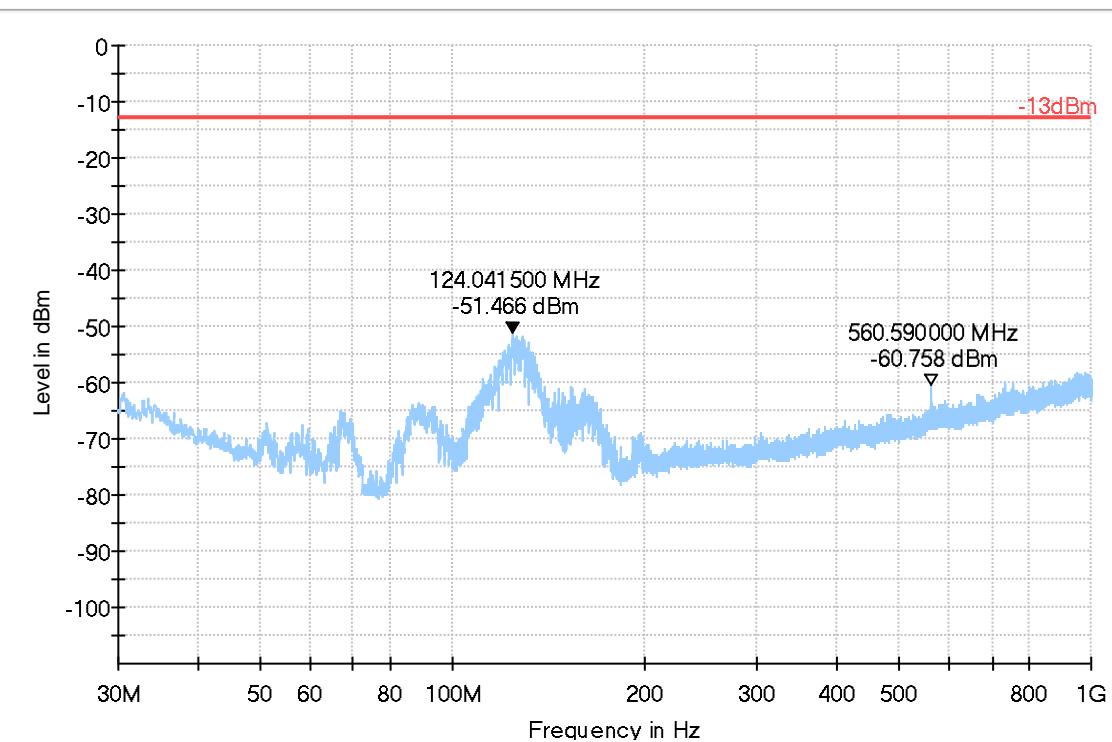
-13dBm

◆

Final_Result RMS

Plot # 9 Radiated Emissions: 30 MHz - 1 GHz

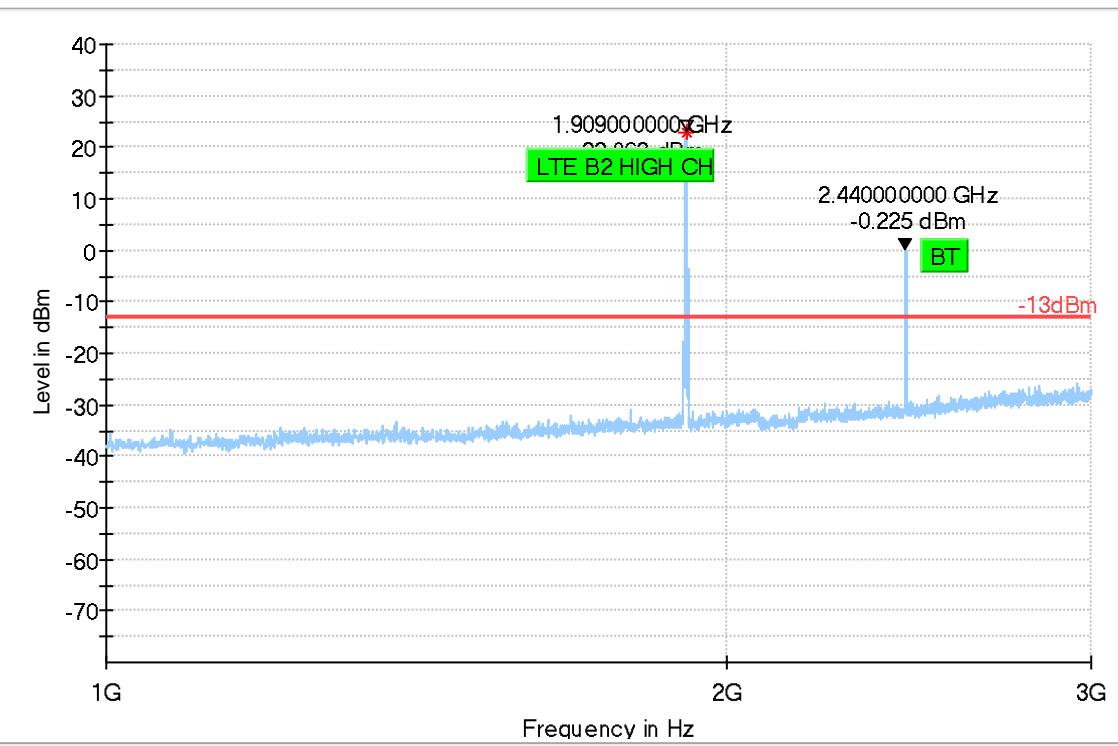
Channel: High



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 10 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

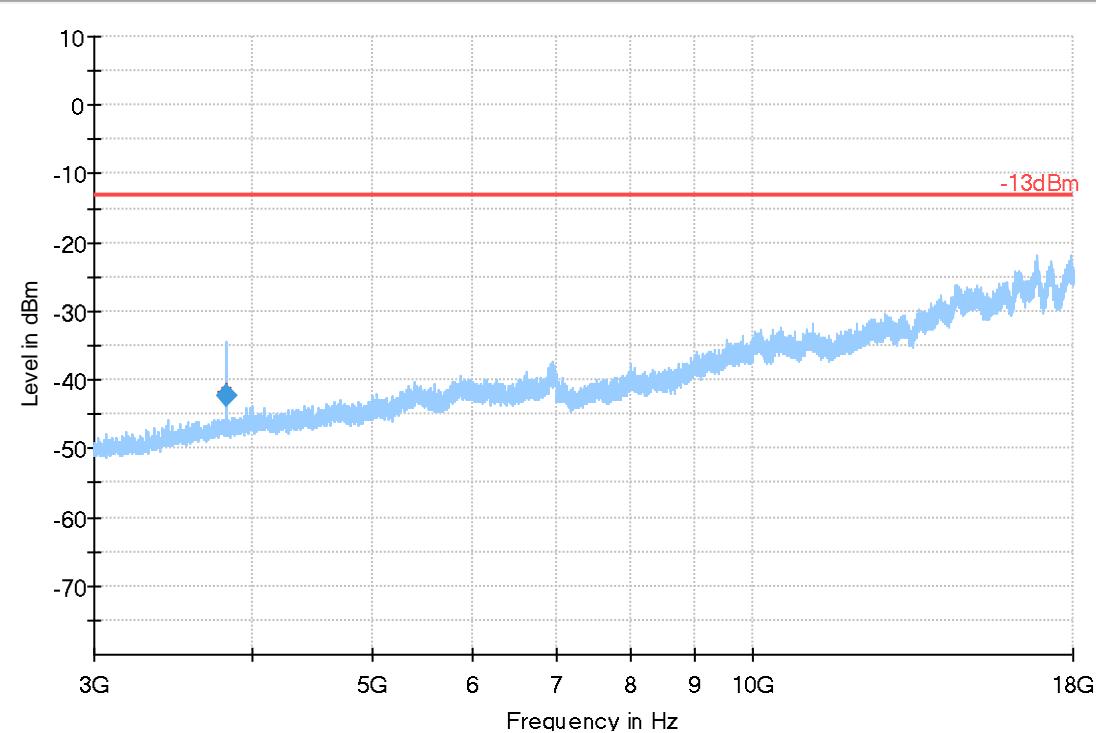


Plot # 11 Radiated Emissions: 3 GHz - 18 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3817.053	-42.268	-13.00	29.27	200.0	1000.000	143.0	H	167.0	-102.4	11:18:58 AM - 2/7/2020



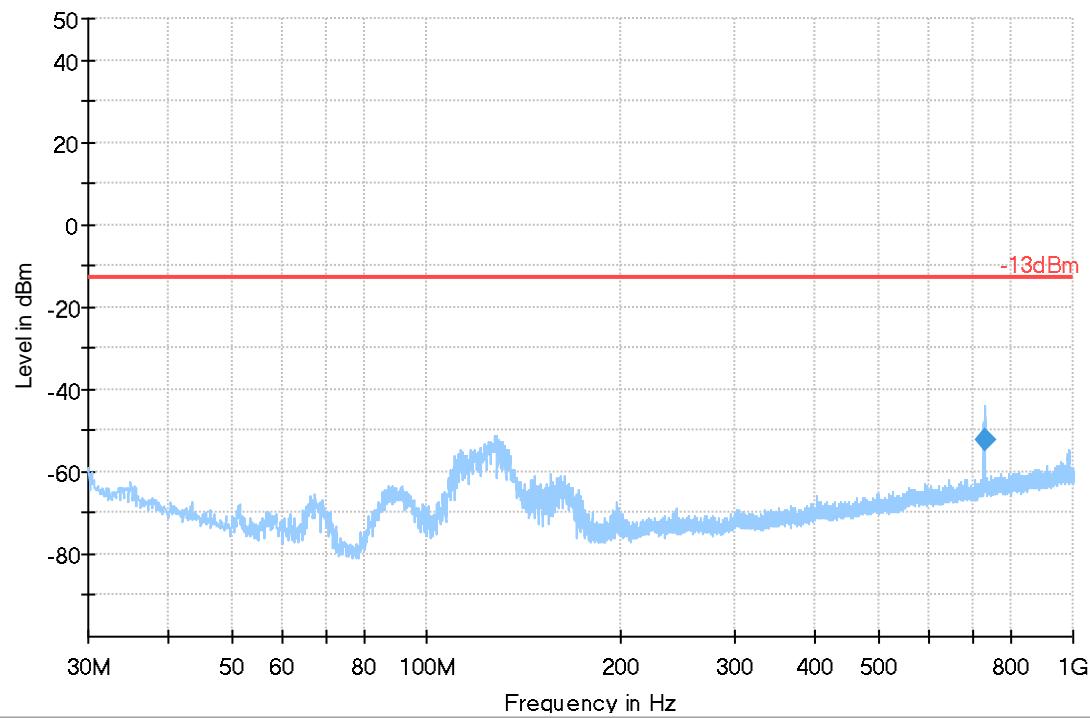
LTE Band 4

Plot # 12 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
728.253	-52.247	-13.00	39.25	200.0	100.000	107.0	H	44.0	-93.3	8:37:15 PM - 2/7/2020



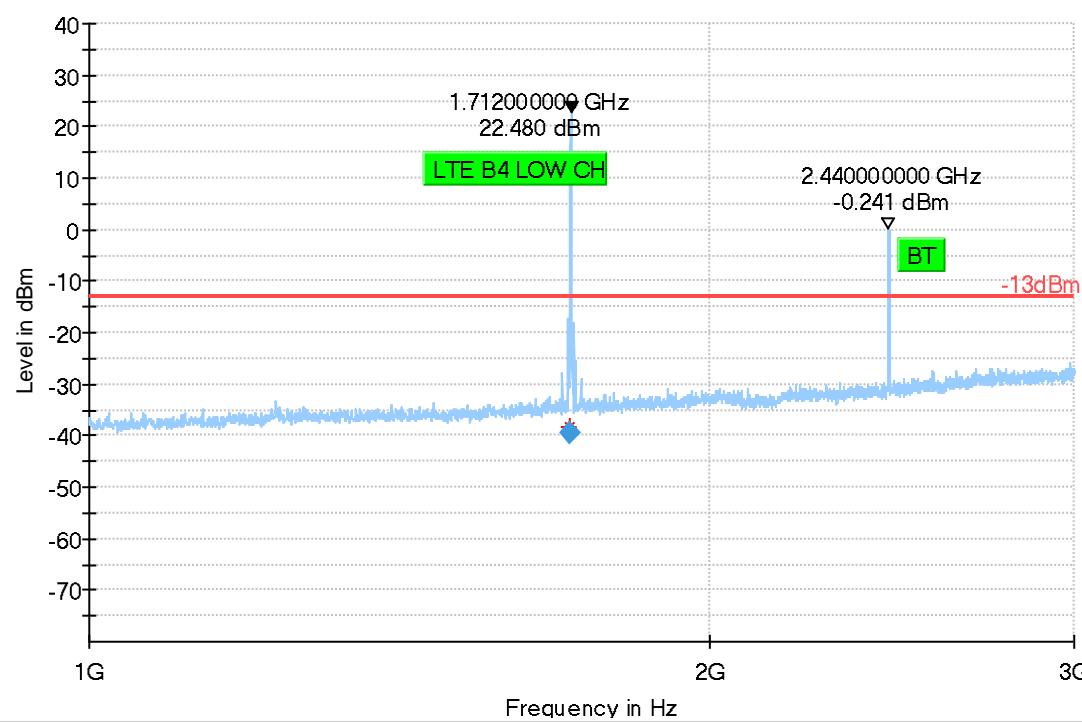
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 13 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1708.829	-39.673	-13.00	26.67	500.0	1000.000	272.0	V	253.0	-91.8	7:02:20 PM - 2/7/2020

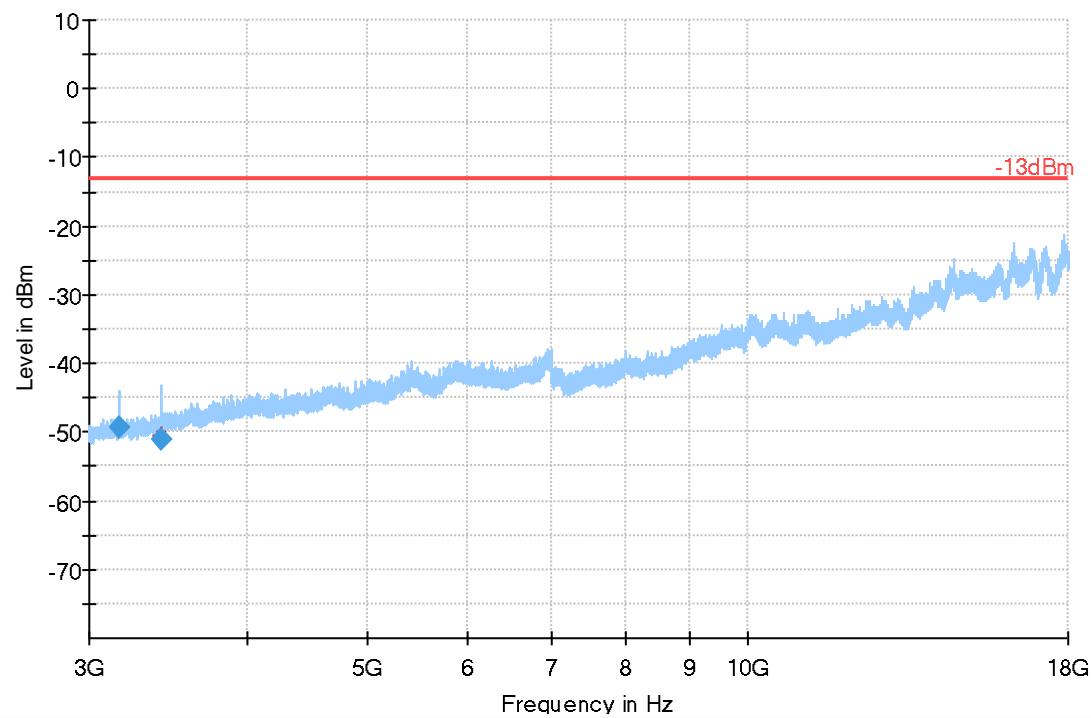


Plot # 14 Radiated Emissions: 3 GHz - 18 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3167.781	-49.187	-13.00	36.19	200.0	1000.000	311.0	H	133.0	-104.4	1:07:49 PM - 2/7/2020
3422.129	-51.027	-13.00	38.03	200.0	1000.000	150.0	V	135.0	-103.9	1:11:13PM - 2/7/2020

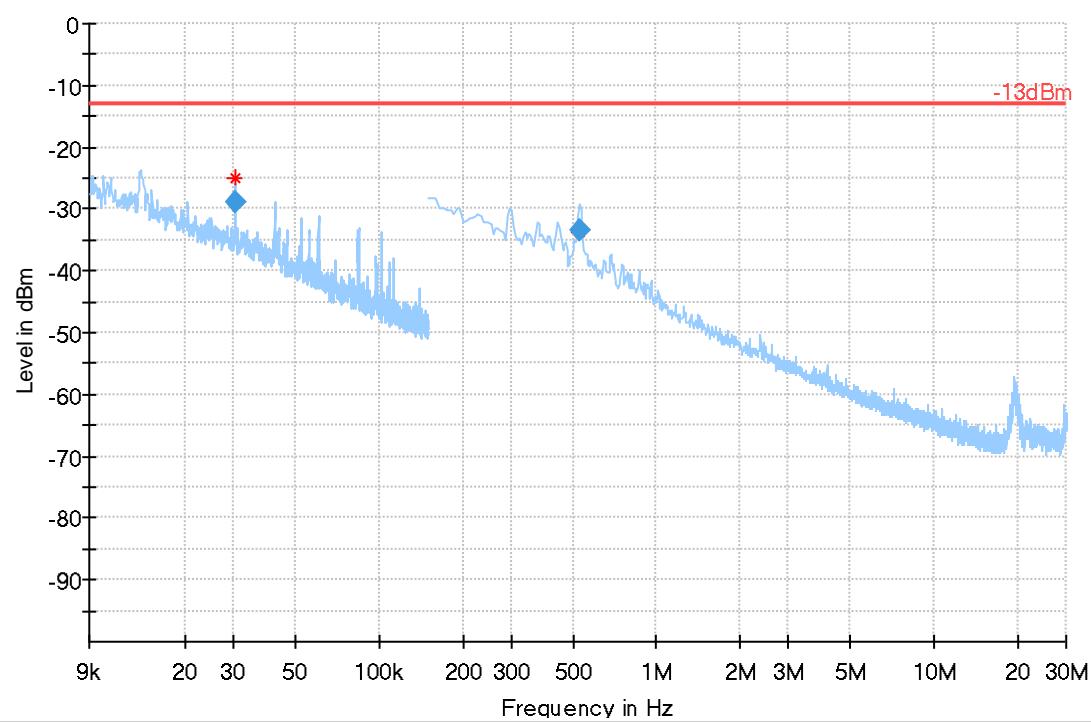


Plot # 15 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

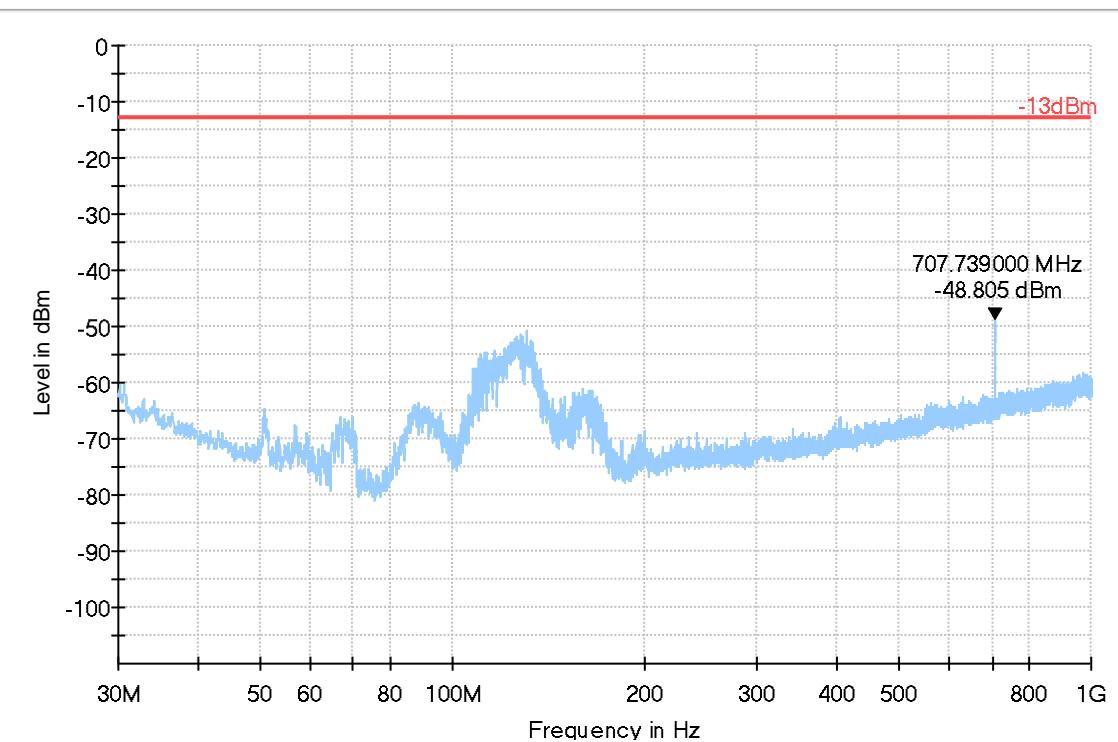
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
0.030	-28.800	-13.00	15.80	100.0	0.100	100.0	H	35.0	-75.8	2:21:22 PM - 2/10/2020
0.526	-33.422	-13.00	20.42	500.0	9.000	107.0	V	140.0	-79.7	2:17:39 PM - 2/10/2020



Plot # 16 Radiated Emissions: 30 MHz – 1 GHz

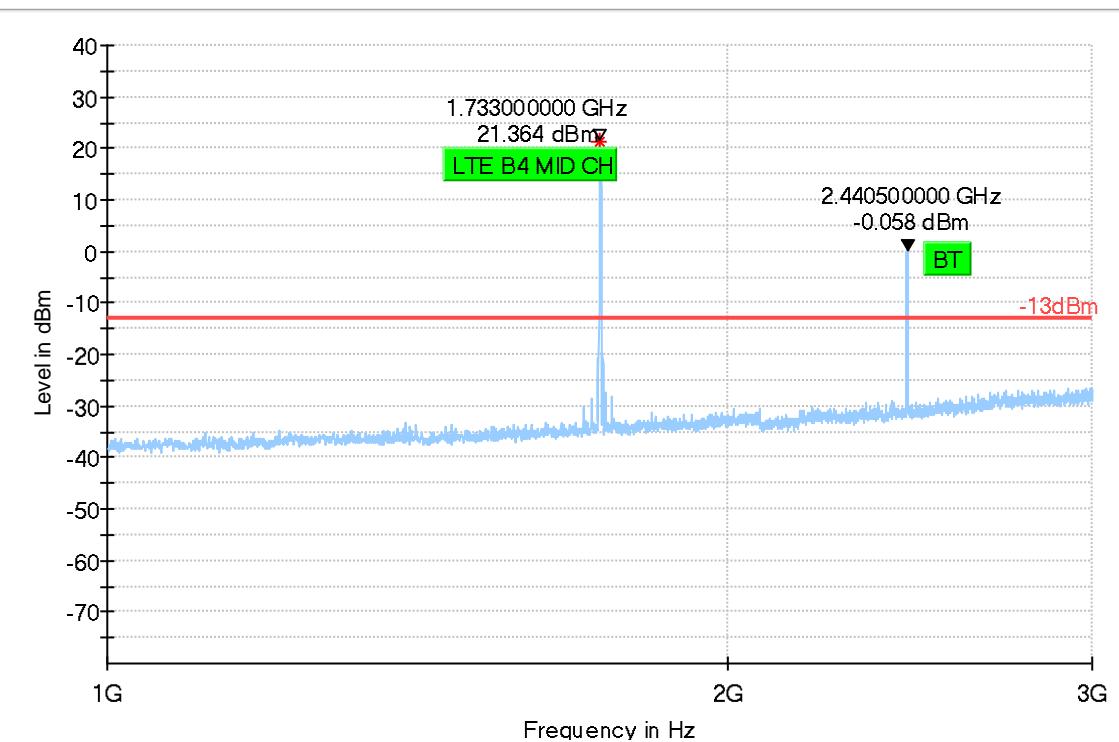
Channel: Mid



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 17 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

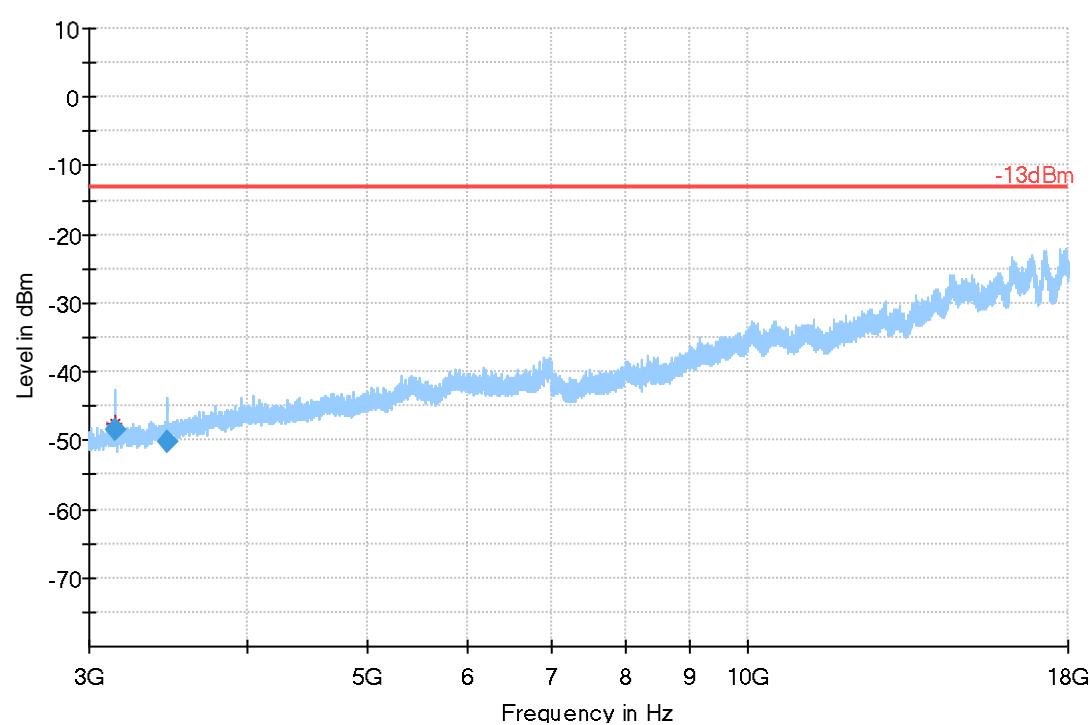


Plot # 18 Radiated Emissions: 3 GHz – 18GHz

Channel: Mid

Final_Result

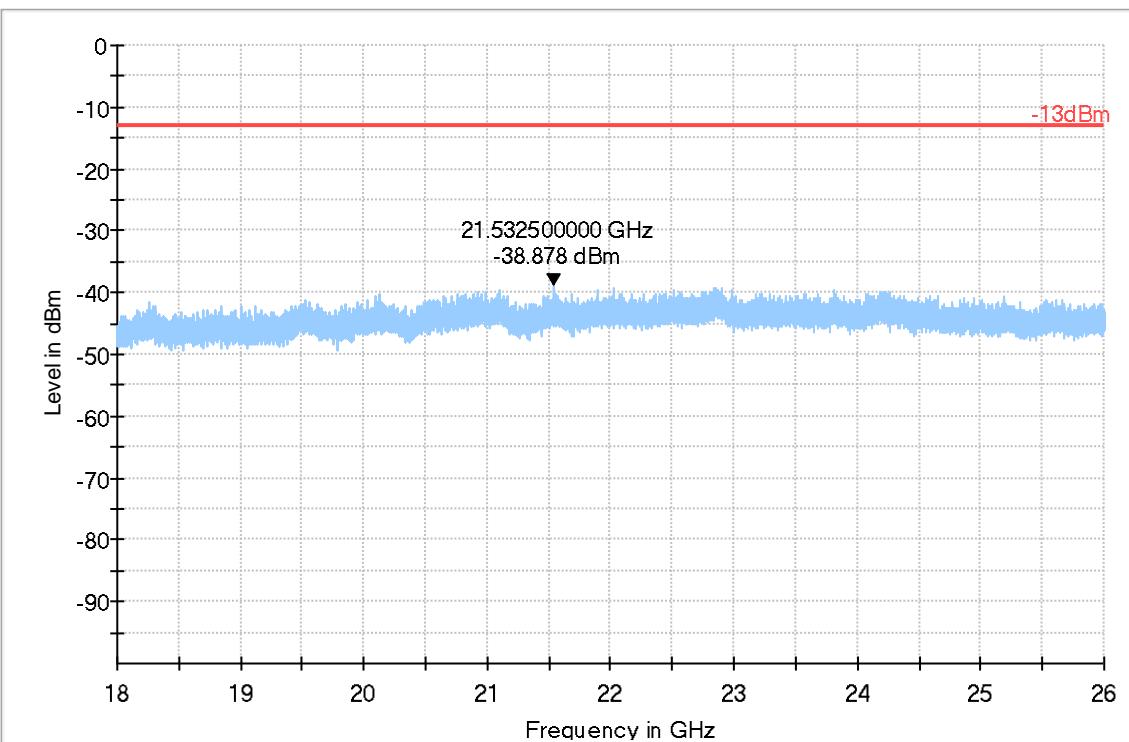
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3147.300	-48.428	-13.00	35.43	200.0	1000.000	125.0	H	313.0	-104.5	12:50:52 PM - 2/7/2020
3465.610	-50.133	-13.00	37.13	200.0	1000.000	100.0	H	247.0	-103.8	12:47:31 PM - 2/7/2020



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 19 Radiated Emissions: 18 GHz – 26 GHz

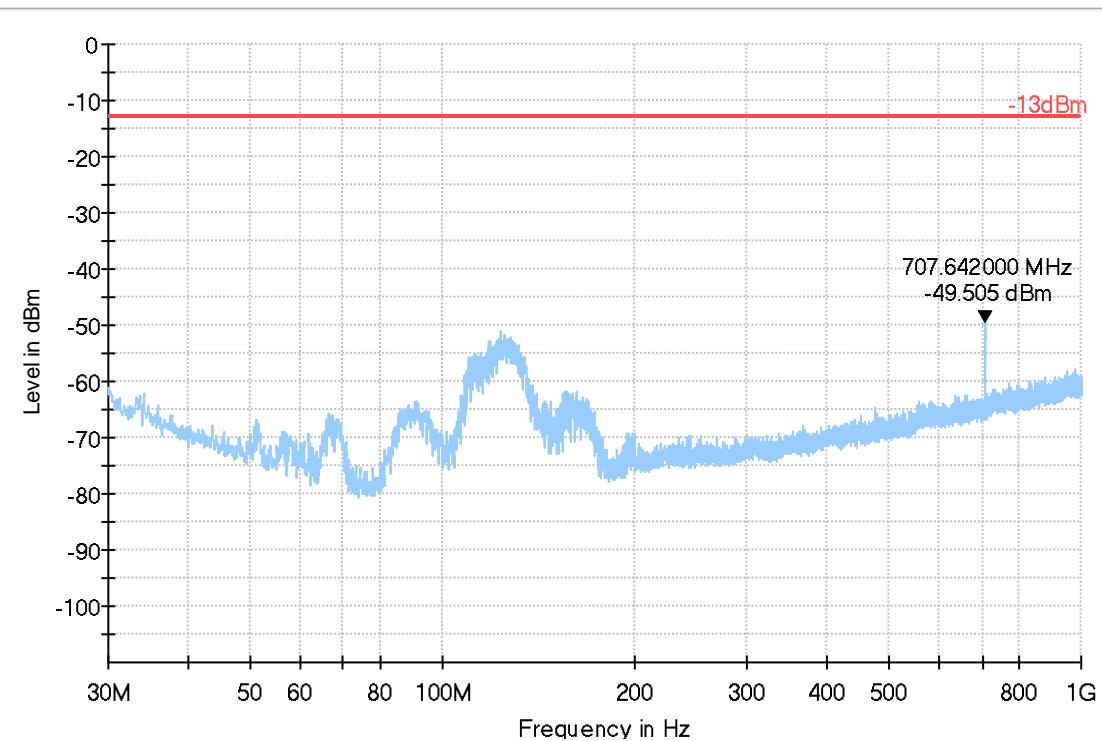
Channel: Mid



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 20 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

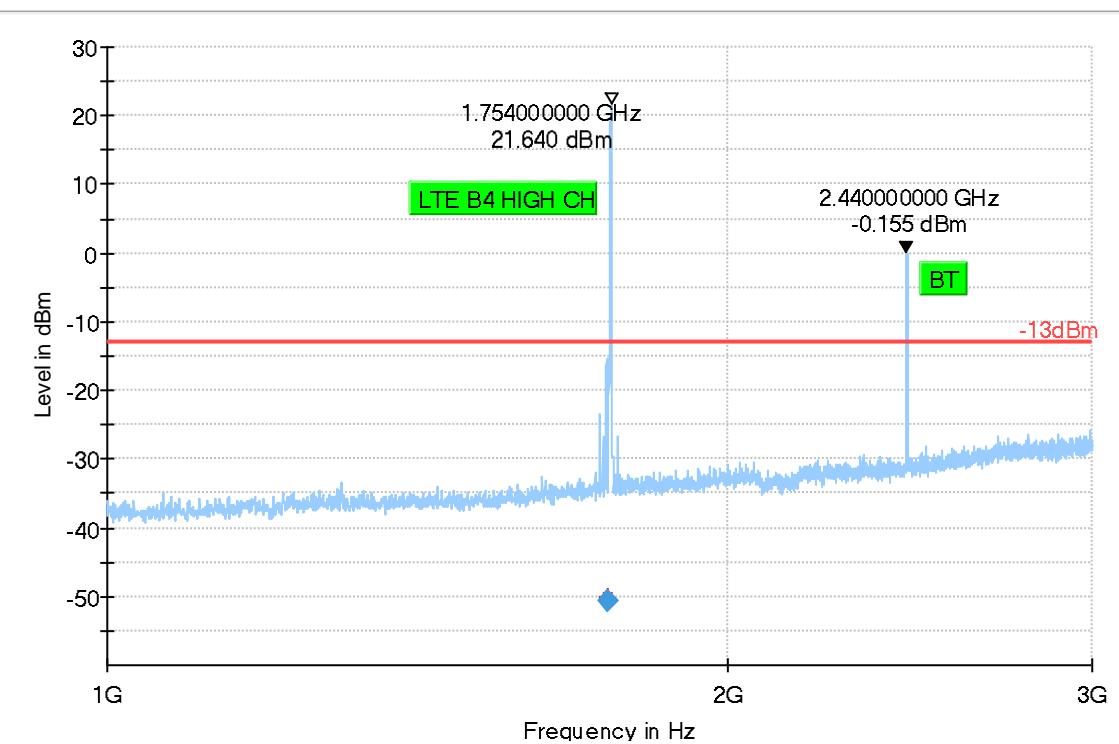


Plot # 21 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1746.459	-50.518	-13.00	37.52	500.0	1000.000	132.0	H	283.0	-91.6	6:40:00 PM - 2/7/2020



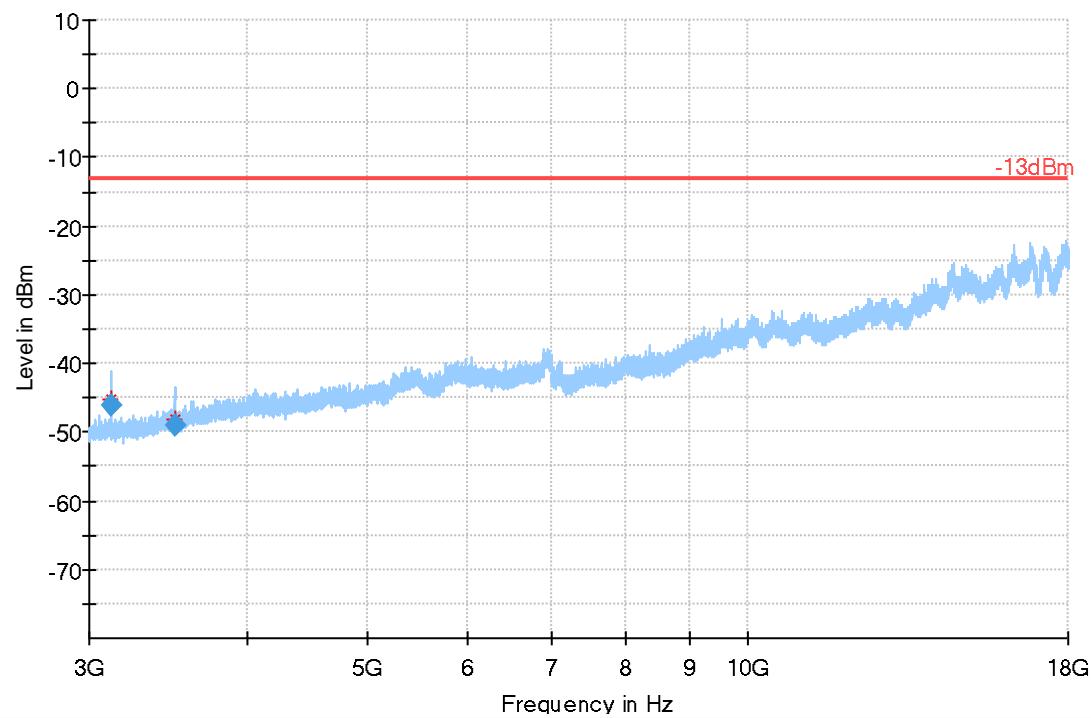
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 22 Radiated Emissions: 3 GHz - 18 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3126.763	-45.994	-13.00	32.99	200.0	1000.000	220.0	H	125.0	-104.4	1:26:57 PM - 2/7/2020
3507.393	-48.939	-13.00	35.94	200.0	1000.000	167.0	V	133.0	-103.5	1:23:43 PM - 2/7/2020



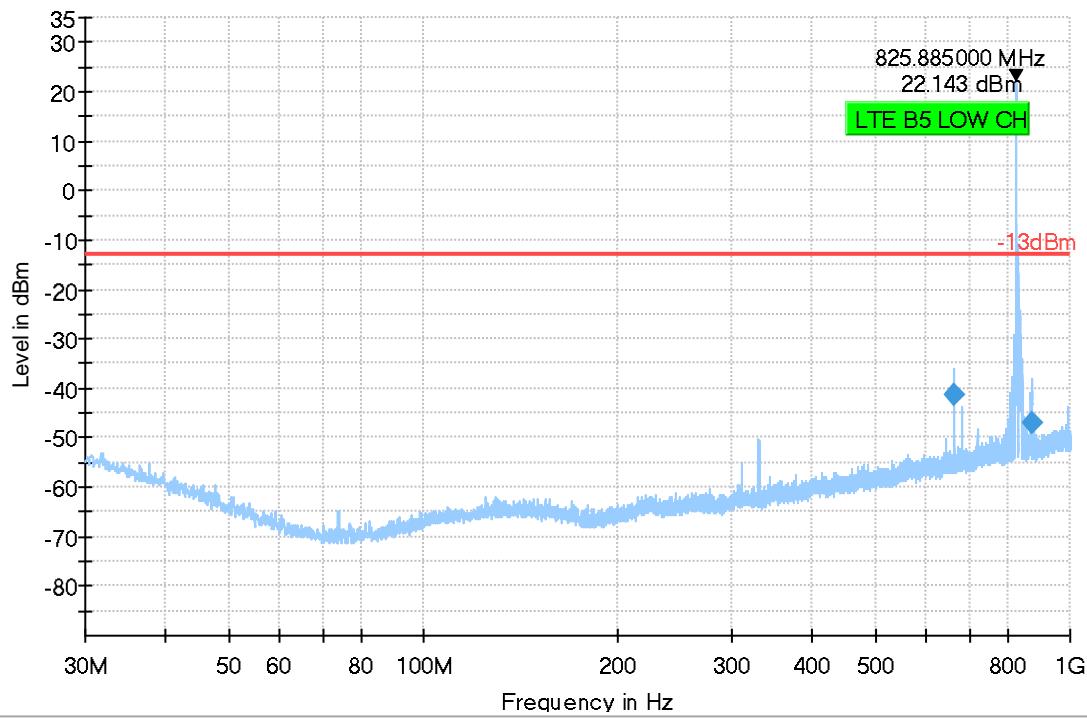
LTE Band 5

Plot # 23 Radiated Emissions: 30 MHz - 1 GHz

Channel: Low

Final_Result

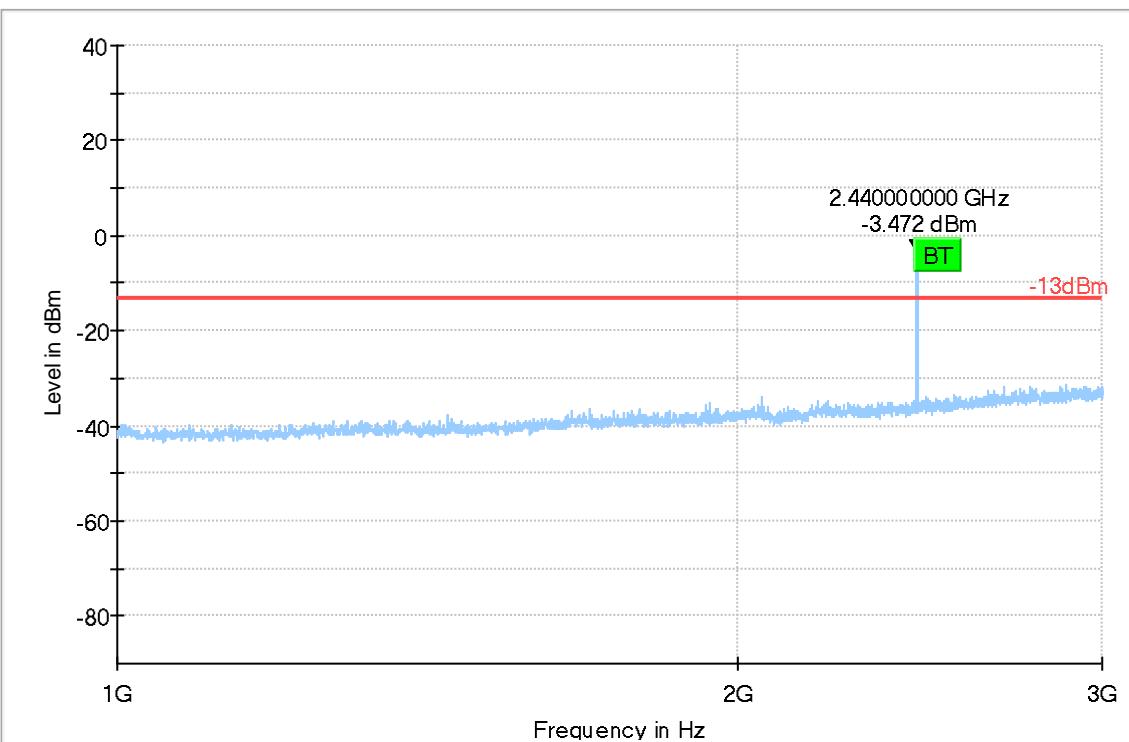
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
660.308	-41.183	-13.00	28.18	500.0	100.000	150.0	H	74.0	-84.5	11:39:53 AM - 2/10/2020
870.765	-47.106	-13.00	34.11	500.0	100.000	100.0	H	344.0	-81.2	11:43:53 AM - 2/10/2020



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 24 Radiated Emissions: 1 GHz - 3 GHz

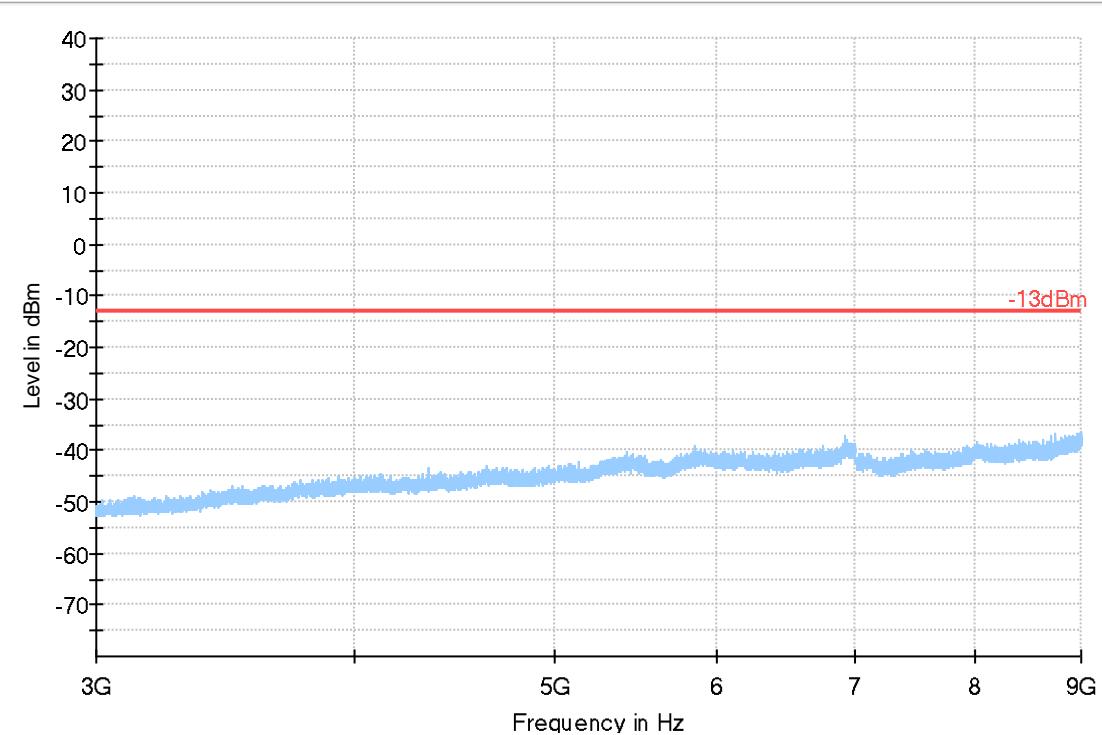
Channel: Low



— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ◆ Final_Result RMS

Plot # 25 Radiated Emissions: 3 GHz - 9 GHz

Channel: Low



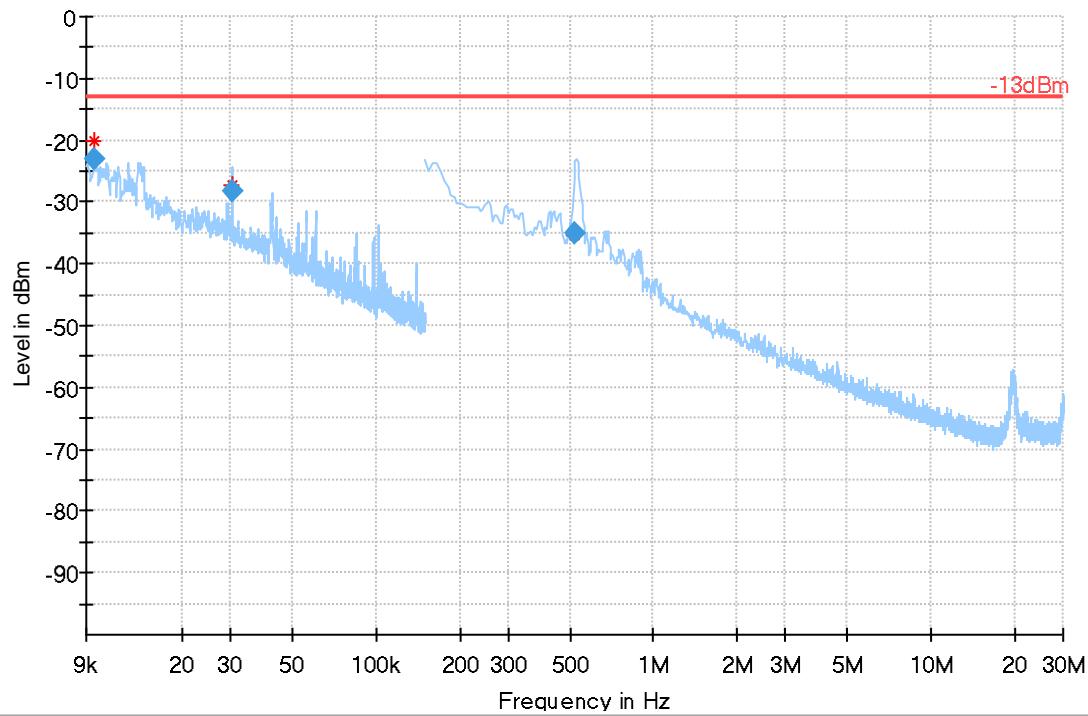
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ◆ Final_Result RMS

Plot # 26 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
0.010	-23.169	-13.00	10.17	100.0	0.100	134.0	V	277.0	-69.1	2:35:35 PM - 2/10/2020
0.030	-28.356	-13.00	15.36	100.0	0.100	100.0	H	81.0	-75.8	2:39:04 PM - 2/10/2020
0.524	-35.149	-13.00	22.15	500.0	9.000	116.0	V	134.0	-79.7	2:42:07 PM - 2/10/2020



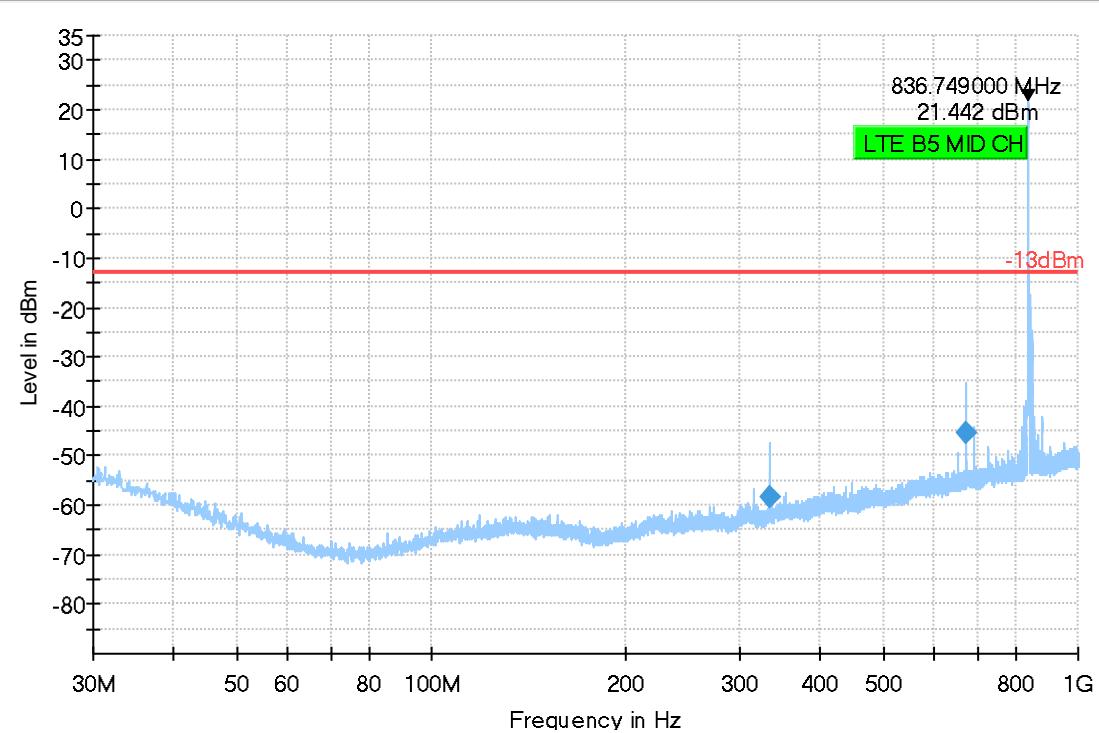
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 27 Radiated Emissions: 30 MHz – 1 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
334.566	-58.235	-13.00	45.23	500.0	100.000	100.0	H	85.0	-91.6	11:26:31 AM - 2/10/2020
669.242	-45.351	-13.00	32.35	500.0	100.000	125.0	V	34.0	-84.6	11:23:15 AM - 2/10/2020



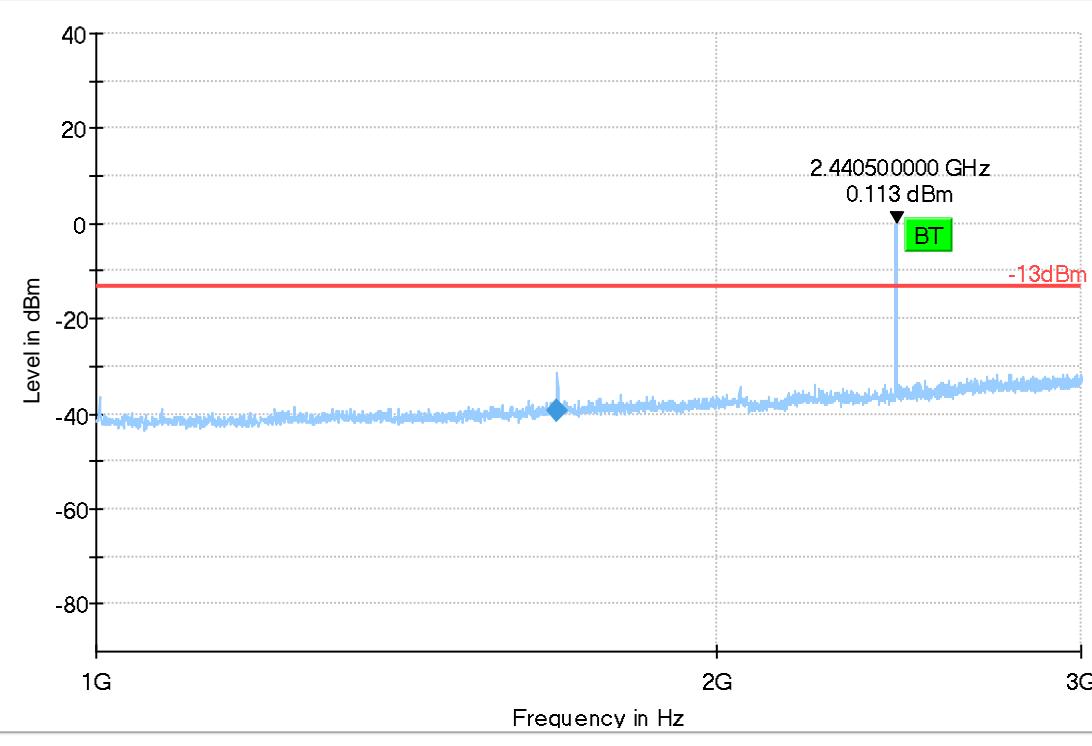
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 28 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

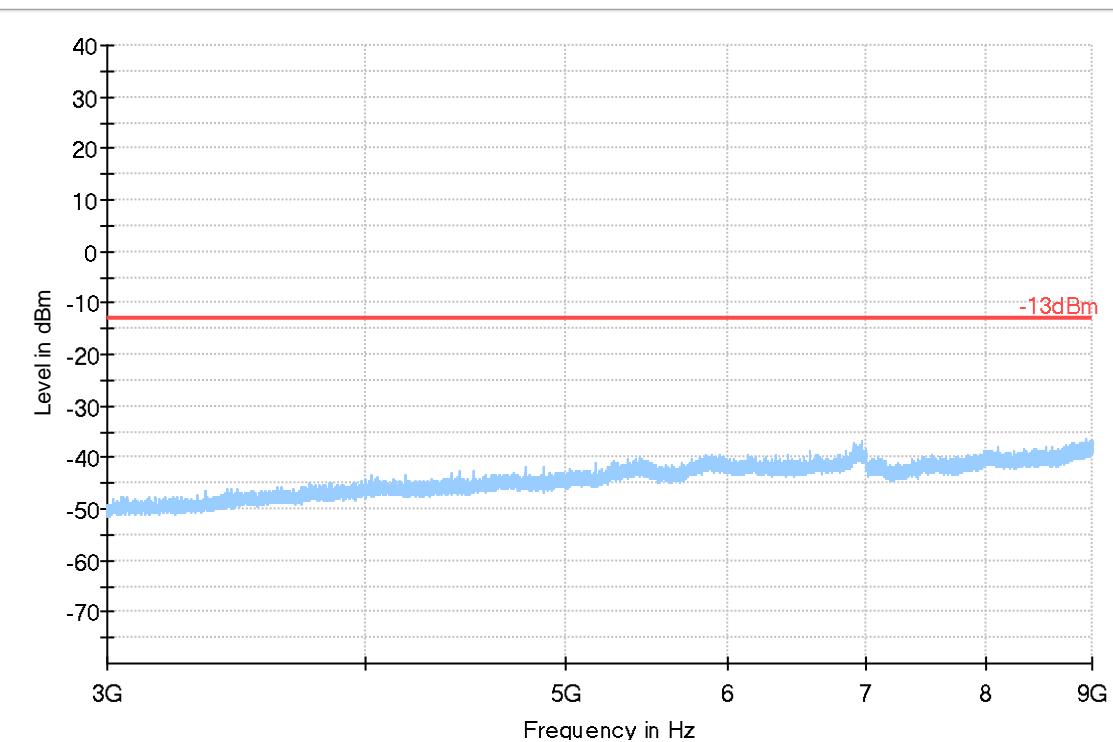
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1672.620	-39.272	-13.00	26.27	500.0	1000.000	120.0	H	74.0	-90.5	7:12:34 PM - 2/7/2020



Plot # 29 Radiated Emissions: 3 GHz – 9 GHz

Channel: Mid



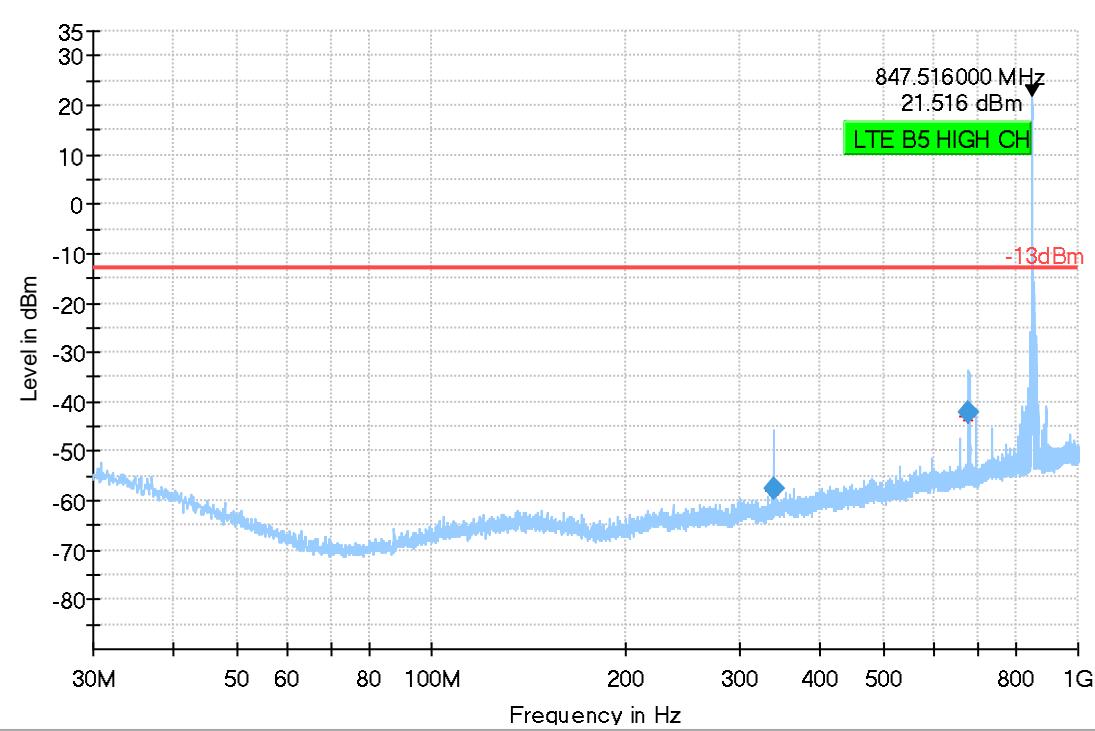
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 30 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimut	Corr. (dB)	Comment
339.008	-57.611	-13.00	44.61	500.0	100.000	100.0	H	115.0	-91.5	12:01:05 PM - 2/10/2020
678.077	-42.181	-13.00	29.18	500.0	100.000	100.0	V	11.0	-84.6	11:57:59 AM - 2/10/2020



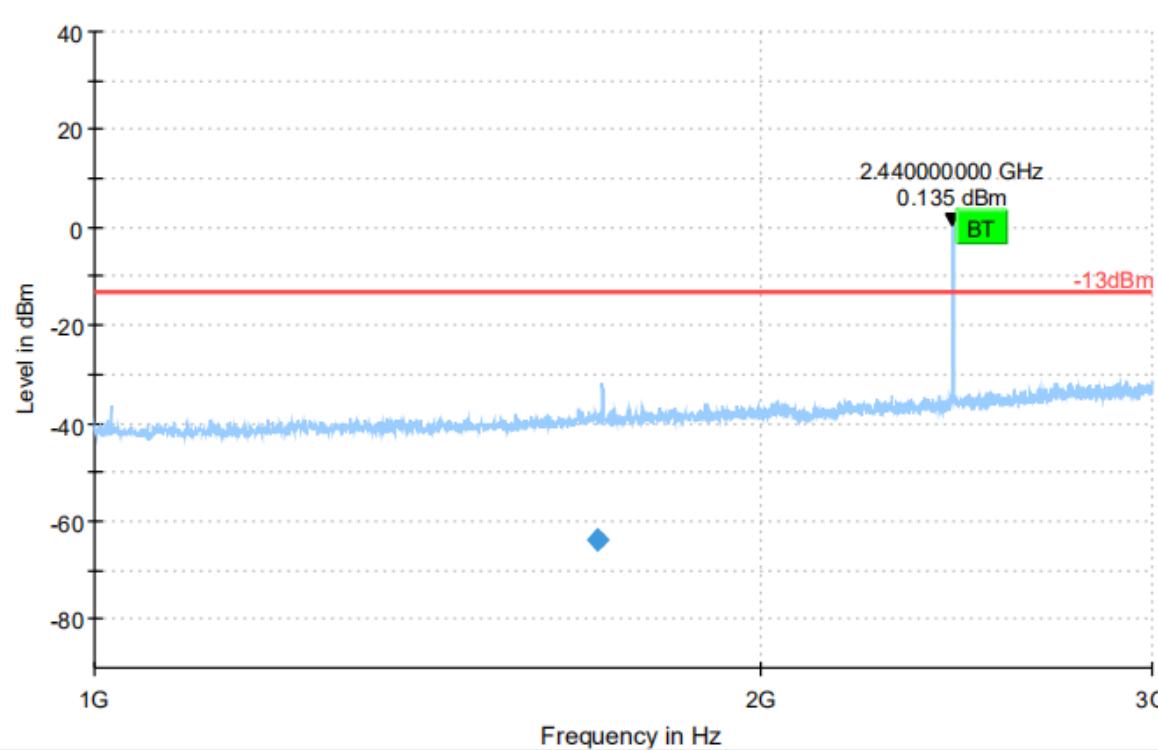
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

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
1685.040	-63.982	-13.00	50.98	500.0	1000.000	141.0	H	149.0	-90.3	7:23:51 PM - 2/7/2020

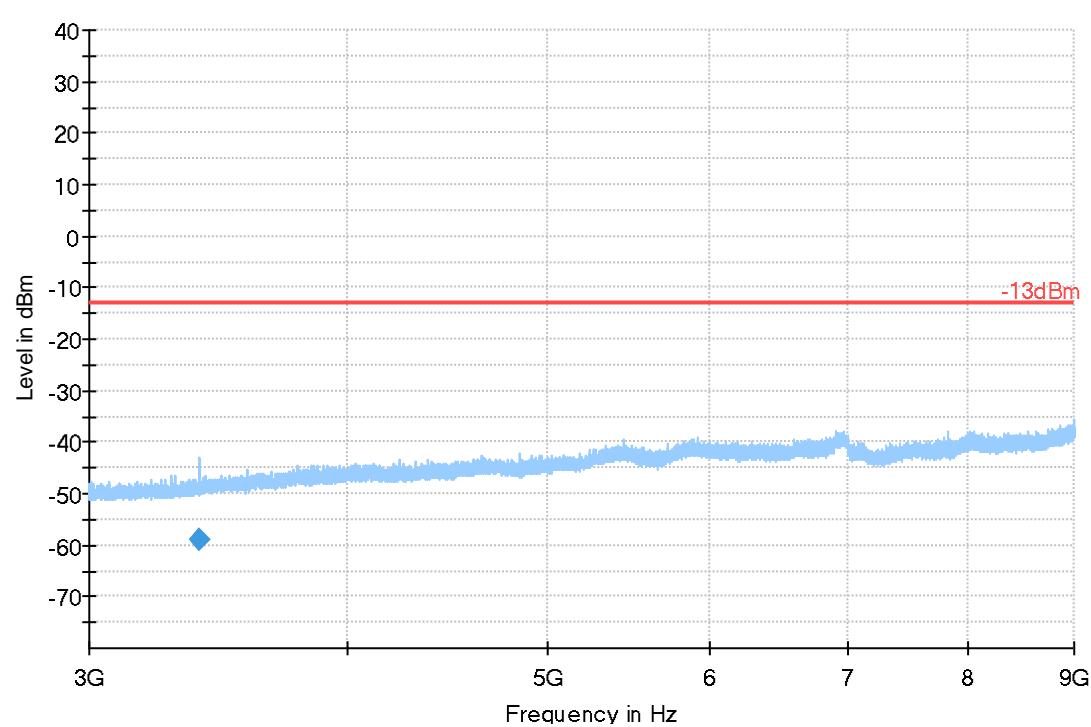


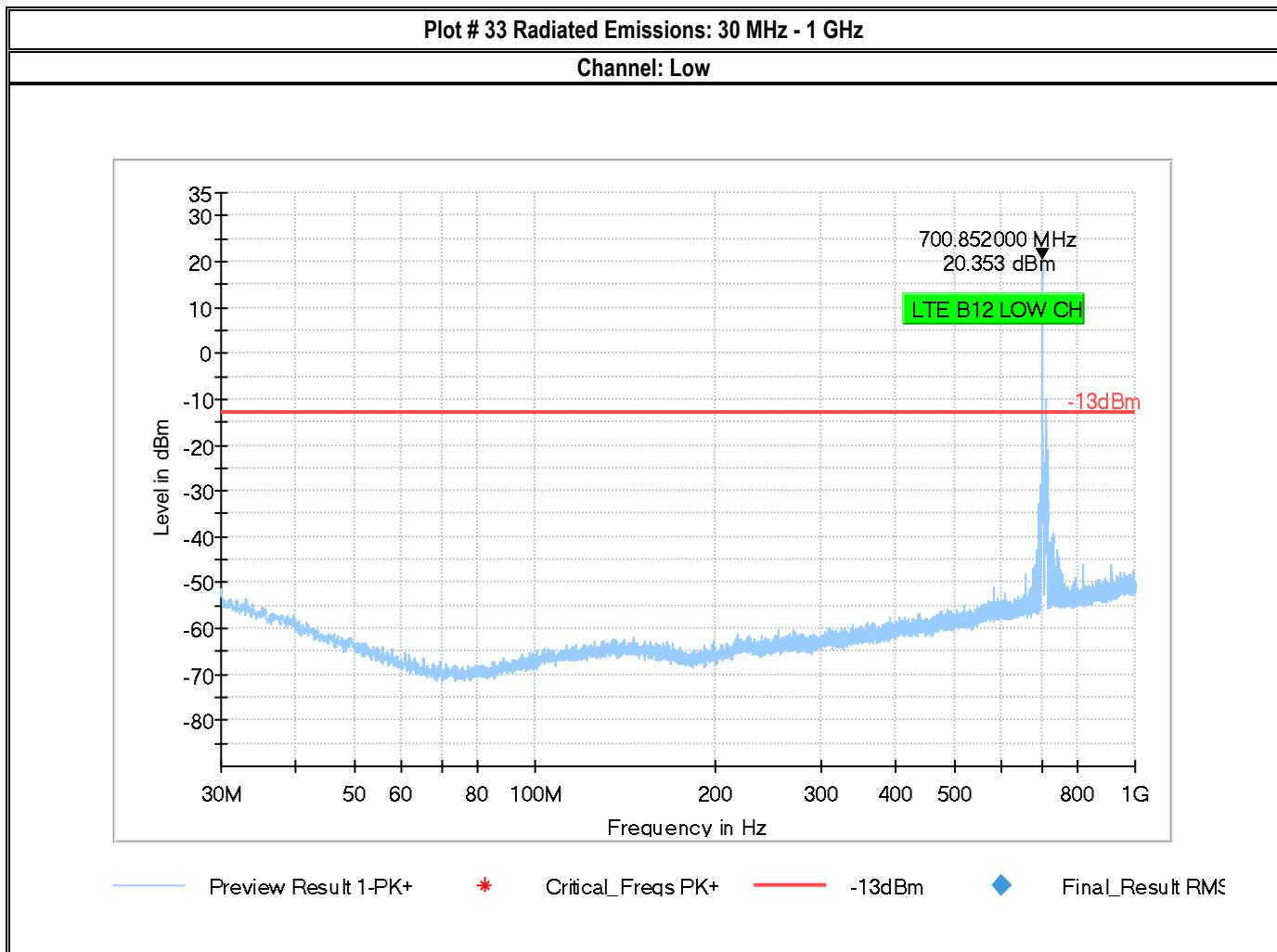
Plot # 32 Radiated Emissions: 3 GHz - 9 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3390.670	-58.850	-13.00	45.85	500.0	1000.000	149.0	H	149.0	-104.1	12:35:58 PM - 2/7/2020



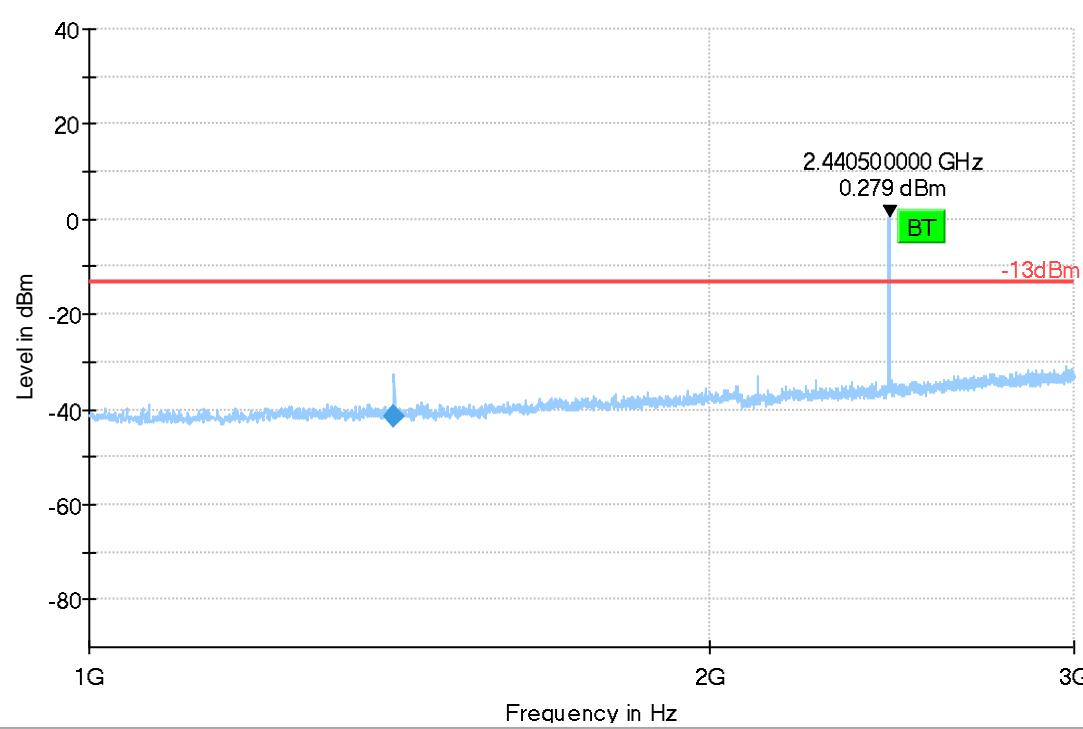
LTE Band 12

Plot # 34 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margi n	Meas. Time (ms)	Bandwidt h	Heig ht	Pol	Azimut h	Corr. (dB)	Comment
1404.850	-41.486	-13.00	28.49	500.0	1000.000	174.0	V	97.0	-92.3	5:37:15 PM - 2/7/2020

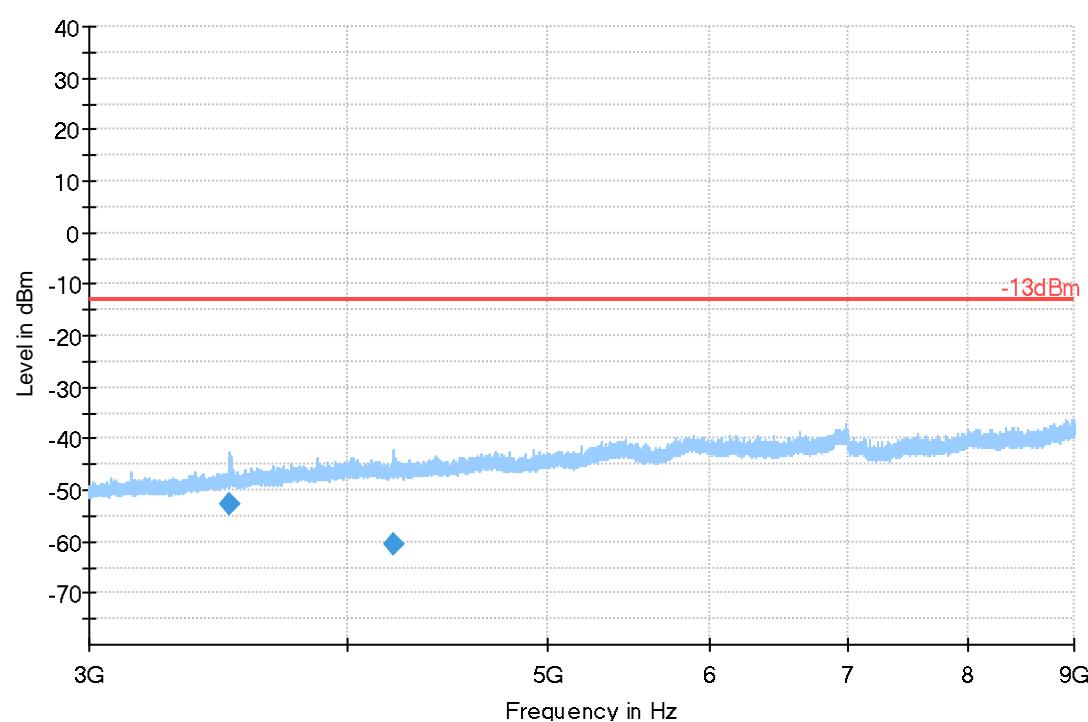


Plot # 35 Radiated Emissions: 3 GHz - 9 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3511.373	-52.801	-13.00	39.80	500.0	1000.000	150.0	V	319.0	-103.5	2:36:24 PM - 2/7/2020
4214.067	-60.690	-13.00	47.69	500.0	1000.000	140.0	H	-59.0	-101.9	2:32:37 PM - 2/7/2020



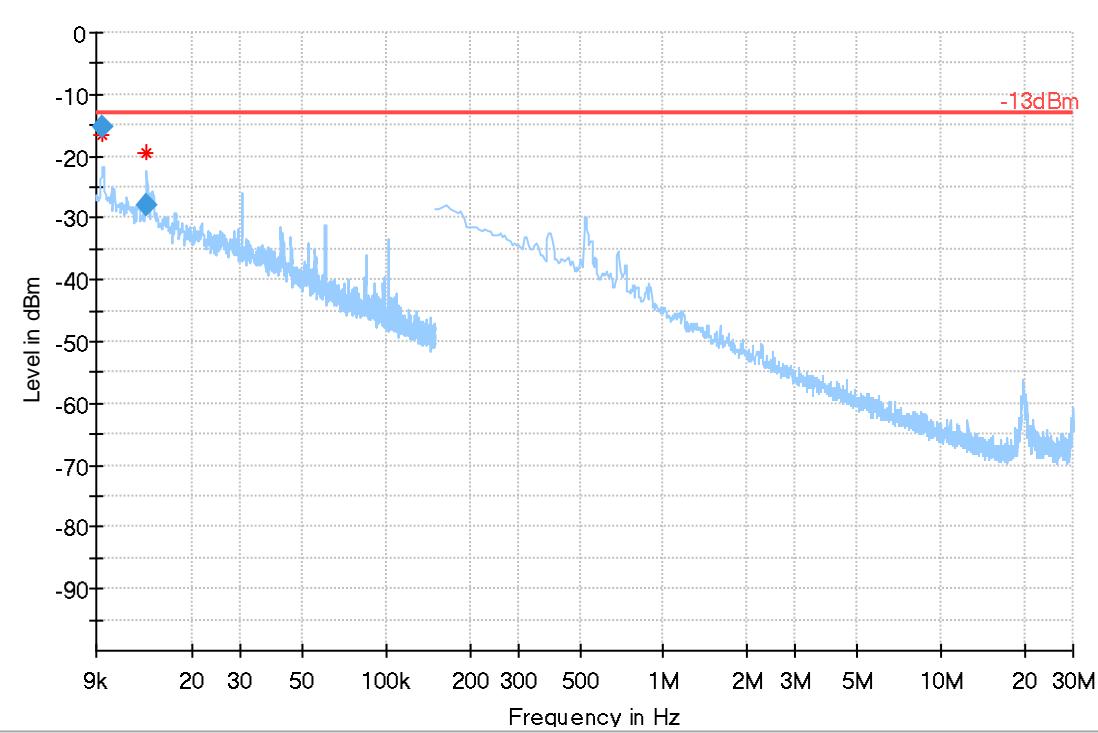
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 36 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

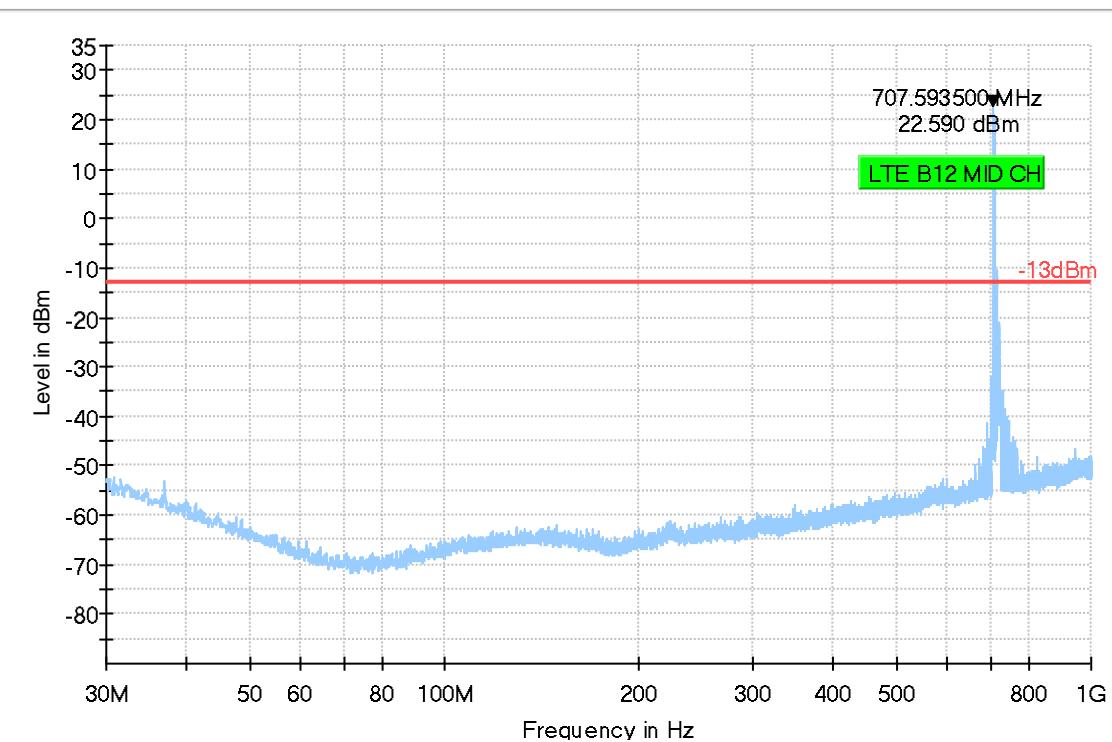
Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
0.010	-15.388	-13.00	2.39	100.0	0.100	118.0	V	140.0	-68.9	2:55:34 PM - 2/10/2020
0.014	-27.778	-13.00	14.78	100.0	0.100	107.0	V	140.0	-71.3	2:58:33 PM - 2/10/2020



Plot # 37 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

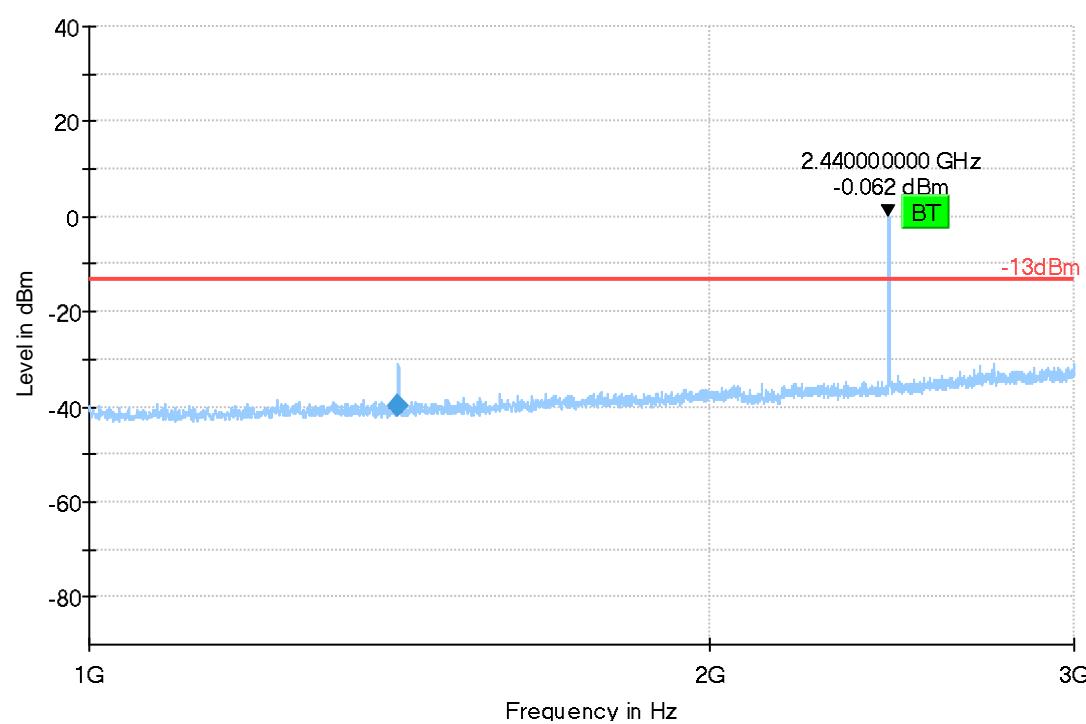


Plot # 38 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1411.825	-39.947	-13.00	26.95	500.0	1000.000	142.0	H	60.0	-92.3	5:48:41 PM - 2/7/2020

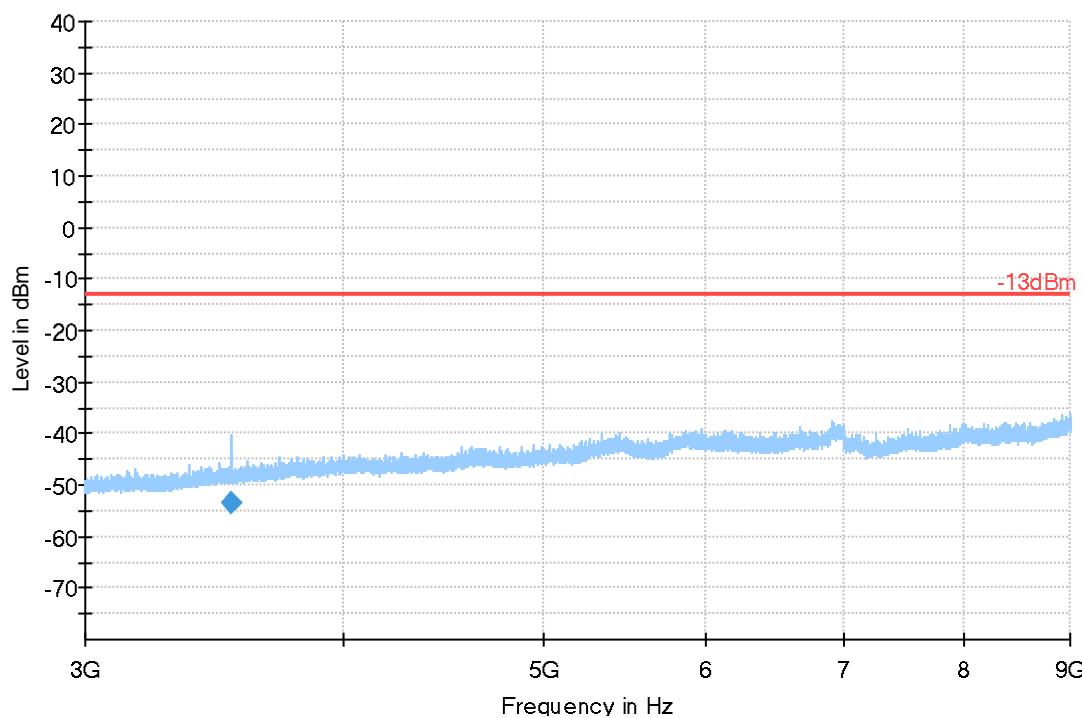


Plot # 39 Radiated Emissions: 3 GHz – 9 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3528.378	-53.451	-13.00	40.45	500.0	1000.000	174.0	V	325.0	-103.5	1:47:53 PM - 2/7/2020

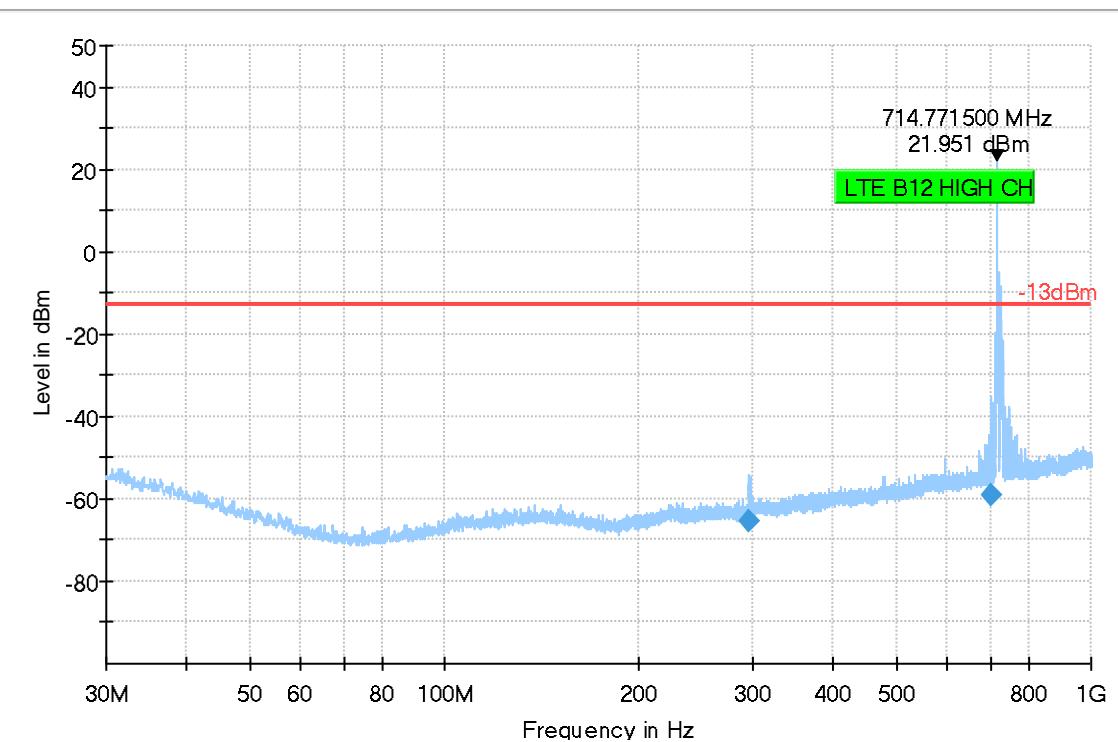


Plot # 40 Radiated Emissions: 30 MHz - 1 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
295.775	-65.205	-13.00	52.21	500.0	100.000	100.0	H	106.0	-93.0	12:31:17 PM - 2/10/2020
702.159	-59.054	-13.00	46.05	500.0	100.000	132.0	H	58.0	-84.1	12:34:10 PM - 2/10/2020



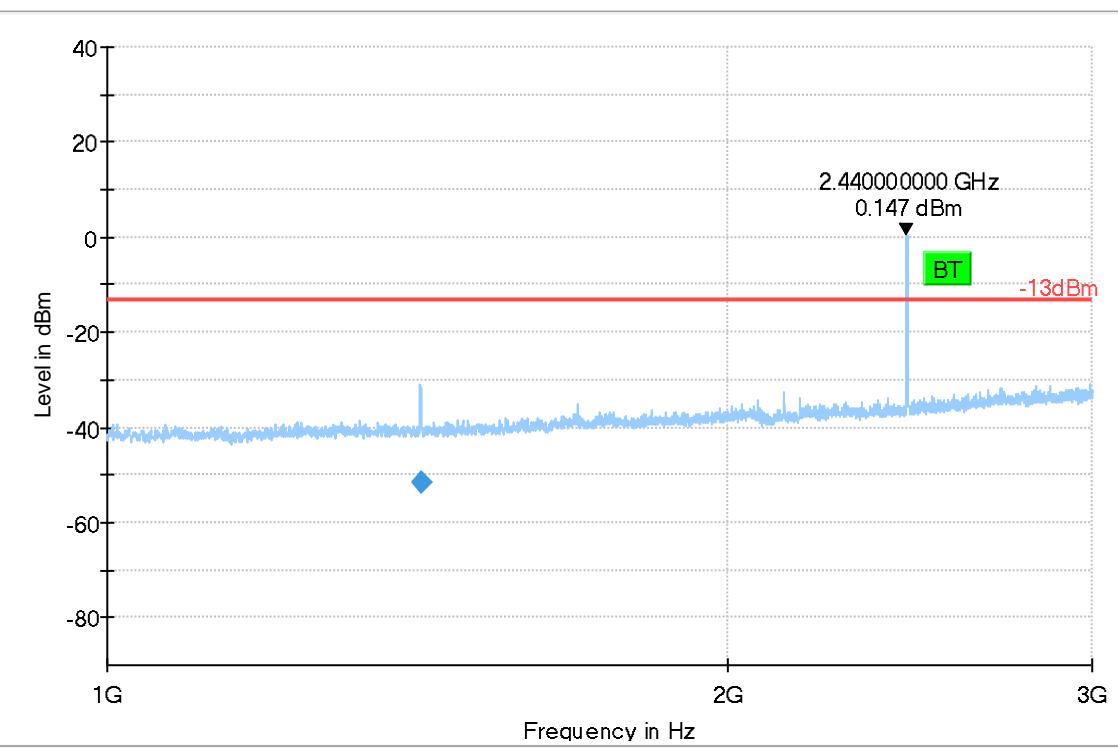
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 41 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1420.010	-51.644	-13.00	38.64	500.0	1000.000	186.0	V	220.0	-92.2	6:01:49 PM - 2/7/2020

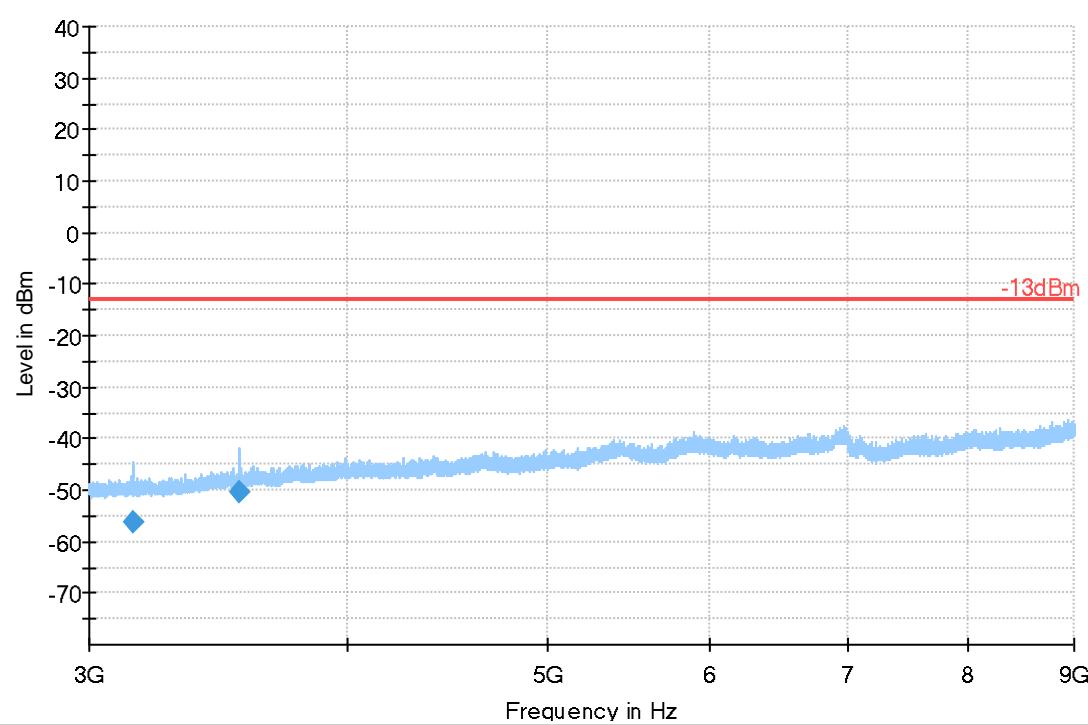


Plot # 42 Radiated Emissions: 3 GHz - 9 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3149.603	-56.178	-13.00	43.18	500.0	1000.000	141.0	V	129.0	-104.5	2:15:44 PM - 2/7/2020
3548.424	-50.347	-13.00	37.35	500.0	1000.000	141.0	V	322.0	-103.4	2:19:13 PM - 2/7/2020



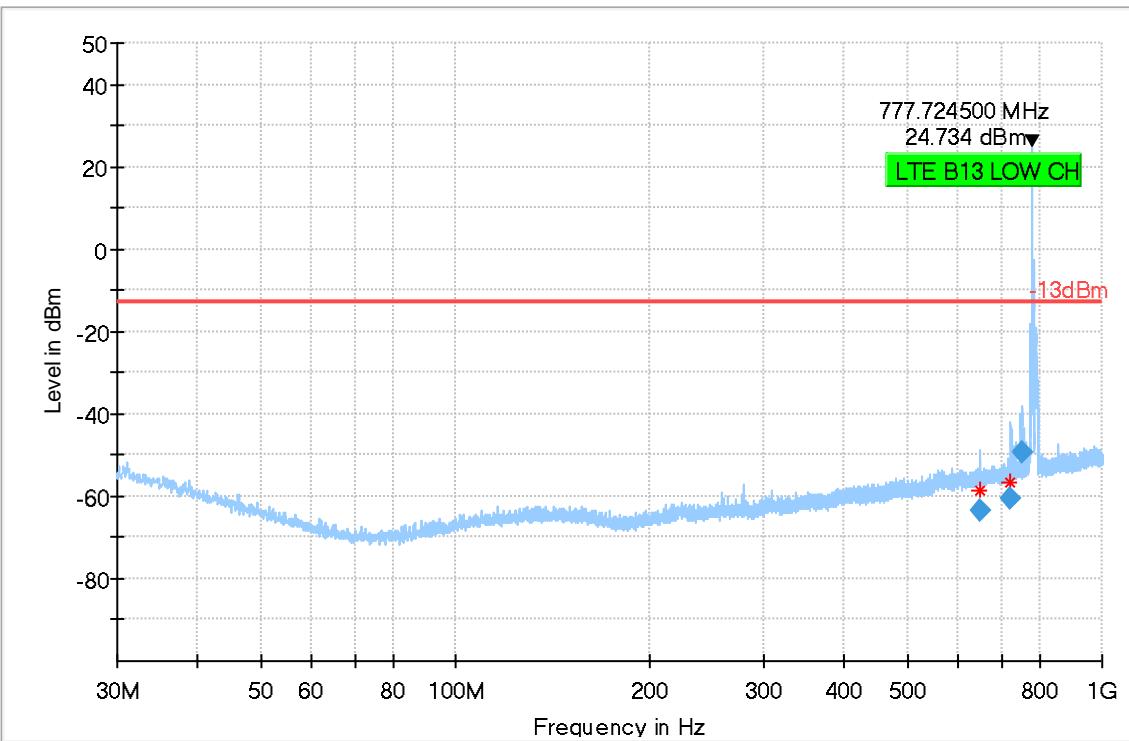
LTE Band 13

Plot # 43 Radiated Emissions: 30 MHz – 1GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
649.027	-63.699	-13.00	50.70	500.0	100.000	286.0	H	132.0	-84.8	1:12:57 PM - 2/10/2020
722.952	-60.553	-13.00	47.55	500.0	100.000	117.0	H	116.0	-83.5	1:07:03 PM - 2/10/2020
750.564	-49.474	-13.00	36.47	500.0	100.000	265.0	H	117.0	-83.0	1:09:49 PM - 2/10/2020

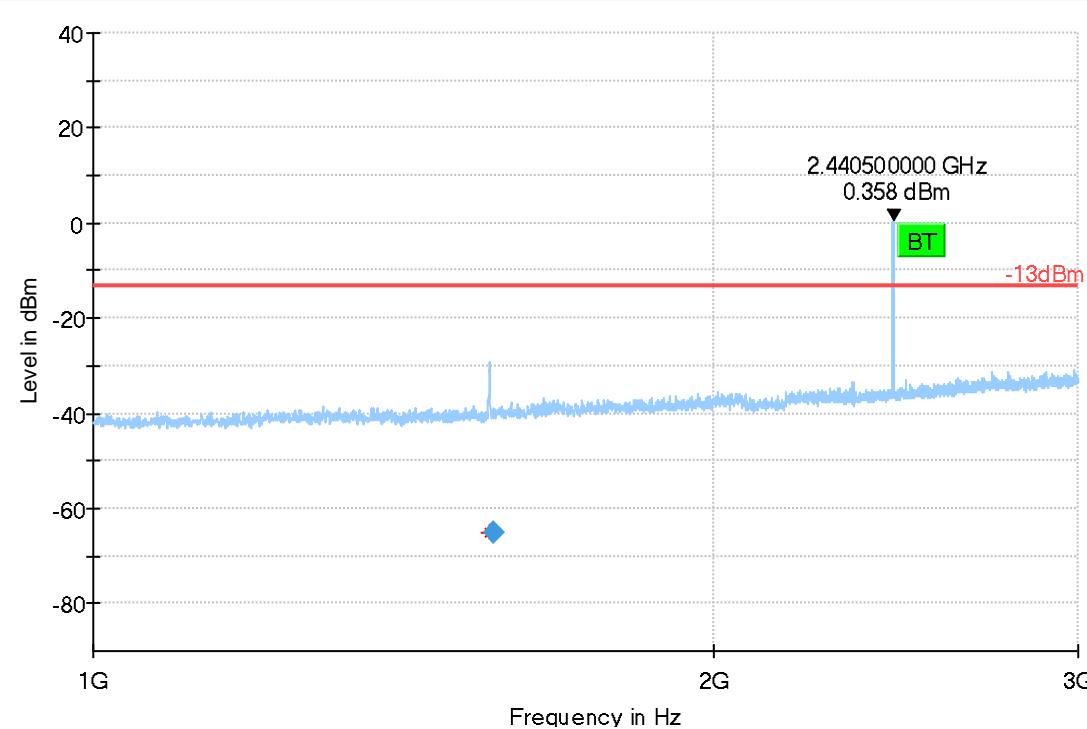


Plot # 44 Radiated Emissions: 1 GHz - 3 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1561.435	-65.177	-13.00	52.18	500.0	1000.000	158.0	H	83.0	-91.4	5:07:29 PM - 2/7/2020

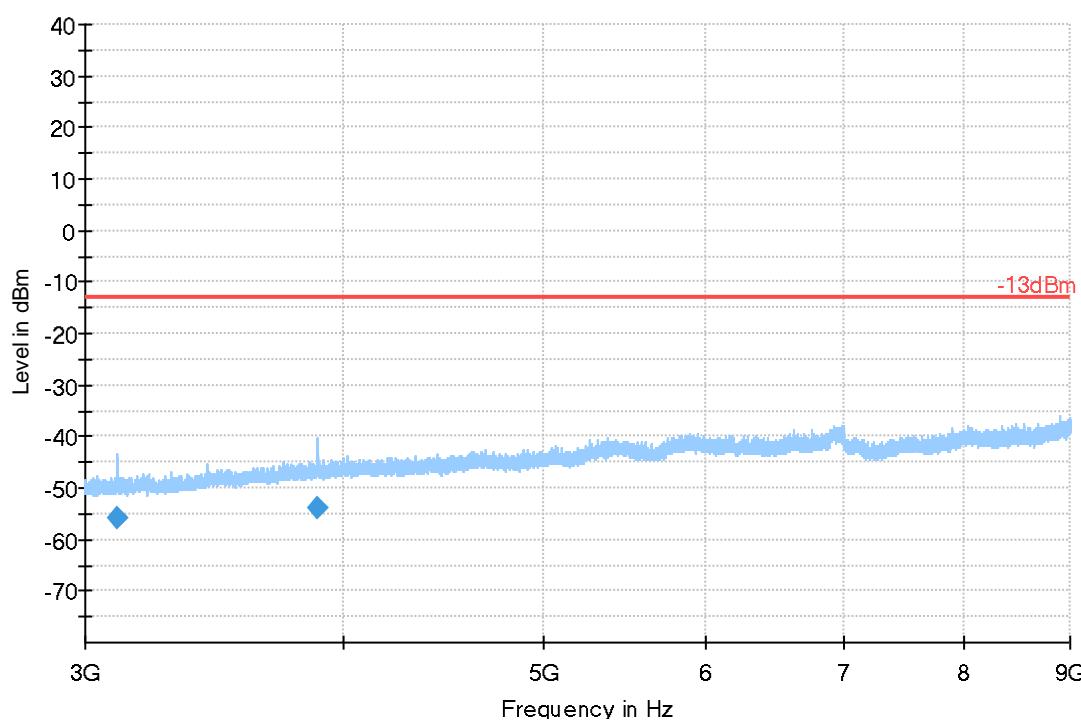


Plot # 45 Radiated Emissions: 3 GHz – 9 GHz

Channel: Low

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3110.980	-56.027	-13.00	43.03	500.0	1000.000	199.0	V	79.0	-104.4	4:07:28 PM - 2/7/2020
3890.268	-53.825	-13.00	40.83	500.0	1000.000	142.0	H	304.0	-102.3	4:11:08PM - 2/7/2020

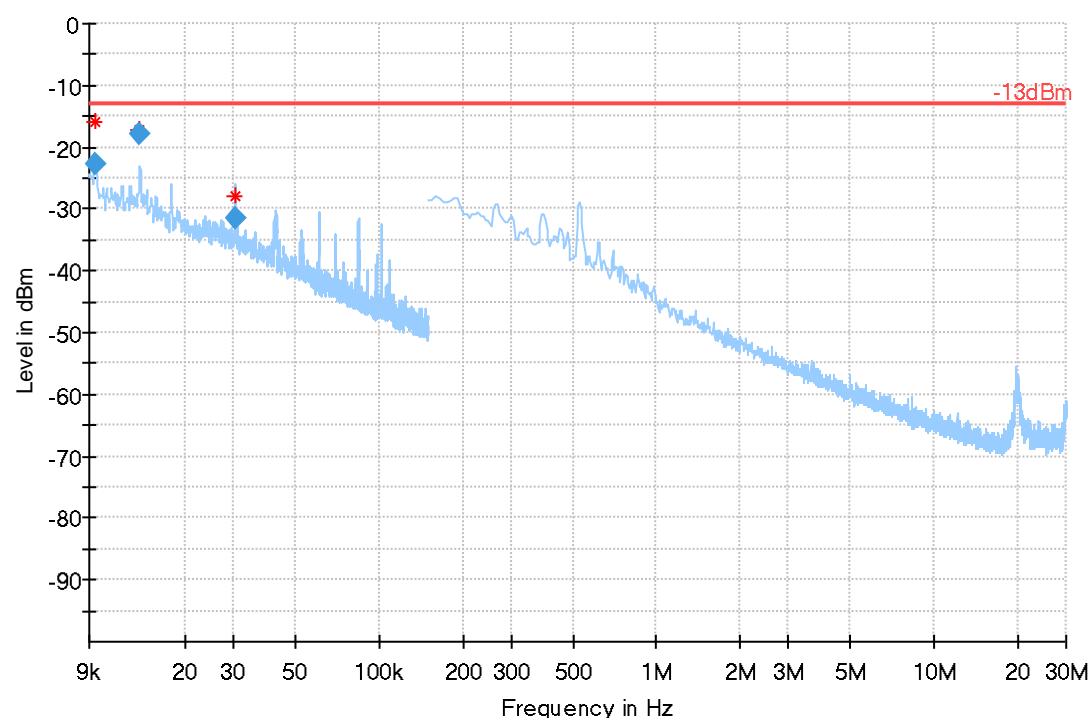


Plot # 46 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
0.010	-22.599	-13.00	9.60	100.0	0.100	113.0	V	130.0	-68.9	3:11:42 PM - 2/10/2020
0.014	-17.780	-13.00	4.78	100.0	0.100	113.0	V	137.0	-71.3	3:14:49 PM - 2/10/2020
0.030	-31.347	-13.00	18.35	100.0	0.100	100.0	H	82.0	-75.8	3:18:08 PM - 2/10/2020



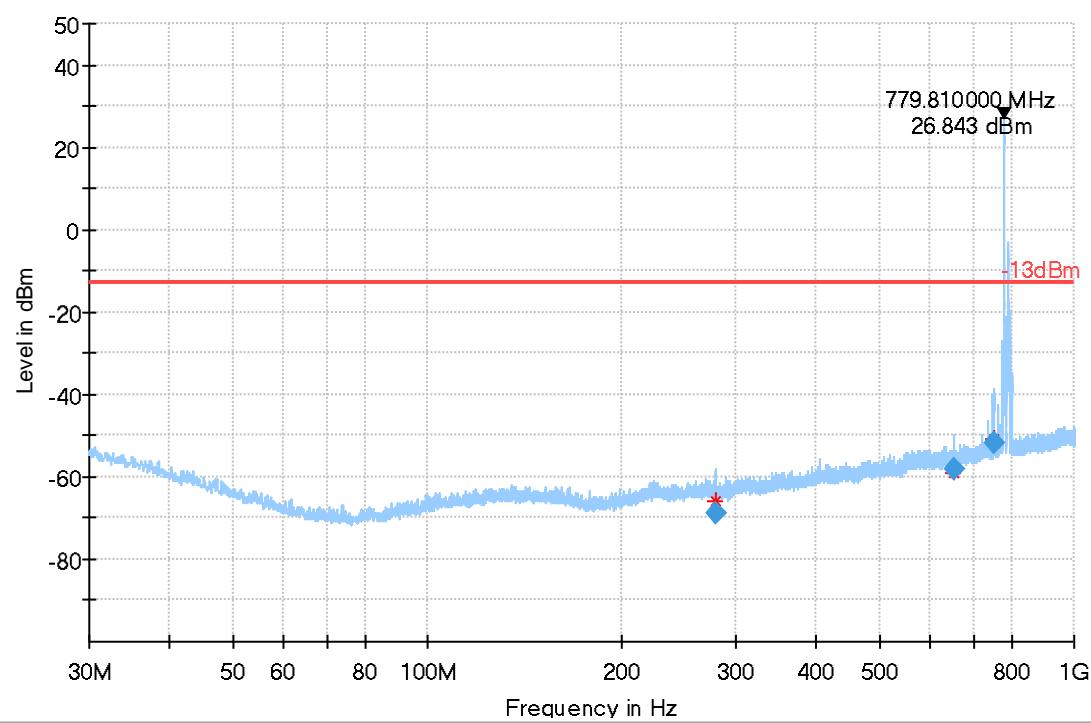
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 47 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
279.304	-68.588	-13.00	55.59	500.0	100.000	100.0	H	102.0	-93.2	12:47:50 PM - 2/10/2020
650.246	-57.919	-13.00	44.92	500.0	100.000	158.0	V	45.0	-84.7	12:52:12 PM - 2/10/2020
750.331	-51.781	-13.00	38.78	500.0	100.000	100.0	H	131.0	-83.0	12:44:59 PM - 2/10/2020

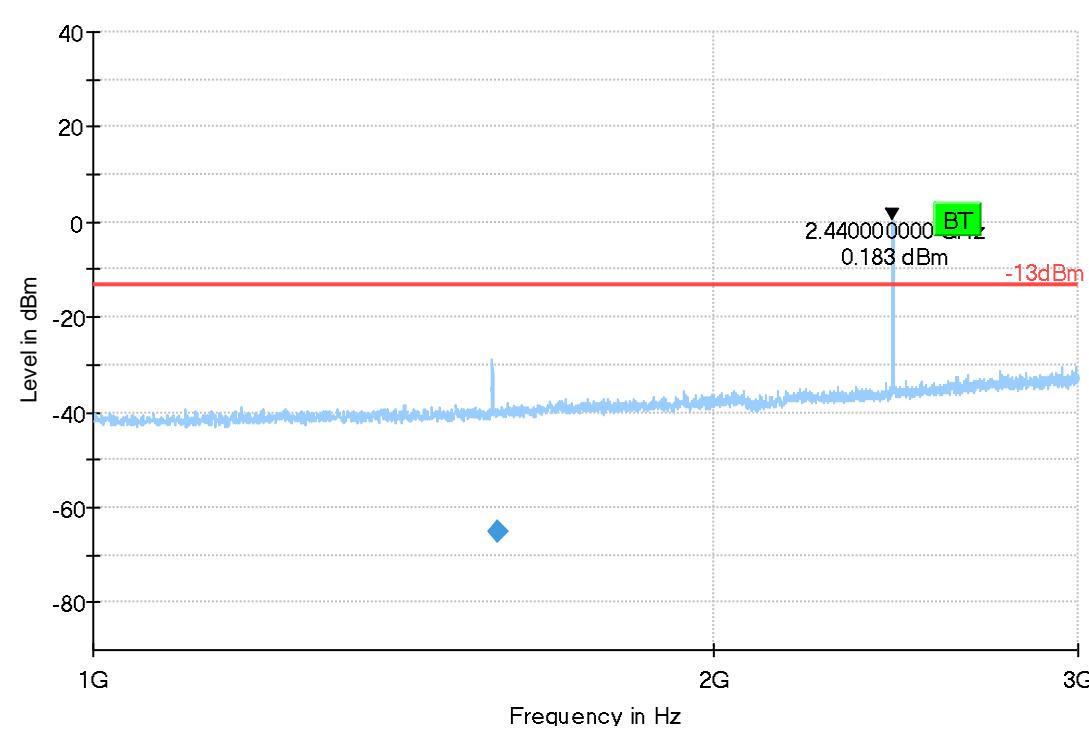


Plot # 48 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1569.150	-65.084	-13.00	52.08	500.0	1000.000	142.0	H	158.0	-91.3	5:19:04 PM - 2/7/2020

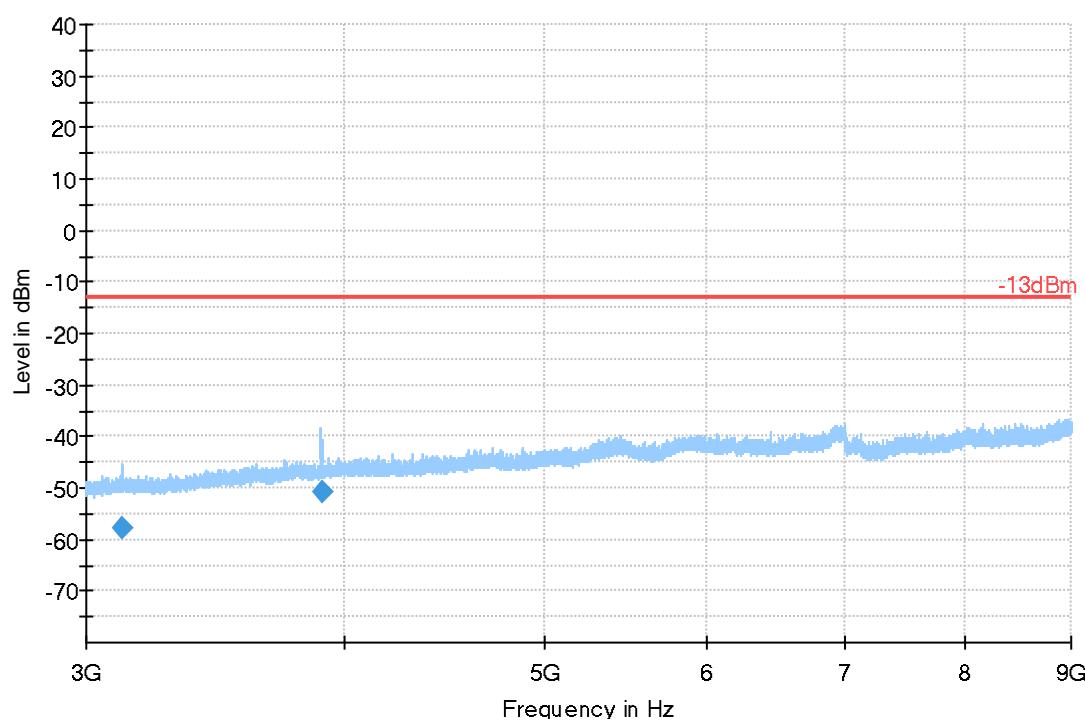


Plot # 49 Radiated Emissions: 3 GHz – 9 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3120.753	-57.828	-13.00	44.83	500.0	1000.000	149.0	V	102.0	-104.4	3:37:08 PM - 2/7/2020
3901.375	-50.624	-13.00	37.62	500.0	1000.000	199.0	V	233.0	-102.3	3:40:33 PM - 2/7/2020

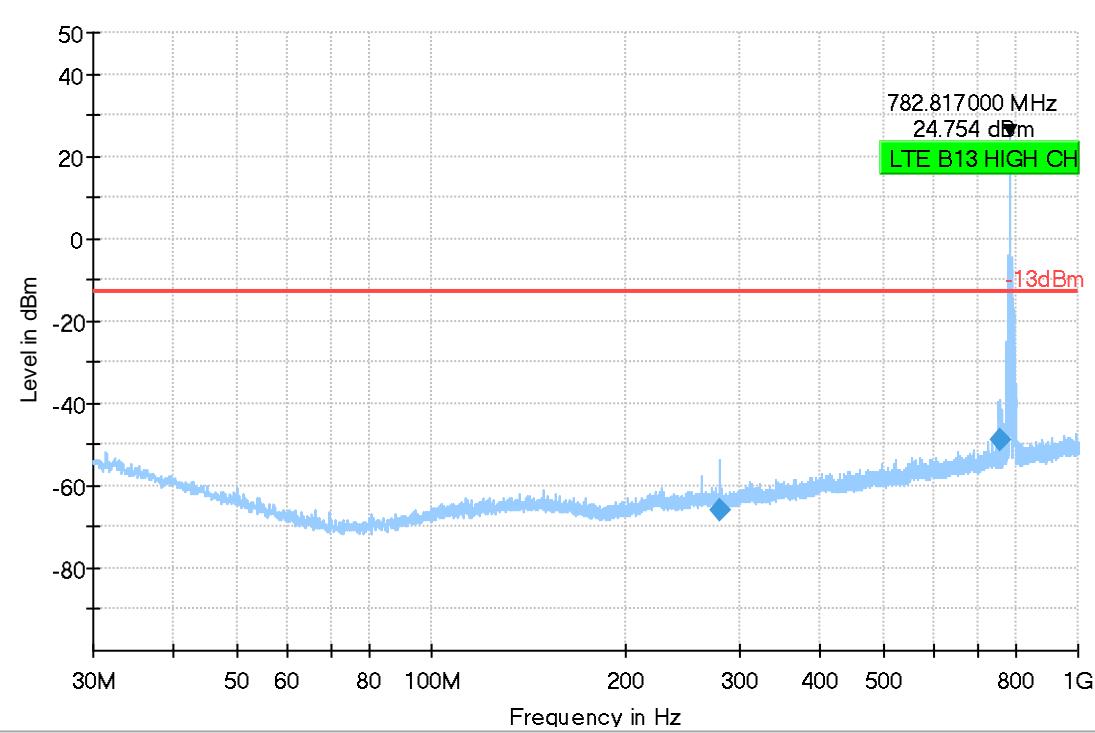


Plot # 50 Radiated Emissions: 30 MHz – 1GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
279.872	-65.820	-13.00	52.82	500.0	100.000	100.0	H	101.0	-93.2	1:28:13 PM - 2/10/2020
755.707	-48.846	-13.00	35.85	500.0	100.000	100.0	H	113.0	-82.9	1:25:25 PM - 2/10/2020



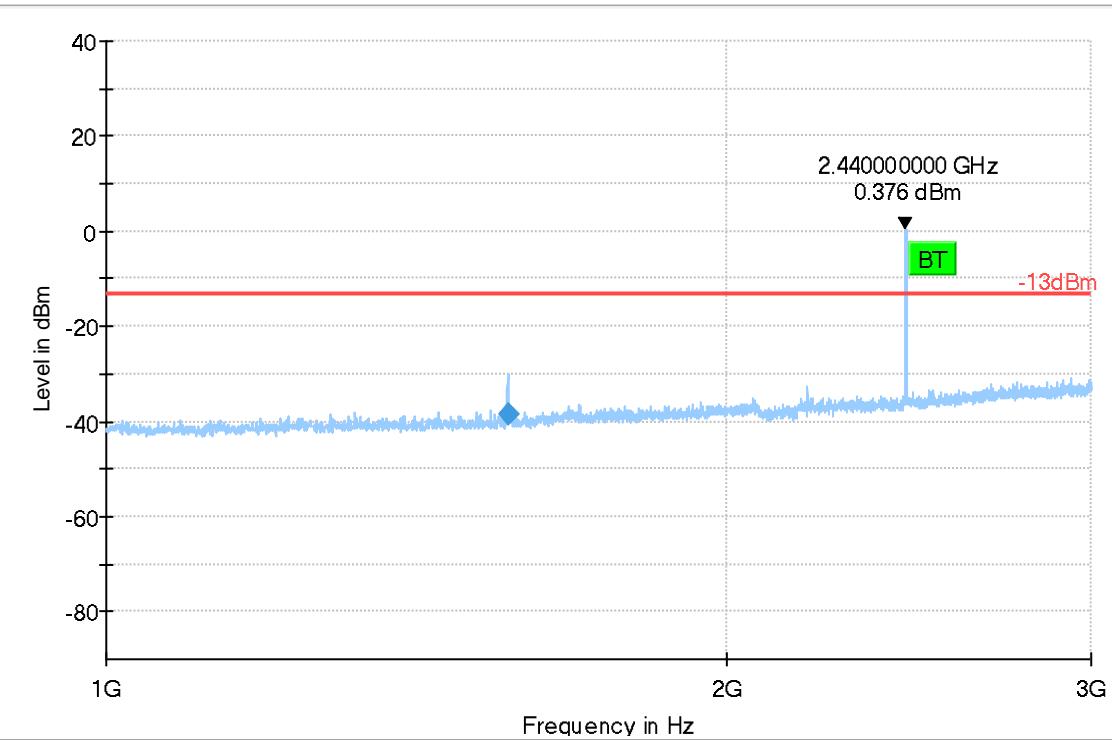
— Preview Result 1-PK+ * Critical_Freqs PK+ — -13dBm ♦ Final_Result RMS

Plot # 51 Radiated Emissions: 1 GHz - 3 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
1565.865	-38.553	-13.00	25.55	500.0	1000.000	143.0	H	74.0	-91.4	4:57:18 PM - 2/7/2020

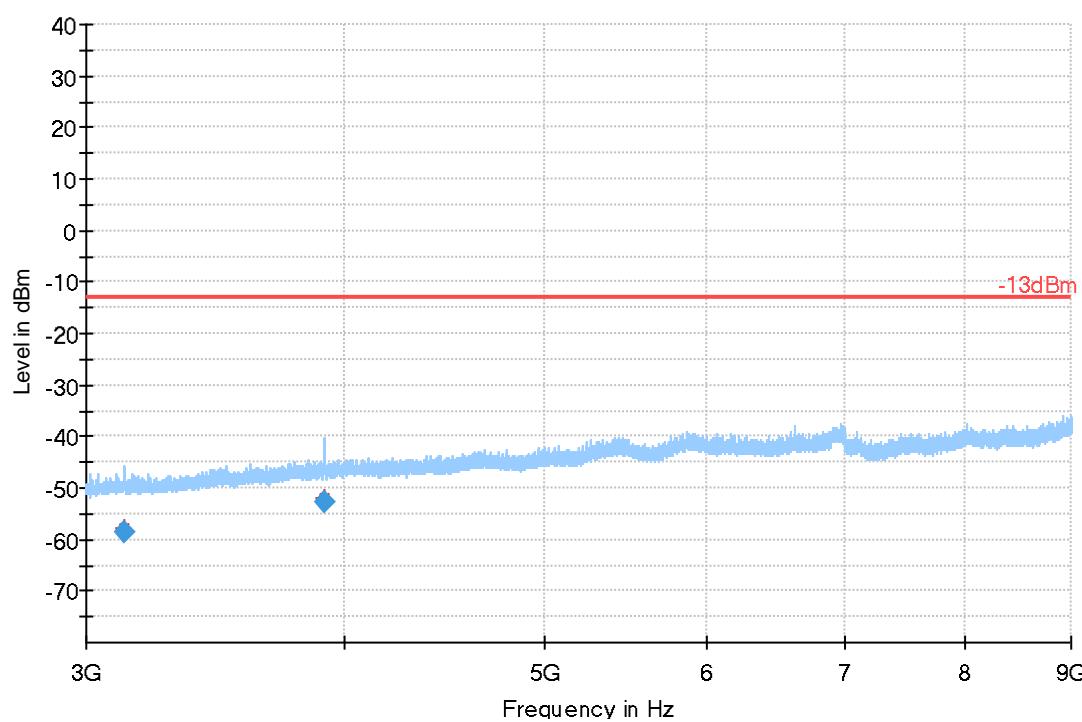


Plot # 52 Radiated Emissions: 3 GHz – 9 GHz

Channel: High

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB)	Comment
3129.102	-58.586	-13.00	45.59	500.0	1000.000	192.0	V	355.0	-104.5	4:31:35 PM - 2/7/2020
3913.154	-52.876	-13.00	39.88	500.0	1000.000	117.0	H	308.0	-102.2	4:28:19 PM - 2/7/2020



8 Test setup photo

Setup photos are included in supporting file name: "EMC_PHIL4-064-20001_Setup_Photos.pdf"

9 Test Equipment And Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
PASSIVE LOOP ANTENNA	ETS LINDGREN	6507	00161344	3 YEARS	10/26/2017
BILOG ANTENNA	TESEO	CBL 6141B	41106	3 YEARS	11/01/2017
HORN ANTENNA	EMCO	3115	00035114	3 YEARS	07/31/2017
HORN ANTENNA	ETS LINDGREN	3117	00169547	3 YEARS	08/08/2017
HORN ANTENNA	ETS LINDGREN	3116C	00169535	3 YEARS	09/24/2017
UNIVERSAL RADIO COMMUNICATION TESTER	R&S	CMU 200	101821	3 YEARS	07/06/2017
WIDEBAND RADIO COMMUNICATION	R&S	CMW500	127068	3 YEARS	07/01/2017
SIGNAL ANALYZER	R&S	FSV 40	101022	2 YEARS	07/15/2019
COMPACT DIGITAL BAROMETER	CONTROL COMPANY	35519-055	91119547	3 YEARS	06/20/2017
DIGITAL THERMOMETER	CONTROL COMPANY	36934-164	191871994	2 YEARS	01/10/2019

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
2020-04-09	EMC_PHIL4-064-20001_FCC_22_24_27	Initial version	Yuchan Lu

<<The End>>