EMC Test Report

Project Number: 4148120

Report Number: 4148120EMC02 **Revision Level:** 0

Client: Arris Group, Inc.

Equipment Under Test: Digital Gateway Modem

Model: DG3450

FCC ID: UIDDG3450

IC ID: 6670A-DG3450

Applicable Standards: FCC Part 15 Subpart C, § 15.407

ANSI C63.10: 2013

Report issued on: 13 July 2017

Test Result: Compliant

Tested by: Jeremy Pickens, Senior EMC Engineer

Reviewed by: David Schramm, Operations Manager

Table of Contents

1 Summary of Test Results

Test Description	Test Specification	Test Result
Emission Bandwidth	15.407(a), 15.407(e)	Compliant(1)
Spectral Density	15.407(a)	Compliant(1)
Peak Power Output	15.407(a)	Compliant(1)
Unwanted Emissions	15.407(b)	Compliant
AC Powerline Conducted Emission	15.107, 15.207	Compliant

(1) Note: The DG3450 hardware is identical to that of the model TG3452 which has been tested and certified under FCC ID UIDTG3452 and IC ID: 6670A-TG3452. Therefore the antenna port conducted measurement data from the TG3452 filing also applies to the DG3450.

1.1 *Modifications Required for Compliance*

None

2 General Information

2.1 *Client Information*

Name:	ARRIS Group, Inc.
Address:	3871 Lakefield Drive, Suite 300
City, State, Zip, Country:	Suwanee, GA 30024, USA

2.2 *Test Laboratory*

Name:	SGS North America, Inc.
Address:	620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country:	Suwanee, GA 30024, USA
Accrediting Body:	A2LA
Type of lab:	Testing Laboratory
Certificate Number:	3212.01

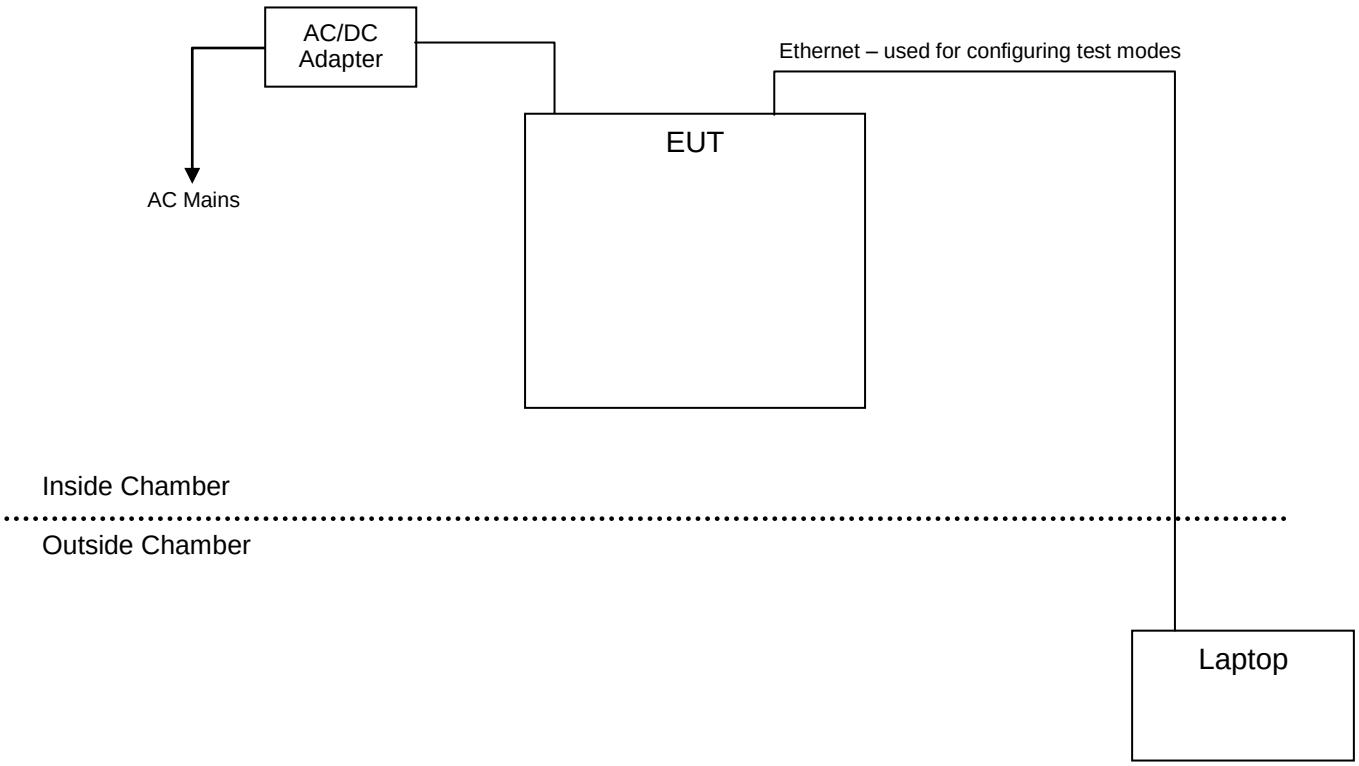
2.3 *General Information of EUT*

Type of Product:	Digital Gateway Modem
Model Number:	DG3450
Serial Number:	73R2XC333301541
Power Supply:	M/N: NBS36H120300VU, P/N: AREP05681
Frequency Range:	5150 to 5250 MHz and 5725 to 5825MHz
Data Modes:	802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT20), 802.11ac (VHT40), 802.11ac (VHT80)
Antenna:	Internal, 4x4 MIMO
Rated Voltage:	100-240Vac, 50/60Hz (AC to 12VDC Adapter)
Test Voltage:	120Vac, 60Hz
Sample Received Date:	24 May 2017
Dates of testing:	30 May - 29 June 2017

2.4 *Operating Modes and Conditions*

Using test commands, the EUT would transmit continuously on any of the UNII Band 1 or UNII Band 3 channels at full power. Worst-case power and PSD were achieved at the lowest data rate. For radiated spurious emissions measurements, only the worst-case mode with respect to peak power was investigated.

2.5 *EUT Connection Block Diagram – Radiated Measurements*



2.6 *System Configurations*

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Arris	Digital Gateway Modem	DG3450	73R2XC333301541
B	NetBit	AC/DC Supply	NBS36H120300VU P/N: AREP05681	Not Labeled

3 Unwanted Emissions

3.1 *Test Result*

Test Description	Test Specification	Test Result
Spurious Emissions	15.407(b) ANSI C63.10: 2013	Compliant

3.2 *Test Method*

Testing was performed using the radiated and conducted methods defined in ANSI C63.10: 2013 clause 12.7 and KDB 789033 D02 General UNII Test Procedures New Rules v01r03. In lieu of the marker-delta or integration methods, band edge compliance was shown using a peak detector and a 1MHz resolution bandwidth.

Lowest, middle, and highest channels were investigated for each band. Only the modulation providing the worst-case power was reported except at the band edges where all modulations and bandwidths were measured. The frequency range examined was 9kHz to 40GHz. A pre-scan was performed in the 9kHz-30MHz range and no emissions associated with the radio were observed.

For this evaluation, only the fundamental and harmonics were investigated due to the layout differences of the antennas relative to the radio modules relative to the certified TG3452. Measurements below 1GHz were not repeated.

Limit:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

3.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.5 °C
Relative Humidity: 43.5 %

3.4 *Test Equipment – Radiated Measurements*

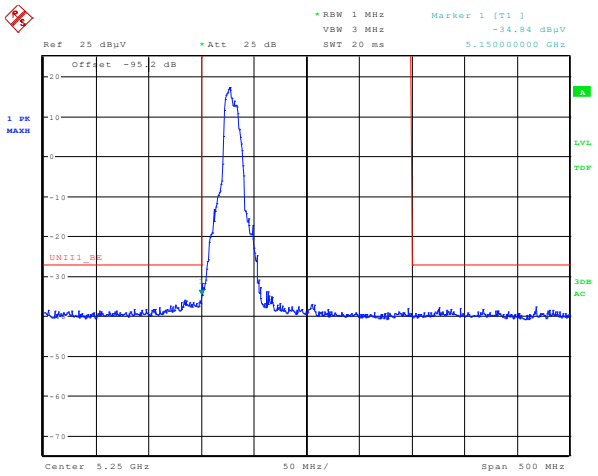
Test End Date: 5-Jun-2017 Tester: JOP/FN

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	25-Apr-2018
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	27-Jul-2017
RF CABLE	SF106	HUBER & SUHNER	B079661	29-Jul-2017
RF CABLE	NFS-290-78.7-NFS	FLORIDA RF LABS	B095019	28-Jul-2017
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	29-Jul-2017
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	4-Aug-2017
HORN(SMALL)	LB-180400-20-C-KF	A-INFO	15007	21-Mar-2018
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2017
RF CABLE	SF102	HUBER & SUHNER	B079824	27-Jul-2017
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	29-Jul-2017

Note: The equipment calibration period is 1 year.

3.5 *Test Data - UNII Band 1 – Radiated Band Edge*

802.11a
Channels 36 and 48



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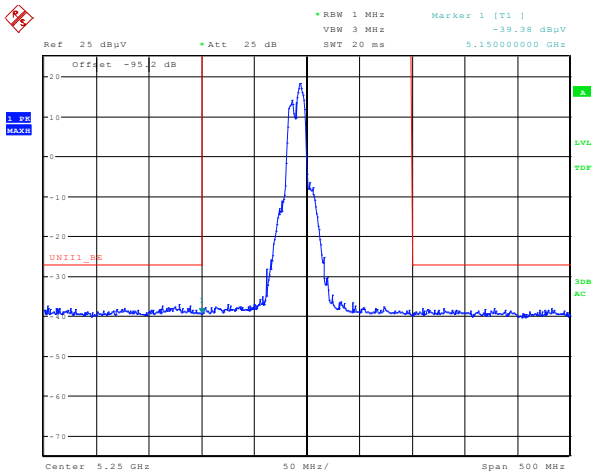

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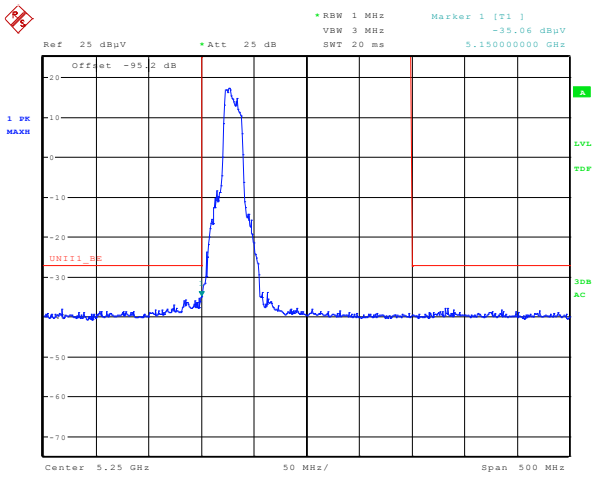
802.11n (HT20)
Channels 36 and 48



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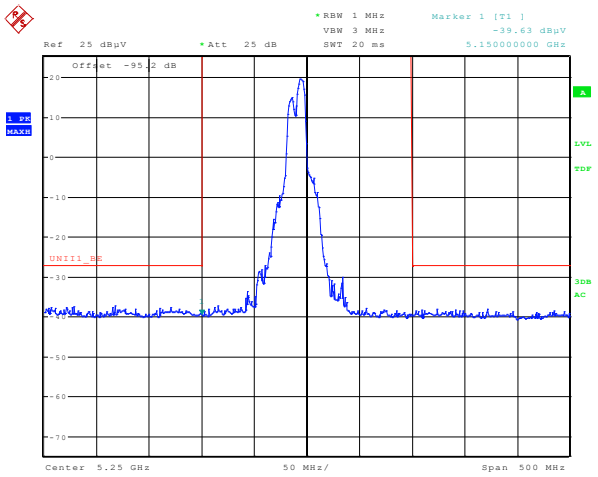

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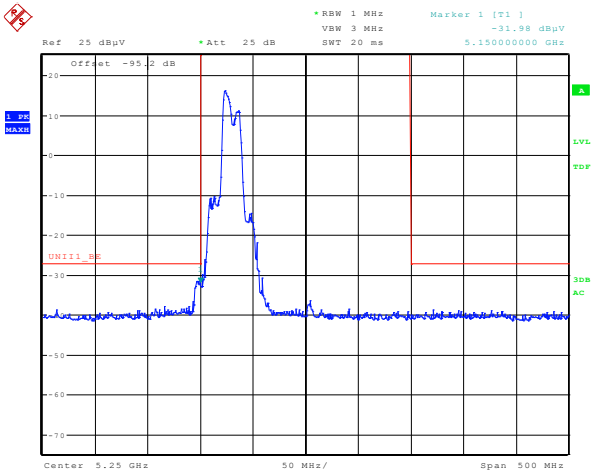
802.11ac (VHT20)
Channels 36 and 48



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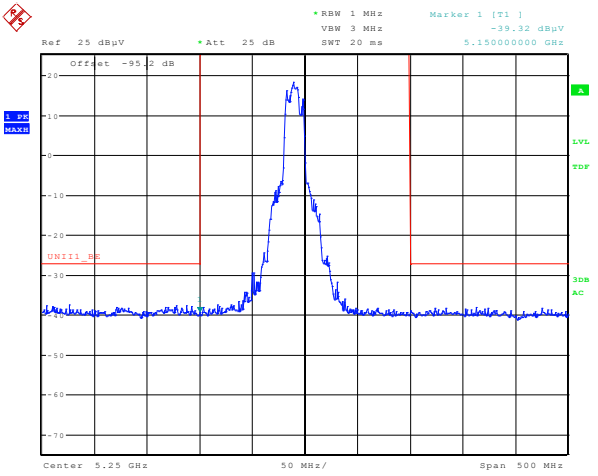

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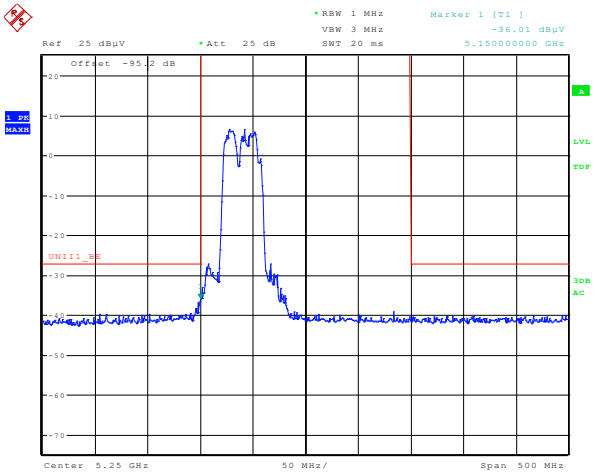
802.11n (HT40)
Channels 38 and 46



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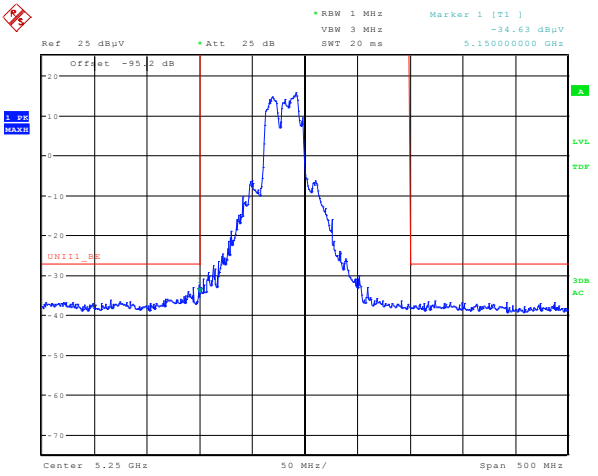

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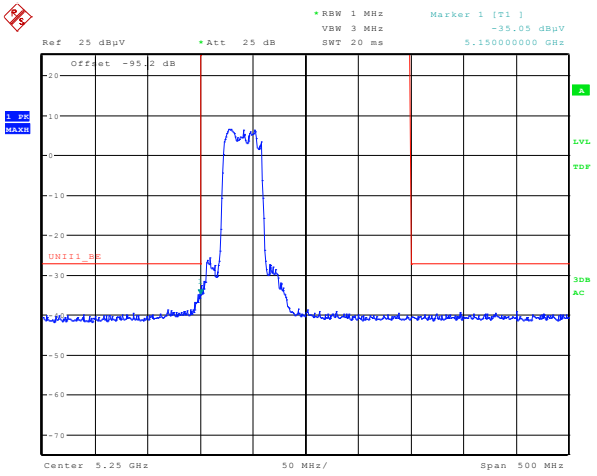
802.11ac (VHT40)
Channels 38 and 46



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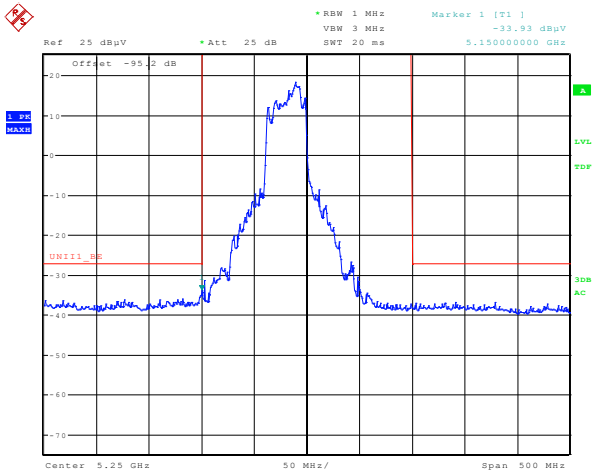

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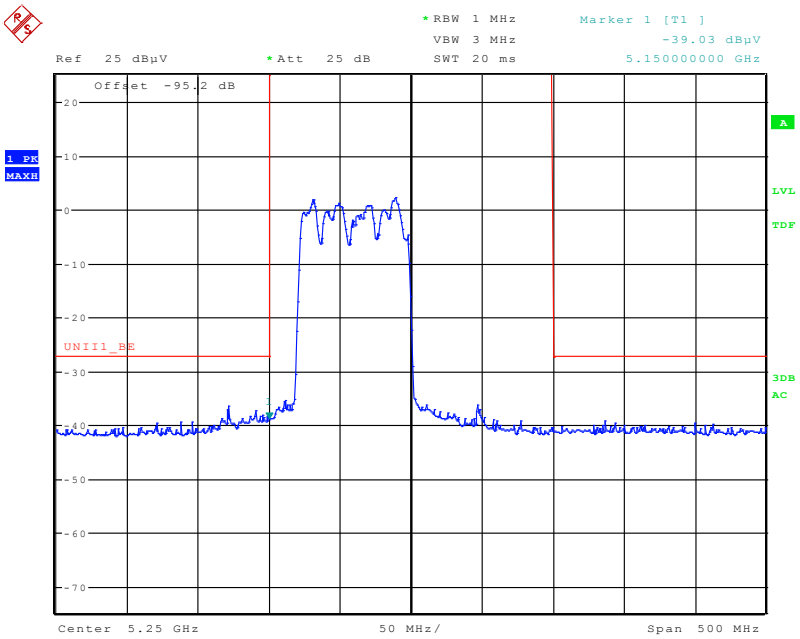
802.11ac (VHT80)
Channel 42



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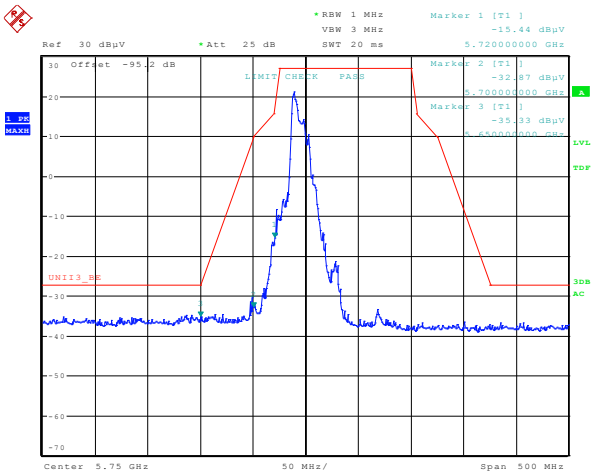
3.6 *Test Data - UNII Band 1 – Radiated Band Edge*

802.11a
Channels 149 and 165



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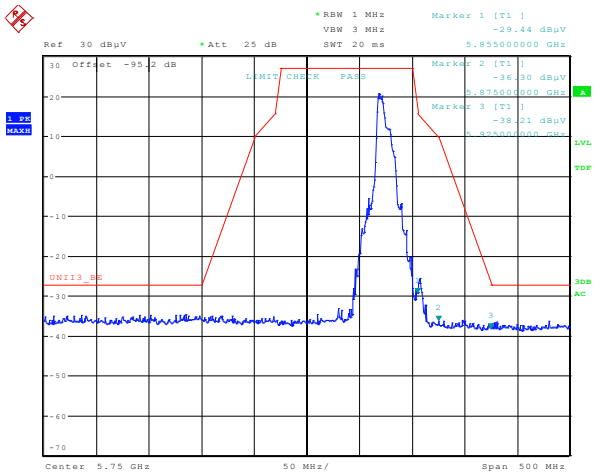

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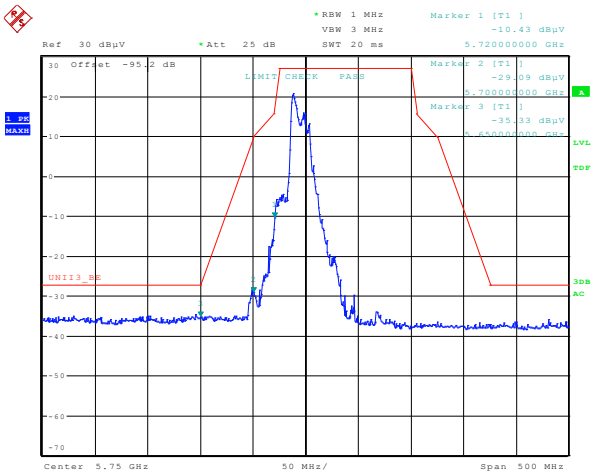
802.11n (HT20)
Channels 149 and 165



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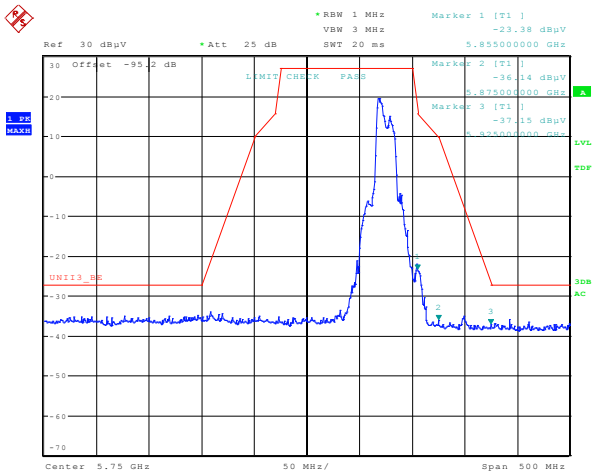

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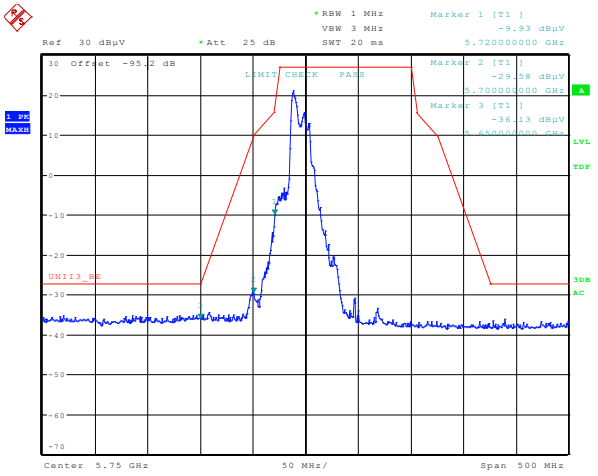
802.11ac (VHT20)
Channels 149 and 165



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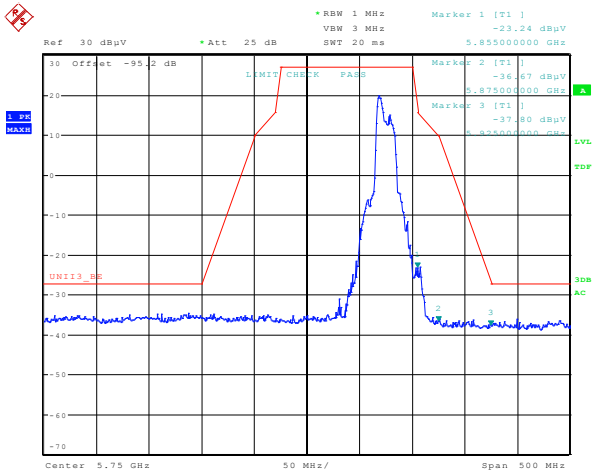

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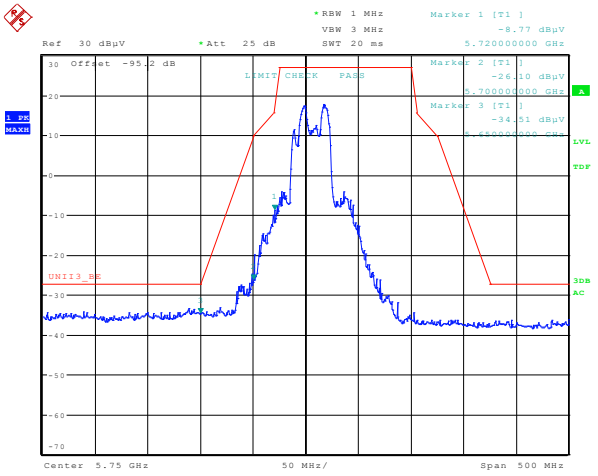
802.11n (HT40)
Channels 151 and 159



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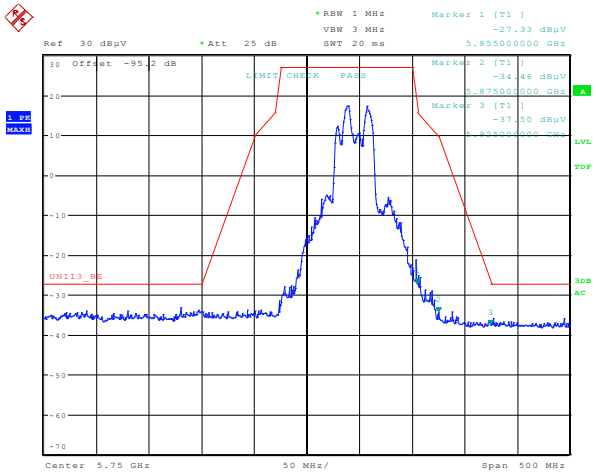

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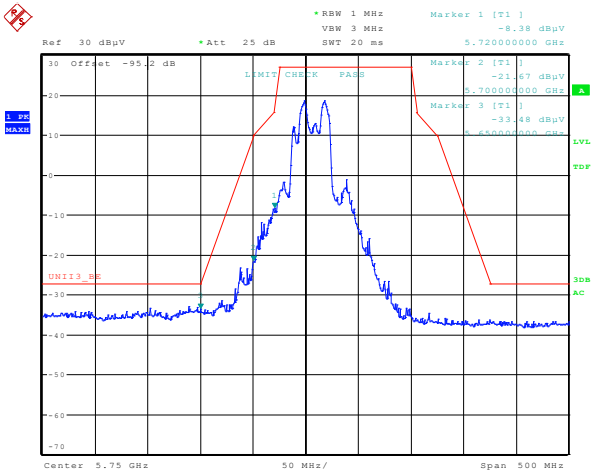
802.11ac (VHT40)
Channels 151 and 159



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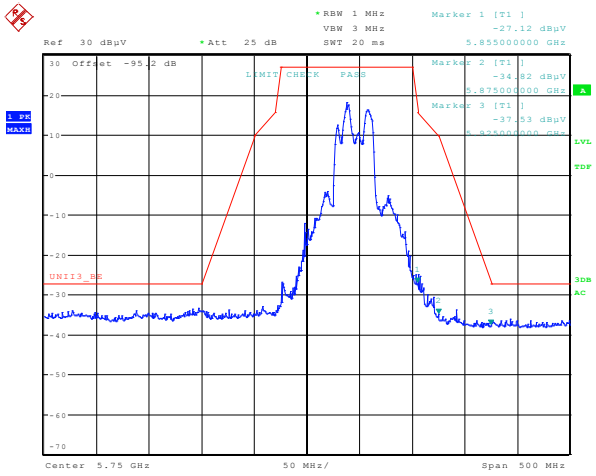

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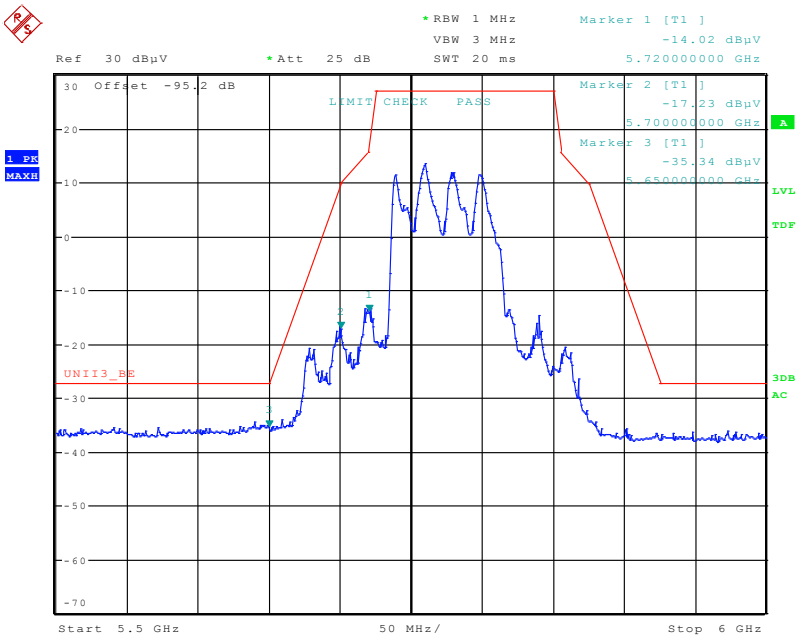
802.11ac (VHT80)
Channel 155



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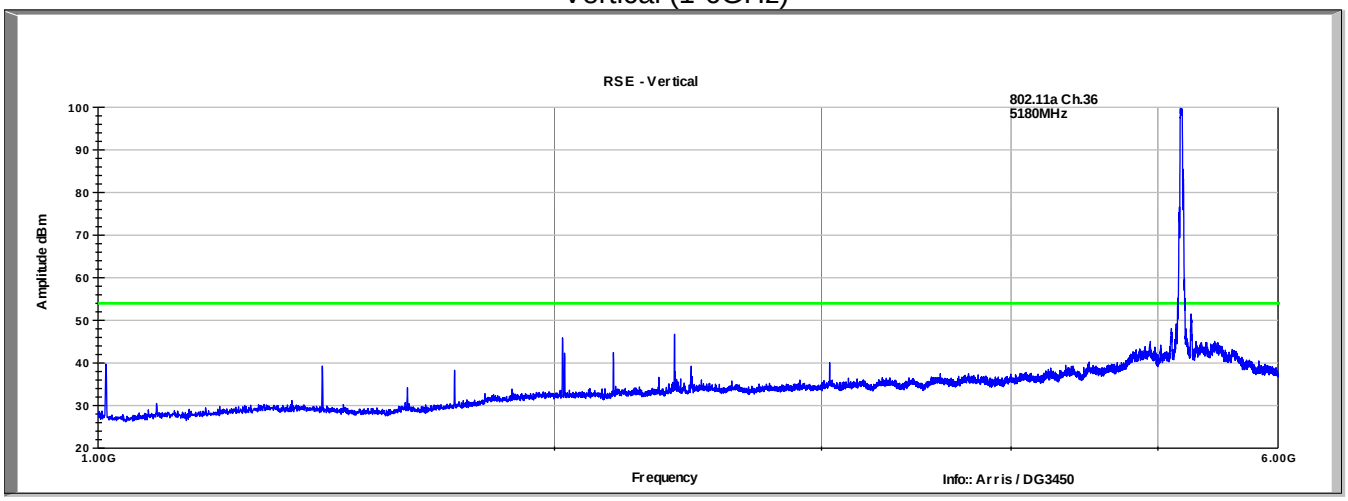
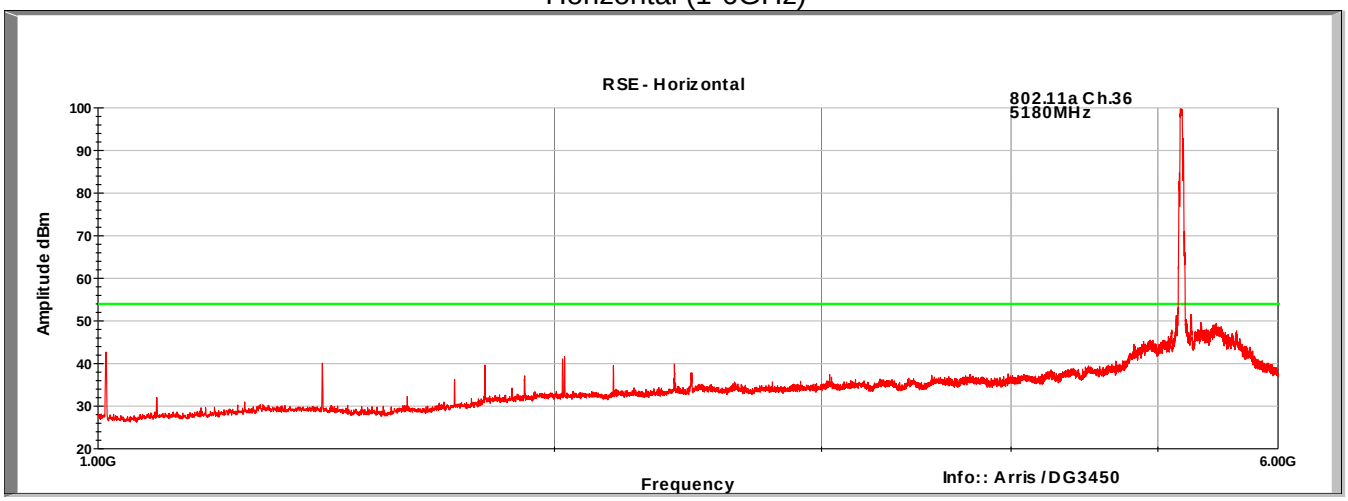
3.7 *Unwanted Emissions – Cabinet Radiation*

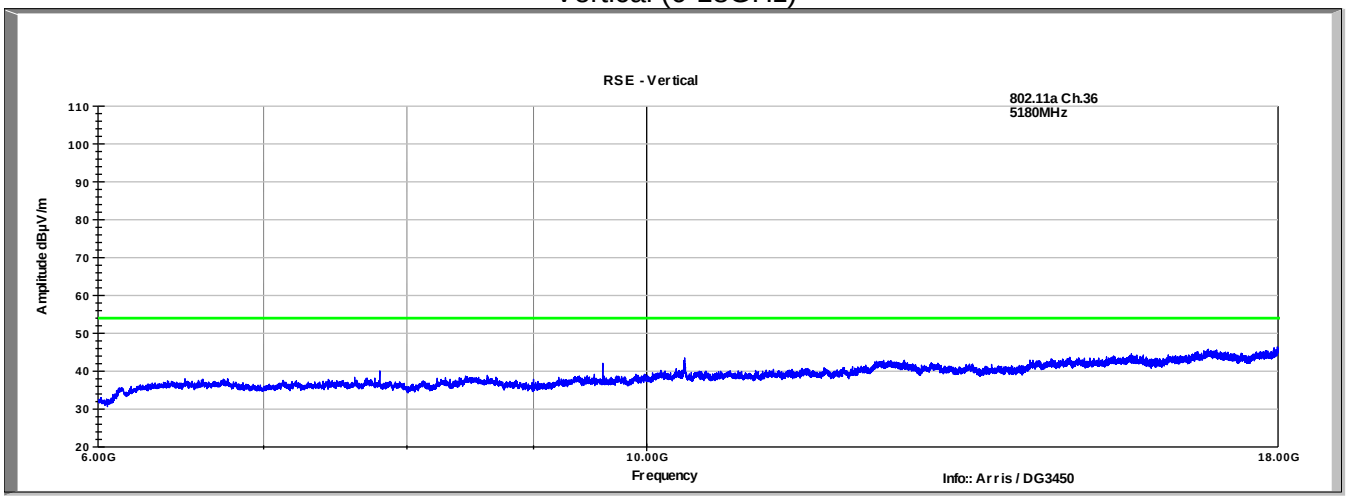
Channel 36
Vertical (1-6GHz)



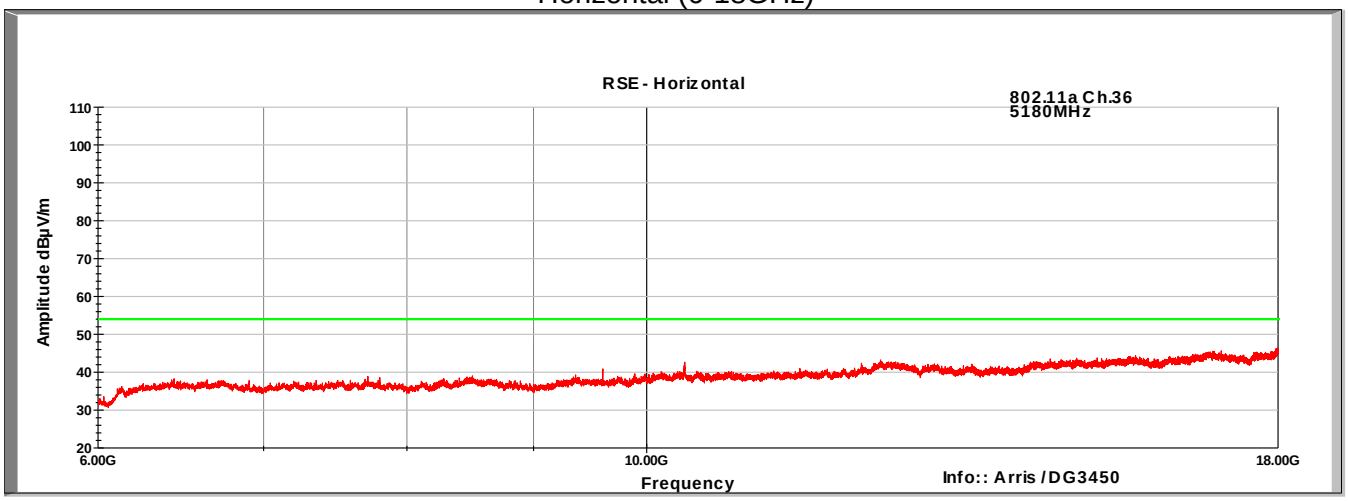
Channel 36
Horizontal (1-6GHz)



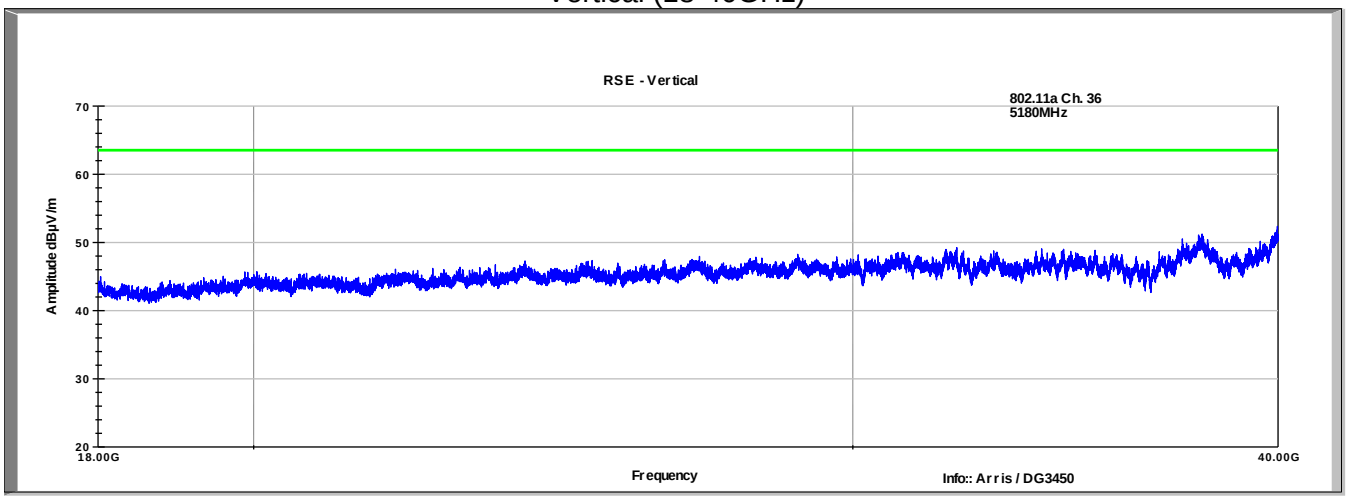
Channel 36
Vertical (6-18GHz)



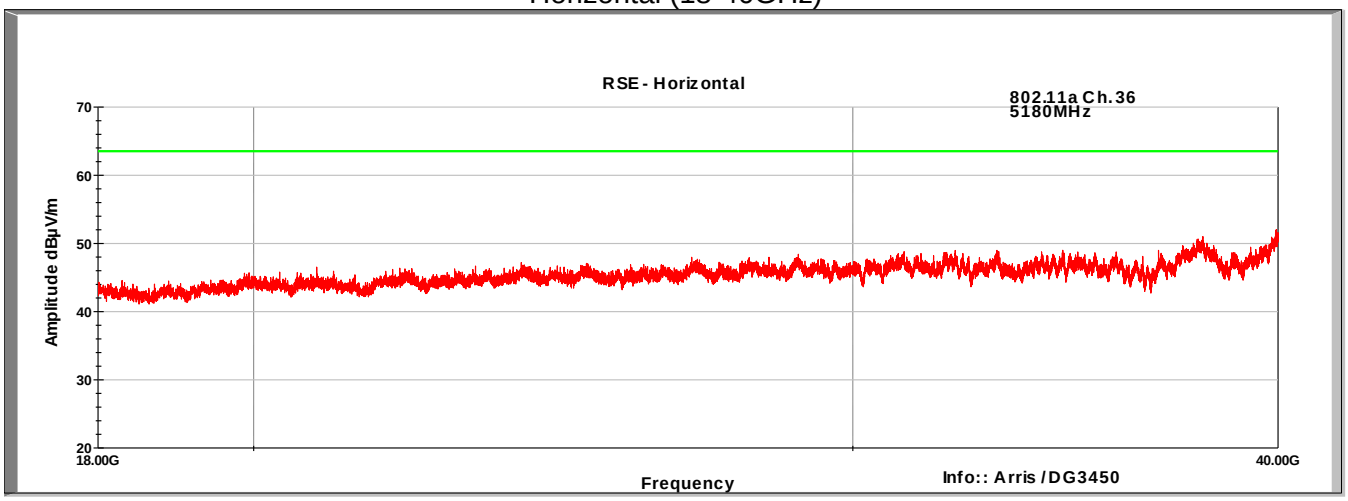
Channel 36
Horizontal (6-18GHz)



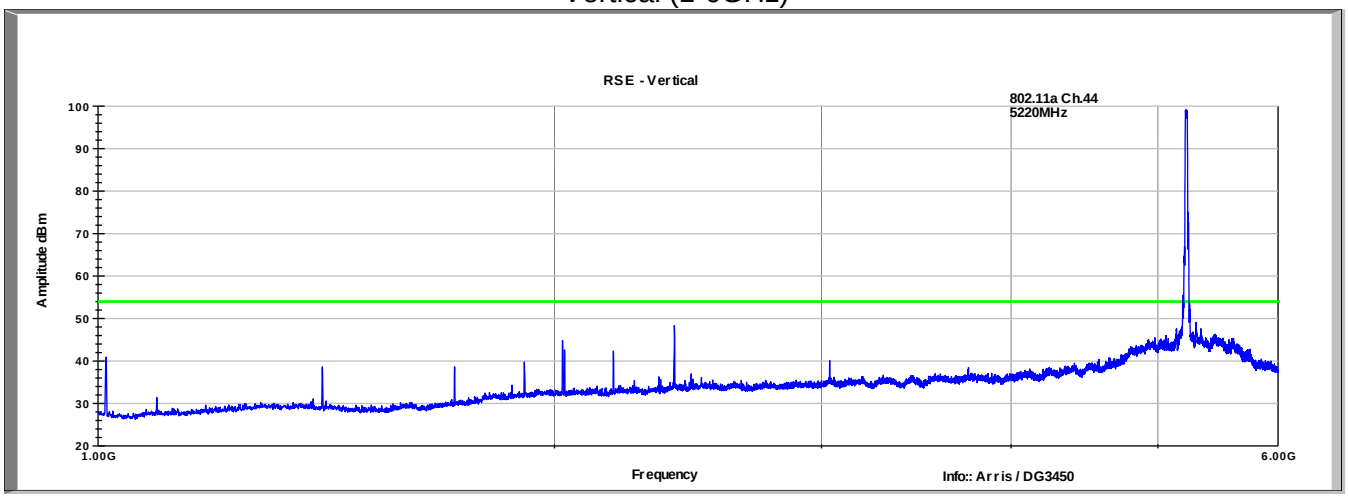
Channel 36
Vertical (18-40GHz)



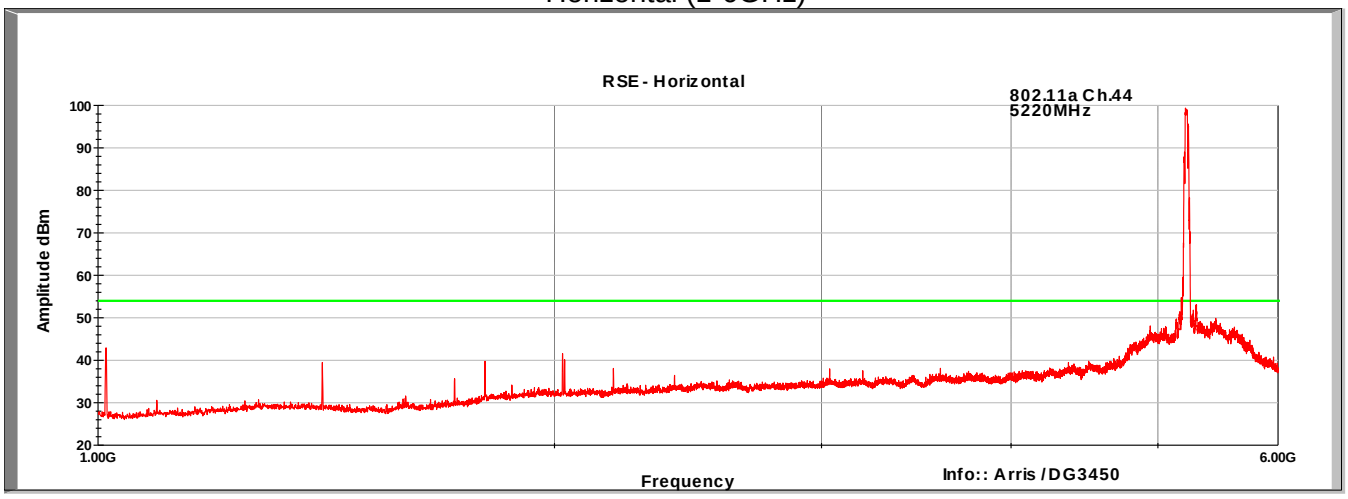
Channel 36
Horizontal (18-40GHz)



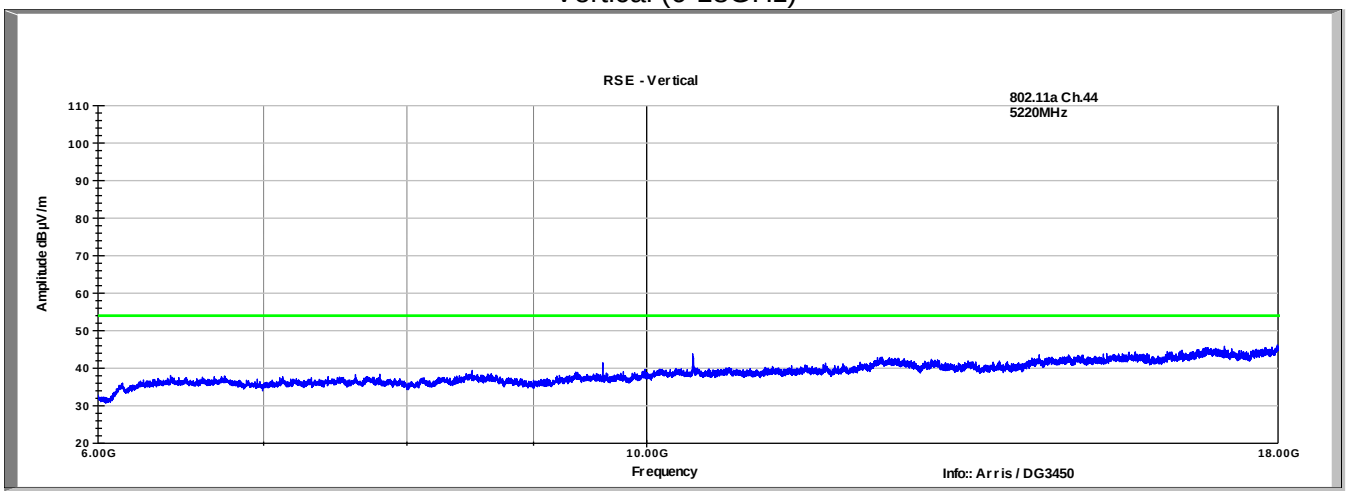
Channel 44
Vertical (1-6GHz)



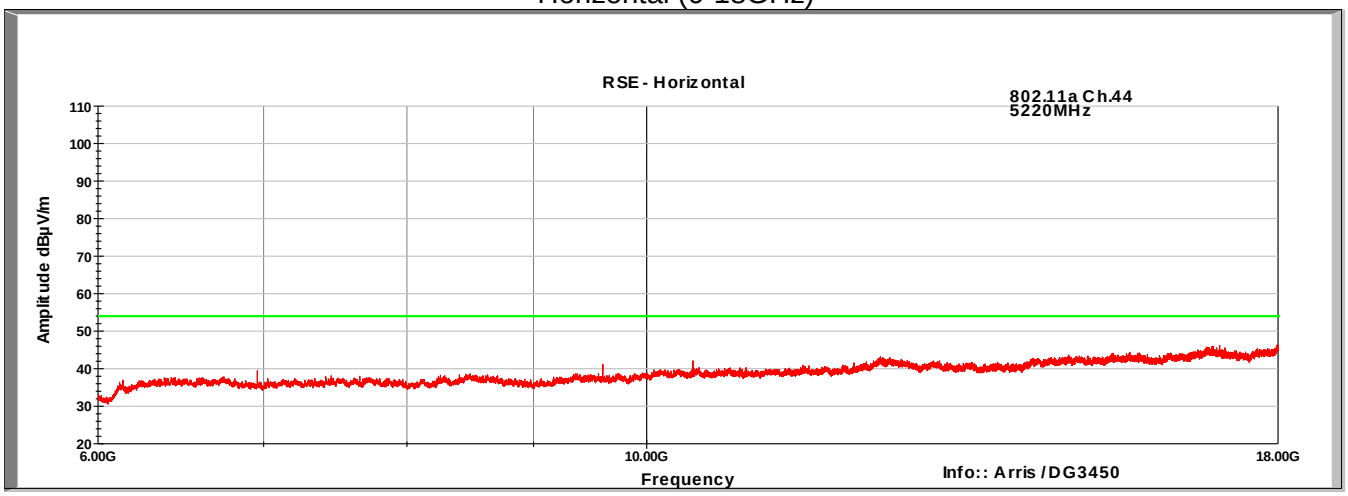
Channel 44
Horizontal (1-6GHz)



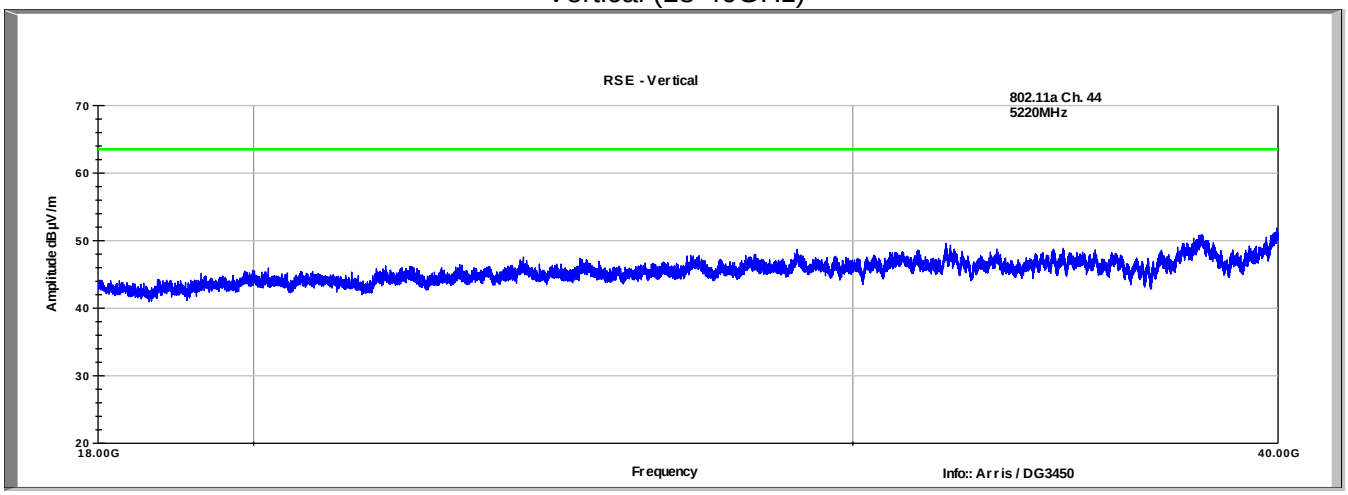
Channel 44
Vertical (6-18GHz)



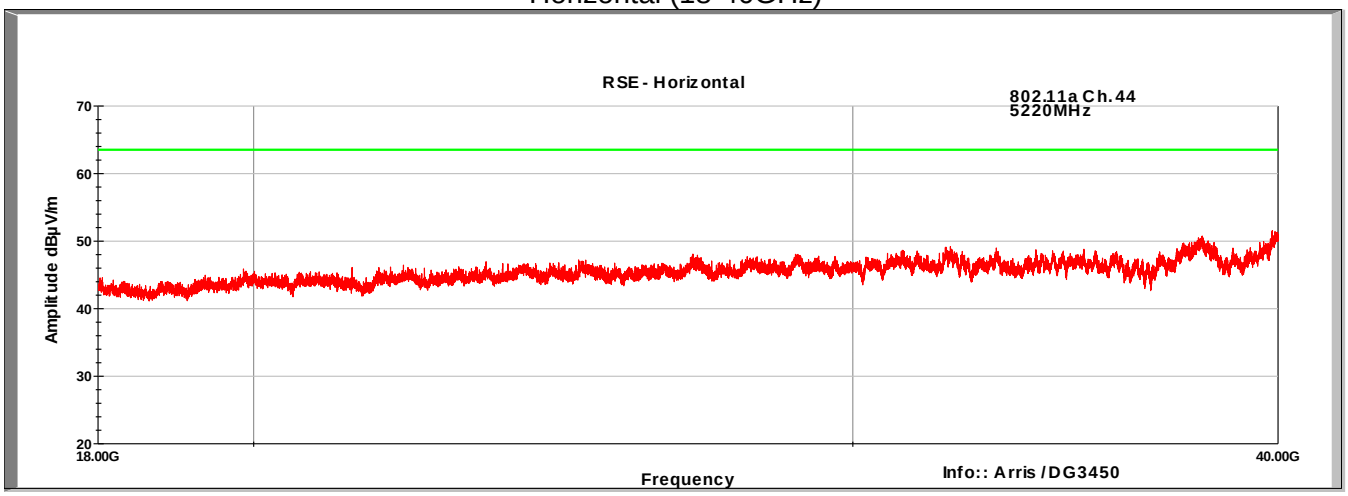
Channel 44
Horizontal (6-18GHz)



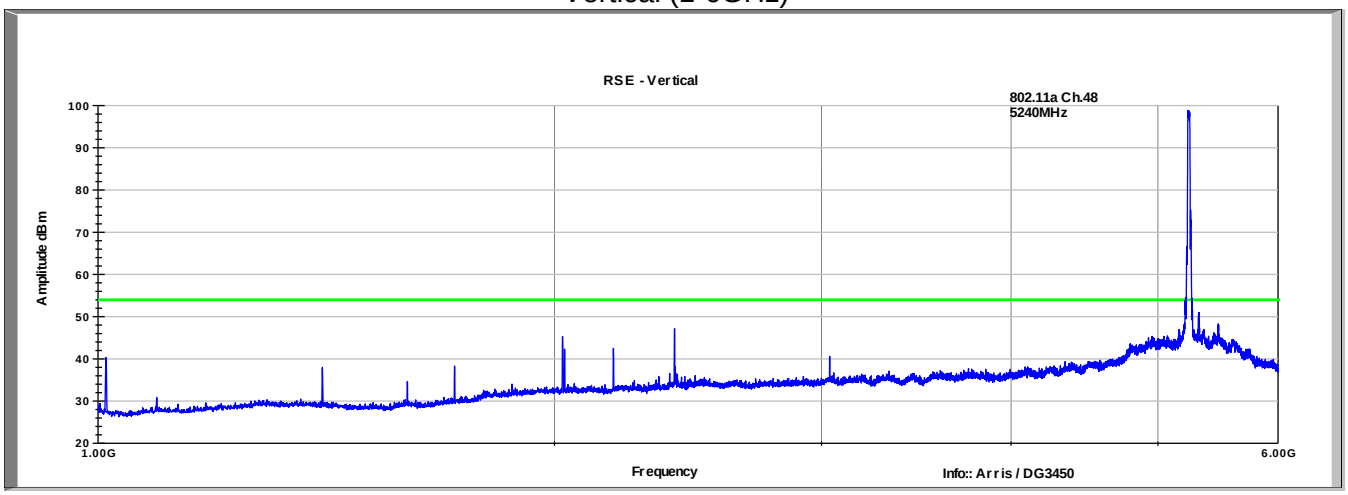
Channel 44
Vertical (18-40GHz)



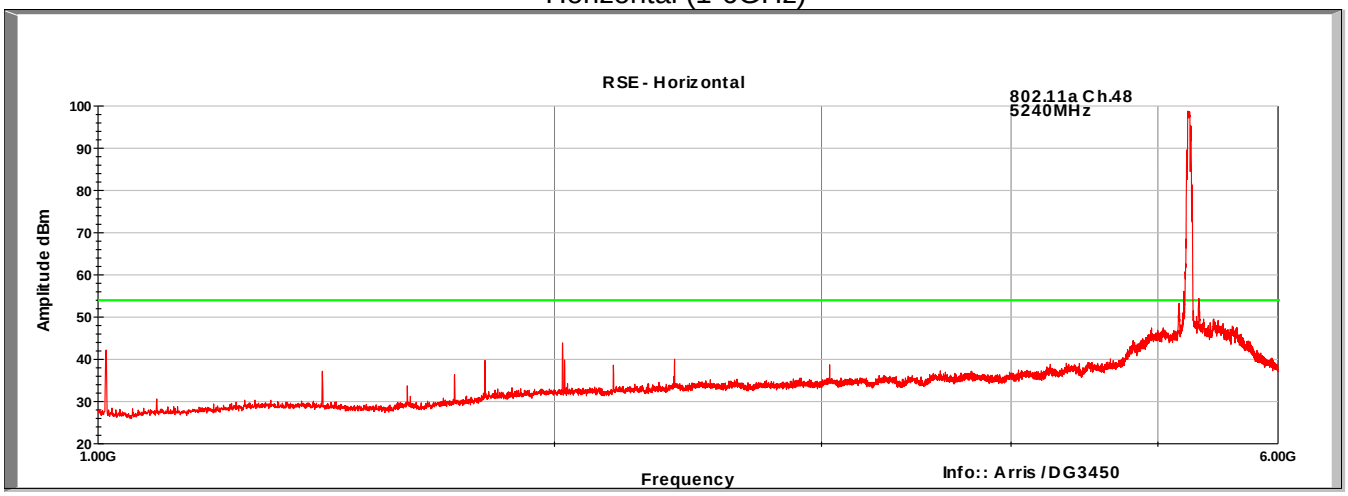
Channel 44
Horizontal (18-40GHz)



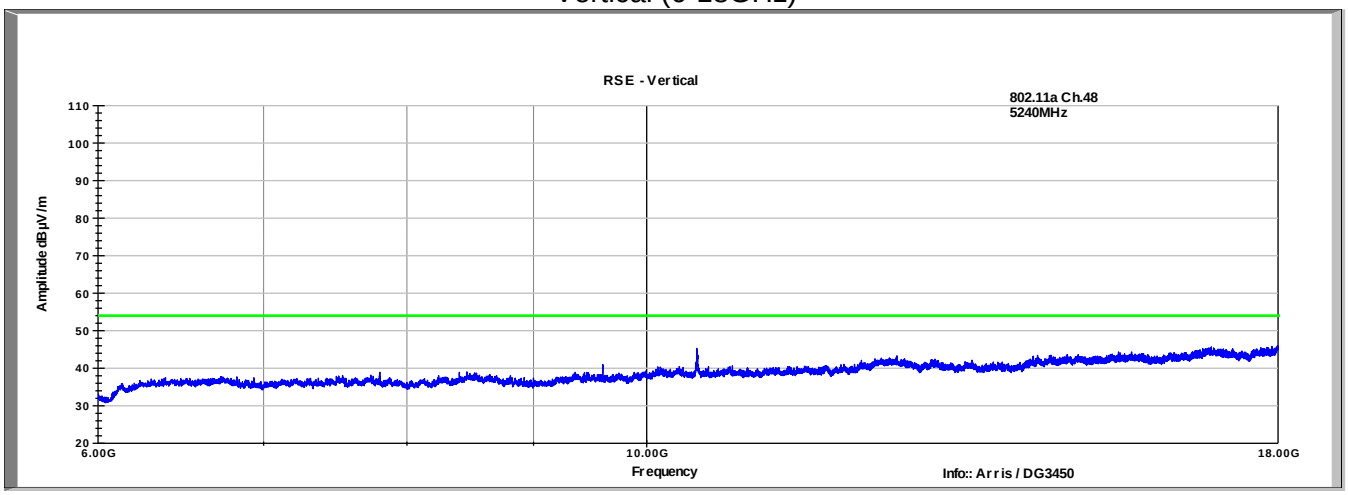
Channel 48
Vertical (1-6GHz)



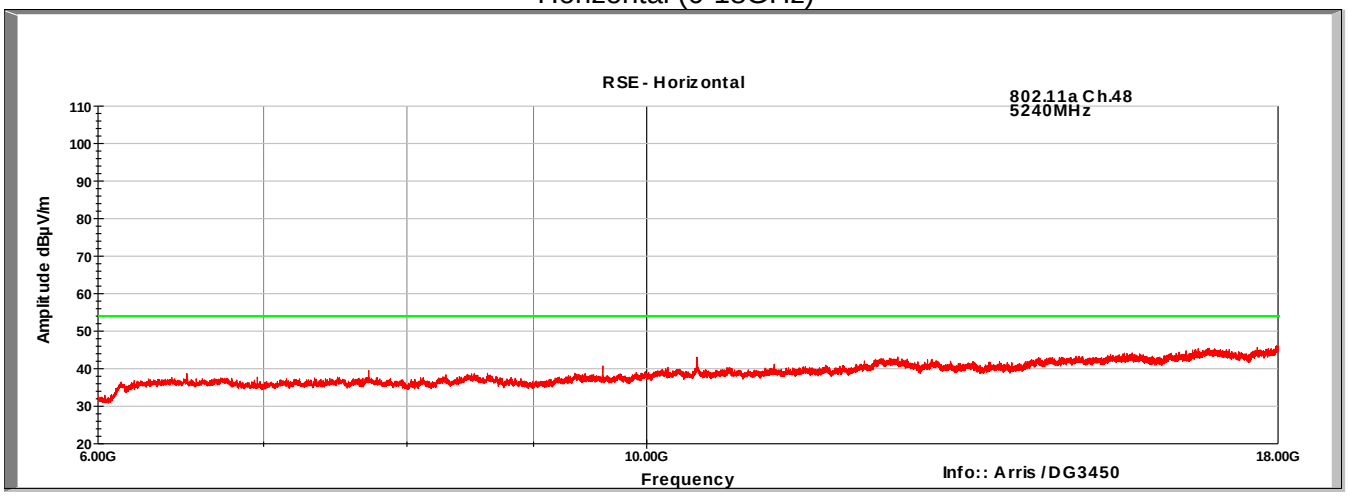
Channel 48
Horizontal (1-6GHz)



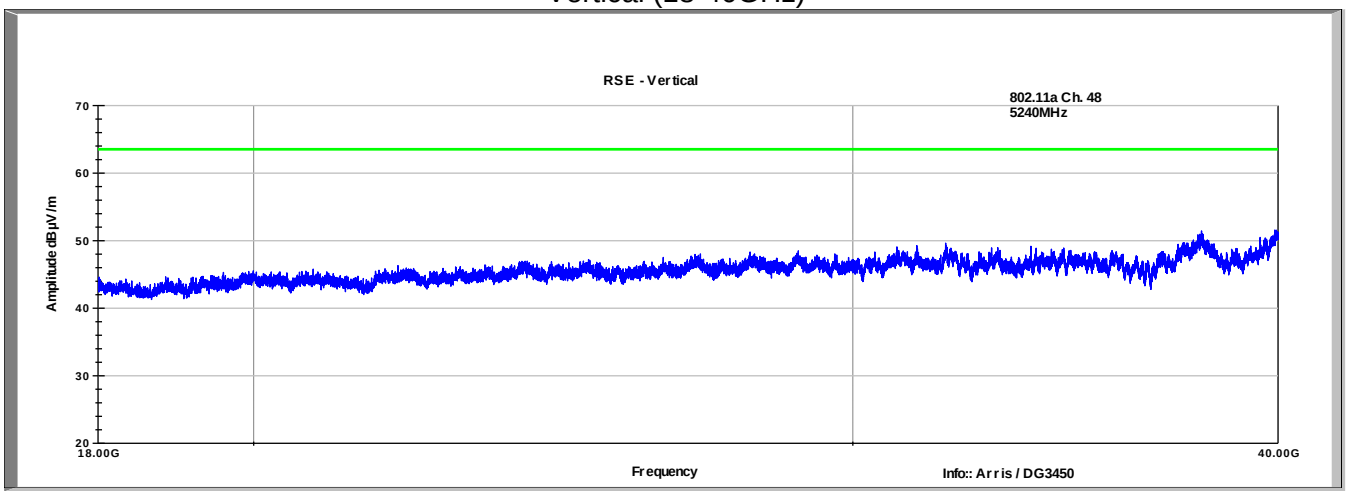
Channel 48
Vertical (6-18GHz)



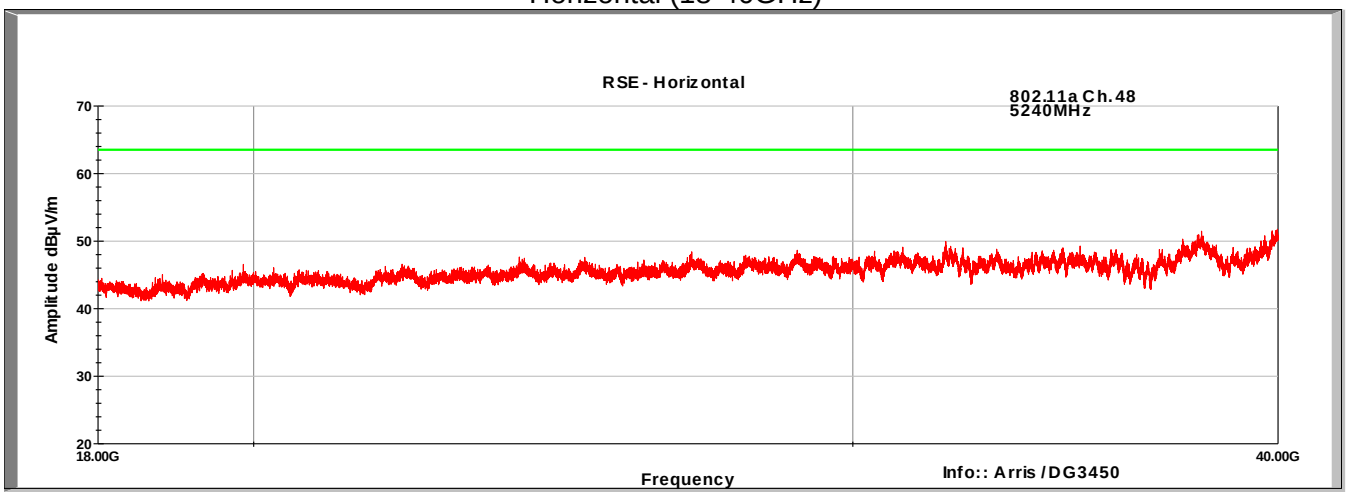
Channel 48
Horizontal (6-18GHz)



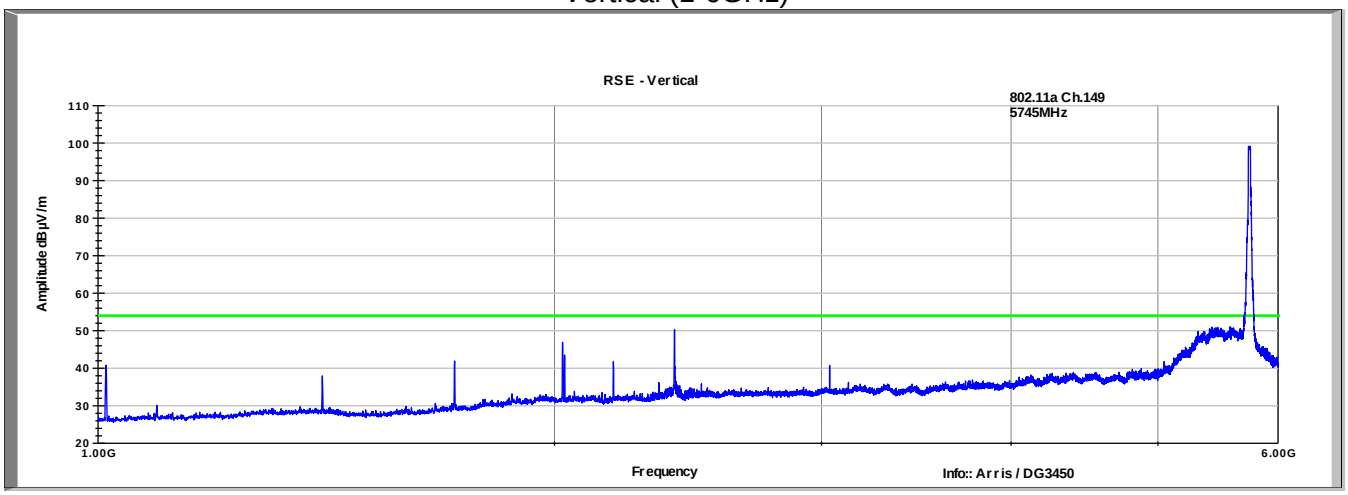
Channel 48
Vertical (18-40GHz)



Channel 48
Horizontal (18-40GHz)

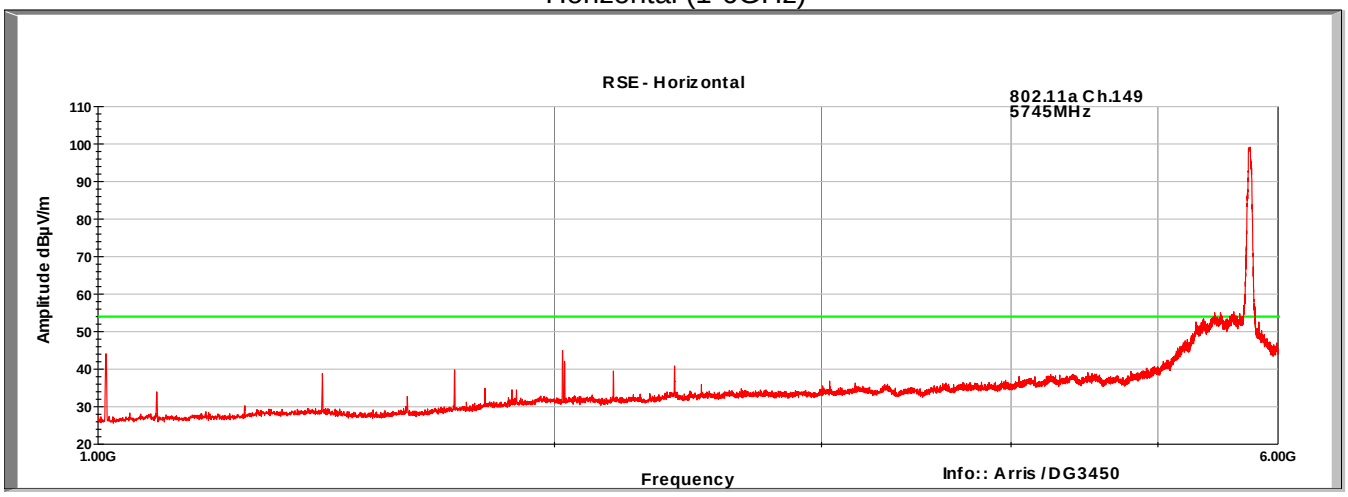


Channel 149
Vertical (1-6GHz)

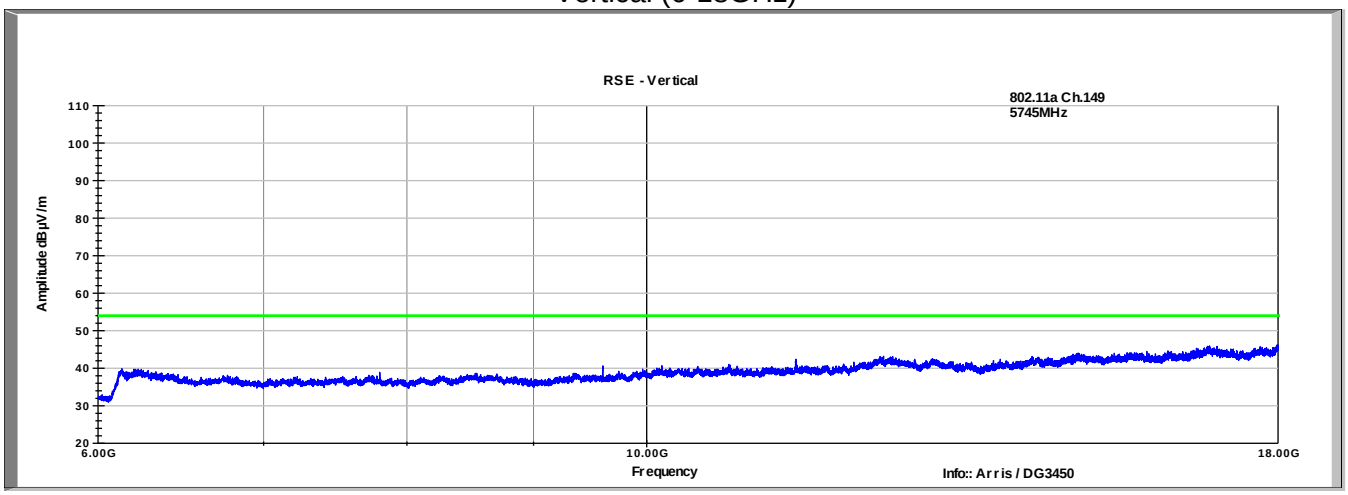


Worst case spur (digital): 50.3dBµV/m @ 2.4GHz

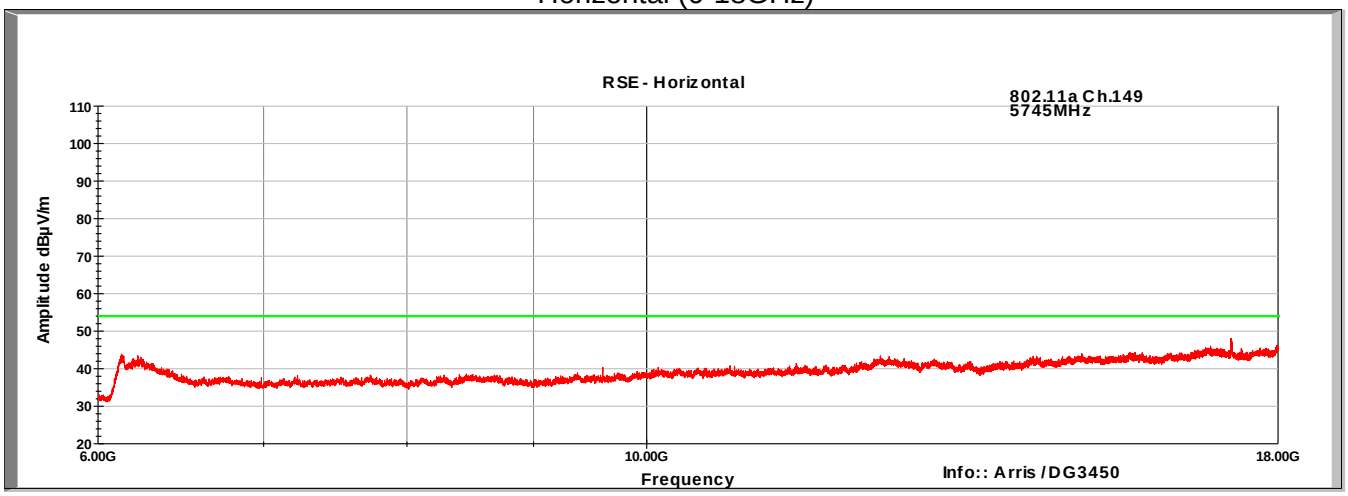
Channel 149
Horizontal (1-6GHz)



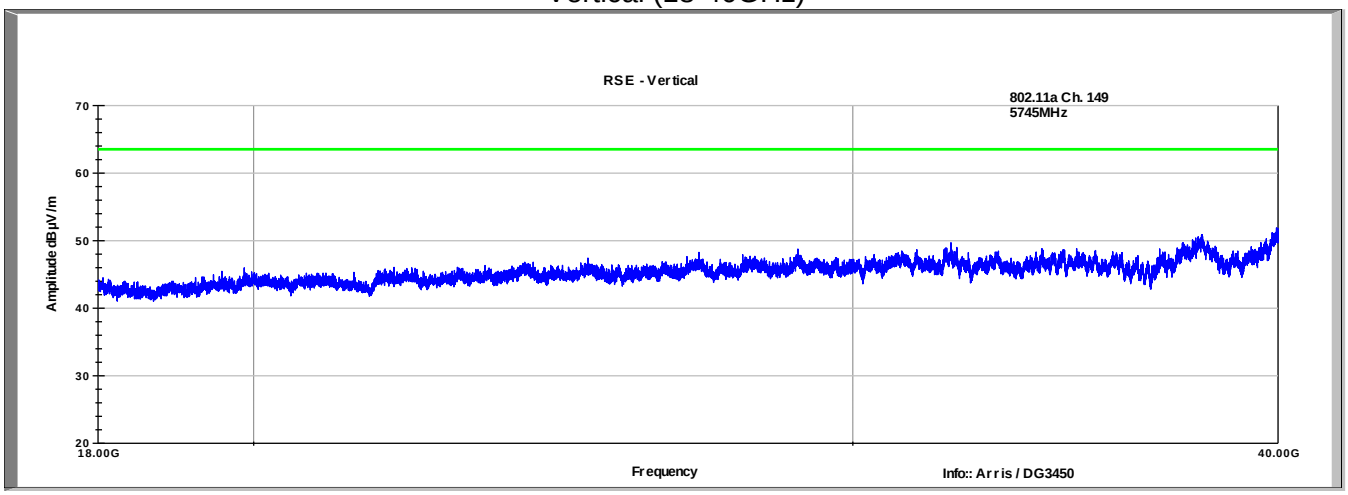
Channel 149
Vertical (6-18GHz)



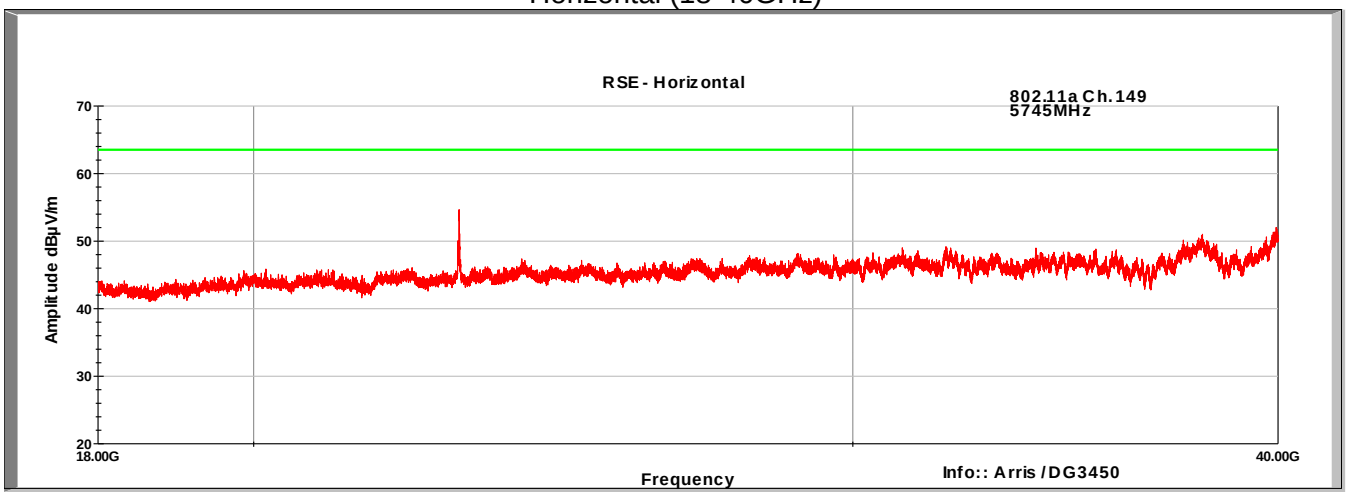
Channel 149
Horizontal (6-18GHz)



Channel 149
Vertical (18-40GHz)

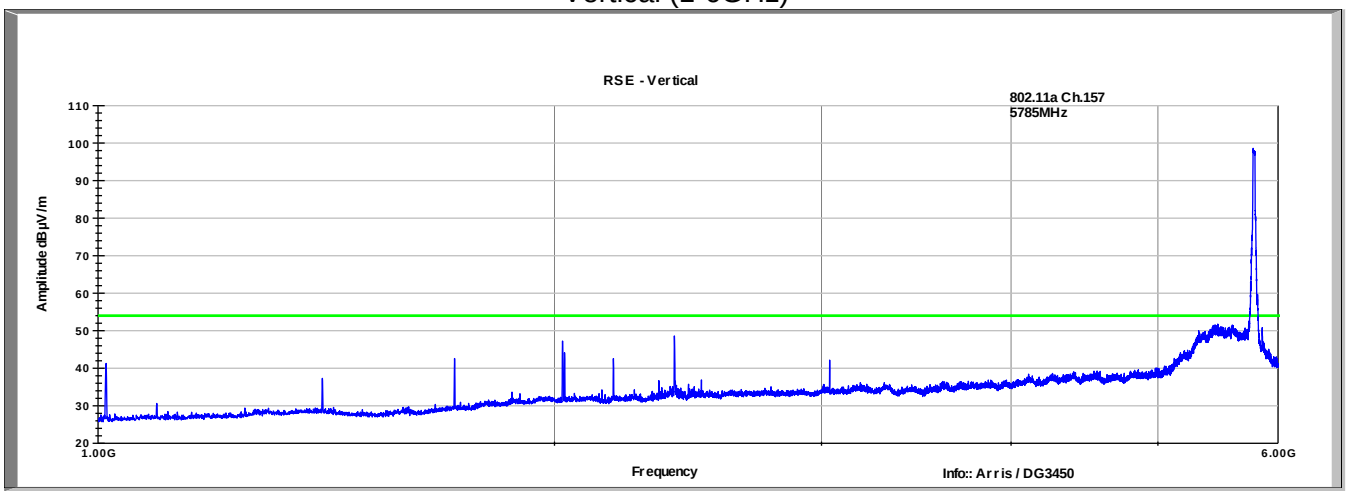


Channel 149
Horizontal (18-40GHz)

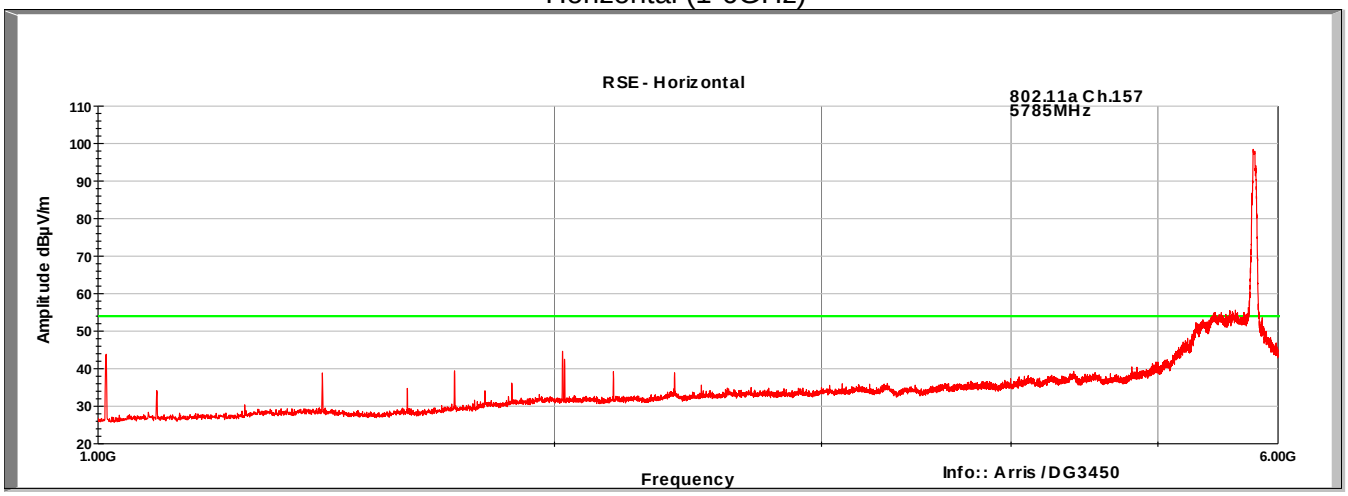


Worst case spur (harmonic): 54.7dBµV/m @ 22.98GHz

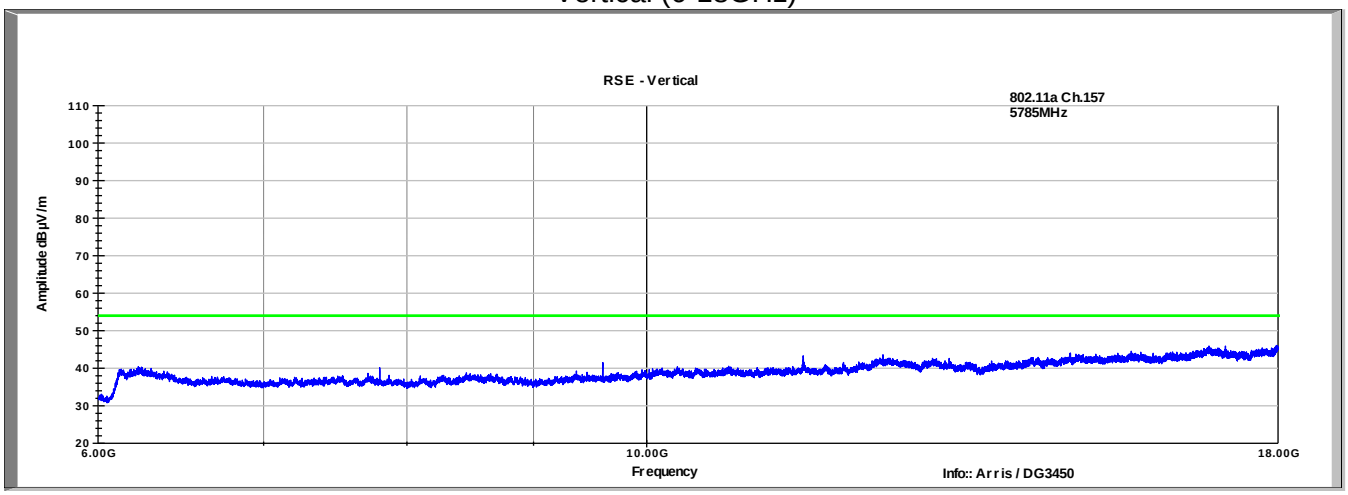
Channel 157
Vertical (1-6GHz)



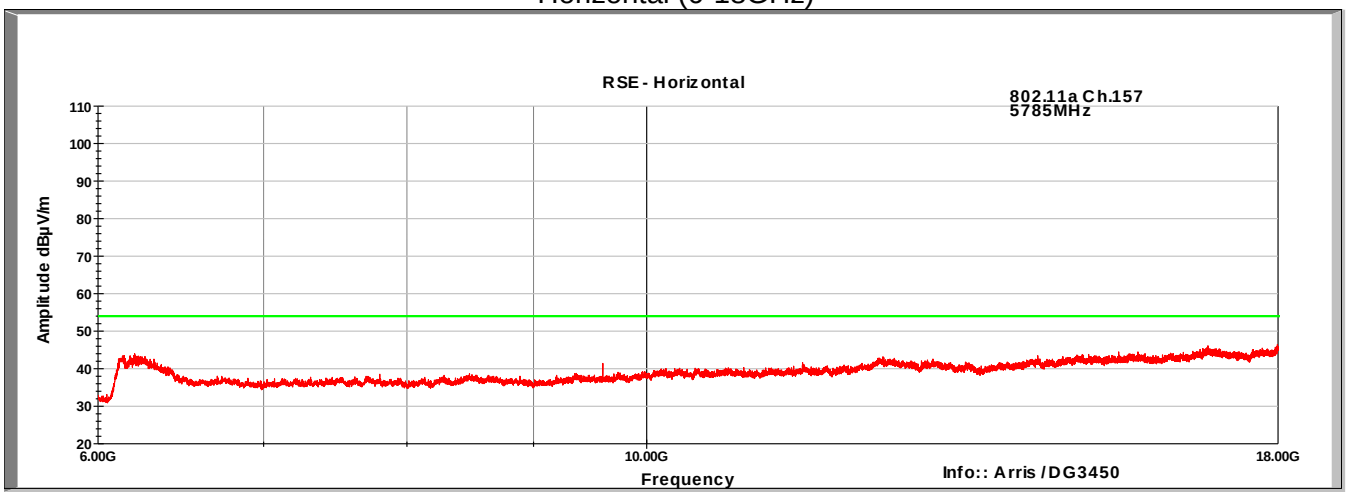
Channel 157
Horizontal (1-6GHz)



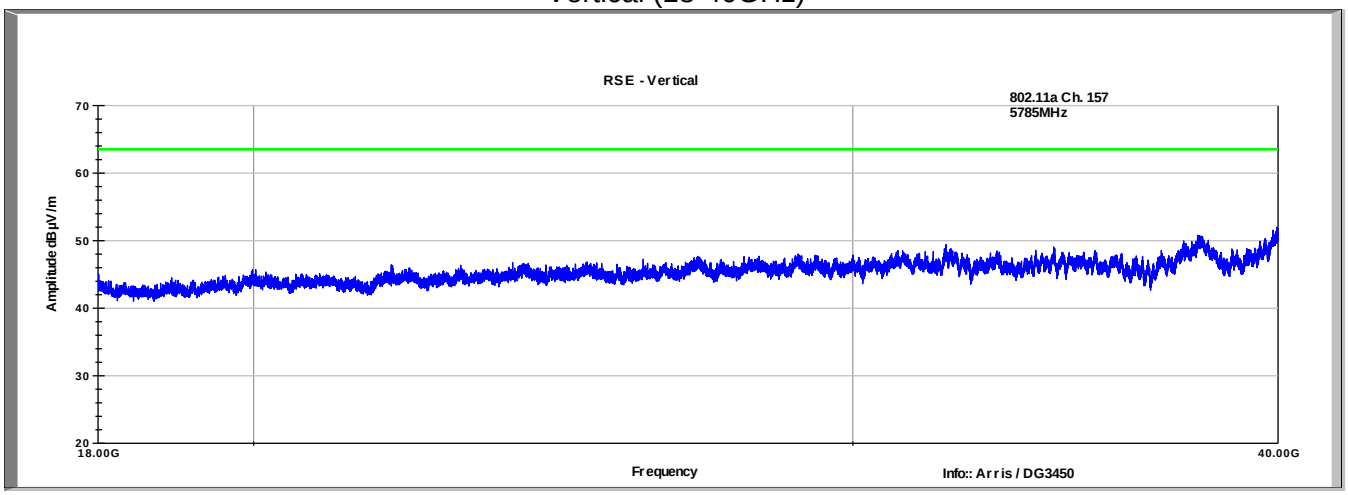
Channel 157
Vertical (6-18GHz)



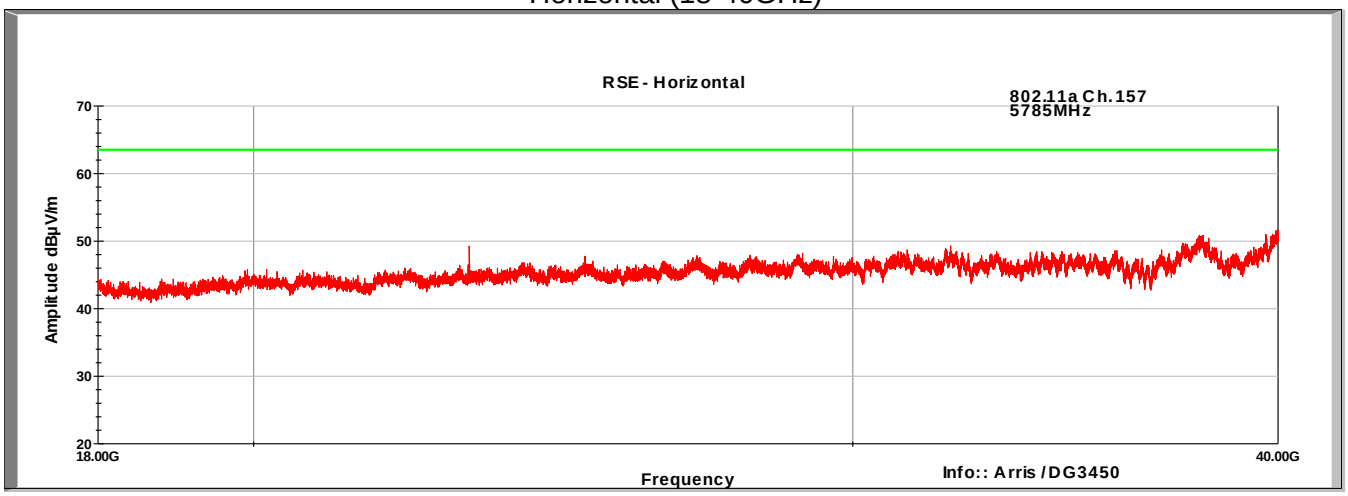
Channel 157
Horizontal (6-18GHz)



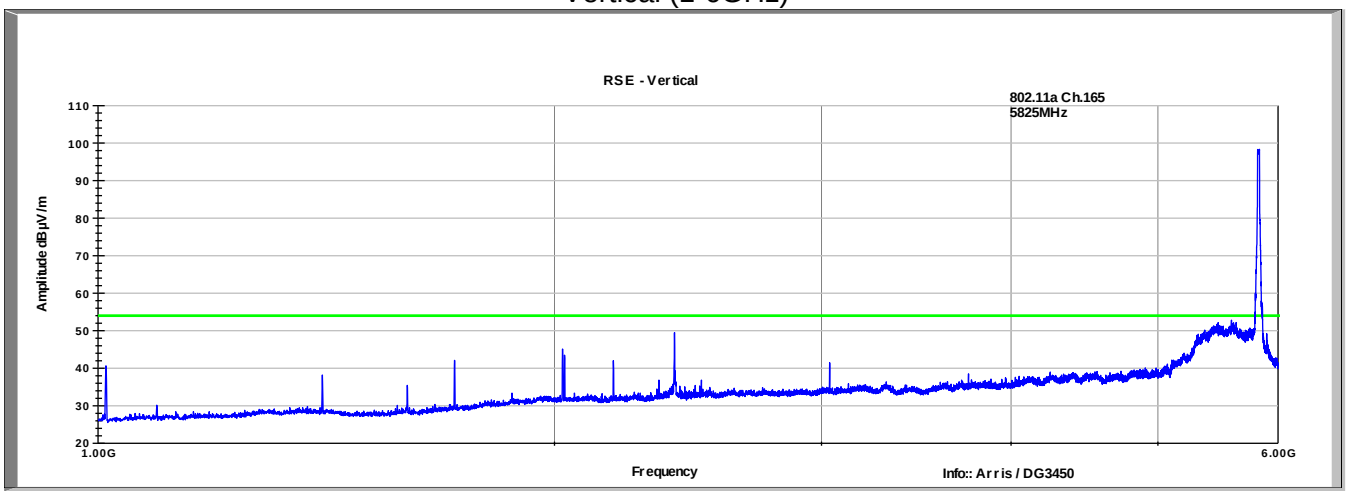
Channel 157
Vertical (18-40GHz)



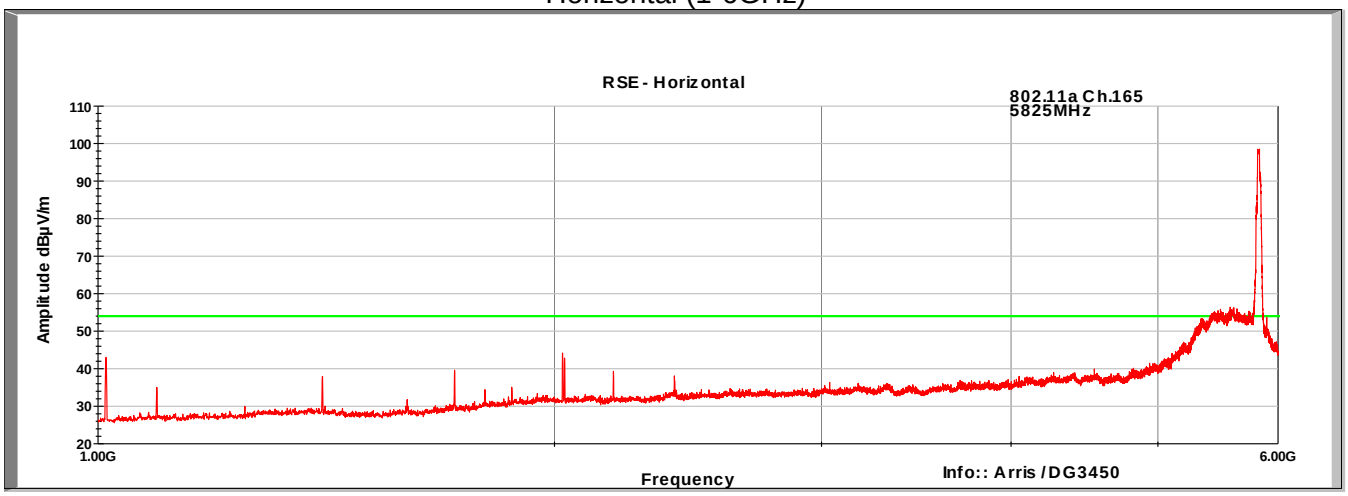
Channel 157
Horizontal (18-40GHz)



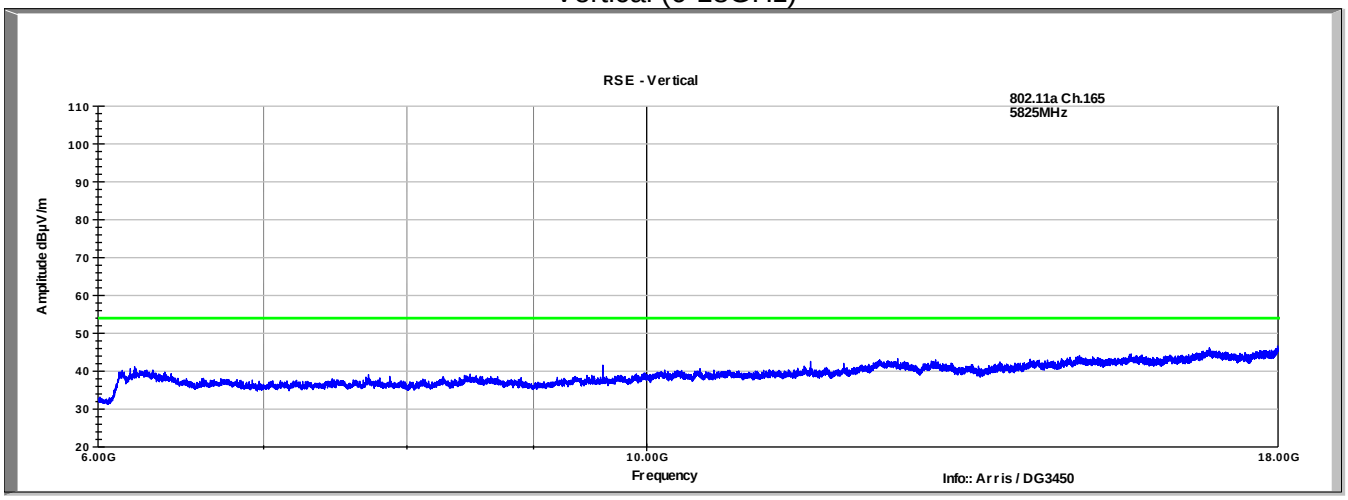
Channel 165
Vertical (1-6GHz)



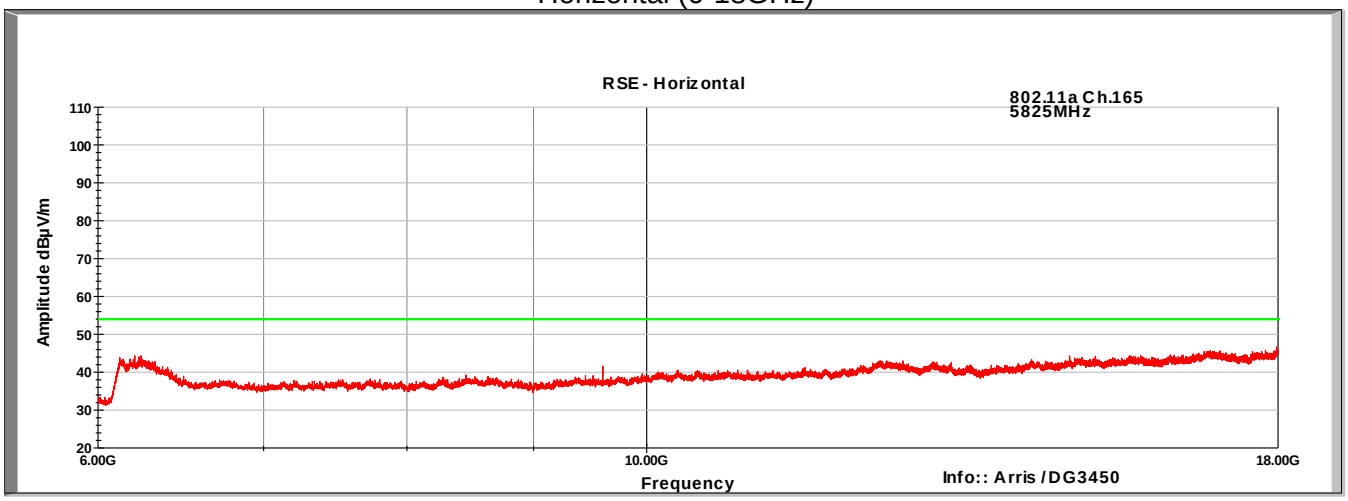
Channel 165
Horizontal (1-6GHz)



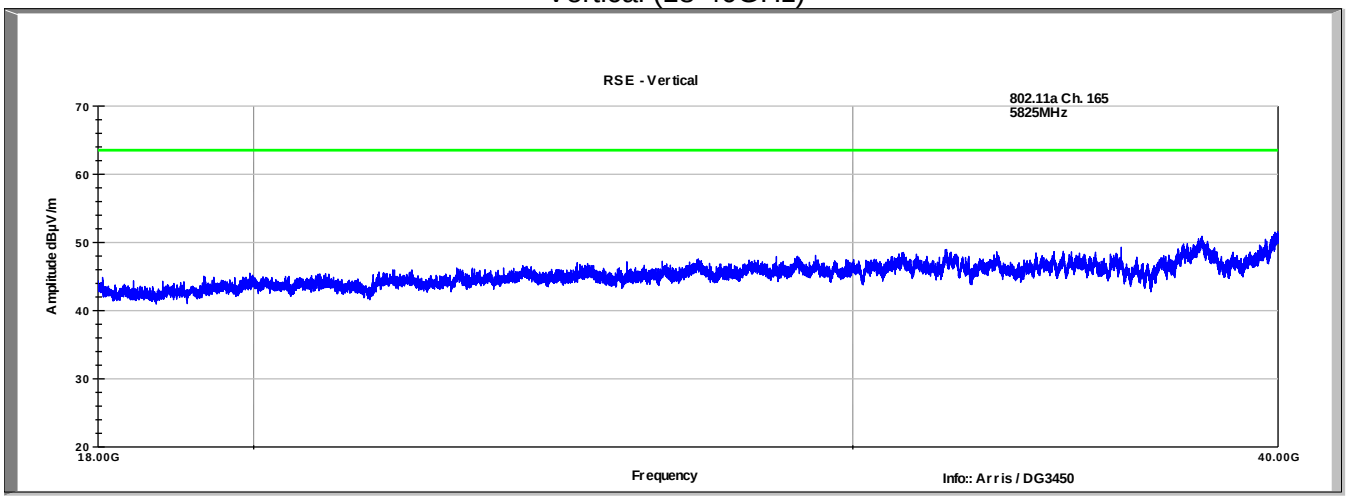
Channel 165
Vertical (6-18GHz)



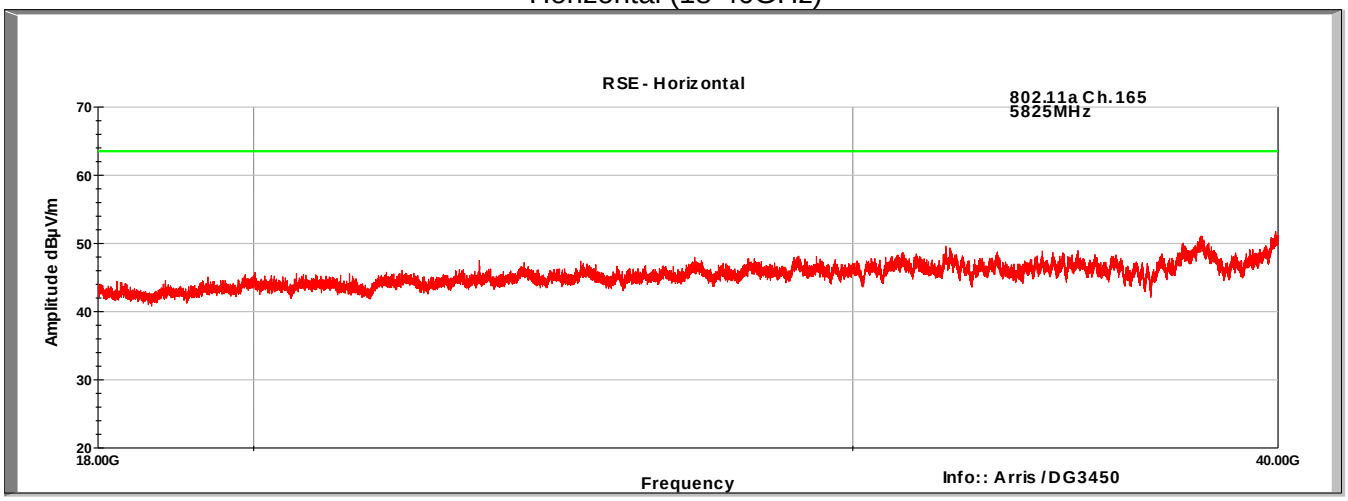
Channel 165
Horizontal (6-18GHz)



Channel 165
Vertical (18-40GHz)



Channel 165
Horizontal (18-40GHz)



4 Conducted Emissions

4.1 *Test Result*

Test Description	Basic Standards	Test Result
Conducted Emissions, Class B	RSS-GEN, Issue 4 ANSI C63.4:2014	Compliant

4.2 *Test Method*

With the receivers resolution bandwidth was set to 9 kHz the initial preliminary exploratory scans were performed over the measuring frequency range (0.15MHz to 30MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

Frequency Range	Class A Limits (dBuV)	Class B Limits (dBuV) CISPR
0.15 to 0.5 MHz	Avg 66 QP 79	Avg 56 to 46 QP 66 to 56
0.5 to 5 MHz	Avg 60 QP 73	Avg 46 Pk 56
5 to 30 MHz	Avg 60 QP 73	Avg 50 Pk 60

4.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 23.7°C
Relative Humidity: 47.8%

4.4 *Test Equipment*

Test Date: 29-Jun-2017 Tester: FL

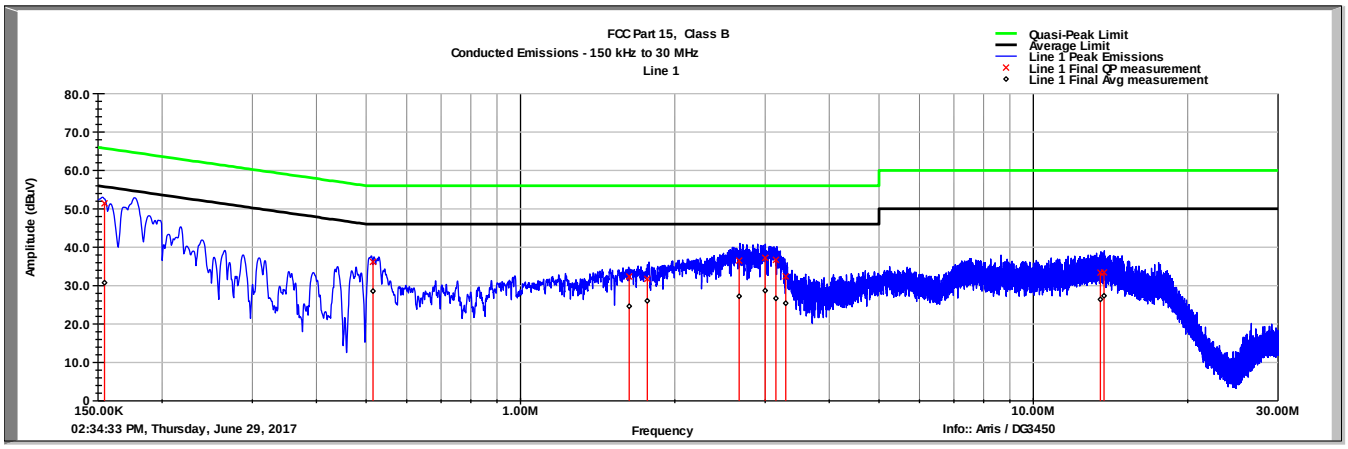
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	21-Jul-2017
LINE IMPEDANCE STABILIZATION NETWORK	NNB 51	TESEQ	B087573	16-Nov-2017
RF CABLE	SF106	HUBER & SUHNER	B079660	25-Jul-2017

Note: The equipment calibration period is 1 year.

Software:
“Conducted Emissions” TILE! profile dated Dec 2015

4.5 *Test Data*

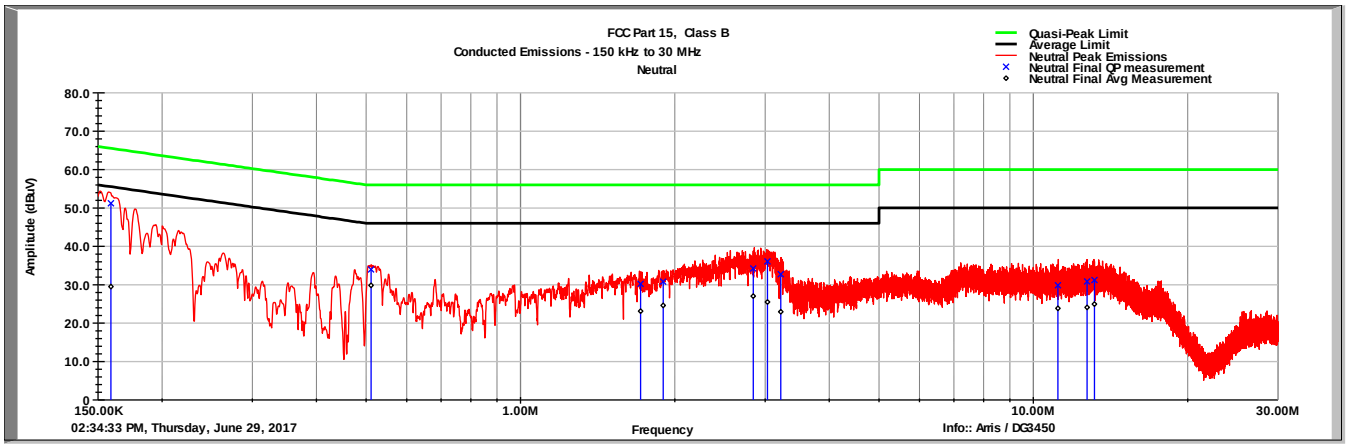
Line 1 Conducted Emissions Plot 150-30MHz



Line 1 Conducted Emissions Data 150-30MHz

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.155	51.4	65.7	-14.3	30.7	55.7	-25.0
0.516	36.2	56.0	-19.8	28.6	46.0	-17.4
1.630	32.4	56.0	-23.6	24.6	46.0	-21.4
1.767	31.8	56.0	-24.2	26.0	46.0	-20.0
2.669	36.5	56.0	-19.5	27.2	46.0	-18.8
3.000	37.2	56.0	-18.8	28.7	46.0	-17.3
3.148	36.7	56.0	-19.3	26.7	46.0	-19.3
3.290	32.4	56.0	-23.6	25.4	46.0	-20.6
13.515	33.4	60.0	-26.6	26.4	50.0	-23.6
13.734	33.4	60.0	-26.6	27.4	50.0	-22.6

Neutral Conducted Emissions Plot 150-30MHz



Neutral Conducted Emissions Data 150-30MHz

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.159	51.2	65.5	-14.3	29.5	55.5	-26.0
0.511	34.0	56.0	-22.0	29.8	46.0	-16.2
1.715	30.2	56.0	-25.8	23.1	46.0	-22.9
1.898	30.8	56.0	-25.2	24.6	46.0	-21.4
2.843	34.2	56.0	-21.8	27.0	46.0	-19.0
3.031	36.1	56.0	-19.9	25.5	46.0	-20.5
3.217	32.7	56.0	-23.3	23.0	46.0	-23.0
11.167	29.9	60.0	-30.1	23.9	50.0	-26.1
12.734	30.8	60.0	-29.2	24.1	50.0	-25.9
13.158	31.2	60.0	-28.8	25.0	50.0	-25.0

5 Revision History

Revision Level	Description of changes	Revision Date
--	Initial release	13 July 2017