TEST REPORT

N°: 141605-685425A

Subject	**Radio spectrum Matters (ERM) tests according to standards: 47CFR Part 15.407**
Test Site FCC registration number	**888863**
Issued to	**EBlink** 3 rue marcel Pagnol ZI du Clos Auchin F-91800 Boussy-Saint-Antoine France
Apparatus under test	
Product	**Front Link (FL58-45) equipment**
Trade mark	**EBlink**
Manufacturer	**EBlink**
Model under test	**FL58R2EABW45-CEN**
Frequency plan	**EBDIRTECH16-MEM096-11**
Serial number	**EBL1613C0073**
FCC ID	**2ACLSFL58-45**
Test date	18/04/2016 to 27/05/2016
Test location	Ecuelles Fontenay Aux Roses
Test performed by	Laurent Deneux & Arnaud Fayette
Composition of document	90 pages
Document issued on	23/06/2016

Written by :	**Approved by :**
Arnaud Fayette	**Stéphane Phoudiah**
Tests operator	**Technical manager**

LABORATOIRE CENTRAL DES
S.A.S au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33 avenue du General Leclerc
F - 92260 FONTENAY AUX ROSES

SUMMARY

1. TEST PROGRAM

References

- **47 CFR Part 15.407**
- **KDB 789033 D02 General U-NII Tests Procedures New Rules v01r02**
- **KDB 662911 D01 Multiple Transmitter Output v02r01**
- **KDB 644545 D03 Guidance for IEEE 802.11ac v01**
- **ANSI C63.10-2013**

Radio requirement:

Test Description	TEST RESULT - Comments
Maximum Conducted Output Power	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
Power Spectral Density	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
Undesirable Emission Limits	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
6dB bandwidth	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
AC Power Line Conducted Emissions	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
Unwanted Emissions	☑ **PASS** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
Frequency stability	☑ **PASS (The Manufacturer declares the EUT emission is maintained within the band of operation under all conditions of normal operation as specified in the user manual)** ☐ **FAIL** ☐ **NA** ☐ **NP (Limited Program)**
This table is a summary of test report, see conclusion of each clause of this test report for detail.	

PASS: EUT complies with standard's requirement
FAIL: EUT does not comply with standard's requirement
NA: Not Applicable
NP: Test Not Performed
DP: Declaration of provider

2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
FL58R2EABW45-CEN **Serial Number: EBL1613C0073**

Equipment Under Test

Inputs/outputs -

Access	Type	Comments
Power supply	-	-
Ethernet	-	-
Optical fiber * 3	-	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	-	-	-
IQbox	Rohde & Scharwz	101208	-
Optical coupleur	Eblink	-	-

Equipment information:

Type:				
Frequency band:	☑ 5725MHz-5850MHz			
Channel bandwidth:	☑ 5MHz	☑ 10MHz	☑ 15MHz	☑ 20MHz
Antenna Type:	☐ Integral	☑ External	☐ Dedicated	
Antenna connector:	☑ Yes	☐ No	☐ Temporary for test	
Transmit chains:	☐ 1	☑ 2		
	☐ Single antenna	☑ Symmetrical	☐ Asymmetrical	
	Gain 1: 29dBi	Gain 2: 29dBi		
Receiver chains	☐ 1	☑ 2		
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Ad-Hoc mode:	☐ Yes	☑ No		
Duty cycle:	☐ Continuous duty	☐ Intermittent duty	☑ 100% duty	
Equipment type:	☑ Production model	☐ Pre-production model		
Operating temperature range:	Tnom:	20°C		
Type of power source:	☐ AC power supply	☑ DC power supply	☐ Battery (Select Type)	
Operating voltage range:	Vnom:	☐ 207V/50Hz	☑ 48Vdc	

Channel Plan
See “EBDIRTECH16-MEM096-11” EBlink document describing all configurations available for the product.

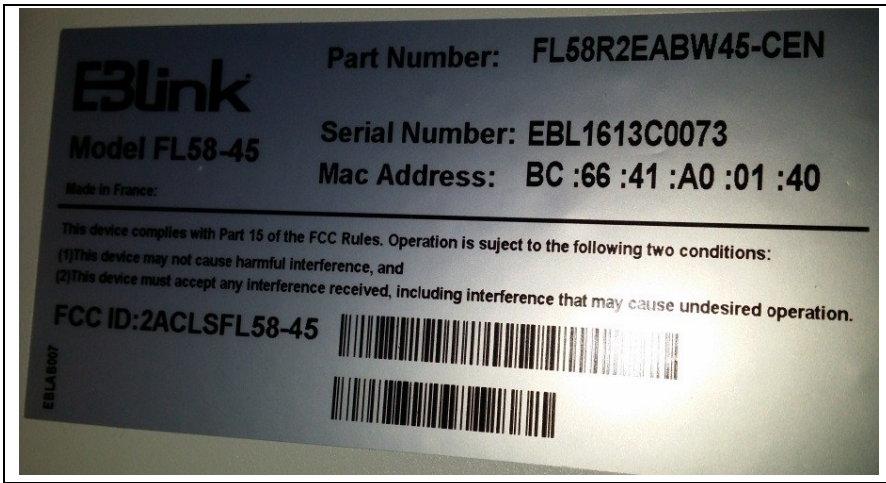
2.2. RUNNING MODE

The EUT is set in the following modes during tests:
- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power

The specific test software “LRMT_FL58_V2.0 Standalone” is used to set the product.

Test	Configuration Tested	Remarks
Power limits	1-2-3-4-5-6-7-8-9-10-11-12-13	Multiple configurations are available on the product. Some configurations are equivalents. So a sampling of the configurations is performed to test the product in Low, Middle, High channel for each bandwidth of the product
Power spectral density	1-2-3-4-5-6-7-8-9-10-11-12-13	Multiple configurations are available on the product. Some configurations are equivalents. So a sampling of the configurations is performed to test the product in Low, Middle, High channel for each bandwidth of the product
6db bandwidth	1-2-3-4-5-6-7-8-9-10-11-12-13	Multiple configurations are available on the product. Some configurations are equivalents. So a sampling of the configurations is performed to test the product in Low, Middle, High channel for each bandwidth of the product
AC Power Line Conducted Emissions	7	The test is performed on the worst case configuration found during Power Limits test
Unwanted Emissions below 1GHz	7	The test is performed on the worst case configuration found during Power Limits test
Unwanted Emissions above 1GHz	1-2-3-4-5-6-7-8-9-10-11-12-13	Multiple configurations are available on the product. Some configurations are equivalents. So a sampling of configurations is performed to test the product in Low & High channel for each bandwidth

2.3. EQUIPMENT LABELLING



2.4. EQUIPMENT MODIFICATION

☑ None ☐ Modification:

3. MAXIMUM CONDUCTED OUTPUT POWER

3.1. TEST CONDITIONS

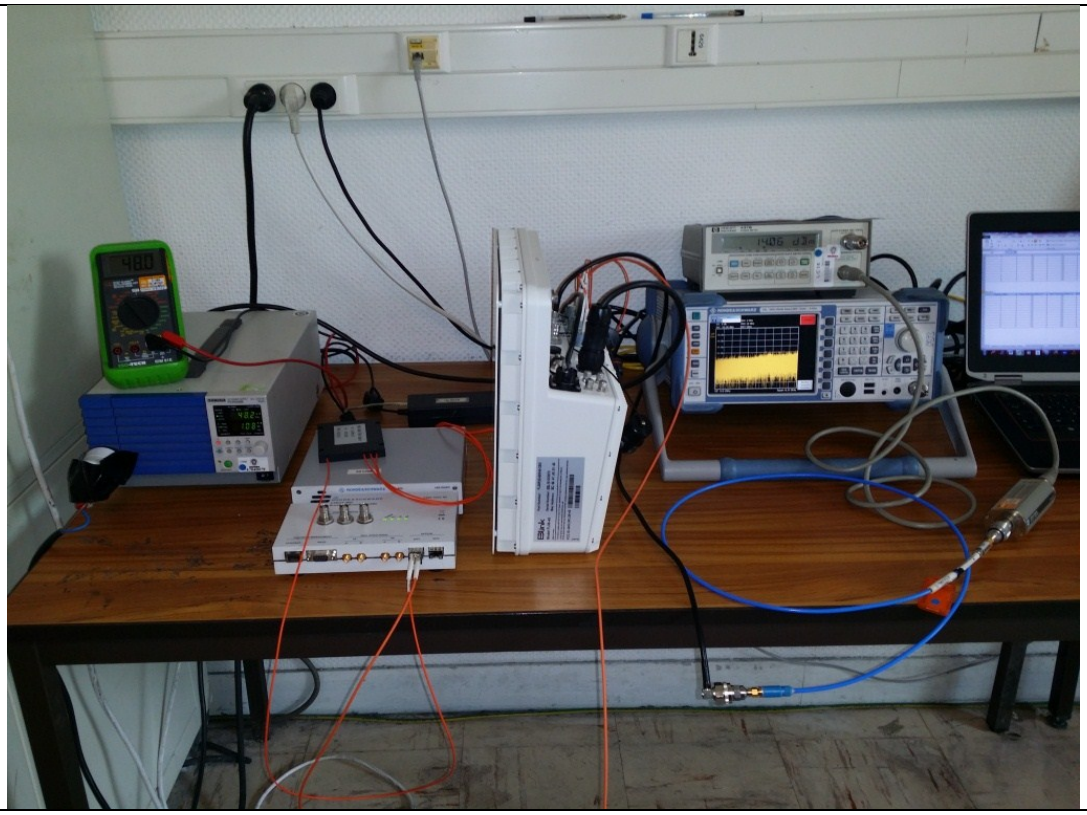
Test performed by : Arnaud Fayette
Date of test : 2016/05/20
Ambient temperature : 23°C
Relative humidity : 45%

3.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☑ On a table

-Measurement is performed with a spectrum analyzer
☑ On the EUT conducted access

- Test Procedure:
☑ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § E3
☑ KDB 662911 D01 Multiple Transmitter Output v02r01
☑ KDB 644545 D03 Guidance for IEEE 802.11ac v01



Photograph for Maximum Conducted Output Power

3.3. LIMIT

The RF output power shall not exceed 1W (30dBm)

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal date	Cal due
Power meter	HEWLETT PACKARD	437B	A1503001	2015/09	2016/09
Multi-meter	ISOTECH	IDM 91E	A1240253	2015/08	2016/08
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	2014/05	2016/05
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2015/10	2016/10

Note: In our system quality, the calibration due is more & less 2 months

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

3.6. RESULTS

Thermocouple Power Sensor Offset : Cable Loss + Attenuator = 43,2dB

Configuration	Tx1 (dBm)	Tx2 (dBm)	Maximum Conducted Output Power (dBm)
1	14,01	14,37	17,20
2	13,95	14,55	17,27
3	12,62	14,02	16,39
4	12,57	14,3	16,53
5	11,17	13,43	15,46
6	11,11	13,39	15,41
7	15,76	16,48	19,15
8	11,45	15,43	16,89
9	13,39	16,4	18,16
10	12,16	14,89	16,75
11	12,99	15,29	17,30
12	13,8	15,28	17,61
13	12,62	13,5	16,09

3.7. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product FL58R2EABW45-CEN, SN: EBL1613C0073, in configuration and description presented in this test report, show levels **conform to** the FCC 15.407 limits.

4. POWER SPECTRAL DENSITY

4.1. TEST CONDITIONS

Test performed by : Arnaud Fayette
Date of test : 2016/05/20
Ambient temperature : 23°C
Relative humidity : 45%

4.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☑ On a table

-Measurement is performed with a spectrum analyzer
☑ On the EUT conducted access

- Test Procedure:
☑ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § E3
☑ KDB 662911 D01 Multiple Transmitter Output v02r01
☑ KDB 644545 D03 Guidance for IEEE 802.11ac v01

Photograph for Power Spectral Density

4.3. LIMIT

The Spectral Density shall not exceed 30dBm/500kHz

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal date	Cal due
Multi-meter	ISOTECH	IDM 91E	A1240253	2015/08	2016/08
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	2014/05	2016/05
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2015/10	2016/10
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2015/04	2017/04

Note: In our system quality, the calibration due is more & less 2 months.

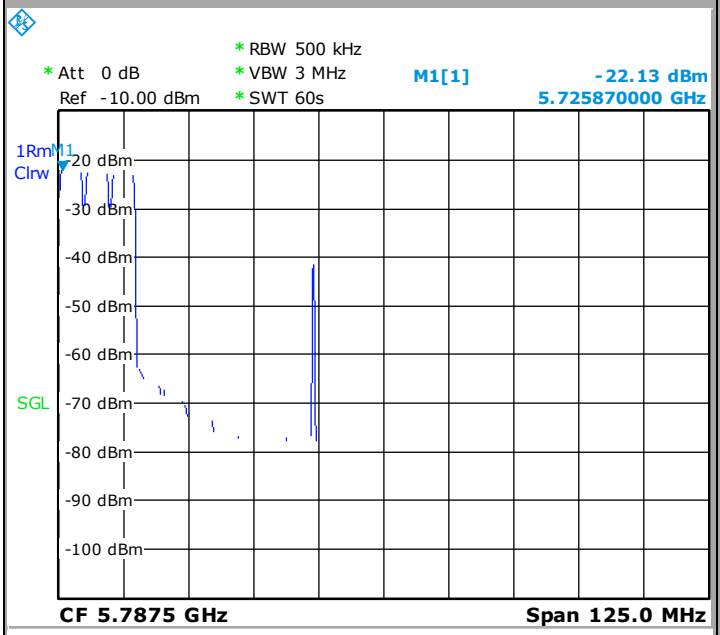
4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

4.6. GRAPHICS & RESULTS

Configuration 1

Tx1



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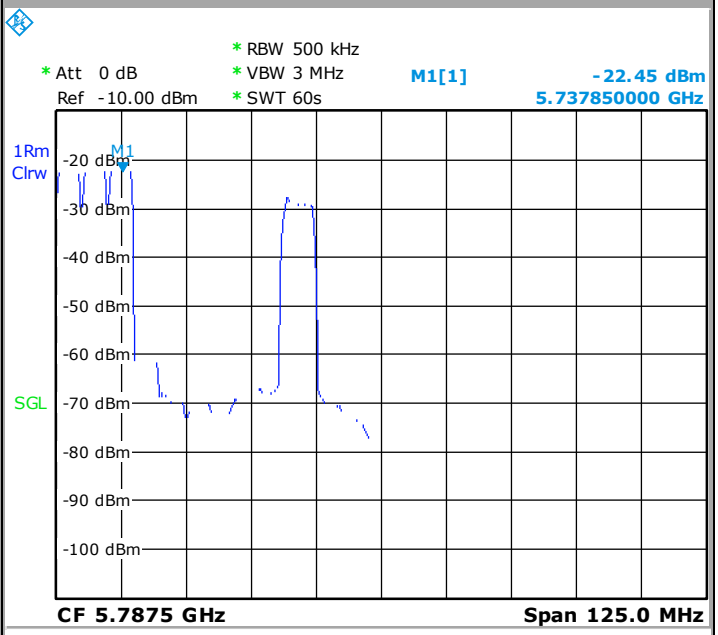

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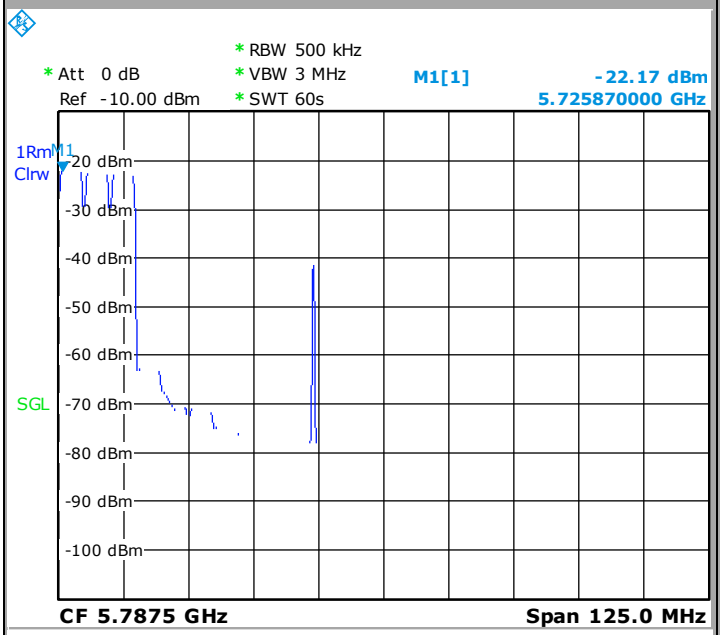
Configuration 2

Tx1



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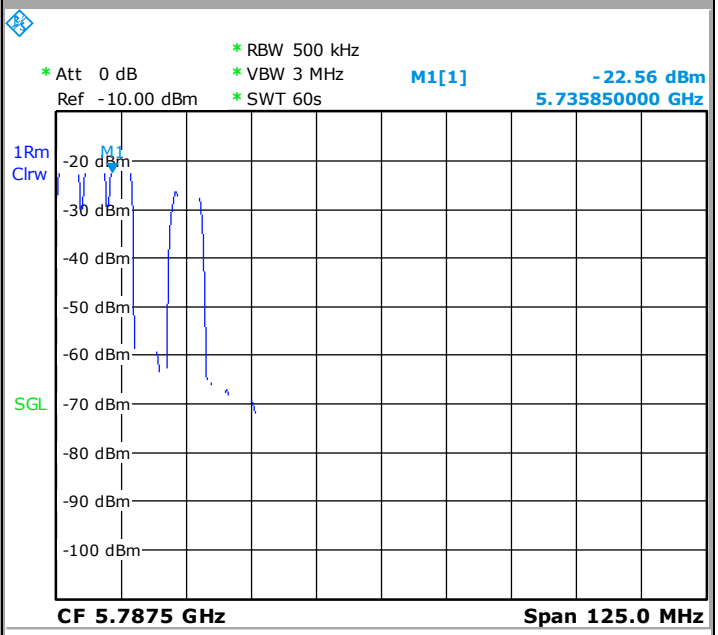
Tx2



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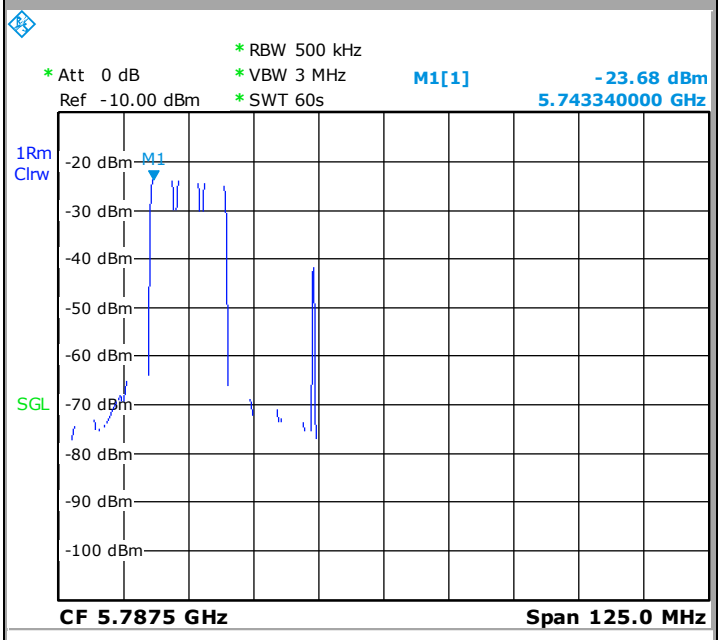
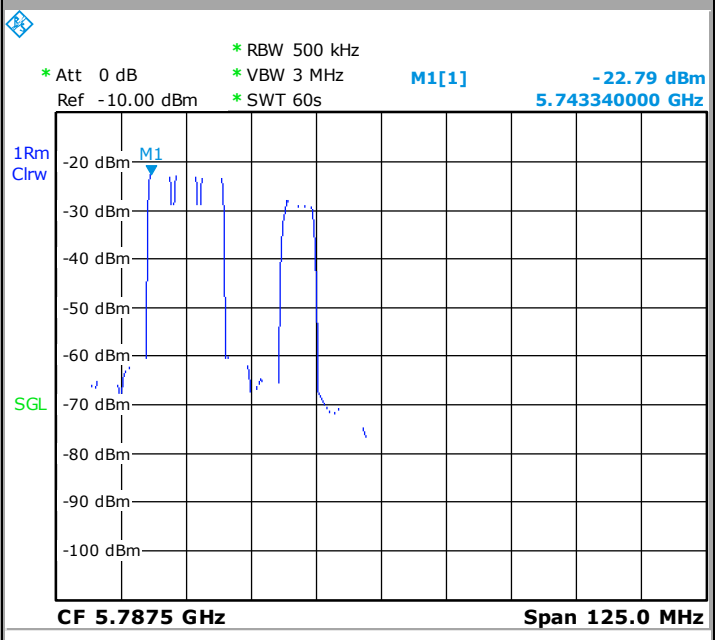
Configuration 3	
Tx1	**Tx2**
 Date: 20.MAY.2016 14:00:43	 Date: 20.MAY.2016 13:58:52
Configuration 4	
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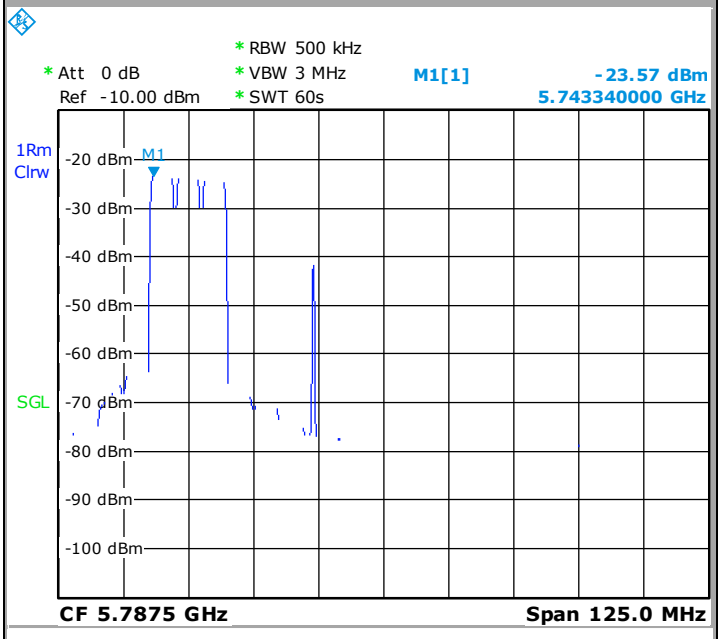
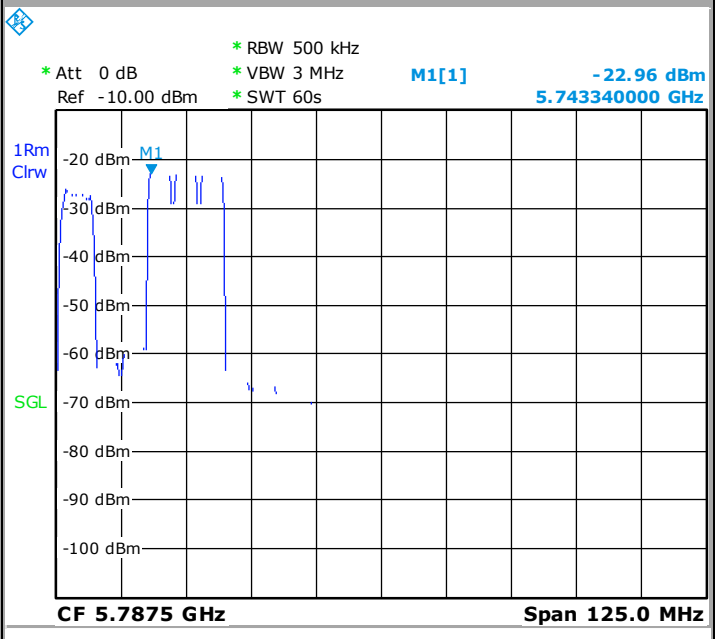
 Date: 20.MAY.2016 14:02:54	 Date: 20.MAY.2016 14:04:41

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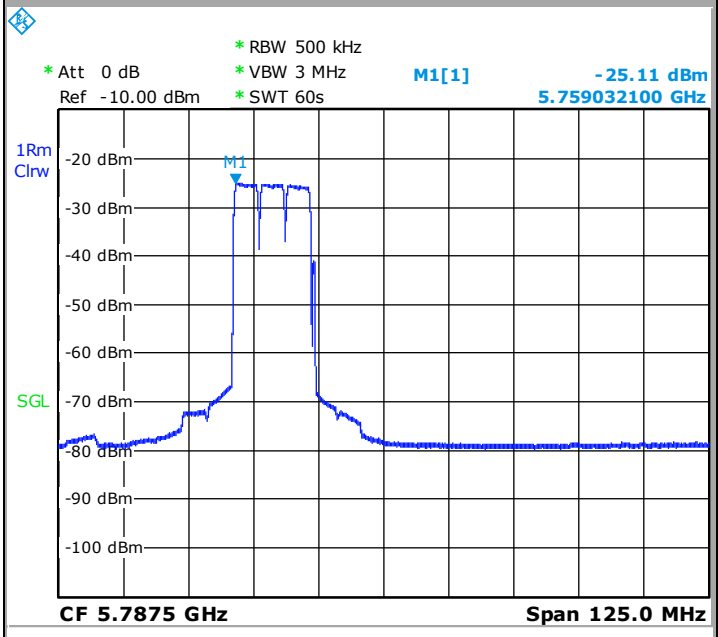
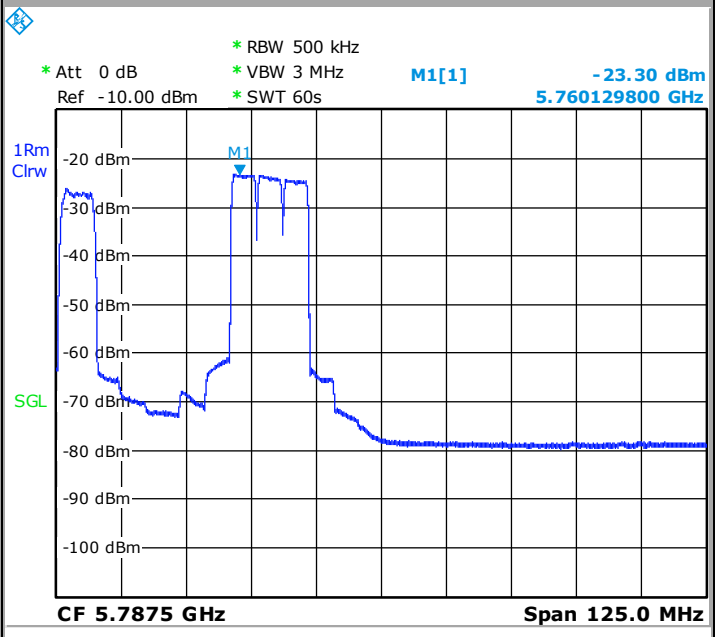
 Date: 20.MAY.2016 14:12:13	 Date: 20.MAY.2016 14:10:57
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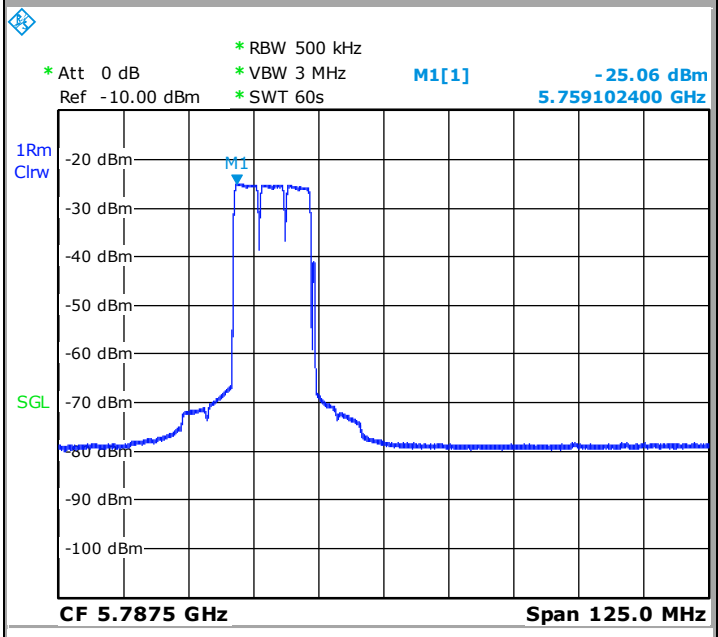
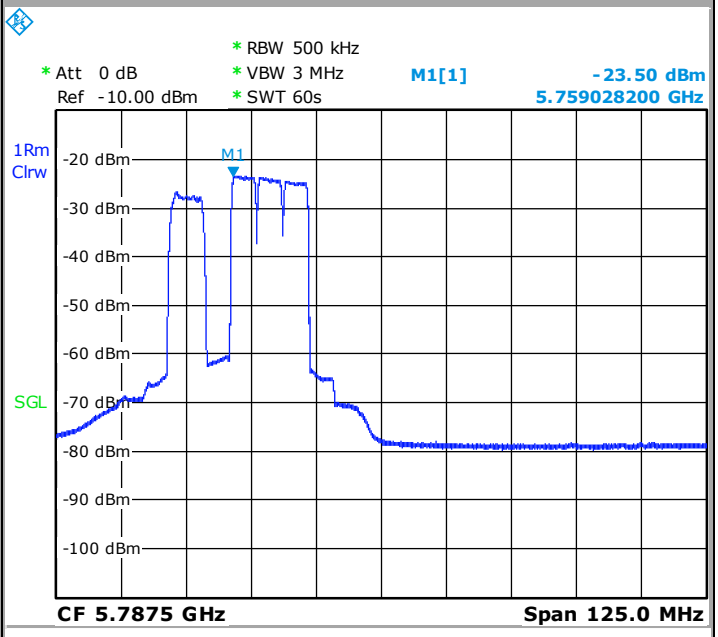
 Date: 20.MAY.2016 14:13:54	 Date: 20.MAY.2016 14:15:11

Configuration 7	
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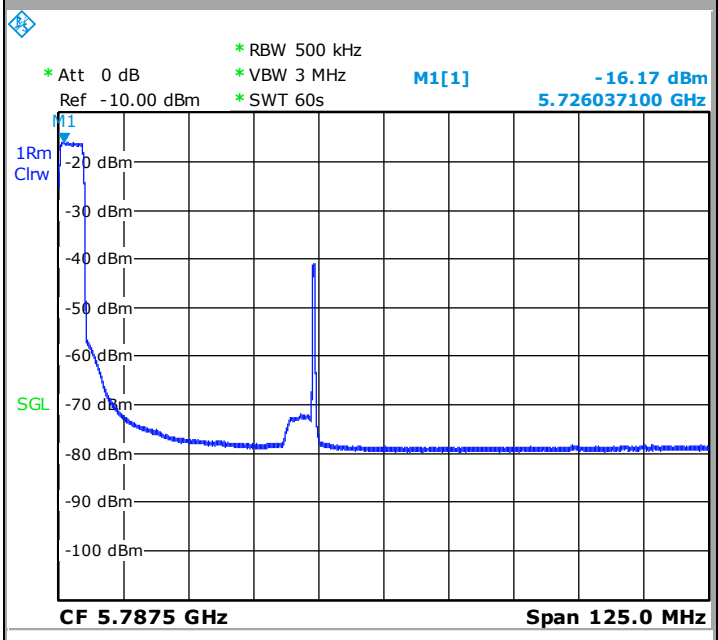
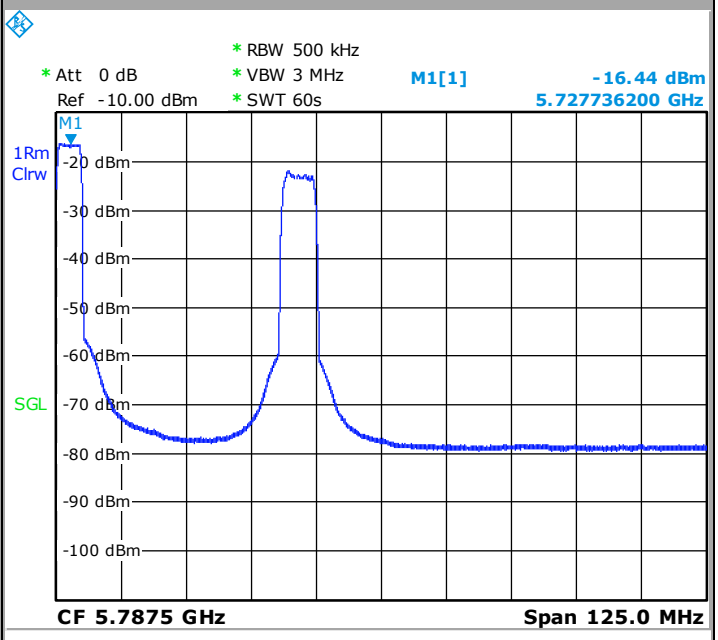
 Date: 20.MAY.2016 14:18:53	 Date: 20.MAY.2016 14:17:41
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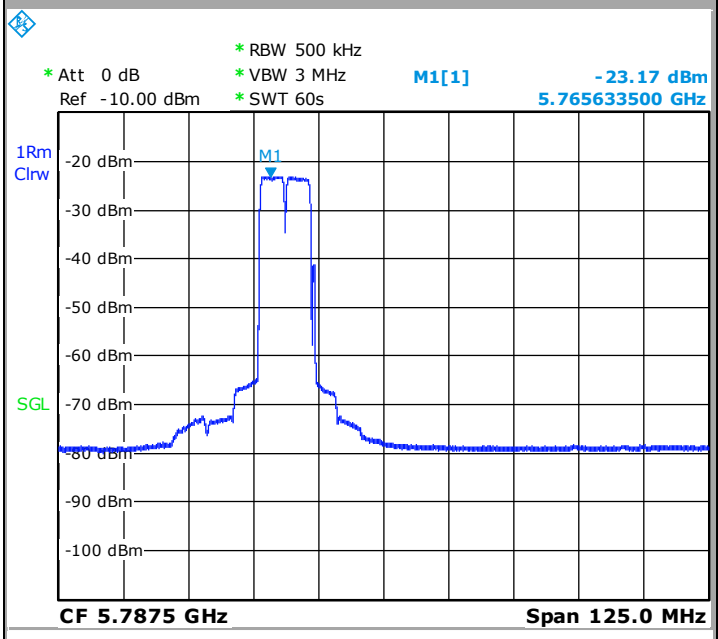
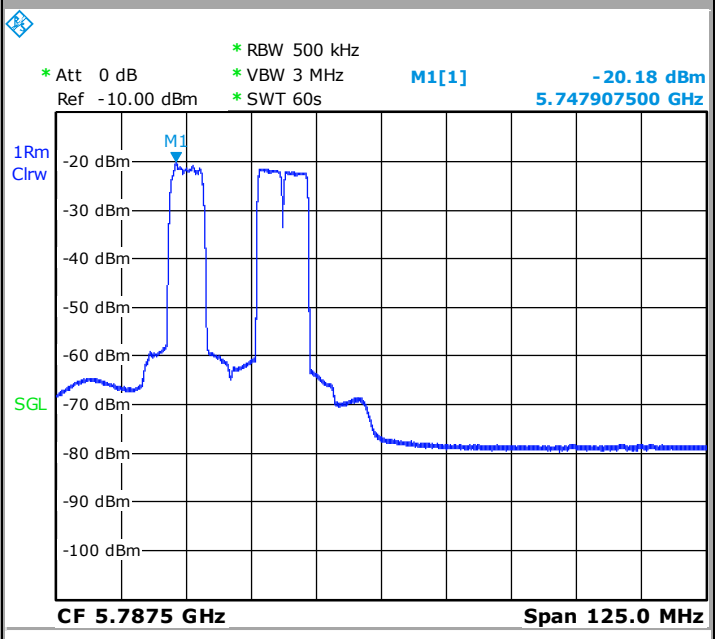
 Date: 20.MAY.2016 14:21:38	 Date: 20.MAY.2016 14:23:18

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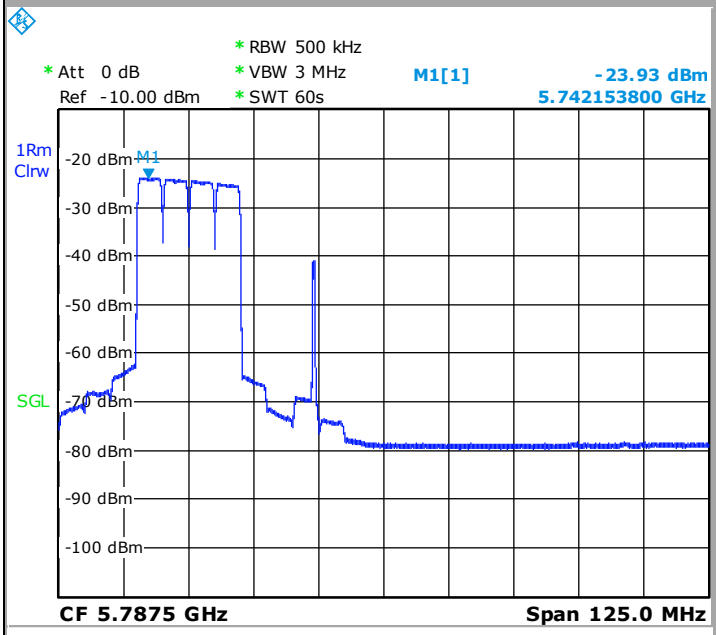
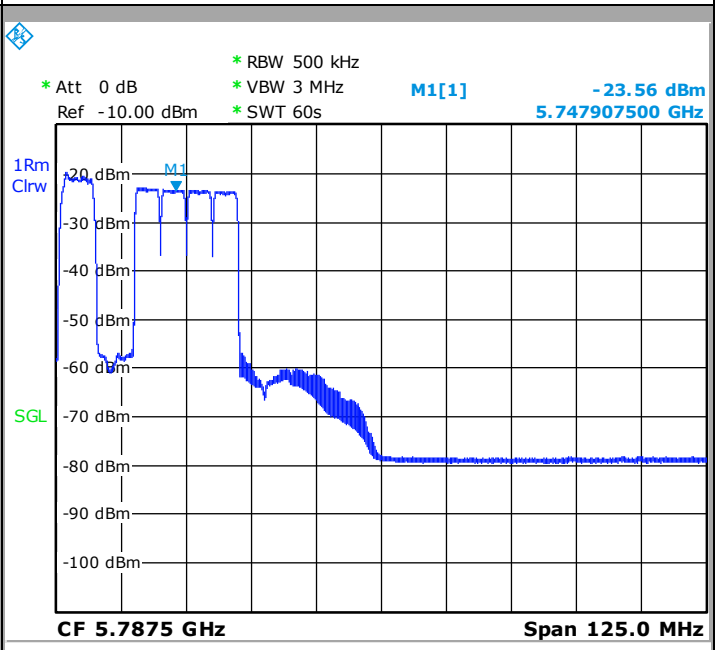
 Date: 20.MAY.2016 14:29:06	 Date: 20.MAY.2016 14:27:28
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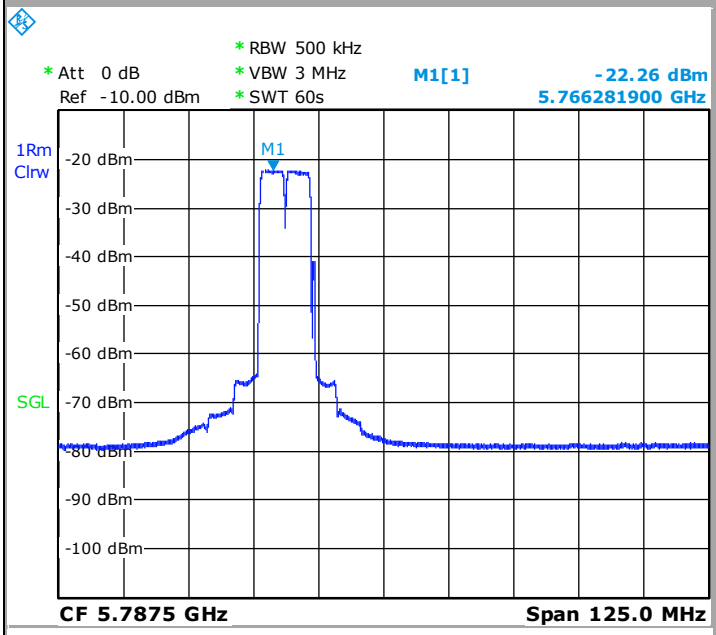
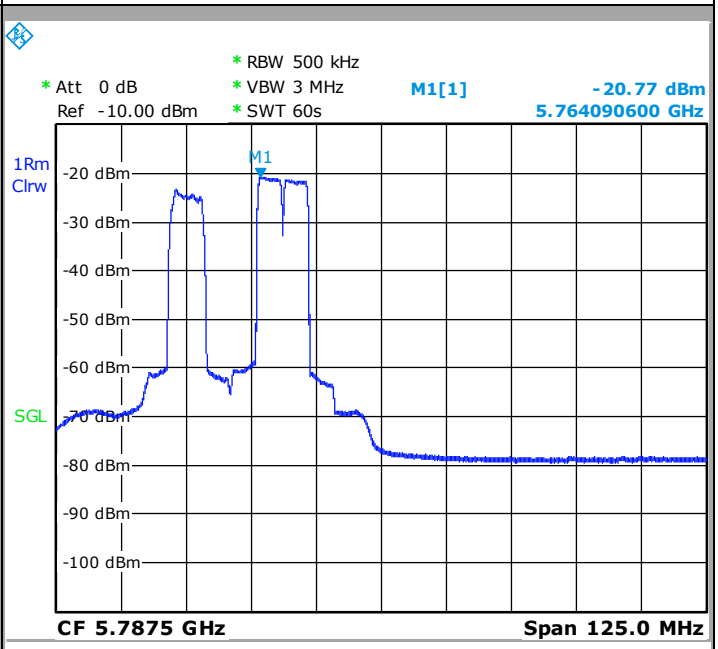
 Date: 20.MAY.2016 14:33:14	 Date: 20.MAY.2016 14:36:38

Configuration 11	
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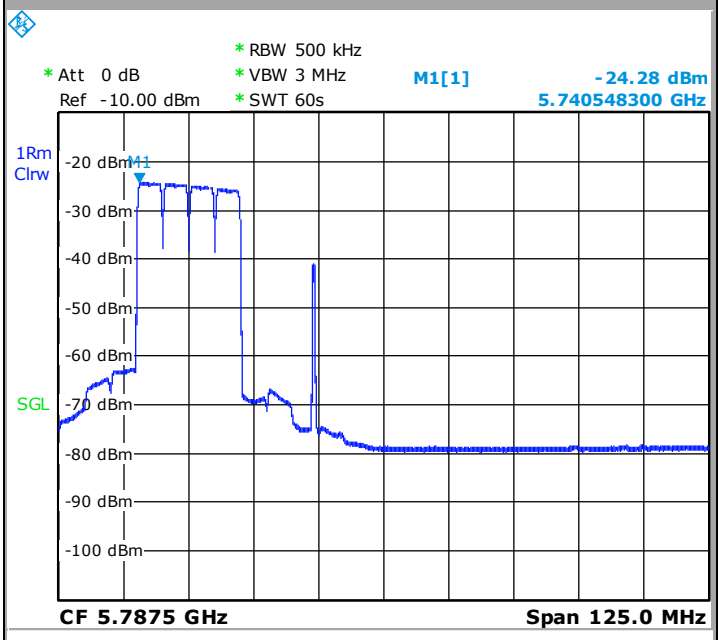
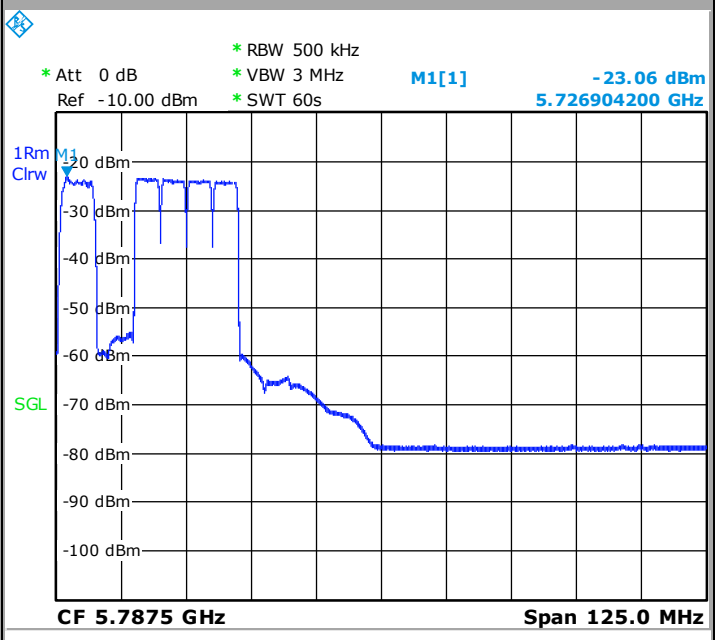
 Date: 20.MAY.2016 14:41:05	 Date: 20.MAY.2016 14:39:55
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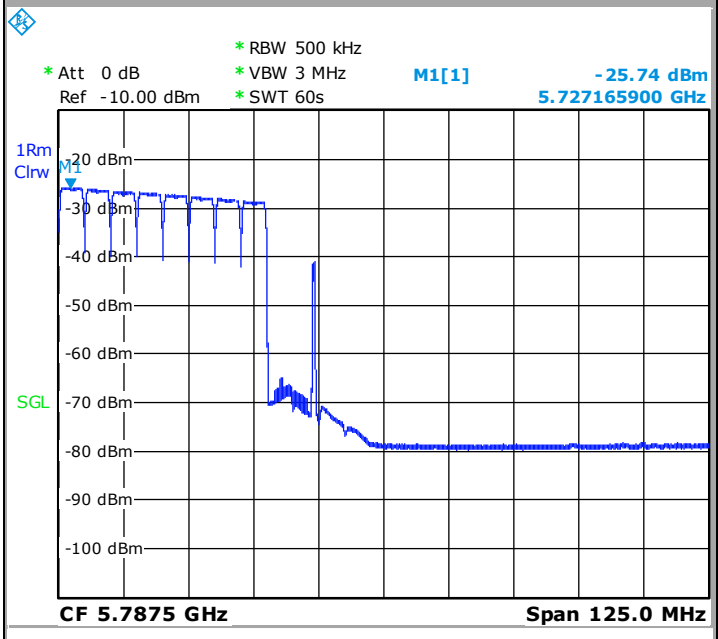
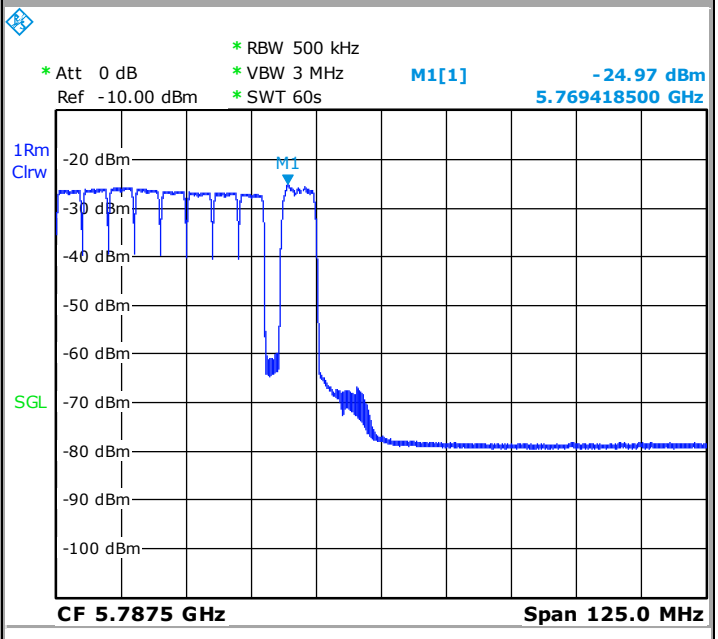
 Date: 20.MAY.2016 14:43:51	 Date: 20.MAY.2016 14:53:30

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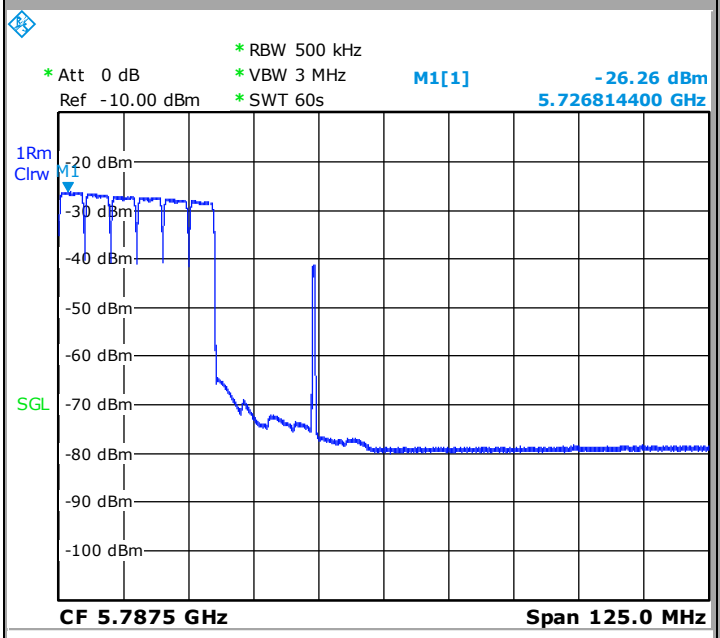
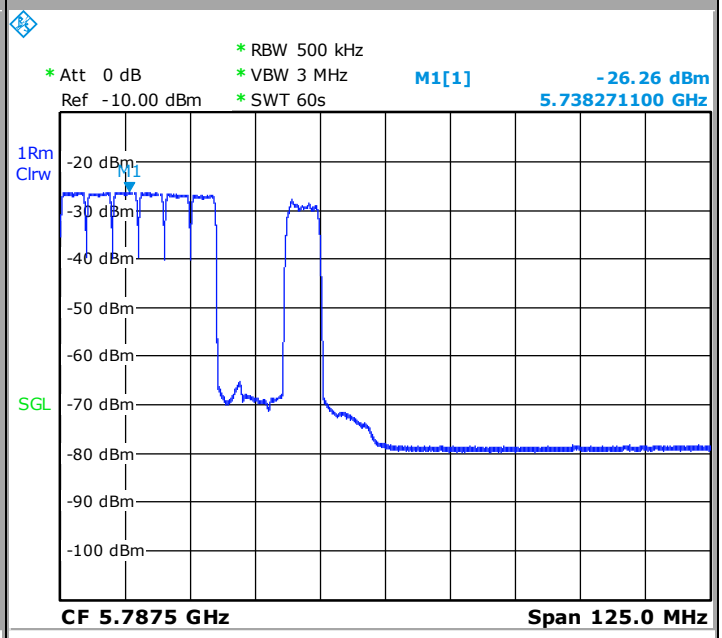
	

Spectrum Analyzer Offset:
Cable Loss + Attenuator = 23,2 dB

Configuration	Tx1 (dBm/500kHz)	Tx2 (dBm/500kHz)	Power Spectral Density (dBm/500kHz)
1	-22,13	-22,45	3,92
2	-22,17	-22,56	3,85
3	-23,68	-22,79	3,00
4	-23,57	-22,96	2,96
5	-25,11	-23,3	2,10
6	-25,06	-23,5	2,00
7	-16,17	-16,44	9,91
8	-23,17	-20,18	4,79
9	-23,93	-23,56	2,47
10	-22,26	-20,77	4,76
11	-24,28	-23,06	2,58
12	-25,74	-24,97	0,87
13	-26,26	-26,26	-0,05

4.7. CONCLUSION

Power Spectral density measurement performed on the sample of the product FL58R2EABW45-CEN, SN: EBL1613C0073, in configuration and description presented in this test report, show levels **conform to** the FCC 15.407 limits.

5. 6dB BANDWIDTH

5.1. TEST CONDITIONS

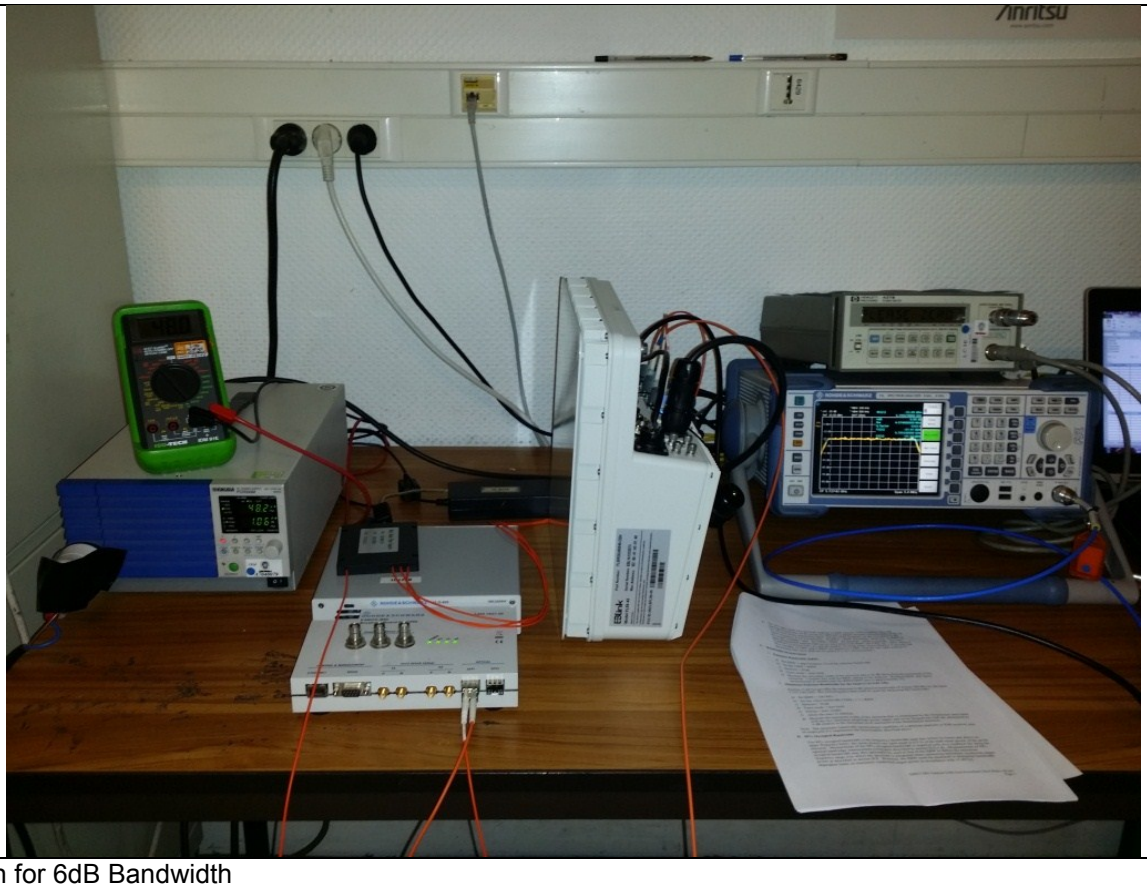
Test performed by : Arnaud Fayette
Date of test : 2016/05/20
Ambient temperature : 23°C
Relative humidity : 45%

5.2. TEST SETUP

- The Equipment under Test is installed:
☐ In the climatic chamber
☑ On a table

-Measurement is performed with a spectrum analyzer
☑ On the EUT conducted access

- Test Procedure:
☑ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § C1
☑ KDB 644545 D03 Guidance for IEEE 802.11ac v01



Photograph for 6dB Bandwidth

5.3. LIMIT

The 6dB Bandwidth shall be at least 500kHz.

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal date	Cal due
Multi-meter	ISOTECH	IDM 91E	A1240253	2015/08	2016/08
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	2014/05	2016/05
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2015/10	2016/10
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2015/04	2017/04

Note: In our system quality, the calibration due is more & less 2 months.

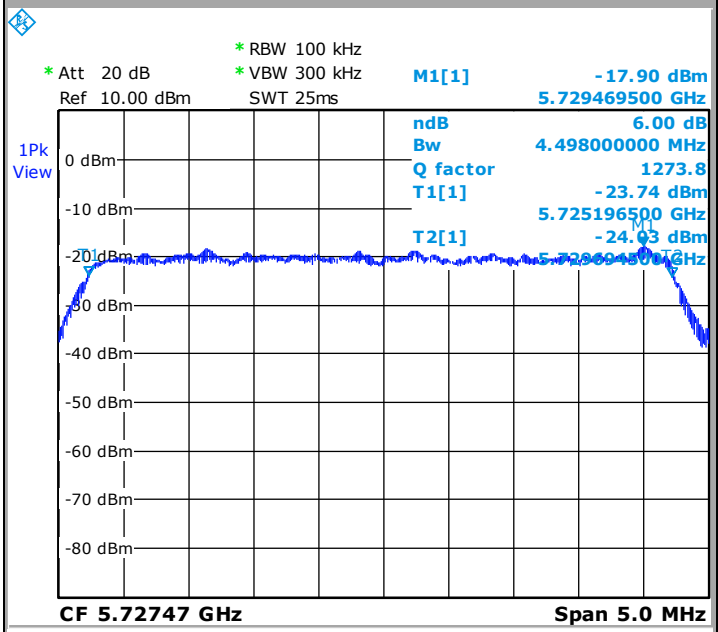
5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

5.6. GRAPHICS & RESULTS

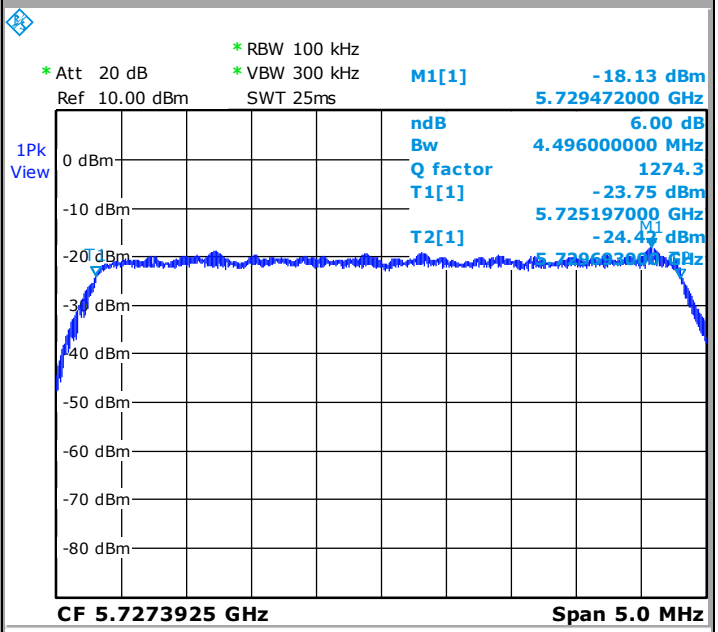
Configuration 1

Tx1 IQ CPRI 1



Date: 20.MAY.2016 16:36:24

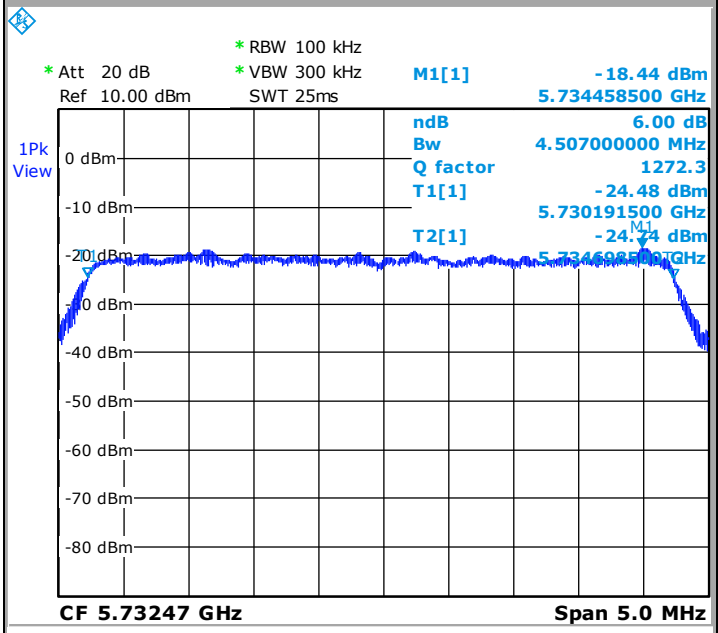
Tx2 IQ CPRI 1



Date: 23.MAY.2016 14:29:08

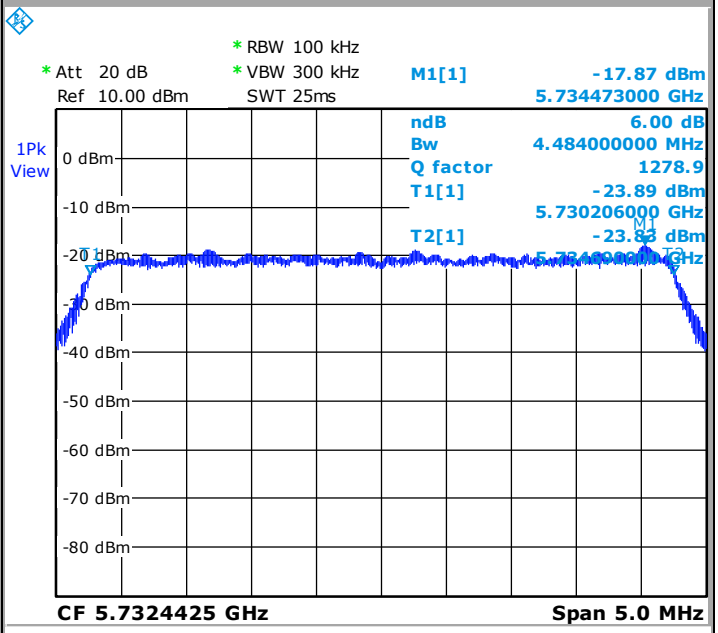
Configuration 1

Tx1 IQ CPRI 2



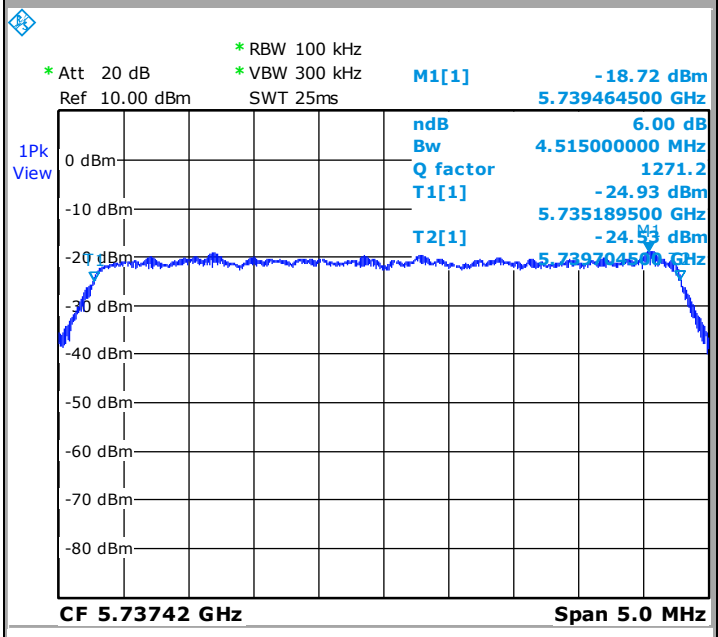
Date: 20.MAY.2016 16:38:27

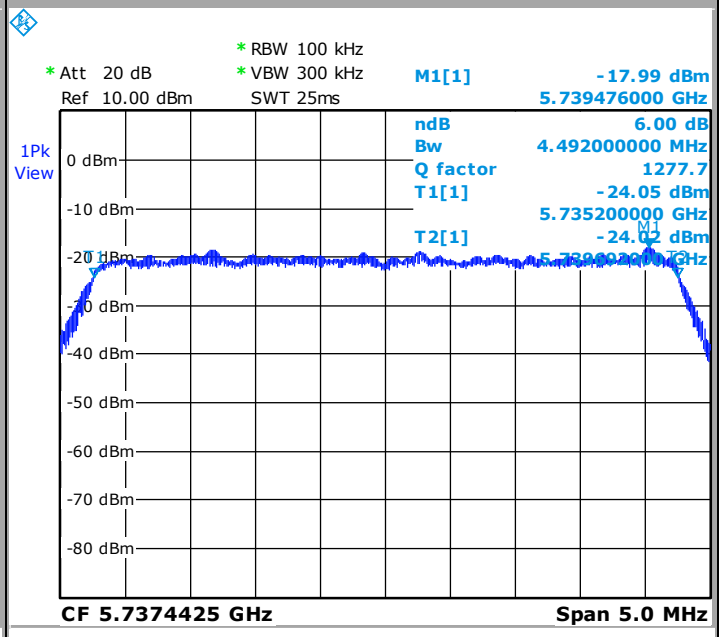
Tx2 IQ CPRI 2



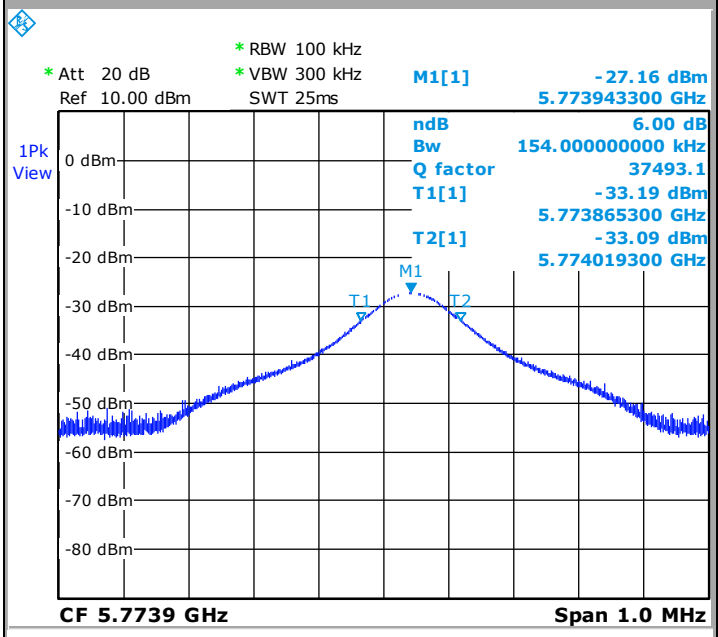
Date: 23.MAY.2016 14:30:47

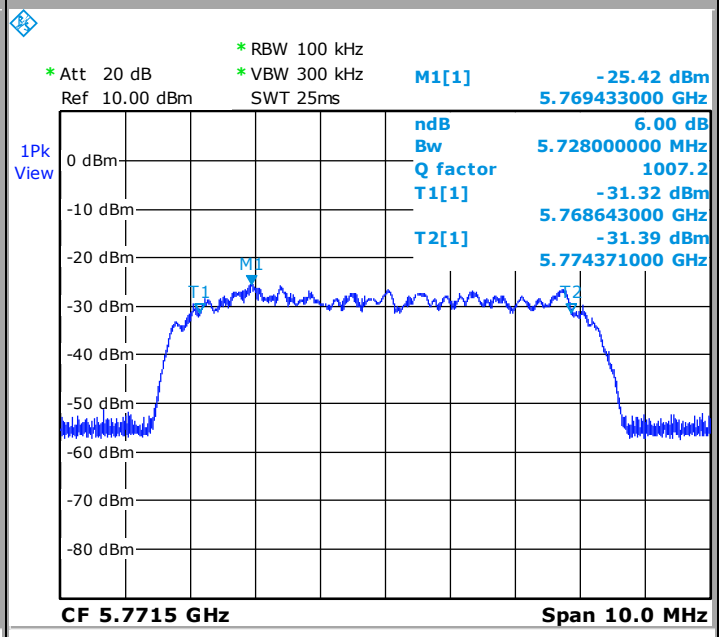
Configuration 1	
Tx1 IQ CPRI 3	**Tx2 IQ CPRI 3**



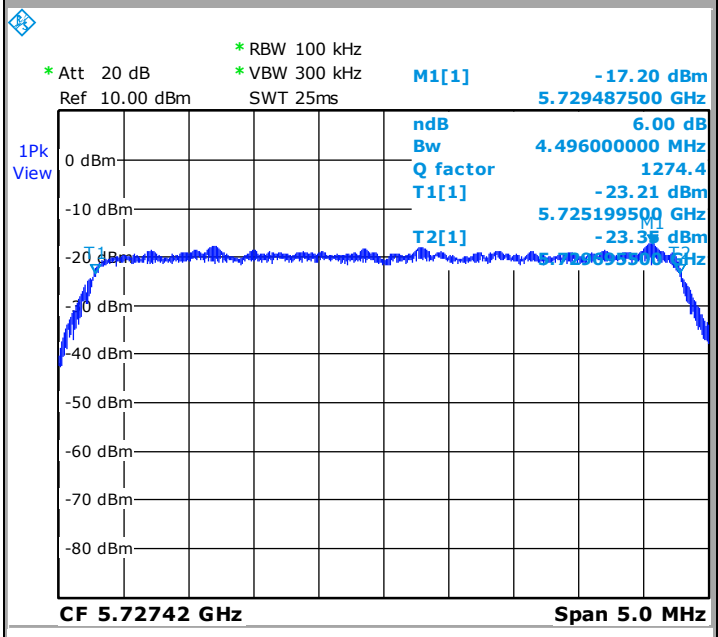


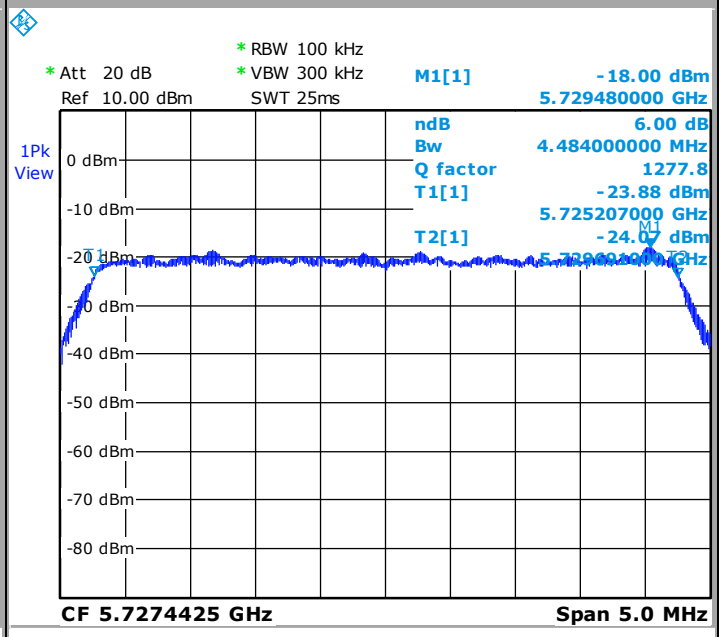
Configuration 1	
Tx1	**Tx2 C&M**



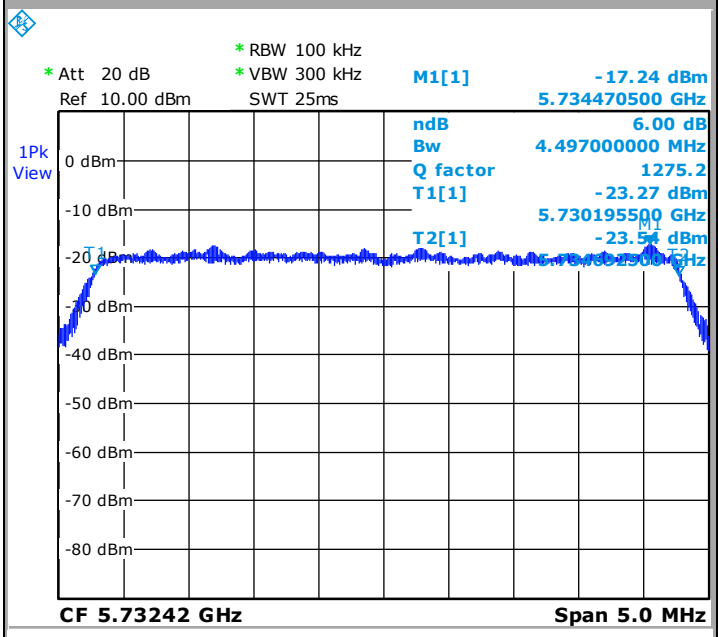


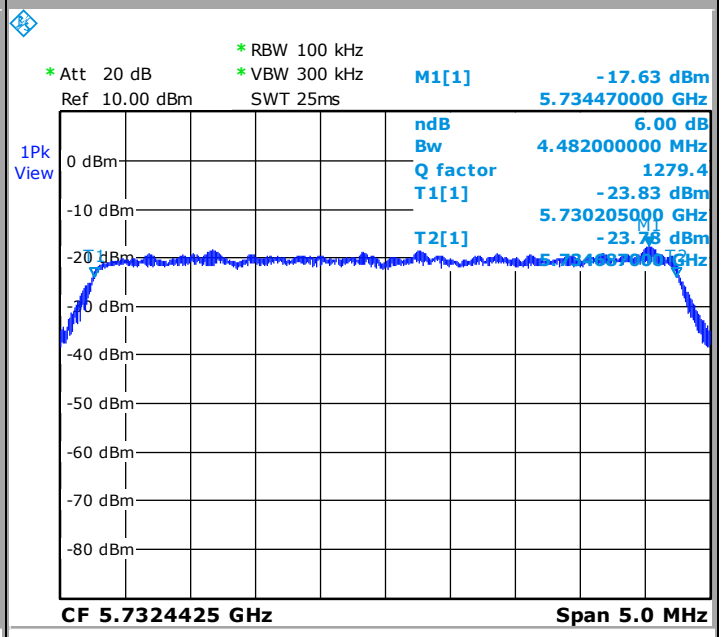
Configuration 2	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**



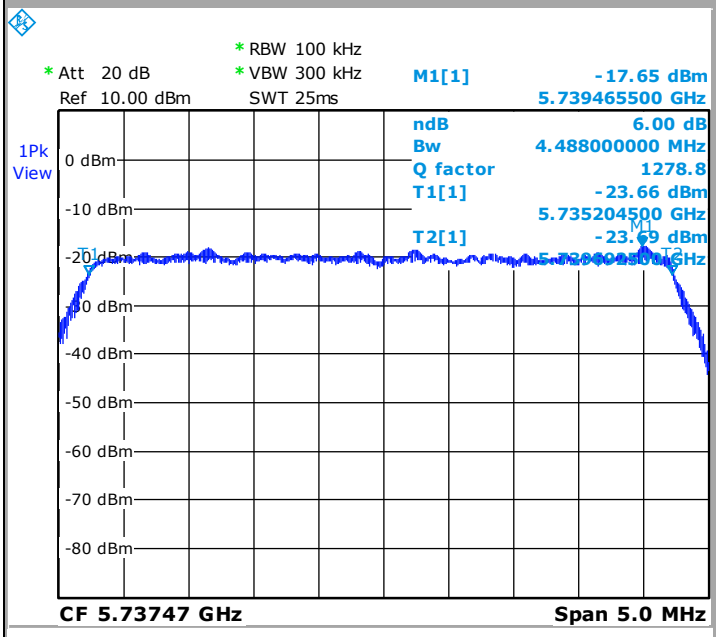


Configuration 2	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**

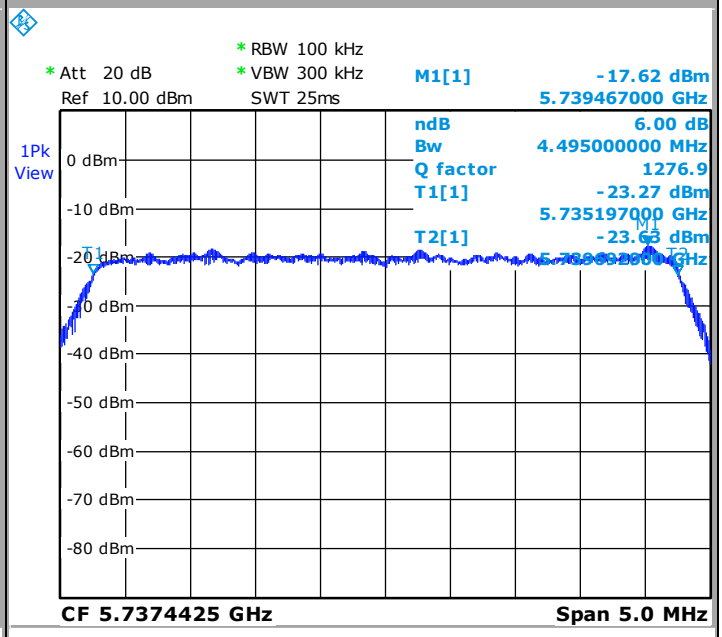




Configuration 2	
Tx1 IQ CPRI 3	**Tx2 IQ CPRI 3**

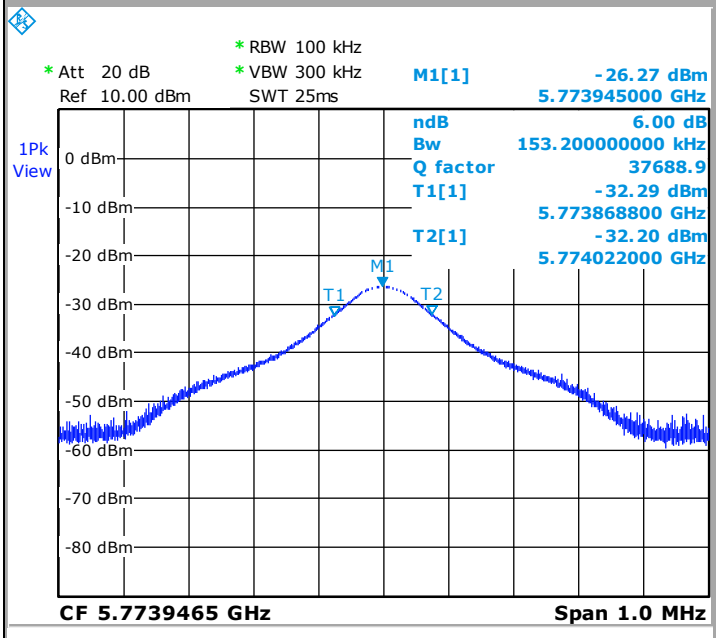


Date: 23.MAY.2016 09:02:43

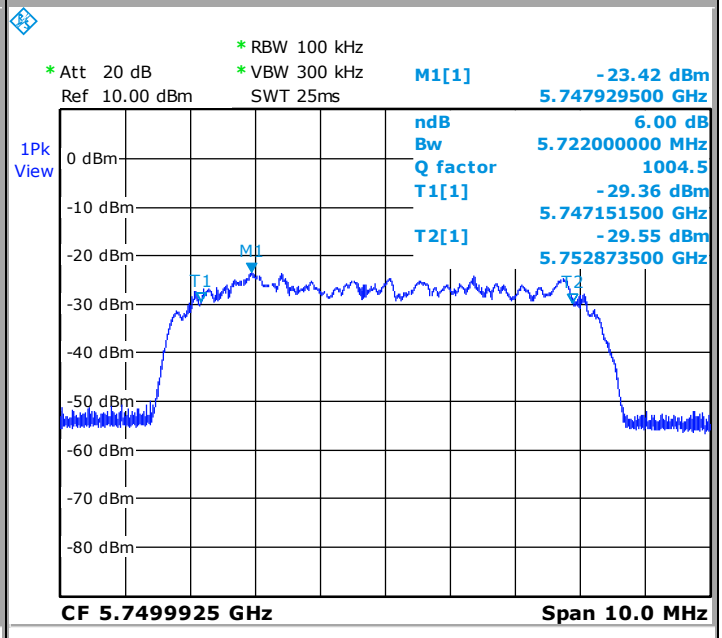


Date: 23.MAY.2016 09:19:17

Configuration 2	
Tx1	**Tx2 C&M**

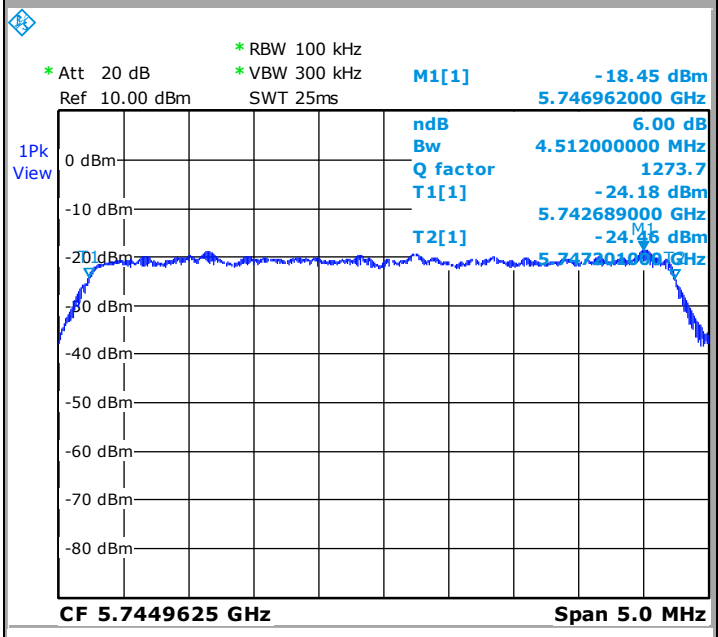


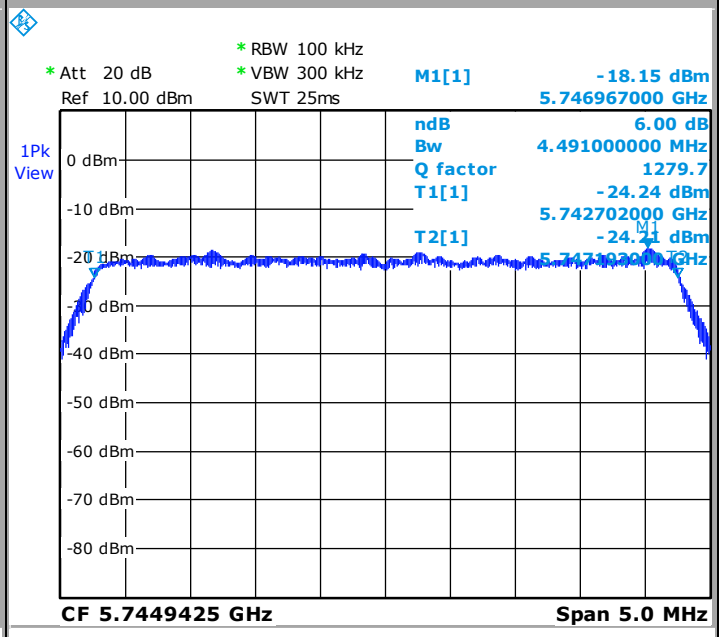
Date: 23.MAY.2016 09:05:57



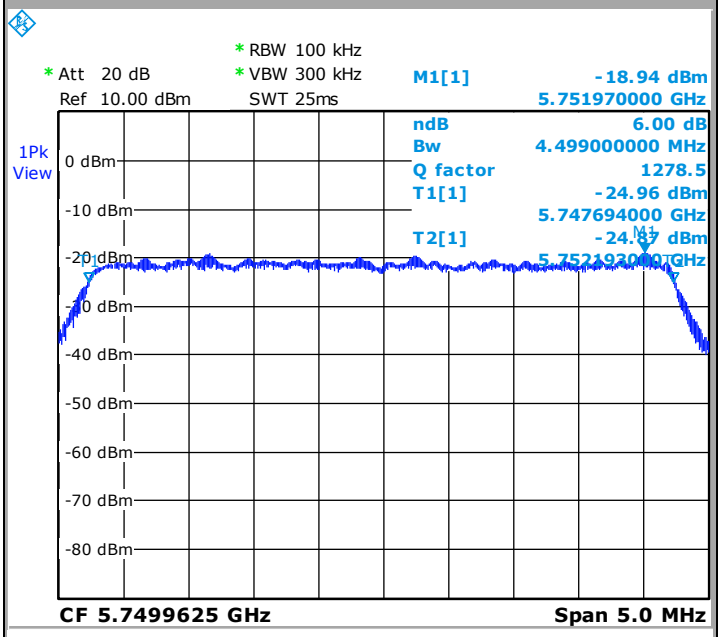
Date: 23.MAY.2016 09:11:15

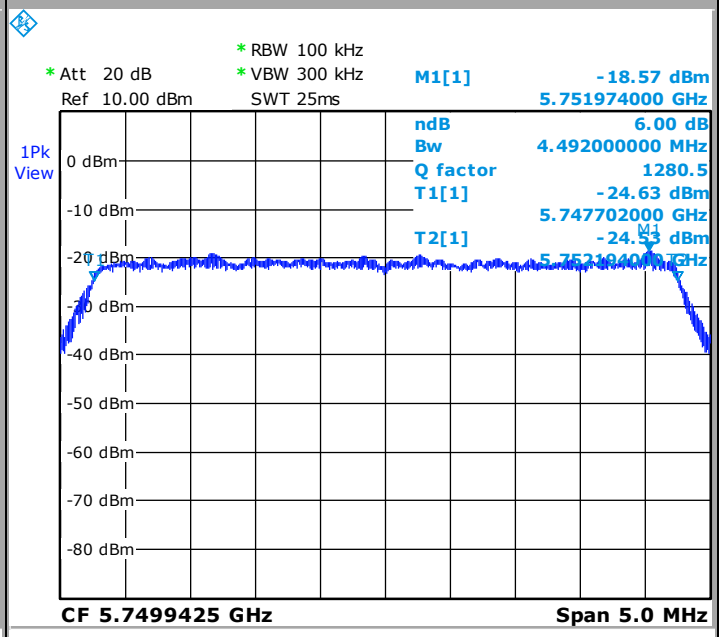
Configuration 3	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**



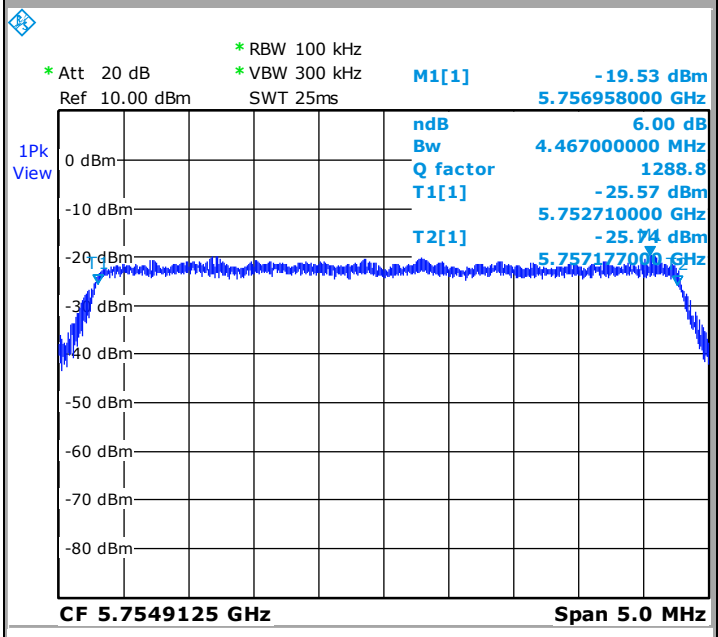


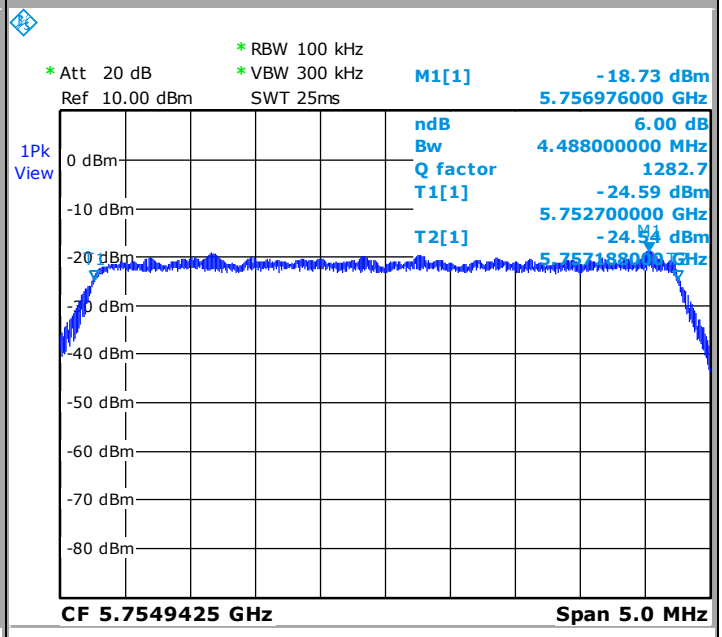
Configuration 3	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



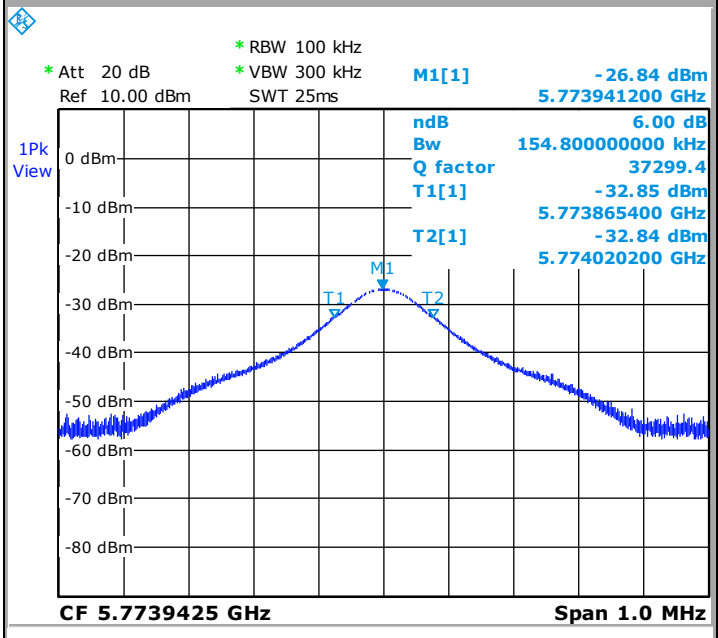


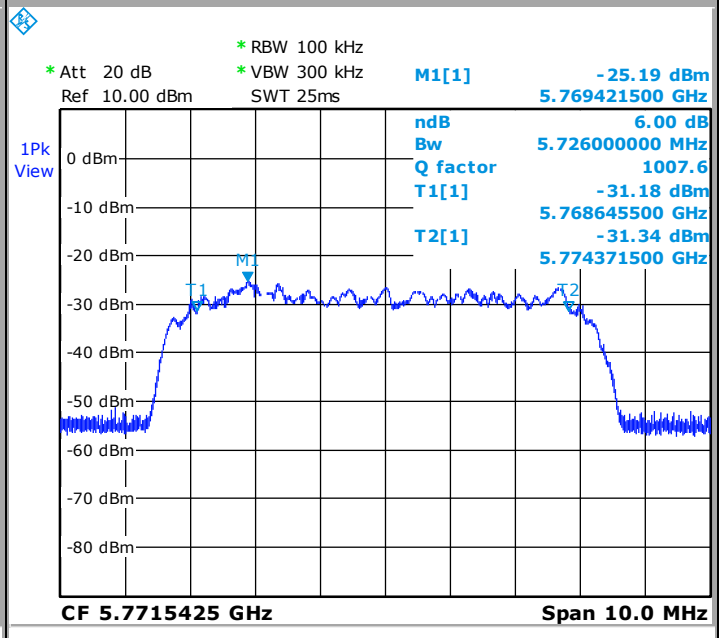
Configuration 3	
Tx1 IQ CPRI 3	**Tx2 IQ CPRI 3**



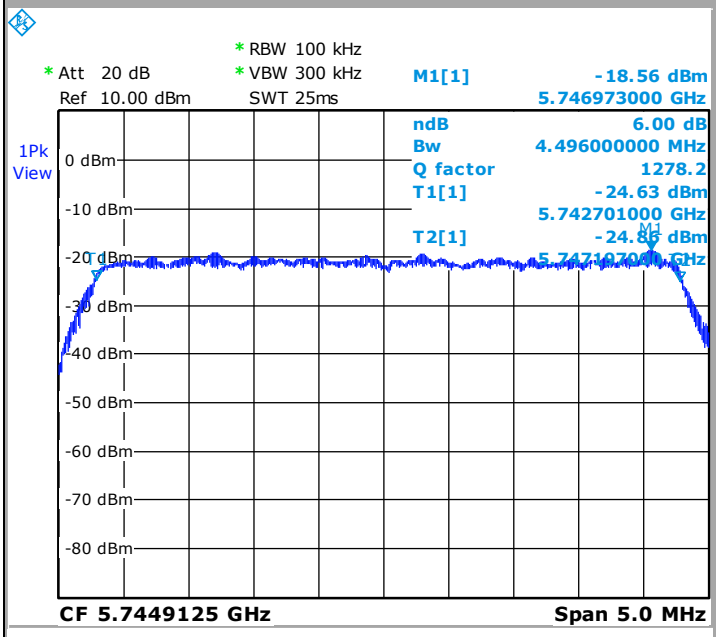


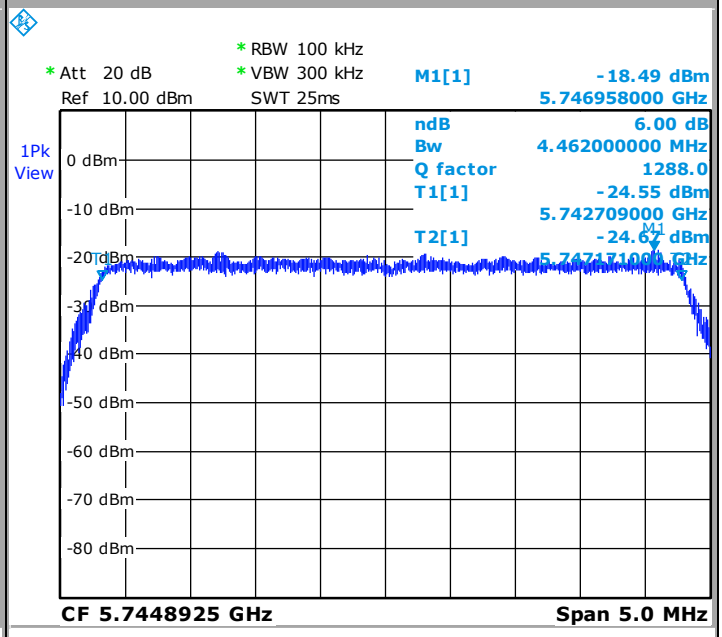
Configuration 3	
Tx1	**Tx2 C&M**



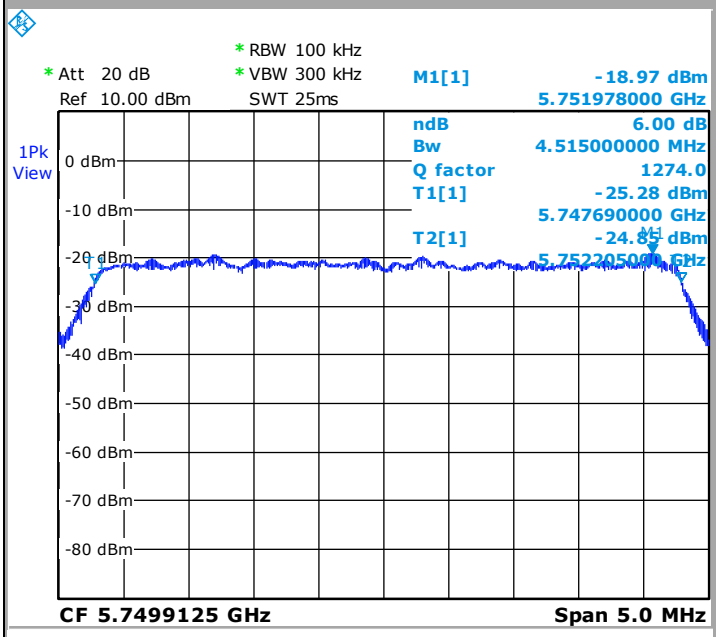


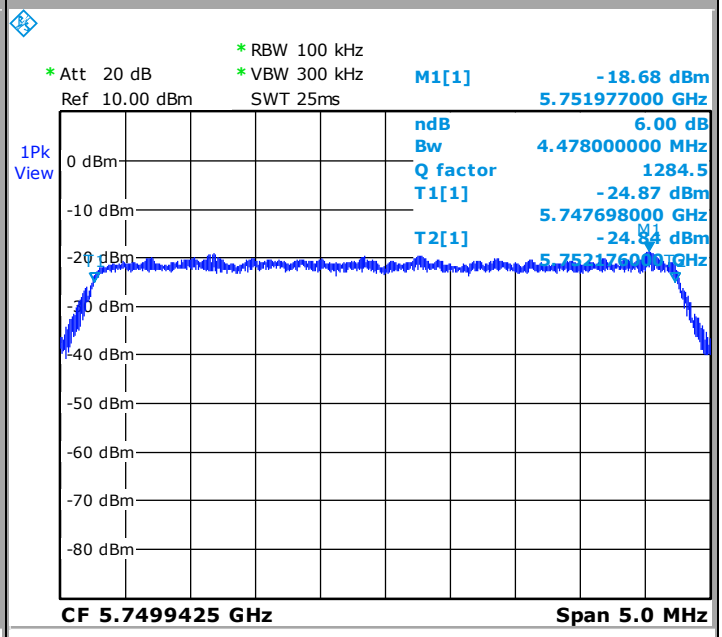
Configuration 4	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**





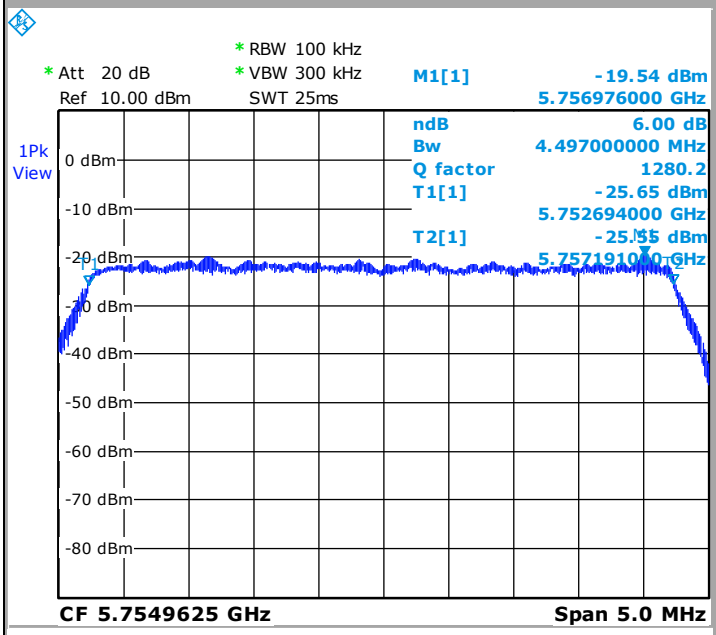
Configuration 4	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**





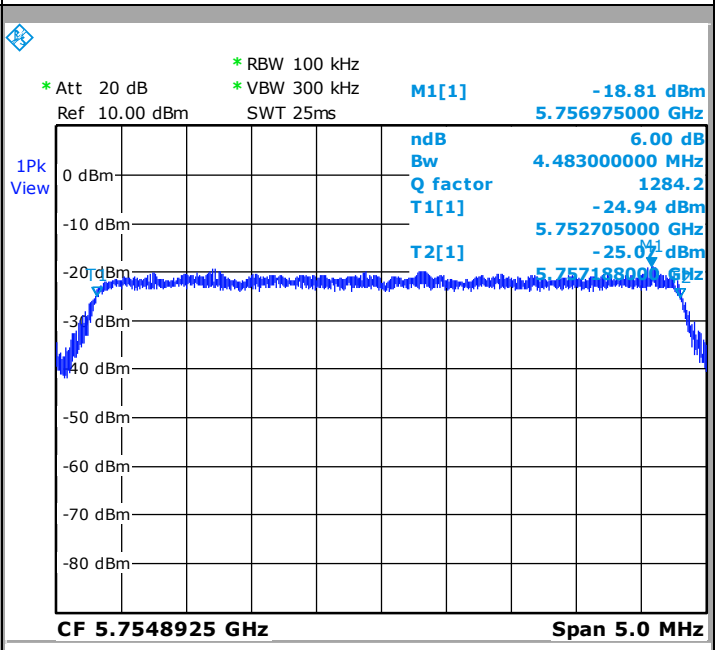
Configuration 4

Tx1 IQ CPRI 3



Date: 23.MAY.2016 09:51:35

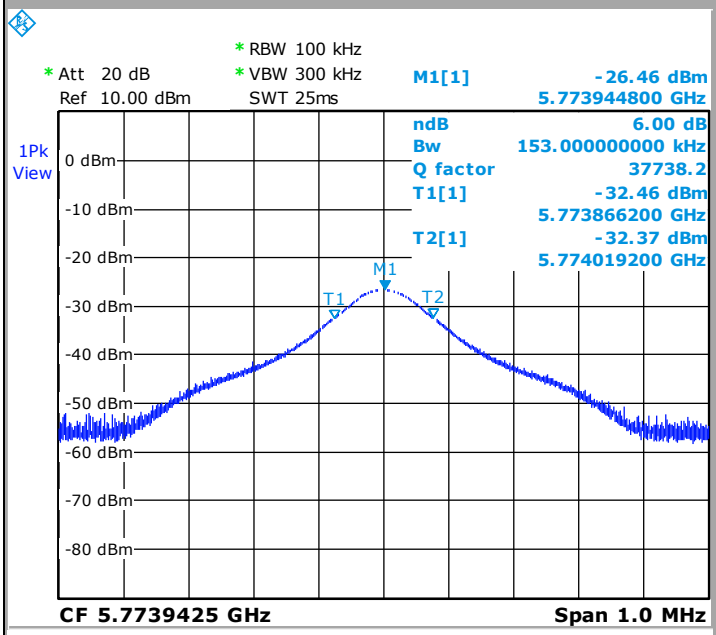
Tx2 IQ CPRI 3



Date: 23.MAY.2016 10:06:57

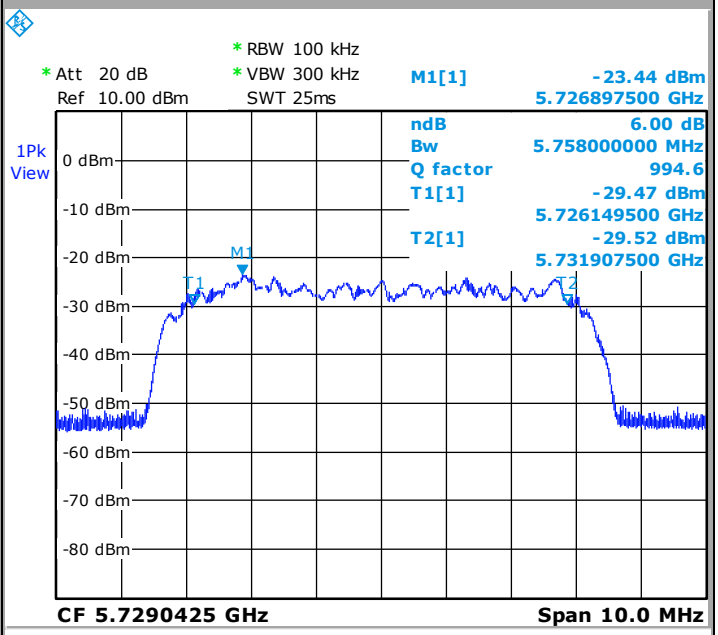
Configuration 4

Tx1



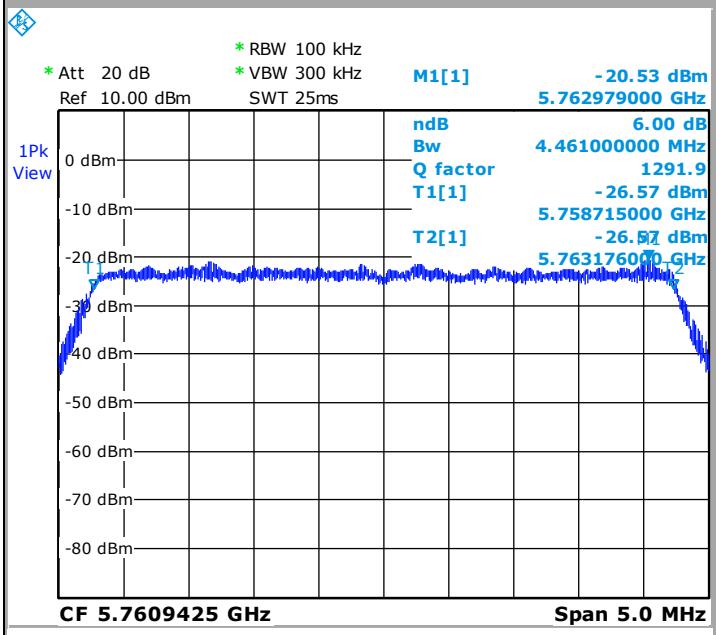
Date: 23.MAY.2016 09:53:32

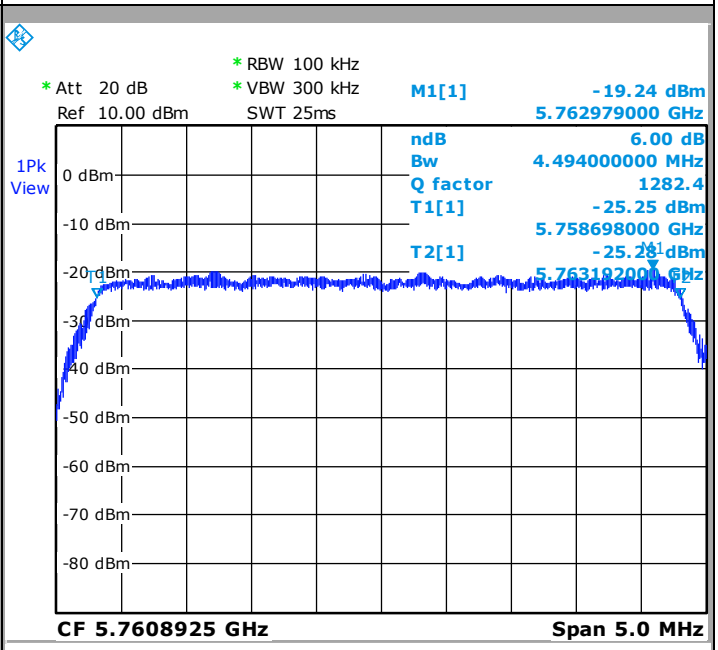
Tx2 C&M



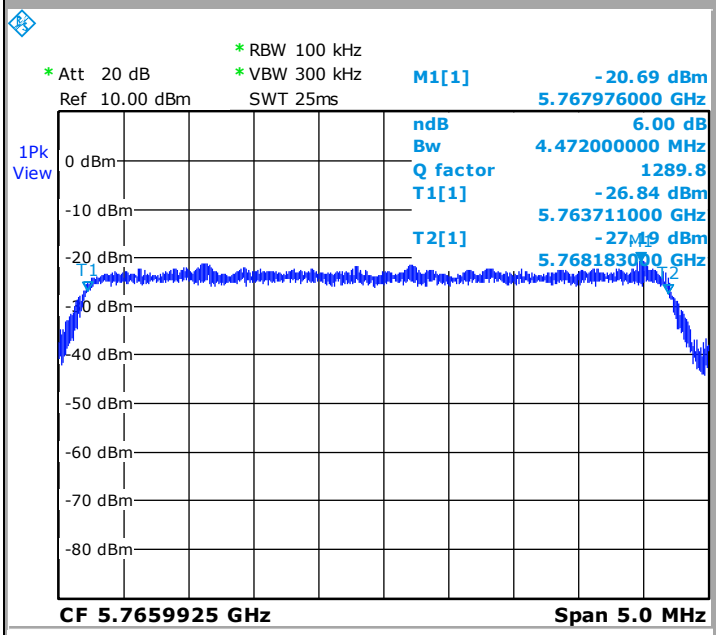
Date: 23.MAY.2016 10:03:53

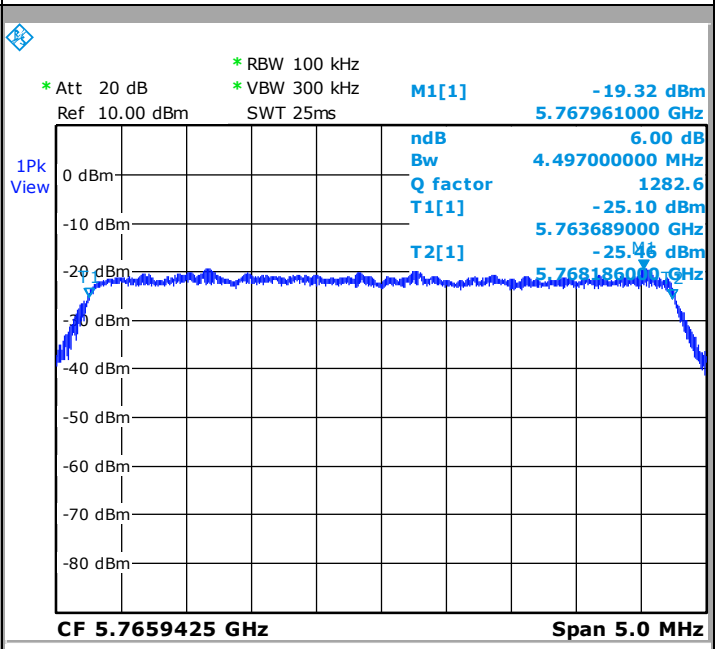
Configuration 5	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**



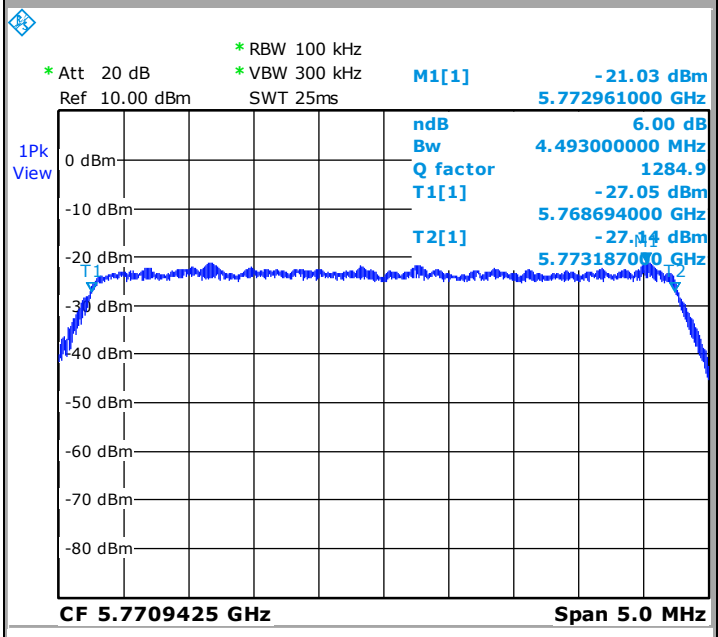


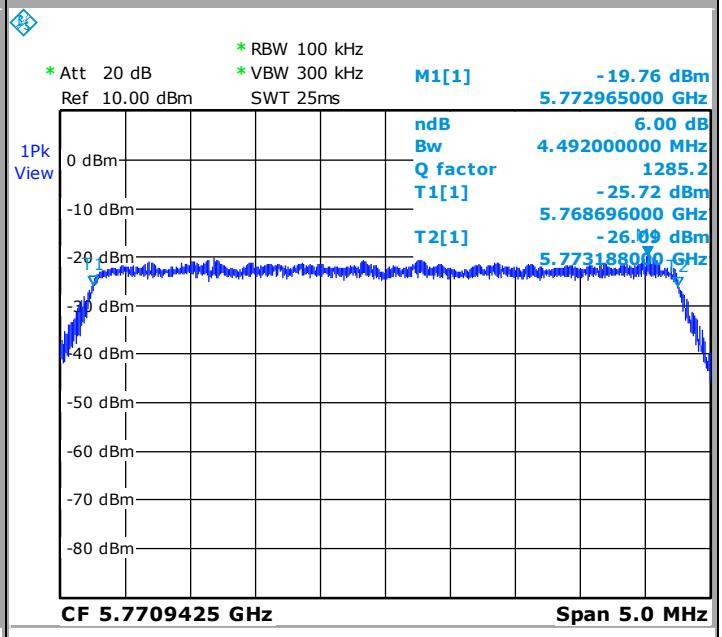
Configuration 5	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



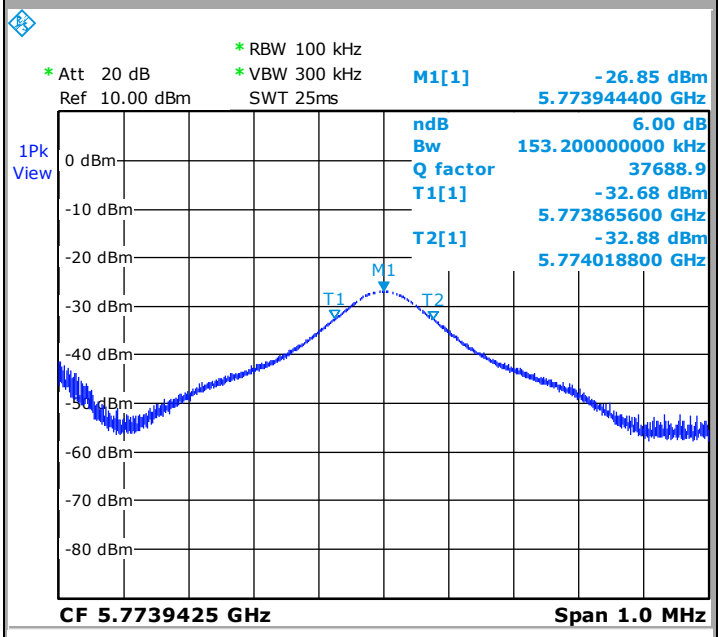


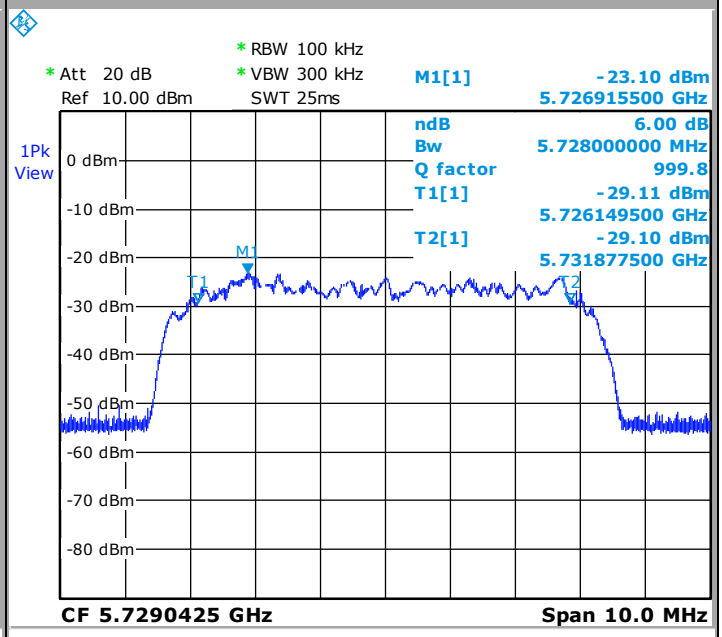
Configuration 5	
Tx1 IQ CPRI 3	**Tx2 IQ CPRI 3**



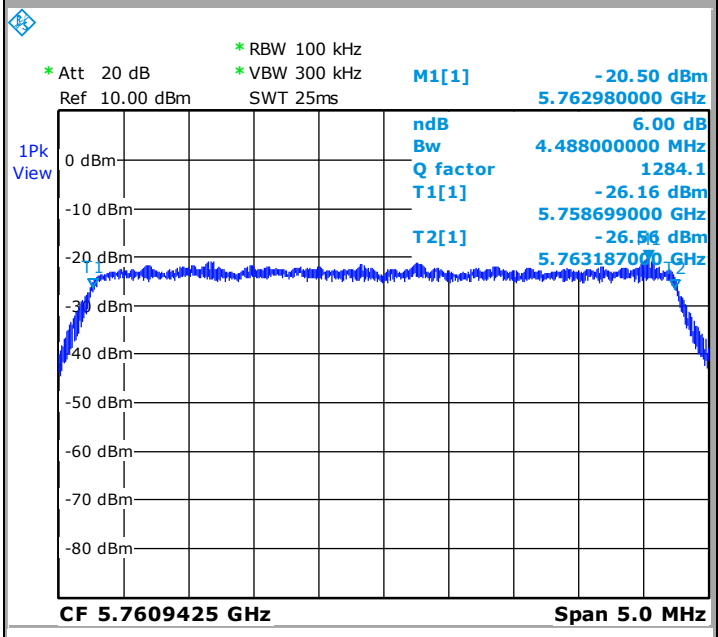


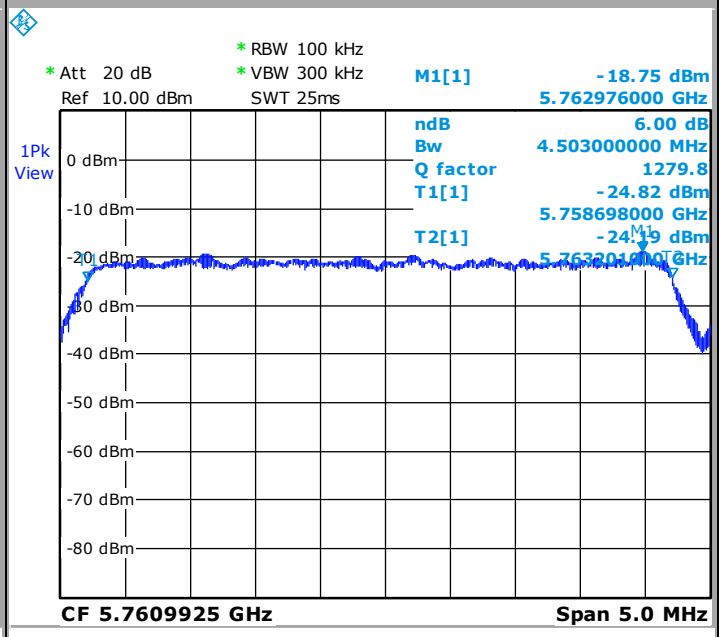
Configuration 5	
Tx1	**Tx2 C&M**



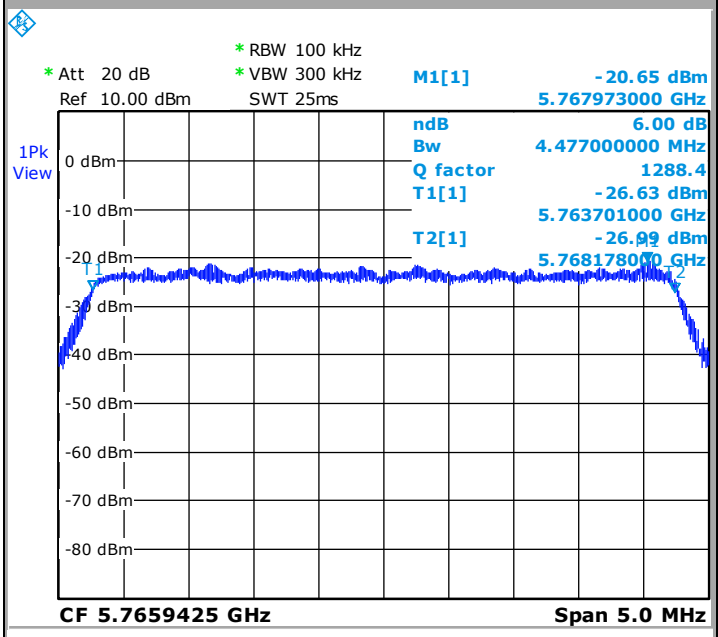


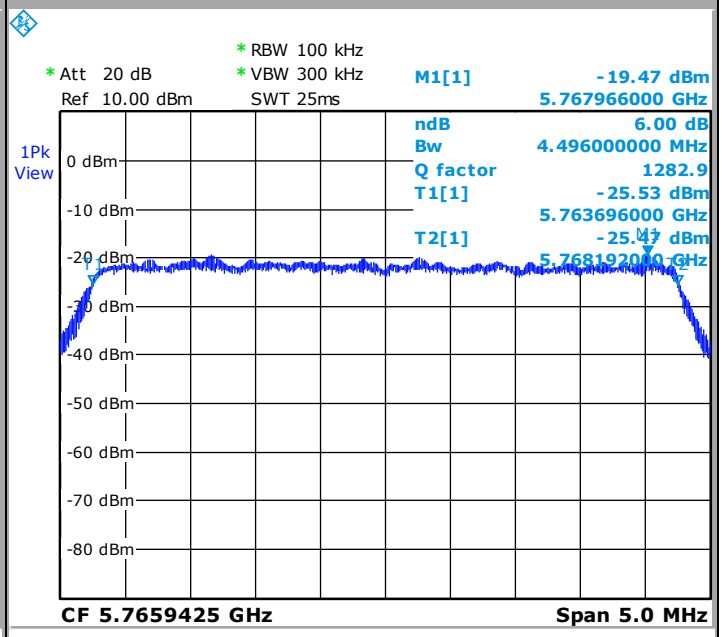
Configuration 6	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**



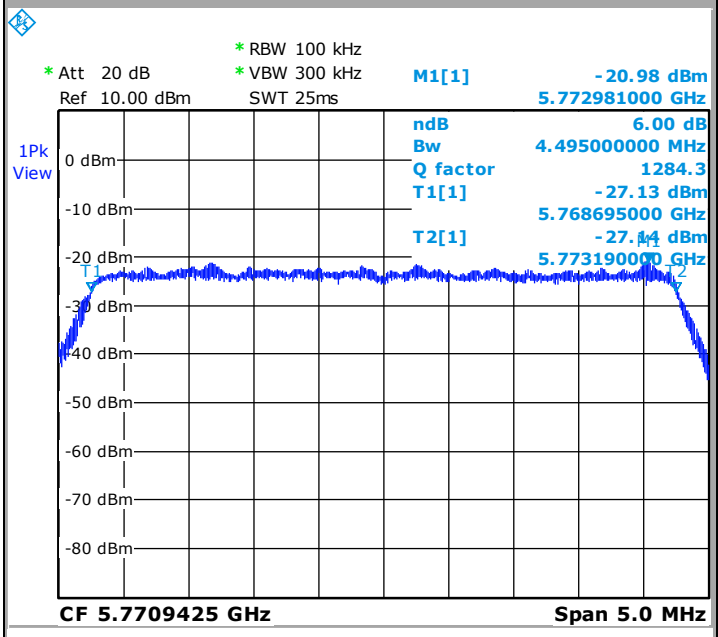


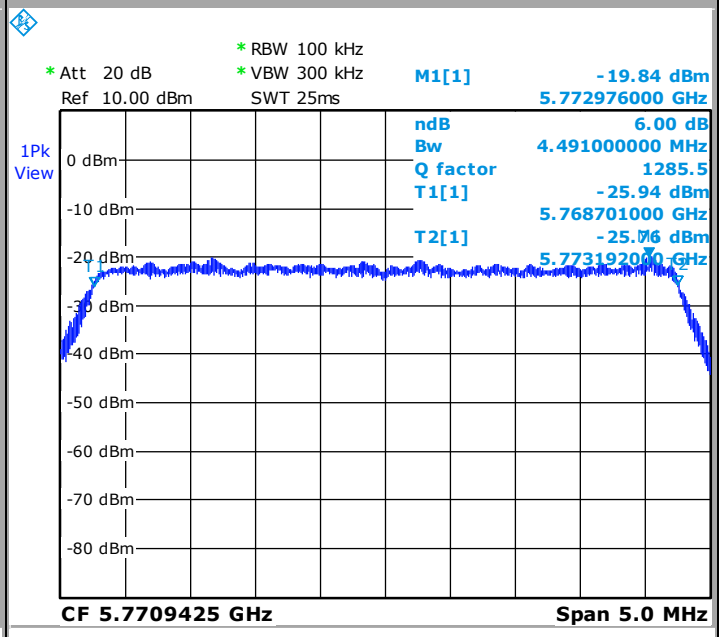
Configuration 6	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



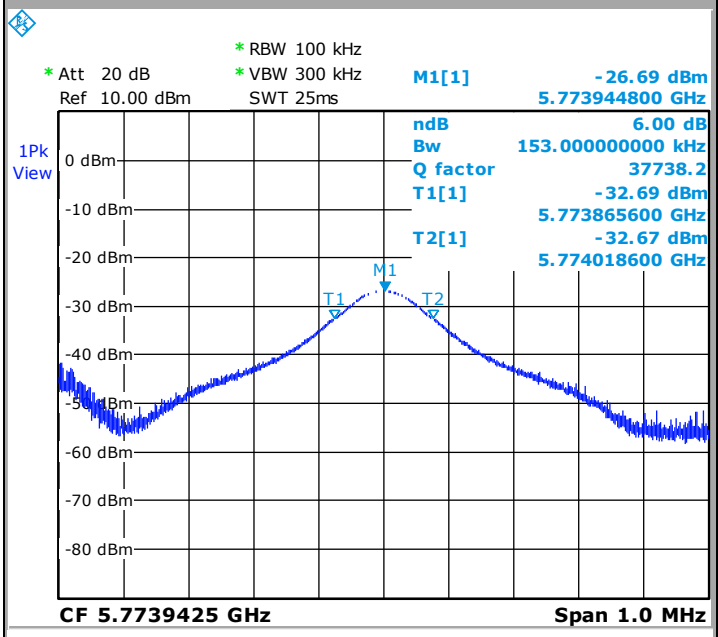


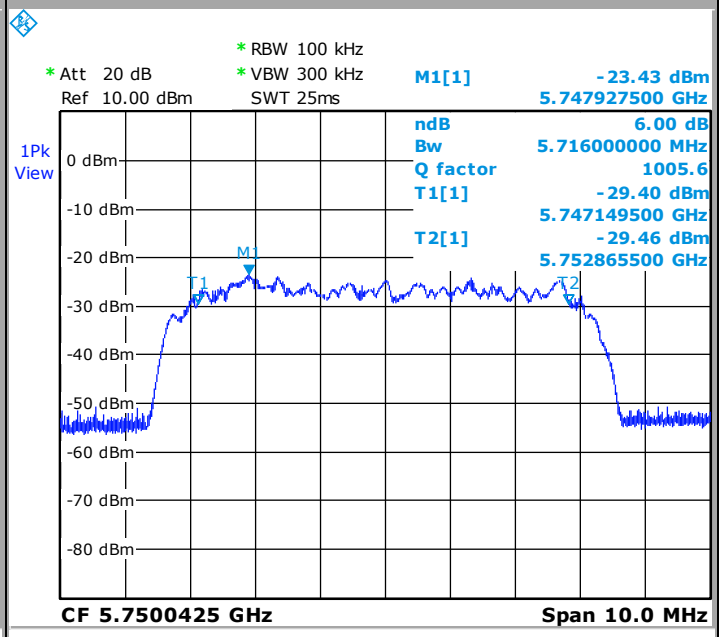
Configuration 6	
Tx1 IQ CPRI 3	**Tx2 IQ CPRI 3**



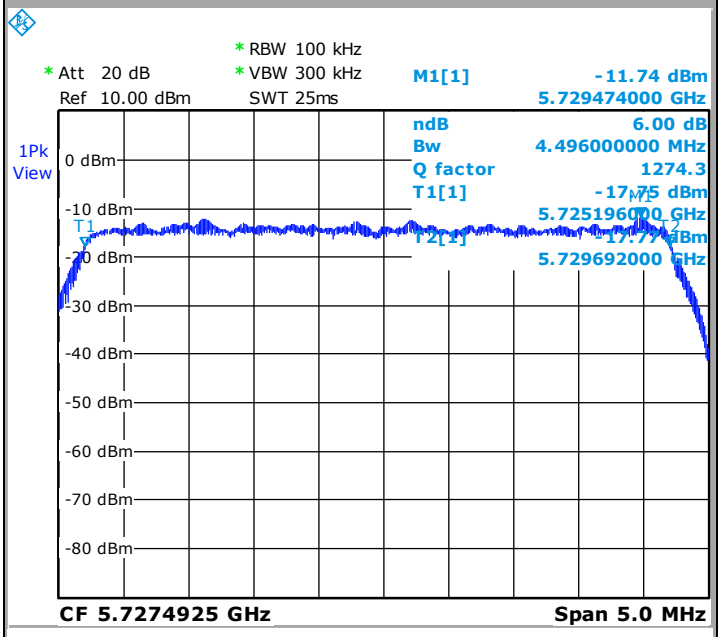


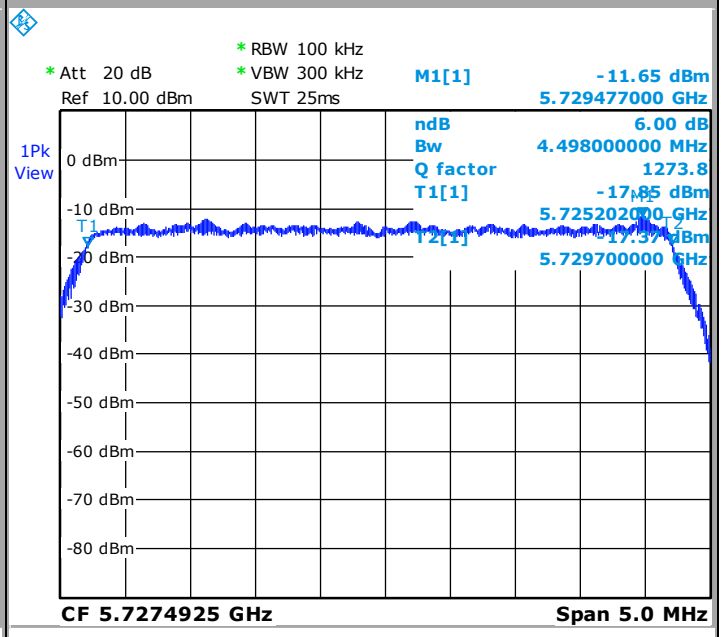
Configuration 6	
Tx1	**Tx2 C&M**



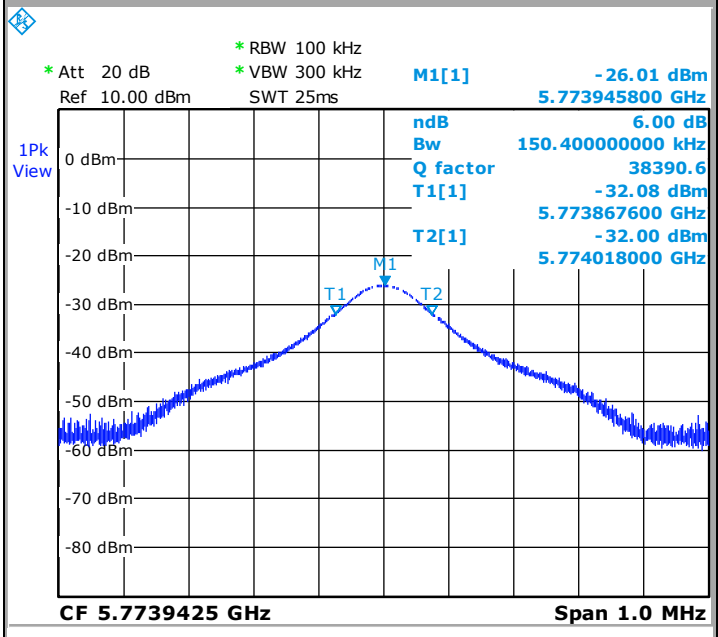


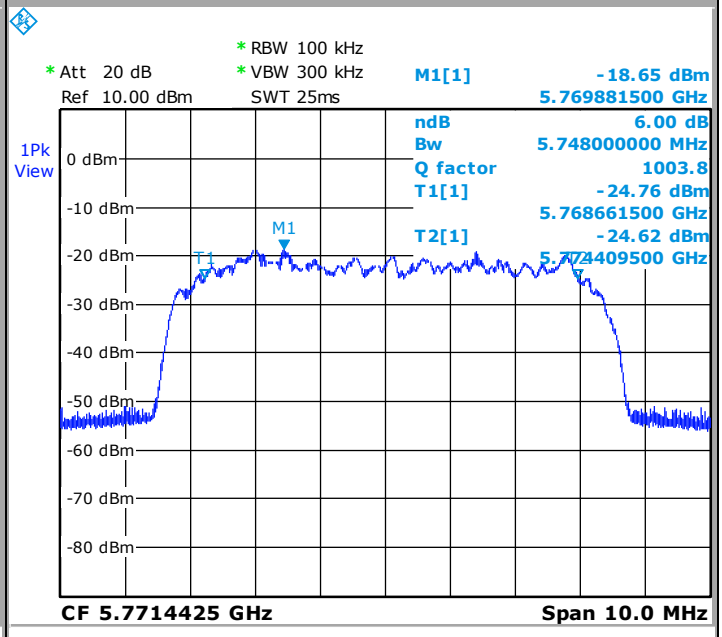
Configuration 7	
Tx1 IQ CPRI	**Tx2 IQ CPRI**



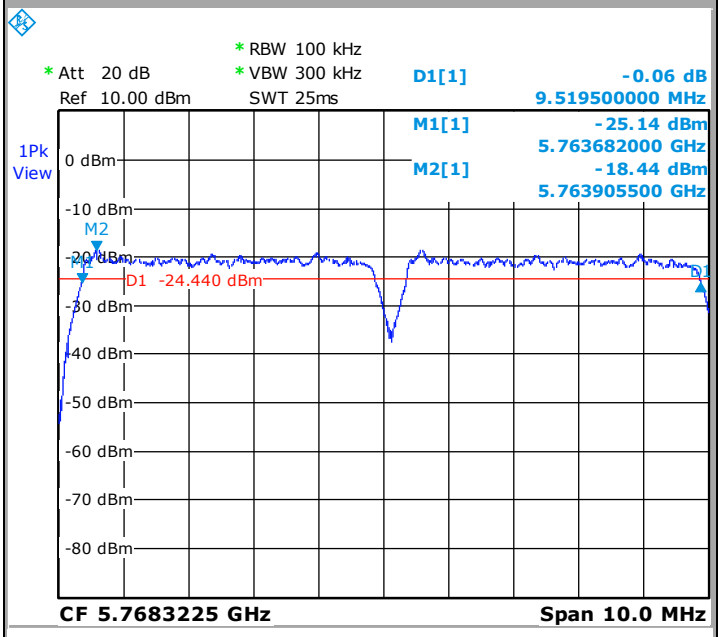


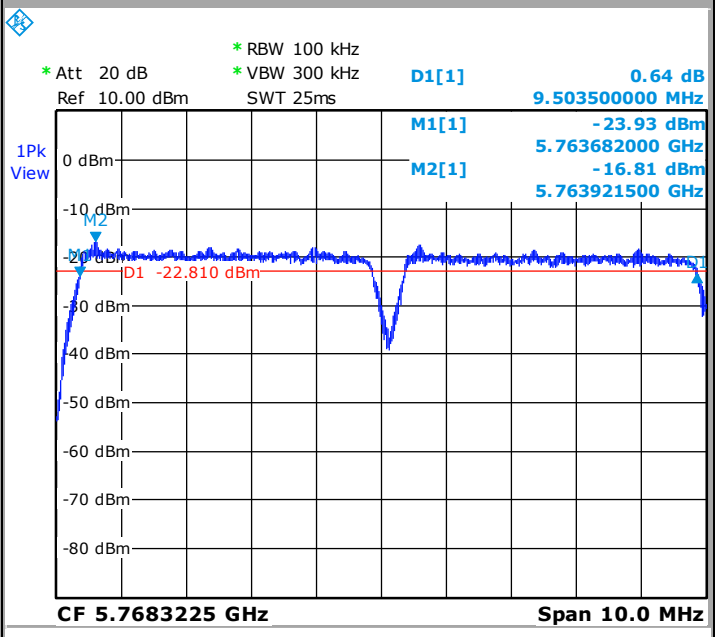
Configuration 7	
Tx1	**Tx2 C&M**



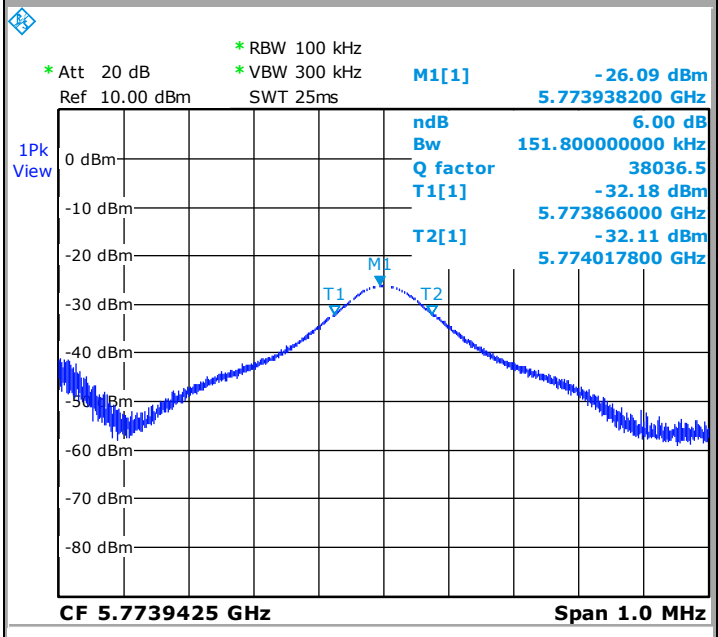


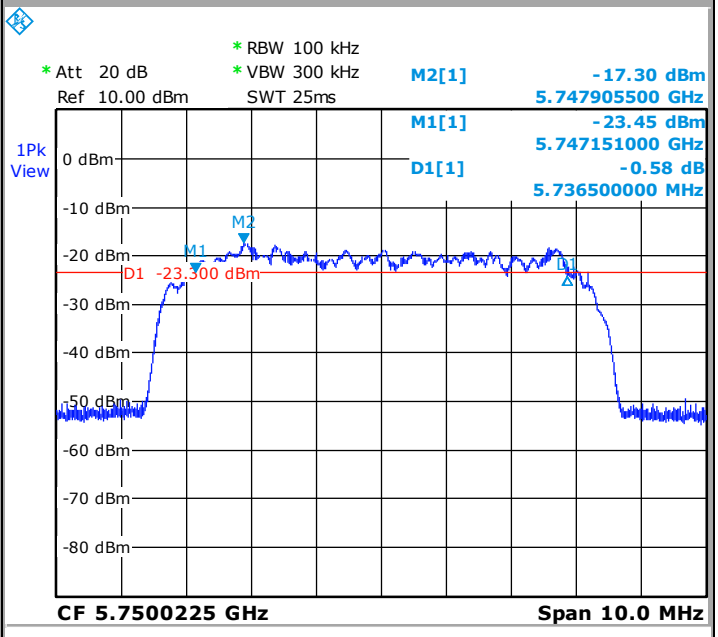
Configuration 8	
Tx1 IQ CPRI	**Tx2 IQ CPRI**



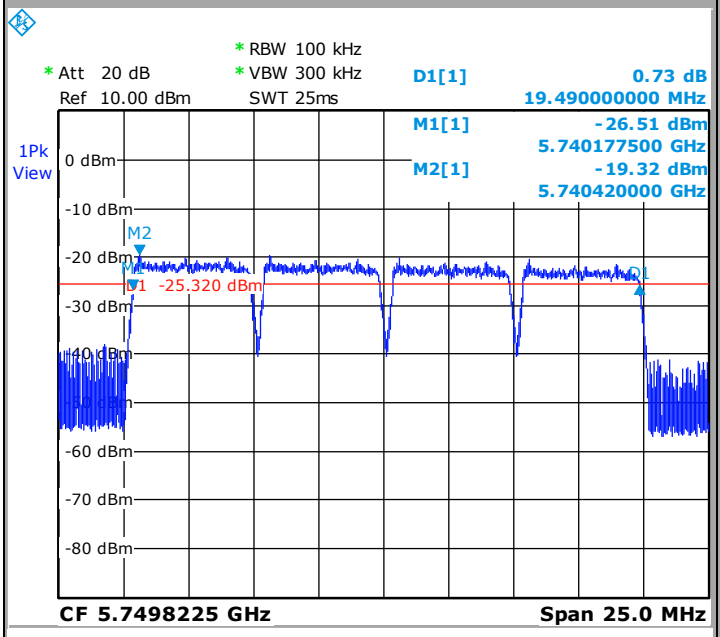


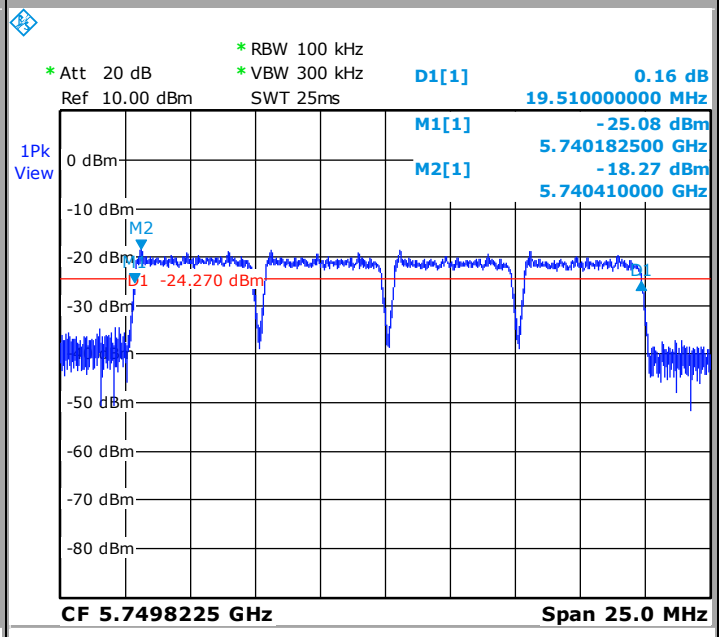
Configuration 8	
Tx1	**Tx2 C&M**



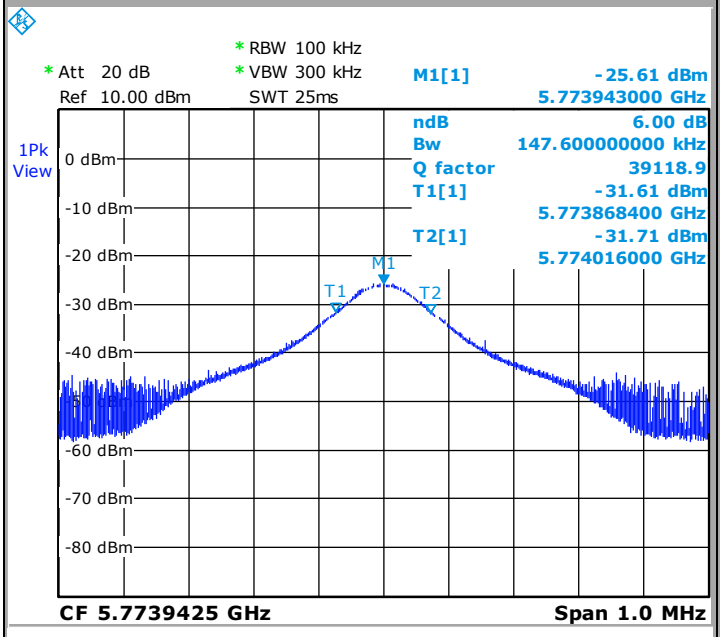


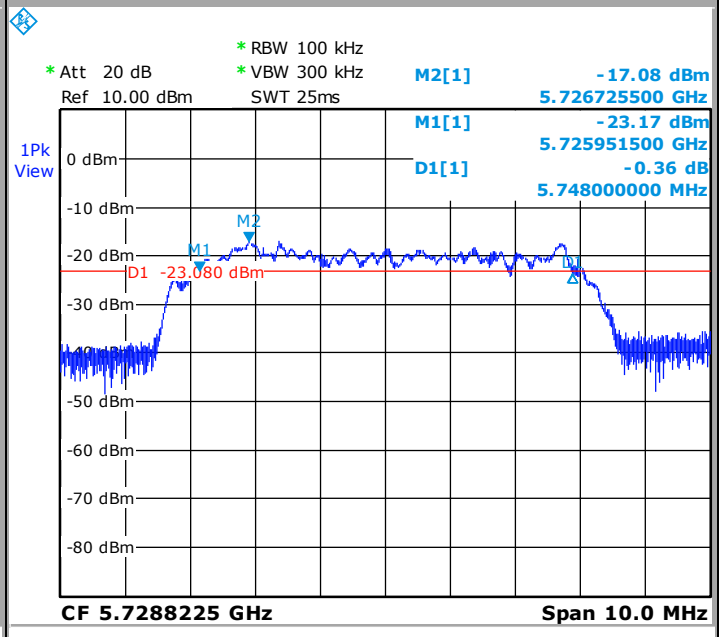
Configuration 9	
Tx1 IQ CPRI	**Tx2 IQ CPRI**



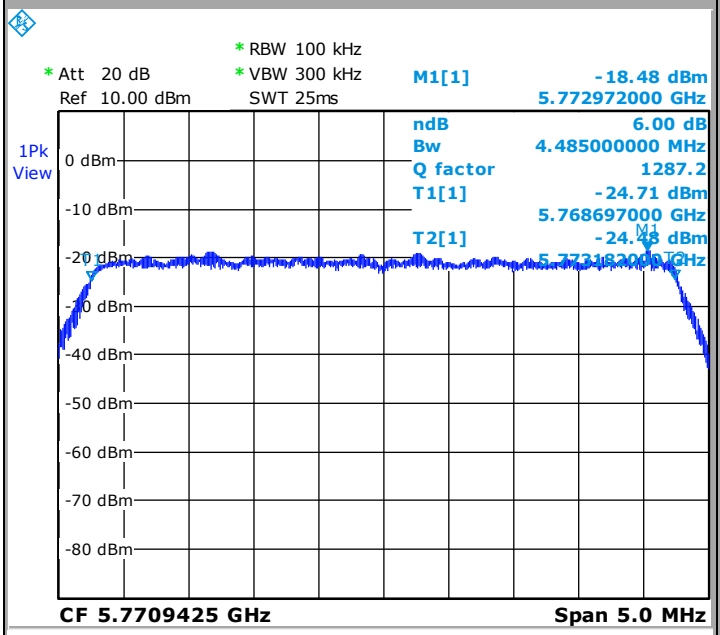


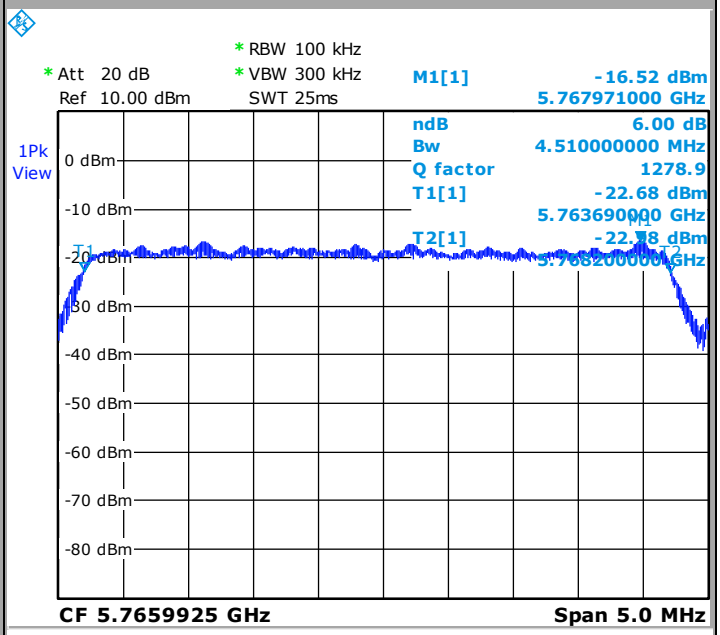
Configuration 9	
Tx1	**Tx2 C&M**



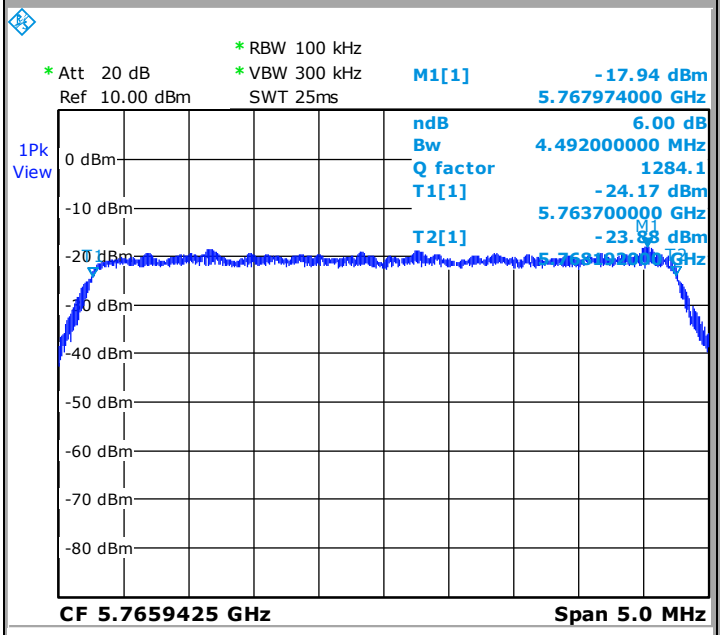


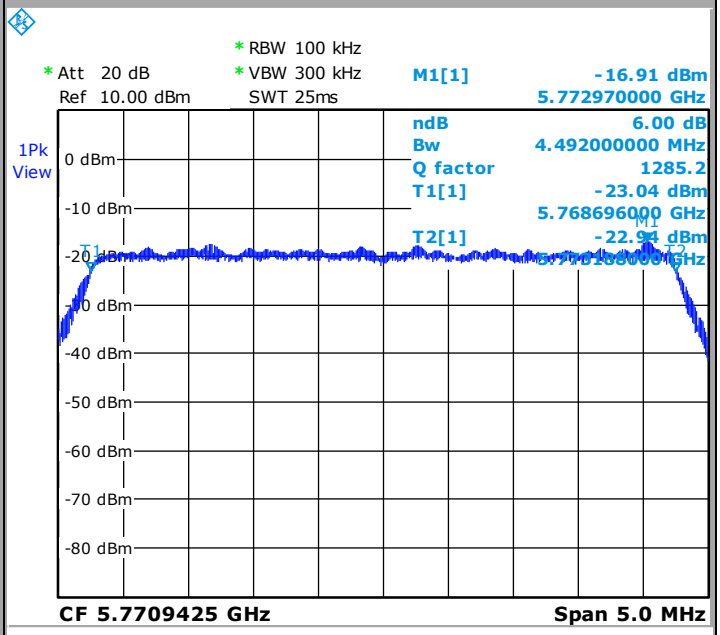
Configuration 10	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**

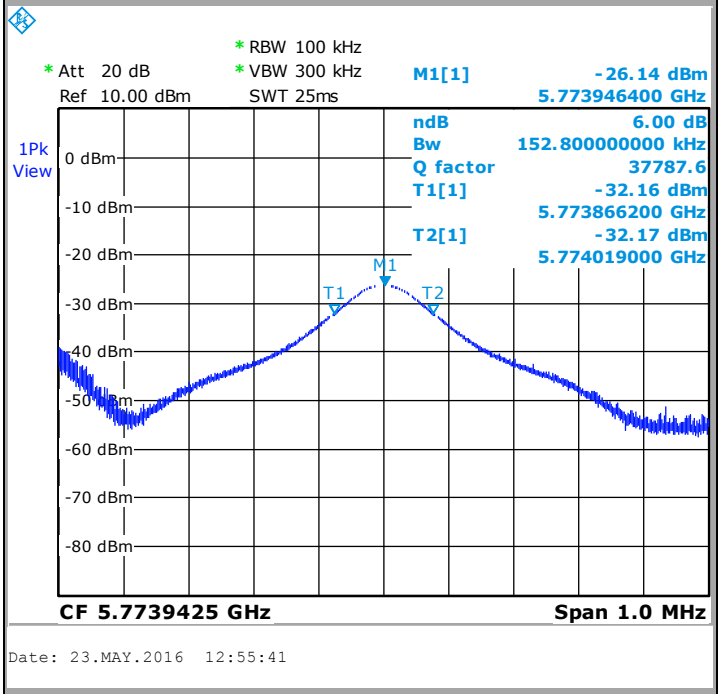
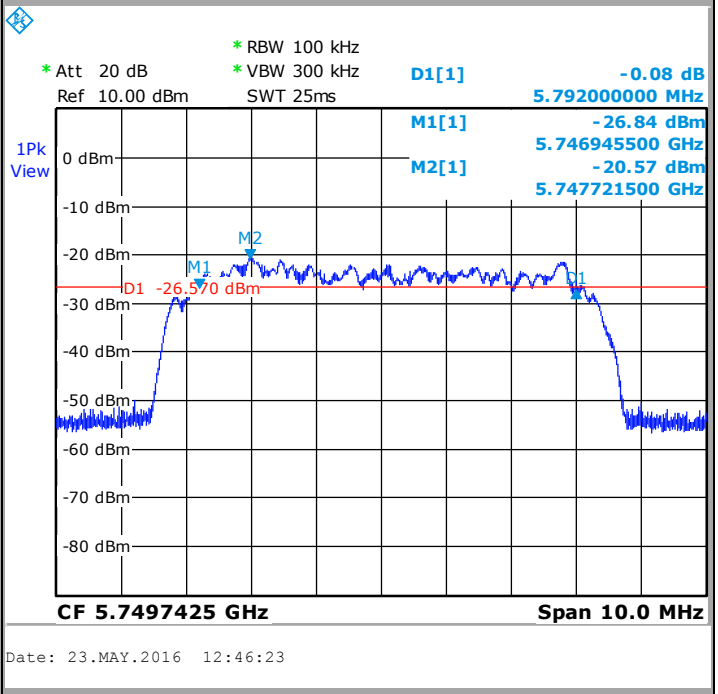




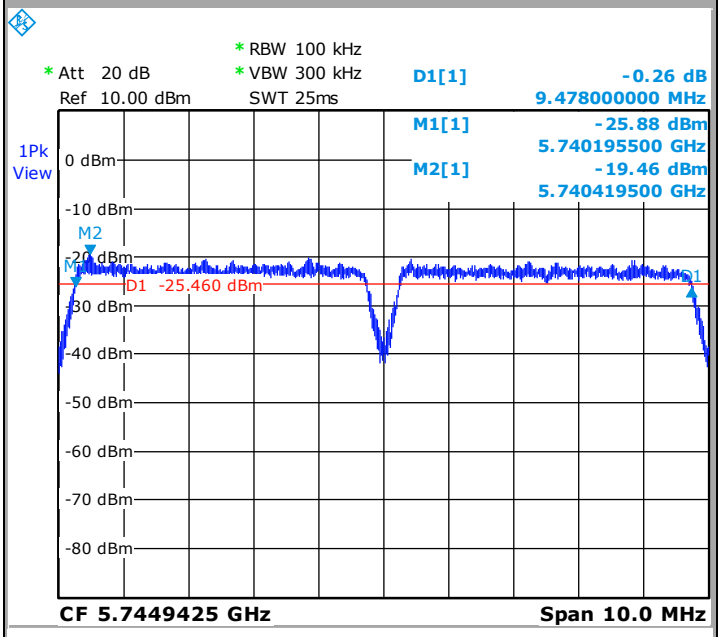
Configuration 10	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



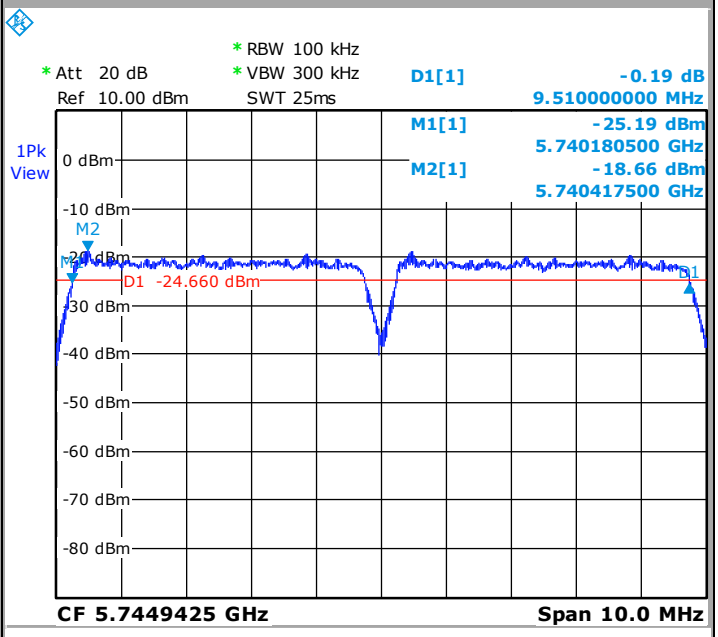


Configuration 10	
Tx1	**Tx2 C&M**
	

Configuration 11	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**

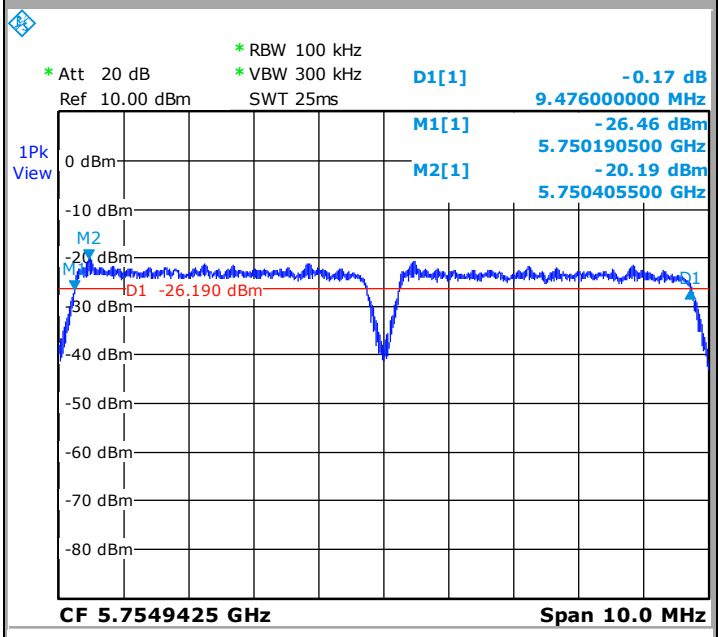


Date: 23.MAY.2016 13:04:43

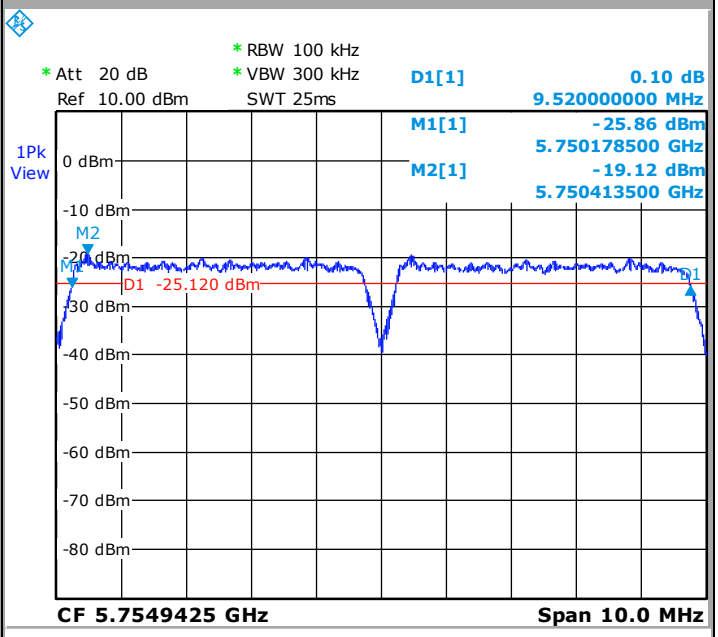


Date: 23.MAY.2016 13:20:47

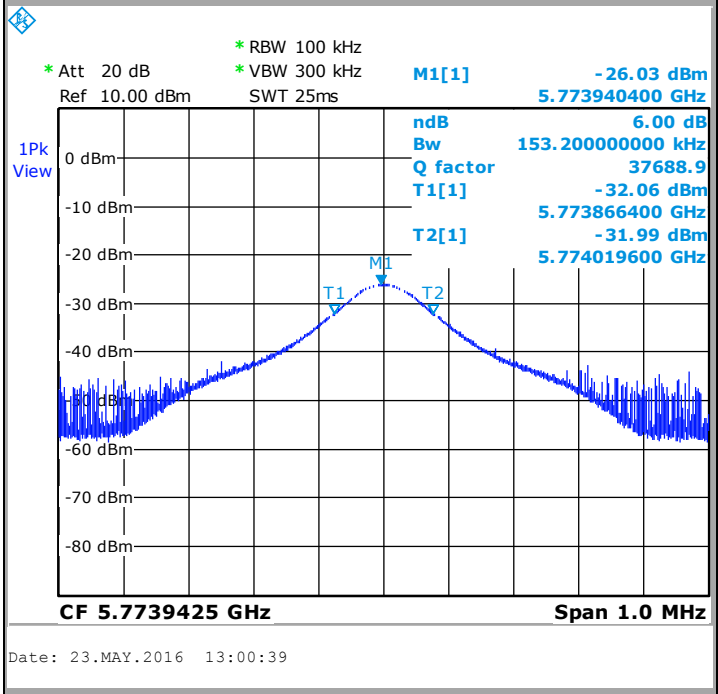
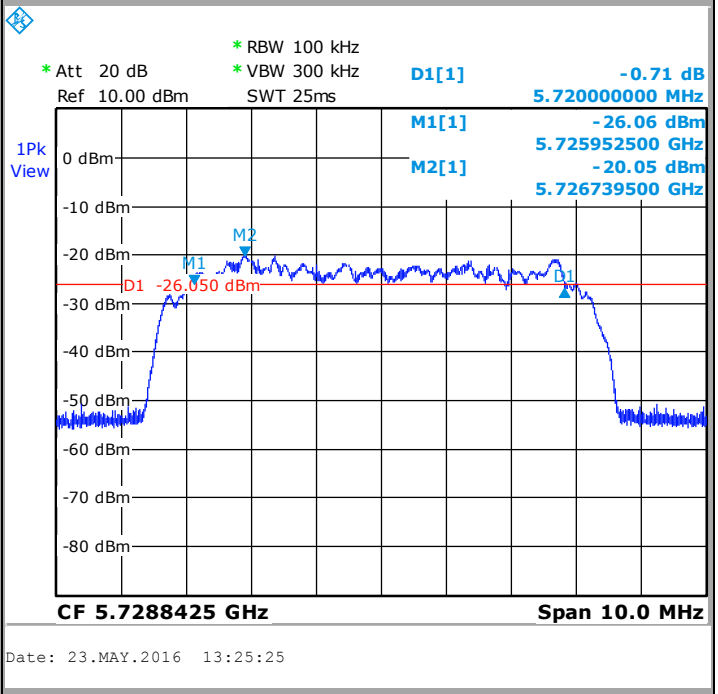
Configuration 11	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



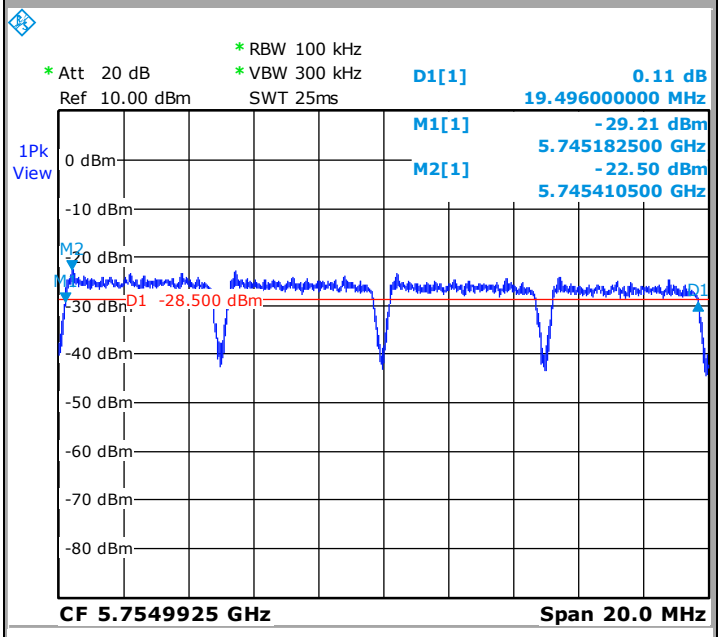
Date: 23.MAY.2016 13:08:35

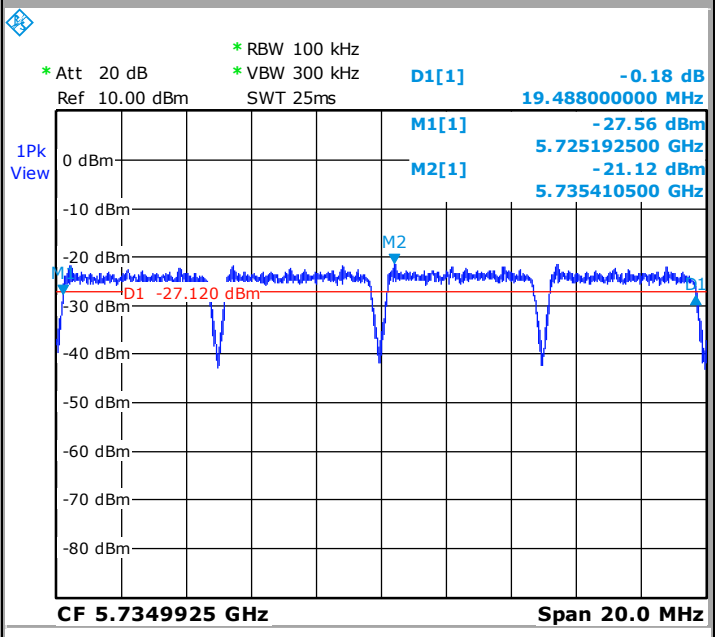


Date: 23.MAY.2016 13:16:00

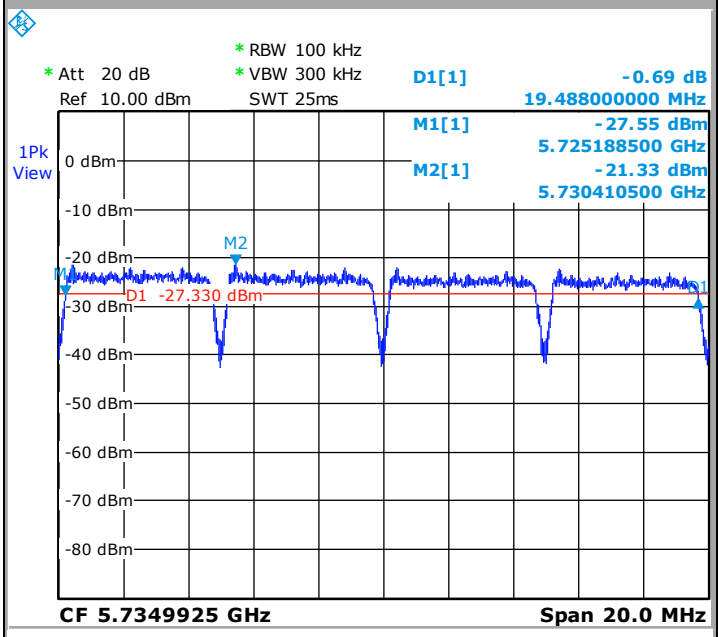
Configuration 11	
Tx1	**Tx2 C&M**
	

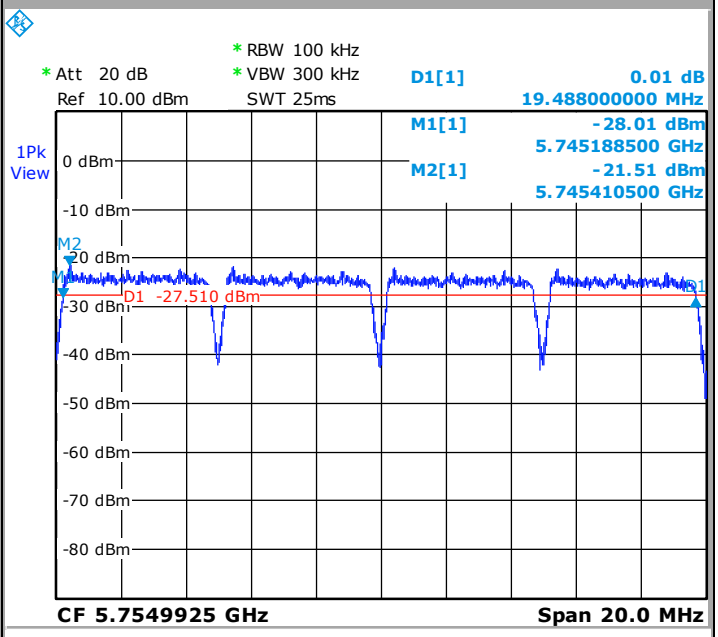
Configuration 12	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**



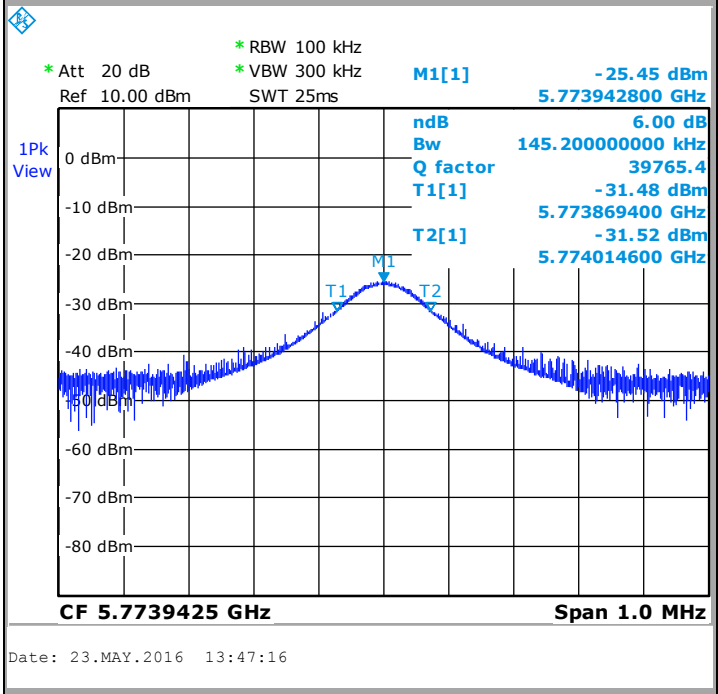


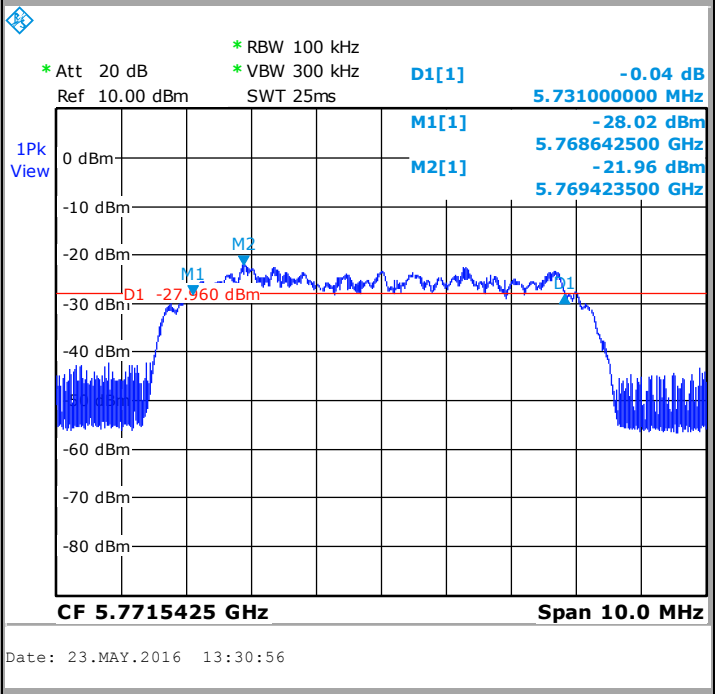
Configuration 12	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



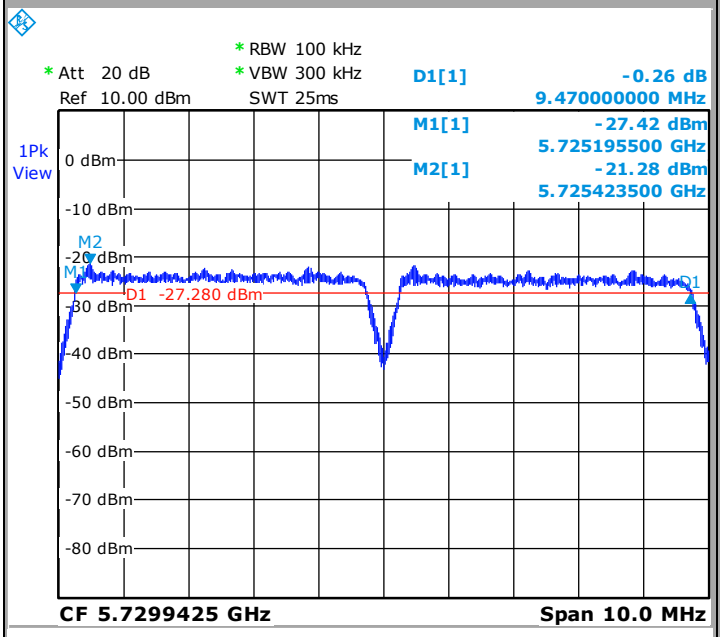


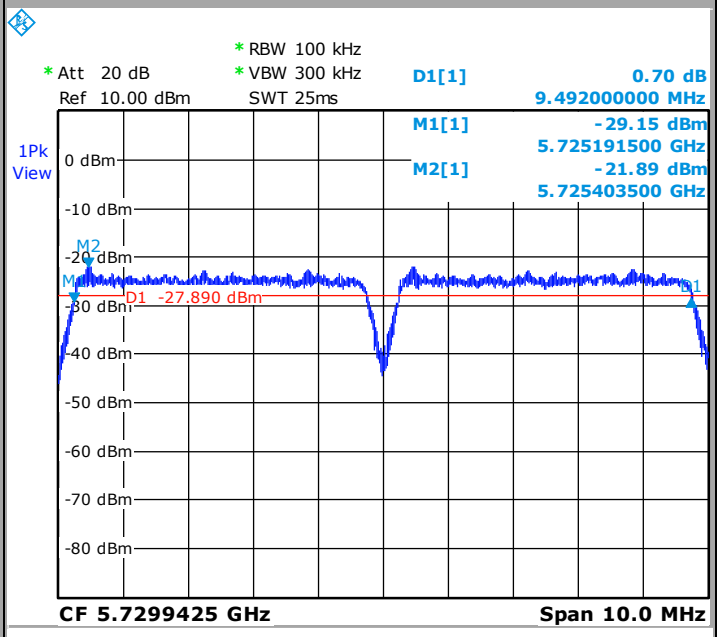
Configuration 12	
Tx1	**Tx2 C&M**



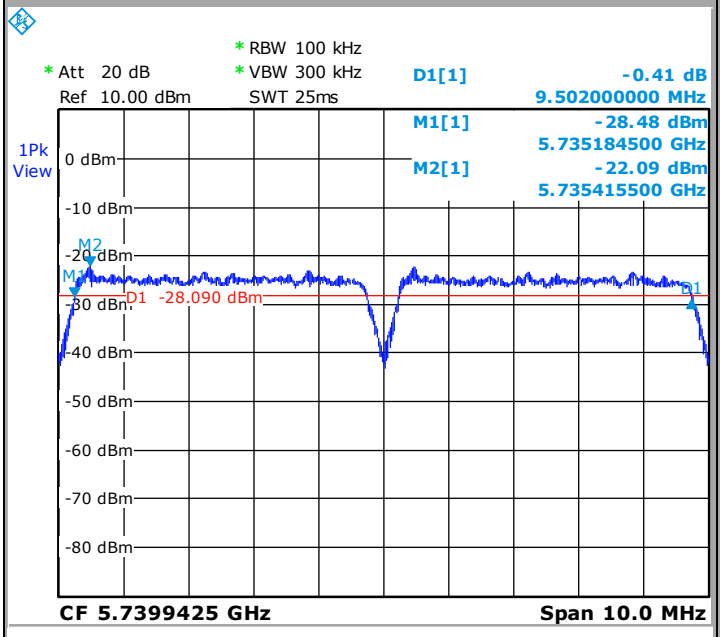


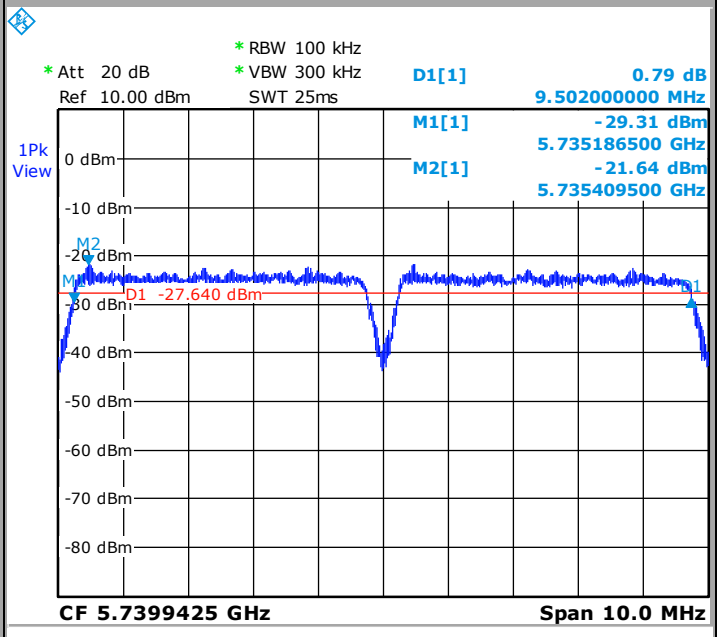
Configuration 13	
Tx1 IQ CPRI 1	**Tx2 IQ CPRI 1**



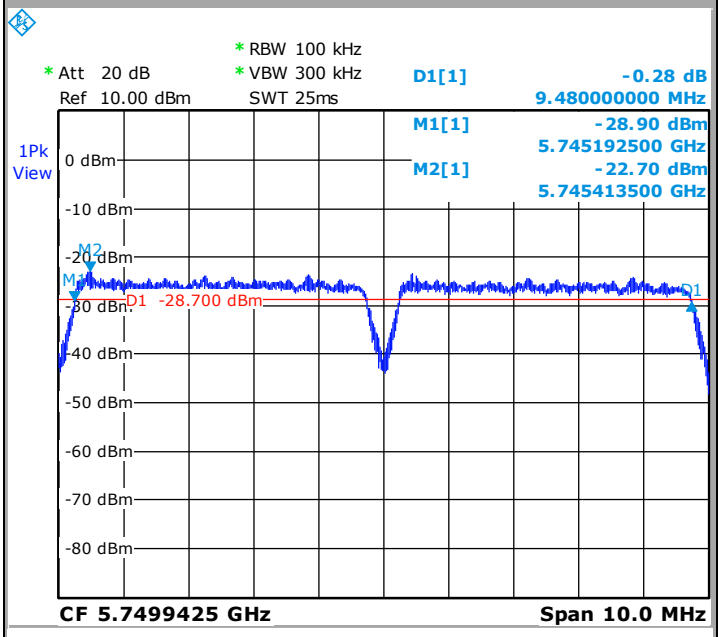


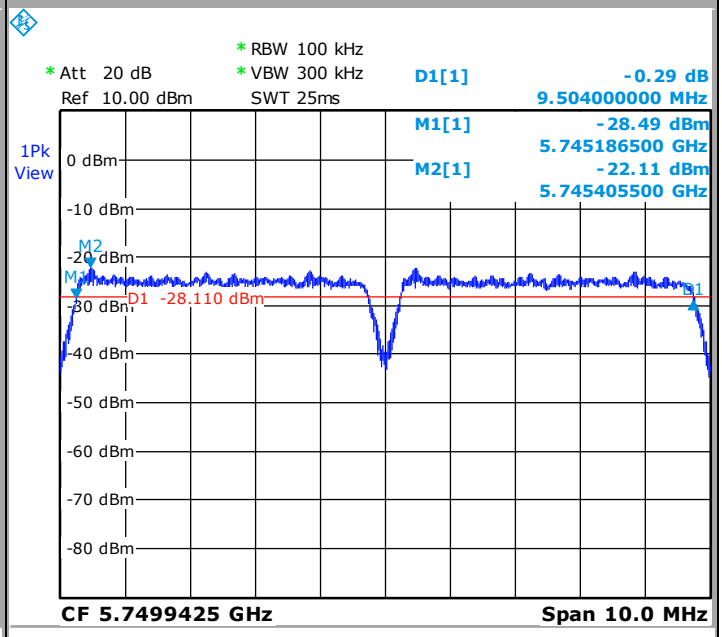
Configuration 13	
Tx1 IQ CPRI 2	**Tx2 IQ CPRI 2**



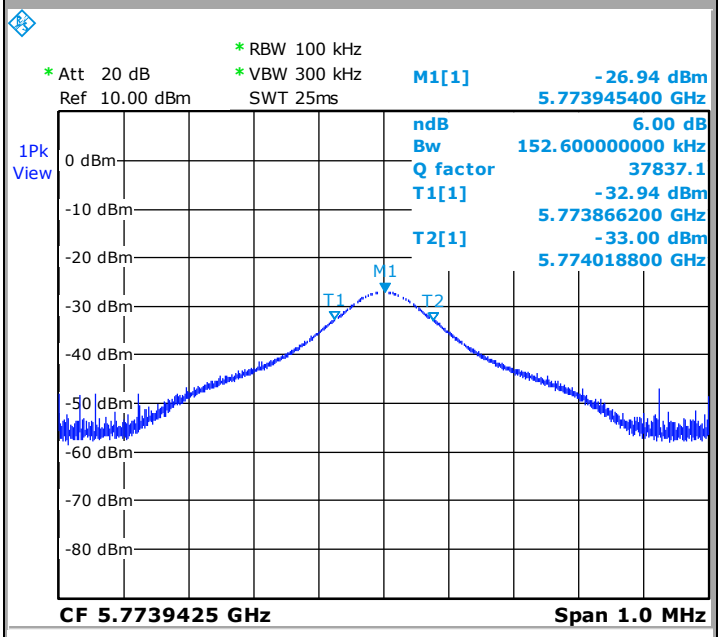


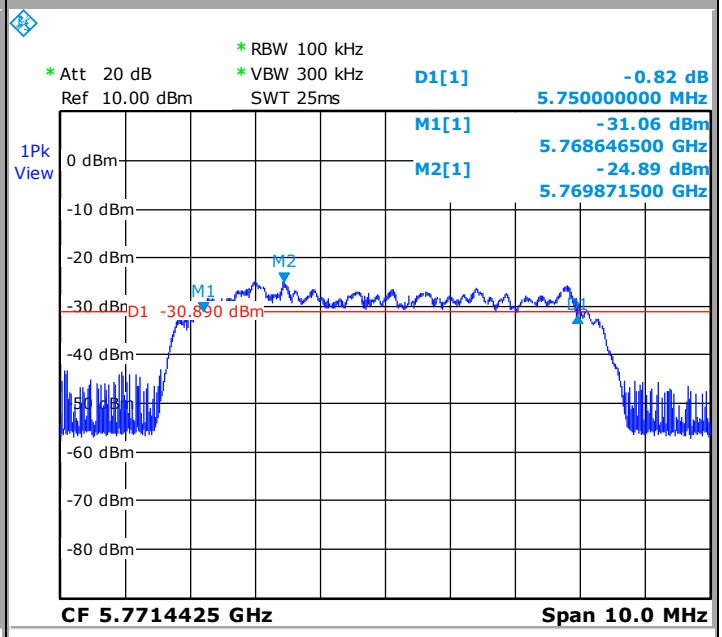
Configuration 13	
Tx1 IQ CPRI 3	**Tx2 IQ CPRI 3**





Configuration 13	
Tx1	**Tx2 C&M**





Configuration	Tx1 (MHz)	Tx2 (MHz)	Minimum 6dB Bandwidth (MHz)
1	13,674	19,200	13,674
2	13,634	19,183	13,634
3	13,633	19,197	13,633
4	13,661	19,181	13,661
5	13,579	19,211	13,579
6	13,613	19,206	13,613
7	4,646	10,246	4,646
8	9,671	15,239	9,671
9	19,638	25,258	19,638
10	9,13	14,794	9,13
11	19,107	24,756	19,107
12	39,129	44,707	39,129
13	28,605	34,248	28,605

5.7. CONCLUSION

6dB Bandwidth measurement performed on the sample of the product FL58R2EABW45-CEN, SN: EBL1613C0073, in configuration and description presented in this test report, show levels **conform to** the FCC 15.407 limits.

6. AC POWER LINE CONDUCTED EMISSIONS

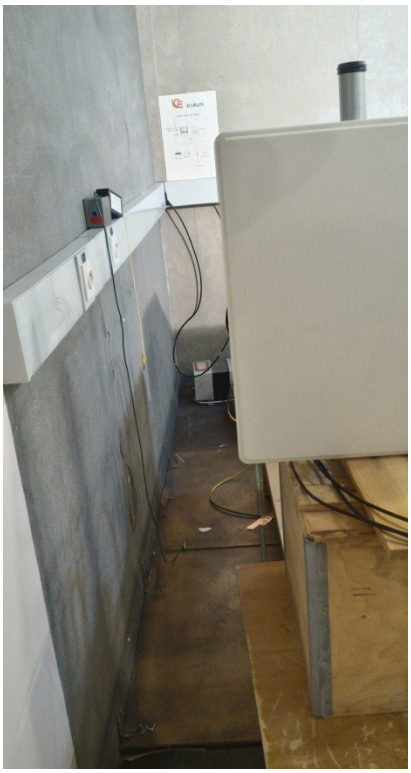
6.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : April 18th,2016
Ambient temperature : 21°C
Relative humidity : 53%

6.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT is powered through the LISN. Measurement is made with a receiver in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is 50Ω / 50µH. Interconnecting cables and equipment's were moved to position that maximized emission.

Photograph for AC Power Line Conducted Emissions (Front View)



Photograph for AC Power Line Conducted Emissions (Rear View)

6.3. LIMIT

AC Power Line Conducted Emissions shall not exceed value below:

Quasi-Peak
0,15kHz to 0,5MHz: 66dBµV to 56dBµV*
0,5MHz to 5MHz: 56dBµV
5MHz to 30MHz: 60dBµV

Average
0,15kHz to 0,5MHz: 56dBµV/m to 46dBµV*
0,5MHz to 5MHz: 46dBµV
5MHz to 30MHz: 50dBµV

*Decreases with the logarithm of the frequency

6.4. TEST EQUIPMENT LIST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642019	2016-03	2017-03
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2015-06	2016-06
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649007	2015-07	2016-07
Cable	-	-	A5329417	2015-10	2016-10
Ground plane	LCIE	-	-	-	-

Note: In our system quality, the calibration due is more & less 2 months.

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

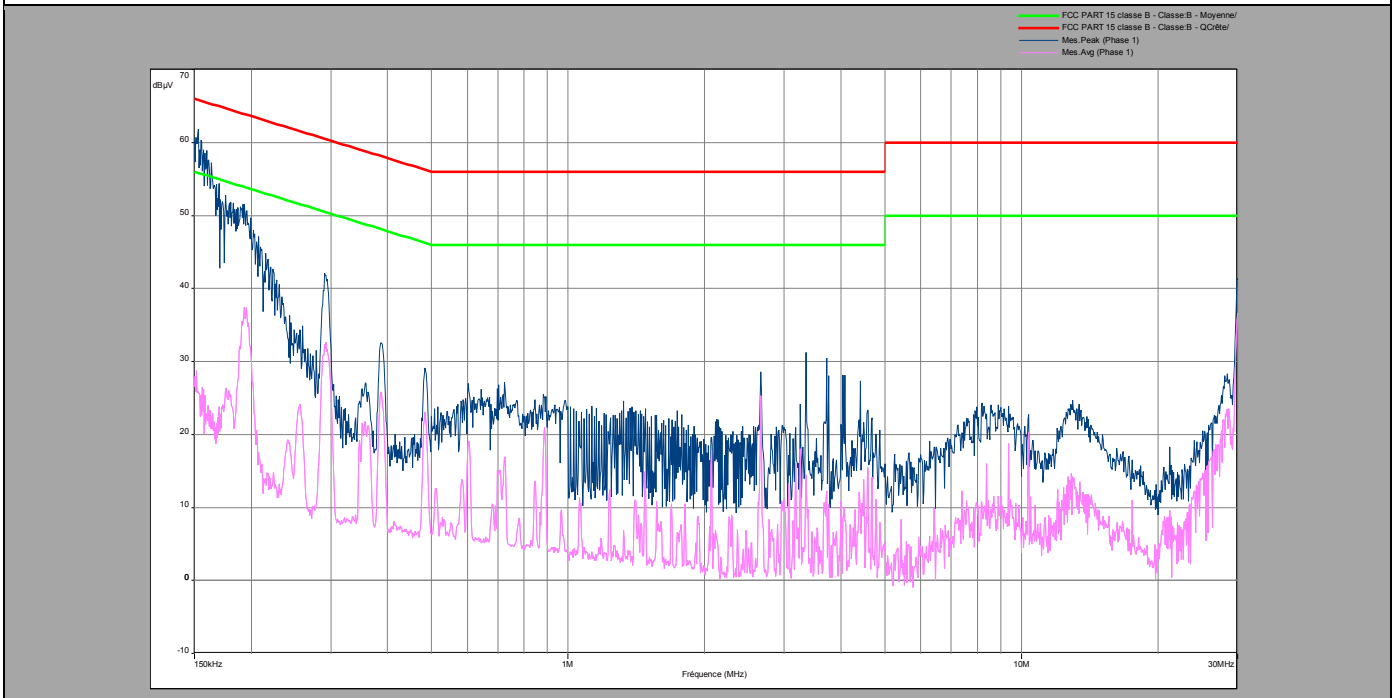
☒None ☐Divergence:

6.6. GRAPHICS & RESULTS

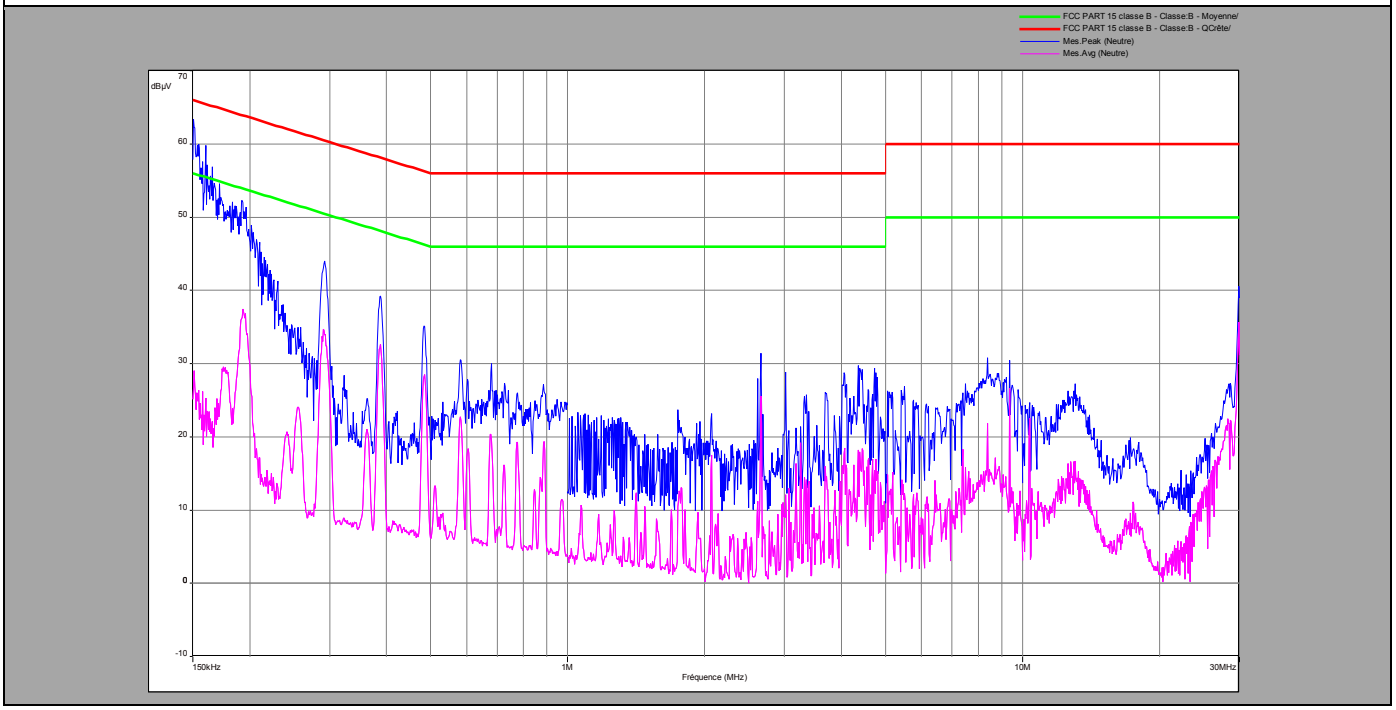
Configuration 1

AC Power Line Conducted Emissions

Phase Line



Neutral Line



Configuration 1					
Phase Line					
Frequencies (kHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Average Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Limit (dBµV)
153	61.8	-	28	65.8	55.8
291	41.7	-	32.7	60.5	50.5
2660	28.5	-	25.3	56	46
9376	24	-	19.6	60	50
29950	41.2	-	36.6	60	50
Neutral Line					
Frequencies (kHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Average Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Limit (dBµV)
151	62.3	-	29	65.8	55.8
291	43.7	-	34.7	60.5	50.5
2664	31.4	-	25	56	46
9376	30.4	-	26.6	60	50
29950	40.5	-	35.7	60	50

6.7. CONCLUSION

AC Power Line Conducted Emissions measurement performed on the sample of the product FL58R2EABW45-CEN, SN: EBL1613C0073, in configuration and description presented in this test report, show levels **conform to** the FCC 15.407 limits.

7. UNWANTED EMISSIONS & UNDESIRABLE EMISSION

7.1. TEST CONDITIONS

Test performed by : Laurent DENEUX & Arnaud FAYETTE
Date of test : April and May 2016
Ambient temperature : 17 to 23°C
Relative humidity : 45 to 55%

7.2. TEST SETUP

- The Equipment under Test is installed:
☒SAR ☒OATS

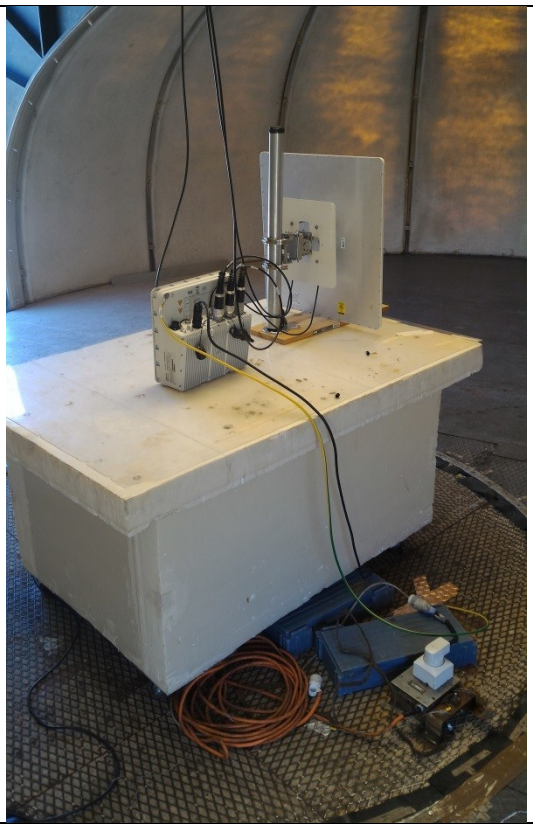
- Distance between EUT and the measuring antenna is:
☒3m ☒10m

- Choice of measuring antenna below 1GHz:
☒Bilog ☐Log periodic ☐Biconic ☐Dipole antenna

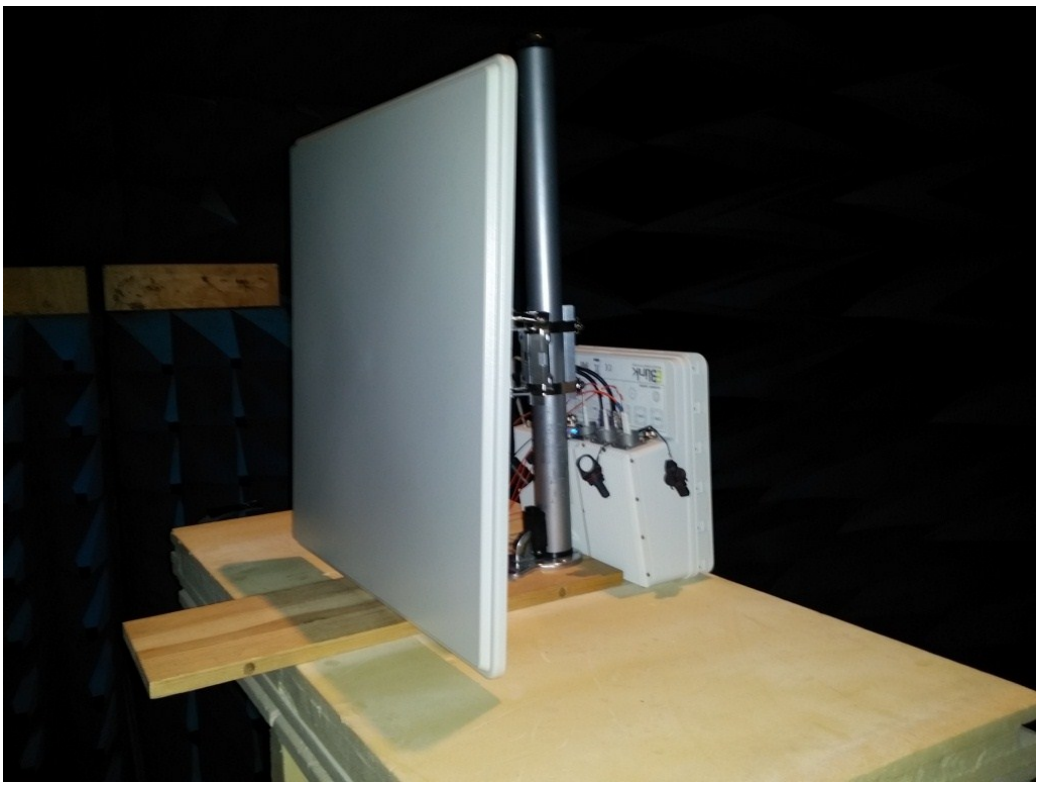
- Choice of measuring antenna above 1GHz:
☒Horn

The product has been tested according to ANSI C63.10 (2013). Test is performed in horizontal (H) and vertical (V) polarization. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height search was performed from 1 to 4m.

Photograph for Unwanted Emissions

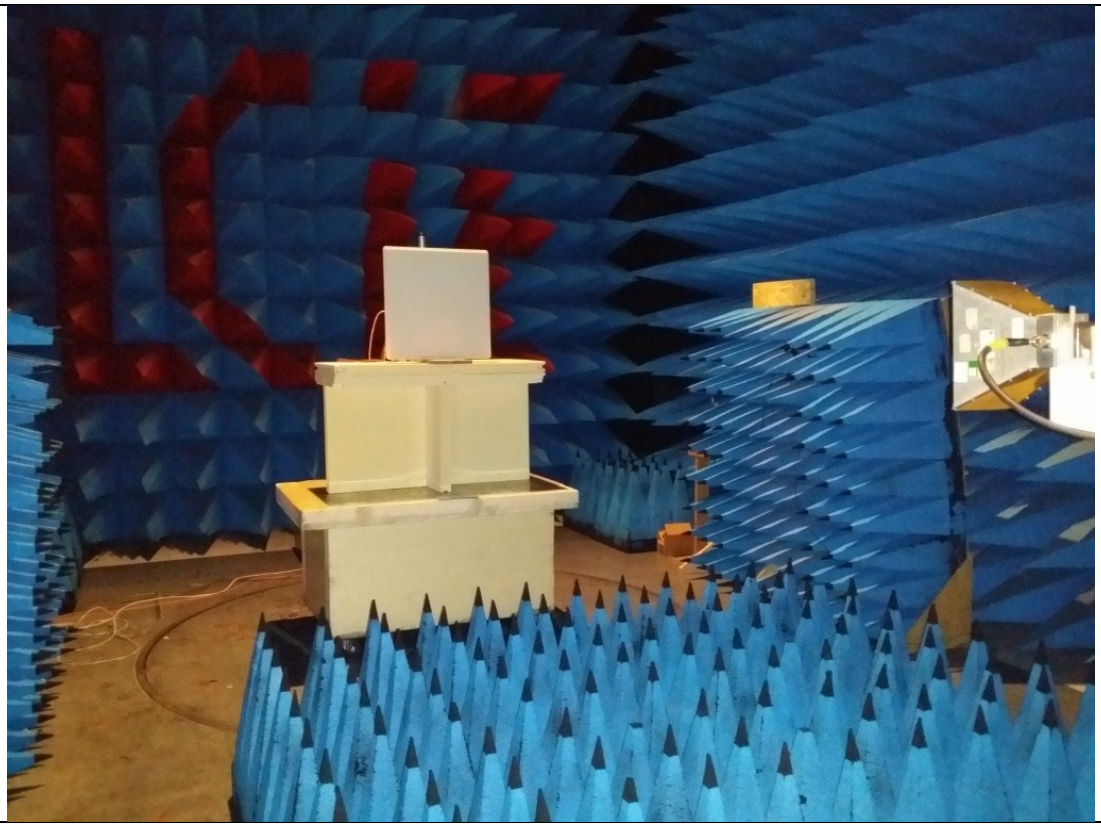


Photograph for Unwanted Emissions

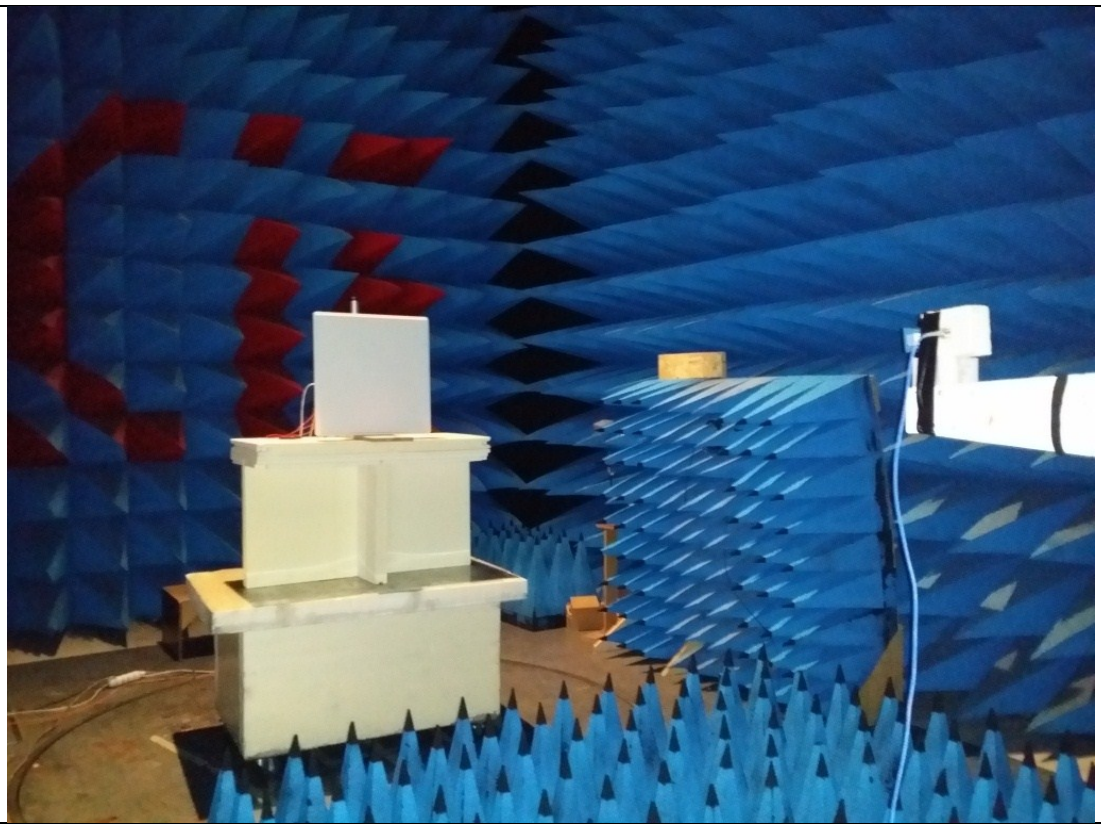


Photograph for Unwanted Emissions

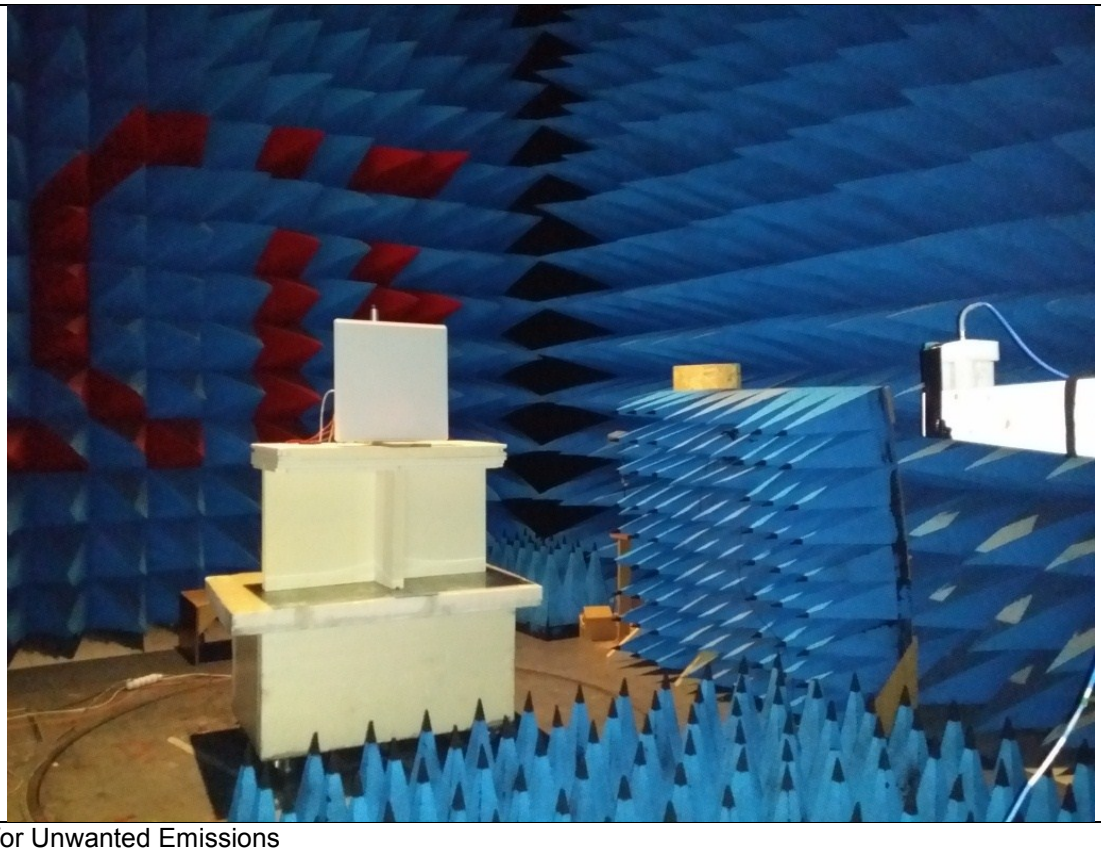
Photograph for Unwanted Emissions



Photograph for Unwanted Emissions



Photograph for Unwanted Emissions



Photograph for Unwanted Emissions

7.3. LIMIT

Unwanted Emissions shall not exceed value below:
30MHz to 88MHz: 29.5dBµV/m QPeak
88MHz to 216MHz: 33dBµV/m QPeak
216MHz to 960MHz: 35.5BµV/m QPeak
960MHz to 1000MHz: 43.5dBµV/m QPeak
Above 1000MHz: 63.5dBµV/m Peak
43.5dBµV/m Average

All emissions shall be limited to a level of −27 dBm/MHz (68.2dBµV/m) at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz (105.2dBµV/m) at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz (110.8dBµV/m) at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz (122.2dBµV/m) at the band edge.

7.4. TEST EQUIPMENT LIST

Test	Appareil	Marque	Type	Immatriculation	Cal. date	Cal. Due
Open area test site						
X	Open test site	LCIE	-	F2000400	2015-06	2016-06
X	EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2016-03	2017-03
X	Bilog antenna	CHASE	CBL 6112A	C2040040	2016-01	2017-01
X	Cable	-	-	A5329449	2015-11	2016-11
X	Cable	-	-	A5329368	2015-11	2016-11
X	cable	-	-	A5329444	2015-11	2016-11
X	Preamplifier	LCIE; LCIE	LCIE-ALB-001	A7080073	2015/06	2016/06
X	EMI receiver	ROHDE & SCHWARZ	ESI40 1088 740K40	A2642010	2015/05	2016/05
X	EMI receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015/12	2016/12
X	RF cable	RADIALL; CDI	30990-7M	A5329711	2016/03	2017/03
X	Measurement RF cable	-	Cordon 082-5454-1.5mtr	A5329624	2015/12	2016/12
X	Measurement RF cable	-	082-0404-1MTR	A5329625	2015/10	2016/10
X	Measurement RF cable	-	-	A5329626	2015/10	2016/10
X	Horn antenna	EMCO	3115	C2042018	2015/05	2016/05
X	Measurement horn antenna 18-26,5GHz	PASTERNACK	PE9852/2F-20	C2042048	2015/05	2017/05
X	Horn antenna 26,5-40GHz	PASTERNACK	PE9850/2F-20	C2042052	2016/04	2018/04
X	Filter	MICRO-TRONICS	HPS17421	A7484059	2015/07	2016/07

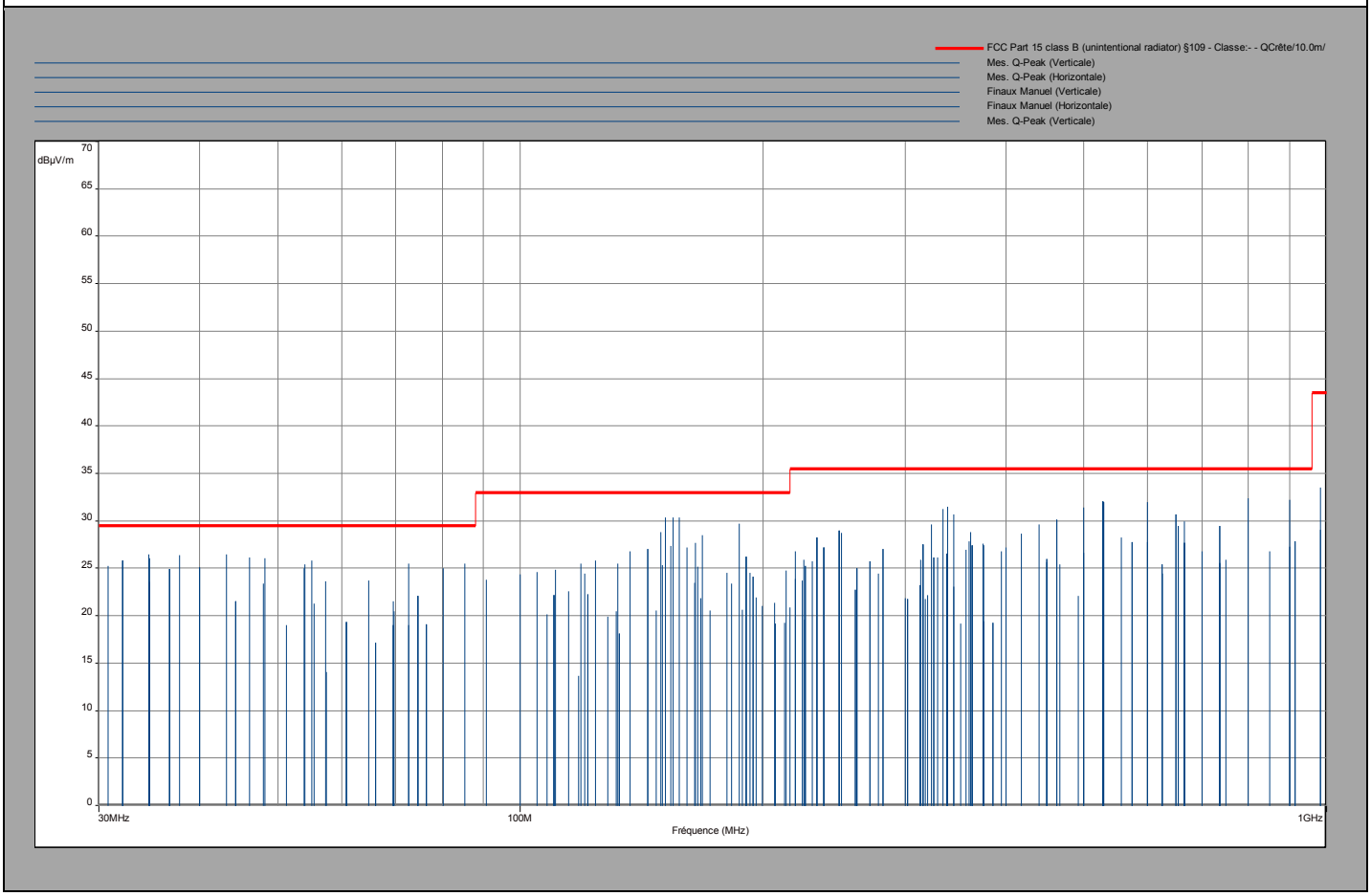
Note: In our system quality, the calibration due is more & less 2 months.

7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒None ☐Divergence:

7.6. GRAPHICS & RESULTS

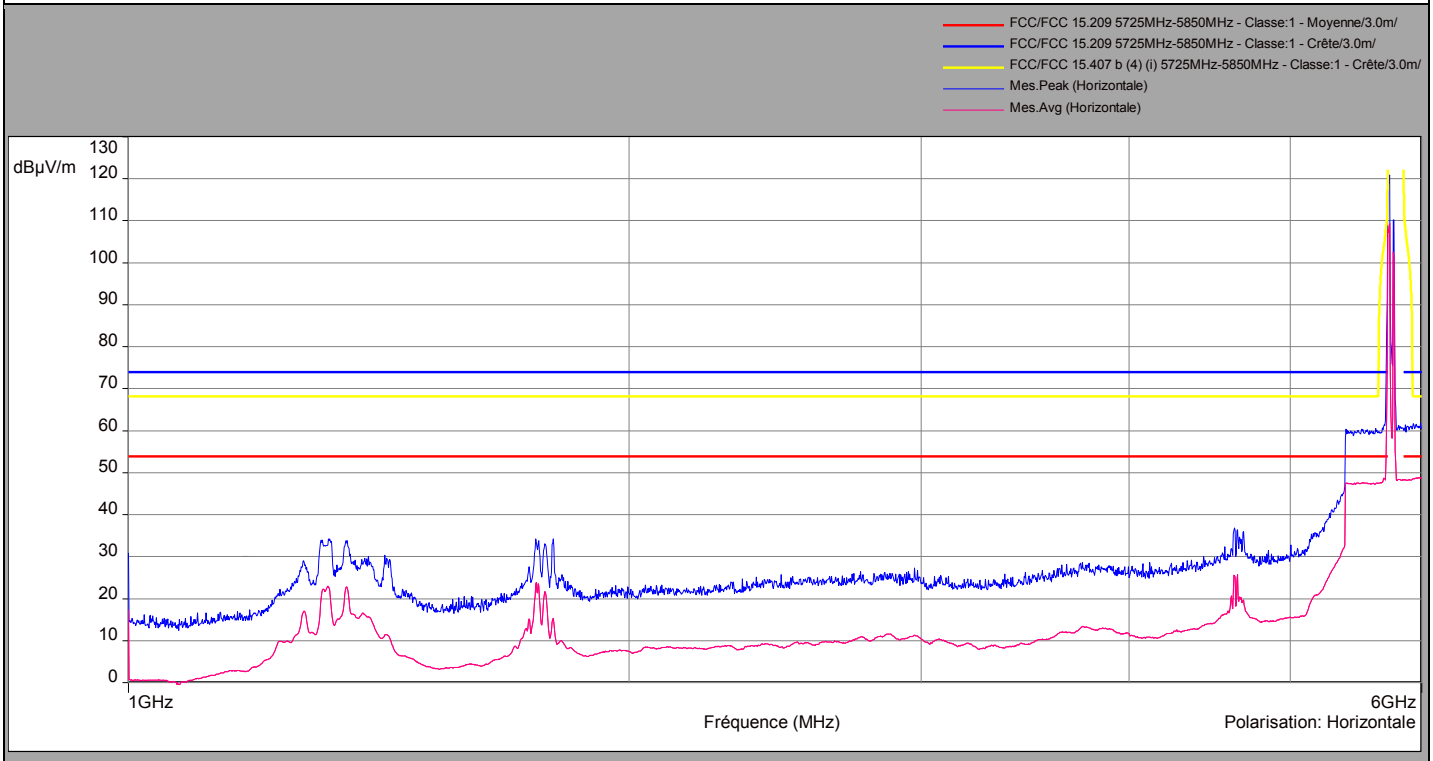
Configuration 1
Below 1GHz



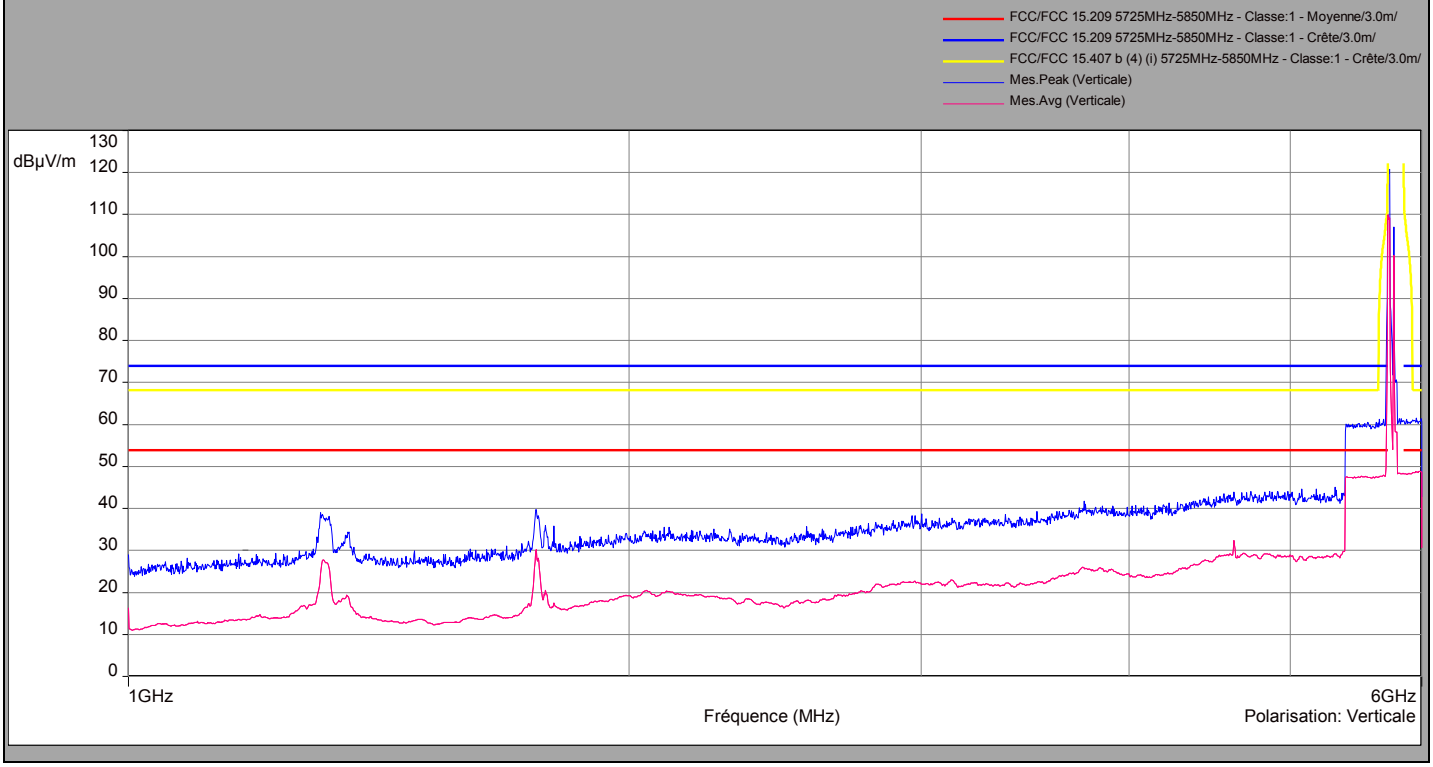
Configuration 1

Above 1GHz

Vertical Polarization



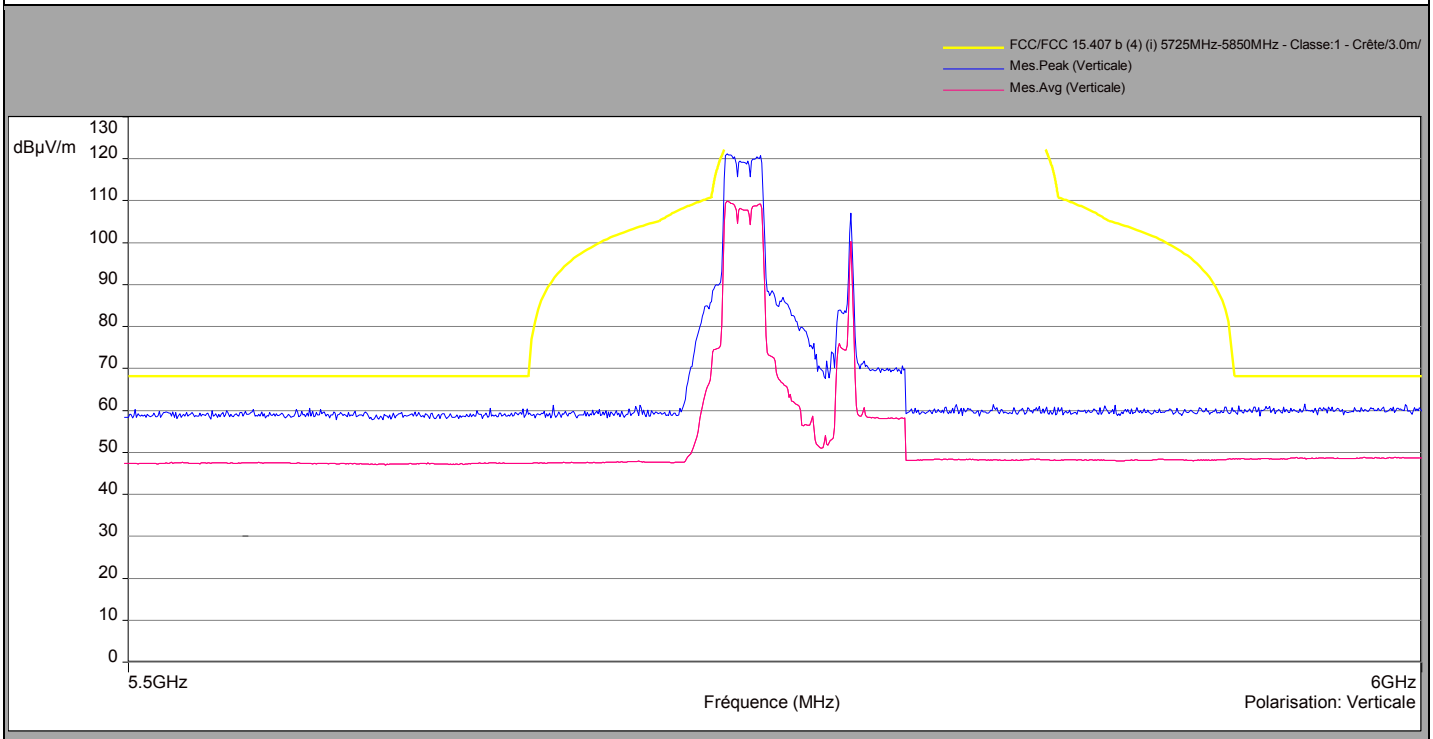
Horizontal Polarization



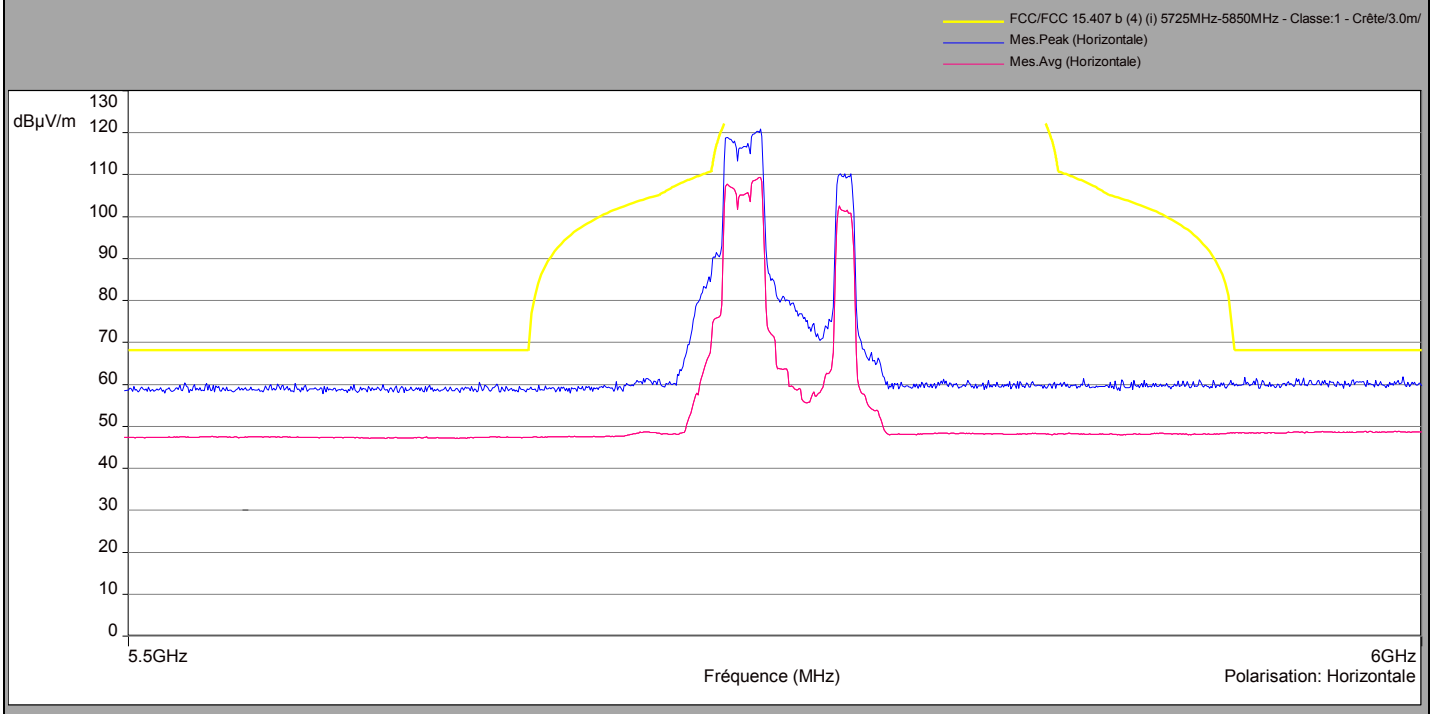
Configuration 1

Above 1GHz

Vertical Polarization



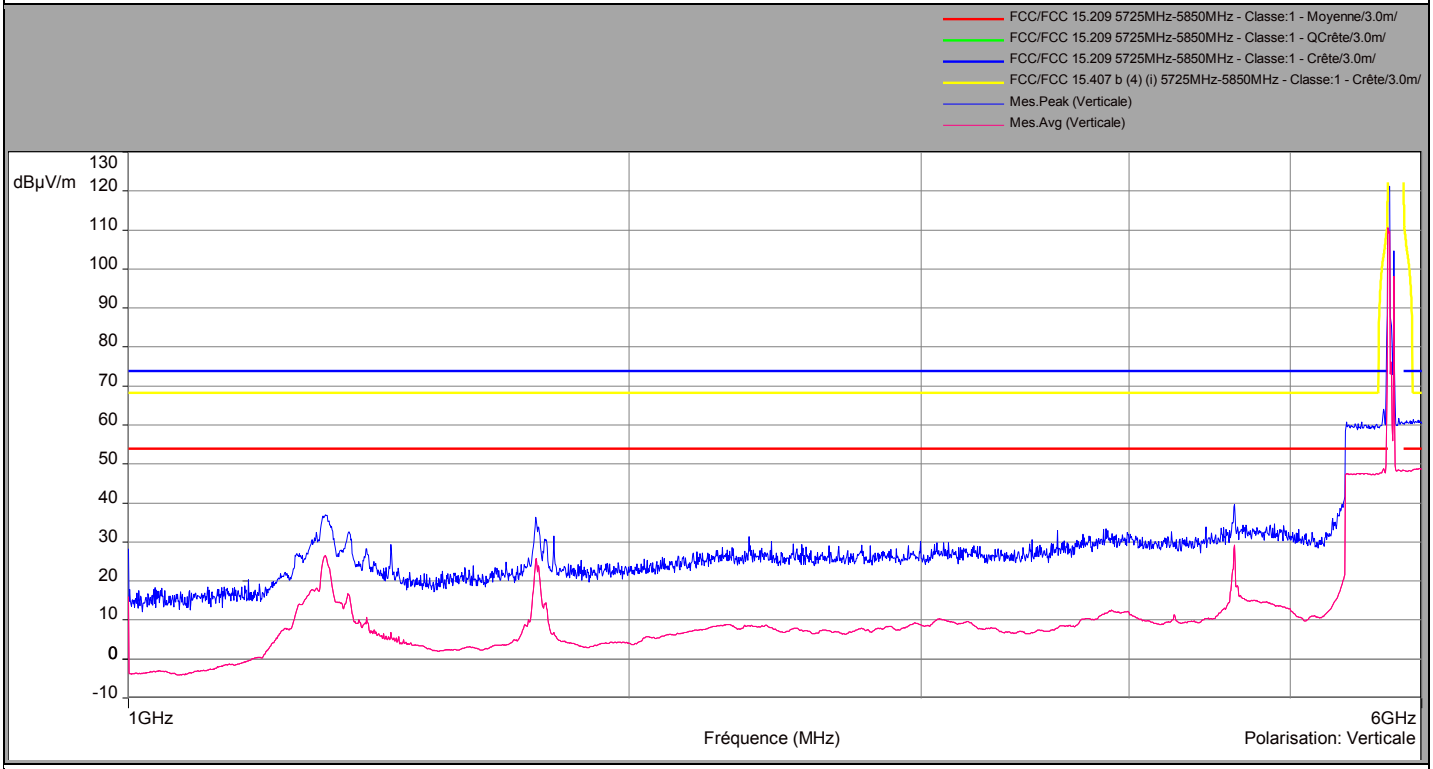
Horizontal Polarization



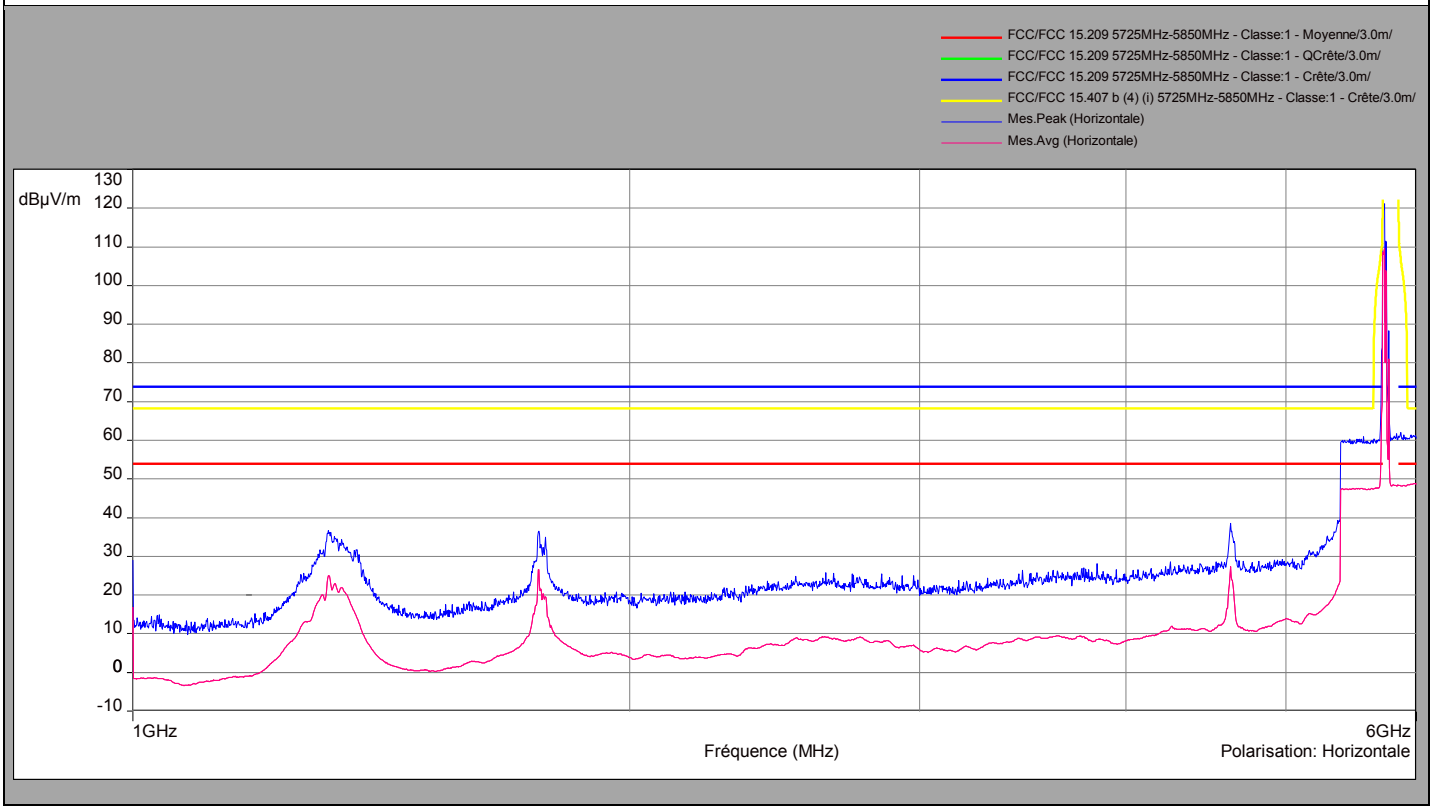
Configuration 2

Above 1GHz

Vertical Polarization



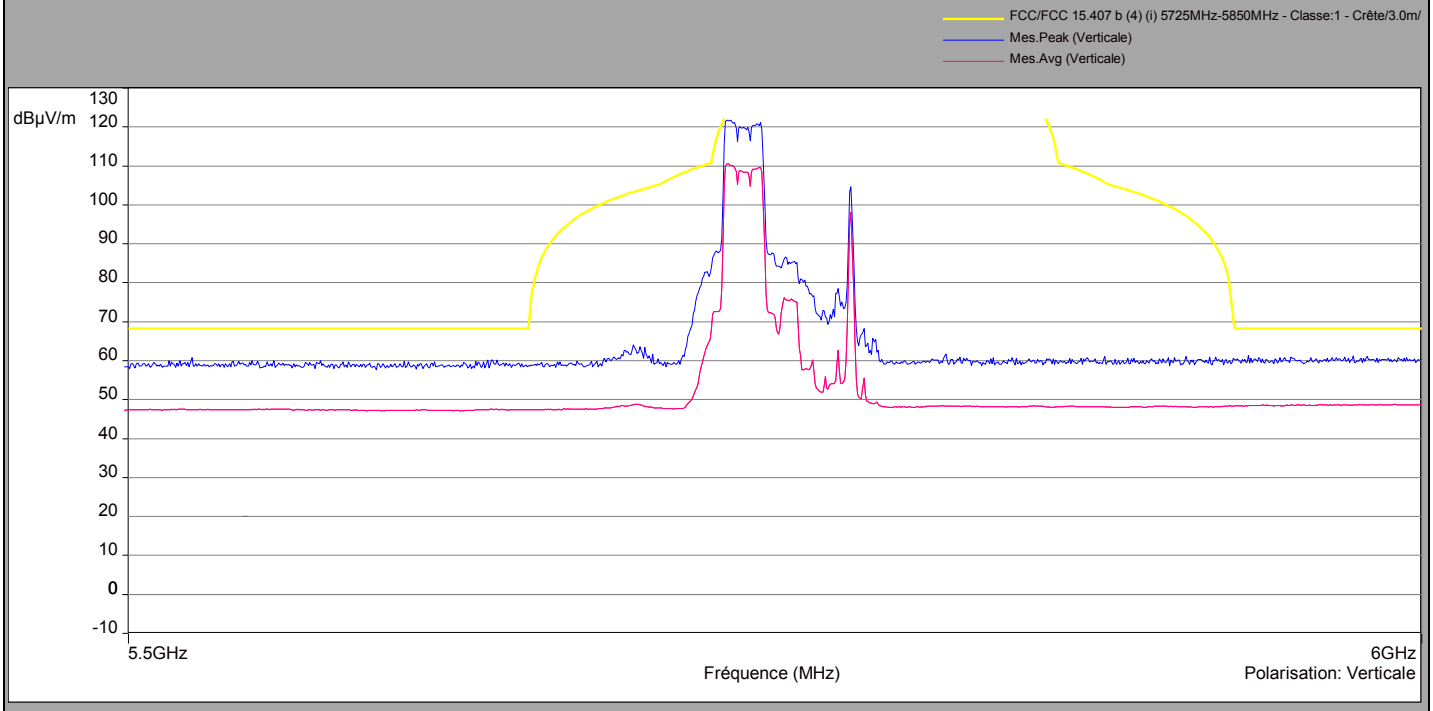
Horizontal Polarization



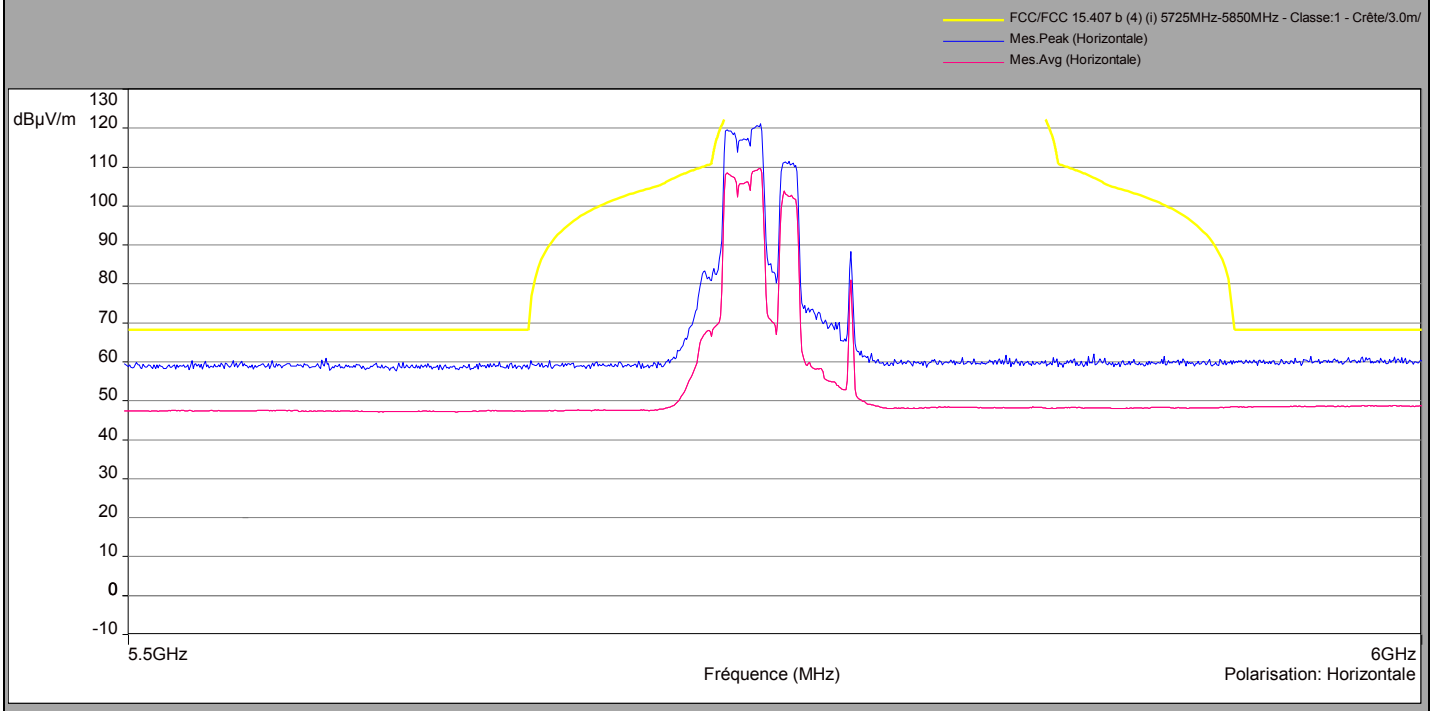
Configuration 2

Above 1GHz

Vertical Polarization



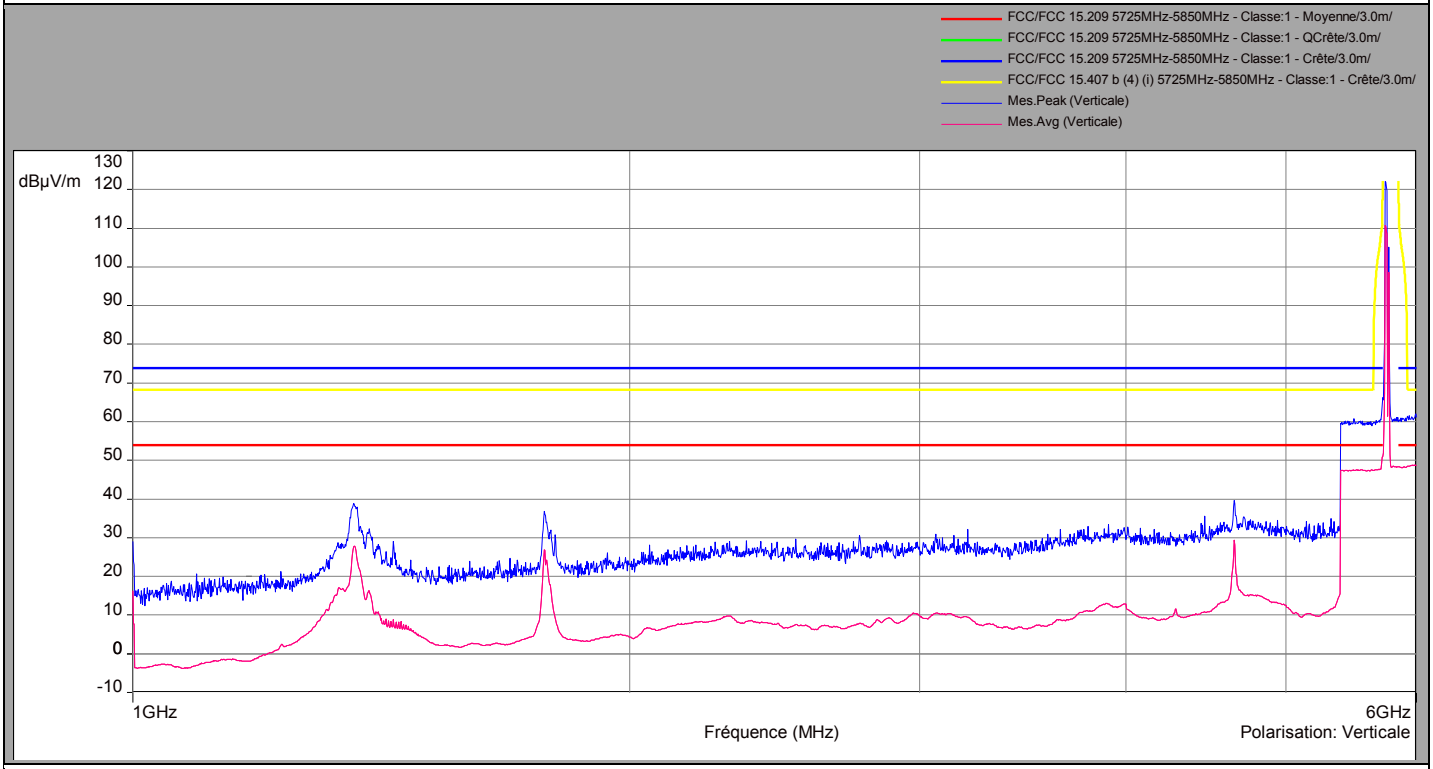
Horizontal Polarization



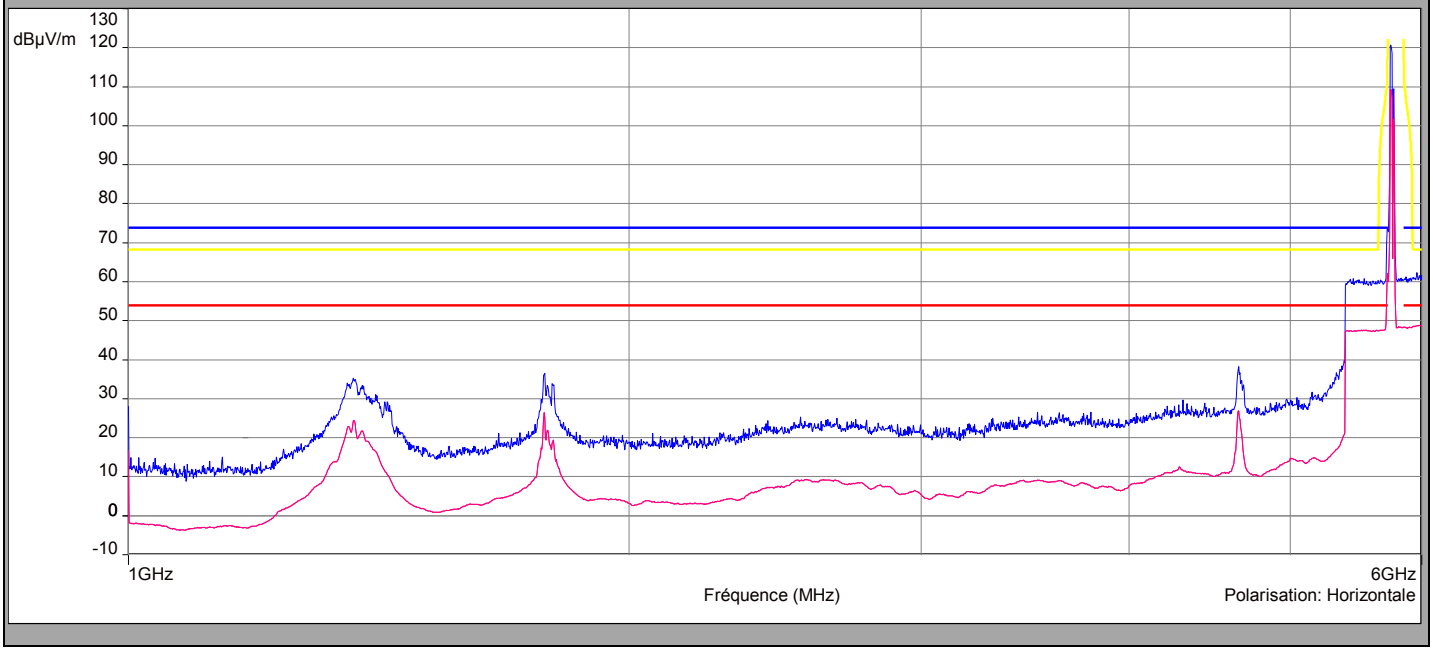
Configuration 3

Above 1GHz

Vertical Polarization



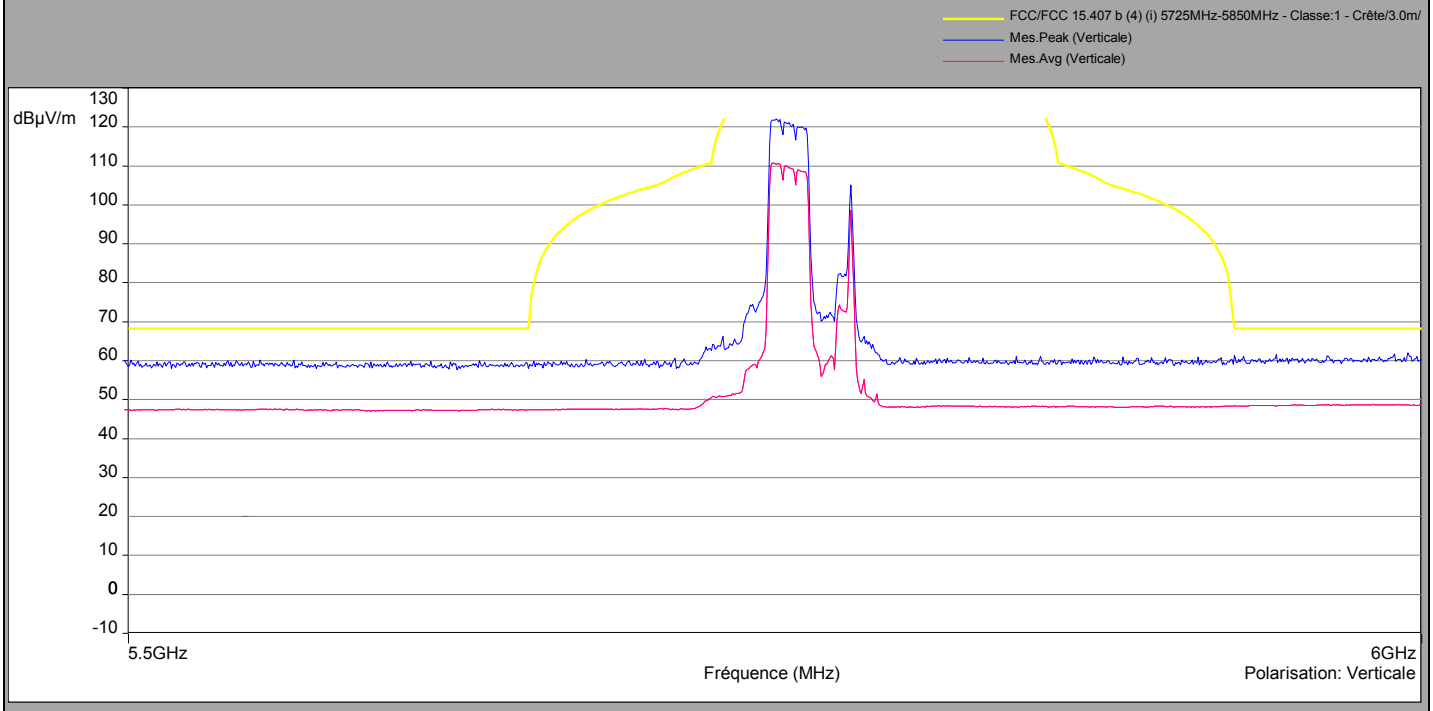
Horizontal Polarization



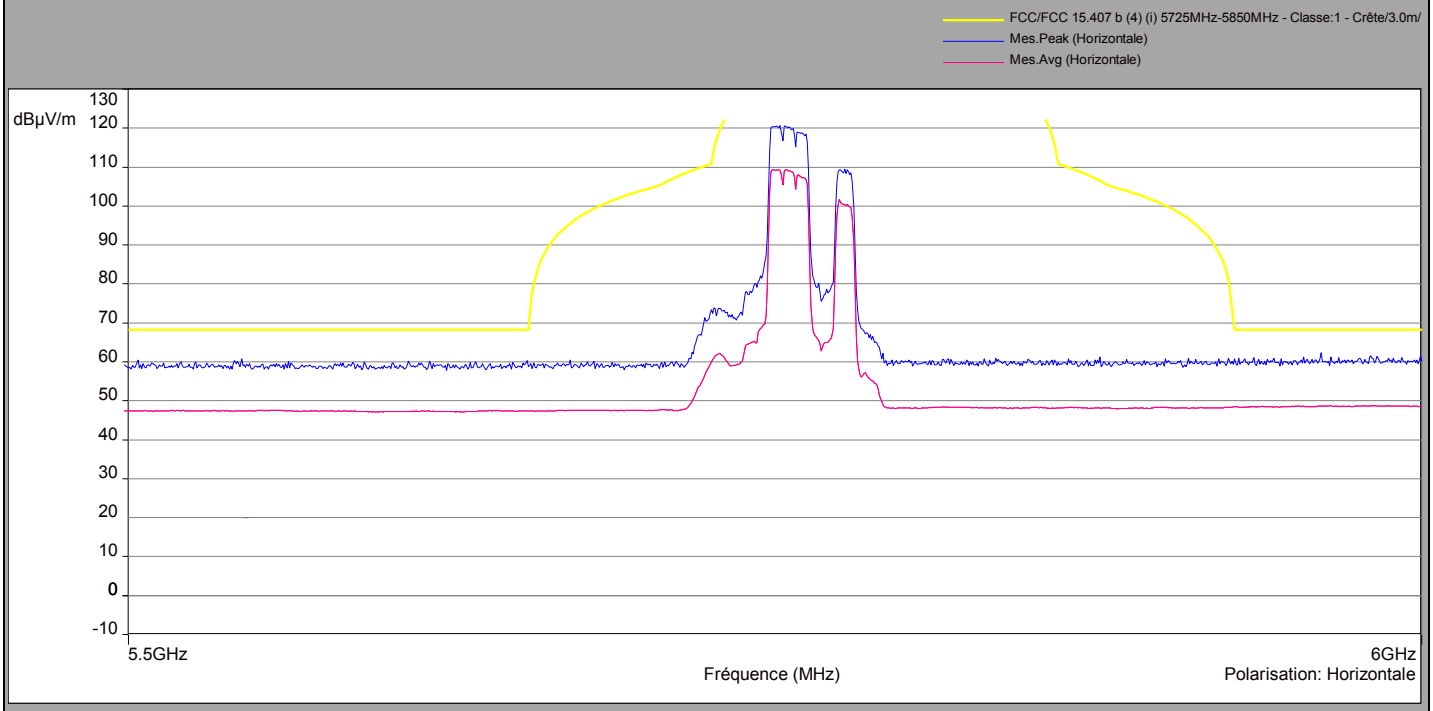
Configuration 3

Above 1GHz

Vertical Polarization



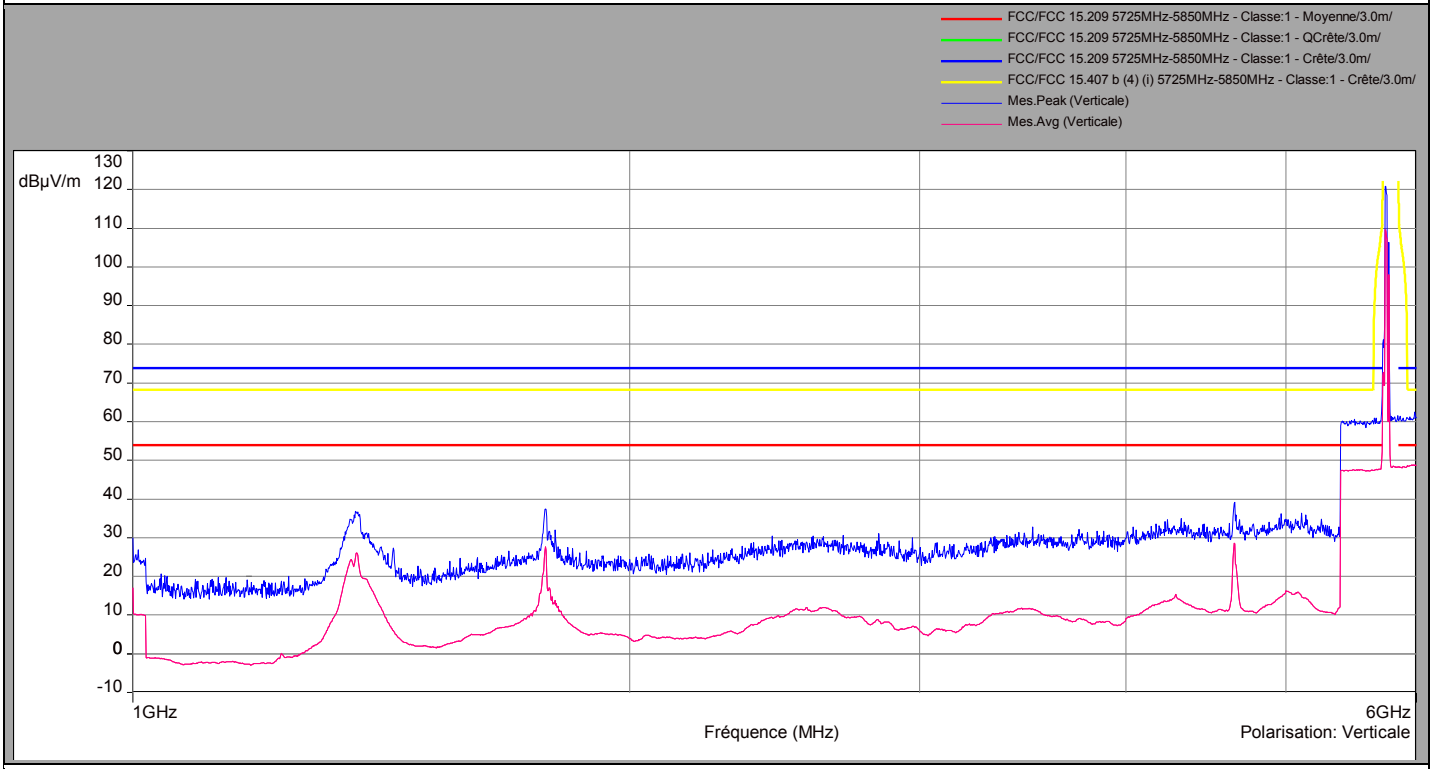
Horizontal Polarization



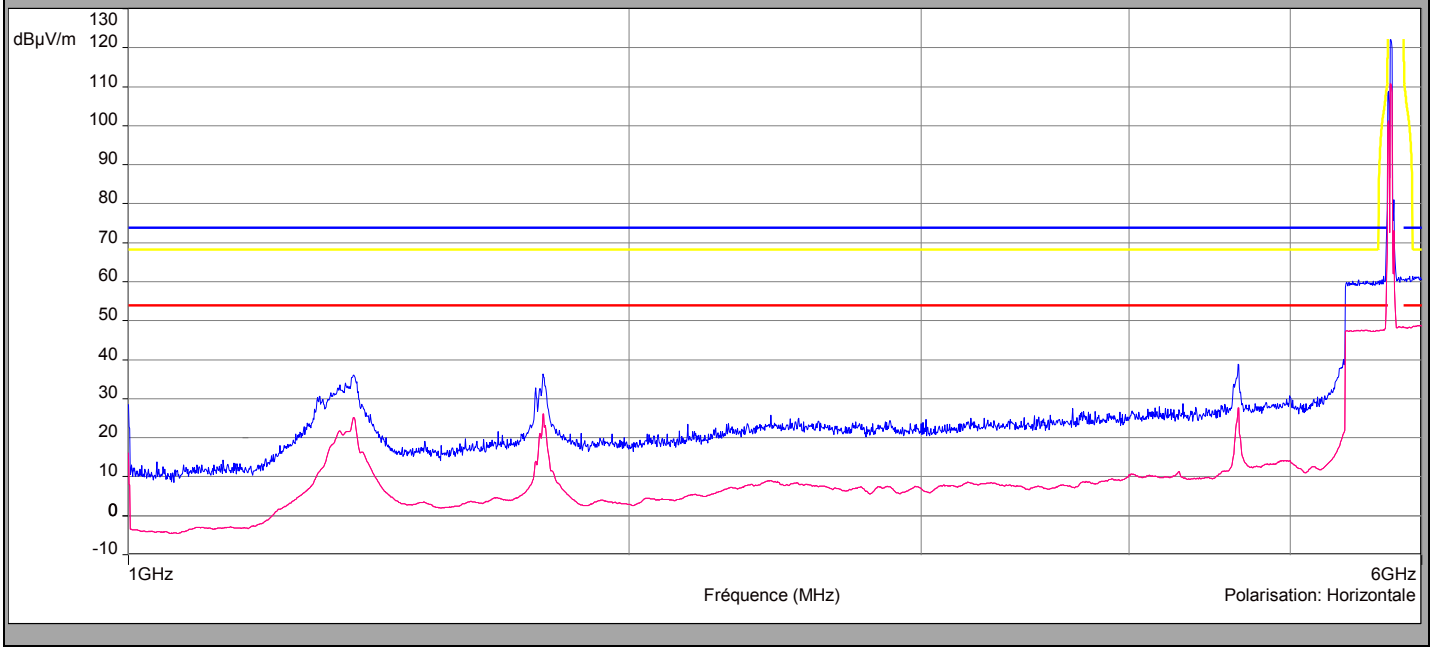
Configuration 4

Above 1GHz

Vertical Polarization



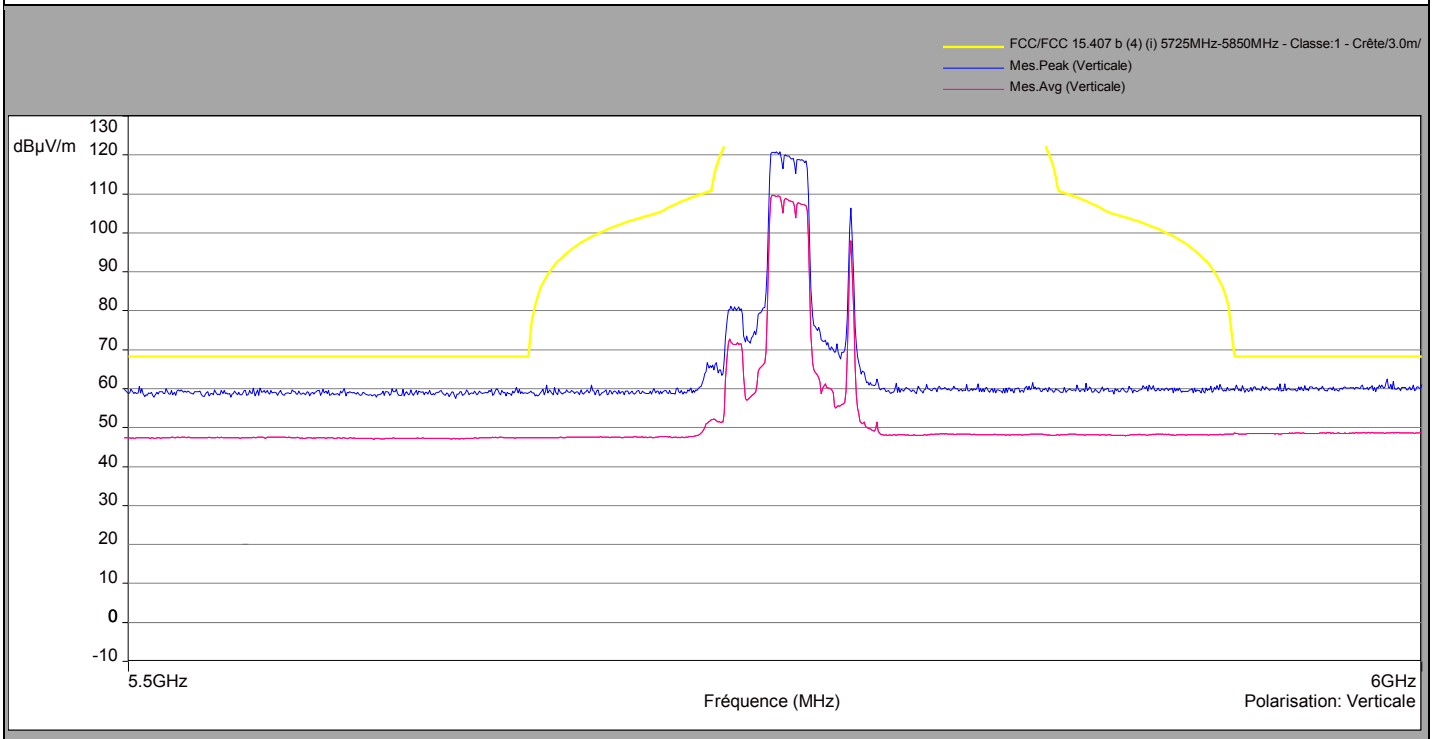
Horizontal Polarization



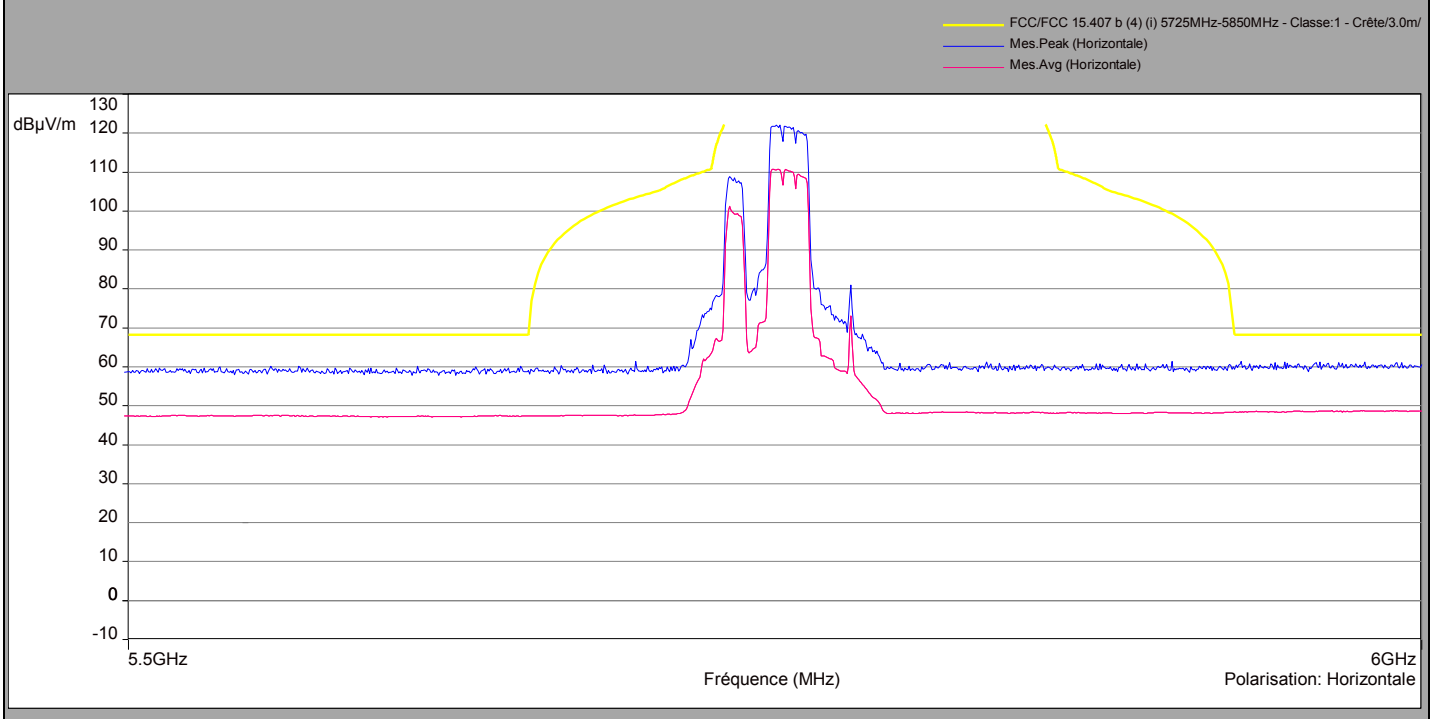
Configuration 4

Above 1GHz

Vertical Polarization



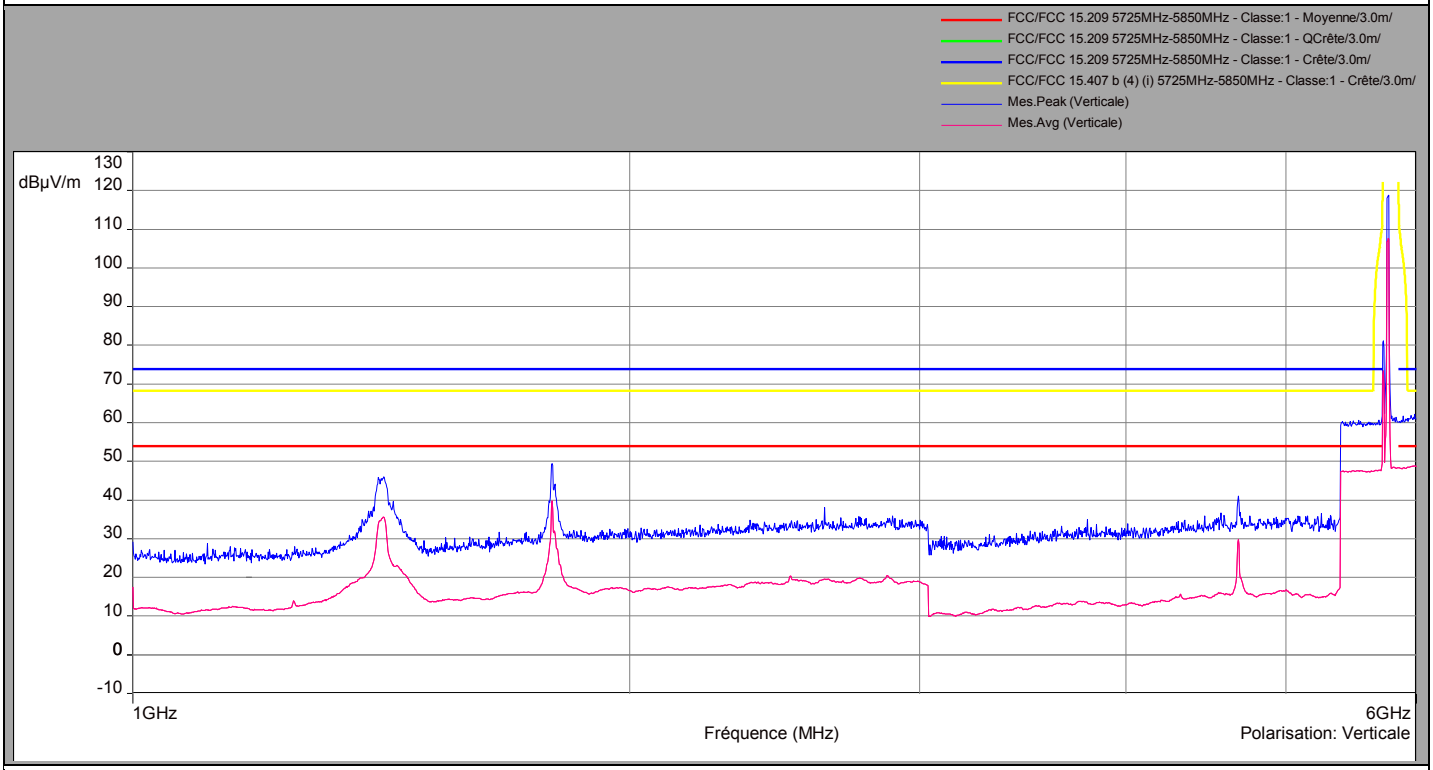
Horizontal Polarization



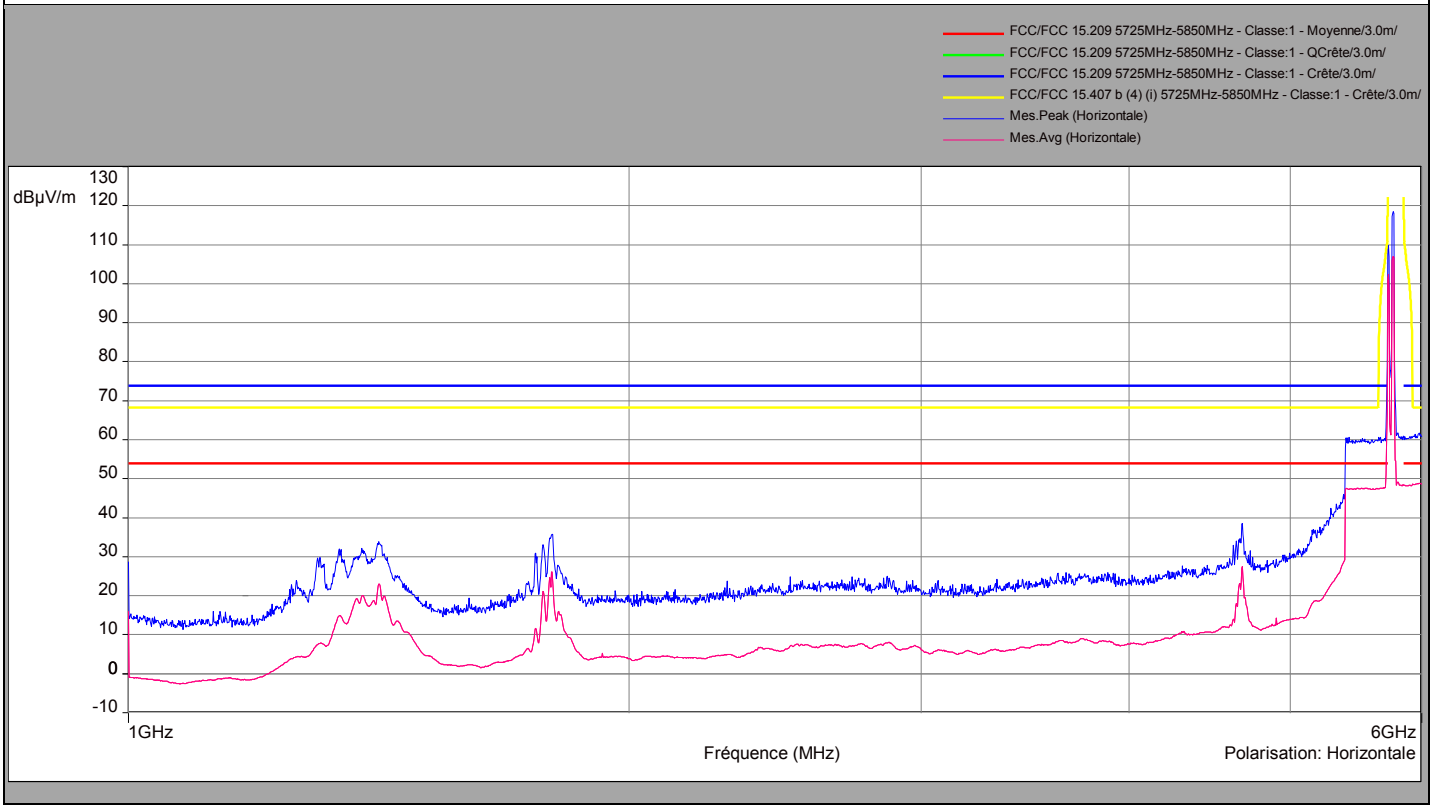
Configuration 5

Above 1GHz

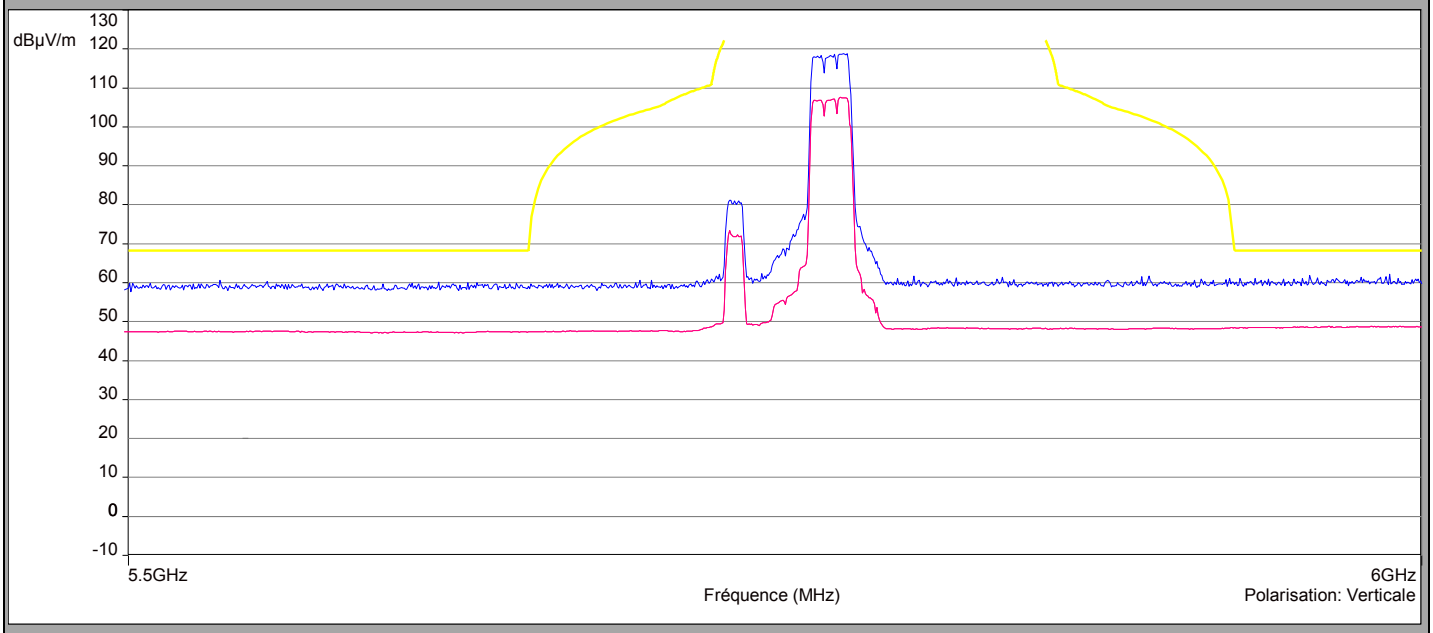
Vertical Polarization



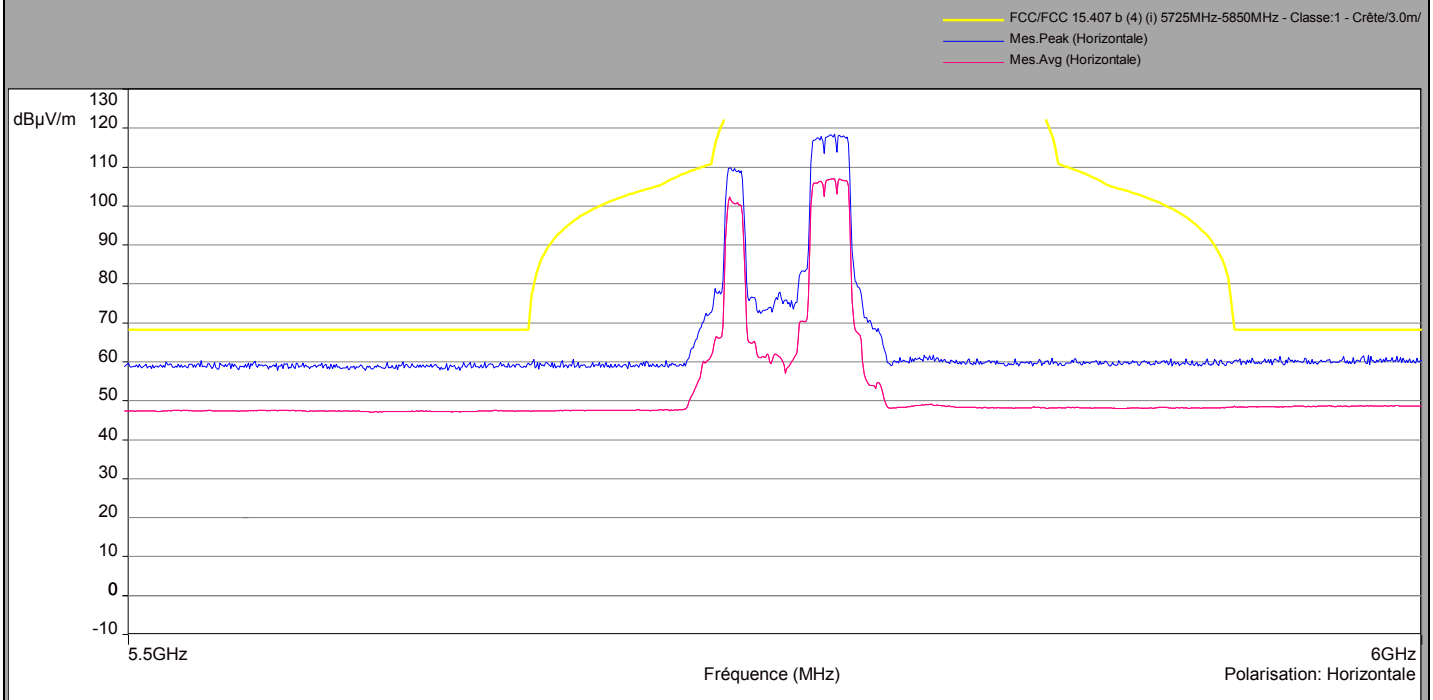
Horizontal Polarization



Configuration 5
Above 1GHz
Vertical Polarization



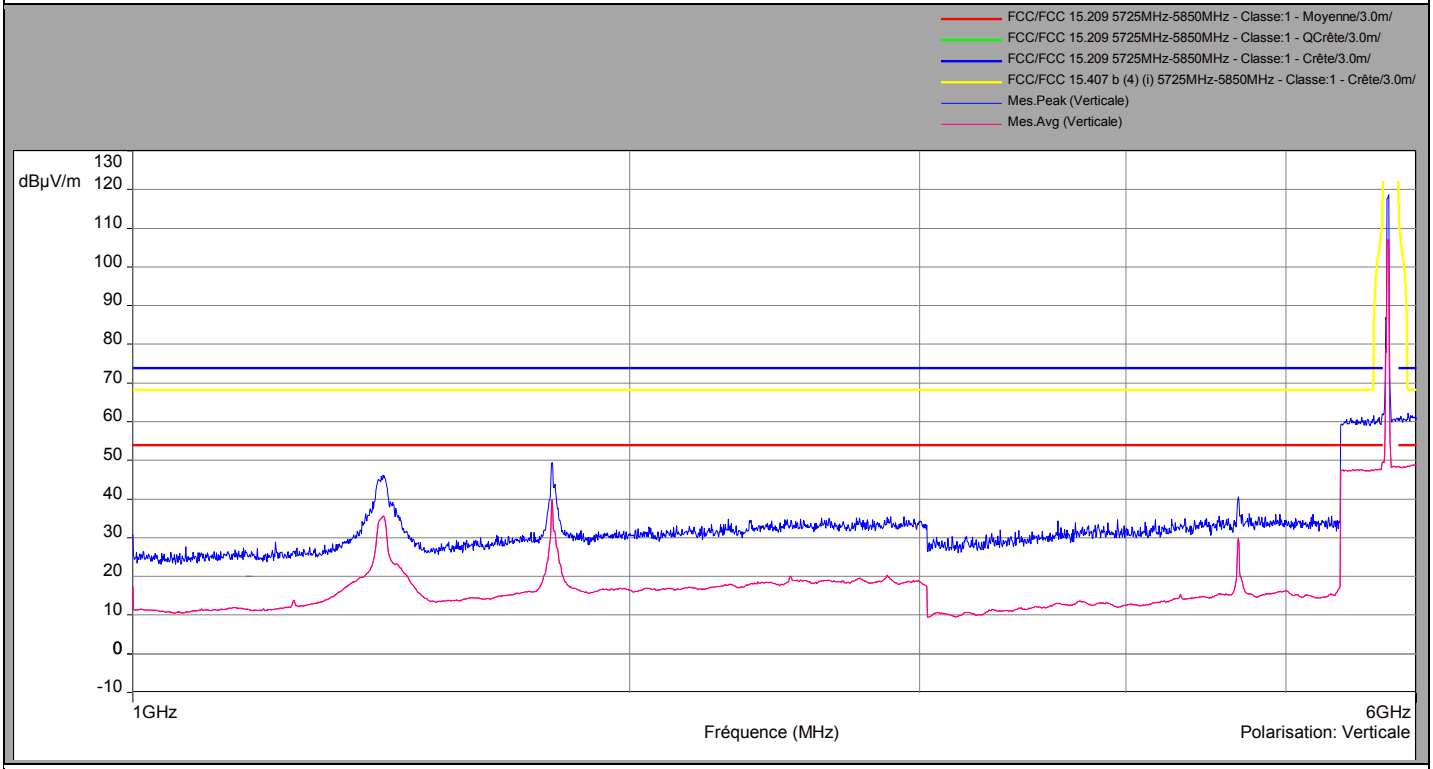
Horizontal Polarization



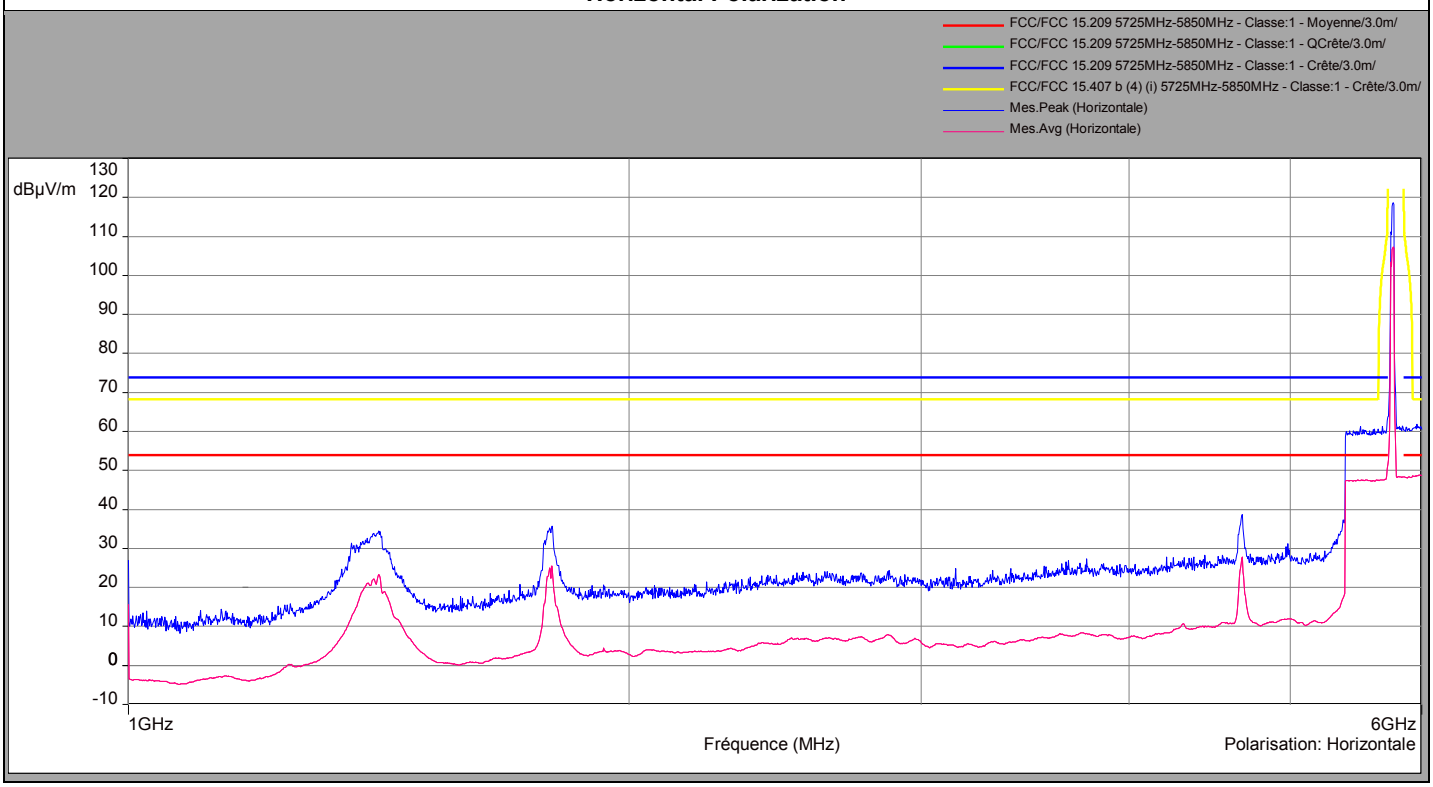
Configuration 6

Above 1GHz

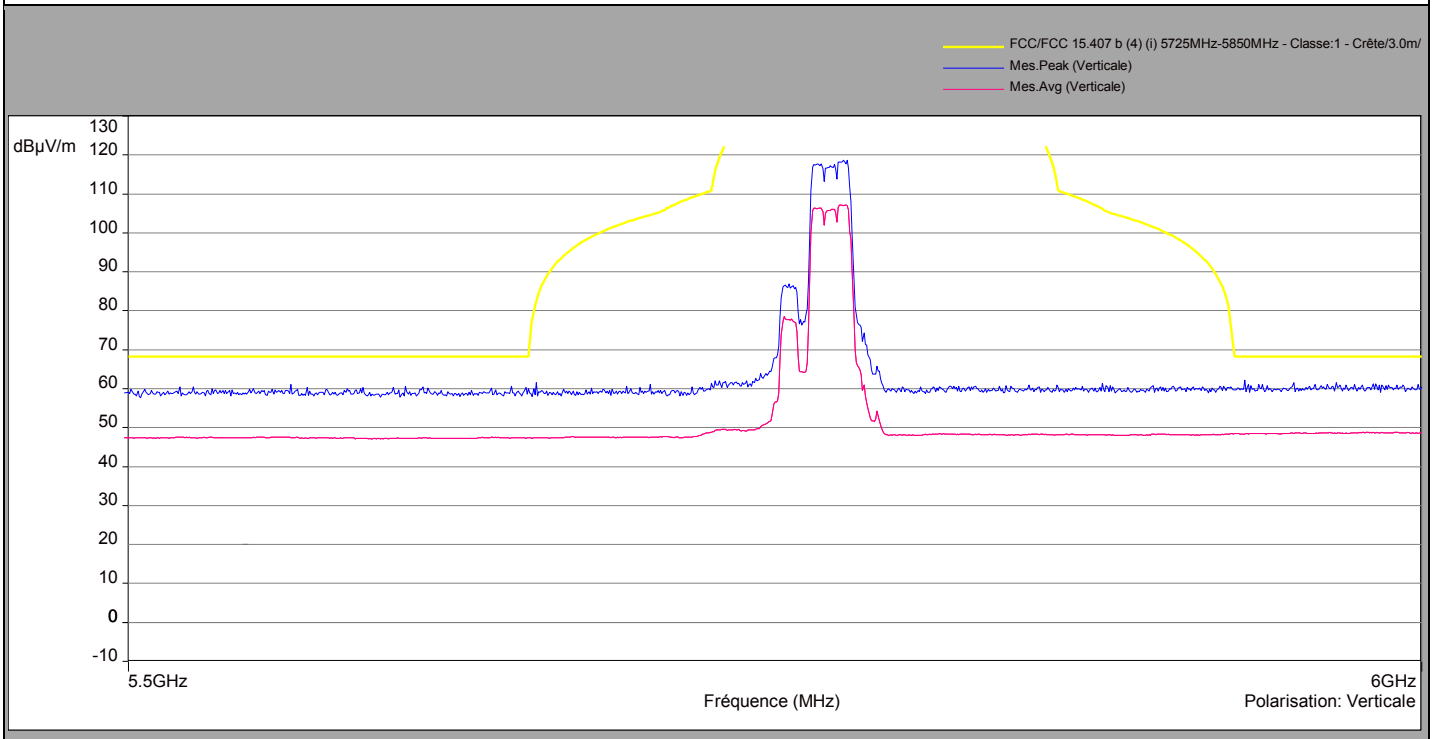
Vertical Polarization



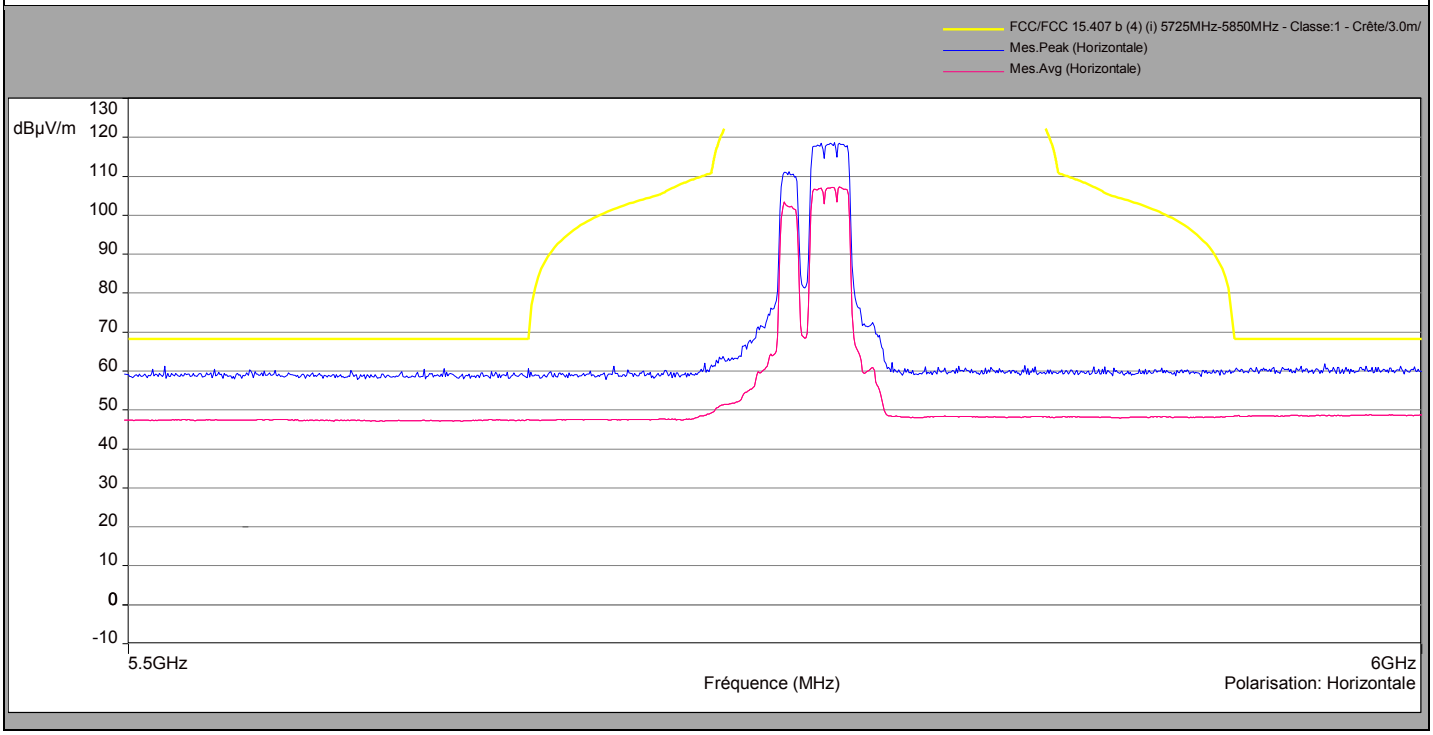
Horizontal Polarization



Configuration 6
Above 1GHz
Vertical Polarization



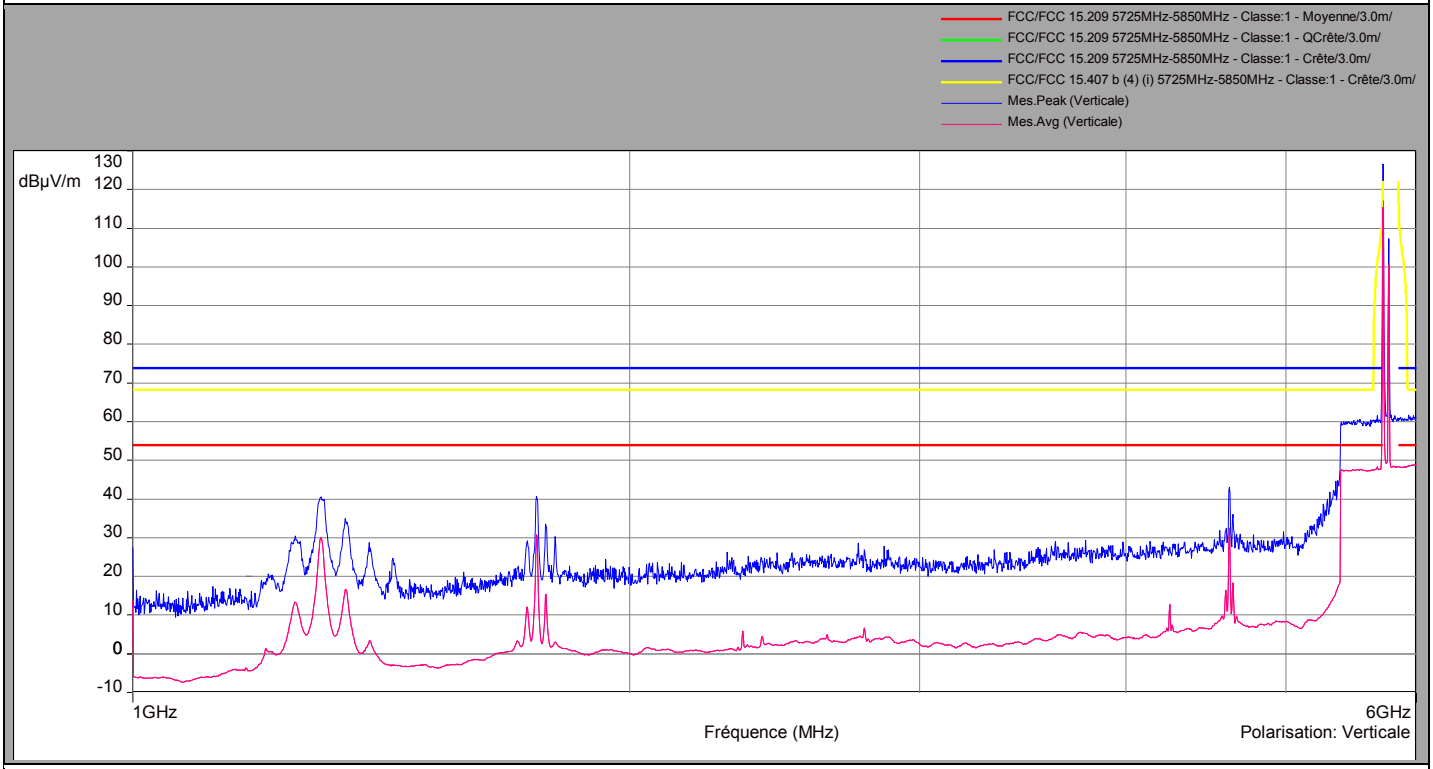
Horizontal Polarization



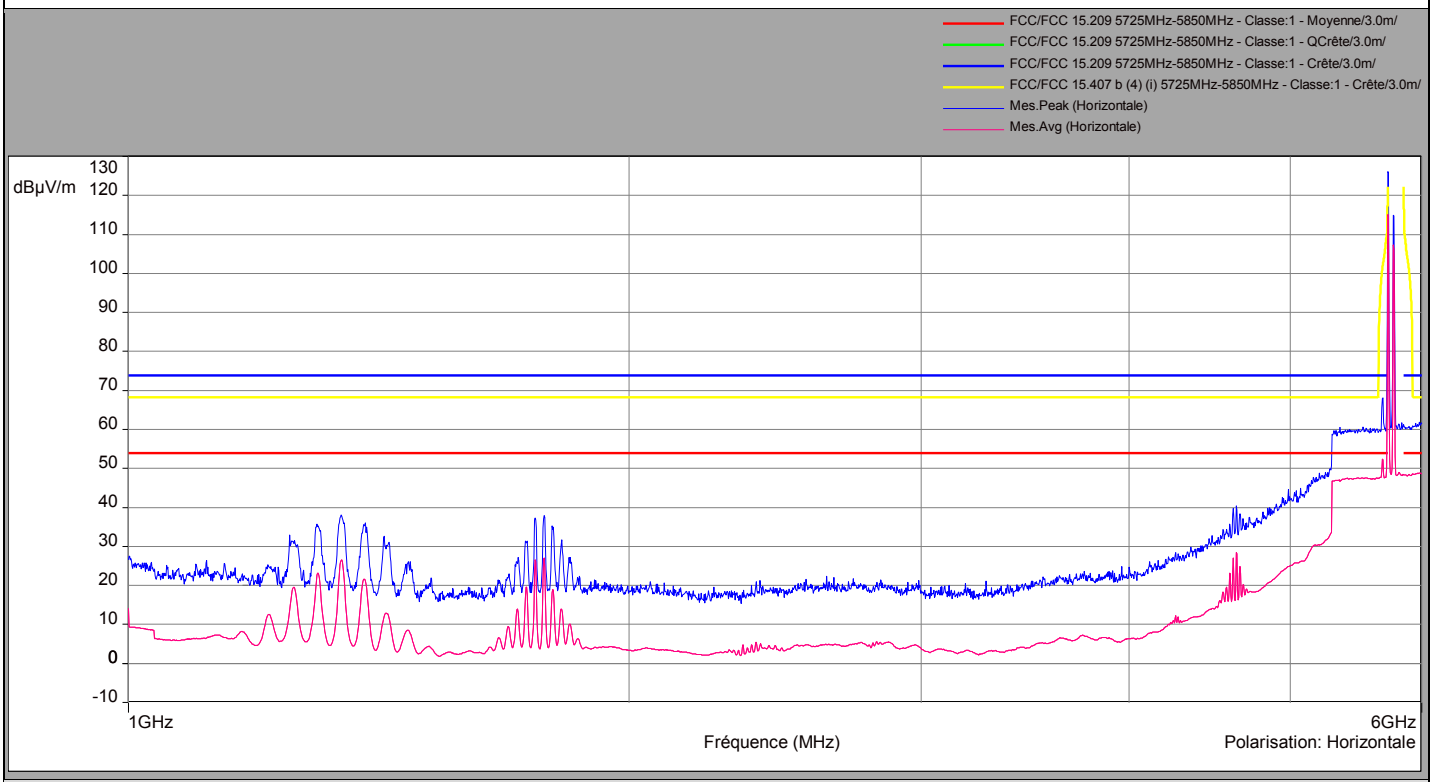
Configuration 7

Above 1GHz

Vertical Polarization



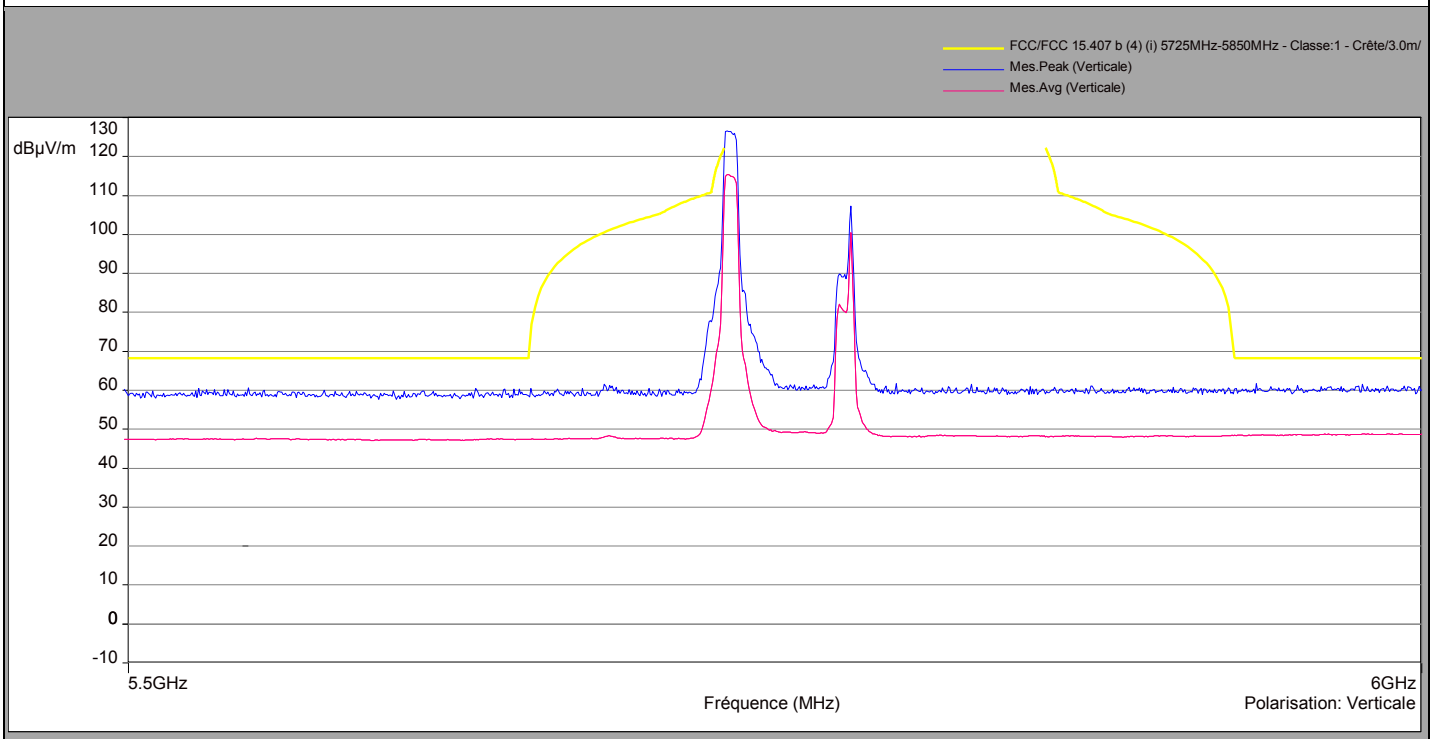
Horizontal Polarization



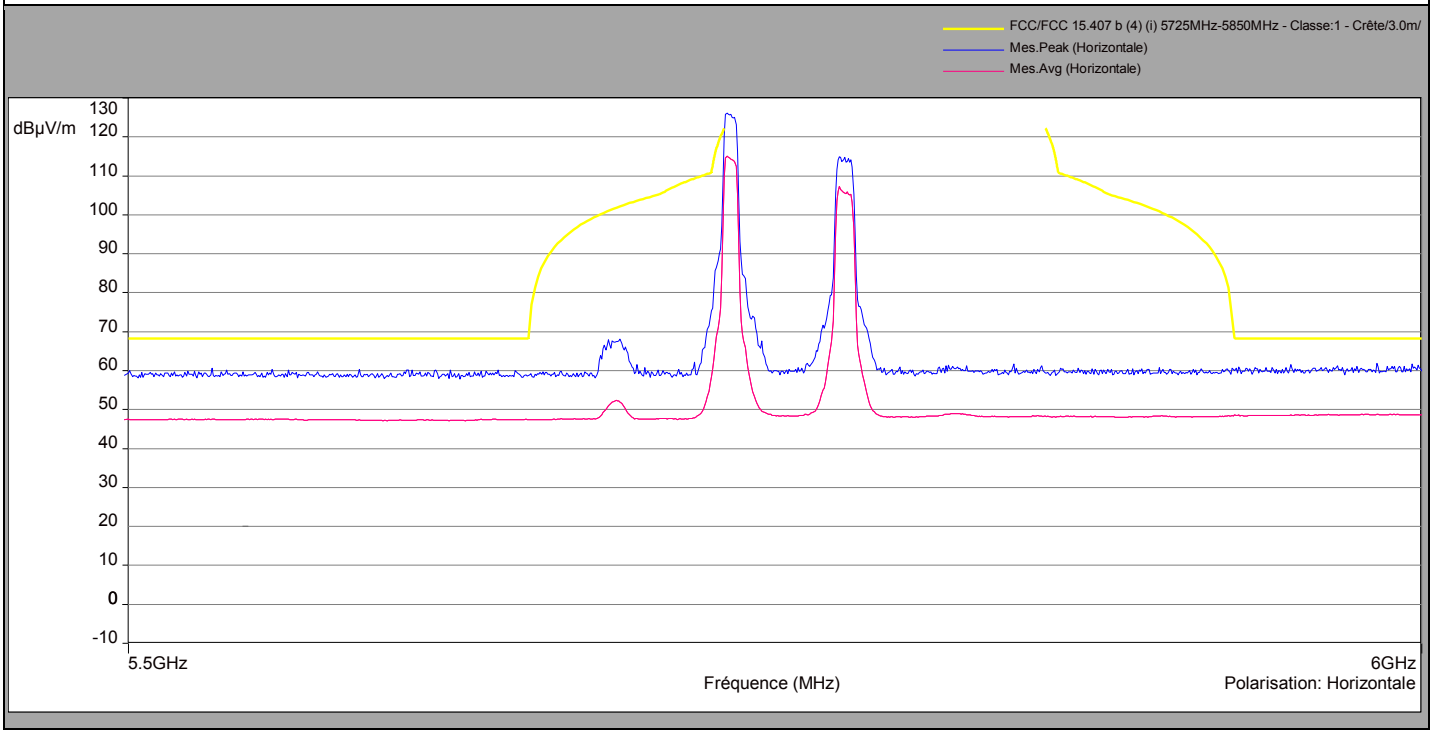
Configuration 7

Above 1GHz

Vertical Polarization



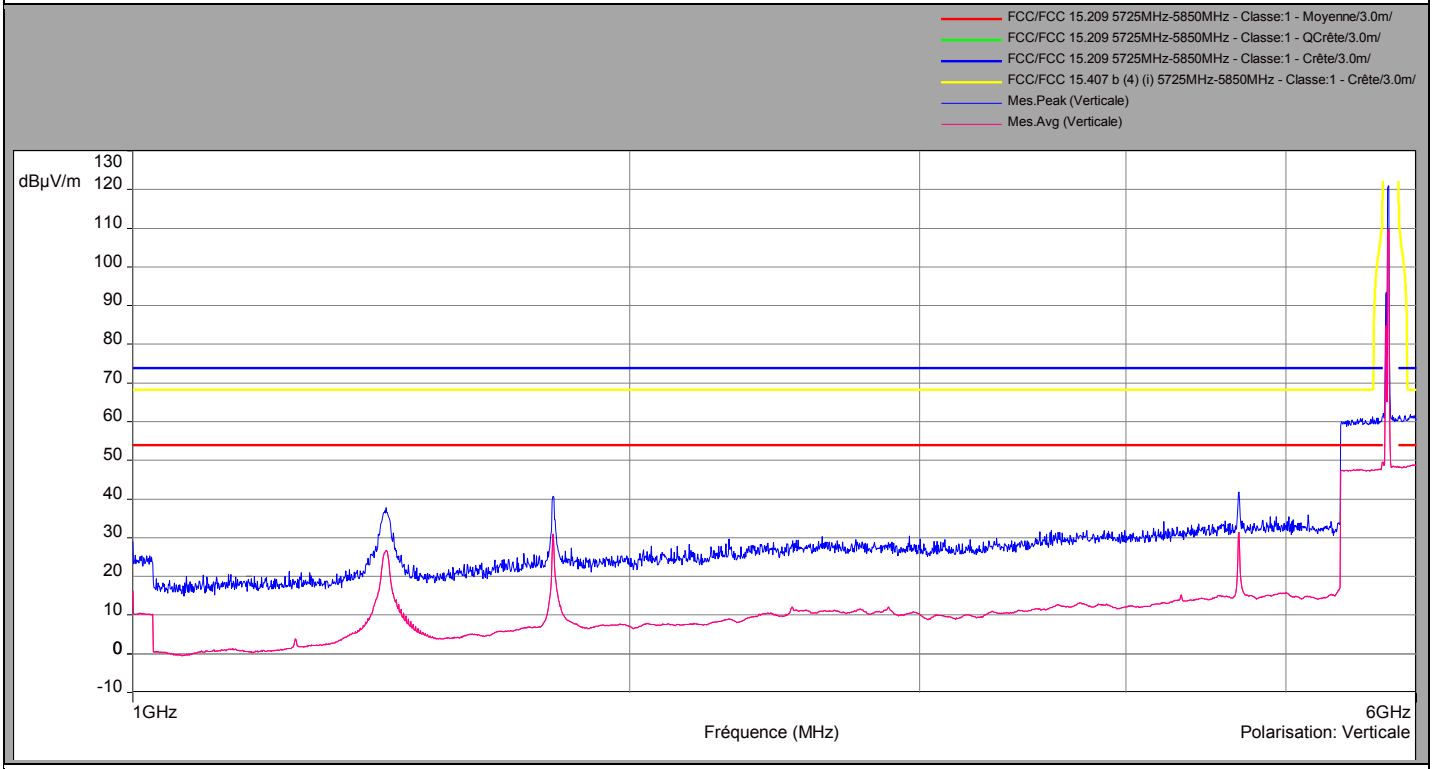
Horizontal Polarization



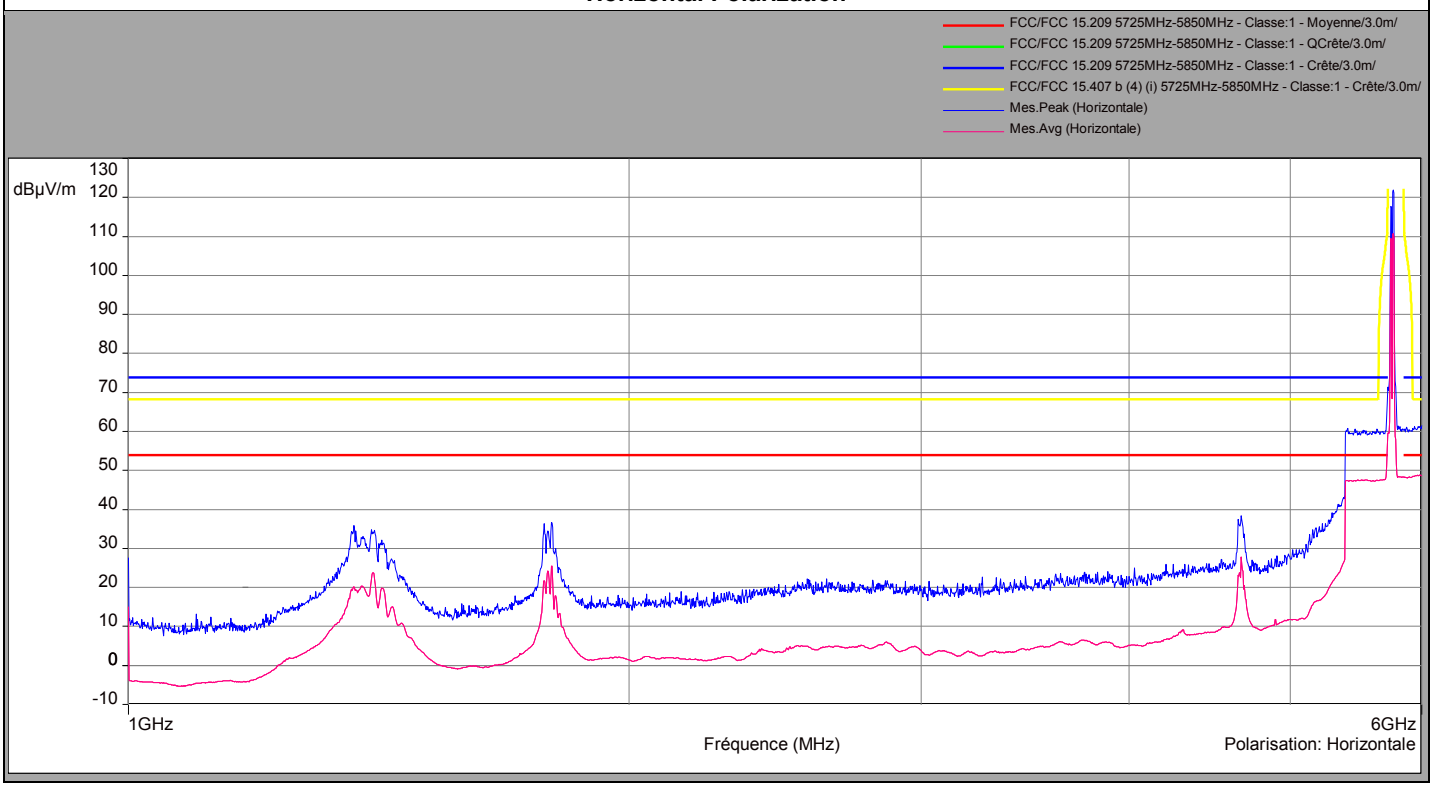
Configuration 8

Above 1GHz

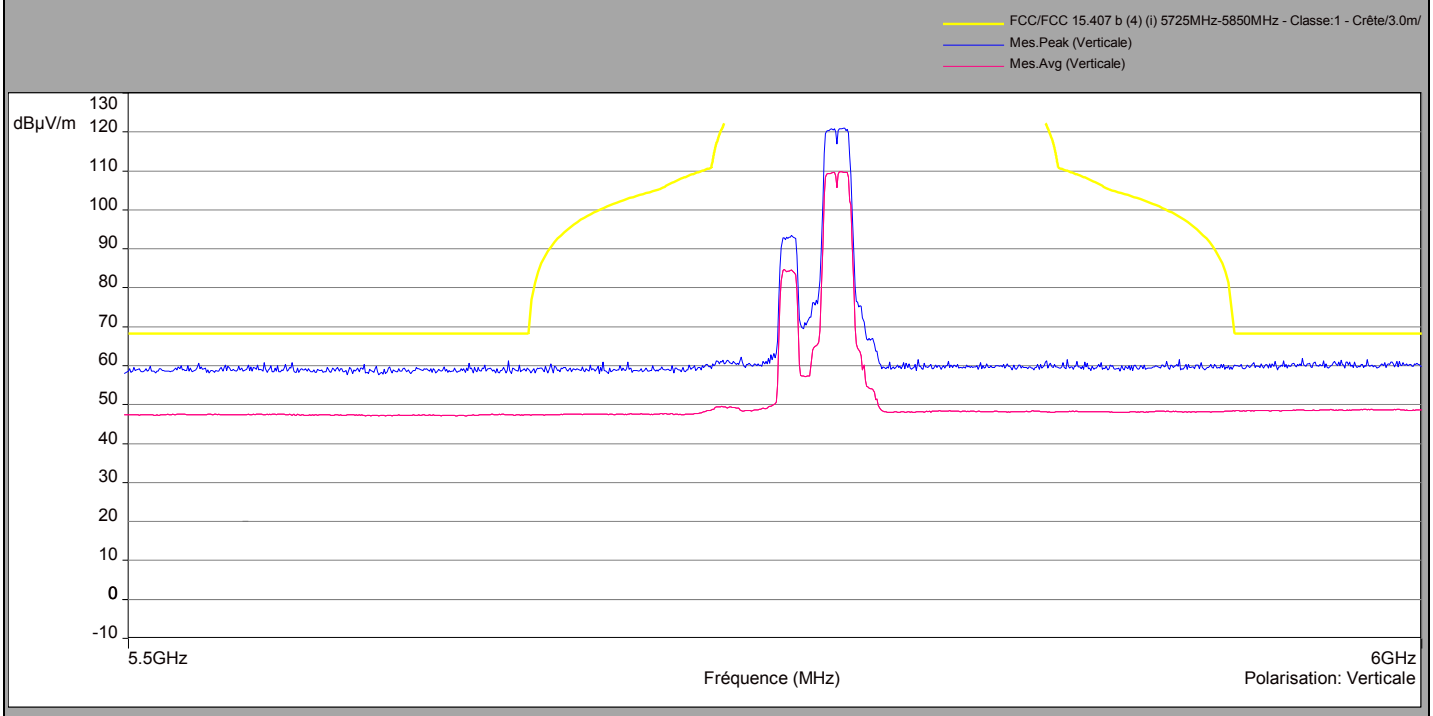
Vertical Polarization



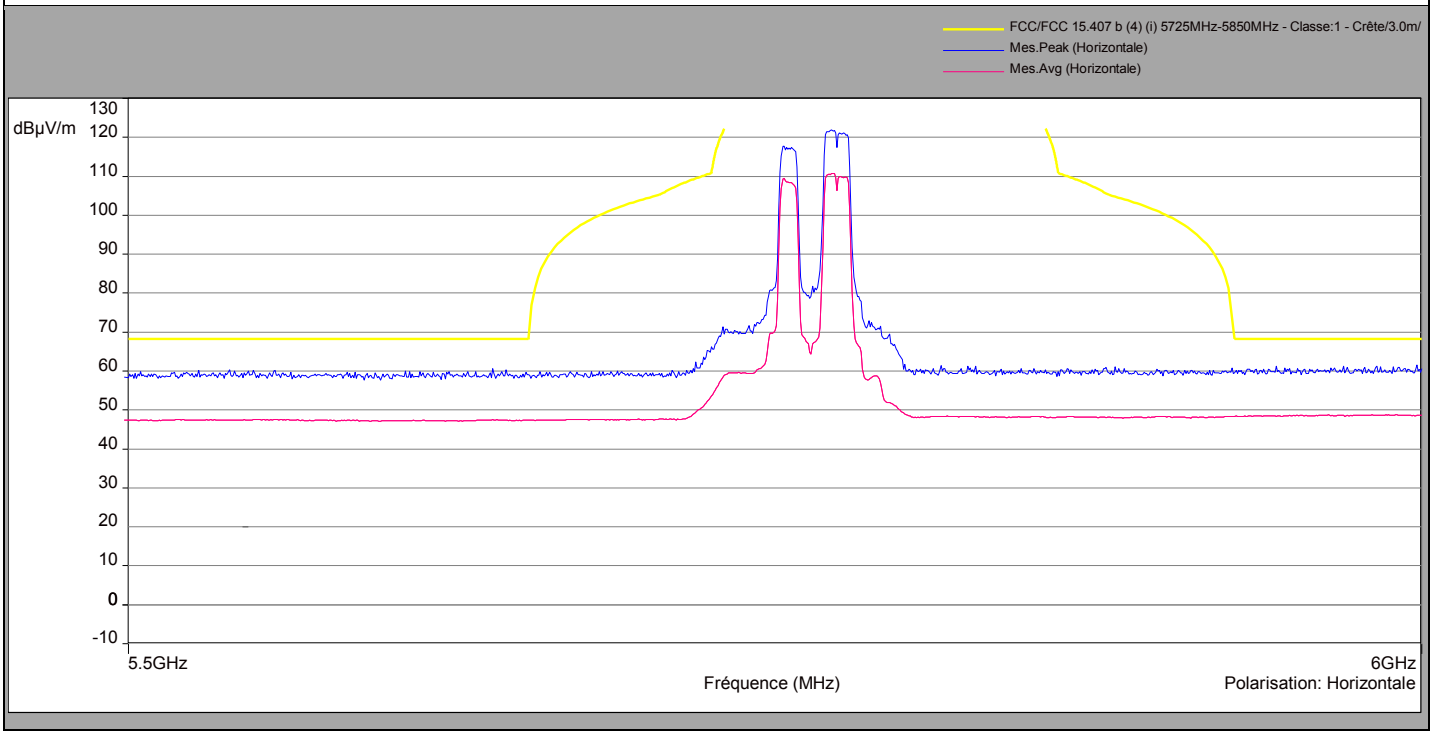
Horizontal Polarization



Configuration 8
Above 1GHz
Vertical Polarization



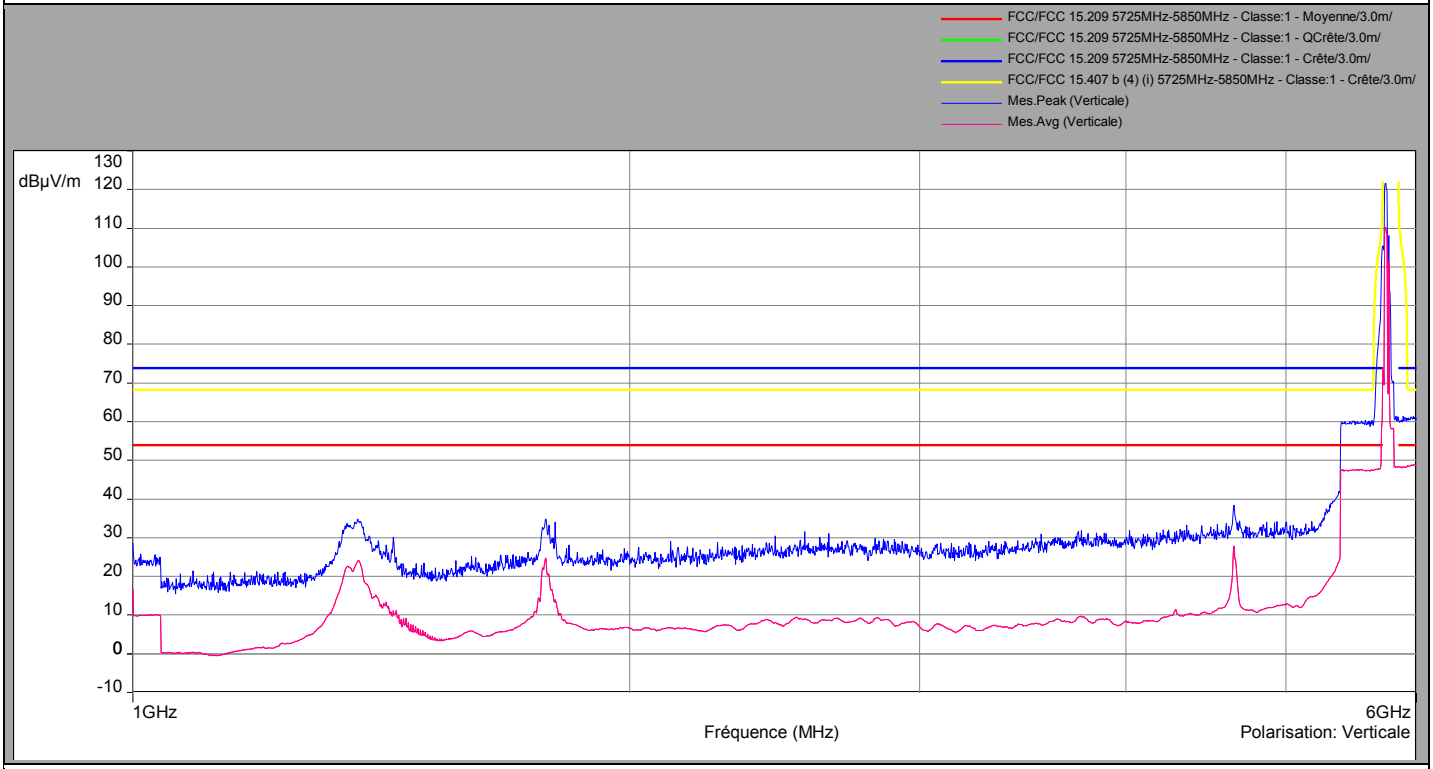
Horizontal Polarization



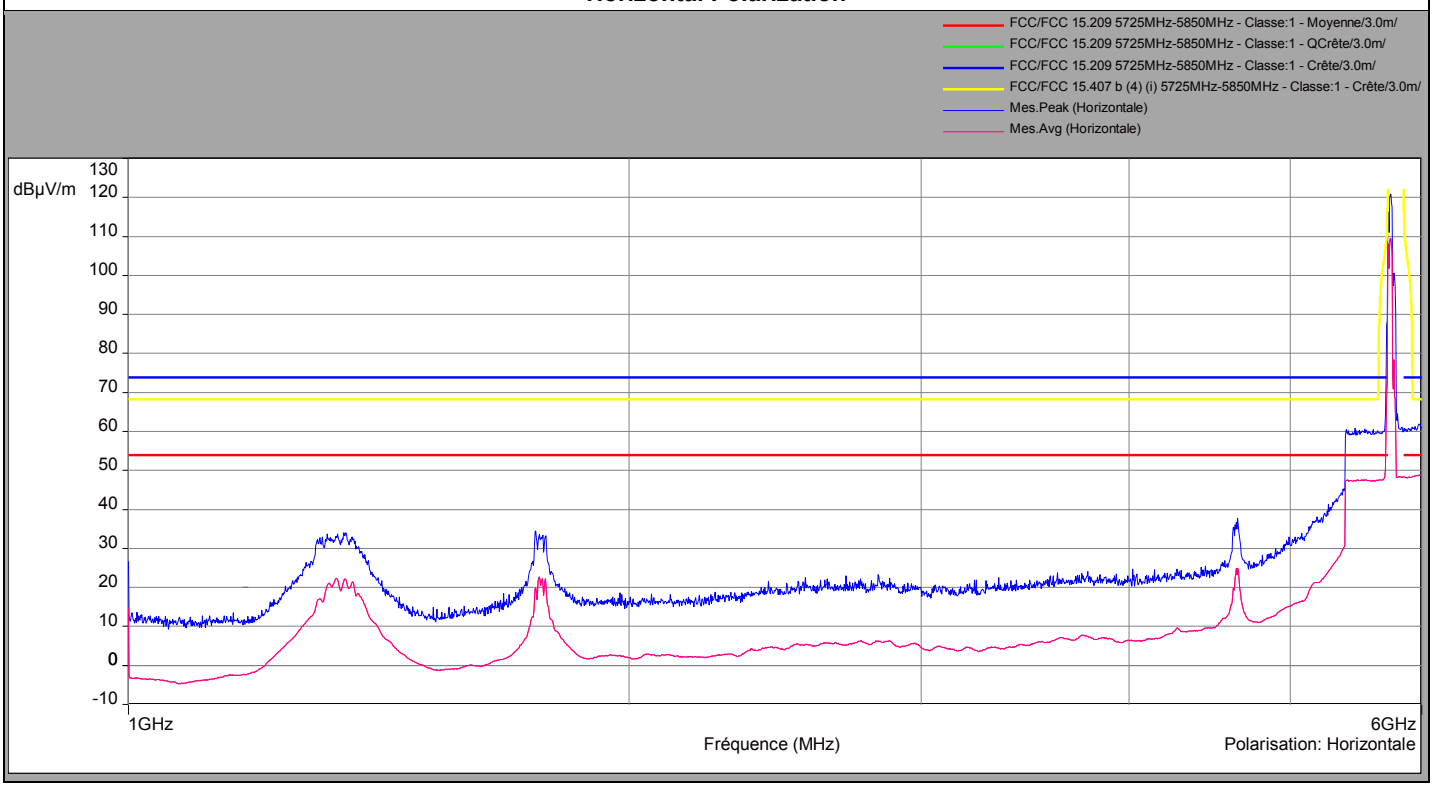
Configuration 9

Above 1GHz

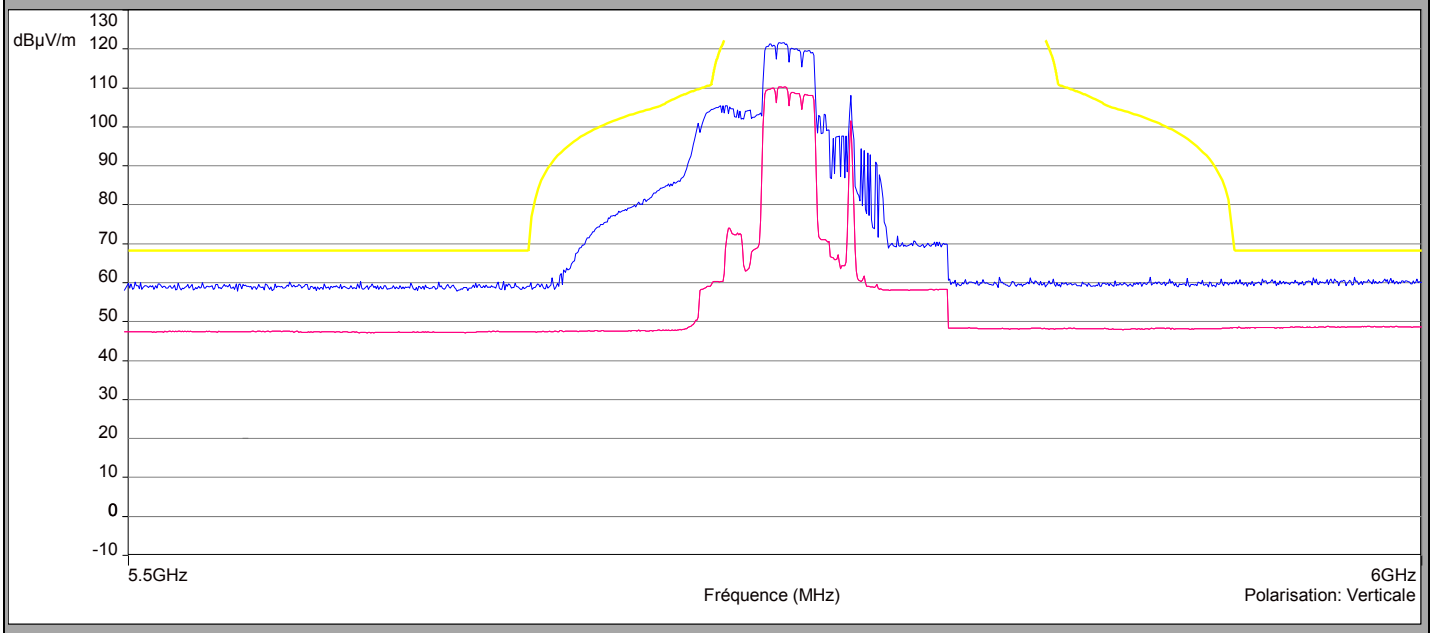
Vertical Polarization



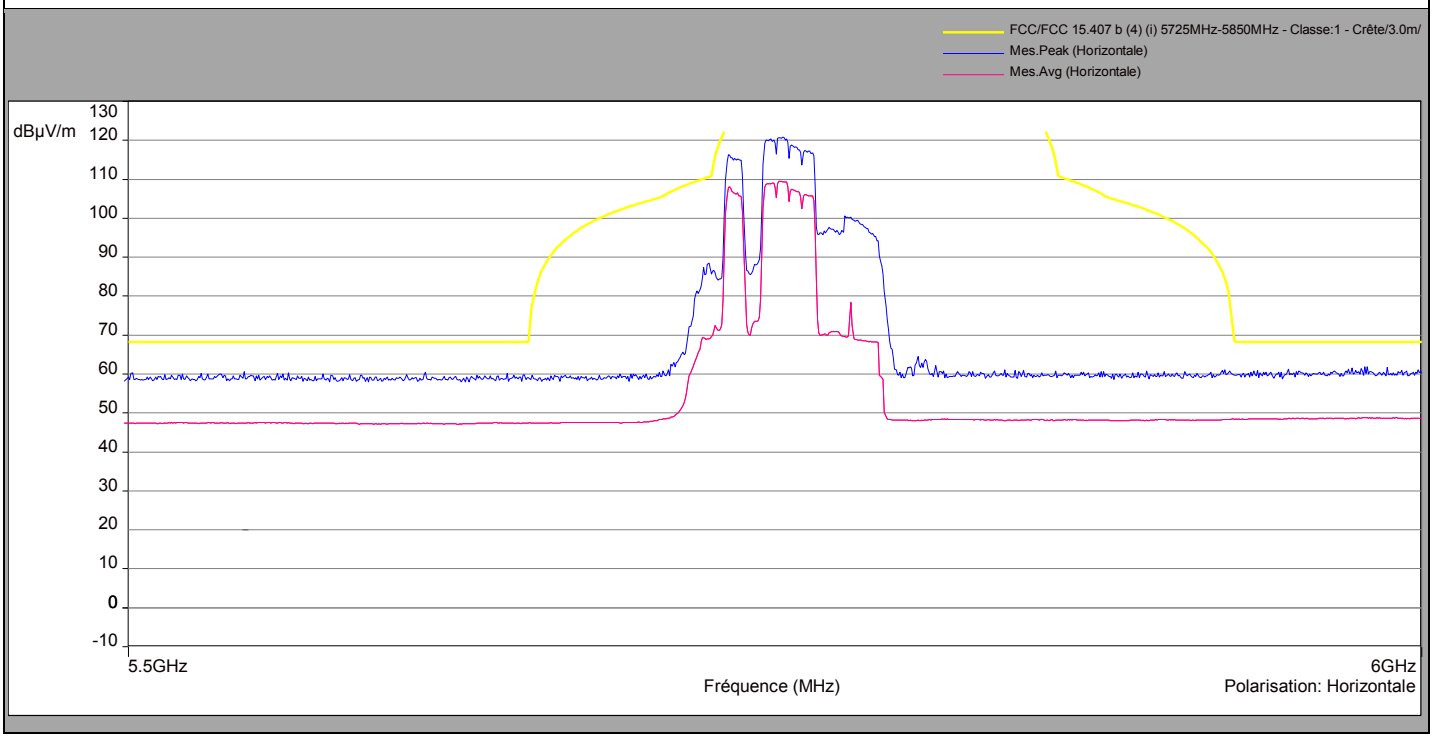
Horizontal Polarization



Configuration 9
Above 1GHz
Vertical Polarization



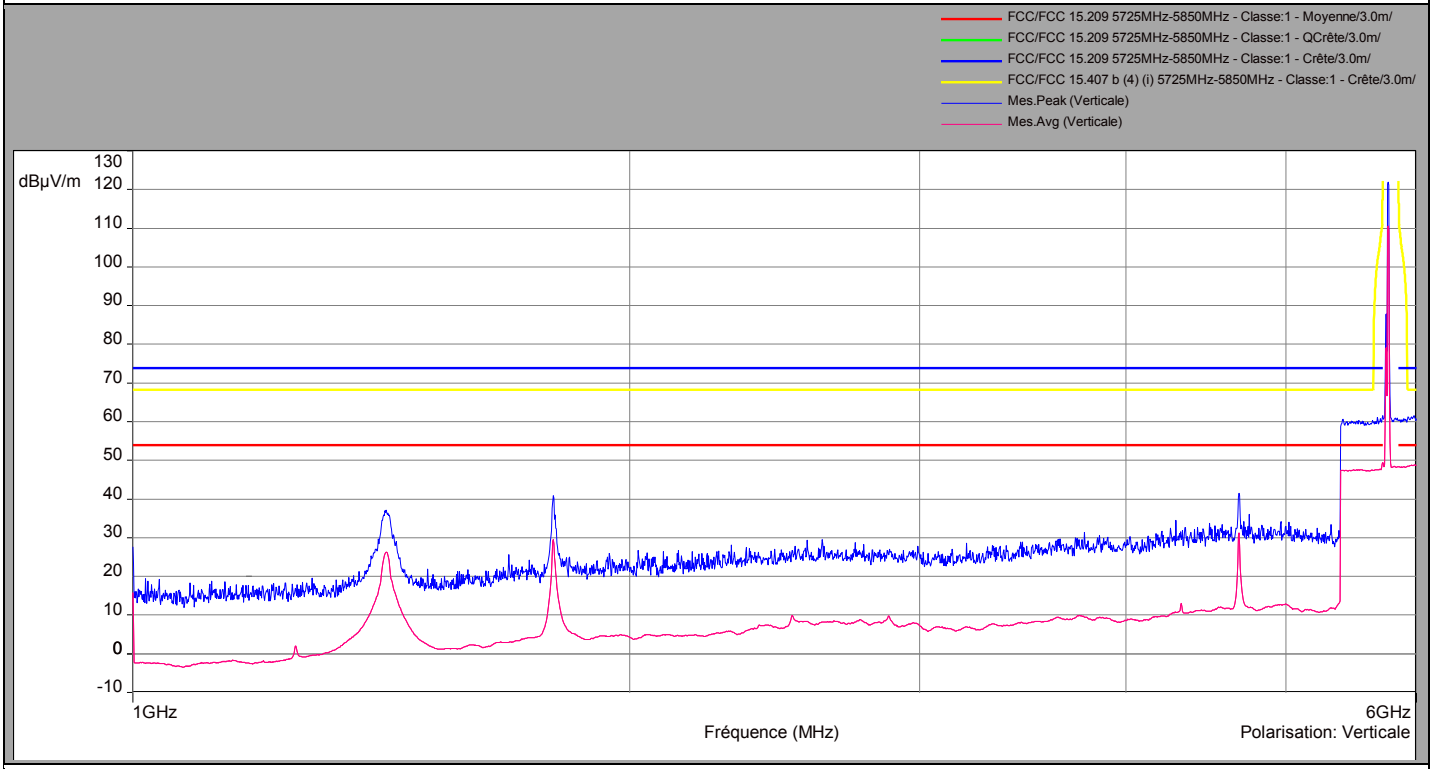
Horizontal Polarization



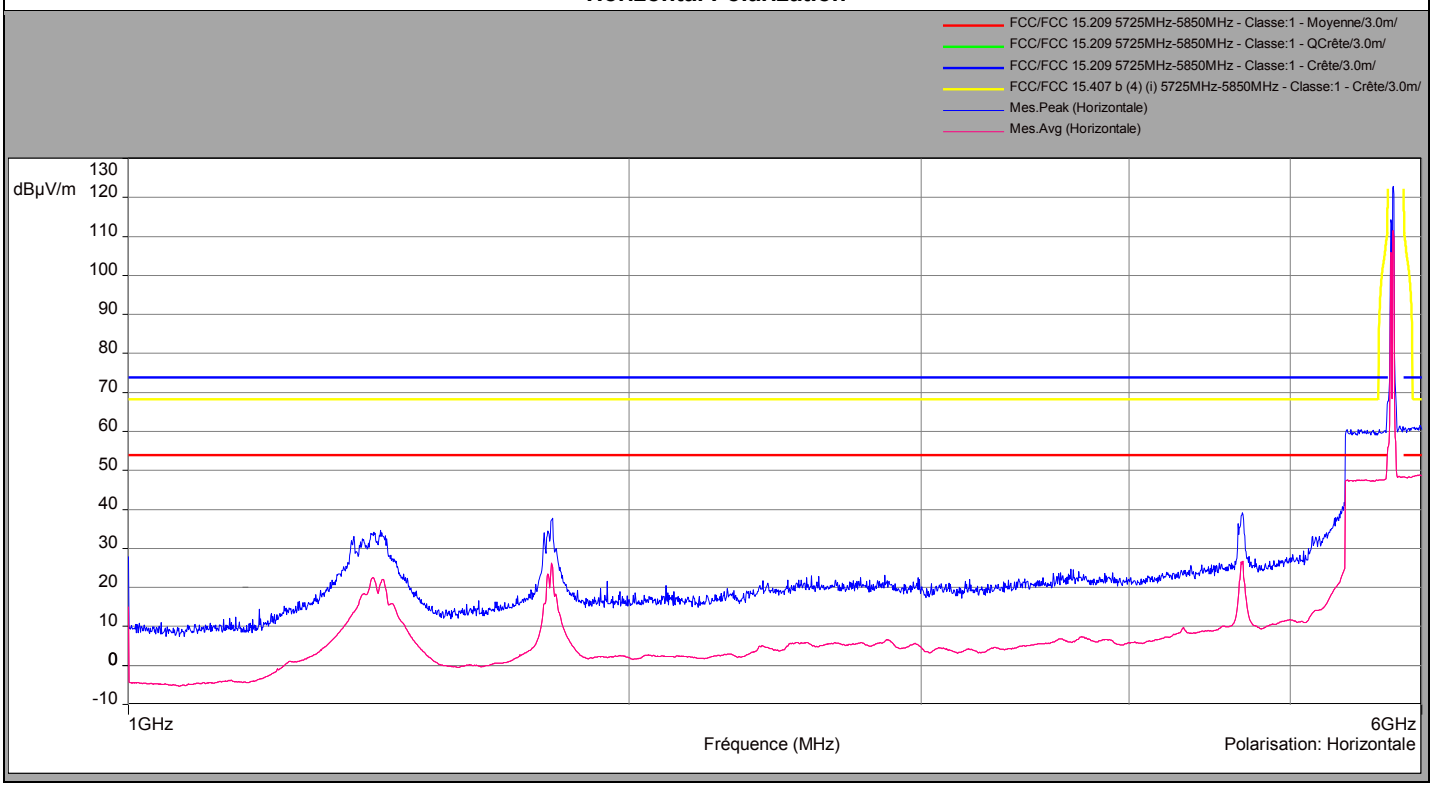
Configuration 10

Above 1GHz

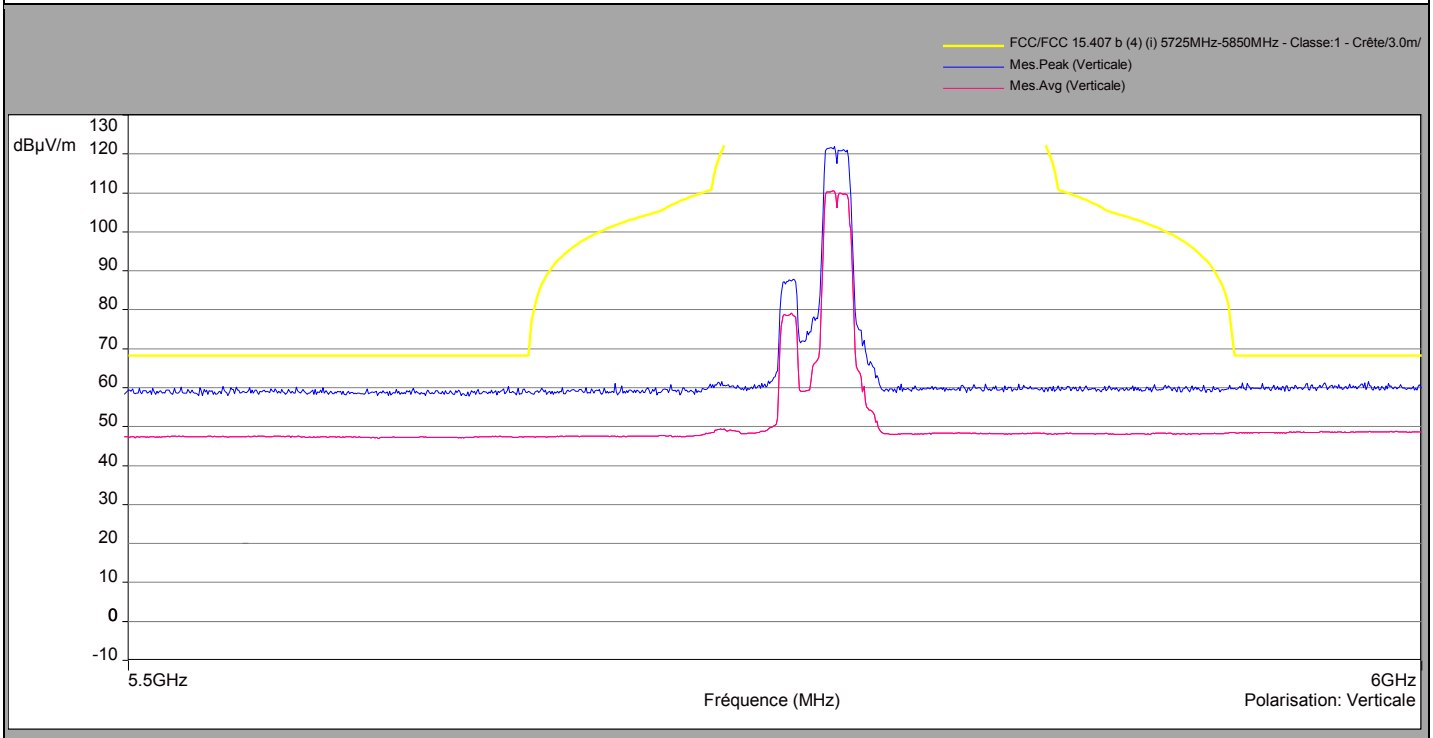
Vertical Polarization



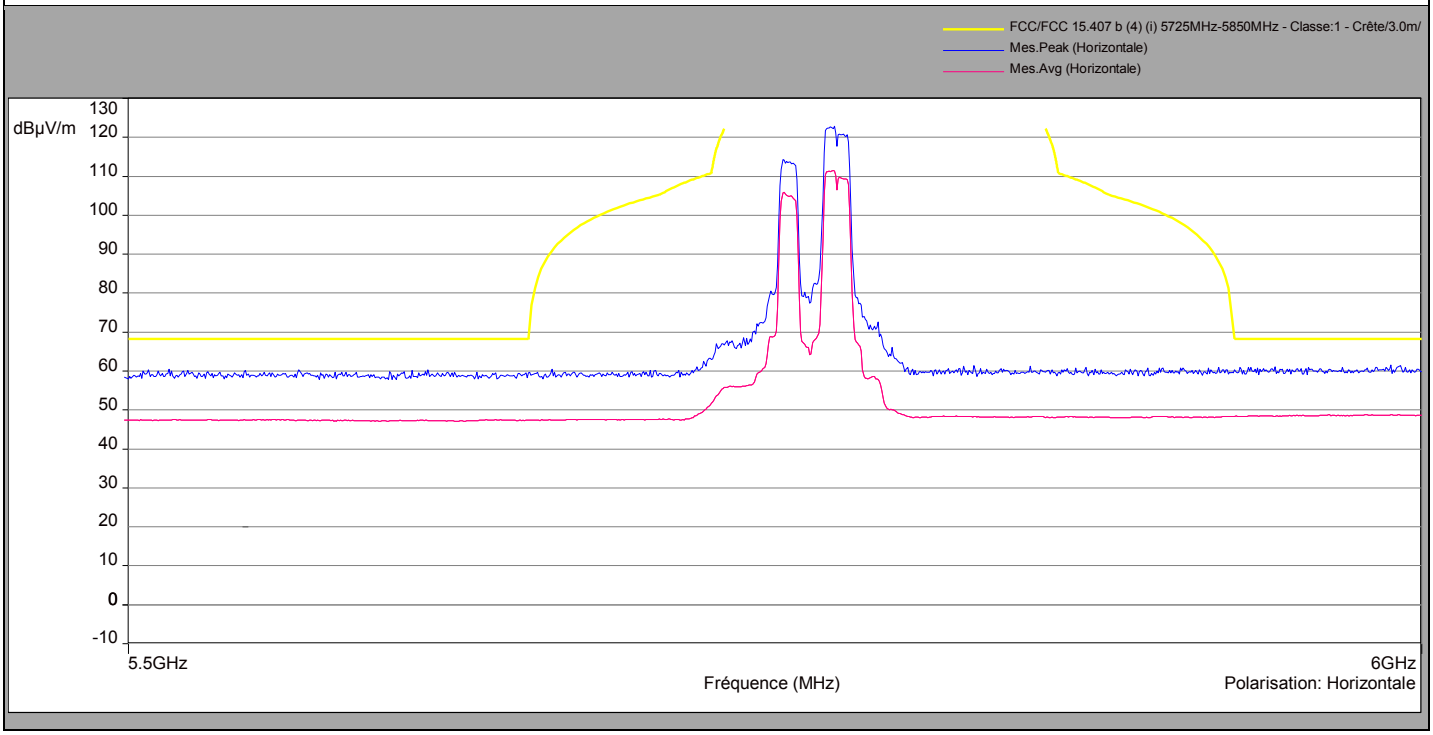
Horizontal Polarization



Configuration 10
Above 1GHz
Vertical Polarization



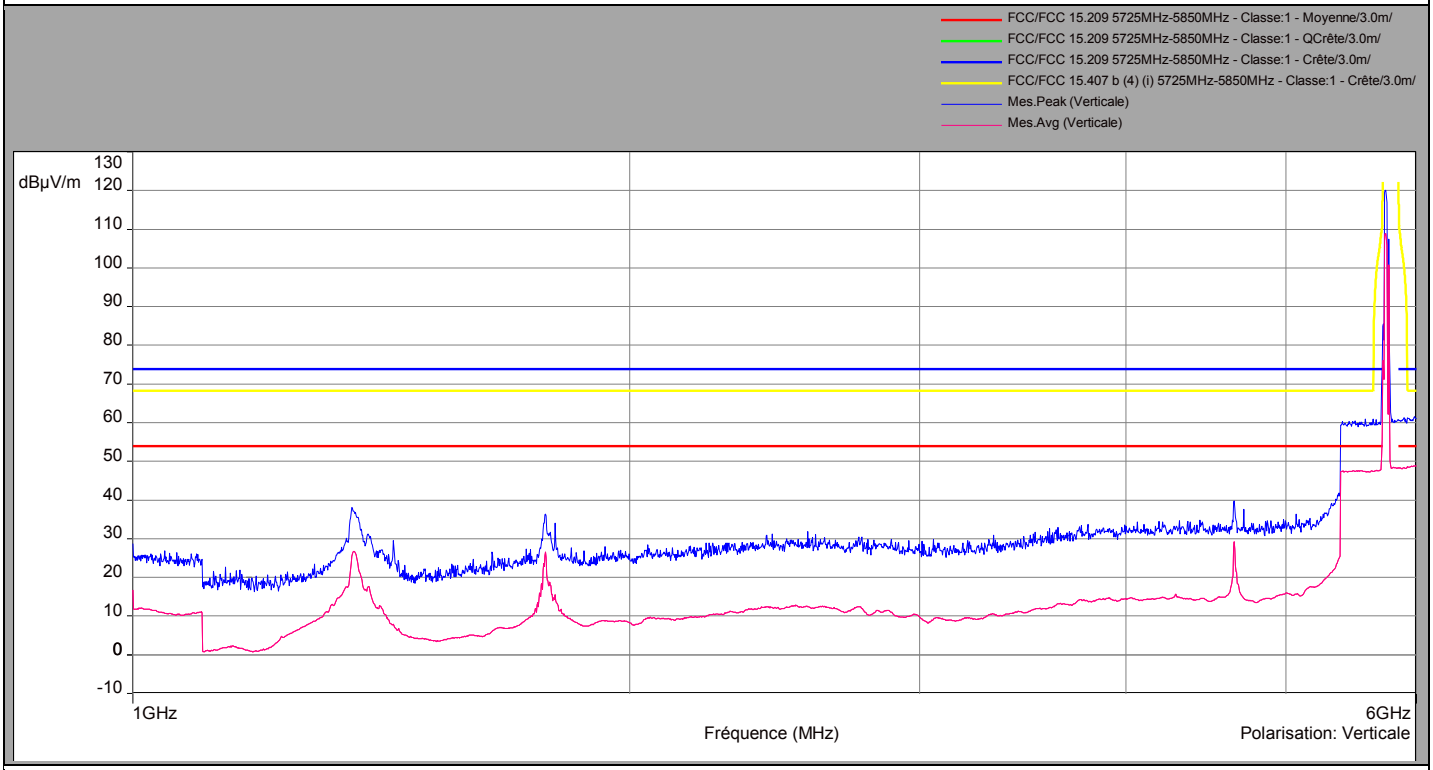
Horizontal Polarization



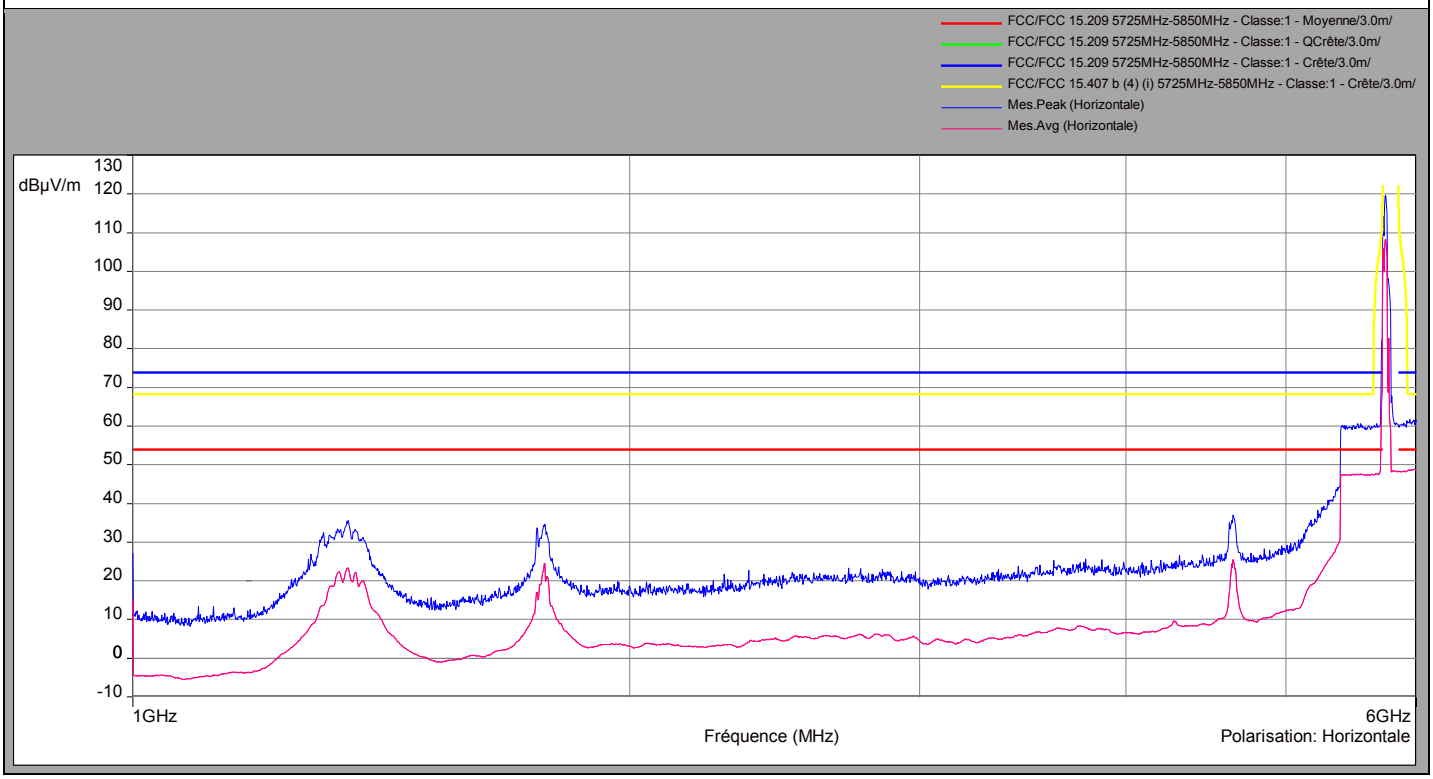
Configuration 11

Above 1GHz

Vertical Polarization



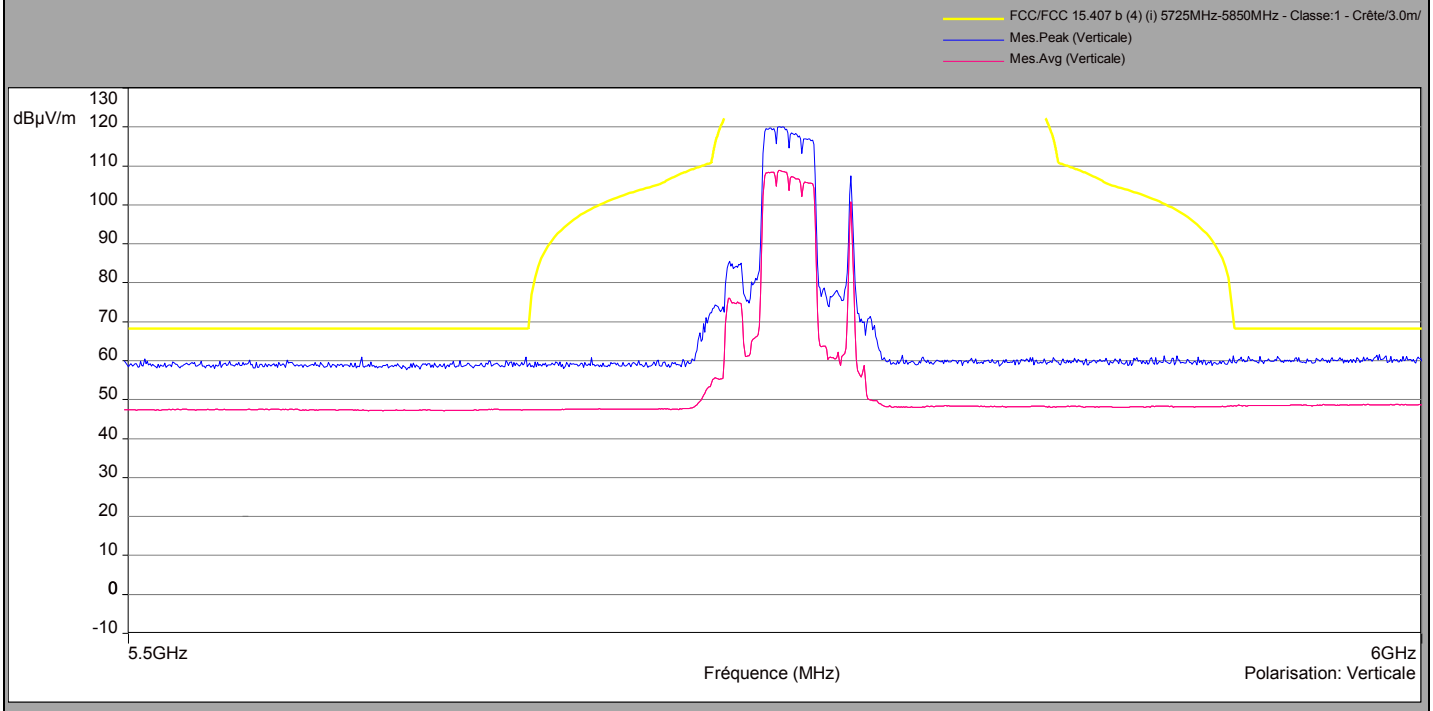
Horizontal Polarization



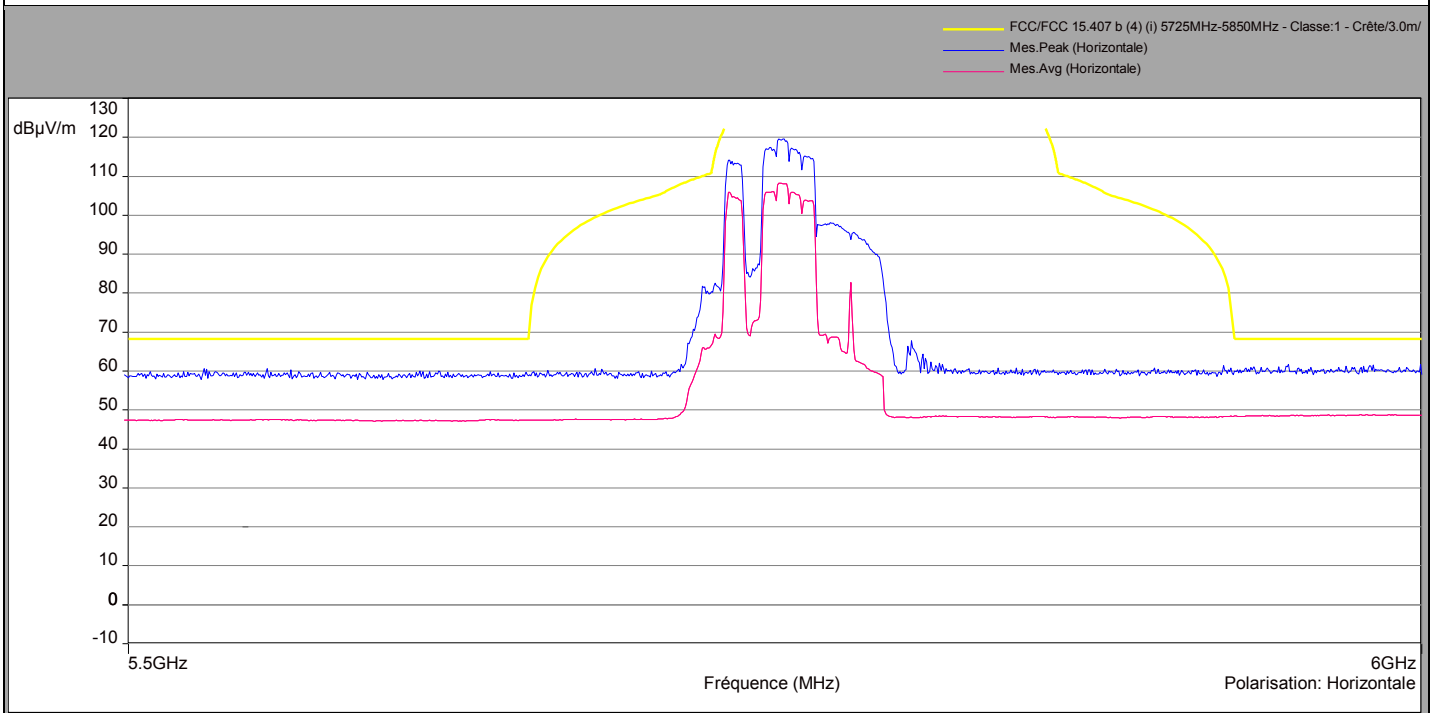
Configuration 11

Above 1GHz

Vertical Polarization



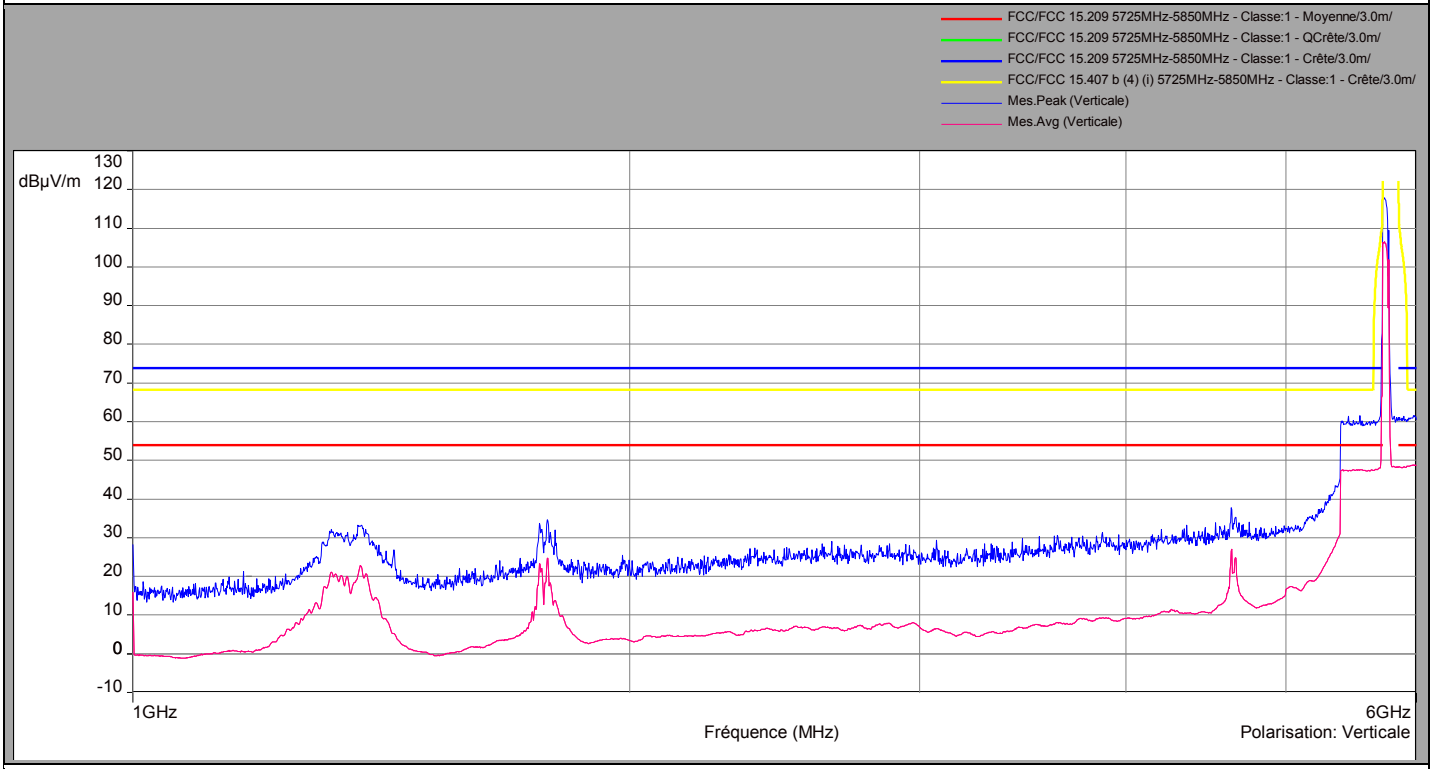
Horizontal Polarization



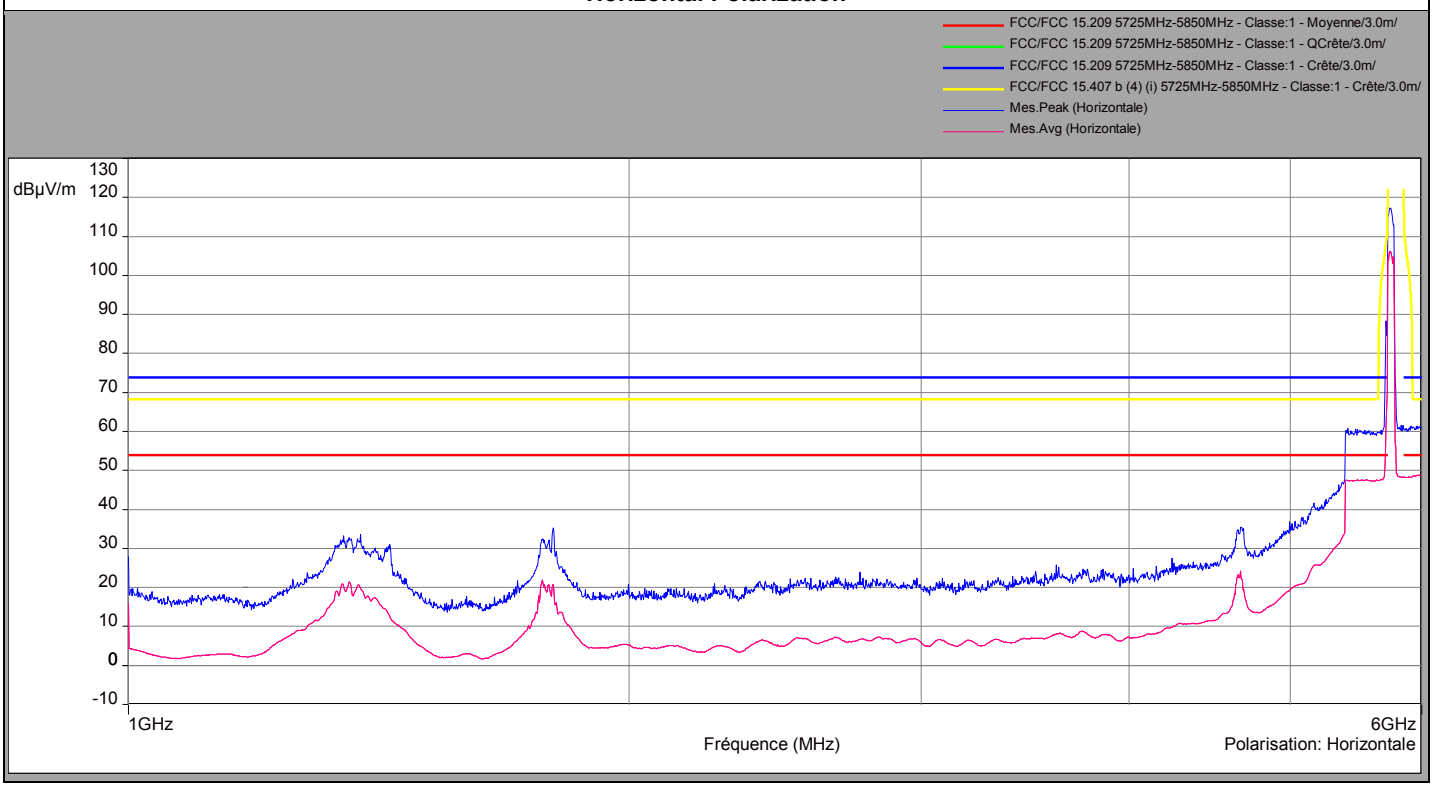
Configuration 12

Above 1GHz

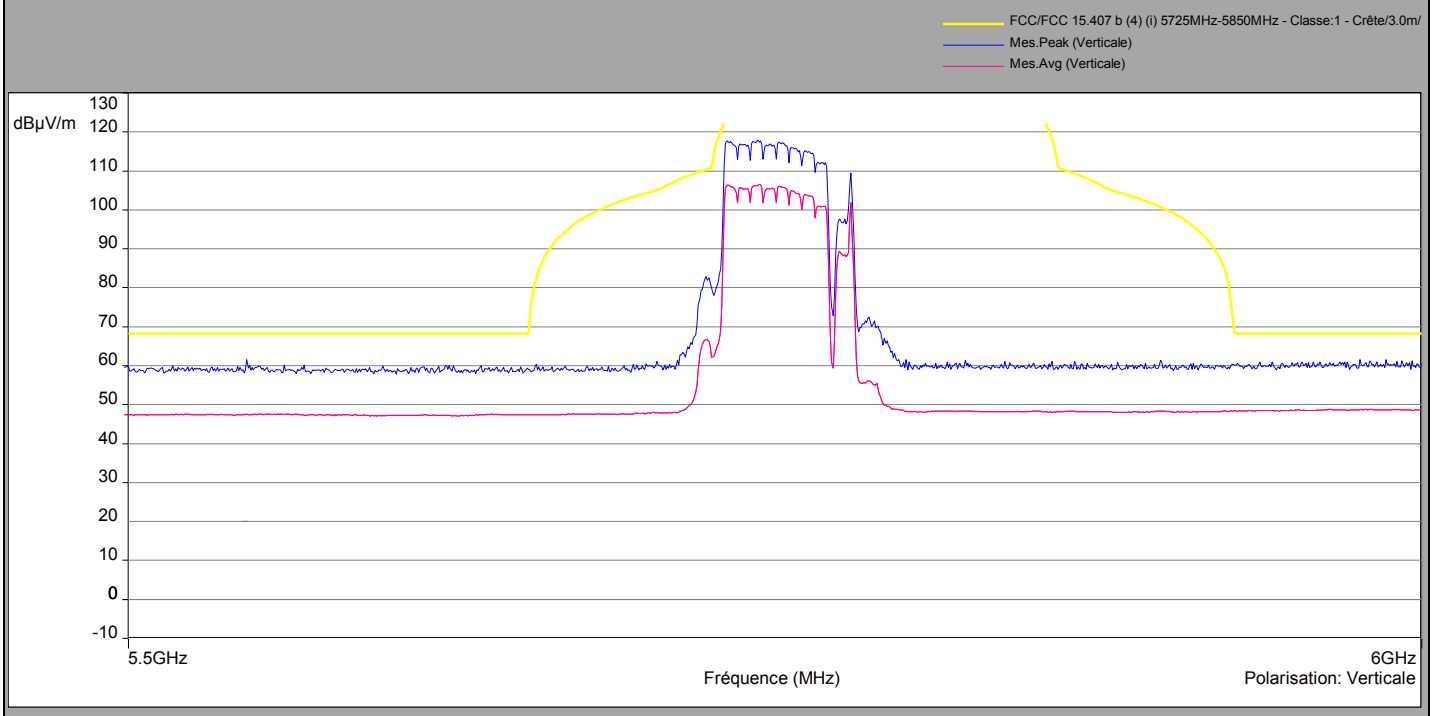
Vertical Polarization



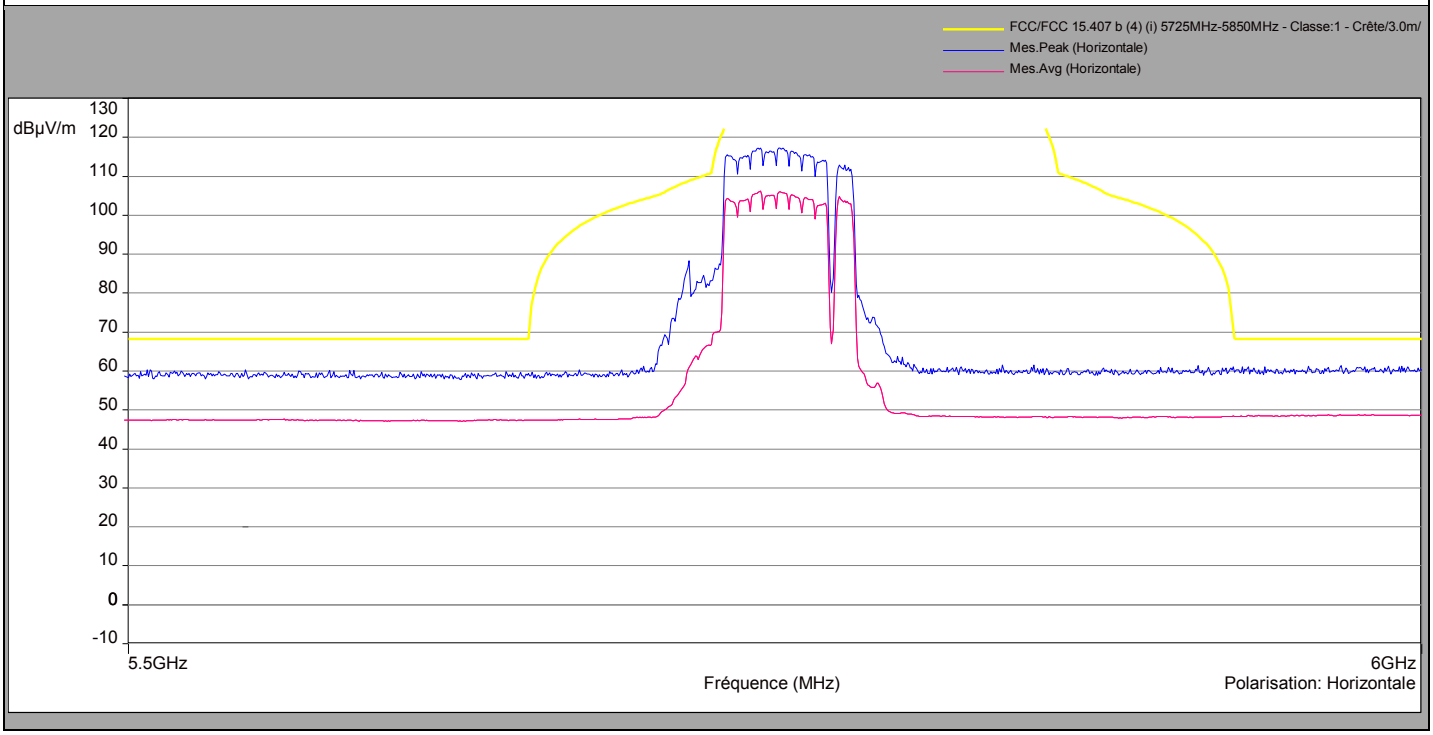
Horizontal Polarization



Configuration 12
Above 1GHz
Vertical Polarization



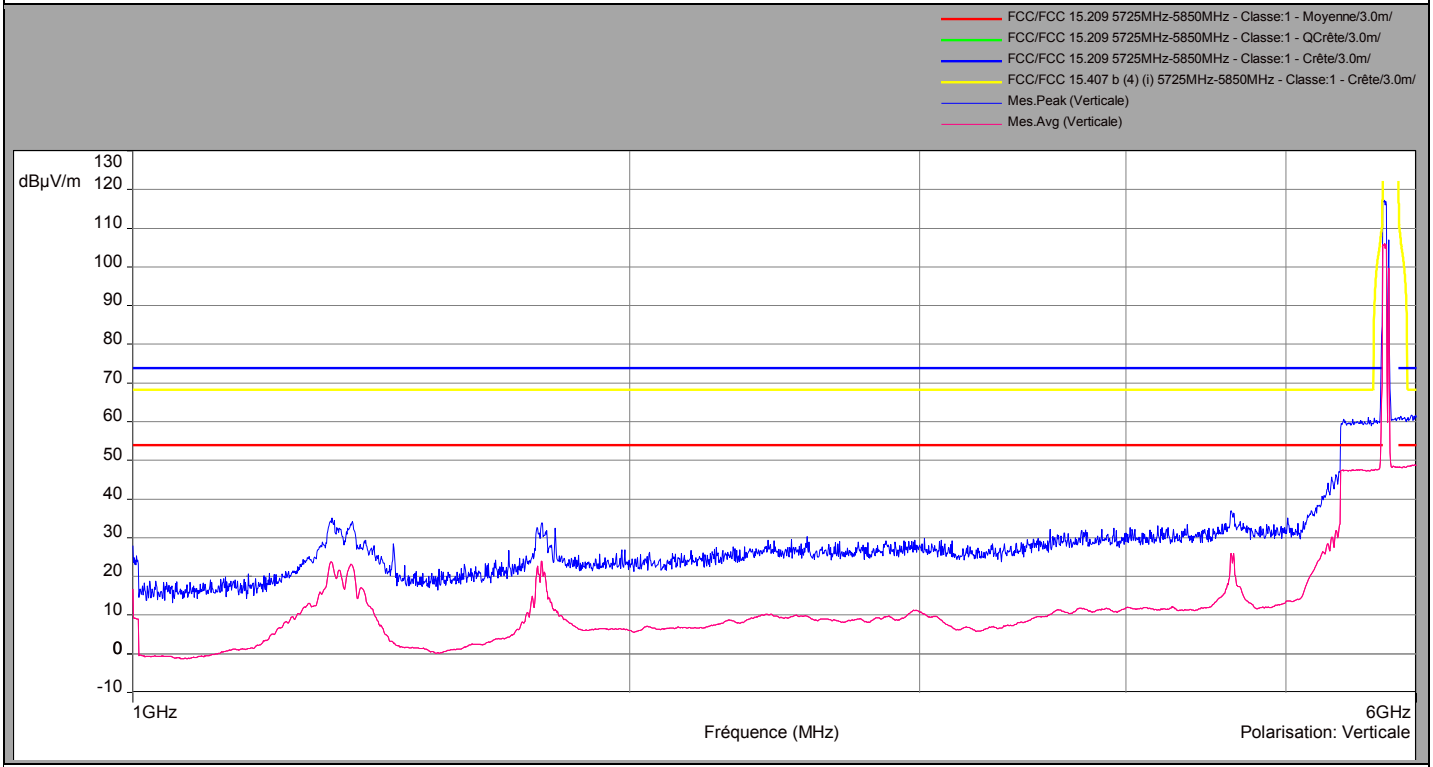
Horizontal Polarization



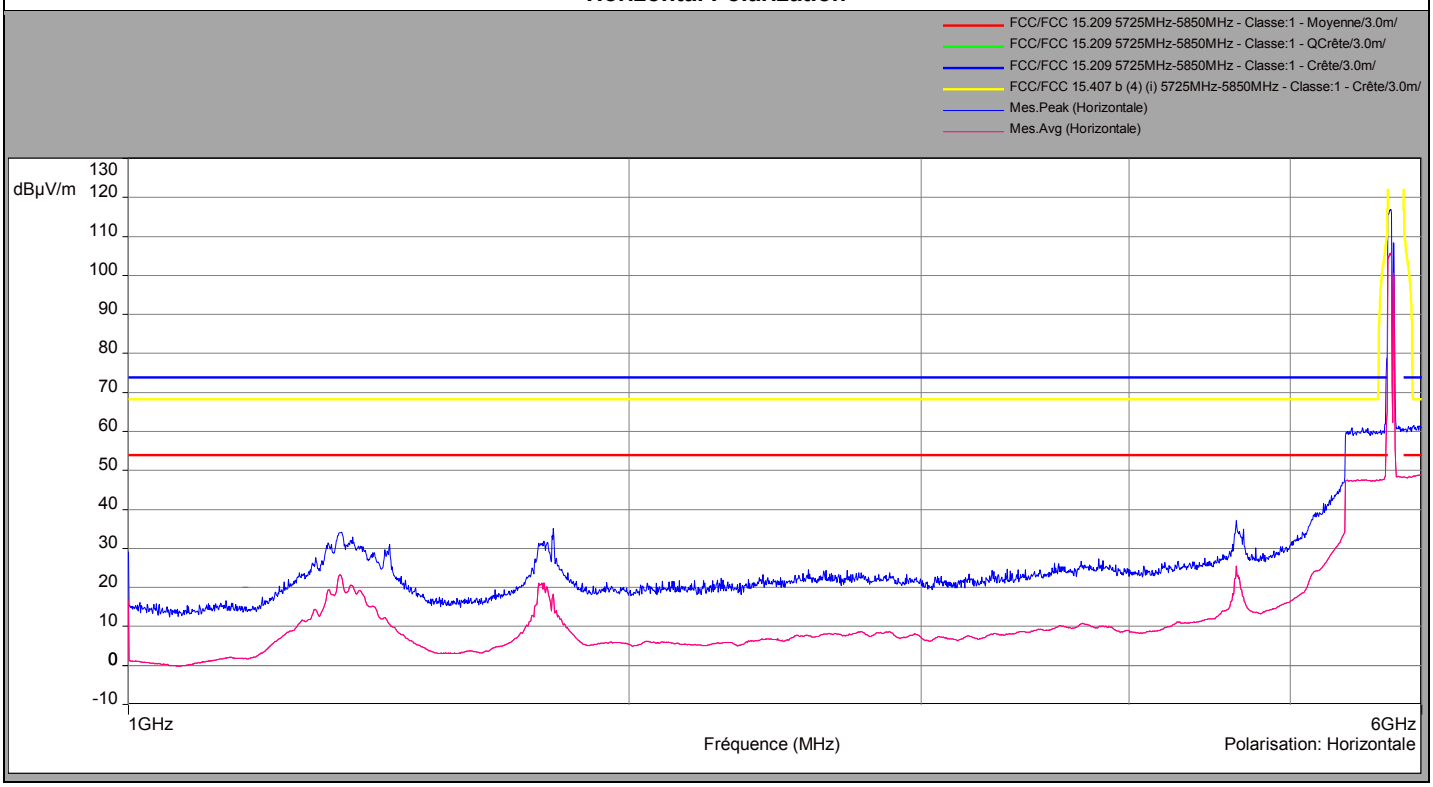
Configuration 13

Above 1GHz

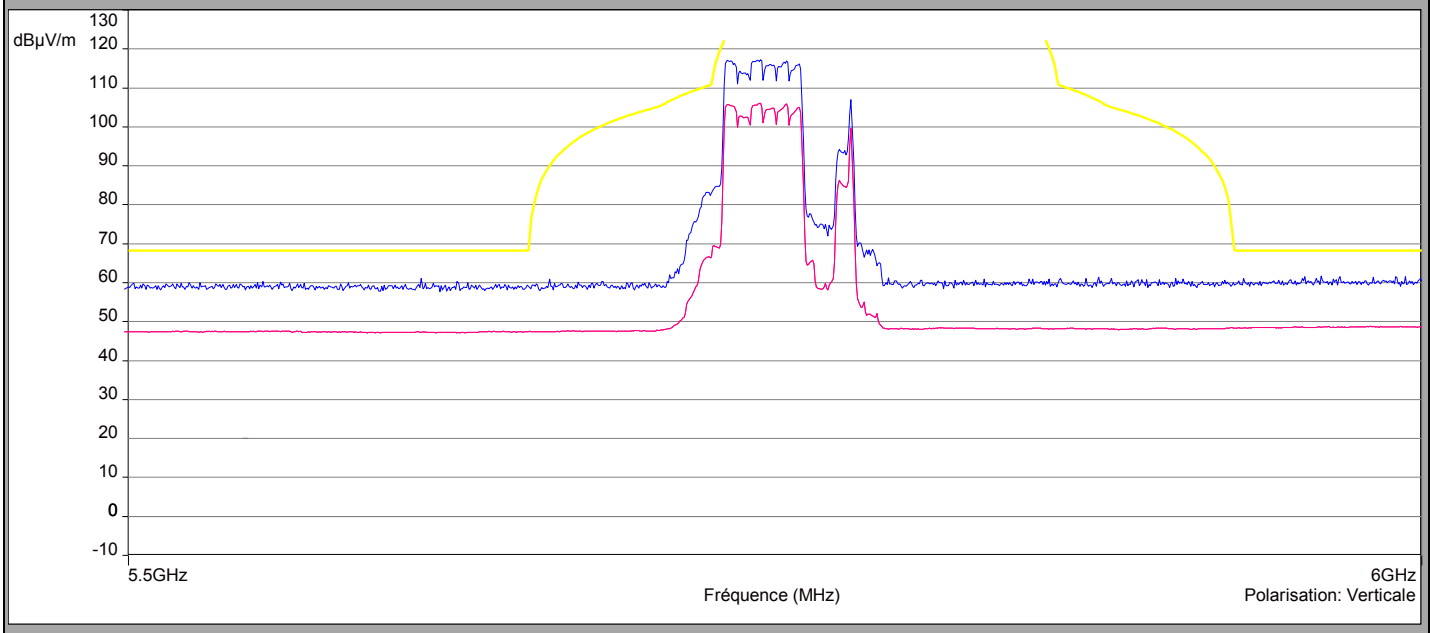
Vertical Polarization



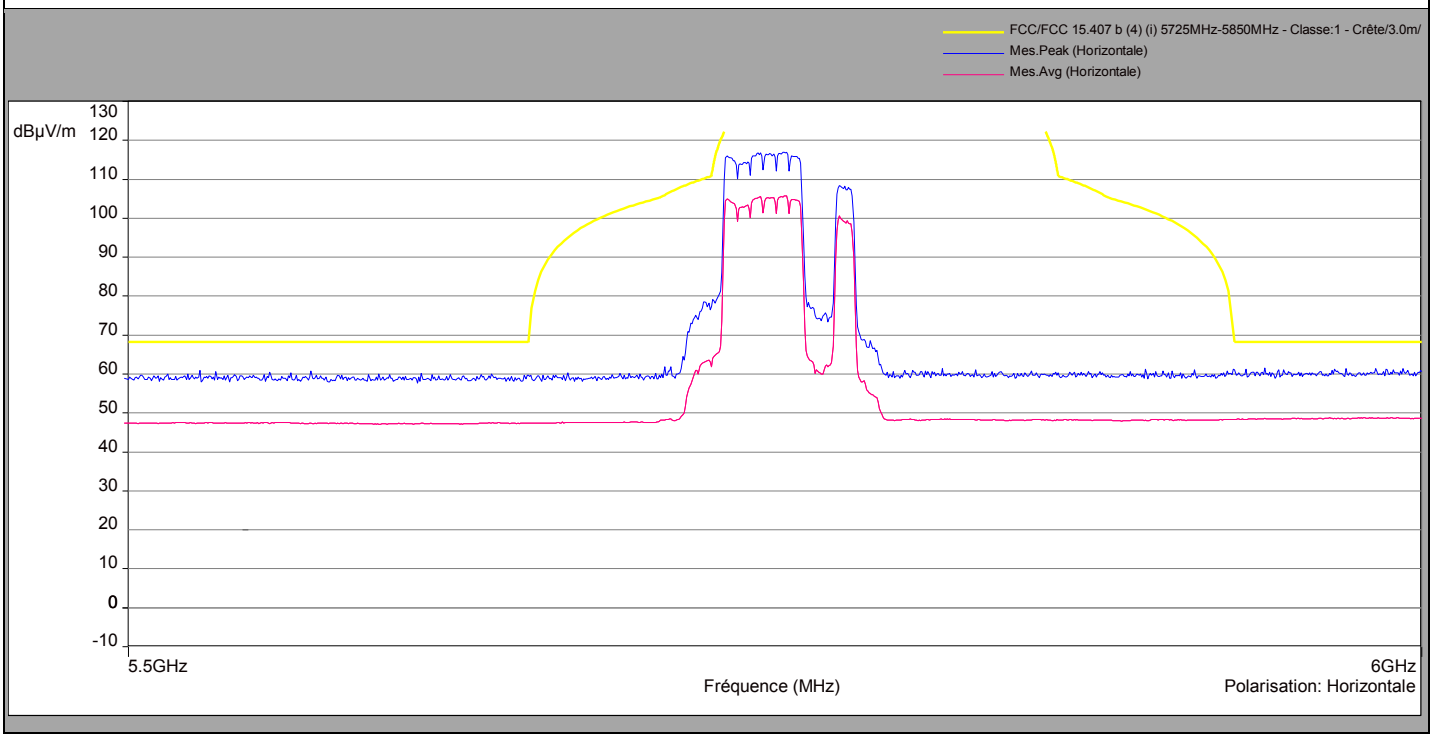
Horizontal Polarization



Configuration 13
Above 1GHz
Vertical Polarization



Horizontal Polarization



Configuration 1			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Vertical	30.8	25.25	29.5
Vertical	32.1	25.86	29.5
Vertical	34.6	26.45	29.5
Vertical	36.7	24.98	29.5
Vertical	37.8	26.4	29.5
Vertical	40	25.15	29.5
Vertical	43.2	26.47	29.5
Vertical	44.3	21.54	29.5
Vertical	46.1	26.18	29.5
Vertical	48	23.38	29.5
Vertical	48.2	26.12	29.5
Vertical	51.3	19	29.5
Vertical	54	25.42	29.5
Vertical	55.1	25.84	29.5
Vertical	55.5	21.3	29.5
Vertical	57.3	23.65	29.5
Vertical	57.5	14.13	29.5
Vertical	60.8	19.39	29.5
Vertical	64.8	23.7	29.5
Vertical	66.1	17.14	29.5
Vertical	69.5	21.54	29.5
Vertical	69.7	20.53	29.5
Vertical	72.7	25.51	29.5
Vertical	74.6	22.12	29.5
Vertical	76.5	19.09	29.5
Vertical	80.3	25.02	29.5
Vertical	85.4	25.55	29.5
Vertical	110	22.18	33
Vertical	110.6	24.88	33
Vertical	114.7	22.59	33
Vertical	118.9	25.54	33
Vertical	120.3	24.44	33
Vertical	121.2	22.27	33
Vertical	124	25.82	33

Configuration 1			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Vertical	128.4	19.97	33
Vertical	131.5	20.53	33
Vertical	132.2	25.56	33
Vertical	136.8	26.85	33
Vertical	147.3	20.57	33
Vertical	149.2	28.85	33
Vertical	150	25.36	33
Vertical	151.2	30.4	33
Vertical	153.8	27.37	33
Vertical	154.8	30.42	33
Vertical	157.3	30.39	33
Vertical	160.9	27.2	33
Vertical	164.5	23.5	33
Vertical	165	27.74	33
Vertical	166	25.16	33
Vertical	167.3	21.86	33
Vertical	168	28.52	33
Vertical	171.9	20.56	33
Vertical	180.5	24.57	33
Vertical	182.9	23.5	33
Vertical	186.9	29.71	33
Vertical	190.7	26.26	33
Vertical	192.5	24.55	33
Vertical	207.2	19.23	33
Vertical	213.6	24.81	33
Vertical	216.1	20.92	35.5
Vertical	219.2	26.84	35.5
Vertical	224.8	25.97	35.5
Vertical	225	19.59	35.5
Vertical	230	25.8	35.5
Vertical	233	28.31	35.5
Vertical	237.9	27.25	35.5

Configuration 1			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Vertical	248.5	29	35.5
Vertical	261.3	25.06	35.5
Vertical	277.9	24.46	35.5
Vertical	313.4	25.96	35.5
Vertical	316	27.52	35.5
Vertical	318.2	21.79	35.5
Vertical	320	22.16	35.5
Vertical	323.3	29.66	35.5
Vertical	328.9	26.14	35.5
Vertical	338.3	26.6	35.5
Vertical	344.4	23.05	35.5
Vertical	360	27.91	35.5
Vertical	363.7	27.44	35.5
Vertical	375	27.59	35.5
Vertical	395.5	26.82	35.5
Vertical	400	27.24	35.5
Vertical	418.6	28.72	35.5
Vertical	440	29.67	35.5
Vertical	450	25.64	35.5
Vertical	463.2	30.11	35.5
Vertical	467.1	25.43	35.5
Vertical	491.5	22.1	35.5
Vertical	500	31.46	35.5
Vertical	600	32	35.5
Vertical	625	24.44	35.5
Vertical	653.9	29.52	35.5
Vertical	666.7	27.73	35.5
Vertical	737.3	25.54	35.5
Vertical	750	25.92	35.5
Vertical	850	26.79	35.5
Vertical	900	27.3	35.5
Vertical	983	33.56	43.5

Configuration 1			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Horizontal	118.2	13.67	33
Horizontal	132.7	18.17	33
Horizontal	143.9	27.05	33
Horizontal	188.4	20.6	33
Horizontal	194.3	24.15	33
Horizontal	196.1	21.92	33
Horizontal	199.7	26.61	33
Horizontal	206.9	21.36	33
Horizontal	212.9	19.28	33
Horizontal	219.1	23.92	35.5
Horizontal	223.7	23.71	35.5
Horizontal	225.5	25.25	35.5
Horizontal	250	28.73	35.5
Horizontal	260.1	22.8	35.5
Horizontal	271.1	25.81	35.5
Horizontal	281.9	27.06	35.5
Horizontal	300	21.84	35.5
Horizontal	302.2	21.81	35.5
Horizontal	313.1	23.27	35.5
Horizontal	325.9	26.19	35.5
Horizontal	334.1	31.3	35.5
Horizontal	337.8	26.57	35.5
Horizontal	339	31.54	35.5
Horizontal	345.1	30.69	35.5
Horizontal	351.3	19.23	35.5
Horizontal	356.8	26.95	35.5
Horizontal	361.8	28.85	35.5
Horizontal	375.9	27.5	35.5
Horizontal	385.2	19.27	35.5
Horizontal	400	26.51	35.5
Horizontal	450	26	35.5
Horizontal	573.4	27.79	35.5
Horizontal	625	25.47	35.5
Horizontal	650	30.73	35.5
Horizontal	666.7	30.01	35.5

Configuration 1			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Horizontal	700	26.8	35.5
Horizontal	737.3	29.53	35.5
Horizontal	800	32.45	35.5
Horizontal	900	32.27	35.5
Horizontal	913	27.9	35.5
Horizontal	983	29.05	43.5
Horizontal	700	26.8	35.5
Horizontal	737.3	29.53	35.5
Horizontal	800	32.45	35.5
Horizontal	900	32.27	35.5
Horizontal	913	27.9	35.5
Horizontal	983	29.05	43.5

Worst case results among configurations 1-2-3-4-5-6-7-8-9-10-11-12-13					
Above 1GHz					
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)
Vertical	1419	46.20	35.52	63,5	43,5
Vertical	1795	49.39	39.37	63,5	43,5
Vertical	4680	40.49	29.89	63,5	43,5
Vertical	5715	100.9	58.01	109.68	
Vertical	5720	104.46	60.31	110.8	-
Vertical	5725	120.42	109.92	122.2	-

Worst case results among the configurations 1-2-3-4-5-6-7-8-9-10-11-12-13					
Above 1GHz					
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)	Peak Limit (dBµV/m)	Average Limit (dBµV/m)
Horizontal	1414	34.44	23.28	63,5	43,5
Horizontal	1798	35.79	25.45	63,5	43,5
Horizontal	4679	38.74	27.79	63,5	43,5
Horizontal	5719	88.479	68.99	110.59	-
Horizontal	5725	120.28	109.42	122.2	-

7.7. CONCLUSION

Unwanted Emission into Restricted Bands measurement performed on the sample of the product FL58R2EABW45-CEN, SN: EBL1613C0073, in configuration and description presented in this test report, show levels **conform to** the FCC 15.407 limits.

8. UNCERTAINTIES CHART

Kind of test	Measurement uncertainties (k=2) ±x(dB) / (Hz)	Limit for uncertainties ±y(dB)
REQUIREMENTS		
RF output power, conducted	±0.6 dB	±1,5 dB
Power Spectral Density, conducted	±0.6 dB	±1,5 dB
Unwanted Emissions, conducted	±0.6 dB	±1,5 dB
Radiated emissions • Frequency < 1000 MHz • Frequency > 1000 MHz	±3.9 dB ±3.1 dB	±6 dB
Temperature	±0.5°C	±1°C
Humidity	±2.5 %	±5 %