

7. POWER SPECTRAL DENSITY

7.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : May 31, 2018
Ambient temperature : 24 °C
Relative humidity : 42 %

7.2. TEST SETUP

- The Equipment Under Test is installed:

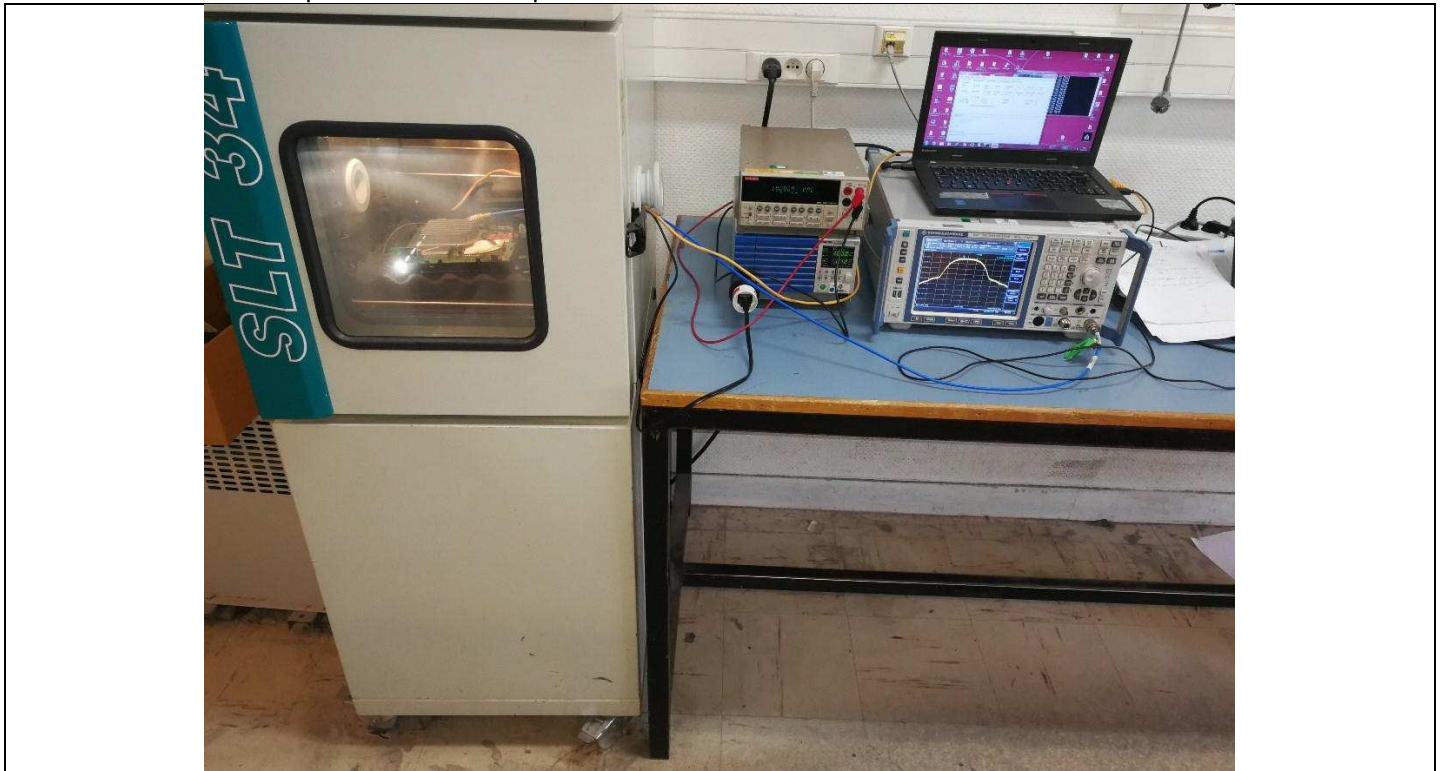
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v04 § 10.2 (Method PKPSD)
- KDB 558074 D01 DTS Meas Guidance v04 § 10.3 (Method AVGPSD-1)
- KDB 662911 D01 Multiple Transmitter Output v02r01



Photograph for Power Spectral Density



7.3. LIMIT

Power Spectral Density:
2400MHz-2483.5MHz: Shall not exceed 8dBm/3kHz
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

7.4. TEST EQUIPMENT LIST

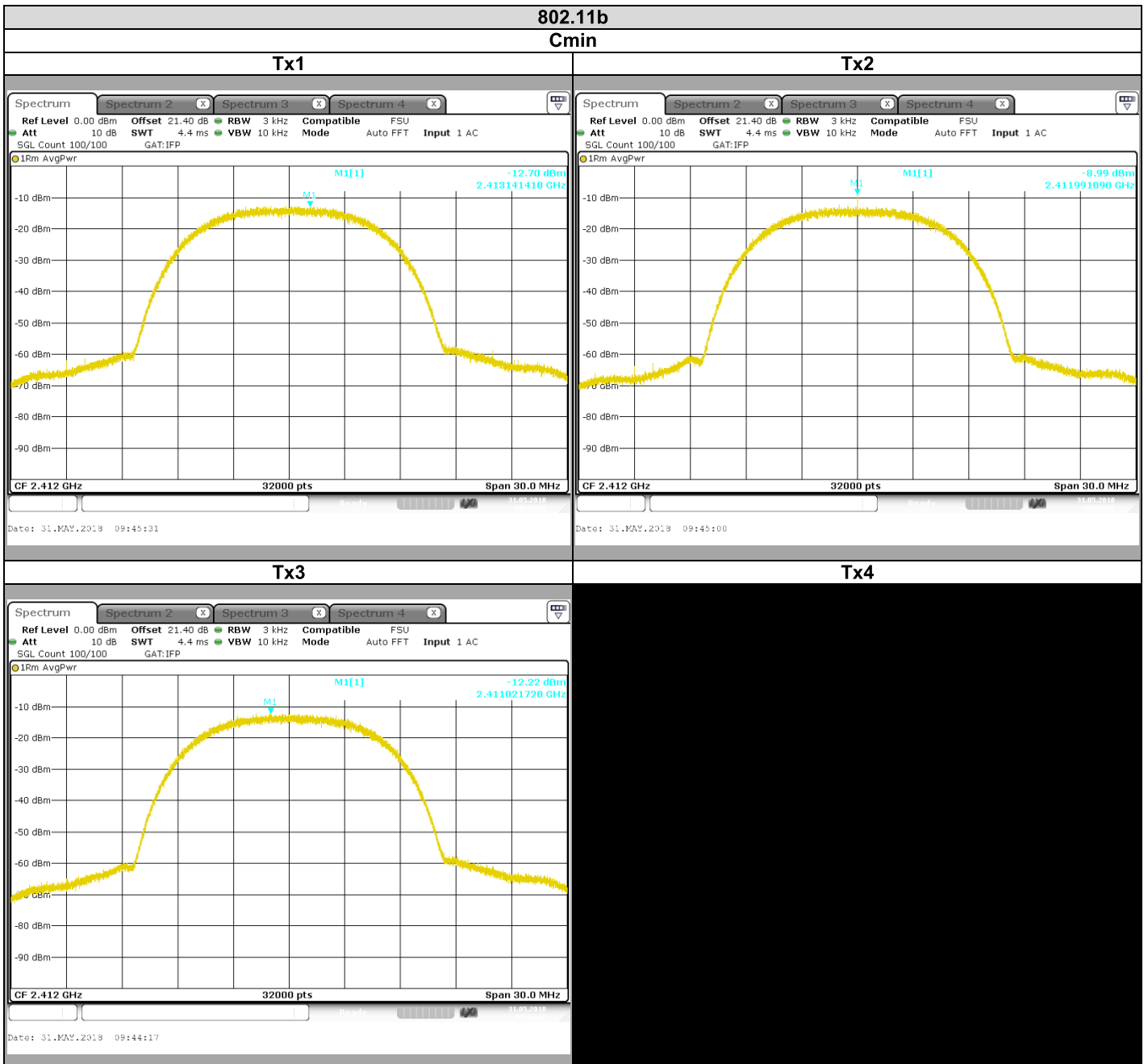
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329676	2017/09	2018/09

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



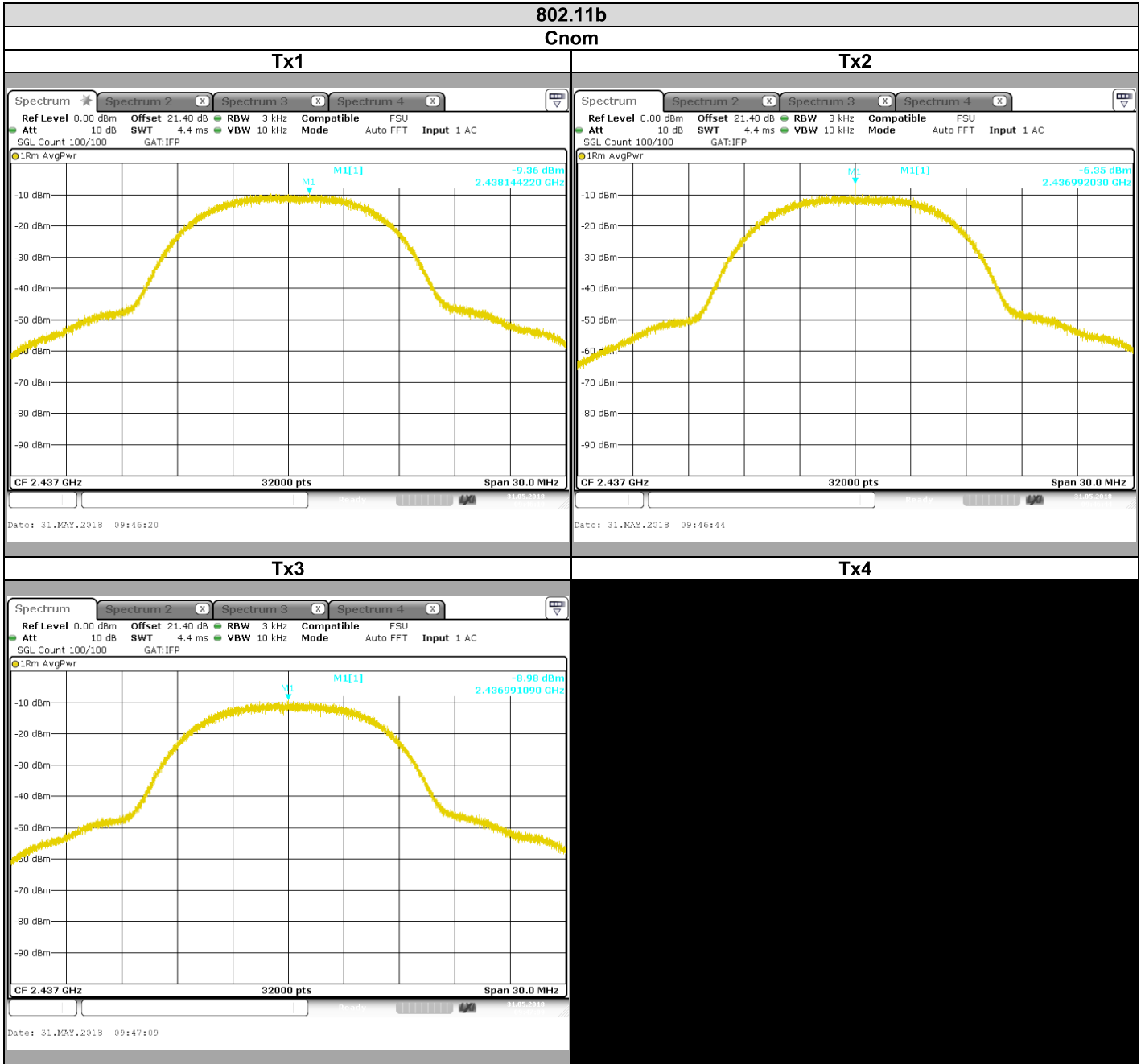
L C I E

7.5. RESULTS





L C I E



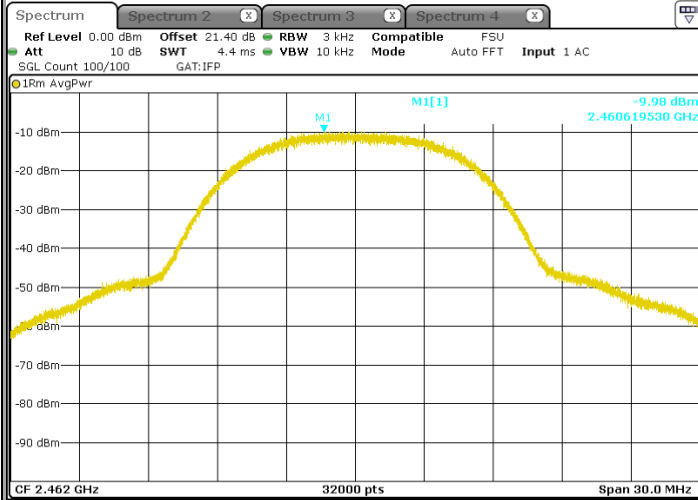


L C I E

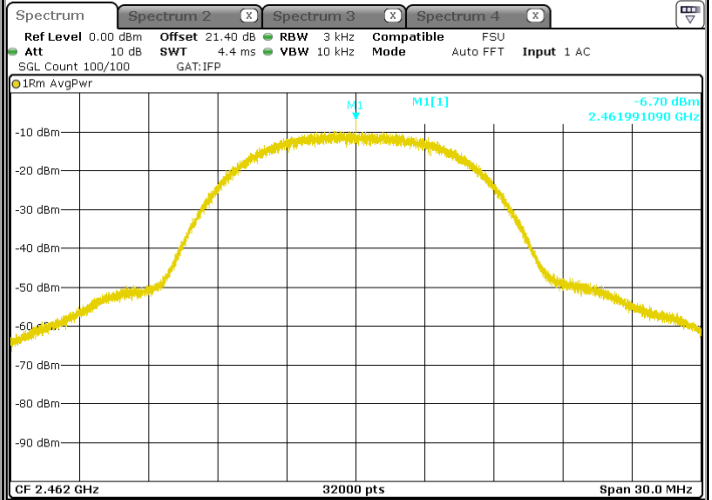
802.11b

Cmax

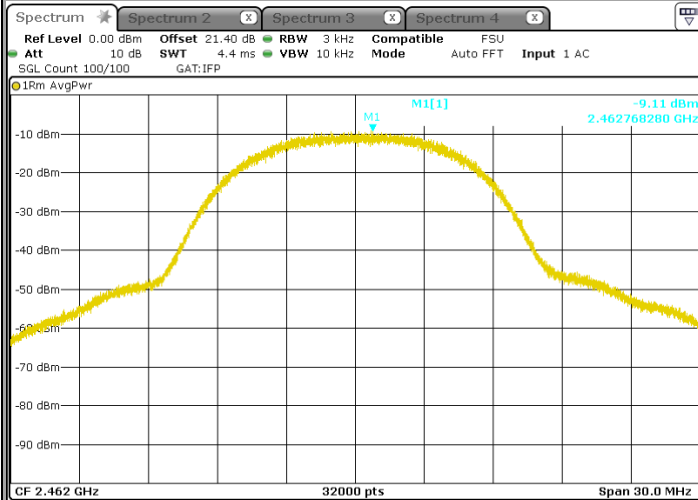
Tx1



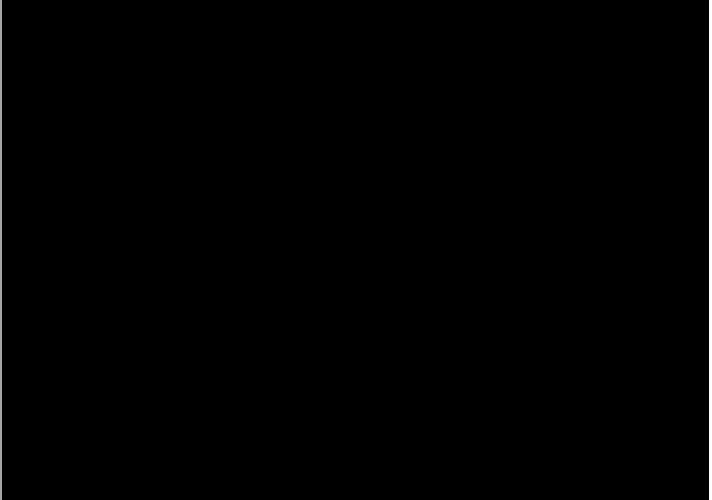
Tx2



Tx3

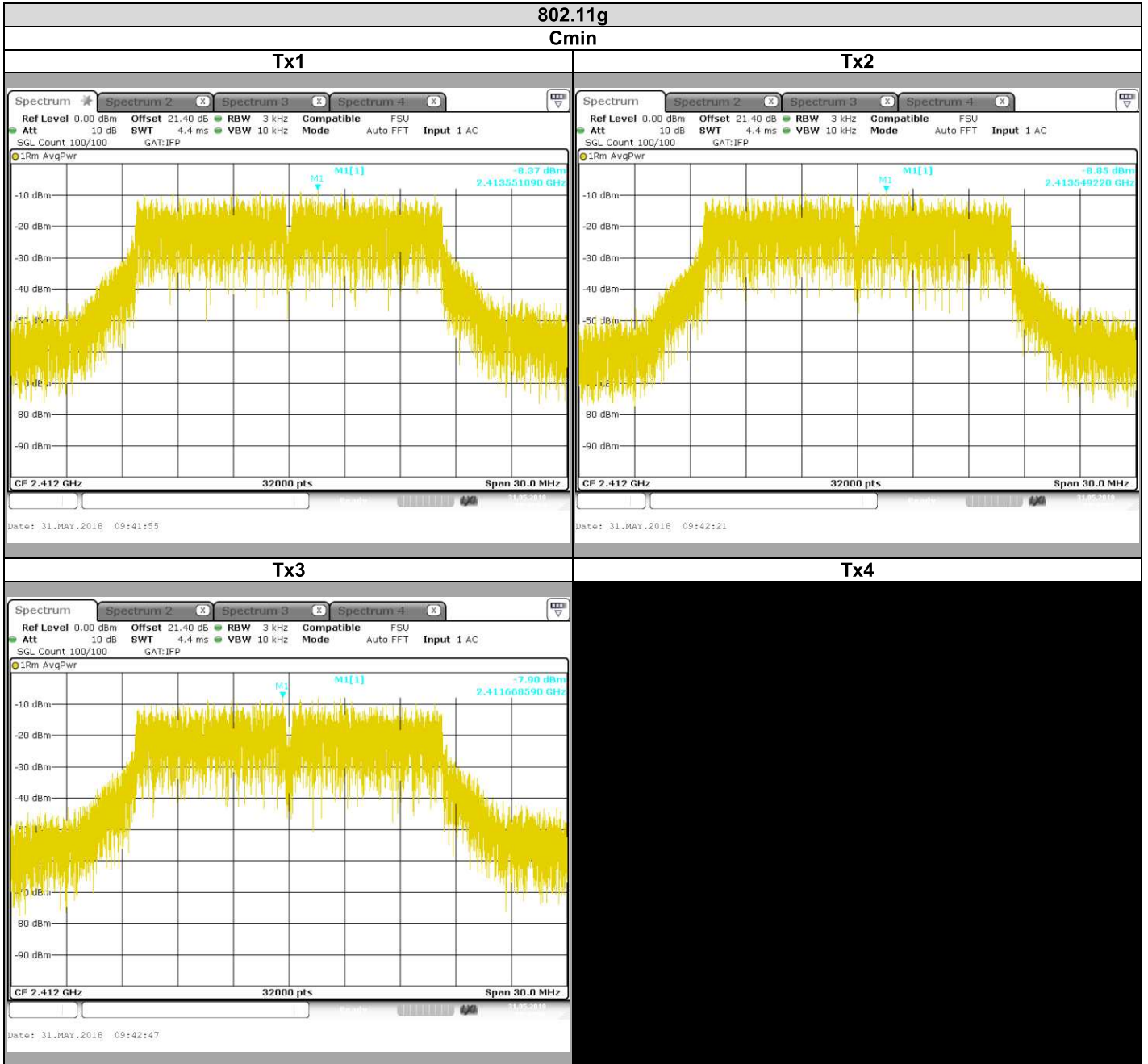


Tx4



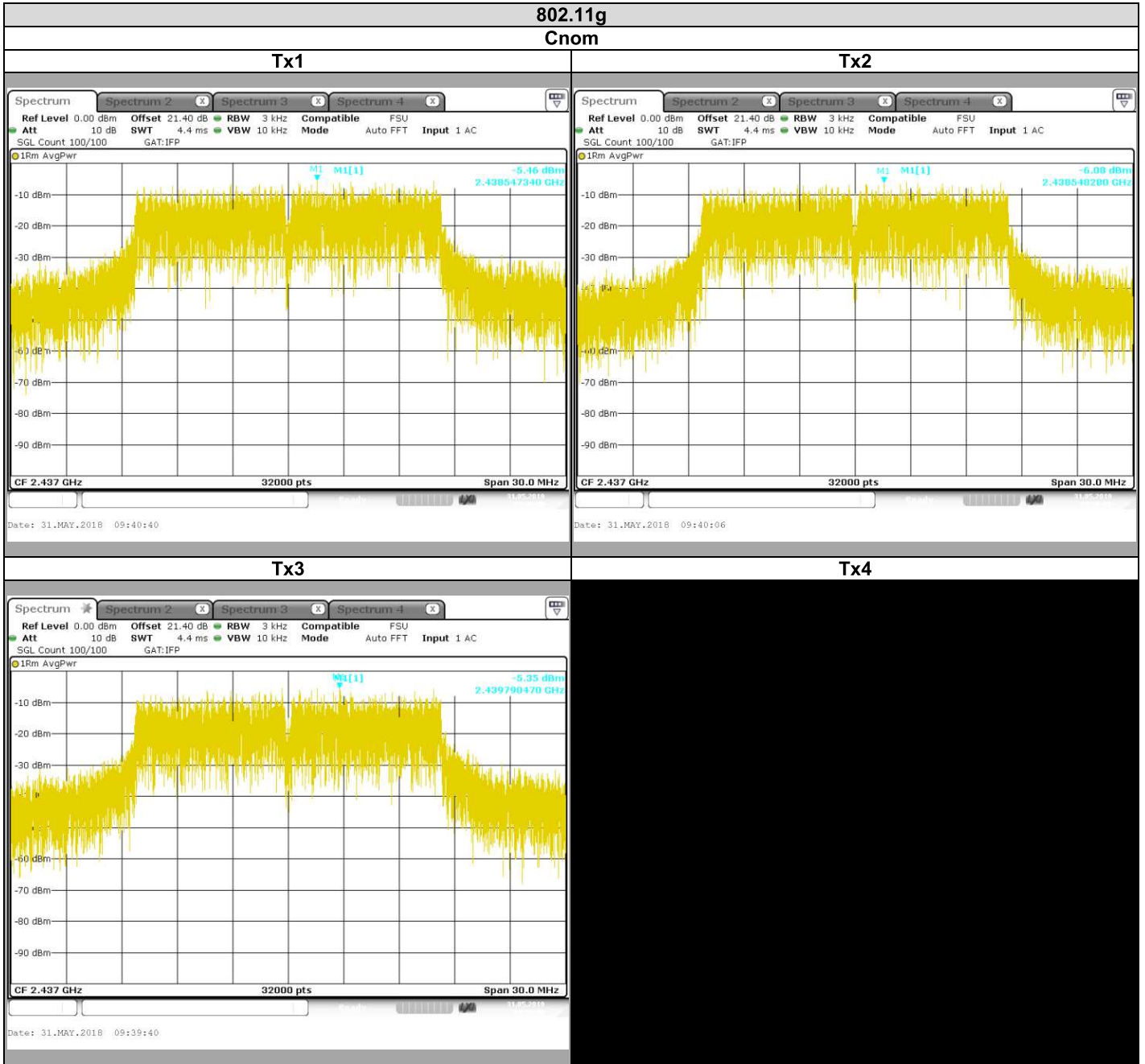


L C I E



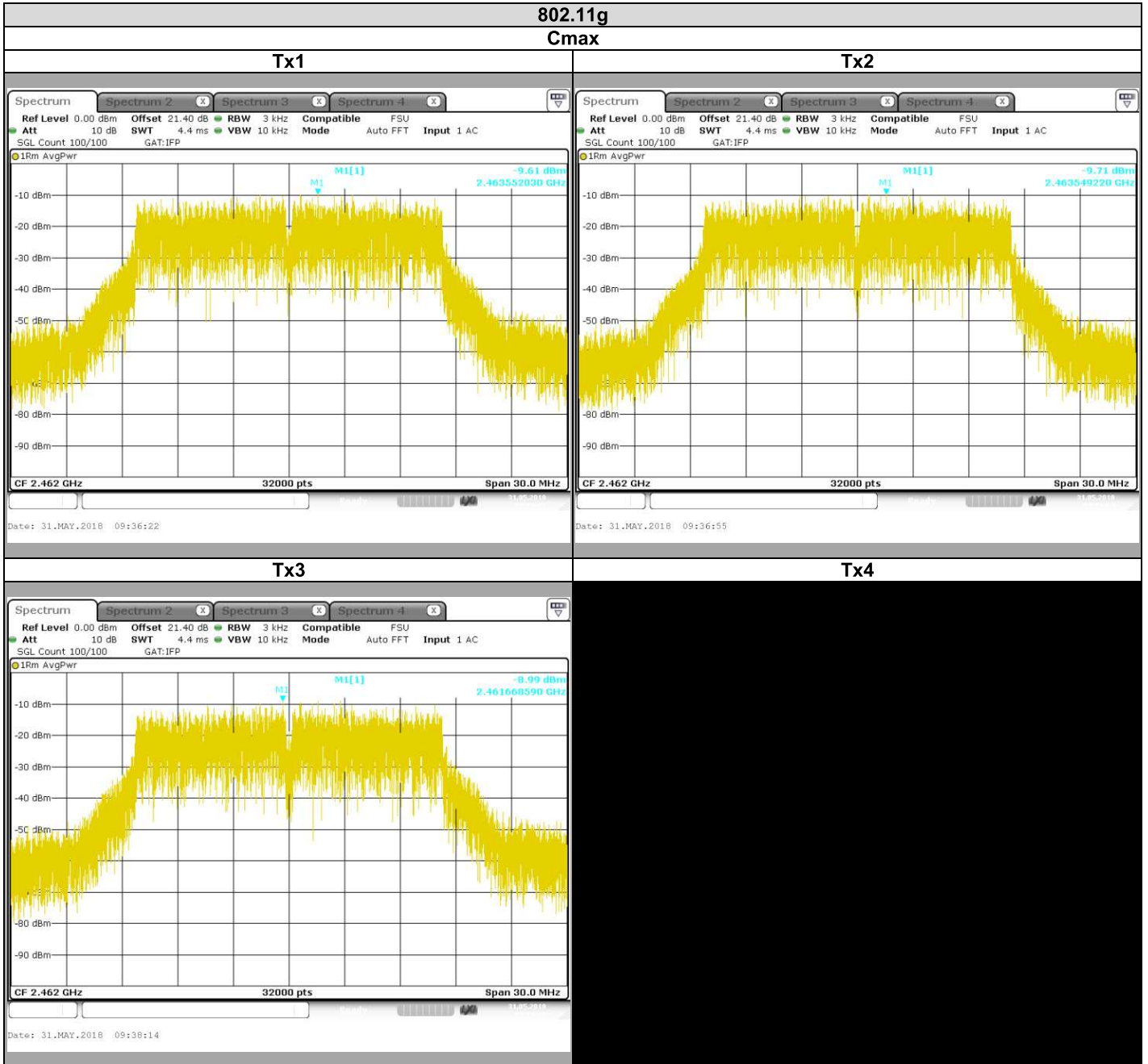


L C I E



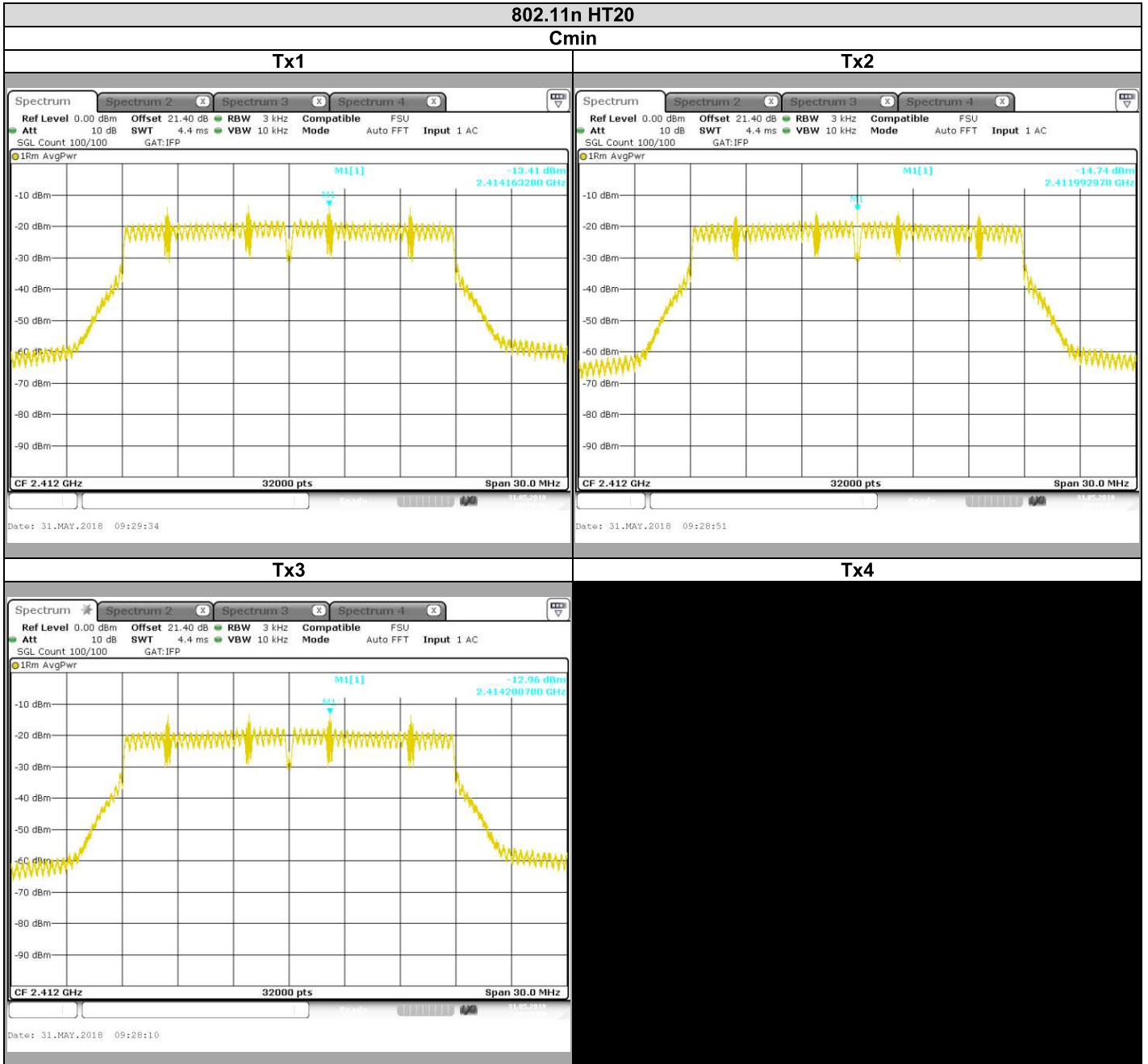


L C I E





L C I E



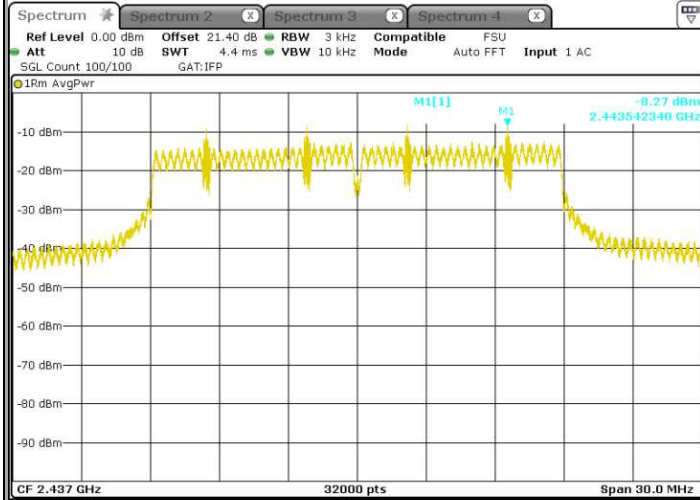


L C I E

802.11n HT20

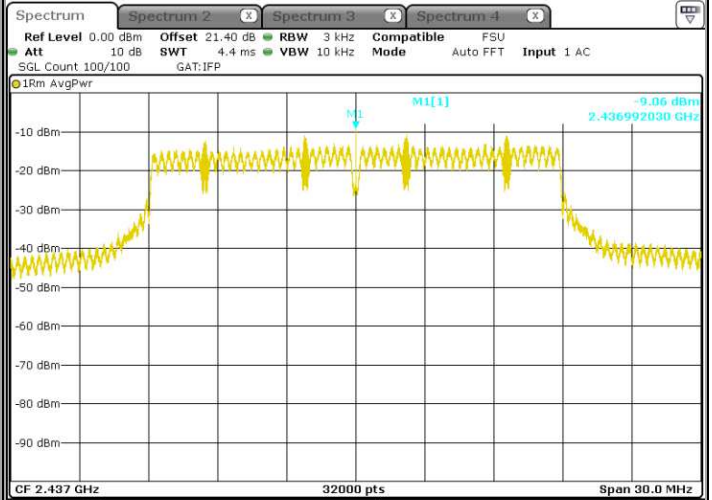
Cnom

Tx1



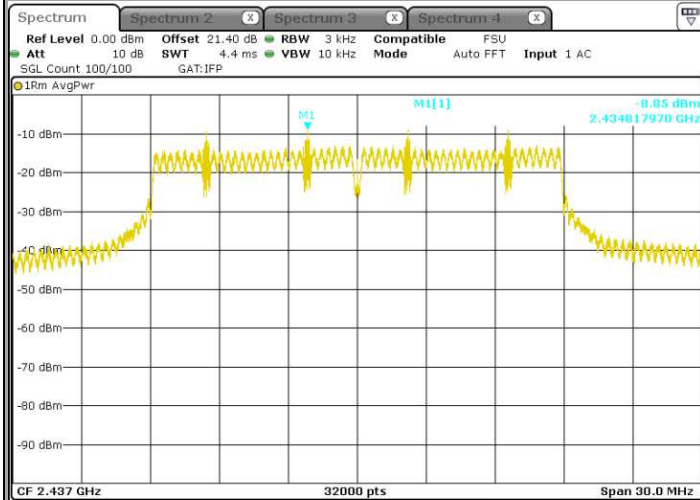
Date: 31.MAY.2018 09:30:31

Tx2



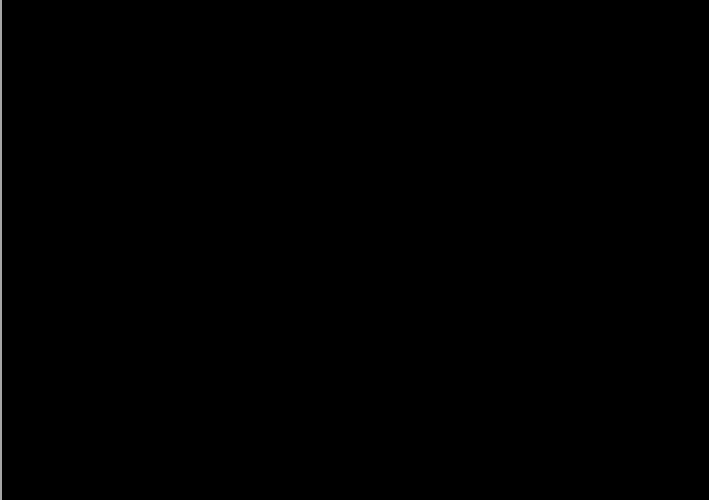
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Tx3



Date: 31.MAY.2018 09:32:01

Tx4



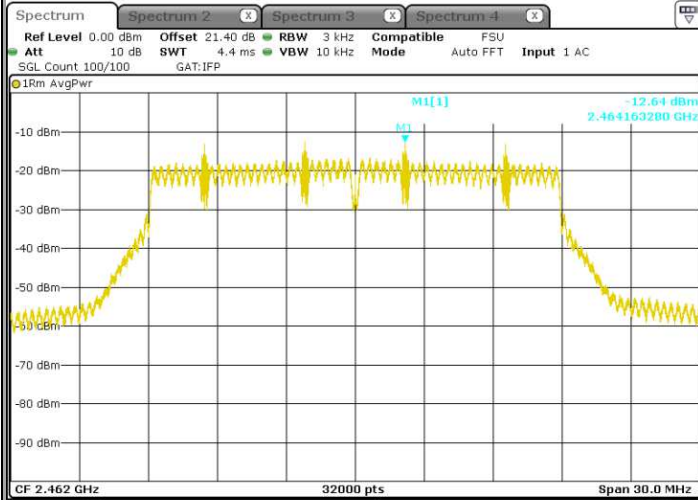


L C I E

802.11n HT20

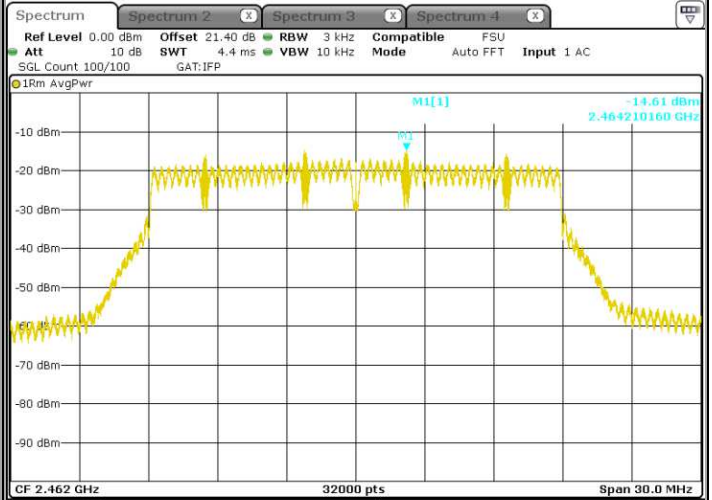
Cmax

Tx1



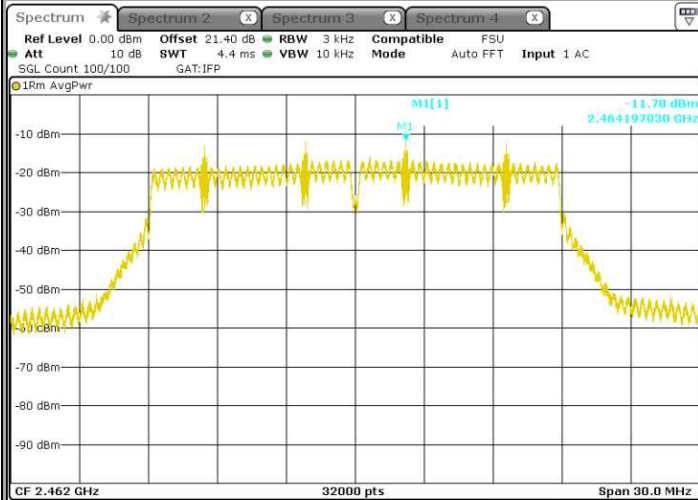
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Tx2



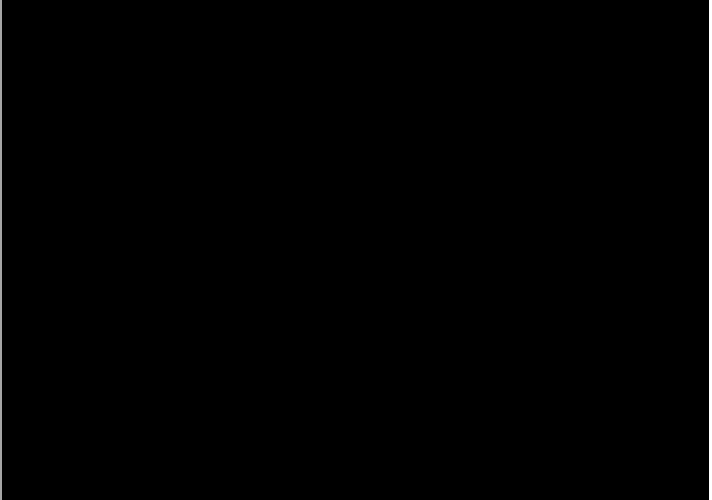
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Tx3



Date: 31.MAY.2018 09:33:05

Tx4



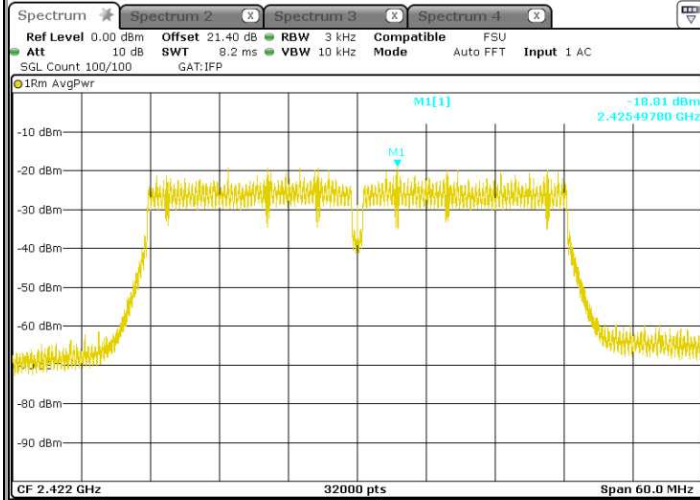


L C I E

802.11n HT40

Cmin

Tx1



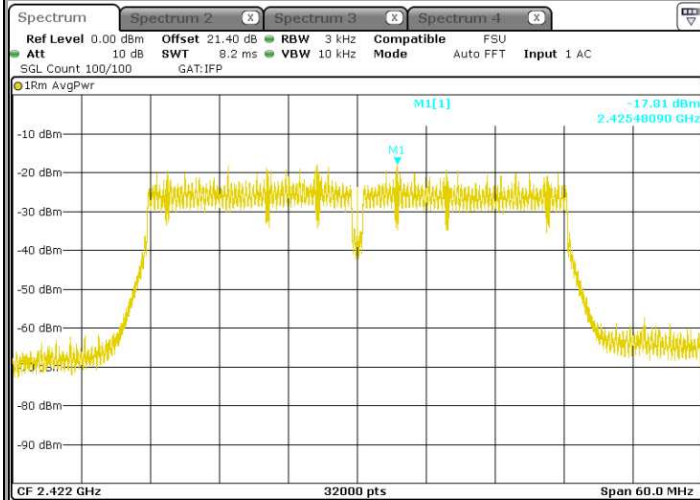
Date: 31.MAY.2018 09:25:39

Tx2



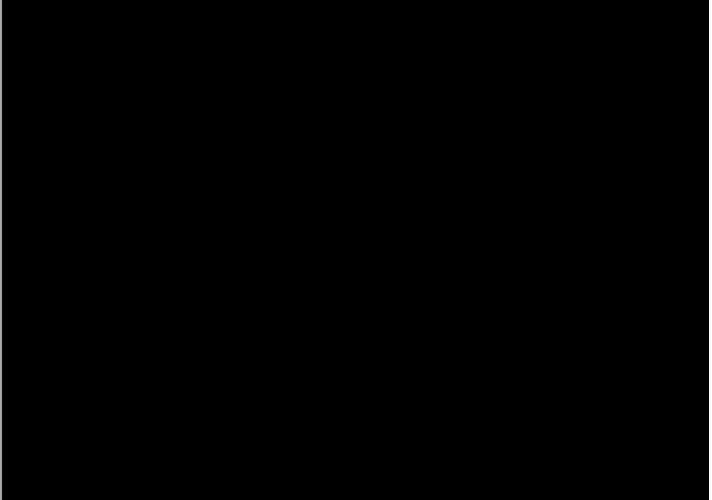
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Tx3



Date: 31.MAY.2018 09:26:38

Tx4



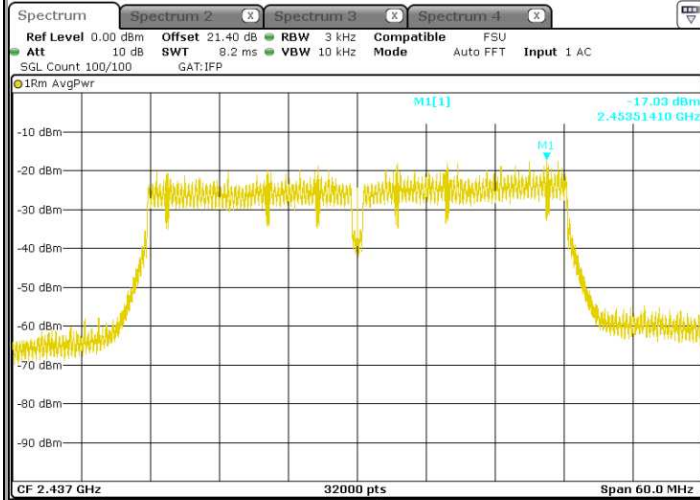


L C I E

802.11n HT40

Cnom

Tx1



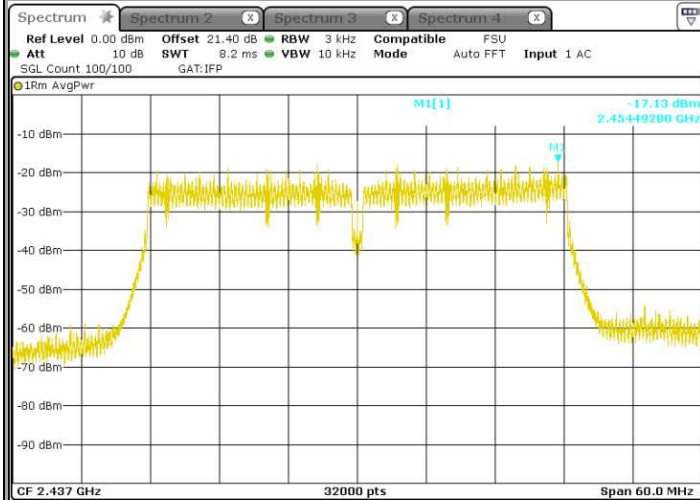
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Tx2



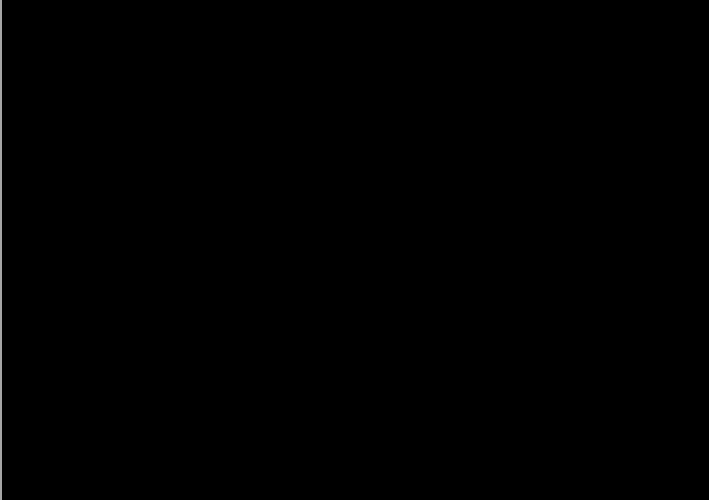
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Tx3



Date: 31.MAY.2018 09:23:00

Tx4



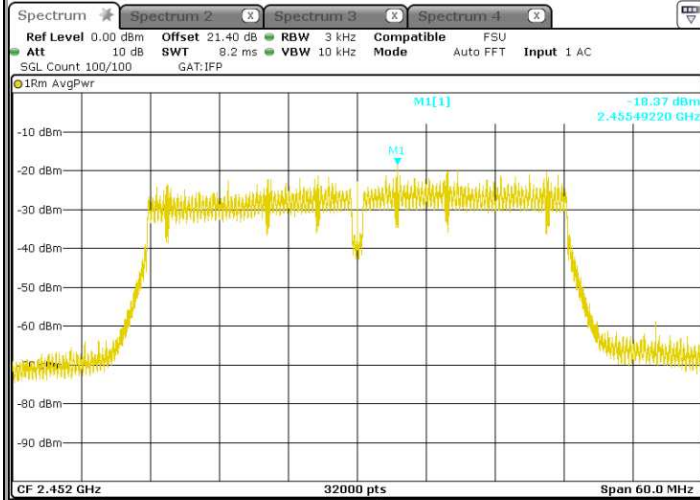


L C I E

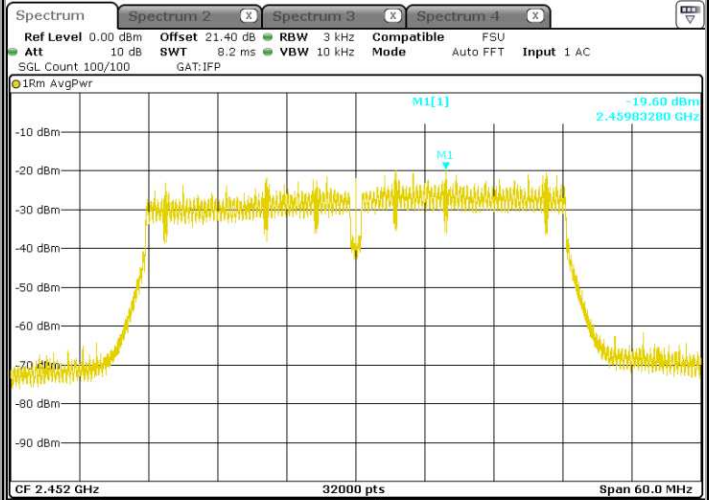
802.11n HT40

Cmax

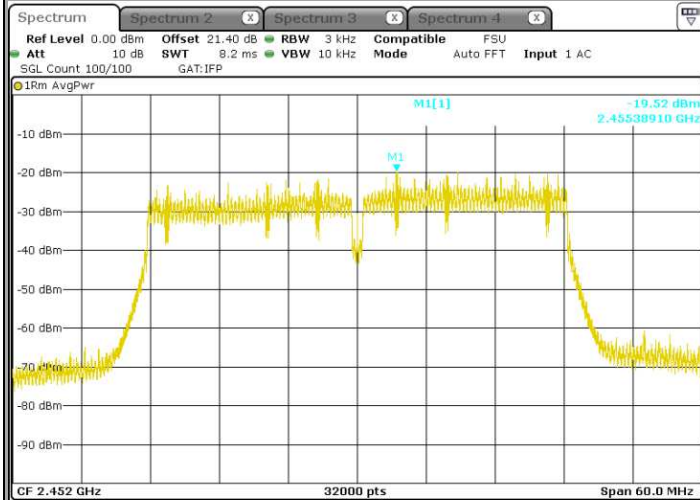
Tx1



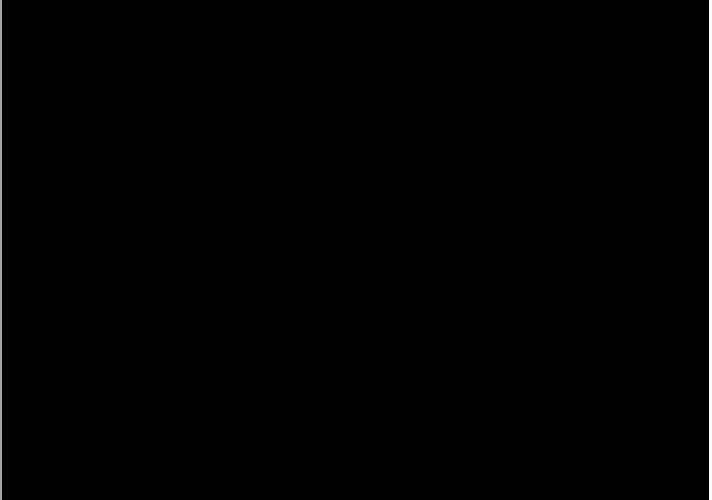
Tx2



Tx3



Tx4





L C I E

802.11b							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-12,7	-8,99	-12,22		5	-6,2	8
Cnom	-9,36	-6,35	-8,98		5	-3,24	8
Cmax	-9,98	-6,7	-9,11		5	-3,6	8

802.11g							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-8,37	-8,85	-7,9		5	-3,58	8
Cnom	-5,46	-6,08	-5,35		5	-0,85	8
Cmax	-9,61	-9,71	-8,99		5	-4,65	8

802.11n HT20							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-13,41	-14,74	-12,96		5	-8,87	8
Cnom	-8,27	-9,06	-8,85		5	-3,94	8
Cmax	-12,64	-14,61	-11,78		5	-8,08	8

802.11n HT40							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-18,81	-18,66	-17,81		5	-13,63	8
Cnom	-17,03	-16,52	-17,13		5	-12,11	8
Cmax	-18,37	-19,6	-19,52		5	-14,35	8

7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SAGEMCOM DCIWA384 UHD Ait US V2**, SN: **253764997**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

8.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : May 31, 2018
Ambient temperature : 24 °C
Relative humidity : 42 %

8.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v04 § 11
- KDB 662911 D01 Multiple Transmitter Output v02r01



Photograph for Unwanted Emission into non-restricted frequency bands at the band edge



8.3. LIMIT

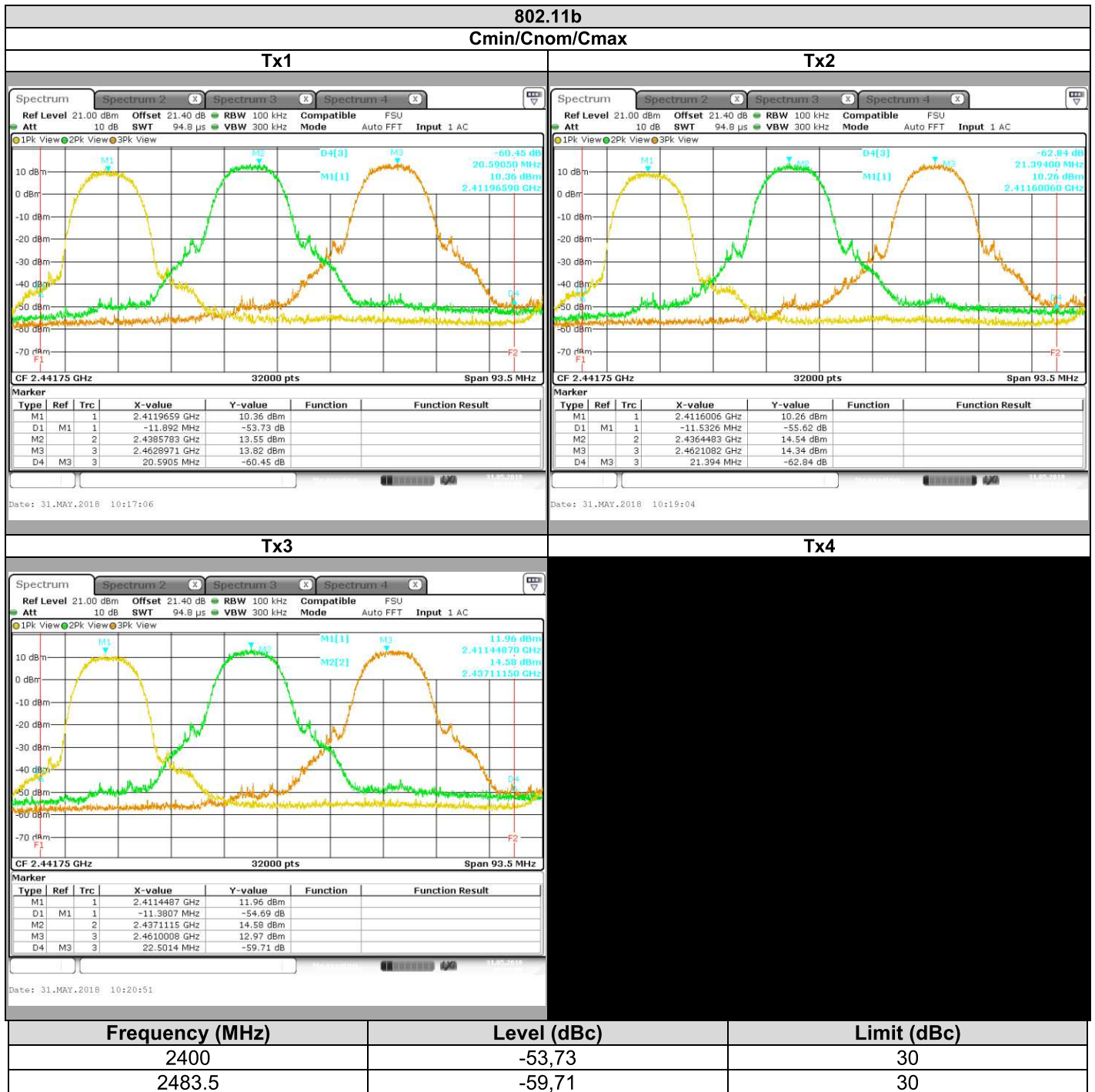
All Spurious Emissions must be at least 30dB (Average Conducted Power) below the Fundamental Radiator Level at the Band Edge "2400MHz & 2483,5MHz"

8.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2017/09	2018/09
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329676	2017/09	2018/09

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

8.5. RESULTS





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802.11g

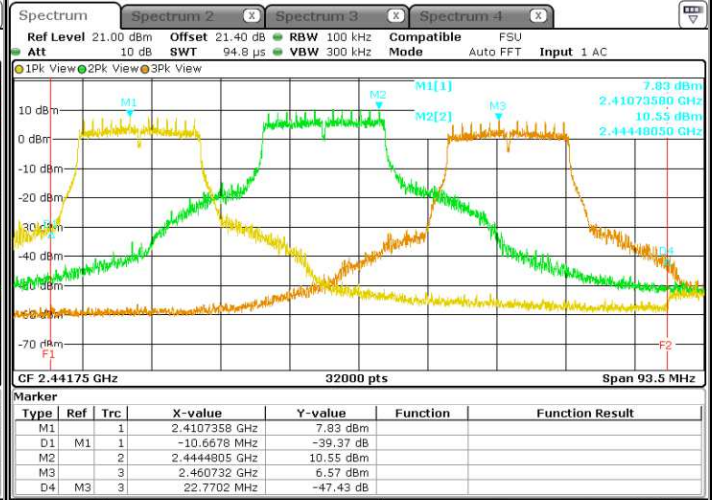
Cmin/Cnom/Cmax

Tx1



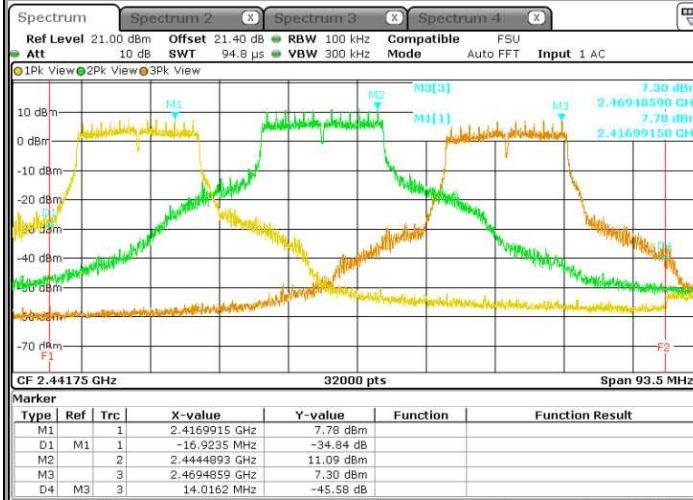
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Tx2



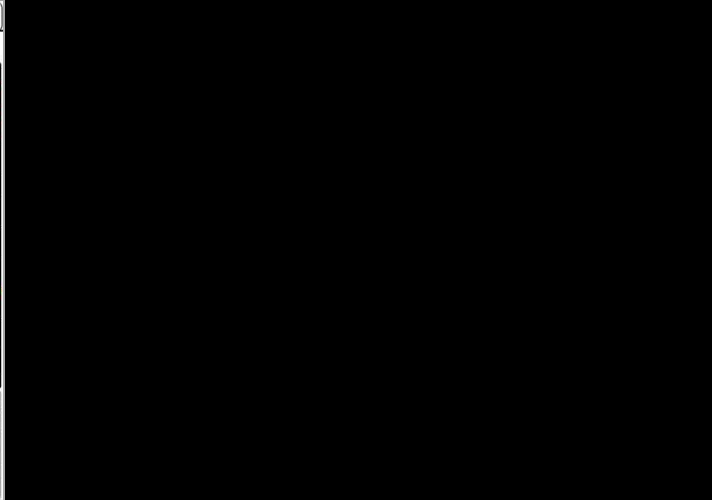
Date: 31.MAY.2018 10:27:21

Tx3



Date: 31.MAY.2018 10:25:07

Tx4



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	-34,84	30
2483.5	-45,58	30

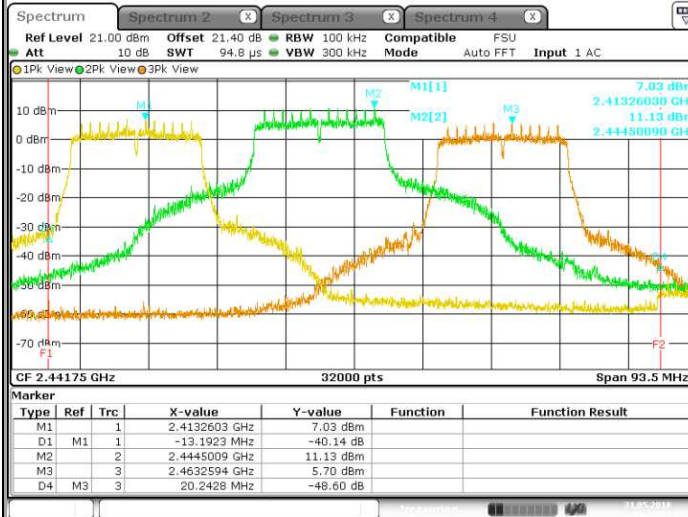


L C I E

802.11n HT20

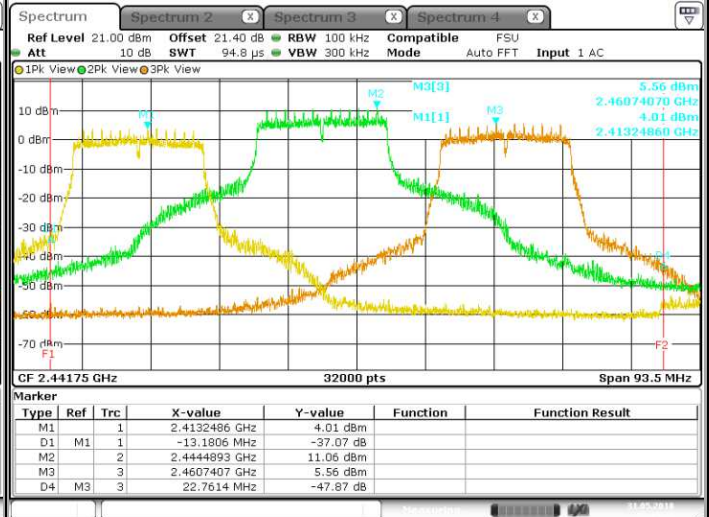
Cmin/Cnom/Cmax

Tx1



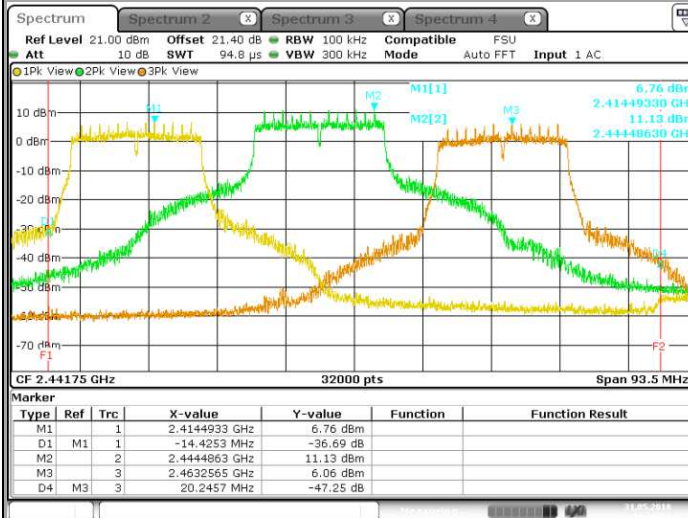
Date: 31.MAY.2018 10:32:51

Tx2



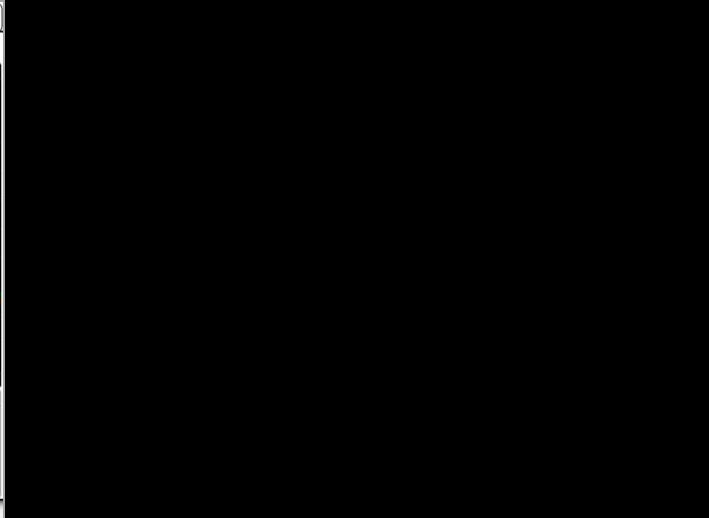
Date: 31.MAY.2018 10:34:47

Tx3



Date: 31.MAY.2018 10:36:30

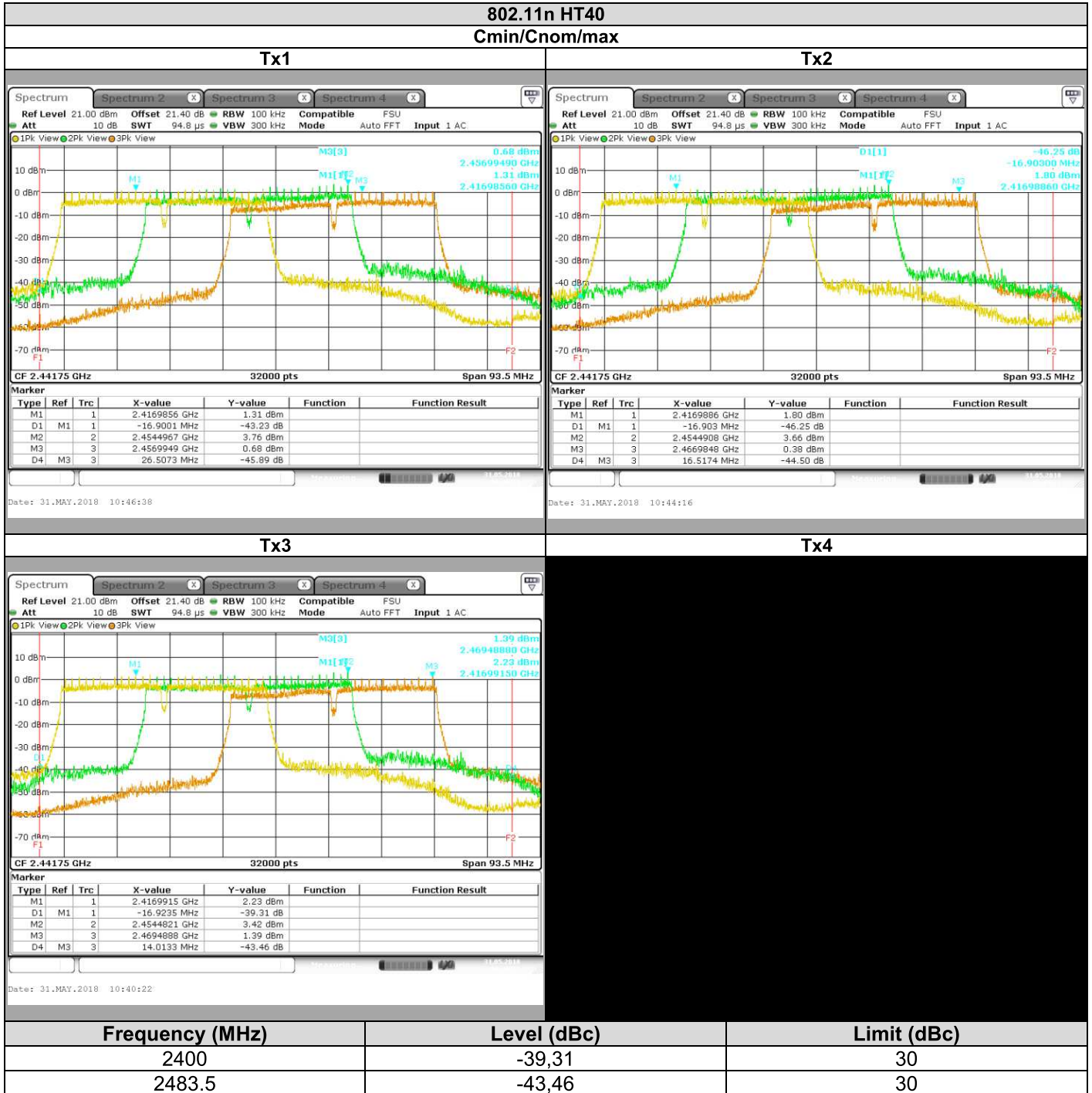
Tx4



Frequency (MHz)	Level (dBc)	Limit (dBc)
2400	-36,69	30
2483.5	-47,25	30



L C I E



8.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **SAGEMCOM DCIWA384 UHD Ait US V2**, SN: **253764997**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : May 25, 2018
Ambient temperature : 26 °C
Relative humidity : 46 %

9.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

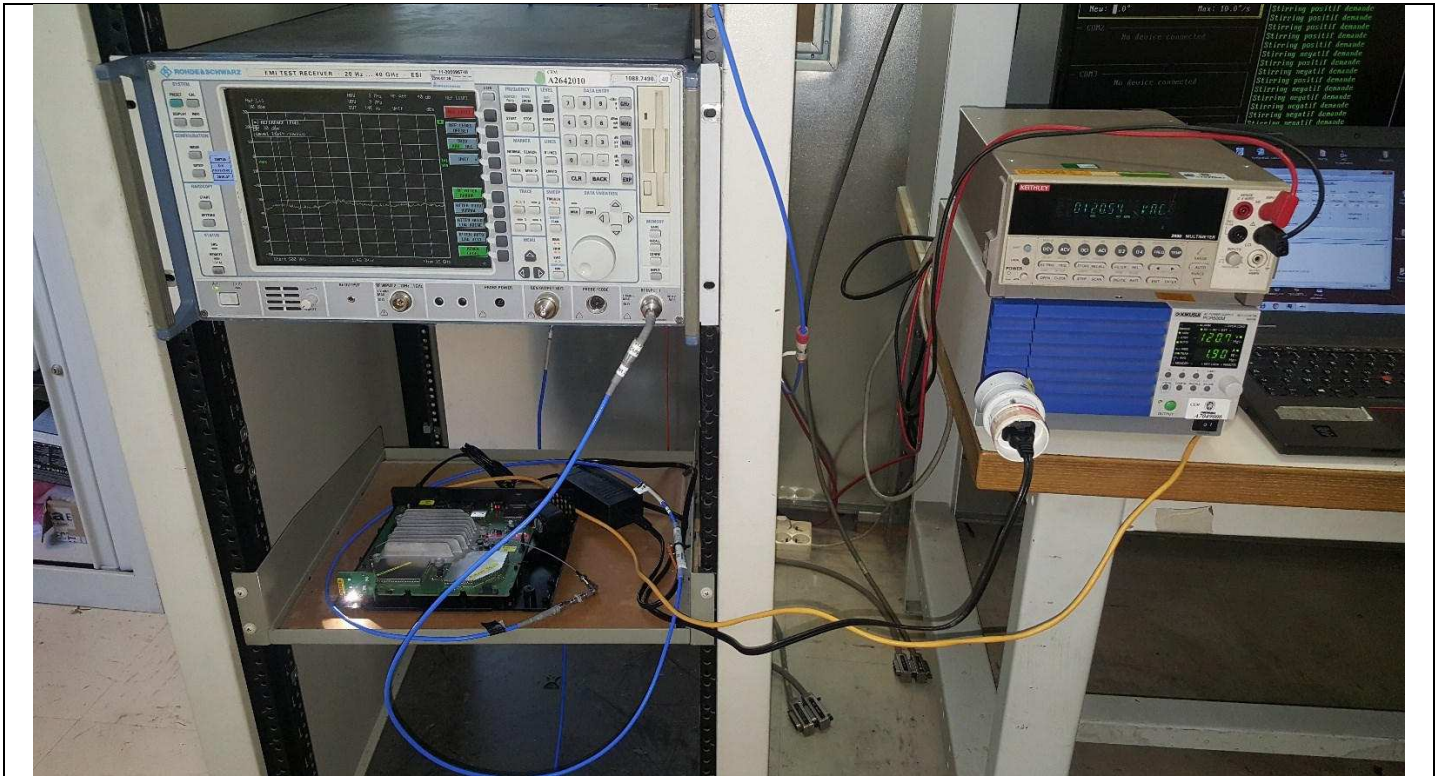
- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v04 § 11
- KDB 662911 D01 Multiple Transmitter Output v02r01



Photograph for Unwanted Emission into non-restricted frequency bands



Photograph for Unwanted Emission into non-restricted frequency bands

9.3. LIMIT

All Spurious Emissions must be at least 30dB (Average Conducted Power) below the Fundamental Radiator Level

9.4. TEST EQUIPMENT LIST

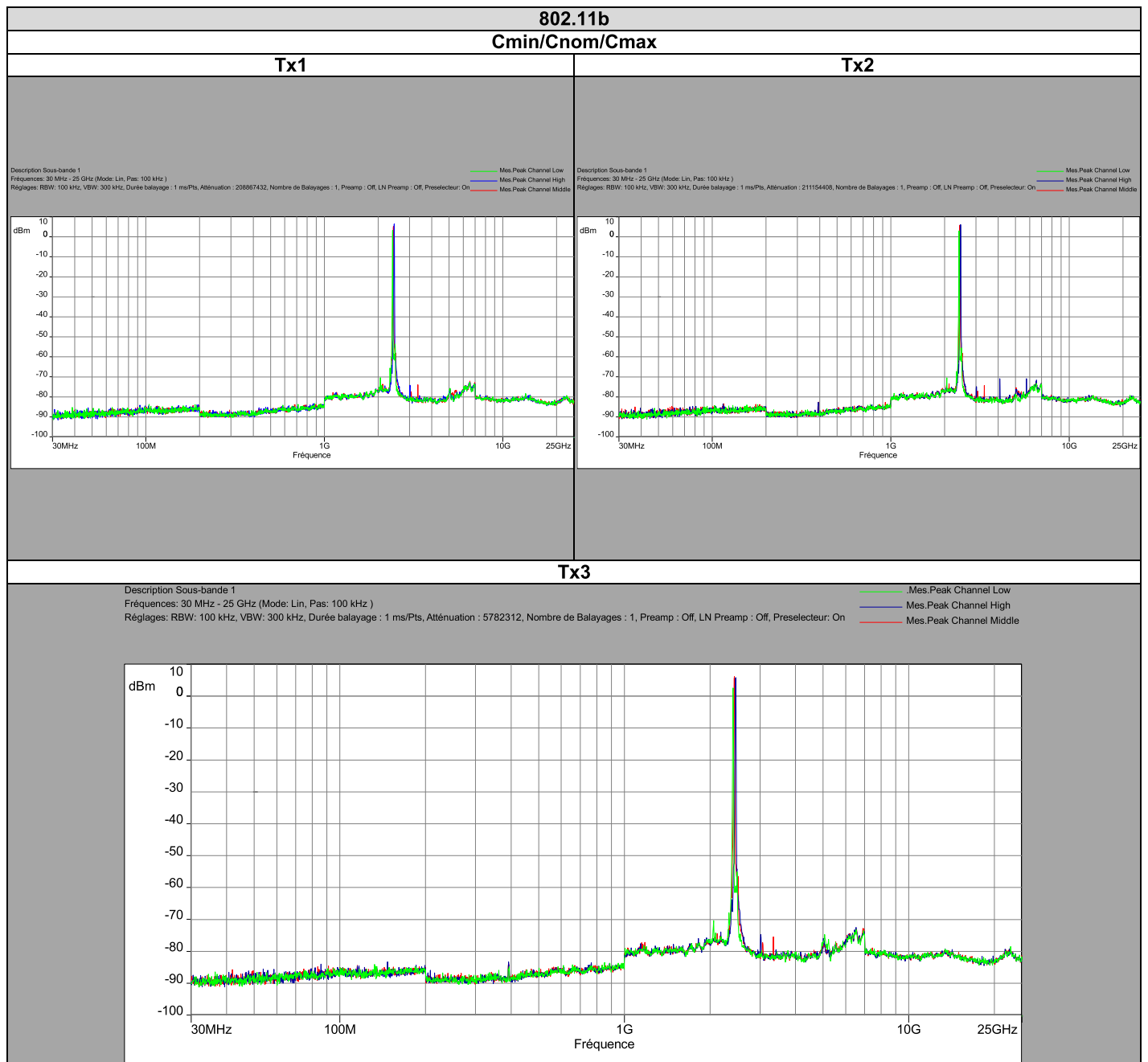
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
EMI receiver	ROHDE & SCHWARZ	ESI40 1088 740K40	A2642010	2017/07	2018/07
cable	Télédyne	084-0555-2MTR	A5329758	2017/10	2018/10
Attenuator 3dB	WEINSCHEL	WA54-3-12	A7122223	2017/10	2018/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Rejector filter 2,4GHz	-	2.45GHz	A7484048	2017/09	2018/09

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



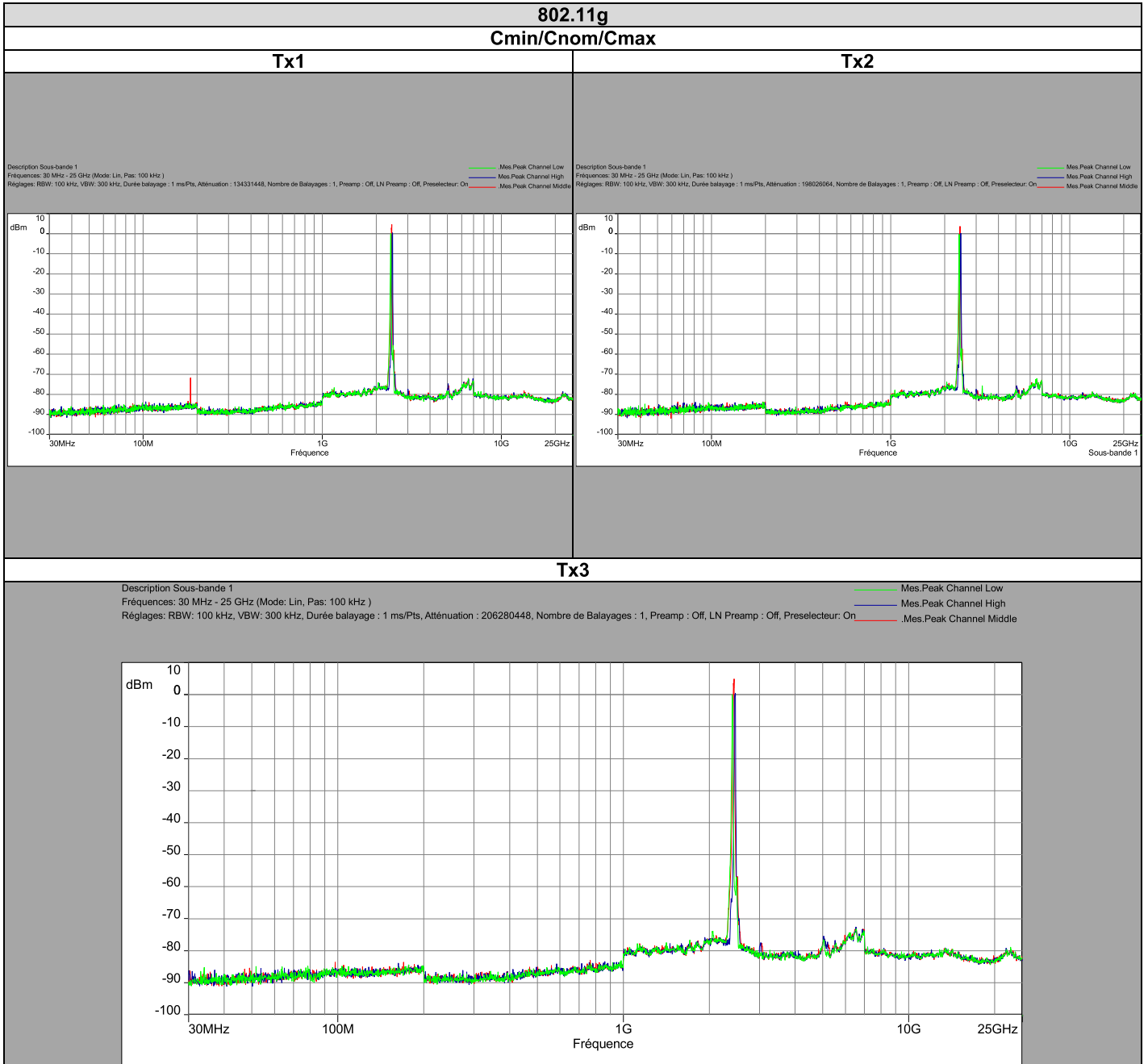
L C I E

9.5. RESULTS





L C I E





L C I E

802.11n HT20

Cmin/Cnom/Cmax

Tx1

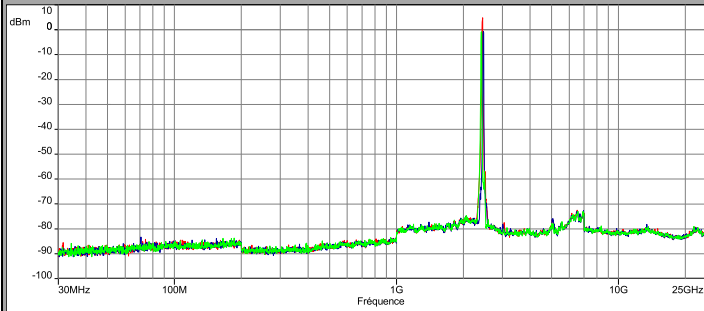
Tx2

Description Sous-bande 1

Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)

Réglages: RBW: 100 kHz, VBW: 300 kHz, Durée balayage : 1 ms/Pts, Atténuation : 210049690, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes Peak Channel Low
Mes Peak Channel High
Mes Peak Channel Middle

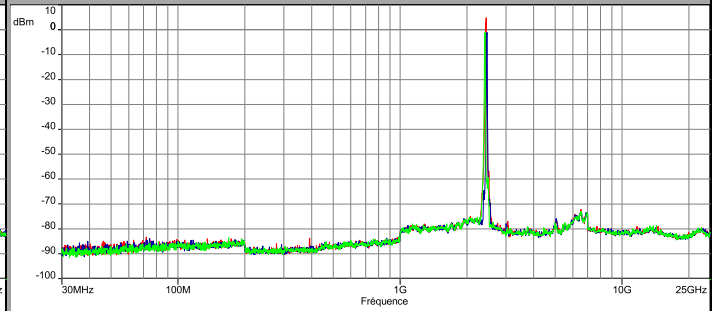


Description Sous-bande 1

Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)

Réglages: RBW: 100 kHz, VBW: 300 kHz, Durée balayage : 1 ms/Pts, Atténuation : 200721040, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes Peak Channel Low
Mes Peak Channel High
Mes Peak Channel Middle



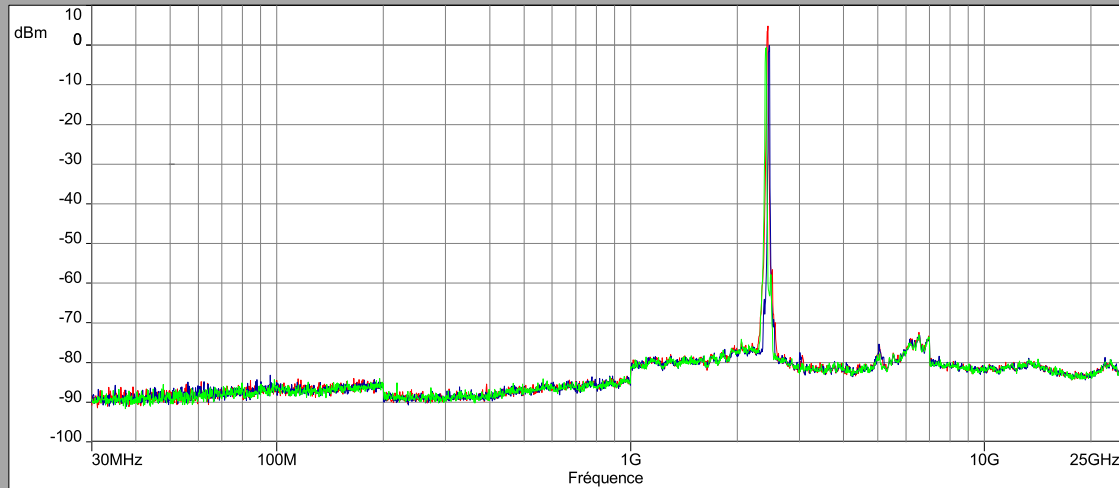
Tx3

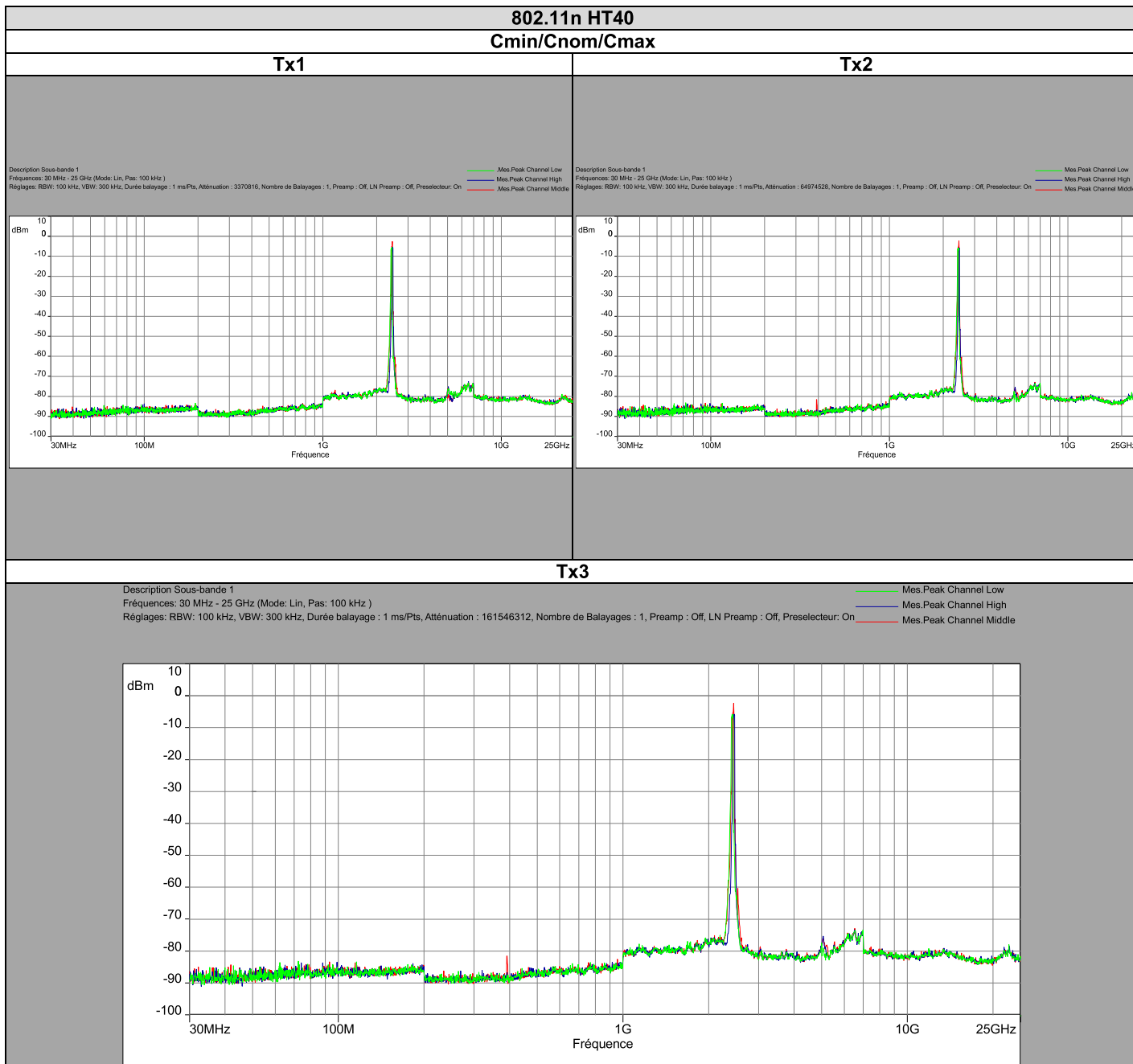
Description Sous-bande 1

Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)

Réglages: RBW: 100 kHz, VBW: 300 kHz, Durée balayage : 1 ms/Pts, Atténuation : 5227264, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes Peak Channel Low
Mes Peak Channel High
Mes Peak Channel Middle







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802.11b			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	3.31		
4824	-80.35	77.04	30
7236	-80.80	77.49	30
9648	-80.60	77.26	30
2437	5.18		
4874	-80.52	75.34	30
7311	-80.88	75.70	30
9748	-80.45	75.27	30
2462	6.45		
4924	-80.20	73.75	30
7386	-80.90	73.45	30
9848	-80.54	74.09	30

802.11g			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	0.16		
4824	-80.89	80.73	30
7236	-78.55	78.39	30
9648	-80.32	80.16	30
2437	4.92		
4874	-80.75	75.83	30
7311	-78.33	73.41	30
9748	-80.12	75.20	30
2462	0.39		
4924	-80.10	79.71	30
7386	-78.10	77.71	30
9848	-80.56	80.17	30

802.11n HT20			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2412	-0.60		
4824	-78.22	77.62	30
7236	-78.40	77.80	30
9648	-80.77	80.17	30
2437	4.78		
4874	-78.64	73.86	30
7311	-77.44	72.66	30
9748	-80.87	76.09	30
2462	-0.1		
4924	-78.09	77.99	30
7386	-78.22	78.12	30
9848	-80.55	80.45	30



802.11n HT40			
Frequency (MHz)	Level (dBm)	Level (dBc)	Limit (dBc)
2422	-5.90		
4844	-78.99	73.09	30
7266	-77.11	71.21	30
9688	-81.25	75.35	30
2437	-2.35		
4874	-79.33	76.98	30
7311	-76.44	74.09	30
9748	-81.30	78.95	30
2452	-5.79		
4904	-80.10	74.31	30
7356	-77.28	71.49	30
9808	-81.09	75.30	30

9.1. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **SAGEMCOM DCIWA384 UHD AiT US V2**, SN: **253764997**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

10. AC POWER LINE CONDUCTED EMISSIONS

10.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : June 6, 2018
Ambient temperature : 21 °C
Relative humidity : 58 %

10.2. TEST SETUP

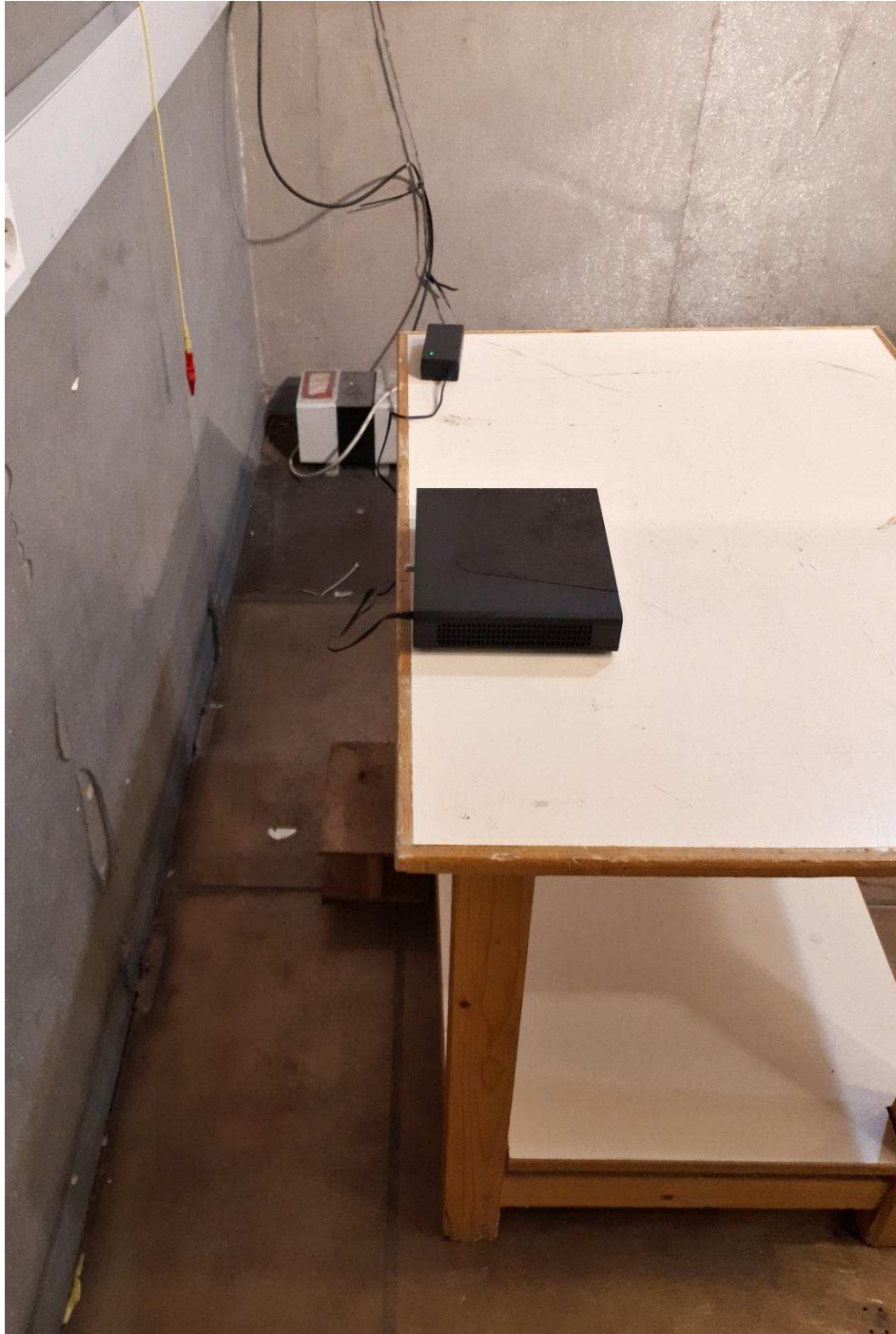
The product has been tested according to ANSI C63.10 (2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT 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 $50\Omega / 50\mu\text{H}$. Interconnecting cables and equipment's were moved to position that maximized emission.



Photograph for AC Power Line Conducted Emissions (Front view)



L C I E



Photograph for AC Power Line Conducted Emissions (Rear view)

10.3. LIMIT

Quasi-Peak

0,15kHz to 0,5MHz: 66dB μ V to 56dB μ V*
 0,5MHz to 5MHz: 56dB μ V
 5MHz to 30MHz: 60dB μ V

Average

0,15kHz to 0,5MHz: 56dB μ V to 46dB μ V*
 0,5MHz to 5MHz: 46dB μ V
 5MHz to 30MHz: 50dB μ V

*Decreases with the logarithm of the frequency

10.4. TEST EQUIPMENT LIST

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Receiver	RHODE & SCHWARZ	ESIB26	A2642021	2015/12	2018/12
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2017/08	2018/08
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2017/09	2018/09
Cable	-	-	A5329417	2017/10	2018/10
Cable	-	-	A5329589	2017/08	2018/08
Reference ground plan 2 x 3m	L.C.I.E.	-	-	-	-

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

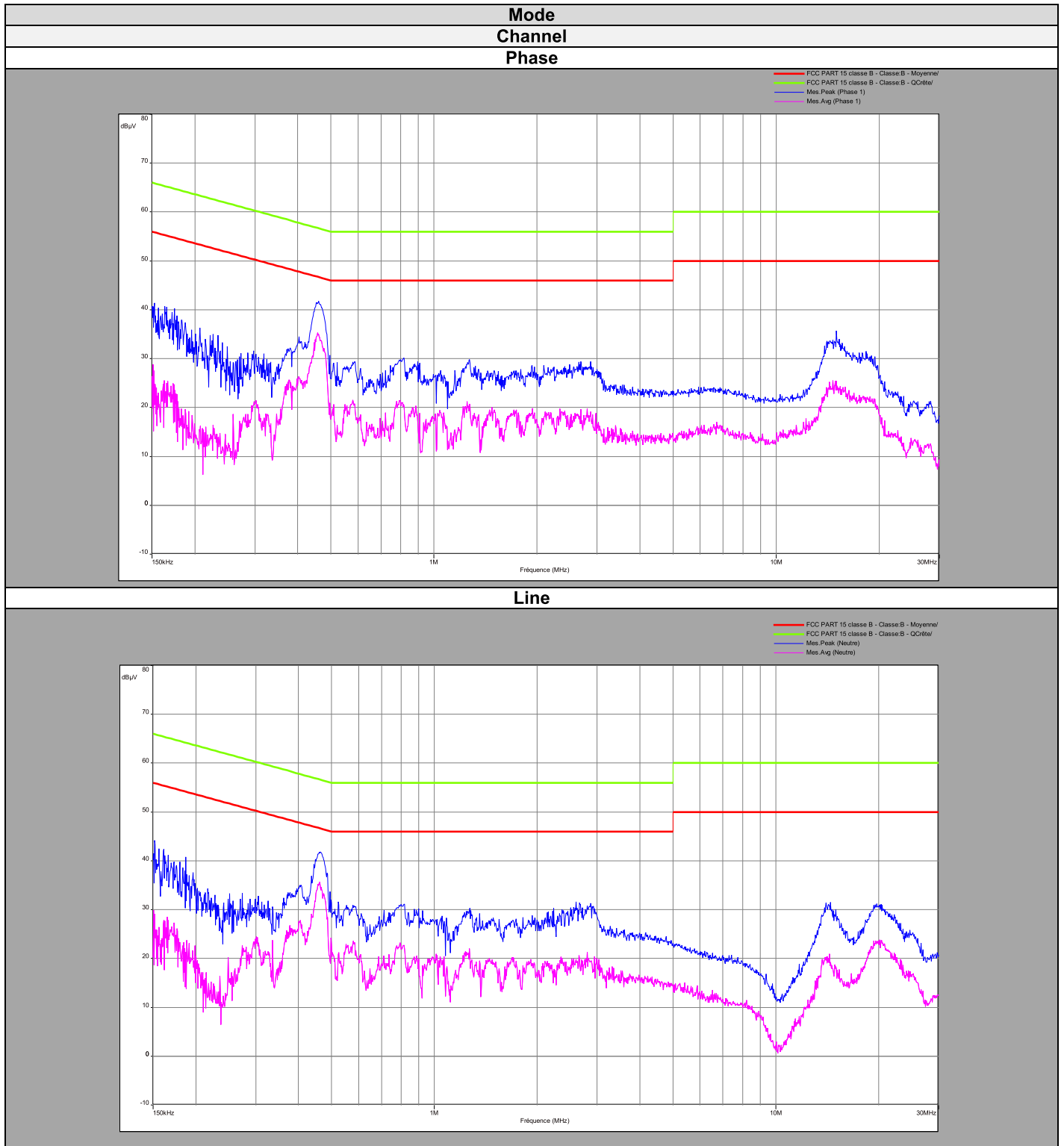
10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:



L C I E

10.6. RESULTS





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,152	40,2	-	65,8	25,6	27,6	55,8	28,2
0,457	41,4	-	56,7	15,3	35,3	46,7	11,4
1,268	29,8	-	56	26,2	21,3	46	24,7
2,684	29,4	-	56	26,6	19,6	46	26,4
15	35,6	-	60	24,4	25,4	50	24,6

Neutral Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,161	42,4	-	65,4	23	27,8	55,4	27,6
0,462	41,4	-	56,6	15,2	35,7	46,6	10,9
2,8	30,8	-	56	25,2	21,4	46	24,6
14	30,5	-	60	29,5	19,5	50	30,5
20,3	31,1	-	60	28,9	23,7	50	26,3

10.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **SAGEMCOM DCIWA384 UHD Alt US V2**, Sn : **253764997**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 limits.

11. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

11.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU & Laurent DENEUX
Date of test : May 16, 2018 to June 7, 2018
Ambient temperature : 20 to 24 °C
Relative humidity : 43 to 47%

11.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013). The EUT is placed **on an open area test site** below 1GHz and **in a full anechoic chamber** above 1GHz. Distance between measuring antenna and the EUT is **10m** below 1GHz and **3m** above 1GHz and below 30MHz.

Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height was 1m.

Test is performed in horizontal (H) and vertical (V) polarization with **bilog** antenna below 1GHz and with a horn antenna above 1GHz. 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. The EUT is place at 1.5m high above 1GHz and at 0.8m high under 1GHz.



Photograph for Unwanted Emissions