



	1
FCC	Radio Test Report
	C ID: M82-ARK2250L
This report concerns (check	a one): ⊠Original Grant
Equipment : Test Model :	1708012 Computer ARK-2250 ARK-2250XXXXXXXXXXXXX, ARK2250XXXXXXXXXXXXXXXXXXXXXXX, alphanumeric character , blank or "-".)
	Advantech Co., Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491, Taiwan, R.O.C.
Issued Date	: Sep. 10, 2017 ~ Dec. 13, 2017 : Dec. 18, 2017 : BTL Inc.
Testing Engineer	: Kehji Lin)
Technical Manage	: James Chiu)
Authorized Signate	ory :Andy Chiu)
No.1 Neihu	CLINC . 8, Ln. 171, Sec. 2, Jiuzong Rd., Dist., Taipei City, Taiwan (R.O.C.) -2657-3299 FAX: +886-2-2657-3331



Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

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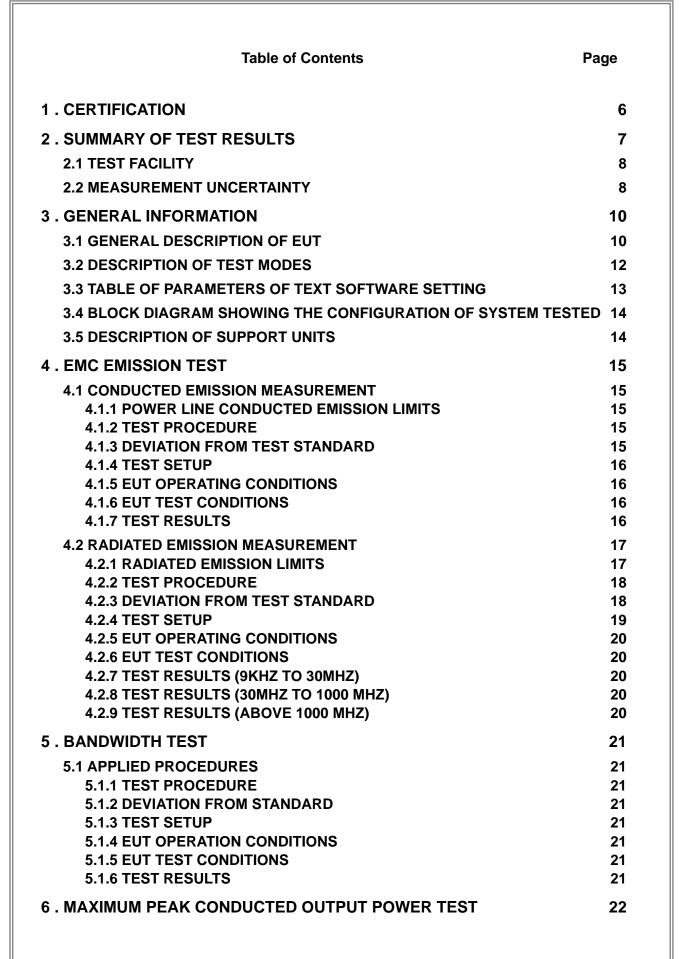
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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

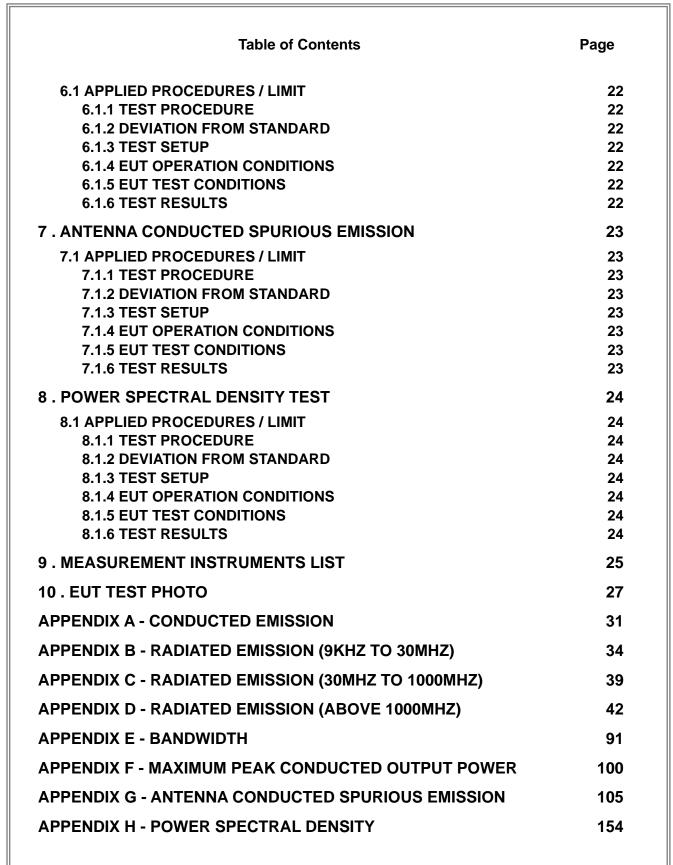
Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.













REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-3-1708012	Original Issue.	Dec. 18, 2017



1. CERTIFICATION

Equipment : Brand Name : Test Model : Series Model :	ADVANTECH
	Advantech Co., Ltd.
Manufacturer :	Advantech Co., Ltd.
Address :	No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491, Taiwan, R.O.C.
Factory :	N/A
Address :	N/A
Date of Test :	Sep. 10, 2017 ~ Dec. 13, 2017
Test Sample :	Production Unit
Standard(s) :	FCC Part15, Subpart C:(15.247) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-3-1708012) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test results included in this report is only for the WIFI 2.4GHz part.



2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15 (15.247) , Subpart C							
Standard(s) Section	Test Item	Judgment	Remark				
15.207	Conducted Emission	PASS					
15.247(d)	Antenna conducted Spurious Emission	PASS					
15.247(a)(2)	6dB Bandwidth	PASS					
15.247(b)(3)	Peak Output Power	PASS					
15.247(e)	Power Spectral Density	PASS					
15.203	Antenna Requirement	PASS					
15.247(d)/ 15.205/ 15.209	Transmitter Radiated Emissions	PASS					

NOTE:

(1)" N/A" denotes test is not applicable in this test report.



2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

Conducted emission Test:

C05: (VCCI RN: C-4742; FCC RN:965108; FCC DN:TW1082) No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Below 1 GHz):

CB15: (VCCI RN: R-20020; FCC RN:674415; FCC DN:TW0659; ISED Assigned Code:20088-5)

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

Radiated emission Test (Above 1 GHz):

CB15: (VCCI RN: G-20031; FCC RN:674415; FCC DN:TW0659; ISED Assigned Code:20088-5)

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

A. Conducted emission test:

Test Site	Method	Measurement Frequency Range	U,(dB)
C05	CISPR	150 kHz ~ 30MHz	2.68

B. Radiated emission test:

Test Site	Method Measurement Frequency Ra		U,(dB)
CB15	CISPR	9kHz ~ 150kHz	2.82
(3m)	CIOPK	150kHz ~ 30MHz	2.58

Test Site	Method	Measurement Frequency Range	Ant.	U,(dB)
CB15 CICDD	30MHz ~ 200MHz	V	4.20	
	30MHz ~ 200MHz	Н	3.64	
(3m)	(3m) CISPR	200MHz ~ 1,000MHz	V	4.56
		200MHz ~ 1,000MHz	Н	3.90

Test Site	Method	Measurement Frequency Range	Ant.	U,(dB)
CB15 (3m) CISPR		1GHz ~ 6GHz	V	4.46
		1GHz ~ 6GHz	Н	4.40
	6GHz ~ 18GHz	V	3.88	
		6GHz ~ 18GHz	Н	4.00

Test Site	Method	Measurement Frequency Range	U,(dB)
CB15	CISPR	18 ~ 26.5 GHz	4.62
(1m)		26.5 ~ 40 GHz	5.12



Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR}, as follows:

Conducted Disturbance (mains port) - 150 kHz - 30 MHz: 3.6 dB Radiated Disturbance (electric field strength on an open area test site or alternative test site) - 30 MHz - 1000 MHz: 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR} .

Note: unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Computer		
Brand Name	ADVANTECH		
Test Model	ARK-2250		
Series Model		(XXXX, ARK2250XXXXXXXXXXXXXXX hanumeric character , blank or "-".)	
Model Difference	The market distribution is	s different only.	
	Operation Frequency	2412~2462 MHz	
	Modulation Technology	802.11b:DSSS 802.11g:OFDM 802.11n:OFDM	
Output Power (Max.)	Bit Rate of Transmitter	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n up to 300 Mbps	
	Output Power (Max.)	802.11b: 23.91dBm 802.11g: 24.3dBm 802.11n(20MHz): 24.15dBm 802.11n(40MHz): 24.19dBm	
Power Source	DC voltage supplied from	n DC Power Supply.	
Power Rating	EUT Rating: I/P: 12VDC, 5A		
Products Covered	N/A		

Note:

- 1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- 2. Channel List:

CH01 – CH11 for 802.11b, 802.11g, 802.11n(20MHz) CH03 – CH09 for 802.11n(40MHz)							
Channel Frequency (MHz) Channel Frequency (MHz) Channel Frequency (MHz) Channel (MHz) Channel (MHz)						Frequency (MHz)	
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		



3. Table for Filed Antenna

Ant.	Brand	Test Model	Antenna Type	Connector	Gain (dBi)
1	ADVANTECH	AN2450-92K01BR S	Dipole	SMA Male Reverse	5.03
2	ADVANTECH	AN2450-92K01BR S	Dipole	SMA Male Reverse	5.03

Note:

The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R) and employs Cyclic Delay Diversity (CDD). In CDD mode,

For power spectral density:

Direction gain (dBi) =

 $10^{\log[10^{(G1/20)+10^{(G2/20)+...+10^{(Gn/20)}^2/NANT]} = 8.04 \text{ dBi} > 6 \text{dBi}.$ The reduced power spectral density limits (dBm/MHz) = 8 - (8.04-6) = 5.96

For conducted power: For $N_{ANT} = 2 < 5$, Direction gain (dBi) = $G_{ANT} + 0 = 5.03 + 0 = 5.03$

The Direction gain is less than 6, so conducted power limits will not be reduced.

Operating Mode	
	2TX
TX Mode	
802.11b	V (ANT 1+ANT 2)
802.11g	V (ANT 1+ANT 2)
802.11n(20MHz)	V (ANT 1+ANT 2)
802.11n(40MHz)	V (ANT 1+ANT 2)

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description	
Mode 1	TX B MODE CHANNEL 01/06/11	
Mode 2	TX G MODE CHANNEL 01/06/11	
Mode 3	TX N-20MHZ MODE CHANNEL 01/06/11	
Mode 4	TX N-40MHZ MODE CHANNEL 03/06/09	
Mode 5	Normal Link	

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

	For Conducted Test
Final Test Mode	Description
Mode 5	Normal Link

For Radiated Test		
Final Test Mode Description		
Mode 1	TX B MODE CHANNEL 01/06/11	
Mode 2	TX G MODE CHANNEL 01/06/11	
Mode 3	TX N-20MHZ MODE CHANNEL 01/06/11	
Mode 4	TX N-40MHZ MODE CHANNEL 03/06/09	

Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) 802.11b mode: DBPSK (1Mbps) 802.11g mode: OFDM (6Mbps) 802.11n HT20 mode : BPSK (13Mbps) 802.11n HT40 mode : BPSK (27Mbps) For radiated emission tests, the highest output powers were set for final test.
 (3) For radiated below 1G test, the TX N-20 2462MHZ is found to be the worst case and
- recorded.(4) The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.



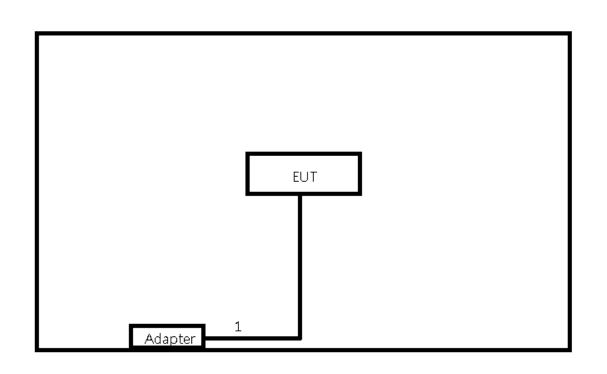
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN

Test software version		QRCT 3.0.161	
Frequency (MHz)	2412	2437	2462
802.11b	19	19	19
802.11g	16	16	13
802.11n (20MHz)	15	16	13
Frequency	2422	2437	2452
802.11n (40MHz)	13	16	10



3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	Adapter	FSP	FSP084-DIBAN2	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	YES	YES	0.5m	Power Cable



4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

Frequency of Emission (MHz)	Conducted Li	mit (dBµV)
Frequency of Emission (MHz)	Quasi-peak	Average
0.15 -0.50	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

- (1) The limit of " * " decreases with the logarithm of the frequency
- (2) The test result calculated as following:
 - Measurement Value = Reading Level + Correct Factor
 - Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
 - Margin Level = Measurement Value Limit Value

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

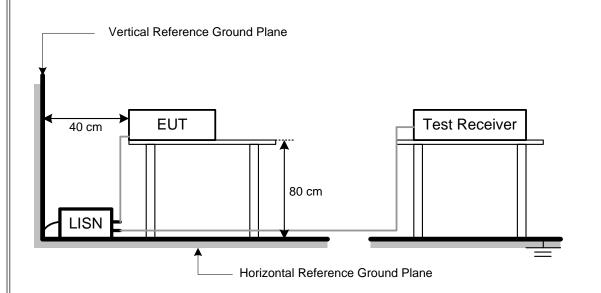
4.1.3 DEVIATION FROM TEST STANDARD

No deviation





4.1.4 TEST SETUP



4.1.5 EUT OPERATING CONDITIONS

The EUT was placed on the test table and programmed in normal function.

4.1.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

4.1.7 TEST RESULTS

Please refer to the Appendix A.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9KHz-1000MHz)

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following: Measurement Value = Reading Level + Correct Factor Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use) Margin Level = Measurement Value - Limit Value



Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	1000 MHz	
Stop Frequency	10th carrier harmonic	
RBW / VBW	1MHz / 3MHz for Peak,	
(Emission in restricted band)	1MHz / 1/T for Average	
Receiver Parameter	Setting	

Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. For the actual test configuration, please refer to the related Item -EUT Test Photos.

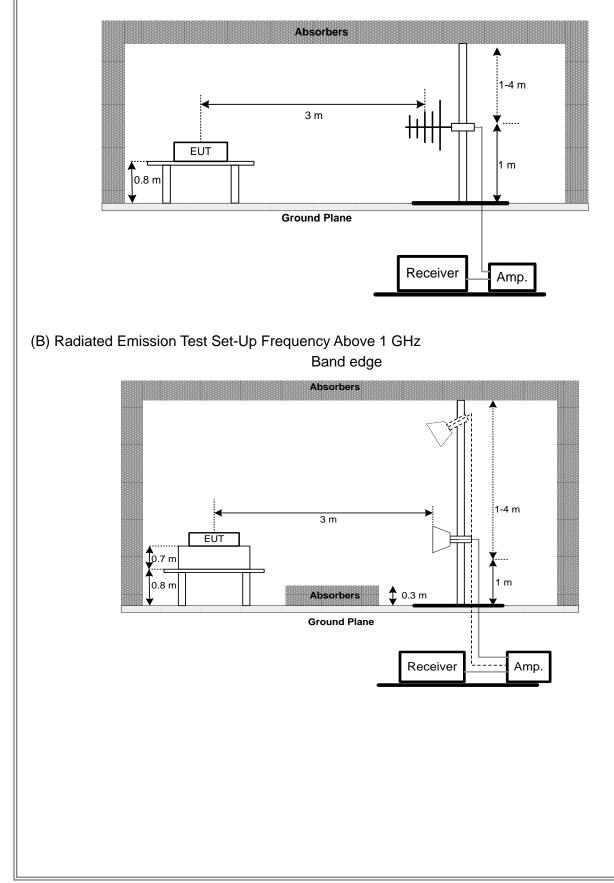
4.2.3 DEVIATION FROM TEST STANDARD

No deviation



4.2.4 TEST SETUP

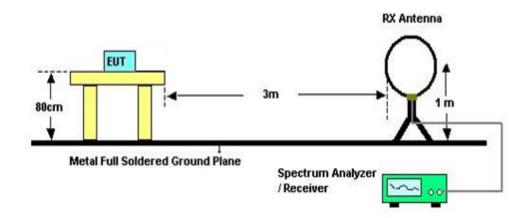
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz







(C) For Radiated Emissions Below 30MHz



4.2.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.2.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)

Please refer to the Appendix C.

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Appendix D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES

FCC Part15 (15.247), Subpart C				
Section	Frequency Range (MHz)	Result		
15.247(a)(2)	Bandwidth	2400-2483.5	PASS	

5.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

5.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

5.1.6 TEST RESULTS

Please refer to the Appendix E.



6. MAXIMUM PEAK CONDUCTED OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

	FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247(b)(3)	Maximum Output Power	1 Watt or 30dBm	2400-2483.5	PASS		

6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

6.1.6 TEST RESULTS

Please refer to the Appendix F.



7. ANTENNA CONDUCTED SPURIOUS EMISSION

7.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

7.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.
- c. Offset=antenna gain+cable loss

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

7.1.6 TEST RESULTS

Please refer to the Appendix G.



8. POWER SPECTRAL DENSITY TEST

8.1 APPLIED PROCEDURES / LIMIT

	FCC Part15 (15.247), Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS		

8.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW=3KHz, VBW=10KHz, Sweep time = Auto.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

8.1.6 TEST RESULTS

Please refer to the Appendix H.



9. MEASUREMENT INSTRUMENTS LIST

	Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	Jan. 25, 2018	
2	Test Cable	TIMES	CFD300-NL	C02	Jun. 14, 2018	
3	EMI Test Receiver	R&S	ESR7	101433	Dec. 09, 2017	
4	Measurement Software	EZ	EZ_EMC (Version NB-03A)	N/A	N/A	

	Radiated Emission Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Preamplifier	EMCI	012645B	980267	Feb. 28, 2018		
2	Preamplifier	EMCI	EMC02325	980217	Dec. 29, 2017		
3	Preamplifier	EMCI	EMC2654045	980030	Feb. 14, 2018		
4	Test Cable	EMCI	EMC104-SM-S M-8000	8m	Jan. 04, 2018		
5	Test Cable	EMCI	EMC104-SM-S M-800	150207	Jan. 04, 2018		
6	Test Cable	EMCI	EEMC104-SM-S M-3000	151205	Jan. 04, 2018		
7	MXE EMI Receiver	Agilent	N9038A	MY5542012 7	Jan. 09, 2018		
8	Signal Analyzer	Agilent	N9010A	MY5222099 0	Feb. 22, 2018		
9	Loop Ant	EMCO	6502	42960	Nov. 24, 2017		
10	Horm Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	Feb. 28, 2018		
11	Horm Ant	Schwarzbeck	BBHA 9170	187	Dec. 07, 2017		
12	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-548	Jan. 16, 2018		
13	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0623	Jan. 16, 2018		



	6dB Bandwidth Measurement				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 25, 2018

	Peak Output Power Measurement				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2495A	1128008	Aug. 16, 2018
2	Power Sensor	Anritsu	MA2411B	1126001	Aug. 16, 2018

	Antenna Conducted Spurious Emission Measurement				
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 25, 2018

Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 25, 2018

Remark: "N/A" denotes no model name, serial no. or calibration specified.

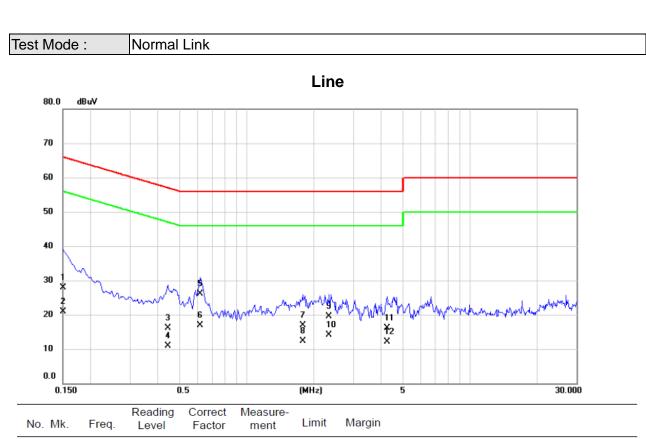
All calibration period of equipment list is one year.



APPENDIX A - CONDUCTED EMISSION



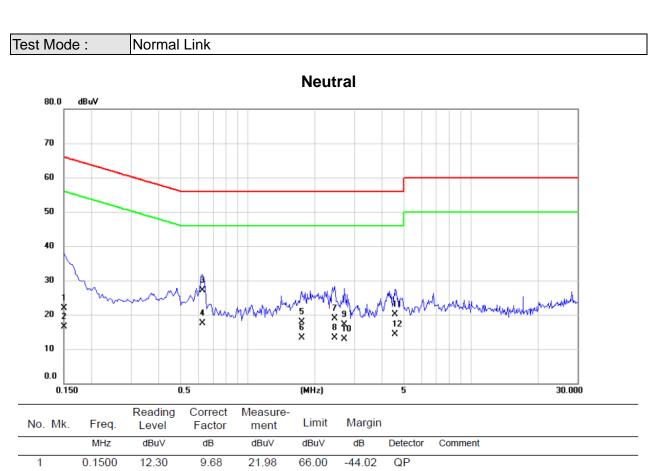




No. Mk.	Freq.	Level	Factor	ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	18.10	9.76	27.86	66.00	-38.14	QP	
2	0.1500	11.20	9.76	20.96	56.00	-35.04	AVG	
3	0.4426	6.40	9.75	16.15	57.01	-40.86	QP	
4	0.4426	1.20	9.75	10.95	47.01	-36.06	AVG	
5	0.6170	16.40	9.77	26.17	56.00	-29.83	QP	
6 *	0.6170	7.10	9.77	16.87	46.00	-29.13	AVG	
7	1.7780	7.00	9.83	16.83	56.00	-39.17	QP	
8	1.7780	2.40	9.83	12.23	46.00	-33.77	AVG	
9	2.3360	9.60	9.84	19.44	56.00	-36.56	QP	
10	2.3360	4.20	9.84	14.04	46.00	-31.96	AVG	
11	4.2530	6.20	9.87	16.07	56.00	-39.93	QP	
12	4.2530	2.20	9.87	12.07	46.00	-33.93	AVG	







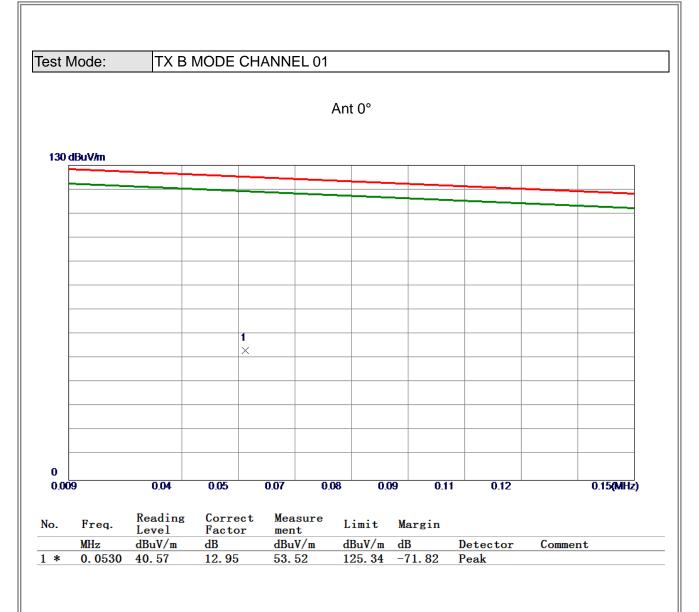
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	12.30	9.68	21.98	66.00	-44.02	QP	
2	0.1500	6.80	9.68	16.48	56.00	-39.52	AVG	
3	0.6260	17.30	9.71	27.01	56.00	-28.99	QP	
4 *	0.6260	7.70	9.71	17.41	46.00	-28.59	AVG	
5	1.7420	8.20	9.77	17.97	56.00	-38.03	QP	
6	1.7420	3.60	9.77	13.37	46.00	-32.63	AVG	
7	2.4440	9.20	9.78	18.98	56.00	-37.02	QP	
8	2.4440	3.60	9.78	13.38	46.00	-32.62	AVG	
9	2.7140	7.40	9.79	17.19	56.00	-38.81	QP	
10	2.7140	3.20	9.79	12.99	46.00	-33.01	AVG	
11	4.5770	10.30	9.84	20.14	56.00	-35.86	QP	
12	4.5770	4.40	9.84	14.24	46.00	-31.76	AVG	



APPENDIX B - RADIATED EMISSION (9KHZ TO 30MHZ)

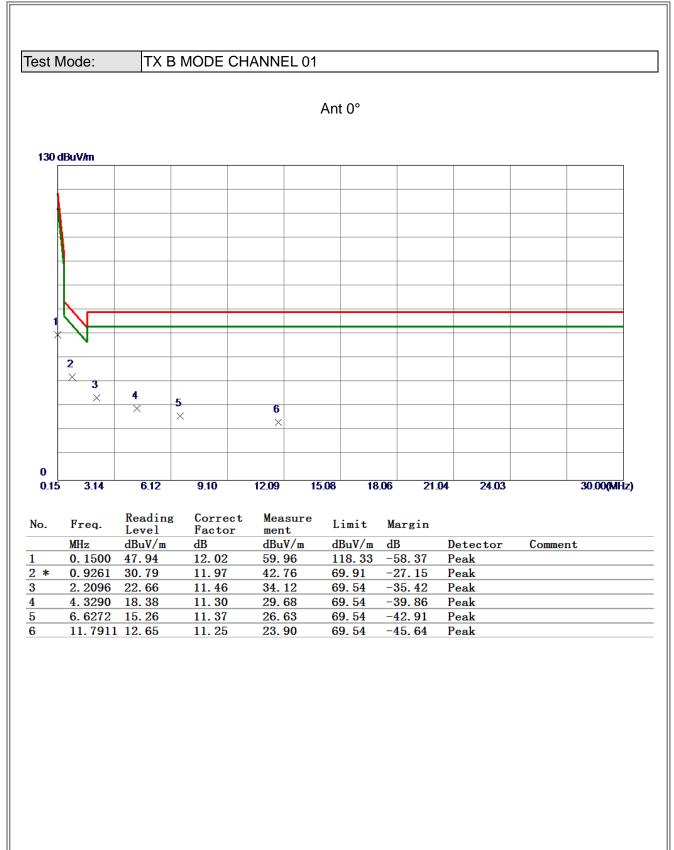






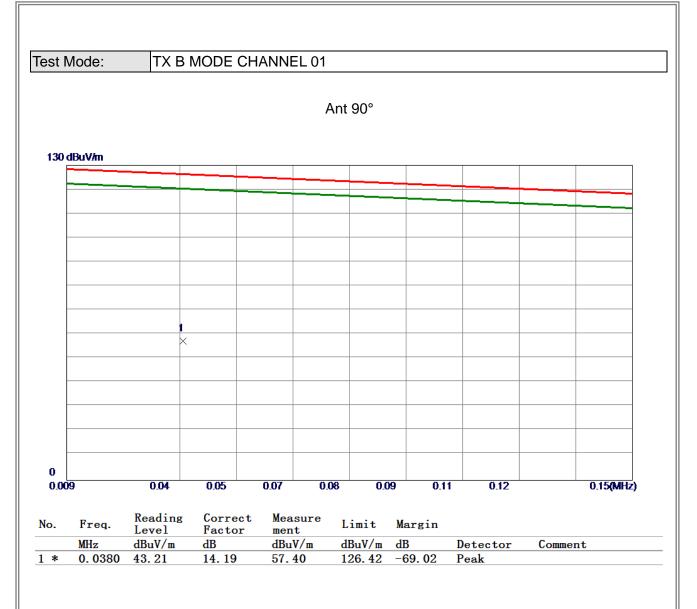






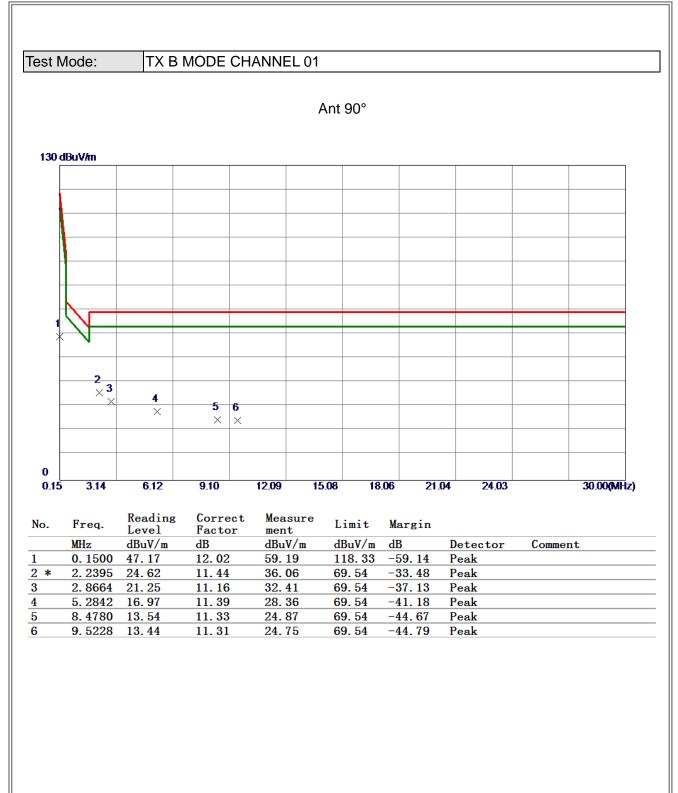










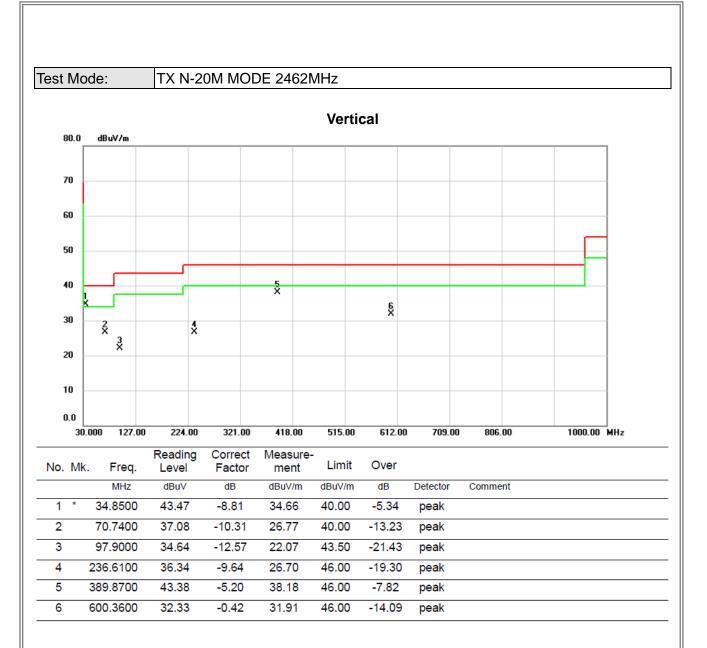




APPENDIX C - RADIATED EMISSION (30MHZ TO 1000MHZ)

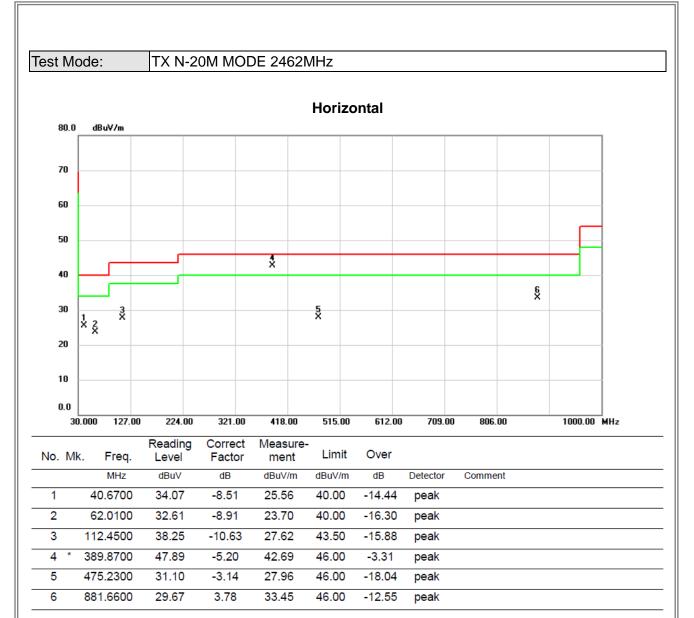










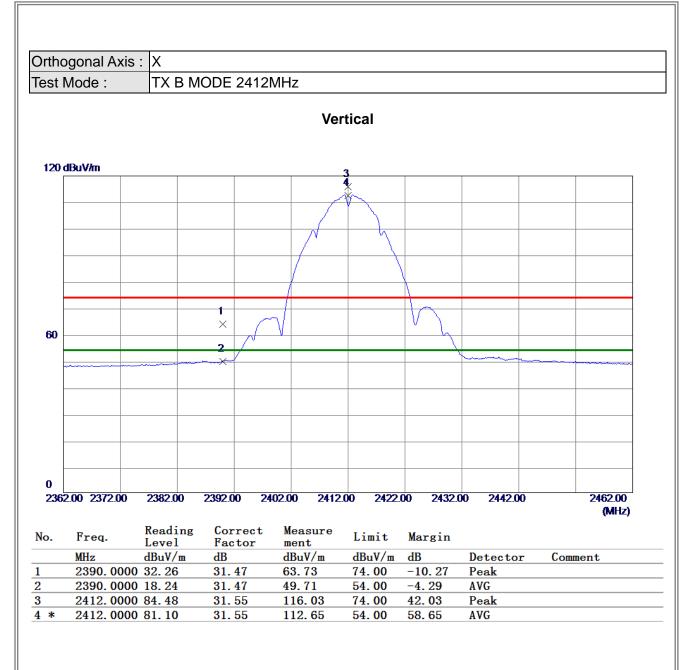




APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

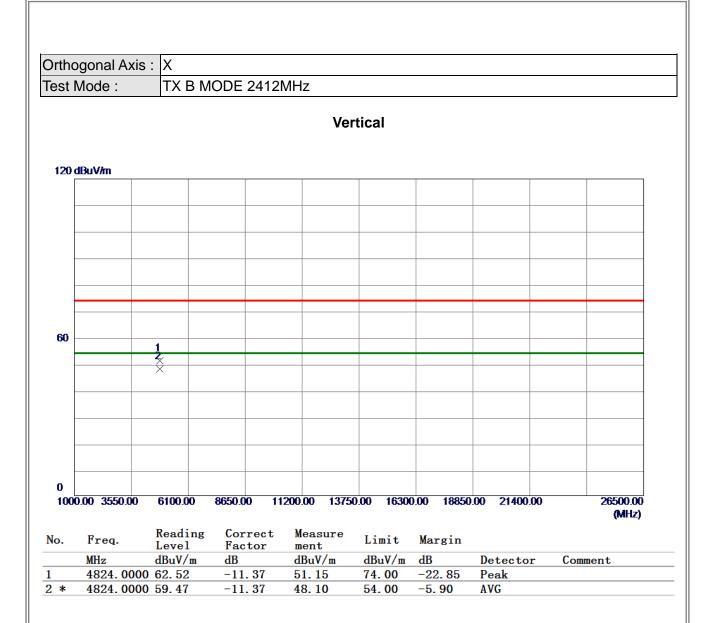






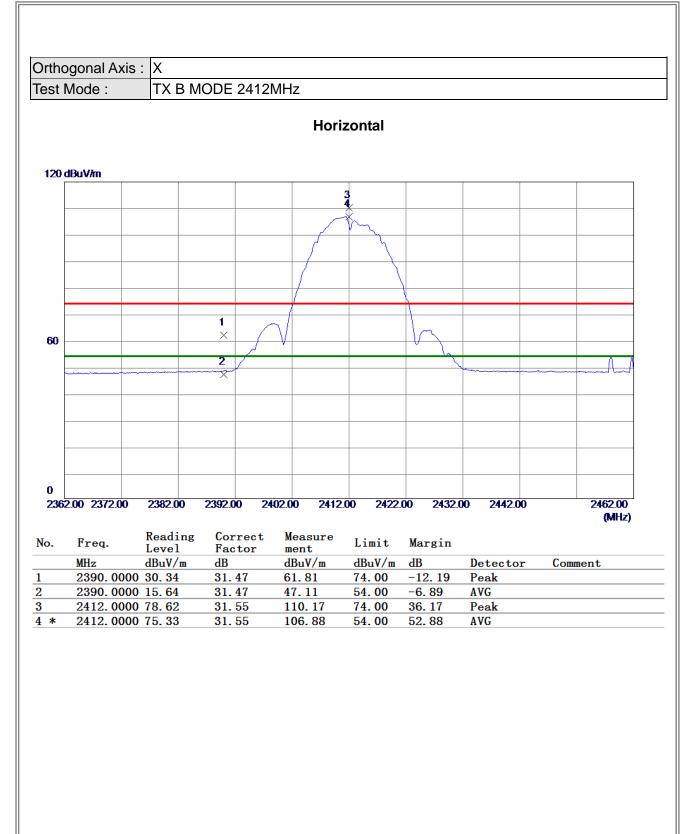






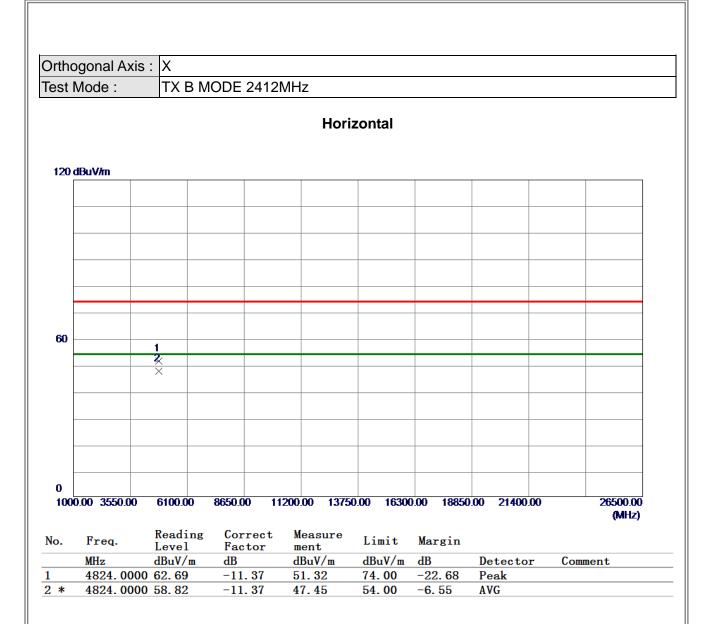






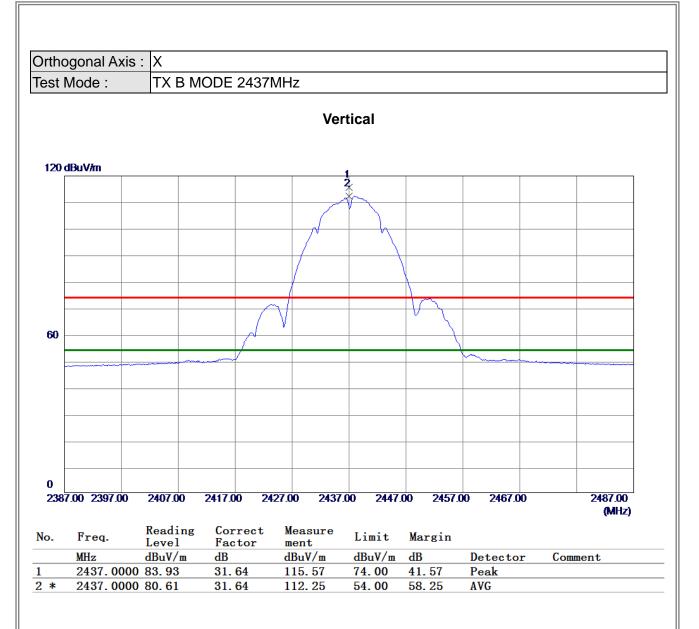






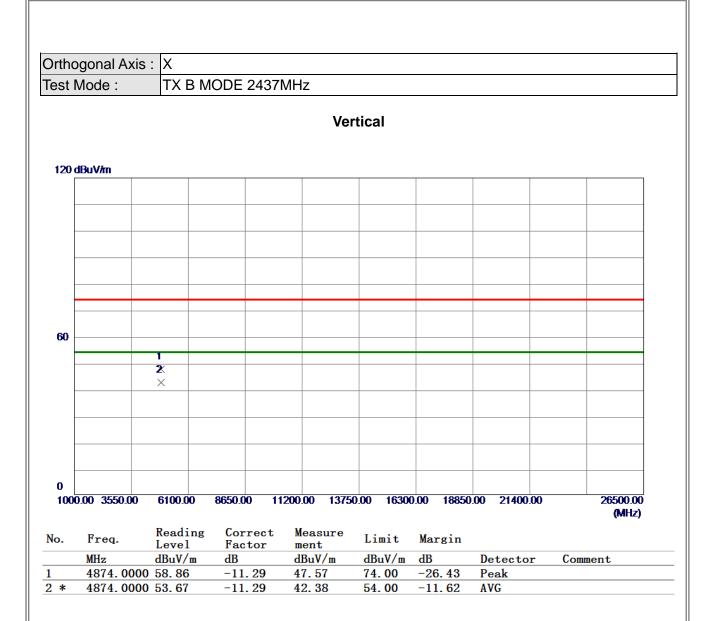






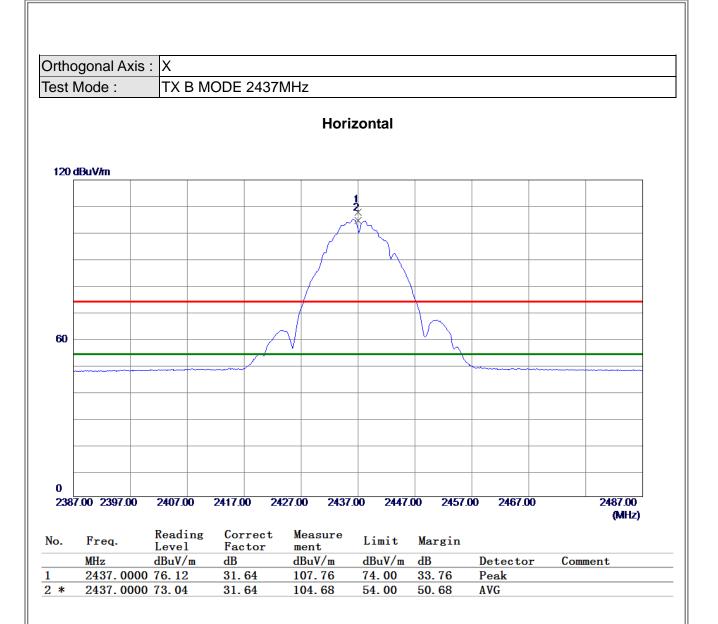






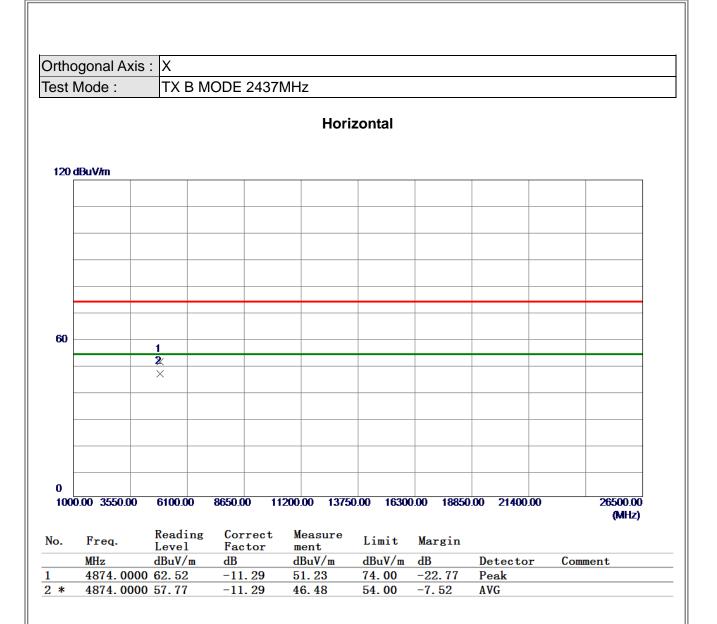






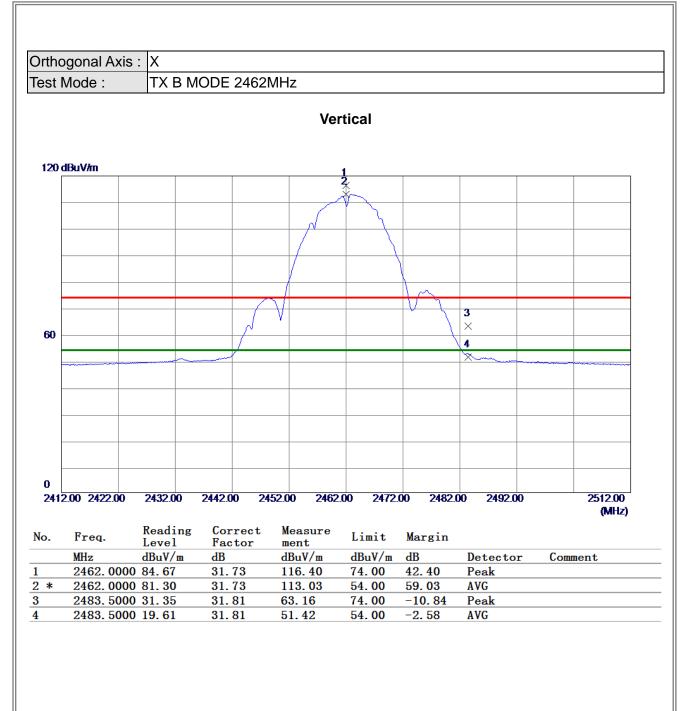






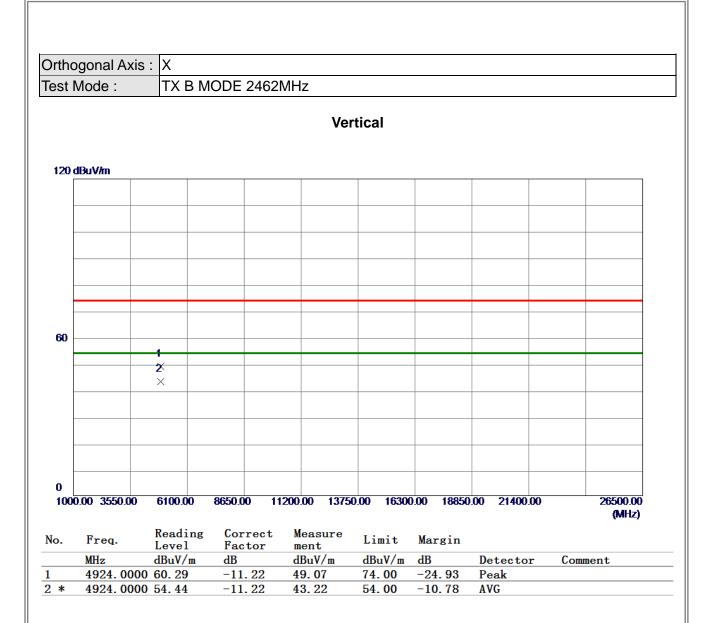






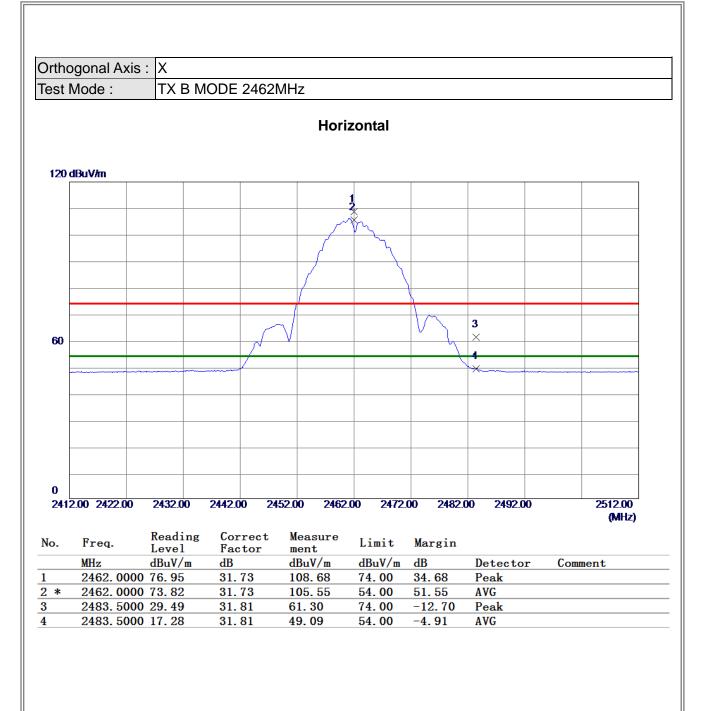






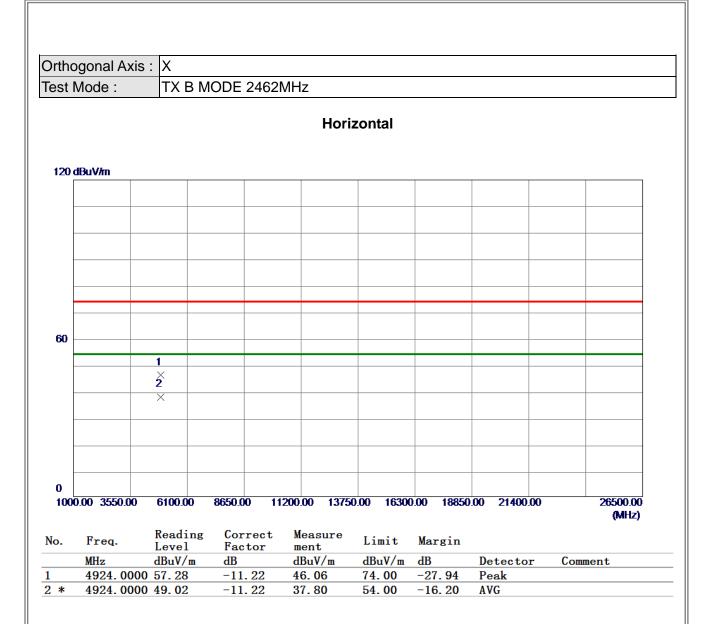






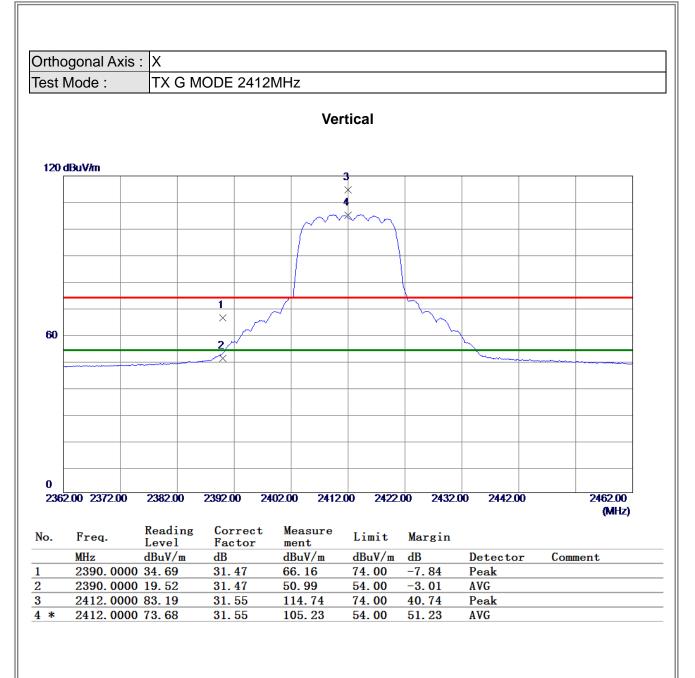






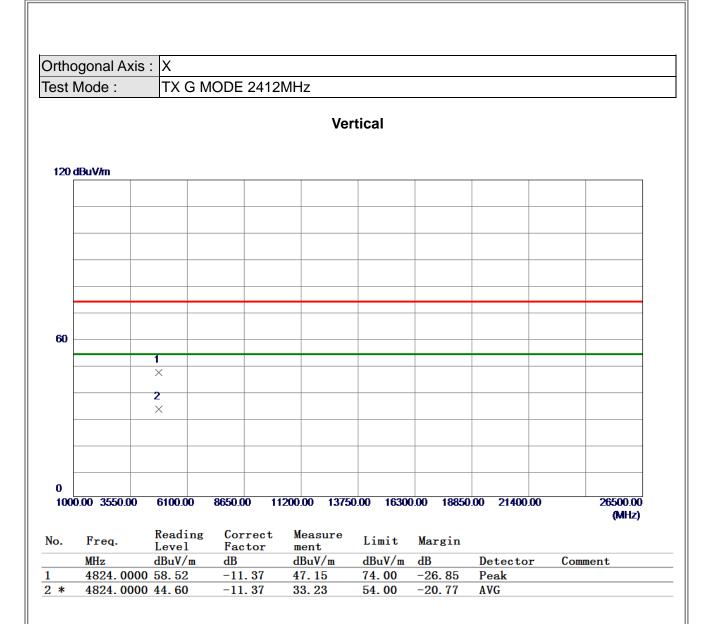






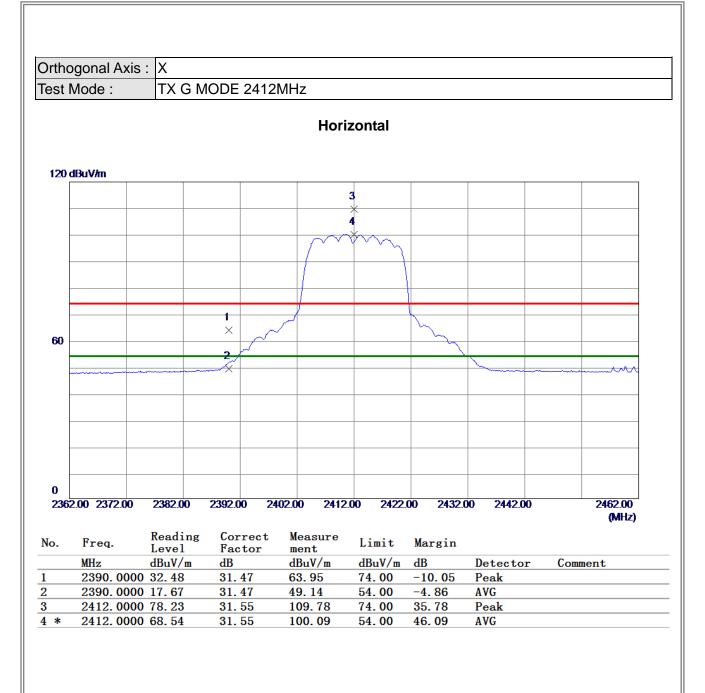






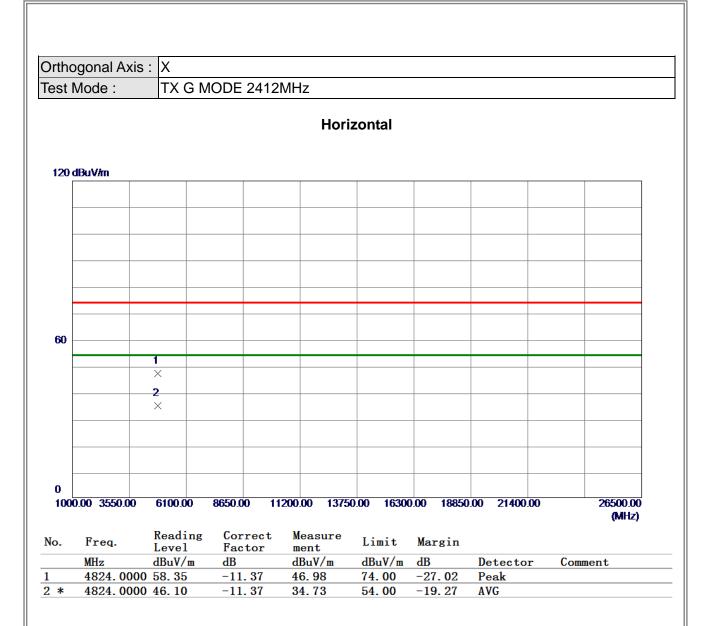






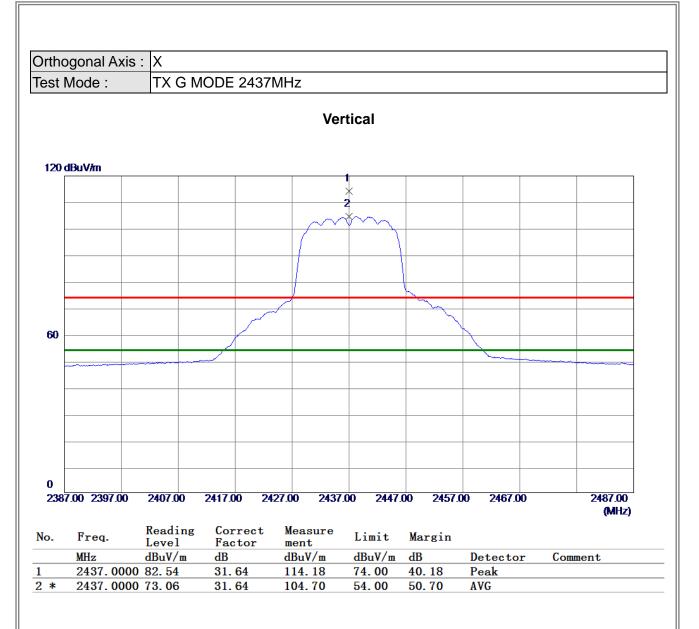






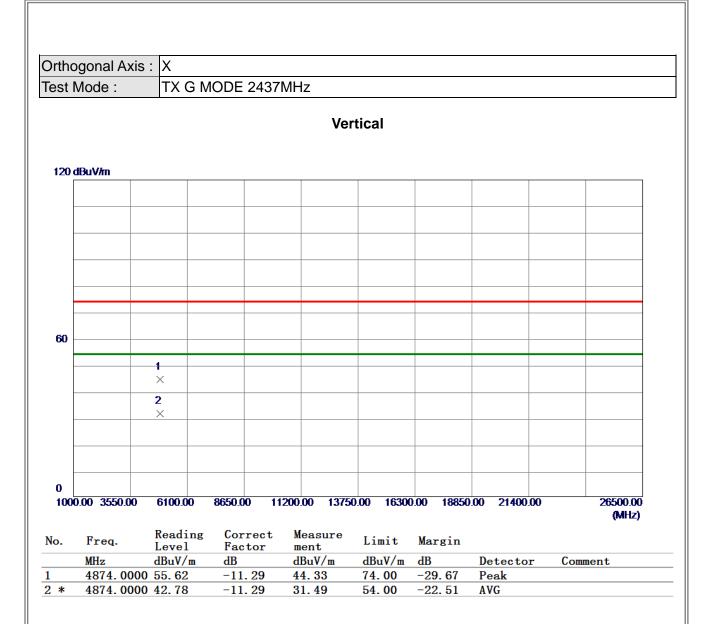






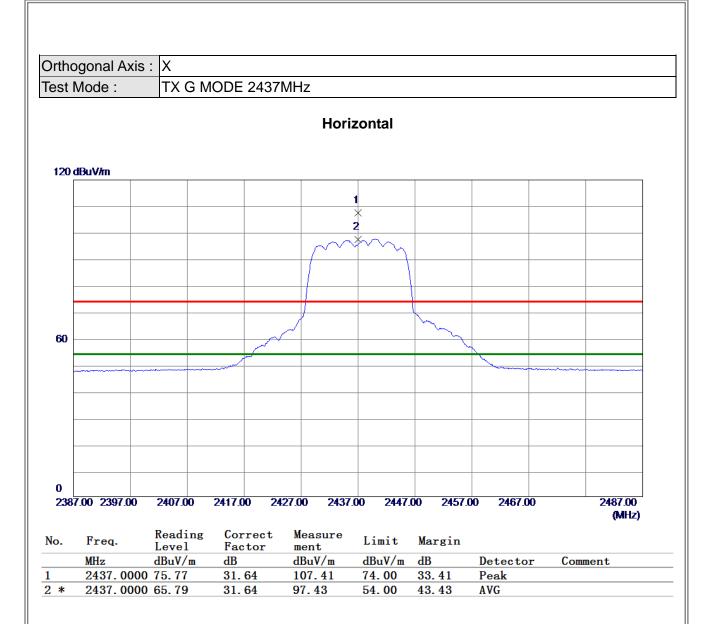






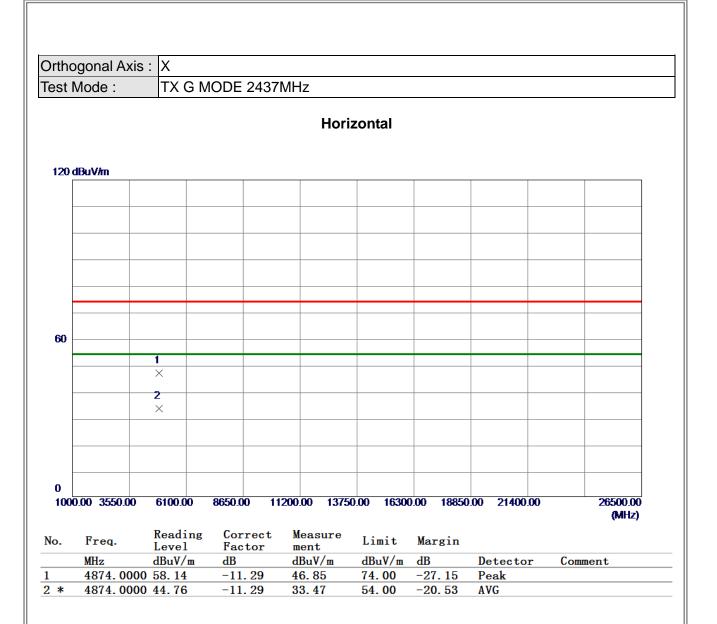






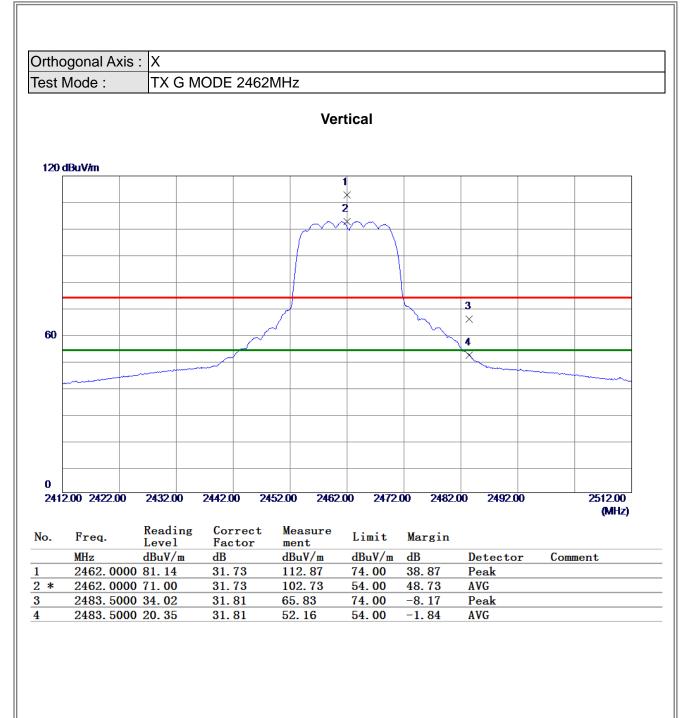






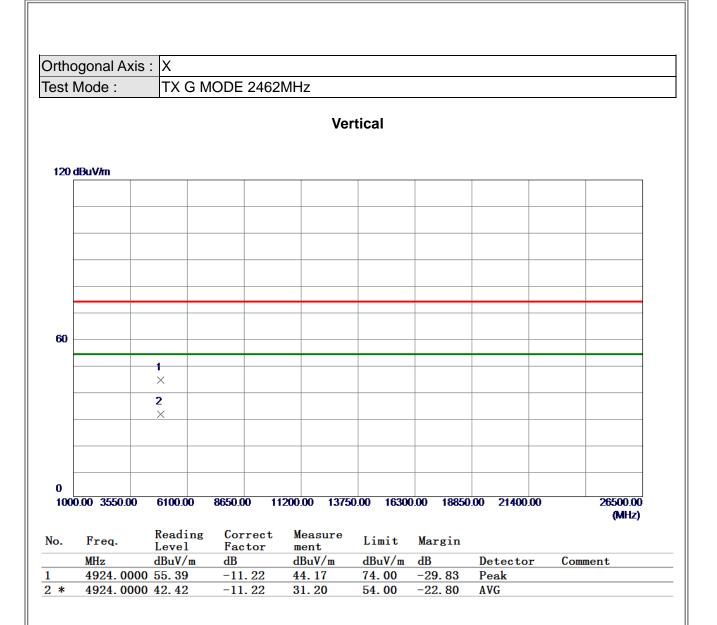






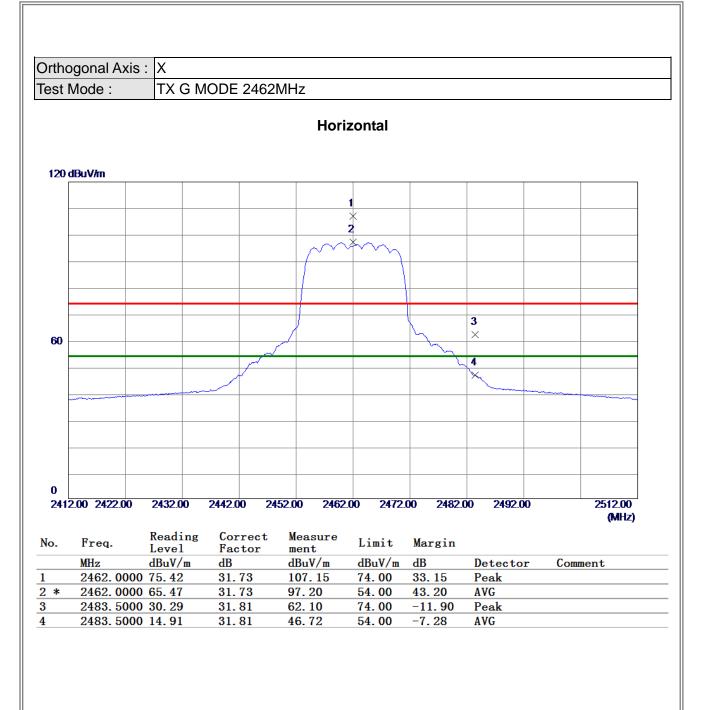












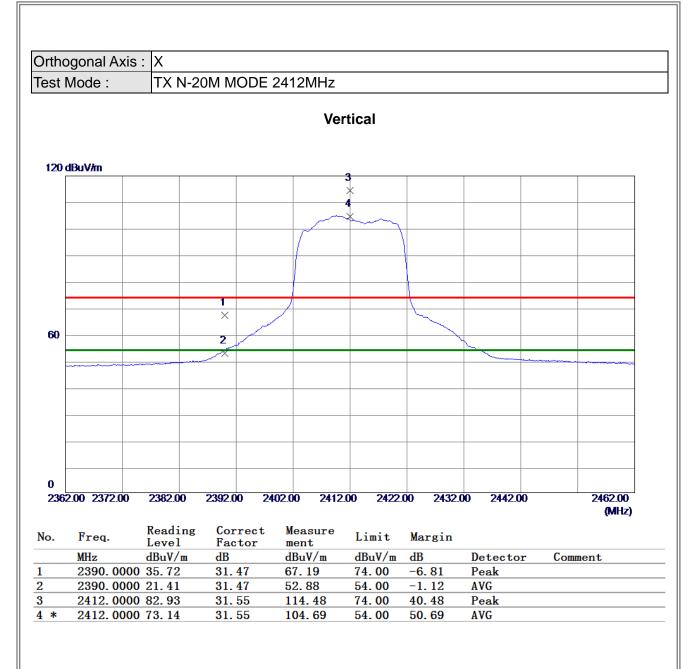






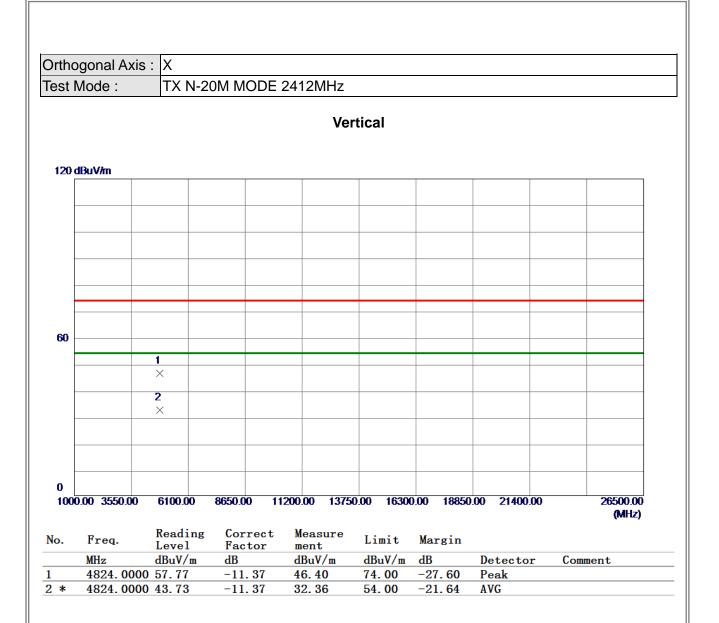






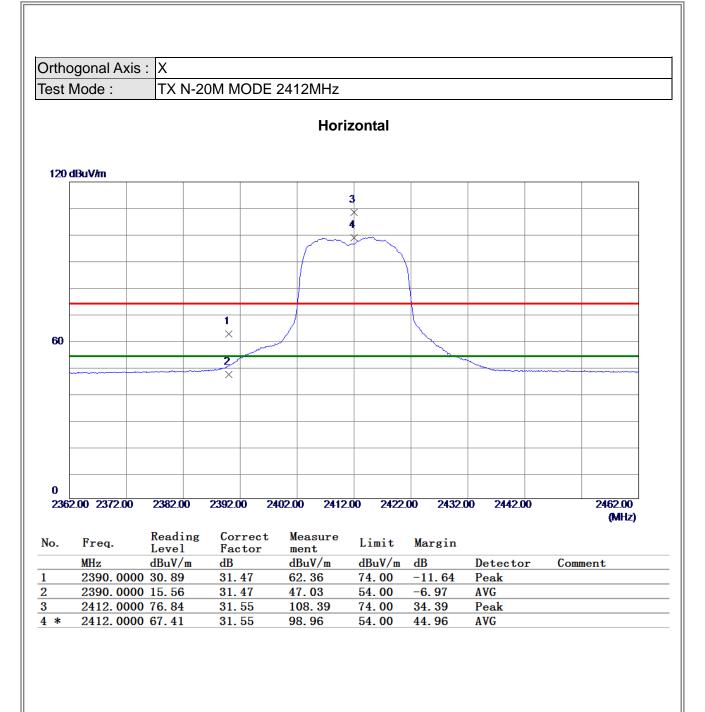






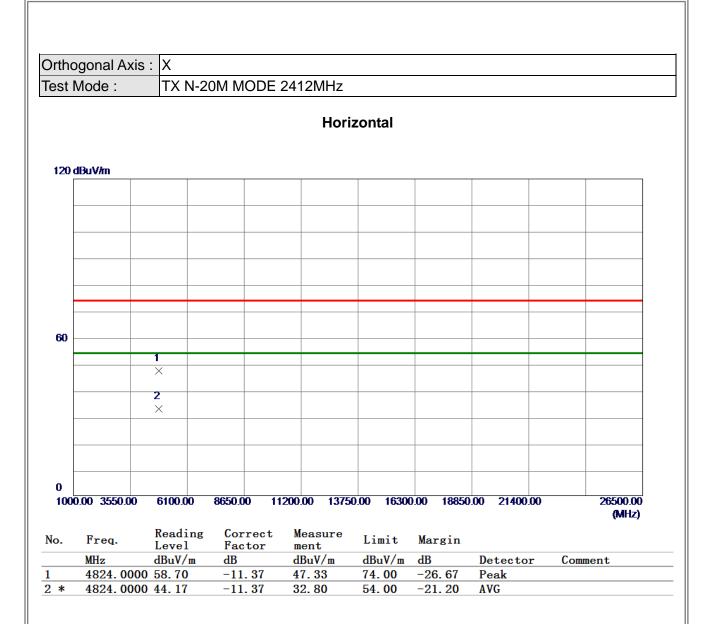






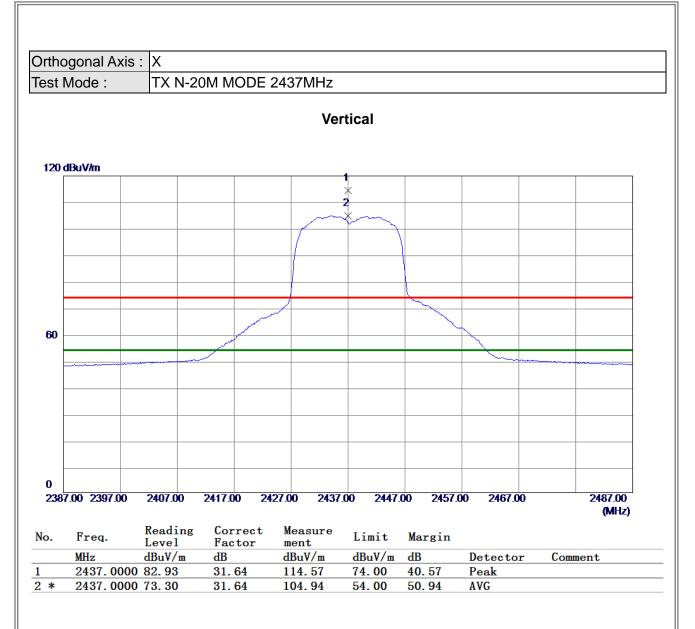






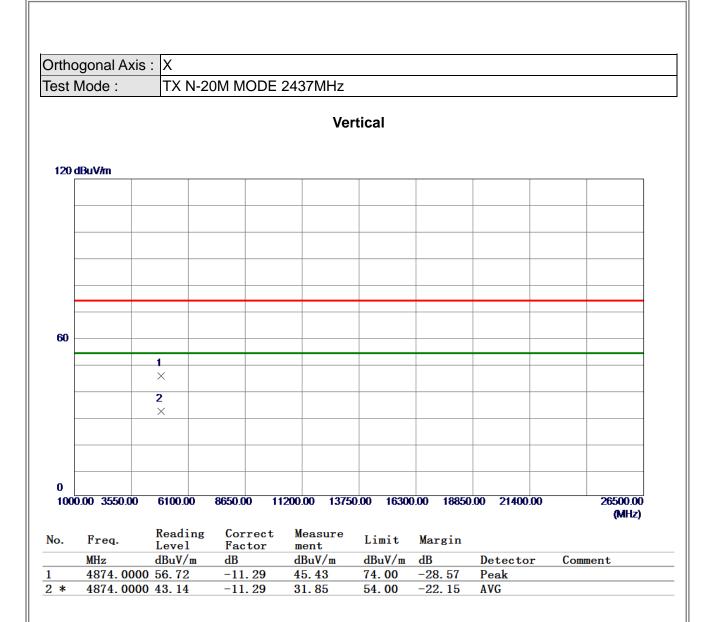






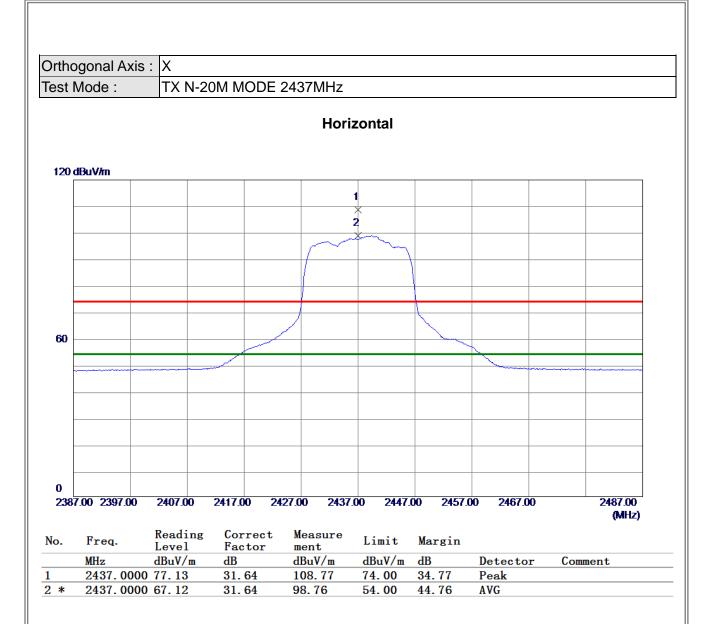












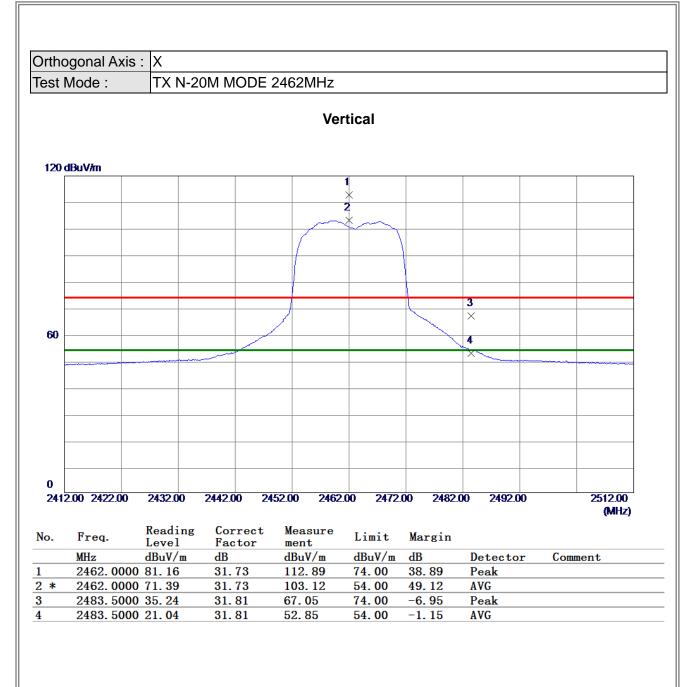






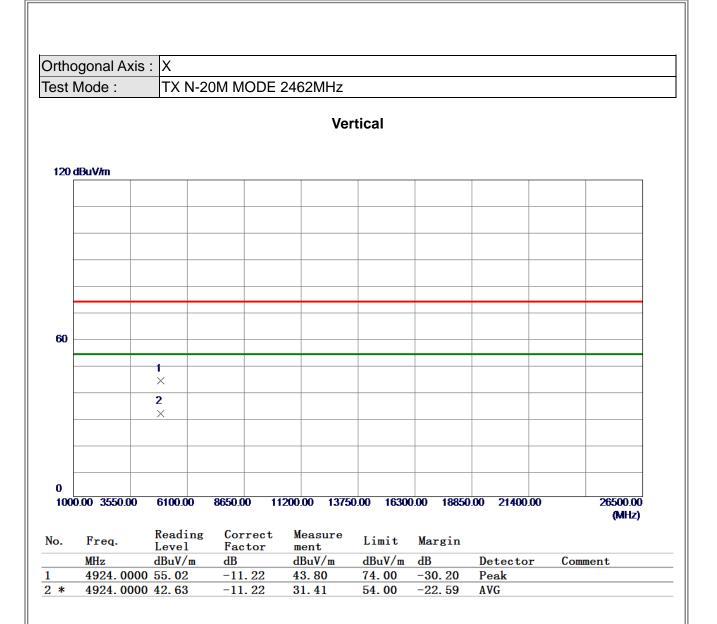






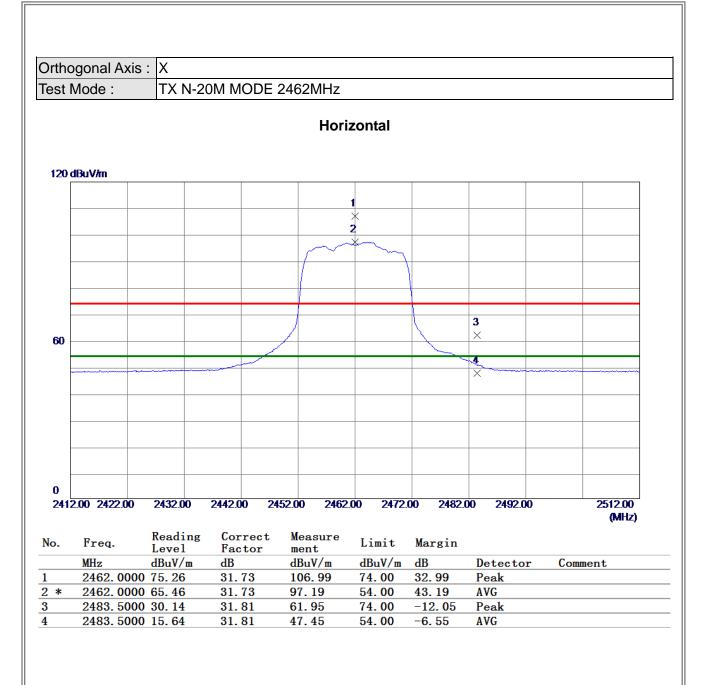






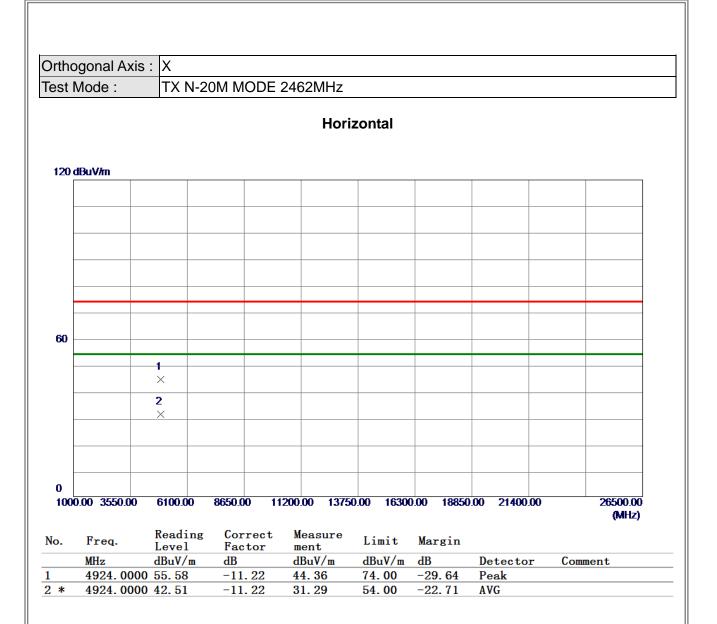






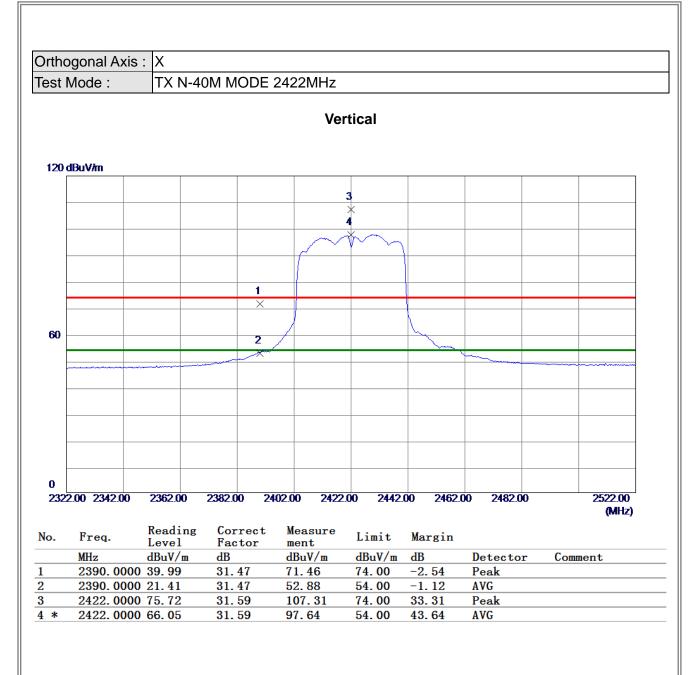






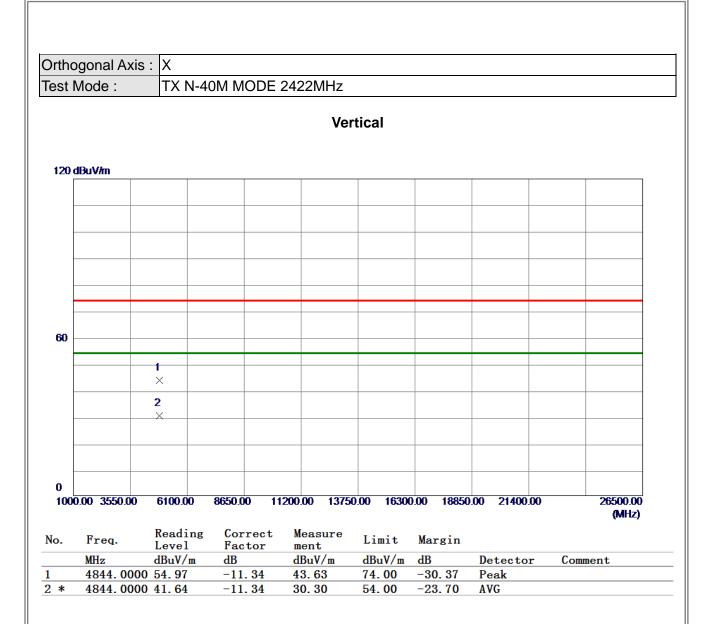






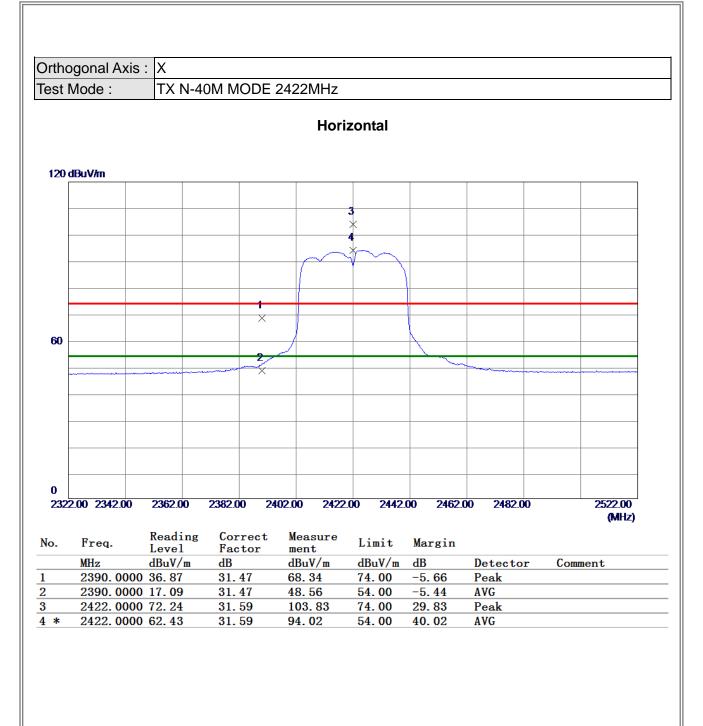






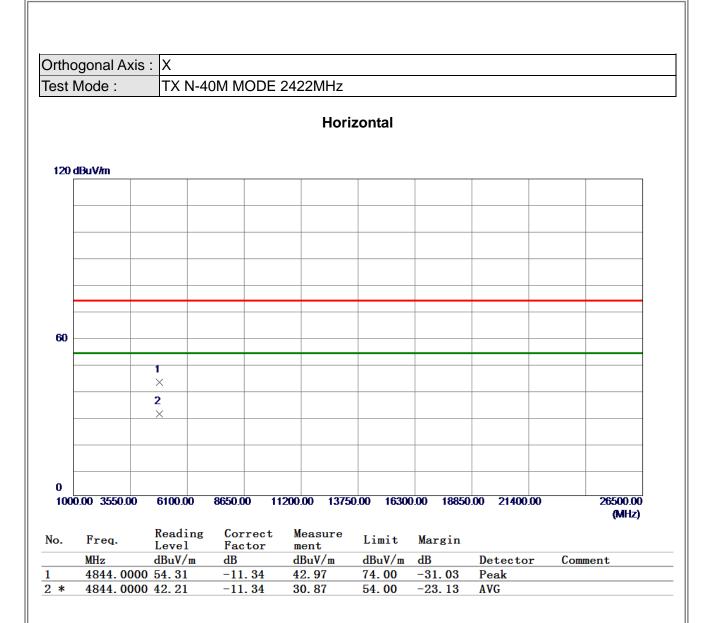






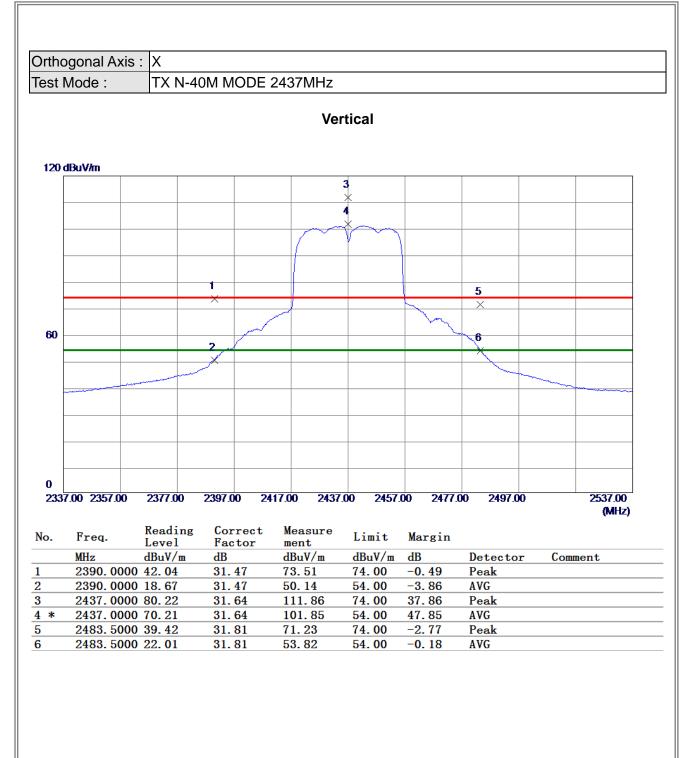






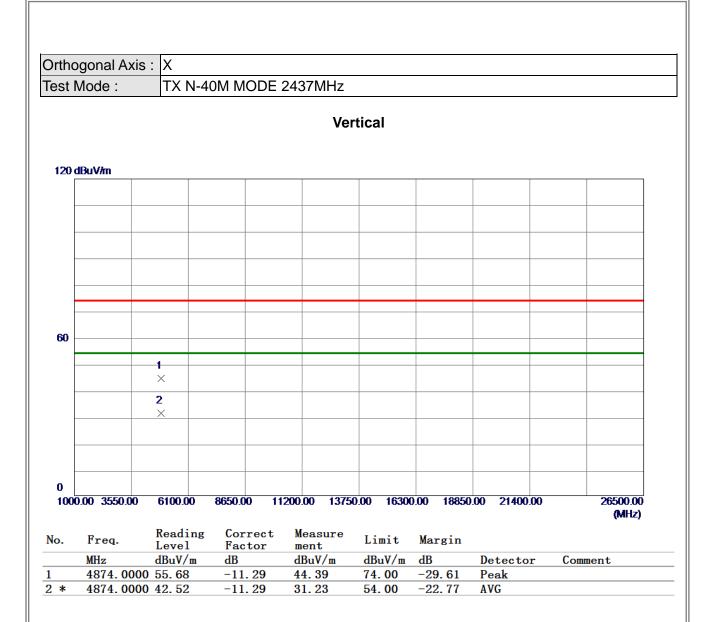






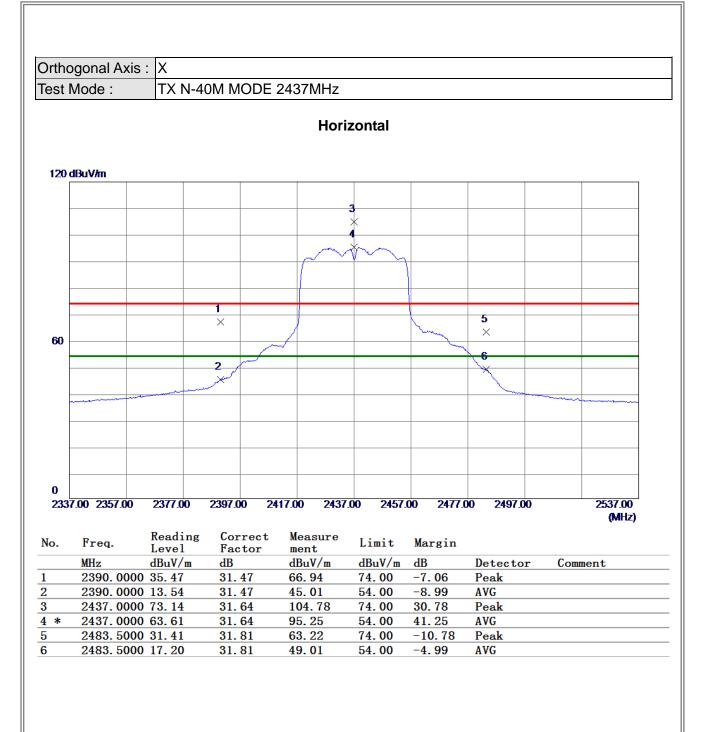






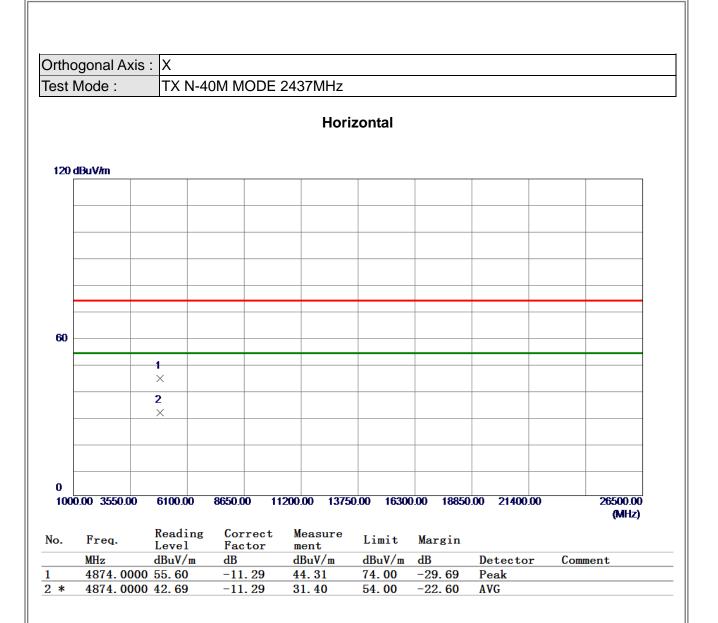






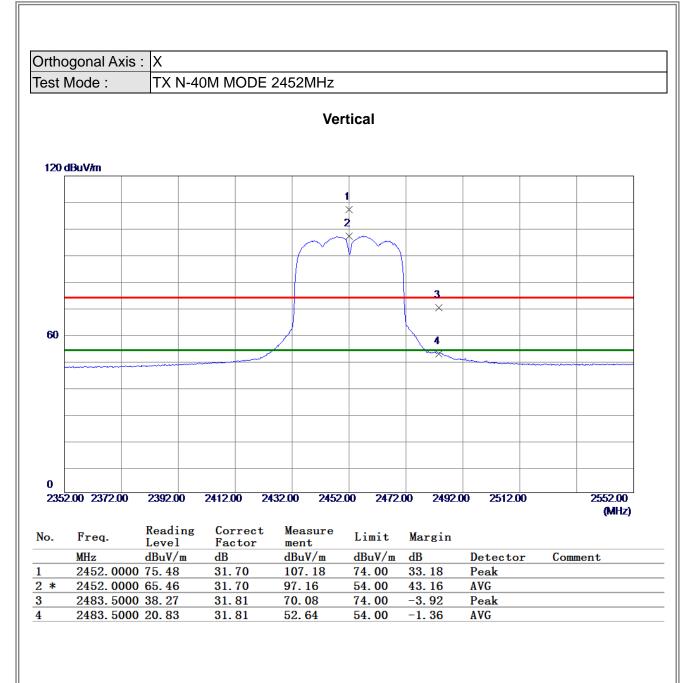






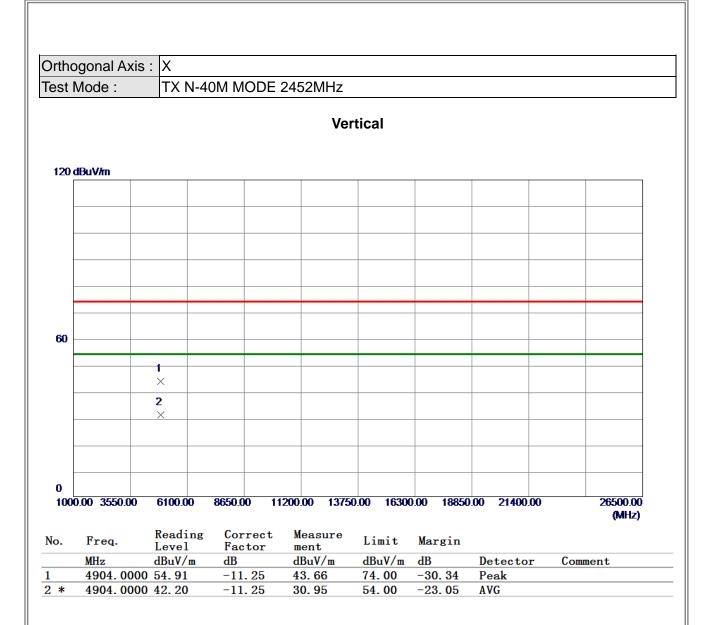






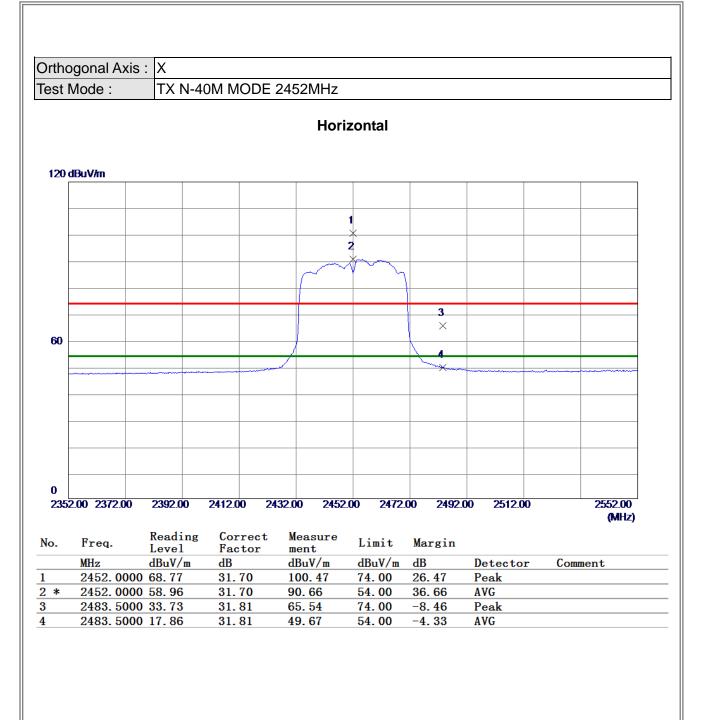






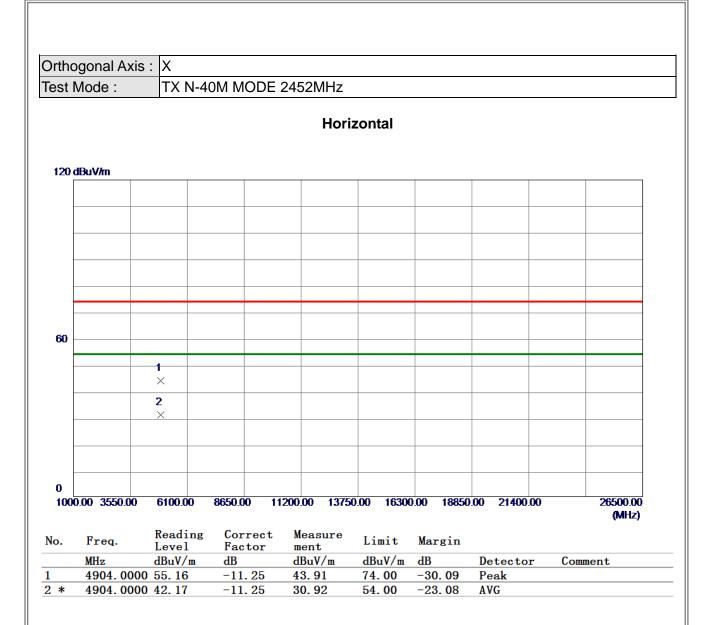












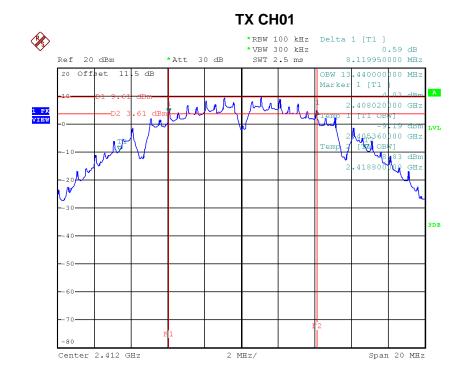


APPENDIX E - BANDWIDTH





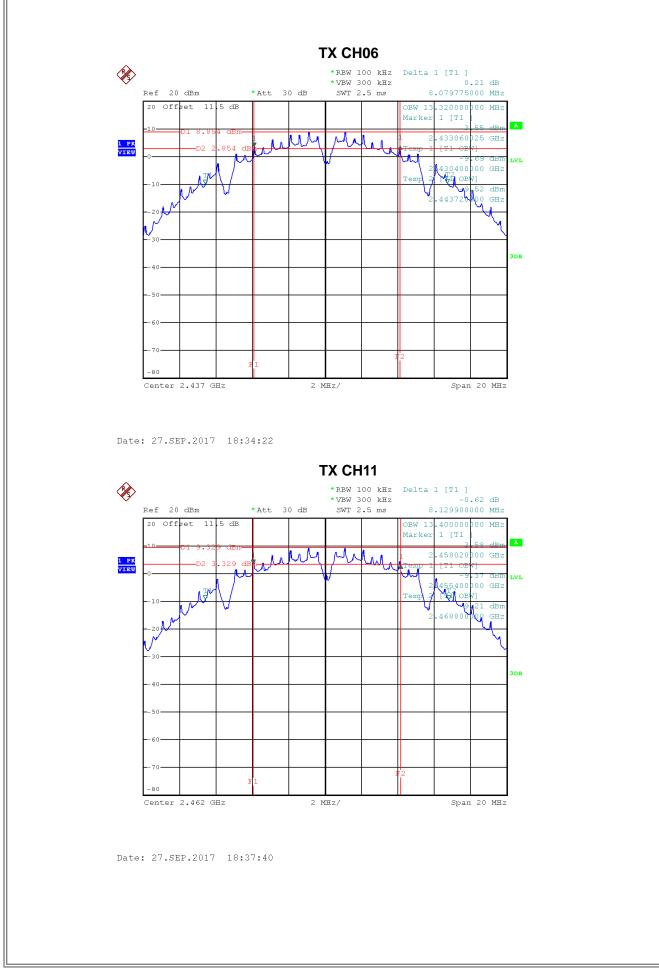
Test Mode : TX B Mode_CH01/06/11							
Frequency (MHz)6dB Bandwidth99% Occupied BWMin. Limit (kHz)Test Result							
2412	8.12	13.44	500	Complies			
2437	8.08	13.32	500	Complies			
2462	8.13	13.4	500	Complies			



Date: 27.SEP.2017 18:28:57

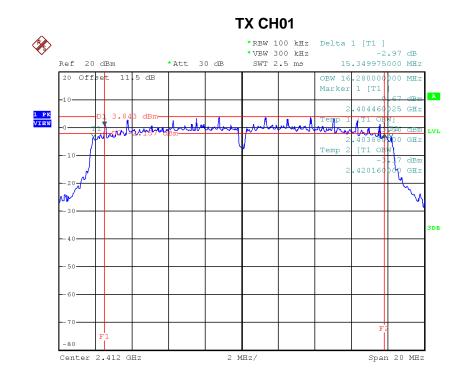








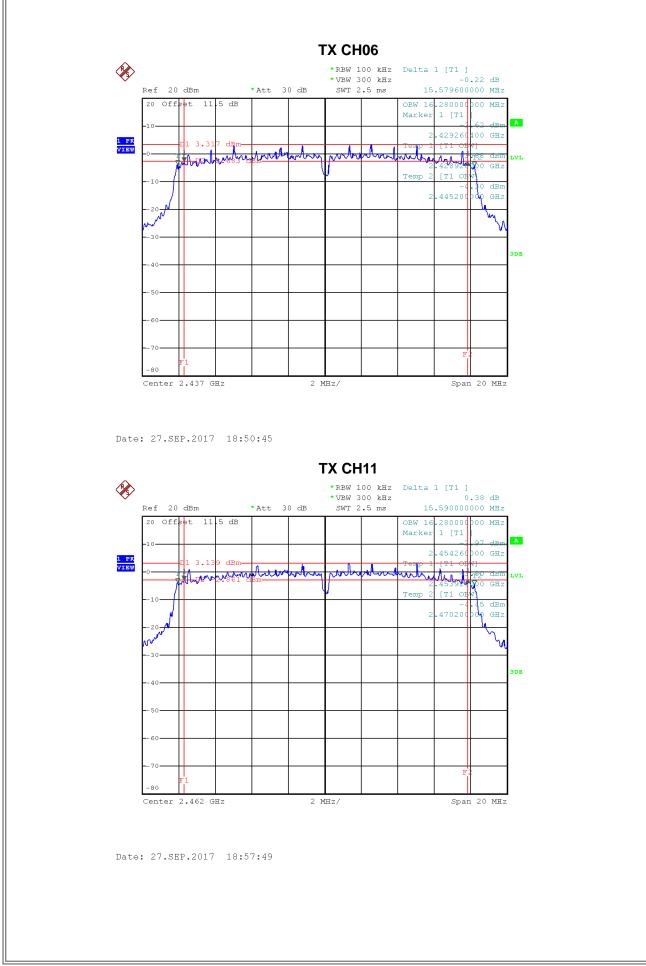
Test Mode: TX G Mode_CH01/06/11						
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result		
2412	15.35	16.28	500	Complies		
2437	15.58	16.28	500	Complies		
2462	15.59	16.28	500	Complies		



Date: 27.SEP.2017 18:43:56

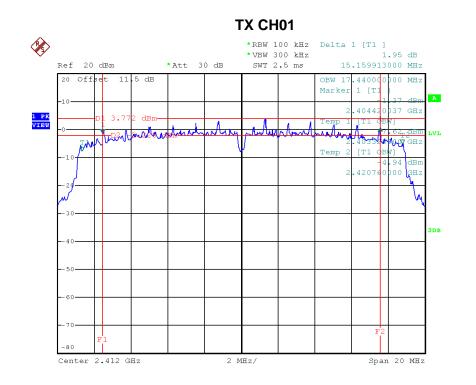
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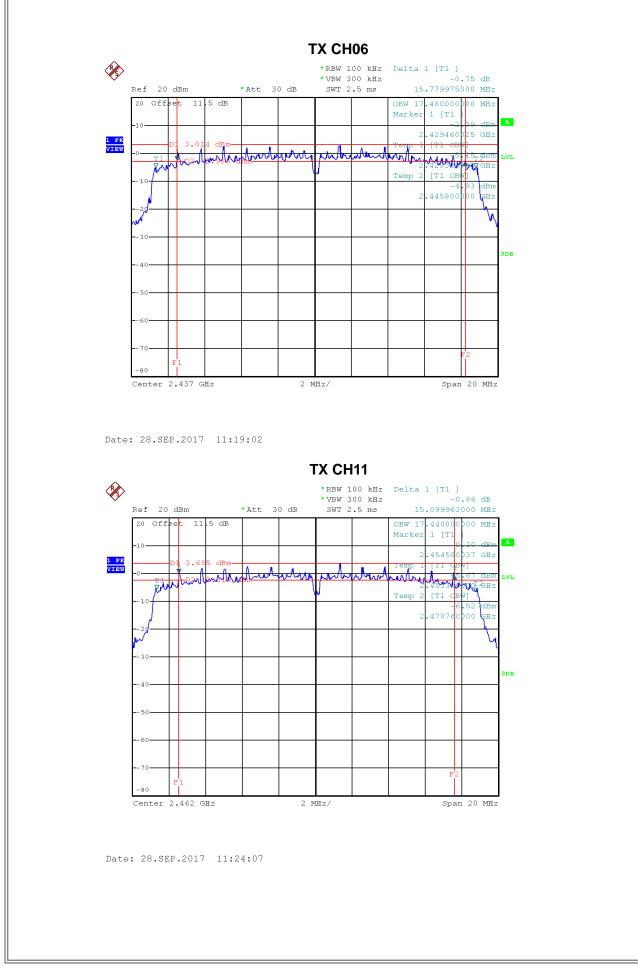


Test Mode : TX N-20MHz Mode_CH01/06/11							
Frequency (MHz)6dB Bandwidth (MHz)99% Occupied BW (MHz)Min. Limit (kHz)Test Result							
2412	15.16	17.44	500	Complies			
2437	15.78	17.48	500	Complies			
2462	15.1	17.44	500	Complies			



Date: 28.SEP.2017 11:09:00

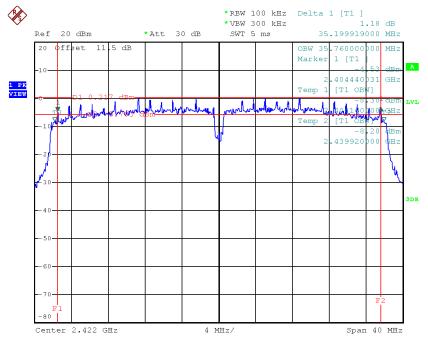






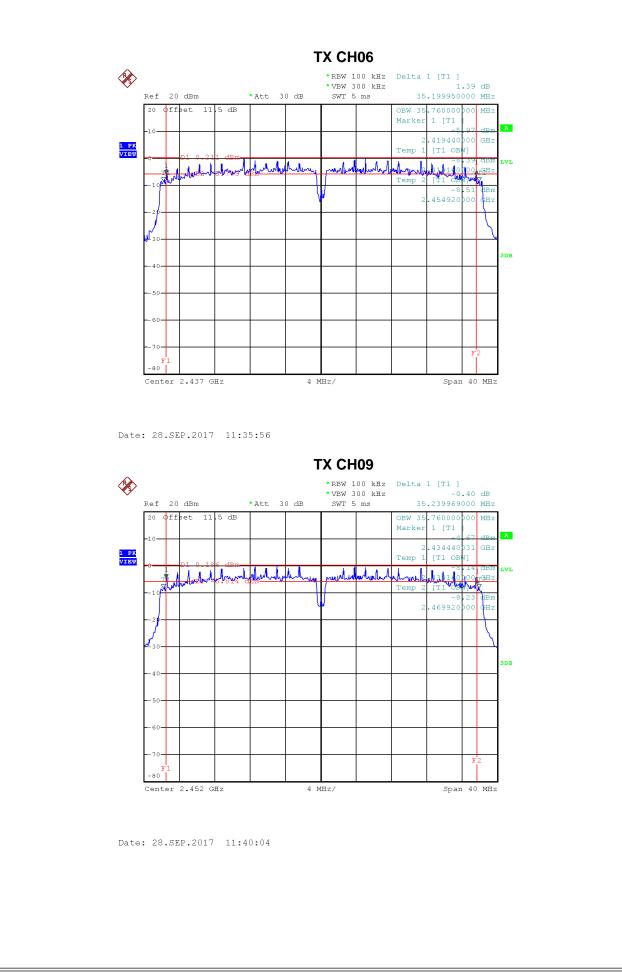
Test Mode : TX N-40MHz Mode_CH03/06/09							
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result			
2422	35.2	35.76	500	Complies			
2437	35.2	35.76	500	Complies			
2452	35.24	35.76	500	Complies			





Date: 28.SEP.2017 11:29:41







APPENDIX F - MAXIMUM PEAK CONDUCTED OUTPUT POWER



Test Mode :TX B Mode_CH01/06/11_ANT 1						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result	
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result	
2412	21.11	0.13	30.00	1.00	Complies	
2437	20.07	0.10	30.00	1.00	Complies	
2462	20.88	0.12	30.00	1.00	Complies	

Test Mode :TX B Mode_CH01/06/11_ANT 2						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result	
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result	
2412	20.67	0.12	30.00	1.00	Complies	
2437	20.79	0.12	30.00	1.00	Complies	
2462	20.89	0.12	30.00	1.00	Complies	

Test Mode :TX B Mode_CH01/06/11_Total							
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result		
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result		
2412	23.91	0.25	30.00	1.00	Complies		
2437	23.46	0.22	30.00	1.00	Complies		
2462	23.90	0.25	30.00	1.00	Complies		



Test Mode :TX G Mode_CH01/06/11_ANT 1						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result	
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result	
2412	21.45	0.14	30.00	1.00	Complies	
2437	20.78	0.12	30.00	1.00	Complies	
2462	17.91	0.06	30.00	1.00	Complies	

Test Mode :TX G Mode_CH01/06/11_ANT 2						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result	
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result	
2412	21.12	0.13	30.00	1.00	Complies	
2437	21.23	0.13	30.00	1.00	Complies	
2462	18.77	0.08	30.00	1.00	Complies	

Test Mode :TX G Mode_CH01/06/11_Total							
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result		
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result		
2412	24.30	0.27	30.00	1.00	Complies		
2437	24.02	0.25	30.00	1.00	Complies		
2462	21.37	0.14	30.00	1.00	Complies		

Test Mode :TX N20 Mode_CH01/06/11_ANT 1							
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result		
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result		
2412	19.95	0.10	30.00	1.00	Complies		
2437	20.97	0.13	30.00	1.00	Complies		
2462	18.45	0.07	30.00	1.00	Complies		

Test Mode :TX N20 Mode_CH01/06/11_ANT 2						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result	
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result	
2412	20.16	0.10	30.00	1.00	Complies	
2437	21.31	0.14	30.00	1.00	Complies	
2462	18.65	0.07	30.00	1.00	Complies	

Test Mode :TX N20 Mode_CH01/06/11_Total					
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	
2412	23.07	0.20	30.00	1.00	Complies
2437	24.15	0.26	30.00	1.00	Complies
2462	21.56	0.14	30.00	1.00	Complies

Test Mode :TX N40 Mode_CH03/06/09_ANT 1					
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	
2422	18.66	0.07	30.00	1.00	Complies
2437	20.94	0.12	30.00	1.00	Complies
2452	15.88	0.04	30.00	1.00	Complies

Test Mode :TX N40 Mode_CH03/06/09_ANT 2					
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	
2422	18.70	0.07	30.00	1.00	Complies
2437	21.41	0.14	30.00	1.00	Complies
2452	16.75	0.05	30.00	1.00	Complies

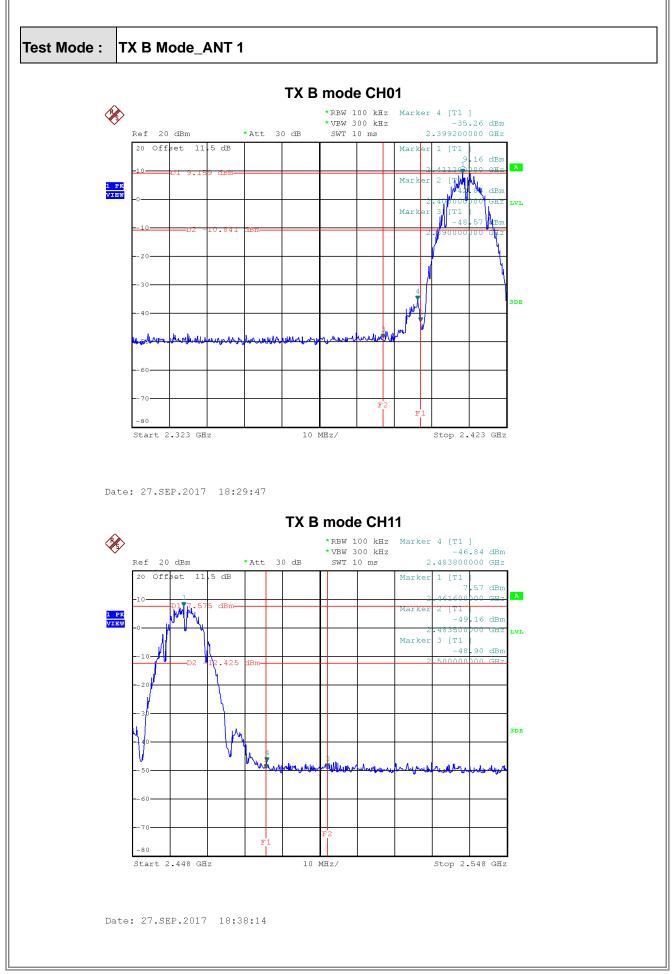
Test Mode :TX N40 Mode_CH03/06/09_Total					
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	
2422	21.69	0.15	30.00	1.00	Complies
2437	24.19	0.26	30.00	1.00	Complies
2452	19.35	0.09	30.00	1.00	Complies



APPENDIX G - ANTENNA CONDUCTED SPURIOUS EMISSION

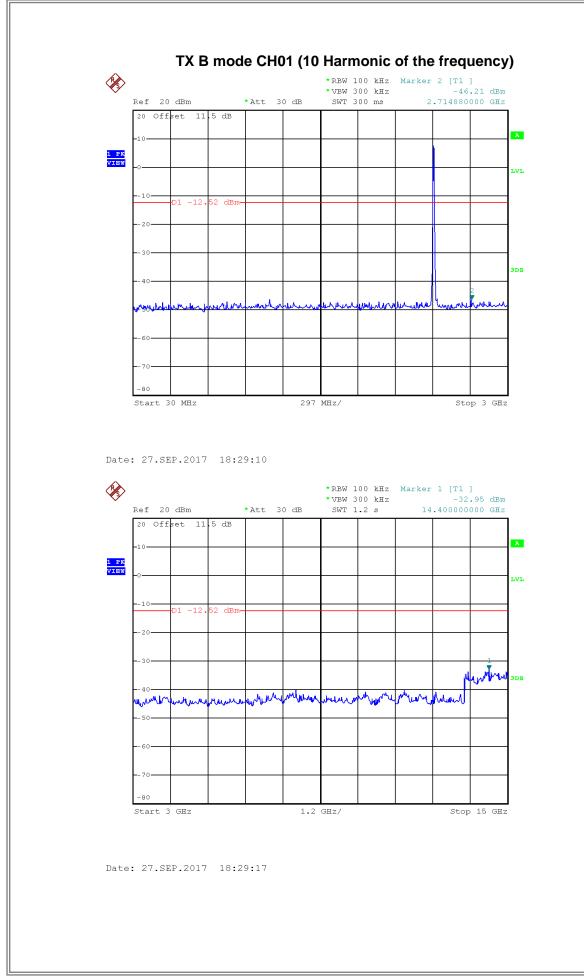






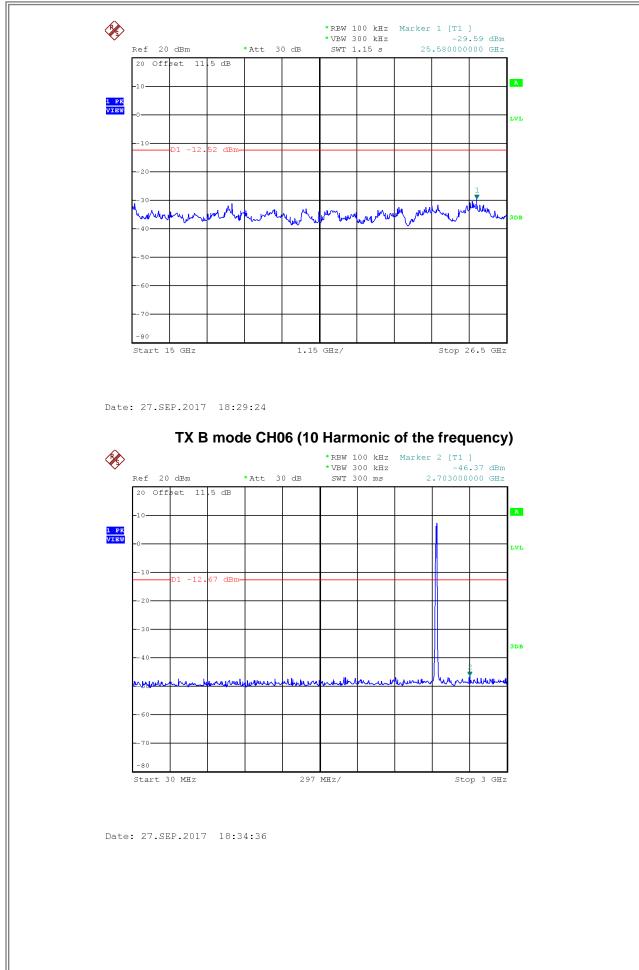
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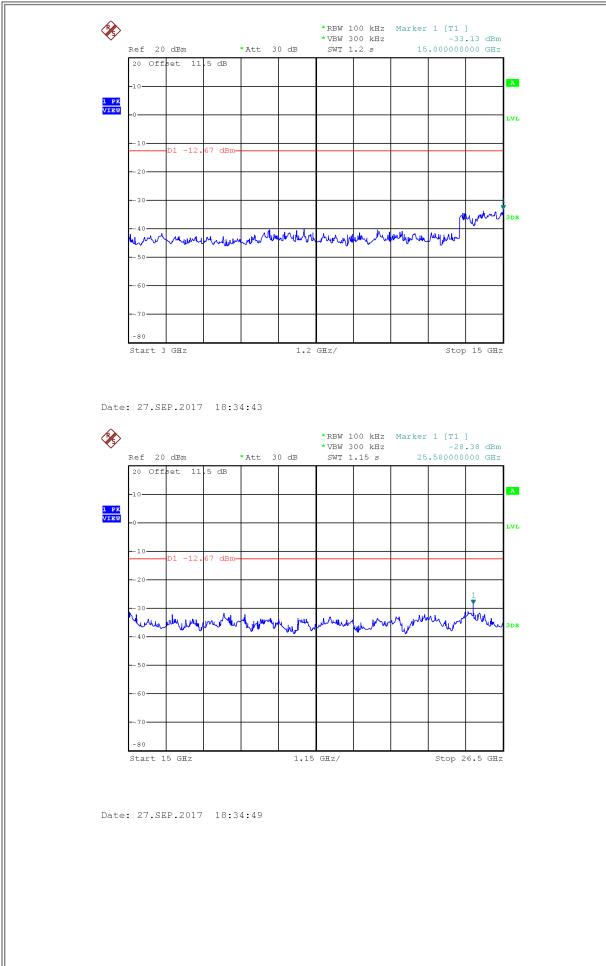
3TL



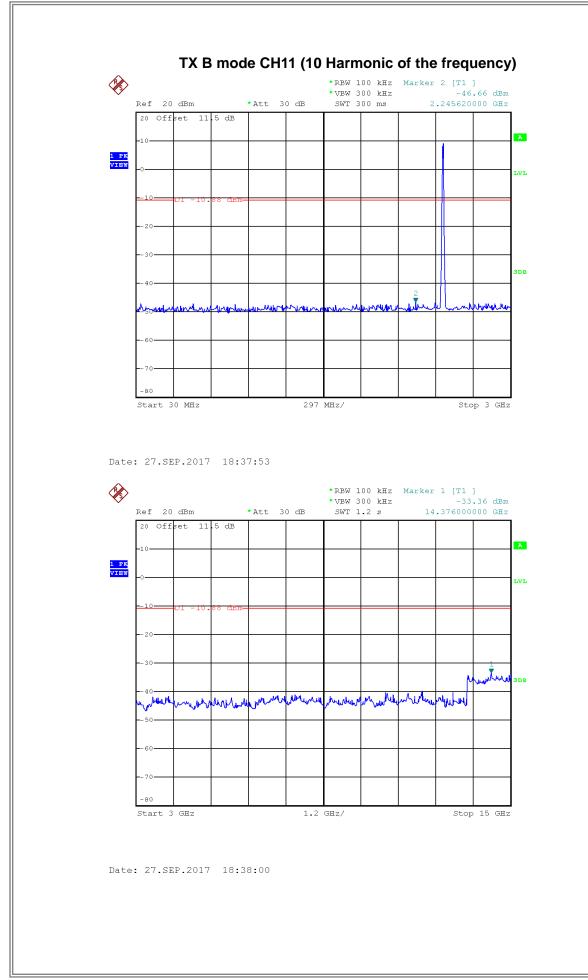


ЗĨL



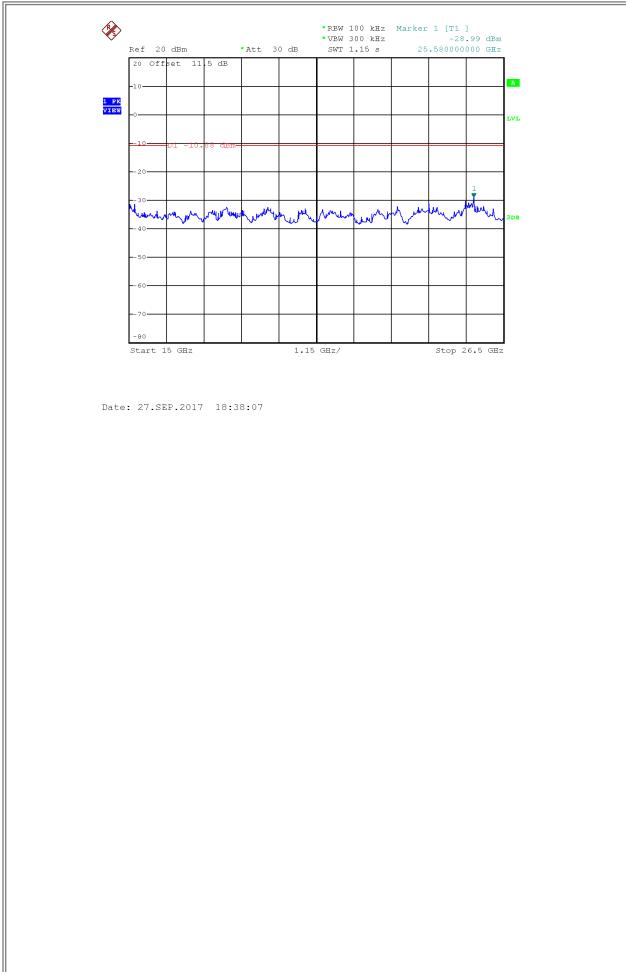






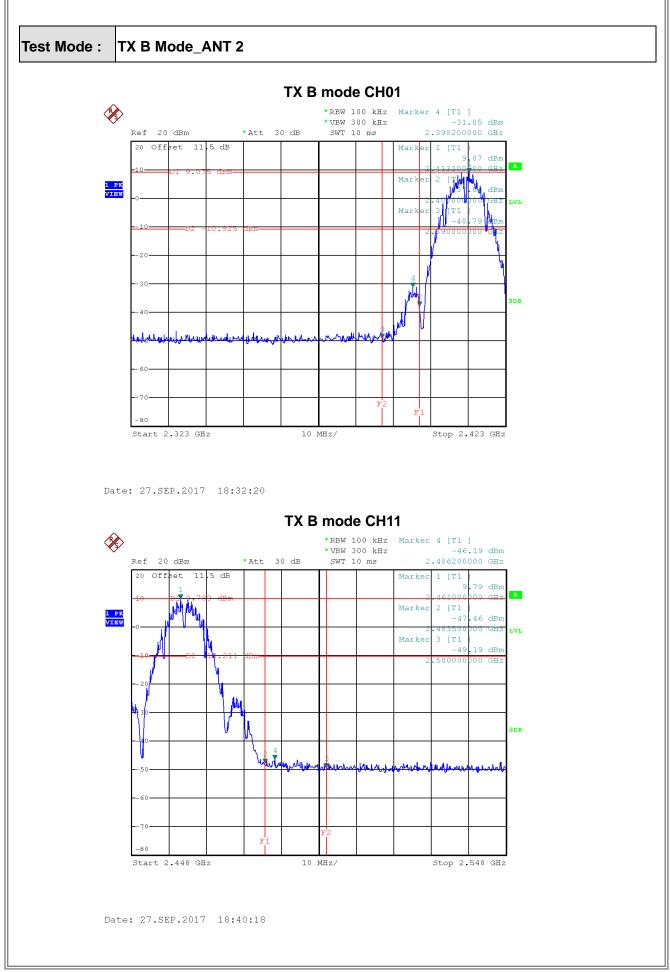
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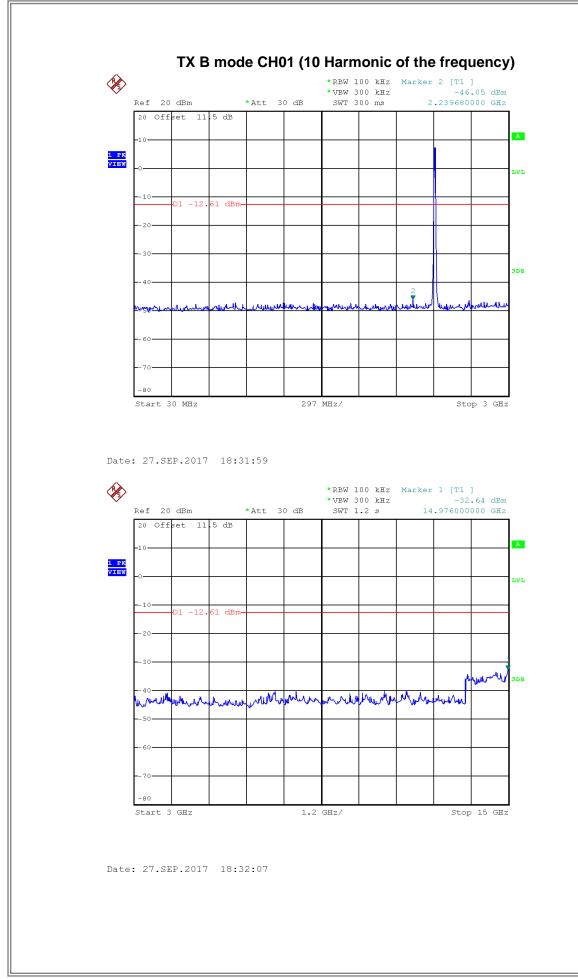




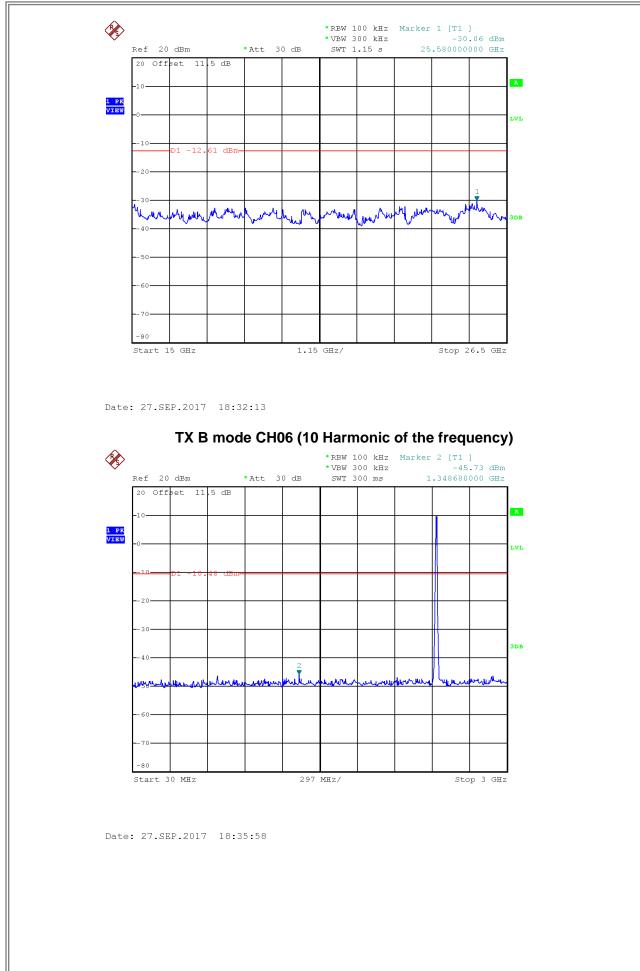




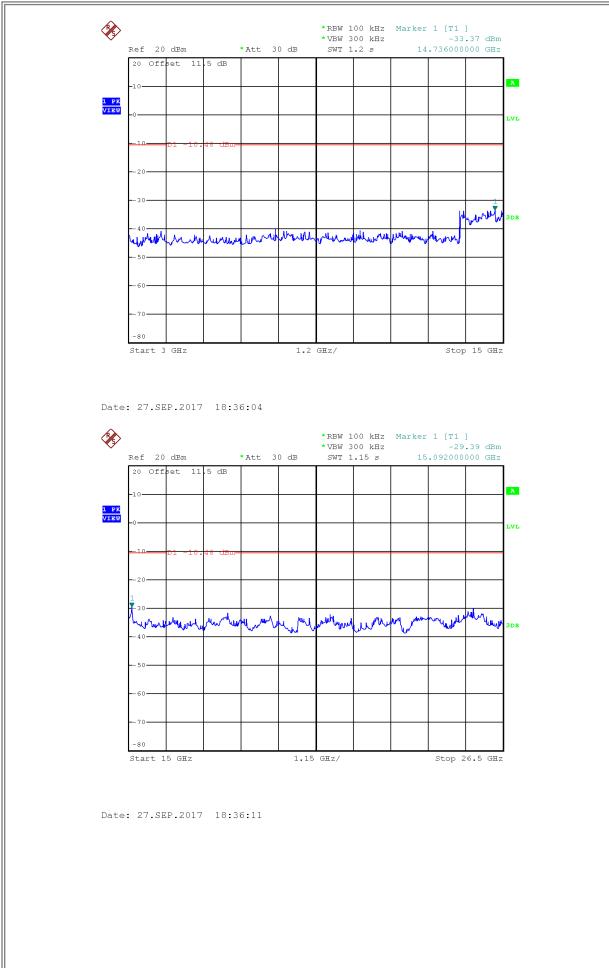




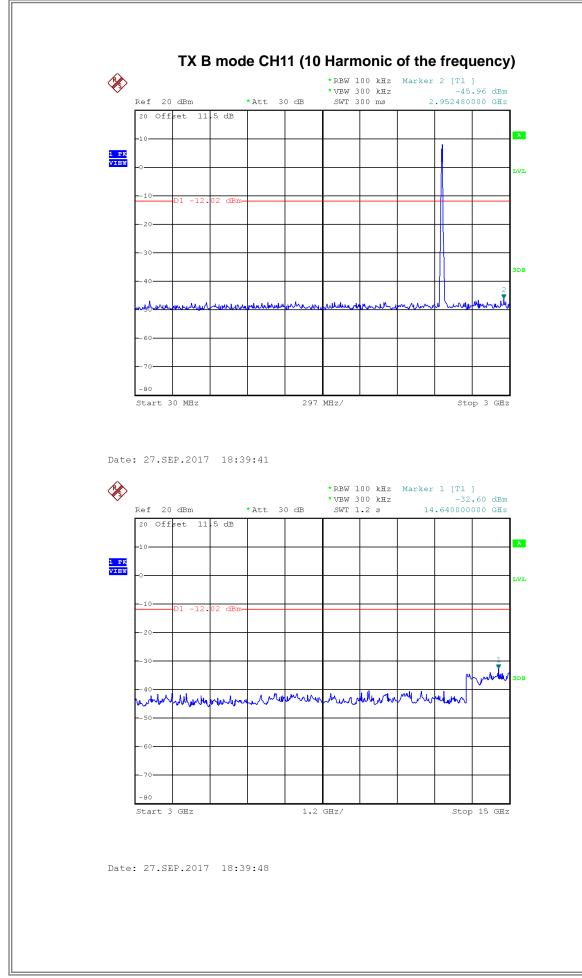




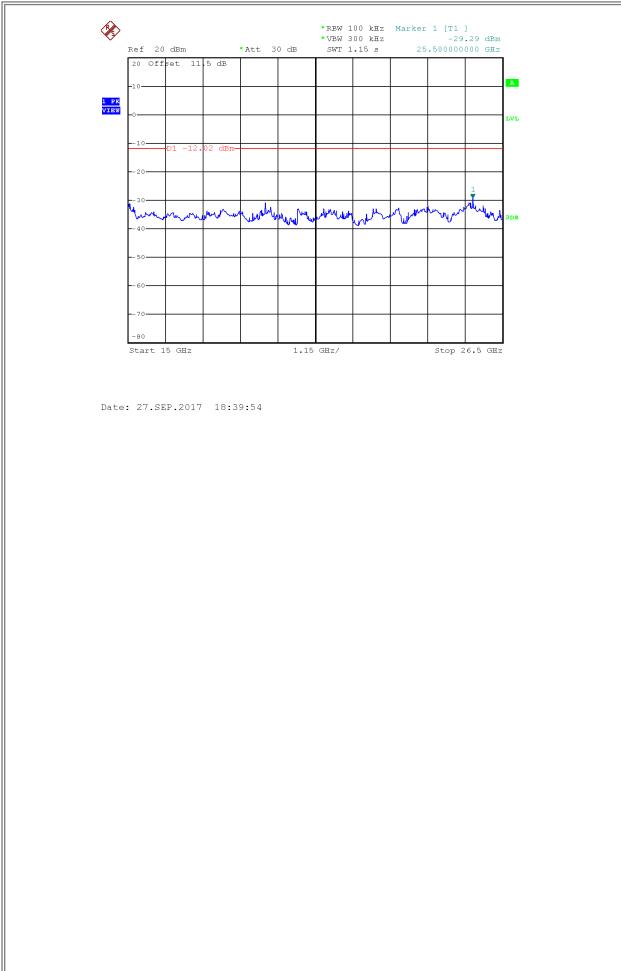






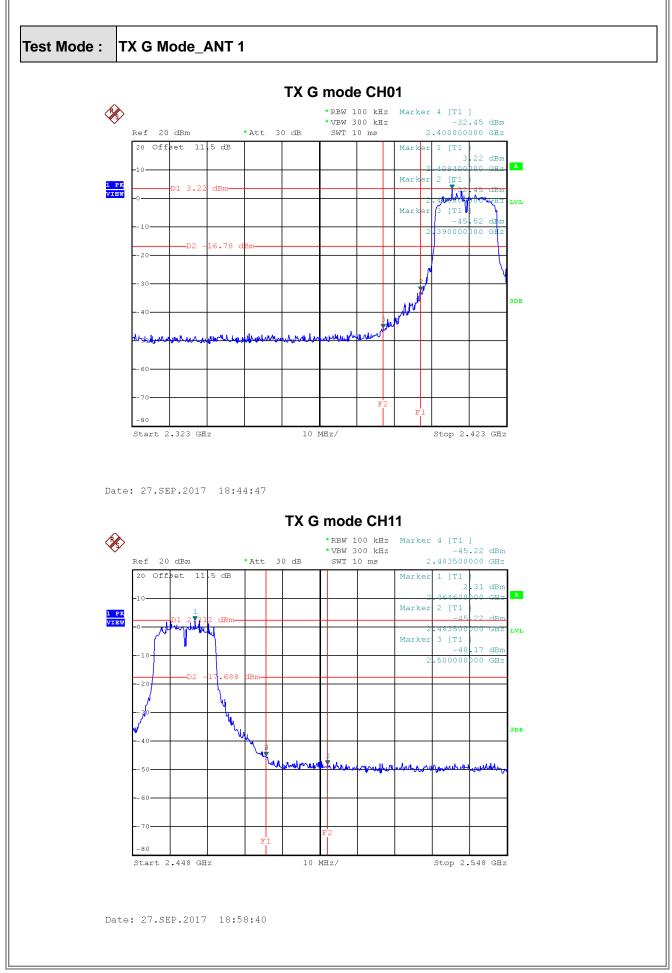




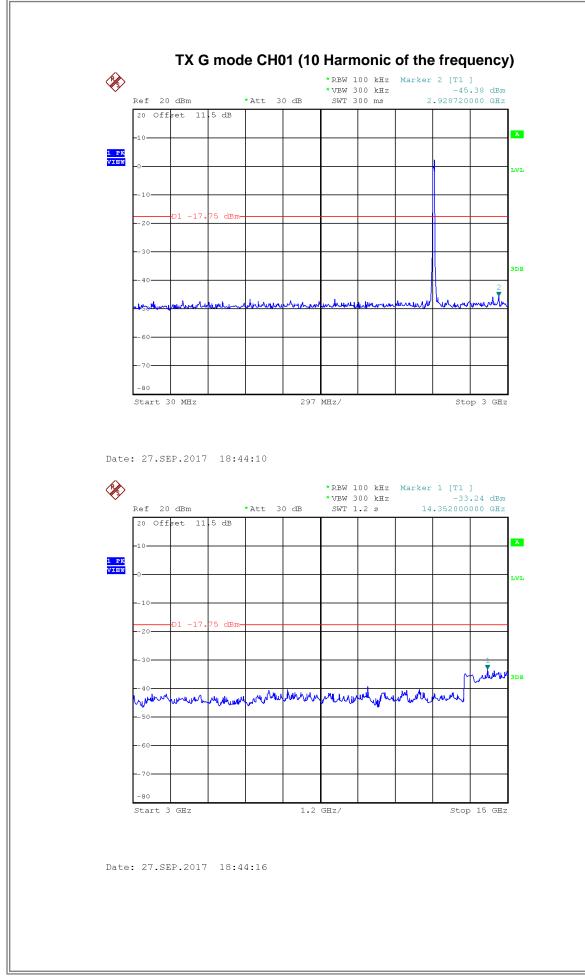




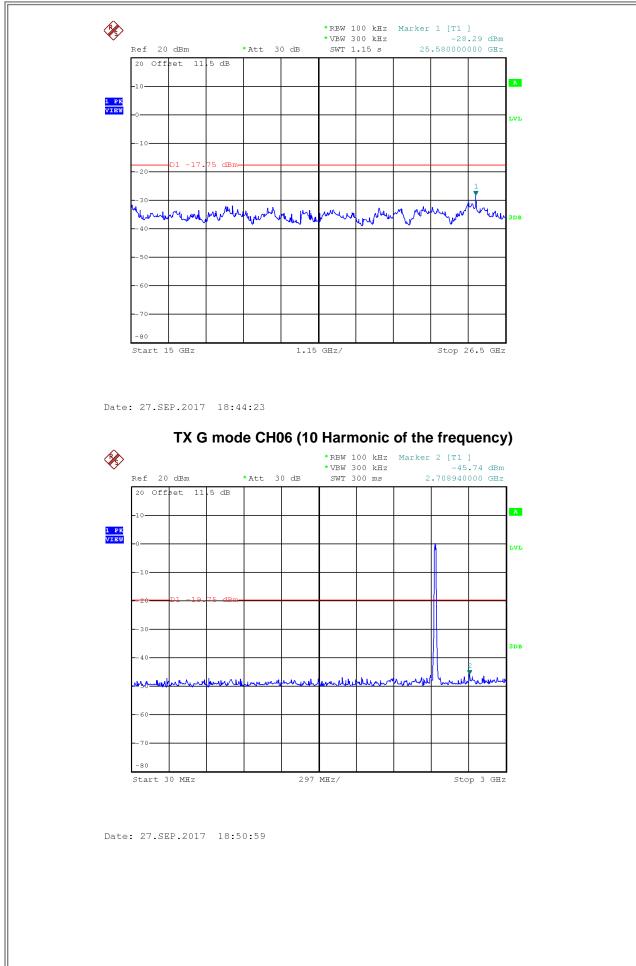




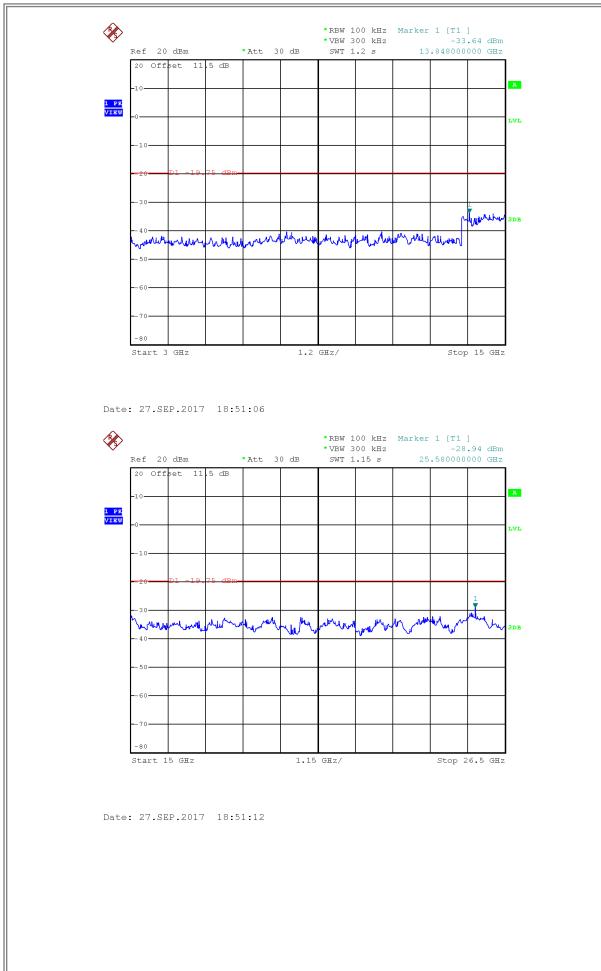




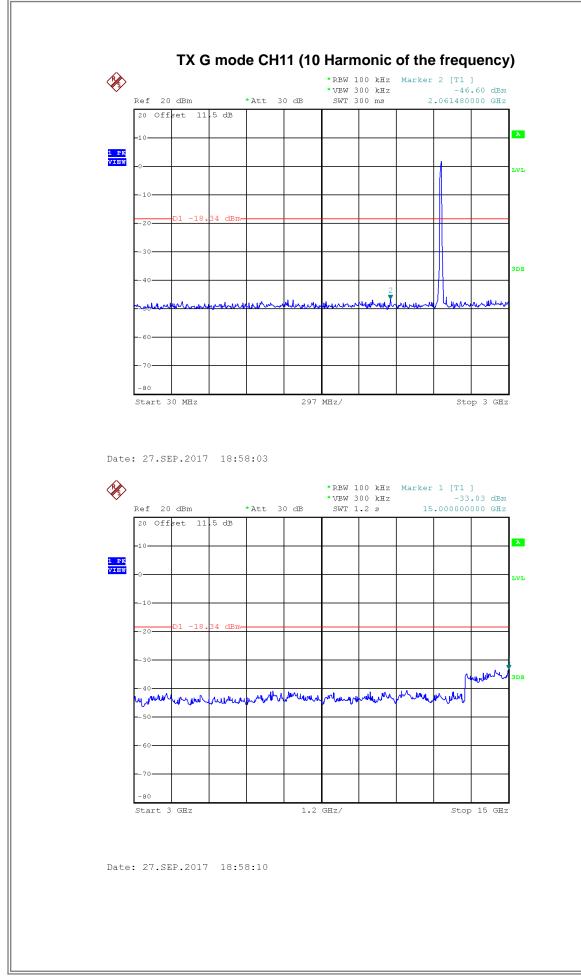




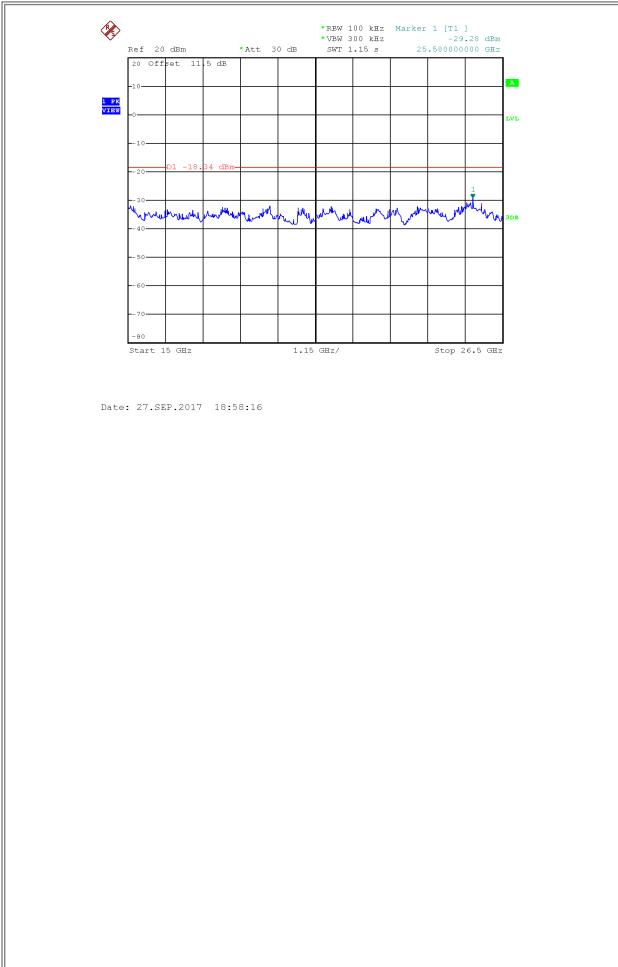






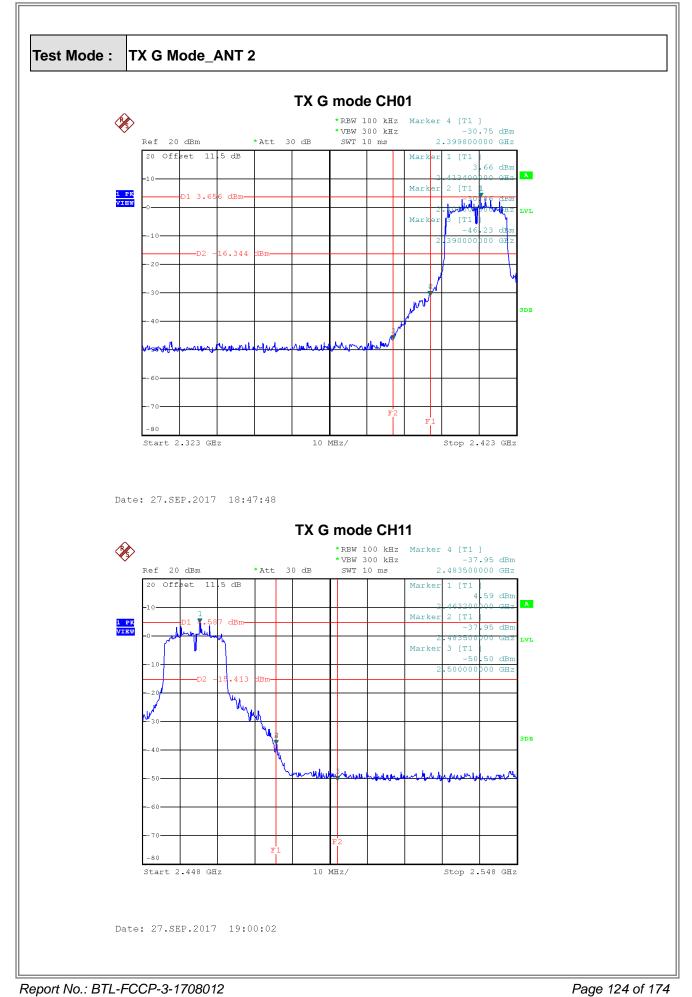




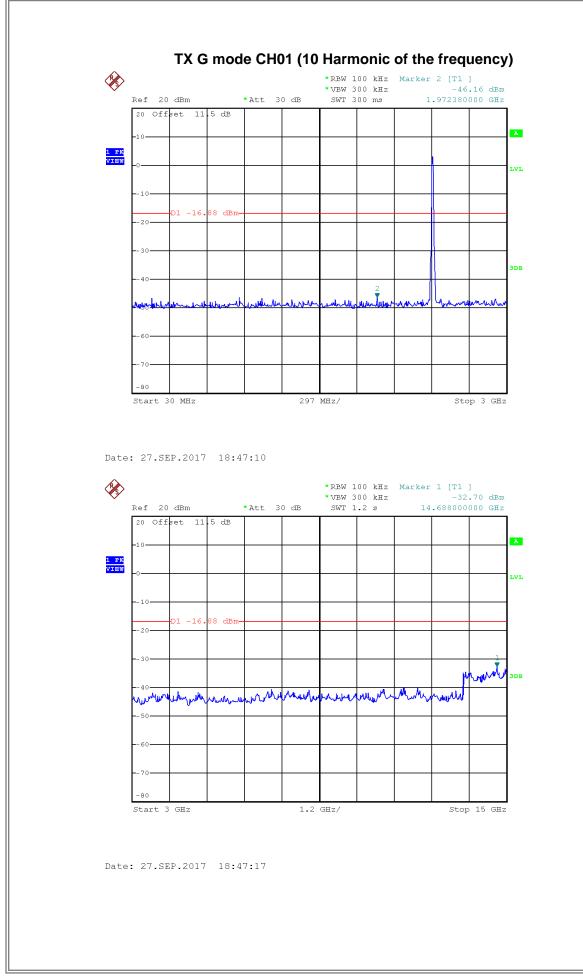






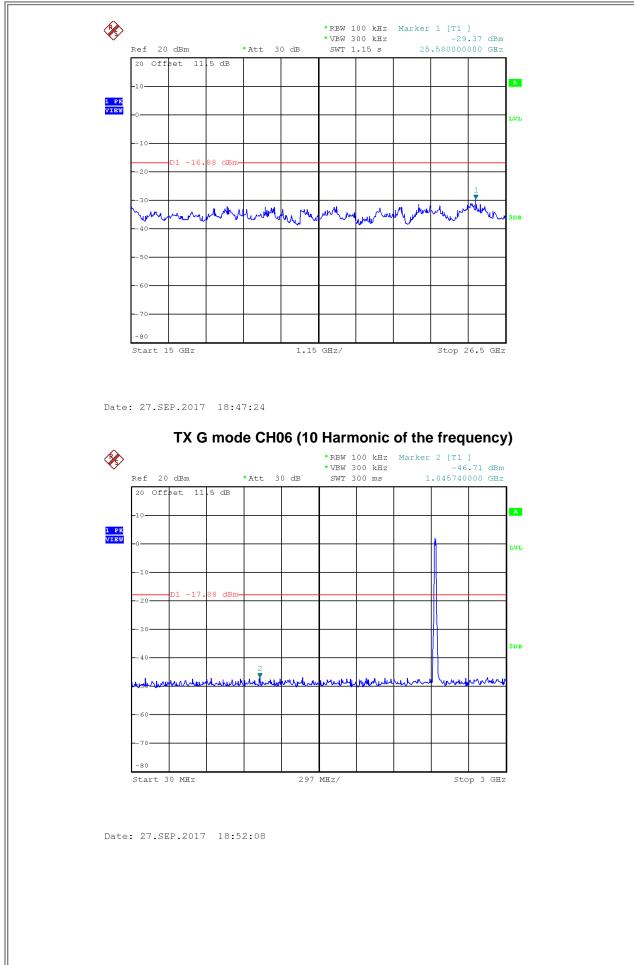






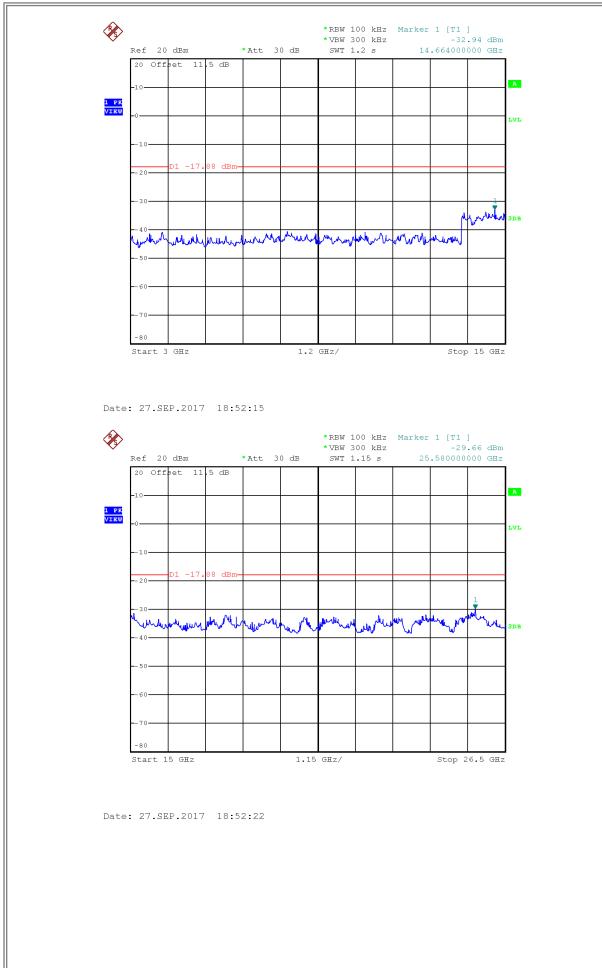
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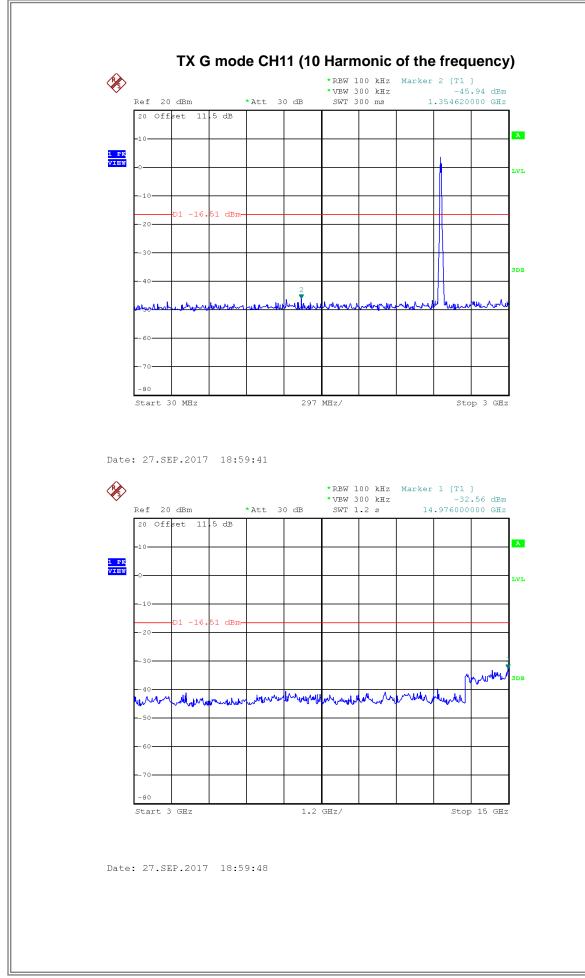


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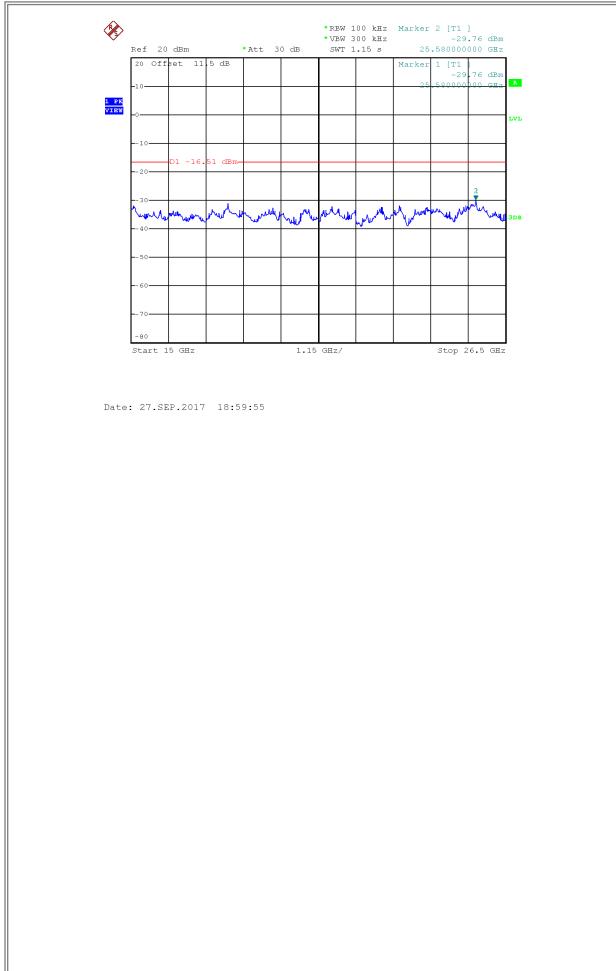






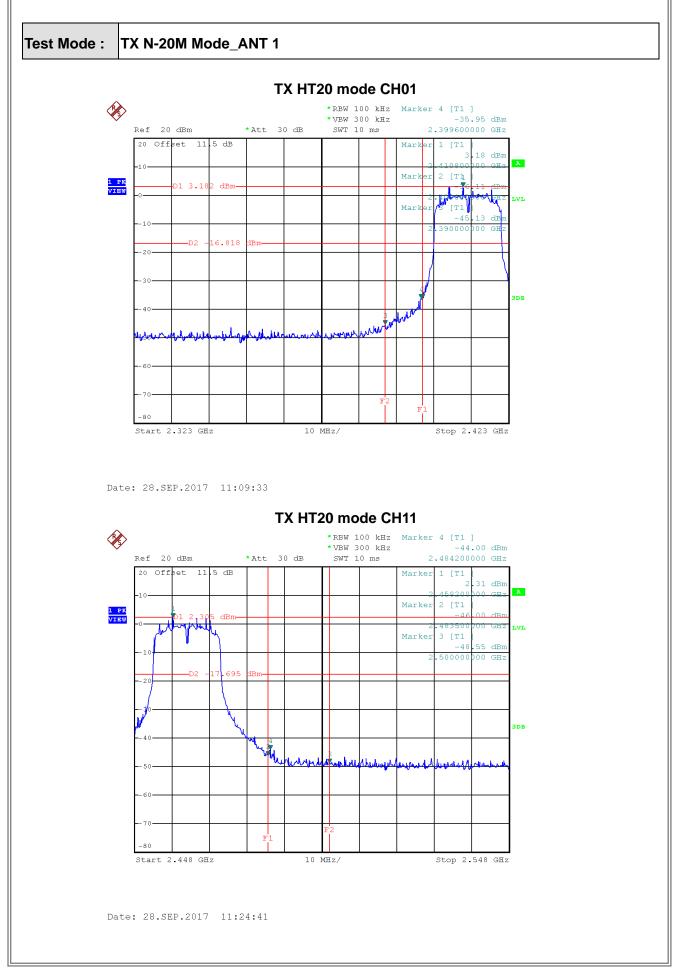




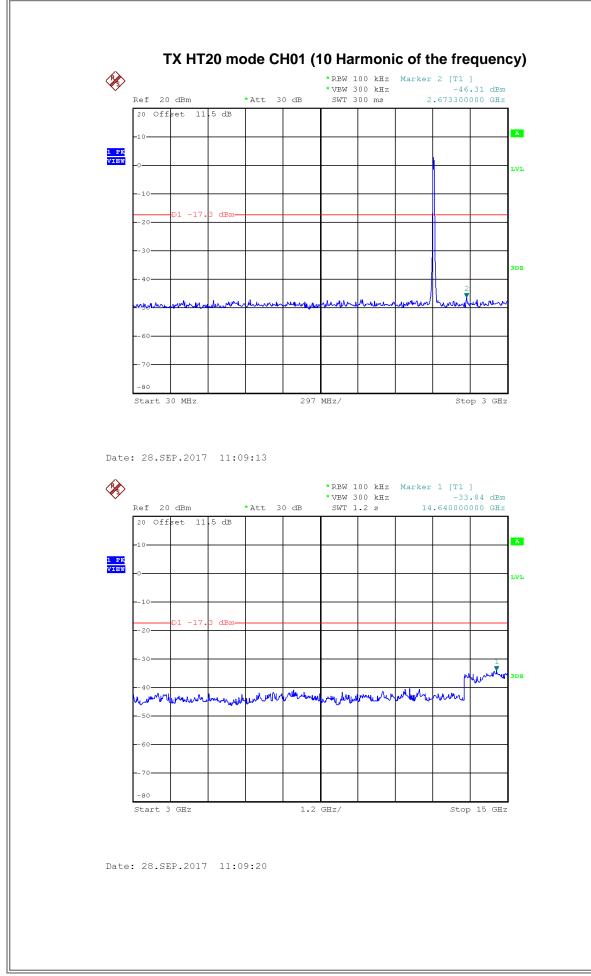




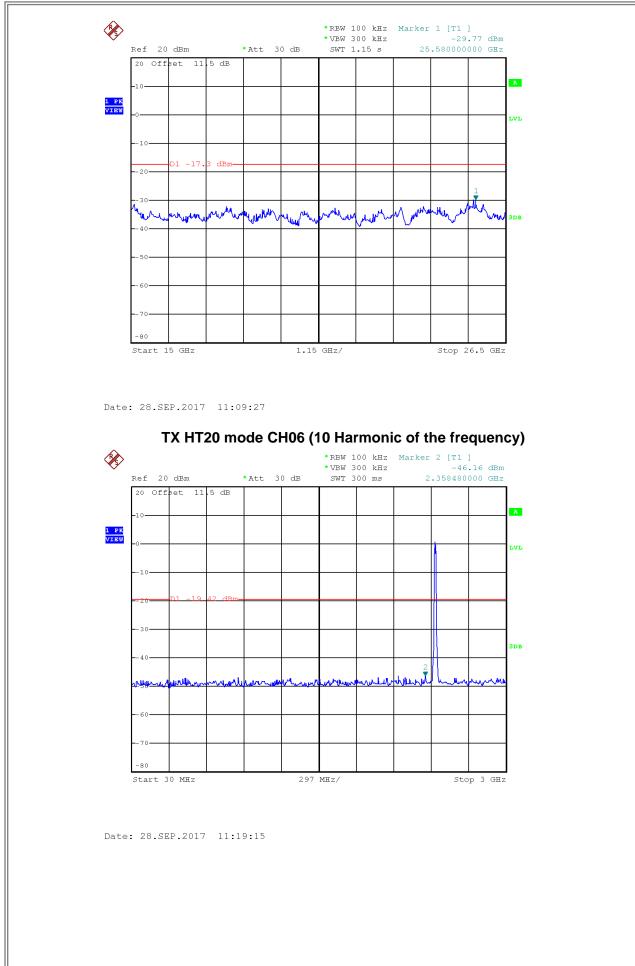




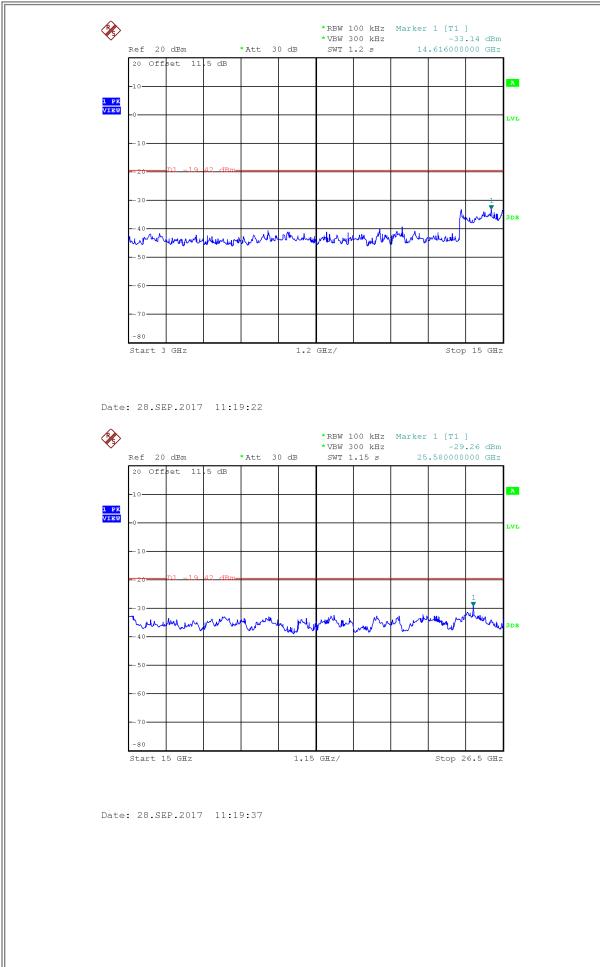




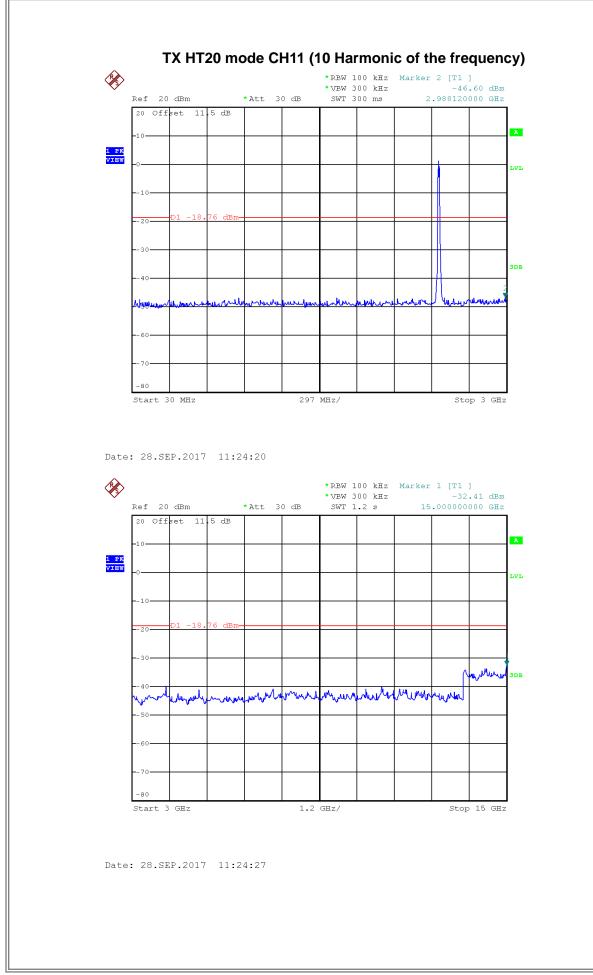




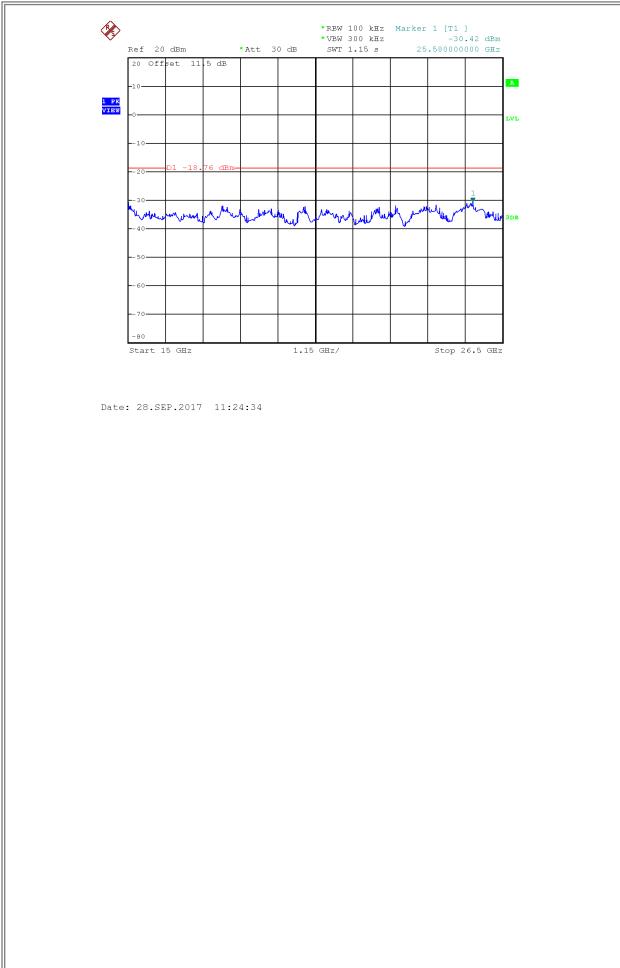






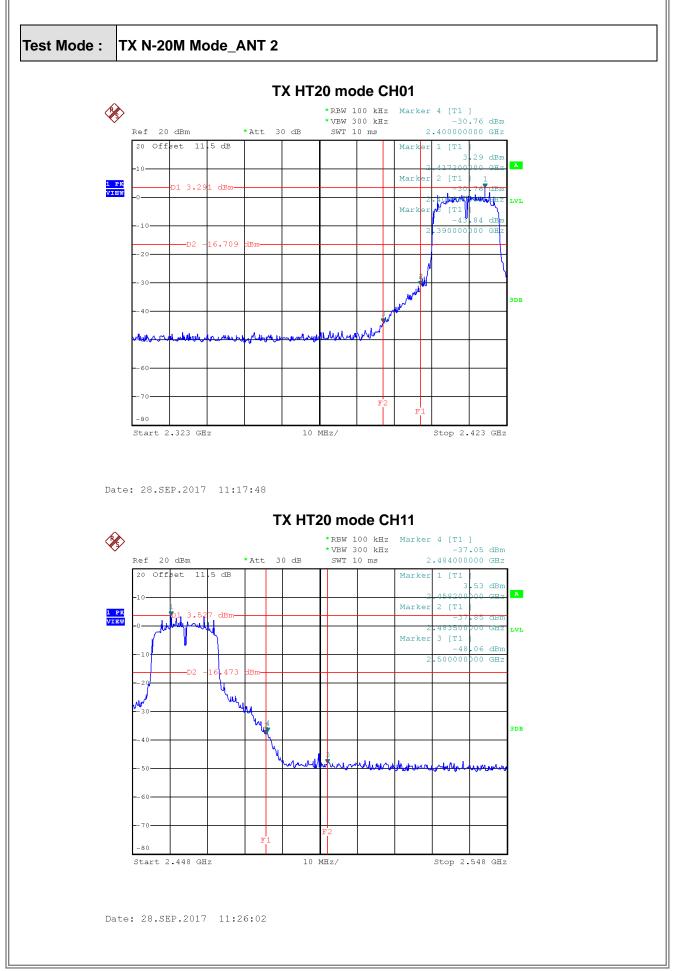




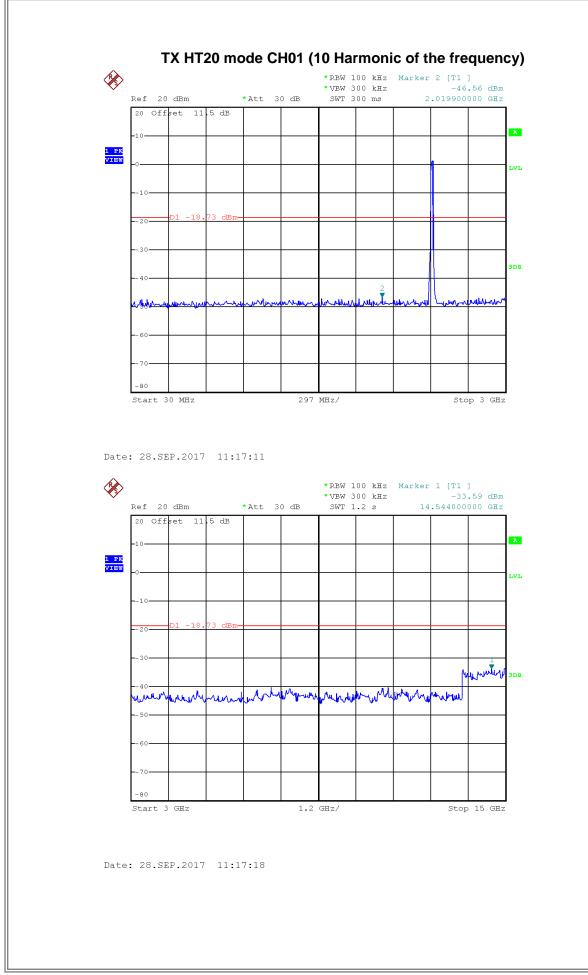






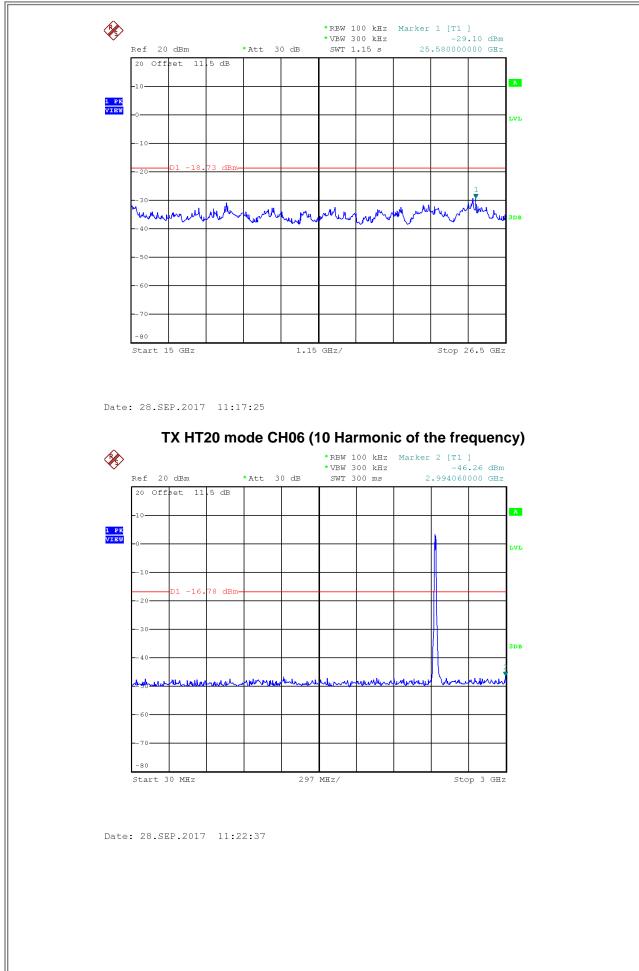




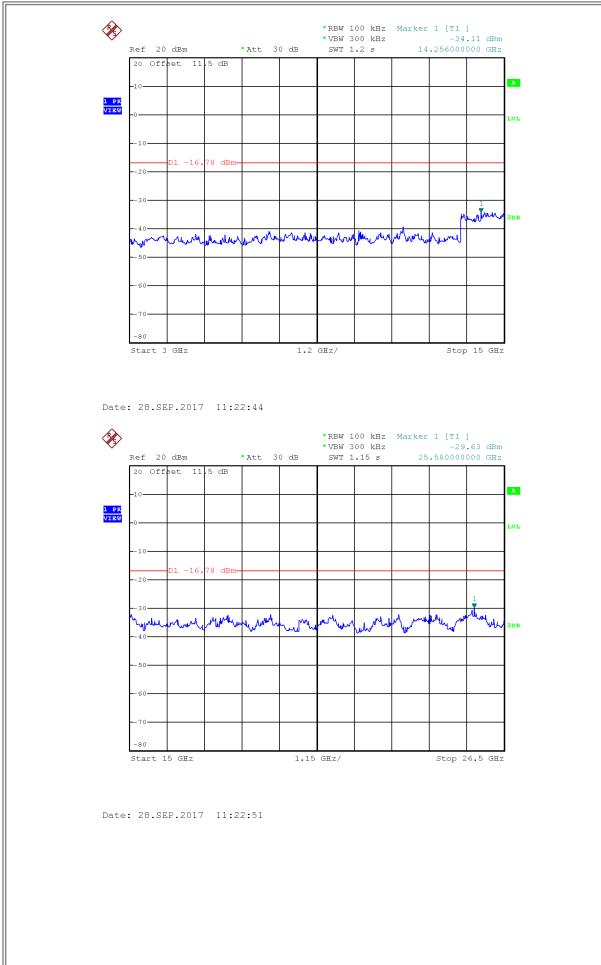


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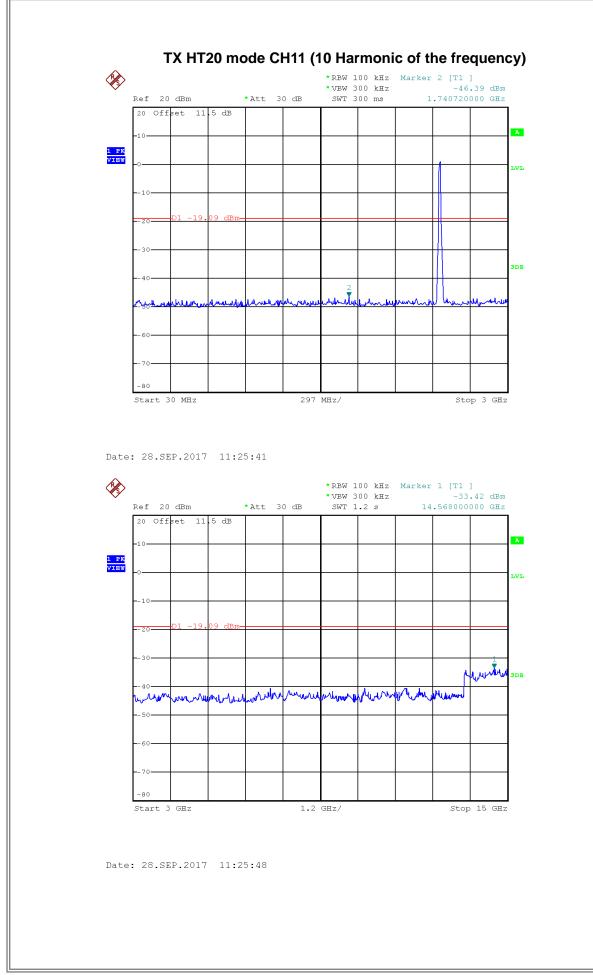




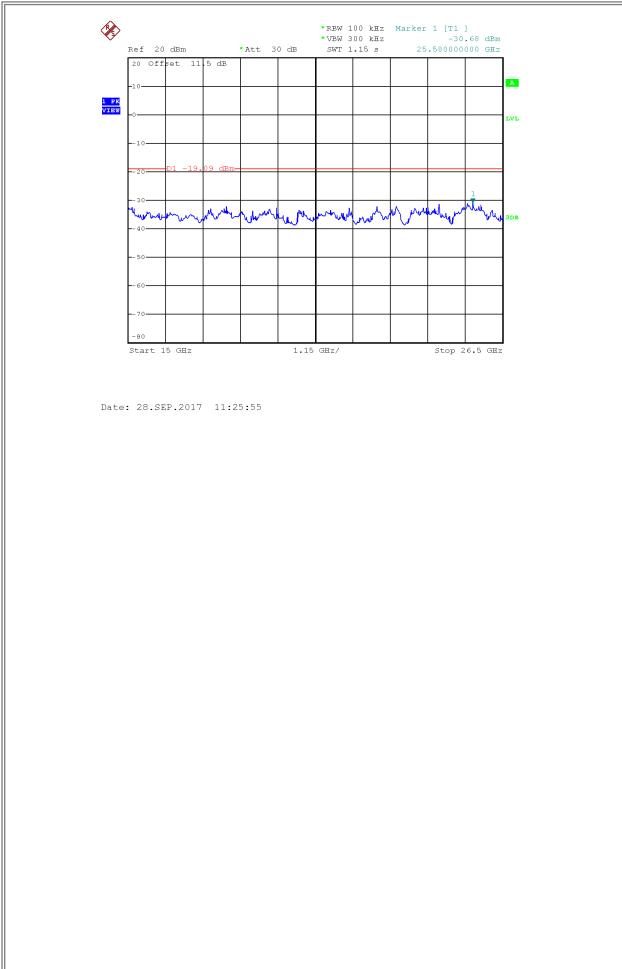






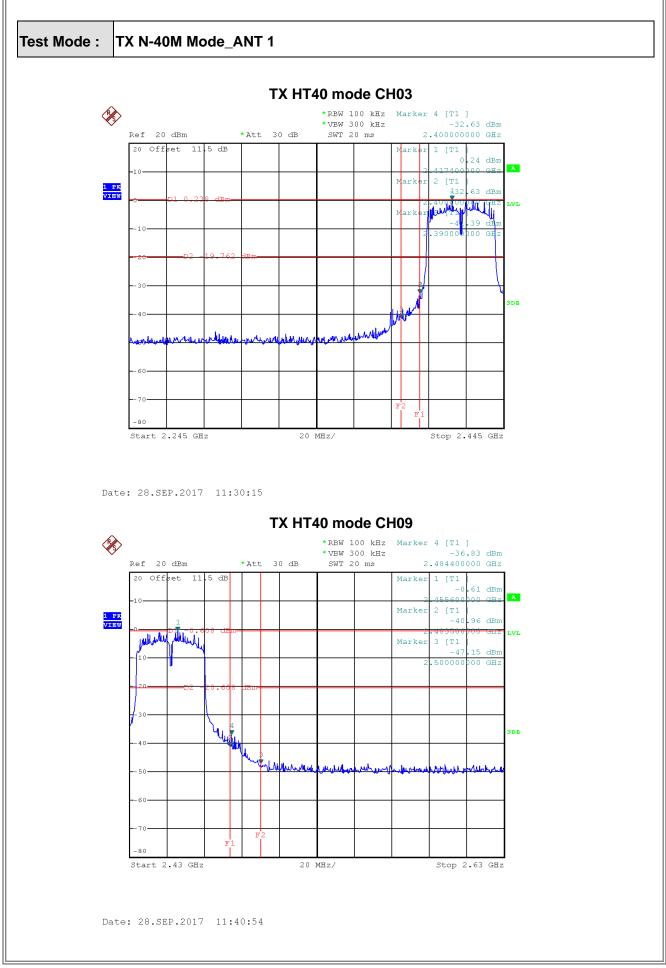




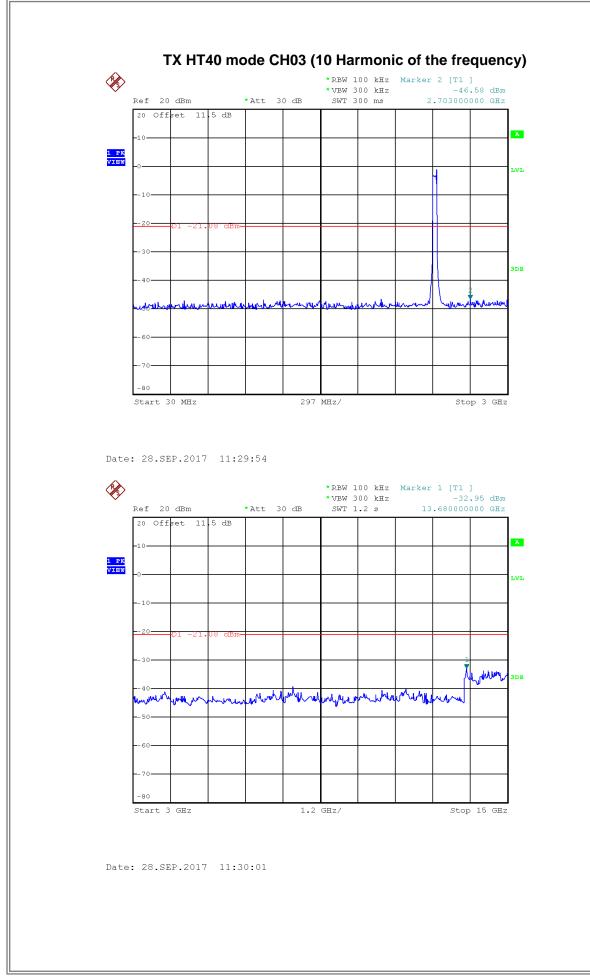




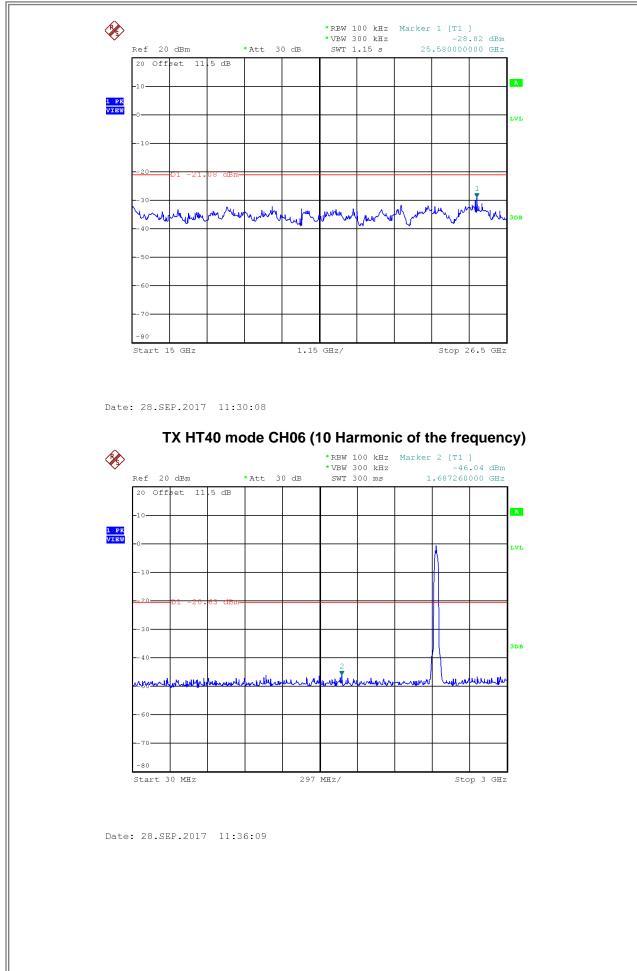




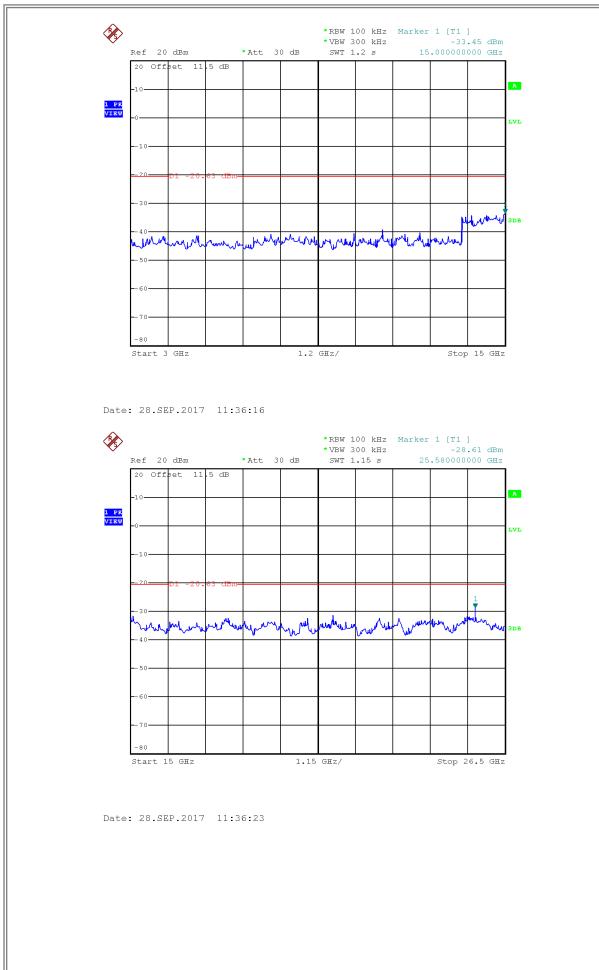




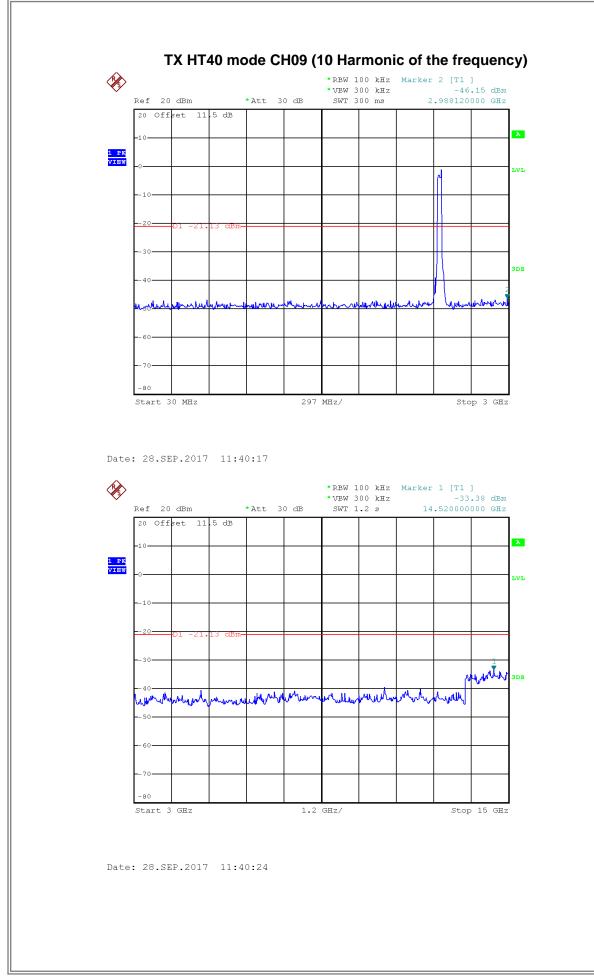




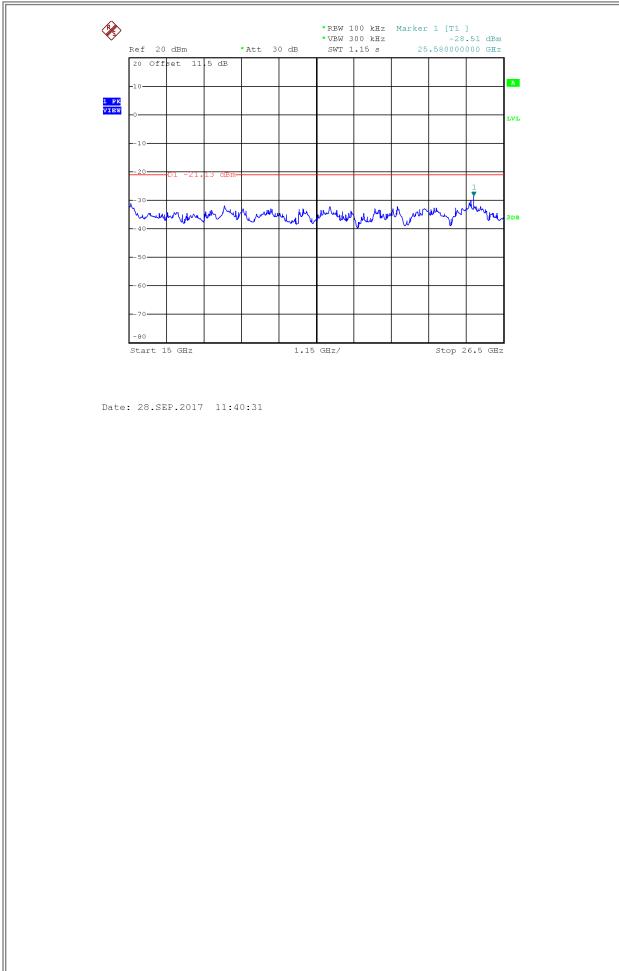






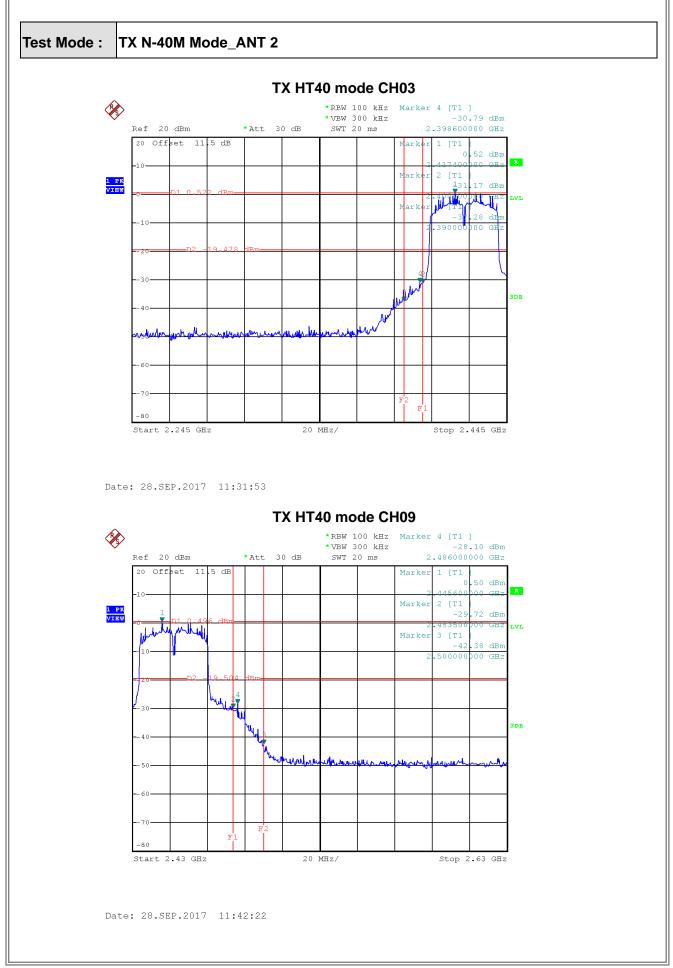




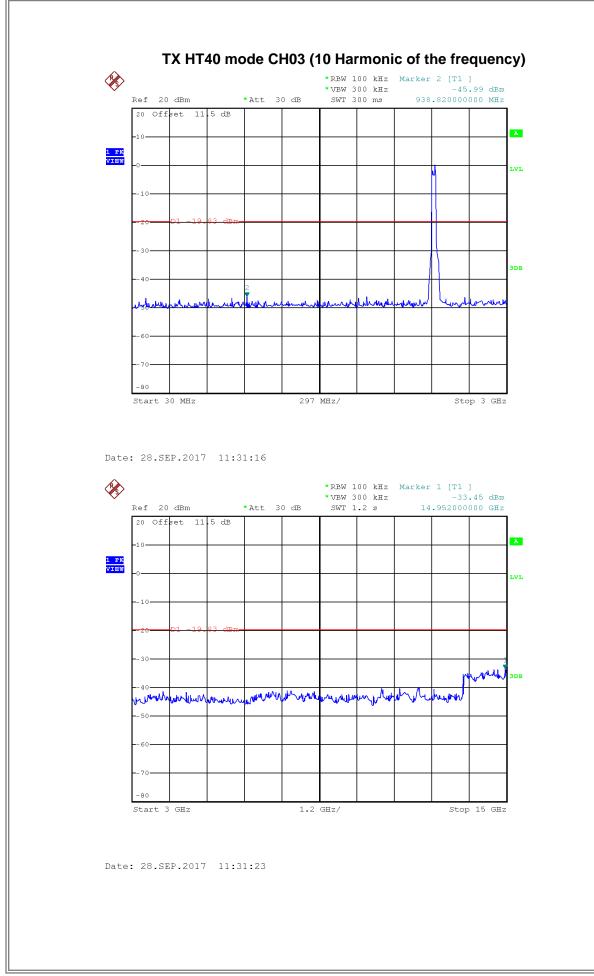






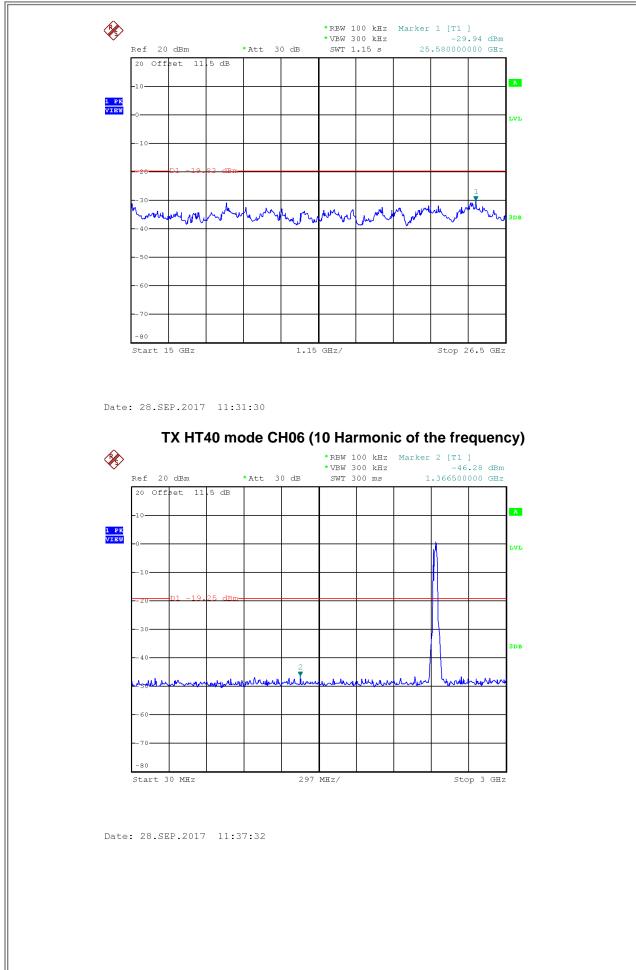






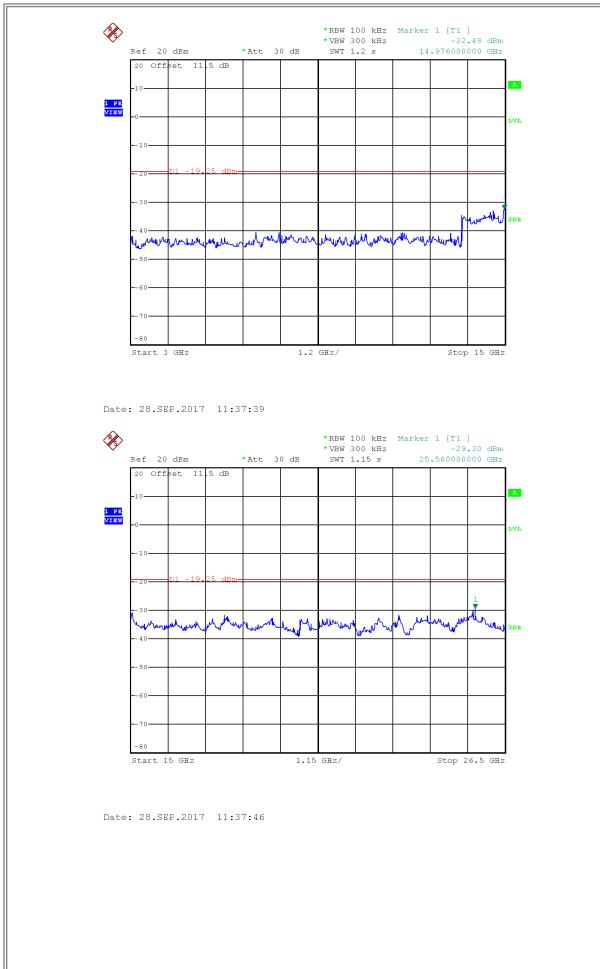
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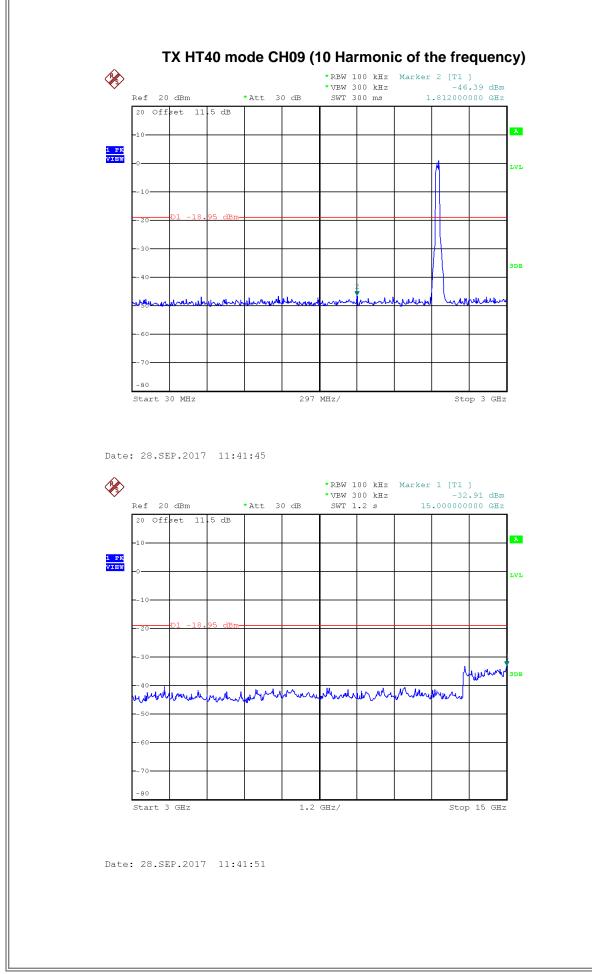


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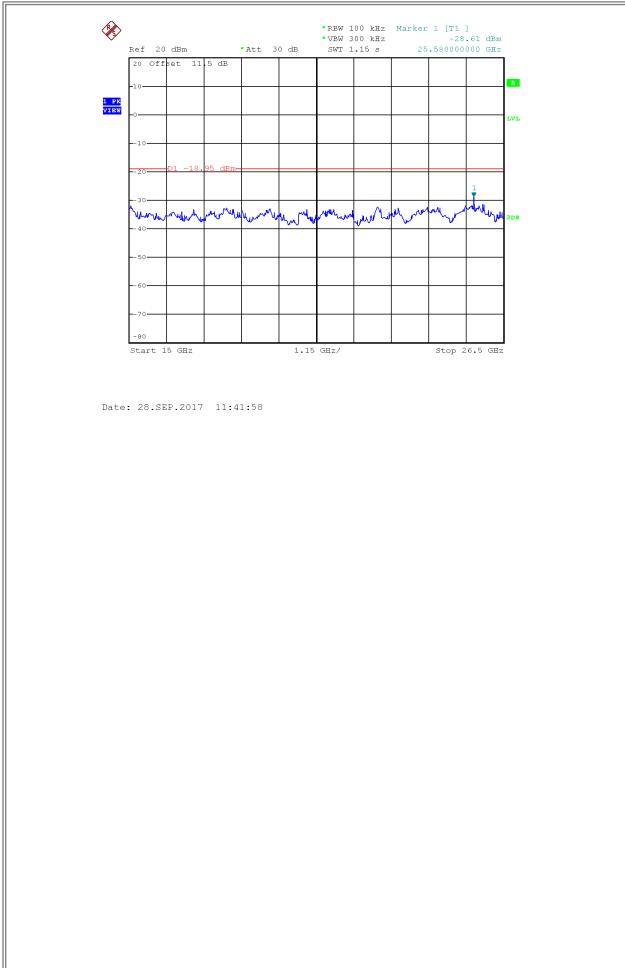






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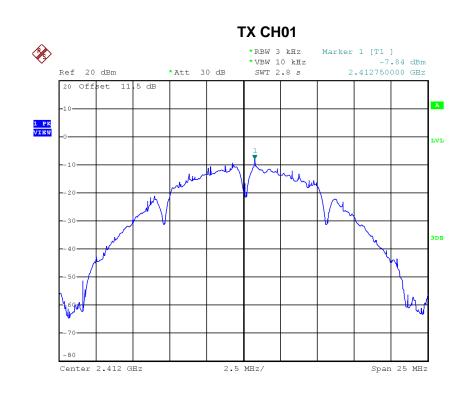




APPENDIX H - POWER SPECTRAL DENSITY

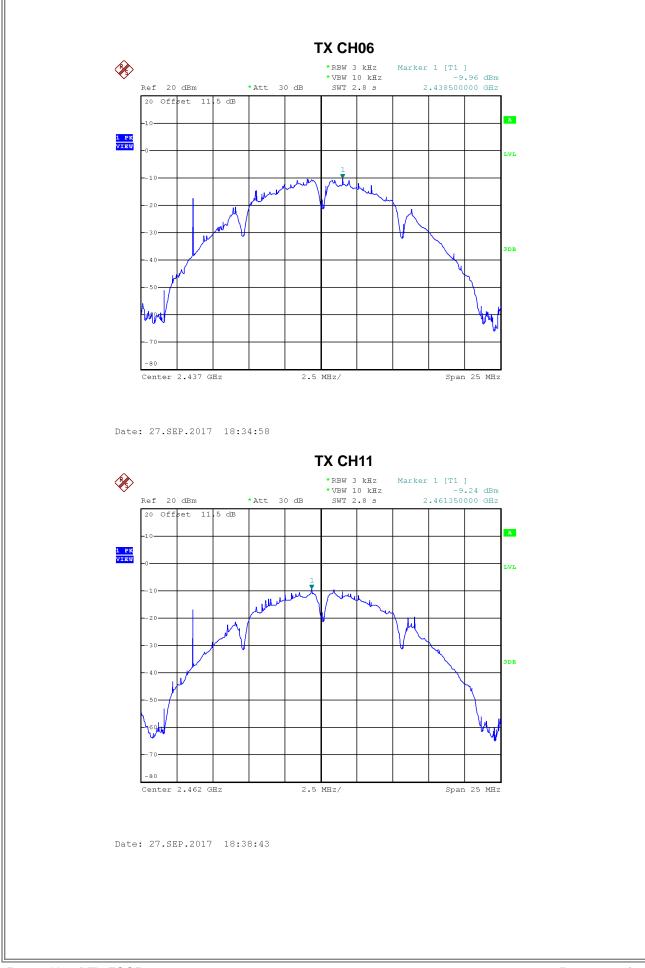


	Test Mode :TX B Mode_CH01/06/11_ANT 1					
Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result		
2412	-7.84	0.1644	5.96	Complies		
2437	-9.96	0.1009	5.96	Complies		
2462	-9.24	0.1191	5.96	Complies		



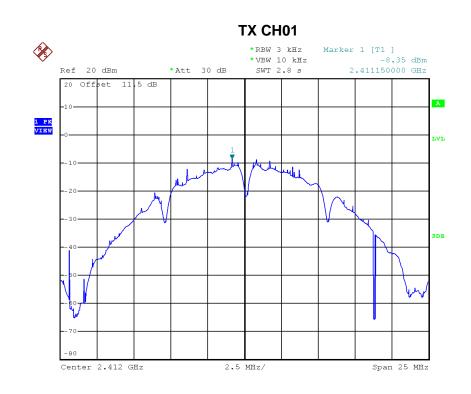
Date: 27.SEP.2017 18:31:01





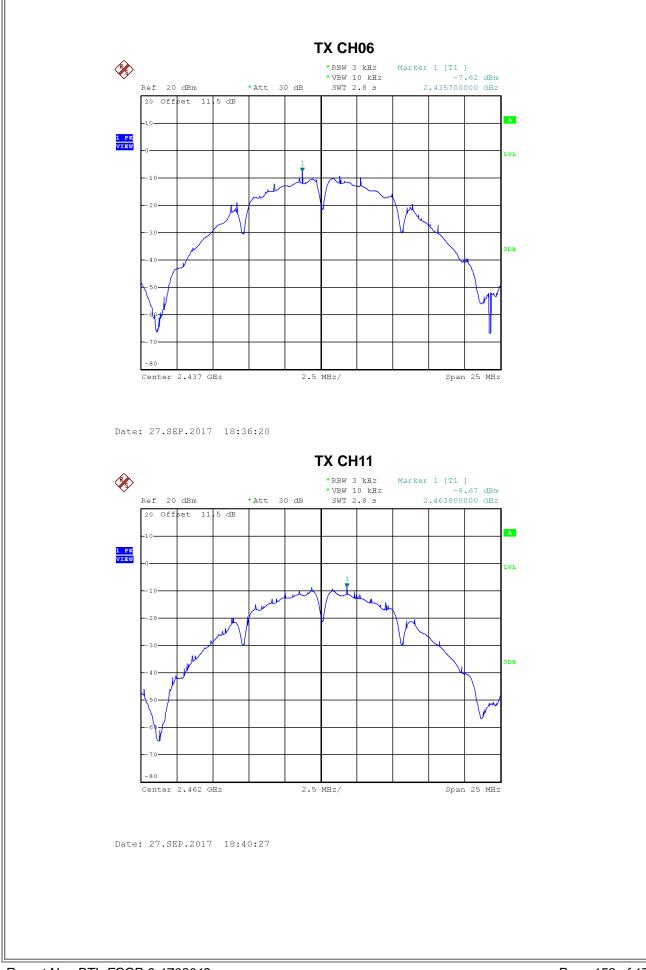


Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-8.35	0.1462	5.96	Complies
2437	-7.62	0.1730	5.96	Complies
2462	-8.67	0.1358	5.96	Complies



Date: 27.SEP.2017 18:32:29





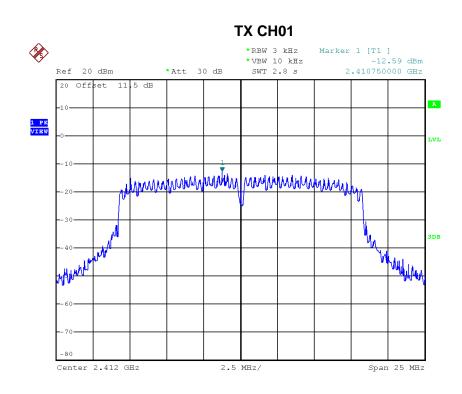


Test Mode :TX B Mode_CH01/06/11_Total

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-5.08	0.3106	5.96	Complies
2437	-5.62	0.2739	5.96	Complies
2462	-5.94	0.2549	5.96	Complies

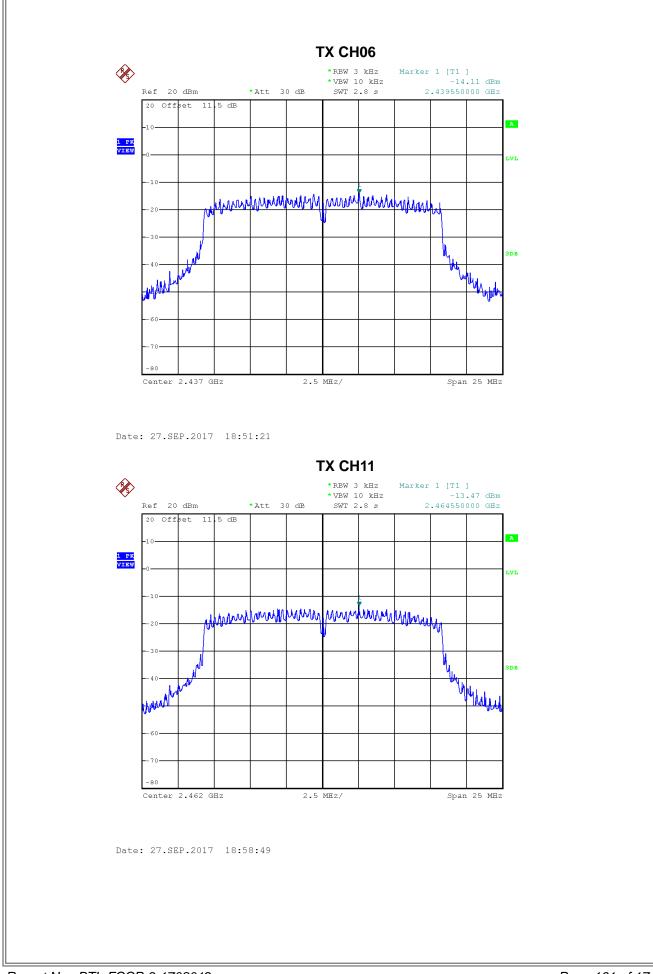


Test Mode :TX G Mode_CH01/06/11_ANT 1					
Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result	
2412	-12.59	0.0551	5.96	Complies	
2437	-14.11	0.0388	5.96	Complies	
2462	-13.47	0.0450	5.96	Complies	



Date: 27.SEP.2017 18:44:55

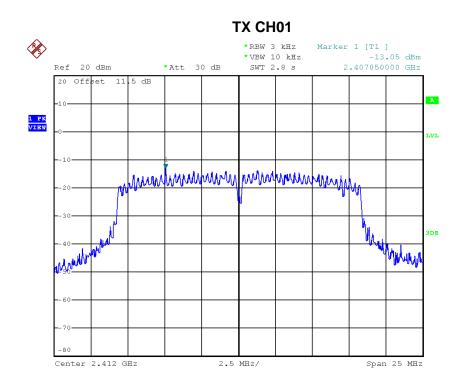






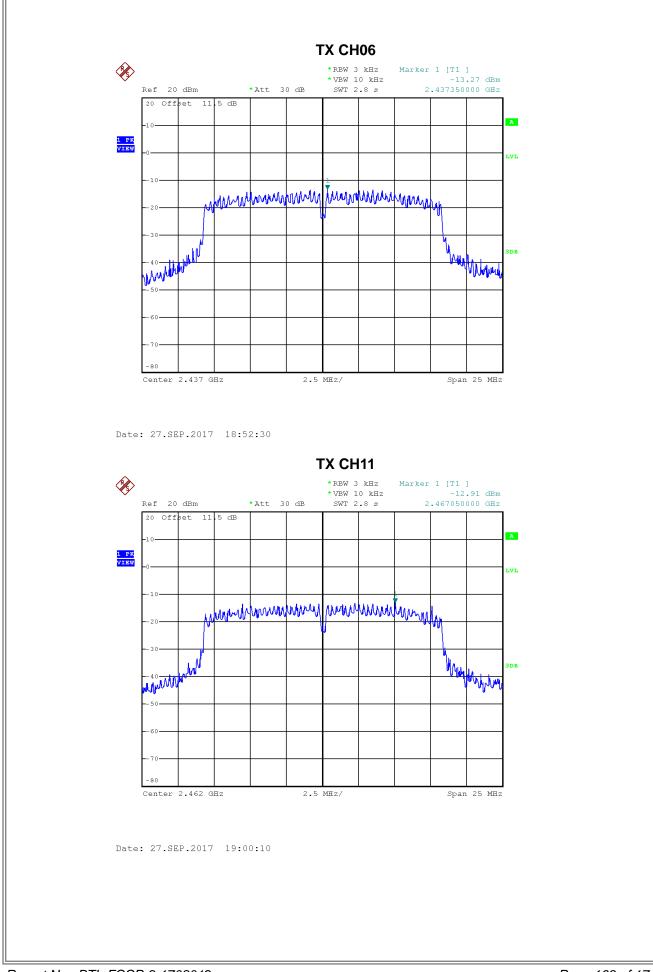
Test Mode :TX G Mode_CH01/06/11_ANT 2

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-13.05	0.0495	5.96	Complies
2437	-13.27	0.0471	5.96	Complies
2462	-12.91	0.0512	5.96	Complies



Date: 27.SEP.2017 18:47:56







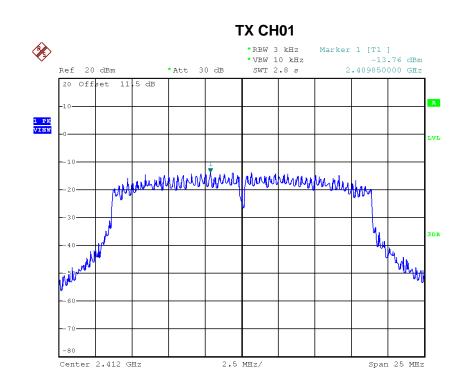
Test Mode :TX G Mode_CH01/06/11_Total

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-9.80	0.1046	5.96	Complies
2437	-10.66	0.0859	5.96	Complies
2462	-10.17	0.0962	5.96	Complies



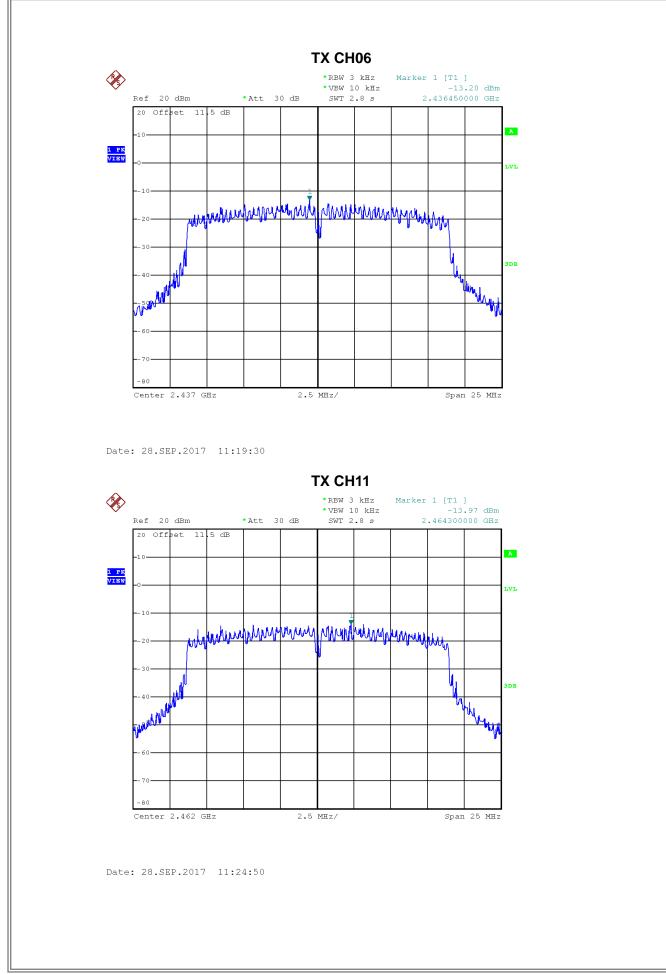
Test Mode : TX N-20M Mode_CH01/06/11_ANT 1

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-13.76	0.0421	5.96	Complies
2437	-13.20	0.0479	5.96	Complies
2462	-13.97	0.0401	5.96	Complies



Date: 28.SEP.2017 11:09:42

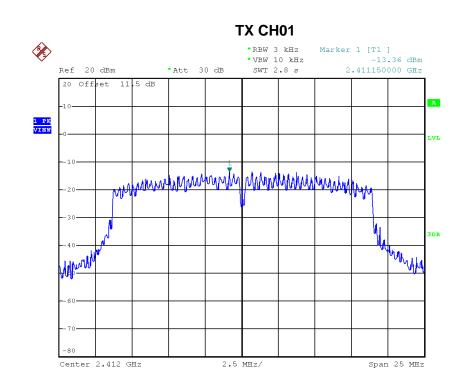






Test Mode : TX N-20M Mode_CH01/06/11_ANT 2

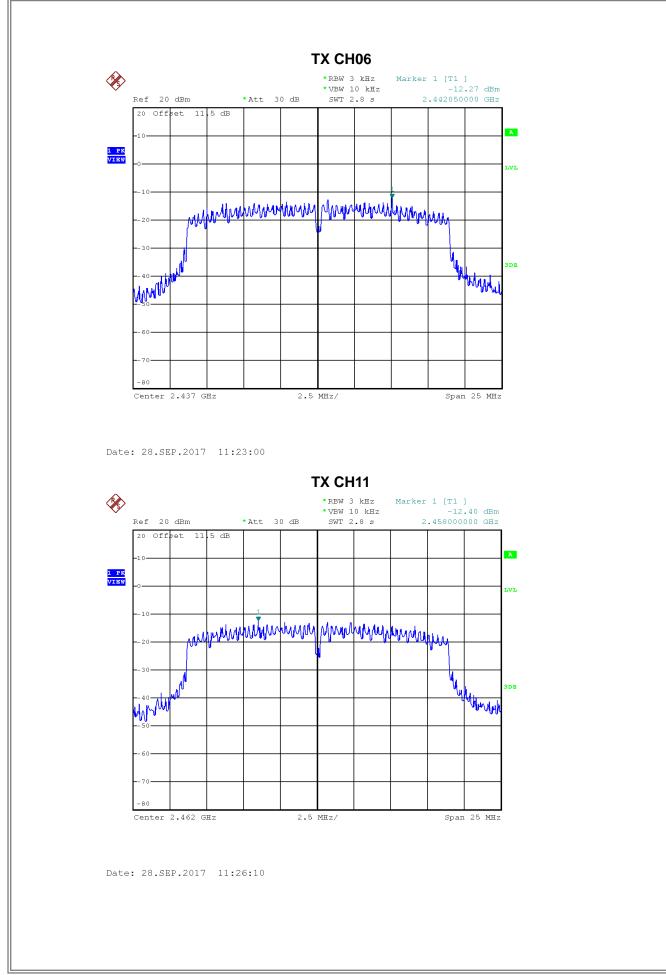
Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-13.36	0.0461	5.96	Complies
2437	-12.27	0.0593	5.96	Complies
2462	-12.40	0.0575	5.96	Complies



Date: 28.SEP.2017 11:17:57

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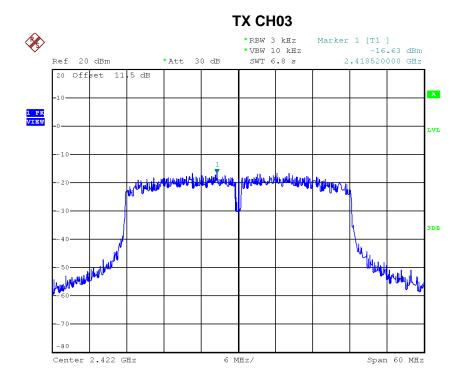


Test Mode : TX N-20M Mode_CH01/06/11_Total

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-10.55	0.0882	5.96	Complies
2437	-9.70	0.1072	5.96	Complies
2462	-10.11	0.0976	5.96	Complies

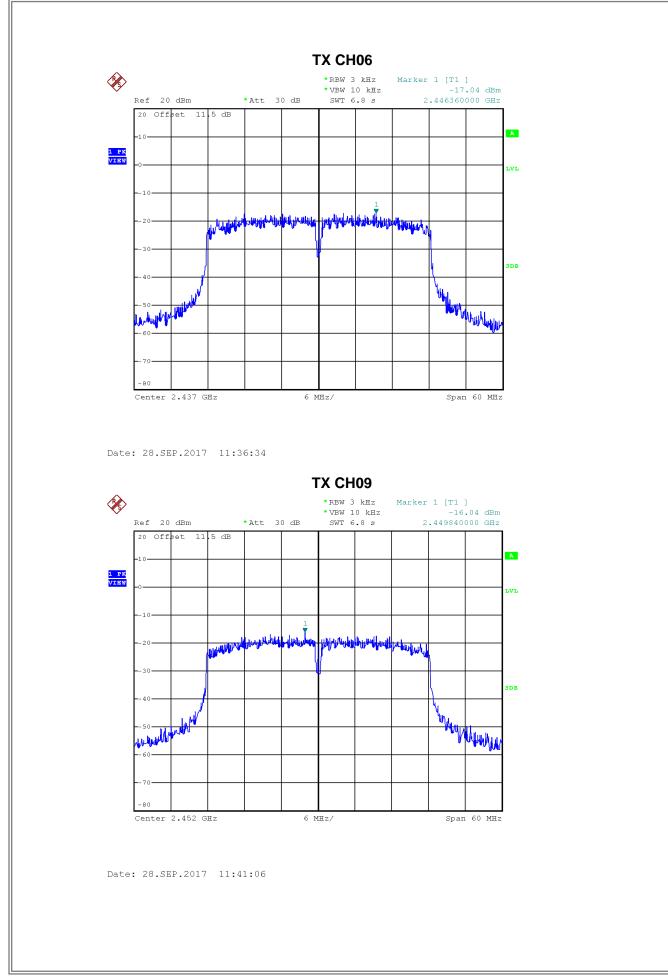


Test Mode : TX N-40M Mode_CH03/06/09_ANT 1					
Frequency	Power Density	Power Density	Max. Limit		
(MHz)	(dBm/3kHz)	(mW/3kHz)	(dBm/3kHz)	Result	
2422	-16.63	0.0217	5.96	Complies	
2437	-17.04	0.0198	5.96	Complies	
2452	-16.04	0.0249	5.96	Complies	



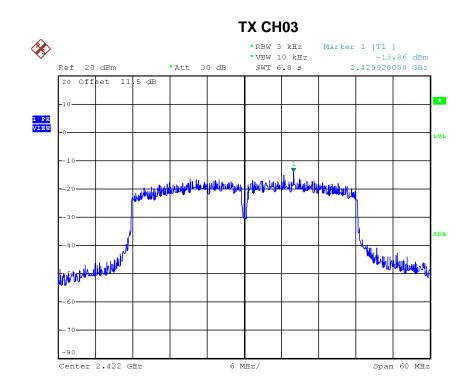
Date: 28.SEP.2017 11:30:26





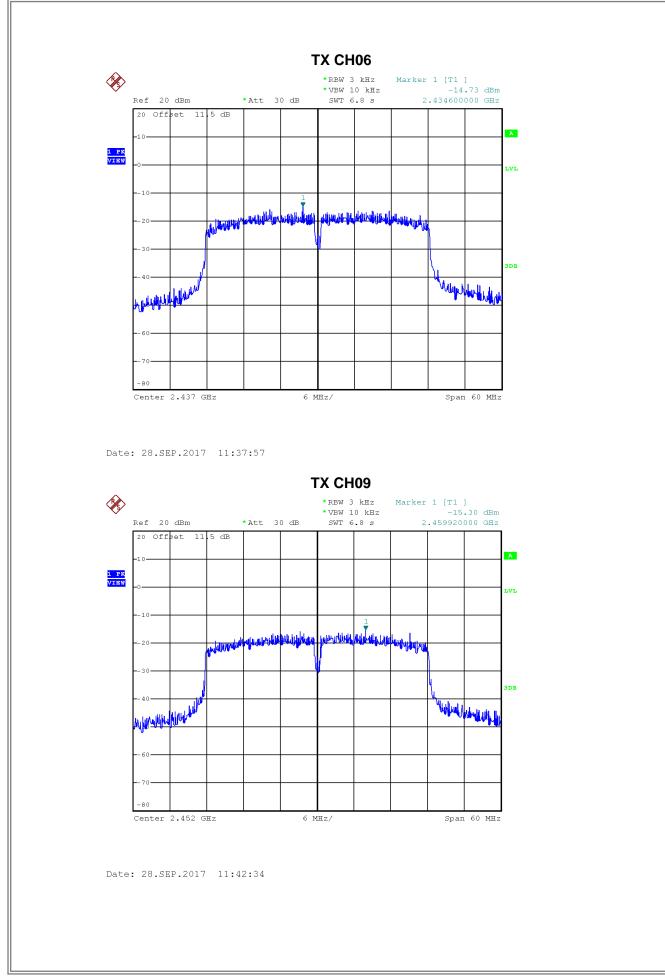


	Test Mode : TX N-40M Mode_CH03/06/09_ANT 2					
Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result		
2422	-13.86	0.0411	5.96	Complies		
2437	-14.73	0.0337	5.96	Complies		
2452	-15.30	0.0295	5.96	Complies		



Date: 28.SEP.2017 11:32:05







Test Mode : TX N-40M Mode_CH03/06/09_Total

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2422	-12.02	0.0628	5.96	Complies
2437	-12.72	0.0535	5.96	Complies
2452	-12.64	0.0544	5.96	Complies