

FCC Radio Test Report

FCC ID: NW71088

This report concerns (check one): ⊠Original Grant □Class II Change

Project No. : 1603075

Equipment: ION 4K, ION 4K SPORT DIGITAL CAMERA,

ZEUS 1.6 CAMERA

Model Name: 1088, 1088X, 1089, 1089X, 1090, 1090X, 1091,

1091X,1092, 1092X, 1093, 1093X, 1094, 1094X,

1095, 1095X (X=0~9 or A~Z)

Applicant: World Wide Licenses Limited

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Date of Receipt : Mar. 22, 2016

Date of Test : Mar. 22, 2016 ~ Mar. 31, 2016

Issued Date : Aug. 15, 2016

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Report No.: BTL-FCCP-3-1603075 Page 1 of 103



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Report No.: BTL-FCCP-3-1603075 Page 2 of 103



Table of Contents	Page
1 . CERTIFICATION	6
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	7
2.2 MEASUREMENT UNCERTAINTY	8
3. GENERAL INFORMATION	9
3.1 GENERAL DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	10
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING	11
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TES	STED 12
3.5 DESCRIPTION OF SUPPORT UNITS	12
4 . EMC EMISSION TEST	13
4.1 CONDUCTED EMISSION MEASUREMENT	13
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
4.1.2 TEST PROCEDURE 4.1.3 DEVIATION FROM TEST STANDARD	13 13
4.1.3 DEVIATION FROM TEST STANDARD 4.1.4 TEST SETUP	14
4.1.5 EUT OPERATING CONDITIONS	14
4.1.6 EUT TEST CONDITIONS	14
4.1.7 TEST RESULTS	14
4.2 RADIATED EMISSION MEASUREMENT 4.2.1 RADIATED EMISSION LIMITS	15 15
4.2.2 TEST PROCEDURE	16
4.2.3 DEVIATION FROM TEST STANDARD	16
4.2.4 TEST SETUP 4.2.5 EUT OPERATING CONDITIONS	17 18
4.2.6 EUT TEST CONDITIONS	18
4.2.7 TEST RESULTS (9KHZ TO 30MHZ)	19
4.2.8 TEST RESULTS (30MHZ TO 1000 MHZ)	19
4.2.9 TEST RESULTS (ABOVE 1000 MHZ)	19
5 . BANDWIDTH TEST	20
5.1 APPLIED PROCEDURES 5.1.1 TEST PROCEDURE	20 20
5.1.2 DEVIATION FROM STANDARD	20
5.1.3 TEST SETUP	20
5.1.4 EUT OPERATION CONDITIONS	20
5.1.5 EUT TEST CONDITIONS 5.1.6 TEST RESULTS	20 20
6. MAXIMUM PEAK CONDUCTED OUTPUT POWER TEST	21

Report No.: BTL-FCCP-3-1603075 Page 3 of 103



Table of Contents	Page
6.1 APPLIED PROCEDURES / LIMIT 6.1.1 TEST PROCEDURE 6.1.2 DEVIATION FROM STANDARD 6.1.3 TEST SETUP 6.1.4 EUT OPERATION CONDITIONS 6.1.5 EUT TEST CONDITIONS 6.1.6 TEST RESULTS	21 21 21 21 21 21 21
7 . ANTENNA CONDUCTED SPURIOUS EMISSION 7.1 APPLIED PROCEDURES / LIMIT 7.1.1 TEST PROCEDURE 7.1.2 DEVIATION FROM STANDARD 7.1.3 TEST SETUP 7.1.4 EUT OPERATION CONDITIONS 7.1.5 EUT TEST CONDITIONS 7.1.6 TEST RESULTS	22 22 22 22 22 22 22 22 22
8 . POWER SPECTRAL DENSITY TEST 8.1 APPLIED PROCEDURES / LIMIT 8.1.1 TEST PROCEDURE 8.1.2 DEVIATION FROM STANDARD 8.1.3 TEST SETUP 8.1.4 EUT OPERATION CONDITIONS 8.1.5 EUT TEST CONDITIONS 8.1.6 TEST RESULTS	23 23 23 23 23 23 23 23 23
9 . MEASUREMENT INSTRUMENTS LIST 10 . EUT TEST PHOTO	24 26
ATTACHMENT A - CONDUCTED EMISSION ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ) ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)	30 33 38
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ) ATTACHMENT E - BANDWIDTH ATTACHMENT F - MAXIMUM PEAK CONDUCTED OUTPUT POWER	41 78 85
ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION ATTACHMENT H - POWER SPECTRAL DENSITY	87 97

Report No.: BTL-FCCP-3-1603075 Page 4 of 103



REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-3-1603075	Original Issue.	Aug. 15, 2016

Report No.: BTL-FCCP-3-1603075 Page 5 of 103



1. CERTIFICATION

Equipment : ION 4K, ION 4K SPORT DIGITAL CAMERA, ZEUS 1.6 CAMERA

Brand Name : ION

Model Name : 1088, 1088X, 1089, 1089X, 1090, 1090X, 1091, 1091X,1092, 1092X, 1093,

1093X, 1094, 1094X, 1095, 1095X (X=0~9 or A~Z)

Applicant World Wide Licenses Limited Date of Test : Mar. 22, 2016 ~ Mar. 31, 2016

Test Sample: Engineering Sample

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-3-1603075) 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).

Report No.: BTL-FCCP-3-1603075 Page 6 of 103



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				
15.209/15.205	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:949005; FCC DN:TW1082)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Below 1GHz):

CB11: (VCCI RN: R-4260; FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088) No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Above 1GHz):

CB11: (VCCI RN: G-868; FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088) No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Report No.: BTL-FCCP-3-1603075 Page 7 of 103



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

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
C05	CISPR	150 kHz~30MHz	2.04

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
CB11	CISPR	9kHz ~ 150kHz	4.00
(3m)	CISPR	150kHz ~ 30MHz	4.00

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB11	CISPR	30 MHz ~ 200 MHz	V	3.06
		30 MHz ~ 200 MHz	Н	2.58
(3m)	CISER	200 MHz ~ 1, 000 MHz	V	3.50
		200 MHz ~ 1, 000 MHz	Н	3.10

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB11	CISPR	1GHz ~ 6GHz	V	4.14
(3m)	CISER	1GHz ~ 6GHz	Н	4.14

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB11	CISPR	6GHz ~ 18GHz	V	5.34
(3m)	CISER	6GHz ~ 18GHz	Н	5.34

Test Site	Method	Measurement Frequency Range	U,(dB)
CB08	CISPR	18 ~ 26.5 GHz	4.66
(3m)	CIOPK	26.5 ~ 40 GHz	4.74

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

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} .

Report No.: BTL-FCCP-3-1603075 Page 8 of 103



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	ION 4K, ION 4K SPORT DIGITAL CAMERA, ZEUS 1.6 CAMERA				
Brand Name	ION	ION			
Model Name	1088, 1088X, 1089, 1089X, 1090, 1090X, 1091, 1091X,1092, 1092X, 1093, 1093X, 1094, 1094X, 1095, 1095X (X=0~9 or A~Z)				
Model Difference	Different model distribute	to different area.			
	Operation Frequency 2412~2462 MHz				
Product Description	Modulation Technology	802.11b:DSSS 802.11g:OFDM 802.11n:OFDM			
	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 65 Mbps			
	Output Power (Max.)	802.11b: 12.81 dBm 802.11g: 21.03 dBm 802.11n(20MHz): 21.32 dBm			
Power Source	#1 DC Voltage supplied from USB power source. #2 Supplied from battery. Model: FT853548P				
Power Rating	#1 I/P: DC5.0~5.5V/1A #2 DC 3.7V 5.55Wh 1500mAh				

Note:

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

2. Channel List:

	802.11b, 802.11g, 802.11n(20MHz)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	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	. Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	Yageo	ANT3216LL11R2 400A	Chip	N/A	-1.0

Report No.: BTL-FCCP-3-1603075 Page 9 of 103



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 Mode

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 4	TX Mode	

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	

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 (6.5Mbps)
 - For radiated emission tests, the highest output powers were set for final test.
- (3) For radiated below 1G test, the 802.11b 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%.

Report No.: BTL-FCCP-3-1603075 Page 10 of 103



3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

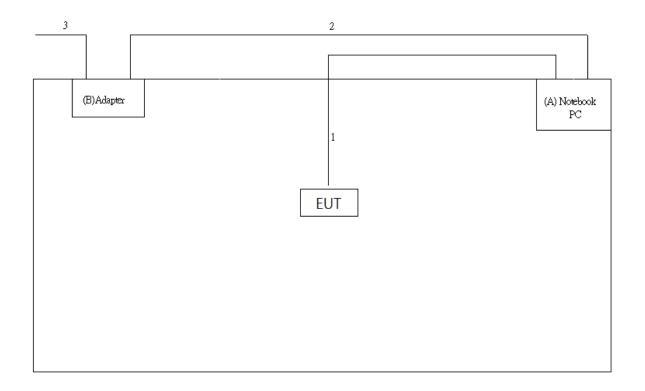
During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Test software version	Amba FW Debug 01.03.20140804.OD		
Frequency (MHz)	2412	2437	2462
802.11b	А	Α	Α
802.11g	Α	Α	Α
802.11n (20MHz)	A	A	A

Report No.: BTL-FCCP-3-1603075 Page 11 of 103



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.
Α	Notebook PC	DELL	E5430	DOC	25285457557
В	Adapter	Dell Inc	HA65NS5-00	DOC	A065R039L

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.6m	USB Cable
2	NO	NO	1.8m	Power Cable
3	NO	NO	1.8m	Power Cable

Report No.: BTL-FCCP-3-1603075 Page 12 of 103



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 Limit (dBµV)		
	Quasi-peak	Average	
0.15 -0.5	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.

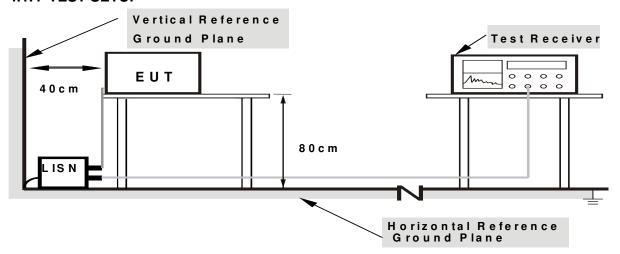
4.1.3 DEVIATION FROM TEST STANDARD

No deviation

Report No.: BTL-FCCP-3-1603075 Page 13 of 103



4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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 Attachment A.

Report No.: BTL-FCCP-3-1603075 Page 14 of 103



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)		
r requericy (Wiriz)	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

Report No.: BTL-FCCP-3-1603075 Page 15 of 103



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 0.8 m or 1.5 m, 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

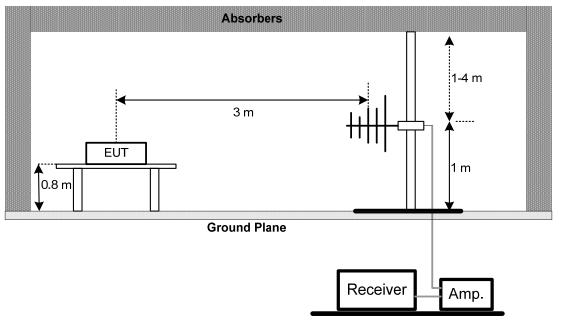
No deviation

Report No.: BTL-FCCP-3-1603075 Page 16 of 103

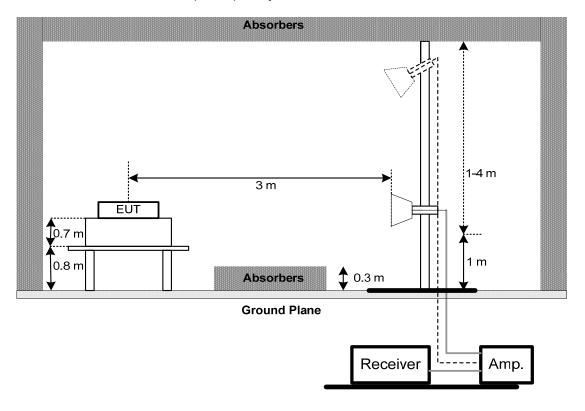


4.2.4 TEST SETUP

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



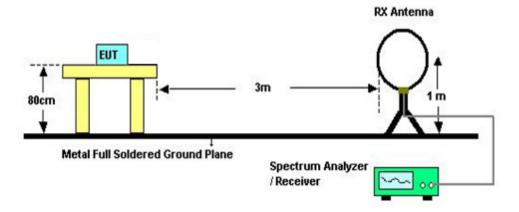
(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



Report No.: BTL-FCCP-3-1603075 Page 17 of 103



(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: 45% Test Voltage: AC 120V/60Hz

Report No.: BTL-FCCP-3-1603075 Page 18 of 103



4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Attachment 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 Attachment C.

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Attachment D.

Remark:

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

Report No.: BTL-FCCP-3-1603075 Page 19 of 103



5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES

FCC Part15 (15.247) , Subpart C					
Section Test Item 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: 60% Test Voltage: AC 120V/60Hz

5.1.6 TEST RESULTS

Please refer to the Attachment E.

Report No.: BTL-FCCP-3-1603075 Page 20 of 103



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 v03r05.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP

EUT	Power Meter
	1 OWEI WELL

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: 60% Test Voltage: AC 120V/60Hz

6.1.6 TEST RESULTS

Please refer to the Attachment F.

Report No.: BTL-FCCP-3-1603075 Page 21 of 103



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

EUT	SPECTRUM
	ANALYZER

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: 60% Test Voltage: AC 120V/60Hz

7.1.6 TEST RESULTS

Please refer to the Attachment G.

Report No.: BTL-FCCP-3-1603075 Page 22 of 103



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: 60% Test Voltage: AC 120V/60Hz

8.1.6 TEST RESULTS

Please refer to the Attachment H.

Report No.: BTL-FCCP-3-1603075 Page 23 of 103



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. 26, 2017		
2	Test Cable	TIMES	CFD300-NL	C02	Jun. 13, 2017		
3	EMI Test Receiver	R&S	ESR7	101433	Dec. 09, 2016		
4	Power Dividers	HP	11636A	8103	May 03, 2017		
5	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	Log-Bicon Antenna	Schwarzbeck	VULB9168-35 2	9168-352	Jul. 29, 2017	
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Apr. 19, 2017	
3	Horn Antenna	Schwarzbeck	BBHA 9120	9120D-1333	May 19, 2017	
4	Pre-Amplifier	Anritsu	MH648A	M92649	Jun. 15, 2017	
5	Pre-Amplifier	Agilent	8449B	3008A01714	Apr. 13, 2017	
6	Test Cable	LMR	LMR-400	01(10M)	May 11, 2017	
7	Test Cable	LMR	LMR-400	01(3M)	May 11, 2017	
8	Test Cable	Harbour industries	27478LL142	1M	May 11, 2017	
9	Test Cable	Harbour industries	27478LL142	3M	May 11, 2017	
10	Test Cable	AISI	S104-SMAP-1	8M	May 11, 2017	
11	Spectrum Analyzer	Agilent	N9020A	MY51160196	Aug. 01, 2017	
12	EMI Test Receiver	R&S	ESCI	100080	May 12, 2017	
13	Measurement Software	Farad	EZ_EMC (Version NB-03A)	N/A	N/A	

Report No.: BTL-FCCP-3-1603075 Page 24 of 103



	6dB Bandwidth Measurement					
Item	Item Kind of Equipment Manufacturer Type No. Serial No. Calibrated until					
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017	

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2487A	6K00004714	May 18, 2017
2	Power Meter Sensor	Anritsu	MA2491A	034138	May 17, 2017

	Antenna Conducted Spurious Emission Measurement							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017			

	Power Spectral Density Measurement							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2017			

Remark: "N/A" denotes no model name, serial no. or calibration specified. All calibration period of equipment list is one year.

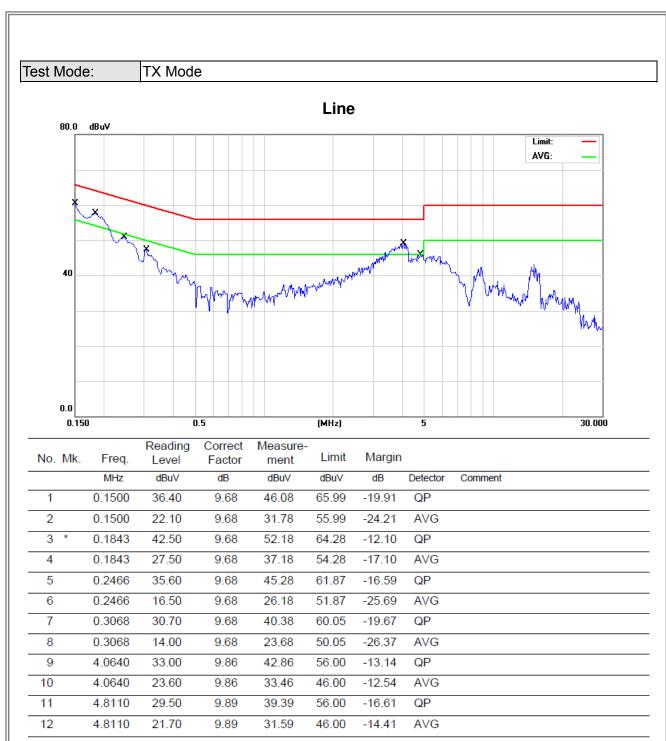
Report No.: BTL-FCCP-3-1603075 Page 25 of 103



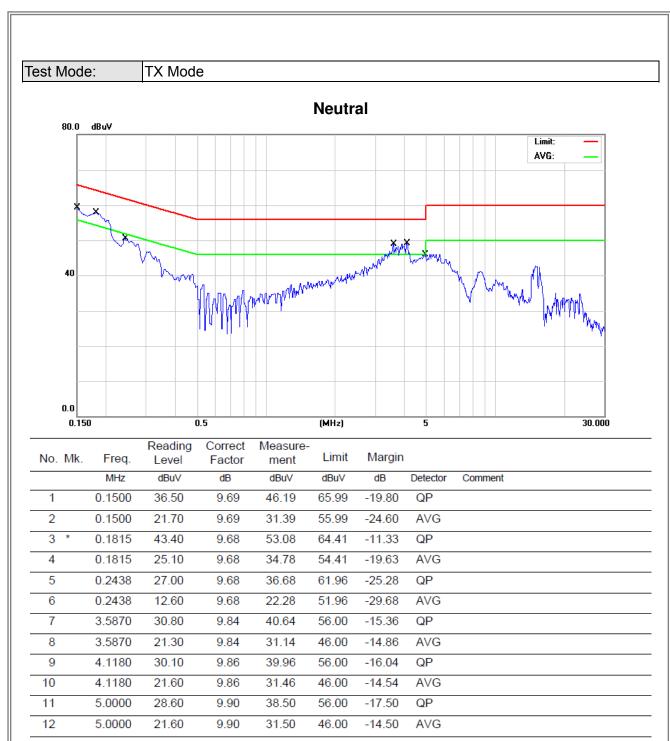
ATTACHMENT A - CONDUCTED EMISSION	

Report No.: BTL-FCCP-3-1603075 Page 30 of 103





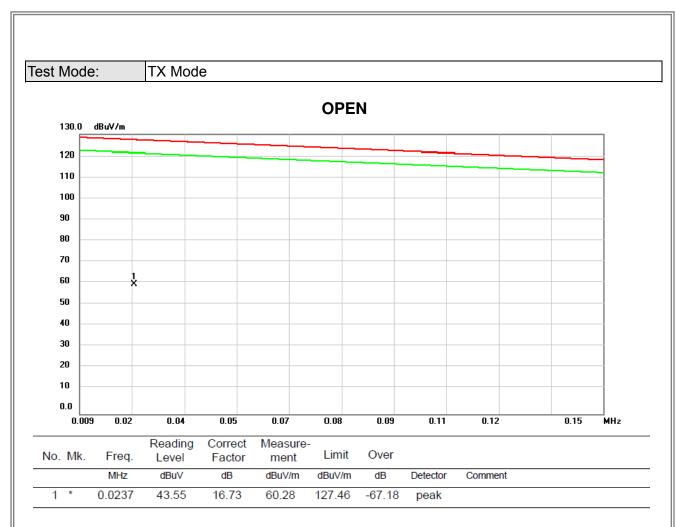






Report No.: BTL-FCCP-3-1603075 Page 33 of 103





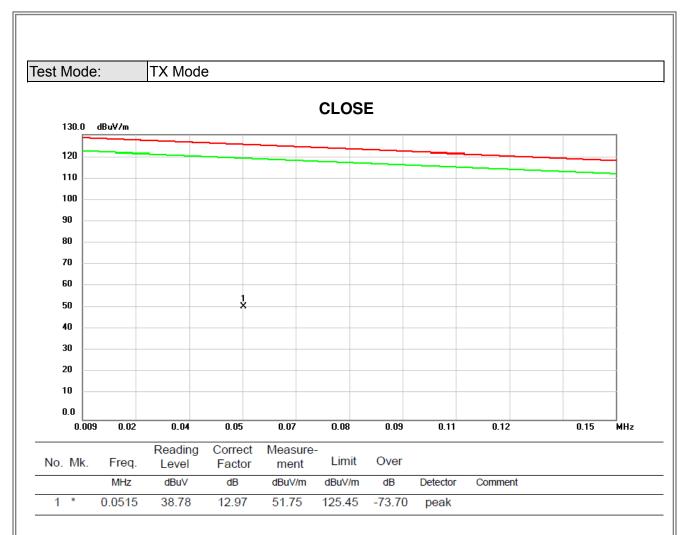
Report No.: BTL-FCCP-3-1603075 Page 34 of 103





Report No.: BTL-FCCP-3-1603075 Page 35 of 103





Report No.: BTL-FCCP-3-1603075 Page 36 of 103





Report No.: BTL-FCCP-3-1603075 Page 37 of 103



ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MH	 Z)

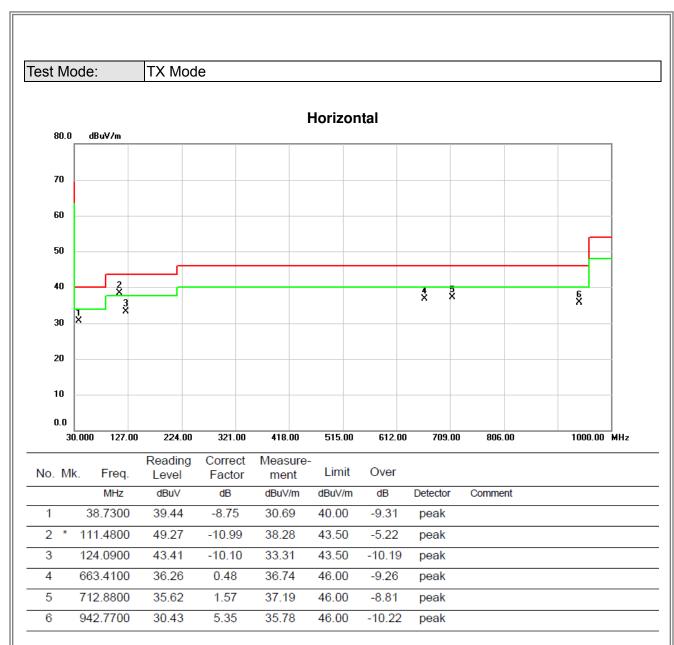
Report No.: BTL-FCCP-3-1603075 Page 38 of 103





Report No.: BTL-FCCP-3-1603075 Page 39 of 103





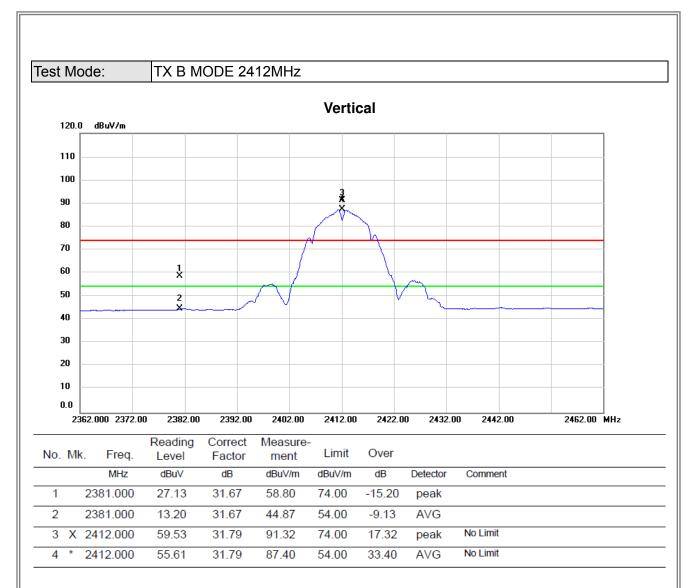
Report No.: BTL-FCCP-3-1603075 Page 40 of 103



ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

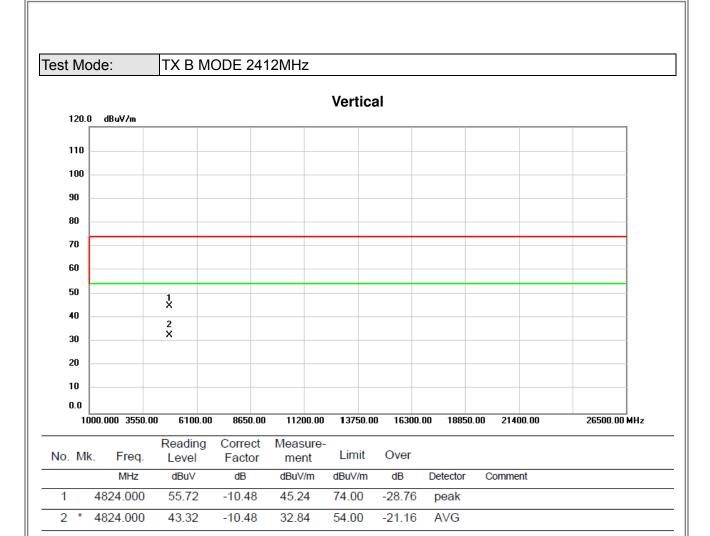
Report No.: BTL-FCCP-3-1603075 Page 41 of 103





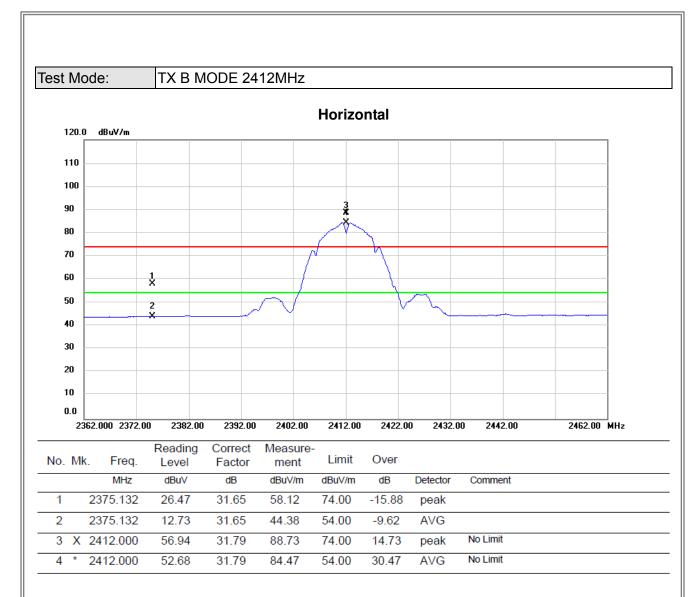
Report No.: BTL-FCCP-3-1603075 Page 42 of 103





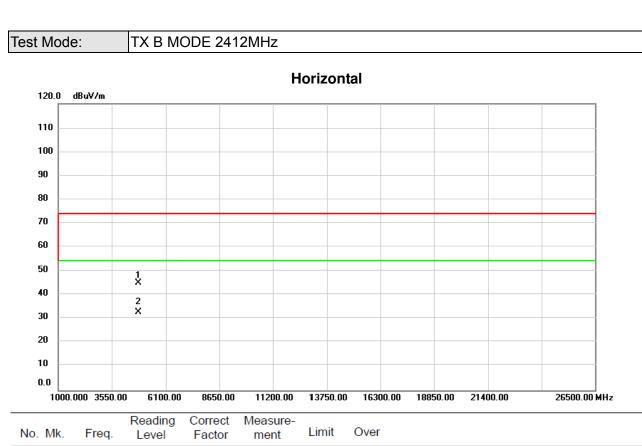
Report No.: BTL-FCCP-3-1603075 Page 43 of 103





Report No.: BTL-FCCP-3-1603075 Page 44 of 103

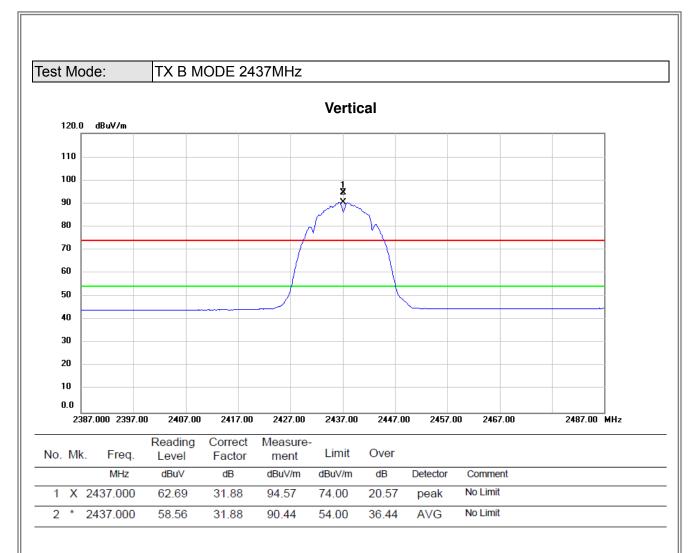




N	0.	Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1		4824.000	55.59	-10.48	45.11	74.00	-28.89	peak	
	2	*	4824.000	43.28	-10.48	32.80	54.00	-21.20	AVG	

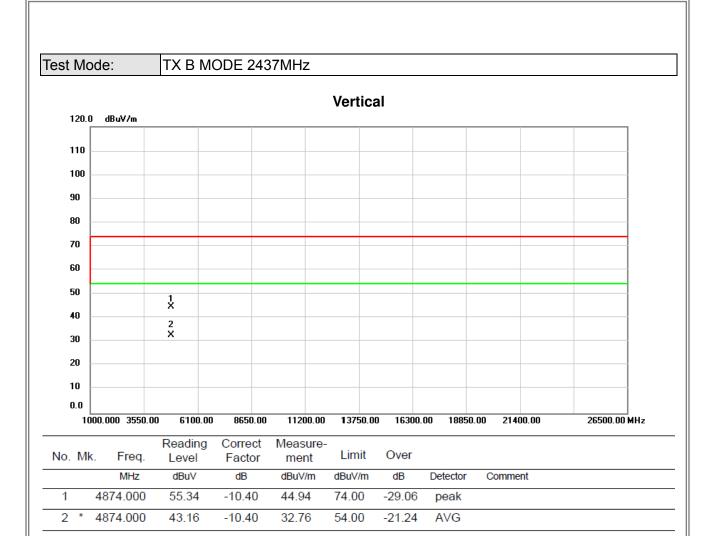
Report No.: BTL-FCCP-3-1603075 Page 45 of 103





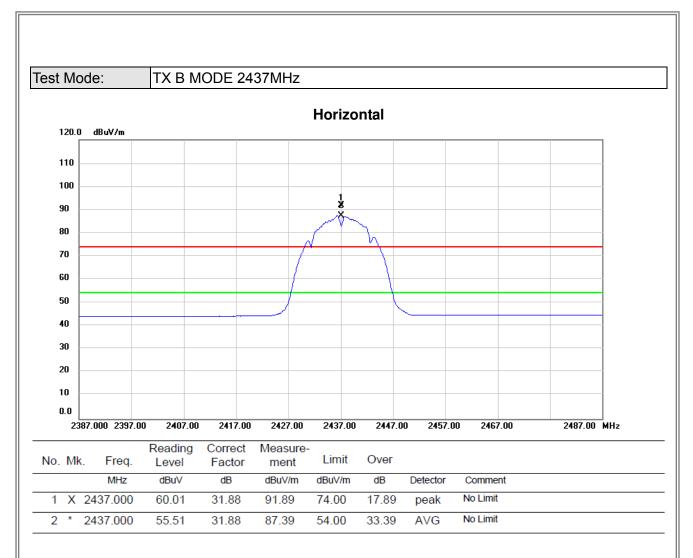
Report No.: BTL-FCCP-3-1603075 Page 46 of 103





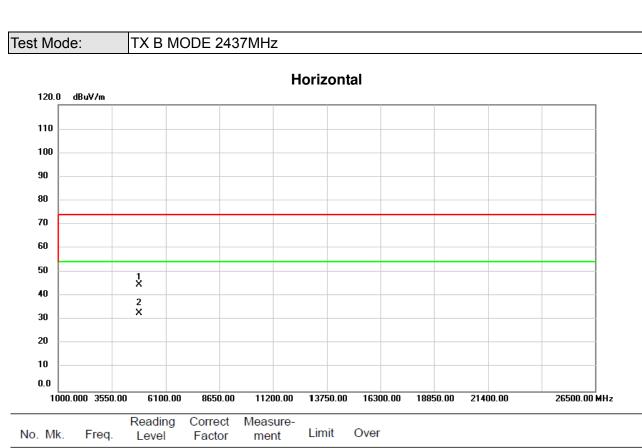
Report No.: BTL-FCCP-3-1603075 Page 47 of 103





Report No.: BTL-FCCP-3-1603075 Page 48 of 103

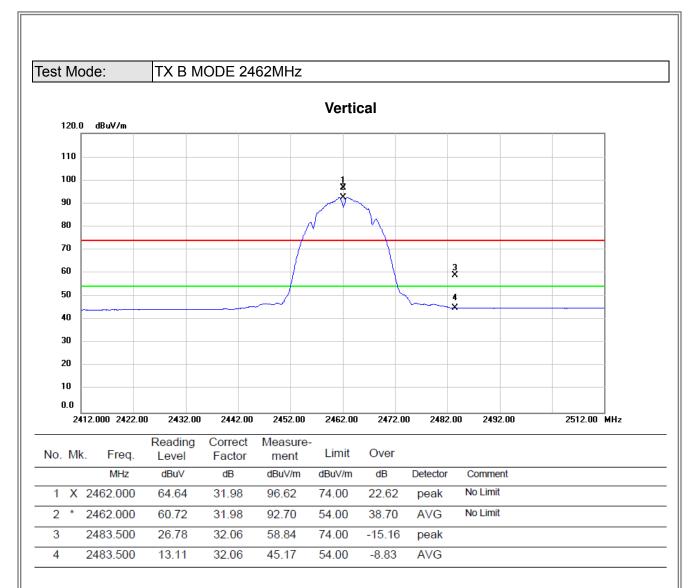




No.	Mk	. Freq.	Reading Level		Measure- ment		Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.000	55.26	-10.40	44.86	74.00	-29.14	peak	
2	*	4874.000	43.12	-10.40	32.72	54.00	-21.28	AVG	

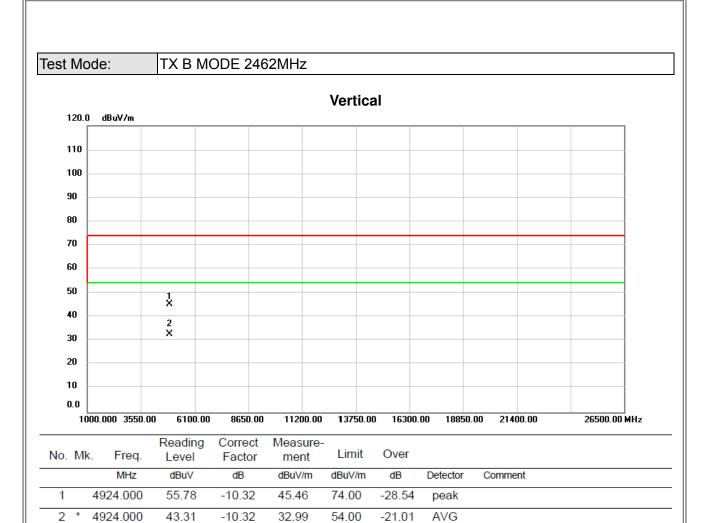
Report No.: BTL-FCCP-3-1603075 Page 49 of 103





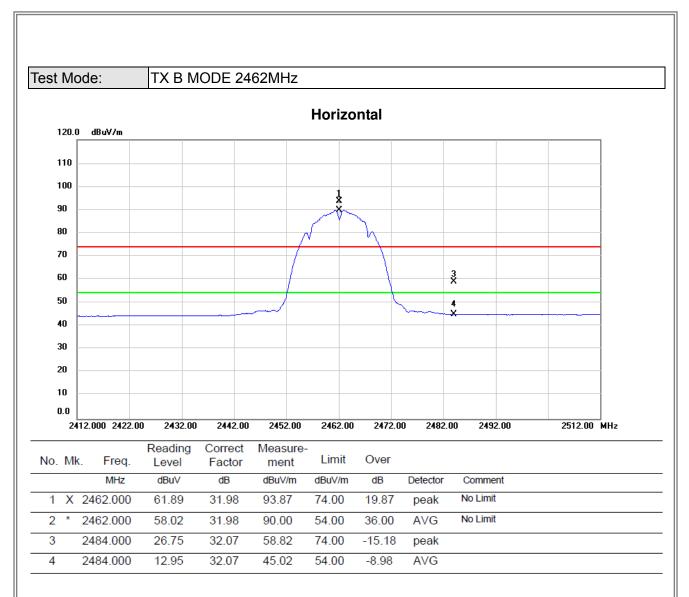
Report No.: BTL-FCCP-3-1603075 Page 50 of 103





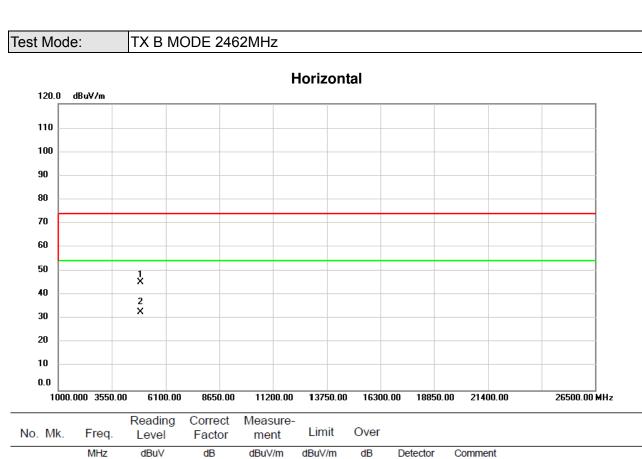
Report No.: BTL-FCCP-3-1603075 Page 51 of 103





Report No.: BTL-FCCP-3-1603075 Page 52 of 103

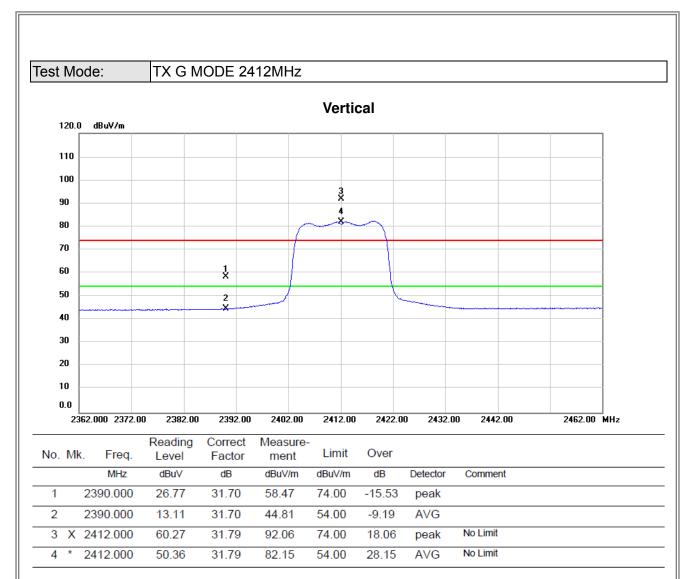




	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over		
-			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
_	1		4924.000	55.71	-10.32	45.39	74.00	-28.61	peak	
	2	*	4924.000	43.31	-10.32	32.99	54.00	-21.01	AVG	

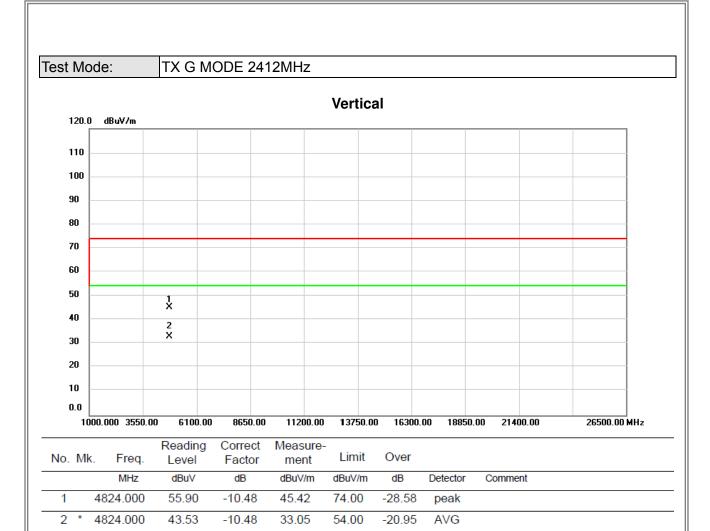
Report No.: BTL-FCCP-3-1603075 Page 53 of 103





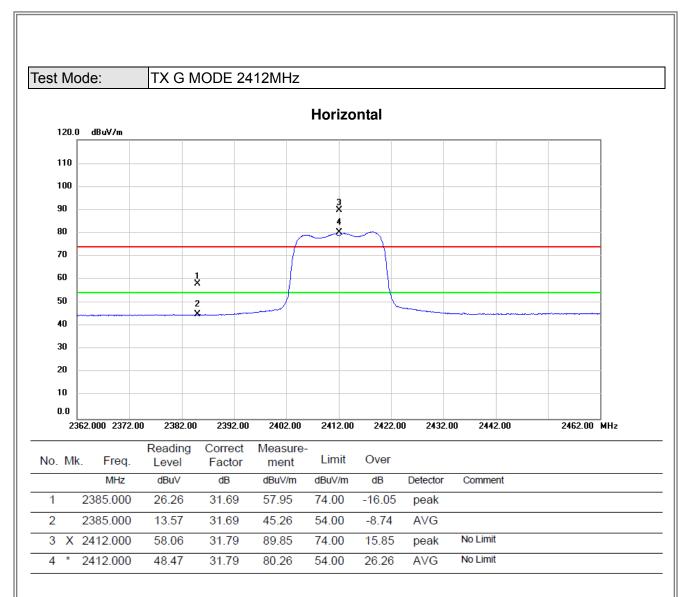
Report No.: BTL-FCCP-3-1603075 Page 54 of 103





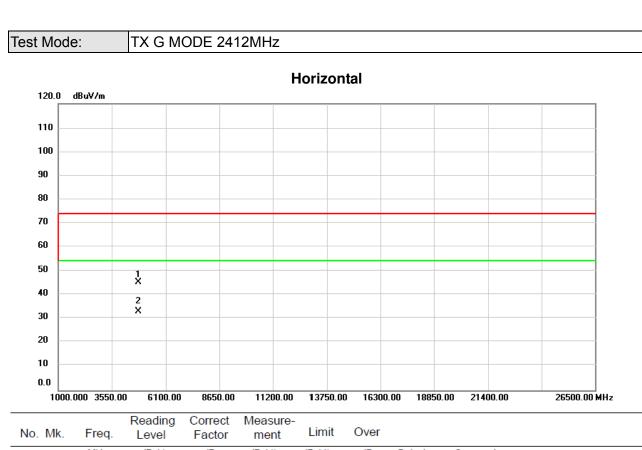
Report No.: BTL-FCCP-3-1603075 Page 55 of 103





Report No.: BTL-FCCP-3-1603075 Page 56 of 103

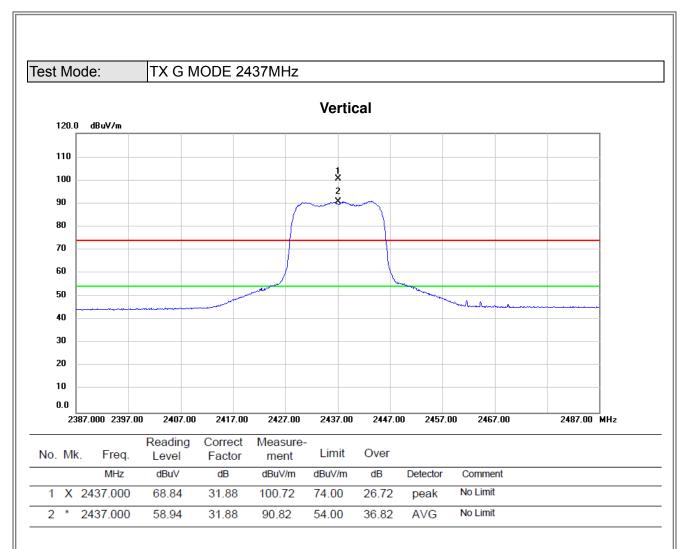




N	0.	M	k. Fre	eq.	Reading Level		Measure- ment	Limit	Over				
			MH	lz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment		
	1		4824.0	00	55.84	-10.48	45.36	74.00	-28.64	peak			
	2	*	4824.0	00	43.51	-10.48	33.03	54.00	-20.97	AVG			

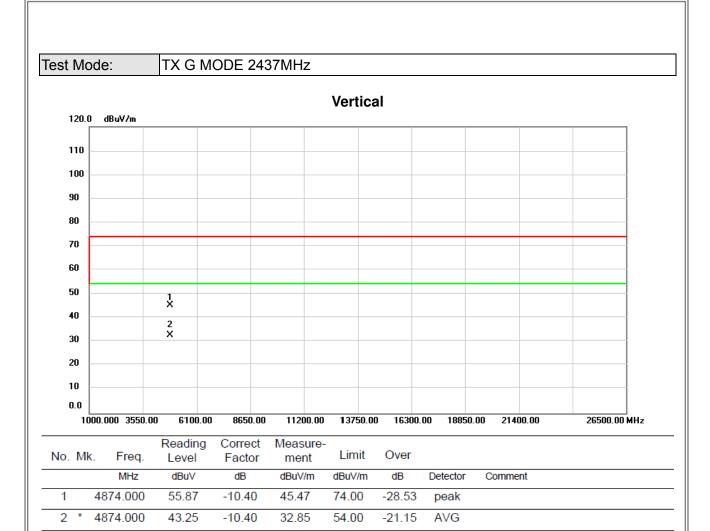
Report No.: BTL-FCCP-3-1603075 Page 57 of 103





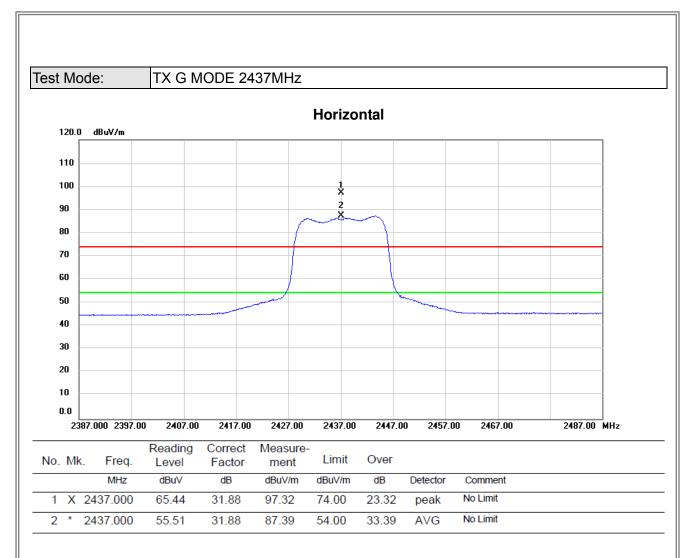
Report No.: BTL-FCCP-3-1603075 Page 58 of 103





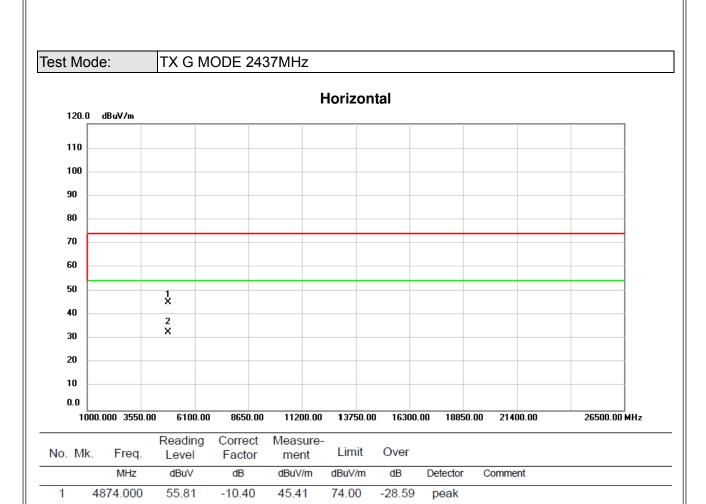
Report No.: BTL-FCCP-3-1603075 Page 59 of 103





Report No.: BTL-FCCP-3-1603075 Page 60 of 103





2

4874.000

43.21

-10.40

32.81

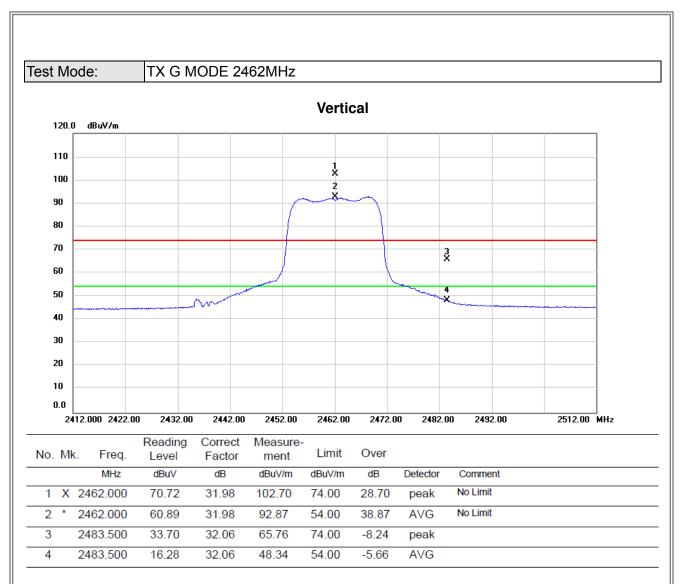
54.00

-21.19

AVG

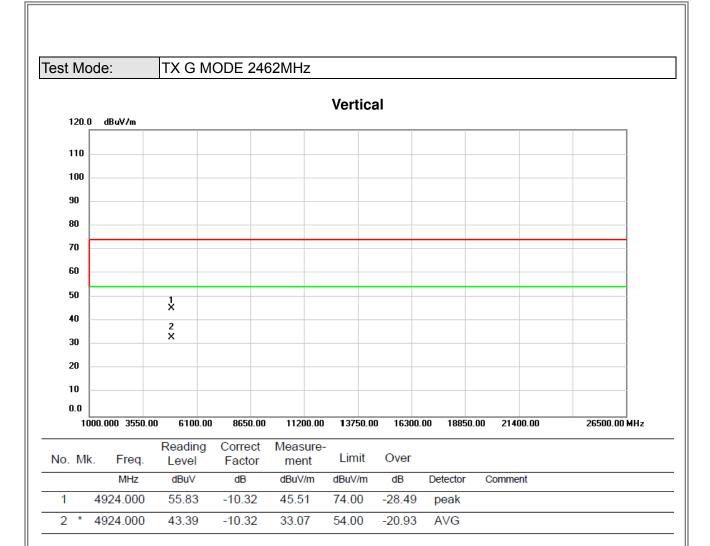
Report No.: BTL-FCCP-3-1603075 Page 61 of 103





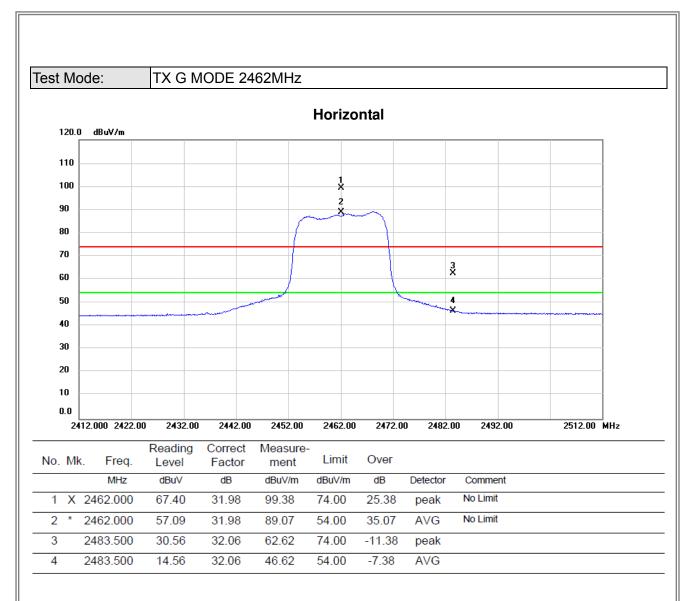
Report No.: BTL-FCCP-3-1603075 Page 62 of 103





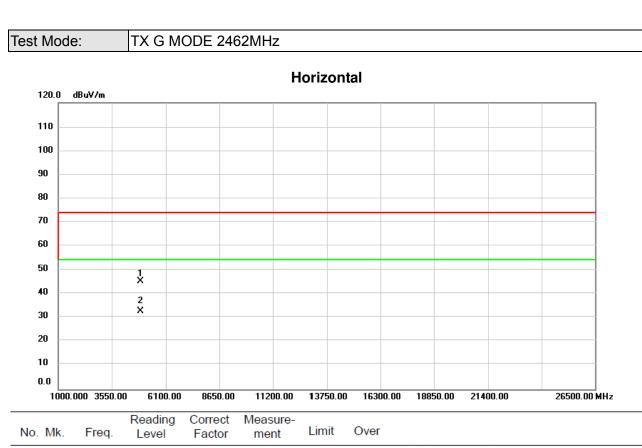
Report No.: BTL-FCCP-3-1603075 Page 63 of 103





Report No.: BTL-FCCP-3-1603075 Page 64 of 103

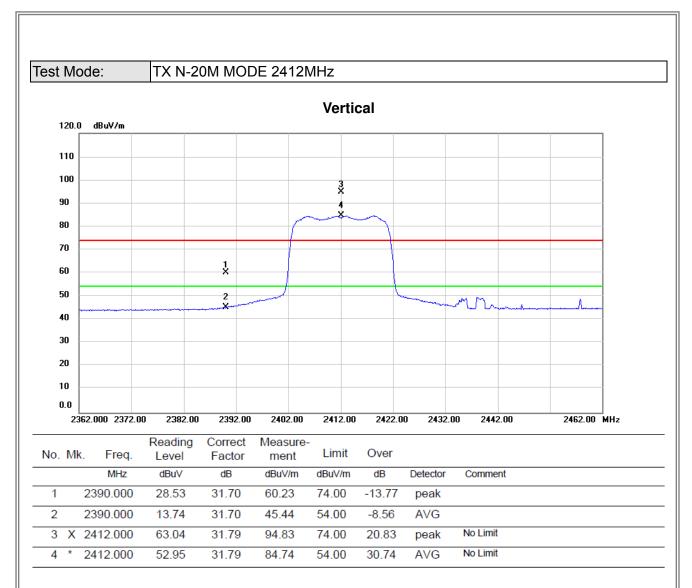




N	0.	M	k.	Freq.	Reading Level		Measure- ment	Limit	Over		
				MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1		492	24.000	55.78	-10.32	45.46	74.00	-28.54	peak	
	2	*	492	24.000	43.31	-10.32	32.99	54.00	-21.01	AVG	

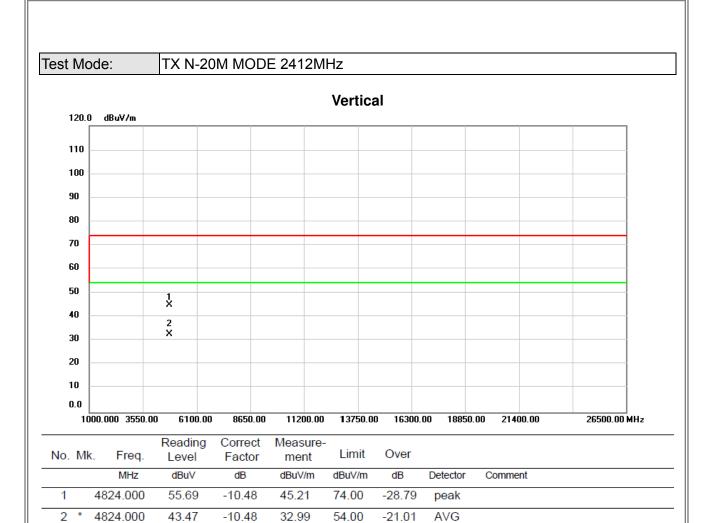
Report No.: BTL-FCCP-3-1603075 Page 65 of 103





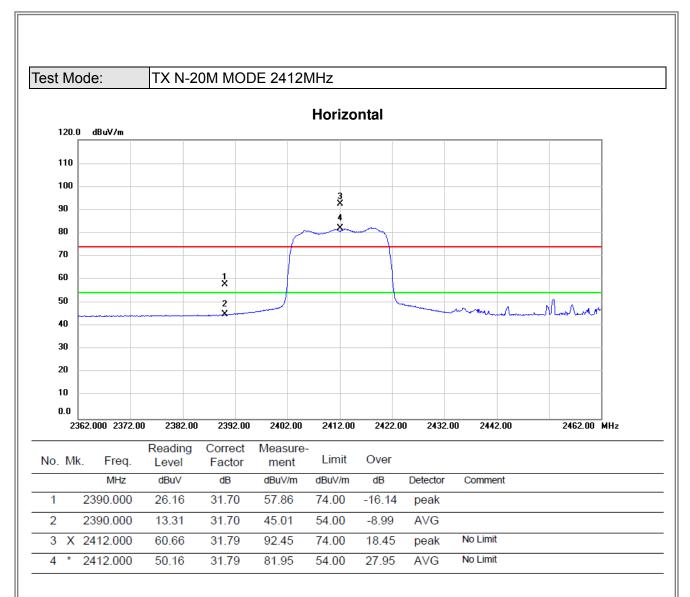
Report No.: BTL-FCCP-3-1603075 Page 66 of 103





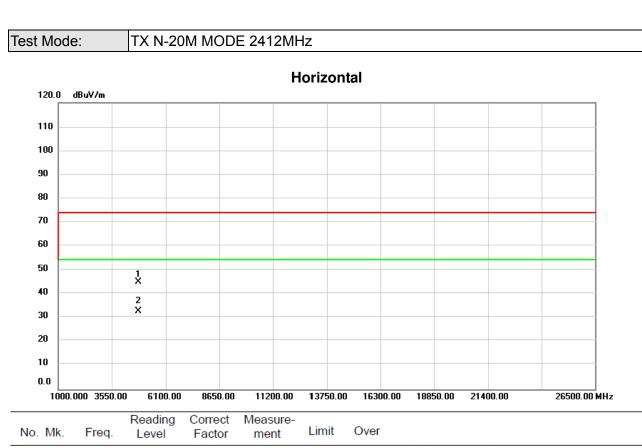
Report No.: BTL-FCCP-3-1603075 Page 67 of 103





Report No.: BTL-FCCP-3-1603075 Page 68 of 103

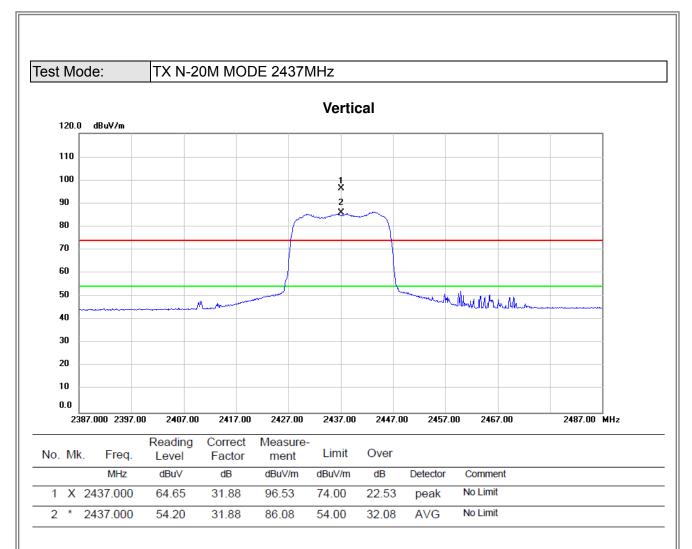




No	M	lk.	Freq.		Correct Factor	Measure- ment		Over		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		48	324.000	55.65	-10.48	45.17	74.00	-28.83	peak	
2	*	48	324.000	43.43	-10.48	32.95	54.00	-21.05	AVG	

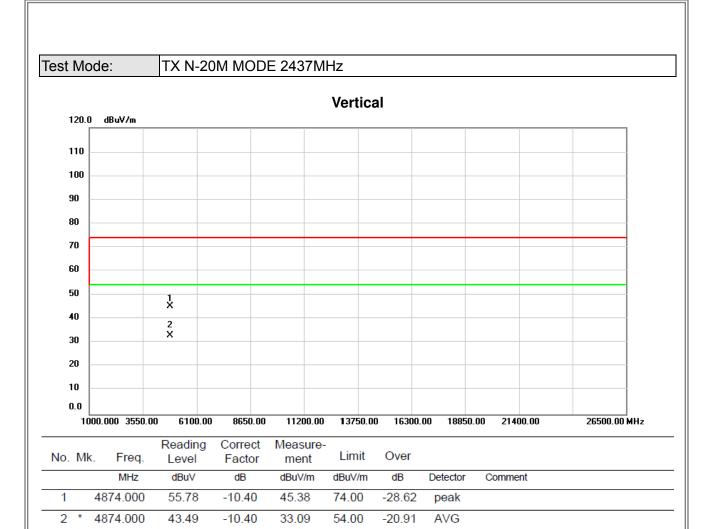
Report No.: BTL-FCCP-3-1603075 Page 69 of 103





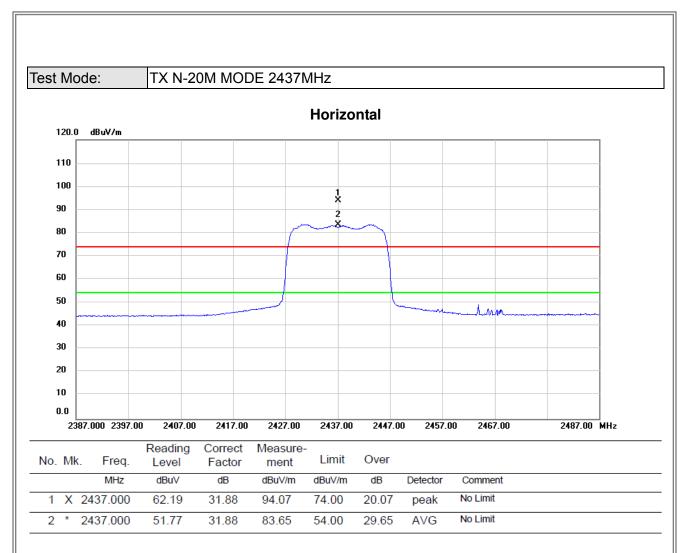
Report No.: BTL-FCCP-3-1603075 Page 70 of 103





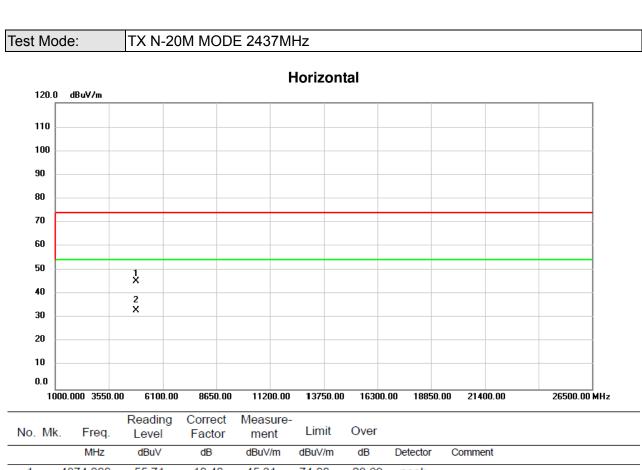
Report No.: BTL-FCCP-3-1603075 Page 71 of 103





Report No.: BTL-FCCP-3-1603075 Page 72 of 103

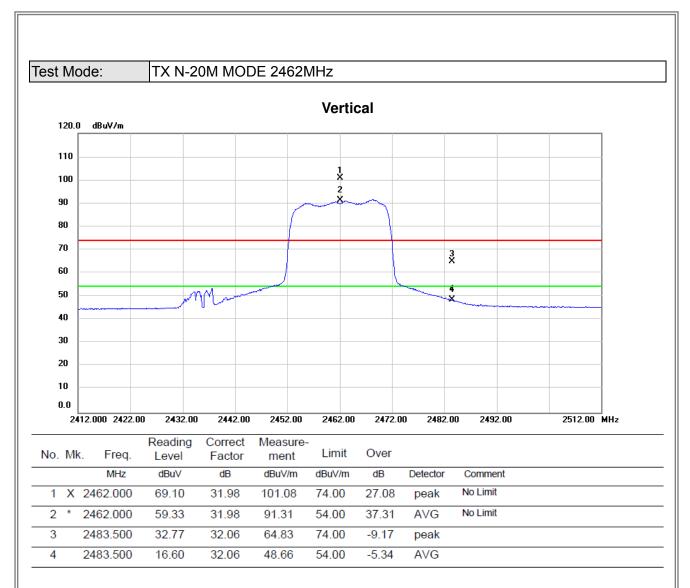




No.	Mk	. Freq.			ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.000	55.71	-10.40	45.31	74.00	-28.69	peak	
2	*	4874.000	43.41	-10.40	33.01	54.00	-20.99	AVG	

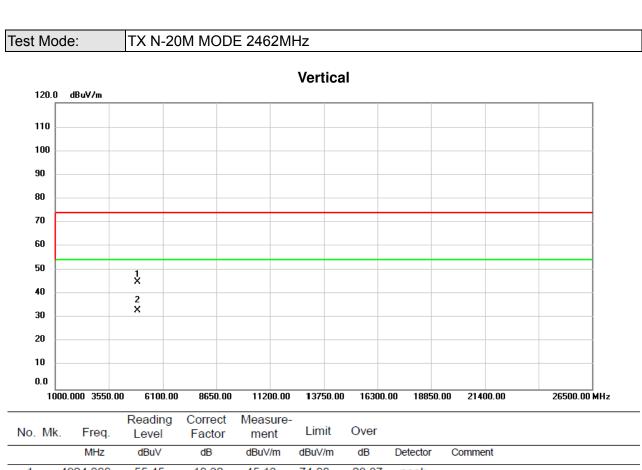
Report No.: BTL-FCCP-3-1603075 Page 73 of 103





Report No.: BTL-FCCP-3-1603075 Page 74 of 103

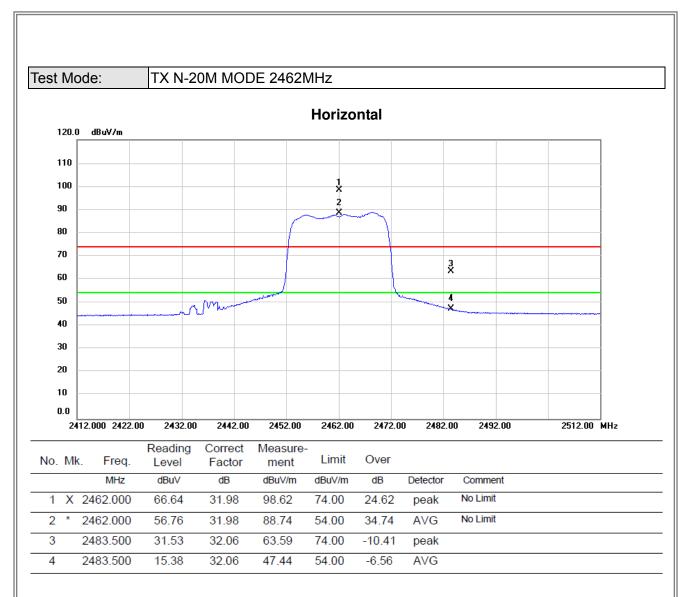




	No.	Mk.	Freq.	Level		ment	Limit	Over		
•			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
•	1	4	4924.000	55.45	-10.32	45.13	74.00	-28.87	peak	
	2	* 4	4924.000	43.49	-10.32	33.17	54.00	-20.83	AVG	

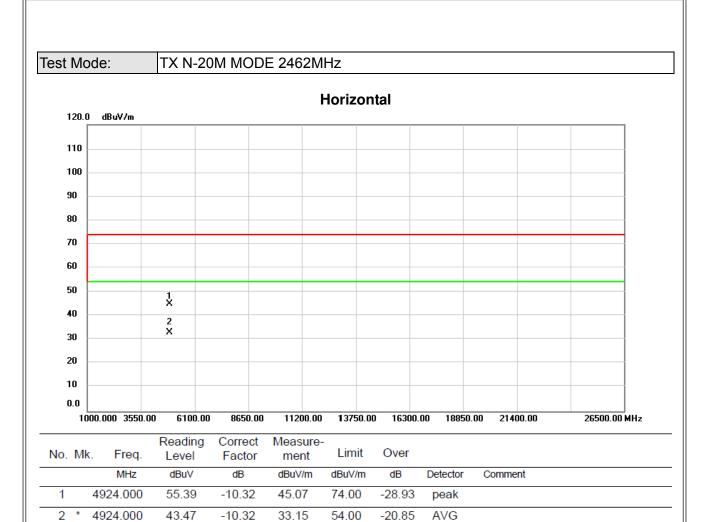
Report No.: BTL-FCCP-3-1603075 Page 75 of 103





Report No.: BTL-FCCP-3-1603075 Page 76 of 103





Report No.: BTL-FCCP-3-1603075 Page 77 of 103



ATTACHMENT E - BANDWIDTH

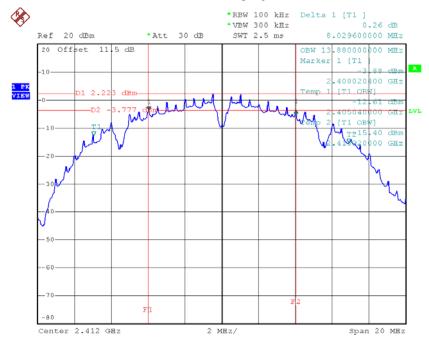
Report No.: BTL-FCCP-3-1603075 Page 78 of 103



Test Mode: TX B Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	8.03	13.88	500	Complies
2437	9.07	14.04	500	Complies
2462	9.51	14.12	500	Complies

TX CH01



Date: 29.MAR.2016 11:49:47

Report No.: BTL-FCCP-3-1603075 Page 79 of 103





Date: 29.MAR.2016 11:54:46

Center 2.462 GHz

2 MHz/

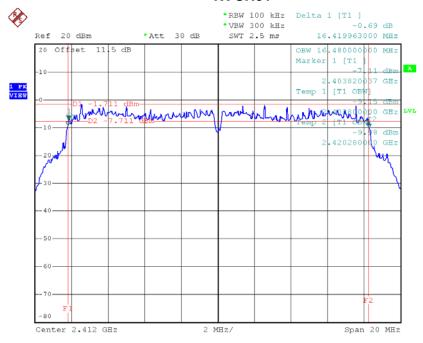
Span 20 MHz



Test Mode: TX G Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	16.42	16.48	500	Complies
2437	16.39	16.44	500	Complies
2462	15.80	16.44	500	Complies

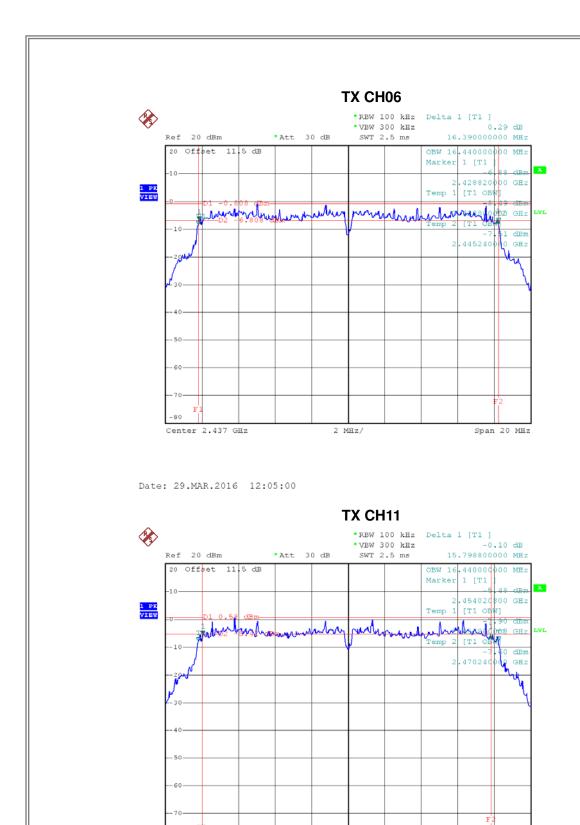
TX CH01



Date: 29.MAR.2016 12:03:44

Report No.: BTL-FCCP-3-1603075 Page 81 of 103





Date: 29.MAR.2016 12:05:58

Center 2.462 GHz

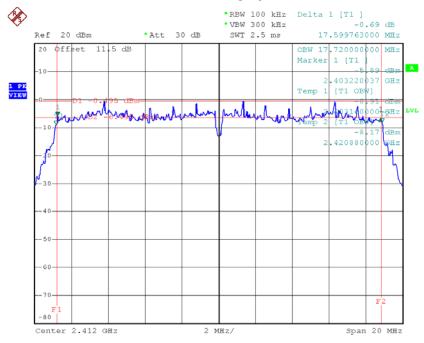
Span 20 MHz



Test Mode: TX N-20MHz Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	17.60	17.72	500	Complies
2437	17.59	17.72	500	Complies
2462	17.62	17.72	500	Complies

TX CH01



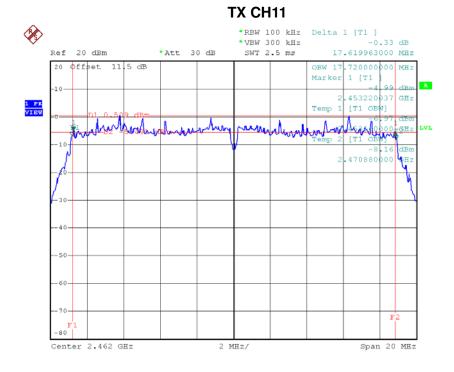
Date: 29.MAR.2016 12:10:36

Report No.: BTL-FCCP-3-1603075 Page 83 of 103





Date: 29.MAR.2016 12:17:31



Date: 29.MAR.2016 12:18:38



ATTACHMENT F – MAXIMUM PEAK CONDUCTED OUTPUT POWER

Report No.: BTL-FCCP-3-1603075 Page 85 of 103



	Test Mode: TX B Mode_CH01/06/11						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result		
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result		
2412	12.28	0.0169	30.00	1.00	Complies		
2437	12.65	0.0184	30.00	1.00	Complies		
2462	12.81	0.0191	30.00	1.00	Complies		

	Test Mode: TX G Mode_CH01/06/11						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result		
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result		
2412	20.02	0.1005	30.00	1.00	Complies		
2437	20.98	0.1253	30.00	1.00	Complies		
2462	21.03	0.1268	30.00	1.00	Complies		

	Test Mode: TX N20 Mode_CH01/06/11						
Frequency	Conducted	Conducted	Max. Limit	Max. Limit	Result		
(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Result		
2412	20.08	0.1019	30.00	1.00	Complies		
2437	20.78	0.1197	30.00	1.00	Complies		
2462	21.32	0.1355	30.00	1.00	Complies		

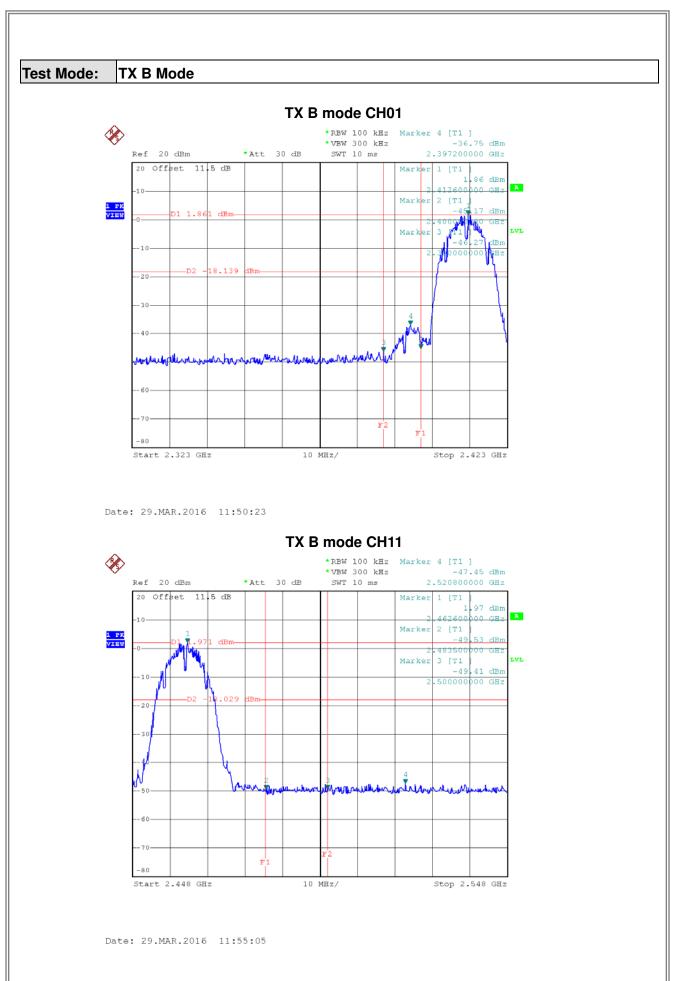
Report No.: BTL-FCCP-3-1603075 Page 86 of 103



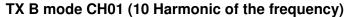
ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

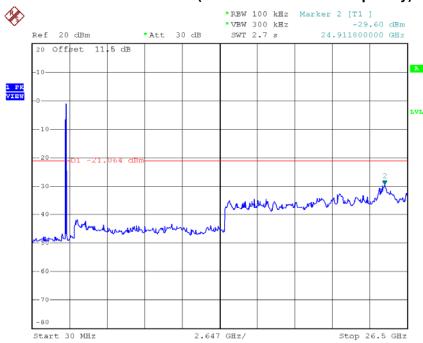
Report No.: BTL-FCCP-3-1603075 Page 87 of 103





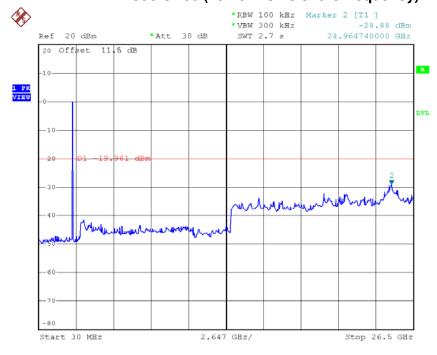






Date: 29.MAR.2016 11:49:59

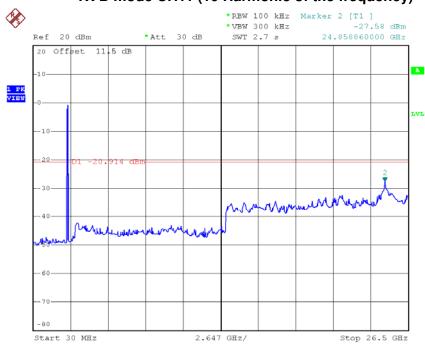
TX B mode CH06 (10 Harmonic of the frequency)



Date: 29.MAR.2016 11:53:05



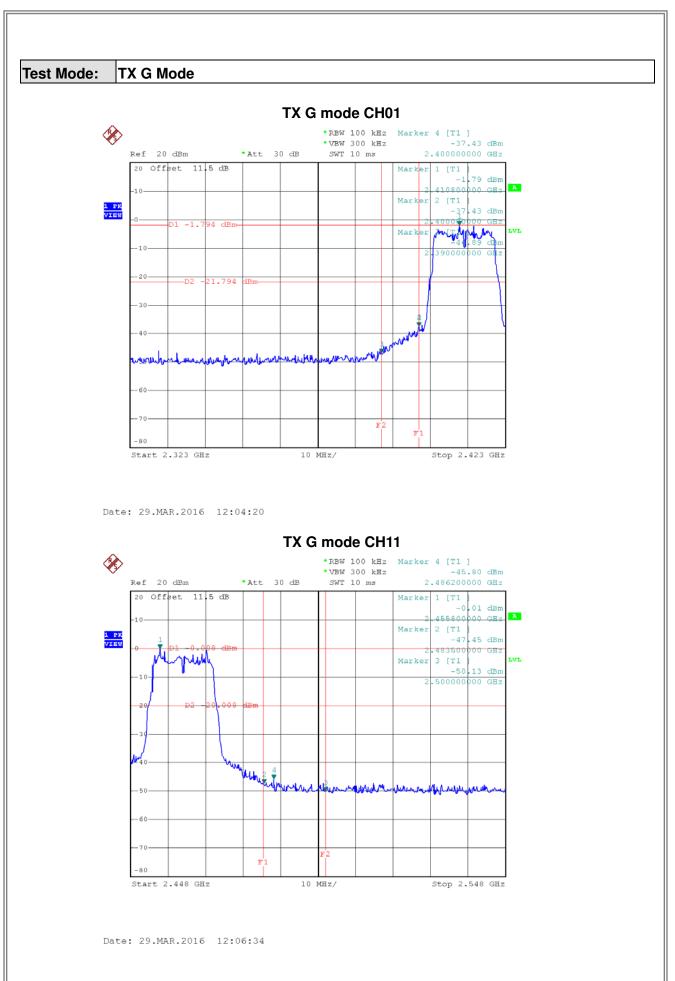




Date: 29.MAR.2016 11:54:59

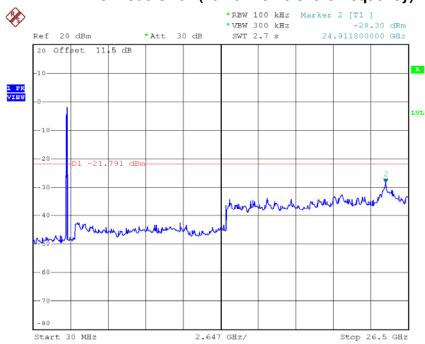
Report No.: BTL-FCCP-3-1603075 Page 90 of 103





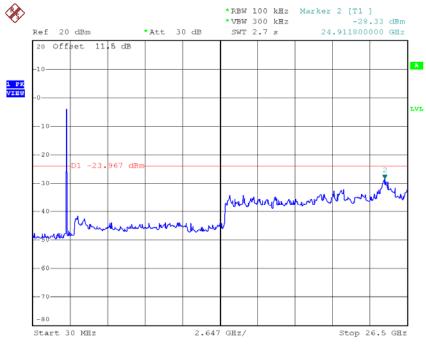






Date: 29.MAR.2016 12:03:57

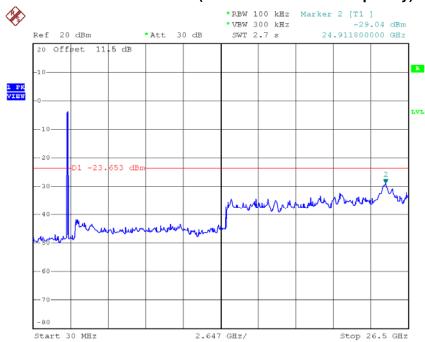
TX G mode CH06 (10 Harmonic of the frequency)



Date: 29.MAR.2016 12:05:12



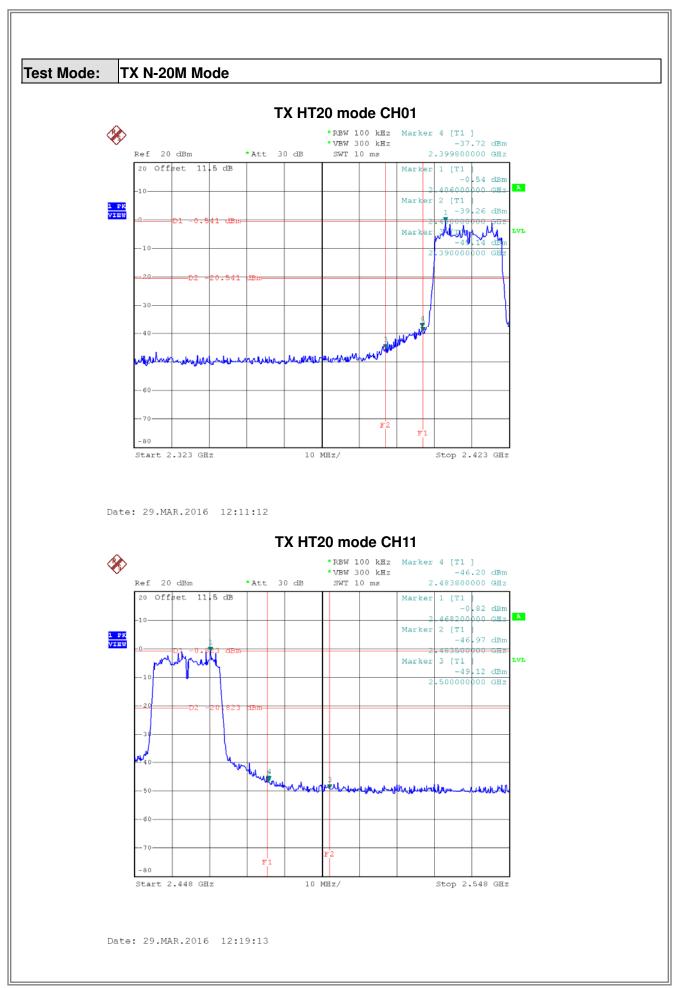




Date: 29.MAR.2016 12:06:11

Report No.: BTL-FCCP-3-1603075 Page 93 of 103

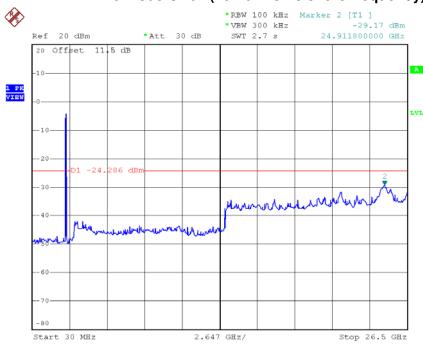




Report No.: BTL-FCCP-3-1603075

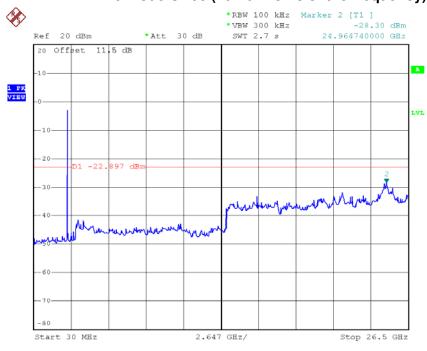






Date: 29.MAR.2016 12:10:49

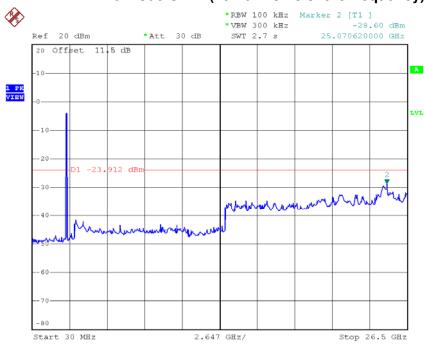
TX HT20 mode CH06 (10 Harmonic of the frequency)



Date: 29.MAR.2016 12:17:43







Date: 29.MAR.2016 12:18:50

Report No.: BTL-FCCP-3-1603075 Page 96 of 103



ATTACHMENT H - POWER SPECTRAL DENSITY	

Report No.: BTL-FCCP-3-1603075 Page 97 of 103



Test Mode: TX B Mode_CH01/06/11

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-13.48	0.04	8.00	Complies
2437	-13.02	0.05	8.00	Complies
2462	-12.80	0.05	8.00	Complies

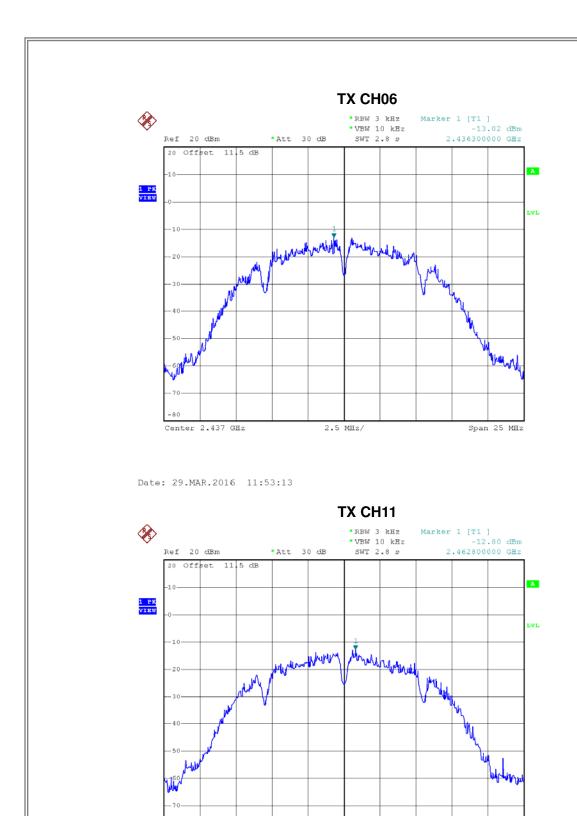
TX CH01



Date: 29.MAR.2016 11:50:31

Report No.: BTL-FCCP-3-1603075 Page 98 of 103





Date: 29.MAR.2016 11:55:13

Center 2.462 GHz

2.5 MHz/

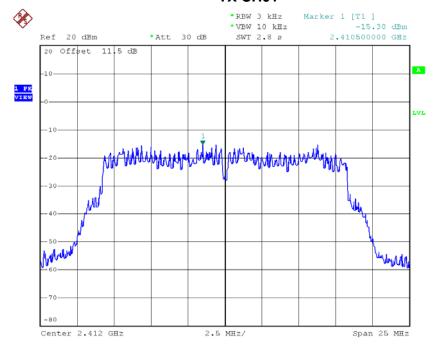
Span 25 MHz



Test Mode: TX G Mode_CH01/06/11

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-15.30	0.03	8.00	Complies
2437	-15.16	0.03	8.00	Complies
2462	-12.95	0.05	8.00	Complies

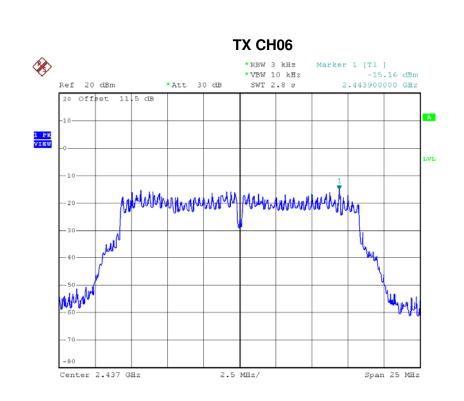
TX CH01



Date: 29.MAR.2016 12:04:28

Report No.: BTL-FCCP-3-1603075 Page 100 of 103





Date: 29.MAR.2016 12:05:20

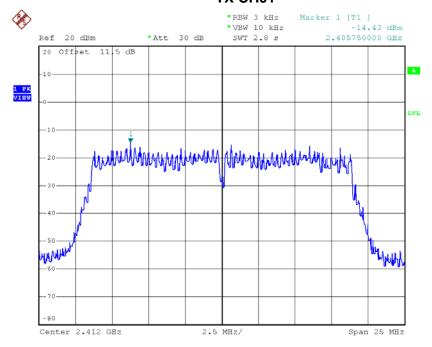
Date: 29.MAR.2016 12:06:42



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

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-14.43	0.04	8.00	Complies
2437	-15.87	0.03	8.00	Complies
2462	-15.16	0.03	8.00	Complies

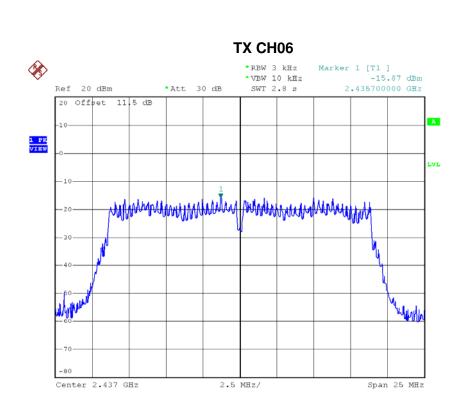
TX CH01



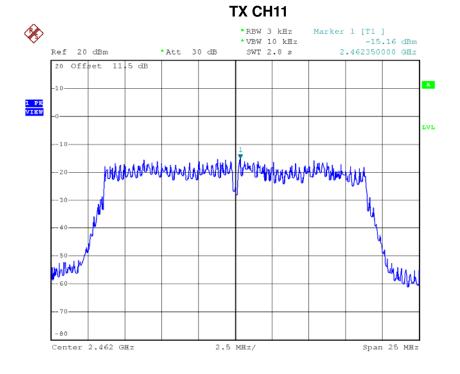
Date: 29.MAR.2016 12:11:20

Report No.: BTL-FCCP-3-1603075 Page 102 of 103





Date: 29.MAR.2016 12:17:51



Date: 29.MAR.2016 12:19:21