

FCC Radio Test Report

FCC ID: UFOOPH5000I

This report concerns (check one): ☒Original Grant ☐Class I Change ☐Class II Change

Project No. : 1611084
Equipment : Handy Terminal with Bluetooth
Test Model : OPH-5000i
Series Mode : N/A
Applicant : OPTOELECTRONICS CO.,LTD.
Address : 12-17, Tsukagoshi 4-chome, Warabi, Saitama Pref.
335-0002 Japan

Date of Receipt : Dec. 05, 2016
Date of Test : Dec. 05, 2016 ~ Dec. 14, 2016
Issued Date : Dec. 20, 2016
Tested by : BTL Inc.

Testing Engineer : Rush Kao
(Rush Kao)

Technical Manager : Jeff Yang
(Jeff Yang)

Authorized Signatory : Andy Chiu
(Andy Chiu)

B T L I N C .

B1, No. 37, Lane 365, Yang-Guang St.,
Nei-Hu District, Taipei City 114, Taiwan.
TEL: +886-2-2657-3299 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).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

BTL's report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **BTL-self**, extracts from the test report shall not be reproduced except in full with **BTL's** authorized written approval.

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.

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	12
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	13
3.5 DESCRIPTION OF SUPPORT UNITS	13
4 . EMC EMISSION TEST	14
4.1 CONDUCTED EMISSION MEASUREMENT	14
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	14
4.1.2 TEST PROCEDURE	14
4.1.3 DEVIATION FROM TEST STANDARD	14
4.1.4 TEST SETUP	15
4.1.5 EUT OPERATING CONDITIONS	15
4.1.6 EUT TEST CONDITIONS	15
4.1.7 TEST RESULTS	15
4.2 RADIATED EMISSION MEASUREMENT	16
4.2.1 RADIATED EMISSION LIMITS	16
4.2.2 TEST PROCEDURE	17
4.2.3 DEVIATION FROM TEST STANDARD	17
4.2.4 TEST SETUP	18
4.2.5 EUT OPERATING CONDITIONS	19
4.2.6 EUT TEST CONDITIONS	19
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	20
5.1.1 TEST PROCEDURE	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	20
5.1.6 TEST RESULTS	20
6 . MAXIMUM PEAK CONDUCTED OUTPUT POWER TEST	21

Table of Contents	Page
6.1 APPLIED PROCEDURES / LIMIT	21
6.1.1 TEST PROCEDURE	21
6.1.2 DEVIATION FROM STANDARD	21
6.1.3 TEST SETUP	21
6.1.4 EUT OPERATION CONDITIONS	21
6.1.5 EUT TEST CONDITIONS	21
6.1.6 TEST RESULTS	21
7 . ANTENNA CONDUCTED SPURIOUS EMISSION	22
7.1 APPLIED PROCEDURES / LIMIT	22
7.1.1 TEST PROCEDURE	22
7.1.2 DEVIATION FROM STANDARD	22
7.1.3 TEST SETUP	22
7.1.4 EUT OPERATION CONDITIONS	22
7.1.5 EUT TEST CONDITIONS	22
7.1.6 TEST RESULTS	22
8 . POWER SPECTRAL DENSITY TEST	23
8.1 APPLIED PROCEDURES / LIMIT	23
8.1.1 TEST PROCEDURE	23
8.1.2 DEVIATION FROM STANDARD	23
8.1.3 TEST SETUP	23
8.1.4 EUT OPERATION CONDITIONS	23
8.1.5 EUT TEST CONDITIONS	23
8.1.6 TEST RESULTS	23
9 . MEASUREMENT INSTRUMENTS LIST	24
10 . EUT TEST PHOTO	26
ATTACHMENT A - CONDUCTED EMISSION	30
ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)	33
ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)	38
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)	41
ATTACHMENT E - BANDWIDTH	78
ATTACHMENT F – MAXIMUM PEAK CONDUCTED OUTPUT POWER	85
ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION	87
ATTACHMENT H - POWER SPECTRAL DENSITY	106

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-2-1611084	Original Issue.	Dec. 20, 2016

1. CERTIFICATION

Equipment : Handy Terminal with Bluetooth
Brand Name : OPTICON
Test Model : OPH-5000i
Series Model : N/A
Applicant : OPTOELECTRONICS CO.,LTD.
Manufacturer : OPTOELECTRONICS CO.,LTD.
Address : 12-17, Tsukagoshi 4-chome, Warabi, Saitama Pref. 335-0002 Japan
Factory : Hokkaido Electronic Industry Co.,Ltd.
Address : 118-122 Kamiashibetsu-cho, Ashibetsu-shi, Hokkaido 079-1371 Japan.
Date of Test : Dec. 05, 2016 ~ Dec. 14, 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-1-1611084) 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 WLAN 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	
15.209/15.205		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:674415; FCC DN:TW0659)
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Below 1GHz):

CB15: (FCC RN:674415; FCC DN:TW0659)
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Above 1GHz):

CB15: (FCC RN:674415; FCC DN:TW0659)
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

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 Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)
C05	CISPR	150 kHz ~ 30MHz	3.06

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)
CB11 (3m)	CISPR	9kHz ~ 150kHz	2.66
		150kHz ~ 30MHz	2.42

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB15 (3m)	CISPR	30MHz ~ 200MHz	V	4.76
		30MHz ~ 200MHz	H	4.28
		200MHz ~ 1,000MHz	V	5.08
		200MHz ~ 1,000MHz	H	4.50

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB15 (3m)	CISPR	1GHz ~ 6GHz	V	4.48
		1GHz ~ 6GHz	H	4.50

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
CB15 (1m)	CISPR	6GHz ~ 18GHz	V	4.30
		6GHz ~ 18GHz	H	4.14

Test Site	Method	Measurement Frequency Range	U, (dB)
CB15 (1m)	CISPR	18 ~ 26.5GHz	5.28

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} .

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Handy Terminal with Bluetooth	
Brand Name	OPTICON	
Test Model	OPH-5000i	
Series Model	N/A	
Model Difference	N/A	
Product Description	Operation Frequency	2412~2462 MHz
	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 300 Mbps
	Output Power (Max.)	802.11b: 21.88dBm 802.11g: 23.88dBm 802.11n(20MHz): 23.99dBm
Power Source	#1 Supplied from USB port. #2 Supplied from battery.	
Power Rating	#1 DC 5V #2 DC 3.7V	

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)							
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		

For 1T1R

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
1	OPTICON	N/A	PCB	N/A	-6.16	N/A

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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	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 4	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

For Band Edge 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

6dB Spectrum Bandwidth	
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

Maximum Conducted Output Power	
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

Power Spectral Density	
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:

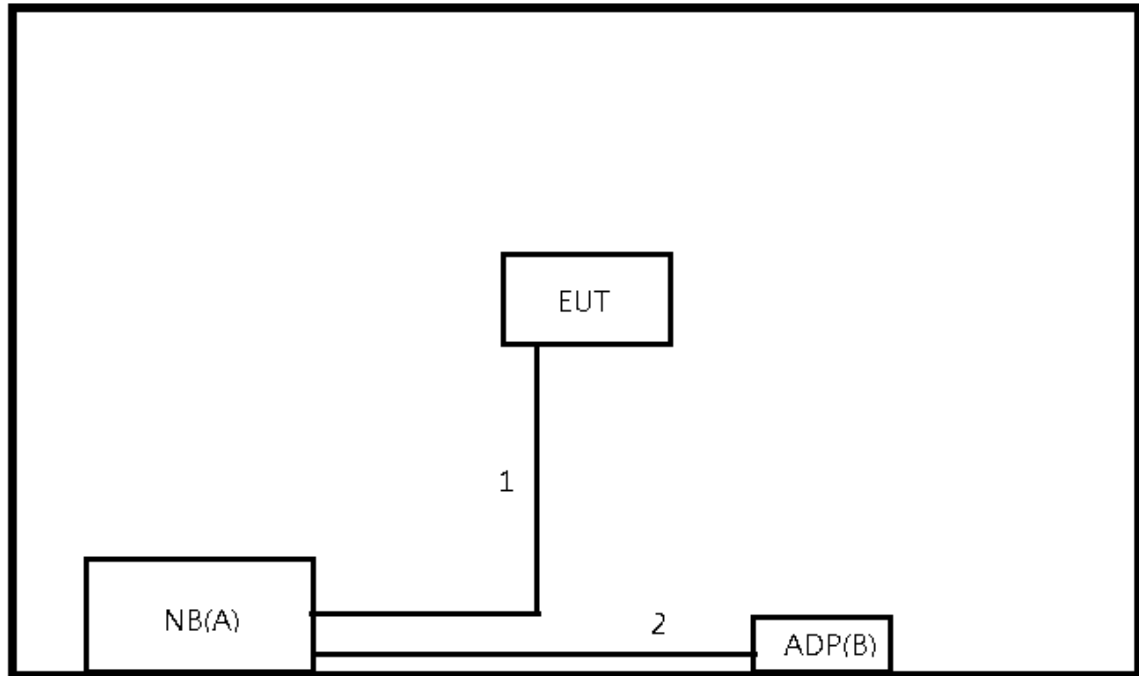
- (1) The measurements are performed at the high, middle, low available channels.
- (2) 802.11b mode: DBPSK (1Mbps)
 802.11g mode: OFDM (6Mbps)
 802.11n HT20 mode : BPSK (6.5Mbps)
 For radiated emission tests, the highest output powers were set for final test.
- (3) For radiated below 1G test, the 802.11b 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%.

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	EUT		
Frequency (MHz)	2412	2437	2462
802.11b	18	18	18
802.11g	9	18	12
802.11n (20MHz)	9	18	9

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.	Note
A	Notebook PC	Acer	M52351	DOC	NXV7JTA005334043 D42000	
B	Adapter	N/A	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.5m	USB Cable
2	NO	NO	1.5m	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 Limit (dBμV)	
	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

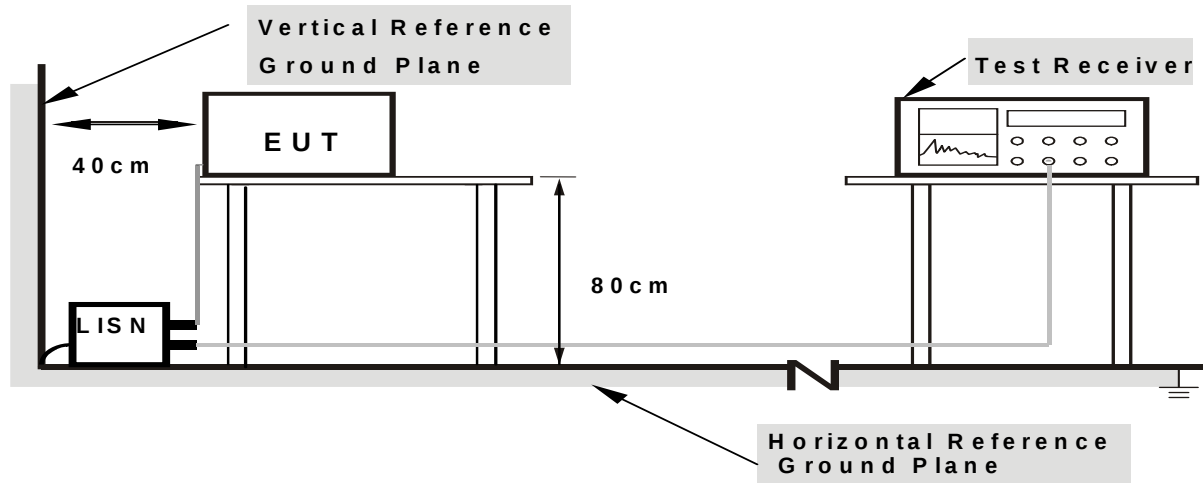
4.1.2 TEST PROCEDURE

- 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



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm 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: DC 5V

4.1.7 TEST RESULTS

Please refer to the Attachment 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 (MHz)	Field Strength (microvolts/meter)	Measurement Distance (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/RSS-247.
- (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 (Emission in restricted band)	1MHz / 3MHz for Peak, 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

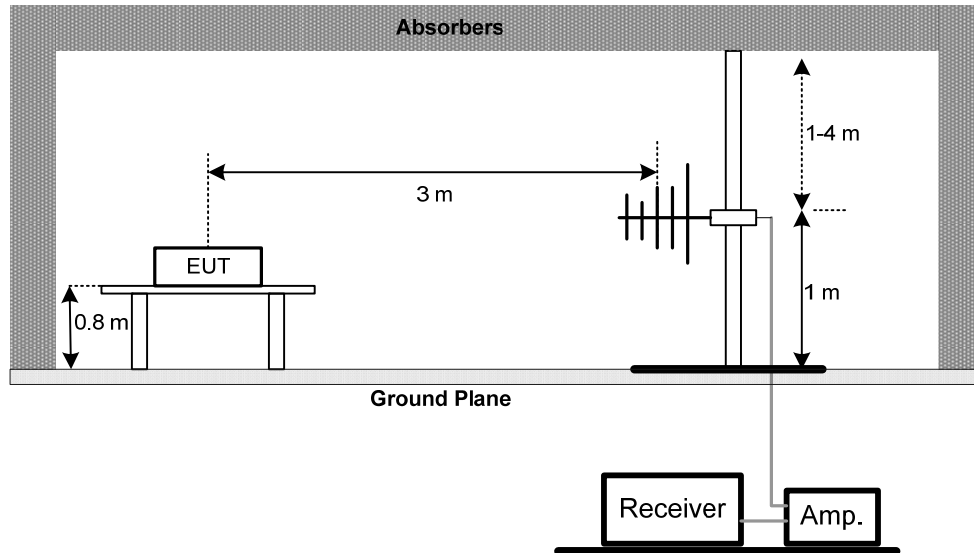
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m or 1.5m 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)
- 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.
- 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).
- 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.
- 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.
- 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)
- 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)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

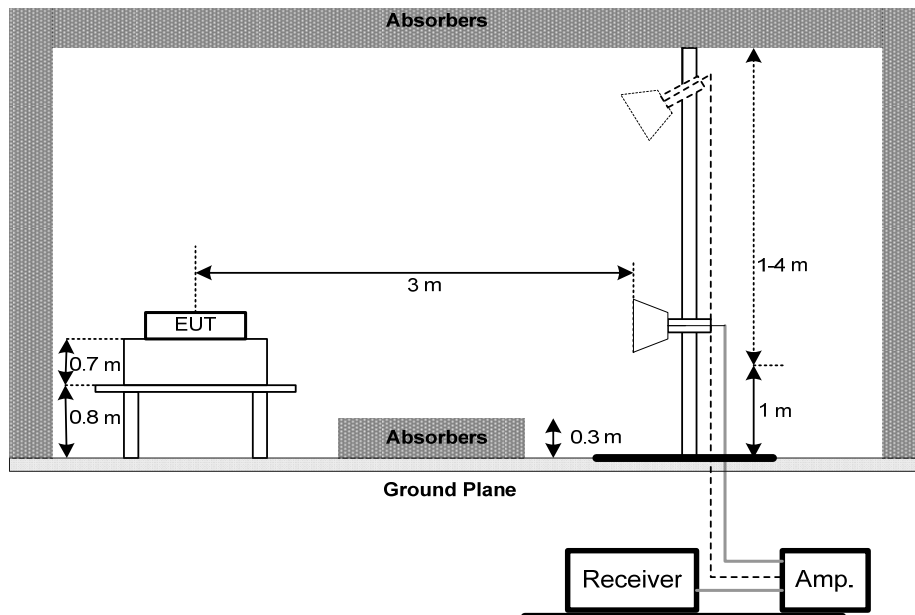
No deviation

4.2.4 TEST SETUP

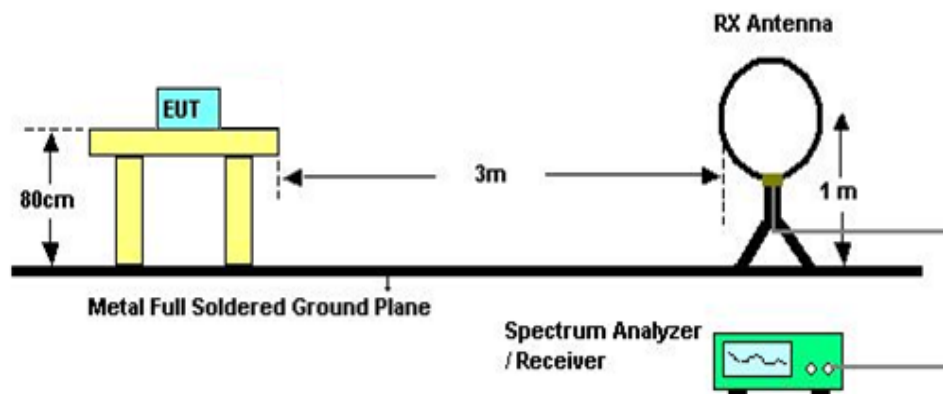
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(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: DC 5V

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 = $40 \log (\text{specific distance} / \text{test distance})$ (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.

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

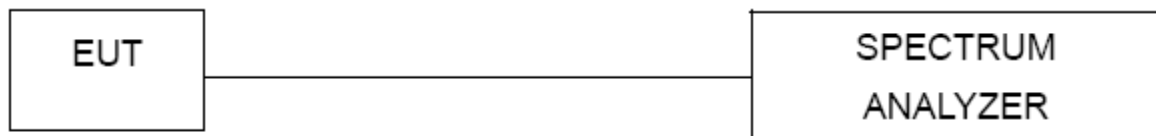
5.1.1 TEST PROCEDURE

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

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



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: DC 5V

5.1.6 TEST RESULTS

Please refer to the Attachment 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

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- 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: DC 5V

6.1.6 TEST RESULTS

Please refer to the Attachment 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

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.
- 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: DC 5V

7.1.6 TEST RESULTS

Please refer to the Attachment 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

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

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



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: DC 5V

8.1.6 TEST RESULTS

Please refer to the Attachment 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	101051	Feb. 23, 2017
2	Test Cable	TIMES	CFD300-NL	C03	Jun. 14, 2017
3	EMI Test Receiver	R&S	ESR3	101854	Dec. 17, 2016
4	Measurement Software	Farad	EZ_EMC (Version NB-03A)	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Receiver	Keysight	N9038A	MY55420127	Jan. 07, 2017
2	EXA Spectrum Analyzer	Keysight	N9010A	MY52220990	Feb. 23, 2017
3	Horn Antenna(1G~18G)	SCHWARZBECK	BBHA 9120 D	9120D-1342	Mar. 01, 2017
4	Trilog-Broadband Antenna(30M~1G)	Schwarzbeck	VULB9168	9168-548	Jan. 17, 2017
5	Pre-Amplifier(30M~1G)	EMC	EMC02325	980217	Dec. 29, 2016
6	Pre-Amplifier(1G~26G)	EMC	012645B	980267	Mar. 01, 2017
7	Test Cable	EMCI	EMC104-SM-S M-800	150207	Jan. 05, 2017
8	Test Cable	EMCI	EEMC104-SM-S M-3000	151205	Jan. 05, 2017
9	Test Cable	EMCI	S104-SMAP-2	M001220	Jan. 05, 2017
10	EXA Spectrum Analyzer	Agilent	N9010A	MY52220990	Feb. 24, 2017
11	EMI Test Receiver	Agilent	N9038A	MY51210215	Jan. 08, 2017
12	Loop Antenna	EMCO	6502	00042960	Nov. 24, 2017

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2495A	1128008	Aug. 17, 2017

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

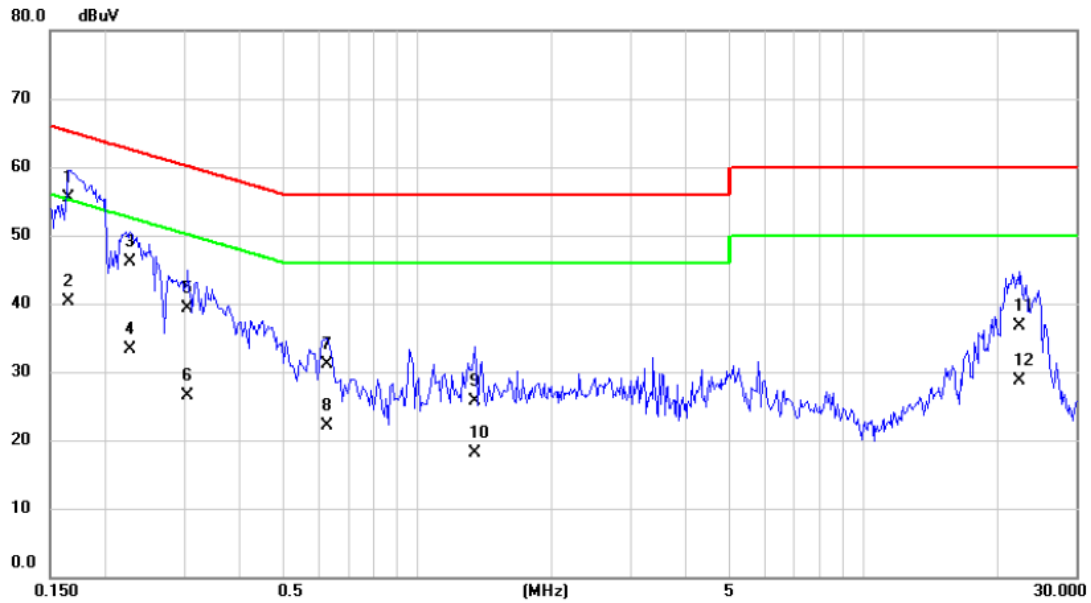
Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51160196	Jul. 27, 2017

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

ATTACHMENT A - CONDUCTED EMISSION

Test Mode : Normal Link

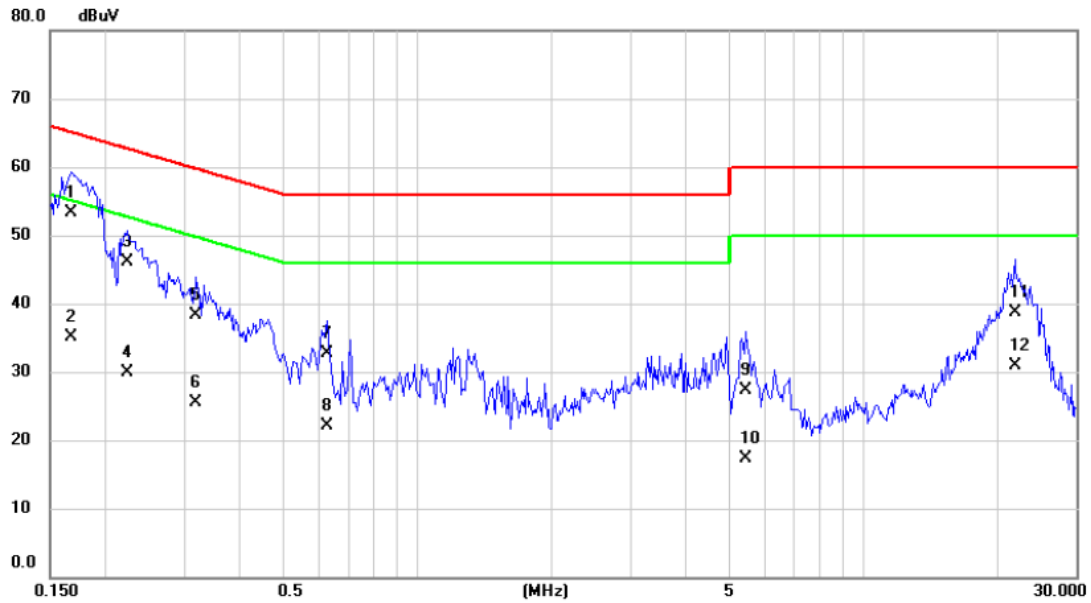
Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1654	45.90	9.64	55.54	65.19	-9.65	QP	
2		0.1654	30.70	9.64	40.34	55.19	-14.85	AVG	
3		0.2270	36.40	9.64	46.04	62.56	-16.52	QP	
4		0.2270	23.60	9.64	33.24	52.56	-19.32	AVG	
5		0.3061	29.60	9.63	39.23	60.08	-20.85	QP	
6		0.3061	16.80	9.63	26.43	50.08	-23.65	AVG	
7		0.6260	21.50	9.63	31.13	56.00	-24.87	QP	
8		0.6260	12.50	9.63	22.13	46.00	-23.87	AVG	
9		1.3460	16.10	9.63	25.73	56.00	-30.27	QP	
10		1.3460	8.50	9.63	18.13	46.00	-27.87	AVG	
11		22.4500	27.00	9.74	36.74	60.00	-23.26	QP	
12		22.4500	19.00	9.74	28.74	50.00	-21.26	AVG	

Test Mode : Normal Link

Neutral

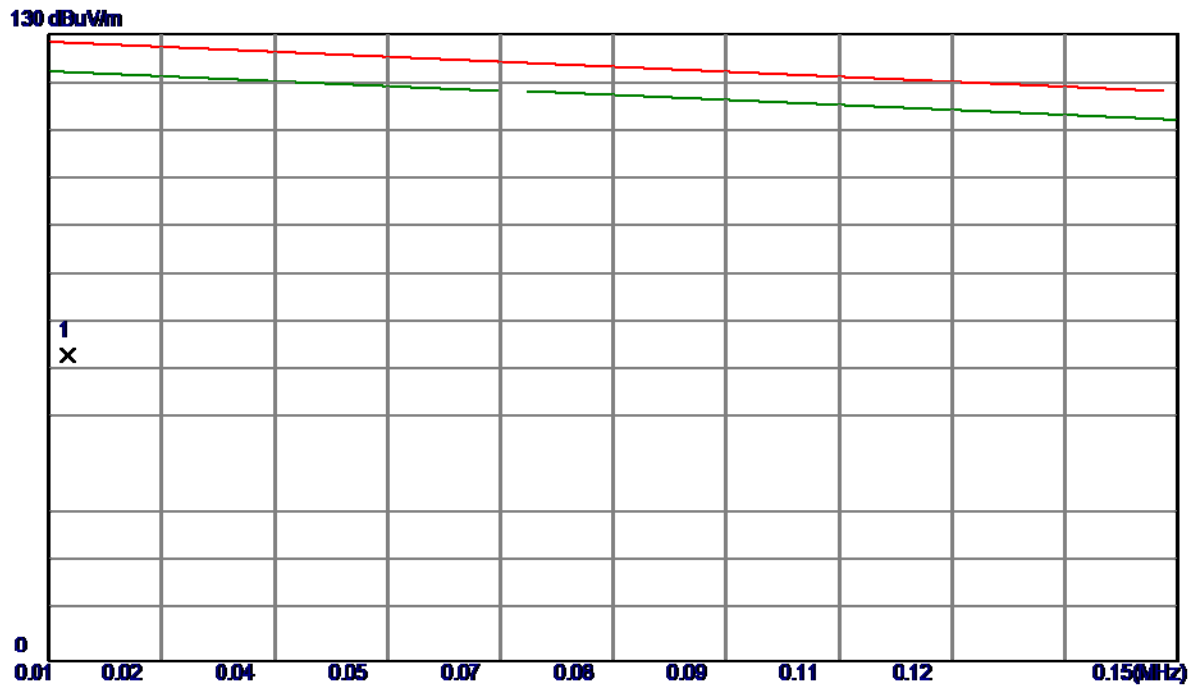


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1668	43.60	9.65	53.25	65.12	-11.87	QP	
2		0.1668	25.40	9.65	35.05	55.12	-20.07	AVG	
3		0.2242	36.40	9.64	46.04	62.66	-16.62	QP	
4		0.2242	20.30	9.64	29.94	52.66	-22.72	AVG	
5		0.3194	28.70	9.63	38.33	59.72	-21.39	QP	
6		0.3194	15.80	9.63	25.43	49.72	-24.29	AVG	
7		0.6260	23.00	9.63	32.63	56.00	-23.37	QP	
8		0.6260	12.50	9.63	22.13	46.00	-23.87	AVG	
9		5.4500	17.60	9.67	27.27	60.00	-32.73	QP	
10		5.4500	7.70	9.67	17.37	50.00	-32.63	AVG	
11		21.8500	29.00	9.74	38.74	60.00	-21.26	QP	
12		21.8500	21.10	9.74	30.84	50.00	-19.16	AVG	

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

Test Mode:	TX B MODE CHANNEL 01
------------	----------------------

Ant 0°

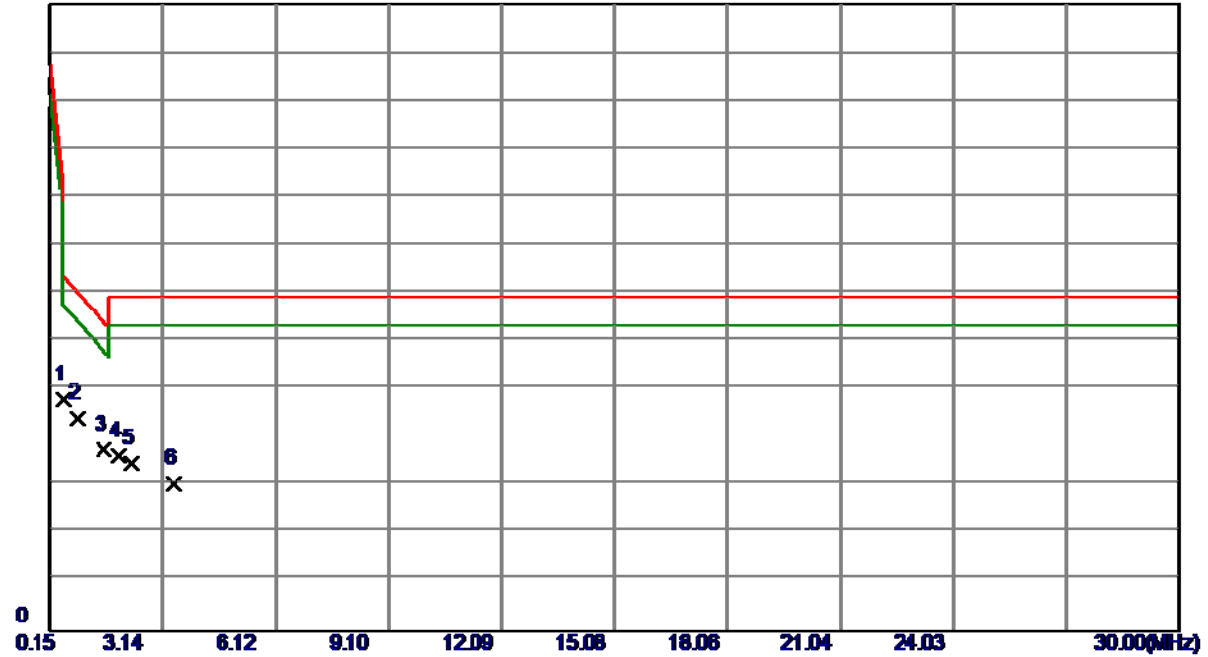


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.0113	43.25	20.14	63.39	128.35	-64.96	Peak	

Test Mode: TX B MODE CHANNEL 01

Ant 0°

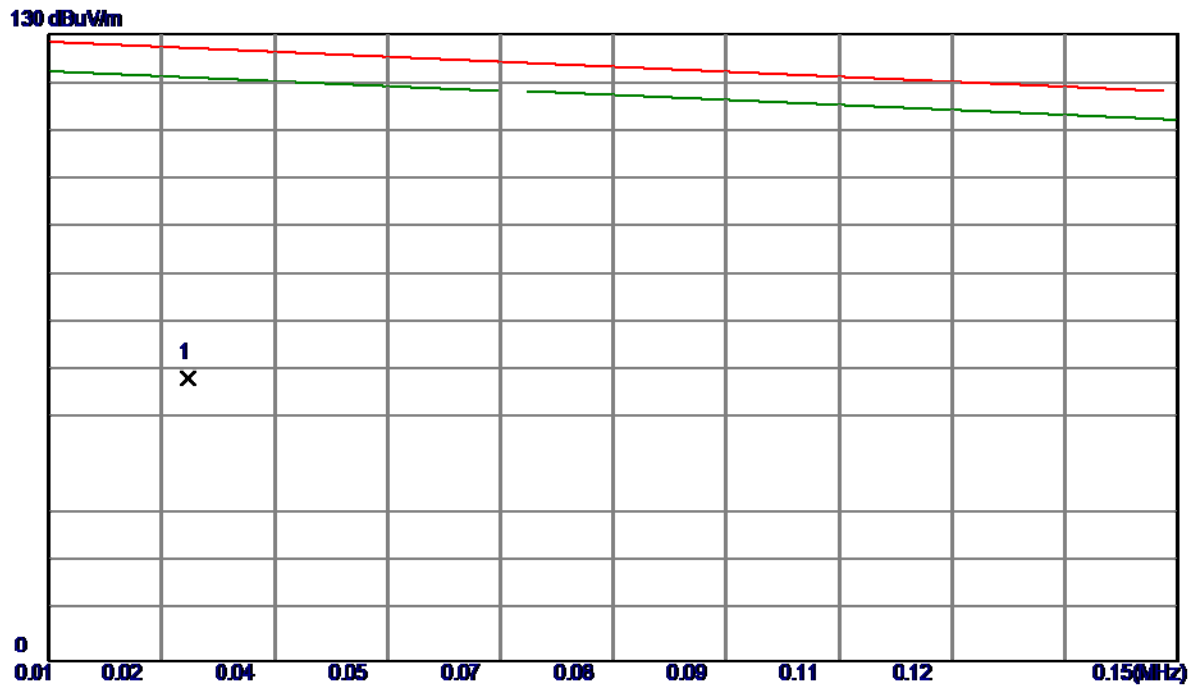
130 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.5082	36.23	11.80	48.03	73.64	-25.61	Peak	
2	0.8664	32.22	11.95	44.17	70.44	-26.27	Peak	
3	1.5828	25.88	11.74	37.62	64.06	-26.44	Peak	
4	1.9708	24.92	11.56	36.48	69.54	-33.06	Peak	
5	2.2992	23.30	11.42	34.72	69.54	-34.82	Peak	
6	3.4335	19.63	11.16	30.79	69.54	-38.75	Peak	

Test Mode: TX B MODE CHANNEL 01

Ant 90°

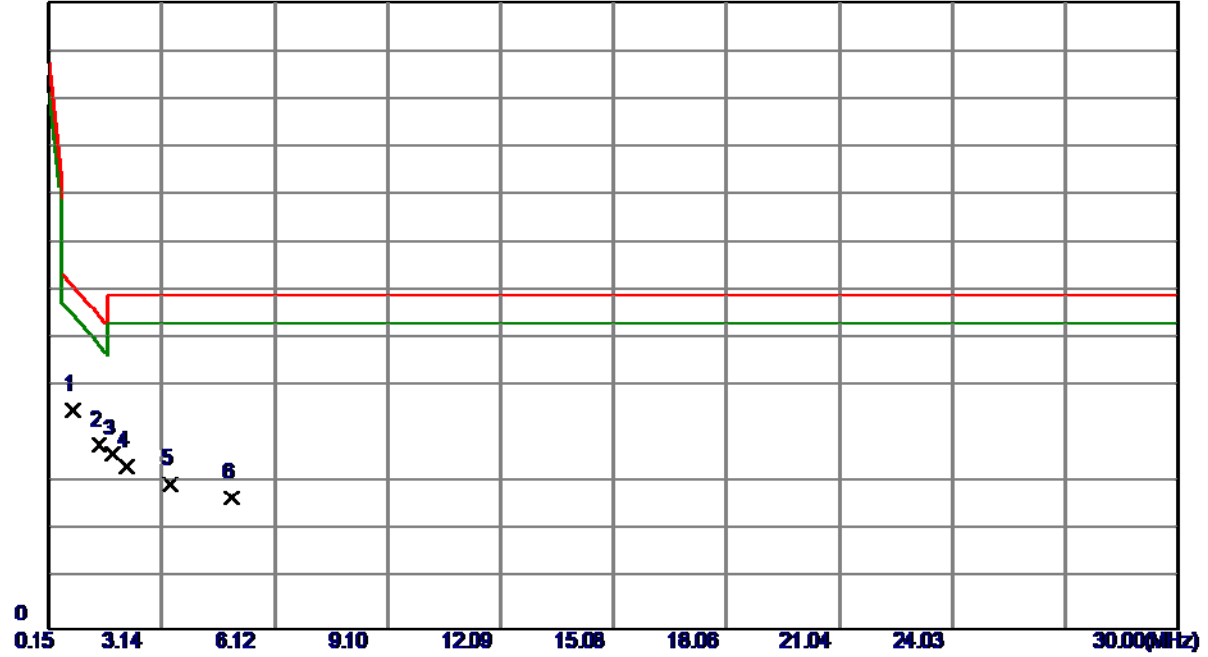


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.0264	42.80	15.97	58.77	127.26	-68.49	Peak	

Test Mode: TX B MODE CHANNEL 01

Ant 90°

130 dBuV/m

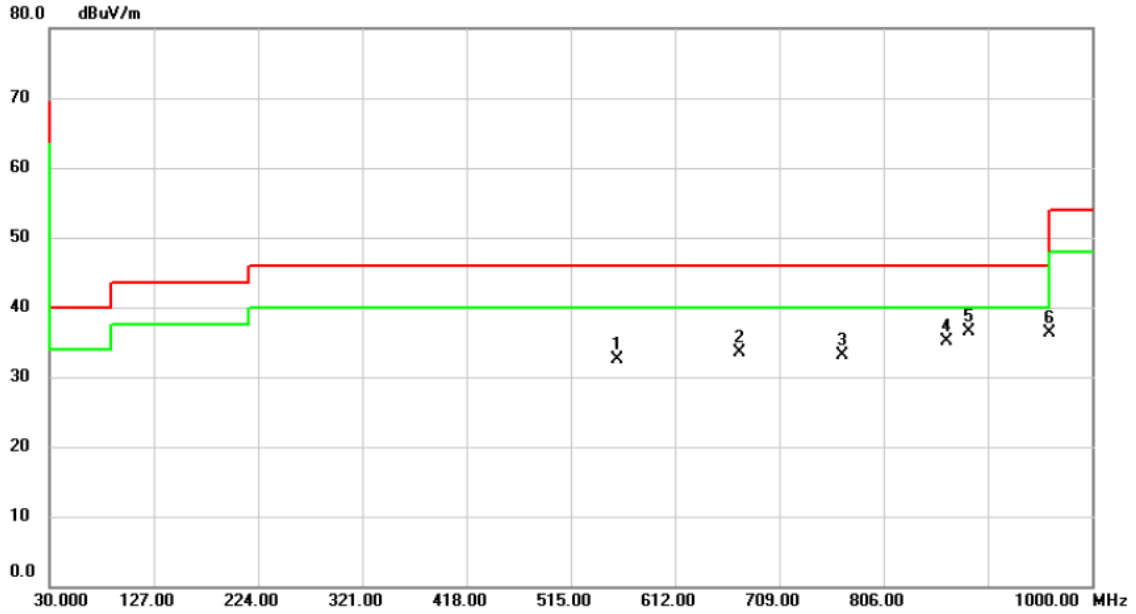


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	0.7768	33.62	11.91	45.53	71.24	-25.71	Peak	
2	1.4932	26.46	11.78	38.24	64.86	-26.62	Peak	
3	1.8515	24.86	11.62	36.48	69.54	-33.06	Peak	
4	2.2096	22.26	11.46	33.72	69.54	-35.82	Peak	
5	3.3738	19.05	11.16	30.21	69.54	-39.33	Peak	
6	4.9856	15.90	11.40	27.30	69.54	-42.24	Peak	

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

Test Mode: TX N-20M MODE CHANNEL 11

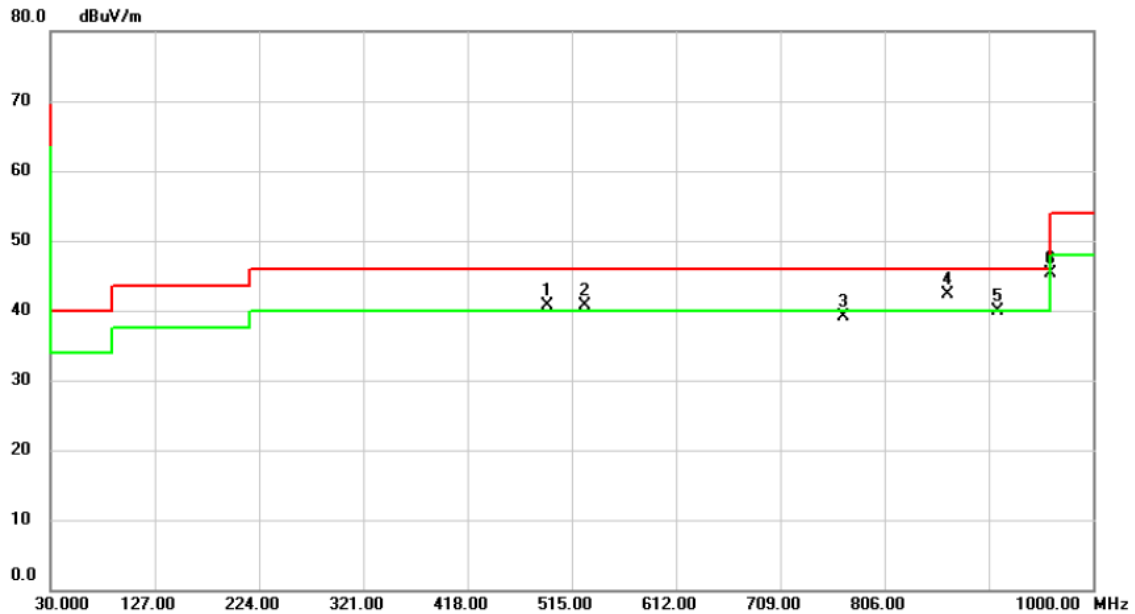
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		558.6500	34.17	-1.69	32.48	46.00	-13.52	peak	
2		672.1400	33.18	0.25	33.43	46.00	-12.57	peak	
3		768.1700	31.08	2.09	33.17	46.00	-12.83	peak	
4		864.2000	31.70	3.41	35.11	46.00	-10.89	peak	
5	*	885.5400	32.72	3.83	36.55	46.00	-9.45	peak	
6		960.2300	31.23	5.13	36.36	54.00	-17.64	peak	

Test Mode: TX N-20M MODE CHANNEL 11

Horizontal

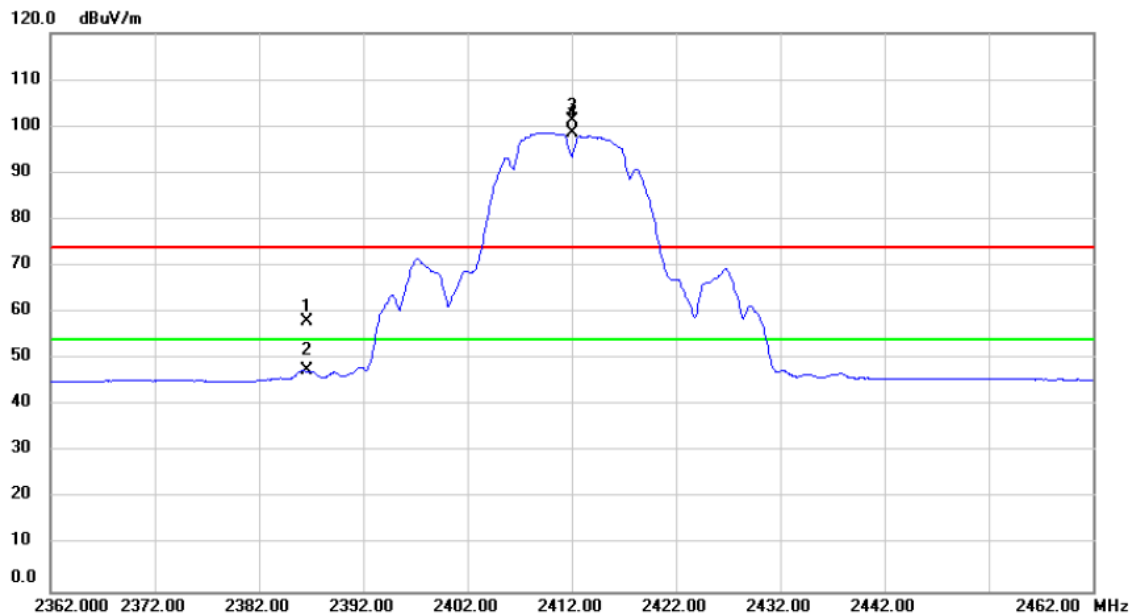


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	!	491.7200	43.86	-3.17	40.69	46.00	-5.31	peak	
2	!	527.6100	43.10	-2.42	40.68	46.00	-5.32	peak	
3		768.1700	37.11	2.09	39.20	46.00	-6.80	peak	
4	*	864.2000	38.94	3.41	42.35	46.00	-3.65	peak	
5		911.7300	35.50	4.32	39.82	46.00	-6.18	peak	
6		960.2300	40.15	5.13	45.28	54.00	-8.72	peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

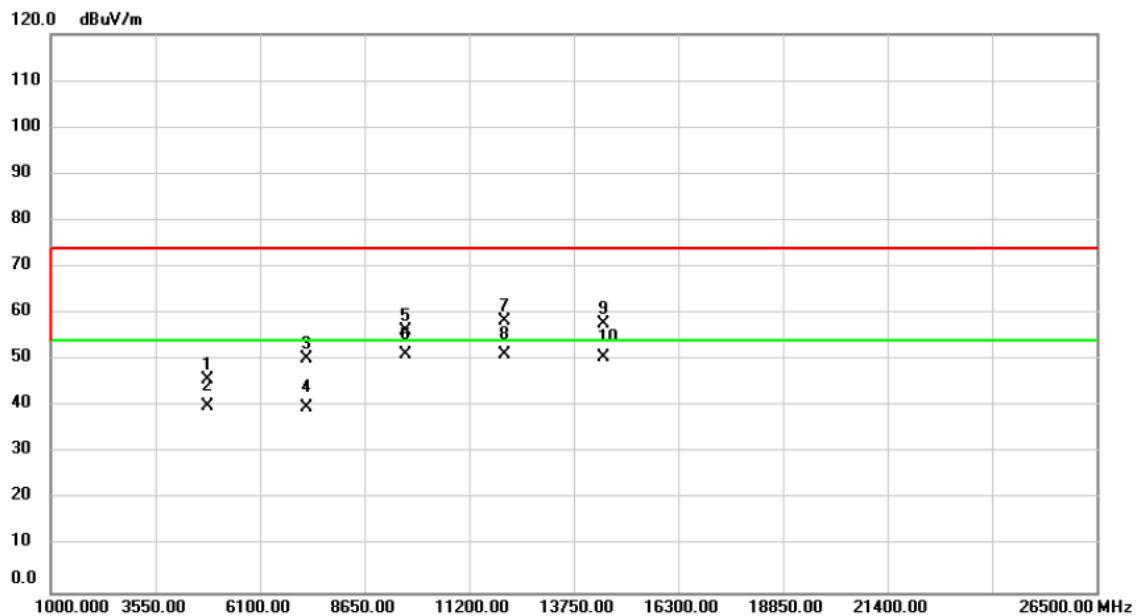
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2386.556	27.21	30.95	58.16	74.00	-15.84	peak	
2		2386.556	16.48	30.95	47.43	54.00	-6.57	AVG	
3	X	2412.000	70.09	31.04	101.13	74.00	27.13	peak	No Limit
4	*	2412.000	67.64	31.04	98.68	54.00	44.68	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

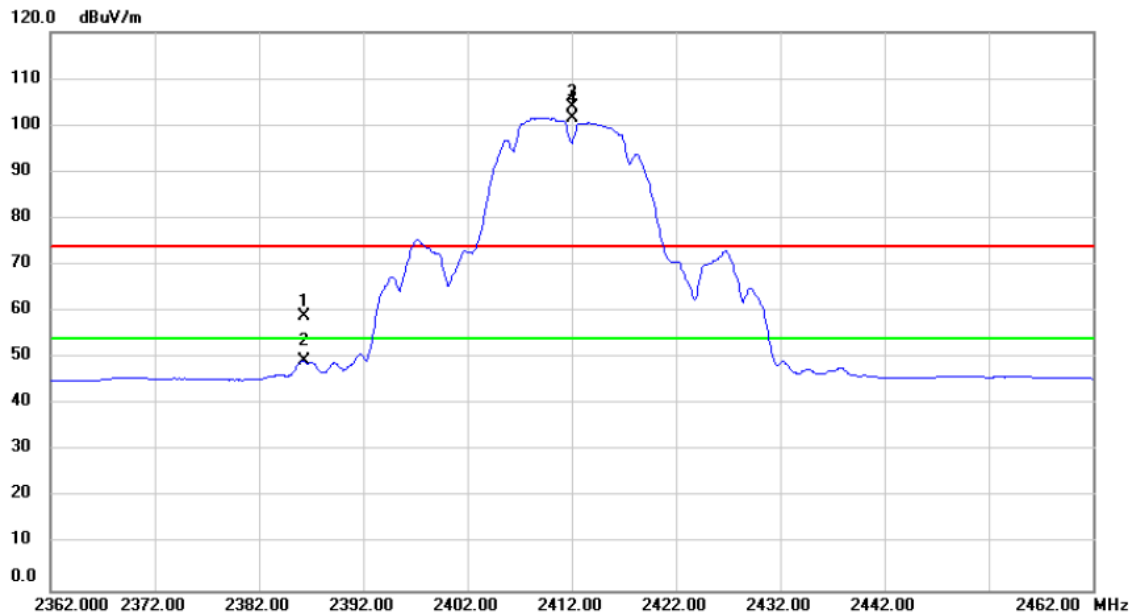
Vertical



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4824.000	57.21	-11.47	45.74	74.00	-28.26	peak	
2	4824.000	51.42	-11.47	39.95	54.00	-14.05	AVG	
3	7236.000	55.55	-5.36	50.19	81.13	-30.94	peak	non-restricted Freq
4	7236.000	45.07	-5.36	39.71	78.68	-38.97	AVG	non-restricted Freq
5	9648.000	55.39	0.81	56.20	81.13	-24.93	peak	non-restricted Freq
6	9648.000	50.23	0.81	51.04	78.68	-27.64	AVG	non-restricted Freq
7	12060.00	55.71	2.55	58.26	74.00	-15.74	peak	
8 *	12060.00	48.48	2.55	51.03	54.00	-2.97	AVG	
9	14472.00	50.34	7.49	57.83	74.00	-16.17	peak	
10	14472.00	43.05	7.49	50.54	54.00	-3.46	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

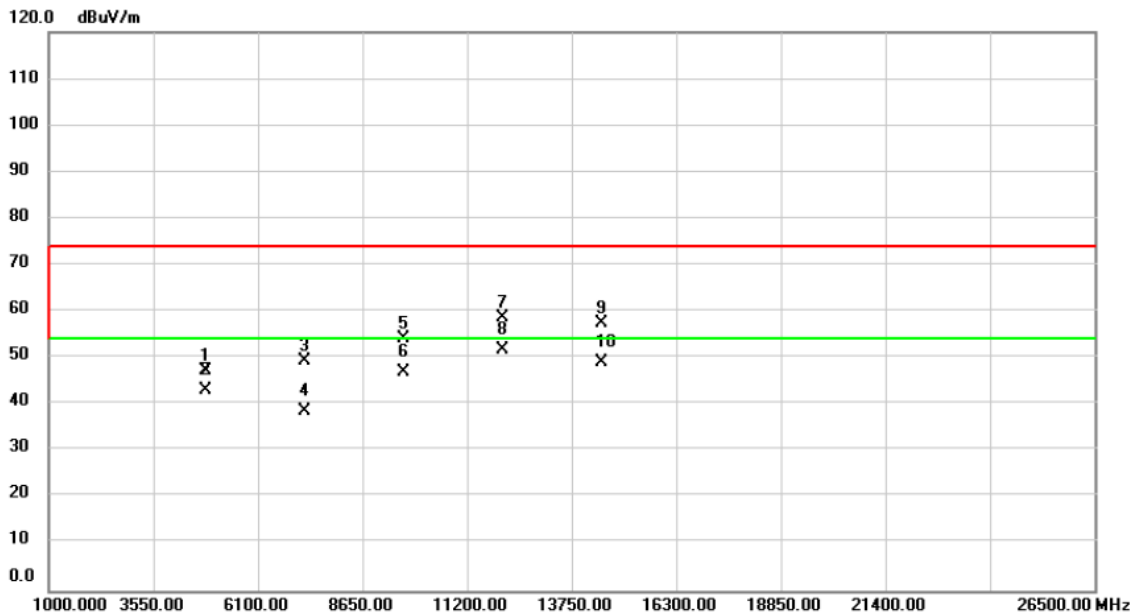
Horizontal



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2386.276	28.00	30.95	58.95	74.00	-15.05	peak	
2	2386.276	18.32	30.95	49.27	54.00	-4.73	AVG	
3 X	2412.000	73.00	31.04	104.04	74.00	30.04	peak	No Limit
4 *	2412.000	70.62	31.04	101.66	54.00	47.66	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX B MODE 2412MHz

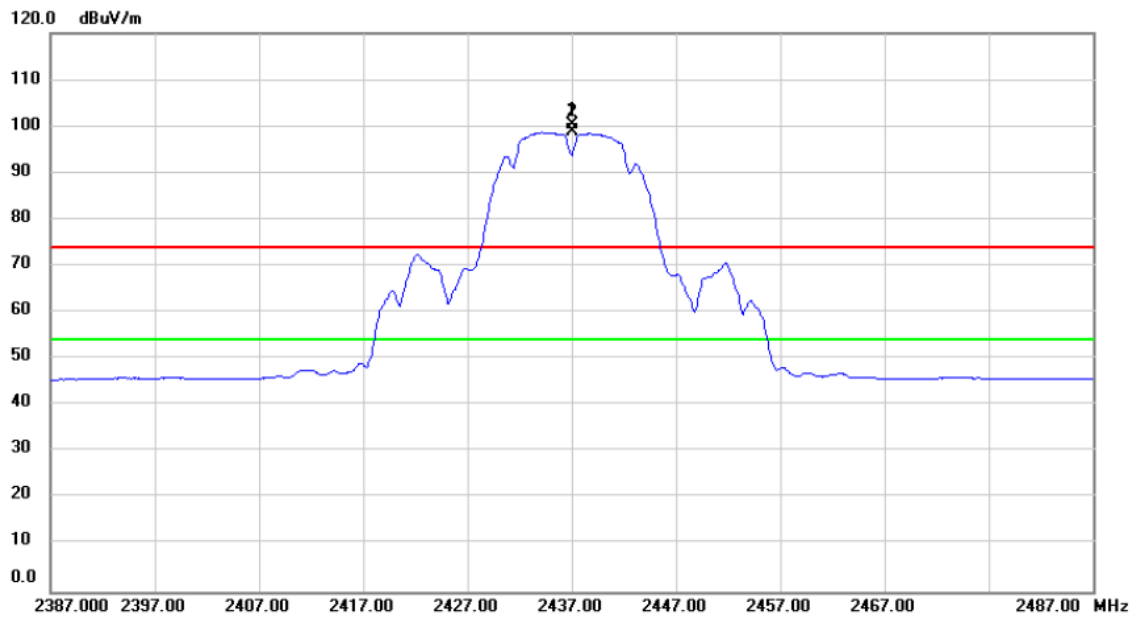
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4824.000	58.76	-11.47	47.29	74.00	-26.71	peak	
2		4824.000	54.59	-11.47	43.12	54.00	-10.88	AVG	
3		7236.000	54.61	-5.36	49.25	84.04	-34.79	peak	non-restricted Freq
4		7236.000	44.01	-5.36	38.65	81.66	-43.01	AVG	non-restricted Freq
5		9648.000	53.49	0.81	54.30	84.04	-29.74	peak	non-restricted Freq
6		9648.000	46.15	0.81	46.96	81.66	-34.7	AVG	non-restricted Freq
7		12060.00	56.13	2.55	58.68	74.00	-15.32	peak	
8	*	12060.00	49.16	2.55	51.71	54.00	-2.29	AVG	
9		14472.00	49.97	7.49	57.46	74.00	-16.54	peak	
10		14472.00	41.52	7.49	49.01	54.00	-4.99	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

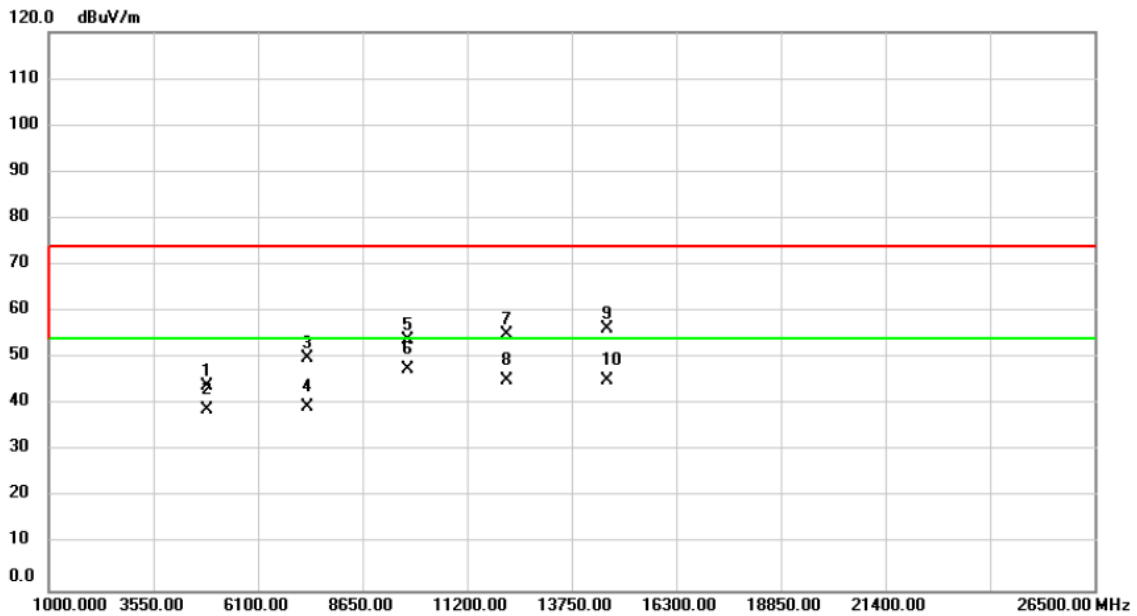
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2437.000	69.17	31.13	100.30	74.00	26.30	peak	No Limit
2	*	2437.000	67.58	31.13	98.71	54.00	44.71	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

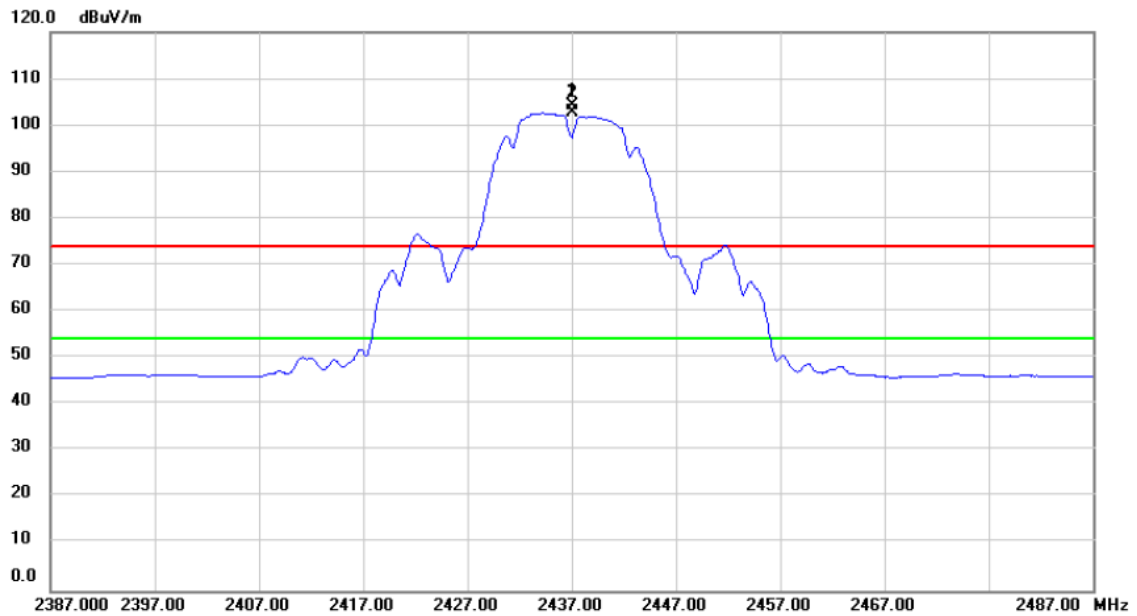
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.000	55.31	-11.39	43.92	74.00	-30.08	peak	
2		4874.000	50.37	-11.39	38.98	54.00	-15.02	AVG	
3		7311.000	54.98	-5.07	49.91	74.00	-24.09	peak	
4		7311.000	44.55	-5.07	39.48	54.00	-14.52	AVG	
5		9748.000	52.61	1.10	53.71	80.30	-26.59	peak	non-restricted Freq
6		9748.000	46.51	1.10	47.61	78.71	-31.1	AVG	non-restricted Freq
7		12185.00	52.63	2.39	55.02	74.00	-18.98	peak	
8	*	12185.00	42.63	2.39	45.02	54.00	-8.98	AVG	
9		14622.00	49.03	7.31	56.34	80.30	-23.96	peak	non-restricted Freq
10		14622.00	37.78	7.31	45.09	78.71	-33.62	AVG	non-restricted Freq

Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

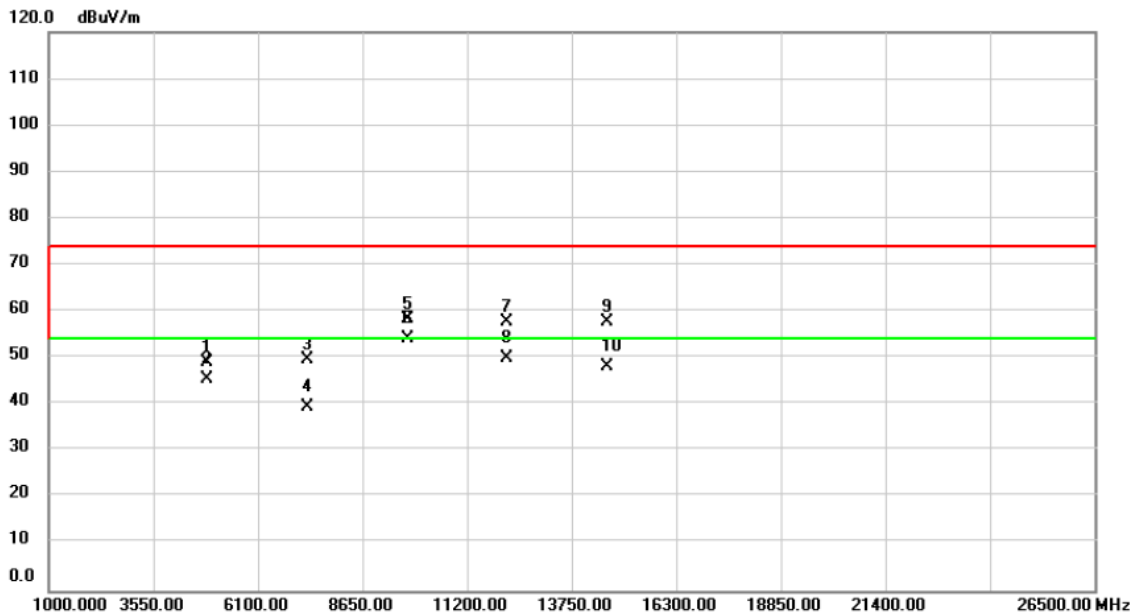
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2437.000	73.07	31.13	104.20	74.00	30.20	peak	No Limit
2	*	2437.000	71.57	31.13	102.70	54.00	48.70	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX B MODE 2437MHz

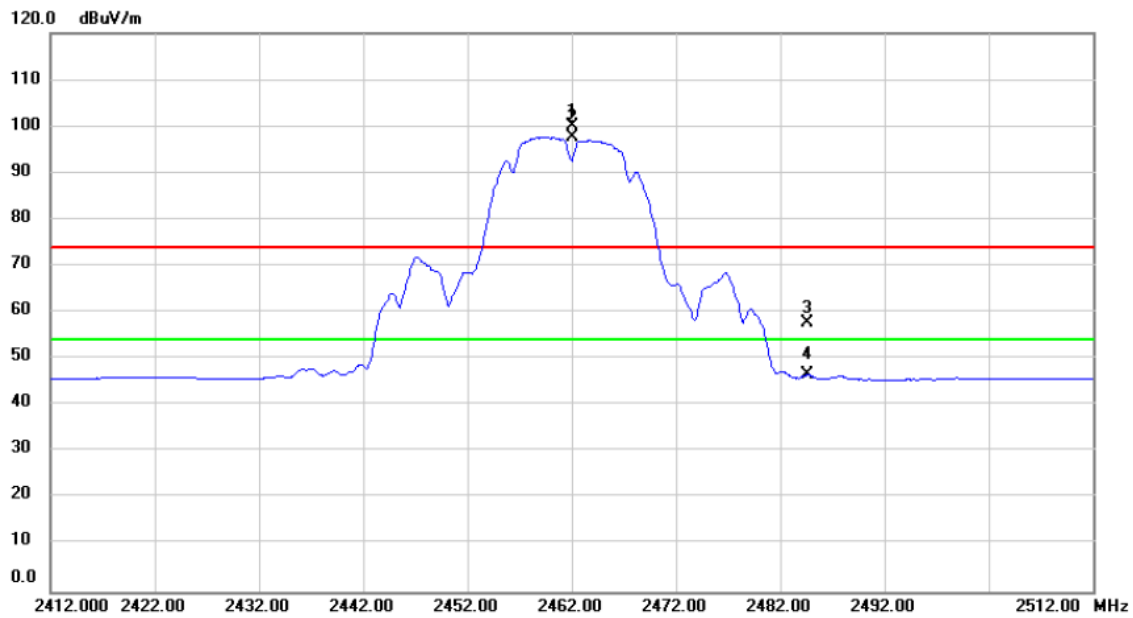
Horizontal



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4874.000	60.34	-11.39	48.95	74.00	-25.05	peak	
2	4874.000	56.97	-11.39	45.58	54.00	-8.42	AVG	
3	7311.000	54.77	-5.07	49.70	74.00	-24.30	peak	
4	7311.000	44.65	-5.07	39.58	54.00	-14.42	AVG	
5	9748.000	57.10	1.10	58.20	84.20	-26.00	peak	non-restricted Freq
6	9748.000	53.05	1.10	54.15	82.70	-28.55	AVG	non-restricted Freq
7	12185.00	55.24	2.39	57.63	74.00	-16.37	peak	
8 *	12185.00	47.42	2.39	49.81	54.00	-4.19	AVG	
9	14622.00	50.40	7.31	57.71	84.20	-26.49	peak	non-restricted Freq
10	14622.00	40.98	7.31	48.29	82.70	-34.41	AVG	non-restricted Freq

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

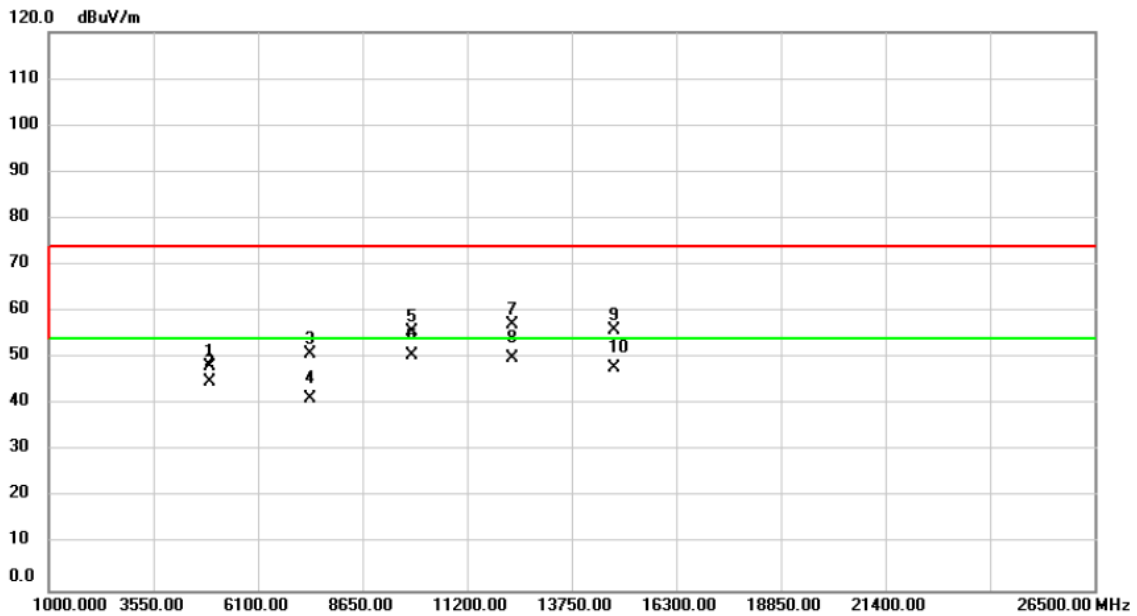
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2462.000	68.93	31.23	100.16	74.00	26.16	peak	No Limit
2	*	2462.000	66.49	31.23	97.72	54.00	43.72	AVG	No Limit
3		2484.606	26.45	31.32	57.77	74.00	-16.23	peak	
4		2484.606	15.31	31.32	46.63	54.00	-7.37	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

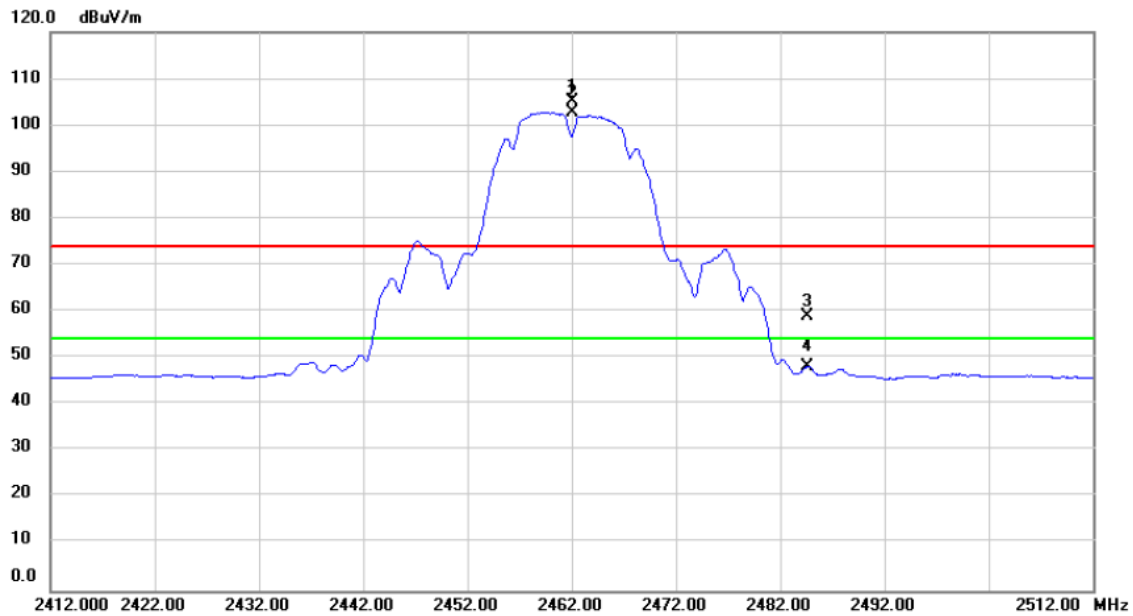
Vertical



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	4924.000	59.52	-11.32	48.20	74.00	-25.80	peak	
2	4924.000	56.04	-11.32	44.72	54.00	-9.28	AVG	
3	7386.000	55.66	-4.80	50.86	74.00	-23.14	peak	
4	7386.000	46.20	-4.80	41.40	54.00	-12.60	AVG	
5	9848.000	54.34	1.39	55.73	80.16	-24.43	peak	non-restricted Freq
6	9848.000	49.29	1.39	50.68	77.72	-27.04	AVG	non-restricted Freq
7	12310.00	55.02	2.22	57.24	74.00	-16.76	peak	
8 *	12310.00	47.68	2.22	49.90	54.00	-4.10	AVG	
9	14772.00	48.92	7.01	55.93	80.16	-24.23	peak	non-restricted Freq
10	14772.00	40.77	7.01	47.78	77.72	-29.94	AVG	non-restricted Freq

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

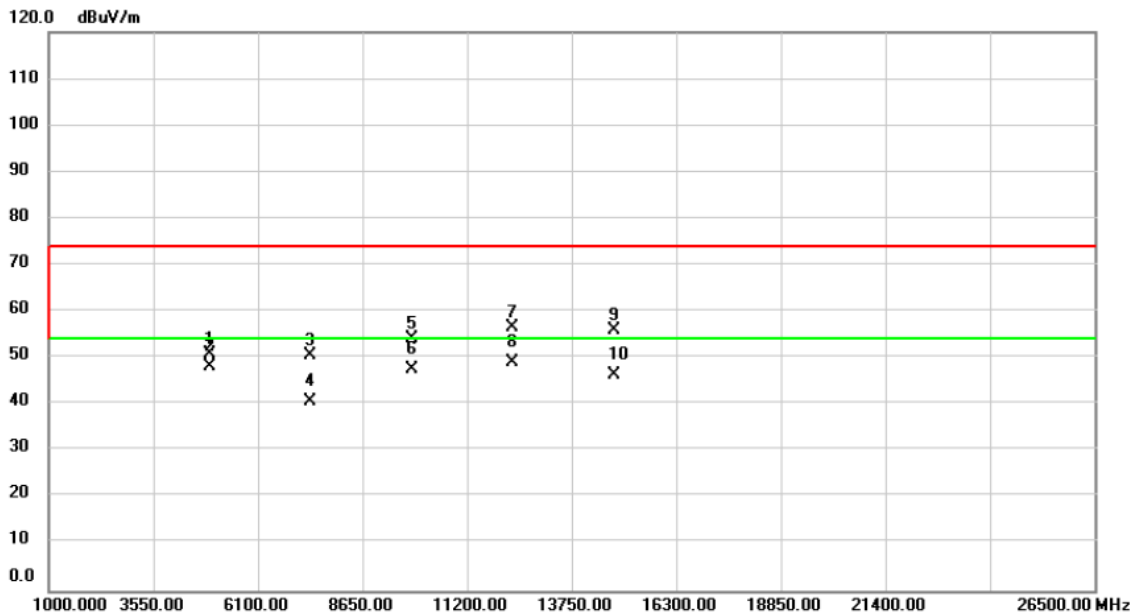
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2462.000	73.95	31.23	105.18	74.00	31.18	peak	No Limit
2	*	2462.000	71.55	31.23	102.78	54.00	48.78	AVG	No Limit
3		2484.655	27.61	31.32	58.93	74.00	-15.07	peak	
4		2484.655	16.87	31.32	48.19	54.00	-5.81	AVG	

Orthogonal Axis :	X
Test Mode :	TX B MODE 2462MHz

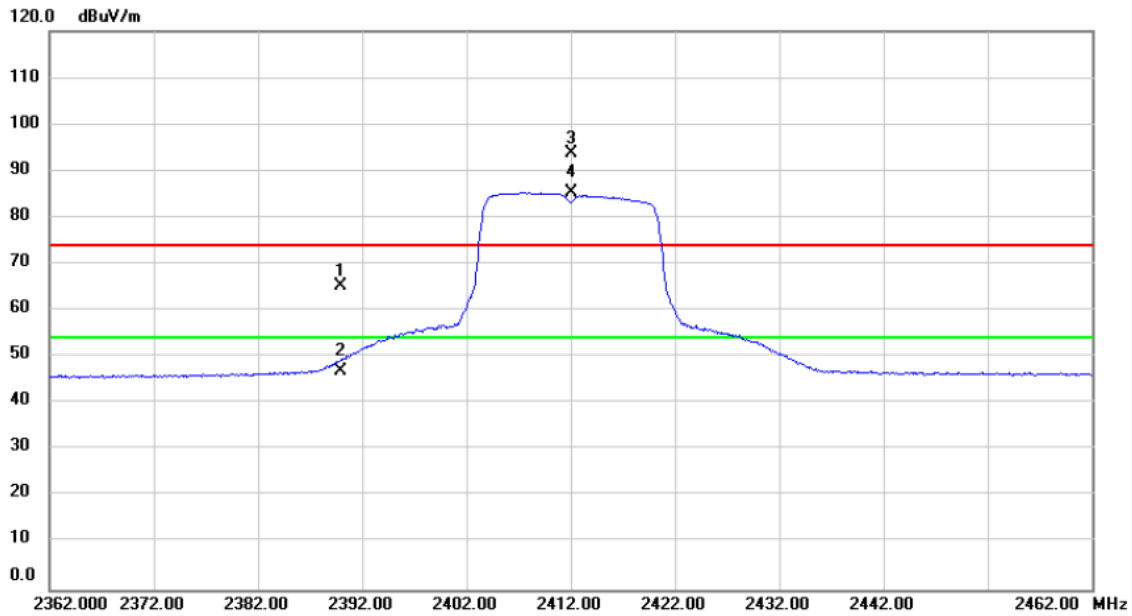
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4924.000	62.22	-11.32	50.90	74.00	-23.10	peak	
2		4924.000	59.40	-11.32	48.08	54.00	-5.92	AVG	
3		7386.000	55.35	-4.80	50.55	74.00	-23.45	peak	
4		7386.000	45.53	-4.80	40.73	54.00	-13.27	AVG	
5		9848.000	52.83	1.39	54.22	85.18	-30.96	peak	non-restricted Freq
6		9848.000	46.22	1.39	47.61	82.78	-35.17	AVG	non-restricted Freq
7		12310.00	54.33	2.22	56.55	74.00	-17.45	peak	
8	*	12310.00	46.91	2.22	49.13	54.00	-4.87	AVG	
9		14772.00	49.04	7.01	56.05	85.18	-29.13	peak	non-restricted Freq
10		14772.00	39.40	7.01	46.41	82.78	-36.37	AVG	non-restricted Freq

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

Vertical

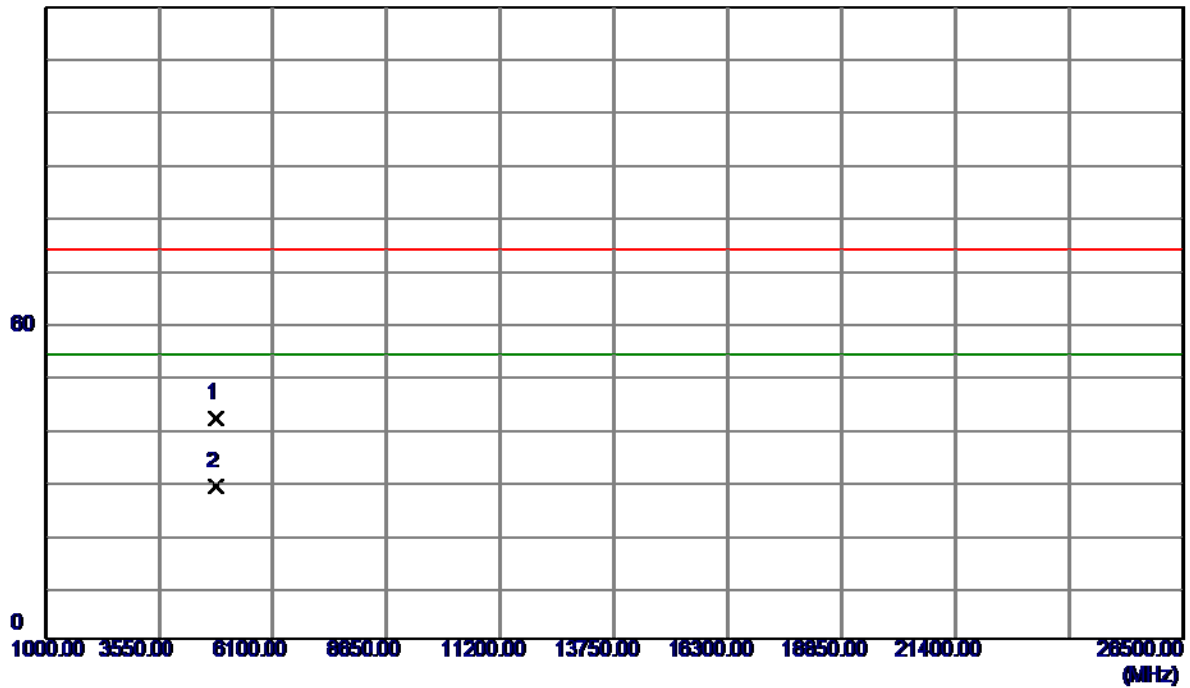


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2389.944	34.40	30.96	65.36	74.00	-8.64	peak	
2		2389.944	16.03	30.96	46.99	54.00	-7.01	AVG	
3	X	2412.000	62.65	31.04	93.69	74.00	19.69	peak	No Limit
4	*	2412.000	54.22	31.04	85.26	54.00	31.26	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

Vertical

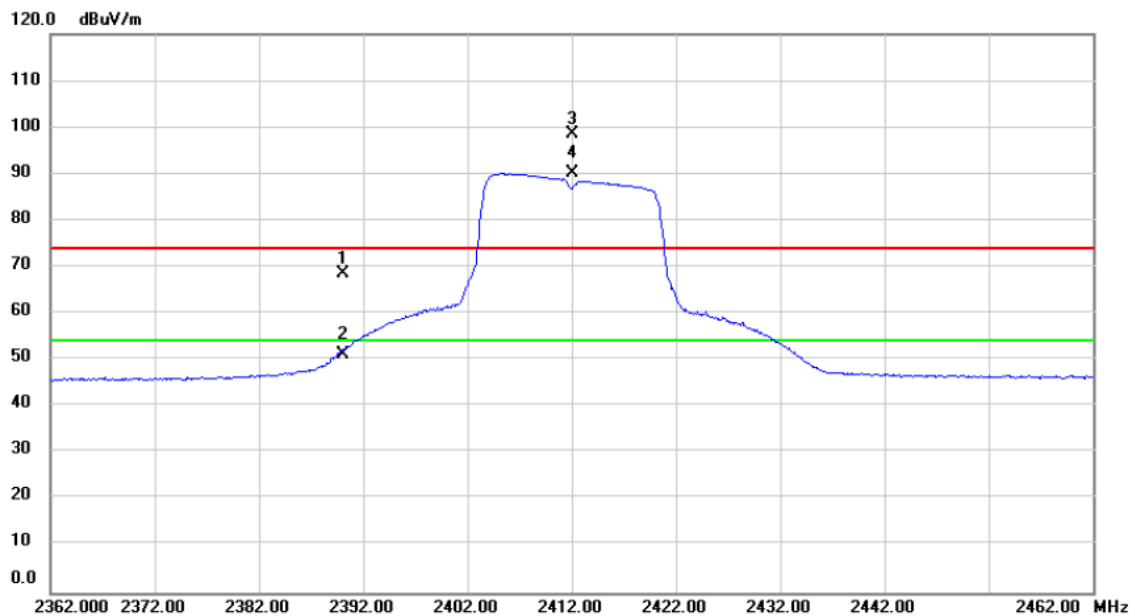
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4824.0000	53.22	-11.47	41.75	74.00	-32.25	Peak	
2 *	4824.0000	40.38	-11.47	28.91	54.00	-25.09	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

Horizontal

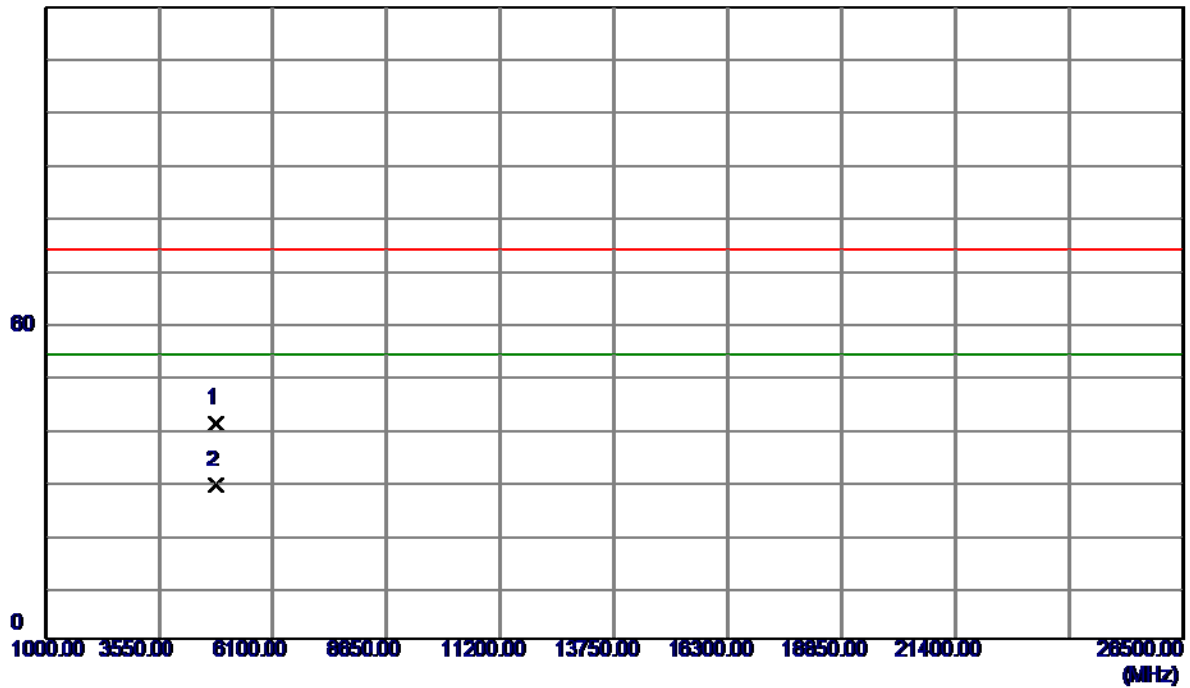


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	37.60	30.96	68.56	74.00	-5.44	peak	
2		2390.000	20.10	30.96	51.06	54.00	-2.94	AVG	
3	X	2412.000	67.61	31.04	98.65	74.00	24.65	peak	No Limit
4	*	2412.000	59.09	31.04	90.13	54.00	36.13	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G MODE 2412MHz

Horizontal

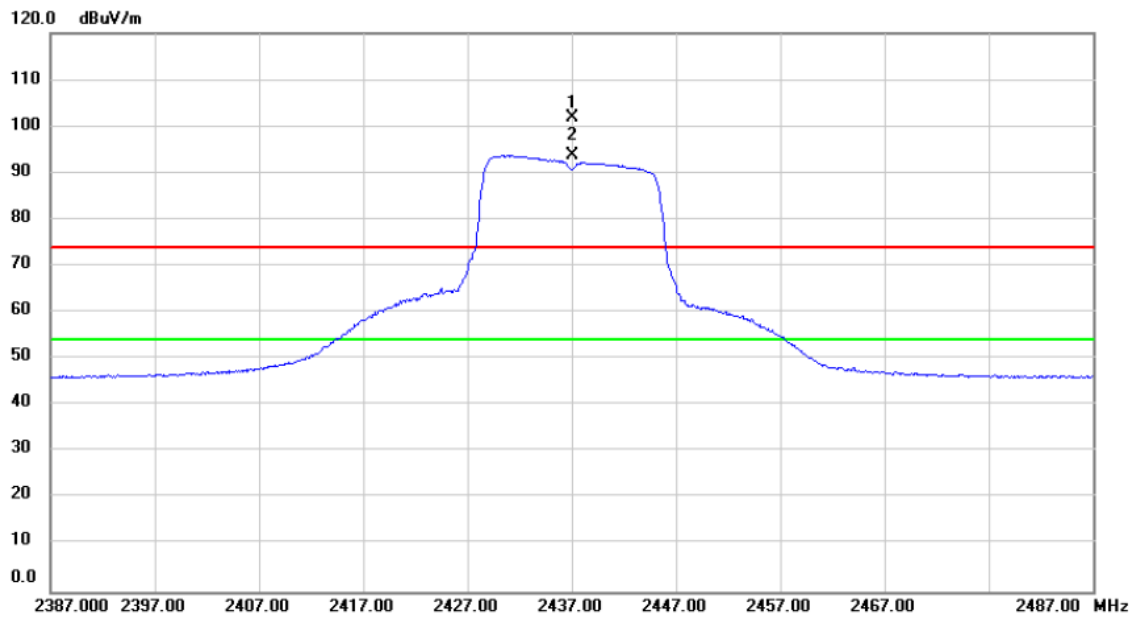
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4824.0000	52.18	-11.47	40.71	74.00	-33.29	Peak	
2 *	4824.0000	40.42	-11.47	28.95	54.00	-25.05	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Vertical

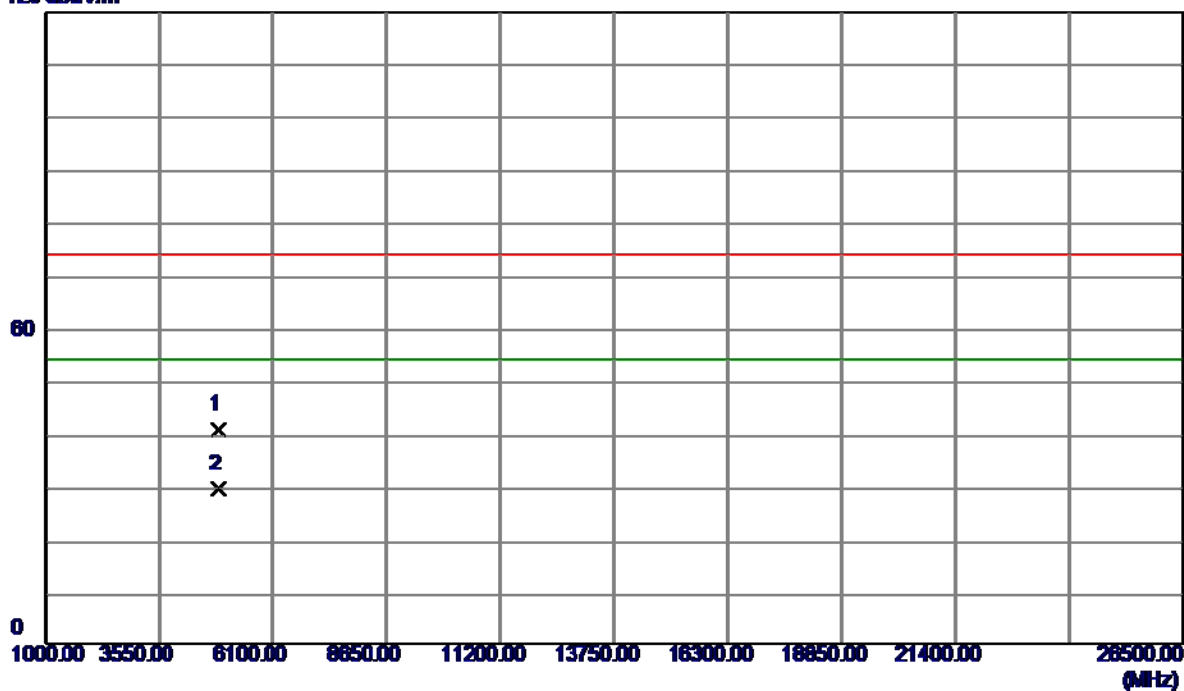


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2437.000	70.76	31.13	101.89	74.00	27.89	peak	No Limit
2	*	2437.000	62.54	31.13	93.67	54.00	39.67	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Vertical

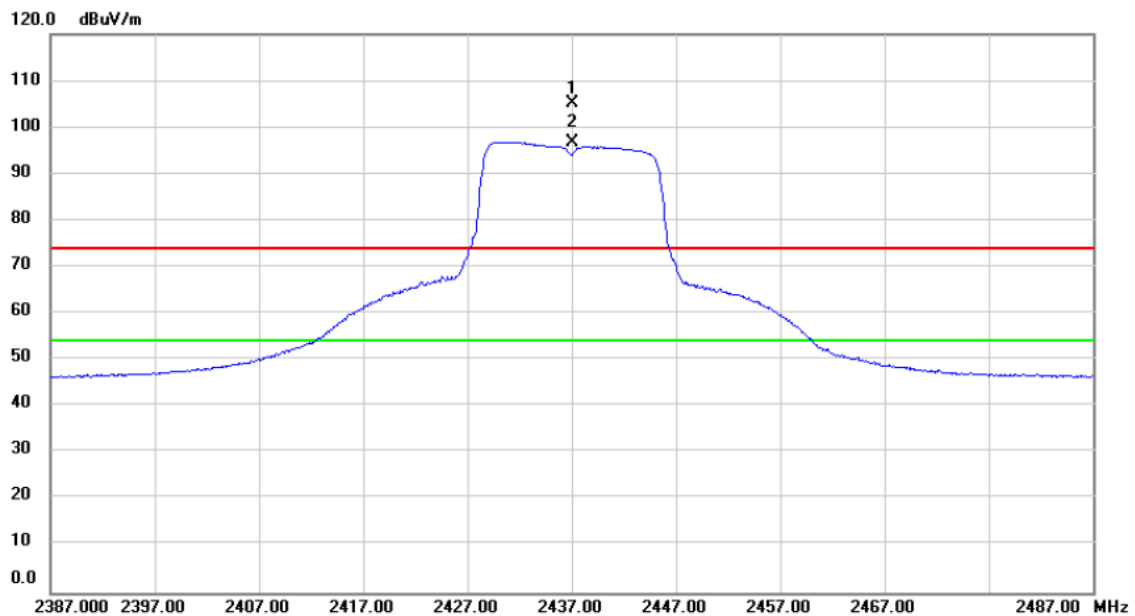
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4874.0000	51.89	-11.39	40.50	74.00	-33.50	Peak	
2 *	4874.0000	40.78	-11.39	29.39	54.00	-24.61	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Horizontal

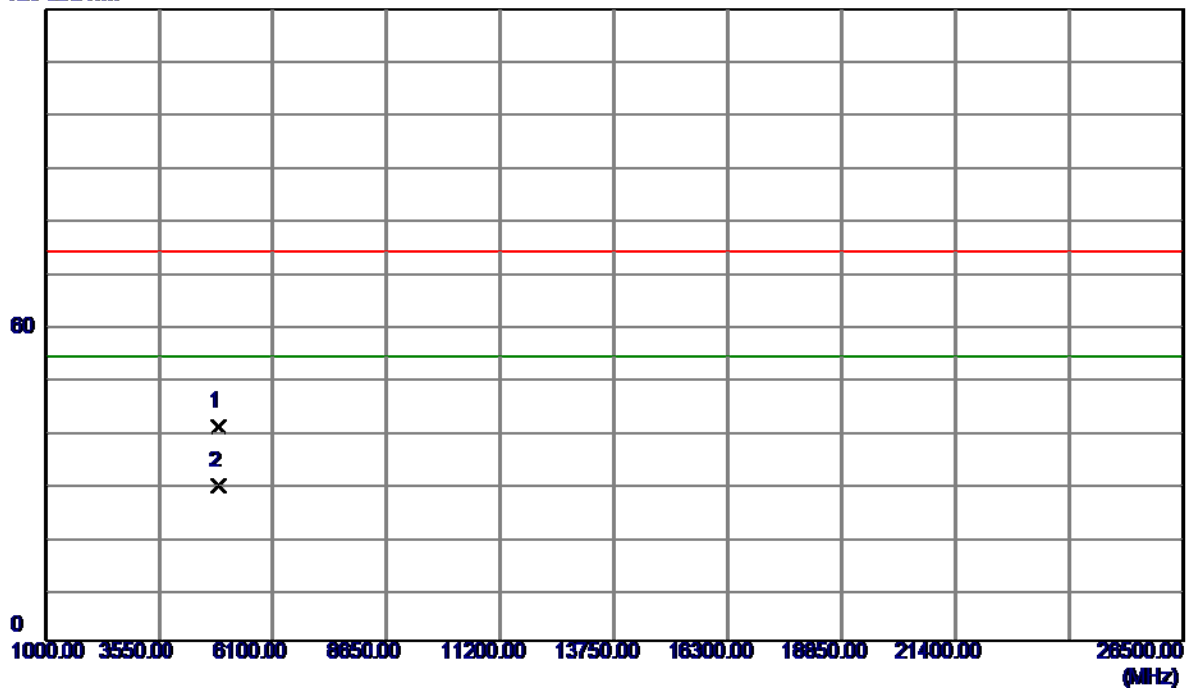


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2437.000	74.05	31.13	105.18	74.00	31.18	peak	No Limit
2	*	2437.000	65.71	31.13	96.84	54.00	42.84	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G MODE 2437MHz

Horizontal

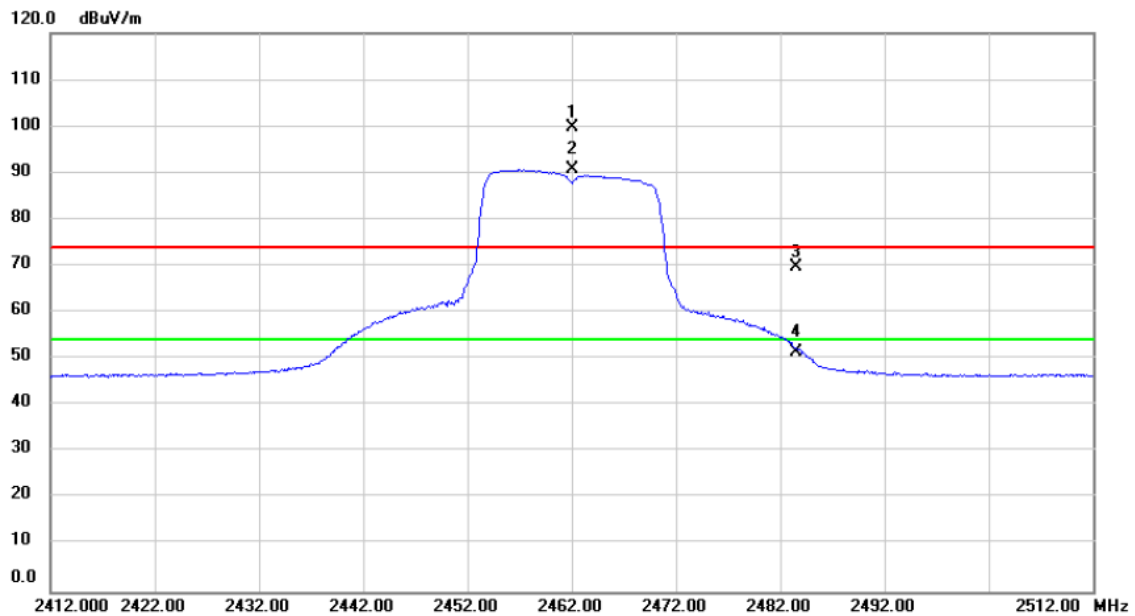
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4874.0000	51.99	-11.39	40.60	74.00	-33.40	Peak	
2 *	4874.0000	40.77	-11.39	29.38	54.00	-24.62	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

Vertical

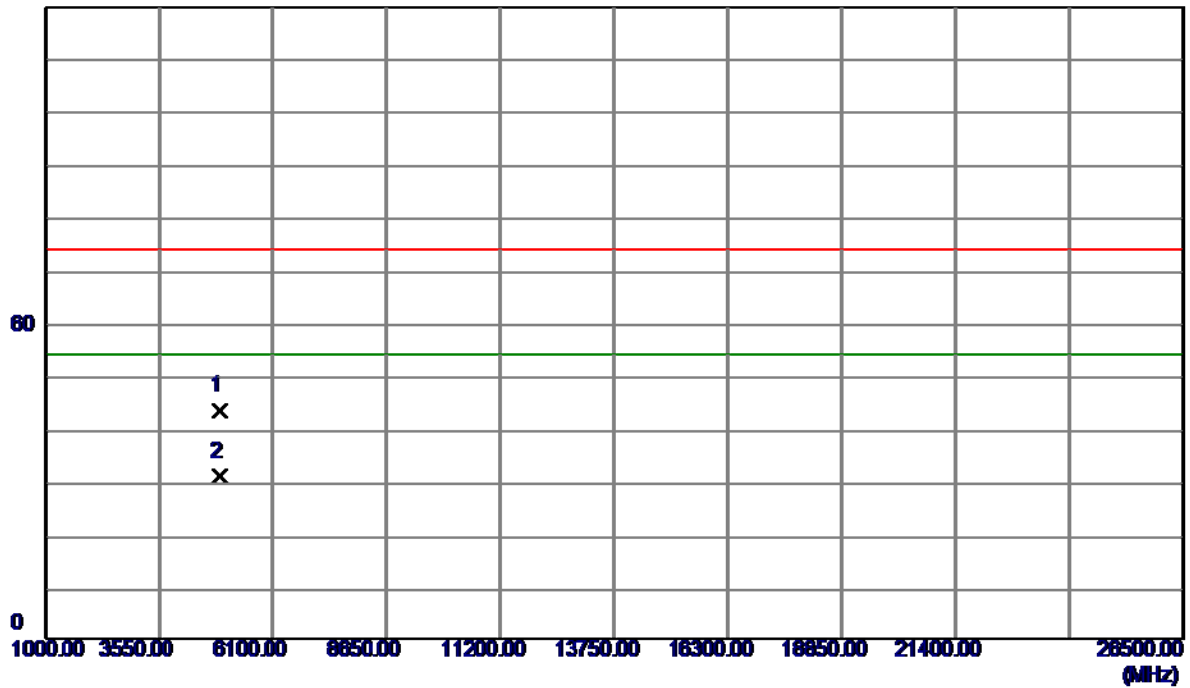


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2462.000	68.52	31.23	99.75	74.00	25.75	peak	No Limit
2	*	2462.000	59.46	31.23	90.69	54.00	36.69	AVG	No Limit
3		2483.500	38.58	31.31	69.89	74.00	-4.11	peak	
4		2483.500	20.14	31.31	51.45	54.00	-2.55	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

Vertical

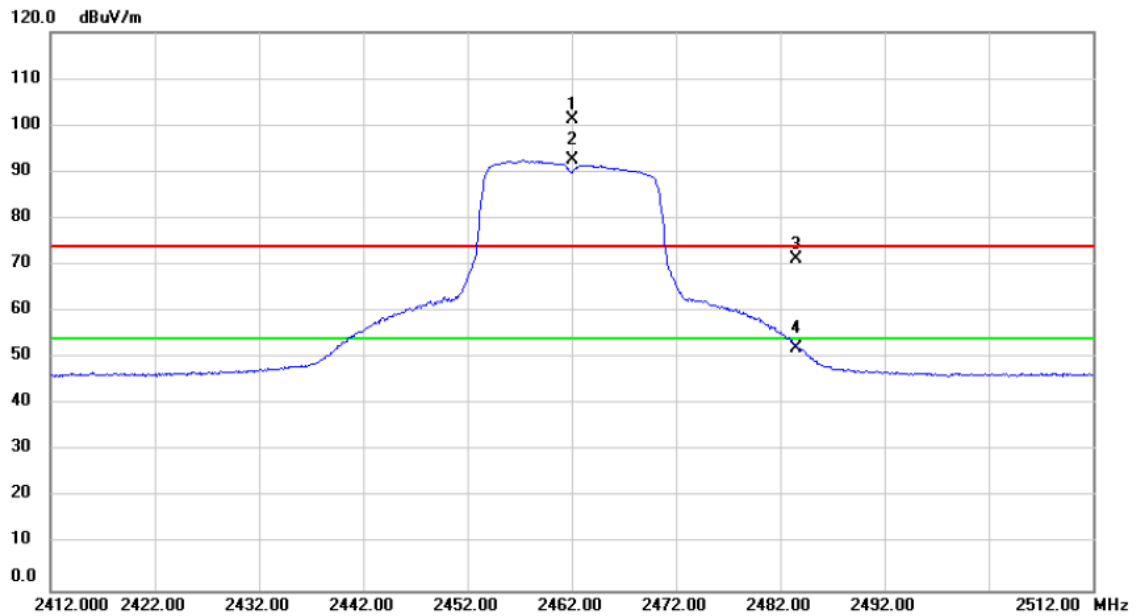
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4924.0000	54.45	-11.32	43.13	74.00	-30.87	Peak	
2 *	4924.0000	41.95	-11.32	30.63	54.00	-23.37	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

Horizontal

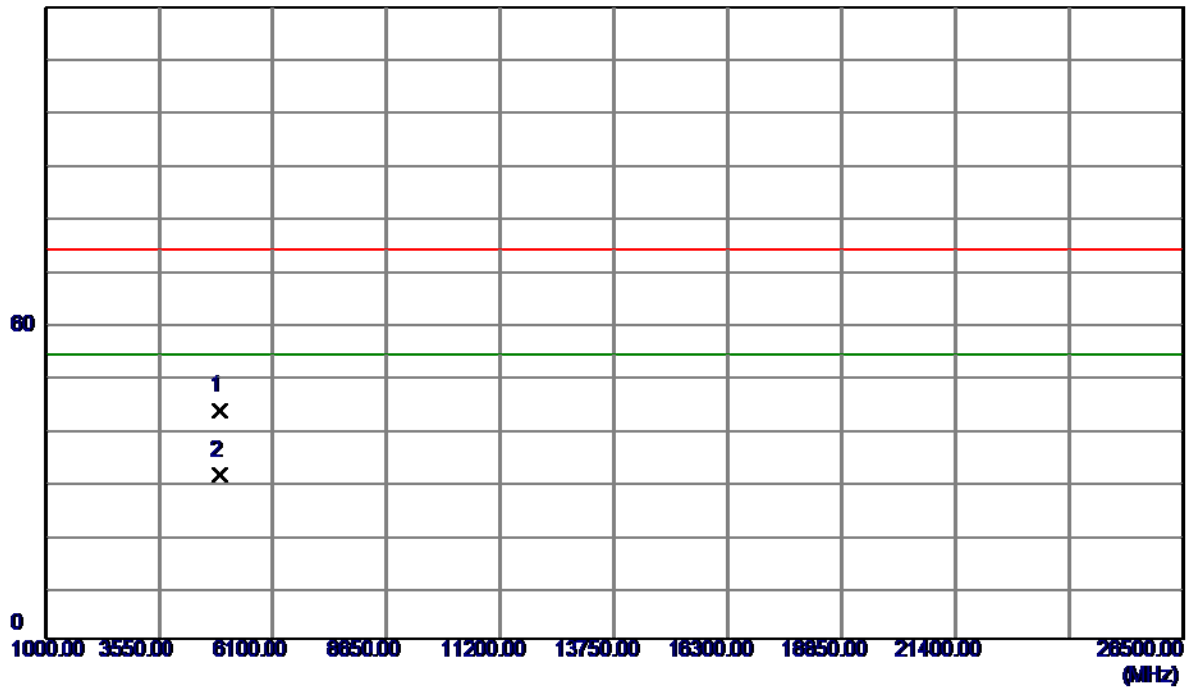


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2462.000	69.89	31.23	101.12	74.00	27.12	peak	No Limit
2	*	2462.000	61.21	31.23	92.44	54.00	38.44	AVG	No Limit
3		2483.500	39.87	31.31	71.18	74.00	-2.82	peak	
4		2483.500	20.86	31.31	52.17	54.00	-1.83	AVG	

Orthogonal Axis :	X
Test Mode :	TX G MODE 2462MHz

Horizontal

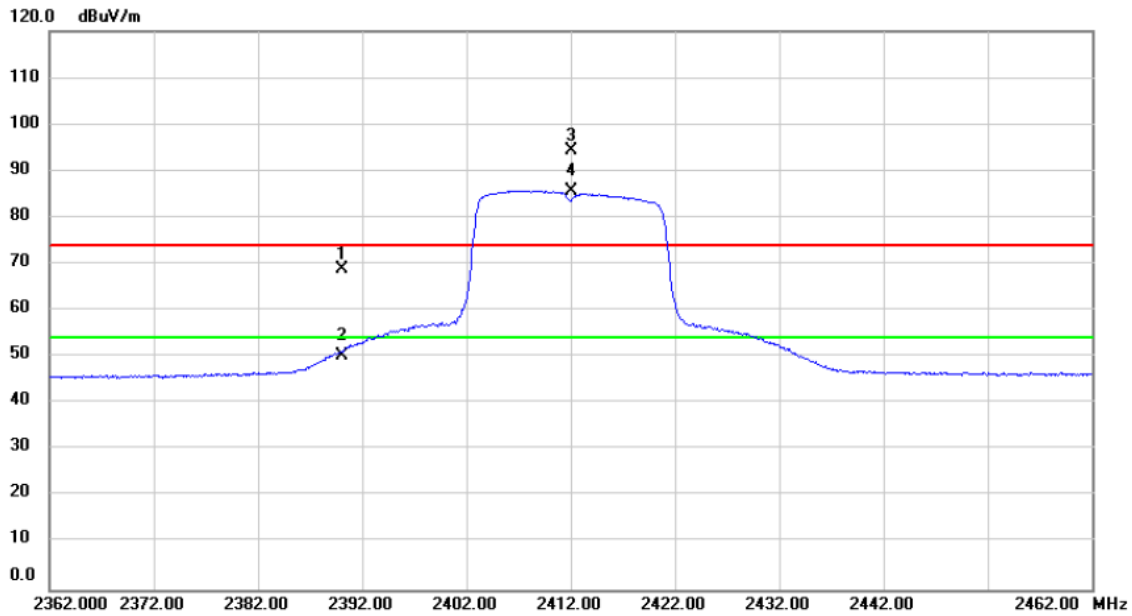
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4924.0000	54.48	-11.32	43.16	74.00	-30.84	Peak	
2 *	4924.0000	42.26	-11.32	30.94	54.00	-23.06	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2412MHz

Vertical

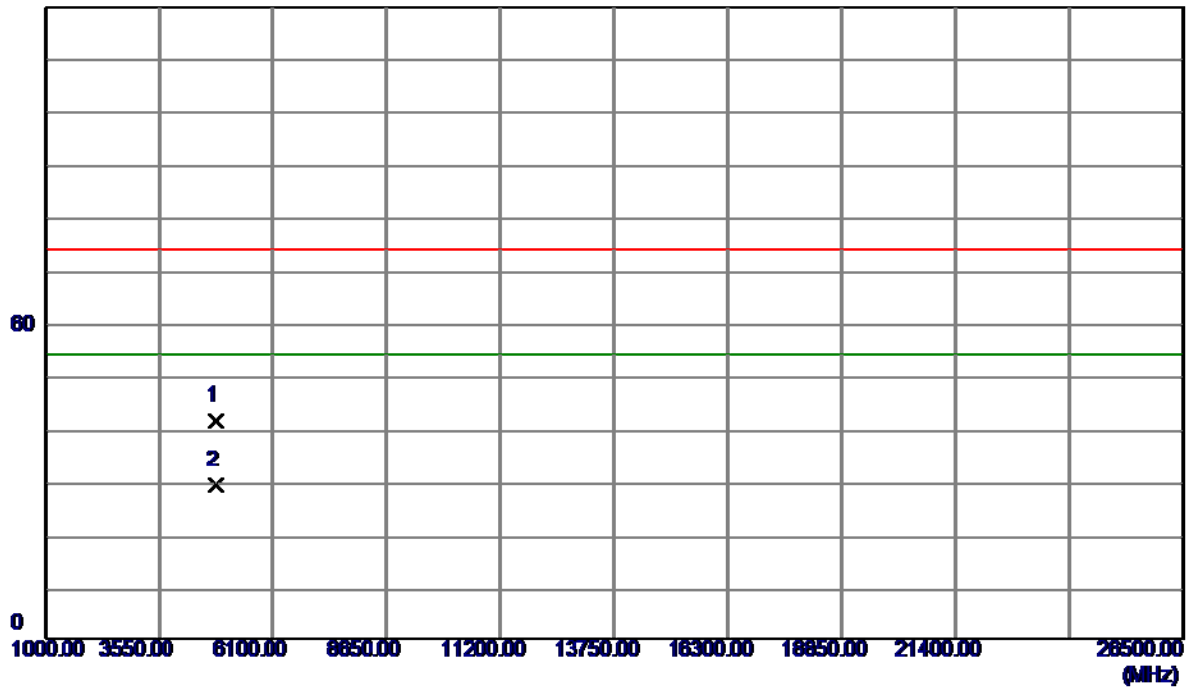


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	37.76	30.96	68.72	74.00	-5.28	peak	
2		2390.000	19.34	30.96	50.30	54.00	-3.70	AVG	
3	X	2412.000	63.39	31.04	94.43	74.00	20.43	peak	No Limit
4	*	2412.000	54.72	31.04	85.76	54.00	31.76	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2412MHz

Vertical

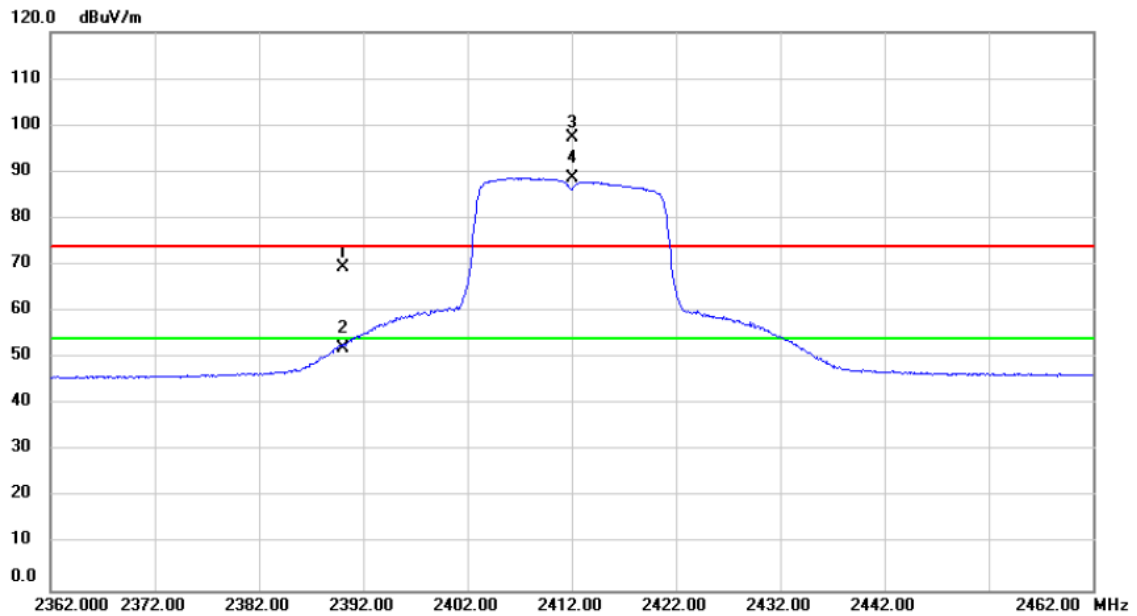
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4824.0000	52.69	-11.47	41.22	74.00	-32.78	Peak	
2 *	4824.0000	40.58	-11.47	29.11	54.00	-24.89	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2412MHz

Horizontal

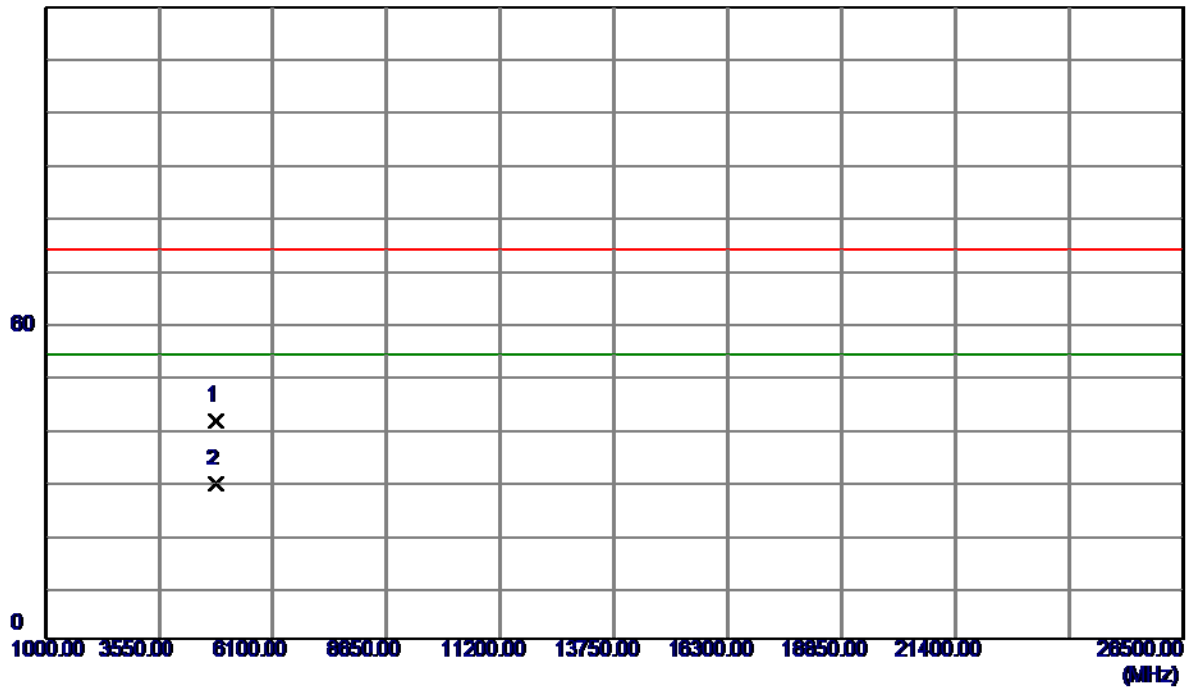


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2390.000	38.63	30.96	69.59	74.00	-4.41	peak	
2	2390.000	21.22	30.96	52.18	54.00	-1.82	AVG	
3 X	2412.000	66.29	31.04	97.33	74.00	23.33	peak	No Limit
4 *	2412.000	57.65	31.04	88.69	54.00	34.69	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2412MHz

Horizontal

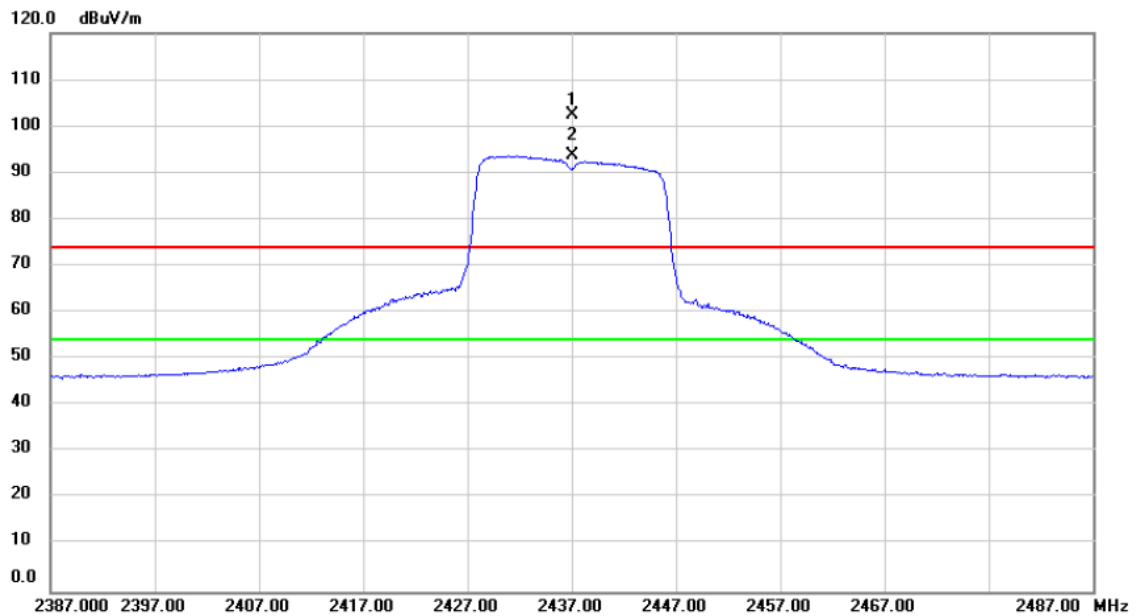
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4824.0000	52.85	-11.47	41.38	74.00	-32.62	Peak	
2 *	4824.0000	40.71	-11.47	29.24	54.00	-24.76	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2437MHz

Vertical

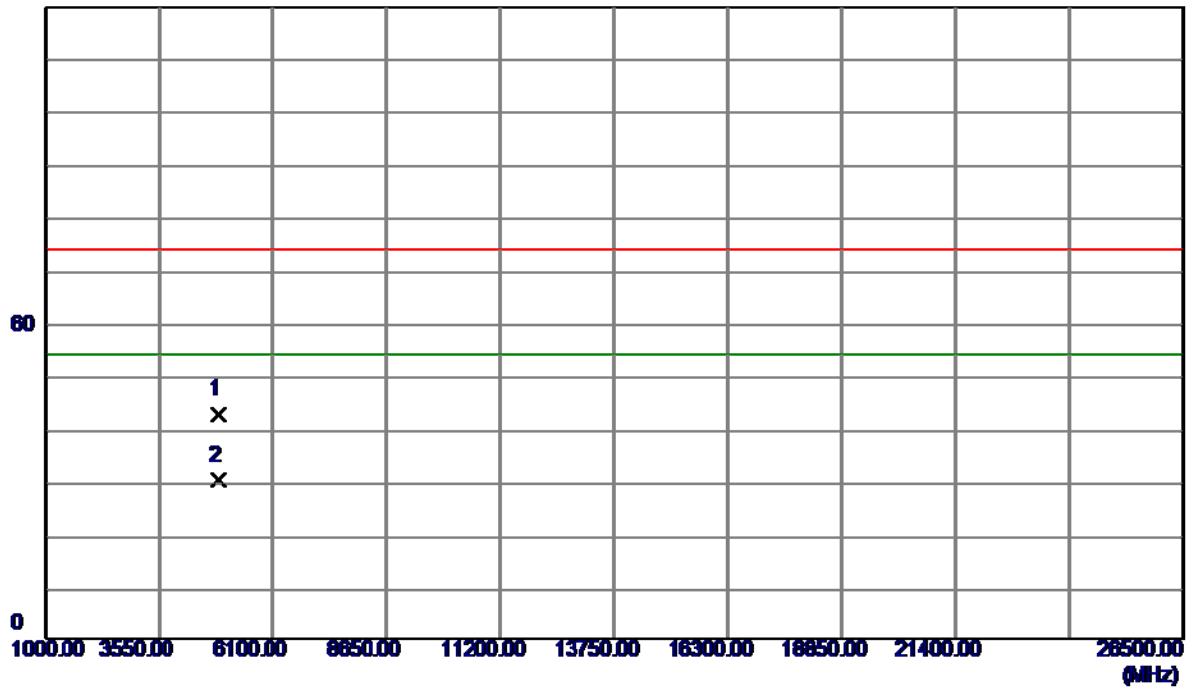


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2437.000	71.38	31.13	102.51	74.00	28.51	peak	No Limit
2	*	2437.000	62.51	31.13	93.64	54.00	39.64	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2437MHz

Vertical

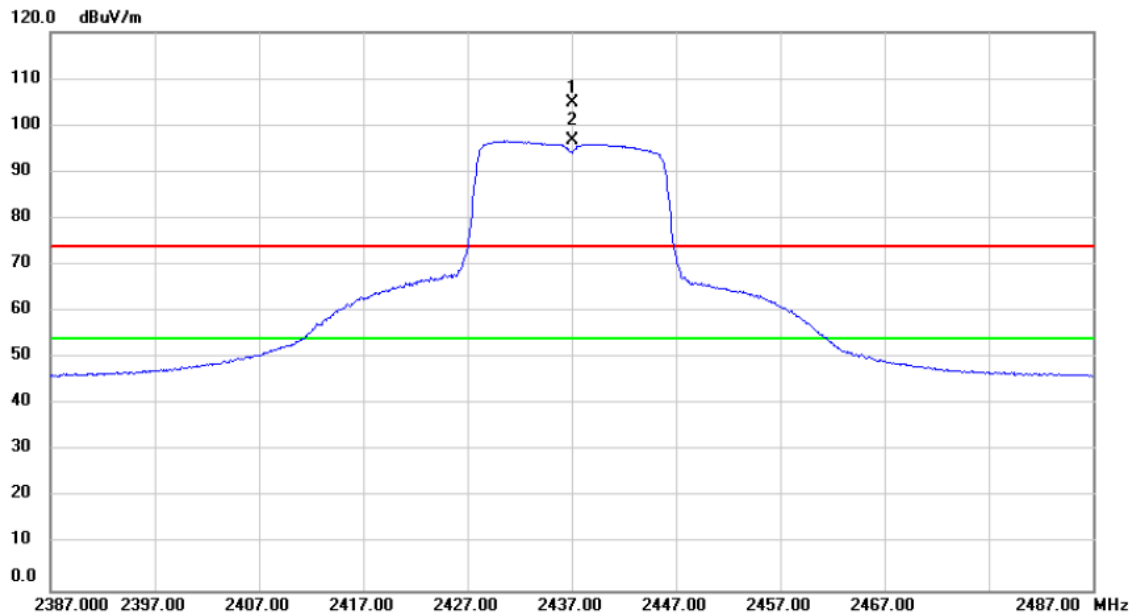
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4874.0000	53.96	-11.39	42.57	74.00	-31.43	Peak	
2 *	4874.0000	41.33	-11.39	29.94	54.00	-24.06	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2437MHz

Horizontal

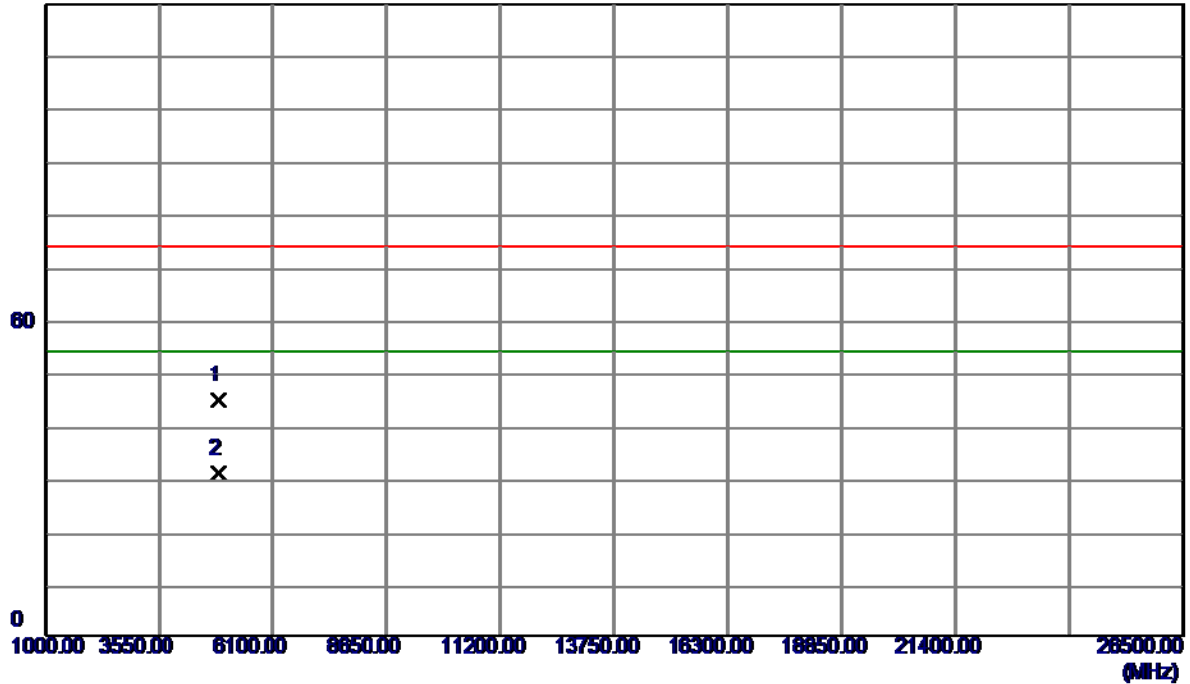


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2437.000	73.59	31.13	104.72	74.00	30.72	peak	No Limit
2	*	2437.000	65.65	31.13	96.78	54.00	42.78	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2437MHz

Horizontal

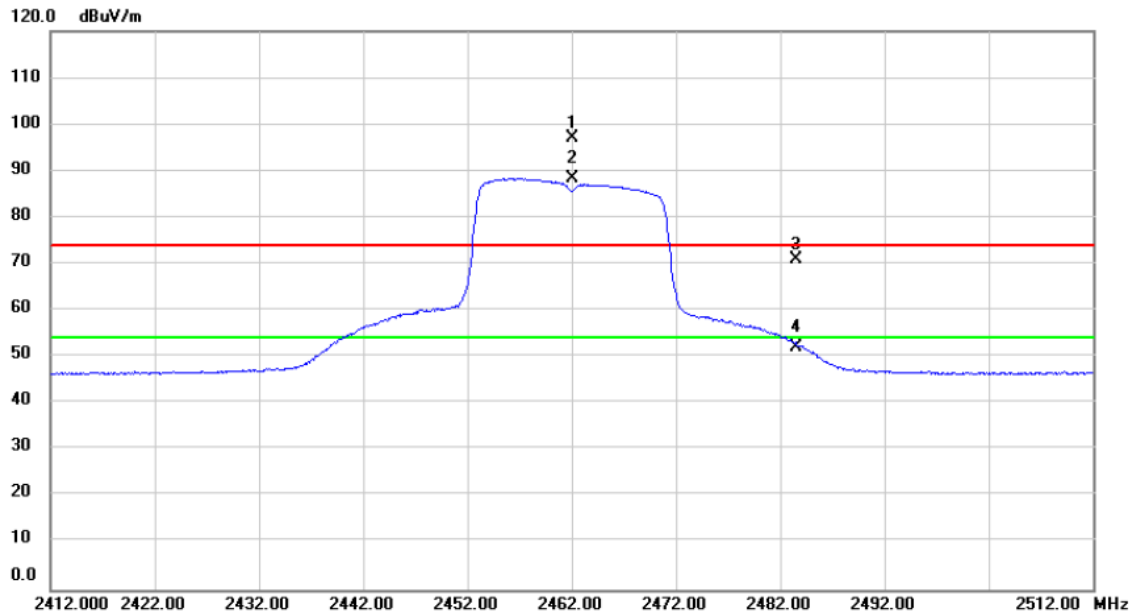
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4874.0000	56.01	-11.39	44.62	74.00	-29.38	Peak	
2 *	4874.0000	42.16	-11.39	30.77	54.00	-23.23	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2462MHz

Vertical

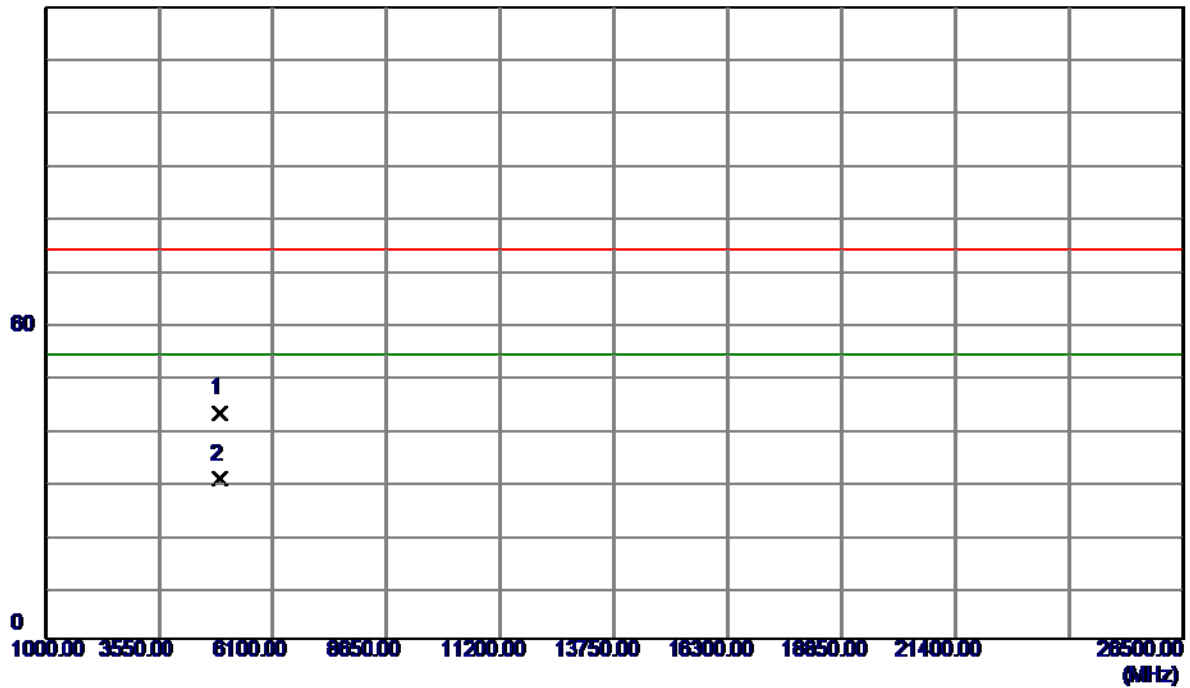


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2462.000	65.73	31.23	96.96	74.00	22.96	peak	No Limit
2	*	2462.000	57.08	31.23	88.31	54.00	34.31	AVG	No Limit
3		2483.566	39.56	31.31	70.87	74.00	-3.13	peak	
4		2483.566	20.85	31.31	52.16	54.00	-1.84	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2462MHz

Vertical

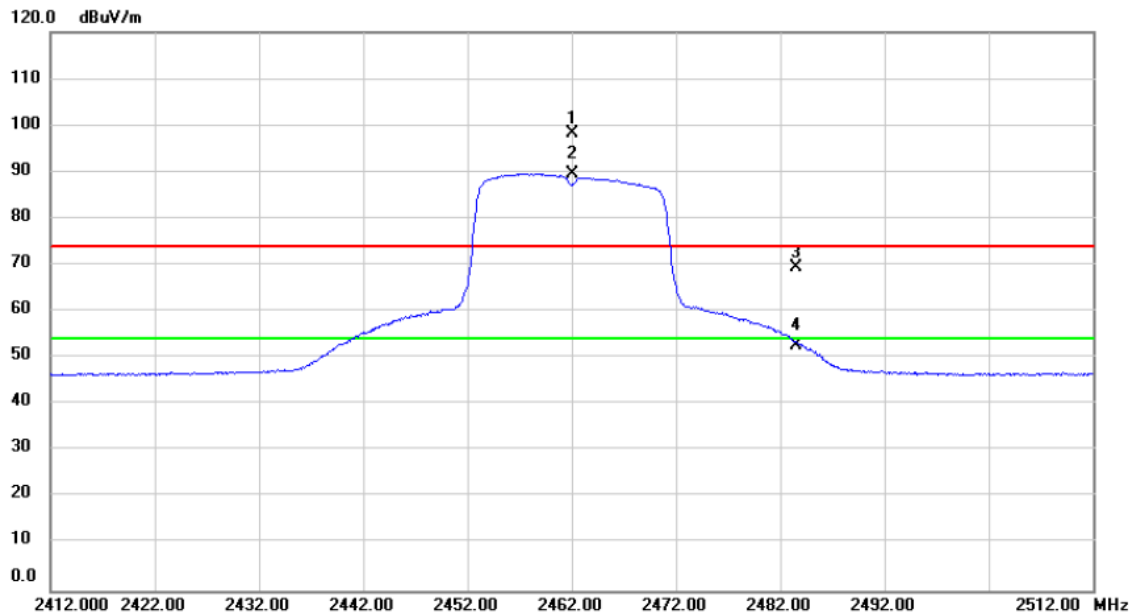
120 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4924.0000	54.11	-11.32	42.79	74.00	-31.21	Peak	
2 *	4924.0000	41.56	-11.32	30.24	54.00	-23.76	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2462MHz

Horizontal

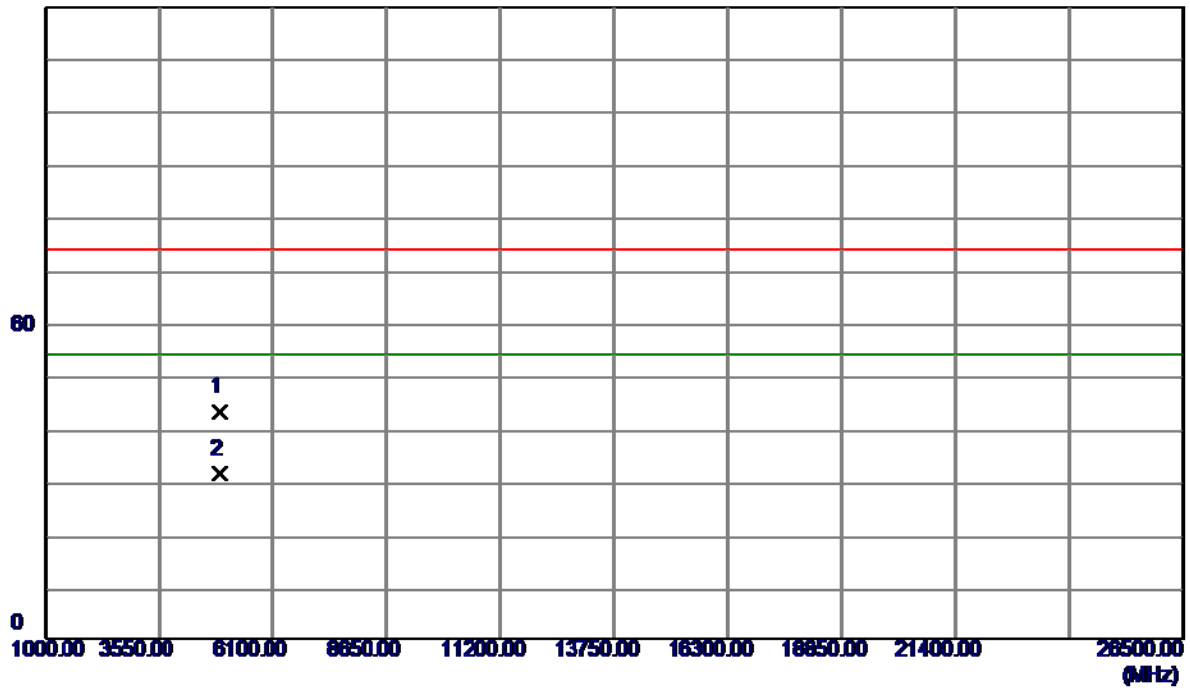


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2462.000	66.90	31.23	98.13	74.00	24.13	peak	No Limit
2	*	2462.000	58.35	31.23	89.58	54.00	35.58	AVG	No Limit
3		2483.582	38.22	31.31	69.53	74.00	-4.47	peak	
4		2483.582	21.30	31.31	52.61	54.00	-1.39	AVG	

Orthogonal Axis :	X
Test Mode :	TX N-20M MODE 2462MHz

Horizontal

120 dBuV/m



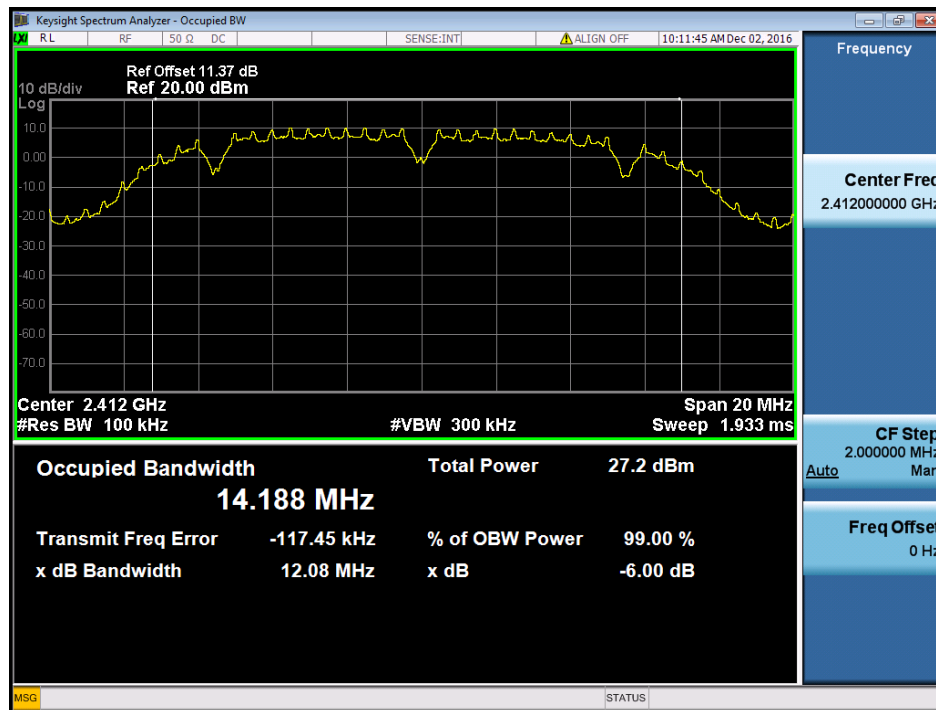
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	4924.0000	54.32	-11.32	43.00	74.00	-31.00	Peak	
2 *	4924.0000	42.58	-11.32	31.26	54.00	-22.74	AVG	

ATTACHMENT E - BANDWIDTH

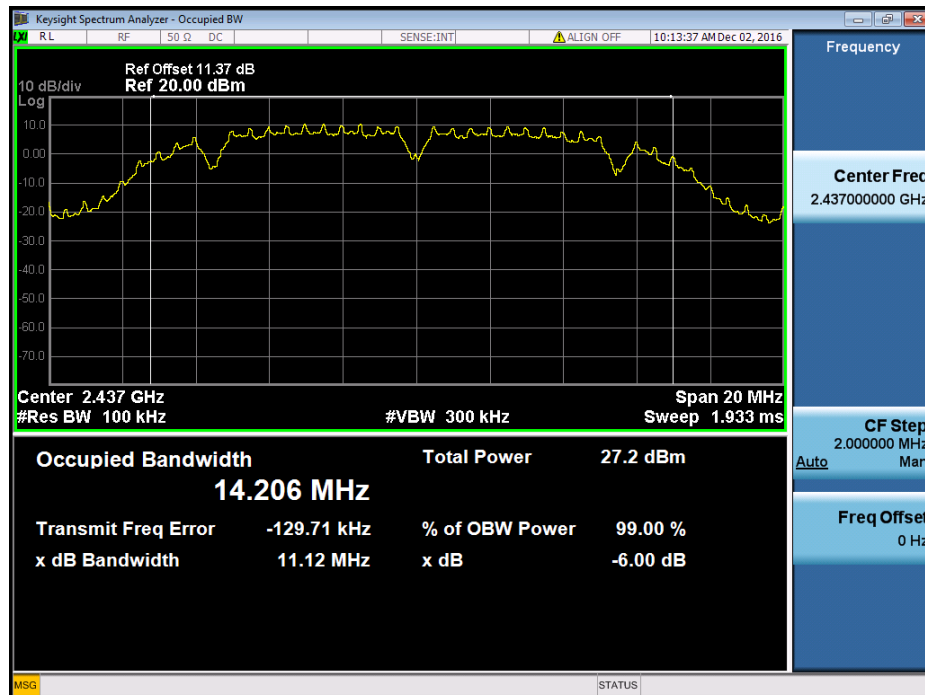
Test Mode : TX B Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	12.08	14.19	500	Complies
2437	11.12	14.21	500	Complies
2462	11.13	14.21	500	Complies

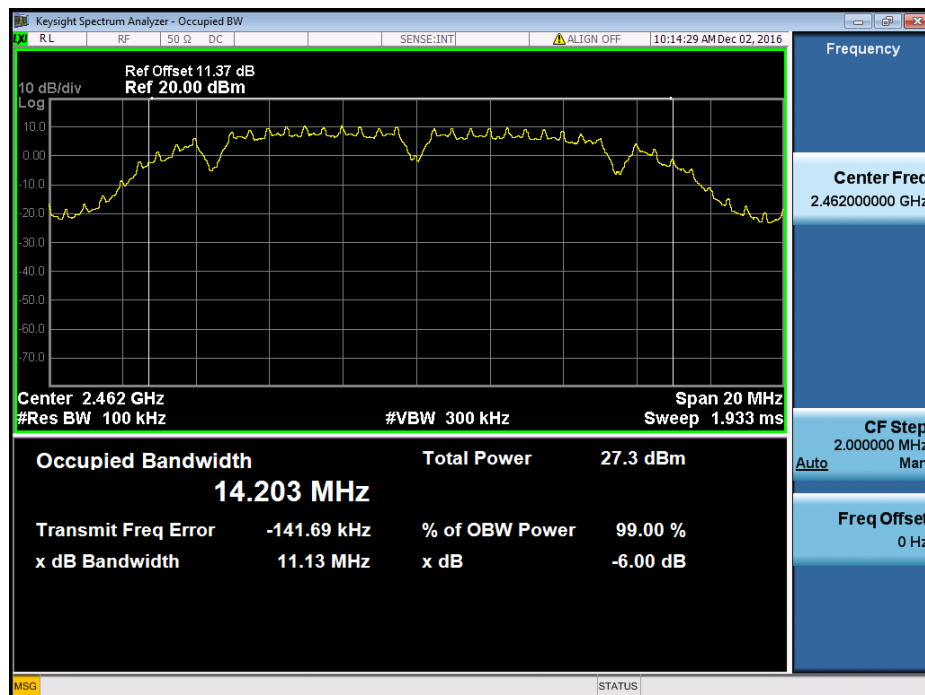
TX CH01



TX CH06



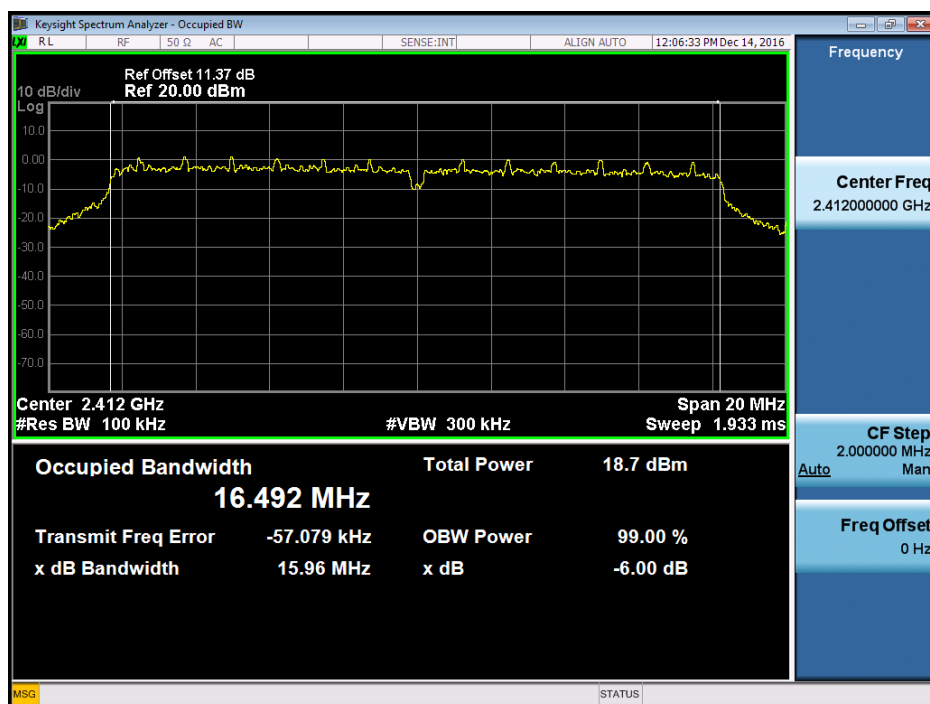
TX CH11



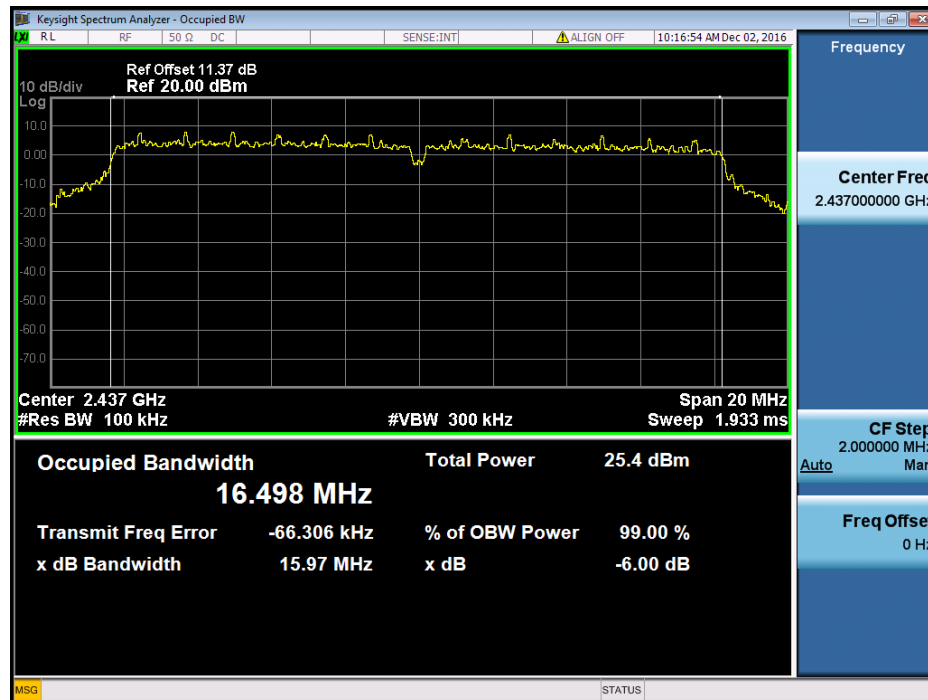
Test Mode: TX G Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	15.97	16.49	500	Complies
2437	15.97	16.50	500	Complies
2462	16.06	16.50	500	Complies

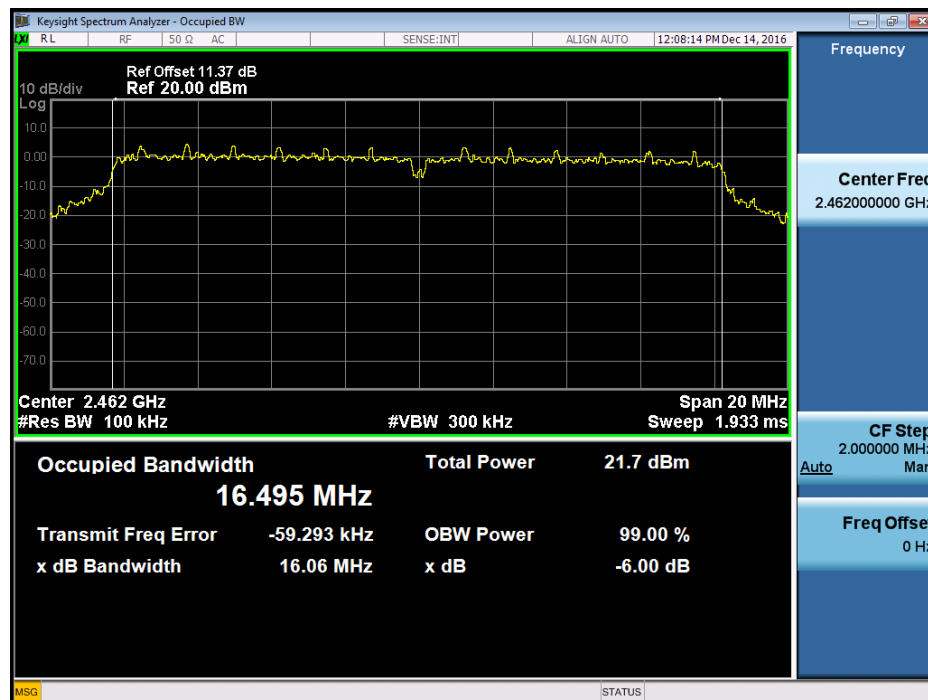
TX CH01



TX CH06



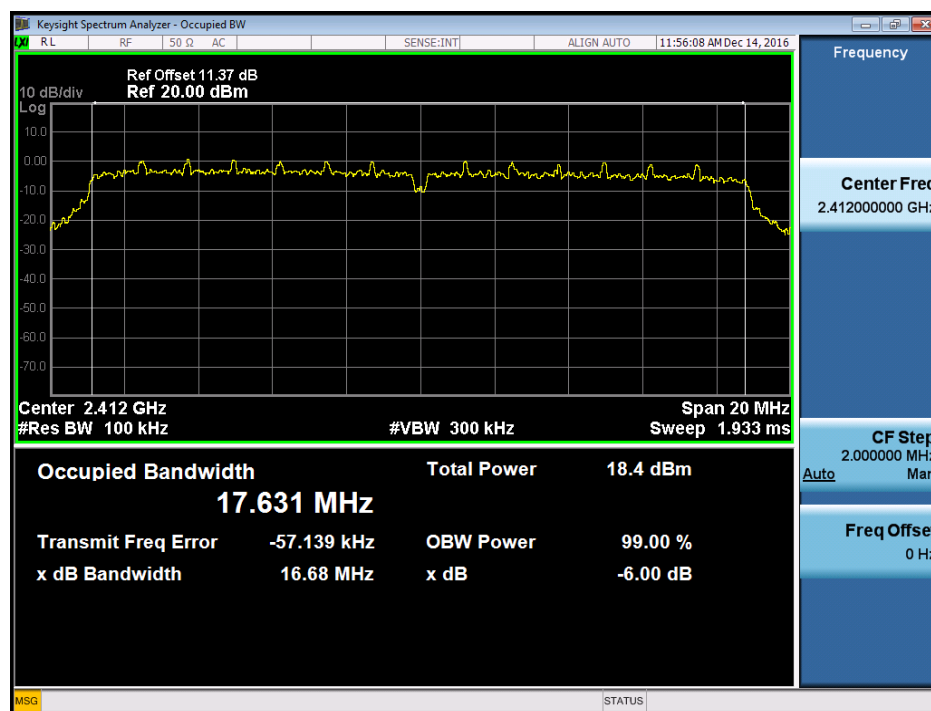
TX CH11



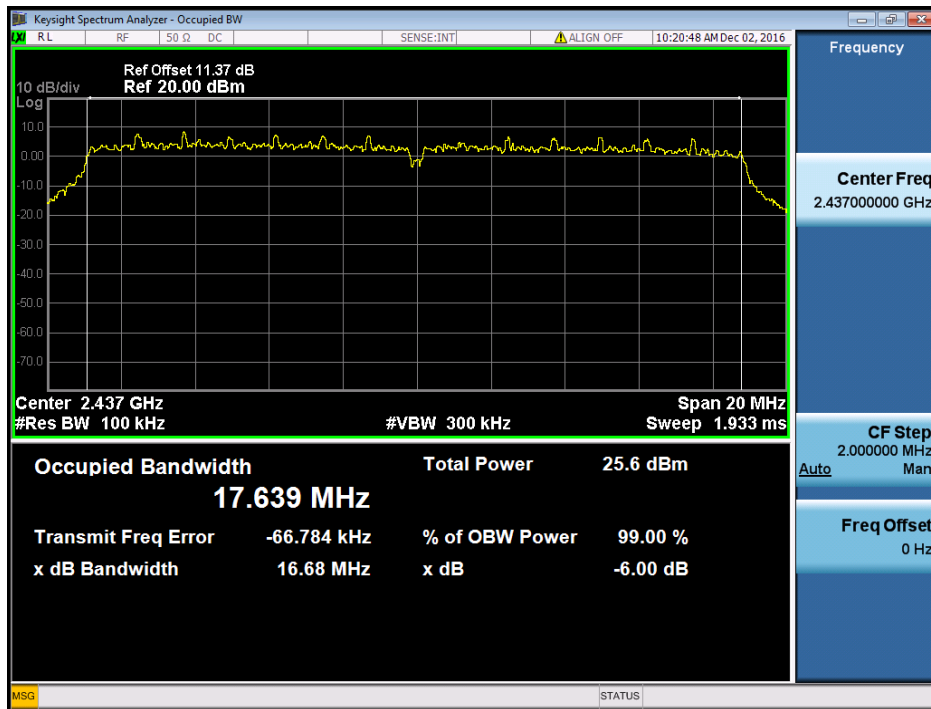
Test Mode : TX N-20MHz Mode_CH01/06/11

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2412	16.68	17.63	500	Complies
2437	16.68	17.64	500	Complies
2462	16.69	17.64	500	Complies

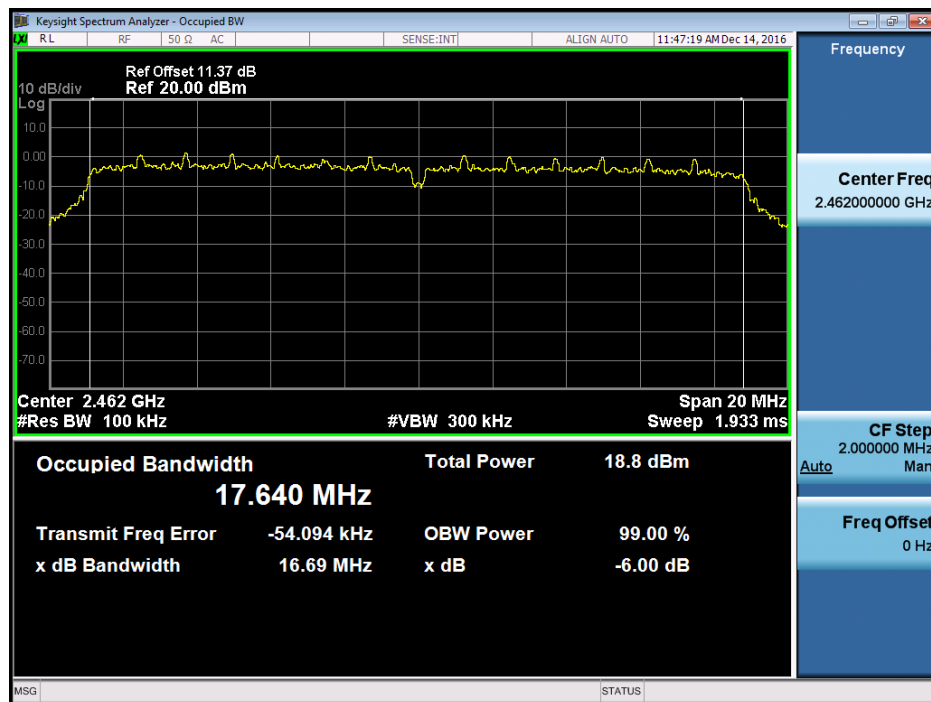
TX CH01



TX CH06



TX CH11



ATTACHMENT F – MAXIMUM PEAK CONDUCTED OUTPUT POWER

For 1T1R

Test Mode :TX B Mode_CH01/06/11					
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	21.82	0.15	30.00	1.00	Complies
2437	21.88	0.15	30.00	1.00	Complies
2462	21.82	0.15	30.00	1.00	Complies

Test Mode :TX G Mode_CH01/06/11					
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	16.54	0.05	30.00	1.00	Complies
2437	23.88	0.24	30.00	1.00	Complies
2462	19.69	0.09	30.00	1.00	Complies

Test Mode :TX N20 Mode_CH01/06/11					
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2412	16.61	0.05	30.00	1.00	Complies
2437	23.99	0.25	30.00	1.00	Complies
2462	16.93	0.05	30.00	1.00	Complies

ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

For 1T1R

Test Mode : TX B Mode

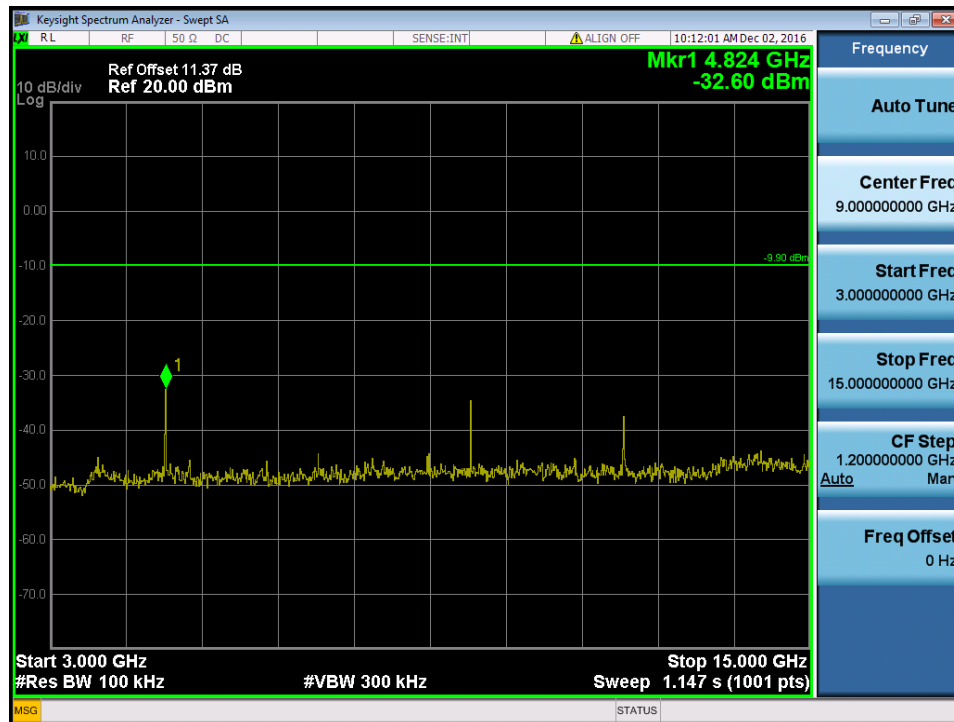
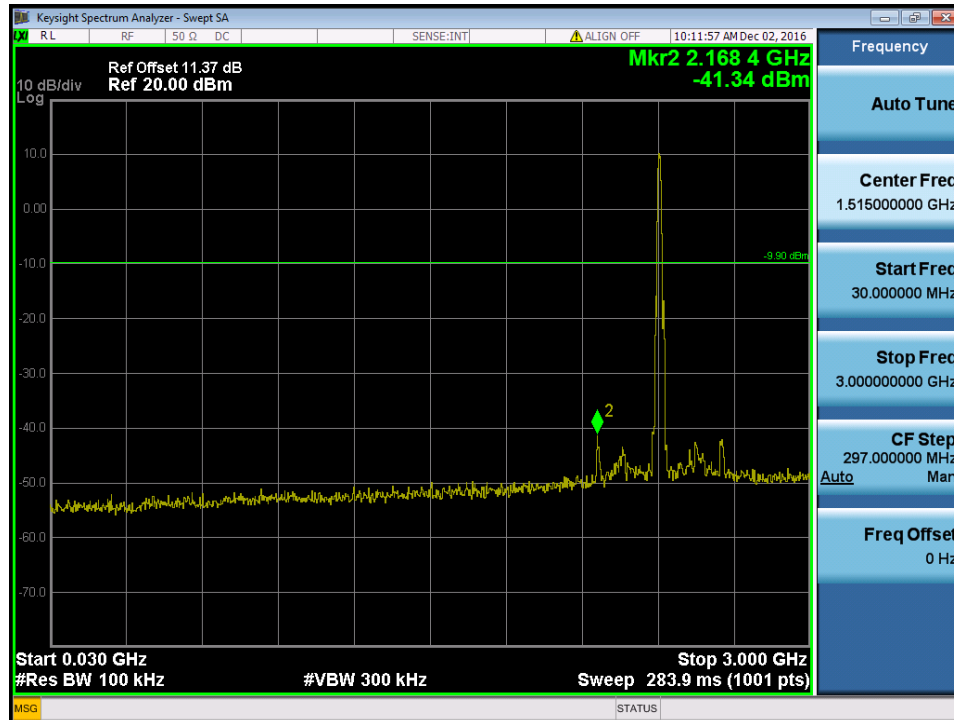
TX B mode CH01

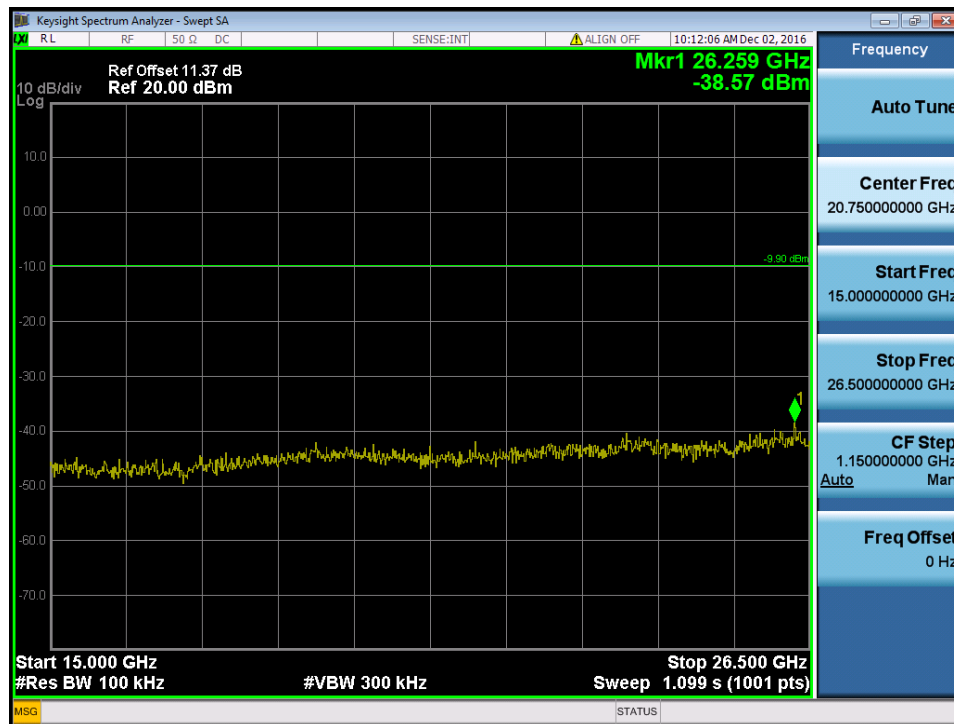


TX B mode CH11

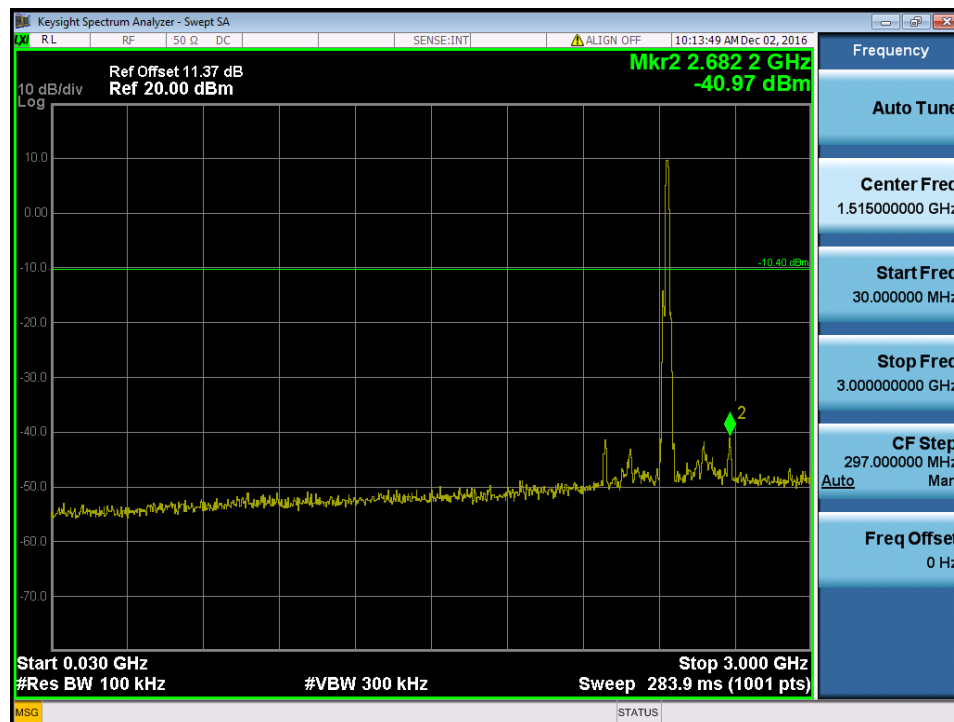


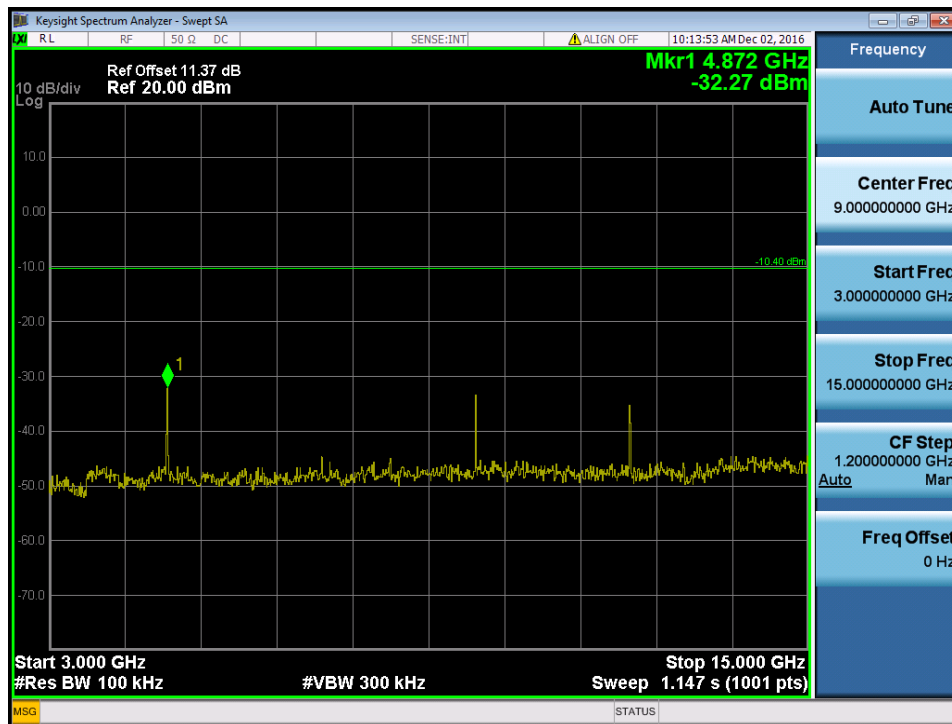
TX B mode CH01 (10 Harmonic of the frequency)



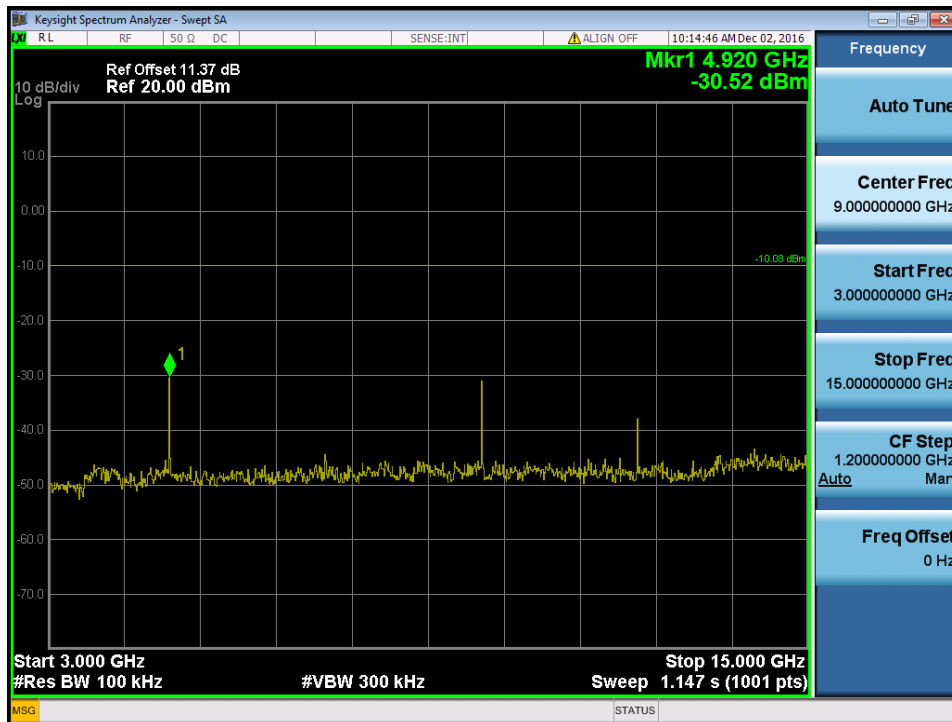
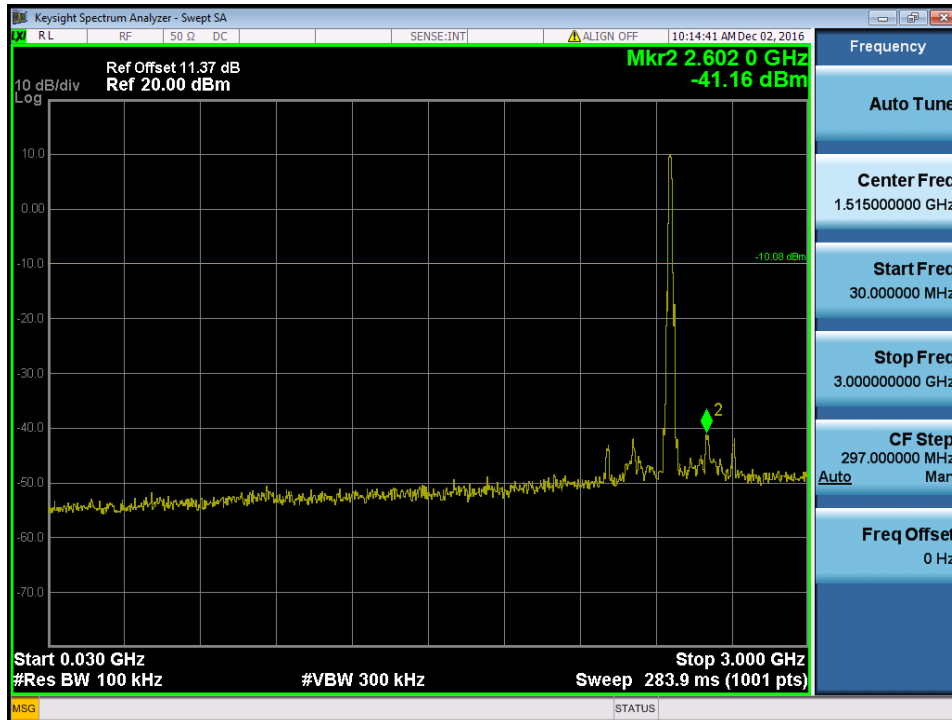


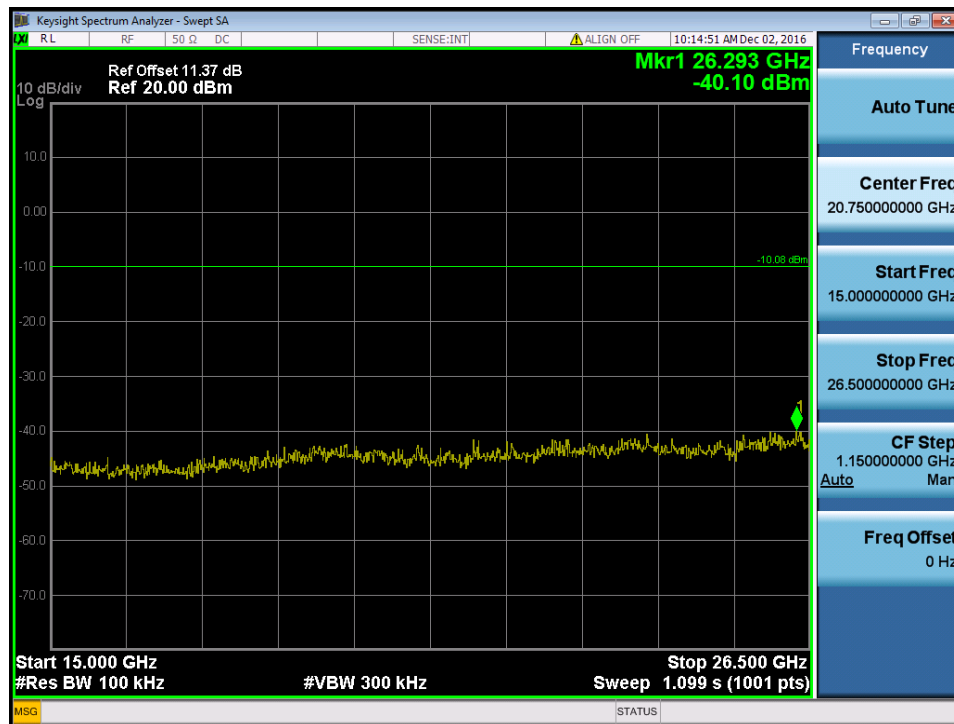
TX B mode CH06 (10 Harmonic of the frequency)





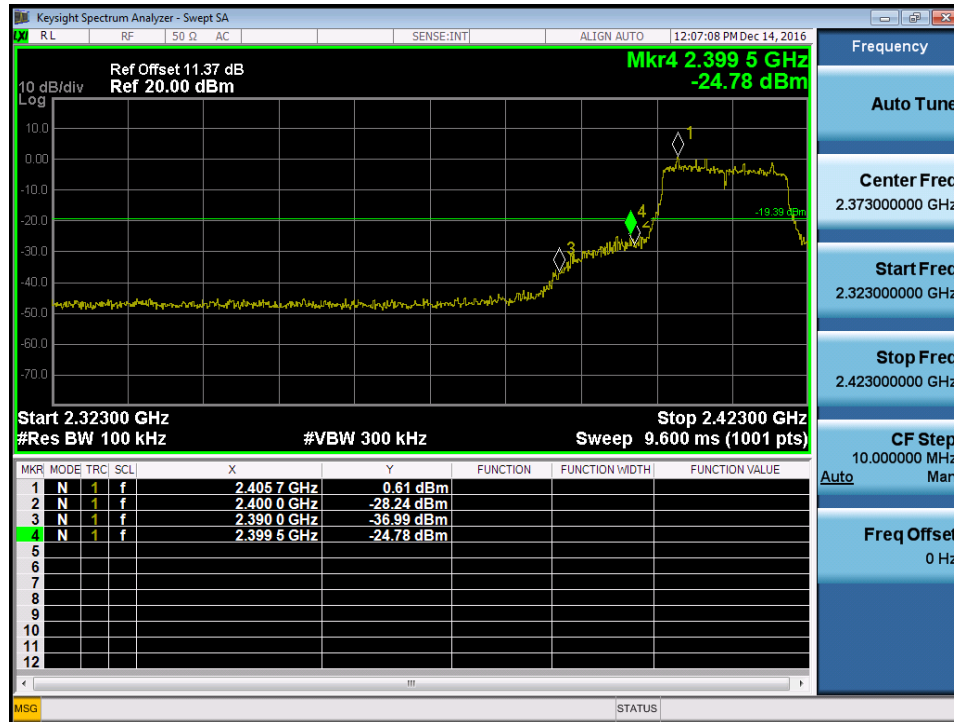
TX B mode CH11 (10 Harmonic of the frequency)





Test Mode : TX G Mode

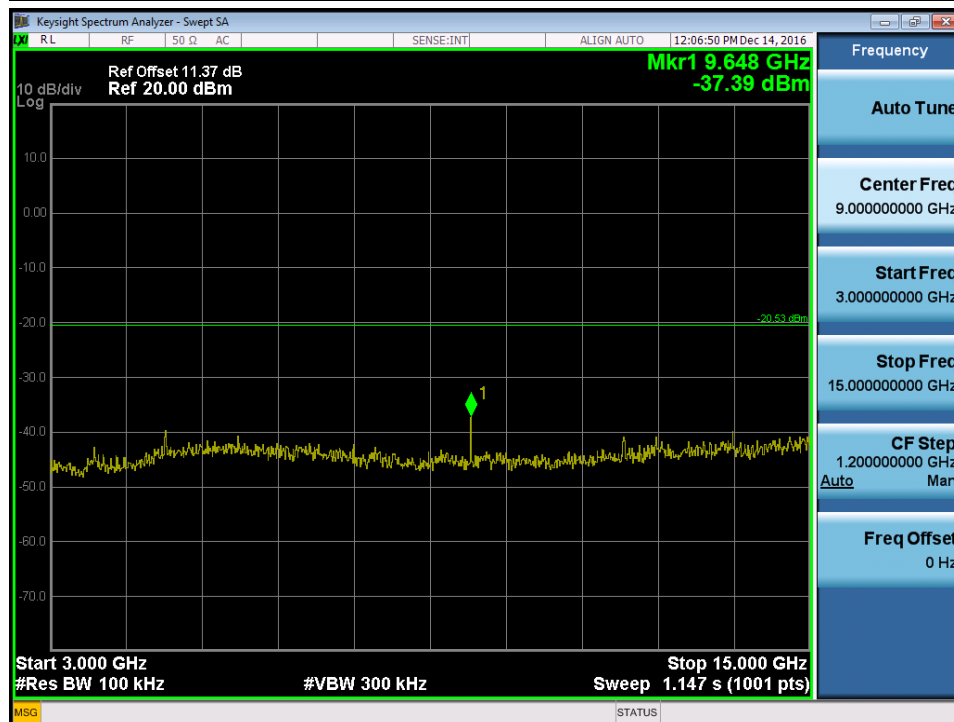
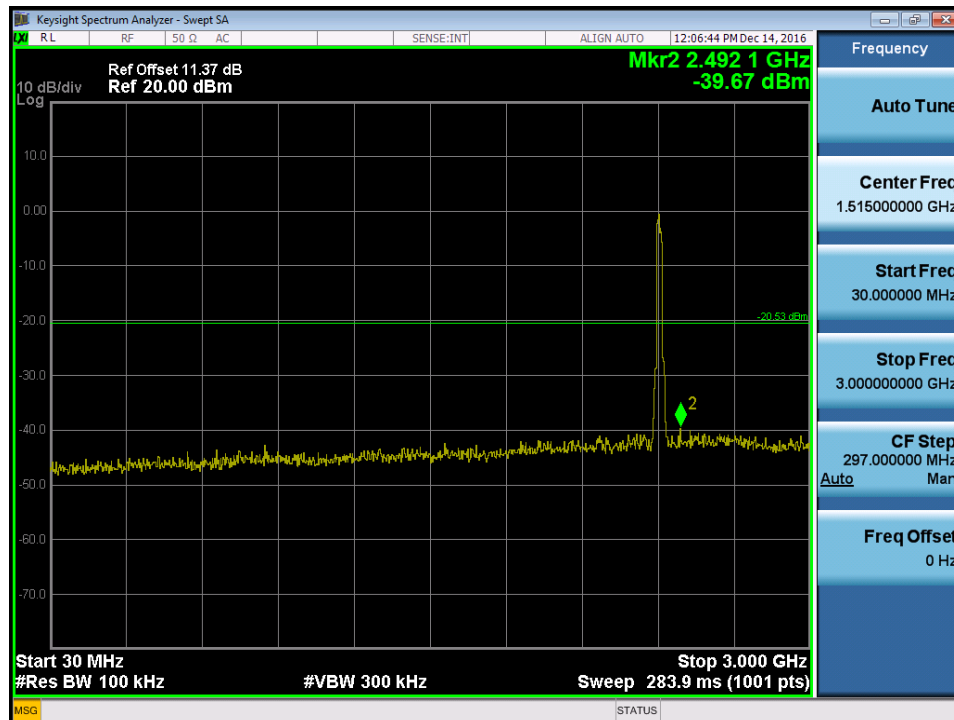
TX G mode CH01



TX G mode CH11

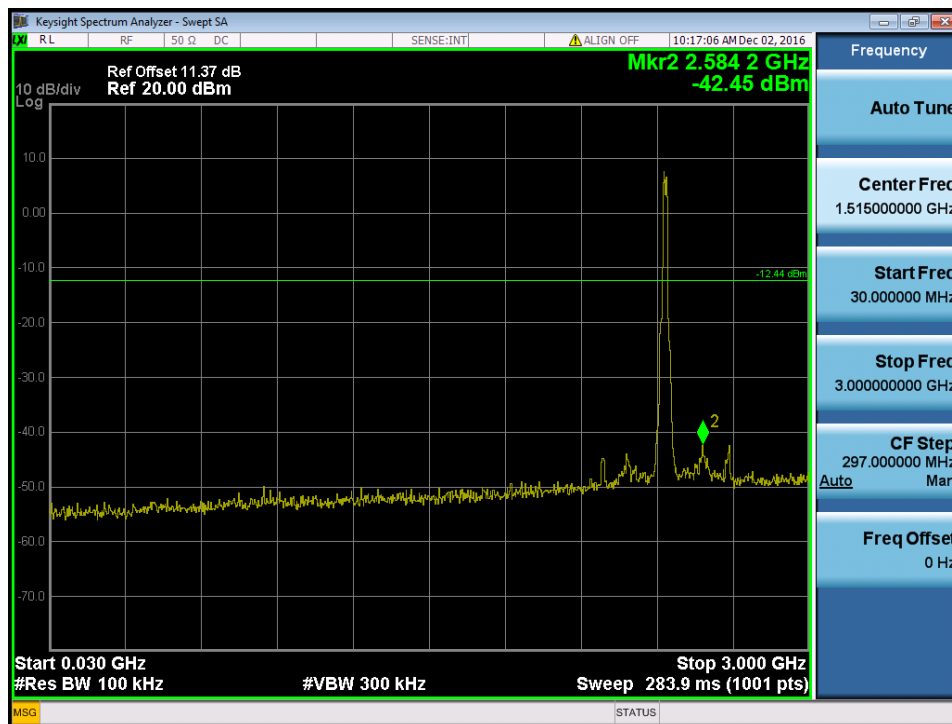


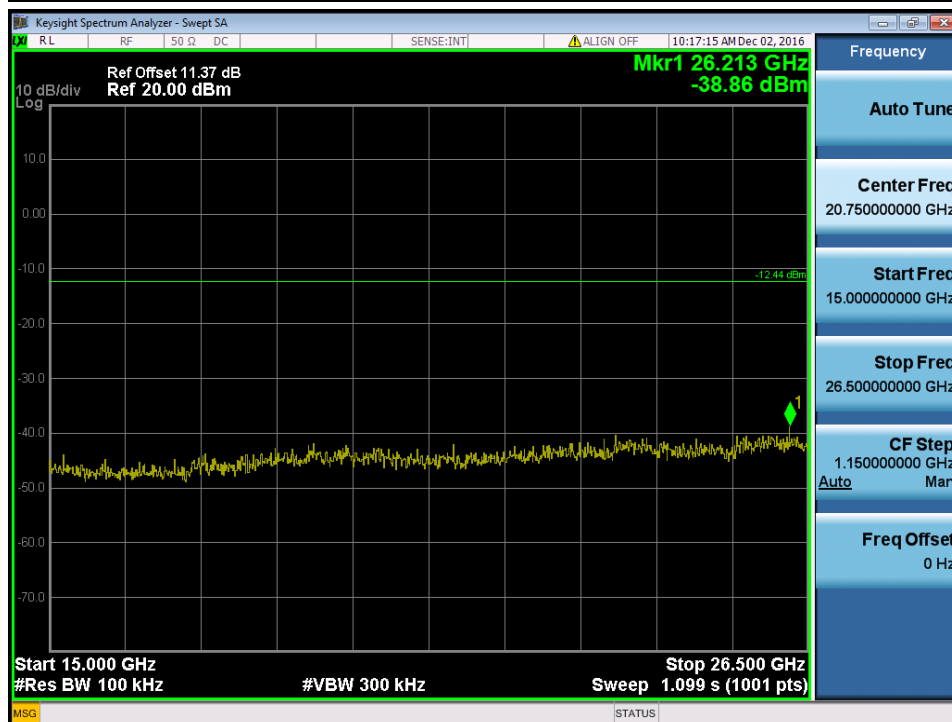
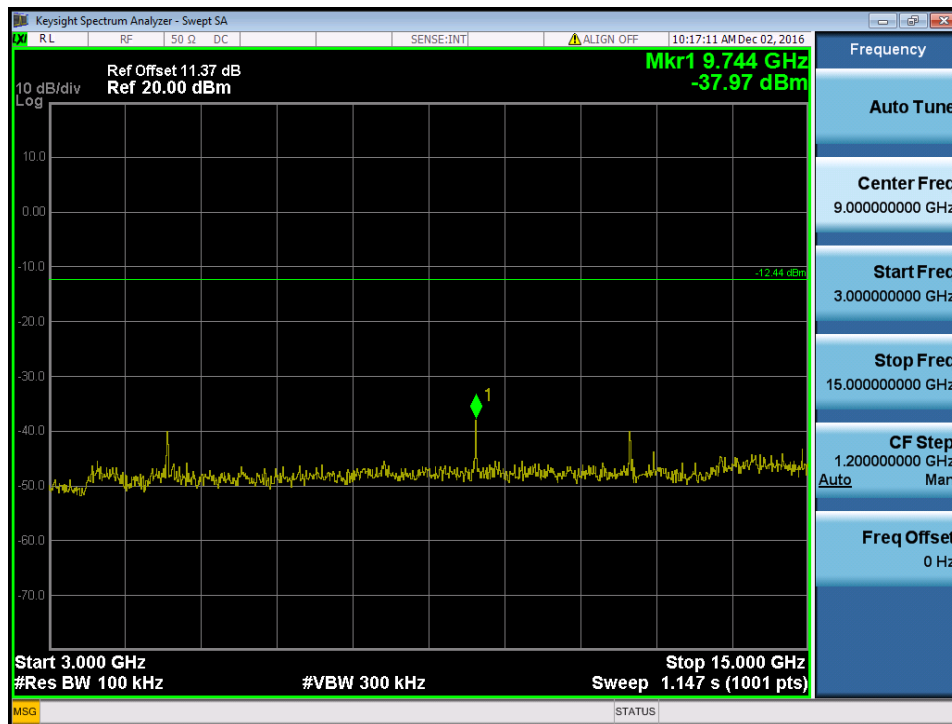
TX G mode CH01 (10 Harmonic of the frequency)



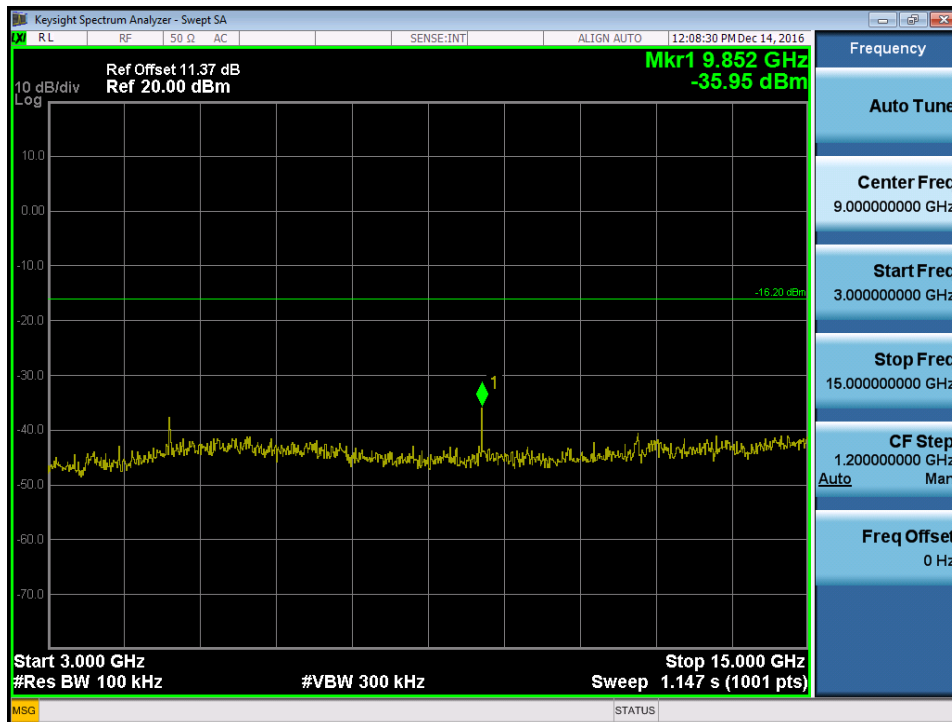
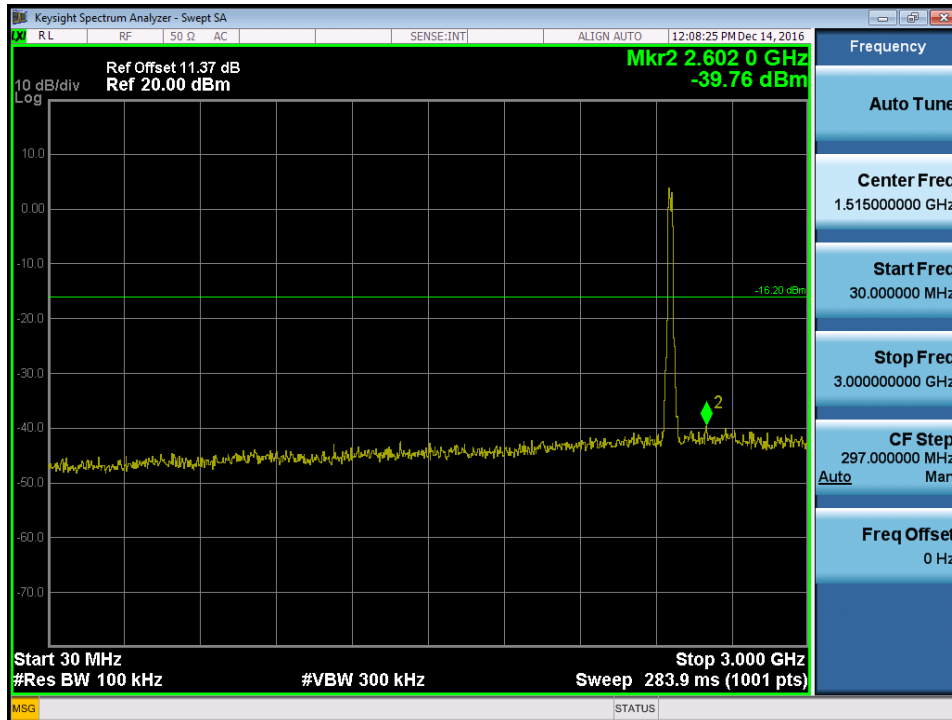


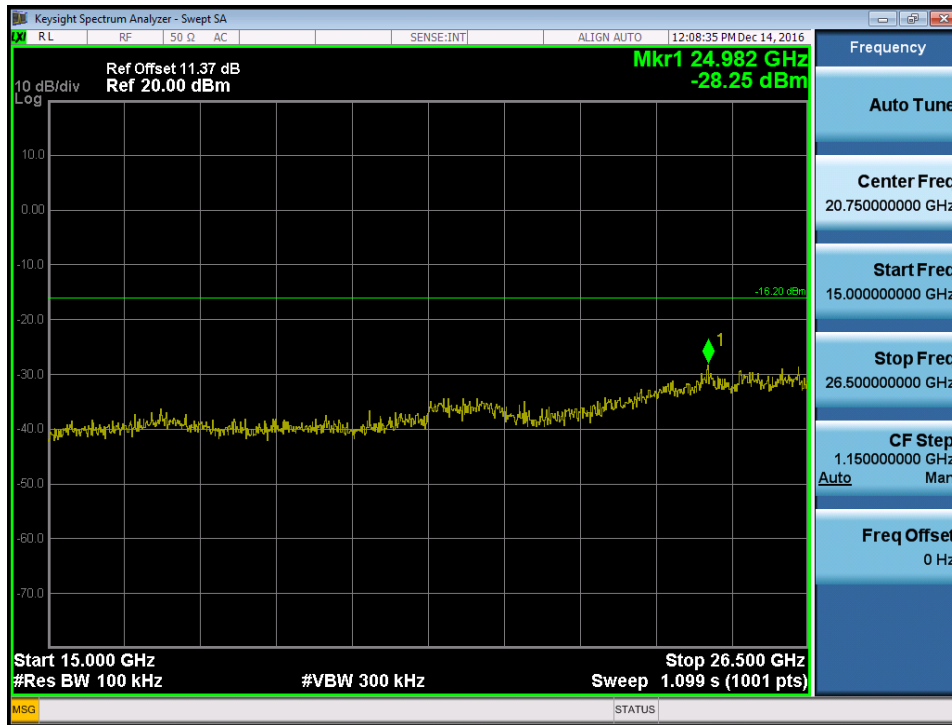
TX G mode CH06 (10 Harmonic of the frequency)





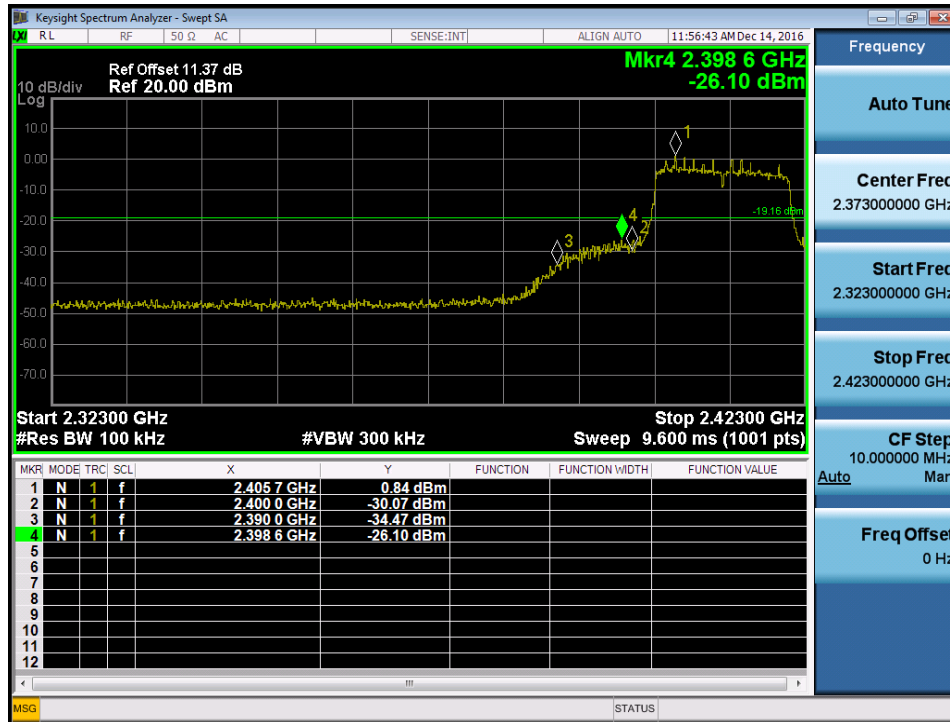
TX G mode CH11 (10 Harmonic of the frequency)





Test Mode : TX N-20M Mode

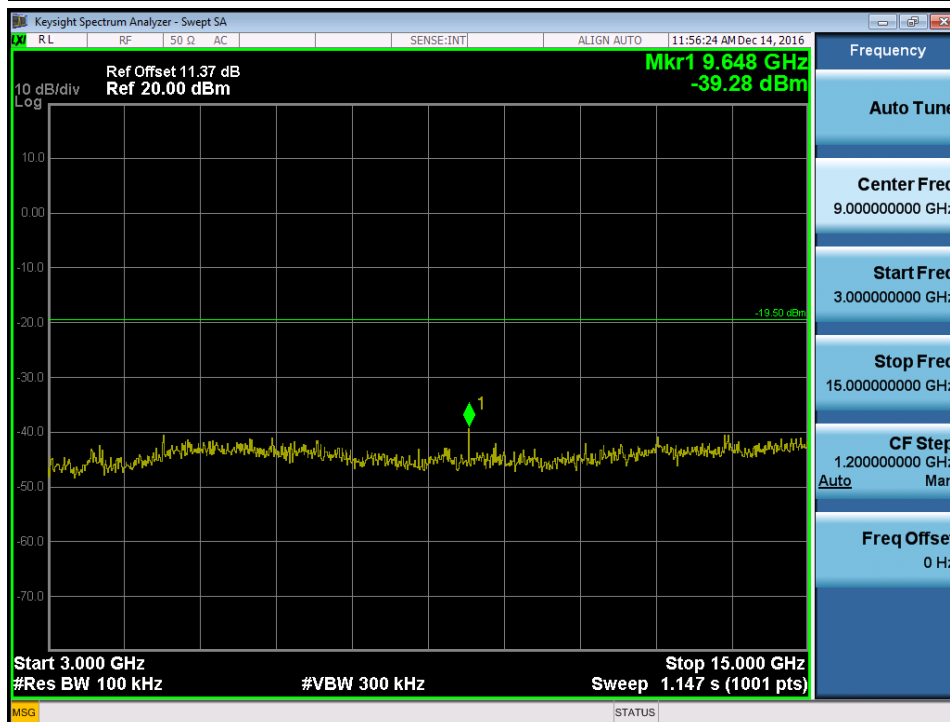
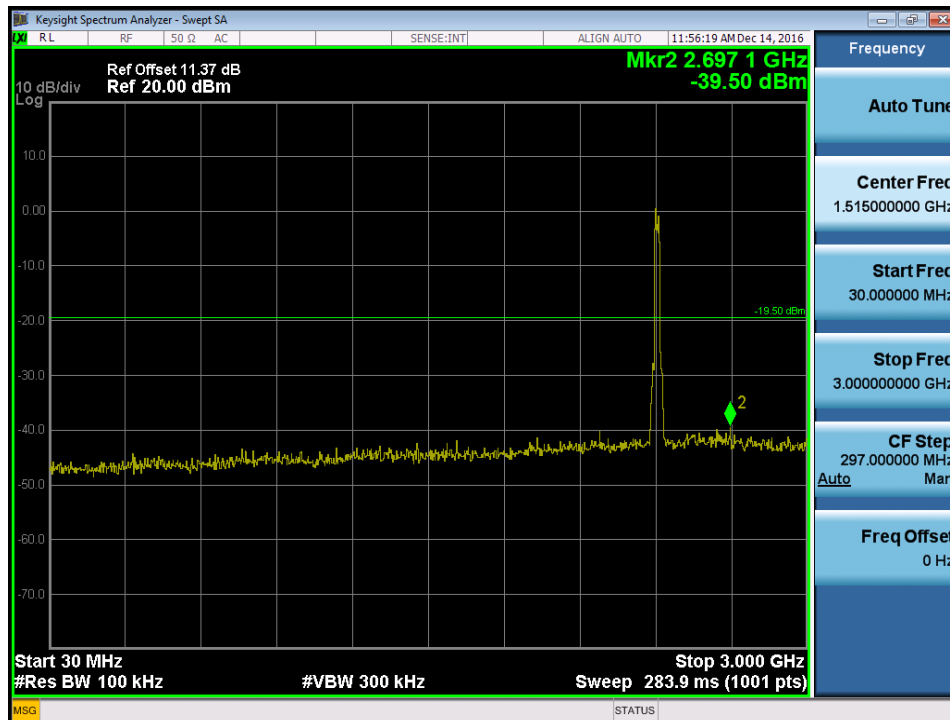
TX HT20 mode CH01



TX HT20 mode CH11

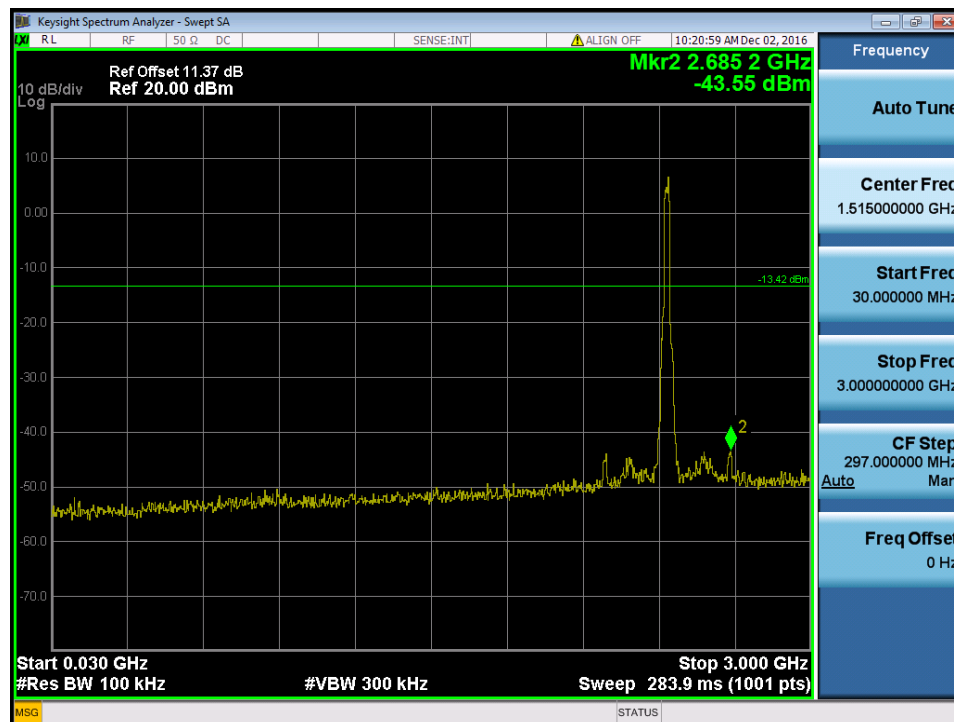


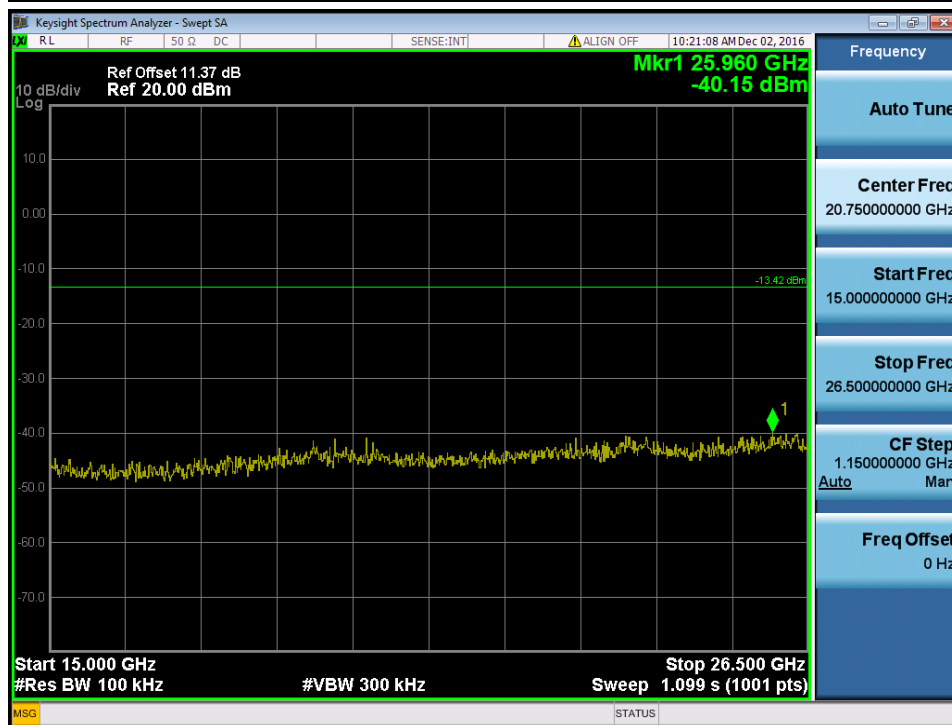
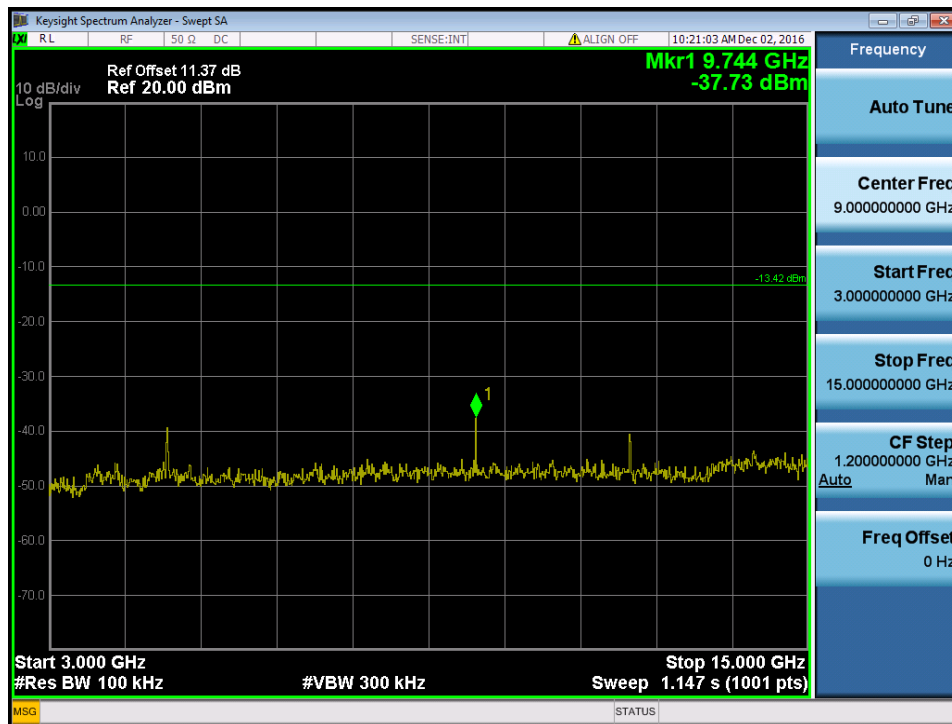
TX HT20 mode CH01 (10 Harmonic of the frequency)



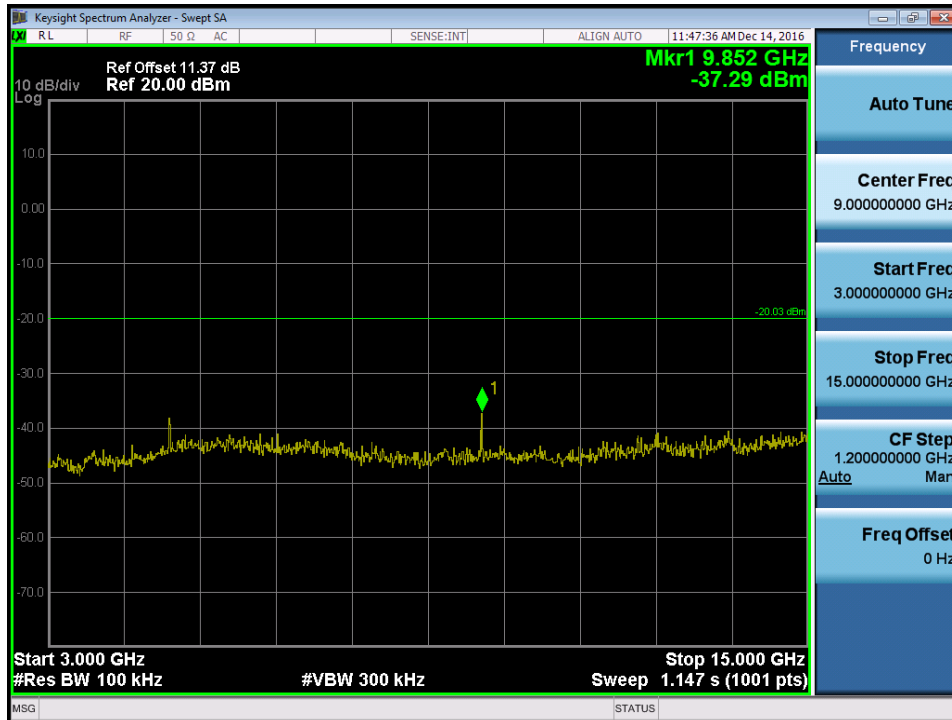
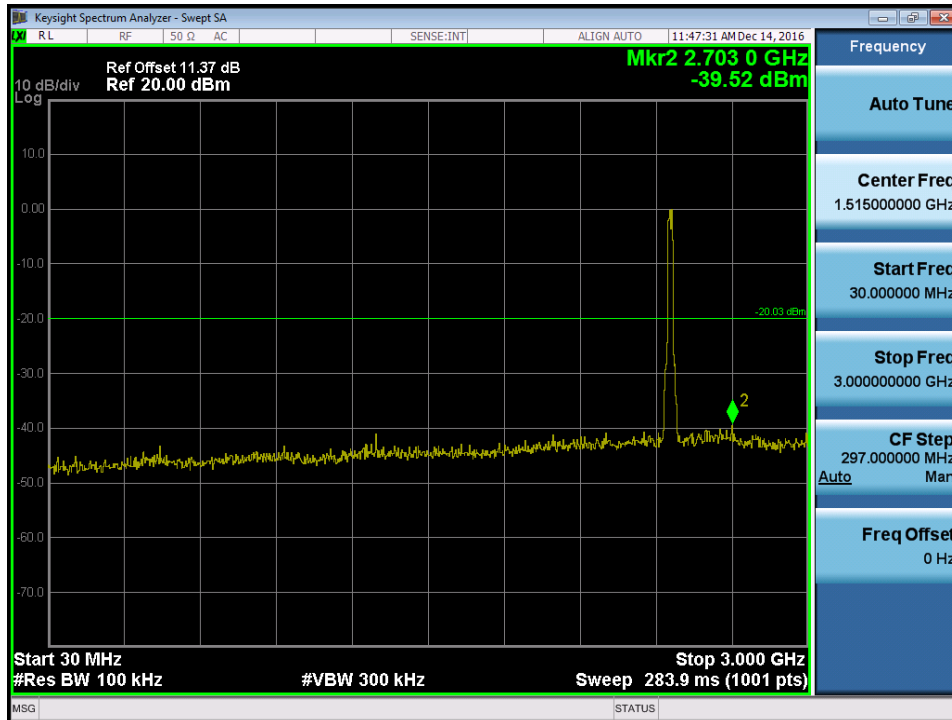


TX HT20 mode CH06 (10 Harmonic of the frequency)





TX HT20 mode CH11 (10 Harmonic of the frequency)





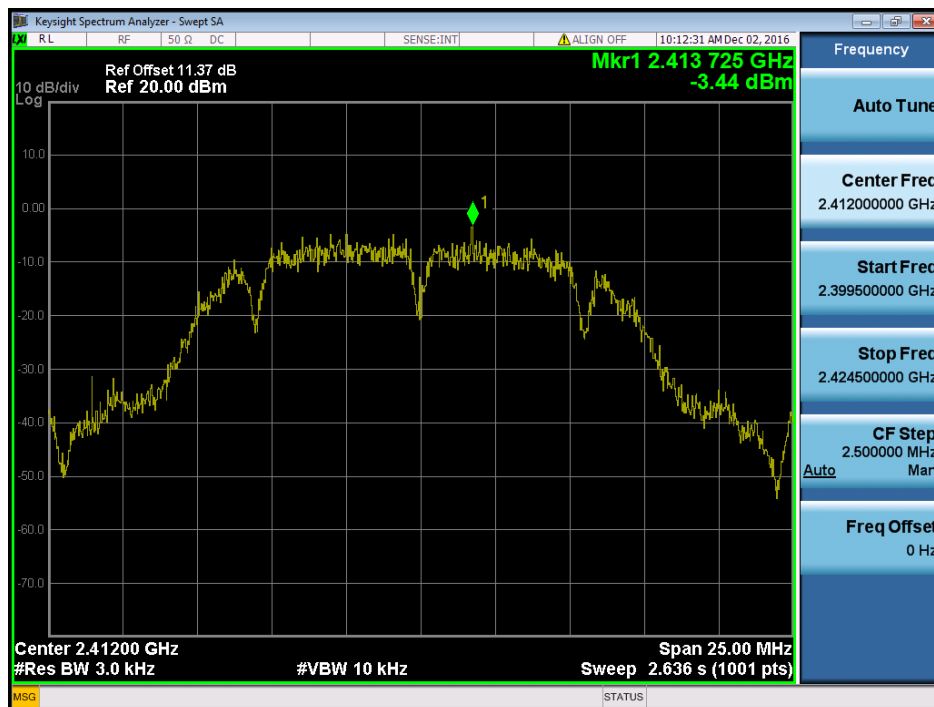
ATTACHMENT H - POWER SPECTRAL DENSITY

For 1T1R

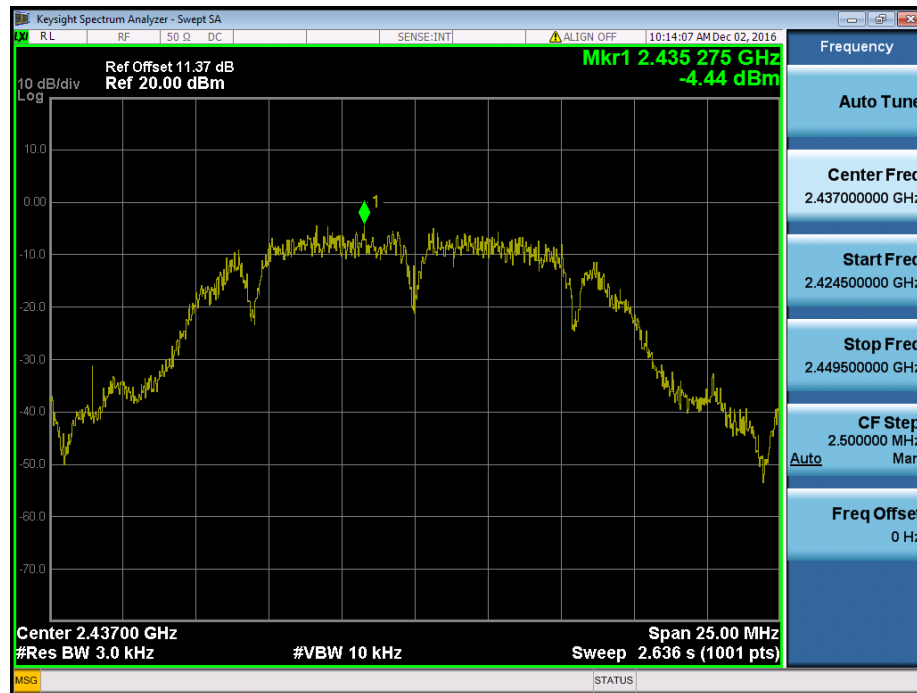
Test Mode :TX B Mode_CH01/06/11

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-3.44	0.4529	8.00	Complies
2437	-4.44	0.3597	8.00	Complies
2462	-4.30	0.3715	8.00	Complies

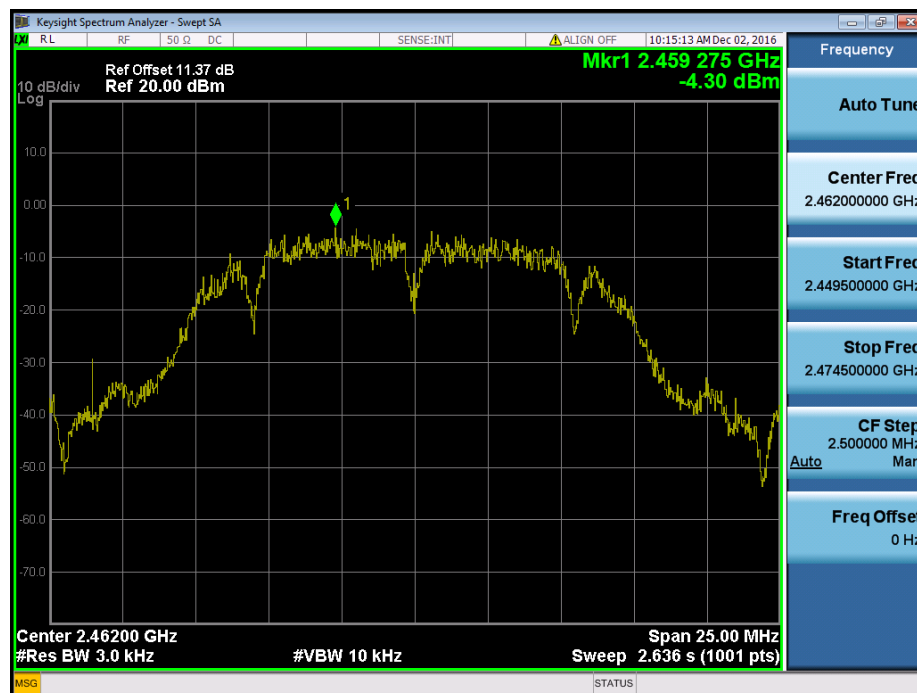
TX CH01



TX CH06



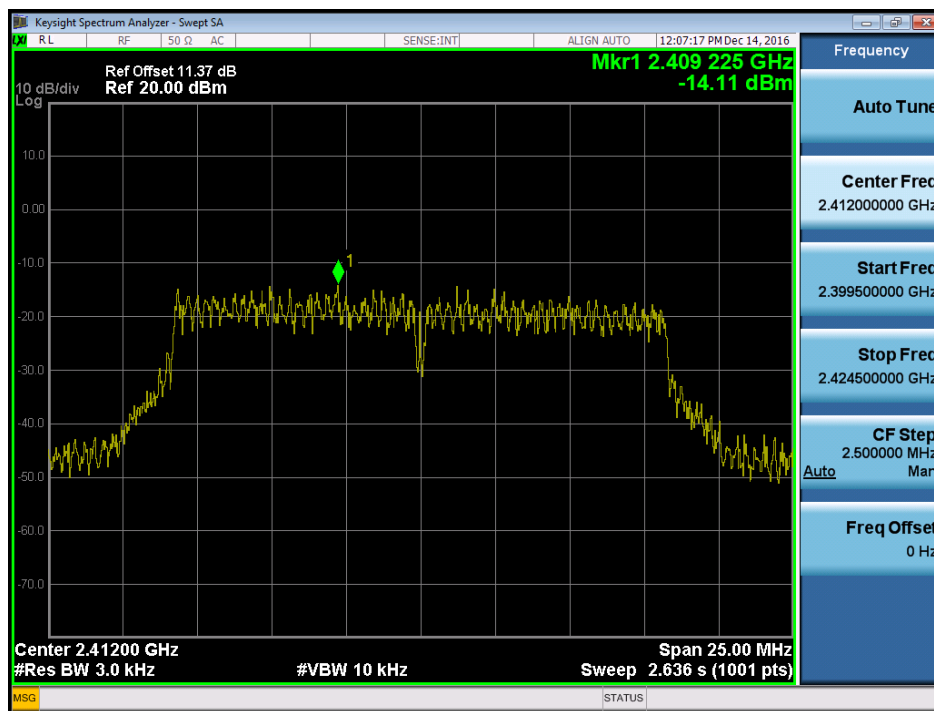
TX CH11



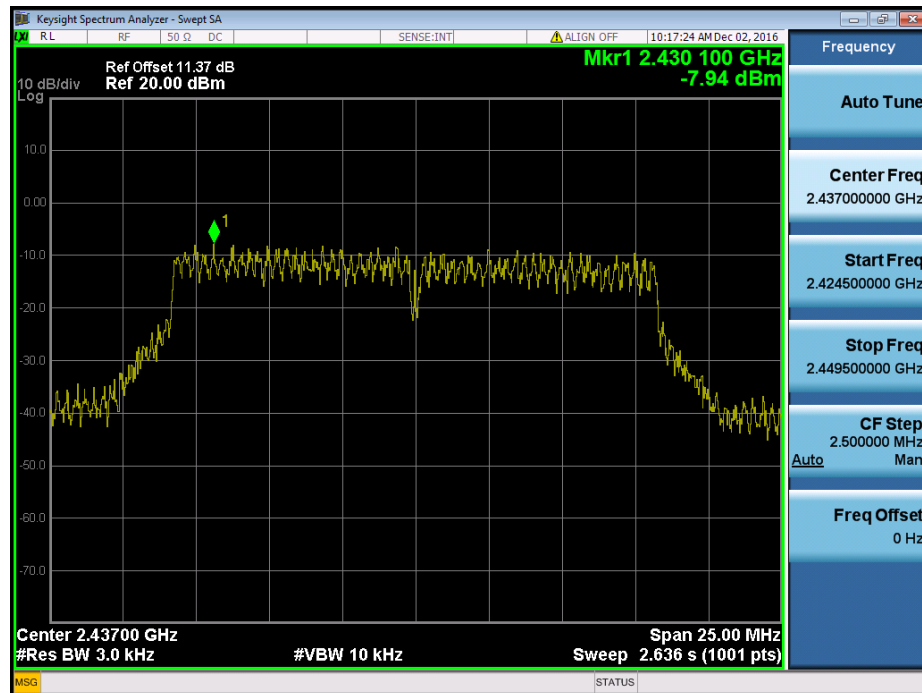
Test Mode :TX G Mode_CH01/06/11

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-14.11	0.0388	8.00	Complies
2437	-7.94	0.1607	8.00	Complies
2462	-11.24	0.0752	8.00	Complies

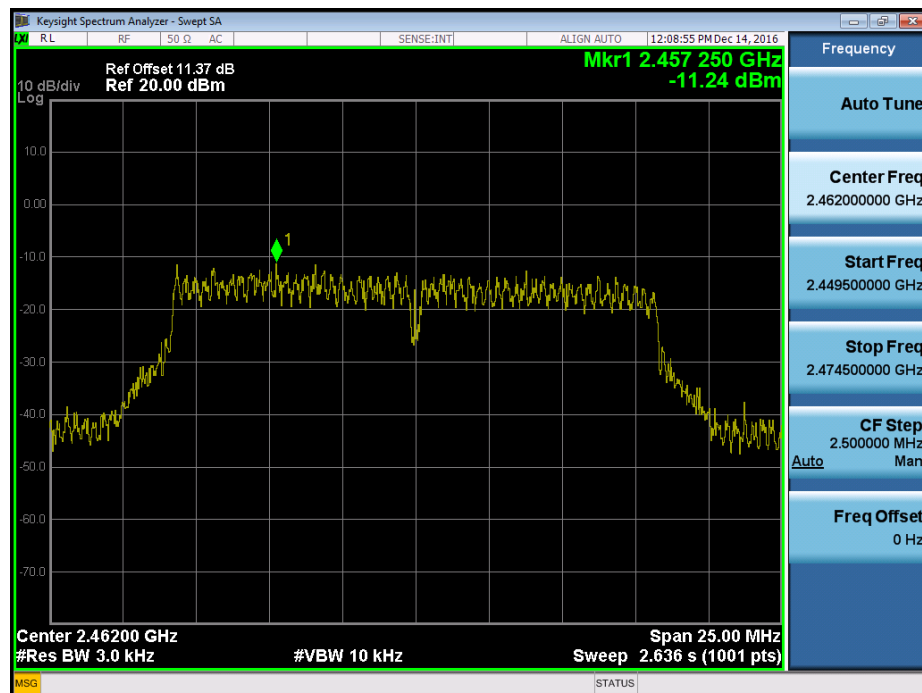
TX CH01



TX CH06



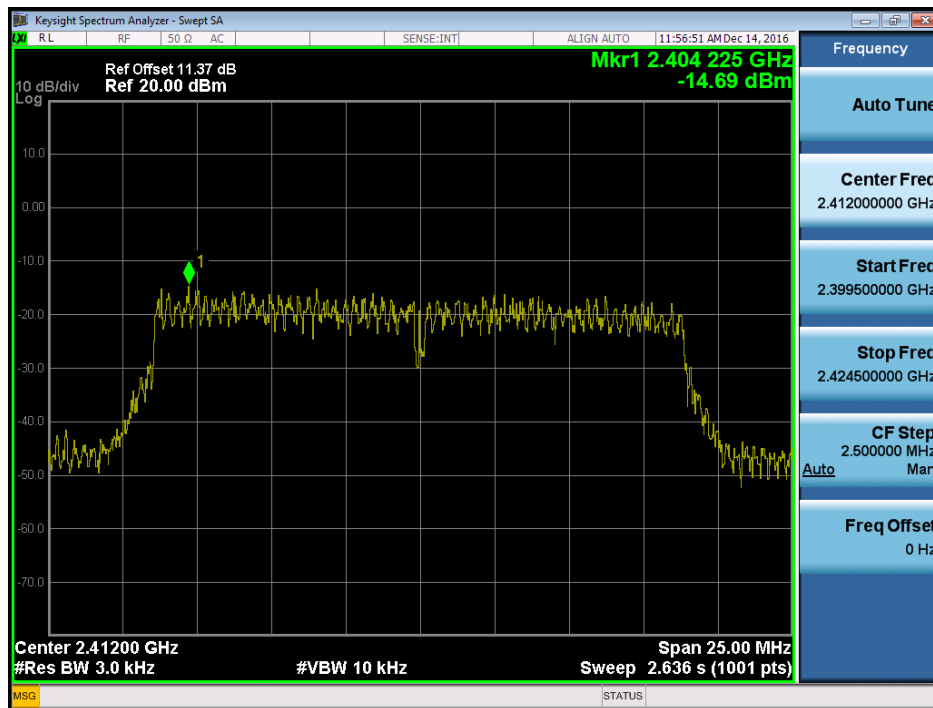
TX CH11



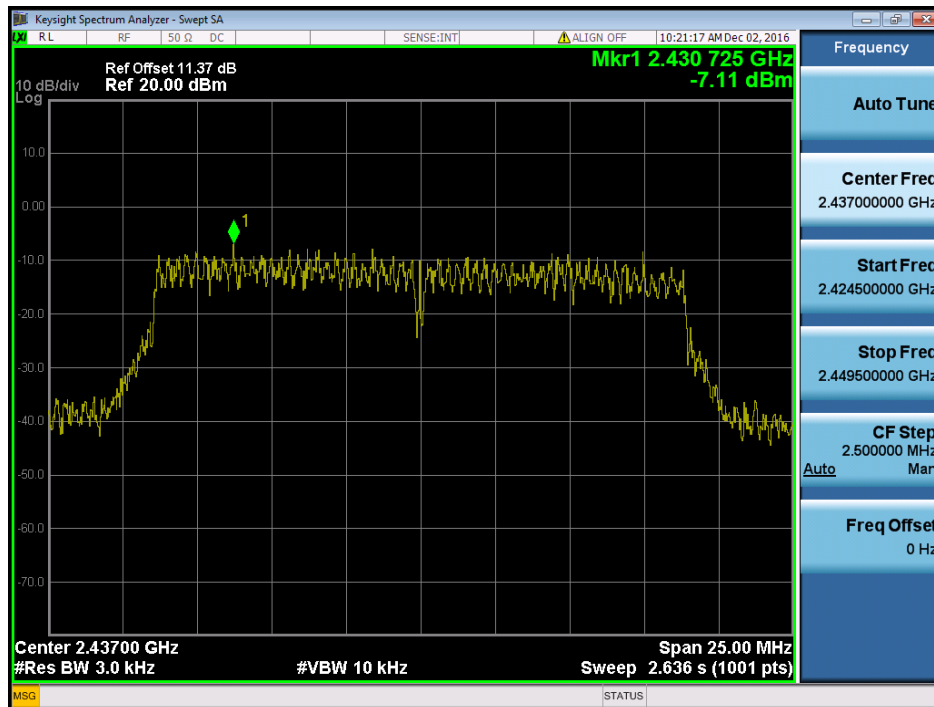
Test Mode : TX N-20M Mode_CH01/06/11

Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2412	-14.69	0.0340	8.00	Complies
2437	-7.11	0.1945	8.00	Complies
2462	-13.34	0.0463	8.00	Complies

TX CH01



TX CH06



TX CH11

