FCC Radio Test Report

FCC ID: V7TA9V2

This report concerns: Original Grant

Project No.	:	1901C127
Equipment	:	Wireless N300 Universal Range Extender
Test Model	:	A9
Series Model	:	N/A
Applicant	:	SHENZHEN TENDA TECHNOLOGY CO.,LTD
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Date of Receipt	:	Feb. 22, 2019
Date of Test	:	Feb. 25, 2019 ~ Mar. 15, 2019
Issued Date	:	May 22, 2019
Tested by	:	BTL Inc.

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Certificate #5123.02

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BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

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.
Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	May 22, 2019

1. GENERAL SUMMARY

Equipment	:	Wireless N300 Universal Range Extender
Brand Name	:	Tenda
Test Model	:	A9
Series Model	:	N/A
Applicant	:	SHENZHEN TENDA TECHNOLOGY CO.,LTD
Manufacturer	:	SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address	:	6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Date of Test	:	Feb. 25, 2019 ~ Mar. 15, 2019
Test Sample	:	Engineering Sample No.: D190201575
Standard(s)	:	FCC Part15, Subpart C (15.247) ANSI C63.10-2013 FCC KDB 558074 D01 DTS Meas Guidance v05r02 FCC KDB 662911 D01 Multiple Transmitter Output v02r01

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-1-1901C127) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

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**	**Test Result**	**Judgment**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS	------
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.247(a)(2)	Bandwidth	APPENDIX E	PASS	------
15.247(b)(3)	Maximum Output Power	APPENDIX F	PASS	------
15.247(d)	Conducted Spurious Emissions	APPENDIX G	PASS	------
15.247(e)	Power Spectral Density	APPENDIX H	PASS	------
15.203	Antenna Requirement	------	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 is at the location of No.3,Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.
BTL's Test Firm Registration Number for FCC: 357015
BTL's Designation Number for FCC: CN1240

2.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)
The BTL measurement uncertainty as below table:

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150 kHz ~ 30 MHz	2.32

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9 KHz~30 MHz	V	3.79
		9 KHz~30 MHz	H	3.57
		30 MHz~200 MHz	V	3.82
		30 MHz~200 MHz	H	3.78
		200 MHz~1,000 MHz	V	4.10
		200 MHz~1,000 MHz	H	4.06
		1 GHz~18 GHz	V	3.12
		1 GHz~18 GHz	H	3.68
		18 GHz~40 GHz	V	4.15
		18 GHz~40 GHz	H	4.14

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless N300 Universal Range Extender
Brand Name	Tenda
Test Model	A9
Series Model	N/A
Model Difference(s)	N/A
Power Source	AC Mains.
Power Rating	100-240V~ 50/60Hz 0.3A
Operation Frequency	2412 MHz ~ 2462 MHz
Modulation Type	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps
Maximum Output Power_ Non-Beamforming	IEEE 802.11b: 22.25 dBm (0.1679 W) IEEE 802.11g: 25.56 dBm (0.3598 W) IEEE 802.11n (HT20): 29.17 dBm (0.8260 W) IEEE 802.11n (HT40): 23.46 dBm (0.2218 W)
Maximum Output Power_ With Beamforming	IEEE 802.11n (HT20): 28.95 dBm (0.7852 W) IEEE 802.11n (HT40): 23.38 dBm (0.2178 W)

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(20 MHz) CH03 - CH09 for 802.11n(40 MHz)							
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. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Dipole	N/A	2.7
2	N/A	N/A	Dipole	N/A	2.7

Note:

(1) Antenna Gain=2.7dBi. This EUT supports MIMO 2X2, any transmit signals are correlated with each other, so Directional gain = G_{ANT}+10log(N)dBi, that is Directional gain=2.7+ 10log(2)dBi=5.71.

(2) Beamforming Gain: 3dB, so Directional gain=2.7+3=5.70.

4. The worst case for 1TX / 2TX as follow:

Operating Mode / TX Mode	1TX	2TX
IEEE 802.11b	V (ANT 2)	-
IEEE 802.11g	V (ANT 2)	-
IEEE 802.11n (HT20)	-	V (ANT 1 + ANT 2)
IEEE 802.11n (HT40)	-	V (ANT 1 + ANT 2)

3.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

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-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09
Mode 5	TX N20 Mode Channel 06

Following mode(s) as (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test	
Final Test Mode:	Description
Mode 5	TX N20 Mode Channel 06

Radiated emissions 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-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09

Conducted 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-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09

NOTE:

(1) The measurements are performed at the high, middle, low available channels.

(2) 802.11b mode: CCK (1 Mbps)
802.11g mode: BPSK (6 Mbps)
802.11n HT20 mode : BPSK (13 Mbps)
802.11n HT40 mode : BPSK (27 Mbps)
For radiated emission tests, the highest output powers were set for final test.

(3) For radiated emission below 1 GHz test, the IEEE 802.11b is found to be the worst case and recorded.

(4) For radiated emission above 1 GHz test, 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

3.3 PARAMETERS OF TEST SOFTWARE

Non-Beamforming

Test Software	cart		
Test Frequency (MHz)	2412	2437	2462
IEEE 802.11b	14	15	17
IEEE 802.11g	13	18	12.5
IEEE 802.11n (HT20)	12.5	19	12
Test Frequency (MHz)	2422	2437	2452
IEEE 802.11n (HT40)	9.5	13	10

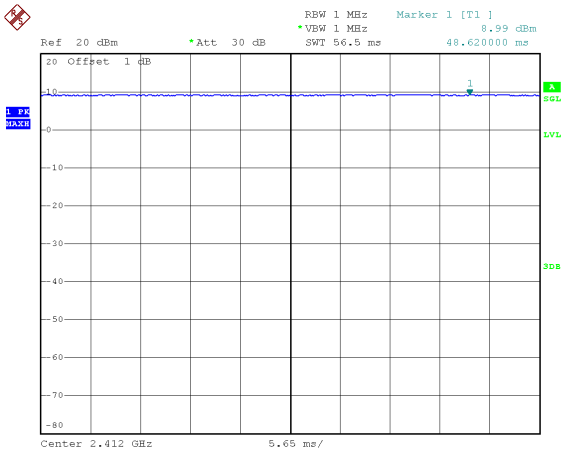
With Beamforming

Test Software	cart		
Test Frequency (MHz)	2412	2437	2462
IEEE 802.11n (HT20)	12	18.5	11.5
Test Frequency (MHz)	2422	2437	2452
IEEE 802.11n (HT40)	9	12.5	9.5

3.4 DUTY CYCLE

If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.

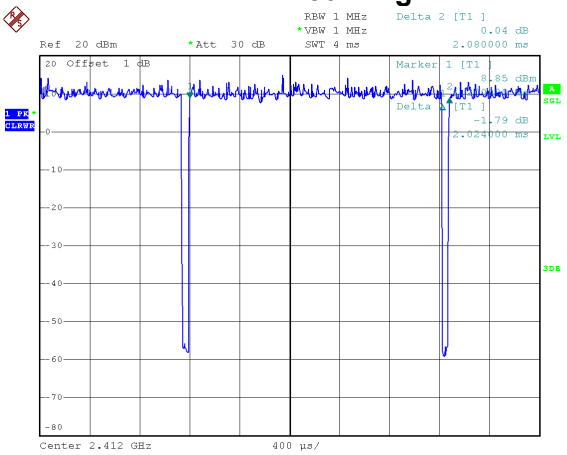
IEEE 802.11b



Date: 28.FEB.2019 17:25:15

Duty cycle = 56.5 ms / 56.5 ms = 100.00%

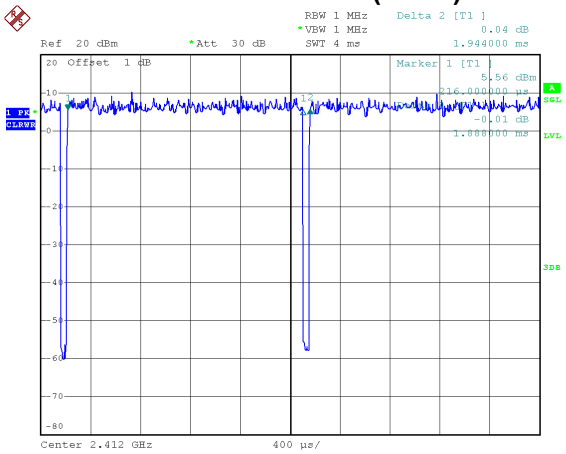
IEEE 802.11g



Date: 28.FEB.2019 17:26:14

Duty cycle = 2.024 ms / 2.080 ms = 97.31%

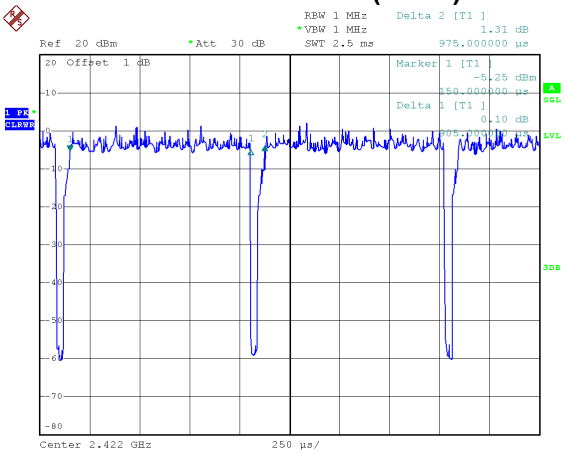
IEEE 802.11n (HT20)



Date: 28.FEB.2019 17:26:51

Duty cycle = 1.888 ms / 1.944 ms = 97.12%

IEEE 802.11n (HT40)



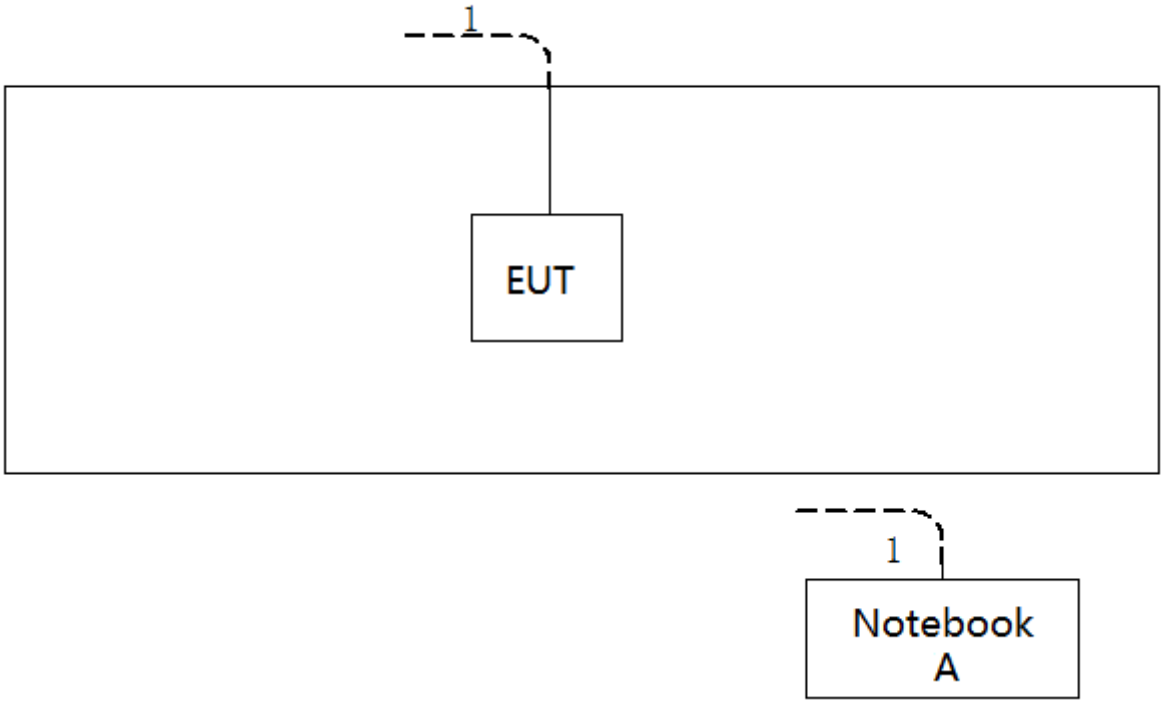
Date: 28.FEB.2019 17:27:20

Duty cycle = 0.905 ms / 0.975 ms = 92.82%

NOTE:
For IEEE 802.11g and IEEE 802.11n (HT20):
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz (Duty cycle < 98%).

For IEEE 802.11n (HT40):
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 2 kHz (Duty cycle < 98%).

3.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.6 SUPPORT UNITS

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	Notebook	Dell	Inspiron 15-7559	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	10m	RJ45 Cable

4. AC POWER LINE CONDUCTED EMISSIONS TEST

4.1 LIMIT

Frequency of Emission (MHz)	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 tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) 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

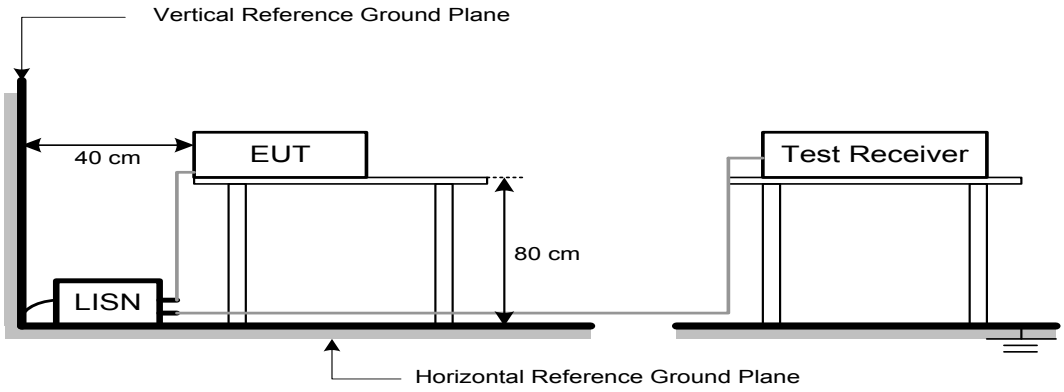
4.2 TEST PROCEDURE

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 equipment 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.

4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

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

4.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 53% Test Voltage: AC 120V/60Hz

4.7 TEST RESULTS

Please refer to the APPENDIX A.

5. RADIATED EMISSIONS TEST

5.1 LIMIT

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 (9 kHz-1000 MHz)

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
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

NOTE:

(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 (Emission in restricted band)	1 MHz / 3 MHz for Peak, 1 MHz / 1/T for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector

5.2 TEST PROCEDURE

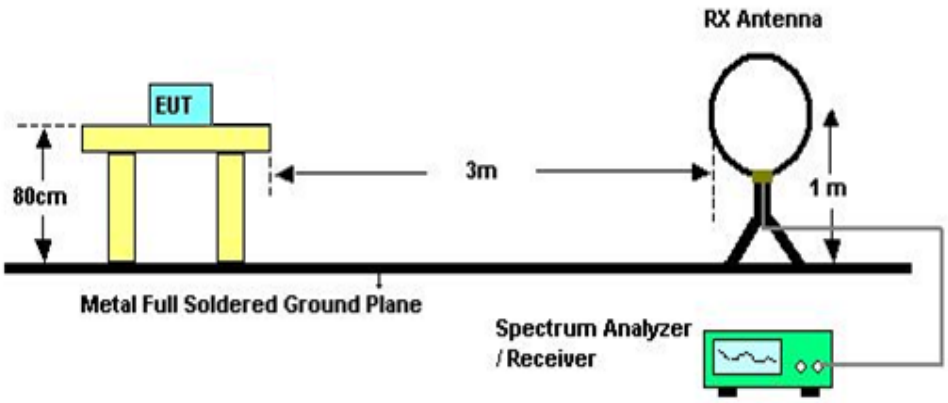
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance 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 1 GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
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 1 GHz)
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 1 GHz)
i. For the actual test configuration, please refer to the related Item -EUT Test Photos.

5.3 DEVIATION FROM TEST STANDARD

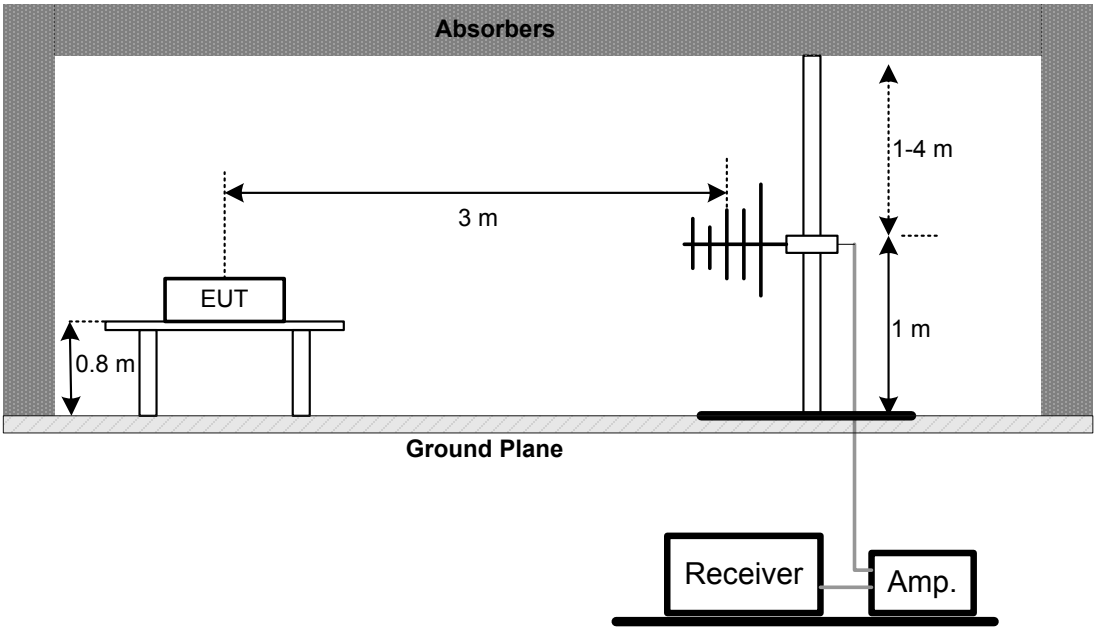
No deviation

5.4 TEST SETUP

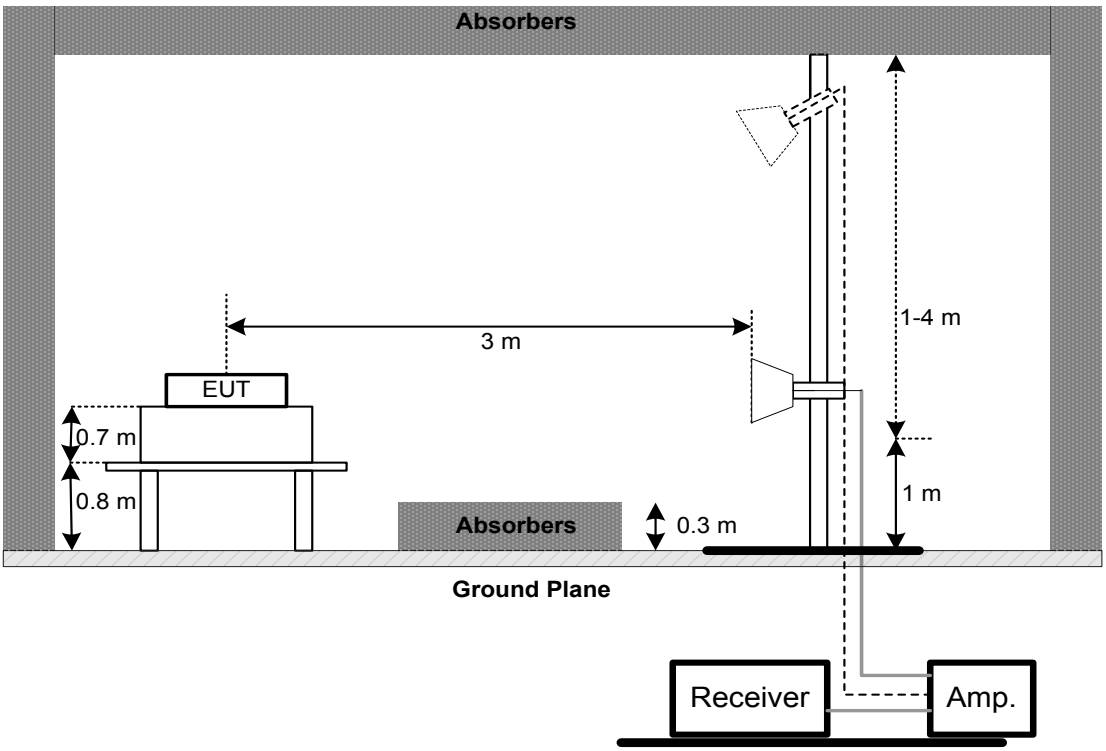
9 kHz-30 MHz



30 MHz to 1 GHz



Above 1 GHz



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 EUT TEST CONDITIONS

Temperature: 21°C Relative Humidity: 60% Test Voltage: AC 120V/60Hz

5.7 TEST RESULTS - 9 KHZ TO 30 MHZ

Please refer to the APPENDIX B

Remark:

(1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) Limit line = specific limits (dBuV) + distance extrapolation factor.

5.8 TEST RESULTS - 30 MHZ TO 1000 MHZ

Please refer to the APPENDIX C.

5.9 TEST RESULTS - ABOVE 1000 MHZ

Please refer to the APPENDIX D.

Remark:

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

6. BANDWIDTH TEST

6.1 LIMIT

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247(a)(2)	6 dB Bandwidth	Minimum 500 kHz
	99% Emission Bandwidth	-

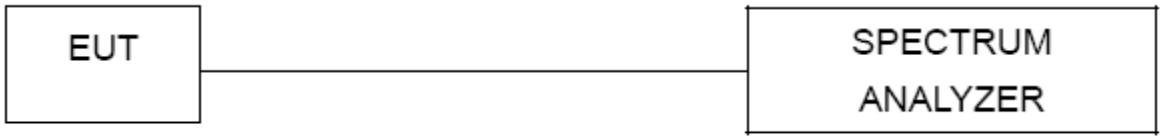
6.2 TEST PROCEDURE

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= 100 kHz, VBW=300 kHz, Sweep time = 2.5 ms.
c. The bandwidth was performed in accordance with method 11.8 of ANSI C63.10-2013.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 EUT TEST CONDITIONS

Temperature: 23.2°C Relative Humidity: 57.3% Test Voltage: AC 120V/60Hz

6.7 TEST RESULTS

Please refer to the APPENDIX E.

7. MAXIMUM OUTPUT POWER TEST

7.1 LIMIT

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247(b)(3)	Maximum Output Power	1 Watt or 30dBm

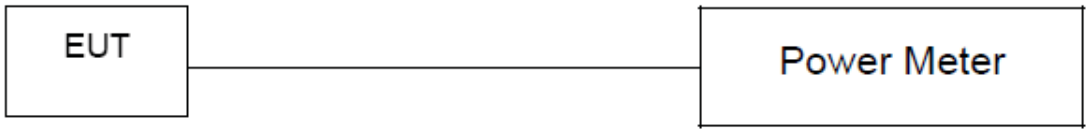
7.2 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
b. The maximum conducted output power was performed in accordance with method 11.9.1.3 of ANSI C63.10-2013.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 EUT TEST CONDITIONS

Temperature: 23.2°C Relative Humidity: 57.3% Test Voltage: AC 120V/60Hz

7.7 TEST RESULTS

Please refer to the APPENDIX F.

8. CONDUCTED SPURIOUS EMISSIONS

8.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

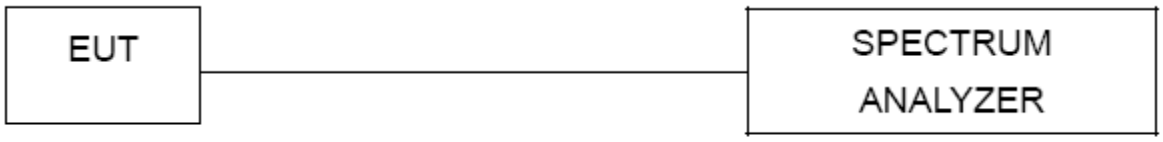
8.2 TEST PROCEDURE

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= 100 kHz, VBW=300 kHz, Sweep time = Auto.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 EUT TEST CONDITIONS

Temperature: 23.2°C Relative Humidity: 57.3% Test Voltage: AC 120V/60Hz

8.7 TEST RESULTS

Please refer to the APPENDIX G.

9. POWER SPECTRAL DENSITY TEST

9.1 LIMIT

FCC Part15 (15.247) , Subpart C		
Section	Test Item	Limit
15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

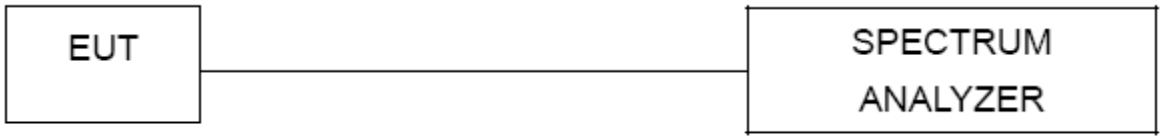
9.2 TEST PROCEDURE

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=3 kHz, VBW=10 kHz, Sweep time = Auto.
c. The Power Spectral Density was performed in accordance with method 11.10.2 of ANSI C63.10-2013.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

9.6 EUT TEST CONDITIONS

Temperature: 23.2°C Relative Humidity: 57.3% Test Voltage: AC 120V/60Hz

9.7 TEST RESULTS

Please refer to the APPENDIX H.

10. MEASUREMENT INSTRUMENTS LIST

AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Mar. 10, 2020
2	LISN	EMCO	3816/2	52765	Mar. 10, 2020
3	50Ω Terminator	SHX	TF5-3	15041305	Mar. 10, 2020
4	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Jun. 25, 2019
5	TRANSIENT LIMITER	EM	EM-7600	772	Mar. 10, 2020
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Cable	N/A	RG223	12m	Mar. 23, 2019

Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EM	EM-6876-1	230	Jan. 15, 2020
2	Cable	N/A	RG 213/U	C-102	Jun. 01, 2019
3	EMI Test Receiver	R&S	ESCI	100382	Mar. 10, 2020
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2020
2	Amplifier	HP	8447D	2944A09673	Aug. 11, 2019
3	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019
4	Cable	emci	LMR-400(30MHz-1GHz)(8m+5m)	N/A	May 25, 2019
5	Controller	CT	SC100	N/A	N/A
6	Controller	MF	MF-7802	MF780208416	N/A
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 09, 2020
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2019
3	Amplifier	Agilent	8449B	3008A02274	Mar. 10, 2020
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 10, 2020
5	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	mitron	B10-01-01-12M	18072744	Jul. 30, 2019
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Peak Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	P-series power meter	Agilent	N1911A	MY45100473	Aug. 11, 2019
2	wideband power sensor	Agilent	N1921A	MY51100041	Aug. 11, 2019

Antenna Conducted Spurious Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 11, 2019

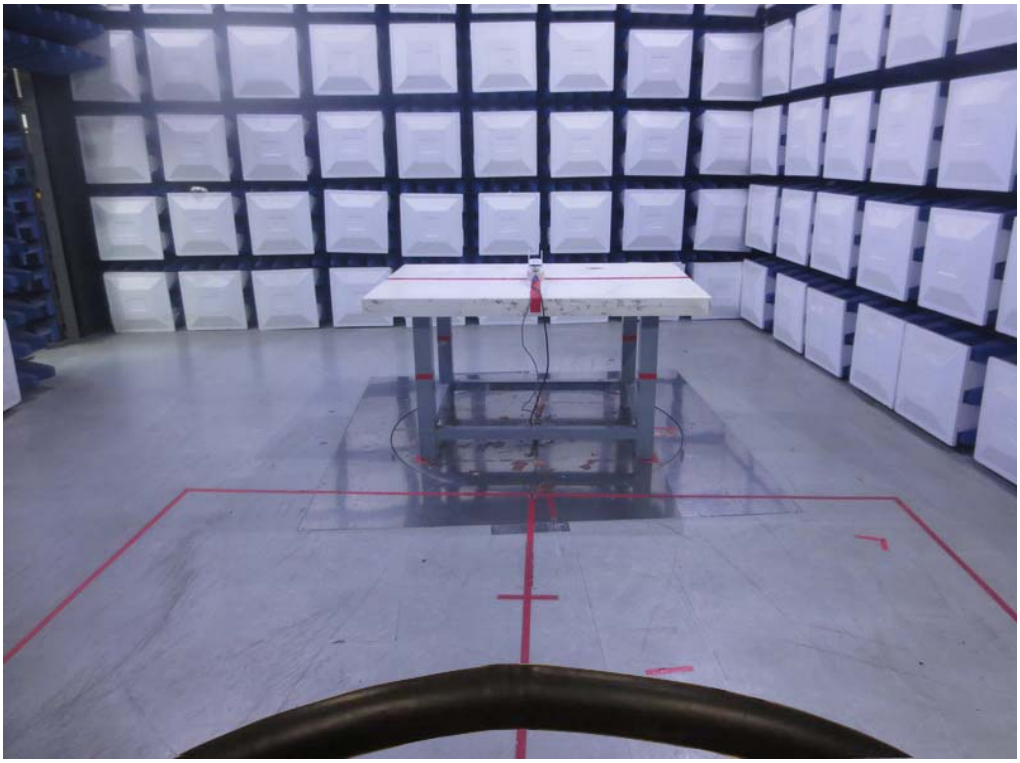
Remark: ”N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

11. EUT TEST PHOTO

AC Power Line Conducted Emissions Test Photos

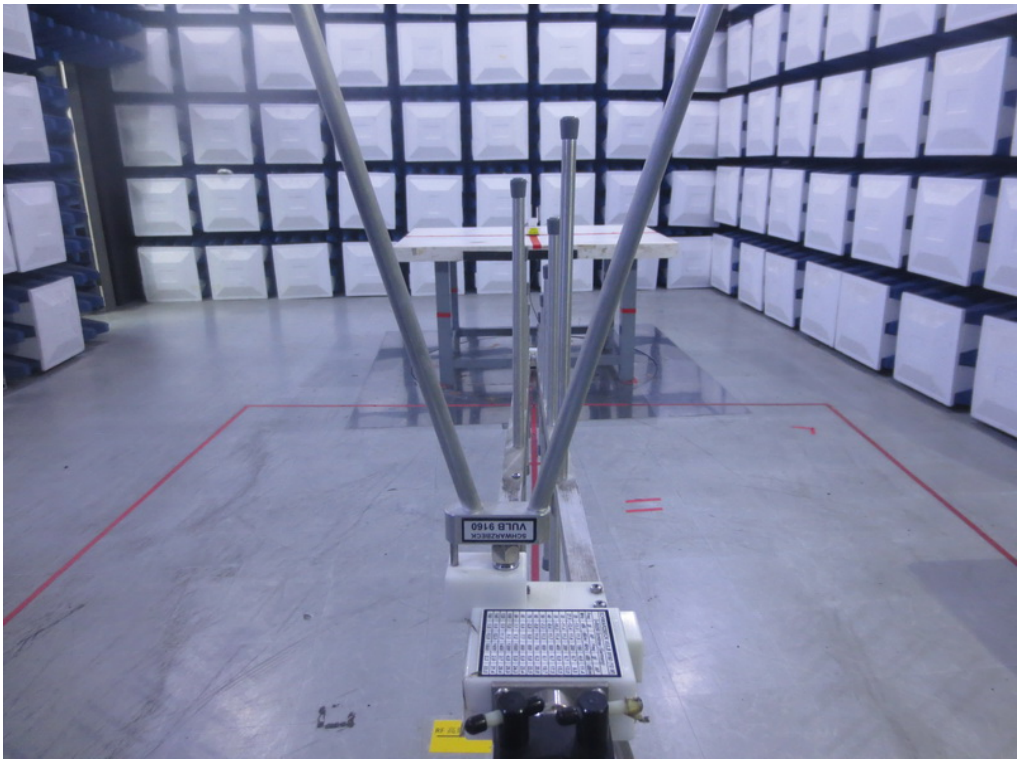
Radiated Emissions Test Photos

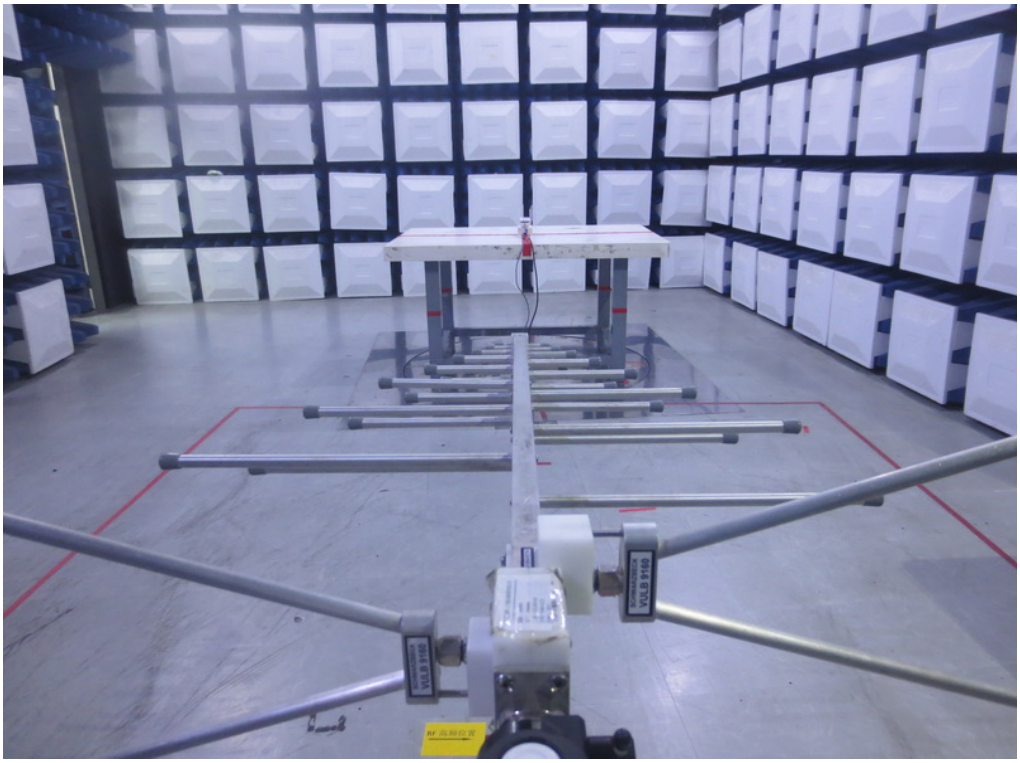
9 kHz to 30 MHz



Radiated Emissions Test Photos

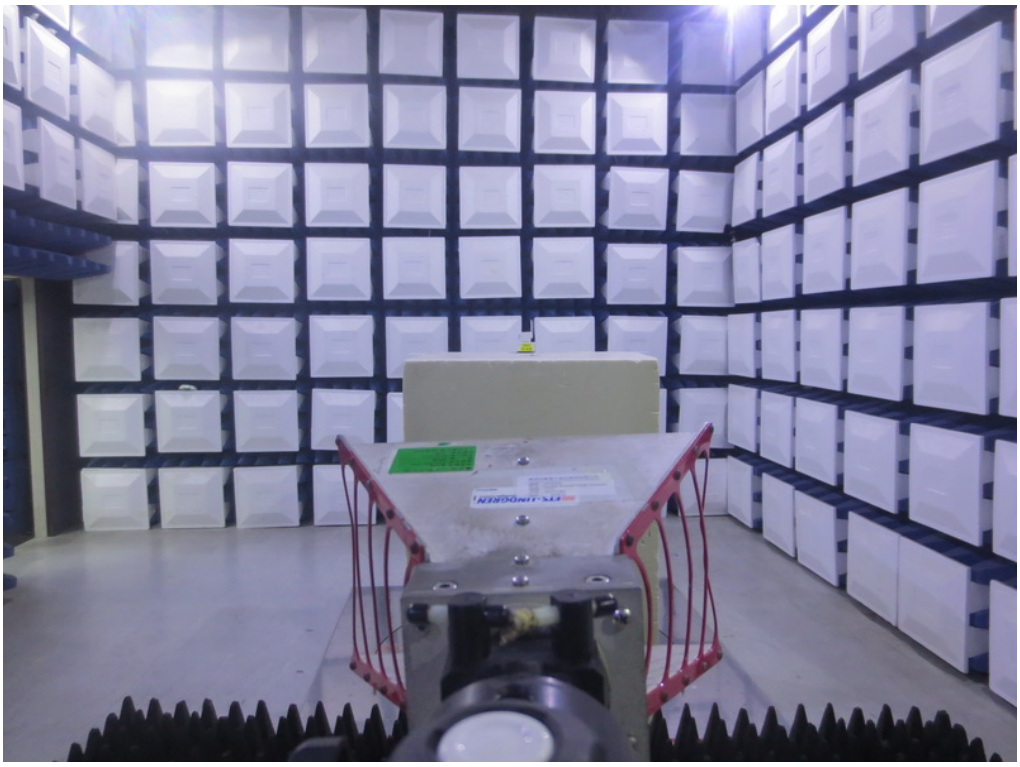
30 MHz to 1 GHz

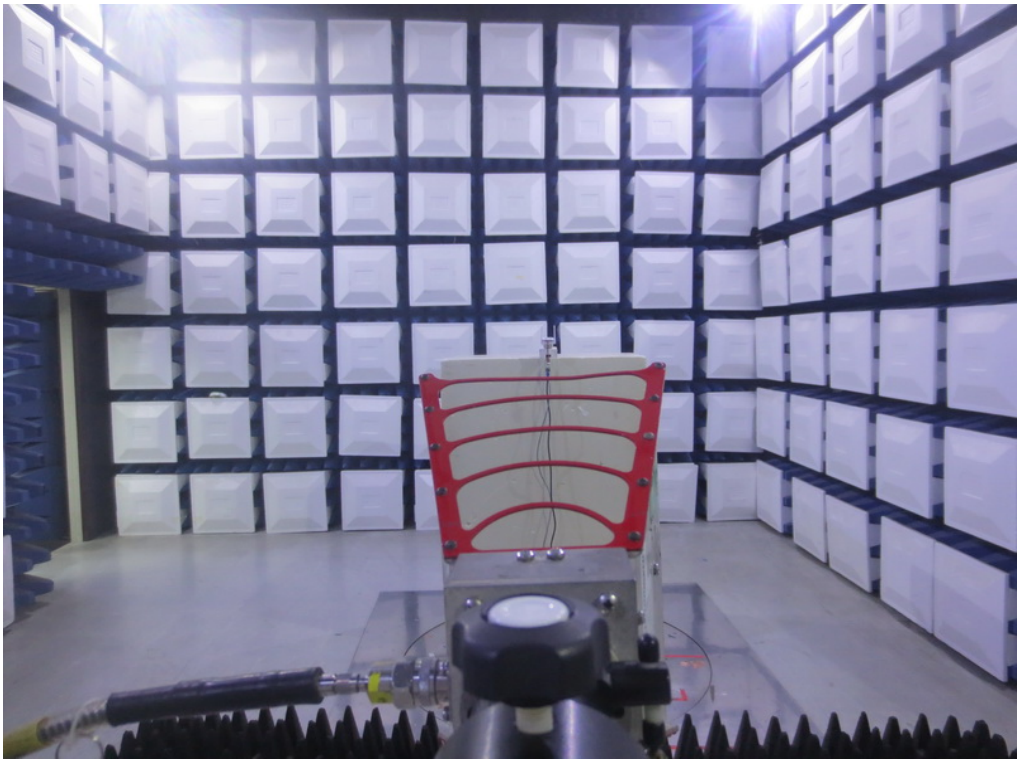




Radiated Emissions Test Photos

Above 1 GHz

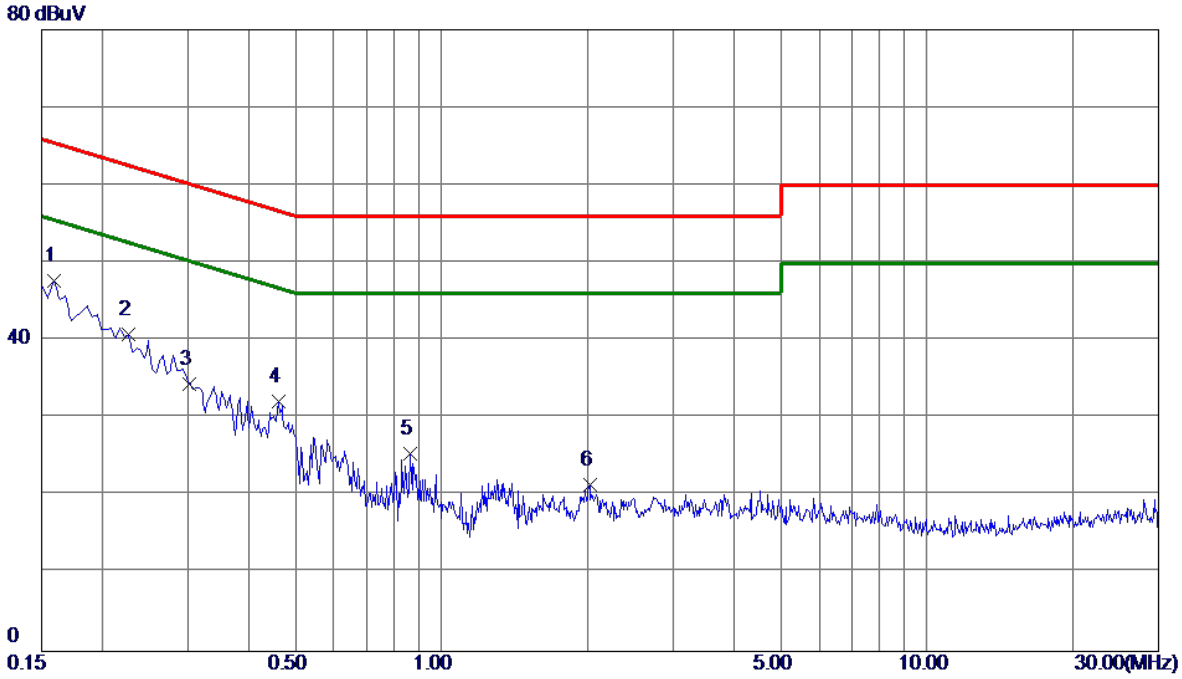




APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode:	TX N20 MODE CHANNEL 06

Line

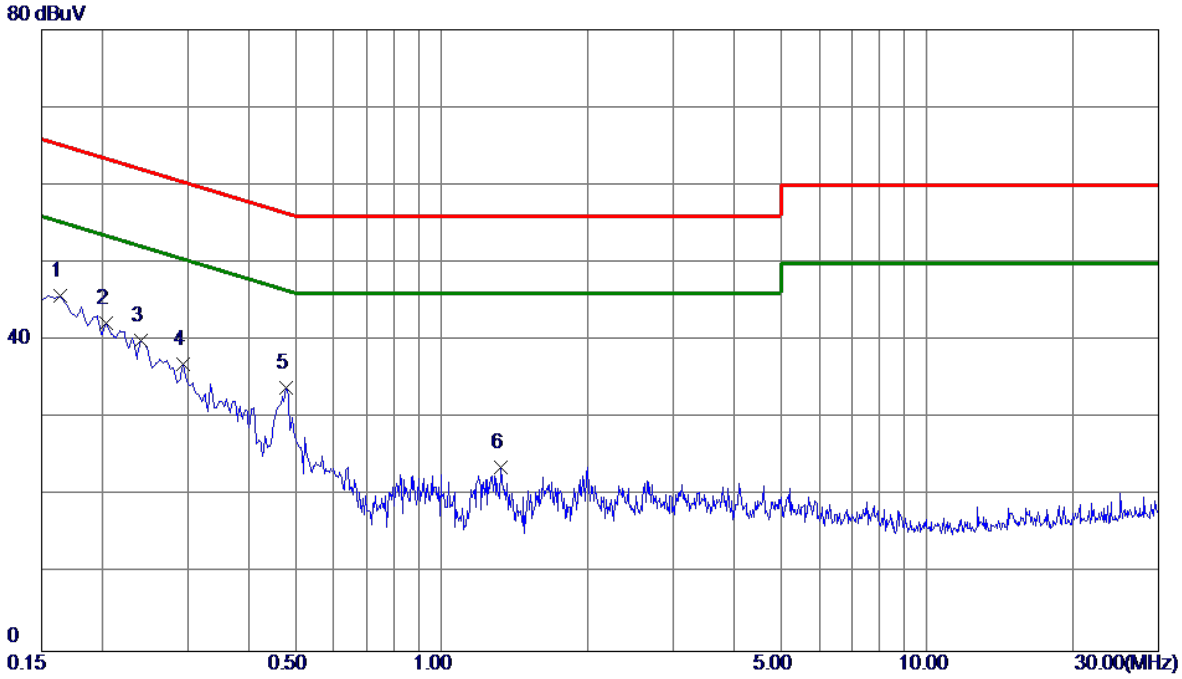


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1590	37.84	9.82	47.66	65.52	-17.86	Peak	
2	0.2265	30.97	9.82	40.79	62.58	-21.79	Peak	
3	0.3030	24.60	9.82	34.42	60.16	-25.74	Peak	
4	0.4605	22.41	9.80	32.21	56.68	-24.47	Peak	
5	0.8610	15.47	9.91	25.38	56.00	-30.62	Peak	
6	2.0220	11.49	10.00	21.49	56.00	-34.51	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX N20 MODE CHANNEL 06

Neutral



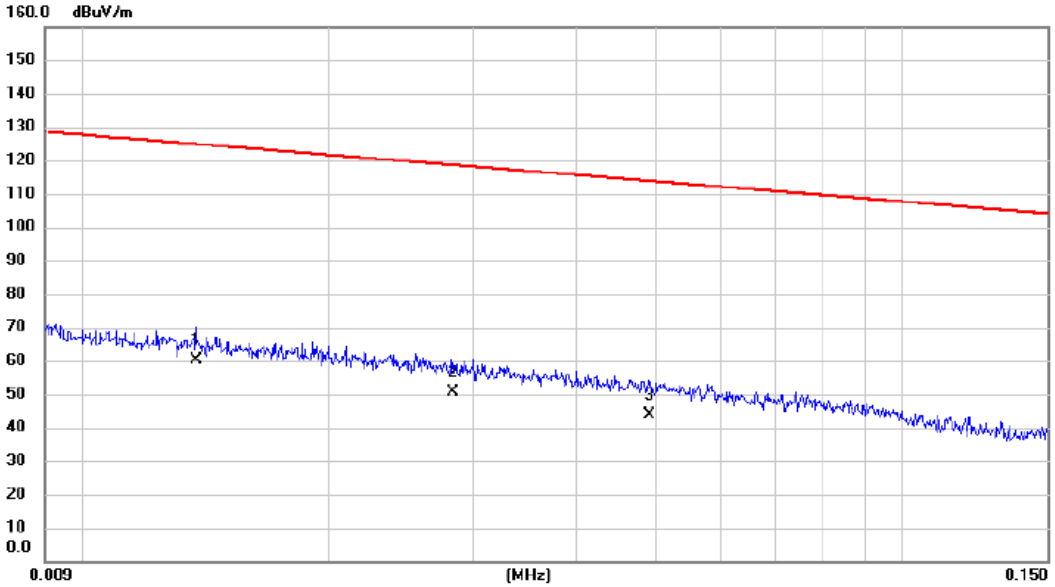
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1635	35.82	9.91	45.73	65.28	-19.55	Peak	
2	0.2040	32.32	9.91	42.23	63.45	-21.22	Peak	
3	0.2400	30.13	9.92	40.05	62.10	-22.05	Peak	
4	0.2940	27.01	9.93	36.94	60.41	-23.47	Peak	
5	0.4785	23.95	9.94	33.89	56.37	-22.48	Peak	
6	1.3245	13.60	10.14	23.74	56.00	-32.26	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

Test Mode:	TX B MODE CHANNEL 01

Ant 0°

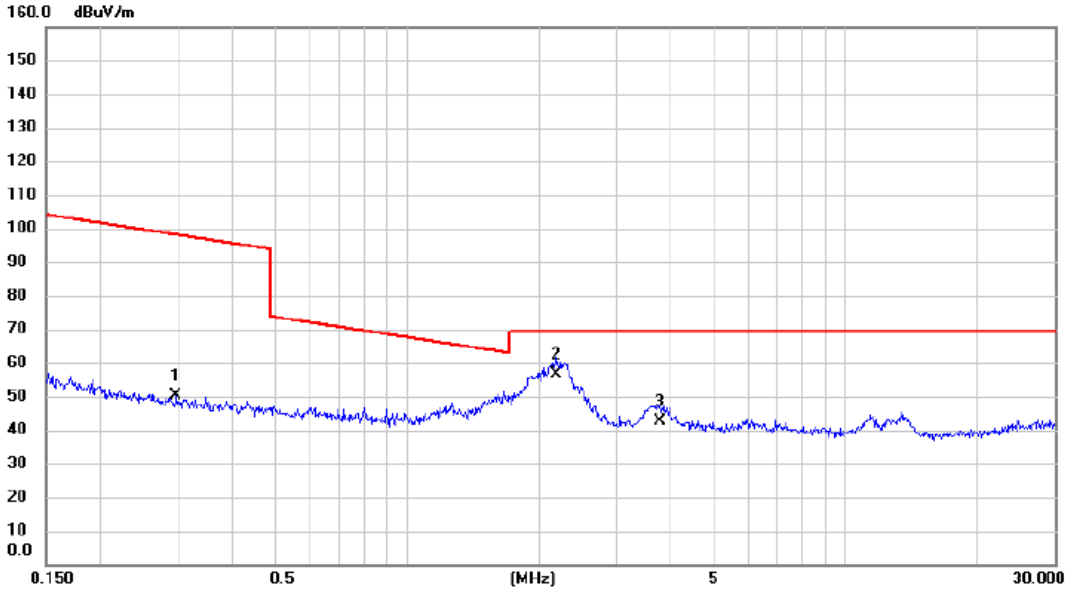


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0138	39.51	20.89	60.40	124.81	-64.41	AVG	
2		0.0283	30.81	19.88	50.69	118.57	-67.88	AVG	
3		0.0492	24.15	19.54	43.69	113.77	-70.08	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX B MODE CHANNEL 01

Ant 0°

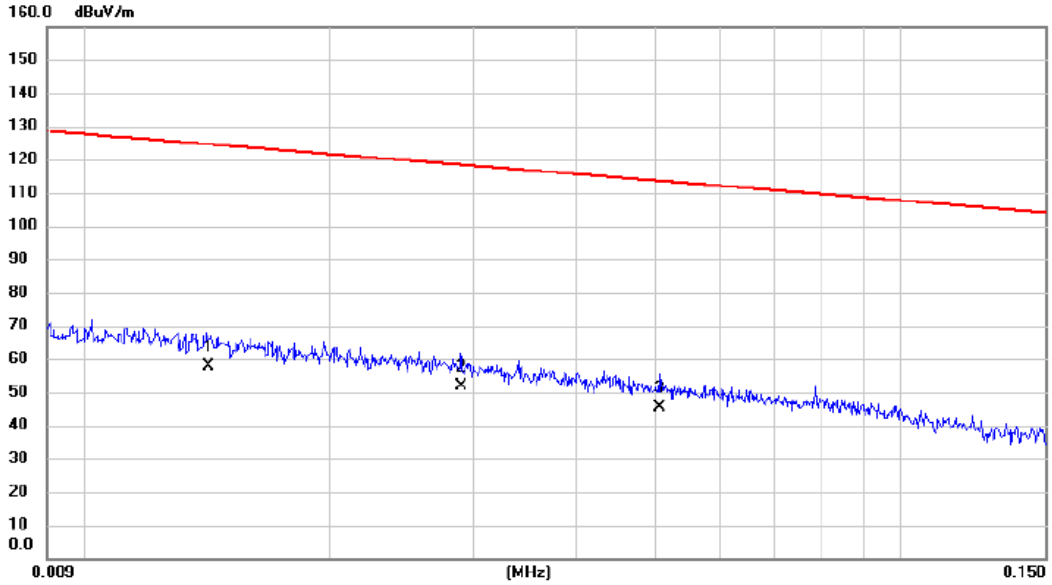


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.2971	32.97	17.04	50.01	98.15	-48.14	AVG	
2	*	2.1956	39.72	17.00	56.72	69.54	-12.82	QP	
3		3.7794	26.53	15.92	42.45	69.54	-27.09	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX B MODE CHANNEL 01

Ant 90°

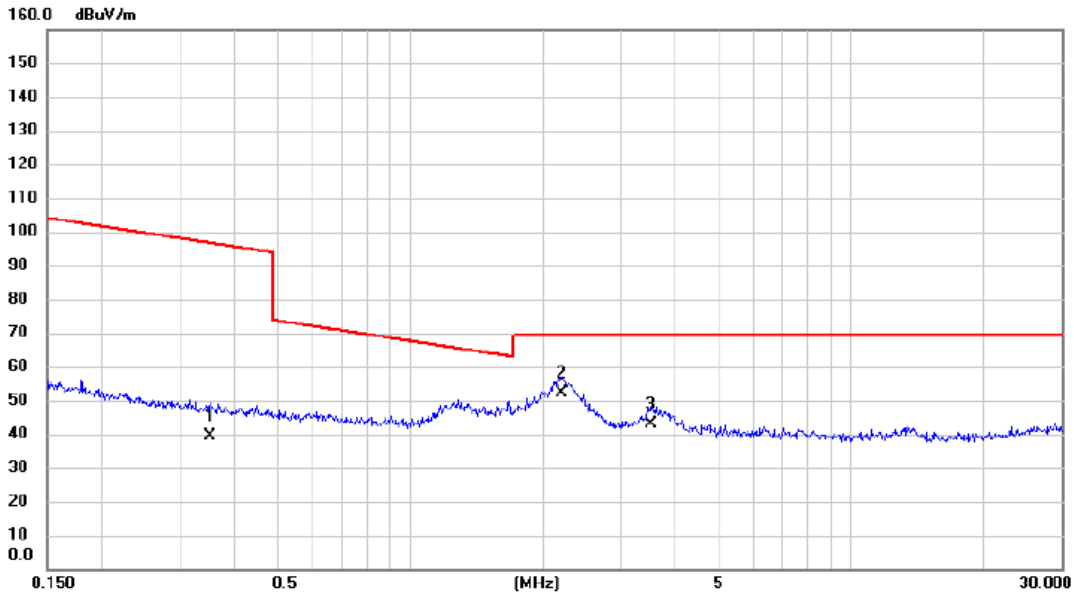


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0142	36.78	20.83	57.61	124.56	-66.95	AVG	
2	*	0.0290	31.87	19.87	51.74	118.36	-66.62	AVG	
3		0.0507	25.82	19.52	45.34	113.50	-68.16	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX B MODE CHANNEL 01

Ant 90°



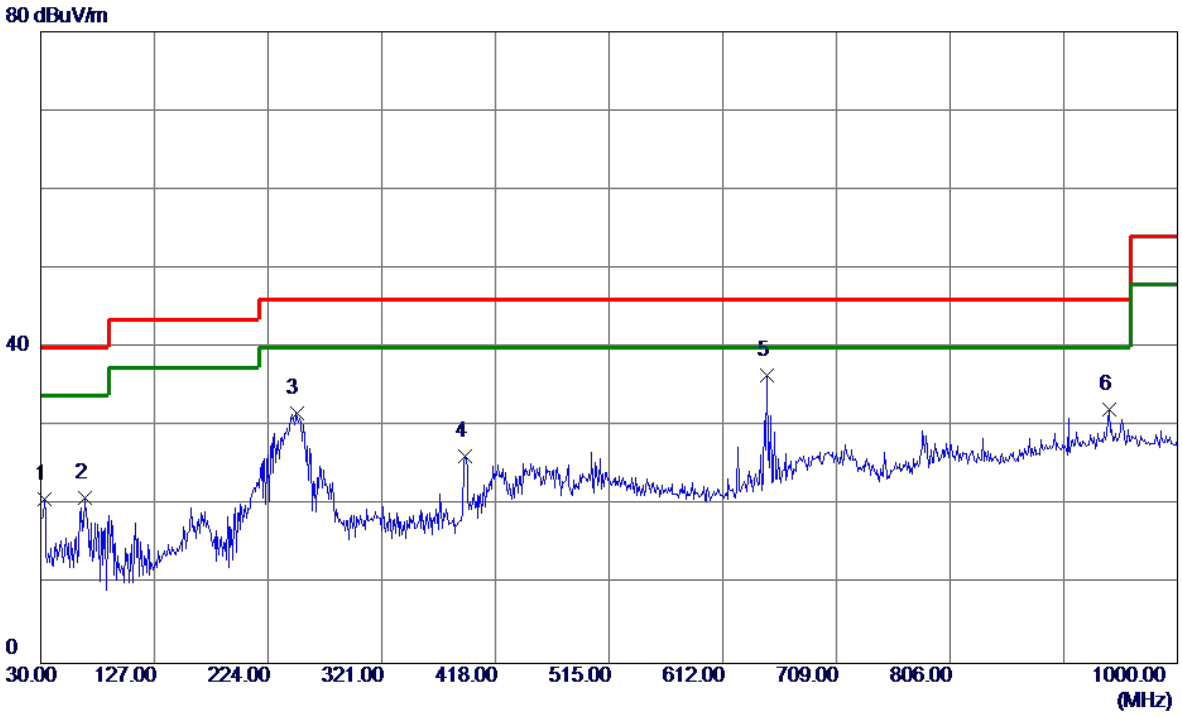
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.3511	22.35	17.02	39.37	96.70	-57.33	AVG	
2	*	2.2072	35.14	17.00	52.14	69.54	-17.40	QP	
3		3.5278	26.95	16.12	43.07	69.54	-26.47	QP	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

Test Mode:	TX B MODE CHANNEL 01

Vertical

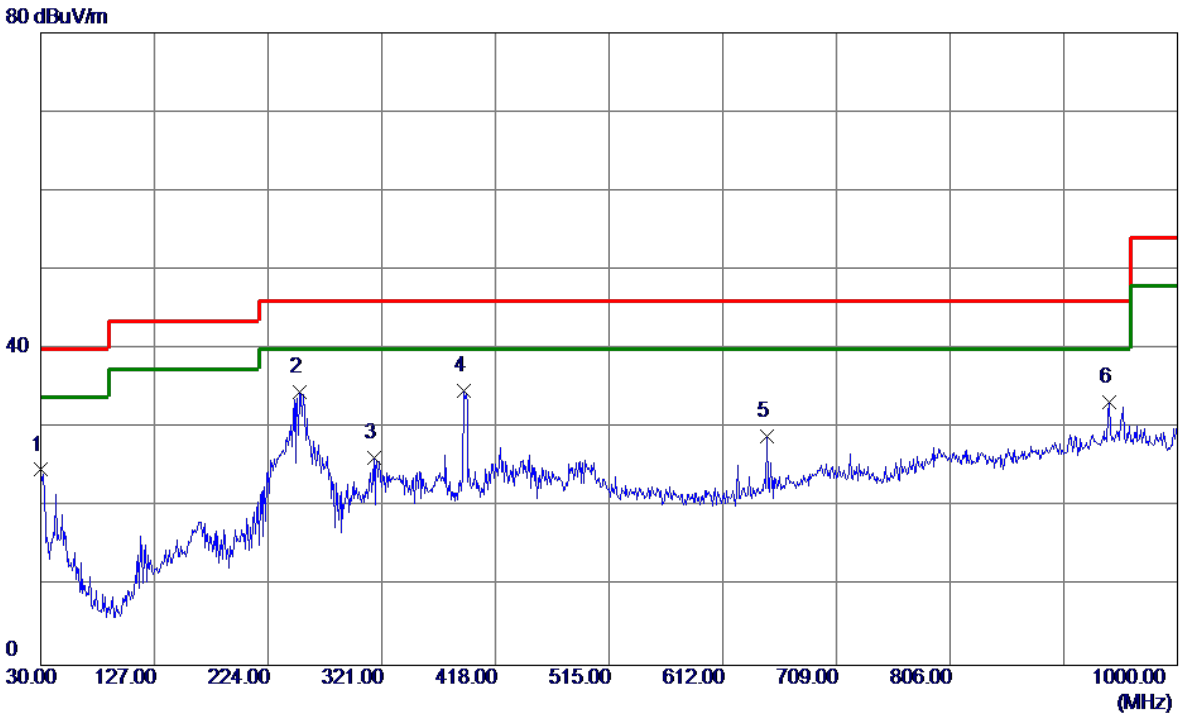


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	32.9100	35.84	-15.10	20.74	40.00	-19.26	Peak	
2	67.8300	38.24	-17.26	20.98	40.00	-19.02	Peak	
3	248.2500	46.41	-14.70	31.71	46.00	-14.29	Peak	
4	391.8100	36.05	-9.88	26.17	46.00	-19.83	Peak	
5 *	649.8300	41.99	-5.44	36.55	46.00	-9.45	Peak	
6	941.8000	31.31	0.88	32.19	46.00	-13.81	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX B MODE CHANNEL 01

Horizontal



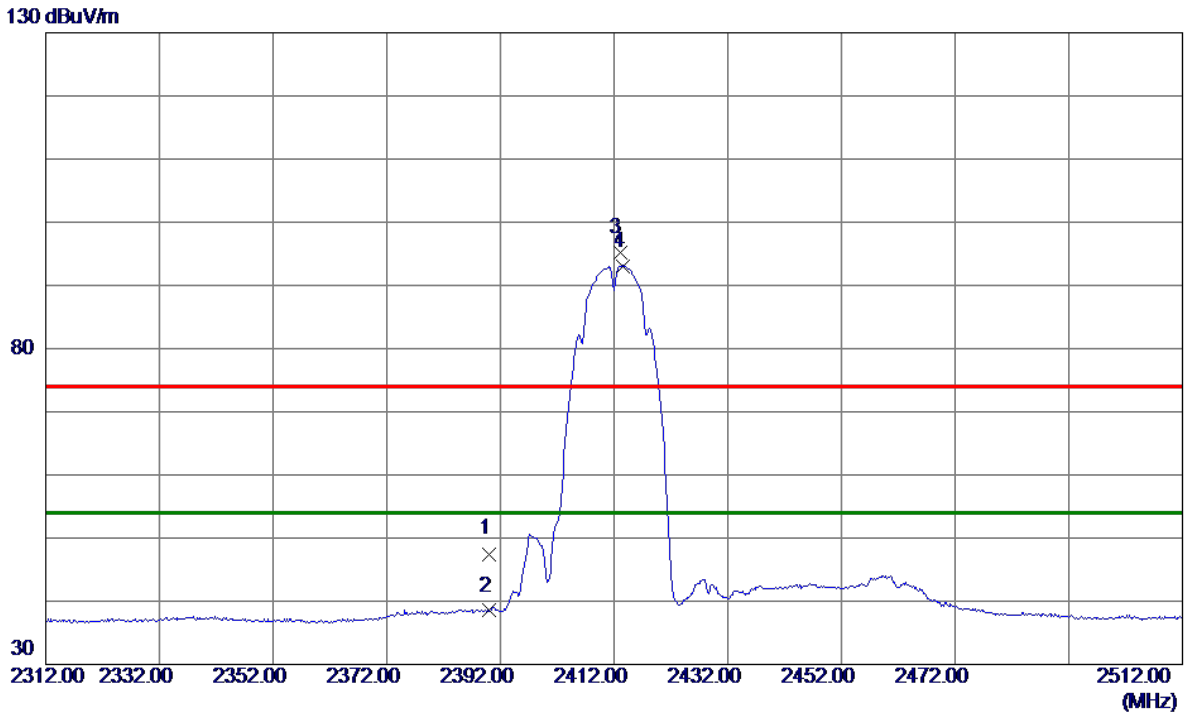
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	30.0000	39.85	-15.13	24.72	40.00	-15.28	Peak	
2	251.1600	49.07	-14.54	34.53	46.00	-11.47	Peak	
3	314.2100	37.10	-10.88	26.22	46.00	-19.78	Peak	
4 *	390.8400	44.57	-9.91	34.66	46.00	-11.34	Peak	
5	649.8300	34.39	-5.44	28.95	46.00	-17.05	Peak	
6	941.8000	32.36	0.88	33.24	46.00	-12.76	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	40.49	7.01	47.50	74.00	-26.50	Peak	
2	2390.0000	31.49	7.01	38.50	54.00	-15.50	AVG	
3	2413.0000	88.17	7.02	95.19	74.00	21.19	Peak	No Limit
4 *	2413.6000	86.08	7.02	93.10	54.00	39.10	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

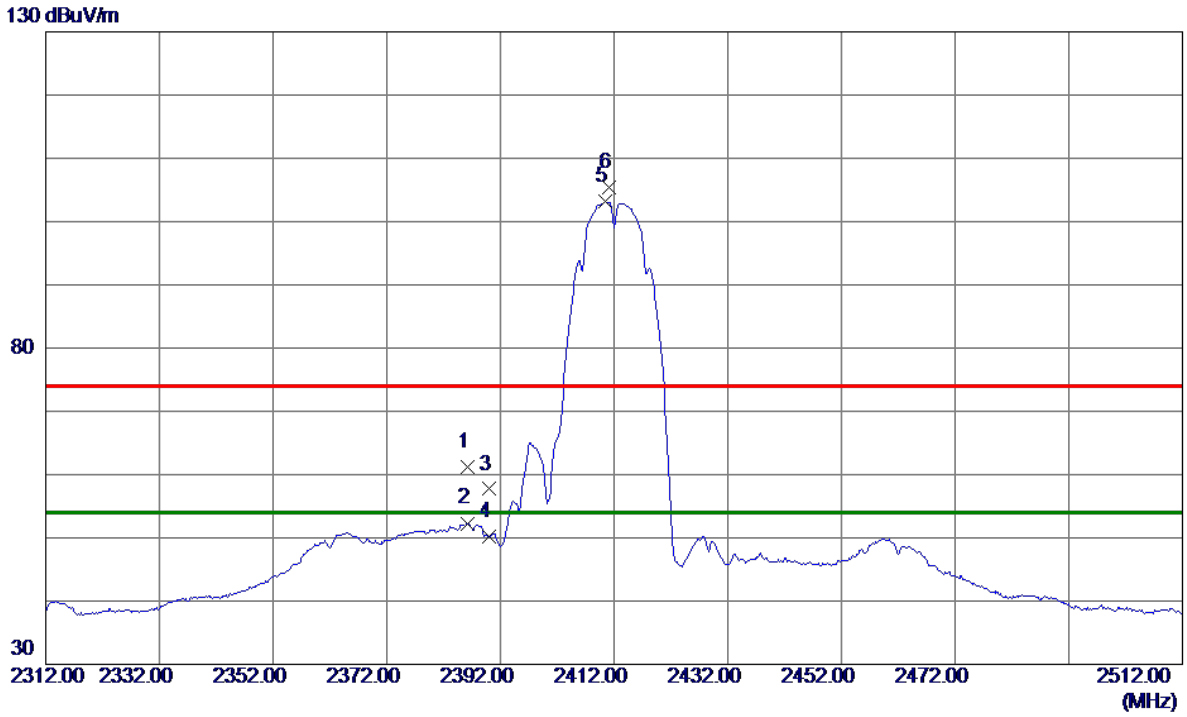
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4823.9000	48.04	4.23	52.27	74.00	-21.73	Peak	
2 *	4824.0050	45.32	4.23	49.55	54.00	-4.45	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2386.2000	54.17	7.01	61.18	74.00	-12.82	Peak	
2	2386.2000	45.29	7.01	52.30	54.00	-1.70	AVG	
3	2390.0000	50.69	7.01	57.70	74.00	-16.30	Peak	
4	2390.0000	43.20	7.01	50.21	54.00	-3.79	AVG	
5 *	2410.4000	96.12	7.02	103.14	54.00	49.14	AVG	No Limit
6	2411.2000	98.35	7.02	105.37	74.00	31.37	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

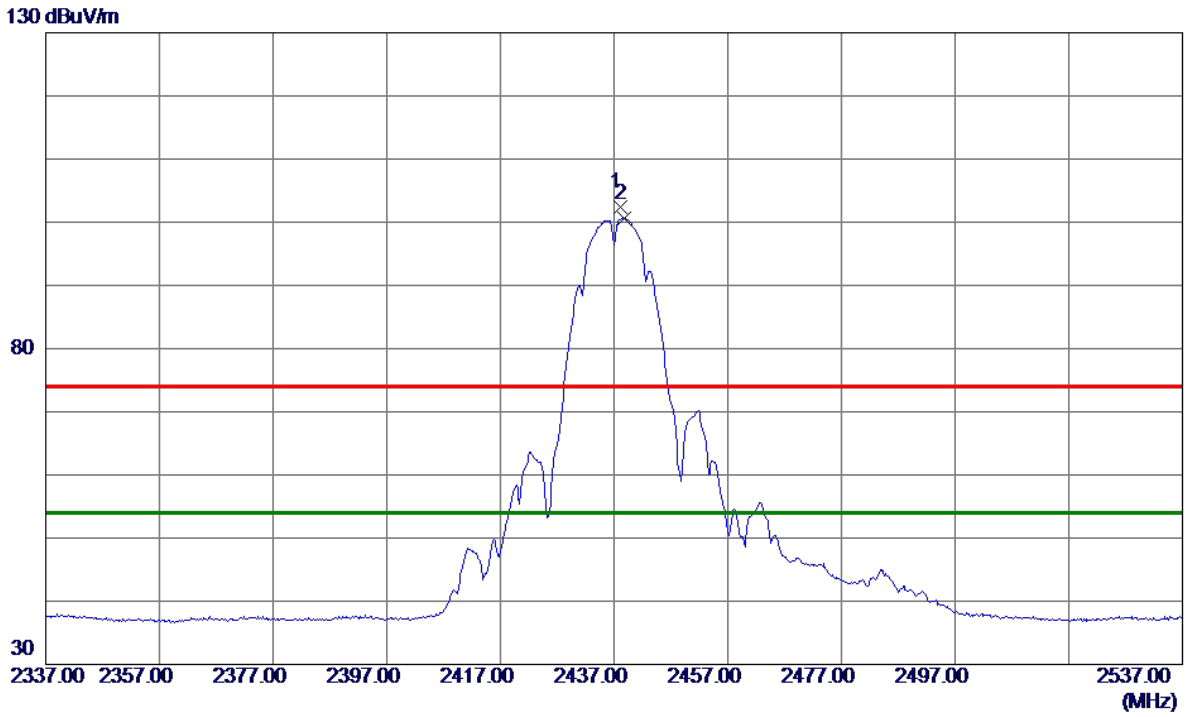
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4823.9600	49.35	4.23	53.58	74.00	-20.42	Peak	
2 *	4823.9750	48.31	4.23	52.54	54.00	-1.46	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2438.0000	95.37	7.02	102.39	74.00	28.39	Peak	No Limit
2 *	2438.8000	93.60	7.02	100.62	54.00	46.62	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

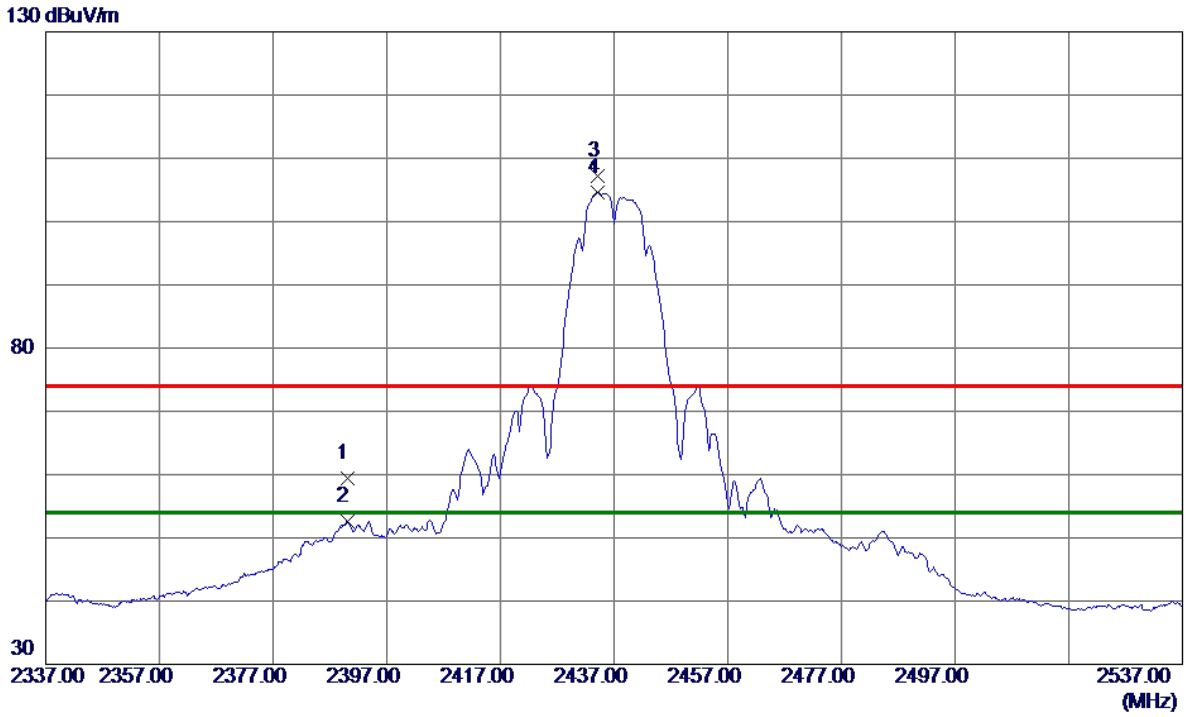
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4873.9850	45.90	4.34	50.24	54.00	-3.76	AVG	
2	4874.1349	49.29	4.34	53.63	74.00	-20.37	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	52.39	7.01	59.40	74.00	-14.60	Peak	
2	2390.0000	45.57	7.01	52.58	54.00	-1.42	AVG	
3	2434.2000	100.20	7.02	107.22	74.00	33.22	Peak	No Limit
4 *	2434.2000	97.53	7.02	104.55	54.00	50.55	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz

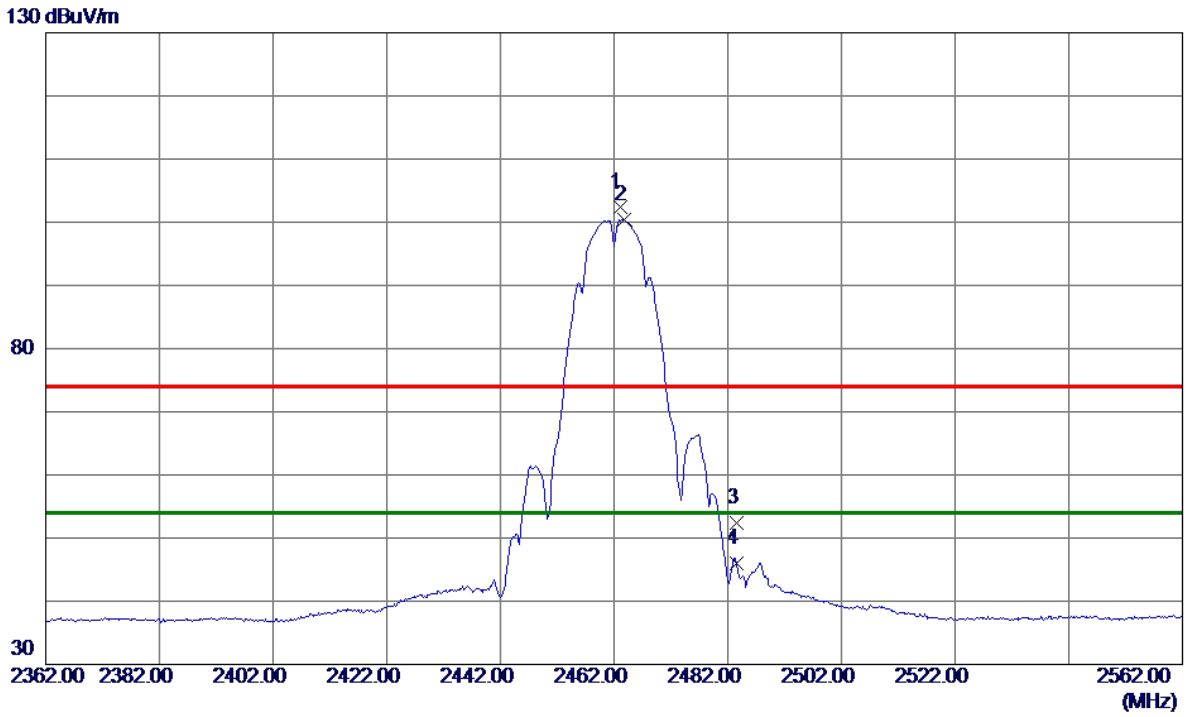
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4873.9400	50.41	4.34	54.75	74.00	-19.25	Peak	
2 *	4873.9950	48.08	4.34	52.42	54.00	-1.58	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2463.0000	95.29	7.03	102.32	74.00	28.32	Peak	No Limit
2 *	2463.8000	93.33	7.03	100.36	54.00	46.36	AVG	No Limit
3	2483.5000	45.33	7.03	52.36	74.00	-21.64	Peak	
4	2483.5000	39.04	7.03	46.07	54.00	-7.93	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

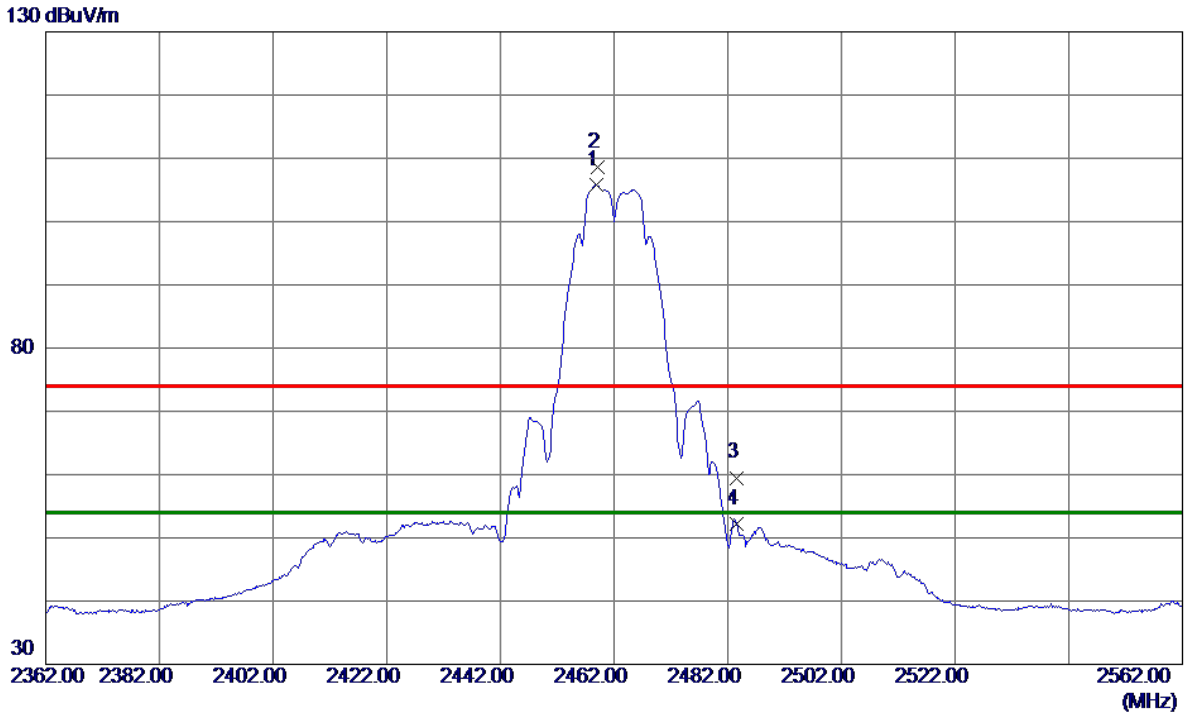
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4923.9550	43.54	4.44	47.98	54.00	-6.02	AVG	
2	4924.0750	49.87	4.44	54.31	74.00	-19.69	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2458.8000	98.84	7.03	105.87	54.00	51.87	AVG	No Limit
2	2459.2000	101.62	7.03	108.65	74.00	34.65	Peak	No Limit
3	2483.5000	52.47	7.03	59.50	74.00	-14.50	Peak	
4	2483.5000	45.26	7.03	52.29	54.00	-1.71	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz

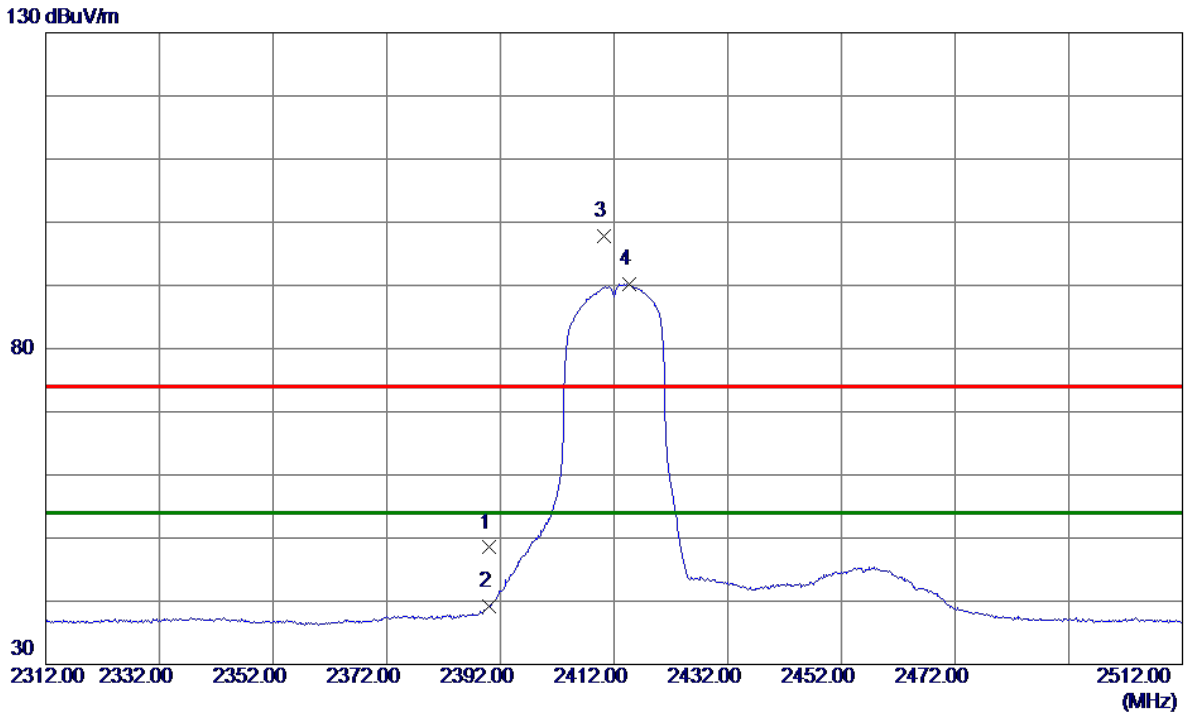
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4923.9550	45.66	4.44	50.10	54.00	-3.90	AVG	
2	4924.1150	50.23	4.44	54.67	74.00	-19.33	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	41.49	7.01	48.50	74.00	-25.50	Peak	
2	2390.0000	32.15	7.01	39.16	54.00	-14.84	AVG	
3	2410.2000	90.70	7.02	97.72	74.00	23.72	Peak	No Limit
4 *	2414.6000	83.11	7.02	90.13	54.00	36.13	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

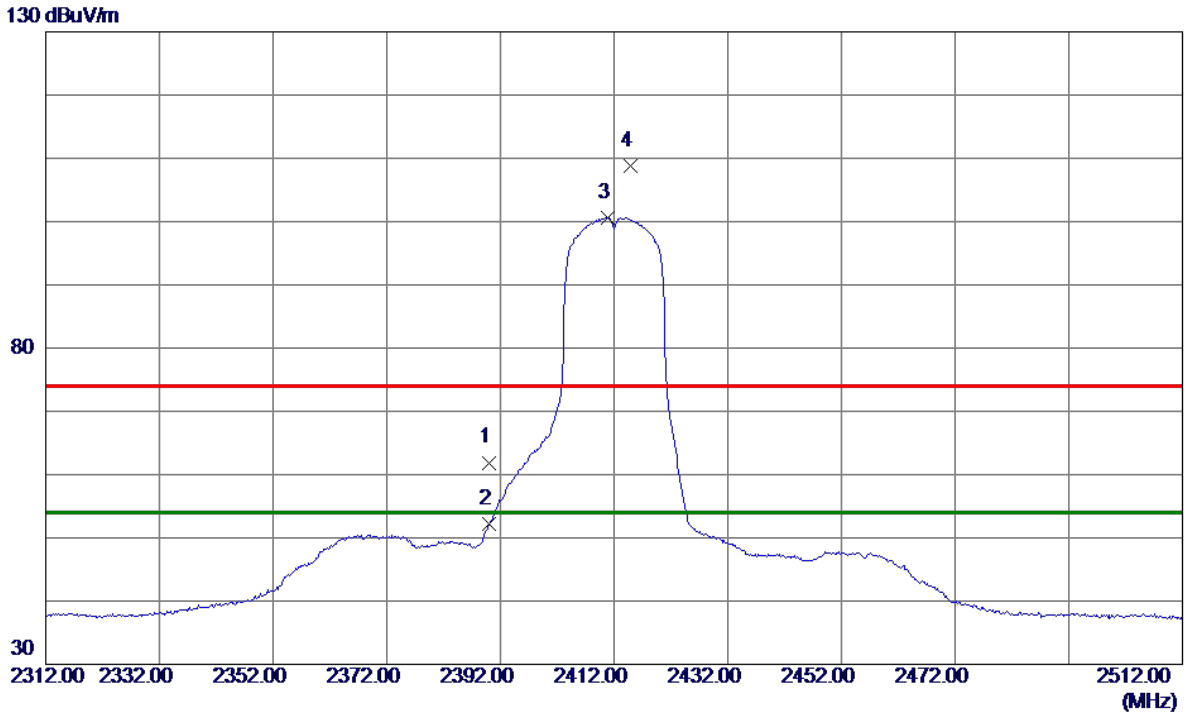
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4825.2000	33.53	4.23	37.76	54.00	-16.24	AVG	
2	4825.7000	44.39	4.24	48.63	74.00	-25.37	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	54.89	7.01	61.90	74.00	-12.10	Peak	
2	2390.0000	45.12	7.01	52.13	54.00	-1.87	AVG	
3 *	2410.8000	93.56	7.02	100.58	54.00	46.58	AVG	No Limit
4	2414.8000	101.76	7.02	108.78	74.00	34.78	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz

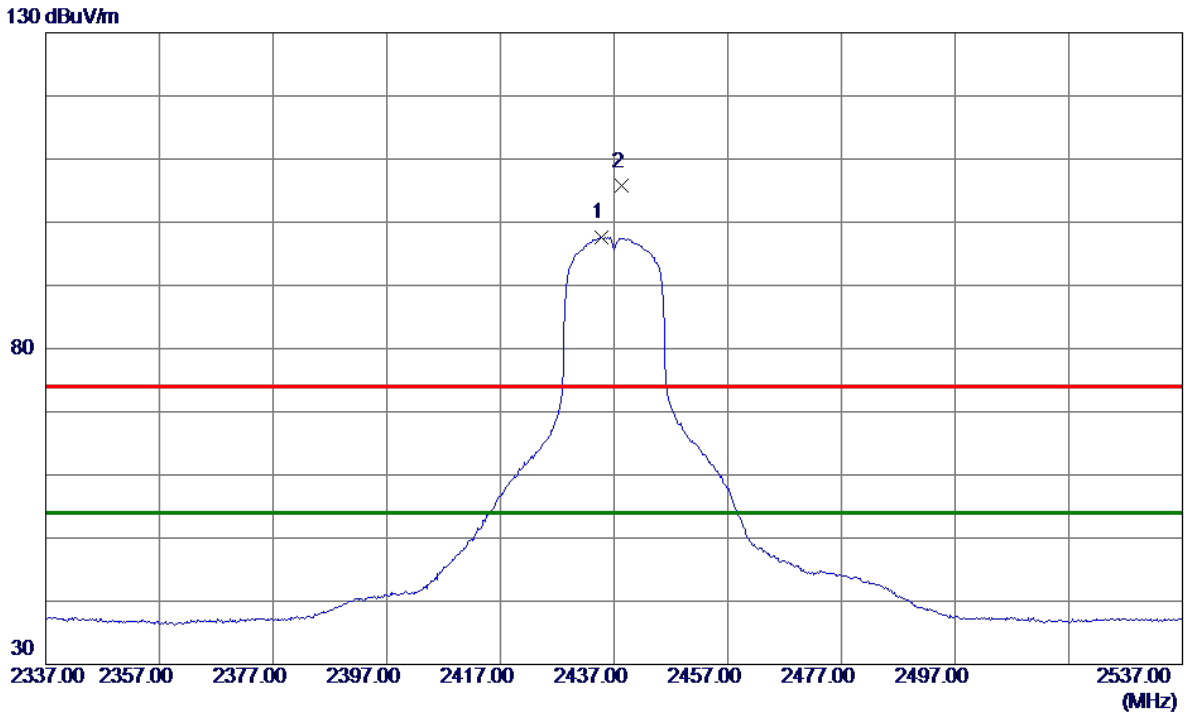
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4824.6500	34.80	4.23	39.03	54.00	-14.97	AVG	
2	4826.2500	46.17	4.24	50.41	74.00	-23.59	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2434.8000	90.54	7.02	97.56	54.00	43.56	AVG	No Limit
2	2438.4000	98.68	7.02	105.70	74.00	31.70	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

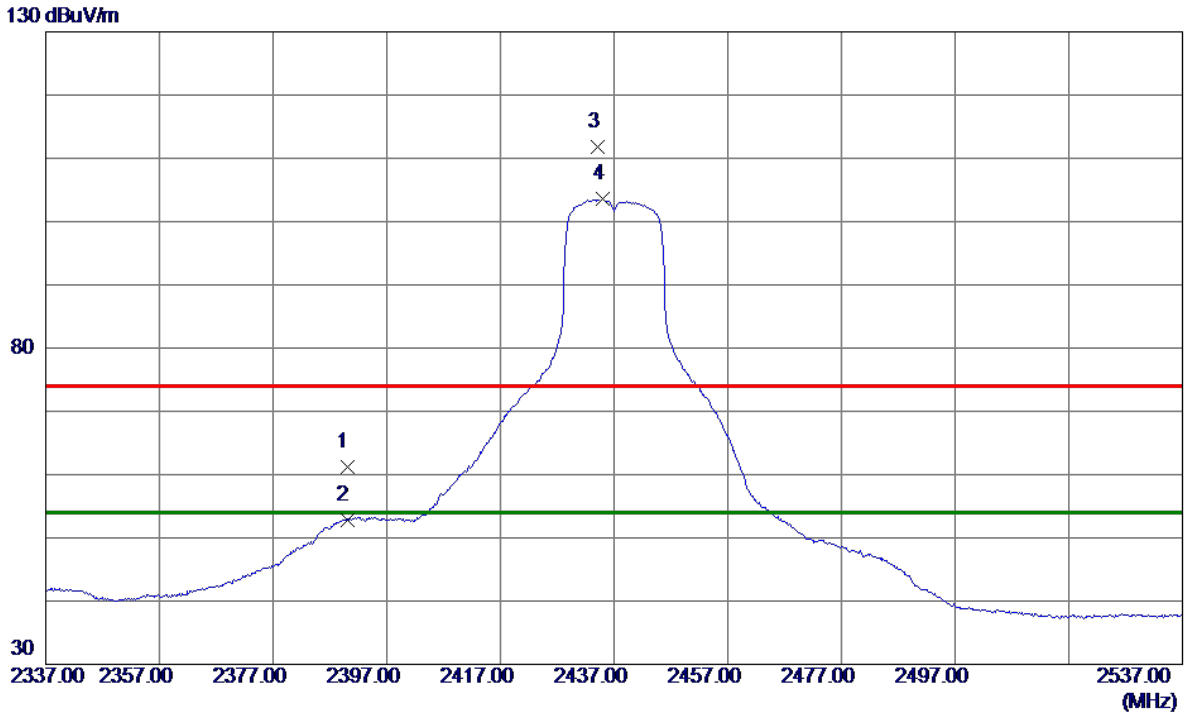
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4872.7500	50.14	4.33	54.47	74.00	-19.53	Peak	
2 *	4873.8500	37.83	4.34	42.17	54.00	-11.83	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	54.19	7.01	61.20	74.00	-12.80	Peak	
2	2390.0000	45.76	7.01	52.77	54.00	-1.23	AVG	
3	2434.2000	104.69	7.02	111.71	74.00	37.71	Peak	No Limit
4 *	2435.0000	96.56	7.02	103.58	54.00	49.58	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz

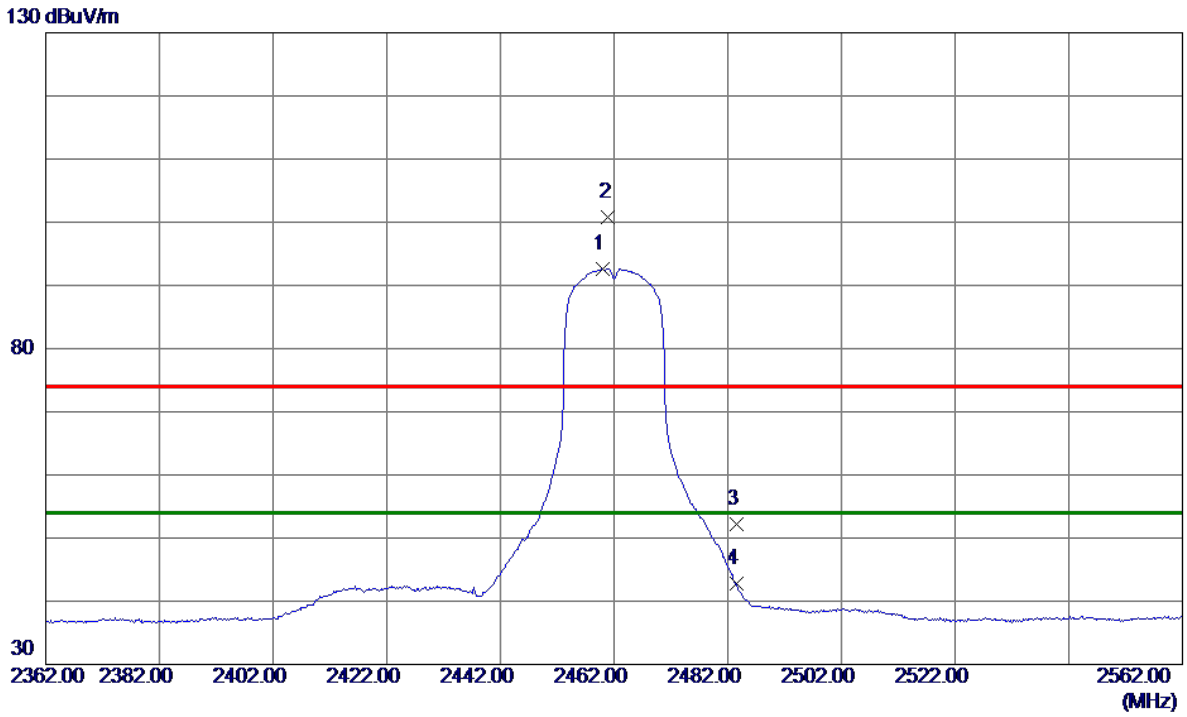
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4872.2000	39.05	4.33	43.38	54.00	-10.62	AVG	
2	4873.1000	49.52	4.33	53.85	74.00	-20.15	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2460.0000	85.56	7.03	92.59	54.00	38.59	AVG	No Limit
2	2461.0000	93.69	7.03	100.72	74.00	26.72	Peak	No Limit
3	2483.5000	45.12	7.03	52.15	74.00	-21.85	Peak	
4	2483.5000	35.70	7.03	42.73	54.00	-11.27	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

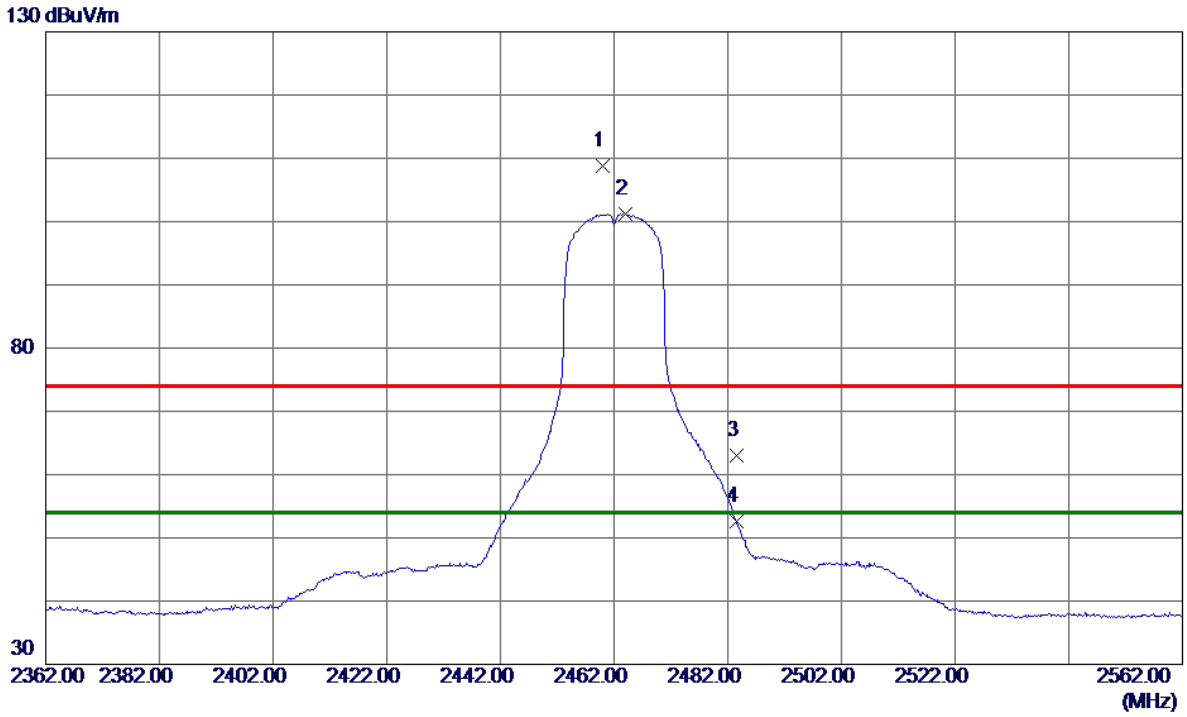
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4923.8000	28.78	4.44	33.22	54.00	-20.78	AVG	
2	4923.9500	40.92	4.44	45.36	74.00	-28.64	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2460.0000	101.80	7.03	108.83	74.00	34.83	Peak	No Limit
2 *	2464.0000	94.15	7.03	101.18	54.00	47.18	AVG	No Limit
3	2483.5000	55.88	7.03	62.91	74.00	-11.09	Peak	
4	2483.5000	45.60	7.03	52.63	54.00	-1.37	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz

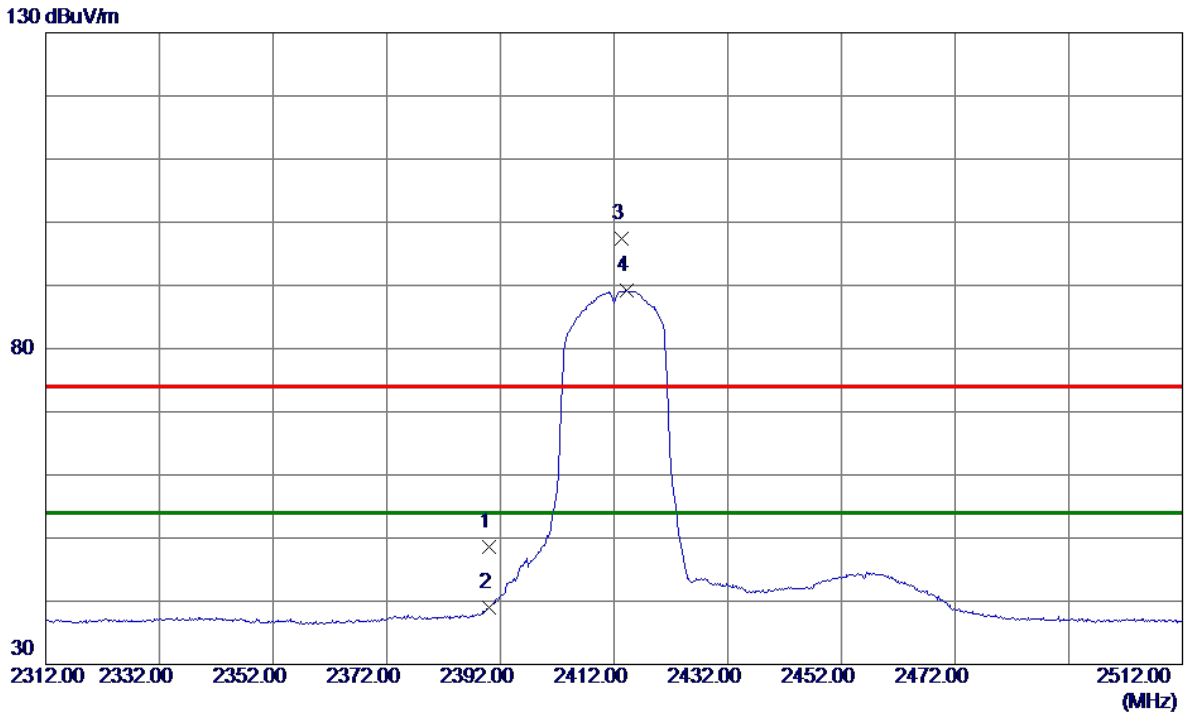
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4918.3000	40.83	4.43	45.26	74.00	-28.74	Peak	
2 *	4924.6500	30.75	4.44	35.19	54.00	-18.81	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	41.65	7.01	48.66	74.00	-25.34	Peak	
2	2390.0000	32.08	7.01	39.09	54.00	-14.91	AVG	
3	2413.4000	90.37	7.02	97.39	74.00	23.39	Peak	No Limit
4 *	2414.2000	82.21	7.02	89.23	54.00	35.23	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

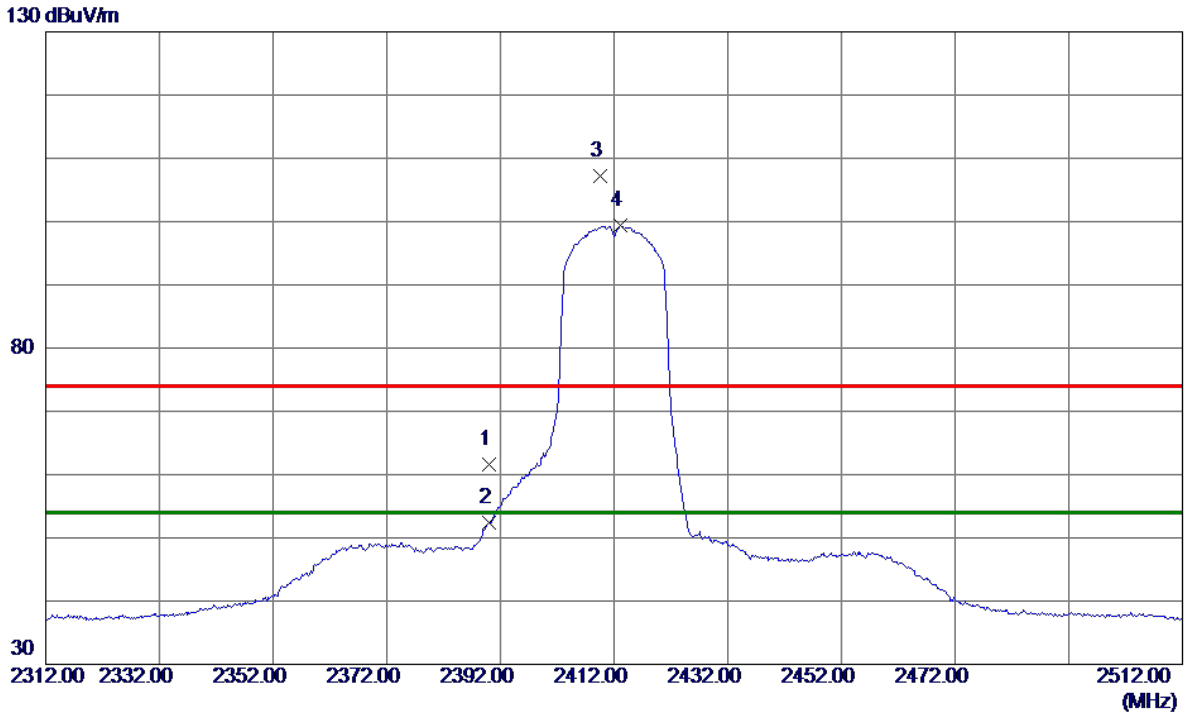
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4822.9000	30.32	4.23	34.55	54.00	-19.45	AVG	
2	4824.1000	42.02	4.23	46.25	74.00	-27.75	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	54.57	7.01	61.58	74.00	-12.42	Peak	
2	2390.0000	45.40	7.01	52.41	54.00	-1.59	AVG	
3	2409.6000	100.15	7.02	107.17	74.00	33.17	Peak	No Limit
4 *	2413.2000	92.31	7.02	99.33	54.00	45.33	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

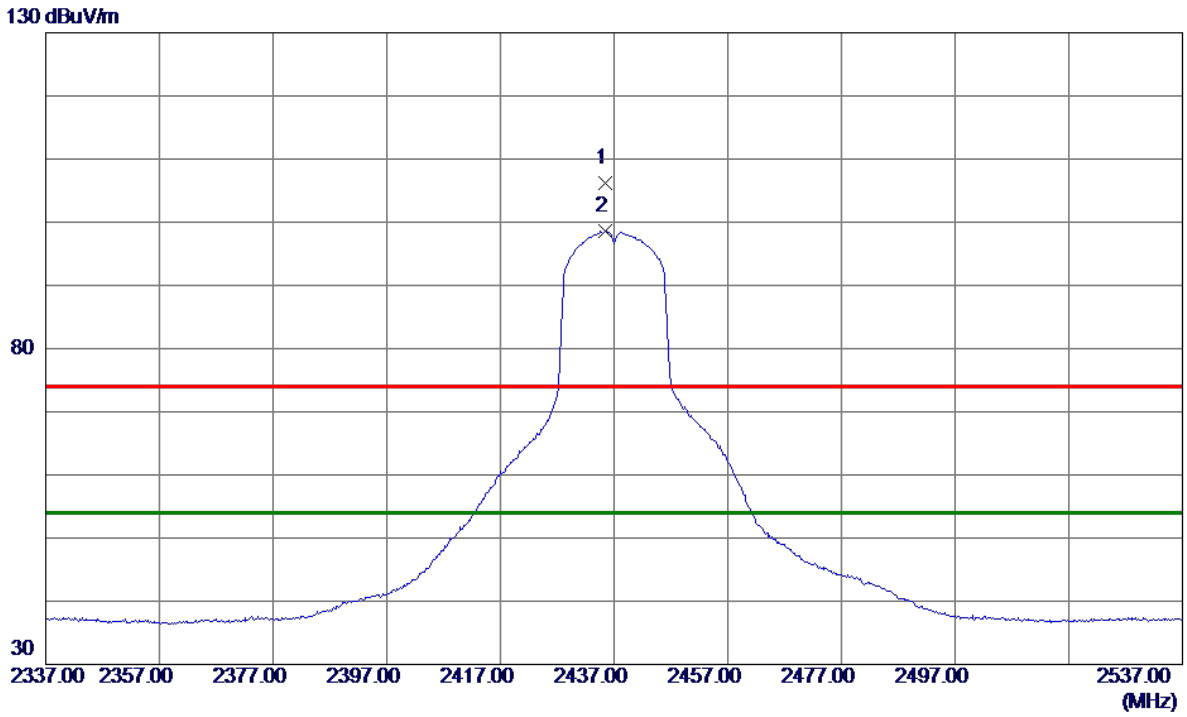
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4824.1000	32.55	4.23	36.78	54.00	-17.22	AVG	
2	4826.5500	43.19	4.24	47.43	74.00	-26.57	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2435.4000	99.23	7.02	106.25	74.00	32.25	Peak	No Limit
2 *	2435.4000	91.54	7.02	98.56	54.00	44.56	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

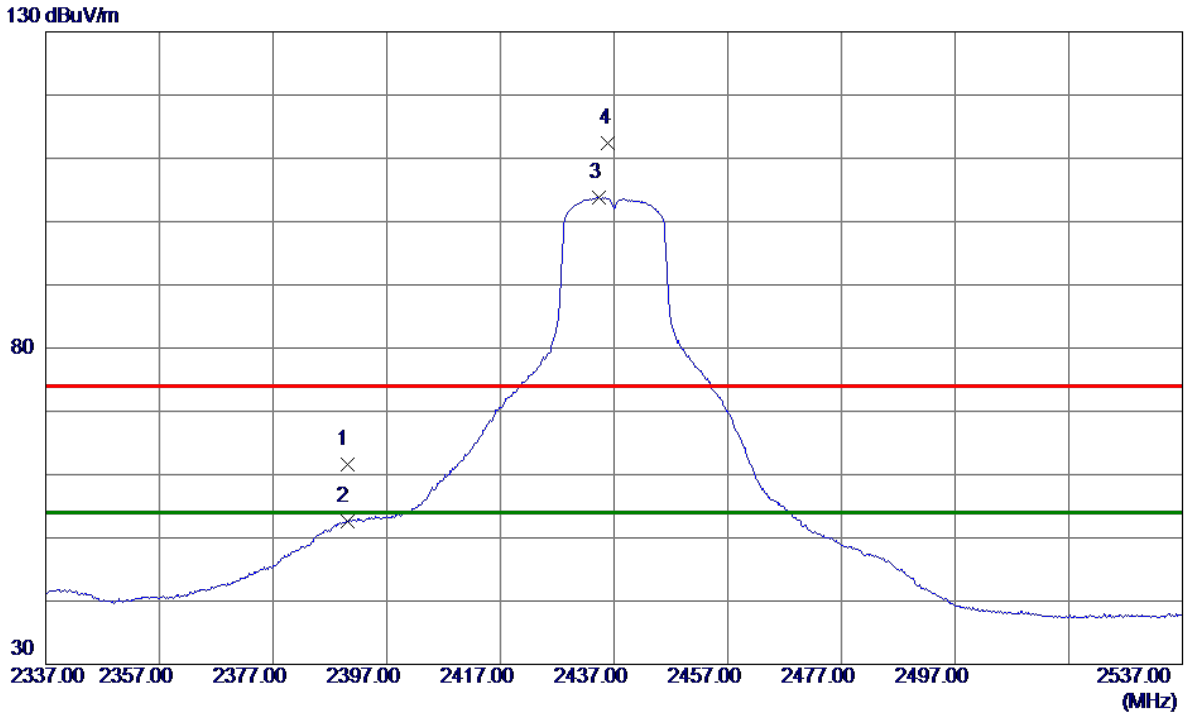
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4870.9000	33.14	4.33	37.47	54.00	-16.53	AVG	
2	4872.9500	44.48	4.33	48.81	74.00	-25.19	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	54.58	7.01	61.59	74.00	-12.41	Peak	
2	2390.0000	45.53	7.01	52.54	54.00	-1.46	AVG	
3 *	2434.4000	96.79	7.02	103.81	54.00	49.81	AVG	No Limit
4	2436.0000	105.32	7.02	112.34	74.00	38.34	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

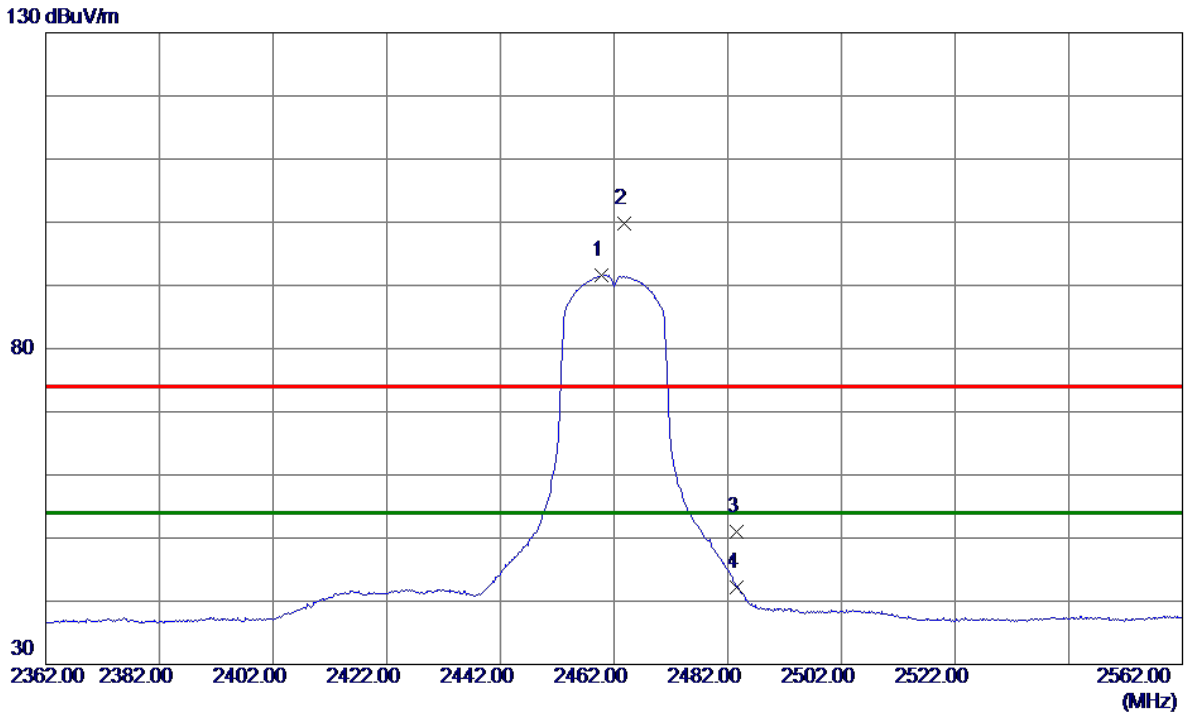
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4869.6000	50.10	4.33	54.43	74.00	-19.57	Peak	
2 *	4872.1000	37.62	4.33	41.95	54.00	-12.05	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2459.8000	84.64	7.03	91.67	54.00	37.67	AVG	No Limit
2	2463.8000	92.77	7.03	99.80	74.00	25.80	Peak	No Limit
3	2483.5000	43.93	7.03	50.96	74.00	-23.04	Peak	
4	2483.5000	35.23	7.03	42.26	54.00	-11.74	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

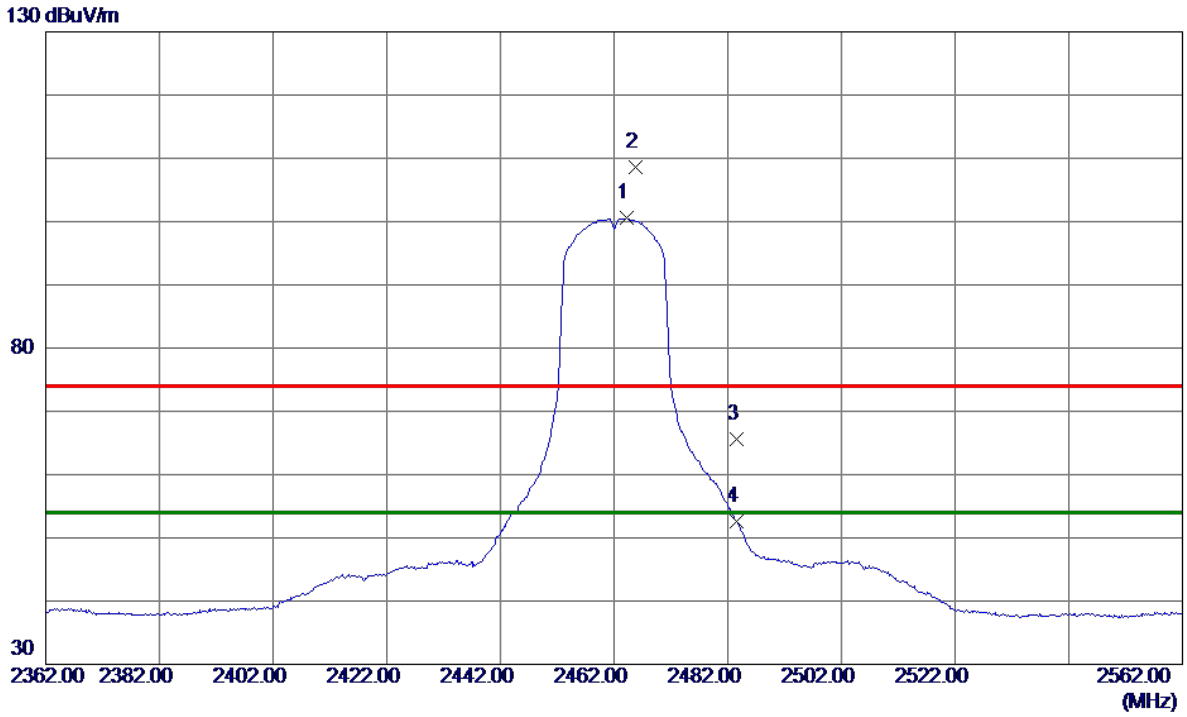
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4920.6500	37.61	4.43	42.04	74.00	-31.96	Peak	
2 *	4924.2000	27.01	4.44	31.45	54.00	-22.55	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2464.2000	93.55	7.03	100.58	54.00	46.58	AVG	No Limit
2	2465.8000	101.62	7.03	108.65	74.00	34.65	Peak	No Limit
3	2483.5000	58.58	7.03	65.61	74.00	-8.39	Peak	
4	2483.5000	45.60	7.03	52.63	54.00	-1.37	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

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

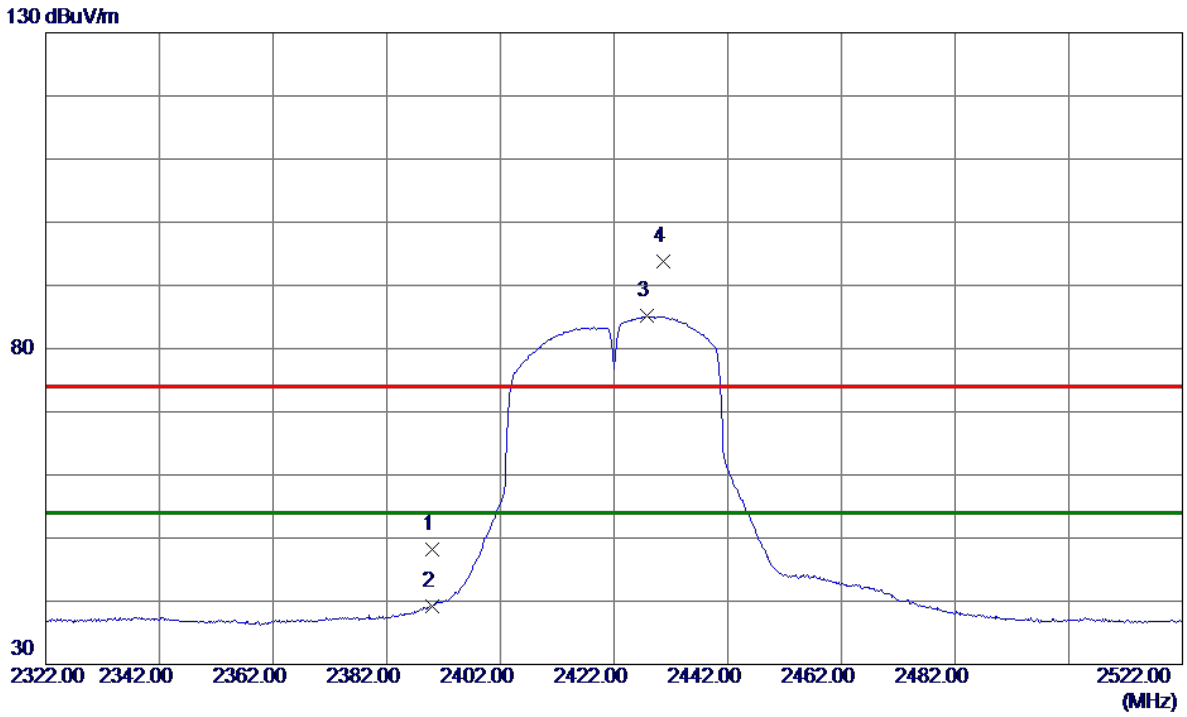
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4924.1000	28.33	4.44	32.77	54.00	-21.23	AVG	
2	4925.2500	39.58	4.44	44.02	74.00	-29.98	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	41.12	7.01	48.13	74.00	-25.87	Peak	
2	2390.0000	32.26	7.01	39.27	54.00	-14.73	AVG	
3 *	2427.8000	78.09	7.02	85.11	54.00	31.11	AVG	No Limit
4	2430.6000	86.69	7.02	93.71	74.00	19.71	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

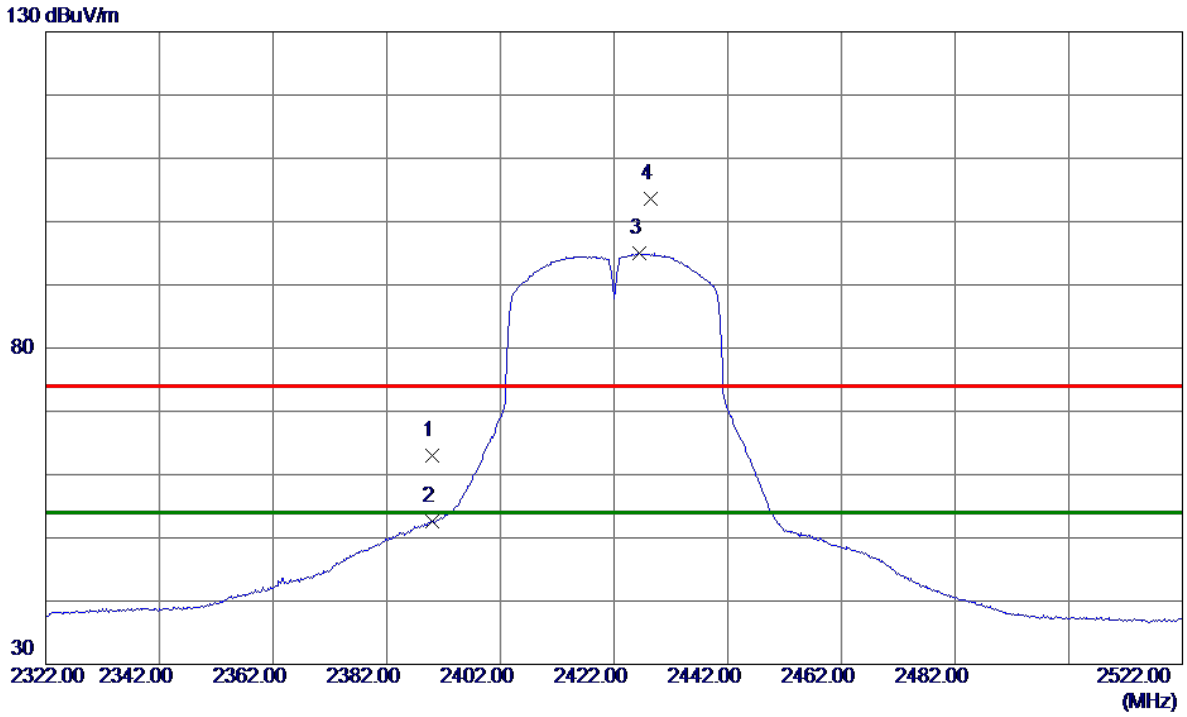
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4838.8500	26.89	4.26	31.15	54.00	-22.85	AVG	
2	4840.5500	36.94	4.27	41.21	74.00	-32.79	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	55.95	7.01	62.96	74.00	-11.04	Peak	
2	2390.0000	45.61	7.01	52.62	54.00	-1.38	AVG	
3 *	2426.4000	87.92	7.02	94.94	54.00	40.94	AVG	No Limit
4	2428.4000	96.53	7.02	103.55	74.00	29.55	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz

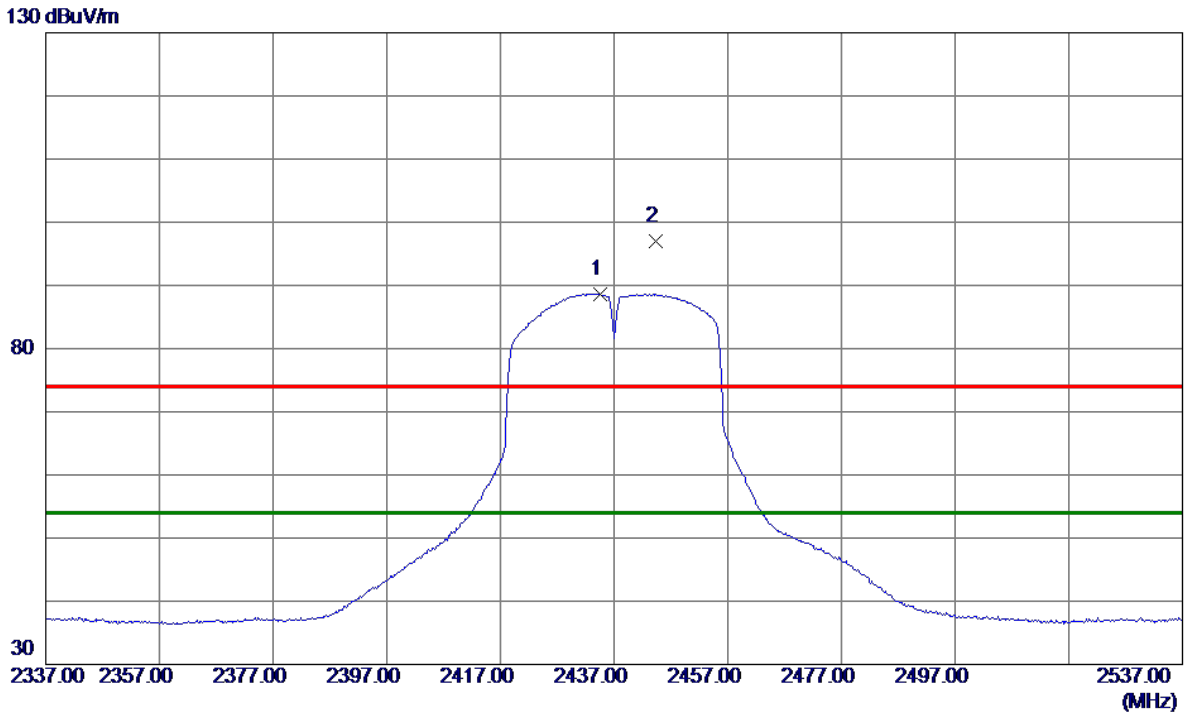
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4843.9500	28.20	4.27	32.47	54.00	-21.53	AVG	
2	4844.6000	38.30	4.28	42.58	74.00	-31.42	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2434.6000	81.67	7.02	88.69	54.00	34.69	AVG	No Limit
2	2444.4000	89.93	7.02	96.95	74.00	22.95	Peak	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

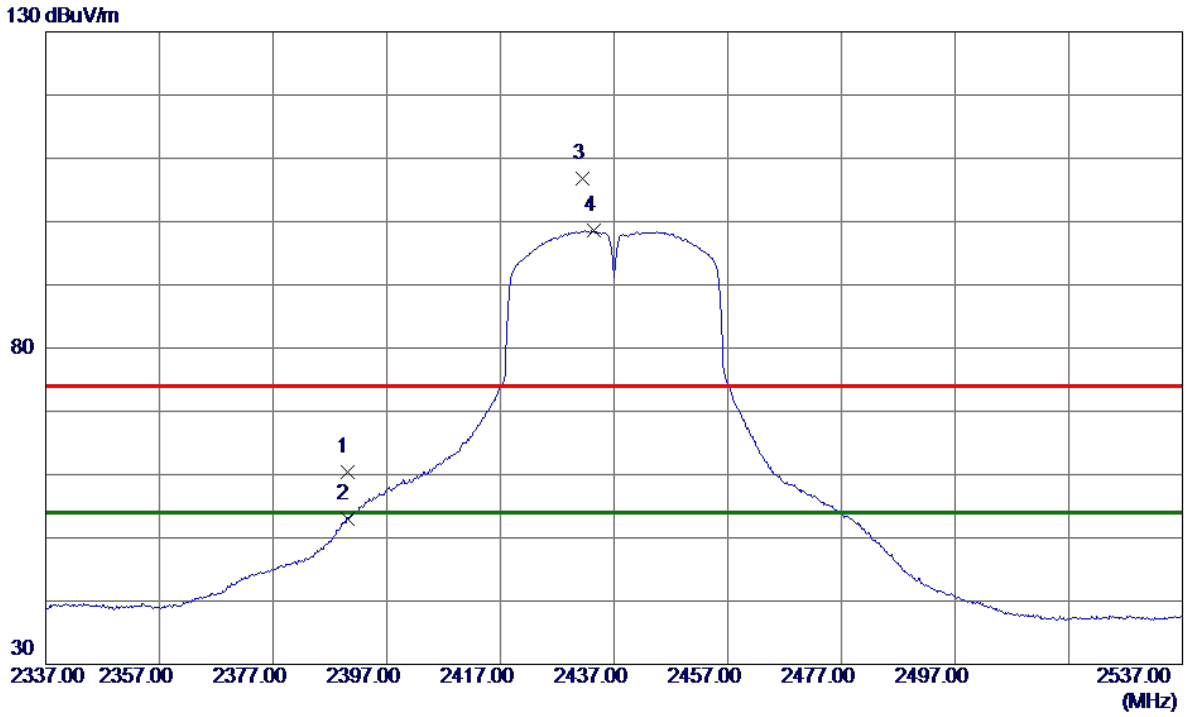
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4877.8500	27.79	4.34	32.13	54.00	-21.87	AVG	
2	4892.4500	39.80	4.38	44.18	74.00	-29.82	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	53.44	7.01	60.45	74.00	-13.55	Peak	
2	2390.0000	45.94	7.01	52.95	54.00	-1.05	AVG	
3	2431.4000	99.83	7.02	106.85	74.00	32.85	Peak	No Limit
4 *	2433.4000	91.57	7.02	98.59	54.00	44.59	AVG	No Limit

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

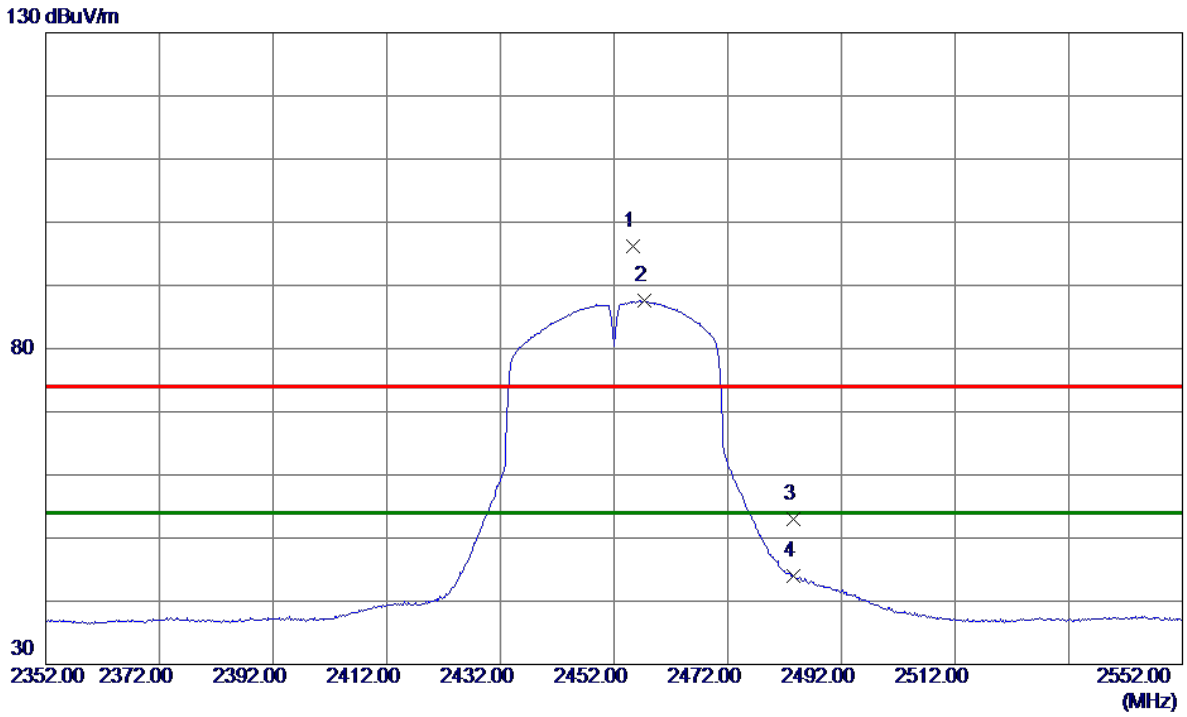
Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	4874.0000	30.39	4.34	34.73	54.00	-19.27	AVG	
2	4874.3000	41.14	4.34	45.48	74.00	-28.52	Peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452 MHz

Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2455.4000	89.14	7.03	96.17	74.00	22.17	Peak	No Limit
2 *	2457.4000	80.52	7.03	87.55	54.00	33.55	AVG	No Limit
3	2483.5000	45.95	7.03	52.98	74.00	-21.02	Peak	
4	2483.5000	37.02	7.03	44.05	54.00	-9.95	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452 MHz

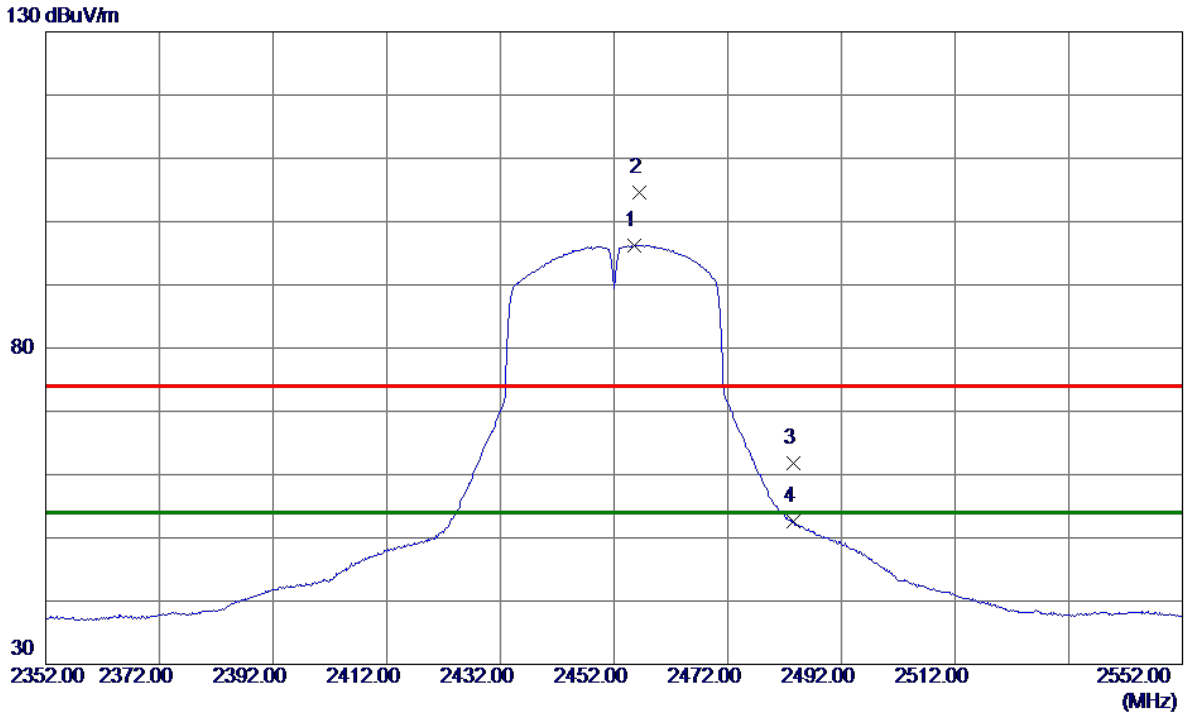
Vertical

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4895.1000	37.33	4.38	41.71	74.00	-32.29	Peak	
2 *	4904.1000	27.01	4.40	31.41	54.00	-22.59	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452 MHz

Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2455.6000	89.21	7.03	96.24	54.00	42.24	AVG	No Limit
2	2456.4000	97.56	7.03	104.59	74.00	30.59	Peak	No Limit
3	2483.5000	54.85	7.03	61.88	74.00	-12.12	Peak	
4	2483.5000	45.53	7.03	52.56	54.00	-1.44	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2452 MHz

Horizontal

No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4900.5500	38.00	4.39	42.39	74.00	-31.61	Peak	
2 *	4904.0500	28.28	4.40	32.68	54.00	-21.32	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

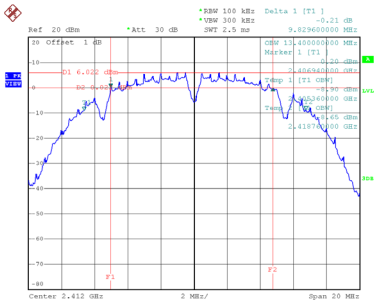
APPENDIX E - BANDWIDTH

Non-Beamforming

Test Mode	TX B Mode

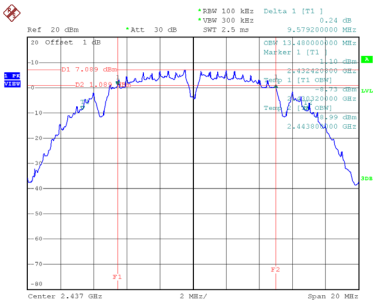
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	9.83	13.40	500	Complies
06	2437	9.58	13.48	500	Complies
11	2462	10.10	13.60	500	Complies

CH01



Date: 28.FEB.2019 15:48:26

CH06



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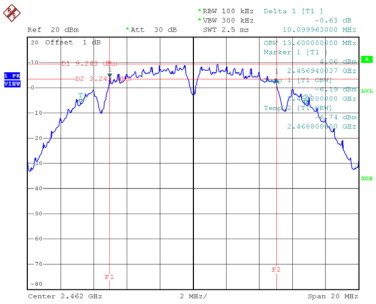
CH11

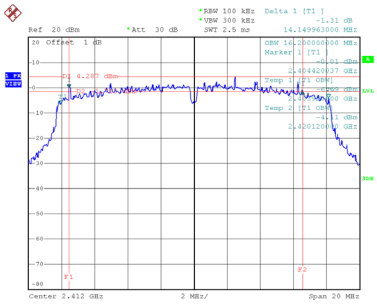


Date: 28.FEB.2019 15:54:45

Test Mode	TX G Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	14.15	16.20	500	Complies
06	2437	14.12	16.20	500	Complies
11	2462	15.12	16.24	500	Complies

CH01



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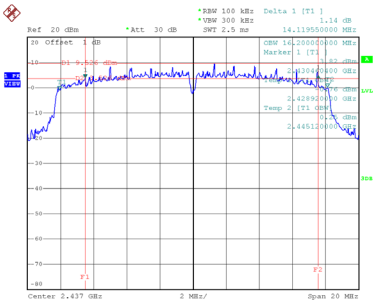
CH06



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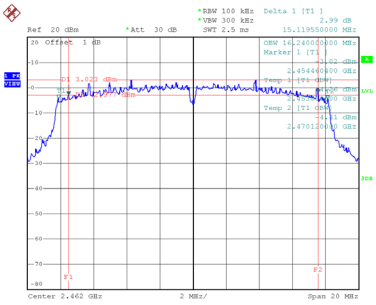
CH11

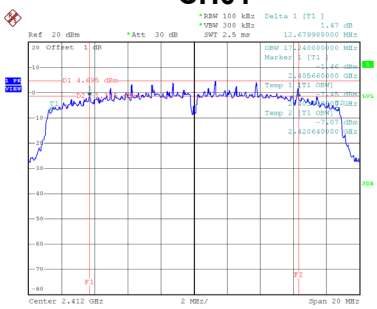


Date: 28.FEB.2019 16:02:30

Test Mode	TX N (HT20) Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	12.68	17.24	500	Complies
06	2437	15.12	17.32	500	Complies
11	2462	15.08	17.40	500	Complies

CH01



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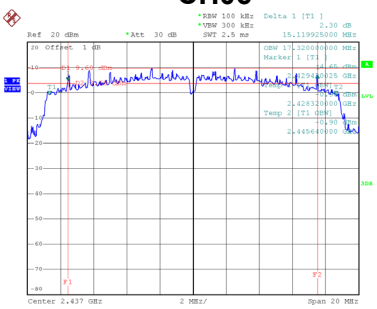
CH06



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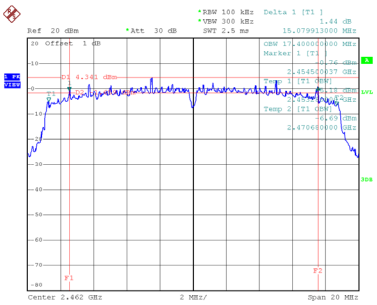
CH11

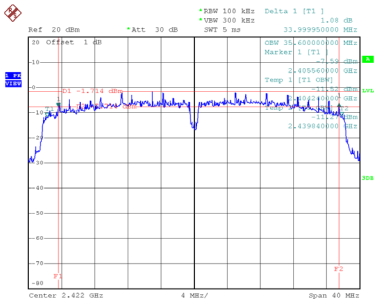


Date: 28.FEB.2019 16:10:32

Test Mode	TX N (HT40) Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
03	2422	34.00	35.60	500	Complies
06	2437	33.84	35.76	500	Complies
09	2452	32.72	35.76	500	Complies

CH03



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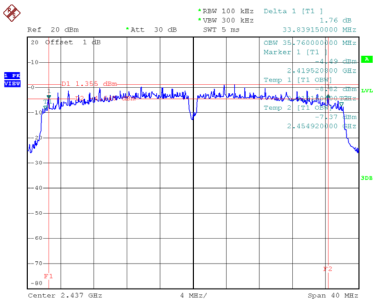
CH06



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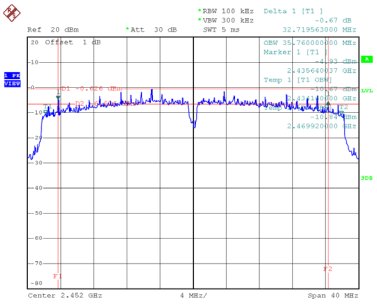
CH09



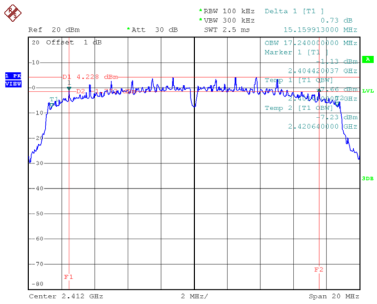
Date: 28.FEB.2019 16:17:25

Beamforming

Test Mode	TX N (HT20) Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
01	2412	15.16	17.24	500	Complies
06	2437	13.90	17.40	500	Complies
11	2462	14.24	17.24	500	Complies

CH01



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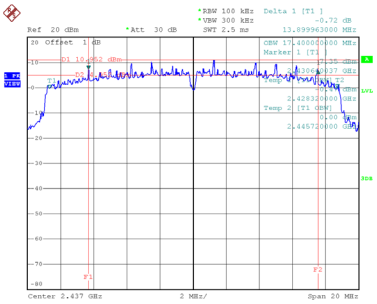
CH06



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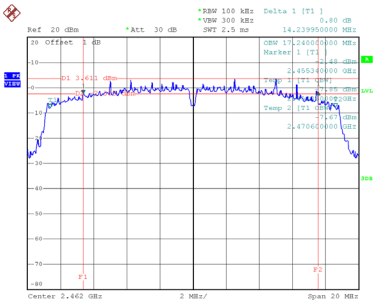
CH11

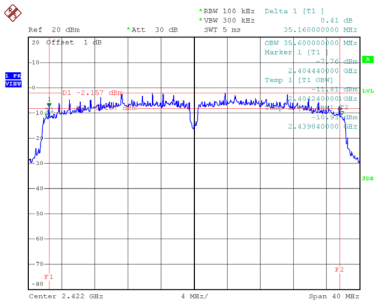


Date: 28.FEB.2019 16:50:36

Test Mode	TX N (HT40) Mode

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Result
03	2422	35.16	35.60	500	Complies
06	2437	35.16	35.68	500	Complies
09	2452	31.52	35.76	500	Complies

CH03



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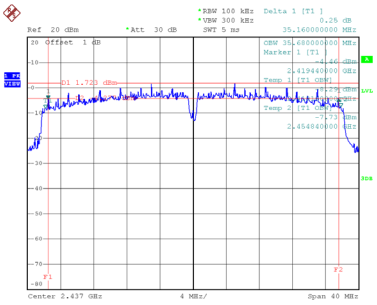
CH06



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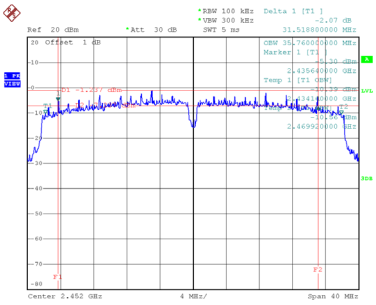
CH09



Date: 28.FEB.2019 16:58:09

APPENDIX F - MAXIMUM OUTPUT POWER

Non-Beamforming

Test Mode	TX B Mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	18.81	0.0760	30.00	1.0000	Complies
06	2437	19.63	0.0918	30.00	1.0000	Complies
11	2462	22.25	0.1679	30.00	1.0000	Complies

Test Mode	TX G Mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	21.95	0.1567	30.00	1.0000	Complies
06	2437	25.56	0.3598	30.00	1.0000	Complies
11	2462	22.17	0.1648	30.00	1.0000	Complies

Test Mode	TX N (HT20) Mode_Ant. 1

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	21.34	0.1361	30.00	1.0000	Complies
06	2437	25.65	0.3673	30.00	1.0000	Complies
11	2462	21.93	0.1560	30.00	1.0000	Complies

Test Mode	TX N (HT20) Mode_Ant. 2

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	20.99	0.1256	30.00	1.0000	Complies
06	2437	26.62	0.4592	30.00	1.0000	Complies
11	2462	21.45	0.1396	30.00	1.0000	Complies

Test Mode	TX N (HT20) Mode_Total

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	24.18	0.2618	30.00	1.0000	Complies
06	2437	29.17	0.8260	30.00	1.0000	Complies
11	2462	24.71	0.2958	30.00	1.0000	Complies

Test Mode	TX N (HT40) Mode_Ant. 1

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	16.94	0.0494	30.00	1.0000	Complies
06	2437	20.39	0.1094	30.00	1.0000	Complies
09	2452	17.72	0.0592	30.00	1.0000	Complies

Test Mode	TX N (HT40) Mode_Ant. 2

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	16.97	0.0498	30.00	1.0000	Complies
06	2437	20.51	0.1125	30.00	1.0000	Complies
09	2452	17.55	0.0569	30.00	1.0000	Complies

Test Mode	TX N (HT40) Mode_Total

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	19.97	0.0993	30.00	1.0000	Complies
06	2437	23.46	0.2218	30.00	1.0000	Complies
09	2452	20.65	0.1161	30.00	1.0000	Complies

With Beamforming

Test Mode	TX N (HT20) Mode_Ant. 1

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	21.16	0.1306	30.00	1.0000	Complies
06	2437	25.49	0.3540	30.00	1.0000	Complies
11	2462	21.74	0.1493	30.00	1.0000	Complies

Test Mode	TX N (HT20) Mode_Ant. 2

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	21.03	0.1268	30.00	1.0000	Complies
06	2437	26.34	0.4305	30.00	1.0000	Complies
11	2462	21.38	0.1374	30.00	1.0000	Complies

Test Mode	TX N (HT20) Mode_Total

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
01	2412	24.11	0.2576	30.00	1.0000	Complies
06	2437	28.95	0.7852	30.00	1.0000	Complies
11	2462	24.57	0.2864	30.00	1.0000	Complies

Test Mode	TX N (HT40) Mode_Ant. 1

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	16.67	0.0465	30.00	1.0000	Complies
06	2437	20.31	0.1074	30.00	1.0000	Complies
09	2452	17.56	0.0570	30.00	1.0000	Complies

Test Mode	TX N (HT40) Mode_Ant. 2

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	16.63	0.0460	30.00	1.0000	Complies
06	2437	20.42	0.1102	30.00	1.0000	Complies
09	2452	17.39	0.0548	30.00	1.0000	Complies

Test Mode	TX N (HT40) Mode_Total

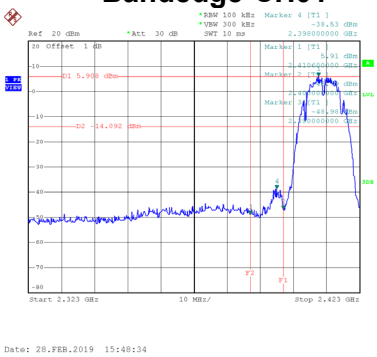
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
03	2422	19.66	0.0925	30.00	1.0000	Complies
06	2437	23.38	0.2178	30.00	1.0000	Complies
09	2452	20.49	0.1119	30.00	1.0000	Complies

APPENDIX G - CONDUCTED SPURIOUS EMISSIONS

Non-Beamforming

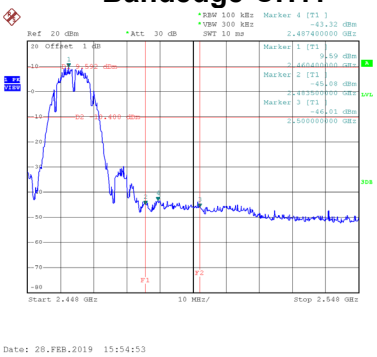
Test Mode	TX B Mode

Bandedge-CH01



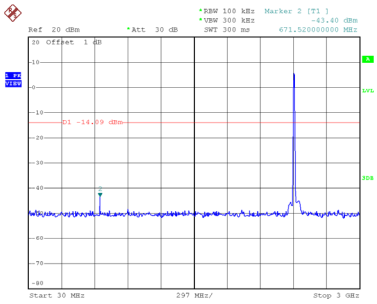
Date: 28.FEB.2019 15:48:34

Bandedge-CH11

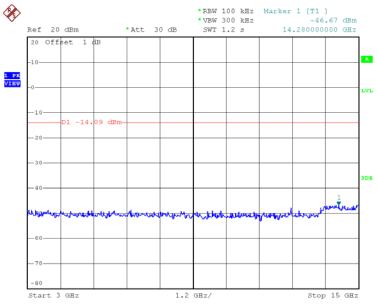


Date: 28.FEB.2019 15:54:53

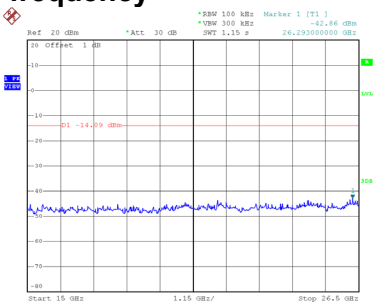
CH01 – 10th Harmonic of the fundamental frequency



Date: 28.FEB.2019 15:48:47

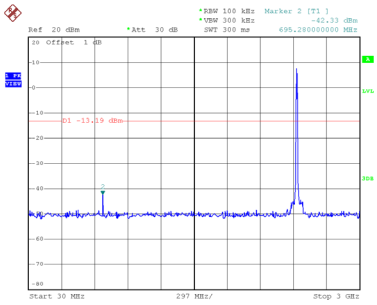


Date: 28.FEB.2019 15:48:55

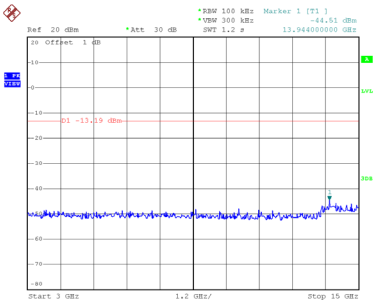


Date: 28.FEB.2019 15:49:03

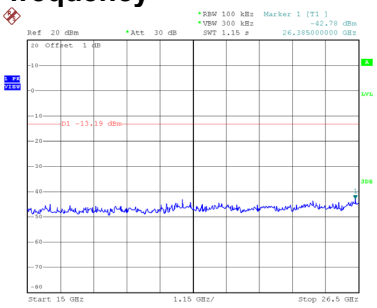
CH06 – 10th Harmonic of the fundamental frequency



Date: 28.FEB.2019 15:52:59



Date: 28.FEB.2019 15:53:08



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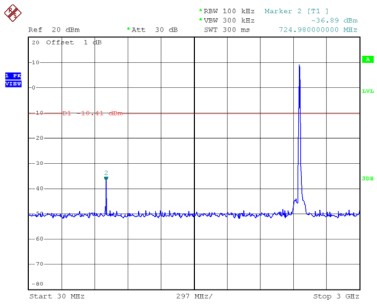
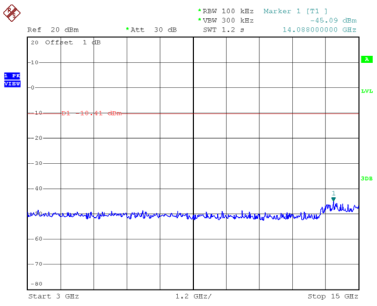
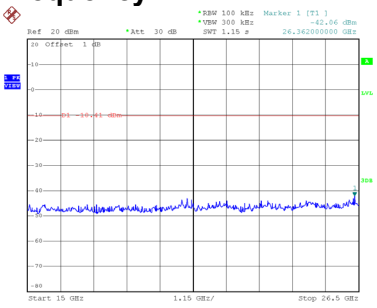
CH11 – 10th Harmonic of the fundamental frequency



Date: 28.FEB.2019 15:55:06



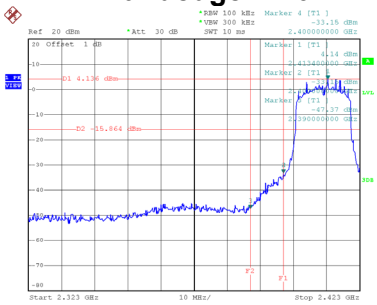
Date: 28.FEB.2019 15:55:14



Date: 28.FEB.2019 15:55:22

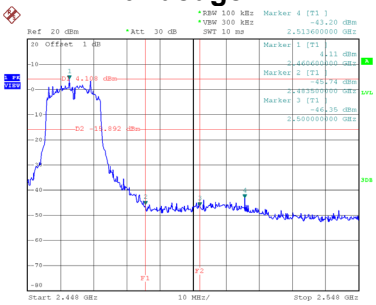
Test Mode	TX G Mode

Bandedge-CH01



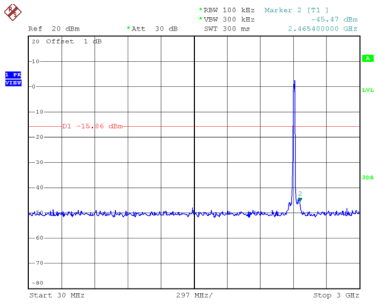
Date: 28.FEB.2019 15:58:03

Bandedge-CH11

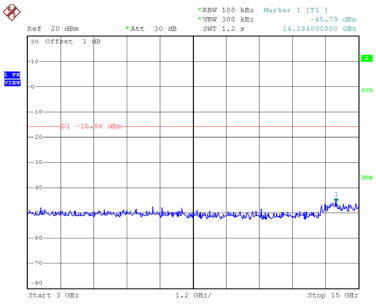


Date: 28.FEB.2019 16:02:38

CH01 – 10th Harmonic of the fundamental frequency



Date: 28.FEB.2019 15:58:17



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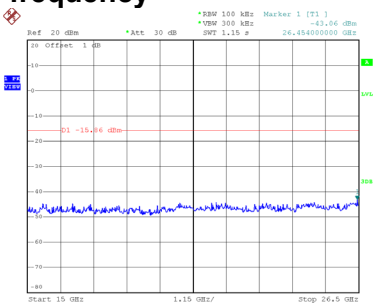

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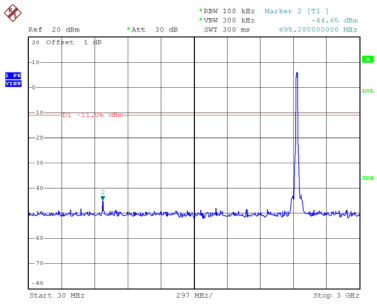
CH06 – 10th Harmonic of the fundamental frequency



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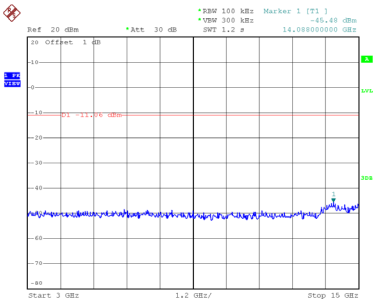

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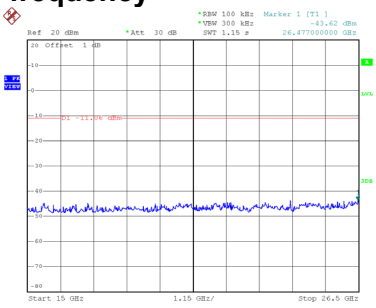

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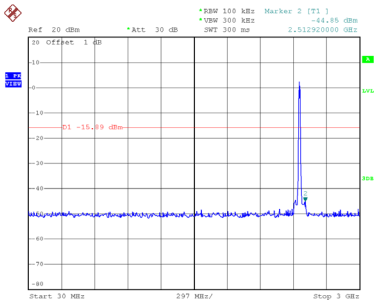
CH11 – 10th Harmonic of the fundamental frequency



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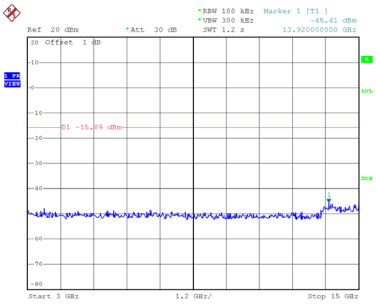

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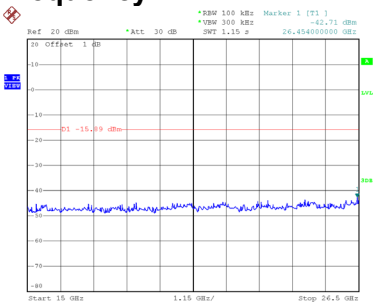

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