

FCC Radio Test Report

FCC ID: OP5PL5576

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

Project No. : 1904C070
Equipment : 2.4GHz wireless headphone
Test Model : PL5576
Series Model : N/A
Applicant : Eleven Engineering Incorporated
Address : 10150 - 100 Street, Suite 800 Edmonton, AB T5J 0P6
Canada

Date of Receipt : Apr. 30, 2019
Date of Test : May 05, 2019 ~ May 24, 2019
Issued Date : Sep. 16, 2019
Tested by : BTL Inc.

Testing Engineer : Mandy Wang
(Mandy Wang)

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B T L I N C .

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Certificate #5123.02

Declaration

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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.

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

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.

Table of Contents	Page
REPORT ISSUED HISTORY	5
1 . GENERAL SUMMARY	6
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	8
2.2 MEASUREMENT UNCERTAINTY	8
3 . GENERAL INFORMATION	9
3.1 GENERAL DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	10
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	11
3.5 DESCRIPTION OF SUPPORT UNITS	11
4 . EMC EMISSION TEST	12
4.1 CONDUCTED EMISSION MEASUREMENT	12
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	12
4.1.2 TEST PROCEDURE	12
4.1.3 DEVIATION FROM TEST STANDARD	12
4.1.4 TEST SETUP	13
4.1.5 EUT OPERATING CONDITIONS	13
4.1.6 EUT TEST CONDITIONS	13
4.1.7 TEST RESULTS	13
4.2 RADIATED EMISSION MEASUREMENT	14
4.2.1 RADIATED EMISSION LIMITS	14
4.2.2 TEST PROCEDURE	16
4.2.3 DEVIATION FROM TEST STANDARD	16
4.2.4 TEST SETUP	17
4.2.5 EUT TEST CONDITIONS	18
4.2.6 TEST RESULTS (9KHZ TO 30MHZ)	18
4.2.7 TEST RESULTS (30MHZ TO 1000 MHZ)	18
4.2.8 TEST RESULTS (ABOVE 1000 MHZ)	18
5 . BANDWIDTH TEST	19
5.1 TEST PROCEDURE	19
5.2 DEVIATION FROM STANDARD	19
5.3 TEST SETUP	19
5.4 EUT OPERATION CONDITIONS	19
5.5 EUT TEST CONDITIONS	19
5.6 TEST RESULTS	19
6 . MEASUREMENT INSTRUMENTS LIST	20
7 . EUT TEST PHOTO	22

Table of Contents

Page

APPENDIX A - CONDUCTED EMISSION	26
APPENDIX B - RADIATED EMISSION (9KHZ TO 30MHZ)	29
APPENDIX C - RADIATED EMISSION (30MHZ TO 1000MHZ)	34
APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)	37
APPENDIX E - BANDWIDTH	50

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Sep. 04, 2019
R01	Updated the data for Bandwidth.	Sep. 16, 2019

1. GENERAL SUMMARY

Equipment : 2.4GHz wireless headphone
Brand Name : DILLINGER HELIX
Test Model : PL5576
Series Model : N/A
Applicant : Eleven Engineering Incorporated
Manufacturer : Audio-Technica Hangzhou Co., Ltd.
Address : 252#Huaide Street, Binjiang District, Hangzhou, China 310052
Factory : Audio-Technica Hangzhou Co., Ltd.
Address : 252#Huaide Street, Binjiang District, Hangzhou, China 310052
Date of Test : May 05, 2019 ~ May 24, 2019
Test Sample : Engineering Sample No.: DG19050512
Standard(s) : FCC Part15, Subpart C (15.249)
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-1-1904C070) 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, Subpart C (15.249)			
Standard(s) Section	Test Item	Judgment	Remark
15.207(a)	Conducted Emission	PASS	
15.209 15.249(a)	Radiated Emissions	PASS	
15.215(c)	20dB Bandwidth Test	PASS	

NOTE:

(1) "N/A" denotes test is not applicable to this device.

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 number for FCC: 357015

BTL's designation number for FCC: CN1240

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor) $k=1.96$ or $k=2$ (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$.

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 Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9KHz~30MHz	V	3.79
		9KHz~30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06
		1GHz~18GHz	V	3.12
		1GHz~18GHz	H	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	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	2.4GHz wireless headphone		
Brand Name	DILLINGER HELIX		
Test Model	PL5576		
Series Model	N/A		
Model Difference(s)	N/A		
Power Source	1# Supplied from 2*AA battery. 2# Supplied from USB port.		
Power Rating	1# DC 3V 2# DC 5V		
Product Description	Operation Frequency	2403.585MHz – 2477.313MHz	
	Modulation Technology	FSK	
	Bit Rate of Transmitter	2 Mbps	
	Field Strength	86.68dBuV/m(Peak Max) 61.20dBuV/m(AVG Max)	

Note:

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

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2403.585	18	2429.697	35	2455.809
02	2405.121	19	2431.233	36	2457.345
03	2406.657	20	2432.769	37	2458.881
04	2480.193	21	2434.305	38	2460.417
05	2409.729	22	2435.841	39	2461.953
06	2411.265	23	2437.377	40	2463.489
07	2412.801	24	2438.913	41	2465.025
08	2414.337	25	2440.449	42	2466.561
09	2415.873	26	2441.985	43	2468.097
10	2417.409	27	2443.521	44	2469.633
11	2418.945	28	2445.057	45	2471.169
12	2420.481	29	2446.593	46	2472.705
13	2422.017	30	2448.129	47	2474.241
14	2423.553	31	2449.665	48	2475.777
15	2425.089	32	2451.201	49	2477.313
16	2426.625	33	2452.737		
17	2428.161	34	2454.273		

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	N/A	3.36

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 Mode

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

For Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

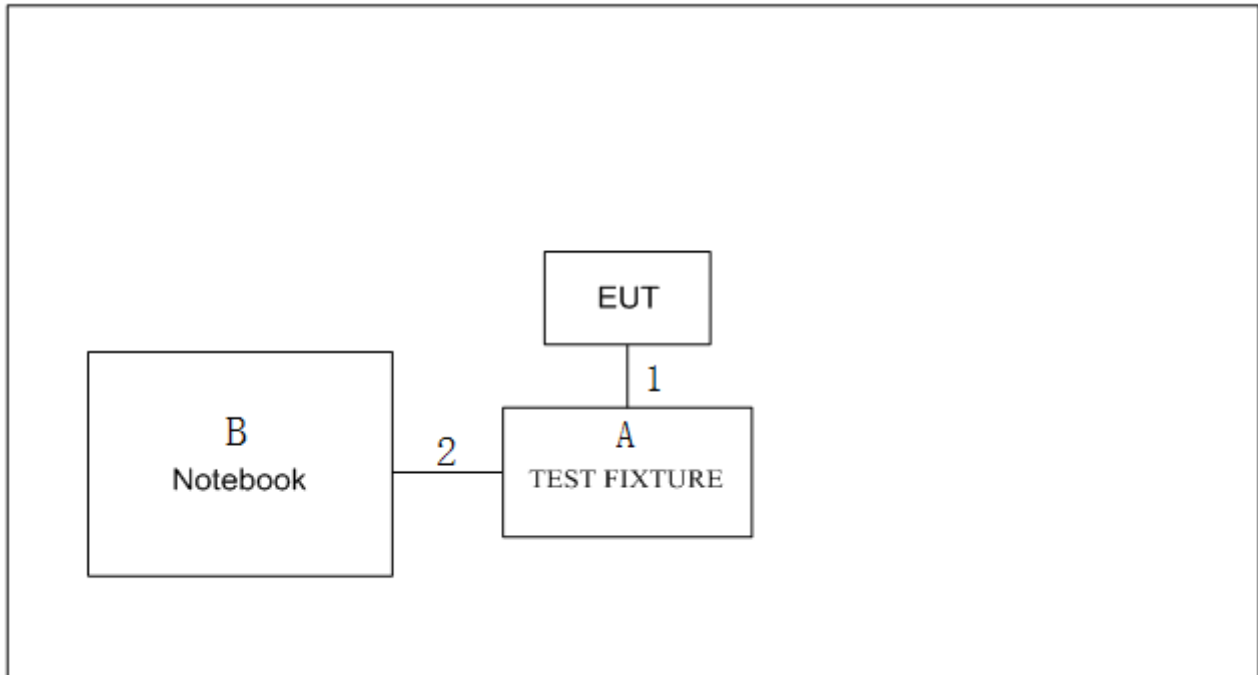
For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode

For Bandwidth Test	
Final Test Mode	Description
Mode 1	TX Mode

Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) For radiated 9 kHz to 1000 MHz test, the highest available channel is found to be the worst case and recorded.

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.	Series No.
A	TEST FIXTURE	N/A	N/A	N/A
B	Notebook	Dell	Inspiron 15-7559	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	Data Cable	NO	NO	0.2m
2	USB Cable	NO	NO	1m

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 (dB μ V)	
	Quasi-Peak	Average
0.15 -0.50	66 to \square 56*	56 to \square 6*
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 - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

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

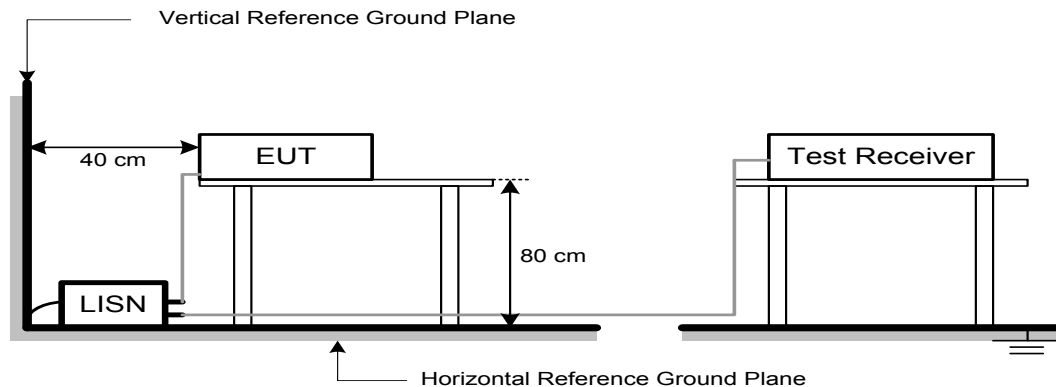
4.1.2 TEST PROCEDURE

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

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting/receiving data or hopping on mode.

4.1.6 EUT TEST CONDITIONS

Temperature: 24°C Relative Humidity: 67% Test Voltage: AC 120V/60Hz

4.1.7 TEST RESULTS

Please refer to the Appendix A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) “ N/A ” denotes test is not applicable to this device.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 Radiated Emission Limits (FCC 15.209)

Frequencies (MHz)	Field Strength (microrvolts/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

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.209)

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

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

FCC Part15 (15.249) , Subpart C	
Limit	Frequency Range(MHz)
Field strength of fundamental 50000 μ V/m (94 dB μ V/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 μ V/m (54 dB μ V/m) @ 3 m	Above 2483.5

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic

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
Start ~ Stop Frequency	Above 1GHz for AVG detector

DWELL TIME OF PERIODIC OPERATION MEASUREMENT

Duty Cycle = On Time/Total Time

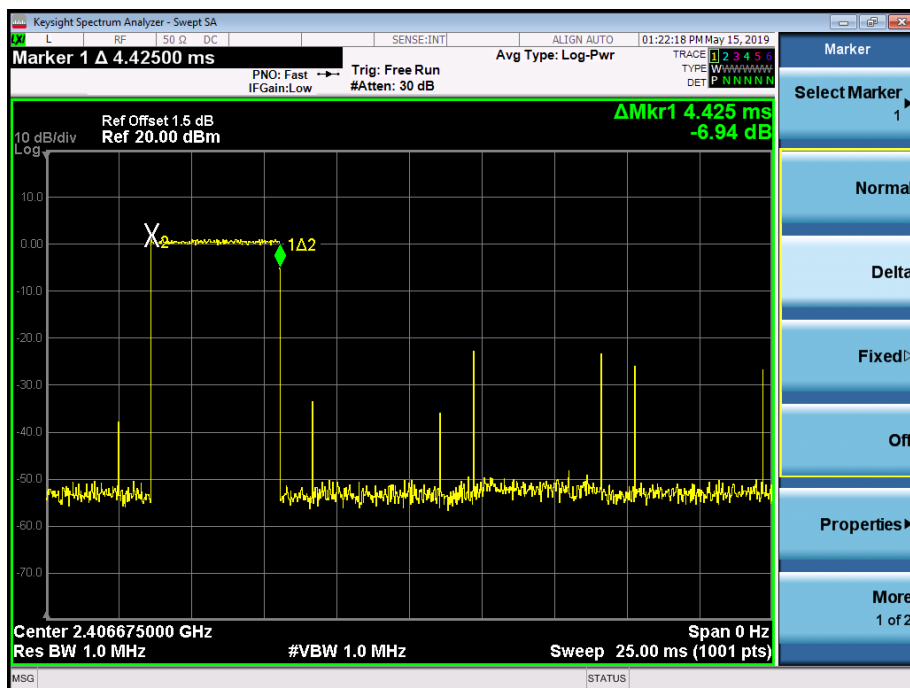
T_{ON}: 4.425 ms

T_{Total}: 83.20 ms

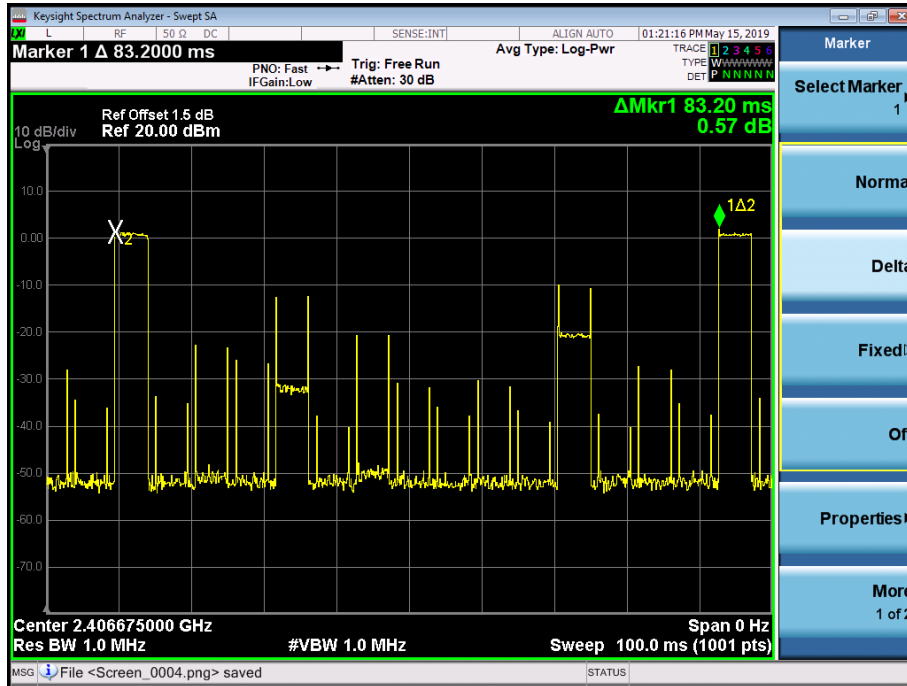
Duty cycle=4.425/83.20= 5.32%

Average Reading = Peak value + 20log(Duty cycle) , AV=Peak-25.48

On Time



Total Time



4.2.2 TEST PROCEDURE

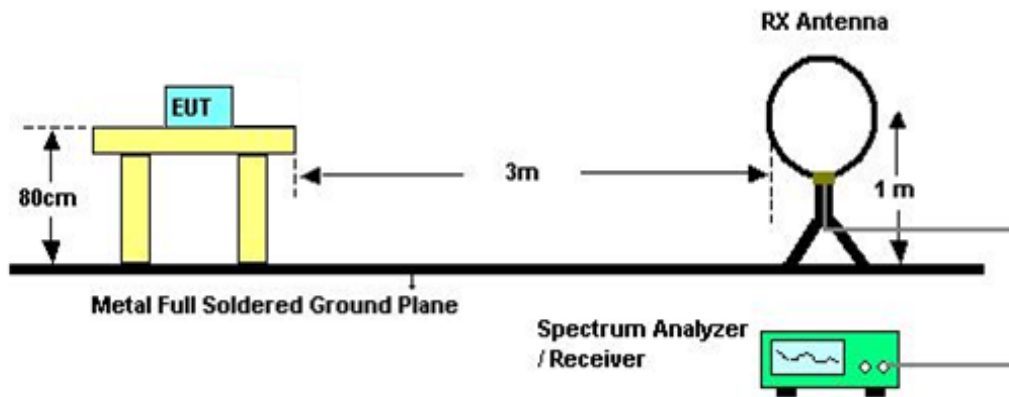
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m 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 0.8 m 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

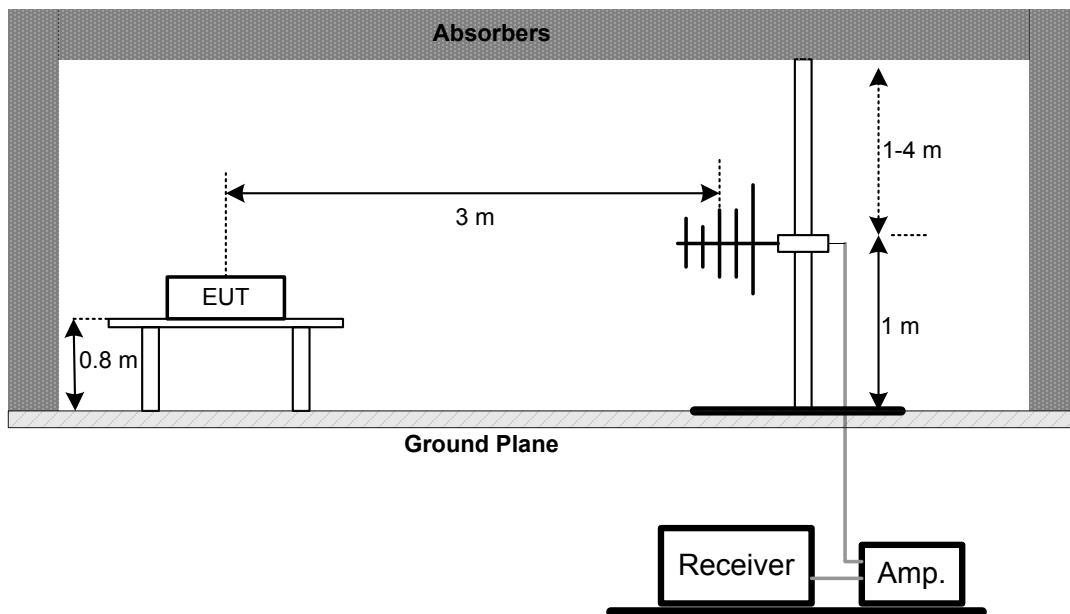
No deviation

4.2.4 TEST SETUP

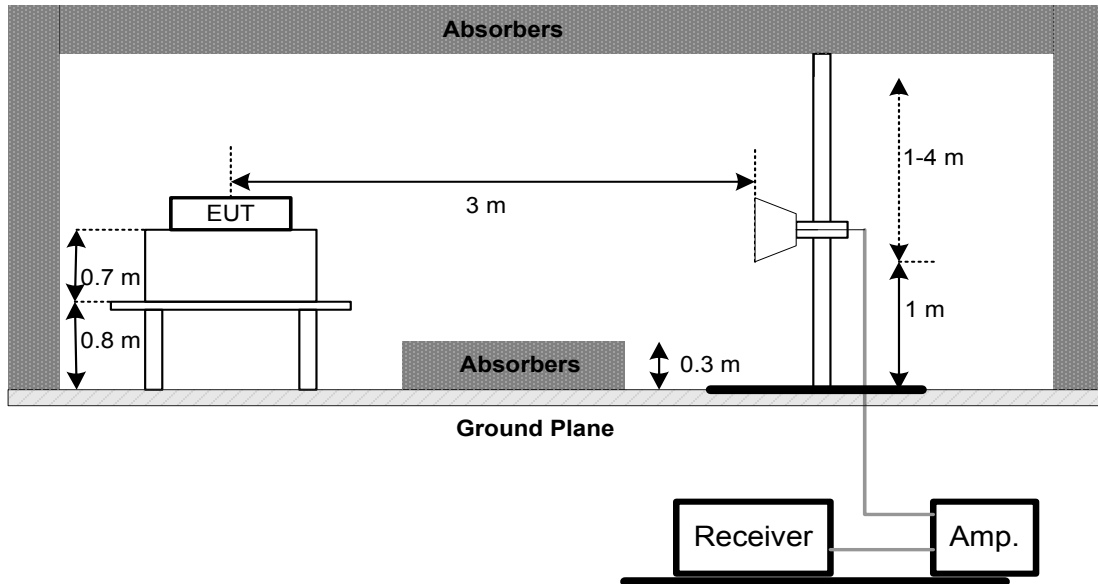
(A) For radiated emissions below 30MHz



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



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



4.2.5 EUT TEST CONDITIONS

Temperature: 24°C Relative Humidity: 68% Test Voltage: DC 5V

4.2.6 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix B

Remark:

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

4.2.7 TEST RESULTS (30MHZ TO 1000 MHZ)

Please refer to the Appendix C

4.2.8 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Appendix D

Remark:

- (1) EUT Orthogonal Axis:
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

5. BANDWIDTH TEST

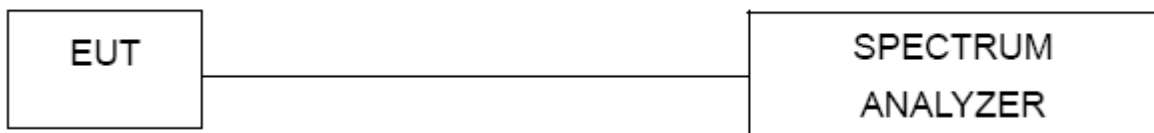
5.1 TEST PROCEDURE

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

5.2 DEVIATION FROM STANDARD

No deviation.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.5 EUT TEST CONDITIONS

Temperature: 22°C Relative Humidity: 70% Test Voltage: DC 5V

5.6 TEST RESULTS

Please refer to the Appendix E

6. 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	50ohm Terminator	SHX	TF5-3	15041305	Mar. 10, 2020
4	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Mar. 10, 2020
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. 12, 2020

Radiated Emission Measurement-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 Emission Measurement-30 MHz TO 1000 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 10, 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 24, 2020
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 Emission Measurement - Above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 10, 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

Duty Cycle					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 10, 2020

Bandwidth					
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.

7. EUT TEST PHOTO

AC Power Line Conducted Emissions Test Photos



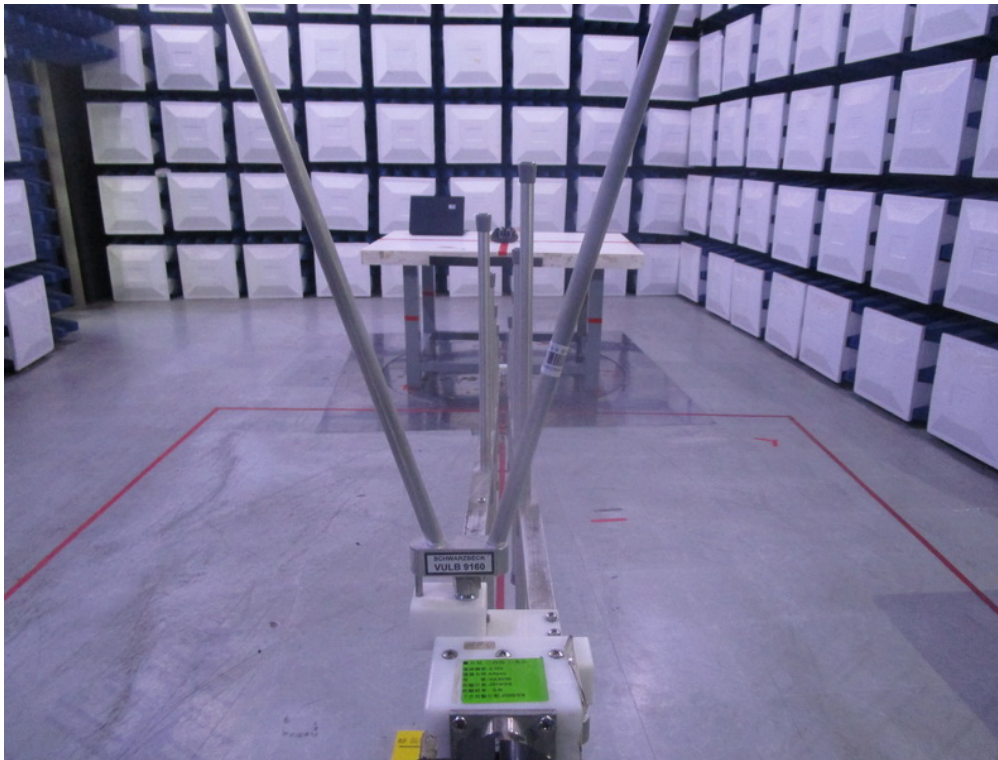
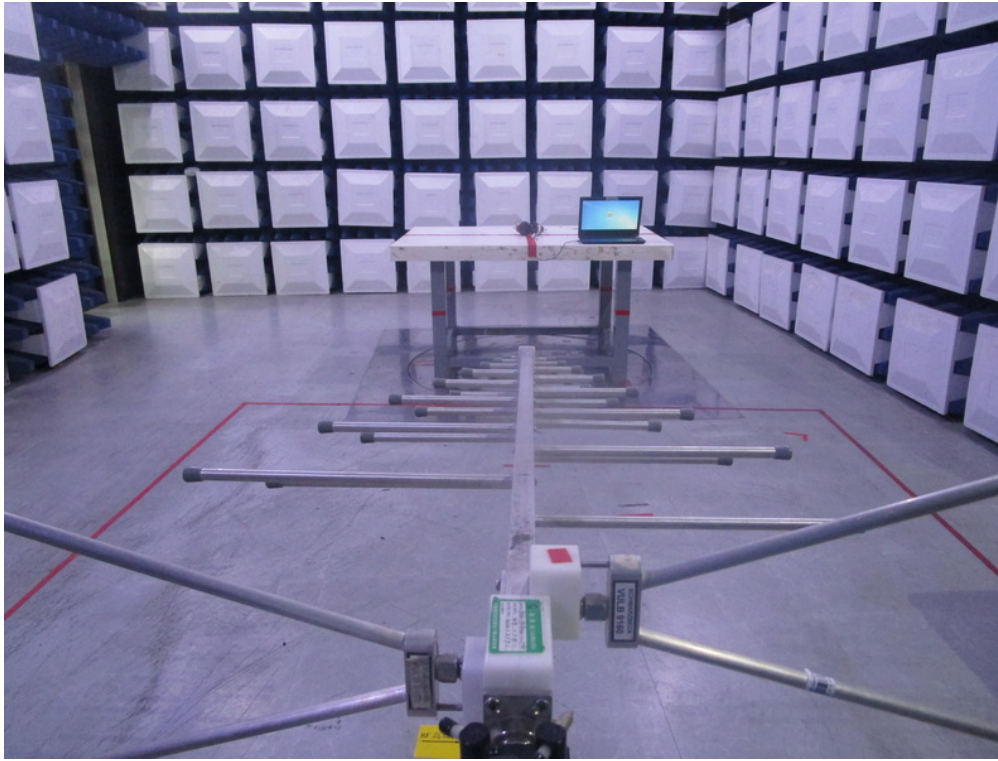
Radiated Measurement Photos

9KHz to 30MHz



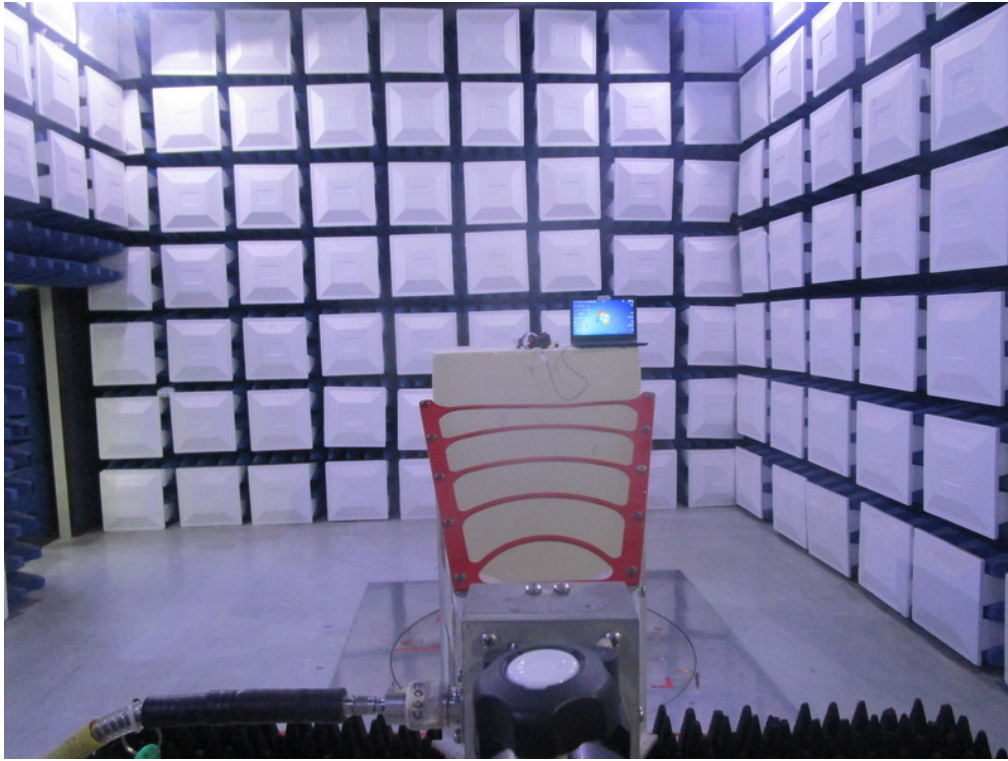
Radiated Measurement Photos

30MHz to 1000MHz



Radiated Measurement Photos

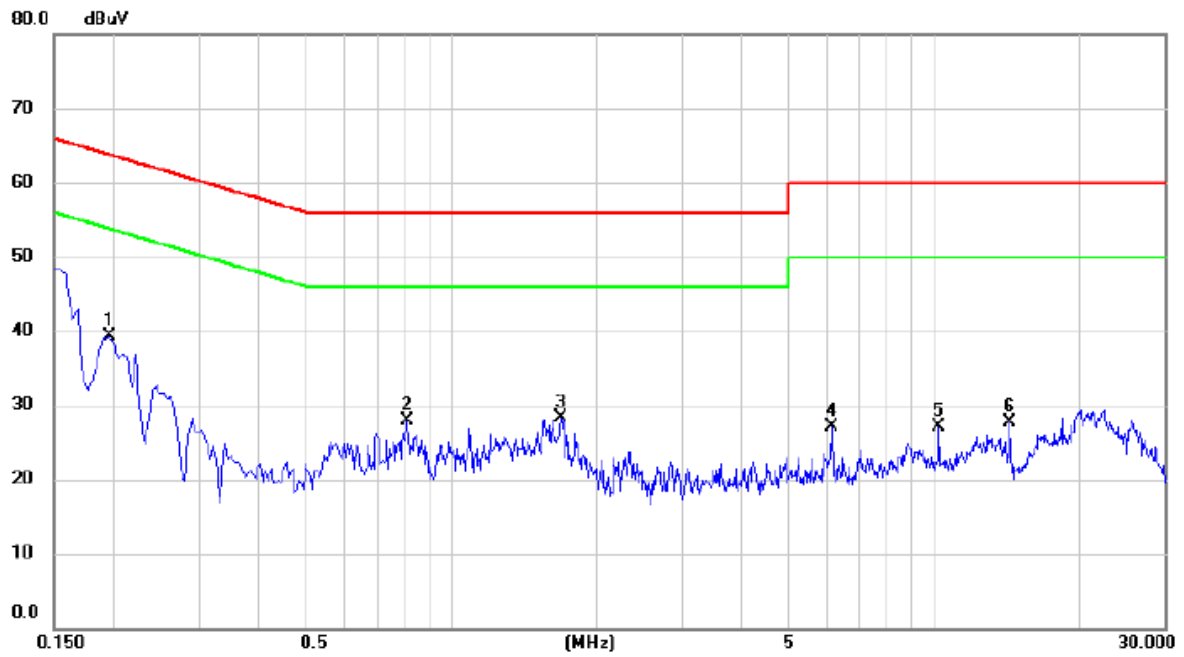
Above 1000MHz



APPENDIX A - CONDUCTED EMISSION

Test Mode: TX Mode Channel 49

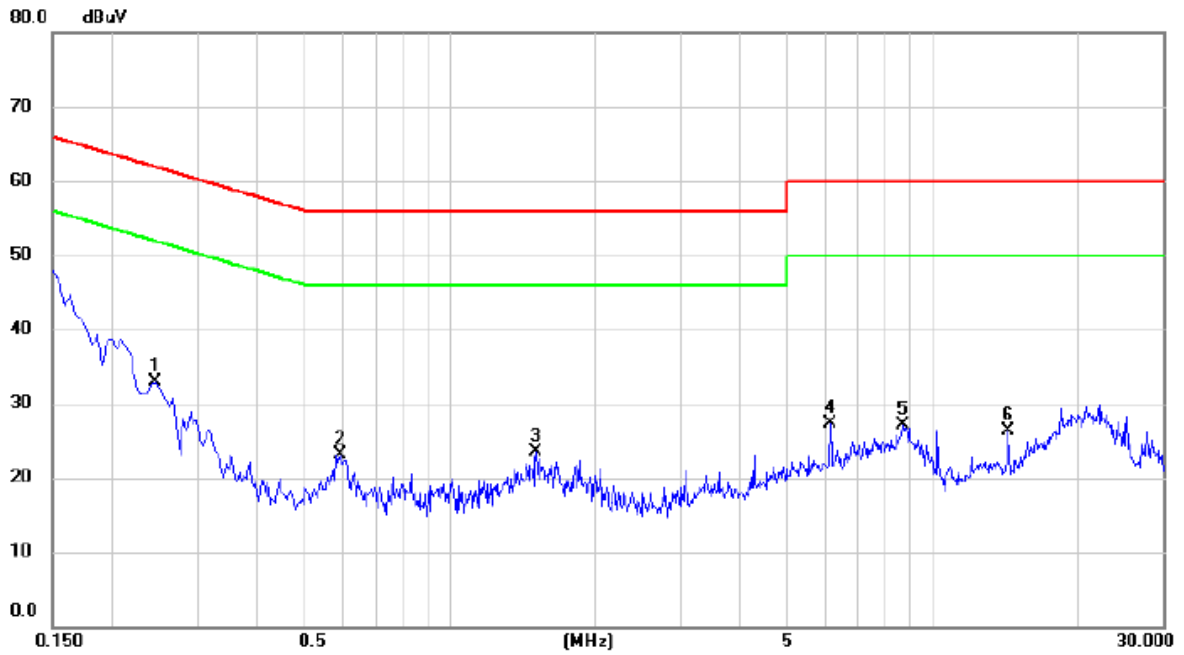
Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1950	28.73	10.48	39.21	63.82	-24.61	peak	
2		0.8070	17.47	10.53	28.00	56.00	-28.00	peak	
3		1.6890	17.70	10.61	28.31	56.00	-27.69	peak	
4		6.1440	16.35	10.83	27.18	60.00	-32.82	peak	
5		10.2390	16.14	10.94	27.08	60.00	-32.92	peak	
6		14.3340	16.81	10.99	27.80	60.00	-32.20	peak	

Test Mode: TX Mode Channel 49

Neutral

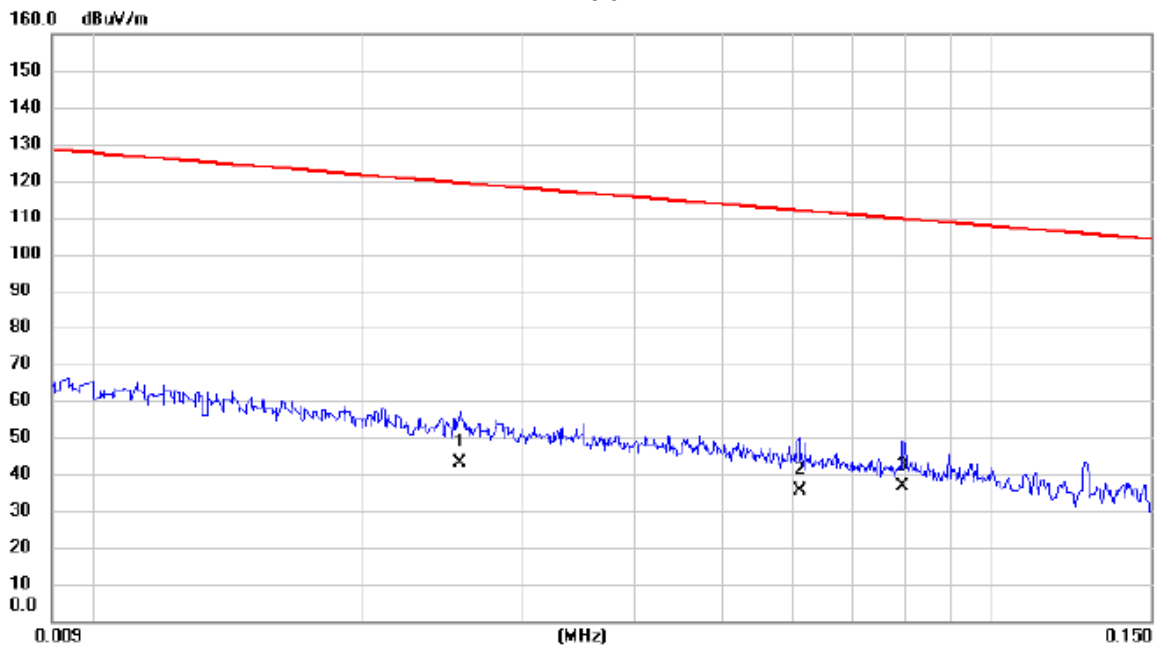


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.2445	22.39	10.47	32.86	61.94	-29.08	peak	
2		0.5910	12.64	10.49	23.13	56.00	-32.87	peak	
3		1.5045	13.00	10.55	23.55	56.00	-32.45	peak	
4		6.1440	16.60	10.78	27.38	60.00	-32.62	peak	
5		8.6775	16.19	10.86	27.05	60.00	-32.95	peak	
6		14.3340	15.23	10.98	26.21	60.00	-33.79	peak	

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

Test Mode: TX Mode Channel 49

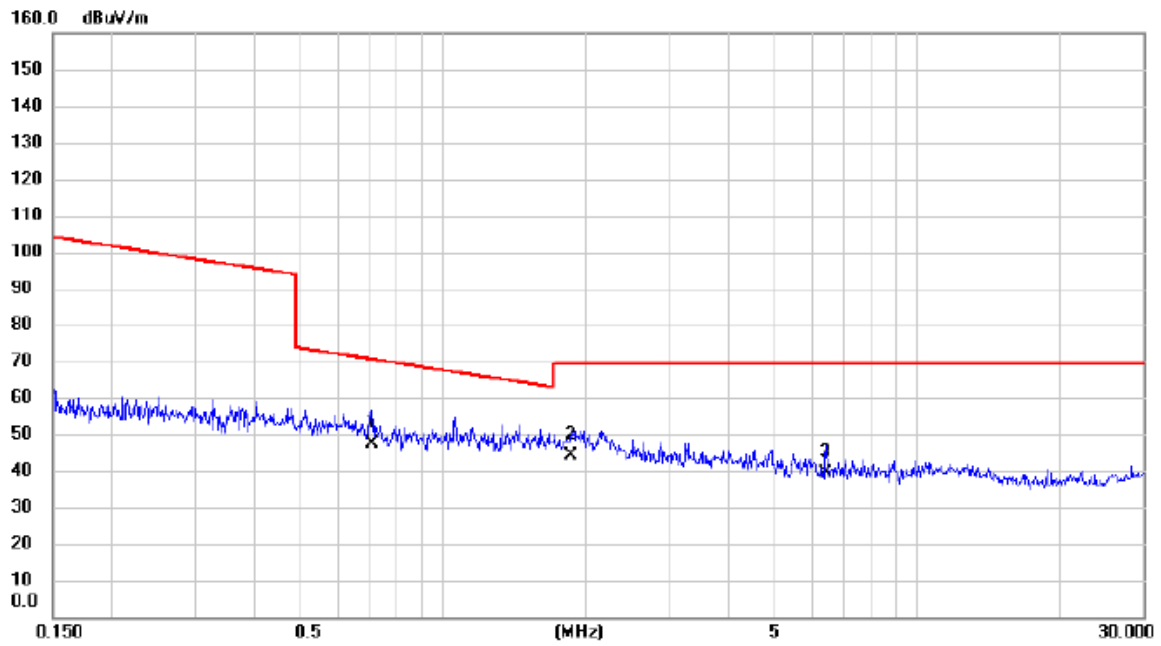
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0256	29.30	13.84	43.14	119.44	-76.30	AVG	
2		0.0610	21.80	13.75	35.55	111.90	-76.35	AVG	
3	*	0.0793	23.20	13.54	36.74	109.62	-72.88	AVG	

Test Mode: TX Mode Channel 49

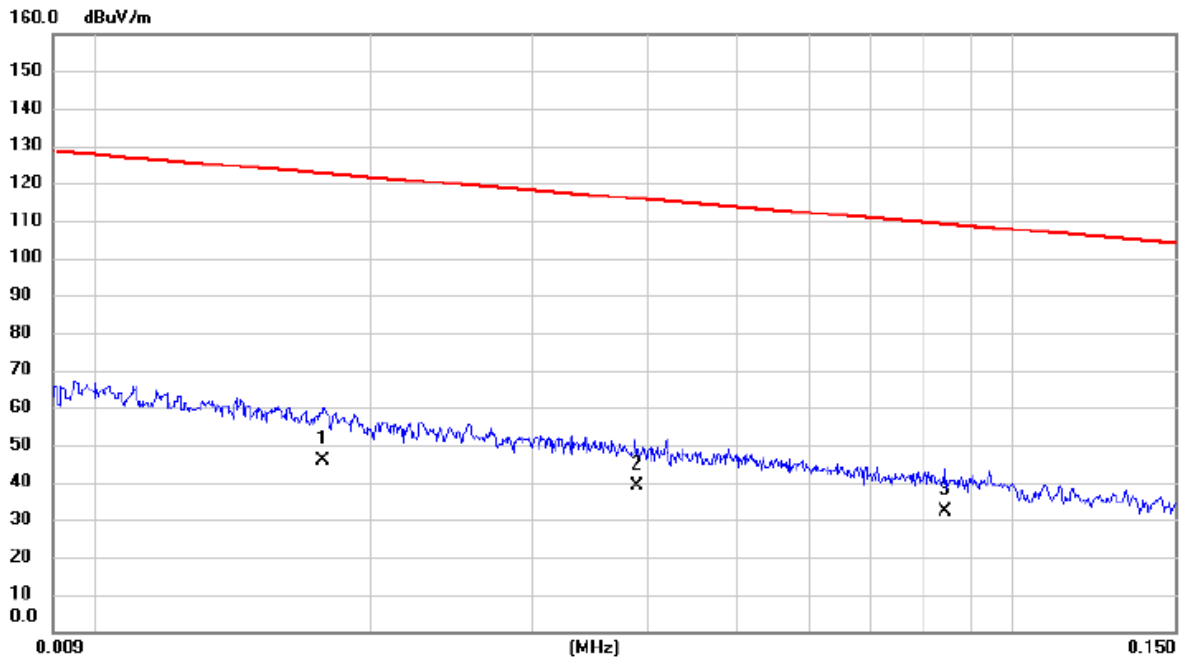
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	0.7084	34.60	12.66	47.26	70.60	-23.34	QP	
2		1.8581	32.40	11.91	44.31	69.54	-25.23	QP	
3		6.4198	28.30	11.08	39.38	69.54	-30.16	QP	

Test Mode: TX Mode Channel 49

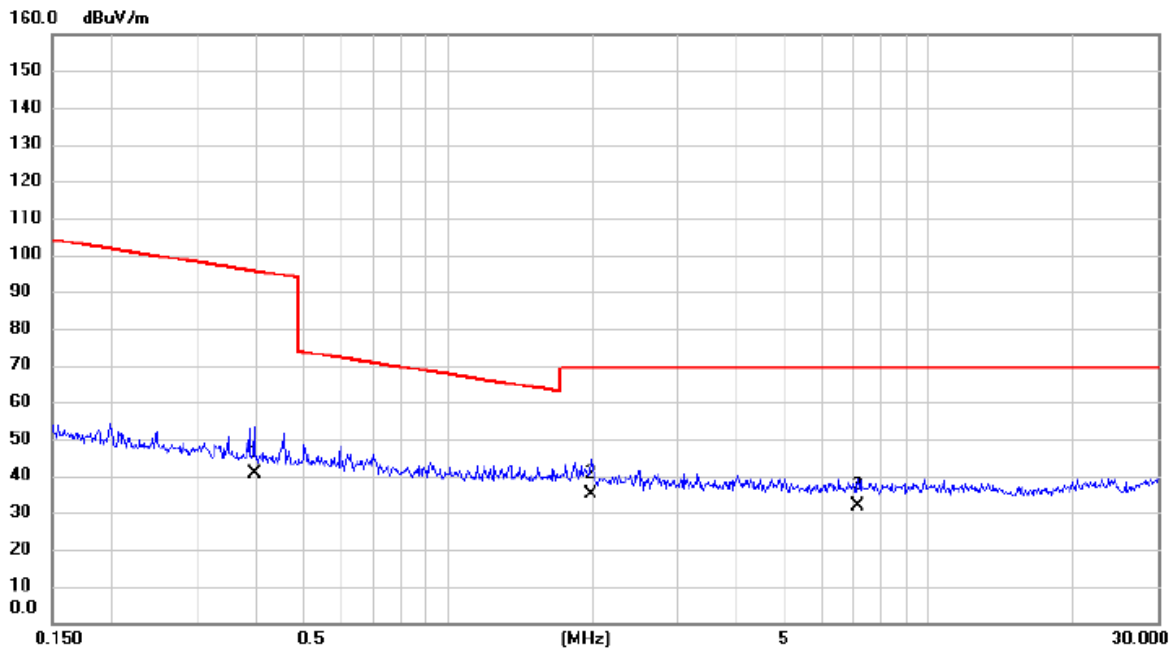
Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0177	31.37	14.51	45.88	122.65	-76.77	AVG	
2	*	0.0390	25.30	13.89	39.19	115.78	-76.59	AVG	
3		0.0844	18.70	13.54	32.24	109.08	-76.84	AVG	

Test Mode: TX Mode Channel 49

Ant 90°

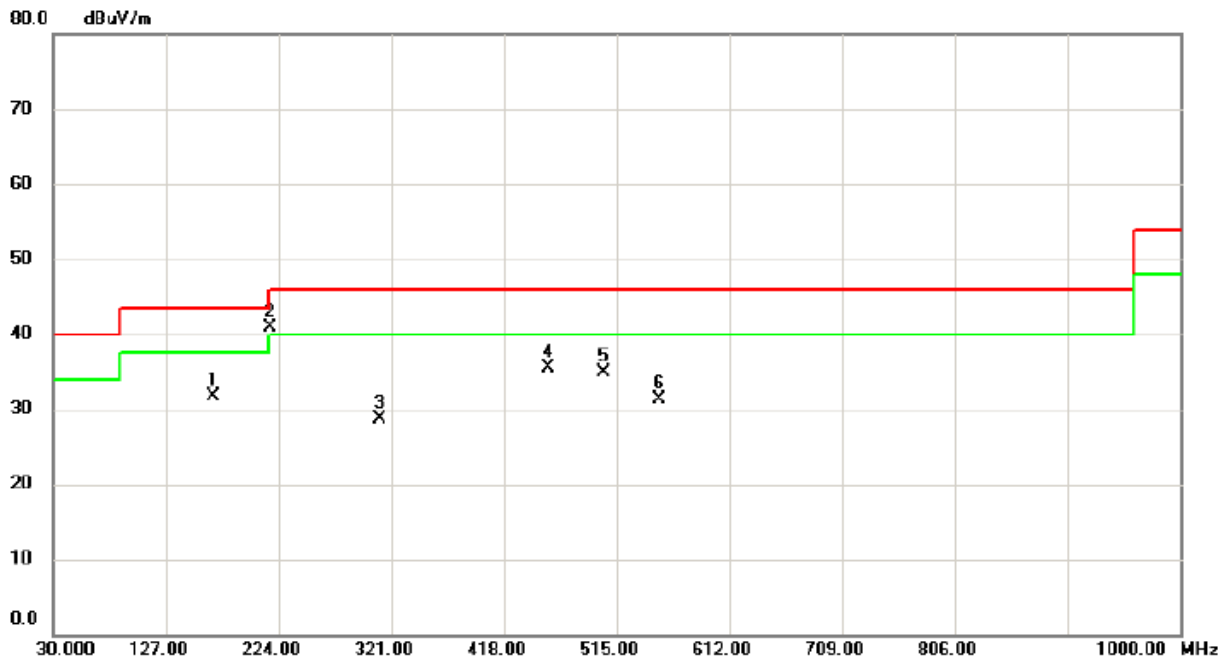


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.3955	27.40	13.31	40.71	95.66	-54.95	AVG	
2	*	1.9906	23.10	11.82	34.92	69.54	-34.62	QP	
3		7.1374	20.60	11.19	31.79	69.54	-37.75	QP	

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

Test Mode: TX Mode Channel 49

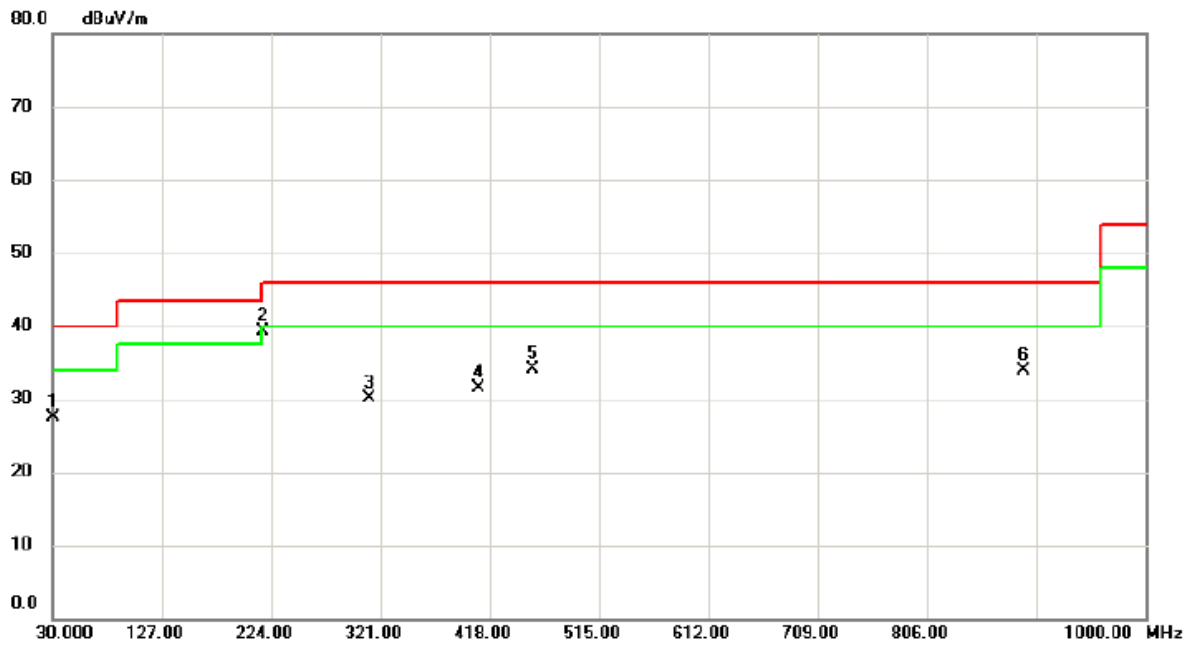
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		168.225	43.84	-12.23	31.61	43.50	-11.89	peak	
2	*	216.240	56.07	-15.07	41.00	46.00	-5.00	peak	
3		311.785	40.06	-11.35	28.71	46.00	-17.29	peak	
4		455.830	43.70	-8.10	35.60	46.00	-10.40	peak	
5		503.845	42.55	-7.71	34.84	46.00	-11.16	peak	
6		551.860	38.52	-7.22	31.30	46.00	-14.70	peak	

Test Mode: TX Mode Channel 49

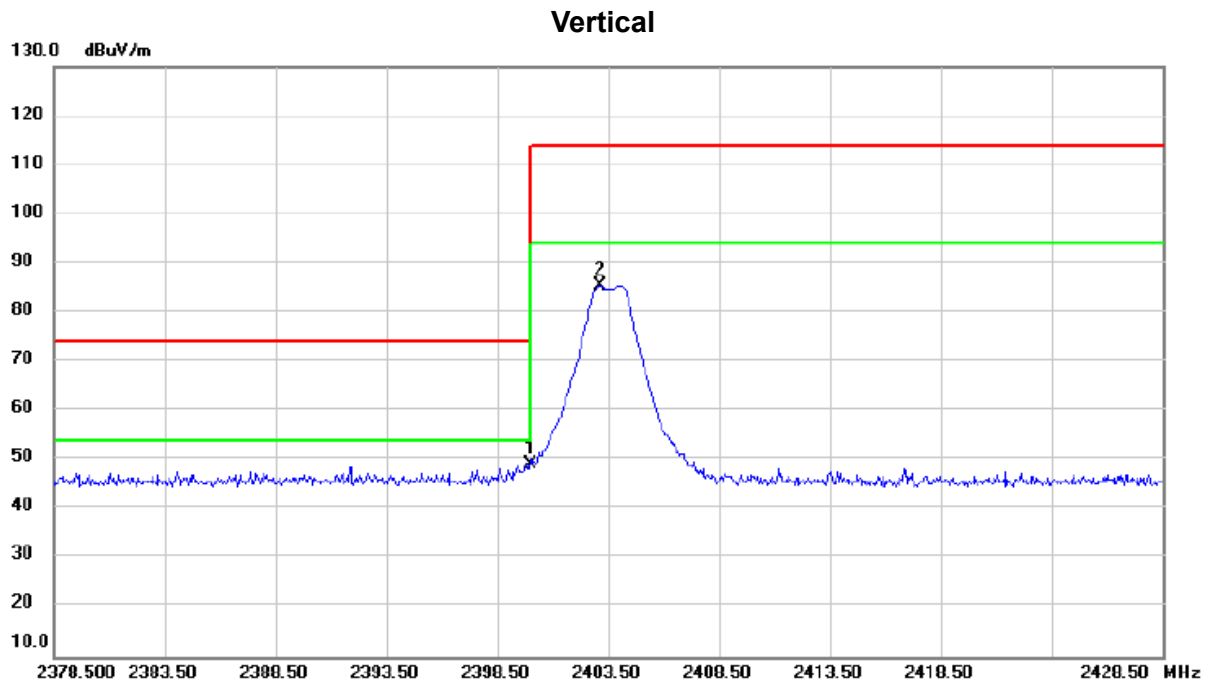
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		30.000	42.53	-15.02	27.51	40.00	-12.49	peak	
2	*	216.240	54.29	-15.07	39.22	46.00	-6.78	peak	
3		311.785	41.49	-11.35	30.14	46.00	-15.86	peak	
4		407.815	40.85	-9.31	31.54	46.00	-14.46	peak	
5		455.830	42.15	-8.10	34.05	46.00	-11.95	peak	
6		891.360	35.92	-1.95	33.97	46.00	-12.03	peak	

APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

Test Mode	TX Mode Channel 01
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2400.000	42.58	6.52	49.10	74.00	-24.90	peak	
2		2403.125	79.00	6.51	85.51	114.00	-28.49	peak	

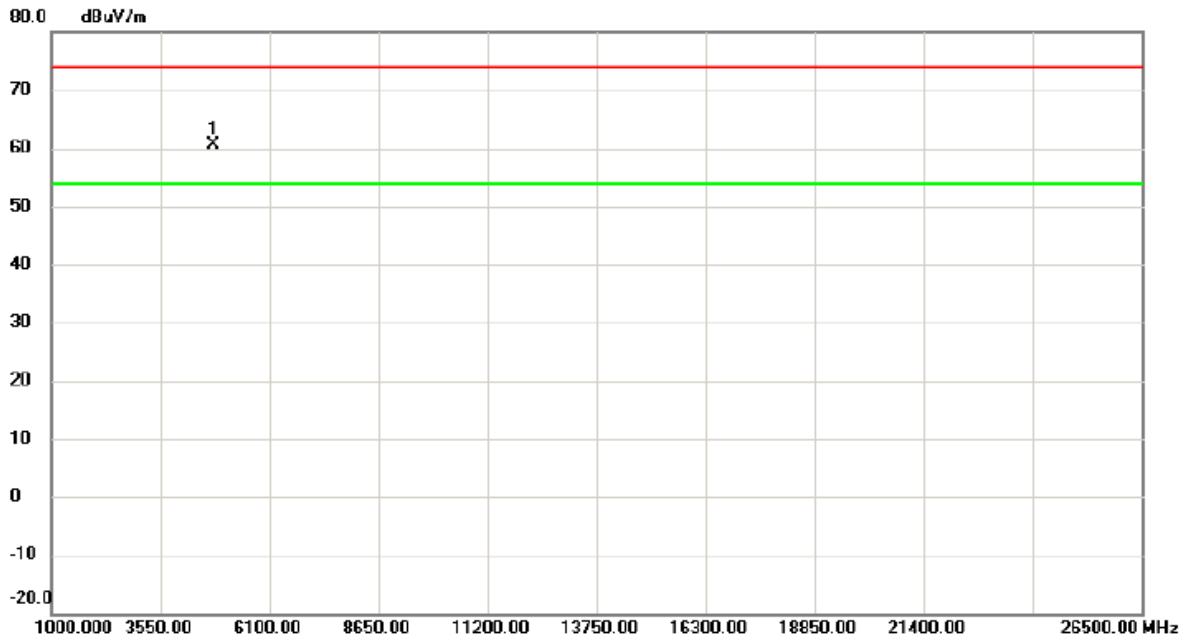
Remark:

- (1) The AVG value of fundamental frequency is:
 AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2400.000	49.10	23.62	54	PASS
2403.125	85.51	60.03	94	PASS

Test Mode	TX Mode Channel 01
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Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4806.345	57.33	3.38	60.71	74.00	-13.29	peak	

Remark:

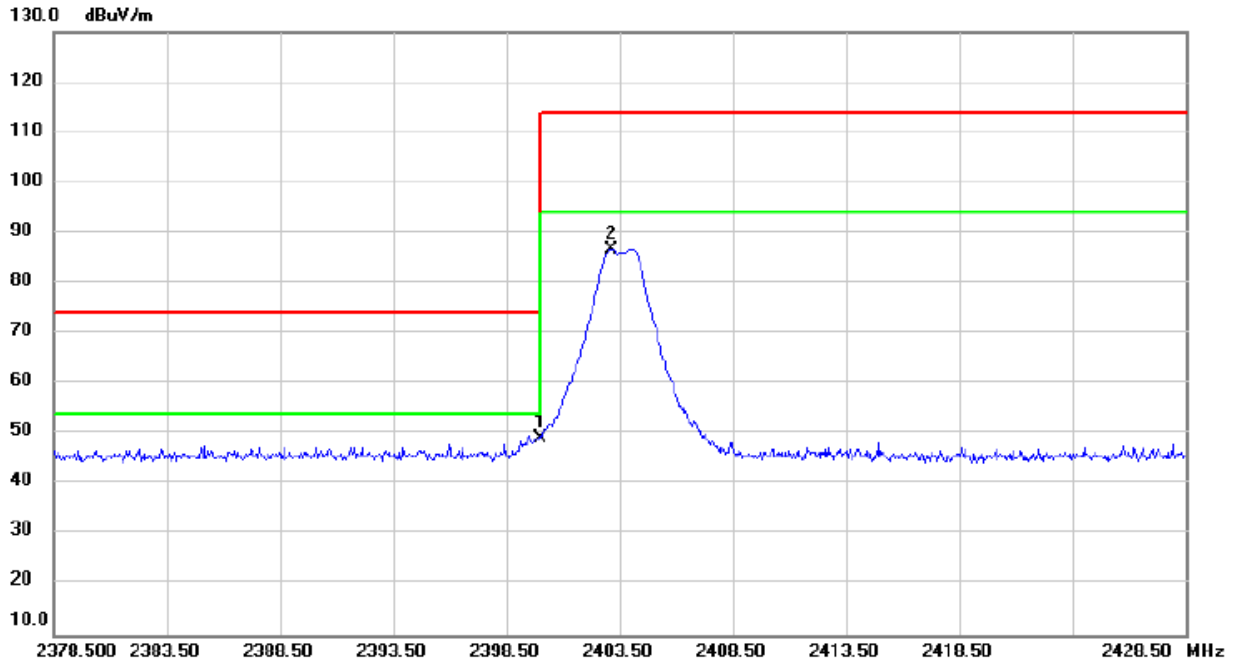
(1) The AVG value of fundamental frequency is:

AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4806.345	60.71	35.23	54	PASS

Test Mode TX Mode Channel 01

Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2400.000	42.57	6.52	49.09	74.00	-24.91	peak	
2		2403.125	80.17	6.51	86.68	114.00	-27.32	peak	

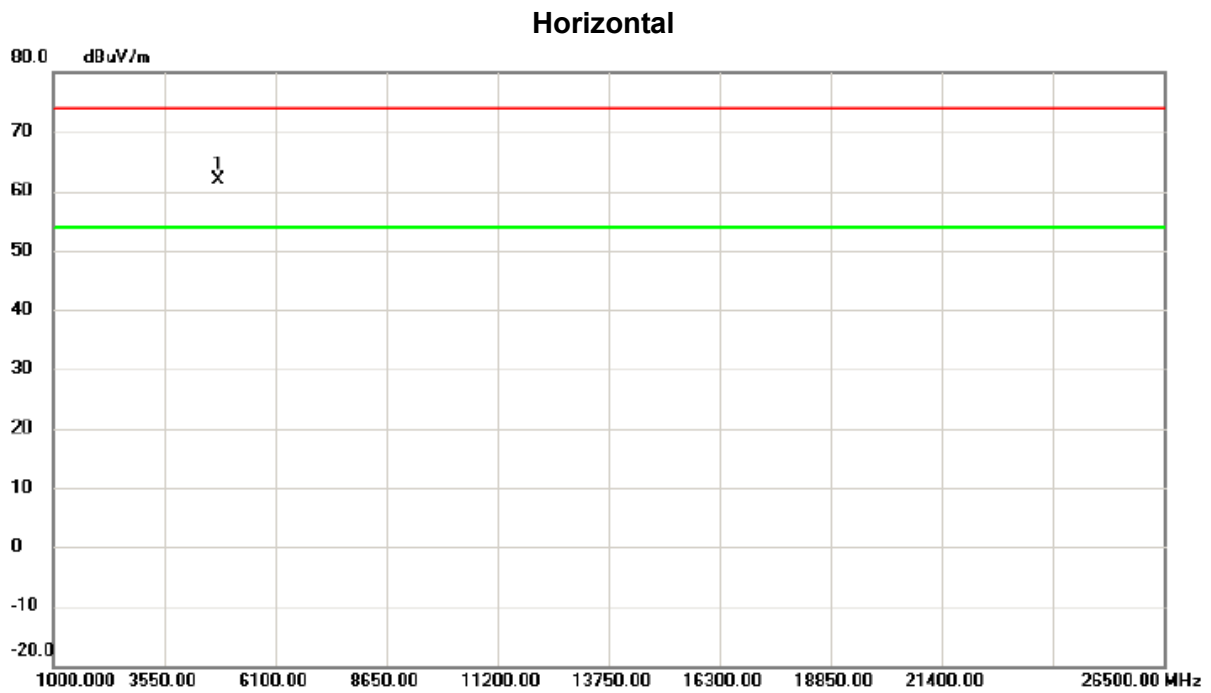
Remark:

(1) The AVG value of fundamental frequency is:

AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2400.000	49.09	23.61	54	PASS
2403.125	86.68	61.20	94	PASS

Test Mode TX Mode Channel 01



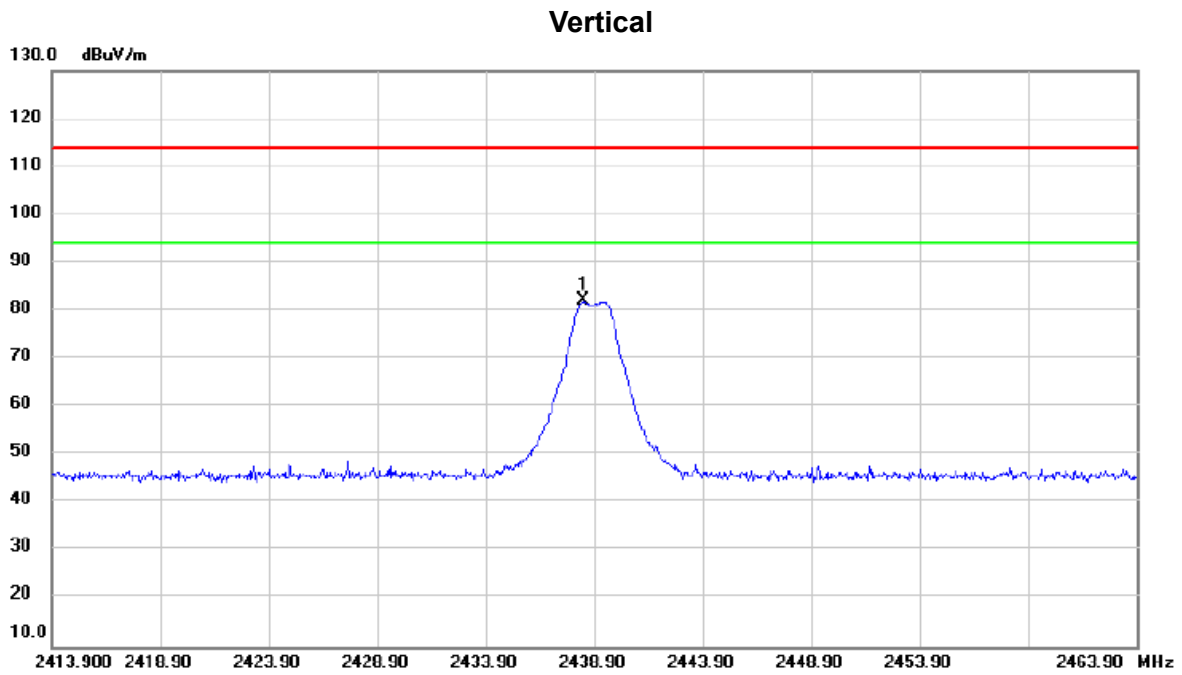
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4806.245	58.38	3.38	61.76	74.00	-12.24	peak	

Remark:

- (1) The AVG value of fundamental frequency is:
 AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4806.245	61.76	36.28	54	PASS

Test Mode	TX Mode Channel 24
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	2438.425	75.57	6.48	82.05	114.00	-31.95	peak	

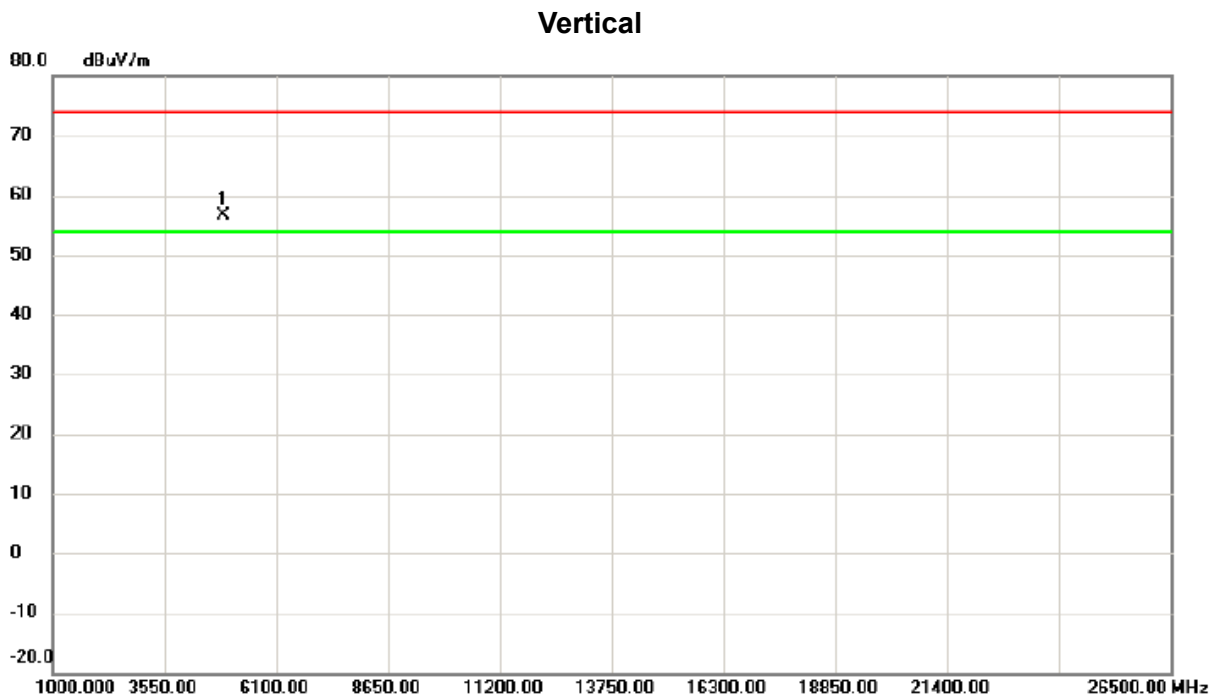
Remark:

(1) The AVG value of fundamental frequency is:

AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2438.425	82.05	56.57	94	PASS

Test Mode TX Mode Channel 24



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4876.780	52.96	3.59	56.55	74.00	-17.45	peak	

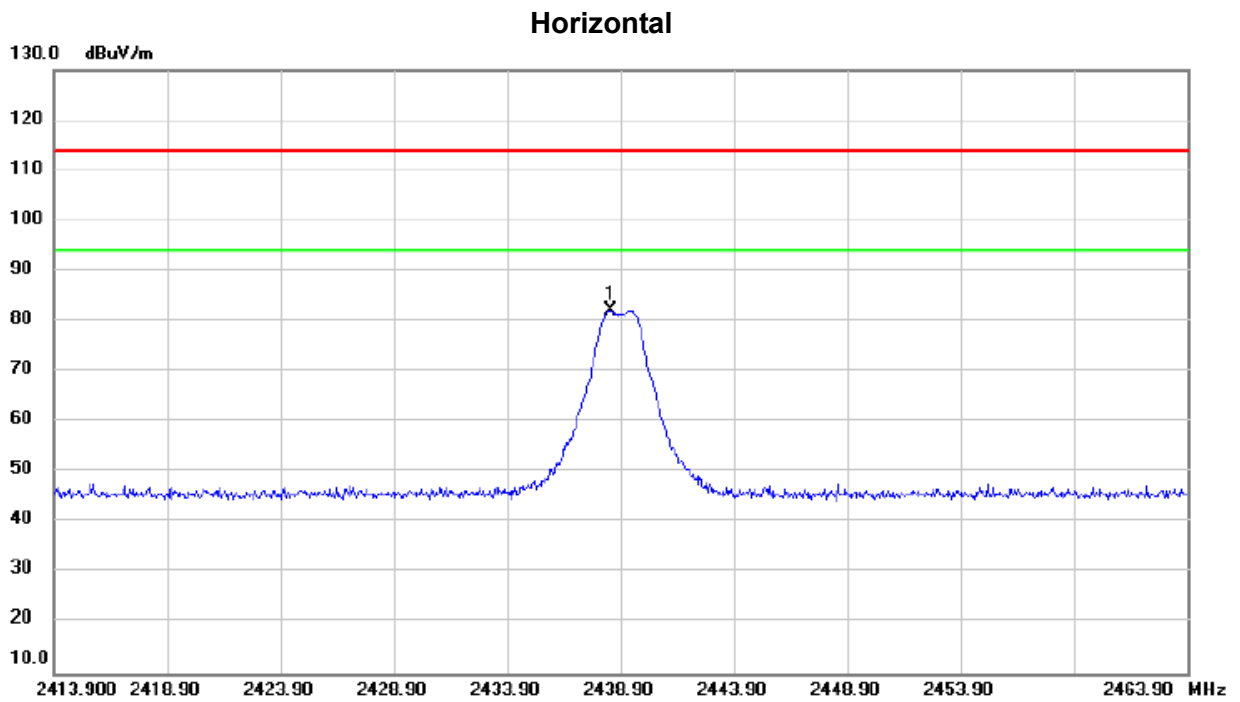
Remark:

(1) The AVG value of fundamental frequency is:

AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4876.780	56.55	31.07	54	PASS

Test Mode TX Mode Channel 24



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	2438.450	75.76	6.48	82.24	114.00	-31.76	peak	

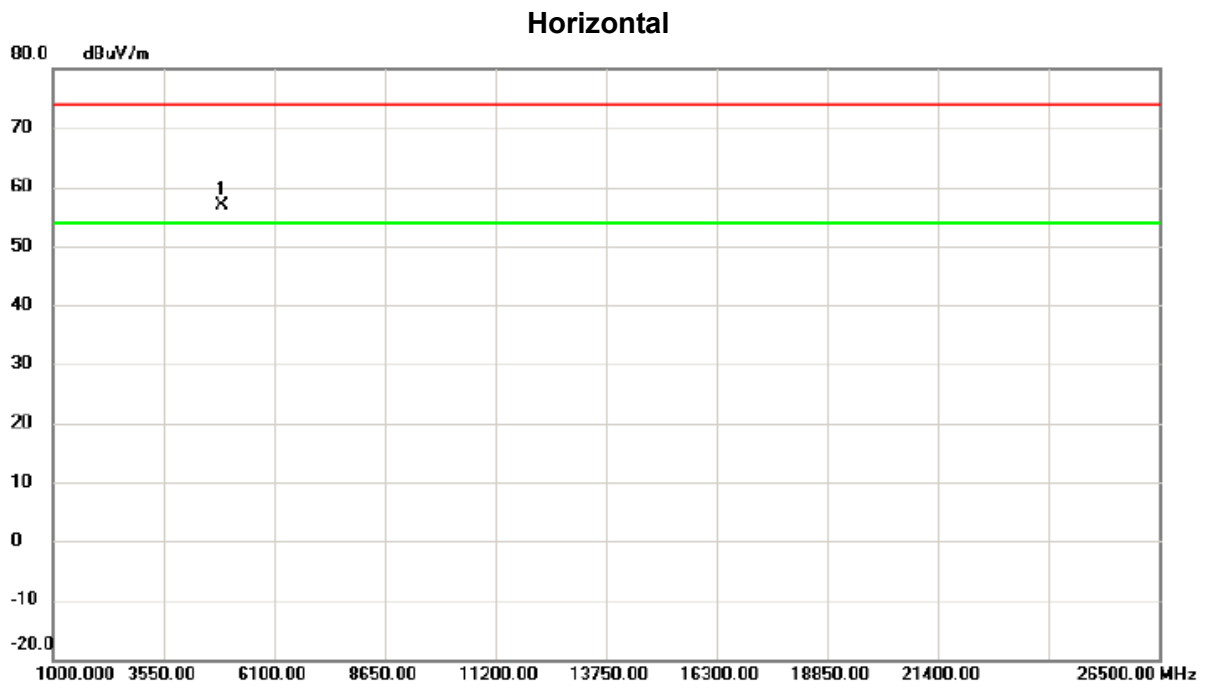
Remark:

(1) The AVG value of fundamental frequency is:

AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2438.450	82.24	56.76	94	PASS

Test Mode TX Mode Channel 24



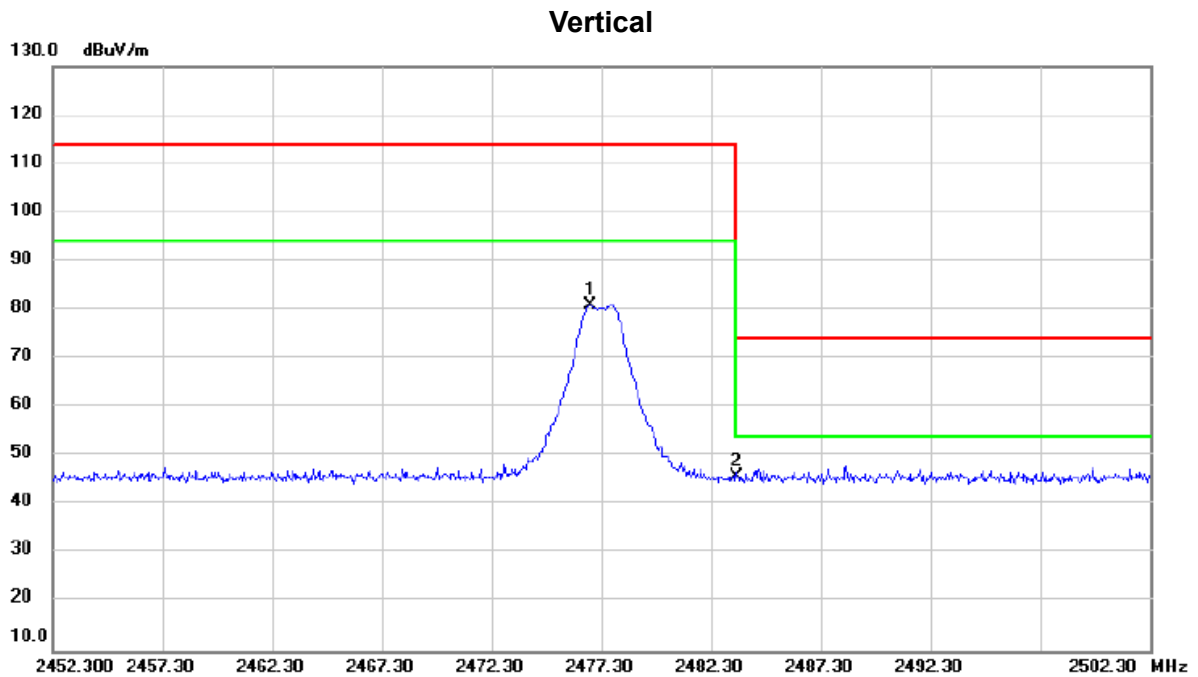
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4876.900	53.41	3.59	57.00	74.00	-17.00	peak	

Remark:

- (1) The AVG value of fundamental frequency is:
 AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4876.900	57.00	31.52	54	PASS

Test Mode	TX Mode Channel 49
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2476.800	74.53	6.43	80.96	114.00	-33.04	peak	
2	*	2483.500	39.44	6.43	45.87	74.00	-28.13	peak	

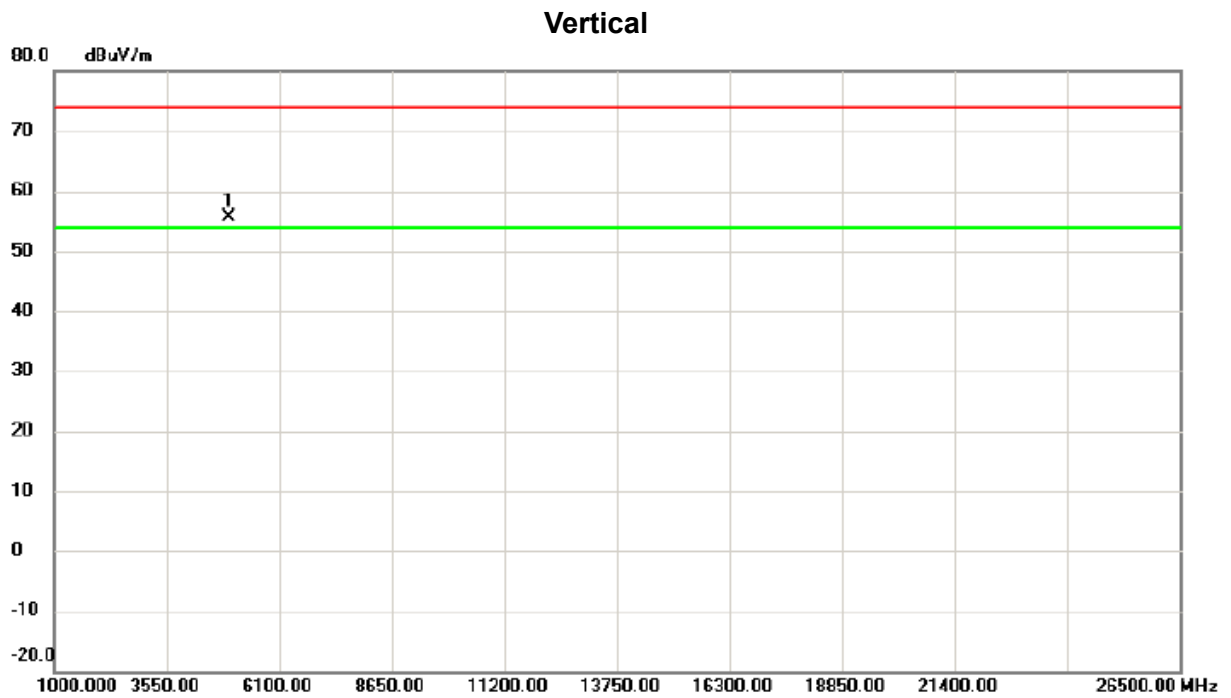
Remark:

(1) The AVG value of fundamental frequency is:

AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2476.800	80.96	55.48	94	PASS
2483.500	45.87	20.39	54	PASS

Test Mode TX Mode Channel 49



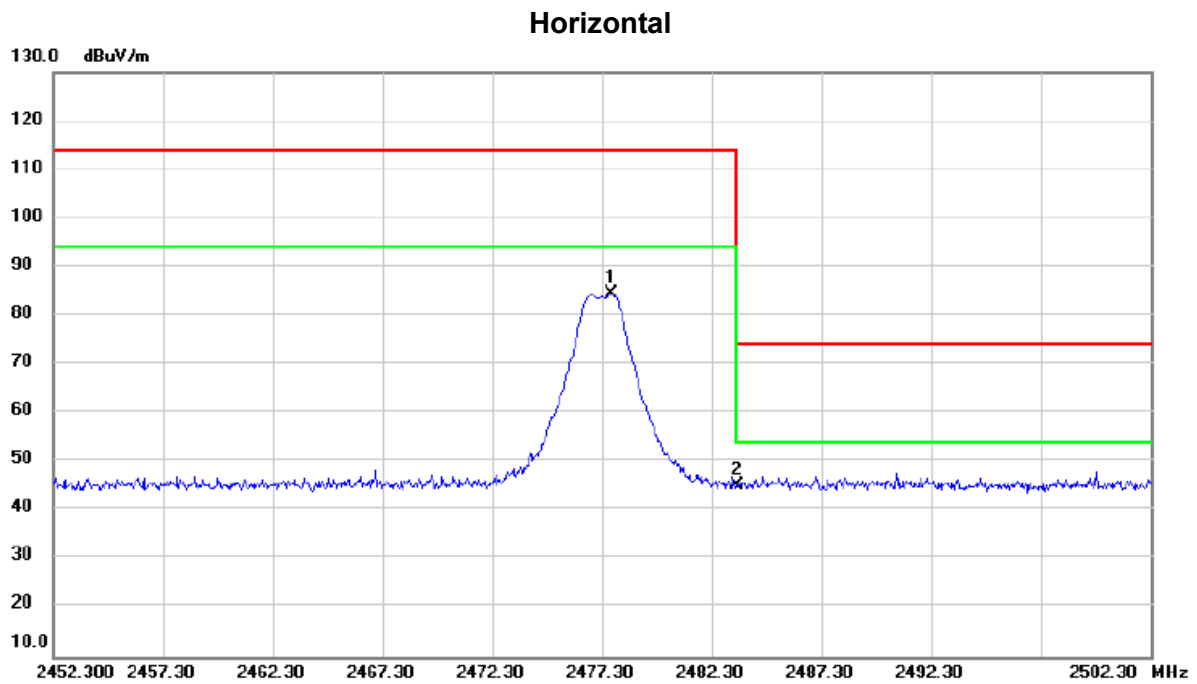
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4955.410	51.75	3.82	55.57	74.00	-18.43	peak	

Remark:

(1) The AVG value of fundamental frequency is:
 AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4955.410	55.57	30.09	54	PASS

Test Mode TX Mode Channel 49



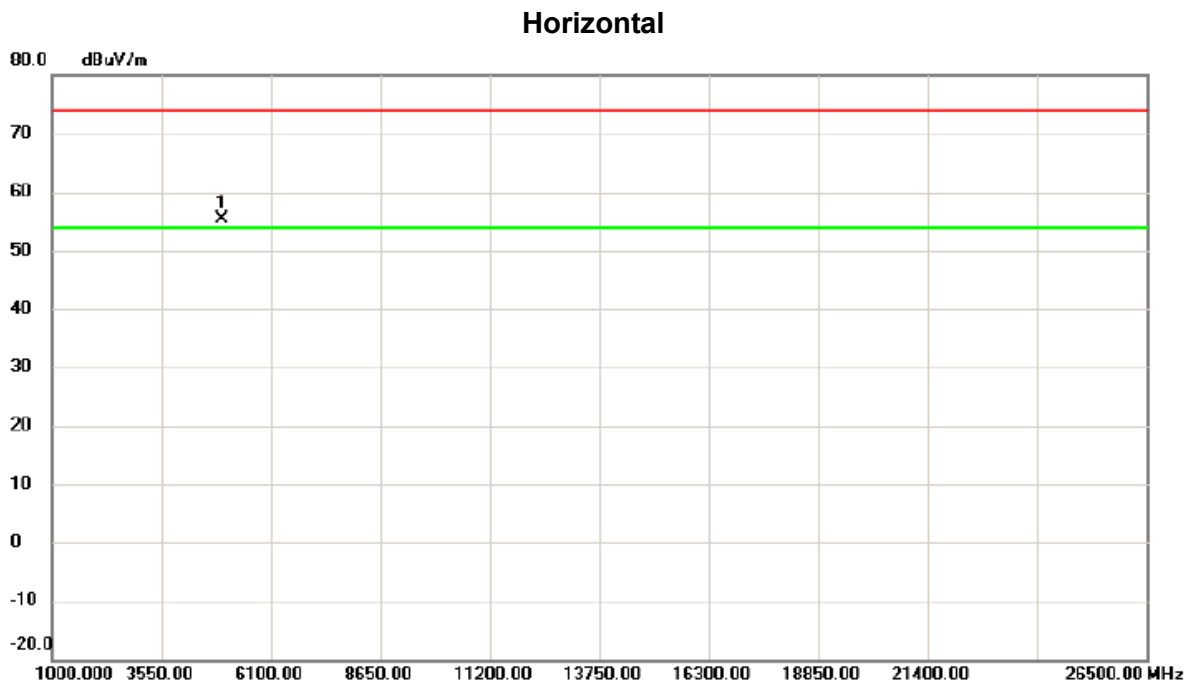
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2477.750	78.00	6.42	84.42	114.00	-29.58	peak	
2	*	2483.500	38.91	6.43	45.34	74.00	-28.66	peak	

Remark:

(1) The AVG value of fundamental frequency is:
 $AVG \text{ Reading} = \text{Peak value} + 20\log(\text{Duty cycle})$, $AVG = \text{Peak} - 25.48$

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2477.750	84.42	58.94	94	PASS
2483.500	45.34	19.86	54	PASS

Test Mode	TX Mode Channel 49
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4955.430	51.46	3.82	55.28	74.00	-18.72	peak	

Remark:

(1) The AVG value of fundamental frequency is:
 AVG Reading = Peak value + 20log(Duty cycle) , AVG=Peak-25.48

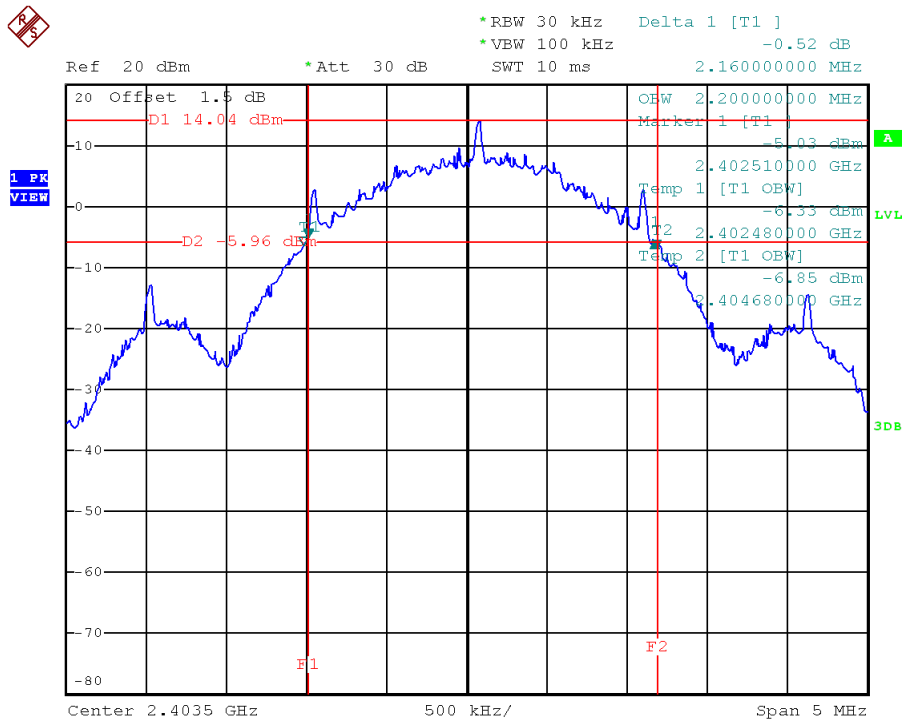
Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4955.430	55.28	29.80	54	PASS

APPENDIX E - BANDWIDTH

Test Mode: TX Mode

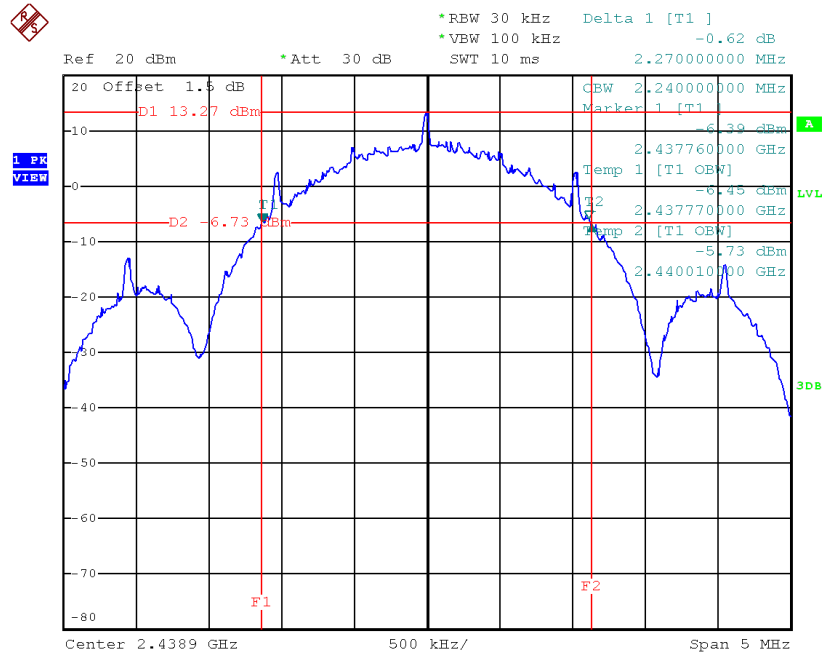
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)
2403.585	2.16	2.20
2438.913	2.27	2.24
2477.313	2.22	2.24

TX Mode_2403.585 MHz



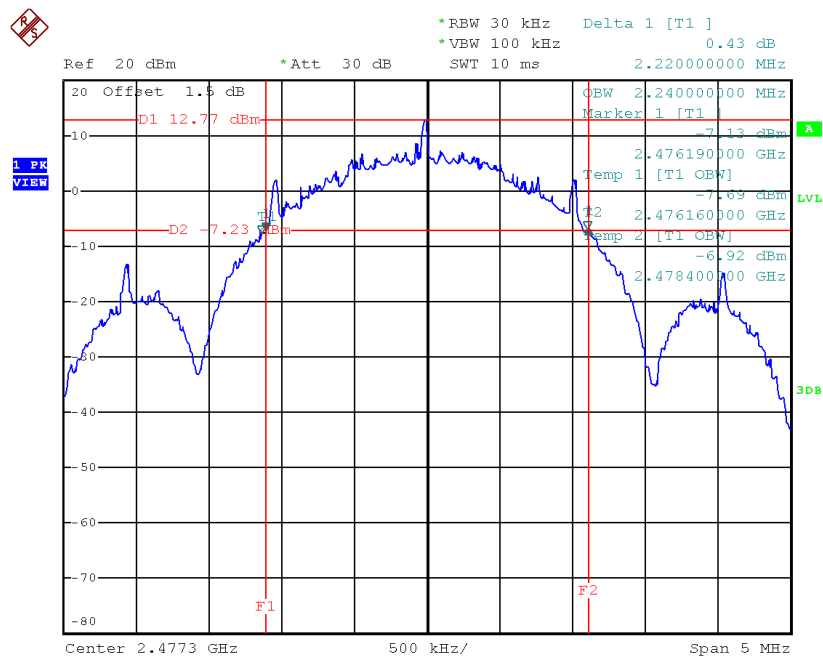
Date: 10.MAY.2019 14:59:25

TX Mode_2438.913 MHz



Date: 10.MAY.2019 15:43:49

TX Mode_2477.313 MHz



Date: 10.MAY.2019 16:40:50

End of Test Report