

FCC Radio Test Report

FCC ID: QWHDW20R

This report concerns: Original Grant

Project No. : 1712C210B
Equipment : Wireless Systems
Brand Name : KLARK TEKNIK
Test Model : DW 20R
Series Model : N/A
Applicant : MUSIC Tribe Manufacturing PH Ltd.
Address : 17A Brunswick Street Hamilton HM 10 Bermuda
Manufacturer : MUSIC Tribe Manufacturing PH Ltd.
Address : 17A Brunswick Street Hamilton HM 10 Bermuda
Factory : Zhongshan Eurotec Electronics Ltd.
Address : No.10 Wanmei Road, South China Modern Chinese Medicine Park,
Nanlang Town, Zhongshan City, Guangdong Province, P.R. China
Date of Receipt : Apr. 01, 2020
Date of Test : Apr. 02, 2020 ~ Jun. 19, 2020
Issued Date : Jul. 08, 2020
Report Version : R01
Test Sample : Sample No.: DG20200420196
Standard(s) : FCC Part15, Subpart C (15.247)
ANSI C63.10-2013
FCC KDB 558074 D01 15.247 Meas Guidance V05r02

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

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Declaration

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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.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jul. 03, 2020
R01	Revised report to address comments.	Jul. 08, 2020

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.247)				
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 Emission	APPENDIX G	PASS	-----
15.247(e)	Power Spectral Density	APPENDIX H	PASS	-----
15.203	Antenna Requirement	-----	PASS	Note(2)

Note:

- (1) "N/A" denotes test is not applicable to this device.
- (2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

1.1 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

1.2 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 Measurement:

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

B. Radiated emissions 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	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80
		1GHz ~ 6GHz	-	4.58
		6GHz ~ 18GHz	-	5.18
		18GHz ~ 26.5 GHz	-	3.80
		26.5GHz ~ 40 GHz	-	4.30

C. Other Measurement:

Parameter	Uncertainty
Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Conducted Spurious Emission	±2.71 dB
Power Spectral Density	±0.86 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

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

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25°C	55%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-9K-30MHz	25°C	60%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-30 MHz to 1GHz	25°C	60%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-Above 1000 MHz	22°C	54%	AC 120V/60Hz	Kwok Guo
Bandwidth	25°C	50%	AC 120V/60Hz	Hayden Chen
Maximum Output Power	25°C	50%	AC 120V/60Hz	Laughing Zhang
Conducted Spurious Emission	25°C	50%	AC 120V/60Hz	Hayden Chen
Power Spectral Density	25°C	50%	AC 120V/60Hz	Hayden Chen

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Systems
Brand Name	KLARK TEKNIK
Test Model	DW 20R
Series Model	N/A
Model Difference(s)	N/A
Power Source	DC Voltage supplied from AC/DC adapter. 1# Model: S008ACM1200040 2# Model: GPE053A-V120040-Z
Power Rating	1# I/P: 100-240V~50/60Hz 300mA O/P: 12V $\overline{\text{---}}$ 400mA 2# I/P: 100-240V~50/60Hz 0.2A O/P: 12V $\overline{\text{---}}$ 400mA 4.8W
Operation Frequency	2406-2475MHz
Modulation Technology	3Mbps
Bit Rate of Transmitter	GFSK
Max. Output Power	4.28 dBm (0.0027 W)

Note:

1. 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)
00	2406	12	2442
01	2409	13	2445
02	2412	14	2448
03	2415	15	2451
04	2418	16	2454
05	2421	17	2457
06	2424	18	2460
07	2427	19	2463
08	2430	20	2466
09	2433	21	2469
10	2436	22	2472
11	2439	23	2475

3. Table for Filed Antenna:

Group 1

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Zhigaoda	323032-25532-1R	Dipole	N/A	5

Group 2

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	 ALEAD technology	AT-02-5-A80617H1-190	Dipole	N/A	5

Note:

Equipment has 2 group antennas, group 1 and group 2 are same type antenna, only differ in brand and model name. Both two antennas were tested and in this report only recorded the worst case.

2.2 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 Mode NOTE (1)
Mode 2	TX Mode_ 2406 MHz _CH00

Following mode(s) was (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 2	TX Mode_ 2406 MHz _CH00

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 2	TX Mode_ 2406 MHz _CH00

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

Conducted test	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

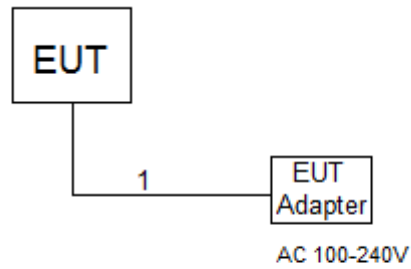
Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) 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) For AC power line conducted emissions test and radiated emission below 1 GHz test, the 2406 MHz _CH00 was found to be the worst case and recorded.
- (4) For AC power line conducted emissions test and radiated emission below 1 GHz test, all adapters had been pre-test and in this report only recorded the worst case.

2.3 PARAMETERS OF TEST SOFTWARE

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

Test Software	N/A		
Frequency (MHz)	2406	2442	2475
Parameters	N/A	N/A	N/A

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**2.5 SUPPORT UNITS**

Item	Equipment	Brand	Model No.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m

3. AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency of Emission (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 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.

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

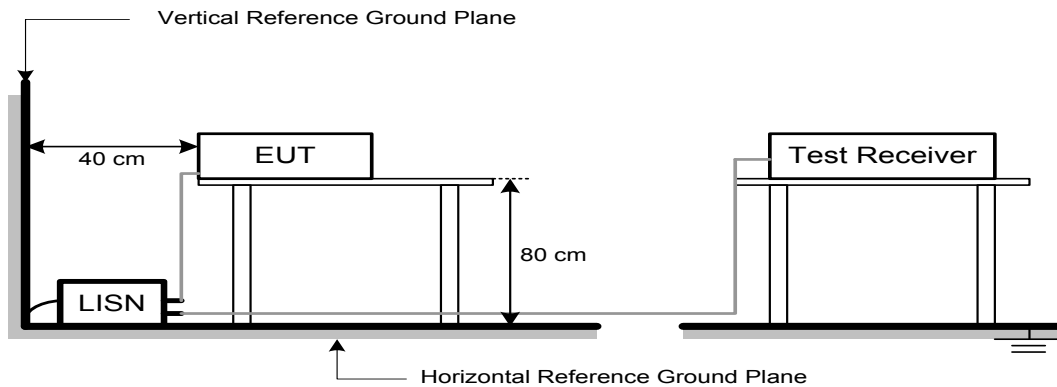
3.2 TEST PROCEDURE

- 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.

3.3 DEVIATION FROM TEST STANDARD

No deviation

3.4 TEST SETUP



3.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.6 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 150 kHz to 30 MHz.

4. RADIATED EMISSION TEST

4.1 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).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	RBW 1 MHz VBW 3 MHz peak detector for Pk value RMS detector for AV value

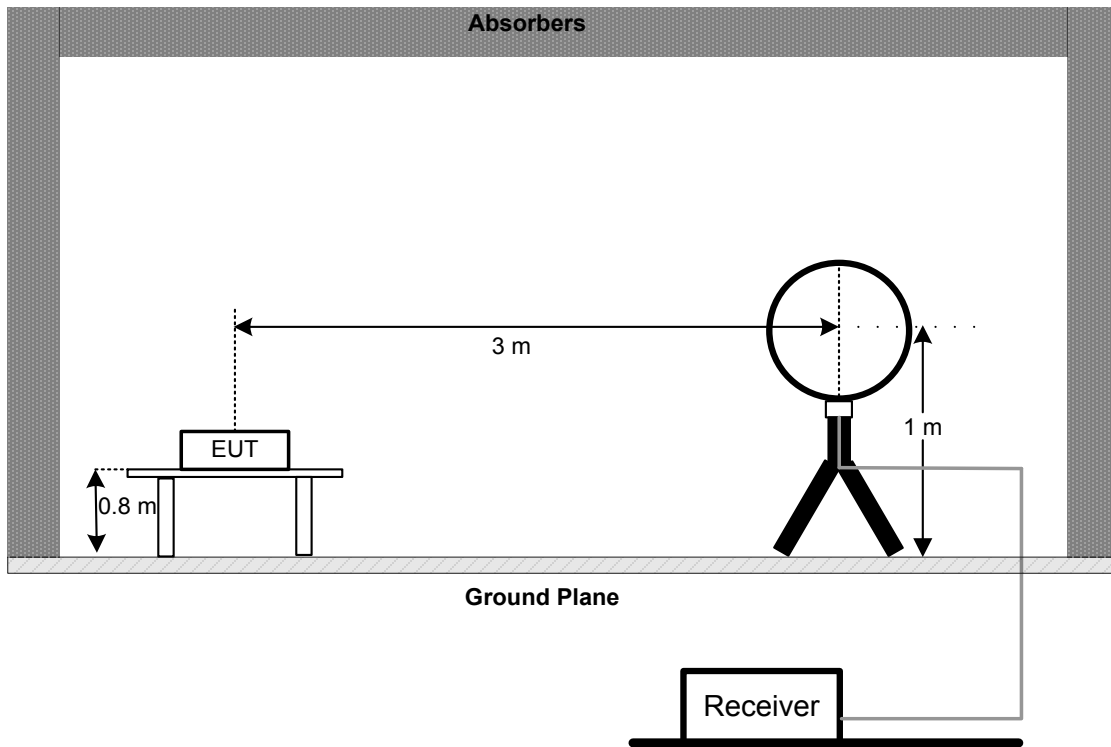
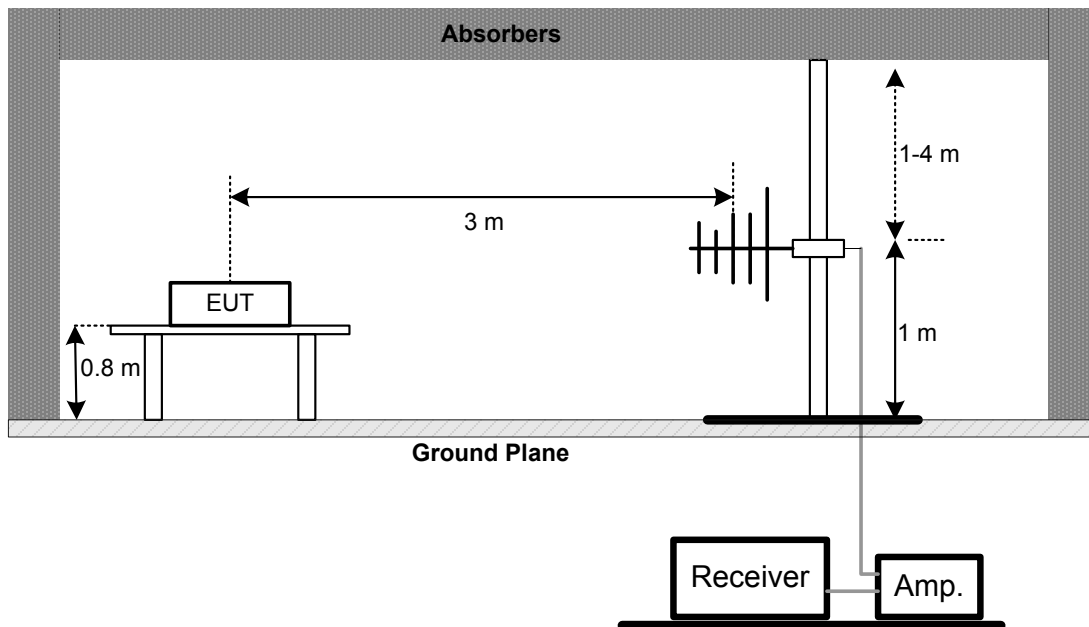
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000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

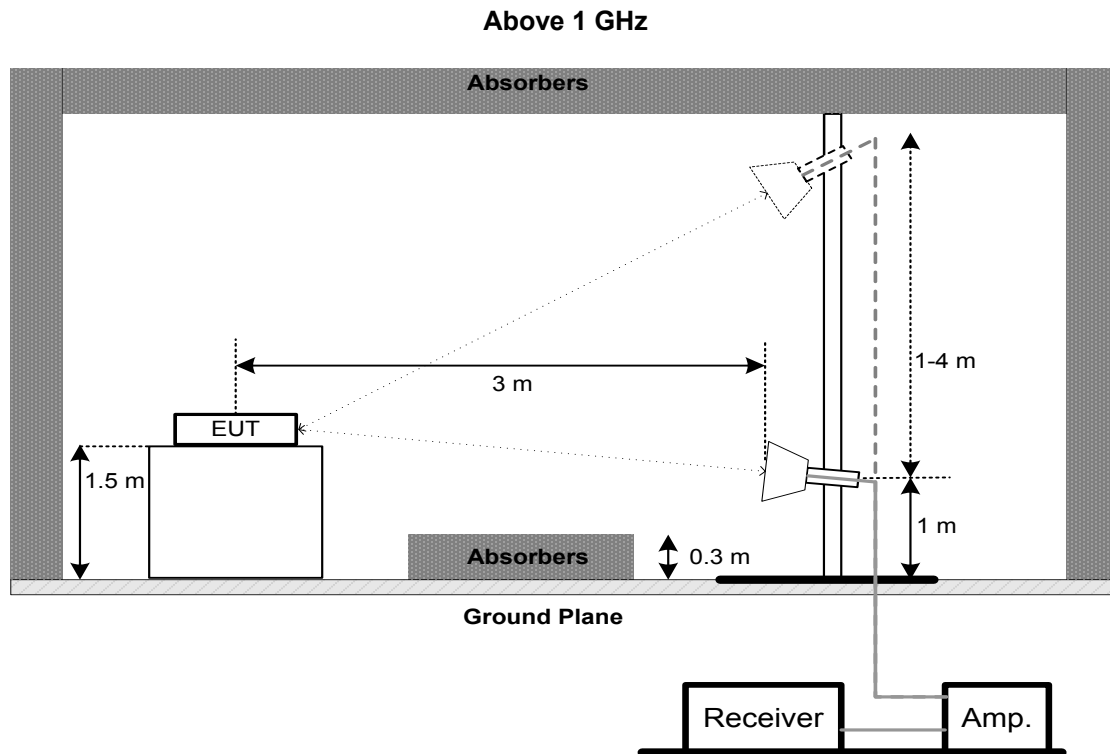
4.2 TEST PROCEDURE

- 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.

4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4 TEST SETUP**9 kHz-30 MHz****30 MHz to 1 GHz**



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT - 9 kHz TO 30 MHz

Please refer to the APPENDIX B

Remark:

- (1) Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB).
- (2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7 TEST RESULT - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

4.8 TEST RESULT - ABOVE 1000 MHz

Please refer to the APPENDIX D.

Remark:

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

5. BANDWIDTH TEST

5.1 LIMIT

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

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Spectrum Setting : RBW= 100 kHz, VBW=300 kHz, Sweep time = 2.5 ms.
- The bandwidth was performed in accordance with method 11.8.1 of ANSI C63.10-2013.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 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.

5.6 TEST RESULTS

Please refer to the APPENDIX E.

6. MAXIMUM OUTPUT POWER

6.1 LIMIT

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

6.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The maximum conducted output power was performed in accordance with method 11.9.2.2 of ANSI C63.10-2013.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 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.

6.6 TEST RESULTS

Please refer to the APPENDIX F.

7. CONDUCTED SPURIOUS EMISSION

7.1 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.

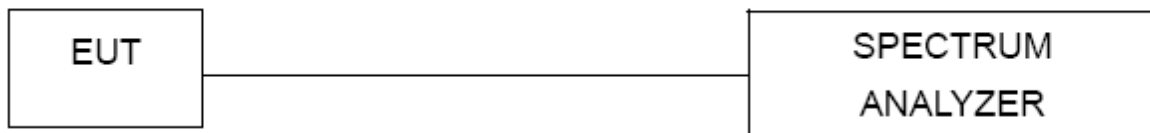
7.2 TEST PROCEDURE

- 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.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 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.

7.6 TEST RESULTS

Please refer to the APPENDIX G.

8. POWER SPECTRAL DENSITY TEST

8.1 LIMIT

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

8.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Spectrum Setting: RBW=3 kHz, VBW=10 kHz, Sweep time = auto.
- The Power Spectral Density was performed in accordance with method 11.10.2 of ANSI C63.10-2013.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 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.

8.6 TEST RESULTS

Please refer to the APPENDIX H.

9. 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	Feb. 28, 2021
2	LISN	EMCO	3816/2	52765	Mar. 01, 2021
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 28, 2021
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 01, 2021
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Mar. 10, 2021

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	Apr. 16, 2021
2	Cable	N/A	RG 213/U(9kHz~1GHz)	N/A	May 30, 2021
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 28, 2021
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, 2021
2*	Amplifier	HP	8447D	2944A08742	Mar. 01, 2021
3	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 24, 2021
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	75846	Mar. 19, 2021
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 23, 2020
3	Amplifier	Agilent	8449B	3008A02584	Aug. 03, 2020
4	Microwave Preampifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 07, 2021
5	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	mitron	RWLP50-4.0A-KJ-S MSM-12M	N/A	Nov. 25, 2020
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

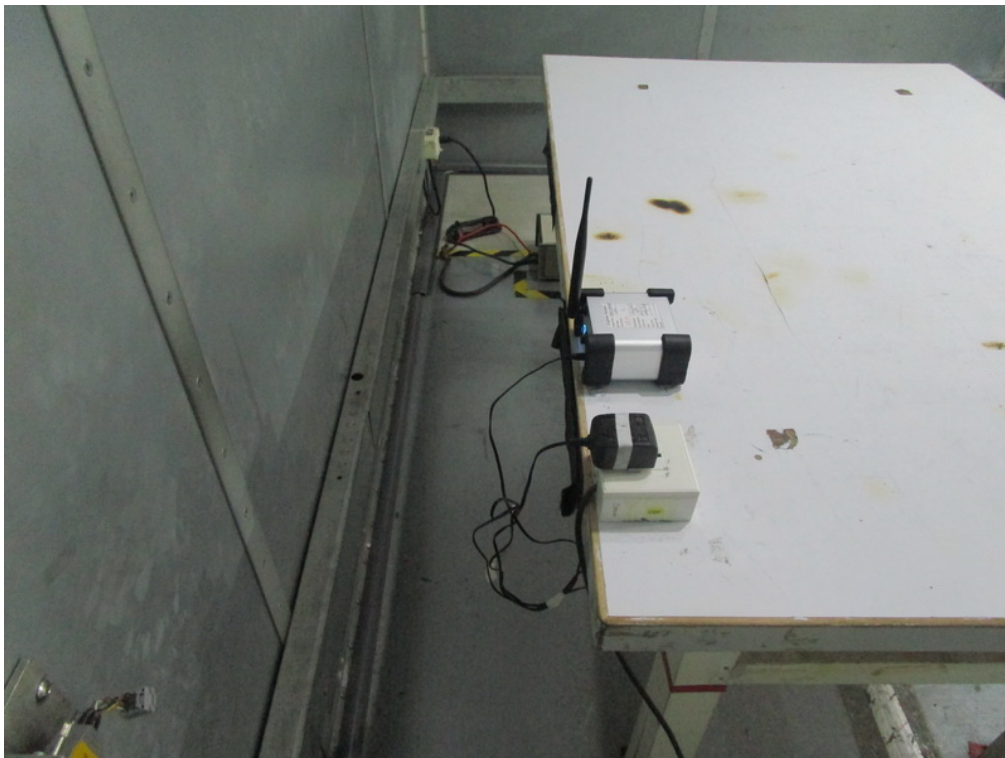
**Bandwidth &
Maximum Output Power &
Power Spectral Density &
Antenna Conducted Spurious Emission**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 03, 2020

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

"**" calibration period of equipment list is three year.

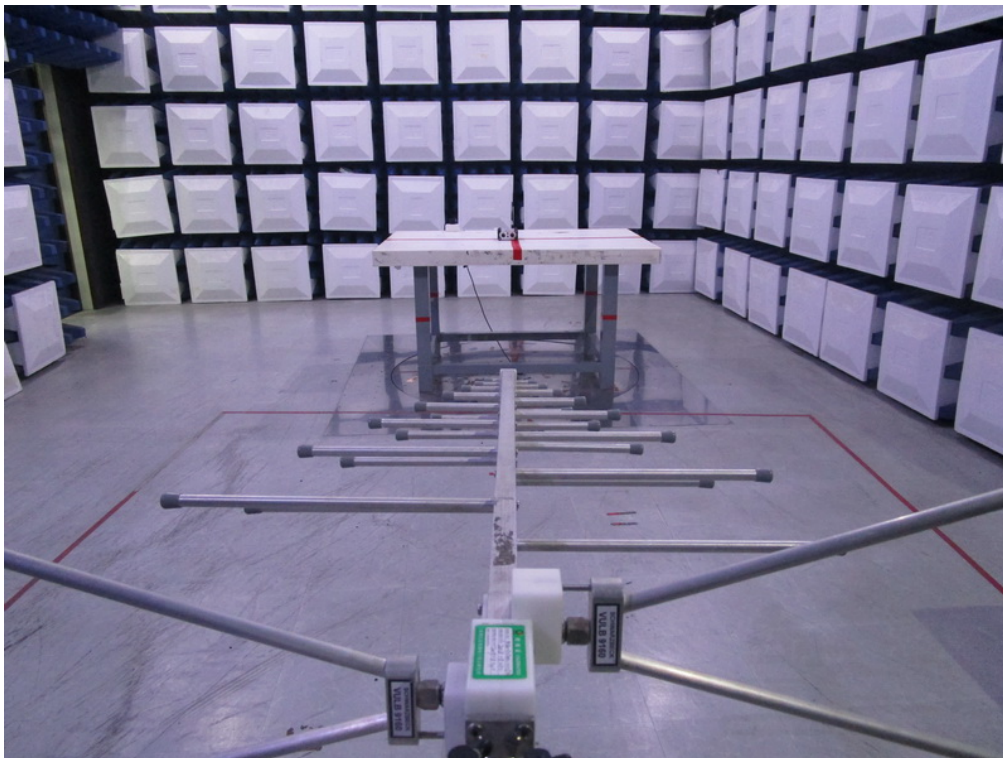
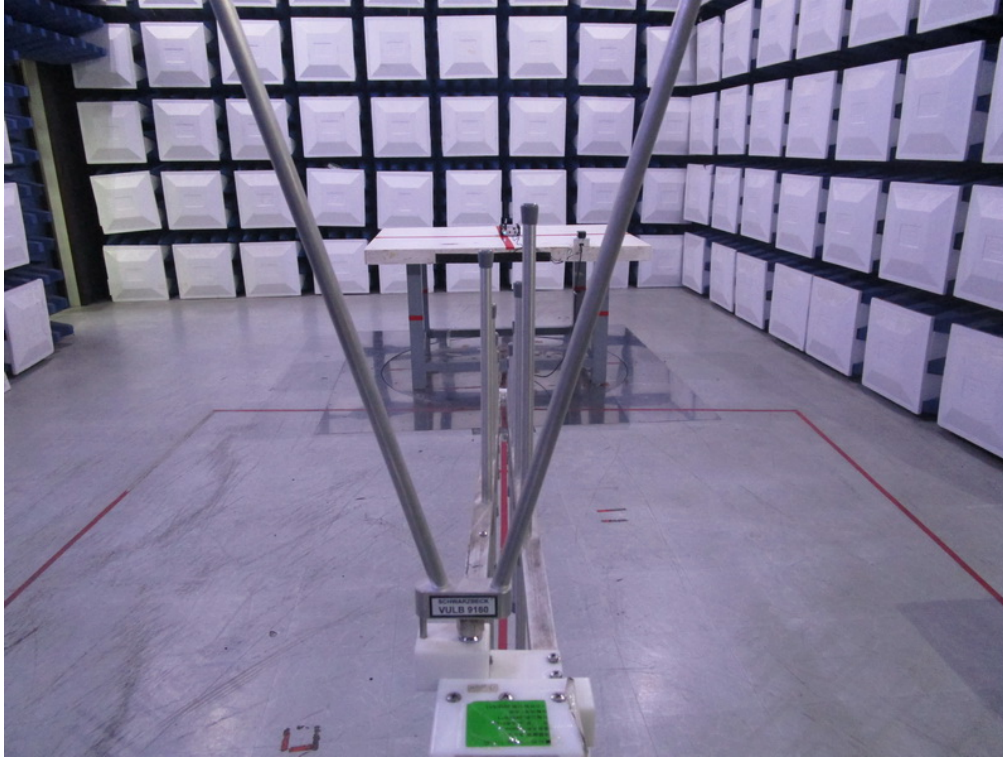
Except * item, all calibration period of equipment list is one year.

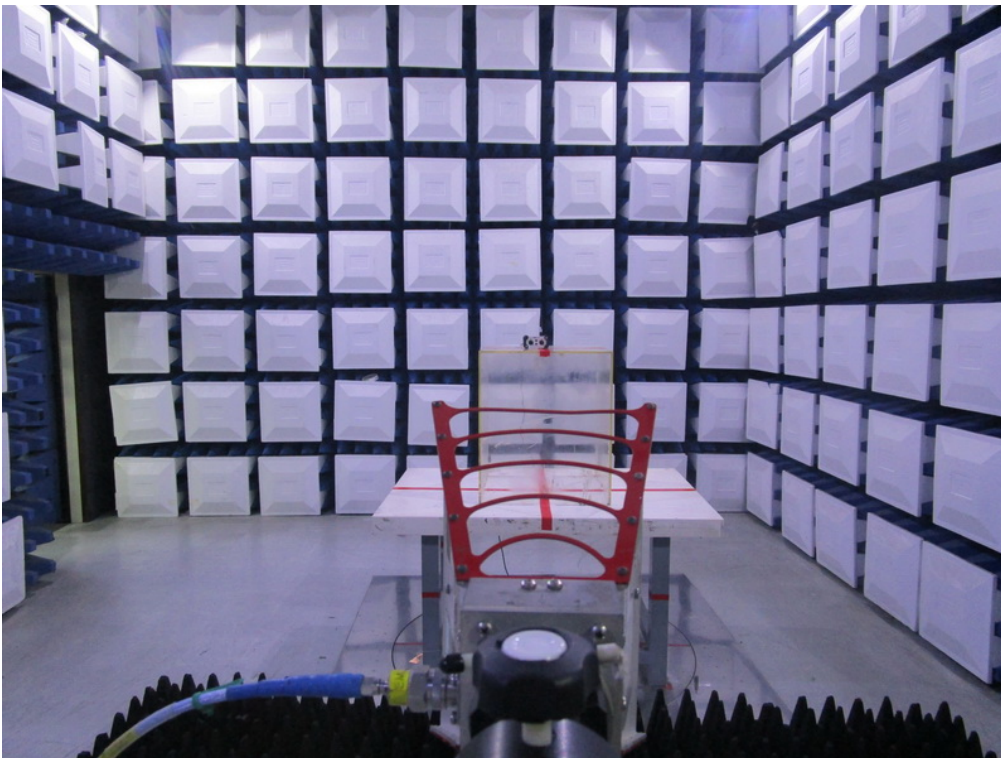
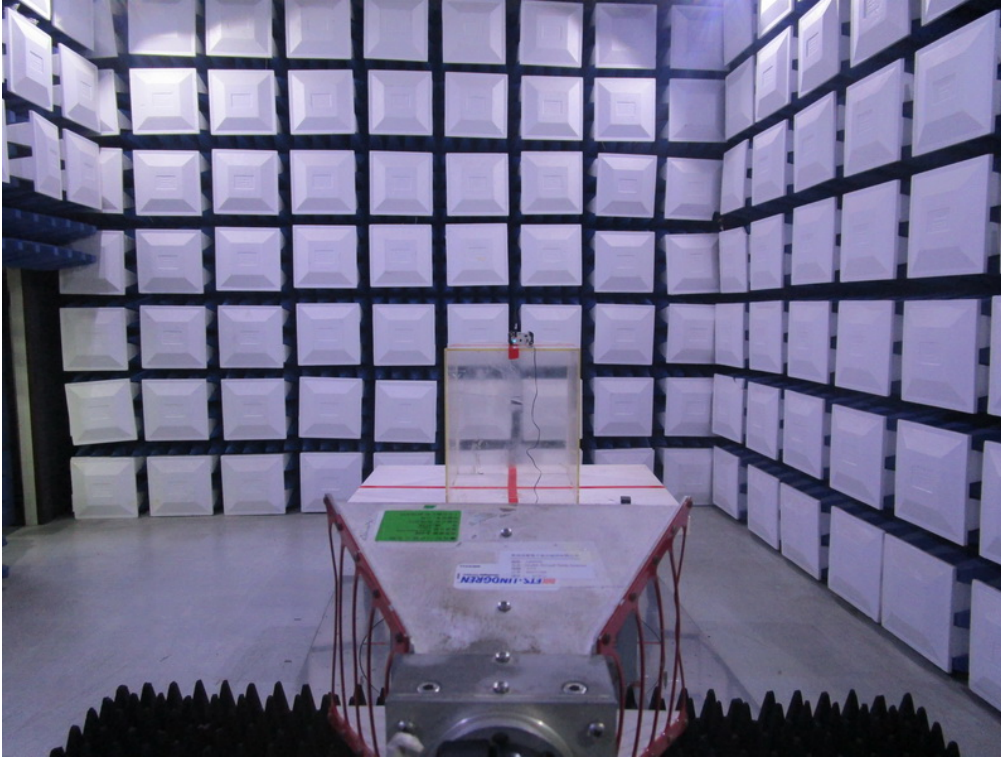
10. EUT TEST PHOTO**AC Power Line Conducted Measurement Photos**

Radiated Measurement Photos**9KHz to 30MHz**

Radiated Measurement Photos

30MHz to 1000MHz

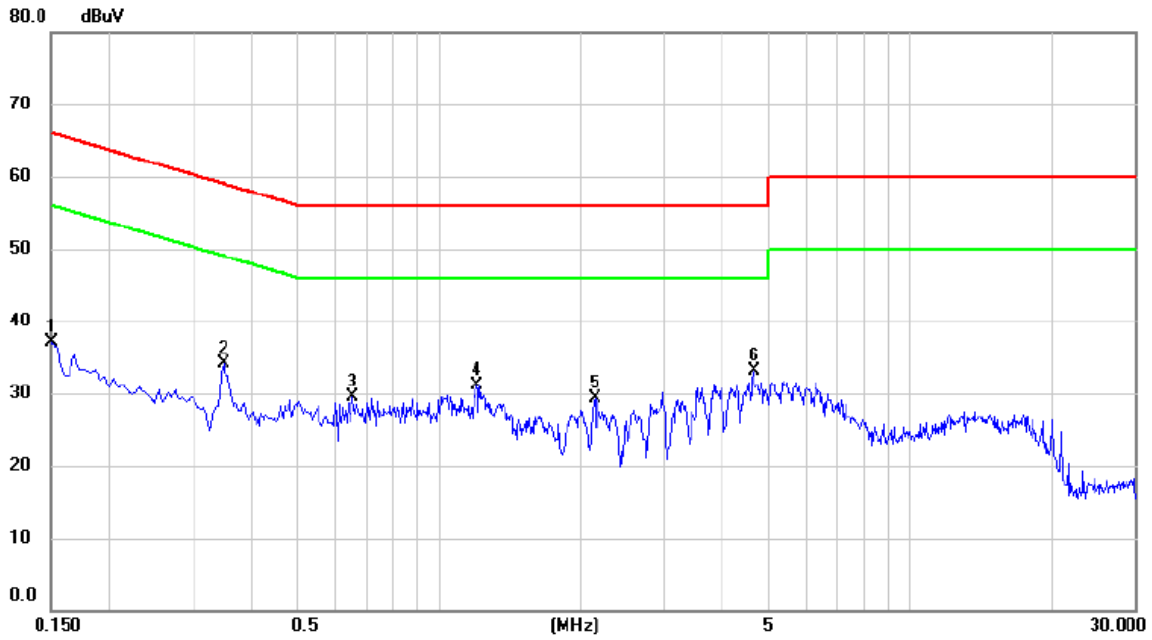


Radiated Measurement Photos**Above 1000MHz**

APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode: TX Mode_ 2406 MHz _CH00

Line



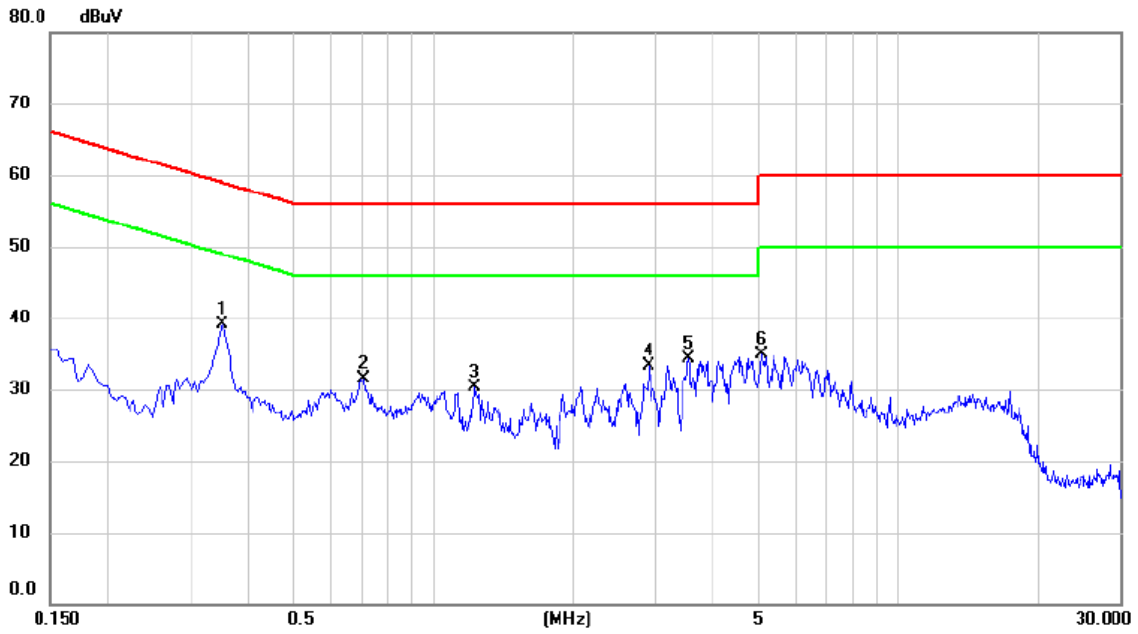
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.150	27.46	9.67	37.13	66.00	-28.87	peak	
2		0.348	24.21	9.91	34.12	59.01	-24.89	peak	
3		0.654	19.67	9.92	29.59	56.00	-26.41	peak	
4		1.203	21.08	10.02	31.10	56.00	-24.90	peak	
5		2.143	19.29	10.10	29.39	56.00	-26.61	peak	
6	*	4.659	22.82	10.31	33.13	56.00	-22.87	peak	

REMARKS:

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

Test Mode: TX Mode_ 2406 MHz _CH00

Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.352	28.97	10.05	39.02	58.90	-19.88	peak	
2		0.708	21.44	10.12	31.56	56.00	-24.44	peak	
3		1.226	19.92	10.33	30.25	56.00	-25.75	peak	
4		2.904	22.86	10.51	33.37	56.00	-22.63	peak	
5		3.543	23.72	10.56	34.28	56.00	-21.72	peak	
6		5.082	24.32	10.67	34.99	60.00	-25.01	peak	

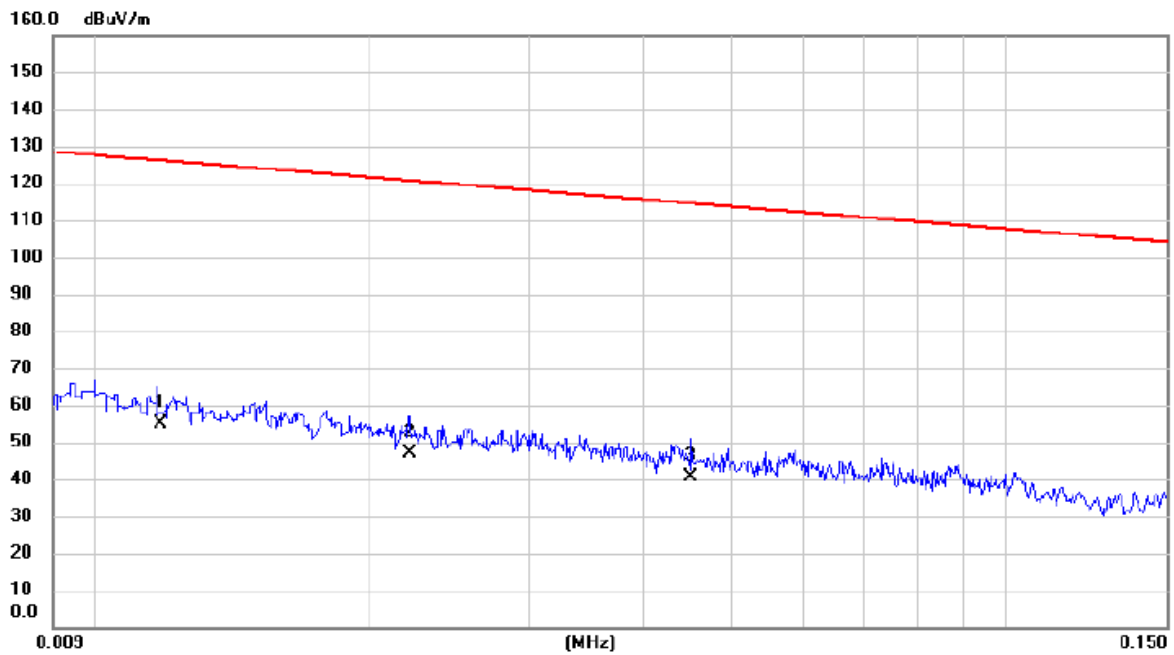
REMARKS:

- (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 Mode_ 2406 MHz _CH00

Ant 0°



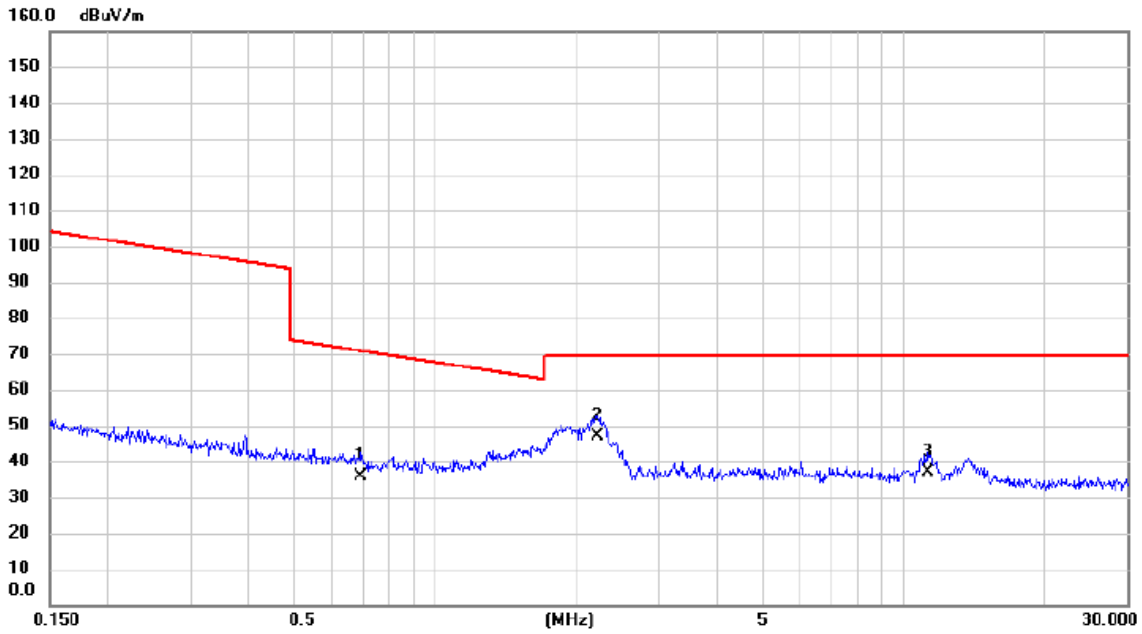
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	0.0118	39.34	15.67	55.01	126.17	-71.16	AVG	
2		0.0222	33.87	13.07	46.94	120.68	-73.74	AVG	
3		0.0451	28.13	12.47	40.60	114.52	-73.92	AVG	

REMARKS:

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

Test Mode: TX Mode_ 2406 MHz _CH00

Ant 0°



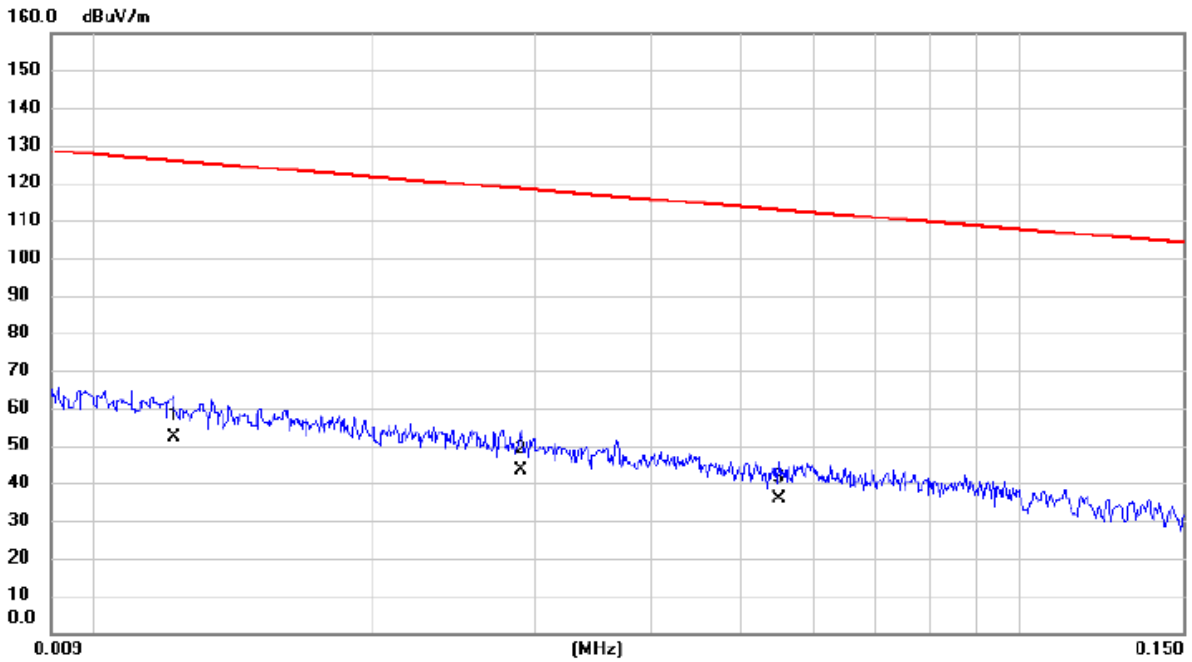
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.6936	24.24	11.73	35.97	70.78	-34.81	QP	
2	*	2.2250	35.86	10.96	46.82	69.54	-22.72	QP	
3		11.2572	25.79	11.08	36.87	69.54	-32.67	QP	

REMARKS:

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

Test Mode: TX Mode_ 2406 MHz _CH00

Ant 90°



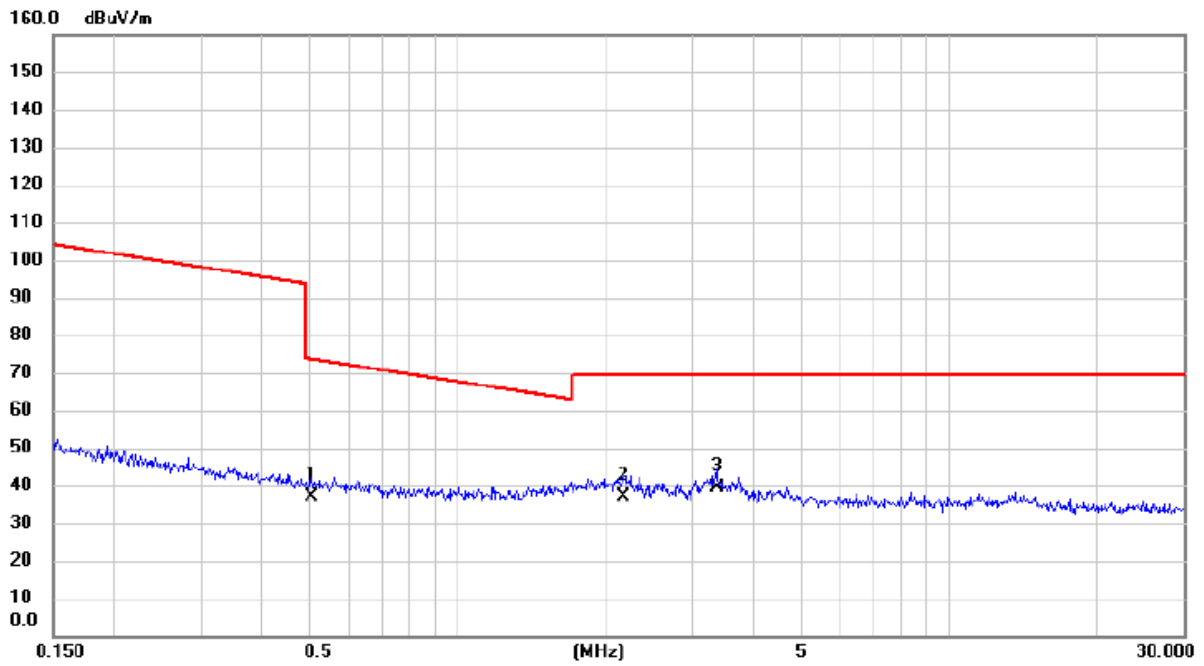
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	0.0122	36.69	15.55	52.24	125.88	-73.64	AVG	
2		0.0290	30.57	12.89	43.46	118.36	-74.90	AVG	
3		0.0550	23.39	12.37	35.76	112.80	-77.04	AVG	

REMARKS:

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

Test Mode: TX Mode_ 2406 MHz _CH00

Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.5047	25.12	11.79	36.91	73.54	-36.63	QP	
2		2.1668	25.87	10.99	36.86	69.54	-32.68	QP	
3	*	3.3635	28.83	10.56	39.39	69.54	-30.15	QP	

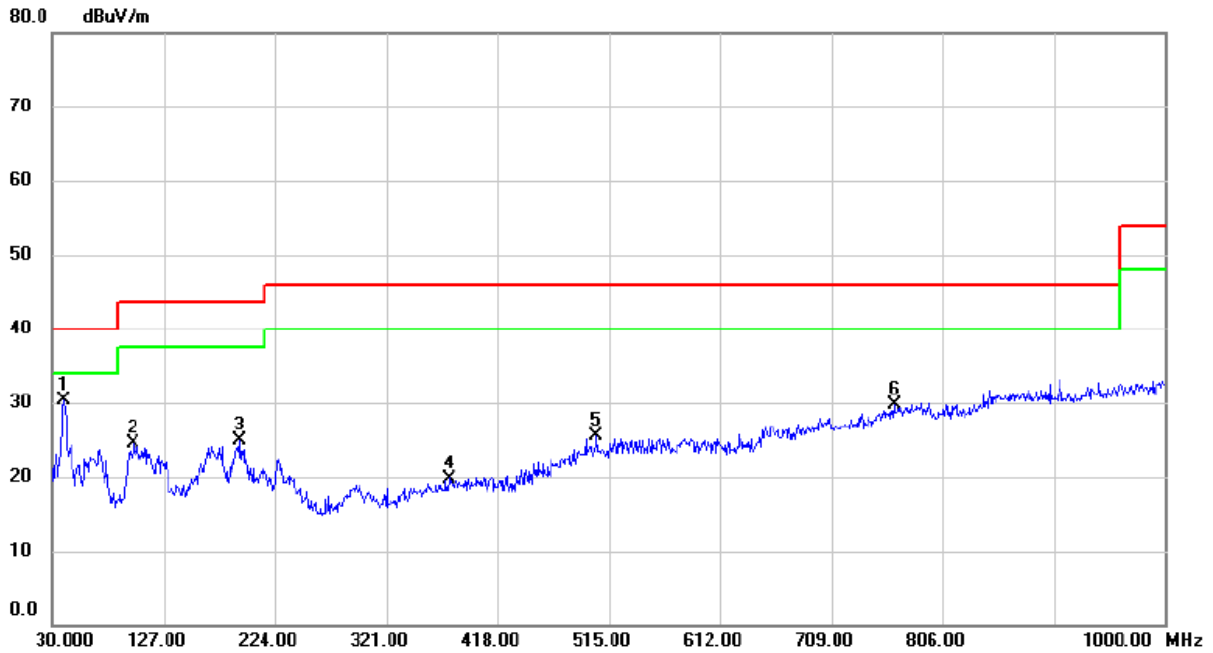
REMARKS:

- (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 Mode_ 2406 MHz _CH00

Vertical

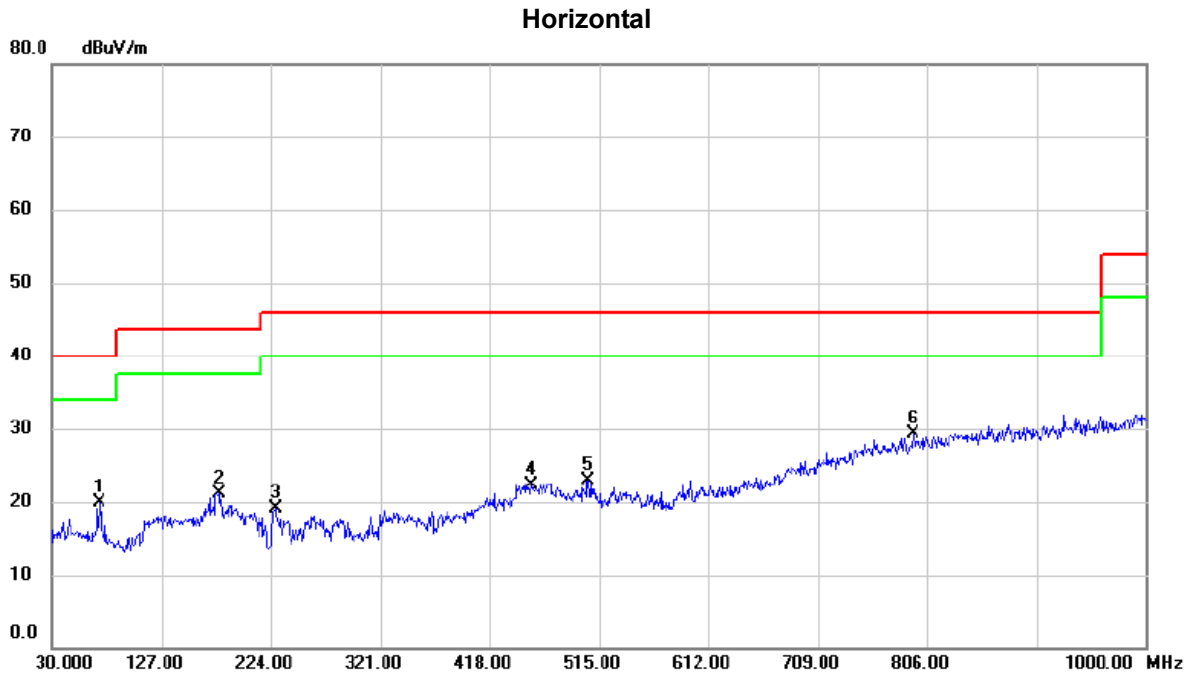


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	39.700	44.26	-14.00	30.26	40.00	-9.74	peak	
2		100.810	41.82	-17.38	24.44	43.50	-19.06	peak	
3		193.930	38.07	-13.19	24.88	43.50	-18.62	peak	
4		376.290	31.44	-11.64	19.80	46.00	-26.20	peak	
5		504.330	34.10	-8.63	25.47	46.00	-20.53	peak	
6		763.320	31.81	-2.16	29.65	46.00	-16.35	peak	

REMARKS:

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

Test Mode: TX Mode_ 2406 MHz _CH00



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		71.710	36.59	-16.72	19.87	40.00	-20.13	peak	
2		177.440	33.27	-12.12	21.15	43.50	-22.35	peak	
3		227.880	33.28	-14.09	19.19	46.00	-26.81	peak	
4		454.860	32.20	-9.82	22.38	46.00	-23.62	peak	
5		505.300	31.43	-8.61	22.82	46.00	-23.18	peak	
6	*	793.390	30.81	-1.51	29.30	46.00	-16.70	peak	

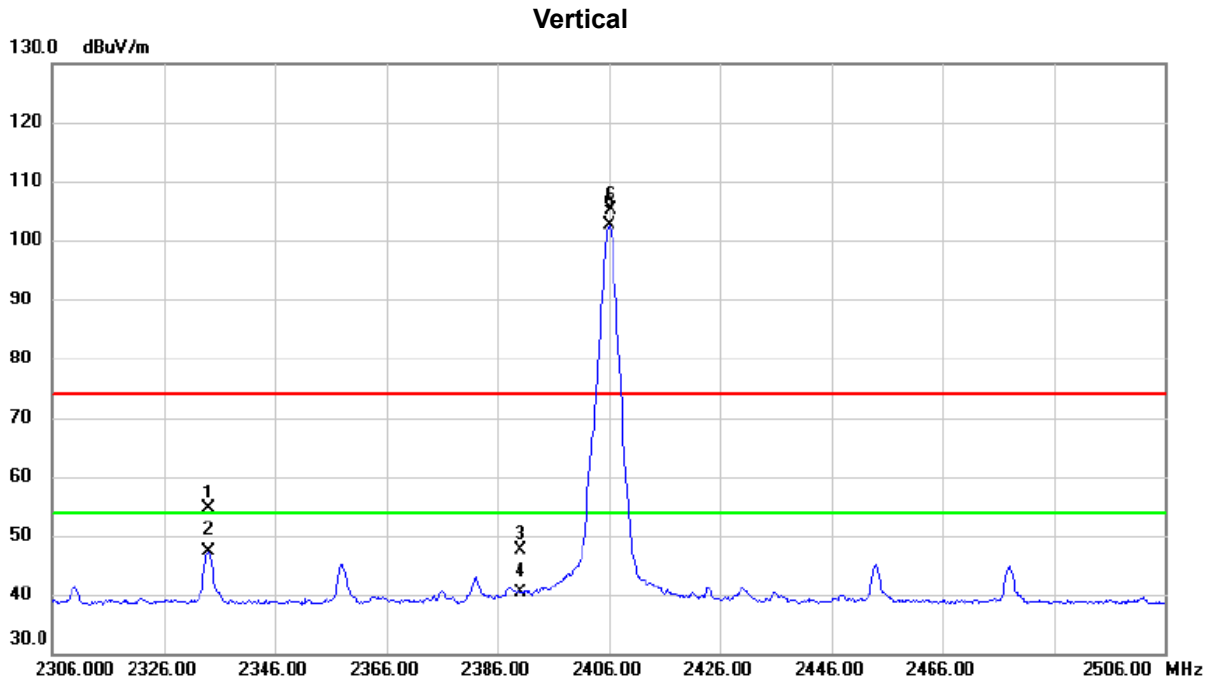
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

Test Mode :	TX Mode_ 2406 MHz _CH00
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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		2334.000	46.34	8.22	54.56	74.00	-19.44	peak	
2		2334.000	39.23	8.22	47.45	54.00	-6.55	AVG	
3		2390.000	39.26	8.29	47.55	74.00	-26.45	peak	
4		2390.000	32.21	8.29	40.50	54.00	-13.50	AVG	
5	*	2406.000	94.44	8.30	102.74	54.00	48.74	AVG	No Limit
6	X	2406.400	96.92	8.30	105.22	74.00	31.22	peak	No Limit

REMARKS:

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

Test Mode :	TX Mode_ 2406 MHz _CH00
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Vertical

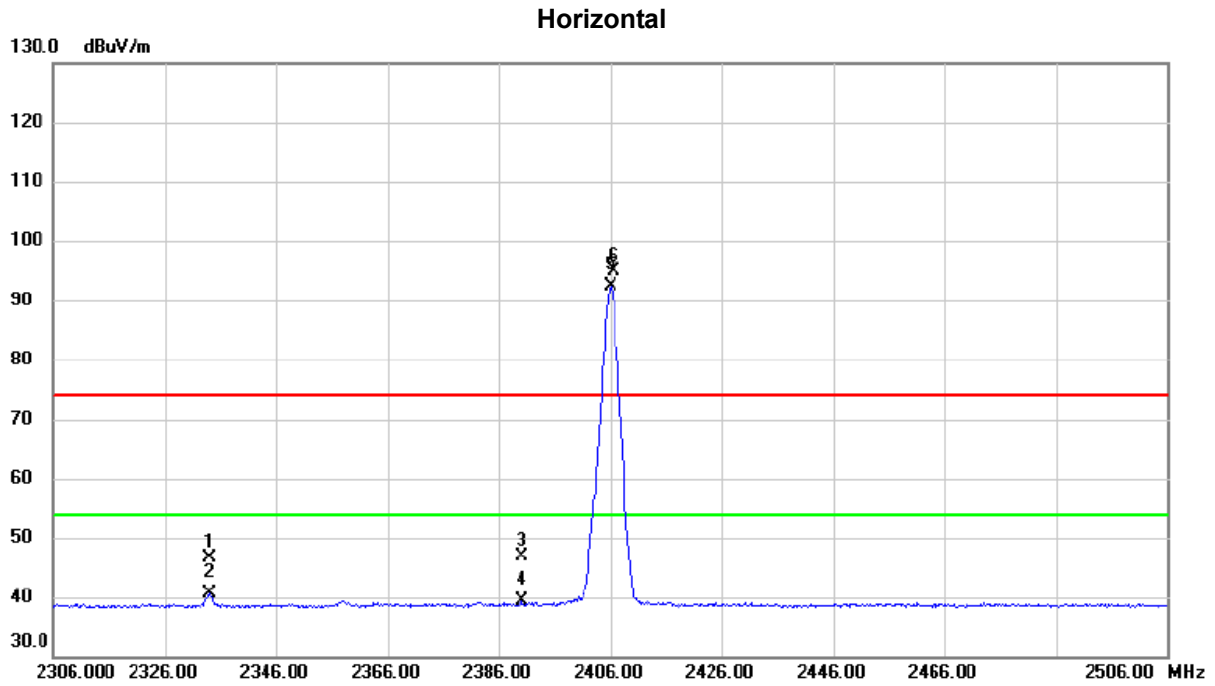


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4812.330	31.78	5.29	37.07	54.00	-16.93	AVG	
2		4816.650	47.36	5.31	52.67	74.00	-21.33	peak	

REMARKS:

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

Test Mode :	TX Mode_ 2406 MHz _CH00
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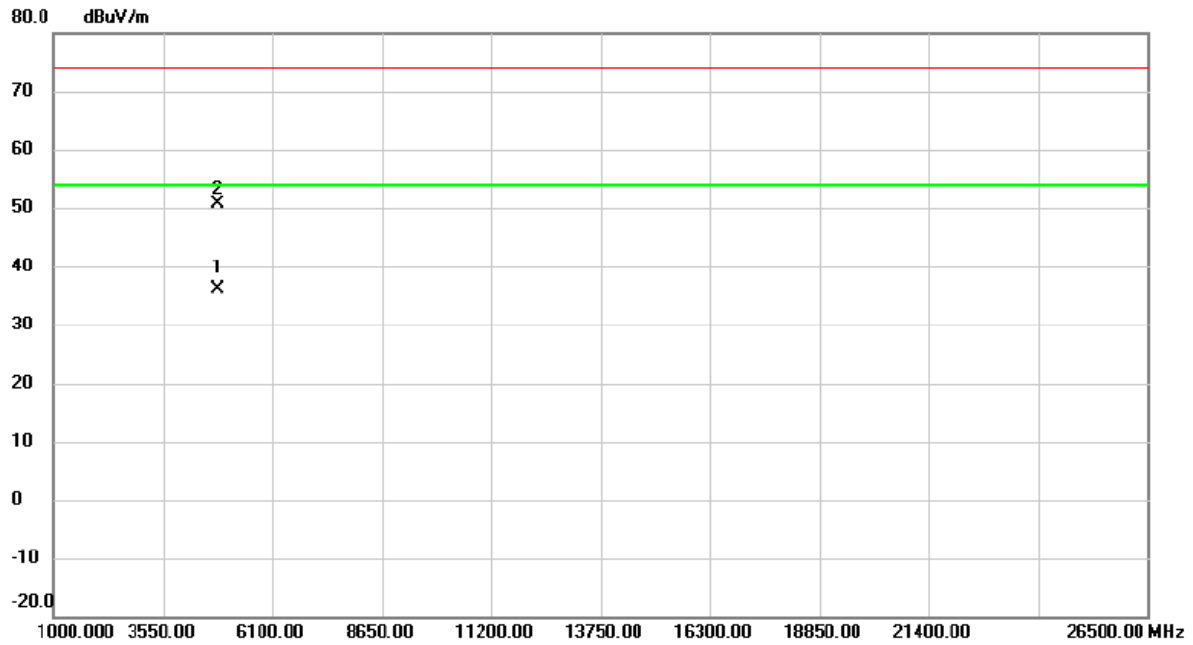
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2334.200	38.39	8.22	46.61	74.00	-27.39	peak	
2		2334.200	32.39	8.22	40.61	54.00	-13.39	AVG	
3		2390.000	38.54	8.29	46.83	74.00	-27.17	peak	
4		2390.000	30.98	8.29	39.27	54.00	-14.73	AVG	
5	*	2406.000	84.12	8.30	92.42	54.00	38.42	AVG	No Limit
6	X	2406.600	86.61	8.30	94.91	74.00	20.91	peak	No Limit

REMARKS:

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

Test Mode :	TX Mode_ 2406 MHz _CH00
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Horizontal

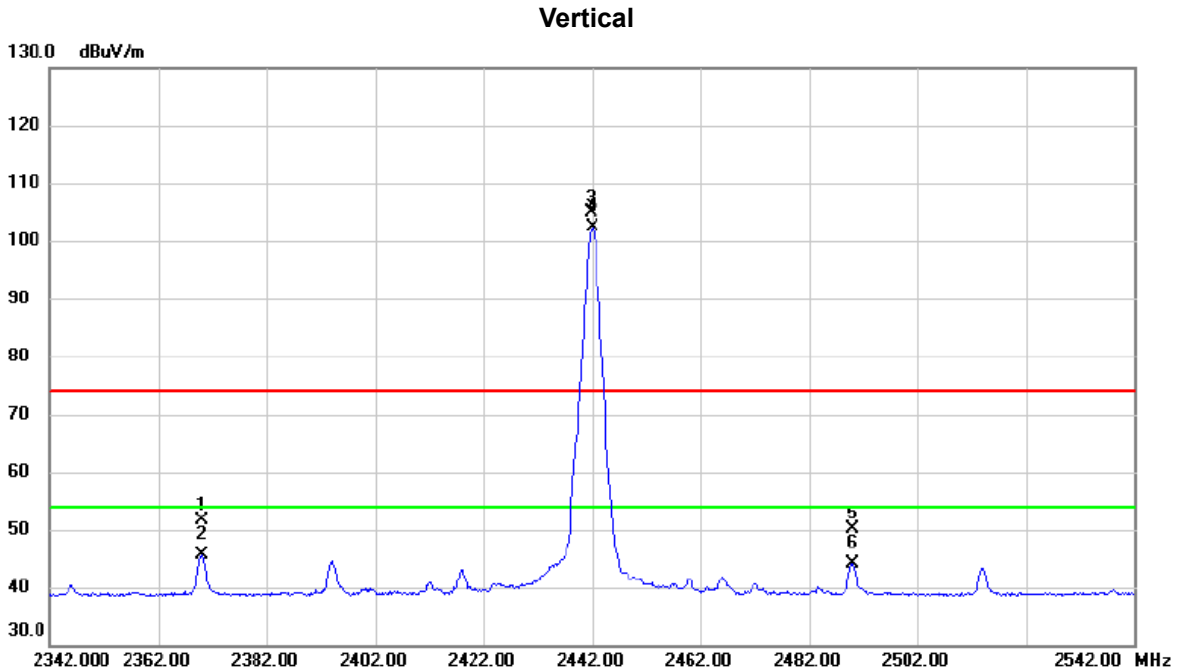


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4812.130	30.81	5.29	36.10	54.00	-17.90	AVG	
2		4814.300	45.37	5.30	50.67	74.00	-23.33	peak	

REMARKS:

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

Test Mode : TX Mode_ 2442 MHz _CH12



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2370.000	43.46	8.27	51.73	74.00	-22.27	peak	
2		2370.000	37.46	8.27	45.73	54.00	-8.27	AVG	
3	X	2441.800	96.60	8.34	104.94	74.00	30.94	peak	No Limit
4	*	2442.000	94.13	8.34	102.47	54.00	48.47	AVG	No Limit
5		2490.000	41.72	8.39	50.11	74.00	-23.89	peak	
6		2490.000	35.72	8.39	44.11	54.00	-9.89	AVG	

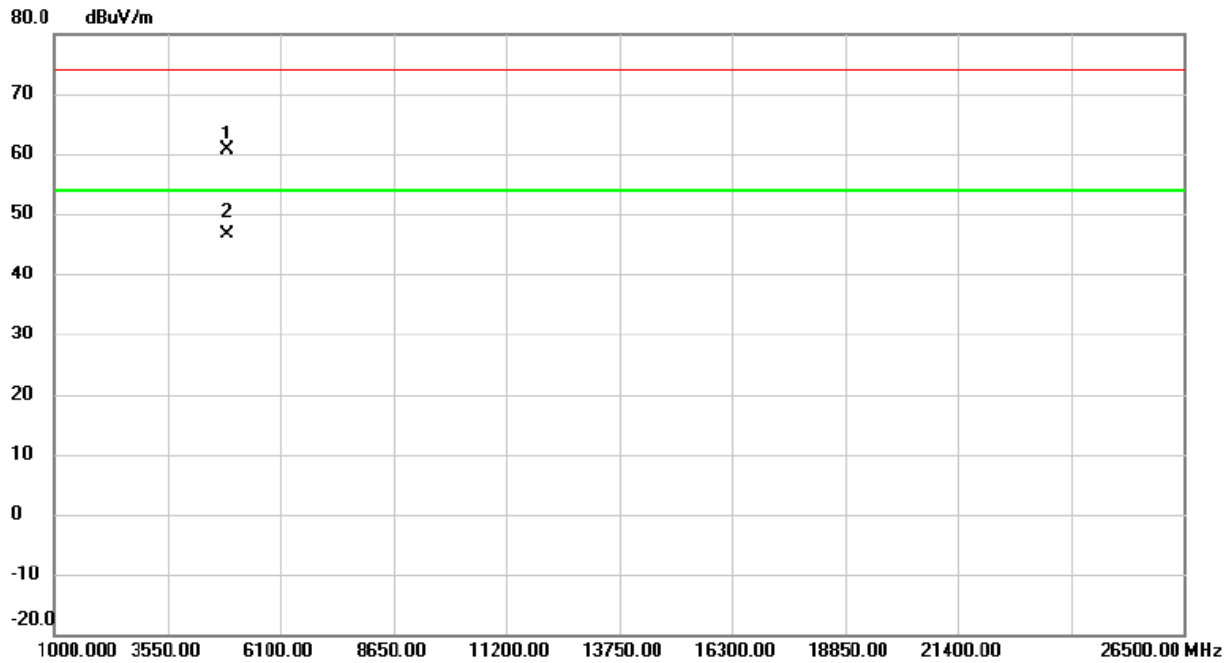
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode : TX Mode_ 2442 MHz _CH12

Vertical



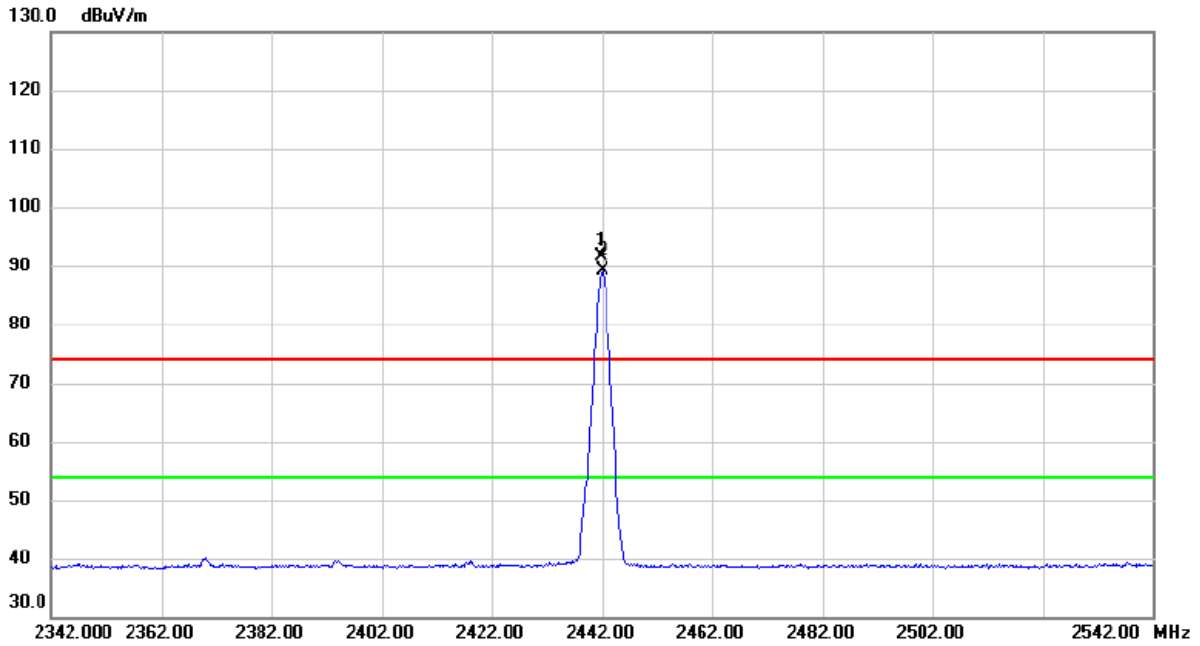
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4884.240	55.04	5.50	60.54	74.00	-13.46	peak	
2	*	4884.370	41.13	5.50	46.63	54.00	-7.37	AVG	

REMARKS:

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

Test Mode : TX Mode_ 2442 MHz _CH12

Horizontal



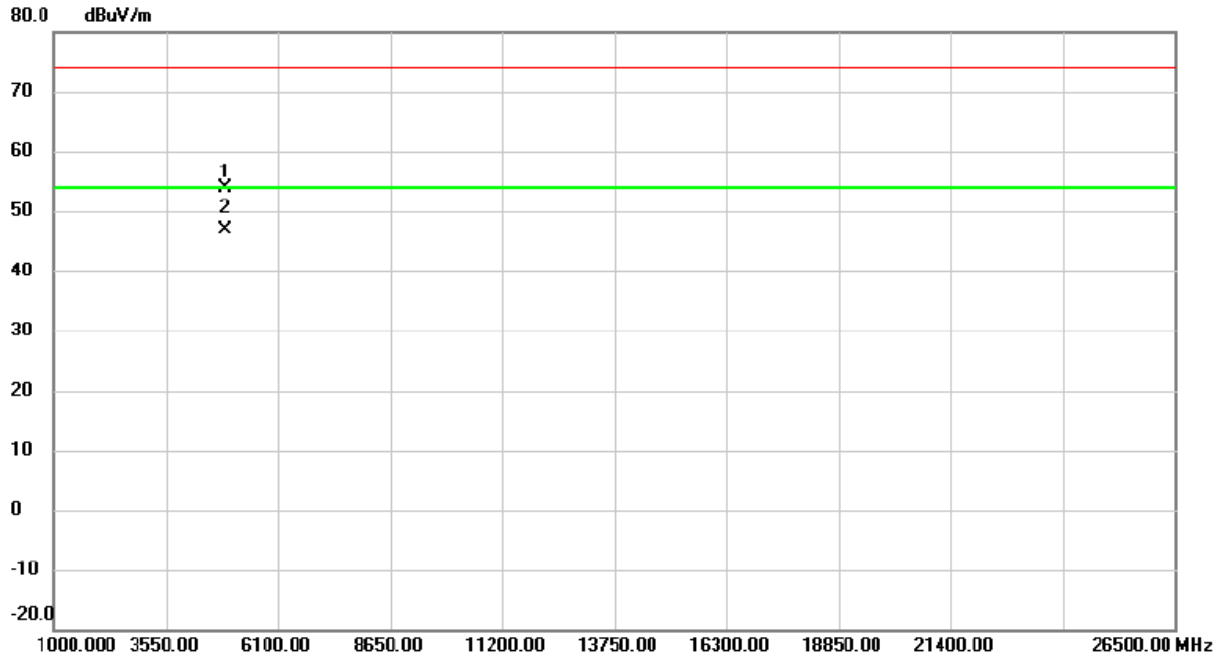
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2441.800	83.25	8.34	91.59	74.00	17.59	peak	No Limit
2	*	2442.000	80.80	8.34	89.14	54.00	35.14	AVG	No Limit

REMARKS:

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

Test Mode : TX Mode_ 2442 MHz _CH12

Horizontal



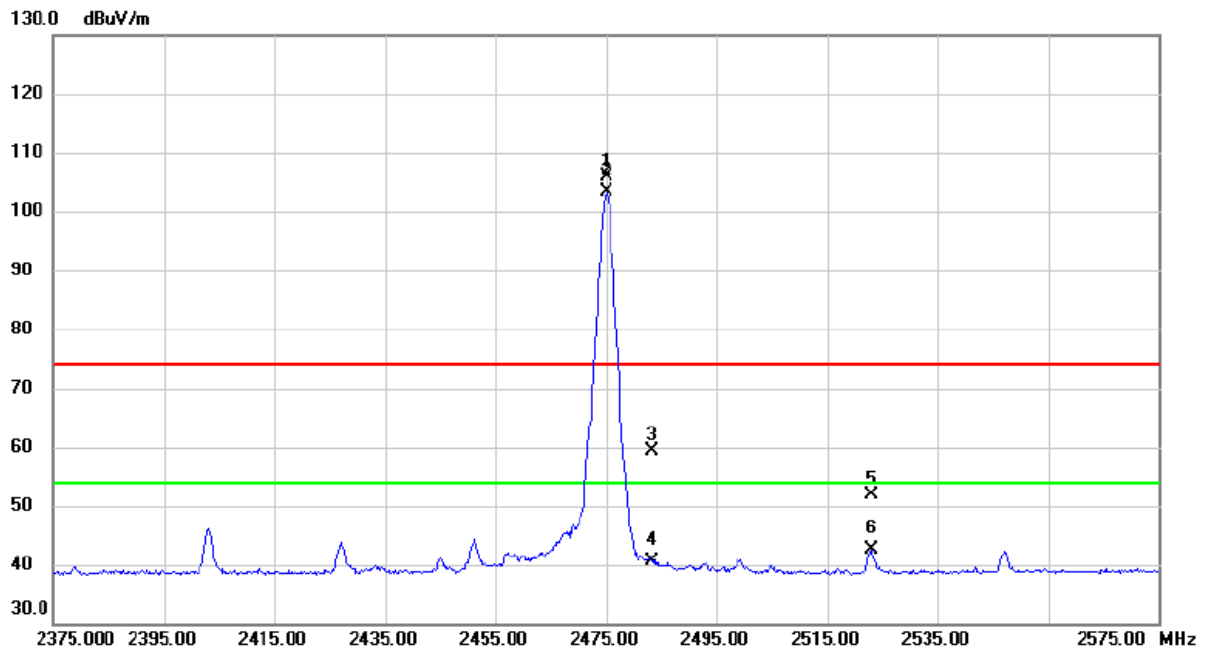
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		4883.070	48.28	5.48	53.76	74.00	-20.24	peak	
2	*	4884.340	41.28	5.50	46.78	54.00	-7.22	AVG	

REMARKS:

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

Test Mode : TX Mode_ 2475 MHz _CH23

Vertical



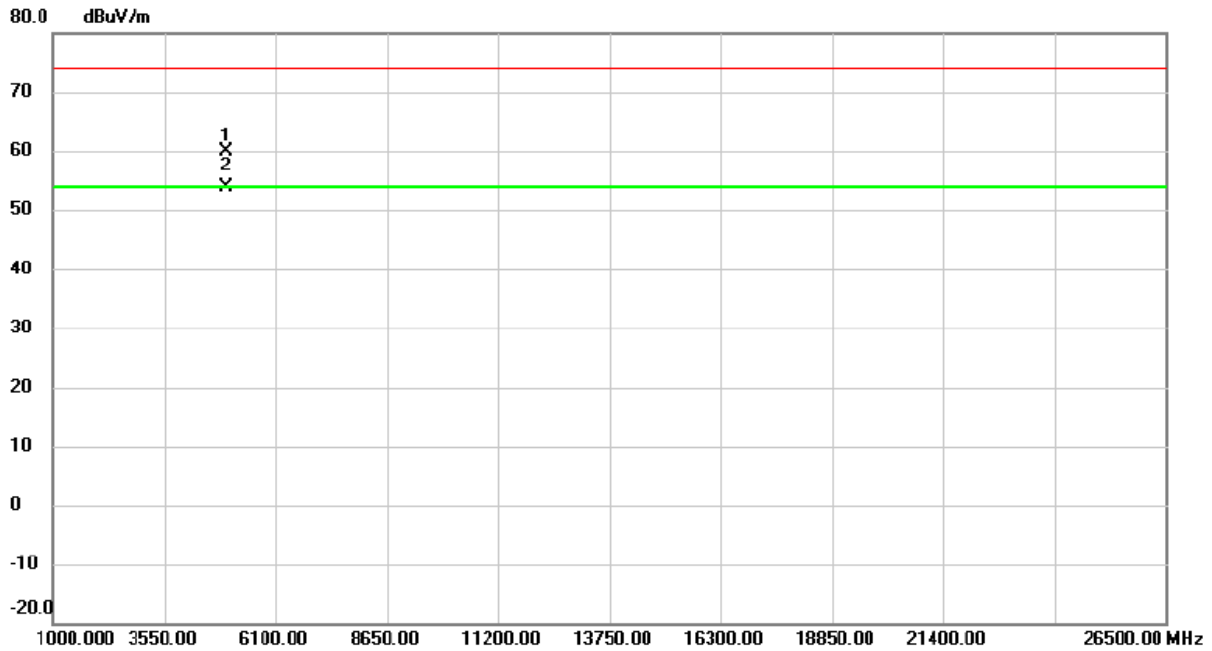
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2475.000	97.61	8.38	105.99	74.00	31.99	peak	No Limit
2	*	2475.200	94.93	8.37	103.30	54.00	49.30	AVG	No Limit
3		2483.500	51.02	8.39	59.41	74.00	-14.59	peak	
4		2483.500	32.23	8.39	40.62	54.00	-13.38	AVG	
5		2523.000	43.38	8.51	51.89	74.00	-22.11	peak	
6		2523.000	34.04	8.51	42.55	54.00	-11.45	AVG	

REMARKS:

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

Test Mode :	TX Mode_ 2475 MHz _CH23
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Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		4949.870	54.31	5.66	59.97	74.00	-14.03	peak	
2	*	4950.490	48.21	5.66	53.87	54.00	-0.13	AVG	

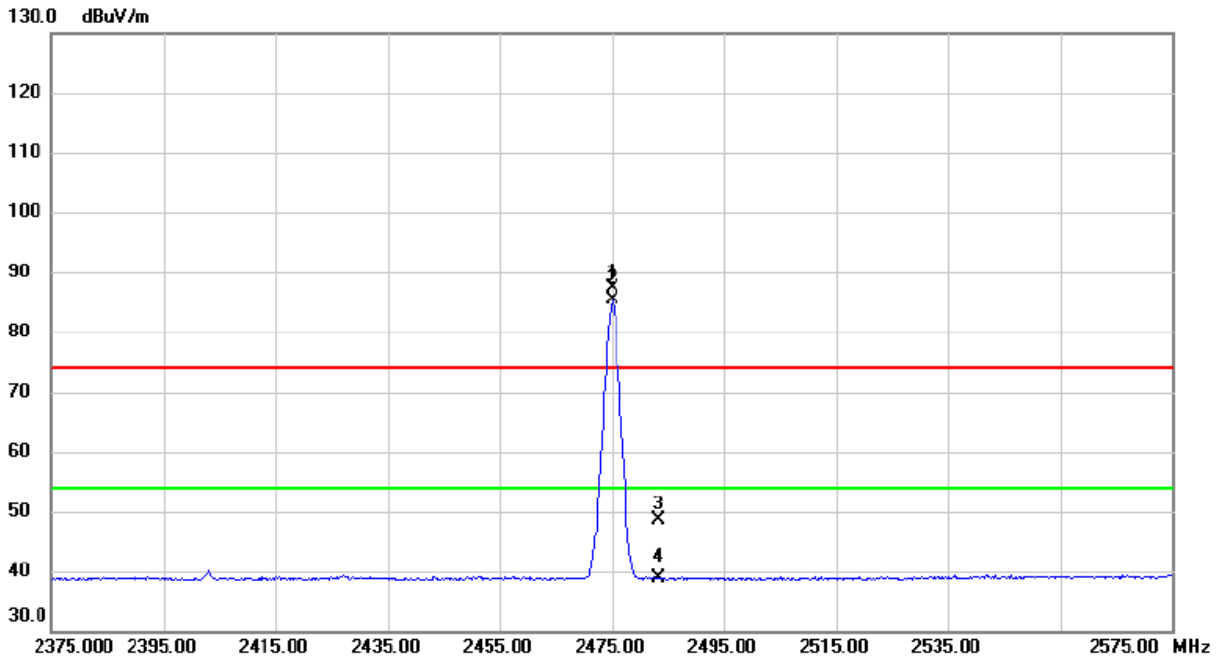
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode : TX Mode_ 2475 MHz _CH23

Horizontal



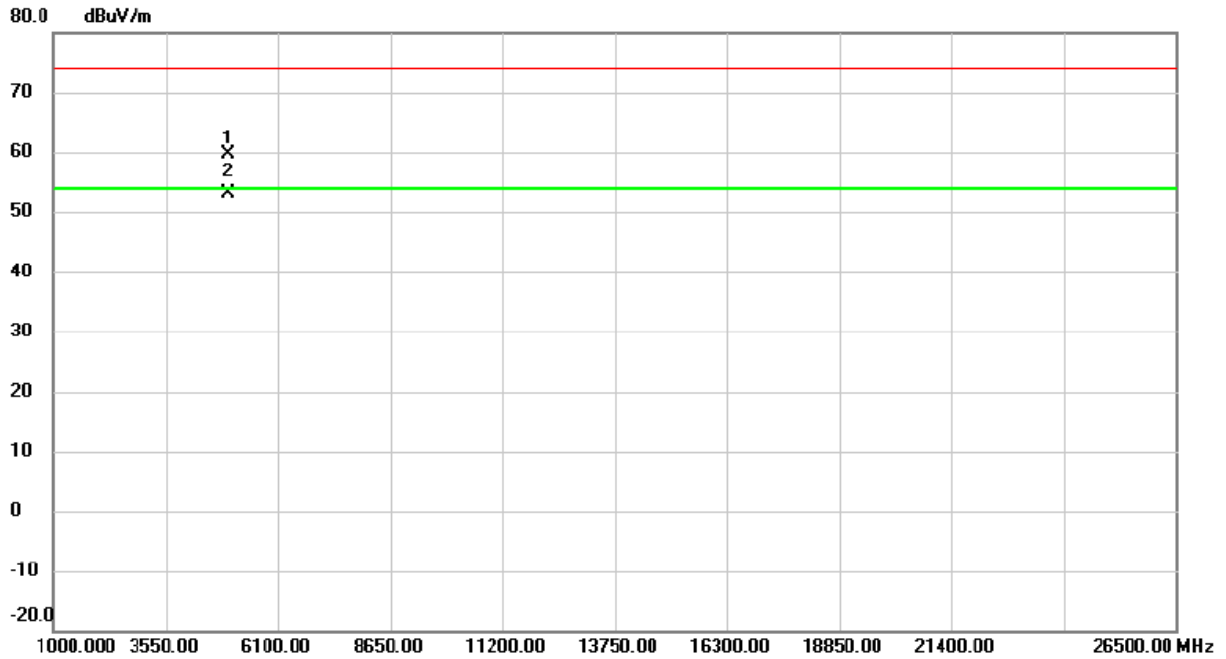
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2475.000	79.09	8.38	87.47	74.00	13.47	peak	No Limit
2	*	2475.200	76.92	8.37	85.29	54.00	31.29	AVG	No Limit
3		2483.500	40.12	8.39	48.51	74.00	-25.49	peak	
4		2483.500	30.43	8.39	38.82	54.00	-15.18	AVG	

REMARKS:

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

Test Mode :	TX Mode_ 2475 MHz _CH23
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Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4950.270	53.97	5.66	59.63	74.00	-14.37	peak	
2	*	4950.510	47.42	5.66	53.08	54.00	-0.92	AVG	

REMARKS:

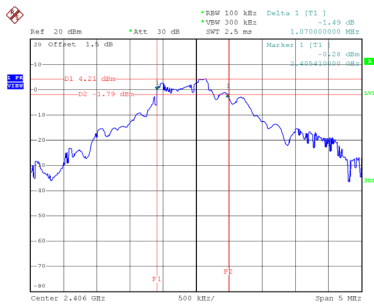
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

APPENDIX E - BANDWIDTH

Test Mode:	CH00, CH12, CH23
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Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Test Result
00	2406	1.070	2.484	500	Pass
12	2442	0.960	2.520	500	Pass
23	2475	1.190	2.796	500	Pass

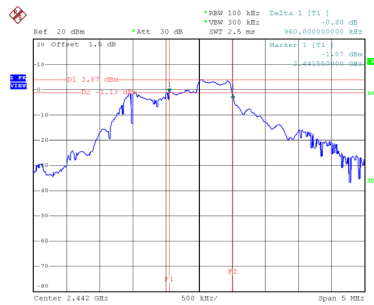
CH00



Date: 17 JUN 2020 19:36:22

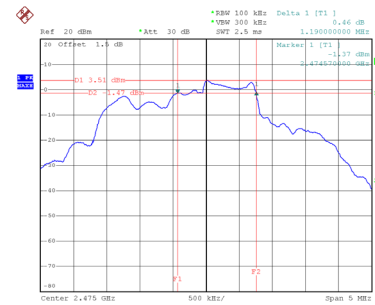
CH12

6 dB Bandwidth



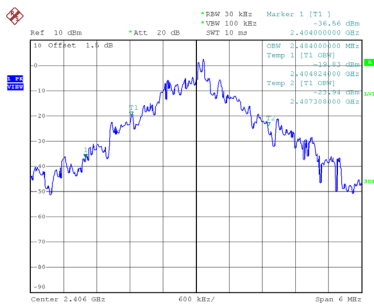
Date: 17 JUN 2020 20:04:23

CH23



Date: 17 JUN 2020 19:57:23

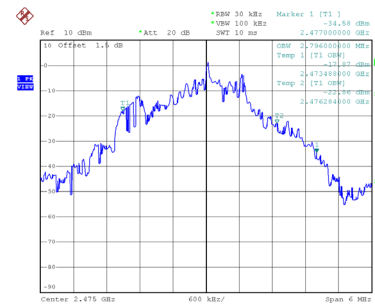
99 % Emission Bandwidth



Date: 17 JUN 2020 19:31:01



Date: 17 JUN 2020 19:47:21



Date: 17 JUN 2020 19:52:46

APPENDIX F - MAXIMUM OUTPUT POWER

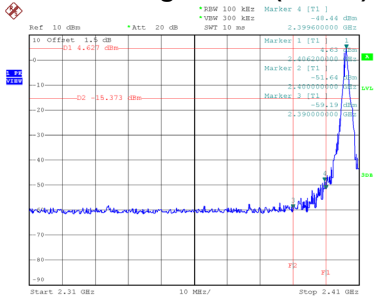
Test Mode:	CH00, CH12, CH23
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Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2406	4.28	0.0027	30.00	1.00	Pass
2442	3.98	0.0025	30.00	1.00	Pass
2475	3.58	0.0023	30.00	1.00	Pass

APPENDIX G - CONDUCTED SPURIOUS EMISSION

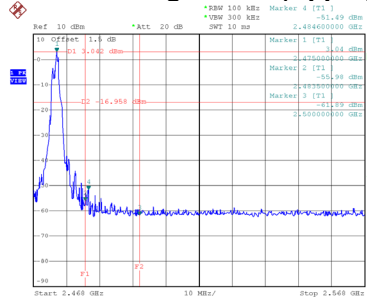
Test Mode: CH00, CH12, CH23

Bandedge CH00 (Lower)



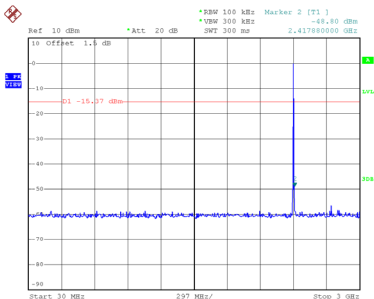
Date: 17 JUN 2020 19:39:10

Bandedge CH23 (Upper)

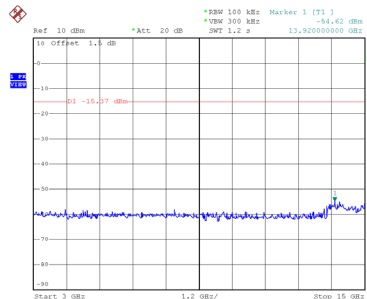


Date: 17 JUN 2020 19:53:31

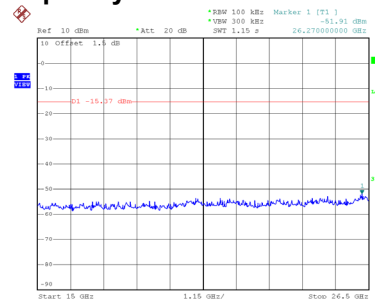
CH00 – 10th Harmonic of the fundamental frequency



Date: 17 JUN 2020 19:39:25

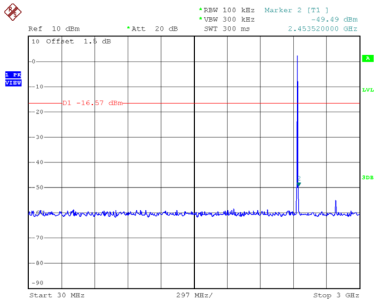


Date: 17 JUN 2020 19:39:34

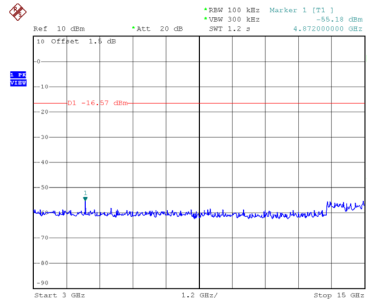


Date: 17 JUN 2020 19:39:43

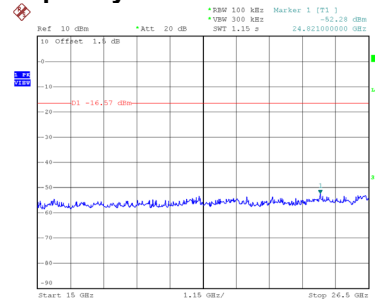
CH12 – 10th Harmonic of the fundamental frequency



Date: 17 JUN 2020 19:46:11

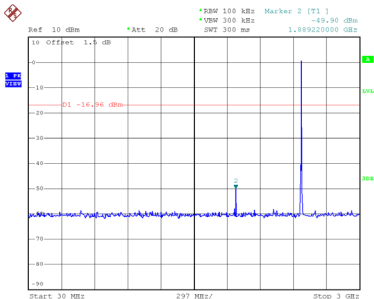


Date: 17 JUN 2020 19:46:21

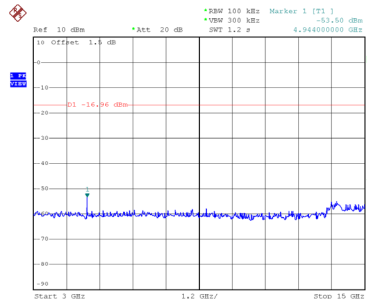


Date: 17 JUN 2020 19:46:30

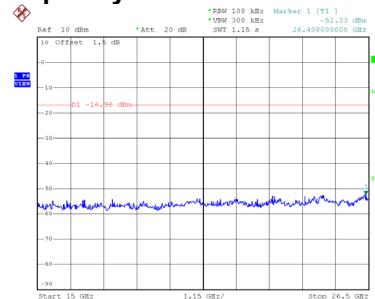
CH23 – 10th Harmonic of the fundamental frequency



Date: 17 JUN 2020 19:53:45



Date: 17 JUN 2020 19:53:55

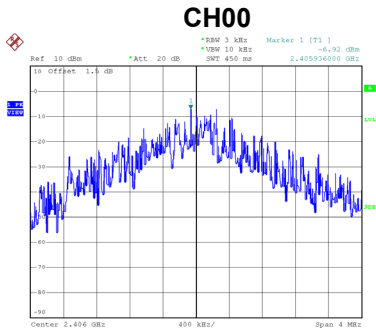


Date: 17 JUN 2020 19:54:05

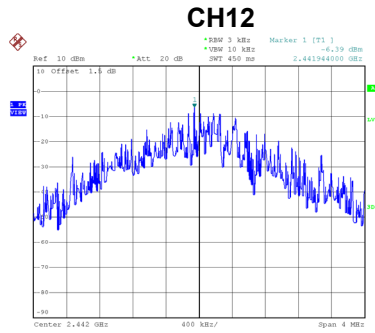
APPENDIX H - POWER SPECTRAL DENSITY

Test Mode: CH00, CH12, CH23

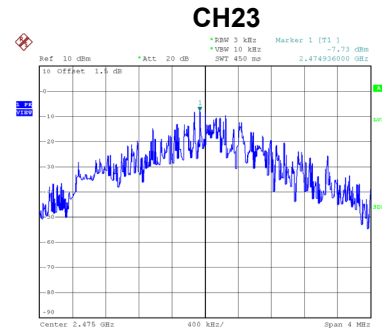
Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Max. Limit (dBm/3 kHz)	Test Result
00	2406	-6.92	8.00	Pass
12	2442	-6.39	8.00	Pass
23	2475	-7.73	8.00	Pass



Date: 17_JUN_2020 19:40:21



Date: 17_JUN_2020 19:46:42



Date: 17_JUN_2020 19:54:17

End of Test Report