

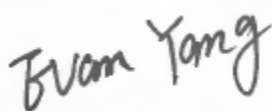
FCC Radio Test Report

FCC ID: RWO-RC300346

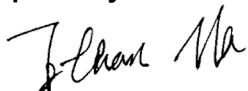
This report concerns: Original Grant

Project No. : 2108C157
Equipment : USB WIRELESS TRANSCEIVER
Brand Name : RAZER
Test Model : RC30-0346
Series Model : RC30-0346XXXX-XXXX(X can be 0-9 or A-Z)
Applicant : Razer Inc.
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Manufacturer : Razer (Asia-Pacific) Pte.,Ltd.
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Date of Receipt : Aug. 18, 2021
Date of Test : Aug. 20, 2021 ~ Oct. 21, 2021
Issued Date : Nov. 03, 2021
Report Version : R00
Test Sample : Sample No.: DG2021081931 for conducted, DG2021081933 for radiated.
Standard(s) : FCC CFR Title 47, Part 15, Subpart C
FCC KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

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



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TESTING CERT #5123.02

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

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

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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.	Nov. 03, 2021

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, 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 Emission	APPENDIX B APPENDIX C APPENDIX D	PASS	-----
15.247 (a)(1)(iii)	Number of Hopping Frequency	APPENDIX E	PASS	-----
15.247 (a)(1)(iii)	Average Time of Occupancy	APPENDIX F	PASS	-----
15.247(a)(1)	Hopping Channel Separation	APPENDIX G	PASS	-----
15.247(a)(1)	Bandwidth	APPENDIX H	PASS	-----
15.247(a)(1)	Maximum Output Power	APPENDIX I	PASS	-----
15.247(d)	Conducted Spurious Emission	APPENDIX J	PASS	-----
15.203	Antenna Requirement	-----	PASS	Note(2)

Note:

- (1) "N/A" denotes test is not applicable in this test report
- (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 Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of 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 test:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.60

B. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9kHz ~ 30MHz	-	3.02
		30MHz ~ 200MHz	V	4.36
		30MHz ~ 200MHz	H	3.32
		200MHz ~ 1,000MHz	V	4.08
		200MHz ~ 1,000MHz	H	3.96
		1GHz ~ 6GHz	-	3.80
		6GHz ~ 18GHz	-	4.82
		18GHz ~ 26.5GHz	-	3.62
		26.5GHz ~ 40GHz	-	4.00

C. Other Measurement:

Test Item	Uncertainty
Conducted Spurious Emission	±2.71 dB
Hopping Channel Separation	±53.46 Hz
Maximum Output Power	±0.95 dB
Number of Hopping Frequency	±53.46 Hz
Bandwidth	±3.8 %
Temperature	±0.08 °C
Humidity	±1.5%

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	53%	AC 120V/60Hz	Aries Tang
Radiated Emissions-9 kHz to 30 MHz	25°C	60%	DC 5V	Sparrow Liu
Radiated Emissions-30 MHz to 1000 MHz	26°C	52%	DC 5V	Jakyri Wen
Radiated Emissions-Above 1000 MHz	26°C	52%	DC 5V	Hayden Chen
Number of Hopping Frequency	25°C	50%	DC 5V	Grani Zhou
Average Time of Occupancy	25°C	50%	DC 5V	Grani Zhou
Hopping Channel Separation	25°C	50%	DC 5V	Grani Zhou
Bandwidth	25°C	50%	DC 5V	Grani Zhou
Maximum Output Power	25°C	50%	DC 5V	Grani Zhou
Conducted Spurious Emission	25°C	50%	DC 5V	Grani Zhou

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	USB WIRELESS TRANSCEIVER
Brand Name	RAZER
Test Model	RC30-0346
Series Model	RC30-0346XXXX-XXXX(X can be 0-9 or A-Z)
Model Difference(s)	The system model number is RZ04-0346XXXX-XXXX, this system consists of Gaming Headset (Model: RZ04-0346) and USB Wireless Transceiver (Model: RC30-0346), X can be 0-9 or A-Z.
Power Source	Supplied from PC USB port.
Power Rating	DC 5V
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Max. Peak Output Power	2Mbps: 15.58 dBm (0.0361 W)
Max. Average Output Power	2Mbps: 15.25 dBm (0.0335 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	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

Note:

For Datarate 1Mbps: Channel 0-39

For Datarate 2Mbps: Channel 1-38

3. Table for Filed Antenna:

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	Shenzhen Horn Audio Co., Ltd.	N/A	Printed	N/A	1.95

Note: The antenna gain is provided by the manufacturer.

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_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 01/19/38
Mode 3	TX Mode_2Mbps Channel 19

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 3	TX Mode_2Mbps Channel 19

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 3	TX Mode_2Mbps Channel 19

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 01/19/38

Other Conducted test	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 01/19/38

Note:

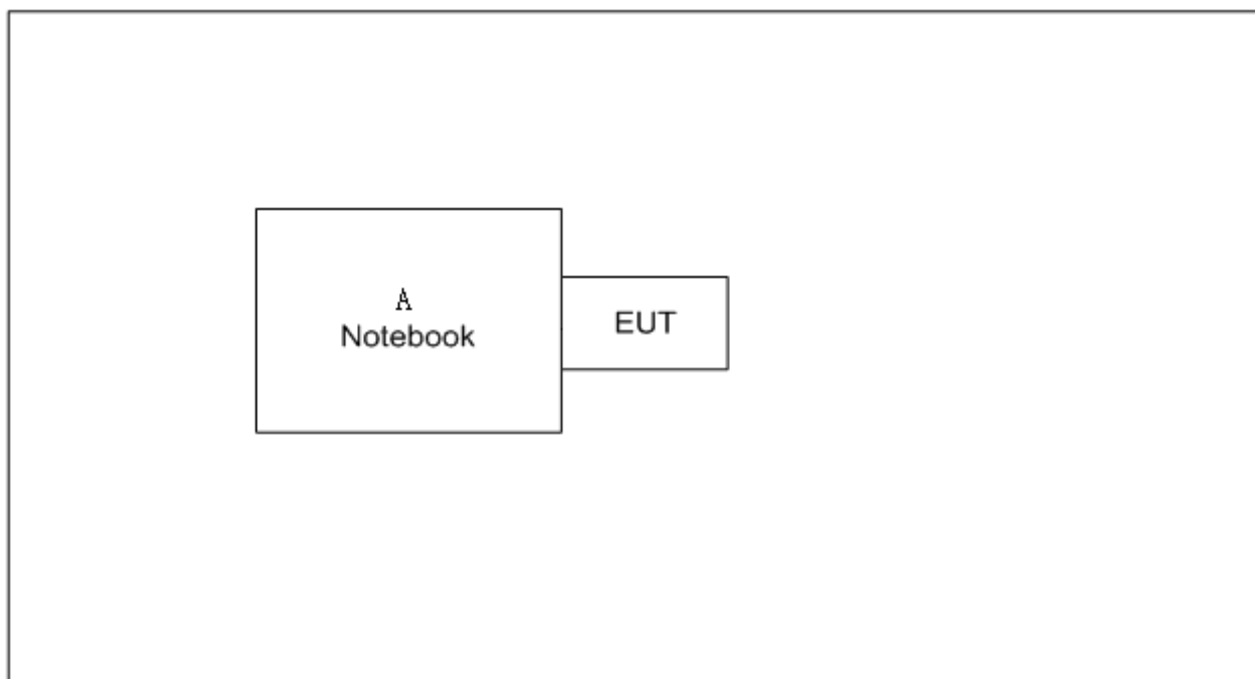
- (1) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.
- (2) For AC power line conducted emissions and radiated spurious emissions below 1 GHz test, the 2Mbps Channel 19 are found to be the worst case and recorded.

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.

Test Software Version	testsuite_gui_V1.0.0		
Frequency (MHz)	2402	2441	2480
1Mbps	-2	-2	-2
2Mbps	-2	-2	-2

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Note
A	Notebook	Honor	HBB-WAH9PHNL	N/A	AC power line conducted emissions test
		Lenovo	V310-14ISK	LR07GZNB	Radiated emissions test

Item	Cable Type	Shielded Type	Ferrite Core	Length
-	-	-	-	-

3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	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.

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.

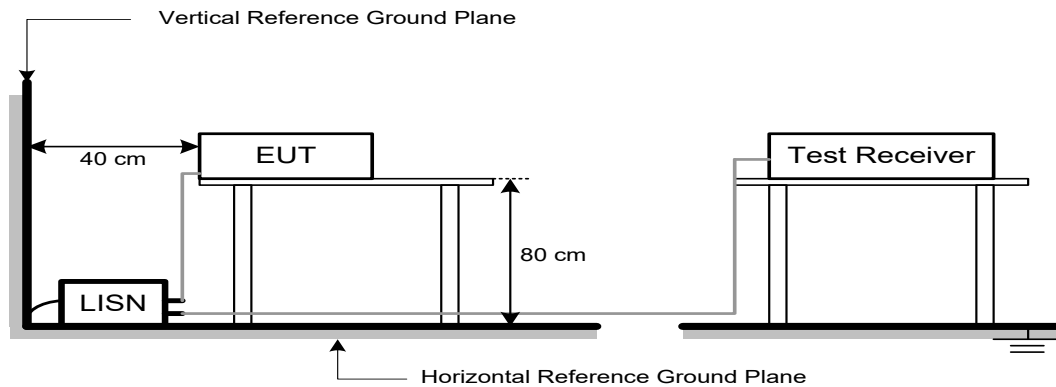
The following table is the setting of the receiver:

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

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 function (as a customer would normally use it), EUT was programmed to be in continuously transmitting data or hopping on mode.

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 EMISSIONS

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 CFR Title 47, Part 15, Subpart C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2 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 1 GHz)
- 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)
- The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- 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 1 GHz)
- 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)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

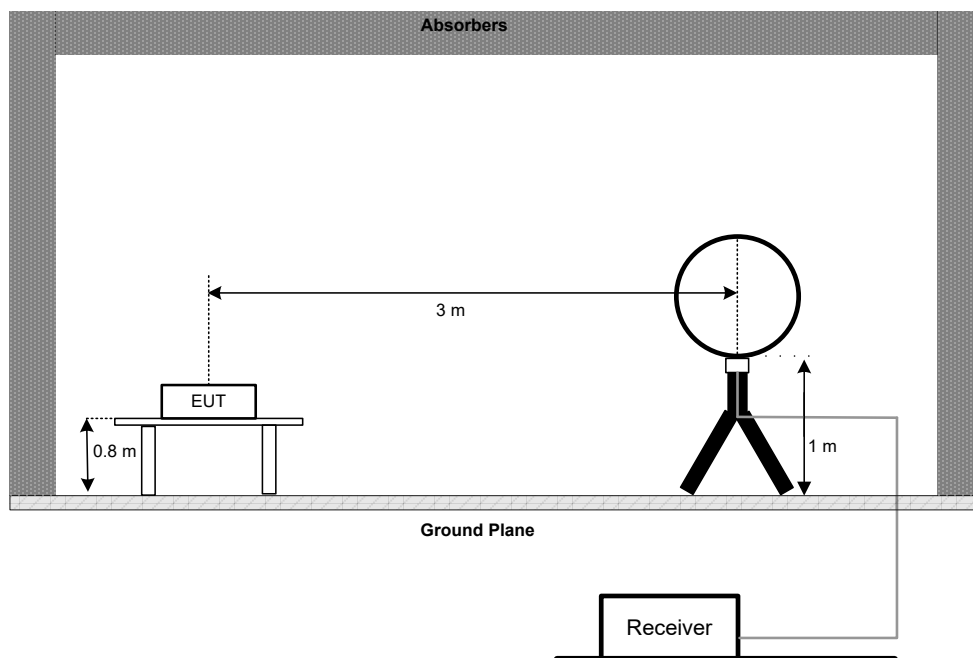
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

4.3 DEVIATION FROM TEST STANDARD

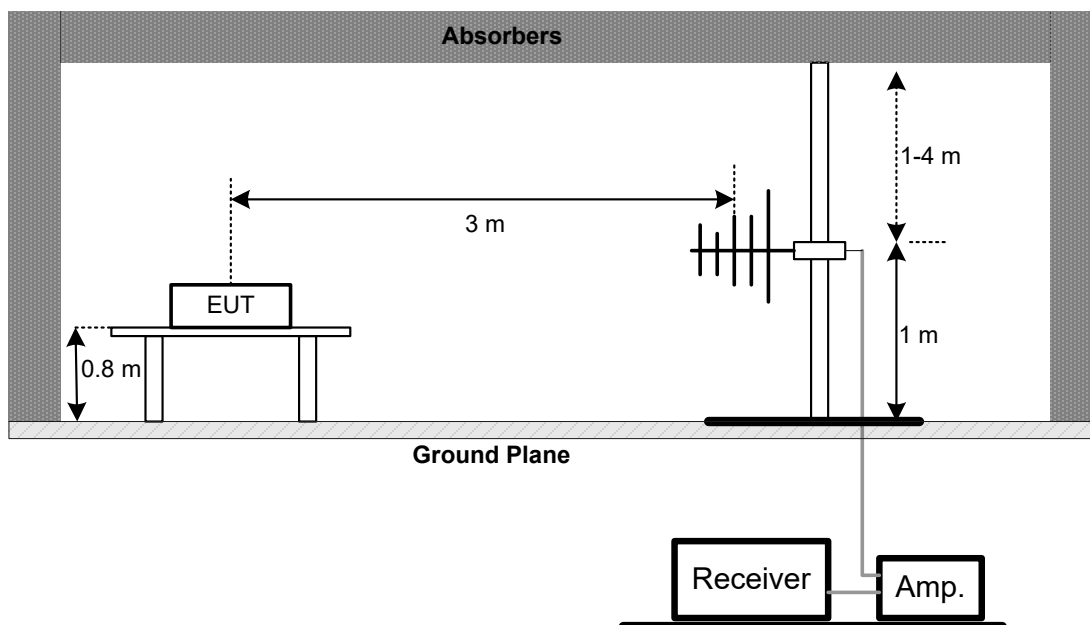
No deviation.

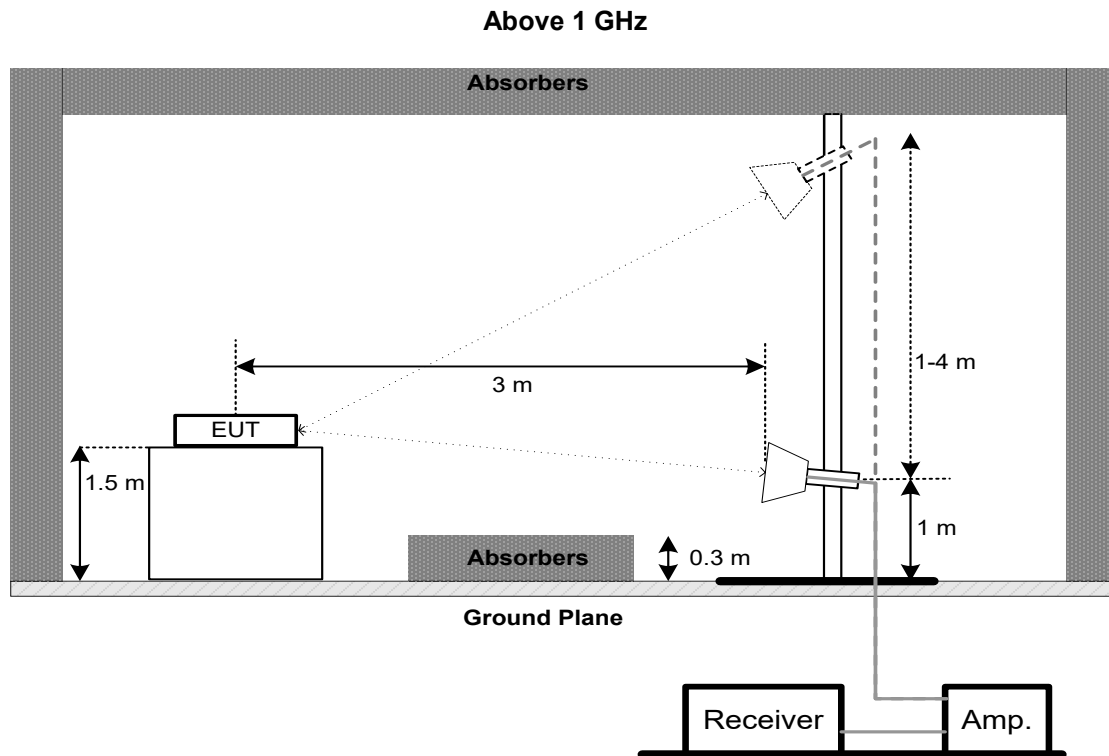
4.4 TEST SETUP

9 kHz to 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 RESULTS - 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 RESULTS - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

4.8 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.

5. NUMBER OF HOPPING FREQUENCY

5.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(iii)	Number of Hopping Frequency	15

5.2 TEST PROCEDURE

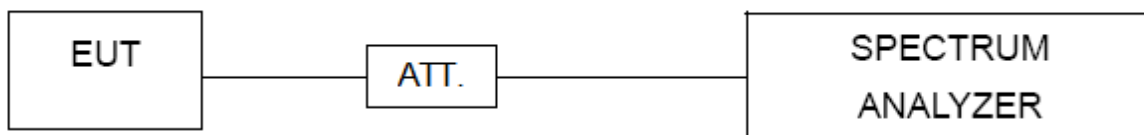
- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	> Operating Frequency Range
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to the APPENDIX E.

6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)(iii)	Average Time of Occupancy	0.4sec

6.2 TEST PROCEDURE

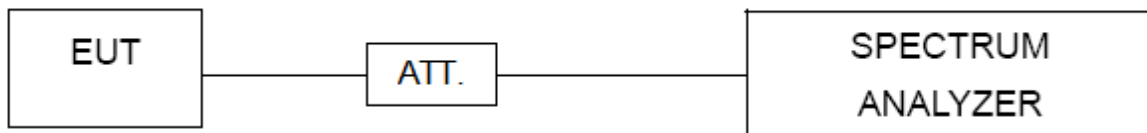
- Set the EUT for packet transmitting.
- Measure the maximum time duration of one single pulse.
- Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds.
- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	0 MHz
RBW	1 MHz
VBW	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	As necessary to capture the entire dwell time per hopping channel

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 TEST RESULTS

Please refer to the APPENDIX F.

7. HOPPING CHANNEL SEPARATION

7.1 LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

7.2 TEST PROCEDURE

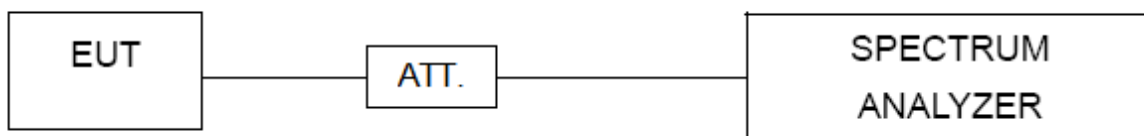
- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	Wide enough to capture the peaks of two adjacent channels
RBW	30 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

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 TEST RESULTS

Please refer to the APPENDIX G.

8. BANDWIDTH

8.1 LIMIT

Section	Test Item
FCC 15.247(a)(1)	Bandwidth

8.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	> Measurement Bandwidth
RBW	30 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
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 TEST RESULTS

Please refer to the APPENDIX H.

9. MAXIMUM OUTPUT POWER

9.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(1)	Maximum Output Power	0.1250 Watt or 20.97 dBm

Note: Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

9.2 TEST PROCEDURE

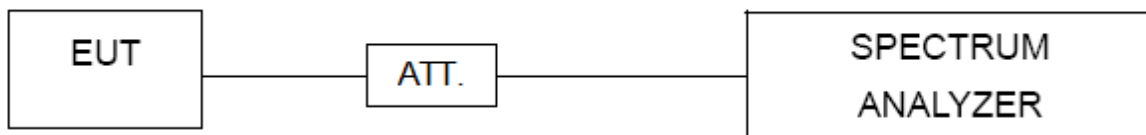
- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	Approximately five times the 20 dB bandwidth, centered on a hopping channel.
RBW	3 MHz
VBW	3 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

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 TEST RESULTS

Please refer to the APPENDIX I.

10. CONDUCTED SPURIOUS EMISSION

10.1 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.

10.2 TEST PROCEDURE

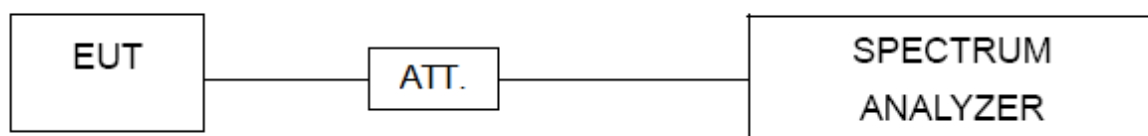
- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

10.3 DEVIATION FROM STANDARD

No deviation.

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

10.6 TEST RESULTS

Please refer to the APPENDIX J.

11. 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, 2022
2	LISN	EMCO	3816/2	52765	Feb. 27, 2022
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 27, 2022
4	50Ω Terminator	SHX	TF5-3	15041305	Feb. 27, 2022
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	Cable	N/A	RG223	12m	Mar. 09, 2022
7	643 Shield Room	ETS	6*4*3m	N/A	N/A

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. 28, 2022
2	Cable	N/A	RG 213/U	N/A	May 27, 2022
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 27, 2022
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
5	966 Chambe Room	RM	9*6*6m	N/A	Jul. 24, 2022

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. 15, 2022
2	Amplifier	HP	8447D	2944A08742	Feb. 28, 2022
3	Receiver	Agilent	N9038A	MY52130039	Mar. 19, 2022
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 20, 2022
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
8	966 Chambe Room	RM	9*6*6m	N/A	Jul. 24, 2022

Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	May 10, 2022
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2022
3	Amplifier	Agilent	8449B	3008A02584	Jul. 10, 2022
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022
5	Receiver	Agilent	N9038A	MY52130039	Mar. 19, 2022
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	N/A	EMC104-SM-SM-6000	N/A	Oct. 16, 2022
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
10	Filter	STI	STI15-9912	N/A	Jul. 10, 2022
11	966 Chambe Room	RM	9*6*6m	N/A	Jul. 24, 2022

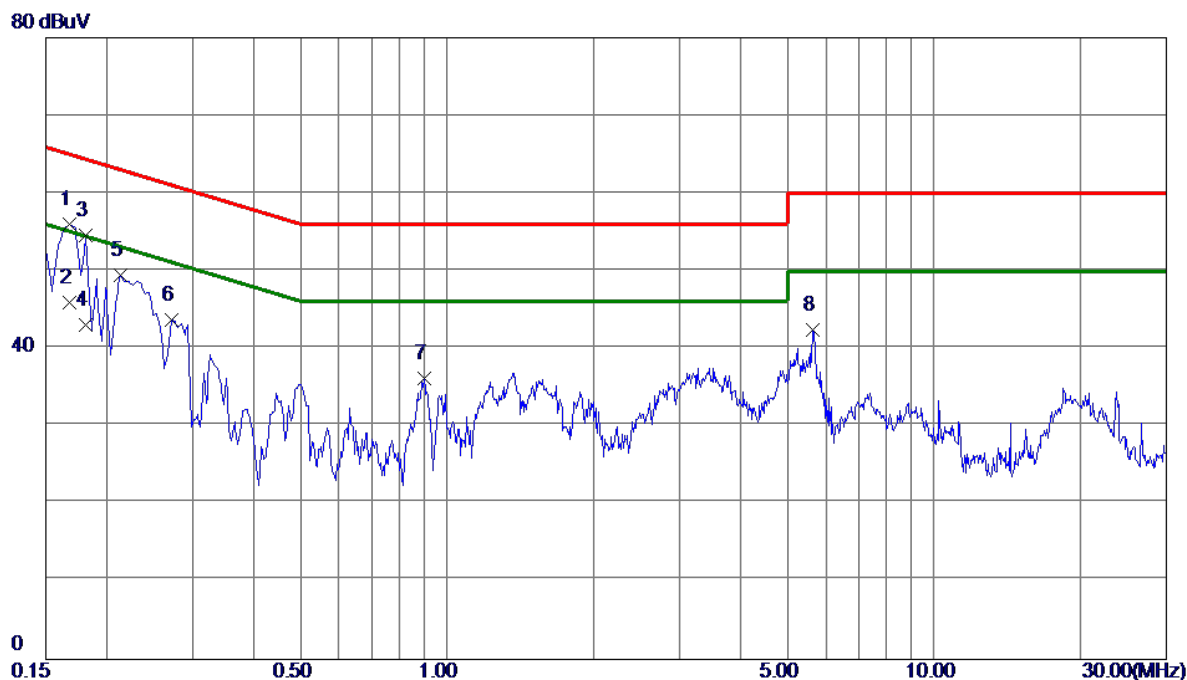
Number of Hopping Frequency & Average Time of Occupancy & Hopping Channel Separation & Bandwidth & Maximum Output Power & Conducted Spurious Emission					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Jul. 10, 2022
2	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 07, 2022
3	RF Cable	Tongkaichuan	N/A	N/A	N/A
4	DC Block	Mini	N/A	N/A	N/A

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

All calibration period of equipment list is one year.

APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

Test Mode	TX Mode_2Mbps Channel 19	Phase	Line
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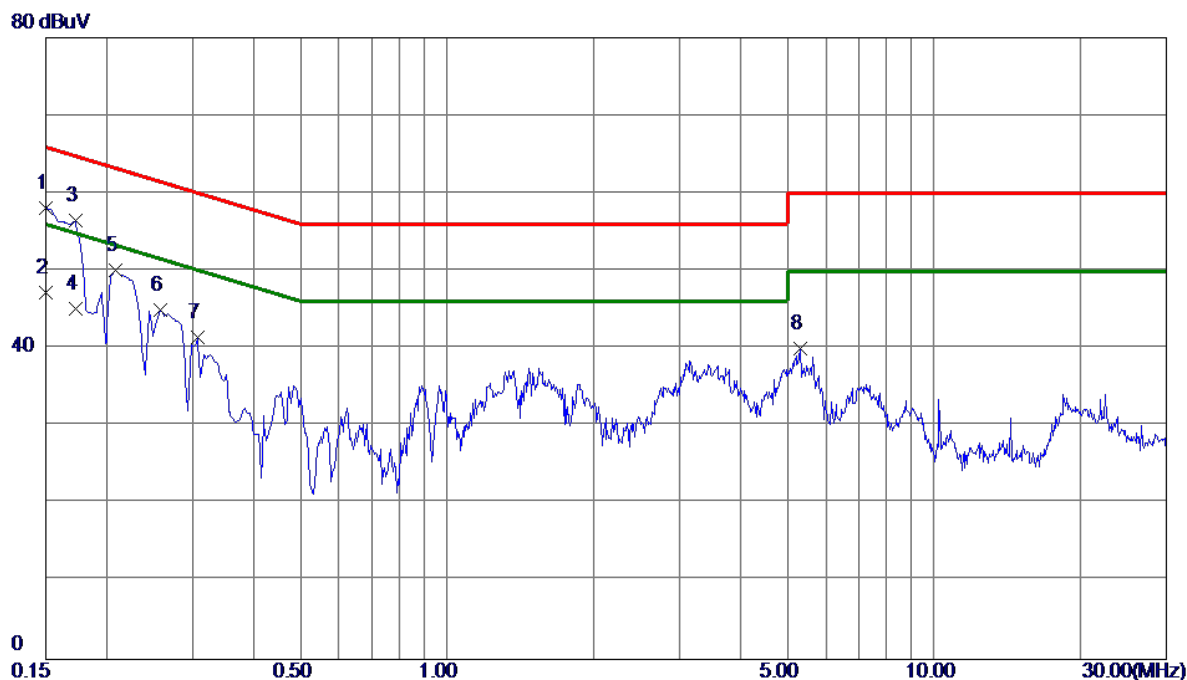


No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1680	46.15	9.80	55.95	65.06	-9.11	Peak	
2	0.1680	36.11	9.80	45.91	55.06	-9.15	AVG	
3	0.1815	44.77	9.85	54.62	64.42	-9.80	Peak	
4	0.1815	33.20	9.85	43.05	54.42	-11.37	AVG	
5	0.2130	39.59	9.90	49.49	63.09	-13.60	Peak	
6	0.2714	33.82	9.87	43.69	61.07	-17.38	Peak	
7	0.8970	26.26	9.97	36.23	56.00	-19.77	Peak	
8	5.6445	32.08	10.32	42.40	60.00	-17.60	Peak	

REMARKS:

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

Test Mode	TX Mode_2Mbps Channel 19	Phase	Neutral
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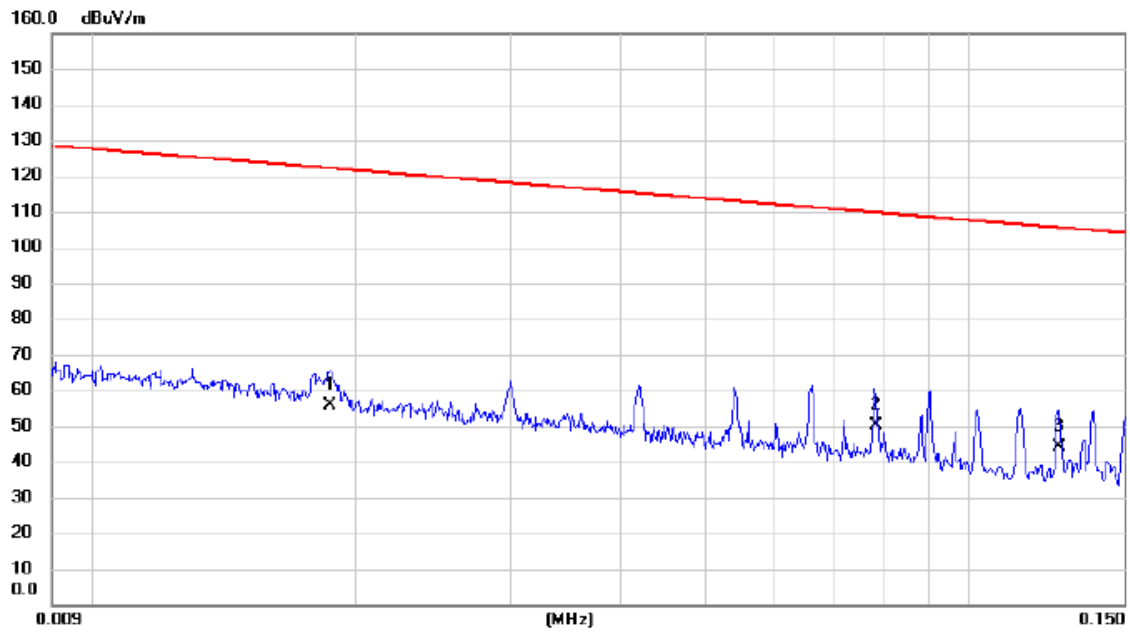
No.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1 *	0.1500	48.34	9.74	58.08	66.00	-7.92	Peak	
2	0.1500	37.40	9.74	47.14	56.00	-8.86	AVG	
3	0.1725	46.50	9.91	56.41	64.84	-8.43	Peak	
4	0.1725	35.20	9.91	45.11	54.84	-9.73	AVG	
5	0.2085	40.08	10.00	50.08	63.26	-13.18	Peak	
6	0.2580	34.93	9.98	44.91	61.50	-16.59	Peak	
7	0.3075	31.42	10.01	41.43	60.04	-18.61	Peak	
8	5.3070	29.37	10.64	40.01	60.00	-19.99	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_2Mbps Channel 19	Polarization	Ant 0°
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree	Comment
1		0.0187	40.84	14.82	55.66	122.17	-66.51	AVG			
2	*	0.0781	36.53	13.75	50.28	109.75	-59.47	AVG			
3		0.1263	30.59	13.78	44.37	105.58	-61.21	AVG			

REMARKS:

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

Test Mode	TX Mode_2Mbps Channel 19	Polarization	Ant 0°
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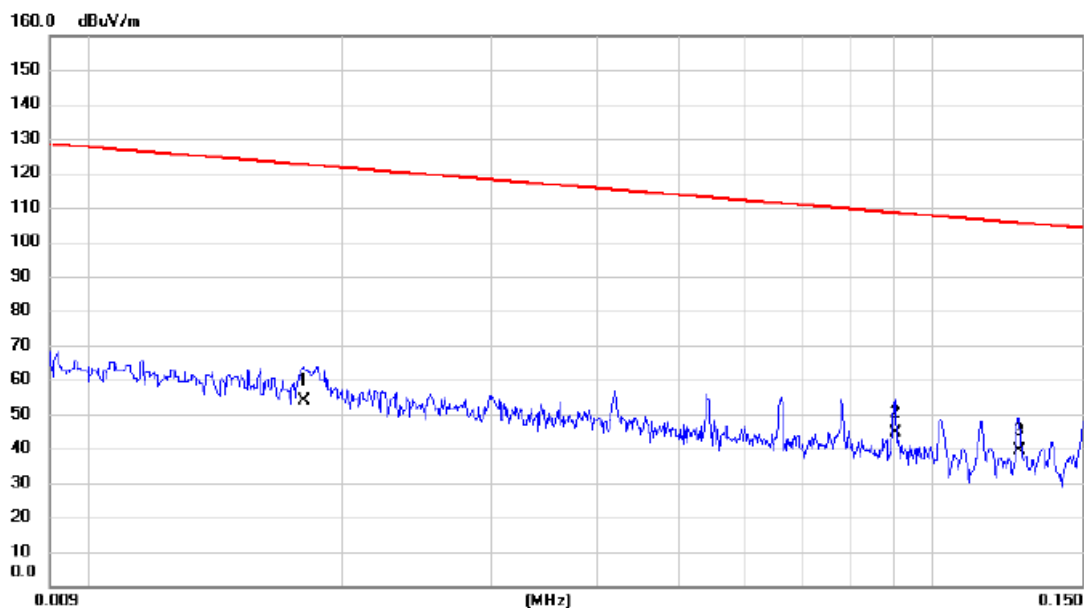


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1		0.4588	47.82	13.60	61.42	94.37	-32.95	AVG		
2		2.2015	35.64	12.18	47.82	69.54	-21.72	QP		
3	*	4.3376	36.51	12.06	48.57	69.54	-20.97	QP		

REMARKS:

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

Test Mode	TX Mode_2Mbps Channel 19	Polarization	Ant 0°
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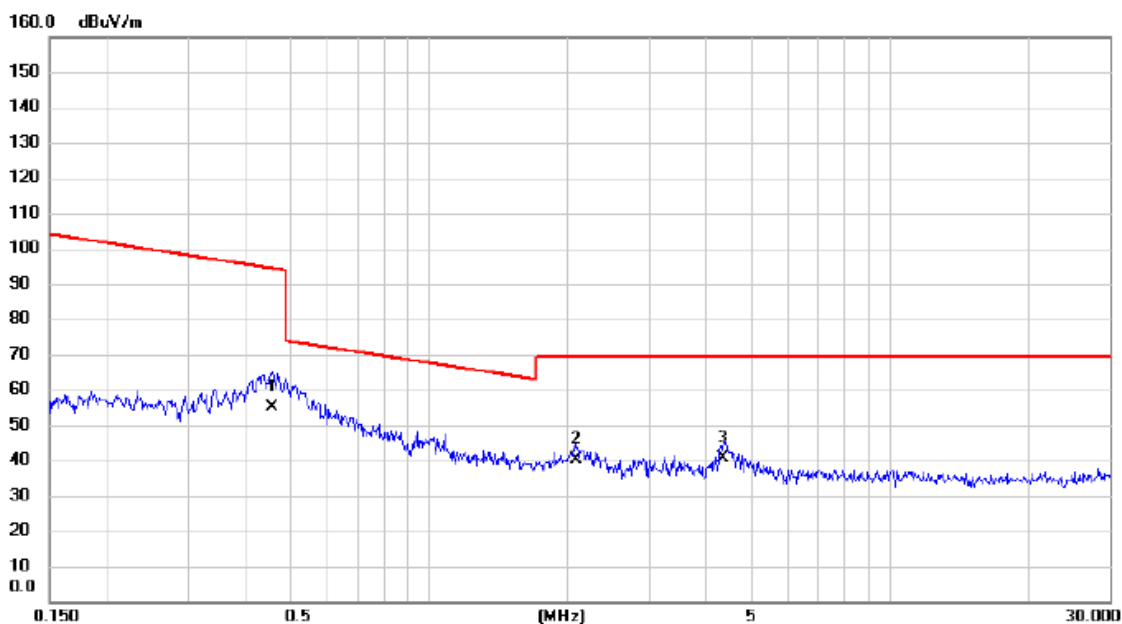


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		0.0180	38.68	15.04	53.72	122.50	-68.78	AVG		
2	*	0.0901	30.81	13.77	44.58	108.51	-63.93	AVG		
3		0.1263	25.79	13.78	39.57	105.58	-66.01	AVG		

REMARKS:

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

Test Mode	TX Mode_2Mbps Channel 19	Polarization	Ant 90°
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		0.4564	41.48	13.60	55.08	94.42	-39.34	AVG		
2		2.0880	27.79	12.22	40.01	69.54	-29.53	QP		
3	*	4.3376	28.73	12.06	40.79	69.54	-28.75	QP		

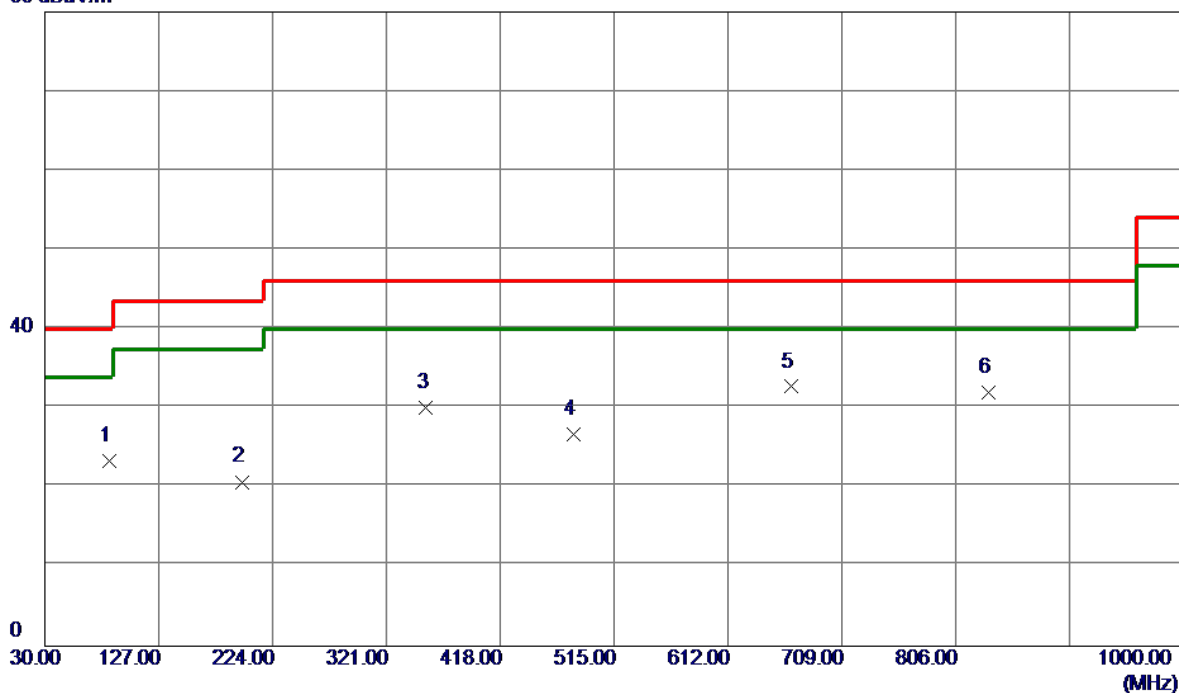
REMARKS:

- (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_2Mbps Channel 19	Polarization	Vertical
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80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	85.2900	42.04	-18.67	23.37	40.00	-16.63	Peak	
2	197.8100	36.03	-15.31	20.72	43.50	-22.78	Peak	
3	354.9500	39.89	-9.85	30.04	46.00	-15.96	Peak	
4	480.0800	33.57	-6.89	26.68	46.00	-19.32	Peak	
5 *	666.3200	36.24	-3.52	32.72	46.00	-13.28	Peak	
6	834.1300	32.71	-0.65	32.06	46.00	-13.94	Peak	

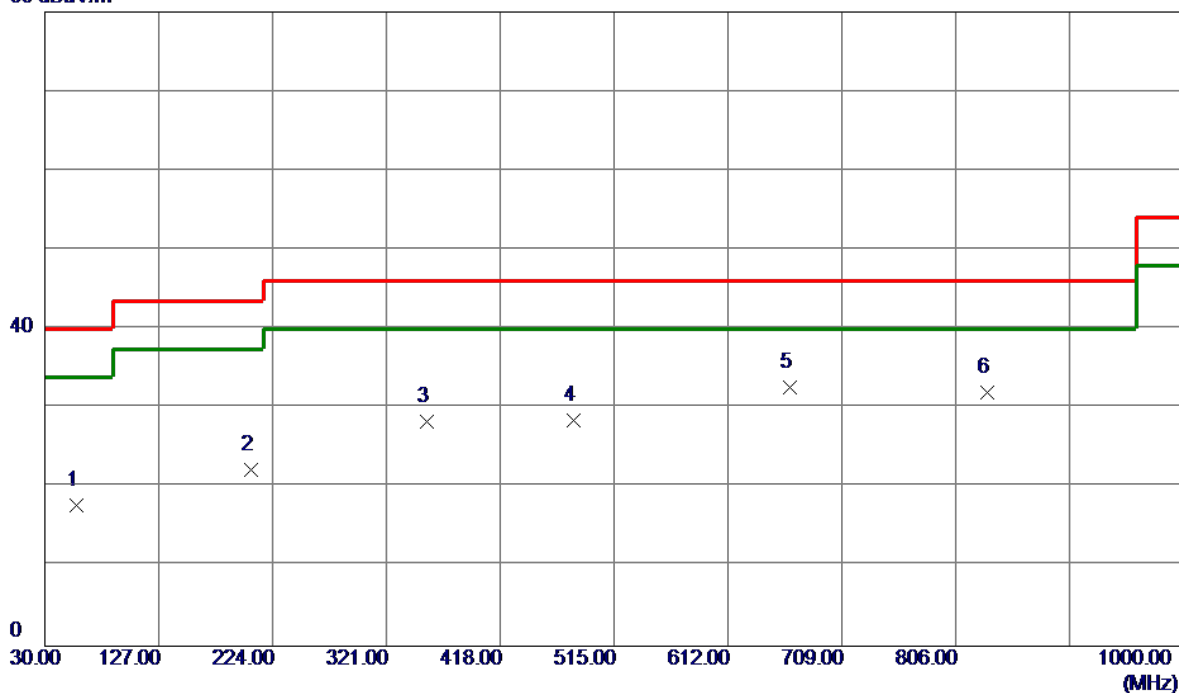
REMARKS:

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

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

Test Mode	TX Mode_2Mbps Channel 19	Polarization	Horizontal
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80 dBuV/m



No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	57.1600	31.95	-14.21	17.74	40.00	-22.26	Peak	
2	205.5700	37.55	-15.31	22.24	43.50	-21.26	Peak	
3	355.9200	38.12	-9.82	28.30	46.00	-17.70	Peak	
4	480.0800	35.41	-6.89	28.52	46.00	-17.48	Peak	
5 *	664.3800	36.25	-3.54	32.71	46.00	-13.29	Peak	
6	833.1599	32.62	-0.66	31.96	46.00	-14.04	Peak	

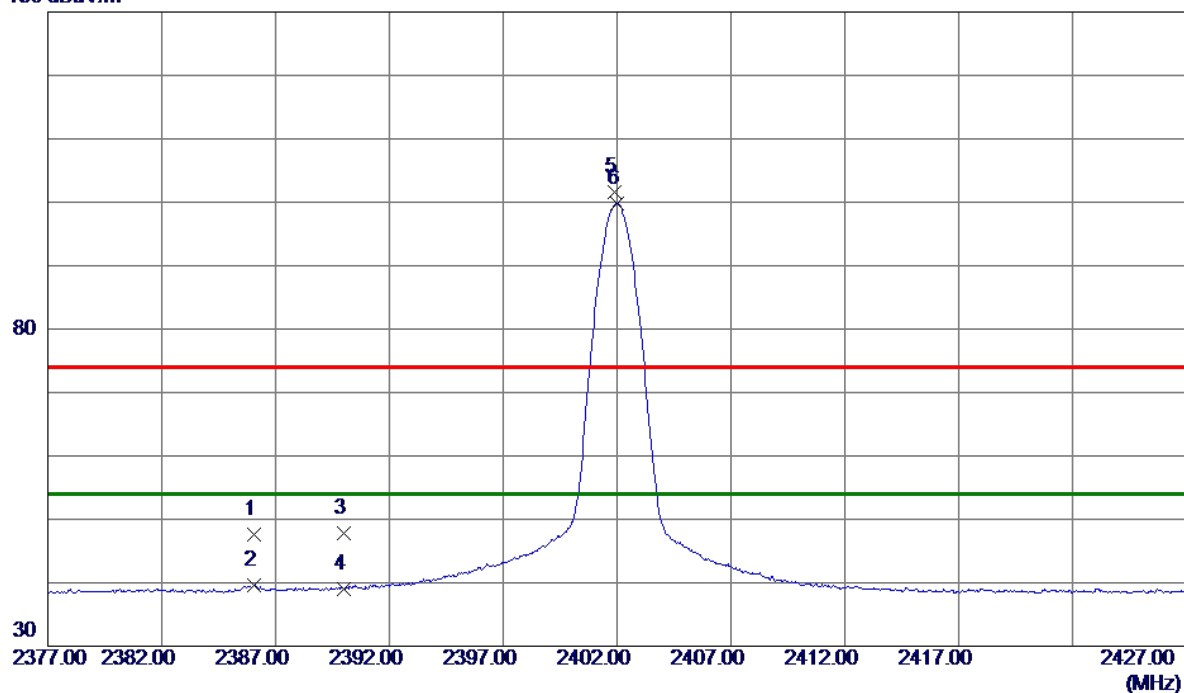
REMARKS:

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

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

Test Mode	TX 2402 MHz_CH00_1Mbps	Polarization	Vertical
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130 dBuV/m



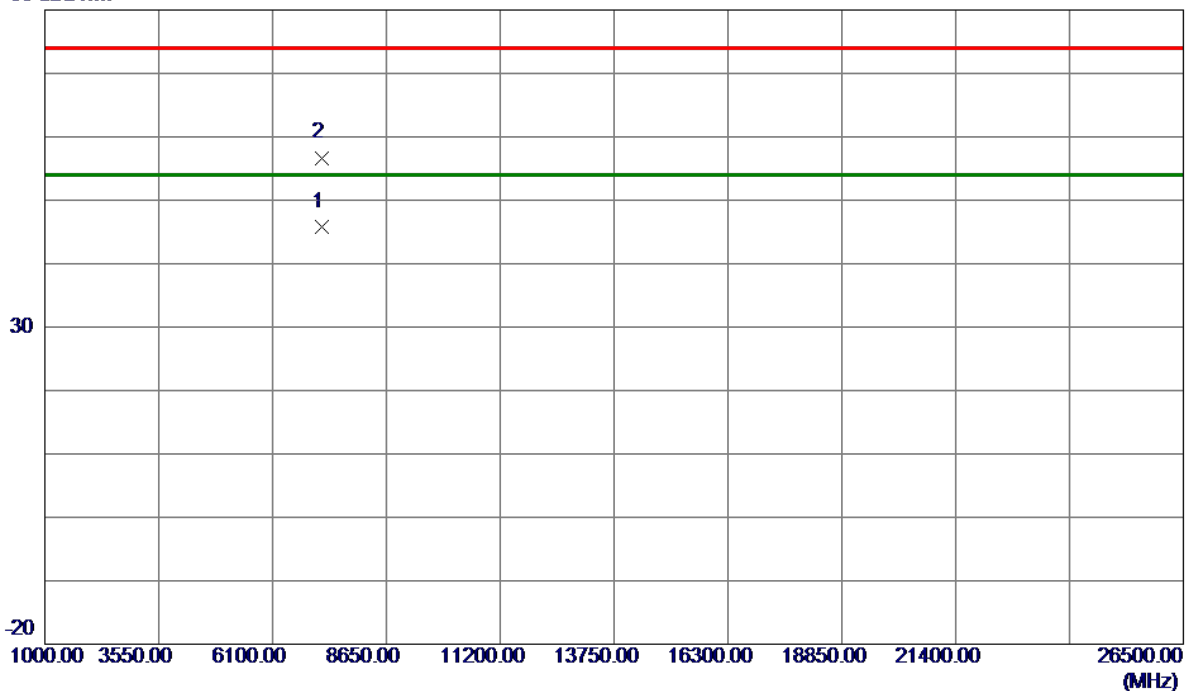
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2386.0500	39.38	8.30	47.68	74.00	-26.32	Peak	
2	2386.0500	31.25	8.30	39.55	54.00	-14.45	AVG	
3	2390.0000	39.40	8.31	47.71	74.00	-26.29	Peak	
4	2390.0000	30.73	8.31	39.04	54.00	-14.96	AVG	
5	2401.8750	93.26	8.32	101.58	74.00	27.58	Peak	No Limit
6 *	2401.9750	91.50	8.32	99.82	54.00	45.82	AVG	No Limit

REMARKS:

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

Test Mode	TX 2402 MHz _CH00_1Mbps	Polarization	Vertical
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80 dBuV/m



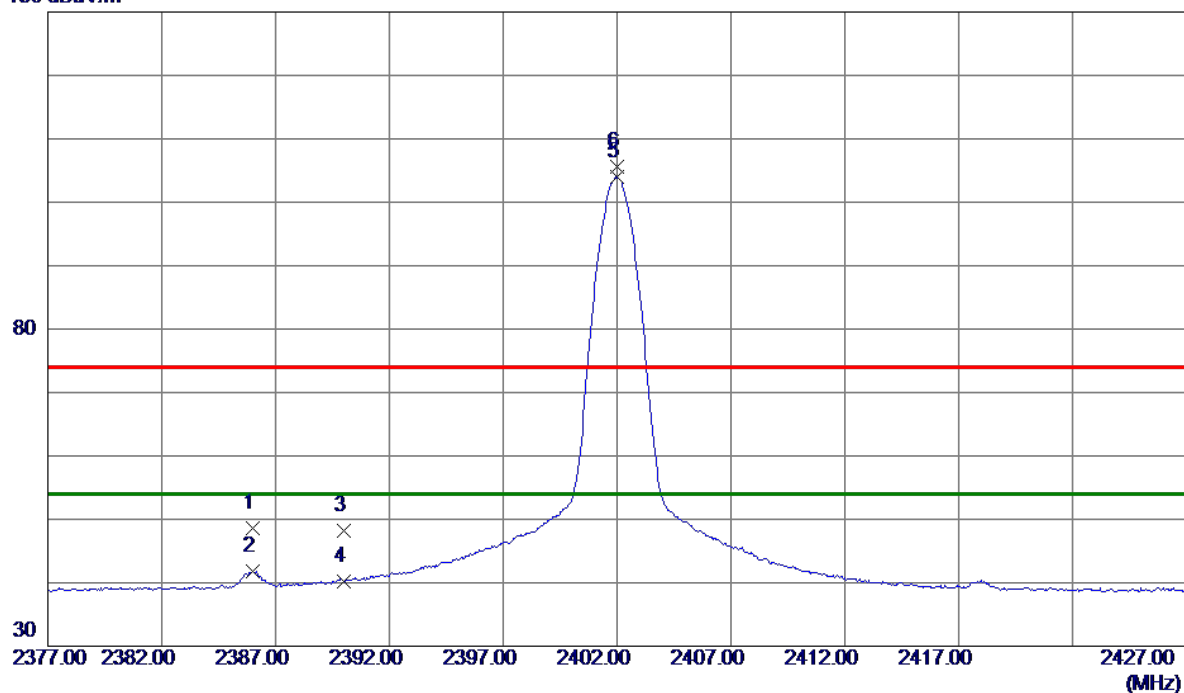
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	7205.3300	35.25	10.56	45.81	54.00	-8.19	AVG	
2	7205.8770	46.14	10.56	56.70	74.00	-17.30	Peak	

REMARKS:

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

Test Mode	TX 2402 MHz_CH00_1Mbps	Polarization	Horizontal
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130 dBuV/m



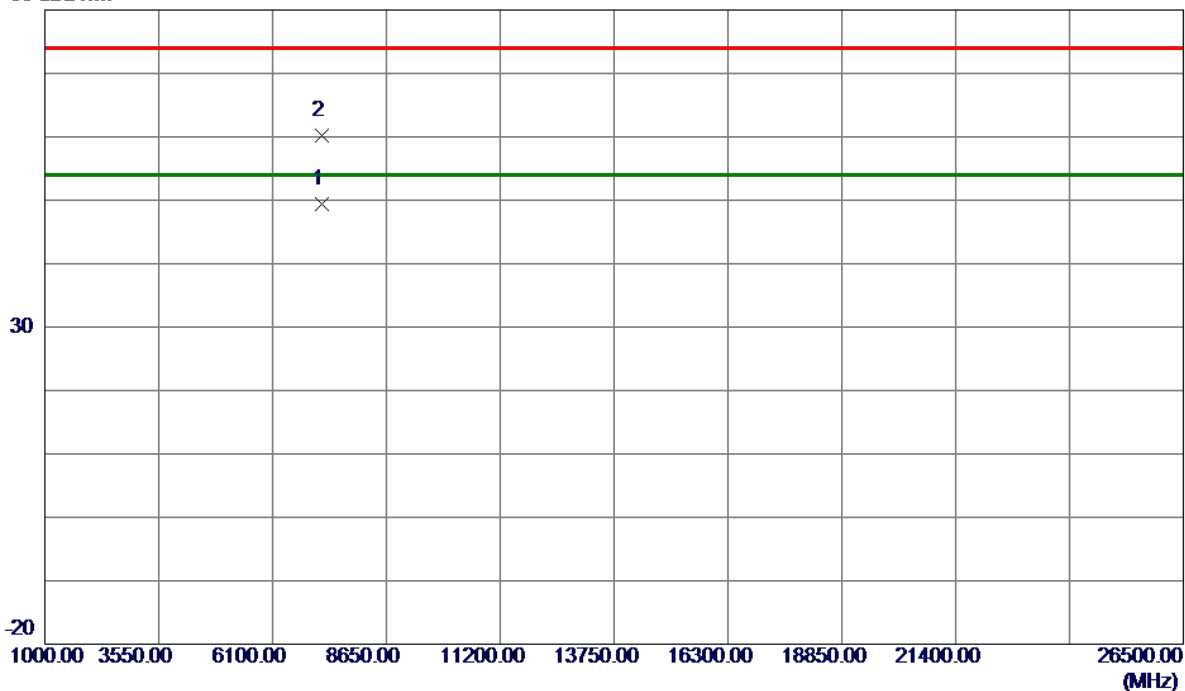
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2386.0000	40.29	8.30	48.59	74.00	-25.41	Peak	
2	2386.0000	33.56	8.30	41.86	54.00	-12.14	AVG	
3	2390.0000	39.89	8.31	48.20	74.00	-25.80	Peak	
4	2390.0000	31.91	8.31	40.22	54.00	-13.78	AVG	
5 *	2401.9750	95.59	8.32	103.91	54.00	49.91	AVG	No Limit
6	2402.0000	97.22	8.32	105.54	74.00	31.54	Peak	No Limit

REMARKS:

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

Test Mode	TX 2402 MHz _CH00_1Mbps	Polarization	Horizontal
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80 dBuV/m



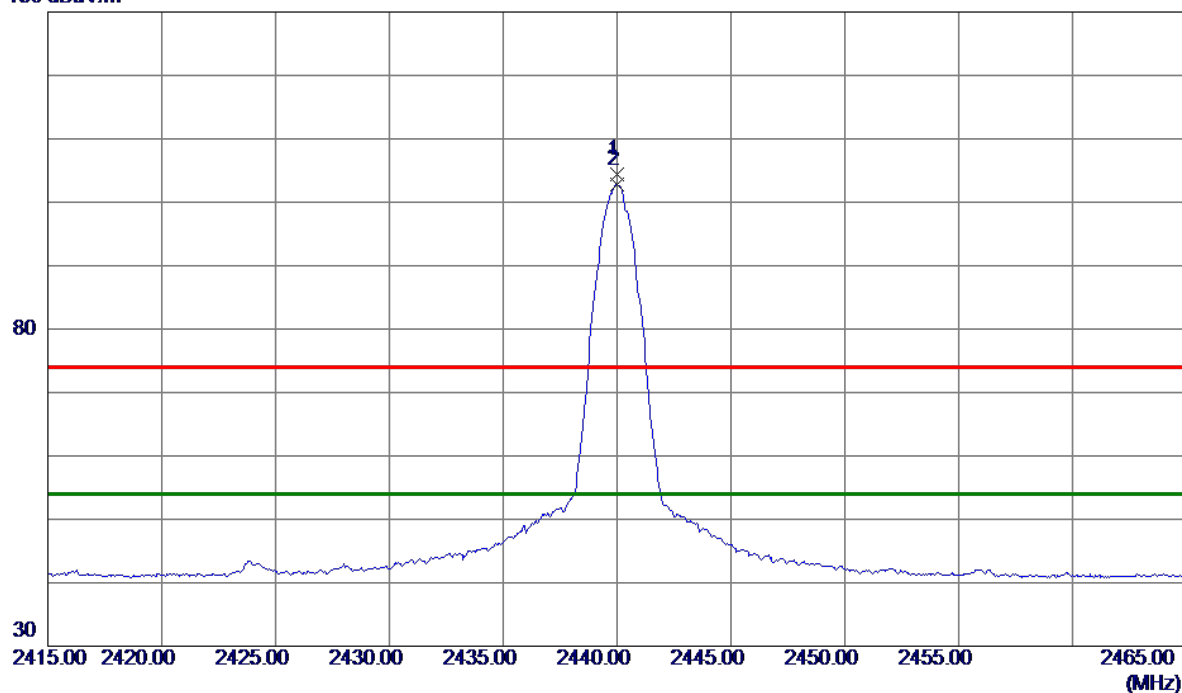
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	7205.4550	38.81	10.56	49.37	54.00	-4.63	AVG	
2	7205.8820	49.58	10.56	60.14	74.00	-13.86	Peak	

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Vertical
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130 dBuV/m



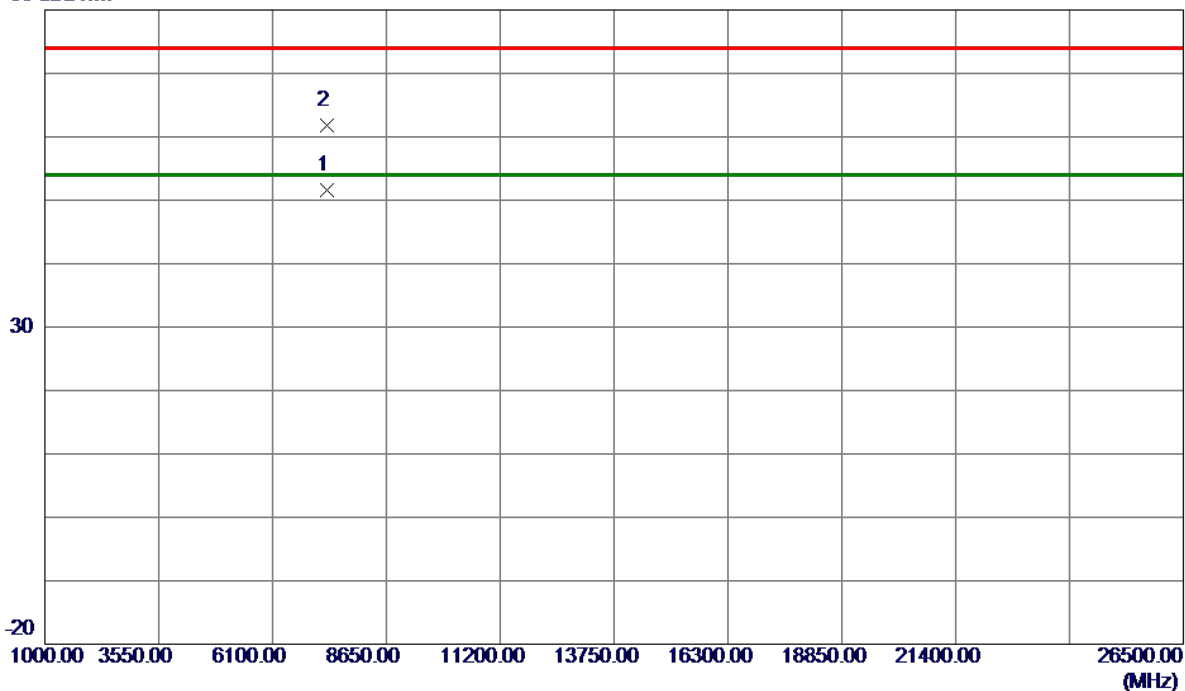
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2440.0000	96.08	8.37	104.45	74.00	30.45	Peak	No Limit
2 *	2440.0000	94.37	8.37	102.74	54.00	48.74	AVG	No Limit

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Vertical
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80 dBuV/m

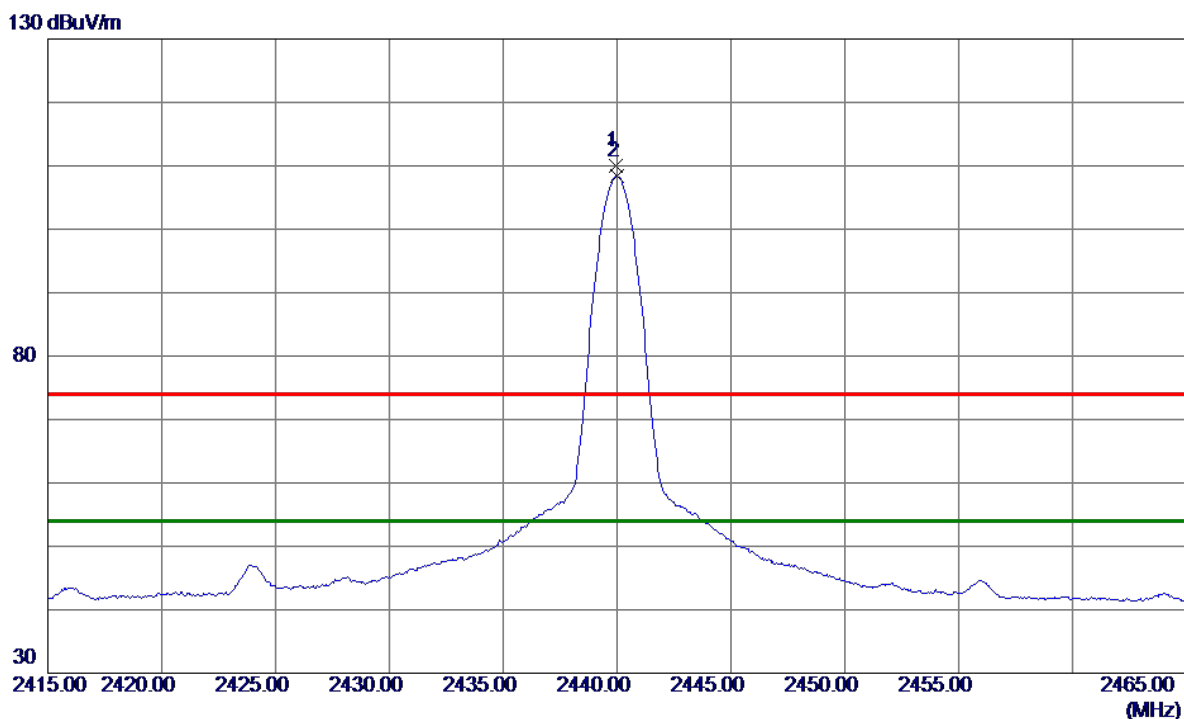


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	7319.3750	40.92	10.71	51.63	54.00	-2.37	AVG	
2	7319.9800	51.02	10.71	61.73	74.00	-12.27	Peak	

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Horizontal
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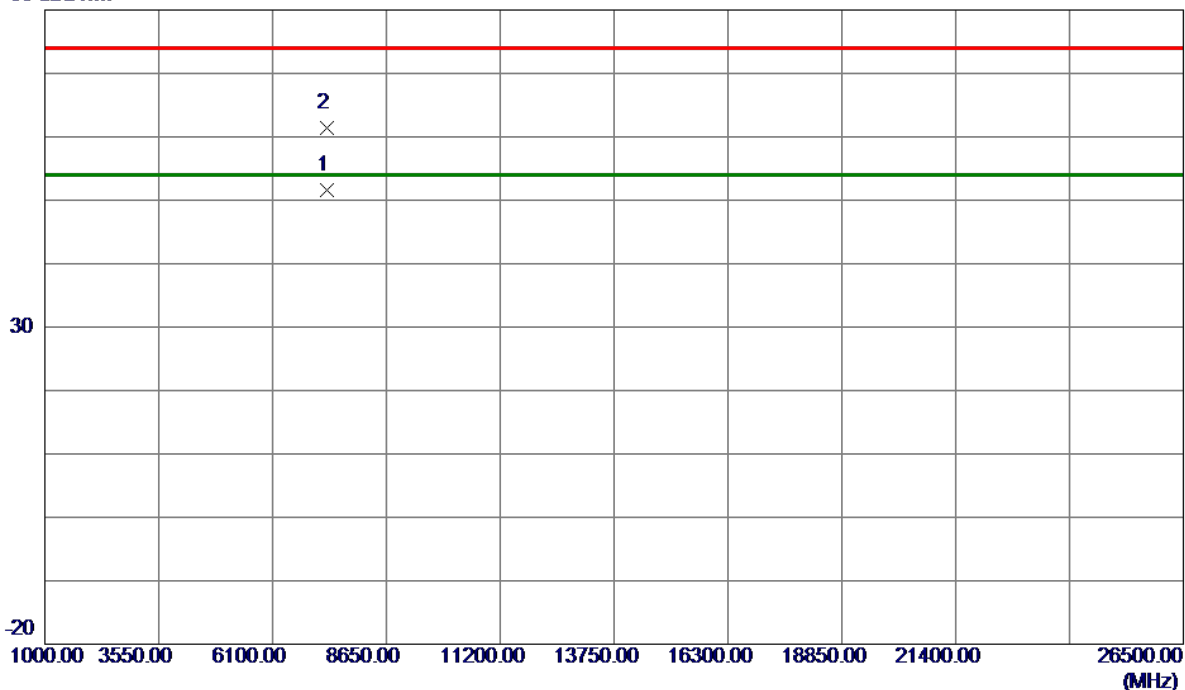
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2439.9500	101.58	8.37	109.95	74.00	35.95	Peak	No Limit
2 *	2440.0000	99.96	8.37	108.33	54.00	54.33	AVG	No Limit

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_ 1Mbps	Polarization	Horizontal
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80 dBuV/m



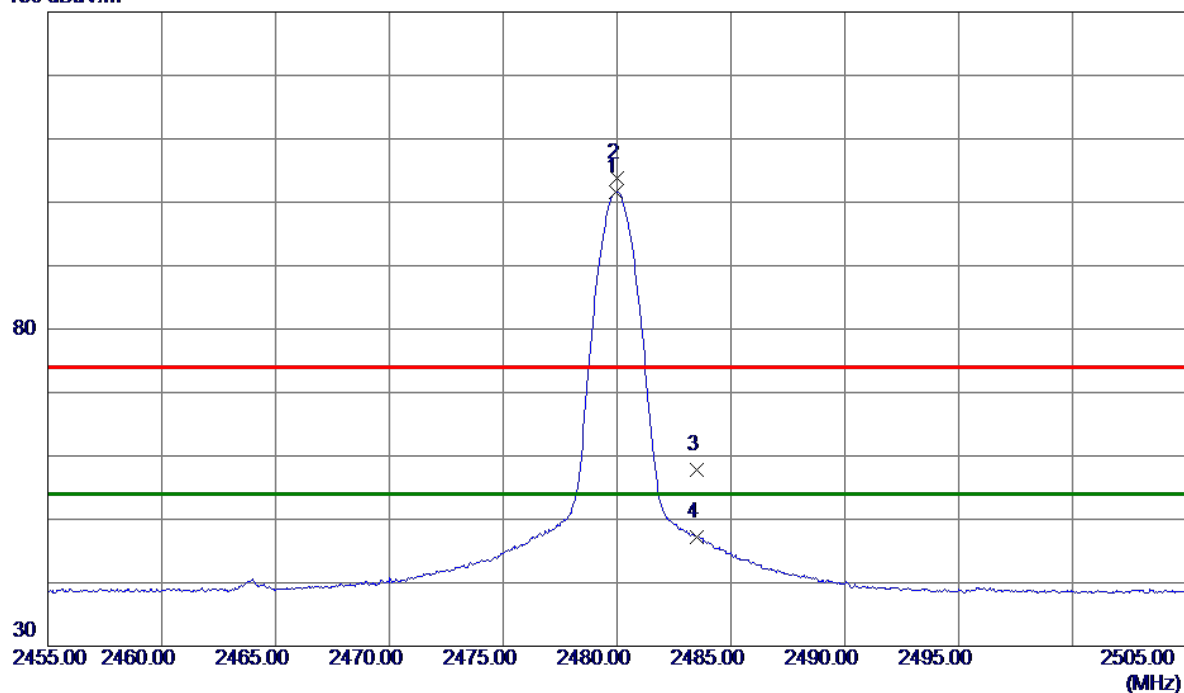
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	7319.3680	40.85	10.71	51.56	54.00	-2.44	AVG	
2	7319.9650	50.72	10.71	61.43	74.00	-12.57	Peak	

REMARKS:

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

Test Mode	TX 2480 MHz_CH39_1Mbps	Polarization	Vertical
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130 dBuV/m



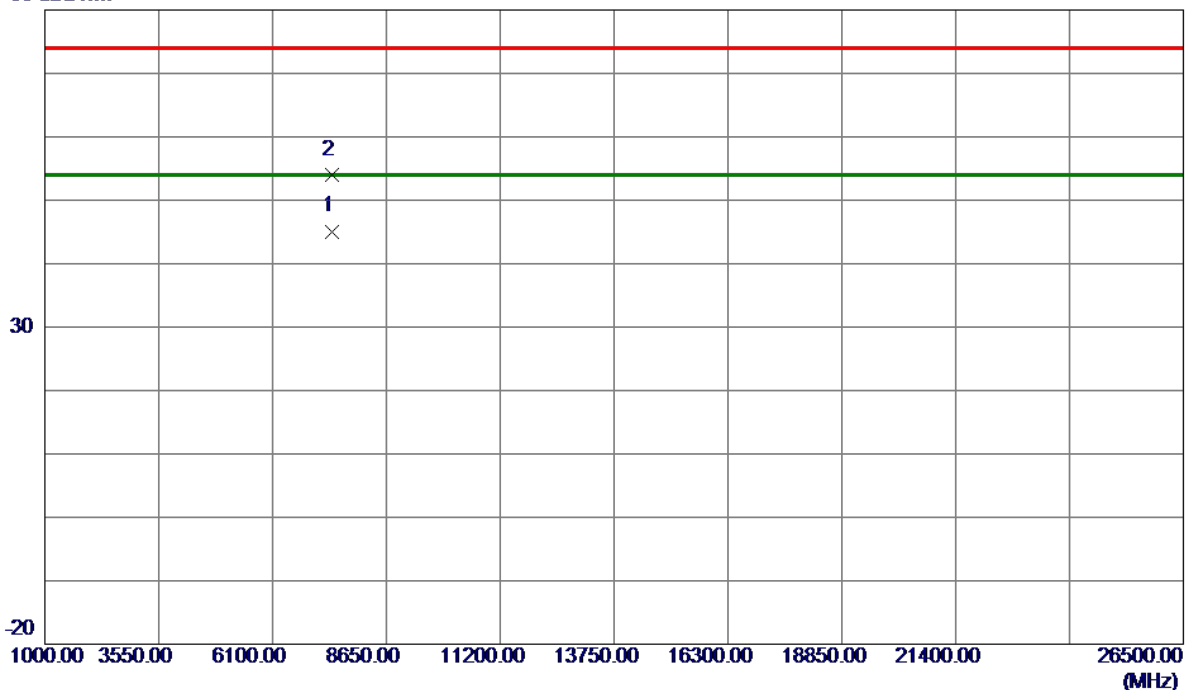
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	2479.9500	93.22	8.42	101.64	54.00	47.64	AVG	No Limit
2	2480.0000	95.35	8.42	103.77	74.00	29.77	Peak	No Limit
3	2483.5000	49.41	8.42	57.83	74.00	-16.17	Peak	
4	2483.5000	38.87	8.42	47.29	54.00	-6.71	AVG	

REMARKS:

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

Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Vertical
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80 dBuV/m

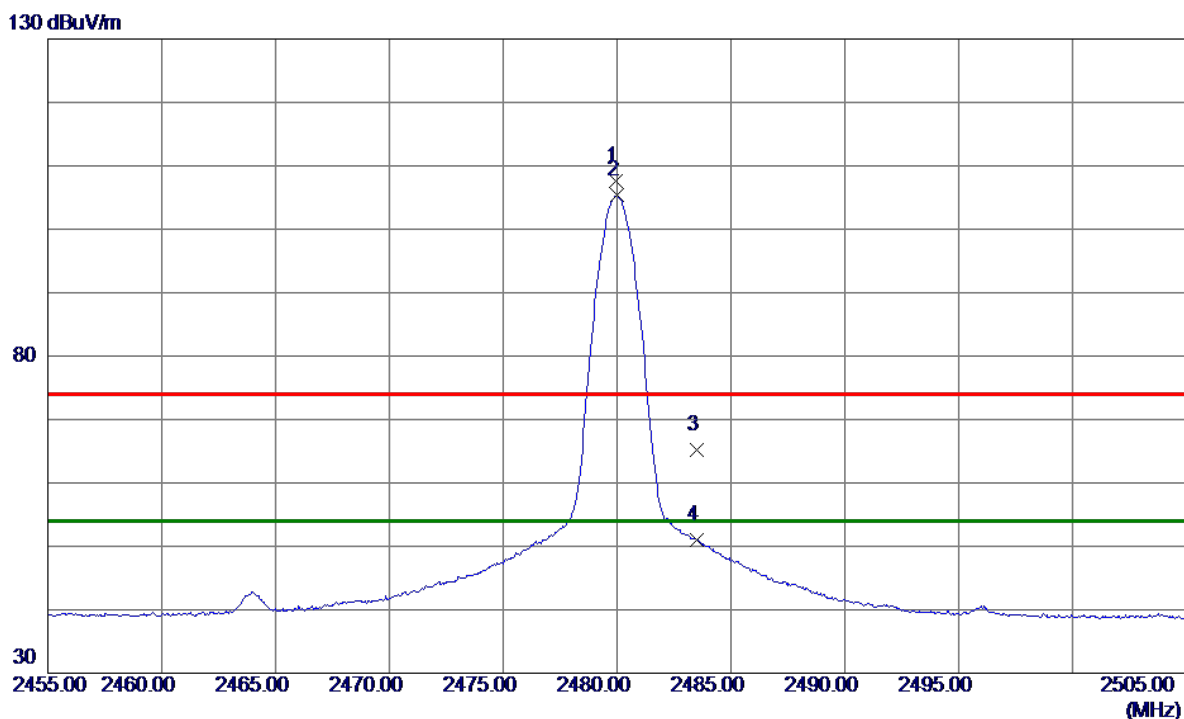


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	7439.3470	34.24	10.86	45.10	54.00	-8.90	AVG	
2	7440.7500	43.16	10.86	54.02	74.00	-19.98	Peak	

REMARKS:

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

Test Mode	TX 2480 MHz _CH39_ 1Mbps	Polarization	Horizontal
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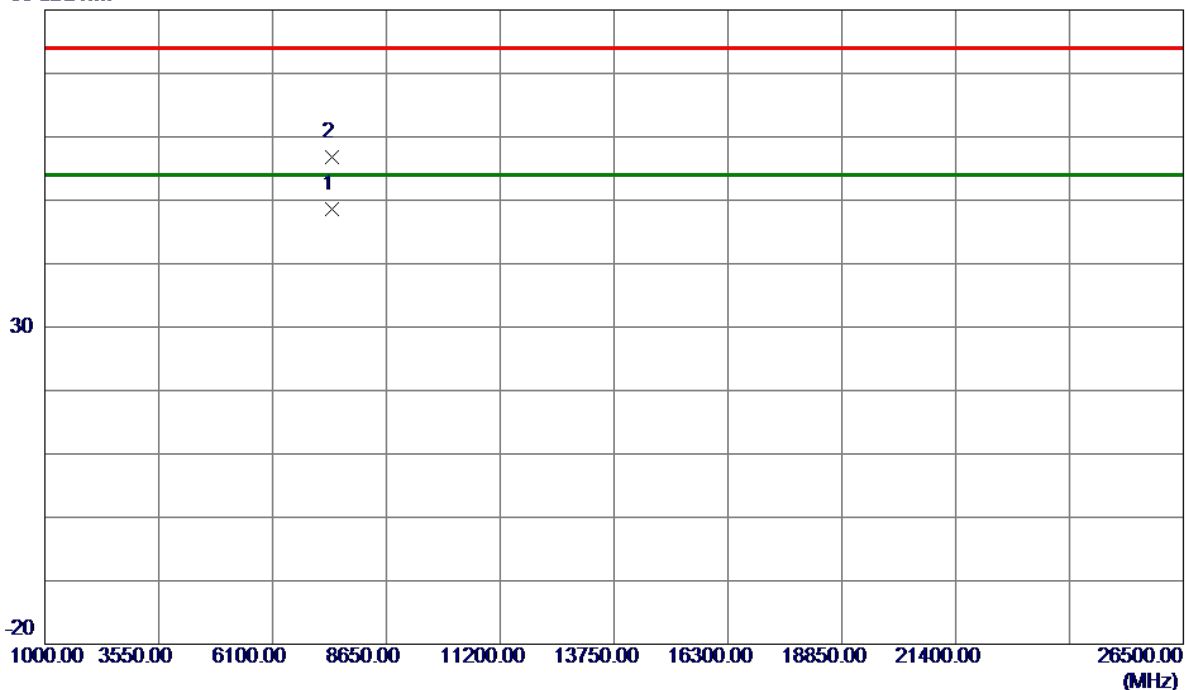
No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2479.9250	99.09	8.42	107.51	74.00	33.51	Peak	No Limit
2 *	2480.0000	96.91	8.42	105.33	54.00	51.33	AVG	No Limit
3	2483.5000	56.70	8.42	65.12	74.00	-8.88	Peak	
4	2483.5000	42.56	8.42	50.98	54.00	-3.02	AVG	

REMARKS:

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

Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Horizontal
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80 dBuV/m

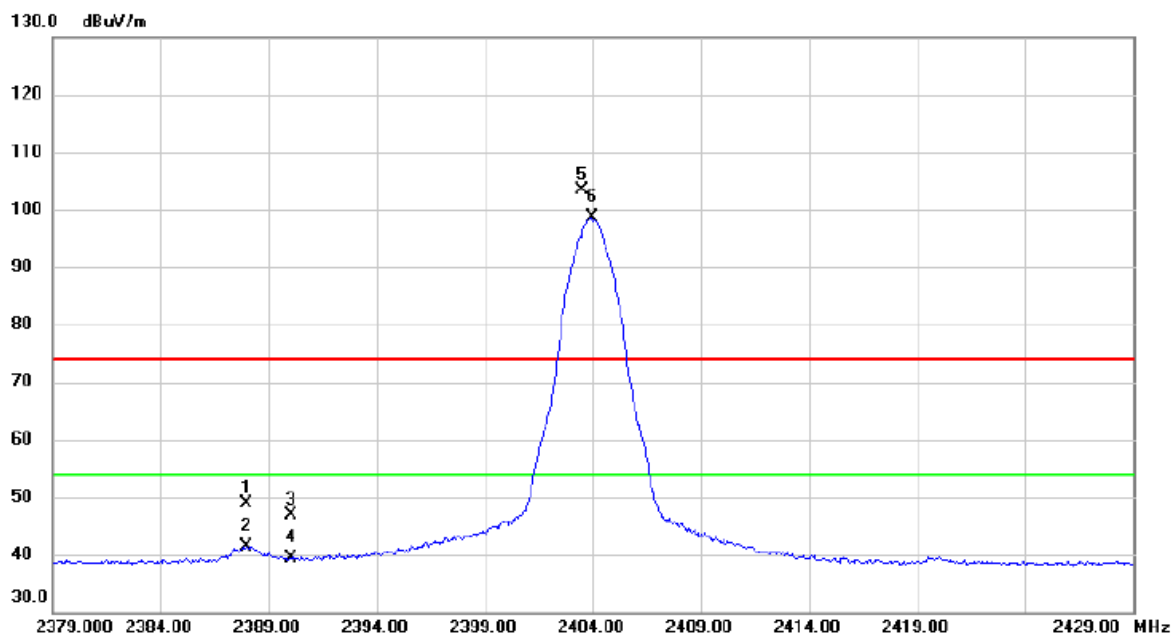


No.	Freq. MHz	Reading Level dBuV/m	Correct Factor dB	Measure ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	7439.4300	37.70	10.86	48.56	54.00	-5.44	AVG	
2	7440.6100	45.91	10.86	56.77	74.00	-17.23	Peak	

REMARKS:

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

Test Mode	TX 2404 MHz_CH01_2Mbps	Polarization	Vertical
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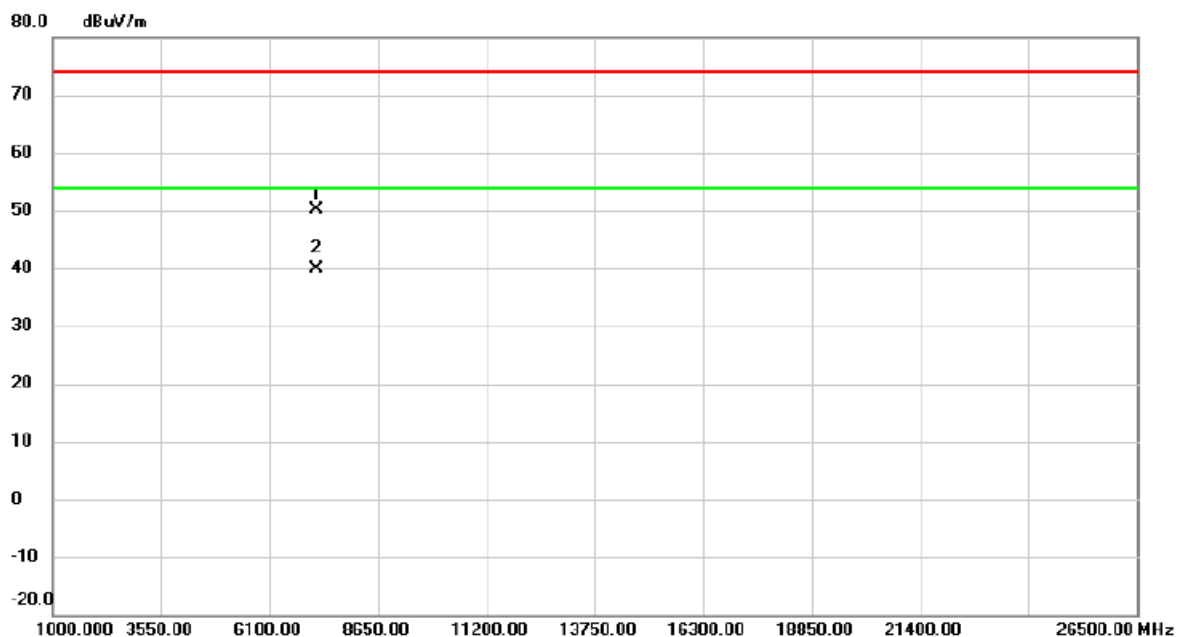
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2387.975	40.60	8.30	48.90	74.00	-25.10	peak	
2		2387.975	32.98	8.30	41.28	54.00	-12.72	AVG	
3		2390.000	38.64	8.31	46.95	74.00	-27.05	peak	
4		2390.000	30.95	8.31	39.26	54.00	-14.74	AVG	
5	X	2403.525	94.95	8.32	103.27	74.00	29.27	peak	No Limit
6	*	2403.975	90.39	8.32	98.71	54.00	44.71	AVG	No Limit

REMARKS:

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

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

Test Mode	TX 2404 MHz _CH01_2Mbps	Polarization	Vertical
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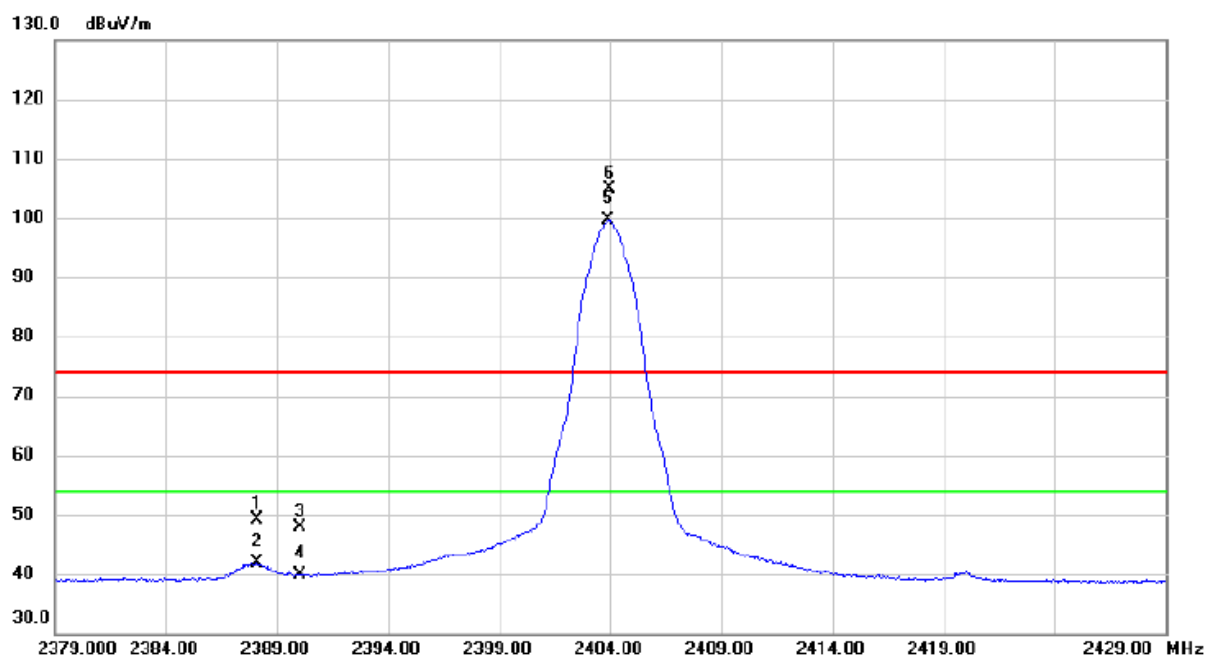


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		7210.295	39.52	10.56	50.08	74.00	-23.92	peak	
2	*	7212.770	29.41	10.56	39.97	54.00	-14.03	AVG	

REMARKS:

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

Test Mode	TX 2404 MHz_CH01_2Mbps	Polarization	Horizontal
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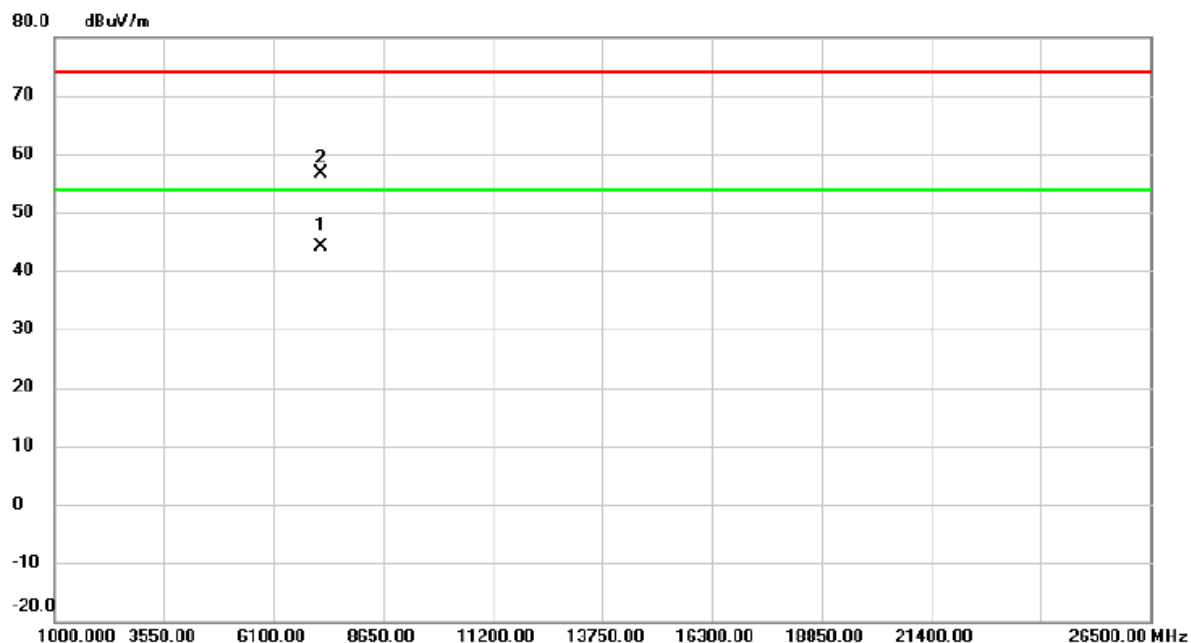
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2388.100	40.90	8.30	49.20	74.00	-24.80	peak	
2		2388.100	33.62	8.30	41.92	54.00	-12.08	AVG	
3		2390.000	39.69	8.31	48.00	74.00	-26.00	peak	
4		2390.000	31.55	8.31	39.86	54.00	-14.14	AVG	
5	*	2403.925	91.27	8.32	99.59	54.00	45.59	AVG	No Limit
6	X	2403.975	96.67	8.32	104.99	74.00	30.99	peak	No Limit

REMARKS:

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

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

Test Mode	TX 2404 MHz _CH01_2Mbps	Polarization	Horizontal
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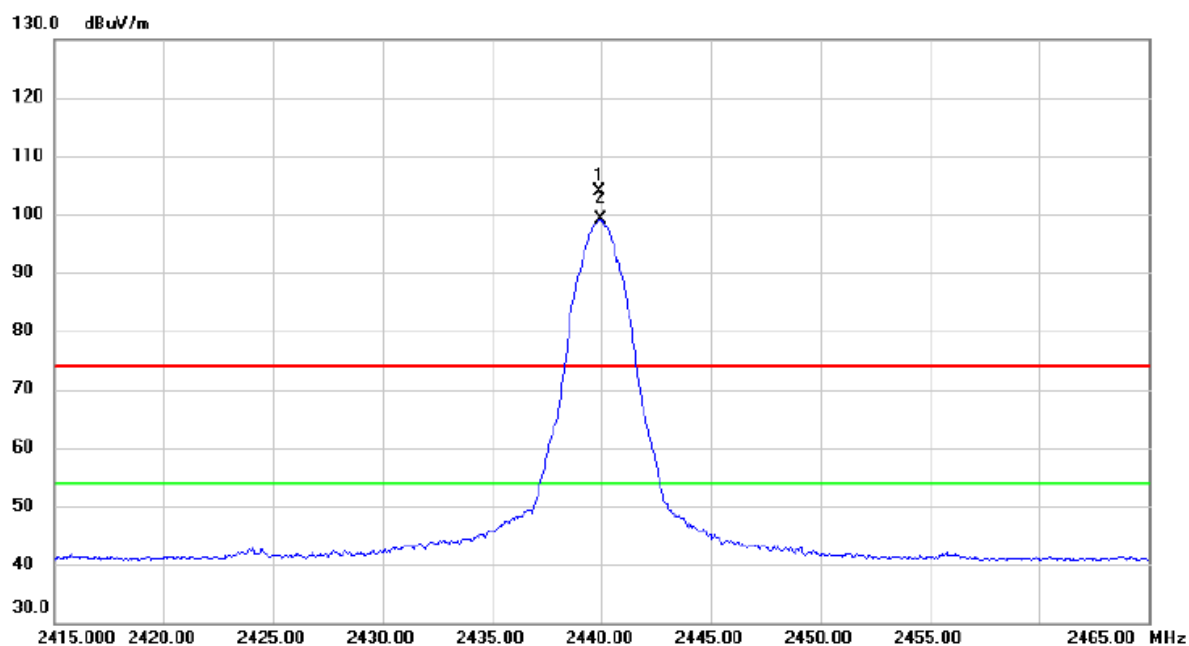


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	7210.795	33.49	10.56	44.05	54.00	-9.95	AVG	
2		7211.780	45.99	10.56	56.55	74.00	-17.45	peak	

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_ 2Mbps	Polarization	Vertical
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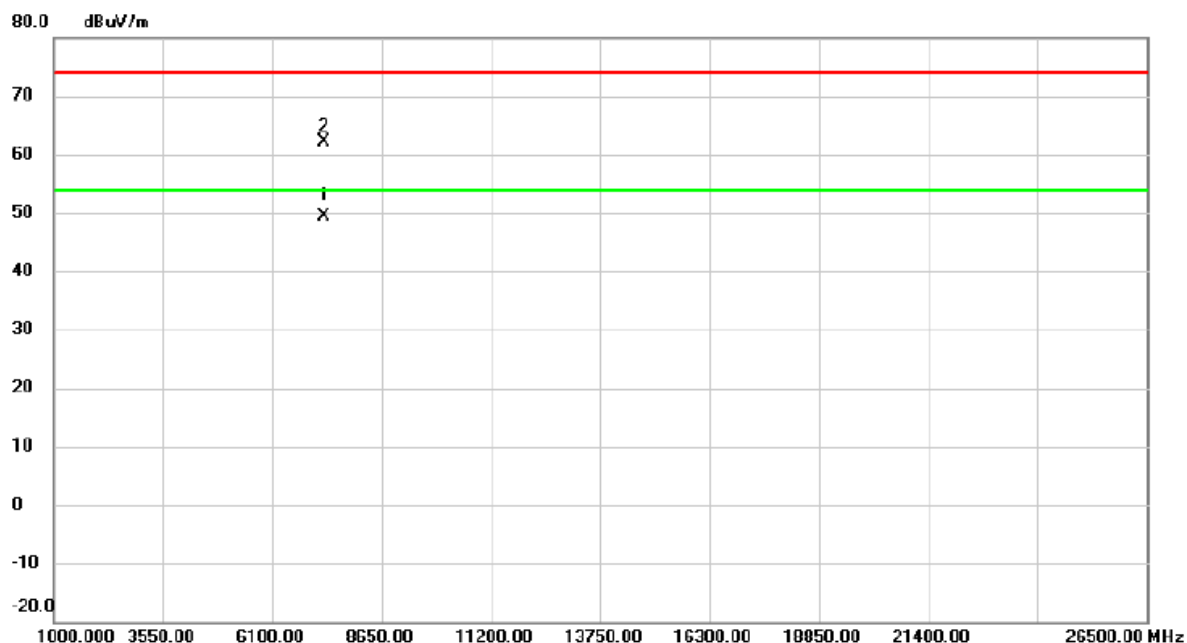


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2439.900	95.48	8.37	103.85	74.00	29.85	peak	No Limit
2	*	2439.950	90.81	8.37	99.18	54.00	45.18	AVG	No Limit

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_2Mbps	Polarization	Vertical
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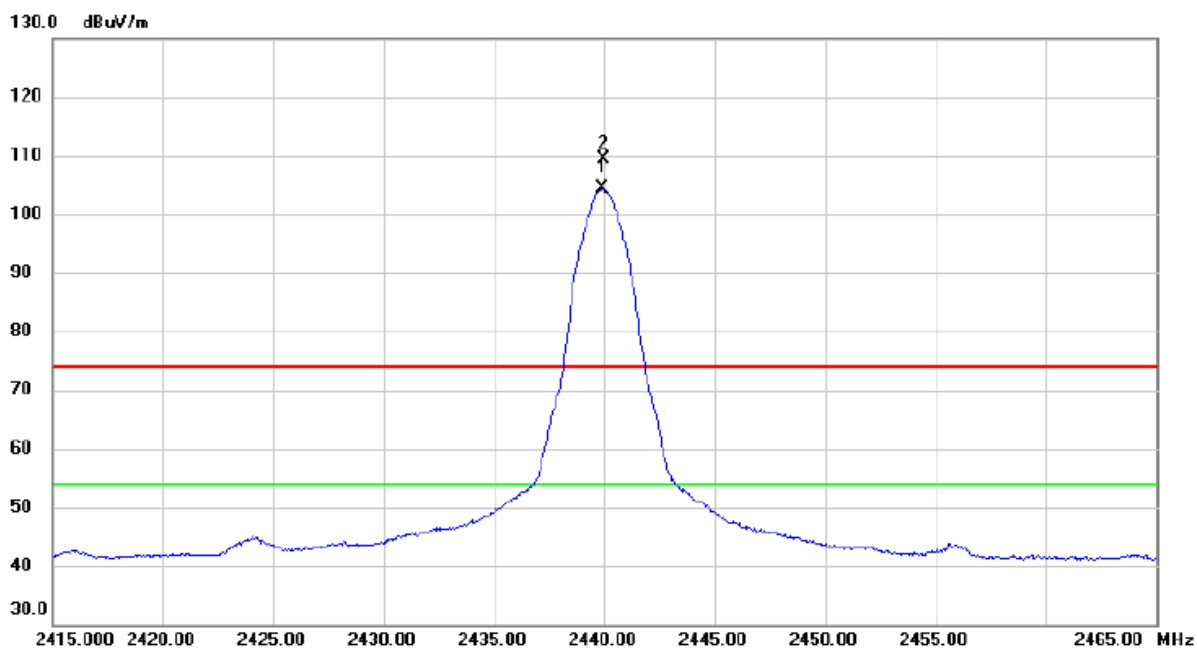


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	7318.775	38.69	10.70	49.39	54.00	-4.61	AVG	
2		7319.962	51.36	10.70	62.06	74.00	-11.94	peak	

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_2Mbps	Polarization	Horizontal
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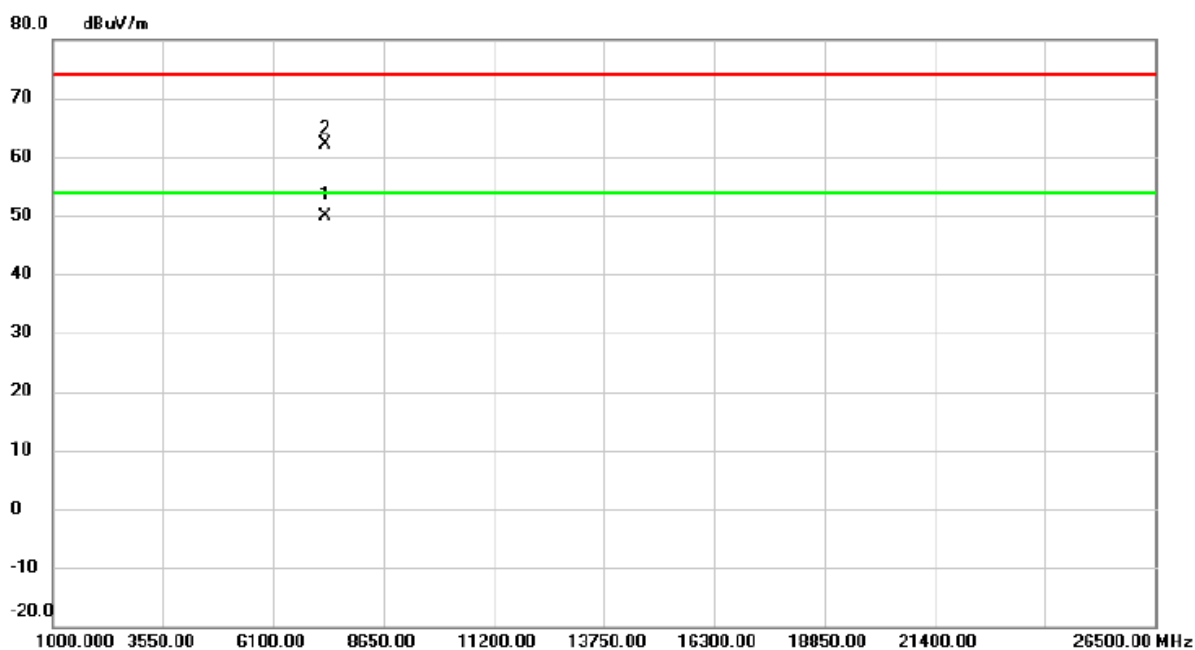


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2439.900	96.08	8.37	104.45	54.00	50.45	AVG	No Limit
2	X	2439.950	101.04	8.37	109.41	74.00	35.41	peak	No Limit

REMARKS:

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

Test Mode	TX 2440 MHz _CH19_2Mbps	Polarization	Horizontal
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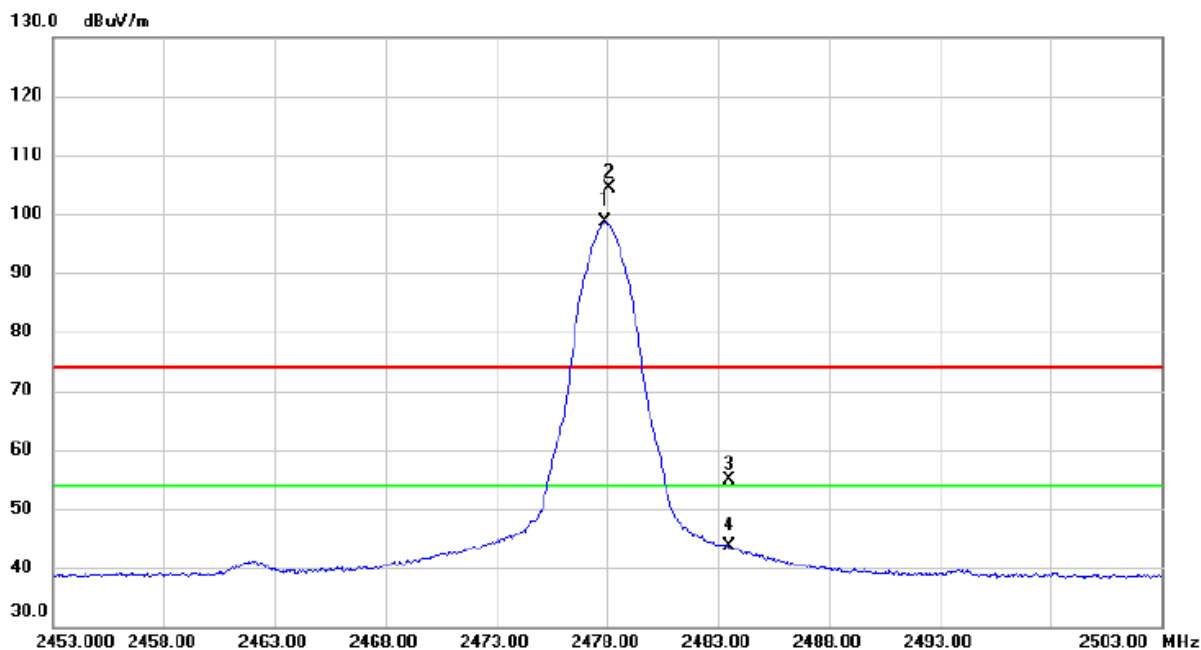


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	7318.730	39.12	10.70	49.82	54.00	-4.18	AVG	
2		7319.927	51.33	10.70	62.03	74.00	-11.97	peak	

REMARKS:

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

Test Mode	TX 2478 MHz _CH38_2Mbps	Polarization	Vertical
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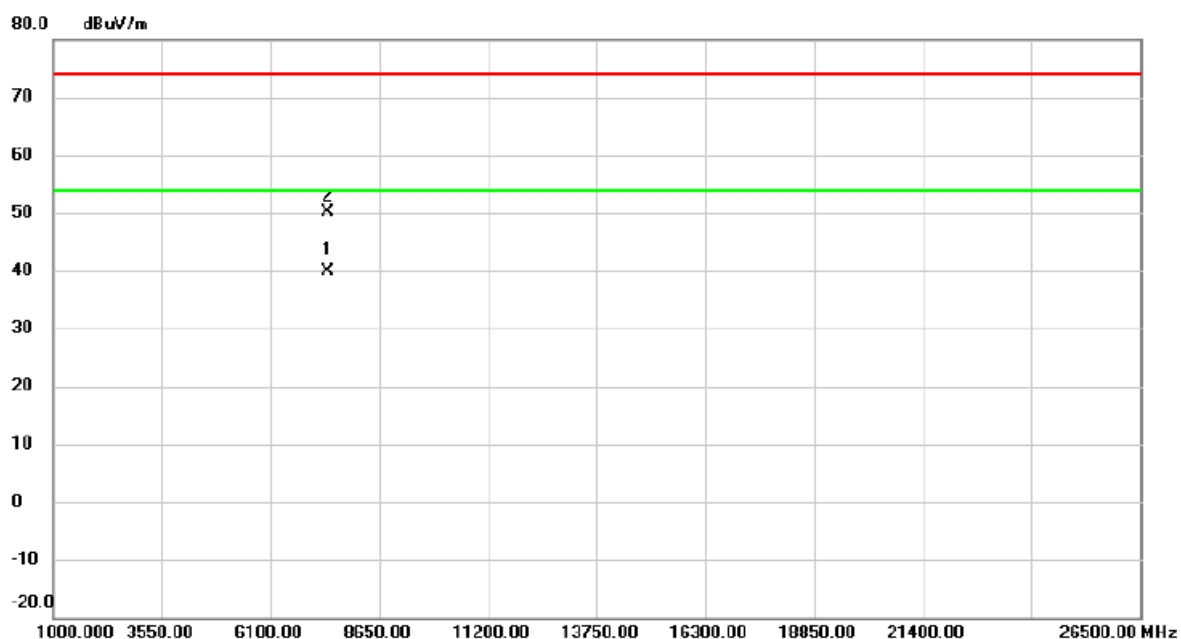
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2477.925	90.19	8.42	98.61	54.00	44.61	AVG	No Limit
2	X	2478.075	95.87	8.42	104.29	74.00	30.29	peak	No Limit
3		2483.500	46.39	8.43	54.82	74.00	-19.18	peak	
4		2483.500	35.19	8.43	43.62	54.00	-10.38	AVG	

REMARKS:

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

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

Test Mode	TX 2478 MHz _CH38_2Mbps	Polarization	Vertical
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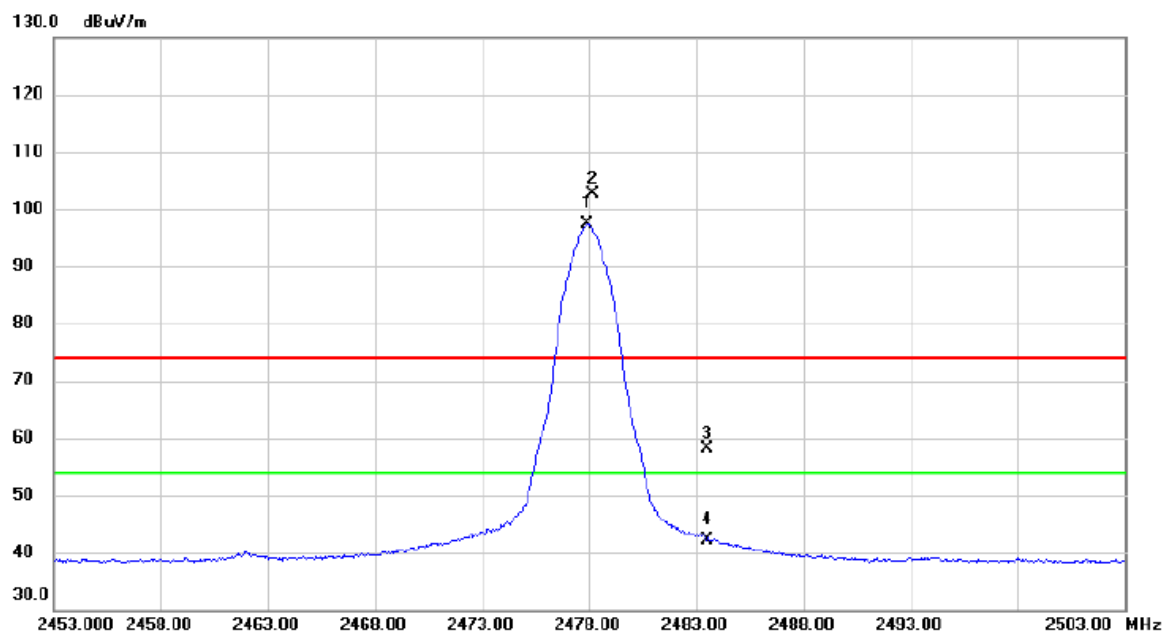


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	7432.480	29.02	10.85	39.87	54.00	-14.13	AVG	
2		7434.045	39.17	10.85	50.02	74.00	-23.98	peak	

REMARKS:

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

Test Mode	TX 2478 MHz _CH38_2Mbps	Polarization	Horizontal
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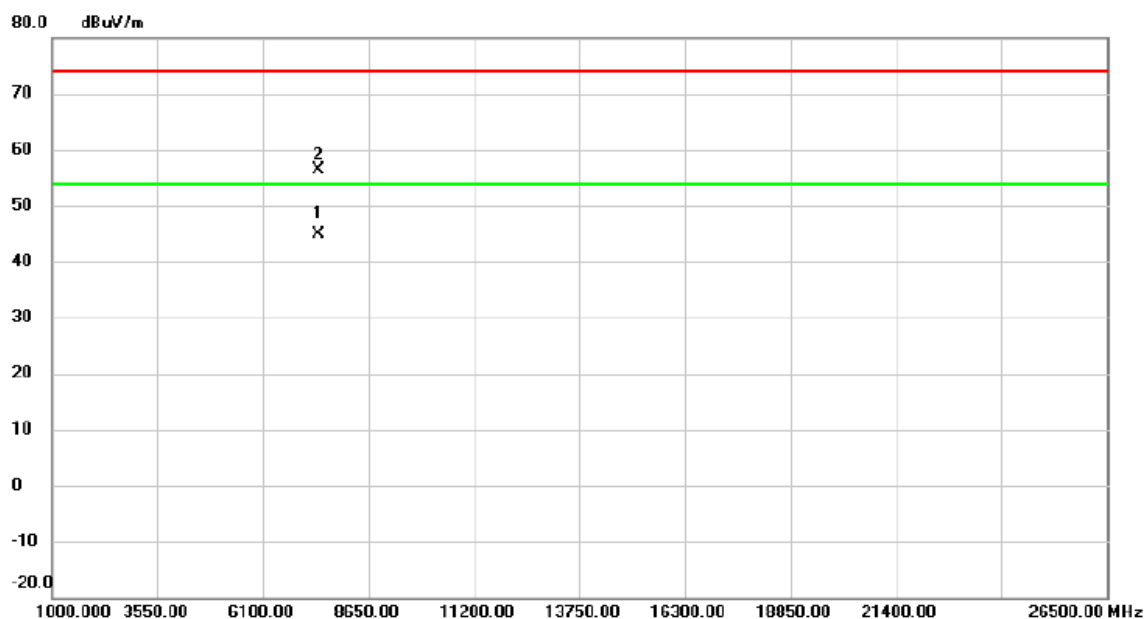


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2477.925	88.93	8.42	97.35	54.00	43.35	AVG	No Limit
2	X	2478.175	94.17	8.42	102.59	74.00	28.59	peak	No Limit
3		2483.500	49.62	8.43	58.05	74.00	-15.95	peak	
4		2483.500	33.75	8.43	42.18	54.00	-11.82	AVG	

REMARKS:

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

Test Mode	TX 2478 MHz _CH38_2Mbps	Polarization	Horizontal
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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 *	7432.743	34.13	10.85	44.98	54.00	-9.02	AVG	
2	7434.097	45.56	10.85	56.41	74.00	-17.59	peak	

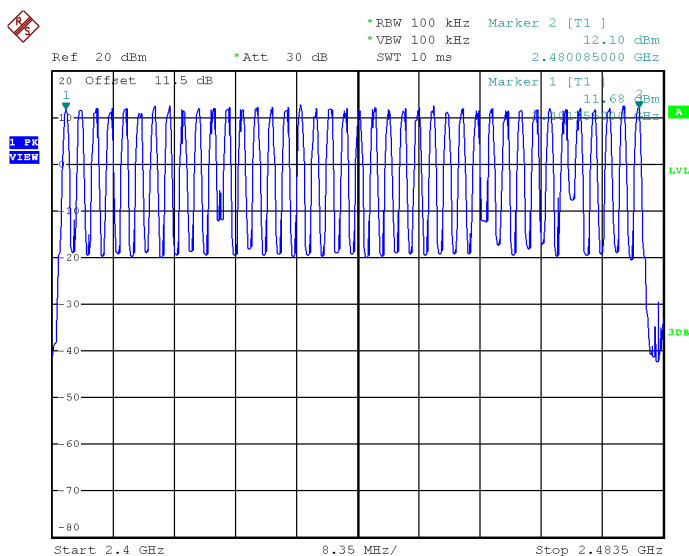
REMARKS:

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

APPENDIX E - NUMBER OF HOPPING FREQUENCY

Test Mode:	TX Mode_1Mbps
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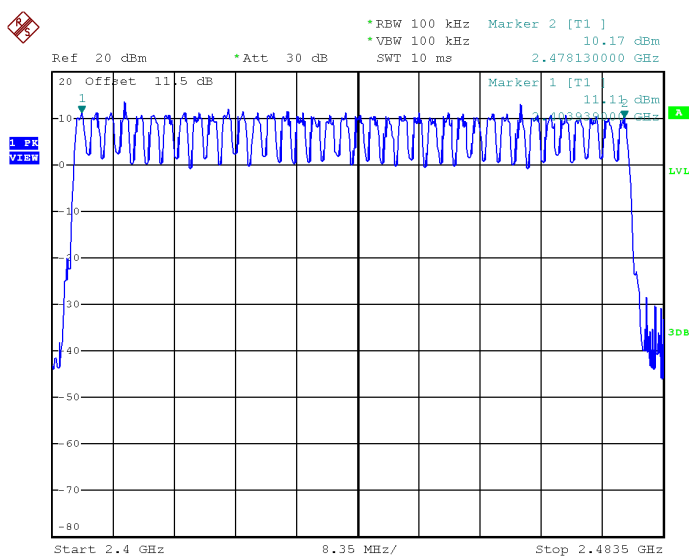
Test Mode	Hopping Mode_1Mbps	Limit	Test Result
Number of Hopping Frequency	40	15	Pass



Date: 15.OCT.2021 10:20:20

Test Mode:	TX Mode_2Mbps
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Test Mode	Hopping Mode_1Mbps	Limit	Test Result
Number of Hopping Frequency	38	15	Pass

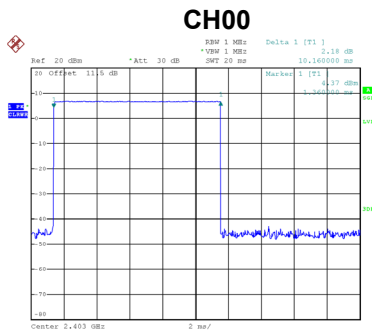


Date: 15.OCT.2021 10:51:00

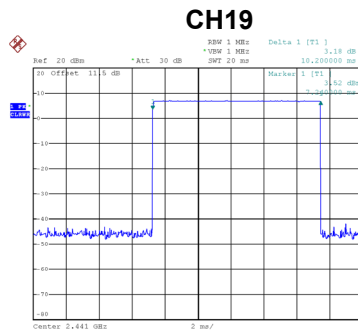
APPENDIX F - AVERAGE TIME OF OCCUPANCY

Test Mode	Hopping Mode_1Mbps
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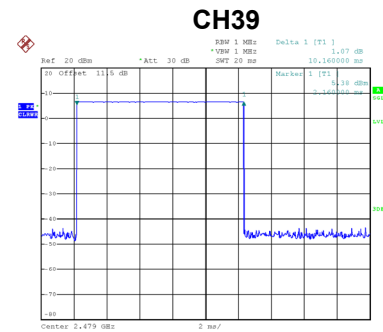
Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
2402	10.1600	0.1016	0.4000	Pass
2440	10.2000	0.1020	0.4000	Pass
2480	10.1600	0.1016	0.4000	Pass



Date: 15.OCT.2021 10:24:59



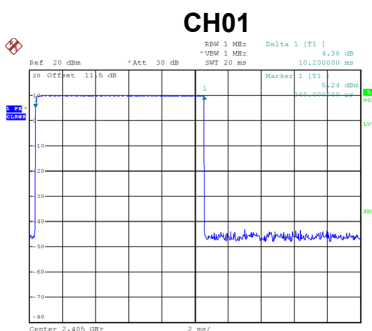
Date: 15.OCT.2021 10:22:46



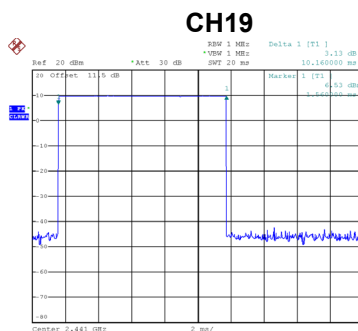
Date: 15.OCT.2021 10:23:25

Test Mode	Hopping Mode_2Mbps
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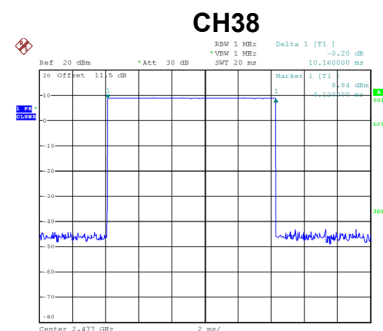
Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
2404	10.2000	0.1020	0.4000	Pass
2440	10.1600	0.1016	0.4000	Pass
2478	10.1600	0.1016	0.4000	Pass



Date: 15.OCT.2021 11:00:29



Date: 15.OCT.2021 11:00:35

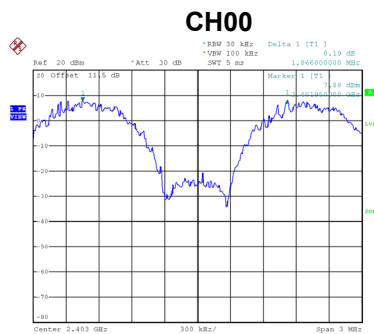


Date: 15.OCT.2021 11:01:01

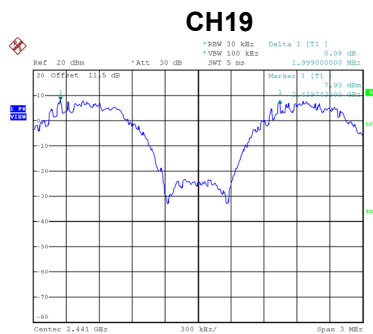
APPENDIX G - HOPPING CHANNEL SEPARATION

Test Mode	Hopping Mode_1Mbps
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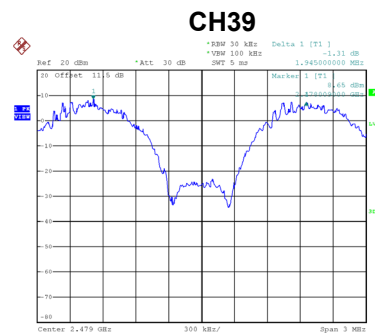
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
00	2402	1.866	0.722	Pass
19	2440	1.999	0.733	Pass
39	2480	1.945	0.727	Pass



Date: 15.OCT.2021 10:07:52



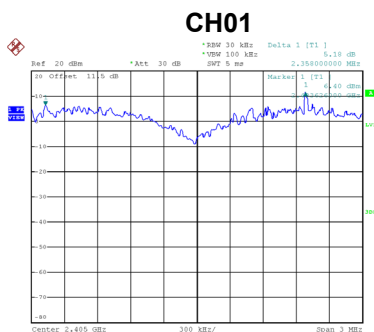
Date: 15.OCT.2021 13:40:01



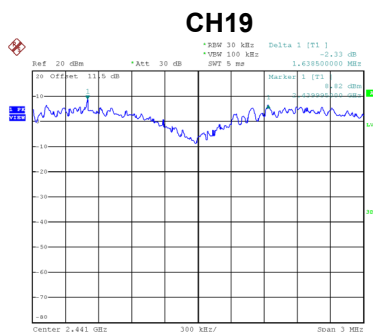
Date: 15.OCT.2021 13:42:09

Test Mode	Hopping Mode_2Mbps
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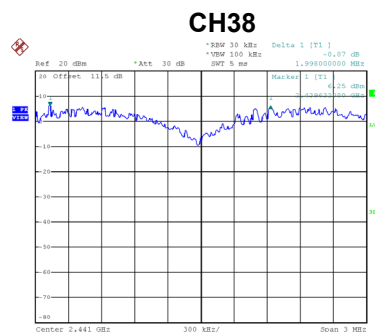
Channel	Frequency (MHz)	Channel Separation (MHz)	2/3 of 20 dB Bandwidth (MHz)	Test Result
01	2404	2.358	1.413	Pass
19	2440	1.639	1.419	Pass
38	2478	1.998	1.479	Pass



Date: 15.OCT.2021 10:30:50



Date: 15.OCT.2021 13:45:55

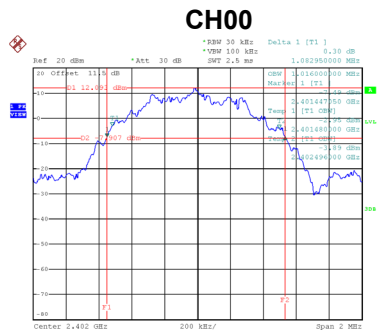


Date: 15.OCT.2021 10:33:09

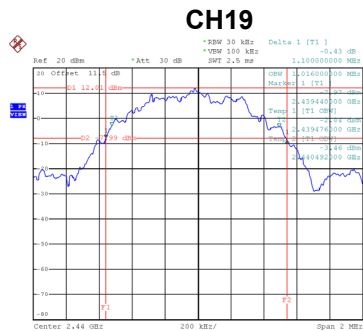
APPENDIX H - BANDWIDTH

Test Mode	TX Mode _1Mbps
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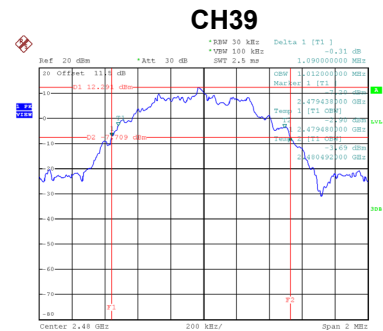
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)
00	2402	1.083	1.016
19	2440	1.100	1.016
39	2480	1.090	1.012



Date: 15.OCT.2021 09:13:56



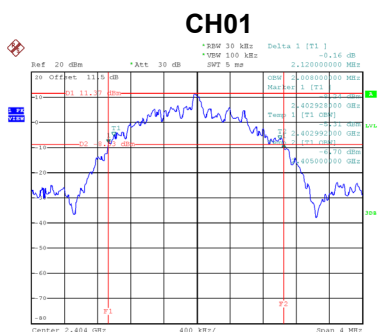
Date: 15.OCT.2021 08:52:38



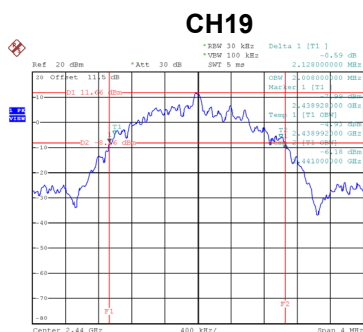
Date: 15.OCT.2021 08:54:26

Test Mode	TX Mode _2Mbps
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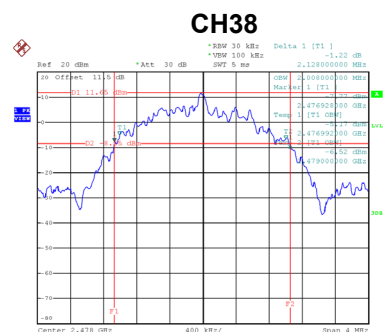
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)
01	2404	2.120	2.008
19	2440	2.128	2.008
38	2478	2.128	2.008



Date: 15.OCT.2021 09:06:44



Date: 15.OCT.2021 09:09:23



Date: 15.OCT.2021 09:11:13

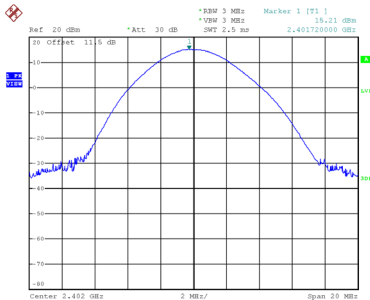
APPENDIX I - MAXIMUM OUTPUT POWER

Test Mode	TX Mode _1Mbps
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Channel	Frequency (MHz)	Peak Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	15.21	20.97	0.1250	Pass
19	2440	15.40	20.97	0.1250	Pass
39	2480	15.15	20.97	0.1250	Pass

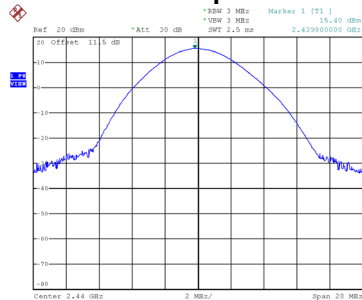
Channel	Frequency (MHz)	Average Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
00	2402	14.84	20.97	0.1250	Pass
19	2440	15.15	20.97	0.1250	Pass
39	2480	14.89	20.97	0.1250	Pass

CH00



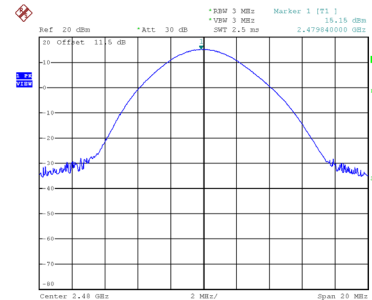
Date: 15.OCT.2021 08:45:36

CH19



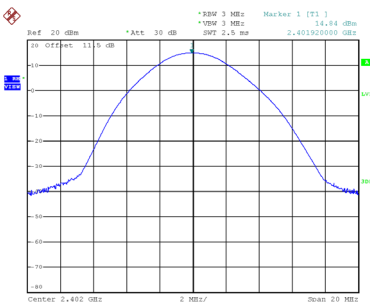
Date: 15.OCT.2021 08:53:33

CH39

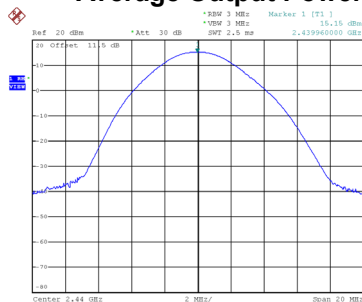


Date: 15.OCT.2021 08:55:02

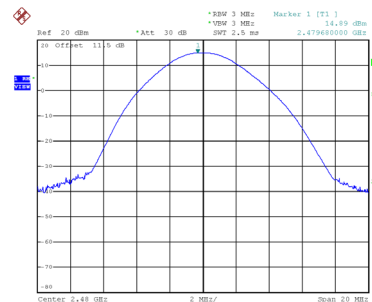
Average Output Power



Date: 15.OCT.2021 09:18:18



Date: 15.OCT.2021 09:18:48



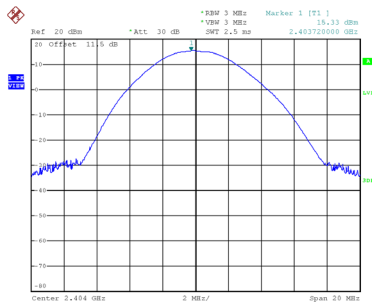
Date: 15.OCT.2021 09:19:17

Test Mode	TX Mode _2Mbps
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Channel	Frequency (MHz)	Peak Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
01	2404	15.33	20.97	0.1250	Pass
19	2440	15.58	20.97	0.1250	Pass
38	2478	15.41	20.97	0.1250	Pass

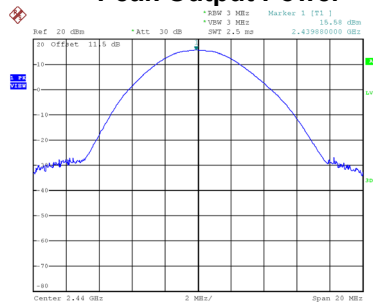
Channel	Frequency (MHz)	Average Output Power (dBm)	Max. Limit (dBm)	Max. Limit (W)	Test Result
01	2404	14.92	20.97	0.1250	Pass
19	2440	15.25	20.97	0.1250	Pass
38	2478	15.04	20.97	0.1250	Pass

CH01



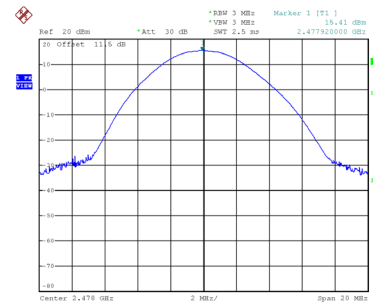
Date: 15.OCT.2021 08:59:03

CH19



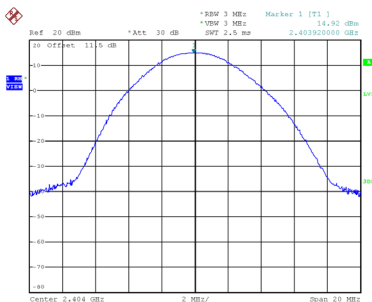
Date: 15.OCT.2021 09:01:11

CH38

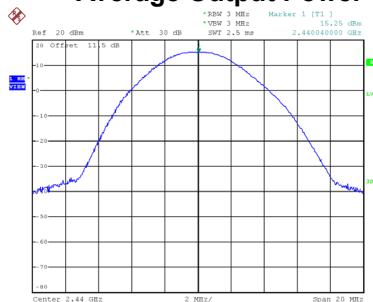


Date: 15.OCT.2021 09:02:34

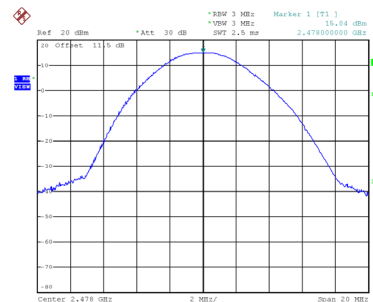
Average Output Power



Date: 15.OCT.2021 09:20:22



Date: 15.OCT.2021 09:20:55

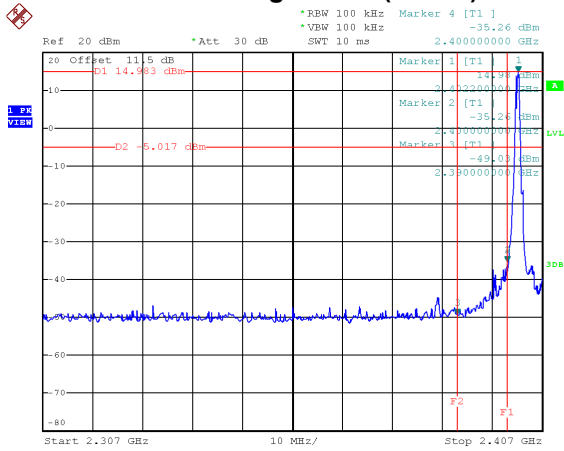


Date: 15.OCT.2021 09:21:28

APPENDIX J - CONDUCTED SPURIOUS EMISSION

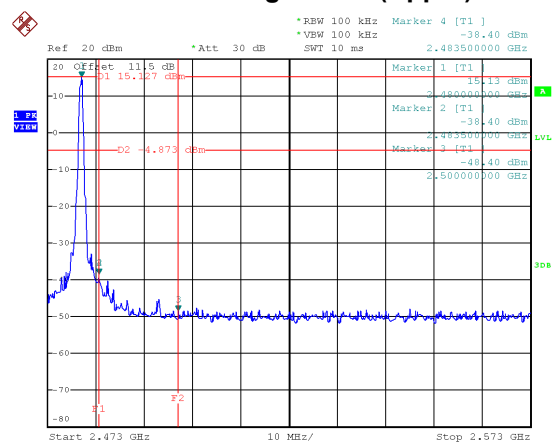
Test Mode TX Mode _1Mbps

Bandedge CH00 (Lower)



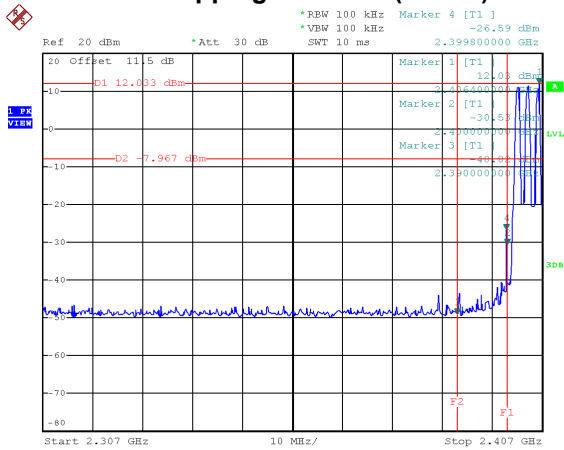
Date: 15.OCT.2021 08:44:45

Bandedge CH39 (Upper)



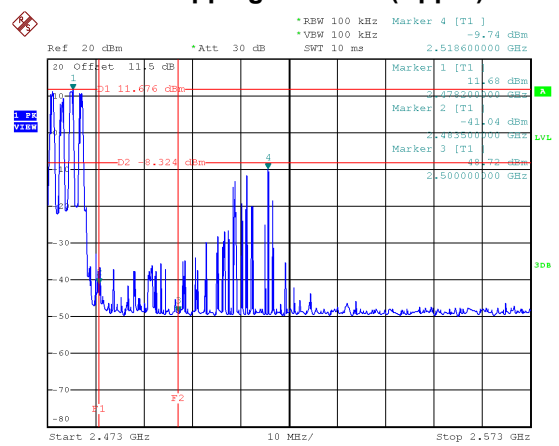
Date: 15.OCT.2021 08:54:02

Hopping on mode (Lower)



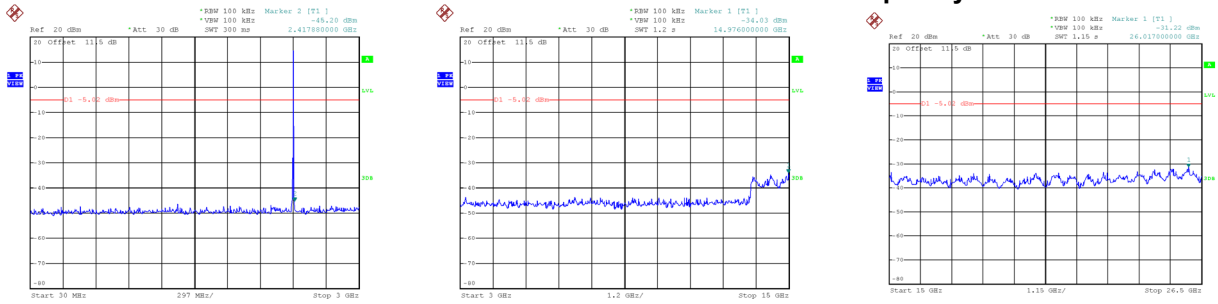
Date: 15.OCT.2021 10:17:27

Hopping on mode (Upper)



Date: 15.OCT.2021 10:18:02

CH00 – 10th Harmonic of the fundamental frequency

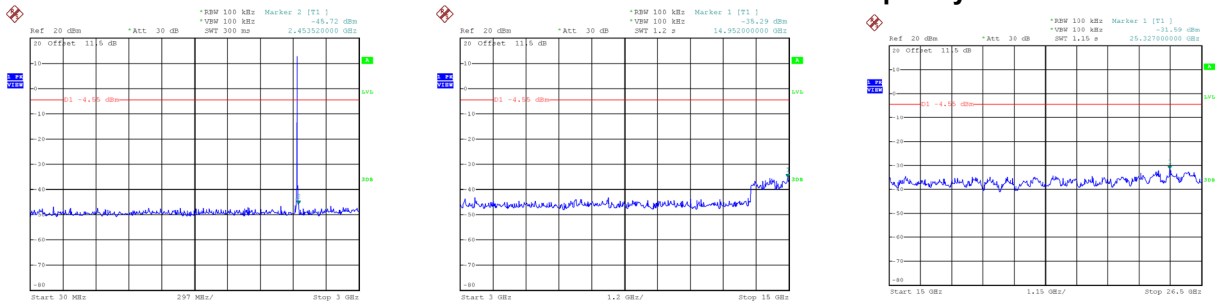


Date: 15.OCT.2021 08:45:17

Date: 15.OCT.2021 08:45:24

Date: 15.OCT.2021 08:45:30

CH19 – 10th Harmonic of the fundamental frequency

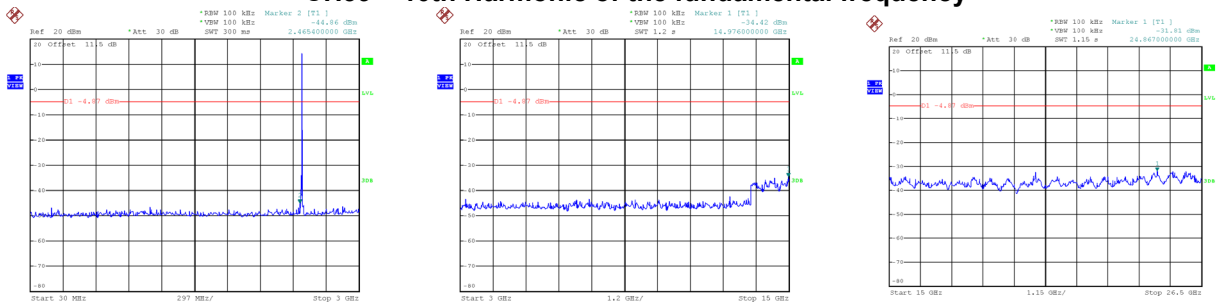


Date: 15.OCT.2021 08:46:57

Date: 15.OCT.2021 08:47:04

Date: 15.OCT.2021 08:47:11

CH39 – 10th Harmonic of the fundamental frequency



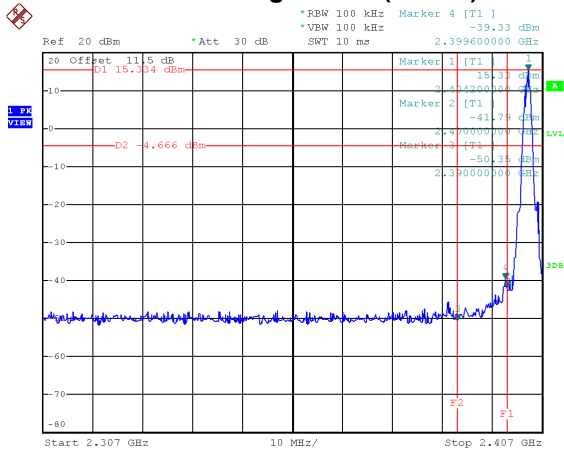
Date: 15.OCT.2021 08:54:40

Date: 15.OCT.2021 08:54:47

Date: 15.OCT.2021 08:54:55

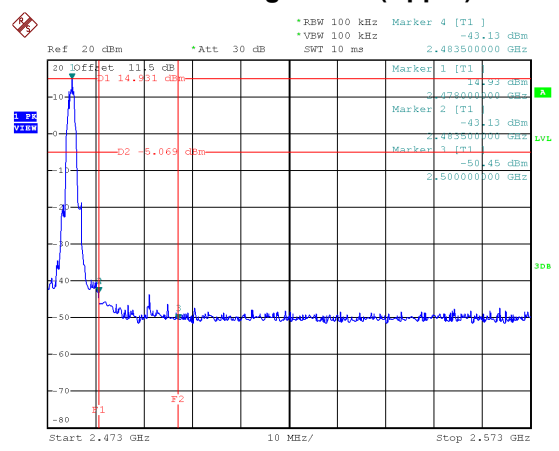
Test Mode TX Mode _2Mbps

Bandedge CH01 (Lower)



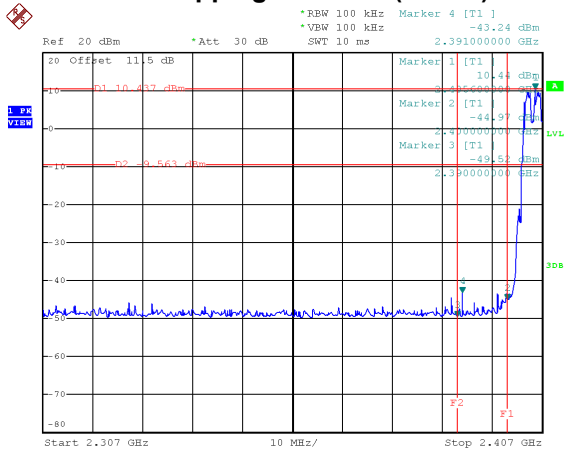
Date: 15.OCT.2021 08:58:18

Bandedge CH38 (Upper)



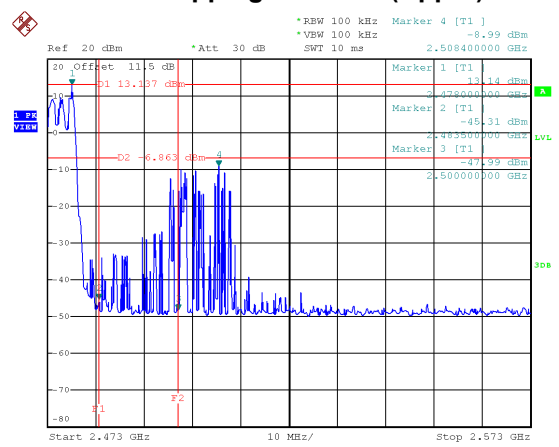
Date: 15.OCT.2021 09:01:49

Hopping on mode (Lower)



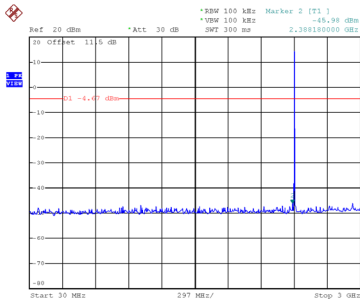
Date: 15.OCT.2021 10:42:01

Hopping on mode (Upper)

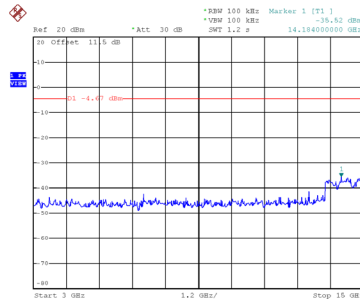


Date: 15.OCT.2021 14:06:08

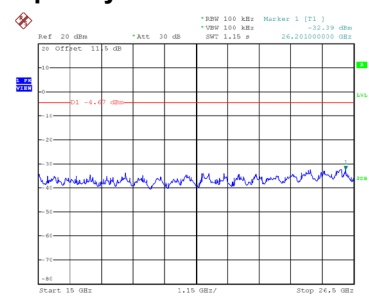
CH01 – 10th Harmonic of the fundamental frequency



Date: 15.OCT.2021 08:58:31

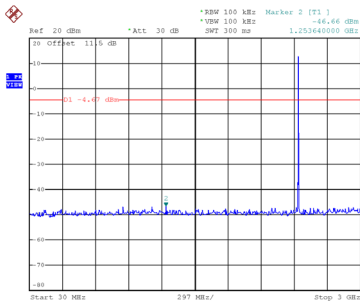


Date: 15.OCT.2021 08:58:39

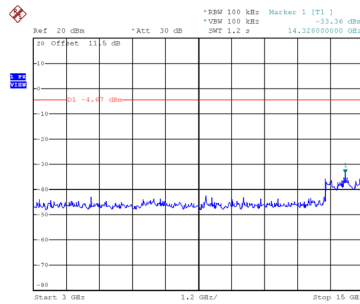


Date: 15.OCT.2021 08:58:47

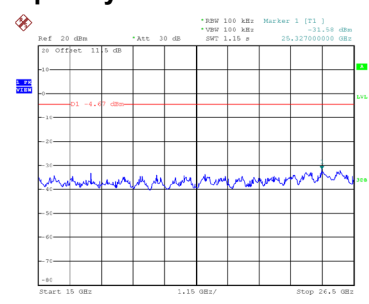
CH19 – 10th Harmonic of the fundamental frequency



Date: 15.OCT.2021 09:00:08

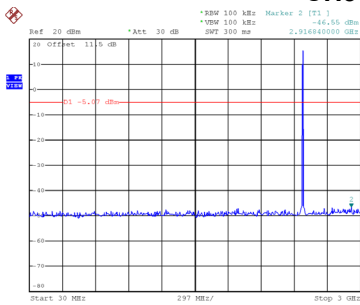


Date: 15.OCT.2021 09:00:16

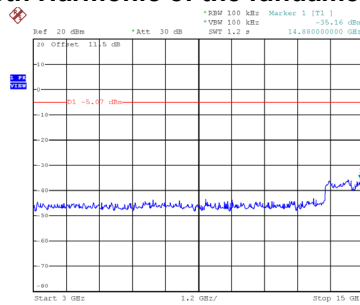


Date: 15.OCT.2021 09:00:24

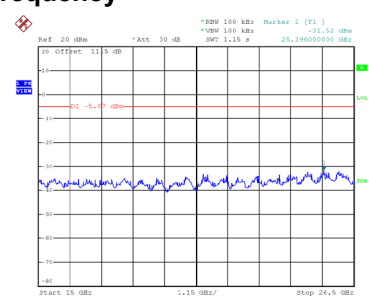
CH38 – 10th Harmonic of the fundamental frequency



Date: 15.OCT.2021 09:02:02



Date: 15.OCT.2021 09:02:10



Date: 15.OCT.2021 09:02:18

APPENDIX K - DECLARATION FOR BLUETOOTH DEVICE

1. Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device has no influence on the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason the check of these RF parameters in one op-mode is sufficient.

2. Frequency range of a Bluetooth device:

Hereby we declare that the maximum frequency of this device is: 2402 - 2480MHz. This is according to the Bluetooth Core Specification (+ critical errata) for devices which will be operated in the USA. This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04-E). Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification are not supported by this device.

3. Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organised in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from its BD address which is unique for each Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4. Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:

40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67, 56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59, 72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75, 09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06, 01, 51, 03, 55, 05, 04

5. Equally average use of frequencies in data mode and behaviour for short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:

- a) LAP/UAP of the master of the connection.
- b) Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS.

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronisation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 μ s. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire.

LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR- operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behaviour:

The first connection between the two devices is established, a hopping sequence was generated. For transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 μ s). The hopping sequence will always differ from the first one.

6. Receiver input bandwidth and behaviour for repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master.

Additionally the type of connection (e.g. single or multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

End of Test Report