

FCC &ISED Radio Test Report

FCC ID: 2AC23-WT541**IC: 12290A-WT541****The report concerns: Original Grant**

Report Reference No.....: 20EFAS12075 0331
Date Sample(s) Received.....: 2020-12-18
Date of Tested.....: 2020-12-19 to 2021-01-13
Date of issue.....: 2021-01-13
Testing Laboratory: DongGuan ShuoXin Electronic Technology Co., Ltd.
Zone A, 1F, No. 6, XinGang Road YuanGang Street,
Address: XinAn District, ChangAn Town, DongGuan City,
GuangDong, China

Applicant's name: Hui Zhou Gaoshengda Technology Co., LTD
Address: NO.75 Zhongkai Development Area, Huizhou,
Guangdong,China
Manufacturer.....: Hui Zhou Gaoshengda Technology Co., LTD

Equipment.....: WIFI +BT Module
Trade Mark: GSD
Model: WT54M2001
Ratings: I/P: DC 3.3V

Test Engineer:



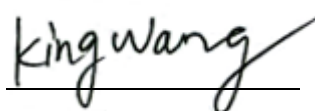
Blue Qiu

Responsible Engineer :



Smile Wang

Authorized Signatory:



King Wang

Table of Contents	Page
1 . TEST REPORT DECLARE	4
2 . SUMMARY OF TEST RESULTS	5
2.1 MEASUREMENT UNCERTAINTY	6
3 . GENERAL INFORMATION	7
3.1 GENERAL DESCRIPTION OF EUT	7
3.2 DESCRIPTION OF TEST MODES	8
3.3 PARAMETERS OF TEST SOFTWARE	9
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
3.5 SUPPORT UNITS	10
3.6 TEST ENVIRONMENT CONDITIONS	10
3.7 DUTY CYCLE	11
4 . AC POWER LINE CONDUCTED EMISSIONS TEST	12
4.1 LIMIT	12
4.2 TEST PROCEDURE	12
4.3 MEASUREMENT INSTRUMENTS LIST	12
4.4 TESTSETUP	13
4.5 EUT OPERATION CONDITIONS	13
4.6 TEST RESULTS	14
5 . RADIATED EMISSIONSTEST	16
5.1 LIMIT	16
5.2 TEST PROCEDURE	17
5.3 MEASUREMENT INSTRUMENTS LIST	18
5.4 TESTSETUP	18
5.5 EUT OPERATIONCONDITIONS	19
5.6 TEST RESULTS - 9KHZ TO 30MHZ	20
5.7 TEST RESULTS - 30MHZTO 1000MHZ	21
5.8 TEST RESULTS- ABOVE 1000MHZ(BAND EDGE)	23
5.9 TEST RESULTS- ABOVE 1000MHZ(HARMONIC)	39
6 . BANDWIDTH TEST	63
6.1 LIMIT	63
6.2 TEST PROCEDURE AND SETTING	63
6.3 MEASUREMENT INSTRUMENTS LIST	63
6.4 TEST SETUP	63

Table of Contents	Page
6.5 EUT OPERATION CONDITIONS	63
6.6 TESTRESULTS	64
7 . MAXIMUM OUTPUT POWER TEST	68
7.1 LIMIT	68
7.2 TEST PROCEDURE AND SETTING	68
7.3 MEASUREMENT INSTRUMENTS LIST	68
7.4 TEST SETUP	68
7.5 EUT OPERATION CONDITIONS	68
7.6 TESTRESULTS	69
8 . CONDUCTED SPURIOUS EMISSIONS	73
8.1 LIMIT	73
8.2 TEST PROCEDURE AND SETTING	73
8.3 MEASUREMENT INSTRUMENTS LIST	73
8.4 TEST SETUP	73
8.5 EUT OPERATION CONDITIONS	73
8.6 TESTRESULTS	74
9 . POWER SPECTRAL DENSITY TEST	77
9.1 LIMIT	77
9.2 TEST PROCEDURE AND SETTING	77
9.3 MEASUREMENT INSTRUMENTS LIST	77
9.4 TEST SETUP	77
9.5 EUT OPERATION CONDITIONS	77
9.6 TESTRESULTS	78
10 . FREQUENCY STABILITY MEASUREMENT	81
10.1 LIMIT	81
10.2 TEST PROCEDURE AND SETTING	81
10.3 MEASUREMENT INSTRUMENTS LIST	81
10.4 TEST SETUP	81
10.5 EUT OPERATION CONDITIONS	81
10.6 TEST RESULTS	82

1 TEST REPORT DECLARE

Applicant	Hui Zhou Gaoshengda Technology Co., LTD
Address	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
Manufacturer	Hui Zhou Gaoshengda Technology Co., LTD
Address	No.2,Jin-da Road, Huinan High-tech Industrial Park, Hui-ao Avenue, Huizhou City, Guangdong, China
Factory	Hui Zhou Gaoshengda Technology Co., LTD
Address	No.2,Jin-da Road, Huinan High-tech Industrial Park, Hui-ao Avenue, Huizhou City, Guangdong, China
Equipment	WIFI +BT Module
Model No.	WT54M2001
Trade Mark	GSD
Standard	FCC Part15, Subpart C (15.247) RSS-247 Issue 2, Feb. 2017 RSS-Gen Issue 5, Mar. 2019 ANSI C63.10-2013

We Declare:

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd(ATT). and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd.(ATT) is assumed of full responsibility for the accuracy and completeness of these tests.

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

ATT'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. ATT shall have no liability for any declarations, inferences or generalizations drawn by the client or others from ATT issued reports.

2 SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below:

Standard(s) Section		Test Item	Judgment	Remark
FCC	ISED			
15.207	RSS-Gen8.8	AC Power Line Conducted Emissions	PASS	-----
15.247(d) 15.205(a) 15.209(a)	RSS-247 5.5 RSS-Gen8.9 RSS-Gen8.10	Radiated Emissions	PASS	-----
15.247(a)(2)	RSS-247 5.2 (a) RSS-Gen6.7	Bandwidth	PASS	-----
15.247(b)(3)	RSS-247 5.4 (d)	Maximum Output Power	PASS	-----
15.247(d)	RSS-247 5.5	Conducted Spurious Emission	PASS	-----
15.247(e)	RSS-247 5.2 (b)	Power Spectral Density	PASS	-----
-	RSS-Gen 6.11	Frequency Stability	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.

2.1 MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Uncertainty for Conduction emission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: V)
	4.60 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	6.10 dB (Polarize: V)
	5.08 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: V)
	5.01 dB (Polarize: H)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: V)
	5.26 dB (Polarize: H)
Uncertainty for Radiation Emission test (18GHz-40GHz)	5.06 dB (Polarize: V)
	5.06 dB (Polarize: H)
Uncertainty for radio frequency	$\pm 0.048\text{kHz}$
Uncertainty for conducted RF Power	$\pm 0.32\text{dB}$

Note:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Test Facility:

The Test site used by DongGuan ShuoXin Electronic Technology Co., Ltd. to collect test data is located on the Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China

The test facility is recognized, certified, or accredited by the following organizations:

Item	Registration No.	Expiration Date
CNAS	L3098	2024-08-27
A2LA	4893.01	2022-06-30
Innovation, Science and Economic Development Canada (ISED)	11033A	2022-06-30
Federal Communications Commission (FCC)	171688 Designation No.: CN1235	2022-06-30

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	WIFI+BT Module	
Brand Name	GSD	
Test Model	WT54M2001	
Series Model	N/A	
Model Difference(s)	N/A	
Hardware Version	V1.0	
Software Version	V1.0	
Power Source	Supplied from USB.	
Power Rating	DC 3.3V	
Operation Frequency	2412 MHz~ 2462 MHz	
Modulation Technology	IEEE 802.11b:DSSS IEEE 802.11g:OFDM IEEE 802.11n:OFDM	
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps	
Operating Mode	IEEE 802.11b:1TX(Ant 1 or Ant 2) IEEE 802.11g:1TX(Ant 1 or Ant 2) IEEE 802.11n (HT20):2TX(Ant 1+Ant 2) IEEE 802.11n (HT40):2TX(Ant 1+Ant 2)	
Antenna Information	Antenna Type: PIFA	Maximum Peak Gain:1.72dBi
Max. Output Power	IEEE 802.11b: 20.84dBm(0.1213W) IEEE 802.11g: 24.51dBm(0.2825W) IEEE 802.11n (HT20):26.30dBm(0.4268W) IEEE 802.11n (HT40):26.66dBm(0.4638W)	

Note:

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

2. Channel List:

CH01 - CH11 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n (HT20) CH03-CH09 for IEEE 802.11n (HT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

3.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09
Mode 5	TX N-40 MHz Mode Channel 09

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

AC power line conducted emissions test	
Final Test Mode	Description
Mode 5	TX N-40 MHz Mode Channel 09

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 5	TX N-40 MHz Mode Channel 09

Radiated emissions test- Above 1GHz	
Final Test Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09

Conducted test	
Final Test Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N-20 MHz Mode Channel 01/06/11
Mode 4	TX N-40 MHz Mode Channel 03/06/09

NOTE:

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

(2) 802.11b mode: DBPSK (1Mbps)

802.11g mode: OFDM (6Mbps)

802.11n HT20 mode : BPSK (13Mbps)

802.11n HT40mode : BPSK (27Mbps)

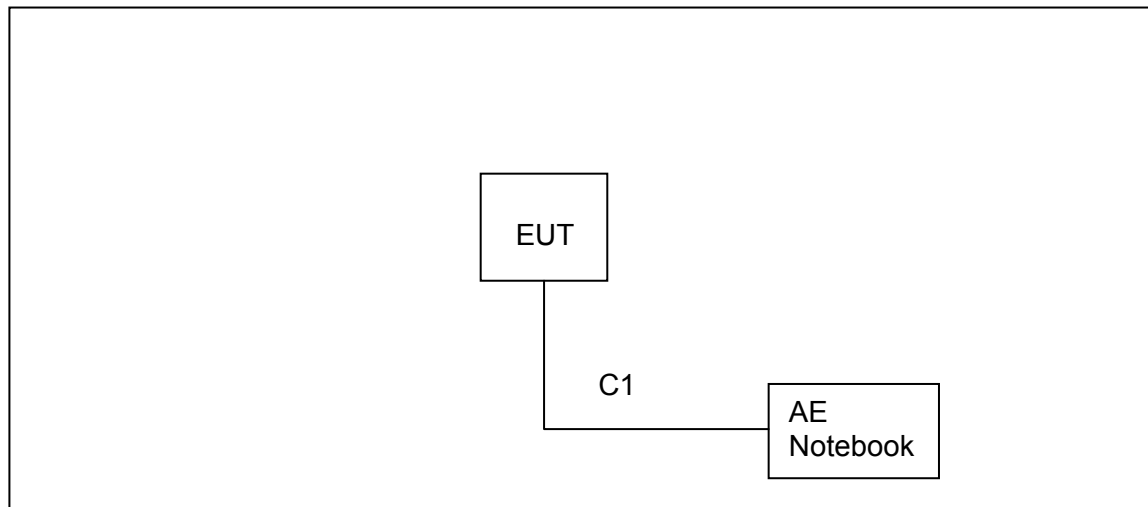
For radiated emission tests, the highest output powers were set for final test.

(3) For radiated emission below 1GHz and AC power line conducted emissions test, the IEEE 802.11n40 channel 09 is found to be the worst case and recorded.

3.3 PARAMETERS OF TEST SOFTWARE

Test Software	MT7668QA		
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	1E	1E	1E
IEEE 802.11g	20	20	20
IEEE 802.11n (HT20)	20	20	20
Test Frequency (MHz)	2422	2437	2452
IEEE 802.11n (HT40)	20	22	20

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
AE	Notebook	ACER	MS2367	32807810766

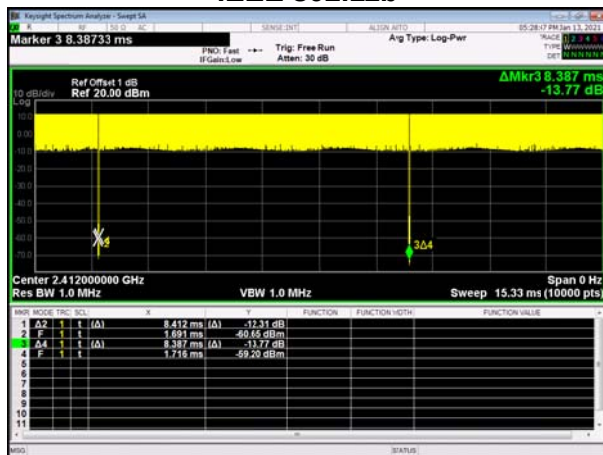
Item	Cable Type	Shielded Type	Ferrite Core	Length
C1	DC Cable	NO	NO	0.8m

3.6 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage
AC Power Line Conducted Emissions	23.1°C	52%	DC 3.3V
Radiated Emissions-9K-30MHz	22°C	60%	DC 3.3V
Radiated Emissions-30 MHz to 1GHz	23°C	54%	DC 3.3V
Radiated Emissions-Above 1000 MHz	23°C	54%	DC 3.3V
Bandwidth	20.6°C	51%	DC 3.3V
Maximum Output Power	20.6°C	51%	DC 3.3V
Conducted Spurious Emission	20.6°C	51%	DC 3.3V
Power Spectral Density	20.6°C	51%	DC 3.3V

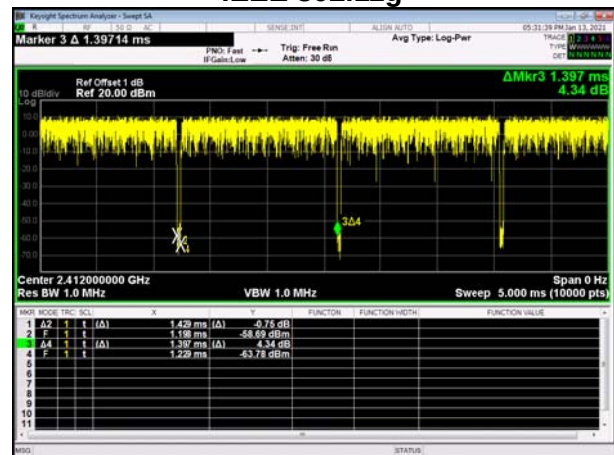
3.7 DUTY CYCLE

IEEE 802.11b



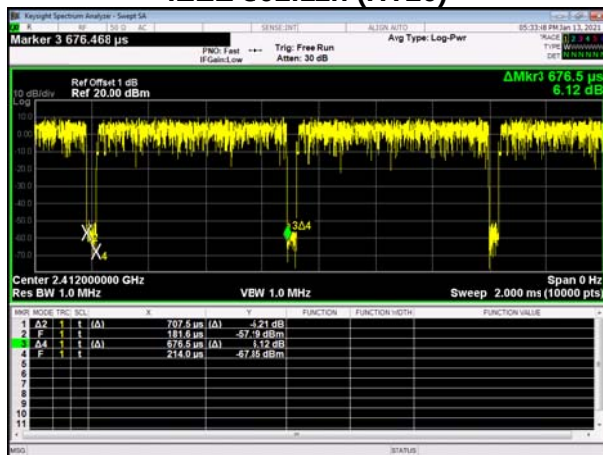
Duty cycle = $8.387\text{ms} / 8.412\text{ms} = 99.70\%$
Duty Factor = $10 \log(1 / \text{Duty cycle}) = 0.0$

IEEE 802.11g



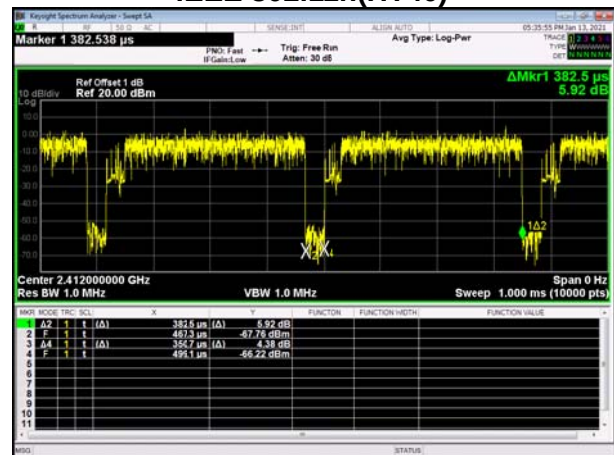
Duty cycle = $1.397\text{ms} / 1.429\text{ms} = 97.76\%$
Duty Factor = $10 \log(1 / \text{Duty cycle}) = 0.1$

IEEE 802.11n (HT20)



Duty cycle = $0.6765\text{ms} / 0.7075\text{ms} = 95.618\%$
Duty Factor = $10 \log(1 / \text{Duty cycle}) = 0.2$

IEEE 802.11n(HT40)



Duty cycle = $0.3507\text{ms} / 0.3825\text{ms} = 91.686\%$
Duty Factor = $10 \log(1 / \text{Duty cycle}) = 0.4$

If duty cycle is $\geq 98\%$, duty factor is not required.

If duty cycle is $< 98\%$, duty factor shall be considered, the Duty Factor = $10 \log(1/\text{Duty cycle})$, the output power = measured power + duty factor, the result of duty factor as below table:

IEEE 802.11b	IEEE 802.11g	IEEE 802.11n (HT20)	IEEE 802.11n (HT40)
0.0	0.1	0.2	0.4

NOTE:

For IEEE 802.11a, IEEE 802.11n (HT20)

For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz (Duty cycle $< 98\%$).

For IEEE 802.11n (HT40)

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

4 AC POWER LINE CONDUCTED EMISSIONS TEST

4.1 LIMIT

Frequency of Emission (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0.15 -0.50	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

NOTE:

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

The following table is the setting of the receiver

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

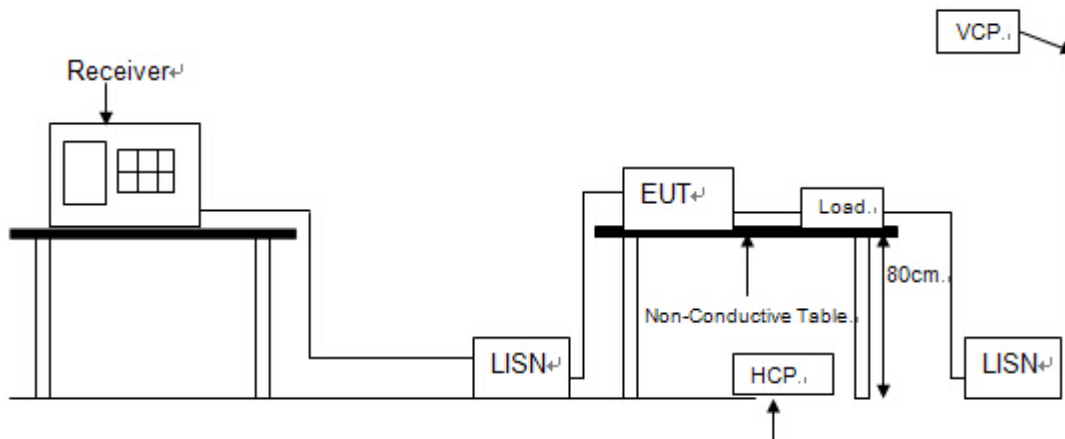
4.2 TEST PROCEDURE

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

4.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/11/2021
2	EMI Test Receiver	R&S	ESCI	101308	12/11/2021
3	LISN	AFJ	LS16	16011103219	06/10/2021
4	LISN	Schwarzbeck	NSLK 8127	8127-432	12/11/2021
5	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

4.4 TESTSETUP

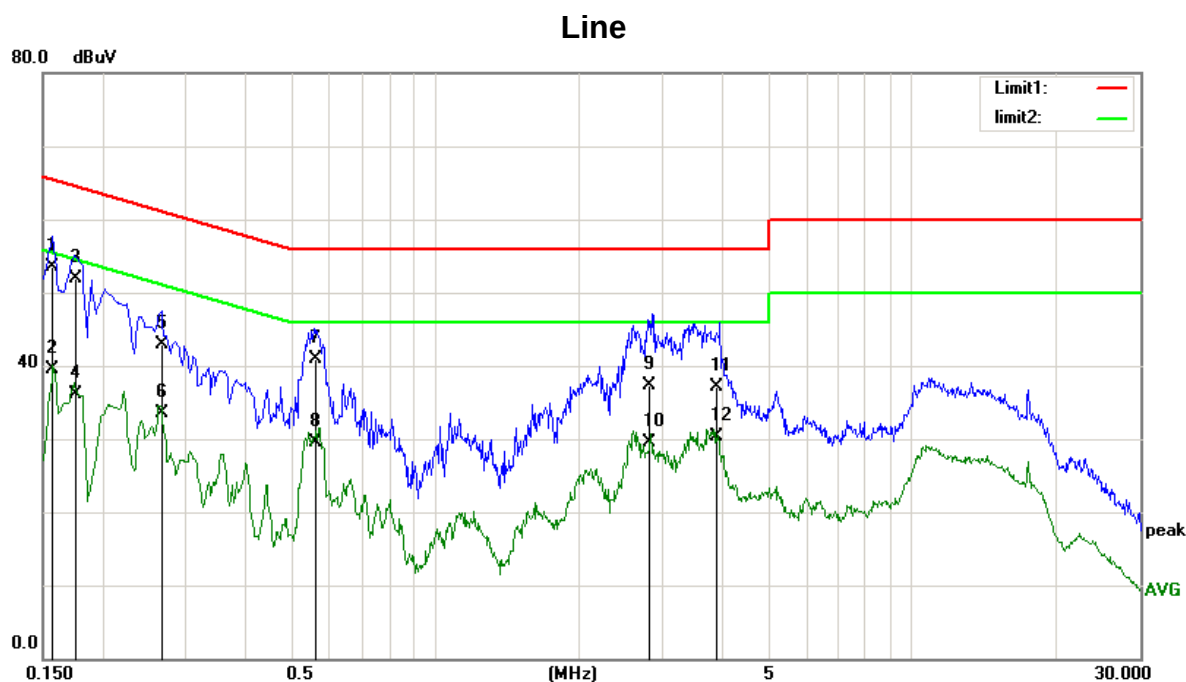


4.5 EUT OPERATION CONDITIONS

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.

4.6 TEST RESULTS

Test Mode: TX N-40 MHz Mode Channel 09



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1570	41.96	11.48	53.44	65.62	-12.18	QP
2	0.1570	28.08	11.48	39.56	55.62	-16.06	AVG
3	0.1763	40.57	11.35	51.92	64.65	-12.73	QP
4	0.1763	24.74	11.35	36.09	54.65	-18.56	AVG
5	0.2674	32.26	10.74	43.00	61.20	-18.20	QP
6	0.2674	22.78	10.74	33.52	51.20	-17.68	AVG
7	0.5583	30.61	10.27	40.88	56.00	-15.12	QP
8	0.5583	19.32	10.27	29.59	46.00	-16.41	AVG
9	2.8191	27.07	10.23	37.30	56.00	-18.70	QP
10	2.8191	19.36	10.23	29.59	46.00	-16.41	AVG
11	3.9009	26.94	10.22	37.16	56.00	-18.84	QP
12	3.9009	20.03	10.22	30.25	46.00	-15.75	AVG

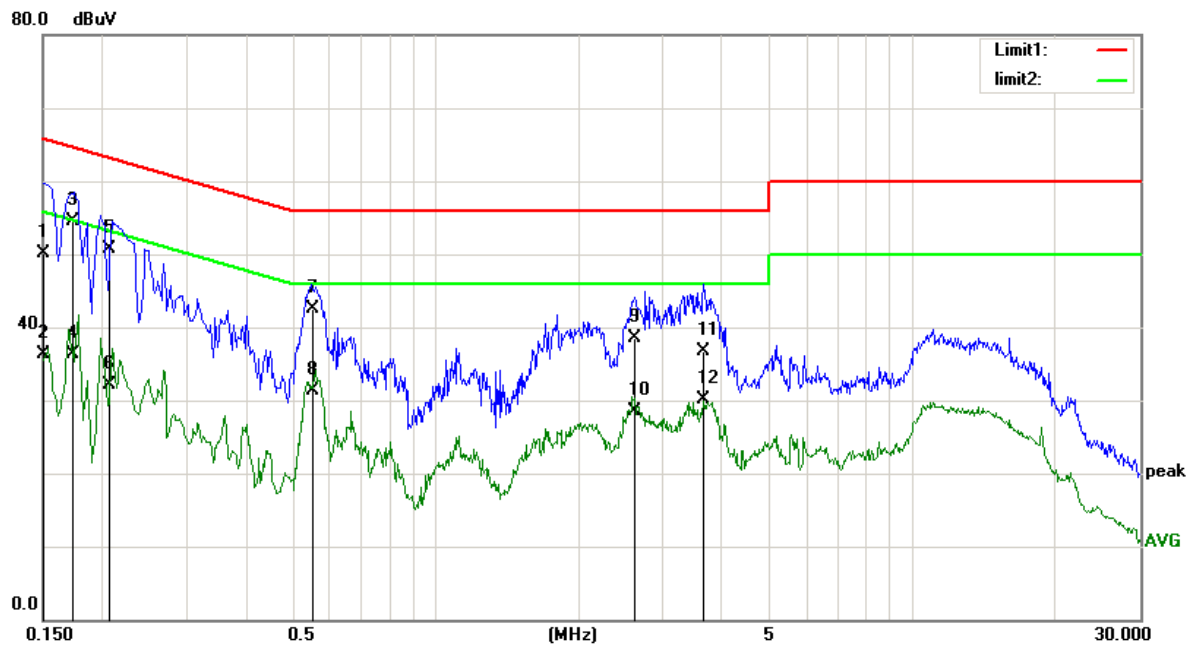
Remarks:

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

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

Test Mode: TX N-40 MHz Mode Channel 09

Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1505	38.64	11.53	50.17	65.97	-15.80	QP
2	0.1505	24.73	11.53	36.26	55.97	-19.71	AVG
3	0.1730	43.06	11.37	54.43	64.81	-10.38	QP
4	0.1730	24.93	11.37	36.30	54.81	-18.51	AVG
5	0.2065	39.60	11.15	50.75	63.34	-12.59	QP
6	0.2065	21.02	11.15	32.17	53.34	-21.17	AVG
7	0.5559	32.33	10.27	42.60	56.00	-13.40	QP
8	0.5559	21.05	10.27	31.32	46.00	-14.68	AVG
9	2.6086	28.27	10.22	38.49	56.00	-17.51	QP
10	2.6086	18.26	10.22	28.48	46.00	-17.52	AVG
11	3.6327	26.42	10.23	36.65	56.00	-19.35	QP
12	3.6327	19.97	10.23	30.20	46.00	-15.80	AVG

Remarks:

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

5 RADIATED EMISSIONSTEST

5.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a) and RSS-Gen 8.10, then the 15.209(a) and RSS-Gen 8.9limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-30 MHz)

Frequency (MHz)	Magnetic field strength (H-Field) (μ A/m)	Measurement Distance (meters)
0.009-0.490	6.37/F(kHz)	300
0.490-1.705	6.37/F(kHz)	30
1.705-30.0	0.08	30

LIMITS OF RADIATED EMISSION MEASUREMENT (30 MHz-1000MHz)

Frequency (MHz)	Field Strength (μ V/m at 3m)
30-88	100
88-216	150
216-960	200
Above 960	500

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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 and RSS-247.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (μ V/m).

5.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- 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 1GHz)
- 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 1GHz.
- 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 1GHz)
- 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 1GHz)
- i. The test result is calculated as the following:
 - (1) Result = Reading + Correct Factor
 - (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
 - (3) Margin = Result - Limit

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

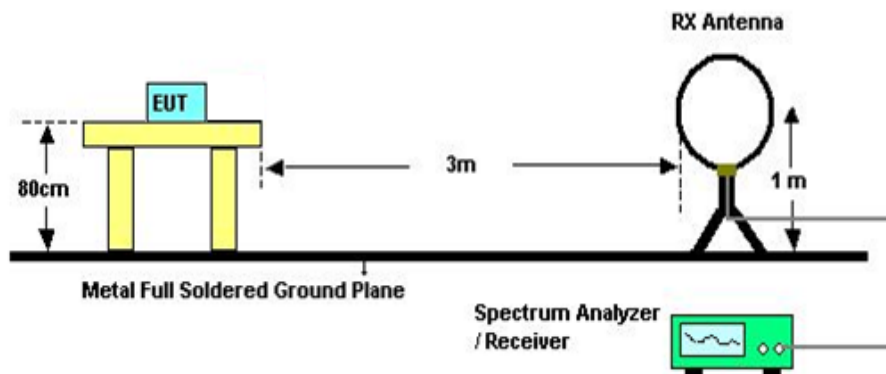
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz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

5.3 MEASUREMENT INSTRUMENTS LIST

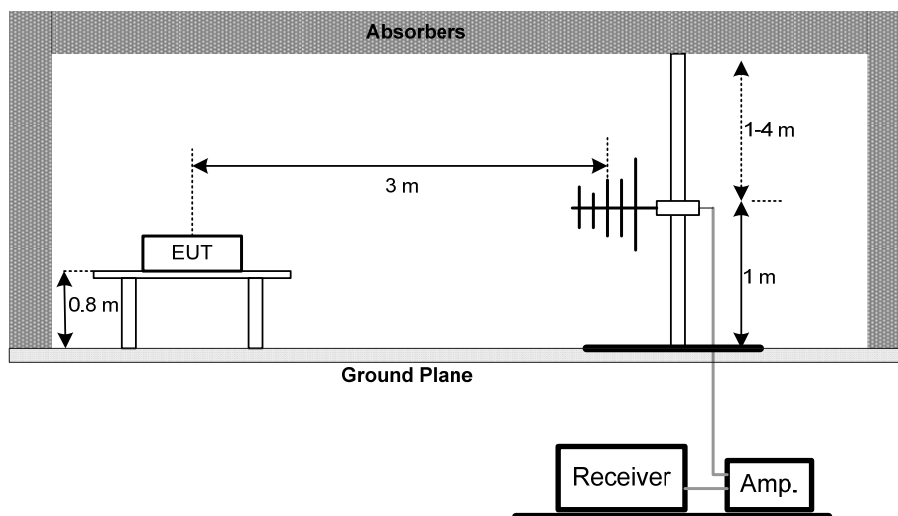
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101307	12/12/2021
2	Spectrum Analyzer	Agilent	E4407B	US40240708	11/17/2021
3	Loop antenna	SCHWARZBECK K	FMZB1519	1519-062	12/14/2021
4	Broadband antenna	SCHWARZBECK	VULB9168	VULB9168-192	03/22/2021
5	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D 1065	04/21/2021
6	Preamplifier Amplifier	HP	8447F	3113A05680	12/11/2021
7	PRE-AMPLIFIER	CY	EMC011830	980136	12/11/2021
8	RF Cable	R&S	Test Cable 4	4	12/11/2021
9	RF Cable	R&S	Test Cable 5	5	12/11/2021
10	RF Cable	R&S	Test Cable 9	9	04/21/2021
11	RF Cable	R&S	Test Cable 10	10	12/11/2021
12	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

5.4 TESTSETUP

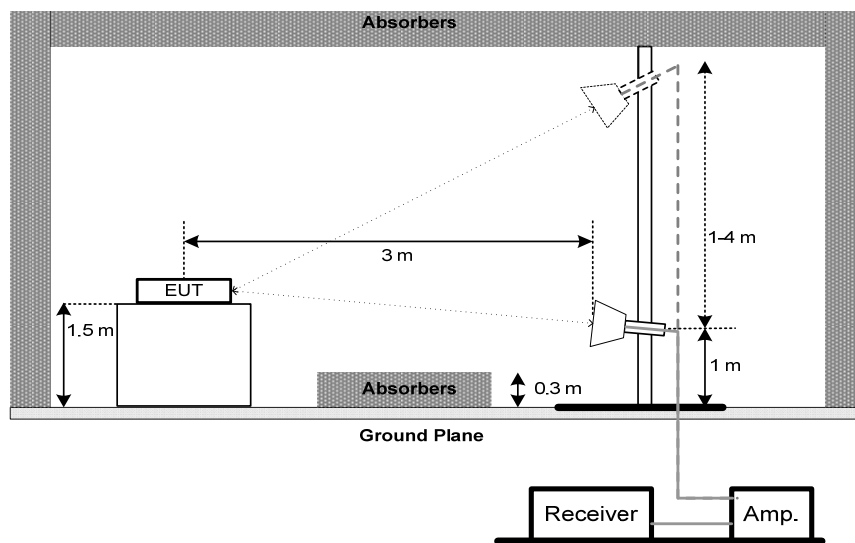
9 kHz-30 MHz



30 MHz to 1 GHz



Above 1 GHz



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS - 9kHz TO 30MHz

Test Mode:	TX N-40 MHz Mode Channel 09
------------	-----------------------------

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:

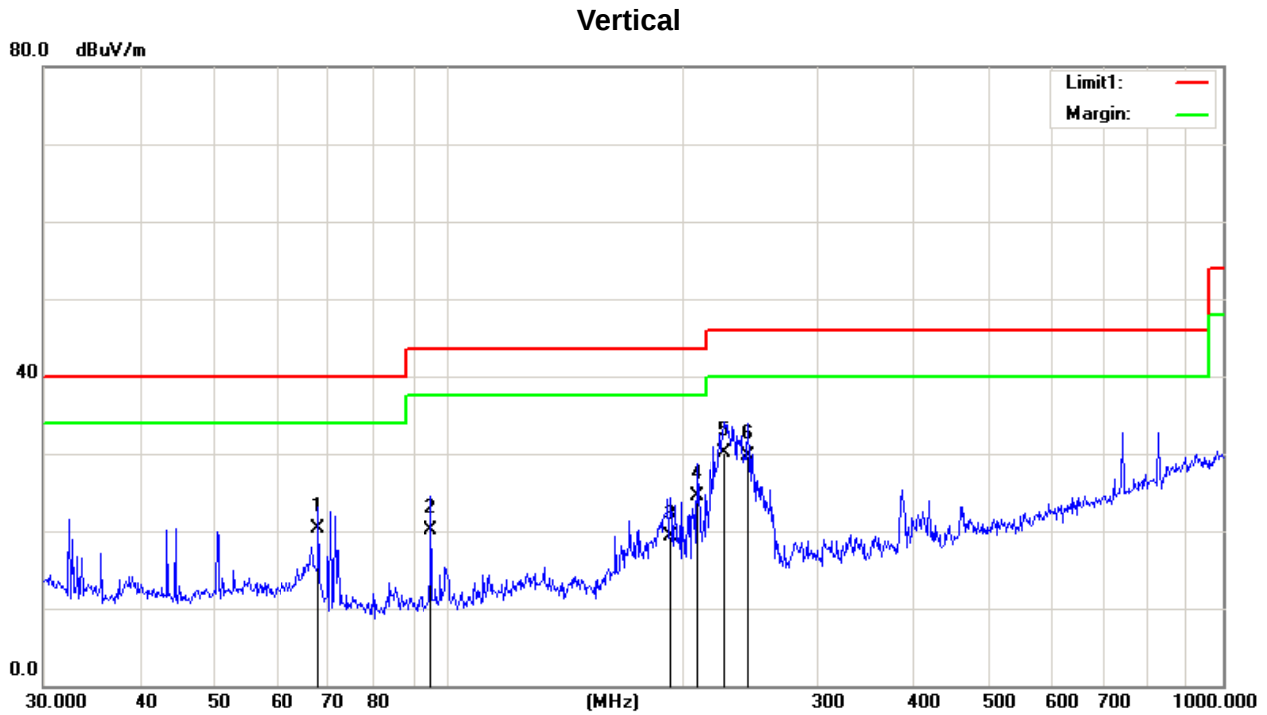
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $20 \log (\text{specific distance/test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor

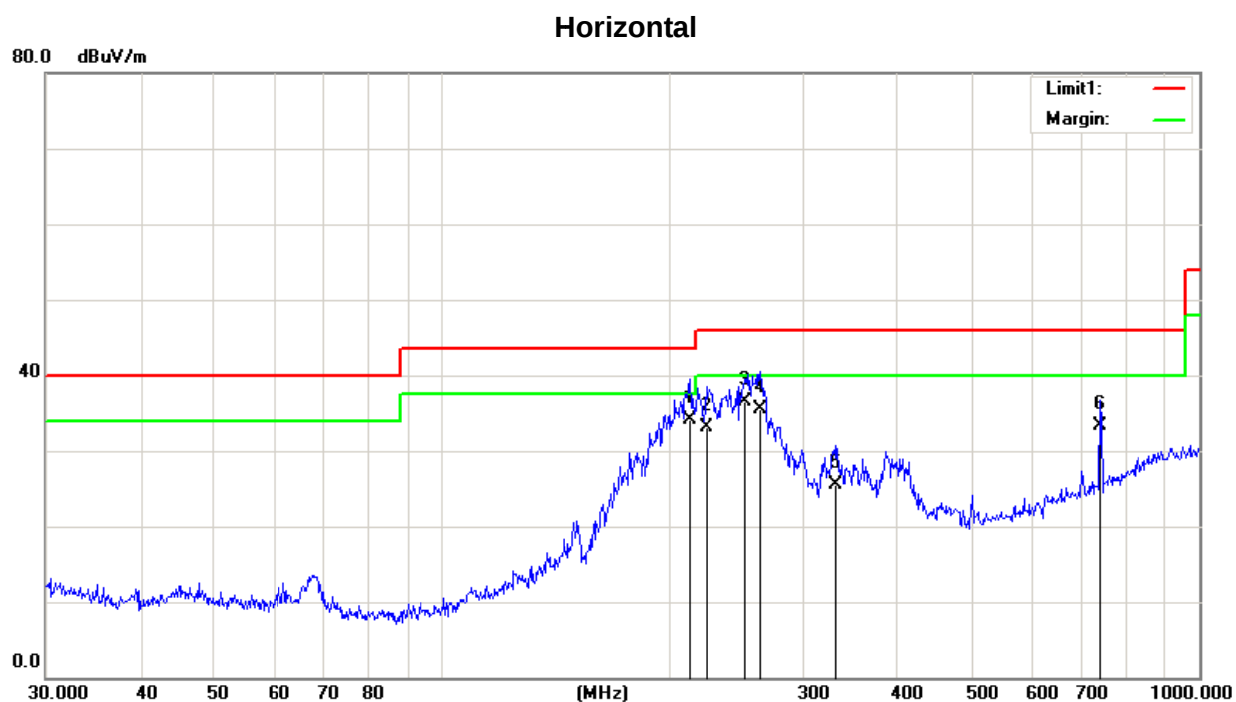
5.7 TEST RESULTS - 30MHz TO 1000MHz

Test Mode : TX N-40 MHz Mode Channel 09



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	67.9128	34.13	-13.83	20.30	40.00	-19.70	QP
2	95.0930	34.92	-14.79	20.13	43.50	-23.37	QP
3	193.0945	30.89	-11.59	19.30	43.50	-24.20	QP
4	209.3129	35.27	-10.76	24.51	43.50	-18.99	QP
5	227.6905	38.63	-8.43	30.20	46.00	-15.80	QP
6	244.2321	37.77	-8.14	29.63	46.00	-16.37	QP

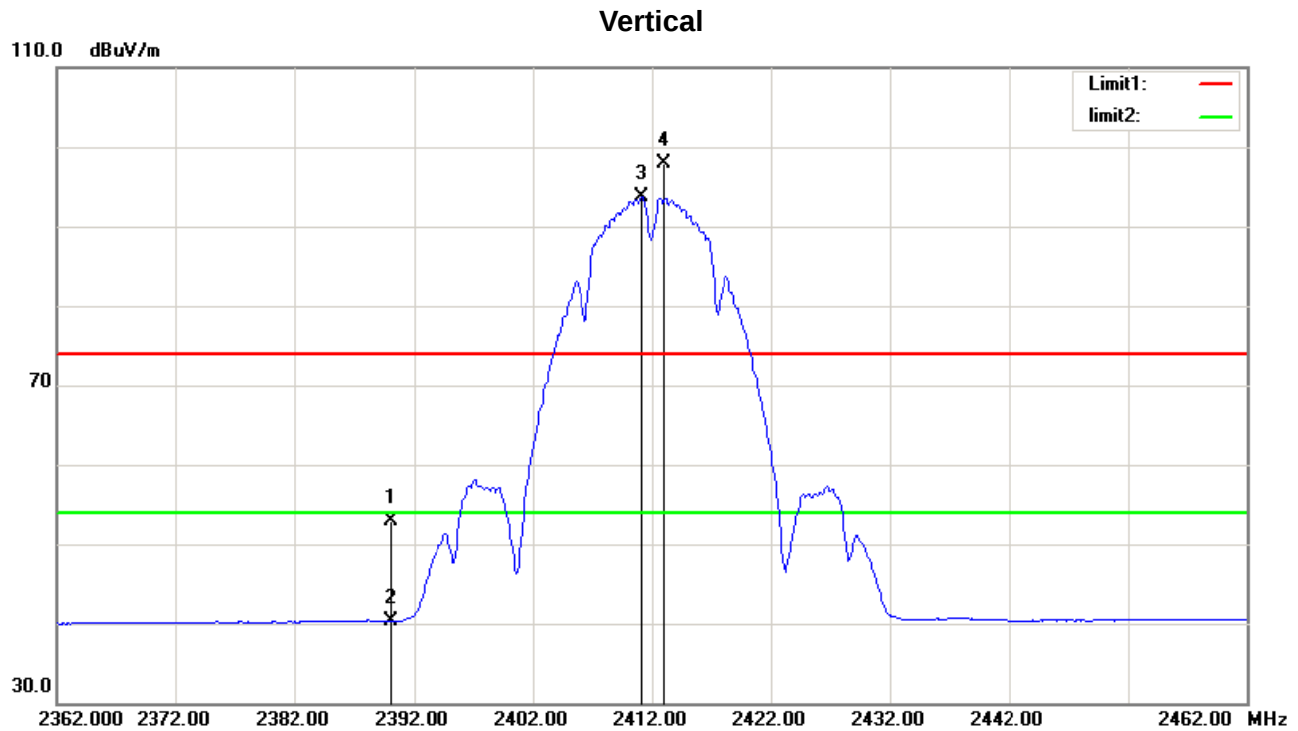
Test Mode : TX N-40 MHz Mode Channel 09



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	212.2694	43.28	-9.13	34.15	43.50	-9.35	QP
2	222.9501	41.48	-8.28	33.20	46.00	-12.80	QP
3	251.1803	42.54	-6.04	36.50	46.00	-9.50	QP
4	262.8955	40.27	-4.80	35.47	46.00	-10.53	QP
5	331.3546	34.01	-8.41	25.60	46.00	-20.40	QP
6	739.6604	33.01	0.28	33.29	46.00	-12.71	QP

5.8 TEST RESULTS- ABOVE 1000MHz(BAND EDGE)

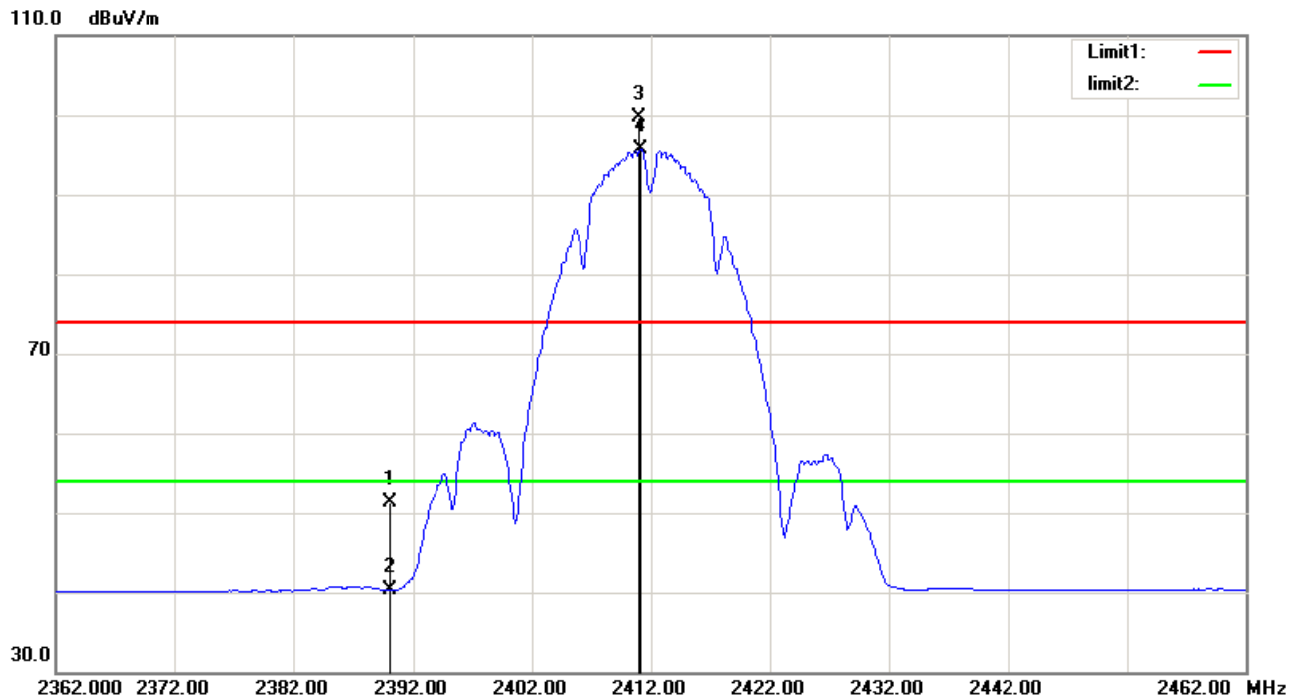
Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	22.86	30.06	52.92	74.00	-21.08	peak
2	2390.000	10.22	30.06	40.28	54.00	-13.72	AVG
3	2411.200	63.55	30.12	93.67	/	/	AVG
4	2413.000	67.73	30.13	97.86	/	/	peak

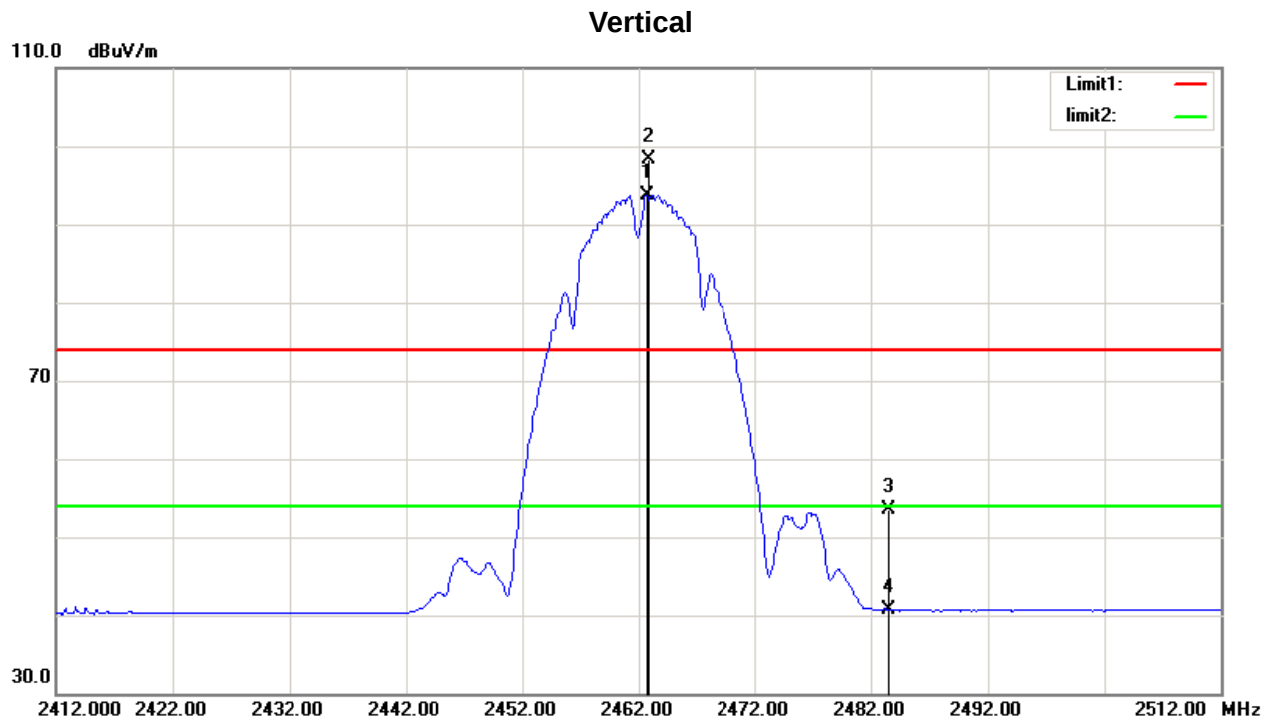
Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz

Horizontal



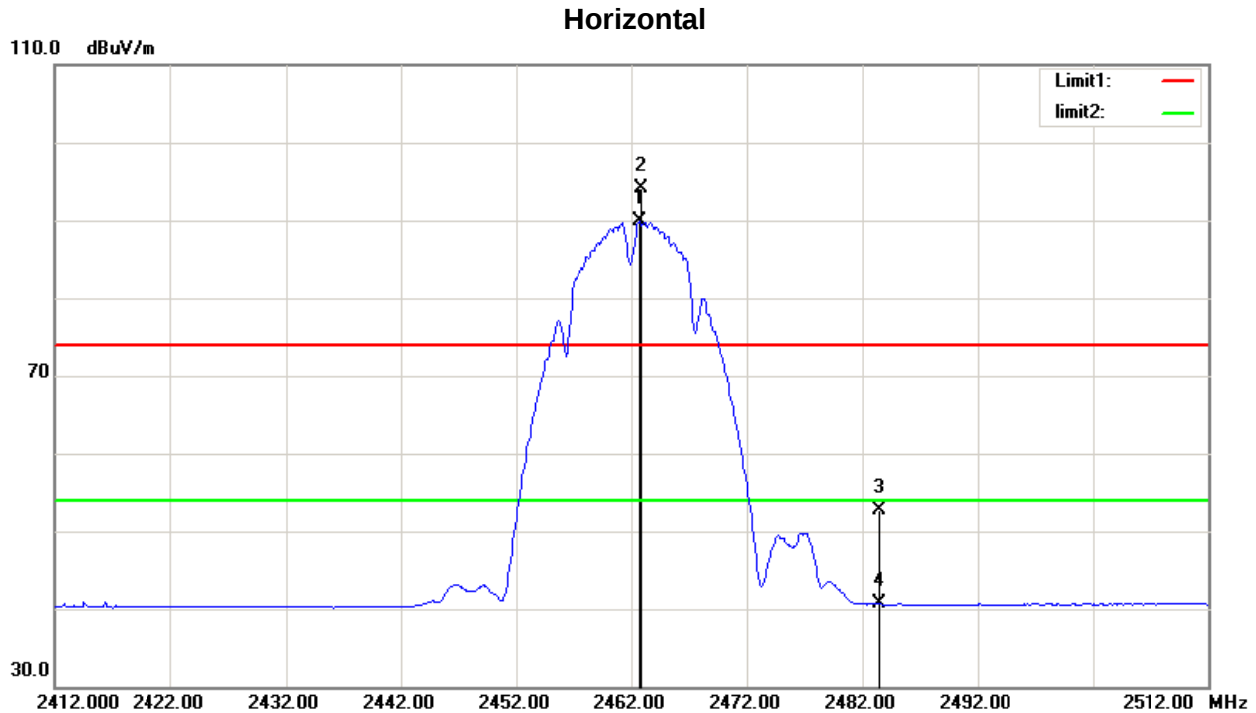
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	21.21	30.06	51.27	74.00	-22.73	peak
2	2390.000	10.23	30.06	40.29	54.00	-13.71	AVG
3	2411.000	69.60	30.12	99.72	/	/	peak
4	2411.200	65.61	30.12	95.73	/	/	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz



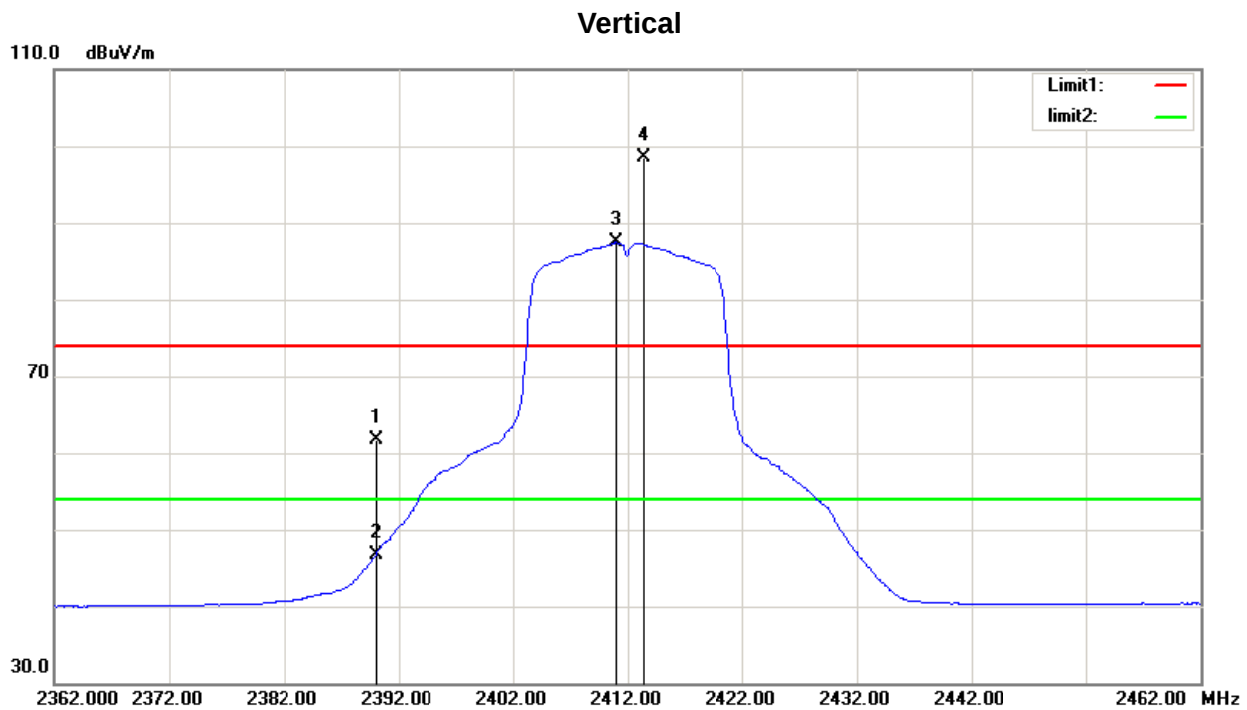
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.700	63.47	30.28	93.75	/	/	AVG
2	2462.900	67.99	30.28	98.27	/	/	peak
3	2483.500	23.23	30.33	53.56	74.00	-20.44	peak
4	2483.500	10.40	30.33	40.73	54.00	-13.27	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz



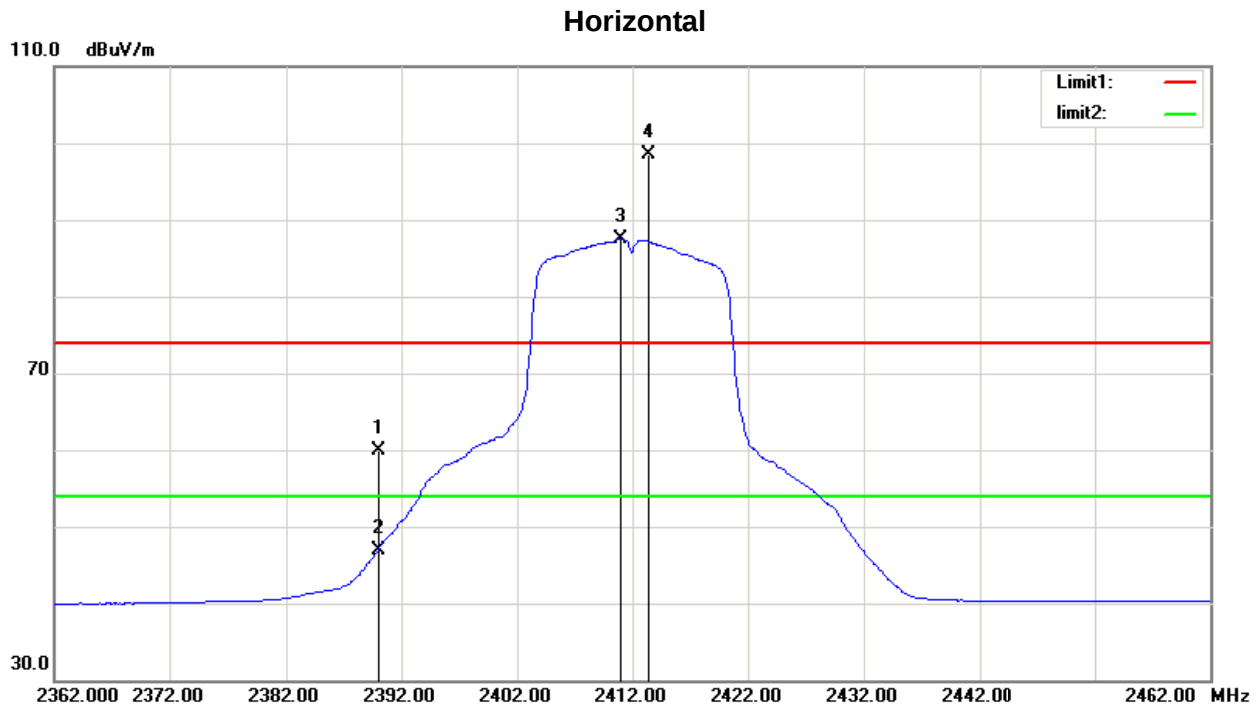
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.700	59.57	30.28	89.85	/	/	AVG
2	2462.900	63.81	30.28	94.09	/	/	peak
3	2483.500	22.28	30.33	52.61	74.00	-21.39	peak
4	2483.500	10.28	30.33	40.61	54.00	-13.39	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz



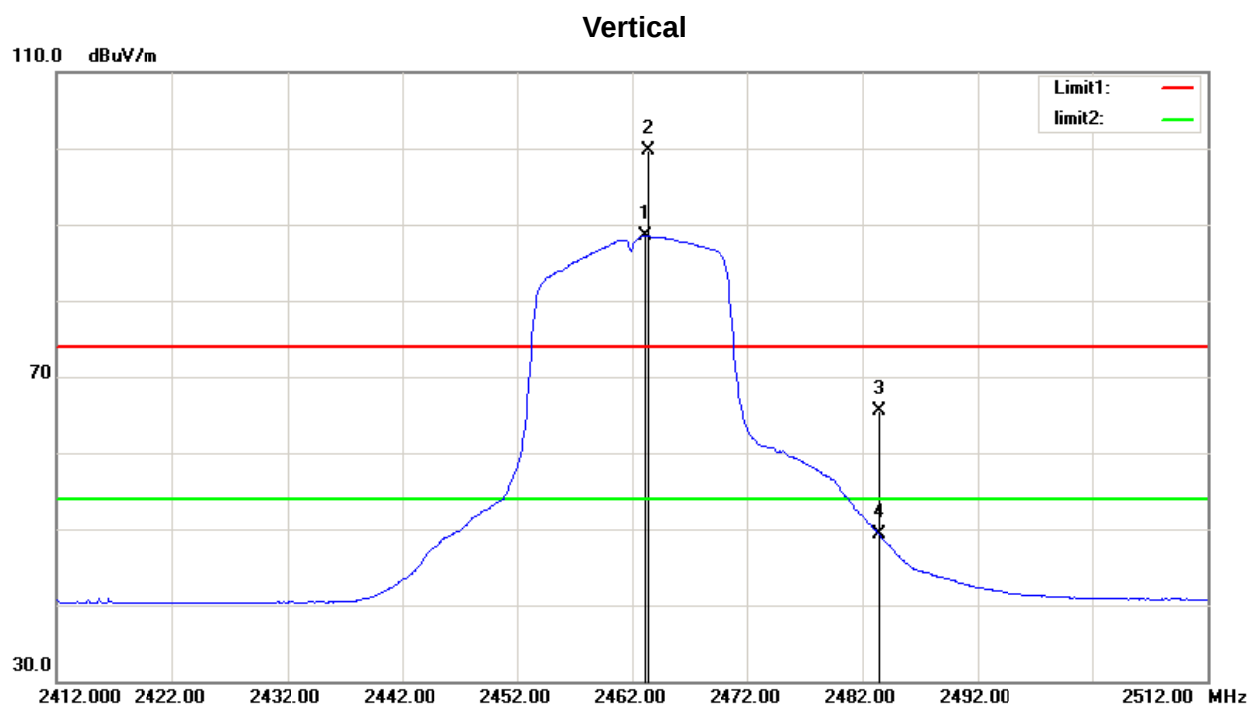
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	31.70	30.06	61.76	74.00	-12.24	peak
2	2390.000	16.67	30.06	46.73	54.00	-7.27	AVG
3	2411.000	57.32	30.12	87.44	/	/	AVG
4	2413.400	68.29	30.13	98.42	/	/	peak

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz



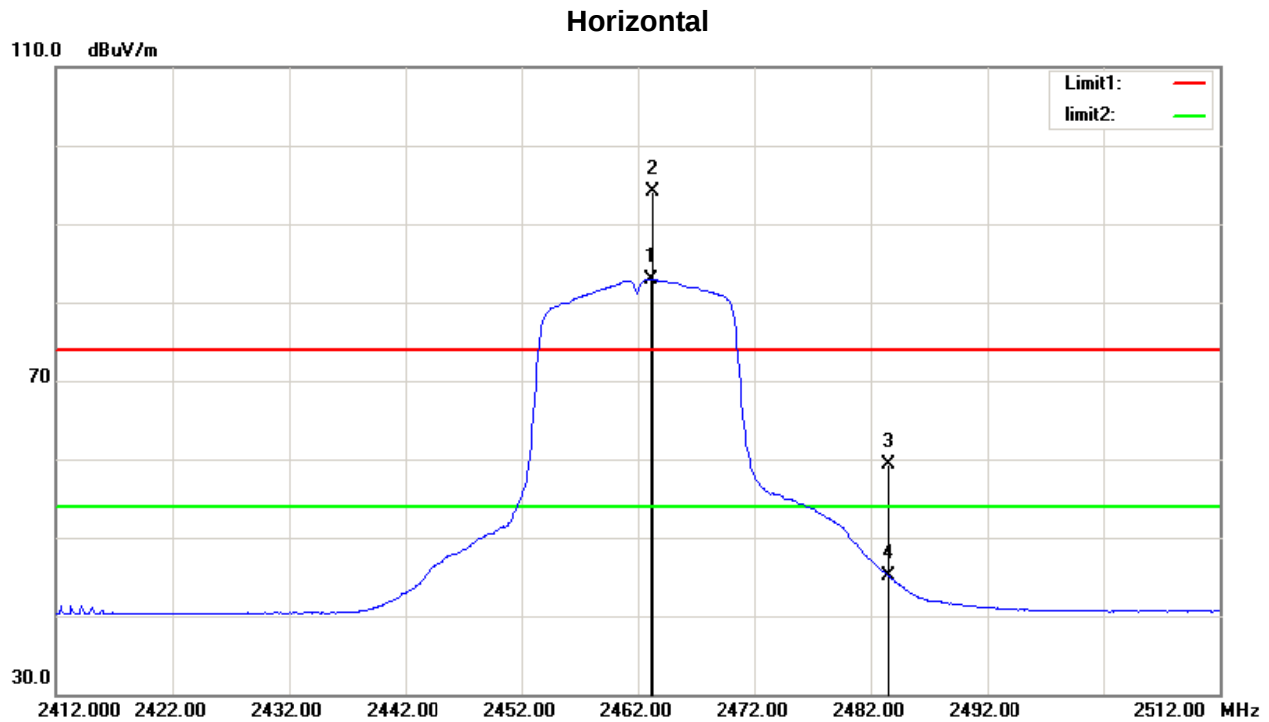
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	29.89	30.06	59.95	74.00	-14.05	peak
2	2390.000	16.86	30.06	46.92	54.00	-7.08	AVG
3	2411.000	57.41	30.12	87.53	/	/	AVG
4	2413.400	68.34	30.13	98.47	/	/	peak

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz



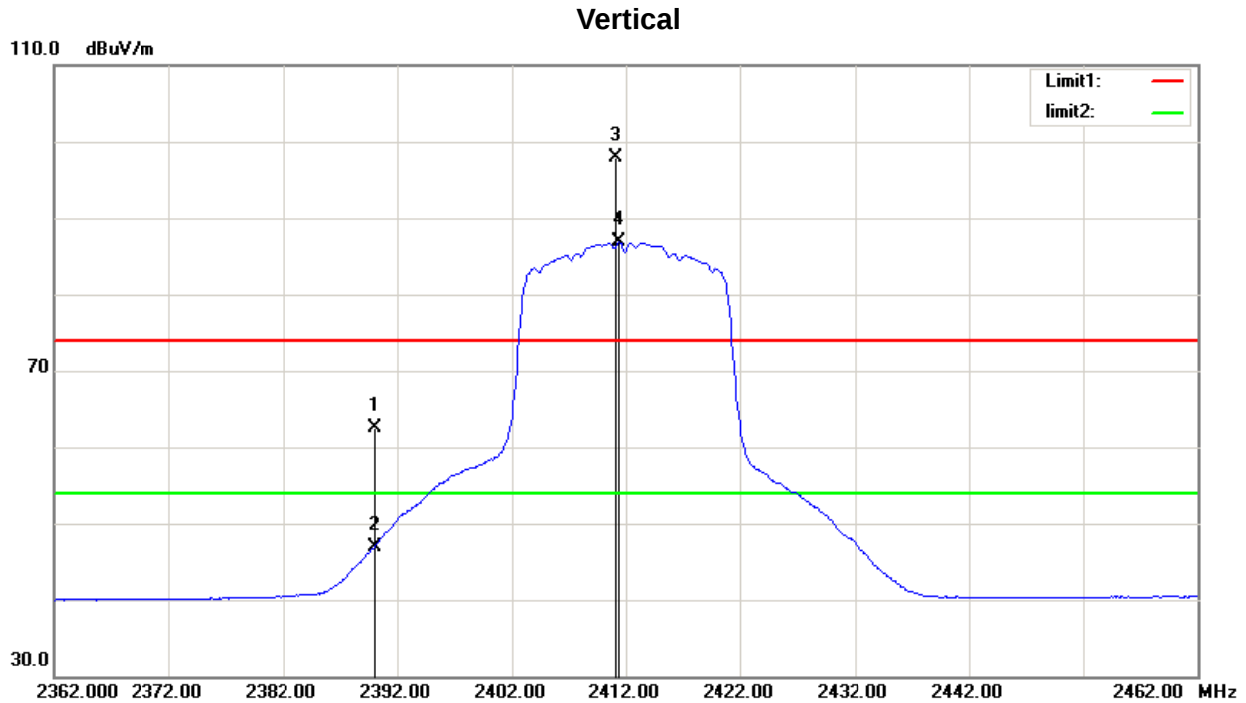
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.200	58.23	30.28	88.51	/	/	AVG
2	2463.400	69.48	30.28	99.76	/	/	peak
3	2483.500	35.26	30.33	65.59	74.00	-8.41	peak
4	2483.500	19.05	30.33	49.38	54.00	-4.62	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.200	52.70	30.28	82.98	/	/	AVG
2	2463.300	63.81	30.28	94.09	/	/	peak
3	2483.500	28.96	30.33	59.29	74.00	-14.71	peak
4	2483.500	14.86	30.33	45.19	54.00	-8.81	AVG

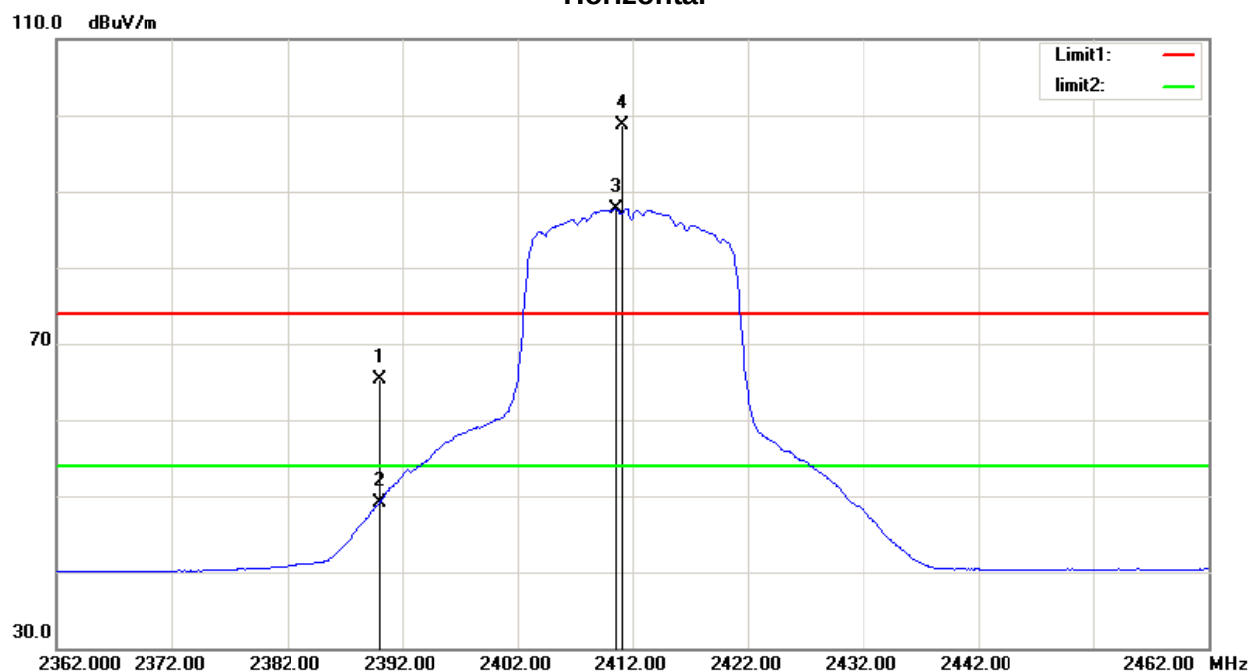
Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2412 MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	32.52	30.06	62.58	74.00	-11.42	peak
2	2390.000	16.90	30.06	46.96	54.00	-7.04	AVG
3	2411.200	67.85	30.12	97.97	/	/	peak
4	2411.400	56.71	30.12	86.83	/	/	AVG

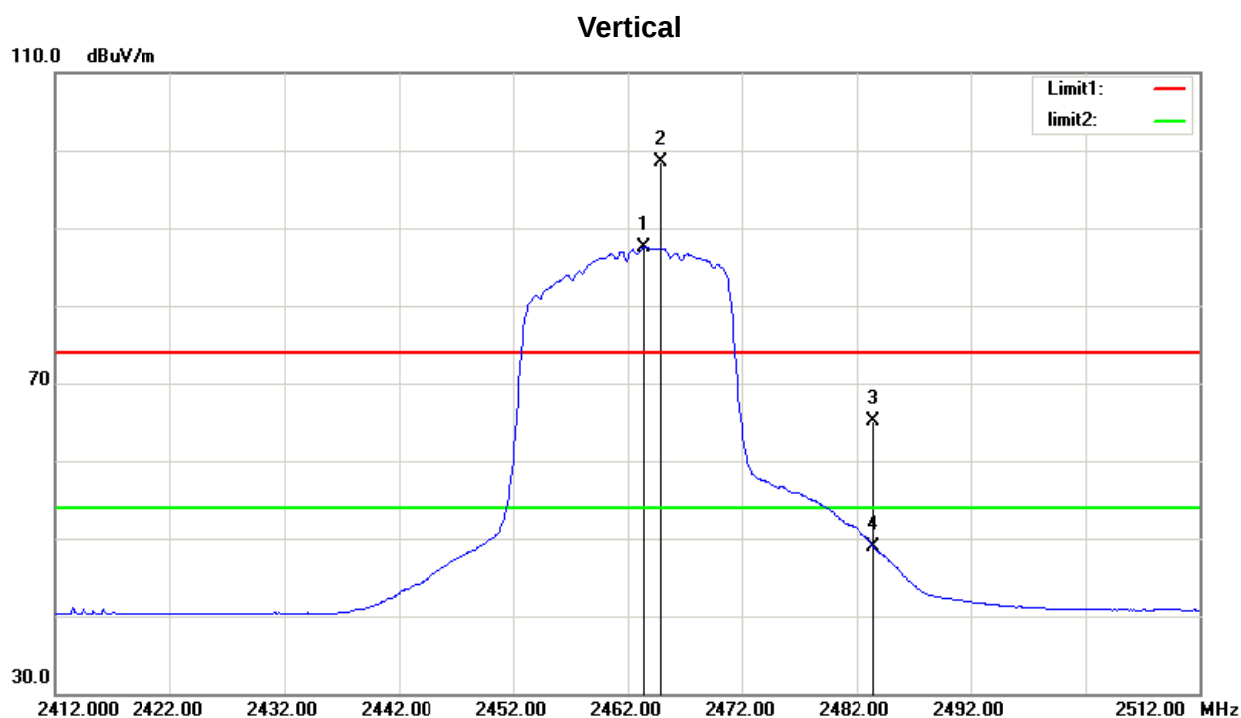
Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2412 MHz

Horizontal



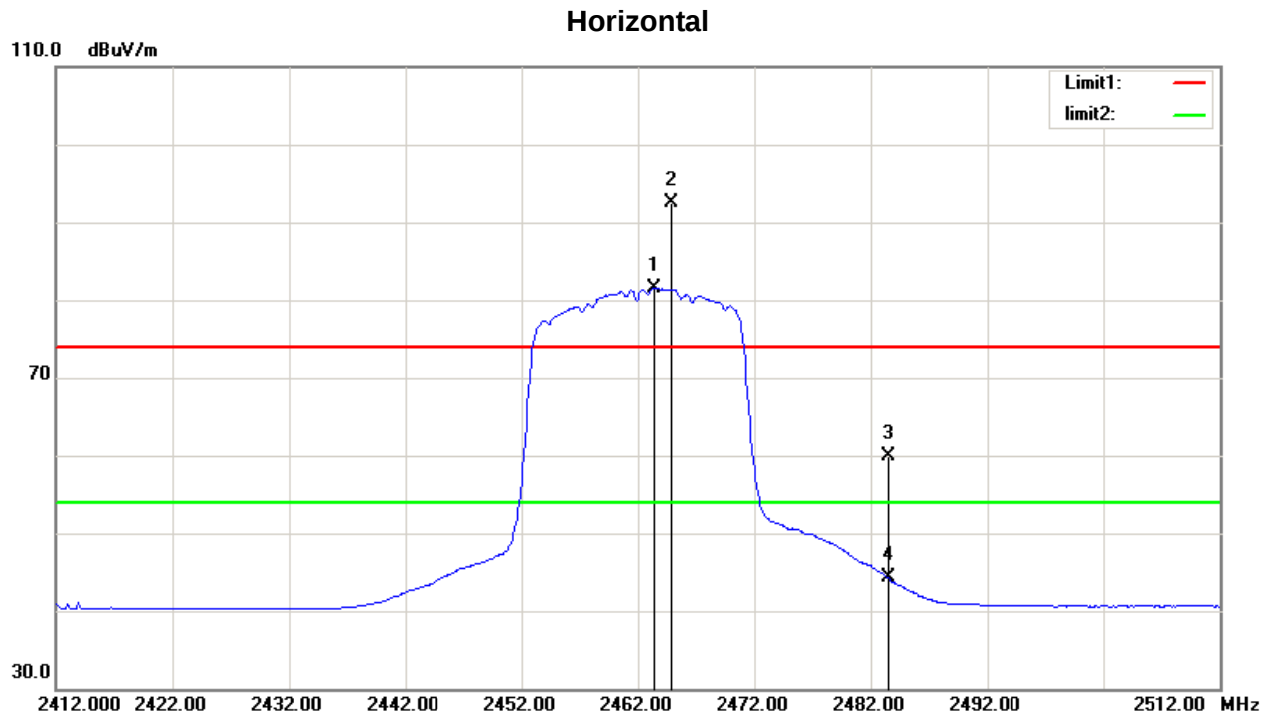
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	35.30	30.06	65.36	74.00	-8.64	peak
2	2390.000	18.99	30.06	49.05	54.00	-4.95	AVG
3	2410.600	57.61	30.12	87.73	/	/	AVG
4	2411.200	68.57	30.12	98.69	/	/	peak

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



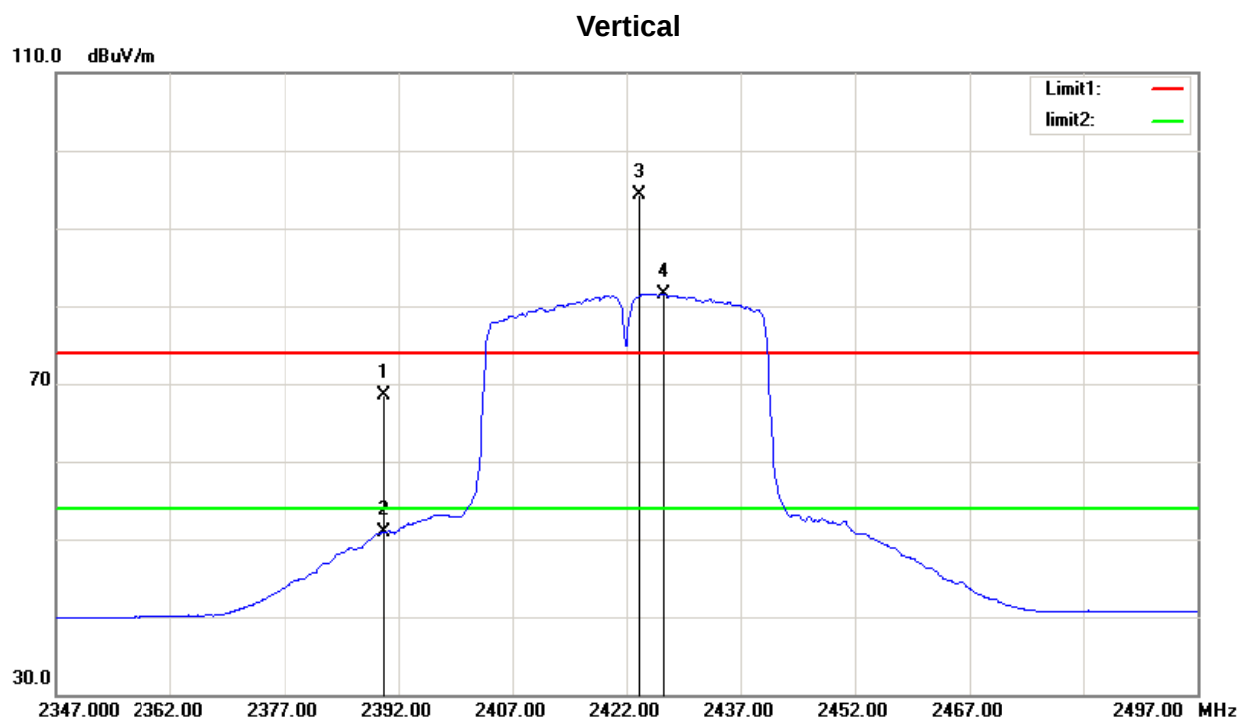
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.400	57.22	30.28	87.50	/	/	AVG
2	2464.800	68.19	30.28	98.47	/	/	peak
3	2483.500	34.73	30.33	65.06	74.00	-8.94	peak
4	2483.500	18.67	30.33	49.00	54.00	-5.00	AVG

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.400	51.27	30.28	81.55	/	/	AVG
2	2464.900	62.20	30.28	92.48	/	/	peak
3	2483.500	29.62	30.33	59.95	74.00	-14.05	peak
4	2483.500	13.89	30.33	44.22	54.00	-9.78	AVG

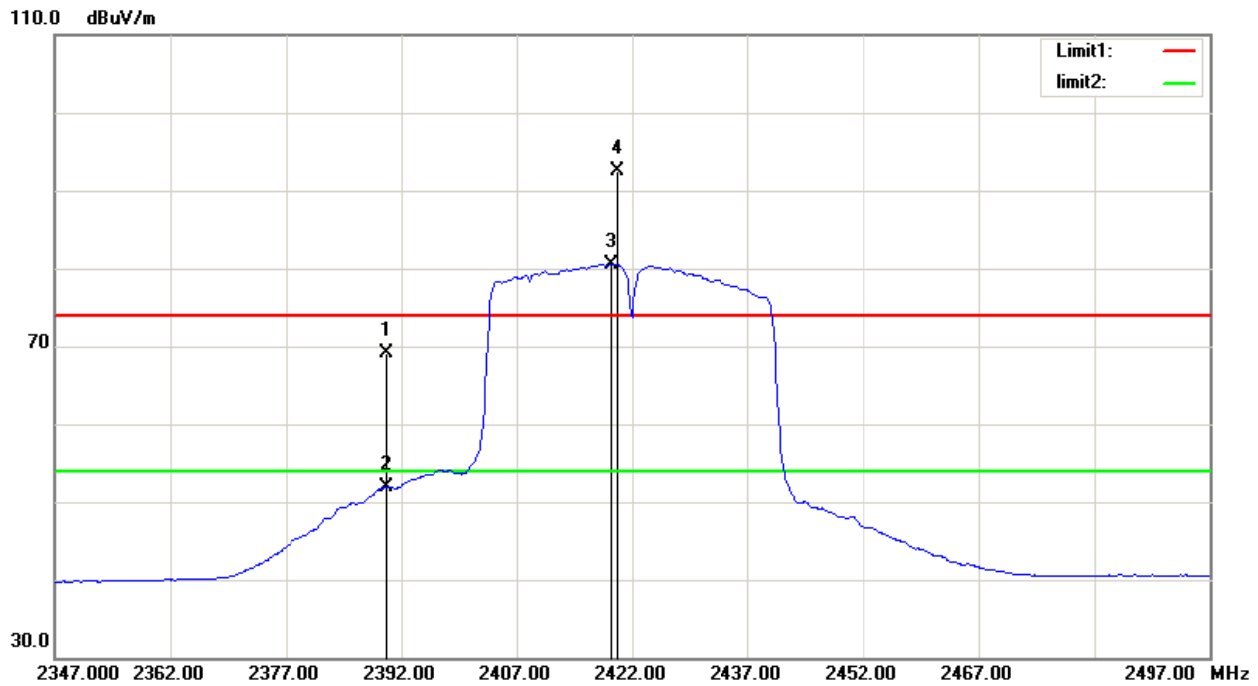
Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2422MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	38.53	30.06	68.59	74.00	-5.41	peak
2	2390.000	20.87	30.06	50.93	54.00	-3.07	AVG
3	2423.650	64.07	30.16	94.23	/	/	peak
4	2426.800	51.36	30.17	81.53	/	/	AVG

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

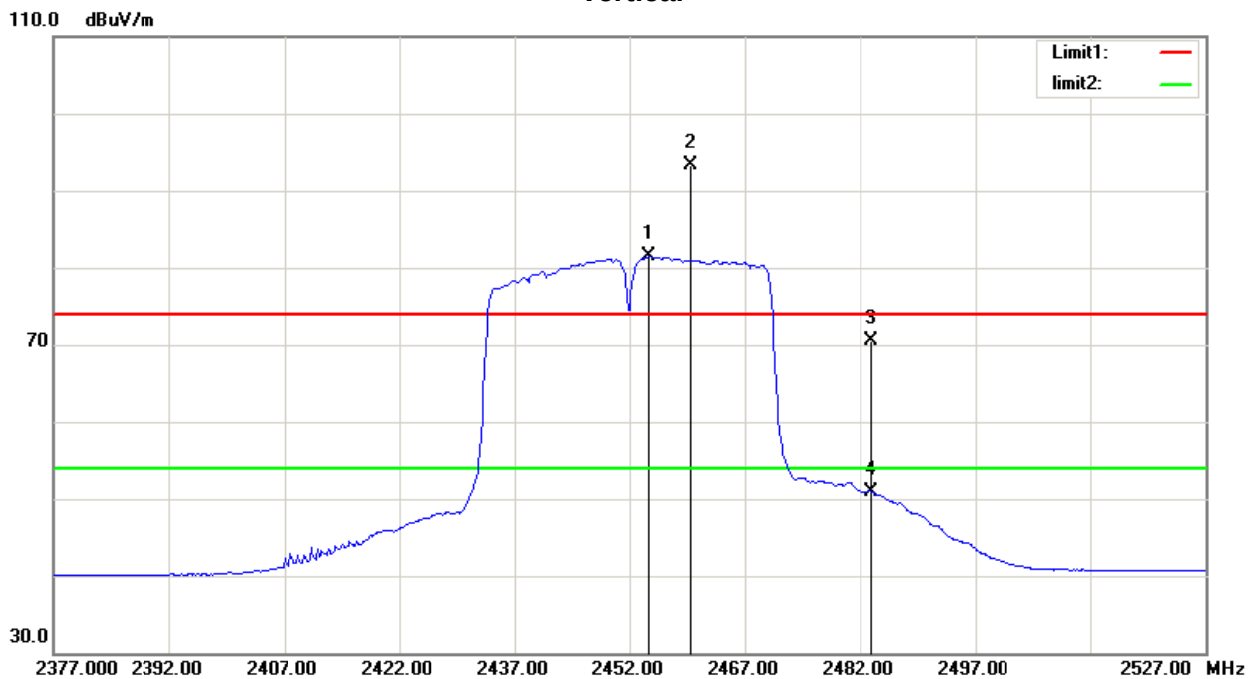
Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	38.99	30.06	69.05	74.00	-4.95	peak
2	2390.000	21.85	30.06	51.91	54.00	-2.09	AVG
3	2419.300	50.41	30.14	80.55	/	/	AVG
4	2420.200	62.27	30.15	92.42	/	/	peak

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

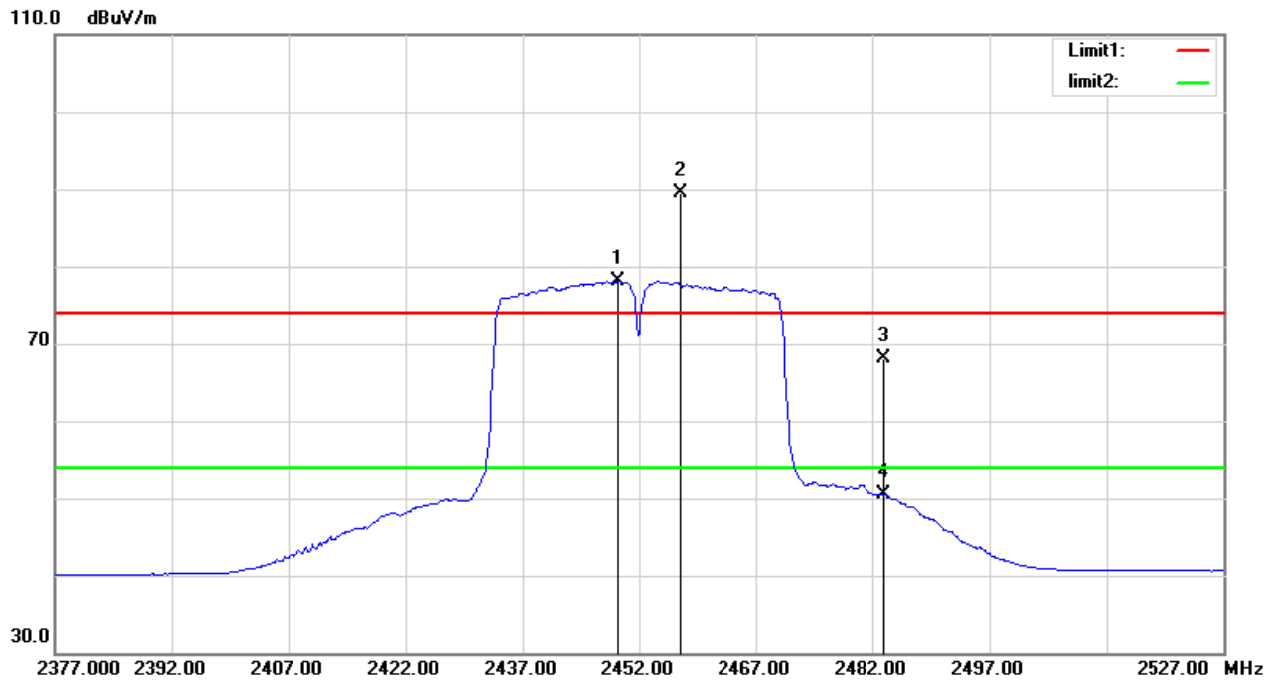
Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2454.400	51.18	30.25	81.43	/	/	AVG
2	2459.800	62.95	30.27	93.22	/	/	peak
3	2483.500	40.25	30.33	70.58	74.00	-3.42	peak
4	2483.500	20.65	30.33	50.98	54.00	-3.02	AVG

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

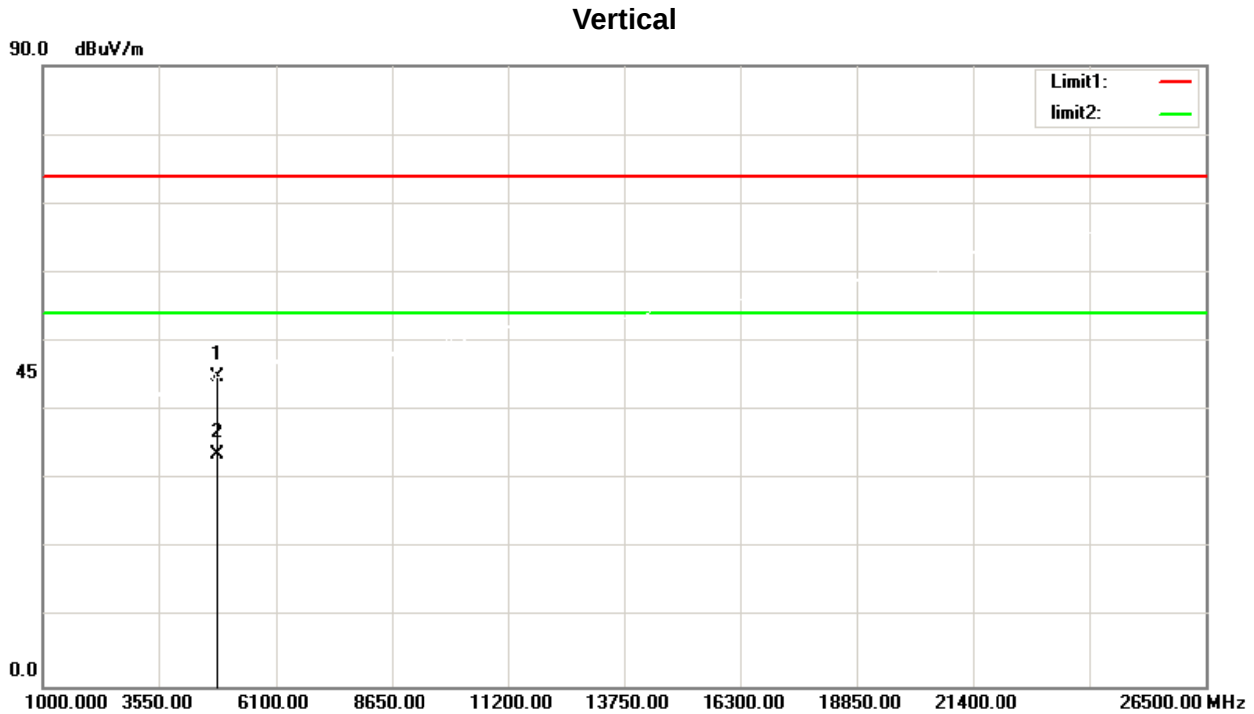
Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2449.300	47.82	30.24	78.06	/	/	AVG
2	2457.250	59.31	30.26	89.57	/	/	peak
3	2483.500	37.70	30.33	68.03	74.00	-5.97	peak
4	2483.500	20.25	30.33	50.58	54.00	-3.42	AVG

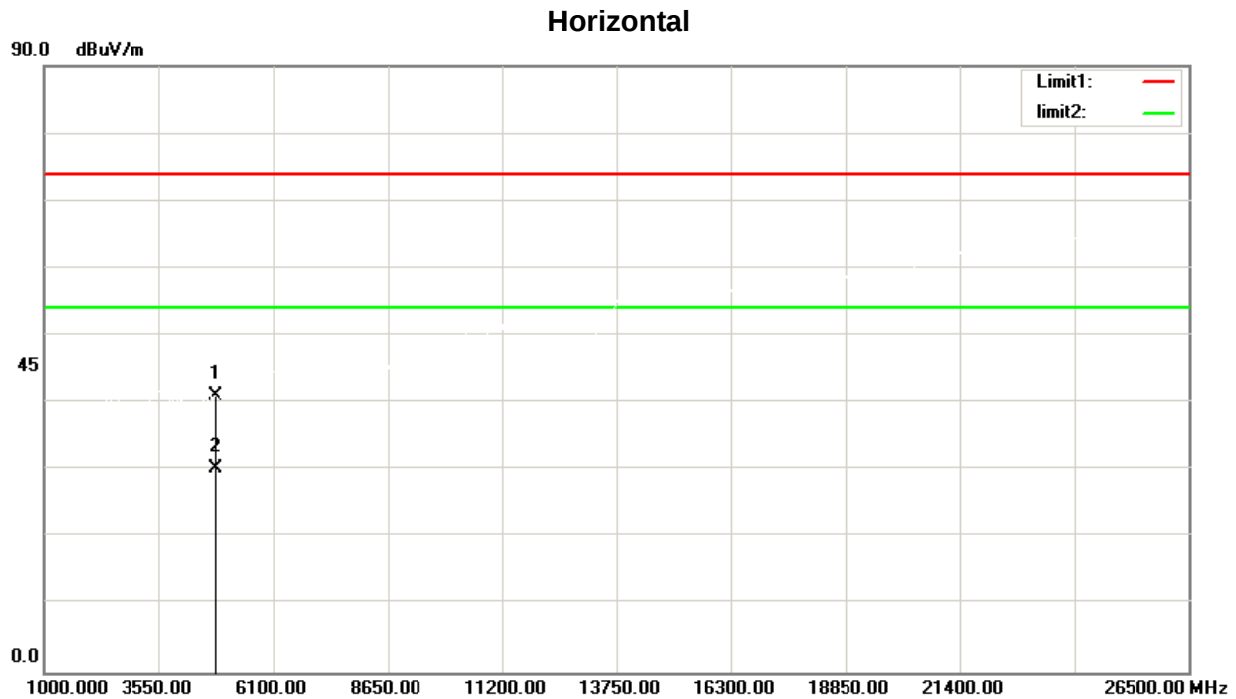
5.9 TEST RESULTS- ABOVE 1000MHz(HARMONIC)

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz



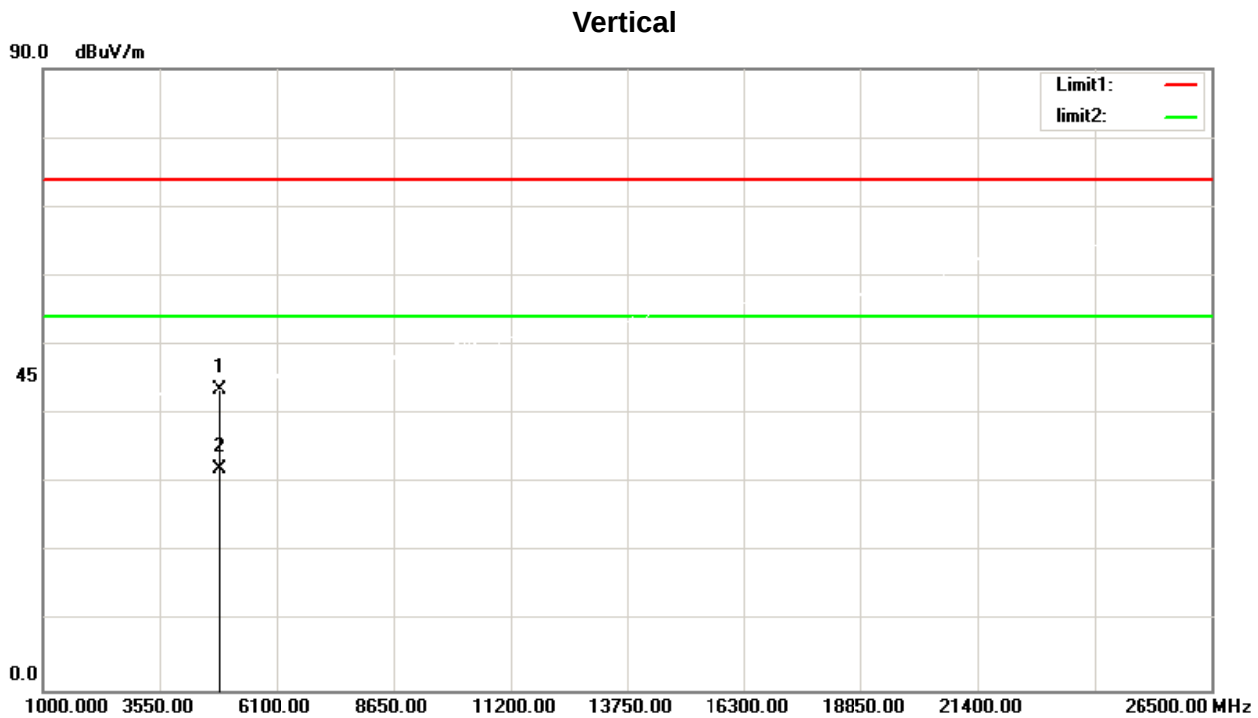
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	52.43	-7.48	44.95	74.00	-29.05	peak
2	4824.000	41.11	-7.48	33.63	54.00	-20.37	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2412 MHz



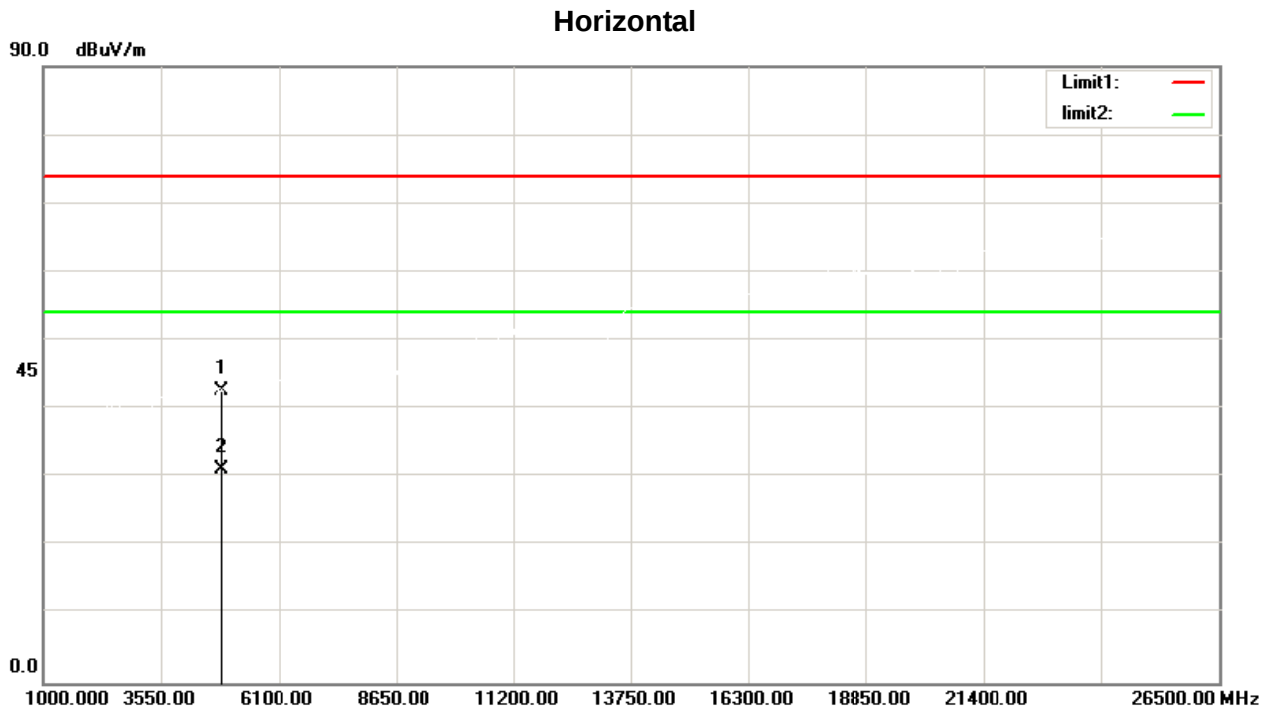
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	48.55	-7.48	41.07	74.00	-32.93	peak
2	4824.000	37.68	-7.48	30.20	54.00	-23.80	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz



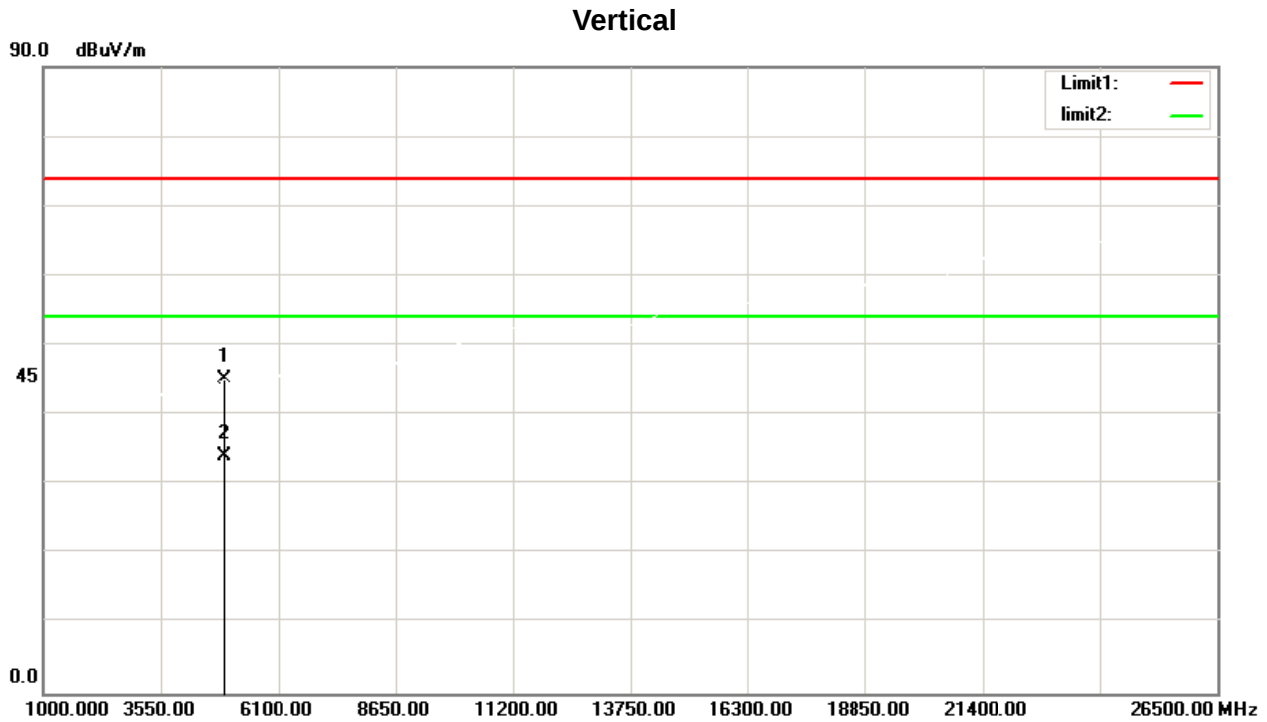
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	50.80	-7.34	43.46	74.00	-30.54	peak
2	4874.000	39.46	-7.34	32.12	54.00	-21.88	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2437 MHz



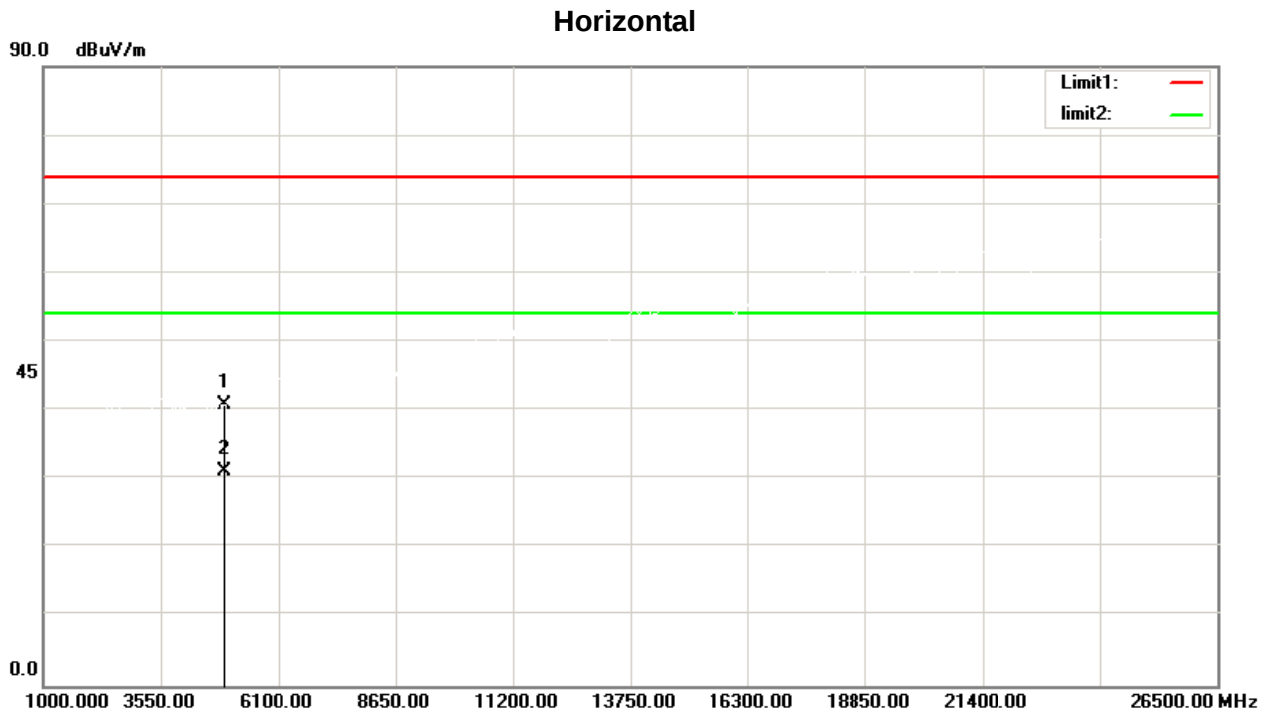
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	50.04	-7.34	42.70	74.00	-31.30	peak
2	4874.000	38.58	-7.34	31.24	54.00	-22.76	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz



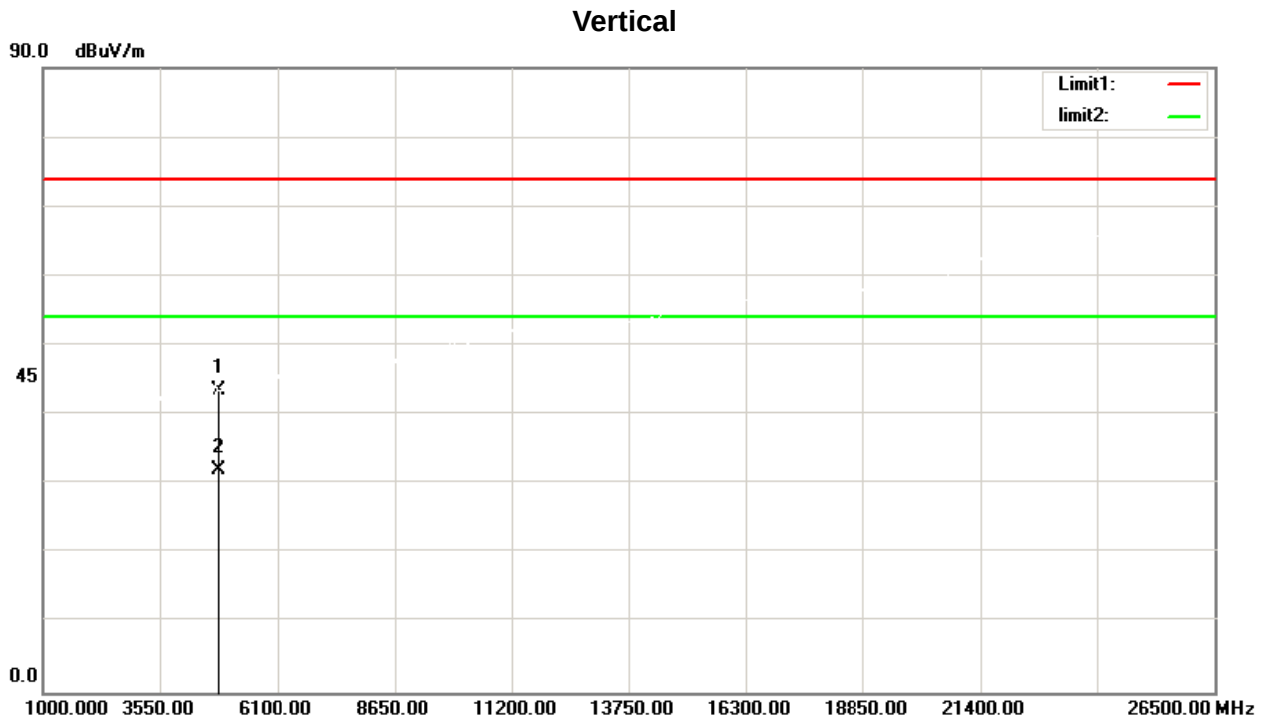
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	52.33	-7.20	45.13	74.00	-28.87	peak
2	4924.000	41.35	-7.20	34.15	54.00	-19.85	AVG

Orthogonal Axis	X
Test Mode:	TX B Mode 2462 MHz



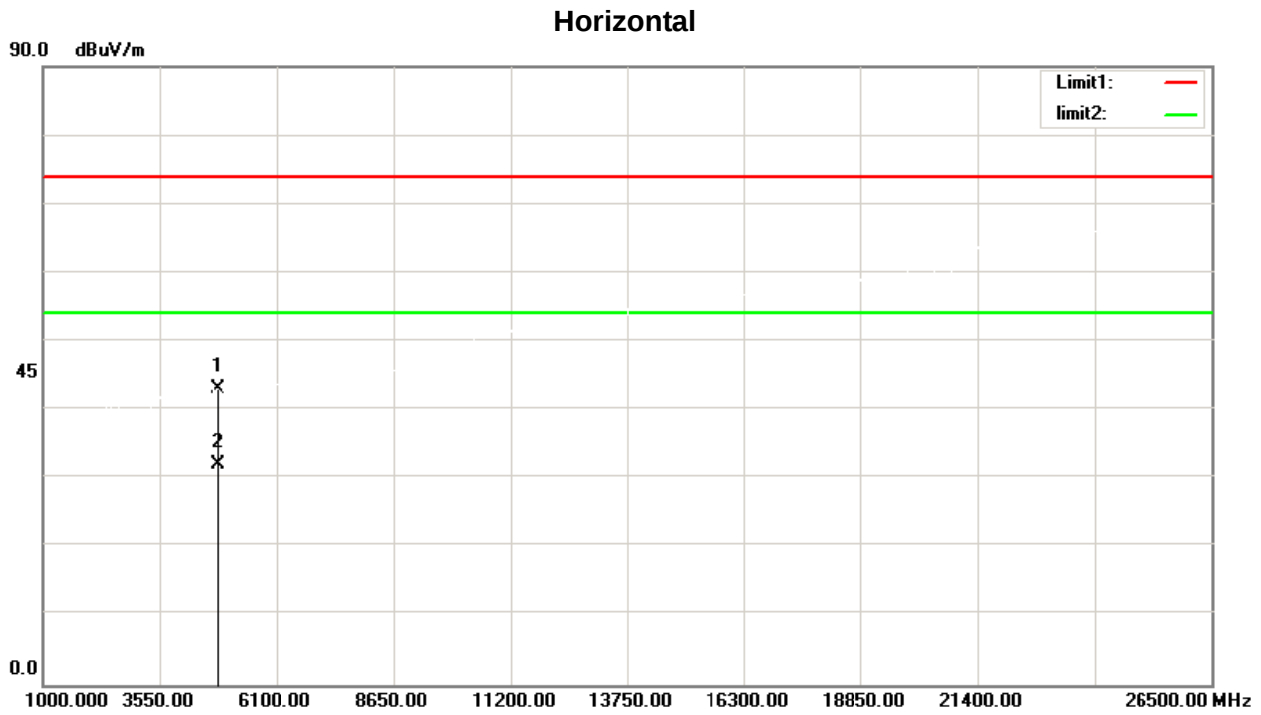
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	48.11	-7.20	40.91	74.00	-33.09	peak
2	4924.000	38.40	-7.20	31.20	54.00	-22.80	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz



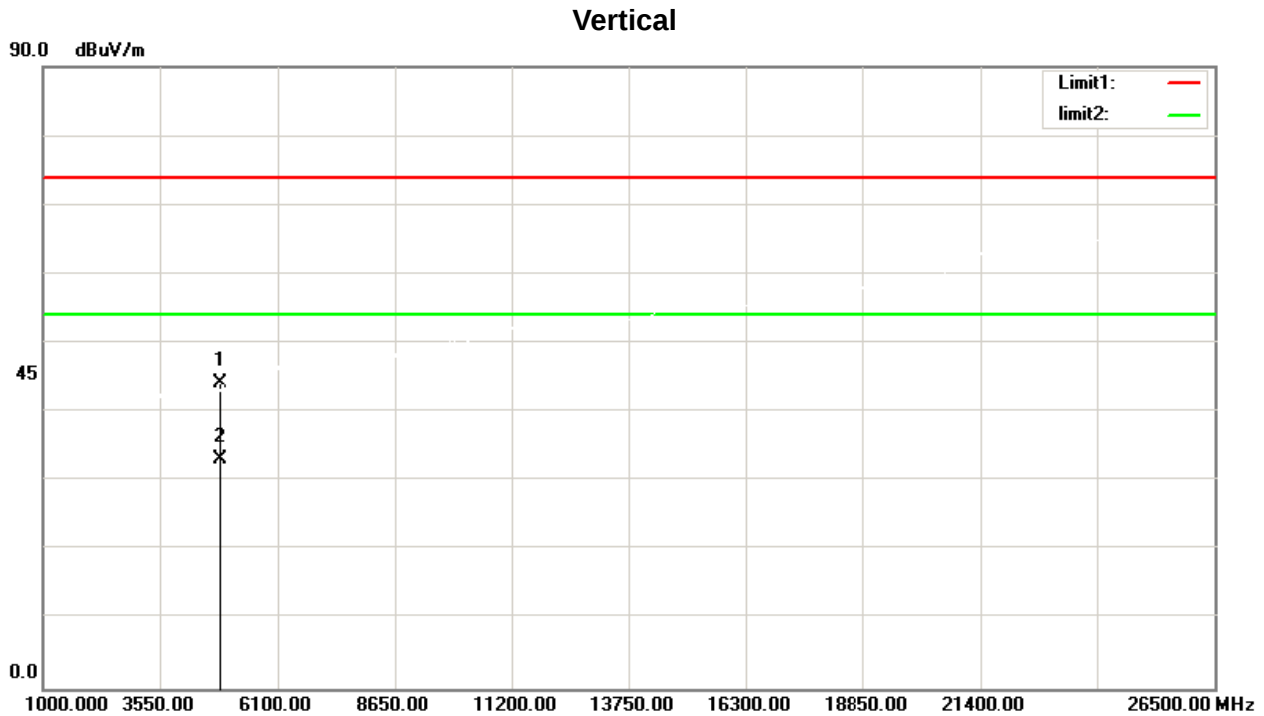
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	50.93	-7.48	43.45	74.00	-30.55	peak
2	4824.000	39.58	-7.48	32.10	54.00	-21.90	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2412 MHz



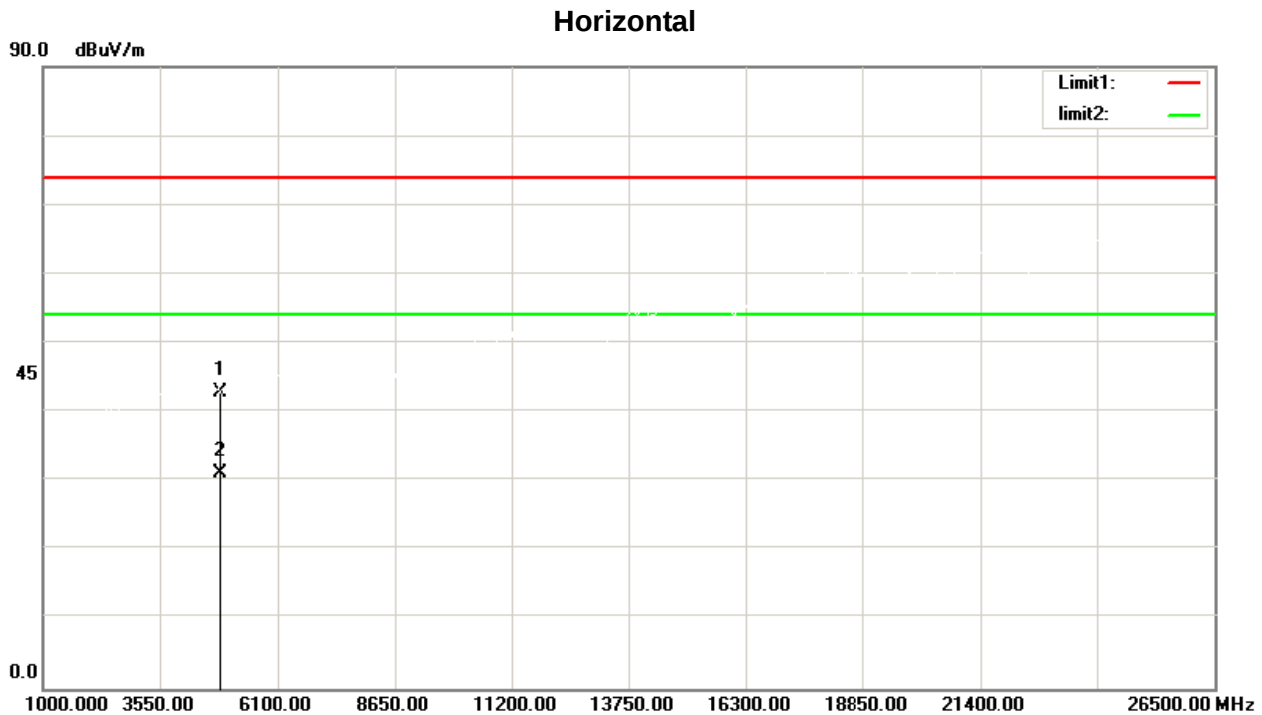
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	50.55	-7.48	43.07	74.00	-30.93	peak
2	4824.000	39.58	-7.48	32.10	54.00	-21.90	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz



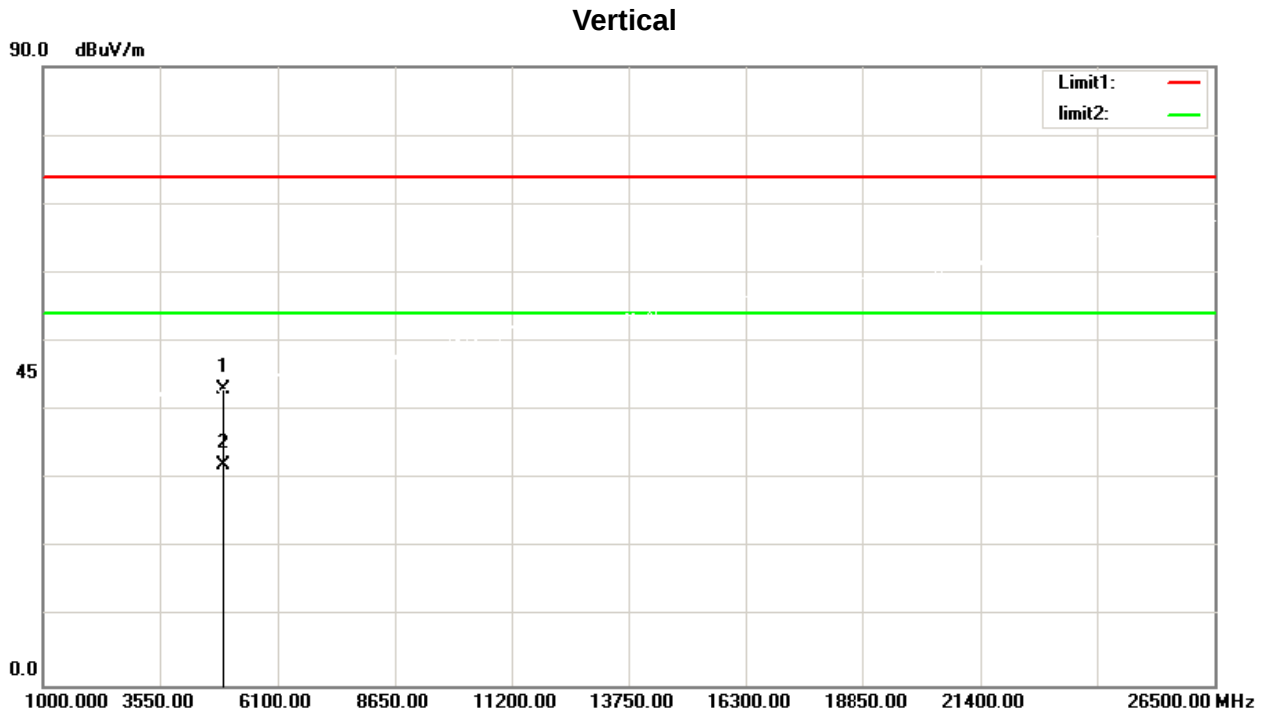
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	51.47	-7.34	44.13	74.00	-29.87	peak
2	4874.000	40.46	-7.34	33.12	54.00	-20.88	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2437 MHz



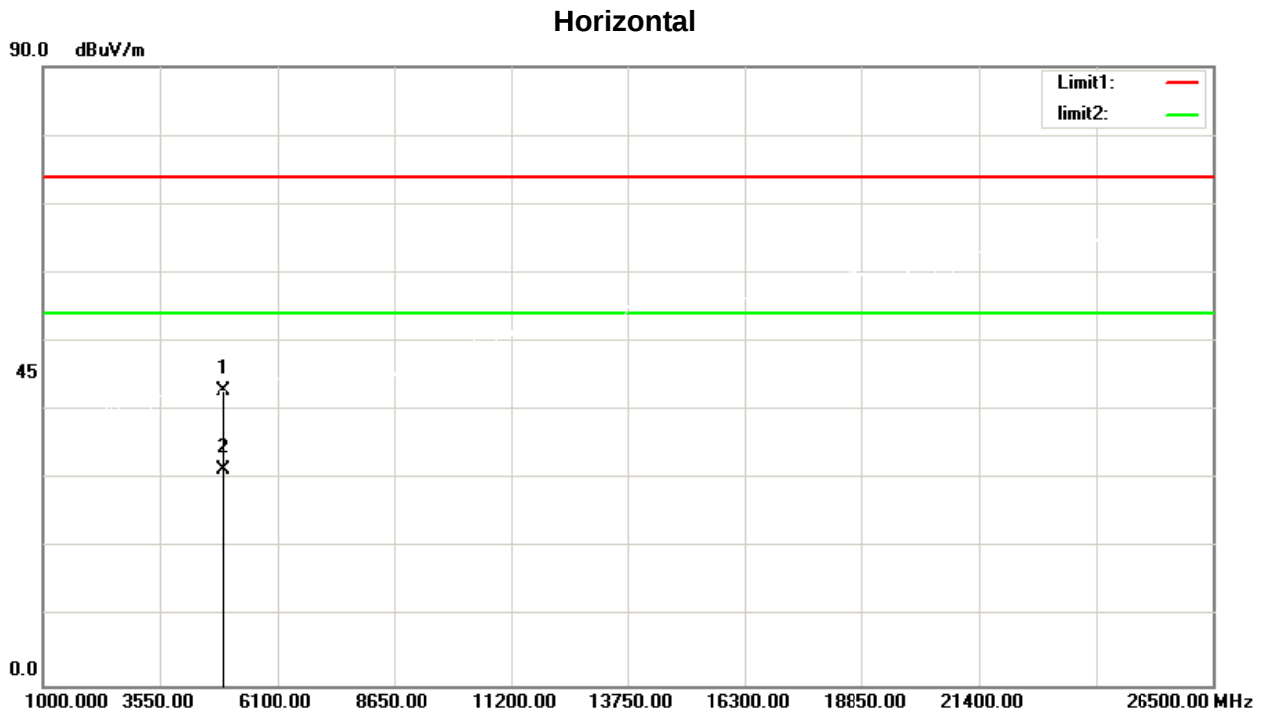
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	50.25	-7.34	42.91	74.00	-31.09	peak
2	4874.000	38.58	-7.34	31.24	54.00	-22.76	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz



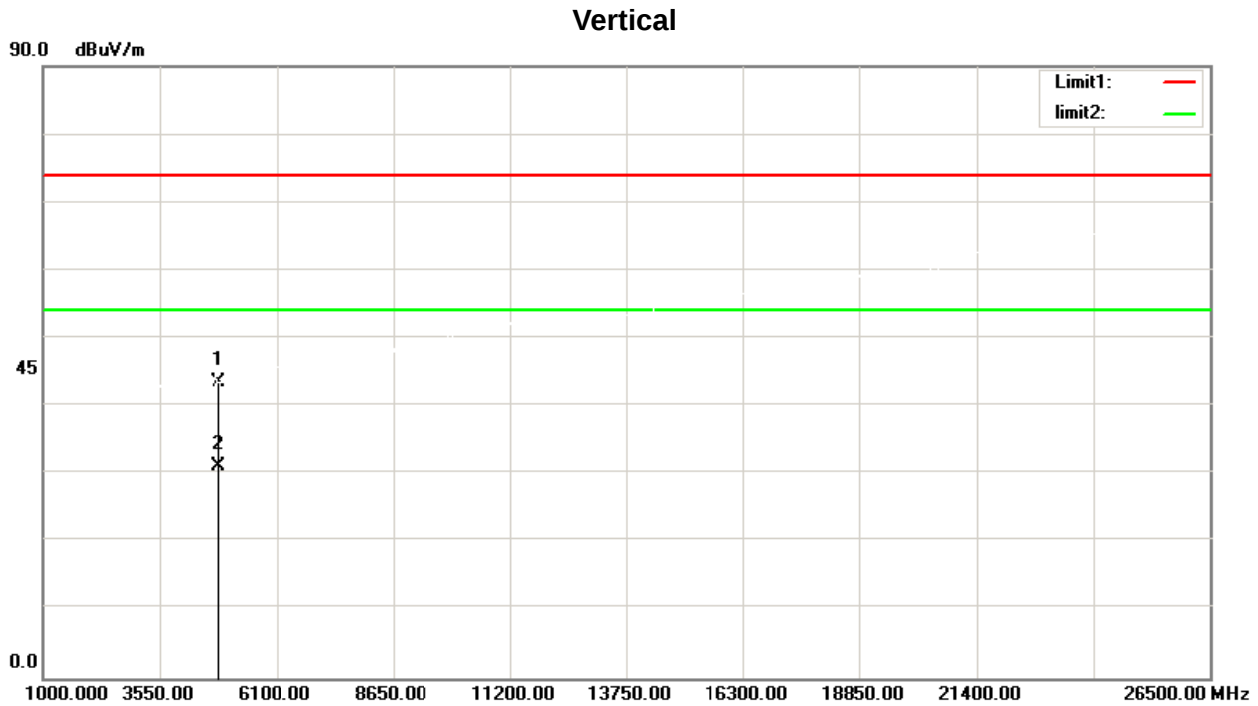
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	50.33	-7.20	43.13	74.00	-30.87	peak
2	4924.000	39.30	-7.20	32.10	54.00	-21.90	AVG

Orthogonal Axis	X
Test Mode:	TX G Mode 2462 MHz



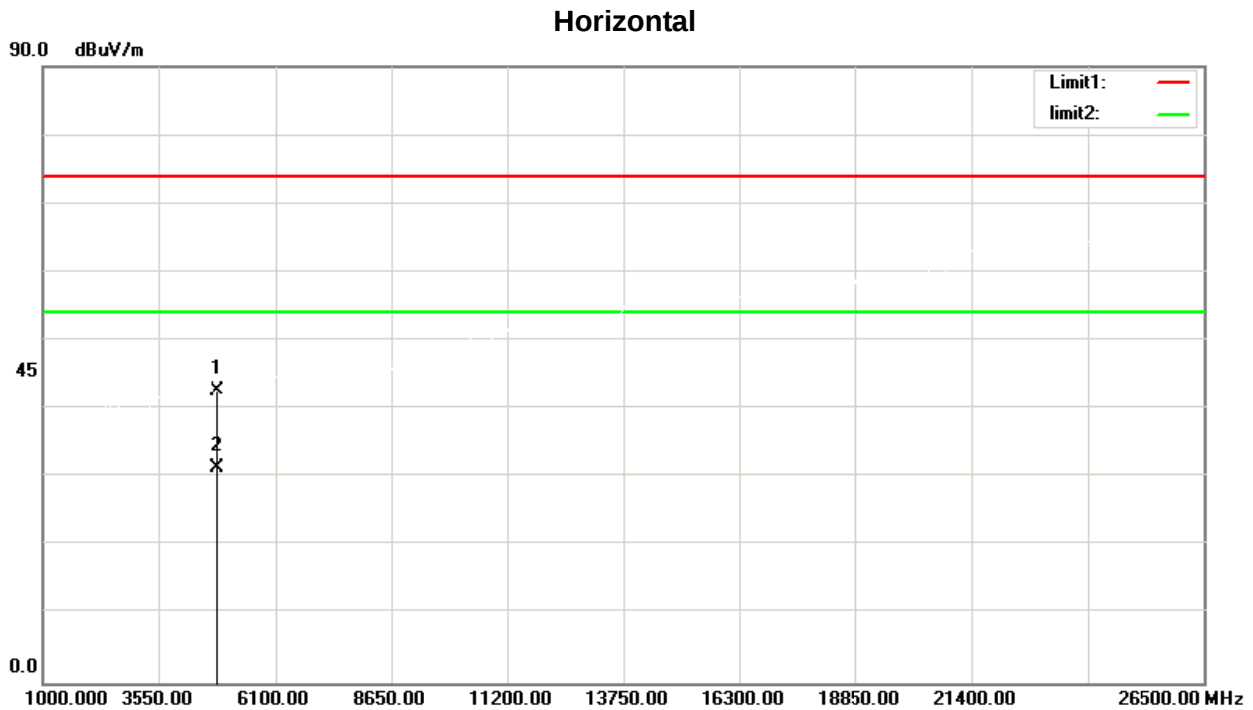
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	50.11	-7.20	42.91	74.00	-31.09	peak
2	4924.000	38.50	-7.20	31.30	54.00	-22.70	AVG

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



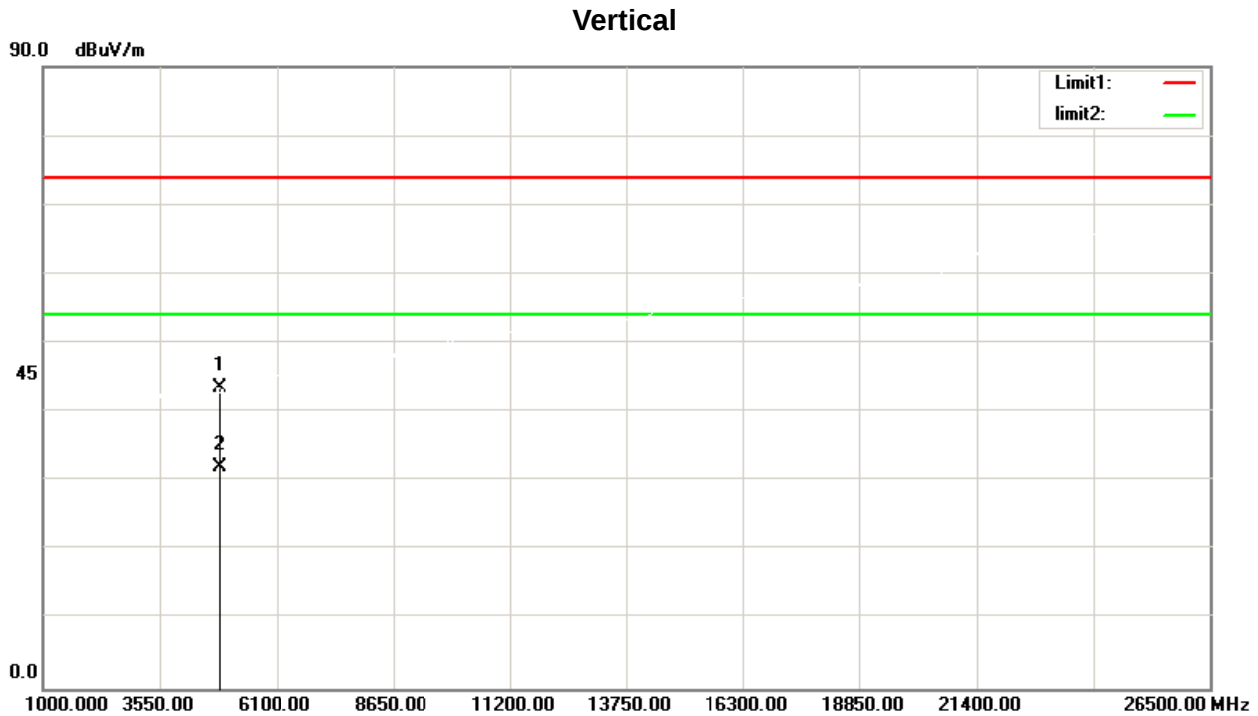
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	50.93	-7.48	43.45	74.00	-30.55	peak
2	4824.000	38.68	-7.48	31.20	54.00	-22.80	AVG

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	50.05	-7.48	42.57	74.00	-31.43	peak
2	4824.000	38.89	-7.48	31.41	54.00	-22.59	AVG

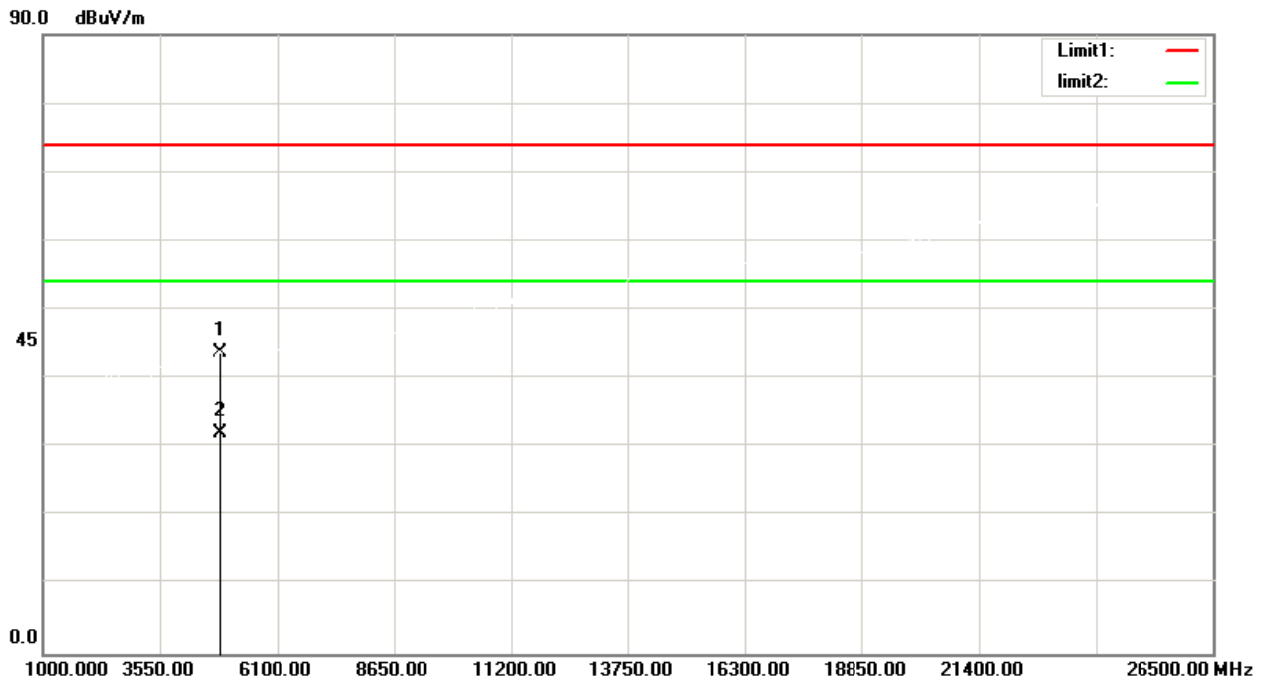
Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2437 MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	50.97	-7.34	43.63	74.00	-30.37	peak
2	4874.000	39.46	-7.34	32.12	54.00	-21.88	AVG

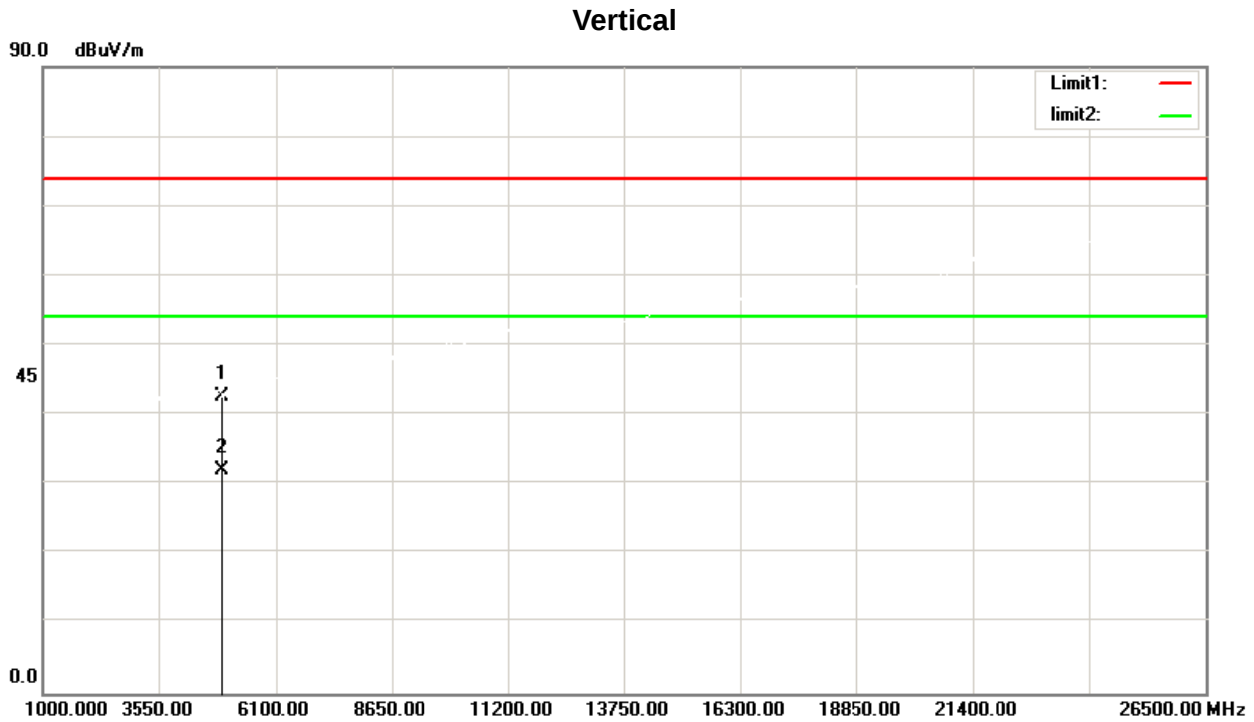
Orthogonal Axis	X
Test Mode:	TX N-20M Mode 2437 MHz

Horizontal



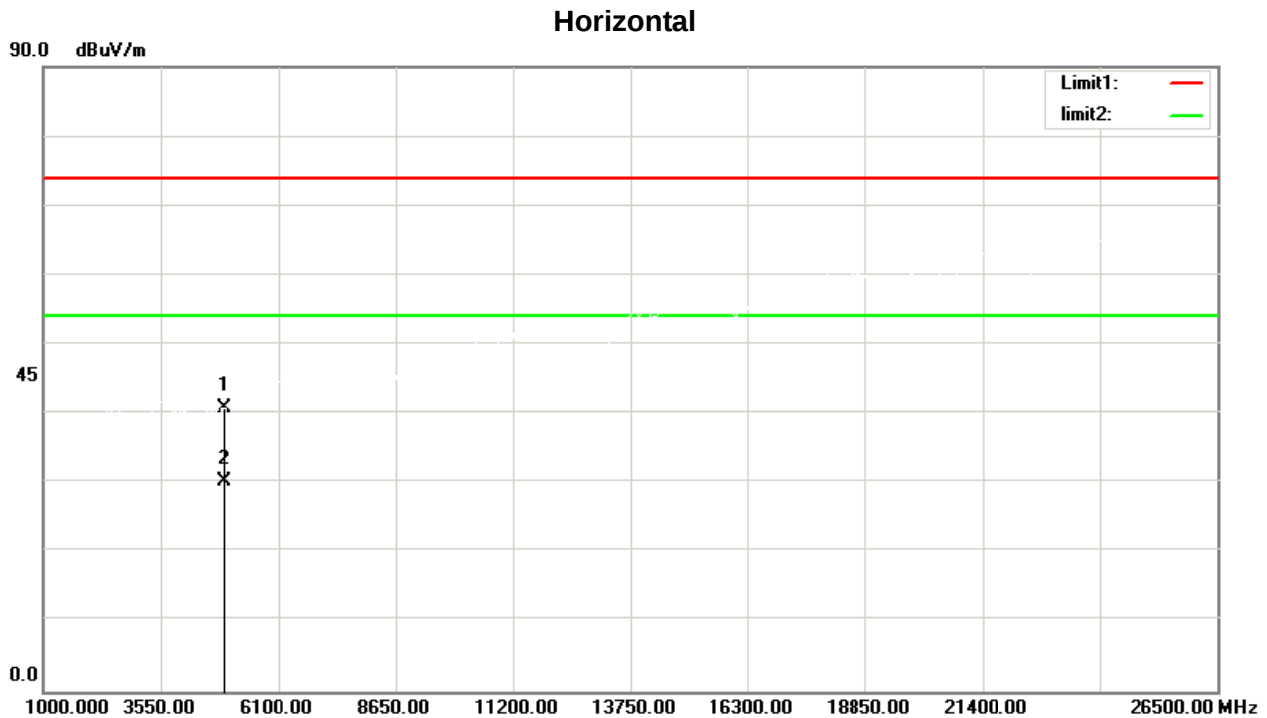
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	51.04	-7.34	43.70	74.00	-30.30	peak
2	4874.000	39.44	-7.34	32.10	54.00	-21.90	AVG

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



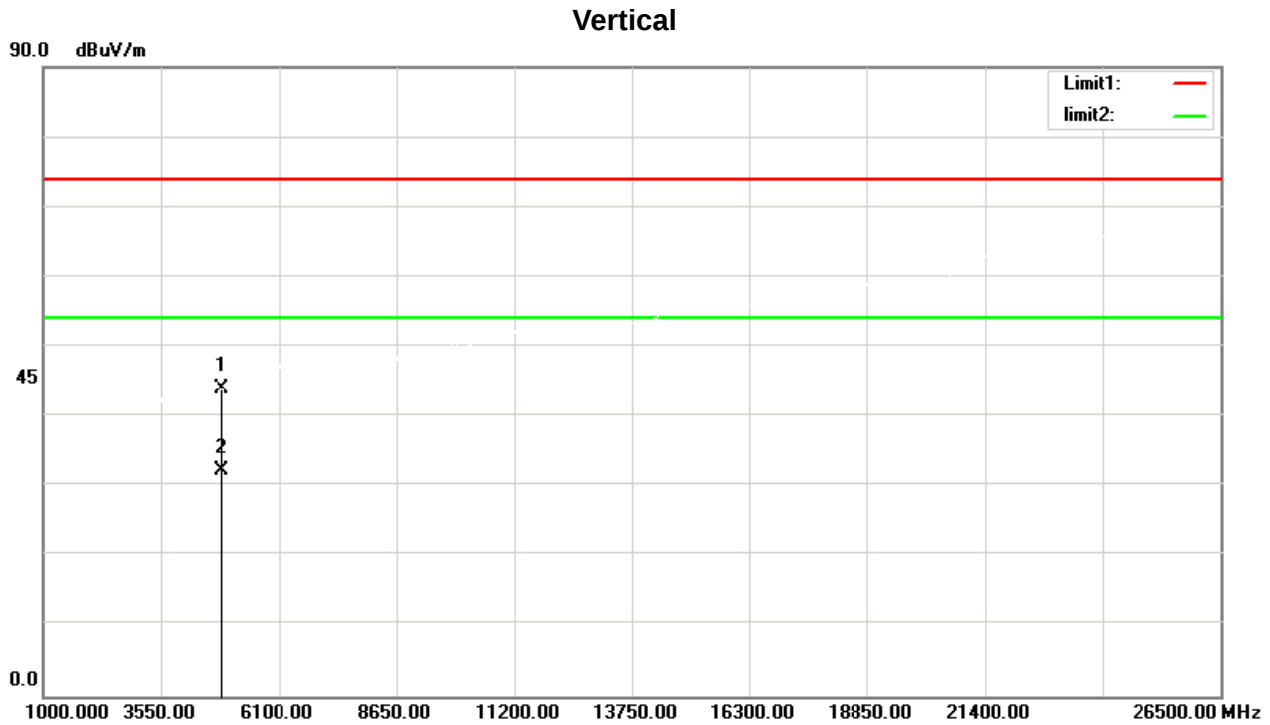
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	49.83	-7.20	42.63	74.00	-31.37	peak
2	4924.000	39.30	-7.20	32.10	54.00	-21.90	AVG

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



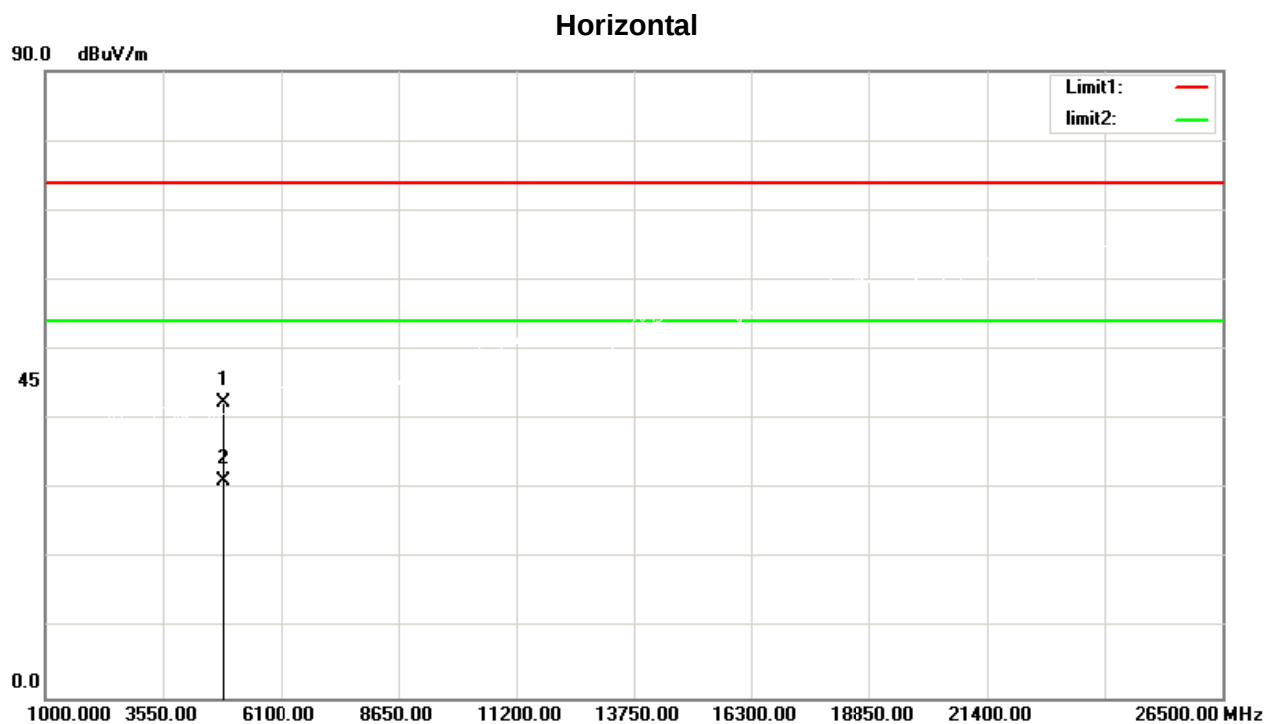
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	48.11	-7.20	40.91	74.00	-33.09	peak
2	4924.000	37.44	-7.20	30.24	54.00	-23.76	AVG

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



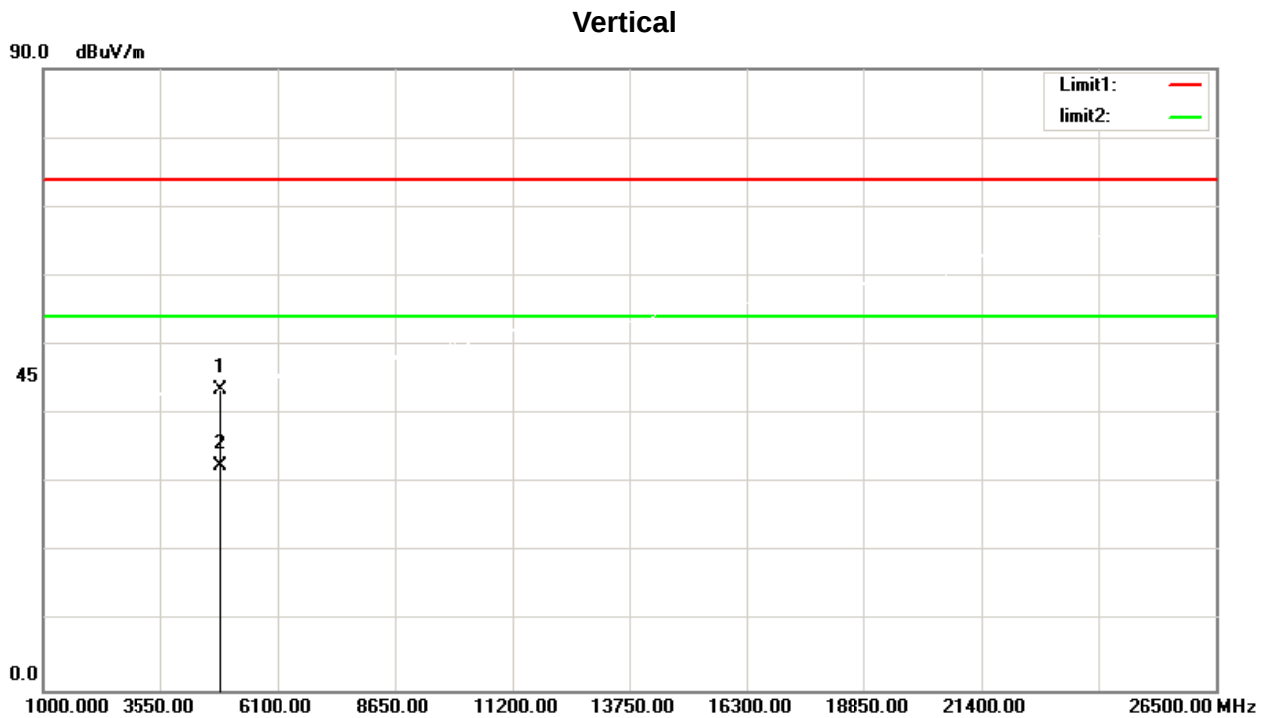
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4844.000	51.38	-7.42	43.96	74.00	-30.04	peak
2	4844.000	39.66	-7.42	32.24	54.00	-21.76	AVG

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4844.500	49.79	-7.41	42.38	74.00	-31.62	peak
2	4844.500	38.61	-7.41	31.20	54.00	-22.80	AVG

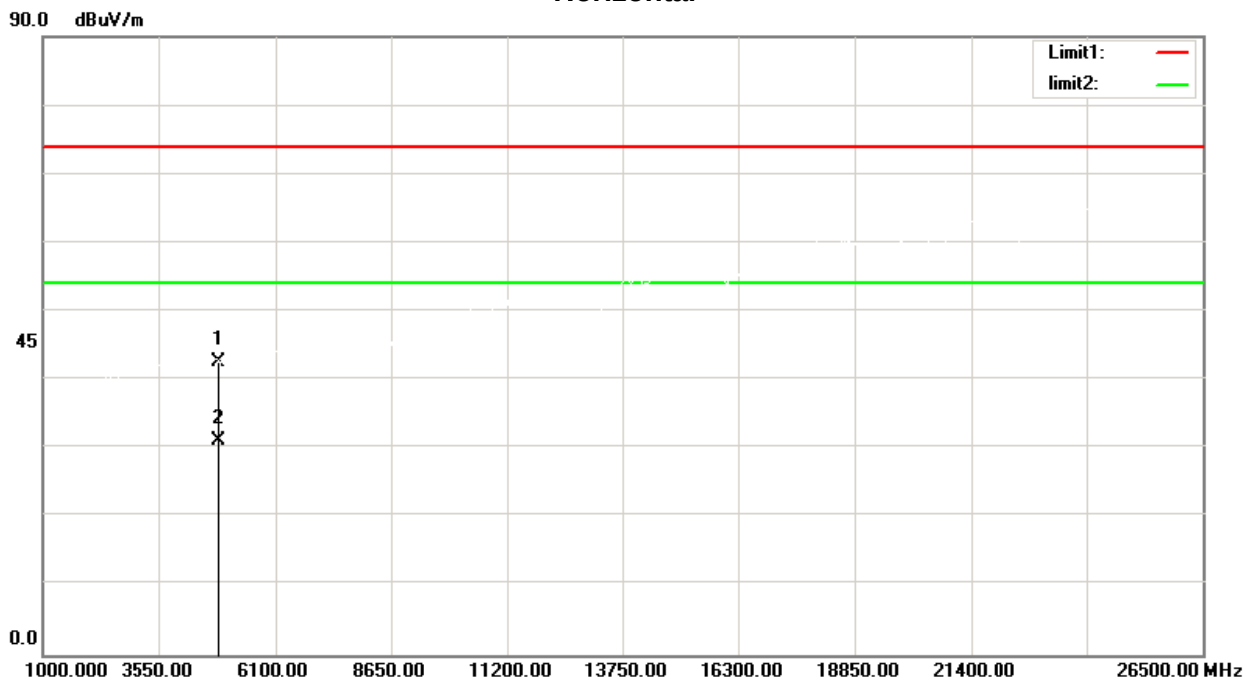
Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4875.000	50.78	-7.32	43.46	74.00	-30.54	peak
2	4875.000	39.83	-7.32	32.51	54.00	-21.49	AVG

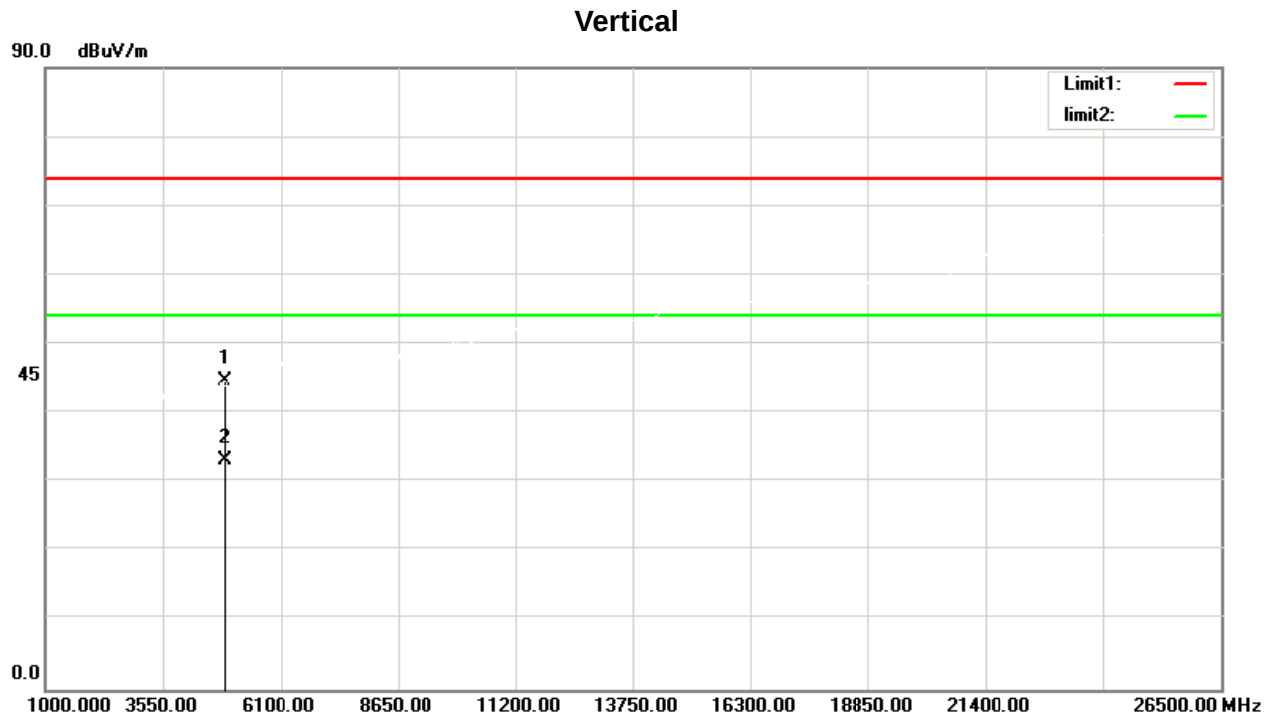
Orthogonal Axis	X
Test Mode:	TX N-40M Mode 2437 MHz

Horizontal



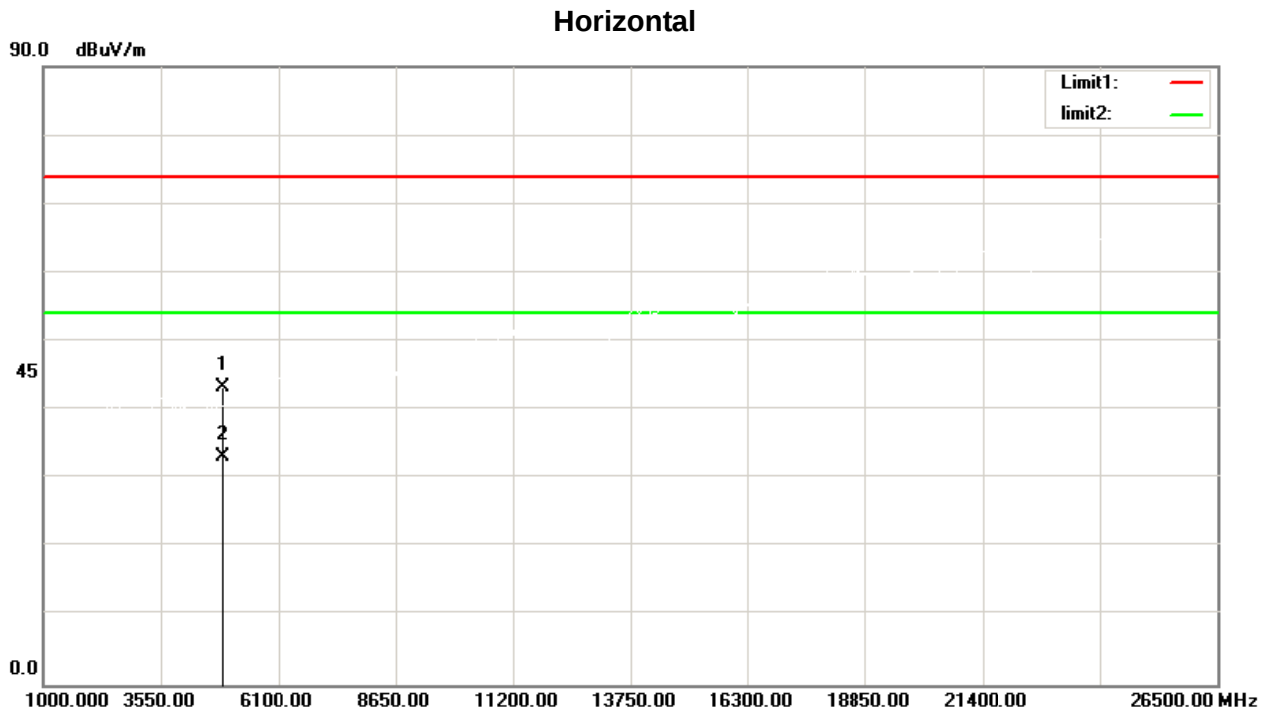
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4875.000	50.02	-7.32	42.70	74.00	-31.30	peak
2	4875.000	38.56	-7.32	31.24	54.00	-22.76	AVG

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4904.000	51.88	-7.25	44.63	74.00	-29.37	peak
2	4904.000	40.45	-7.25	33.20	54.00	-20.80	AVG

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



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4904.000	50.55	-7.25	43.30	74.00	-30.70	peak
2	4904.000	40.45	-7.25	33.20	54.00	-20.80	AVG

6 BANDWIDTH TEST

6.1 LIMIT

FCC Part15, Subpart C (15.247)&RSS-Gen and RSS-247		
Section	Test Item	Limit
15.247(a)(2) RSS-Gen6.7 RSS-247 5.2 (a)	6dB Bandwidth	Minimum 500 kHz
	99% Emission Bandwidth	-

6.2 TEST PROCEDURE AND SETTING

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- For 6dB Bandwidth Spectrum setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5ms.
For 99% OBW Spectrum Setting: RBW= 300KHz, VBW=1MHz,Sweep time = 2.5ms.
- The bandwidth was performed in accordance with method 11.8.1 of ANSI C63.10-2013.

6.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2021/05/24
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

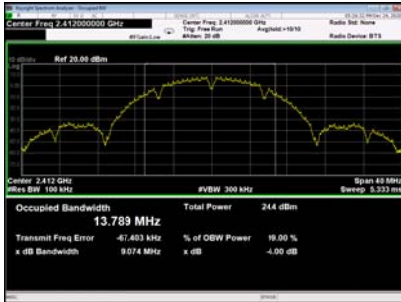
The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TESTRESULTS

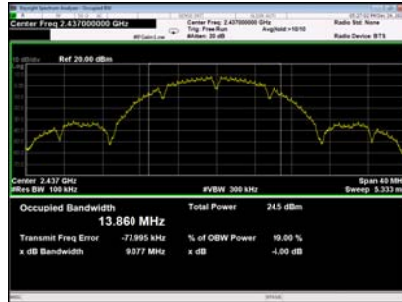
TX B Mode					
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Emission Bandwidth(MHz)	6dB Bandwidth Min. Limit(kHz)	Result
01	2412	9.074	13.705	500	PASS
06	2437	9.077	13.716	500	PASS
11	2462	9.061	13.744	500	PASS

6dB

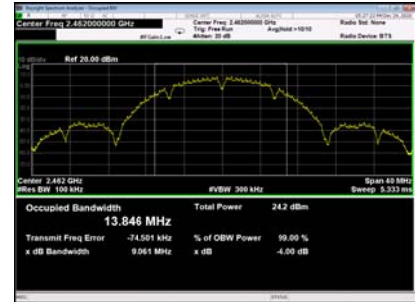
CH01



CH06

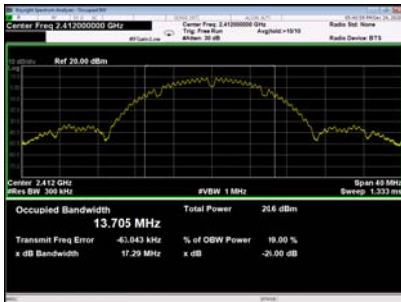


CH11

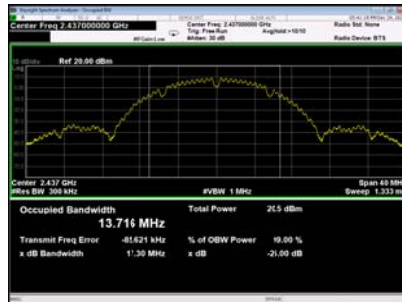


99%

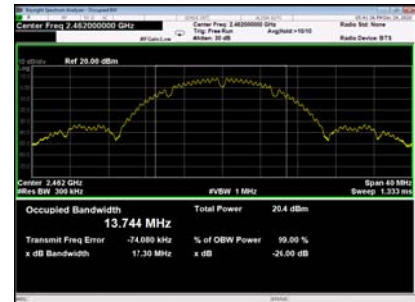
CH01



CH06



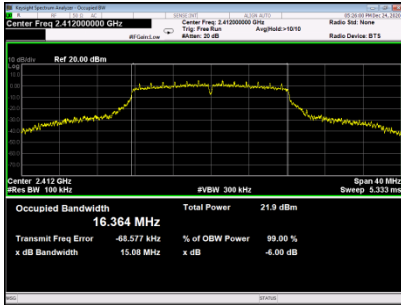
CH11



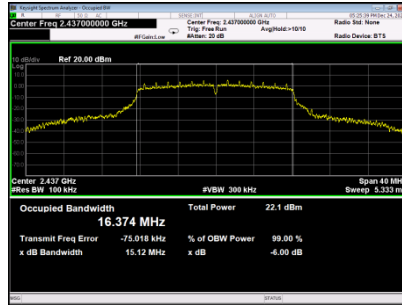
TX G Mode					
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Emission Bandwidth(MHz)	6dB Bandwidth Min. Limit(kHz)	Result
01	2412	15.08	16.803	500	PASS
06	2437	15.12	16.843	500	PASS
11	2462	15.12	16.811	500	PASS

6dB

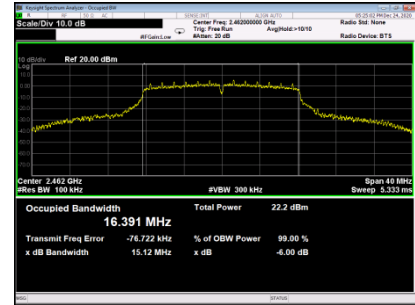
CH01



CH06

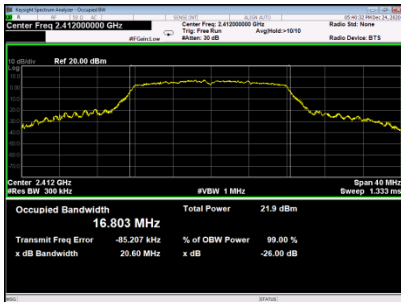


CH11

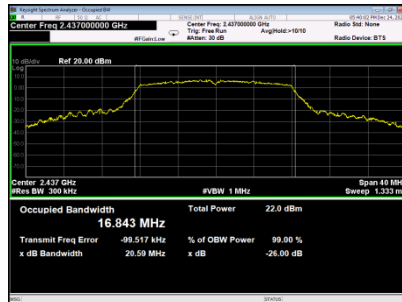


99%

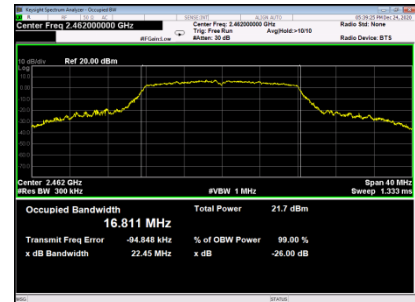
CH01



CH06



CH11

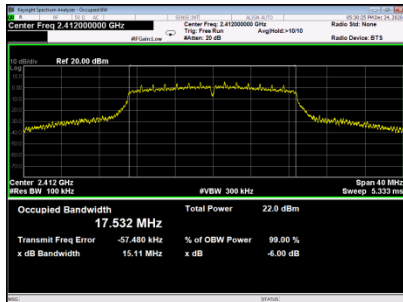


TX N (HT20) Mode

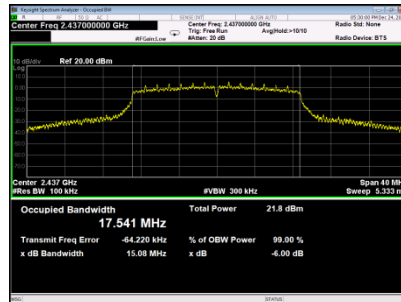
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Emission Bandwidth(MHz)	6dB Bandwidth Min. Limit(kHz)	Result
01	2412	15.11	17.733	500	PASS
06	2437	15.08	17.759	500	PASS
11	2462	15.12	17.758	500	PASS

6dB

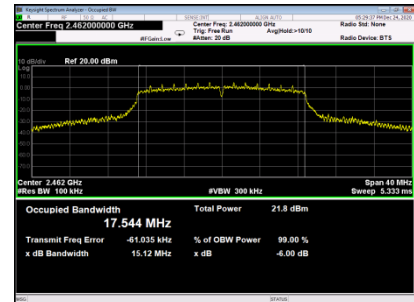
CH01



CH06

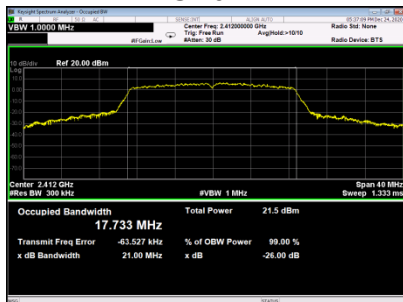


CH11

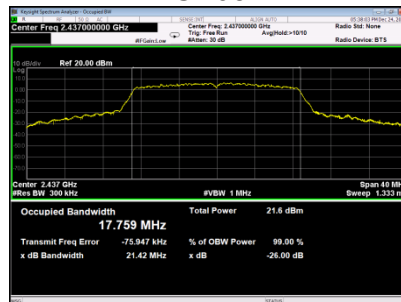


99%

CH01



CH06



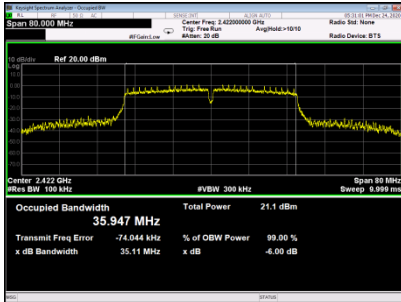
CH11



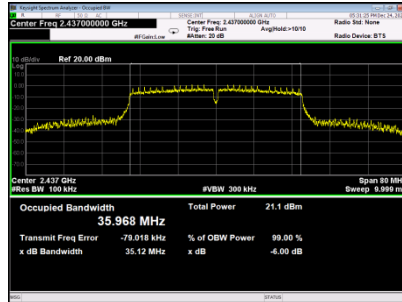
TX N (HT40) Mode					
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Emission Bandwidth(MHz)	6dB Bandwidth Min. Limit(kHz)	Result
03	2422	35.11	36.596	500	PASS
06	2437	35.12	36.750	500	PASS
09	2452	35.10	36.760	500	PASS

6dB

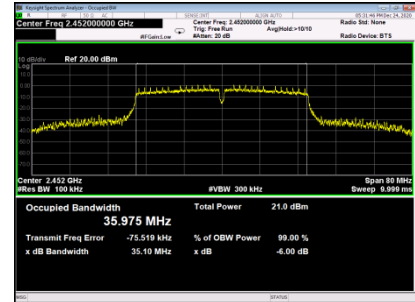
CH03



CH06

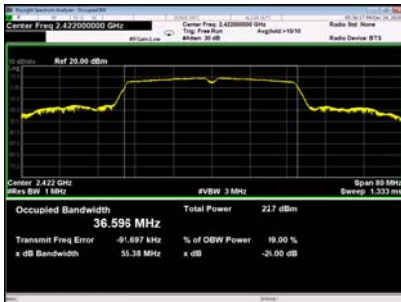


CH09



99%

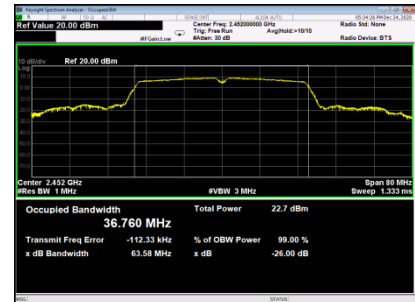
CH03



CH06



CH9



7 MAXIMUM OUTPUT POWER TEST

7.1 LIMIT

FCC Part15, Subpart C (15.247)&RSS-247		
Section	Test Item	Limit
15.247(b)(3) RSS-2475.4 (d)	Maximum Output Power	1 Watt or 30dBm

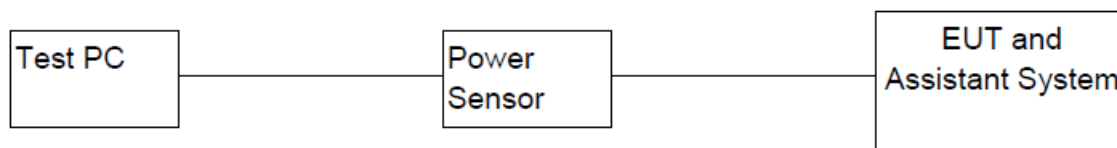
7.2 TEST PROCEDURE AND SETTING

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- The maximum conducted output power was performed in accordance with method 11.9.1.3 of ANSI C63.10-2013.and FCC KDB 662911 D01 v02r01 Multiple Transmitter Output.

7.3 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Power Sensor	KEYSIGHT	U2021XA	MY55240009	05/24/2021
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Micable	C10-01-01-1	100309	N/A
4	Test Software	KEYSIGHT	Power Panel	V3.11	N/A

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 TESTRESULTS

TX B Mode_Ant 1				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	20.84	0.1213	PASS
06	2437	20.80	0.1202	PASS
11	2462	20.66	0.1164	PASS
Limit	30dBm / 1W			

TX B Mode_Ant 2				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	20.75	0.1189	PASS
06	2437	20.83	0.1211	PASS
11	2462	20.91	0.1233	PASS
Limit	30dBm / 1W			

TX G Mode_Ant 1				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	24.13	0.2588	PASS
06	2437	23.93	0.2472	PASS
11	2462	23.88	0.2443	PASS
Limit	30dBm / 1W			

TX G Mode_Ant 2				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	24.51	0.2825	PASS
06	2437	24.20	0.2630	PASS
11	2462	24.32	0.2704	PASS
Limit	30dBm / 1W			

TX N (HT20) _Ant 1				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	23.40	0.2188	PASS
06	2437	22.98	0.1986	PASS
11	2462	22.73	0.1875	PASS
Limit	30dBm / 1W			

TX N (HT20) _Ant 2				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	23.18	0.2080	PASS
06	2437	23.22	0.2099	PASS
11	2462	23.48	0.2228	PASS
Limit	30dBm / 1W			

TX N (HT20) _Total				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
01	2412	26.30	0.4267	PASS
06	2437	26.11	0.4085	PASS
11	2462	26.13	0.4103	PASS
Limit	30dBm / 1W			

TX N (HT40) _Ant 1				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
03	2422	23.36	0.2168	PASS
06	2437	23.18	0.2080	PASS
09	2452	23.48	0.2228	PASS
Limit	30dBm / 1W			

TX N (HT40) _Ant 2				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
03	2422	23.28	0.2128	PASS
06	2437	23.52	0.2249	PASS
09	2452	23.82	0.2410	PASS
Limit	30dBm / 1W			

TX N (HT40) _Total				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
03	2422	26.33	0.4296	PASS
06	2437	26.36	0.4329	PASS
09	2452	26.66	0.4638	PASS
Limit	30dBm / 1W			

8 CONDUCTED SPURIOUS EMISSIONS

8.1 LIMIT

For FCC

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.

For ISSED

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

8.2 TEST PROCEDURE AND SETTING

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

8.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2021/05/24
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

8.4 TEST SETUP



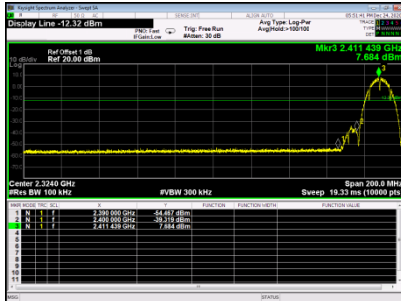
8.5 EUT OPERATION CONDITIONS

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.

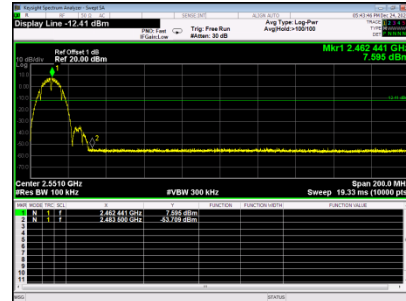
8.6 TESTRESULTS

TX B Mode_Ant 1

Bandedge-CH01

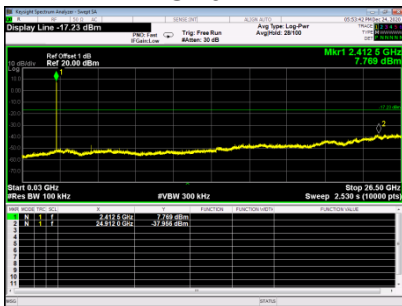


Bandedge-CH11

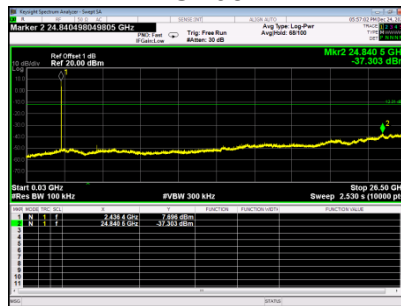


10th Harmonic of the fundamental frequency

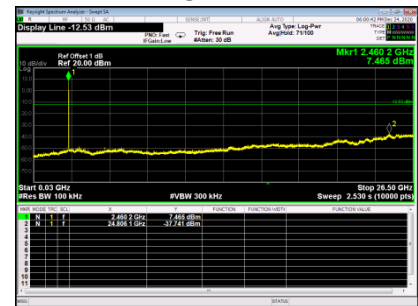
CH01



CH06

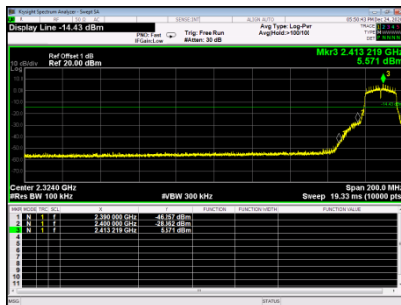


CH11



TX G Mode_Ant 1

Bandedge-CH01

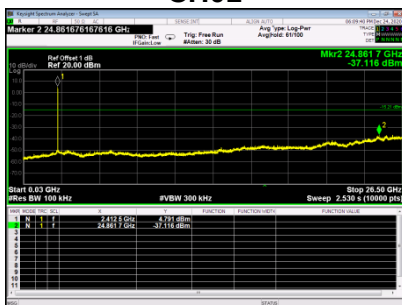


Bandedge-CH11

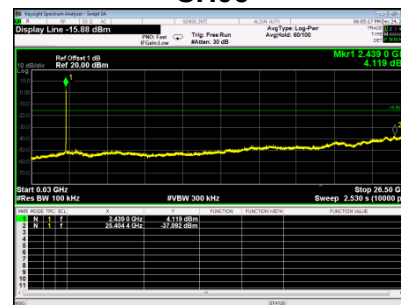


10th Harmonic of the fundamental frequency

CH01



CH06

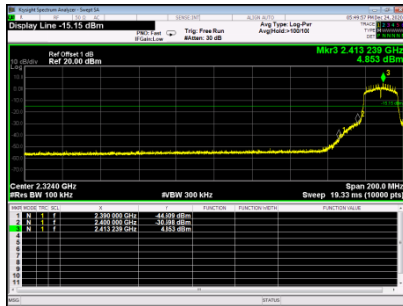


CH11

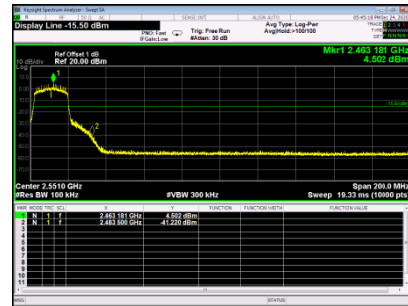


TX N (HT20) Mode _Ant 1

Bandedge-CH01

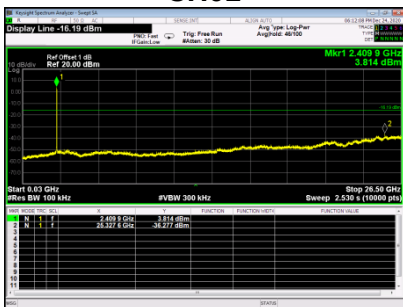


Bandedge-CH11

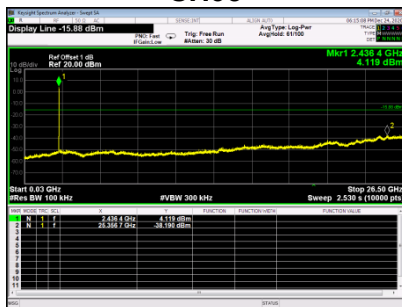


10th Harmonic of the fundamental frequency

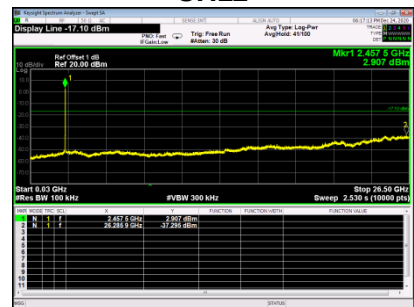
CH01



CH06

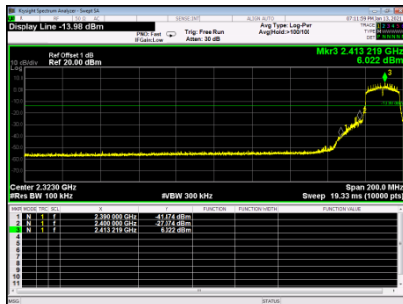


CH11



TX N (HT20) Mode _Ant 2

Bandedge-CH01

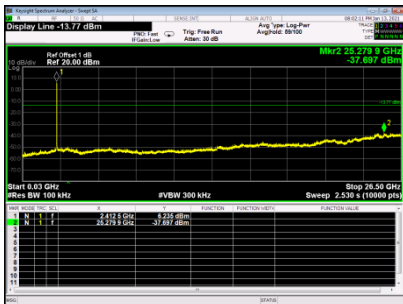


Bandedge-CH11

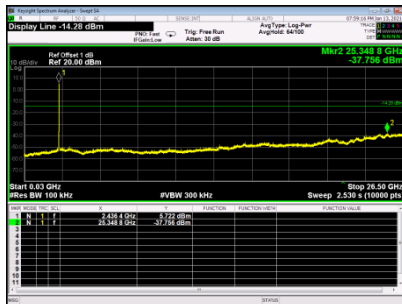


10th Harmonic of the fundamental frequency

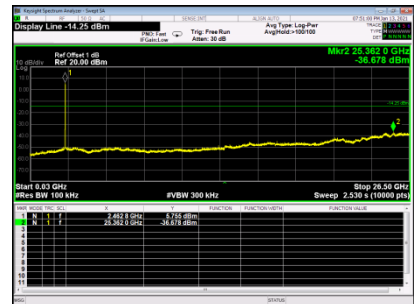
CH01



CH06

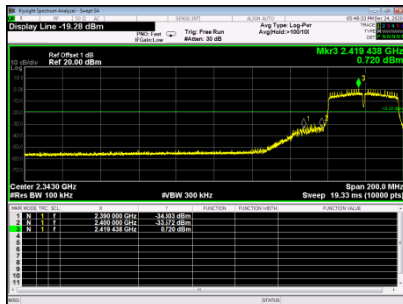


CH11



TX N (HT40) Mode _Ant 1

Bandedge-CH03

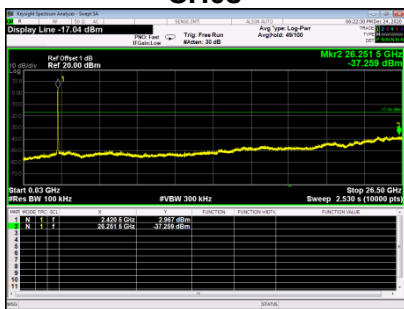


Bandedge-CH09



10th Harmonic of the fundamental frequency

CH03



CH06

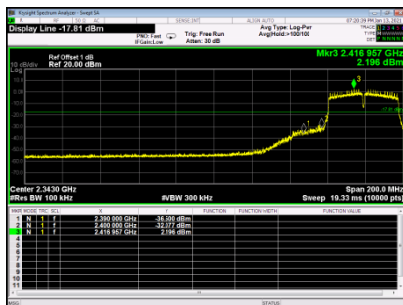


CH09



TX N (HT40) Mode _Ant 2

Bandedge-CH03

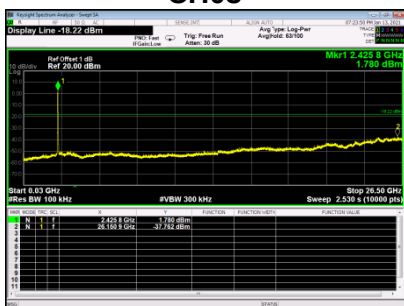


Bandedge-CH09



10th Harmonic of the fundamental frequency

CH03



CH06



CH09



9 POWER SPECTRAL DENSITY TEST

9.1 LIMIT

FCC Part15, Subpart C (15.247)&RSS-247		
Section	Test Item	Limit
15.247(e) RSS-2475.2 (b)	Power Spectral Density	8 dBm (in any 3 kHz)

9.2 TEST PROCEDURE AND SETTING

- 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 method11.10.2 of ANSI C63.10-2013.

9.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2021/05/24
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

9.4 TEST SETUP



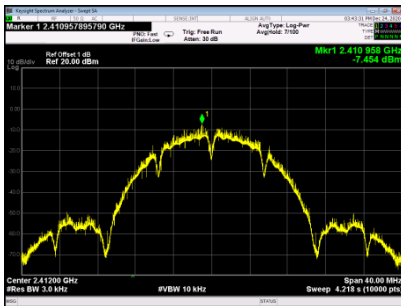
9.5 EUT OPERATION CONDITIONS

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.

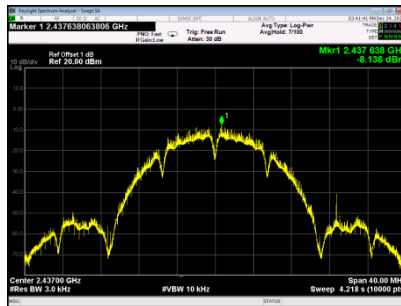
9.6 TESTRESULTS

TX B Mode_Ant 1				
Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
01	2412	-7.454	8	PASS
06	2437	-8.136	8	PASS
11	2462	-8.059	8	PASS

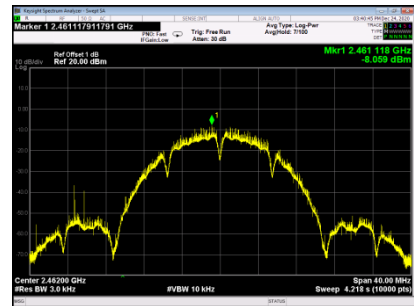
CH01



CH06

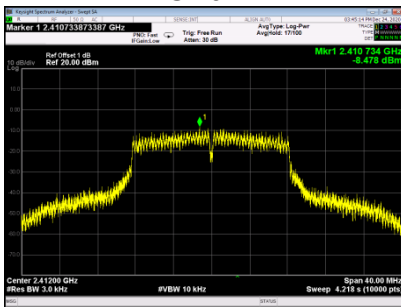


CH11

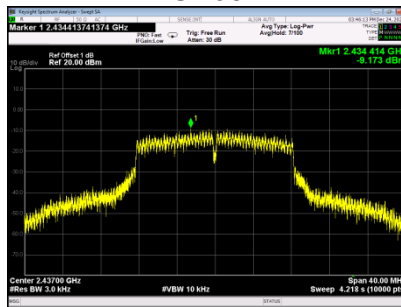


TX G Mode_Ant 1				
Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
01	2412	-8.478	8	PASS
06	2437	-9.173	8	PASS
11	2462	-7.817	8	PASS

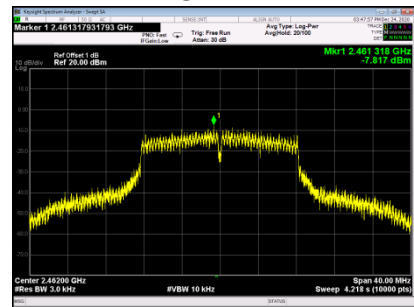
CH01



CH06



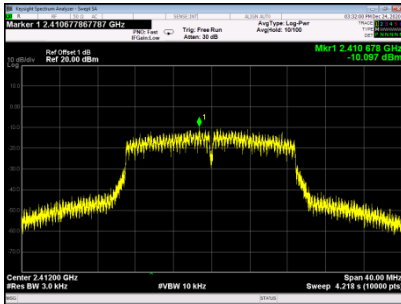
CH11



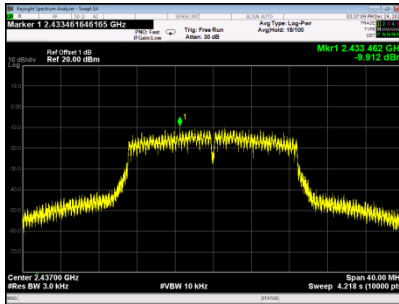
TX N (HT20) Mode_Ant 1

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
01	2412	-10.097	8	PASS
06	2437	-9.912	8	PASS
11	2462	-8.911	8	PASS

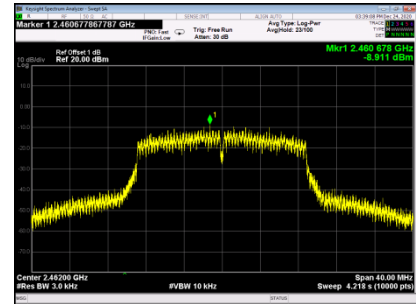
CH01



CH06



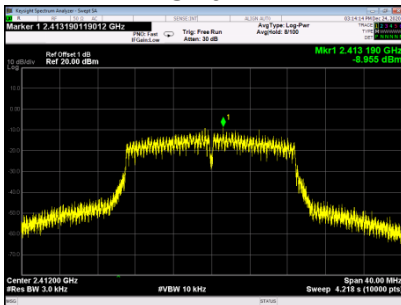
CH11



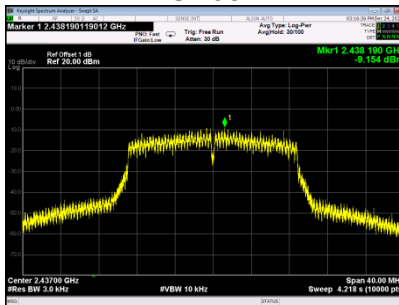
TX N (HT20) Mode_Ant 2

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
01	2412	-8.955	8	PASS
06	2437	-9.154	8	PASS
11	2462	-9.524	8	PASS

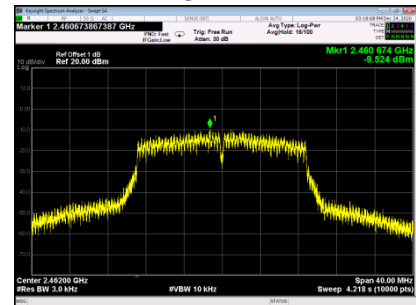
CH01



CH06



CH11



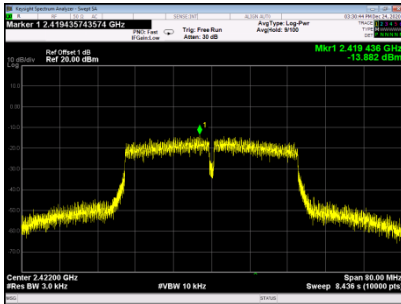
TX N (HT20) Mode_Total

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
01	2412	-6.48	8	PASS
06	2437	-6.51	8	PASS
11	2462	-6.20	8	PASS

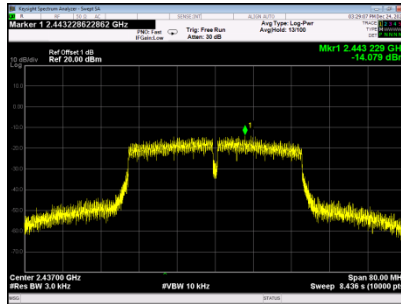
TX N (HT40) Mode_Ant 1

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
03	2412	-13.882	8	PASS
06	2437	-14.079	8	PASS
09	2452	-14.372	8	PASS

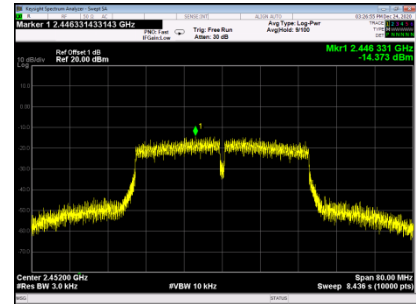
CH03



CH06



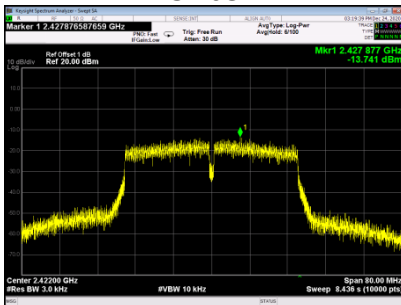
CH09



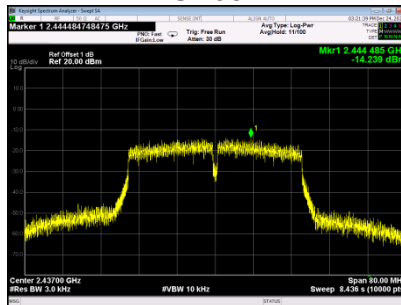
TX N (HT40) Mode_Ant 2

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
03	2412	-13.741	8	PASS
06	2437	-14.239	8	PASS
09	2452	-13.809	8	PASS

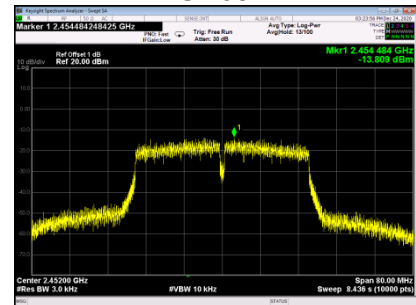
CH03



CH06



CH09



TX N (HT40) Mode_Total

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit: <dBm/3KHz	Result
03	2412	-10.80	8	PASS
06	2437	-11.15	8	PASS
09	2452	-11.07	8	PASS

10 FREQUENCY STABILITY MEASUREMENT

10.1 LIMIT

RSS-Gen			
Section	Test Item	Limit	Frequency Range (MHz)
RSS-Gen 6.11	Frequency Stability	Specified in the user's manual	2412-2462

10.2 TEST PROCEDURE AND SETTING

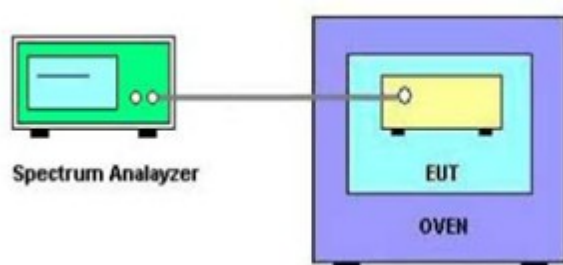
- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting:

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RBW	10 kHz
VBW	10kHz
Sweep Time	Auto

10.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2021/05/24
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A
4	Temperature conditioning	Guan Jian.HTH1000	-20-130°C	GJ1000-10D001	N/A
5	DC Power Supply	G.KE	IPR-10010D	010931954	N/A

10.4 TEST SETUP



10.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

10.6 TEST RESULTS

	Temperature vs. Frequency Stability	
Voltage	Temperature	Measurement Frequency (MHz)
3.3V	(°C)	2412
	-20	2411.990
	25	2411.992
	50	2411.990
2.1V	25	2411.975
Max. Deviation (MHz)		-0.025
Max. Deviation (ppm)		-10.36

Note: 2.7V is the end point voltage, and products below 2.7V will cease working.

END OF TEST REPORT