

FCC Radio Test Report

FCC ID: P27SZWTD03N

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

Project No. : 1702040A
Equipment : Water Detector
Test Model : SZ-WTD03
Series Model : SZ-WTD03Nxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-", for marking purpose)
Applicant : Sercomm Corporation
Address : 8F, No. 3-1, YuanQu St., NanKang, Taipei, Taiwan 115

Date of Receipt : Feb. 22, 2017
Date of Test : Feb. 22, 2017 ~ Mar. 20, 2017
Issued Date : Mar. 22, 2017
Tested by : BTL Inc.

Testing Engineer : Rush Kao
(Rush Kao)

Technical Manager : Jeff Yang
(Jeff Yang)

Authorized Signatory : Andy Chiu
(Andy Chiu)

B T L I N C .

B1, No.37, Lane 365, Yang Guang St.,
Nei-Hu District, Taipei City 114, Taiwan.
TEL:+886-2-2657-3299 FAX: +886-2- 2657-3331

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Table of Contents	Page
1 . CERTIFICATION	6
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	8
2.1.1 MEASUREMENT UNCERTAINTY	8
3 . GENERAL INFORMATION	9
3.1 GENERAL DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	10
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING	10
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	11
3.5 DESCRIPTION OF SUPPORT UNITS	11
4 . EMC EMISSION TEST	12
4.1 CONDUCTED EMISSION MEASUREMENT	12
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	12
4.1.2 TEST PROCEDURE	12
4.1.3 DEVIATION FROM TEST STANDARD	12
4.1.4 TEST SETUP	13
4.1.5 EUT OPERATING CONDITIONS	13
4.1.6 EUT TEST CONDITIONS	13
4.1.7 TEST RESULTS	13
4.2 RADIATED EMISSION MEASUREMENT	14
4.2.1 RADIATED EMISSION LIMITS	14
4.2.2 TEST PROCEDURE	15
4.2.3 DEVIATION FROM TEST STANDARD	15
4.2.4 TEST SETUP	16
4.2.5 EUT TEST CONDITIONS	17
4.2.6 TEST RESULTS (9KHZ TO 30MHZ)	17
4.2.7 TEST RESULTS (BETWEEN 30MHZ TO 1000 MHZ)	17
4.2.8 TEST RESULTS (ABOVE 1000 MHZ)	17
5 . BANDWIDTH TEST	18
5.1 APPLIED PROCEDURES / LIMIT	18
5.1.1 TEST PROCEDURE	18
5.1.2 DEVIATION FROM STANDARD	18
5.1.3 TEST SETUP	18
5.1.4 EUT OPERATION CONDITIONS	18
5.1.5 EUT TEST CONDITIONS	18
5.1.6 TEST RESULTS	18
6 . MAXIMUM OUTPUT POWER TEST	19

Table of Contents	Page
6.1 APPLIED PROCEDURES / LIMIT	19
6.1.1 TEST PROCEDURE	19
6.1.2 DEVIATION FROM STANDARD	19
6.1.3 TEST SETUP	19
6.1.4 EUT OPERATION CONDITIONS	19
6.1.5 EUT TEST CONDITIONS	19
6.1.6 TEST RESULTS	19
7 . ANTENNA CONDUCTED SPURIOUS EMISSION	20
7.1 APPLIED PROCEDURES / LIMIT	20
7.1.1 TEST PROCEDURE	20
7.1.2 DEVIATION FROM STANDARD	20
7.1.3 TEST SETUP	20
7.1.4 EUT OPERATION CONDITIONS	20
7.1.5 EUT OPERATION CONDITIONS	20
7.1.6 TEST RESULTS	20
8 . POWER SPECTRAL DENSITY TEST	21
8.1 APPLIED PROCEDURES / LIMIT	21
8.1.1 TEST PROCEDURE	21
8.1.2 DEVIATION FROM STANDARD	21
8.1.3 TEST SETUP	21
8.1.4 EUT OPERATION CONDITIONS	21
8.1.5 EUT TEST CONDITIONS	21
8.1.6 TEST RESULTS	21
9 . MEASUREMENT INSTRUMENTS LIST	22
10 . EUT TEST PHOTO	24
ATTACHMENT A - CONDUCTED EMISSION	28
ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)	29
ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)	34
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)	37
ATTACHMENT E - BANDWIDTH	66
ATTACHMENT F - MAXIMUM OUTPUT POWER TEST	71
ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION	72
ATTACHMENT H - POWER SPECTRAL DENSITY TEST	81

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1702040A	Original Issue.	Mar. 22, 2017

1. CERTIFICATION

Equipment : Water Detector
Brand Name : Sercomm
Test Model : SZ-WTD03
Series Model : SZ-WTD03Nxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-", for marking purpose)
Applicant : Sercomm Corporation
Manufacturer : SERCOMM CORP
Address : 3F 81 YUYI RD CHU-NAN MIAO-LI, 350 TAIWAN
Factory : SERCOMM CORP
Address : 3F 81 YUYI RD CHU-NAN MIAO-LI, 350 TAIWAN
Date of Test : Feb. 22, 2017 ~ Mar. 20, 2017
Test Sample : Engineering Sample
Standard(s) : FCC Part15, Subpart C (15.247) / ANSI C63.10-2013

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

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1702040A) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15 (15.247) , Subpart C			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	NOTE (1)
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(b)(3)	Peak Output Power	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	
15.209/15.205	Transmitter Radiated Emissions	PASS	

NOTE:

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

2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

Radiated emission Test (Below 1GHz):

CB15: (FCC RN:674415; FCC DN:TW0659)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Above 1GHz):

CB15: (FCC RN:674415; FCC DN:TW0659)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

2.1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U , (dB)
CB15 (3m)	CISPR	9kHz ~ 150kHz	2.96
		150kHz ~ 30MHz	2.74

Test Site	Method	Measurement Frequency Range	Ant.	U , (dB)
CB15 (3m)	CISPR	30MHz ~ 200MHz	V	4.76
		30MHz ~ 200MHz	H	4.28
		200MHz ~ 1,000MHz	V	5.08
		200MHz ~ 1,000MHz	H	4.50

Test Site	Method	Measurement Frequency Range	Ant.	U , (dB)
CB15 (3m)	CISPR	1GHz ~ 6GHz	V	4.48
		1GHz ~ 6GHz	H	4.50
		6GHz ~ 18GHz	V	4.30
		6GHz ~ 18GHz	H	4.14

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

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR} , as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz : 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz : 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR} .

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Water Detector	
Brand Name	Sercomm	
Test Model	SZ-WTD03	
Series Model	SZ-WTD03Nxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-", for marking purpose)	
Model Difference	All models are identical to each other except for model designation and marketing purpose.	
Power Source	DC Voltage supplied from Battery. Model: a. Panasonic / CR2 b. GP / CR2	
Power Rating	a. DC 3V 850mAh b. DC 3V 800mAh	
Product Description	Operation Frequency	2405~2480 MHz
	Modulation Technology	OQPSK
	Bit Rate of Transmitter	250Kbps
	Output Power (Max.)	9.32 dBm

Note:

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

- Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Sercomm	SZ-WTD03N	Printed	N/A	0.63

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode NOTE (1)

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

For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

Note:

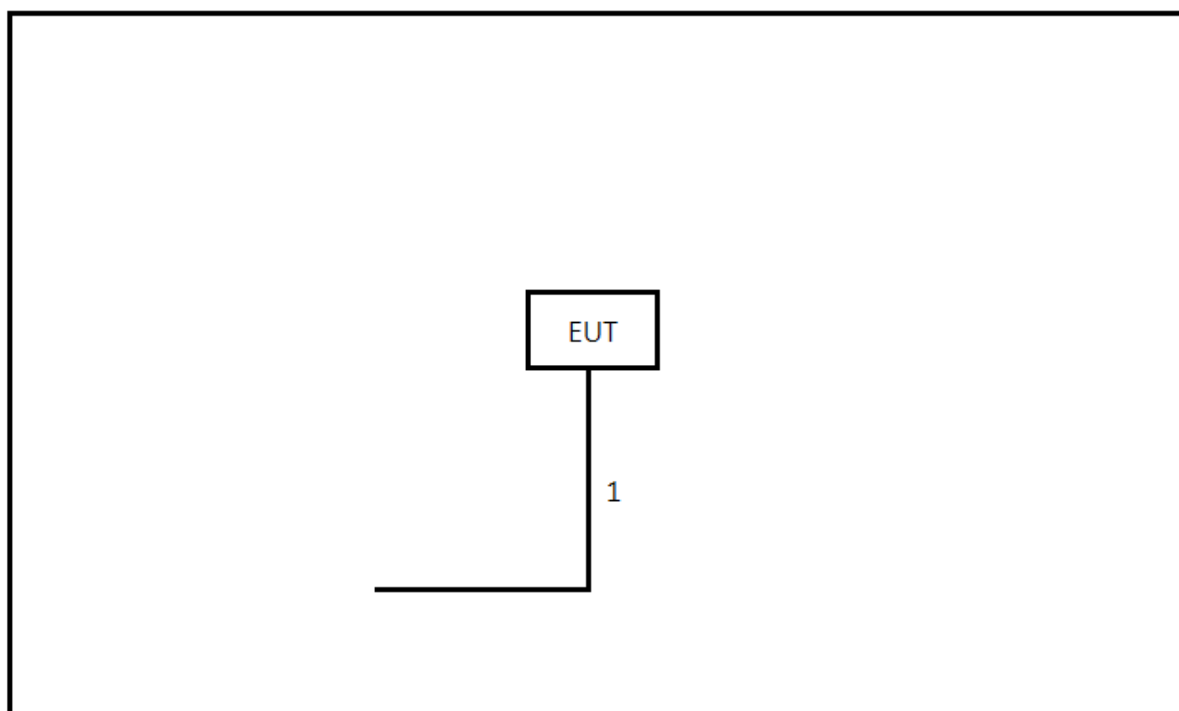
(1) The measurements are performed at the high, middle, low available channels.

3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of IEEE 802.15.4.

Test Software Version	Putty		
Frequency (MHz)	2405	2425	2440
IEEE 802.15.4	0A	0A	0A
Frequency (MHz)	2445	2450	2475
IEEE 802.15.4	0A	0A	0A
Frequency (MHz)	2480		
IEEE 802.15.4	09		

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	No	No	1m	Water Cable

Note:

- (1) For detachable type I/O cable should be specified the length in m in 『Length』 column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 -0.5	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

- (1) The limit of " * " decreases with the logarithm of the frequency
- (2) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

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

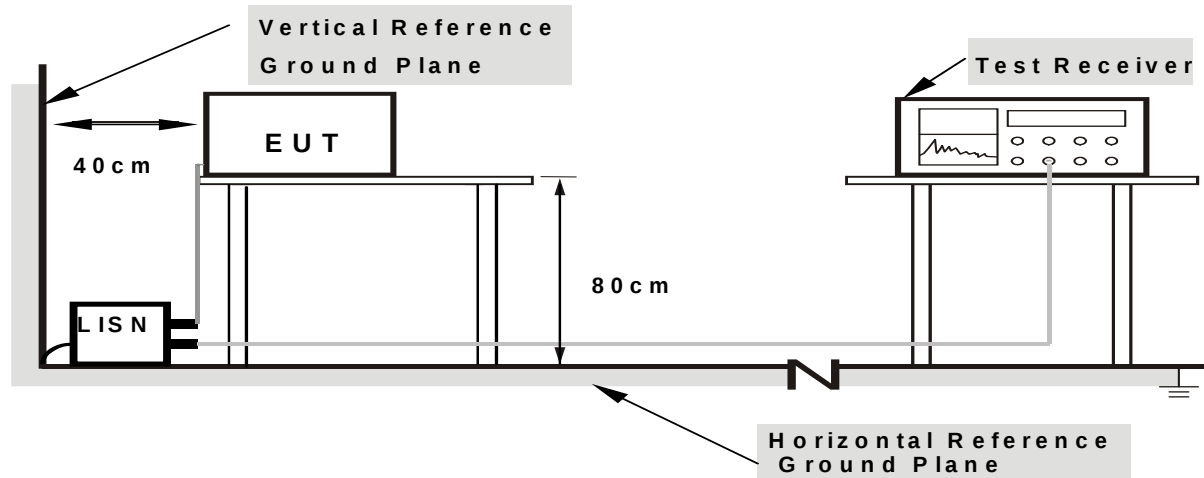
4.1.2 TEST PROCEDURE

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

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN .
 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

4.1.5 EUT OPERATING CONDITIONS

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

4.1.6 EUT TEST CONDITIONS

Temperature: N/A
 Relative Humidity: N/A
 Test Voltage: N/A

4.1.7 TEST RESULTS

Please refer to the Attachment A.

Remark:

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

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS

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 (9KHz-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
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

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

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

4.2.2 TEST PROCEDURE

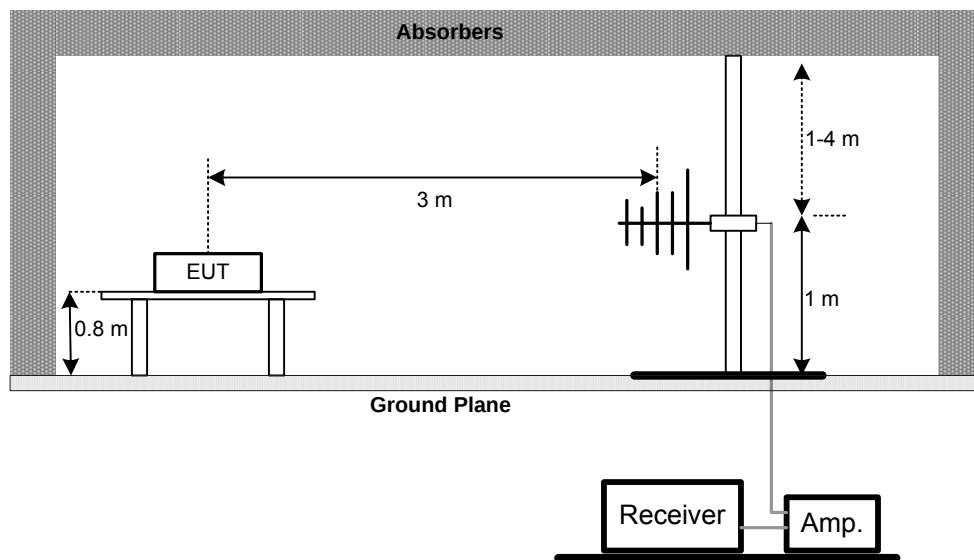
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

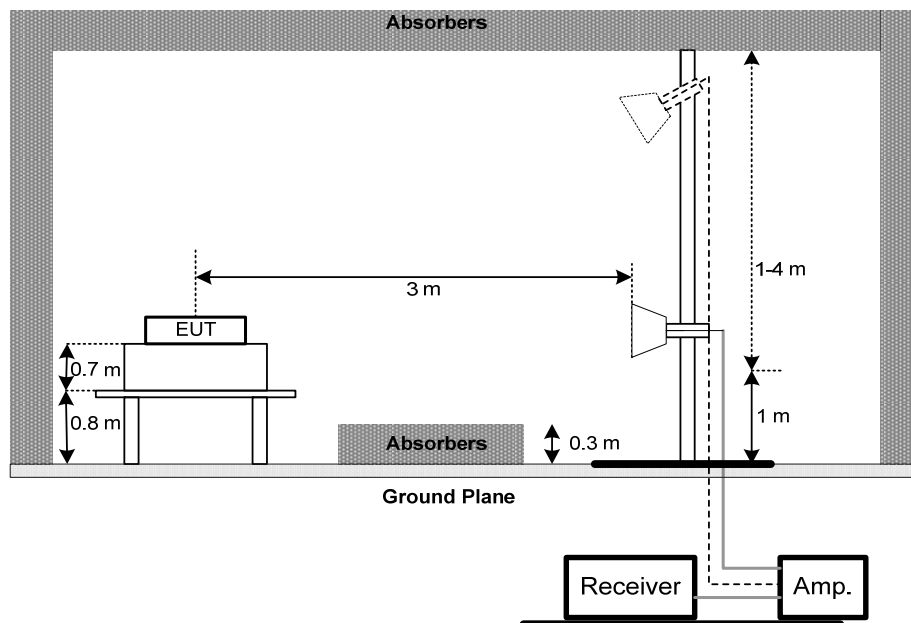
No deviation

4.2.4 TEST SETUP

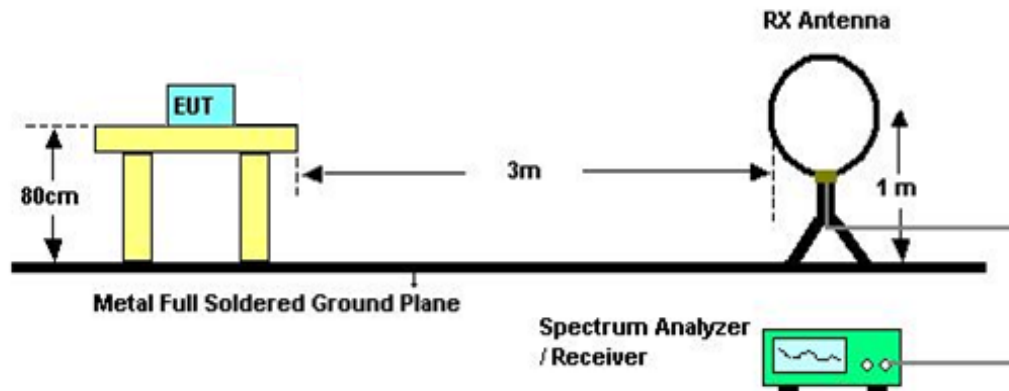
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



4.2.5 EUT TEST CONDITIONS

Temperature: 23°C

Relative Humidity: 70%

Test Voltage: DC 3V

4.2.6 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Attachment B.

Remark:

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

4.2.7 TEST RESULTS (BETWEEN 30MHZ TO 1000 MHZ)

Please refer to the Attachment C.

Remark:

- (1) Measuring frequency range from 30MHz to 1000MHz.
- (2) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

4.2.8 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Attachment D.

Remark:

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (2) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (3) EUT Orthogonal Axis:
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (4) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (5) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2405~2480 MHz	PASS

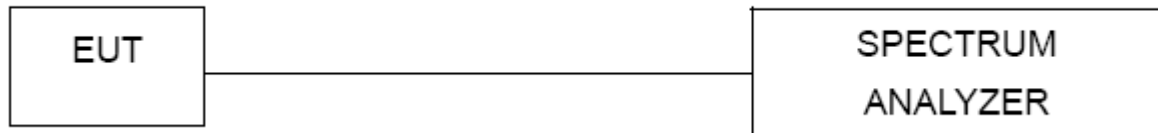
5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: DC 3V

5.1.6 TEST RESULTS

Please refer to the Attachment E.

6. MAXIMUM OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Maximum Output Power	1 watt or 30dBm	2405~2480 MHz	PASS

6.1.1 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance v03r05.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.
 Transmit output power was measured while the host equipment supply voltage was varied from 85 % to 115 % of the nominal rated supply voltage. No change in transmit output power was observed.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: DC 3V

6.1.6 TEST RESULTS

Please refer to the Attachment F.

7. ANTENNA CONDUCTED SPURIOUS EMISSION

7.1 APPLIED PROCEDURES / 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

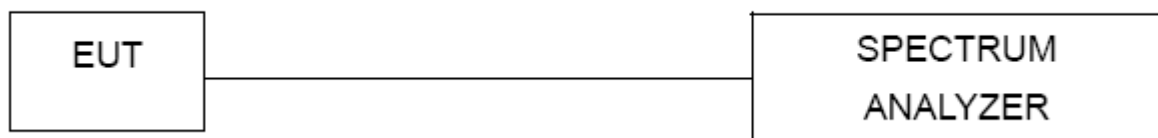
7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 10 ms.
- Offset=antenna gain + cable loss

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 EUT OPERATION CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: DC 3V

7.1.6 TEST RESULTS

Please refer to the Attachment G.

8. POWER SPECTRAL DENSITY TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)	2405~2480 MHz	PASS

8.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW=3KHz, VBW=10 KHz, Sweep time = auto.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 EUT TEST CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: DC 3V

8.1.6 TEST RESULTS

Please refer to the Attachment H.

9. MEASUREMENT INSTRUMENTS LIST

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Preamplifier	EMCI	012645B	980267	Feb. 28, 2018
2	Preamplifier	EMCI	EMC02325	980217	Dec. 29, 2017
3	Preamplifier	EMCI	EMC2654045	980030	Feb. 14, 2018
4	Test Cable	EMCI	EMC104-SM-S M-8000	8m	Jan. 04, 2018
5	Test Cable	EMCI	EMC104-SM-S M-800	150207	Jan. 04, 2018
6	Test Cable	EMCI	EEMC104-SM- SM-3000	151205	Jan. 04, 2018
7	MXE EMI Receiver	Agilent	N9038A	MY55420127	Jan. 09, 2018
8	Signal Analyzer	Agilent	N9010A	MY52220990	Feb. 22, 2018
9	Loop Ant	EMCO	6502	42960	Nov. 24, 2017
10	Horn Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	Feb. 28, 2018
11	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-548	Jan.16, 2018
12	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0623	Jan.16, 2018

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 26, 2017

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 26, 2017
2	Power Meter	Anritsu	ML2495A	1128008	Aug. 17, 2017
3	Power Sensor	Anritsu	MA2411B	1126001	Aug. 17, 2017

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 26, 2017

Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	R&S/FSP30	100854	May 26, 2017

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

ATTACHMENT A - CONDUCTED EMISSION

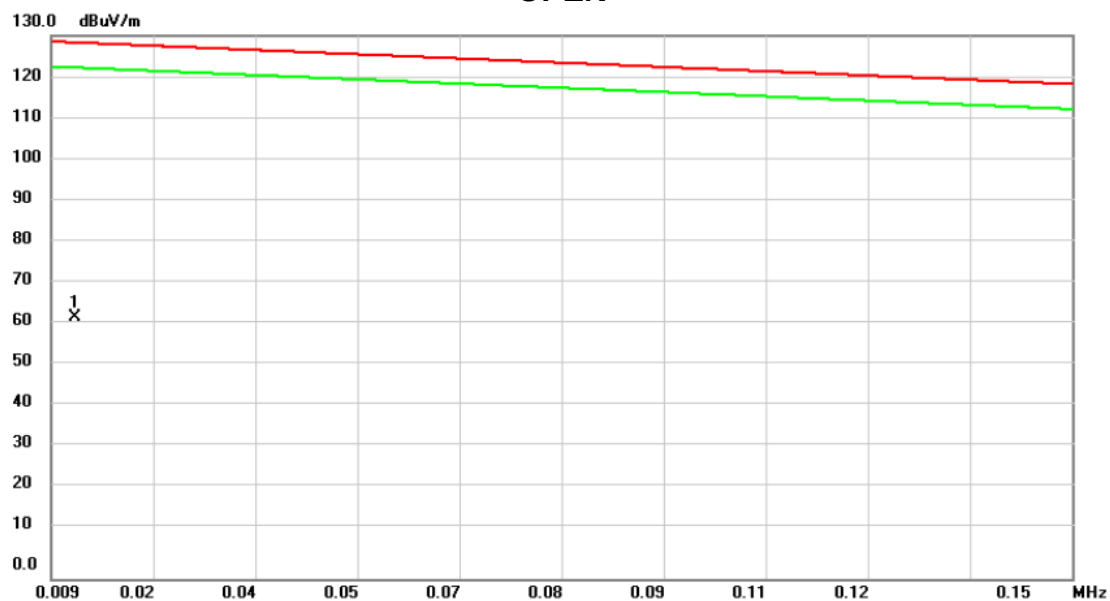
Test Mode: N/A

Note: "N/A" denotes test is not applicable to this device.

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

Test Mode: TX Mode

OPEN



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	*	0.0123	42.66	19.87	62.53	128.28	-65.75	peak	100	37

Test Mode: TX Mode

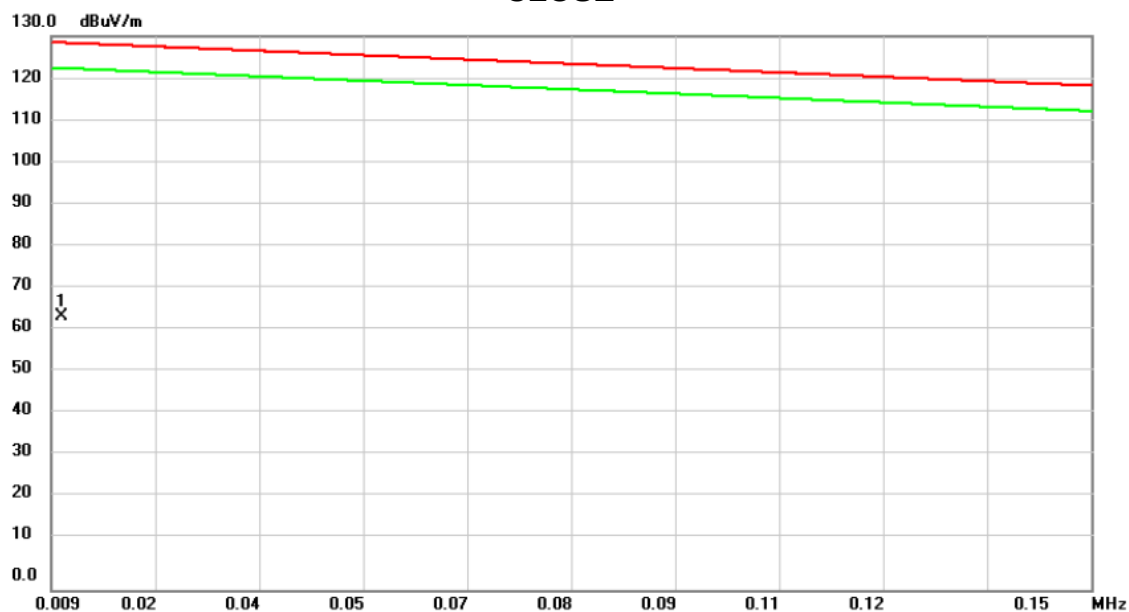
OPEN



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	*	0.7768	33.78	11.91	45.69	71.24	-25.55	peak	100	10	
2		1.3141	27.65	11.86	39.51	66.45	-26.94	peak	100	242	
3		1.6724	24.00	11.70	35.70	63.26	-27.56	peak	100	222	
4		2.0604	22.74	11.52	34.26	69.54	-35.28	peak	100	189	
5		3.0753	18.30	11.11	29.41	69.54	-40.13	peak	100	311	
6		4.8066	16.45	11.37	27.82	69.54	-41.72	peak	100	9	

Test Mode: TX Mode

CLOSE



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	*	0.0104	43.73	20.39	64.12	128.42	-64.30	peak	100	209

Test Mode: TX Mode

CLOSE

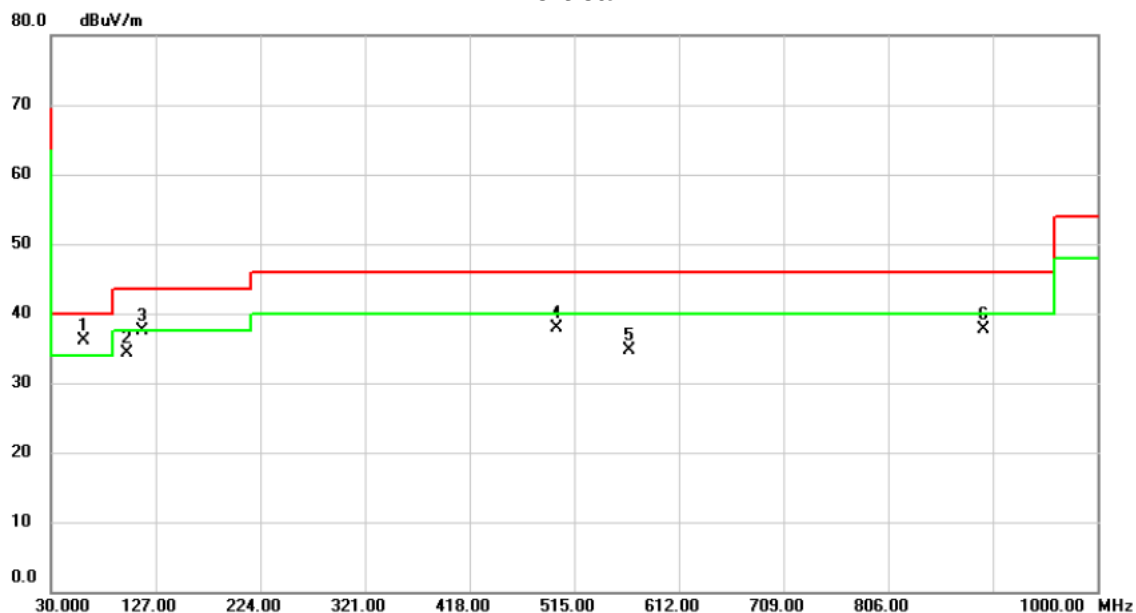


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	0.5381	35.59	11.82	47.41	73.37	-25.96	peak	100	295
2		1.2843	27.92	11.87	39.79	66.72	-26.93	peak	100	92
3		1.6724	24.74	11.70	36.44	63.26	-26.82	peak	100	315
4		2.2395	21.92	11.44	33.36	69.54	-36.18	peak	100	260
5		3.2544	18.42	11.14	29.56	69.54	-39.98	peak	100	186
6		4.2991	16.63	11.29	27.92	69.54	-41.62	peak	100	0

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

Test Mode: TX Mode

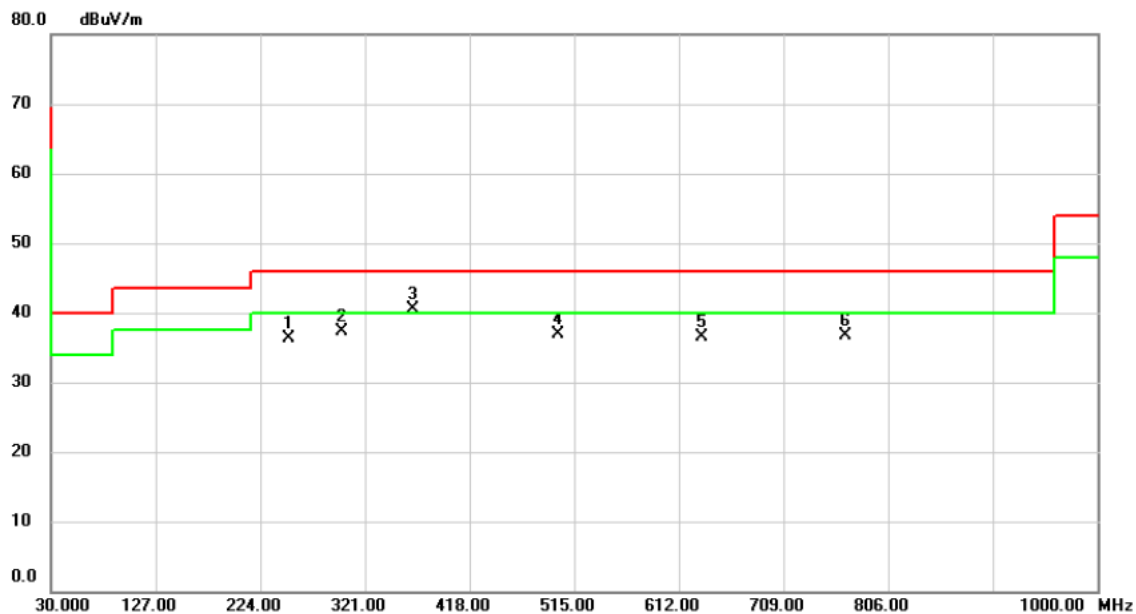
Vertical



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 degree	Comment
1	*	60.0700	45.06	-9.01	36.05	40.00	-3.95	peak	200	18	
2		99.8400	47.17	-12.89	34.28	43.50	-9.22	peak	200	284	
3		114.3900	48.48	-11.02	37.46	43.50	-6.04	peak	200	259	
4		498.5100	41.00	-3.05	37.95	46.00	-8.05	peak	200	298	
5		566.4100	36.12	-1.50	34.62	46.00	-11.38	peak	200	259	
6		894.2700	33.61	4.01	37.62	46.00	-8.38	peak	300	178	

Test Mode: TX Mode

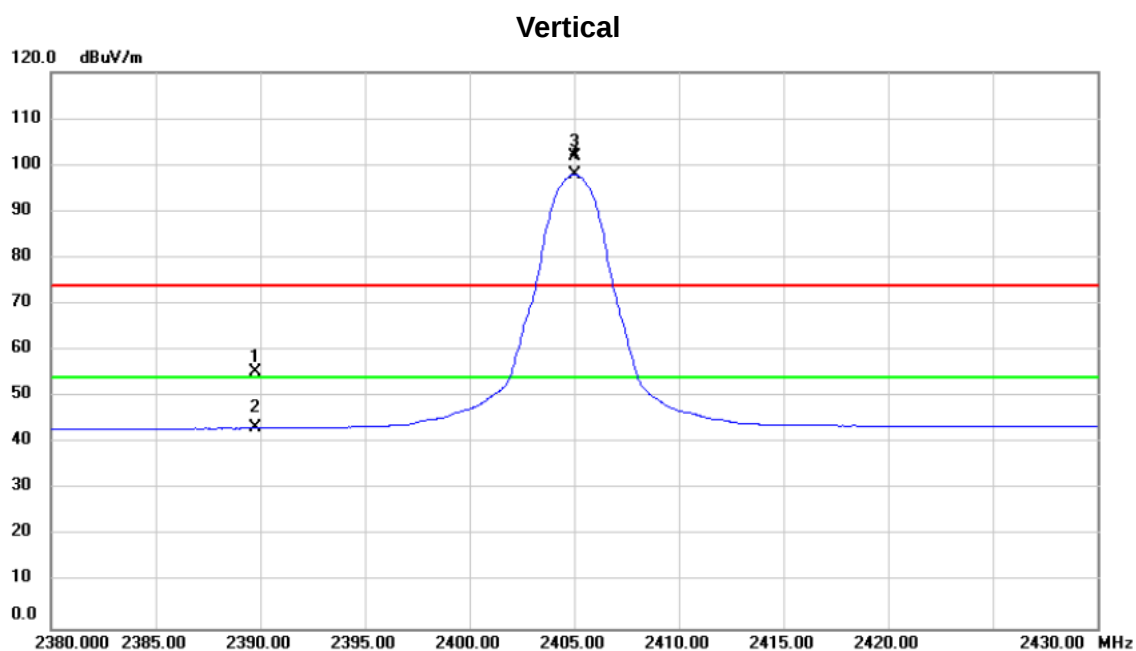
Horizontal



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		250.1900	45.76	-9.47	36.29	46.00	-9.71	peak	100	351
2		299.6600	45.10	-7.79	37.31	46.00	-8.69	peak	100	288
3	*	365.6200	46.41	-6.00	40.41	46.00	-5.59	peak	100	306
4		500.4500	39.93	-3.02	36.91	46.00	-9.09	peak	100	281
5		633.3400	36.80	-0.36	36.44	46.00	-9.56	peak	100	235
6		766.2300	34.71	2.06	36.77	46.00	-9.23	peak	100	337

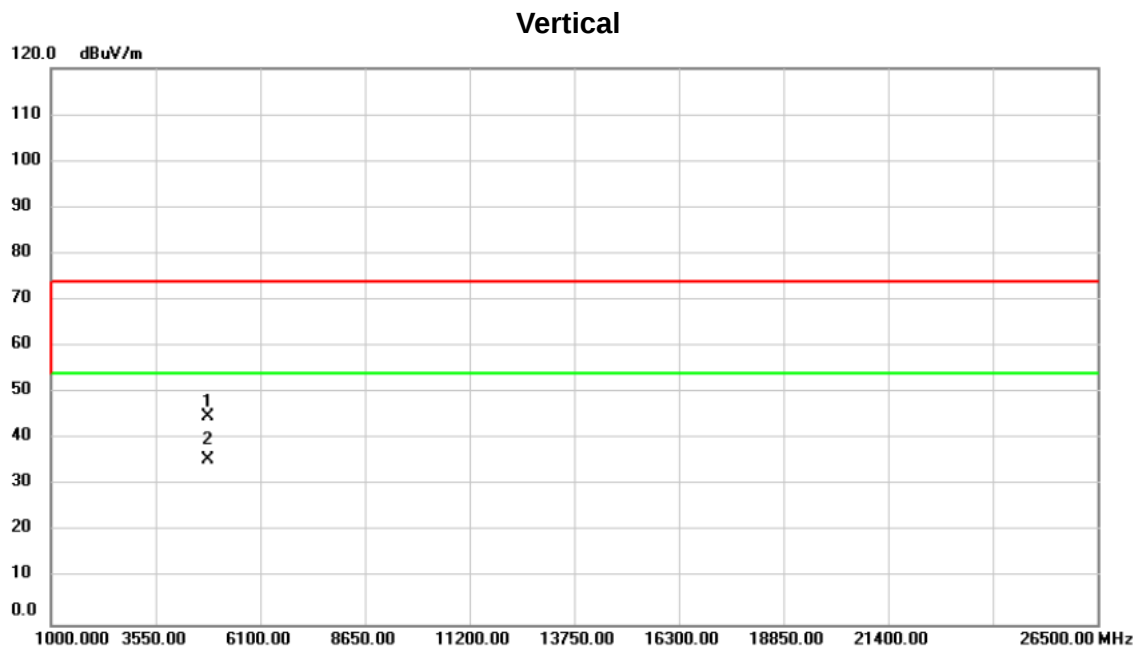
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX 2405MHz



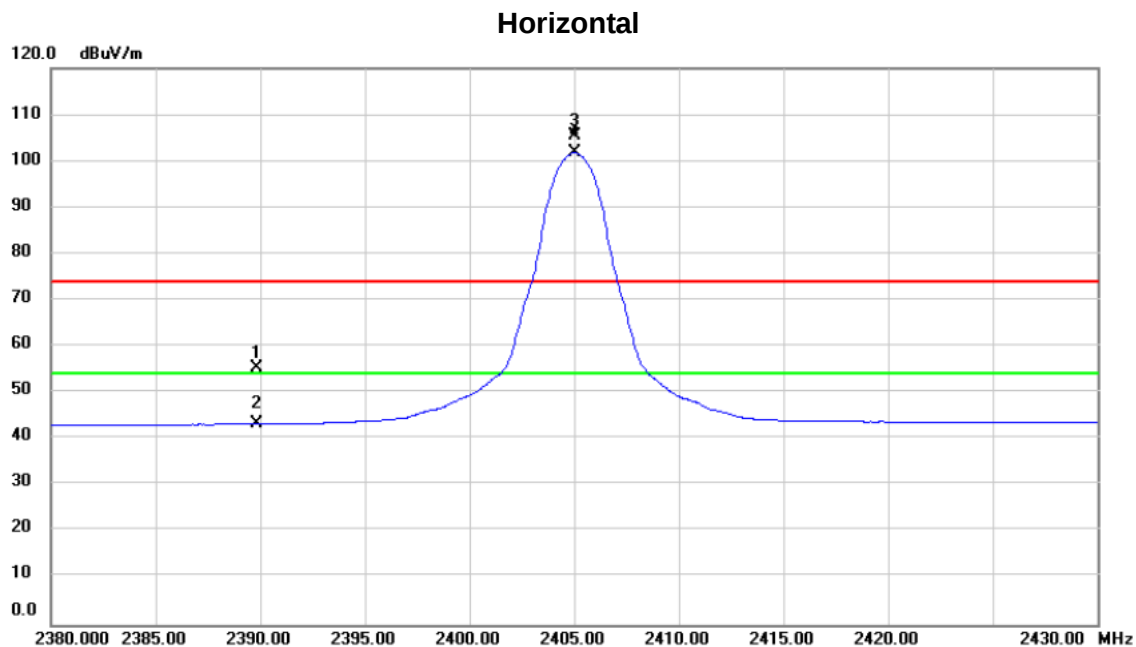
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		2389.790	24.28	30.96	55.24	74.00	-18.76	peak	102	296
2		2389.790	12.31	30.96	43.27	54.00	-10.73	AVG	102	296
3	X	2405.000	70.71	31.02	101.73	74.00	27.73	peak	102	296
4	*	2405.000	66.93	31.02	97.95	54.00	43.95	AVG	102	296

Orthogonal Axis :	X
Test Mode :	TX 2405MHz



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		4810.000	56.27	-11.49	44.78	74.00	-29.22	peak	100	237
2	*	4810.000	47.11	-11.49	35.62	54.00	-18.38	AVG	100	237

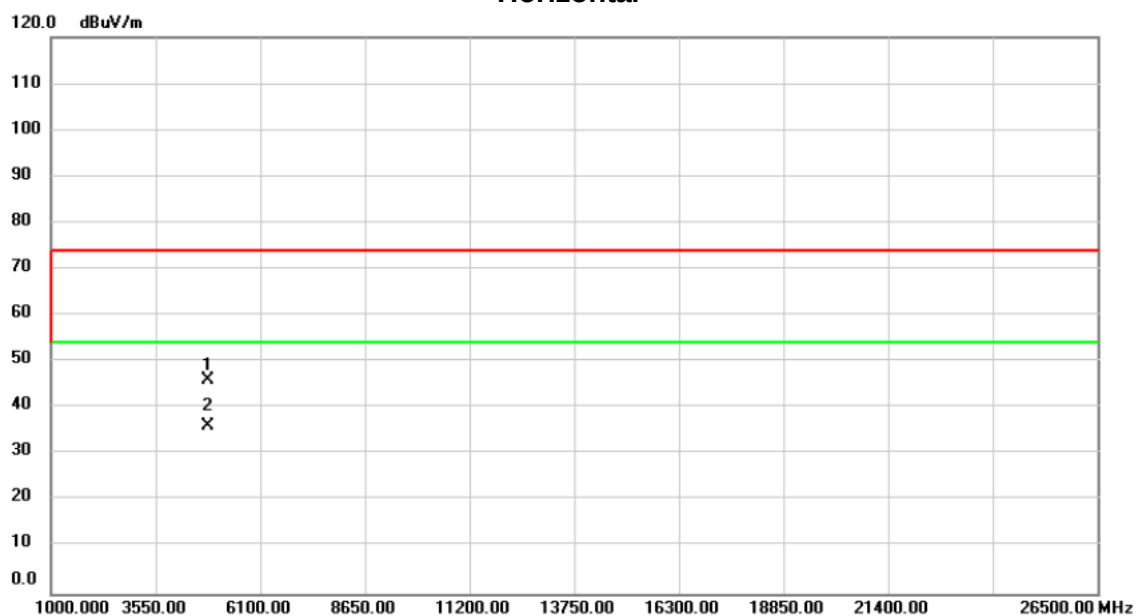
Orthogonal Axis :	X
Test Mode :	TX 2405MHz



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		2389.810	24.51	30.96	55.47	74.00	-18.53	peak	198	12
2		2389.810	12.39	30.96	43.35	54.00	-10.65	AVG	198	12
3	X	2405.000	74.46	31.02	105.48	74.00	31.48	peak	198	12
4	*	2405.000	70.75	31.02	101.77	54.00	47.77	AVG	198	12

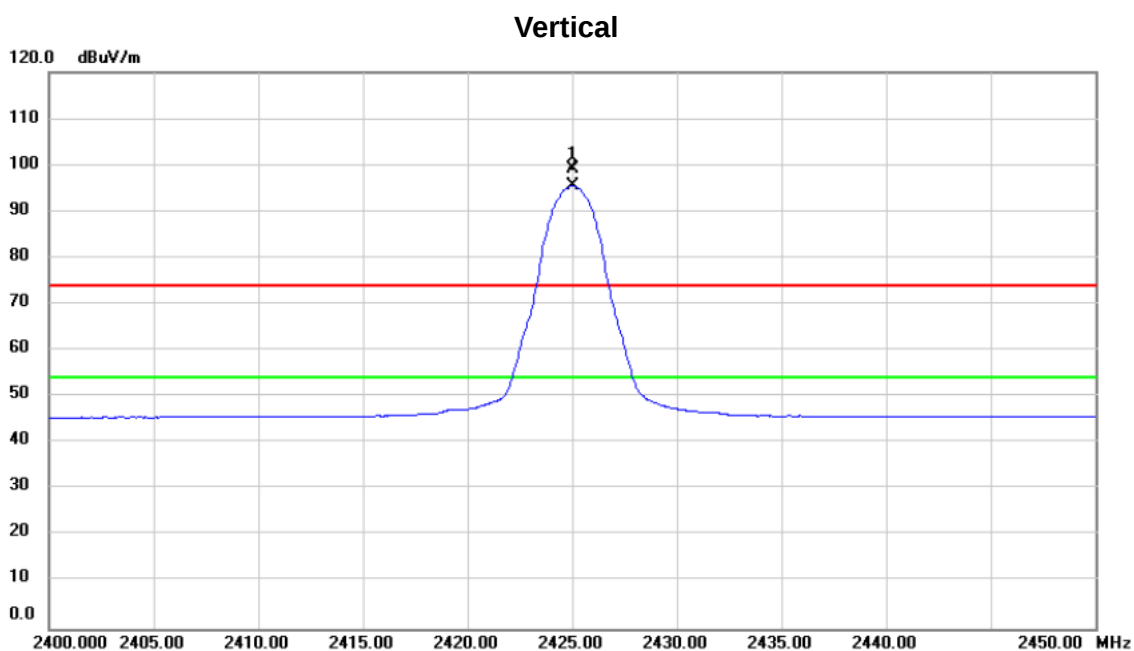
Orthogonal Axis :	X
Test Mode :	TX 2405MHz

Horizontal



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		4810.000	57.56	-11.49	46.07	74.00	-27.93	peak	387	123
2	*	4810.000	47.78	-11.49	36.29	54.00	-17.71	AVG	387	123

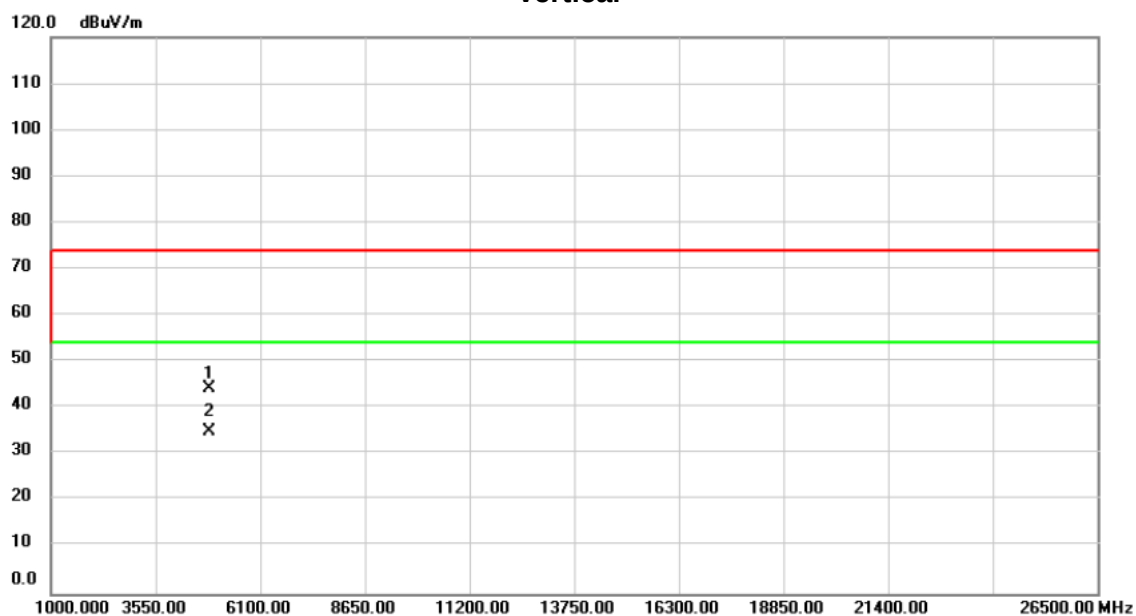
Orthogonal Axis :	X
Test Mode :	TX 2425MHz



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	X	2425.000	68.11	31.09	99.20	74.00	25.20	peak	101	295	No Limit
2	*	2425.000	64.39	31.09	95.48	54.00	41.48	AVG	101	295	No Limit

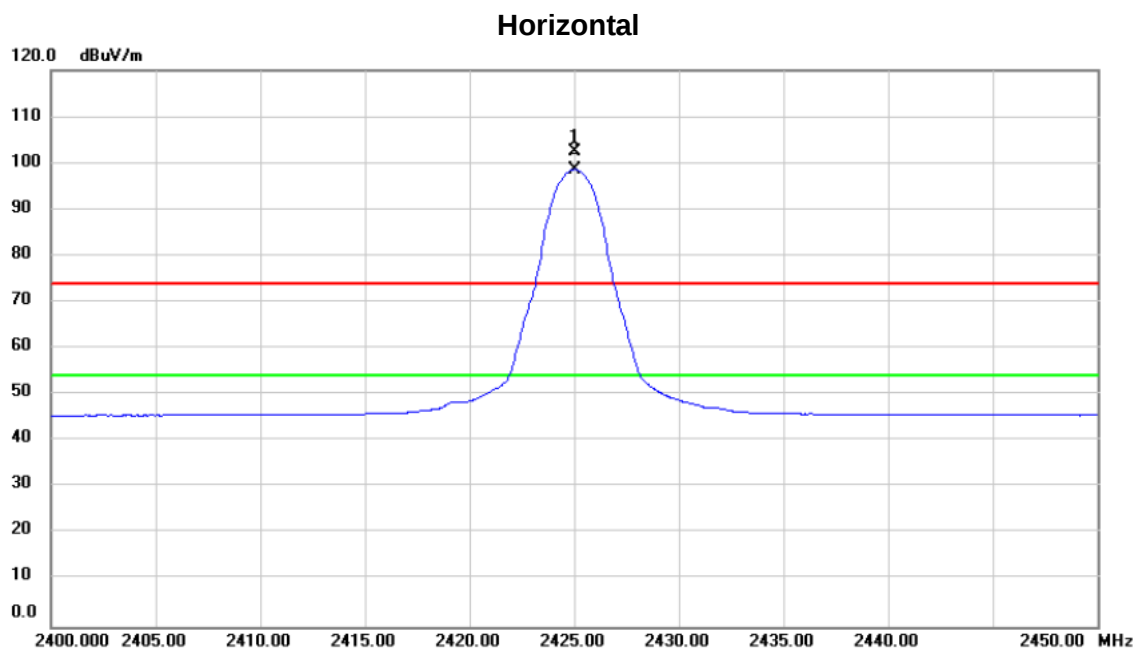
Orthogonal Axis :	X
Test Mode :	TX 2425MHz

Vertical



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	4850.000	55.59	-11.43	44.16	74.00	-29.84	peak	100	238
2 *	4850.000	46.26	-11.43	34.83	54.00	-19.17	AVG	100	238

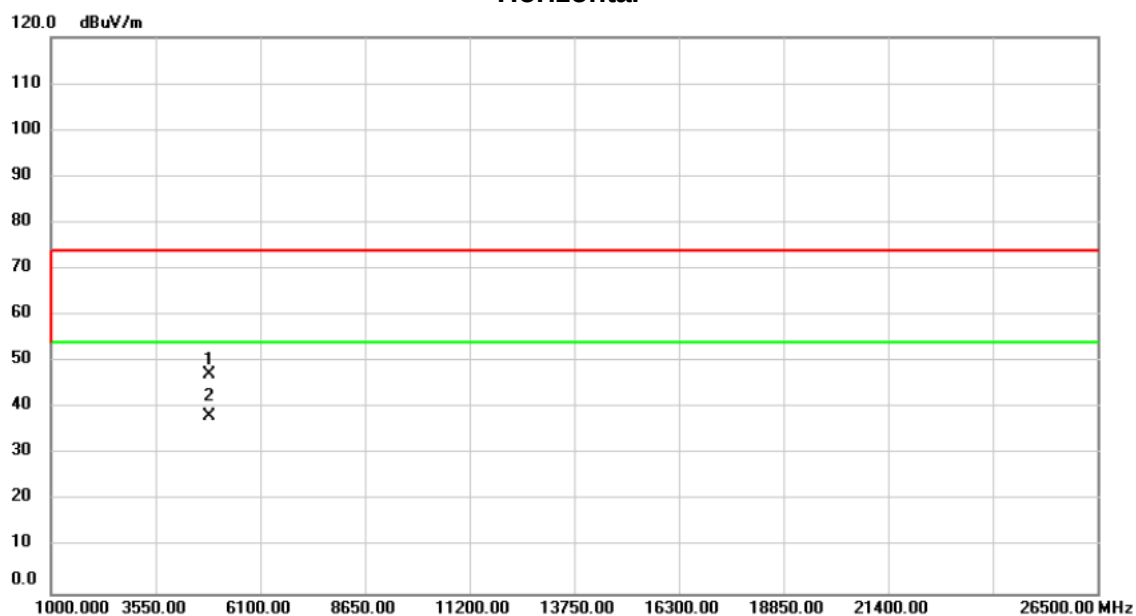
Orthogonal Axis :	X
Test Mode :	TX 2425MHz



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	X	2425.000	71.22	31.09	102.31	74.00	28.31	peak	195	22
2	*	2425.000	67.61	31.09	98.70	54.00	44.70	AVG	195	22

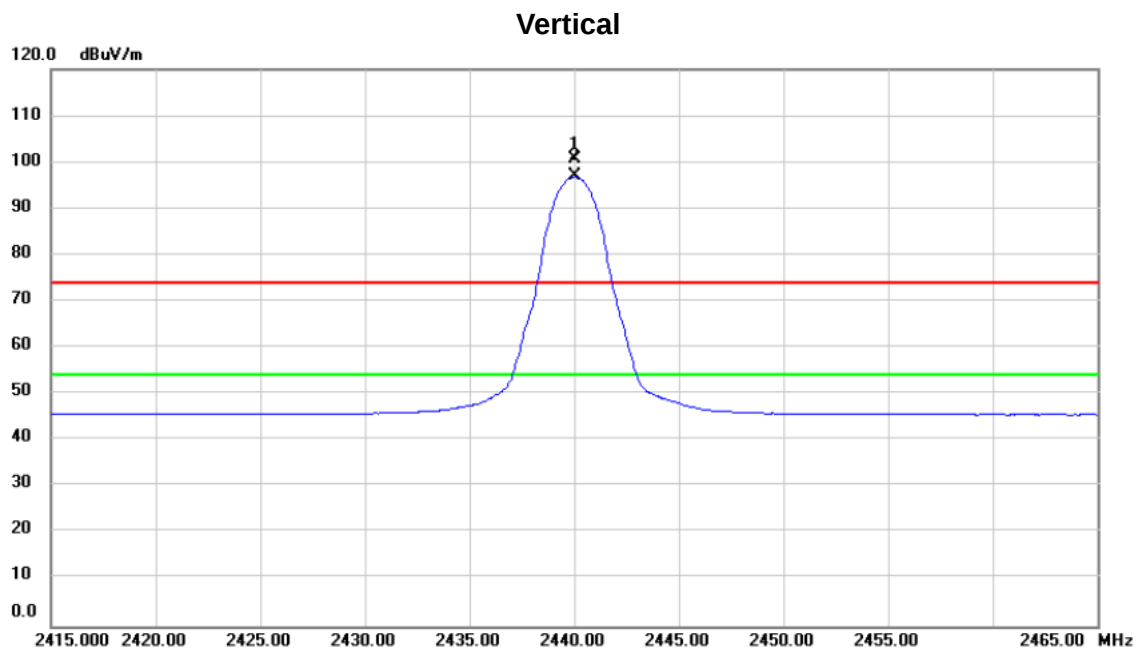
Orthogonal Axis :	X
Test Mode :	TX 2425MHz

Horizontal



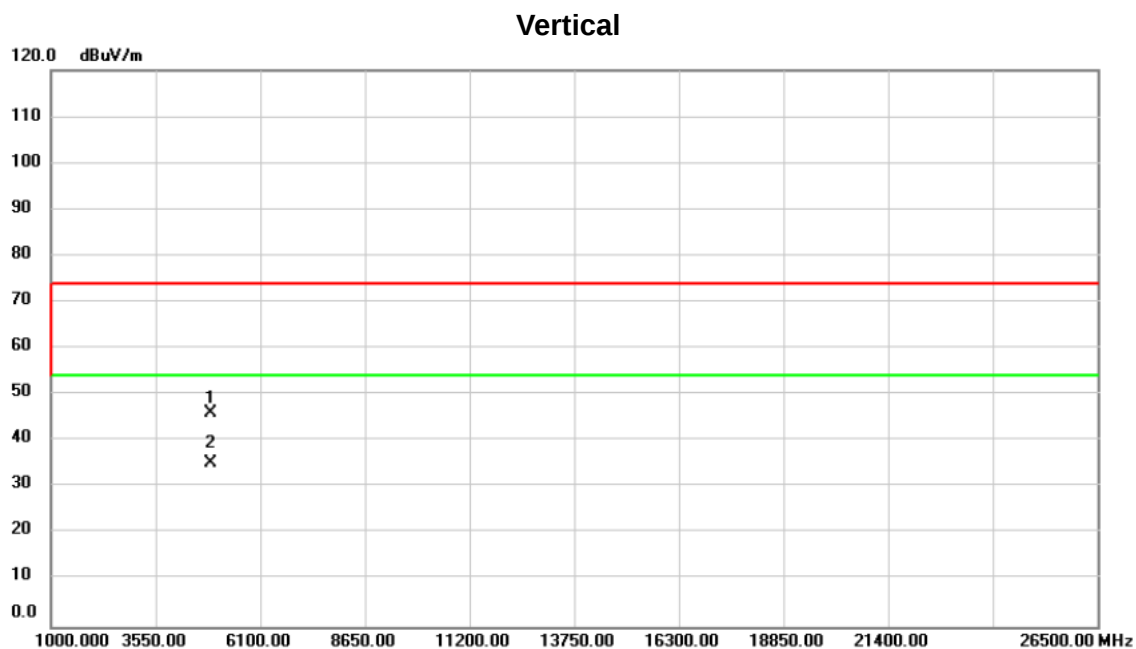
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1		4850.000	58.65	-11.43	47.22	74.00	-26.78	peak	400	123
2	*	4850.000	49.81	-11.43	38.38	54.00	-15.62	AVG	400	123

Orthogonal Axis :	X
Test Mode :	TX 2440MHz



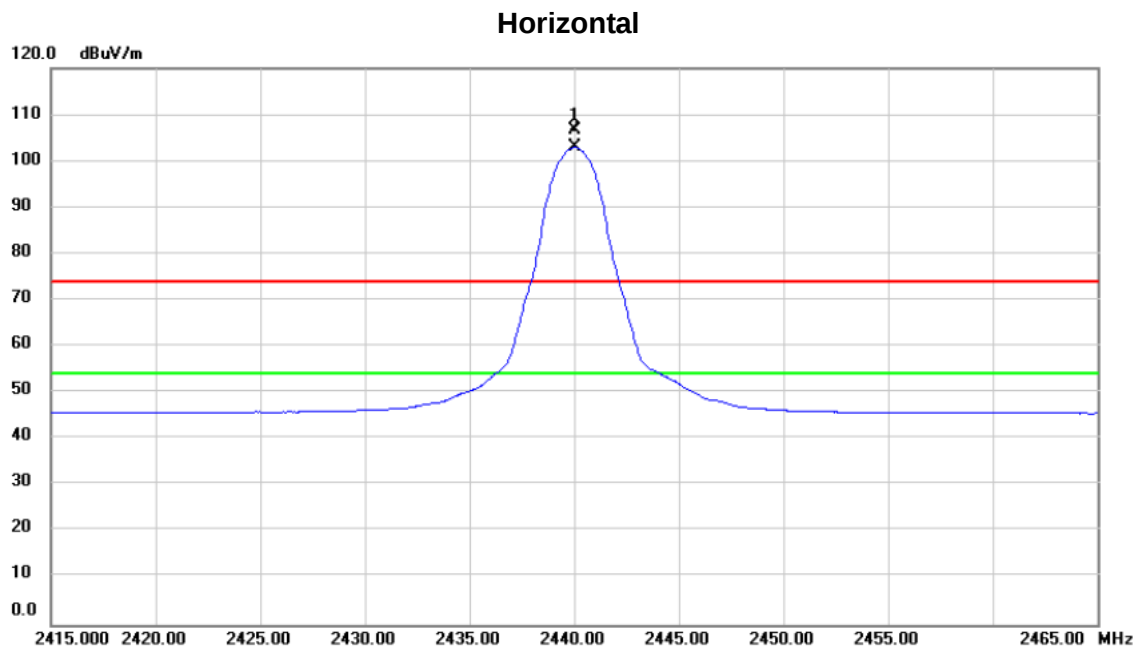
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	X	2440.000	69.54	31.15	100.69	74.00	26.69	peak	100	39	No Limit
2	*	2440.000	65.76	31.15	96.91	54.00	42.91	AVG	100	39	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2440MHz



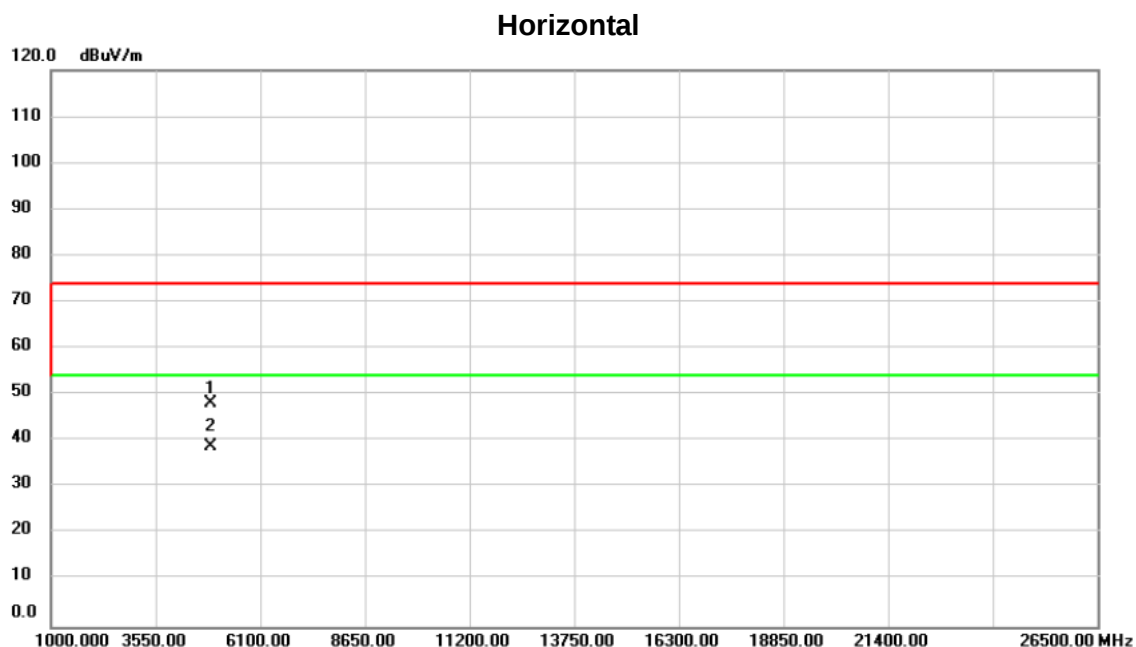
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1		4880.000	57.34	-11.38	45.96	74.00	-28.04	peak	100	220
2	*	4880.000	46.71	-11.38	35.33	54.00	-18.67	AVG	100	220

Orthogonal Axis :	X
Test Mode :	TX 2440MHz



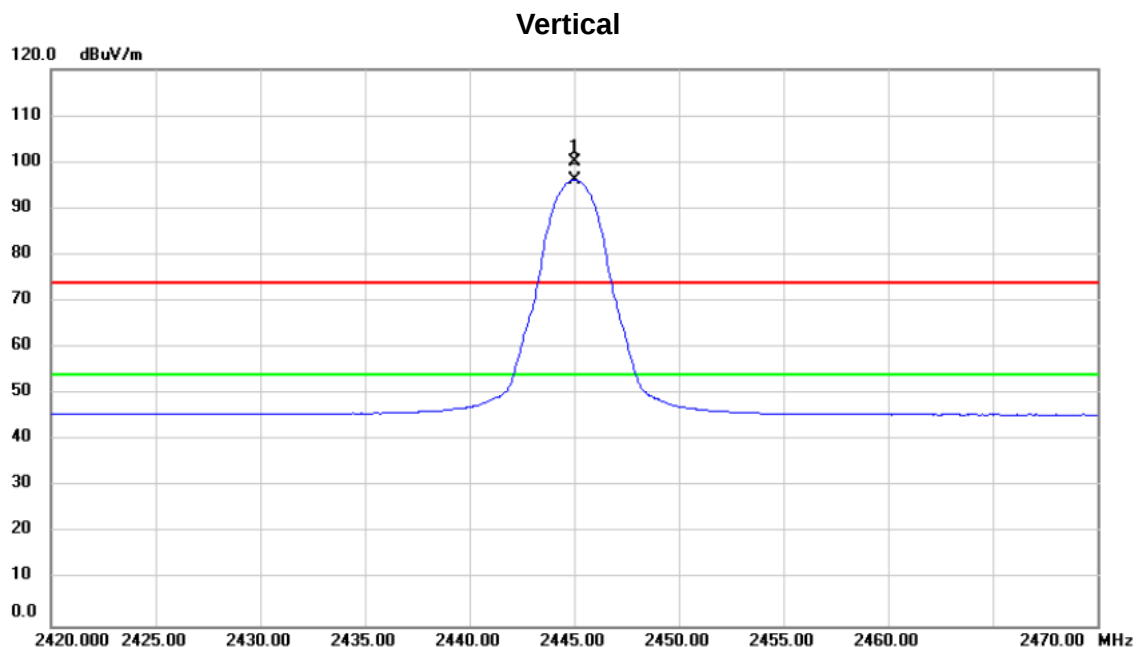
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	X	2440.000	75.55	31.15	106.70	74.00	32.70	peak	219	357
2	*	2440.000	71.78	31.15	102.93	54.00	48.93	AVG	219	357

Orthogonal Axis :	X
Test Mode :	TX 2440MHz



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		4880.000	59.44	-11.38	48.06	74.00	-25.94	peak	400	137
2	*	4880.000	50.23	-11.38	38.85	54.00	-15.15	AVG	400	137

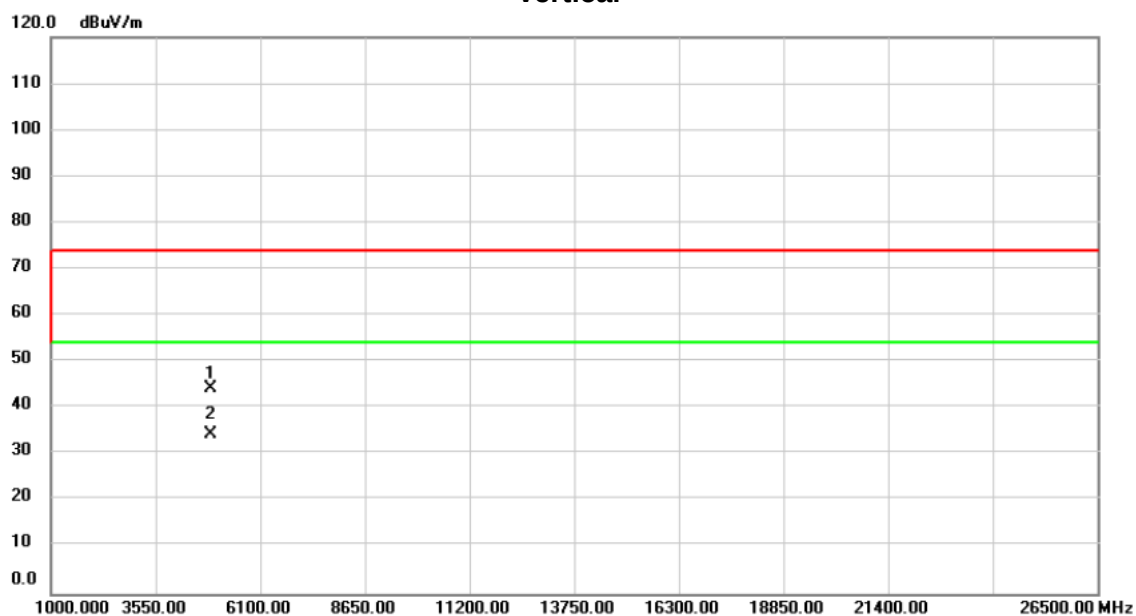
Orthogonal Axis :	X
Test Mode :	TX 2445MHz



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	Comment
1	X	2445.000	68.82	31.17	99.99	74.00	25.99	peak	100	31	No Limit
2	*	2445.000	65.12	31.17	96.29	54.00	42.29	AVG	100	31	No Limit

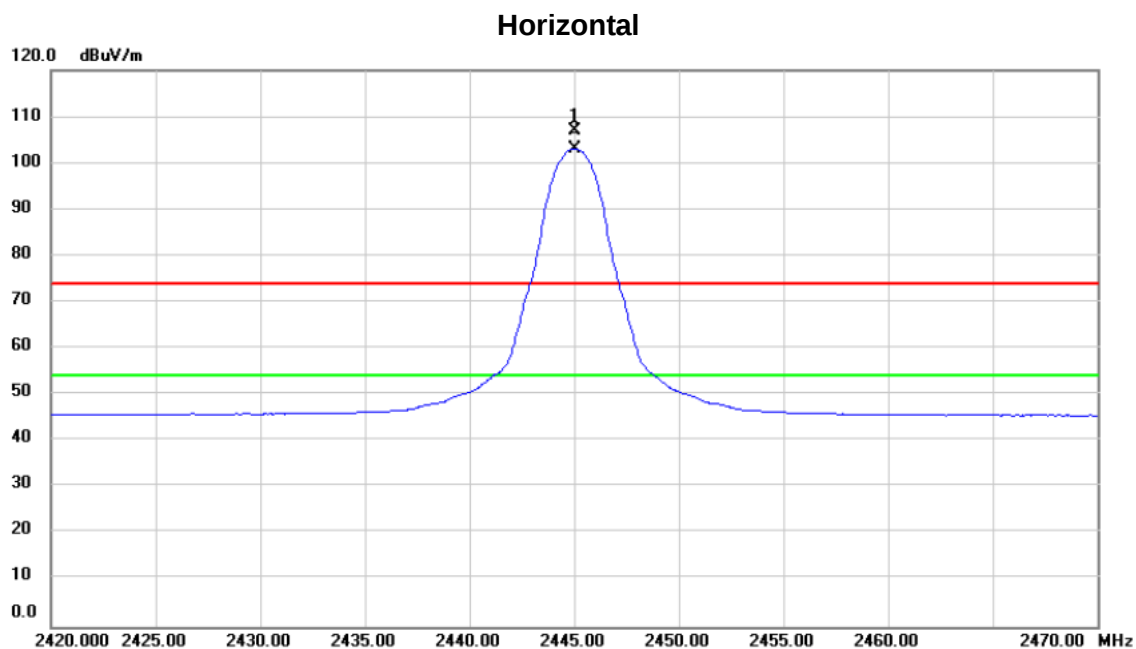
Orthogonal Axis :	X
Test Mode :	TX 2445MHz

Vertical



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	4890.000	55.57	-11.37	44.20	74.00	-29.80	peak	100	303
2 *	4890.000	45.67	-11.37	34.30	54.00	-19.70	AVG	100	303

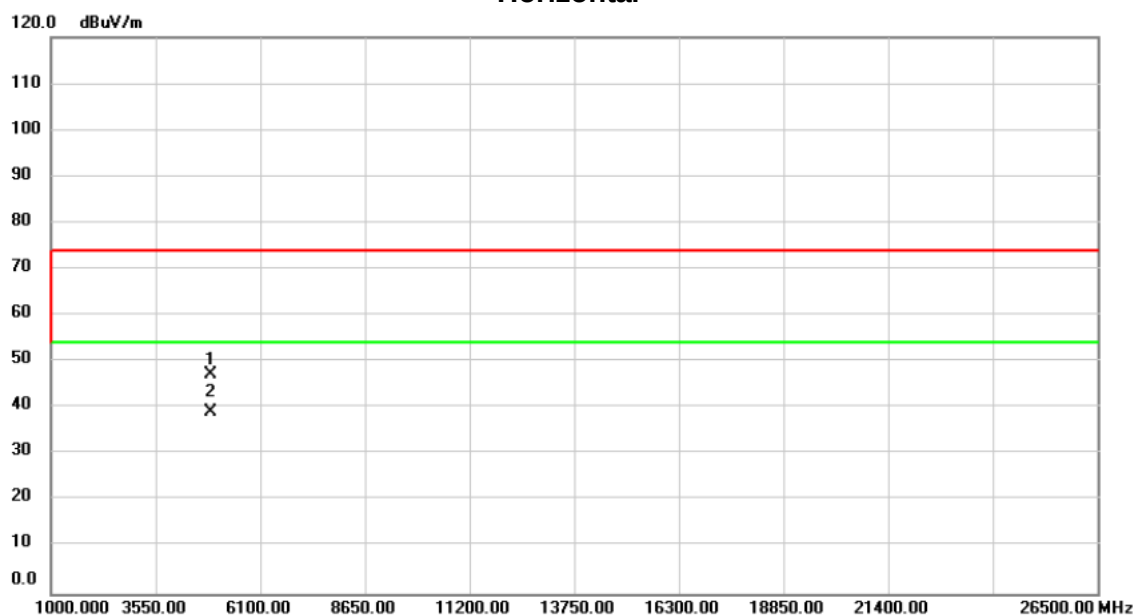
Orthogonal Axis :	X
Test Mode :	TX 2445MHz



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	X	2445.000	75.72	31.17	106.89	74.00	32.89	peak	218	358
2	*	2445.000	72.00	31.17	103.17	54.00	49.17	AVG	218	358

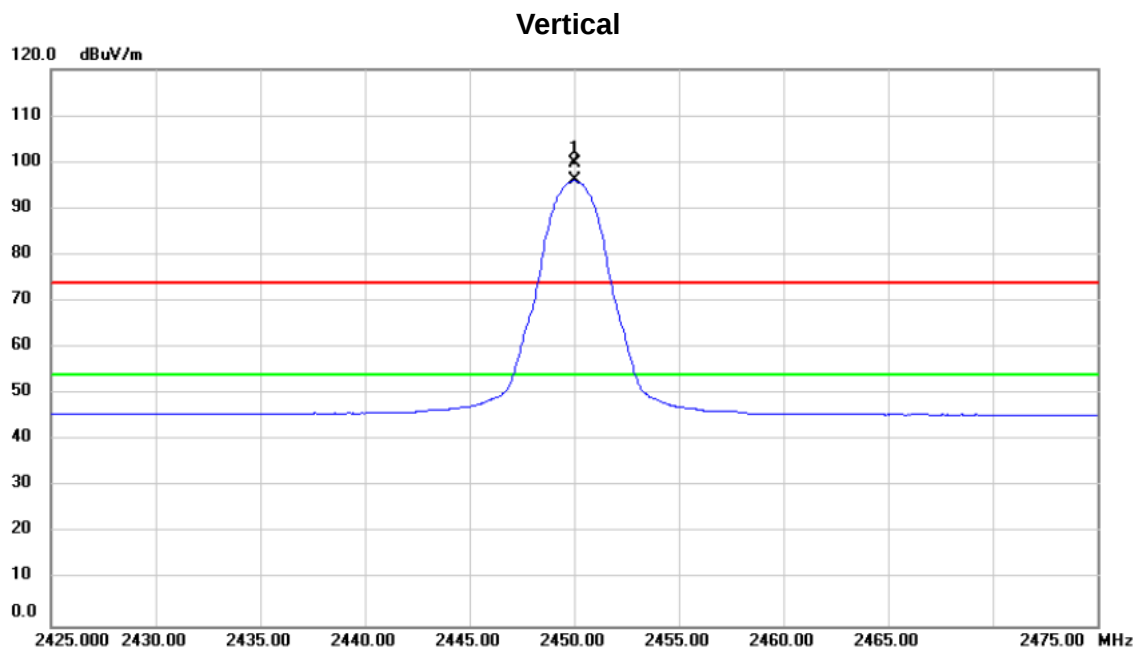
Orthogonal Axis :	X
Test Mode :	TX 2445MHz

Horizontal



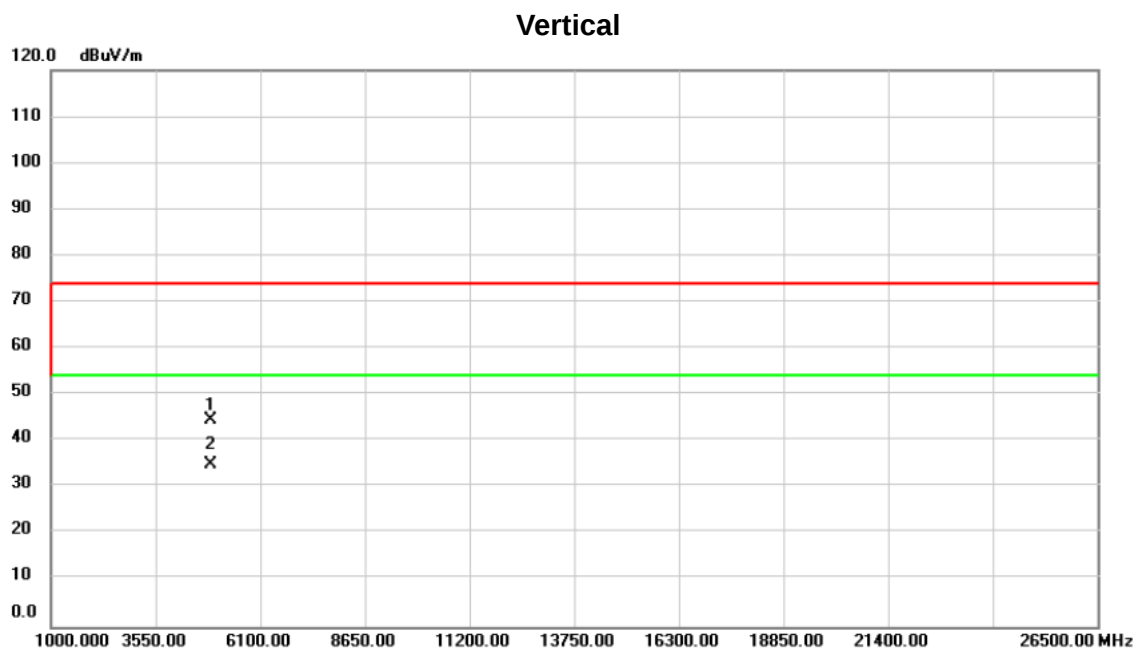
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	4890.000	58.57	-11.37	47.20	74.00	-26.80	peak	329	121
2 *	4890.000	50.56	-11.37	39.19	54.00	-14.81	AVG	329	121

Orthogonal Axis :	X
Test Mode :	TX 2450MHz



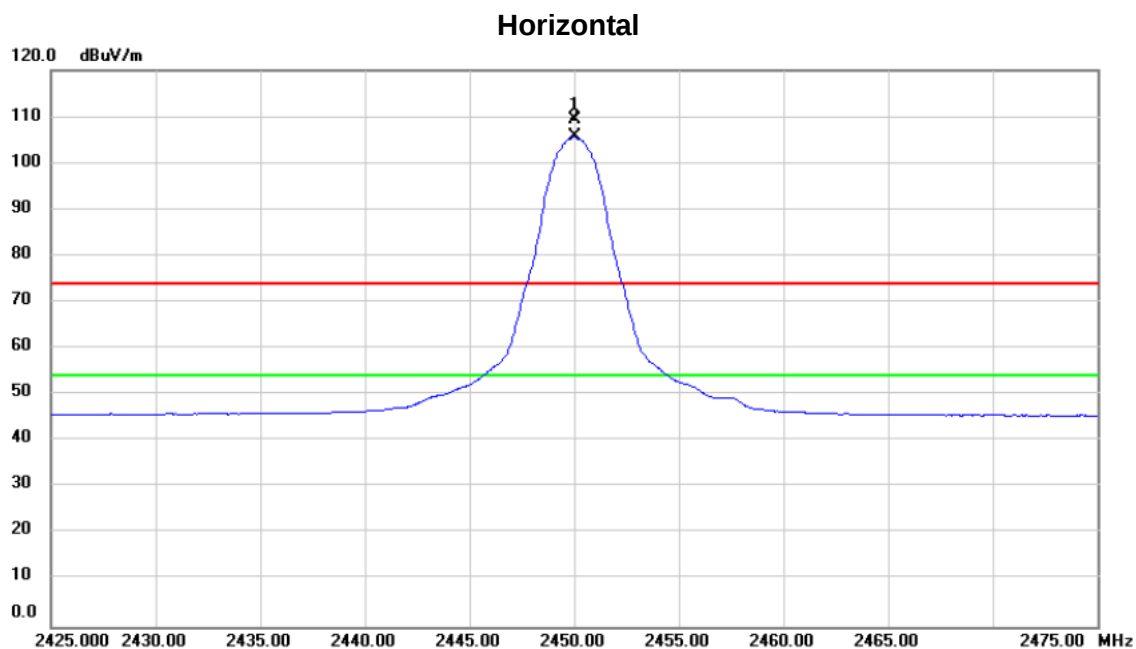
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	X	2450.000	68.57	31.19	99.76	74.00	25.76	peak	100	30	No Limit
2	*	2450.000	64.84	31.19	96.03	54.00	42.03	AVG	100	30	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2450MHz



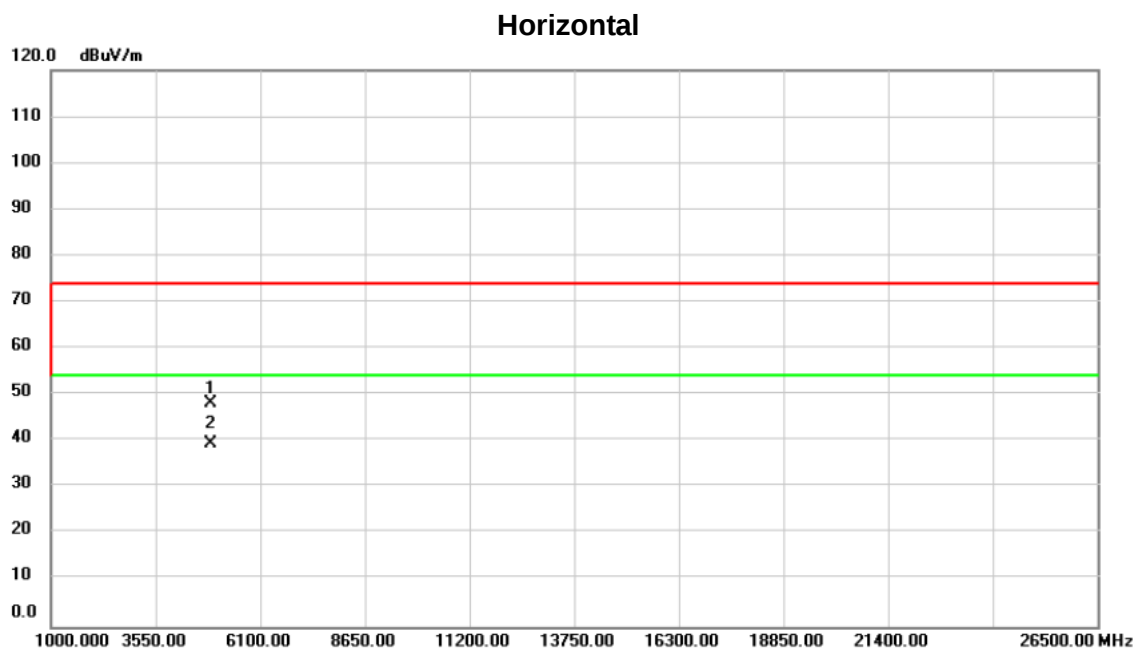
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1		4900.000	55.94	-11.36	44.58	74.00	-29.42	peak	100	221
2	*	4900.000	46.19	-11.36	34.83	54.00	-19.17	AVG	100	221

Orthogonal Axis :	X
Test Mode :	TX 2450MHz



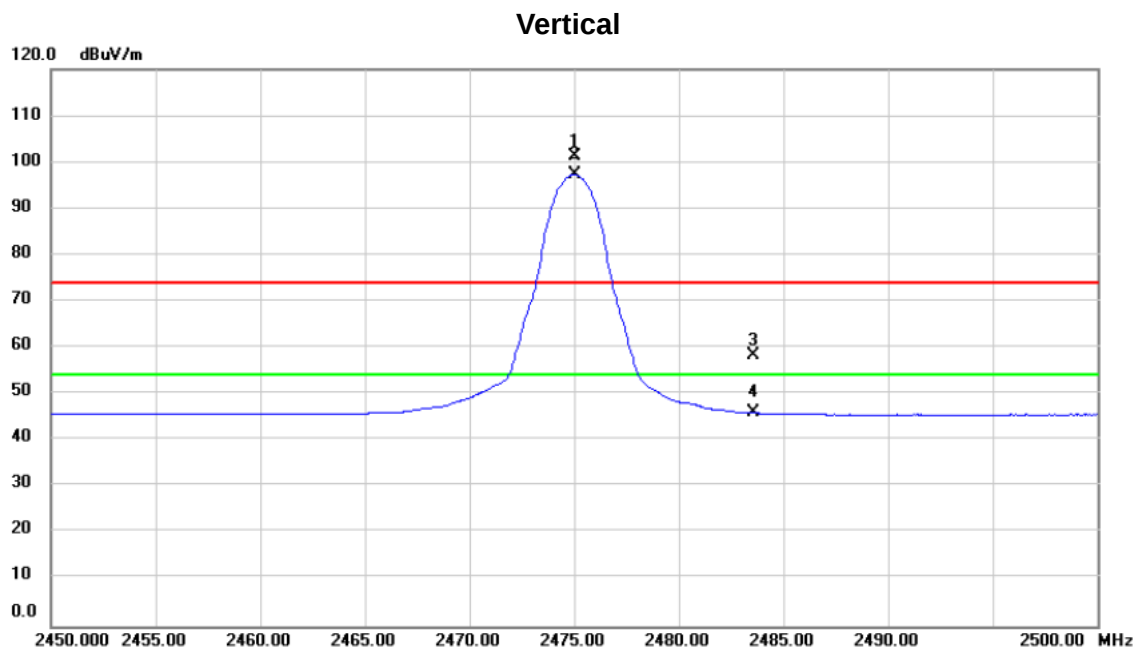
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	X	2450.000	78.14	31.19	109.33	74.00	35.33	peak	287	140
2	*	2450.000	74.43	31.19	105.62	54.00	51.62	AVG	287	140

Orthogonal Axis :	X
Test Mode :	TX 2450MHz



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		4900.000	59.57	-11.36	48.21	74.00	-25.79	peak	327	122
2	*	4900.000	50.93	-11.36	39.57	54.00	-14.43	AVG	327	122

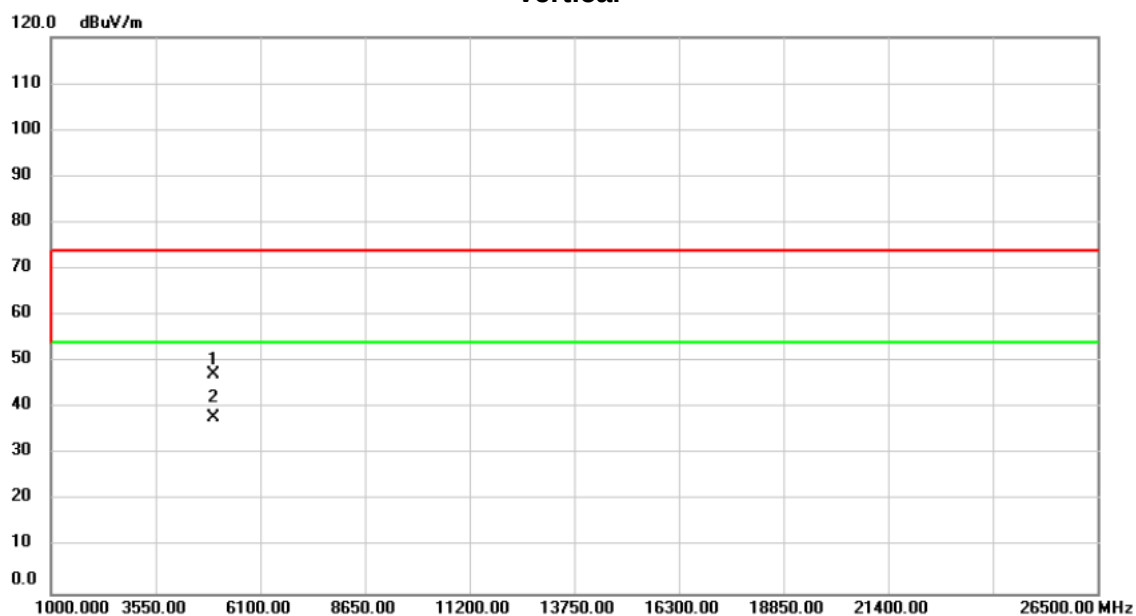
Orthogonal Axis :	X
Test Mode :	TX 2475MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	X	2475.000	69.94	31.28	101.22	74.00	27.22	peak	100	246	No Limit
2	*	2475.000	66.06	31.28	97.34	54.00	43.34	AVG	100	246	No Limit
3		2483.550	27.01	31.31	58.32	74.00	-15.68	peak	100	246	
4		2483.550	14.64	31.31	45.95	54.00	-8.05	AVG	100	246	

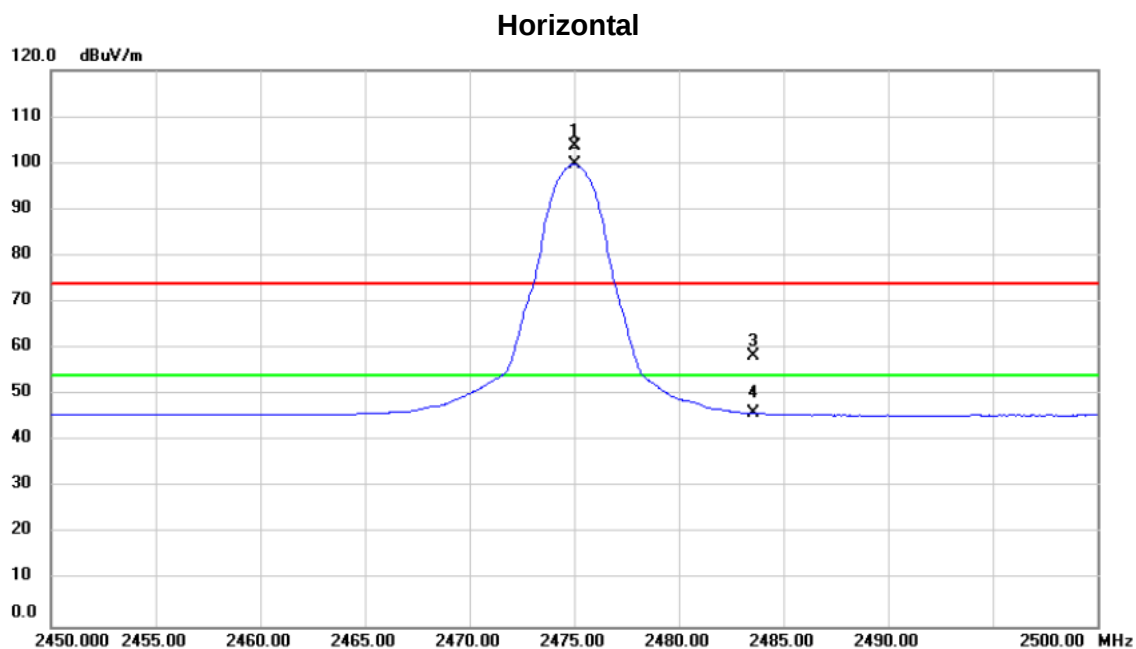
Orthogonal Axis :	X
Test Mode :	TX 2475MHz

Vertical



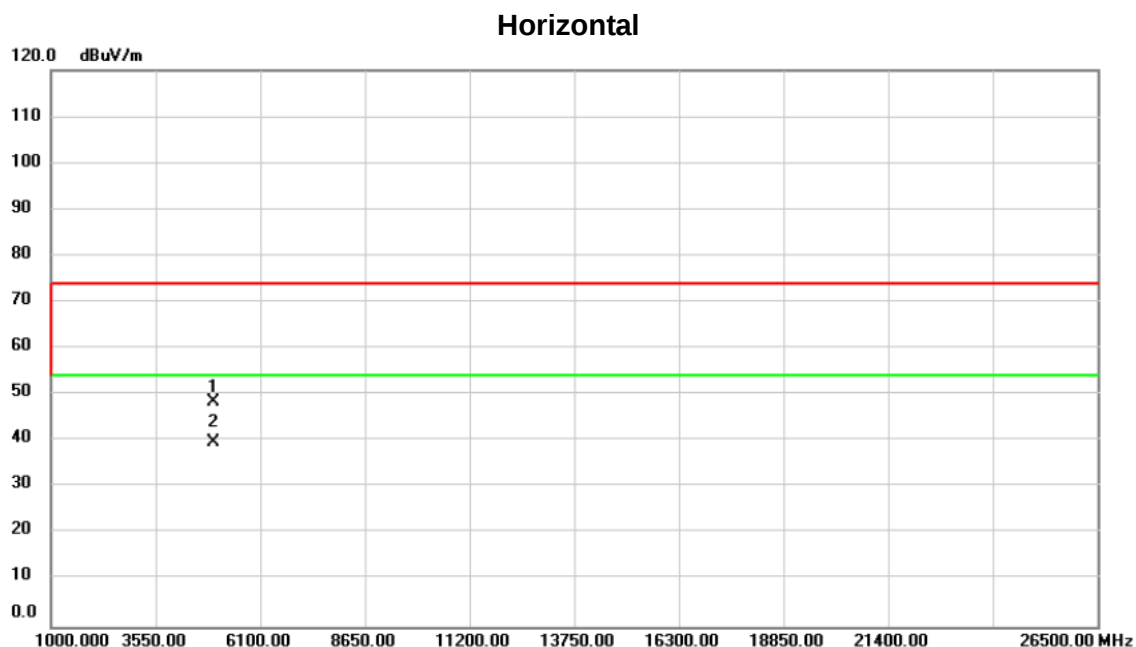
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		4950.000	58.58	-11.27	47.31	74.00	-26.69	peak	396	29
2	*	4950.000	49.10	-11.27	37.83	54.00	-16.17	AVG	396	29

Orthogonal Axis :	X
Test Mode :	TX 2475MHz



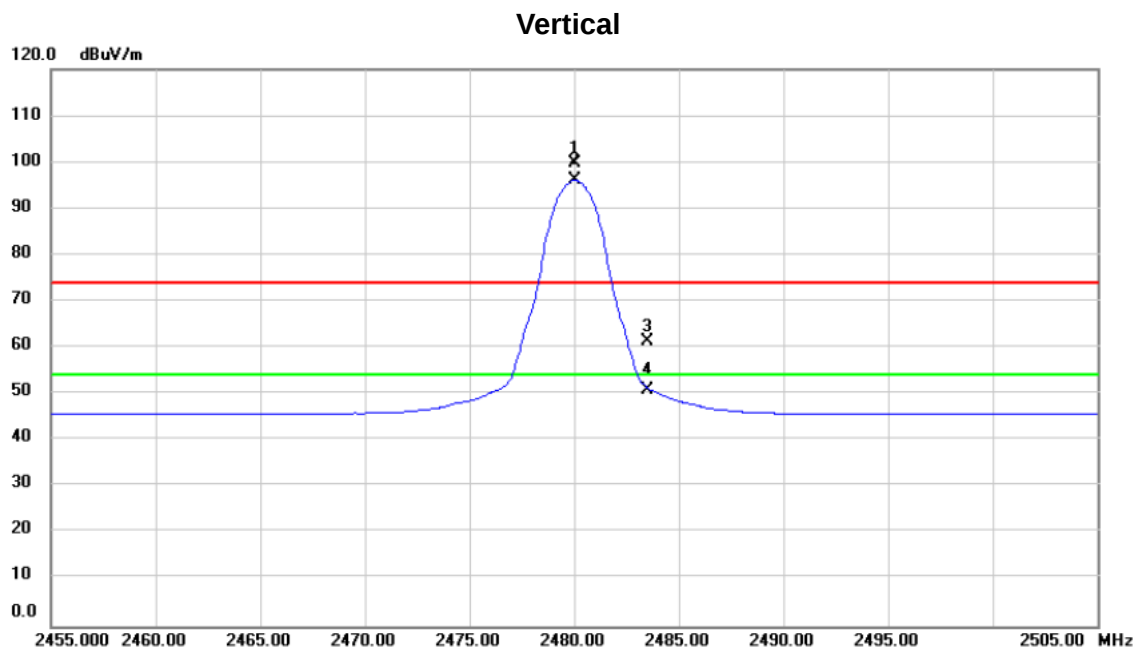
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	X	2475.000	72.25	31.28	103.53	74.00	29.53	peak	215	217
2	*	2475.000	68.46	31.28	99.74	54.00	45.74	AVG	215	217
3		2483.550	27.05	31.31	58.36	74.00	-15.64	peak	215	217
4		2483.550	14.74	31.31	46.05	54.00	-7.95	AVG	215	217

Orthogonal Axis :	X
Test Mode :	TX 2475MHz



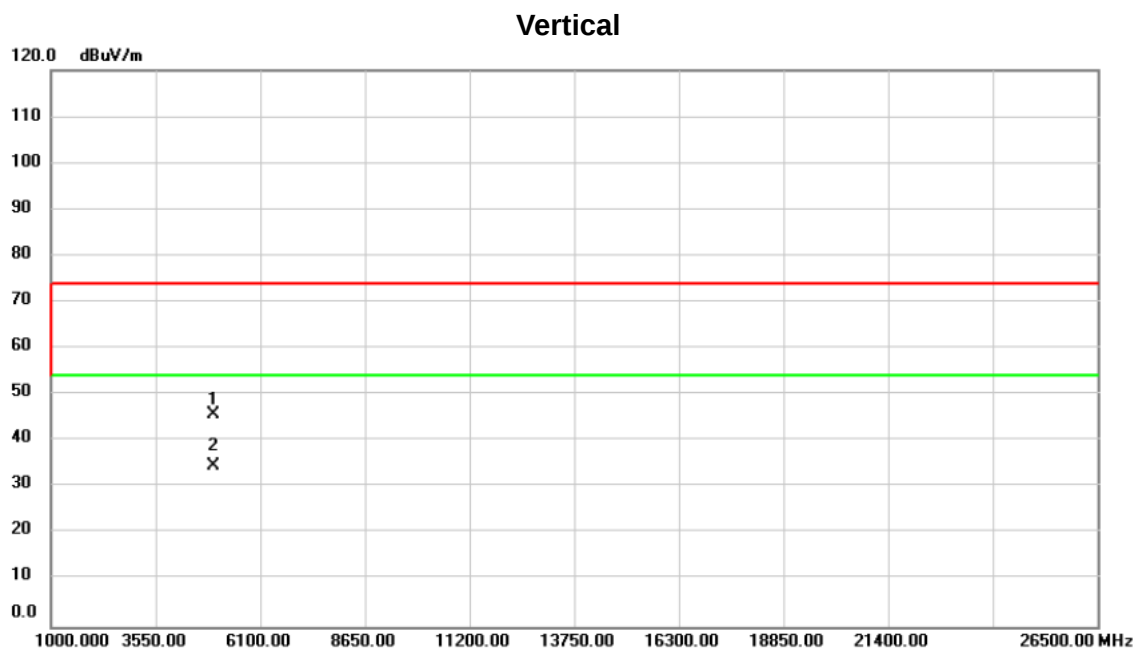
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	4950.000	59.67	-11.27	48.40	74.00	-25.60	peak	389	117
2 *	4950.000	50.96	-11.27	39.69	54.00	-14.31	AVG	389	117

Orthogonal Axis :	X
Test Mode :	TX 2480MHz



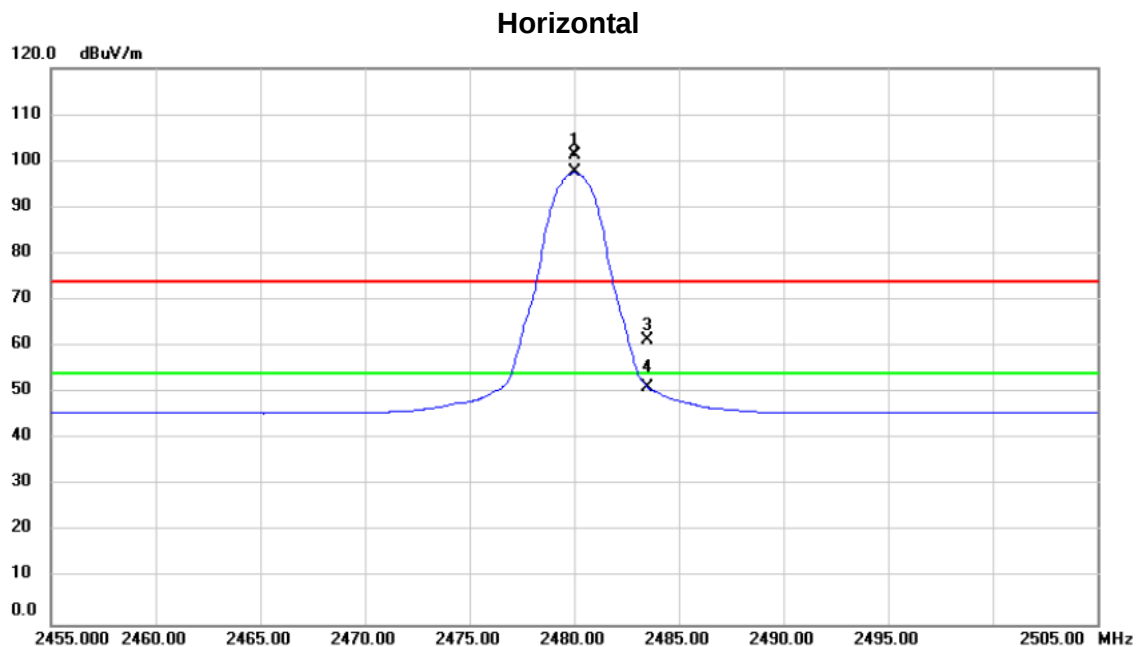
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	X	2480.000	68.45	31.29	99.74	74.00	25.74	peak	146	242	No Limit
2	*	2480.000	64.82	31.29	96.11	54.00	42.11	AVG	146	242	No Limit
3		2483.500	29.90	31.31	61.21	74.00	-12.79	peak	146	242	
4		2483.500	19.68	31.31	50.99	54.00	-3.01	AVG	146	242	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz



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		4960.000	57.07	-11.25	45.82	74.00	-28.18	peak	106	155
2	*	4960.000	45.88	-11.25	34.63	54.00	-19.37	AVG	106	155

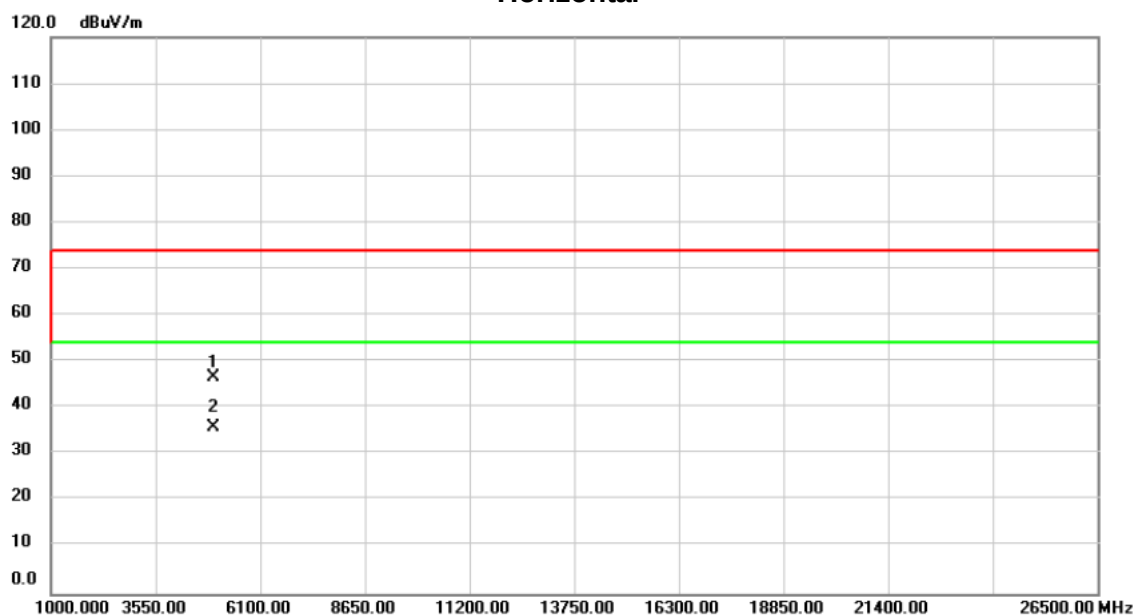
Orthogonal Axis :	X
Test Mode :	TX 2480MHz



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	X	2480.000	70.01	31.29	101.30	74.00	27.30	peak	212	227
2	*	2480.000	66.24	31.29	97.53	54.00	43.53	AVG	212	227
3		2483.500	29.91	31.31	61.22	74.00	-12.78	peak	212	227
4		2483.500	19.79	31.31	51.10	54.00	-2.90	AVG	212	227

Orthogonal Axis :	X
Test Mode :	TX 2480MHz

Horizontal

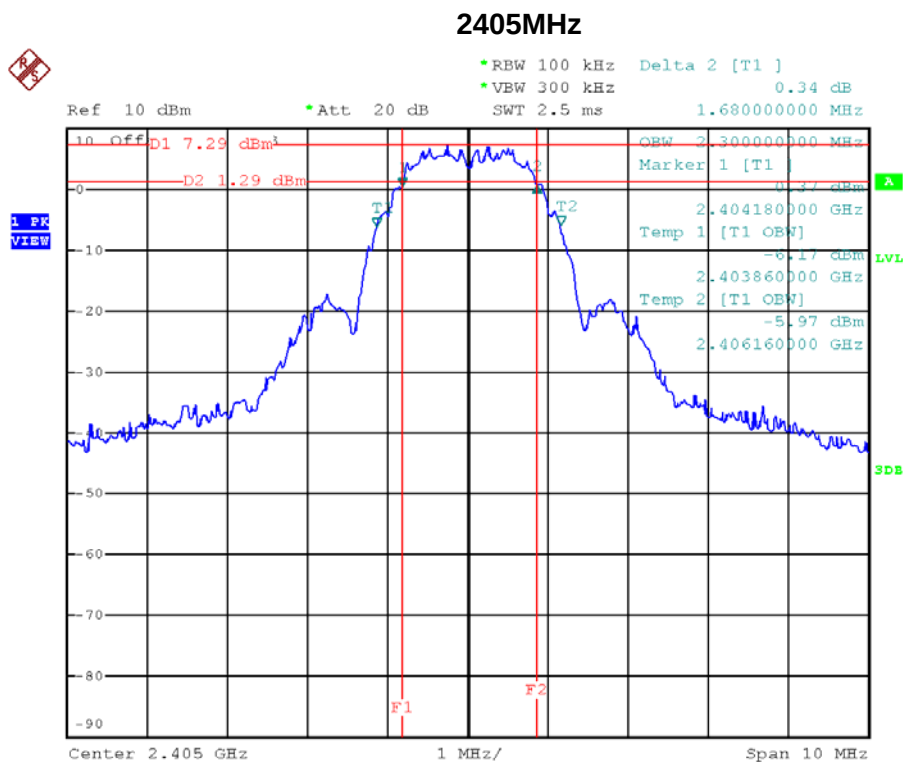


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1		4960.000	57.76	-11.25	46.51	74.00	-27.49	peak	100	266
2	*	4960.000	47.24	-11.25	35.99	54.00	-18.01	AVG	100	266

ATTACHMENT E - BANDWIDTH

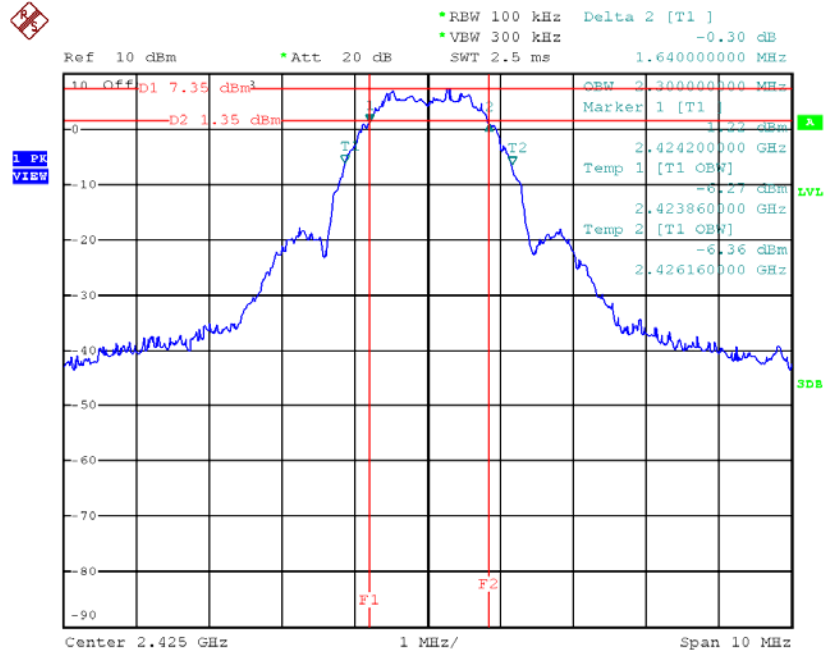
Test Mode : TX Mode

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)
2405	1.68	2.30	500
2425	1.64	2.30	500
2440	1.68	2.28	500
2445	1.68	2.30	500
2450	1.68	2.30	500
2475	1.68	2.30	500
2480	1.68	2.30	500



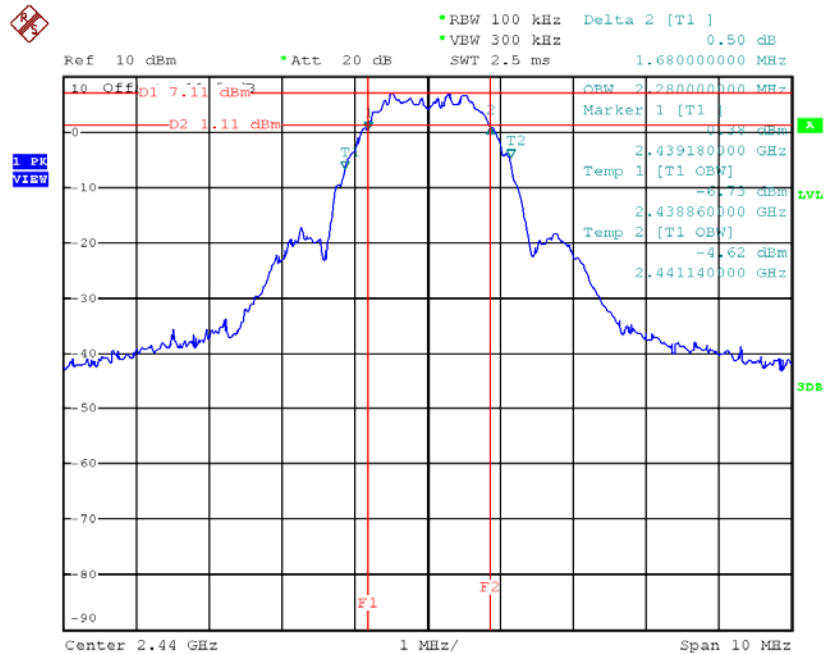
Date: 16.MAR.2017 14:55:56

2425MHz



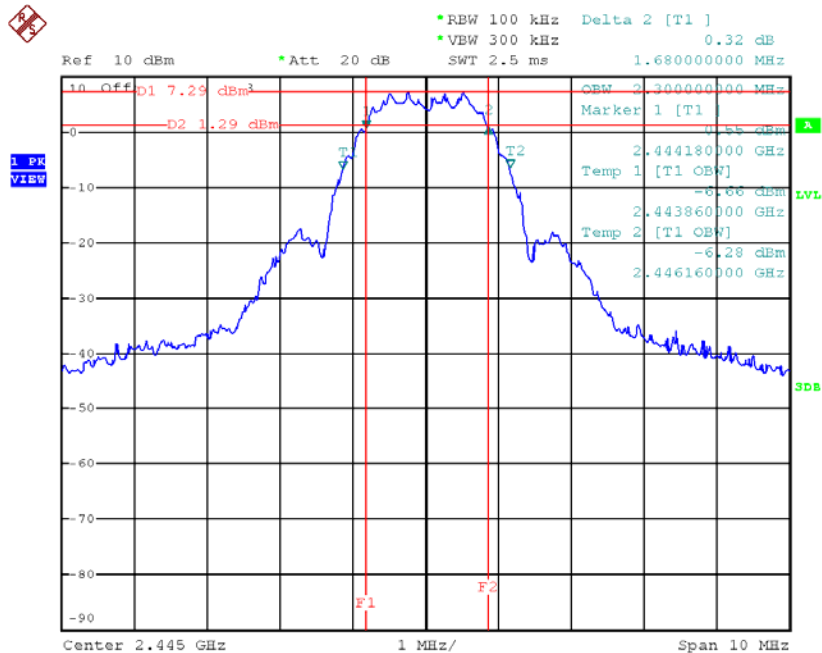
Date: 16.MAR.2017 14:54:19

2440MHz



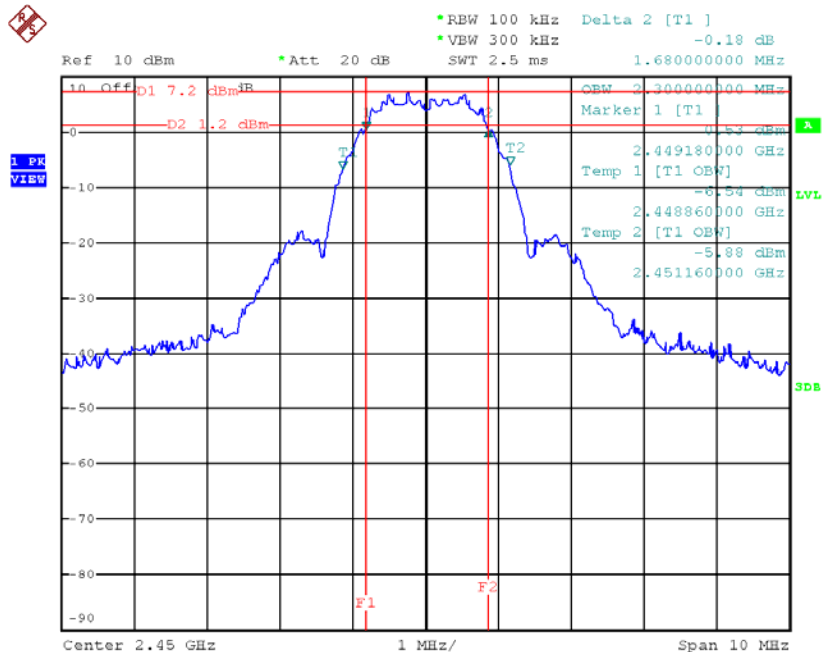
Date: 16.MAR.2017 15:00:02

2445MHz



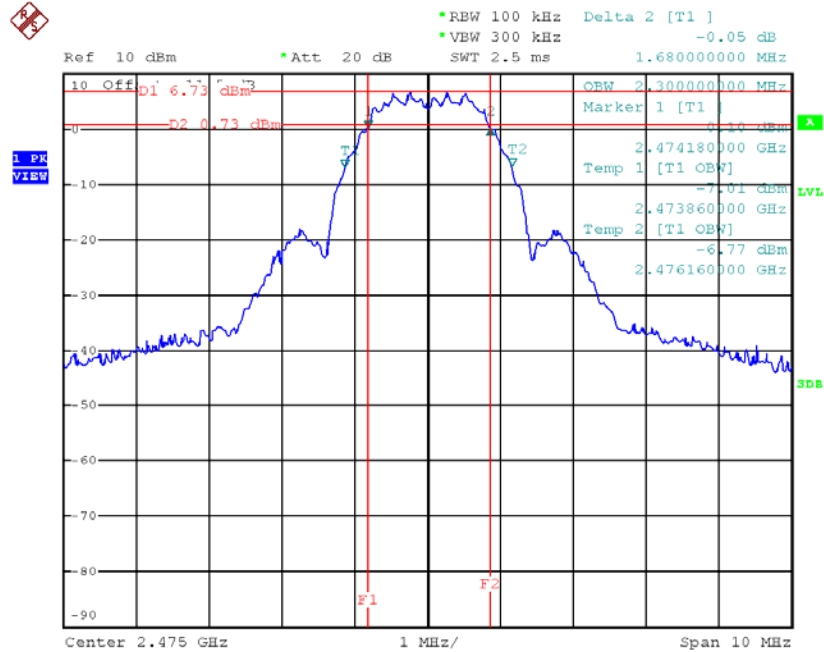
Date: 16.MAR.2017 15:02:15

2450MHz



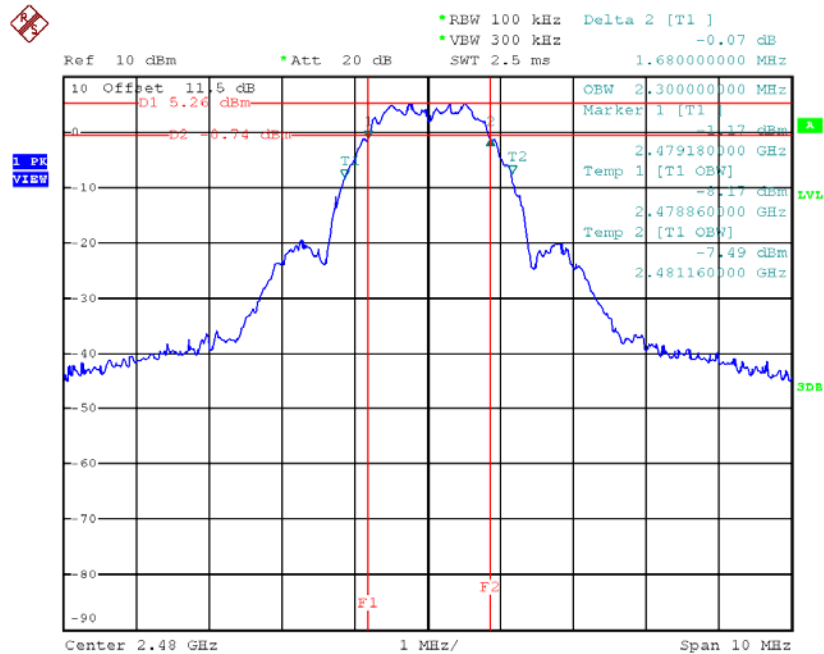
Date: 16.MAR.2017 15:05:13

2475MHz



Date: 16.MAR.2017 15:19:37

2480MHz



Date: 16.MAR.2017 15:23:51

ATTACHMENT F - MAXIMUM OUTPUT POWER TEST

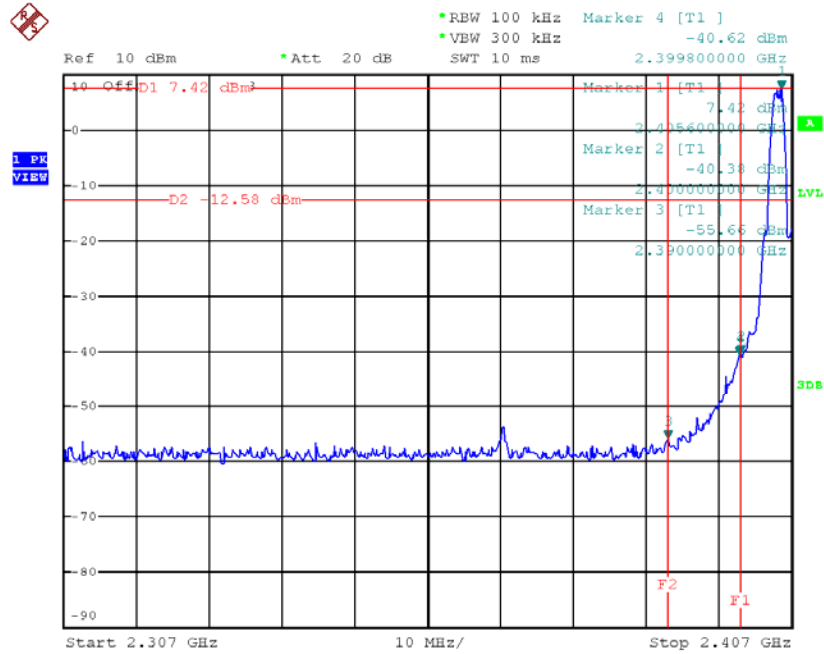
Test Mode :	TX Mode
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Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watt)	Max. Limit (dBm)	Max. Limit (Watt)
2405	9.32	0.0086	30.00	1.00
2425	9.29	0.0085	30.00	1.00
2440	9.24	0.0084	30.00	1.00
2445	9.21	0.0083	30.00	1.00
2450	9.19	0.0083	30.00	1.00
2475	8.83	0.0076	30.00	1.00
2480	8.22	0.0066	30.00	1.00

ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

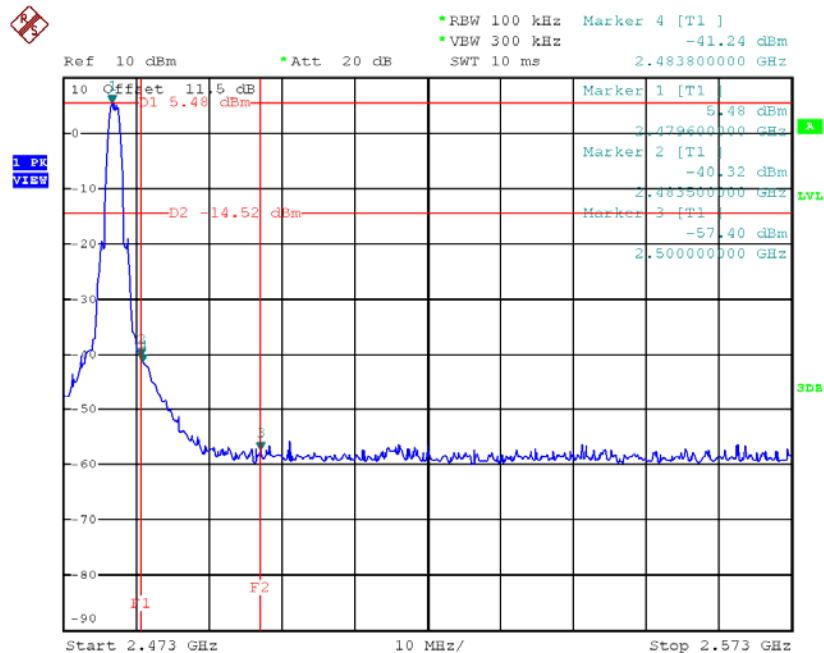
Test Mode : TX Mode

2405MHz (Lower)



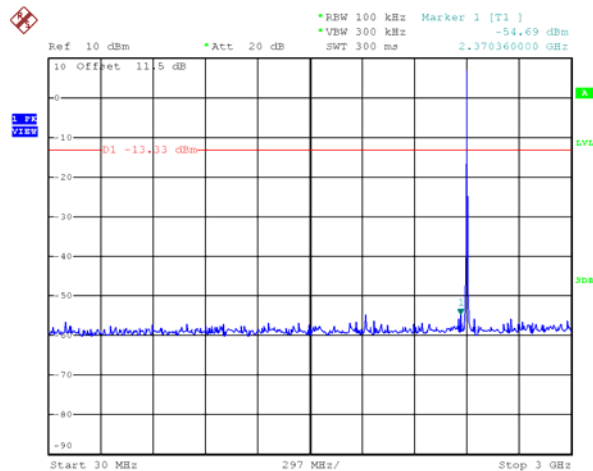
Date: 16.MAR.2017 17:07:35

2480MHz (upper)

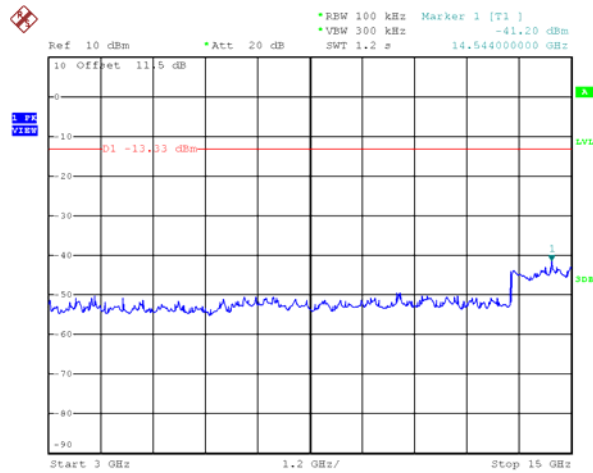


Date: 16.MAR.2017 17:13:25

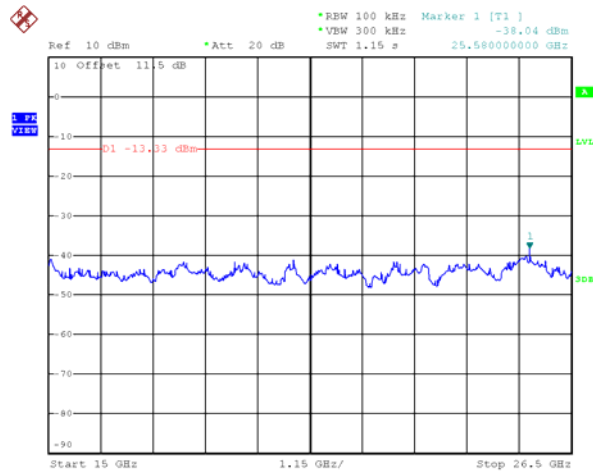
2405MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 15:27:58

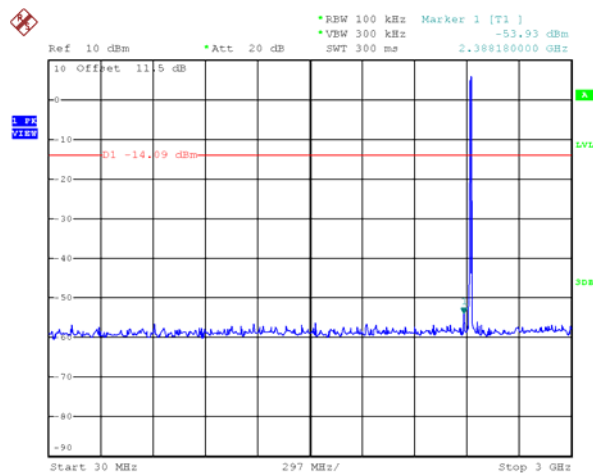


Date: 16.MAR.2017 15:29:36

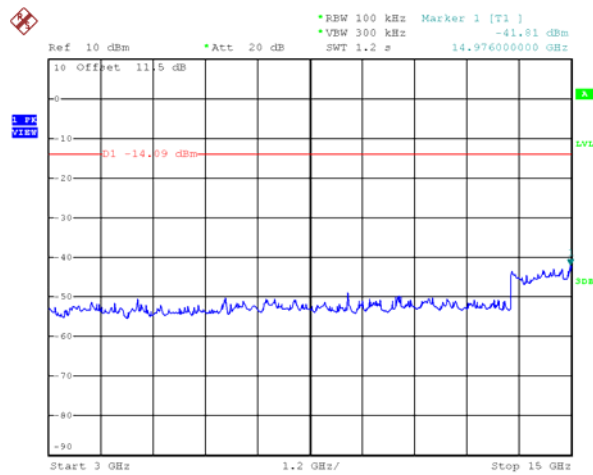


Date: 16.MAR.2017 15:30:35

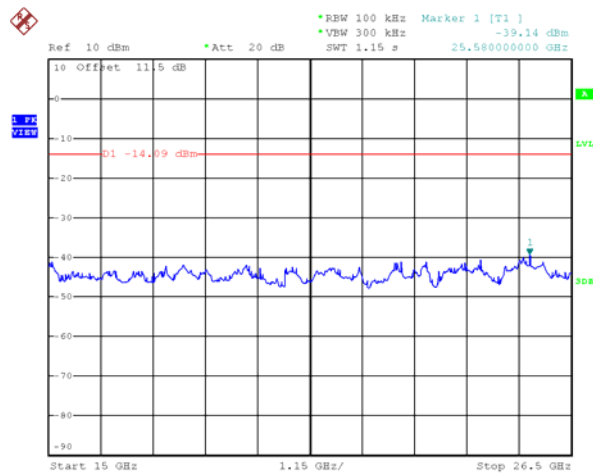
2425MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 15:33:29

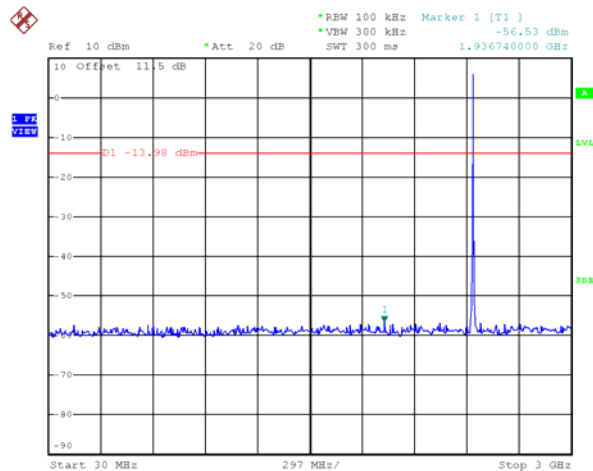


Date: 16.MAR.2017 15:34:23

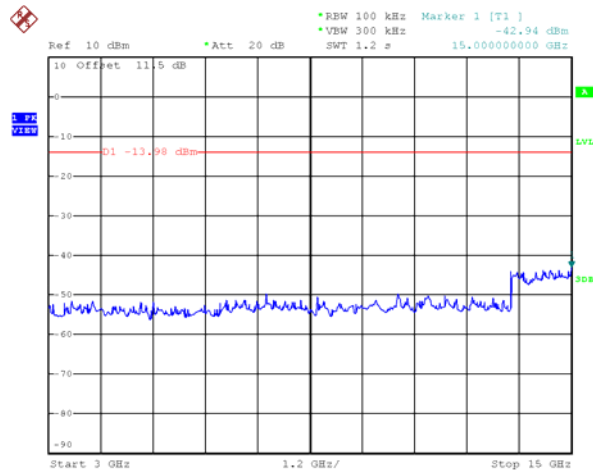


Date: 16.MAR.2017 15:37:20

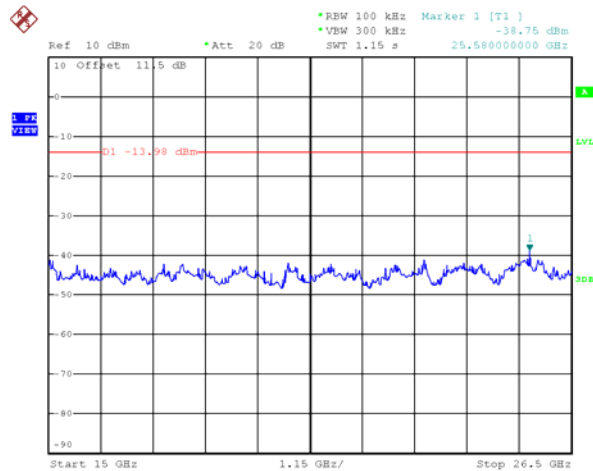
2440MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 15:49:10

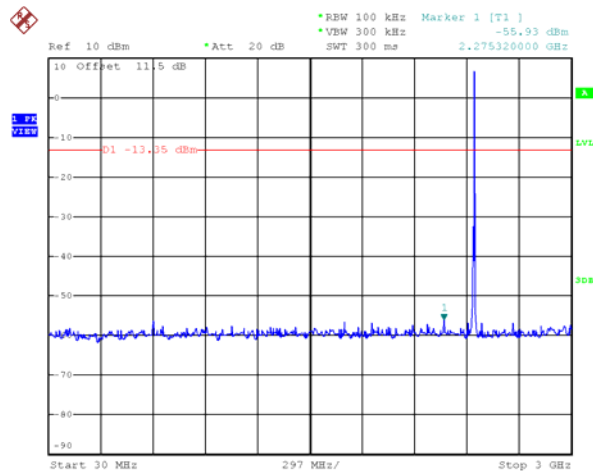


Date: 16.MAR.2017 15:50:10

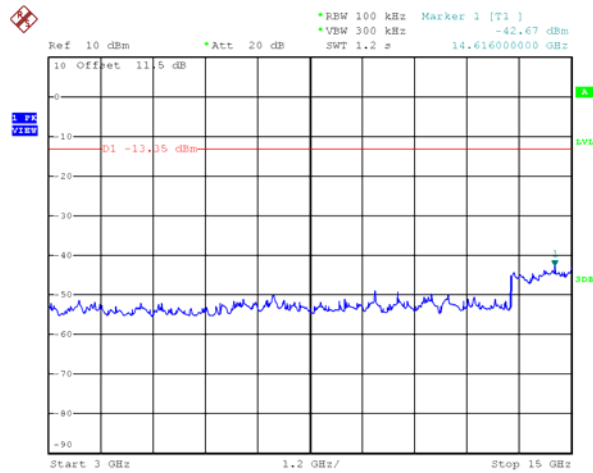


Date: 16.MAR.2017 15:53:10

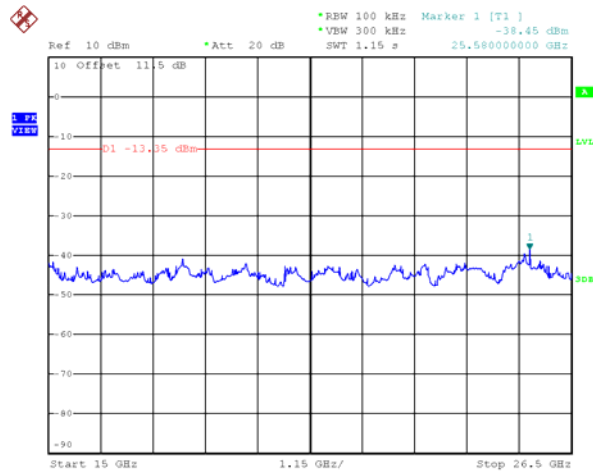
2445MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 15:55:42

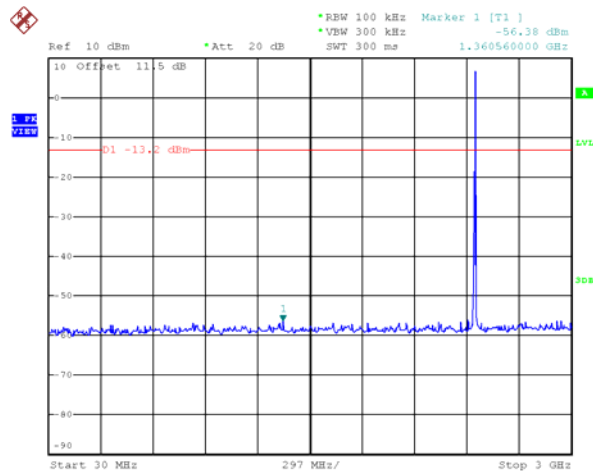


Date: 16.MAR.2017 15:56:54

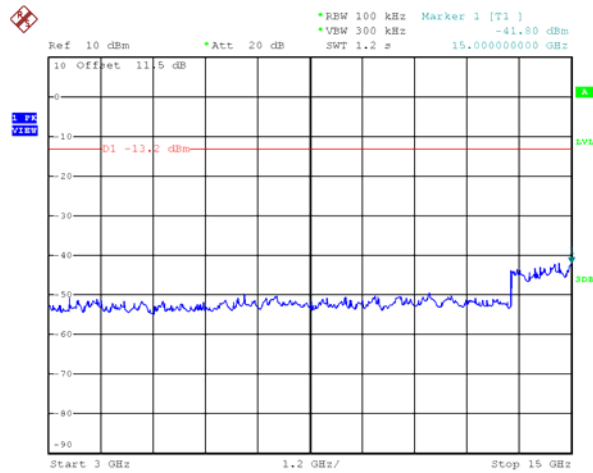


Date: 16.MAR.2017 15:57:33

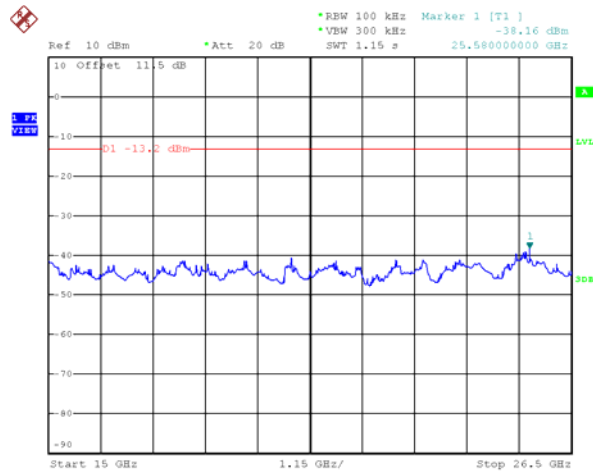
2450MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 16:03:11

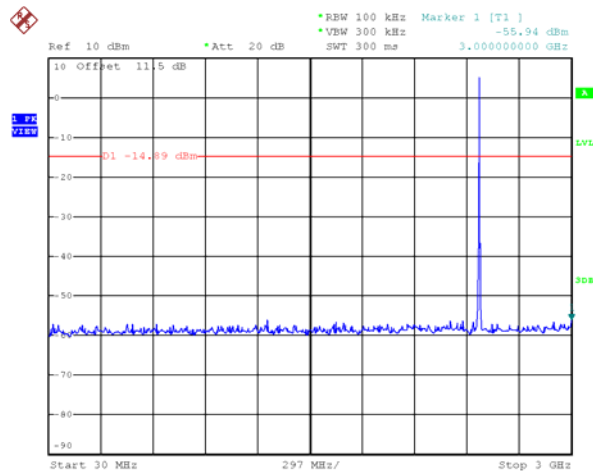


Date: 16.MAR.2017 16:04:17

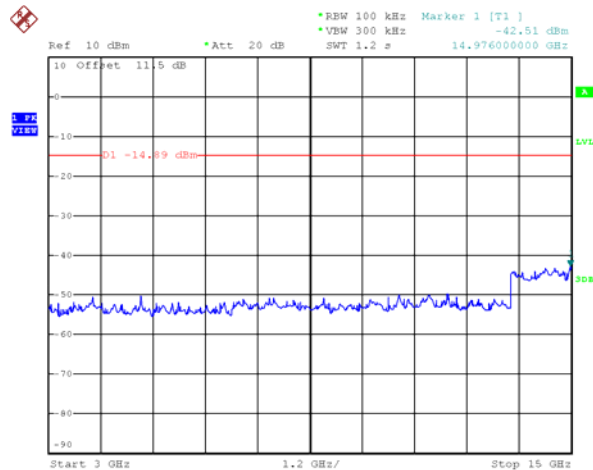


Date: 16.MAR.2017 16:06:20

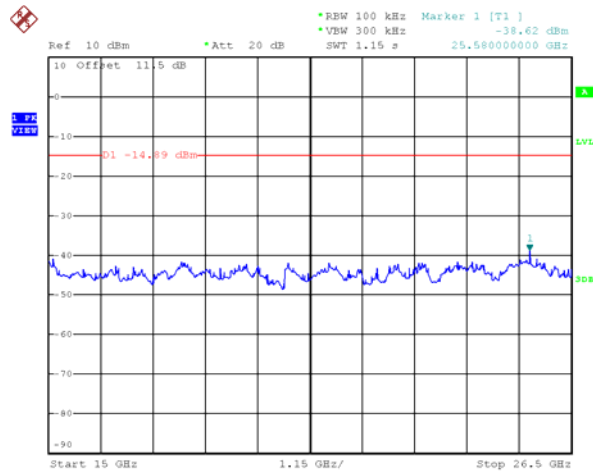
2475MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 16:14:19

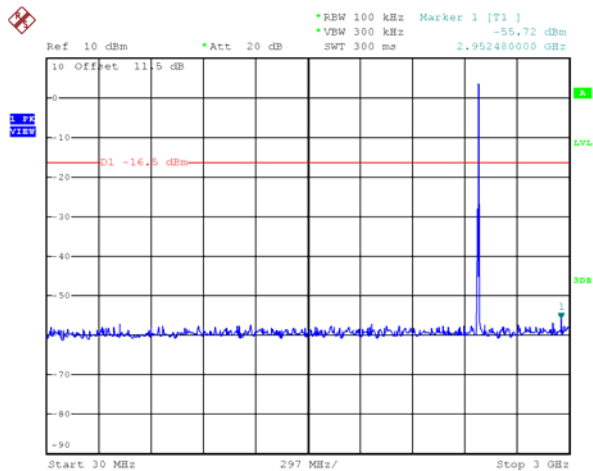


Date: 16.MAR.2017 16:16:11

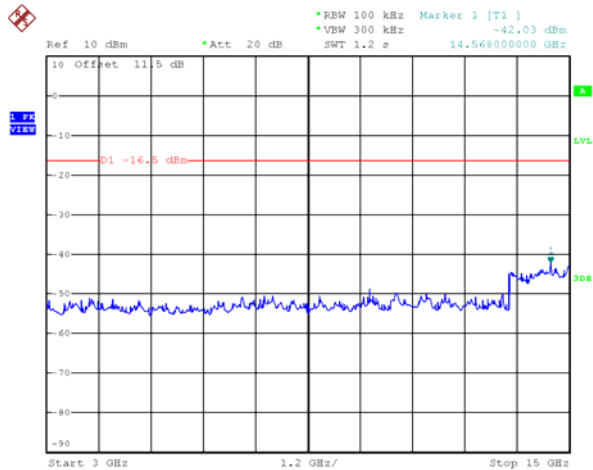


Date: 16.MAR.2017 16:21:43

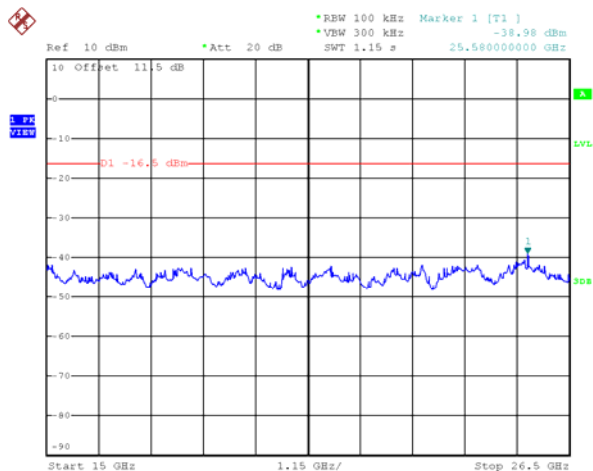
2480MHz (10th Harmonic of the frequency)



Date: 16.MAR.2017 16:26:57



Date: 16.MAR.2017 16:30:38

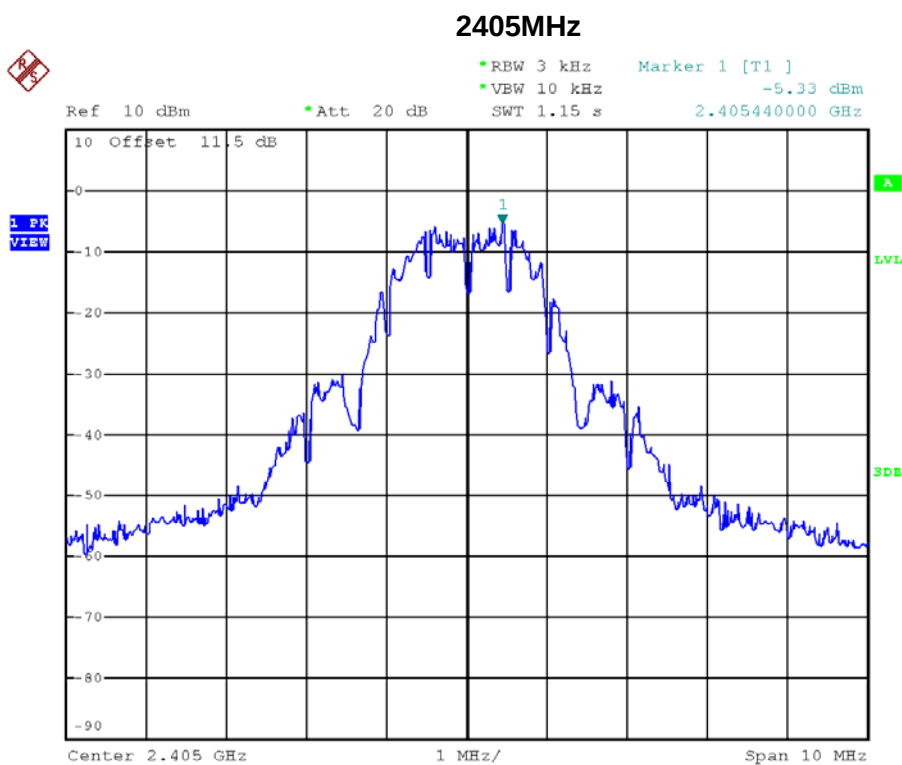


Date: 16.MAR.2017 16:32:30

ATTACHMENT H - POWER SPECTRAL DENSITY TEST

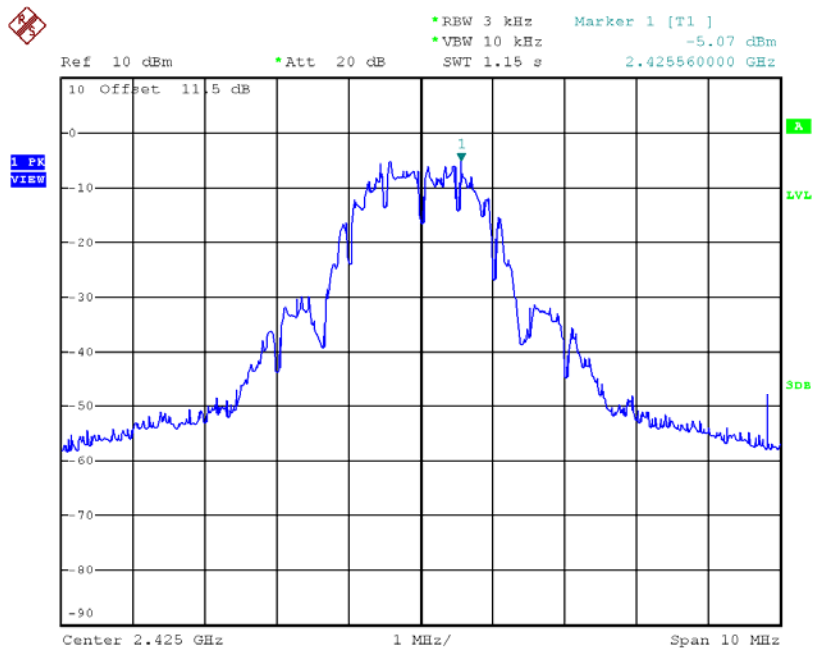
Test Mode :	TX Mode
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Frequency (MHz)	Power Density (dBm)	Max. Limit (dBm)
2405	-5.33	8
2425	-5.07	8
2440	-4.58	8
2445	-5.43	8
2450	-4.47	8
2475	-4.92	8
2480	-7.55	8



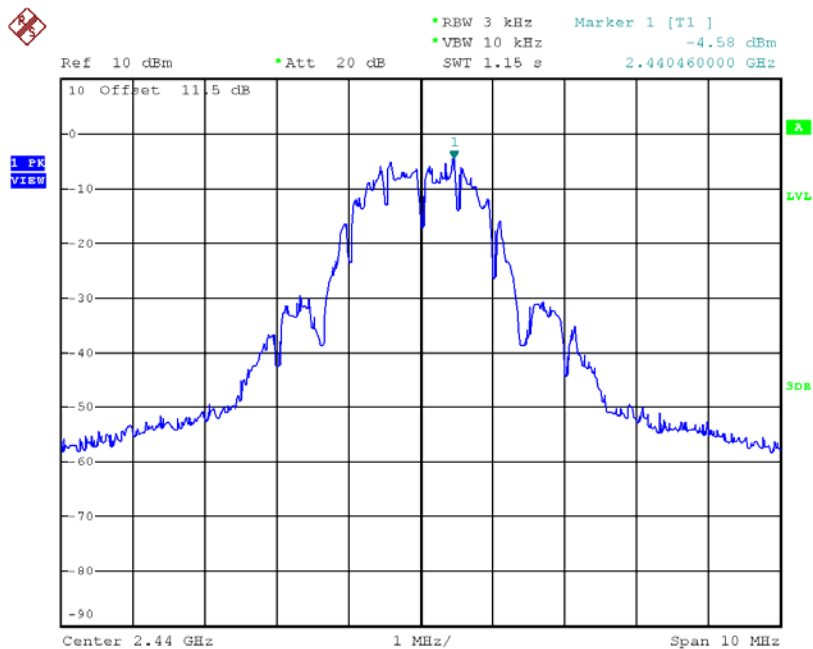
Date: 16.MAR.2017 17:44:47

2425MHz



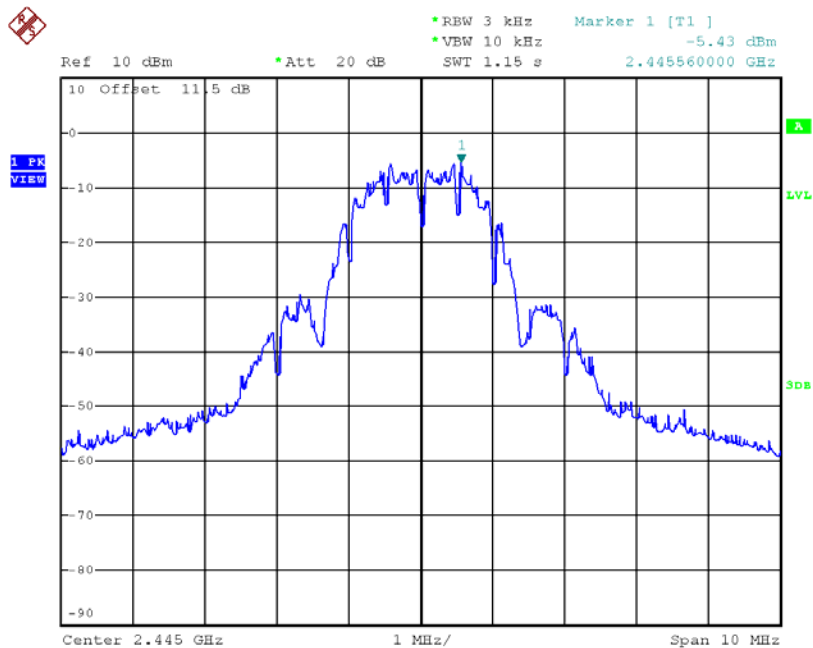
Date: 16.MAR.2017 17:51:33

2440MHz



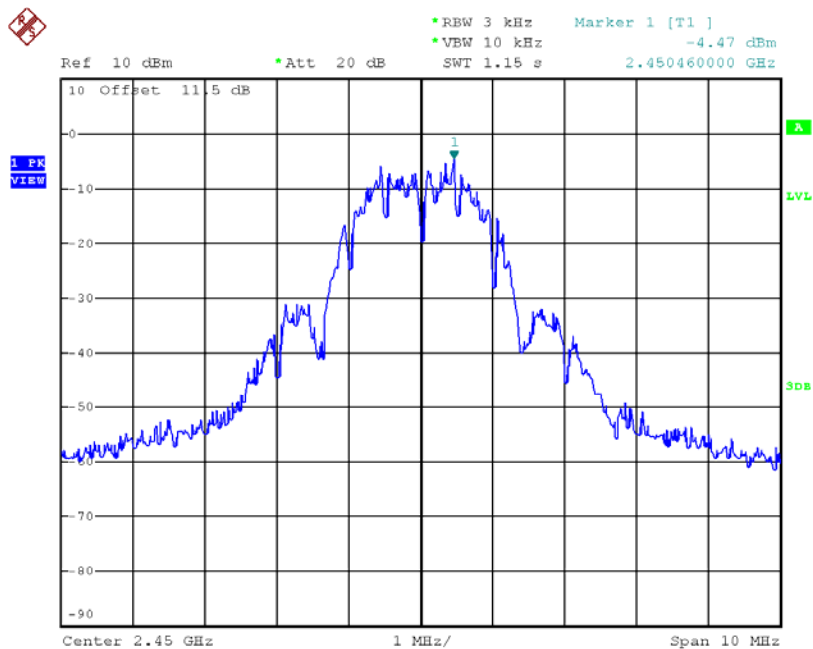
Date: 16.MAR.2017 17:53:39

2445MHz



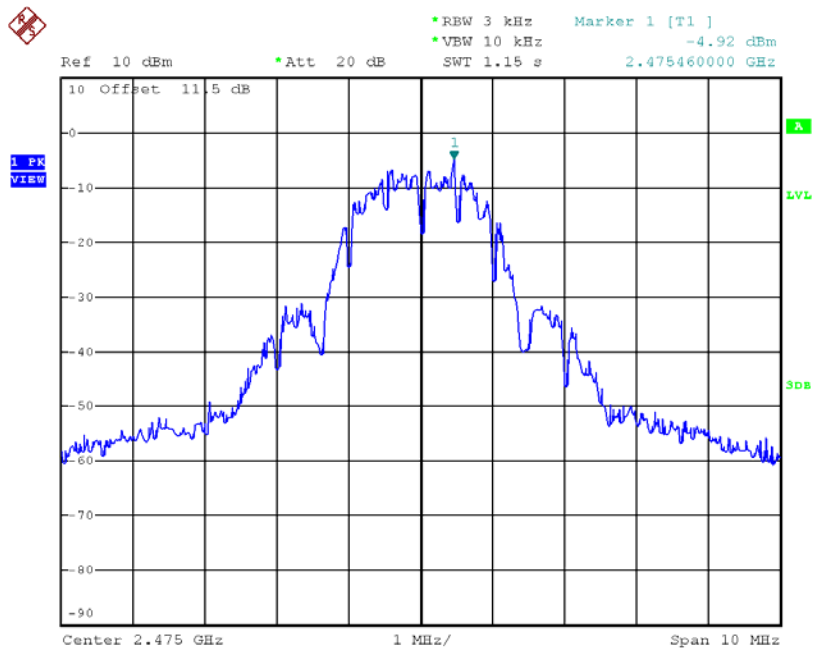
Date: 16.MAR.2017 17:55:59

2450MHz



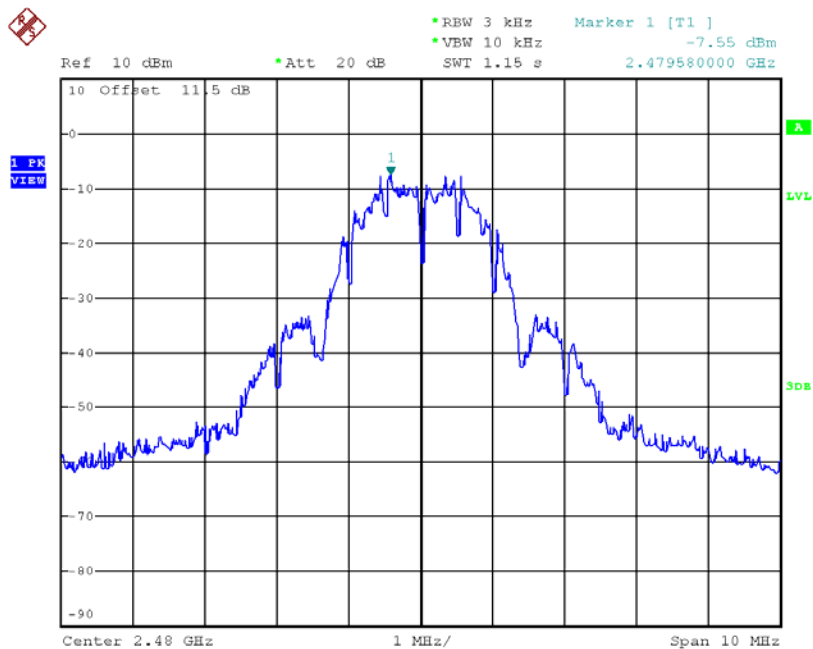
Date: 16.MAR.2017 17:56:51

2475MHz



Date: 16.MAR.2017 17:57:59

2480MHz



Date: 16.MAR.2017 17:59:39