FCC Radio Test Report

FCC ID: O62-HSAD01K

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

Project No.	: 1609027
Equipment	: Keyboard
Test Model	: HSA-D01K
Applicant	: Darfon Electronics Corp
Address	: 167, Shanying Road, Gueishan Taoyuan Taiwan 333

Date of Receipt	: Sep. 05, 2016
Date of Test	: Sep. 05, 2016 ~ Sep. 12, 2016
Issued Date	: Sep. 13, 2016
Tested by	: BTL Inc.

Testing Engineer : Rush Kao
(Rush Kao)

Technical Manager : Jeff Yang
(Jeff Yang)

Authorized Signatory : Andy Chiu
(Andy Chiu)

BTL INC.

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

Declaration

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

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

BTL's report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **BTL-self**, extracts from the test report shall not be reproduced except in full with **BTL**'s authorized written approval.

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

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Table of Contents Page

Table of Contents Page

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1609027	Original Issue.	Sep. 13, 2016

1. CERTIFICATION

Equipment	:	Keyboard
Brand Name	:	HP
Test Model.	:	HSA-D01K
Applicant	:	Darfon Electronics Corp
Date of Test	:	Sep. 05, 2016 ~ Sep. 12, 2016
Test Sample	:	Engineering Sample
Standard(s)	:	FCC Part15, Subpart C (15.249) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1609027) 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, Subpart C (15.249)			
Standard(s) Section	Test Item	Judgment	Remark
15.207(a)	Conducted Emission	N/A	NOTE (1)
15.205	Restricted Band of Operation	PASS	
15.209 15.249(a)	Radiated Emissions	PASS	
15.215(c)	20dB Bandwidth Test	PASS	

NOTE:

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

2.1 TEST FACILITY

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

Radiated emission Test (Below 1 GHz):

CB11: (VCCI RN: R-4260; FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088)
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Above 1 GHz):

CB11: (VCCI RN: G-868; FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088)
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty is not specified by FCC rules for reference only.

The reported uncertainty of measurement **y** ± **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**%.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

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

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U,(dB)
CB11 (3m)	CISPR	9kHz ~ 150kHz	4.00
		150kHz ~ 30MHz	4.00

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB11 (3m)	CISPR	30MHz ~ 200MHz	V	3.06
		30MHz ~ 200MHz	H	2.58
		200MHz ~ 1,000MHz	V	3.50
		200MHz ~ 1,000MHz	H	3.10

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB11 (3m)	CISPR	1GHz ~ 6GHz	V	4.14
		1GHz ~ 6GHz	H	4.14
		6GHz ~ 18GHz	V	5.34
		6GHz ~ 18GHz	H	5.34

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 DESCRIPTION OF EUT

Product Name	Keyboard	
Brand	HP	
Test Model	HSA-D01K	
Model Difference	N/A	
Product Description	Operation Frequency	2405-2470 MHz
	Modulation Technology	GFSK
	Bit Rate of Transmitter	1 Mbps
	Field Strength	88.49 dBuV/m (AVG Max) 90.36 dBuV/m (Peak Max)
Power Source	Supplied from 2*AAA battery	
EUT Power Rating	DC 3V, 5mA	

Note:

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

Channel	Frequency (MHz)
01	2405
02	2413
03	2422
04	2430
05	2440
06	2450
07	2460
08	2470

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	N/A	3.72

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

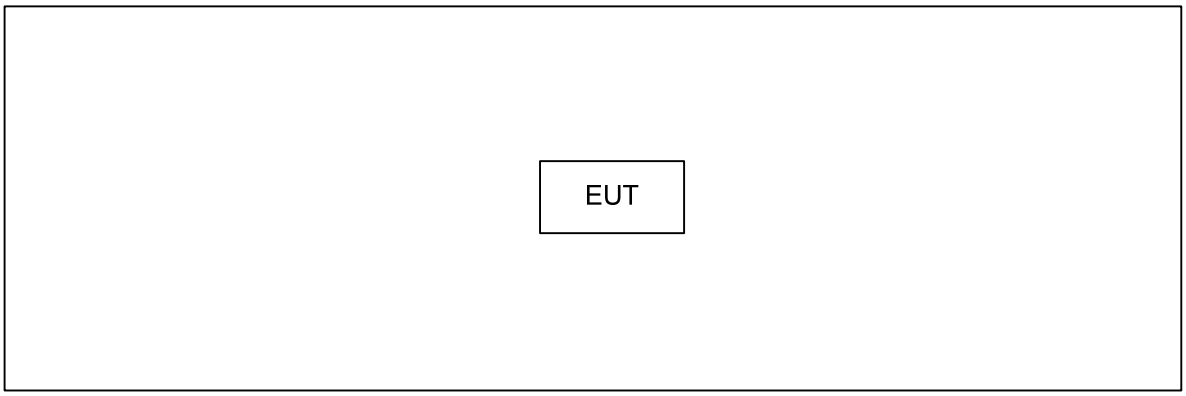
The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

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

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

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
-	-	-	-	-

Note:
(1) The support equipment was authorized by Declaration of Conformity (DOC).

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 = Insertion Loss + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

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

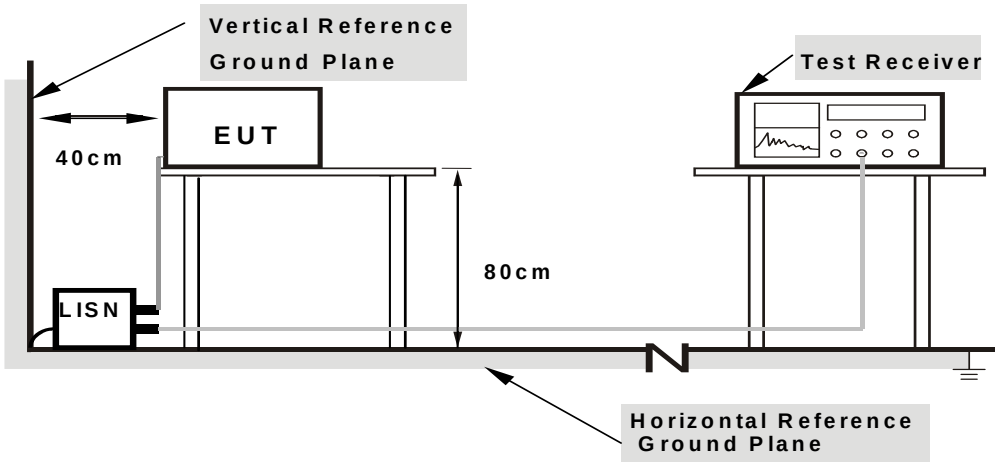
4.1.2 TEST PROCEDURE

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

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 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 (FCC 15.209)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section15.209(a) limit in the table below has to be followed.

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.209)

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

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

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

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

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

DUTY CYCLE: TX 2405 MHz (1 Mbps)

Dwell time = ON/ON+OFF

ON: = 0 msec

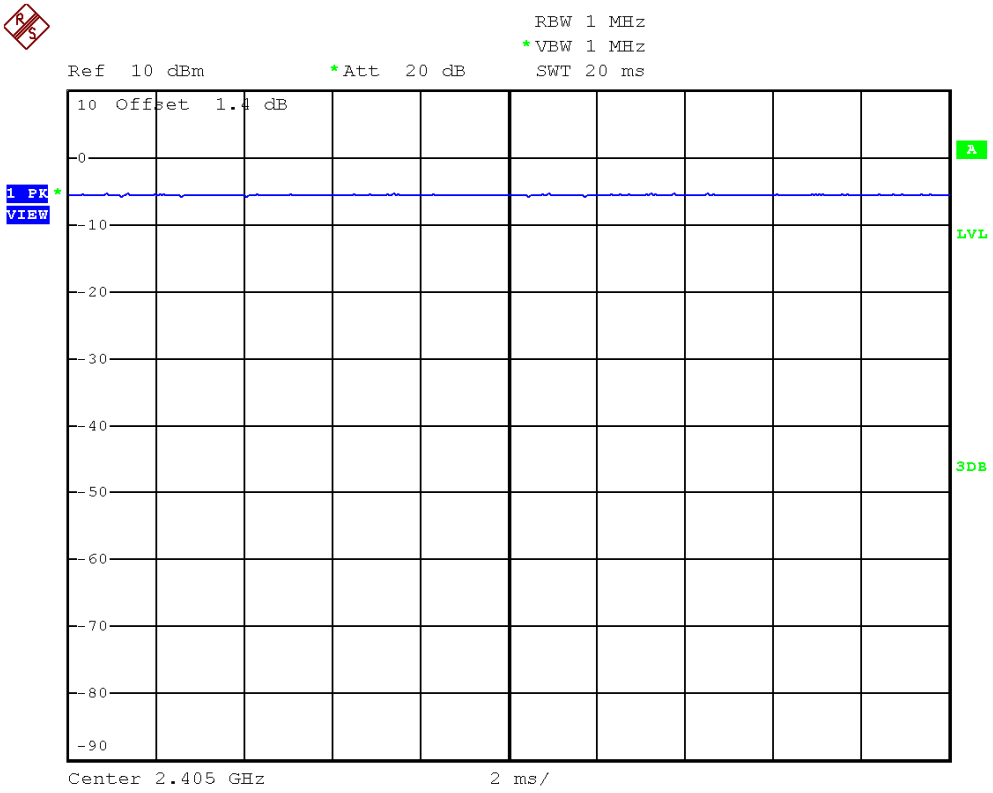
ON+OFF (total time): 0 msec

Dwell time: 0 %

AV = PK + 20 log(Dwell time)

AV = PK + 0

Total time (ON+OFF) = 0 msec, ON = 0 msec



Date: 9.SEP.2016 17:12:25

4.2.2 TEST PROCEDURE

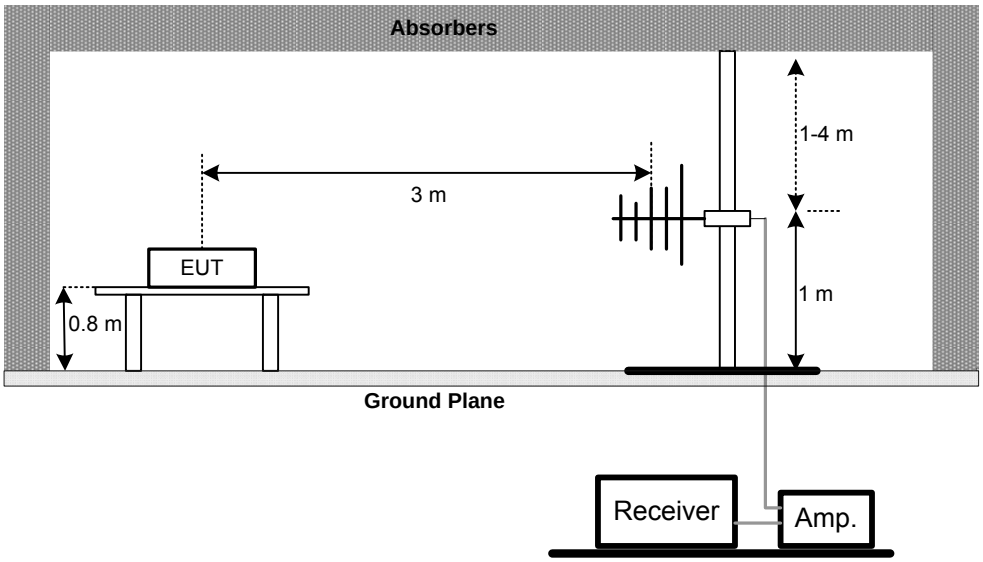
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance 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 0.8 m or 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
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. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

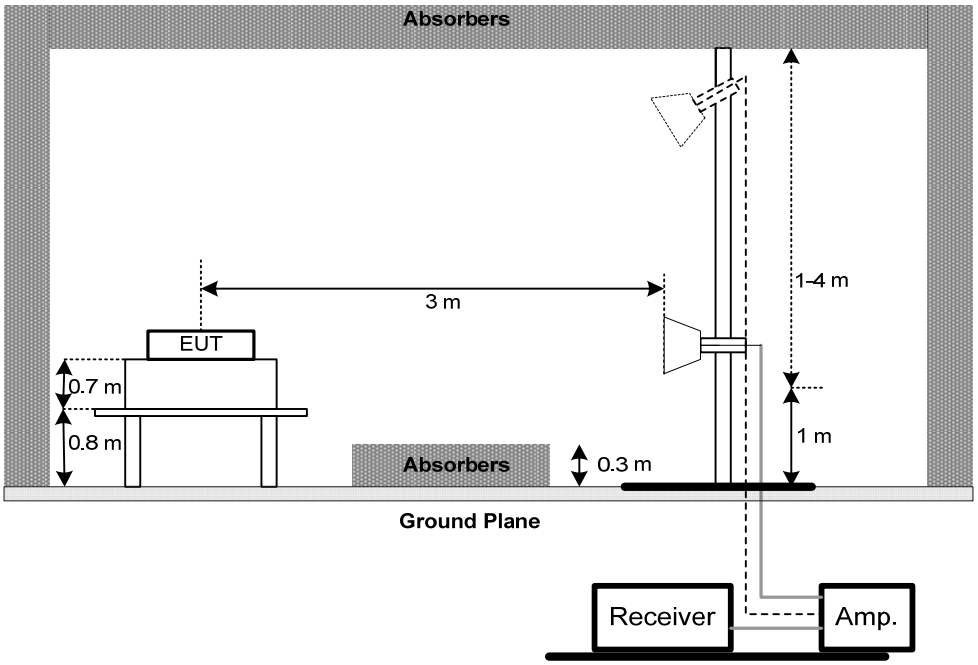
No deviation

4.2.4 TEST SETUP

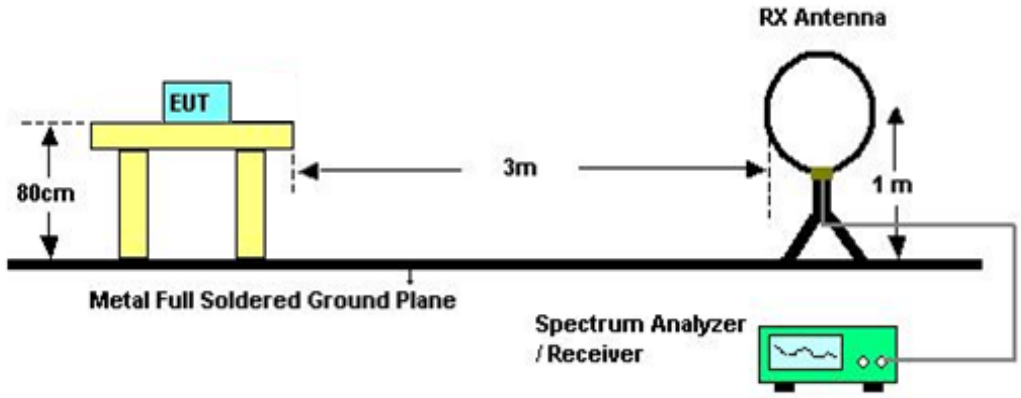
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



4.2.5 EUT OPERATING 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.

4.2.6 EUT TEST CONDITIONS

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

4.2.7 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 (specific distance / test distance) (dB).
(3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.8 TEST RESULTS (30MHZ TO 1000MHZ)

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.

4.2.9TEST 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

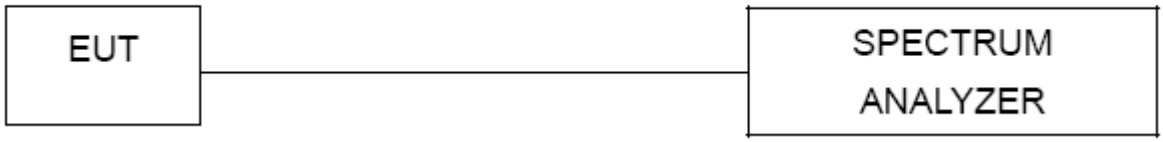
5.1 TEST PROCEDURE

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

5.2 DEVIATION FROM STANDARD

No deviation.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.5 EUT TEST CONDITIONS

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

5.6 TEST RESULTS

Please refer to the Attachment E.

6. MEASUREMENT INSTRUMENTS LIST

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9038A	MY51210215	Jun. 06, 2017
2	Loop Antenna	EMCO	6502	00042960	Nov. 15, 2016
3	Pre-Amplifier	HP	8447D	2944A08891	Mar. 08, 2017
4	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	9168-364	Feb. 03, 2017
5	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0624	Feb. 03, 2017
6	Pre-Amplifier	Agilent	8449B	3008A02331	Jan. 23, 2017
7	Horn Antenna	Schwarzbeck	BBHA 9120	D-546	Nov. 04, 2016
8	Test Cable	EMCI	EMC8D-NM-NM-8000	150301	Mar. 08, 2017
9	Test Cable	EMCI	EMC104-SM-SM-2500	150303	Mar. 08, 2017
10	Test Cable	EMCI	EMC104-NM-SM-1000	150304	Mar. 08, 2017
11	Test Cable	EMCI	EMC104-SM-SM-800	150305	Mar. 08, 2017
12	Test Cable	EMCI	EMC104-SM-SM-2500	150306	Mar. 08, 2017
13	Test Cable	EMCI	EMC104-SM-SM-6000	151203	Mar. 08, 2017
14	Test Cable	EMCI	S104-SMAP-1	130503	Mar. 28, 2017
15	Preamplifier With Adaptor	EMC	EMC2654045	980030	Feb. 14, 2017
16	Measurement Software	Farad	EZ_EMC (Version NB-03A)	N/A	N/A

Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 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

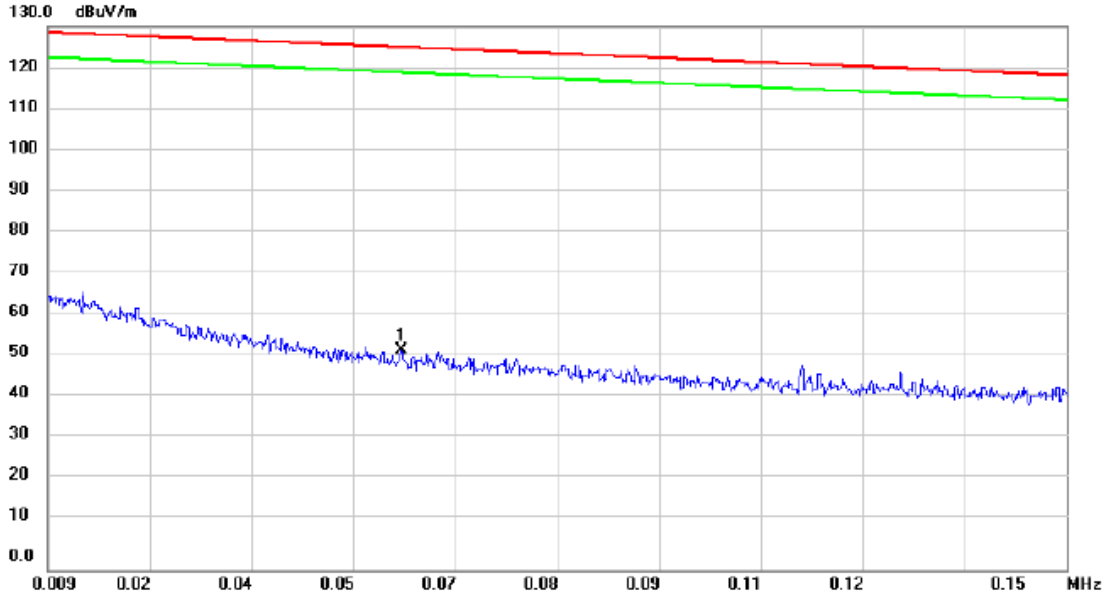
Test Mode: N/A

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

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

Test Mode	TX Mode_2405 MHz

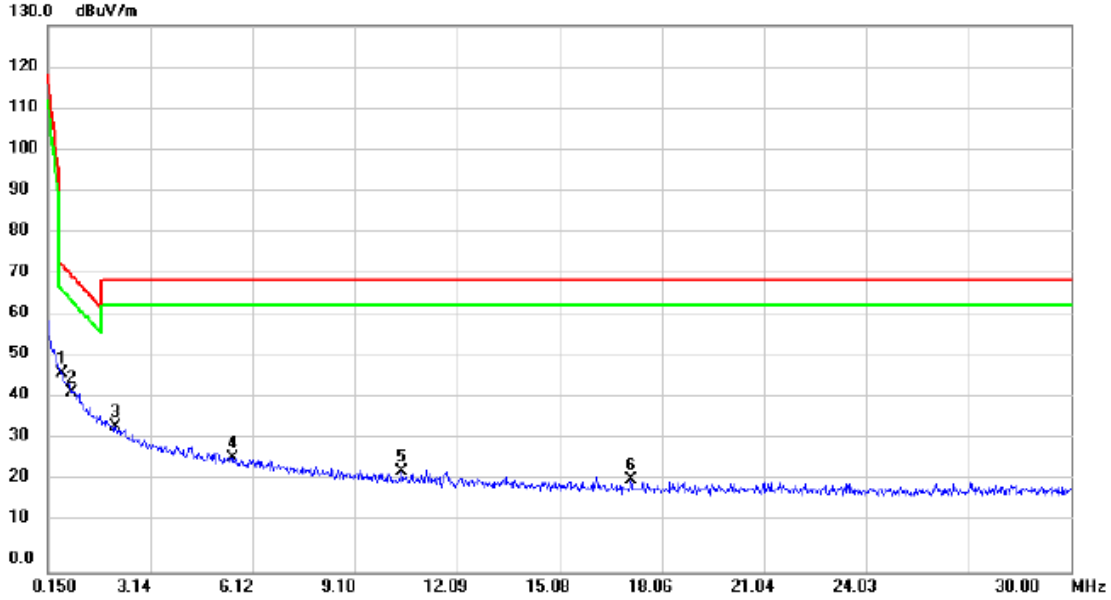
Open



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0580	39.60	12.86	52.46	124.98	-72.52	peak	

Test Mode	TX Mode_2405 MHz

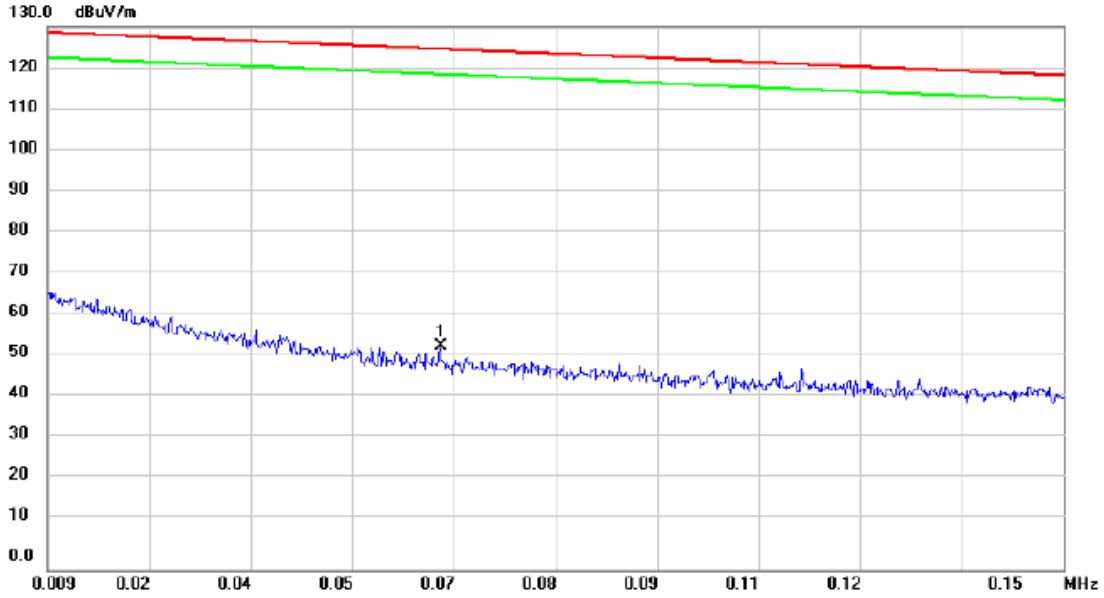
Open



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.5675	35.40	11.83	47.23	73.11	-25.88	peak	
2		0.8660	30.84	11.95	42.79	70.45	-27.66	peak	
3		2.1200	23.06	11.50	34.56	69.54	-34.98	peak	
4		5.5230	15.90	11.39	27.29	69.54	-42.25	peak	
5		10.4780	12.56	11.29	23.85	69.54	-45.69	peak	
6		17.1645	10.77	11.09	21.86	69.54	-47.68	peak	

Test Mode	TX Mode_2405 MHz

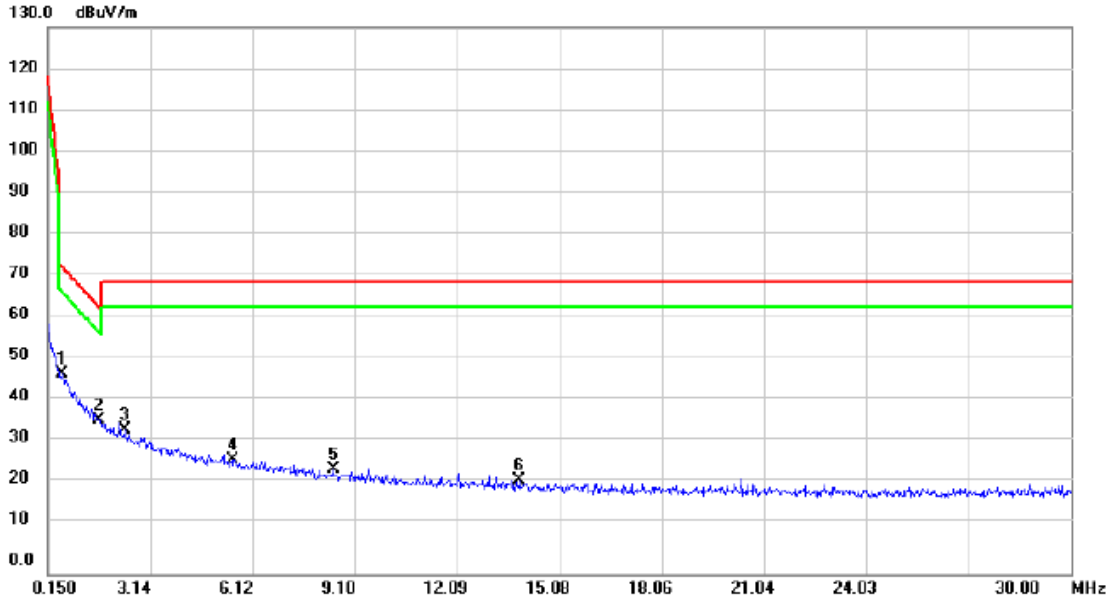
Close



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0637	40.61	12.75	53.36	124.57	-71.21	peak	

Test Mode	TX Mode_2405 MHz

Close

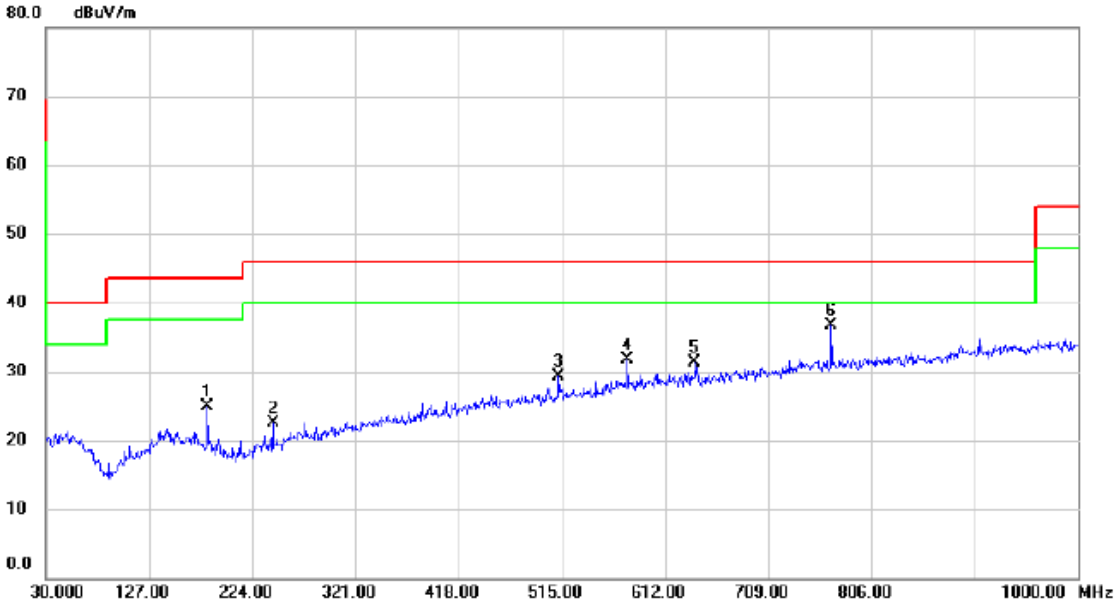


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.5675	35.78	11.83	47.61	73.11	-25.50	peak	
2		1.6425	24.87	11.71	36.58	63.53	-26.95	peak	
3		2.3887	22.98	11.38	34.36	69.54	-35.18	peak	
4		5.5530	15.80	11.39	27.19	69.54	-42.35	peak	
5		8.4780	13.54	11.33	24.87	69.54	-44.67	peak	
6		13.9108	11.23	11.18	22.41	69.54	-47.13	peak	

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

Test Mode	TX Mode_2405 MHz

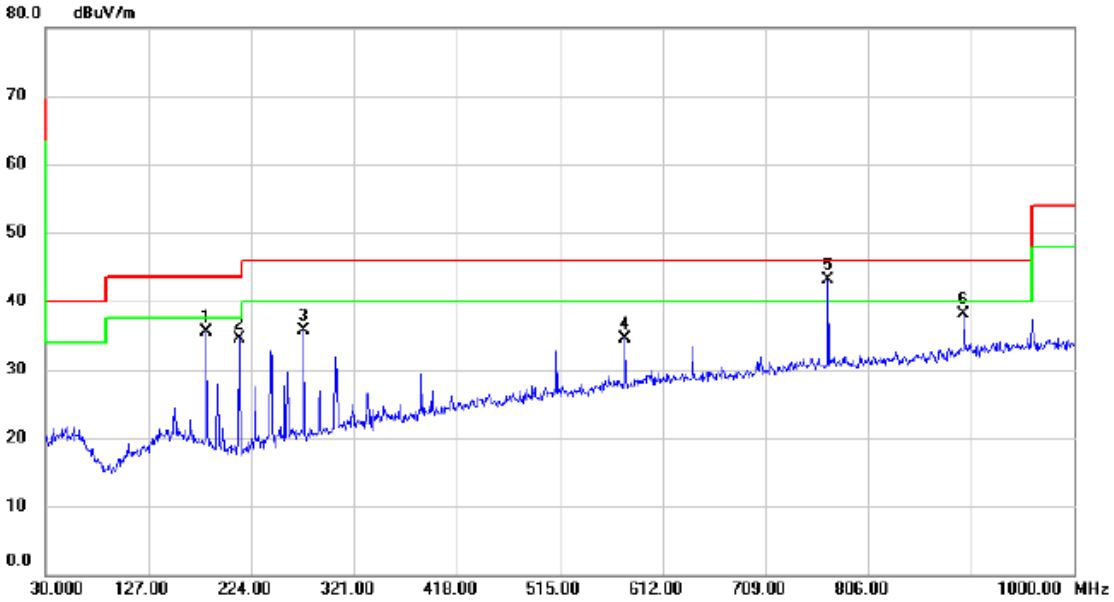
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		182.2900	34.99	-10.05	24.94	43.50	-18.56	peak	
2		243.4000	31.86	-9.35	22.51	46.00	-23.49	peak	
3		512.0900	31.61	-2.38	29.23	46.00	-16.77	peak	
4		576.1100	32.53	-0.84	31.69	46.00	-14.31	peak	
5		640.1300	31.20	0.10	31.30	46.00	-14.70	peak	
6	*	768.1700	34.16	2.54	36.70	46.00	-9.30	peak	

Test Mode	TX Mode_2405 MHz

Horizontal

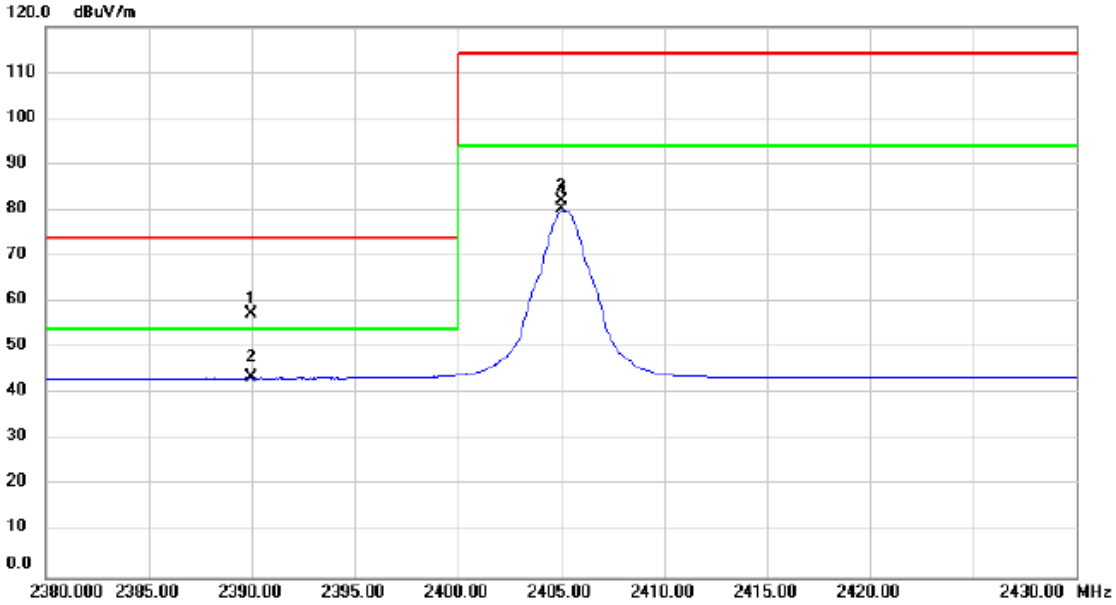


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		182.2900	45.51	-10.05	35.46	43.50	-8.04	peak	
2		212.3600	45.45	-10.89	34.56	43.50	-8.94	peak	
3		273.4700	43.85	-8.21	35.64	46.00	-10.36	peak	
4		576.1100	35.31	-0.84	34.47	46.00	-11.53	peak	
5	*	768.1700	40.48	2.54	43.02	46.00	-2.98	peak	
6		896.2100	33.50	4.53	38.03	46.00	-7.97	peak	

ATTACHMENT D -RADIATED EMISSION (ABOVE 1000MHZ)

Test Mode	TX Mode_2405 MHz

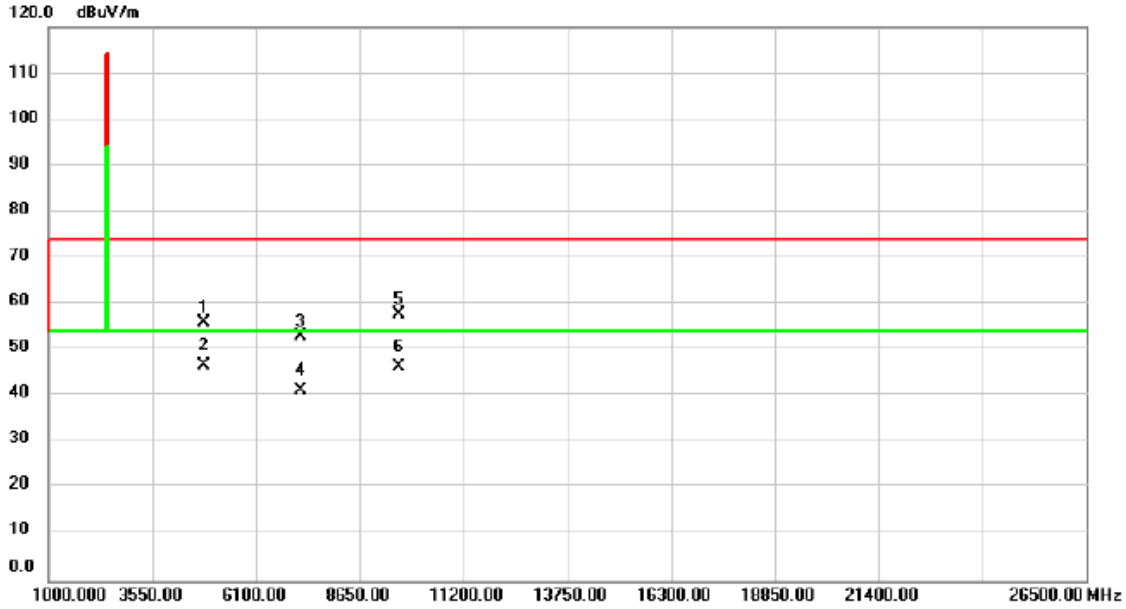
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2389.950	26.44	30.96	57.40	74.00	-16.60	peak	
2	*	2389.950	12.55	30.96	43.51	54.00	-10.49	AVG	
3		2405.000	51.14	31.02	82.16	114.00	-31.84	peak	
4		2405.000	49.09	31.02	80.11	94.00	-13.89	AVG	

Test Mode	TX Mode_2405 MHz

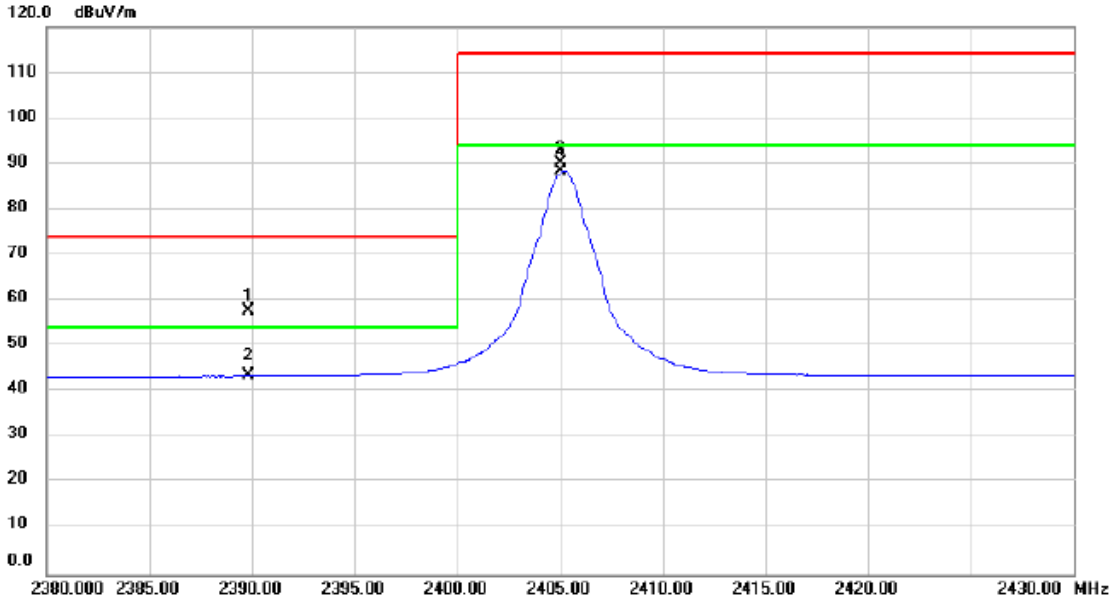
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4810.000	67.58	-11.49	56.09	74.00	-17.91	peak	
2	*	4810.000	58.05	-11.49	46.56	54.00	-7.44	AVG	
3		7215.000	58.38	-5.44	52.94	74.00	-21.06	peak	
4		7215.000	46.83	-5.44	41.39	54.00	-12.61	AVG	
5		9620.000	57.04	0.73	57.77	74.00	-16.23	peak	
6		9620.000	45.59	0.73	46.32	54.00	-7.68	AVG	

Test Mode	TX Mode_2405 MHz

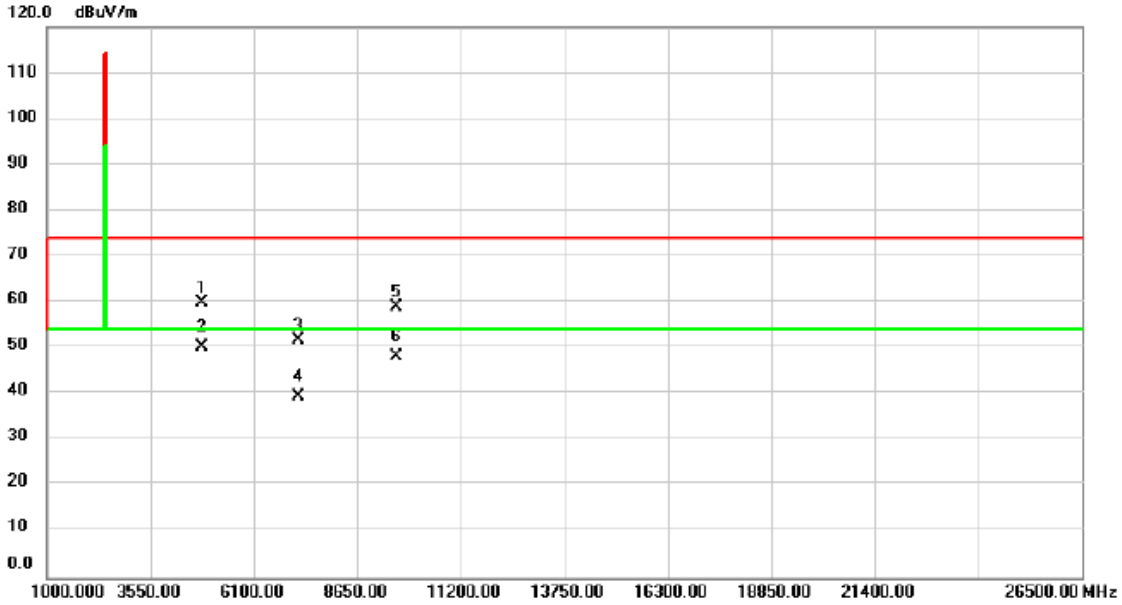
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2389.850	26.75	30.96	57.71	74.00	-16.29	peak	
2		2389.850	12.58	30.96	43.54	54.00	-10.46	AVG	
3		2405.000	59.24	31.02	90.26	114.00	-23.74	peak	
4	*	2405.000	57.28	31.02	88.30	94.00	-5.70	AVG	

Test Mode	TX Mode_2405 MHz

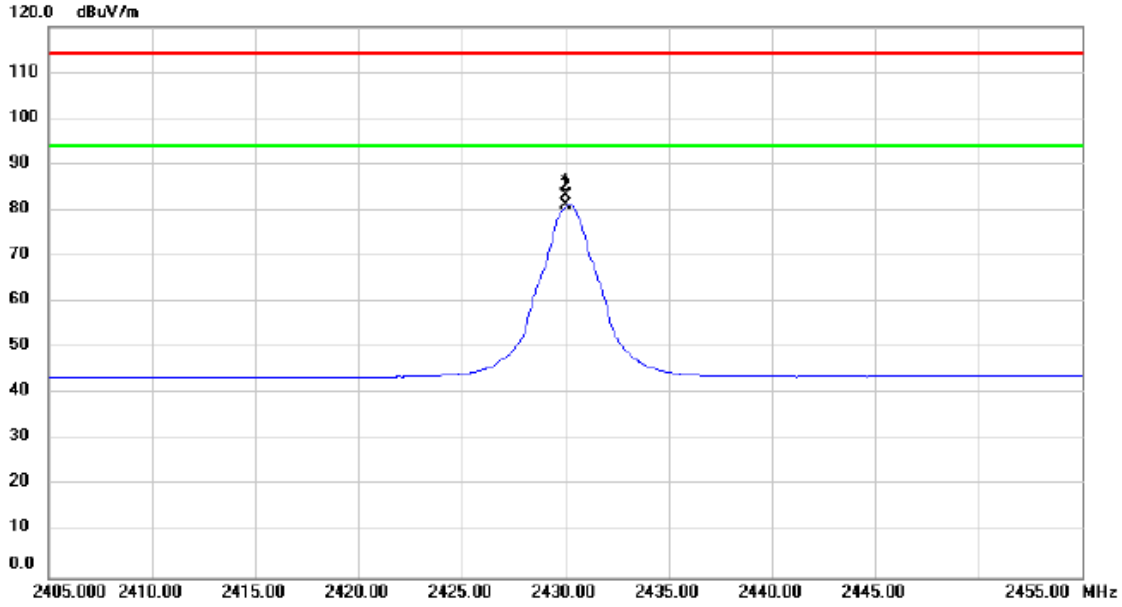
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4810.000	71.25	-11.49	59.76	74.00	-14.24	peak	
2	*	4810.000	61.79	-11.49	50.30	54.00	-3.70	AVG	
3		7215.000	57.11	-5.44	51.67	74.00	-22.33	peak	
4		7215.000	44.85	-5.44	39.41	54.00	-14.59	AVG	
5		9620.000	58.25	0.73	58.98	74.00	-15.02	peak	
6		9620.000	47.38	0.73	48.11	54.00	-5.89	AVG	

Test Mode	TX Mode_2430 MHz

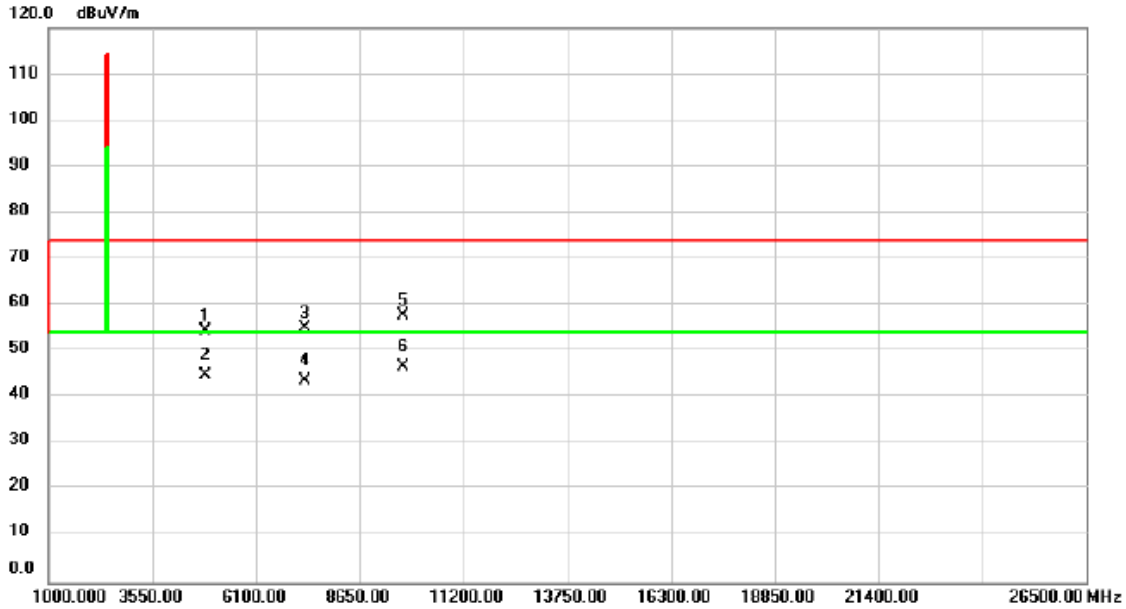
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2430.000	52.19	31.11	83.30	114.00	-30.70	peak	
2	*	2430.000	50.00	31.11	81.11	94.00	-12.89	AVG	

Test Mode	TX Mode_2430 MHz

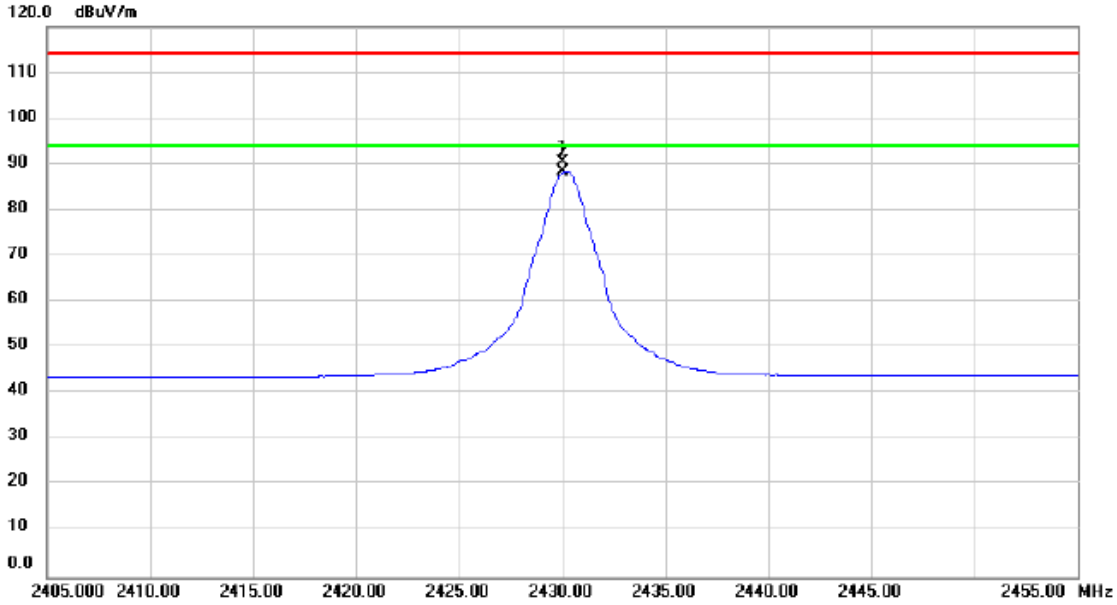
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4860.000	65.92	-11.41	54.51	74.00	-19.49	peak	
2		4860.000	56.23	-11.41	44.82	54.00	-9.18	AVG	
3		7290.000	60.18	-5.16	55.02	74.00	-18.98	peak	
4		7290.000	48.87	-5.16	43.71	54.00	-10.29	AVG	
5		9720.000	56.77	1.02	57.79	74.00	-16.21	peak	
6	*	9720.000	45.53	1.02	46.55	54.00	-7.45	AVG	

Test Mode	TX Mode_2430 MHz

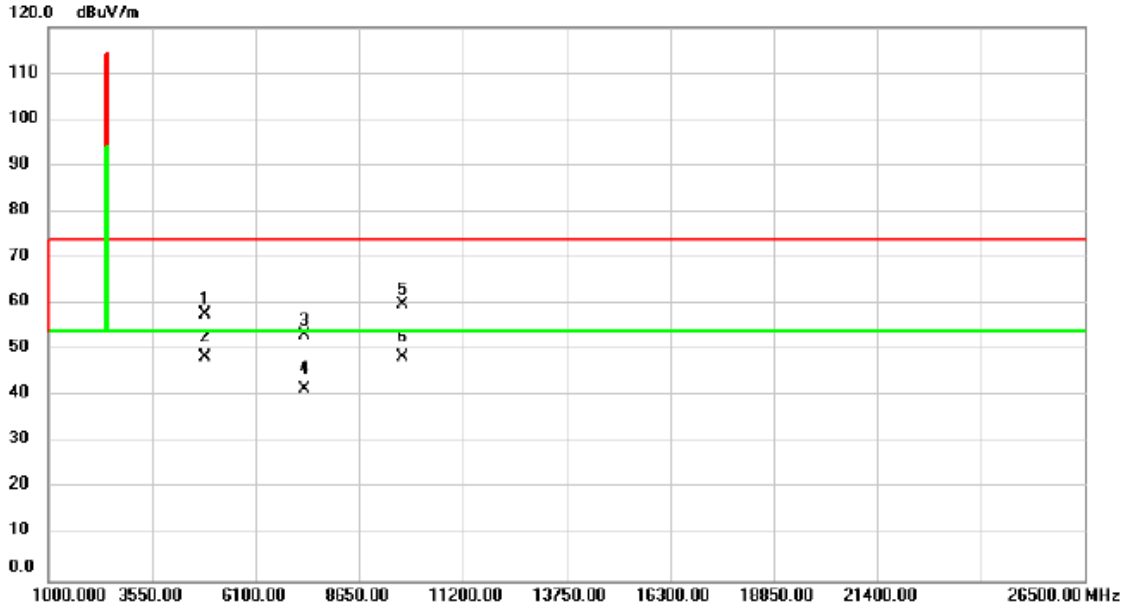
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2430.000	59.25	31.11	90.36	114.00	-23.64	peak	
2	*	2430.000	57.38	31.11	88.49	94.00	-5.51	AVG	

Test Mode	TX Mode_2430 MHz

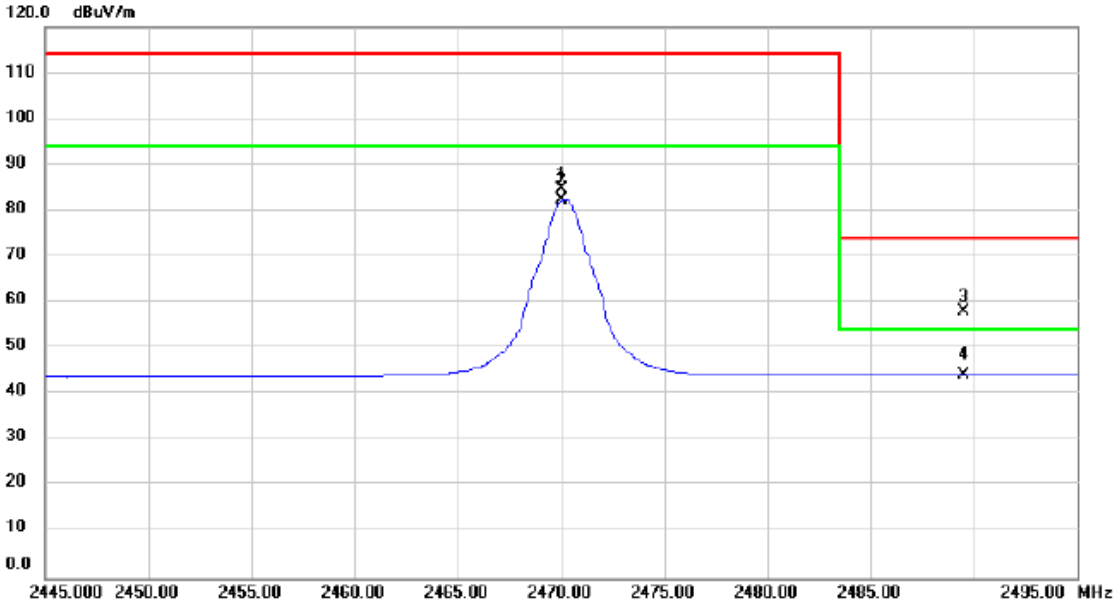
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4860.000	69.04	-11.41	57.63	74.00	-16.37	peak	
2		4860.000	59.99	-11.41	48.58	54.00	-5.42	AVG	
3		7290.000	58.56	-5.16	53.40	74.00	-20.60	peak	
4		7290.000	46.69	-5.16	41.53	54.00	-12.47	AVG	
5		9720.000	58.73	1.02	59.75	74.00	-14.25	peak	
6	*	9720.000	47.57	1.02	48.59	54.00	-5.41	AVG	

Test Mode	TX Mode_2470 MHz

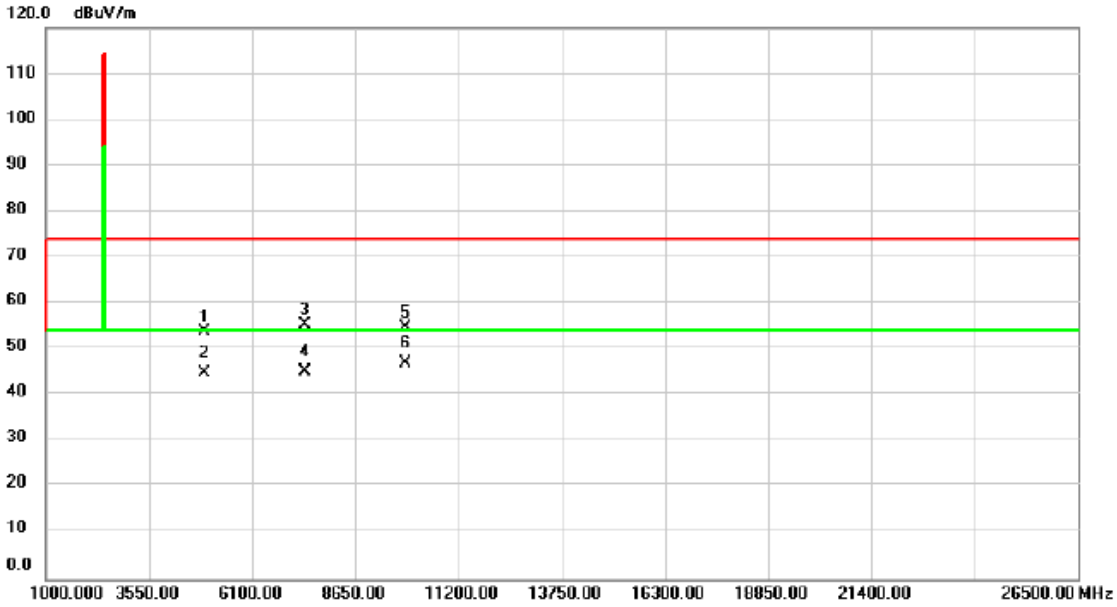
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2470.000	53.42	31.26	84.68	114.00	-29.32	peak	
2		2470.000	51.23	31.26	82.49	94.00	-11.51	AVG	
3		2489.480	26.79	31.33	58.12	74.00	-15.88	peak	
4	*	2489.480	12.91	31.33	44.24	54.00	-9.76	AVG	

Test Mode	TX Mode_2470 MHz

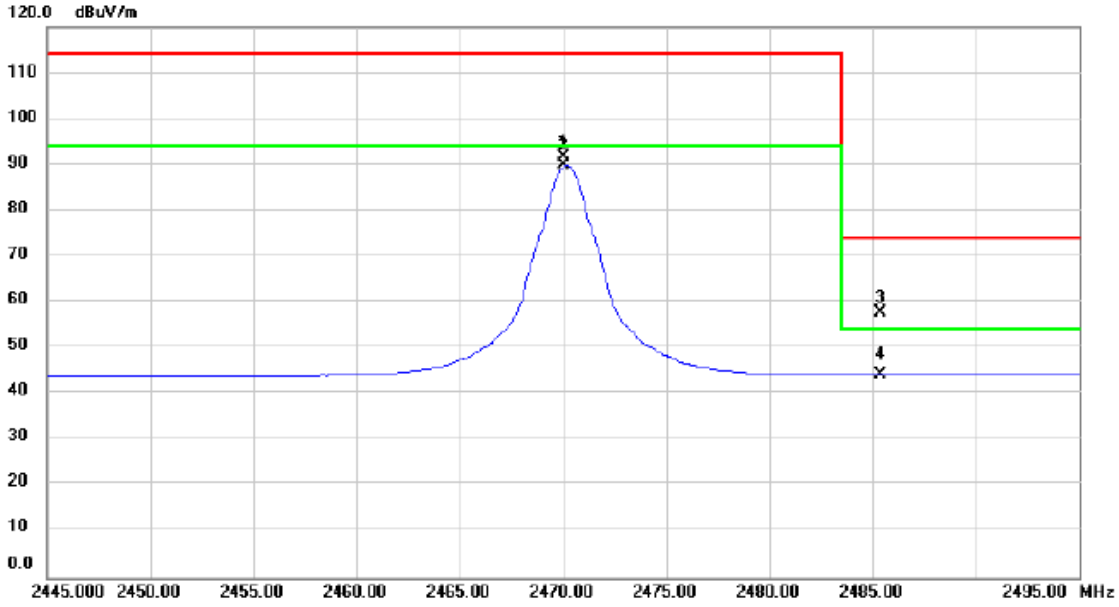
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4940.000	65.21	-11.29	53.92	74.00	-20.08	peak	
2		4940.000	56.11	-11.29	44.82	54.00	-9.18	AVG	
3		7410.000	60.08	-4.70	55.38	74.00	-18.62	peak	
4		7410.000	49.82	-4.70	45.12	54.00	-8.88	AVG	
5		9880.000	53.39	1.48	54.87	74.00	-19.13	peak	
6	*	9880.000	45.61	1.48	47.09	54.00	-6.91	AVG	

Test Mode	TX Mode_2470 MHz

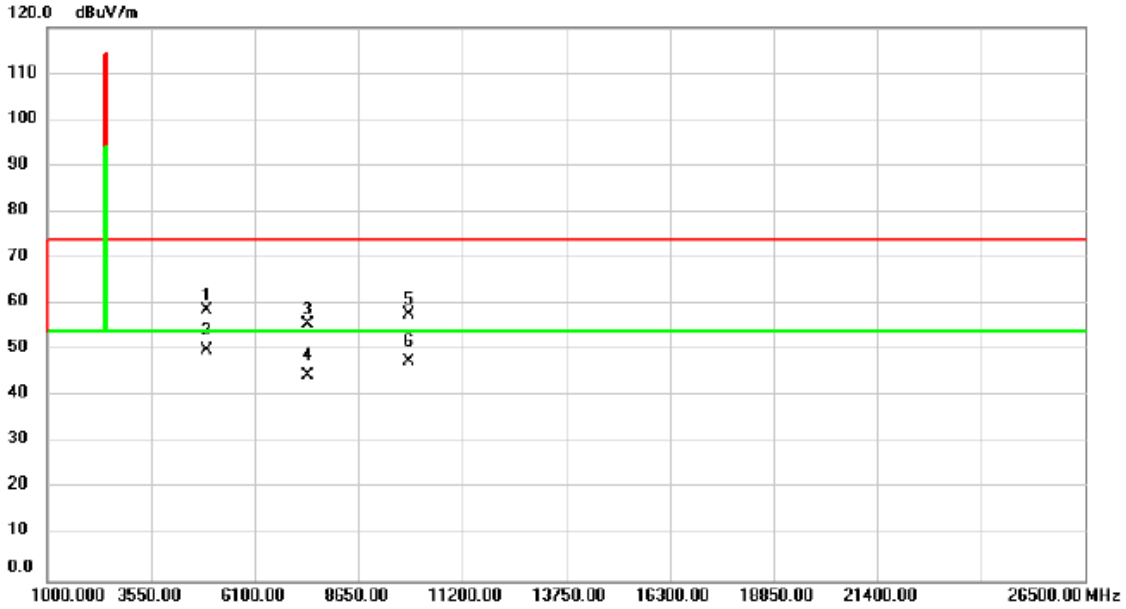
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2470.000	60.47	31.26	91.73	114.00	-22.27	peak	
2	*	2470.000	58.55	31.26	89.81	94.00	-4.19	AVG	
3		2485.350	26.36	31.32	57.68	74.00	-16.32	peak	
4		2485.350	12.94	31.32	44.26	54.00	-9.74	AVG	

Test Mode	TX Mode_2470 MHz

Horizontal



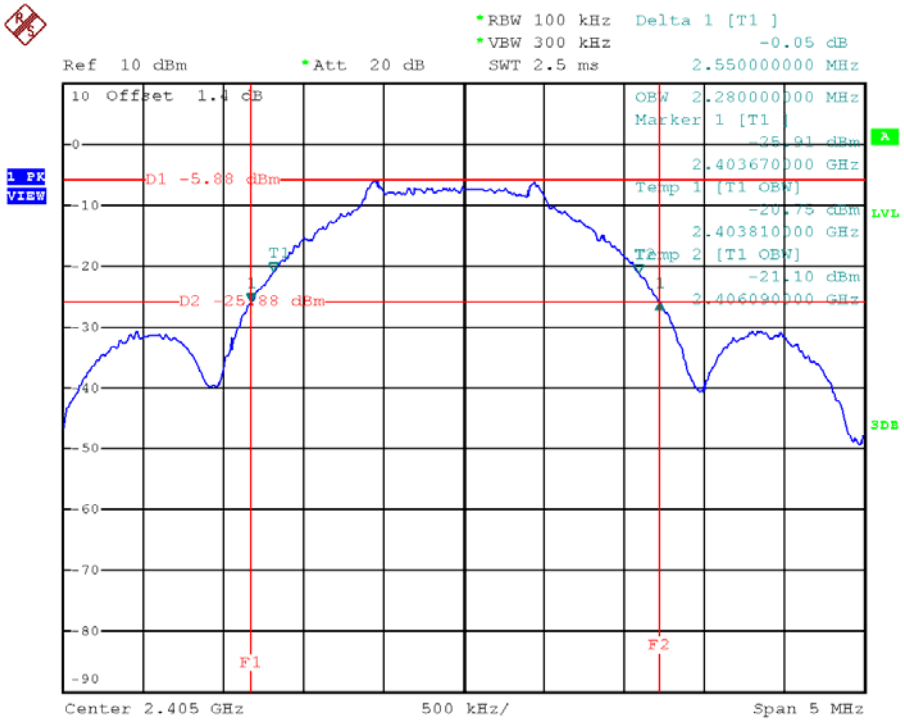
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4940.000	69.92	-11.29	58.63	74.00	-15.37	peak	
2	*	4940.000	61.14	-11.29	49.85	54.00	-4.15	AVG	
3		7410.000	60.33	-4.70	55.63	74.00	-18.37	peak	
4		7410.000	49.36	-4.70	44.66	54.00	-9.34	AVG	
5		9880.000	56.20	1.48	57.68	74.00	-16.32	peak	
6		9880.000	46.08	1.48	47.56	54.00	-6.44	AVG	

ATTACHMENT E - BANDWIDTH

Test Mode:	TX Mode_2405 MHz/2430 MHz/2470 MHz

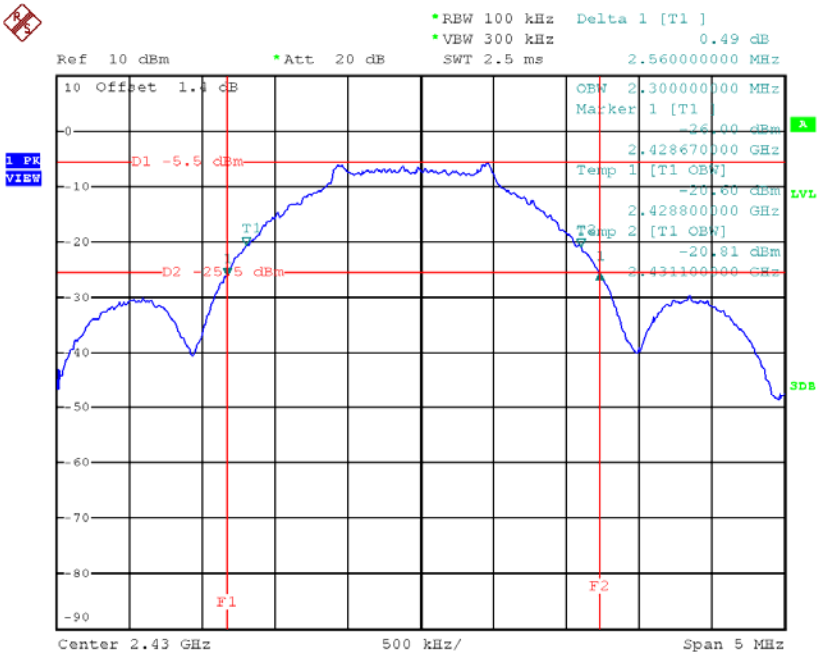
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)
2405	2.55	2.28
2430	2.56	2.30
2470	2.57	2.31

TX Mode_2405 MHz



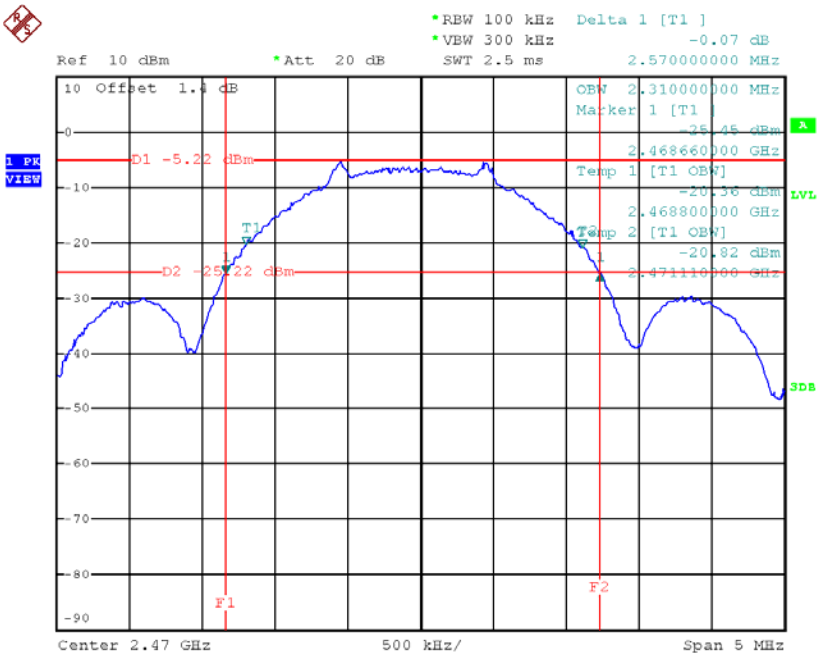
Date: 9.SEP.2016 16:54:12

TX Mode_2430 MHz



Date: 9.SEP.2016 17:05:20

TX Mode_2470 MHz



Date: 9.SEP.2016 17:09:44