FCC Radio Test Report

FCC ID: XHM-J680222

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

Project No.	:	1407139
Equipment	:	POS
Test Model	:	J2 680
Series Model	:	N/A
Applicant	:	FLYTECH Technology Co., Ltd.
Address	:	1F, No. 168, Sing-Ai Rd., NeiHu District 11494, Taipei, Taiwan

Date of Receipt	:	Jan. 27, 2015
Date of Test	:	Jan. 27, 2015 ~ May 25, 2017
Issued Date	:	Jul. 12, 2017
Tested by	:	BTL Inc.

Testing Engineer : Rush Kao
(Rush Kao)

Technical Manager : James Chiu
(James Chiu)

Authorized Signatory : Andy Chiu
(Andy Chiu)

BTL INC.

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Declaration

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

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

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BTL's laboratory quality assurance procedures are in compliance with the **ISO 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.

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REPORT ISSUED HISTORY

Issue No.	Description	Issued Date
BTL-FCCP-2-1407139	Original Issue.	Jul. 12, 2017

1 CERTIFICATION

Equipment	:	POS
Brand Name	:	FLYTECH
Test Model	:	J2 680
Series Model	:	N/A
Applicant	:	FLYTECH Technology Co., Ltd.
Manufacturer	:	FLYTECH Technology Co., Ltd.
Address	:	1F, No. 168, Sing-Ai Rd., NeiHu District 11494, Taipei, Taiwan
Factory	:	FLYTECH TECHNOLOGY CO., LTD.
Address	:	No.36 Huaya 3rd Rd., Guishan Township, Taoyuan Country 33383,Taiwan
Date of Test	:	Jan. 27, 2015 ~ May 25, 2017
Test Sample	:	Engineering Sample
Standards	:	FCC Part 15, Subpart C(15.209) ANSI C63. 10-2013

The above equipment has been tested and found in 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-2-1407139) 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 standards:

Standard Section	Test Item	**Result**
15.207	Conducted emission	**PASS**
15.209	Radiated Emission	**PASS**

NOTE:

1. **N/A**: denotes test is not applicable in this Test Report

2.1 TEST FACILITY

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

Conducted emission Test:

C05: (VCCI RN: C-4742; FCC RN:965108; FCC DN:TW1082)
No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test:

CB15: (FCC RN:674415; FCC DN:TW0659)
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/Industry Canada rules and 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. Conducted emission test:

Test Site	Method	Measurement Frequency Range	U,(dB)
C05	CISPR	150 kHz ~ 30MHz	3.06

B. Radiated emission test:

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. H / V	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

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}.

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	POS	
Brand Name	FLYTECH	
Test Model	J2 680	
Series Model	N/A	
Model Difference	N/A	
Product Description	Operation Frequency	125 kHz
	Antenna Designation	LOOP Antenna
Power Source	DC Voltage supplied from AC/DC adapter. Brand/ Model: FSP GROUP INC./FSP180-ABAN1	
Power Rating	I/P:AC 100-240V 2.5A 50-60Hz, O/P:DC 19V 9.47A	
Products Covered	N/A	

Note:

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

3.2 DESCRIPTION OF TEST MODES

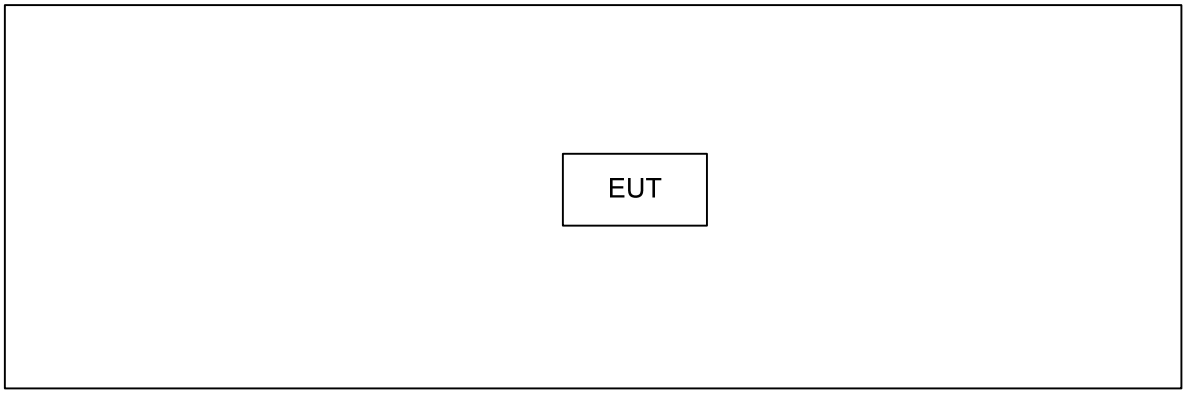
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration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

Pretest Mode	Description
Mode 1	125 KHz Transmit

Conducted emission test	
Final Test Mode	Description
Mode 1	13.56MHz Transmit

Radiated emission test	
Final Test Mode	Description
Mode 1	125 KHz Transmit

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 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 CONDUCTED EMISSION

4.1 LIMITS

FREQUENCY (MHz)	(dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56.00	46.00
5.0 - 30.0	60.00	50.00

NOTE:

1. The tighter limit applies at the band edges.
2. The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
3. The test result calculated as following:
   Measurement Value = Reading Level + Correct Factor
   Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
   Margin Level = Measurement Value – Limit Value

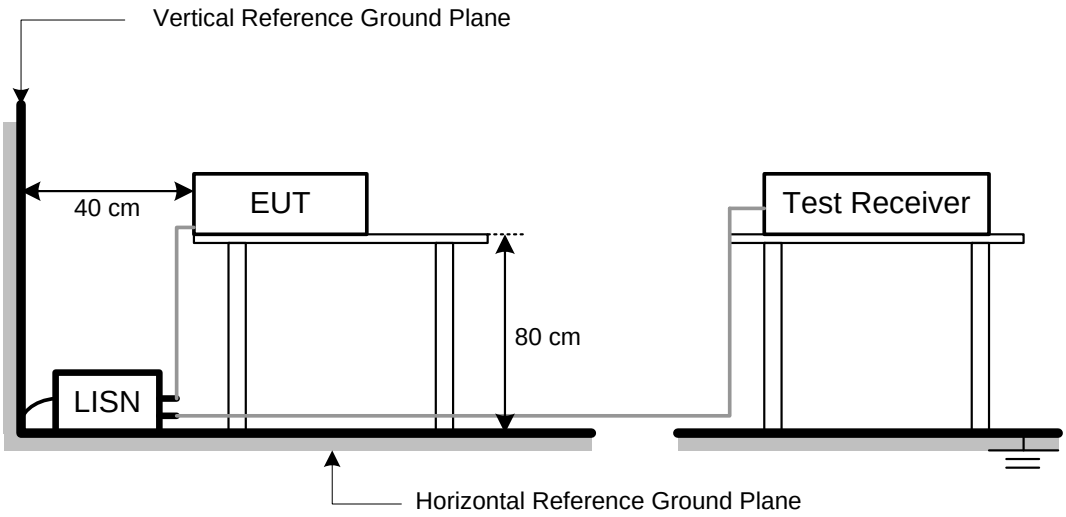
4.2 TEST PROCEDURES

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.

NOTE:

a. Reading in which marked as Peak, QP or AVG means measurements by using are Quasi-Peak or Average Mode with Detector BW=9 kHz (6 dB Bandwidth).
b. All readings are Peak Mode value unless otherwise stated QP or AVG in column of Note. If the Peak or 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 Peak or QP Mode was measured, but AVG Mode didn't perform.

4.3 TEST SETUP LAYOUT



4.4 DEVIATION FROM TEST STANDARD

No deviation

4.5 EUT OPERATING CONDITIONS

The EUT used during radiated and/or conducted emission measurement was designed to exercise in a manner similar to a typical use.

Temperature: 25°C Relative Humidity: 55%

4.6 TEST RESULTS

Please refer to the Attachment A.

5 RADIATED EMISSION

5.1 LIMITS

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

NOTE:

(1) The tighter limit shall apply at the boundary between two frequency range.

(2) Limitation expressed in dBuV/m is calculated by 20log Emission Level (uV/m).

(3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)^2$.
Example:
F.S Limit at 30m distance is 30uV/m , then F.S Limitation at 3m distance is adjusted as $L_{d1} = L_1 =$ 30uV/m * $(10)^2$ = 100 * 30 uV/m

(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
Margin Level = Measurement Value – Limit Value

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 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.
c. 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.
d. 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)
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

NOTE:

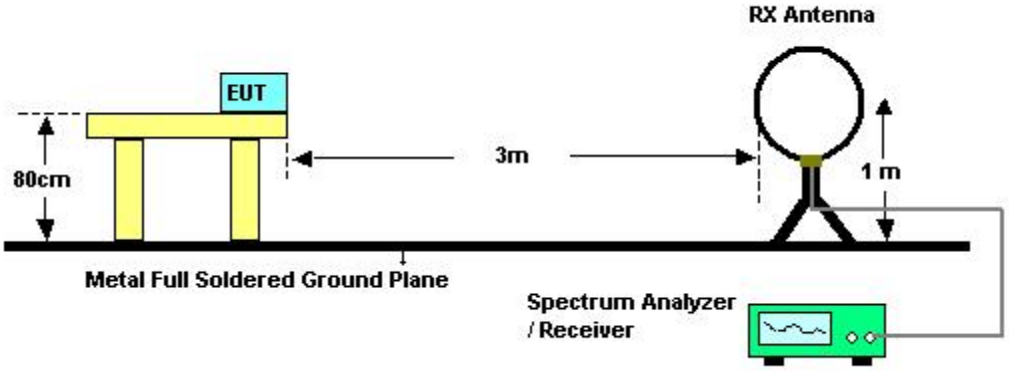
a. Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode with Detector BW=120 kHz.
b. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform.

5.3 DEVIATION FROM TEST STANDARD

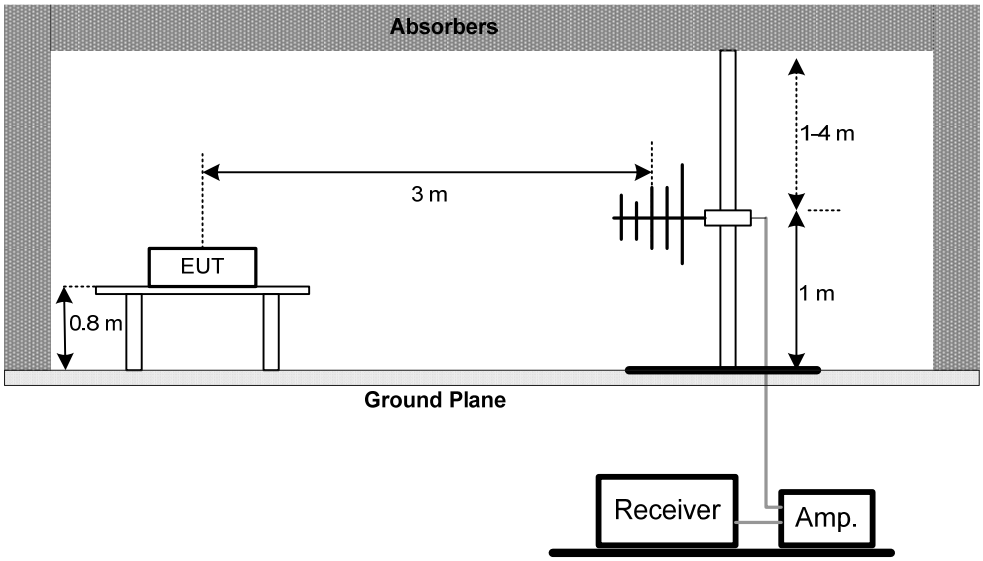
No deviation

5.4 TEST SETUP

Below 30MHz



30MHz-1GHz



5.5 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.

Below 30MHz:
Temperature: 25°C Relative Humidity: 65%
30MHz-1GHz:
Temperature: 25°C Relative Humidity: 65%

5.6 TEST RESULTS (BELOW 30MHz)

Please refer to the Attachment B.

5.7 TEST RESULTS (30MHz-1GHz)

Please refer to the Attachment C.

6. 20dB SPECTRUM BANDWIDTH MEASUREMENT

6.1. LIMIT OF 20DB BANDWIDTH MEASUREMENT

The 20dB bandwidth shall be specified in operating frequency band.

6.2.TEST PROCEDURES

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10kHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

6.3. TEST SETUP LAYOUT

6.4. TEST DEVIATION

There is no deviation with the original standard.

6.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

6.6. TEST RESULT

Please refer to the Attachment D.

7 MEASUREMENT INSTRUMENTS LIST

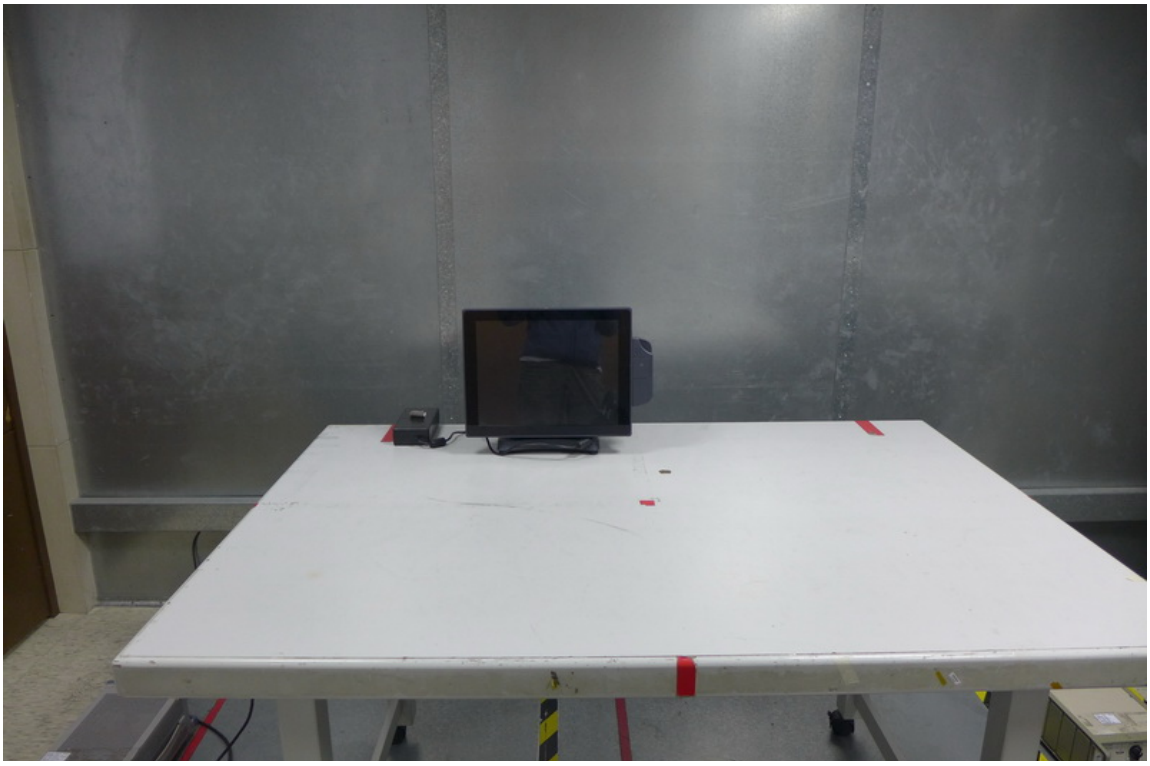
Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	Jun. 01, 2017
2	Test Cable	TIMES	CFD300-NL	C05	Jun. 14, 2016
3	EMI Test Receiver	R&S	ESR3	101854	Dec. 10, 2016
4	Measurement Software	EZ	EZ_EMC (Version NB-03A)	N/A	N/A

Radiated Emission Measurement Instruments List					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	Schwarzbeck	VULB9168-548	9168-548	Jan. 11, 2016
2	Pre-Amplifier	EMCI	012645B	980267	Mar. 01, 2015
3	Test Cable	EMCI	S104-SMAP-2	M001220	Jan. 06, 2016
4	EMI Test Receiver	R&S	ESCI	100080	May 13, 2016
5	Loop Ant	EMCO	6502	42960	Nov.15. 2016

20dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 17, 2018

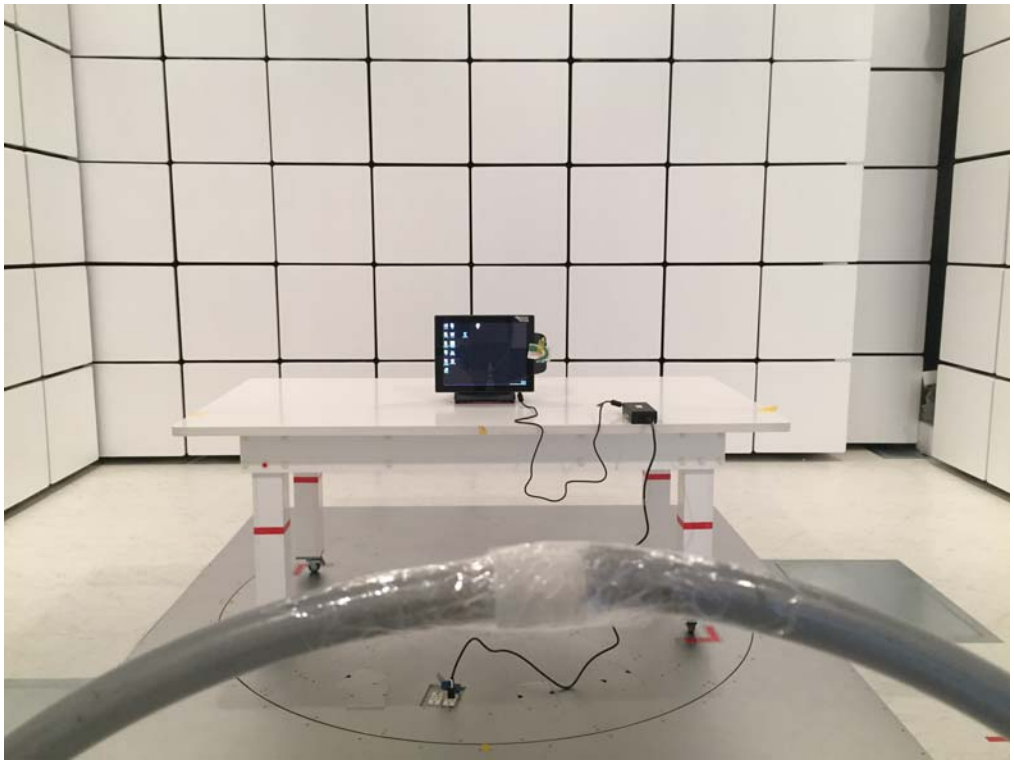
6 EUT TEST PHOTO

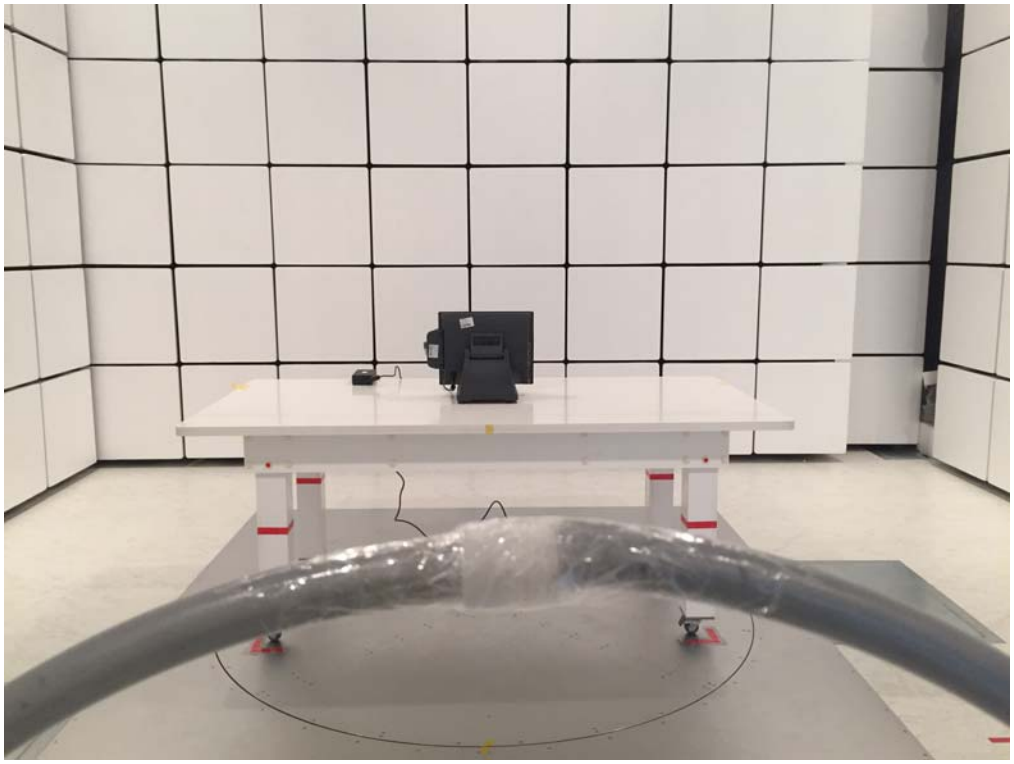
Conducted emission test photos



Radiated emission test photos

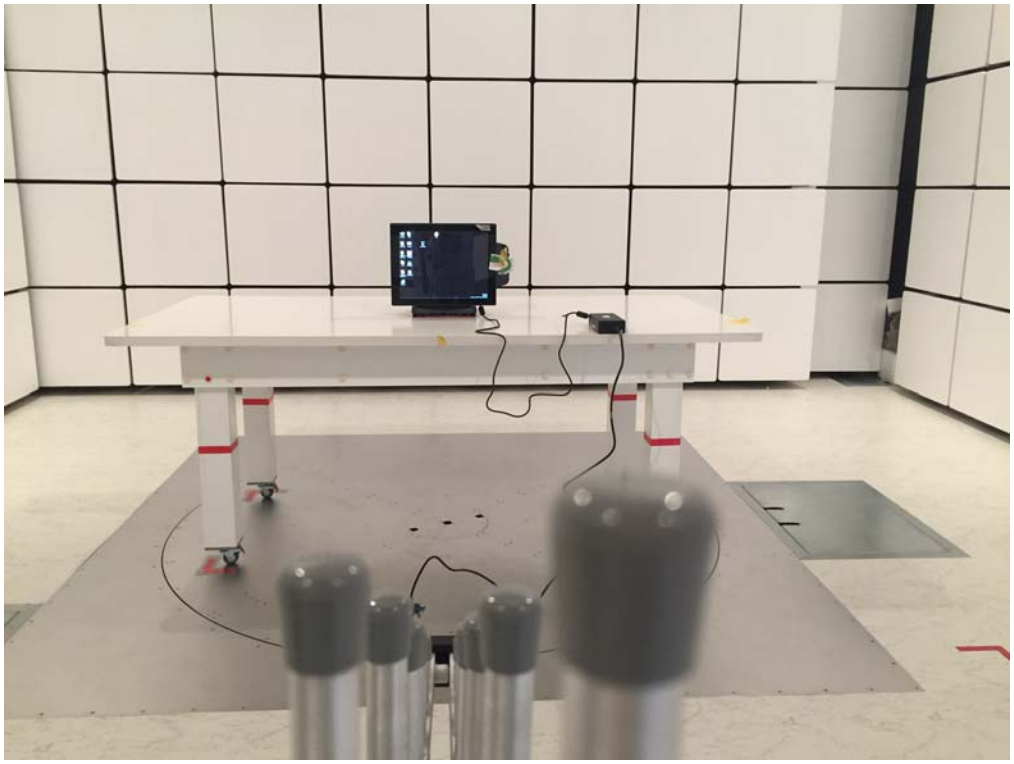
9KHz to 30MHz

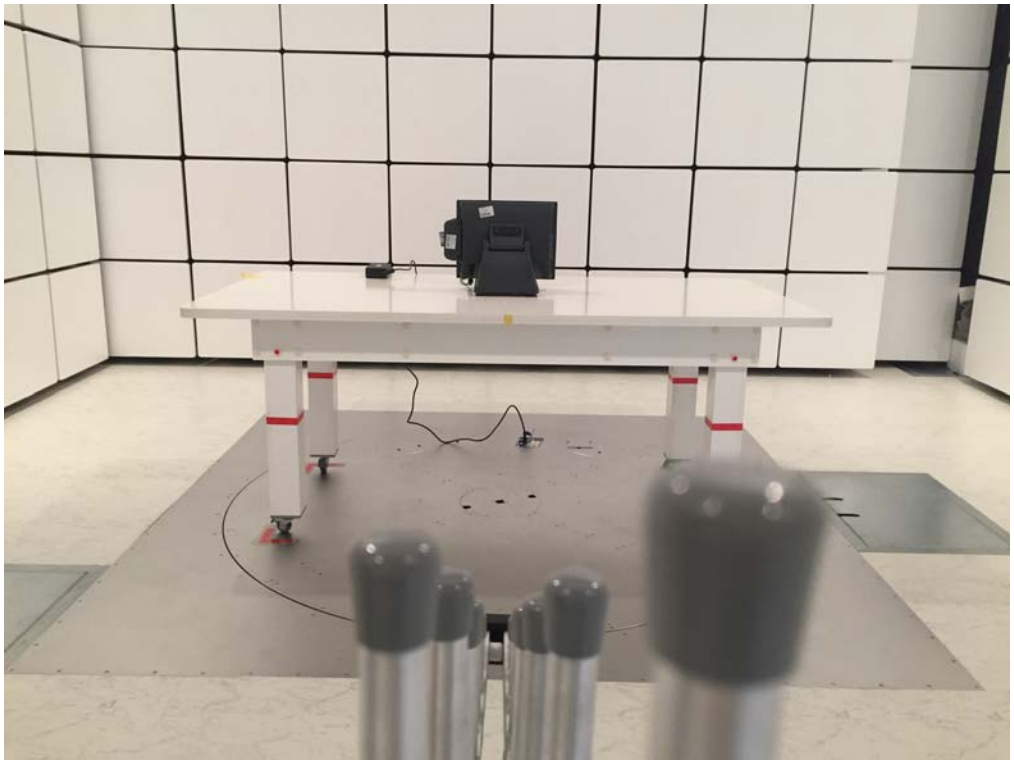




Radiated emission test photos

30MHz to 1000MHz

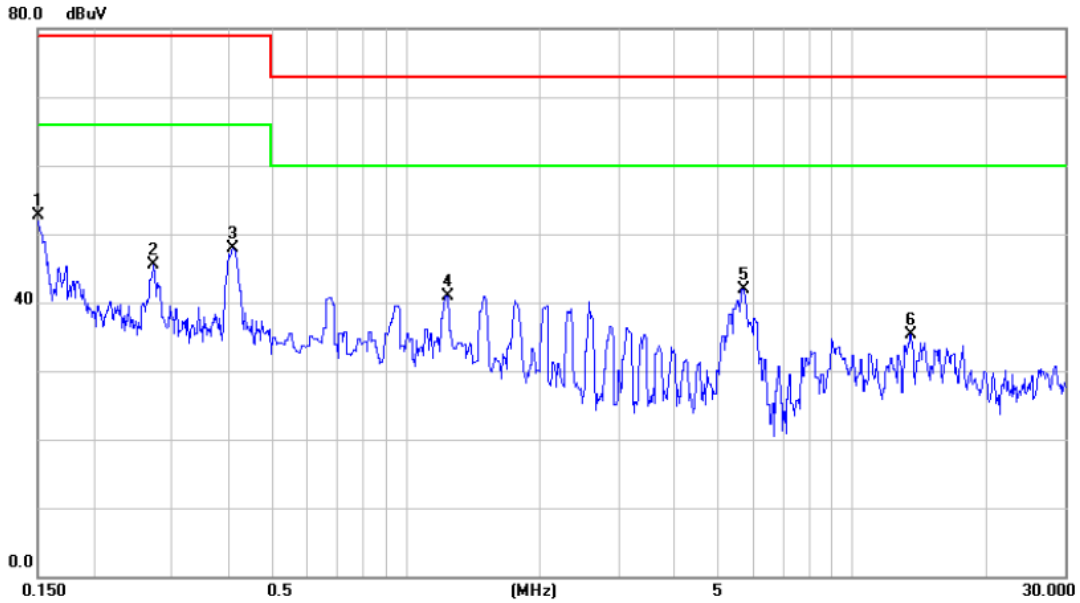




ATTACHMENT A - CONDUCTED EMISSION

Test Mode :	125 KHz Transmit

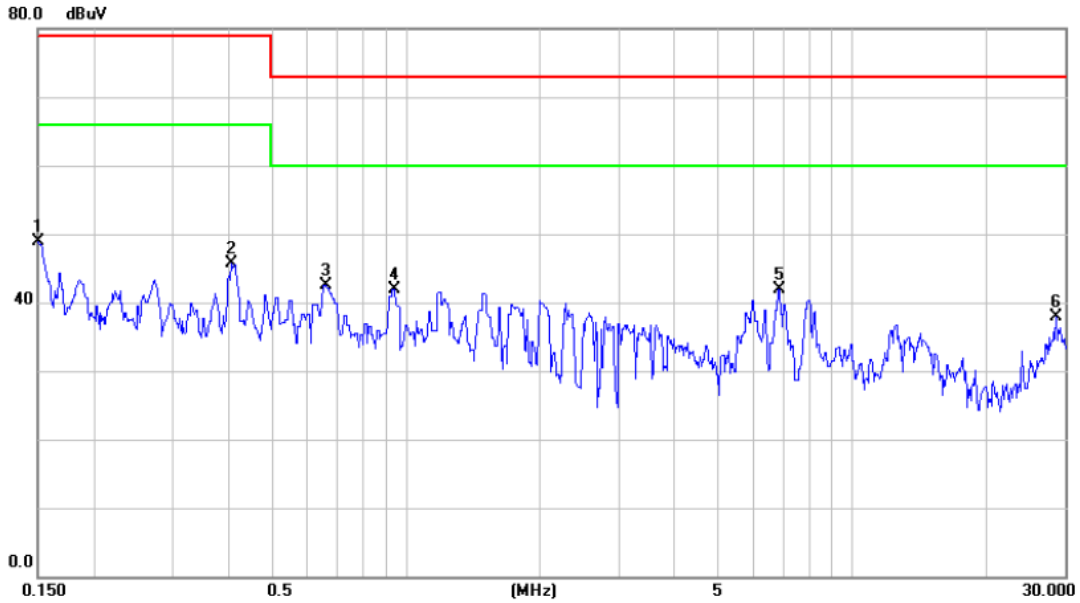
Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	42.98	9.72	52.70	79.00	-26.30	peak	
2		0.2711	35.73	9.71	45.44	79.00	-33.56	peak	
3		0.4104	38.09	9.72	47.81	79.00	-31.19	peak	
4		1.2380	31.16	9.76	40.92	73.00	-32.08	peak	
5		5.7000	31.97	9.94	41.91	73.00	-31.09	peak	
6		13.5000	25.37	9.93	35.30	73.00	-37.70	peak	

Test Mode :	125 KHz Transmit

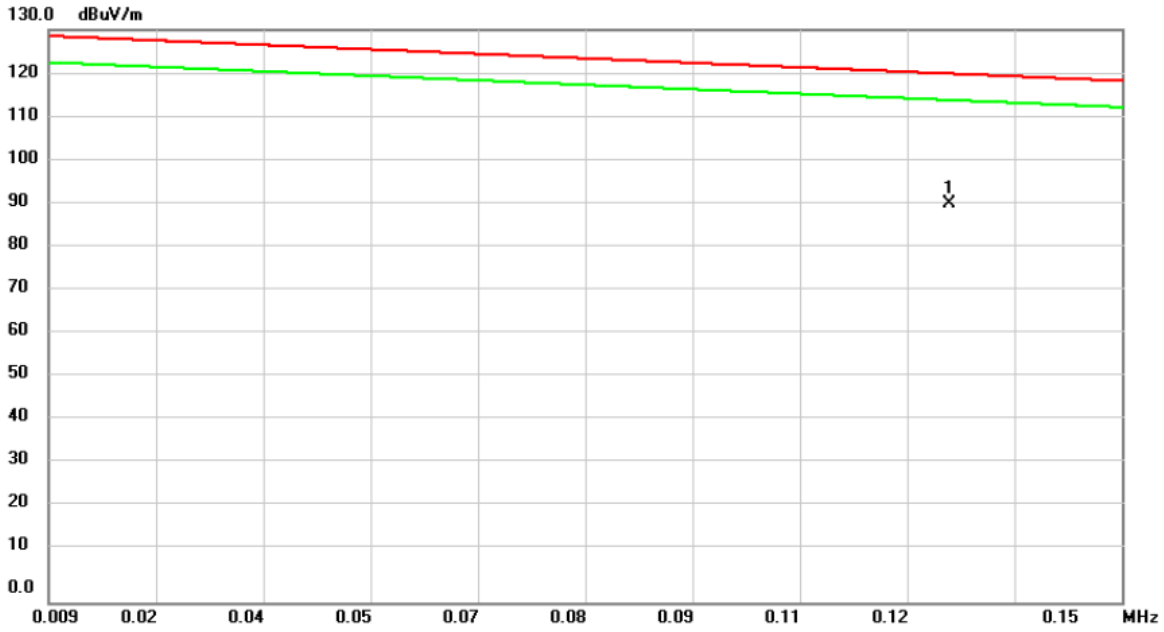
Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1507	39.04	9.77	48.81	79.00	-30.19	peak	
2		0.4061	35.98	9.77	45.75	79.00	-33.25	peak	
3		0.6620	32.69	9.79	42.48	73.00	-30.52	peak	
4		0.9410	32.12	9.81	41.93	73.00	-31.07	peak	
5		6.8500	31.78	10.03	41.81	73.00	-31.19	peak	
6		28.5500	27.79	10.13	37.92	73.00	-35.08	peak	

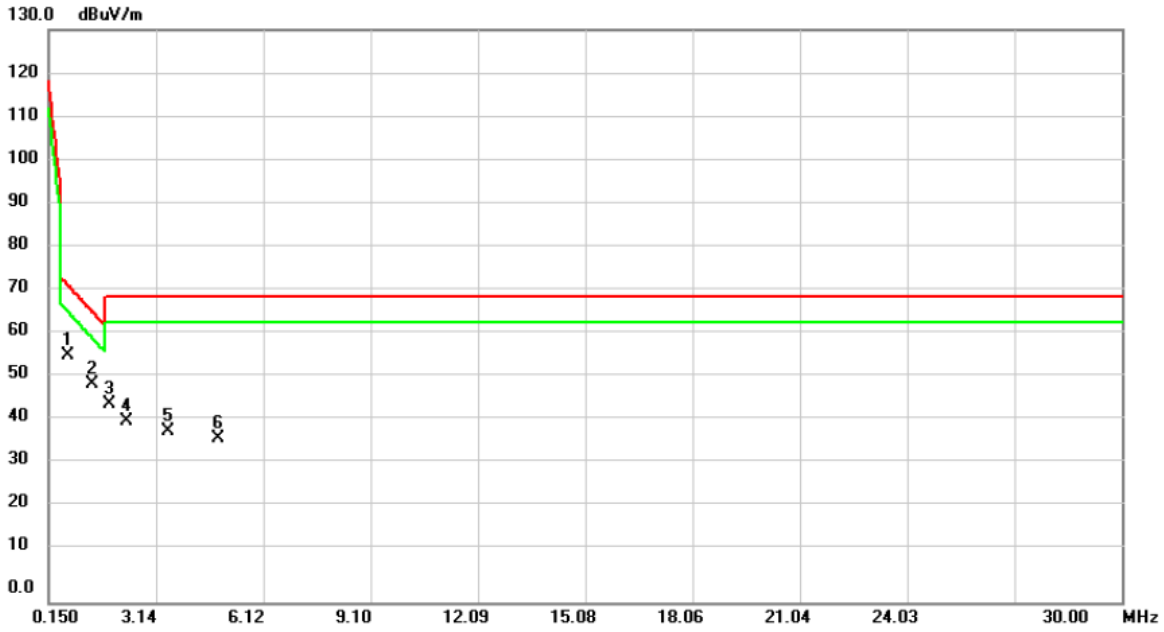
ATTACHMENT B - RADIATED EMISSION (9KHZ-30MHZ)

Test Mode:	13.56MHz Transmit - Open



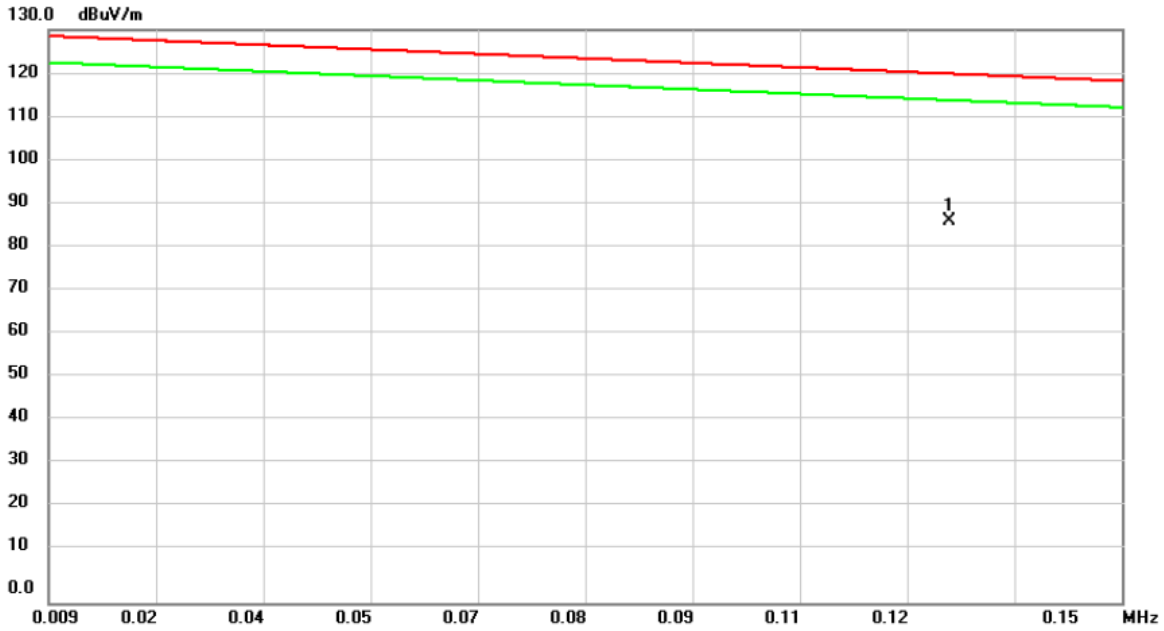
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.1273	78.51	12.06	90.57	119.98	-29.41	peak	

Test Mode:	13.56MHz Transmit - Open



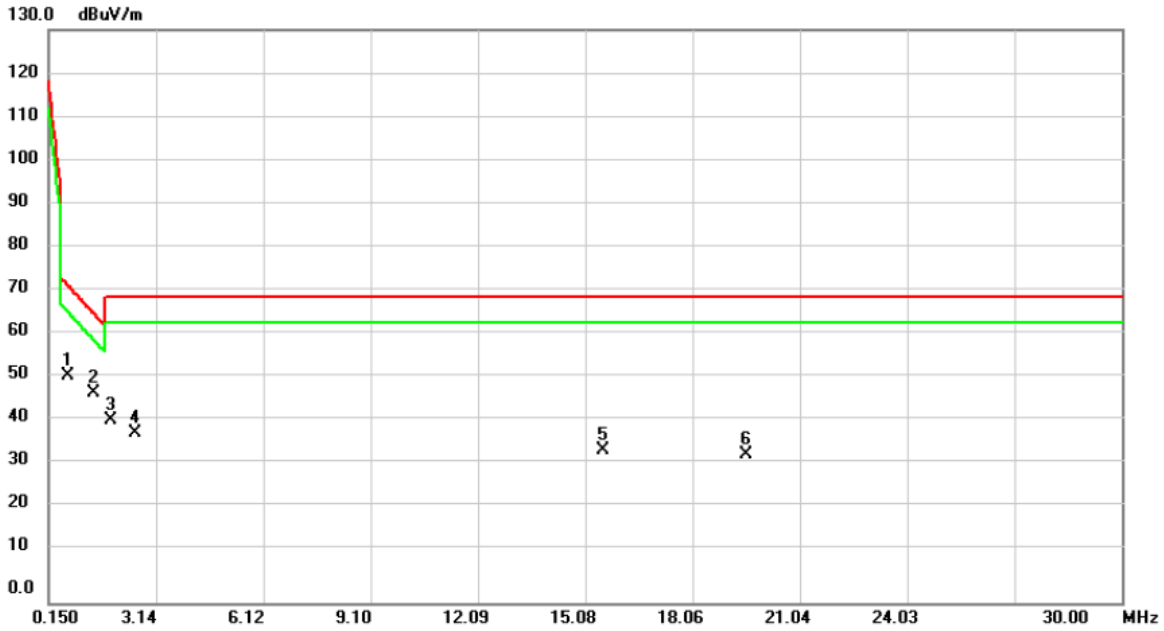
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.6873	44.20	11.87	56.07	72.04	-15.97	peak	
2		1.3740	37.66	11.83	49.49	65.92	-16.43	peak	
3		1.8515	33.27	11.62	44.89	69.54	-24.65	peak	
4		2.3291	29.56	11.40	40.96	69.54	-28.58	peak	
5		3.4634	27.61	11.17	38.78	69.54	-30.76	peak	
6		4.8663	25.95	11.38	37.33	69.54	-32.21	peak	

Test Mode:	13.56MHz Transmit - Close



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.1274	74.44	12.06	86.50	119.97	-33.47	peak	

Test Mode:	13.56MHz Transmit - Close

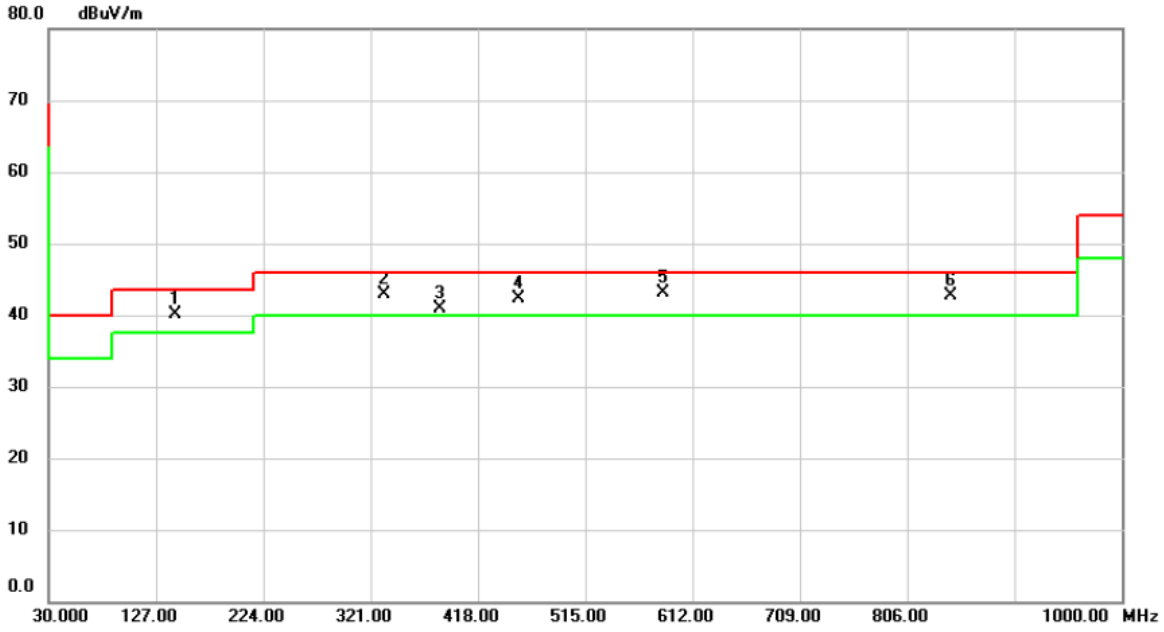


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.6873	39.63	11.87	51.50	72.04	-20.54	peak	
2	*	1.4037	35.94	11.82	47.76	65.65	-17.89	peak	
3		1.8813	29.99	11.60	41.59	69.54	-27.95	peak	
4		2.5678	27.24	11.29	38.53	69.54	-31.01	peak	
5		15.5824	23.47	11.13	34.60	69.54	-34.94	peak	
6		19.5525	22.71	11.01	33.72	69.54	-35.82	peak	

ATTACHMENT C - RADIATED EMISSION (30 MHz TO 1 GHz)

Test Voltage	AC 120V/60Hz
Test Mode	125 KHz Transmit

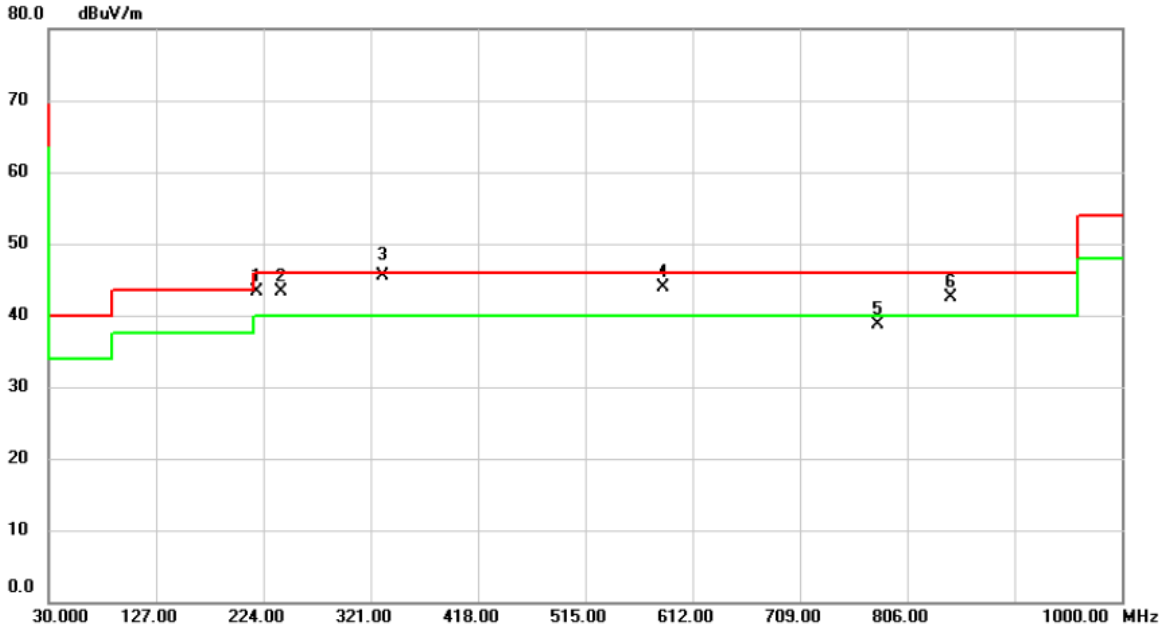
Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	!	144.4600	48.97	-8.90	40.07	43.50	-3.43	peak	
2	!	332.6400	49.83	-6.85	42.98	46.00	-3.02	peak	
3	!	384.0500	46.55	-5.59	40.96	46.00	-5.04	peak	
4	!	454.8600	46.05	-3.78	42.27	46.00	-3.73	peak	
5	*	584.8400	44.11	-1.01	43.10	46.00	-2.90	peak	
6	!	844.8000	39.68	3.05	42.73	46.00	-3.27	peak	

Test Voltage	AC 120V/60Hz
Test Mode	125 KHz Transmit

Polarization: Horizontal

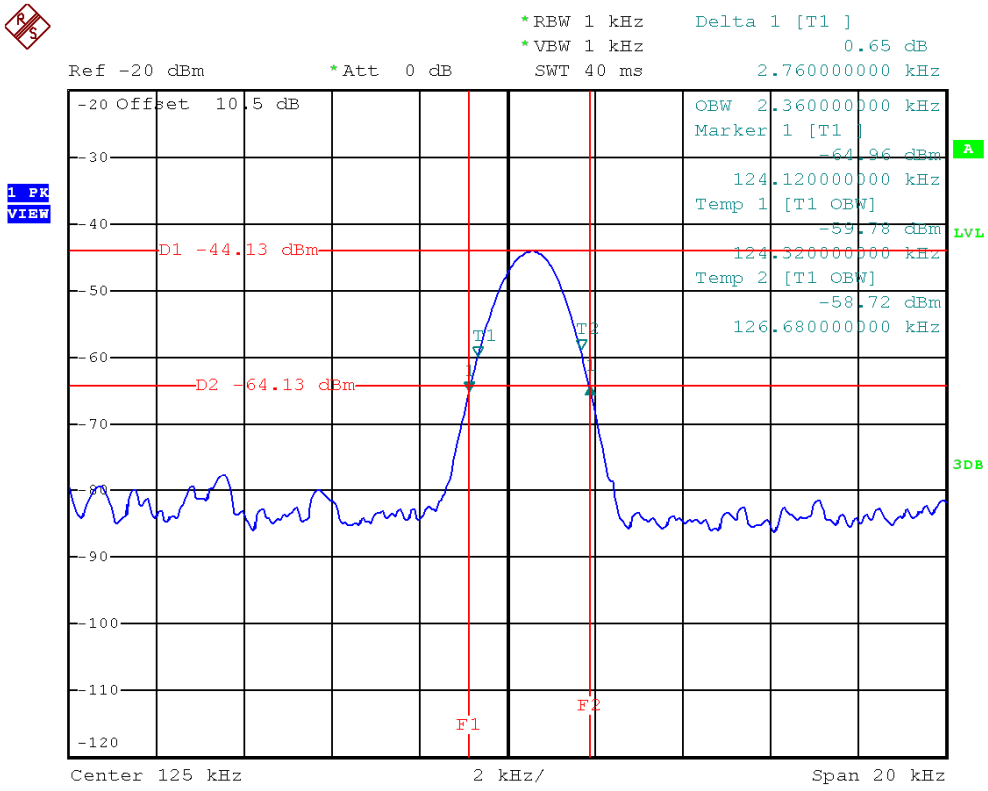


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	!	218.1800	54.40	-11.13	43.27	46.00	-2.73	peak	
2	!	240.4900	52.89	-9.68	43.21	46.00	-2.79	peak	
3	*	331.6700	52.36	-6.87	45.49	46.00	-0.51	QP	
4	!	584.8400	44.89	-1.01	43.88	46.00	-2.12	peak	
5		779.8100	36.49	2.21	38.70	46.00	-7.30	peak	
6	!	844.8000	39.39	3.05	42.44	46.00	-3.56	peak	

ATTACHMENT D - 20dB SPECTRUM BANDWIDTH MEASUREMENT

Test Mode : TX Mode			
Frequency (kHz)	20dB Bandwidth (kHz)	99% OBW (kHz)	Test Result
125.5000	2.76	2.36	Complies

TX CH 01



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