TIMCO ENGINEERING, Inc.

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FCC PART 15.249 & IC RSS-210

UNLICENSED INTENTIONAL RADIATOR

TEST REPORT

Applicant	**DIGITAL MONITORING PRODUCTS INC.**
Address	**2500 N. PARTNERSHIP BLVD.**
	SPRINGFIELD MISSOURI 65802 USA
FCC ID	**CCKPC0181**
IC Certification Number	**5251A-PC0181**
Model Number	XTLplus
Product Description	Control Panel
Date Sample Received	5/6/2016
Final Test Date	5/18/2016
Tested By	Cory Leverett
Approved By	Tim Royer

Report Number	Version Number	Description	Issue Date
760AUT16TestReport_	Rev1	Initial Issue	5/19/2016
	Rev2	Added test site reg# to page 3, Added Statement to radiated emissions on page 16 & 17	5/23/2016

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary
The device under test does:

☒ Fulfill the general approval requirements as identified in this test report and was selected by the customer.

☐ Not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669
IC Test Site Registration #: 2056A-3

Tested by: _____

Cory Leverett
Project Manager/Testing Technician

Date: 5/19/2016

Reviewed and approved by: _____

Tim Royer
Project Manager/Testing Technician
Date: 5/19/2016

GENERAL INFORMATION

EUT Specification

Regulatory Standards	FCC Title 47 CFR Part 15.249 IC RSS-210 Issue 8 A2.9 & RSS-GEN Issue 4		
FCC ID	**CCKPC0181**		
IC	**5251A-PC0181**		
Model	XTLplus		
EUT Description	Control Panel		
Modulation Types	Mode 1:GFSK 9.6 KBps (Z-Wave)		
	Mode 2: GFSK 40 KBps (Z-Wave)		
Operating Frequency	TX: 908.4 – 908.4 MHz	RX: 908.4 – 908.4 MHz	
EUT Power Source	☒ 110–120Vac/50– 60Hz		
	☐ DC Power		
	☐ Battery Operated Exclusively		
Test Item	☐ Prototype	☐ Pre-Production	☒ Production
Type of Equipment	☒ Fixed	☐ Mobile	☐ Portable
Antenna Connector	None (Temporary Connector Provided for Testing)		
Antenna	Fixed Wire Antenna		
Test Conditions	Temperature: 24-26ºC Relative humidity: 50-65%		
Measurement Standard	ANSI C63.10-2013 ANSI C63.4-2014 (Radiated Site Validation)		
Test Exercise	Engineering Software was used to enable the modes of operation, all modes of modulation were tested.		

Test Supporting Equipment

Device	Manufacturer	Model	S/N	Supplied By	Used For
NA					

RESULTS SUMMARY

FCC Rule Part No.	IC Standard Ref.	Requirement	Test Item	Result
2.1049	RSS-GEN 6.6	Occupied Bandwidth	99% Bandwidth	Pass
15.249(a)(c)	RSS-210 § A2.9(a)	Fundamental and Harmonics	Radiated Spurious Emissions	Pass
15.249(d)(e)	RSS-247 § 5.5	Spurious Emissions	Bandedge	Pass
			Radiated Spurious Emissions	Pass
15.207(a)	RSS-GEN § 8.8	AC Conducted Emissions	AC Powerline Conducted Emissions	Pass

Notes:

OCCUPIED BANDWIDTH

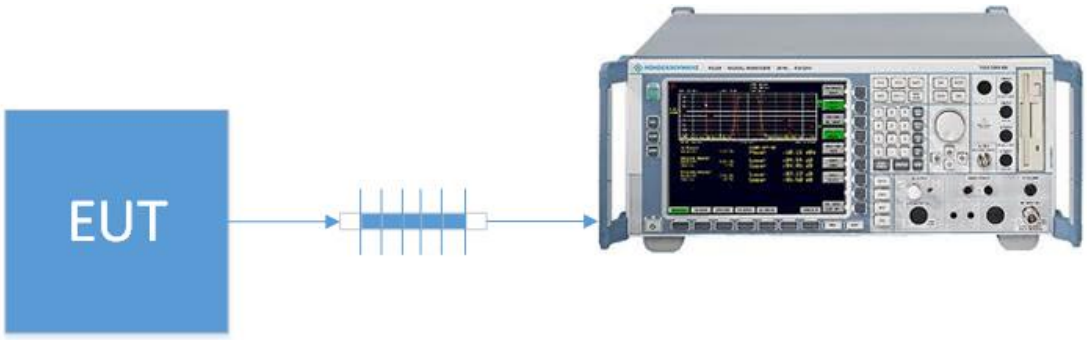
Rules Part No.: FCC 2.1049, IC RSS GEN § 6.6

FCC Requirements: Reporting only

IC Requirements: Reporting Only

Test Method: ANSI C63.10 § 6.9.3 Occupied bandwidth-99% procedure

Setup:



Test Data: **Mode 1 99% Occupied Bandwidth Measurement Table**

Tuned Frequency (MHz)	BW (KHz)
908.4	89.07

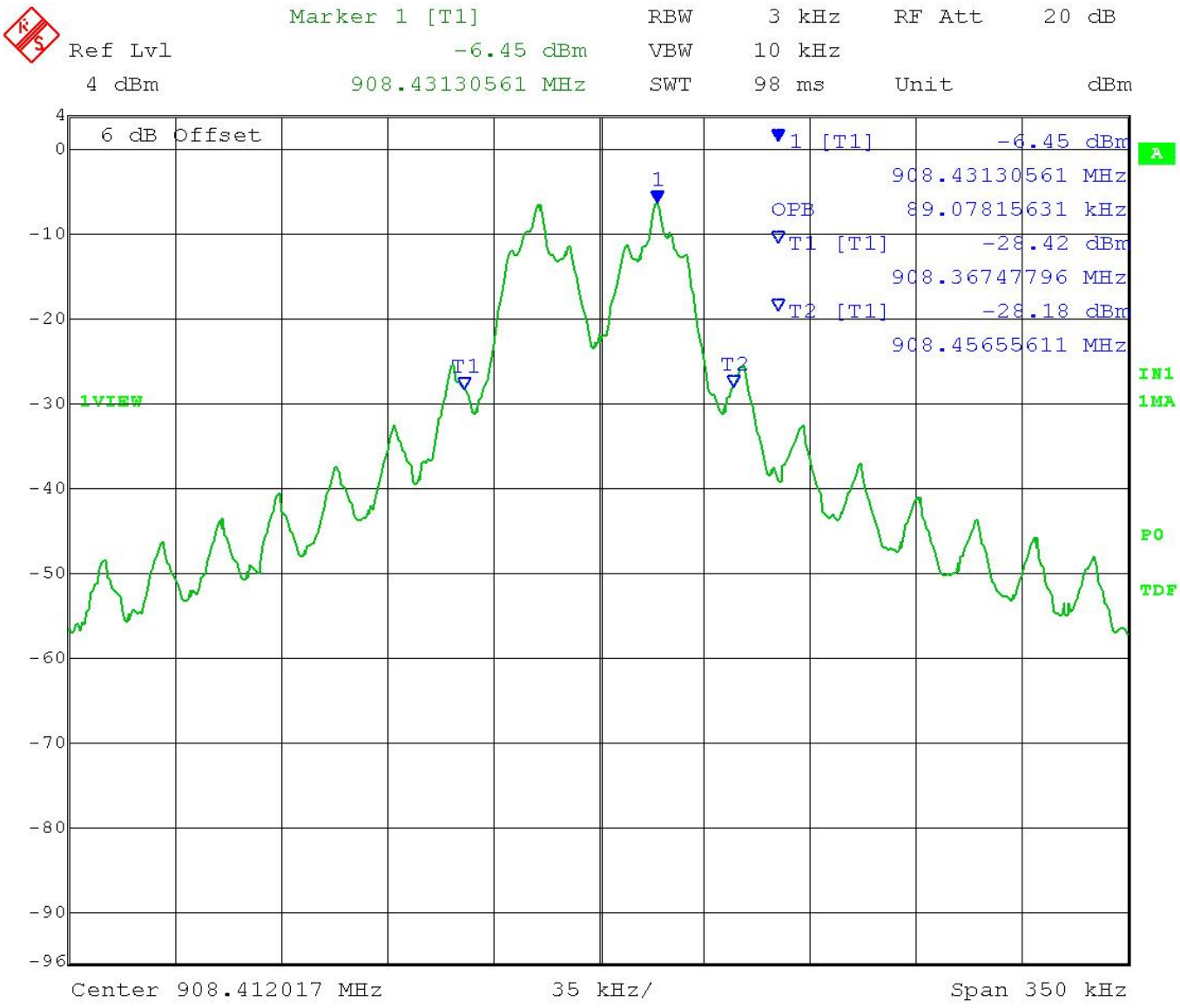
Test Data: **Mode 2 99% Occupied Bandwidth Measurement Table**

Tuned Frequency (MHz)	BW (KHz)
908.4	86.27

RESULTS: Meets Requirements

OCCUPIED BANDWIDTH

Test Data: **99% OBW Mode 1 Plot**

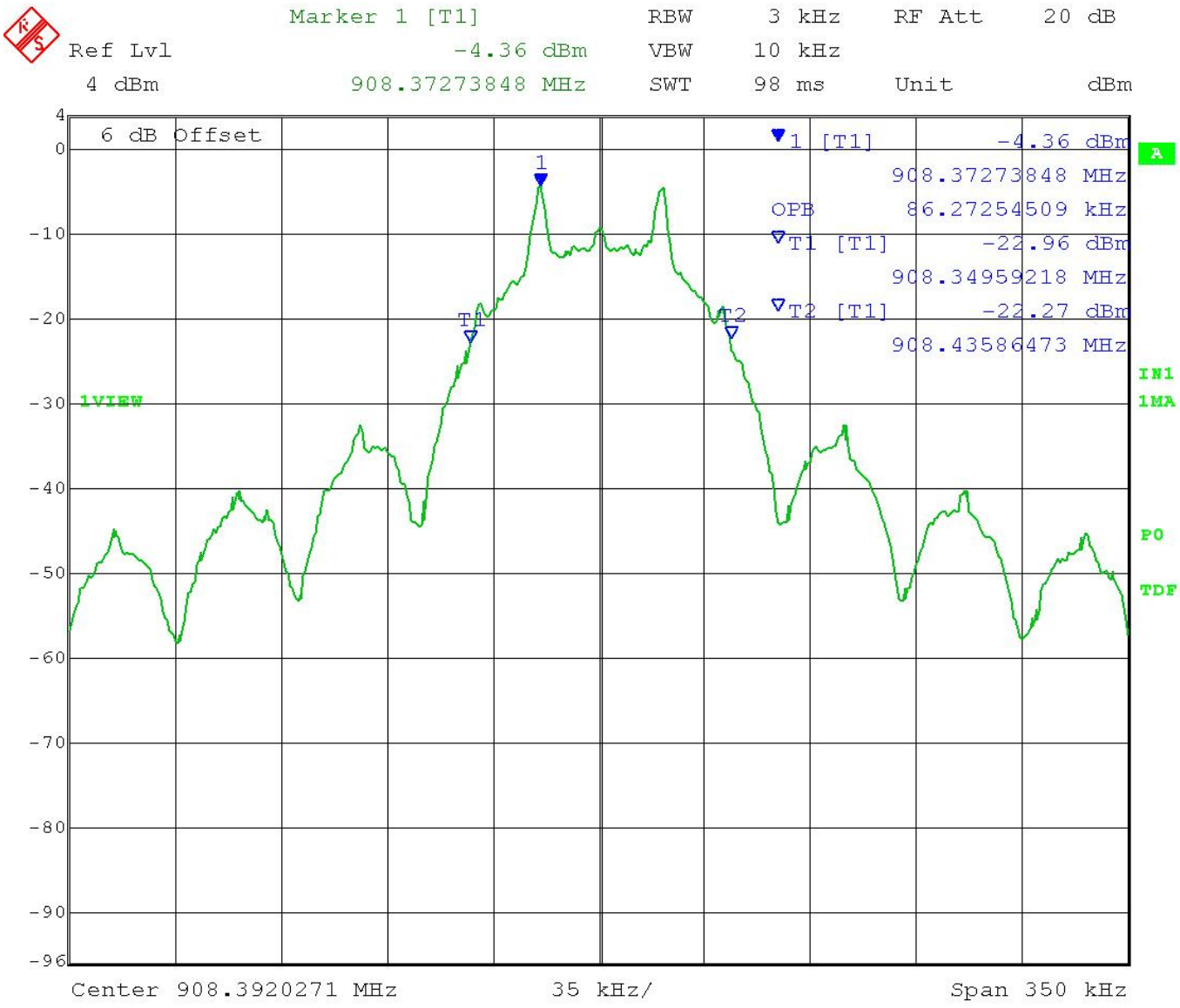


Date: 18.MAY.2016 09:08:11

RESULTS: Meets Requirements

OCCUPIED BANDWIDTH

Test Data: **99% OBW Mode 2 Plot**



Date: 18.MAY.2016 09:10:34

RESULTS: Meets Requirements

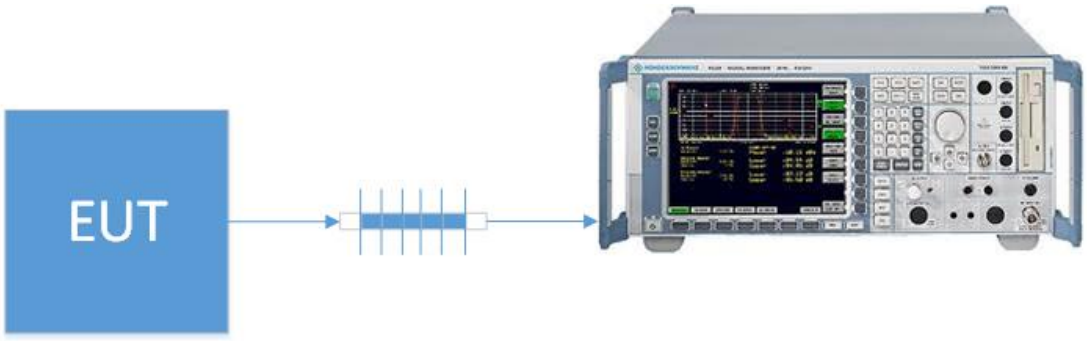
BANDEDGE

Rule Part No.: FCC 15.249(d), IC RSS 210 § A2.9(b)

Requirements: Emissions must be at least 50 dB down from the highest emission level Within the authorized band as measured with a 100 kHz RBW

Test Method: ANSI C63.10 § 6.10.4 Authorized band-edge relative method

Setup:



Test Data: **Mode 1 Bandedge Measurement Table**

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	908.4	-57.07	50	7.07
Upper	908.4	-61.14	50	11.14

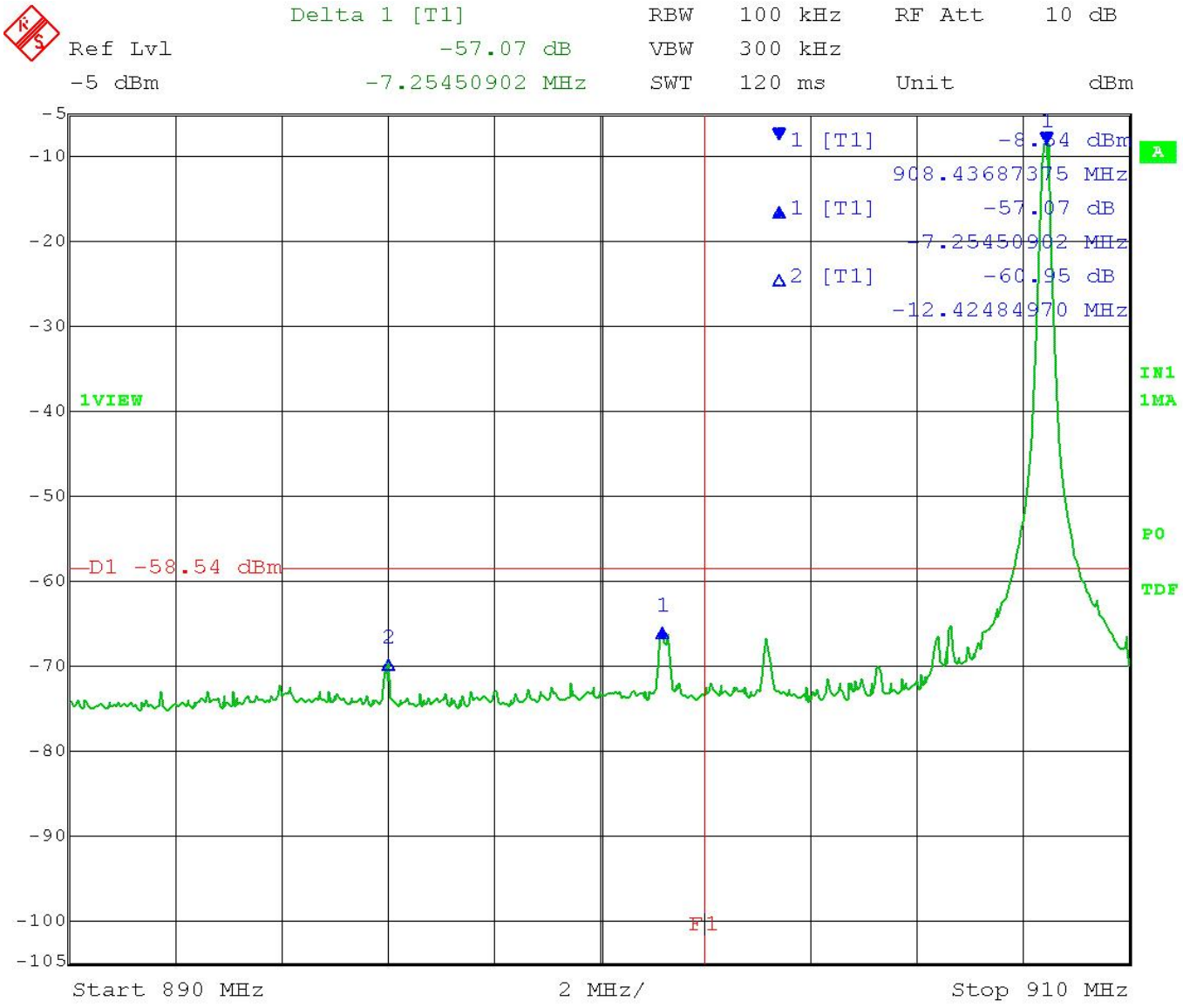
Test Data: **Mode 2 Bandedge Measurement Table**

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	908.4	-55.60	50	5.60
Upper	908.4	-60.37	50	10.37

Results Meet Requirements

BANDEDGE

Test Data: **Mode 1 Lower Band Edge Plot**

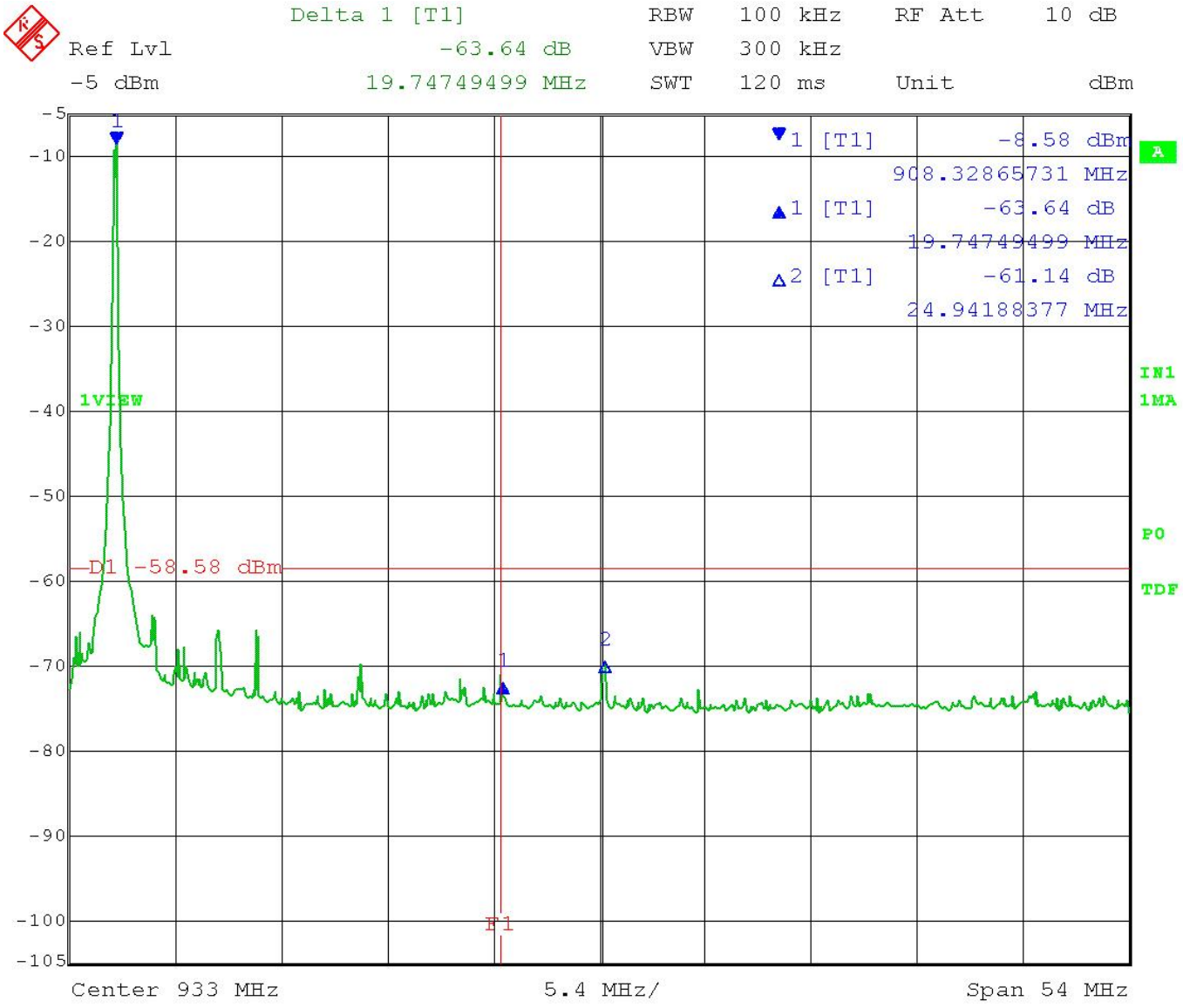


Date: 18.MAY.2016 08:57:17

RESULTS: Meets Requirements

BANDEDGE

Test Data: **Mode 1 Upper Band Edge Plot**

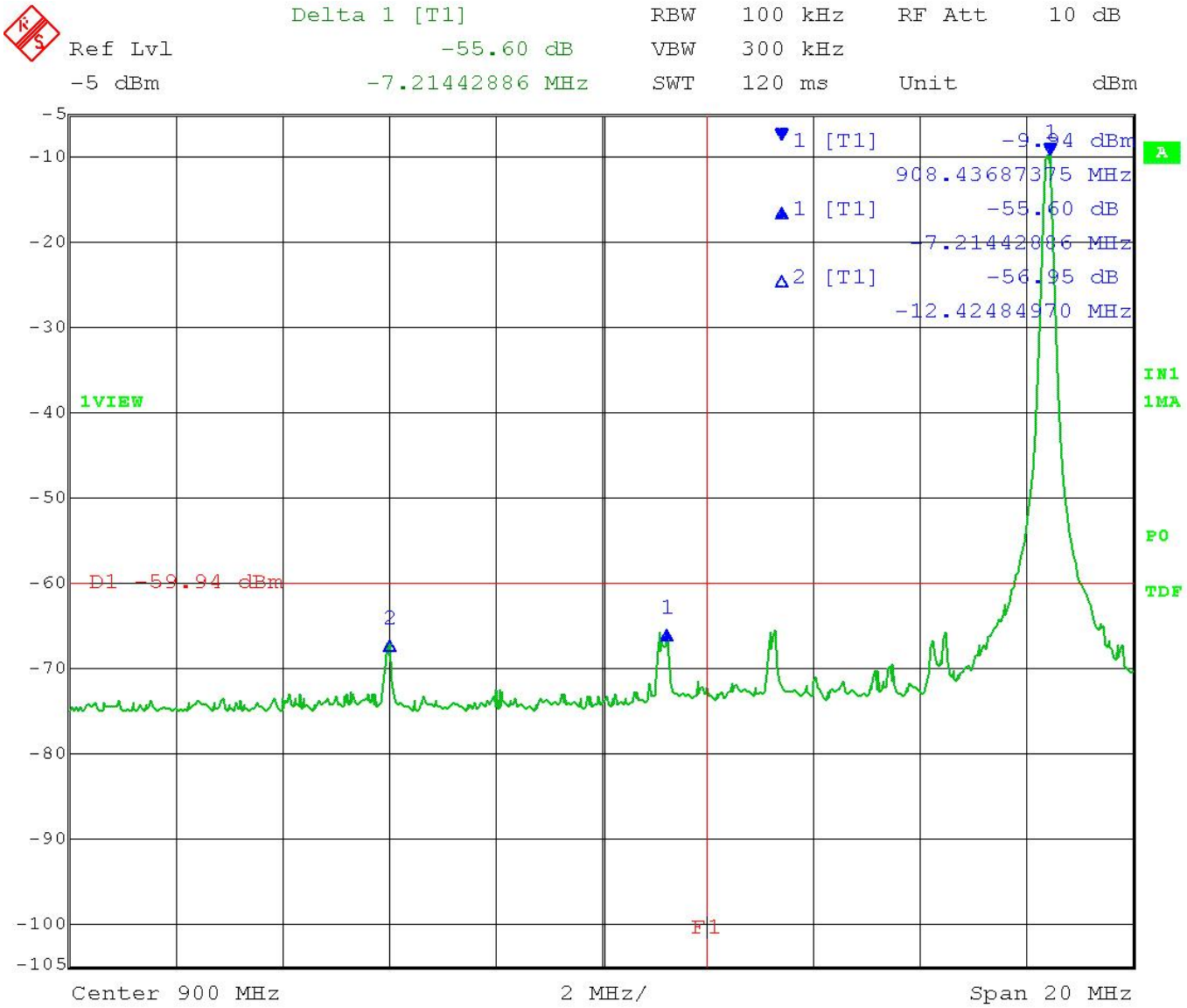


Date: 18.MAY.2016 09:03:16

RESULTS: Meets Requirements

BANDEDGE

Test Data: **Mode 2 Lower Band Edge Plot**

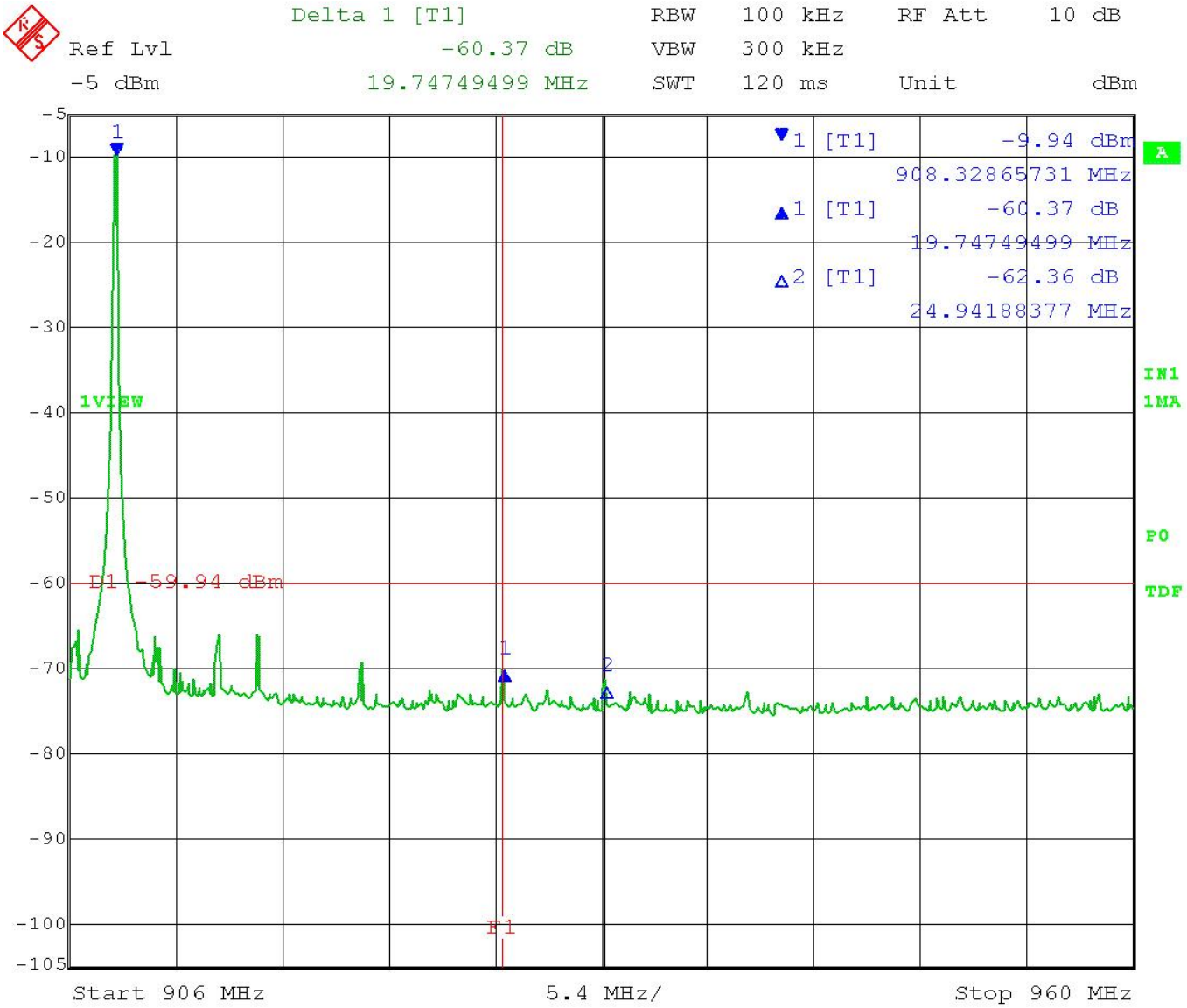


Date: 18.MAY.2016 08:59:35

RESULTS: Meets Requirements

BANDEDGE

Test Data: **Mode 2 Upper Band Edge Plot**



Date: 18.MAY.2016 09:01:40

RESULTS: Meets Requirements

RADIATED SPURIOUS EMISSIONS

Rules Part No.: FCC part 15.249 (d)(e), IC RSS 210 § A2.9(b)

Requirements: 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 50 dB below the fundamental output or to the limits of 15.209 whichever is lesser

FCC part 15.209 General Emission Limits

Frequency	Limits
FCC Part 15.209, IC RSS-GEN 8.9	
9 to 490 kHz	2400/F (kHz) µV/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) µV/m @ 30 meters
1705 kHz to 30 MHz	29.54 dBµV/m @ 30 meters
30 – 88	40.0 dBµV/m @ 3 meters
80 – 216	43.5 dBµV/m @ 3 meters
216 – 960	46.0 dBµV/m @ 3 meters
Above 960	54.0 dBµV/m @ 3 meters

Test Method: ANSI C63.4 § Annex D Validation of radiated emissions standard test sites
ANSI C63.10 § 6.3 Common requirements radiated emissions
ANSI C63.10 § 6.4 Emissions below 30 MHz
ANSI C63.10 § 6.5 Emissions between 30 & 1000 MHz
ANSI C63.10 § 6.6 Emissions above 1 GHz

Field Strength Calculation:

The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBµV) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

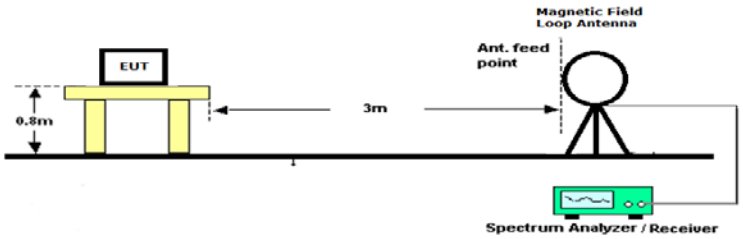
Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dBµV	+ 10.36 dB	+ 0.5 = 30.86 dBµV/m @ 3m

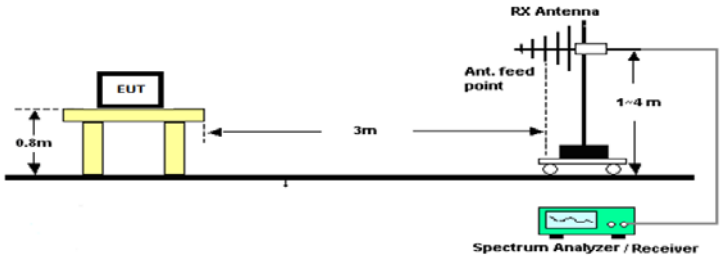
RADIATED SPURIOUS EMISSIONS

Setup:

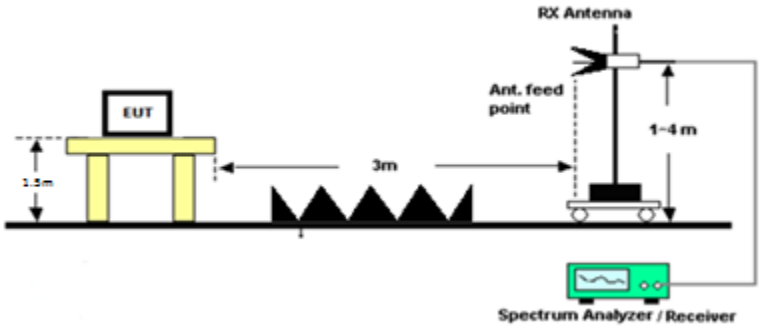
Emissions below 30 MHz



Emissions 30 – 1000 MHz



Emissions above 1 GHz



RADIATED SPURIOUS EMISSIONS

Notes: The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

The spectrum was measured from 9 KHz to 25 GHz, Only emissions within 20dB of the limit are reported.

***** Indicates noise floor only

Test Data: **Mode 1 Field Strength at 3 Meters Measurement Table**

Tuned Frequency (MHz)	Emission Frequency (MHz)	Detector (PK/QP/AV)	Meter Reading (dBuV)	Ant. Polarity (H/V)	Coax Loss (dB)	Correction Factor (dB)	Field Strength (dBuV/m)	Margin (dB)
908.40	64.00	PK	30.83	V	0.9	6.5	38.3	1.7
908.40	96.01	PK	19.74	V	1.2	11.0	31.9	11.6
908.40	109.33	PK	19.53	V	1.2	10.5	31.2	12.3
908.40	128.03	PK	22.88	V	1.3	12.5	36.7	6.8
908.40	224.00	PK	19.93	V	1.7	10.6	32.3	13.8
908.40	256.00	PK	22.72	V	1.9	12.3	36.9	9.1
908.40	259.33	PK	15.63	V	1.9	12.5	30.0	16.0
908.40	259.33	PK	15.63	V	1.9	12.5	30.0	16.0
908.40	384.00	PK	13.26	V	2.2	14.7	30.2	15.8
908.40	908.40	QP	65.81	H	3.5	22.0	91.3	2.7
908.40	1816.8 *	PK	13.63	H	4.9	30.7	49.3	24.7
908.40	1816.8 *	AV	1.67	H	4.9	30.7	37.3	16.7
908.40	2725.20	PK	17.46	V	6.1	32.6	56.1	17.9
908.40	2725.20	AV	8.66	H	6.1	32.6	47.3	6.7
908.40	3633.6 *	PK	13.41	V	7.0	33.6	54.0	20.0
908.40	3633.6 *	AV	-0.85	V	7.0	33.6	39.7	14.3

Results Meet Requirements

RADIATED SPURIOUS EMISSIONS

Notes: The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

The spectrum was measured from 9 KHz to 25 GHz, Only emissions within 20dB of the limit are reported.

***** Indicates noise floor only

Test Data: **Mode 2 Field Strength at 3 Meters Measurement Table**

Tuned Frequency (MHz)	Emission Frequency (MHz)	Detector (PK/QP/AV)	Meter Reading (dBuV)	Ant. Polarity (H/V)	Coax Loss (dB)	Correction Factor (dB)	Field Strength (dBuV/m)	Margin (dB)
908.40	36.53	PK	15.14	V	0.7	13.1	28.9	11.1
908.40	73.63	PK	21.08	V	1.0	6.8	28.9	11.1
908.40	80.00	PK	25.60	V	1.1	8.5	35.2	4.8
908.40	128.03	PK	17.17	V	1.3	12.5	31.0	9.0
908.40	320.00	PK	16.31	H	2.1	13.6	32.0	14.0
908.40	416.00	PK	11.89	V	2.3	15.9	30.1	15.9
908.40	908.40	QP	64.81	H	3.5	22.0	90.3	3.7
908.40	1816.80 *	PK	13.60	H	4.9	30.7	49.3	24.7
908.40	1816.80 *	AV	2.47	H	4.9	30.7	38.1	15.9
908.40	2725.20	PK	17.52	V	6.1	32.6	56.1	17.9
908.40	2725.20	AV	8.50	H	6.1	32.6	47.1	6.9
908.40	3633.60 *	PK	13.36	H	7.0	33.6	53.9	20.1
908.40	3633.60 *	AV	-0.64	H	7.0	33.6	39.9	14.1

Results Meet Requirements

AC POWER LINE CONDUCTED EMISSIONS

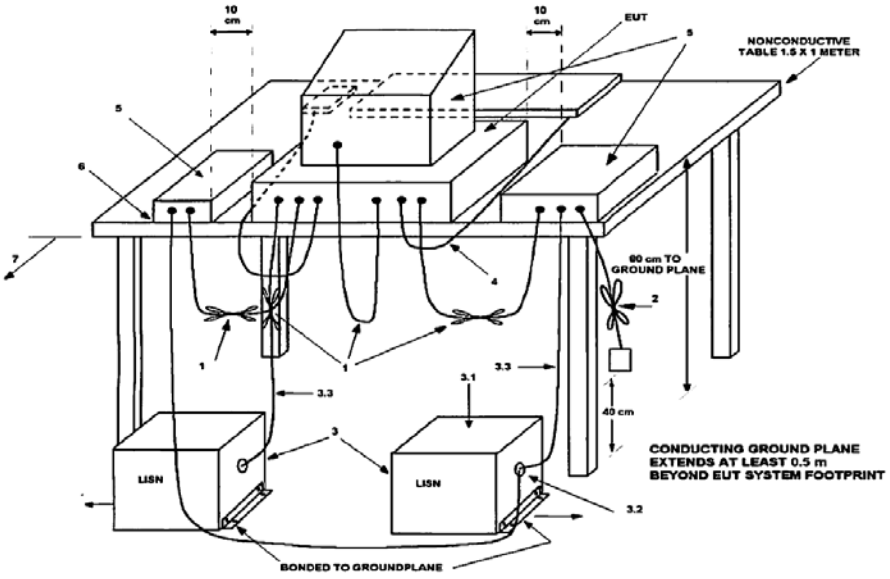
Rules Part No.: FCC 15.207(a), IC RSS Gen § 8.8

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBµV)	Average Limits (dBµV)
0.15 – 0.5	66 – 56 *	56 – 46 *
0.5 – 5.0	56	46
5.0 – 30	60	50
* Decrease with logarithm of frequency		

Test Method: ANSI C63.10 § 6.2 Test Method for AC power-line conducted emissions

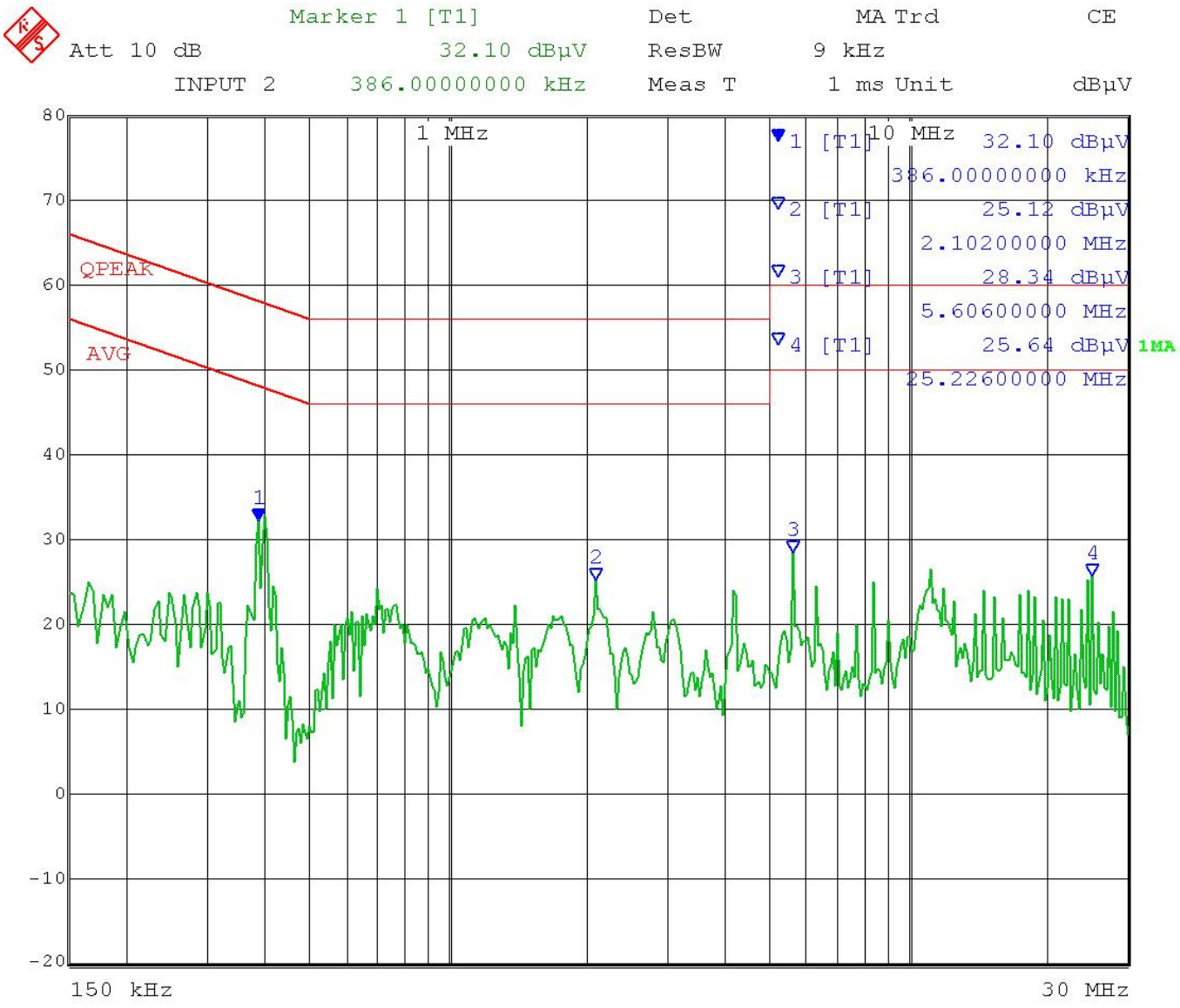
Setup:



AC POWER LINE CONDUCTED EMISSIONS

Notes: The following plots represent the emissions read for power line Conducted. Both lines were observed.

Test Data: Mode 1 Powerline 1 Peak Plot

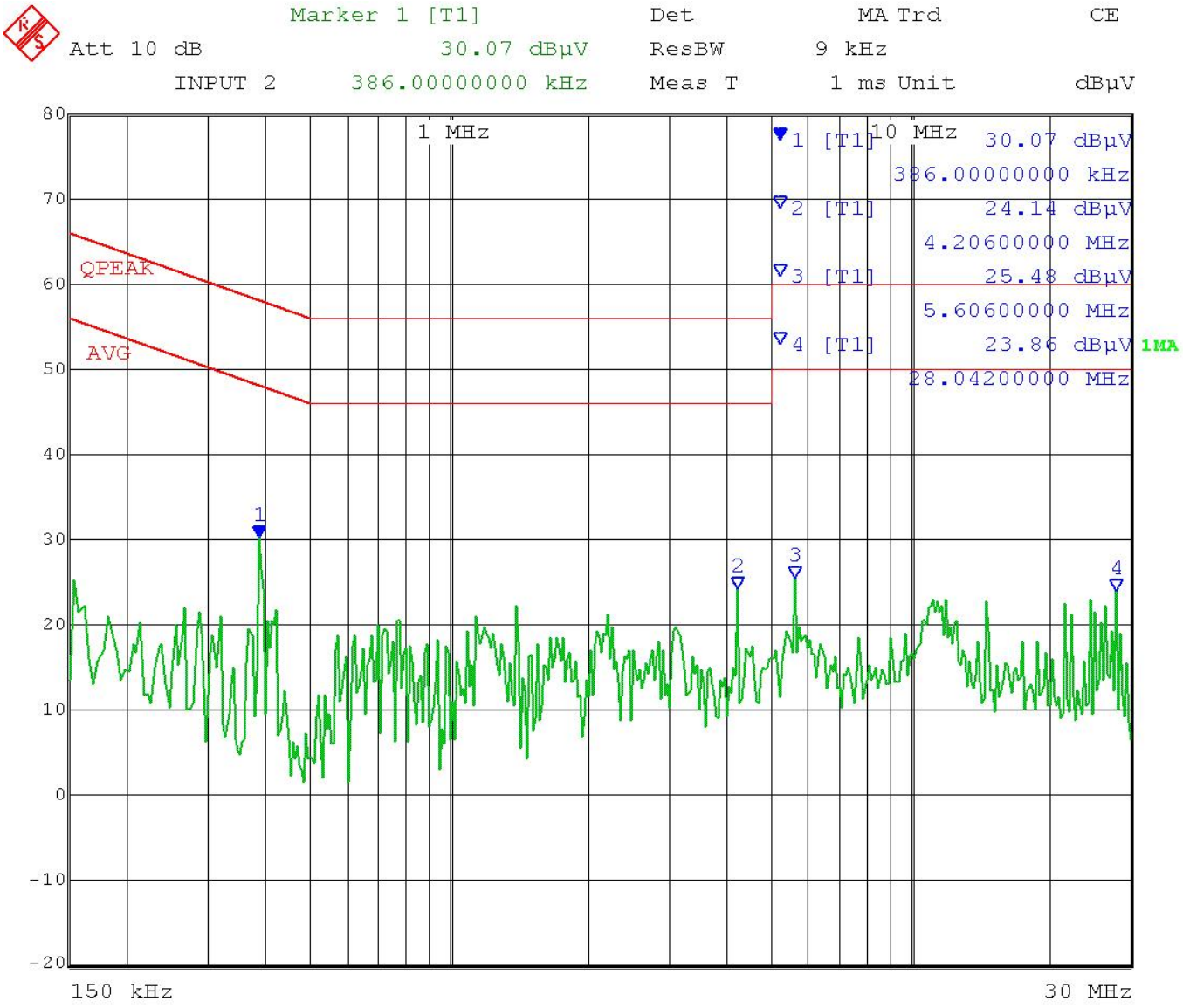


Date: 18.MAY.2016 11:15:09

RESULTS: Meets Requirements

AC POWER LINE CONDUCTED EMISSIONS

Test Data: Mode 1 Powerline 2 Peak Plot



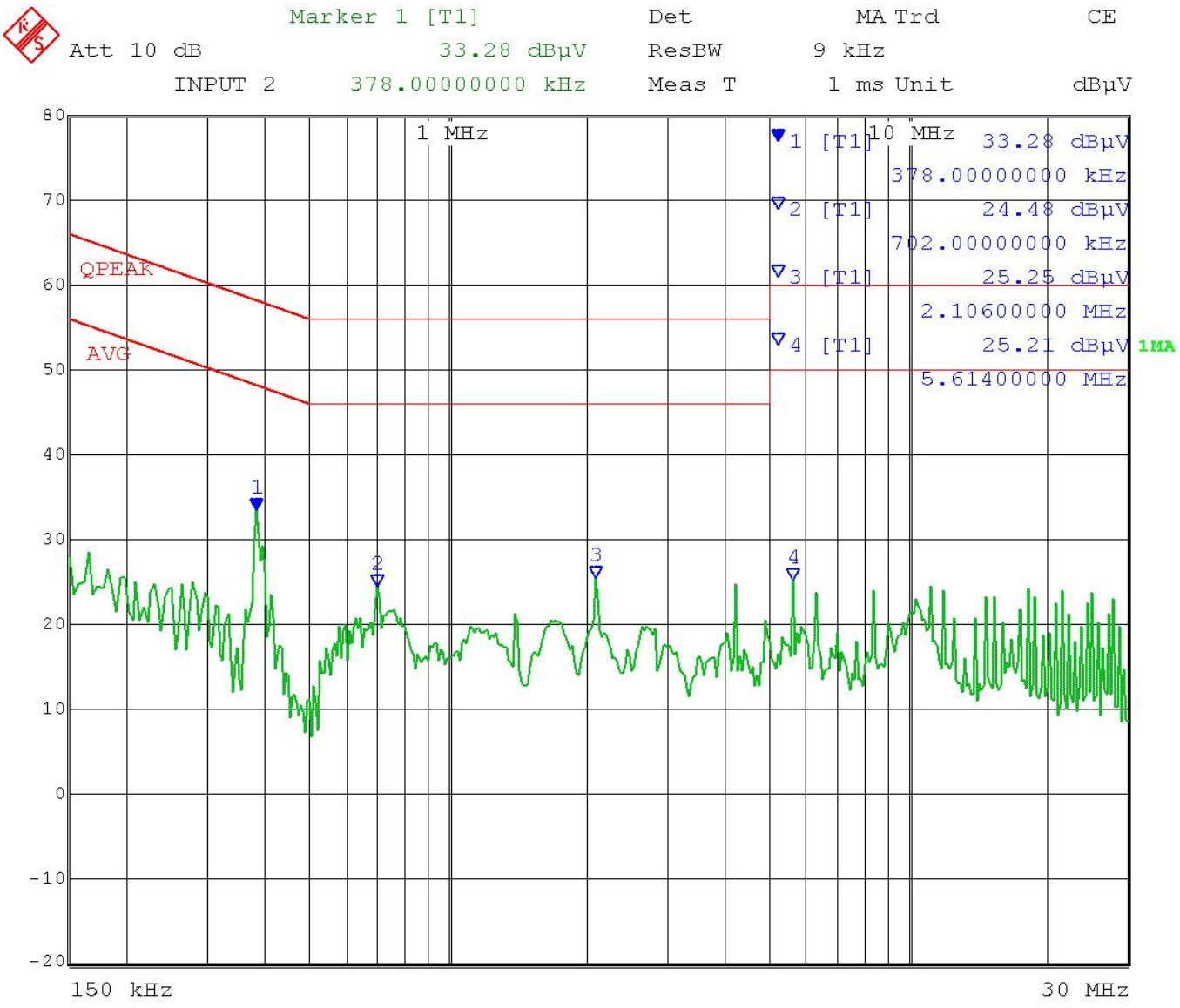
Date: 18.MAY.2016 11:06:54

RESULTS: Meets Requirements

AC POWER LINE CONDUCTED EMISSIONS

Notes: The following plots represent the emissions read for power line Conducted. Both lines were observed.

Test Data: Mode 2 Powerline 1 Peak Plot

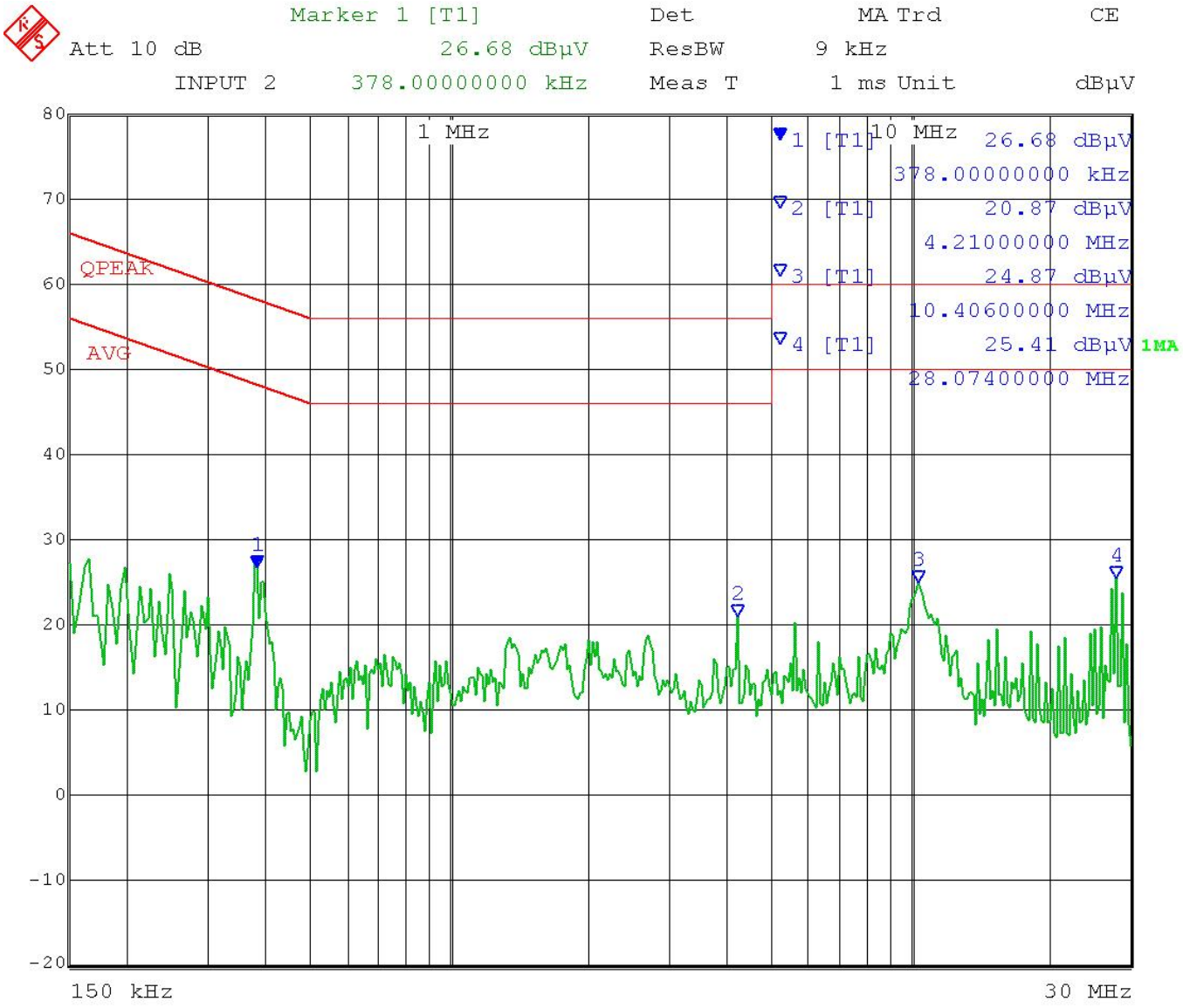


Date: 18.MAY.2016 11:03:15

RESULTS: Meets Requirements

AC POWER LINE CONDUCTED EMISSIONS

Test Data: Mode 2 Powerline 2 Peak Plot



Date: 18.MAY.2016 11:05:32

RESULTS: Meets Requirements

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconnical 1096	Eaton	94455-1	1096	07/14/15	07/14/17
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/14/15	07/14/17
LISN (Primary)	Electro-Metrics	EM-7820	2682	05/08/15	05/08/17
CHAMBER	Panashield	3M	N/A	01/05/16	12/31/17
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren Chamber	3117	00041534	02/25/15	02/25/17
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/12/14	08/12/16
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
Antenna: Active Loop	ETS-Lindgren	6502	00062529	11/18/15	11/18/17
Coaxial Cable #103 - K MS MS 180cm Aqua	Micro-Coax	UFB142A-0-0720-200200	225363-002 (#103)	08/05/15	08/05/17
Attenuator #27 - K 6dB 2W DC-40	Narda	4768-6	1044-3 (#27)	06/25/15	06/25/17
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable for LISN	TIMCO LISN	17	NO	01/05/16	01/04/17
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax		Chamber 3 cable set (Primary) .	12/05/15	12/05/17

***EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT