



EMC TEST REPORT for Licensed Device

No. SH11070245-002

Applicant : JTECH Communications, Inc.
6413 Congress Avenue Suite 150, Boca Raton, Florida,
United States 33487

Manufacturer : GES Information Technology Co., Ltd.
668 Li Shi Zhen Road, Zhangjiang Hi-Tech Park,
Shanghai, 201203, China

Product Name : IntelFlex™ Controller

Type/Model : Base Station

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 90 (2010): Private Land Mobile Radio Service

TIA/EIA-603-C (2004): Land Mobile FM or PM – Communications Equipment –
Measurement and performance Standards

RSS-Gen Issue 3 (December 2010): General Requirements and Information for the
Certification of Radiocommunication Equipment

RSS-119 Issue 10 (April 2010): Land Mobile and Fixed Radio Transmitters and Receivers
Operating in the Frequency Range 27.41-960 MHz

47CFR Part 15 (2010): Radio Frequency Devices

ANSI C63.4 (2003): American National Standard for Methods of Measurement
of Radio-Noise Emissions from Low-Voltage Electrical and Electronic
Equipment in the Range of 9 kHz to 40 GHz

Date of issue: Aug 24, 2011

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FCC ID: HLG- INTELFLEXBS
IC: 3065A- INTELFLEXBS

Description of Test Facility

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Content

SUMMARY	1
DESCRIPTION OF TEST FACILITY.....	2
1. GENERAL INFORMATION	5
1.1 Applicant Information.....	5
1.2 Identification of the EUT	5
1.3 Technical specification.....	6
1.4 Mode of operation during the test / Test peripherals used	6
2. TEST SPECIFICATION	7
2.1 Instrument list.....	7
2.2 Test Standard.....	7
3. TRANSMITTER CARRIER OUTPUT POWER.....	9
3.1 Limit	9
3.2 Test Configuration	9
3.3 Test Procedure and test setup.....	9
3.4 Test Protocol	10
4. TRANSMITTER OCCUPIED BANDWIDTH.....	14
4.1 Test limit.....	14
4.2 Test Configuration	15
4.3 Test procedure and test setup.....	15
4.4 Test protocol.....	16
5. TRANSMITTER CONDUCTED EMISSIONS MASKS	19
5.1 Test limit.....	19
5.2 Test Configuration	19
5.3 Test procedure and test setup.....	19
5.4 Test Protocol	20
6. TRANSMITTER CONDUCTED EMISSIONS (OUT OF BAND).....	24
6.1 Test limit.....	24
6.2 Test Configuration	24
6.3 Test procedure and test setup.....	24
6.4 Test protocol.....	25
7. TRANSMITTER RADIATED EMISSIONS (OUT OF BAND).....	33
7.1 Limit	33
7.2 Test Configuration	33
7.3 Test procedure and test setup.....	34
7.4 Test protocol.....	34
8. TRANSMITTER FREQUENCY STABILITY (TEMPERATURE VARIATION)	35
8.1 Test limit.....	35
8.2 Test Configuration	35
8.3 Test procedure and test setup.....	35
8.4 Test protocol.....	36
9. TRANSMITTER FREQUENCY STABILITY (VOLTAGE VARIATION)	37
9.1 Test limit.....	37
9.2 Test Configuration	37
9.3 Test procedure and test setup.....	37
9.4 Test protocol.....	38



10. TRANSMITTER TRANSIENT FREQUENCY BEHAVIOR	39
10.1 Test limit	39
10.2 Test Configuration	39
10.3 Test procedure and test setup	39
10.4 Test protocol	40
11. MAINS CONDUCTED EMISSIONS	41
11.1 Limit	41
11.2 Test configuration	41
11.3 Test procedure and test set up	42
11.4 Test protocol	42
12. SPURIOUS EMISSION FOR RECEIVER	43
12.1 Test limit	43
12.2 Test Configuration	43
12.3 Test procedure and test setup	44
12.4 Test protocol	44



1. General Information

1.1 Applicant Information

Applicant: JTECH Communications, Inc.
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Manufacturer: GES Information Technology Co., Ltd.
668 Li Shi Zhen Road, Zhangjiang Hi-Tech Park,
Shanghai, 201203, China

Sample received date : May 25, 2011

Date of test : May 25, 2011 ~ July 25, 2011

1.2 Identification of the EUT

Equipment: IntelFlex™ Controller

Type/model: Base Station

FCC ID: HLG-INTELFLEXBS

IC: 3065A-INTELFLEXBS



1.3 Technical specification

Operation Frequency Band: 430 - 470MHz
Type of Unit: Base Station
Modulation: FSK
Gain of Antenna: 2.0dBi max. (Namely -0.15dBd max.)
Rating: DC 13.5V, 2.4A powered by AC/DC Adapter: input 100-240V AC, 1.0A, 50-60Hz
Description of EUT: Here is one model only.

Power Output:

Power level	Power output (W)	Power output (dBm)	Tolerance
1	0.1	20	±1.5dB
2	0.4	26	±1.5dB
3	0.8	29	±1.5dB
4	1.4	31.5	±0.1W
5	2.0	33.0	±0.1W

Channel separation: 25 kHz
Channel Description: The lowest channel is 445.900MHz and the highest one is 469.650MHz.

Port identification:

Port	Description	Type / Length
1	USB	USB2.0, 1m
2	RRS232	RJ45, 2m
3	TELCO	RJ11, 2m
4	Contact	1m
5	RF antenna	50ohm BNC

1.4 Mode of operation during the test / Test peripherals used

The EUT was set up as its normal use.



2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESIB 26	R&S	EC 3045	2010-10-22	2011-10-21
A.M.N.	ESH2-Z5	R&S	EC 3119	2011-1-10	2012-1-9
A.M.N.	ESH3-Z5	R&S	EC 2109	2011-1-10	2012-1-9
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2011-5-16	2012-5-15
Horn antenna	HF 906	R&S	EC 3049	2011-5-13	2012-5-12
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2010-9-18	2011-9-17
Signal generator	SMR 20	R&S	EC 3044-1	2010-8-17	2011-8-16
Semi-anechoic chamber	-	Albatross project	EC 3048	2011-5-21	2012-5-20
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2011-2-8	2012-2-7
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2011-2-8	2012-2-7
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2011-2-8	2012-2-7
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2011-2-8	2012-2-7
Power sensor / Power meter	N1911A/N1921A	Agilent	EC4318	2011-04-11	2012-04-10
Test Receiver	ESCI 7	R&S	EC4501	2010-12-24	2011-12-23
Oscilloscope	DPO 4504	Tektronix	EC 3515	2011-1-18	2012-1-17
Power Divider	RVZ-800.6612.52	R&S	EC3557	2011-5-10	2012-5-9
Modulation Meter	8220	Boonton	/	2011-5-10	2012-5-9

2.2 Test Standard

47CFR Part 90 (2010)
TIA/EIA-603-C (2004)
RSS-Gen Issue 3 (December 2010)
RSS-119 Issue 10 (April 2010)
47CFR Part 15 (2009)
ANSIC63.4 (2003)



2.3 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Transmitter Carrier Output Power	90.267	RSS-119 Clause 5.4	Pass
Transmitter Occupied Bandwidth	90.209	RSS-119 Clause 5.5	Pass
Transmitter Conducted Emissions Masks	90.210 (d) Mask D	RSS-119 Clause 5.5	Pass
Transmitter Conducted Emissions (Out of Band) (9kHz to 5GHz)	90.210	RSS-119 Clause 5.8	Pass
Transmitter Radiated Emissions (Out of Band) (30MHz to 5GHz)	90.210	RSS-119 Clause 5.8	Pass
Transmitter Frequency Stability (Temperature Variation)	90.213	RSS-119 Clause 5.3	Pass
Transmitter Frequency Stability (Voltage Variation)	90.213	RSS-119 Clause 5.3	Pass
Transmitter Transient Frequency Behaviour	Part 90.214	RSS-119 Clause 5.9	Pass
Mains Conducted Emissions	15.107	RSS-Gen Clause 7.2.4	Pass
Receiver Radiated Spurious Emissions	15.109	RSS-119 Clause 5.11	Pass

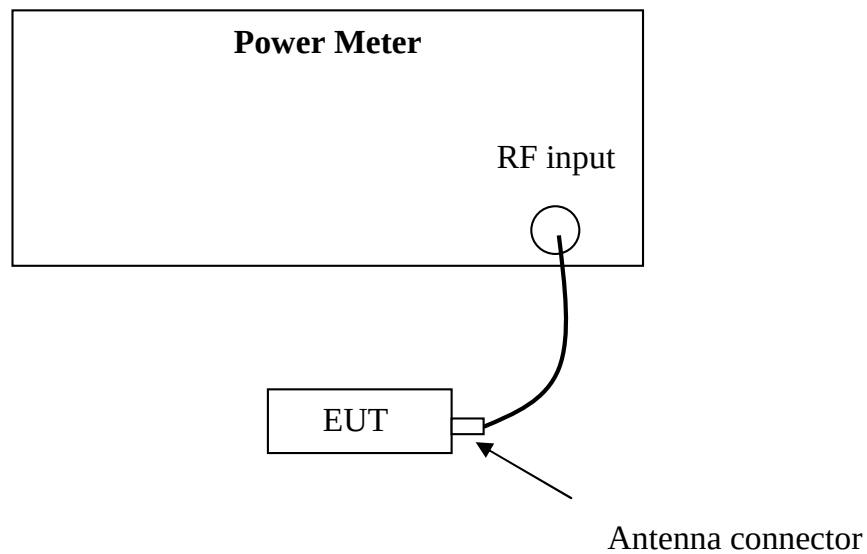
3. Transmitter Carrier Output Power

Test result: PASS

3.1 Limit

Maximum ERP is dependent upon the station's antenna HAAT and required service area.

3.2 Test Configuration



3.3 Test Procedure and test setup

Test procedure is followed as TIA-603-C 2.2.1.

3.4 Test Protocol

Temperature : 22°C
Relative Humidity : 43 %

Power level	CH	Reading of power meter (dBm)	Attenuation (dB)	Conducted power (dBm)
5	L	13.09	20	33.09
	M	13.06		33.06
	H	13.14		33.14
1	L	0.57		20.57
	M	-0.03		19.97
	H	-0.49		19.51

Note: Conducted power = Reading of power meter + Attenuation

Level 5, Channel L



Level 5, Channel M



Level 5, Channel H



Level 1, Channel L



Level 1, Channel M



Level 1, Channel H



Power level	CH	Conducted power (dBm)	Gain of antenna (dBd)	ERP (dBm)
5	L	33.09	-0.15	32.94
	M	33.06		32.91
	H	33.14		32.99
1	L	20.57		20.42
	M	19.97		19.82
	H	19.51		19.36

Note: ERP = Conducted power + Gain of antenna

4. Transmitter Occupied Bandwidth

Test result: Pass

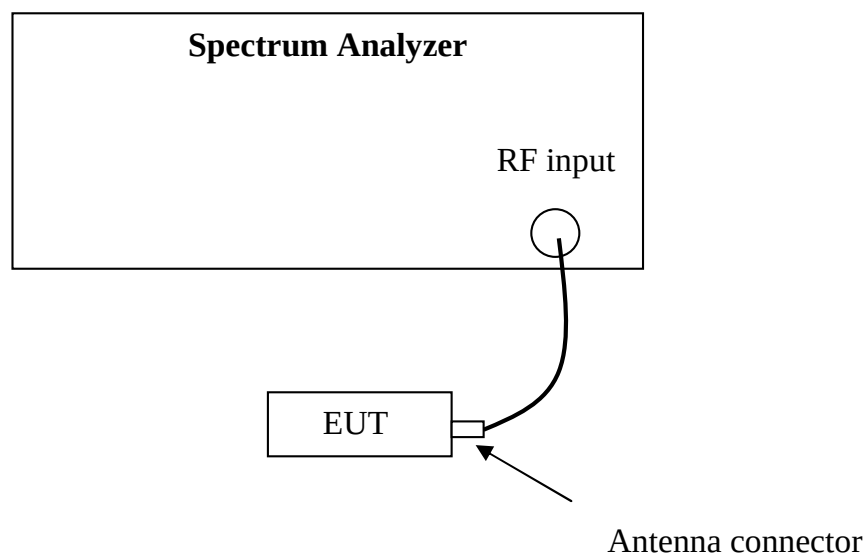
4.1 Test limit

Frequency band (MHz)	Channel Spacing (kHz)	Authorized Bandwidth (kHz)
Below 25 ²	/	/
25-50	20	20
72-76	20	20
150-174	¹ 7.5	^{1,3} 20/11.25/6
216-220 ⁵	6.25	20/11.25/6
220-222	5	4
406-512 ²	¹ 6.25	^{1,3} 20/11.25/6
806-809 / 851-854	12.5	20
809-824 / 854-869	25	20
896-901 / 935-940	12.5	13.6
902-928 ⁴	/	/
929-930	25	20
1427-1432 ⁵	12.5	12.5
³ 2450-2483.5 ²	12.5	12.5
Above 2500 ²	12.5	12.5

1. For stations authorized on or after August 18, 1995.
2. Bandwidths for radiolocation stations in the 420–450 MHz band and for stations operating in bands subject to this footnote will be reviewed and authorized on a case-by-case basis.
3. Operations using equipment designed to operate with a 25kHz channel bandwidth will be authorized a 20 kHz bandwidth. Operations using equipment designed to operate with a 12.5 kHz channel bandwidth will be authorized a 11.25 kHz bandwidth. Operations using equipment designed to operate with a 6.25 kHz channel bandwidth will be authorized a 6 kHz bandwidth. All stations must operate on channels with a bandwidth of 12.5 kHz or less beginning January 1, 2013, unless the operations meet the efficiency standard of § 90.203(j)(3).
4. The maximum authorized bandwidth shall be 12 MHz for non-multilateration LMS operations in the band 909.75–921.75 MHz and 2 MHz in the band 902.00–904.00 MHz. The maximum authorized bandwidth for multilateration LMS

operations shall be 5.75 MHz in the 904.00–909.75 MHz band; 2MHz in the 919.75–921.75 MHz band; 5.75 MHz in the 921.75–927.25 MHz band and its associated 927.25–927.50MHz narrowband forward link; and 8.00 MHz if the 919.75–921.75 MHz and 921.75–927.25 MHz bands and their associated 927.25–927.50 MHz and 927.50–927.75 MHz narrowband forward links are aggregated.
5. See § 90.259.

4.2 Test Configuration



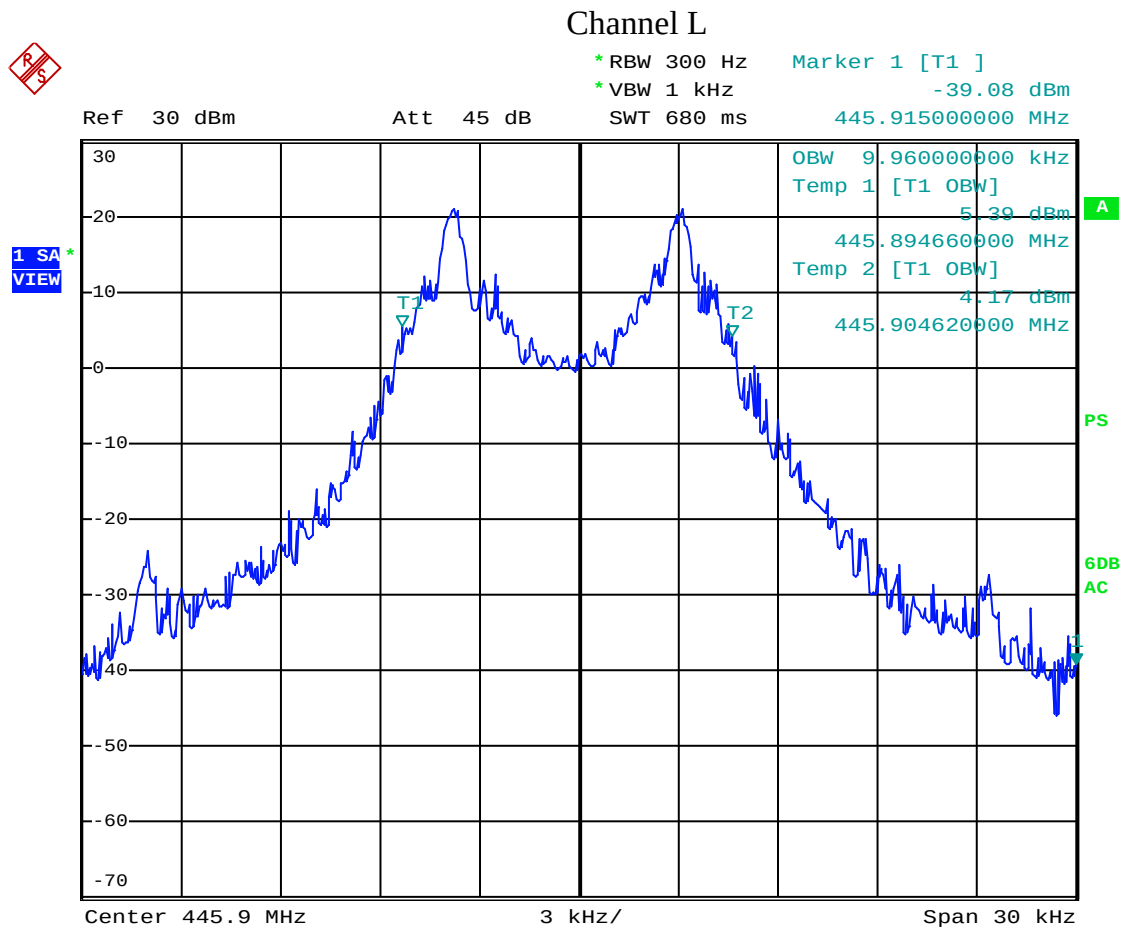
4.3 Test procedure and test setup

Tested for 99% bandwidth with Channel Power Function of Spectrum Analyzer.

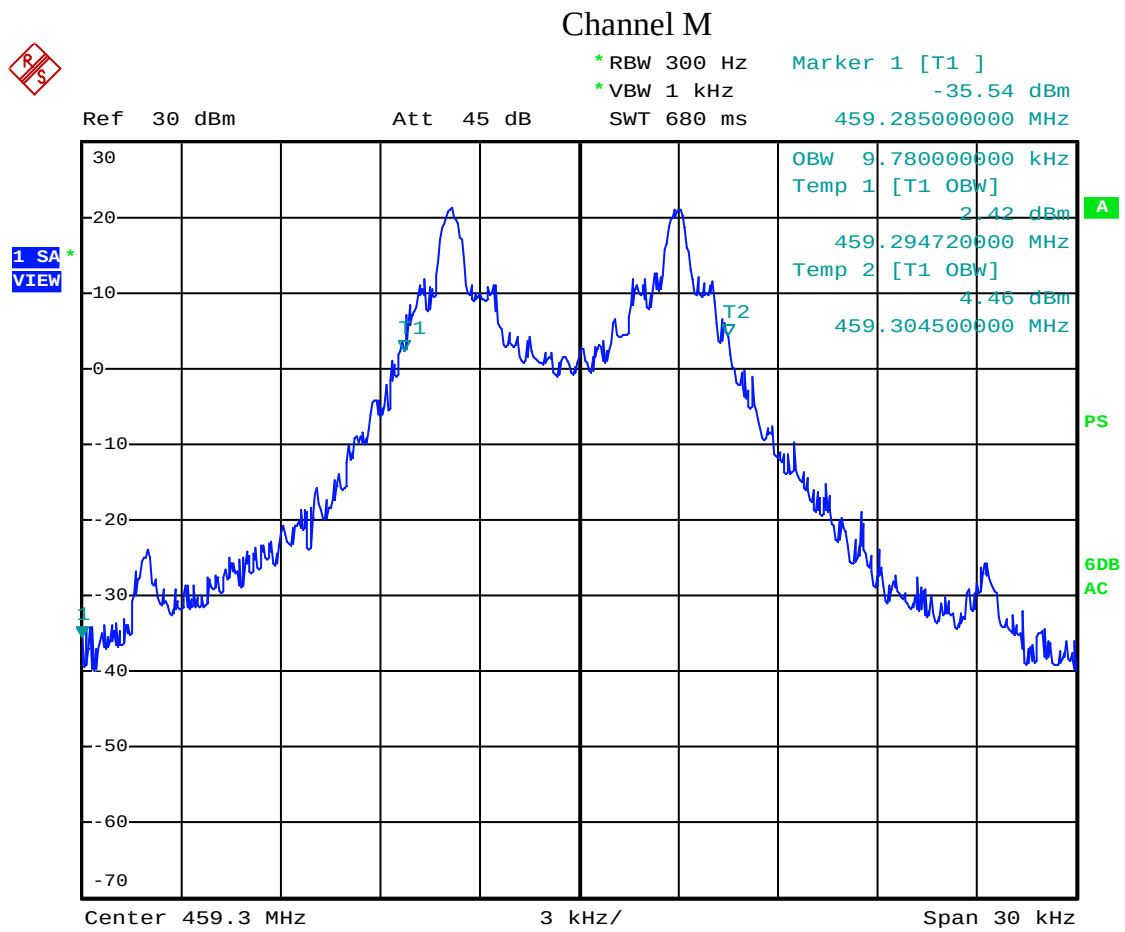
4.4 Test protocol

Temperature : 22 °C
Relative Humidity : 43 %

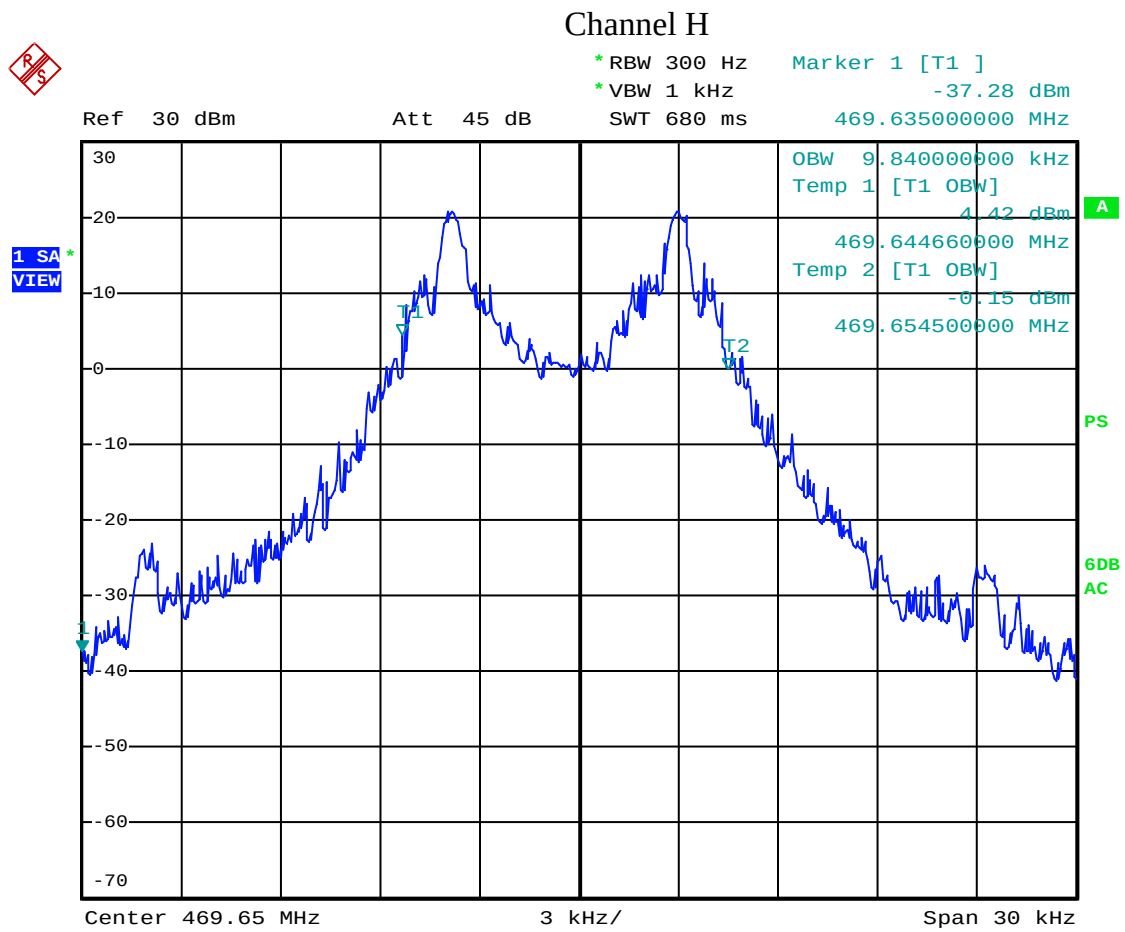
Power level	CH	Occupied Bandwidth (kHz)	Limit (kHz)
5	L	9.96	≤11.25
	M	9.78	≤11.25
	H	9.84	≤11.25



Date: 27.MAY.2011 15:08:08



Date: 27.MAY.2011 15:16:41



Date: 27.MAY.2011 15:18:48

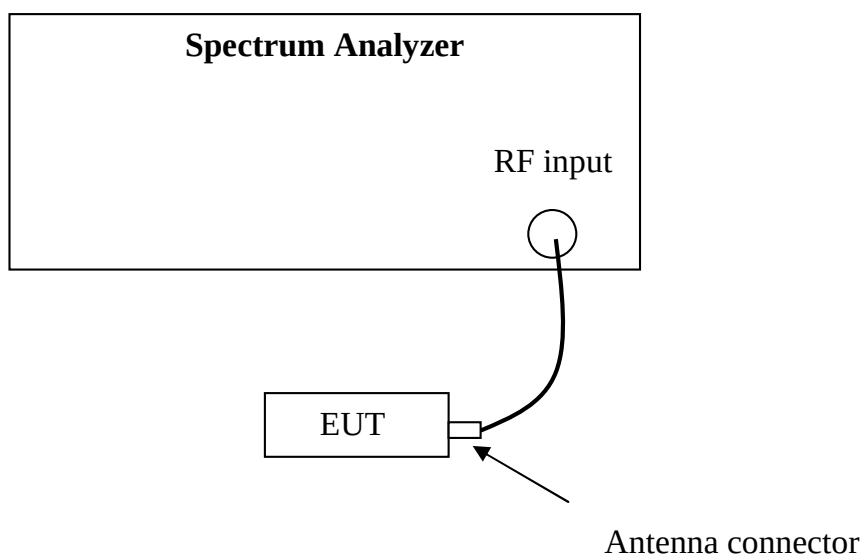
5. Transmitter Conducted Emissions Masks

Test result: Pass

5.1 Test limit

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows: (1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : Zero dB. (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB. (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is the lesser attenuation.

5.2 Test Configuration



5.3 Test procedure and test setup

Test procedure as per TIA-603-C Section 2.2.13.

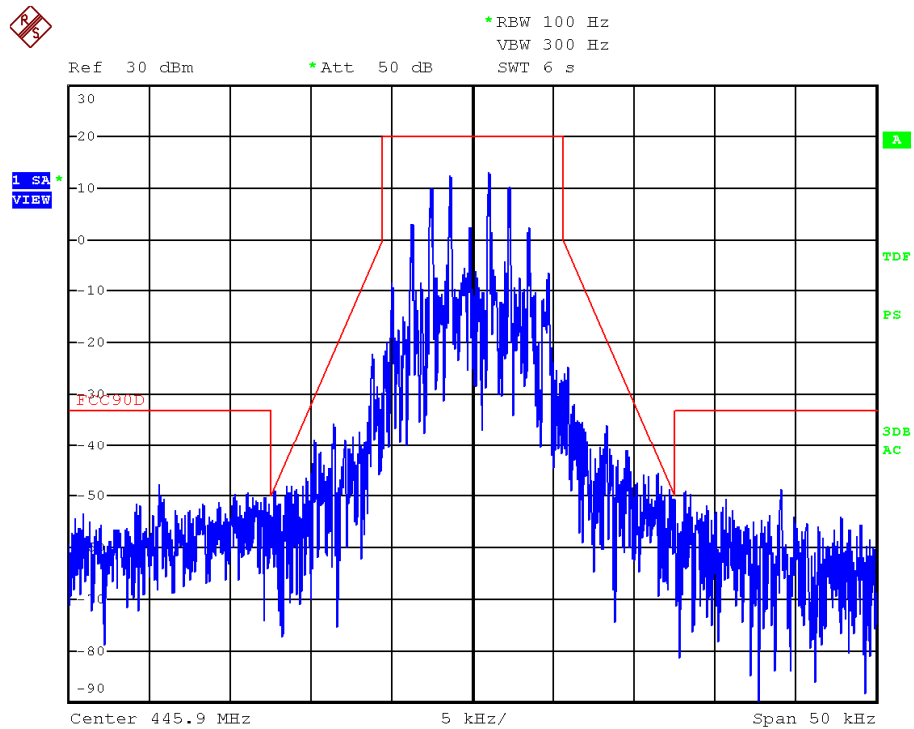
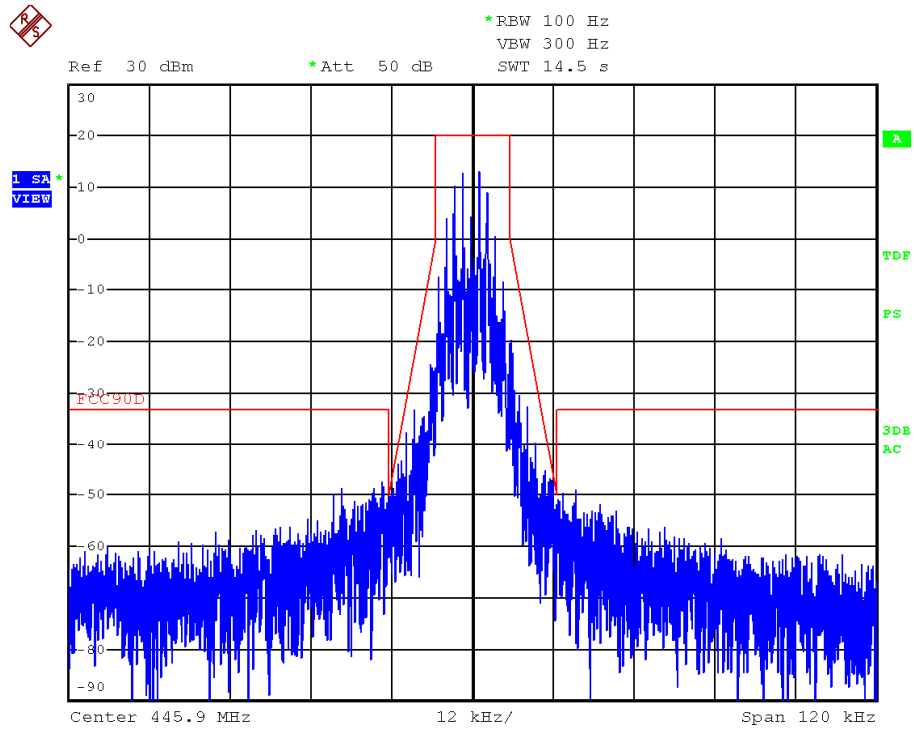


5.4 Test Protocol

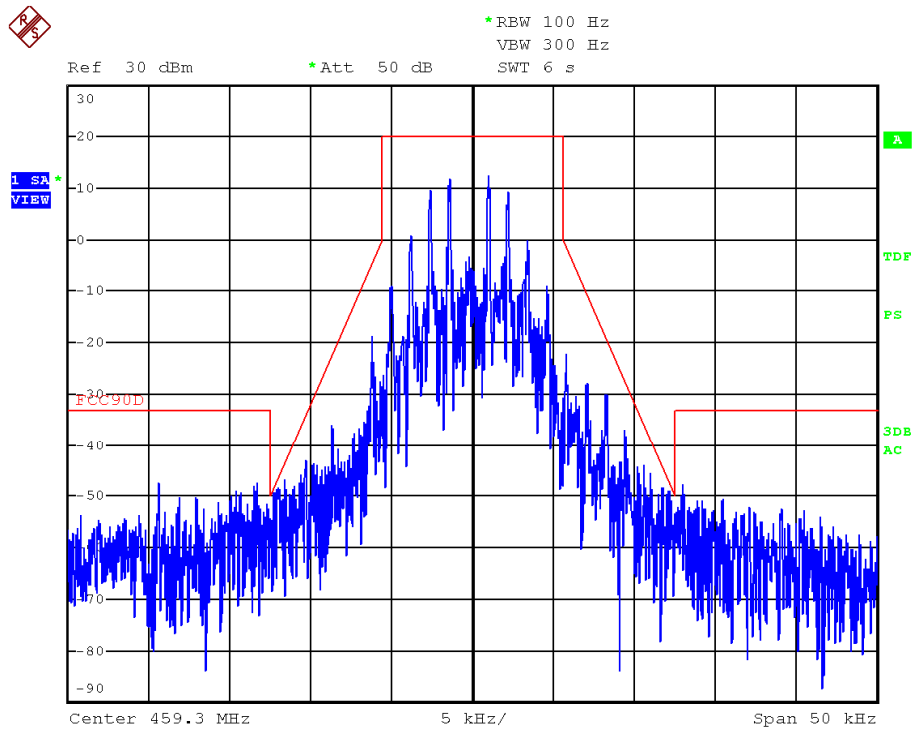
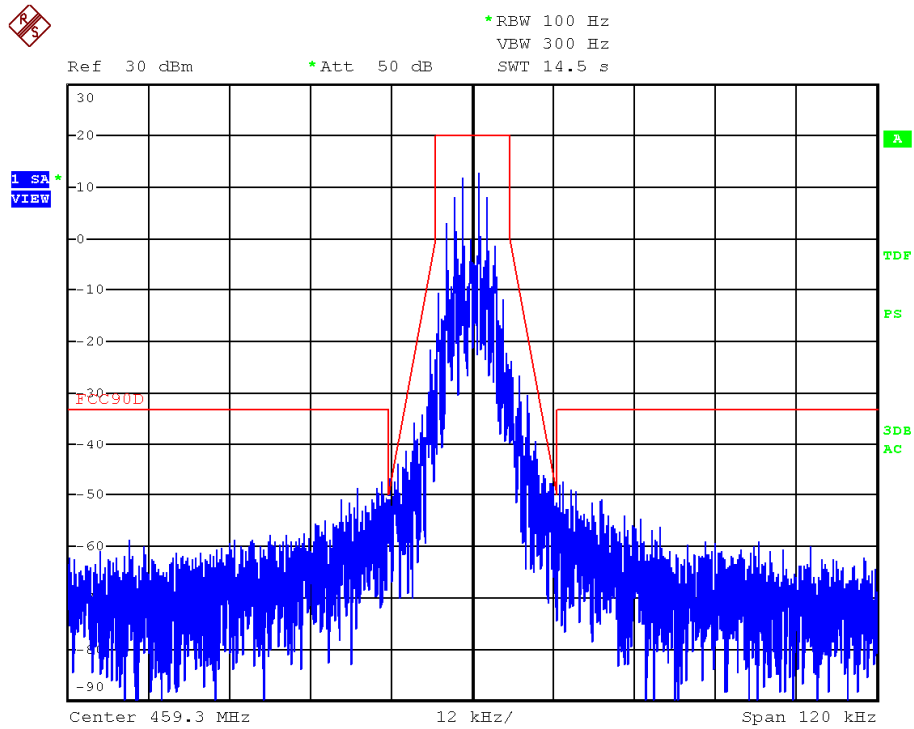
Temperature : 22 °C
Relative Humidity : 43 %

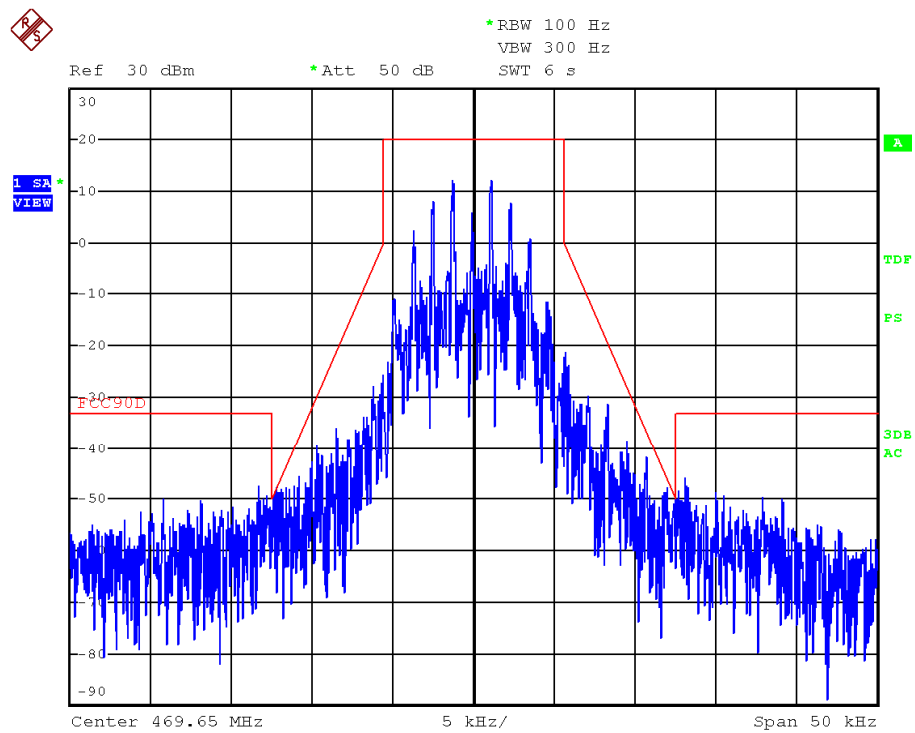
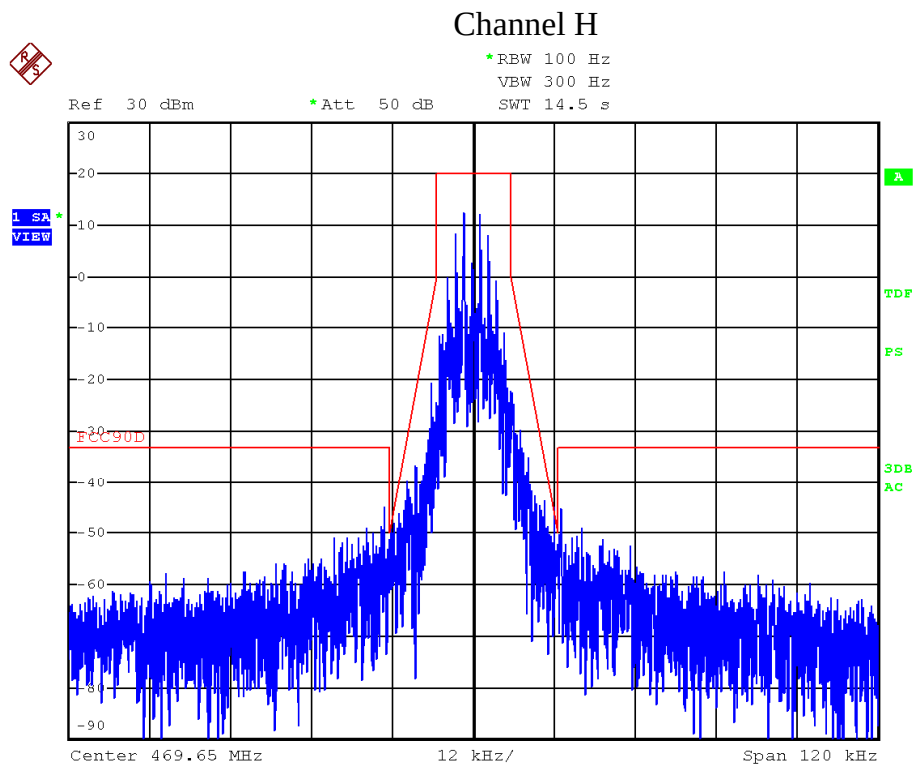
Power level	CH	Result
5	L	Pass
	M	Pass
	H	Pass

Channel L



Channel M





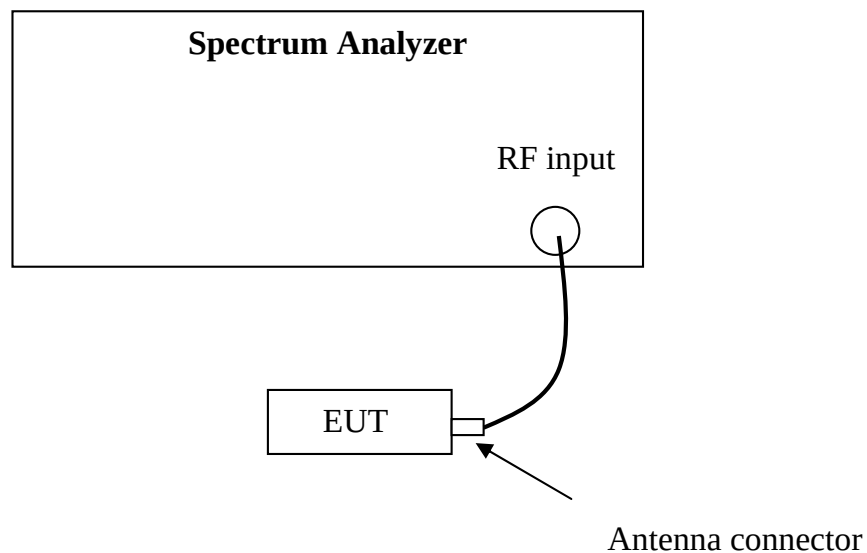
6. Transmitter Conducted Emissions (Out of Band)

Test result: PASS

6.1 Test limit

Please refer to Clause 5.1 of this report.

6.2 Test Configuration



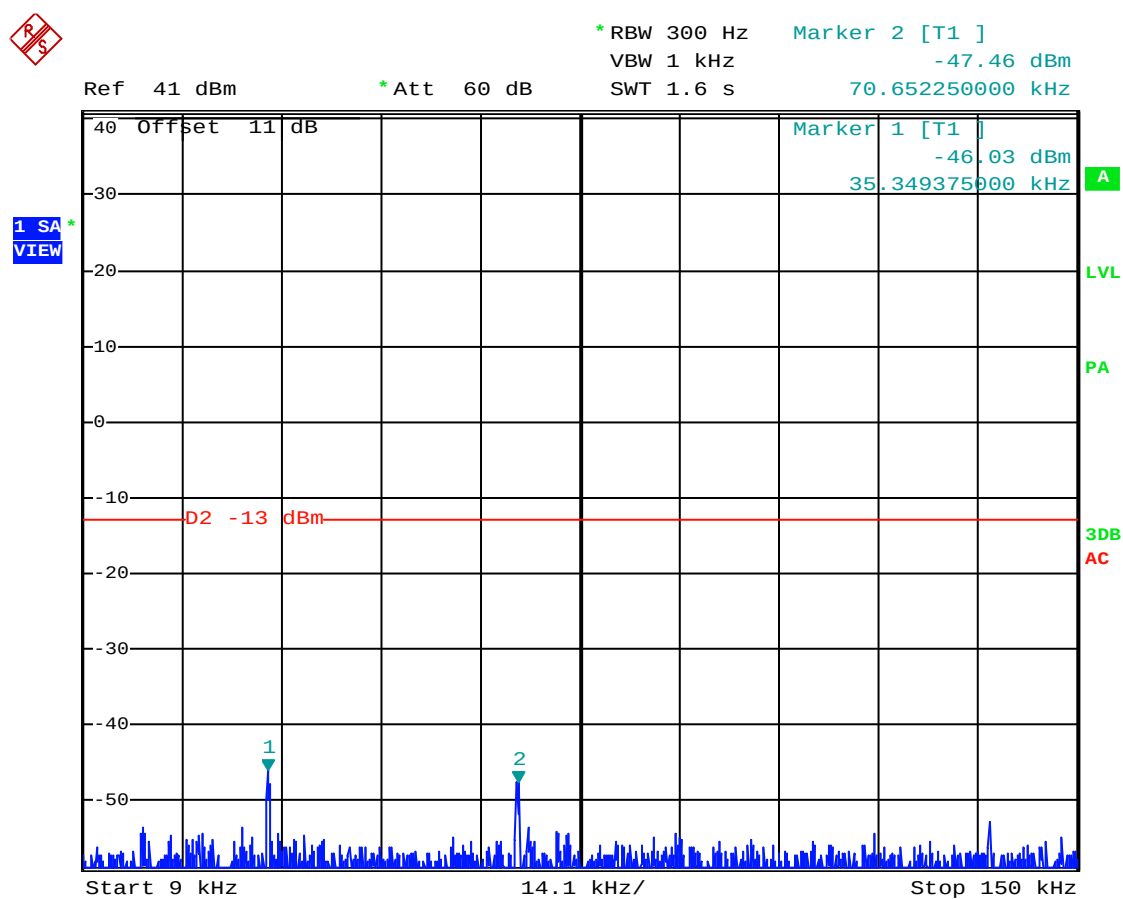
6.3 Test procedure and test setup

Test procedure as per TIA-603-C Section 2.2.13.

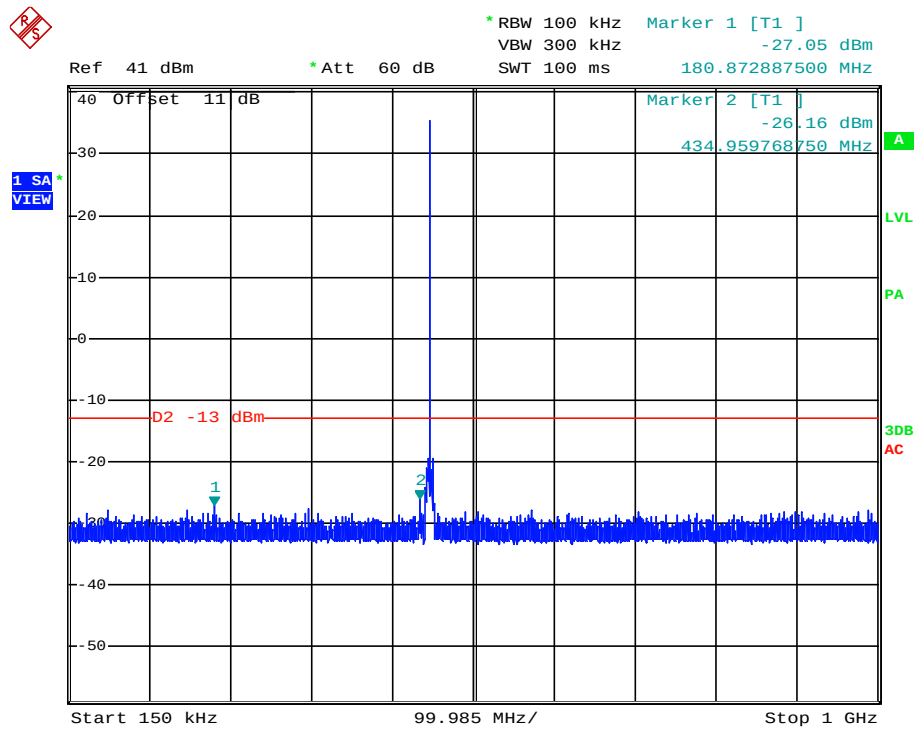
6.4 Test protocol

Power level	CH	Max reading (dBm)	Limit (dBm)	Result
5	L	-22.12	-20.00	Pass
	M	-23.43		Pass
	H	-22.75		Pass

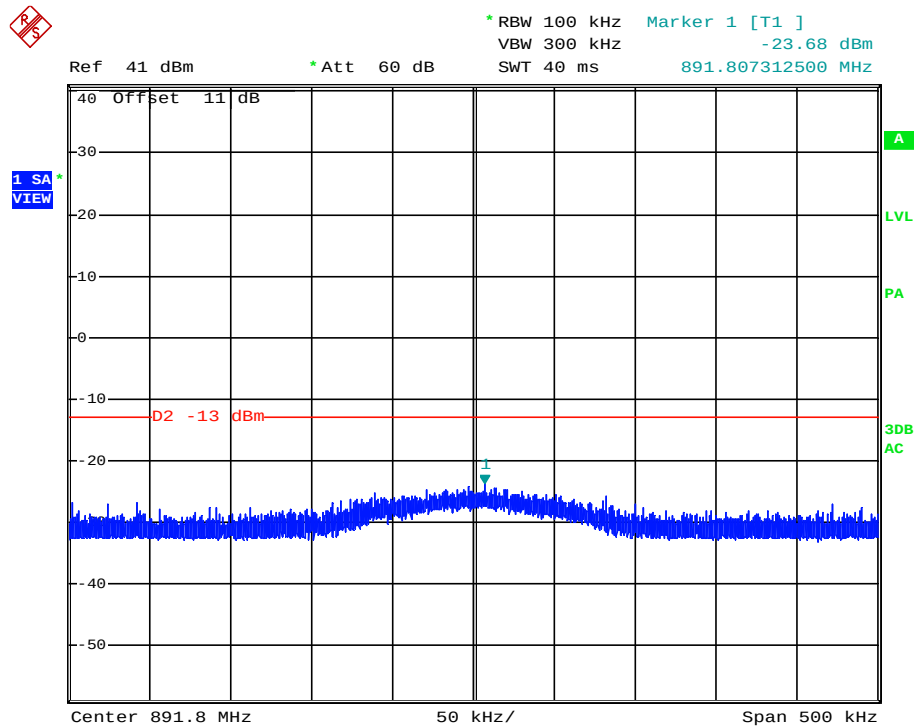
Channel L



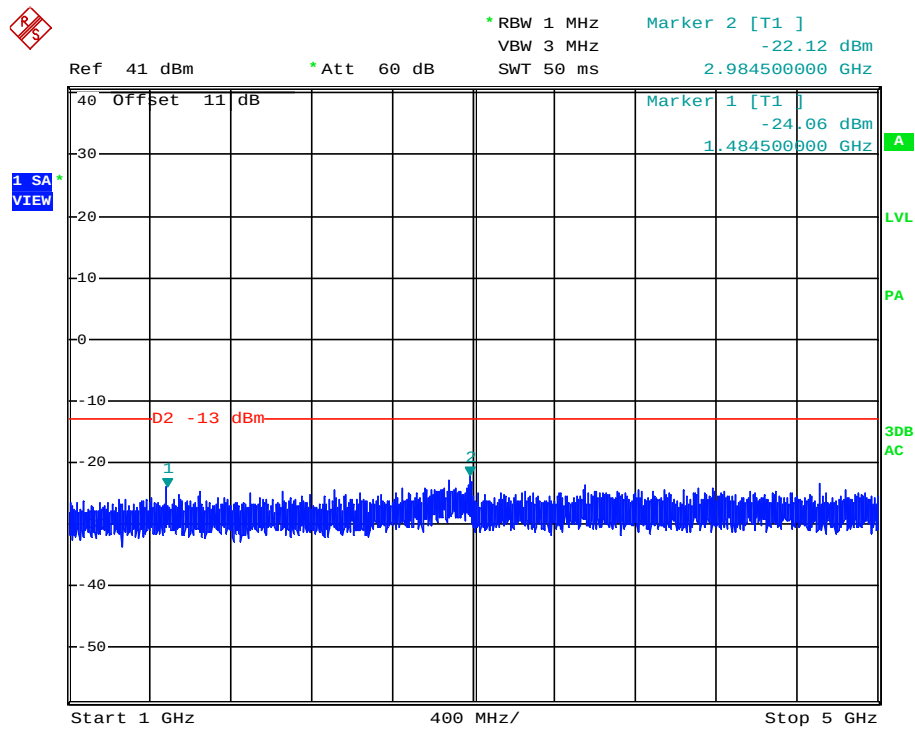
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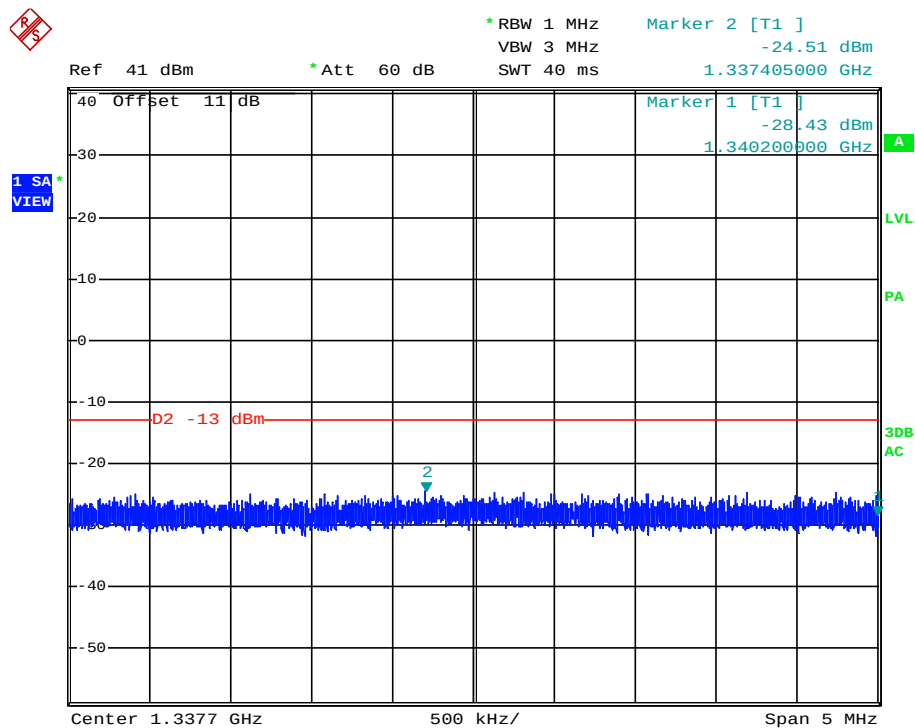
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Date: 28.MAY.2011 07:03:53



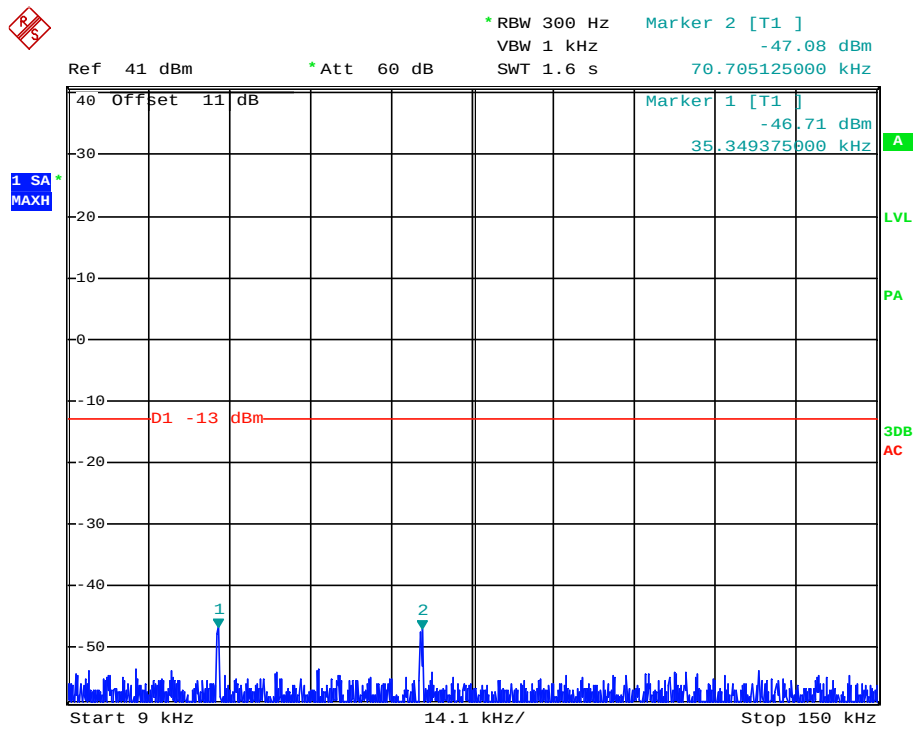
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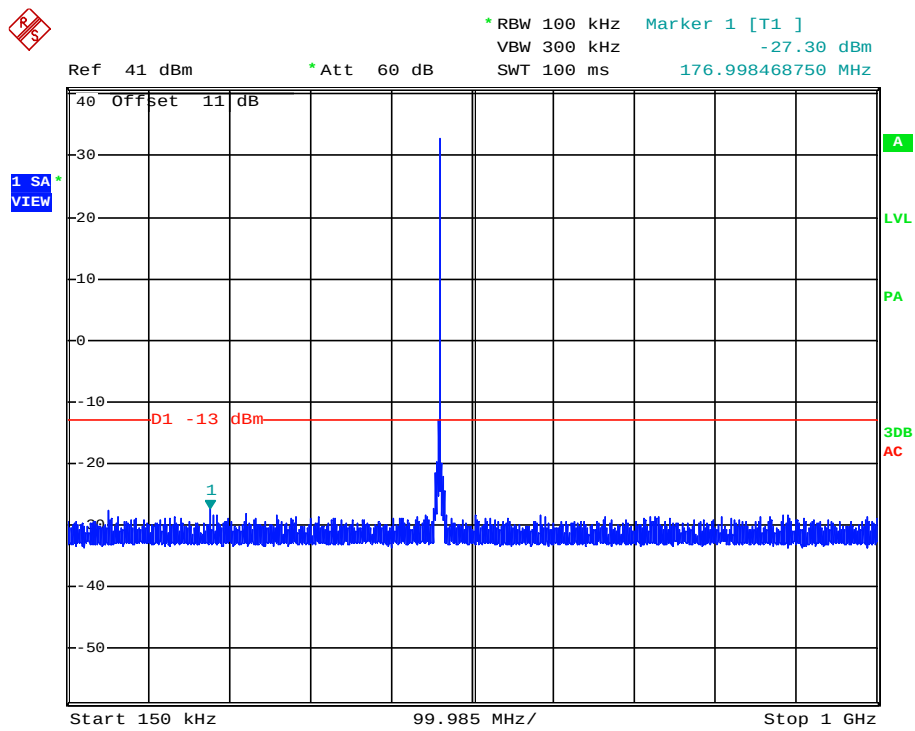
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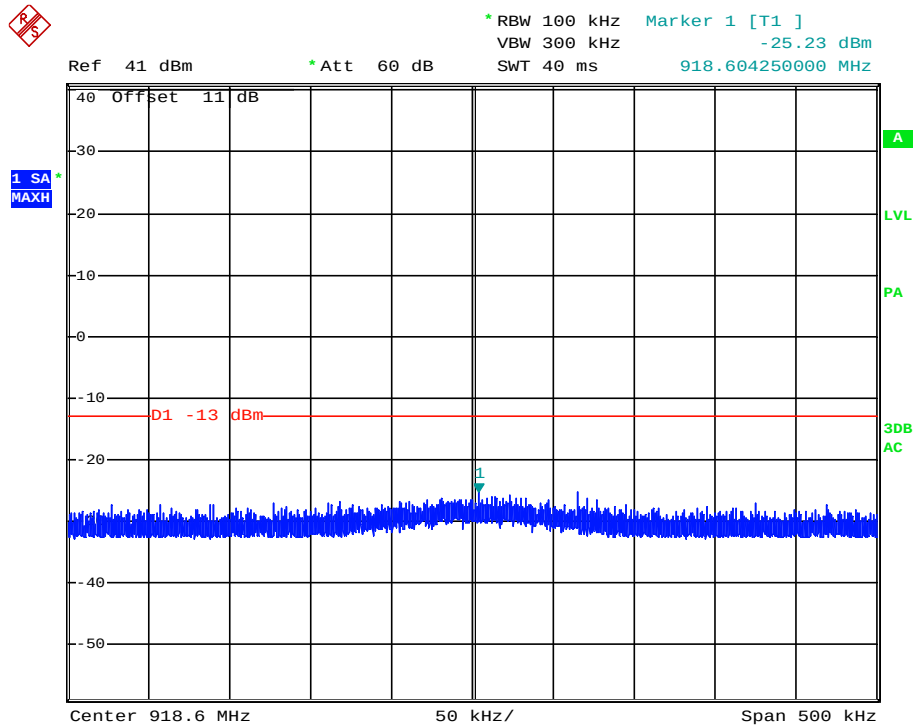
Channel M



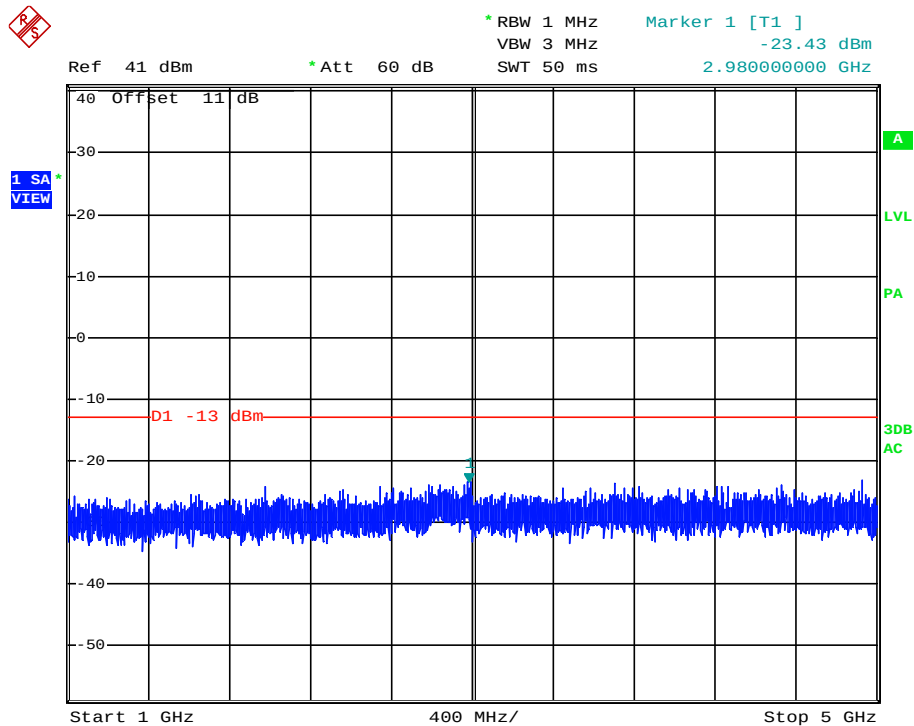
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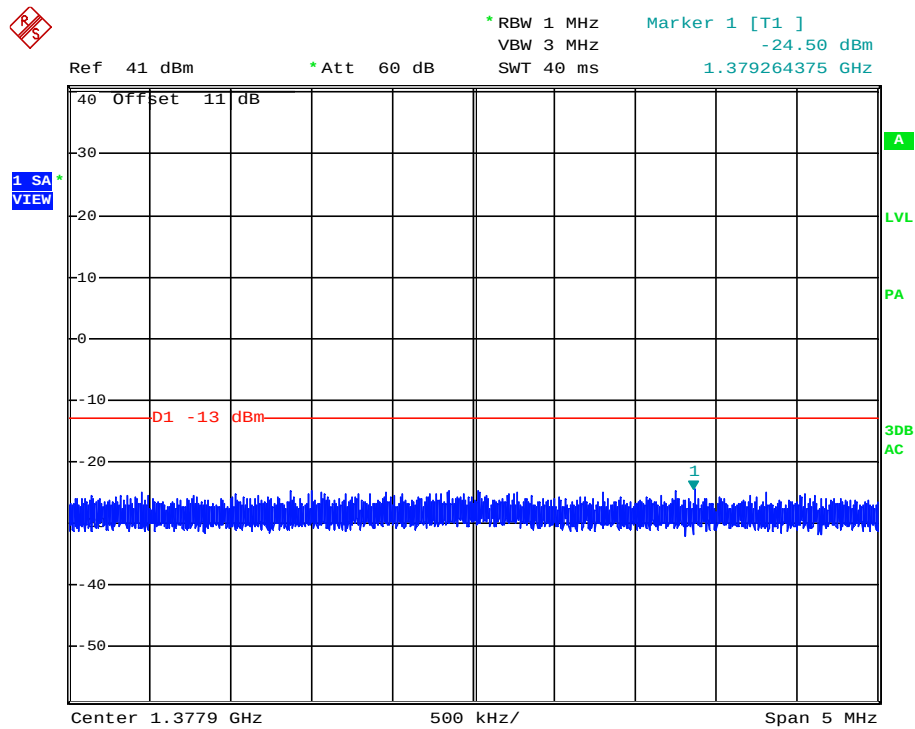
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Date: 28.MAY.2011 07:18:48

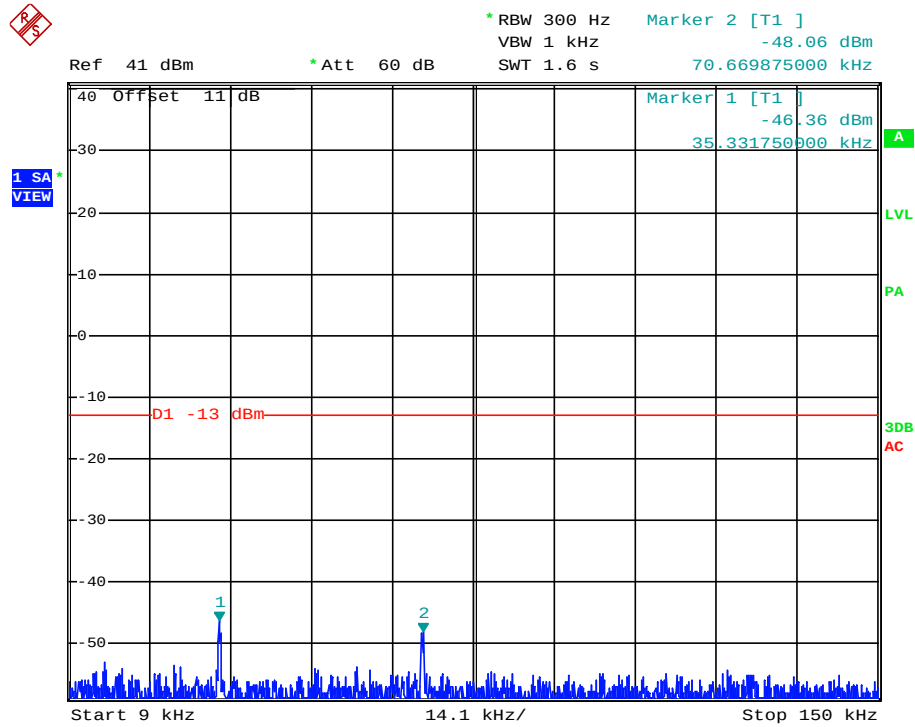


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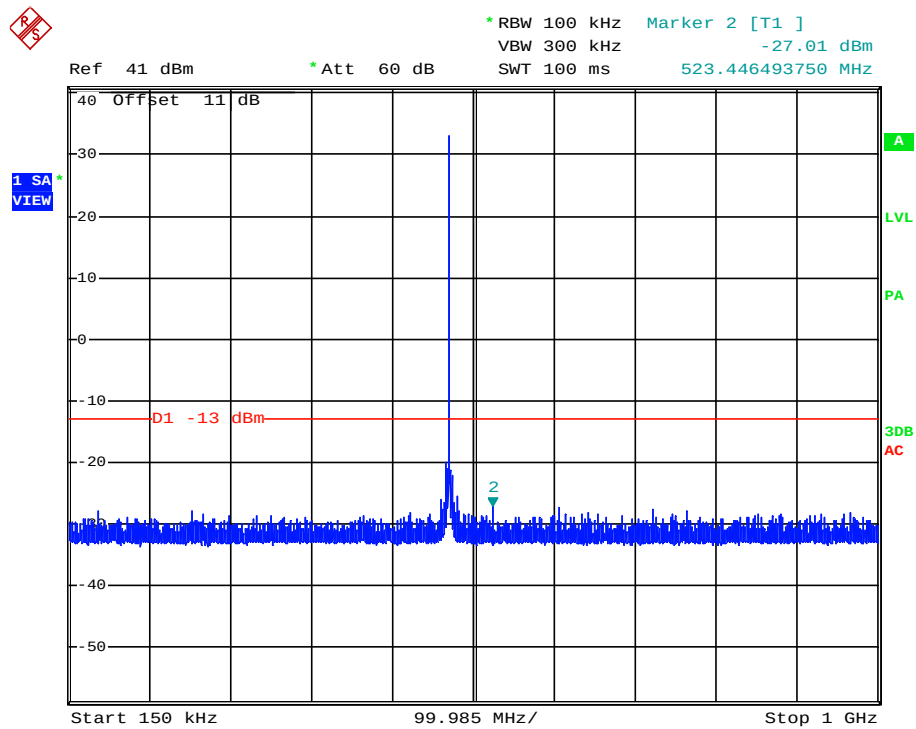


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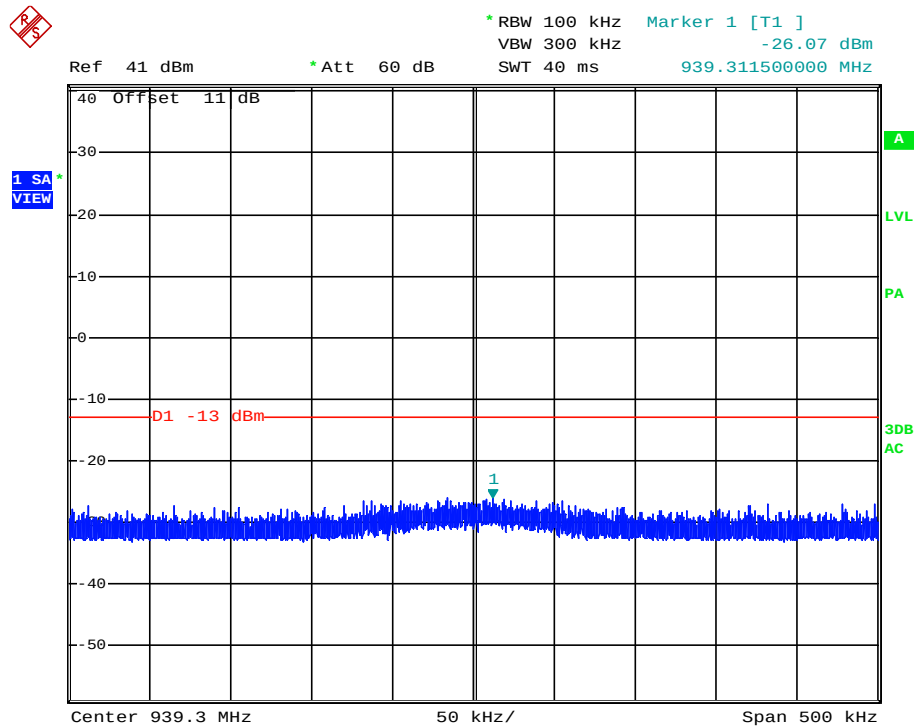
Channel H



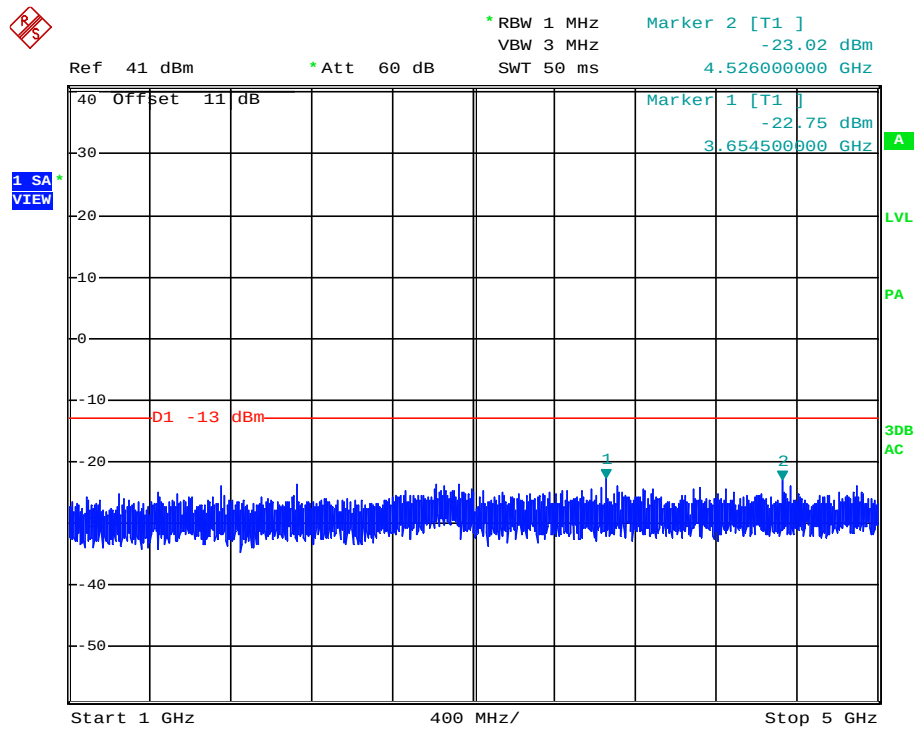
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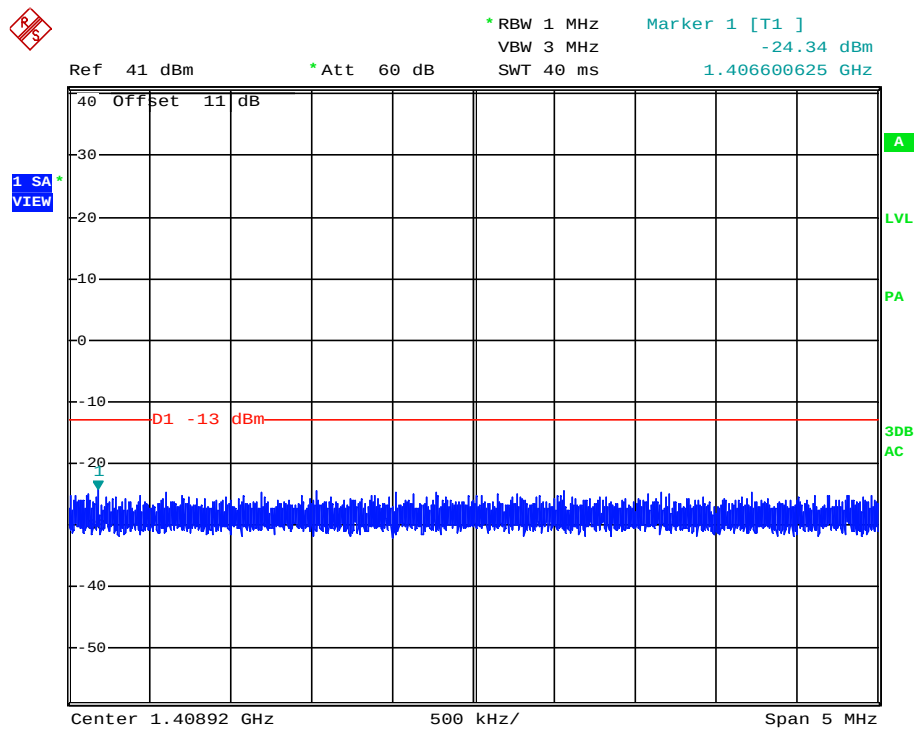
Date: 28.MAY.2011 07:26:40



Date: 28.MAY.2011 07:27:38



Date: 28.MAY.2011 07:28:54



Date: 28.MAY.2011 07:29:44

7. Transmitter Radiated Emissions (Out of Band)

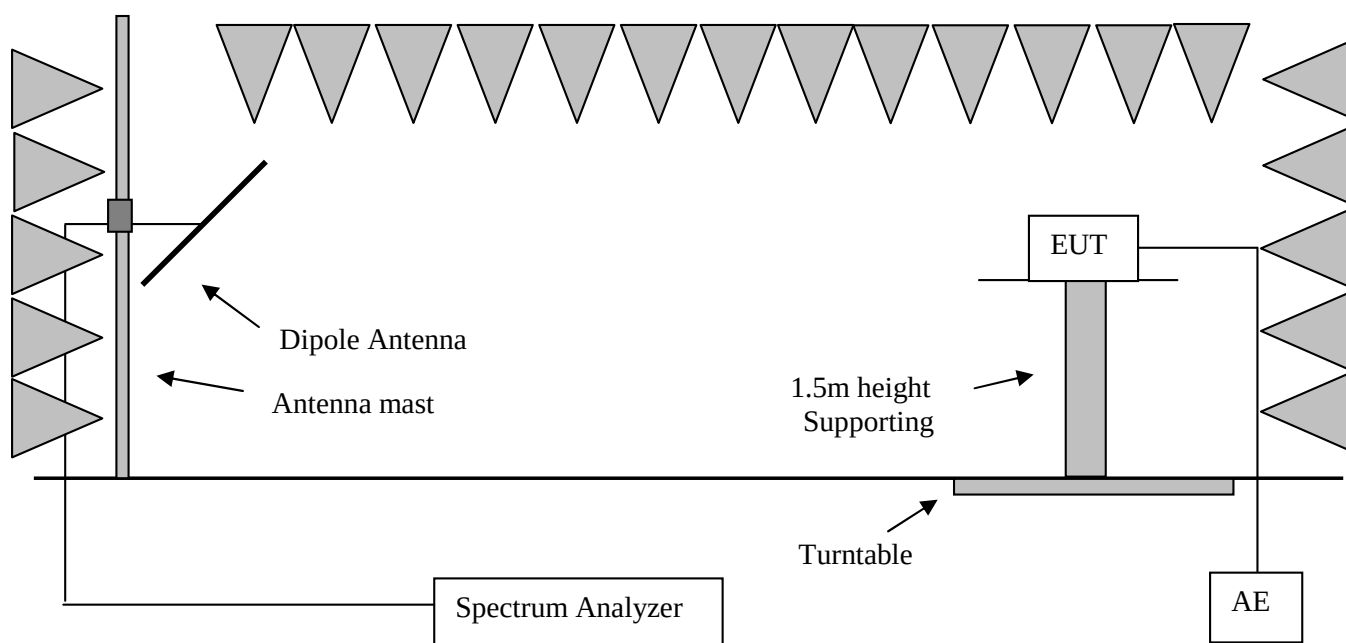
Test result: PASS

7.1 Limit

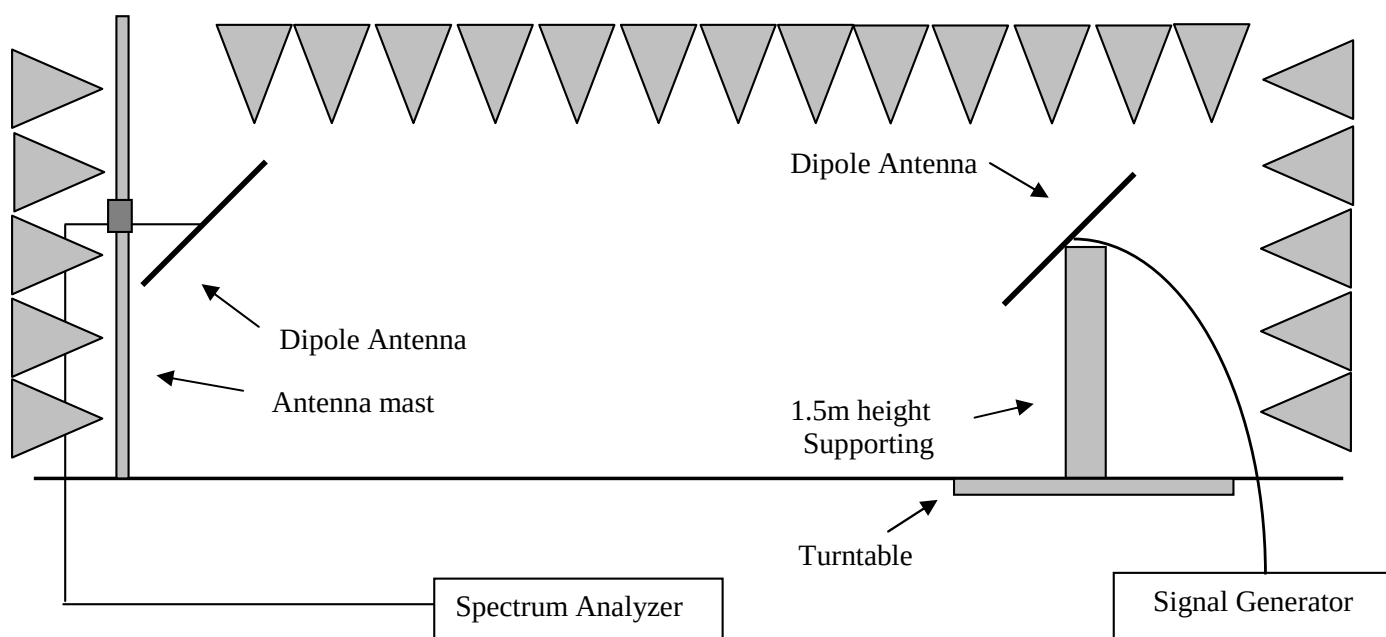
Please refer to Clause 5.1 of this report.

7.2 Test Configuration

7.2.1. Step one



3.2.2 Step two



Note: for frequency below 1GHz, it is permissible to use other antennas provided they can be referenced to a dipole.

7.3 Test procedure and test setup

Test procedure as per TIA-603-C Section 2.2.12.

7.4 Test protocol

CH	Ant	Frequency (MHz)	Reading of SG (dBm)	Cable Loss (dB)	Substitution Antenna (dBd)	ERP (dBm)	Limit (dBm)
L	H	891.08	-41.90	0.60	2.70	-38.60	-20.00
	V	1337.30	-35.80	1.30	6.50	-28.00	
	V	2228.85	-43.40	2.30	6.80	-34.30	
M	H	918.71	-41.80	0.60	2.70	-38.50	
	V	1377.86	-35.90	1.30	6.50	-28.10	
	V	2296.18	-43.60	2.30	6.80	-34.50	
H	H	939.52	-41.70	0.60	2.70	-38.40	
	V	1408.56	-35.60	1.30	6.50	-27.80	
	V	2348.15	-43.30	2.30	6.80	-34.20	

Note: 1. this test was conducted per using the substitution method.

2. The ERP of EUT = Reading of SG + cable loss + Substitution Antenna

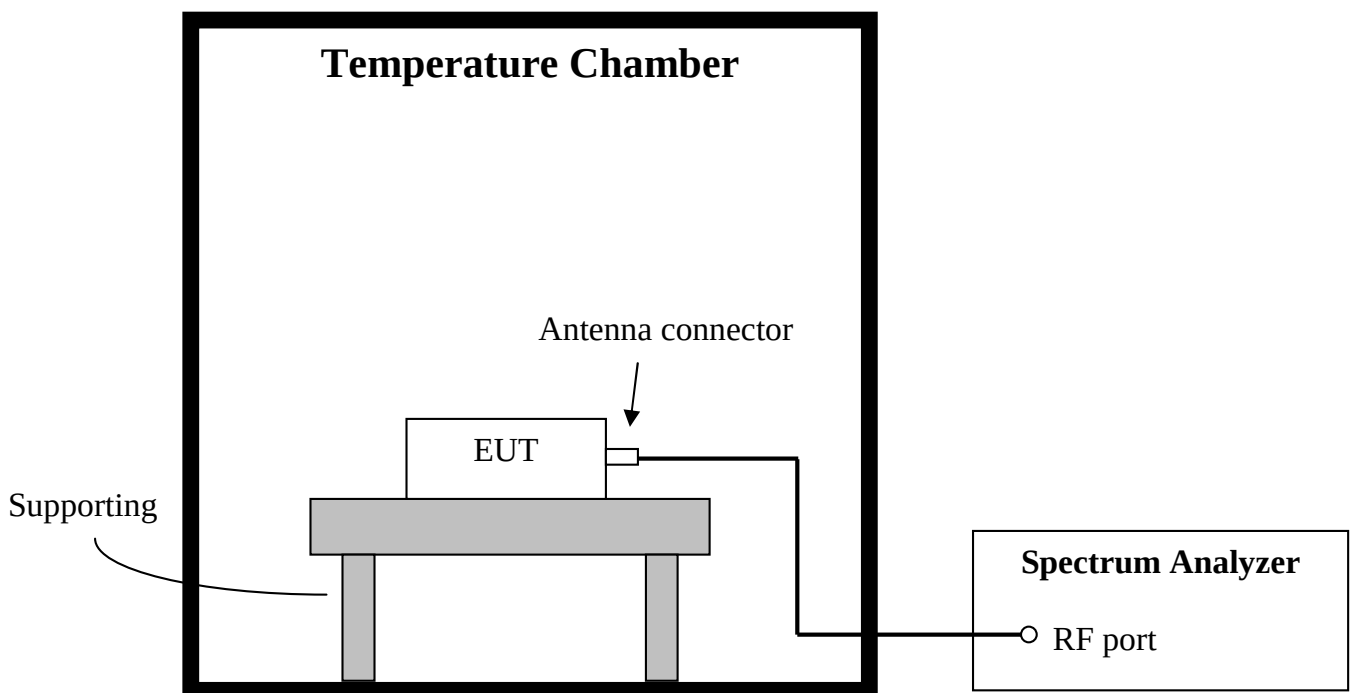
8. Transmitter Frequency Stability (Temperature Variation)

Test result: PASS

8.1 Test limit

Fixed and base stations working among 421–512MHz: 2.5ppm

8.2 Test Configuration



8.3 Test procedure and test setup

Test Procedure as per TIA-603-C 2.2.2.

8.4 Test protocol

CH	Temp (°C)	Freq measured (MHz)	Freq nominal (MHz)	Freq Error (kHz)	Limit (kHz)
L	-30	445.8996	445.9000	0.4	1.1
	-20	445.8997		0.3	
	-10	445.8997		0.3	
	0	445.8999		0.1	
	10	445.8999		0.1	
	20	445.8999		0.1	
	30	445.8999		0.1	
	40	445.8999		0.1	
	50	445.9000		0	
M	-30	459.2995	459.3000	0.5	1.2
	-20	459.2997		0.3	
	-10	459.2997		0.3	
	0	459.2998		0.2	
	10	459.2999		0.1	
	20	459.2999		0.1	
	30	459.2999		0.1	
	40	459.2999		0.1	
	50	459.2999		0.1	
H	-30	469.5996	469.6000	0.4	1.2
	-20	469.5997		0.3	
	-10	469.5998		0.2	
	0	469.5998		0.2	
	10	469.5998		0.2	
	20	469.5998		0.2	
	30	469.5998		0.2	
	40	469.5998		0.2	
	50	469.5999		0.1	

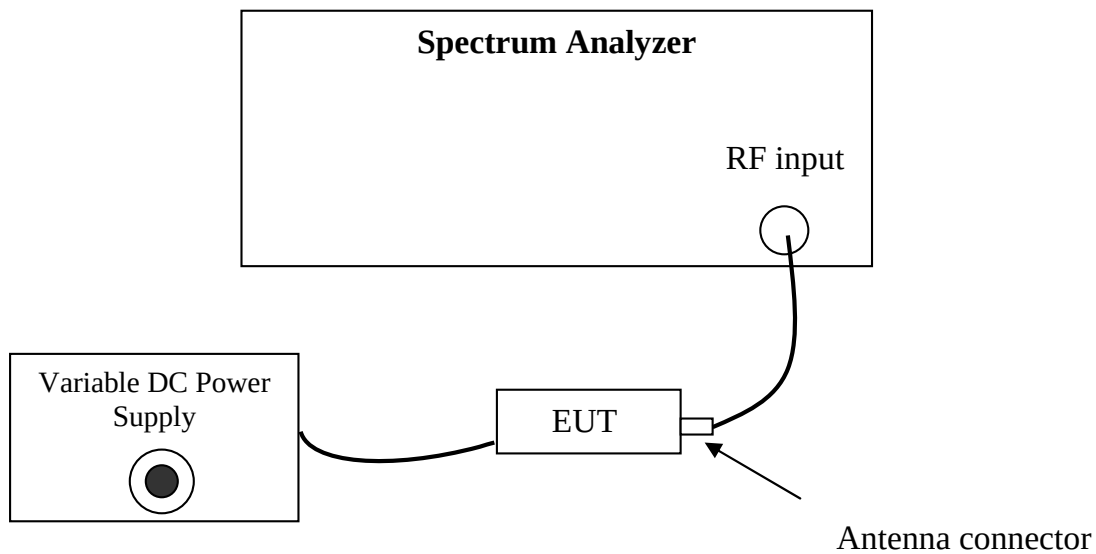
9. Transmitter Frequency Stability (Voltage Variation)

Test result: PASS

9.1 Test limit

Fixed and base stations working among 421–512MHz: 2.5ppm

9.2 Test Configuration



9.3 Test procedure and test setup

Test Procedure as per TIA-603-C 2.2.2.

9.4 Test protocol

CH	Voltage (V)	Freq Measured (MHz)	Freq nominal (MHz)	Freq Error (kHz)	Limit (kHz)
L	85	445.8999	445.9000	0.1	1.1
	120	445.8999		0.1	
	276	445.9000		0	
M	85	459.2998	459.3000	0.2	1.2
	120	459.2998		0.2	
	276	459.2998		0.2	
H	85	469.6003	469.6000	0.3	1.2
	120	469.6003		0.3	
	276	469.6003		0.3	

10. Transmitter Transient Frequency Behavior

Test result: **PASS**

10.1 Test limit

Time Intervals	Maximum frequency difference	All Equipment	
		150-174 MHz	421-512 MHz

Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels

$t_1^{\pm}$	± 25.0 kHz	5.0 mS	10.0 mS
t_2	± 12.5 kHz	20.0 mS	25.0 mS
$t_3^{\pm}$	± 25.0 kHz	5.0 mS	10.0 mS

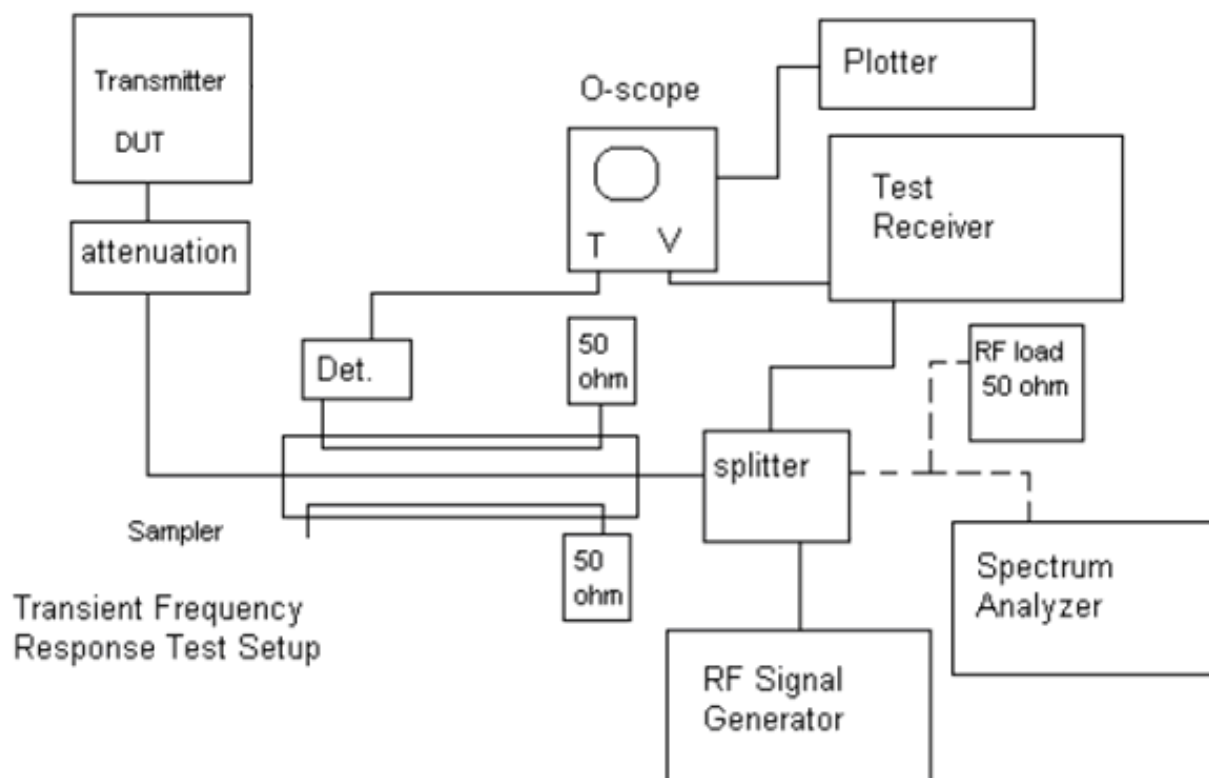
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels

$t_1^{\pm}$	± 12.5 kHz	5.0 mS	10.0 mS
t_2	± 6.25 kHz	20.0 mS	25.0 mS
$t_3^{\pm}$	± 12.5 kHz	5.0 mS	10.0 mS

Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels

$t_1^{\pm}$	± 6.25 kHz	5.0 mS	10.0 mS
t_2	± 3.125 kHz	20.0 mS	25.0 mS
$t_3^{\pm}$	± 6.25 kHz	5.0 mS	10.0 mS

10.2 Test Configuration

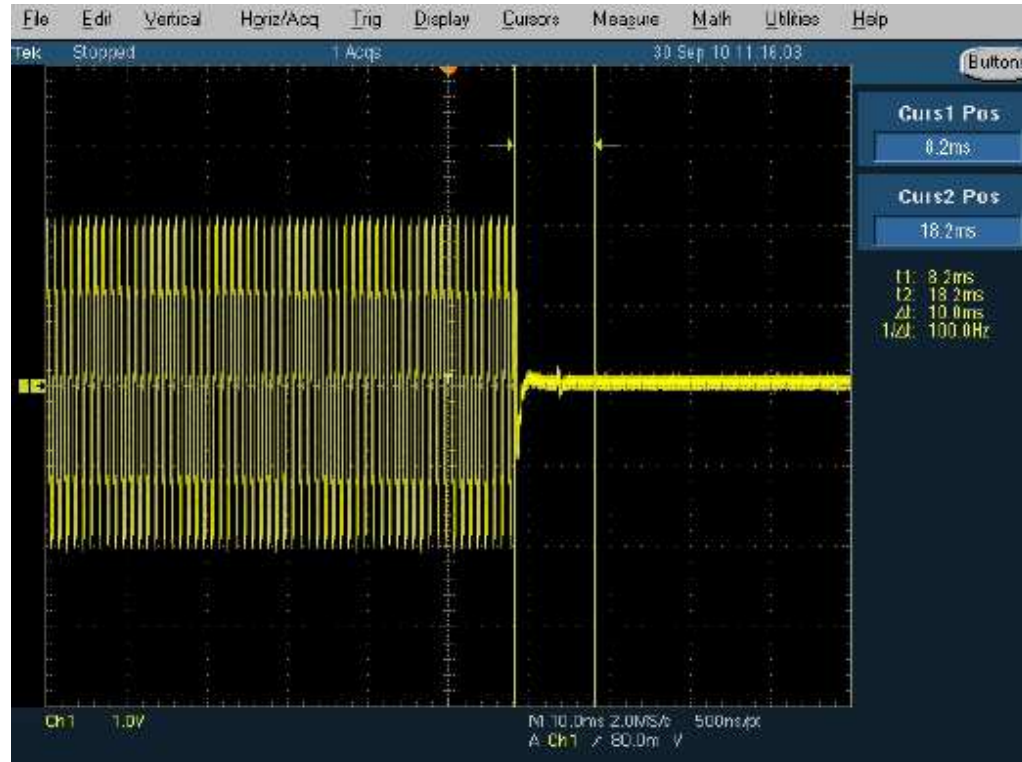


10.3 Test procedure and test setup

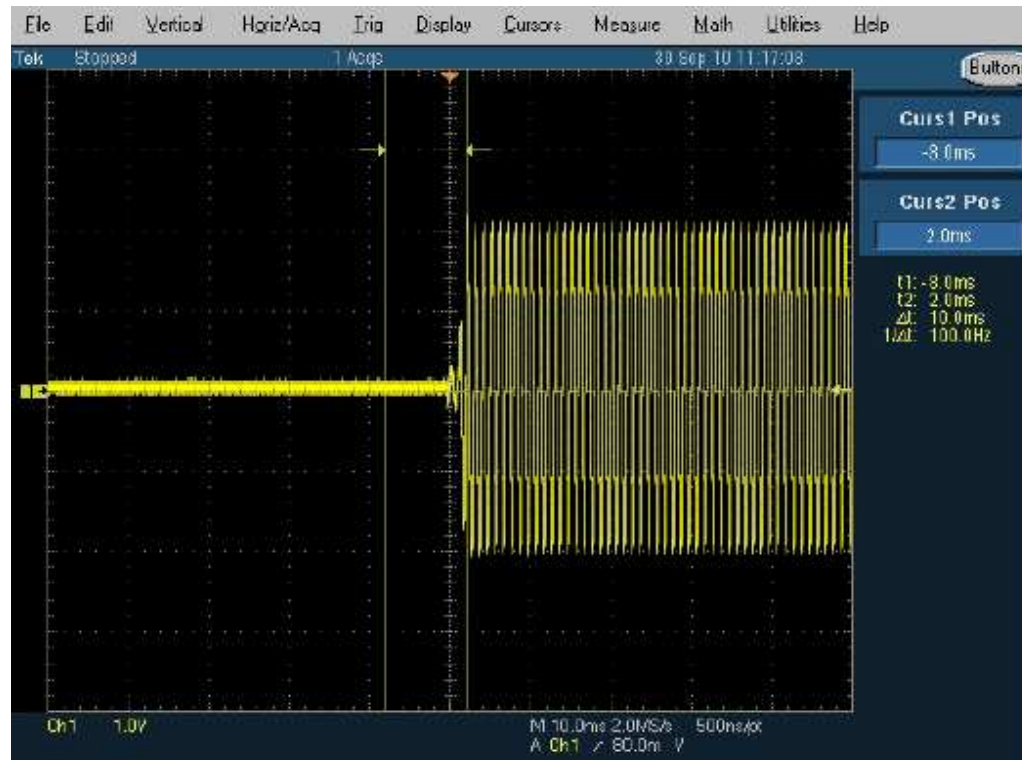
Test Procedure as per TIA-603-C 2.2.19.

10.4 Test protocol

Power on



Power off



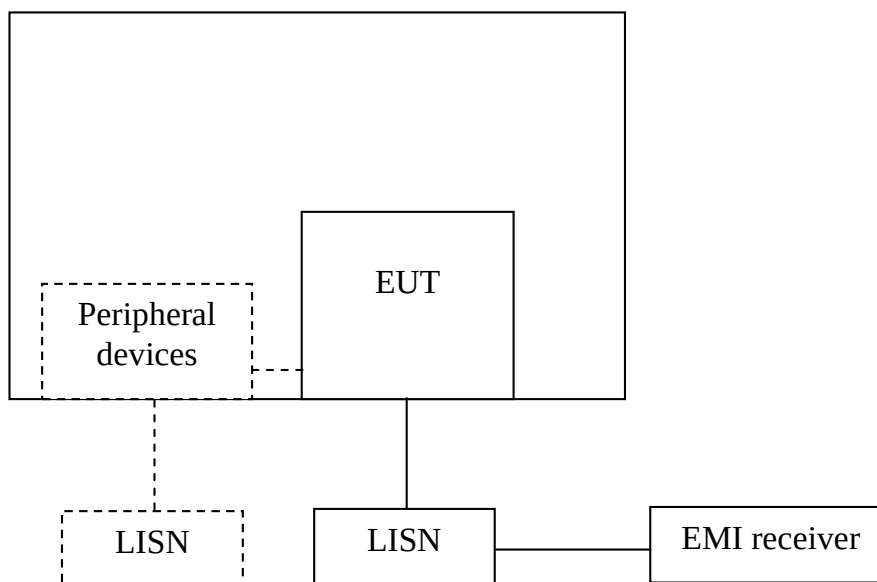
11. Mains Conducted Emissions

Test result: Pass

11.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

11.2 Test configuration



☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

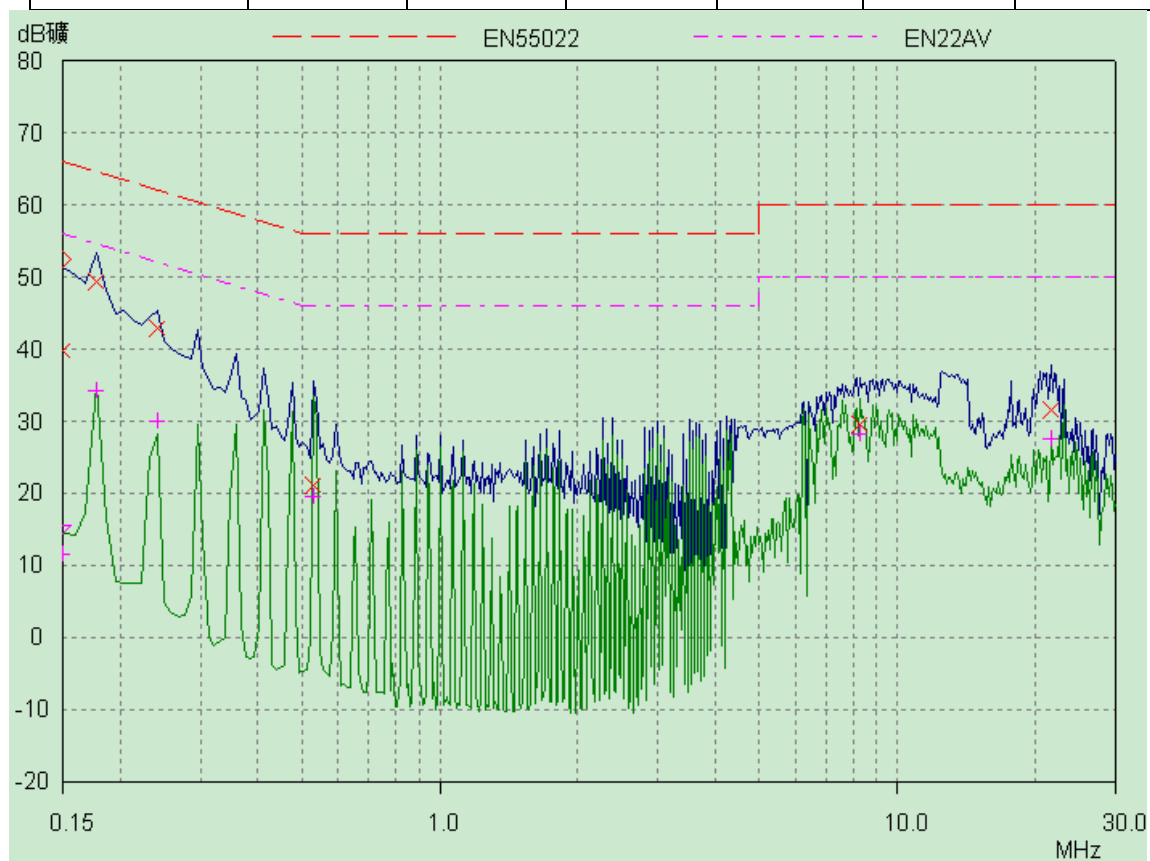
11.3 Test procedure and test set up

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50Ω/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω/50uH coupling impedance with 50Ω termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement. The bandwidth of the test receiver is set at 9 kHz.

11.4 Test protocol

Frequency	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	QP	AV	QP	AV	QP	AV
0.15 (L)	39.79	11.47	66.00	56.00	26.21	44.53
0.18 (L)	49.46	34.12	64.63	54.63	15.17	20.51
0.24 (N)	42.83	30.09	62.10	52.10	19.27	22.01
0.53 (L)	21.10	19.62	56.00	46.00	34.90	26.38
8.23 (L)	29.61	28.30	60.00	50.00	30.39	21.70
21.66 (N)	31.49	27.45	60.00	50.00	28.51	22.55



12. Spurious emission for receiver

Test result: PASS

12.1 Test limit

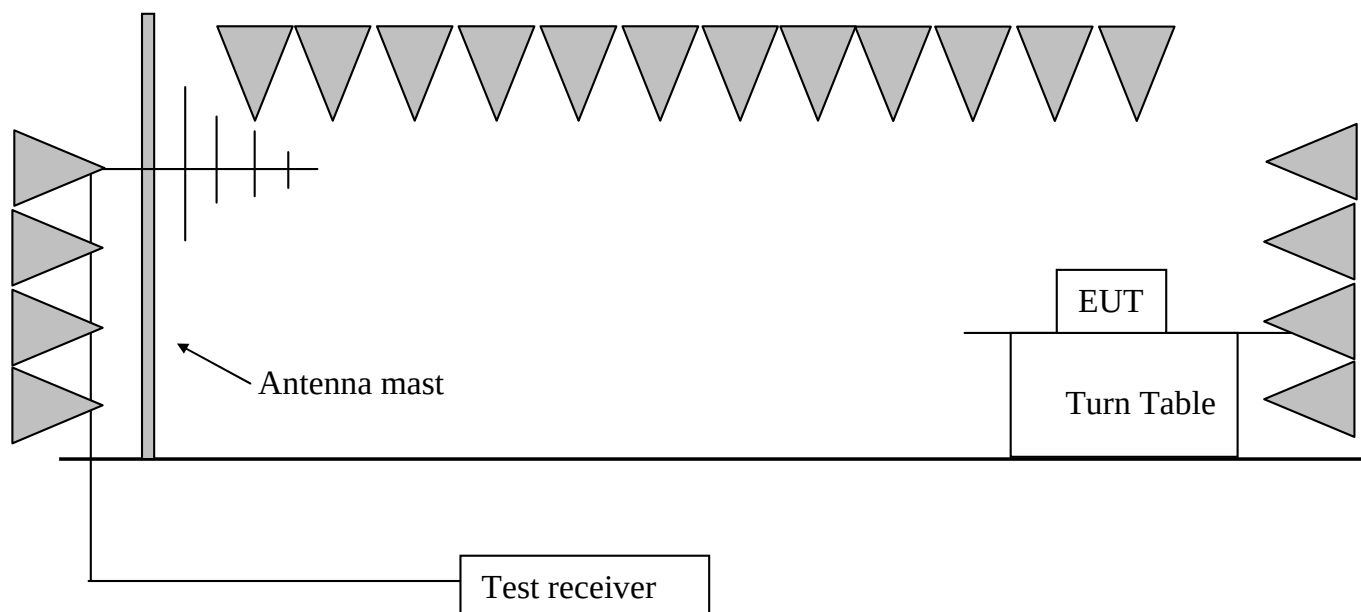
The spurious emission shall test through 3 times tuneable or local oscillator frequency whichever is the higher, without exceeding 40 GHz.

1) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2nW per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5nW above 1 GHz.

2) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

12.2 Test Configuration



12.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 100kHz, VBW = 300kHz (30MHz~1GHz)

RBW = 1MHz, VBW = 3MHz (>1GHz for PK);

RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

12.4 Test protocol

Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	527.64	20.00	40.40	46.00	5.60	PK
V	30.00	18.60	38.70	40.00	1.30	PK
V	41.66	11.60	37.60	40.00	2.40	PK
V	70.82	6.20	34.50	40.00	5.50	PK
V	82.48	8.00	38.40	40.00	1.60	PK
V	1561.12	-11.70	49.50	54.00	4.50	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)

2. Corrected Reading = Original Receiver Reading + Correct Factor

3. Margin = limit – Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,

Original Receiver Reading = 10dBuV.

Then Correct Factor = 30.20 + 2.00 = 32.20dB/m; Corrected Reading = 10dBuV + 32.20dB/m = 42.20dBuV/m

Assuming limit = 54dBuV/m, Corrected Reading = 42.20dBuV/m, then Margin = 54 -42.20 = 11.80dBuV/m