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Report On

FCC and Industry Canada Testing of the
Ericsson AB RUS 01 B5 / KRC 118 64/2

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IC ID: 287AB-AS118642

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May 2014



Product Service

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REPORT ON FCC and Industry Canada Testing of the
Ericsson RUS 01 B5 / KRC 118 64/2

Document 75926313 Report 01 Issue 1

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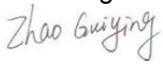
APPROVED BY 
Mark Jenkins
Authorised Signatory

DATED 14 May 2014

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate compliance with FCC CFR 47: Part 22 and Industry Canada RSS-132. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);


G Zhao


X Zhang





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Product Service

SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Ericsson RUS 01 B5 / KRC 118 64/2



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ericsson RUS 01 B5 / KRC 118 64/2 to the requirements of FCC CFR 47 Part 22 and Industry Canada RSS-132.

Testing was carried out in support of a C2PC application for Grant of RUS 01 B5 / KRC 118 64/2 to include GSM/LTE multi-standard wireless network.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Ericsson AB
Product Name	RUS 01 B5
Product Number	KRC 118 64/2
IC Model Number	AS118642
Serial Number(s)	C824752731 C824772345
GSM Software	CXP1040013 Rev 09R71H
LTE Software	CXP102051/18 Rev R25AU
PIS Software	CXP9013268/6 Rev R49DV
Hardware Version	R2A
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 22: 2013 Industry Canada RSS-132 Issue 3: 2013
Incoming Release Date	Declaration of Build Status 18 March 2014
Order Number Date	PTP 18 March 2014
Start of Test	19 March 2014
Finish of Test	30 March 2014
Name of Engineer(s)	G Zhao X Zhang
Related Document(s)	ANSI C63.4: 2009 FCC CFR 47 Part 2: 2013 Industry Canada RSS-GEN Issue 3: 2010



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 22 and Industry Canada RSS-132, is shown below.

Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2 and 22	RSS-132 and RSS-GEN					
	22.913 (a)	5.4	Effective Radiated Power	869.4 MHz* (G) + 877.6 MHz (L1.4, L3, L5, L10, L15)		N/A	No integral antenna.
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)		N/A	
				886.6 MHz (L1.4, L3, L5, L10) + 893.6 MHz* (G) / 881.5 MHz (L15) + 893.6 MHz* (G)		N/A	
				869.4 MHz* (G) + 871.0 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)		N/A	
				871.6 MHz (G) + 873.2 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)		N/A	
				880.5MHz (L1.4, L3, L5, L10) + 892.0 MHz (G) + 893.6 MHz* (G)		N/A	
				871.6 MHz (G) + 873.2 MHz (G) + 874.8 MHz (G) + 889.0 MHz (L1.4, L3, L5)		N/A	
				871.6 MHz (G) + 873.2 MHz (G) + 881.0 MHz (L1.4, L3) + 884.0 MHz (L1.4, L3) / 871.6 MHz (G) + 873.2 MHz (G) + 879.0 MHz (L5) + 884.0 MHz (L5)		N/A	
2.1	2.1046, 22.913 (a)	5.4	RF Output Power - Conducted	869.4 MHz* (G) + 877.6 MHz (L1.4, L3, L5, L10, L15)	0	Pass	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)	0	Pass	
				886.6 MHz (L1.4, L3, L5, L10) + 893.6 MHz* (G) / 881.5 MHz (L15) + 893.6 MHz* (G)	0	Pass	
				869.4 MHz* (G) + 871.0 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)	0	Pass	
				880.5MHz (L1.4, L3, L5, L10) + 892.0 MHz (G) + 893.6 MHz* (G)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 874.8 MHz (G) + 889.0 MHz (L1.4, L3, L5)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 881.0 MHz (L1.4, L3) + 884.0 MHz (L1.4, L3) / 871.6 MHz (G) + 873.2 MHz (G) + 879.0 MHz (L5) + 884.0 MHz (L5)	0	Pass	
2.2	22.913 (a)	5.4	Peak – Average Ratio	869.4 MHz* (G) + 877.6 MHz (L1.4)	0	Pass	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)	0	Pass	
				886.6 MHz (L1.4) + 893.6 MHz* (G)	0	Pass	
				869.4 MHz* (G) + 871.0 MHz (G) + 884.0 MHz (L1.4)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)	0	Pass	
				880.5MHz (L1.4) + 892.0 MHz (G) + 893.6 MHz* (G)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 874.8 MHz (G) + 889.0 MHz (L1.4, L3, L5)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 881.0 MHz (L1.4, L3) + 884.0 MHz (L1.4, L3) / 871.6 MHz (G) + 873.2 MHz (G) + 879.0 MHz (L5) + 884.0 MHz (L5)	0	Pass	



Configuration 1 – Radio Equipment							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Comments
	FCC Part 2, 15 and 22	RSS-132 and RSS-GEN					
	2.1047 (d)	5.2	Modulation Characteristics	869.4 MHz* (G) + 877.6 MHz (L1.4)		N/A	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)		N/A	
				886.6 MHz (L1.4) + 893.6 MHz* (G)		N/A	
	2.1049, 22.917 (b)	RSS-Gen 4.6.1	Occupied Bandwidth	869.4 MHz* (G) + 877.6 MHz (L1.4)		N/A	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)		N/A	
				886.6 MHz (L1.4) + 893.6 MHz* (G)		N/A	
2.3	2.1051, 22.917 (b)	5.5	Spurious Emissions at Antenna Terminals (±1MHz)	869.4 MHz* (G) + 871.0 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)	0	Pass	
				880.5MHz (L1.4, L3, L5, L10) + 892.0 MHz (G) + 893.6 MHz* (G)	0	Pass	
2.4	2.1053, 22.917 (a)	5.5	Radiated Spurious Emissions	869.4 MHz* (G) + 877.6 MHz (L1.4)	0	Pass	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)	0	Pass	
				886.6 MHz (L1.4) + 893.6 MHz* (G)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 884.0 MHz (L1.4)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 874.8 MHz (G) + 889.0 MHz (L1.4)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 881.0 MHz (L1.4) + 884.0 MHz (L1.4)	0	Pass	
2.5	2.1051, 22.917 (a)	5.5	Conducted Spurious Emissions	869.4 MHz* (G) + 877.6 MHz (L1.4)	0	Pass	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)	0	Pass	
				886.6 MHz (L1.4) + 893.6 MHz* (G)	0	Pass	
				869.4 MHz* (G) + 871.0 MHz (G) + 884.0 MHz (L1.4)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 884.0 MHz (L1.4, L3, L5, L10)	0	Pass	
				880.5MHz (L1.4) + 892.0 MHz (G) + 893.6 MHz* (G)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 874.8 MHz (G) + 889.0 MHz (L1.4)	0	Pass	
				871.6 MHz (G) + 873.2 MHz (G) + 881.0 MHz (L1.4) + 884.0 MHz (L1.4)	0	Pass	
	2.1055, 22.355	5.3	Frequency Stability Under Temperature Variations	869.4 MHz* (G) + 877.6 MHz (L1.4)		N/A	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)		N/A	
				886.6 MHz (L1.4) + 893.6 MHz* (G)		N/A	
	2.1055, 22.355	5.3	Frequency Stability Under Voltage Variations	869.4 MHz* (G) + 877.6 MHz (L1.4)		N/A	-
				877.0 MHz (G) + 886.0 MHz (L1.4, L3, L5, L10, L15)		N/A	
				886.6 MHz (L1.4) + 893.6 MHz* (G)		N/A	



Product Service

Configuration 1 – Radio Equipment						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Comments
	FCC Part 15					
2.6	15.111	Receiver Spurious Emissions	869.4 MHz* (G) + 877.6 MHz (L1.4)	0	Pass	-
			877.0 MHz (G) + 886.0 MHz (L1.4)	0	Pass	
			886.6 MHz (L1.4) + 893.6 MHz* (G)	0	Pass	

Note*: The channel adjacent to the lower and higher band-edge cannot be used. The lowest usable channel is 129 (869.4MHz), and the highest usable channel is 250 (893.6MHz).

- L1.4 denotes LTE network with 1.4MHz channel bandwidth.
- L3 denotes LTE network with 3MHz channel bandwidth.
- L5 denotes LTE network with 5MHz channel bandwidth.
- L10 denotes LTE network with 10MHz channel bandwidth.
- L15 denotes LTE network with 15MHz channel bandwidth.
- G denotes GSM network
- N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Equipment
MANUFACTURER	Ericsson AB
PRODUCT NUMBER	RUS 01 B5
PART NUMBER	KRC 118 64/2
IC Model NUMBER	AS118642
SERIAL NUMBER	C824752731 C824772345
HARDWARE VERSION	R2A
GSM Software	CXP1040013 Rev 09R71H
LTE Software	CXP102051/18 Rev R25AU
PIS Software	CXP9013268/6 Rev R49DV
TRANSMITTER OPERATING RANGE	TX: 869MHz - 894MHz RX: 824MHz - 849MHz
MODULATIONS	GSM: GMSK, 8-PSK, 16QAM, 32QAM, AQPSK LTE: QPSK, 16QAM, 64QAM
NUMBER OF CARRIERS	Maximum 4carriers (1 - 3 GSM carriers and 1 - 2 LTE carriers)
ITU DESIGNATION OF EMISSION	GSM: 250KGXW, 250KG7W LTE: 1M40F9W, 3M00F9W, 5M00F9W, 10M0F9W, 15M0F9W
OUTPUT POWER (RMS) (W or dBm)	GSM/LTE Mix Carrier (x2): GSM + LTE: 47.8dBm (60W)
	GSM/LTE Mix Carrier (x3): 2 x GSM + LTE: 47.8dBm (60W)
	GSM/LTE Mix Carrier (x4): 3 x GSM + LTE: 47.8dBm (60W) 2 x GSM + 2 x LTE: 47.8dBm (60W)
OUTPUT POWER TOLERANCE	± 2.0dB
INSTANTANEOUS BANDWIDTH	20MHz
CHANNEL BANDWIDTH	GSM: 250kHz LTE: 1.4MHz, 3MHz, 5MHz, 10MHz and 15MHz according to 3GPP TS 36.141
NUMBER OF ANTENNA PORTS	1 TX/RX port and 1 RX port
FCC ID	TA8AKRC11864-2
IC ID	287AB-AS118642
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Radio Part of GSM, LTE Base Station.

Signature

Date

26 March 2014

D of B S Serial No

75926313/01

No responsibility will be accepted by TÜV SÜD Product Service as to the accuracy of the information declared in this document by the manufacturer.

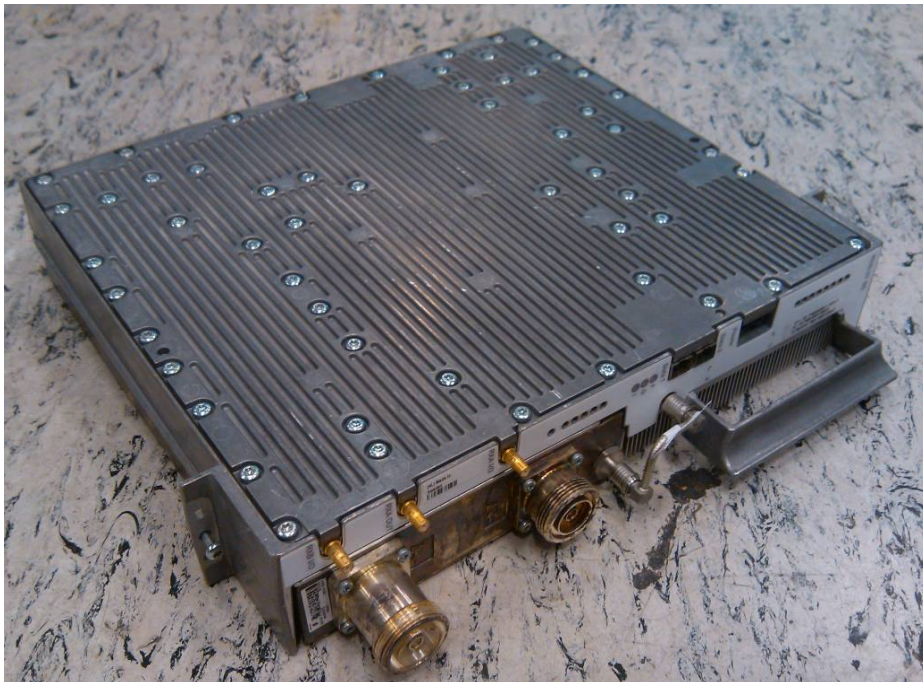


1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) RUS 01 B5 / KRC 118 64/2 is an Ericsson Radio Equipment working in the public mobile service 850MHz band which provides communication connections to GSM and LTE network. The RUS 01 B5 / KRC 118 64/2 operates from a - 48V DC supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturers documentation.



Equipment Under Test



1.4.2 Test Configuration

Configuration 1: Radio Equipment

The EUT was configured in accordance with FCC CFR 47 Part 22 and Industry Canada RSS-132.

The RUS 01 B5 / KRC 118 64/2 supports Multi-standard (GSM/LTE) configured for mix-carrier. GSM supports GMSK, 8-PSK, 16QAM, 64QAM and AQPSK defined in 3GPP TS 51.021, and LTE supports Test Models E-TM1.1 (QPSK), E-TM3.2 (16QAM) and E-TM3.1 (64QAM) defined in 3GPP TS 36.141 at 869-894MHz.

The EUT has only one TX/RX port. By combining two EUTs together, the EUTs were configured to transmit in LTE MIMO mode with two TX/RX ports (RF A1, RF A2) and two RX ports (RF B1, RF B2) at 850MHz.

The settings below were found to be representative for all modes when several settings, with the different modulations, number of carriers, and the channel bandwidth were tested to find the worst case setting. After the results were compared, the following settings were used for all measurements unless otherwise noted:

- GSM/LTE Mix Carrier:

LTE operates in TX MIMO mode with Test Model E-TM1.1 (QPSK).

GSM operates with all GSM timeslots activated, using GMSK modulation.

The Output Power settings as below:

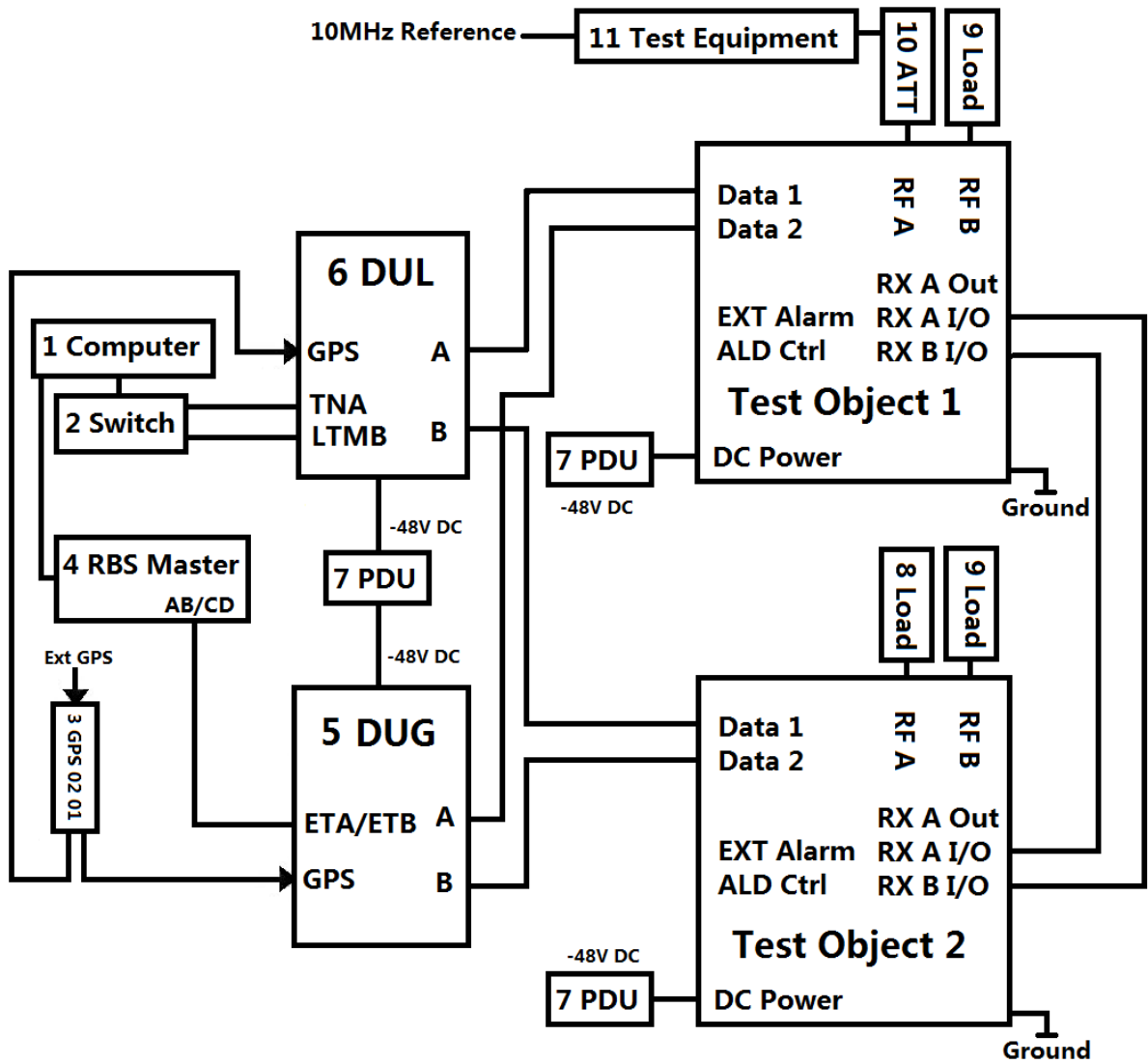
Mix Carriers	The Output Power Settings	Bandwidth for LTE
	Antenna Port A1 / A2	
x2	30W(G) & 30W(L)	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
x3	20W(G) & 20W(G) & 20W(L)	1.4MHz, 3MHz, 5MHz, 10MHz
x4	15W(G) & 15W(G) & 15W(G) & 15W(L)	1.4MHz, 3MHz, 5MHz
	15W(G) & 15W(G) & 15W(L) & 15W(L)	1.4MHz, 3MHz, 5MHz

All TX measurements were performed on the combined TX/RX output connector RF A1 of the EUTs. RX testing was performed on the RX connector RF B1 of the EUT when the EUT was set as single transmitter. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

The EUT was powered by a -48V DC Power supply.



Test Setup, Conducted Measurement:





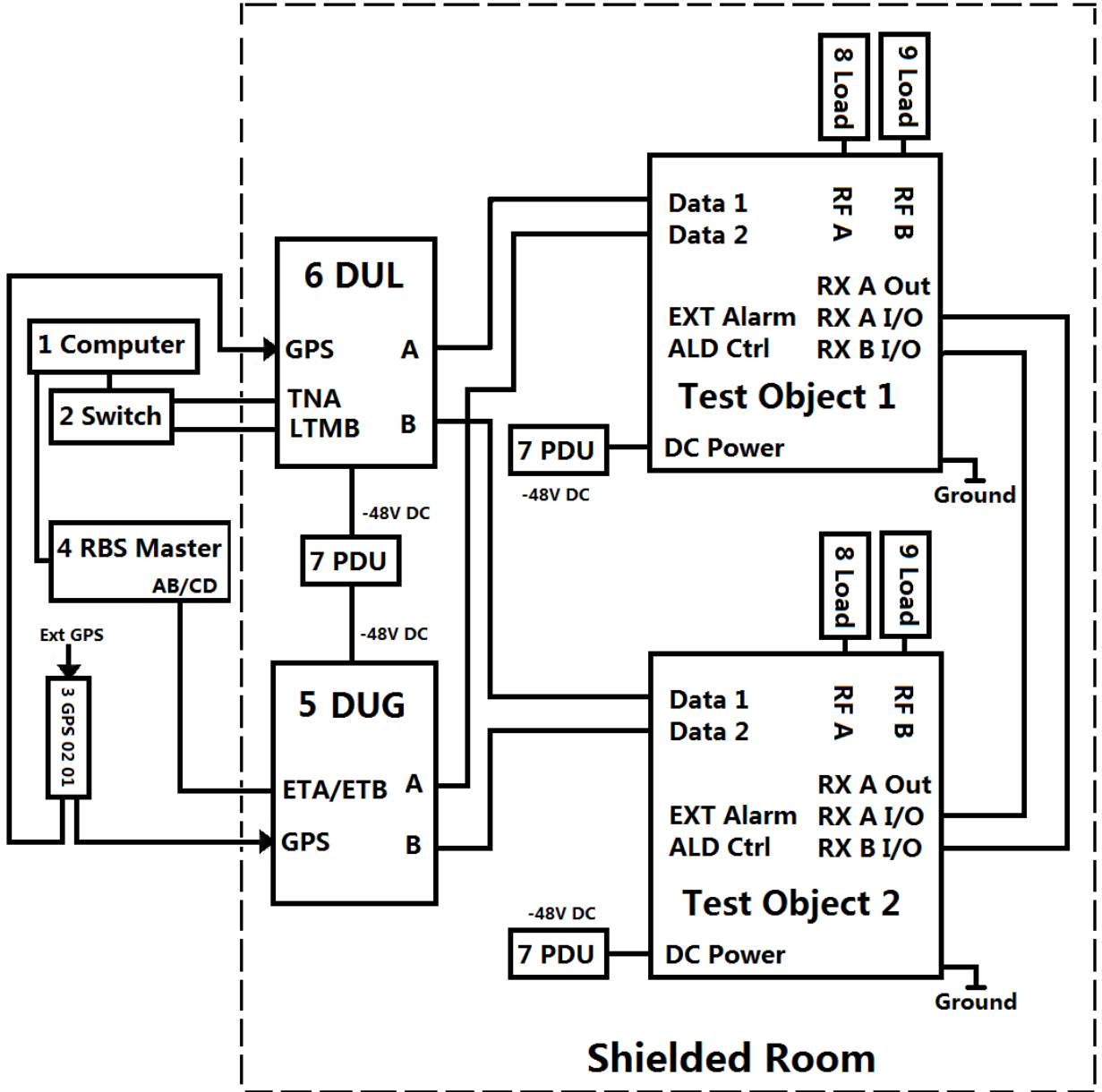
Product Service

Product Name	Product Number	Version	Serial Number
RUS 01 B5	KRC 118 64/2	R2A	C824752731
RUS 01 B5	KRC 118 64/2	R2A	C824772345

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8530w	--	AP103078
2	Switch	TL-HP8MU	--	05300902892
3	GPS 02 01	NCD 901 41/1	R1D	TU8K595208
4	RBS Master	LPY 107 1007/3	R1C	T01E050944
5	RBS 6601	BFL 901 009/1	--	--
	DUG 20 01	KDU 137 569/1	R3C	D166616487
	SUP 6601	1/BFL 901 009/1	R3B	BR81262578
6	RBS 6601	BFL 901 009/1	--	--
	DUL 20 01	KDU 137 533/4	R2A	D166926358
	SUP 6601	1/BFL 901 009/1	R3B	BR80908065
7	Power Supply	DH1716-5D	--	2008040041
	Power Supply	DH1716A-10	--	ETQ-123
8	Load	TF100	--	09121648
9	Load	TFE5-3	--	090323194
	Load	TFE5-3	--	090323220
10	40dB Attenuator	66-40-43	--	CE6211
11	Power Meter	Rohde & Schwarz NRP	--	101283
	Power Sensor	Rohde & Schwarz NRP-Z51	--	102310
	Spectrum Analyzer	FSQ26	--	100253



Test Setup, Radiated Measurement:





Product Service

Product Name	Product Number	Version	Serial Number
RUS 01 B5	KRC 118 64/2	R2A	C824752731
RUS 01 B5	KRC 118 64/2	R2A	C824772345

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8530w	--	AP103078
2	Switch	TL-HP8MU	--	05300902892
3	GPS 02 01	NCD 901 41/1	R1D	TU8K595208
4	RBS Master	LPY 107 1007/3	R1C	T01E050944
5	RBS 6601	BFL 901 009/1	--	--
	DUG 20 01	KDU 137 569/1	R3C	D166616487
	SUP 6601	1/BFL 901 009/1	R3B	BR81262578
6	RBS 6601	BFL 901 009/1	--	--
	DUL 20 01	KDU 137 533/4	R2A	D166926358
	SUP 6601	1/BFL 901 009/1	R3B	BR80908065
7	Power Supply	DH1716-5D	--	2008040041
	Power Supply	DH1716A-10	--	ETQ-123
8	Load	TF100	--	09121648
	Load	TF100	--	09121605
9	Load	TFE5-3	--	090323194
	Load	TFE5-3	--	090323220



1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

L1.4 denotes LTE network with 1.4MHz channel bandwidth.

L3 denotes LTE network with 3MHz channel bandwidth.

L5 denotes LTE network with 5MHz channel bandwidth.

L10 denotes LTE network with 10MHz channel bandwidth.

L15 denotes LTE network with 15MHz channel bandwidth.

G denotes GSM network.

L denotes LTE network.

GSM/LTE MSR:

Mix Carrier(x2): 1G (30W) + 1L (30W)

Mode 1 - G&L1.4, G&L3, G&L5, G&L10, G&L15

MSR	Channel No.	Frequencies (MHz)
G&L	129(G) & 2486(L)	869.4+877.6

Mode 2 - G&L1.4, G&L3, G&L5, G&L10, G&L15

MSR	Channel No.	Frequencies (MHz)
G&L	167(G) & 2570(L)	877.0+886.0

Mode 3 - L1.4&G, L3&G, L5&G, L10&G, L15&G

MSR	Channel No.	Frequencies (MHz)
L(1.4, 3, 5, 10)&G	2576(L) & 250(G)	886.6+893.6
L15&G	2525(L) & 250(G)	881.5+893.6

Mix Carrier(x3): 2G (2x20W) + 1L (1x20W)

Mode 4 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10

MSR	Channel No.	Frequencies (MHz)
G&G&L	129(G) & 137(G) & 2550(L)	869.4+871.0+884.0

Mode 5 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10

MSR	Channel No.	Frequencies (MHz)
G&G&L	140(G) & 148(G) & 2550(L)	871.6+873.2+884.0

Mode 6 - L1.4&G&G, L3&G&G, L5&G&G, L10&G&G

MSR	Channel No.	Frequencies (MHz)
L&G&G	2515(L) & 242(G) & 250(G)	880.5+892.0+893.6



Mix Carrier(x4): 3G (3x15W) + 1L (1x15W)

Mode 7 - G&G&G&L1.4, G&G&G&L3, G&G&G&L5

MSR	Channel No.	Frequencies (MHz)
G&G&G&L1.4	140(G) & 148(G) & 156(G) & 2600(L)	871.6+873.2+874.8+889.0
G&G&G&L3	140(G) & 148(G) & 156(G) & 2600(L)	871.6+873.2+874.8+889.0
G&G&G&L5	140(G) & 148(G) & 156(G) & 2600(L)	871.6+873.2+874.8+889.0

Mix Carrier(x4): 2G (2x15W) + 2L (2x15W)

Mode 8 - G&G&L1.4&L1.4, G&G&L3&L3, G&G&L5&L5

MSR	Channel No.	Frequencies (MHz)
G&G&L1.4&L1.4	140(G) & 148(G) & 2520(L) & 2550(L)	871.6+873.2+881.0+884.0
G&G&L3&L3	140(G) & 148(G) & 2520(L) & 2550(L)	871.6+873.2+881.0+884.0
G&G&L5&L5	140(G) & 148(G) & 2500(L) & 2550(L)	871.6+873.2+879.0+884.0

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



Product Service

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a -48V DC supply.

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.8 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV SÜD Product Service conducted the following tests at Ericsson in Beijing, China:

- RF Output Power – Conducted
- Peak - Average Ratio
- Spurious Emissions at Antenna Terminals (± 1 MHz)
- Conducted Spurious Emissions
- Receiver Spurious Emissions

Only Radiated Spurious Emission testing has been performed under the following site registrations:

FCC Accreditation 413514:

TA Beijing Limited, Building B-4, No.1 JingHai 3rd Road, BDA East Park, Beijing, 100176, China

Industry Canada Accreditation 10852A-1:

TA Beijing Limited, Building B-4, No.1 JingHai 3rd Road, BDA East Park, Beijing, 100176, China



Product Service

SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Ericsson RUS 01 B5 / KRC 118 64/2



Product Service

2.1 RF OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
 FCC CFR 47 Part 22, Clause 22.913 (a)
 Industry Canada RSS-132, Clause 5.4

2.1.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824752731

2.1.3 Date of Test and Modification State

19 to 24 March 2014 – Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132.

Using a power meter and attenuator(s), the output power of the EUTs was measured at the antenna terminal without antenna.

The path loss was measured and entered to the power meter as a reference level offset to get the output power value directly.

Not all modes and modulations were tested, the modes with LTE modulation E-TM1.1 that produced the worst case intermodulation product level were tested with the other supported modulation schemes.

The test was performed with the EUT in the following configurations and modes of operation:

- Configuration 1 - Mode 1 - G&L1.4, G&L3, G&L5, G&L10, G&L15
 - Mode 2 - G&L1.4, G&L3, G&L5, G&L10, G&L15
 - Mode 3 - L1.4&G, L3&G, L5&G, L10&G, L15&G
 - Mode 4 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10
 - Mode 5 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10
 - Mode 6 - L1.4&G&G, L3&G&G, L5&G&G, L10&G&G
 - Mode 7 - G&G&G&L1.4, G&G&G&L3, G&G&G&L5
 - Mode 8 - G&G&L1.4&L1.4, G&G&L3&L3, G&G&L5&L5

2.1.6 Environmental Conditions

Ambient Temperature	22.5 – 23.6°C
Relative Humidity	20.5 – 25.0%



2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 for RF Output Power.

The test results are shown below

Antenna RF A1 and RF A2

Mix Carrier(x2): 1G+1L

Declarative Maximum Output Power:

G&L1.4, G&L3, G&L5, G&L10, G&L15 : 47.8dBm

Configuration 1 - Mode 1 - G&L1.4, G&L3, G&L5, G&L10, G&L15

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&L1.4	129 & 2486	869.4+877.6	47.39	54.83
G&L3	129 & 2486	869.4+877.6	47.40	54.95
G&L5	129 & 2486	869.4+877.6	47.38	54.70
G&L10	129 & 2486	869.4+877.6	47.34	54.20
G&L15	129 & 2486	869.4+877.6	47.25	53.09

GSM (GMSK) & LTE (E-TM3.2)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&L1.4	129 & 2486	869.4+877.6	47.34	54.20
G&L3	129 & 2486	869.4+877.6	47.37	54.58
G&L5	129 & 2486	869.4+877.6	47.35	54.33
G&L10	129 & 2486	869.4+877.6	47.30	53.70
G&L15	129 & 2486	869.4+877.6	47.22	52.72

GSM (GMSK) & LTE (E-TM3.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&L1.4	129 & 2486	869.4+877.6	47.35	54.33
G&L3	129 & 2486	869.4+877.6	47.38	54.70
G&L5	129 & 2486	869.4+877.6	47.39	54.83
G&L10	129 & 2486	869.4+877.6	47.30	53.70
G&L15	129 & 2486	869.4+877.6	47.26	53.21



Configuration 1 - Mode 2 - G&L1.4, G&L3, G&L5, G&L10, G&L15

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&L1.4	167 & 2570	877.0+886.0	47.40	54.95
G&L3	167 & 2570	877.0+886.0	47.47	55.85
G&L5	167 & 2570	877.0+886.0	47.42	55.21
G&L10	167 & 2570	877.0+886.0	47.45	55.59
G&L15	167 & 2570	877.0+886.0	47.41	55.08

GSM (GMSK) & LTE (E-TM3.2)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&L1.4	167 & 2570	877.0+886.0	47.38	54.70
G&L3	167 & 2570	877.0+886.0	47.43	55.34
G&L5	167 & 2570	877.0+886.0	47.42	55.21
G&L10	167 & 2570	877.0+886.0	47.42	55.21
G&L15	167 & 2570	877.0+886.0	47.40	54.95

GSM (GMSK) & LTE (E-TM3.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&L1.4	167 & 2570	877.0+886.0	47.40	54.95
G&L3	167 & 2570	877.0+886.0	47.42	55.21
G&L5	167 & 2570	877.0+886.0	47.43	55.34
G&L10	167 & 2570	877.0+886.0	47.43	55.34
G&L15	167 & 2570	877.0+886.0	47.42	55.21

Configuration 1 - Mode 3 - L1.4&G, L3&G, L5&G, L10&G, L15&G

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
L1.4&G	2576 & 250	886.6+893.6	47.31	53.83
L3&G	2576 & 250	886.6+893.6	47.32	53.95
L5&G	2576 & 250	886.6+893.6	47.32	53.95
L10&G	2576 & 250	886.6+893.6	47.28	53.46
L15&G	2525 & 250	881.5+893.6	47.25	53.09

**GSM (GMSK) & LTE (E-TM3.2)**

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
L1.4&G	2576 & 250	886.6+893.6	47.30	53.70
L3&G	2576 & 250	886.6+893.6	47.32	53.95
L5&G	2576 & 250	886.6+893.6	47.29	53.58
L10&G	2576 & 250	886.6+893.6	47.25	53.09
L15&G	2525 & 250	881.5+893.6	47.24	52.97

GSM (GMSK) & LTE (E-TM3.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
L1.4&G	2576 & 250	886.6+893.6	47.29	53.58
L3&G	2576 & 250	886.6+893.6	47.32	53.95
L5&G	2576 & 250	886.6+893.6	47.31	53.83
L10&G	2576 & 250	886.6+893.6	47.28	53.46
L15&G	2525 & 250	881.5+893.6	47.24	52.97

Mix Carrier(x3): 2G+1L

Declarative Maximum Output Power:

G&G&L1.4, G&G&L3, G&G&L5, G&G&L10: 47.8dBm

Configuration 1 - Mode 4 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4	129 & 137 & 2550	869.4+871.0+884.0	47.10	51.29
G&G&L3	129 & 137 & 2550	869.4+871.0+884.0	47.11	51.40
G&G&L5	129 & 137 & 2550	869.4+871.0+884.0	47.19	52.36
G&G&L10	129 & 137 & 2550	869.4+871.0+884.0	47.19	52.36

GSM (GMSK) & LTE (E-TM3.2)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4	129 & 137 & 2550	869.4+871.0+884.0	47.07	50.93

GSM (GMSK) & LTE (E-TM3.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4	129 & 137 & 2550	869.4+871.0+884.0	47.05	50.70



Configuration 1 - Mode 5 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4	140 & 148 & 2550	871.6+873.2+884.0	47.20	52.48
G&G&L3	140 & 148 & 2550	871.6+873.2+884.0	47.24	52.97
G&G&L5	140 & 148 & 2550	871.6+873.2+884.0	47.30	53.70
G&G&L10	140 & 148 & 2550	871.6+873.2+884.0	47.31	53.83

GSM (GMSK) & LTE (E-TM3.2)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4	140 & 148 & 2550	871.6+873.2+884.0	47.18	52.24
G&G&L3	140 & 148 & 2550	871.6+873.2+884.0	47.22	52.72
G&G&L5	140 & 148 & 2550	871.6+873.2+884.0	47.27	53.33
G&G&L10	140 & 148 & 2550	871.6+873.2+884.0	47.29	53.58

GSM (GMSK) & LTE (E-TM3.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4	140 & 148 & 2550	871.6+873.2+884.0	47.18	52.24
G&G&L3	140 & 148 & 2550	871.6+873.2+884.0	47.20	52.48
G&G&L5	140 & 148 & 2550	871.6+873.2+884.0	47.32	53.95
G&G&L10	140 & 148 & 2550	871.6+873.2+884.0	47.29	53.58

Configuration 1 - Mode 6 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
L1.4&G&G	2515 & 242 & 250	880.5+892.0+893.6	47.10	51.29
L3&G&G	2515 & 242 & 250	880.5+892.0+893.6	47.15	51.88
L5&G&G	2515 & 242 & 250	880.5+892.0+893.6	47.21	52.60
L10&G&G	2515 & 242 & 250	880.5+892.0+893.6	47.21	52.60

GSM (GMSK) & LTE (E-TM3.2)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
L1.4&G&G	2515 & 242 & 250	880.5+892.0+893.6	47.10	51.29

GSM (GMSK) & LTE (E-TM3.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
L1.4&G&G	2515 & 242 & 250	880.5+892.0+893.6	47.10	51.29



Product Service

Mix Carrier(x4): 3G+1L

Declarative Maximum Output Power:

G&G&G&L1.4, G&G&G&L3 : 46.0dBm

G&G&G&L5: 47.8dBm

Configuration 1 - Mode 7 - G&G&G&L1.4, G&G&G&L3, G&G&G&L5

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&G&L1.4	140 & 148 & 156 & 2600	871.6+873.2+874.8+889.0	46.14	41.11
G&G&G&L3	140 & 148 & 156 & 2600	871.6+873.2+874.8+889.0	46.17	41.40
G&G&G&L5	140 & 148 & 156 & 2600	871.6+873.2+874.8+889.0	47.28	53.46

Mix Carrier(x4): 2G+2L

Declarative Maximum Output Power:

G&G&L1.4&L1.4, G&G&L3&L3, G&G&L5&L5: 47.8dBm

Configuration 1 - Mode 8 - G&G&L1.4&L1.4, G&G&L3&L3, G&G&L5&L5

GSM (GMSK) & LTE (E-TM1.1)

MSR	Channel No.	Frequency (MHz)	Result (dBm) RMS	Result (W) RMS
G&G&L1.4&L1.4	140 & 148 & 2520 & 2550	871.6+873.2+881.0+884.0	47.32	53.95
G&G&L3&L3	140 & 148 & 2520 & 2550	871.6+873.2+881.0+884.0	47.39	54.83
G&G&L5&L5	140 & 148 & 2500 & 2550	871.6+873.2+879.0+884.0	47.37	54.58

This unit is tested without antenna. ERP/EIRP compliance is addressed at the time of licensing, as required by responsible FCC/IC Bureau(s). Licensee's are required to take into account maximum allowed antenna gain used in combination with above power setting to prevent the radiated output power to exceed the limits.

Limit	≤820W or ≤+59.1dBm
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Remarks

The EUT does not exceed 820W or 59.1dBm at the measured frequencies.



Product Service

2.2 PEAK – AVERAGE RATIO

2.2.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.913 (a)
Industry Canada RSS-132, Clause 5.4

2.2.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824752731

2.2.3 Date of Test and Modification State

19 to 24 March 2014 – Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 22.

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

The measurements were performed on the combined output connector RF A1. Limited complementary measurement were done at the output connector RF A2 to verify identical performance for both transmitter chains.

The path loss measured and entered as a reference level offset.

Not all modes and modulation schemes were tested, the worst case results were determined as being with LTE bandwidth of 1.4MHz. As a minimum, all modes were tested with a 1.4MHz LTE bandwidth, however other bandwidths were tested for some modes.

The test was performed with the EUT in the following configurations and modes of operation:

- Configuration 1 - Mode 1 - G&L1.4
 - Mode 2 - G&L1.4, G&L3, G&L5, G&L10, G&L15
 - Mode 3 - L1.4&G
 - Mode 4 - G&G&L1.4
 - Mode 5 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10
 - Mode 6 - L1.4&G&G
 - Mode 7 - G&G&G&L1.4, G&G&G&L3, G&G&G&L5
 - Mode 8 - G&G&L1.4&L1.4, G&G&L3&L3, G&G&L5&L5



Product Service

2.2.6 Environmental Conditions

Ambient Temperature 22.5 – 23.6°C
 Relative Humidity 20.5 – 25.0%

2.2.7 Test Results

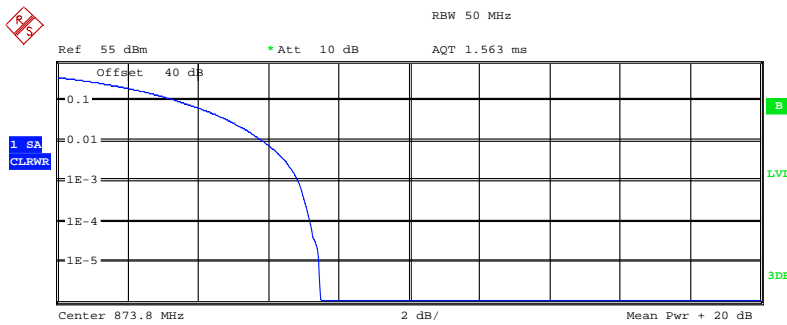
For the period of test the EUT met the requirements of FCC CFR 47 Part 22 Peak – Average Ratio.

The test results are shown below.

Mix Carrier(x2): 1G+1L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 1 - G&L1.4



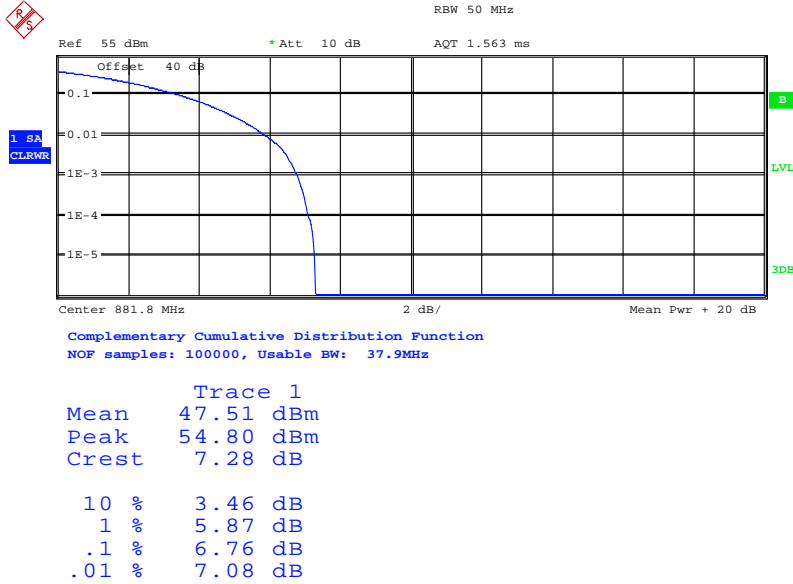
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.41 dBm
Peak	54.88 dBm
Crest	7.47 dB
10 %	3.43 dB
1 %	5.83 dB
.1 %	6.86 dB
.01 %	7.18 dB

Date: 19.MAR.2014 10:24:16

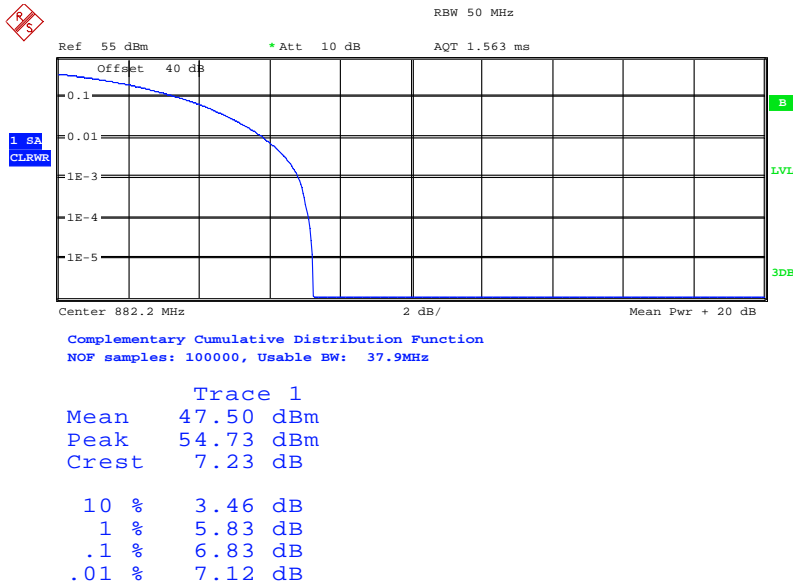


Configuration 1 - Mode 2 - G&L1.4



Date: 20.MAR.2014 09:49:35

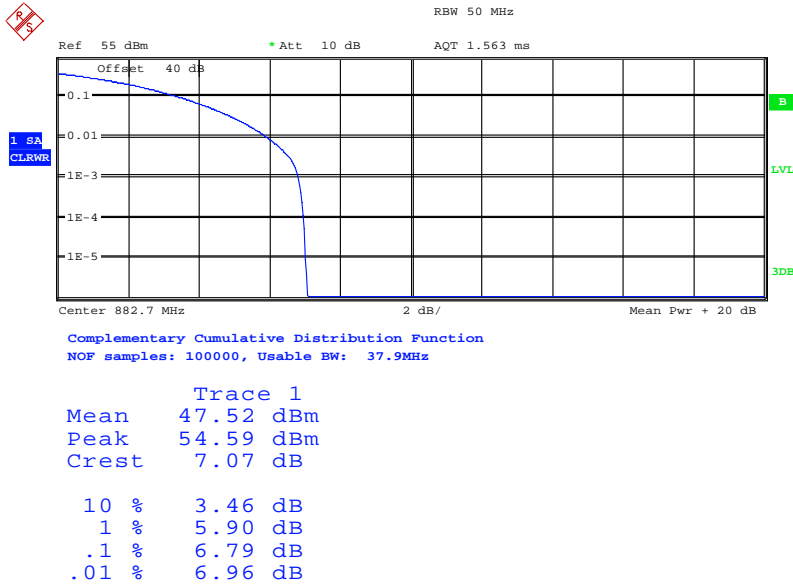
Configuration 1 - Mode 2 - G&L3



Date: 20.MAR.2014 10:35:45

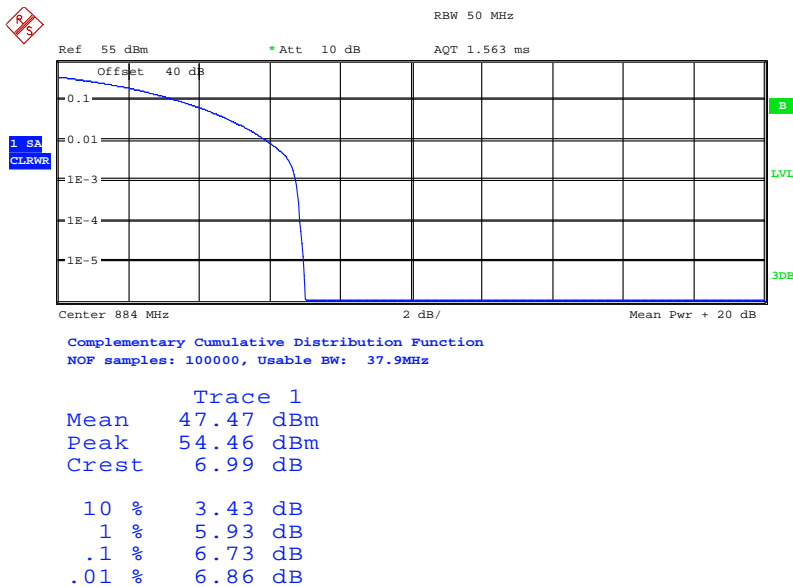


Configuration 1 - Mode 2 - G&L5



Date: 20.MAR.2014 10:45:40

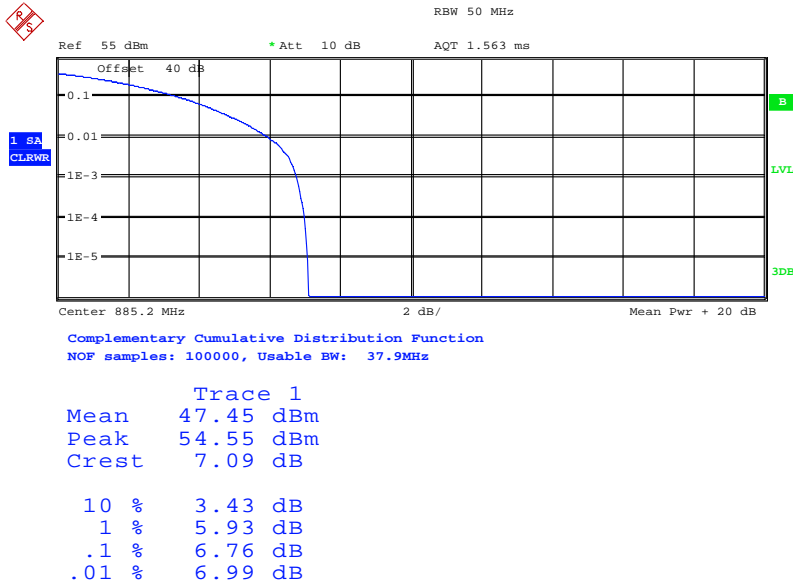
Configuration 1 - Mode 2 - G&L10



Date: 20.MAR.2014 11:05:46

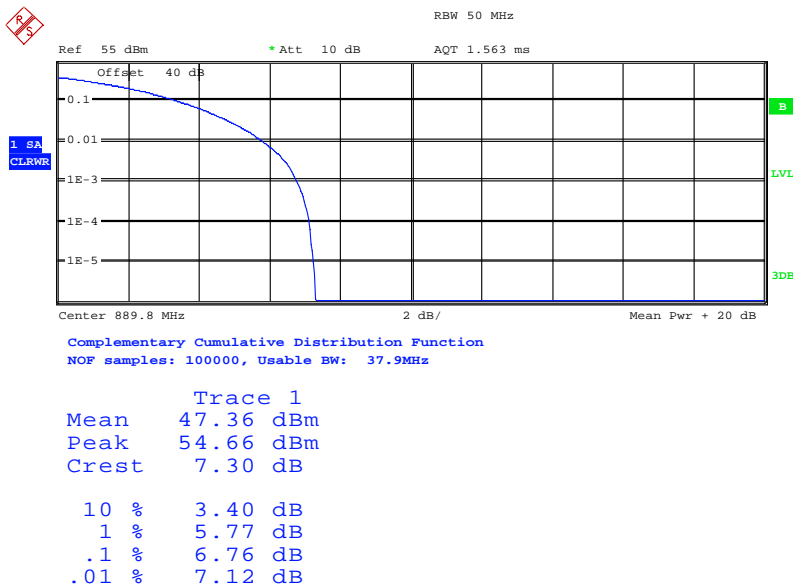


Configuration 1 - Mode 2 - G&L15



Date: 20.MAR.2014 11:13:37

Configuration 1 - Mode 3 - L1.4&G

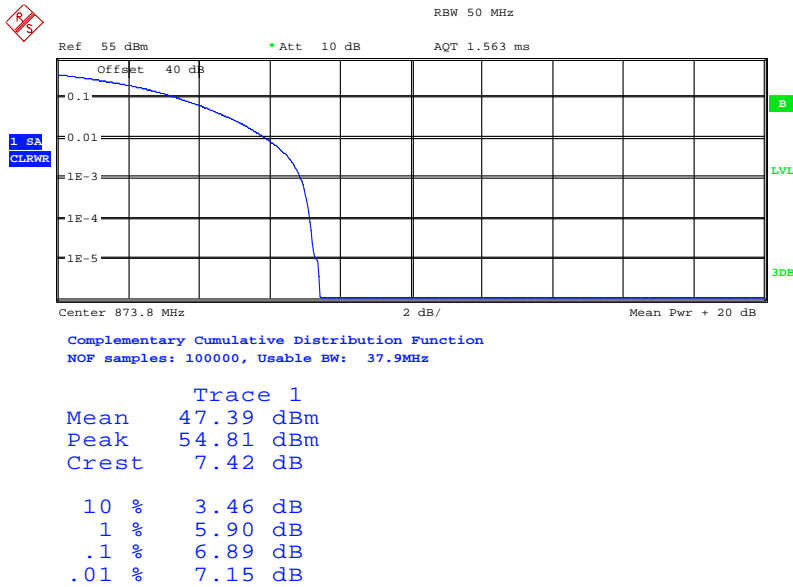


Date: 19.MAR.2014 14:24:18



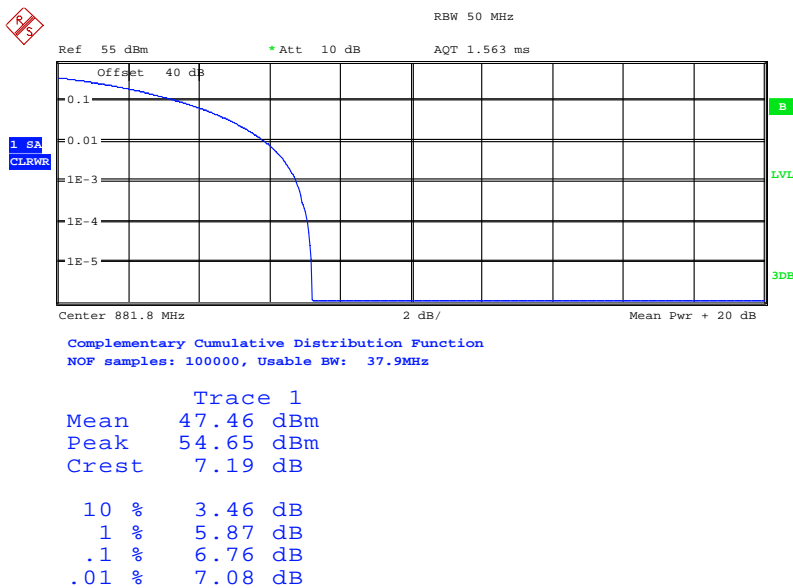
GSM (GMSK) & LTE (E-TM3.2)

Configuration 1 - Mode 1 - G&L1.4



Date: 19.MAR.2014 11:03:47

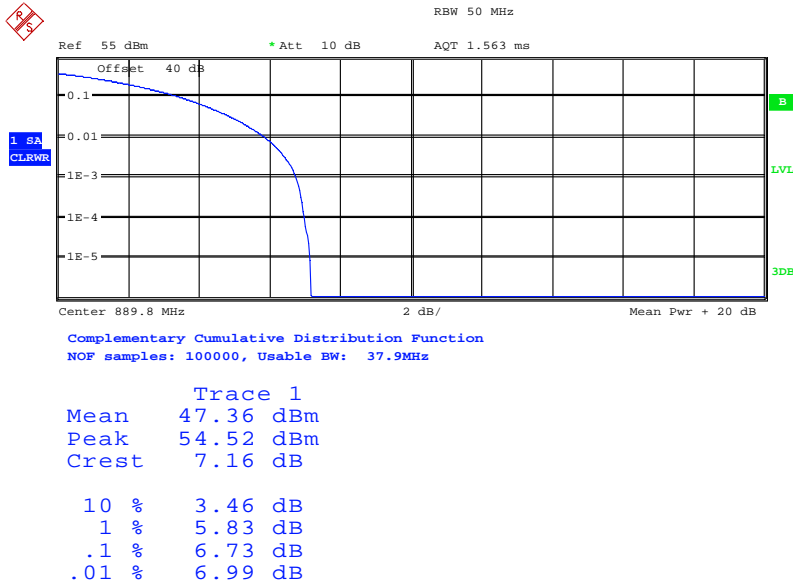
Configuration 1 - Mode 2 - G&L1.4



Date: 20.MAR.2014 10:04:19



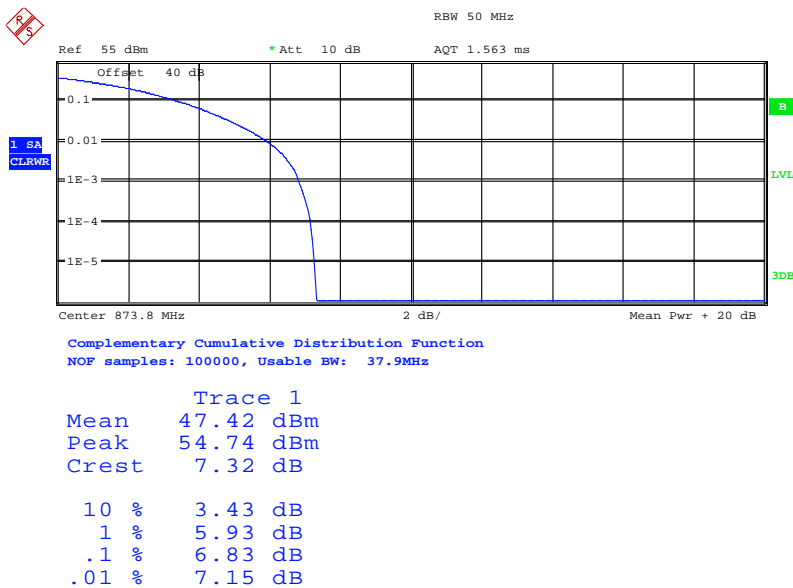
Configuration 1 - Mode 3 - L1.4&G



Date: 19.MAR.2014 15:10:39

GSM (GMSK) & LTE (E-TM3.1)

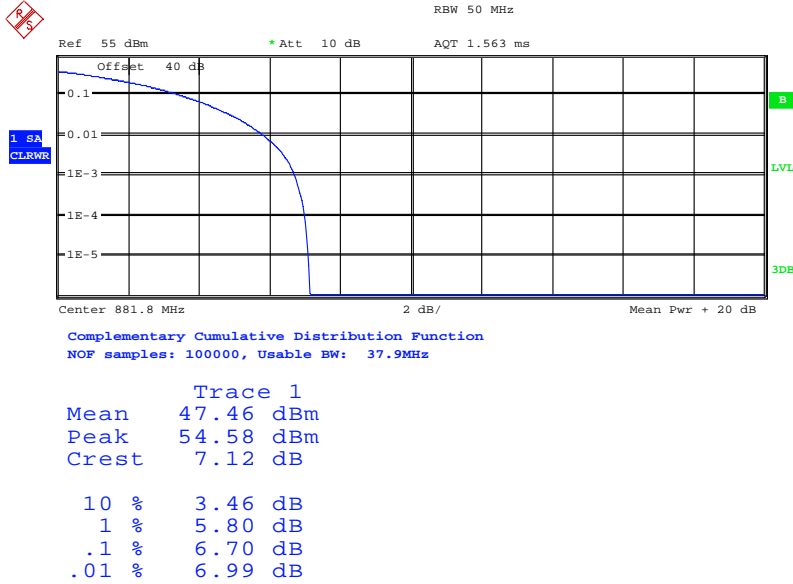
Configuration 1 - Mode 1 - G&L1.4



Date: 19.MAR.2014 10:57:59

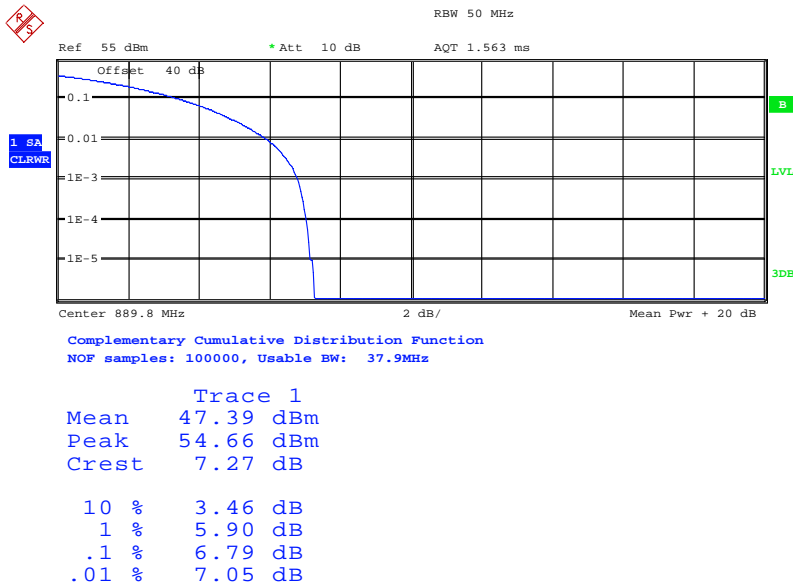


Configuration 1 - Mode 2 - G&L1.4



Date: 20.MAR.2014 09:52:05

Configuration 1 - Mode 3 - L1.4&G



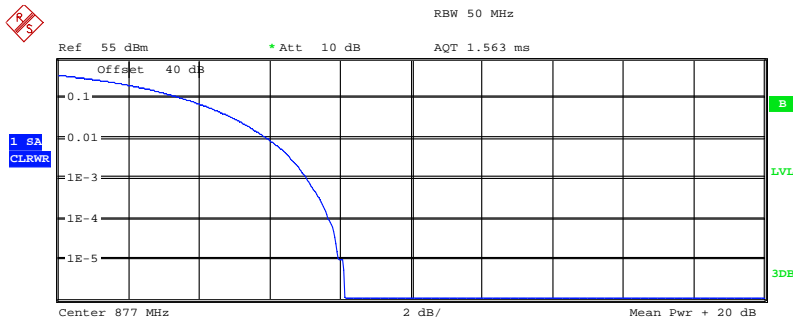
Date: 19.MAR.2014 15:03:54



Mix Carrier (x3): 2G+1L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 4 - G&G&L1.4

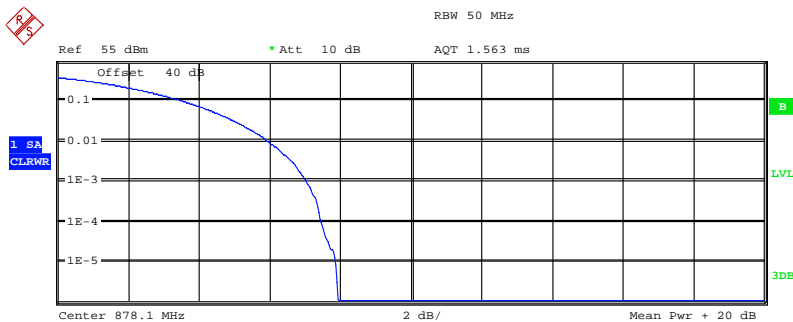


Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.19 dBm
Peak	55.32 dBm
Crest	8.13 dB
10 %	3.56 dB
1 %	5.93 dB
.1 %	7.05 dB
.01 %	7.66 dB

Date: 20.MAR.2014 13:22:32

Configuration 1 - Mode 5 - G&G&L1.4



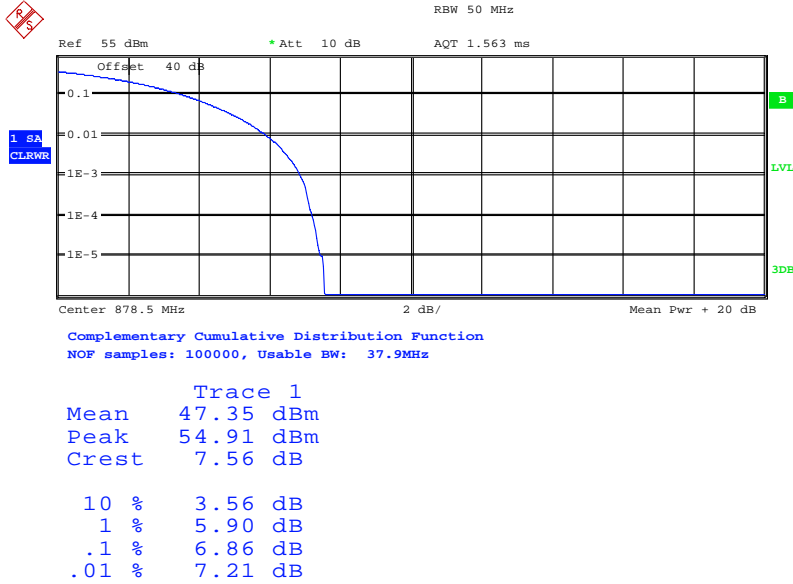
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.26 dBm
Peak	55.19 dBm
Crest	7.92 dB
10 %	3.56 dB
1 %	5.93 dB
.1 %	7.02 dB
.01 %	7.47 dB

Date: 20.MAR.2014 16:47:37

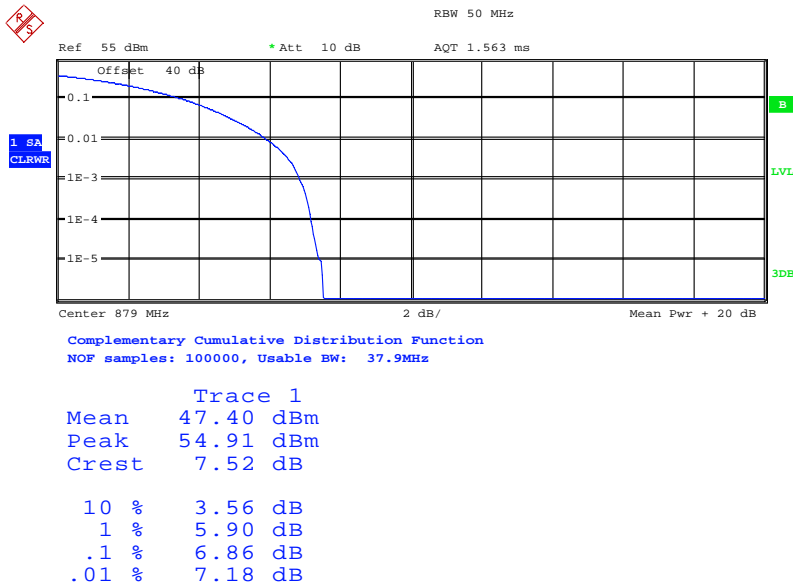


Configuration 1 - Mode 5 - G&G&L3



Date: 20.MAR.2014 17:06:43

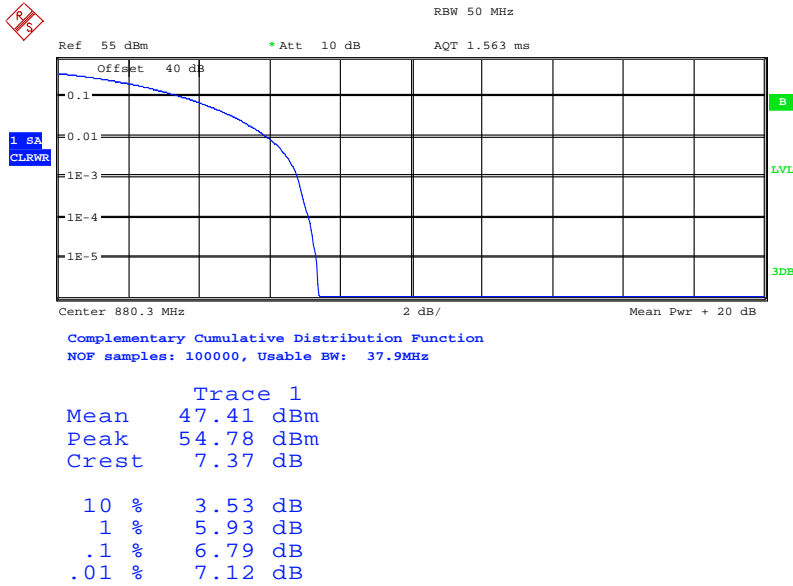
Configuration 1 - Mode 5 - G&G&L5



Date: 21.MAR.2014 09:49:39

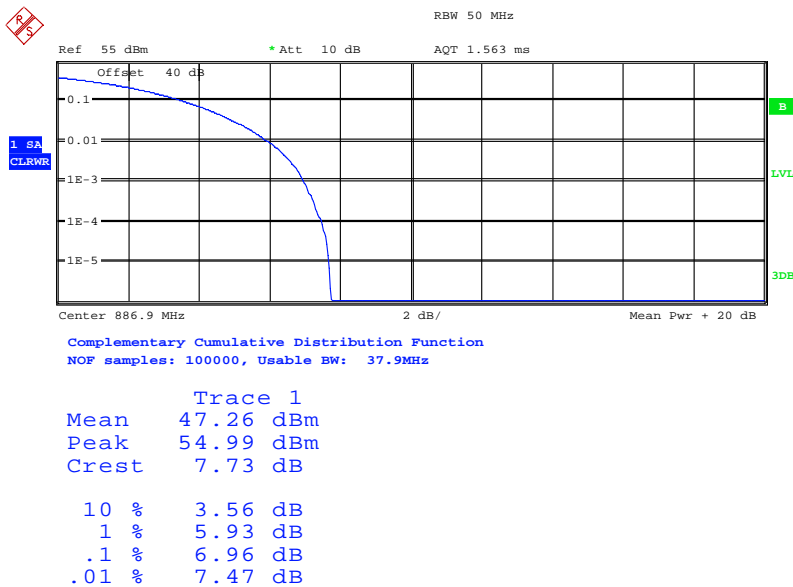


Configuration 1 - Mode 5 - G&G&L10



Date: 21.MAR.2014 10:06:19

Configuration 1 - Mode 6 - L1.4&G&G

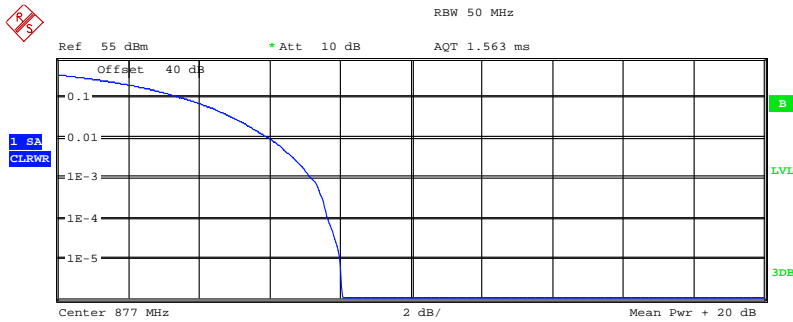


Date: 20.MAR.2014 15:33:48



GSM (GMSK) & LTE (E-TM3.2)

Configuration 1 - Mode 4 - G&G&L1.4

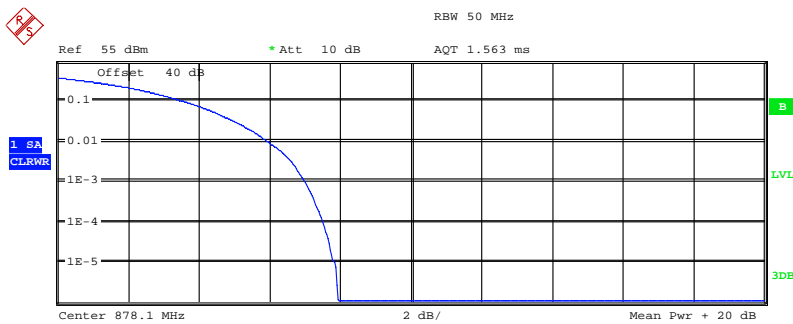


Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.14 dBm
Peak	55.18 dBm
Crest	8.05 dB
10 %	3.59 dB
1 %	5.99 dB
.1 %	7.18 dB
.01 %	7.63 dB

Date: 20.MAR.2014 13:38:40

Configuration 1 - Mode 5 - G&G&L1.4



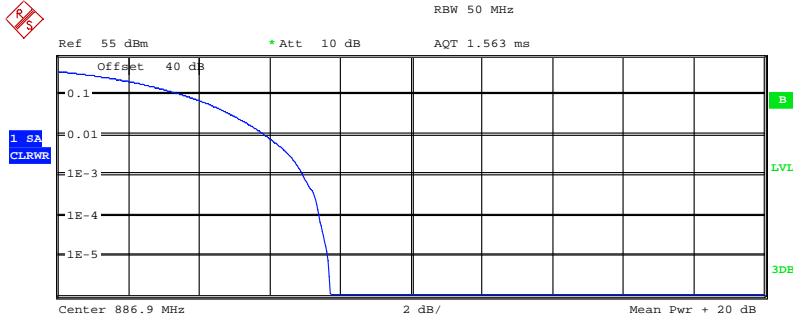
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.27 dBm
Peak	55.19 dBm
Crest	7.92 dB
10 %	3.59 dB
1 %	5.93 dB
.1 %	6.99 dB
.01 %	7.50 dB

Date: 20.MAR.2014 16:54:19



Configuration 1 - Mode 6 - L1.4&G&G



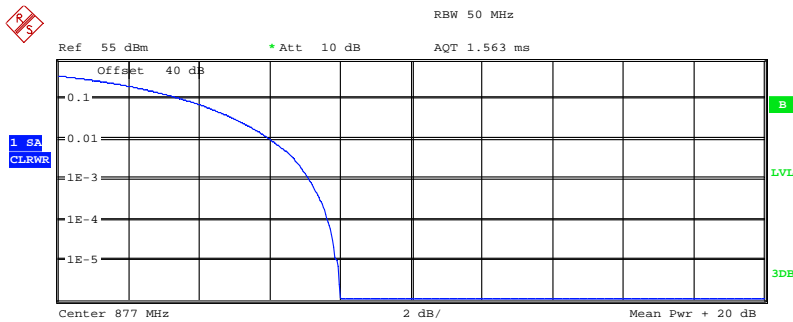
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.29 dBm
Peak	54.99 dBm
Crest	7.70 dB
10 %	3.56 dB
1 %	5.87 dB
.1 %	6.96 dB
.01 %	7.40 dB

Date: 20.MAR.2014 15:40:16

GSM (GMSK) & LTE (E-TM3.1)

Configuration 1 - Mode 4 - G&G&L1.4



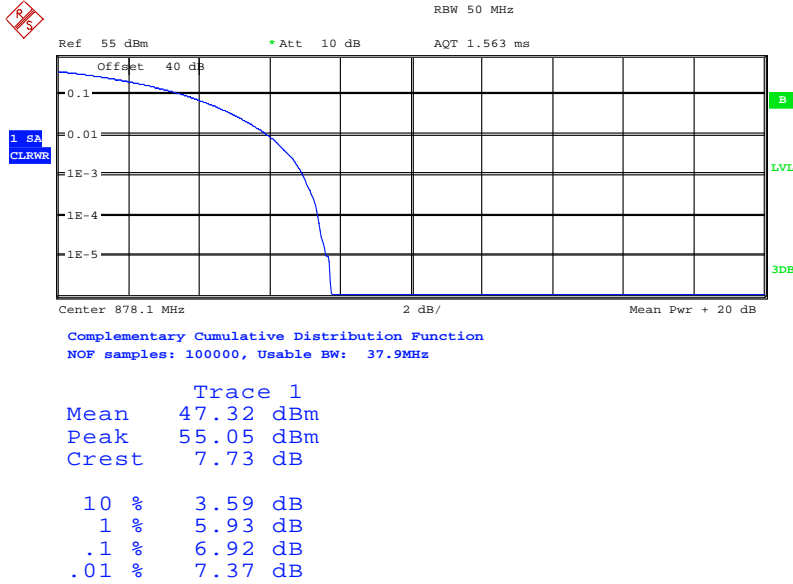
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.20 dBm
Peak	55.18 dBm
Crest	7.99 dB
10 %	3.56 dB
1 %	6.03 dB
.1 %	7.12 dB
.01 %	7.63 dB

Date: 20.MAR.2014 13:36:55

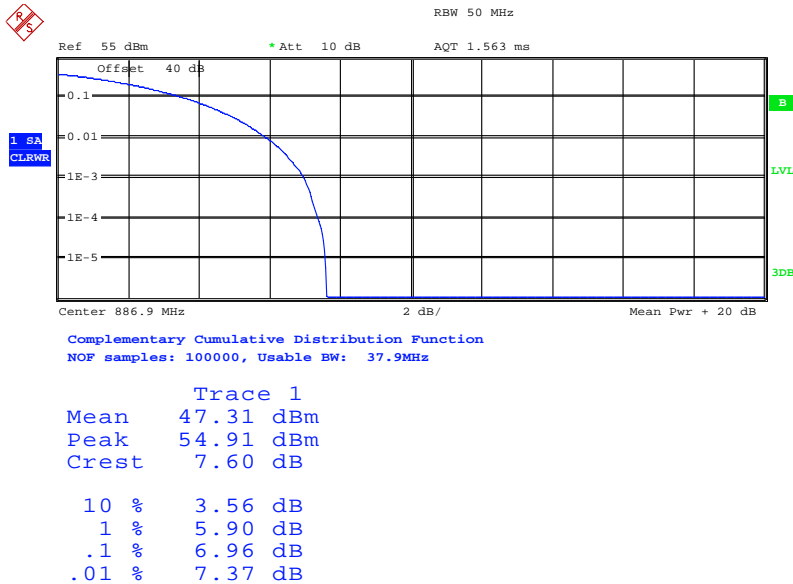


Configuration 1 - Mode 5 - G&G&L1.4



Date: 20.MAR.2014 16:45:15

Configuration 1 - Mode 6 - L1.4&G&G



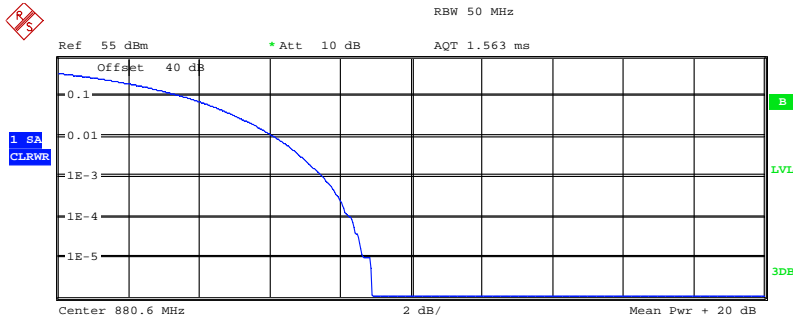
Date: 20.MAR.2014 15:30:55



Mix Carrier (x4): 3G+1L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 7 - G&G&G&L1.4

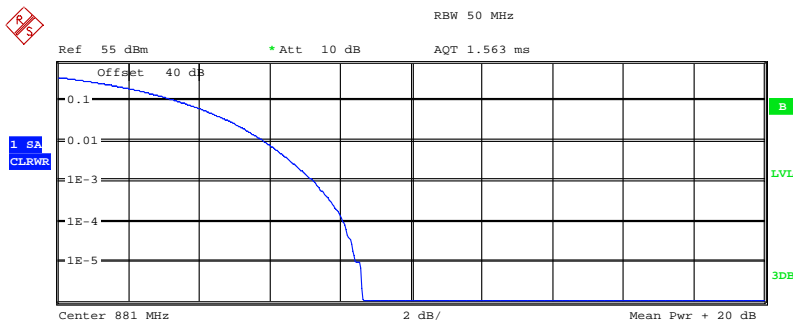


Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	46.31 dBm
Peak	55.21 dBm
Crest	8.90 dB
10 %	3.56 dB
1 %	6.12 dB
.1 %	7.50 dB
.01 %	8.27 dB

Date: 24.MAR.2014 14:45:31

Configuration 1 - Mode 7 - G&G&G&L3



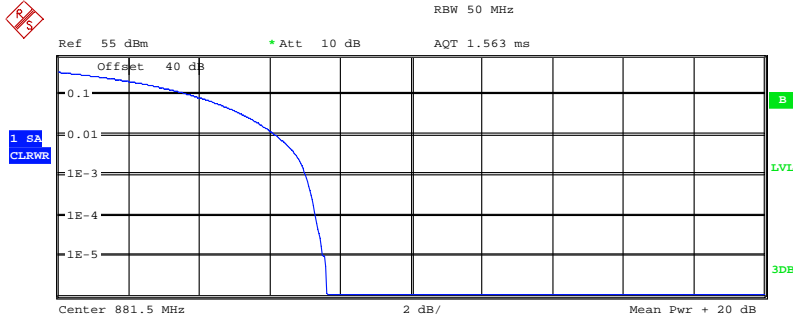
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	46.31 dBm
Peak	54.93 dBm
Crest	8.62 dB
10 %	3.40 dB
1 %	5.83 dB
.1 %	7.24 dB
.01 %	8.08 dB

Date: 24.MAR.2014 15:02:38



Configuration 1 - Mode 7 - G&G&G&L5



Center 881.5 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

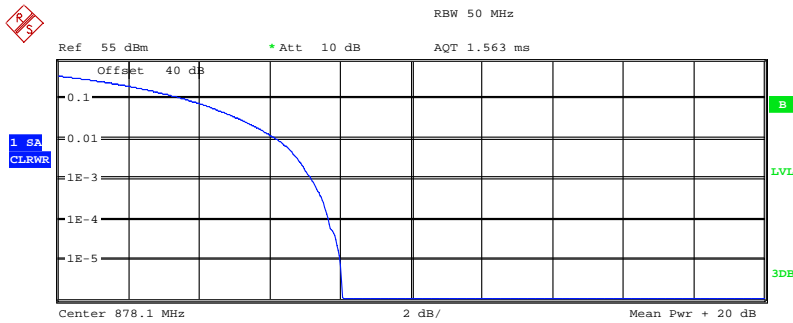
Trace 1	
Mean	47.38 dBm
Peak	55.00 dBm
Crest	7.62 dB
10 %	3.78 dB
1 %	6.15 dB
.1 %	7.02 dB
.01 %	7.31 dB

Date: 24.MAR.2014 15:41:45

Mix Carrier (x4): 2G+2L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 8 - G&G&L1.4&L1.4



Center 878.1 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

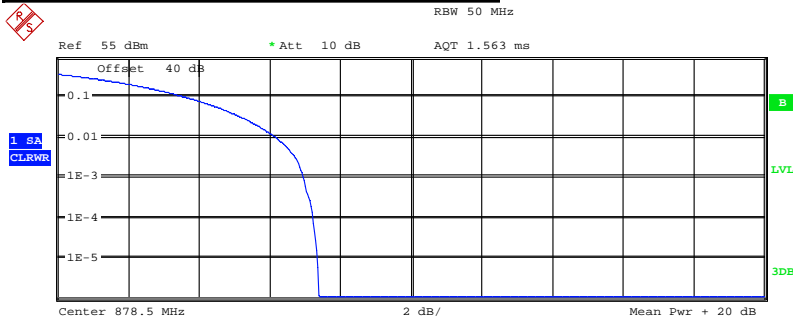
Trace 1	
Mean	47.49 dBm
Peak	55.54 dBm
Crest	8.05 dB
10 %	3.62 dB
1 %	6.19 dB
.1 %	7.18 dB
.01 %	7.66 dB

Date: 21.MAR.2014 15:41:59



Product Service

Configuration 1 - Mode 8 - G&G&L3&L3

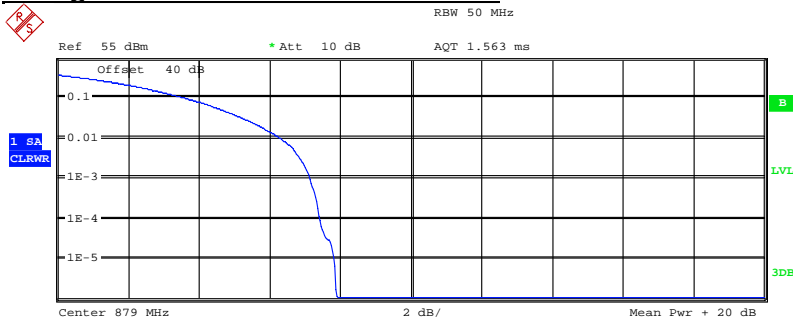


Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.46 dBm
Peak	54.84 dBm
Crest	7.38 dB
10 %	3.65 dB
1 %	6.15 dB
.1 %	6.96 dB
.01 %	7.24 dB

Date: 21.MAR.2014 15:57:40

Configuration 1 - Mode 8 - G&G&L5&L5



Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 37.9MHz

Trace 1	
Mean	47.45 dBm
Peak	55.34 dBm
Crest	7.88 dB
10 %	3.62 dB
1 %	6.28 dB
.1 %	7.15 dB
.01 %	7.40 dB

Date: 21.MAR.2014 16:35:16

Limit	13dB
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Remarks

The Peak – Average ratio does not exceed 13dB at the measured frequencies.



2.3 SPURIOUS EMISSIONS AT ANTENNA TERMINALS (± 1 MHz)

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.917(b)
Industry Canada RSS-132 Clause 5.5

2.3.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824752731

2.3.3 Date of Test and Modification State

20 March 2014 – Modification State 0

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132.

In accordance with 22.917(b), at least 1% of the emission bandwidth shall be used for the resolution bandwidth up to 1MHz away from the block edge and a RBW of 100kHz for measurements of emissions > 1MHz away from the band edges. The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10\log P$ dB. After calculation, the limit is -13dBm. As the EUT can operate in LTE MIMO mode, according to FCC KDB662911 D01 Multiple Transmitter Output v02r01, the limit should be adjusted with a correction of -3dB $[10\log(2)]$.

For GSM/LTE mix carrier(x2), with GSM signal at the edge, which is selected as the worst case. The RBW of 2kHz was used for frequencies offset up to 1MHz away from the band edge and 1% of the emission bandwidth was 3kHz, so the the correction of $10\log(2/3)$ was added to -13dBm. Due to LTE transmit in TX-MIMO in Mix carrier mode and the EUT has Two transmit ports, the limit was adjusted to -17.8dBm.

The resolution bandwidth of 100kHz was used between 1MHz to 5MHz away from the band edge. Spectrum analyzer detector was set as RMS.

The EUT was tested at it's maximum power level. The path loss was measured and entered to the test equipment as a reference level offset.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 4 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10
- Mode 6 - L1.4&G&G, L3&G&G, L5&G&G, L10&G&G



Product Service

2.3.6 Environmental Conditions

Ambient Temperature 22.5 – 23.6°C

Relative Humidity 20.5 – 25.0%

2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 for Spurious Emissions Antenna Terminals (±1MHz).

Below are the Frequencies the EUT was tested against along with the tested channels.

Mix Carrier(x3): 2G+1L

Configuration 1 - Mode 4 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10

Band Edge Frequency	Edge Test with GSM Channel No./Frequencies	RBW / VBW (kHz)	Limit (dB)
Bottom 869MHz	Channel: 129(G) & 137(G) & 2550(L) Frequency: 869.4+871.0+884.0	2 / 20	-17.8

Configuration 1 - Mode 6 - L1.4&G&G, L3&G&G, L5&G&G, L10&G&G

Band Edge Frequency	Edge Test with GSM Channel No./Frequencies	RBW / VBW (kHz)	Limit (dB)
Top 894MHz	Channel: 2515(L) & 242(G) & 250(G) Frequency: 880.5+892.0+893.6	2 / 20	-17.8

The channels shown in the table above are the minimum and maximum channels that can be used in the authorised frequency ranges to maintain compliance. Channels used outside of those stated and power levels used beyond those stated in the table exceed the specification limits, thus they cannot be used.

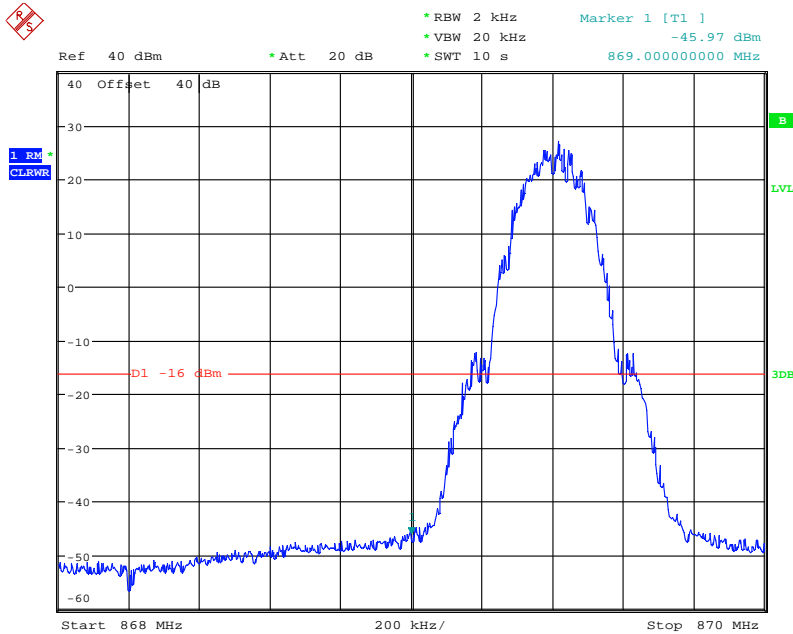
The test results are shown below



Mix Carrier(x3): 2G+1L

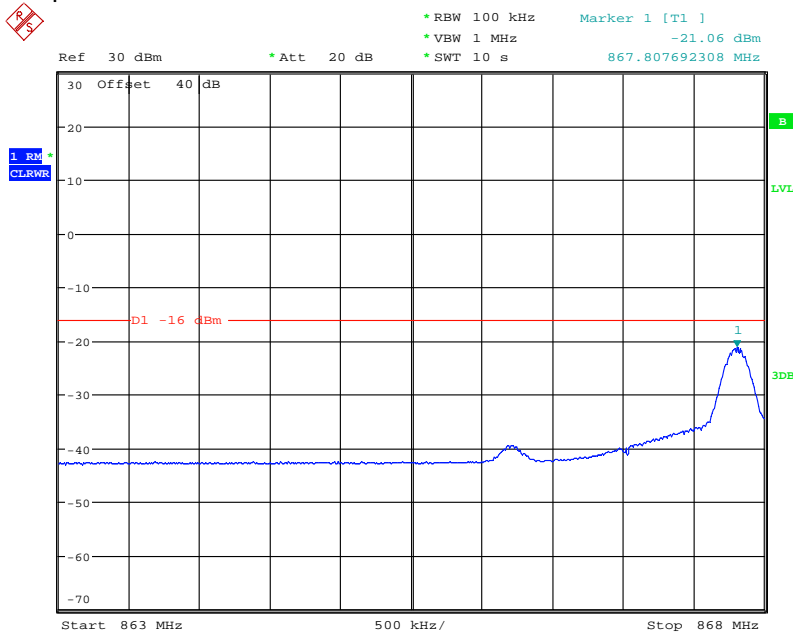
GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 4 - G&G&L1.4



Date: 20.MAR.2014 13:31:04

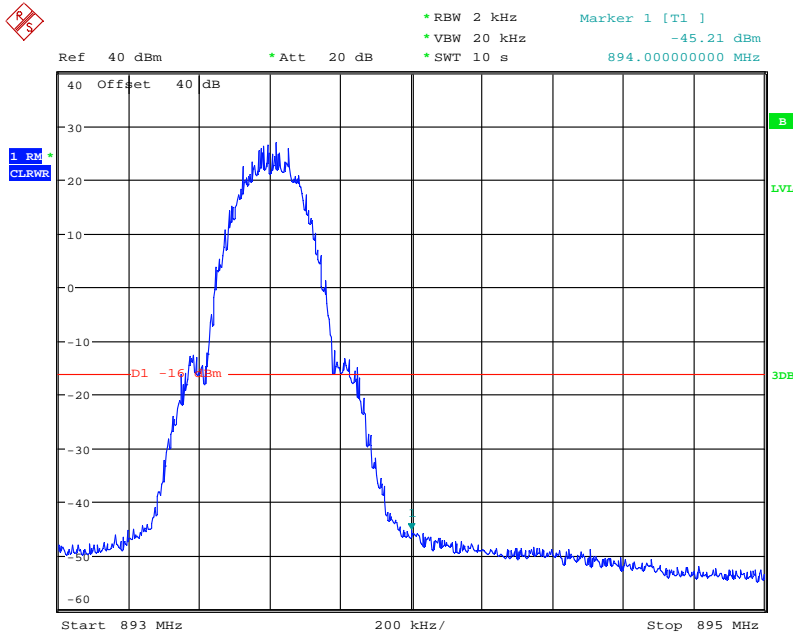
Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 13:32:45

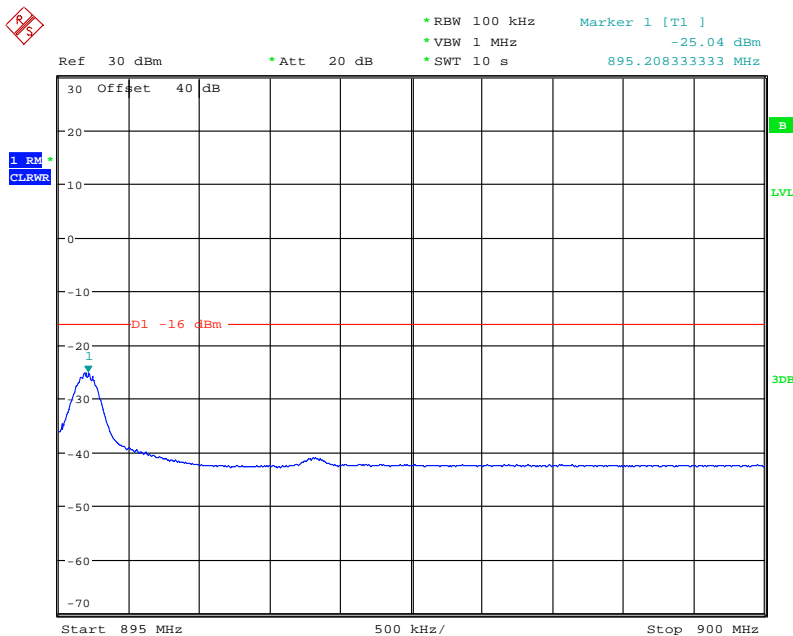


Configuration 1 - Mode 6 - L1.4&G&G



Date: 20.MAR.2014 15:25:32

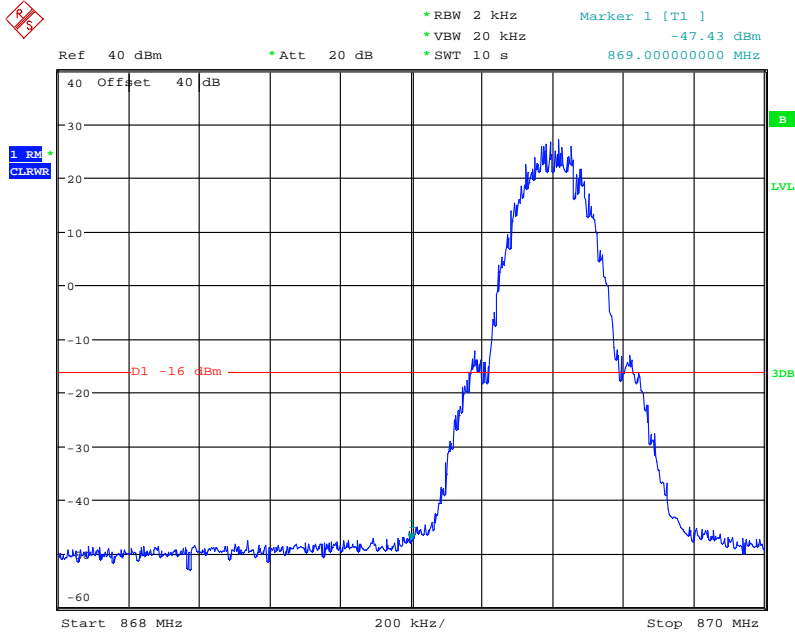
Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 15:26:47

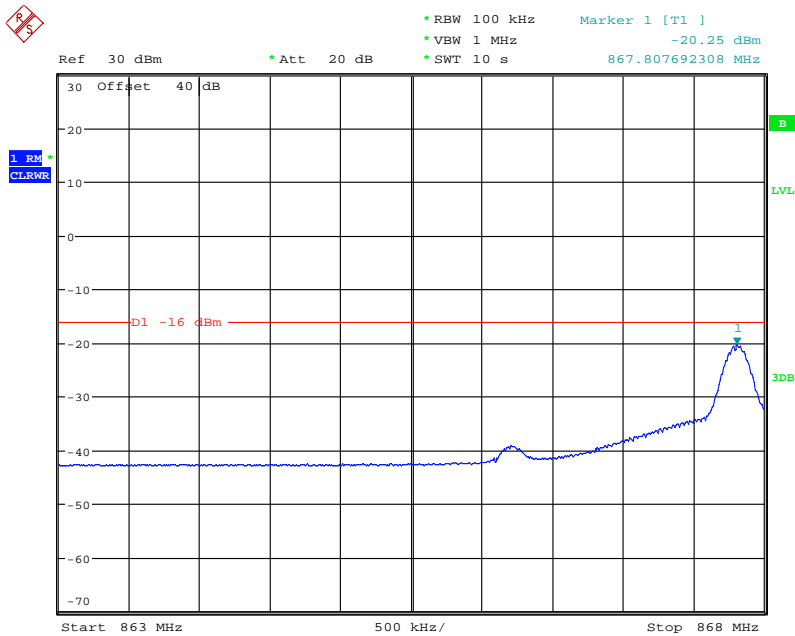


Configuration 1 - Mode 4 - G&G&L13



Date: 20.MAR.2014 13:51:37

Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.

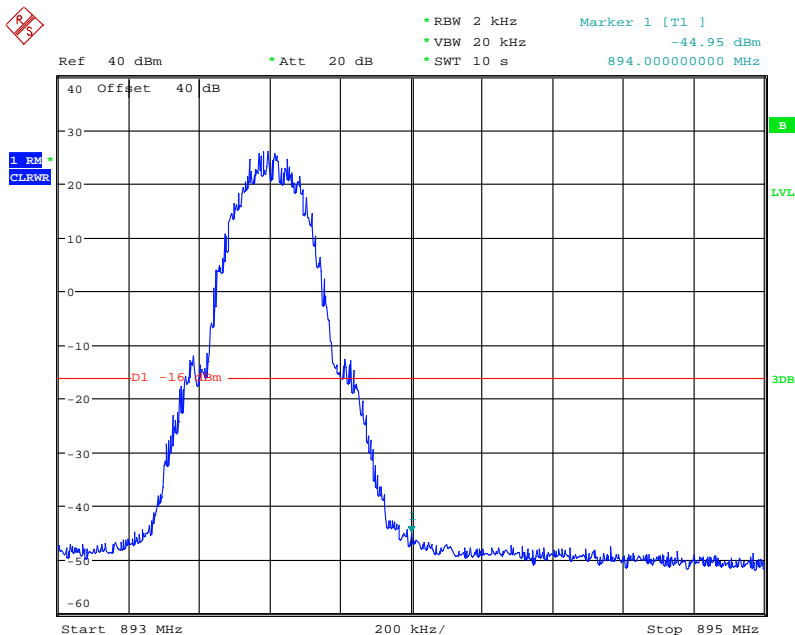


Date: 20.MAR.2014 13:47:49



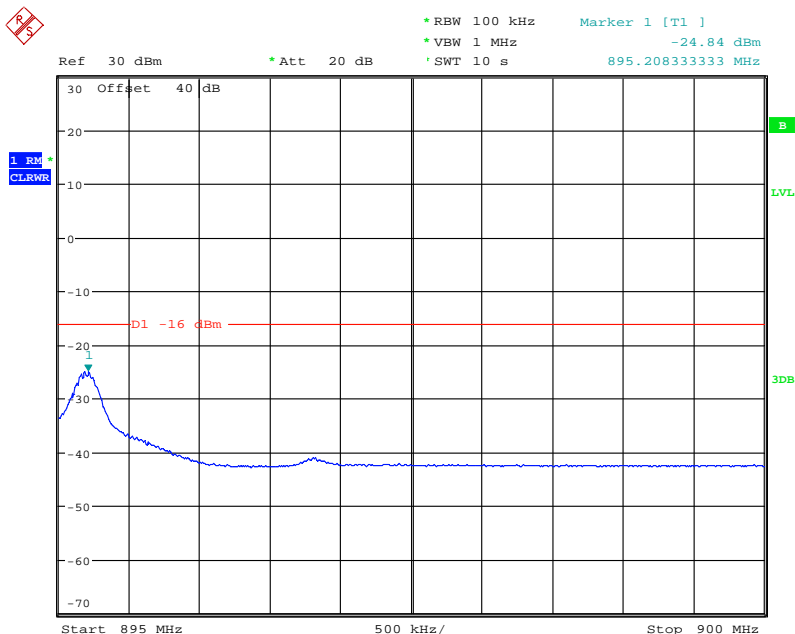
Product Service

Configuration 1 - Mode 6 - L3&G&G



Date: 20.MAR.2014 15:46:43

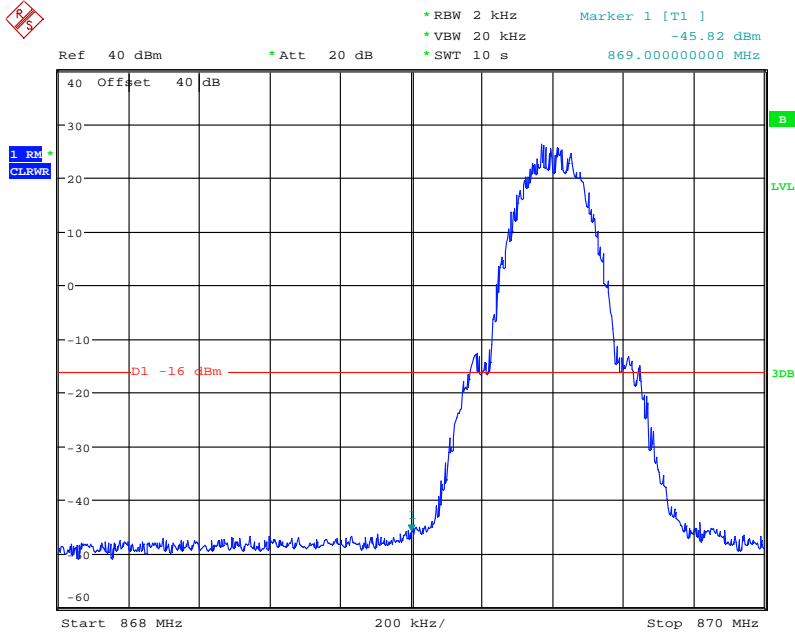
Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 15:45:34

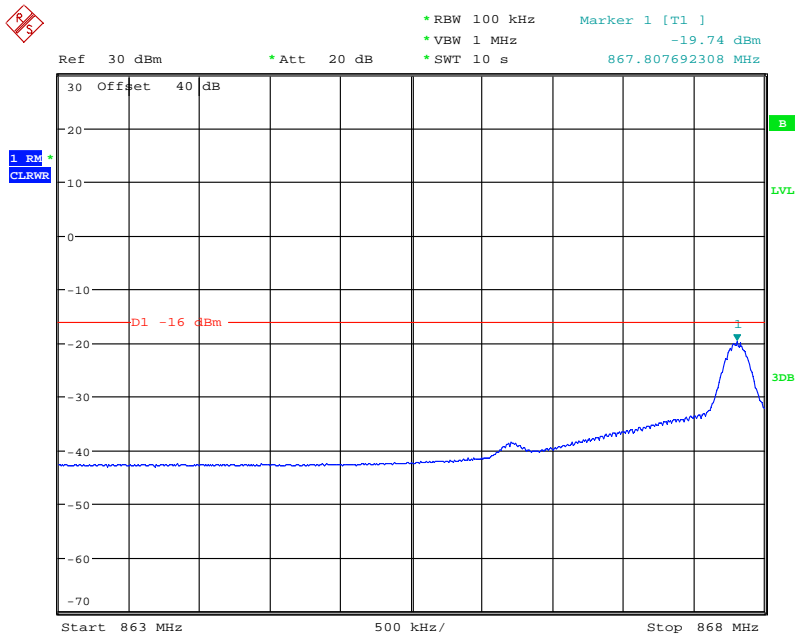


Configuration 1 - Mode 4 - G&G&L5



Date: 20.MAR.2014 14:29:39

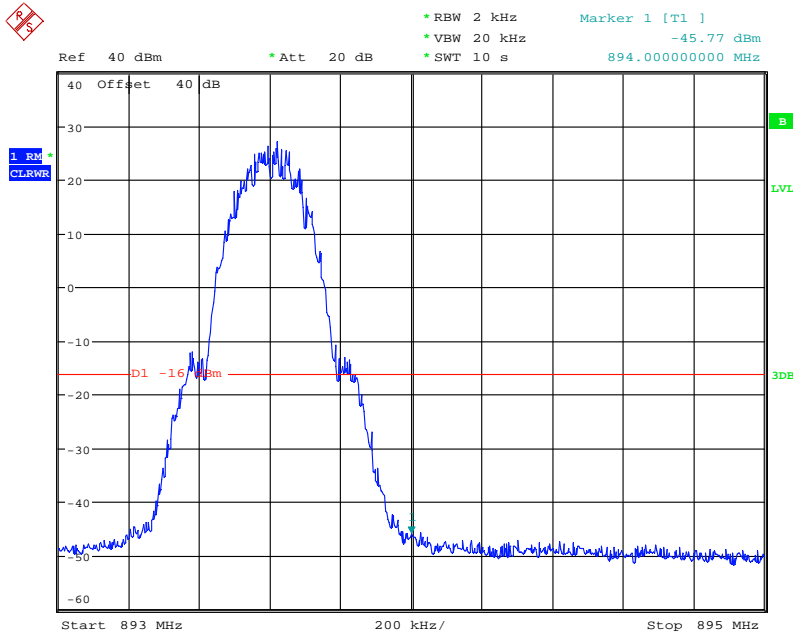
Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 14:31:05

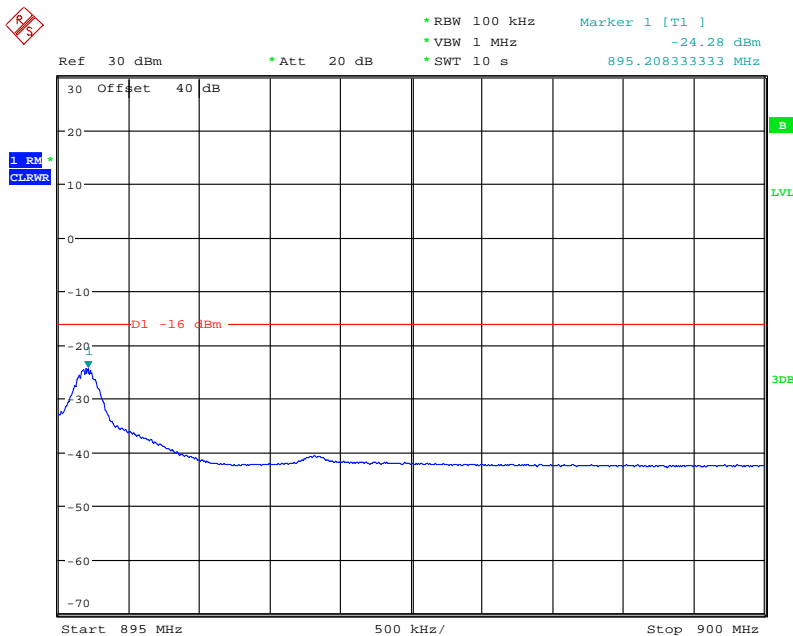


Configuration 1 - Mode 6 - L5&G&G



Date: 20.MAR.2014 16:08:58

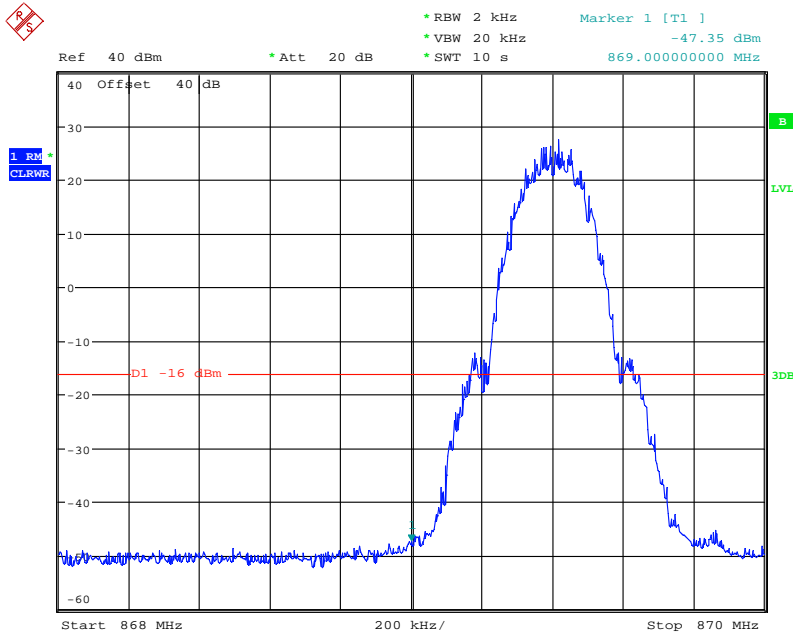
Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 16:03:04

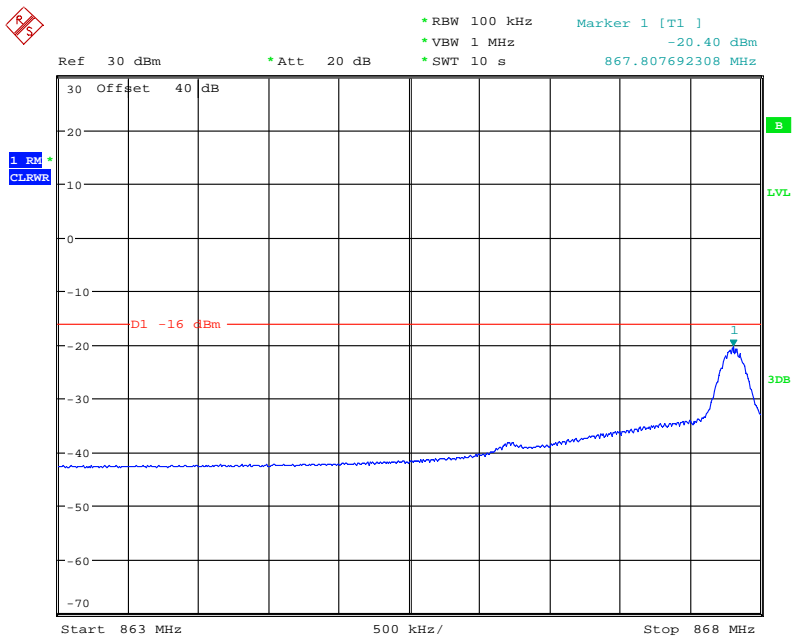


Configuration 1 - Mode 4 - G&G&L10



Date: 20.MAR.2014 14:46:54

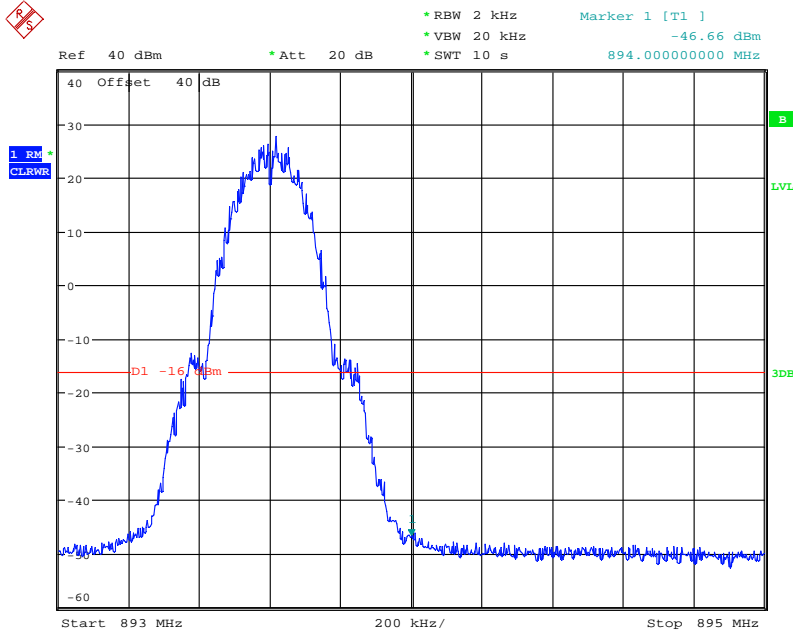
Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 14:46:04

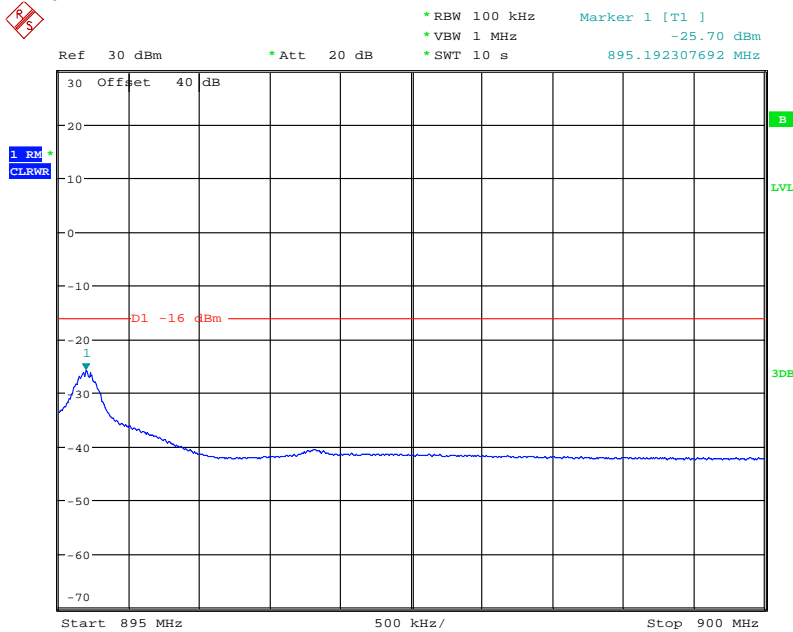


Configuration 1 - Mode 6 - L10&G&G



Date: 20.MAR.2014 16:20:41

Note: The results for frequencies offset up to 1MHz away from the band edge should be compared to a limit of -17.8dBm.



Date: 20.MAR.2014 16:19:14

Limit

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10\log P \text{ dB} + 10\log(\text{NANT})$.



Product Service

2.4 RADIATED SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 22, Clause 22.917 (a)
Industry Canada RSS-132, Clause 5.5

2.4.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824752731 / C824772345

2.4.3 Date of Test and Modification State

26 and 28 March 2014 – Modification State 0

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the chamber. Measurements of emissions from the EUT were obtained with the measurement antenna in both horizontal and vertical polarisations.

Emissions identified within the range 30MHz – 10GHz were then formally measured using a Peak detector as the worst case.

In the frequency Range 30MHz – 10GHz, the measurement was performed with a resolution bandwidth of 1MHz as the worst case.

The measurements were performed at a 3m distance unless otherwise stated.

The limits for Spurious Emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - $(43 + 10\text{Log}(P))$ dB

Where:

Field Strength is measured in dB μ V/m

P is measured Transmitter Power in Watts



Determination of Spurious Emission Limit

As the EUT does not have an integral antenna, the field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipole as per 2.1053 (a).

$$E_{(v/m)} = (30 \times G_i \times P_o)^{0.5} / d$$

Where G_i is the antenna gain of ideal half-wave dipoles,
 P_o is the power out of the transceiver in W,
 d is the measurement distance in meters.

Therefore at 3m measurement distance the field strength using the lowest transceiver output power would be:

$$E_{(v/m)} = (30 \times 1.64 \times 41.11)^{0.5} / 3 = 14.99V/m = 143.52dB\mu V/m$$

As per 22.917 (a) the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(41.11) = 59.14dB$$

Therefore the limit at 3m measurement distance is:

$$143.52 - 59.14 = 84.4dB\mu V/m$$

This limit has been used to determine pass or fail for the harmonics measured and detailed in the following results.

The test was performed with the EUT in the following configurations and modes of operation:

- Configuration 1 - Mode 1 - G&L1.4
- Mode 2 - G&L1.4, G&L3, G&L5, G&L10, G&L15
- Mode 3 - L1.4&G
- Mode 5 - G&G&L1.4
- Mode 7 - G&G&G&L1.4
- Mode 8 - G&G&L1.4&L1.4

2.4.6 Environmental Conditions

Ambient Temperature 22.4 – 24.6°C

Relative Humidity 28.5 – 35.5%



2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 & Part 22 and Industry Canada RSS-132 for Radiated Spurious Emissions.

The test results are shown below

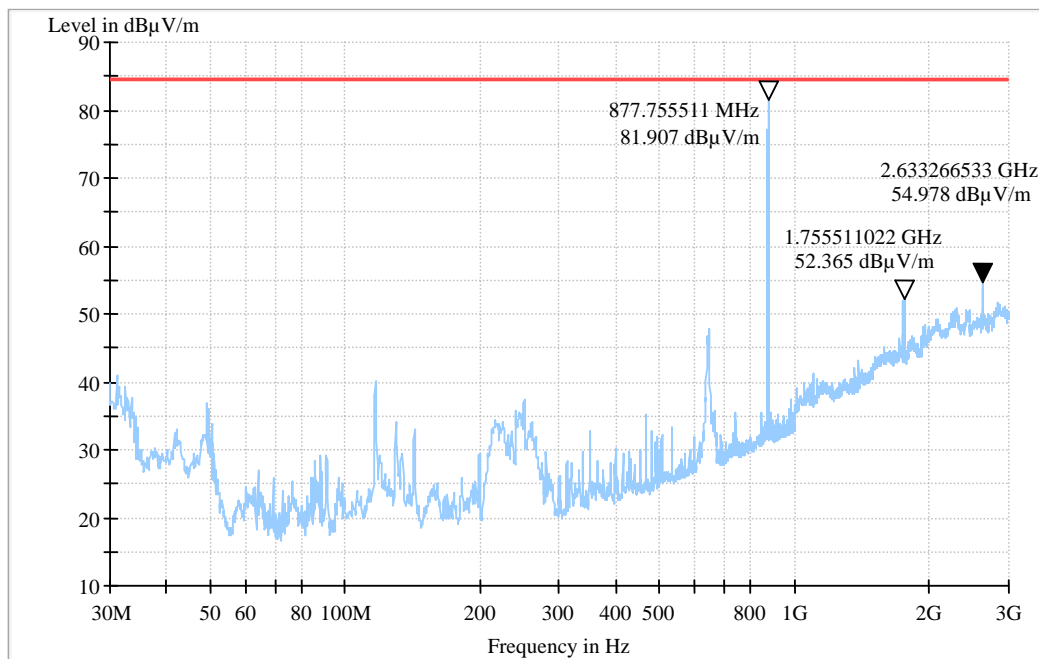
Note: Only the worst case results plots have been included as all of the emissions are greater than 20dB below the limit. A set of plots have been included to show the measurement system noise floor.

Mix Carrier(x2): 1G+1L

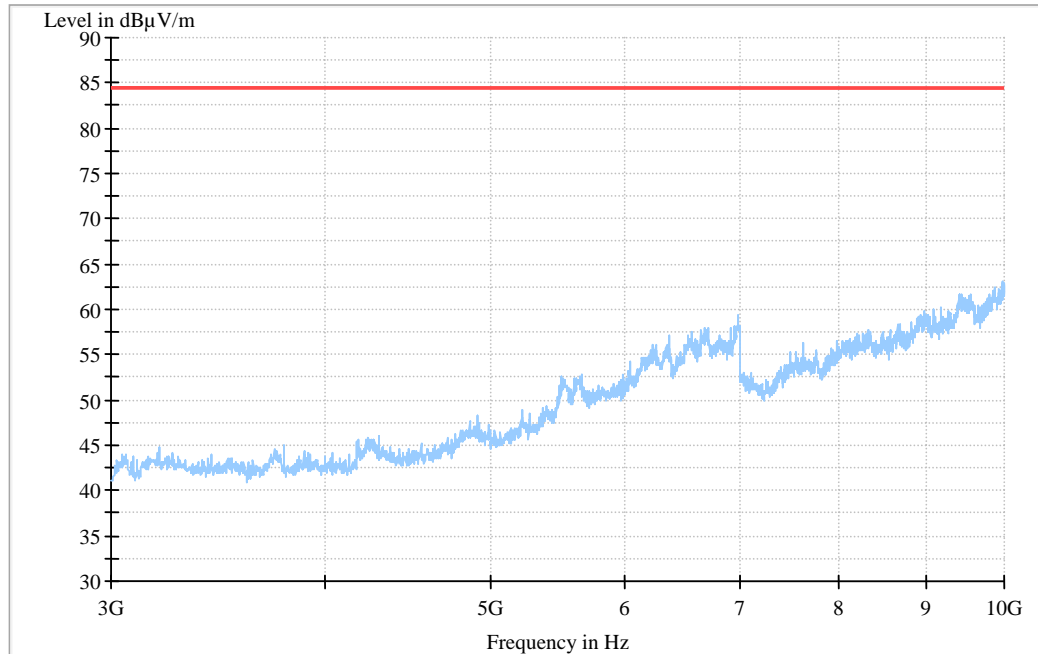
GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 1 - G&L1.4

30MHz - 3GHz



Note: The maximum emission marked beyond the limit is the operating frequency.

3GHz - 10GHzConfiguration 1 - Mode 2 - G&L1.4

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 3 - L1.4&LG

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 2 - G&L3

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 2 - G&L5

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 2 - G&L10

No emissions were detected within 20dB of the limit.

Configuration 1 - Mode 2 - G&L15

No emissions were detected within 20dB of the limit.



Product Service

GSM (GMSK) & LTE (E-TM3.2)

Configuration 1 - Mode 2 - G&L1.4

No emissions were detected within 20dB of the limit.

GSM (GMSK) & LTE (E-TM3.1)

Configuration 1 - Mode 2 - G&L1.4

No emissions were detected within 20dB of the limit.

Mix Carrier(x3): 2G+1L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 5 - G&G&L1.4

No emissions were detected within 20dB of the limit.

Mix Carrier(x4): 2G+1L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 7 - G&G&G&L1.4

No emissions were detected within 20dB of the limit.

Mix Carrier(x4): 2G+2L

GSM (GMSK) & LTE (E-TM1.1)

Configuration 1 - Mode 8 - G&G&L1.4&L1.4

No emissions were detected within 20dB of the limit.

Limit	-13dBm or 84.4dB μ V/m
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Remarks

The EUT does not exceed -13dBm or 84.4dB μ V/m at the measured frequencies.



2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
 FCC CFR 47 Part 22, Clause 22.917 (a)
 Industry Canada RSS-132, Clause 5.5

2.5.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824752731 / C824772345

2.5.3 Date of Test and Modification State

19 to 24 March 2014 – Modification State 0

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132.

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 10GHz. The EUT was set to transmit on maximum power. The resolution was set to 100kHz for 9kHz to 10GHz thus meeting the requirements of FCC CFR 47 Part 22, Clause 22.917 (a) and Industry Canada RSS-132, Clause 5.5. The spectrum analyzer detector was set to peak and trace was kept on Max Hold.

According to FCC KDB662911 D01 Multiple Transmitter Output v02r01, the limit was adjusted with a correction of -3dB [10Log(2)] to -13dBm by using the Measure and Add 10Log(N) dB technique as LTE transmit simultaneous at antenna ports RF A1 and RF A2.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

Measurements were made up to the 10th harmonic of the highest carrier frequency at least.

The test was performed with the EUT in the following configurations and modes of operation:

- Configuration 1 - Mode 1 - G&L1.4
- Mode 2 - G&L1.4, G&L3, G&L5, G&L10, G&L15
- Mode 3 - L1.4&G
- Mode 4 - G&G&L1.4
- Mode 5 - G&G&L1.4, G&G&L3, G&G&L5, G&G&L10
- Mode 6 - L1.4&G&G
- Mode 7 - G&G&G&L1.4
- Mode 8 - G&G&L1.4&L1.4



2.5.6 Environmental Conditions

Ambient Temperature 22.5 – 23.6°C
 Relative Humidity 20.5 – 25.0%

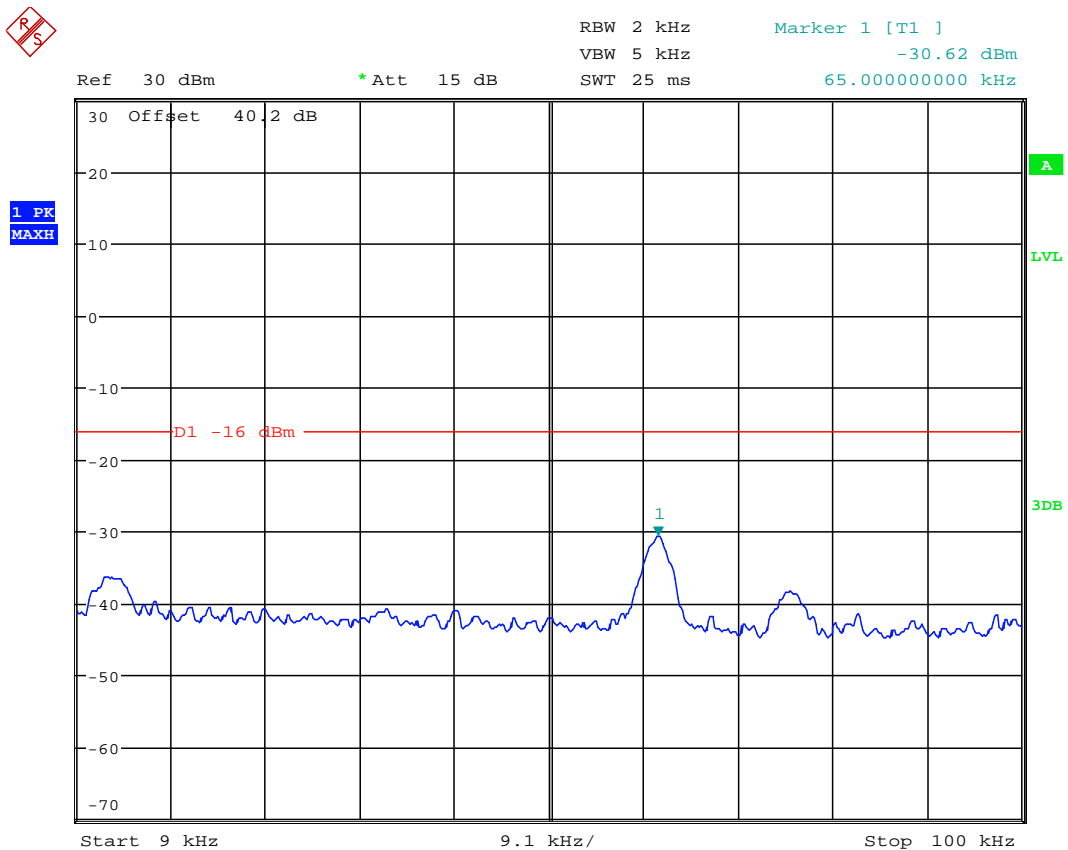
2.5.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and Part 22 and Industry Canada RSS-132 for Conducted Spurious Emissions.

The test results are shown below

Remark:

The emissions at 9kHz on the plots was not generated by the test object. A complementary measurement with a smaller span showed that it was related to the LO feedthrough.



Date: 19.MAR.2014 10:12:16

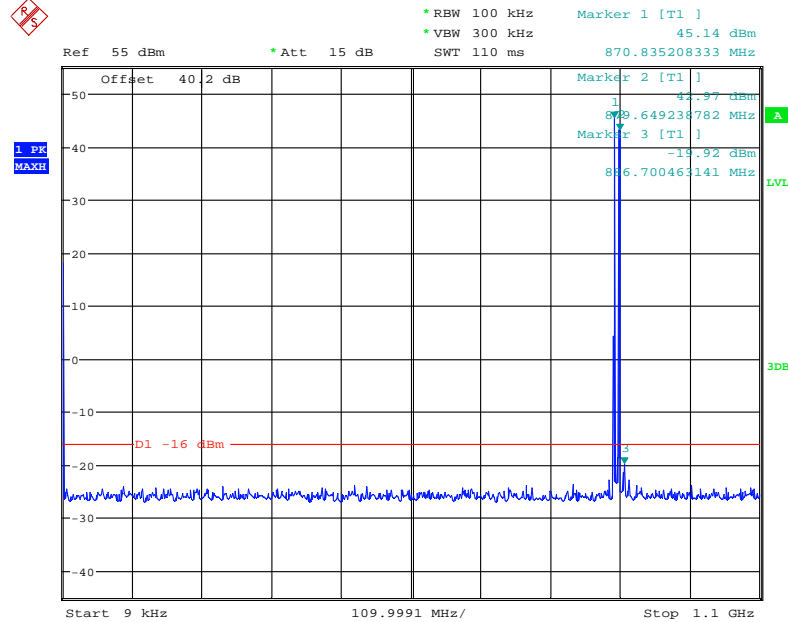


GSM/LTE MSR:

Mix Carrier(x2): 1G+1L

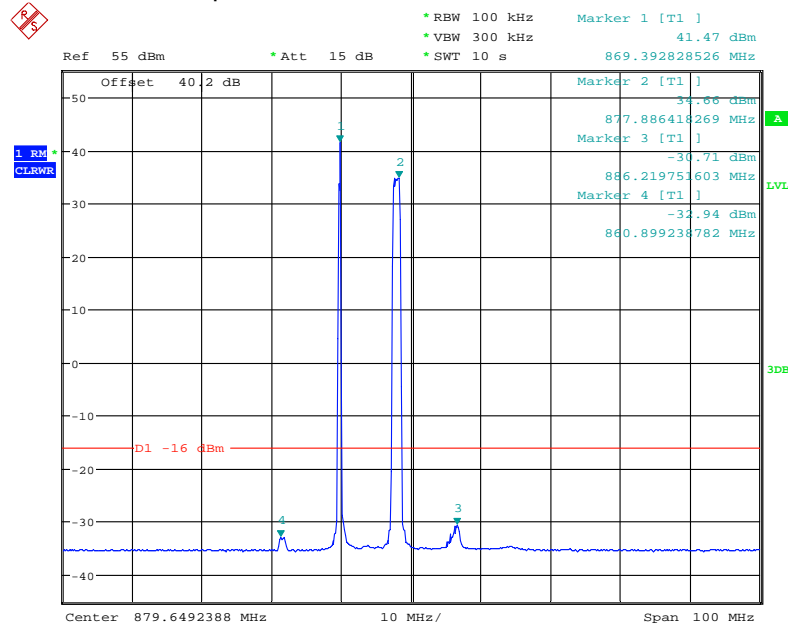
Configuration 1 - Mode 1 - G&L1.4

9kHz to 1.1GHz



Date: 19.MAR.2014 10:41:11

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

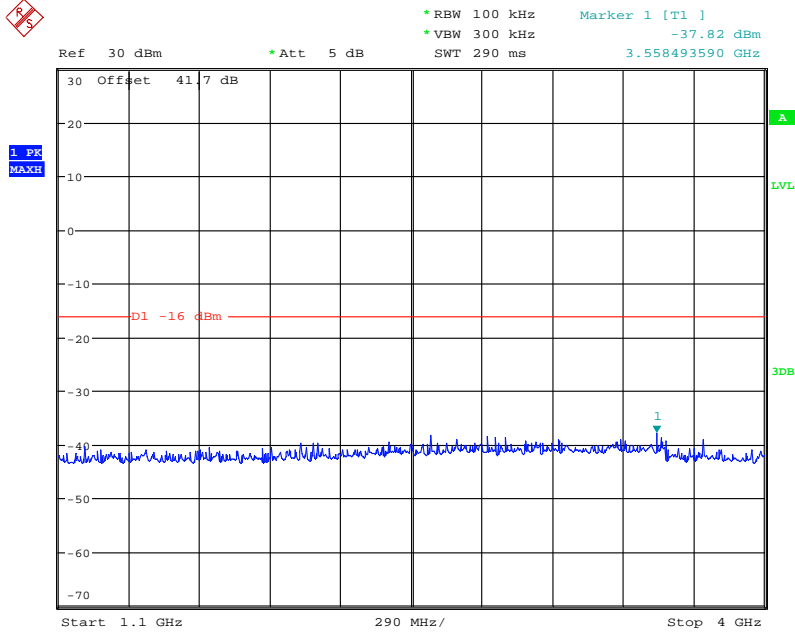


Date: 19.MAR.2014 10:42:27

Note: The emissions beyond the limit are the operating frequencies.

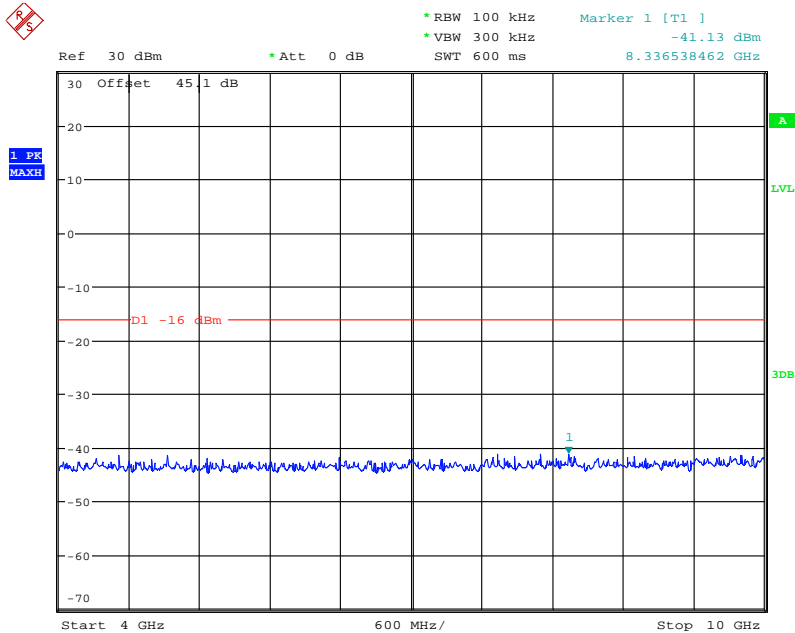


1.1GHz to 4GHz



Date: 20.MAR.2014 11:33:36

4GHz to 10GHz

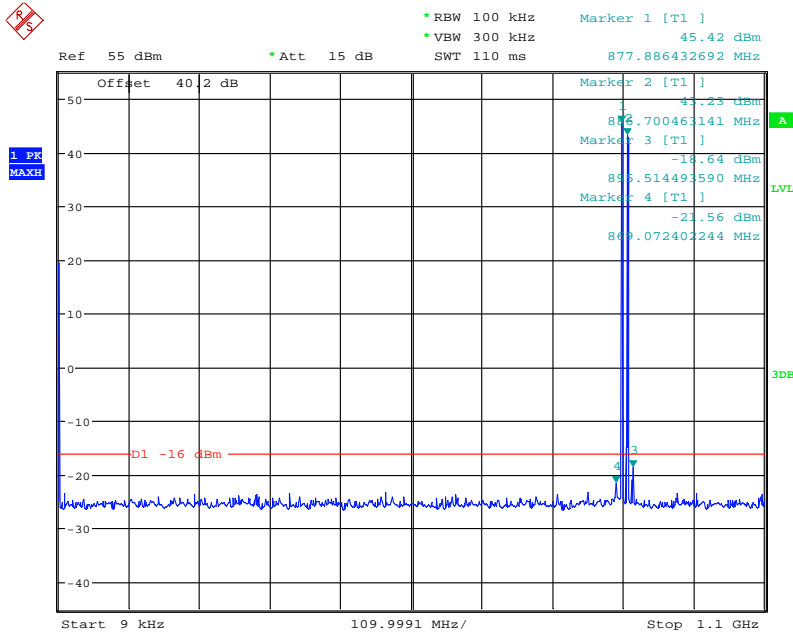


Date: 19.MAR.2014 10:56:46



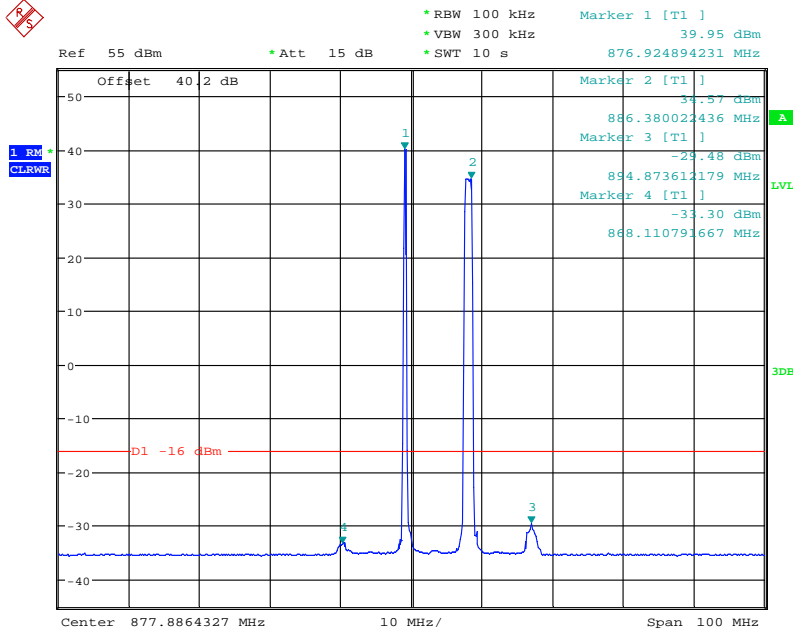
Configuration 1 - Mode 2 - G&L1.4

9kHz to 1.1GHz



Date: 20.MAR.2014 09:40:24

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

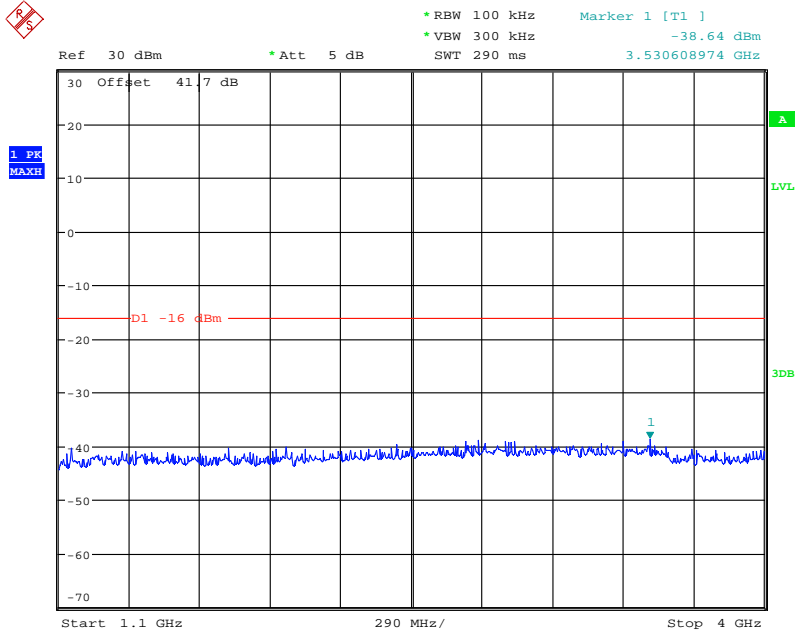


Date: 20.MAR.2014 09:46:49

Note: The emissions beyond the limit are the operating frequencies.

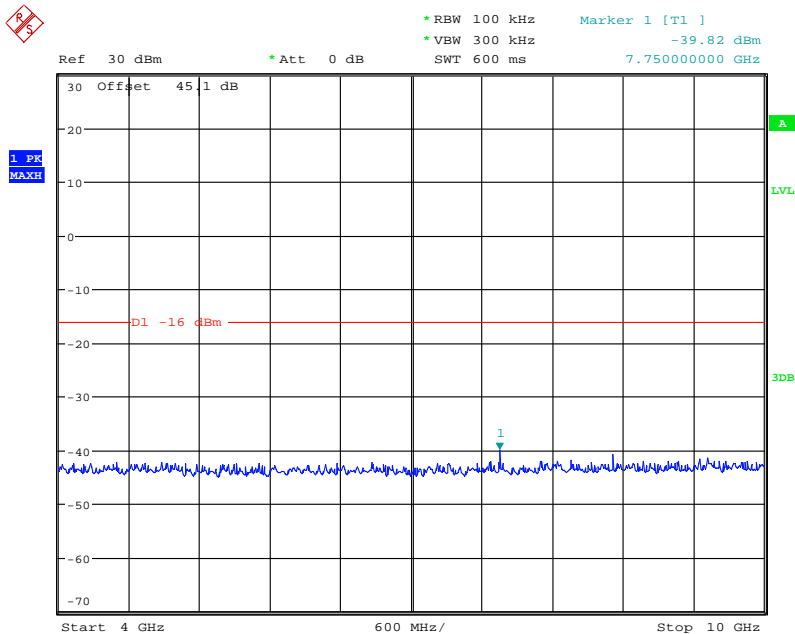


1.1GHz to 4GHz



Date: 20.MAR.2014 11:30:57

4GHz to 10GHz

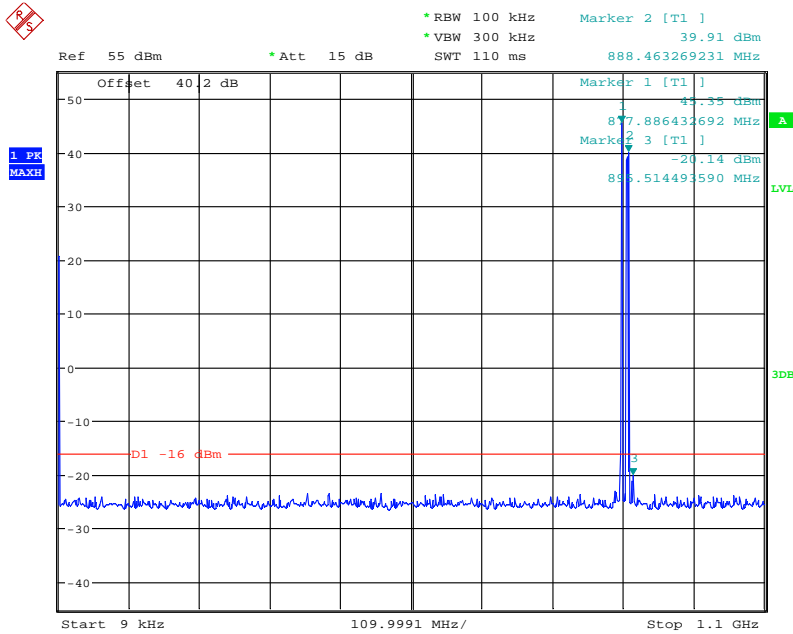


Date: 20.MAR.2014 09:47:38



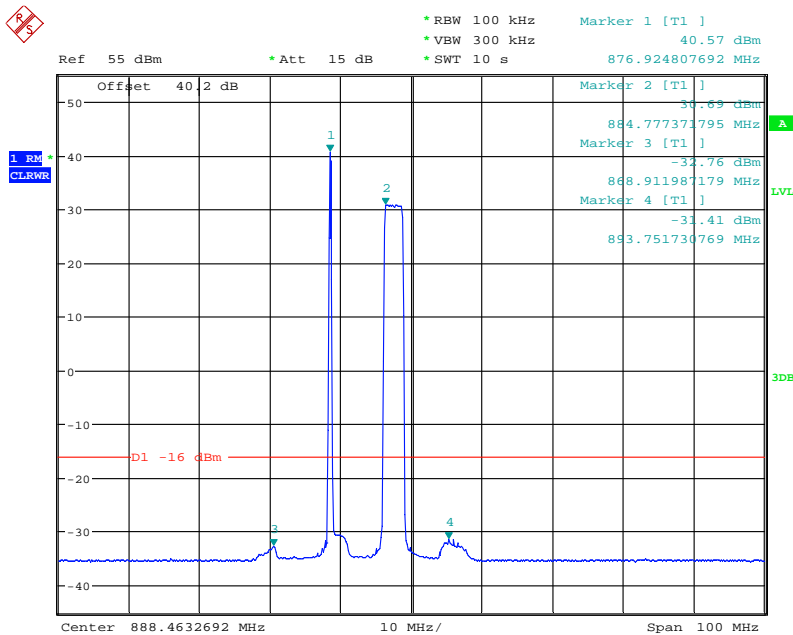
Configuration 1 - Mode 2 - G&L3

9kHz to 1.1GHz



Date: 20.MAR.2014 10:30:03

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



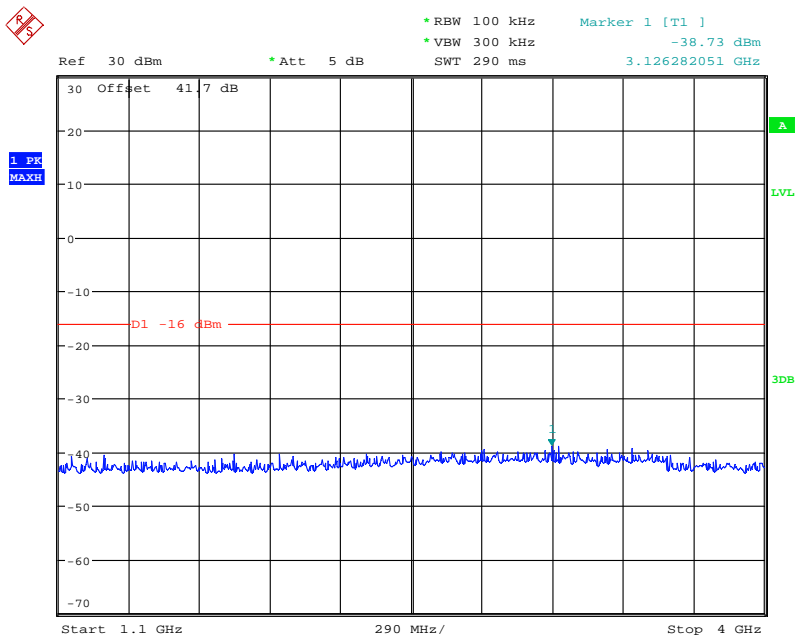
Date: 20.MAR.2014 10:30:46

Note: The emissions beyond the limit are the operating frequencies.



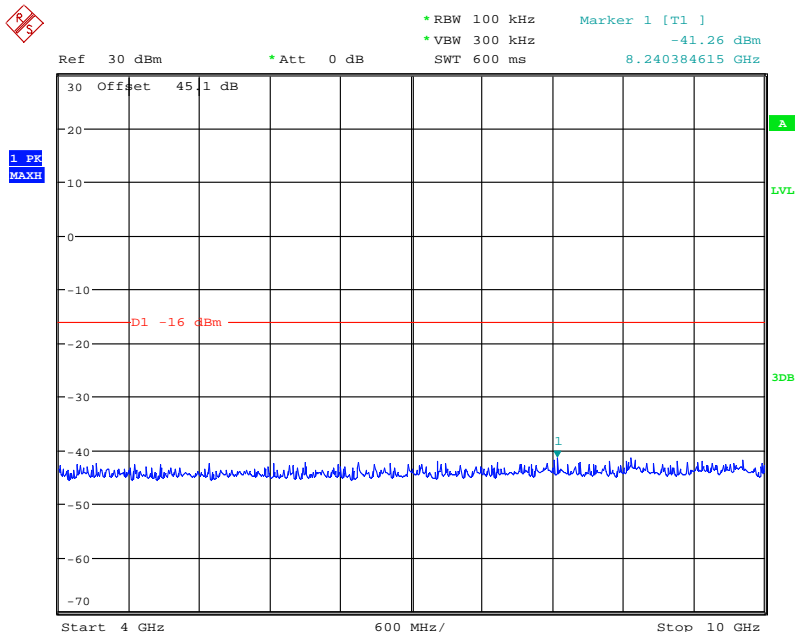
Product Service

1.1GHz to 4GHz



Date: 20.MAR.2014 11:30:10

4GHz to 10GHz



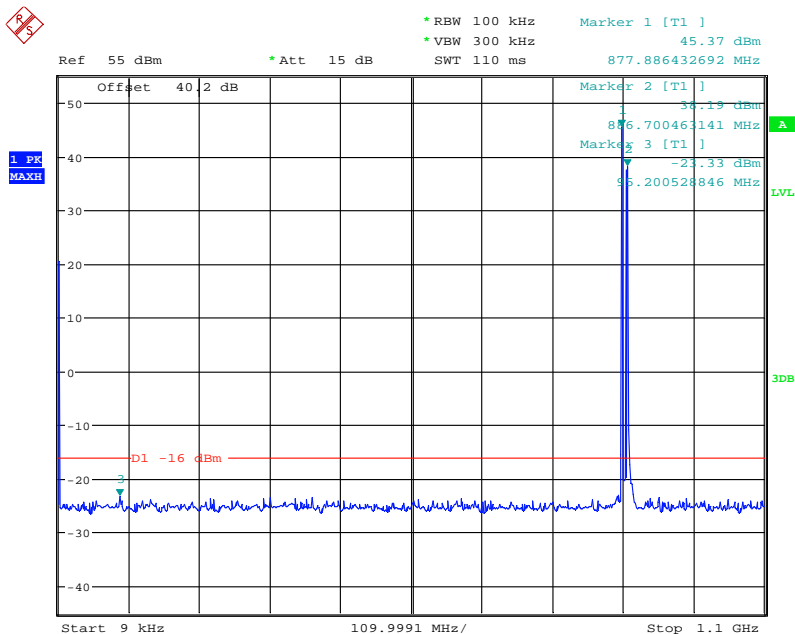
Date: 20.MAR.2014 10:28:48



Product Service

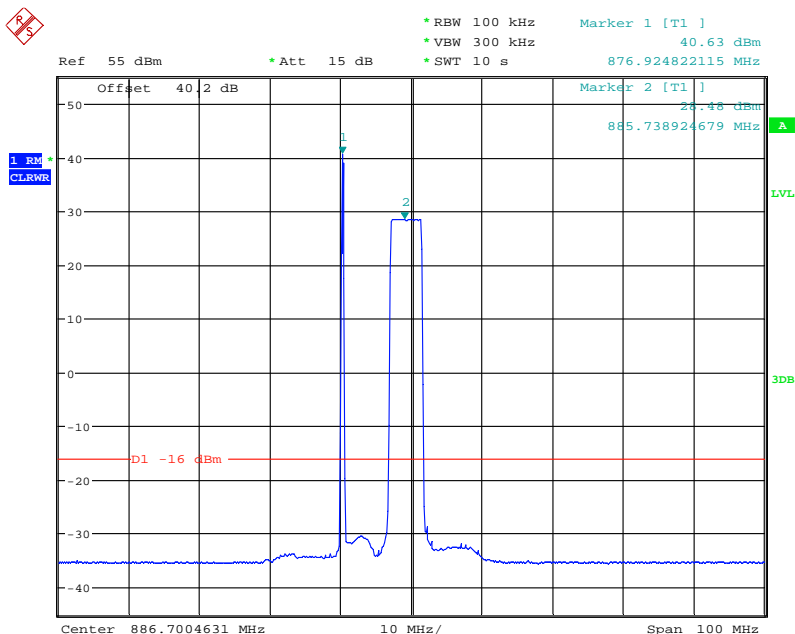
Configuration 1 - Mode 2 - G&L5

9kHz to 1.1GHz



Date: 20.MAR.2014 10:42:07

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



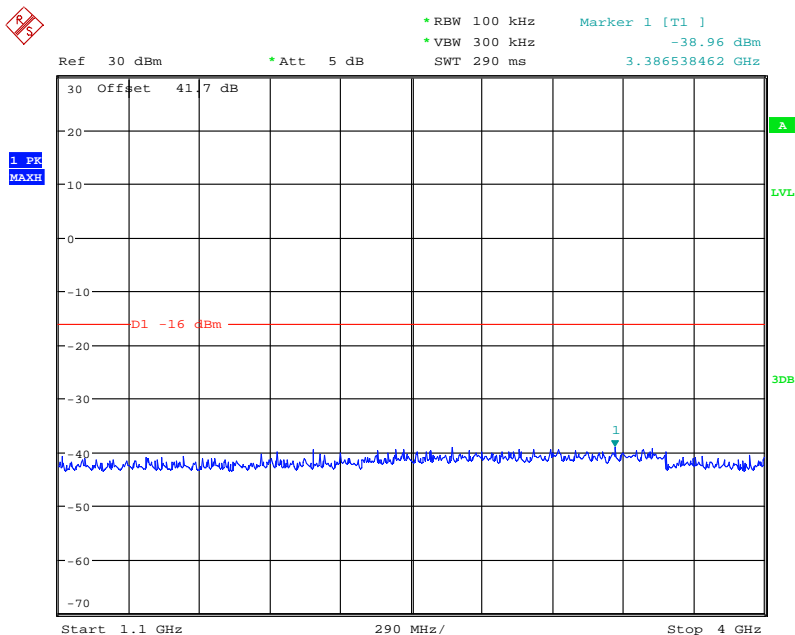
Date: 20.MAR.2014 10:42:54

Note: The emissions beyond the limit are the operating frequencies.



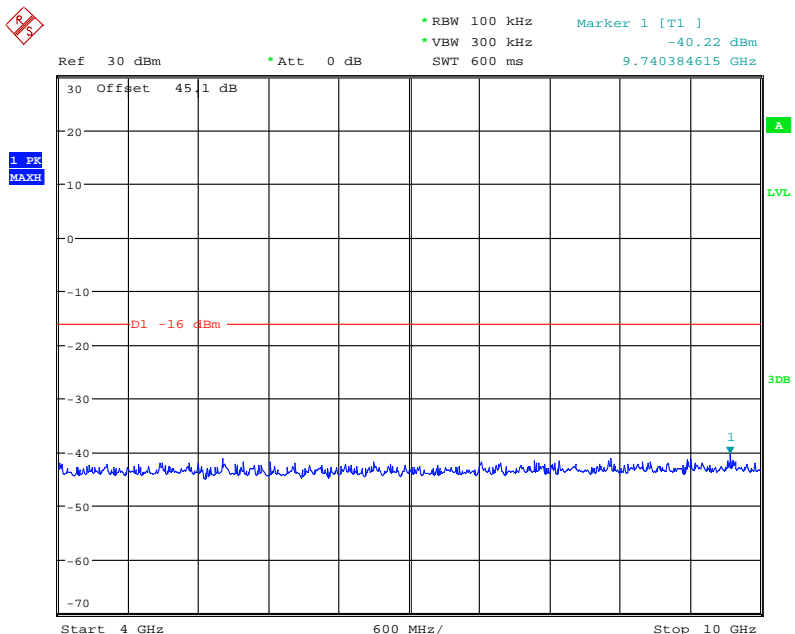
Product Service

1.1GHz to 4GHz



Date: 20.MAR.2014 11:27:39

4GHz to 10GHz

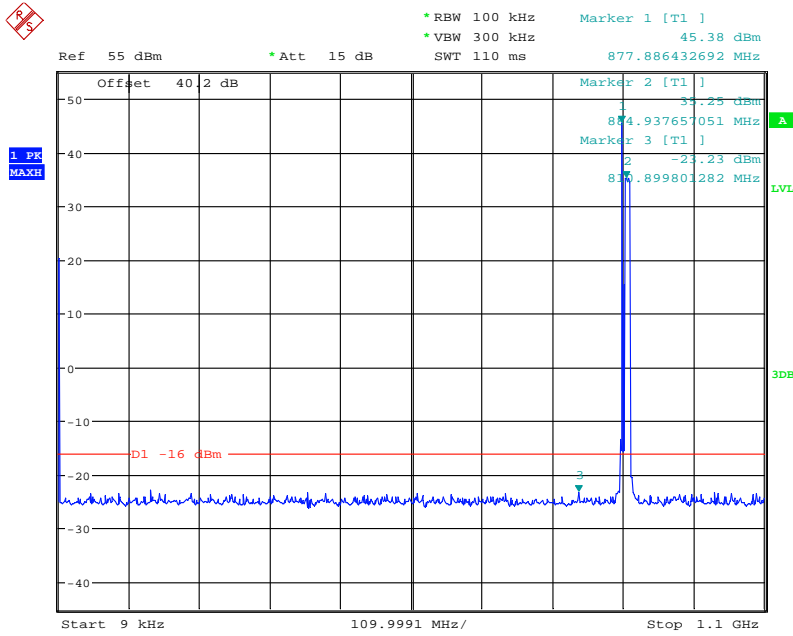


Date: 20.MAR.2014 10:43:55



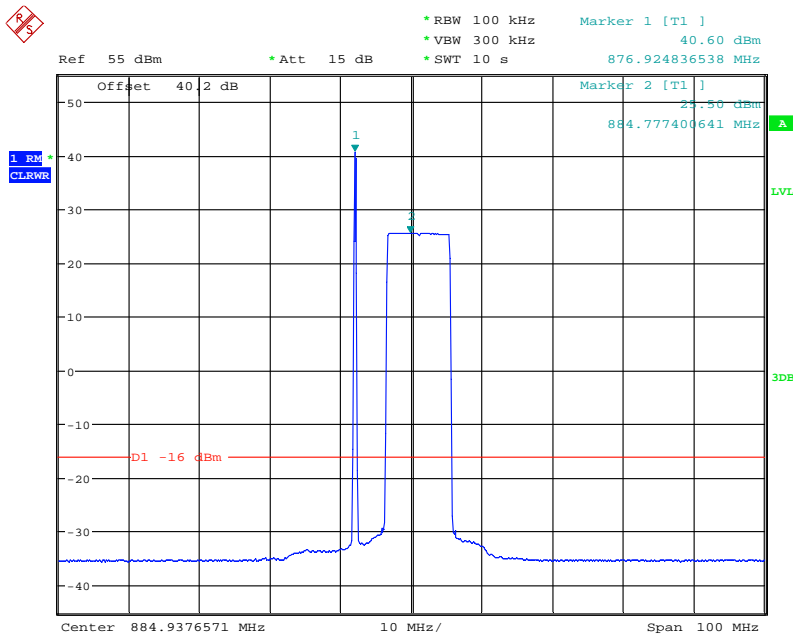
Configuration 1 - Mode 2 - G&L10

9kHz to 1.1GHz



Date: 20.MAR.2014 11:00:28

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

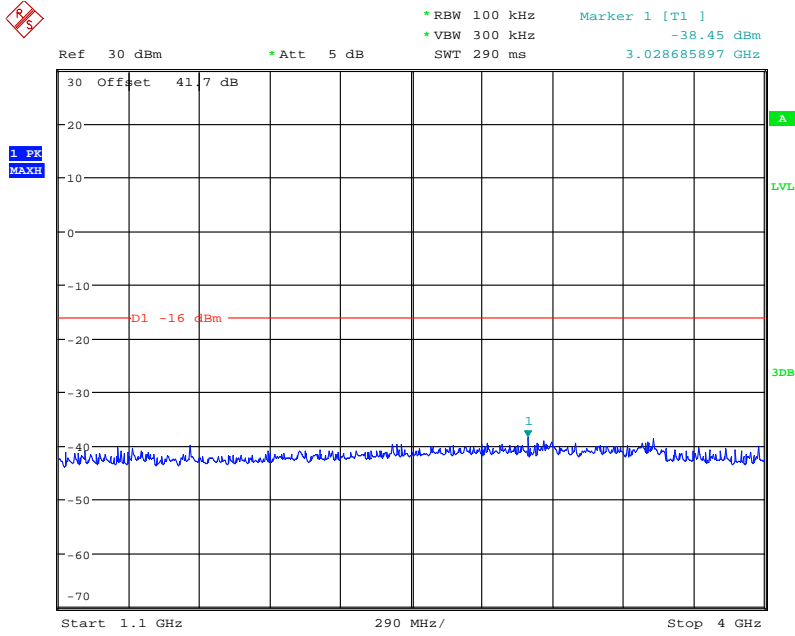


Date: 20.MAR.2014 11:00:56

Note: The emissions beyond the limit are the operating frequencies.

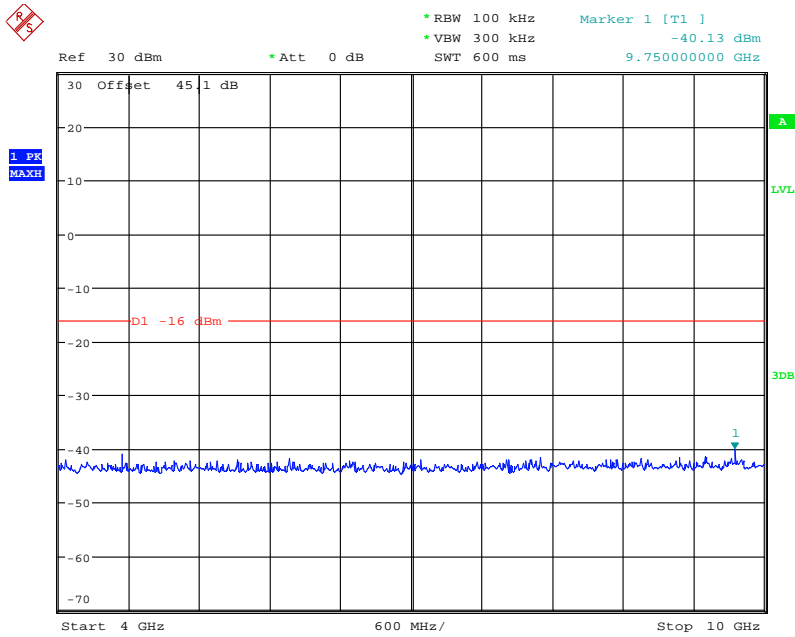


1.1GHz to 4GHz



Date: 20.MAR.2014 11:25:52

4GHz to 10GHz

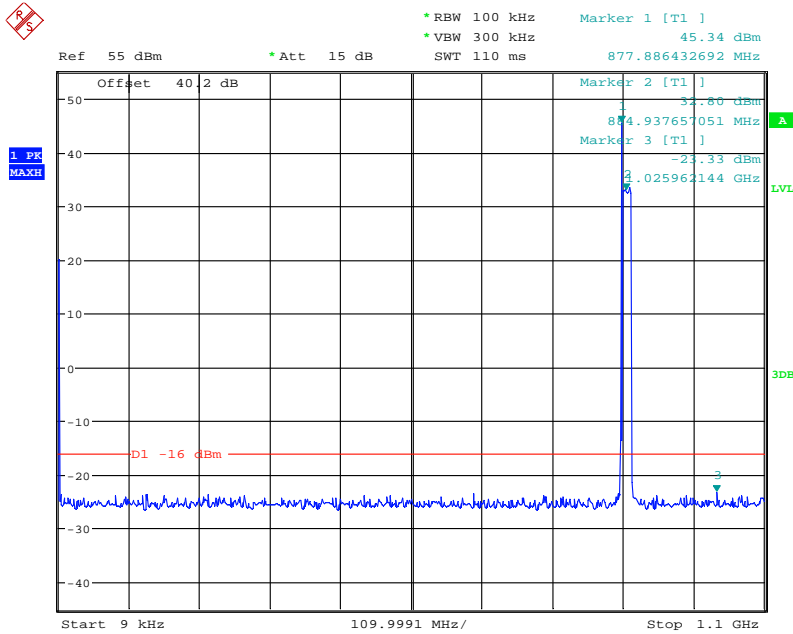


Date: 20.MAR.2014 10:58:08



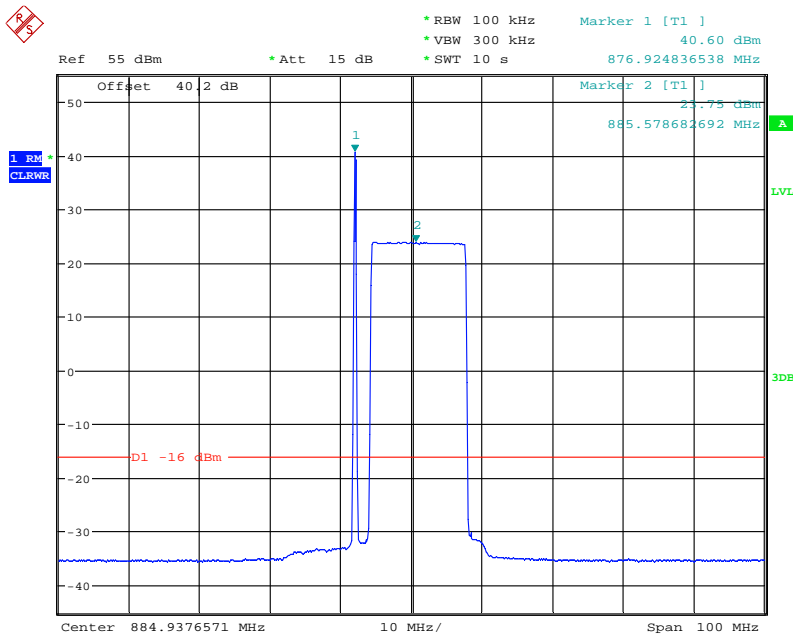
Configuration 1 - Mode 2 - G&L15

9kHz to 1.1GHz



Date: 20.MAR.2014 11:10:15

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

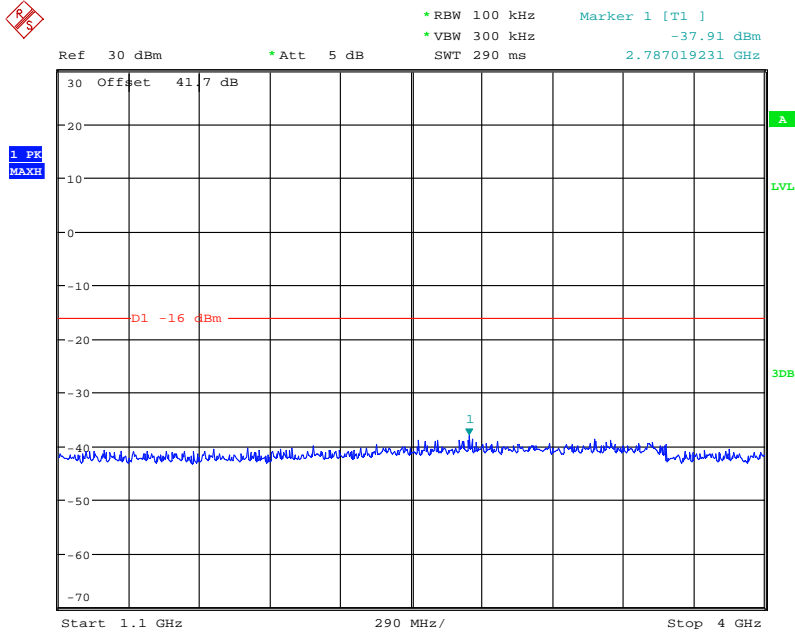


Date: 20.MAR.2014 11:10:52

Note: The emissions beyond the limit are the operating frequencies.

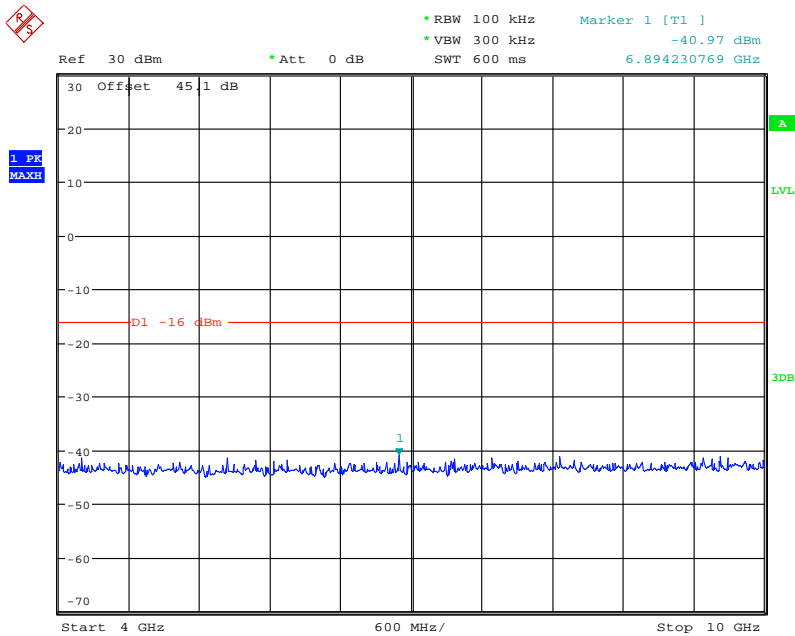


1.1GHz to 4GHz



Date: 20.MAR.2014 11:25:29

4GHz to 10GHz

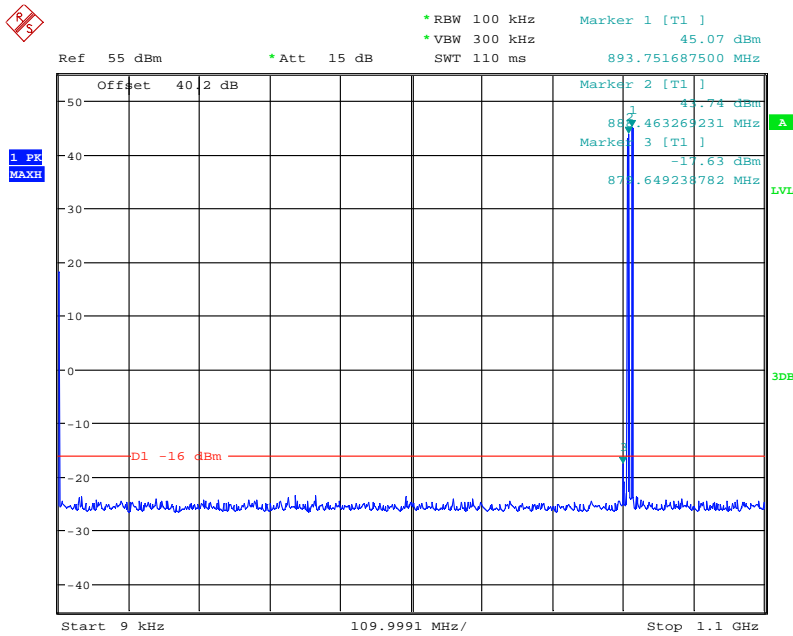


Date: 20.MAR.2014 11:12:02



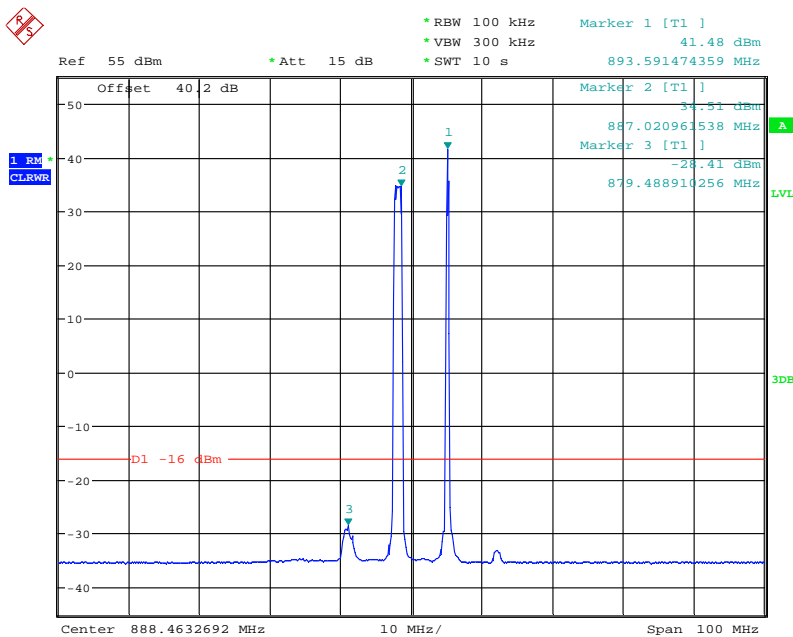
Configuration 1 - Mode 3 - L1.4&G

9kHz to 1.1GHz



Date: 19.MAR.2014 14:29:03

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

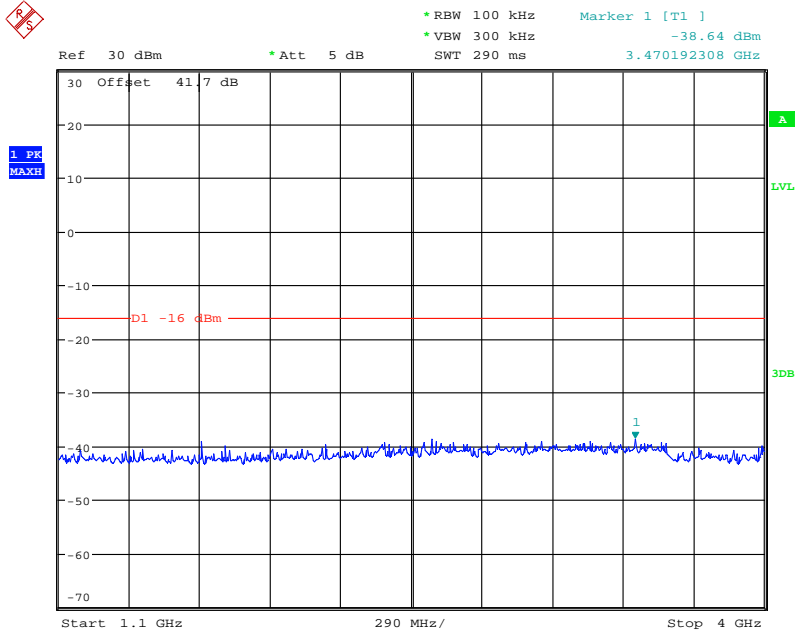


Date: 19.MAR.2014 14:29:44

Note: The emissions beyond the limit are the operating frequencies.

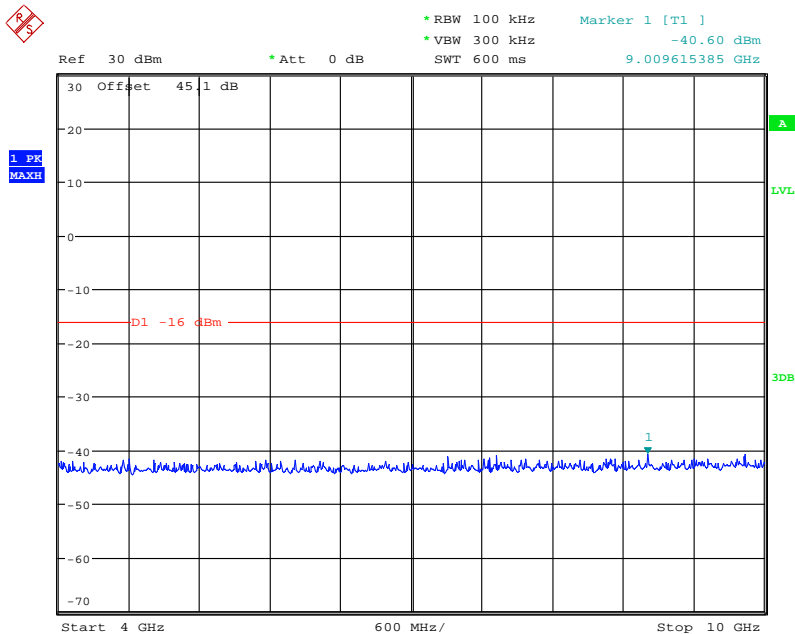


1.1GHz to 4GHz



Date: 20.MAR.2014 12:15:43

4GHz to 10GHz



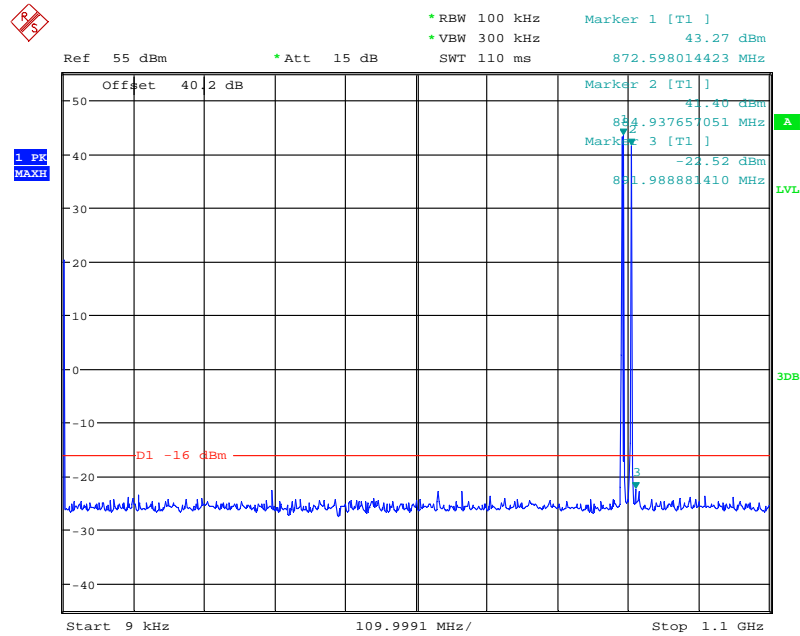
Date: 19.MAR.2014 14:44:22



Mix Carrier(x3): 2G+1L

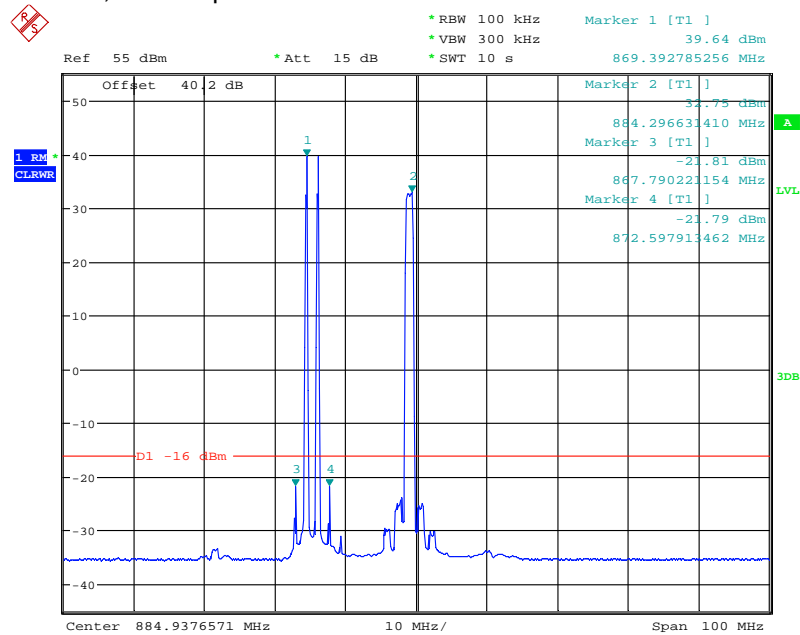
Configuration 1 - Mode 4 - G&G&L1.4

9kHz to 1.1GHz



Date: 20.MAR.2014 13:14:24

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



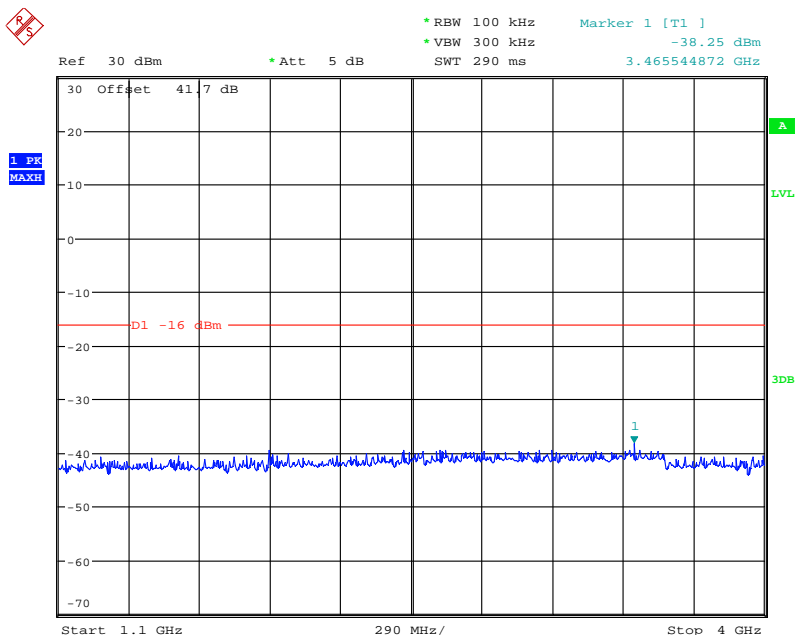
Date: 20.MAR.2014 13:16:22

Note: The emissions beyond the limit are the operating frequencies.



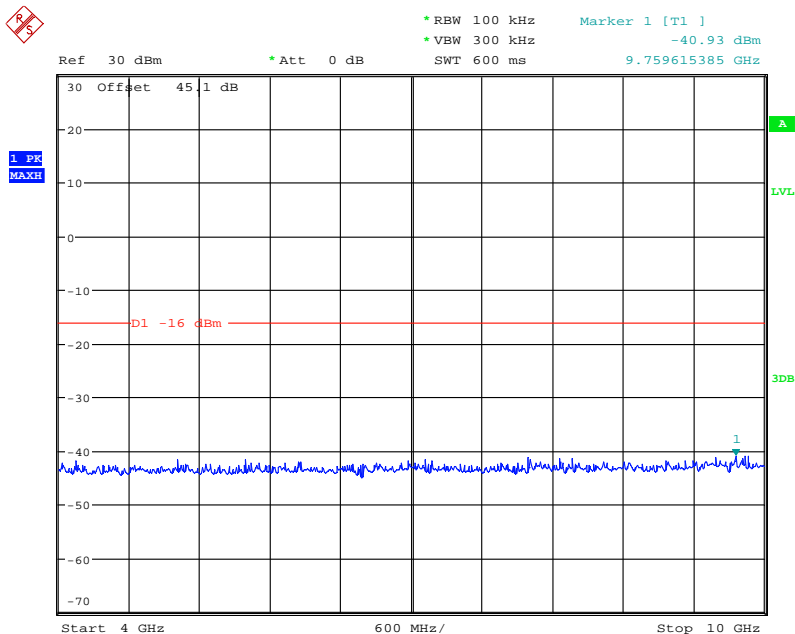
Product Service

1.1GHz to 4GHz



Date: 20.MAR.2014 15:11:47

4GHz to 10GHz

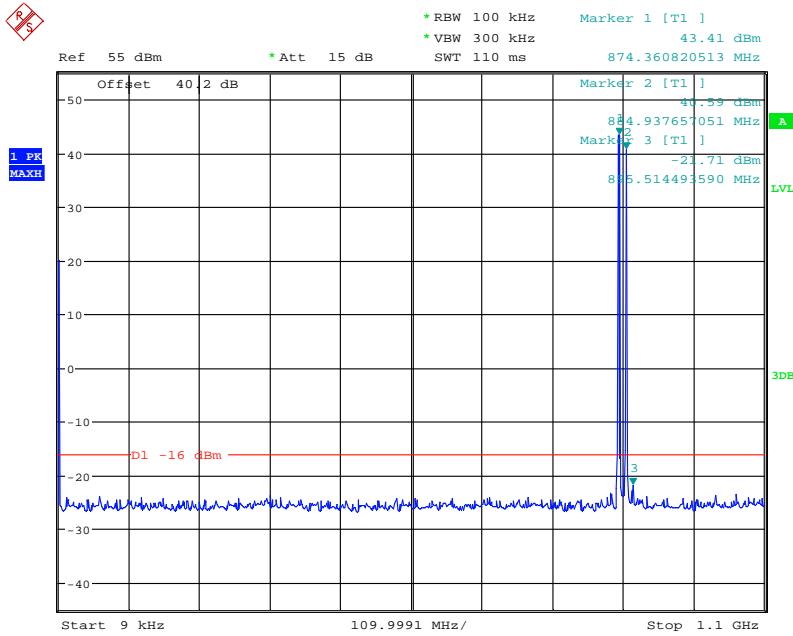


Date: 20.MAR.2014 13:17:21



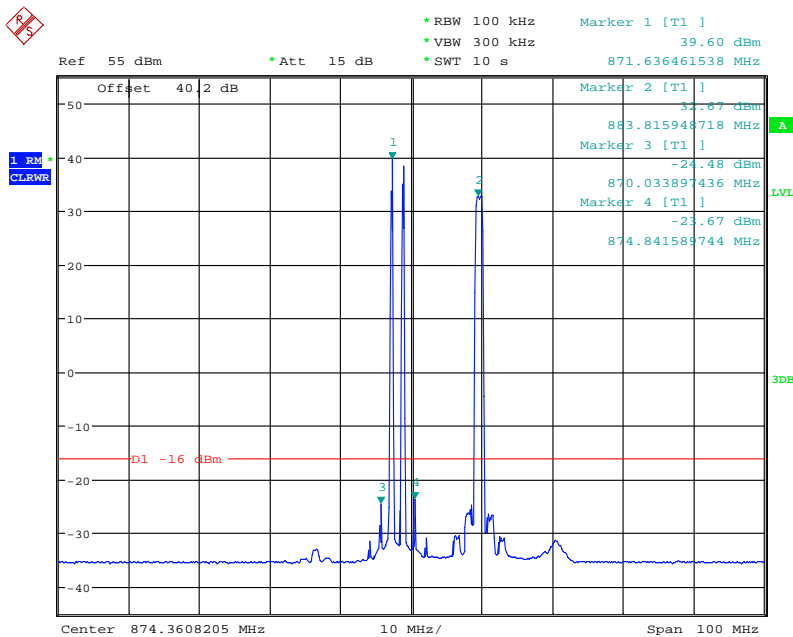
Configuration 1 - Mode 5 - G&G&L1.4

9kHz to 1.1GHz



Date: 20.MAR.2014 16:39:56

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

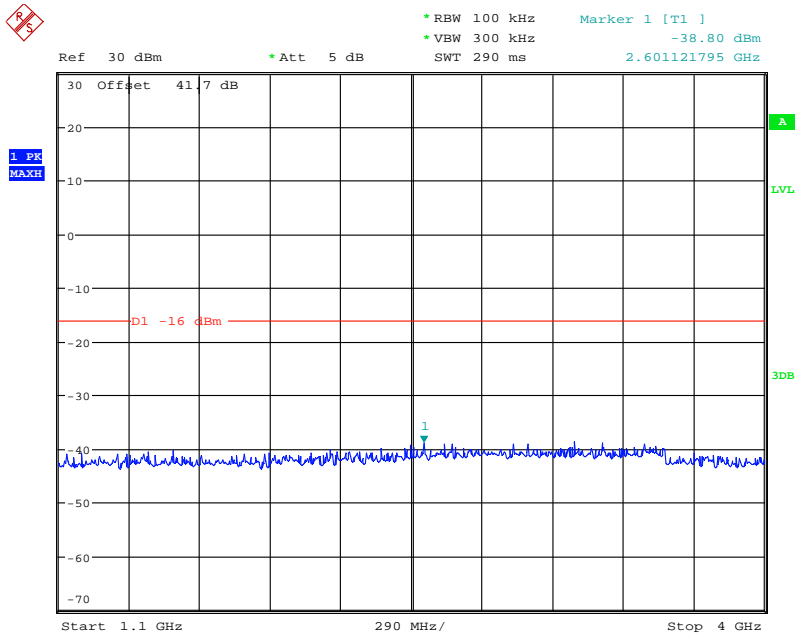


Date: 20.MAR.2014 16:41:05

Note: The emissions beyond the limit are the operating frequencies.

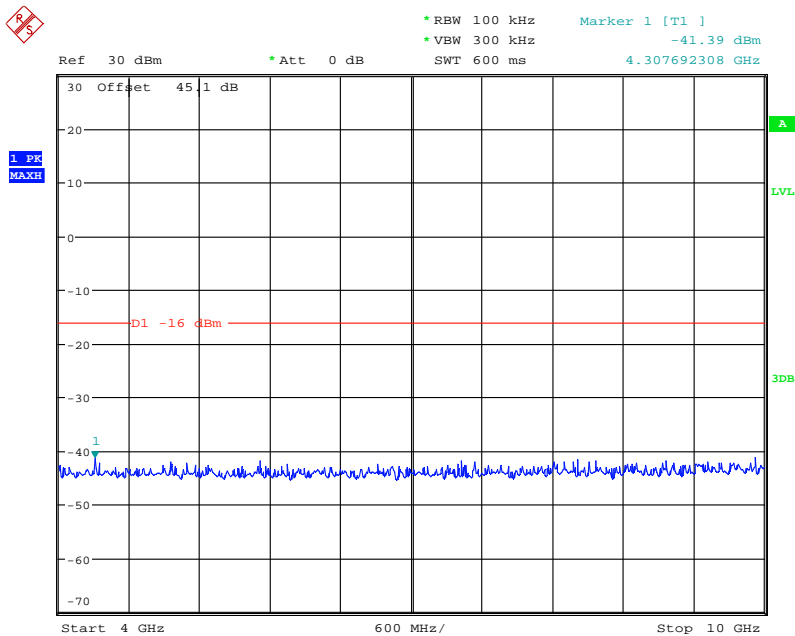


1.1GHz to 4GHz



Date: 20.MAR.2014 17:12:31

4GHz to 10GHz

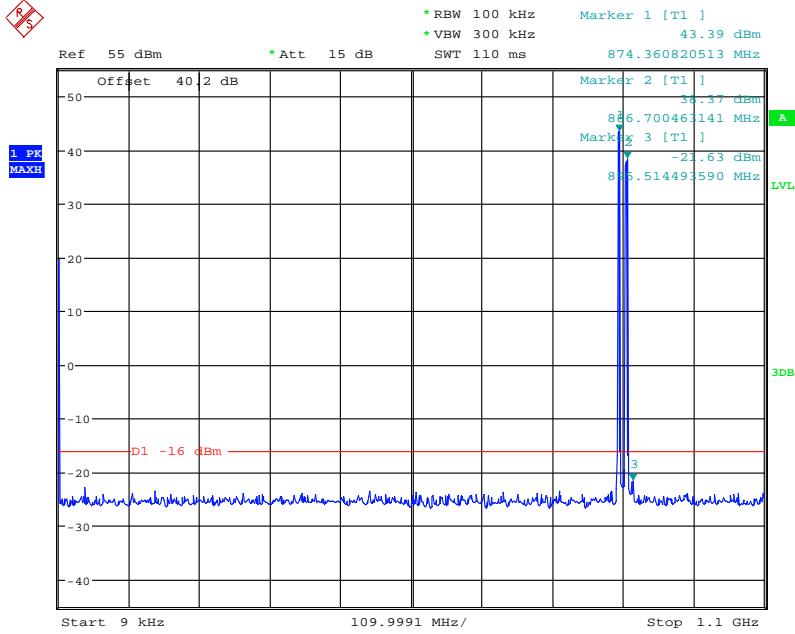


Date: 20.MAR.2014 16:41:54



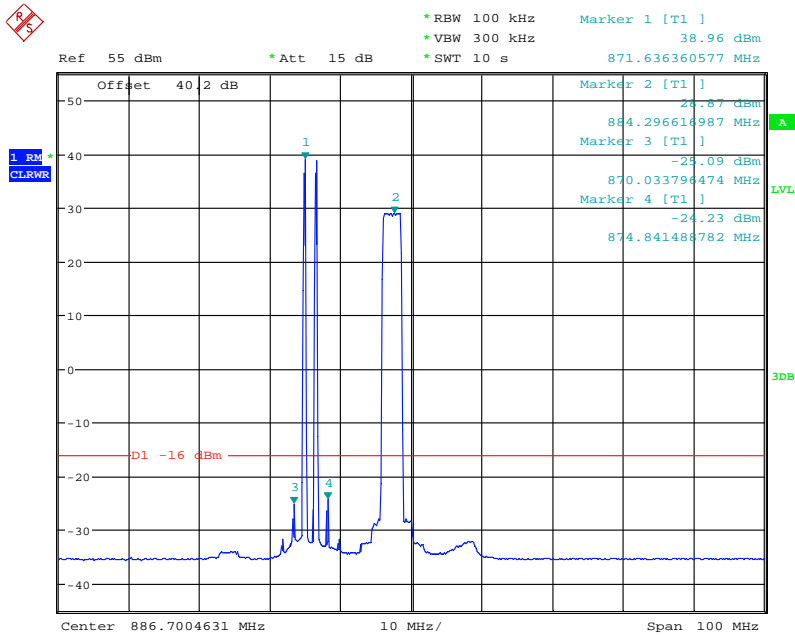
Configuration 1 - Mode 5 - G&G&L3

9kHz to 1.1GHz



Date: 20.MAR.2014 16:59:03

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



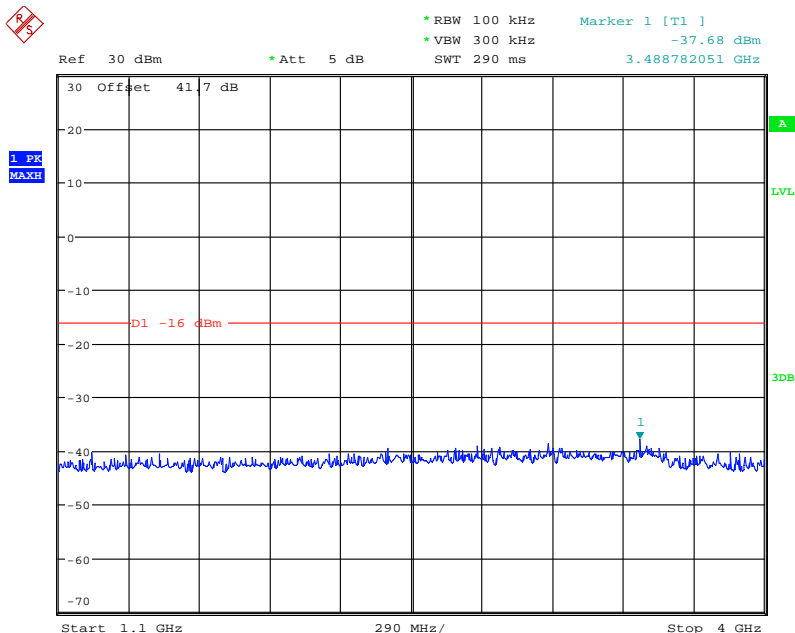
Date: 20.MAR.2014 16:59:52

Note: The emissions beyond the limit are the operating frequencies.



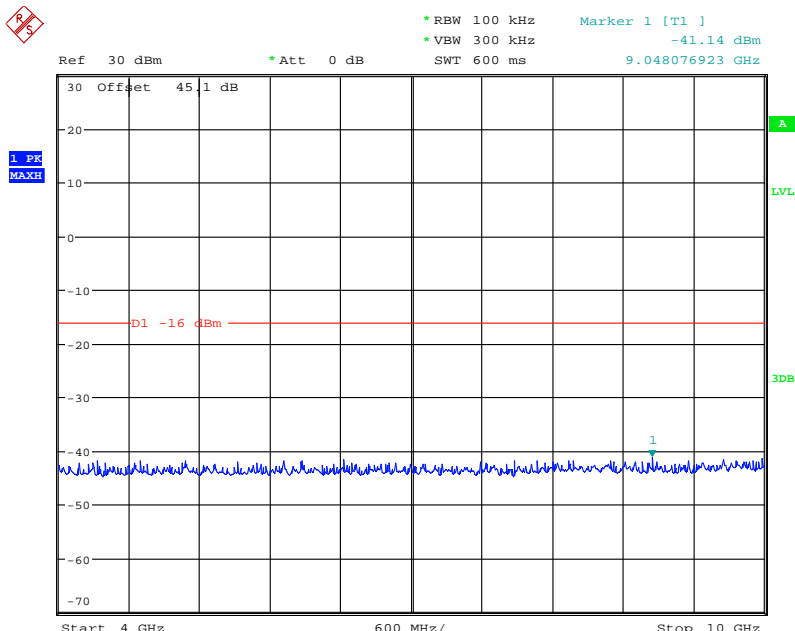
Product Service

1.1GHz to 4GHz



Date: 20.MAR.2014 17:11:52

4GHz to 10GHz



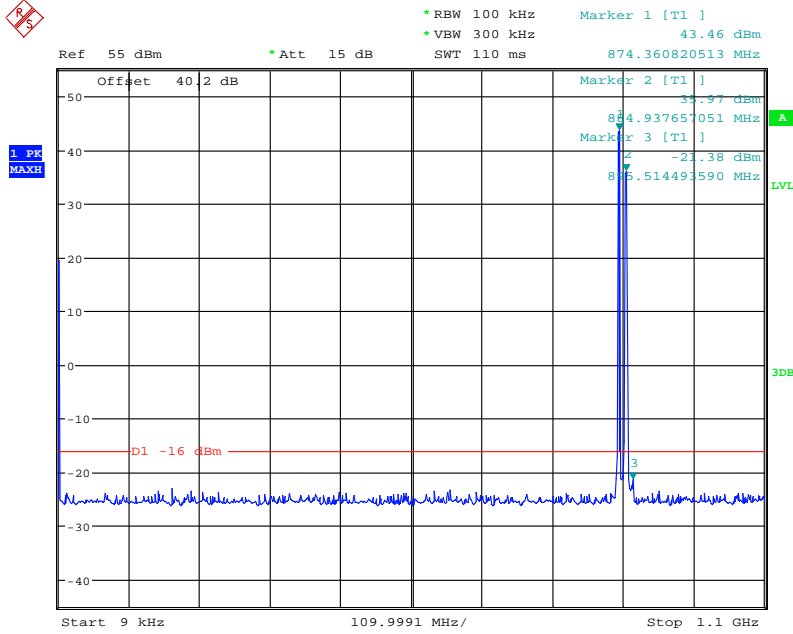
Date: 20.MAR.2014 16:58:02



Product Service

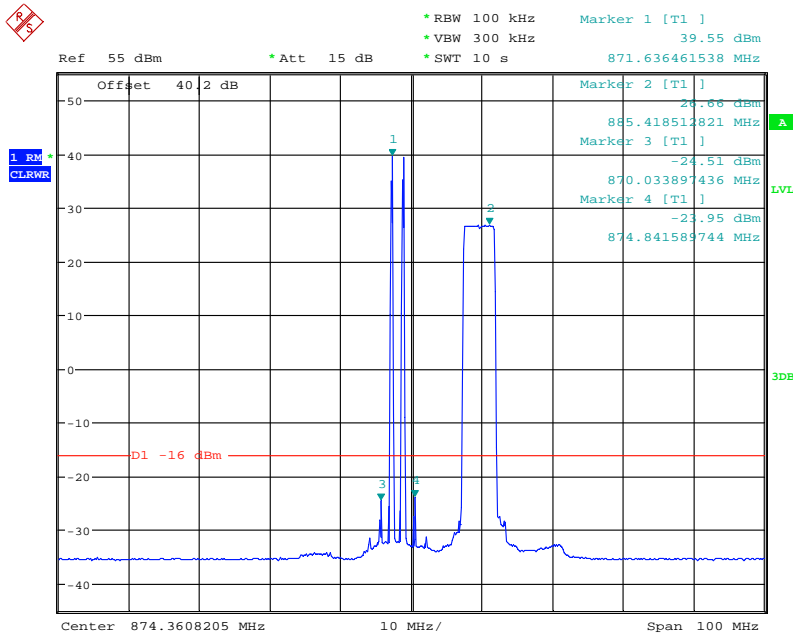
Configuration 1 - Mode 5 - G&G&L5

9kHz to 1.1GHz



Date: 21.MAR.2014 09:52:05

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

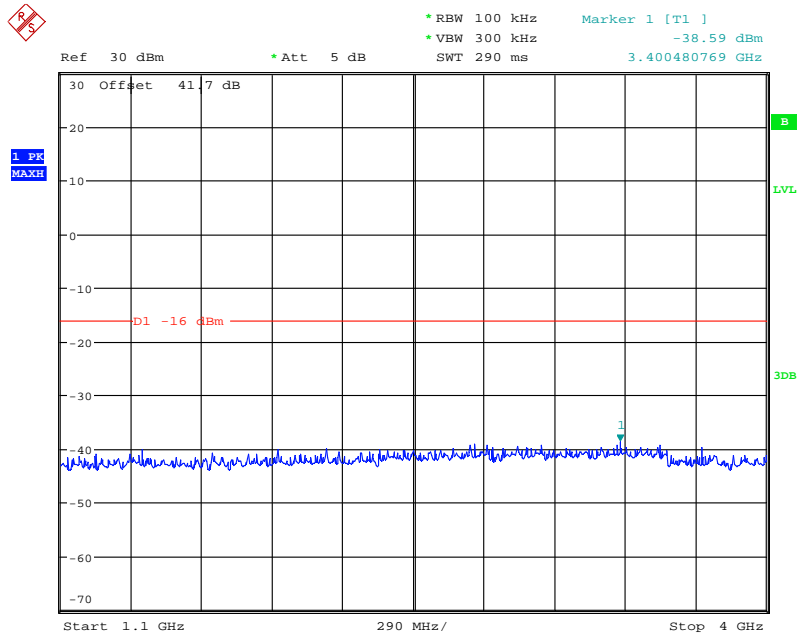


Date: 21.MAR.2014 09:52:44

Note: The emissions beyond the limit are the operating frequencies.

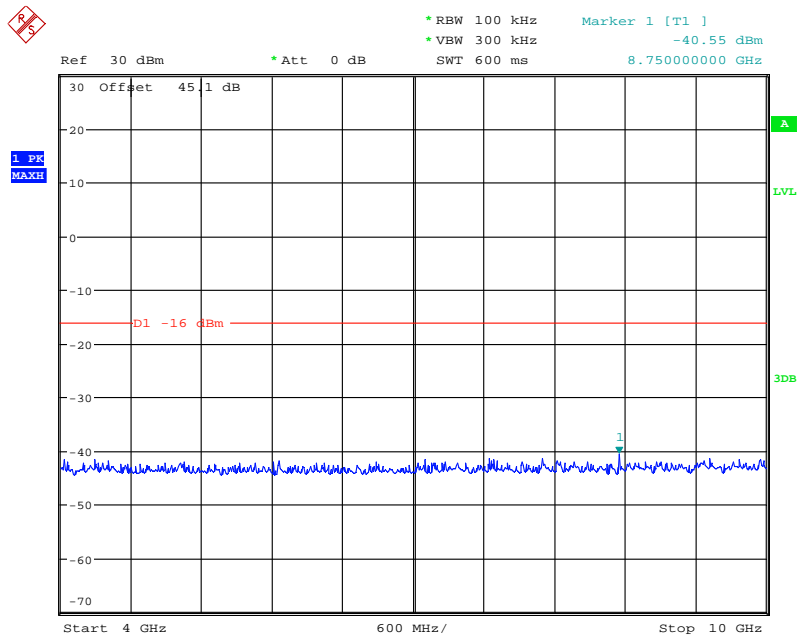


1.1GHz to 4GHz



Date: 21.MAR.2014 10:30:18

4GHz to 10GHz

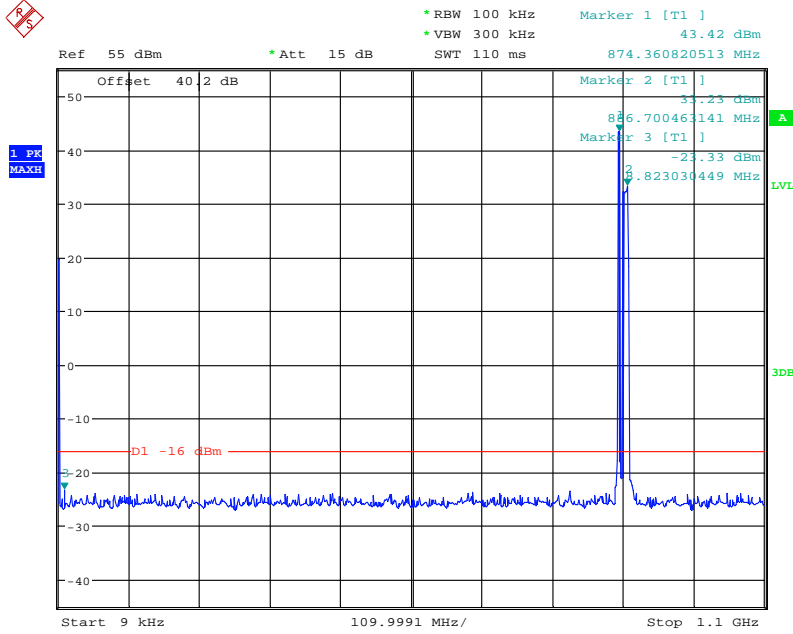


Date: 21.MAR.2014 09:55:02



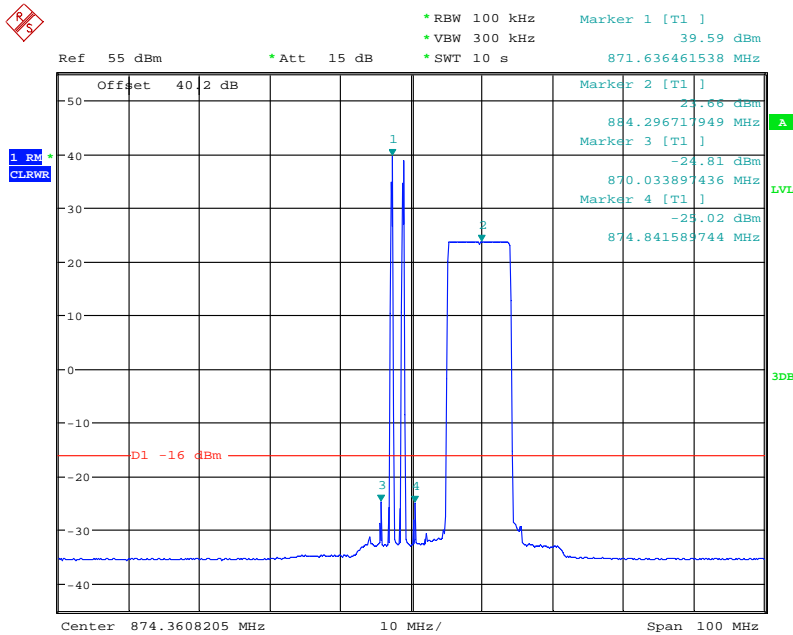
Configuration 1 - Mode 5 - G&G&L10

9kHz to 1.1GHz



Date: 21.MAR.2014 10:11:44

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

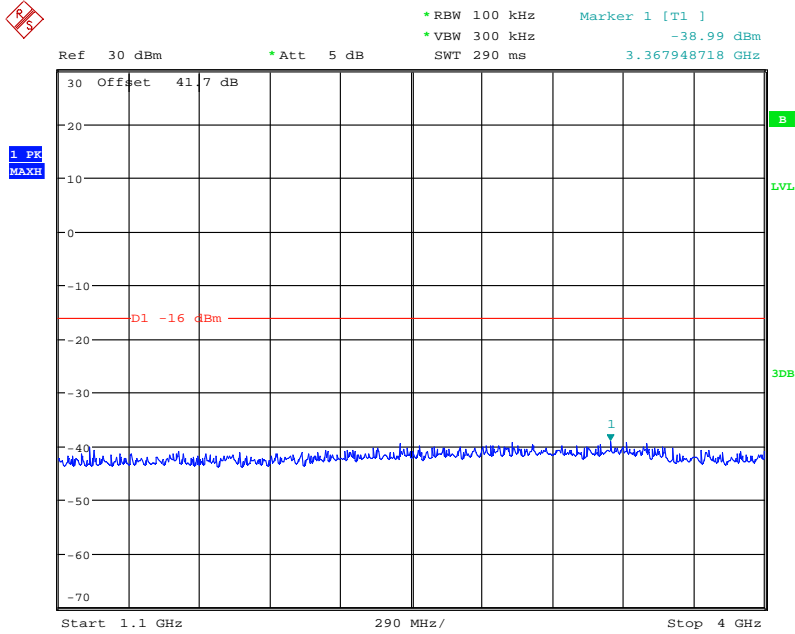


Date: 21.MAR.2014 10:12:28

Note: The emissions beyond the limit are the operating frequencies.

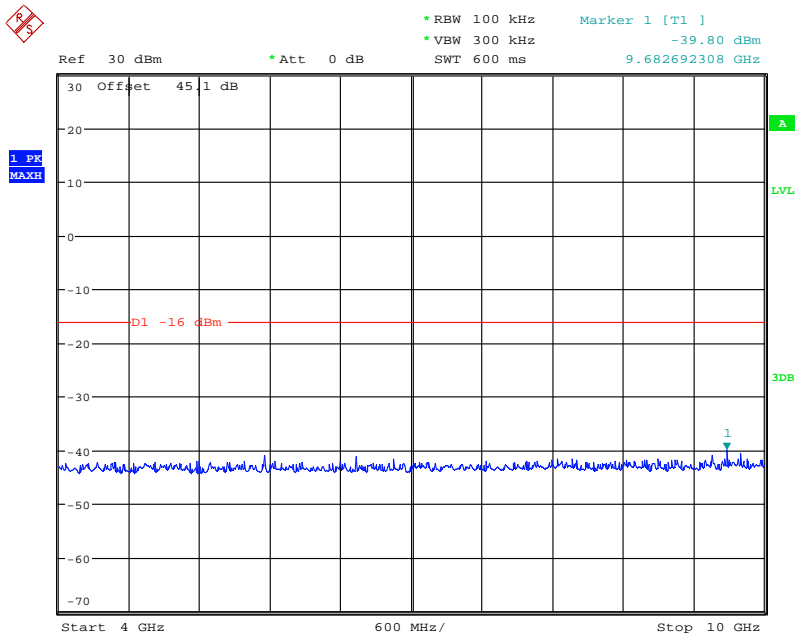


1.1GHz to 4GHz



Date: 21.MAR.2014 10:24:44

4GHz to 10GHz

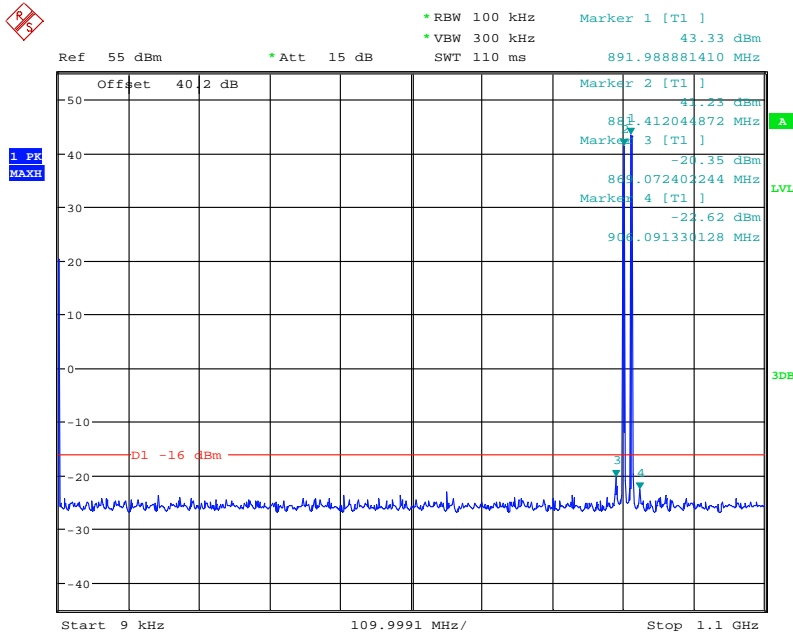


Date: 21.MAR.2014 10:10:11



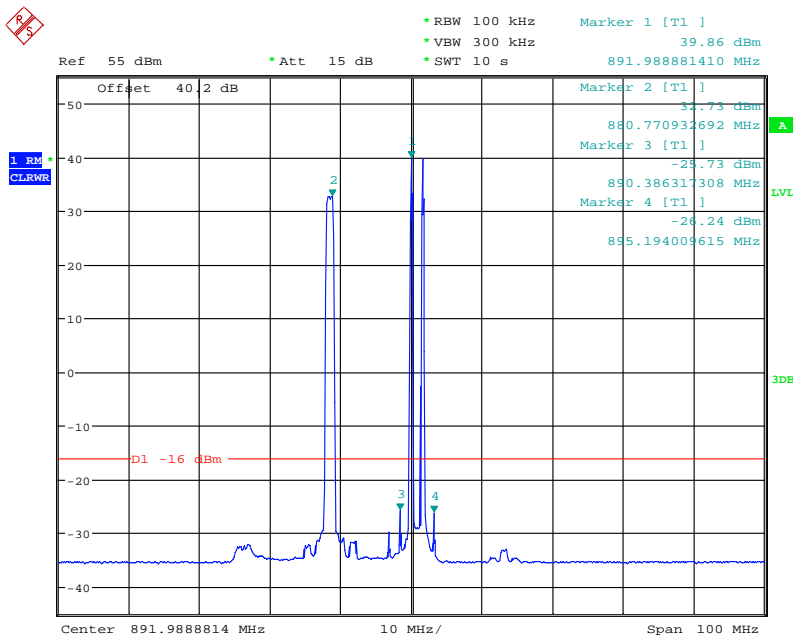
Configuration 1 - Mode 6 - L1.4&G&G

9kHz to 1.1GHz



Date: 20.MAR.2014 15:22:20

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

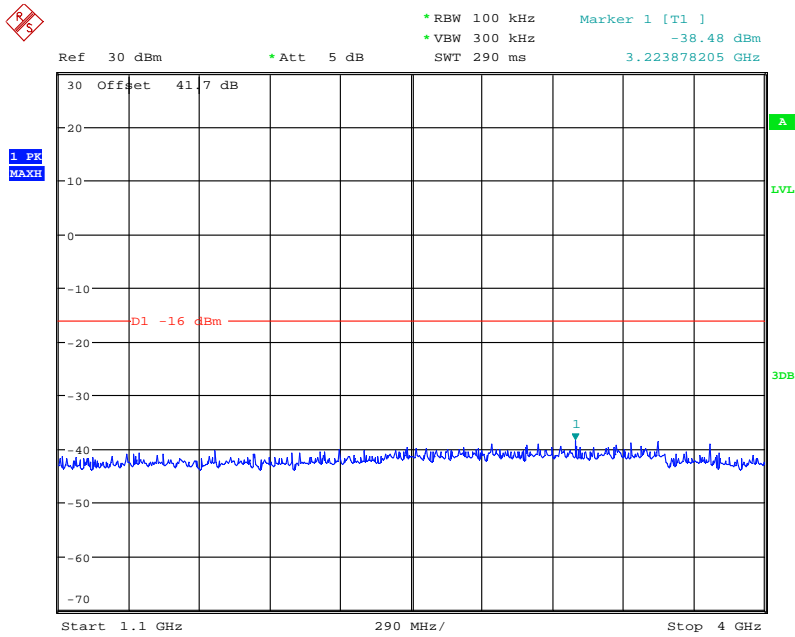


Date: 20.MAR.2014 15:23:28

Note: The emissions beyond the limit are the operating frequencies.

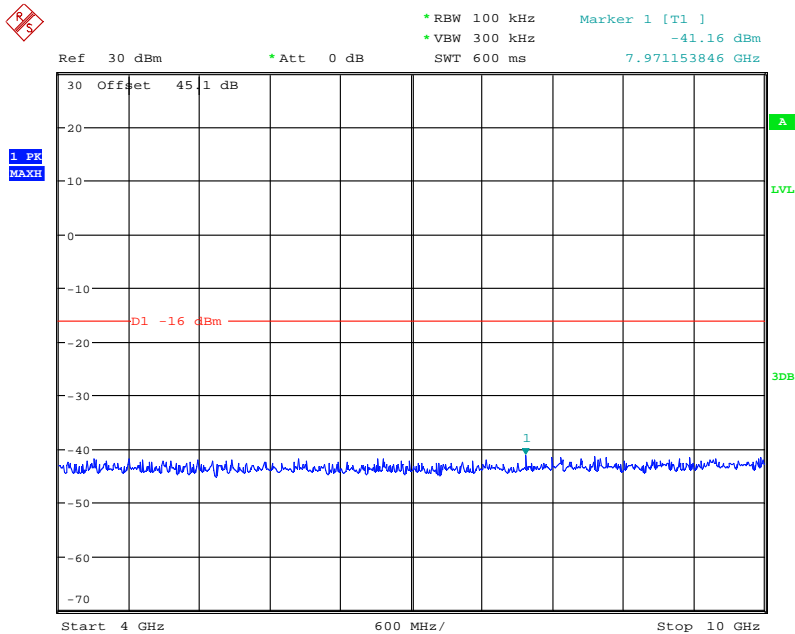


1.1GHz to 4GHz



Date: 20.MAR.2014 16:36:57

4GHz to 10GHz



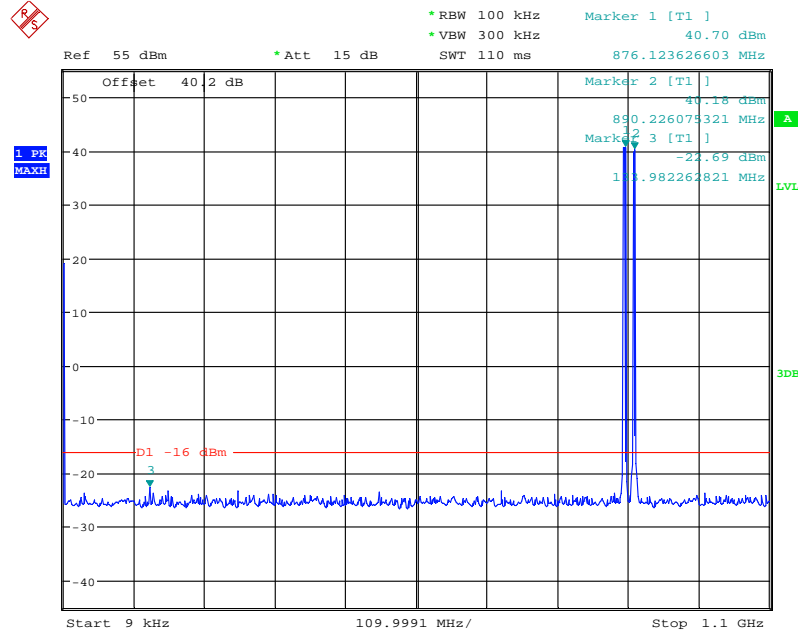
Date: 20.MAR.2014 15:19:18



Mix Carrier(x4): 3G+1L

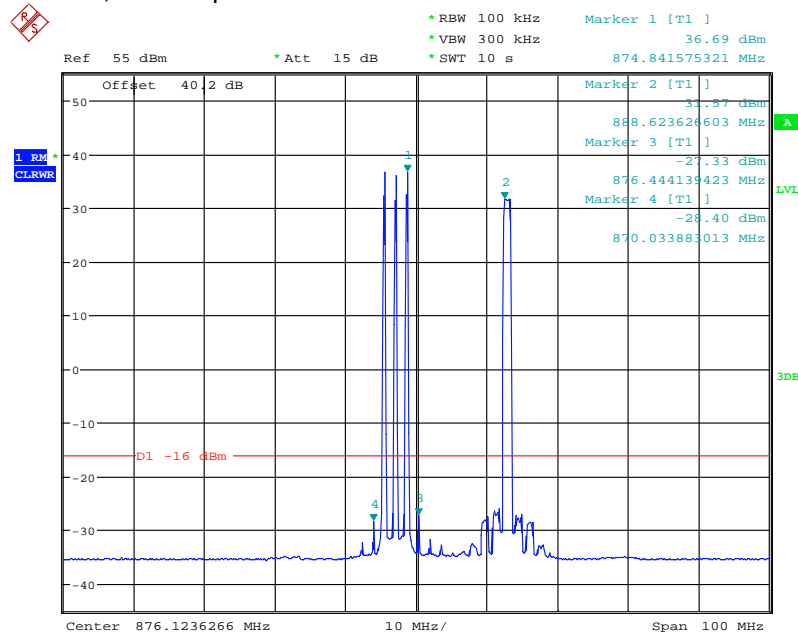
Configuration 1 - Mode 7 - G&G&G&L1.4

9kHz to 1.1GHz



Date: 24.MAR.2014 14:38:09

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.



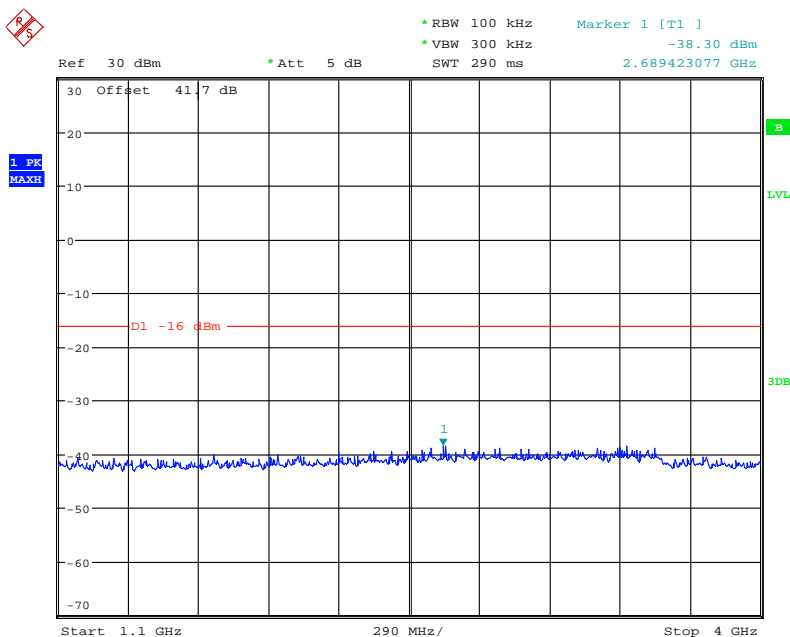
Date: 24.MAR.2014 14:39:34

Note: The emissions beyond the limit are the operating frequencies.



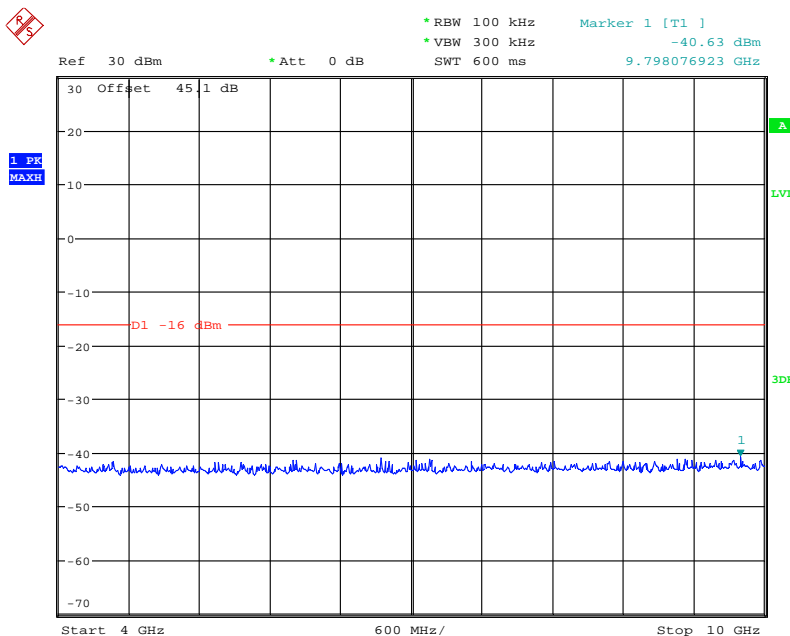
Product Service

1.1GHz to 4GHz



Date: 24.MAR.2014 16:14:34

4GHz to 10GHz



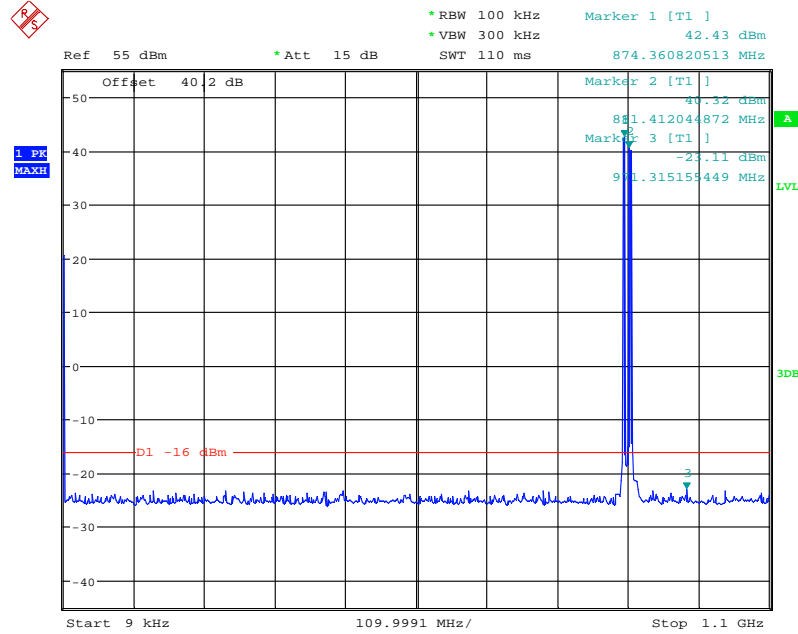
Date: 24.MAR.2014 14:36:29



Mix Carrier(x4): 2G+2L

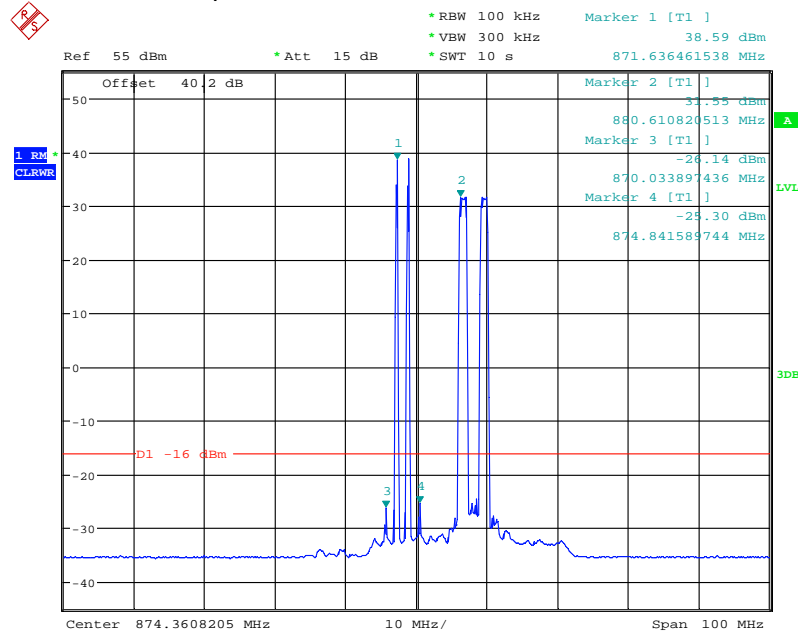
Configuration 1 - Mode 8 - G&G&L1.4&L1.4

9kHz to 1.1GHz



Date: 21.MAR.2014 15:35:13

Note: The emissions above the limit are measured in a smaller bandwidth and using a RMS detector, see the plot below.

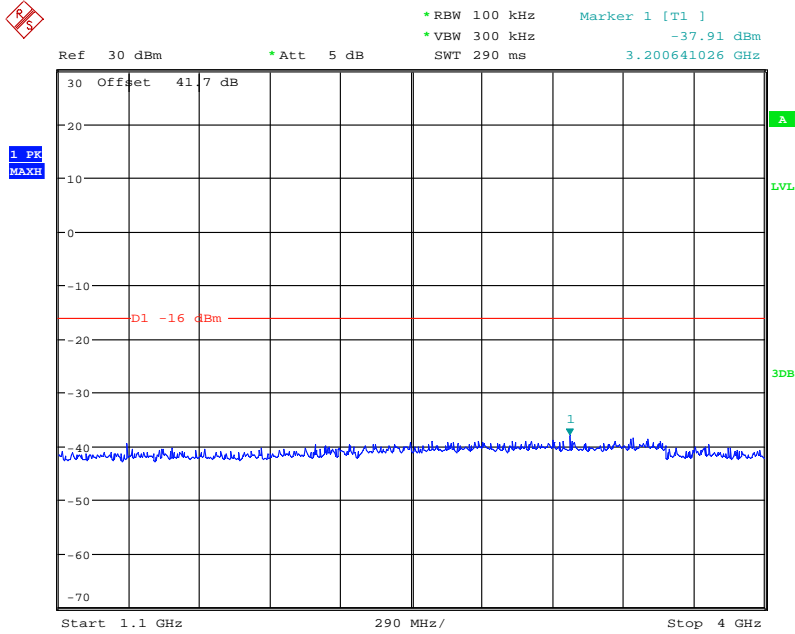


Date: 21.MAR.2014 15:37:29

Note: The emissions beyond the limit are the operating frequencies.

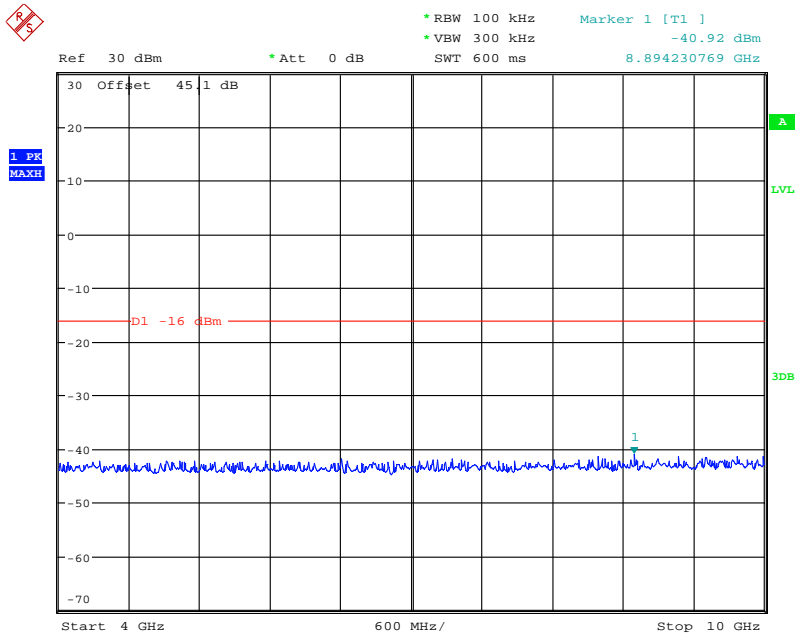


1.1GHz to 4GHz



Date: 21.MAR.2014 16:45:59

4GHz to 10GHz



Date: 21.MAR.2014 15:38:56

Remarks

The EUT does not exceed -16dBm at the frequency range of 9kHz to 10GHz.



Product Service

2.6 RECEIVER SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.111

2.6.2 Equipment Under Test

RUS 01 B5 / KRC 118 64/2, S/N: C824752731

2.6.3 Date of Test and Modification State

24 March 2014 – Modification State 0

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.

In accordance with FCC CFR 47 Part 15 Clause 15.111, the receiver spurious emissions from the antenna terminal were measured. Measurements were performed on the receiver antenna connector RF B1. The EUT was set to transmitter mode on the TX connector RF A1 and during the measurement the RF A1 was terminated with match load, (50 Ohm).

The resolution was set to 1MHz in the frequency range 9kHz to 10GHz. The spectrum analyzer detector was set to peak and trace was kept on Max Hold to give the worst case. The limit line that apply is -57dBm, 2 nanowatts in band 9kHz to 10GHz.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

Measurements were made from 9kHz up to at least 5th harmonic of the highest carrier frequency at least.

The test was performed with the EUT in the following configurations and modes of operation:

- Configuration 1 - Mode 1 - G&L1.4
- Mode 2 - G&L1.4
- Mode 3 - L1.4&G



2.6.6 Environmental Conditions

Ambient Temperature 22.5 – 23.6°C
 Relative Humidity 20.5 – 25.0%

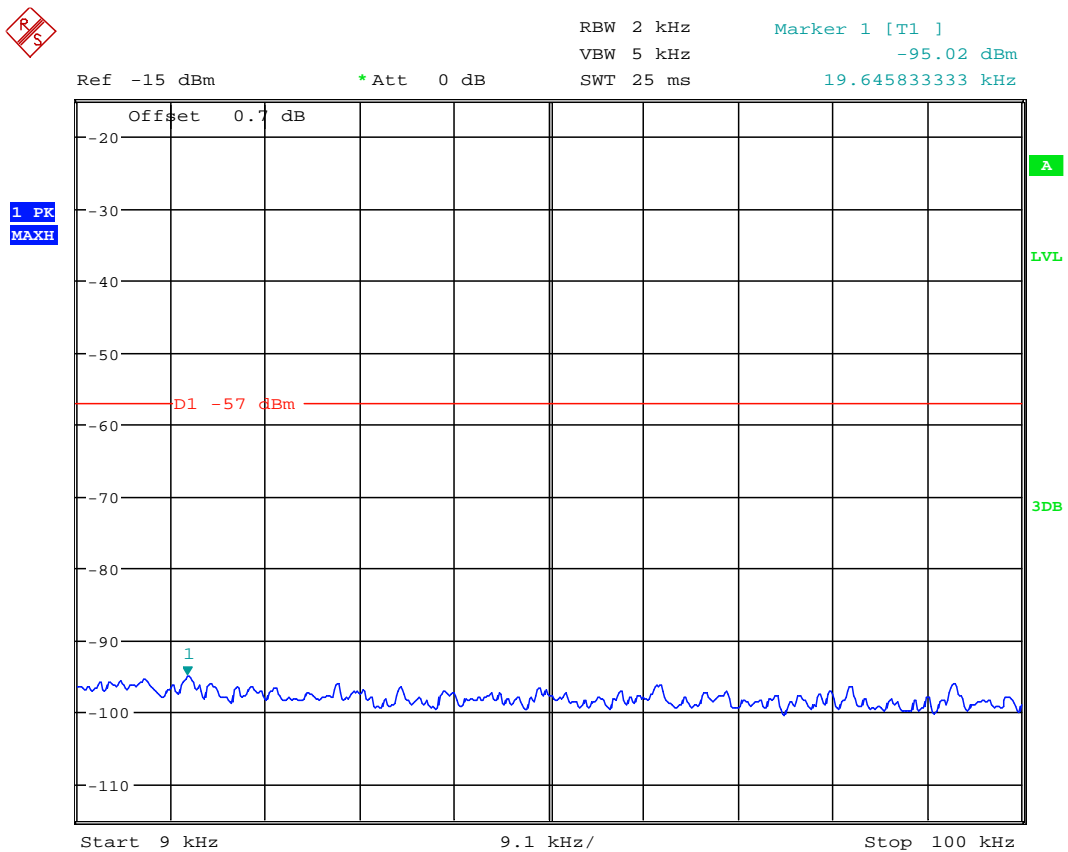
2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15 for Receiver Spurious Emissions.

The test results are shown below

Remark:

The emissions at 9kHz on the plots was not generated by the test object. A complementary measurement with a smaller span showed that it was related to the LO feedthrough.

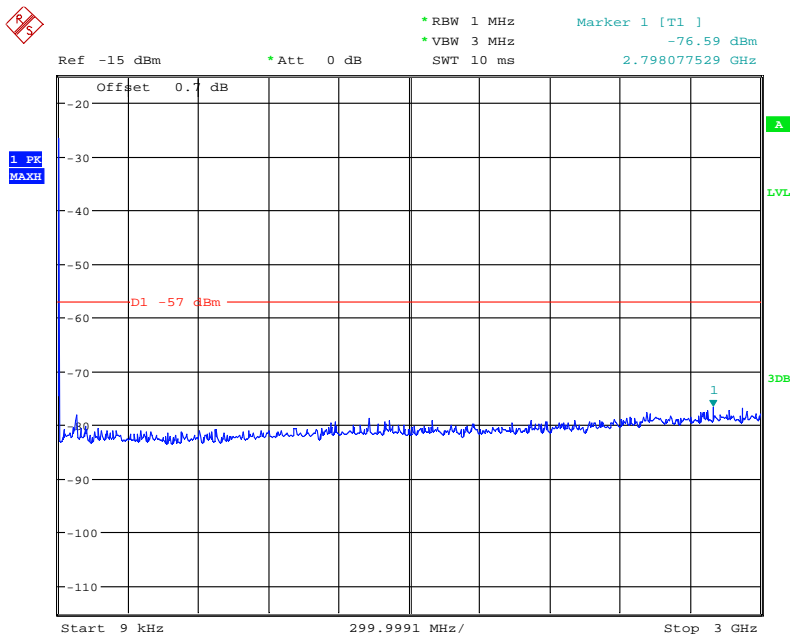


Date: 24.MAR.2014 16:20:30



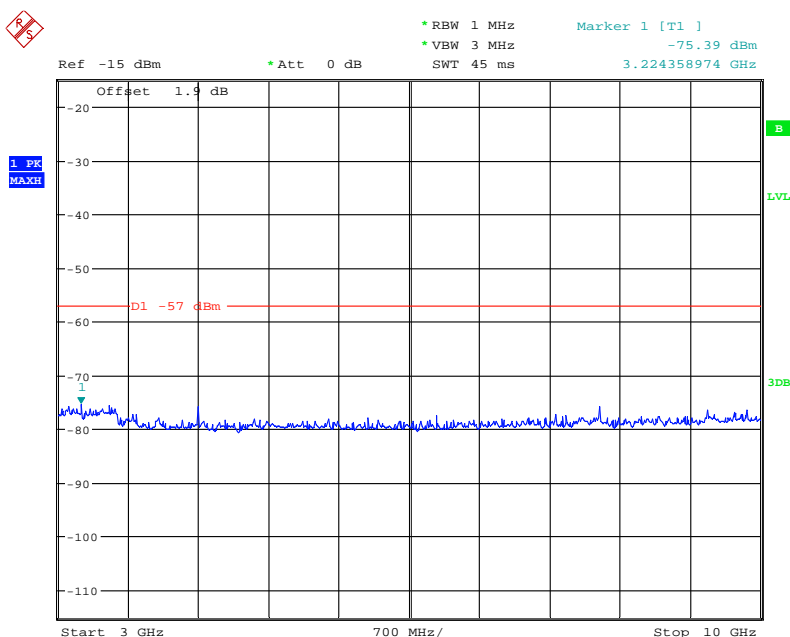
Configuration 1 - Mode 1 - G&L1.4

9kHz to 3GHz



Date: 24.MAR.2014 16:19:53

3GHz to 10GHz

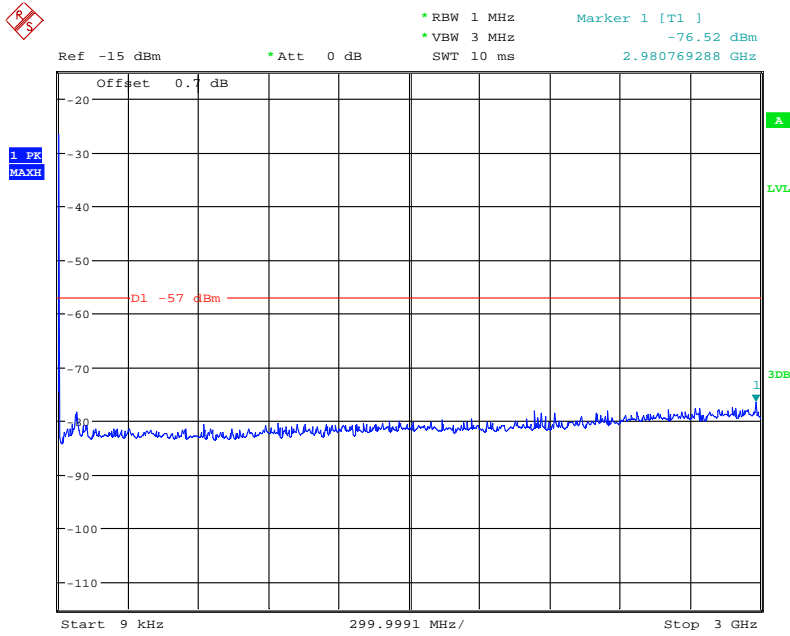


Date: 24.MAR.2014 16:22:14



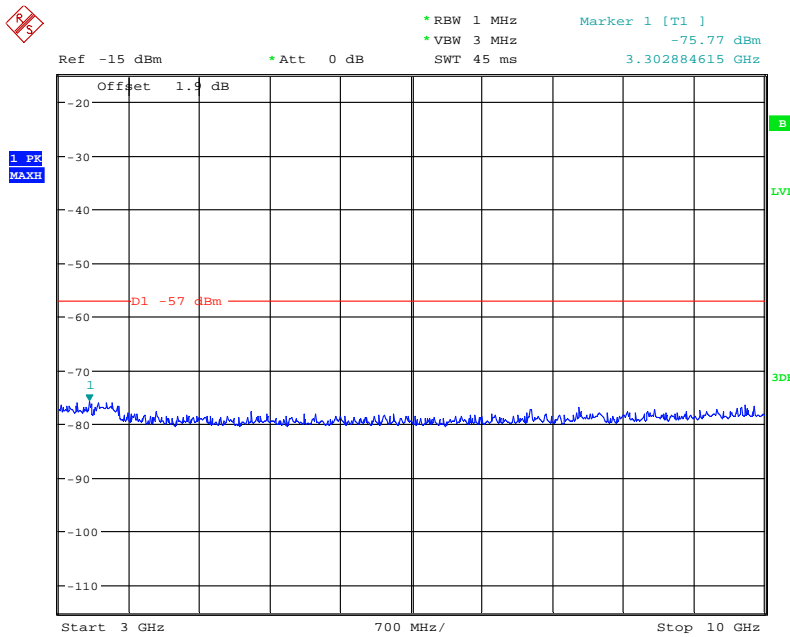
Configuration 1 - Mode 2 - G&L1.4

9kHz to 3GHz



Date: 24.MAR.2014 16:24:58

3GHz to 10GHz

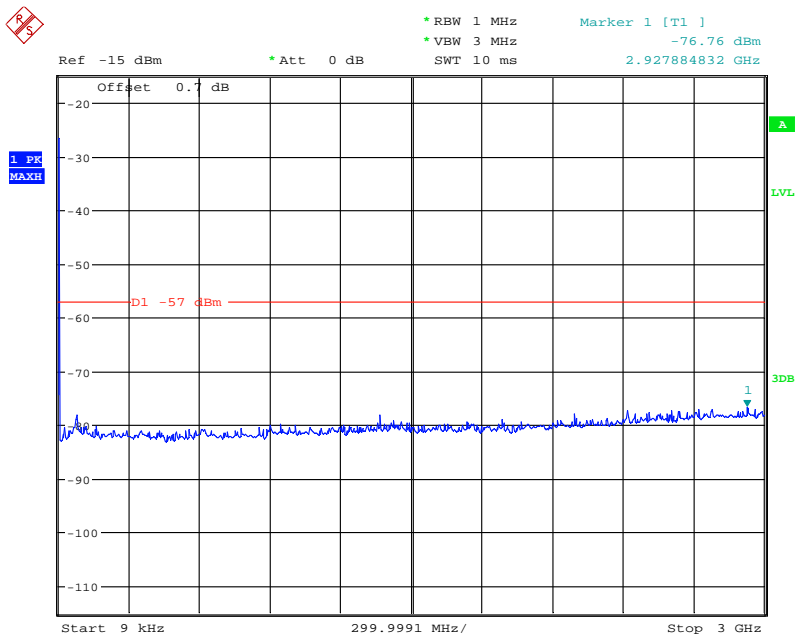


Date: 24.MAR.2014 16:24:29



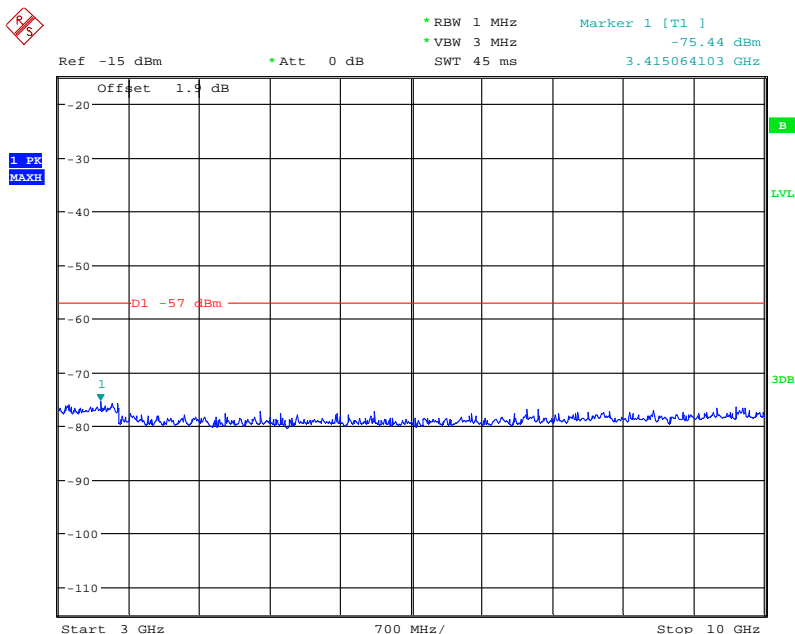
Configuration 1 - Mode 3 - L1.4&G

9kHz to 3GHz



Date: 24.MAR.2014 16:33:48

3GHz to 10GHz



Date: 24.MAR.2014 16:34:31



Product Service

Limit

Receiver spurious emissions shall not exceed -57dBm / 2 nanowatts in the band 9kHz to 10GHz.

Remarks

The EUT does not exceed the limit at the frequency range of 9kHz to 10GHz.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	Serial No.	Calibration Period (months)	Calibration Due
Section 2.1, 2.2, 2.3, 2.5, 2.6 – Maximum Conducted Output Power, Peak – Average Ratio, Spurious Emissions at Antenna Terminals (± 1MHz), Conducted Spurious Emissions and Receiver Spurious Emissions.					
Spectrum Analyzer	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
Power Meter	Rohde & Schwarz	NRP	101283	12	04-Aug-2014
Power Sensor	Rohde & Schwarz	NRP-Z51	102310	12	04-Aug-2014
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-43	CE6211	-	O/P MON
Pass Filter	K&L	ULK 904 098/2	16	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323194	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323220	-	O/P MON
Power Supply	Dahua	DH1716-5D	2008040041	-	O/P MON
Power Supply	Dahua	DH1716A-10	ETQ-123	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151665	12	12-Dec-2014



Product Service

Instrument	Manufacturer	Type No.	Serial No.	Calibration Period (months)	Calibration Due
Section 2.4 – Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121605	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323194	-	O/P MON
Load	Shanghai Huaxiang	TFE5-3	090323220	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESIB26	100301	12	27-Mar-2015
BiLog Antenna	Rohde & Schwarz	HL562	100488	12	15-Feb-2015
Double Ridge Guide Horn Antenna	ETS-Lindgren	EMCO 3117	00056645	12	15-Feb-2015
Double Ridge Guide Horn Antenna	ETS-Lindgren	EMCO 3117	00056662	12	15-Feb-2015
Semi Anechoic Chamber	ETS-Lindgren	9.6m×6.72m×5.98m	-	12	18-Mar-2015
30MHz~3GHz Pre-amplifier	Rohde & Schwarz	SCU03	10005	-	O/P MON
3GHz~18GHz Pre-amplifier	Rohde & Schwarz	AFS42-00101800-25-S-42	1078388		O/P MON
Filters Array	Rohde & Schwarz	TS-Filt	-	-	O/P MON
Switches Array	Rohde & Schwarz	TS-RSP	100241	-	O/P MON
Multi-Device Controller	ETS-Lindgren	2090	00049393	-	O/P MON
Viedo monitoring system	ETS-Lindgren	Y21953A	2501103	-	O/P MON
Power Supply	Dahua	DH1716-5D	2008040041	-	O/P MON
Power Supply	Dahua	DH1716A-10	ETQ-123	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151665	12	12-Dec-2014

O/P MON Output monitored with calibration equipment
 TU Traceability Unscheduled



Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Conducted RF Output Power	30MHz to 10GHz Amplitude	0.5dB*
Conducted Emissions	30MHz to 40GHz Amplitude	3.0dB*
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Worst case error for both Time and Frequency measurement 12 parts in 10 ⁶		

* In accordance with CISPR 16-4



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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