REPORT ON THE CERTIFICATION TESTING OF A AERIAL FACILITIES LIMITED Q116270 CELL ENHANCER WITH RESPECT TO THE FCC RULES CFR 47, PART 90 Subpart I PRIVATE LAND MOBILE REPEATER.

TEST REPORT NO: RU1410/8338

COPY NO: 2

ISSUE NO: 1

FCC ID: NEO60-2128SERIES

REPORT ON THE CERTIFICATION TESTING OF A
AERIAL FACILITIES LIMITED
Q116270 CELL ENHANCER
WITH RESPECT TO
THE FCC RULES CFR 47, PART 90 Subpart I
PRIVATE LAND MOBILE REPEATER.

TEST DATE: 21st December 2007 – 3rd January 2008

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = <n Reason: I am the author of this document Date: 2008.03.03 08:43:48 Z — D WINSTANLEY

APPROVED BY: John Charters — Digitally signed by John Charters DN: CN = John Charters, C = GB, O = TRL Compliance Ltd Reason: I am approving this document Date: 2008.03.03 08:47:21 Z — J CHARTERS RADIO SECTION LEADER

DATE: 19th February 2008

Distribution:

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F +44 (0)1695 557077
E test@trlcompliance.com

CONTENTS

Notes:

1. Component failure during test — YES [ ] NO [X]
2. If Yes, details of failure:
3. The facilities used for the testing of the product contain in this report are FCC Listed.

TRL Compliance
part of TRAC global

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	NEO60-2128SERIES
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 90 Subpart I
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	Q116270 Cell Enhancer
EQUIPMENT TYPE:	Private Land Mobile Repeater
MAXIMUM GAIN:	Uplink = 57.62 dB Downlink = 55.68 dB
MAXIMUM INPUT:	Uplink = -63.0 dBm Downlink = -15.0 dBm
MAXIMUM OUTPUT CONDUCTED:	Uplink = -5.59 dBm Downlink = 40.47 dBm
NUMBER OF CHANNELS:	Uplink Wideband Downlink Wideband
CHANNEL SPACING:	Not Applicable, Wideband
FREQUENCY GENERATION:	N/A
MODULATION TYPE:	F3E
POWER SOURCE(s):	+110 Vac
TEST DATE(s):	21st December 2007 – 3rd January 2008
ORDER No(s):	47882
APPLICANT:	Aerial Facilities Limited
ADDRESS:	Aerial House Asheridge Road Chesham Buckinghamshire HP5 1TU

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = <n Reason: I am the author of this document Date: 2008.03.03 08:43:37 Z — D WINSTANLEY

APPROVED BY: John Charters — Digitally signed by John Charters DN: CN = John Charters, C = GB, O = TRL Compliance Ltd Reason: I am approving this document Date: 2008.03.03 08:47:54 Z — J CHARTERS RADIO SECTION LEADER

TRAC testing regulatory and compliance

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	Q116270 Cell Enhancer
EQUIPMENT TYPE:	Private Land Mobile Repeater
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 90 Subpart I
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S ORDER No(s):	47882
APPLICANT'S CONTACT PERSON(s):	Mr Peter Bradfield
E-mail address:	Peterb@aerial.co.uk
APPLICANT:	Aerial Facilities Limited
ADDRESS:	Aerial House Asheridge Road Chesham Buckinghamshire HP5 1TU United Kingdom
TEL:	+44 (0)1494 777000
FAX:	+44 (0)1494 778456
MANUFACTURER:	Aerial Facilities Limited
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL Compliance Ltd
UKAS ACCREDITATION No:	0728
TEST DATE(s):	21st December 2007 – 2nd January 2008
TEST REPORT No:	RU1410/8338

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	APPLICABILITY	RESULT
RF Power Output	90.205	Yes	Complies
Audio Frequency Response	TIA EIA-603.3.2.6	N/A	N/A
Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	N/A	N/A
Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A
Occupied Bandwidth	90.210	Yes	Complies
Spurious Emissions at Antenna Terminals	90.210	Yes	Complies
Field Strength of Spurious Emissions	90.210	Yes	Complies
Frequency Stability	90.213	N/A(note 1)	N/A
Transient behaviour	90.214	N/A(note 2)	N/A

Notes:
1 The EUT does not contain modulation circuitry, therefore the test was not performed.
2 The EUT is not a keyed carrier system, therefore the test was not performed.

2. Product class: Uplink Class A [X] Class B [ ]
   Downlink Class A [X] Class B [ ]
3. Product Use: Private Land Mobile Repeater
4. Emission Designator: F3E
5. Temperatures: Ambient (Tnom) 16°C
6. Supply Voltages: Vnom +110 Vac

   Note: Vnom voltages are as stated above unless otherwise shown on the test report page

7. Equipment Category: Single channel [ ]
   Two channel [ ]
   Multi-channel [X]
8. Channel spacing: Narrowband [ ]
   Wideband [X]
9. Test Location TRL Compliance Limited
   Up Holland [X]
   Long Green [ ]
10. Modifications made during test program No modifications were performed.

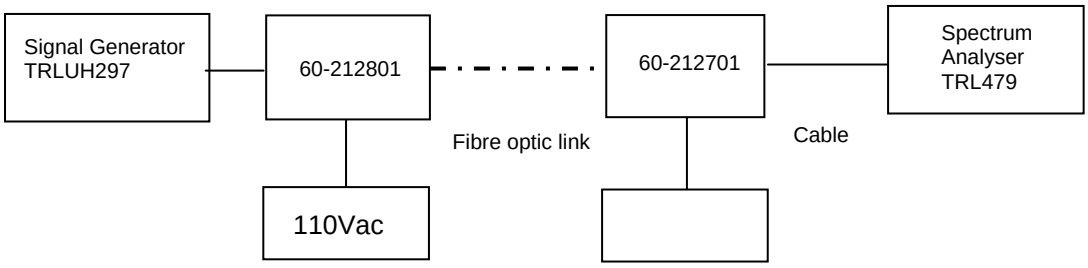
System description:

The Q116270 Cell Enhancer FCCID NEO60-2128SERIES consists of an uplink and downlink. The uplink operates at a gain of approximately 55dB over the frequency range 505.40MHz – 507.96 MHz. The downlink operates at a gain of approximately 55dB over the frequency range 501.35MHz – 503.15 MHz.

COMPLIANCE TESTS

AMPLIFIER GAIN – CONDUCTED – PART 2.1046 – UPLINK

Ambient temperature = 15°C Radio Laboratory
Relative humidity = 55%
Supply voltage = +110 Vac
Channel number = See test results



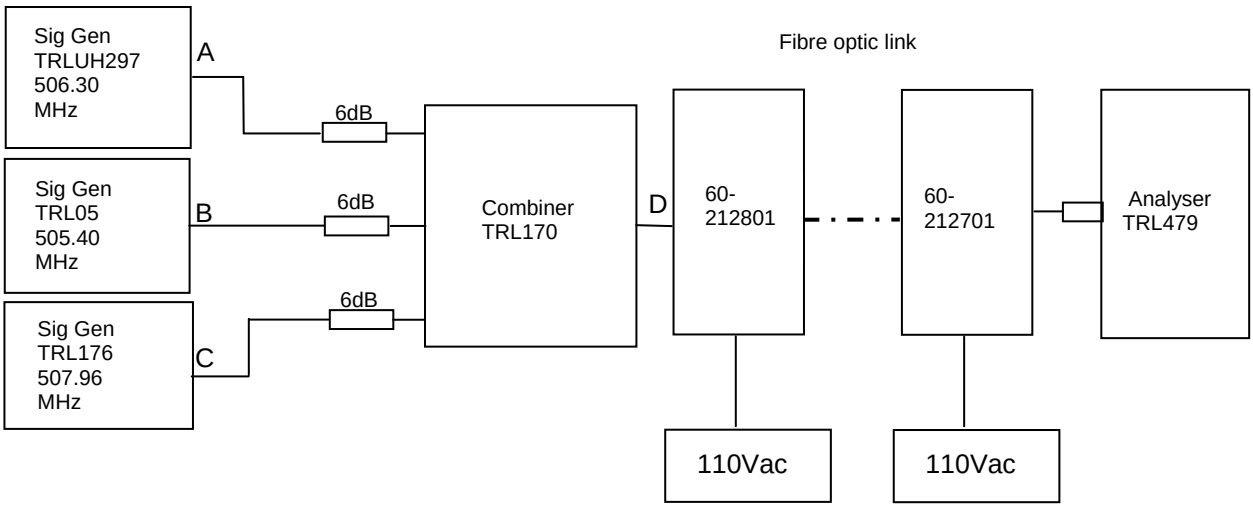
Frequency MHz	Signal Generator input level dBm	Input Cable Loss dB	Output Cable loss dB	Level at Spectrum Analyser dBm	Gain dB	Conducted Output Power dBm	Gain after 10dB input level increase dB
505.40 MHz	-62	0.21	0.21	-5.93	56.49	-5.72	46.58
506.75 MHz	-63	0.21	0.21	-5.80	57.62	-5.59	47.57
507.96 MHz	-58	0.21	0.21	-5.86	52.56	-5.65	42.54

Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**

AMPLIFIER INTERMODULATION SPURIOUS EMISSIONS – CONDUCTED – PART 2.1053– UPLINK

Ambient temperature = 17°C Radio Laboratory
Relative humidity = 66%
Supply voltage = +110 Vac



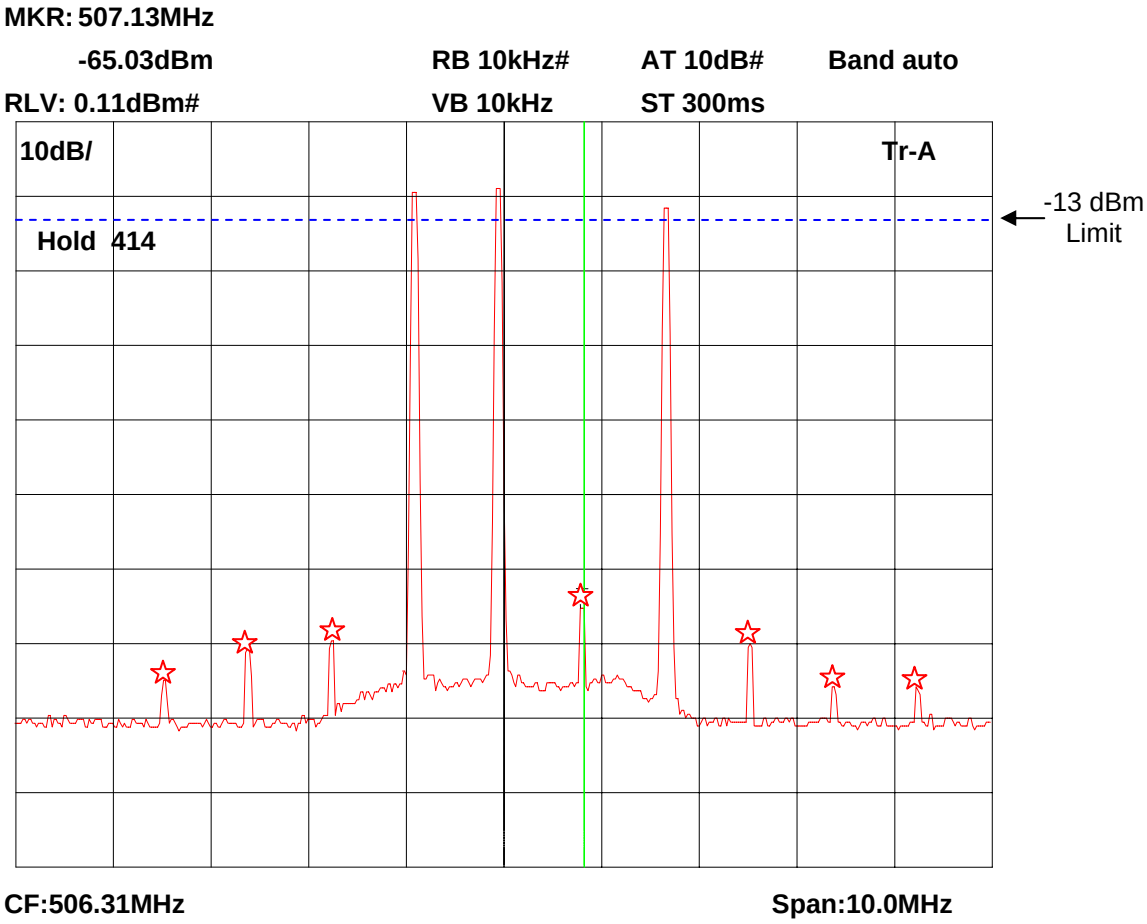
The intermodulation and spurious products were measured with the amplifier operating at maximum gain. A three tone test was conducted using the equipment as above. The input power level was adjusted so the level at point D was 10dB above the maximum input. The cable loss between the EUT and the spectrum analyser was 0.21dB.

RF Input Frequency (MHz)			Highest Intermodulation Product Level (dBm)	Limit (dBm)
506.3	505.40	507.96	-65.03 dBm @ 507.13 MHz	-13

Sweep data is shown on the next page:

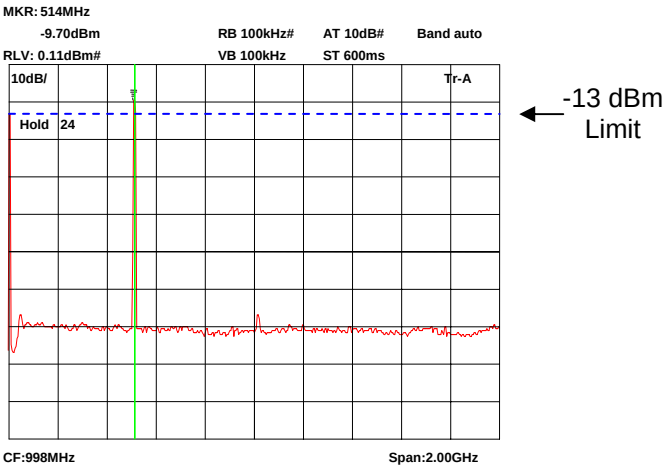
Test equipment used for intermodulation test

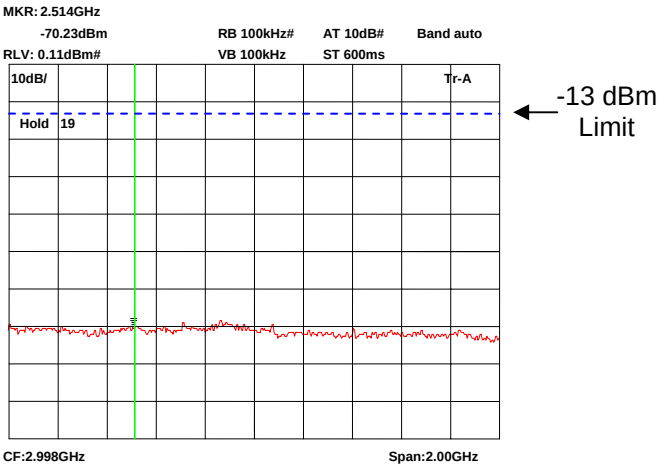
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
SPECTRUM ANALYSER	R&S	FSU46	200034	UH281	
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**
SIGNAL GENERATOR	MARCONI	2022D	119215/058	UH75	
SIGNAL GENERATOR	HP	83630B	3722A00588	UH340	
CMTA	ROHDE & SCHWARZ	CMTA52	894715/033	05	**X**
COMBINER	ELCOM	RC-4-50	N/A	170	**X**

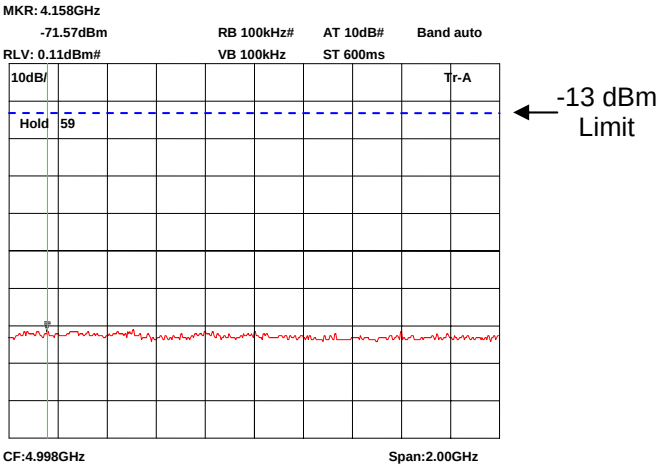


The above plot shows that all roducts (designated by ☆) are below the spurious limit.

Intermodulation Wideband





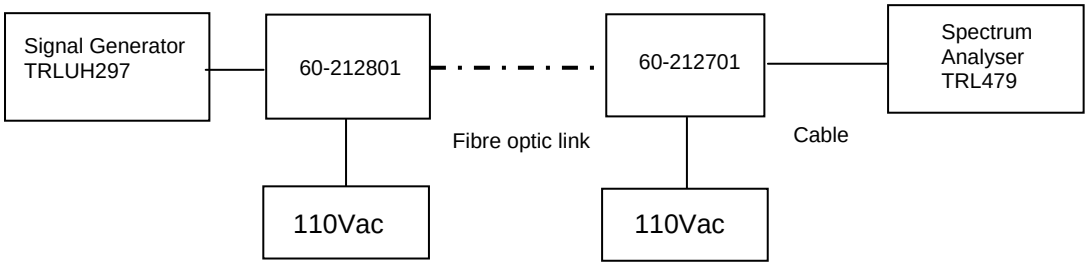


The above plot shows that there are no products outside the bands.

TRANSMITTER TESTS

AMPLIFIER MODULATED CHANNEL TEST – CONDUCTED – Part 2.1049– UPLINK

Ambient temperature	=	15^{o}C	Radio Laboratory
Relative humidity	=	53%	
Supply voltage	=	+110 Vac	
Channel number	=	See test results	



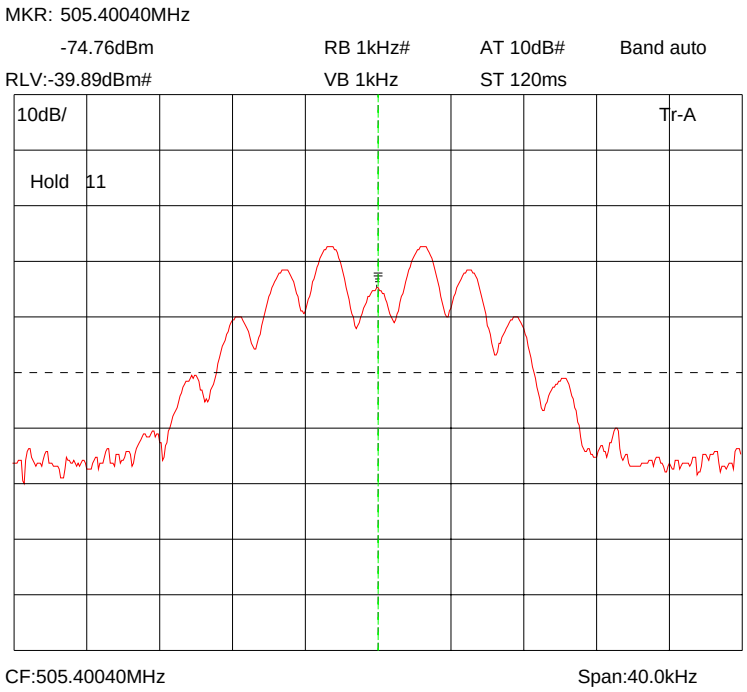
This test was performed to show that the amplifier does not alter the input signal in any way. The input signal was set to the maximum input level and modulated with a 2500Hz tone. The plots show the signal measured at the signal generator and the signal measured at the output of the EUT.

Note: The cables and attenuators had the following losses.

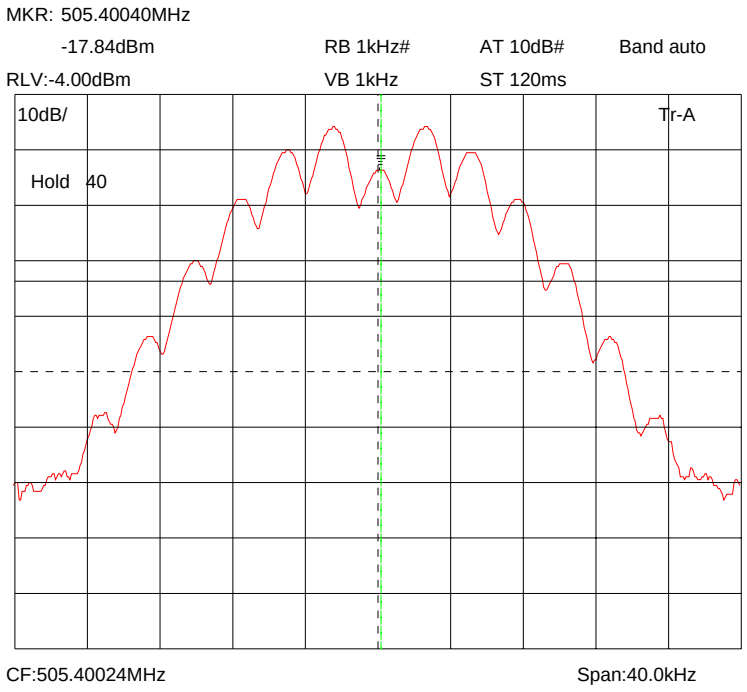
1. Cable between EUT and spectrum analyser 0.21dB
2. Cable between signal generator and EUT 0.21dB

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**

505.40 MHz Signal Generator, deviation set to 5kHz

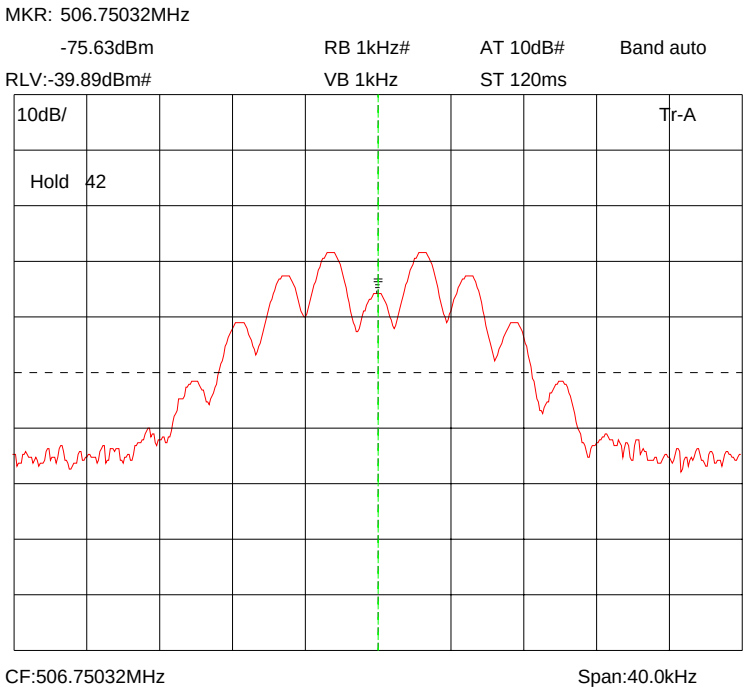


505.40 MHz Signal Generator and EUT, deviation set to 5kHz

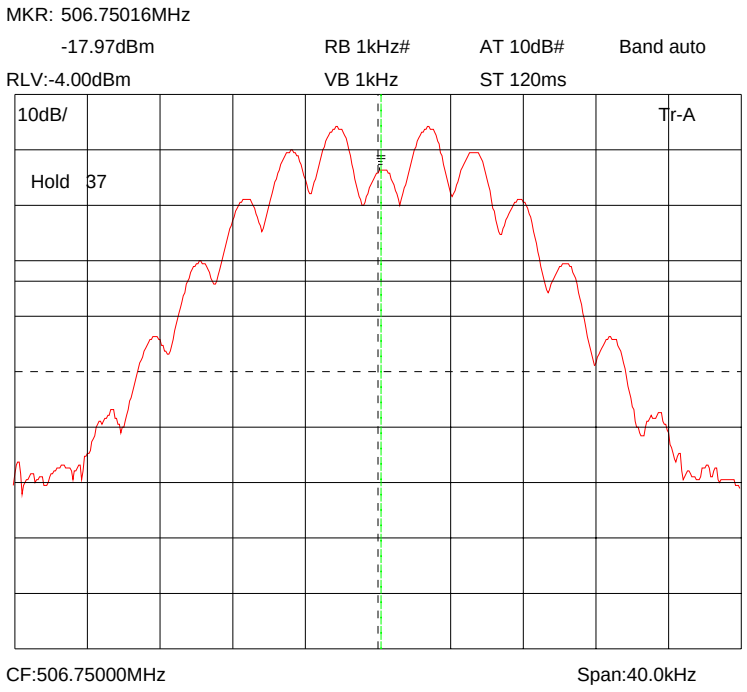


The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

506.75 MHz Signal Generator, deviation set to 5kHz

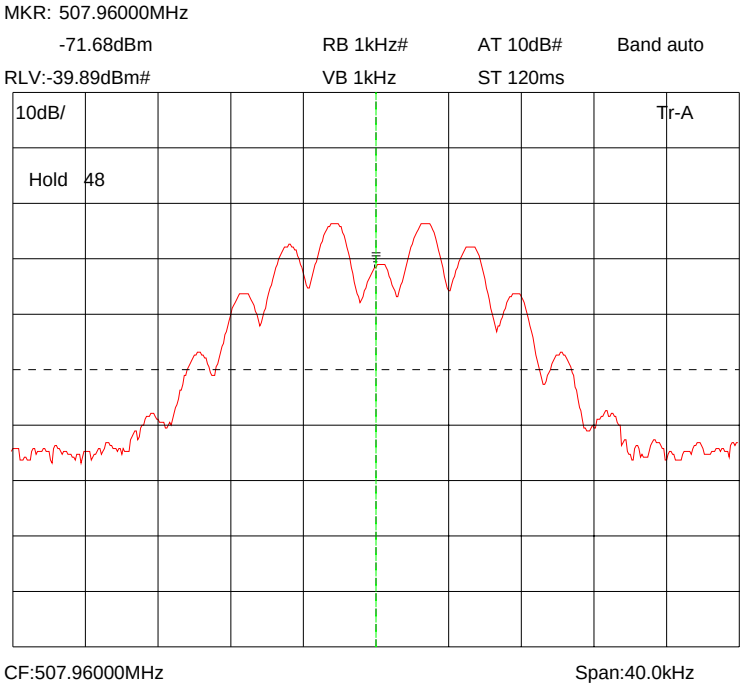


506.75 MHz Signal Generator and EUT, deviation set to 5kHz

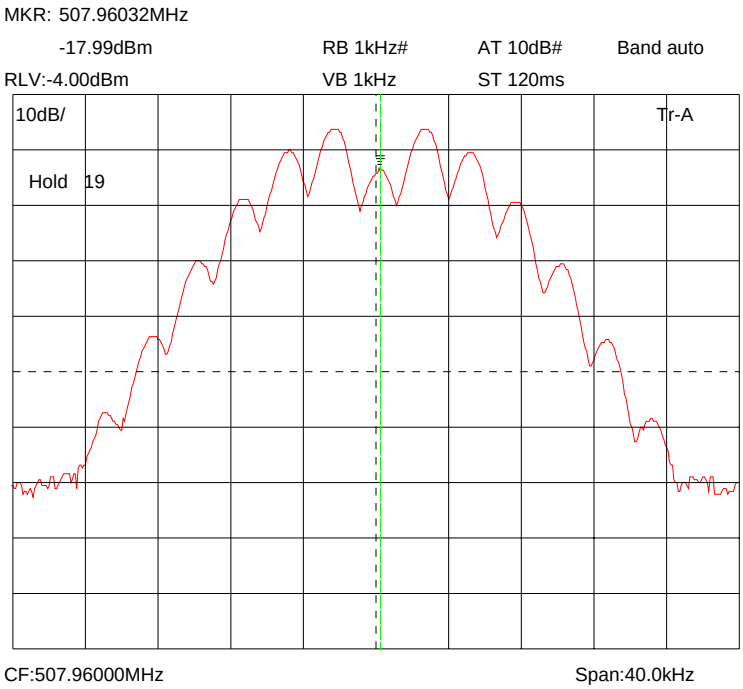


The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

507.96 MHz Signal Generator, deviation set to 5kHz



507.96 MHz Signal Generator and EUT, deviation set to 5kHz

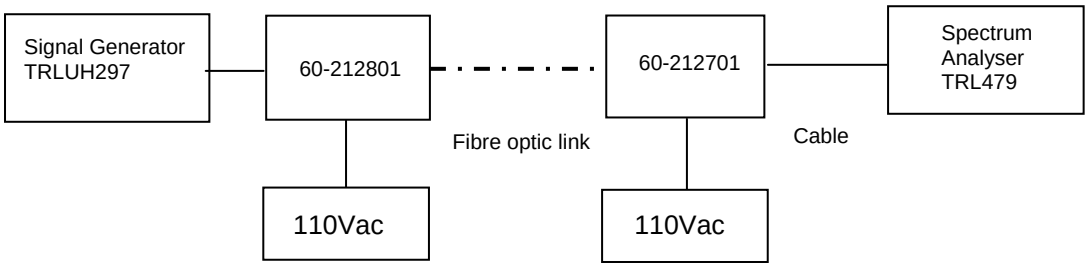


The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053 – UPLINK

Ambient temperature	=	15°C	Radio Laboratory		
Relative humidity	=	53%	Test Signal	=	F3E
Supply voltage	=	+110 Vac			



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating at maximum power and on three test frequencies.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more that 250% of the authorised bandwidth

At least 43 + 10 log PdB

$(10\log P_{watts}) – (43+10\log (P_{watts} * 1000)) =$ LIMIT =-13 dBm

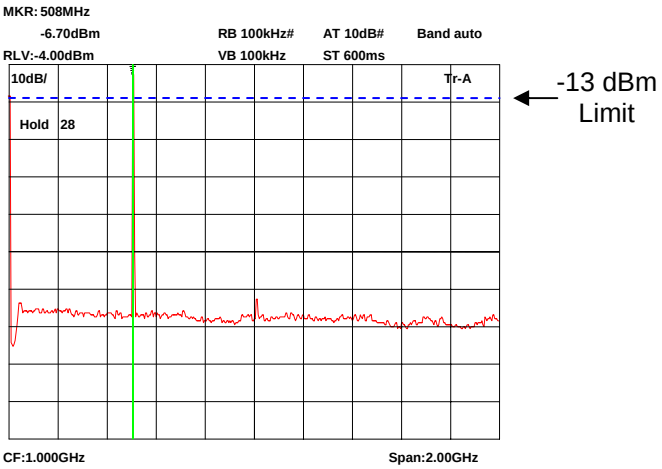
RESULTS

FREQUENCY RANGE	FREQ. (MHz)	MEASURED LEVEL (dBm)	ATTENUATOR & CABLE LOSSES (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
0Hz – 6 GHz	No Significant Emissions within 20 dB of the limit				-13

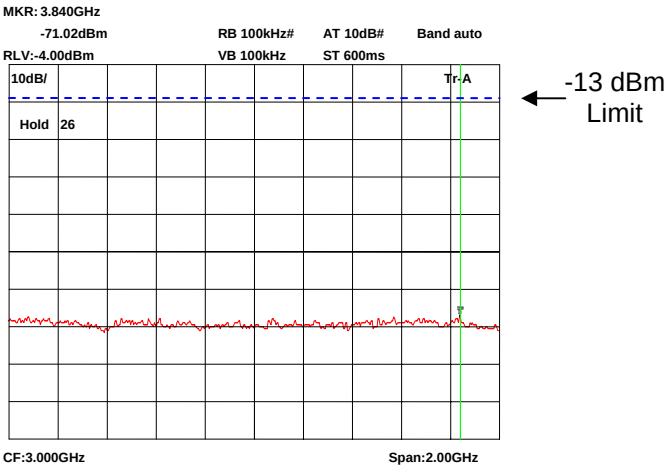
The test equipment used for the Transmitter Conducted Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**

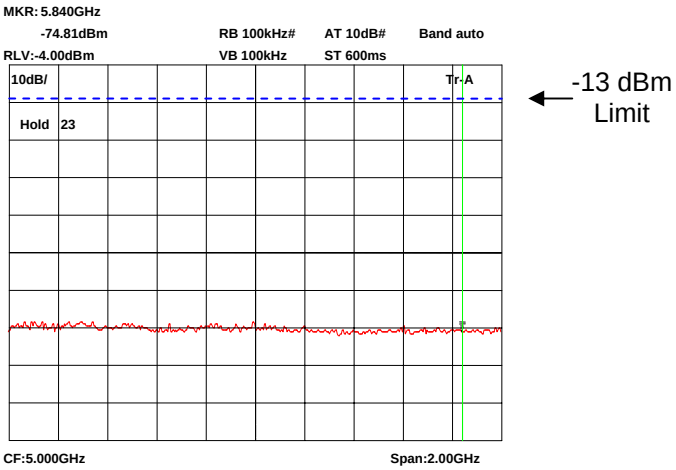
Conducted emissions 505.40 MHz 0 – 2GHz



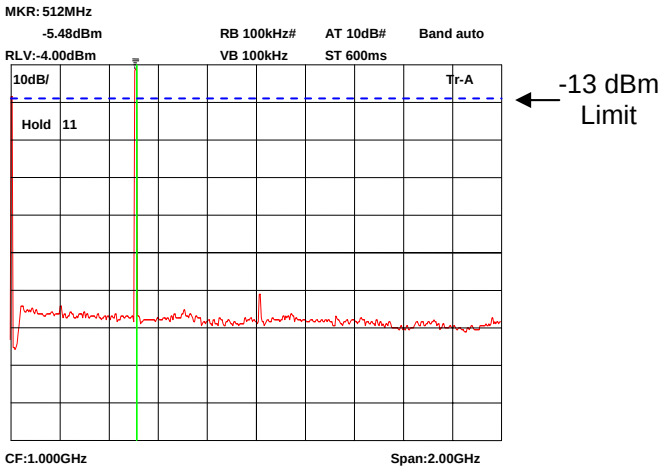
Conducted emissions 505.40 MHz 2 – 4GHz



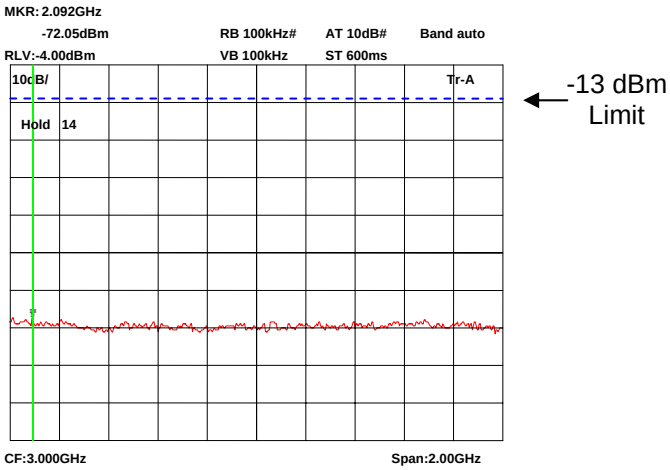
Conducted emissions 505.40 MHz 4 – 6GHz



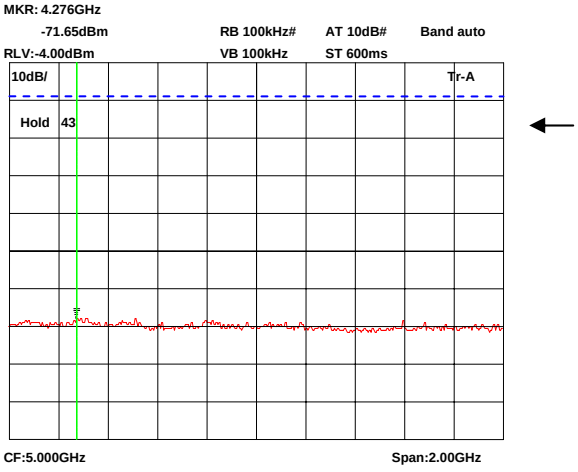
Conducted emissions 506.75 MHz 0 – 2GHz



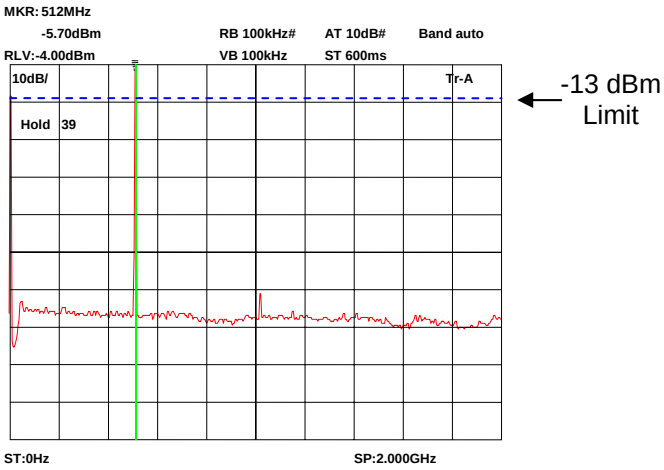
Conducted emissions 506.75 MHz 2 – 4GHz



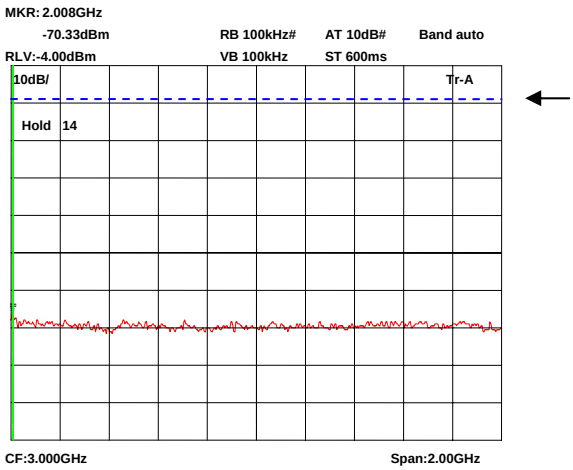
Conducted emissions 506.75 MHz 4 – 6GHz



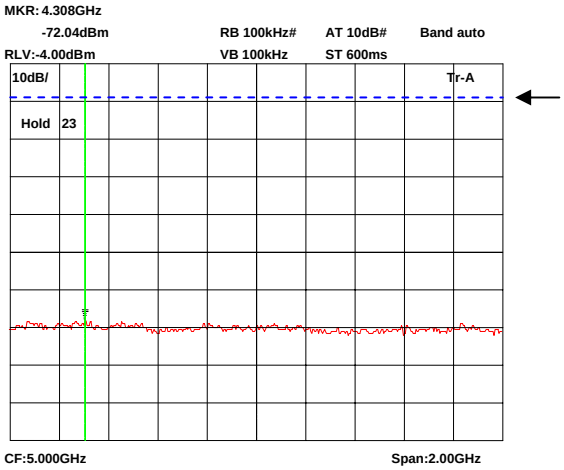
Conducted emissions 507.96 MHz 0 – 2GHz



Conducted emissions 507.96 MHz 2 – 4GHz



Conducted emissions 507.96 MHz 4 – 6GHz

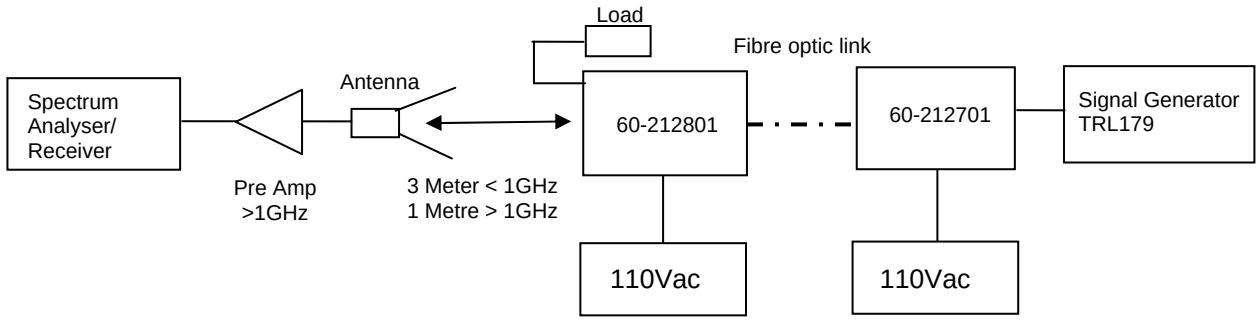


TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – RADIATED – Part 2.1053– UPLINK

Ambient temperature = 15°C
Relative humidity = 58%
Conditions = OATS
Supply voltage = +110 Vac
Supply Frequency = N/A

Test Signal = F3E



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating maximum power on three test frequencies with a 50 ohm load on the output. The unit was also tested with the signal generator replaced by another 50ohm load.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more that 250% of the authorised bandwidth

At least 43 + 10 log PdB

$(10\log P_{watts}) – (43+10\log (P_{watts} * 1000)) = LIMIT = -13$ dBm

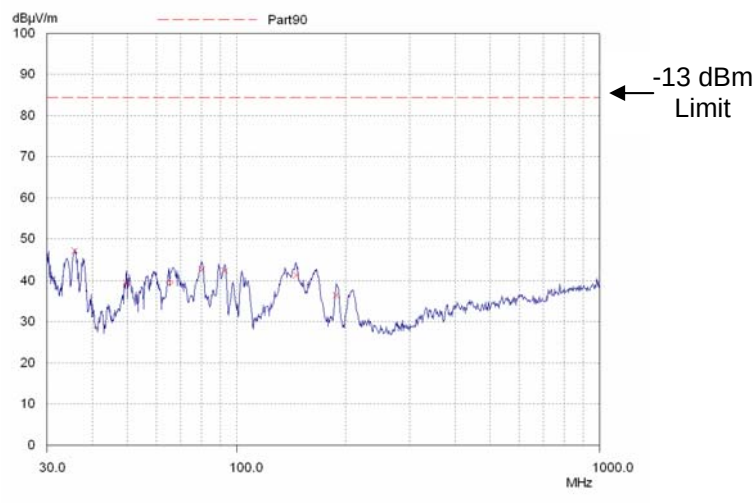
RESULTS

FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	CALCULATED EIRP (dBm)	LIMIT (dBm)
30 MHz – 1 GHz	No Significant Emissions within 20dB of the Limit						-13
1GHz – 6 GHz	No Significant Emissions within 20dB of the Limit						-13

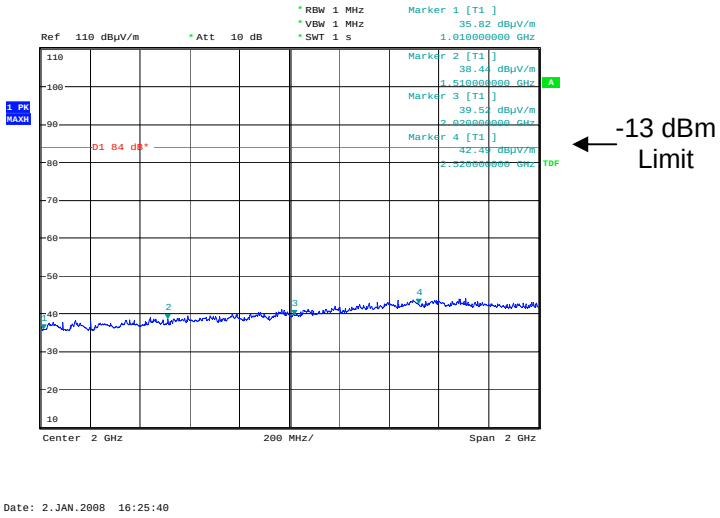
The test equipment used for the Transmitter Spurious Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	R&S	ESVS10	841431/014	UH186	**X**
HORN	EMCO	3115	9010-3580	138	**X**
SPECTRUM ANALYSER	R&S	FSU46	200034	UH281	**X**
PRE AMPLIFIER	HP	8449B	3008A016	572	**X**
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	**X**
ANTENNA	CHASE	CBL6612B	2803	UH93	**X**

Radiated emissions 505.40 MHz 30MHz – 1GHz



Radiated emissions 505.40 MHz 1 – 3GHz



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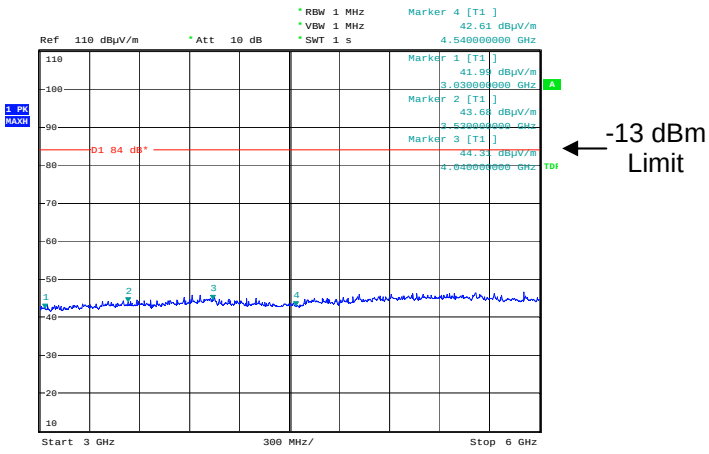
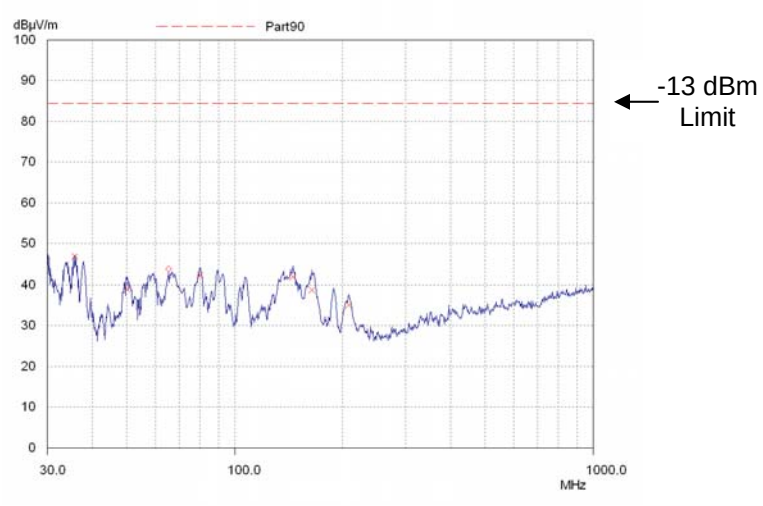
Radiated emissions 505.40 MHz 3 – 6GHz



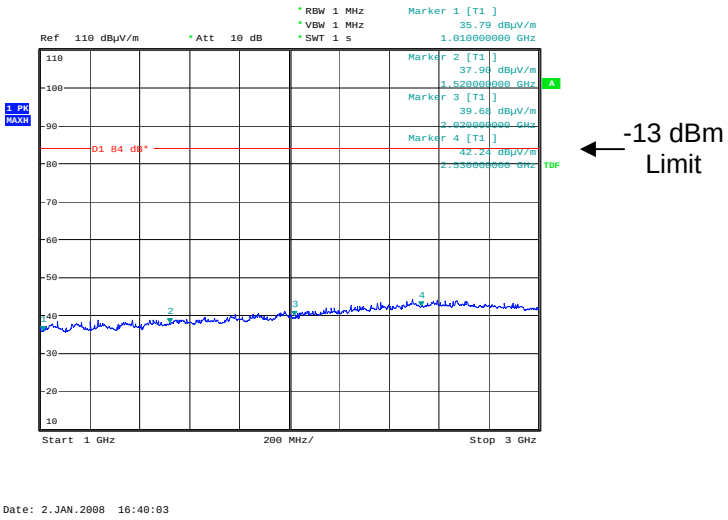
Date: 2.JAN.2008 16:28:33

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions 506.75 MHz 30 MHz – 1GHz

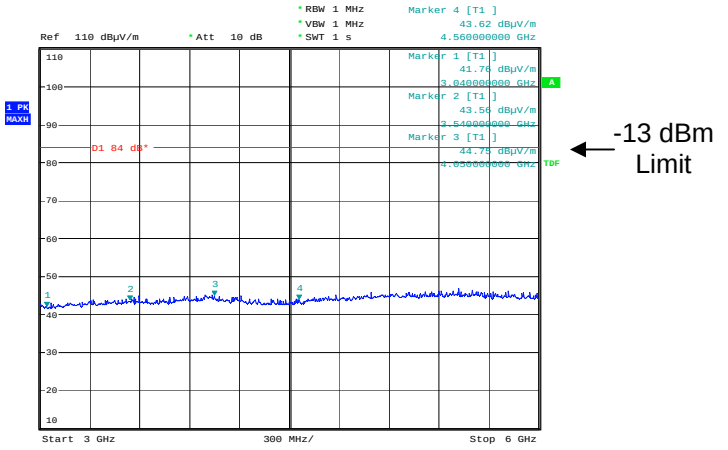


Radiated emissions 506.75 MHz 1GHz – 3GHz



Date: 2.JAN.2008 16:40:03

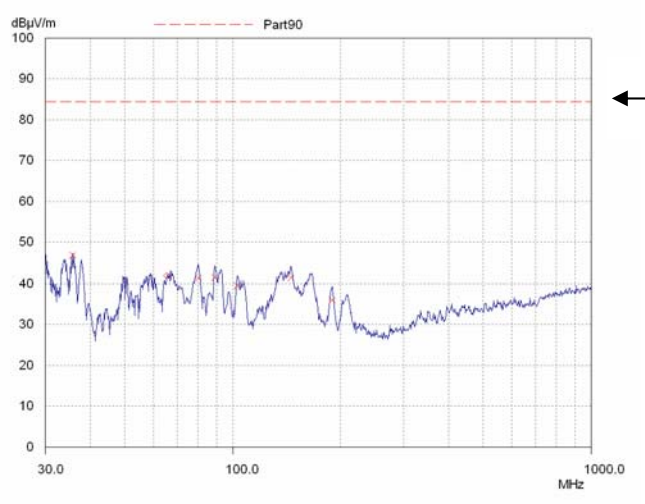
Radiated emissions 506.75 MHz 3GHz – 6GHz



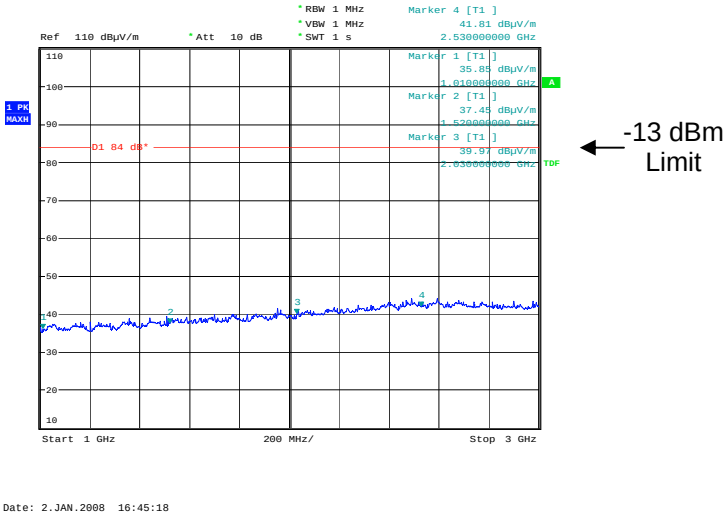
Date: 2.JAN.2008 16:42:07

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions 507.96 MHz 30 MHz – 1GHz

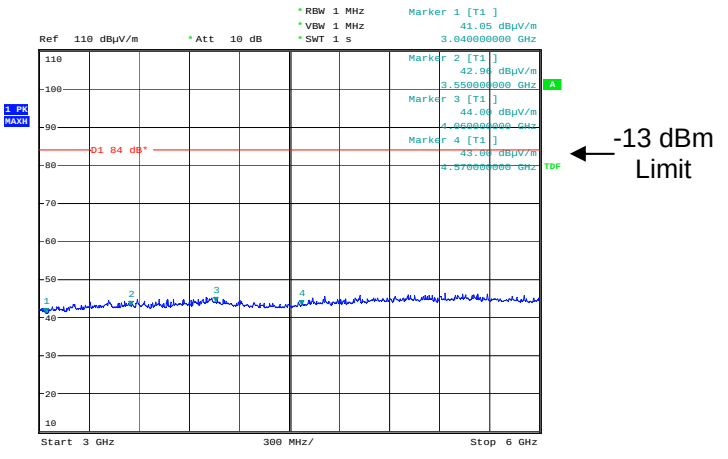


Radiated emissions 507.96 MHz 1GHz – 3GHz



Date: 2.JAN.2008 16:45:18

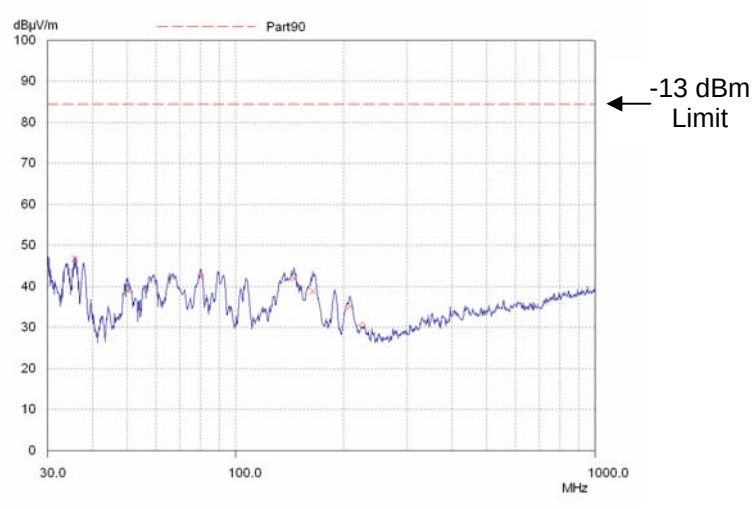
Radiated emissions 507.96 MHz 3GHz – 6GHz



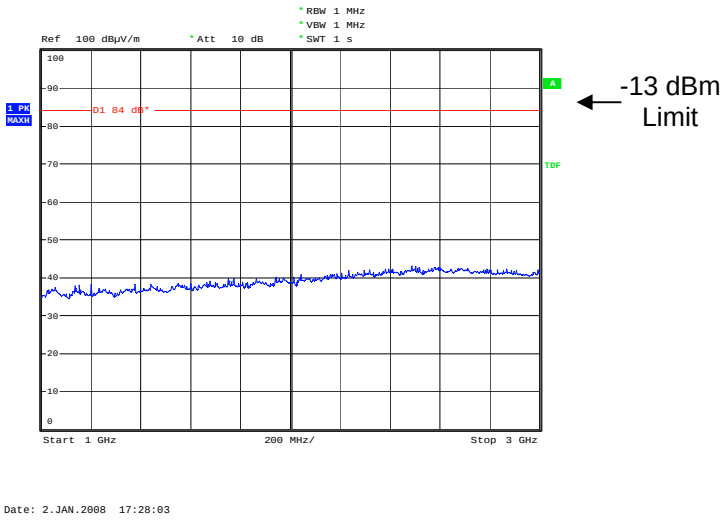
Date: 2.JAN.2008 16:47:12

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions no input signal 30 MHz – 1GHz

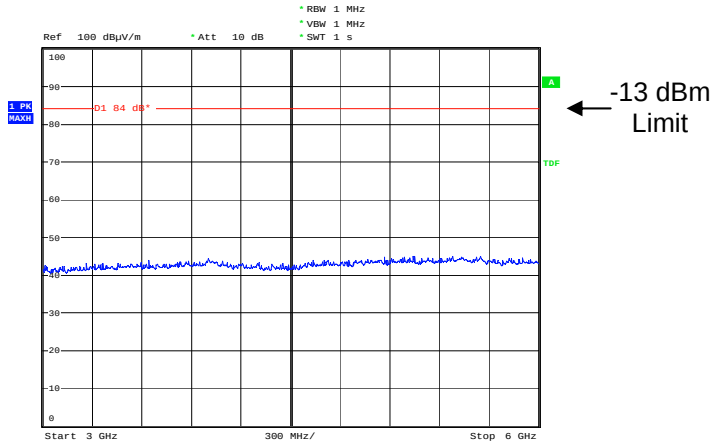


Radiated emissions no input signal 1GHz – 3GHz



Date: 2.JAN.2008 17:28:03

Radiated emissions no input signal 1GHz – 3GHz

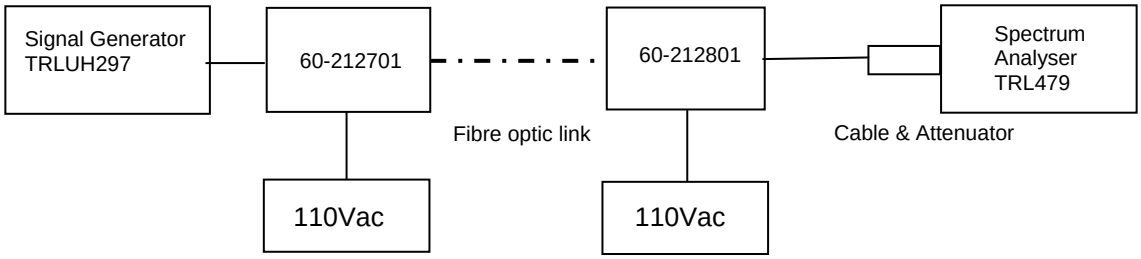


Date: 2.JAN.2008 17:29:51

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

AMPLIFIER GAIN – CONDUCTED – PART 2.1046 – DOWNLINK

Ambient temperature	=	16^{o}C	Radio Laboratory
Relative humidity	=	68%	
Supply voltage	=	+110 Vac	
Channel number	=	See test results	



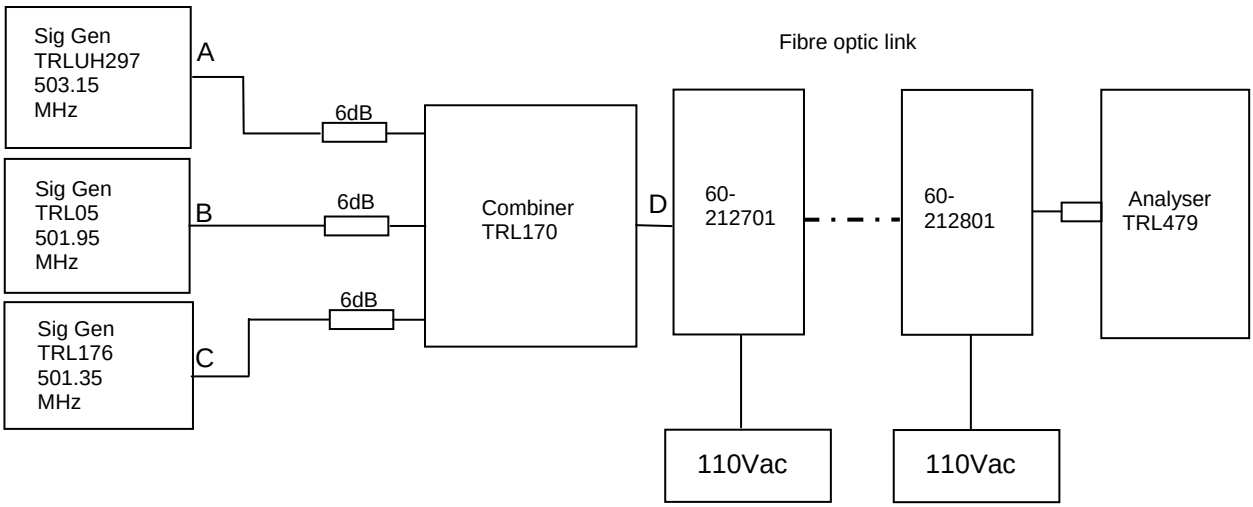
Frequency MHz	Signal Generator input level dBm	Input Cable Loss dB	Output Cable & Attenuator loss dB	Level at Spectrum Analyser dBm	Gain dB	Conducted Output Power dBm	Gain after 10dB input level increase dB
501.35 MHz	-15	0.21	40.17	0.30	55.68	40.47	46.82
502.25 MHz	-13	0.21	40.17	1.74	55.12	41.91	46.22
503.15 MHz	-12	0.21	40.17	0.44	52.82	40.61	44.11

Notes: 1. The signal generator input was increased by 10dBs and the level of the output signal remeasured.

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
ATTENUATOR	BIRD	8308-100	N/A	112	**X**
ATTENUATOR	BIRD	8304-200-N	N/A	221	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**

AMPLIFIER INTERMODULATION SPURIOUS EMISSIONS – CONDUCTED – PART 2.1053– DOWNLINK

Ambient temperature = 17°C Radio Laboratory
Relative humidity = 66%
Supply voltage = +110 Vac



The intermodulation and spurious products were measured with the amplifier operating at maximum gain. A three tone test was conducted using the equipment as above. The input power level was adjusted so the level at point D was 10dB above the maximum input. The cable and attenuator loss between the EUT and the spectrum analyser was 40.17dB.

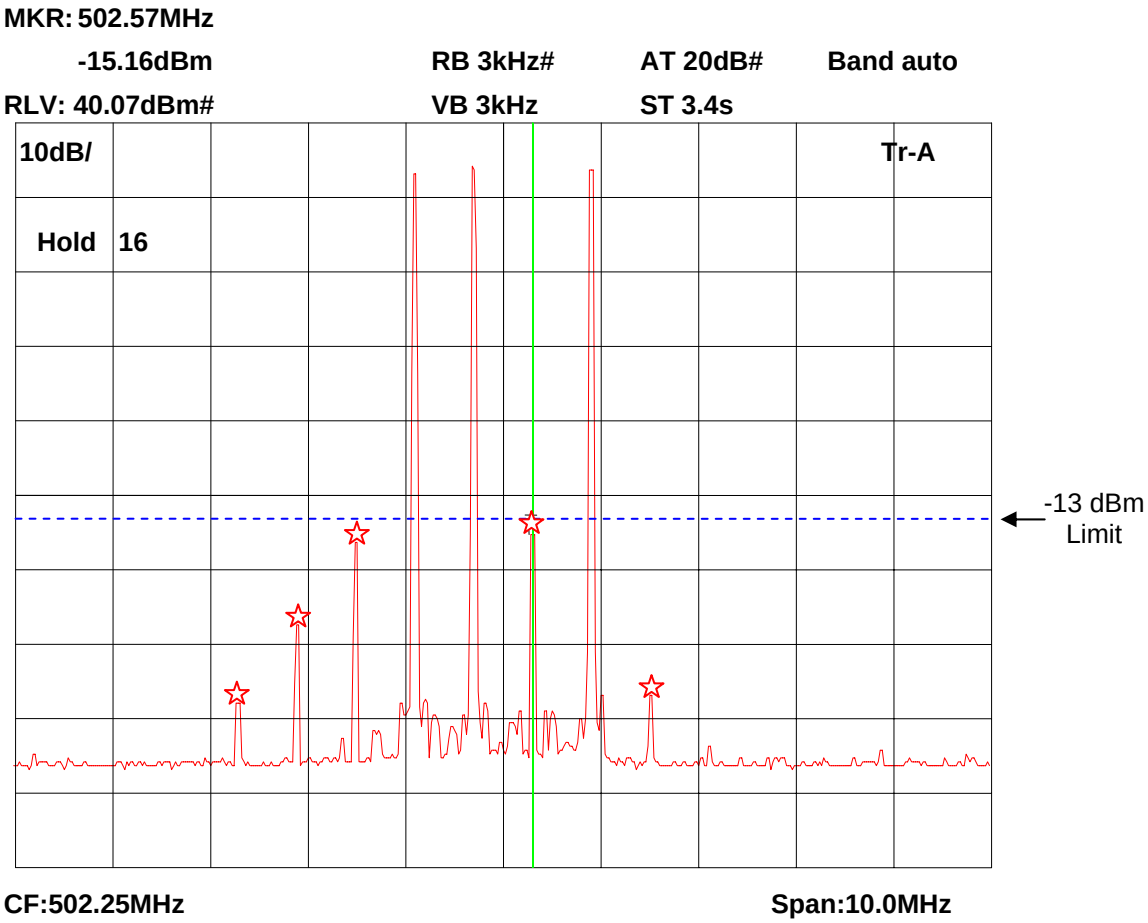
RF Input Frequency (MHz)			Highest Intermodulation Product Level (dBm)	Limit (dBm)
503.15	501.95	501.35	-15.16 dBm @ 502.75	-13

Sweep data is shown on the next page:

Test equipment used for intermodulation test

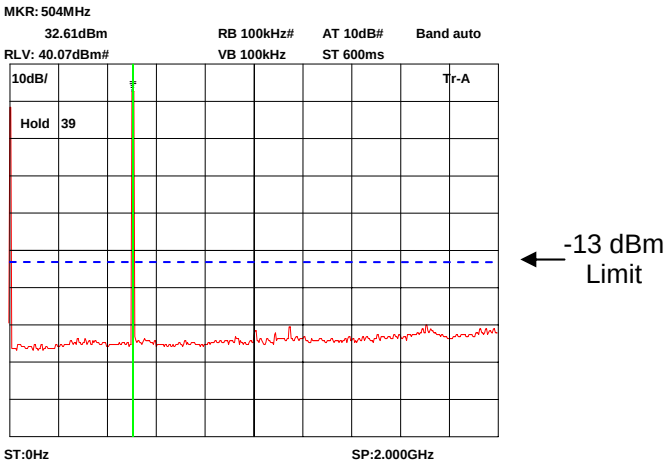
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
SPECTRUM ANALYSER	R&S	FSU46	200034	UH281	
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**
SIGNAL GENERATOR	MARCONI	2022D	119215/058	UH75	
SIGNAL GENERATOR	HP	83630B	3722A00588	UH340	
CMTA	ROHDE & SCHWARZ	CMTA52	894715/033	05	**X**
COMBINER	ELCOM	RC-4-50	N/A	170	**X**

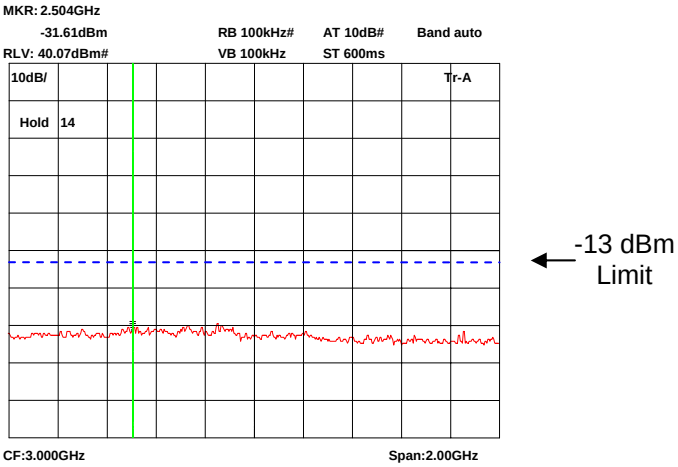
Intermodulation Inband

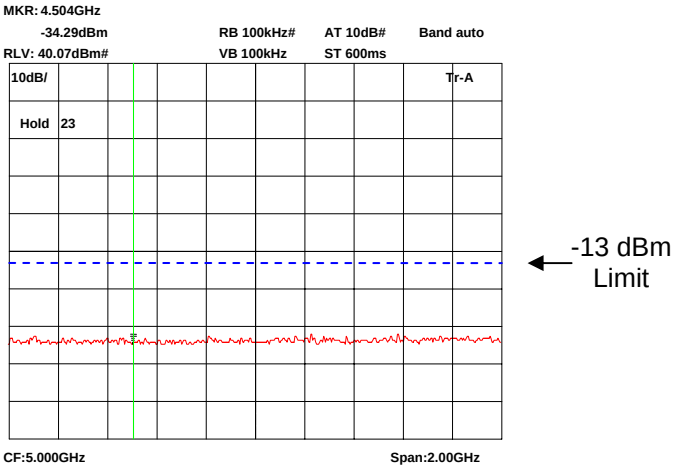


The above plot shows that all products (designated by☆) are below the spurious limit.

Intermodulation Wideband





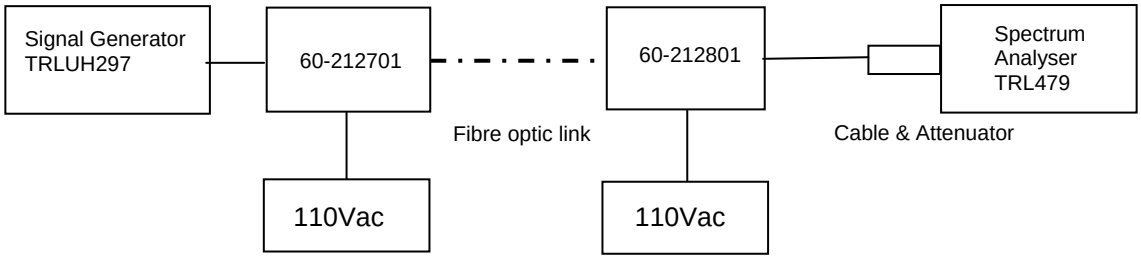


The above plot shows that there are no products outside the bands.

TRANSMITTER TESTS

AMPLIFIER MODULATED CHANNEL TEST – CONDUCTED – Part 2.1049– DOWNLINK

Ambient temperature	=	16^{o}C	Radio Laboratory
Relative humidity	=	68%	
Supply voltage	=	+110 Vac	
Channel number	=	See test results	



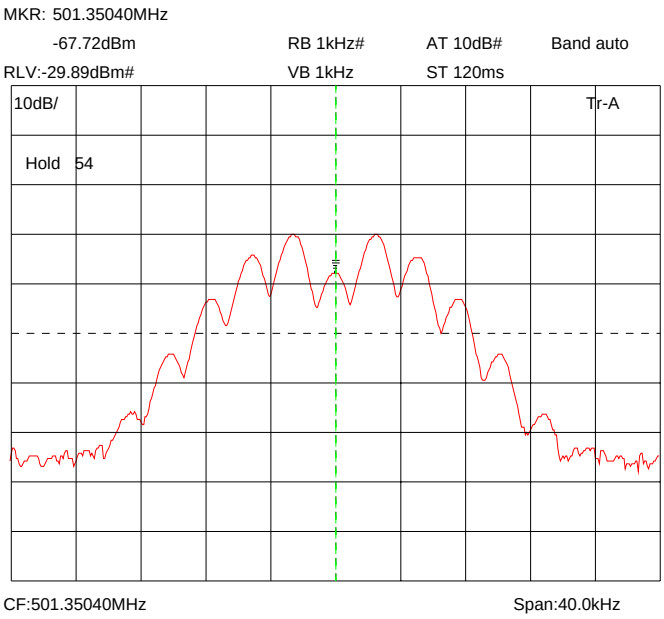
This test was performed to show that the amplifier does not alter the input signal in any way. The input signal was set to the maximum input level and modulated with a 2500Hz tone. The plots show the signal measured at the signal generator and the signal measured at the output of the EUT.

Note: The cables and attenuators had the following losses.

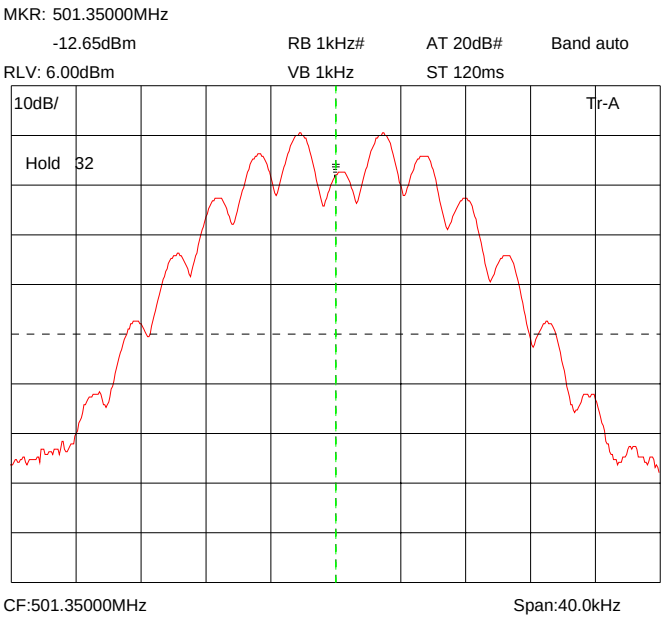
1. Cable and attenuator between EUT and spectrum analyser 40.17dB
2. Cable between signal generator and EUT 0.21dB

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
ATTENUATOR	BIRD	8308-100	N/A	112	**X**
ATTENUATOR	BIRD	8304-200-N	N/A	221	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**

501.35 MHz Signal Generator, deviation set to 5kHz

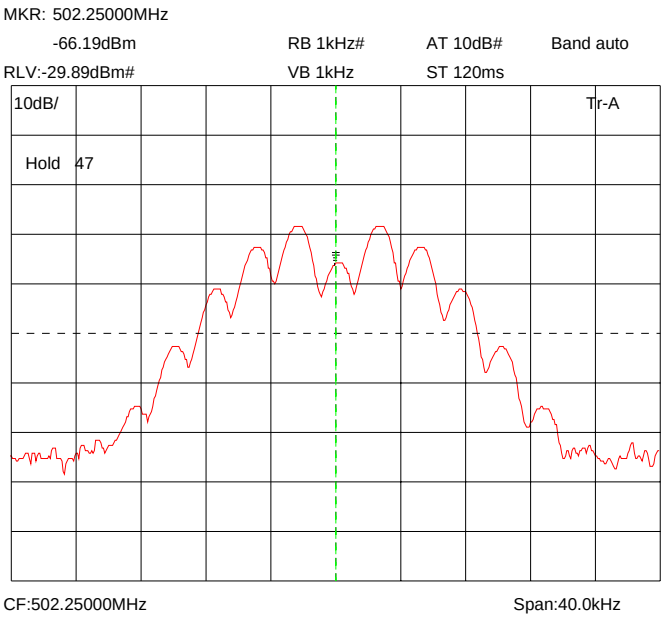


501.35 MHz Signal Generator and EUT, deviation set to 5kHz

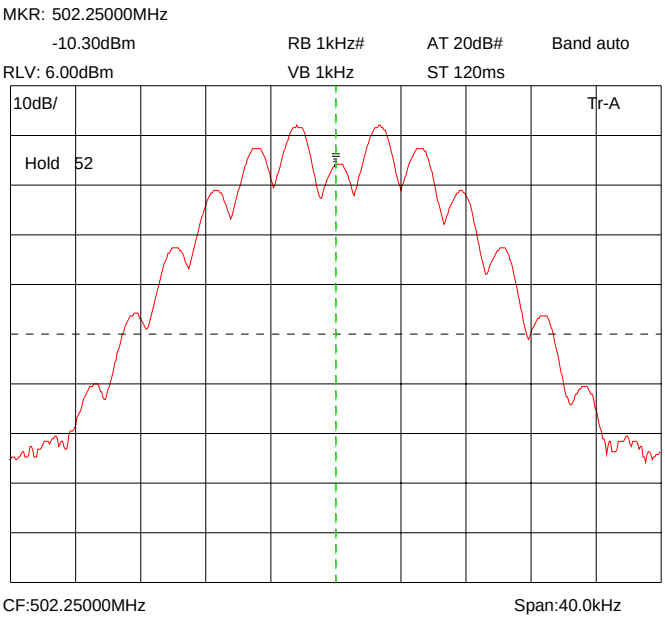


The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

502.25 MHz Signal Generator, deviation set to 5kHz

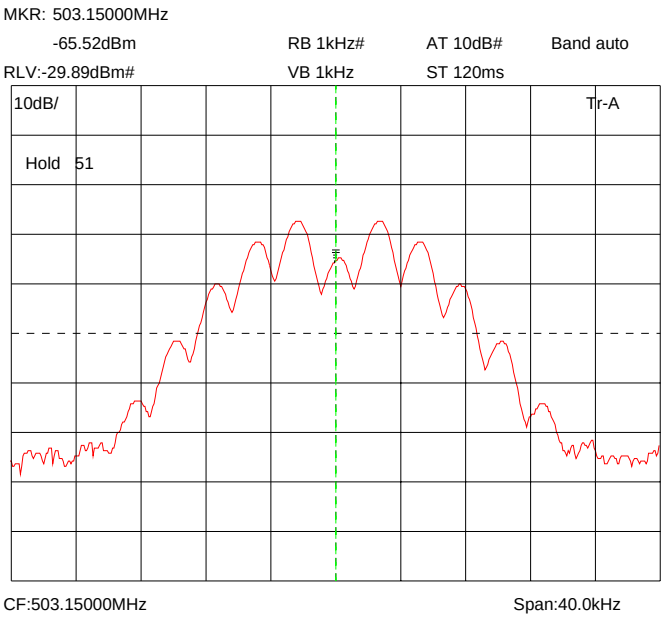


502.25 MHz Signal Generator and EUT, deviation set to 5kHz

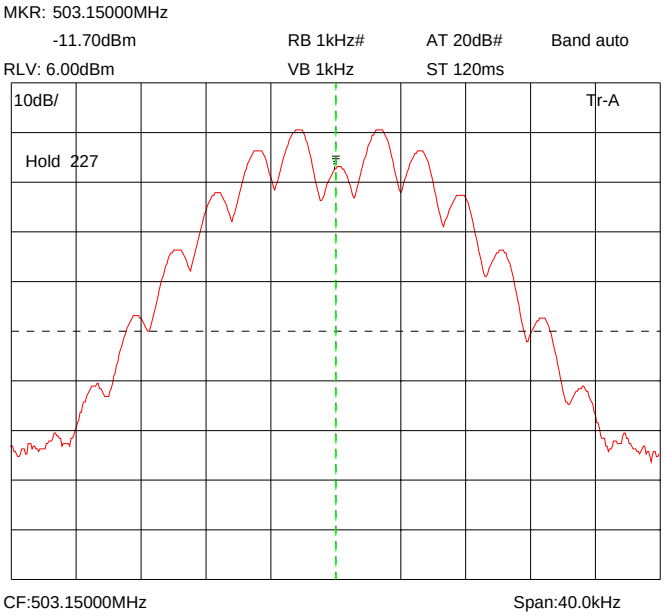


The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

503.15 MHz Signal Generator, deviation set to 5kHz



503.15 MHz Signal Generator and EUT, deviation set to 5kHz

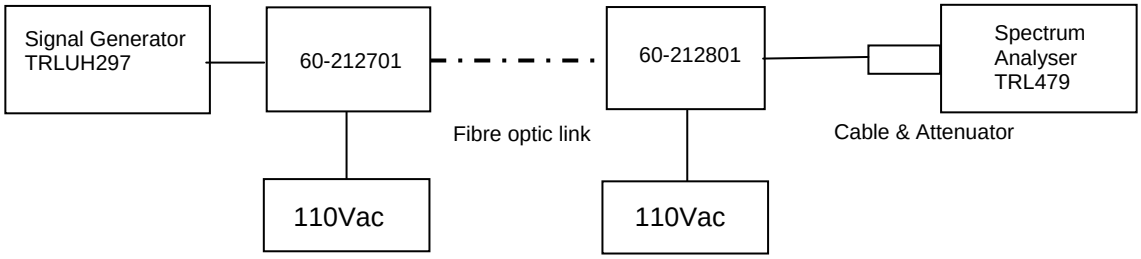


The above plots depicting the output waveshape show no measurable distortion visible when compared to the input signal.

TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053 – DOWNLINK

Ambient temperature	=	17°C	Radio Laboratory		
Relative humidity	=	68%	Test Signal	=	F3E
Supply voltage	=	+110 Vac			



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating at maximum power and on three test frequencies.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more that 250% of the authorised bandwidth

At least 43 + 10 log PdB

$(10\log P_{watts}) – (43+10\log (P_{watts} * 1000)) =$ LIMIT =-13 dBm

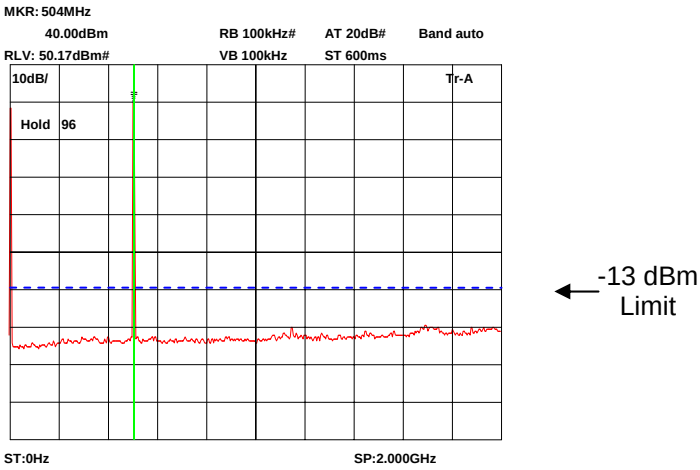
RESULTS

FREQUENCY RANGE	FREQ. (MHz)	MEASURED LEVEL (dBm)	ATTENUATOR & CABLE LOSSES (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
0Hz – 6 GHz	No Significant Emissions Within 20dB of the Limit				-13

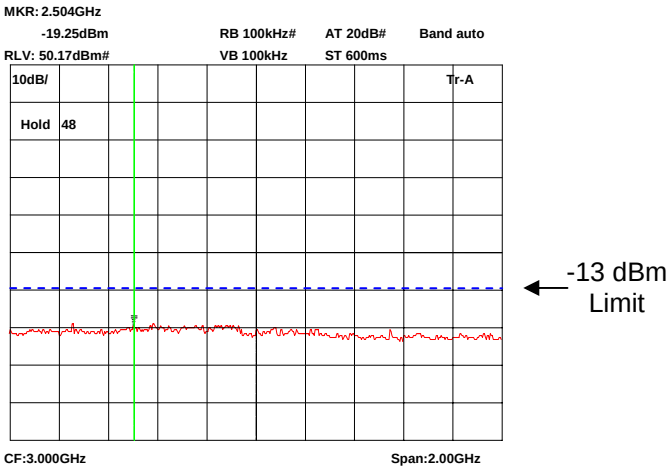
The test equipment used for the Transmitter Conducted Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
ATTENUATOR	BIRD	8308-100	N/A	112	**X**
ATTENUATOR	BIRD	8304-200-N	N/A	221	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**
SIGNAL GENERATOR	R&S	SML 03	102268	UH297	**X**

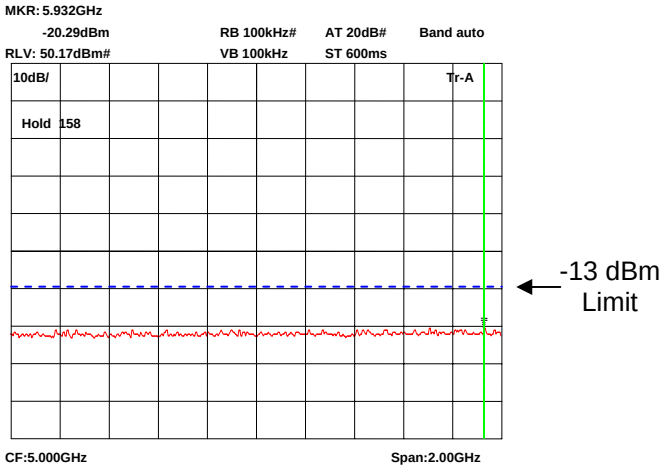
Conducted emissions 501.35 MHz 0Hz – 2GHz



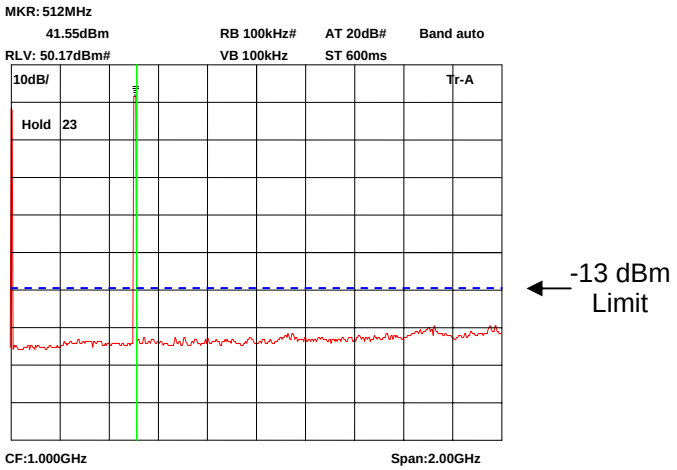
Conducted emissions 501.35 MHz 2GHz – 4GHz



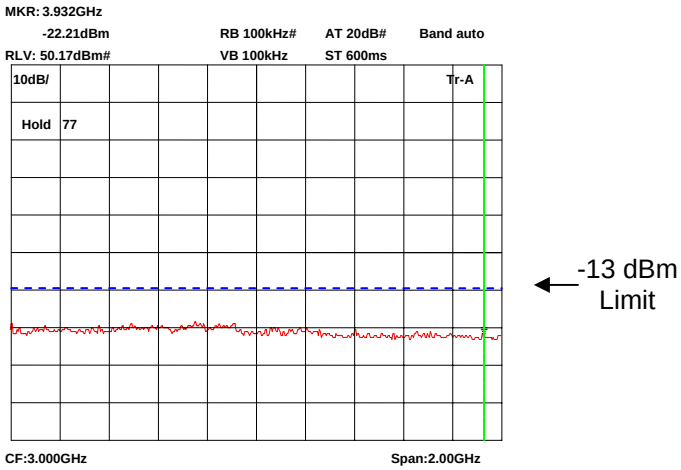
Conducted emissions 501.35 MHz 4GHz – 6GHz



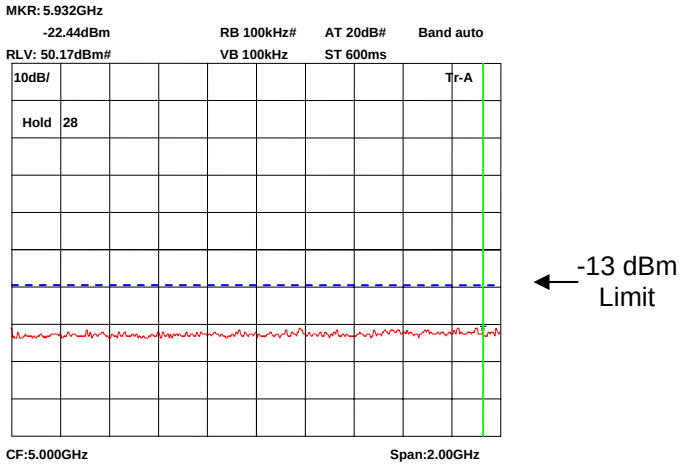
Conducted emissions 502.25 MHz 0Hz – 2GHz



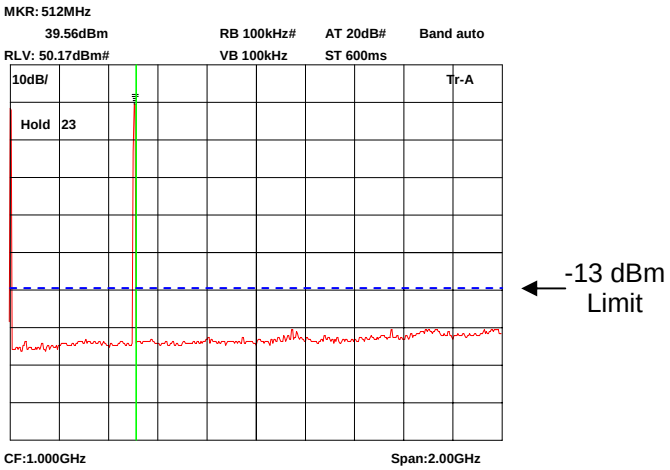
Conducted emissions 502.25 MHz 2GHz – 4GHz



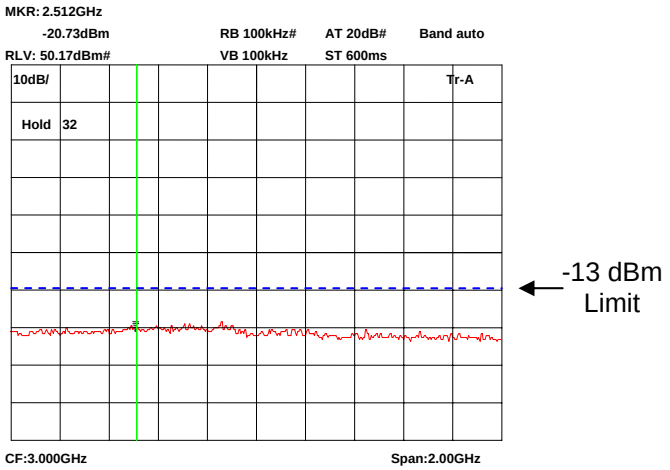
Conducted emissions 502.25 MHz 4GHz – 6GHz



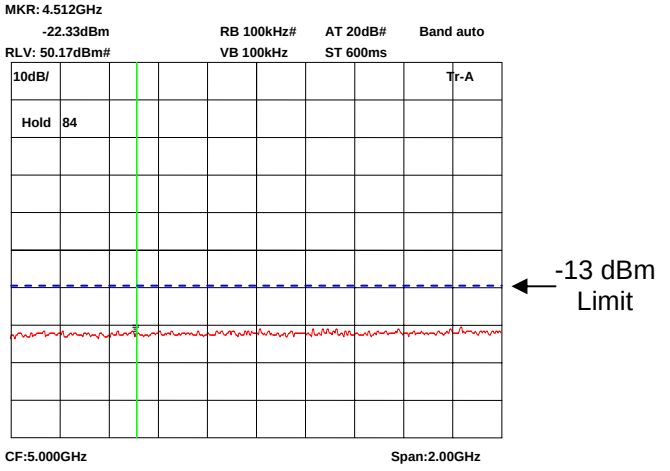
Conducted emissions 503.15 MHz 0Hz – 2GHz



Conducted emissions 503.15 MHz 2GHz – 4GHz



Conducted emissions 503.15 MHz 4GHz – 6GHz

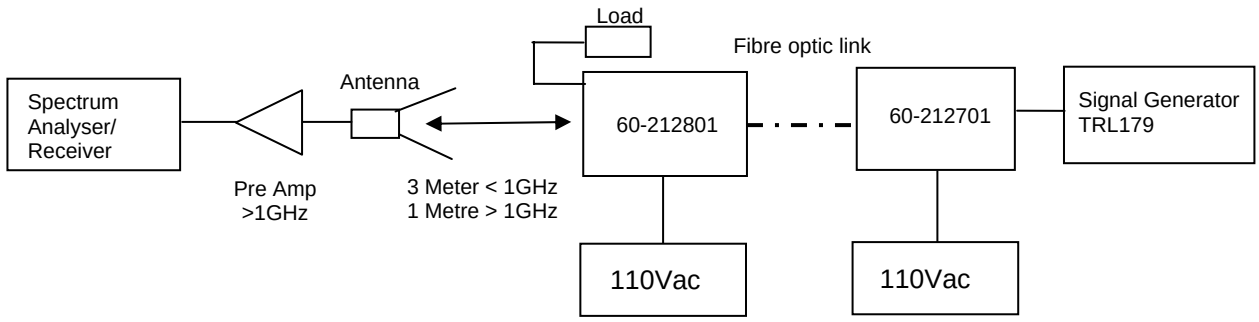


TRANSMITTER TESTS

AMPLIFIER SPURIOUS EMISSIONS – RADIATED – Part 2.1053– DOWNLINK

Ambient temperature = 15°C
Relative humidity = 58%
Conditions = OATS
Supply voltage = +110 Vac
Supply Frequency = N/A

Test Signal = F3E



The test was set up as per the diagram. The level at the input was adjusted to compensate for the loss of the interconnecting cable. The unit was tested operating maximum power on three test frequencies with a 50 ohm load on the output. The unit was also tested with the signal generator replaced by another 50ohm load.

The Spurious limit was calculated as follows:

On any frequency removed from the assigned frequency by more that 250% of the authorised bandwidth

At least 43 + 10 log PdB

$(10\log P_{watts}) – (43+10\log (P_{watts} * 1000)) = LIMIT = -13$ dBm

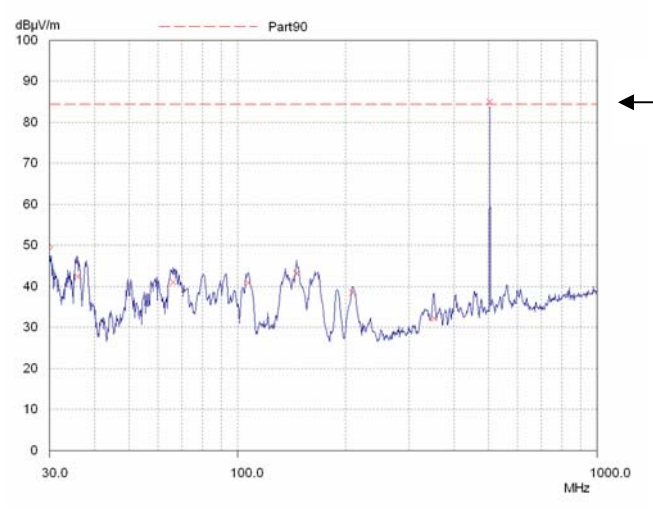
RESULTS

FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	CALCULATED EIRP (dBm)	LIMIT (dBm)
30MHz – 1GHz	No Significant Emissions Within 20 dB of the Limit						-13
1GHz – 6GHz	No Significant Emissions Within 20 dB of the Limit						-13

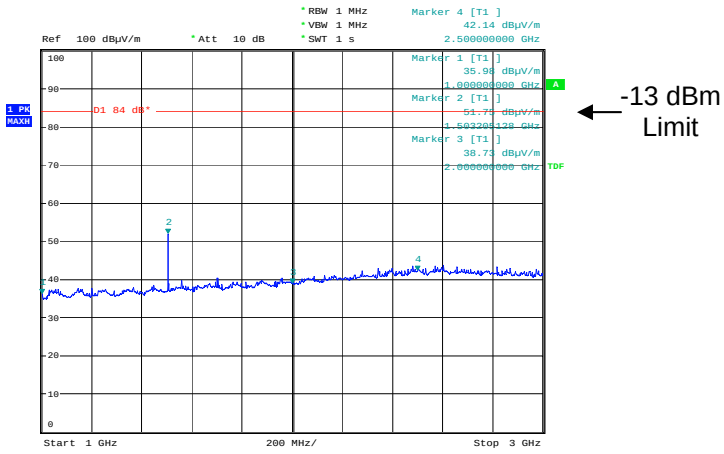
The test equipment used for the Transmitter Spurious Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	R&S	ESVS10	841431/014	UH186	**X**
HORN	EMCO	3115	9010-3580	138	**X**
SPECTRUM ANALYSER	R&S	FSU46	200034	UH281	**X**
PRE AMPLIFIER	HP	8449B	3008A016	572	**X**
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	**X**
ANTENNA	CHASE	CBL6612B	2803	UH93	**X**

Radiated emissions 501.35 MHz 30MHz – 1GHz

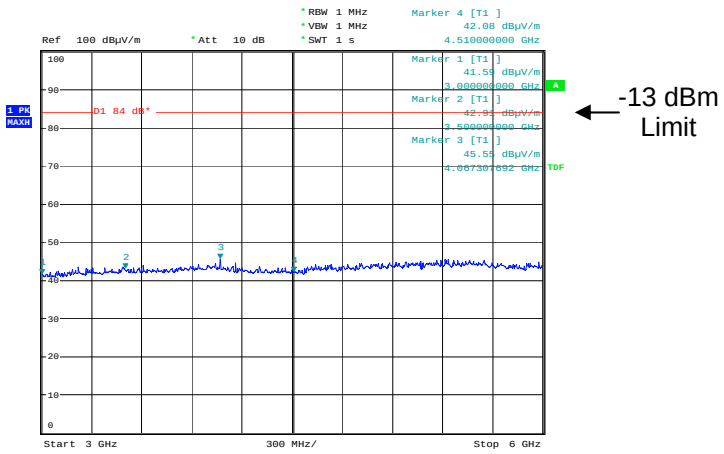


Radiated emissions 501.35 MHz 1GHz – 3GHz



Date: 2.JAN.2008 17:20:57

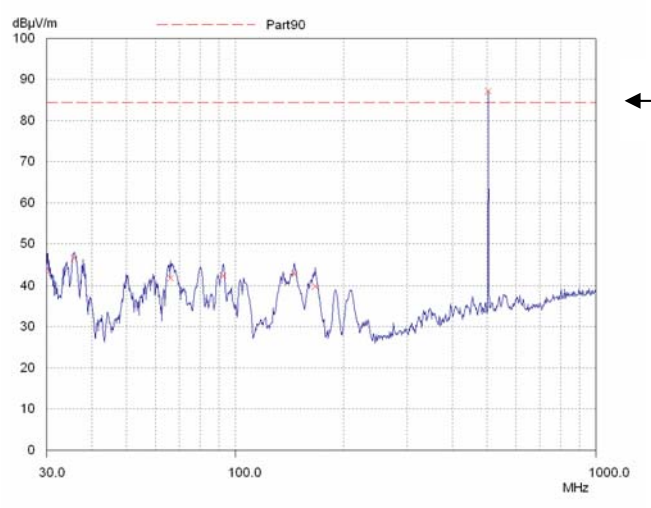
Radiated emissions 501.35 MHz 3GHz – 6GHz



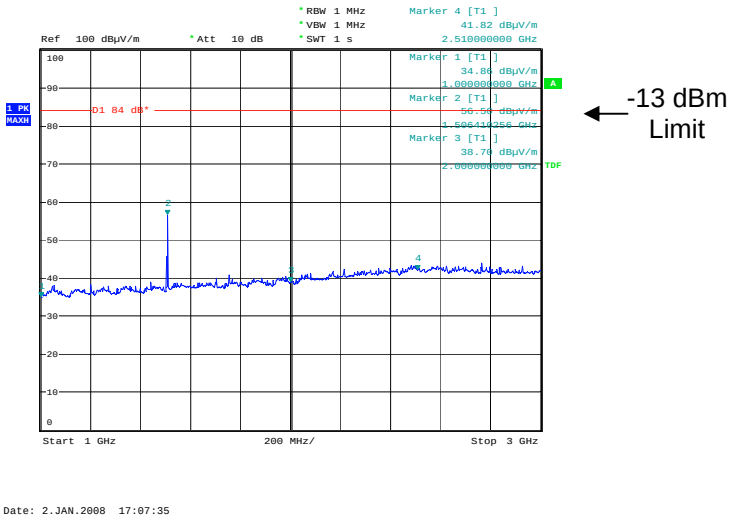
Date: 2.JAN.2008 17:22:16

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions 502.25 MHz 30MHz – 1GHz

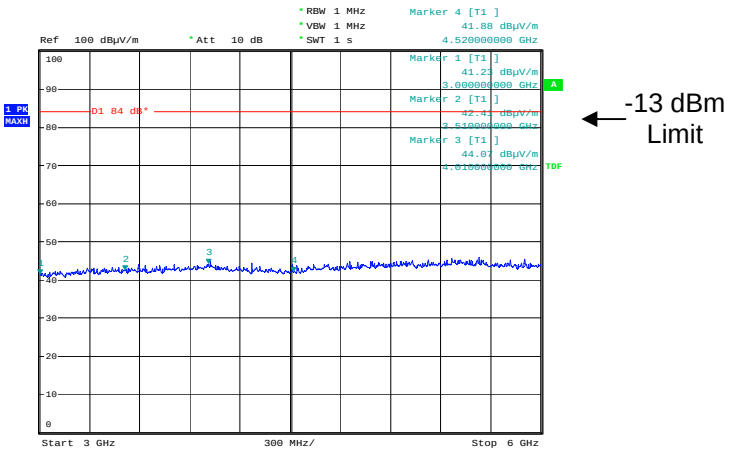


Radiated emissions 502.25 MHz 1GHz – 3GHz



Date: 2.JAN.2008 17:07:35

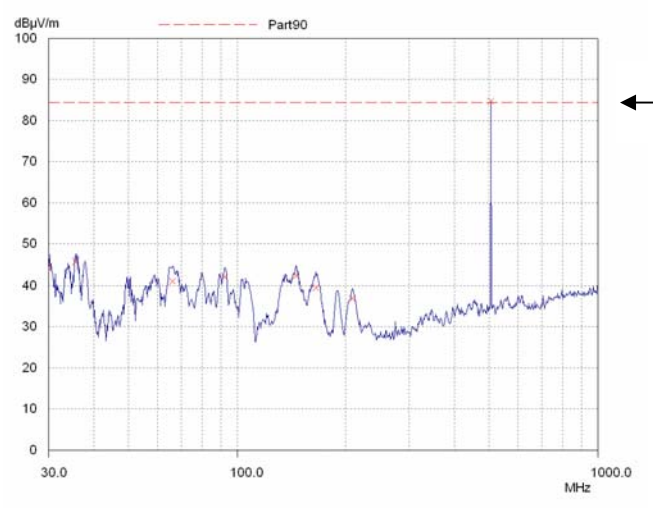
Radiated emissions 502.25 MHz 3GHz – 6GHz



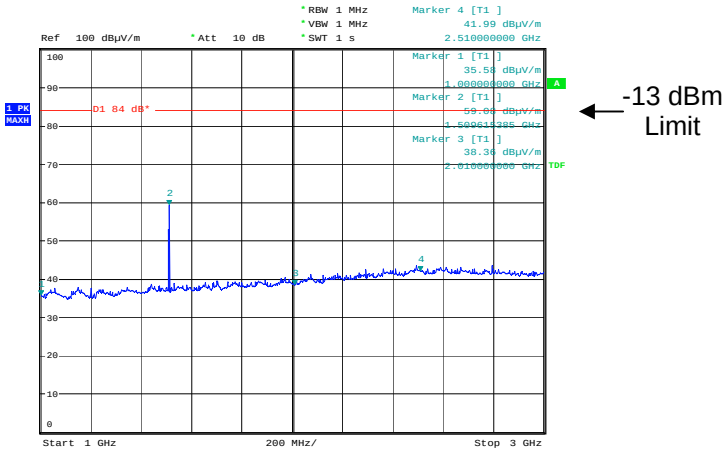
Date: 2.JAN.2008 17:08:57

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions 503.15 MHz 30MHz – 1GHz

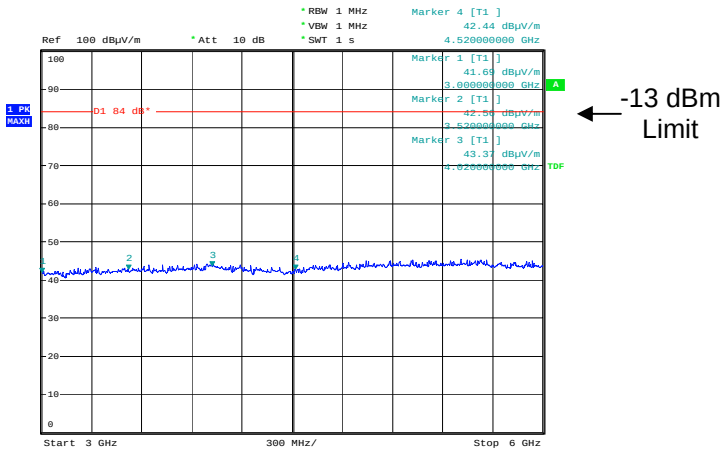


Radiated emissions 503.15 MHz 1GHz – 3GHz



Date: 2.JAN.2008 17:17:15

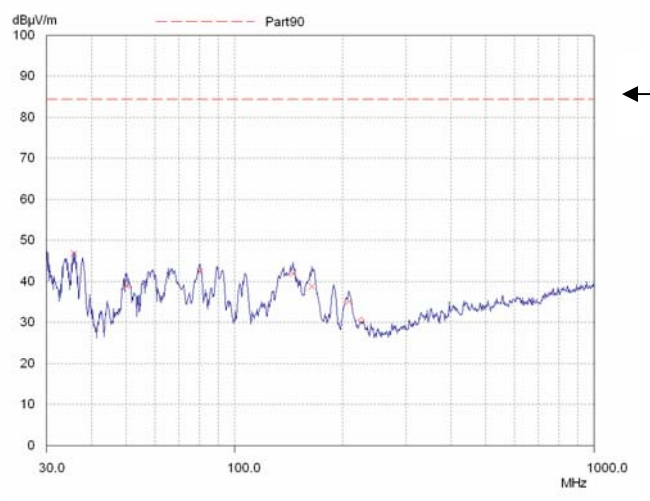
Radiated emissions 503.15 MHz 3GHz – 6GHz



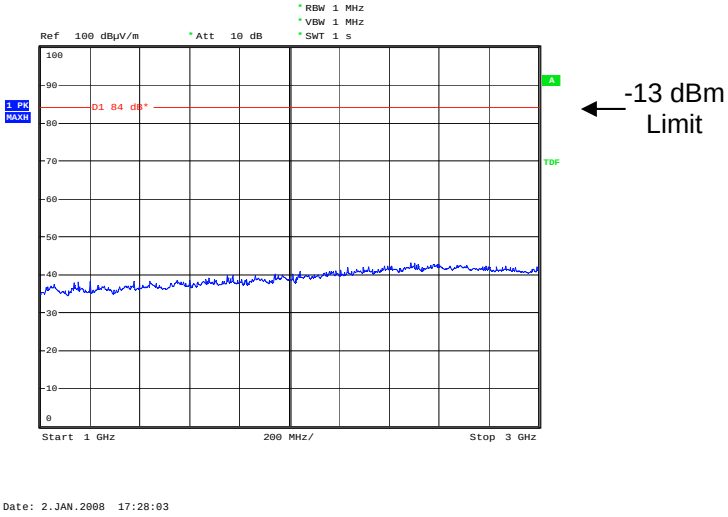
Date: 2.JAN.2008 17:18:21

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Radiated emissions no input signal 30 MHz – 1GHz

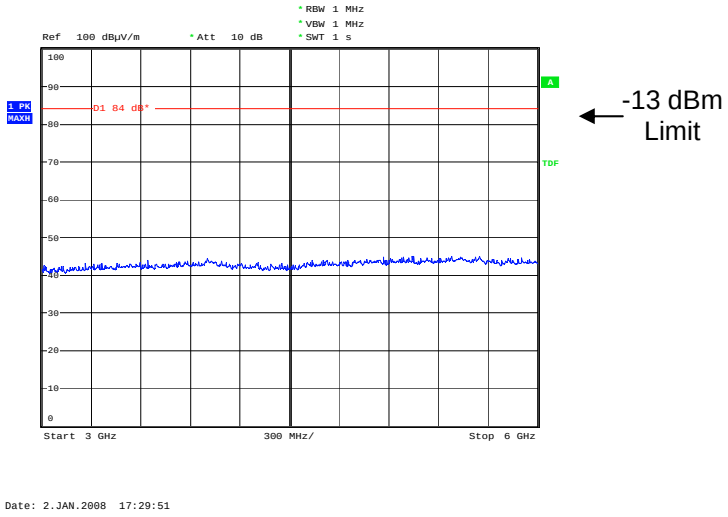


Radiated emissions no input signal 1GHz – 3GHz



Date: 2.JAN.2008 17:28:03

Radiated emissions no input signal 1GHz – 3GHz



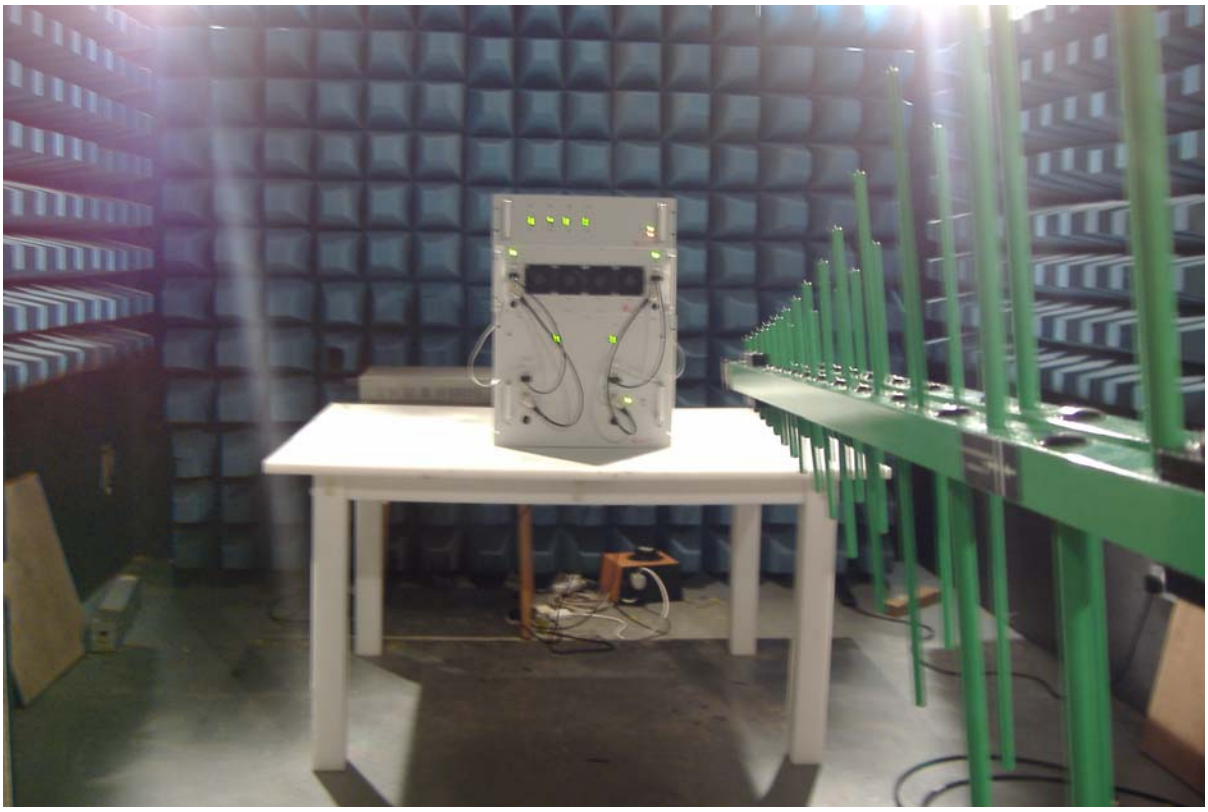
Date: 2.JAN.2008 17:29:51

The above test results show that there were no emissions within 20dBs of the –13dBm limit.

ANNEX A

PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**



PHOTOGRAPH No. 2 **FIBRE OPTIC TRAY CONNECTOR OVERVIEW**

PHOTOGRAPH No. 3 **AMPLIFIER TRAY CONNECTOR OVERVIEW**

PHOTOGRAPH No. 4 **FILTER TRAY CONNECTOR OVERVIEW**

ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[ ]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[ ]
e.	LABELLING	-	PHOTOGRAPHS	[ ]
		-	DECLARATION	[ ]
		-	DRAWINGS	[ ]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
h.	CIRCUIT DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
i.	COMPONENT LOCATION	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
j.	PCB TRACK LAYOUT	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

ANNEX C

EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH06/07	IC OATS Submission	TRL	01/06/2007	24	01/06/2009
UH06/07	NSA Calibration	TRL	17/12/2007	12	17/12/2008
UHo93	Antenna	Chase	21/05/2007	21	21/05/2009
UH186	Receiver	R&S	12/12/2007	12	12/12/2008
UH281	Spectrum Analyser	R&S	24/10/2007	12	24/10/2008
UH297	Signal Generator	R&S	30/05/2007	12	30/05/2008
L005	CMTA	R&S	30/10/2007	12	30/10/2008
L138	1-18GHz Horn	EMCO	23/05/2007	24	23/05/2009
L170	Combiner	Elcom		Calibrate in Use	
L176	Signal Generator	Marconi	01/03/2007	12	01/03/2008
L479	Analyser	Anritsu	11/12/2007	12	11/12/2008
L572	Pre Amp	Agilent		Calibrate in Use	

ANNEX D

MEASUREMENT UNCERTAINTY

Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**
Uncertainty in test result (Equipment – TRL05) = **1.08dB**
Uncertainty in test result (Equipment – TRL479) = **2.48dB**

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**
Uncertainty in test result (Equipment – TRL05) = **0.113ppm**
Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**, Uncertainty in test result (1GHz-18GHz) = **4.7dB**

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**
Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**
Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**
Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%,** Uncertainty in Amplitude measurement = **0.82%**

[11] Power Line Conduction

Uncertainty in test result = **3.4dB**

[12] Spectrum Mask Measurements

Uncertainty in test result = **2.59% (frequency)**
Uncertainty in test result = **1.32dB (amplitude)**

[13] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[14] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[15] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[16] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[17] Receiver Threshold

Uncertainty in test result = **3.23dB**

[18] Transmission Time Measurement

Uncertainty in test result = **7.98%**

ANNEX E

SYSTEM DIAGRAM