



TEST REPORT NO: RU1171/6423
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**REPORT ON THE CERTIFICATION TESTING OF A
TELEGESIS (UK) Ltd.
ETRX1 Module
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 JUNE 2005
INTENTIONAL RADIATOR SPECIFICATION
ON BEHALF OF
TELEGESIS (UK) Ltd.**

TEST DATE: 16th – 22nd June 2005

TESTED BY: _____ J Charters
APPROVED BY: _____ P Green
Product Manager
DATE: 1st September 2005

Distribution:

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FS 21805



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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. | | |
| 4. | The contents of the attached applicants declarations and other supplied information are not covered by the scope of this laboratory's UKAS or FCC accreditations' and is provided in good faith. | | |



CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY: S4GETRX1

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.247 June 2005

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: ETRX1 Module

EQUIPMENT SERIAL No: Engineering sample

EQUIPMENT TYPE: ETRX1 Module

CARRIER EMISSION: 0.00187Watts

ANTENNA TYPE: Integral

GAIN ANTENNA: 4.4dBi

BAND OF OPERATION: 2400MHz – 2483.5MHz

CHANNEL SPACING: N/A Wideband channel allocation

NUMBER OF CHANNELS: 16

FREQUENCY GENERATION: SAW Resonator ☐ Crystal ☐ Synthesiser ☒

MODULATION METHOD: Amplitude ☐ Digital ☒ Angle ☐

POWER SOURCE(s): +3.6Vdc

TEST DATE(s): 16th – 22nd June 2005

ORDER No(s): TG-PO-10197

APPLICANT: TELEGESIS (UK) Ltd.

ADDRESS: Marlow Business Centre
84 Station Road
Marlow
SL7 1NX
United Kingdom

TESTED BY: _____ J Charters

APPROVED BY: _____ P Green
Product Manager

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	ETRX1 Module
EQUIPMENT TYPE:	ETRX1 Module
SERIAL NUMBER OF EUT:	Engineering Sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.247 June2005
TEST RESULT:	COMPLIANT Yes ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ IMPORTER ☐ DISTRIBUTOR ☐ TEST HOUSE ☐ AGENT ☐
APPLICANT'S ORDER No(s):	TG-PO-10197
APPLICANT'S CONTACT PERSON(s):	Mr Corin Clifford
E-mail address:	Corin.clifford@telegesis.com
APPLICANT:	TELEGESIS (UK) Ltd.
ADDRESS:	Marlow Business Centre 84 Station Road Marlow SL7 1NX United Kingdom
TEL:	+44 1628 894347
FAX:	+44 1628 894333
MANUFACTURER:	TELEGESIS (UK) Ltd.
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	16 th – 22 nd June 2005
TEST REPORT No:	RU1171/6423

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Intentional Emission Frequency:	15.247(b)	Peak	Yes
	Intentional Emission Field Strength:	-	-	No
	Intentional Emission Band Occupancy 6dB:	15.247 (a)	Peak	Yes
	Intentional Emission ERP (mW):	15.247 (b)	Peak	Yes
	Spurious Emissions – Conducted:	15.247 (c)	Peak	Yes
	Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak	Yes (note 1)
	Spurious Emissions – Radiated >1000MHz:	15.209	Average	Yes (note 1)
	Spectral Power Density	15.247 (e)	Peak	Yes
	Spurious Emissions – Power Line TX	15.207	Quasi Peak Average	Yes
	Spurious Emissions – Power Line RX	15.207	Quasi Peak Average	Yes
	Maximum Frequency of Search:	15.33	-	Yes
	Antenna Arrangements Integral:	15.203	-	Yes
	Antenna Arrangements External Connector:	15.204	-	Yes
	Restricted Bands	15.205	-	Yes
	Extrapolation Factor	15.31(f)	-	Yes

Note 1: The manufacturer has stated that this unit is not intended to be operated within 20cm of the body.

3. Emission Designator:

4. Duty Cycle: <100%

5. Transmitter bit or pulse rate and level: 38400Bps

6. Temperatures: Ambient (Tnom) 20°C

7. Supply Voltages: Vnom 3.6Vdc

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

8. Equipment Category: Single channel ☐
Two channel ☐
Multi-channel ☒

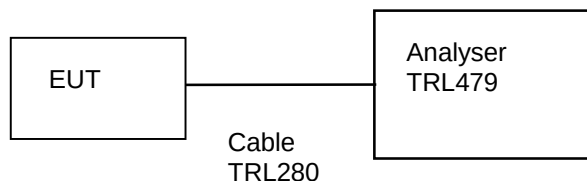
9. Channel Allocation: Narrowband ☐
Wideband ☒

TRANSMITTER TESTS

TRANSMITTER 6dB BANDWIDTH – CONDUCTED - PART 15.247(A)(2)

Ambient temperature = 20°C(<1GHz)
Relative humidity = 50% (<1GHz),
Conditions = Radio Lab
Supply voltage = 3.6V

Diagram



Frequency	Channel	Measured Bandwidth	Limit
2.405MHz	Bottom	1.630MHz	>500kHz
2.445MHz	Middle	1.690MHz	>500kHz
2.480MHz	Top	1.640MHz	>500kHz

Notes: 1 For analyser plots see annex C

Test Method: 1 The integral antenna was replaced by a temporary antenna connector.
2 The EUT was connected to the analyser via a cable
3 The 6dB bandwidth was recorded with the EUT activity transmitting data.

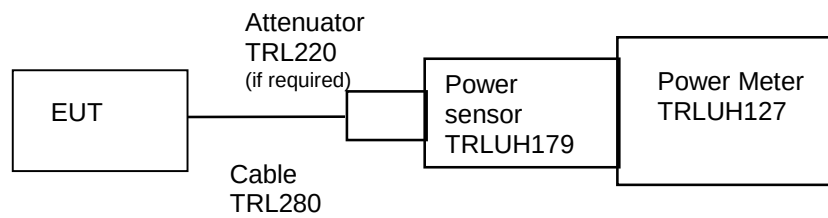
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

TRANSMITTER TESTS

TRANSMITTER - MAXIMUM PEAK POWER - CONDUCTED - PART 15.247(B)(3)

Ambient temperature = 20°C(<1GHz)
 Relative humidity = 50% (<1GHz),
 Conditions = Radio Lab
 Supply voltage = 3.6V

Diagram



High Power

Frequency MHz	Channel	Peak Power on Meter dBm	Attenuator loss dB	Peak Power Watts	EUT Antenna Gain dBi	Average Power Watts	Limit Watts
2.405	Bottom	-33.18	31.5	0.00068	4.4	0.00187	1
2.445	Middle	-33.81	31.5	0.00059	4.4	0.00162	1
2.480	Top	-33.53	31.5	0.00063	4.4	0.00173	1

Low Power

Frequency MHz	Channel	Peak Power on Meter dBm	Attenuator loss dB	Peak Power mW	EUT Antenna Gain dBi	Average Power mW	Limit mW
2.405	Bottom	-31.59	1.3	0.00069	4.4	0.0019	1000
2.445	Middle	-31.73	1.3	0.00067	4.4	0.0018	1000
2.480	Top	-31.69	1.3	0.0068	4.4	0.0019	1000

Notes: 1 Gain of antenna 4.4db declared by manufacturer.

Test Method:

- 1 The integral antenna was replaced by a temporary antenna connector.
- 2 The EUT was connected to the power sensor via a cable and attenuator -if applicable.
- 3 The EUT was operated in transmit mode with modulation.
- 4 The level on the power meter was recorded.

Test equipment used for Peak Power measurement:

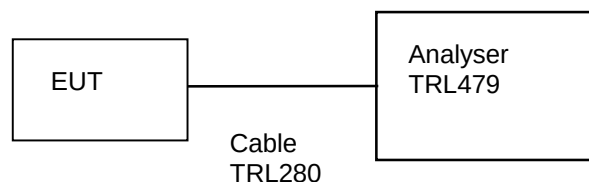
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
POWER METER	MARCONI	6960B	237034/001	UH127	X
POWER SENSOR	MARCONI			UH179	X
ATTENUATOR	BIRD	8304-300-N	-	220	X

TRANSMITTER TESTS

TRANSMITTER BAND EDGE EMISSIONS – CONDUCTED – Part 15.247(D)

Ambient temperature = 20°C
Relative humidity = 55%
Conditions = Conducted – Radio Lab
Supply voltage = 3.6Vdc

Diagram



Test Result

Measured as compliant, see analyser plots

Notes:

- 1 The EUT was set in a to a transmit mode with modulation on the top and bottom channels.
- 2 A temporary antenna connector was used to take the measurement.
- 3 See Annex D for analysers plots.

Test Method:

- 1 A plot covering the lowest channel and band edge was taken. A marker was set on the peak emission of the lowest channel. The delta marker function was then used to measure the highest out of band emissions. (If no peaks exist outside the band the level is taken at the band edge).
- 2 A plot covering the highest channel and band edge was taken. A marker was set on the peak emission of the highest channel. The delta marker function was then used to measure the highest out of band emissions. (If no peaks exist outside the band the level is taken at the band edge).

The test equipment used for the tests is shown below:

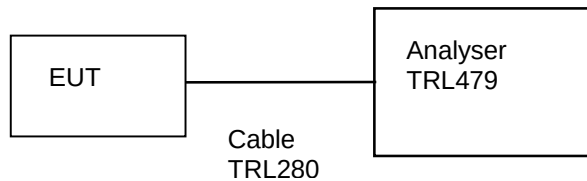
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

TRANSMITTER TESTS

TRANSMITTER POWER SPECTRAL DENSITY – CONDUCTED - PART 15.247(E)

Ambient temperature = 20°C(<1GHz)
Relative humidity = 50% (<1GHz),
Conditions = Radio Lab
Supply voltage = 3.6V

Diagram



Frequency	Channel	Measured Power Spectral Density	Limit
2.405MHz	Bottom	-20.11dBm	8dBm
2.445MHz	Middle	-20.85dBm	8dBm
2.480MHz	Top	-23.49dBm	8dBm

Notes: 1 For analyzer plots see annex E

Test Method: 1 The integral antenna was replaced by a temporary antenna connector.
2 The EUT was connected to the analyser via a cable
3 The resolution bandwidth on the analyser was set to 3kHz and trace set to max hold.

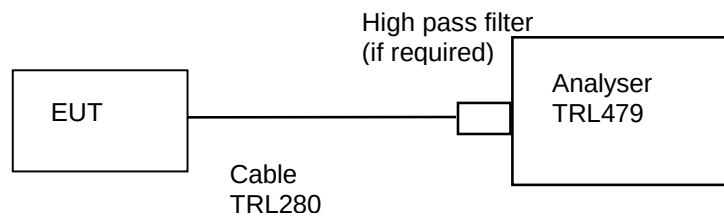
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

TRANSMITTER TESTS

TRANSMITTER CONDUCTED SPURIOUS EMISSIONS – CONDUCTED – Part 15.247(D)

Ambient temperature = 25°C
 Relative humidity = 55%
 Conditions = Conducted –Radio Lab
 Supply voltage = +3.6Vdc

Diagram



Top Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30 – 26000	4959.994	-46.63	1.0	-45.63	-27.76
	7.440520	-56.41	2.3	-54.11	-27.76

See spectrum analyser scan plots – Annex F

Bottom Channel

Range Frequency (MHz)	Emission Frequency (MHz)	Emission Level	Cable loss	Level (dBm)	Limit (dBm)
30 – 26000	4809.94	-44.73	1.0	-43.73	-27.76
	7214.66	-57.84	2.3	-55.54	-27.76

See spectrum analyser scan plots – Annex F

Notes:

- 1 During the scans the unit was operated in the following modes:
Transmitting on lowest channel with modulation
Transmitting on highest channel with modulation
- 2 Section 15.247(c) states that all spurious emissions measured within a 100kHz bandwidth shall be attenuated by at least 20dB below the level of the highest fundamental level measured within a 100kHz bandwidth.
- 3 Only emissions within 20dB of limit are recorded.

Test Method:

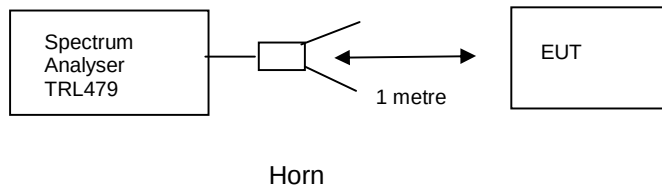
- 1 The EUT was connected to the analyzer using a cable and high pass filter(if required).
- 2 Frequency sweeps were performed to check for spurious emissions.
- 3 An emissions discovered were checked for compliance against the limit.

The test equipment used for the tests is shown below:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESIB 7	100182	630	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	
RANGE 1	TRL	3 METRE	N/A	UH06	
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X

TRANSMITTER EMISSIONS – RADIATED – Part 15.247(c) and 15.209

Ambient temperature = 25°C
 Relative humidity = 55%
 Conditions = Radiated OATS
 Supply voltage = +3.6Vdc



Bottom Channel 30MHz -26000MHz

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz Restricted band	Note 7							100
88MHz – 216MHz Restricted band	Note 7							150
216MHz – 960MHz Restricted band	Note 7							200
960MHz – 1GHz Restricted band	Note 7							500
1GHz – 26GHz Restricted band	Note 7							500
30MHz -26GHz	Note 7							-20dBc
See annex H for initial pre scan results.								

TRANSMITTER TESTS

TRANSMITTER EMISSIONS cont. – RADIATED – Part 15.247(c) and 15.209

Middle Channel 30MHz -26000MHz

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz Restricted band	Note 7							100
88MHz – 216MHz Restricted band	Note 7							150
216MHz – 960MHz Restricted band	Note 7							200
960MHz – 1GHz Restricted band	Note 7							500
1GHz – 26GHz Restricted band	Note 7							500
30MHz -26GHz	Note 7							-20dBc
See annex H for initial pre scan results.								

Top Channel 30MHz -26000MHz

	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor	Field Strength (dBµV/m)	Extrap. Factor (dB)	Result (µV/m)	Limit (µV/m)
30MHz – 88MHz Restricted band	Note 7							100
88MHz – 216MHz Restricted band	Note 7							150
216MHz – 960MHz Restricted band	Note 7							200
960MHz – 1GHz Restricted band	Note 7							500
1GHz – 26GHz Restricted band	Note 7							500
30MHz -26GHz	Note 7							-20dBc
See annex H for initial pre scan results.								

Notes:

- 1 During the scans the unit was operated in the following modes:
Unit operating on lowest channel
Unit operating on highest channel
- 2 R indicates frequency with a restricted band.
- 3 Initial pre scans were performed see Annex H for plots.
- 4 Emissions above 1GHz were measured with both a peak and average detectors.
- 5 Measurements <1GHz were performed at 3 meters.
- 6 Measurements >1GHz were initial performed at 0.3metres. This distance was increased if sensitivity of analyser allowed.
- 7 Only emissions with in 20dB of limit are recorded.

Test Method:

- 1 As per section 15.247
- 2 Measuring distances as Notes 5 to 6 above.
- 3 EUT 0.8 metre above ground plane.
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m >30MHz.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes. Maximum results recorded.

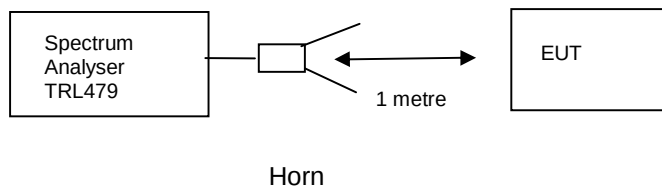
The test equipment used for the tests is shown below:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	X
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	X

RECEIVER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	26°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	55% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+3.6Vdc		



Bottom Channel 30MHz -26000MHz

	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBμ/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (μV/m)
	30MHz - 88MHz	Note 7					
	88MHz - 216MHz	Note 7					
	216MHz - 960MHz	Note 7					
	960MHz - 1GHz	Note 7					
	1GHz - 5GHz	Note 7					
Limits	1.705MHz to 30MHz		30μV/m @ 30m				
	30MHz to 88MHz		100μV/m @ 3m				
	88MHz to 216MHz		150μV/m @ 3m				
	216MHz to 960MHz		200μV/m @ 3m				
	960MHz to 1GHz		500μV/m @ 3m				
	1GHz to 5GHz		500μV/m @ 3m				

Middle Channel 30MHz -26000MHz

	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBμ/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (μV/m)
30MHz - 88MHz	Note 7						
88MHz - 216MHz	Note 7						
216MHz - 960MHz	Note 7						
960MHz - 1GHz	Note 7						
1GHz - 5GHz	Note 7						
Limits	1.705MHz to 30MHz		30μV/m @ 30m				
	30MHz to 88MHz		100μV/m @ 3m				
	88MHz to 216MHz		150μV/m @ 3m				
	216MHz to 960MHz		200μV/m @ 3m				
	960MHz to 1GHz		500μV/m @ 3m				
	1GHz to 5GHz		500μV/m @ 3m				

Top Channel 30MHz -26000MHz

	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBμ/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (μV/m)
30MHz - 88MHz	Note 7						
88MHz - 216MHz	Note 7						
216MHz - 960MHz	Note 7						
960MHz - 1GHz	Note 7						
1GHz - 5GHz	Note 7						
Limits	1.705MHz to 30MHz		30μV/m @ 30m				
	30MHz to 88MHz		100μV/m @ 3m				
	88MHz to 216MHz		150μV/m @ 3m				
	216MHz to 960MHz		200μV/m @ 3m				
	960MHz to 1GHz		500μV/m @ 3m				
	1GHz to 5GHz		500μV/m @ 3m				

Notes:

- 1 During the scans the unit was operated in the following modes
Unit operating on lowest channel
Unit operating on mid channel
Unit operating on highest channel
- 2 R indicates frequency with a restricted band.
- 3 Initial pre scans were performed see Annex I for plots.
- 4 Emissions above 1GHz were measured with both a peak and average detectors.
- 5 Measurements <1GHz were performed at 3 meters.
- 6 Measurements >1GHz were initial performed at 0.3metres. This distance was increased if sensitivity of analyser allowed.
- 7 Only emissions with in 20dB of limit are recorded.

Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
- 2 Measuring distances as Notes 1 to 4 above
- 3 EUT 0.8 metre above ground plane
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	X
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	X

TRANSMITTER TESTS

TRANSMITTER CONDUCTED EMISSIONS – AC POWER LINE Part 15.207

Ambient temperature = 20°C(<1GHz),
Relative humidity = 60%(<1GHz),
Conditions = Power Line Laboratory
Supply voltage = 110V AC
Supply Frequency = 60Hz

SIGNIFICANT EMISSIONS

Transmitting Top Channel DC Voltage supply to EUT 3.6Vdc

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
0.385	43.77	QP	L	58.17
0.765	39.49	QP	L	56.0
0.385	39.33	AV	L	48.17

Transmitting Bottom Channel Voltage supply to EUT 3.6Vdc

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
0.385	43.77	QP	L	58.17
0.765	39.49	QP	L	56.0
0.385	39.33	AV	L	48.17

SIGNIFICANT EMISSIONS

Receiving Voltage supply to EUT 3.6Vdc

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
0.385	43.77	QP	L	58.17
0.765	39.49	QP	L	56.0
0.385	39.33	AV	L	48.17

SIGNIFICANT EMISSIONS

Transmitting Top Channel DC Voltage supply to EUT 2.7Vdc

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
No significant emissions within 10dB of limit.				

Transmitting Bottom Channel Voltage supply to EUT 2.7Vdc

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
No significant emissions within 10dB of limit.				

SIGNIFICANT EMISSIONS

Receiving Voltage supply to EUT 2.7Vdc

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
No significant emissions within 10dB of limit.				

Notes: 1 See attached plots annex J (worst case 3.6Vdc)**Test Method:** 1 As per Radio – Noise Emissions, ANSI C63.4: 2003

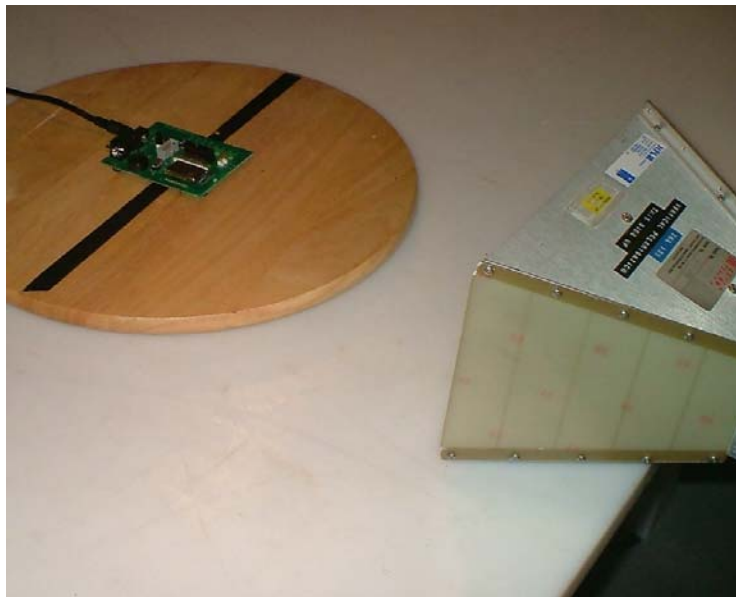
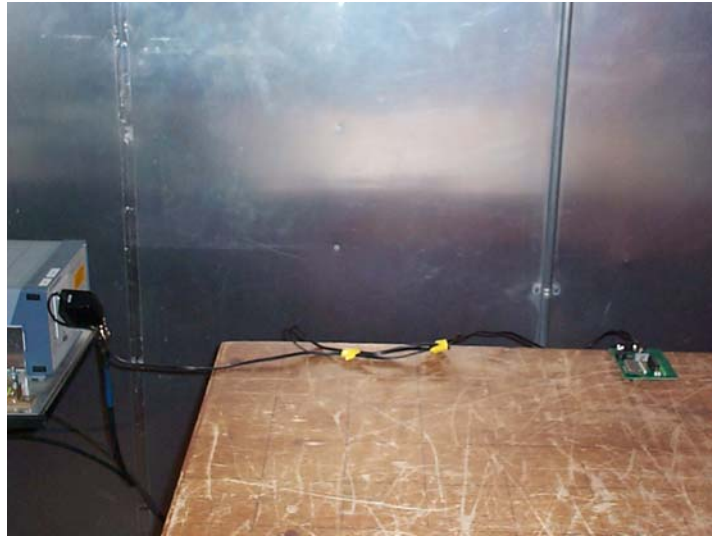
The test equipment used for the Transmitter Conducted Emissions – AC Power Line Part 15.207 test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
LISN / AMN	ROHDE & SCHWARZ	ESH3-Z5	83746/010	289	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	X
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

ANNEX A
PHOTOGRAPHS

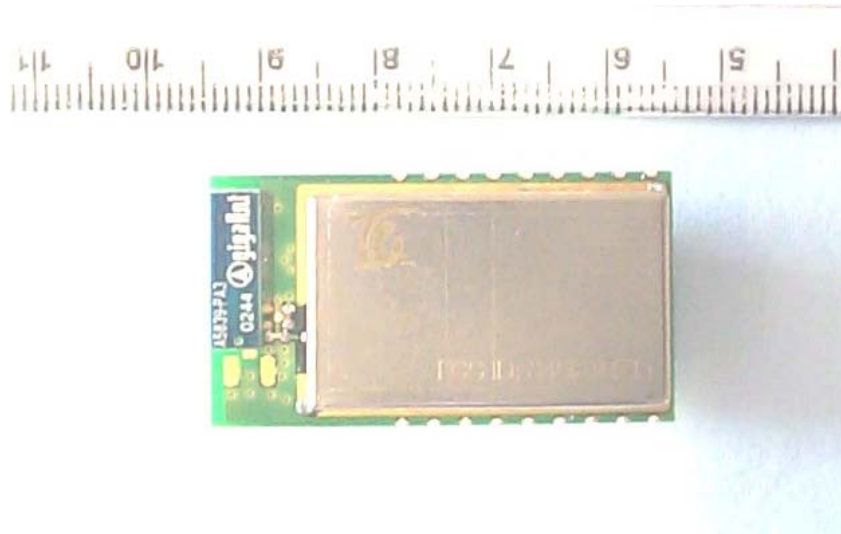
PHOTOGRAPH No. 1

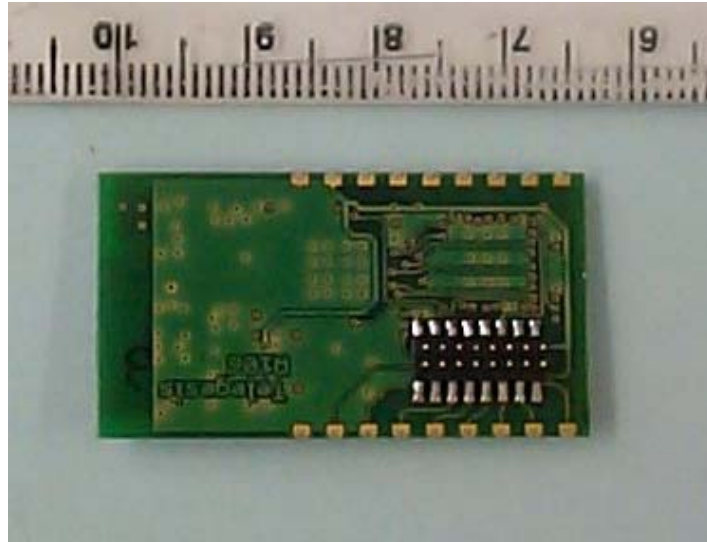
TEST SETUP



PHOTOGRAPH No. 2

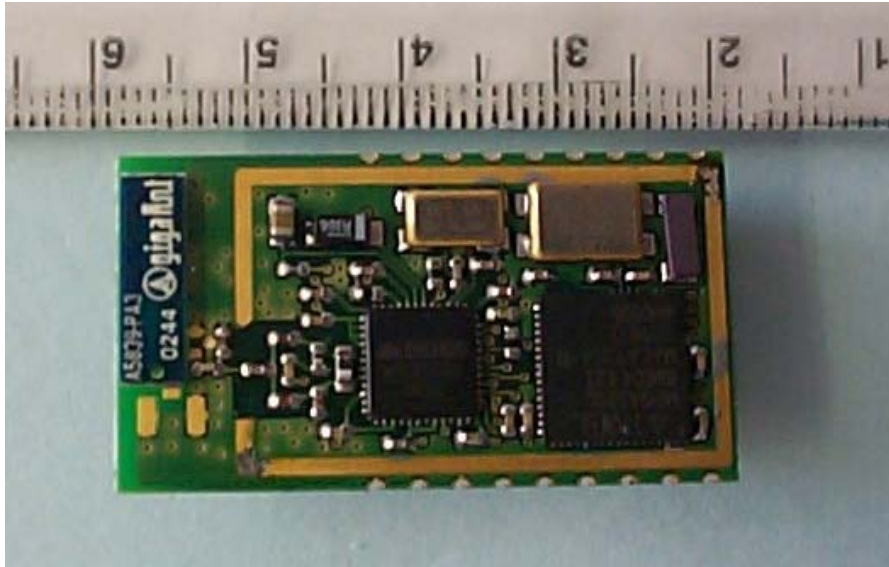
TRANSMITTER FRONT VIEW





PHOTOGRAPH No. 4

TRANSMITTER PCB LID REMOVED



ANNEX B

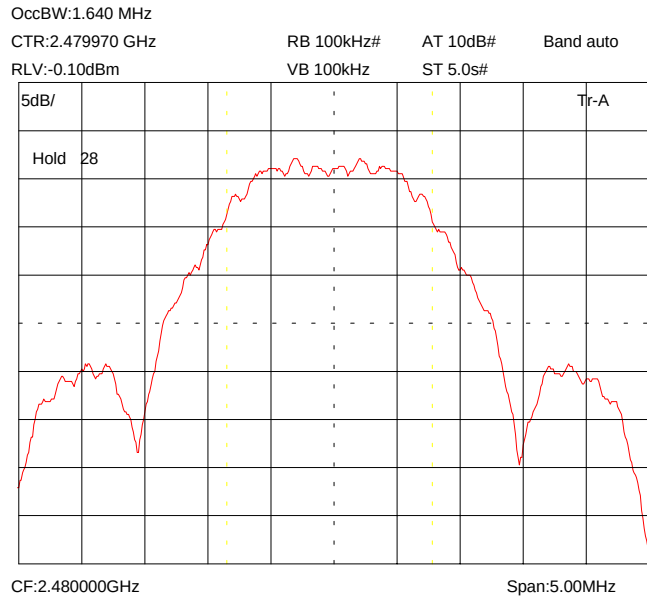
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

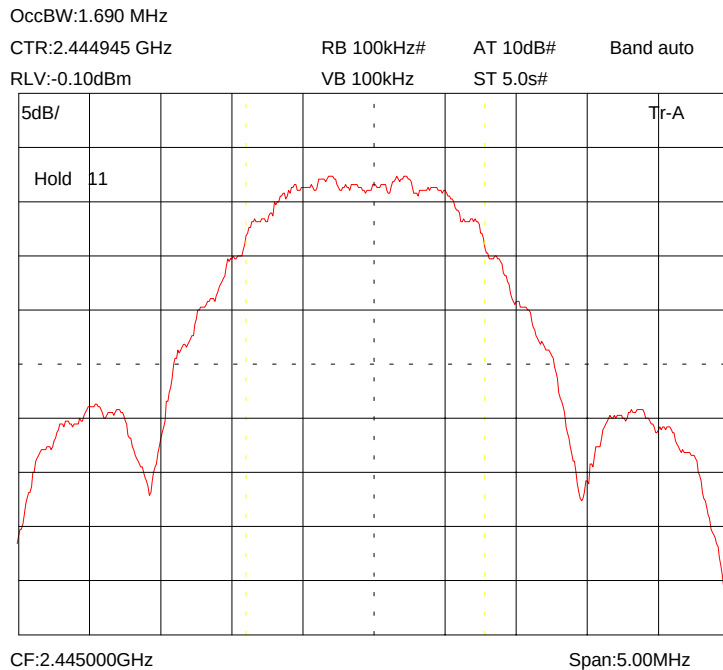
a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[X]
		-	DRAWINGS	[X]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[X]
		-	PSU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

ANNEX C
6 dB BANDWIDTH

6dB Bandwidth Top Channel



6dB Bandwidth Middle Channel



6dB Bandwidth Bottom Channel

OccBW:1.630 MHz

CTR:2.404965 GHz

RB 100kHz#

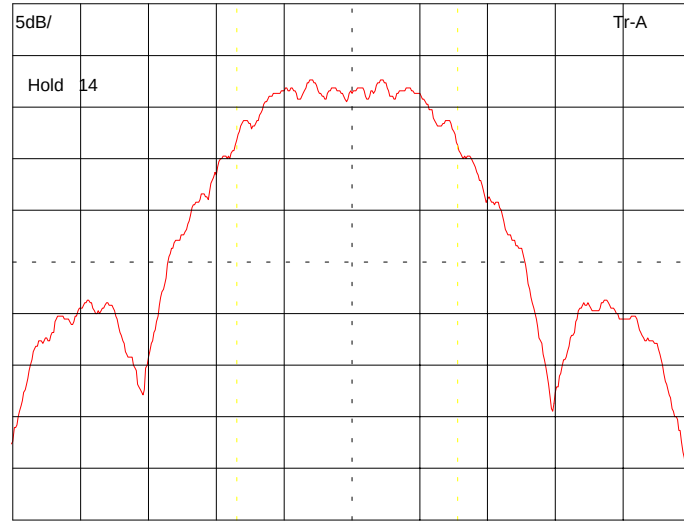
AT 10dB#

Band auto

RLV:-0.10dBm

VB 100kHz

ST 5.0s#

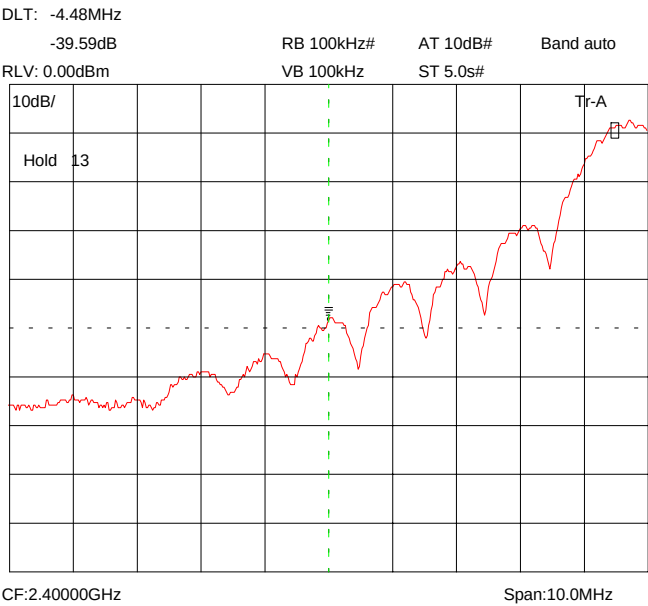


CF:2.405000GHz

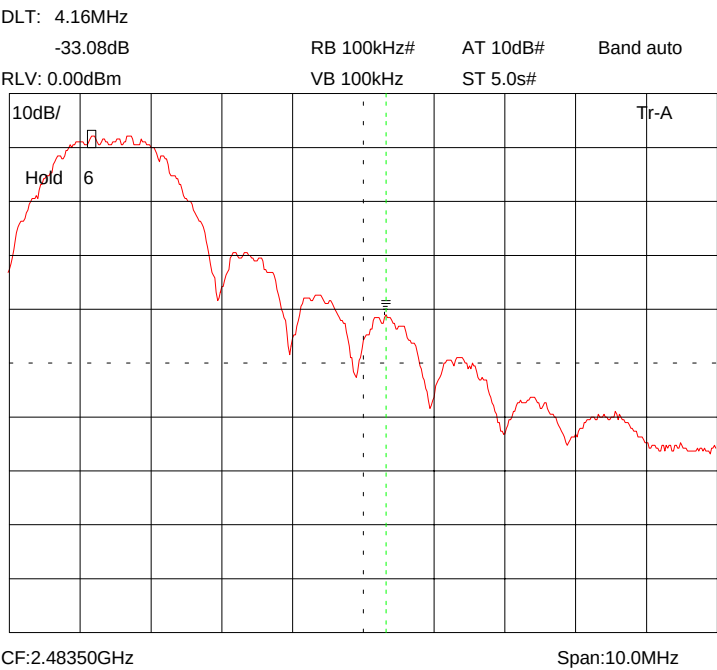
Span:5.00MHz

ANNEX D
BAND EDGE COMPLIANCE

Lower Band Edge

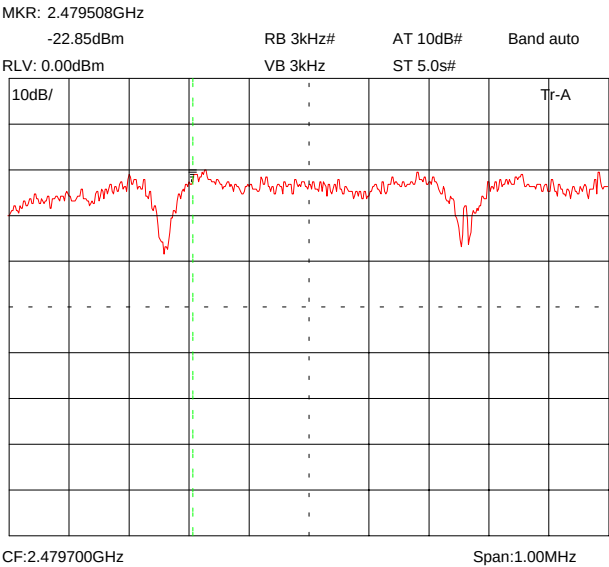


Upper Band Edge

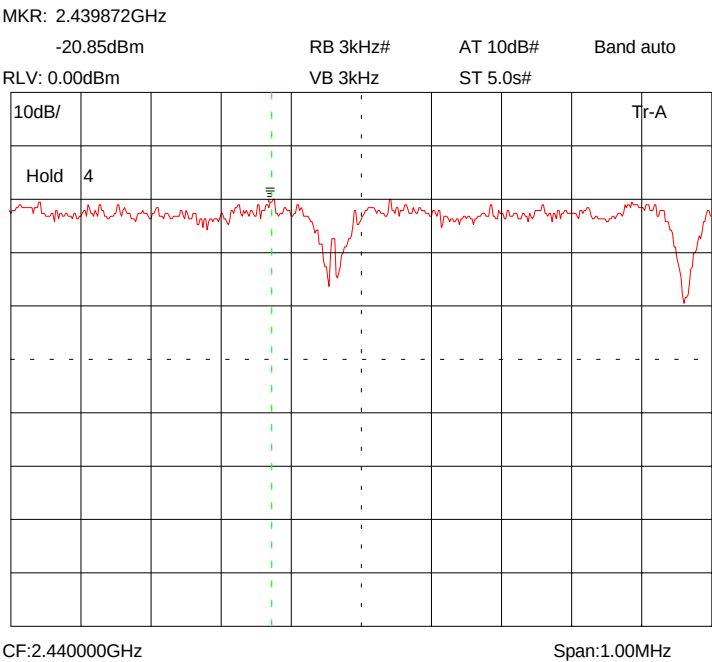


ANNEX E
POWER SPECTRAL DENSITY

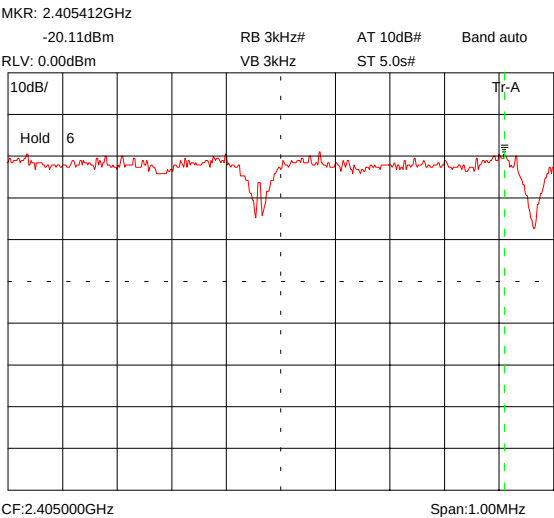
Power Density Top Channel



Power Density Middle Channel

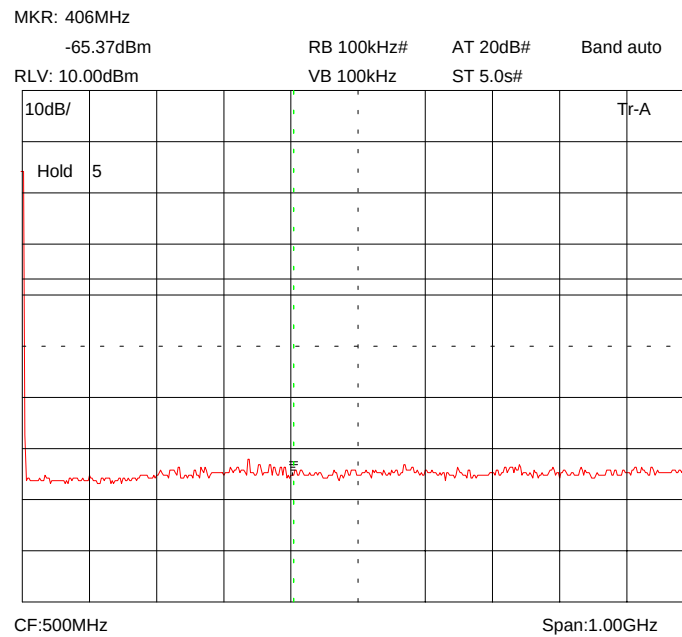


Power Density Bottom Channel

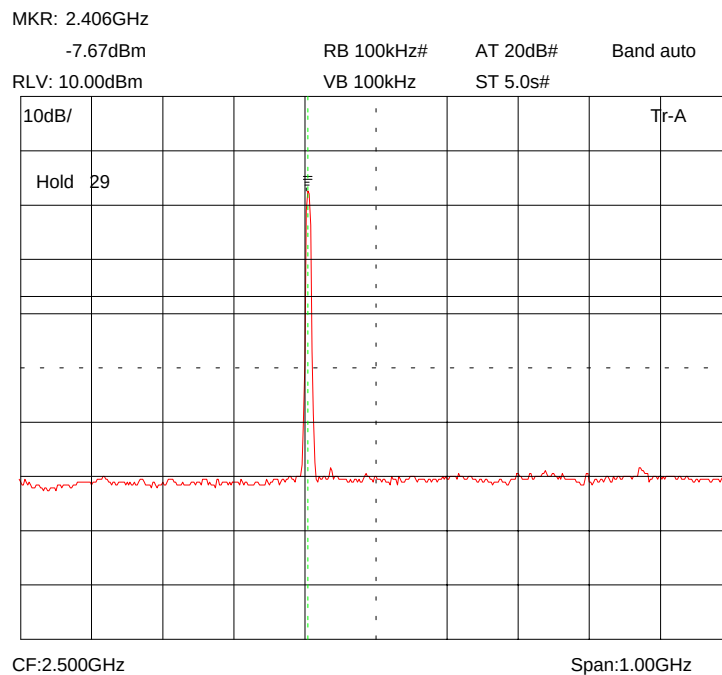


ANNEX F
SPURIOUS EMISSIONS CONDUCTED

0 – 1GHz Low Channel



1-2 GHz Low Channel



2-3GHz Low Channel

MKR: 2.608GHz

-61.14dBm

RB 100kHz#

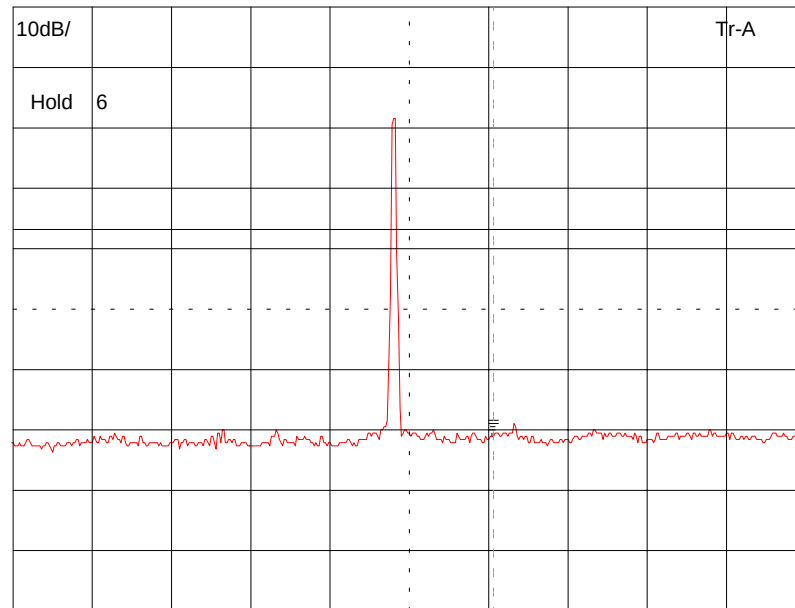
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:2.500GHz

Span:1.00GHz

3-4GHz Low Channel

MKR: 3.406GHz

-62.85dBm

RB 100kHz#

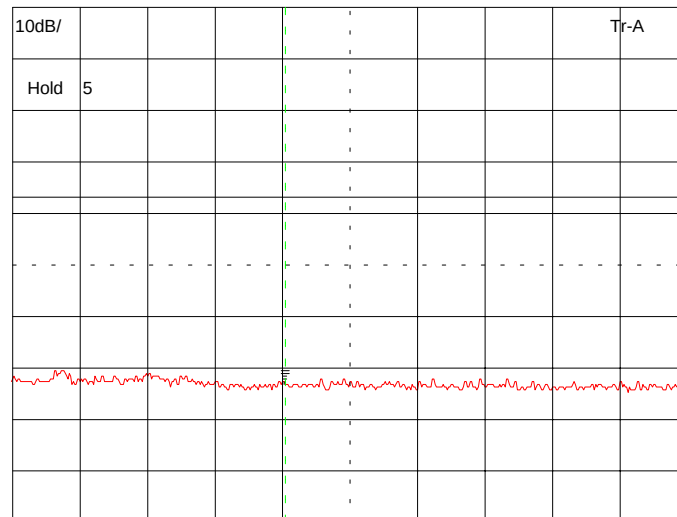
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:3.500GHz

Span:1.00GHz

4-6GHz Low Channel

MKR: 4.812GHz

-44.51dBm

RB 100kHz#

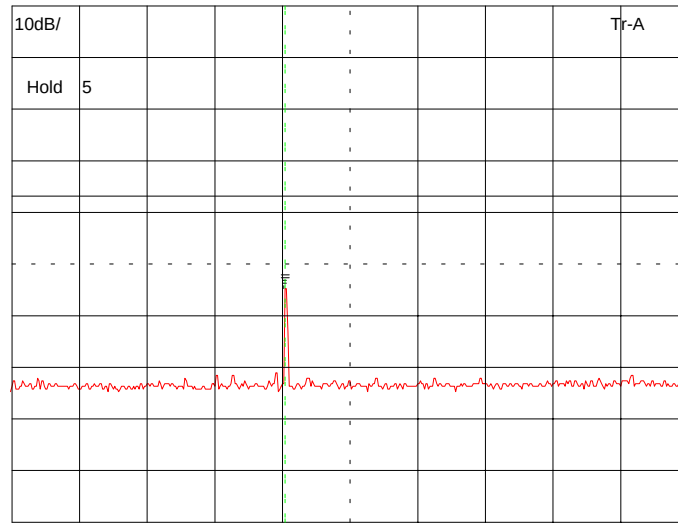
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:5.000GHz

Span:2.00GHz

6-8GHz Low Channel

MKR: 7.216GHz

-56.57dBm

RB 100kHz#

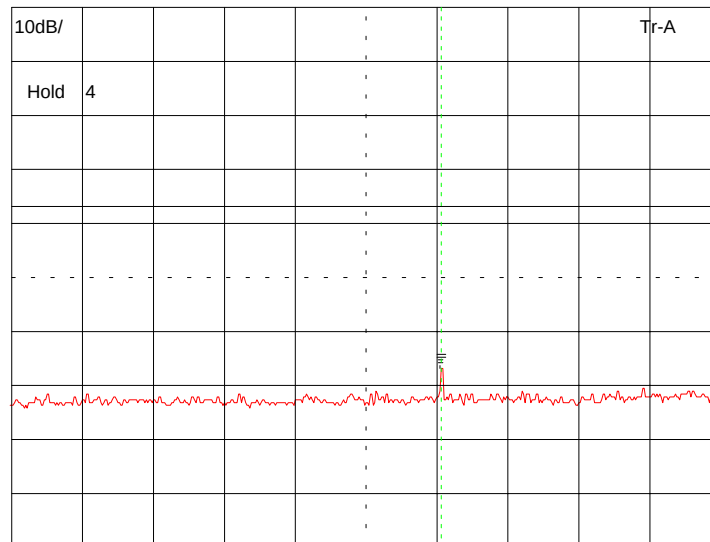
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

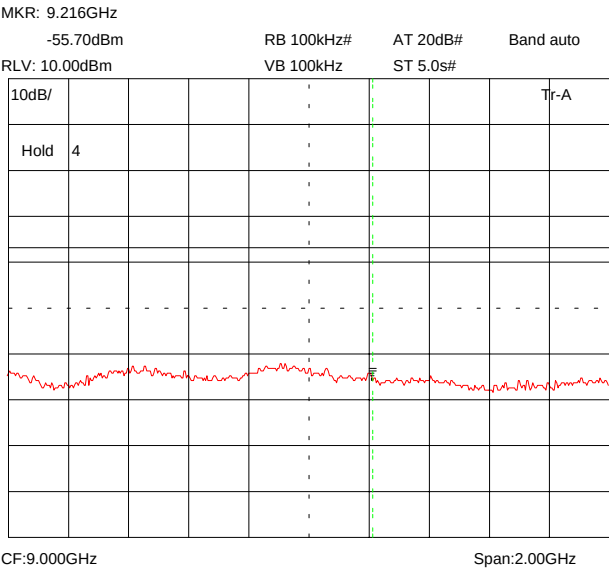
ST 5.0s#



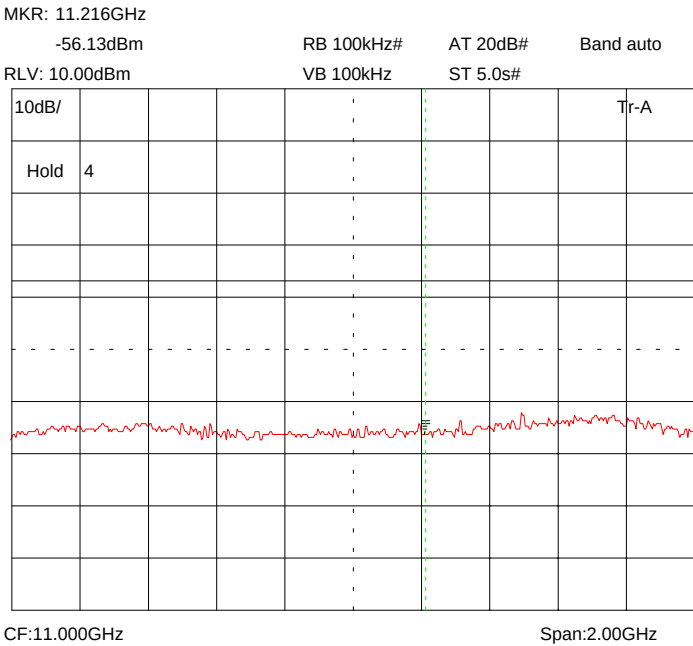
CF:7.000GHz

Span:2.00GHz

8-10GHz Low Channel



10-12GHz Low Channel



12-14GHz Low Channel

MKR: 13.216GHz

-52.98dBm

RB 100kHz#

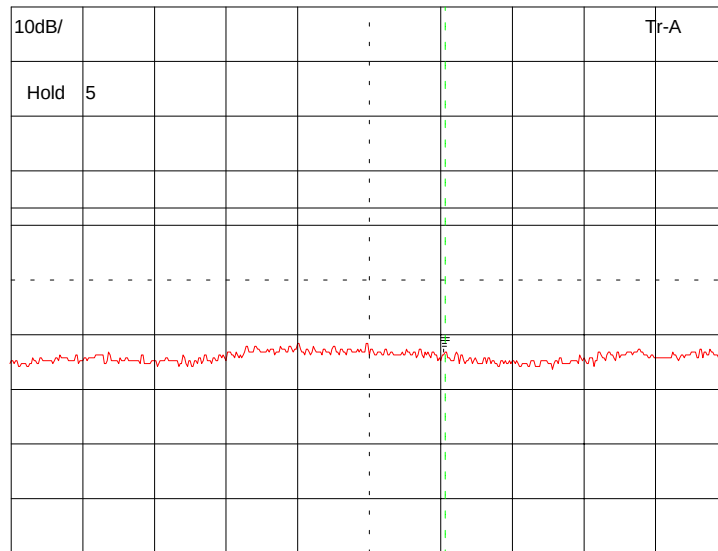
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:13.000GHz

Span:2.00GHz

14-16GHz Low Channel

MKR: 15.216GHz

-52.98dBm

RB 100kHz#

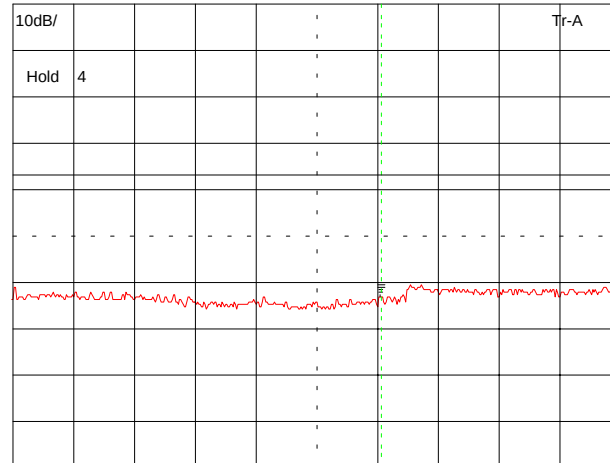
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

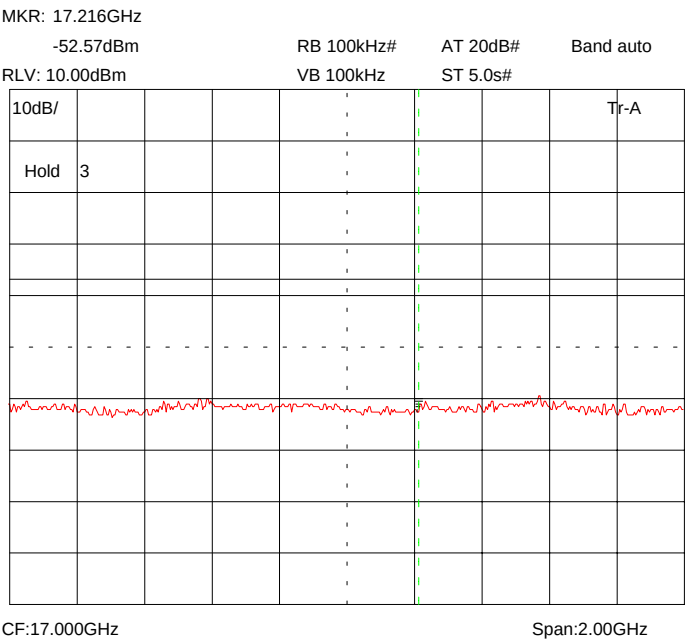
ST 5.0s#



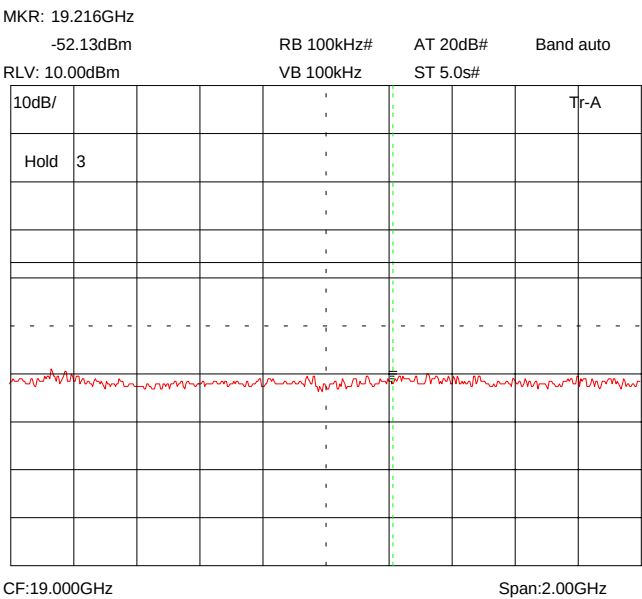
CF:15.000GHz

Span:2.00GHz

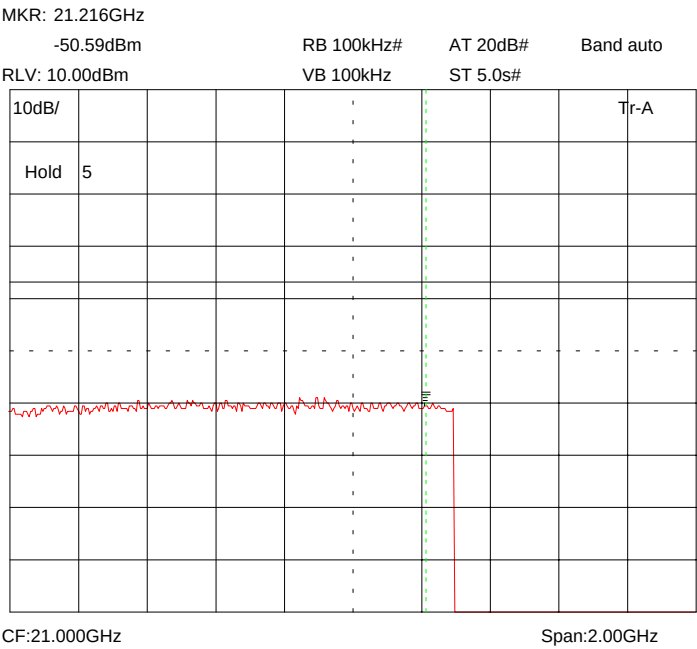
16-18GHz Low Channel



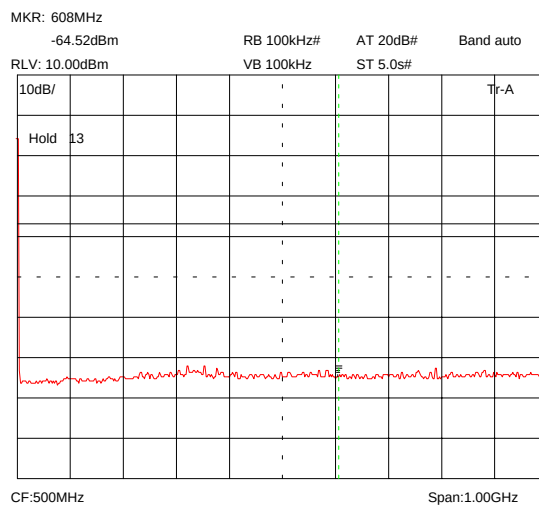
18-20GHz Low Channel



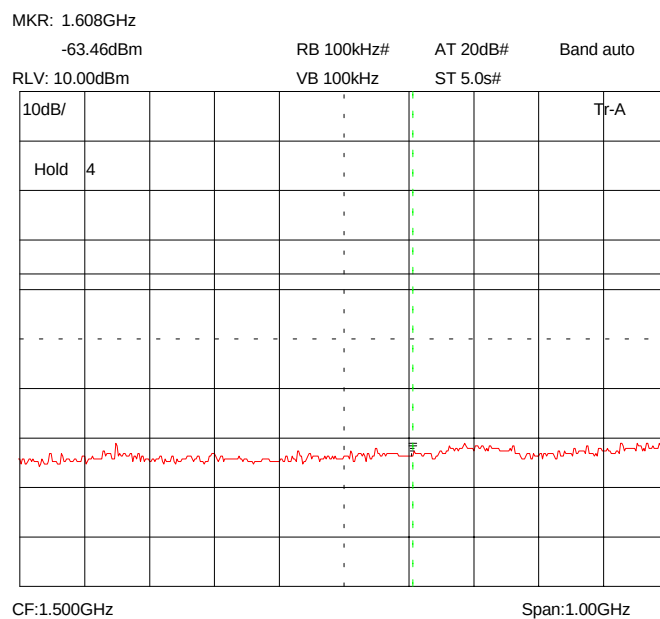
20-22GHz Low Channel



0 – 1GHz High Channel



1-2 GHz Low Channel



2-3GHz High Channel

MKR: 2.608GHz

-61.14dBm

RB 100kHz#

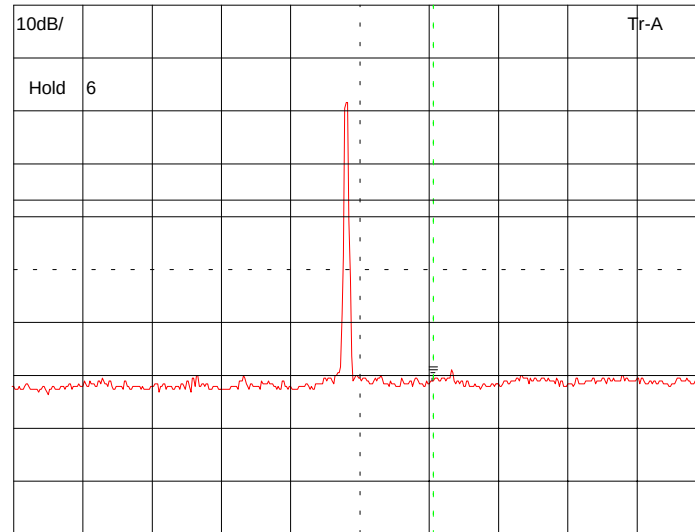
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:2.500GHz

Span:1.00GHz

3-4GHz High Channel

MKR: 3.608GHz

-63.09dBm

RB 100kHz#

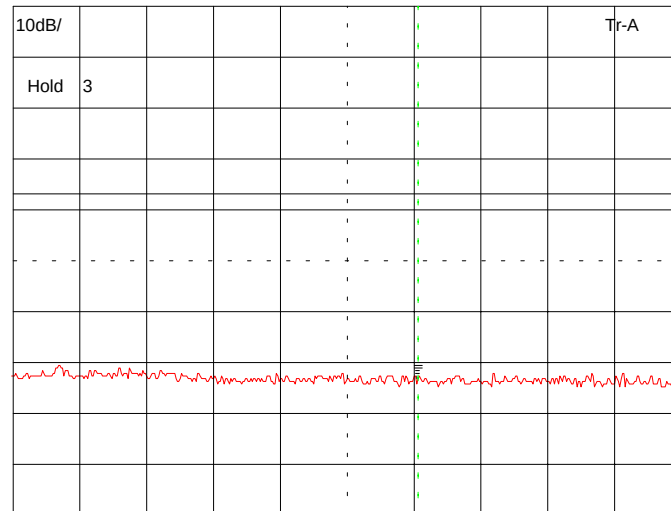
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:3.500GHz

Span:1.00GHz

4-6GHz High Channel

MKR: 4.964GHz

-46.82dBm

RB 100kHz#

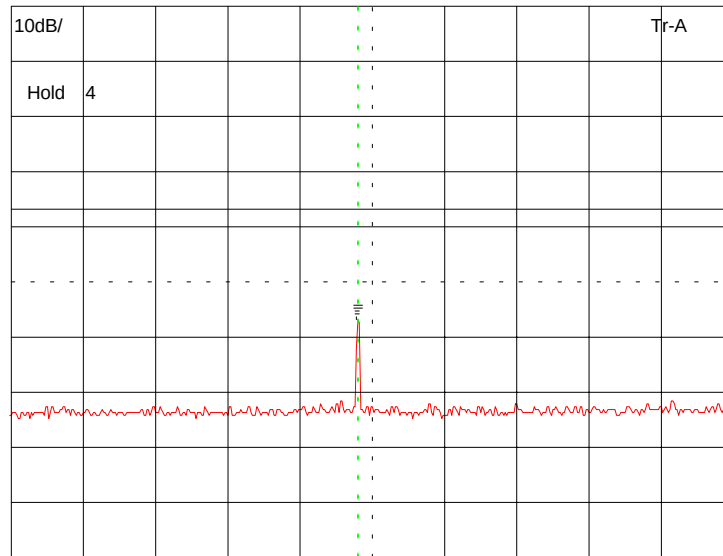
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:5.000GHz

Span:2.00GHz

6-8GHz High Channel

MKR: 6.964GHz

-62.83dBm

RB 100kHz#

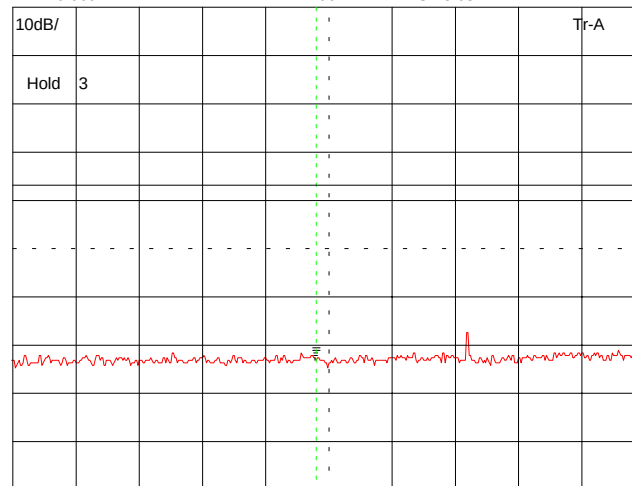
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

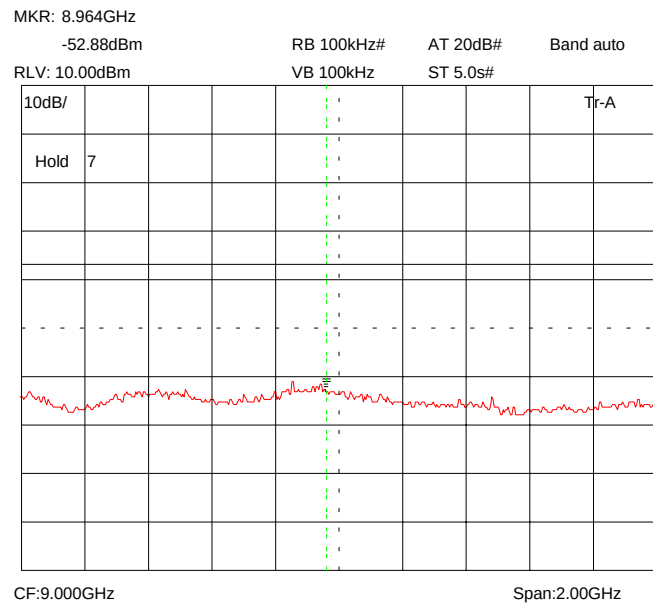
ST 5.0s#



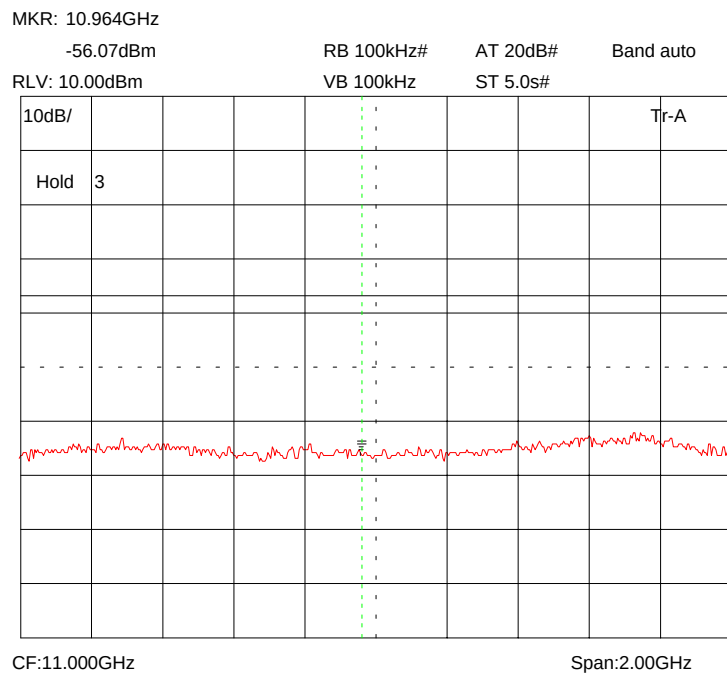
CF:7.000GHz

Span:2.00GHz

8-10GHz High Channel



10-12GHz High Channel



12-14GHz High Channel

MKR: 12.964GHz

-53.70dBm

RB 100kHz#

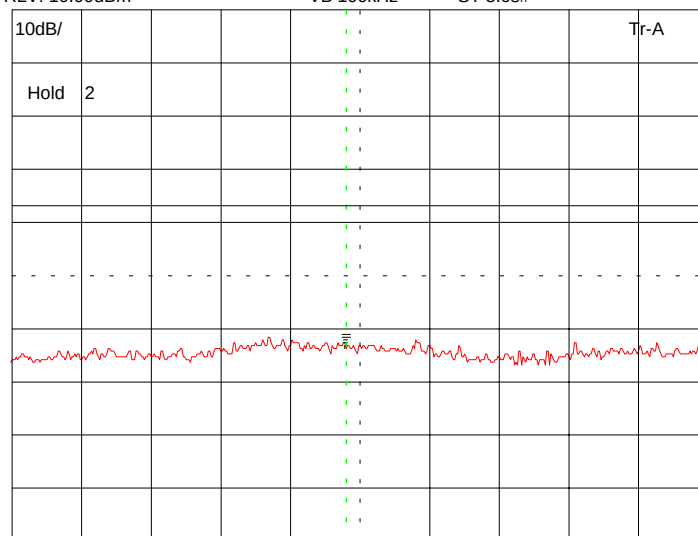
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:13.000GHz

Span:2.00GHz

14-16GHz Low Channel

MKR: 14.964GHz

-54.59dBm

RB 100kHz#

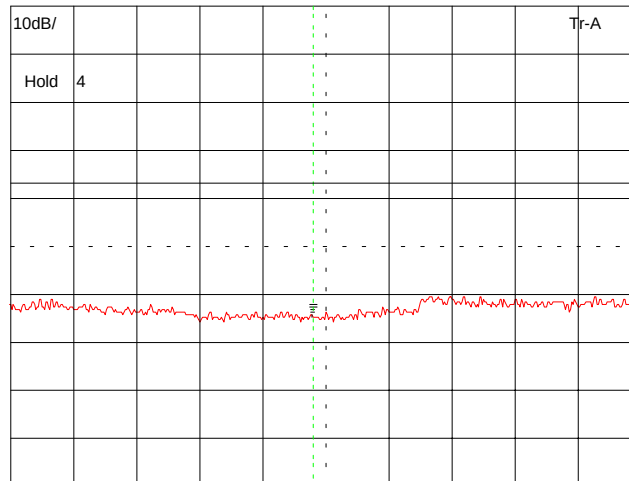
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:15.000GHz

Span:2.00GHz

16-18GHz High Channel

MKR: 16.964GHz

-50.77dBm

RB 100kHz#

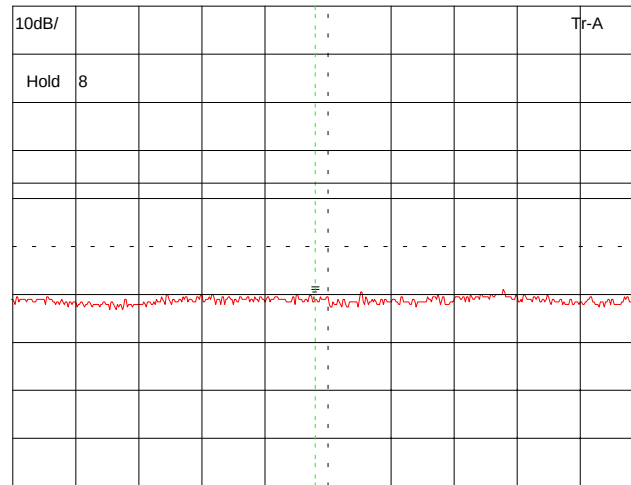
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

ST 5.0s#



CF:17.000GHz

Span:2.00GHz

18-20GHz Low Channel

MKR: 18.964GHz

-52.55dBm

RB 100kHz#

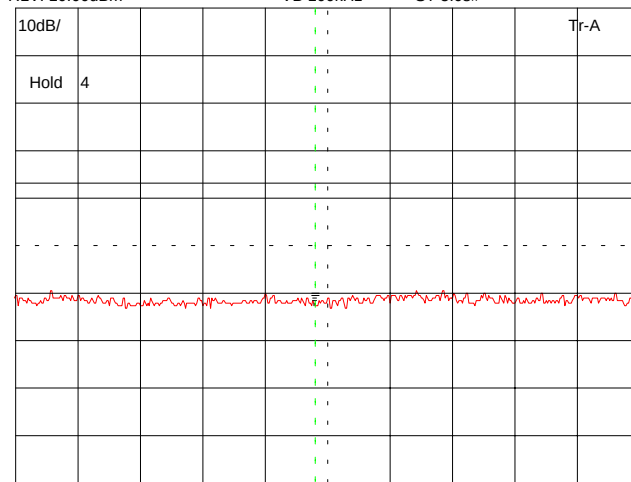
AT 20dB#

Band auto

RLV: 10.00dBm

VB 100kHz

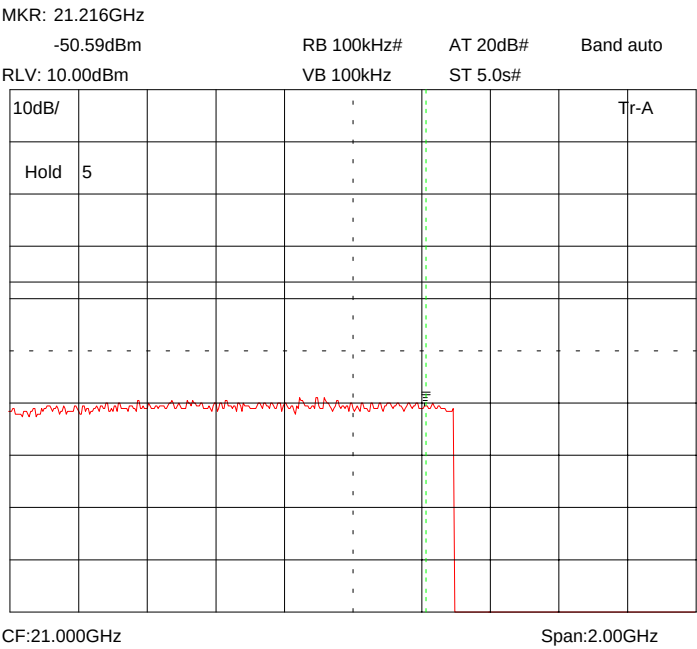
ST 5.0s#



CF:19.000GHz

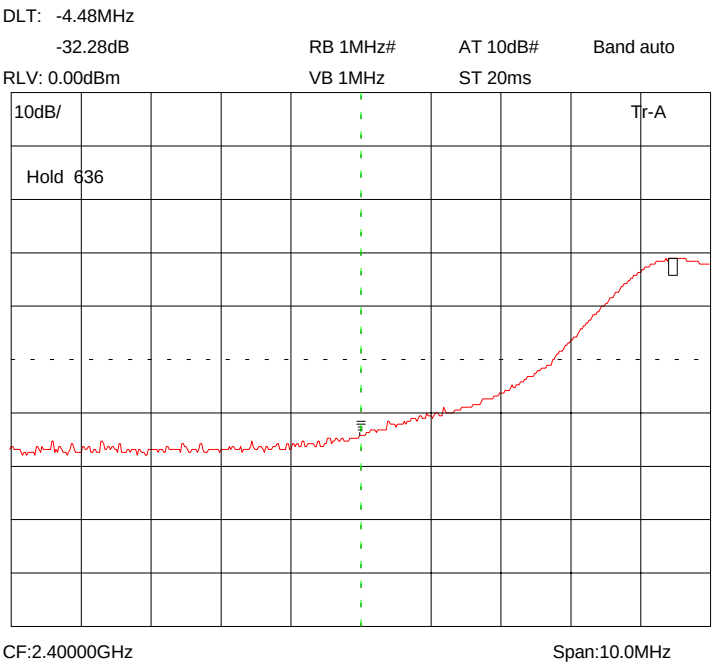
Span:2.00GHz

20-22GHz High Channel

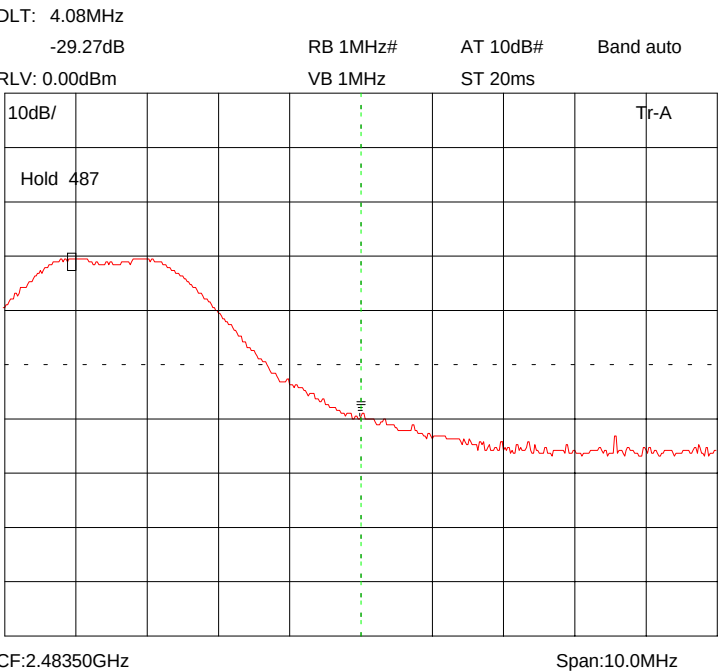


ANNEX G
SPURIOUS EMISSIONS RADIATED (BAND EDGE)

Low Channel Band Edge



High Channel Band Edge



ANNEX H
RECEIVER SPURIOUS EMISSIONS

ANNEX I
POWER LINE CONDUCTION TRANSMITTER

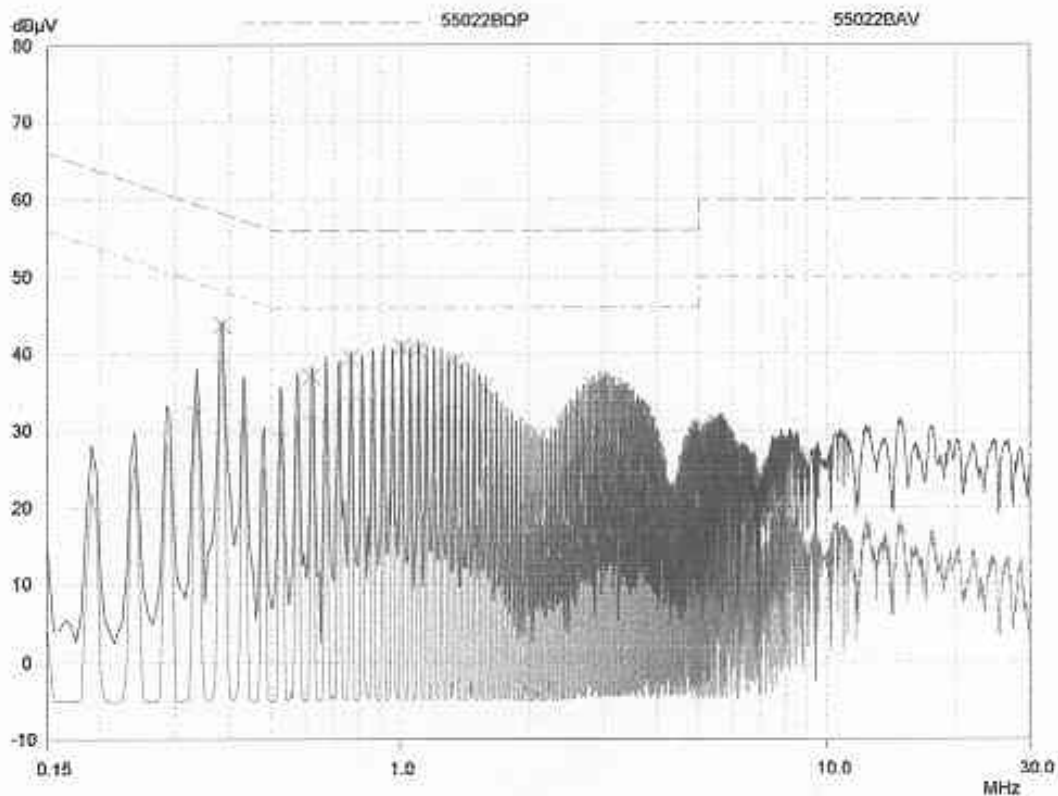
Powerline Conduction

07 Jun 2005 13:09

150kHz - 30MHz

EUT: ETRX1
 Manuf: Telepla
 Op Cond: LISN UH195, cable UH21 & Receiver UH03
 Operator: J Charters
 Test Spec: EN55022 Class B (or Variant)
 Comment: Live line
 RX only

Scan Settings		(1 Range)			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB	
Transducer	No.	Start	Stop	Name					
	1	150kHz	30MHz	UH21					
Final Measurement:		Detectors:	X GP / + AV						
		Meas Time:	2sec						
		Subranges:	25						
		Acc Margin:	20 dB						



PAGE 1

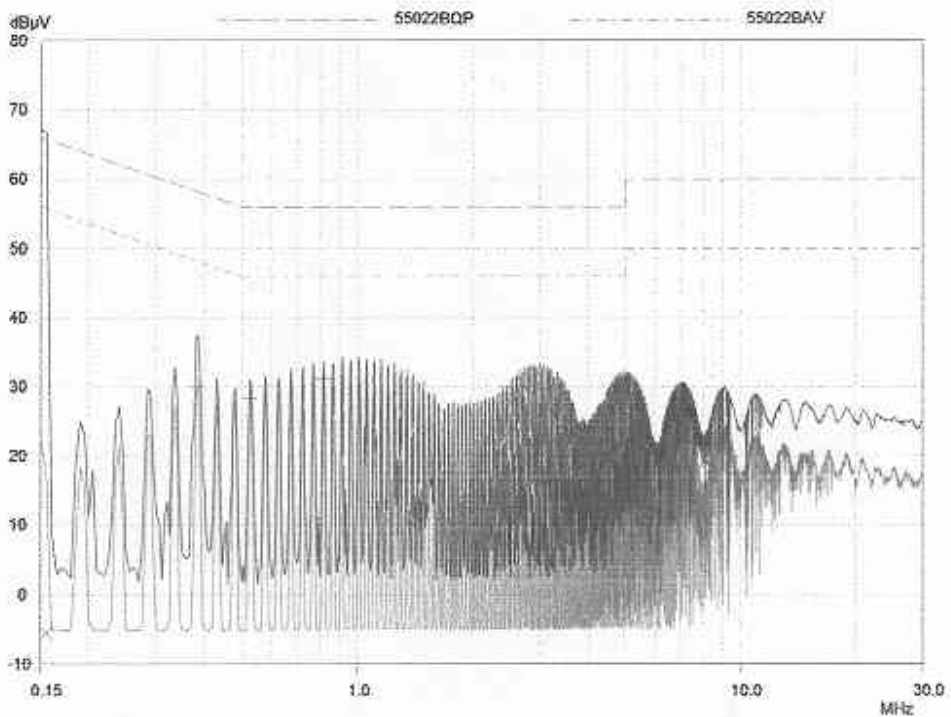
Powerline Conduction

07 Jun 2005 13:25

150kHz - 30MHz

EUT: ETRX1
 Manuf: Teleng
 Op Cond: LISN UH195, cable UH21 & Receiver UH03
 Operator: J Charless
 Test Spec: EN55022 Class B (or Variant)
 Comment: Neutral line
 RX only]

Scan Settings		(1 Range)			Receiver Settings				
Frequencies									
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB	
Transducer	No.	Start	Stop	Name					
	1	150kHz	30MHz	UH21					
Final Measurement:		Detectors:	X QP / + AV						
		Meas Time:	2sec						
		Subranges:	25						
		Acc Margin:	20 dB						



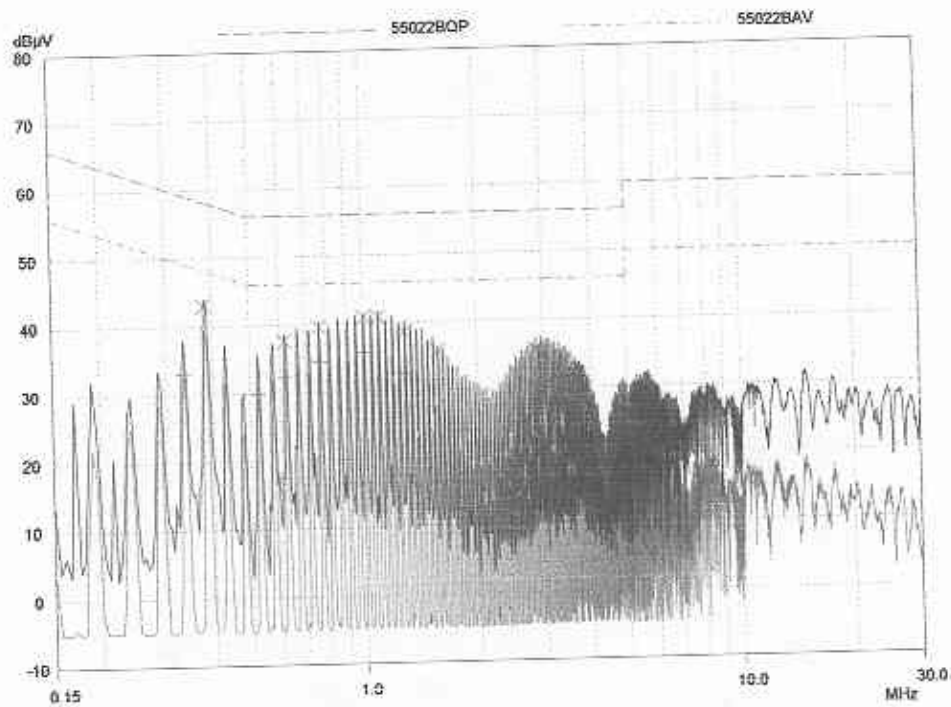
PAGE 1

Powerline Conduction 150kHz - 30MHz

07 Jun 2005 12:50

ELUT: ETRX1
 Manuf: Telegis
 Op Cond: USN UH195, cable UH21 & Receiver UH03
 Operator: J Charters
 Test Spec: EN55022 Class B (or Variant)
 Content: Live line
 TX on high power top channel

Scan Settings		(1 Range) Frequencies			Receiver Settings							
Start		Stop		Step		IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz		30MHz		5kHz		10kHz	PK+AV	20msec	Auto	OFF	60dB	
Transducer	No. 1	Start	150kHz	Stop	30MHz	Name	UH21					
Final Measurement:		Detectors:	X QP / + AV									
		Meas Time:	2sec									
		Subrange:	25									
		Acc Margin:	20 dB									



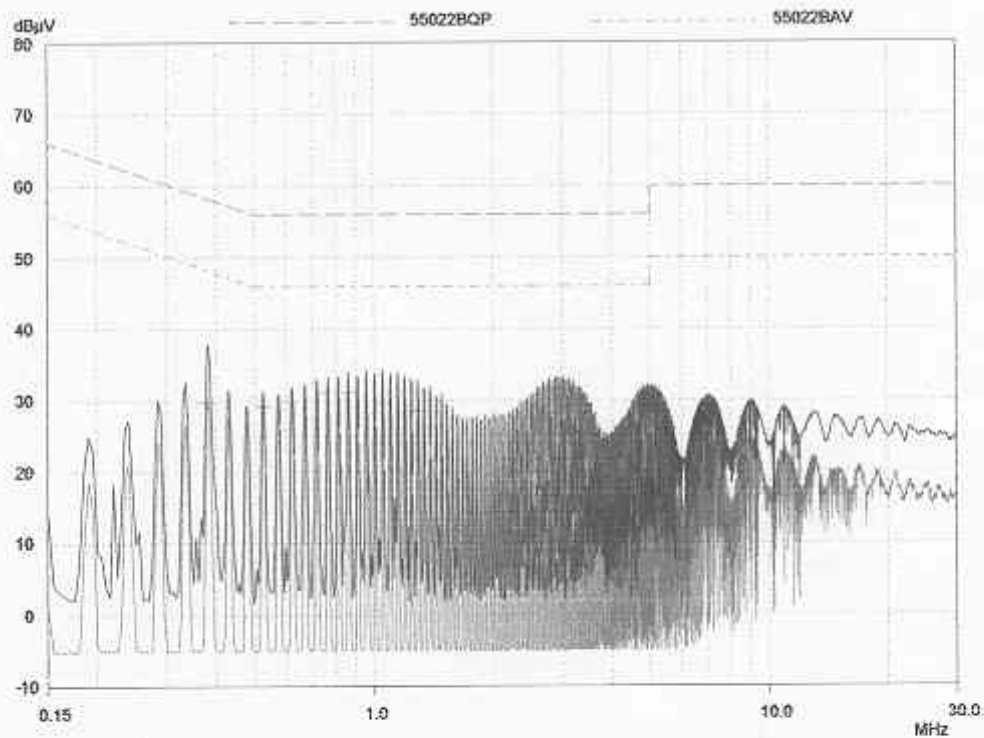
Powerline Conduction

07 Jun 2005 12:35

150kHz - 30MHz

EUT: ETRX1
 Manuf: Telegis
 Op Cond: LISN UH195, cable UH21 & Receiver UH03
 Operator: J Charlers
 Test Spec: EN55022 Class B (or Variant)
 Comment: Neutral line
 TX on high power tap channel

Scan Settings		(1 Range)			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB	
Transducer	No.	Start	Stop	Name					
	1	150kHz	30MHz	UH21					
Final Measurement:		Detectos:	X QP / + AV						
		Meas Time:	2sec						
		Subranges:	25						
		Acc Margin:	20 dB						



PAGE 1

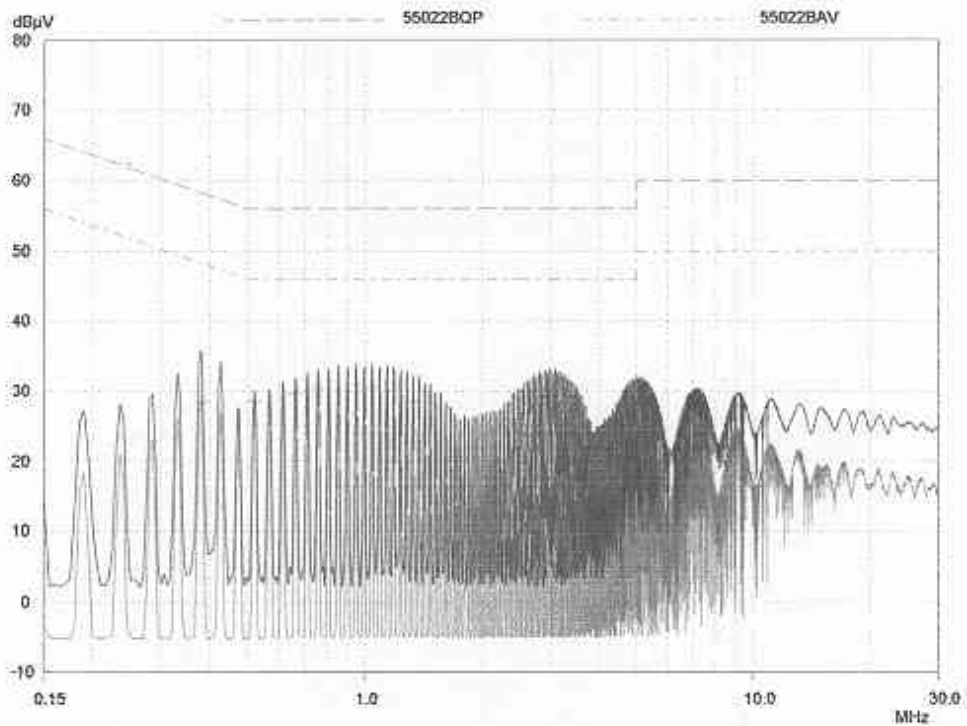
Powerline Conduction

07 Jun 2005 12:06

150kHz - 30MHz

EUT: ETRX1
 Manuf: Tellegis
 Op Cond: LISN UH195, cable UH21 & Receiver UH03
 Operator: J Charters
 Test Spec: EN55022 Class B (or Variant)
 Comment: Live line
 TX on high power bottom channel

Scan Settings		(1 Range)			Receiver Settings			
Frequencies								
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Presamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB
Transducer	No.	Start	Stop	Name				
	1	150kHz	30MHz	UH21				
Prescan Measurement:		Detectors:	X PK / + AV					
		Meas Time:	see scan settings					
		Subranges:	25					
		Acc Margin:	20 dB					



PAGE 1

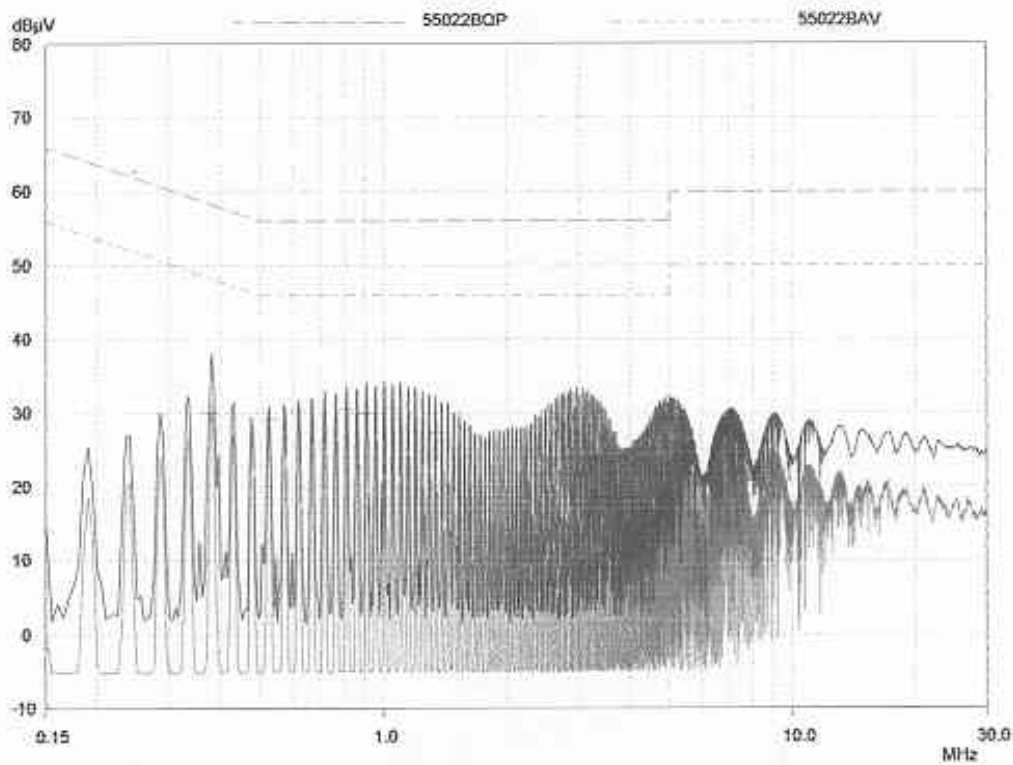
Powerline Conduction

07 Jun 2005 12:20

150kHz - 30MHz

EUT: ETRX1
 Manuf: Telegis
 Op Cond: LISN UH195, cable UH21 & Receiver UH03
 Operator: J Charters
 Test Spec: EN55022 Class B (or Variant)
 Comment: Neutral line
 TX on high power bottom channel

Scan Settings		(1 Range)				Receiver Settings			
Start	Stop	Frequencies	Stop	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz		5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB
Transducer	No.	Start	Stop	Name					
	1	150kHz	30MHz	UH21					
Final Measurement:		Detectors:	X QP / + AV						
		Meas Time:	2sec						
		Subranges:	25						
		Acc Margin:	20 dB						



PAGE 1

ANNEX J
TEST EQUIPMENT CALIBRATION DETAILS

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period
	3m Range ERP			
UH006	CAL	TRL	01/03/05	12
UH028	Log Periodic Ant	Schwarbeck	28/04/05	24
UH029	Bicone Antenna	Schwarbeck	27/04/05	24
UH041	Multimeter	AVOmeter	14/12/04	12
UH120	Spectrum Analyser	Marconi	15/03/05	12
UH122	Oscilloscope	Tektronix	07/06/05	24
UH162	ERP Cable Cal	TRL	23/05/05	12
UH179	Power Sensor	Marconi	14/12/04	12
UH228	Power Sensor	Marconi	17/01/05	12
UH253	1m Cable N type	TRL	10/01/05	12
UH254	1m Cable N type	TRL	10/01/05	12
UH264	CD Audio	Buroschi	N/A	
UH265	Notch filter	Telonic	24/06/05	12
L005	CMTA	R&S	22/10/04	12
L007	Loop Antenna	R&S	29/03/05	24
L138	1-18GHz Horn	EMCO	15/04/05	24
L139	1-18GHz Horn	EMCO	03/05/05	24
L176	Signal Generator	Marconi	31/01/05	12
L193	Bicone Antenna	Chase	12/10/03	24
L203	Log Periodic Ant	Chase	21/10/03	24
L254	Signal Generator	Marconi	13/12/04	12
L280	18GHz Cable	Rosenberger	10/01/05	12
L343	CCIR Noise Filter	TRL	07/06/05	12
	Temperature			
L426	Indicator	Fluke	14/12/04	12
L478	Signal Generator	R&S	19/05/04	12
L479	Analyser	Anritsu	05/10/04	12
L552	Signal Generator	Agilent	25/04/05	12

