A TEST REPORT

FOR

TEAM SIMOCO Ltd

ON

SB2025NT100W

Private Land Mobile Radio

DOCUMENT NO. TRA-010250-W-US-1

TEST REPORT NO: TRA-010250-W-US-1

COPY NO: 1

ISSUE NO: 1

FCC ID: U89SB2K5354R4R5V

REPORT ON THE CERTIFICATION TESTING OF A
TEAM SIMOCO
SB2025NT100W
WITH RESPECT TO
THE FCC RULES CFR 47,
PART 90
SUBPART - R

PRIVATE LAND MOBILE RADIO.

TEST DATE: 28th May– 10th October 2012

APPROVED BY: _____ J CHARTERS
RADIO
PRODUCT
MANAGER

DATE: 11th October 2012

Distribution:

Copy Nos: 1. Team Simoco

2. TRaC Global

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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.

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	U89SB2K5354R4R5V
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 90 Subpart R
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	SB2025NT100W
EQUIPMENT TYPE:	Private Land Mobile Radio
FREQUENCY OF OPERATION:	763MHz – 775MHz
MAXIMUM OUTPUT CONDUCTED:	49.72dBm 93.75W
MODULATION TYPE:	F3E, F1E
POWER SOURCE(s):	+13.8Vdc
TEST DATE(s):	28th May– 10th October 2012
APPLICANT:	Team Simoco
ADDRESS:	Team Simoco Ltd Field House Uttoxeter Old Road Derby DE1 1NH

APPROVED BY: _____

RADIO
PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	SB2025NT100W 700MHz
EQUIPMENT TYPE:	Private Land Mobile Radio
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 90 Subpart R
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S CONTACT PERSON(s):	Mr Richard Stimson
EMAIL ADDRESS:	Richard.stimson@teamsimoco.com
APPLICANT:	Team Simoco Ltd
ADDRESS:	Team Simoco Ltd Field House Uttoxeter Old Road Derby DE1 1NH
TEL:	01332 375414
MANUFACTURER:	Team Simoco Ltd
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRaC Global
TEST DATE(s):	28th May– 10th October 2012
TEST REPORT No:	TRA-010250-W-US-1

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	APPLICABILITY	RESULT
RF Power Output	90.635	Yes	Complies
Audio Frequency Response (a)	2.1047	Yes	Complies
Modulation Limiting	2.1047	No	N/a
Occupied Bandwidth	90.210	Yes	Complies
Spurious Emissions at Antenna Terminals	90.210	Yes	Complies
Field Strength of Spurious Emissions	90.543	Yes	Complies
Field Strength of Un- Intentional Spurious Emissions	15.109	Yes	Complies
Frequency Stability	90.539	Yes	Complies
ACP	90.543	No	Complies
Emission Mask	90.210(b)	Yes	Complies

2. Product class: Class A [X] Class B [ ]

3. Product Use: Private Land Mobile Radio

4. Emission Designator: F3E, F1E

5. Temperatures: Ambient (Tnom) 20°C

6. Supply Voltages: Vnom +13.8Vdc

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 [X]
   - Wideband [X]

9. Test Location TRaC Global
   - Skelmersdale [X]

10. Modifications made during test program No modifications were performed.

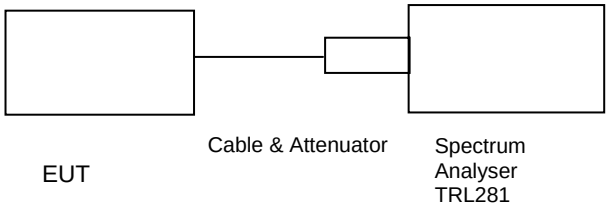
System description:

The SB2025NT100W is a radio base station capable of operating in analogue FM and digital P25 modes as a stand-alone repeater or as part of a simulcast/voted system. Inputs are provided for connection to external frequency and 1PPS timing signals to ensure the accurate frequency and modulation synchronisation necessary for simulcast operation. Dispatcher connection is via Ethernet using the TIA DFSI protocol.

COMPLIANCE TESTS

RF OUTPUT POWER – CONDUCTED – PART 90.635

Ambient temperature	=	20°C	Radio Laboratory
Relative humidity	=	46%	
Supply voltage	=	+13.8Vdc	
Channel number	=	See test results	



Frequency MHz	Level at Analyser (dBm)	Output Cable & Attenuator loss (dB)	Conducted Output Power (dBm)	Conducted Output Power (W)	Rated output Power (dBm)	Rated output Power (W)
763.00MHz*	8.6	41.12	49.72	93.72	50	100
769.00MHz	8.6	41.12	49.72	93.72	50	100
775.00MHz	8.6	41.12	49.72	93.72	50	100

Notes: 1: Power and antenna height clause 90.205(k) refers to limitations specified in clause 90.545 in the band 763MHz – 775MHz. the maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and the required service area.

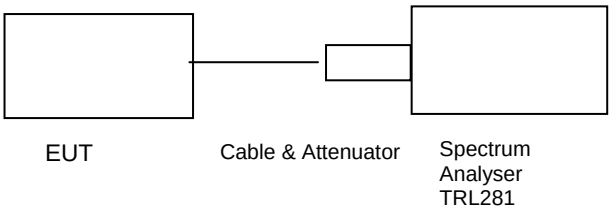
2. * Indicates this frequency is NOT applicable to the FCC filing.

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	No	ACTUAL EQUIPMENT USED
Radio communications Analyser	Rhode & Schwarz	CMTA 52	894715/003	TRL05	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	**X**
ATTENUATOR	-	-	-	20dB	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	

TRANSMITTER TESTS

99% Bandwidth – CONDUCTED – Part 90.209

Ambient temperature	=	20°C	Radio Laboratory
Relative humidity	=	46%	
Supply voltage	=	+13.8Vdc	
Channel number	=	See test results	



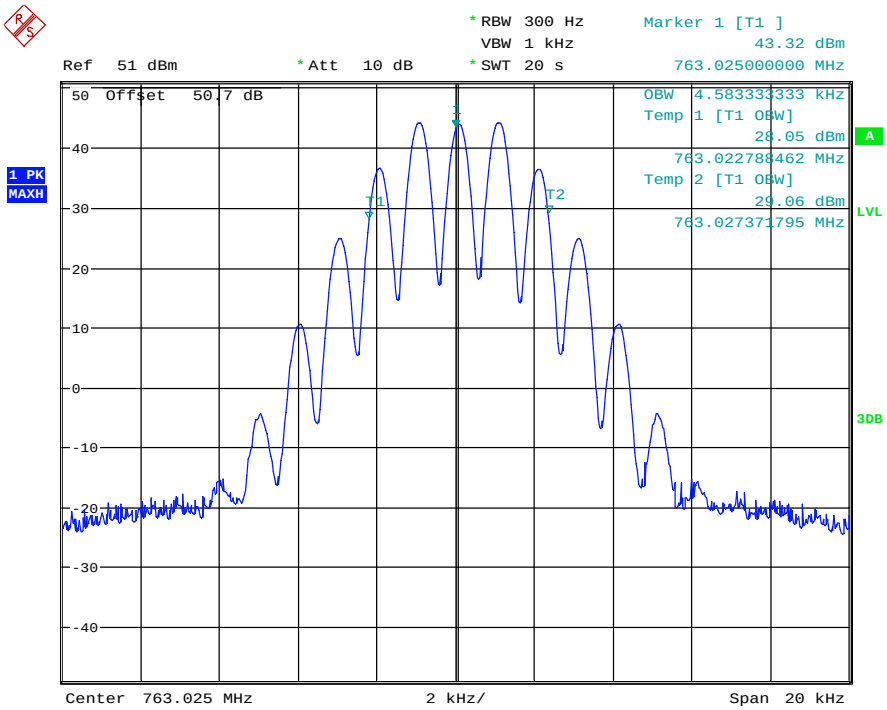
Note:

1. Cable and attenuator between EUT and spectrum analyser 50dB
2. See Table below for 99% Power Occupied Bandwidth
3. Internally generated test tone analogue speech
4. P25 Internally generated test tone C4FM
5. * Indicates this frequency is NOT applicable to the FCC filing.

Frequency Of Operation Channel	Modulation Type
FM 2.5kHz Deviation	
763.025MHz*	99% Bandwidth =4.58kHz
769.00MHz	99% Bandwidth =4.58kHz
774.975MHz	99% Bandwidth =4.51kHz
P25 Modulation	
763.025MHz*	99% Bandwidth =8.33kHz
769.00MHz	99% Bandwidth =8.25kHz
774.975MHz	99% Bandwidth =8.17kHz
FM 25kHz Deviation	
763.025MHz*	99% Bandwidth =8.31kHz
769.00MHz	99% Bandwidth =8.31kHz
774.975MHz	99% Bandwidth =8.26kHz

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	**X**
ATTENUATOR	-	-	-	20dB	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**

763.025MHz 12.5kHz analogue speech - This frequency is NOT applicable to the FCC filing.



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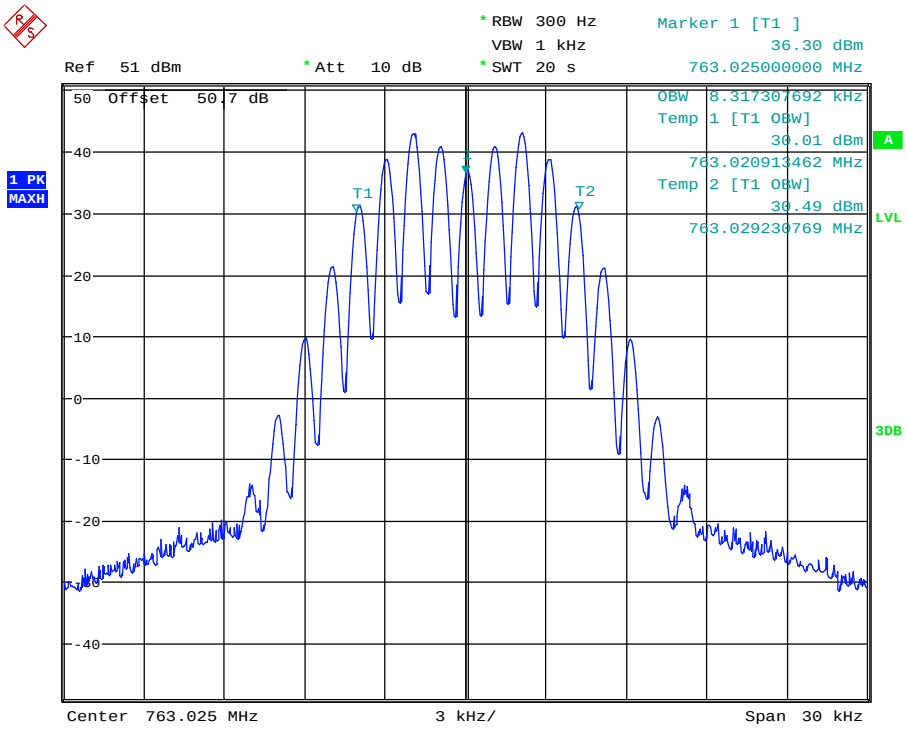
763.025MHz 25kHz analogue speech - This frequency is NOT applicable to the FCC filing.



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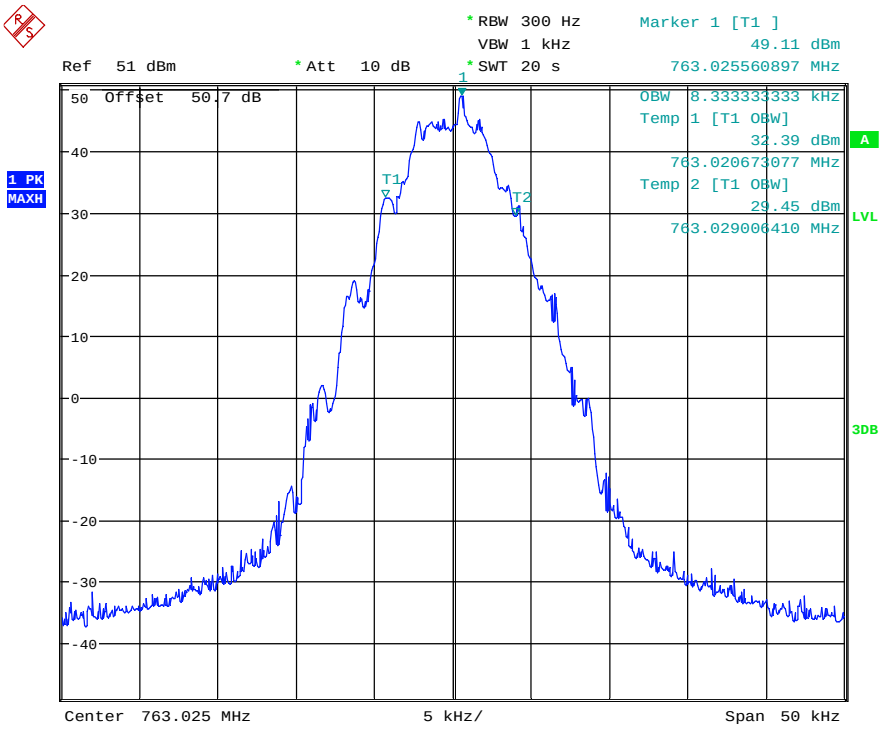
763.025MHz 12.5kHz P25 Modulation - This frequency is NOT applicable to the FCC filing.



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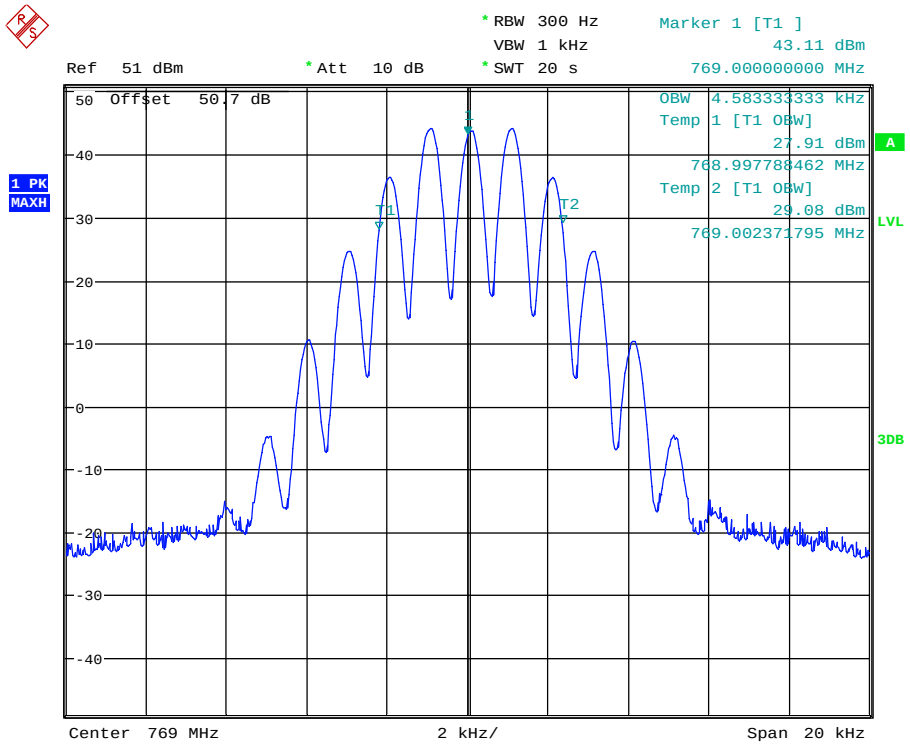
769MHz 12.5kHz analogue speech



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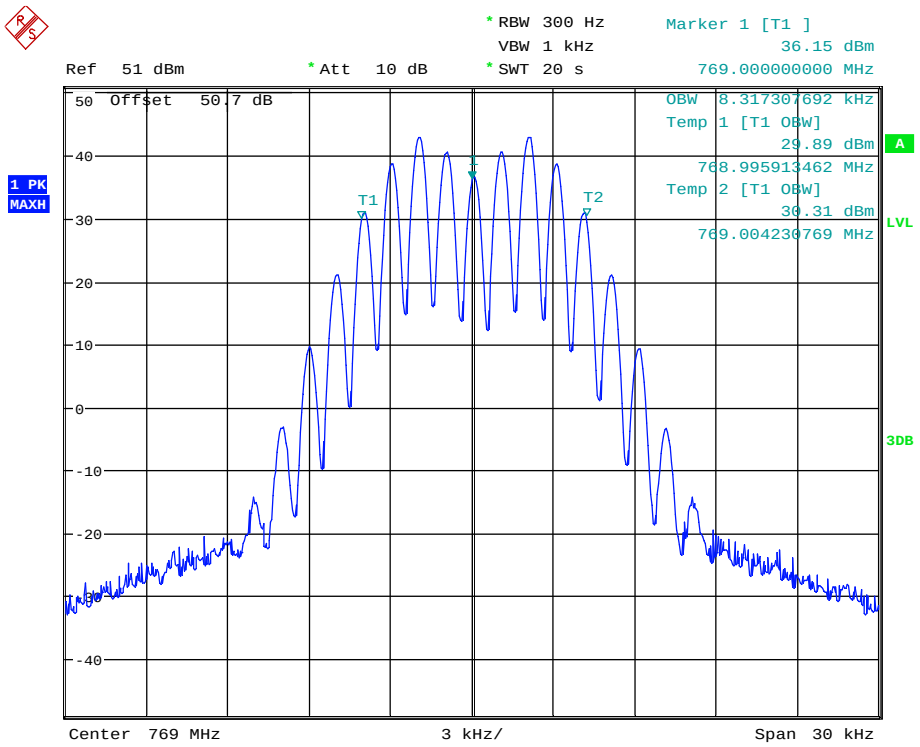
769MHz 25kHz analogue speech



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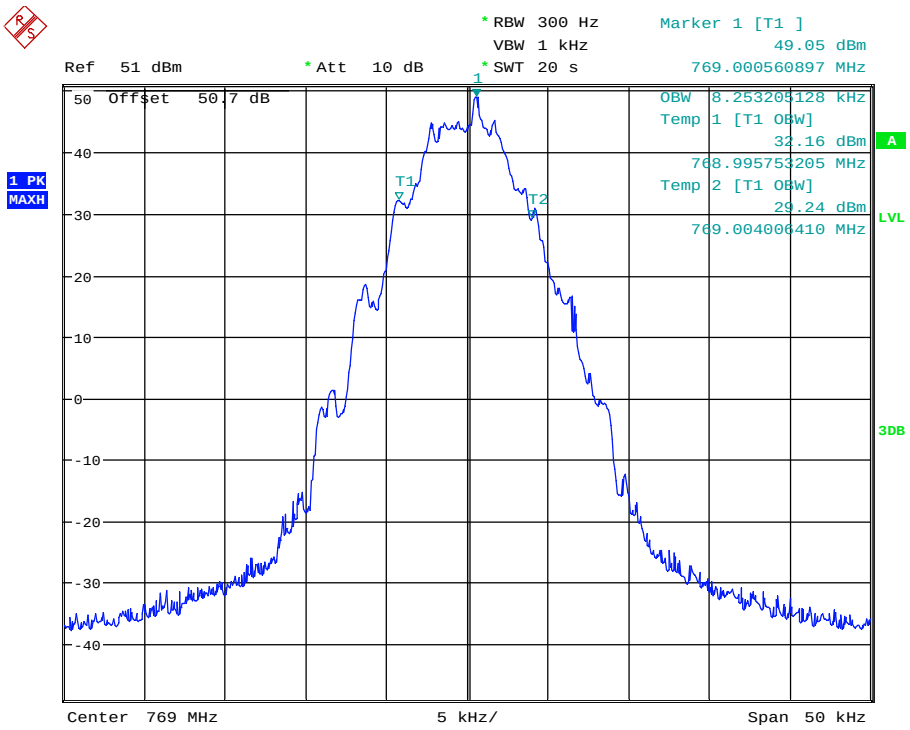
769MHz P25 Modulation



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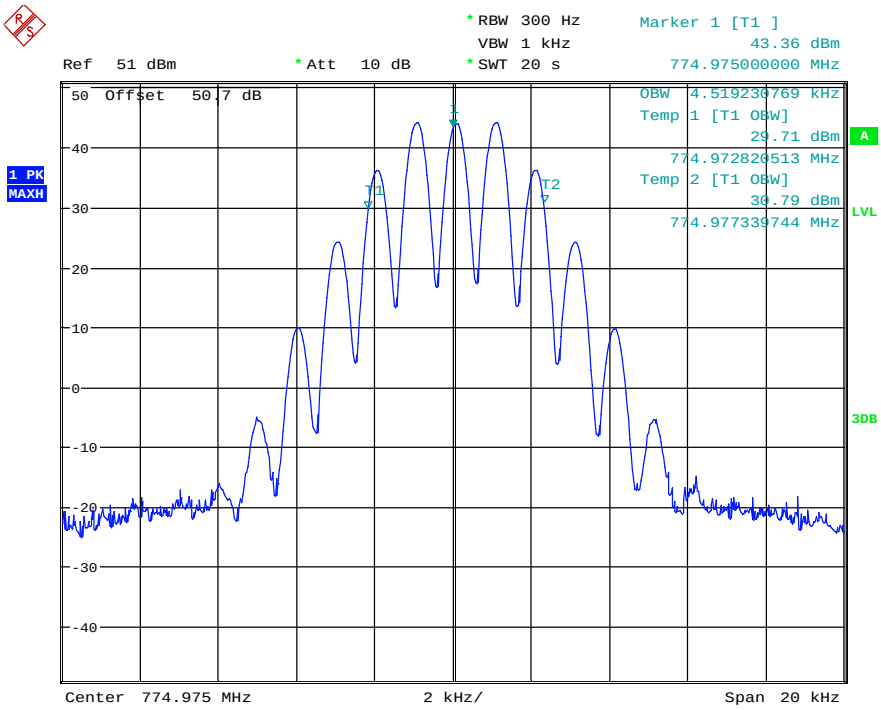
774.975MHz 12.5kHz analogue speech



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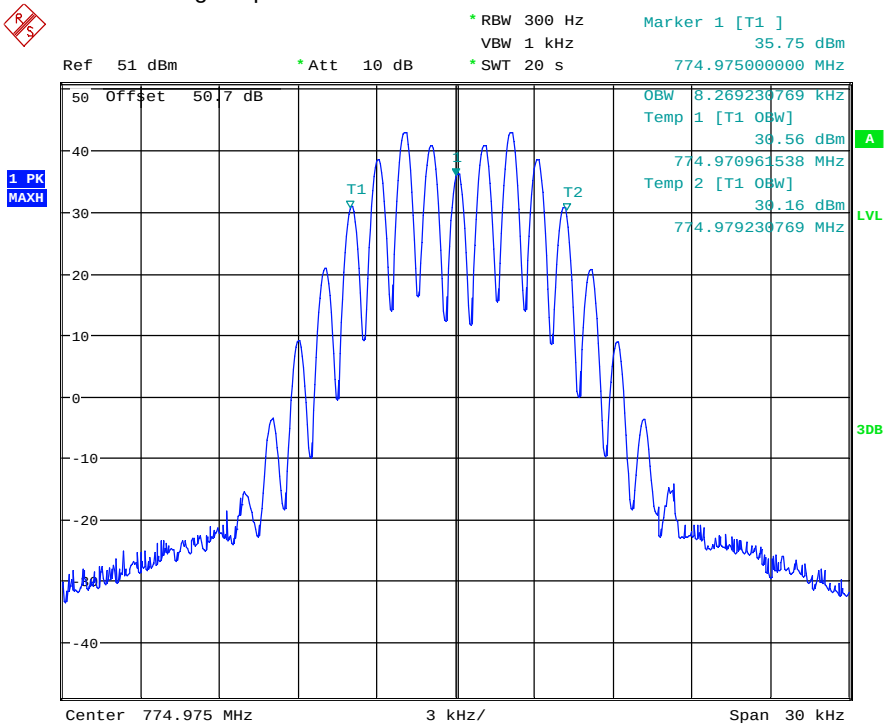
774.9875MHz 25kHz analogue speech



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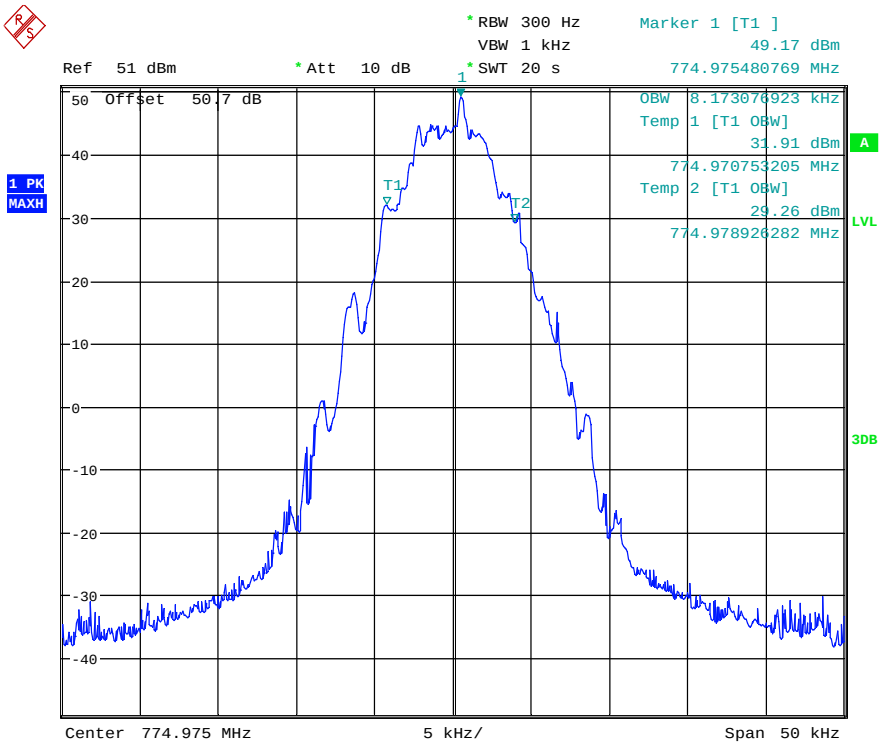
774.9875MHz P25 Modulation

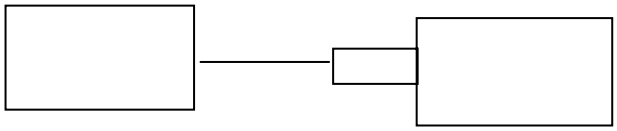


Date: 28.MAY.2012 16:07:08

TRANSMITTER TESTS

Occupied Bandwidth
Emission Masks. Part 90.210(b)

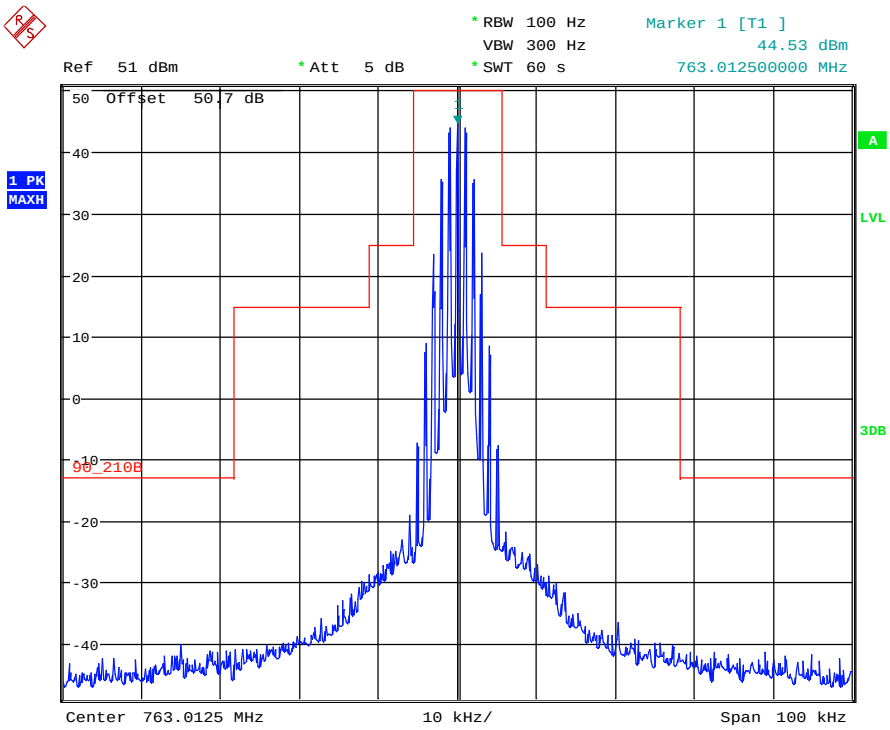
Ambient temperature	=	20°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			



EUT Cable & Attenuator Spectrum Analyser TRL281

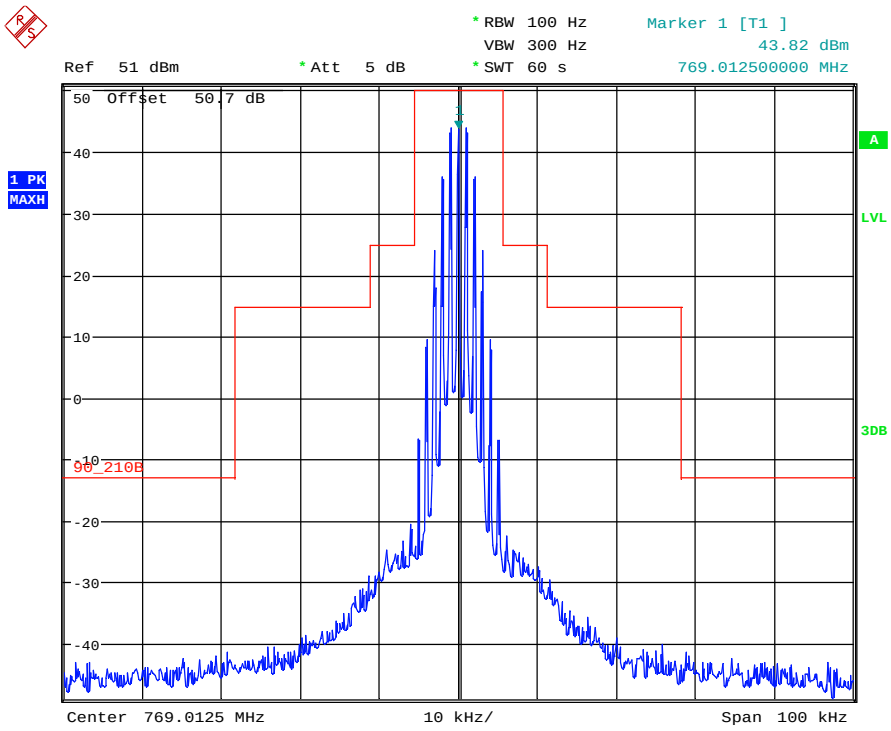
Note: the spectrum masks are defined in: Part 90.210 as the transmitter operates in the band 763MHz- 775MHz the frequencies do not fall into any of the frequency bands listed in the Applicable Emission Mask. Table.,
Mask (b) was used (all other bands)

Part 90 Bottom channel: F3E 12.5kHz channel spacing - This frequency is NOT applicable to the FCC filing.



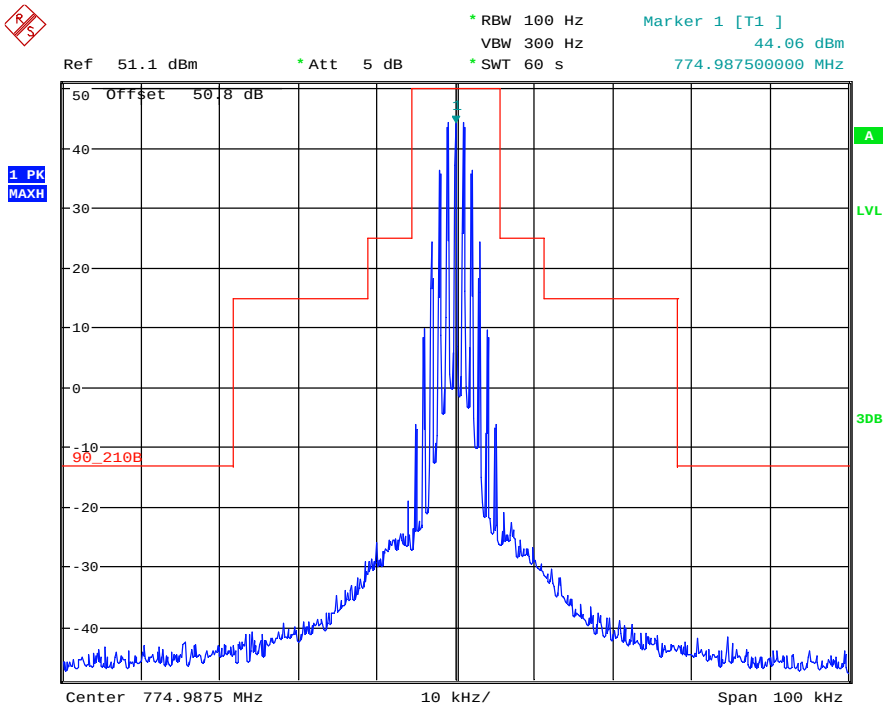
Date: 18.JUN.2012 09:26:44

Part 90 Middle channel: F1E 12.5kHz channel spacing



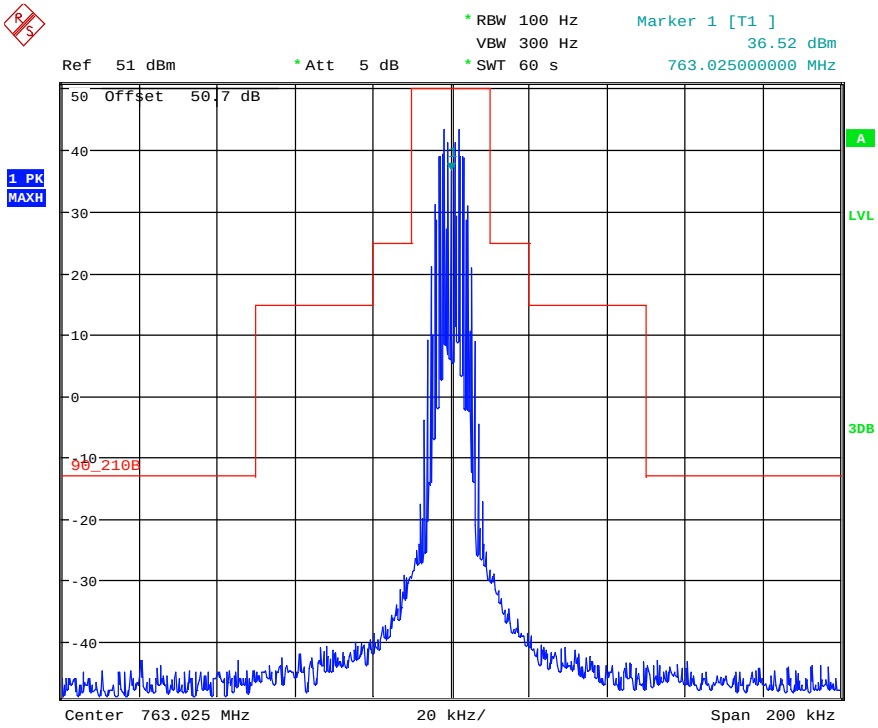
Date: 18.JUN.2012 09:49:44

Part 90 Top channel: F3E 12.5kHz channel spacing



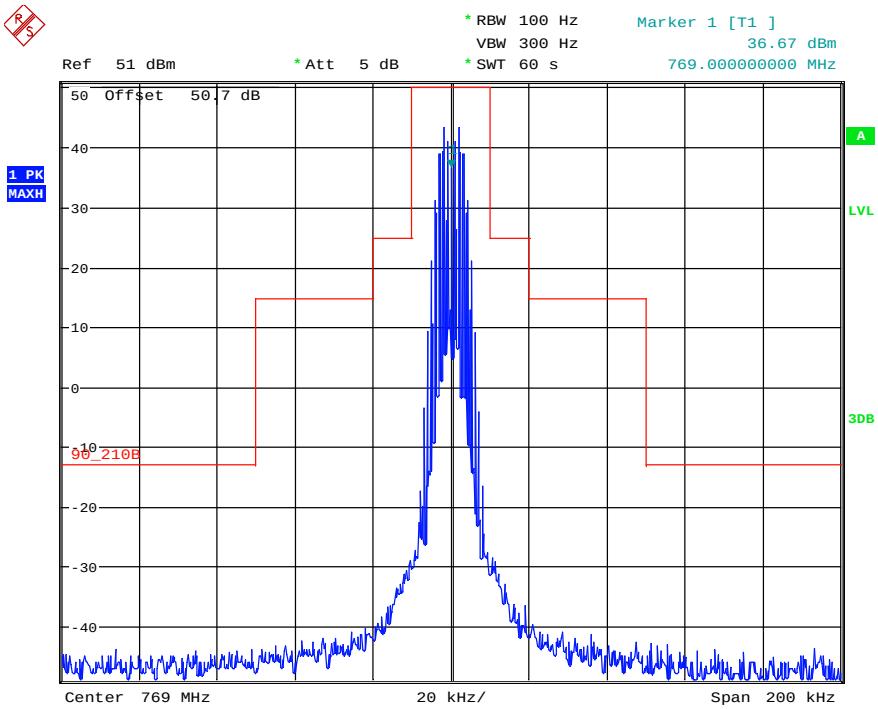
Date: 18.JUN.2012 10:11:56

Part 90 Bottom channel: F3E 25kHz channel spacing - This frequency is NOT applicable to the FCC filing.



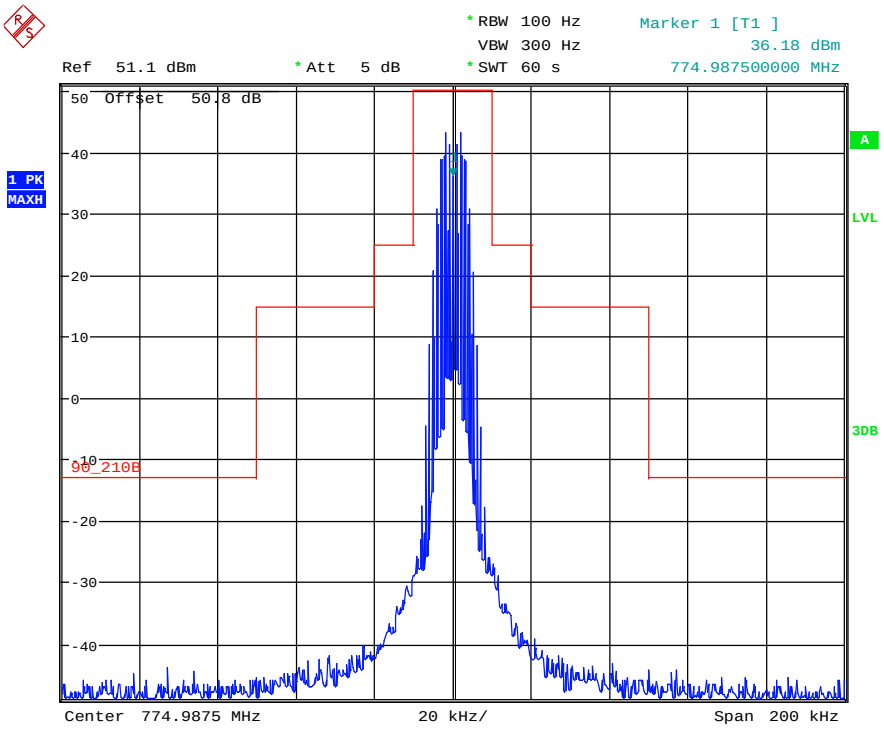
Date: 15.JUN.2012 15:20:25

Part 90 Middle channel: F3E 25kHz channel spacing



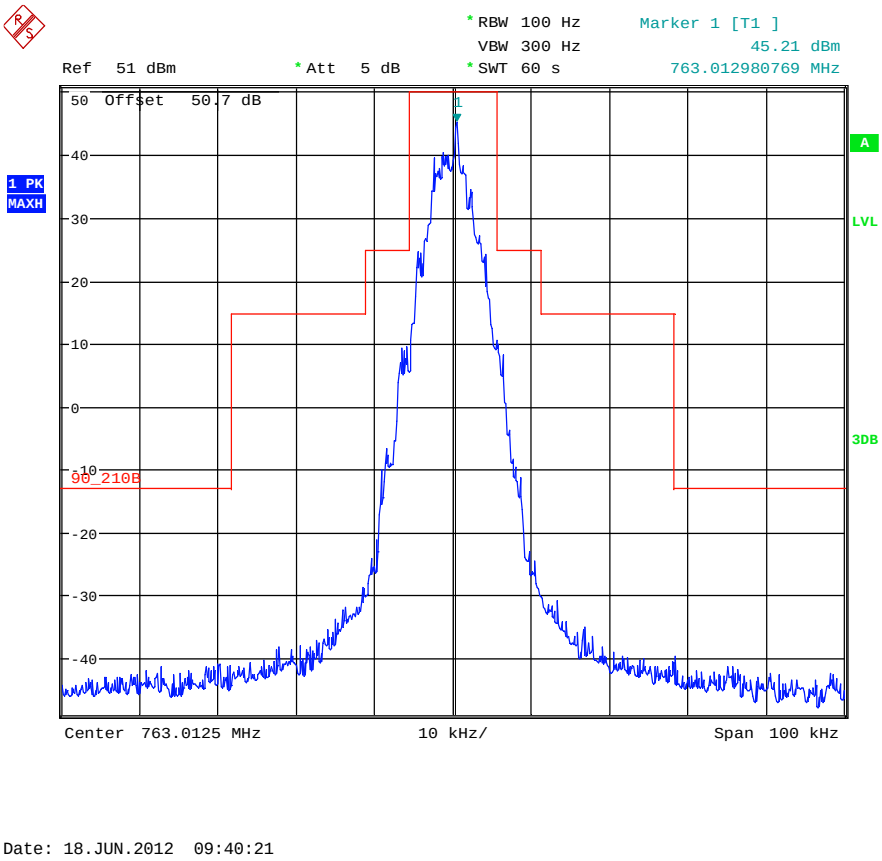
Date: 15.JUN.2012 15:25:46

Part 90 Top channel: F3E 25kHz channel spacing

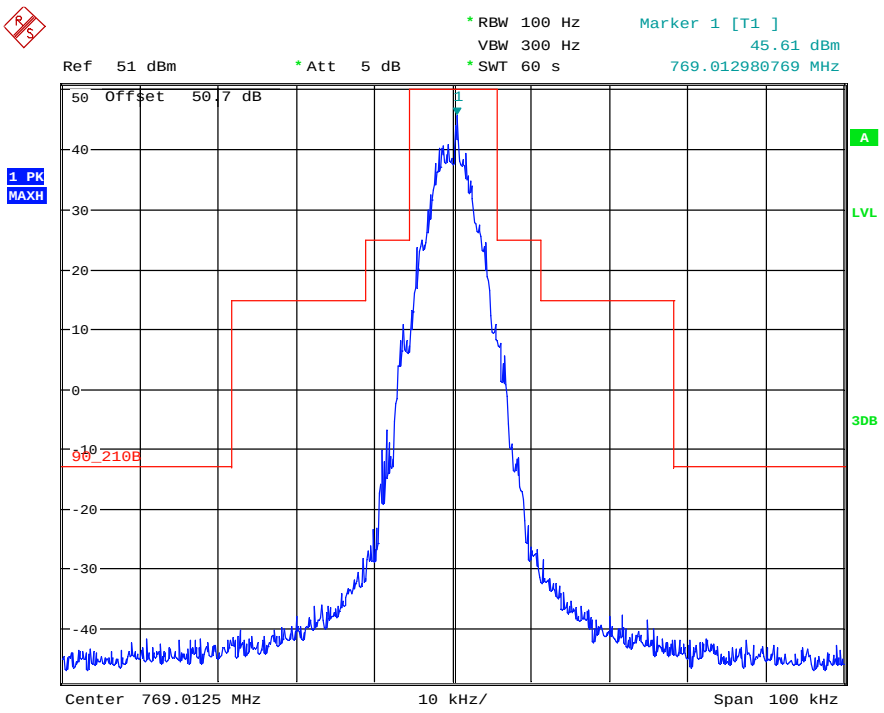


Date: 15.JUN.2012 15:31:30

Part 90 bottom channel: F1E 12.5kHz channel spacing - This frequency is NOT applicable to the FCC filing.

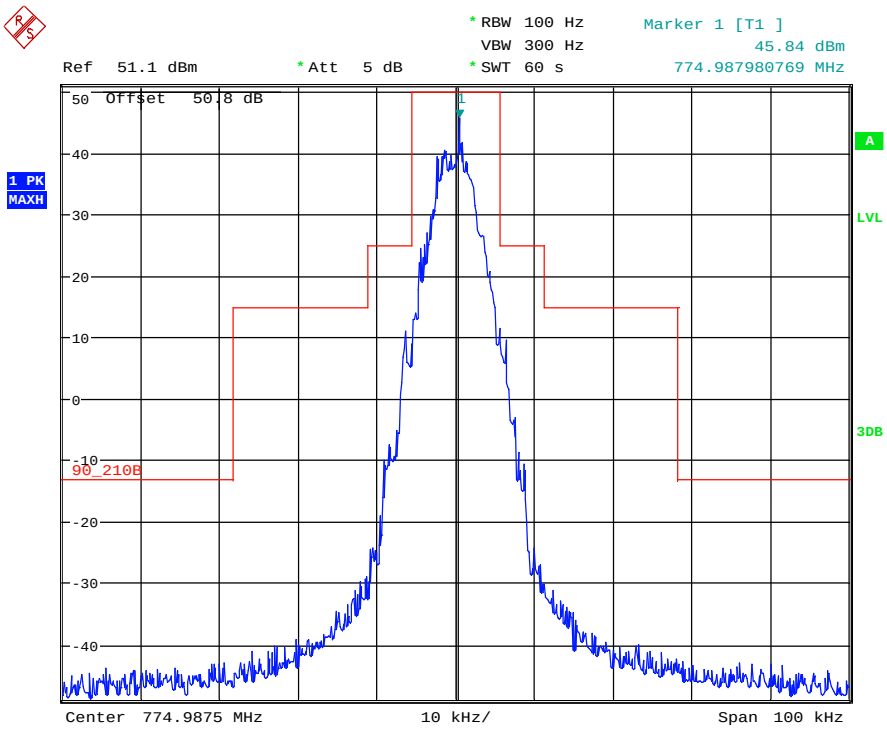


Part 90 Middle channel: F3E 12.5kHz channel spacing



Date: 18.JUN.2012 10:00:51

Part 90 Top channel: F1E 12.5kHz channel spacing

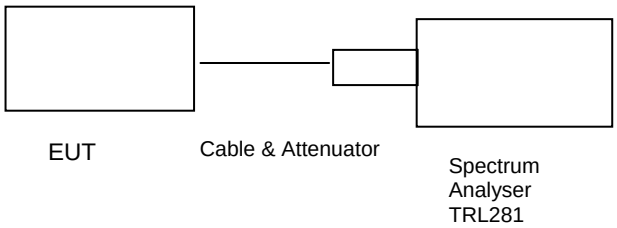


Date: 18.JUN.2012 10:17:03

TRANSMITTER TESTS

SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053
Bottom Channel

Ambient temperature	=	20C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			



The test was set up as per the diagram. The unit was tested operating at maximum power.

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

B**ottom Channel** This frequency is NOT applicable to the FCC filing.

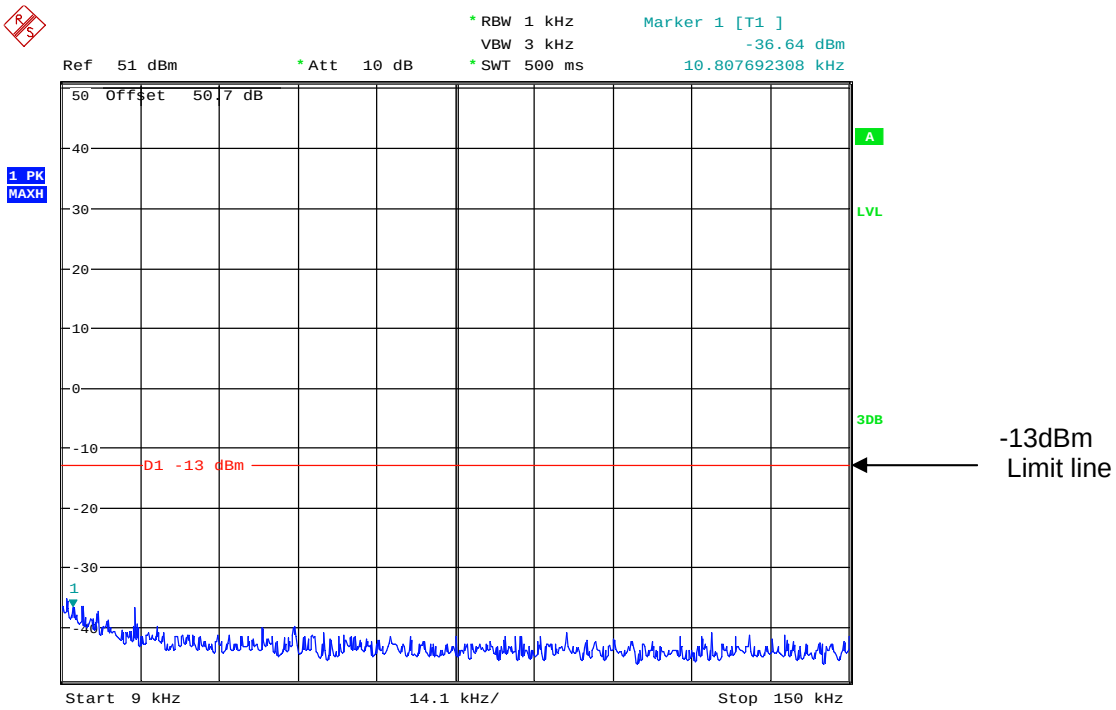
FREQUENCY RANGE	FREQ. (GHz)	MEASURED LEVEL (dBm)	LIMIT (dBm)
9kHz – 10GHz	1.52605	-35.31	-13

The test equipment used for the Transmitter Conducted Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	**X**
ATTENUATOR	-	-	-	20dB	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**
FILTER	K&L MICOWAVE	3TNF-500/1000	620	REF827	**X**

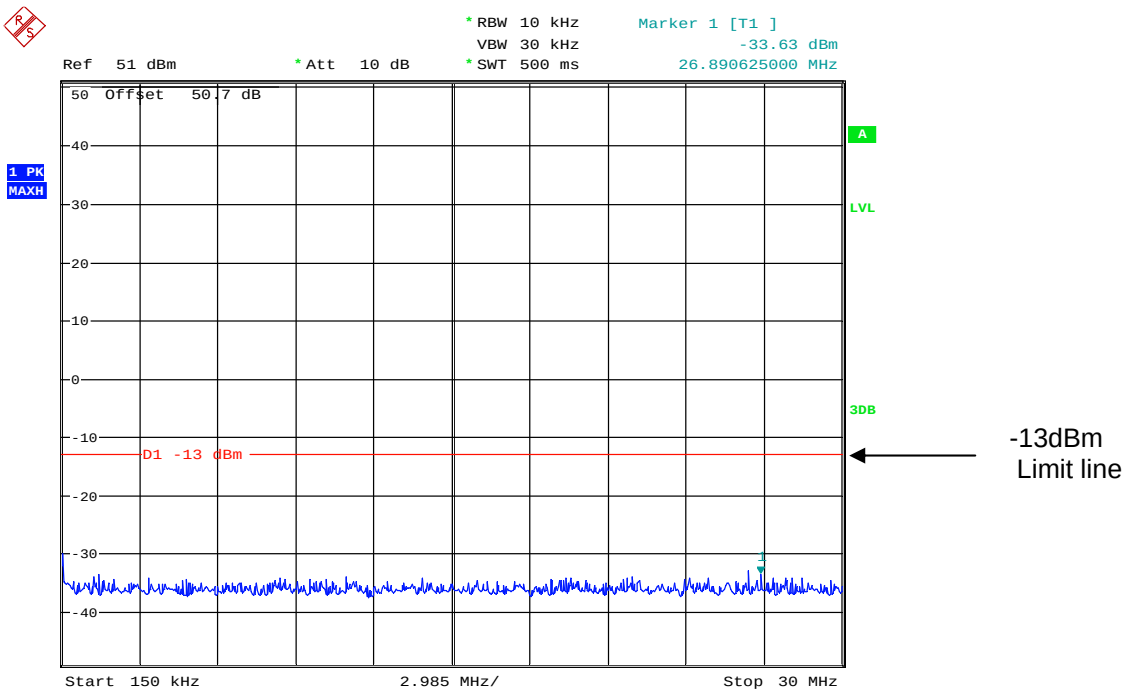
Conducted emissions Bottom Channel

763.025MHz 9kHz – 150kHz - This frequency is NOT applicable to the FCC filing.



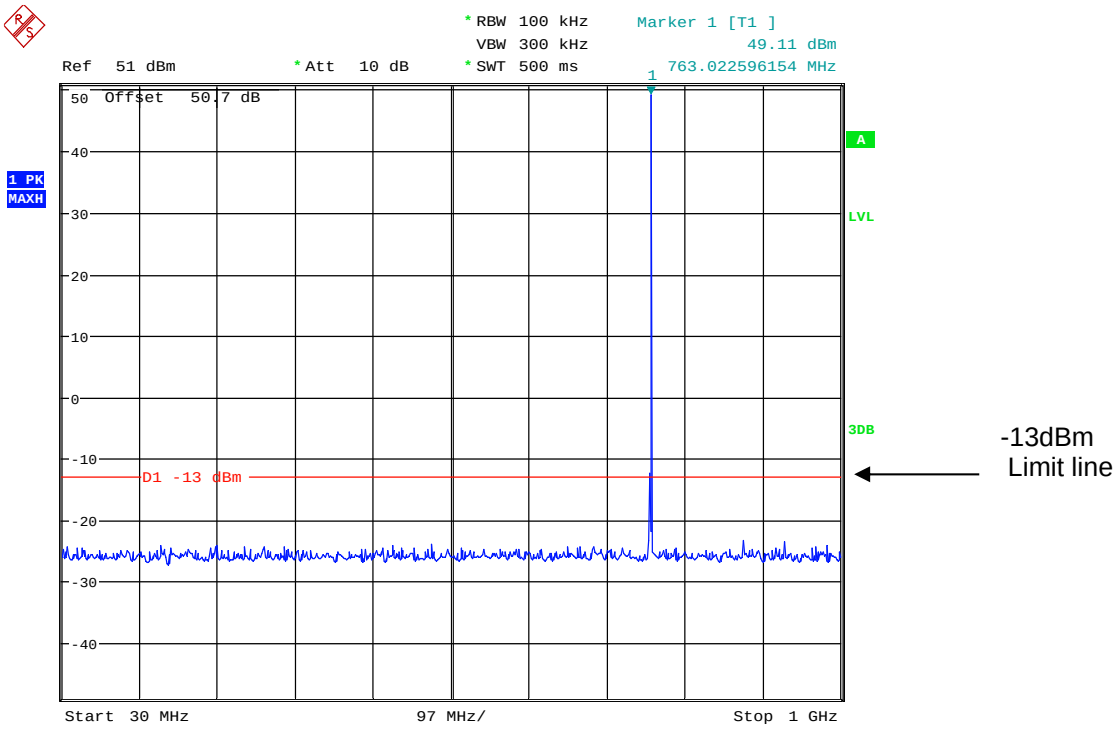
Date: 28.MAY.2012 14:01:36

763.025MHz 150kHz-30MHz This frequency is NOT applicable to the FCC filing.



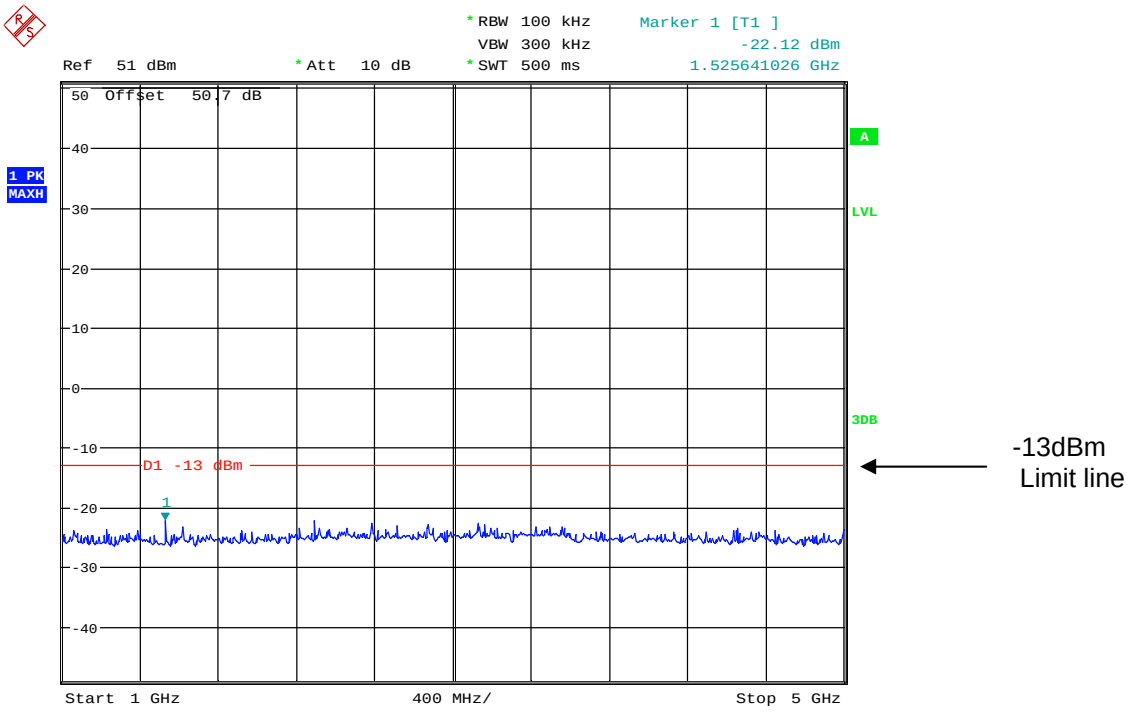
Date: 28.MAY.2012 14:02:17

763.025MHz 30MHz-1GHz This frequency is NOT applicable to the FCC filing.



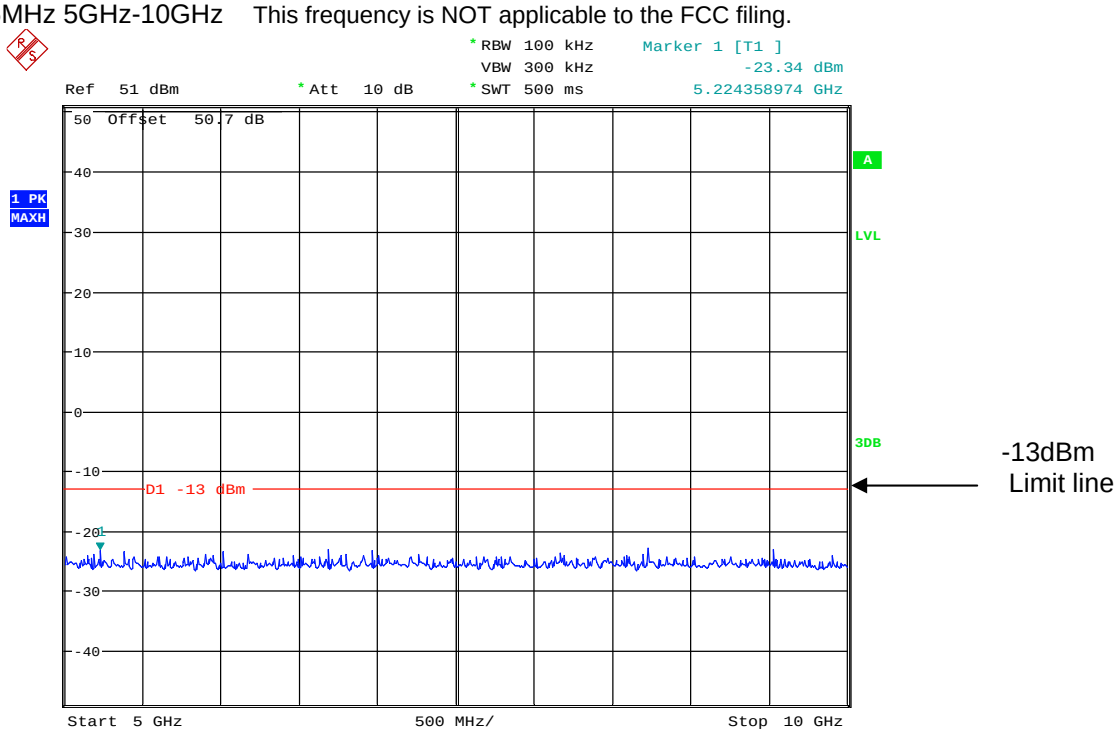
Date: 28.MAY.2012 14:01:00

763.025MHz 1GHz – 5GHz This frequency is NOT applicable to the FCC filing.



Date: 28.MAY.2012 14:03:07

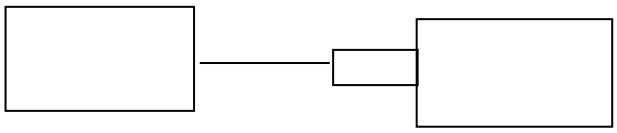
763.025MHz 5GHz-10GHz This frequency is NOT applicable to the FCC filing.



Date: 28.MAY.2012 14:03:33

SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053
Middle Channel

Ambient temperature	=	20°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			



The test was set up as per the diagram. The unit was tested operating at maximum power.

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

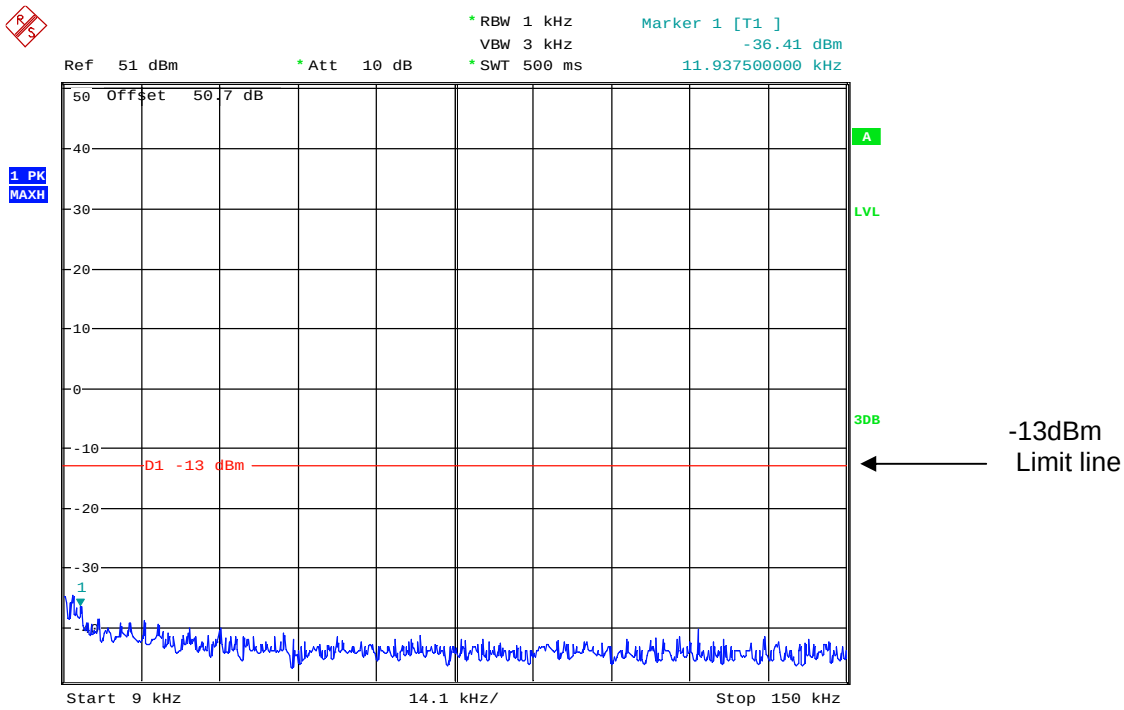
Middle Channel

FREQUENCY RANGE	FREQ. (GHz)	MEASURED LEVEL (dBm)	LIMIT (dBm)
9kHz – 10GHz	1.5380	-37.94	-13

The test equipment used for the Transmitter Conducted Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	**X**
ATTENUATOR	-	-	-	20dB	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**
FILTER	K&L MICOWAVE	3TNF-500/1000	620	REF827	**X**

769MHz 9kHz – 150kHz



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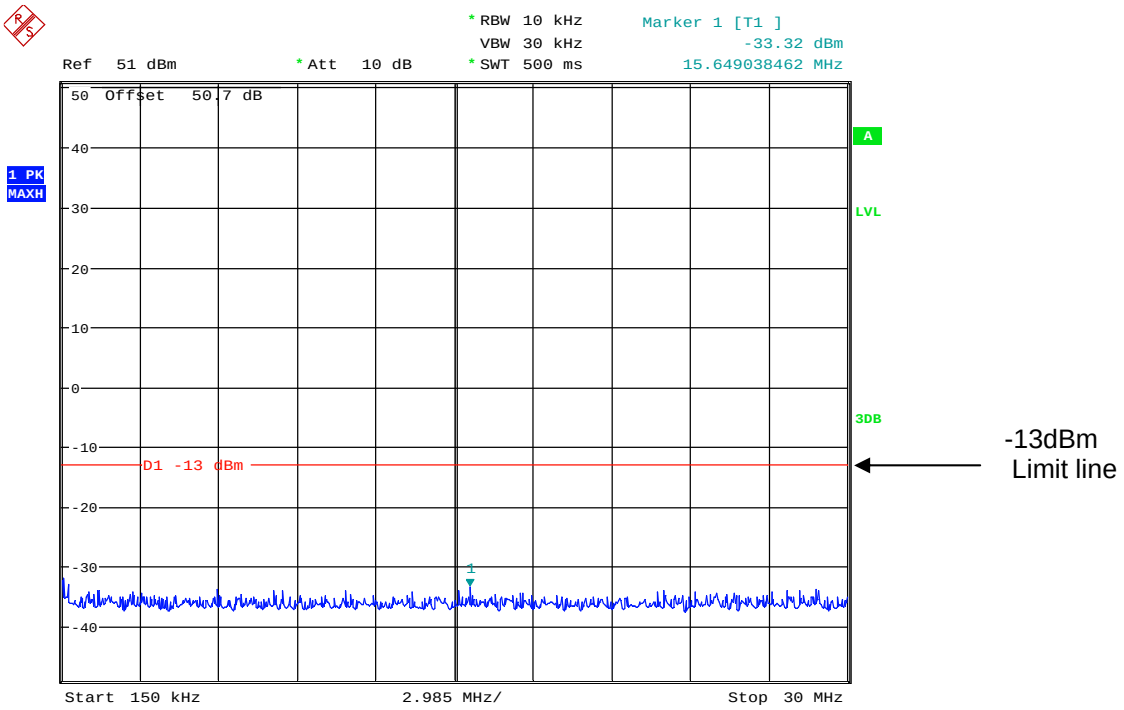
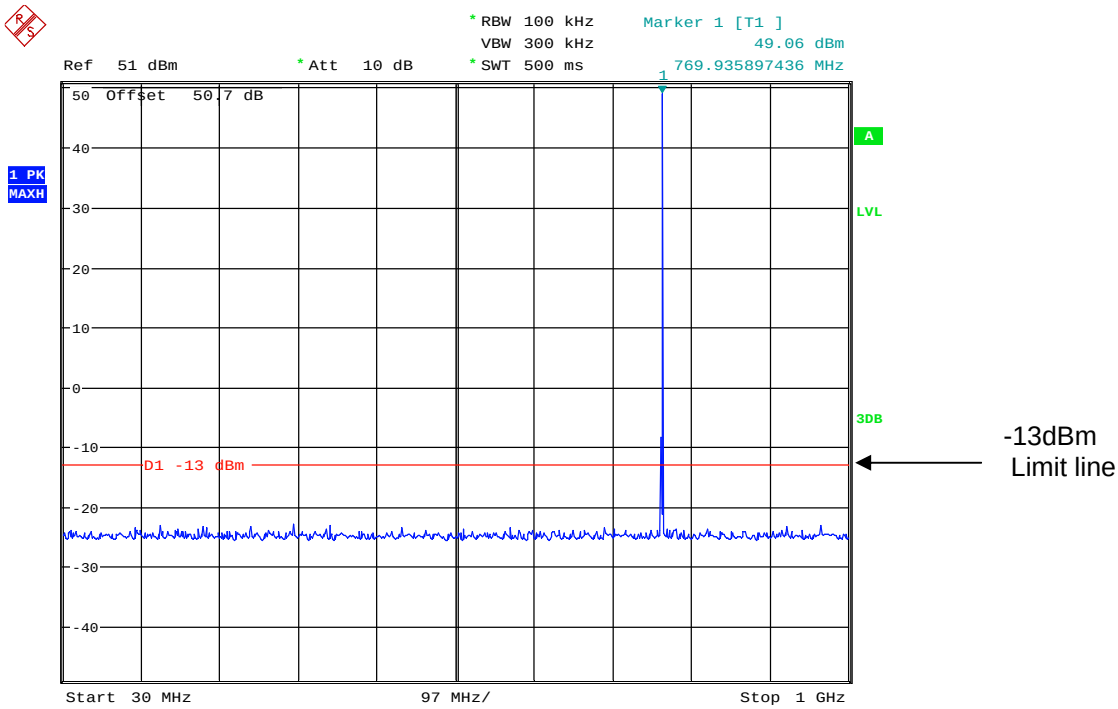
769MHz 150kHz – 30MHz



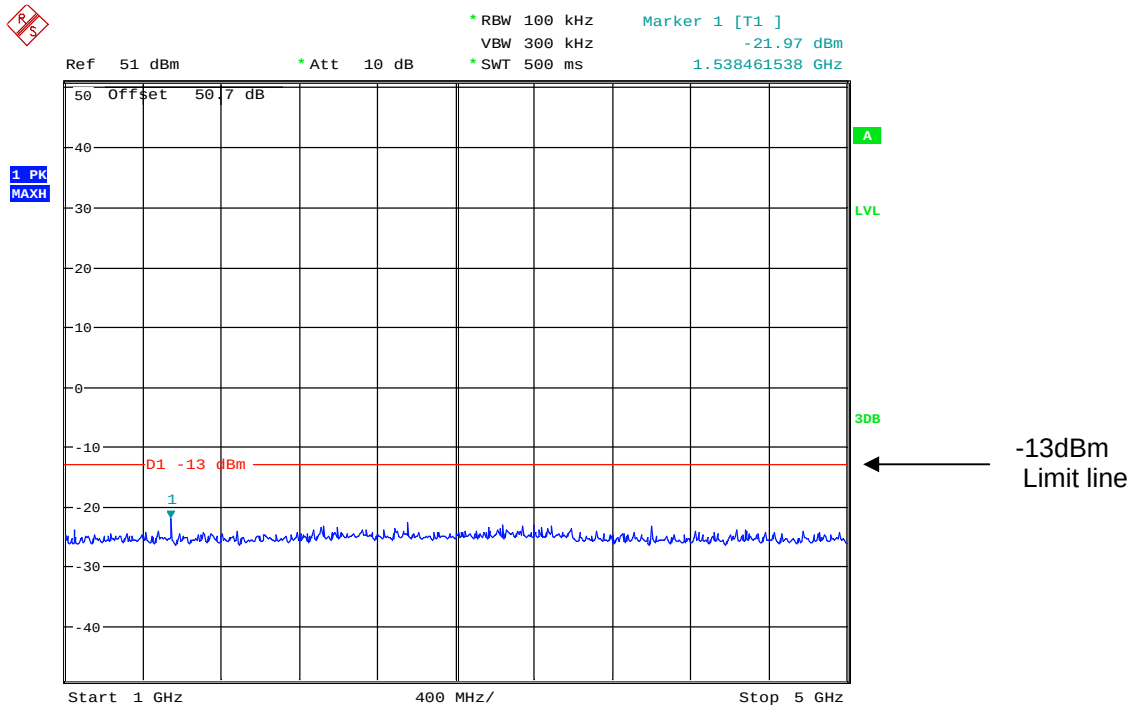
Date: 28.MAY.2012 14:07:07

769MHz 30MHz- 1GHz



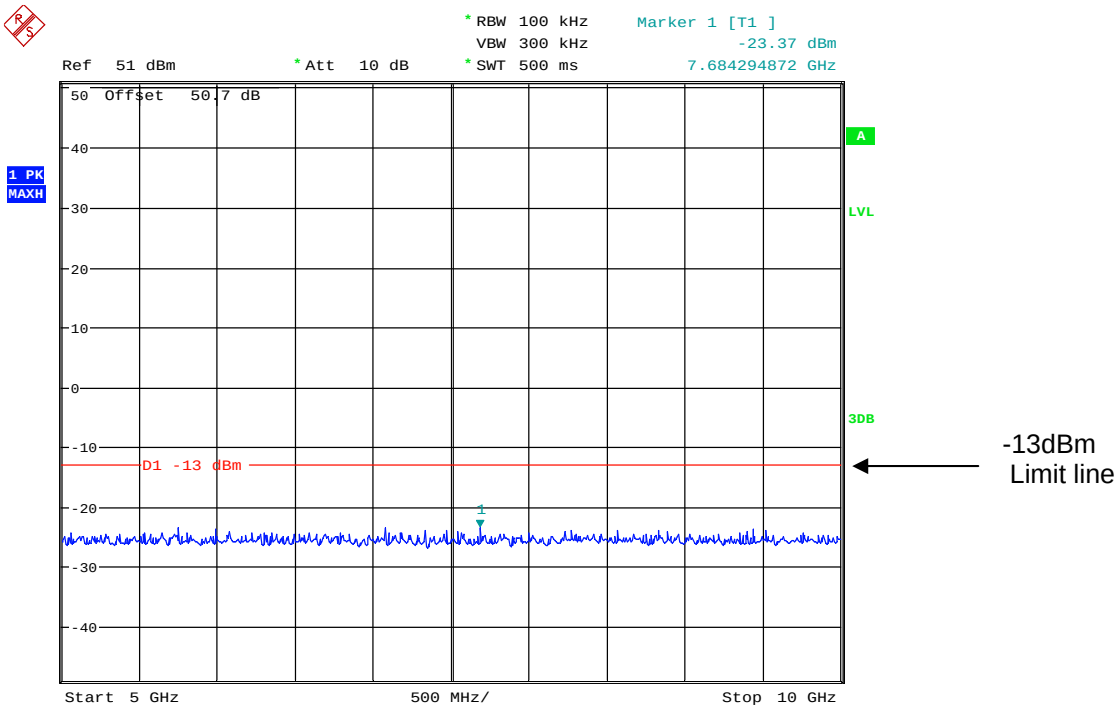
Date: 28.MAY.2012 14:05:58

769MHz 1GHz – 5GHz



Date: 28.MAY.2012 14:07:43

769MHz 5GHz – 10GHz



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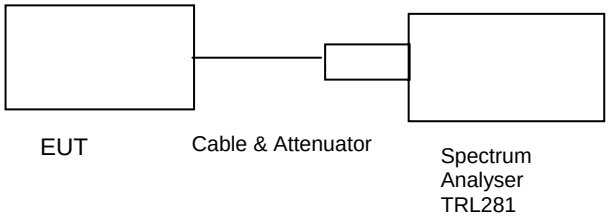
SPURIOUS EMISSIONS – CONDUCTED – Part 2.1053
Top Channel

Ambient temperature	=	20°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			



The test was set up as per the diagram. The unit was tested operating at maximum power .

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

Top Channel

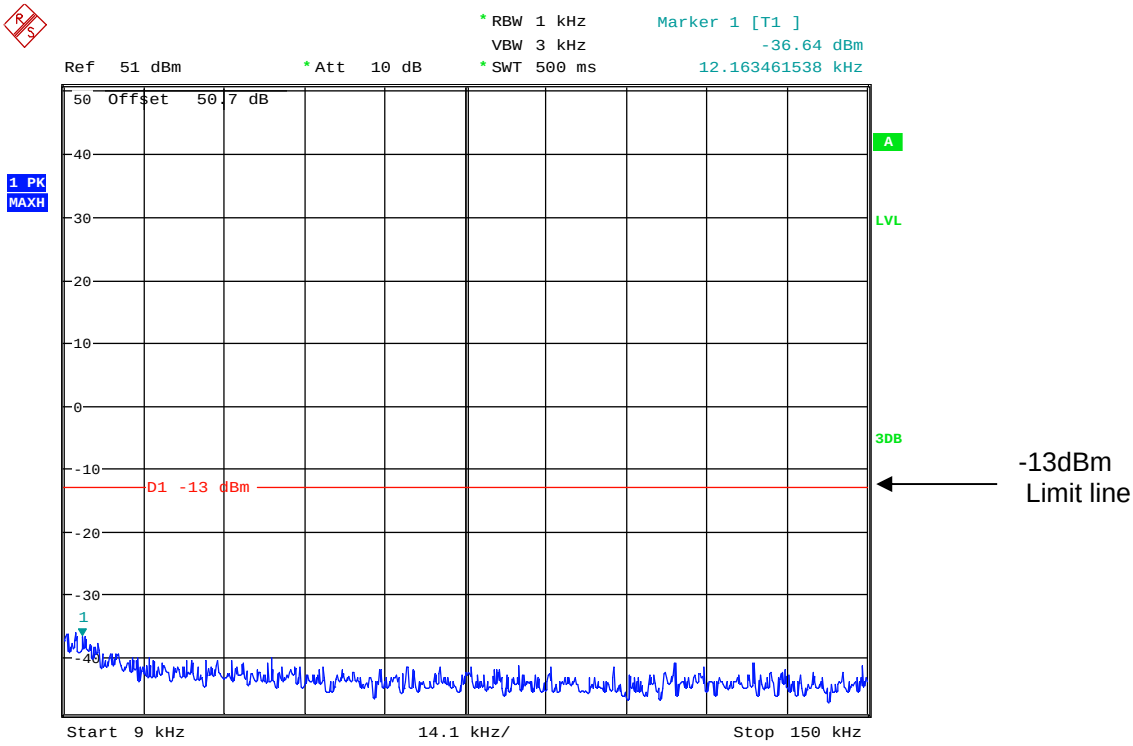
FREQUENCY RANGE	FREQ. (GHz)	MEASURED LEVEL (dBm)	LIMIT (dBm)
9kHz – 10GHz	No Significant emissions		-13

The test equipment used for the Transmitter Conducted Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	**X**
ATTENUATOR	-	-	-	20dB	**X**
ATTENUATOR	BIRD	8304-100-N	N/A	222	**X**
FILTER	K&L MICOWAVE	3TNF-500/1000	620	REF827	**X**

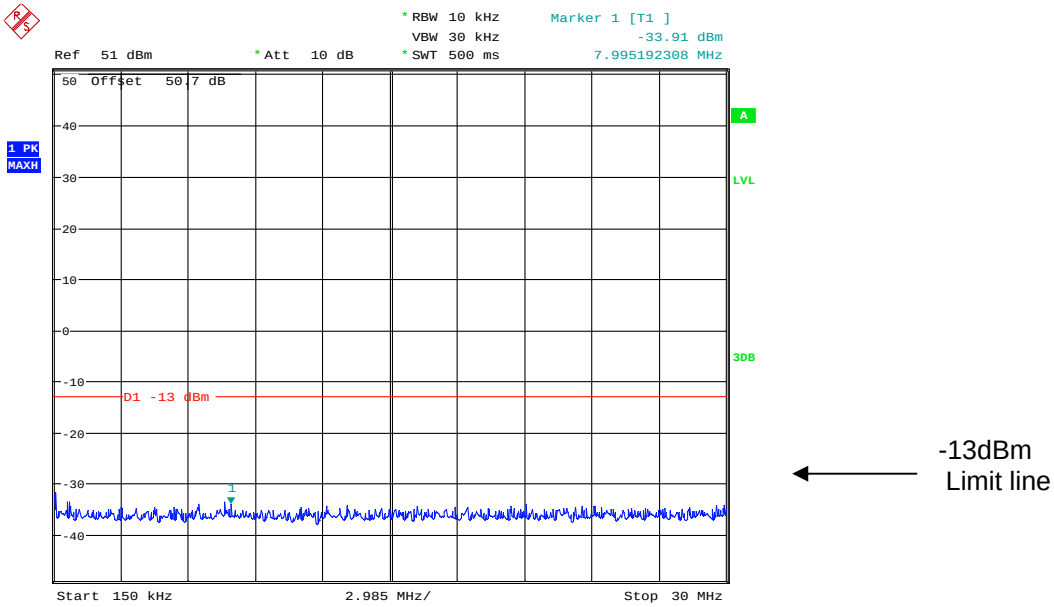
Conducted emissions Top Channel

774.975MHz 9kHz – 150kHz



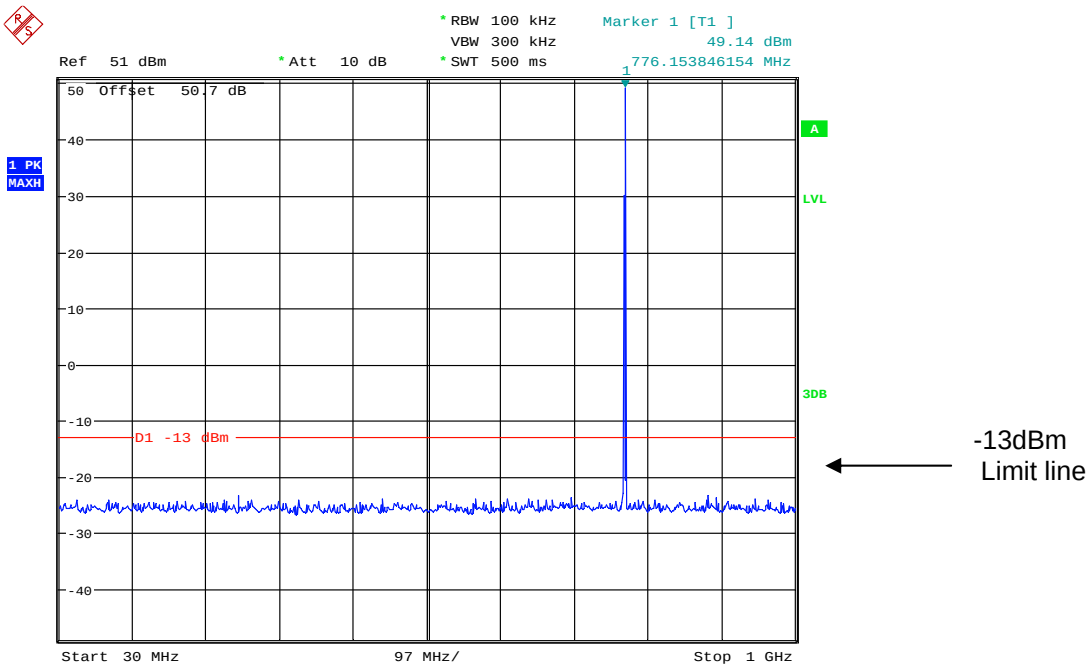
Date: 28.MAY.2012 14:09:39

774.975MHz 150kHz -30MHz



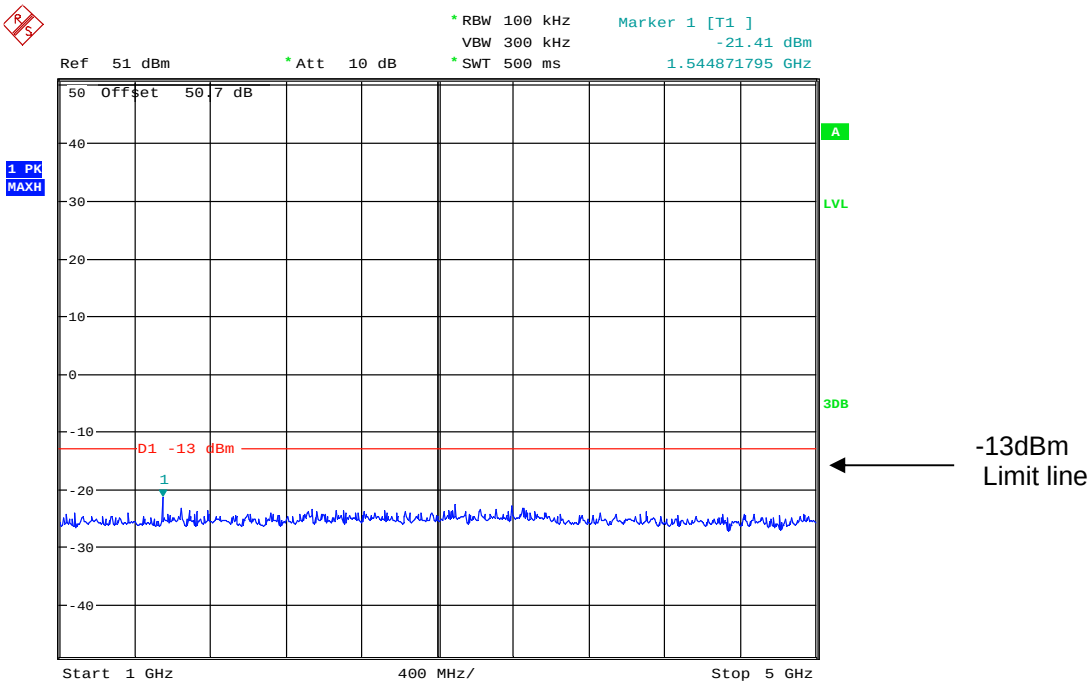
Date: 28.MAY.2012 14:10:28

774.975MHz 30MHz-1GHz



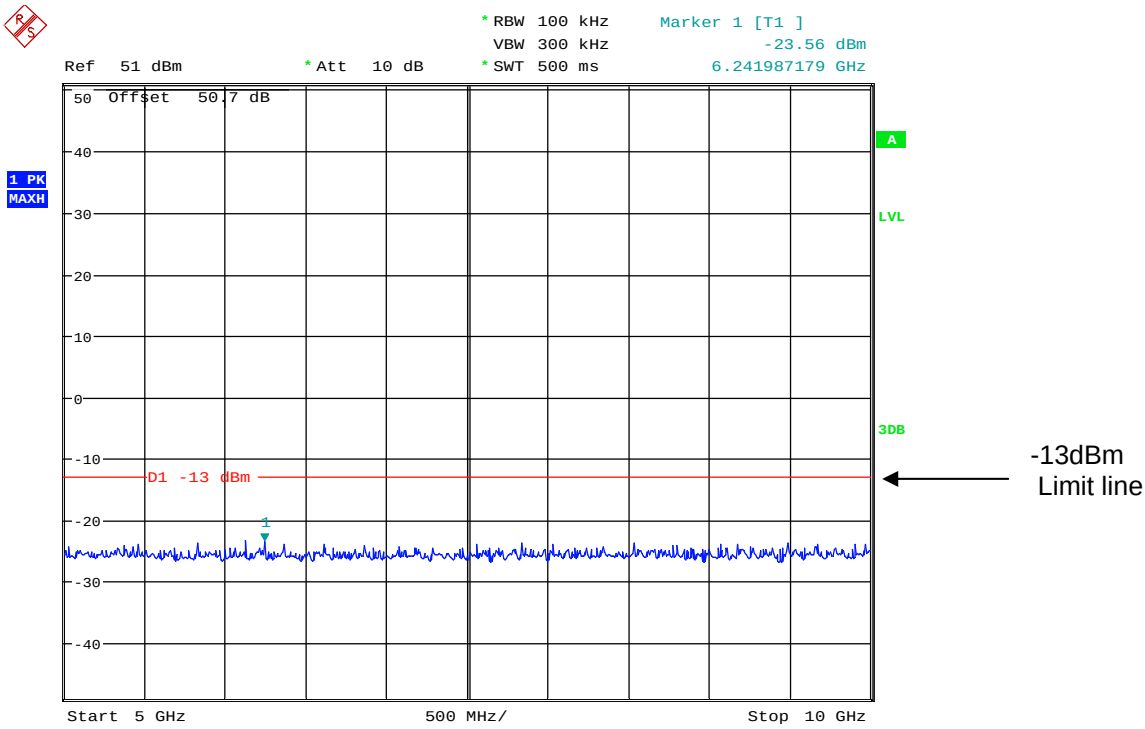
Date: 28.MAY.2012 14:09:08

774.975MHz 1GHz – 5GHz



Date: 28.MAY.2012 14:10:58

774.975MHz 5GHz – 10GHz



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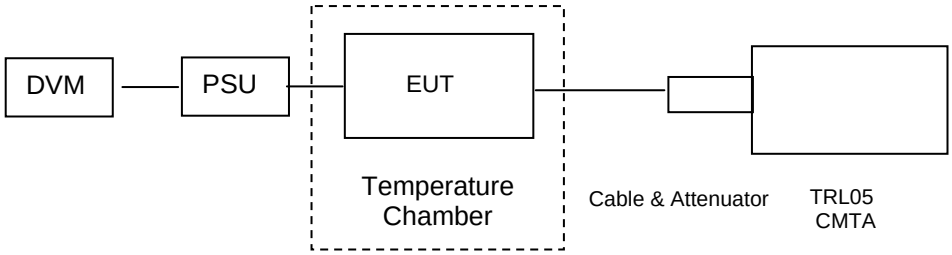
FREQUENCY STABILITY – CONDUCTED – Part 90.539

Ambient temperature	=	24°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			



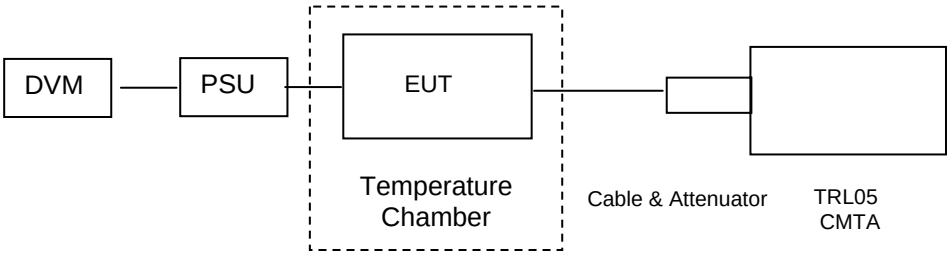
Bottom Channel - This frequency is NOT applicable to the FCC filing.

Temperature °C	Vnom (Vdc)	Measured Frequency (MHz)	Frequency Difference (Hz)	ppm	Limit ± 0.1ppm Pass/Fail
+50	13.8	763.012500000	0	0	Pass
+40	13.8	763.012500000	0	0	Pass
+30	13.8	763.012500000	0	0	Pass
+20	13.8	763.012500000	0	0	Pass
+10	13.8	763.012500000	0	0	Pass
0	13.8	763.012500000	0	0	Pass
-10	13.8	763.012500000	0	0	Pass
-20	13.8	763.012490000	0.000010000	0.04	Pass
-30	13.8	763.012510000	0.000010000	0.04	Pass

Tnom 20 °C	85%= 11.7Vdc	115%= 15.9Vdc
Frequency (MHz)	763.0125	763.0125
Frequency Difference (Hz)	0	0
ppm	0	0
Limit ± 0.1 ppm Pass/Fail	Pass	Pass

Ambient temperature = 20°C
Relative humidity = 46%
Supply voltage = +13.8Vdc

Radio Laboratory
Test Signal = F3E



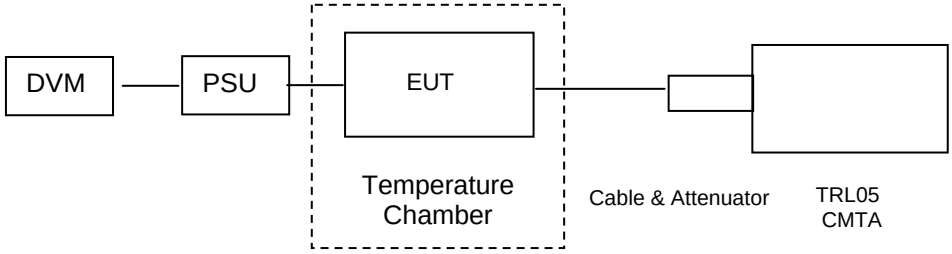
Middle Channel

Temperature °C	Vnom (Vdc)	Measured Frequency (MHz)	Frequency Difference (Hz)	ppm	Limit ± 0.1 ppm Pass/Fail
+50	13.8	769.012500000	0.000000000	0	Pass
+40	13.8	769.012500000	0.000000000	0	Pass
+30	13.8	769.012500000	0.000000000	0	Pass
+20	13.8	769.012500000	0.000000000	0	Pass
+10	13.8	769.012500000	0.000000000	0	Pass
0	13.8	769.012500000	0.000000000	0	Pass
-10	13.8	769.012500000	0.000000000	0	Pass
-20	13.8	769.012490000	0.000010000	0.04	Pass
-30	13.8	769.012500000	0.000000000	0	Pass

Tnom 20°C	85%= 11.7Vdc	115%= 15.9Vdc
Frequency (MHz)	769.0125	769.0125
Frequency Difference (Hz)	0	0
ppm	0	0
Limit ± 0.1 ppm Pass/Fail	Pass	Pass

Ambient temperature = 20°C
Relative humidity = 46%
Supply voltage = +13.8Vdc

Radio Laboratory
Test Signal = F3E



Top Channel

Temperature °C	Vnom (Vdc)	Measured Frequency (MHz)	Frequency Difference (Hz)	ppm	Limit ± 0.1 ppm Pass/Fail
+50	13.8	774.987500000	0	0	Pass
+40	13.8	774.987500000	0	0	Pass
+30	13.8	774.987500000	0	0	Pass
+20	13.8	774.987500000	0	0	Pass
+10	13.8	774.987500000	0	0	Pass
0	13.8	774.987500000	0	0	Pass
-10	13.8	774.987500000	0	0	Pass
-20	13.8	774.987490000	0.000010000	0.045	Pass
-30	13.8	774.987510000	0.000010000	0.045	Pass

Tnom 21.5°C	85%= 11.7Vdc	115%= 15.9Vdc
Frequency (MHz)	774.9875	774.9875
Frequency Difference (Hz)	0	0
ppm	0	0
Limit ± 0.1 ppm Pass/Fail	Pass	Pass

Frequency stability measurements were between -30°C and +50°C in 10°C increments.

At each temperature the transmitter was given a period of 60 minutes to stabilise. The transmitter was then turned on and the frequency error measured after a period of 1 minute.

Measurements were also made with the supply voltage varied between 115% and 85% of the nominal supply voltage(13.8Vdc).

ADJACENT CHANNEL POWER – CONDUCTED – Part 90.543(a) through (d)

Ambient temperature	=	20°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			

REF POWER OUTPUT	49.76dBm		Channel	769.0125 MHz	Channel space =12.5kHz	Modulation Fm	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
9.375	769.003	-64.04	769.022	-65.92	-40	6.25	PASS
15.625	768.997	-69.4	769.028	-74.47	-60	6.25	PASS
21.875	768.991	-72.6	769.034	-76.46	-60	6.25	PASS
37.500	768.975	-72.64	769.050	-72.91	-60	25	PASS
62.500	768.950	-75.15	769.075	-78.58	-65	25	PASS
87.500	768.925	-76.92	769.100	-79.77	-65	25	PASS
150.000	768.863	-76.52	769.163	-76.51	-65	100	PASS
250.000	768.763	-78.64	769.263	-79.35	-65	100	PASS
350.000	768.663	-79.66	769.363	-79.95	-65	100	PASS
400kHz-12MHz	757.0125 - 768.6125MHz	-88.82	769.4125 -781.0125MHz	-88.53	-80	30kHz (s)	PASS
12MHz-799MHz			781-0125 -799MHz	-105.28	-80	30kHz (s)	PASS
799- 805MHz			799- 805MHz	-110.92	-100	30kHz (s)	PASS

REF POWER OUTPUT	49.58dBm		Channel	772 MHz	Channel space =12.5kHz	Modulation Fm	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
9.375	771.990	-67.69	772.009	-65.58	-40	6.25	PASS
15.625	771.984	-76.75	772.015	-75.46	-60	6.25	PASS
21.875	771.978	-81.67	772.021	-81.16	-60	6.25	PASS
37.500	771.963	-79.13	772.037	-79.12	-60	25	PASS
62.500	771.937	-82.81	772.062	-82.86	-65	25	PASS
87.500	771.912	-84.51	772.087	-84.55	-65	25	PASS
150.000	771.850	-86.71	772.150	-86.77	-65	100	PASS
250.000	771.750	-82.46	772.250	-82.27	-65	100	PASS
350.000	771.650	-82.55	772.350	-83.45	-65	100	PASS
400kHz-12MHz	760 - 771.6MHz	-88.46	772.4 - 784MHz	-88.81	-80	30kHz (s)	PASS
12MHz-799MHz			784-799MHz	-104.6	-80	30kHz (s)	PASS
799MHz- 805MHz			799- 805MHz	-110.53	-100	30kHz (s)	PASS

REF POWER OUTPUT	49.87dBm		Channel	774.9875 MHz	Channel space =12.5kHz	Modulation Fm	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
9.375	774.978	-67.56	774.996	-66.29	-40	6.25	PASS
15.625	774.971	-78.03	775.003	-76.77	-60	6.25	PASS
21.875	774.965	-82.88	775.009	-82.29	-60	6.25	PASS
37.500	774.950	-80.74	775.025	-80.73	-60	25	PASS
62.500	774.925	-83.5	775.050	-83.94	-65	25	PASS
87.500	774.900	-85.22	775.075	-85.3	-65	25	PASS
150.000	774.837	-80.44	775.137	-80.45	-65	100	PASS
250.000	774.737	-82.15	775.237	-82.13	-65	100	PASS
350.000	774.637	-83.24	775.337	-83.17	-65	100	PASS
400kHz-12MHz	762.9875 - 774.5875MHz	-88.51	775.387 - 786.9875MHz	-88.44	-80	30kHz (s)	PASS
12-799MHz			786.9875 - 799MHz	-103.37	-80	30kHz (s)	PASS
799MHz- 805MHz			799- 805MHz	-108.51	-100	30kHz (s)	PASS

REF POWER OUTPUT	49.83dBm		Channel	769.0125 MHz	Channel space =12.5kHz	Modulation P25	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
9.375	769.003	-41.58	769.022	-44.14	-40	6.25	PASS
15.625	768.997	-75	769.028	-75.03	-60	6.25	PASS
21.875	768.991	-79.22	769.034	-80.61	-60	6.25	PASS
37.500	768.975	-78.12	769.050	-77.87	-60	25	PASS
62.500	768.950	-80.43	769.075	-80.54	-65	25	PASS
87.500	768.925	-81.99	769.100	-81.98	-65	25	PASS
150.000	768.863	-77.7	769.163	-77.6	-65	100	PASS
250.000	768.763	-78.23	769.263	-82.27	-65	100	PASS
350.000	768.663	-83.56	769.363	-83.51	-65	100	PASS
400kHz-12MHz	757.0125 - 768.6125MHz	-88.75	769.4125 - 781.0125MHz	-88.51	-80	30kHz (s)	PASS
12-799MHz			781-0125 -799MHz	-105.59	-80	30kHz (s)	PASS
799MHz- 805MHz			799- 805MHz	-110.91	-100	30kHz (s)	PASS

REF POWER OUTPUT	48.68dBm		Channel	772 MHz	Channel space =12.5kHz	Modulation P25	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
9.375	771.990	-46.87	772.009	-42.62	-40	6.25	PASS
15.625	771.984	-75.41	772.015	-74.04	-60	6.25	PASS
21.875	771.978	-77.58	772.021	-80.17	-60	6.25	PASS
37.500	771.963	-77.54	772.037	-78.41	-60	25	PASS
62.500	771.937	-78.09	772.062	-81.54	-65	25	PASS
87.500	771.912	-83.58	772.087	-83.61	-65	25	PASS
150.000	771.850	-78.53	772.150	-79.24	-65	100	PASS
250.000	771.750	-81.23	772.250	-80.32	-65	100	PASS
350.000	771.650	-81.42	772.350	-82.2	-65	100	PASS
400kHz-12MHz	760 - 771.6MHz	-88.51	772.4 - 784MHz	-88.55	-80	30kHz (s)	PASS
12-799MHz			784-799MHz	-104.45	-80	30kHz (s)	PASS
799- 805MHz			799- 805MHz	-109.48	-100	30kHz (s)	PASS

REF POWER OUTPUT	48.53dBm		Channel	774.9875 MHz	Channel space =12.5kHz	Modulation P25	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
9.375	774.978	-43.85	774.996	-44.8	-40	6.25	PASS
15.625	774.971	-76.81	775.003	-75.55	-60	6.25	PASS
21.875	774.965	-81.3	775.009	-80.74	-60	6.25	PASS
37.500	774.950	-79.3	775.025	-79.27	-60	25	PASS
62.500	774.925	-82.19	775.050	-82.17	-65	25	PASS
87.500	774.900	-83.28	775.075	-83.3	-65	25	PASS
150.000	774.837	-77.5	775.137	-78.23	-65	100	PASS
250.000	774.737	-79.58	775.237	-80.75	-65	100	PASS
350.000	774.637	-81.86	775.337	-81.83	-65	100	PASS
400kHz-12MHz	762.9875- 774.5875MHz	-88.52	775.387 - 786.9875MHz	-88.49	-80	30kHz (s)	PASS
12-799MHz			786.9875 - 799MHz	-103.35	-80	30kHz (s)	PASS
799- 805MHz			799- 805MHz	-108.6	-100	30kHz (s)	PASS

REF POWER OUTPUT	49.96dBm		Channel	769.025 MHz	Channel space =25kHz	Modulation Fm	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
15.625	769.009	-75.58	769.041	-75.02	-40	6.25	PASS
21.875	769.003	-79.96	769.047	-79.93	-60	6.25	PASS
37.500	768.988	-78.02	769.063	-78.19	-60	25	PASS
62.500	768.963	-80.69	769.088	-80.85	-65	25	PASS
87.500	768.938	-82.22	769.113	-82.16	-65	25	PASS
150.000	768.875	-78.62	769.175	-78.58	-65	100	PASS
250.000	768.775	-81.5	769.275	-82.18	-65	100	PASS
350.000	768.675	-83.4	769.375	-83.26	-65	100	PASS
400kHz-12MHz	757.025 - 768.625MHz	-88.75	769.425 - 781.025MHz	-88.25	-80	30kHz (s)	PASS
12MHz-799MHz			781.025 - 799MHz	-108.64	-80	30kHz (s)	PASS
799MHz- 805MHz			799- 805MHz	-110.47	-100	30kHz (s)	PASS

REF POWER OUTPUT	49.76dBm		Channel	772.00 MHz	Channel space =25kHz	Modulation Fm	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
15.625	771.984	-75.64	772.016	-75.66	-40	6.25	PASS
21.875	771.978	-81.41	772.022	-81.45	-60	6.25	PASS
37.500	771.963	-79.33	772.038	-79.55	-60	25	PASS
62.500	771.938	-82.8	772.063	-82.73	-65	25	PASS
87.500	771.913	-84.35	772.088	-84.6	-65	25	PASS
150.000	771.850	-80.34	772.150	-80.34	-65	100	PASS
250.000	771.750	-82.25	772.250	-82.23	-65	100	PASS
350.000	772.350	-83.18	771.650	-83.24	-65	100	PASS
400kHz-12MHz	760- 771.6MHz	-88.37	772.4 - 784	-88.38	-80	30kHz (s)	PASS
12-799MHz			784 - 799MHz	-104.14	-80	30kHz (s)	PASS
799- 805MHz			799- 805MHz	-109.99	-100	30kHz (s)	PASS

REF POWER OUTPUT	49.91dBm		Channel	774.975 MHz	Channel space =25kHz	Modulation Fm	
Frequency offset kHz	Low freq MHz	Measured ACP dBc	Upper Freq MHz	Measured ACP dBc	Limit dBc Base	Measurement bandwidth kHz	Result
15.625	774.959	-76.55	774.991	-75.27	-40	6.25	PASS
21.875	774.997	-82.54	774.953	-82.51	-60	6.25	PASS
37.500	774.938	-80.62	775.013	-80.88	-60	25	PASS
62.500	774.913	-84.02	775.038	-84.07	-65	25	PASS
87.500	774.888	-85.35	775.063	-85.41	-65	25	PASS
150.000	774.825	-80.42	775.125	-80.42	-65	100	PASS
250.000	774.725	-82.13	775.225	-82.35	-65	100	PASS
350.000	774.625	-83.28	775.325	-83.35	-65	100	PASS
400kHz-12MHz	762.975 - 774.575MHz	-88.39	775.375 - 786.975MHz	-88.51	-80	30kHz (s)	PASS
12MHz-799MHz			786.975 - 799MHz	-104.05	-80	30kHz (s)	PASS
799- 805MHz			799- 805MHz	-106.75	-100	30kHz (s)	PASS

ACP TABLES

12.5kHz Base Transmitter ACP Requirements

Offset from centre frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACP (dBc)
9.375	6.25	-40
15.625	6.25	-60
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
350	100	-65
≥400kHz-12MHz	30(s)	-80
12MHz to paired Rx band	30(s)	-80
In the paired receive band	30(s)	-100

25kHz Base Transmitter ACP Requirements

Offset from centre frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACP (dBc)
15.625	6.25	-40
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
350	100	-65
≥400kHz-12MHz	30(s)	-80
12MHz to paired Rx band	30(s)	-80
In the paired receive band	30(s)	-100

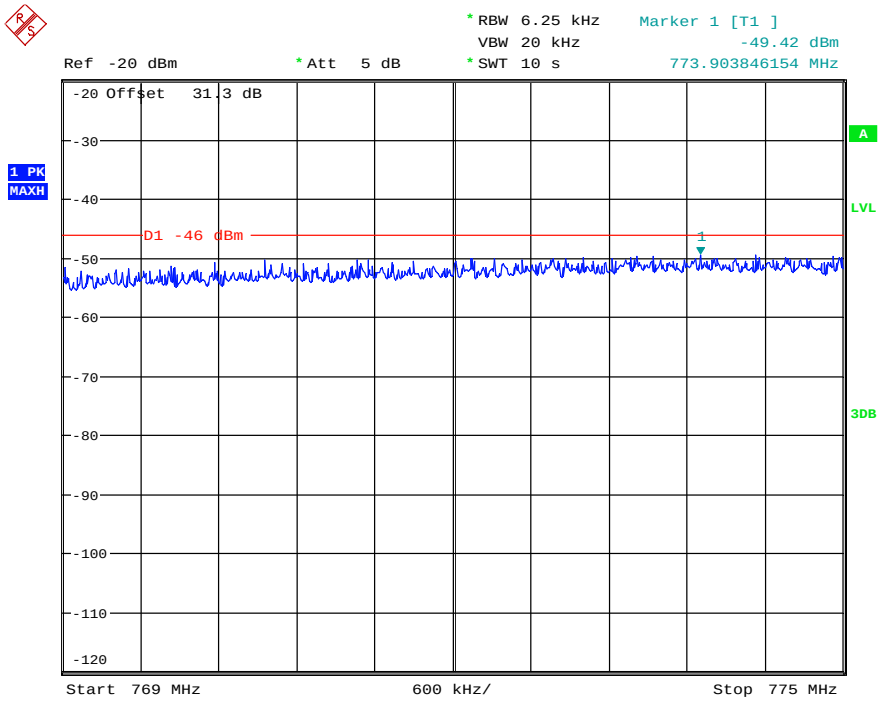
Note: Transmitters designed to operate in 769-775MHz and 799- 805MHz must meet the emission limitatations in part 90.543 paragraph (a) through to (d) Transmitters operating in the 763-768MHz and 793-798MHz must meet the emission limitations of paragraph (e).

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	**X**
ATTENUATOR	-	-	-	20dB	**X**

Part 90.543(e)(1) Conducted emissions

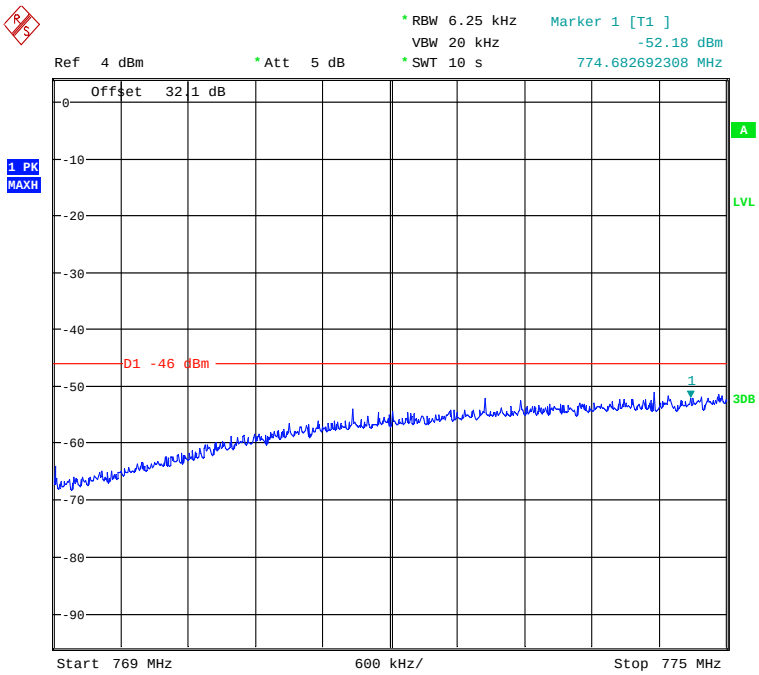
Ambient temperature	=	20°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			

Bottom channel 763MHz - This frequency is NOT applicable to the FCC filing.



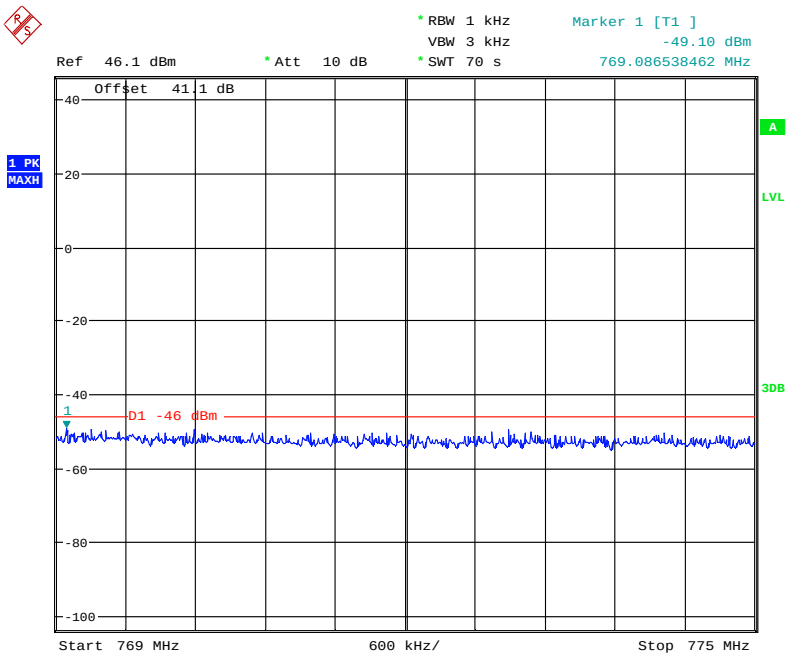
Date: 13.JUN.2012 15:22:58

Top channel 768MHz (1)



Date: 15.JUN.2012 12:02:36

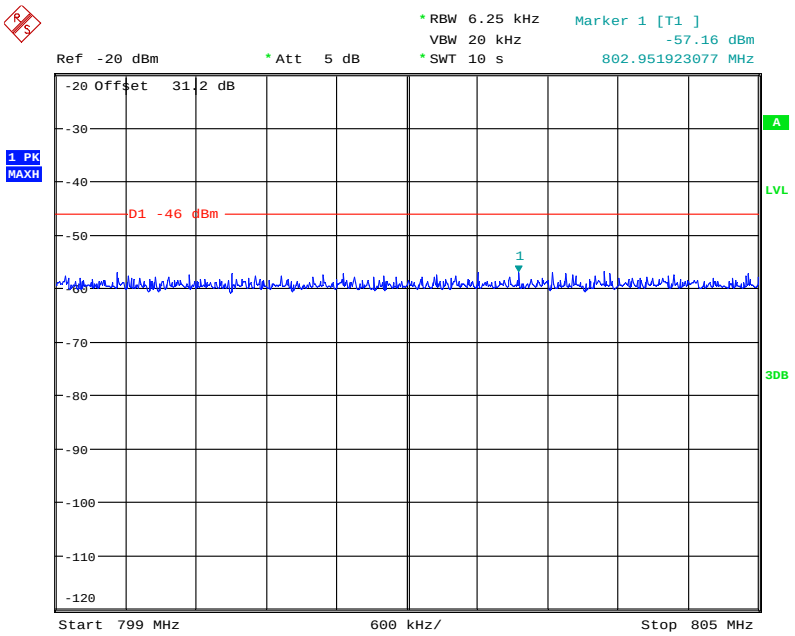
Top channel 768MHz (2)



Date: 30.MAY.2012 11:36:04

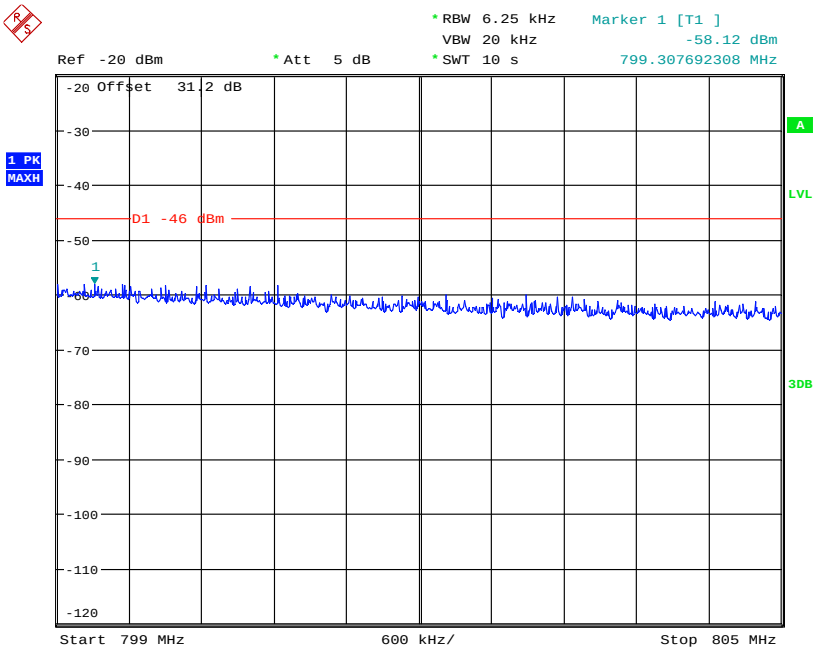
Note: A Notch filter used to reduce the fundamental frequency, attenuation removed to give a better noise floor in a 6.25kHz RBW. The system was then re calibrated for the wanted measurement band, the plot was then taken. Plot (2) shows the noise floor in a 1kHz RBW, without the use of a filter.

Bottom channel 763MHz – This frequency is NOT applicable to the FCC filing.



Date: 15.JUN.2012 11:16:53

Top channel 768MHz

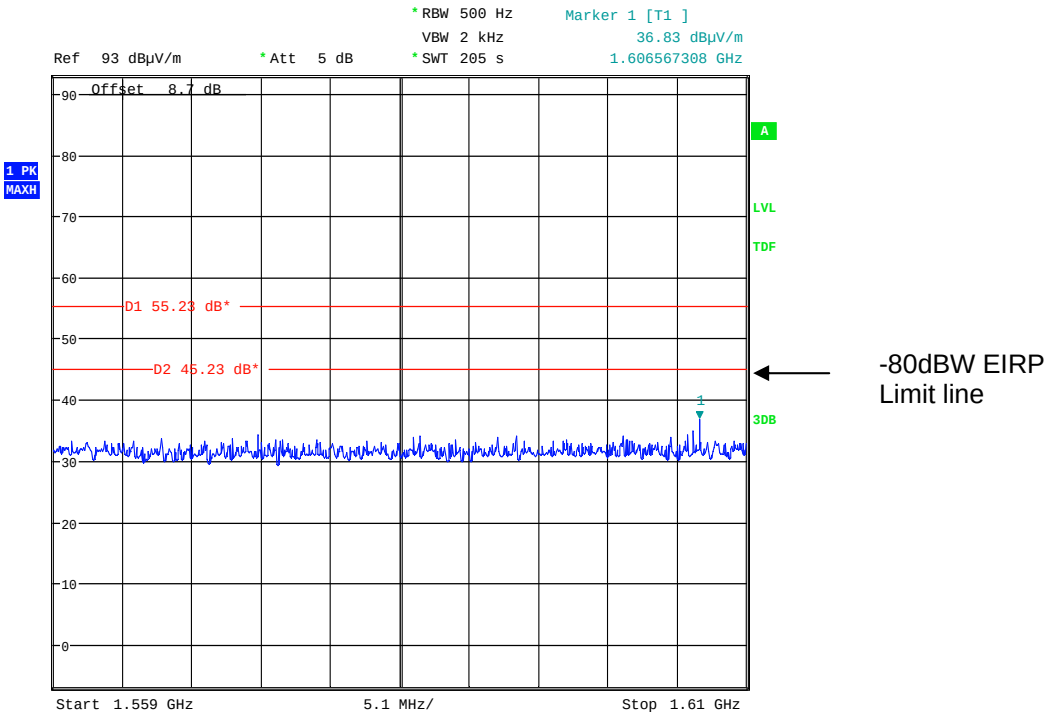


Date: 15.JUN.2012 11:31:34

Limits 90.543(e)(1) On all frequecies between 769-775MHz and 799-805MHz by a factor not less than 76+10 log(p) dB in a 6.25kHz band segment for base and fixed stations

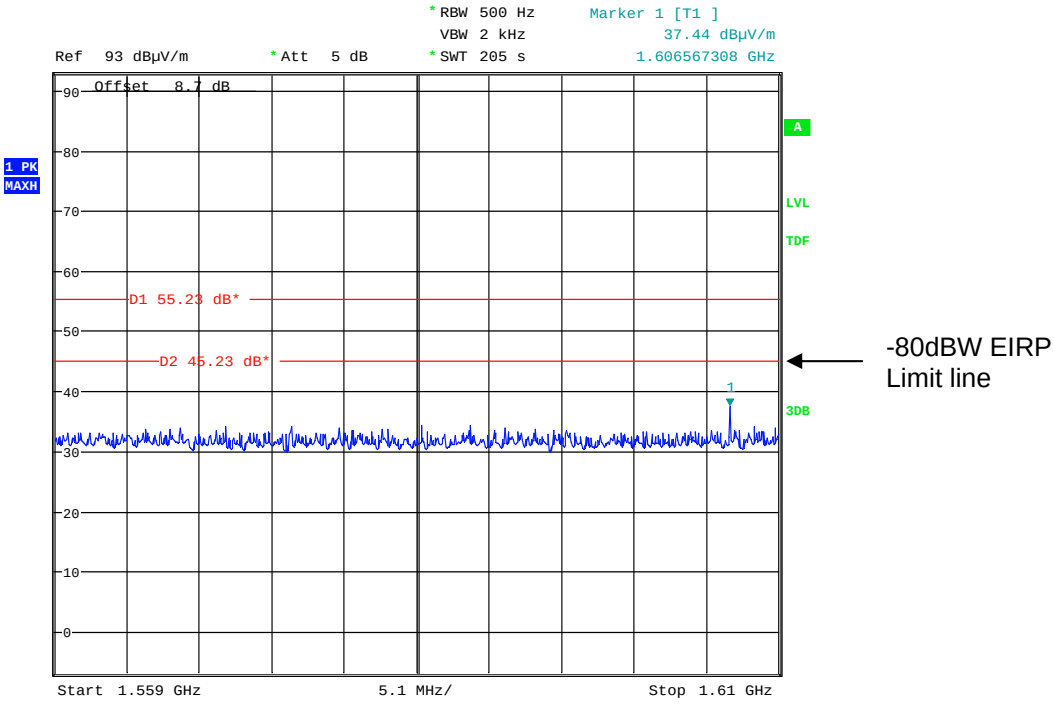
90.543(f) Radiated emissions within the band 1559MHz – 1610MHz

Ambient temperature	=	21°C	Radio Laboratory		
Relative humidity	=	43%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			

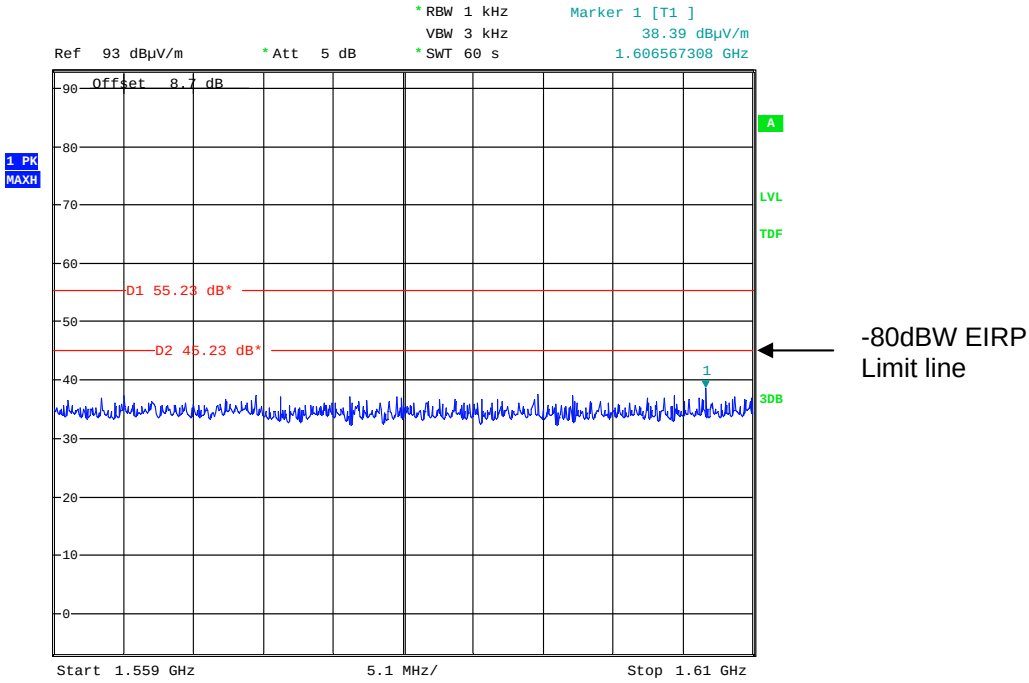


Note: The above plot shows the Spectrum Analyser switched on only. The EUT was disconnected and the supplied power supply was disconnected from the AC mains supply, the emission at 1.606GHz is an ambient emission from the Spectrum Analyser and is not an emission from the EUT.

Radiated emissions within the band 1559MHz – 1610MHz
Vertical Polarization

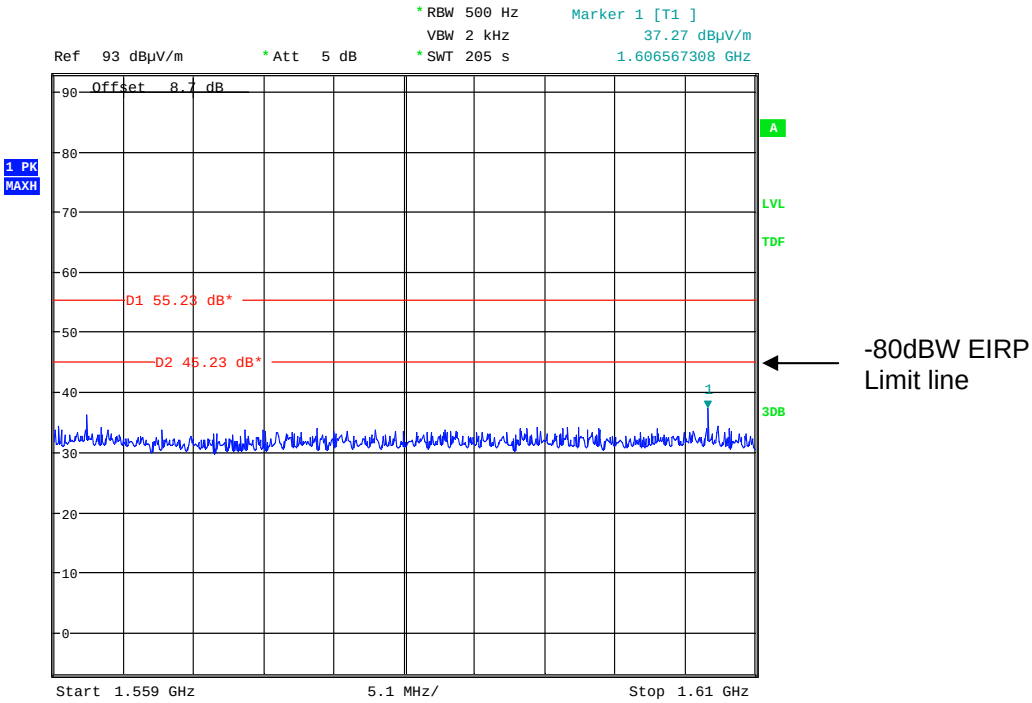


Note: The EUT was transmitting 100W at 772.00MHz,

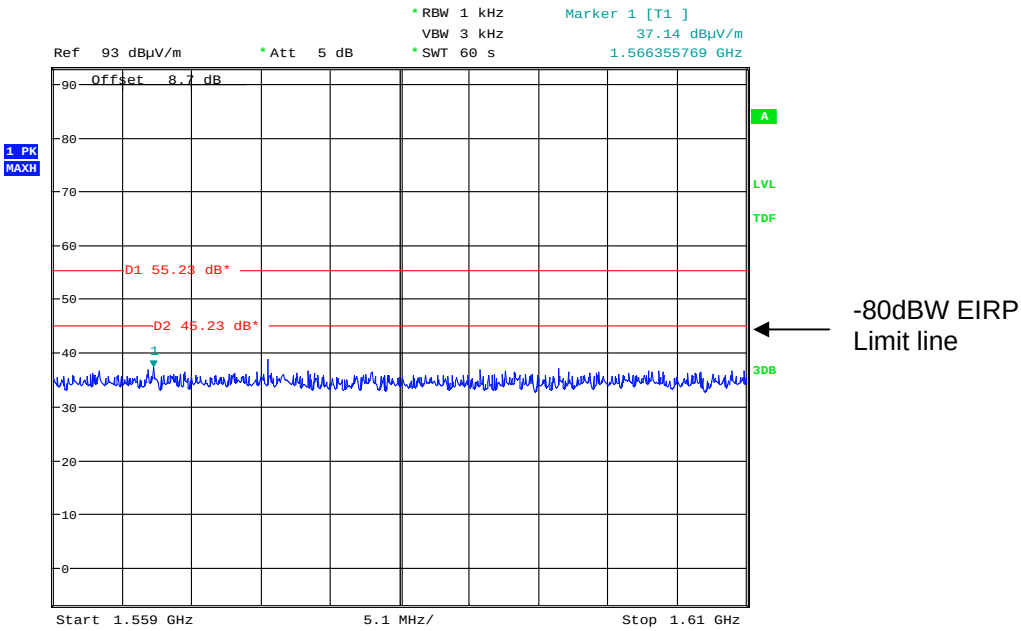


Note: The EUT was transmitting 100W at 772.00MHz,

Radiated emissions within the band 1559MHz – 1610MHz
Horizontal Polarization



Note: The EUT was transmitting 100W at 772.00MHz,



Note: The EUT was transmitting 100W at 772.00MHz,

90.543(f). For operations in the 763-775MHz and 793-805MHz bands all emissions including harmonics in the band 1559-1610MHz shall be limited to -70dBw/MHz for wideband signals and -80dBw for discrete emissions of less than 700Hz bandwidth.

A tuneable notch filter was employed to notch out the fundamental frequency of 772MHz, the dB loss of the notch filter and cables was then added as an offset on the Spectrum Analyser to show compliance against the above limits.

Note: No Wideband or narrowband emissions observed

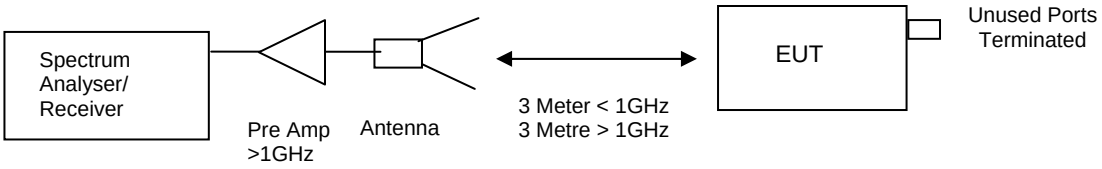
Antenna Information

Antenna Manufacturer: TELEWAVE INC,
Model: ANT77OF2
Frequency Range: 734-806MHz
Fiberglass collinear antenna 2.5dBi gain
Vertical beamwidth 38°

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
SPECTRUM ANALYSER	RHODE & SCHWARZ	FSU46	200034	UH281	**X**
CABLE	TRAC	N/A	N/A	UH271	**X**
CABLE	TRAC	N/A	N/A	UH272	**X**
ATTENUATOR	SPINNER	745357	N/A	TRLUH225	
FILTER	K&L MICOWAVE	3TNF-500/1000	620	REF827	**X**

INTENTIONAL RADIATOR SPURIOUS EMISSIONS – RADIATED – Part 2.1053

Ambient temperature	=	20°C	Test Signal	=	F3E
Relative humidity	=	46%			
Conditions	=	ATS			
Supply voltage	=	+13.8Vdc			
Supply Frequency	=	N/A			



The test was set up as per the diagram. The unit was tested operating maximum power on three test frequencies with a 50 ohm load on the output.

The Spurious limit was calculated as follows:

On any frequency outside of the frequency ranges covered by the ACP tables must be reduced below the mean output power.

At least 43 + 10 log PdB

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

RESULTS

Bottom Channel - This frequency is NOT applicable to the FCC filing.

FREQUENCY RANGE	FREQ. (GHz)	Measured (dBm)	LIMIT (dBm)
30MHz – 10GHz	3.052	-32.48	-13

Middle Channel

FREQUENCY RANGE	FREQ. (GHz)	Measured (dBm)	LIMIT (dBm)
30MHz – 10GHz	No Significant emissions within 20dB of the limit		

Top Channel

FREQUENCY RANGE	FREQ. (GHz)	Measured (dBm)	LIMIT (dBm)
30MHz – 10GHz	3.1000 5.4249	-32.03 -29.63	-13 -13

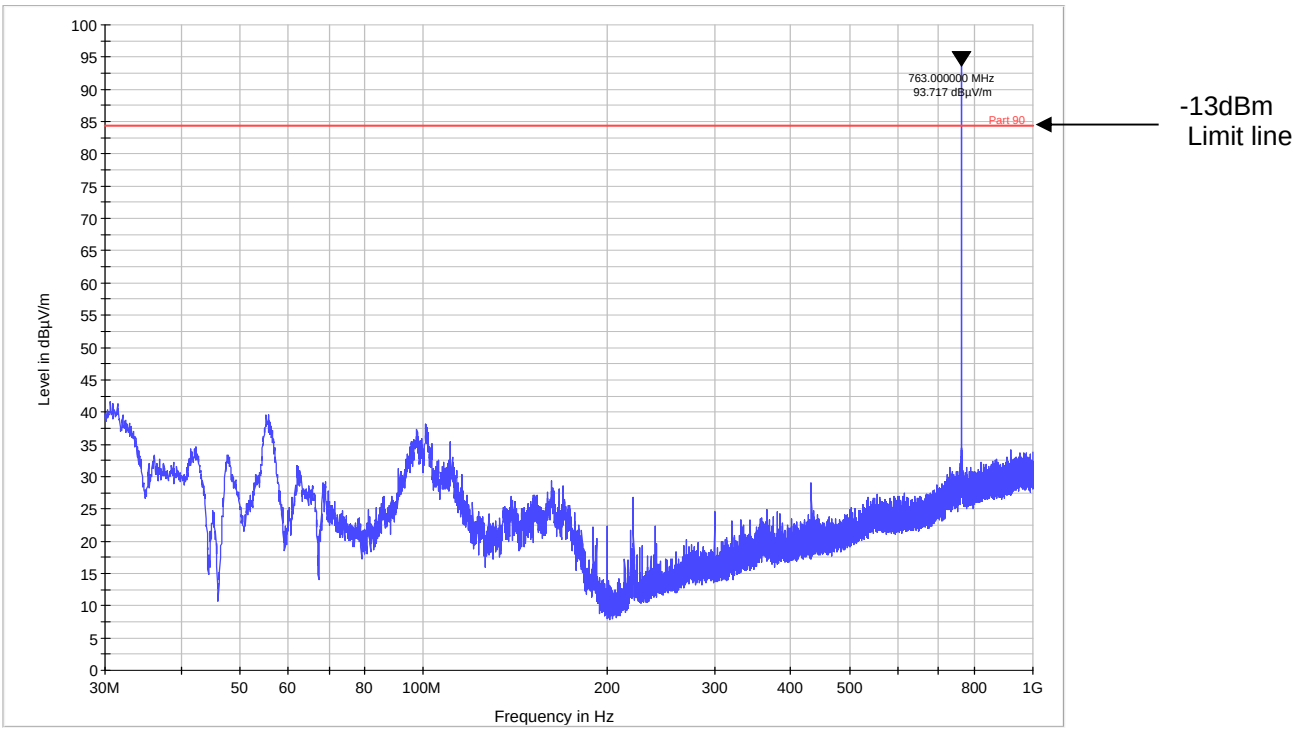
* Note: Emissions that fall below 20dB of the limit are not shown in the above table

The test equipment used for the Transmitter Spurious Emissions:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRAC No	ACTUAL EQUIPMENT USED
HORN	EMCO	3115	9010-3580	138	**X**
SPECTRUM ANALYSER	R&S	FSU46	200034	TRL281	**X**
PRE AMPLIFIER	HP	8449B	3008A016	572	**X**
ANTENNA	YORK	CBL611/A	1618	UH191	**X**
RECEIVER	R&S	ESVS10	825892/006	UH04	**X**

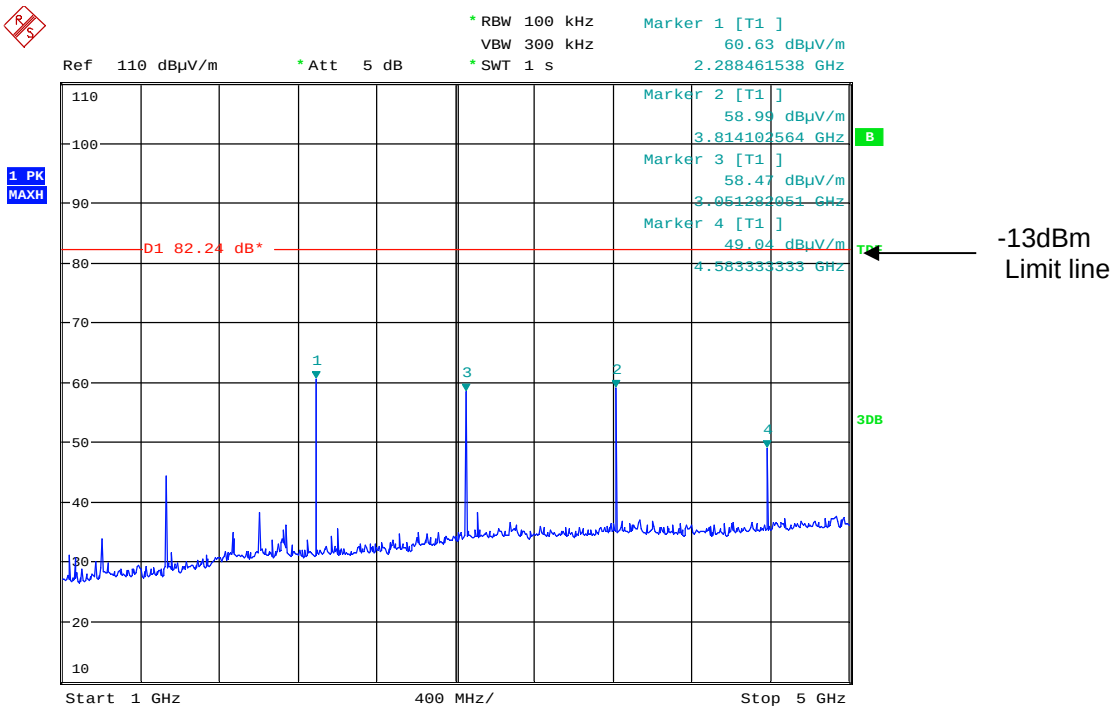
Radiated emissions Bottom Channel

Bottom Channel 30MHz – 1GHz - This frequency is NOT applicable to the FCC filing.



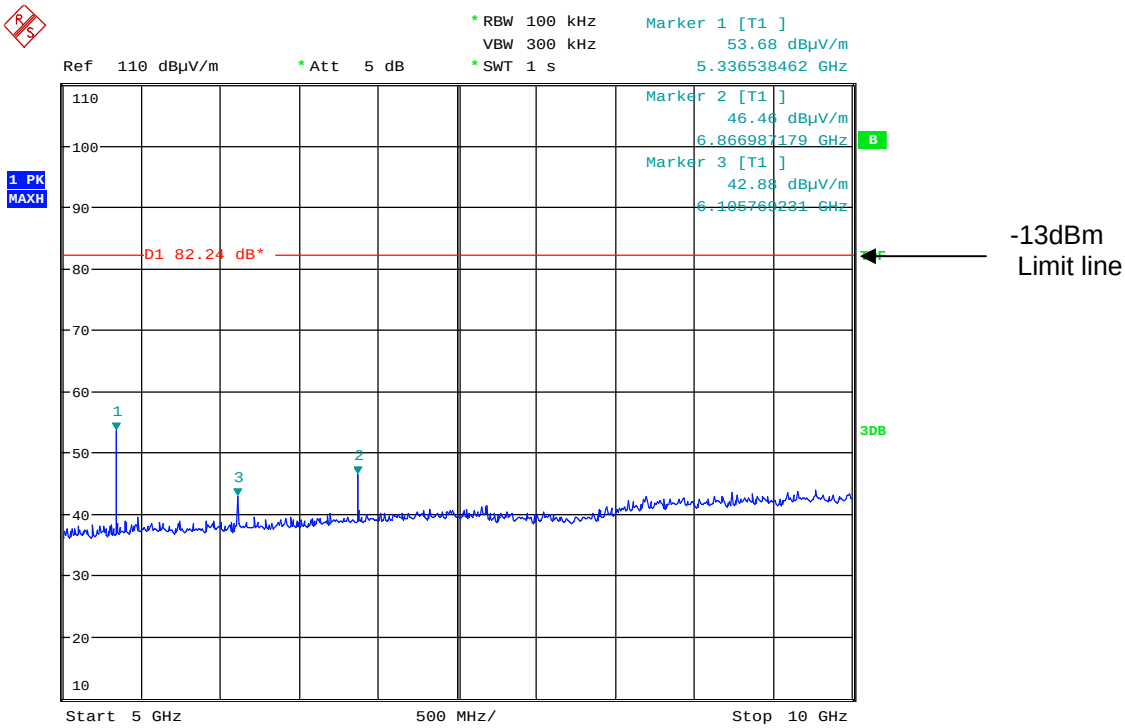
The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Bottom Channel 1GHz – 5GHz -This frequency is NOT applicable to the FCC filing.



Date: 20.JUN.2012 14:52:02

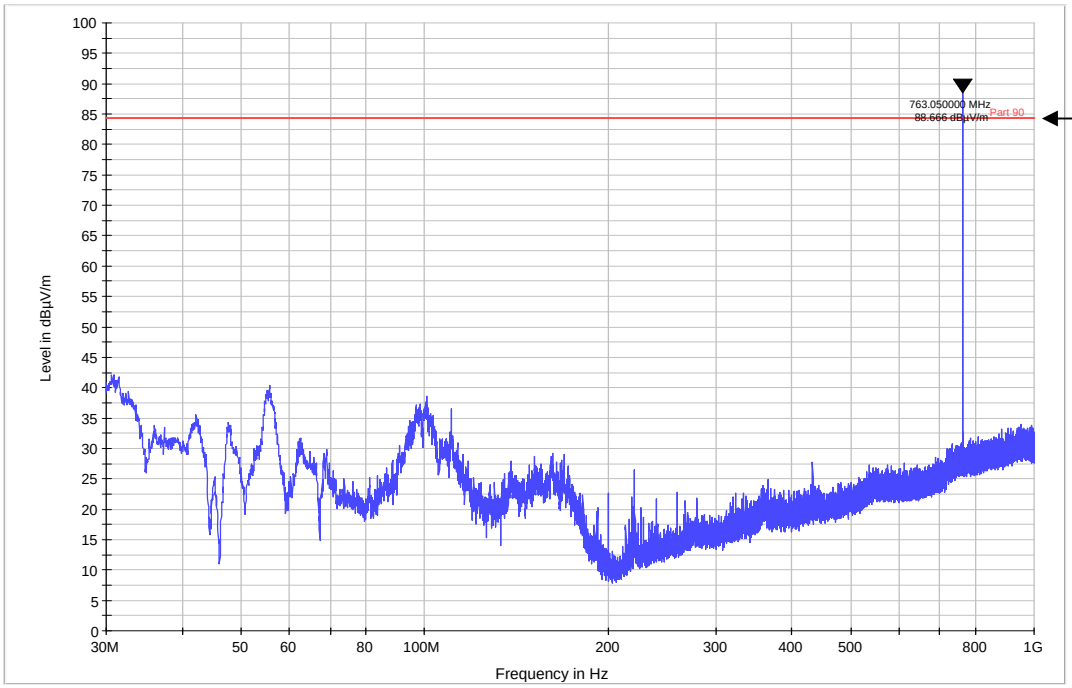
Bottom Channel 5GHz – 10GHz - This frequency is NOT applicable to the FCC filing.



Date: 20.JUN.2012 14:53:18

Radiated emissions

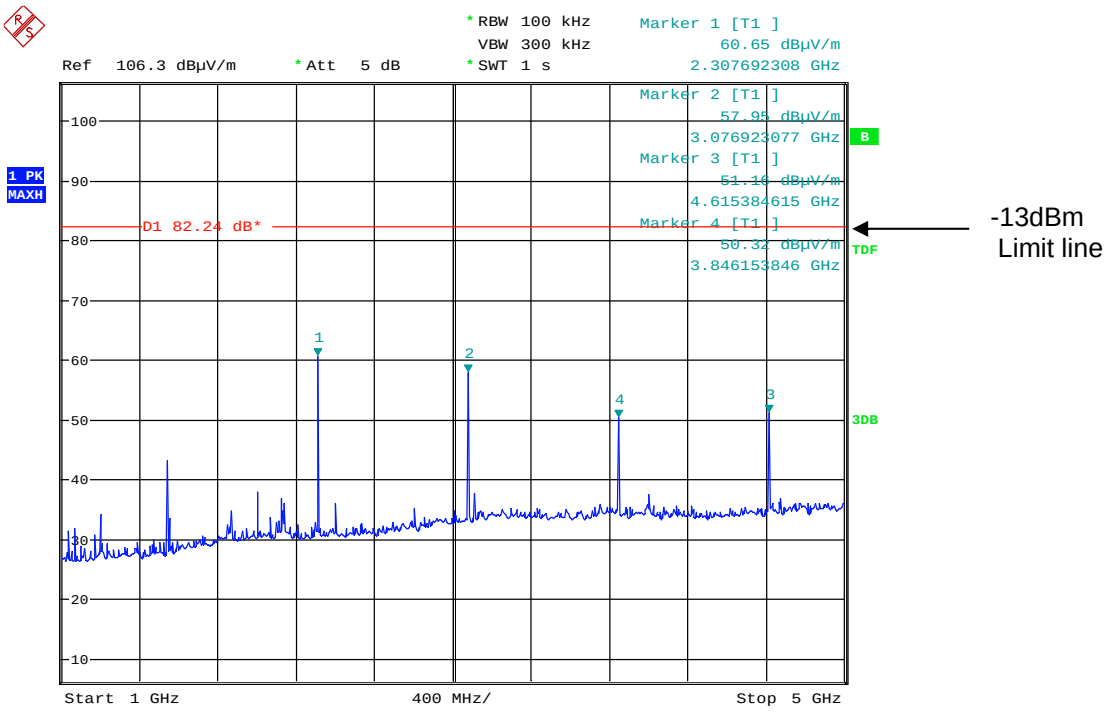
Middle Channel 30MHz – 1GHz



-13dBm
Limit line

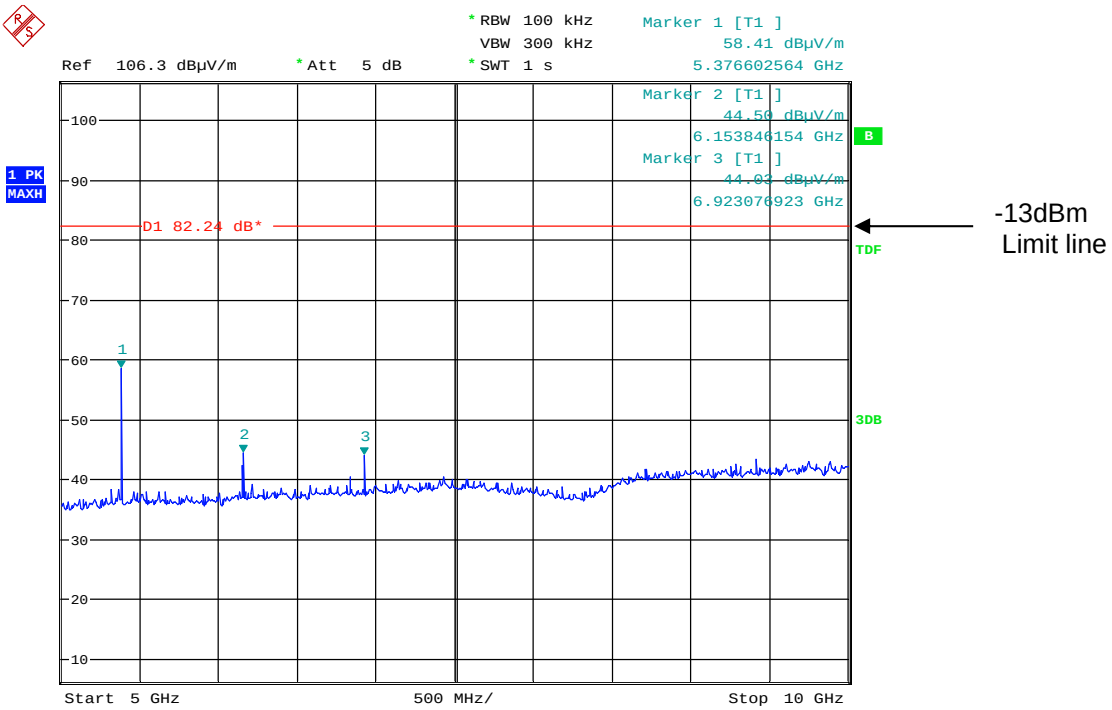
The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Middle Channel 1GHz – 5GHz



Date: 20.JUN.2012 14:05:08

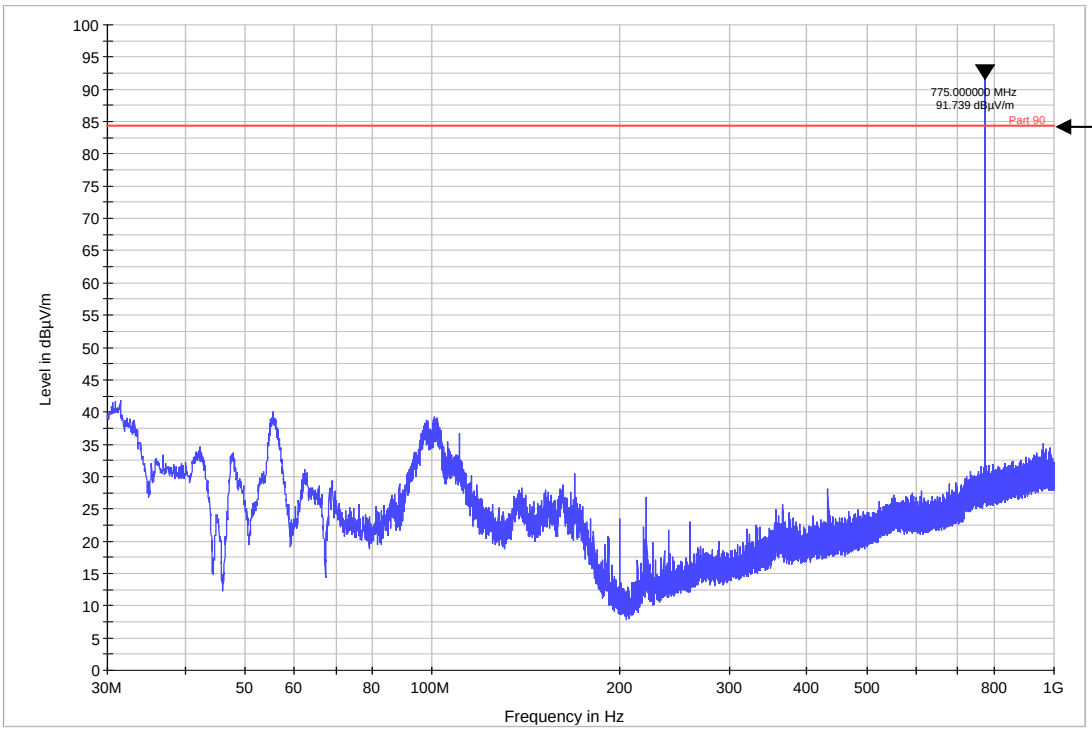
Middle Channel 5GHz – 10GHz



Date: 20.JUN.2012 14:06:21

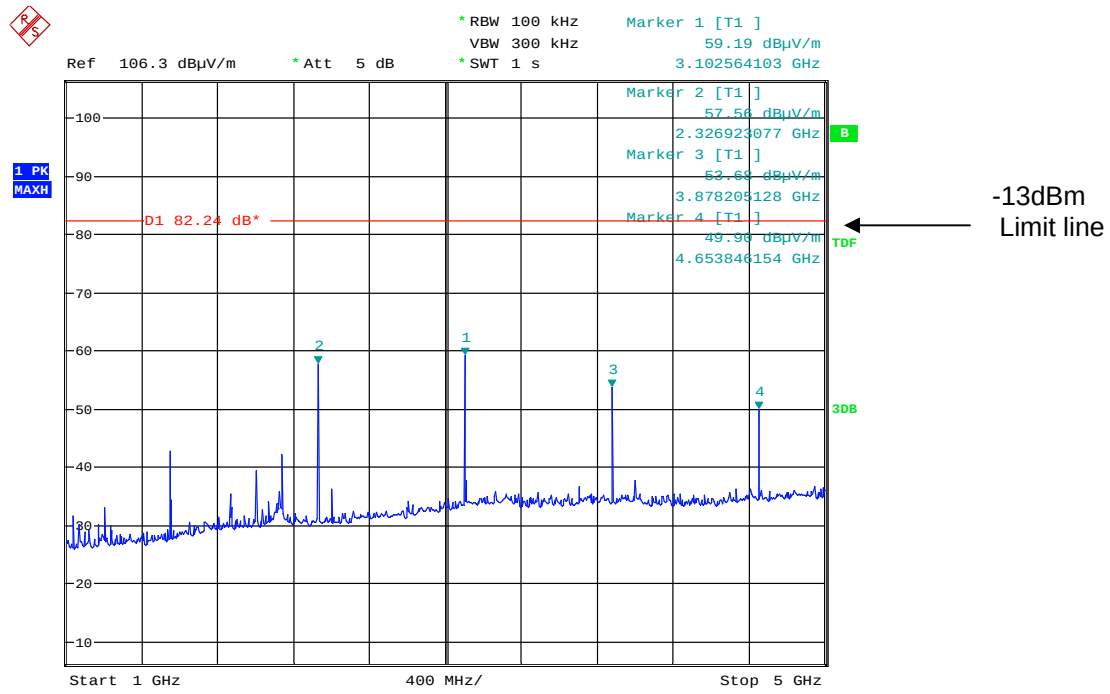
Radiated emissions

Top Channel 30MHz – 1GHz



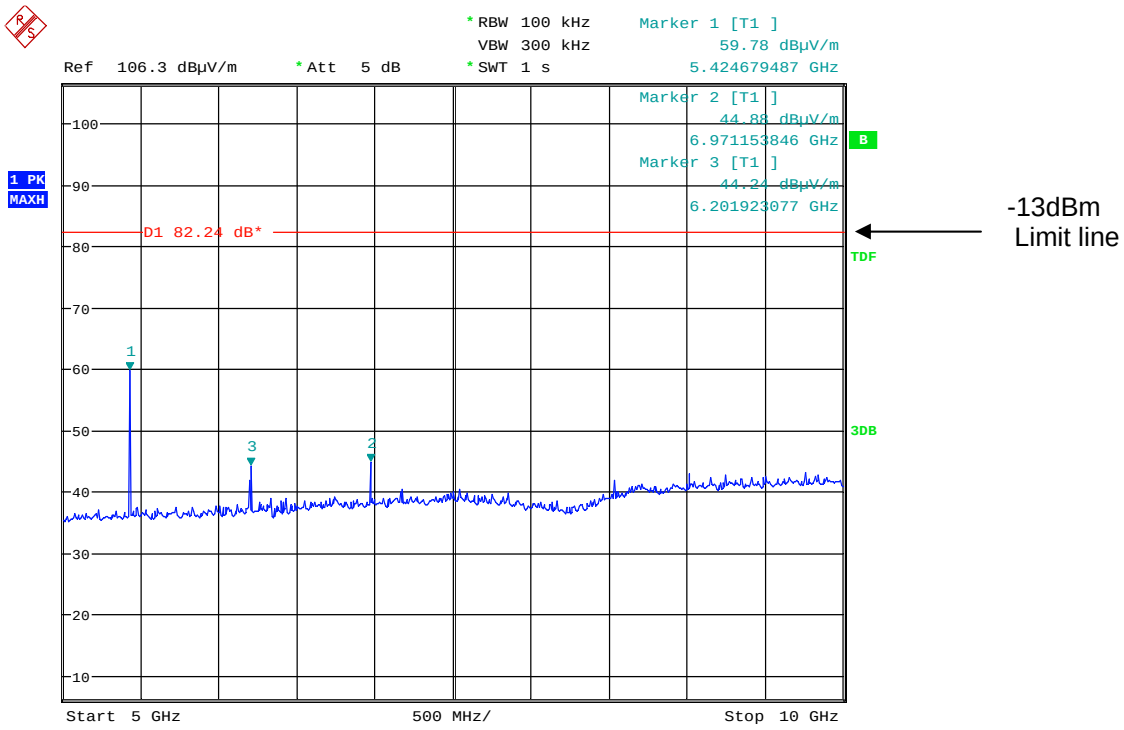
The above test results show that there were no emissions within 20dBs of the –13dBm limit.

Top Channel 1GHz – 5GHz



Date: 20.JUN.2012 14:10:20

Top Channel 5GHz – 10GHz



Date: 20.JUN.2012 14:11:42

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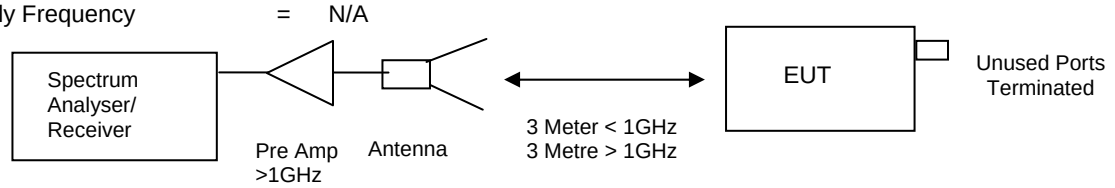
UN-INTENTIONAL RADIATOR SPURIOUS EMISSIONS – RADIATED – Part 15:109

Ambient temperature = 20°C
Relative humidity = 46%
Conditions = ATS
Supply voltage = +13.8Vdc
Supply Frequency = N/A

Test Signal = F3E



The test was set up as per the diagram, the receiver was tested while in receive mode while attached to a dummy load.

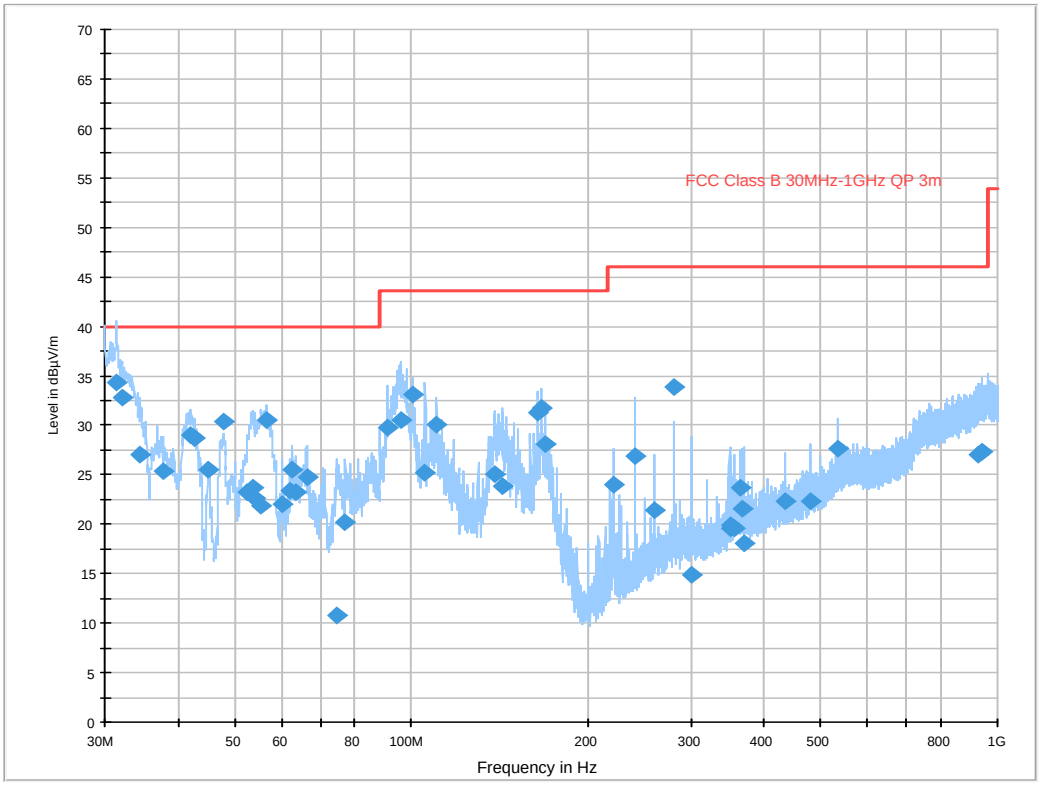
30MHz -1GHz worse case Rx mode

FREQ. (MHz)	MEAS. Rx. (dBµV)	Cable Loss (dB)	Ant Factor	Pre Amp (dB)	FIELD STRENGTH (dBµV/m)	FIELD STRENGTH (µV/m)	Limit (dBµV/m)	Limit (µV/m)
31.40	16.1	0.4	17.8	N/A	34.30	51.88	40.00	100
32.20	15.1	0.4	17.3	N/A	32.80	43.65	40.00	100
34.55	10.6	0.4	16.0	N/A	27.00	22.38	40.00	100
37.80	10.7	0.4	14.2	N/A	25.30	18.40	40.00	100
42.05	16.7	0.4	11.9	N/A	29.00	28.18	40.00	100
42.75	16.9	0.4	11.5	N/A	28.80	27.54	40.00	100
45.00	14.8	0.4	10.2	N/A	25.40	18.62	40.00	100
47.90	21.2	0.4	8.8	N/A	30.40	33.11	40.00	100
52.55	16.3	0.4	6.6	N/A	23.30	14.62	40.00	100
53.50	16.9	0.4	6.4	N/A	23.70	15.31	40.00	100
54.10	15.9	0.4	6.3	N/A	22.60	13.49	40.00	100
55.55	15.6	0.4	5.8	N/A	21.80	12.30	40.00	100
56.50	24.5	0.4	5.6	N/A	30.50	33.49	40.00	100
60.25	16.6	0.4	5.0	N/A	22.00	12.58	40.00	100
62.25	17.9	0.5	5.0	N/A	23.40	14.79	40.00	100
62.80	20.0	0.5	5.0	N/A	25.50	18.83	40.00	100
63.45	17.8	0.5	5.0	N/A	23.30	14.62	40.00	100
66.30	19.1	0.6	5.1	N/A	24.80	17.37	40.00	100
77.20	13.1	0.6	6.4	N/A	20.10	10.11	40.00	100
90.95	20.4	0.6	8.8	N/A	29.80	30.90	43.52	150
95.70	20.7	0.6	9.3	N/A	30.60	33.88	43.52	150
100.75	22.4	0.6	10.0	N/A	33.00	44.66	43.52	150
105.70	14.1	0.6	10.5	N/A	25.20	18.19	43.52	150
110.65	18.5	0.6	11.0	N/A	30.10	31.98	43.52	150
139.20	13.1	0.7	11.3	N/A	25.10	17.98	43.52	150
143.30	12.0	0.7	11.2	N/A	23.90	15.66	43.52	150
164.70	20.9	0.9	9.6	N/A	31.40	37.15	43.52	150

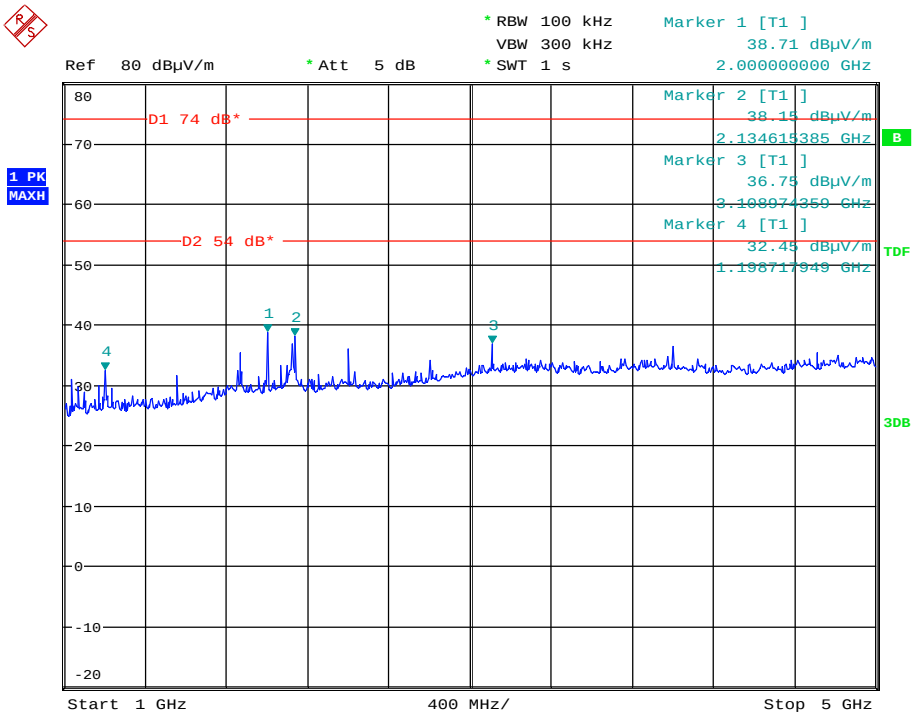
FREQ. (MHz)	MEAS. Rx. (dBµV)	Cable Loss (dB)	Ant Factor	Pre Amp (dB)	FIELD STRENGTH (dBµV/m)	FIELD STRENGTH (µV/m)	Limit (dBµV/m)	Limit (µV/m)
167.15	21.5	0.9	9.4	N/A	31.80	38.90	43.52	150
169.60	18.1	0.9	9.1	N/A	28.10	25.41	43.52	150
240.05	15.4	1.0	10.4	N/A	26.80	21.87	46.00	200
280.05	20.2	1.0	12.7	N/A	33.90	49.54	46.00	200
533.30	6.8	1.5	19.3	N/A	27.60	27.60	46.00	200
928.20	0.3	2.1	24.6	N/A	27.00	22.38	46.00	200
942.95	0.2	2.1	25.0	N/A	27.30	23.17	46.00	200
1866.5	61.36	2.1	27.5	35.6	55.36pk	586.13pk	74.0pk	5011pk
1866.5	40.96	2.1	27.5	35.6	34.96Av	55.97Av	54.0 Av	500 Av
2000	56.91	2.1	27.8	35.6	51.21pk	363.49 pk	74.0 pk	5001pk
2000	51.02	2.1	27.8	35.6	45.32Av	188.50 Av	54.0 Av	500 Av
2133.2	62.68	2.1	27.8	35.6	56.98pk	706.31 pk	74.0 pk	5001pk
2133.2	41.18	2.1	27.8	35.6	35.48Av	59.42 Av	54.0 Av	500 Av

Rx 30MHz-1GHz

FCC RE Class B 30MHz-1GHz ESVS10 + UH191 - 10thFeb2011

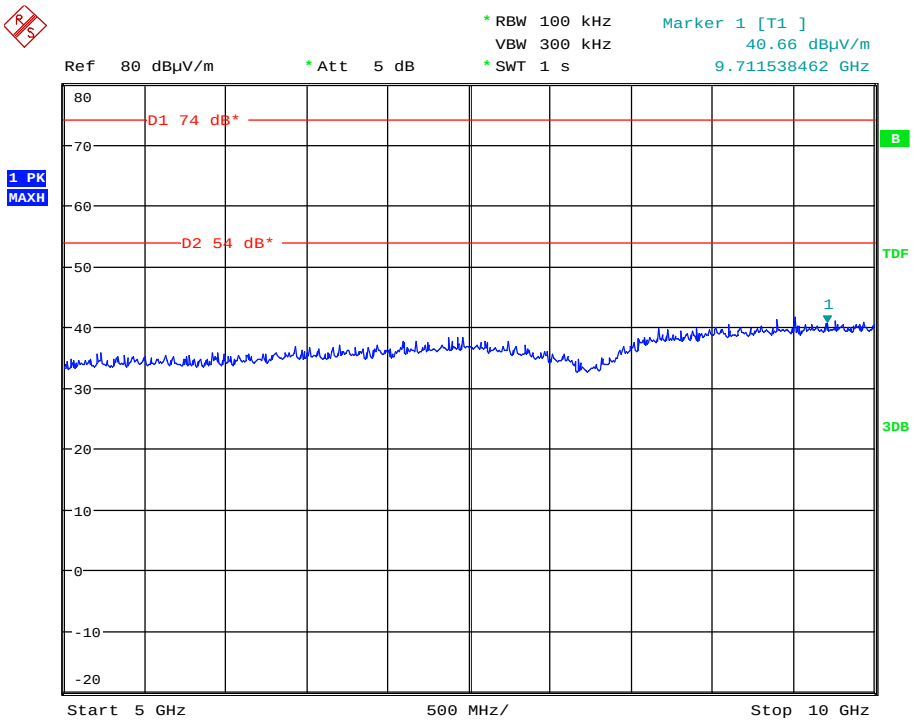


Rx 1GHz – 5GHz



Date: 20.JUN.2012 15:16:40

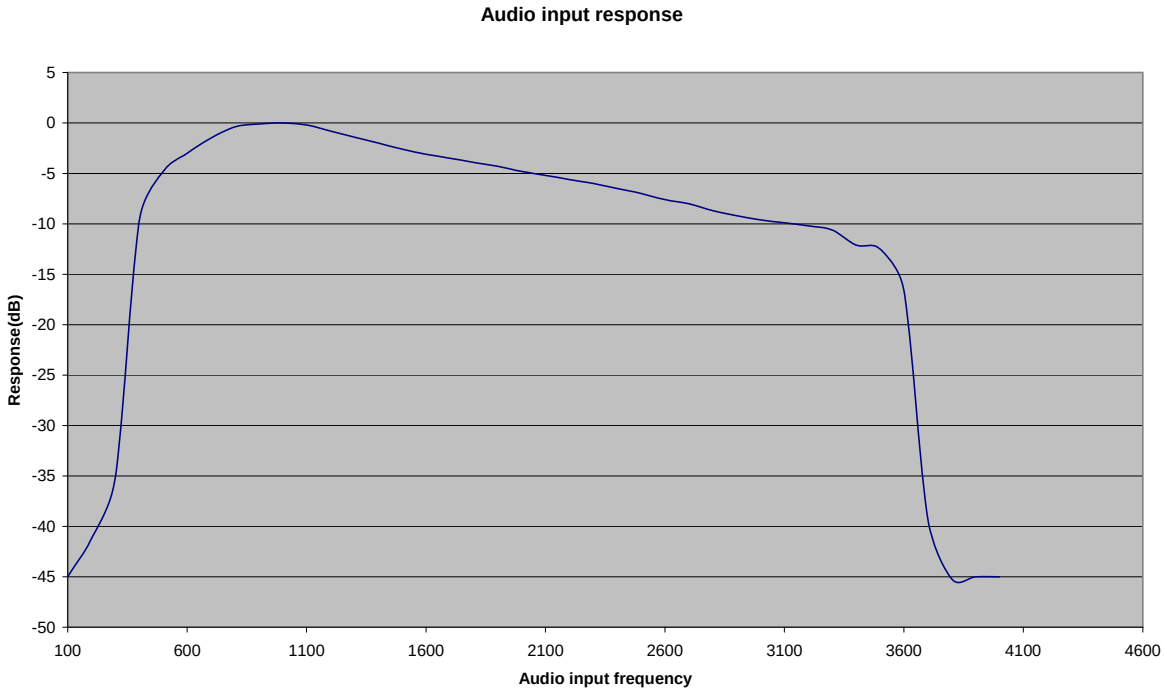
Rx 5GHz – 10GHz



Date: 20.JUN.2012 15:17:15

Modulation Characteristics: 2.1047 (a)

Ambient temperature	=	20°C	Radio Laboratory		
Relative humidity	=	46%	Test Signal	=	F3E
Supply voltage	=	+13.8Vdc			



Note: The SB2025NT100W 700MHz unit is capable of transmitting analogue speech and P25 digital audio modulation.

There are no transmitter audio frequency inputs available via a microphone socket or any other audio frequency input.

The transmitter was tested whilst operating under the following conditions:

1) A signal generator was connected into the receiver RF input, tuned to the receiver frequency, and the deviation level set to 2.5kHz, the audio frequency was then varied between 100Hz and 5kHz.

2) testing was carried out with the talk through feature enabled.
(therefore the audio response will take into account the pre emphasis and de emphasis of the receiver and transmitter).

3) A 1kHz audio signal was applied which was used as a 0dB response reference.

The above plot shows the audio response of the transmitter.

Modulation Characteristics: 2.1047 (b)

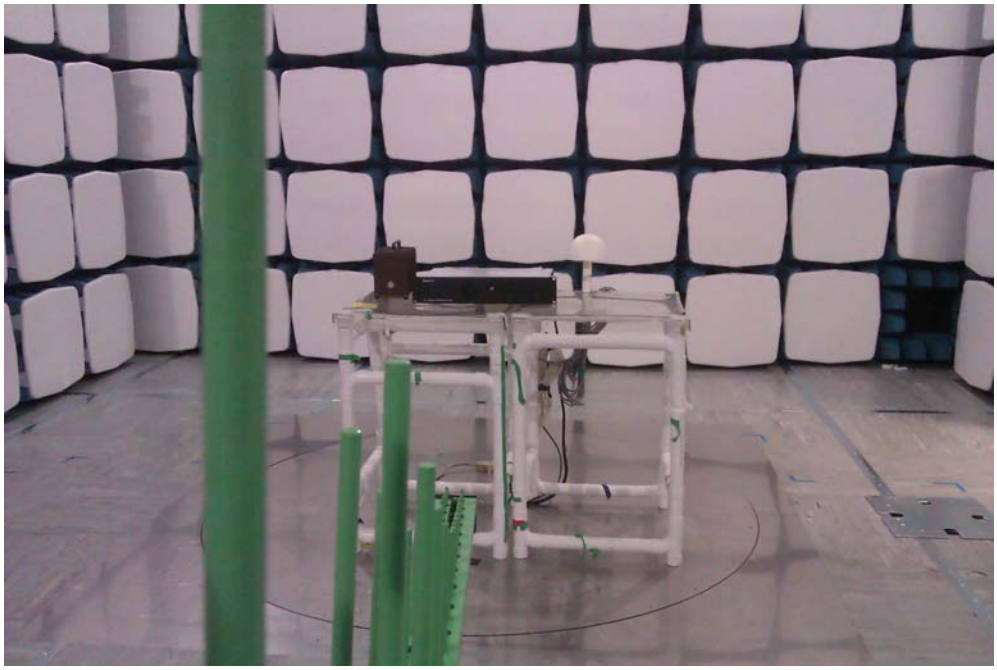
Note: The SB2025NT100W 700MHz unit is capable of transmitting analogue speech and P25 digital audio modulation.

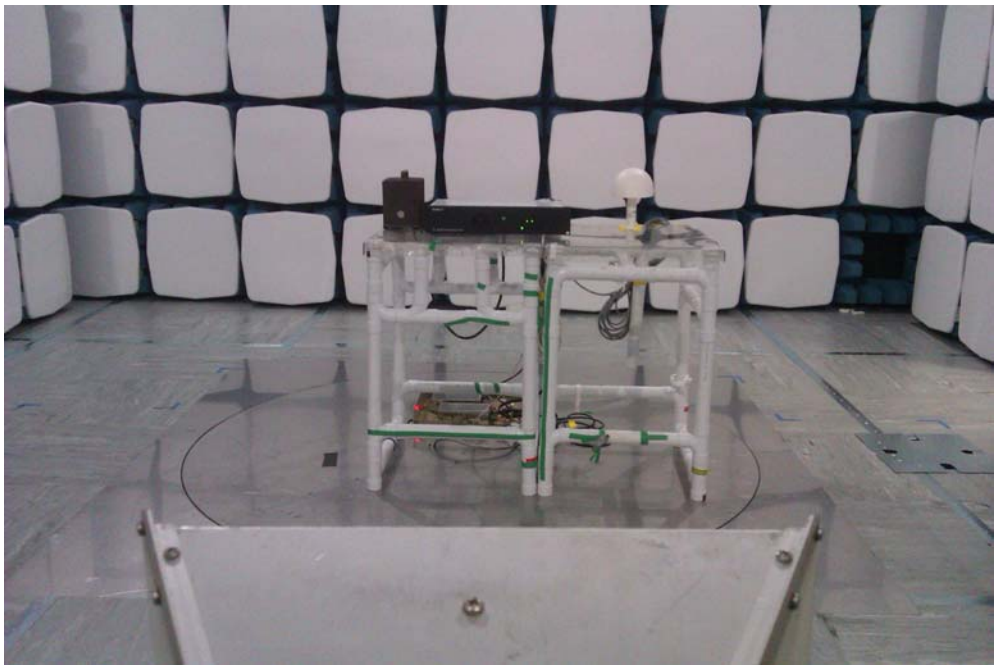
There are no transmitter external audio inputs available via a microphone socket etc, and therefore the test was not performed. The external audio is via the receiver RF input or the digital audio input.

ANNEX A

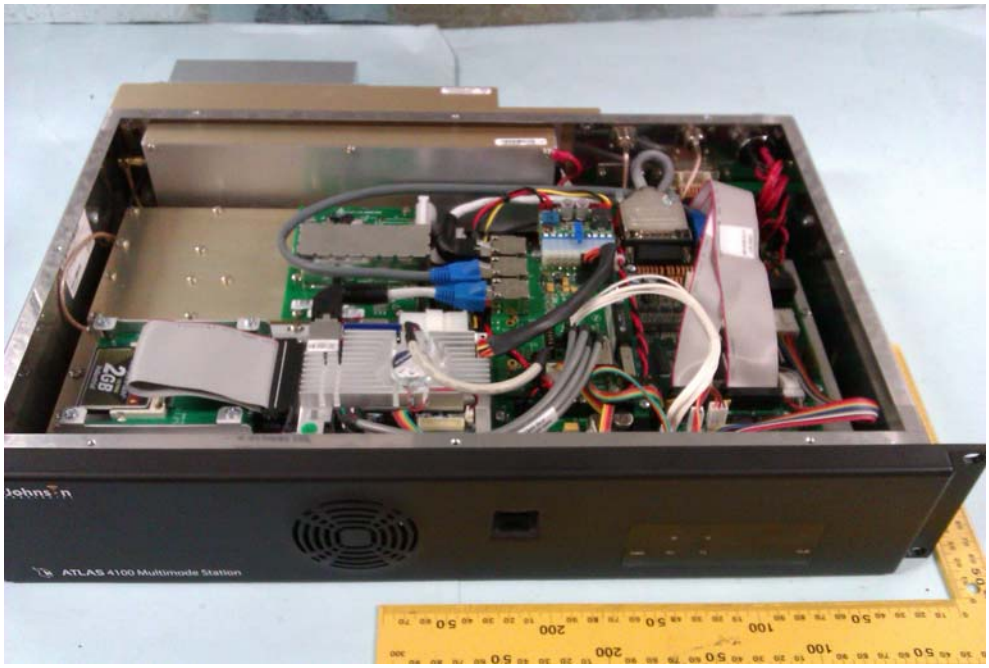
PHOTOGRAPHS

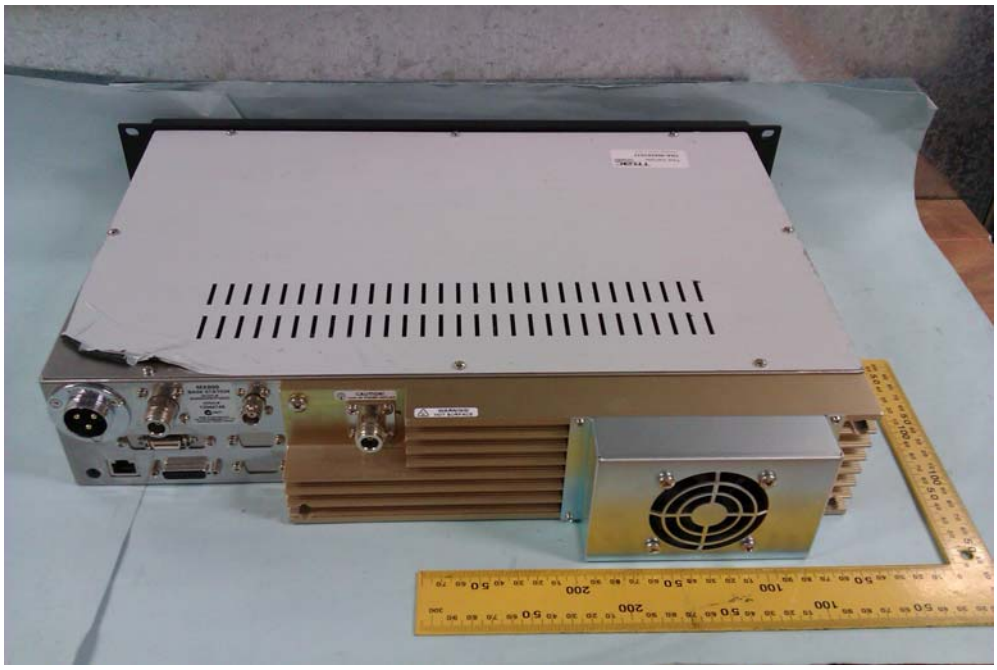
Photograph 1&2: Test Setup



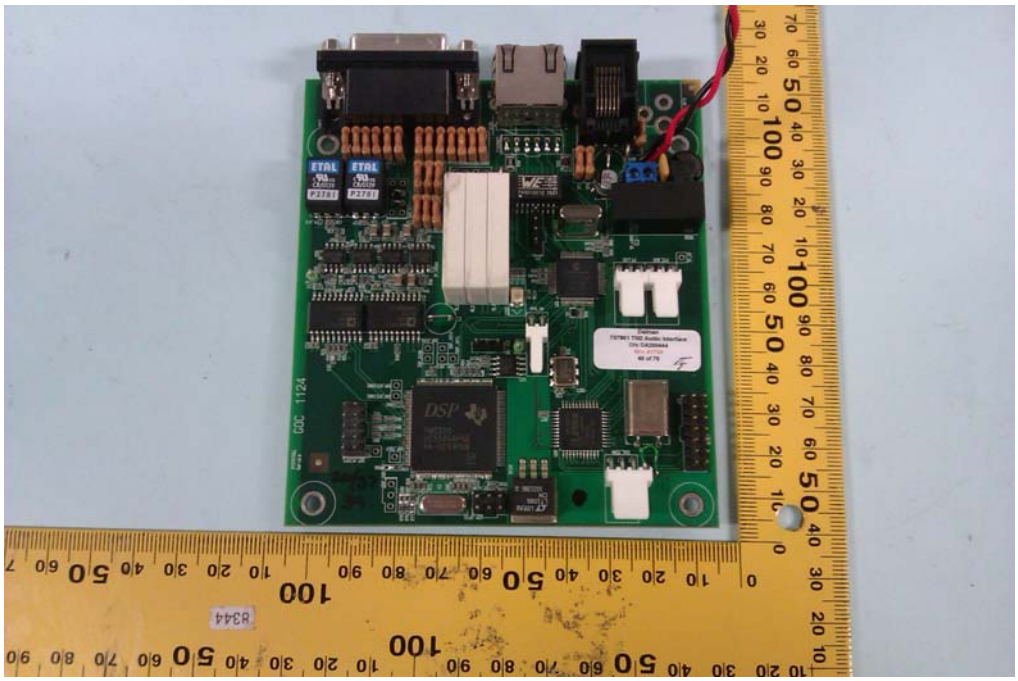


Photograph 3&4: Equipment overview

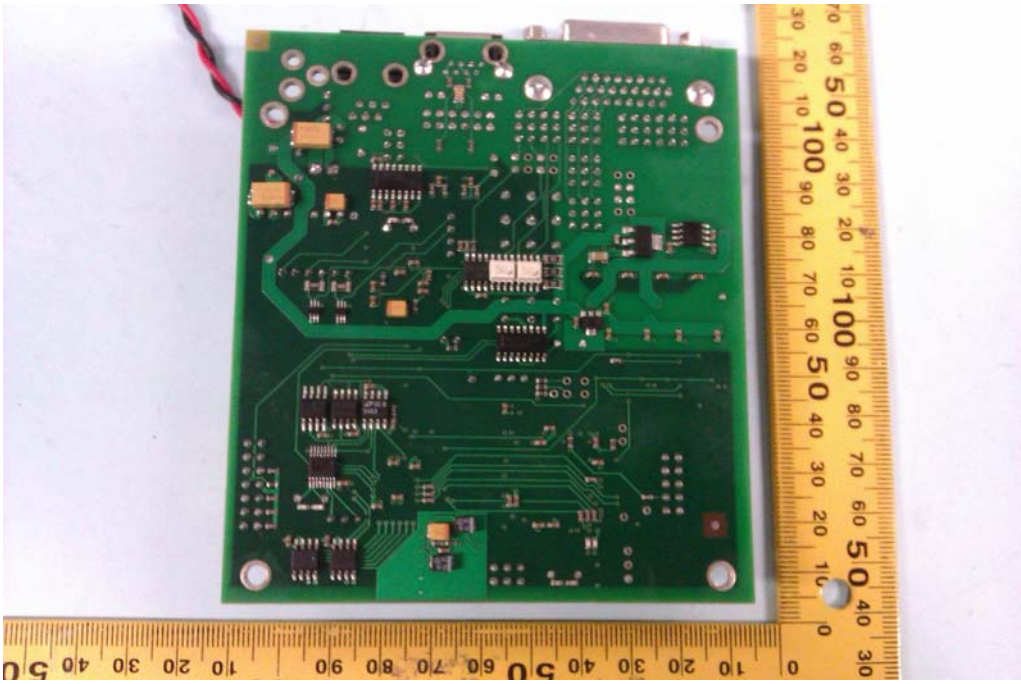




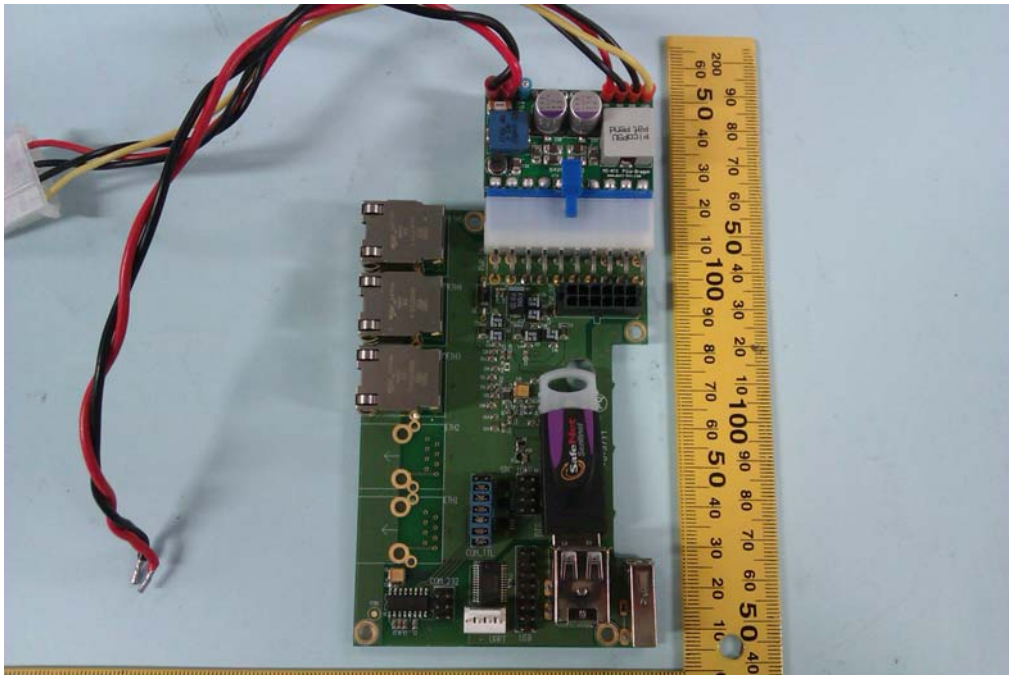
Photograph 5&6: Top View Main Audio PC



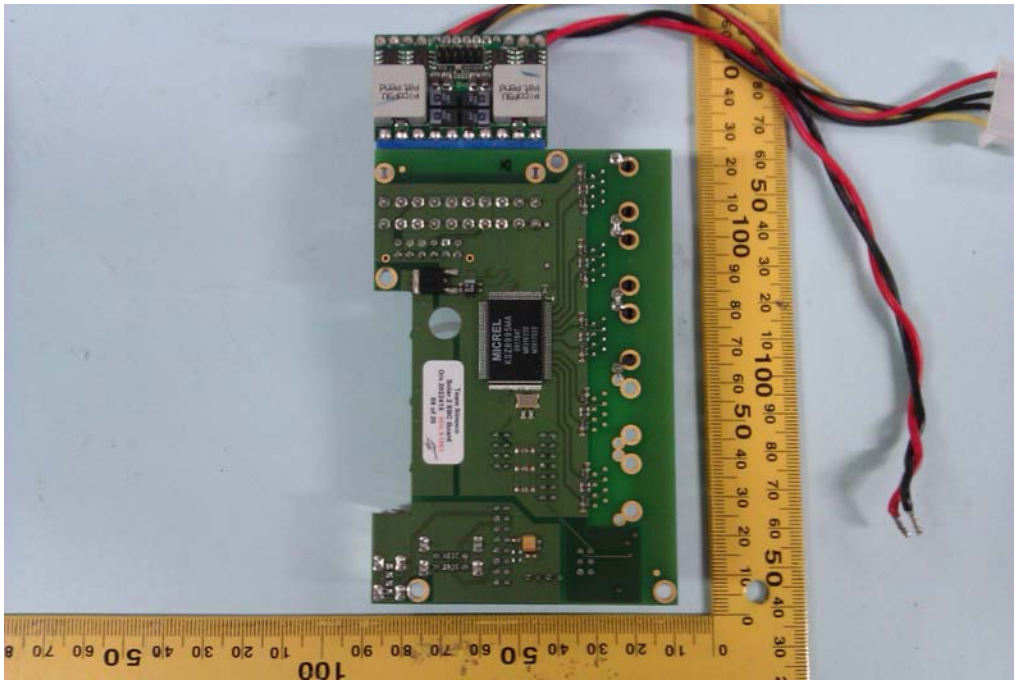
Underside view Main Audio PC



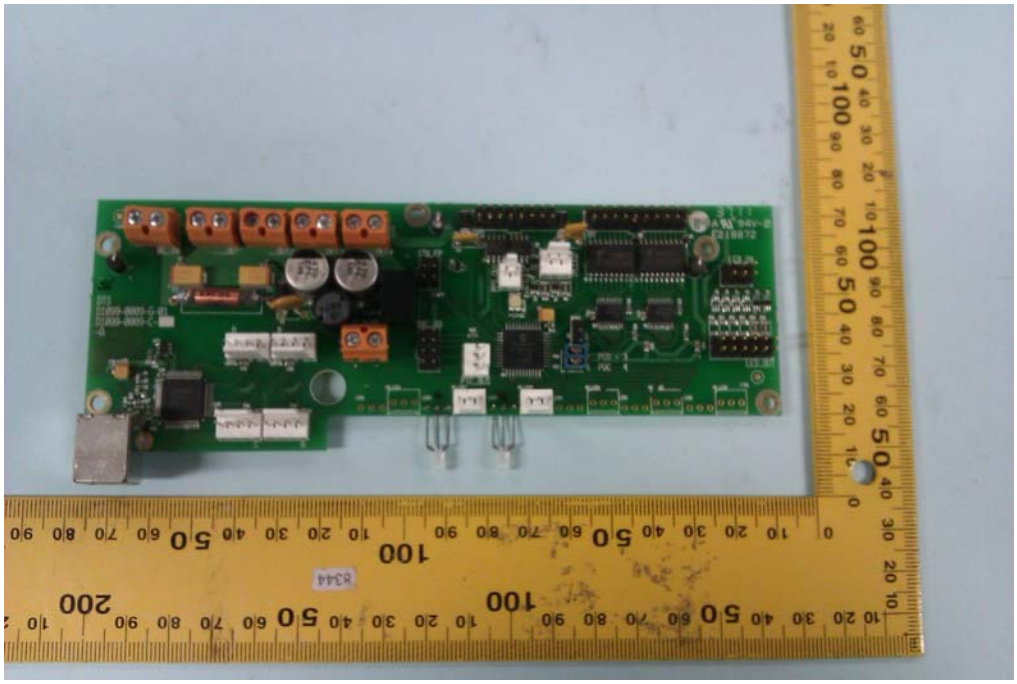
Photograph 7&8: Top View SBC Support PCB



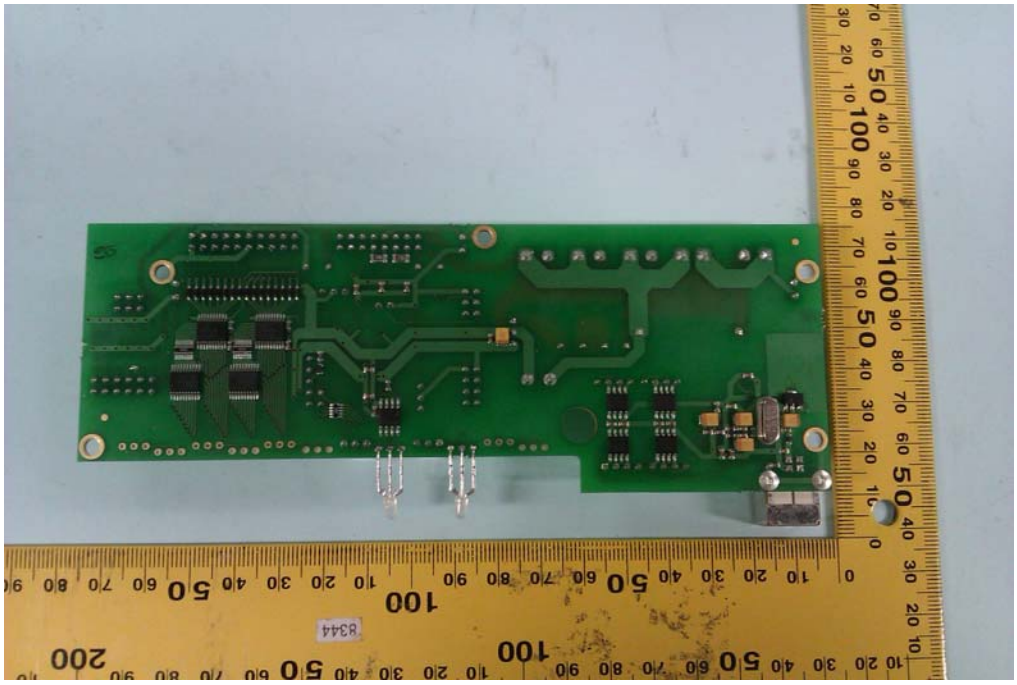
Underside view SBC Support PCB



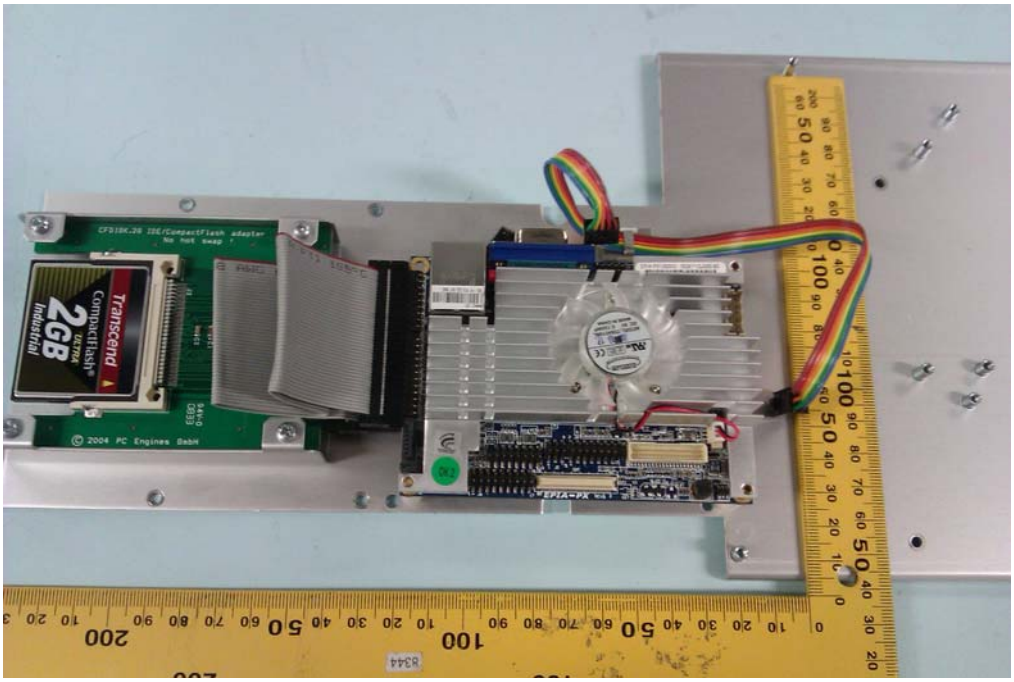
Photograph 9&10: Top View Aux PCB



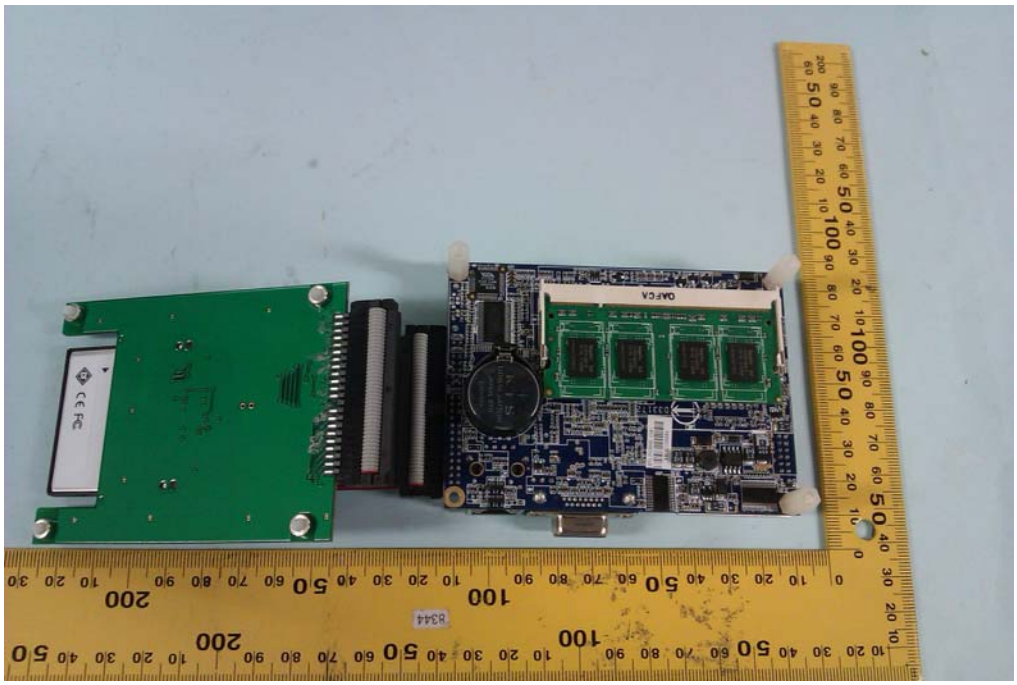
Underside view Aux PCB



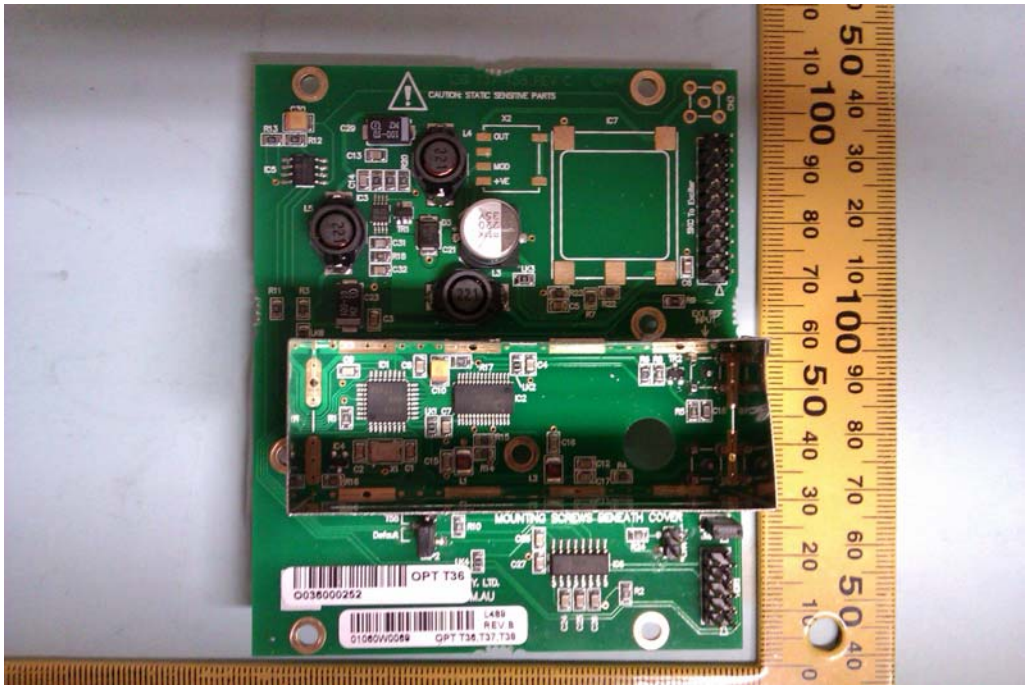
Photograph 11&12: Top View SBC



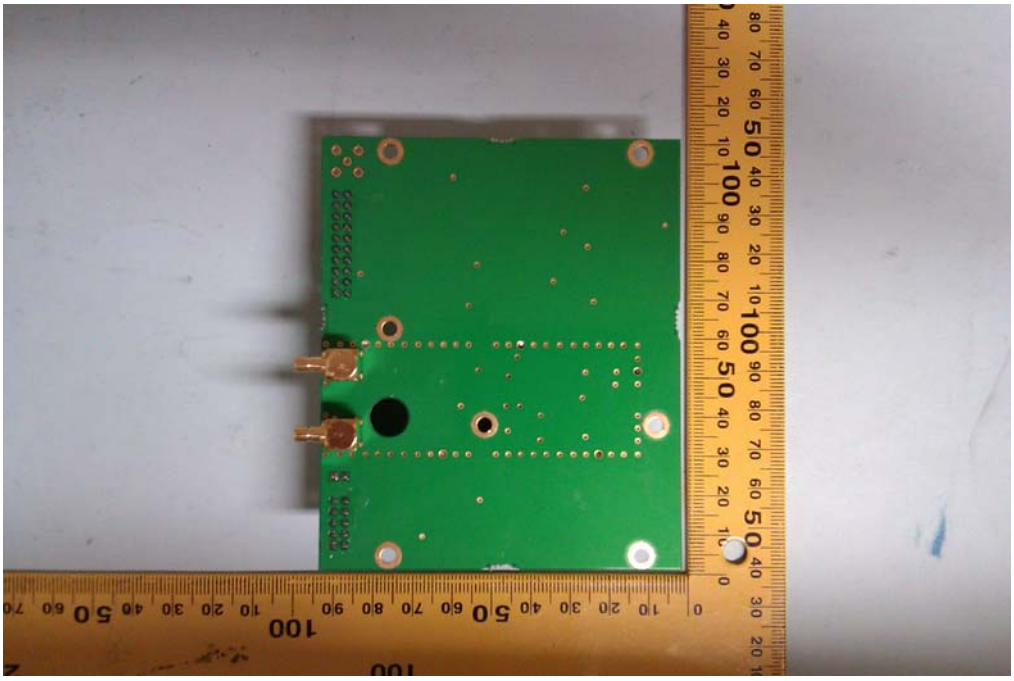
Underside view SBC



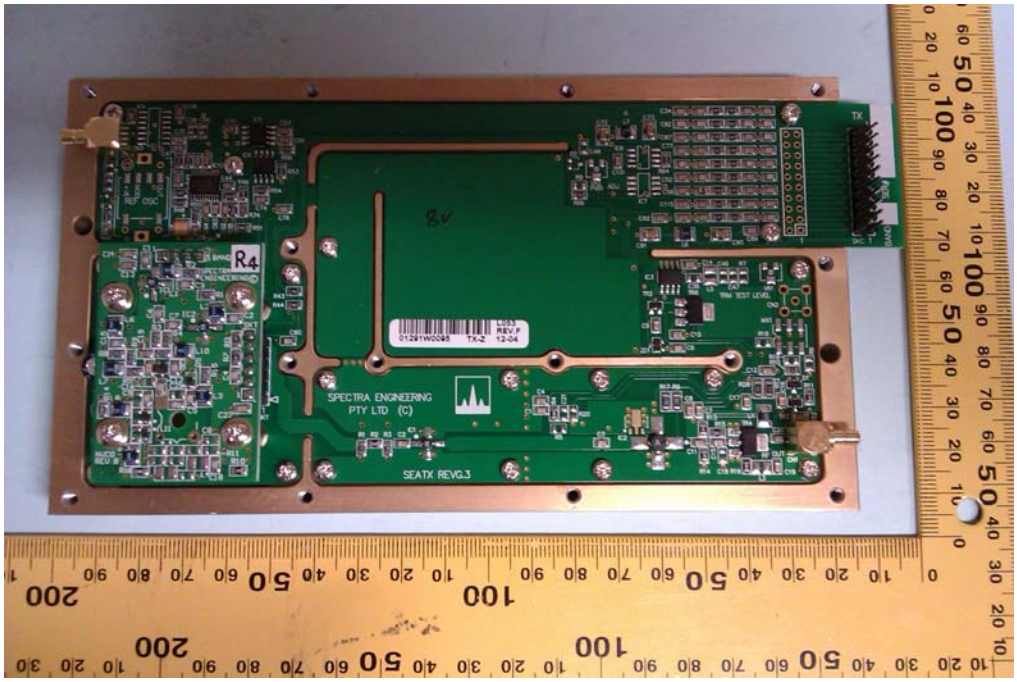
Photograph 13&14: Top View T36 Option PCB



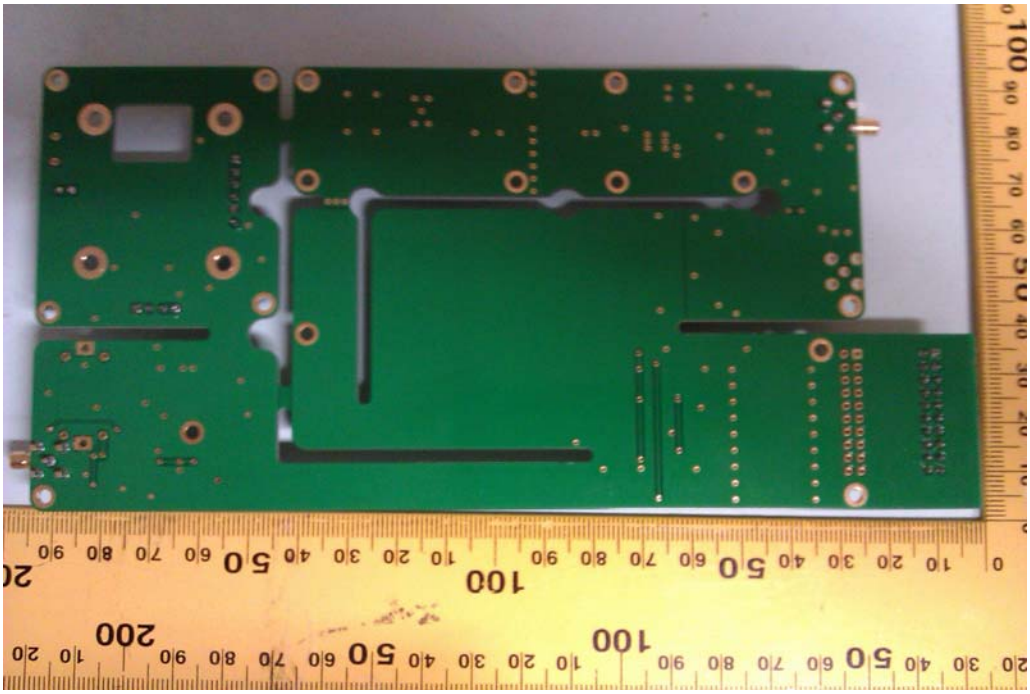
Underside view T36 Option PCB



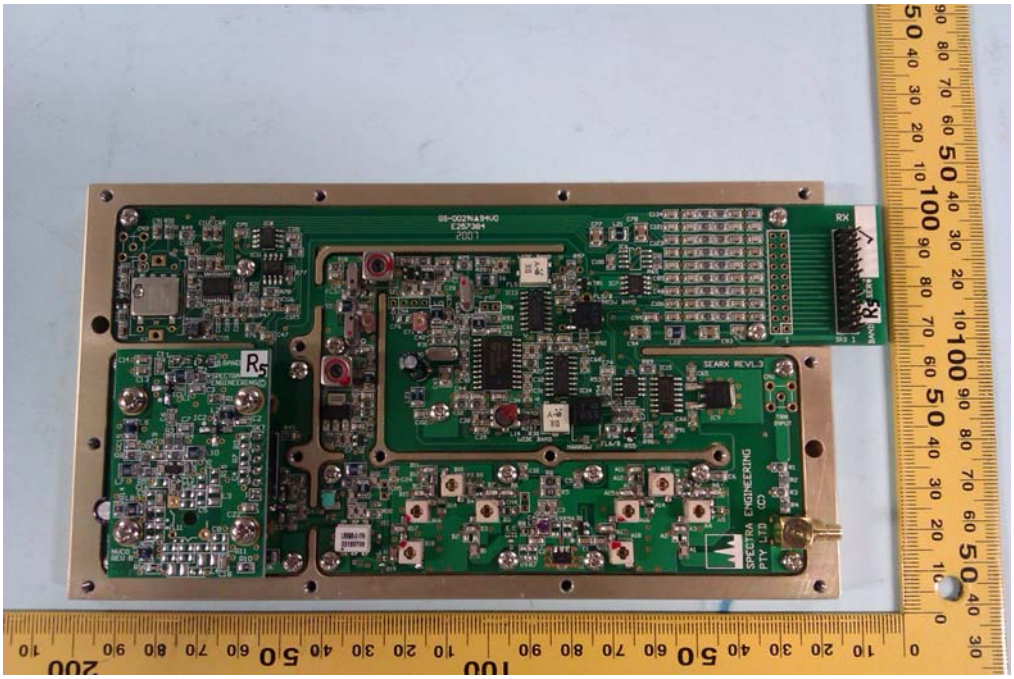
Photograph 15&16: Top View Tx'er exciter PCB



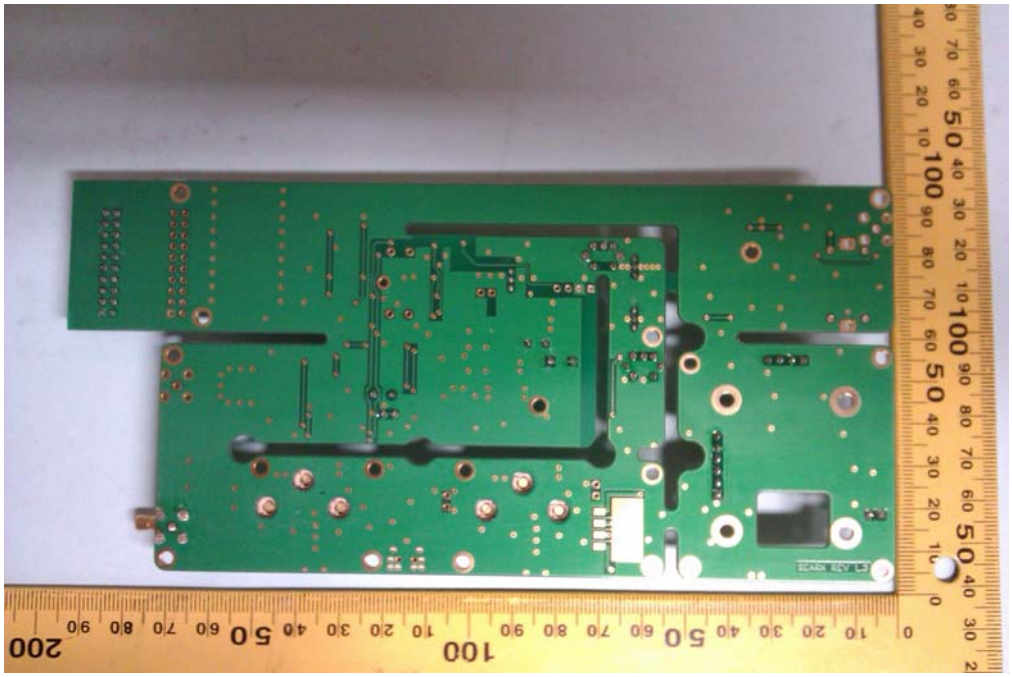
Underside view Tx'er exciter PCB



Photograph 17&18: Top View Rx'er PCB

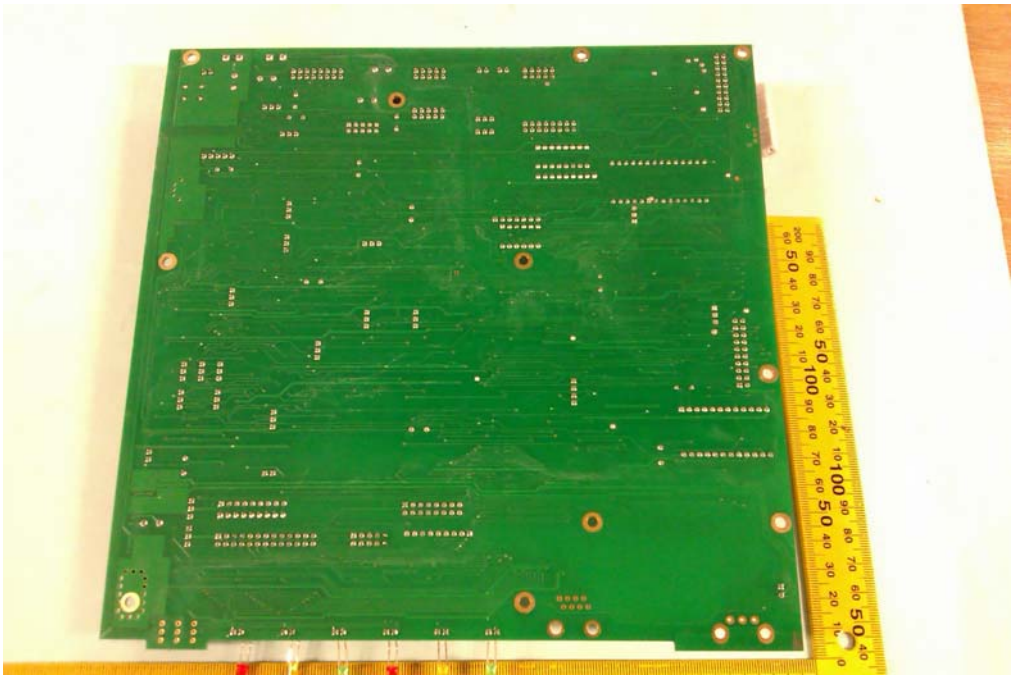


Underside view Rx'er PCB

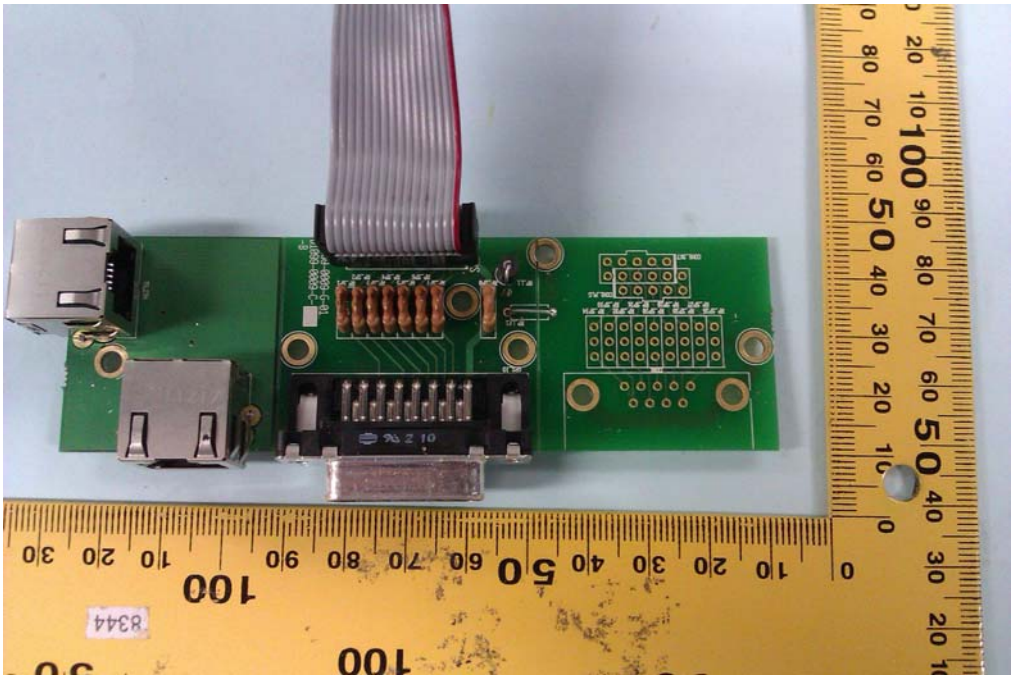


Photograph 19&20: Top View Controller PCB

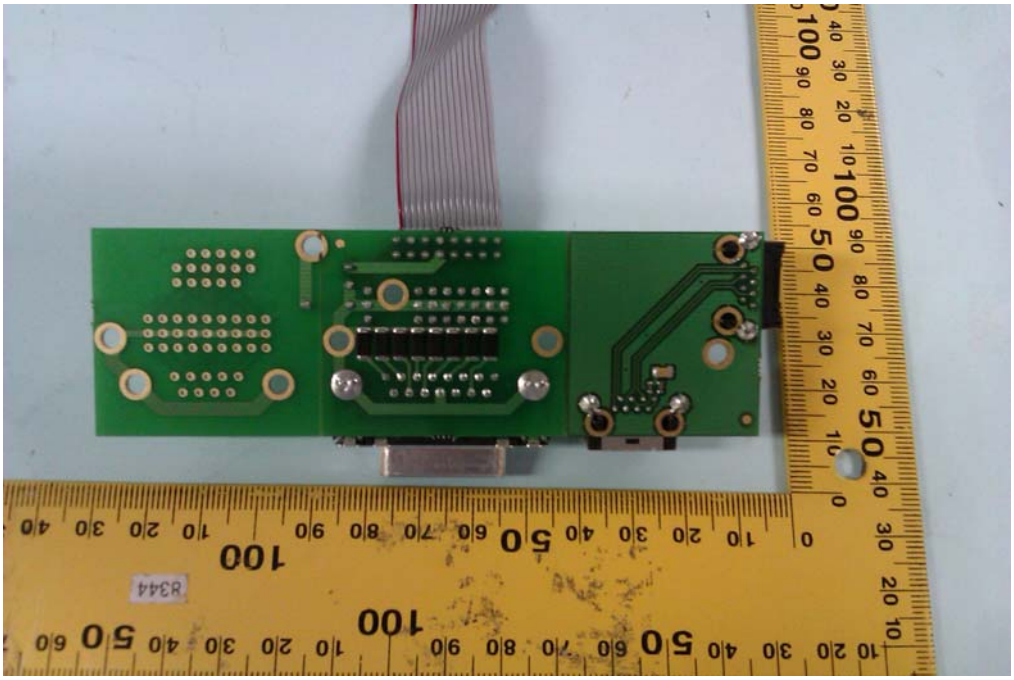
Underside view Controller PCB



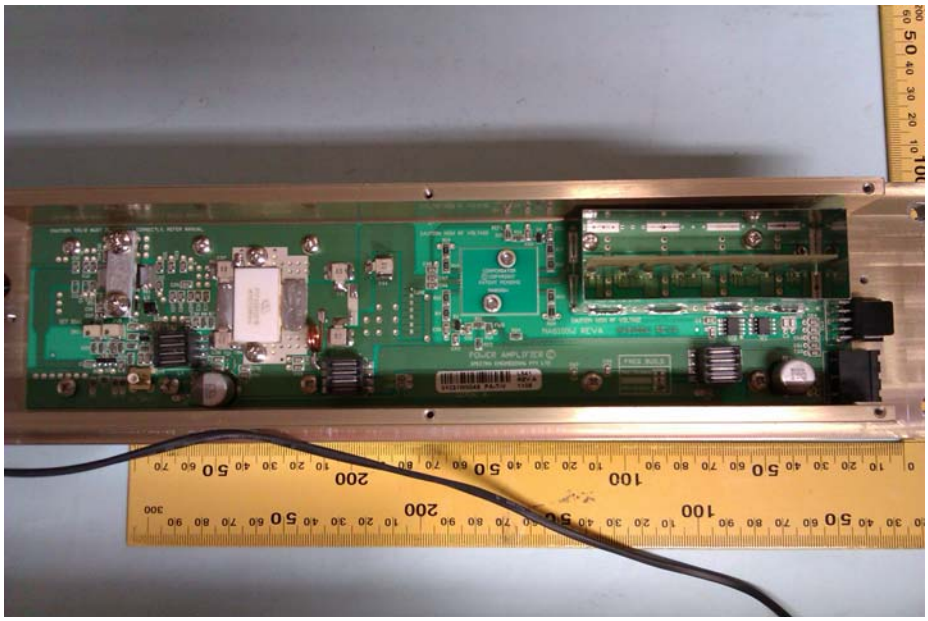
Photograph 21&22 Top View Digital I/O PCB



Underside view Digital I/O PCB



Photograph 23: Top View 100W P. A. PCB



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	[ ]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
j.	PCB TRACK LAYOUT	-	Tx	[ ]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

ANNEX C

EQUIPMENT CALIBRATION

TRAC Ref	Type	Description	Manufacturer	Date Calibrated.	Calibration due date
TRL281	FSU46	Spectrum Analyser	Rhode & Schwarz	02/12/2011	02/12/2013
TRL139	3115	Horn Antenna	EMCO	14/09/2011	14/09/2013
TRL572	8449B	Pre amp	Agilent	24/11/2011	24/11/2012
TRLUH04	ESVS10	Receiver	Rhode & Schwarz	12/01/2012	12/01/2013
TRLUH93	CBL6112B	Antenna	Chase	20/06/2011	20/06/2013
TRL222	8304-100-N	ATTENUATOR	BIRD	Cal In Use	Cal In Use
TRLUH225	745357	ATTENUATOR	SPINNER	Cal In Use	Cal In Use
REF916	SMBV100A	Signal Generator	Rhode & Schwarz	Level checked as required	Level checked as required
TRL426	52 Series 11	Temperature Indicator	Fluke	04/03/2012	04/03/2013
TRL11	-	Environmental Chamber	Sharetree	USE TRL426	USE TRL426
TRLUH41	M3004	Multimeter	AVOmeter	16/03/2012	16/03/2013
TRLUH194	AP60/50	Power Supply	Farnell	USE TRLUH41	USE TRLUH41
REF827	3TNF-500/1000	FILTER	K&L MICOWAVE	Calibrate in use	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 (Power Meter) = **1.08dB**
Uncertainty in test result (Spectrum Analyser) = **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 (Power Meter) = **0.113ppm**
Uncertainty in test result (Spectrum Analyser) = **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 – Up to 8.1GHz = **3.31dB**
Uncertainty in test result – 8.1GHz – 15.3GHz = **4.43dB**
Uncertainty in test result – 15.3GHz – 21GHz = **5.34dB**
Uncertainty in test result – 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%**

[12] Power Line Conduction

Uncertainty in test result = **3.4dB**

[13] Spectrum Mask Measurements

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

[14] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[15] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[16] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[17] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[18] Receiver Threshold

Uncertainty in test result = **3.23dB**

[19] Transmission Time Measurement

Uncertainty in test result = **7.98%**

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testing regulatory and compliance

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