

REPORT ON THE CERTIFICATION TESTING OF
M02WS101/US Wireless Probe
M02WS103/US Repeater Module
M02WS104/US Wireless Probe with external sensors
&
M02LCMU101/US (Base Unit)
THE FCC RULES CFR 47, PART 15.249 July 10th 2008
INTENTIONAL RADIATOR SPECIFICATION
ON BEHALF OF
TEKTRONIKS Ltd

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INTENTIONAL RADIATOR SPECIFICATION
ON BEHALF OF
TEKTRONIKS Ltd

TEST DATE: 29th April – 19th May 2009

TESTED BY: _____ p.p. S HODGKINSON

APPROVED BY: _____ J CHARTERS
PRODUCT MANAGER

DATE: 7th August 2009

Distribution:

- Copy Nos: 1. Tektroniks Ltd
2. TRaC Telecoms & Radio

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The results herein relate only to the sample tested. Full results are contained in the relevant works order file.

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Notes:		
1. Component failure during test	YES	<input type="checkbox"/>
	NO	<input checked="" type="checkbox"/>
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: XAXYASY210007

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.249

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: M02WS101/US M02WS104/US Wireless probes
M02WS103/US M02WS105/U/S Wireless PT Ext range
M02WS104/US M02WS106/U/S Wireless probe -100 +200 PT1000
M02LCMU101/US (Base) M02WS107/U/S Wireless probe -200 +40 PT1000
M02WS108/U/S Wireless probe 4-20mA
M02WS111/U/S Wireless Plant 4 Channel

ITU: EMISSION CODE: 1M72K3D

EQUIPMENT TYPE: Data Transmission

PRODUCT USE: Temperature Monitoring

CARRIER EMISSION: M02WS101US = 92.0 dBµV/m / 39.81mV/m @ 3mtr

FREQUENCY OF OPERATION: 915.0MHz – 916.2MHz

CHANNEL SPACING: Wideband

NUMBER OF CHANNELS: 6

FREQUENCY GENERATION: SAW Resonator ☐ Crystal ☒ Synthesiser ☒

MODULATION METHOD: FHSS ☐ DSSS ☐ Other ☒

POWER SOURCE(s): 110Vac Base Unit / +3.6Vdc Sensor Unit

TEST DATE(s): 29th April – 19th May 2009

ORDER No(s): 4529

APPLICANT: Tektroniks Ltd

ADDRESS: Unit 21
Manvers Business Park
High Hazels Road
Cotgrave
Nottingham
NG12 3GZ

TESTED BY: _____ p.p. S HODGKINSON

APPROVED BY: _____ J CHARTERS
PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST:	M02WS101/US M02WS103/US M02WS104/US M02LCMU101/US (Base)	M02WS104/US Wireless probes M02WS105/U/S Wireless PT Ext range M02WS106/U/S Wireless probe -100 +200 PT1000 M02WS107/U/S Wireless probe -200 +40 PT1000 M02WS108/U/S Wireless probe 4-20mA M02WS111/U/S Wireless Plant 4 Channel
EQUIPMENT TYPE:	Data Transmission	
PURPOSE OF TEST:	Certification	
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.249	
TEST RESULT:	COMPLIANT	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
APPLICANT'S CATEGORY:	MANUFACTURER IMPORTER DISTRIBUTOR TEST HOUSE AGENT	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
APPLICANT'S ORDER No(s):	4529	
APPLICANT'S CONTACT PERSON(s):	Steve Smith	
E-mail address:	stevesmith@tektroniks.co.uk	
APPLICANT:	Tektroniks Ltd	
ADDRESS:	Unit 21 Manvers Business Park High Hazels Road Cotgrave Nottingham NG12 3GZ	
TEL:	0115 9890090	
FAX:	0115 9890048	
EUT(s) COUNTRY OF ORIGIN:	United Kingdom	
TEST LABORATORY:	TRaC Telecoms & Radio	
UKAS ACCREDITATION No:	0971	
TEST DATE(s) :	29 th April – 19 th May 2009	
TEST REPORT No:	9F2240WRP1	

Equipment description: The system is used for temperature monitoring.

The system consists of a

M02LCMU101/US Base station transceiver unit

M02WS101/US transceiver Wireless probe

M02WS103/US transceiver Repeater Module

M02WS104/US transceiver Wireless probe with external sensors

The wireless probe can be used as a stand alone unit, a repeater unit, or with the addition of the plug in probes used for monitoring different temperature ranges.

M02WS105/U/S Wireless PT Ext range

M02WS106/U/S Wireless probe -100 +200 PT1000

M02WS106/U/S Wireless probe -100 +200 PT1000

M02WS107/U/S Wireless probe -200 +40 PT1000

M02WS111/U/S Wireless Plant 4 Channel

The components and PCB layout of the above units are identical but use a different temperature range .The temperature range is determined by the manufacturers software.

M02WS108/U/S Wireless probe 4-20mA

The components and PCB layout of the current probe differ from the above probes

The probe requires an external current source 4-20mA

See Annex A for photographs.

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Intentional Emission Frequency:	15.249(a)	Peak	Yes
	Intentional Emission Field Strength:	15.209(a)	Quasi Peak	Yes
	Intentional Emission Band Occupancy:	15.215(c)	Peak	Yes
	Intentional Emission ERP (mW):	-	-	No
	Spurious Emissions – Conducted:	15.207	Quasi Peak Average	Yes
	Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak Average	Yes
	Spurious Emissions – Radiated >1000MHz:	-	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

2. Product Use: Temperature Monitoring
3. Emission Designator: 1M72K3D
4. Duty Cycle: ≤100%
5. Temperatures: Ambient (Tnom) 20°C
6. Supply Voltages: Vnom Base Unit +110Vac
Sensor Units +3.6Vdc
Note: Vnom voltages are as stated above unless otherwise shown on the test report page
7. Equipment Category: Single channel ☐
Two channel ☐
Multi-channel ☒
8. Channel spacing: Narrowband ☐
Wideband ☒

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.249

M02LCMU101/US (Base unit)

Ambient temperature	=	18°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	49% (<1GHz),	1m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[X]
Supply voltage	=	110Vac		

BOTTOM CHANNEL	Emission Freq (GHz)	Meas. Rx. (dBuV)	Cable loss + Ant. Factor	Pulse	Extrap (dB)	Pre Amp (dB)	Field Strength (dBµV/m)	Result (µV/m)	Limit (µV/m)
30MHz - 88MHz	Emissions not attributable to the transmitter see Receiver spurious emissions								100
88MHz - 216MHz	Emissions not attributable to the transmitter see Receiver spurious emissions								150
216MHz - 960MHz	Emissions not attributable to the transmitter see Receiver spurious emissions								200
960MHz - 1GHz	Emissions not attributable to the transmitter see Receiver spurious emissions								500
1GHz - 10GHz	1.8300	65.39	27.09	N/A	N/A	35.70	56.78pk	690.24	5011
	1.8300	65.39	27.09	14.23	N/A	35.70	42.55AV	134.12	500
	2.7440	66.31	30.32	N/A	N/A	35.18	61.45pk	1181.68	5011
	2.7440	66.31	30.32	14.23	9.50	35.18	37.72AV	76.91	500
	3.6590	58.82	36.35	N/A	N/A	34.97	60.20pk	1023.39	5011
	3.6590	58.82	36.35	14.23	N/A	34.97	45.97AV	198.83	500
	4.5749	61.26	34.42	N/A	N/A	35.01	60.67pk	1080.19	5011
	4.5749	61.26	34.42	14.23	9.50	35.01	36.94AV	70.30	500
	5.4899	62.78	36.58	N/A	N/A	34.86	64.50pk	1678.80	5011
	5.4899	62.78	36.58	14.23	N/A	34.86	50.27AV	326.21	500
	6.4040	51.20	37.13	N/A	N/A	34.66	53.67pk	482.50	5011
	6.4040	51.20	37.13	14.23	9.50	34.66	29.94AV	31.40	500
	7.3199	63.15	38.04	N/A	N/A	35.20	65.99pk	1992.96	5011
	7.3199	63.15	38.04	14.23	9.50	35.20	42.26AV	129.71	500
LIMITS	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 10GHz		500µV/m @ 3m						

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.249

M02LCMU101/US (Base unit)

Ambient temperature	=	18°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	48% (<1GHz),	1m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[X]
Supply voltage	=	110Vac		

TOP CHANNEL	Emission Freq (GHz)	Meas. Rx. (dBuV)	Cable loss + Ant. Factor	Pulse	Extrap (dB)	Pre Amp (dB)	Field Strength (dBµV/m)	Result (µV/m)	Limit (µV/m)
30MHz - 88MHz	Emissions not attributable to the transmitter see Receiver spurious emissions								100
88MHz - 216MHz	Emissions not attributable to the transmitter see Receiver spurious emissions								150
216MHz - 960MHz	Emissions not attributable to the transmitter see Receiver spurious emissions								200
960MHz - 1GHz	Emissions not attributable to the transmitter see Receiver spurious emissions								500
1GHz - 10GHz	1.8324	66.17	27.96	N/A	N/A	35.60	58.53pk	844.30	5011
	1.8324	66.17	27.96	14.23	N/A	35.60	44.30AV	164.05	500
	2.7480	66.09	30.32	N/A	N/A	35.18	61.23pk	1152.12	5011
	2.7480	66.09	30.32	14.23	9.50	35.18	37.50AV	74.98	500
	3.6650	62.51	32.89	N/A	N/A	34.98	60.42pk	1049.54	5011
	3.6650	62.51	32.89	14.23	N/A	34.98	46.19AV	203.931	500
	4.5810	62.83	34.42	N/A	N/A	35.01	62.24pk	294.19	5011
	4.5810	62.83	34.42	14.23	9.50	35.01	38.51AV	84.23	500
	5.4970	61.96	36.58	N/A	N/A	34.86	63.68pk	1527.56	5011
	5.4970	61.96	36.58	14.23	N/A	34.86	49.45AV	296.82	500
	7.3290	62.93	38.04	N/A	N/A	35.16	65.81pk	1952.09	5011
	7.3290	62.93	38.04	14.23	9.50	35.16	42.08AV	127.05	500
LIMITS	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 10GHz			500µV/m @ 3m					

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.249

M02WS101/US Wireless Probe

Ambient temperature	=	13°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	52% (<1GHz),	1m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[X]
Supply voltage	=	3.6Vdc		

BOTTOM CHANNEL	Emission Freq (GHz)	Meas. Rx. (dBuV)	Cable loss + Ant. Factor	Pulse	Extrap (dB)	Pre Amp (dB)	Field Strength (dBµV/m)	Result (µV/m)	Limit (µV/m)
30MHz - 88MHz									
88MHz - 216MHz									
216MHz - 960MHz	863.00	14.42	25.18	N/A	N/A	N/A	39.60	95.49	200
960MHz - 1GHz									
1GHz - 10GHz	1.8300	65.11	27.09	N/A	N/A	35.70	56.50pk	668.34	5011
	1.8300	65.11	27.09	14.23	N/A	35.70	42.27AV	129.86	500
	2.7449	66.10	30.32	N/A	N/A	35.18	61.24pk	1153.45	5011
	2.7449	66.10	30.32	14.23	N/A	35.18	47.01AV	224.13	500
	3.6600	58.85	36.35	N/A	N/A	34.97	60.23pk	1026.83	5011
	3.6600	58.85	36.35	14.23	N/A	34.97	46.00AV	199.52	500
	4.5750	62.23	34.42	N/A	N/A	35.01	61.64pk	1207.81	5011
	4.5750	62.23	34.42	14.23	N/A	35.01	47.41AV	234.69	500
	5.4900	62.90	36.58	N/A	N/A	34.86	64.62pk	1702.15	5011
	5.4900	62.90	36.58	14.23	N/A	34.86	50.39AV	330.75	500
	6.4050	61.19	37.13	N/A	N/A	34.66	63.66pk	1524.05	5011
	6.4050	61.19	37.13	14.23	9.50	34.66	39.93AV	99.19	500
	7.3200	63.30	38.04	N/A	N/A	35.20	66.14pk	2027.68	5011
	7.3200	63.30	38.04	14.23	9.50	35.20	42.41AV	131.97	500
LIMITS	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 10GHz			500µV/m @ 3m					

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.249

M02WS101/US Wireless Probe

Ambient temperature	=	13°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	52% (<1GHz),	1m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[X]
Supply voltage	=	3.6Vdc		

TOP CHANNEL	Emission Freq (GHz)	Meas. Rx. (dBuV)	Cable loss + Ant. Factor	Pulse	Extrap (dB)	Pre Amp (dB)	Field Strength (dBµV/m)	Result (µV/m)	Limit (µV/m)
30MHz - 88MHz									
88MHz - 216MHz									
216MHz - 960MHz	864.20	14.82	25.18	N/A	N/A	N/A	40.00	100	200
960MHz - 1GHz									
1GHz - 10GHz	1.8323	64.14	27.96	N/A	N/A	35.60	56.50pk	668.34	5011
	1.8323	64.14	27.96	14.23	N/A	35.60	42.27AV	125.89	500
	2.7500	54.13	30.32	N/A	N/A	35.18	49.24pk	289.73	5011
	2.7500	54.13	30.32	14.23	N/A	35.18	35.04AV	56.23	500
	3.6647	59.70	32.89	N/A	N/A	34.98	57.61pk	759.45	5011
	3.6647	59.70	32.89	14.23	N/A	34.98	43.38AV	147.57	500
	4.5809	51.18	34.42	N/A	N/A	35.01	50.59pk	338.45	5011
	4.5809	51.18	34.42	14.23	N/A	35.01	36.36AV	65.76	500
	5.4971	60.64	36.58	N/A	N/A	34.86	62.36pk	1312.2	5011
	5.4971	60.64	36.58	14.23	N/A	34.86	48.13AV	254.97	500
LIMITS	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 10GHz		500µV/m @ 3m						

Notes:

- 1 Results quoted are extrapolated as indicated
- 2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
- 3 Extrapolation factor 9.54dB from 1m to 3m, as per Part 15.31f
- 4 Receiver detector >1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
- 5 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth
- 6 New batteries used for battery powered products.
- 7 Emissions 20dB's below the limit are not recorded
- 8 For pulse desensitization and distance correction factors see annex F
- 9 When the wireless probe was connected to any of the additional probes
There were no significant changes to the emission profiles.
See scan plots Annex D.

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	X
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU	200034	281	X
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	EVS 10	825892	UH04	X
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	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
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841429/012	UH187	

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.249

Ambient temperature = 10°C(<1GHz),
 Relative humidity = 51%(<1GHz), 3m measurements @ fc [X]
 Conditions = Open Area Test Site (OATS)
 Supply voltage = +3.6Vdc

M02WS101/US Wireless Probe

Frequency MHz	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dB/m)	Pre Amp (dB)	Field Strength (dBμV/m)	Result (mV/m)	Limit (mV/m)
915.0	63.95	7.24	20.81	N/A	92.00	39.81	50
916.2	63.83	7.26	20.81	N/A	91.90	39.35	50
Band occupancy @ 20dBc		f lower(MHz)		f higher(MHz)		Bandwidth (kHz)	
915.0MHz		914.769230		915.296474		527.24	
916.2MHz		915.966346		916.498397		532.05	

See spectrum analyser plot – Annex B

Notes:
 1 Results quoted are extrapolated as indicated
 2 Receiver detector @ fc = Quasi peak 120kHz bandwidth

Test Method:
 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
 2 Measuring distances 3m
 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 Intentional Emission – Radiated – Part 15.249 tests is shown overleaf:

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.249

Ambient temperature = 10°C(<1GHz),
 Relative humidity = 51%(<1GHz), 3m measurements @ fc [X]
 Conditions = Open Area Test Site (OATS)
 Supply voltage = +110Vac

M02LCMU101/US (Base Unit)

Frequency MHz	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dB/m)	Pre Amp (dB)	Field Strength (dBμV/m)	Result (mV/m)	Limit (mV/m)
915.0	63.75	7.24	20.81	N/A	91.80	38.90	50
916.2	63.53	7.26	20.81	N/A	91.60	38.01	50
Band occupancy @ 20dBc		f lower(MHz)		f higher(MHz)		Bandwidth (kHz)	
915.0MHz		914.758012		915.312500		554.48	
916.2MHz		915.953525		916.527243		573.71	

See spectrum analyser plot – Annex B

Notes:
 1 Results quoted are extrapolated as indicated
 2 Receiver detector @ fc = Quasi peak 120kHz bandwidth
 3 Transmitter output power inclusive of 2dBi antenna gain as per antenna manufacturer's data sheet.

Test Method:
 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
 2 Measuring distances 3m
 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 Intentional Emission – Radiated – Part 15.249 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RANGE 1	TRL	3 METRE	N/A	UH06	X
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU	200034	281	X
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
RECEIVER	ROHDE & SCHWARZ	EVS 10	825892	UH04	X
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841429/012	UH187	X
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	
RANGE 1	TRL	3 METRE	N/A	UH06	
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

TRANSMITTER TESTS

TRANSMITTER CONDUCTED EMISSIONS – AC POWER LINE Part 15.207

Ambient temperature = 10°C(<1GHz),
 Relative humidity = 51%(<1GHz),
 Conditions = Power Line Laboratory
 Supply voltage = 110V AC
 Supply Frequency = 60Hz

M02LCMU101/US (Base Unit)

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	EMISSION (dBµV) LIMIT
0.295	45.19	QUASI PEAK	Live Line	60.38
0.415	42.15	QUASI PEAK	Live Line	57.55
0.475	43.07	QUASI PEAK	Live Line	56.43
0.530	38.77	QUASI PEAK	Live Line	56.00
0.590	42.00	QUASI PEAK	Live Line	56.00
0.595	41.88	QUASI PEAK	Live Line	56.00
0.655	40.49	QUASI PEAK	Live Line	56.00
0.710	43.63	QUASI PEAK	Live Line	56.00
0.770	42.84	QUASI PEAK	Live Line	56.00
0.830	42.66	QUASI PEAK	Live Line	56.00
0.890	42.72	QUASI PEAK	Live Line	56.00
0.945	41.85	QUASI PEAK	Live Line	56.00
1.010	41.92	QUASI PEAK	Live Line	56.00
1.070	40.57	QUASI PEAK	Live Line	56.00
1.125	40.31	QUASI PEAK	Live Line	56.00
1.190	36.61	QUASI PEAK	Live Line	56.00
1.250	37.41	QUASI PEAK	Live Line	56.00
1.485	39.94	QUASI PEAK	Live Line	56.00
1.540	44.12	QUASI PEAK	Live Line	56.00
1.605	42.81	QUASI PEAK	Live Line	56.00
1.660	42.67	QUASI PEAK	Live Line	56.00
1.720	40.95	QUASI PEAK	Live Line	56.00
1.775	42.87	QUASI PEAK	Live Line	56.00
1.840	39.12	QUASI PEAK	Live Line	56.00
1.900	38.24	QUASI PEAK	Live Line	56.00
1.955	38.26	QUASI PEAK	Live Line	56.00
2.135	36.88	QUASI PEAK	Live Line	56.00
2.610	36.96	QUASI PEAK	Live Line	56.00
2.730	37.24	QUASI PEAK	Live Line	56.00
9.525	48.91	QUASI PEAK	Live Line	60.00
13.420	42.62	QUASI PEAK	Live Line	60.00
15.435	43.15	QUASI PEAK	Live Line	60.00
16.230	47.54	QUASI PEAK	Live Line	60.00
16.900	42.53	QUASI PEAK	Live Line	60.00
17.695	44.61	QUASI PEAK	Live Line	60.00
18.245	45.40	QUASI PEAK	Live Line	60.00
20.260	43.96	QUASI PEAK	Live Line	60.00
23.130	45.36	QUASI PEAK	Live Line	60.00
24.535	40.91	QUASI PEAK	Live Line	60.00
27.160	41.08	QUASI PEAK	Live Line	60.00

TRANSMITTER TESTS

TRANSMITTER CONDUCTED EMISSIONS – AC POWER LINE Part 15.207

Ambient temperature = 10°C(<1GHz),
Relative humidity = 51%(<1GHz),
Conditions = Power Line Laboratory
Supply voltage = 110V AC
Supply Frequency = 60Hz

M02LCMU101/US (Base Unit)

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	EMISSION (dBµV) LIMIT
0.295	36.76	AVERAGE	Live Line	50.38
0.415	34.68	AVERAGE	Live Line	47.55
0.475	34.31	AVERAGE	Live Line	46.43
0.530	29.79	AVERAGE	Live Line	46.00
0.535	31.58	AVERAGE	Live Line	46.00
0.655	31.78	AVERAGE	Live Line	46.00
0.710	35.45	AVERAGE	Live Line	46.00
0.770	34.25	AVERAGE	Live Line	46.00
0.890	32.93	AVERAGE	Live Line	46.00
0.945	32.07	AVERAGE	Live Line	46.00
0.950	33.73	AVERAGE	Live Line	46.00
1.070	30.56	AVERAGE	Live Line	46.00
1.245	30.34	AVERAGE	Live Line	46.00
1.250	26.59	AVERAGE	Live Line	46.00
1.485	30.04	AVERAGE	Live Line	46.00
1.540	34.61	AVERAGE	Live Line	46.00
1.605	32.09	AVERAGE	Live Line	46.00
1.660	33.80	AVERAGE	Live Line	46.00
1.720	31.33	AVERAGE	Live Line	46.00
1.775	33.23	AVERAGE	Live Line	46.00
1.840	29.64	AVERAGE	Live Line	46.00
1.900	29.39	AVERAGE	Live Line	46.00
1.960	27.81	AVERAGE	Live Line	46.00
2.135	28.07	AVERAGE	Live Line	46.00
2.730	27.36	AVERAGE	Live Line	46.00
9.525	42.91	AVERAGE	Live Line	46.00
12.810	32.60	AVERAGE	Live Line	50.00
13.420	35.64	AVERAGE	Live Line	50.00
14.215	34.59	AVERAGE	Live Line	50.00
15.435	35.41	AVERAGE	Live Line	50.00
16.230	38.87	AVERAGE	Live Line	50.00
16.900	35.33	AVERAGE	Live Line	50.00
17.695	38.41	AVERAGE	Live Line	50.00
18.245	38.50	AVERAGE	Live Line	50.00
18.915	34.22	AVERAGE	Live Line	50.00
19.710	37.65	AVERAGE	Live Line	50.00
20.810	33.50	AVERAGE	Live Line	50.00
21.665	35.46	AVERAGE	Live Line	50.00
22.580	32.91	AVERAGE	Live Line	50.00
23.010	38.12	AVERAGE	Live Line	50.00
24.535	34.49	AVERAGE	Live Line	50.00
25.695	33.65	AVERAGE	Live Line	50.00
26.610	35.92	AVERAGE	Live Line	50.00
27.160	35.25	AVERAGE	Live Line	50.00

Notes:

- 1 See worst case plot in Annex E.
- 2 Measurements were taken of both live and neutral lines.
- 3 Only emissions within 20dBs of the limit are recorded.
- 4 Only worse case emission listed .

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 15.249 test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/01	UH03	X
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	X

RECEIVER TESTS

RECEIVER SPURIOUS EMISSIONS – RADIATED – PART 15.109

M02LCMU101/US (Base unit)

Ambient temperature	=	13°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	52% (<1GHz),	1m measurements >1GHz	[]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[]
Supply voltage	=	110Vac		

Rx operating in normal mode	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dB/m)	Pre Amp (dB)	Field Strength (dBµV/m)	Result (µV/m)	Limit (µV/m)
30MHz - 88MHz	50.00	21.95	1.11	7.74	N/A	30.80	34.67	100
	58.70	24.09	1.13	5.48	N/A	30.70	34.27	
	60.00	23.98	1.13	5.09	N/A	30.20	32.35	
	60.20	27.78	1.13	5.09	N/A	34.00	50.11	
	64.80	21.92	1.20	4.88	N/A	28.00	25.11	
	65.60	16.64	1.23	4.93	N/A	22.80	13.80	
	67.50	20.58	1.22	5.00	N/A	26.80	21.87	
	68.45	21.70	1.22	5.08	N/A	28.00	25.00	
	69.15	23.24	1.21	5.15	N/A	29.60	30.20	
	69.40	19.55	1.21	5.24	N/A	26.00	19.95	
	70.85	19.55	1.21	5.24	N/A	26.00	19.95	
	71.50	18.63	1.22	5.35	N/A	25.20	18.19	
	72.20	18.38	1.22	5.50	N/A	25.10	17.98	
	73.10	19.37	1.24	5.59	N/A	26.20	20.40	
	74.60	17.57	1.24	5.69	N/A	24.50	16.78	
	75.00	19.89	1.27	5.84	N/A	27.00	22.38	
	78.80	16.52	1.29	6.39	N/A	24.20	15.84	
	79.70	14.62	1.30	6.68	N/A	22.60	13.49	
	80.70	15.01	1.31	6.68	N/A	23.00	13.49	
	82.50	16.59	1.32	7.09	N/A	25.00	17.78	
	83.45	16.82	1.33	7.25	N/A	25.40	18.62	
	84.40	16.54	1.35	7.51	N/A	25.40	18.62	
	87.20	17.52	1.37	8.11	N/A	27.00	22.38	

RECEIVER TESTS

RECEIVER SPURIOUS EMISSIONS – RADIATED – PART 15.109

M02LCMU101/US (Base unit)

Rx operating in normal mode	Emission Frequency (MHz)	Meas. Rx. (dBuV)	Cable loss (dB)	Ant. Factor (dB/m)	Pre Amp (dB)	Field Strength (dBµV/m)	Result (µV/m)	Limit (µV/m)
88MHz - 216MHz	88.15	19.01	1.37	8.32	N/A	28.70	27.22	150
	90.95	19.91	1.37	8.72	N/A	30.00	31.63	
	100.00	19.91	1.41	10.38	N/A	31.70	38.45	
	108.75	14.33	1.48	11.19	N/A	27.00	22.38	
	111.45	15.39	1.50	11.41	N/A	28.30	26.00	
	112.45	14.98	1.51	11.41	N/A	27.90	24.00	
	113.40	11.06	1.52	11.42	N/A	24.00	15.84	
	116.25	22.30	1.53	11.47	N/A	35.30	58.21	
	120.00	27.41	1.57	11.52	N/A	40.50	105.92	
	121.00	12.91	1.57	11.52	N/A	26.00	19.95	
	123.75	21.43	1.55	11.52	N/A	34.50	53.08	
	127.50	25.95	1.55	11.50	N/A	39.00	89.12	
	128.50	13.95	1.55	11.50	N/A	27.00	22.38	
	138.75	20.60	1.60	11.00	N/A	33.20	45.70	
	140.65	18.43	1.69	10.88	N/A	31.00	35.48	
	142.50	26.01	1.69	10.50	N/A	38.20	81.28	
	147.20	16.30	1.70	10.00	N/A	28.60	26.91	
	150.00	27.04	1.71	9.95	N/A	38.70	86.09	
	157.50	23.57	1.73	9.50	N/A	34.80	54.95	
	161.30	17.76	1.74	9.40	N/A	28.90	27.86	
	165.00	21.94	1.77	9.29	N/A	33.00	44.66	
	172.50	25.29	1.81	8.80	N/A	35.90	62.37	
	176.25	16.37	1.83	8.60	N/A	26.80	21.87	
	180.00	28.04	1.84	8.32	N/A	38.20	81.28	
	187.50	15.77	1.85	8.38	N/A	26.00	19.95	
	189.70	11.08	1.90	8.42	N/A	21.40	11.74	
	200.00	19.51	1.92	8.67	N/A	30.10	31.98	
	215.60	14.19	1.99	8.22	N/A	24.40	16.59	
216MHz - 960MHz	348.75	9.12	2.50	14.38	N/A	26.00	19.95	200
	375.05	12.48	2.59	15.03	N/A	30.10	31.98	
	500.05	15.76	3.02	17.22	N/A	36.00	63.09	
960MHz - 1GHz	No significant emissions							500
1GHz - 10GHz	No significant emissions							5011pk 500 AV
LIMITS	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 10GHz		500µV/m @ 3m					

The test equipment used for the Receiver Spurious emissions test 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	X
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU	200034	281	X
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	EVS 10	825892	UH04	X
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	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
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841429/012	UH187	

ANNEX A
PHOTOGRAPHS

PHOTOGRAPH No. 1

M02WS101/US Wireless Probe

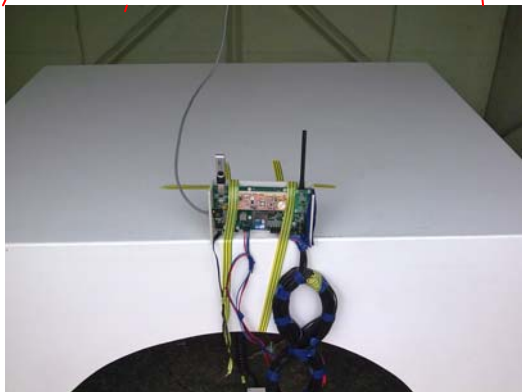
E - FIELD TEST SETUP



PHOTOGRAPH No. 2

M02LCMU101/US (Base Unit)

E - FIELD TEST SETUP



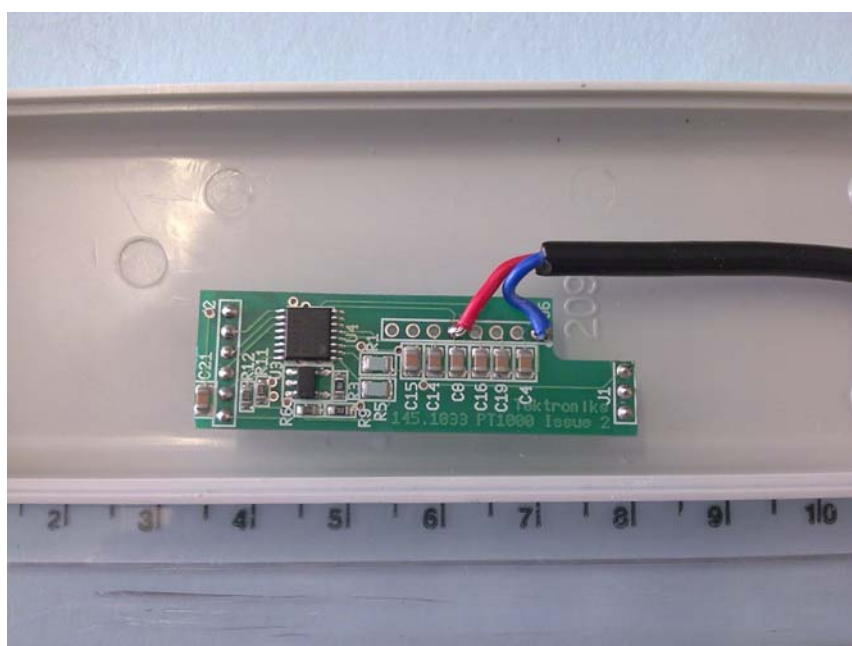


Top view of PCB



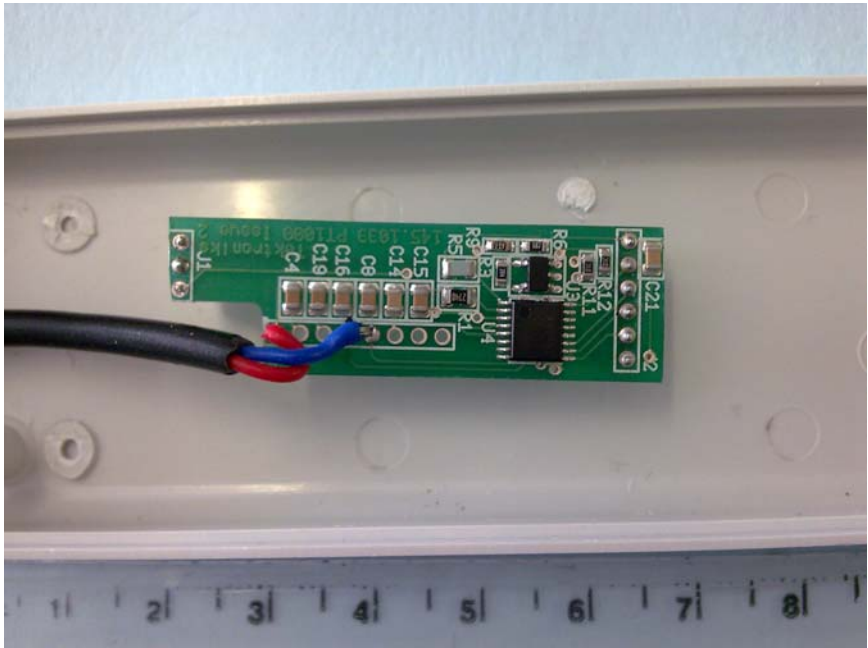


Top view of PCB



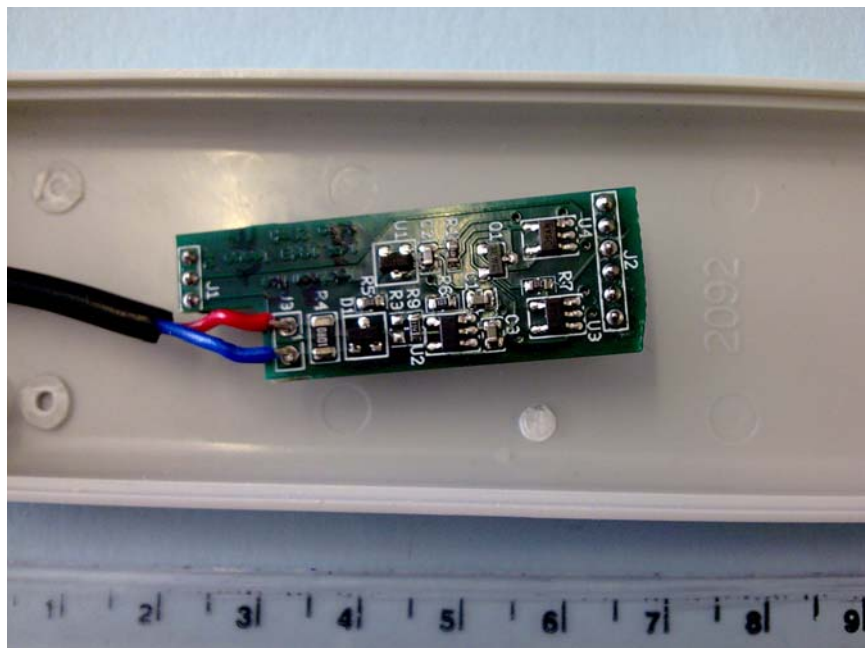


Top view of PCB



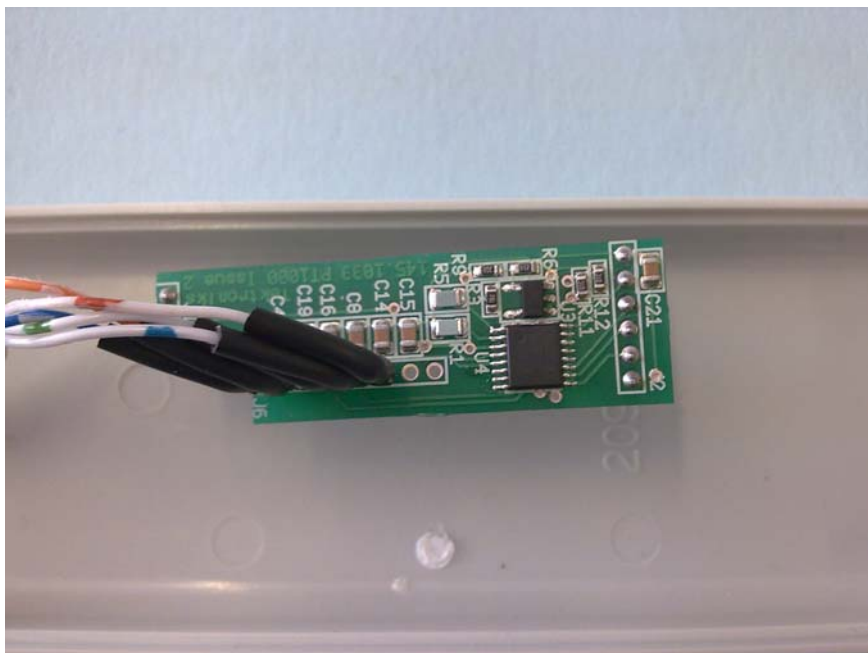


Top view of PCB





Top view of PCB



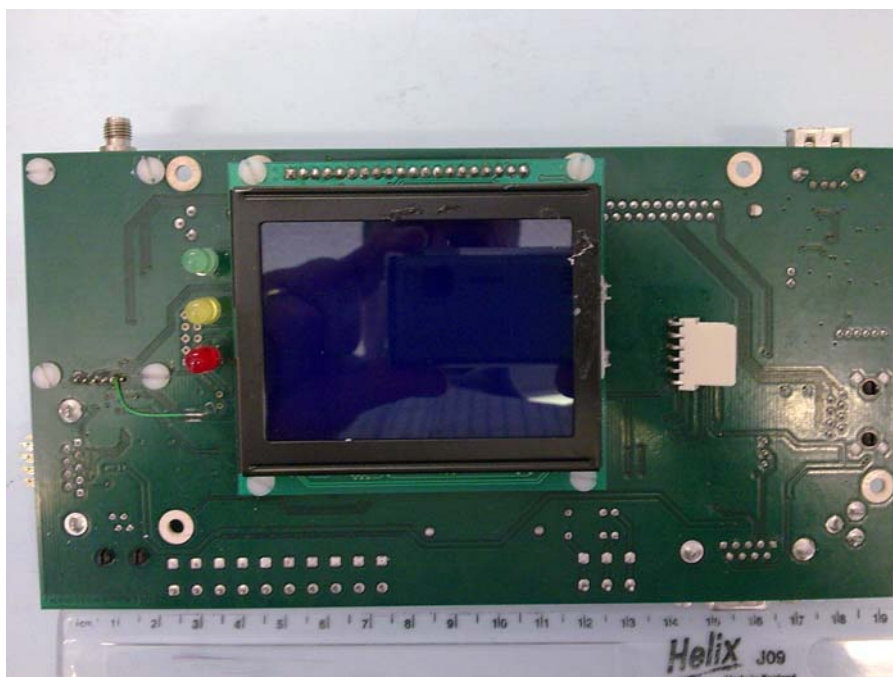
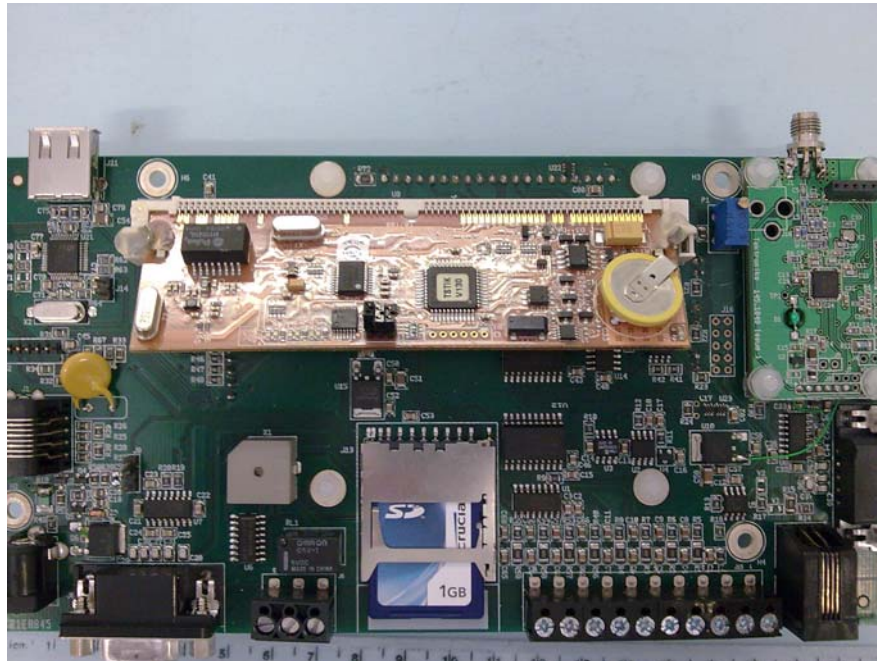
PHOTOGRAPH No. 8

M02LCMU101/US
Overview



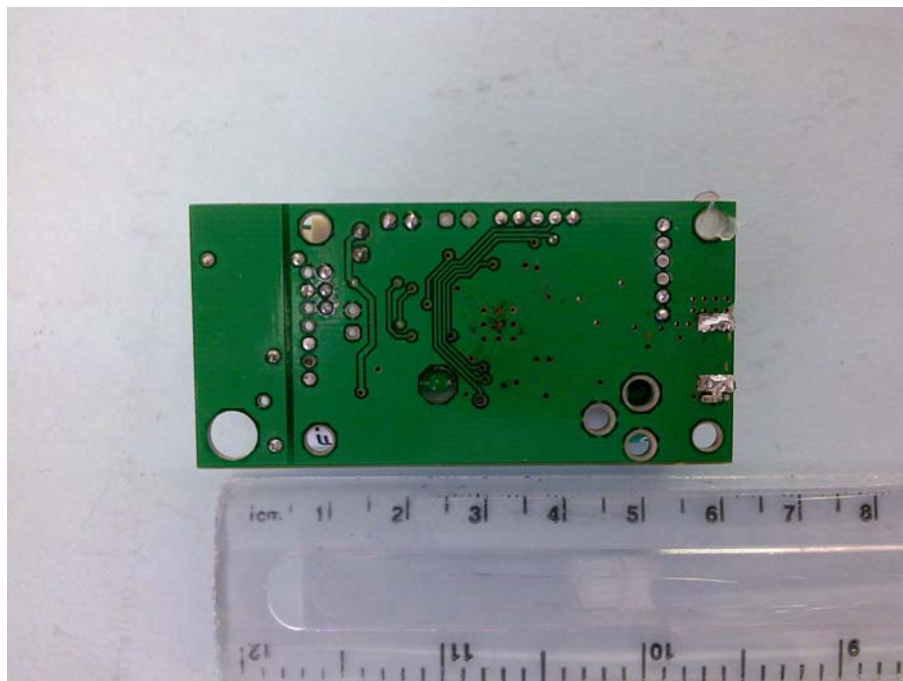
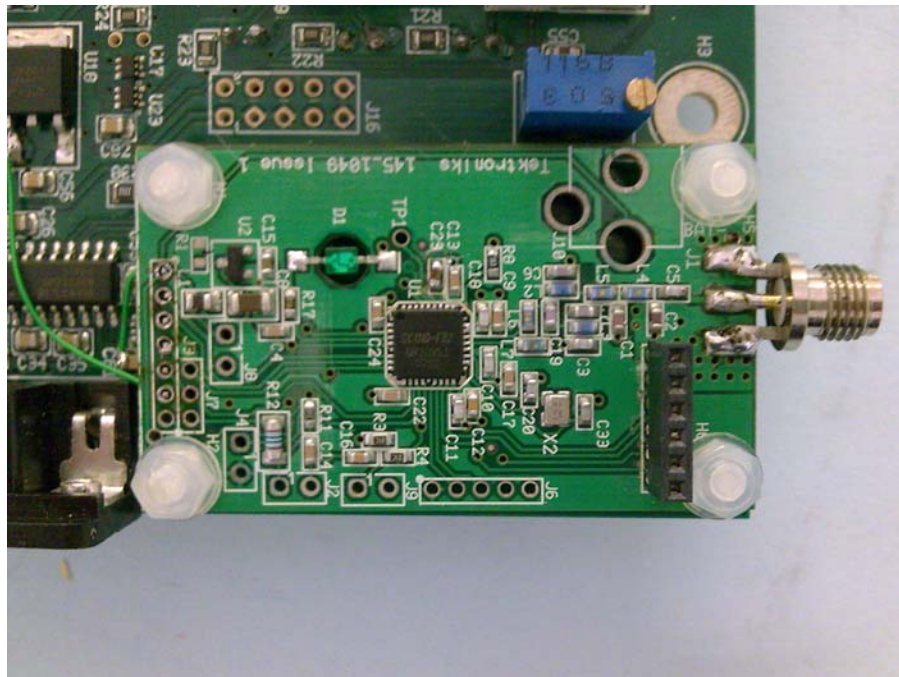
PHOTOGRAPH No. 9

Main PCB and LCD



PHOTOGRAPH No. 10

Top and underside view of the radio PCB

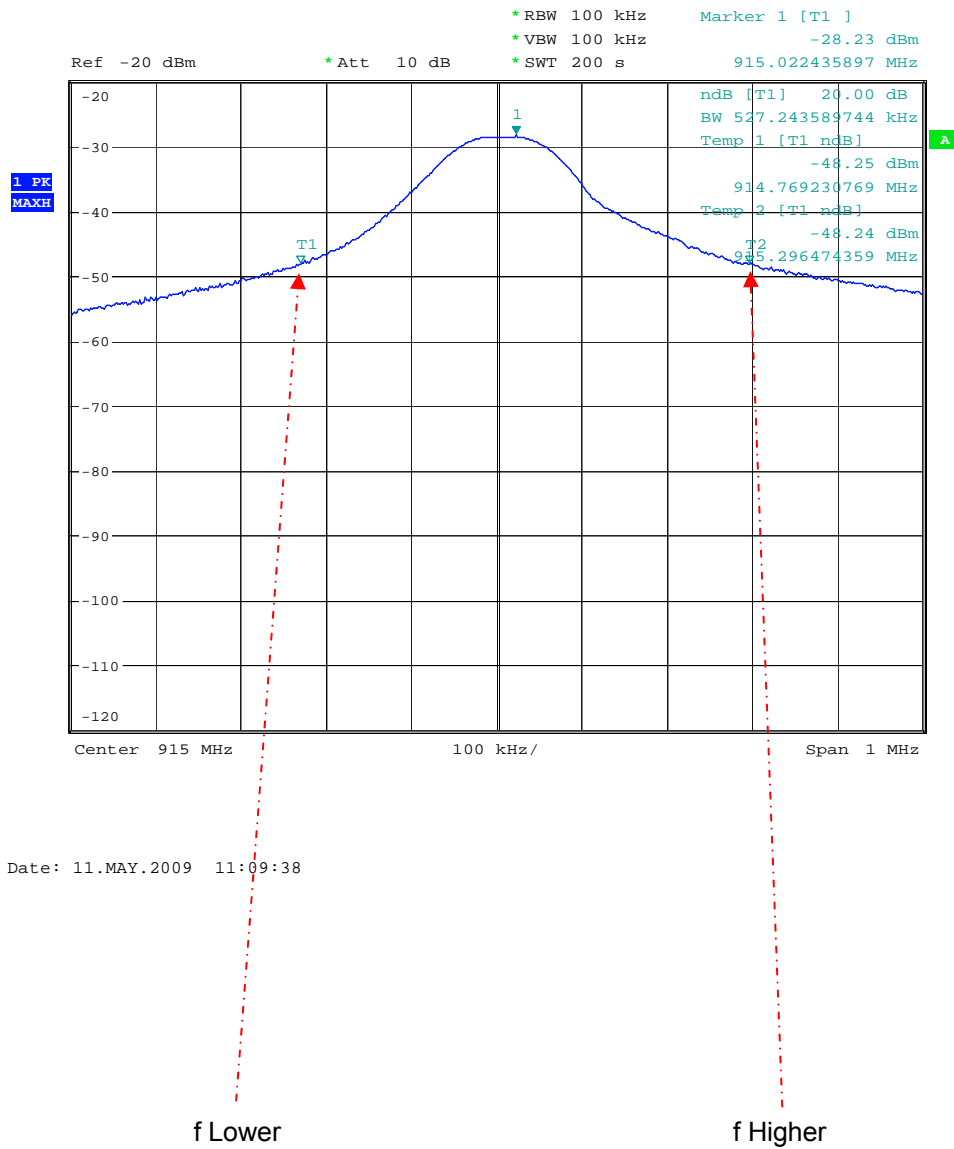


ANNEX B
BANDWIDTH PLOT

M02WS101/US Wireless Probe

BOTTOM CHANNEL

20 dB BANDWIDTH PLOT

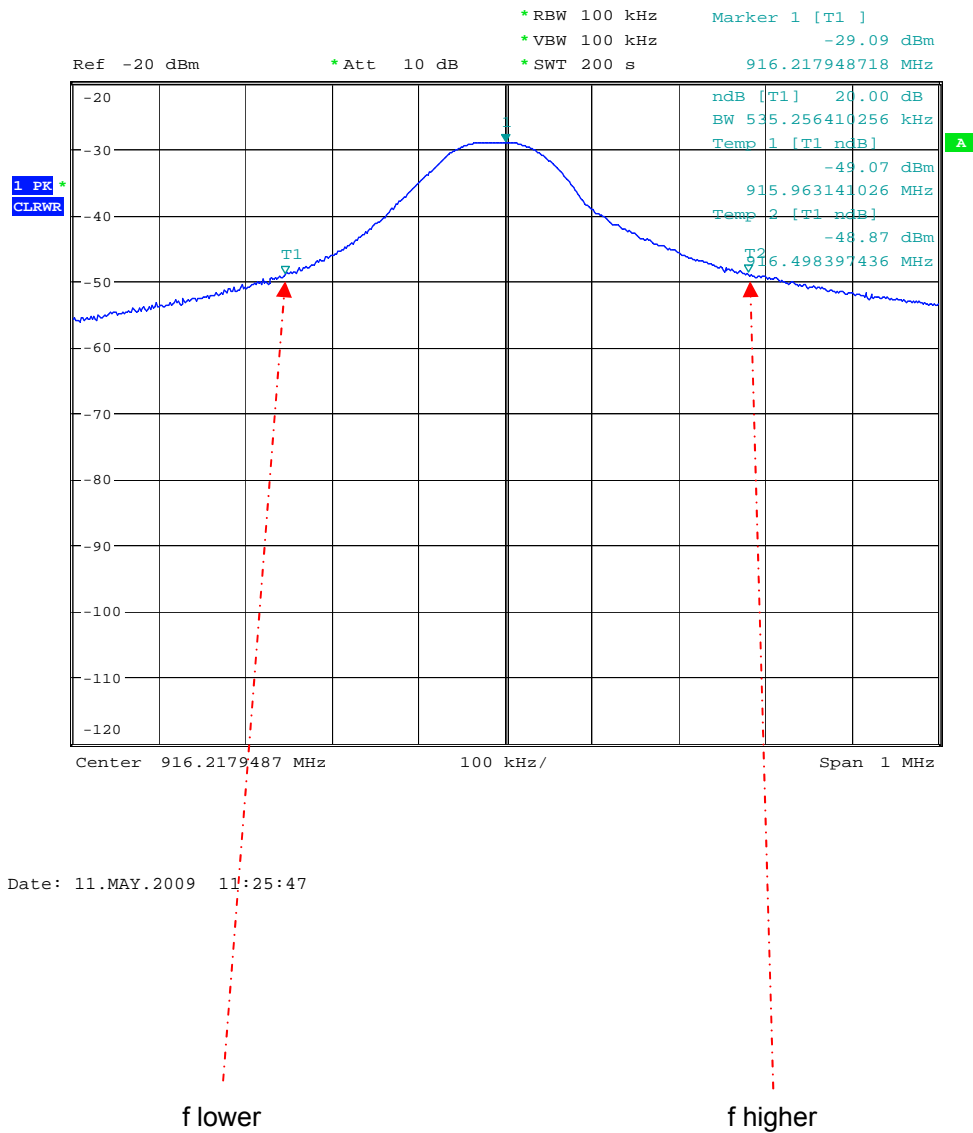


Occupied Bandwidth = 527.24 kHz
f Lower = 914.769230 MHz
f Higher = 915.296474 MHz

M02WS101/US Wireless Probe

TOP CHANNEL

20 dB BANDWIDTH PLOT

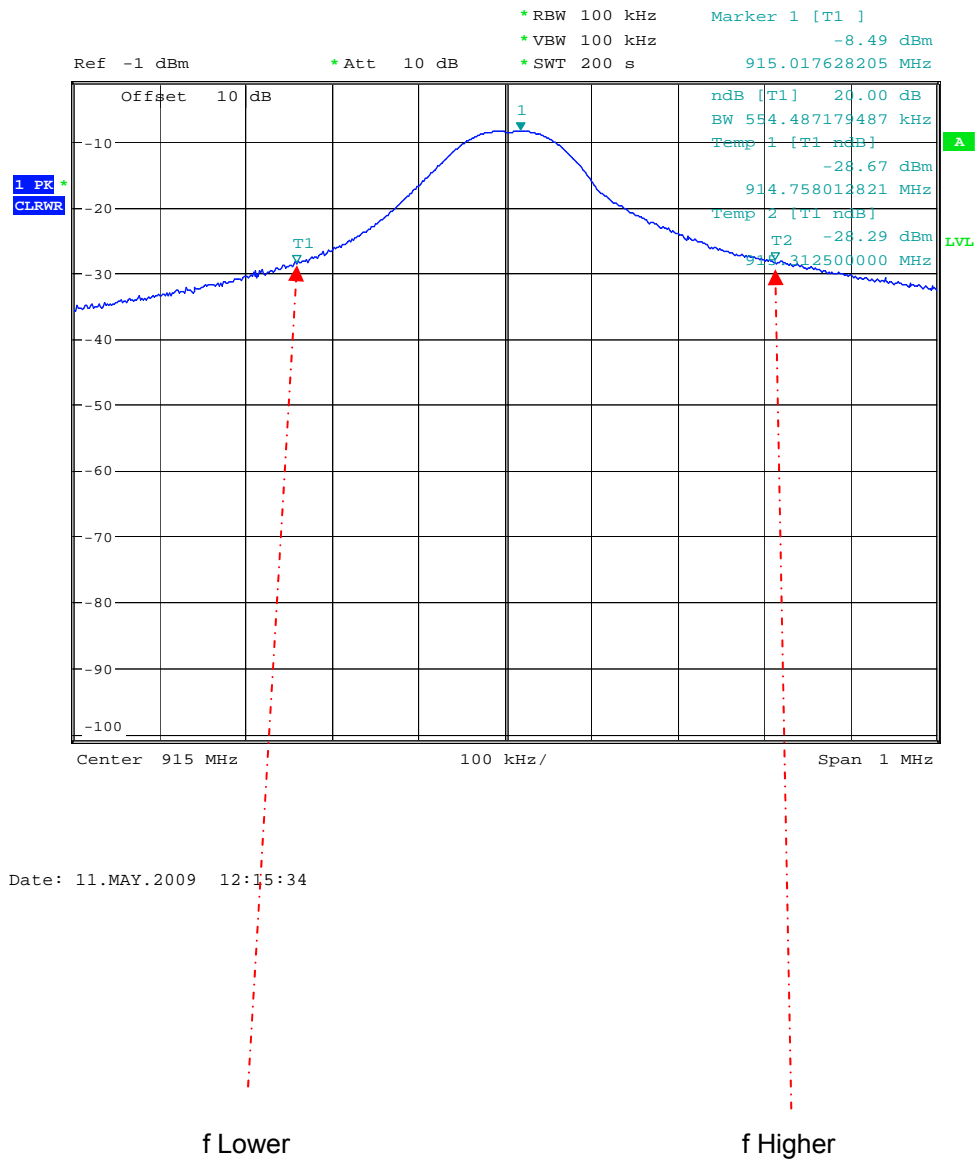


Occupied Bandwidth = 532.05 kHz
f Lower = 915.966346 MHz
f Higher = 916.498397 MHz

M02LCMU101/US (Base Unit)

BOTTOM CHANNEL

20 dB BANDWIDTH PLOT

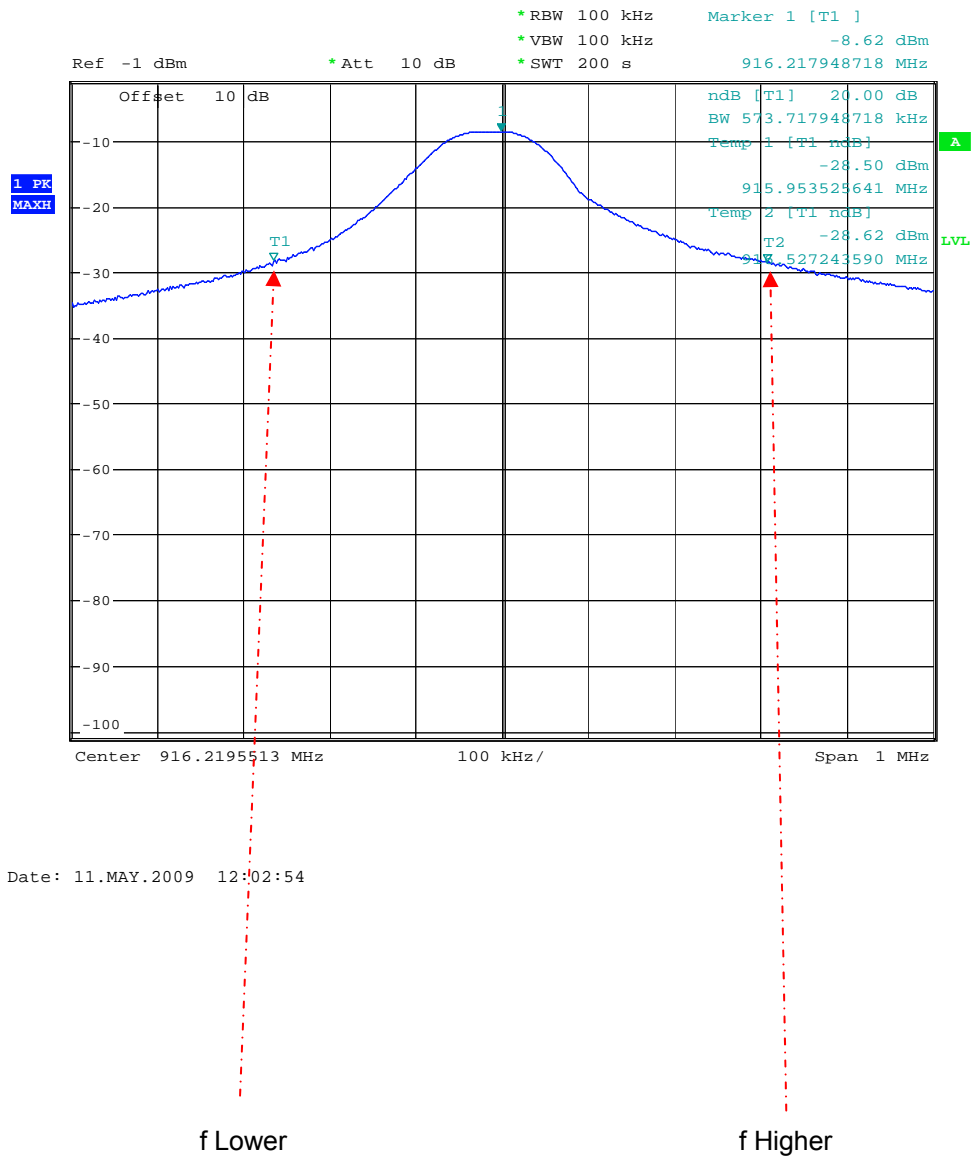


Occupied Bandwidth = 554.48 kHz
 f Lower = 914.758012 MHz
 f Higher = 915.312500 MHz

M02LCMU101/US (Base Unit)

TOP CHANNEL

20 dB BANDWIDTH PLOT



Occupied Bandwidth = 573.71 kHz
 f Lower = 915.953525 MHz
 f Higher = 916.527243 MHz

ANNEX C
POWERLINE SCAN PLOT

TRaC Radio and Telecoms

11 May 2009 16:36

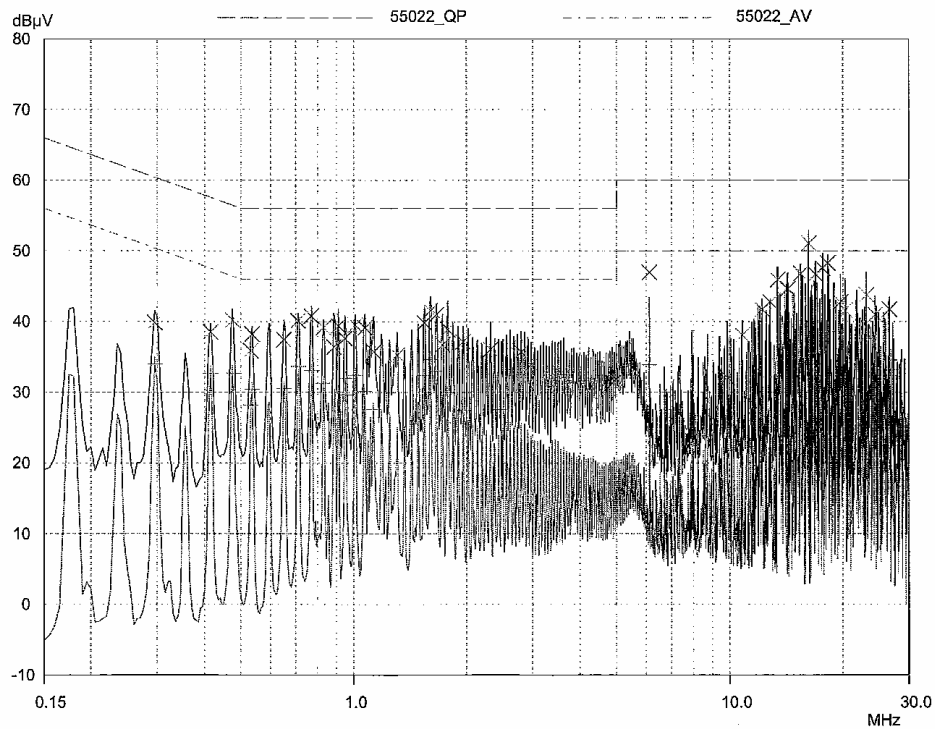
Powerline Conduction 150kHz - 30MHz

EUT: Base unit
 Manuf: Tektroniks
 Op Cond: LISN UH195, cable UH21
 Operator: S Hodgkinson
 Test Spec: EN55022 Class B (or Variant)
 Comment: Neutral Line, 110V, 60Hz
 Unit in permanent Tx mode Top channel. All ports terminated, connected to network via router.
 Result File: 4.dat : Tektronics base unit transmit top channel Neutral Line

Scan Settings		(1 Range)				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB	

Transducer	No.	Start	Stop	Name
1	1	9kHz	30MHz	UH21
	2	150kHz	30MHz	UH195

Final Measurement: Detectors: X QP / + AV
 Meas Time: 2sec
 Subranges: 25
 Acc Margin: 20 dB



PAGE 1

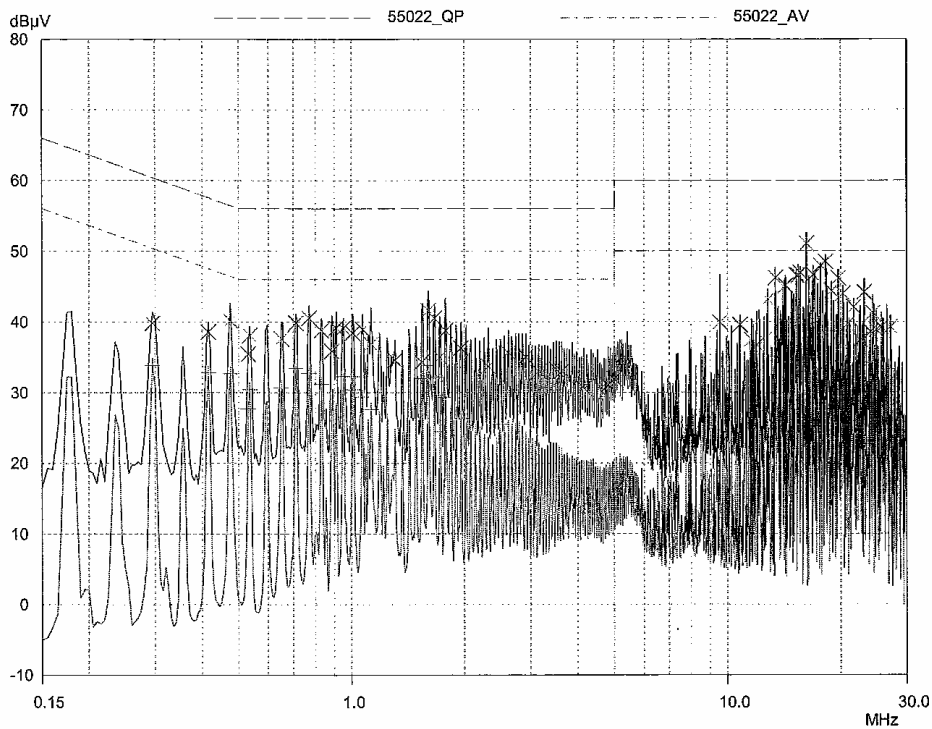
TRaC Radio and Telecoms

11 May 2009 14:37

Powerline Conduction 150kHz - 30MHz

EUT: Base unit
 Manuf: Tektroniks
 Op Cond: LISN UH195, cable UH21
 Operator: S Hodgkinson
 Test Spec: EN55022 Class B (or Variant)
 Comment: Neutral Line, 110V, 60Hz
 Unit in permanent Tx mode bottom channel. All ports terminated, connected to network via router.
 Result File: 2.dat : Tektroniks base unit transmit bottom channel Neutral Line

Scan Settings		(1 Range)			Receiver Settings			
Frequencies								
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB
Transducer	No.	Start	Stop	Name				
1	1	9kHz	30MHz	UH21				
	2	150kHz	30MHz	UH195				
Final Measurement:		Detectors:	X QP / + AV					
		Meas Time:	2sec					
		Subranges:	25					
		Acc Margin:	20 dB					



PAGE 1

ANNEX D
30MHz – 10GHz SCAN PLOT

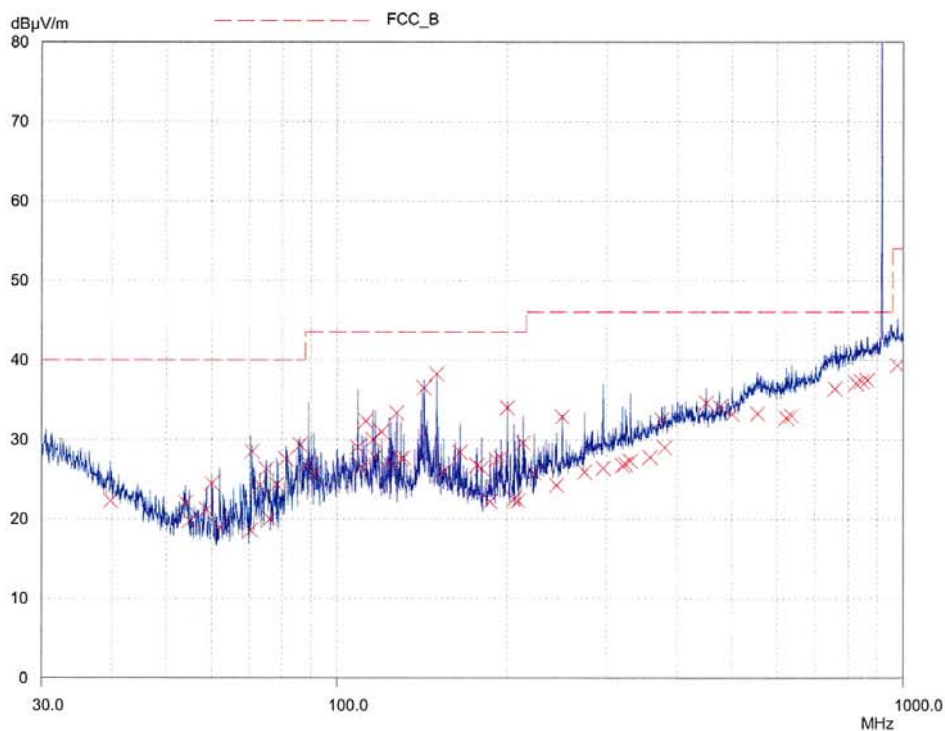
TRaC Telecoms & Radio

12 May 2009 10:50

Radiated E-Field Emissions

EUT: Base Unit
 Manuf: Tektroniks
 Op Cond: 3m Indoor Prescan MAC Chamber
 Operator: S Hodgkinson
 Test Spec: EN SRD
 Comment: Unit in permanent Tx mode, all customer usable ports terminated, thermistors connected to inputs.Connected to network.
 Rx antenna Vertical. Top transmit channel selected.

Scan Settings		(1 Range)			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	50kHz	120kHz	PK	1msec	Auto	ON	60dB
Transducer	No.	Start	Stop	Name				
3	21	30MHz	1000MHz	UH213PS				
	22	30MHz	1000MHz	UH70				
Final Measurement:		Detector:	X QP					
		Meas Time:	2sec					
		Subranges:	50					
		Acc Margin:	20 dB					



PAGE 1

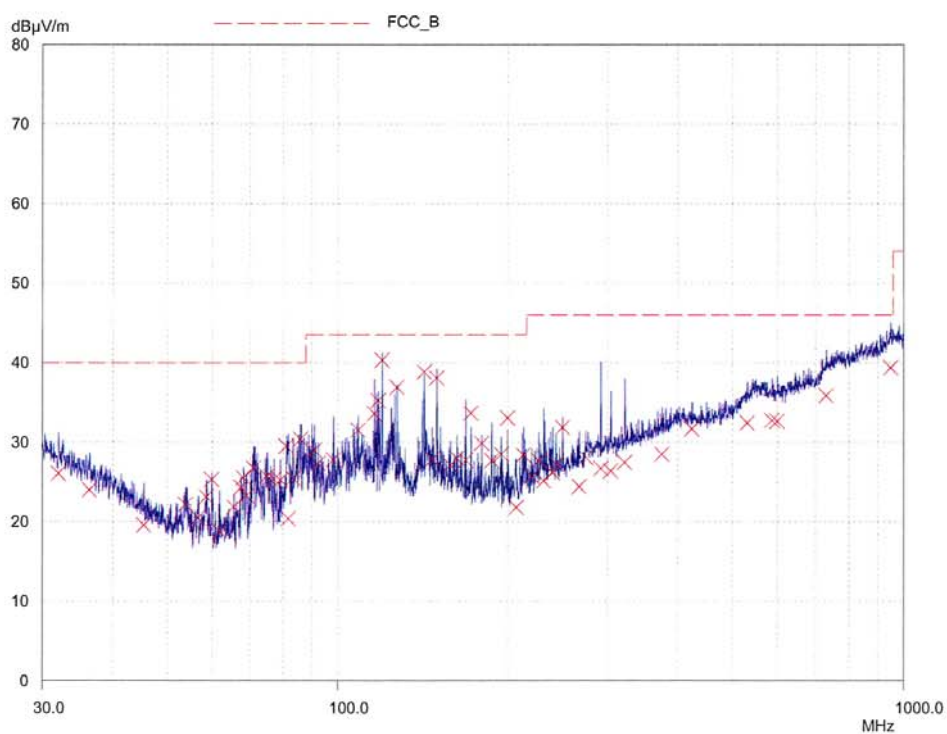
TRaC Telecoms & Radio

12 May 2009 12:21

Radiated E-Field Emissions

EUT: Base Unit
 Manuf: Tektroniks
 Op Cond: 3m Indoor Prescan MAC Chamber
 Operator: S Hodgkinson
 Test Spec: EN SRD
 Comment: Unit in Rx mode, all customer usable ports terminated, thermistors connected to inputs.Connected to network.
 Rx antenna Vertical.Top Rx channel selected.

Scan Settings		(1 Range)			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	50kHz	120kHz	PK	1msec	Auto	ON	60dB
Transducer	No.	Start	Stop	Name				
3	21	30MHz	1000MHz	UH213PS				
	22	30MHz	1000MHz	UH70				
Final Measurement:		Detector:	X QP					
		Meas Time:	2sec					
		Subranges:	50					
		Acc Margin:	20 dB					



PAGE 1

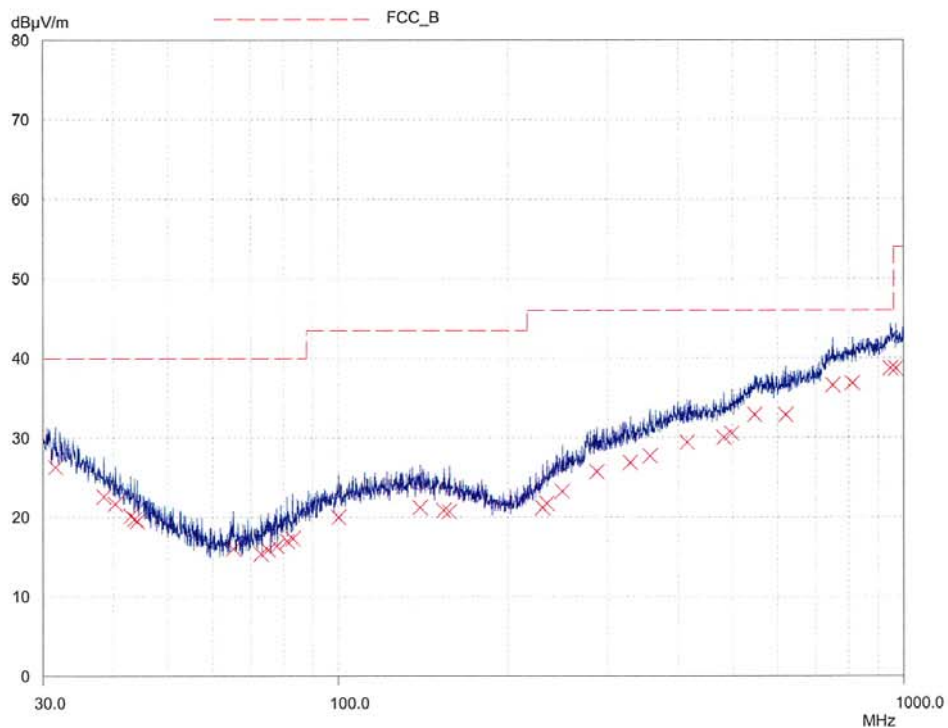
TRaC Telecoms & Radio

06 May 2009 10:23

Radiated E-Field Emissions

EUT: Sensor Unit Transmitter fitted with wireless plant 4 probe
 Manuf: Tektroniks
 Op Cond: 3m Indoor Prescan MAC Chamber
 Operator: S Hodgkinson
 Test Spec: EN SRD
 Comment: Unit in normal operating mode.
 Rx antenna Vertical.

Scan Settings					Receiver Settings			
(1 Range)								
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	50kHz	120kHz	PK	1msec	Auto	ON	60dB
Transducer	No.	Start	Stop	Name				
3	21	30MHz	1000MHz	UH213PS				
	22	30MHz	1000MHz	UH191				
Final Measurement:					Detector:	X QP		
					Meas Time:	2sec		
					Subranges:	50		
					Acc Margin:	20 dB		



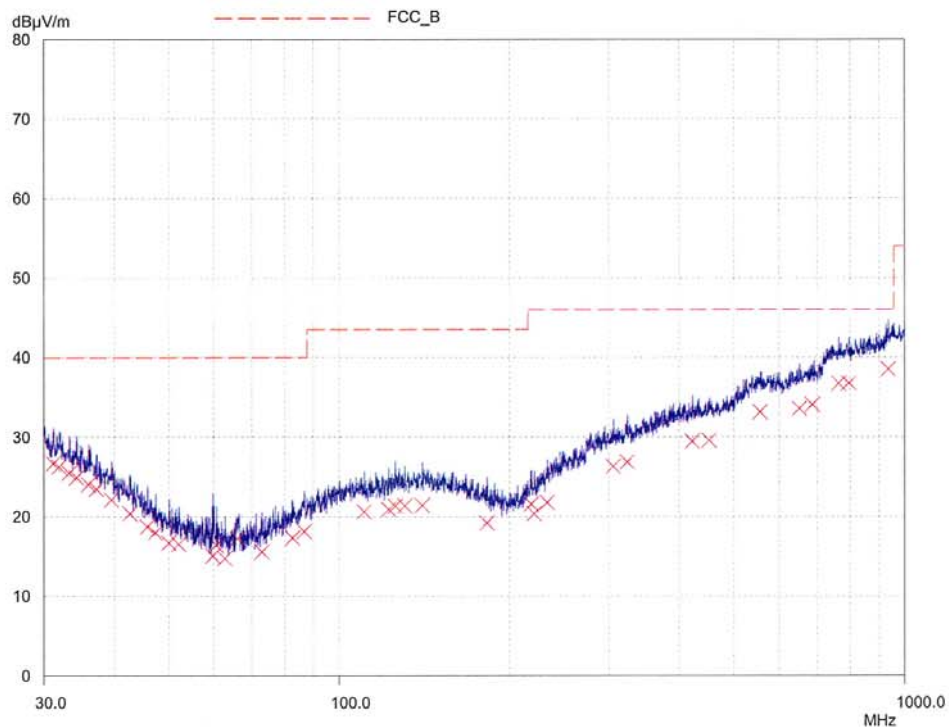
TRaC Telecoms & Radio

06 May 2009 12:02

Radiated E-Field Emissions

EUT: Sensor Unit Transmitter fitted with wireless probe 4 -20mA
 Manuf: Tektroniks
 Op Cond: 3m Indoor Prescan MAC Chamber
 Operator: S Hodgkinson
 Test Spec: EN SRD
 Comment: Unit in normal operating mode.
 Rx antenna Vertical.

Scan Settings		(1 Range)			Receiver Settings			
Frequencies		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
Start	Stop	50kHz	120kHz	PK	1msec	Auto	ON	60dB
30MHz	1000MHz							
Transducer	No.	Start	Stop	Name				
3	21	30MHz	1000MHz	UH213PS				
	22	30MHz	1000MHz	UH191				
Final Measurement:		Detector:	X QP					
		Meas Time:	2sec					
		Subranges:	50					
		Acc Margin:	20 dB					



PAGE 1

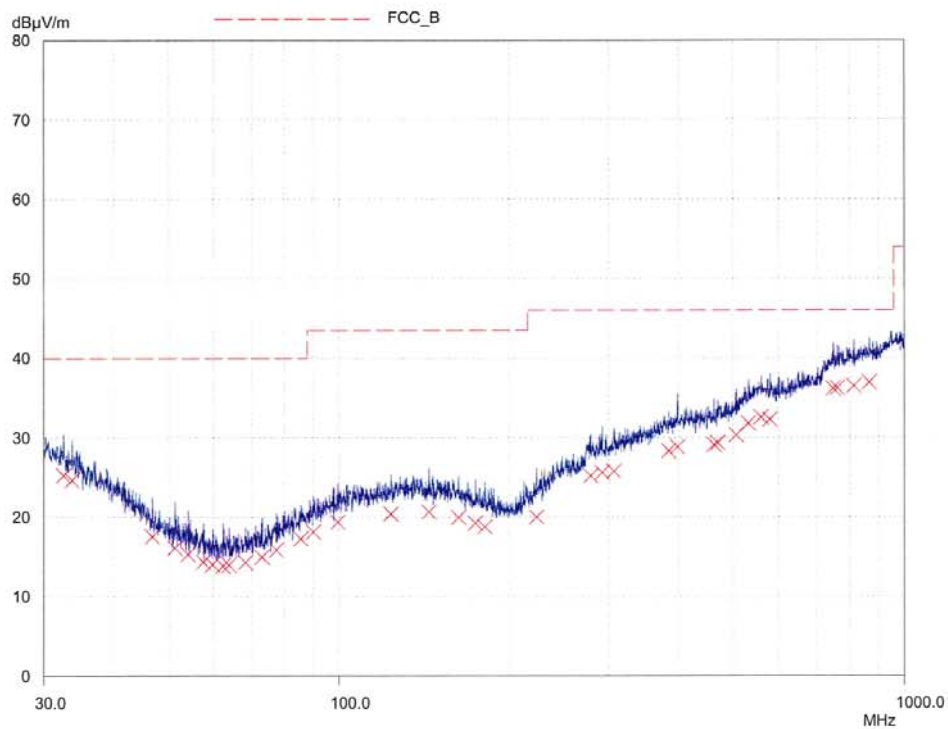
TRaC Telecoms & Radio

06 May 2009 09:00

Radiated E-Field Emissions

EUT: Sensor Unit
 Manuf: Tektroniks
 Op Cond: 3m Indoor Prescan MAC Chamber
 Operator: S Hodgkinson
 Test Spec: EN SRD
 Comment: Unit in Rx mode.
 Rx antenna Vertical.

Scan Settings		(1 Range)			Receiver Settings				
Frequencies									
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
30MHz	1000MHz	50kHz	120kHz	PK	1msec	Auto	ON	60dB	
Transducer	No.	Start	Stop	Name					
3	21	30MHz	1000MHz	UH213PS					
	22	30MHz	1000MHz	UH191					
Final Measurement:		Detector:	X QP						
		Meas Time:	2sec						
		Subranges:	50						
		Acc Margin:	20 dB						

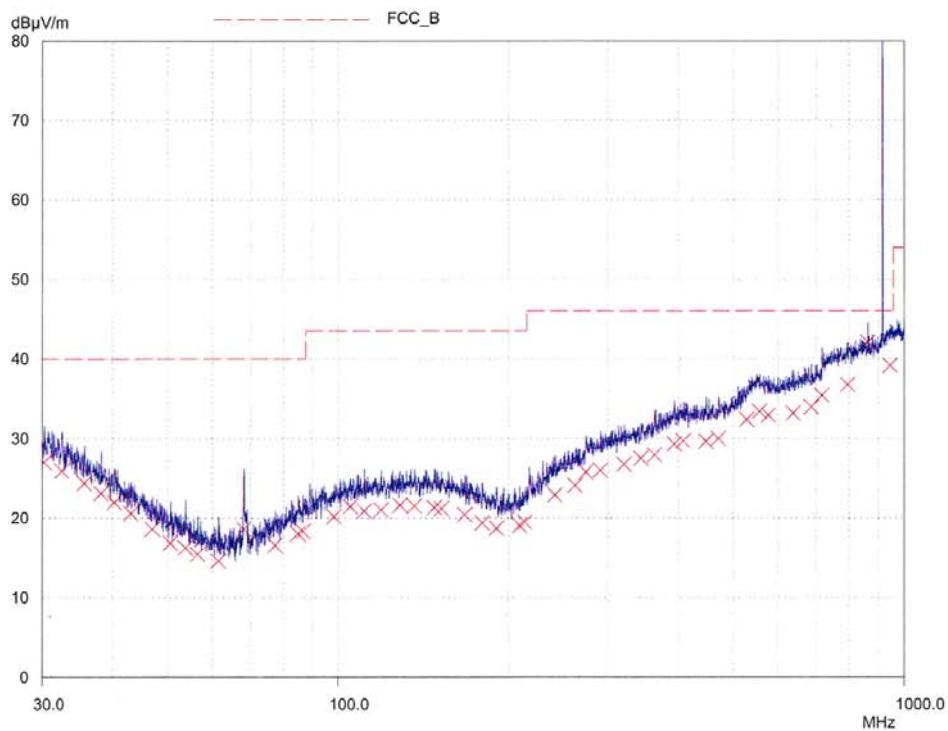


TRaC Telecoms & Radio
Radiated E-Field Emissions

12 May 2009 13:37

EUT: Sensor Unit
Manuf: Tektroniks
Op Cond: 3m Indoor Prescan MAC Chamber
Operator: S Hodgkinson
Test Spec: EN SRD
Comment: Unit in Tx mode,
Rx antenna Horizontal. Top TX channel selected.

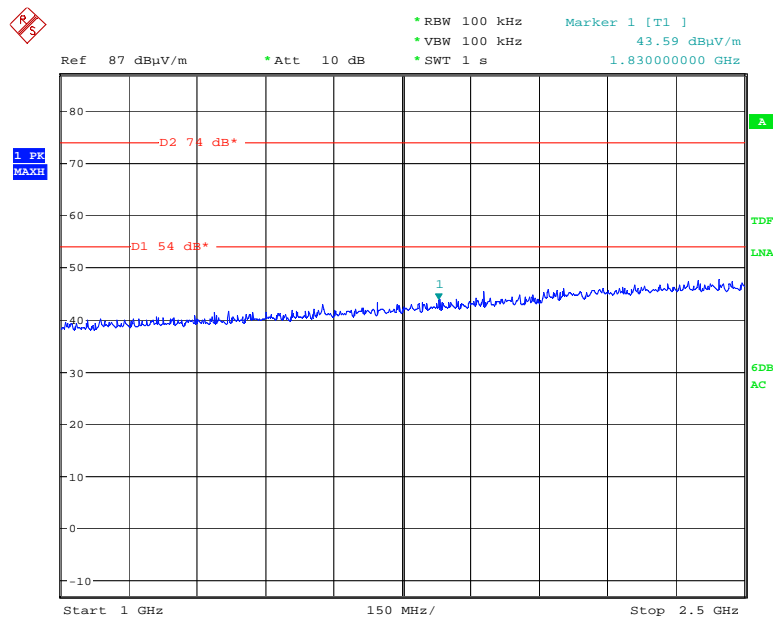
Scan Settings		(1 Range)		Receiver Settings					
Frequencies				IF BW	Detector	M-Time	Atten	Preamp	OpRge
Start	Stop	Step		120kHz	PK	1msec	Auto	ON	60dB
30MHz	1000MHz	50kHz							
Transducer	No.	Start	Stop	Name					
3	21	30MHz	1000MHz	UH213PS					
	22	30MHz	1000MHz	UH70					
Final Measurement:		Detector:	X QP						
		Meas Time:	2sec						
		Subranges:	50						
		Acc Margin:	20 dB						



PAGE 1

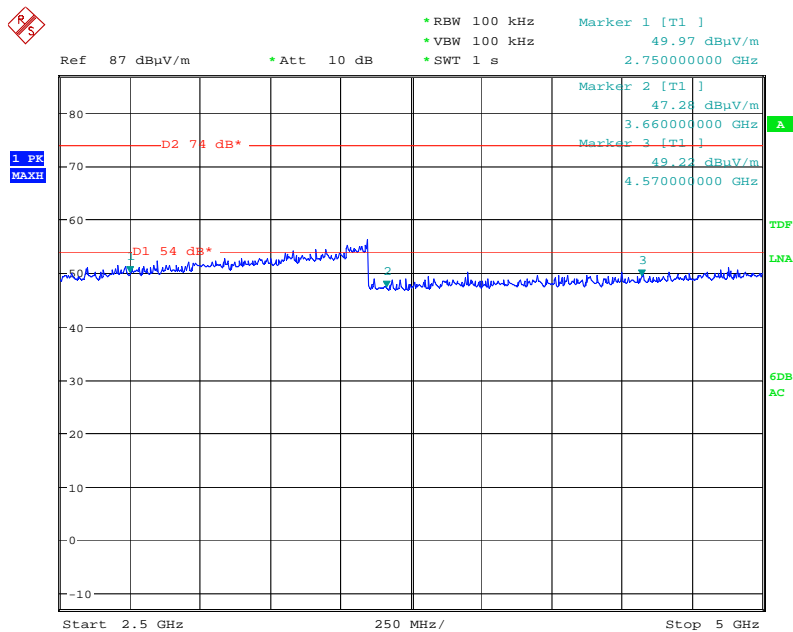
M02WS101/US Wireless Probe

Transmit bottom channel 1 - 2.5 GHz



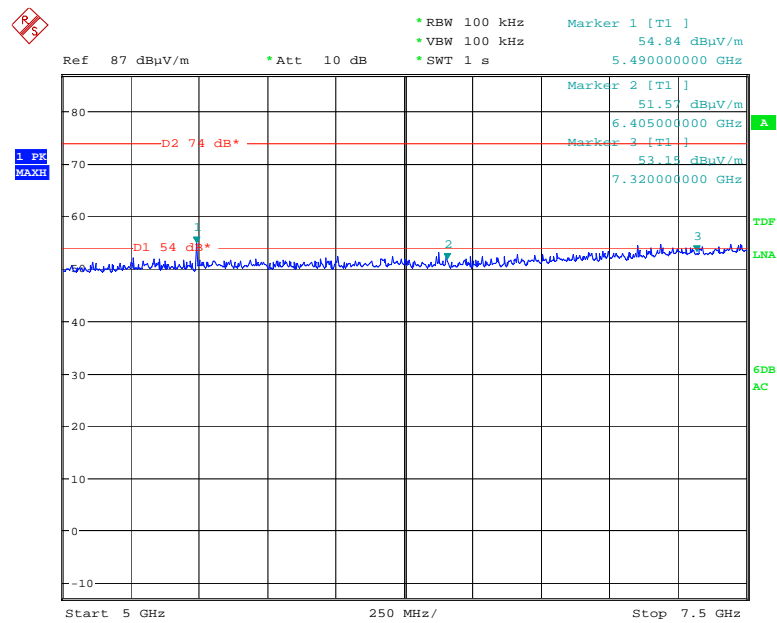
TET TYU
Date: 18.MAY.2009 13:46:25

Transmit bottom channel 2.5 - 5.0GHz



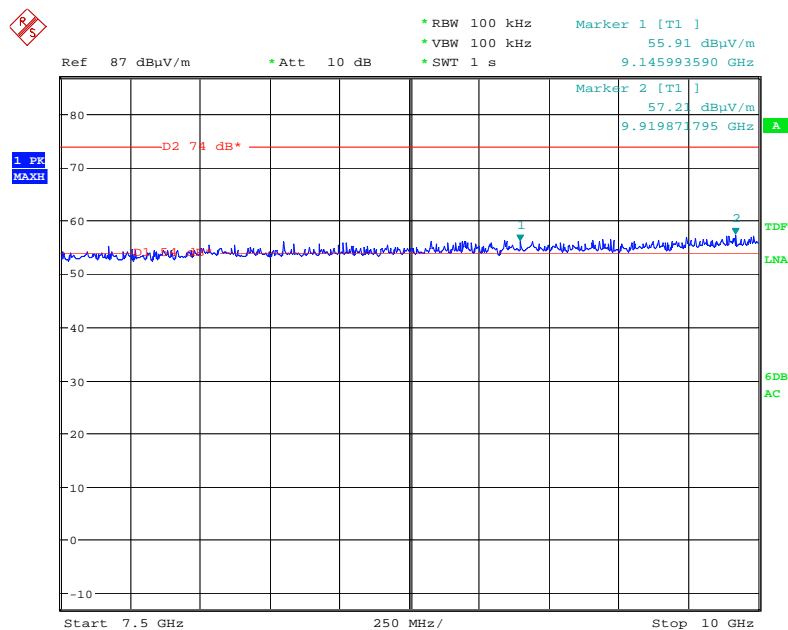
TET TYU
Date: 18.MAY.2009 13:47:55

Transmit bottom channel 5.0 – 7.5GHz



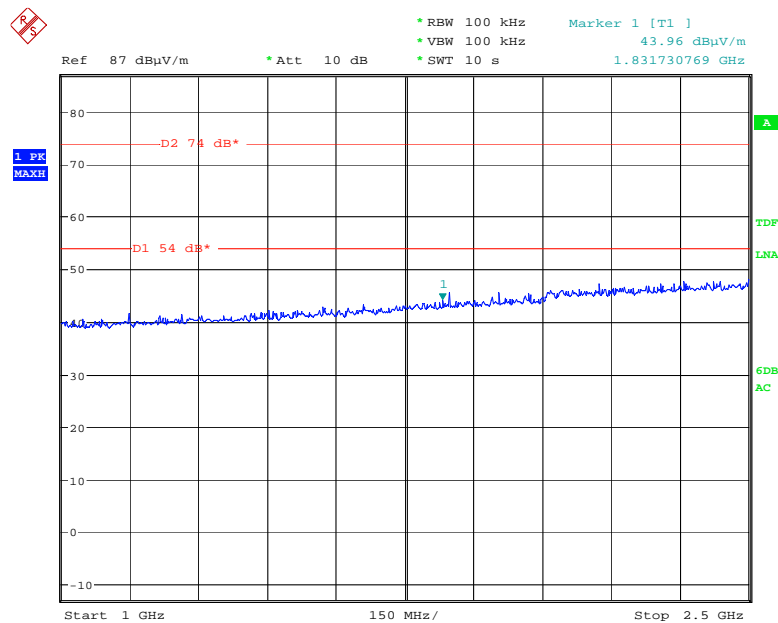
TET TYU
Date: 18.MAY.2009 13:49:10

Transmit bottom channel 7.5 – 10.0GHz



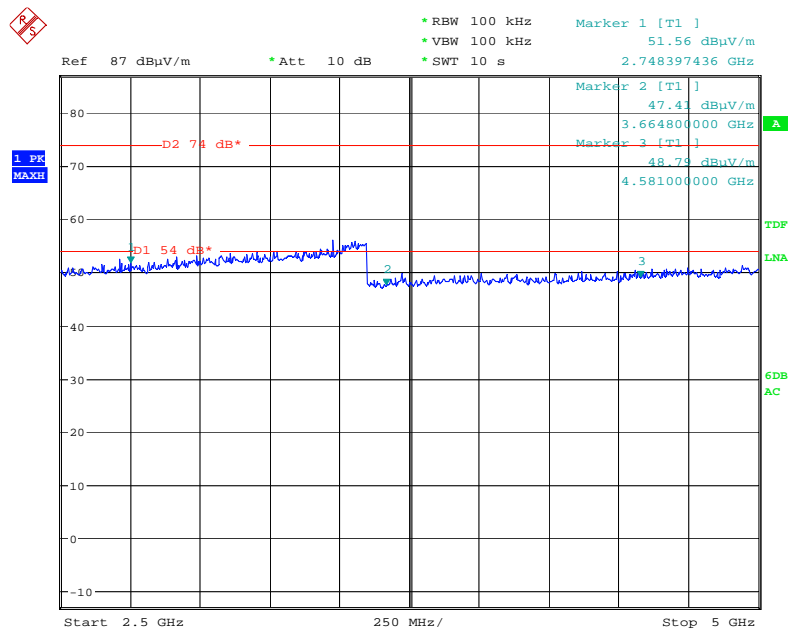
TET TYU
Date: 18.MAY.2009 13:50:18

Transmit top channel 1 - 2.5 GHz



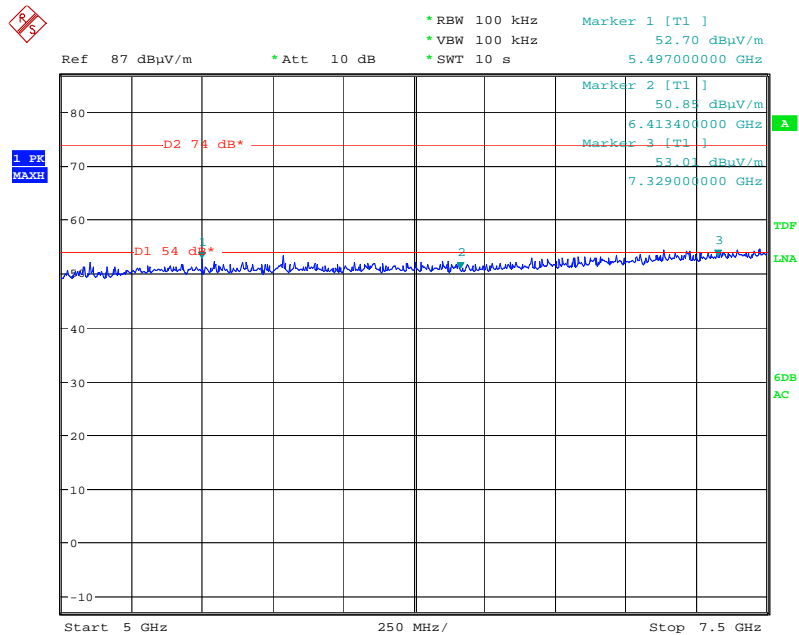
TET TYU
Date: 18.MAY.2009 10:48:22

Transmit top channel 2.5 – 5.0GHz



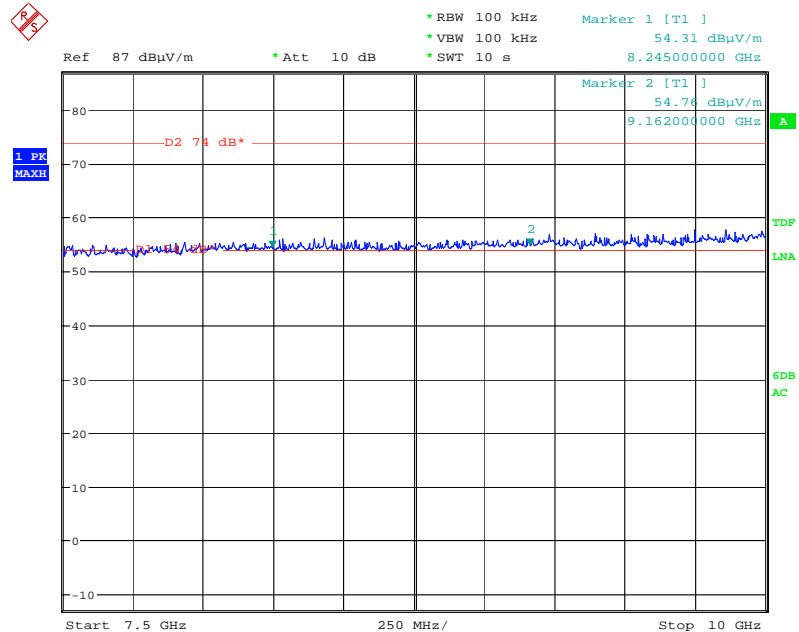
TET TYU
Date: 18.MAY.2009 10:51:04

Transmit top channel 5.0 – 7.5GHz



TET TYU
Date: 18.MAY.2009 10:52:28

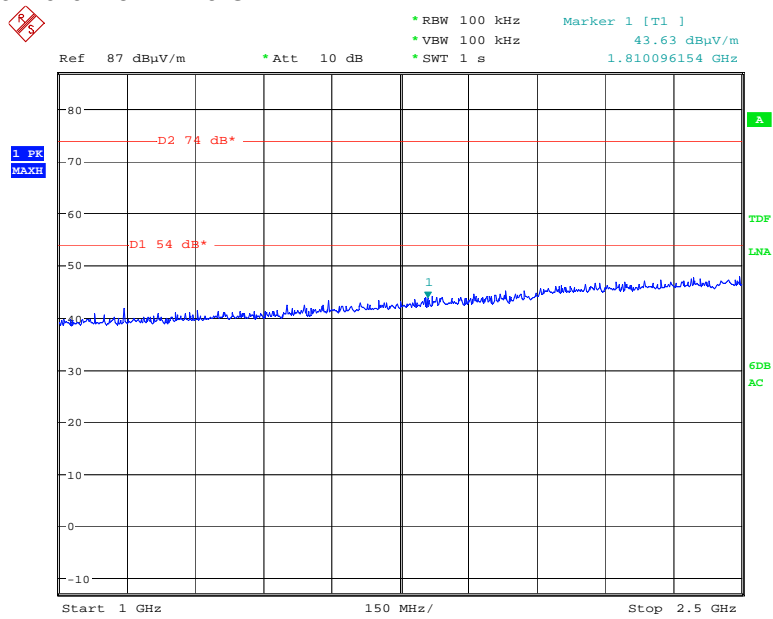
Transmit top channel 7.5 – 10.0GHz



TET TYU
Date: 18.MAY.2009 10:54:20

M02LCMU101/US (Base Unit)

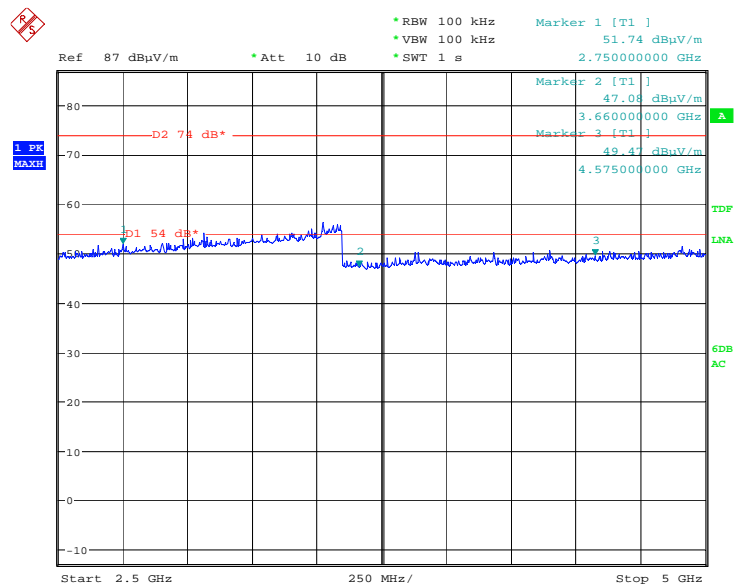
Transmit bottom channel 1 - 2.5 GHz



TET TYU

Date: 18.MAY.2009 15:30:21

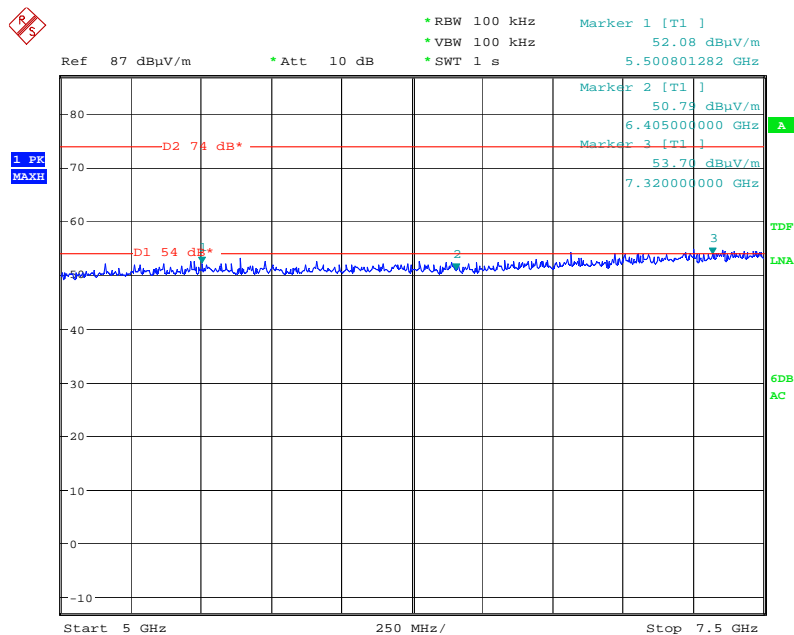
Transmit bottom channel 2.5 - 5 GHz



TET TYU

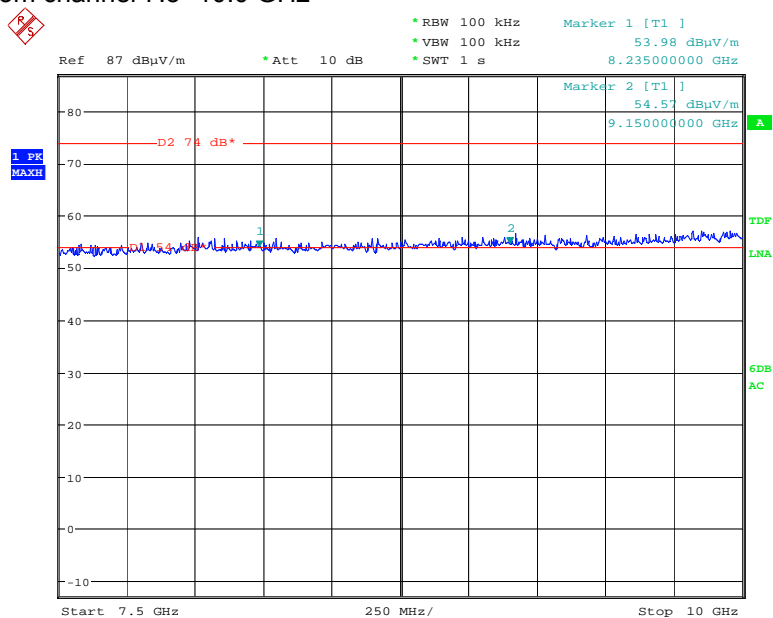
Date: 18.MAY.2009 15:32:02

Transmit bottom channel 5.0 -7.5 GHz



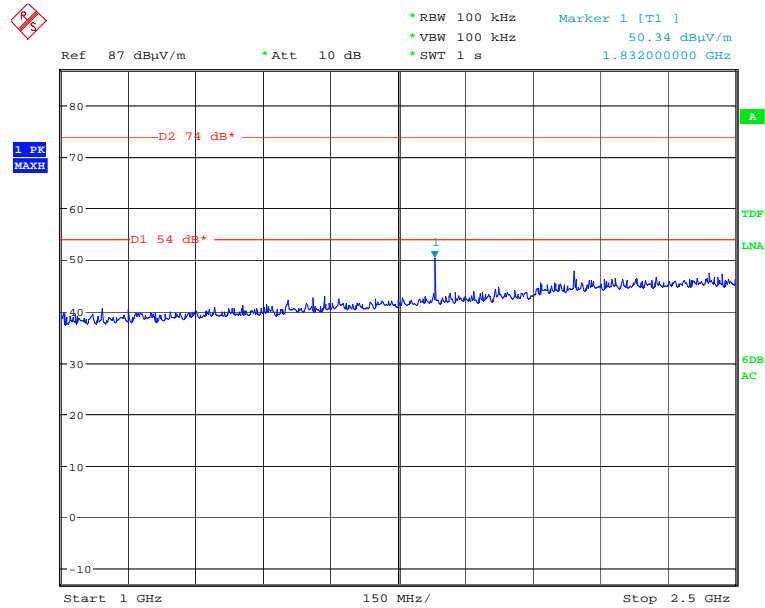
TET TYU
Date: 18.MAY.2009 15:33:53

Transmit bottom channel 7.5 -10.0 GHz



TET TYU
Date: 18.MAY.2009 15:35:03

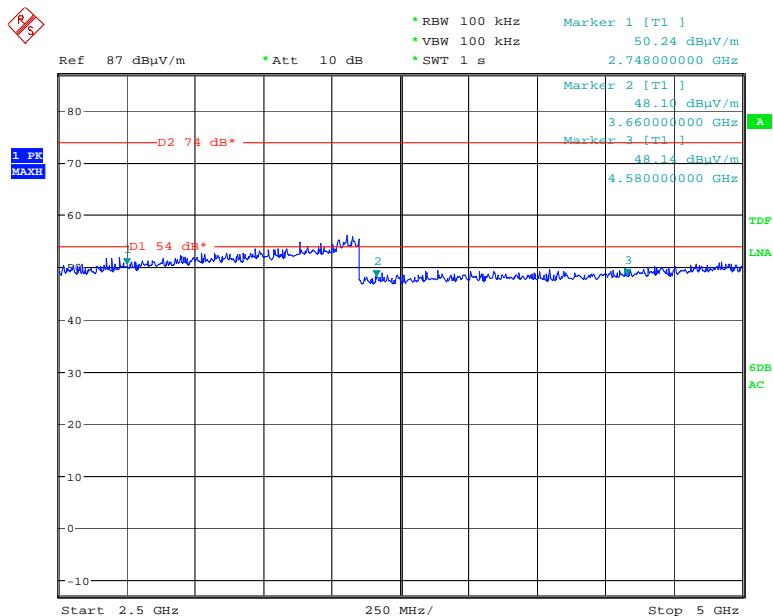
Transmit top channel 1 - 2.5 GHz



TET TYU

Date: 18.MAY.2009 17:05:08

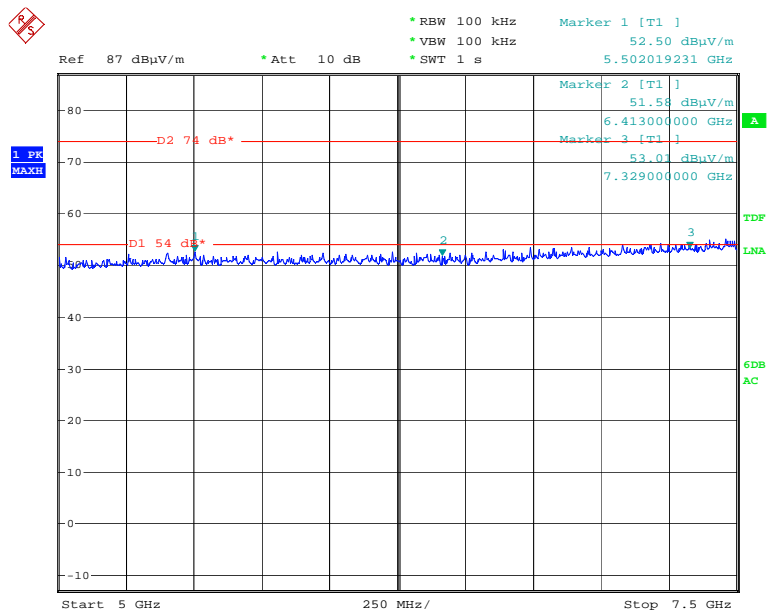
Transmit top channel 2.5 – 5.0 GHz



TET TYU

Date: 18.MAY.2009 17:06:21

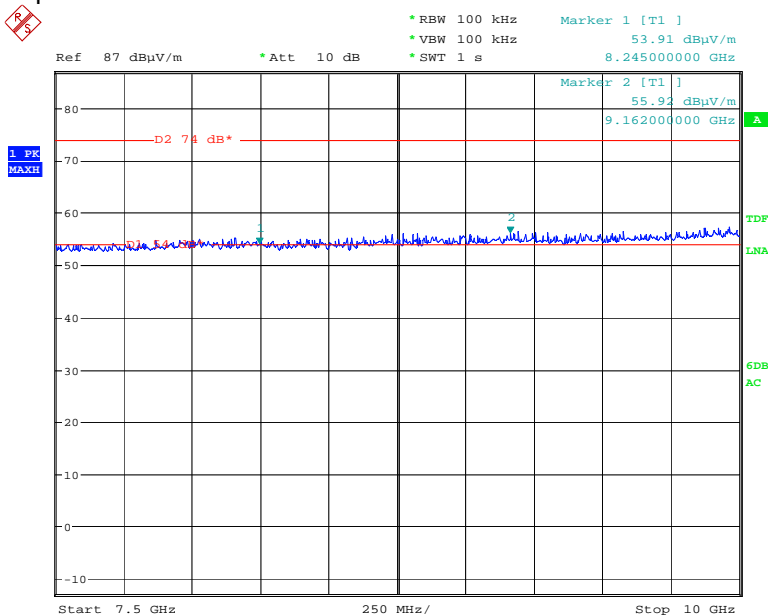
Transmit top channel 5.0 – 7.5 GHz



TET TYU

Date: 18.MAY.2009 17:07:34

Transmit top channel 7.5 – 10.0 GHz

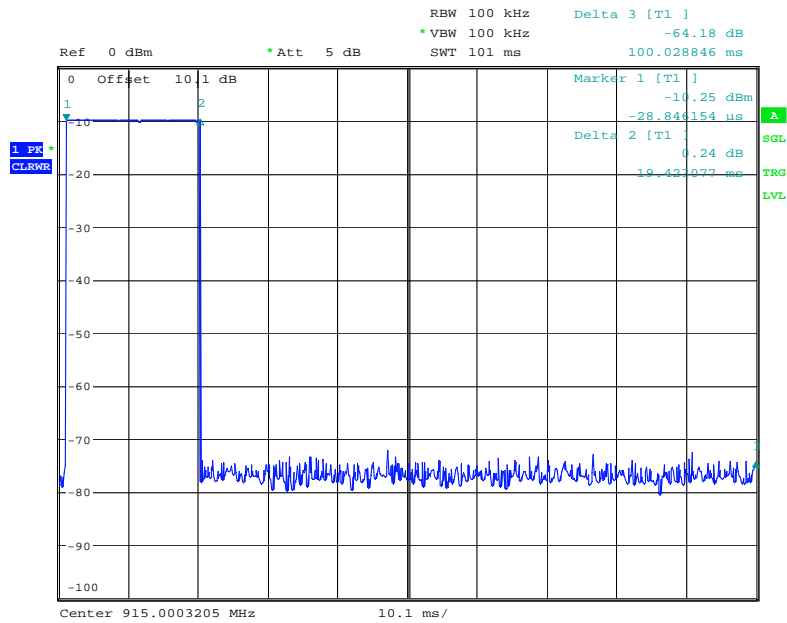


TET TYU

Date: 18.MAY.2009 17:08:33

ANNEX E
TRANSMITTER TIMING PLOTS

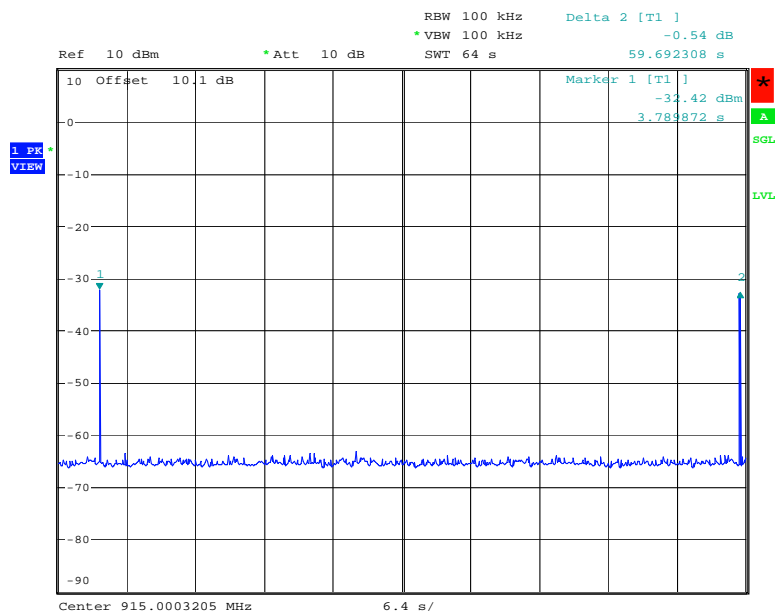
M02WS101/US Wireless Probe Transmitter on period = 19.42ms



Date: 29.APR.2009 15:50:31

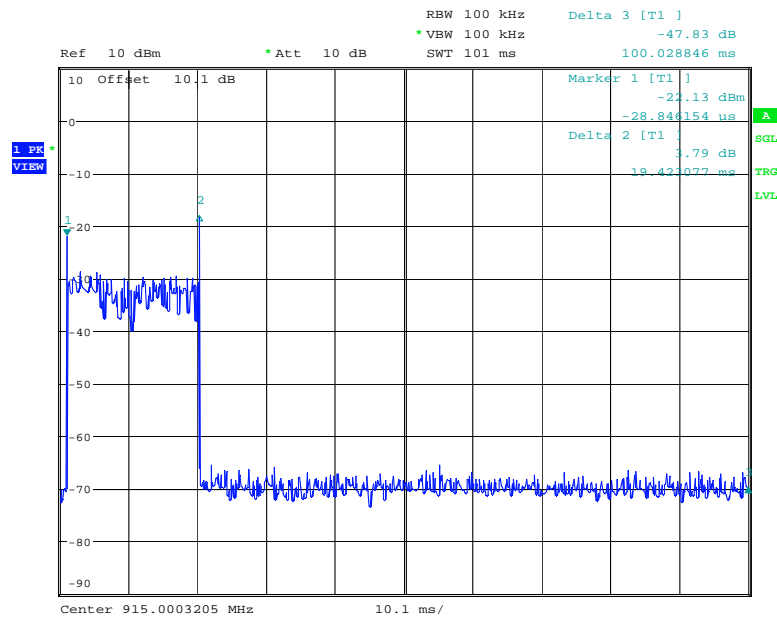
T

M02WS101/US Wireless Probe Transmitter off period = 59.69s



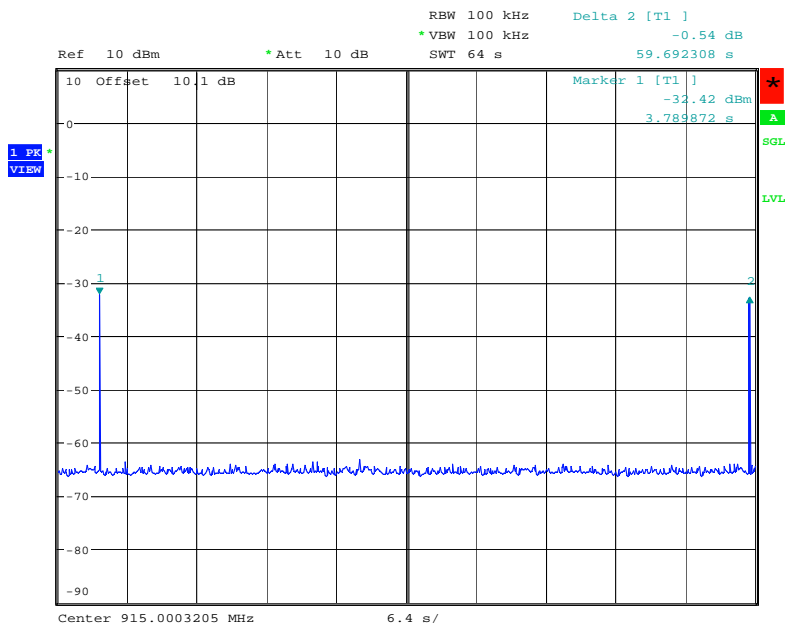
Date: 29.APR.2009 15:20:09

M02LCMU101/US (Base unit)
Transmitter on period = 19.42ms



Date: 29.APR.2009 14:49:14

M02LCMU101/US (Base unit)
Transmitter off period = 59.69s



Date: 29.APR.2009 15:20:09

**ANNEX F
PULSE DESENSITIZATION
AND
DISTANCE EXTRAPOLATION FACTORS**

DUTY CYCLE

TX ON = 19.42ms
1 x pulse per 59s

15.35(b)

Pulse desensitization = $20\log(\text{dwell time}/100\text{ms})$
= $20\log(19.42/100\text{ms}) = 14.23$

Distance extrapolation correction factor
For 1m to 3m > 1GHz = $20\log \text{wanted distance}/\text{measured distance}$
= $20\log 3/1 = 9.5\text{dB}$

ANNEX G
MEASUREMENT UNCERTAINTY

Radio Testing – General Uncertainty Schedule

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

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**

Uncertainty in test result (Equipment – TRL05) = **1.08dB**

Uncertainty in test result (Equipment – TRL479) = **2.48dB**

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**

Uncertainty in test result (Equipment – TRL05) = **0.113ppm**

Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

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

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

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**

Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

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

[11] Power Line Conduction

Uncertainty in test result = **3.4dB**

[12] Spectrum Mask Measurements

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

[13] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[14] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[15] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[16] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[17] Receiver Threshold

Uncertainty in test result = **3.23dB**

[18] Transmission Time Measurement

Uncertainty in test result = **7.98%**