COMPLIANCE ENGINEERING IRELAND LTD

Compliance Engineering Ireland Ltd
Clonross Lane, Derrockstown, Dunshaughlin
Co. Meath, Ireland A85 XN59
Ph +353 1 8017000 , 8256722

Confidential Report

Project Num	23E10494-1
Quotation	Q23-0704-1
Prepared For	Tekelek Europe Ltd
Address	Unit 118 Shannon Free Zone Shannon Co. Clare
Ph	061 47151
Contact	Seamus Normoyle
Contact	seamus.normoyle@tekelek.com
Prepared By	Compliance Engineering Ireland
Test Lab Address	Clonross Lane, Derrockstown, Dunshaughlin, Co. Meath, Ireland
Tested By	Joy Dalayap
Test Report By	Michael Kirby
Date Received	7th Jul 2023
Issue Date	14th Aug 2023
EUT Description	Radar Level Sensor
EUT Model	TEK880
Test Standard (s)	FCC parts 22, 24, 27,15.107,15.109
Authorised by	**Paul Reilly**
Authorised Signature :	

Compliance Engineering Ireland Ltd Terms and Conditions

1. All quotations are submitted, orders are accepted and services supplied by Compliance Engineering Ireland Limited ("CEIL") subject to and upon the following express Terms and Conditions and all other Conditions, warranties and representations express or implied and statutory or otherwise are hereby excluded insofar as it is lawful to do so. No addition thereto or variation therefrom, contained or referred to in the Customers order form or otherwise effected shall apply unless specifically agreed in writing by a duly Authorised Officer of CEIL.
2. All orders including any based on a quotation previously submitted by CEIL are subject to acceptance in writing by CEIL.
3.(a) The prices set out in any quotation are based upon current costs and if there is any variation in the said costs between the date of the order or Contract and delivery of the final report CEIL shall be entitled to adjust prices to reflect such variations.
   b) In the event of any suspension or variation of work arising from the Customer's instructions or lack of instructions the price set out in any quotation may be increased to cover any extra expense incurred by CEIL.
   c) All prices quoted are strictly NET. The customer shall where applicable, in addition to the relevant price, pay a sum equal to the VAT chargeable in respect of the supply of services.
   d) Accounts must be paid in full in advance or by way of an irrevocable letter of credit opened with a Bank approved by CEIL unless credit terms have been agreed by CEIL in which event accounts must be paid in full within 1 month from the date of the invoice. Time for payment is of the essence and the customer shall be liable to pay any outstanding amount from its due date until the date of payment at a rate of 2% per month or part thereof.
4. Any times quoted for the performance of services are to be treated as estimates only. CEIL shall not be liable in any manner whatsoever for failure to perform services within the time quoted, nor in such circumstances shall the Customer be entitled to cancel or terminate any order or contract.
5. The Customer is responsible for delivery to CEIL of test item(s) free of any duty, VAT, freight charges etc. unless otherwise agreed in writing by CEIL.
6. The Customer shall be responsible for collecting non-perishable samples received for testing or laboratory work upon completion of tests or laboratory work. If the Customer fails to collect such samples within 90 days from completion of the tests or laboratory work CEIL shall be entitled without further notice to dispose of the samples without liability.
7. No action or legal proceedings shall be taken (except in the case of wilful neglect or default) against CEIL by reason of or arising out of any research, investigation, test or analyses or the publication of the results thereof in the name of CEIL. Under no circumstances shall CEIL be liable to the Customer for any indirect, incidental, special or consequential damages of any nature whatsoever (including but not limited to loss of use, revenue, profit, data or business opportunity) either based upon a claim or action in Contract or in Tort, indemnity or contribution, or otherwise arising out of the Contract or performance of services by CEIL even if CEIL has been advised of the possibility of such damages. The limit of CEIL's aggregate liability (whether in Contract, Tort, strict liability in Tort or by statute or otherwise) to the Customer or to any third party for non-performance by CEIL and for any and all other claims shall not in the aggregate exceed the fees paid by the Customer to CEIL. The Customer shall indemnify CEIL against all claims made against CEIL by any third party arising from this Contract.
8. The copyright of any report is reserved to CEIL and it shall not be used either in whole or in part, for the purposes of advertising, publicity, litigation or otherwise without the prior written consent of a duly Authorised Officer of CEIL where such consent is given the Customer shall comply with any conditions attaching to the consent. In conformance with laboratory accreditation requirements reports shall only be produced in full. The test results tabulated shall relate only to the defined item(s) tested.
9. If in CEIL's judgment, the customer's financial condition is such as could adversely affect the customers ability to perform any of its obligations or if the customer is in default in any of its obligations to CEIL whether hereunder or under any other Contract CEIL may terminate this Contract and/ or any other Contract between CEIL and the Customer, cancel any uncompleted order or suspend performance of services or the delivery of any reports and if it does so the Customer shall indemnify CEIL against all costs, charges, expense and damages incurred thereby.
10. CEIL will not be liable for non-performance in whole or in part of its obligations if this is attributable to any cause beyond the control of CEIL including (without limitation) any act of god, force majeure, war, civil war, disturbance, rebellion, embargo, strike, labour dispute, illness, flood, fire, sabotage or government action or regulation. If a Contract or order or any part thereof shall become impossible of performance or otherwise frustrated CEIL shall be entitled to reasonable remuneration for any work done up to the date of such impossibility or frustration, due credit being given for any amounts in respect of the Contract or order paid by the Customer.
11. CEI agrees to keep confidential all matters relating to this contract. This includes but is not limited to products tested, methods used, results of the work and contents of any reports.
12. These Conditions and the Contract to which the document relates shall in all respects be governed by and construed in accordance with the laws of the Republic of Ireland and in accordance with the Republic of Ireland shall have exclusive jurisdiction to determine any disputes arising therefrom unless otherwise agreed.
13. CEI is an accredited test laboratory and relevant test reports are denoted by use of the accreditation logo. When the accreditation logo is not used, the report is outside our scope accreditation.
14. In IEC standards measurement uncertainty is already incorporated into the specifications. Statements of conformity in the CEI test report follow these decision rules: Pass – Results within the stated limit, Fail – Results outside the stated limit.
15. The test results presented in this report relate only to the object tested.

1 Equipment Under Test (EUT)

1.1 Identification of EUT

Manufacturer:	Tekelek
Model Number:	TEK880

1.2 Description of E.U.T.

The TEK 880 level sensor product was a battery powered (Lithium thionyl chloride cell 3.6V) Radar level sensor
The application is for tank level monitoring and reporting level of liquid in a tank to a remote end server.
It had a BG95-M3 Quectel LTE module (FCC-ID XMR201910BG95M3) that supports 2G, NB-IoT, CAT-M cellular communications.
There is a radar module (XM132) that supports a 60.5Ghz Radar IC (A111) and allows the sensor to make level measurements.
The sensor also has a small BLE module (FCC-ID/2ATPO-PB03) that is only used for installation purposes to setup the sensor.

1.3 Modifications

There were no modifications on the EUT

1.4 Date of Test

Tests were performed on dates of the 13th 27th Jun , 3rd ,4th ,5th 12th 14th Jul 2023.

1.5 Environmental Conditions

	Temperature	**Relative Humidity**
Test	°C	%
Radiated Emissions <1GHz	22	37
Radiated Emissions >1GHz	24	47

1.6 Test execution

The tests were performed manually and no special software was used for the tests.
RSS 130 is currently not listed on CEI scope but test methods are similar to the other reference standards in the report.

2 Test Specification, Methods and Procedures

FCC Rules part 22 Private and Land Mobile Services
FCC Rules part 24 Public Mobile Services
FCC Rules part 27 Miscellaneous Wireless Communications Services

RSS-130 Issue 2 Feb 2019
Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz,698-756MHz and 777-787MHz

RSS-132 Issue 3 Jan 2013
Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894MHz

RSS-133 Issue 6 Amd 1 Jan 18 2018
2GHz Personal Communications Services

RSS-139 Issue 3 Jul 2015
Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz

Ansi 63.26 2015
American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

KDB 971168 D01 Power Meas Licence Digital Systems V03r01
Measurement Guidance for Certification of Licenced Digital Transmitters

Ansi C63.4a 2017
American National Standard for Methods of Measurement of Radio -Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz

RSS-Gen Issue 5 Apr 2018 A1 Mar 2019 A2 2021
General Requirements for Compliance of Radio Apparatus

RSS Gen Issue 5 2018
General Requirements for Radio Apparatus

3 Operation of E.U.T. During Testing

3.1 Operating Environment

The EUT was powered from its internal battery.

3.2 Operating Mode:

The EUT was operated in a mode where it was repeatedly transmitting in order to assess the emissions for transmit mode.
It was operated with all radios on except for idle mode test.
The Radar, while active during the transmit tests does not form part of this test report.

4 Results Summary

FCC Standard	RSS Standard	Description	Result
22.913	**RSS-132**	Carrier power	**Pass**
24.232c	**RSS-133**	Carrier power	**Pass**
27.5c	**RSS-139**	Carrier power	**Pass**
27.5b	**RSS-130**	Carrier power	**Pass**
22.913	**RSS-132**	Radiated Spurious Emissions	**Pass**
24.232c	**RSS-133**	Radiated Spurious Emissions	**Pass**
27.5c	**RSS-139**	Radiated Spurious Emissions	**Pass**
27.5b	**RSS-130**	Radiated Spurious Emissions	**Pass**
15.109	**RSS Gen**	Radiated Spurious emissions	**Pass**
15.247	**RSS 247**	Carrier Power	**Pass**

Note the test results relate only to the device tested

5 Results

5.1 Radiated Spurious Emissions

Radiated measurements were made at the Compliance Engineering Ireland Ltd anechoic chamber located in Dunshaughlin, Co. Meath, Ireland to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

Emissions below 1GHz were measured using a bi-conical and log periodic antennas with resolution bandwidth 100kHz at a measurement distance of 3 metres with EUT on a motorised turntable which allowed 360 degrees rotation. The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 metres

Emissions between 1GHz and 18GHz were measured using a horn antenna with resolution bandwidth of 1MHz and video bandwidth of 3MHz at a measurement distance of 3 metres with EUT on a motorised turntable which allowed 360 degrees rotation. The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 metres

Emissions above 18GHz were measured using a horn antenna with resolution bandwidth of 1MHz and video bandwidth of 3MHz at a measurement distance of 3 metre with EUT on a motorised turntable which allowed 360 degrees rotation.
The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 metres

5.1.1 Results CATM1 Band 2 Transmit mode

Frequency	Level	Spurious emission limit	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
3816	-44.93	-13	Vertical	O1	31.9	Pass
5724	-46.75	-13	Vertical	O1	33.8	Pass
7632	-44.74	-13	Vertical	O1	31.7	Pass
9540	-43.44	-13	Vertical	O1	30.4	Pass
3816	-46.05	-13	Horizontal	O1	33.1	Pass
5724	-47.41	-13	Horizontal	O1	34.4	Pass
7632	-42.82	-13	Horizontal	O1	29.8	Pass
9540	-42.62	-13	Horizontal	O1	29.6	Pass

Test Result: Pass

5.1.2 Results CATM1 Band 5 Transmit mode

Frequency	Level	Spurious emission limit	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
2510	-47.31	-13	Vertical	O1	34.3	Pass
3346	-45.85	-13	Vertical	O1	32.9	Pass
5019	-48.98	-13	Vertical	O1	36.0	Pass
6692	-44.12	-13	Vertical	O1	31.1	Pass
7528	-43.41	-13	Vertical	O1	30.4	Pass
2510	-46.65	-13	Horizontal	O1	33.7	Pass
3346	-45.34	-13	Horizontal	O1	32.3	Pass
5019	-49.12	-13	Horizontal	O1	36.1	Pass
6692	-44.62	-13	Horizontal	O1	31.6	Pass
7528	-43.27	-13	Horizontal	O1	30.3	Pass

Test Result: Pass

5.1.3 Results CATM1 Band 12 Transmit mode

Frequency	Level	Spurious emission limit	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
434.55	-59.75	-13	Vertical	O1	46.8	Pass
473.97	-59.51	-13	Vertical	O1	46.5	Pass
896.22	-54.96	-13	Horizontal	O1	42.0	Pass
972.99	-55.71	-13	Horizontal	O1	42.7	Pass
2112	-51.77	-13	Vertical	O1	38.8	Pass
2816	-47.92	-13	Vertical	O1	34.9	Pass
3520	-44.58	-13	Vertical	O1	31.6	Pass
5632	-45.68	-13	Vertical	O1	32.7	Pass
2112	-48.22	-13	Horizontal	O1	35.2	Pass
2816	-47	-13	Horizontal	O1	34.0	Pass
3520	-44.59	-13	Horizontal	O1	31.6	Pass
5632	-45.96	-13	Horizontal	O1	33.0	Pass

Test Result: Pass

5.1.4 Results GSM 1900

Frequency	Level	Spurious emission limit	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
3739	-33.49	-13	Vertical	O1	20.5	Pass
5609	-43.73	-13	Vertical	O1	30.7	Pass
7479	-42.16	-13	Vertical	O1	29.2	Pass
9349	-41.17	-13	Vertical	O1	28.2	Pass
3739	-33.11	-13	Horizontal	O1	20.1	Pass
5609	-42.35	-13	Horizontal	O1	29.4	Pass
7479	-41.28	-13	Horizontal	O1	28.3	Pass
9349	-41.98	-13	Horizontal	O1	29.0	Pass

Test Result: Pass

5.1.5 Idle mode

The EUT was placed in idle mode for this test.

Limit as per 15.109

Frequency	Quasi peak Level	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Quasi Peak	Average Limit	Margin	Result
MHz	dBuV/m		V/H	dB	dB	dB	dBuV/m	dBuV/m	dB	P/F
33.360	13.0	O2	Vertical	13.8	0	1	27.8	40.0	12.2	Pass
59.970	18.3	O3	Horizontal	9.5	0	1.3	29.1	40.0	10.9	Pass
540.000	10.7	O2	Vertical	19	0	3.8	33.5	46.0	12.5	Pass
630.000	15.6	O2	Vertical	19.9	0	4.2	39.7	46.0	6.3	Pass
810.000	10.9	O2	Vertical	21.9	0	4.9	37.7	46.0	8.3	Pass
990.000	11.6	O2	Vertical	24.6	0	5.5	41.7	54.0	12.3	Pass
311.970	16.3	O3	Horizontal	15.2	0	2.8	34.3	46.0	11.7	Pass
810.000	16.8	O3	Horizontal	21.9	0	4.9	43.6	46.0	2.4	Pass
990.000	7.7	O3	Horizontal	24.6	0	5.5	37.8	54.0	16.2	Pass

Calculation example
Final Field Strength Quasi Peak (dBuV/m) =Quasi Peak Level (dBuV/m) + Antenna Factor (dB)- Pre-amp Gain (dB) +Cable Loss (dB)
37.8 = 7.7 + 24.6 - 0 + 5.5

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Average Limit	Margin for Peak v Average Limit +20dB	Result
GHz	dBuV/m		V/H	dB	dB	dB	dBuV/m	dBuV/m	dB	P/F
5.564	43.7	O2	Vertical	34.5	39	8.2	47.4	54.0	26.6	Pass
6.342	42.4	O2	Vertical	34.9	40.2	10	47.1	54.0	26.9	Pass
5.742	44.7	O3	Horizontal	34.1	39.2	8.4	48.0	54.0	26.0	Pass
6.574	44.3	O3	Horizontal	34.8	40.3	10	48.8	54.0	25.2	Pass

Calculation example
Final Field Strength Peak (dBuV/m) =Reading Peak (dBuV/m) + Antenna Factor (dB)- Pre-amp Gain (dB) +Cable Loss (dB)
48.8 = 44.3 + 34.8 - 40.3 + 10

Test Result: Pass

5.2 Carrier power

The test was performed as a radiated test, with the test antenna at 3 metres from the EUT in a fully anechoic chamber. The EUT was rotated through 360 degrees azimuth and the maximum level was recorded.
A substitution measurement was performed where the EUT was replaced by an antenna connected to a signal generator. The signal generator level was adjusted to match the recorded level at the receiver. The signal generator level, adjusted for the cable losses and substitution antenna gain resulted in the power in dBm from the EUT.

Results

5.2.1 Band 12 CATM1

Frequency	Level	Emission limit Part27	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
699	12.0	34.8	Vertical	O1	22.8	Pass
699	16.8	34.8	Horizontal	O1	18.0	Pass

Test Result: Pass

5.2.2 Band 2 CATM1

Frequency	Level	Emission limit Part24	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
1908	24.4	33.0	Vertical	O2	8.6	Pass
1908	27.5	33.0	Horizontal	O3	5.5	Pass

Test Result: Pass

5.2.3 Band 5 CATM1

Frequency	Level	Emission limit Part22	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
836.5	14.4	38.5	Vertical	O1	24.1	Pass
836.5	26.6	38.5	Horizontal	O1	11.9	Pass

Test Result: Pass

5.2.4 Band 2 GSM 1900

Frequency	Level	Emission limit Part24	Antenna Polarity	EUT orient	Δ Limit	Pass / Fail
MHz	dBm	dBm	V/H		dB	P/F
1869	18.3	33.0	Vertical	O1	14.7	Pass
1869	23.2	33.0	Horizontal	O1	9.8	Pass

Test Result: Pass

5.2.5 BLE

Frequency	Reading Peak	EUT Orientation	Antenna Polarity	Antenna Factor	Preamp Gain	Cable loss	Final Field Strength Peak	Transmitted Power	Limit	Margin	Result
GHz	dBuV/m		V/H	dB	dB	dB	dBuV/m	dBm	dBm	dB	P/F
2.402	65.0	O1	Vertical	28.6	0	4.8	98.4	3.2	36.0	32.8	Pass
2.426	64.8	O1	Vertical	28.6	0	4.8	98.2	3.0	36.0	33	Pass
2.480	65.0	O1	Vertical	28.6	0	4.9	98.5	3.3	36.0	32.7	Pass
2.402	64.1	O1	Horizontal	28.6	0	4.8	97.5	2.3	36.0	33.7	Pass
2.426	63.5	O1	Horizontal	28.6	0	4.8	96.9	1.7	36.0	34.3	Pass
2.480	61.6	O1	Horizontal	28.6	0	4.9	95.1	-0.1	36.0	36.1	Pass

Calculation Example
Final Field Strength Peak (dBuV/m) =Reading Peak (dBuV/m) + Antenna Factor (dB)- Pre-amp Gain (dB) +Cable Loss (dB)
95.1 = 61.6 + 28.6 - 0 + 4.9

Transmitted Power
Transmitted power (dBm) = Final Field Strength Peak (dBuV/m) -95.2 dB
-0.1 =95.1-95.2

Test Result: Pass

6 Measurement Uncertainty

Measurement	Uncertainty
Radio Frequency	+/- $5x10^{-7}$
Maximum Frequency Deviation	+/- 1.7 %
Radiated Emission 30MHz-100MHz	+/- 5.3 dB
Radiated Emission 100MHz-300MHz	+/- 4.7 dB
Radiated Emission 300MHz-1GHz	+/- 3.9 dB
Radiated Emission 1GHz-6GHz	+/- 3.8 dB

The measurement uncertainties stated were calculated with a k=2 for a confidence level of 95.45%.

Appendix A Scans for Radiated Spurious Emissions Cat M1 Band12 and BLE

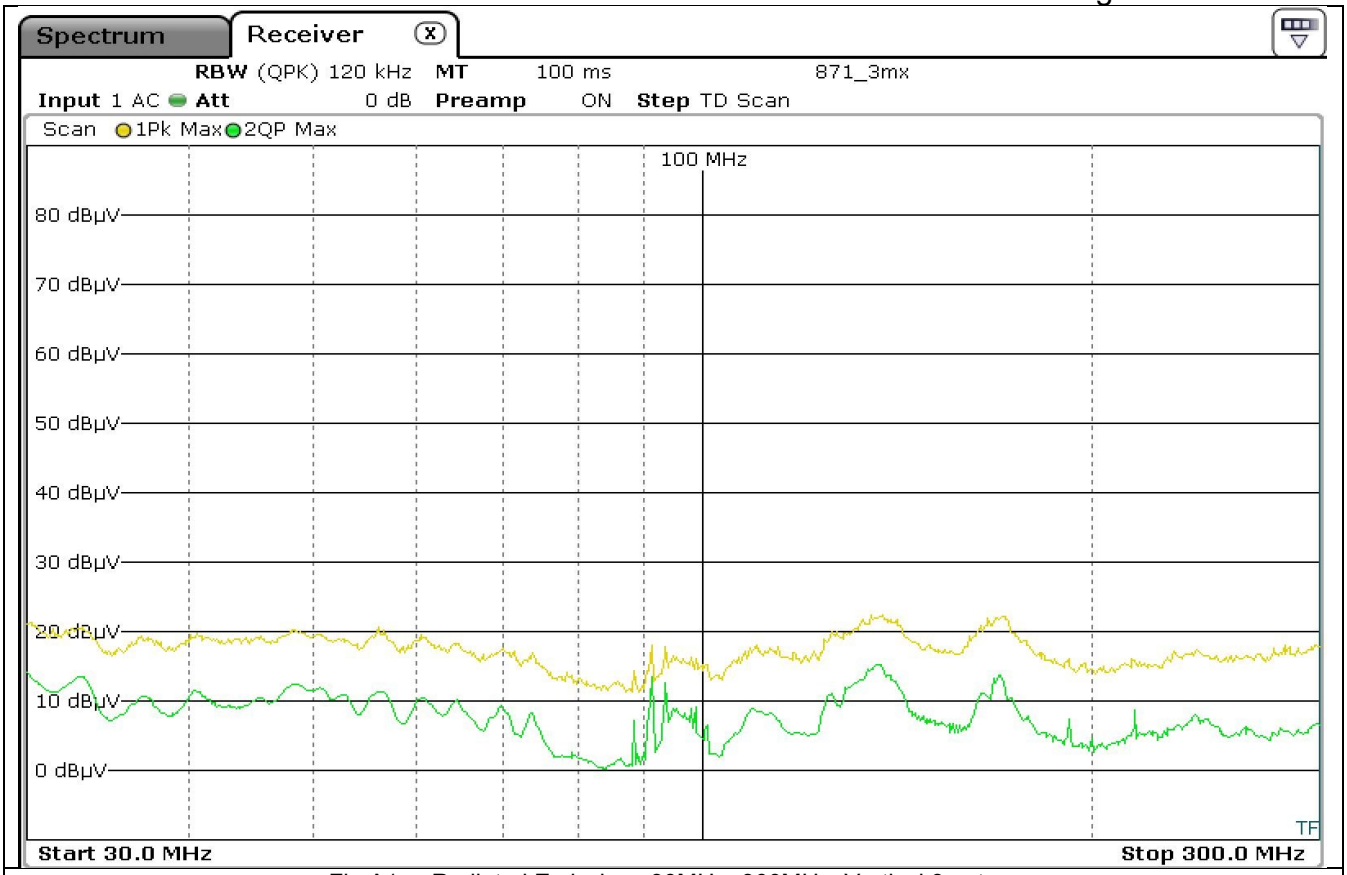

Fig A1 Radiated Emissions 30MHz -300MHz Vertical 3metres

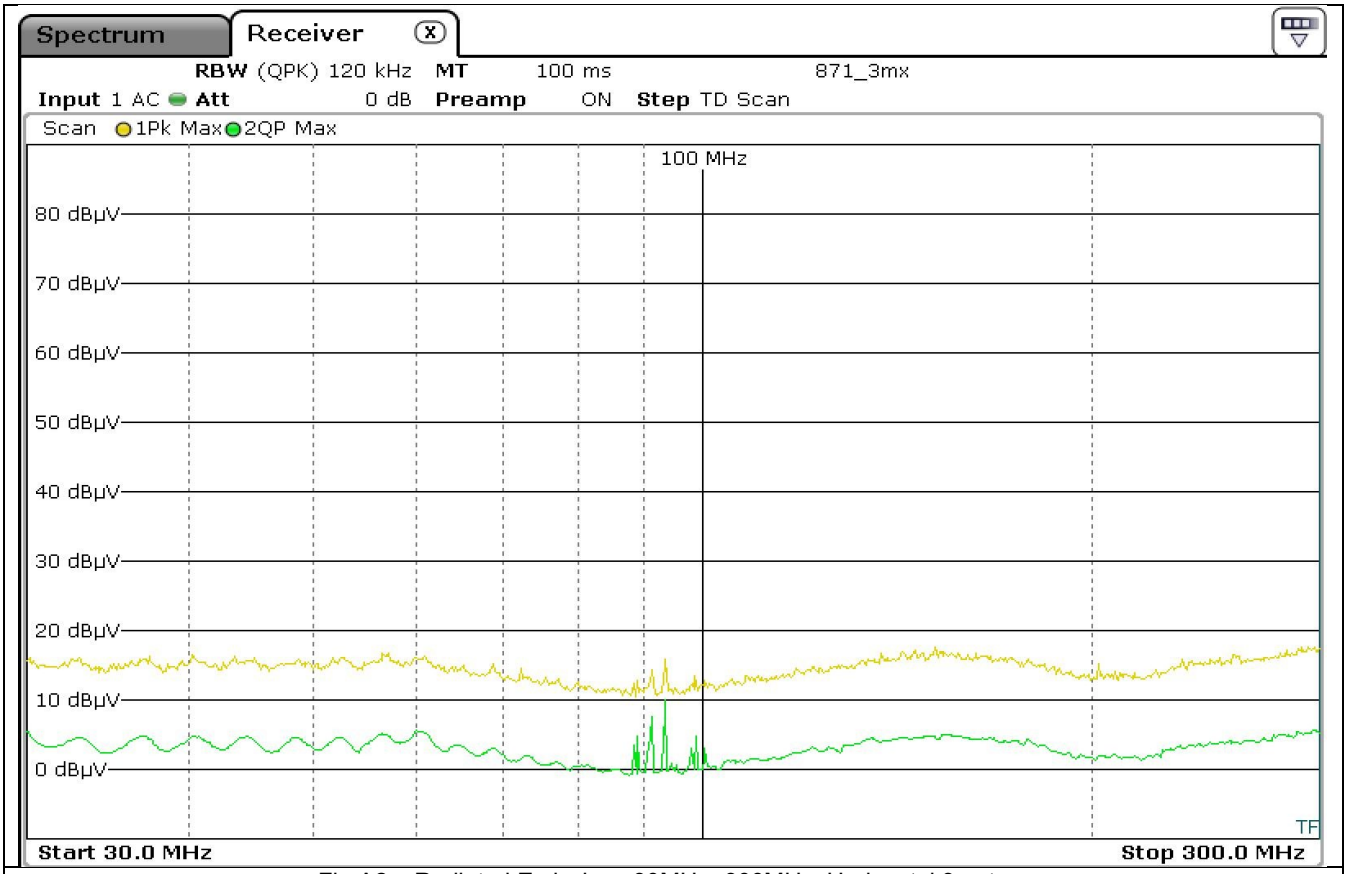

Fig A2 Radiated Emissions 30MHz -300MHz Horizontal 3metres

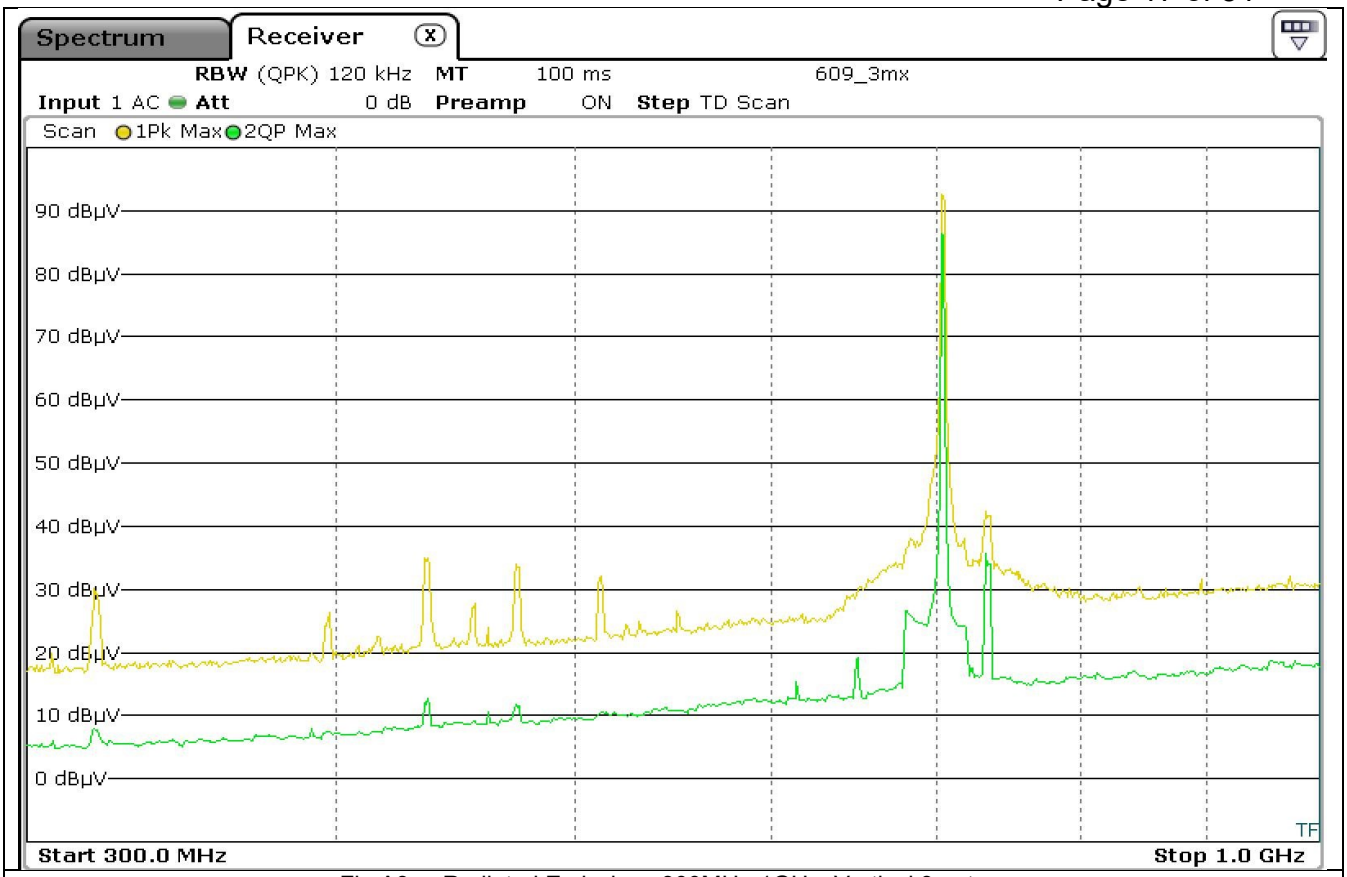

Fig A3 Radiated Emissions 300MHz-1GHz Vertical 3metres

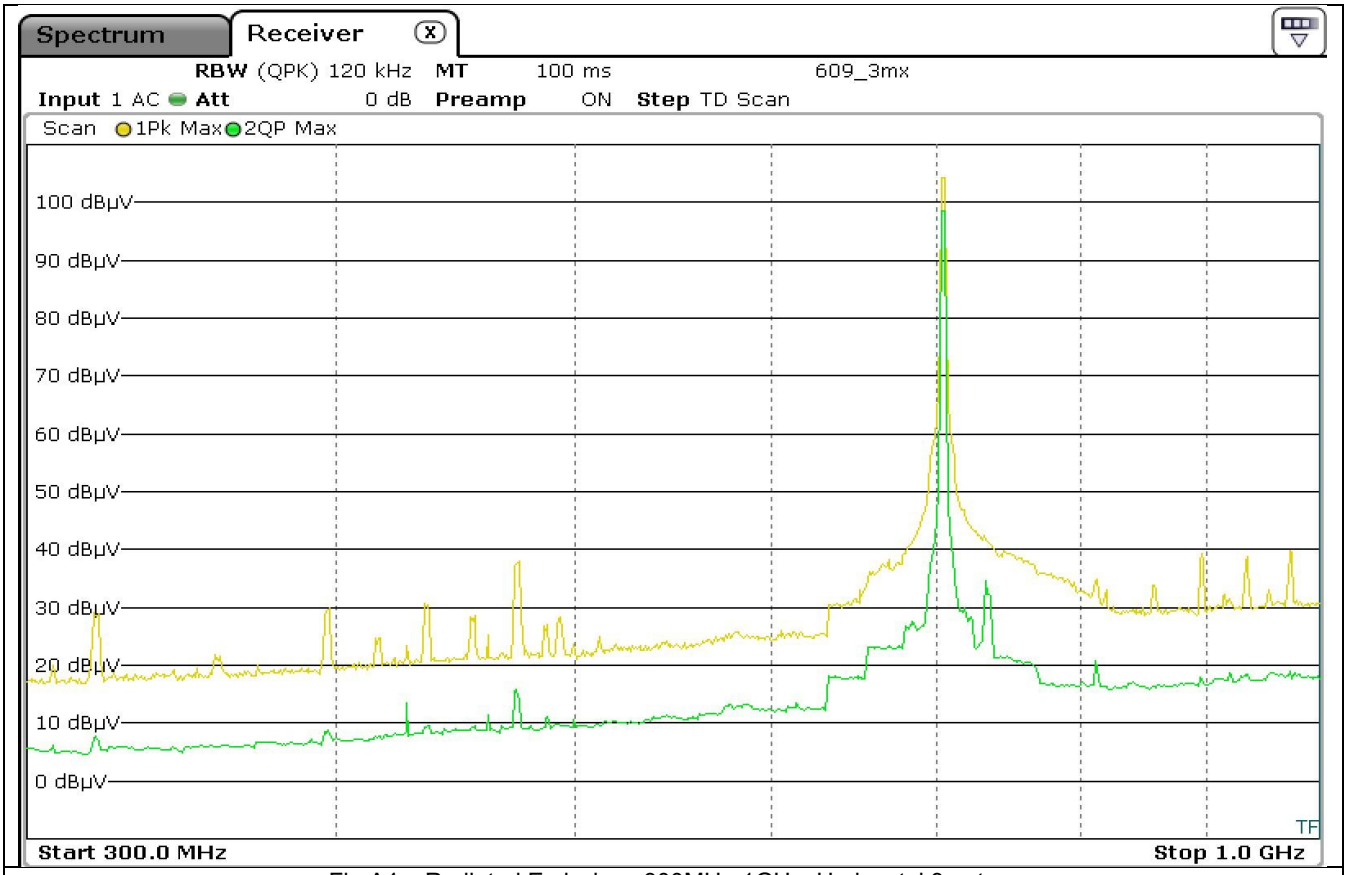

Fig A4 Radiated Emissions 300MHz-1GHz Horizontal 3metres

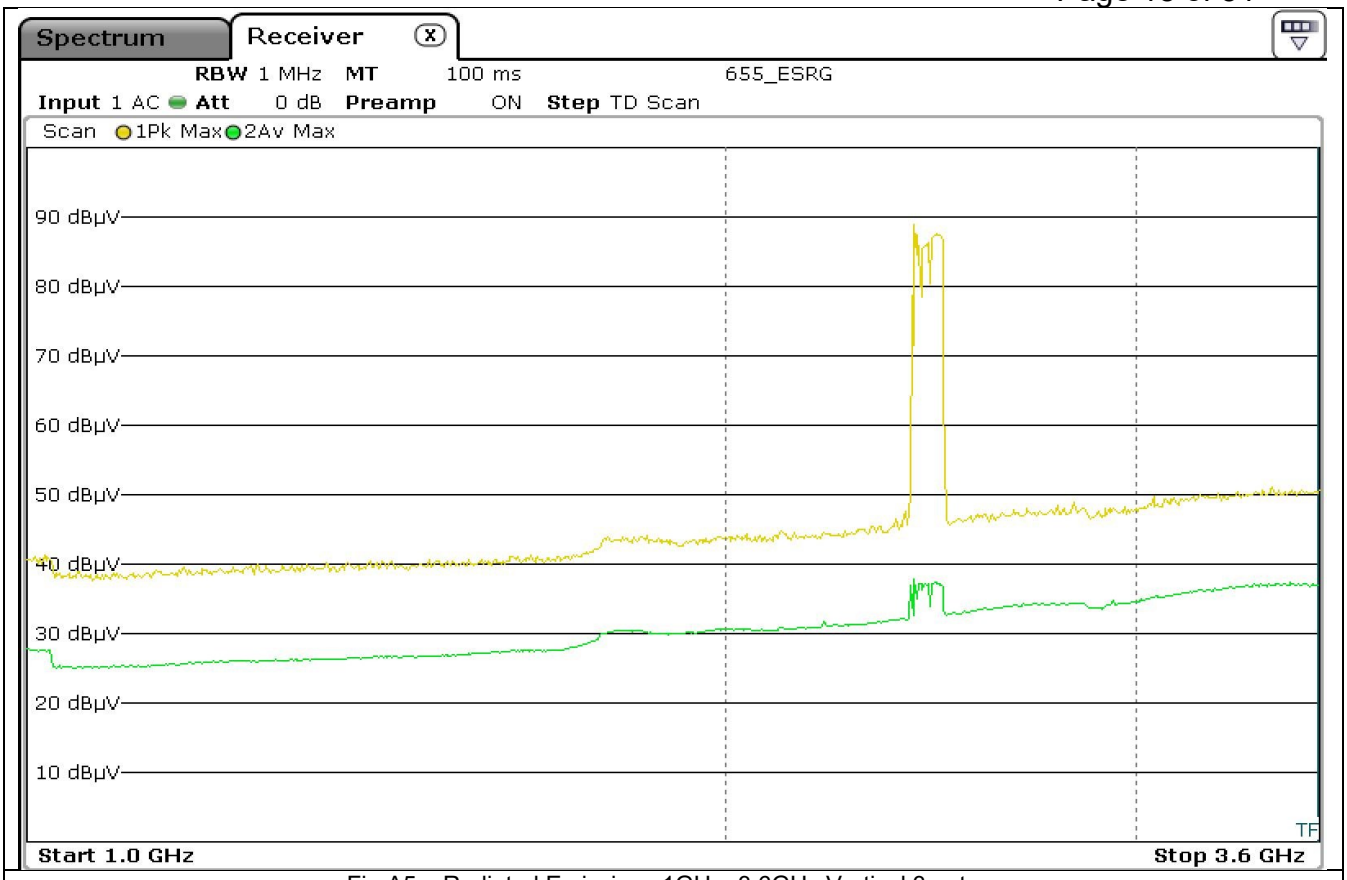

Fig A5 Radiated Emissions 1GHz -3.6GHz Vertical 3metres

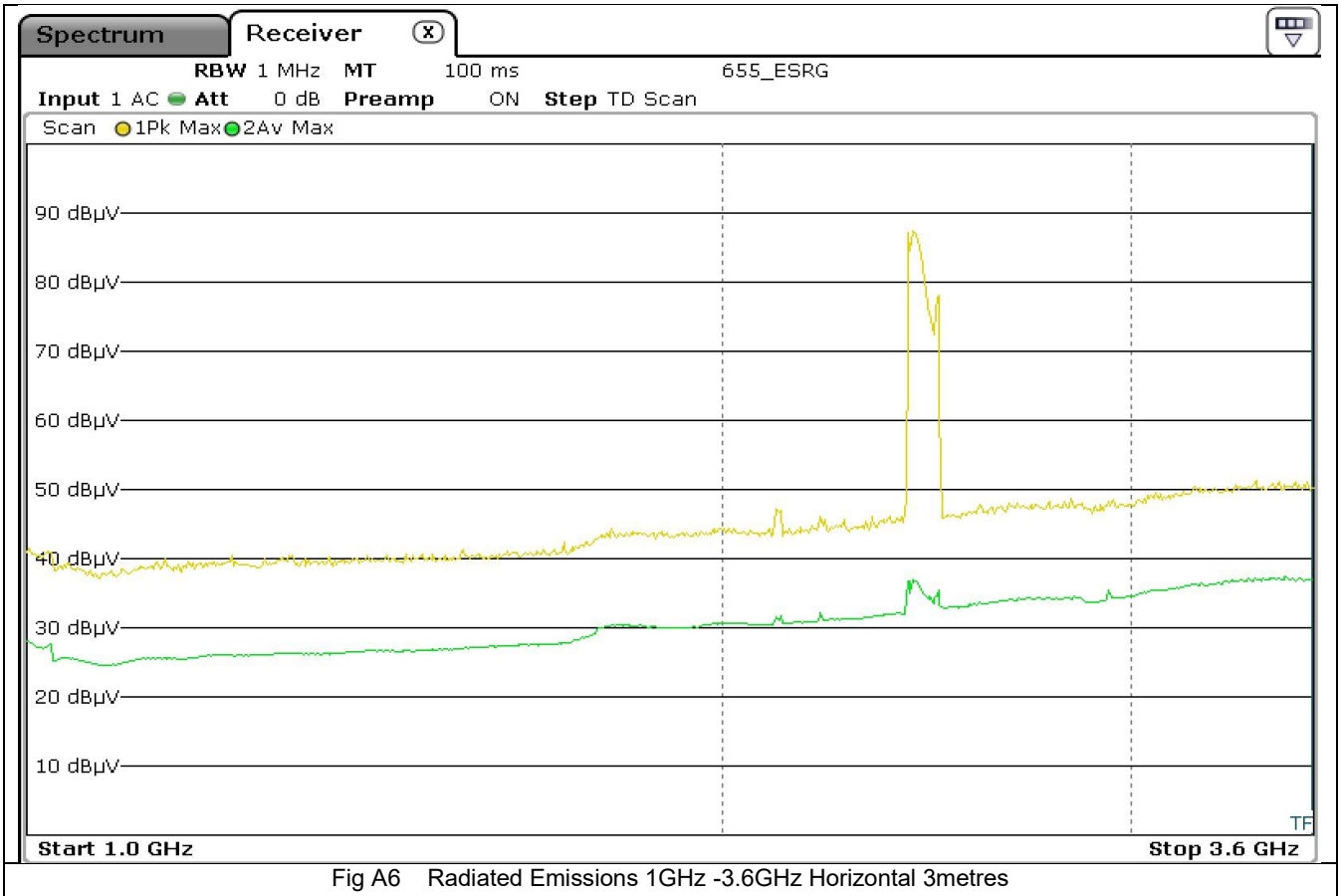

Fig A6 Radiated Emissions 1GHz -3.6GHz Horizontal 3metres

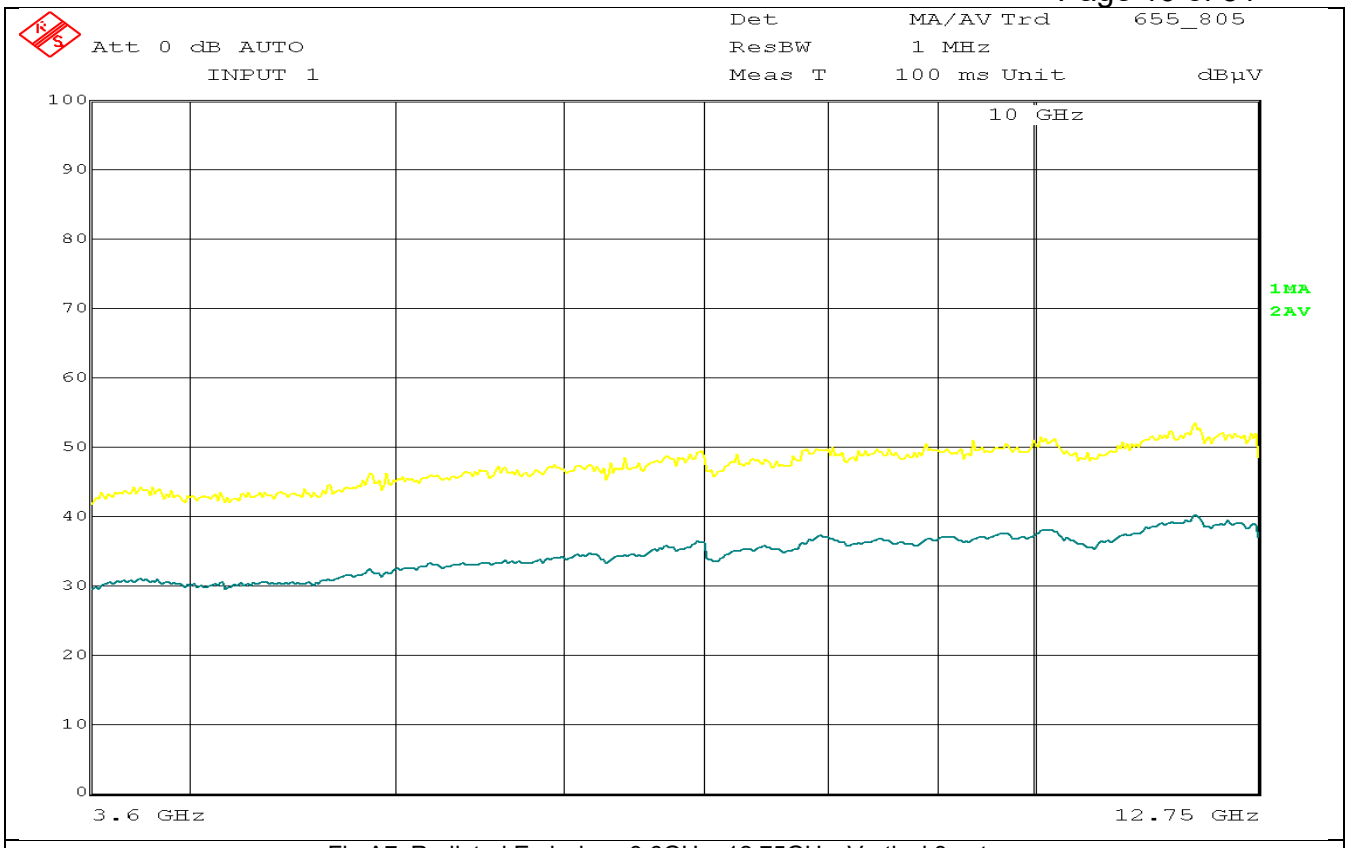

Fig A7 Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

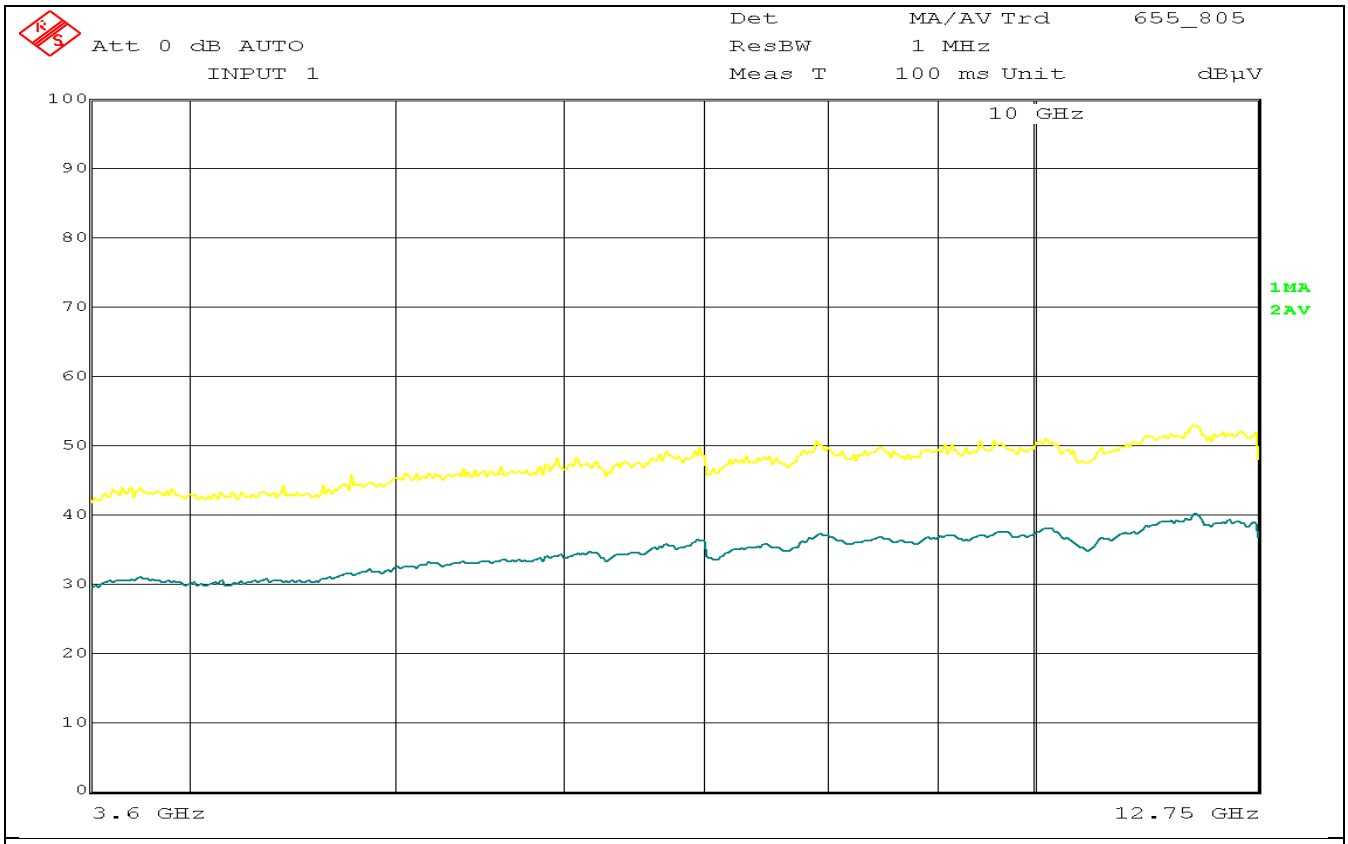

Fig A8 Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

Appendix B Scans for Radiated Spurious Emissions CAT M1 Band 5 and BLE

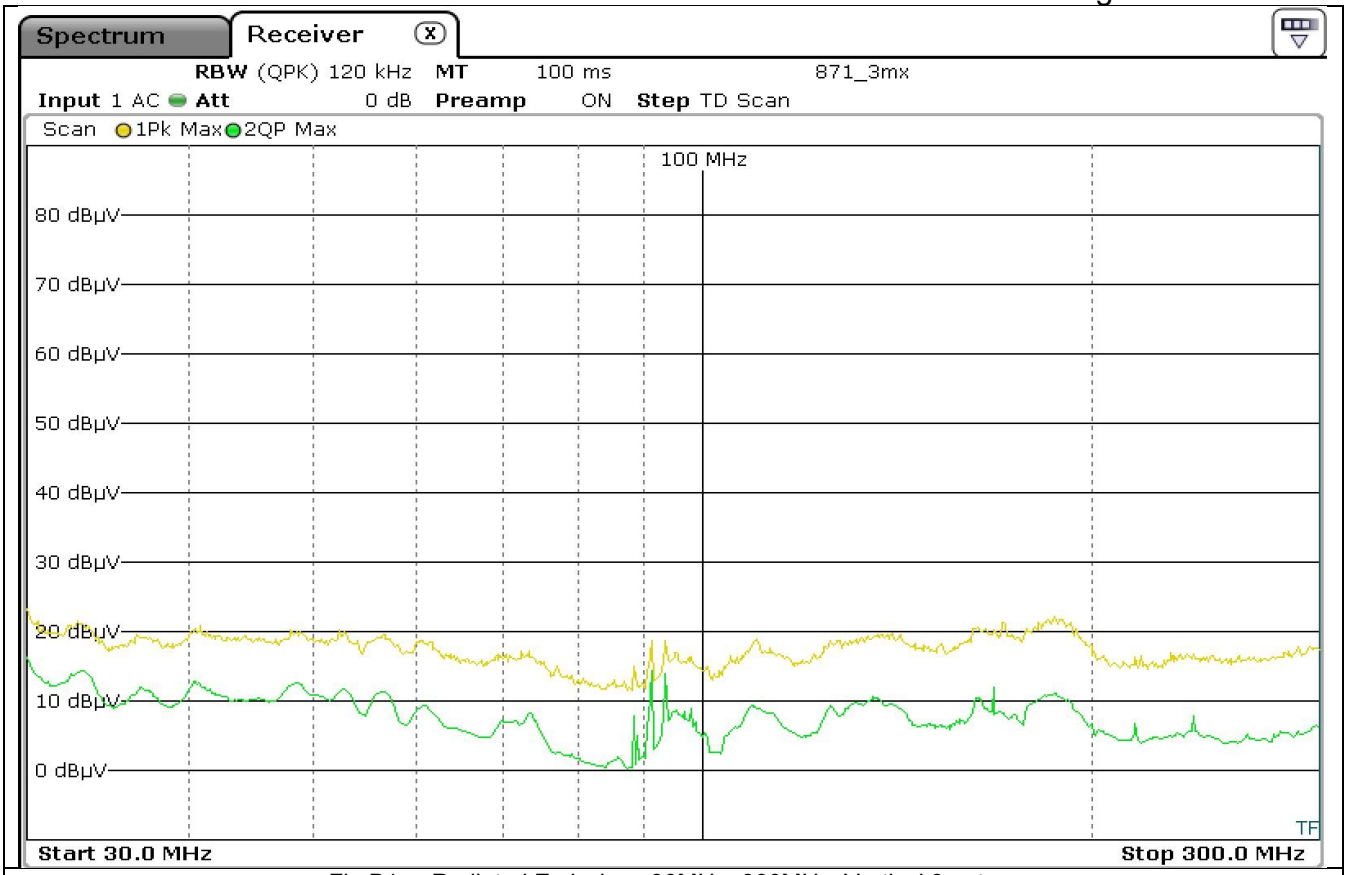

Fig B1 Radiated Emissions 30MHz -300MHz Vertical 3metres

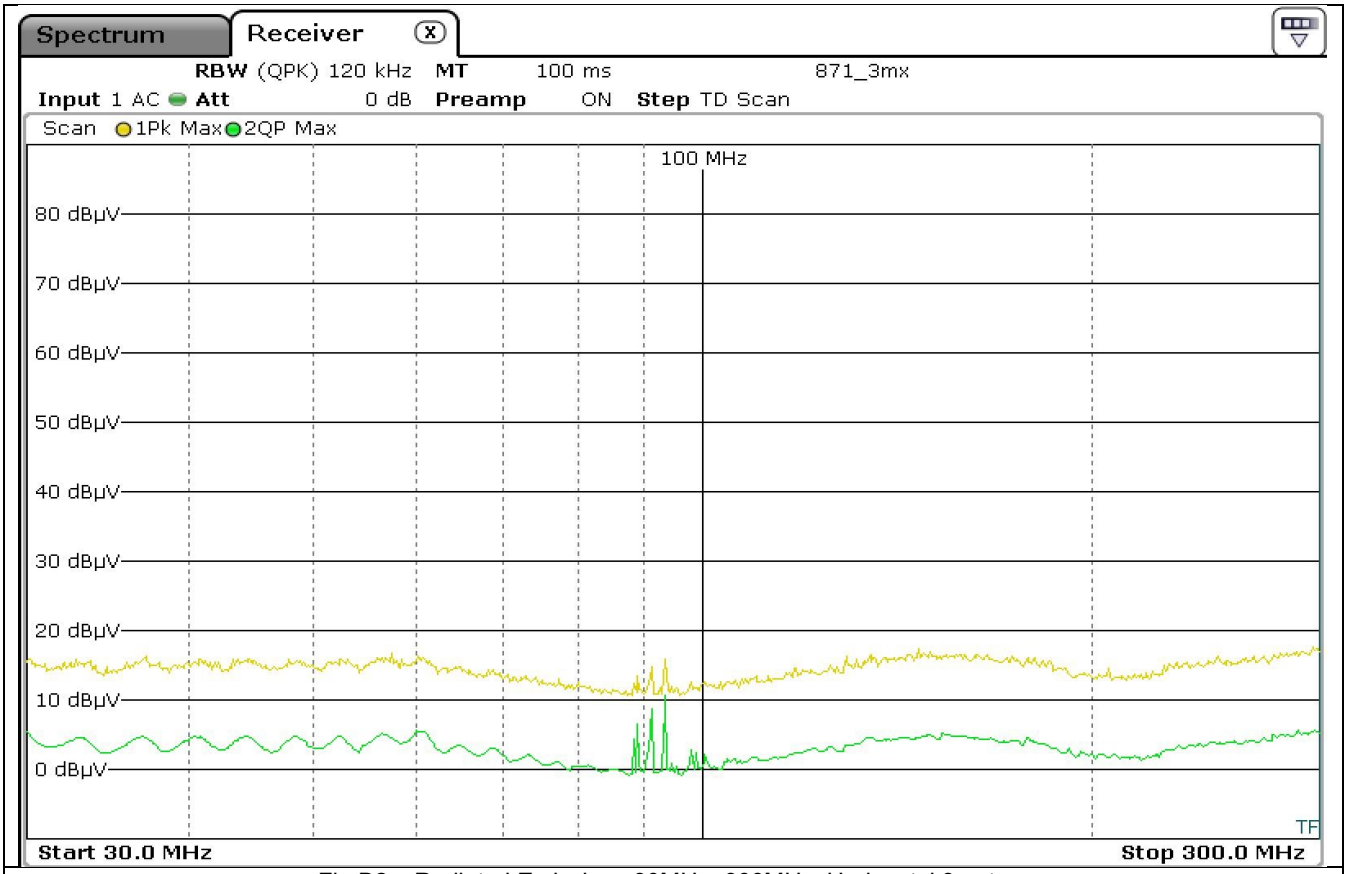

Fig B2 Radiated Emissions 30MHz -300MHz Horizontal 3metres

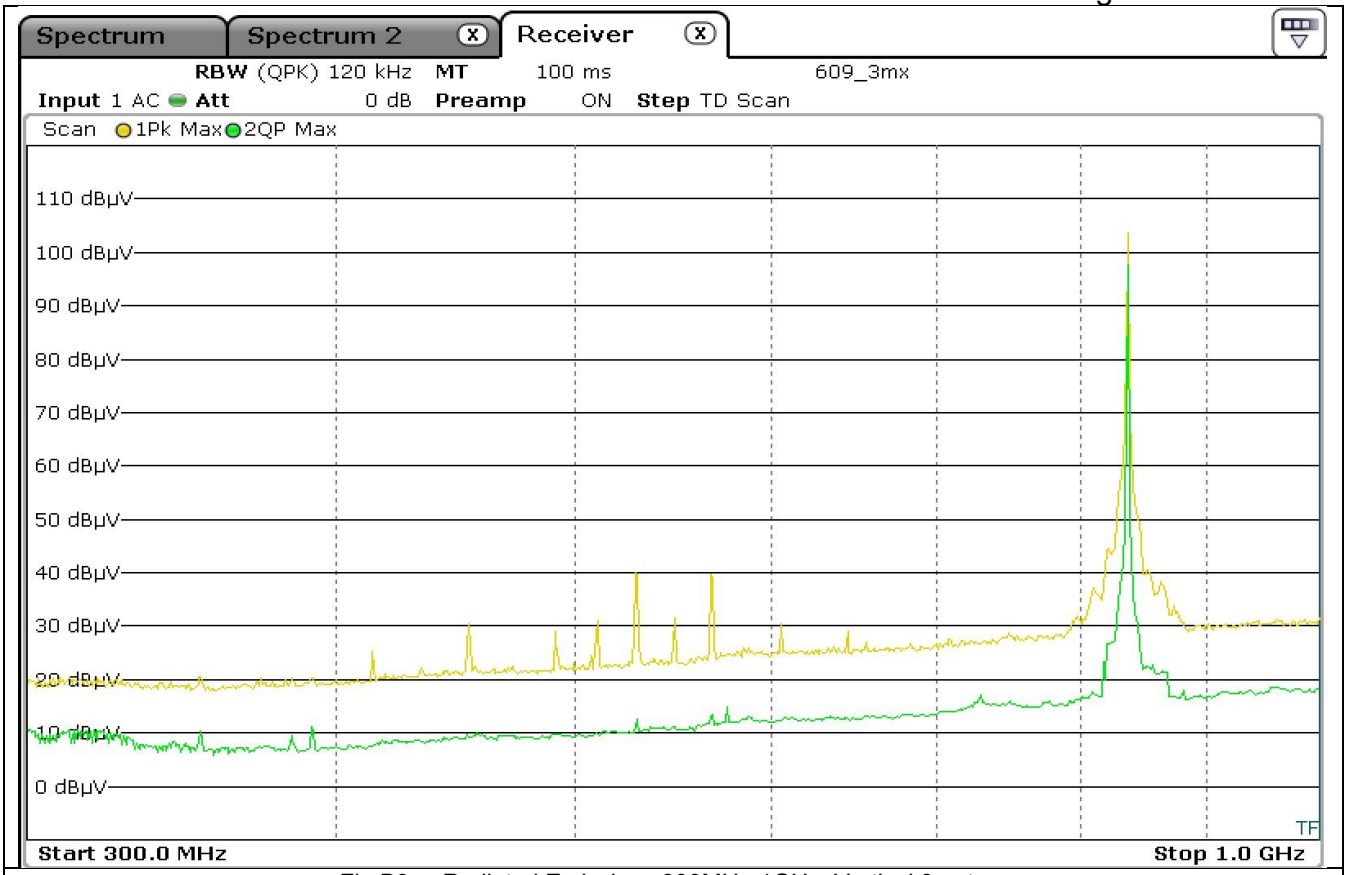

Fig B3 Radiated Emissions 300MHz-1GHz Vertical 3metres

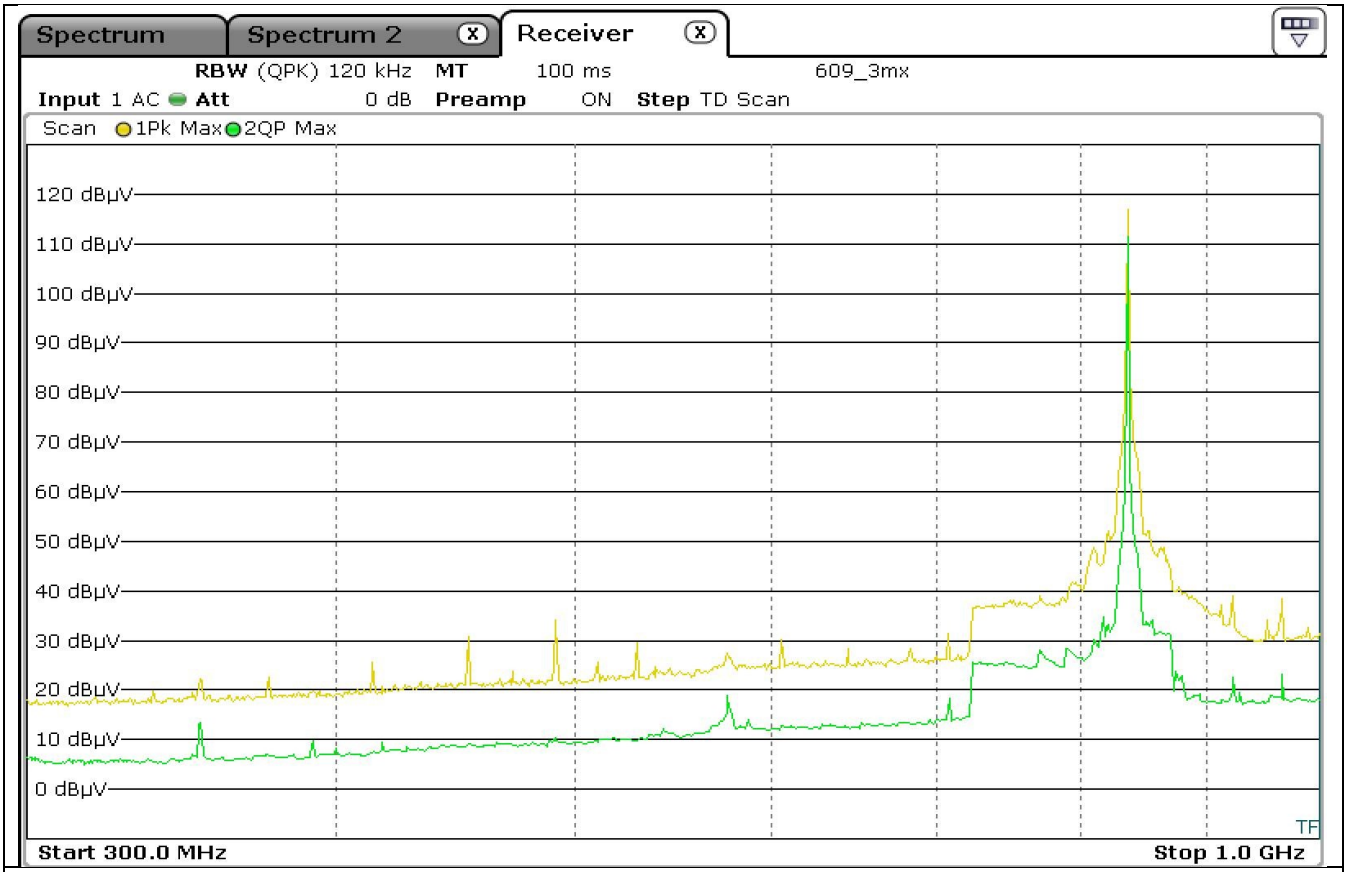

Fig B4 Radiated Emissions 300MHz-1GHz Horizontal 3metres

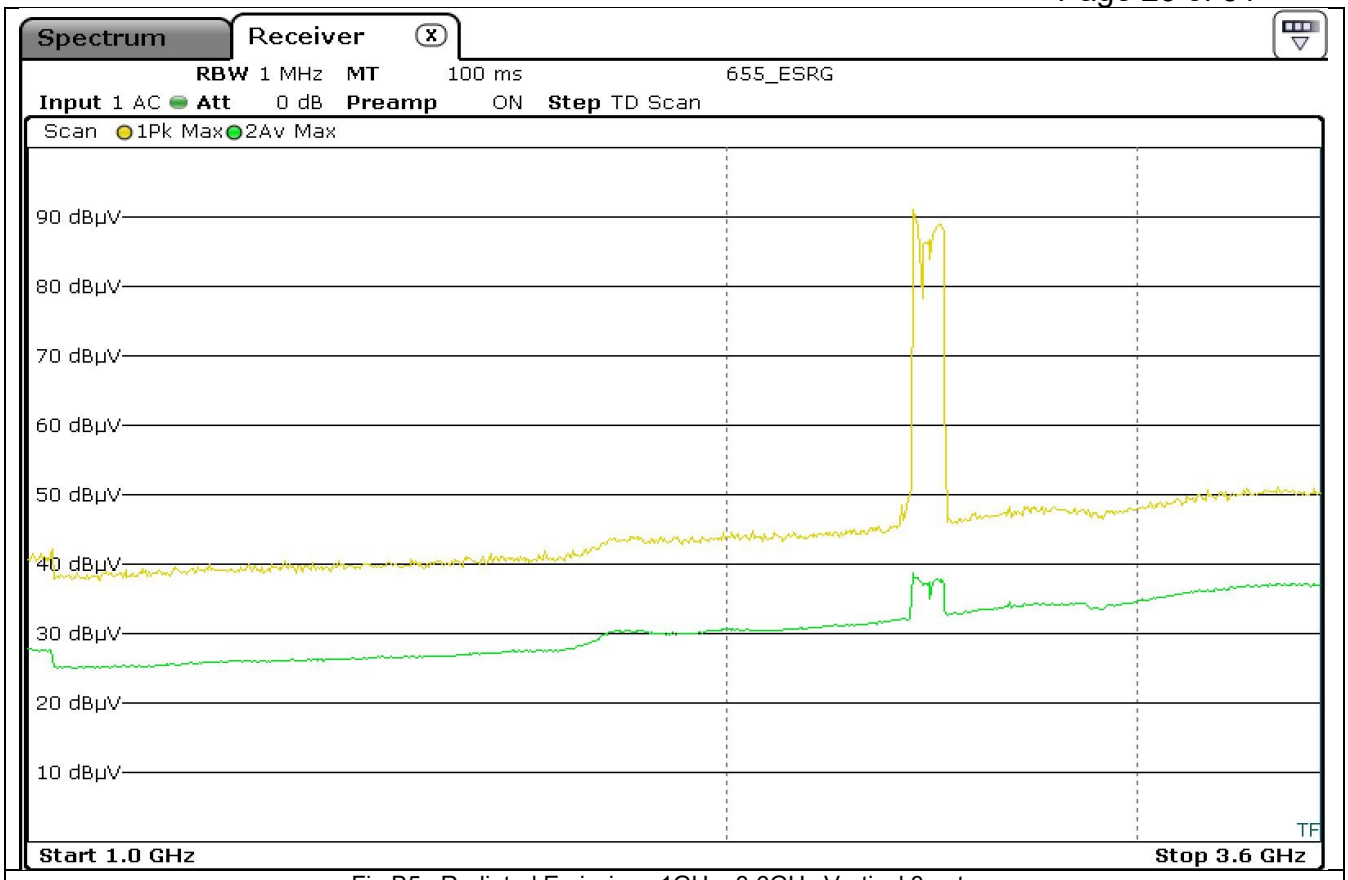

Fig B5 Radiated Emissions 1GHz -3.6GHz Vertical 3metres

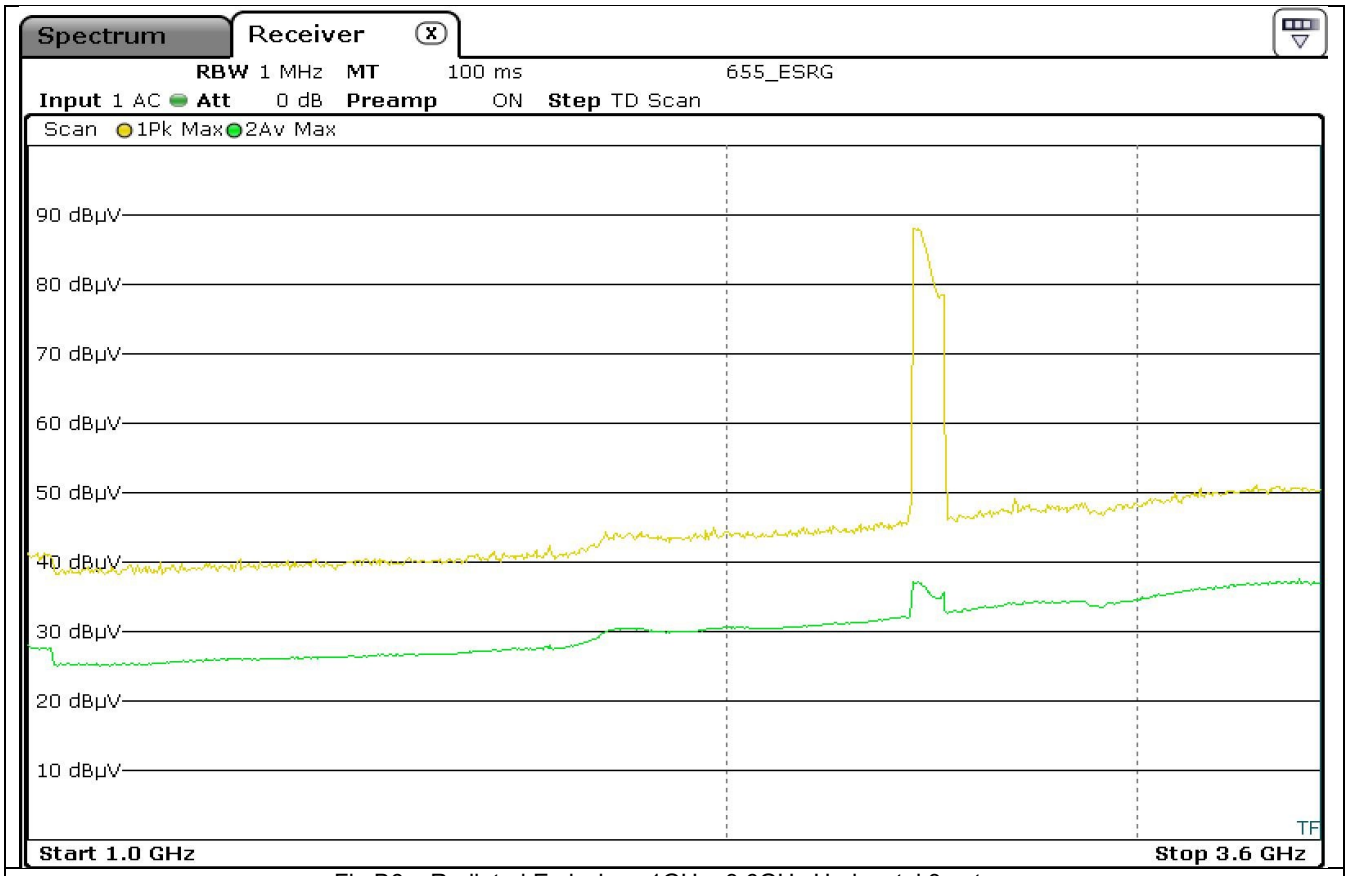

Fig B6 Radiated Emissions 1GHz -3.6GHz Horizontal 3metres

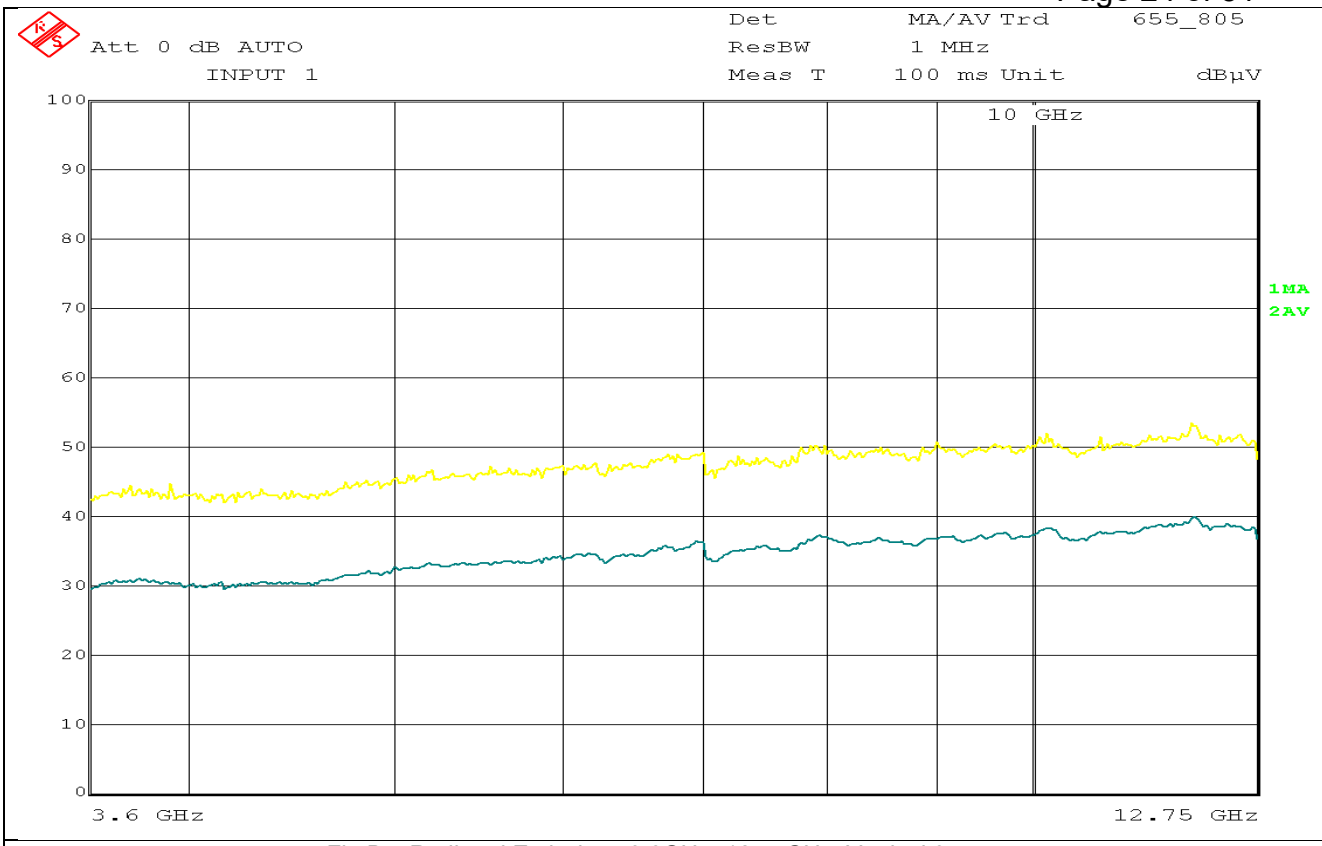

Fig B7 Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

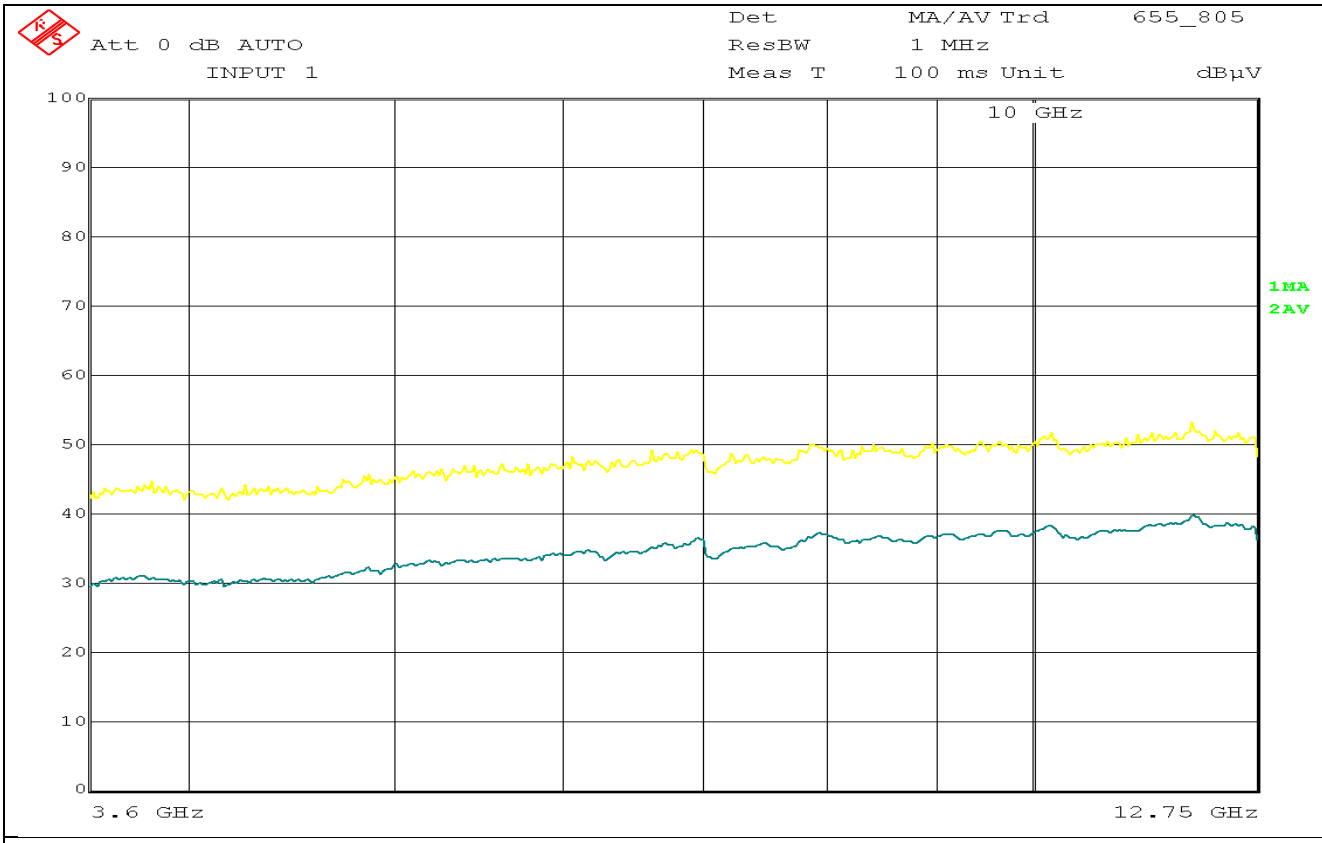

Fig B8 Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

Appendix C Scans for Radiated Spurious Emissions CAT M1 Band 2 and BLE

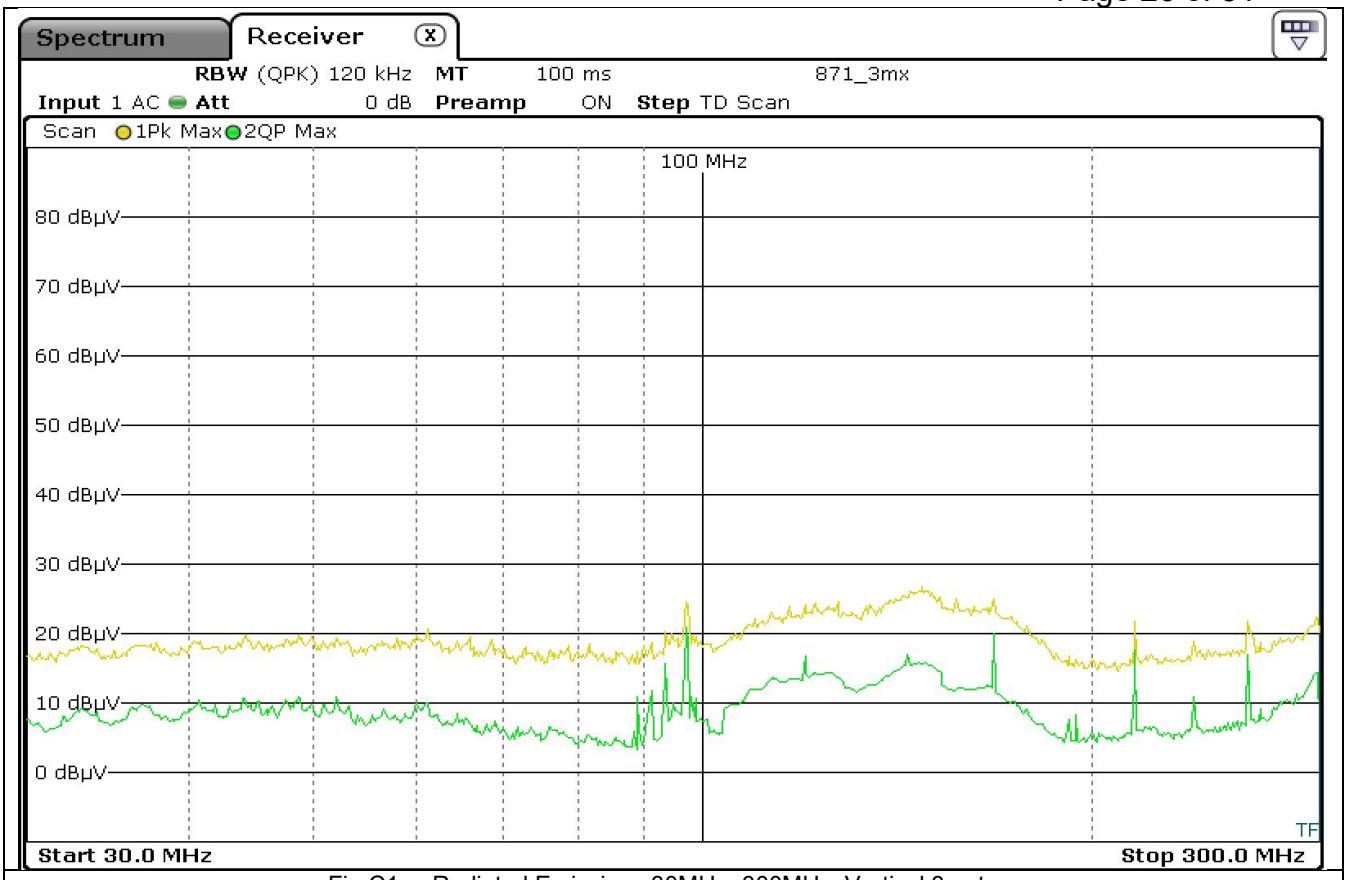

Fig C1 Radiated Emissions 30MHz -300MHz Vertical 3metres

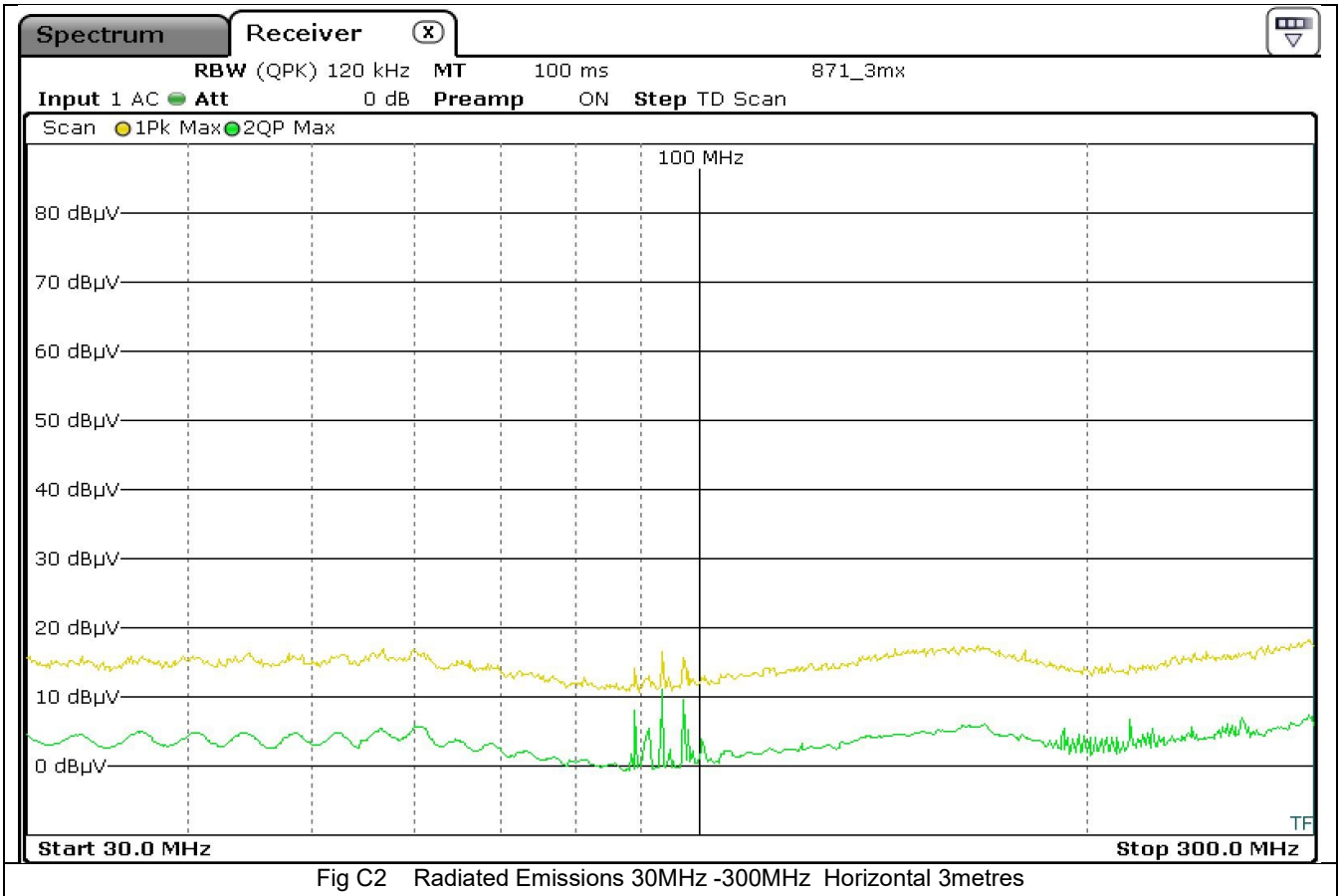

Fig C2 Radiated Emissions 30MHz -300MHz Horizontal 3metres

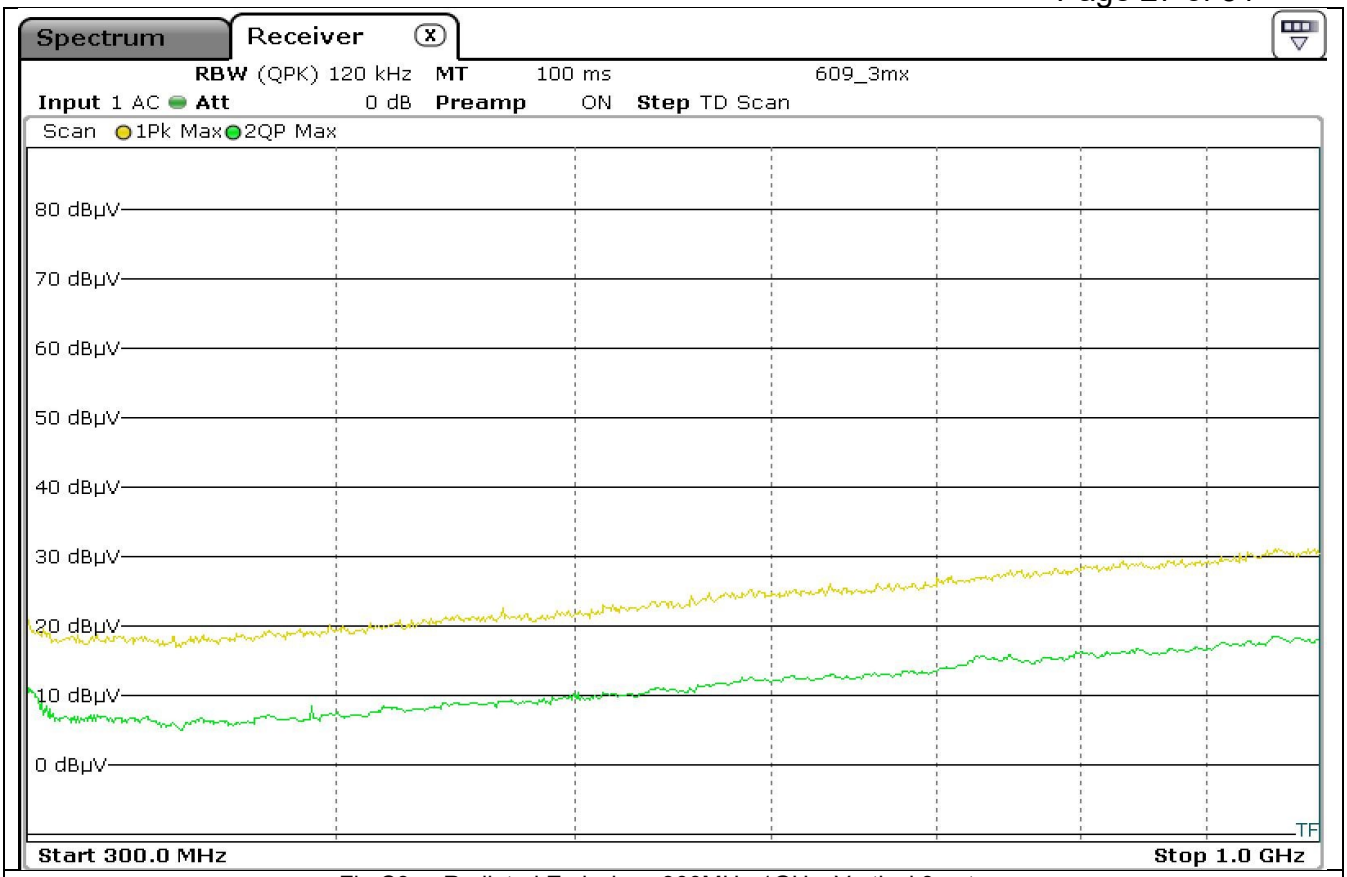

Fig C3 Radiated Emissions 300MHz-1GHz Vertical 3metres

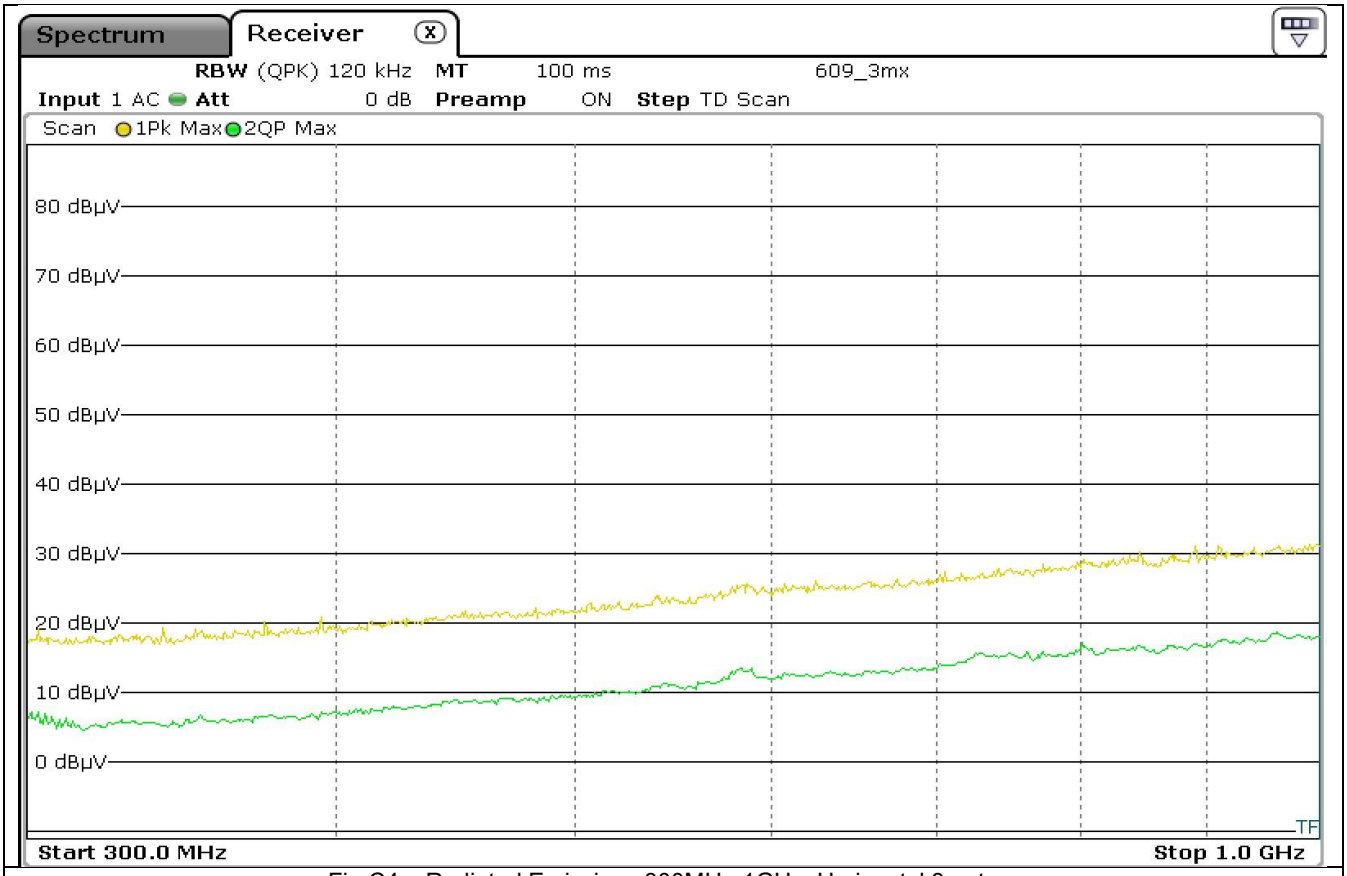

Fig C4 Radiated Emissions 300MHz-1GHz Horizontal 3metres

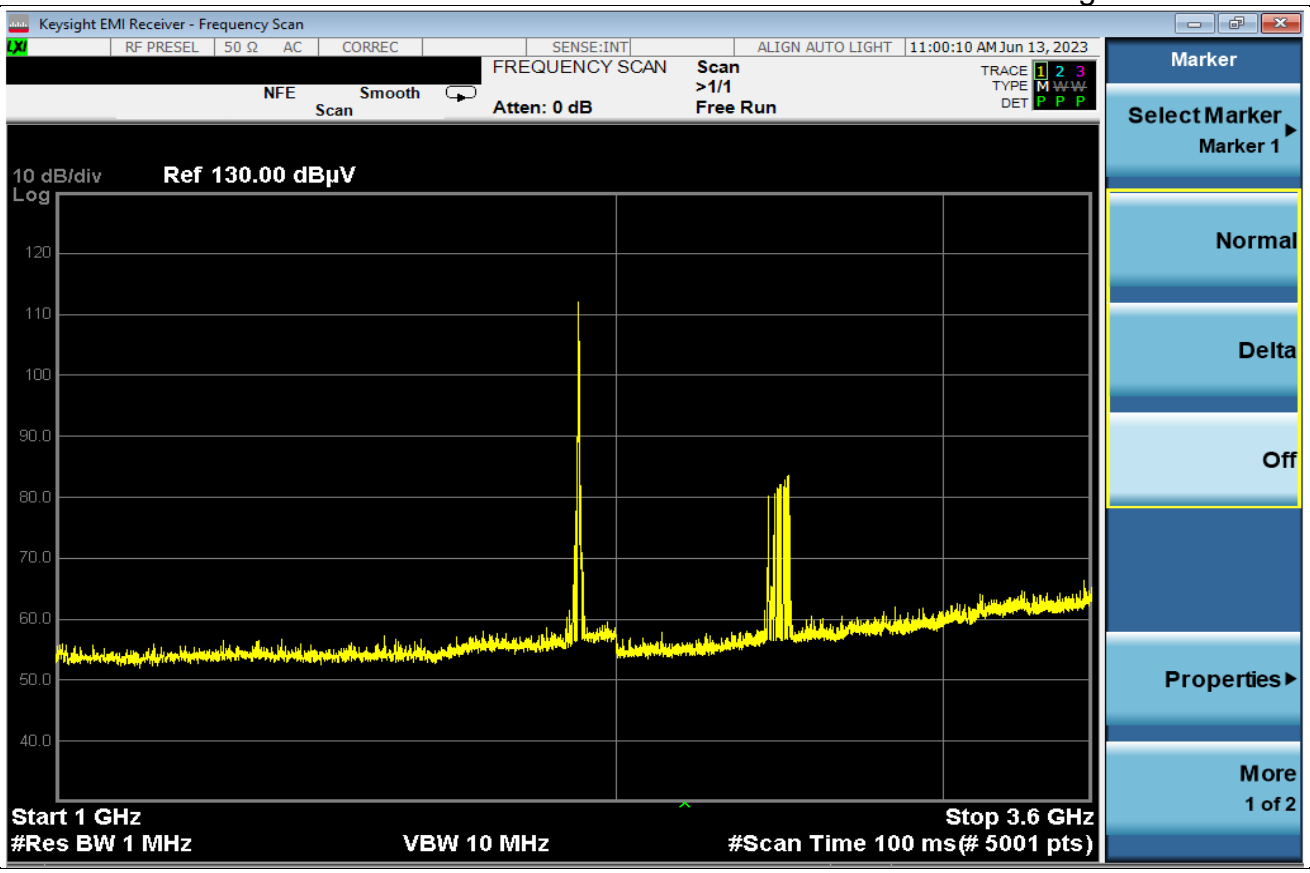

Fig C5 Radiated Emissions 1GHz -3.6GHz Vertical 3metres

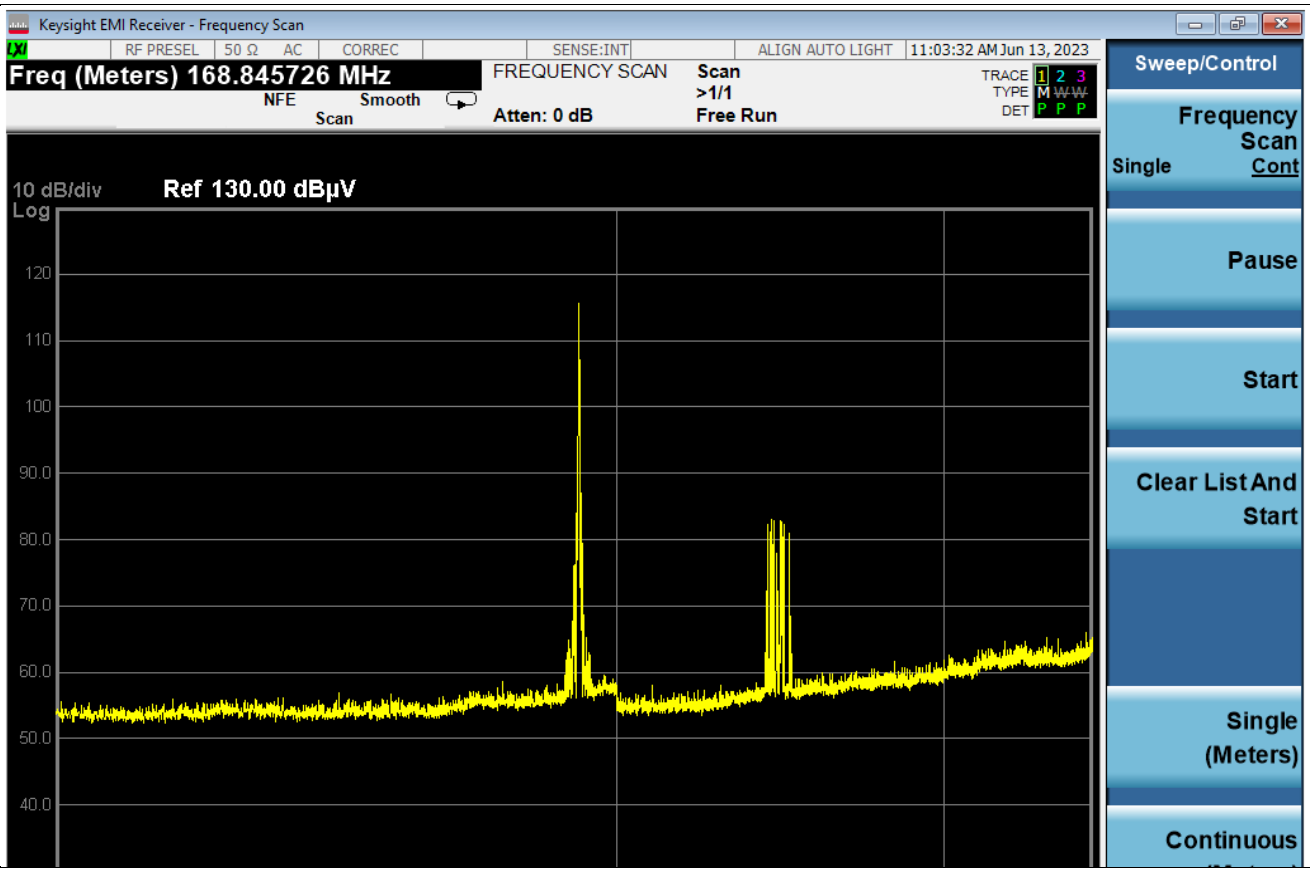

Fig C6 Radiated Emissions 1GHz -3.6GHz Horizontal 3metres

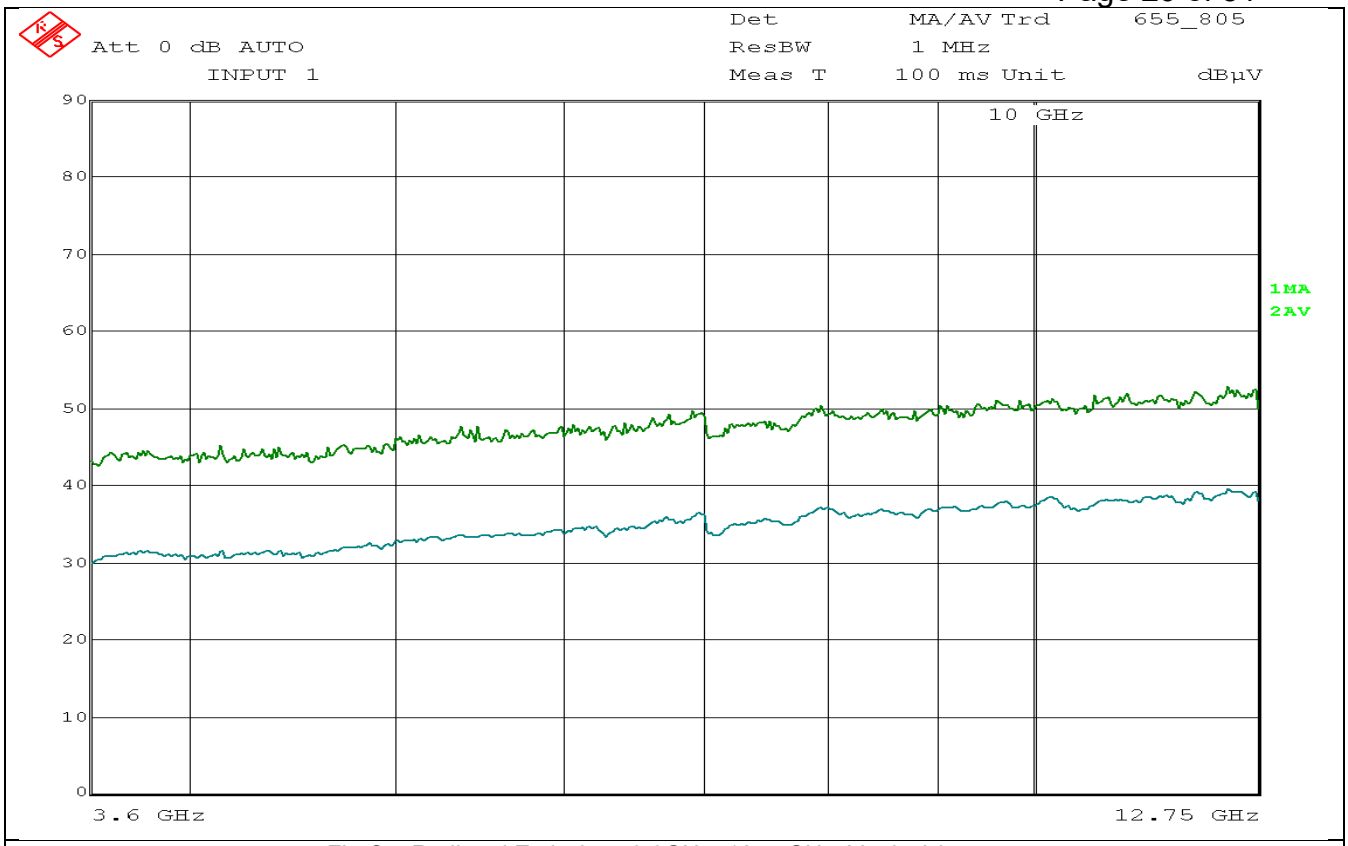

Fig C7 Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

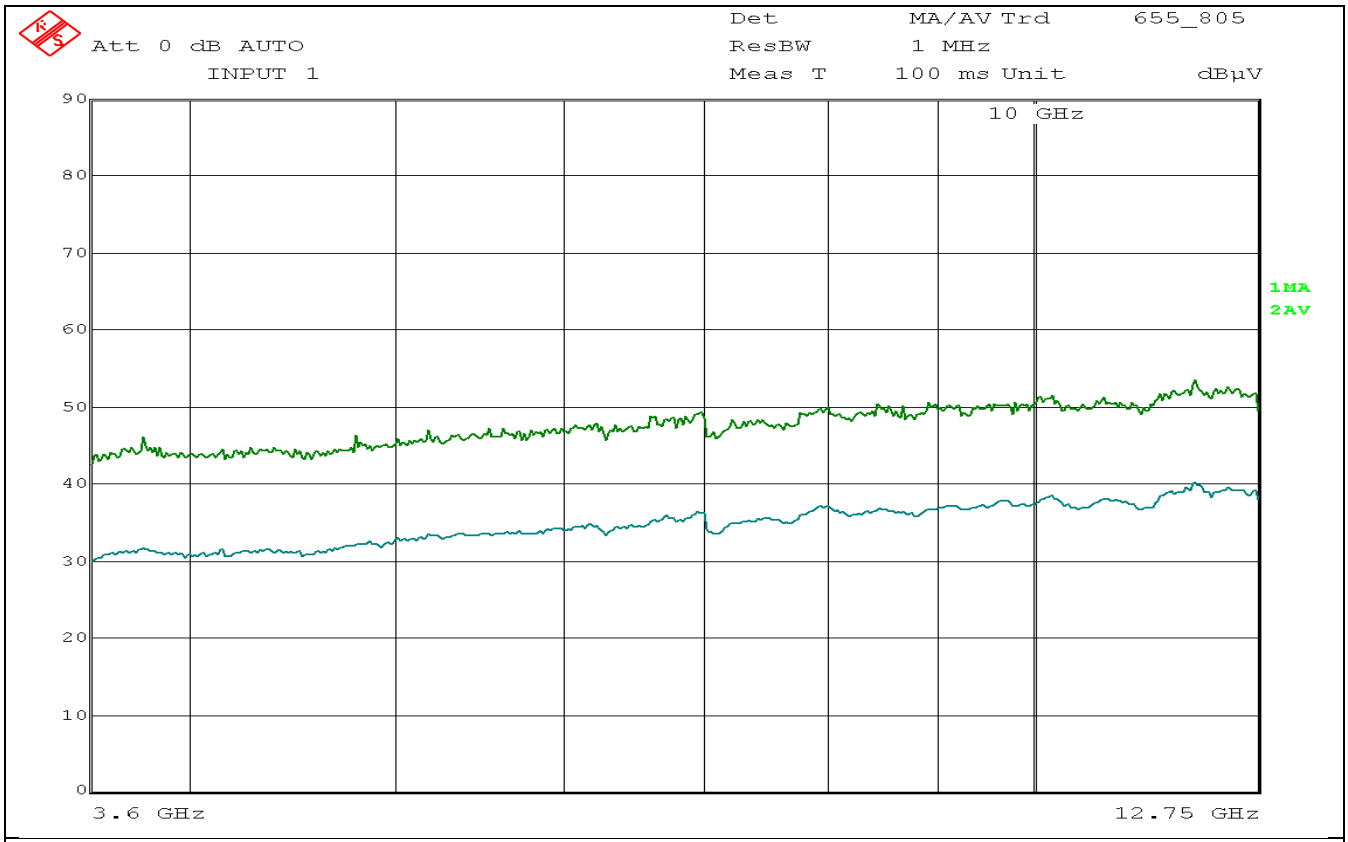

Fig C8 Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

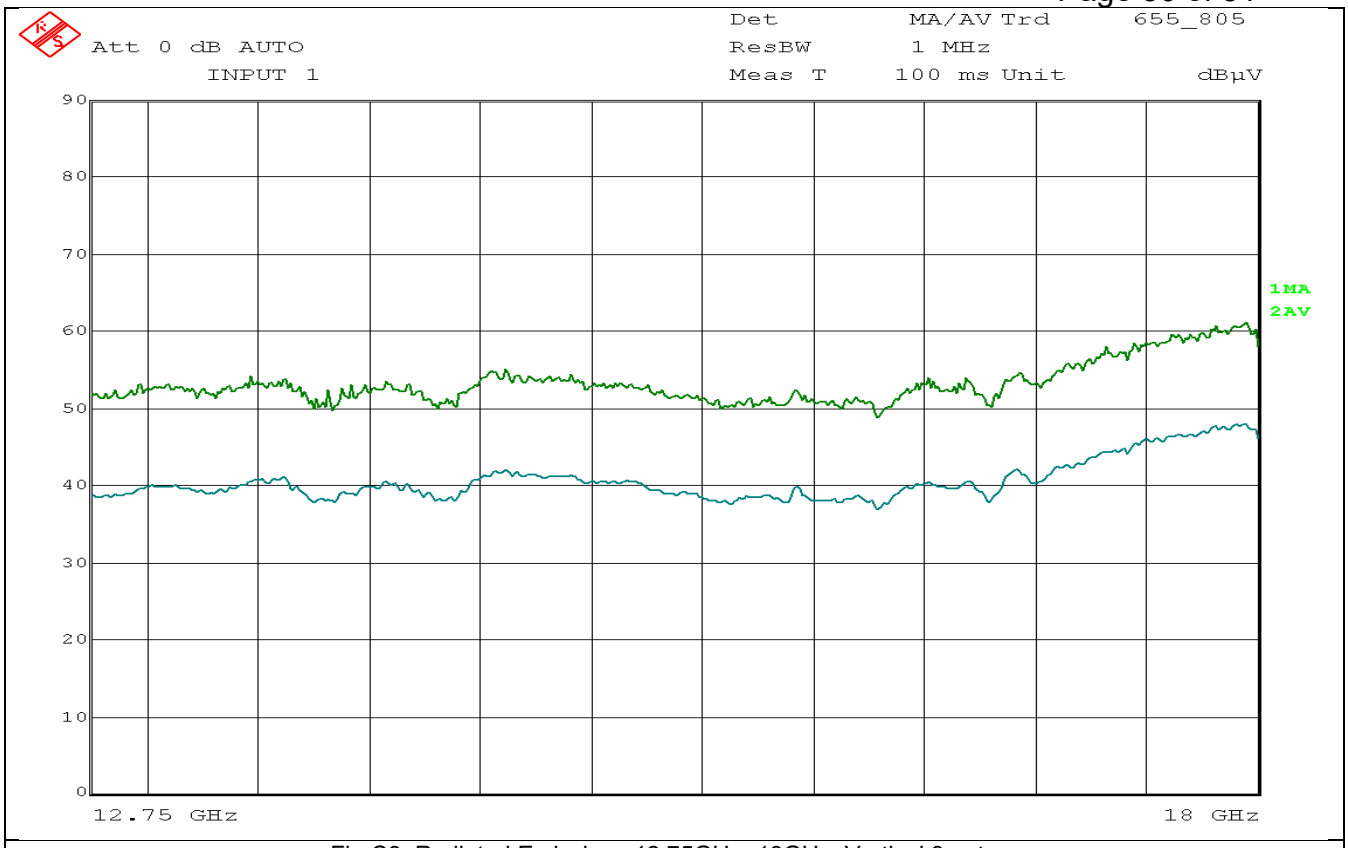

Fig C8 Radiated Emissions 12.75GHz -18GHz Vertical 3metres

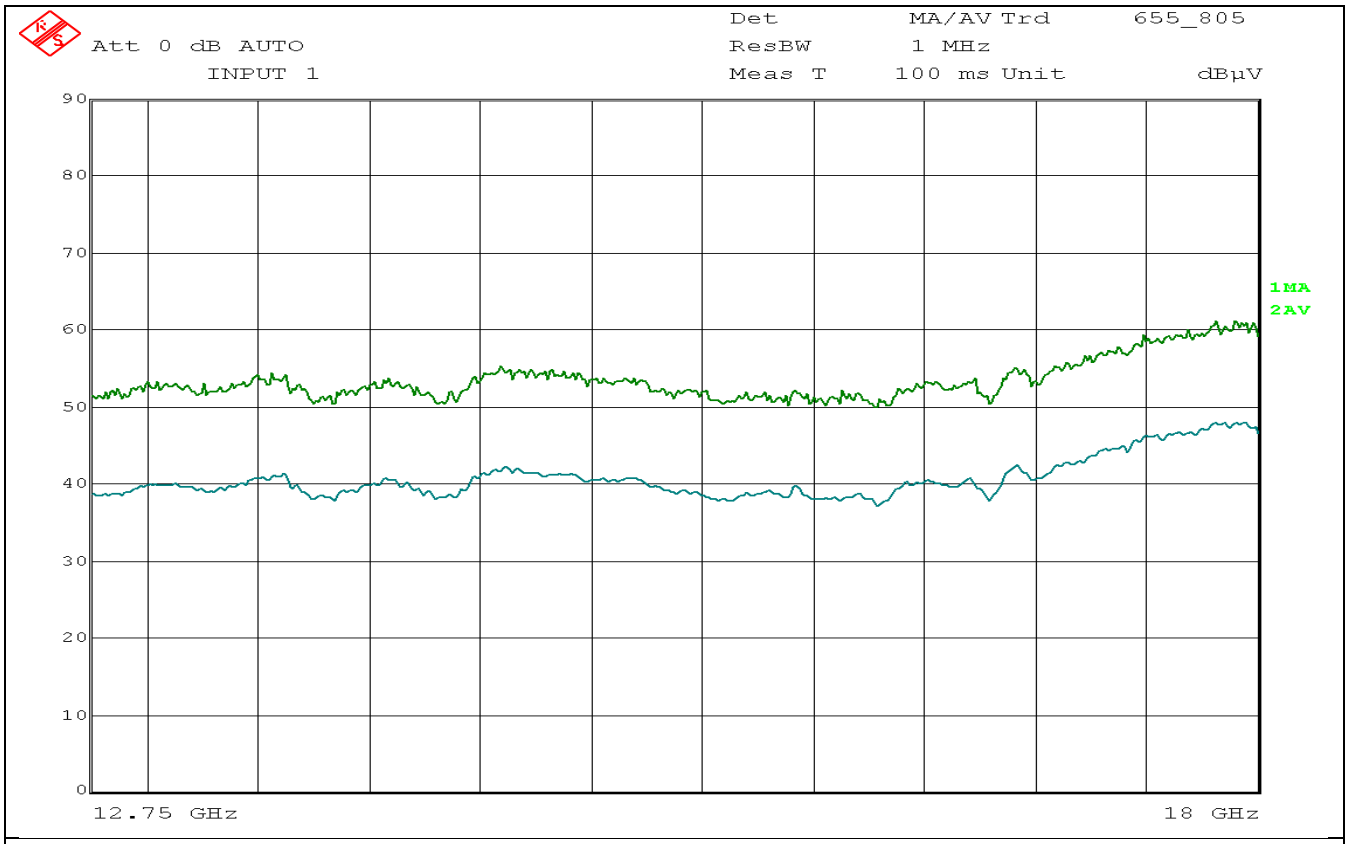

Fig C8 Radiated Emissions 12.75GHz -18GHz Horizontal 3metres

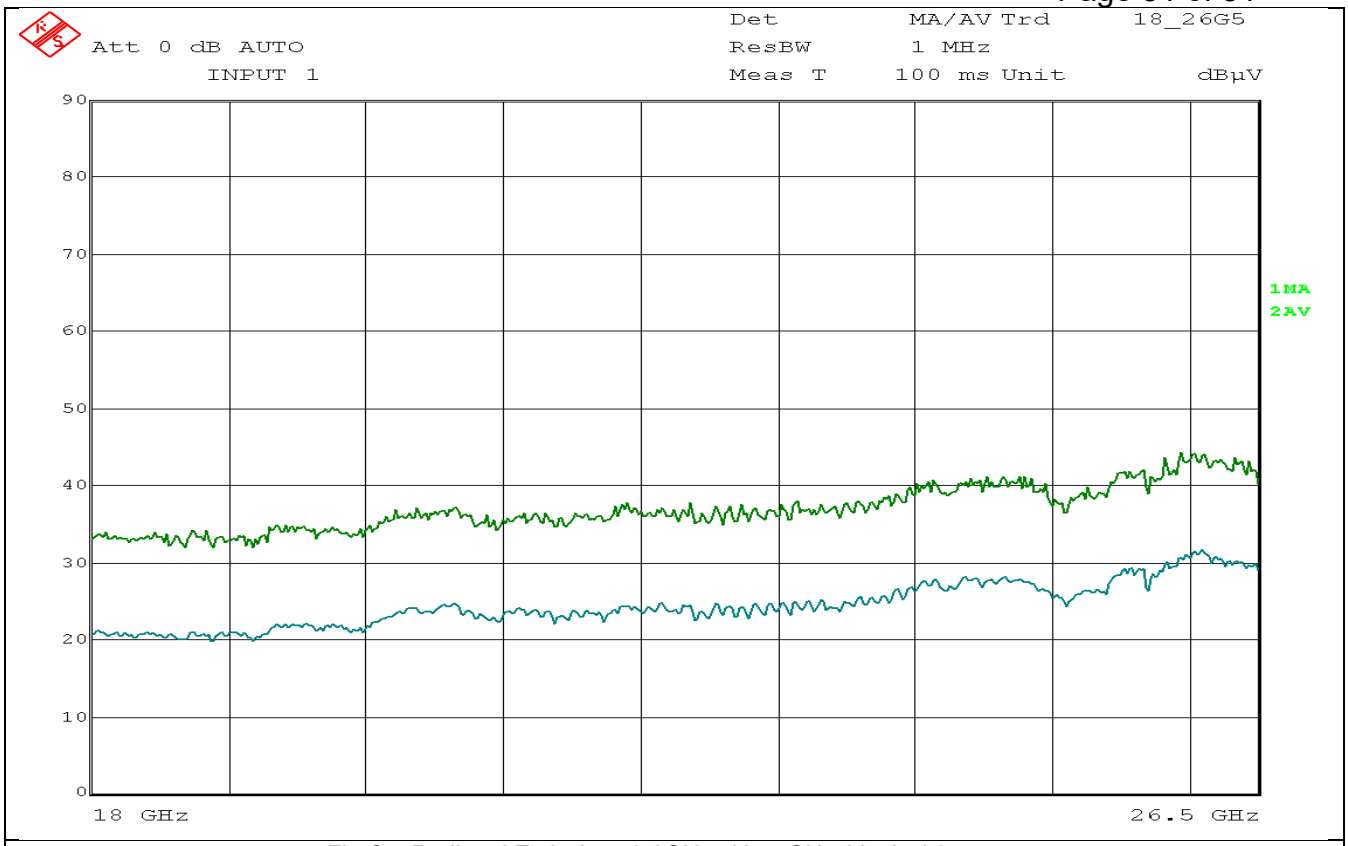

Fig C7 Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

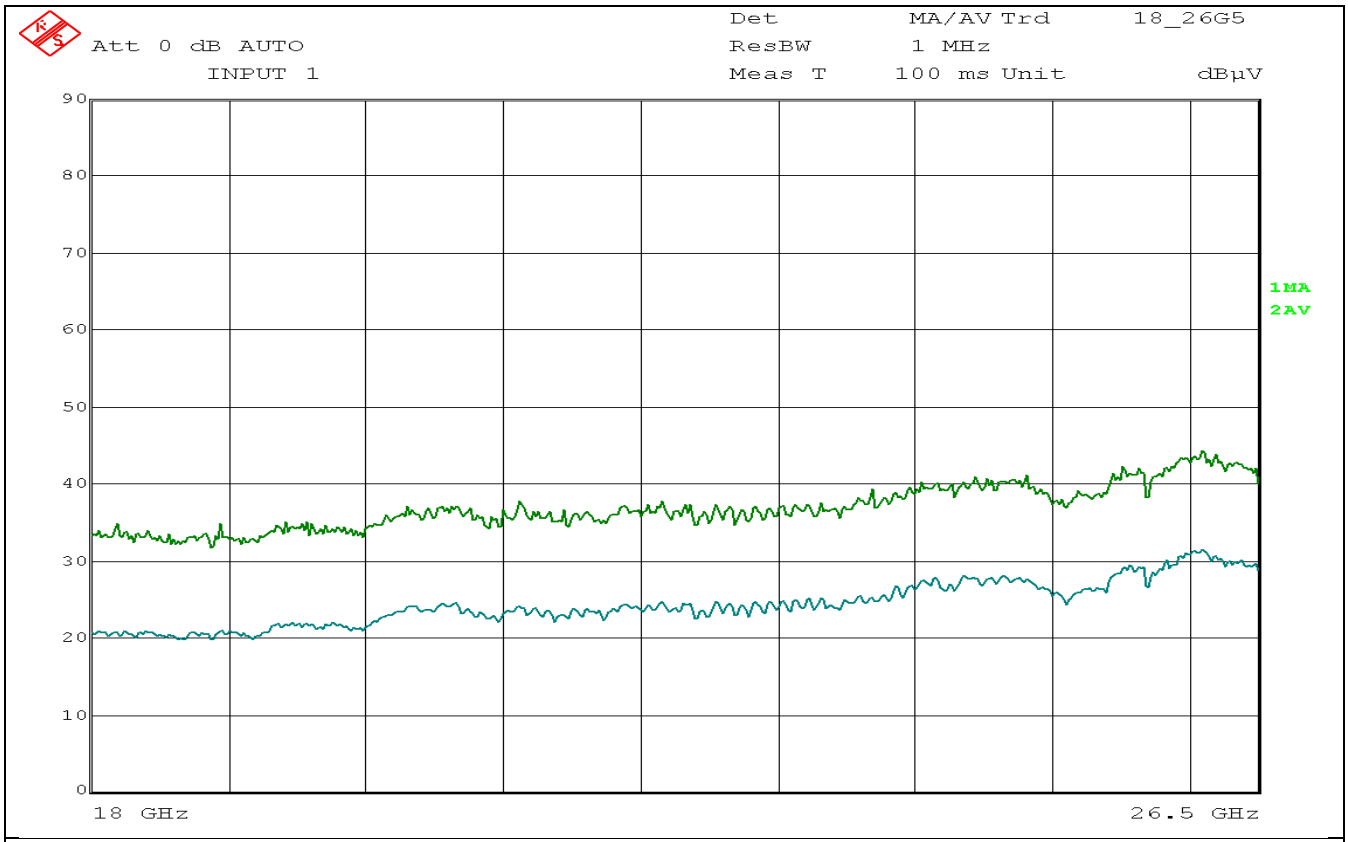

Fig C8 Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

Appendix D Scans for Radiated Spurious Emissions GSM 1900 and BLE

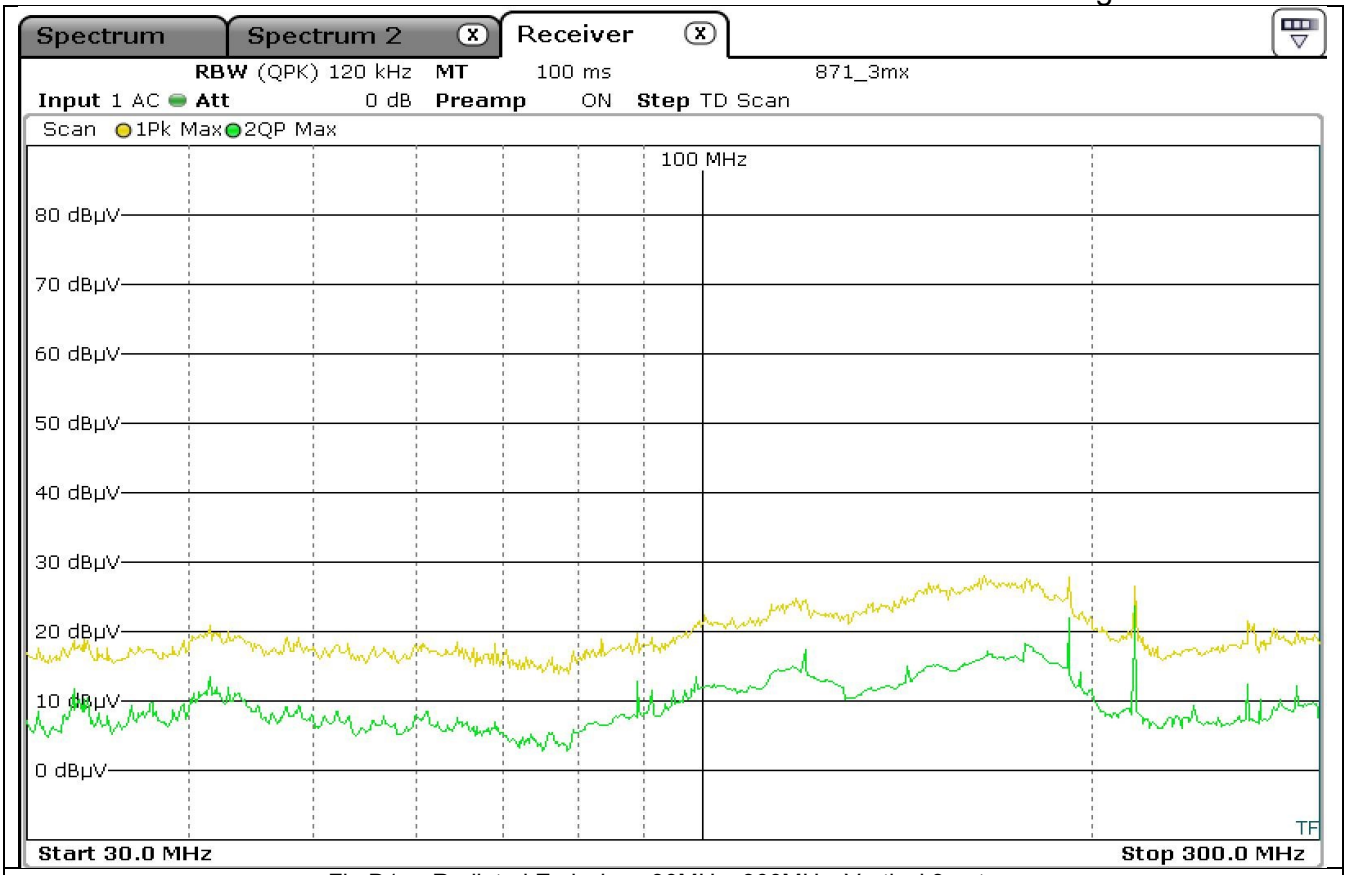

Fig D1 Radiated Emissions 30MHz -300MHz Vertical 3metres

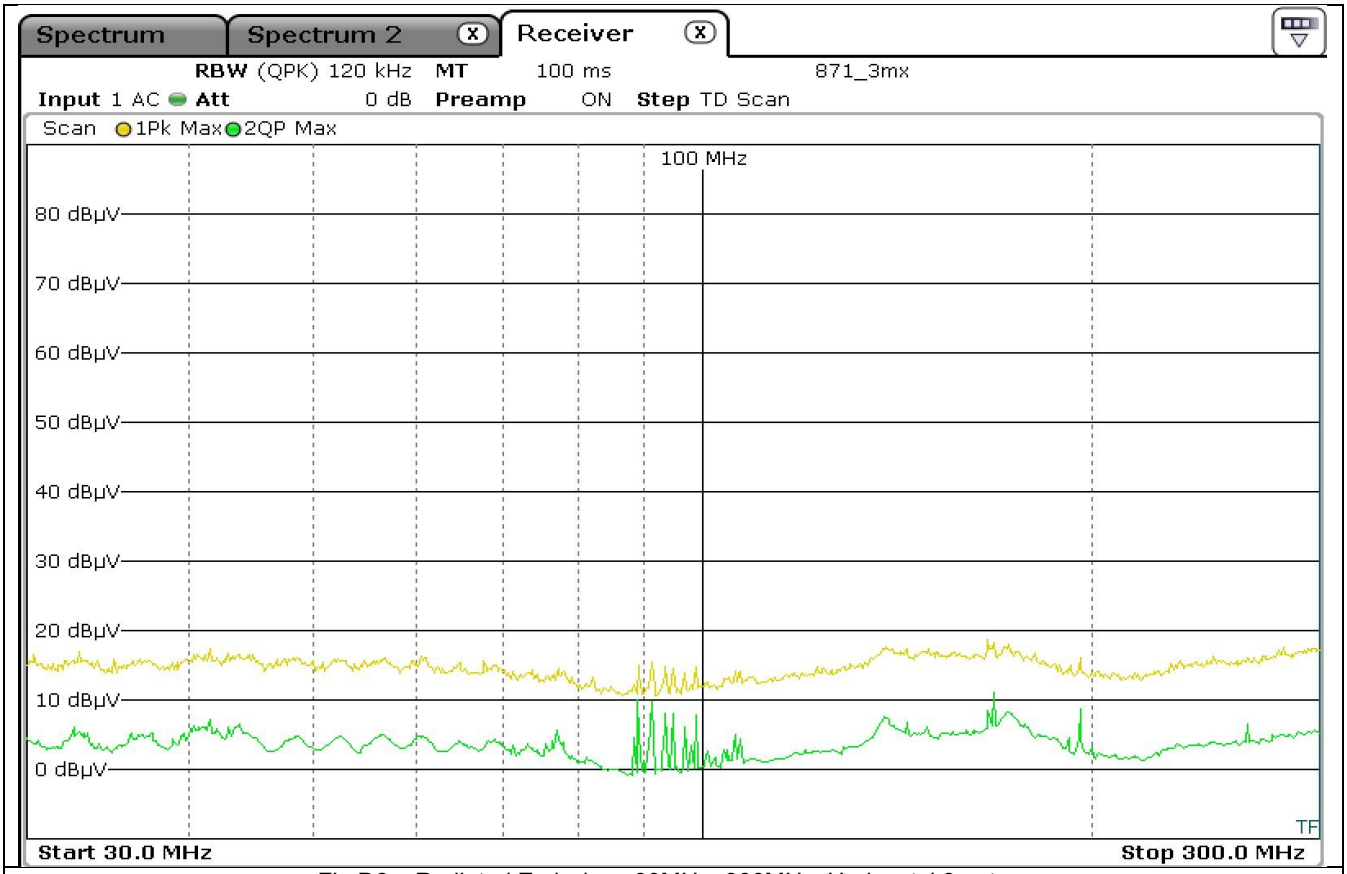

Fig D2 Radiated Emissions 30MHz -300MHz Horizontal 3metres

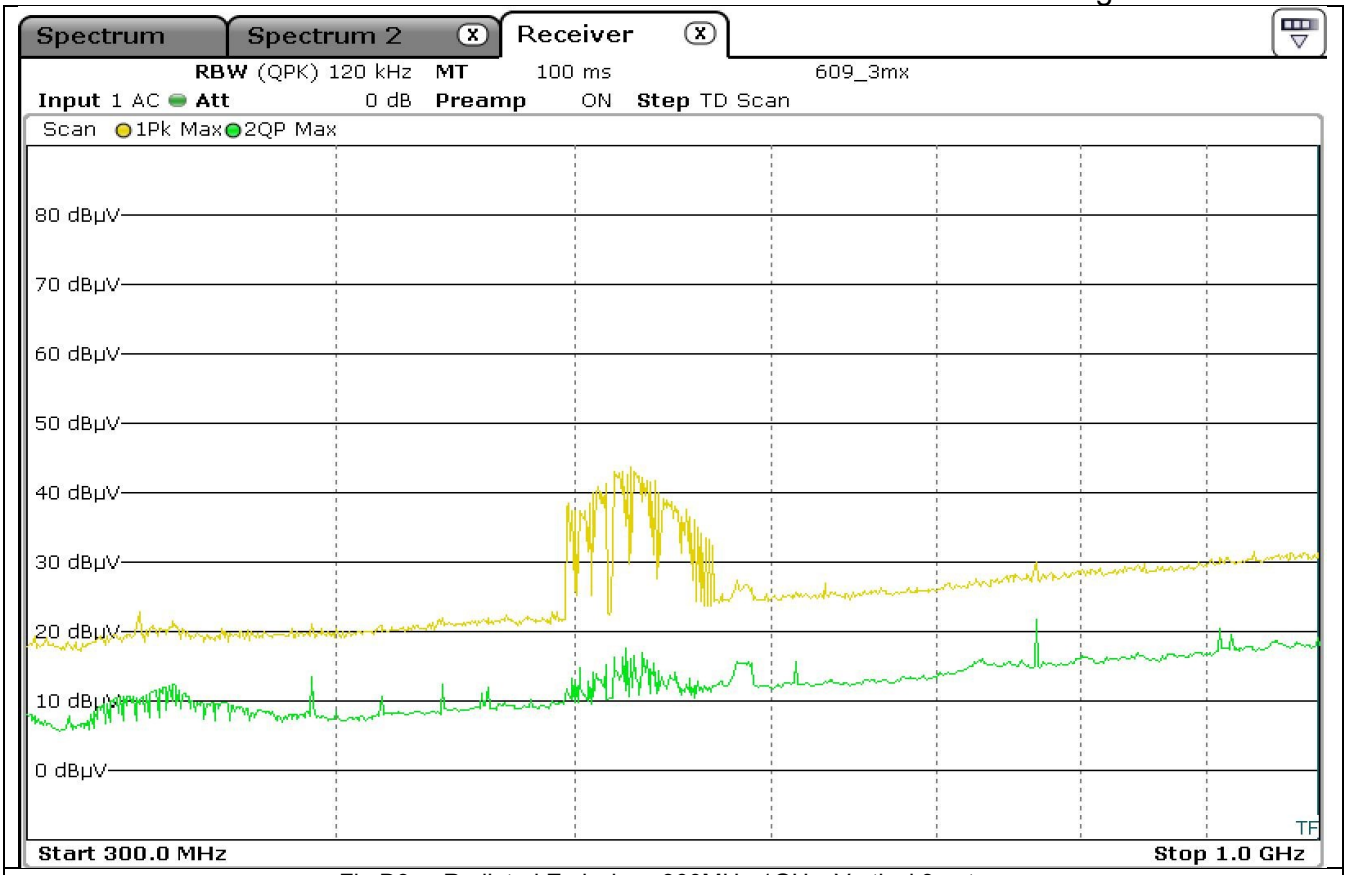

Fig D3 Radiated Emissions 300MHz-1GHz Vertical 3metres

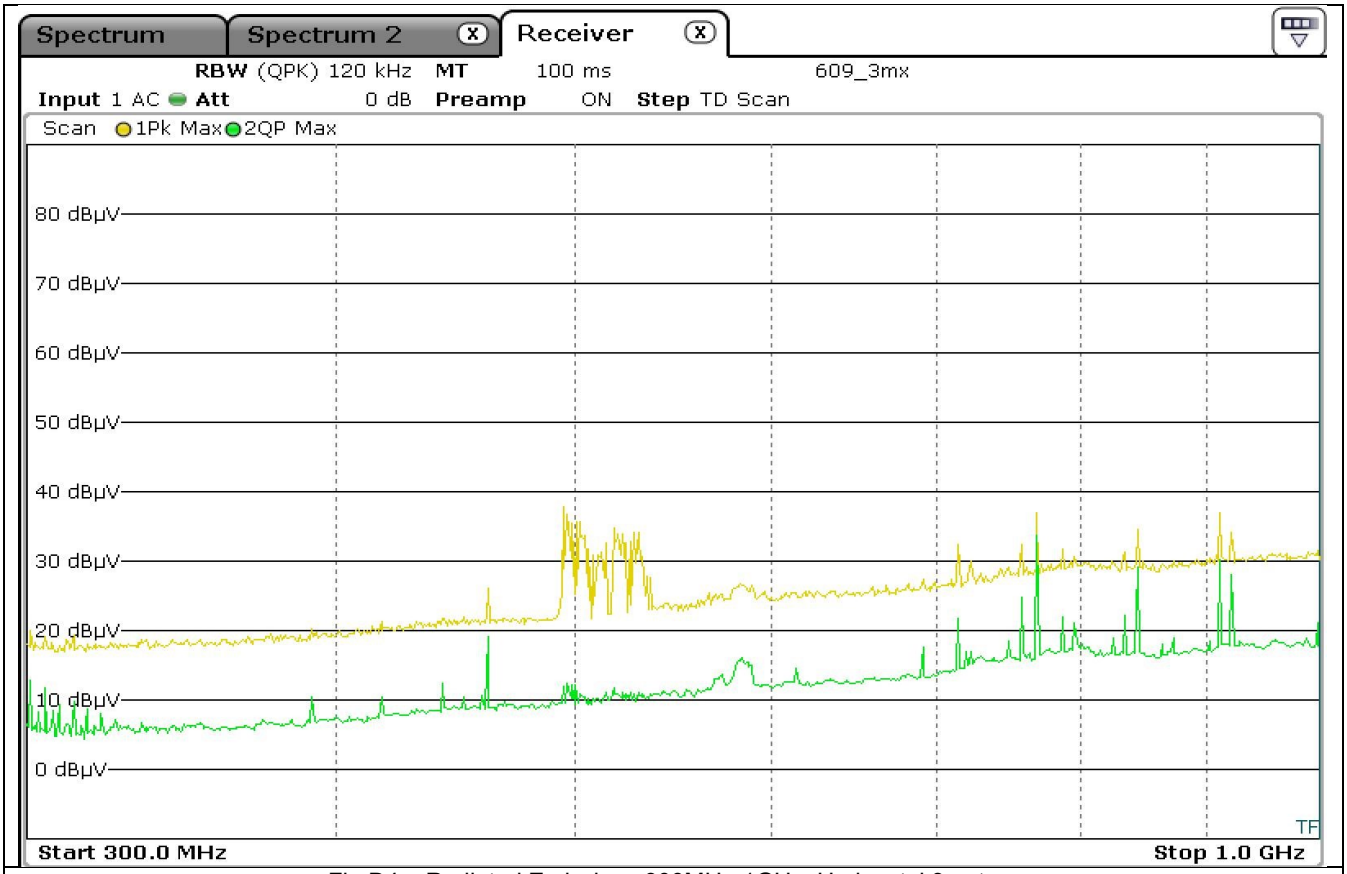

Fig D4 Radiated Emissions 300MHz-1GHz Horizontal 3metres

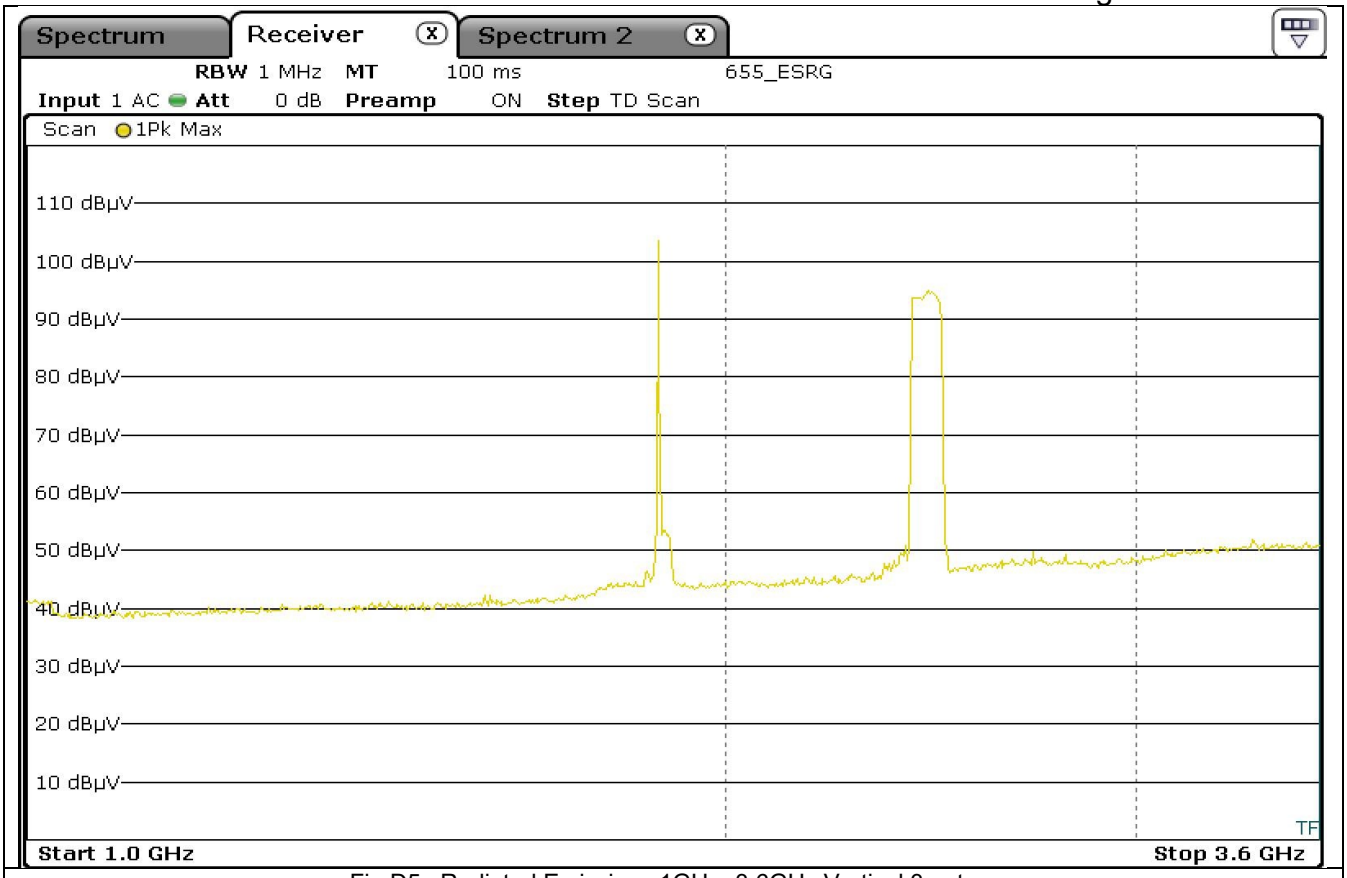

Fig D5 Radiated Emissions 1GHz -3.6GHz Vertical 3metres

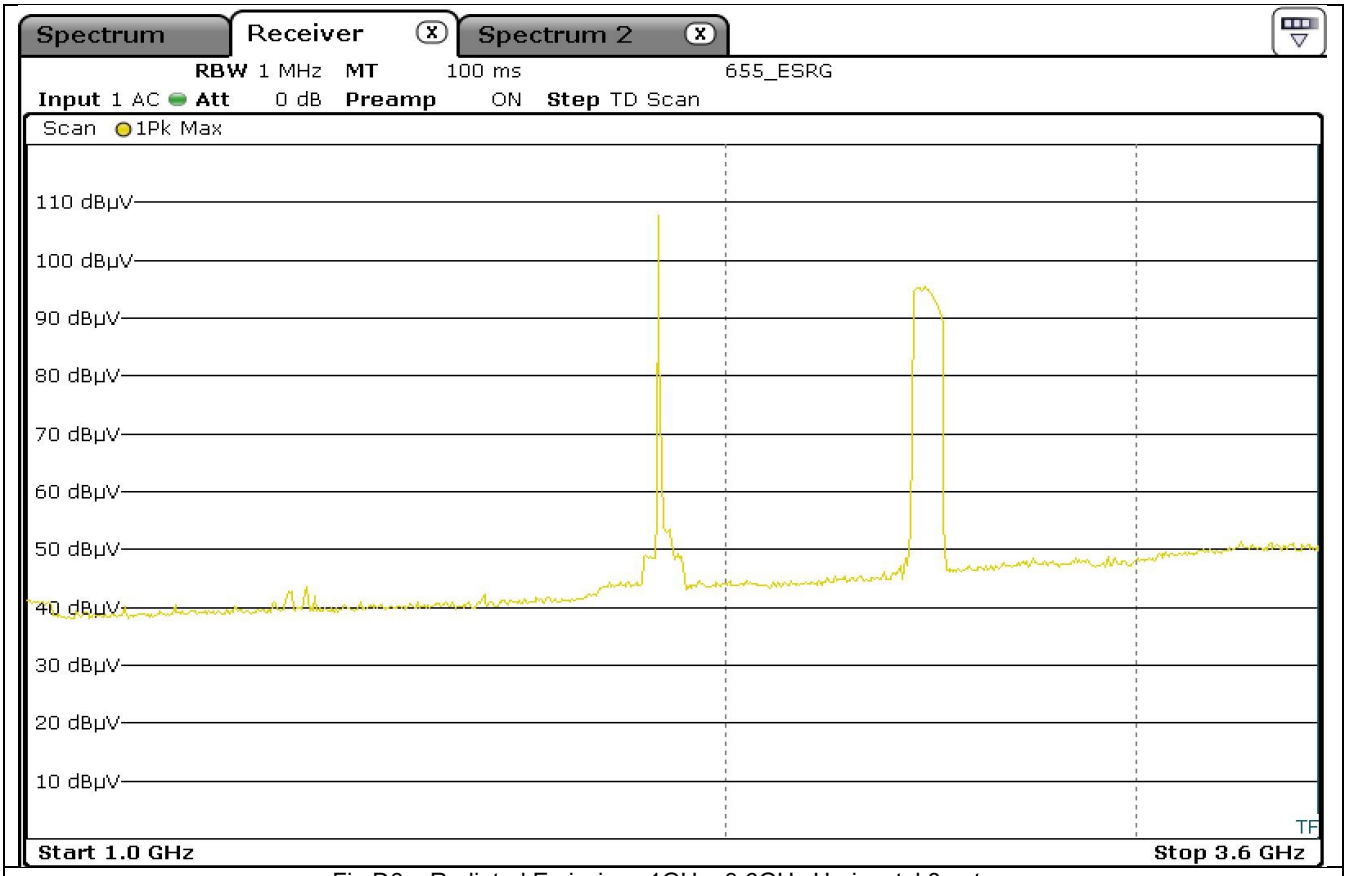

Fig D6 Radiated Emissions 1GHz -3.6GHz Horizontal 3metres

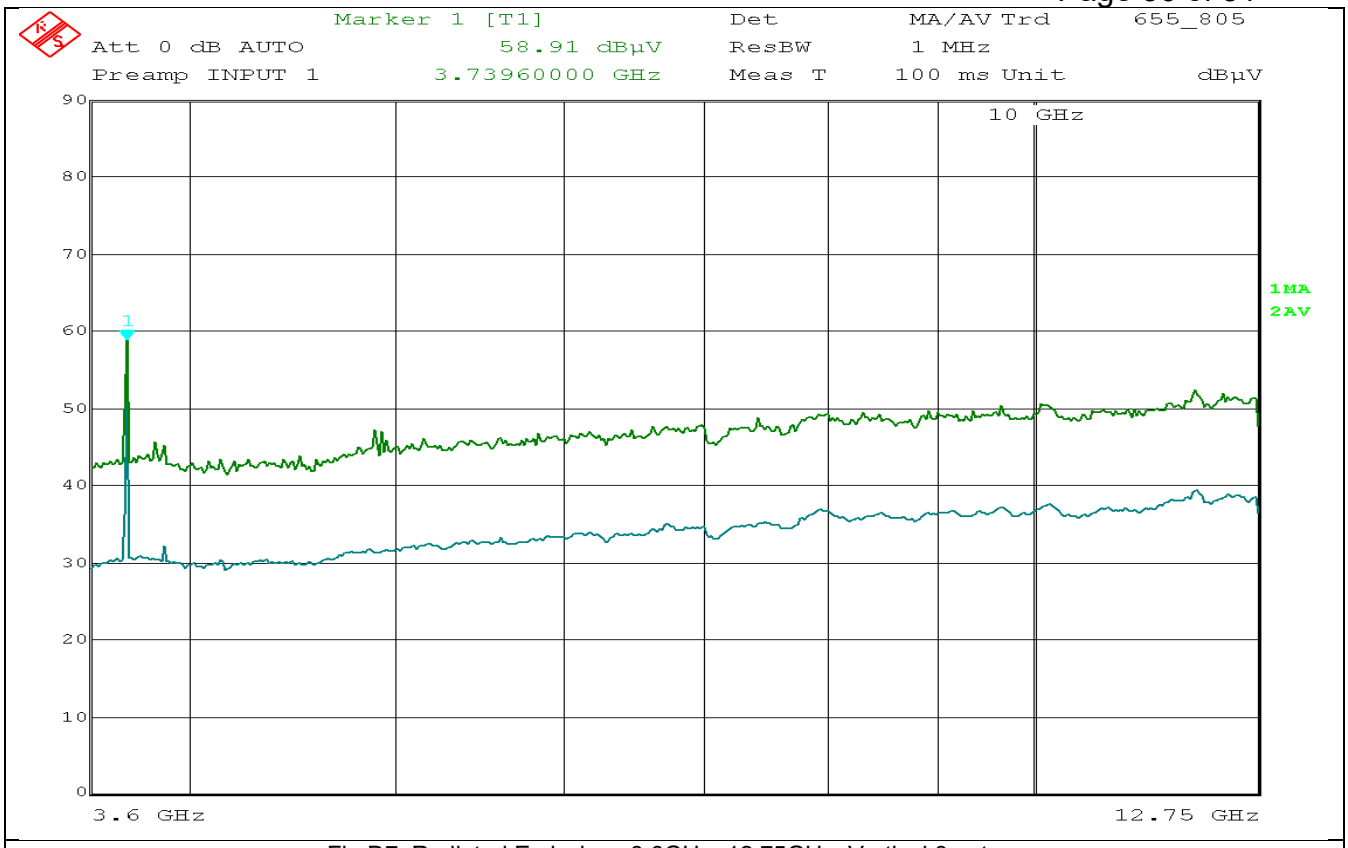

Fig D7 Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

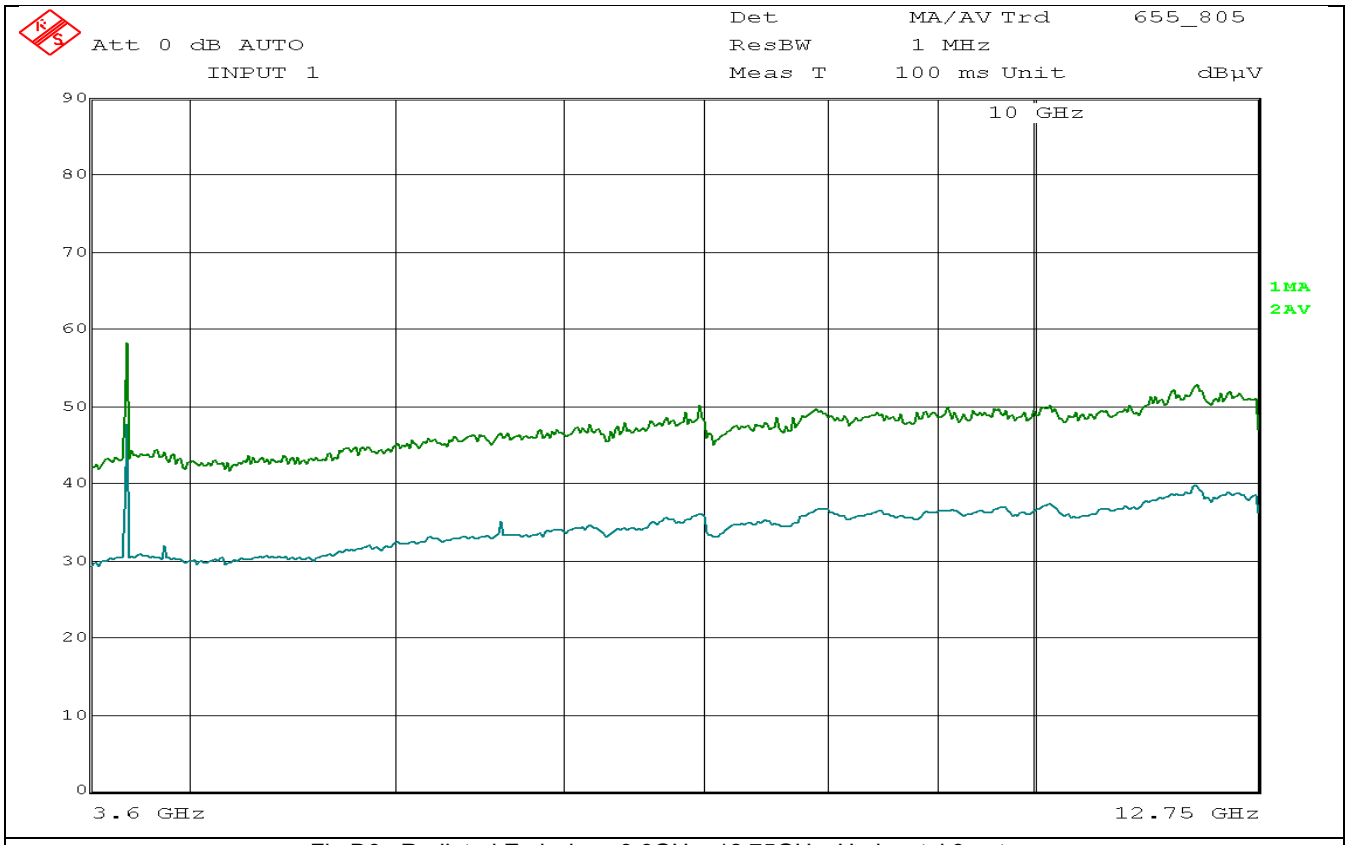

Fig D8 Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

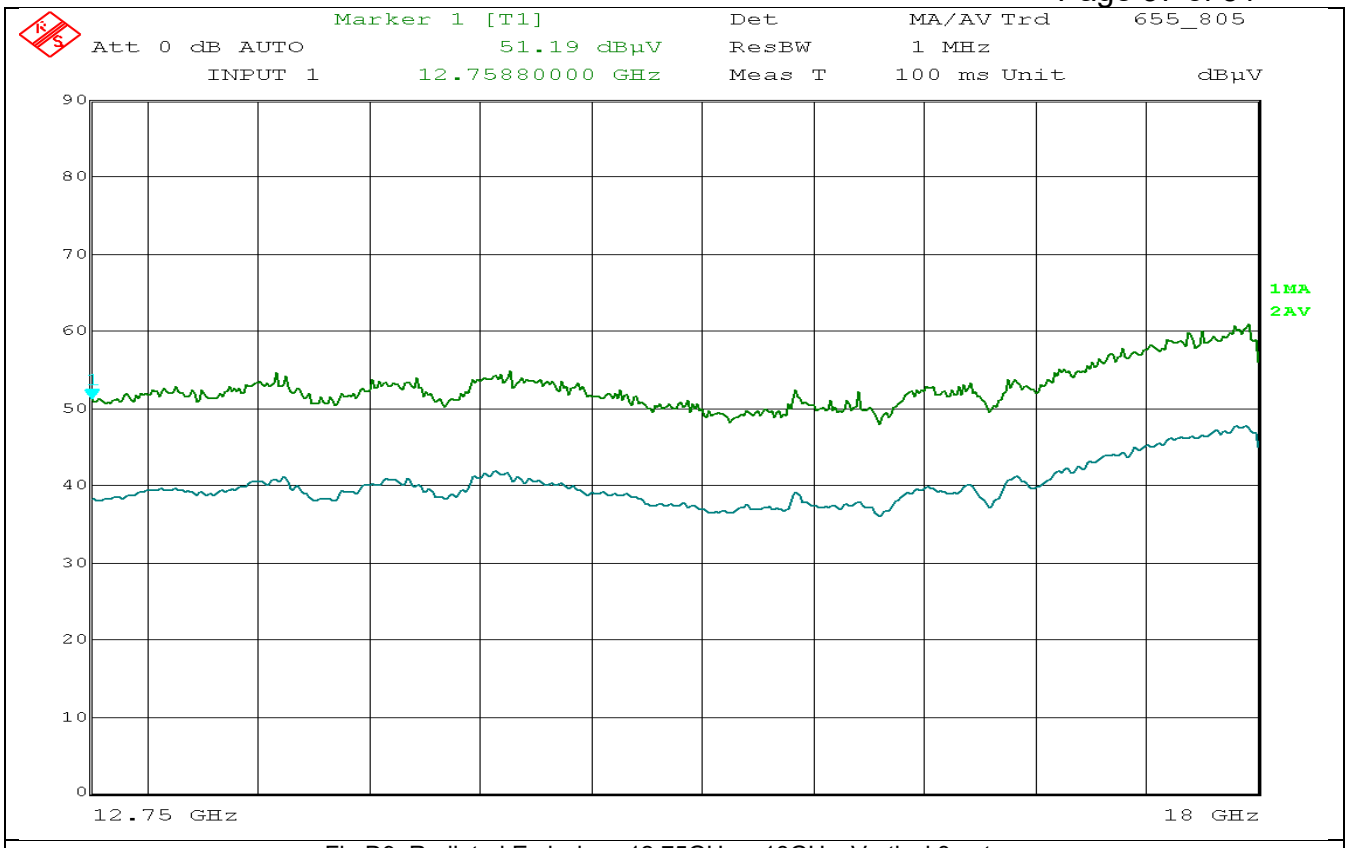

Fig D9 Radiated Emissions 12.75GHz – 18GHz Vertical 3metres

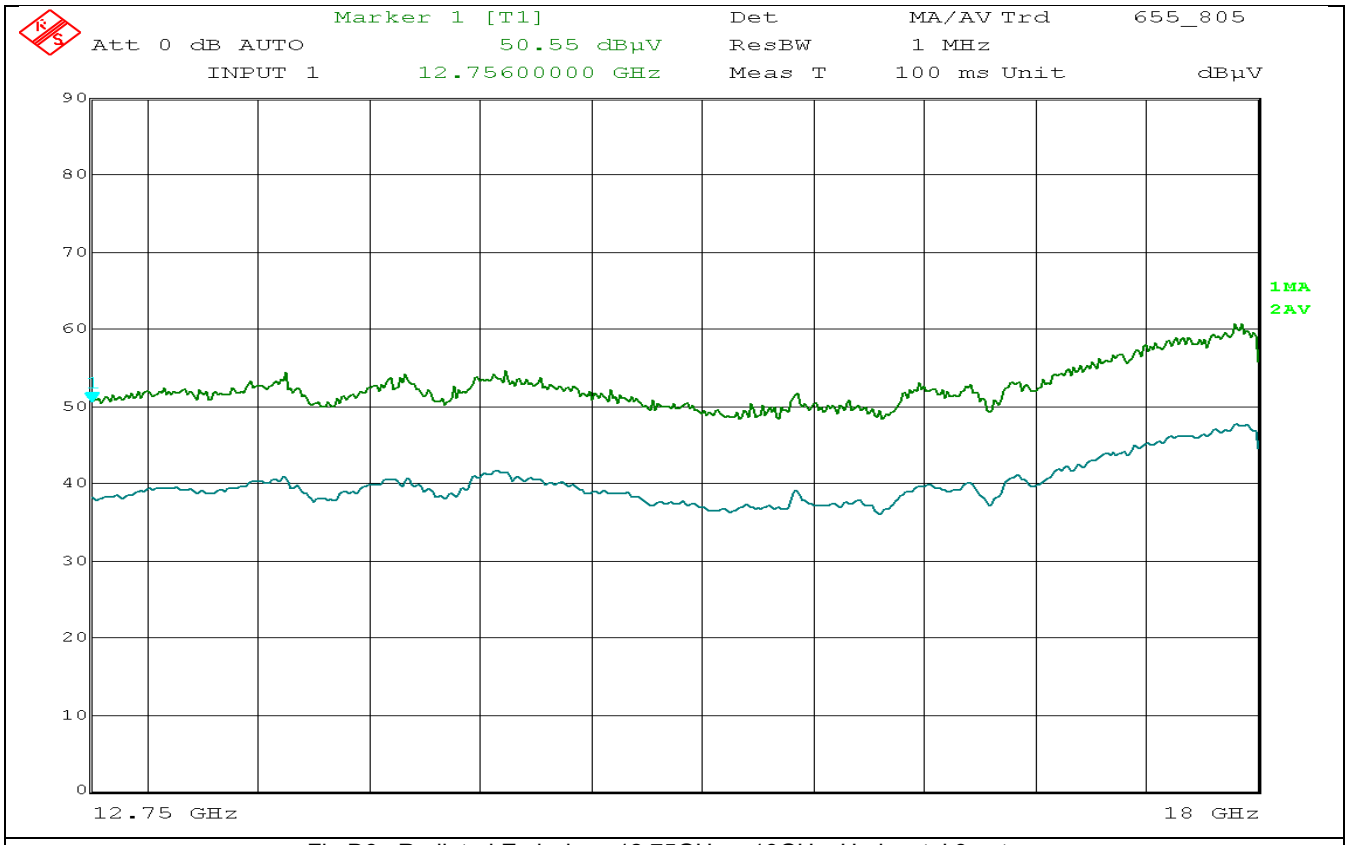

Fig D8 Radiated Emissions 12.75GHz – 18GHz Horizontal 3metres

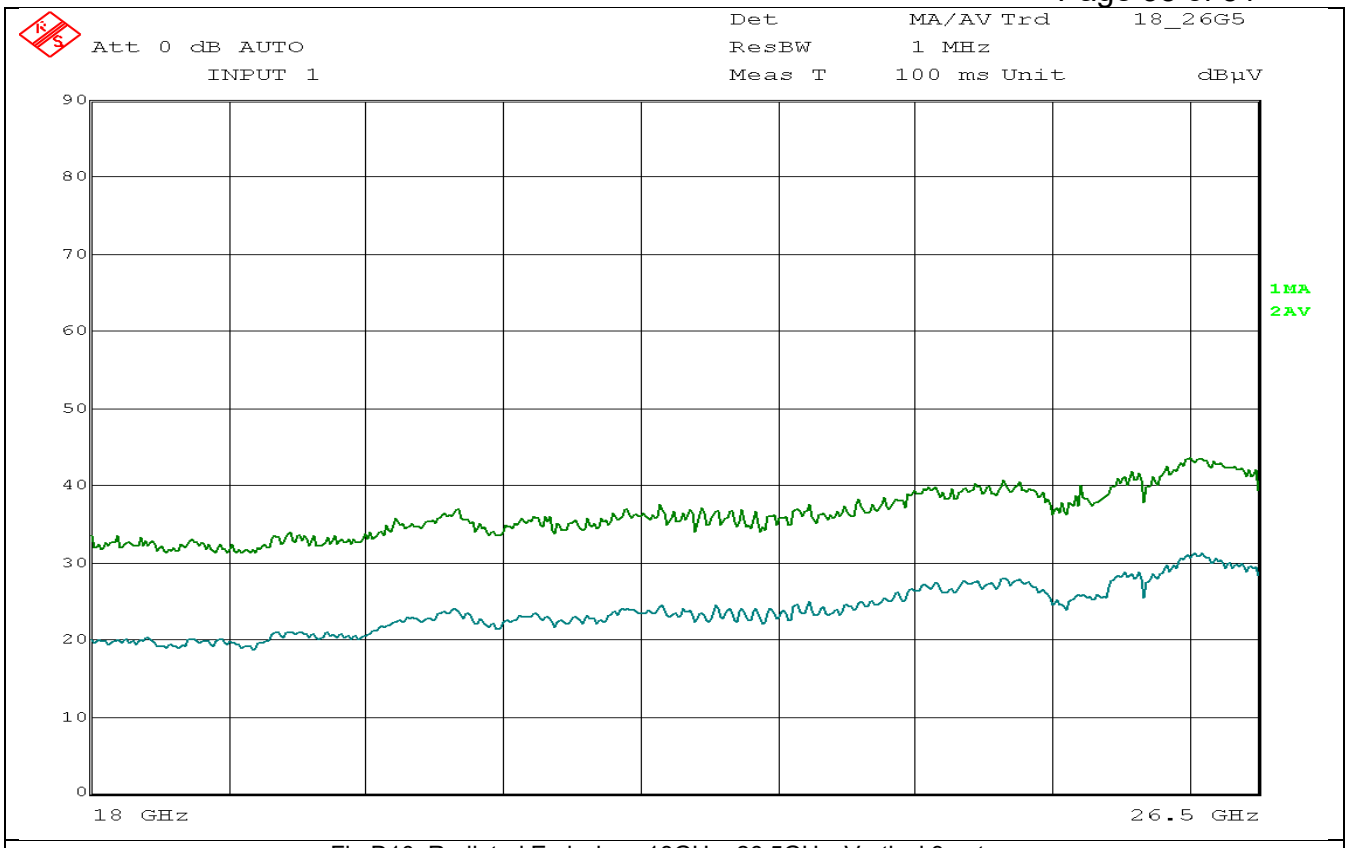

Fig D10 Radiated Emissions 18GHz -26.5GHz Vertical 3metres

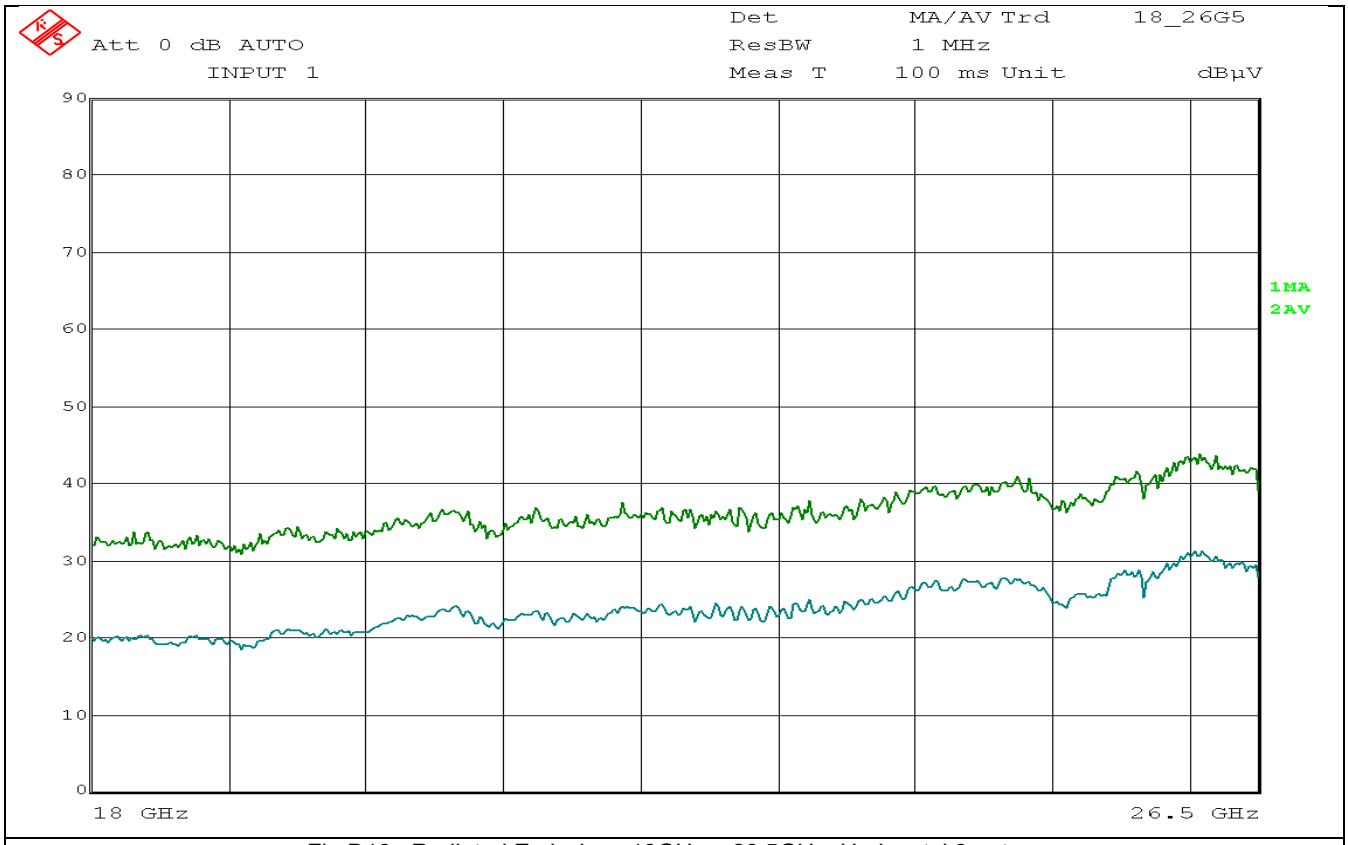

Fig D10 Radiated Emissions 18GHz – 26.5GHz Horizontal 3metres

Appendix E Scans for Radiated Spurious Emissions Idle Mode

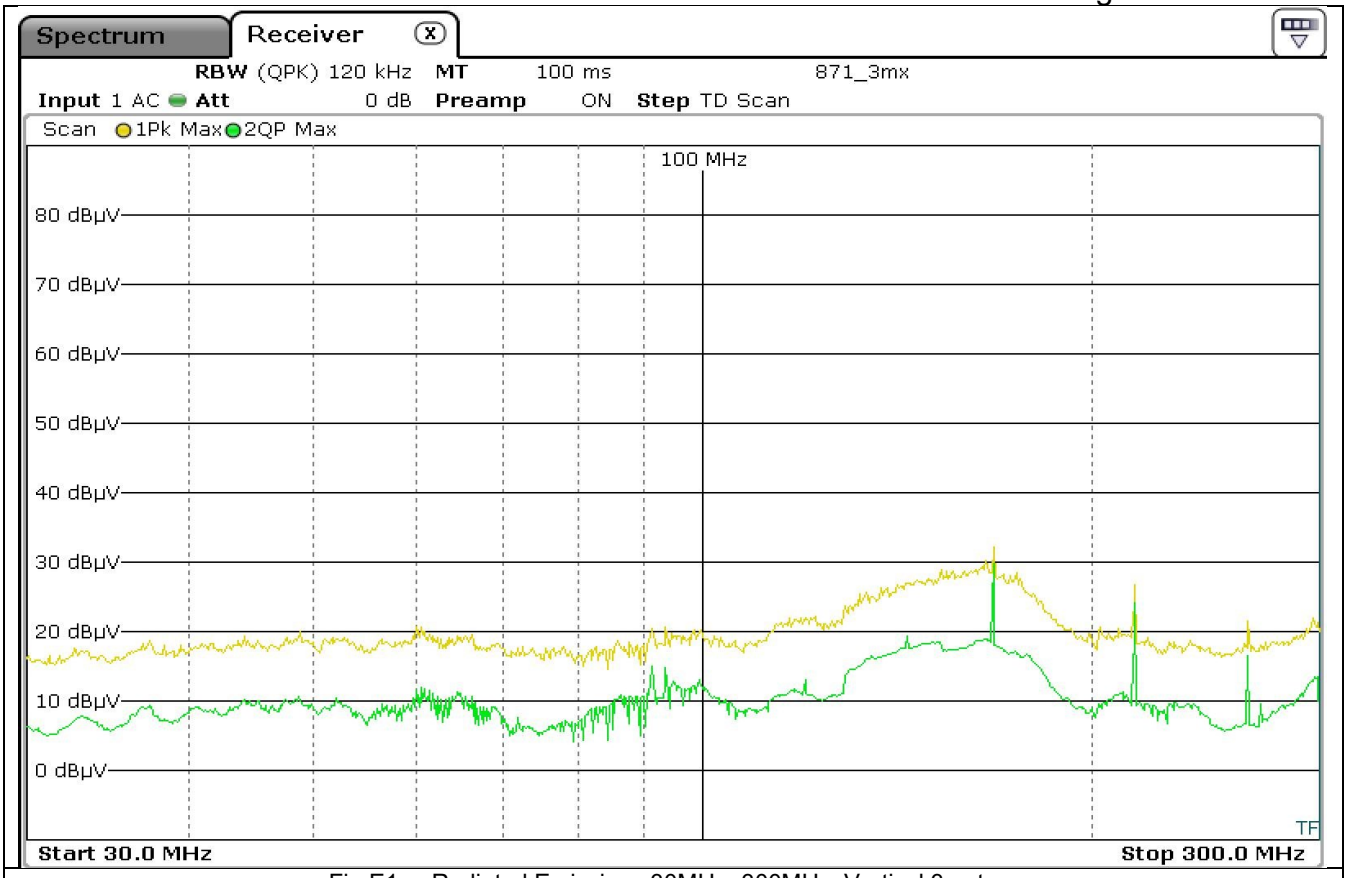

Fig E1 Radiated Emissions 30MHz -300MHz Vertical 3metres

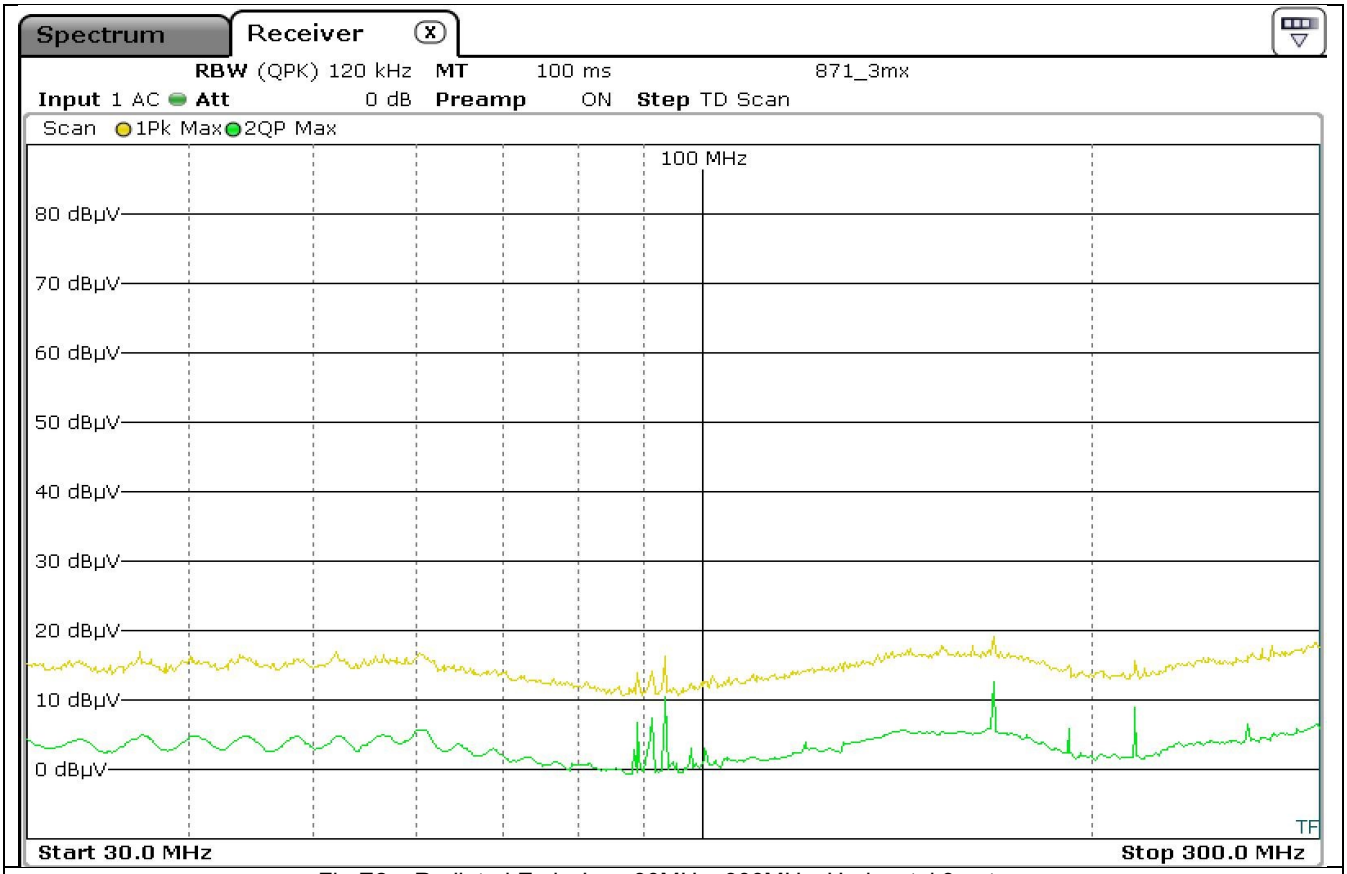

Fig E2 Radiated Emissions 30MHz -300MHz Horizontal 3metres

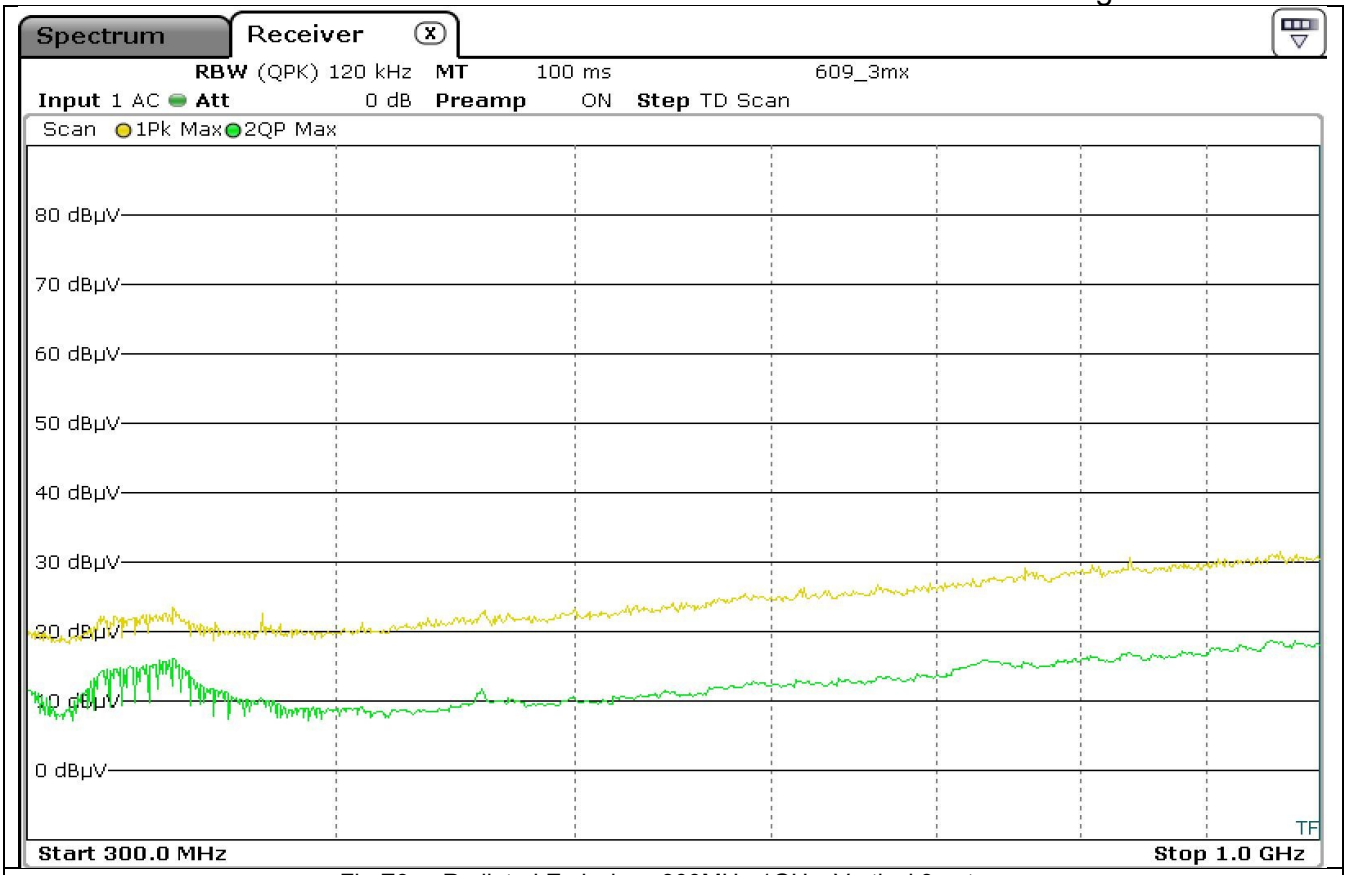

Fig E3 Radiated Emissions 300MHz-1GHz Vertical 3metres

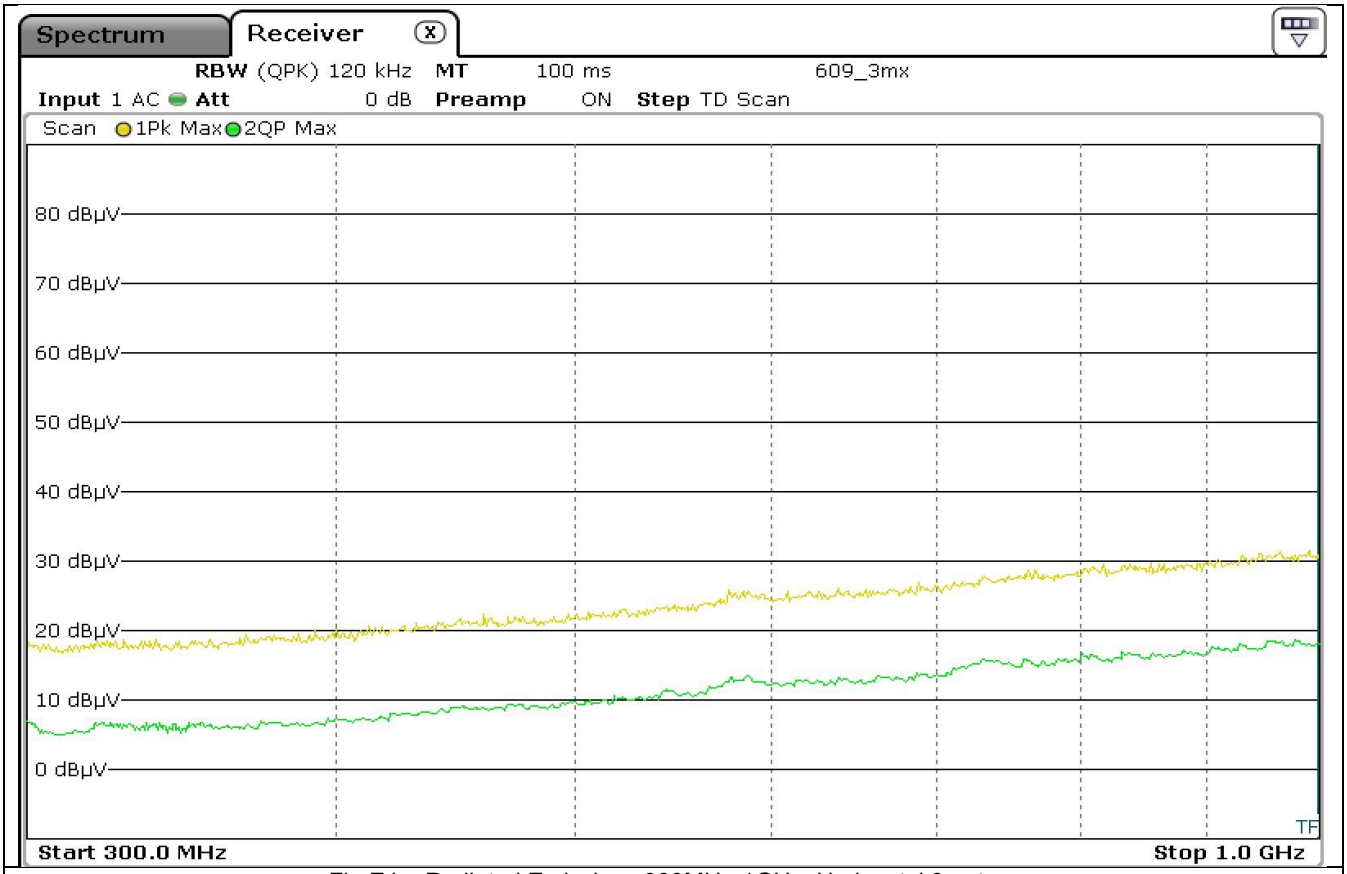

Fig E4 Radiated Emissions 300MHz-1GHz Horizontal 3metres

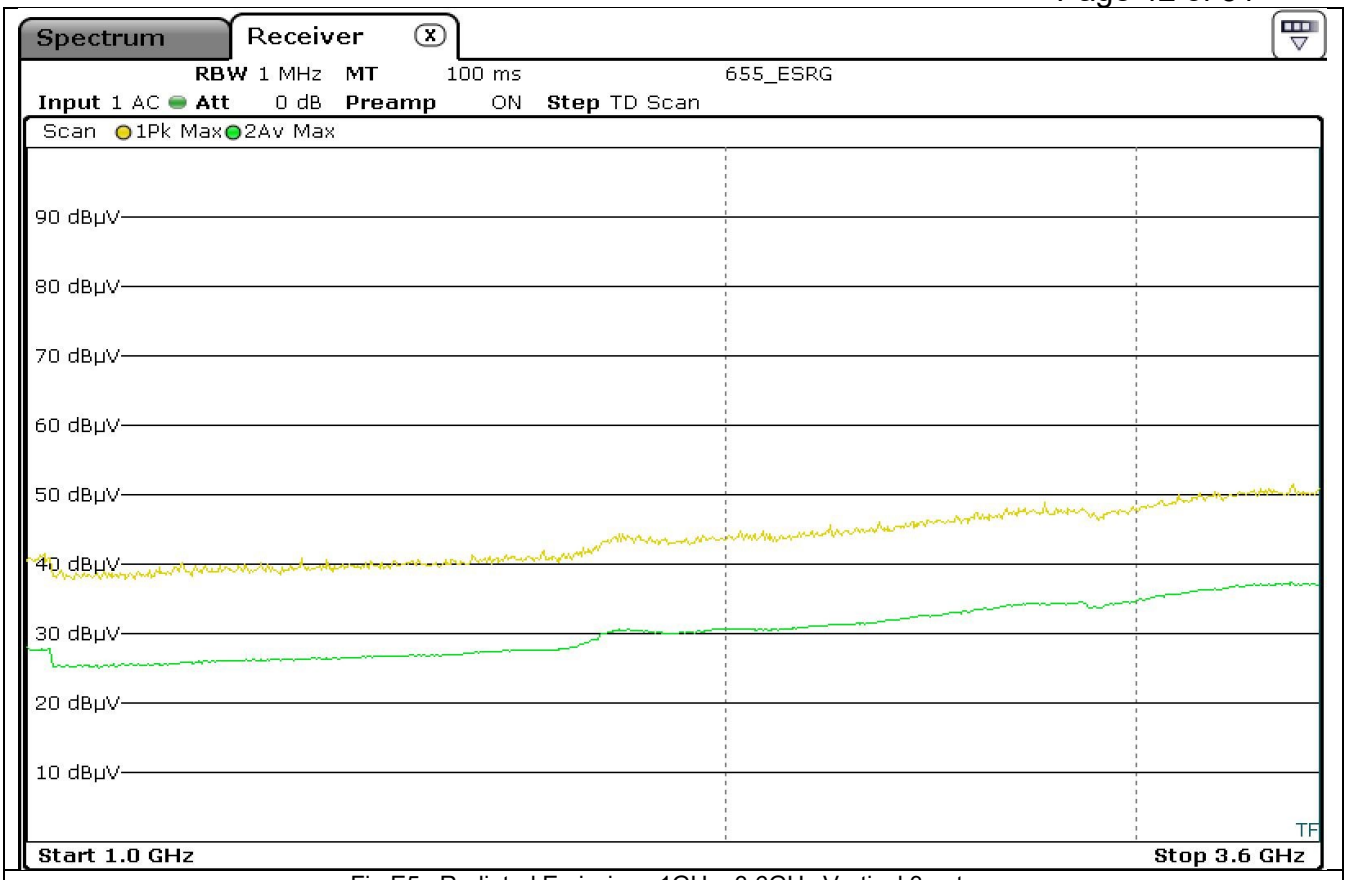

Fig E5 Radiated Emissions 1GHz -3.6GHz Vertical 3metres

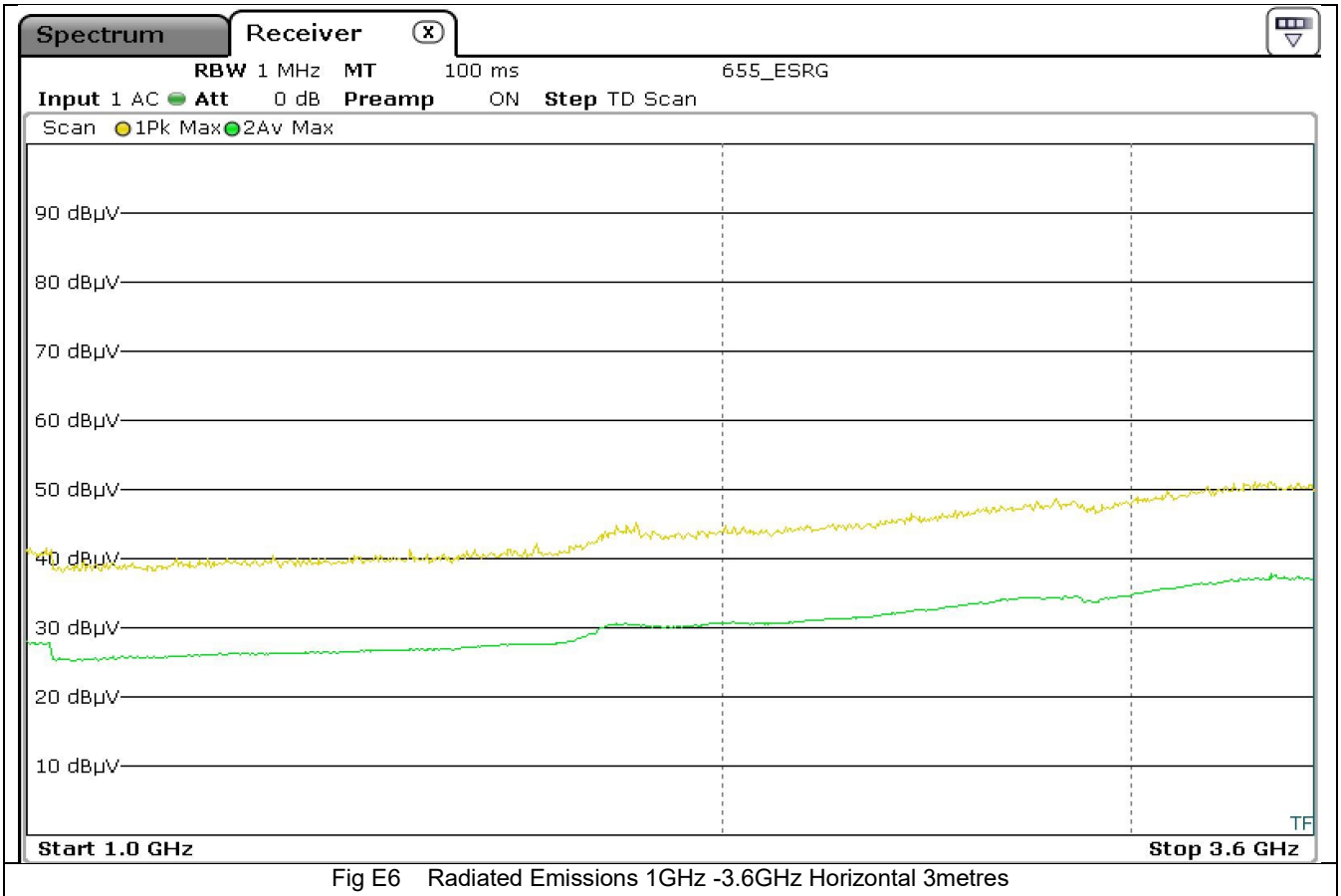

Fig E6 Radiated Emissions 1GHz -3.6GHz Horizontal 3metres

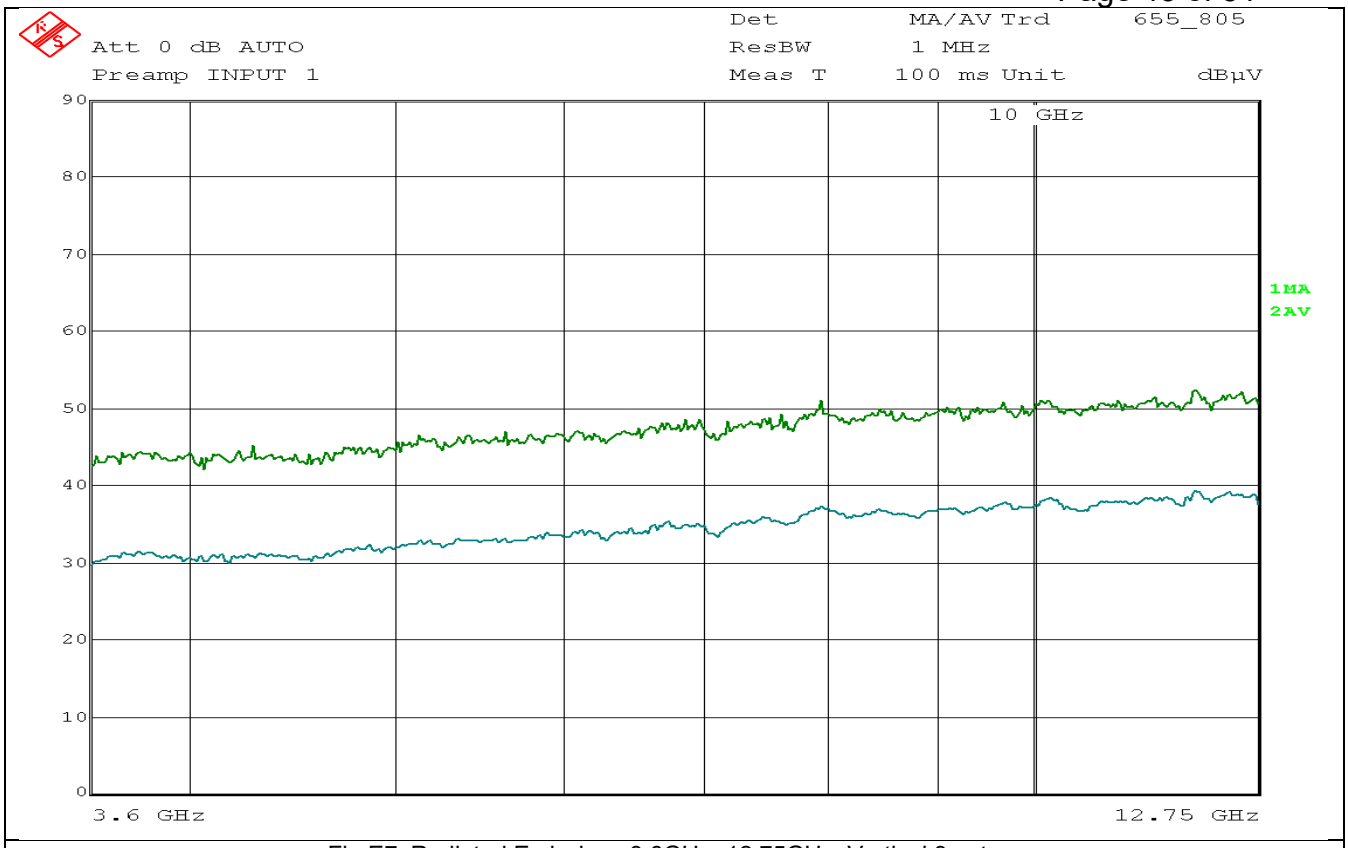

Fig E7 Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

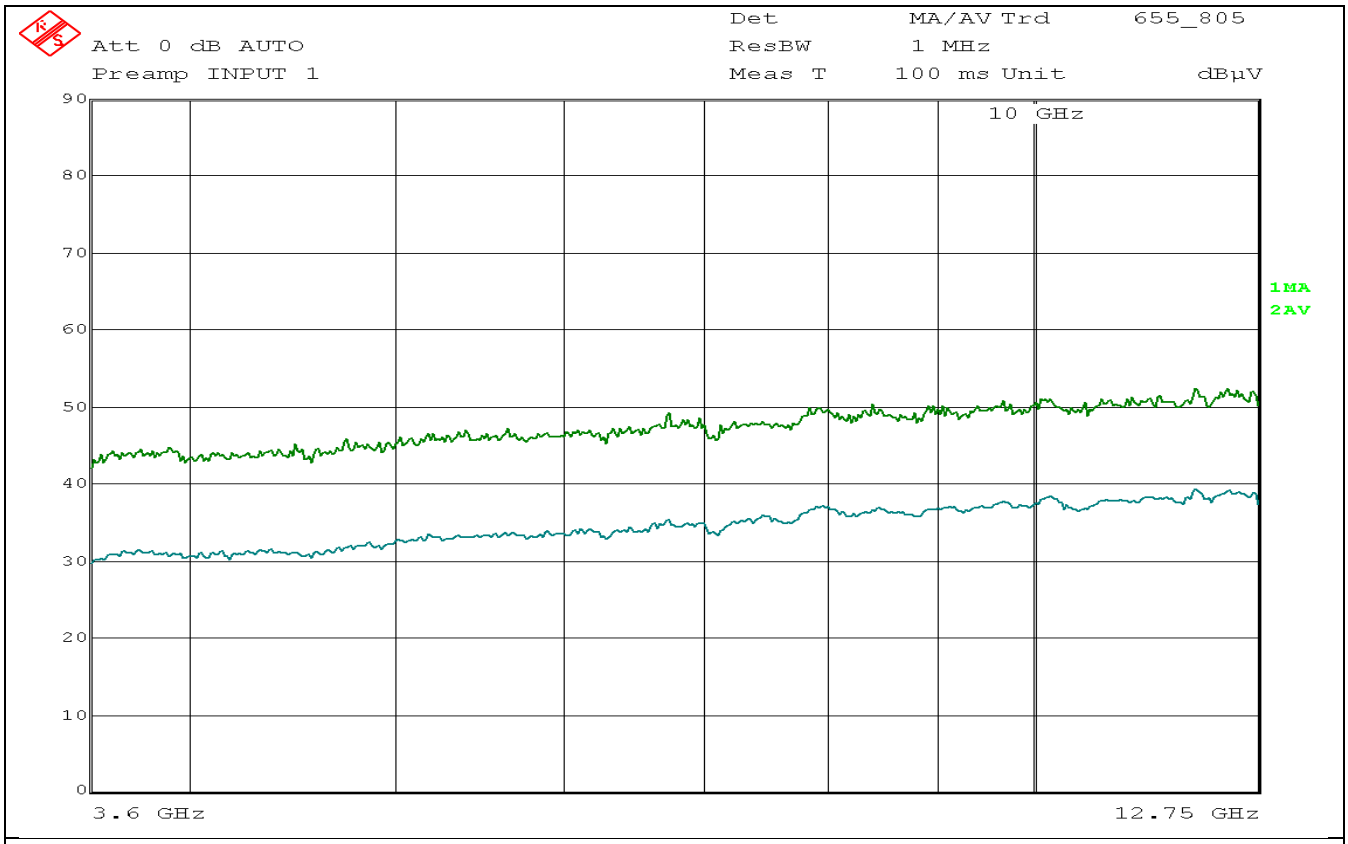

Fig E8 Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

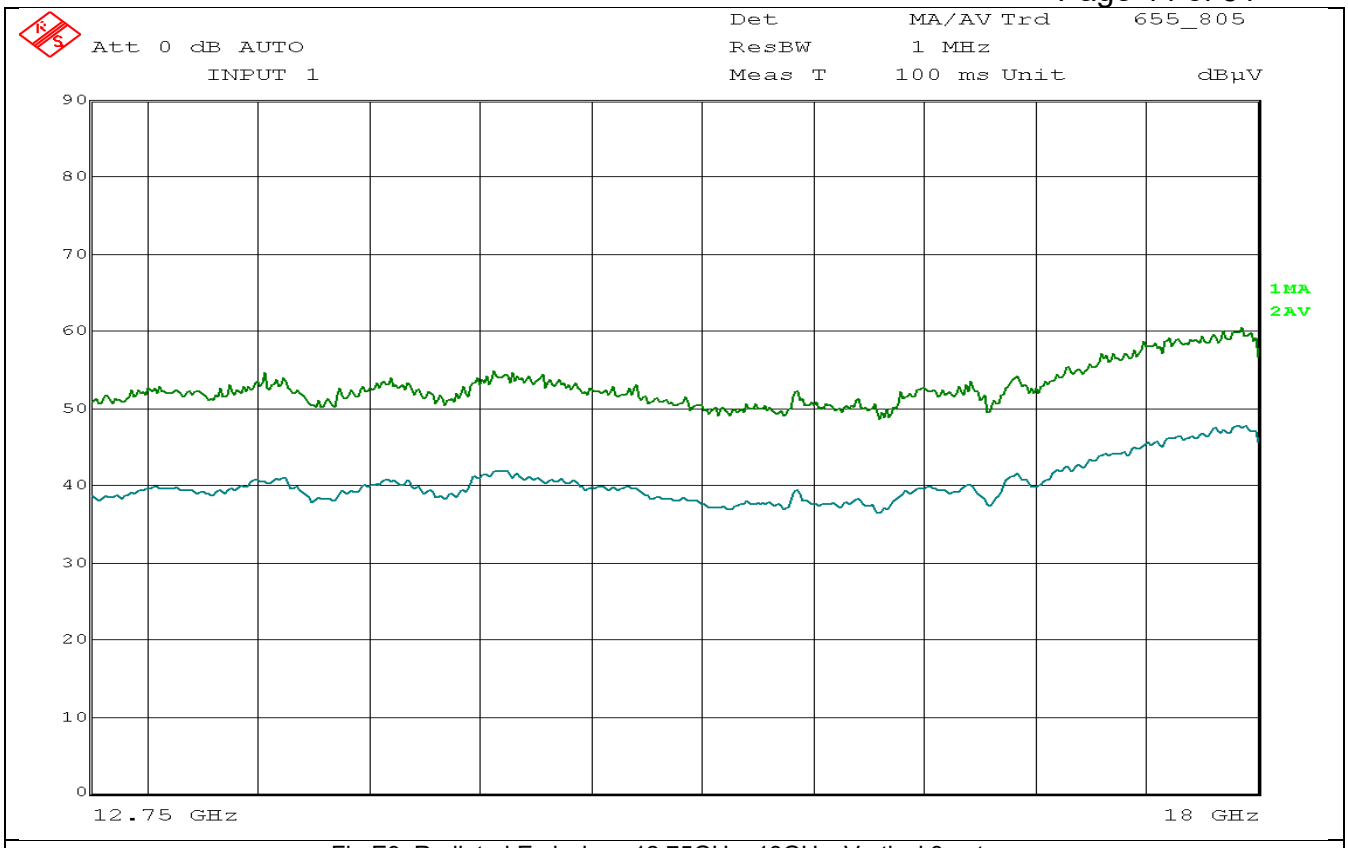

Fig E9 Radiated Emissions 12.75GHz -18GHz Vertical 3metres

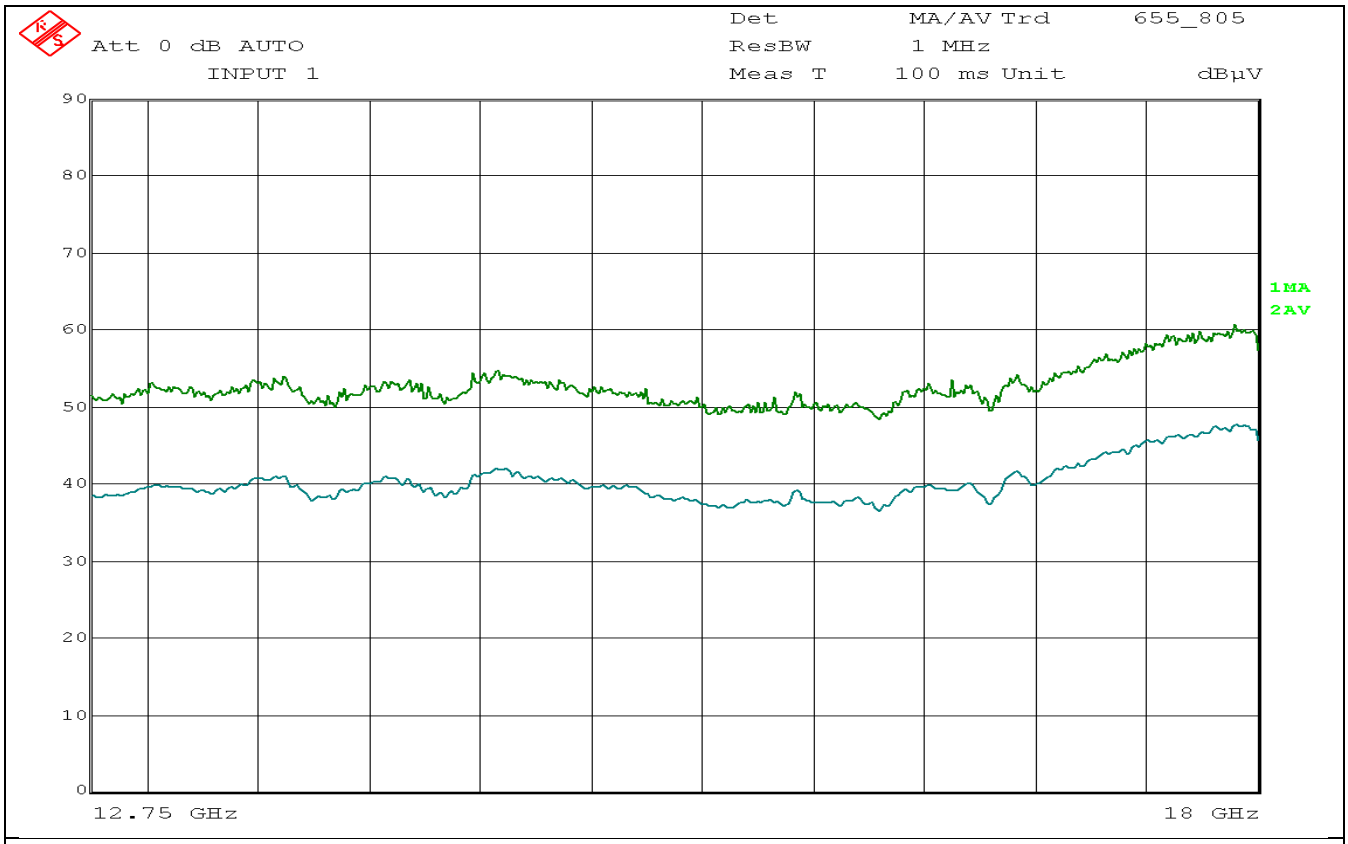

Fig E10 Radiated Emissions 12.75GHz -18GHz Horizontal 3metres

Appendix F Radiated Scans for Band Edge

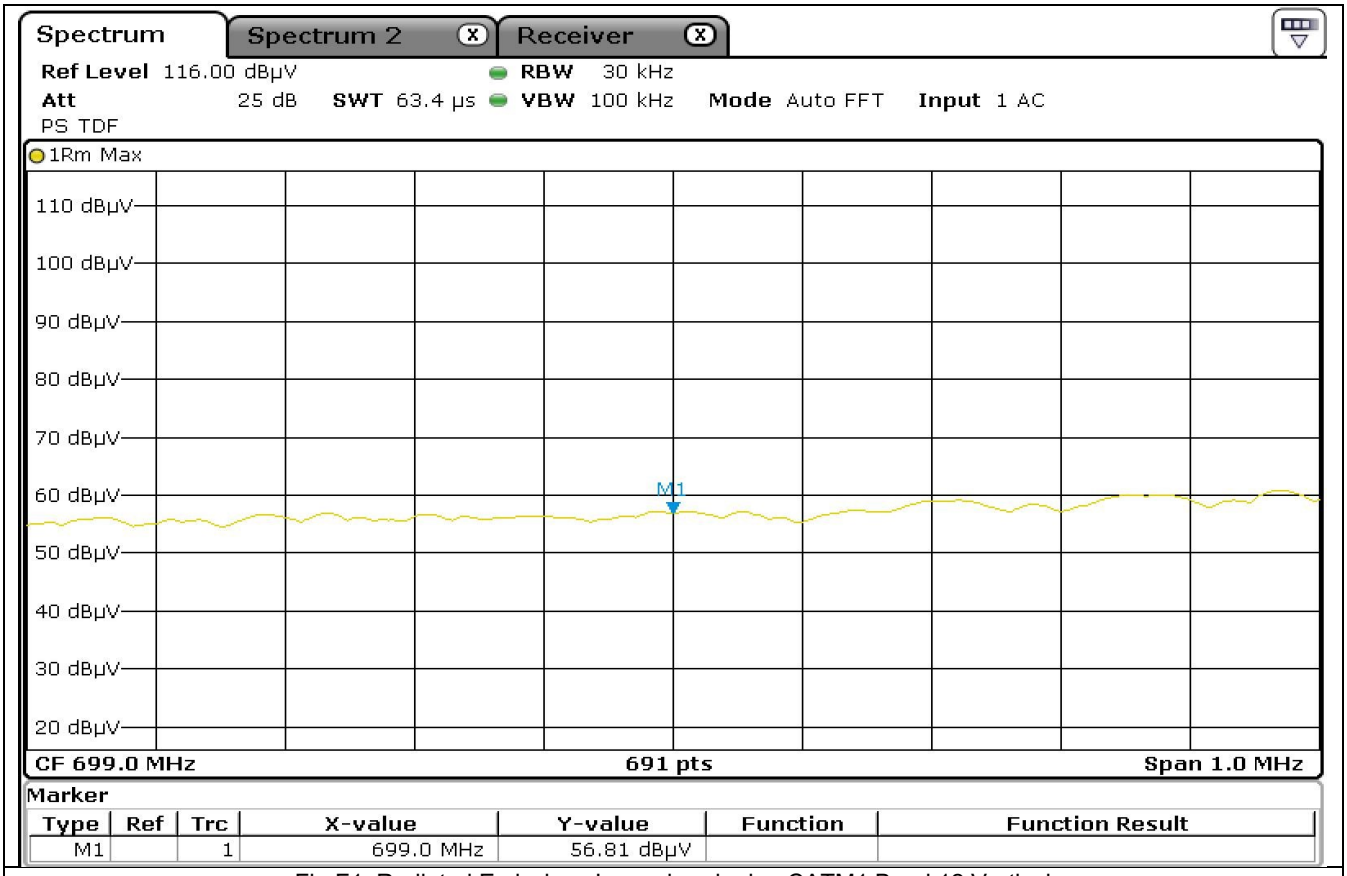

Fig F1 Radiated Emissions Lower band edge CATM1 Band 12 Vertical

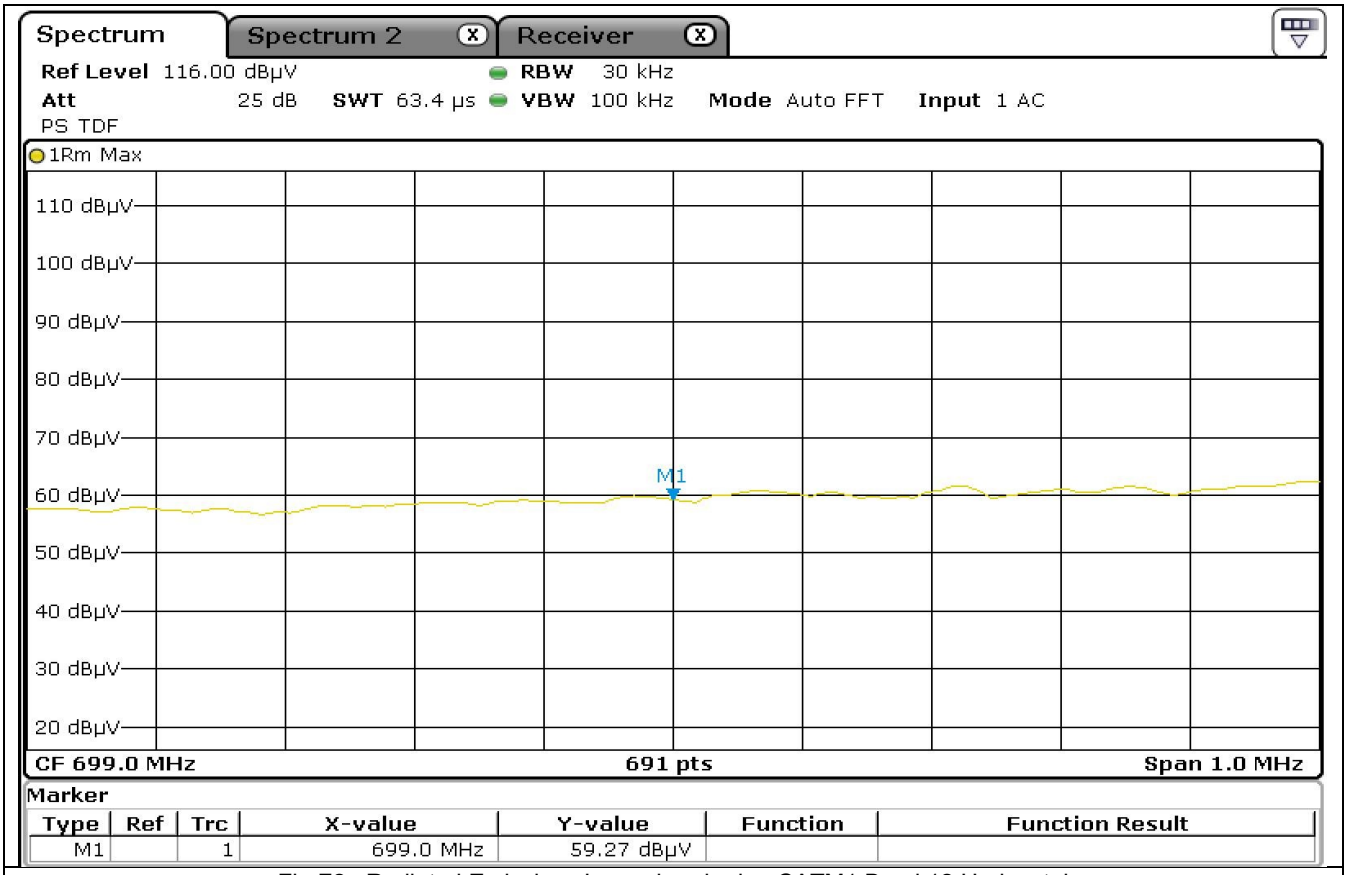

Fig F2 Radiated Emissions Lower band edge CATM1 Band 12 Horizontal

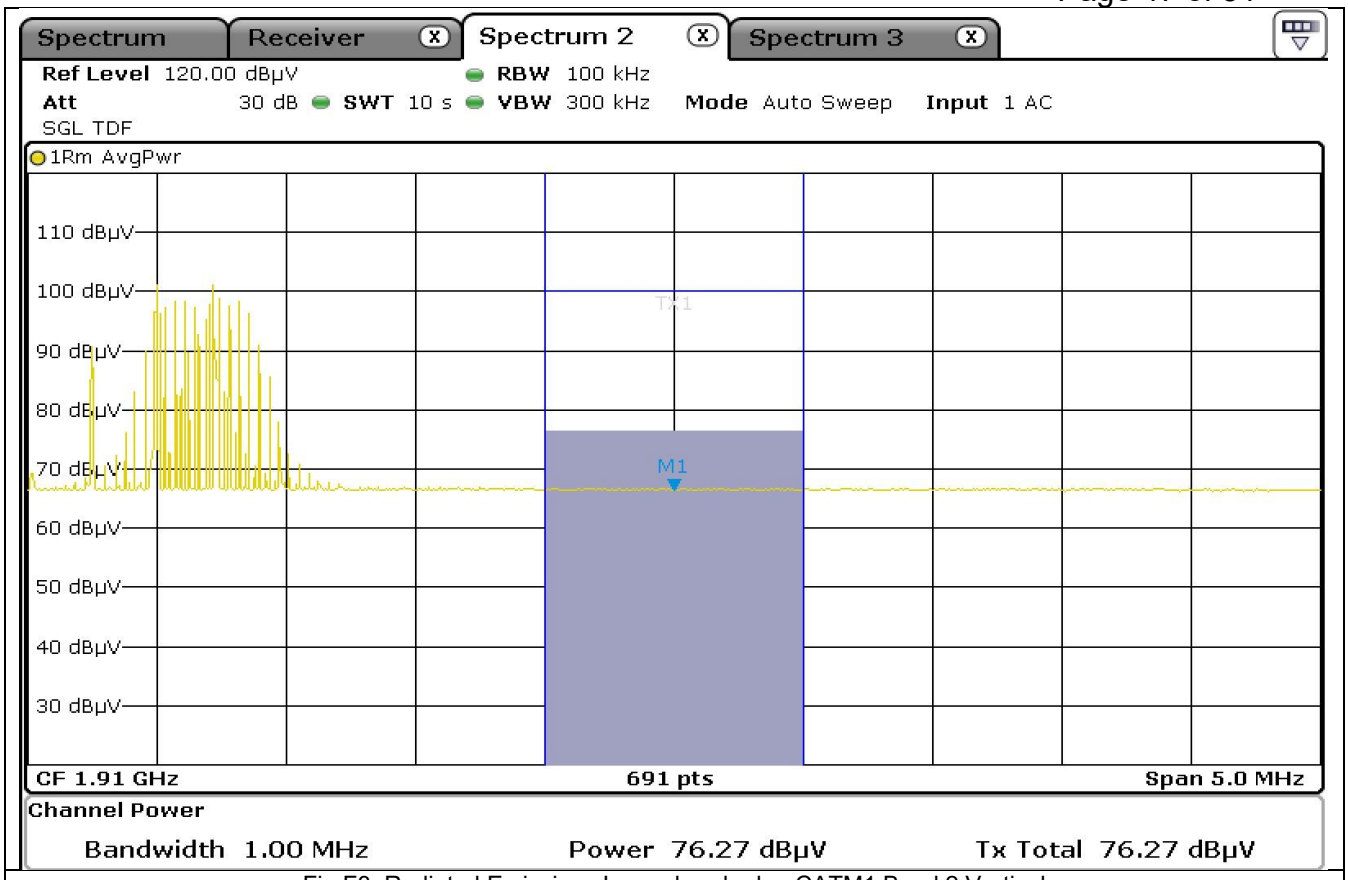

Fig F3 Radiated Emissions Lower band edge CATM1 Band 2 Vertical

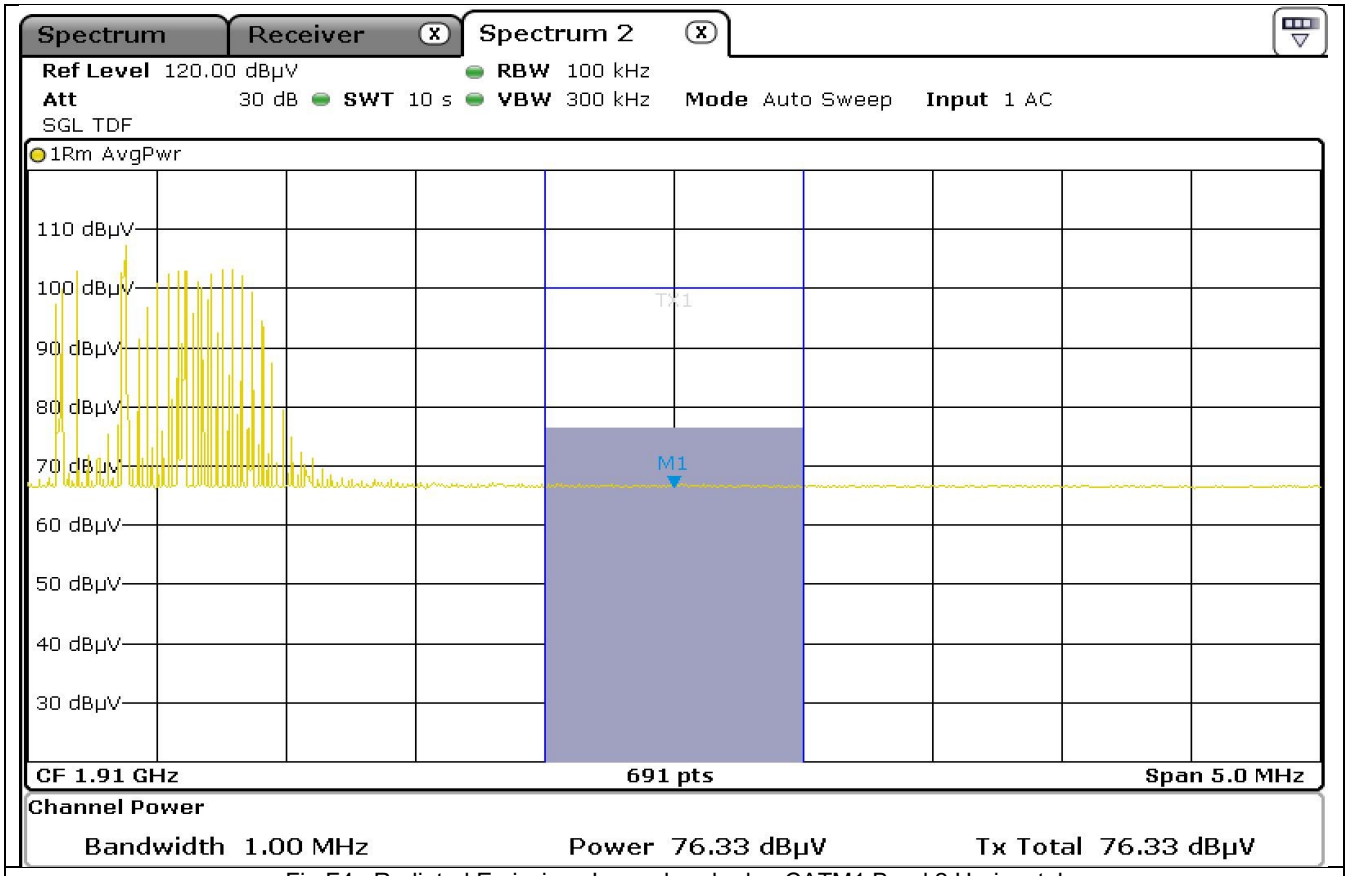

Fig F4 Radiated Emissions Lower band edge CATM1 Band 2 Horizontal

Appendix G Test Equipment Used:

Instrument	Manufacturer	Model	Serial Num	CEI Ref	Cal Date	Cal Interval Months
Microwave Preamplifier	Hewlett Packard	83017A	3123A00175	805	30-Sep-22	12
Spectrum Analyser 30Hz-40GHz	Rohde& Schwarz	FSP40	100053	850	10-Dec-21	36
Test Receiver 3.6GHz	Rohde& Schwarz	ESR	1316.3003k03-101625-s	869	23-May-23	36
Receiver N9038A EMI 3Hz - 8.4 GHz	Keysight	MXE N9038A	MX60320104	1204	28-Feb-23	36
Antenna Horn	EMCO	3115	9905-5809	655	21-Jan-22	24
Fully Anechoic Chamber	CEI	FAR 3M	906	906	23-Jul-22	36
Anechoic Chamber	CEI	SAR 10M	845	845	12-Sep-22	36
Antenna Biconical	Schwarzbeck	VHBB 9124	9124 667	871	06-Oct-21	36
Antenna Log Periodic	Chase	UPA6108	1072	609	09-Sep-21	36
Cable Ntype 20m				1213	15-May-23	12
Cable purple Ktype 1.8m				917	29-Jul-23	12
Cable Ntype 10m				914	29-Jul-23	12
Cable HF Ktype 1.5m				705	29-Jul-23	12

Appendix H Test Configurations:

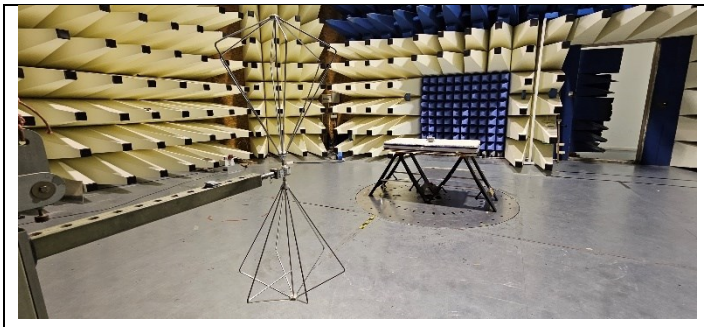

Fig H1 Radiated Emissions 30MHz-300MHz 3 metres

Fig H2 Radiated Emissions 300MHz -1GHz 3metres

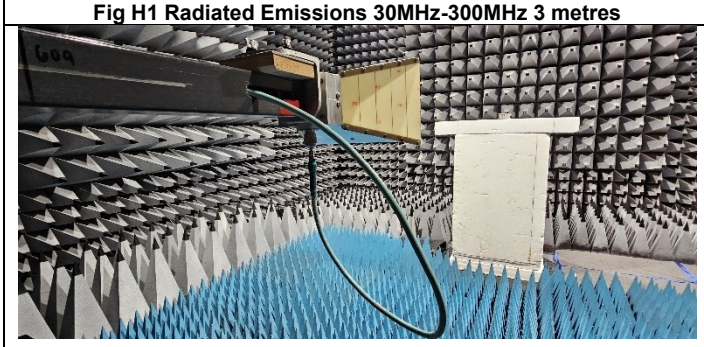

Fig H3 Radiated Emissions 1GHz -18GHz 3metres

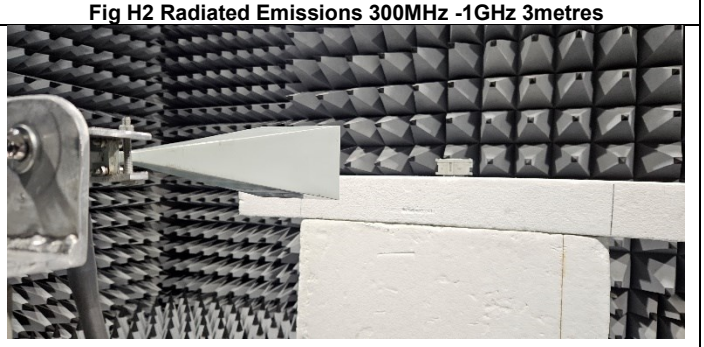

Fig H4 Radiated Emissions above 18GHz 1 metre

Fig H5 Radiated Emissions EUT Close up

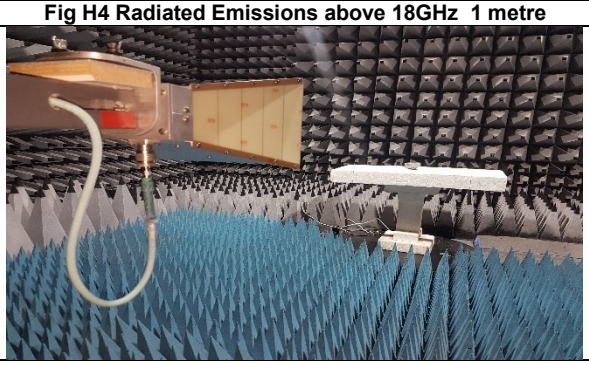

Fig H6 Radiated Emissions Idle mode above 1GHz 3metres

Fig H7 EUT orientation “O1”

Fig H8 EUT orientation “O2”

Orientations for Radiated Emissions

Appendix I Block Diagrams of the test setup:

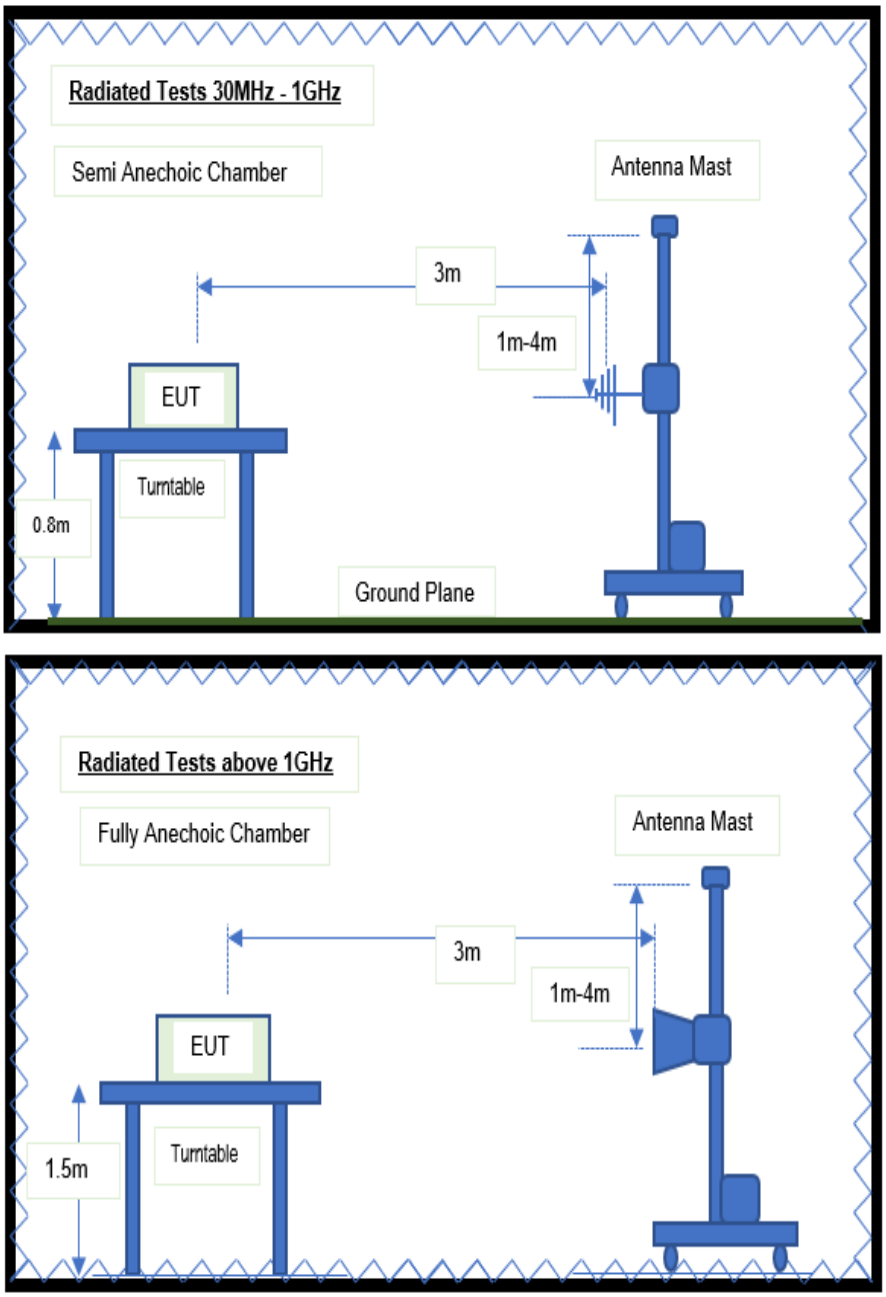

Fig I1: Test Setup Transmit mode

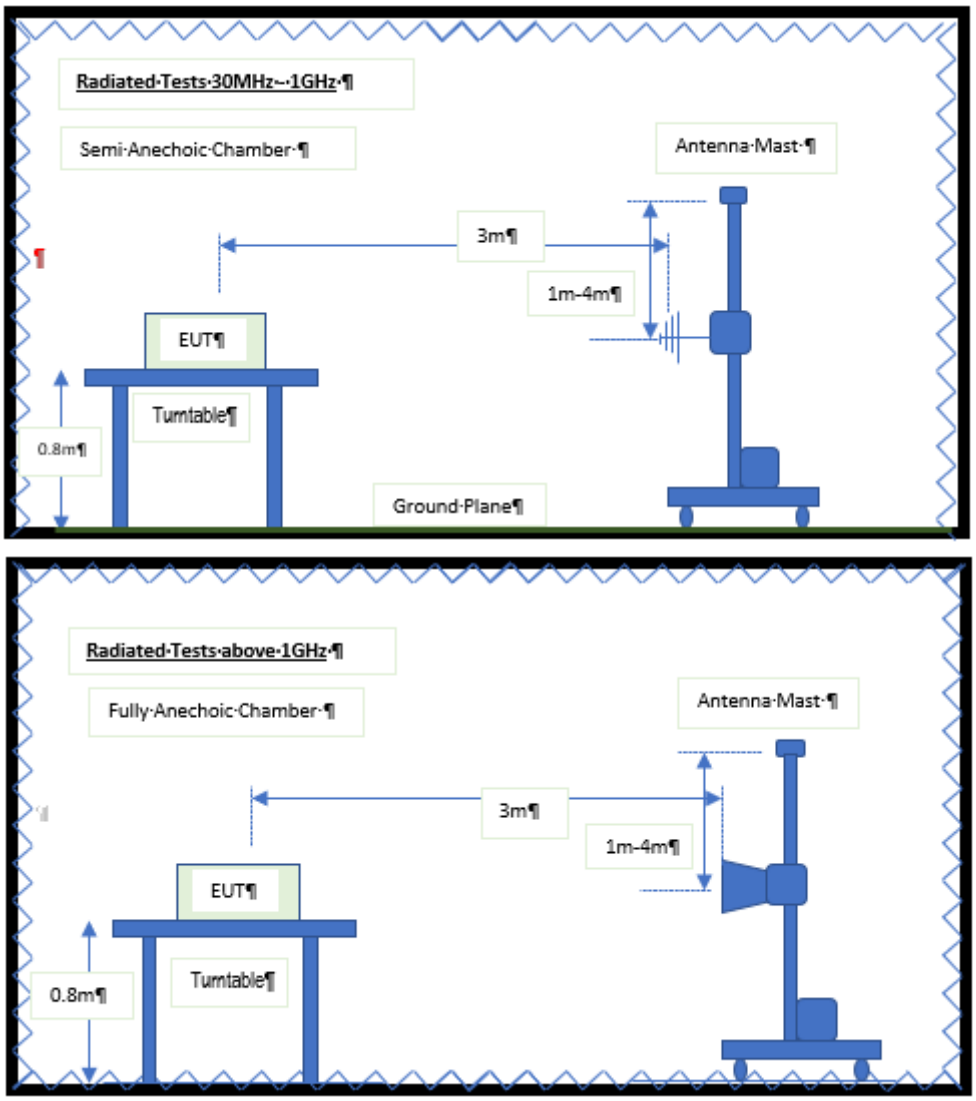

Fig I2: Test Setup Idle mode

End of Report