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FCC Test Firm Registration	409640
IC Site Registration	IE0001
Date	22nd Mar 2021
EUT Description	HUBA
FCC ID	2ATIMHUBA
IC ID	25094-HUBA
Authorised by	**Paul Reilly**
Authorised Signature:	

TEST SUMMARY

The equipment complies with the requirements according to the following standards.

FCC 15.247 Section	RSS-247 Section	TEST PARAMETERS	Test Result
15.247 (a)2	RSS-247 5.2a	6dB bandwidth	Pass
15.247 (e)	RSS-247 5.2b	Power Spectral Density	Pass
15.247 (b)3	RSS-247 5.4d	Output power Conducted	Pass
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Pass
15.205 15.209	RSS Gen 8.9 RSS Gen 8.10	Radiated Spurious Emissions	Pass
	RSS Gen 6.7	99% bandwidth	Pass

RSS 247-2 (Feb 2017)
RSS Gen Issue5 Amd 2 (Feb 2021)

Exhibit A – Technical Report

Table of Contents

1.0 EUT Description

Model:	HUBA
Type:	Wireless Gateway
Type of radio:	Stand-alone
Transmitter Type:	802.15.4 (Thread), 802.11G 802.11N Wifi
Operating Frequency Range(s):	2.405 GHz - 2.480GHz Thread 2.412-2.462GHz Wifi
Number of Channels:	16 Thread 11 Wifi
Antenna:	Integral
Power configuration:	12 v Battery.
Ports:	None
Classification:	DTS, CYY
HVIN:	HUBA
PMN:	HUBA
Test Standards:	15.247 RSS-247
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2013 KDB 558074 V5 R02

The EUT was a Gateway for use in the automobiles. Its purpose was to relay packets received on the 433MHz band using a transmitter in the 2.4GHz band.
The EUT contained transmitters using Wifi and Thread technology and also a 433MHz receiver.
The Thread and Wifi antennas were internal pcb antennas.
This report details test carried out on the Thread transmitter

1.1 EUT Operation

<u>Operating Conditions during Test:</u>

Conducted measurements were carried out on a sample where the antenna was replaced by cable and SMA.

The EUT was operated in test mode where the channel and modulation was set via USB connection from the EUT to a laptop.
The EUT was powered from a bench PSU set to 12Vdc. for all tests

Radiated measurements were performed on a sample with standard internal antenna.

Environmental conditions

	Temperature	**Relative Humidity**
Test	°C	%
Conducted Emissions	20	47
Radiated Emissions <1GHz	17	41
Radiated Emissions >1GHz	21	44

1.2 Modifications

No modifications were required in order to pass the test specifications.

1.3 Date of Test

The tests were carried out on 21st 22nd Dec 2020, 6th -15th Jan 2021.

1.4 Special Software

Tests were performed manually, and no special software was used.

1.5 Description of Test modes

Channel List Thread

Channel	Channel	Freq MHz
Low	11	2405
	12	2410
	13	2415
	14	2420
	15	2425
	16	2430
	17	2435
Mid	18	2440
	19	2445
	20	2450
	21	2455
	22	2460
	23	2465
	24	2470
	25	2475
High	26	2480

All tests were performed with the EUT on the low mid and high channels.

2 Emissions Measurements

2.1 Conducted Emissions Measurements

Radio Conducted measurements were carried out on the EUT as per section 1.1 above.

All results were measured as conducted on the antenna except radiated spurious emissions.

2.2 Radiated Emissions Measurements

Emissions below 1GHz were measured using a test antenna positioned at a distance of 3 metres from the EUT (as measured from the closest point of the EUT) which was placed on a turntable allowing 360 degree rotation, in a semi anechoic chamber. 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. In this case the resolution bandwidth was 100kHz.
Emissions in the above 1GHz were measured using a horn antenna located at 3 metres distance from the EUT in a fully anechoic chamber.
The radiated emissions were maximised by configuring the EUT and by rotating the EUT, and by raising and lowering the test antenna from 1 to 4 metres.
Emissions above 18GHz were measured using a horn antenna located at 1 metre distance from the EUT in a fully anechoic chamber. The radiated emissions were maximised by configuring the EUT and by rotating the EUT and raising the test and antenna from 1 to 4 metres.
The resolution bandwidth was 1MHz and video bandwidth was 3 MHz for peak measurements for radiated emissions above 1GHz.

A pre-scan was performed to determine the worst case EUT orientation for the radiated measurements.
All radiated tests were performed with the EUT in orientation O1 for Horizontal polarization measurements and with the EUT in orientation O2 for Vertical polarisation measurements.

Ref Appendix D for orientations.

3.0 Results for Conducted emissions on the mains

Test not performed as the host for the EUT is battery powered only

4. Conducted Measurements

4.1 Bandwidth

4.1.1 6dB bandwidth

Test Method
As per Ansi 63.10 Section 11.8.2

Ansi63.10 Section **11.8.2 Option 2**
The automatic bandwidth measurement capability of an instrument may be employed using the *X* dB bandwidth mode with *X* set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥6 dB.

Limit for 6dB Bandwidth = 500KHz min

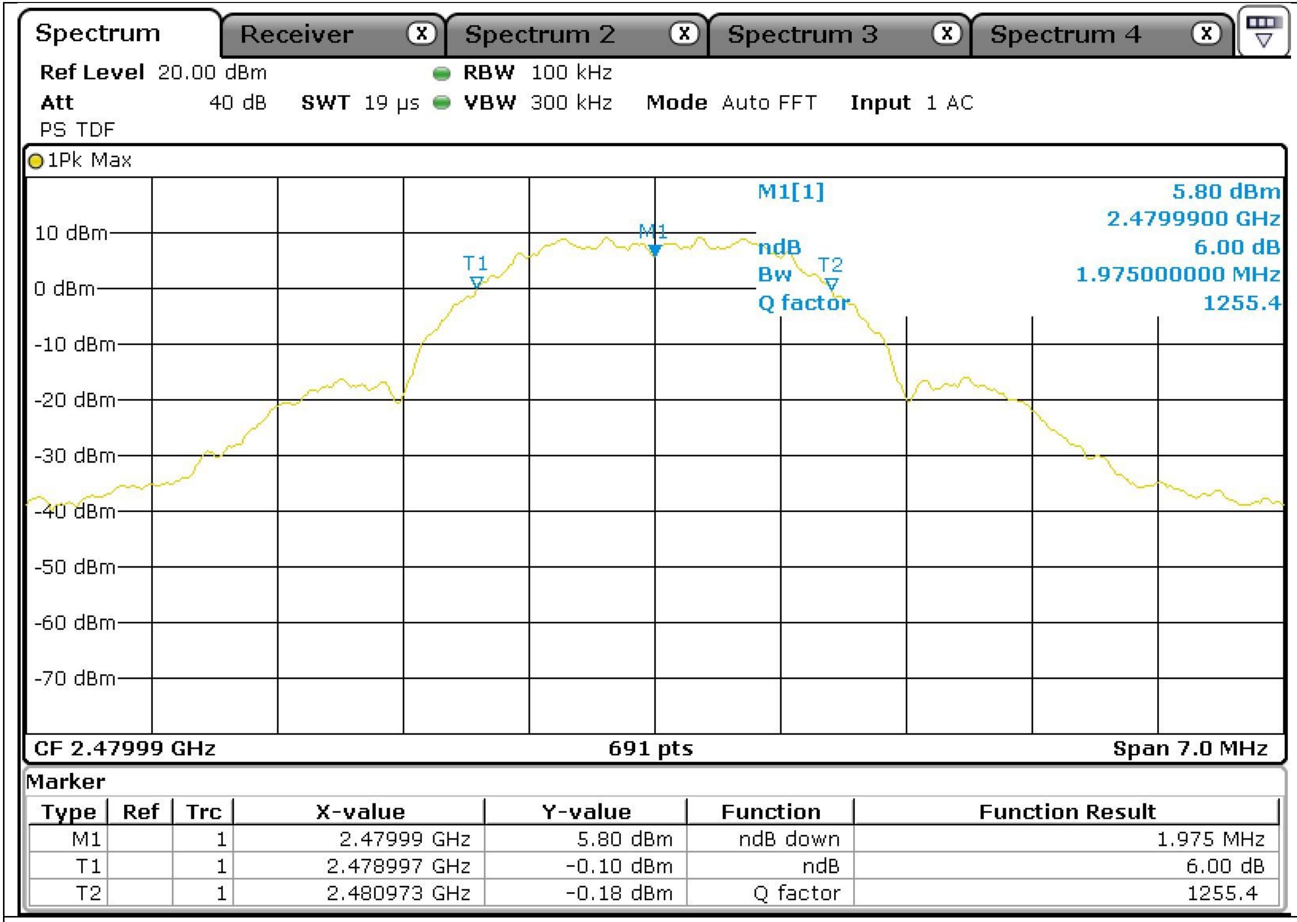


Fig 1 6dB Bandwidth

Frequency	6dB Bandwidth	Limit Min	Margin
GHz	MHz	KHz	MHz
2.405	1.968	500	1.468
2.44	1.955	500	1.455
2.48	1.975	500	1.475

Result :- Pass

4.1.2 99% bandwidth

Test Method
As per Ansi 63.10 Section 6.9.3

Ansi63.10 Section **6.9.3 Occupied bandwidth—power bandwidth (99%) measurement procedure**
The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
The following procedure shall be used for measuring 99% power bandwidth:
a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d) Step a) through step c) might require iteration to adjust within the specified range.
e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

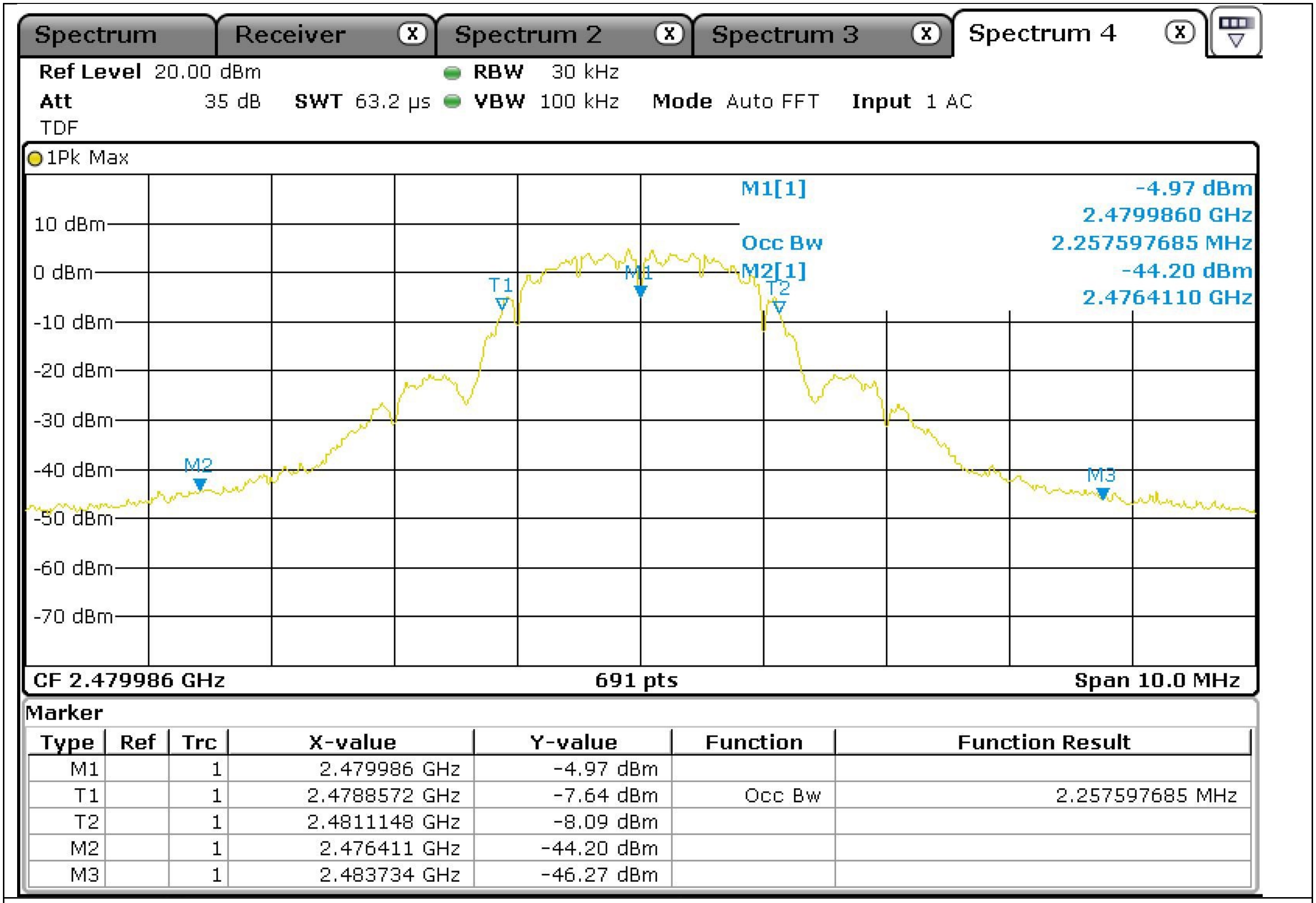


Fig 2 99% Bandwidth

Frequency	99% Bandwidth
GHz	MHz
2.405	2.243
2.44	2.258
2.48	2.258

Result :- Pass

4.2 Duty Cycle

Test Method
As per Ansi 63.10 Section 11.6 KDB 558074 zero span measurement method

Ansi63.10 Section **11.6 Duty cycle (*D*), transmission duration (*T*), and maximum power control level**

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (*T*) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed *T* at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).

KDB 558074 D01 FAQ section

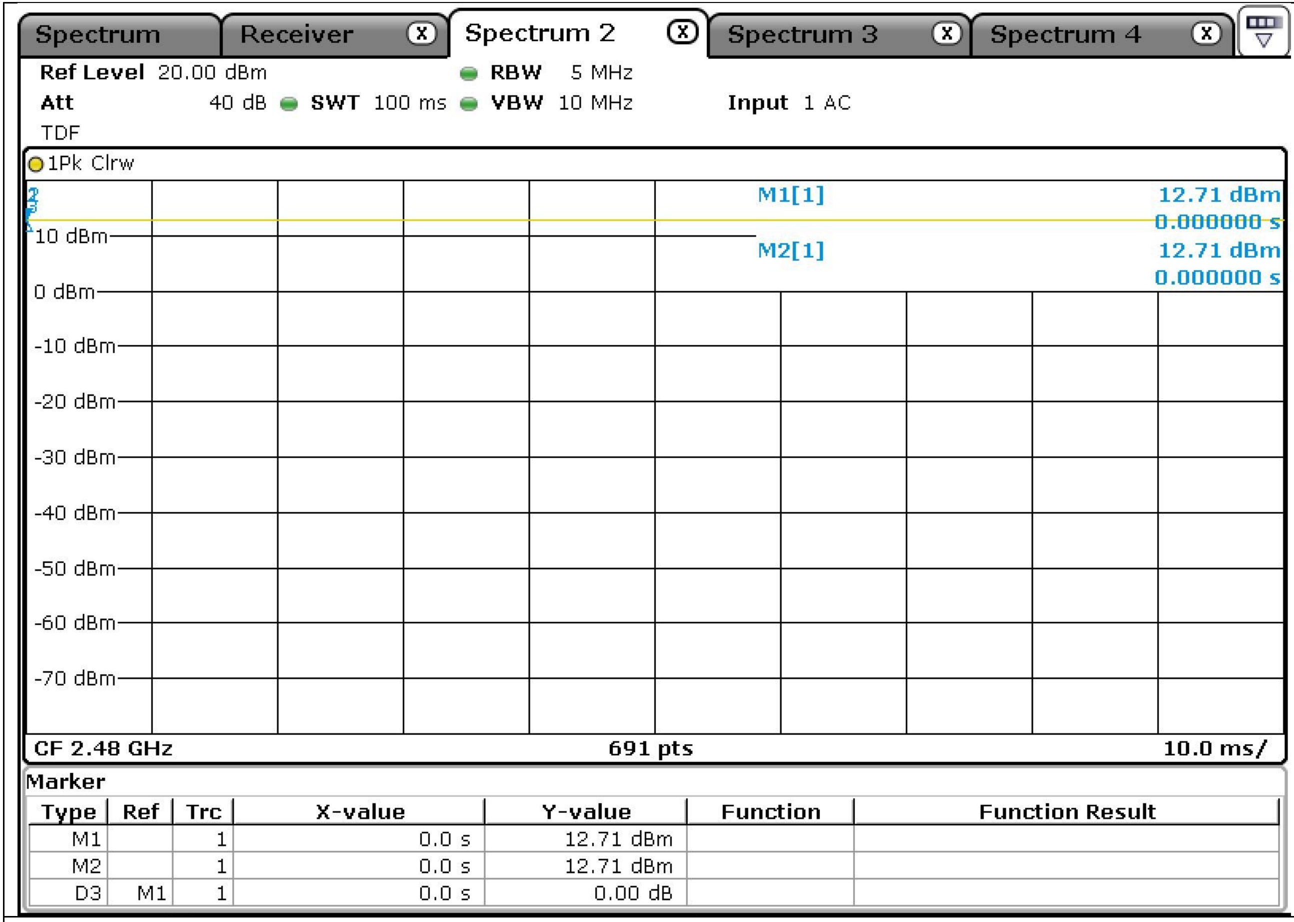


Fig 3 Duty Cycle

Duty Cycle >98%
Note the duty cycle results above shows how the sample operated during testing.
All Thread tests carried out with >98% duty cycle.

Real life worst case duty cycle is protocol limited to 67% for 802.154.4 devices.
Ref Appendix E

4.3 Power Spectral Density

Test Method
As per Ansi 63.10 Section 11.10.2

Ansi63.10 Section **Section 11.10.2 Method PKPSD (peak PSD)**
The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:
a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ [3 × RBW].
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

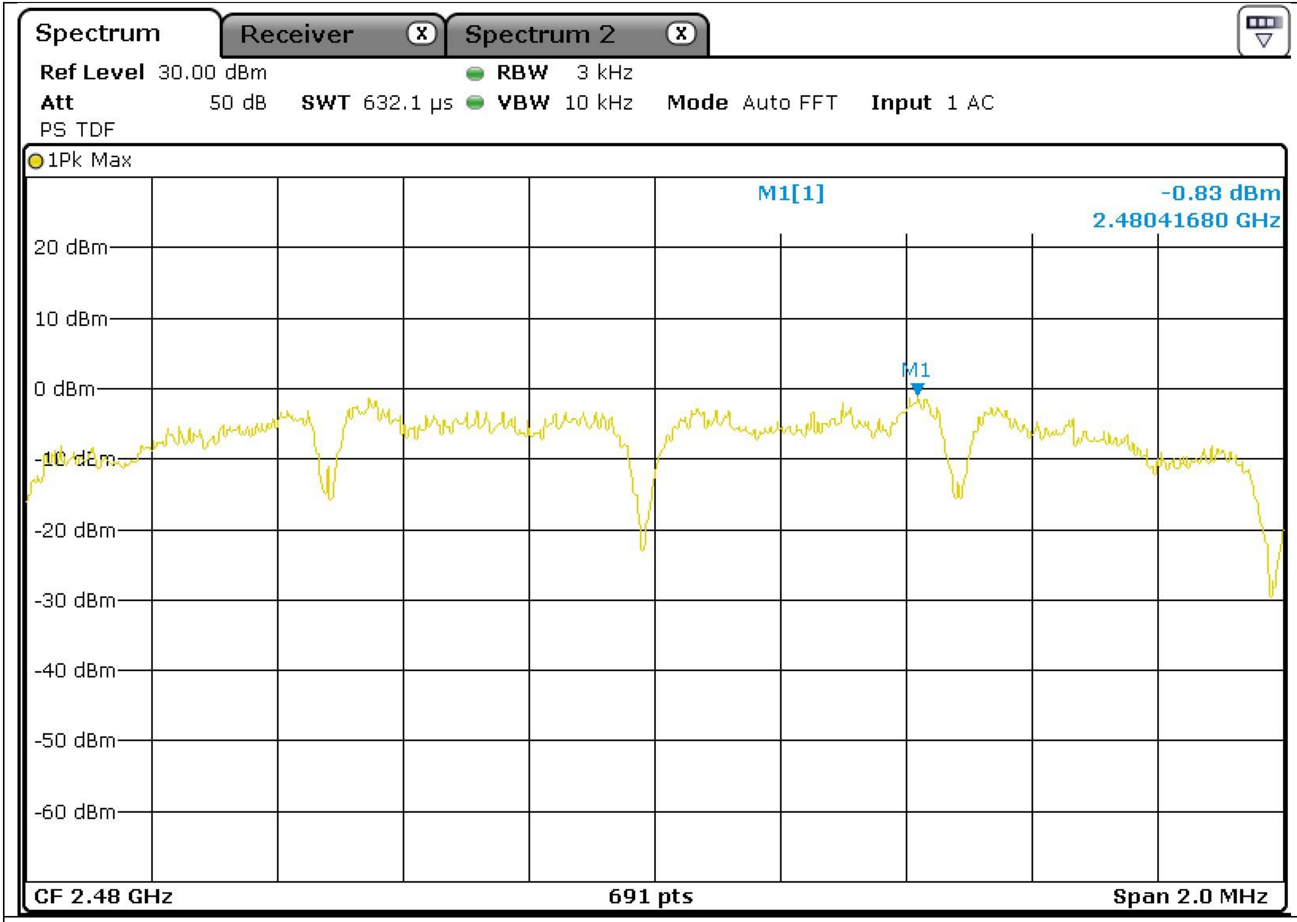


Fig 4 Power Spectral Density

Frequency	Measurement	Conducted Peak	Limit	Margin
GHz	dBm	dBm	dBm	dB
2.405	-0.9	-0.9	8	8.9
2.44	-0.97	-0.97	8	8.97
2.48	-0.83	-0.83	8	8.83

Result :- Pass

4.4 Output power Conducted

4.4.1 Test Method

As per Ansi 63.10 Section 11.9..1.1

Ansi63.10 Section **11.9.1.1 RBW ≥ DTS bandwidth**
The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:
a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

4.4.2 Results

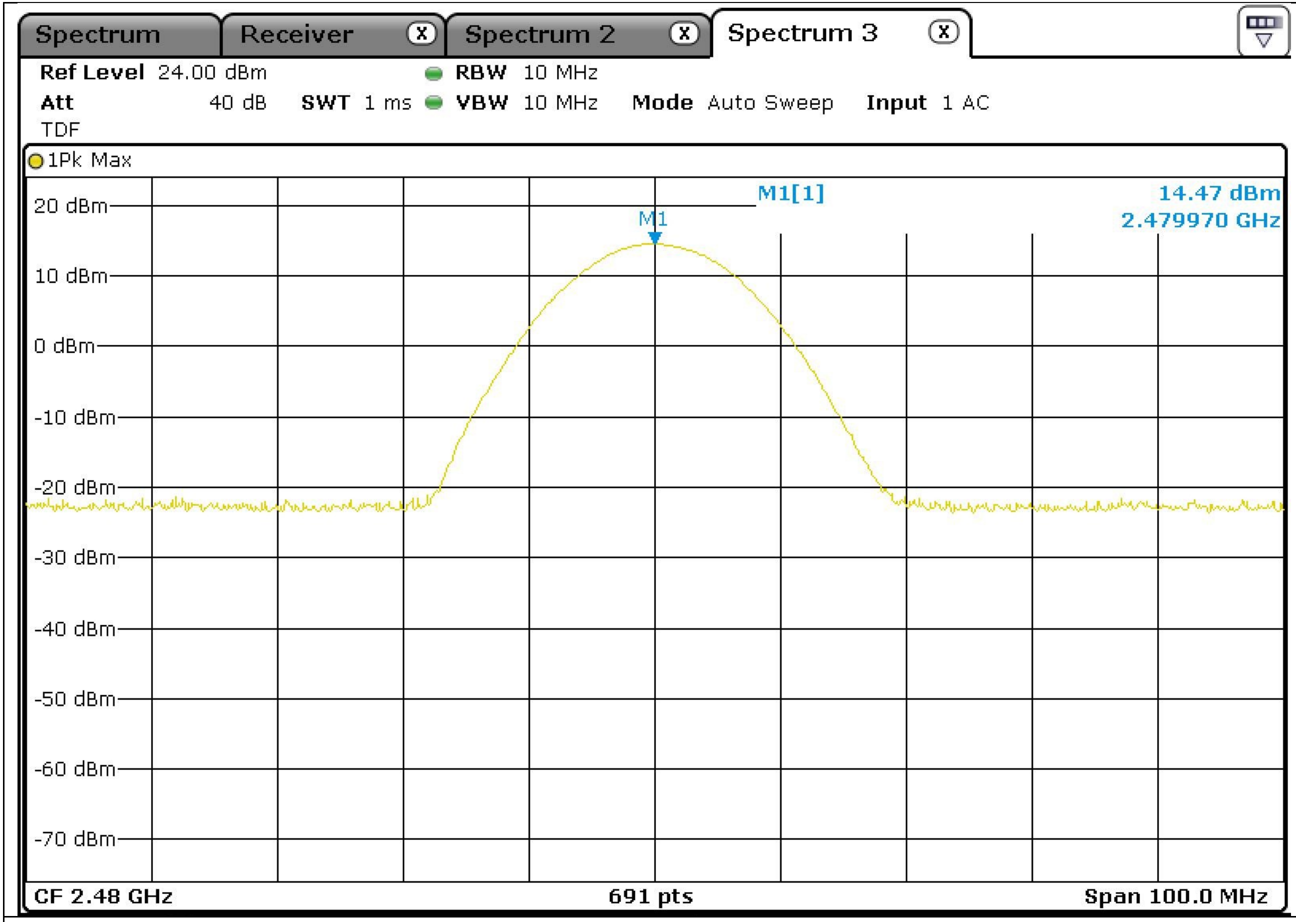


Fig 5 Output power Peak

Frequency	Measurement	Conducted Peak	Limit	Margin
GHz	dBm	dBm	dBm	dB
2.405	14.18	14.18	30	15.82
2.44	14.61	14.61	30	15.39
2.48	14.47	14.47	30	15.53

Test Result :- Pass

5. Spurious Emissions Measurements

5.1 Conducted Emissions

5.1.1 Test Method
As per Ansi63.10 Section 11.11.1 and 6.10.4

Ansi63.10 Section **11.11.1 General**
Typical regulatory requirements specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions[89]:
a) If the maximum peak conducted output power procedure was used to determine compliance as described in 11.9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

Ansi63.10 Section **6.10.4 Authorized-band band-edge measurements (relative method)**
These procedures are applicable for determining compliance at authorized-band band-edges where the requirements are expressed as a value relative to the in-band signal level. Procedures for determining compliance with field strength limits at or close to the band-edges are given in 6.10.6 (see also Table A.2).

5.1.2 Results

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.405	10.71	20	-
4.81	-56.92	20	47.63
7.216	-67.85	20	58.56

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.44	10.73	20	-
4.88	-58.37	20	49.1
7.32	-69.74	20	60.47

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.48	10.75	20	-
4.96	-60.31	20	51.06
7.44	-70.64	20	61.39

Ref Appendix A for Scans

Test Result: - Pass

5.2 Radiated Spurious Emissions in Restricted bands

5.2.1 Test Method
As per Ansi63.10 Section 11.12.1 and 6.10.5

Ansi63.10 Section **11.12.1 Radiated emission measurements**
Because the typical emission requirements are specified in terms of radiated field strength levels, measurements performed to determine compliance have traditionally relied on a radiated test configuration.[92] Radiated measurements remain the principal method for determining compliance to the specified requirements; however antenna-port conducted measurements are also now acceptable to determine compliance (see 11.12.2 for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in 6.3, 6.5, and 6.6 shall be followed

6.10.5 Restricted-band band-edge measurements
These procedures are applicable for determining compliance at band edges of restricted bands.
6.10.5.1 Test setup
Restricted-band band-edge tests shall be performed as radiated measurements, on a test site meeting the specifications in 5.2 at the measurement distances specified in 5.3.[57]
The instrumentation shall meet the requirements in 4.1.1 using the bandwidths and detectors specified in 4.1.4.2. Considering the requirements of 5.8, the antenna(s) shall be connected to the antenna ports. When performing radiated measurements, the measurement antenna(s) shall meet the specifications in 4.3. The EUT shall be connected to an antenna and operated at the highest power settings following procedures in 6.3, and the relevant procedure in 6.4, 6.5, or 6.6

Frequency MHz	Quasi Peak Level dBuV/m	Antenna Polarity	Antenna Factor dB	Cable loss dB	Final Field Strength Quasi Peak dBuV/m	Quasi Peak Limit dBuV/m	Margin dB
264.05	-8	Vertical	16.6	1.4	10	46.0	36.0
133.325	12.7	Horizontal	11.3	1.2	25.2	43.5	18.3
164.825	17.8	Horizontal	12.3	1.2	31.3	43.5	12.2
408.025	-3.7	Vertical	16.5	1.6	14.4	46.0	31.6

Frequency	Measured Peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Peak Level	Average Limit +20dB	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
4.810	43.5	32.4	37.1	5.2	Vertical	0.00	44.0	74	30.0
12.025	38.0	40.3	36.5	7.8	Horizontal	0.00	49.6	74	24.4
4.810	44.0	32.4	37.1	5.2	Vertical	0.00	44.5	74	29.5
12.025	37.4	40.3	36.5	7.8	Horizontal	0.00	49.0	74	25.1

Frequency	Measured Peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Peak Level	Average Limit +20dB	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
4.880	44.3	32.4	37.3	5.2	Vertical	0.00	44.6	74	29.4
7.320	41.2	37.7	38	6.7	Vertical	0.00	47.6	74	26.4
12.200	38.1	40.3	37.7	8.9	Horizontal	0.00	49.6	74	24.4
4.880	45.0	32.4	37.3	5.2	Horizontal	0.00	45.3	74	28.7
7.320	40.2	37.7	38	6.7	Horizontal	0.00	46.6	74	27.4
12.200	36.2	40.3	37.7	8.9	Horizontal	0.00	47.7	74	26.3

Frequency	Measured Peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Peak Level	Average Limit +20dB	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
4.960	43.1	33.5	37.4	5.4	Vertical	0.00	44.6	74	29.4
7.440	40.6	37.7	37.5	6.3	Vertical	0.00	47.1	74	26.9
12.400	37.1	40.3	36.4	8.0	Horizontal	0.00	49.0	74	25.0
4.960	43.9	33.5	37.4	5.4	Vertical	0.00	45.4	74	28.6
7.440	40.6	37.7	37.5	6.3	Vertical	0.00	47.1	74	27.0
12.400	36.3	40.3	36.4	8.0	Vertical	0.00	48.2	74	25.8

Recorded peak levels were less than the average limit of 54dBuV/m therefore the average measurements were not recorded.

Test Result: - Pass

5.3 Radiated Band Edge / Restricted band Measurements

Radiated Measurement

Result

5.3.1 Radiated Restricted Band near 2.4 GHz band

Frequency	Measured Peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Peak Level	Average Limit +20dB	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
2.4835	71.8	28.7	38.3	3.4	Vertical	0.00	65.6	74	8.4
2.500	56.4	28.7	38.3	3.4	Vertical	0.00	50.2	74	23.8
2.4835	71.6	28.7	38.3	3.4	Horizontal	0.00	65.4	74	8.6
2.500	56.5	28.7	38.3	3.4	Horizontal	0.00	50.3	74	23.7

Frequency	Measured Average Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Average Level	Average Limit	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
2.4835	57.6	28.7	38.3	3.4	Vertical	0.00	51.4	54	2.6
2.500	42.8	28.7	38.3	3.4	Vertical	0.00	36.6	54	17.4
2.4835	57.4	28.7	38.3	3.4	Vertical	0.00	51.2	54	2.8
2.500	42.8	28.7	38.3	3.4	Vertical	0.00	36.6	54	17.4

5.3.2 Radiated Band Edges near 2.4 GHz band

Frequency	Measured Peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Peak Level	Average Limit +20dB	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
2.400	66.2	27.4	38.5	3.5	Vertical	0.00	58.6	74	15.4
2.395	59.4	27.4	38.5	3.5	Horizontal	0.00	51.8	74	22.2
2.400	68.6	27.4	38.5	3.5	Horizontal	0.00	61.0	74	13.0
2.395	61.2	27.4	38.5	3.5	Horizontal	0.00	53.6	74	20.4

Frequency	Measured Average Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Duty Cycle Correction	Final Average Level	Average Limit	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dB	dBuV/m	dBuV/m	dB
2.400	52.9	27.4	38.5	3.5	Vertical	0.00	45.27	54	8.7
2.393	46.2	27.4	38.5	3.5	Vertical	0.00	38.6	54	15.4
2.400	54.8	27.4	38.5	3.5	Horizontal	0.00	47.2	54	6.8
2.393	47.4	27.4	38.5	3.5	Horizontal	0.00	39.8	54	14.2

Test Result: - Pass

5.4 Radiated Power at fundamental

Frequency	Measured Peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Final Peak Level	Transmitted power
GHz	dBuV/m	dB	dB	dB	V/H	dBuV/m	dBm
2.405	109.4	27.4	38.5	3.5	Horizontal	101.8	7
2.405	109.5	27.4	38.5	3.5	Vertical	101.9	7
2.440	110.2	27.4	38.5	3.5	Horizontal	102.6	7
2.440	108.4	27.4	38.5	3.5	Vertical	100.8	6
2.480	109.4	28.7	38.3	3.4	Horizontal	103.2	8
2.480	105.6	28.7	38.3	3.4	Vertical	99.4	4

Note the Radiated field strength was measured at 3 metres and the conversion formula below was used to determine the EIRP in dBm

$$EIRP\ (dBm) = E_{3m}\ (dBuV/m) - 95.2$$

6 List of Test Equipment

Instrument	Manufacturer	Model	Serial Num	CEI Ref	Cal Due Date	Cal Interval Months
Spectrum Analyser 30Hz-40GHz	Rohde & Schwarz	FSP40	100053	850	11-Dec-21	36
Test Receiver 3.6GHz	Rohde & Schwarz	ESR	1316.3003k03-101625-s	869	28-May-23	36
Antenna Biconical	Schwarzbeck	VHBB 9124	9124 667	871	03-Sep-21	36
Antenna Horn	EMCO	3115	9905-5809	655	14-Mar-21	24
Anechoic Chamber	CEI	SAR 10M	845	845	16-May-22	36
Antenna Log Periodic	Chase	UPA6108	1072	609	03-Sep-21	36
Fully Anechoic Chamber	CEI	FAR 3M	906	906	22-Mar-21	36
Microwave Preamplifier	Hewlett Packard	83017A	3123A00175	805	30-Sep-21	12
Antenna Horn Standard Gain 18-26.5GHz	A-Info	LB-42-25-C-KF	J2021091103028	877	05-Oct-21	12

7 Measurement Uncertainties

Measurement	Uncertainty
Radio Frequency	+/- $5x10^{-7}$
Maximum Frequency Deviation	+/- 1.7 %
Conducted Emissions	+/- 1 dB
Radiated Emission 30MHz-100MHz	+/- 5.3 dB
Radiated Emission 100MHz-300MHz	+/- 4.7 dB
Radiated Emission 300MHz-1GHz	+/- 3.9 dB
Radiated Emission 1GHz-40GHz	+/- 3.8 dB
Modulation bandwidth	+/- $5x10^{-7}$
Duty Cycle	+/- 5 %
Power supply	±0.1 VDC
Temperature	±0.2 °C
Frequency	±0.01 ppm

The measurement uncertainties stated were calculated with a k=2 for a confidence level of over 95% as per ETS TR100 028.

The test data can be compared directly to the specification limit to determine compliance, as the calculated measurement uncertainty meets the requirements of the applicable specification.

Appendix A

Conducted Measurements on the Antenna Port

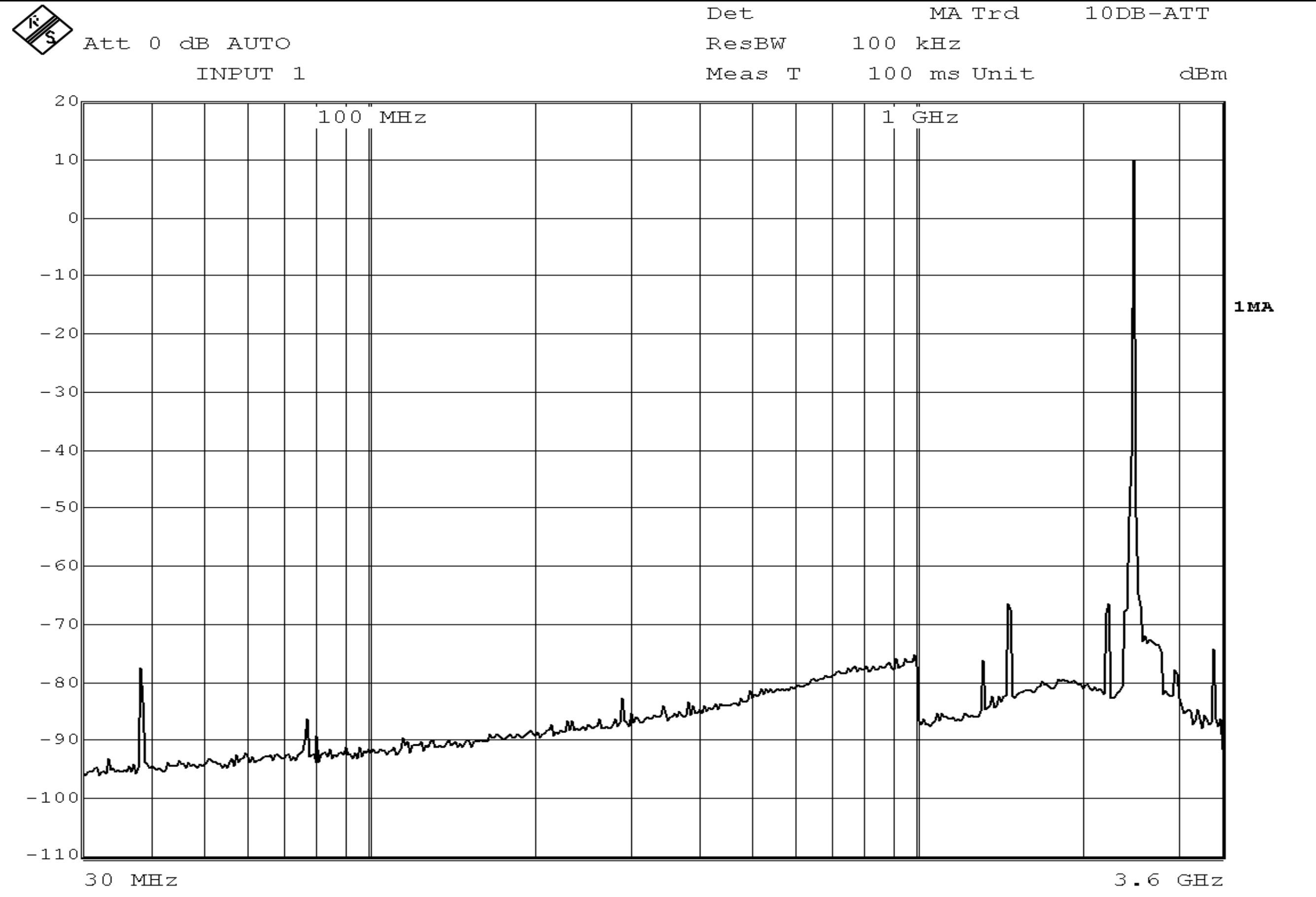


Fig A1 High Channel Conducted Spurious Emissions 30MHz -3.6GHz

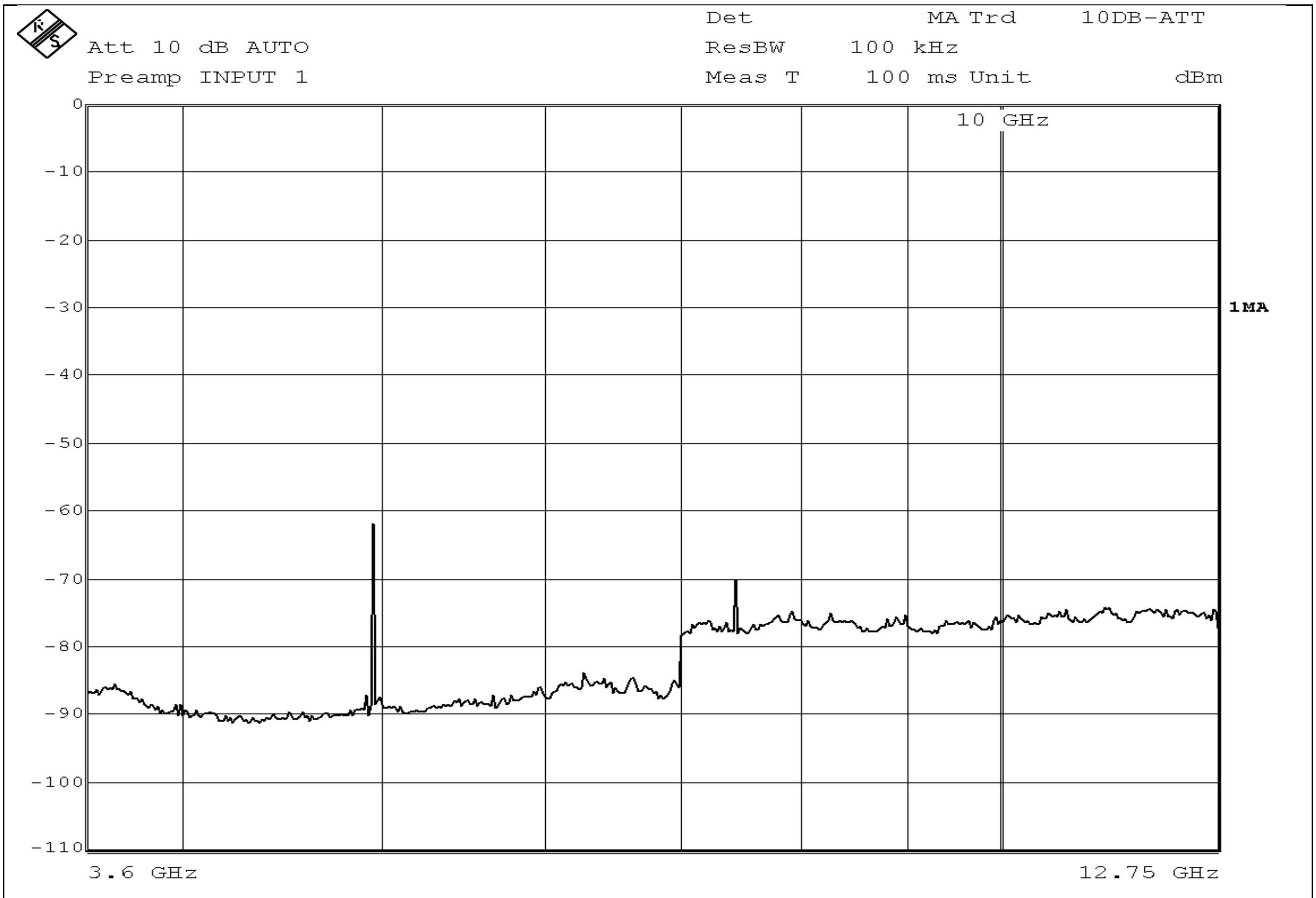


Fig A2 High Channel Conducted Spurious Emissions 3.6GHz-12.75GHz

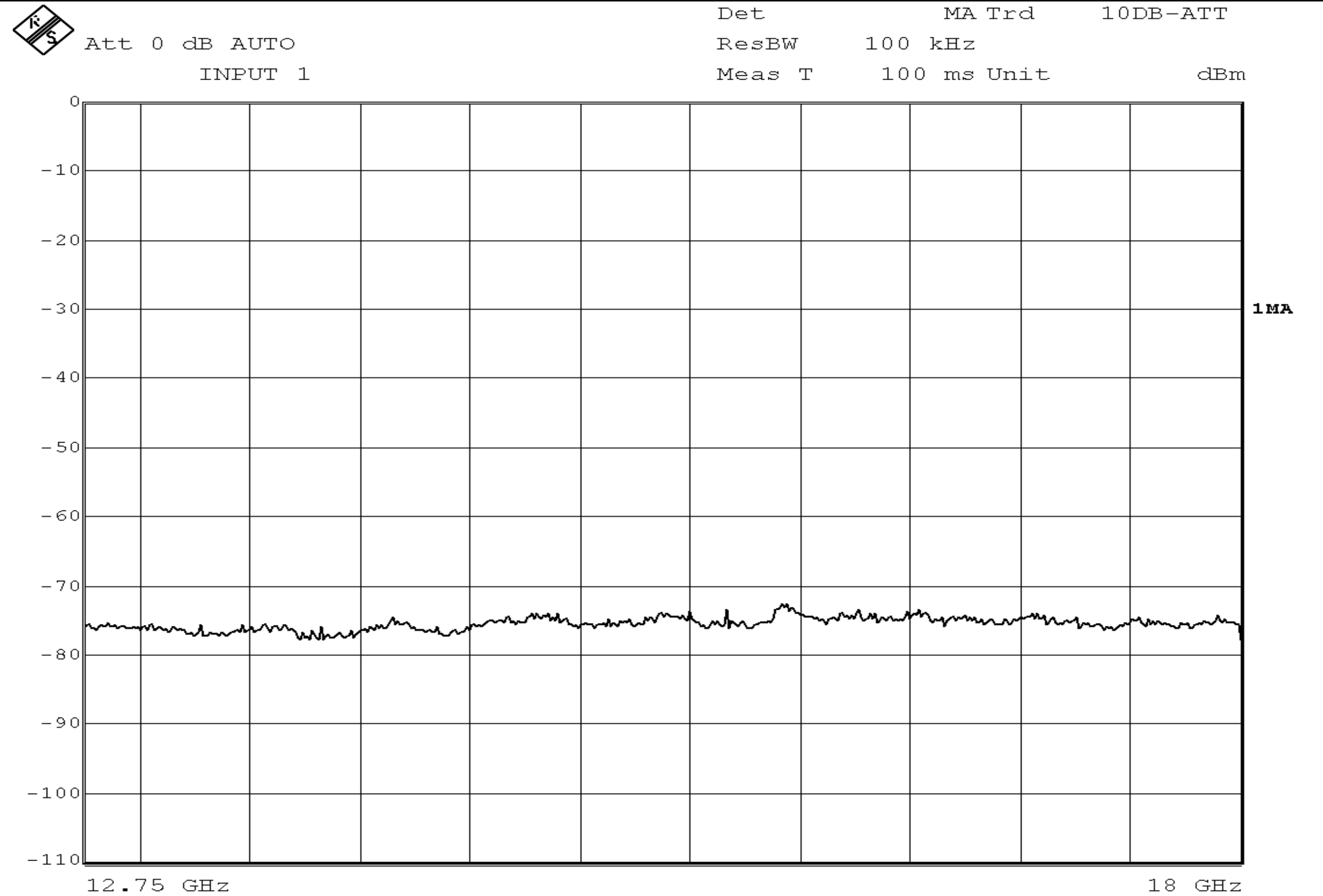


Fig A3 High Channel Conducted Spurious Emissions 12.75GHz -18GHz

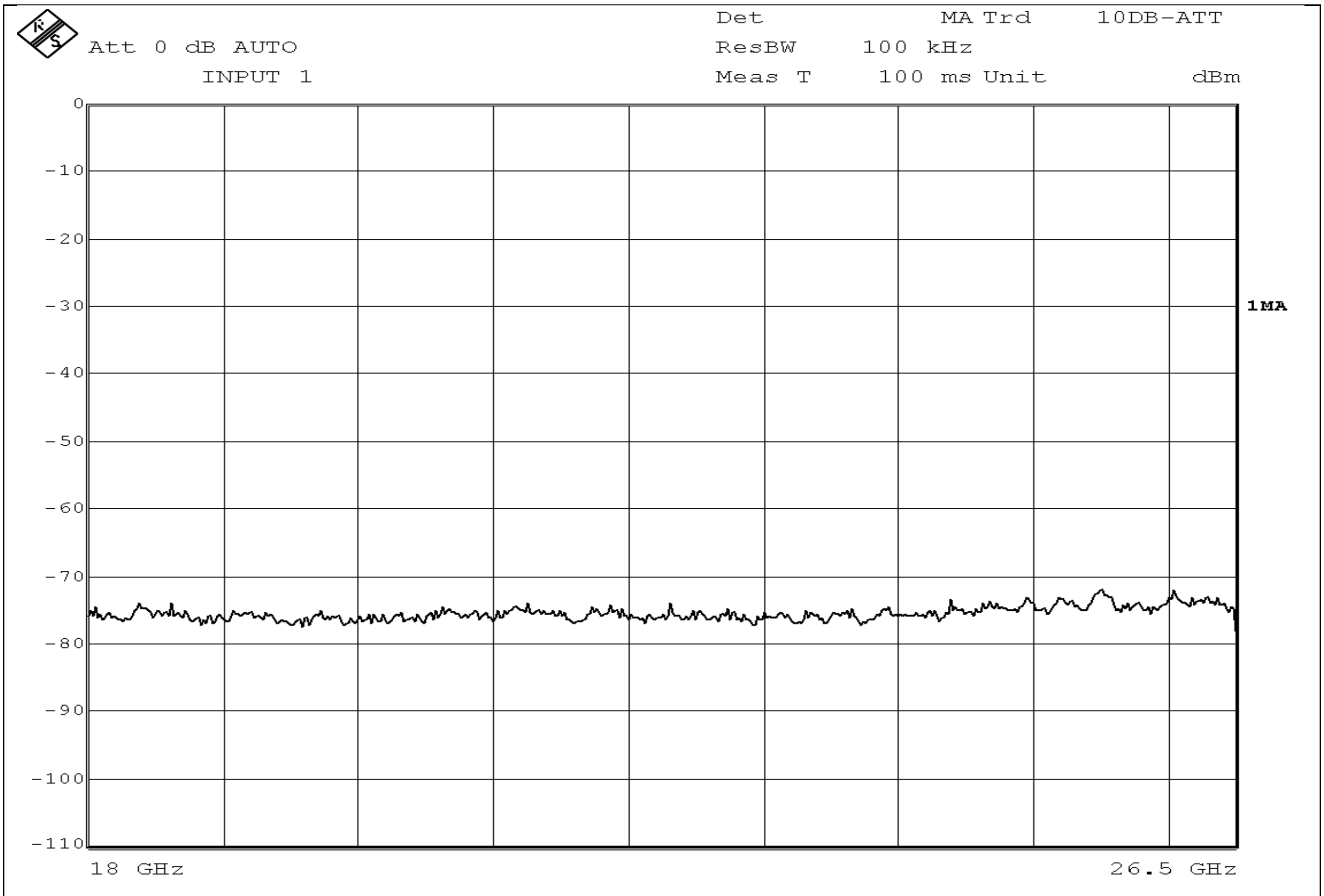


Fig A4 High Channel Conducted Spurious Emissions 18GHz -26.5GHz

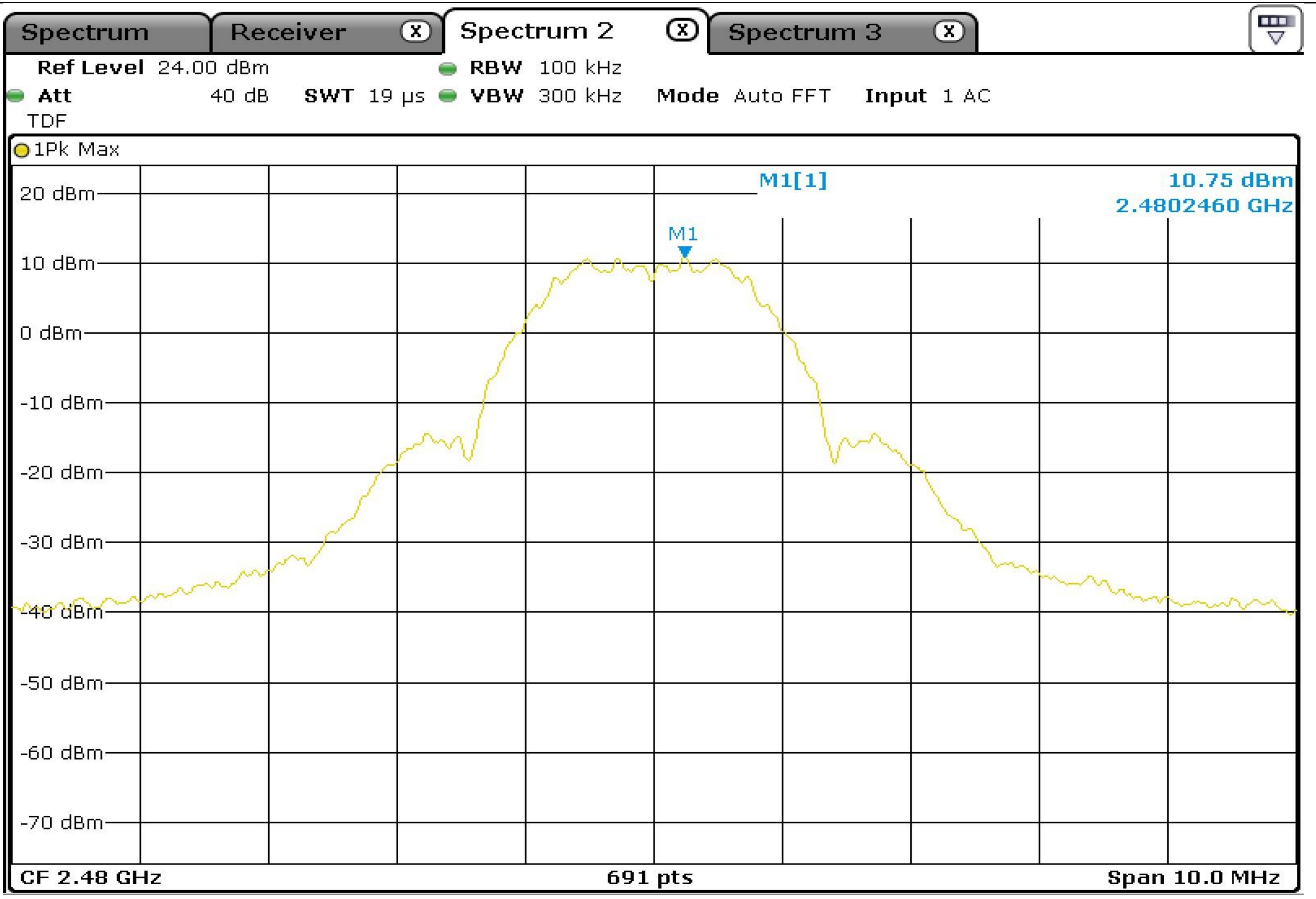


Fig A5 High Channel

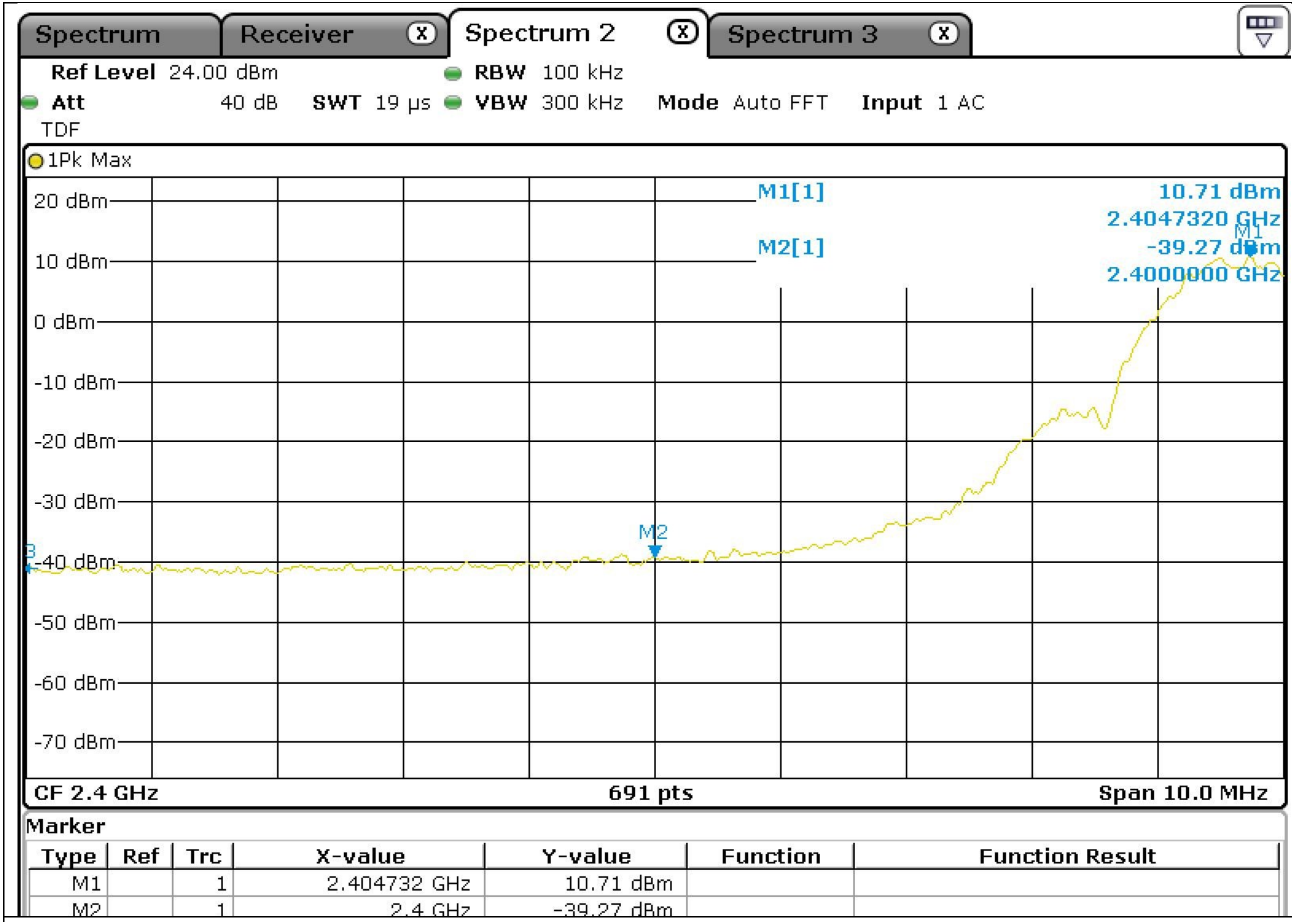


Fig A4 Lower Band Edge Low Channel Conducted

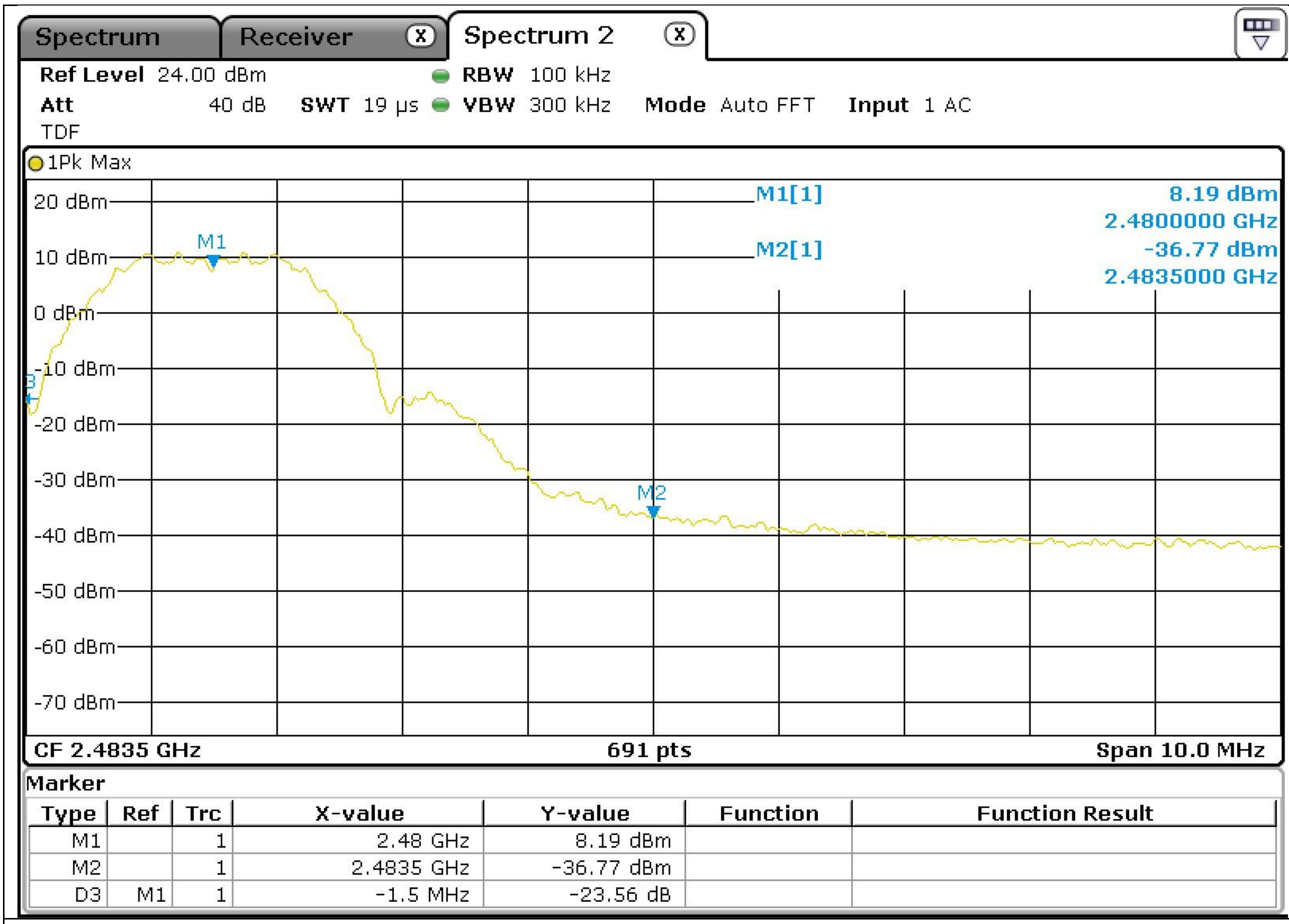
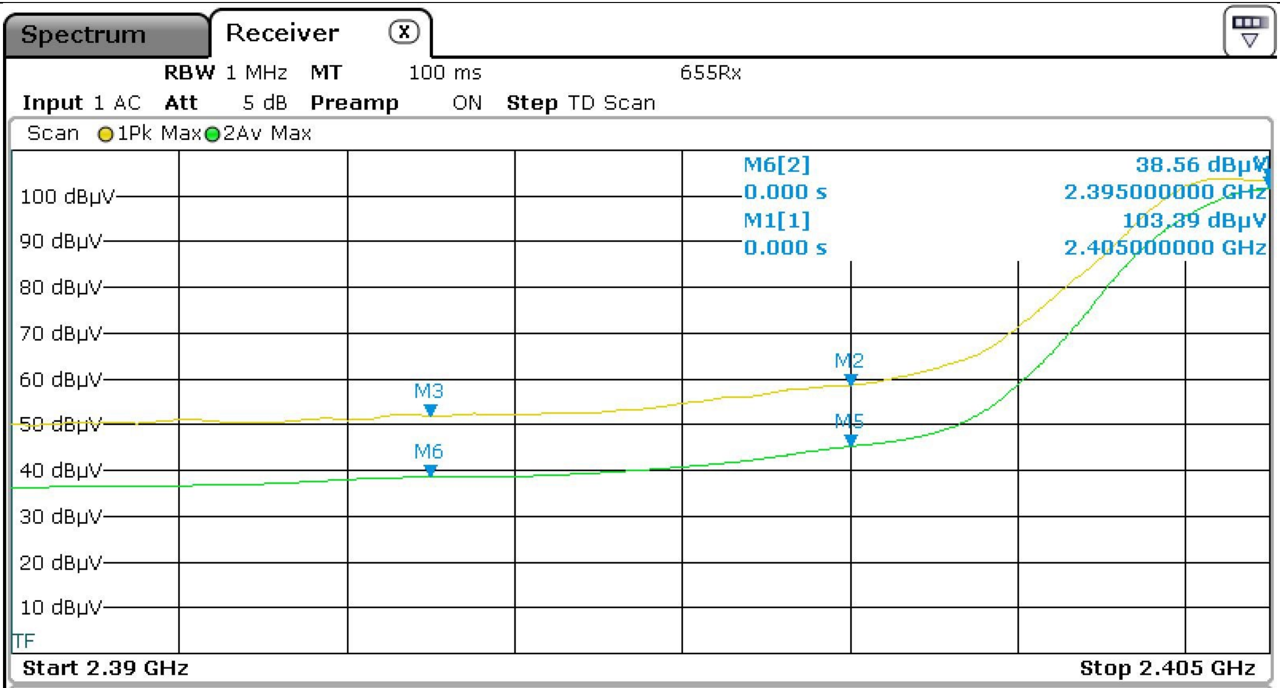


Fig A5 Upper band edge High Channel Conducted

Appendix B

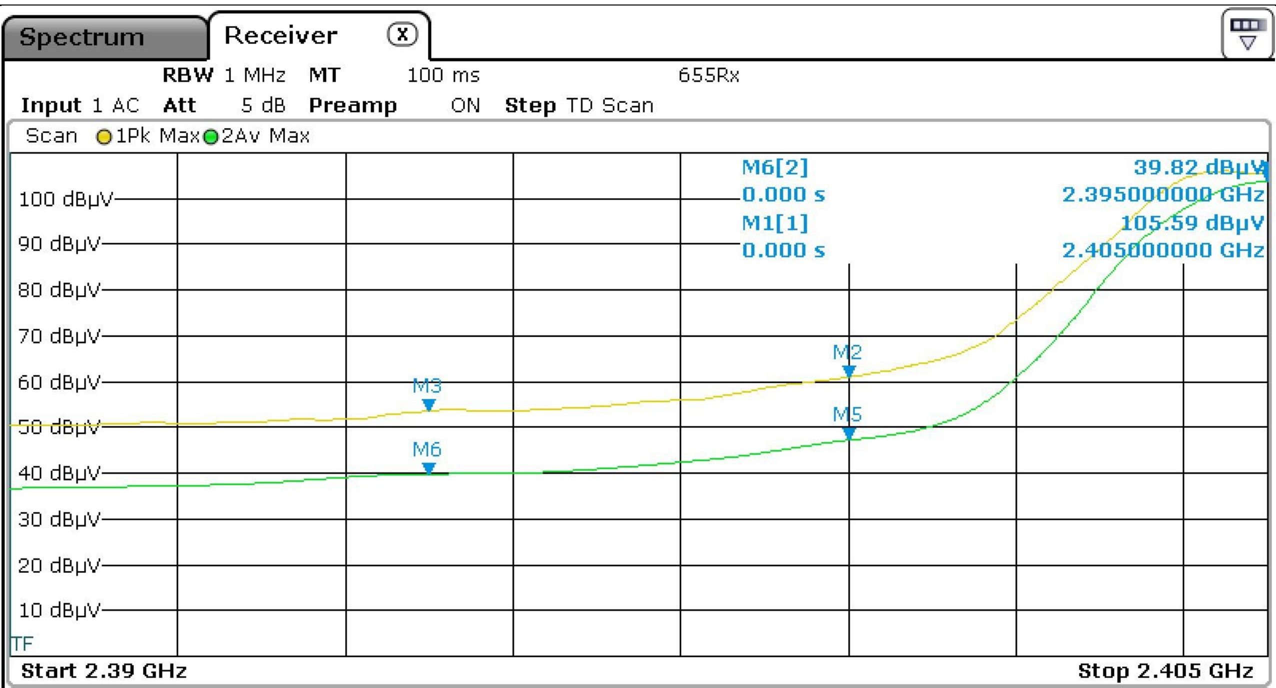
Radiated tests for Band Edges /Restricted band



Marker

Diagr	Type	Ref	Trc	Stimulus	Response	Function	Function Result
Scan	N1		1	2.405 GHz	103.39 dBµV		
Scan	N2		1	2.4 GHz	58.61 dBµV		
Scan	N3		1	2.395 GHz	51.77 dBµV		
Scan	N4		2	2.405 GHz	101.59 dBµV		
Scan	N5		2	2.4 GHz	45.27 dBµV		
Scan	N6		2	2.395 GHz	38.56 dBµV		

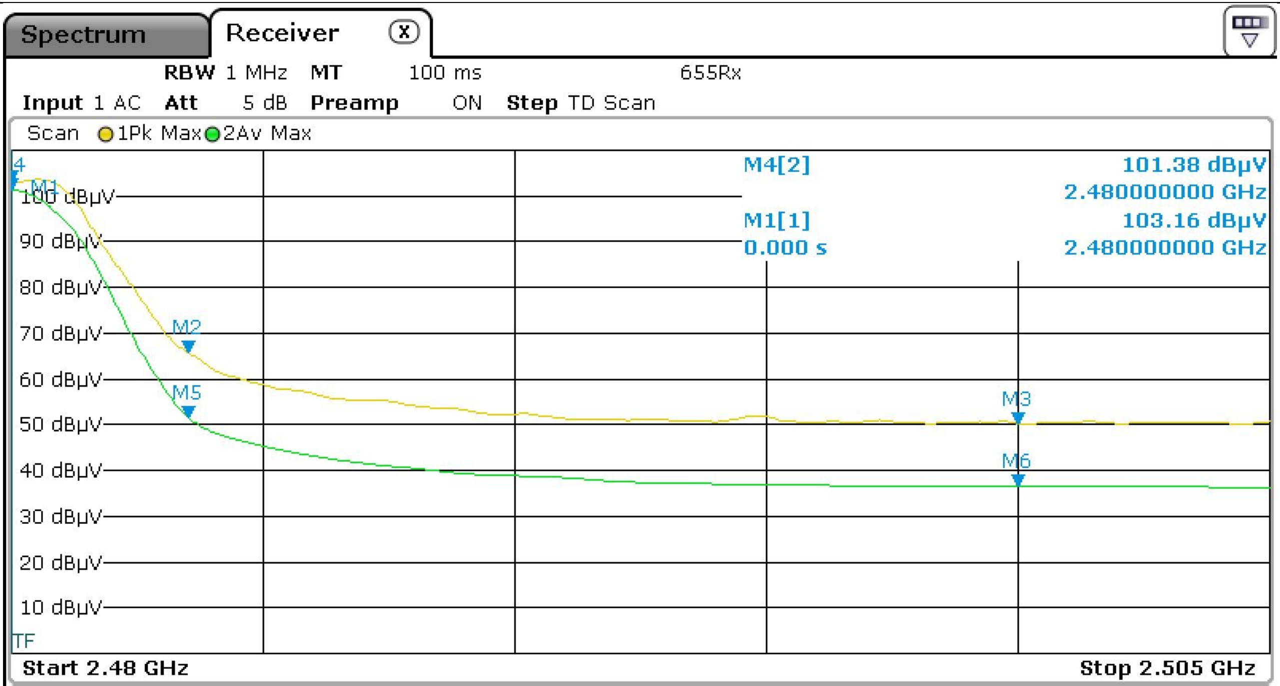
Fig B1 Low Channel Band Edge Vertical peak and average at 3 metres



Marker

Diagr	Type	Ref	Trc	Stimulus	Response	Function	Function Result
Scan	N1		1	2.405 GHz	105.59 dBµV		
Scan	N2		1	2.4 GHz	60.99 dBµV		
Scan	N3		1	2.395 GHz	53.57 dBµV		
Scan	N4		2	2.405 GHz	103.78 dBµV		
Scan	N5		2	2.4 GHz	47.23 dBµV		
Scan	N6		2	2.395 GHz	39.82 dBµV		

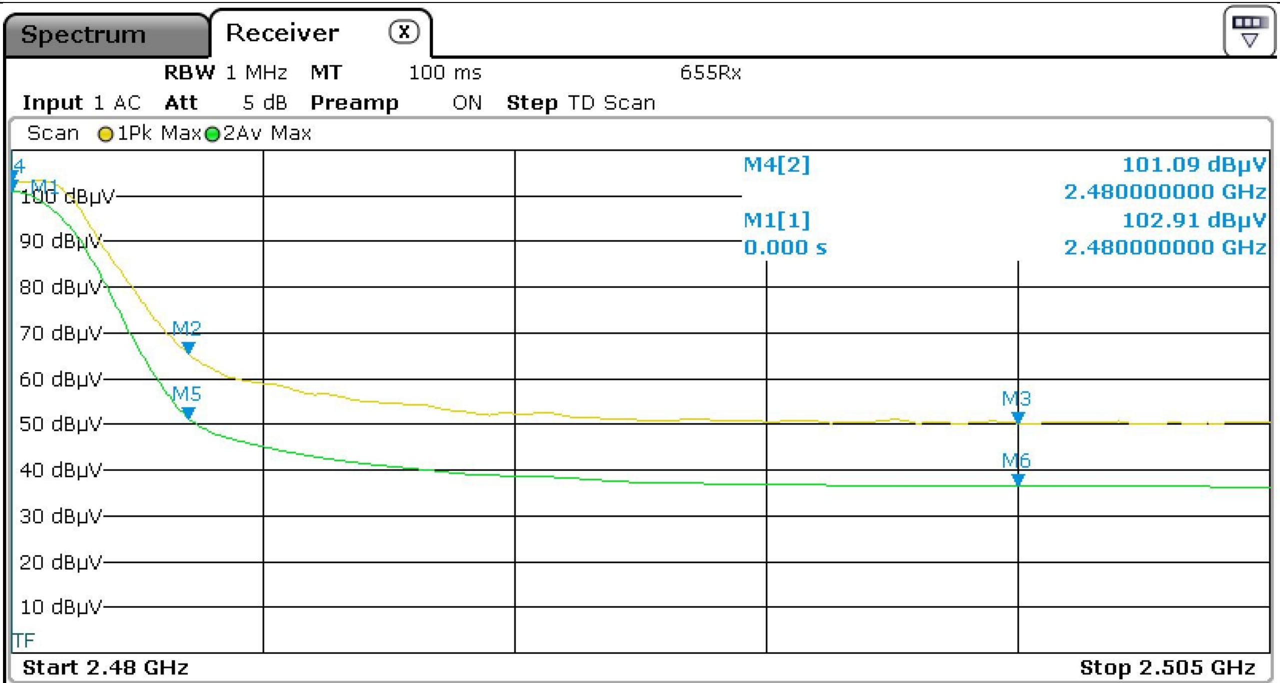
Fig B2 Low Channel Band Edge Horizontal peak and average at 3 metres



Marker

Diagr	Type	Ref	Trc	Stimulus	Response	Function	Function Result
Scan	N1		1	2.48 GHz	103.16 dBµV		
Scan	N2		1	2.4835 GHz	65.64 dBµV		
Scan	N3		1	2.5 GHz	50.22 dBµV		
Scan	N4		2	2.48 GHz	101.38 dBµV		
Scan	N5		2	2.4835 GHz	51.44 dBµV		
Scan	N6		2	2.5 GHz	36.60 dBµV		

Fig B3 High Channel Band Edge Pre-scan Vertical peak at 3 metres



Marker

Diagr	Type	Ref	Trc	Stimulus	Response	Function	Function Result
Scan	N1		1	2.48 GHz	102.91 dBµV		
Scan	N2		1	2.4835 GHz	65.36 dBµV		
Scan	N3		1	2.5 GHz	50.27 dBµV		
Scan	N4		2	2.48 GHz	101.09 dBµV		
Scan	N5		2	2.4835 GHz	51.19 dBµV		
Scan	N6		2	2.5 GHz	36.60 dBµV		

Fig B4 High Channel Band Edge Horizontal peak and average at 3 metres

Appendix C

Radiated Spurious Emissions

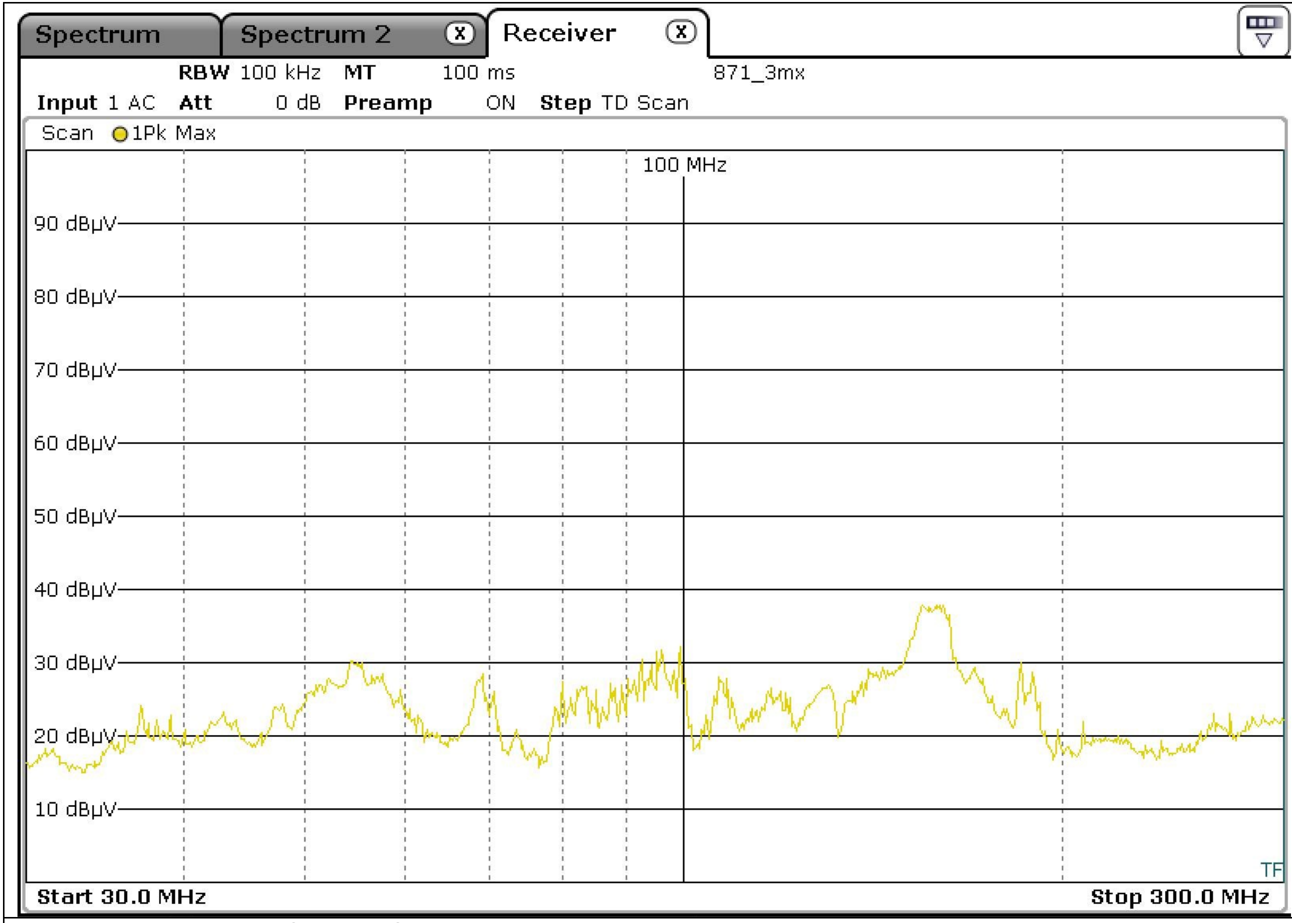


Fig C1 High Channel Radiated Emissions 30MHz -300MHz Vertical 3metres

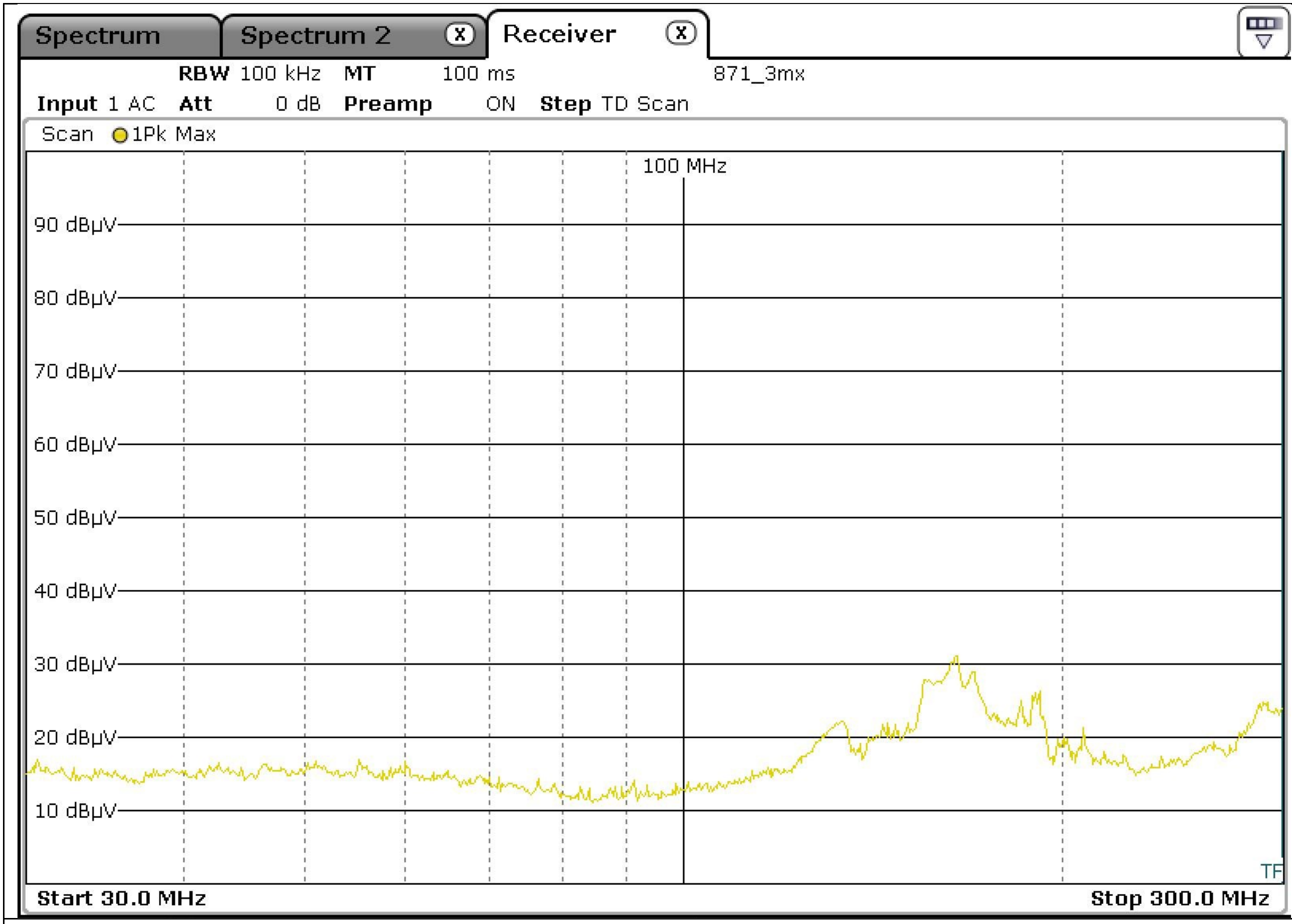


Fig C2 High Channel Radiated Emissions 30MHz -300MHz Horizontal 3metres

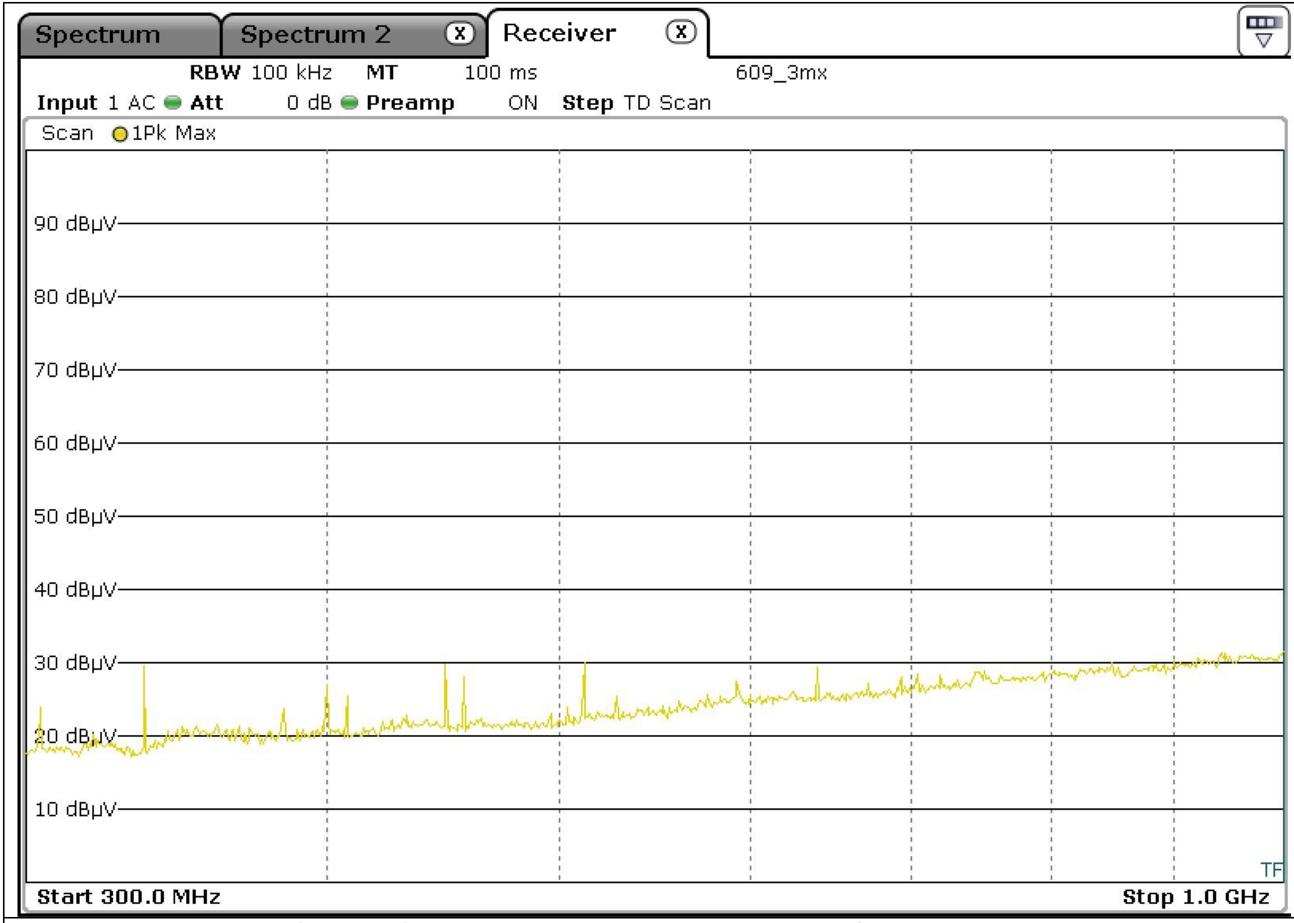


Fig C3 High Channel Radiated Emissions 300MHz -1GHz Vertical 3metres

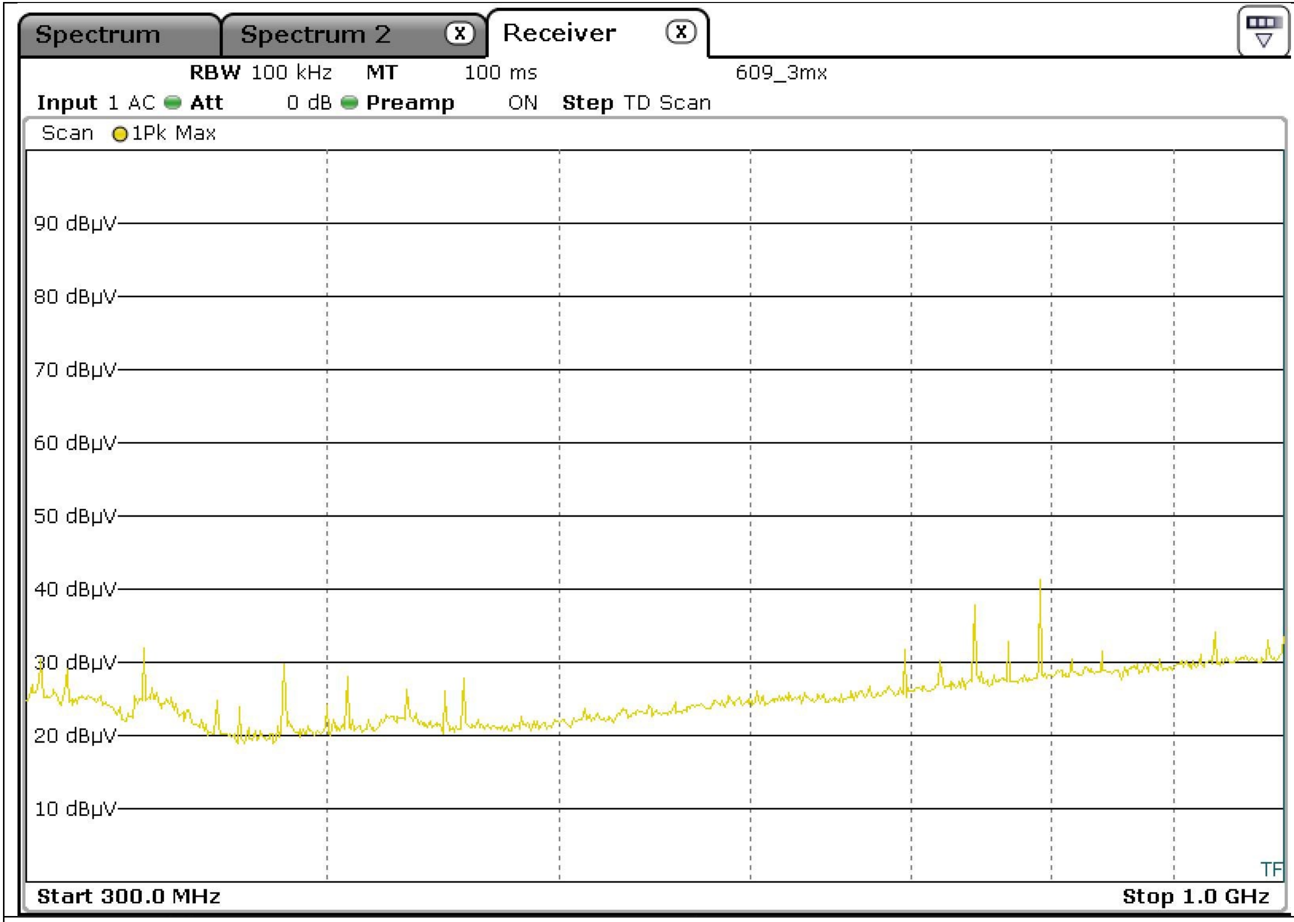


Fig C4 High Channel Radiated Emissions 300MHz -1GHz Horizontal 3metres

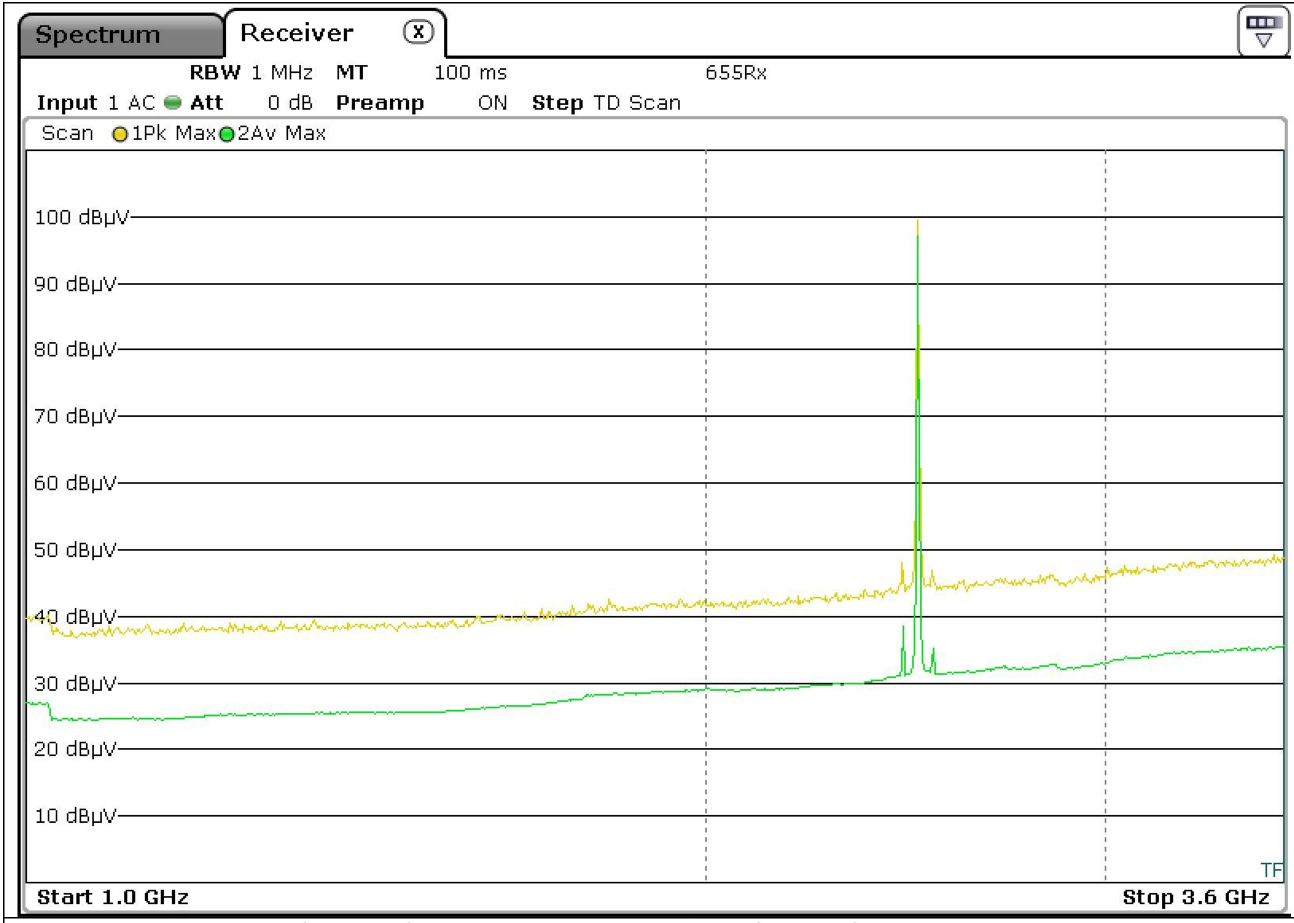


Fig C5 High Channel Radiated Emissions 1GHz -3.6GHz Vertical 3metres

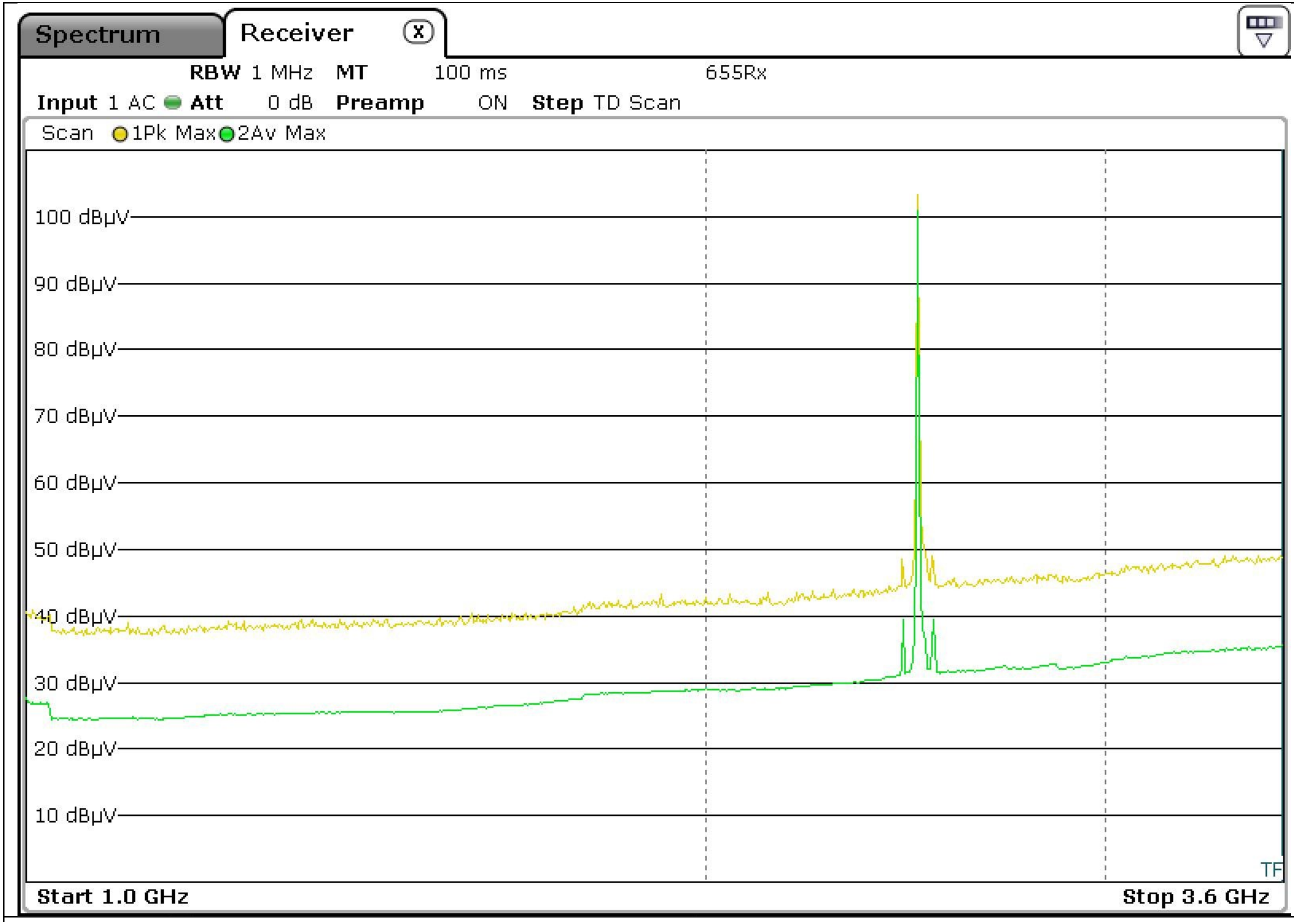


Fig C6 High Channel Radiated Emissions 1GHz -3.6GHz Horizontal 3metres

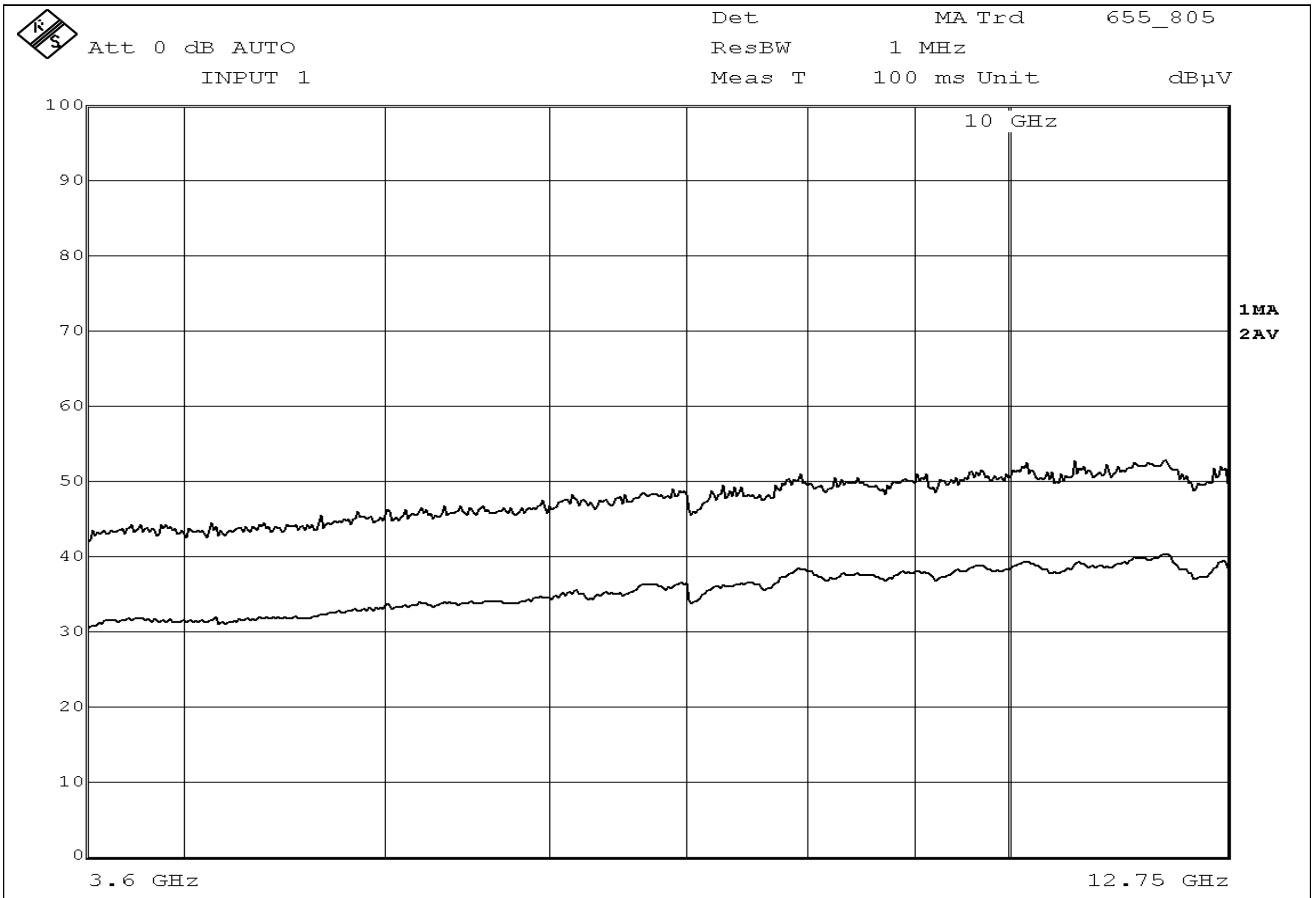


Fig C7 High Channel Radiated Emissions 3.6GHz -12.75GHz Vertical 3metres

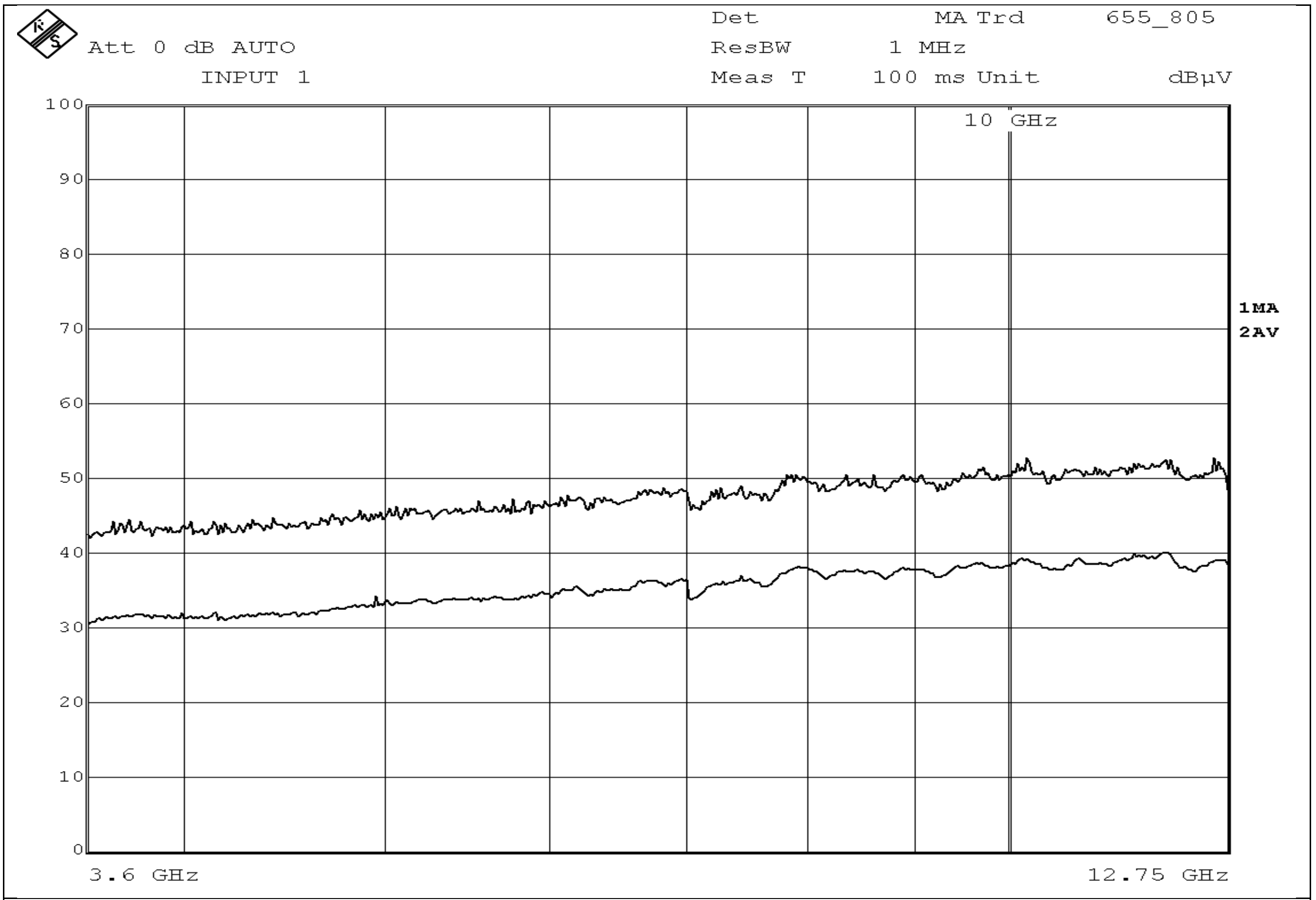


Fig C8 High Channel Radiated Emissions 3.6GHz -12.75GHz Horizontal 3metres

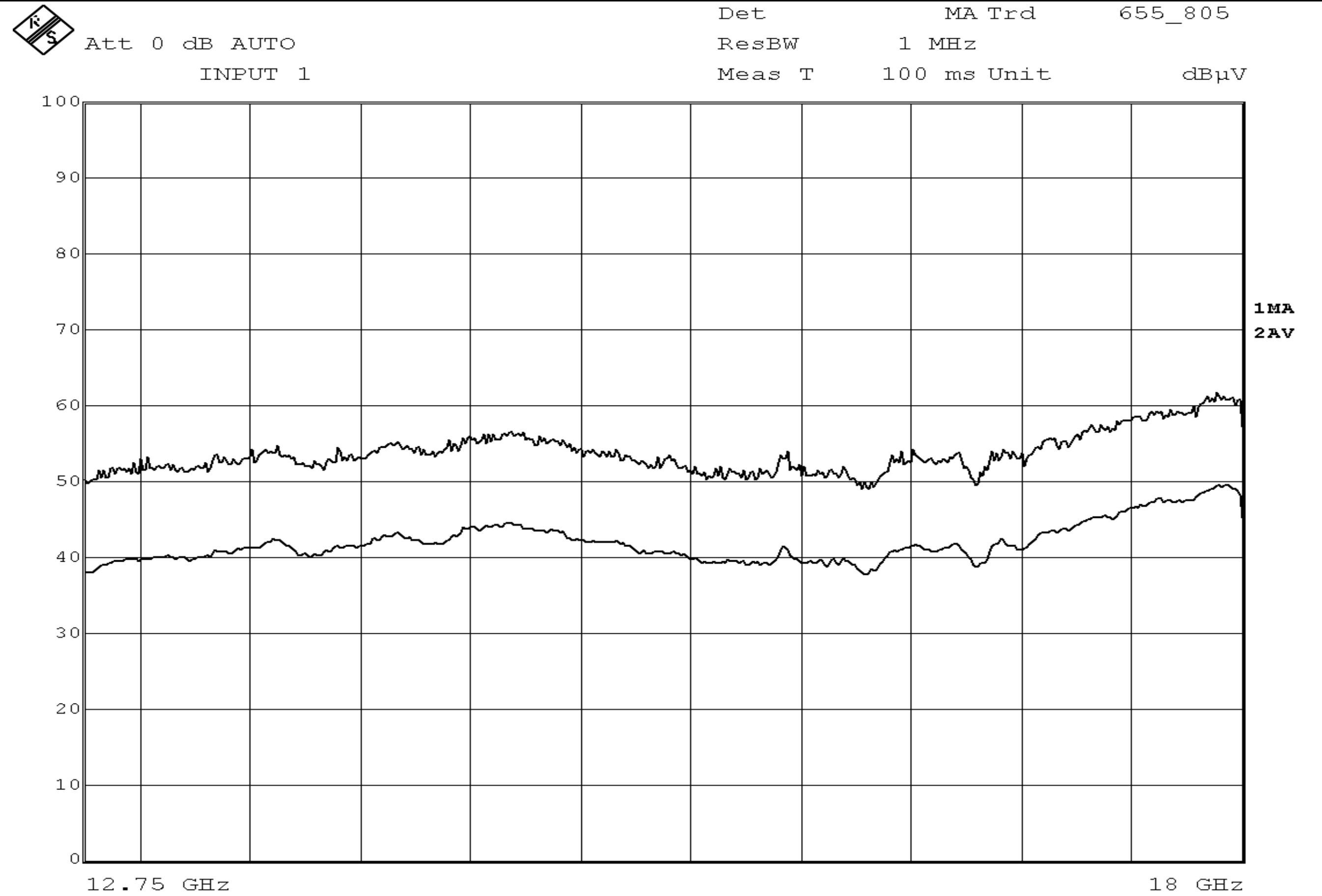


Fig C9 High Channel Radiated Emissions 12.75GHz -18GHz Vertical 3metres

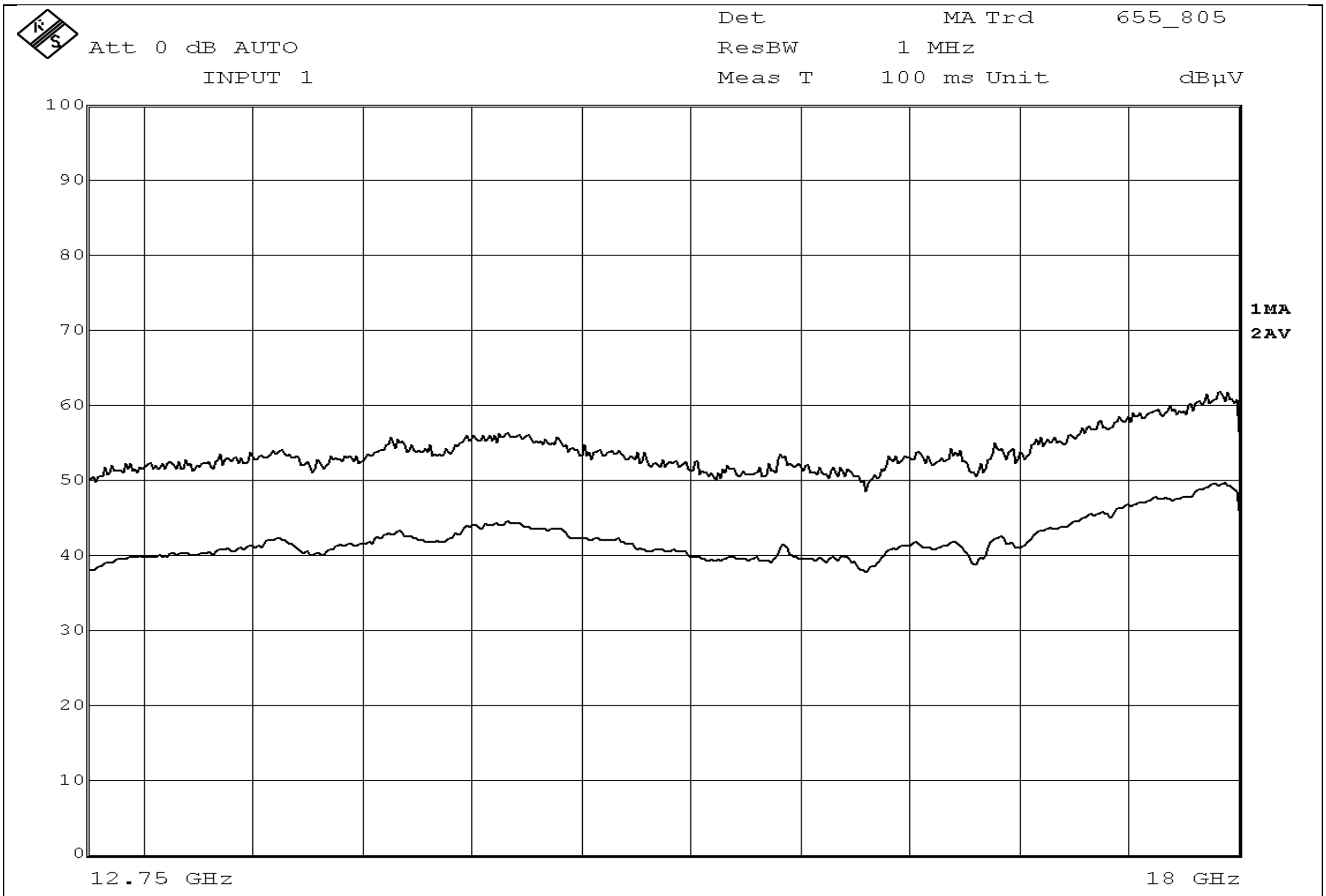


Fig C10 High Channel Radiated Emissions 12.75GHz -18GHz Horizontal 3metres

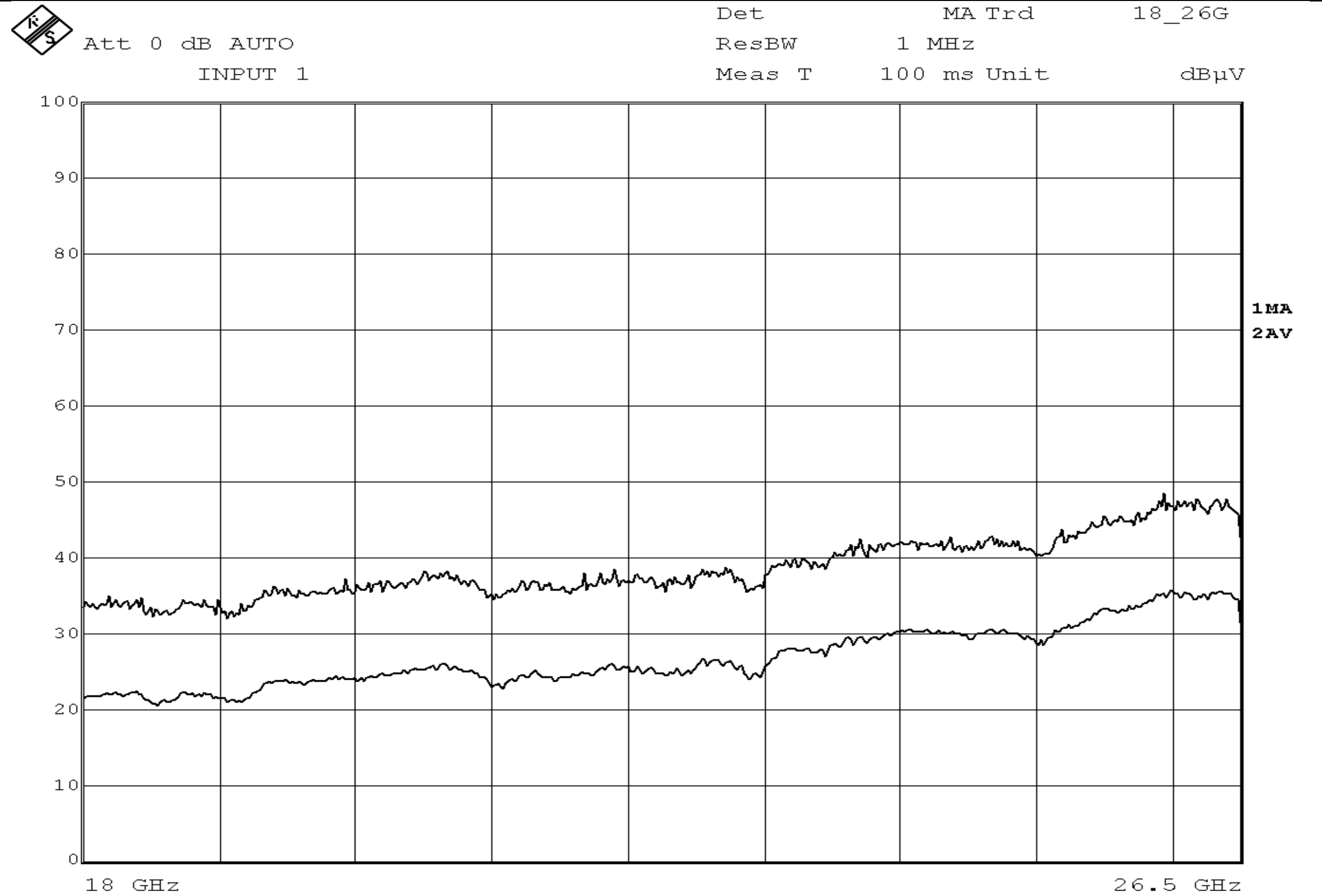


Fig C11 High Channel Radiated Emissions 18GHz -26.5GHz Vertical 1metre

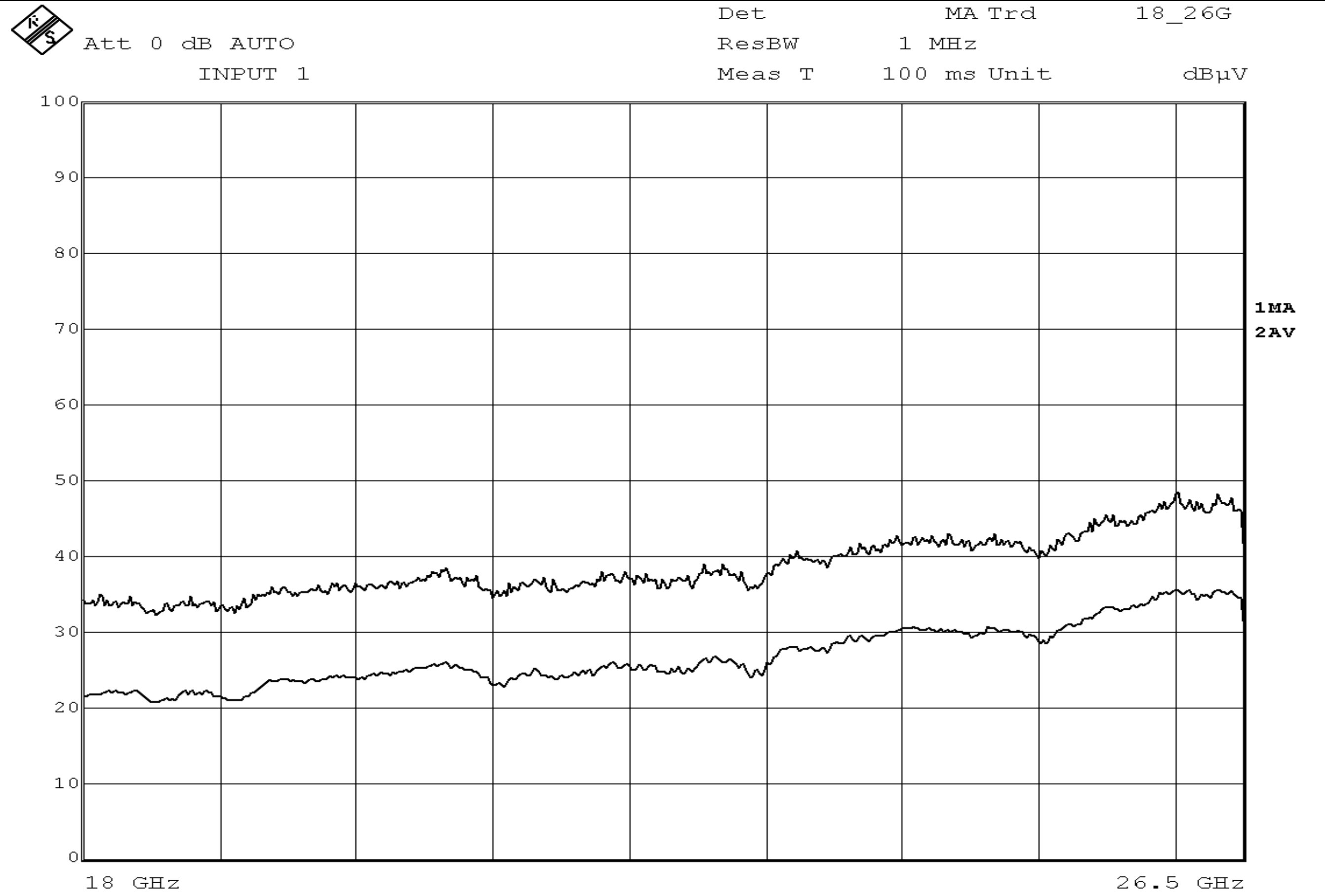
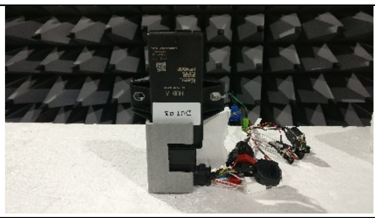


Fig C12 High Channel Radiated Emissions 18GHz -26.5GHz Horizontal 1metre

Appendix D

	
Fig D1 EUT orientation O1"	Fig D2 EUT orientation "O2"

Orientations for Radiated Emissions

Appendix E

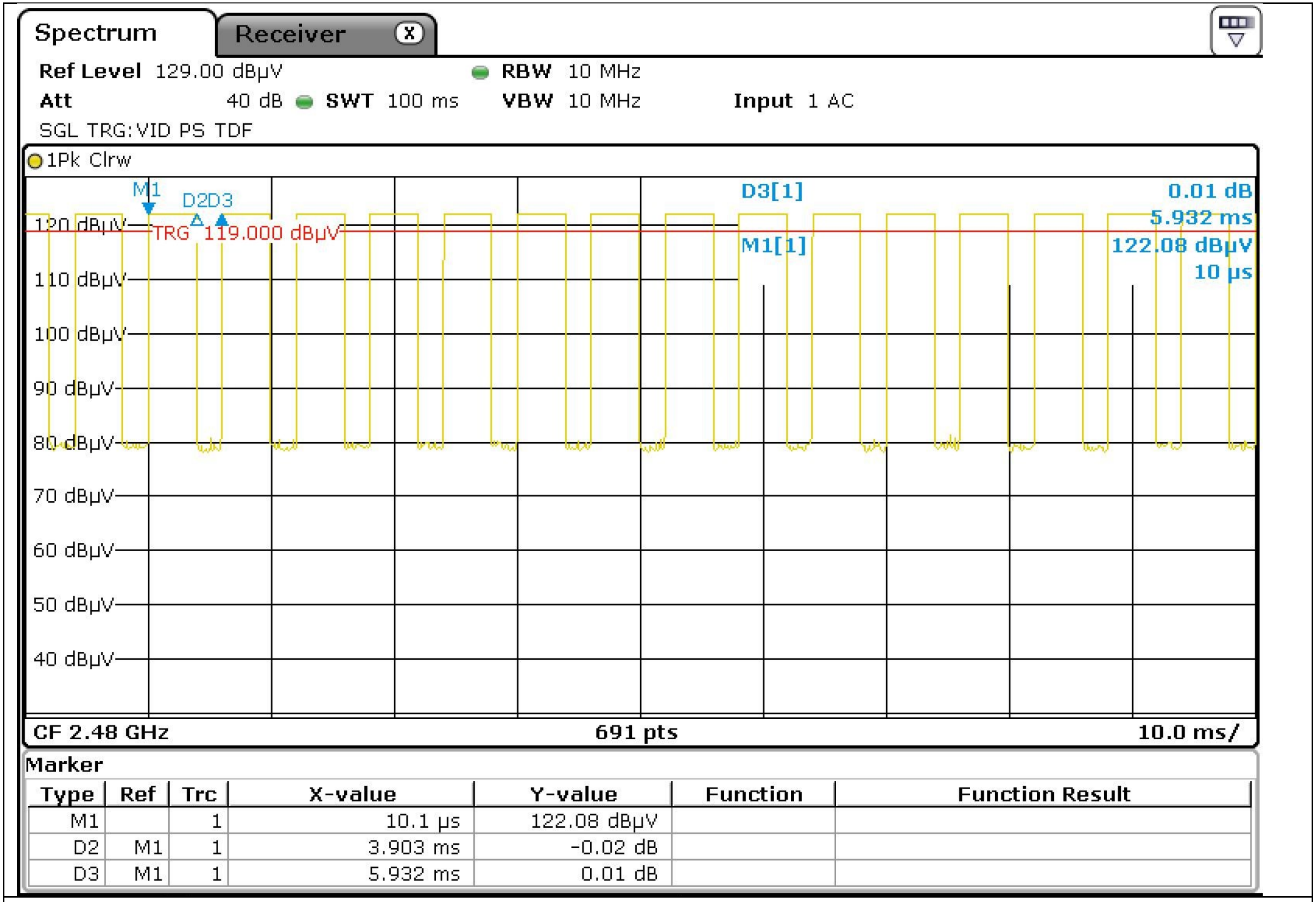


Fig E1 Thread Max duty cycle in normal operation

Duty Cycle = Ton/T period =3.903/5.932 =0.658 = 65.8%

End of Report