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FCC Test Firm Registration	409640
IC Site Registration	IE0001
Date	29th Jun 2022
EUT Description	Sensor with Bluetooth Low Energy
FCC ID	2AYE3TK4E13294G0X
Authorised by	**Paul Reilly**
Authorised Signature:	

This report supercedes 21E9686-1b

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)

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1 EUT Description

Type:	Sensor with Bluetooth Low Energy
Type of radio:	Stand-alone
Transmitter Type:	Bluetooth Low Energy
Operating Frequency Range(s):	2.402 GHz - 2.480GHz
Number of Channels:	39
Antenna:	Integral
Power configuration:	3 v DC battery
Ports:	None
Classification:	DTS
BLE Antenna Type :	Pcb printed antenna
BLE Antenna Gain Max:	4.4 dBi
BLE Antenna Impedance:	50 ohms
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 sensor with BLE connectivity and passive NFC antenna.

There are a number of models available as follows

Model	Ref. Thermo King	Variant Thermo King	Description	Functionality Description
04 03 02 (L)	4E13294 G01	425179	Datalogger-Temperature & RH	This version works as a Temperature and Relative Humidity datalogger storing the information and allowing the user to download this information whenever is required. Besides, this version works as a Temperature and Relative Humidity Bluetooth broadcaster.
06 03 02 (W)	4E13294 G02	425180	Datalogger-Temperature	This version works as a Temperature datalogger storing the information and allowing the user to download this information whenever is required. Besides, this version works as a Temperature and Bluetooth broadcaster.
01 03 02 (U)	4E13294 G03	425484	Wireless Sensor-Temperature & RH	This version works as a Temperature and Relative Humidity Bluetooth broadcaster.
02 03 02 (V)	4E13294 G04	425485	Wireless Sensor-Door	This version works as a Door Status Bluetooth broadcaster. It works detecting the magnetic field of an external fixed magnet positioned on a truck door.

There is a common pcb with different sensors fitted depending on the model.
The RF section is identical on all models.

1.2 EUT Operation

Operating Conditions during Test:

Conducted measurements were carried out on 3 Samples
#001 programmed for low channel ,
#002 programmed for mid channel and
#003 programmed for high channel
where the antenna was replaced by cable and SMA for all 3 samples

Radiated measurements were carried out on 3 Samples
#004 programmed for low channel ,
#005 programmed for mid channel and
#006 programmed for high channel
standard internal antenna for all 3 samples.

All samples above were fully configured with all sensors fitted for a worst case scenario.
Each EUT was powered from its internal battery for all tests

Note a pre-test evaluation was carried out on minimally populated pcb versus a pcb with all sensors fitted. The results show that the worst case emissions were found on the fully populated pcb (with all sensors fitted).

Environmental conditions

	Temperature	**Relative Humidity**
Test	°C	%
Conducted Emissions	23	40
Radiated Emissions <1GHz	18	42
Radiated Emissions >1GHz	19	47

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

1.2.2 Date of Test
The tests were carried out on 12th 15th 16th 22nd Nov 7th Dec 2021

1.2.3 Description of Test modes

Channel	**Freq MHz**
Low	2402
Mid	2426
High	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

Radiated Power 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.
The EUT was centred on a motorized turntable, which allows 360 degree rotation.

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). 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 1GHz-18GHz range 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.
In this case the resolution bandwidth was 1MHz and video bandwidth was 3 MHz. for peak measurements. Average measurements were performed as per ANSI 63.10 2013 Section 11.12.2.5.2)

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 O2 for Horizontal polarization measurements and with the EUT in orientation O1 for Vertical polarisation measurements.
Ref Appendix D for orientations.

3 Results for Conducted emissions on the mains

No tested as EUT is (non-rechargeable) battery powered

Test Result Pass

4. Conducted Measurements

4.1 Bandwidth

4.1.1 6dB bandwidth

4.1.1.2 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

4.1.1.3 Results

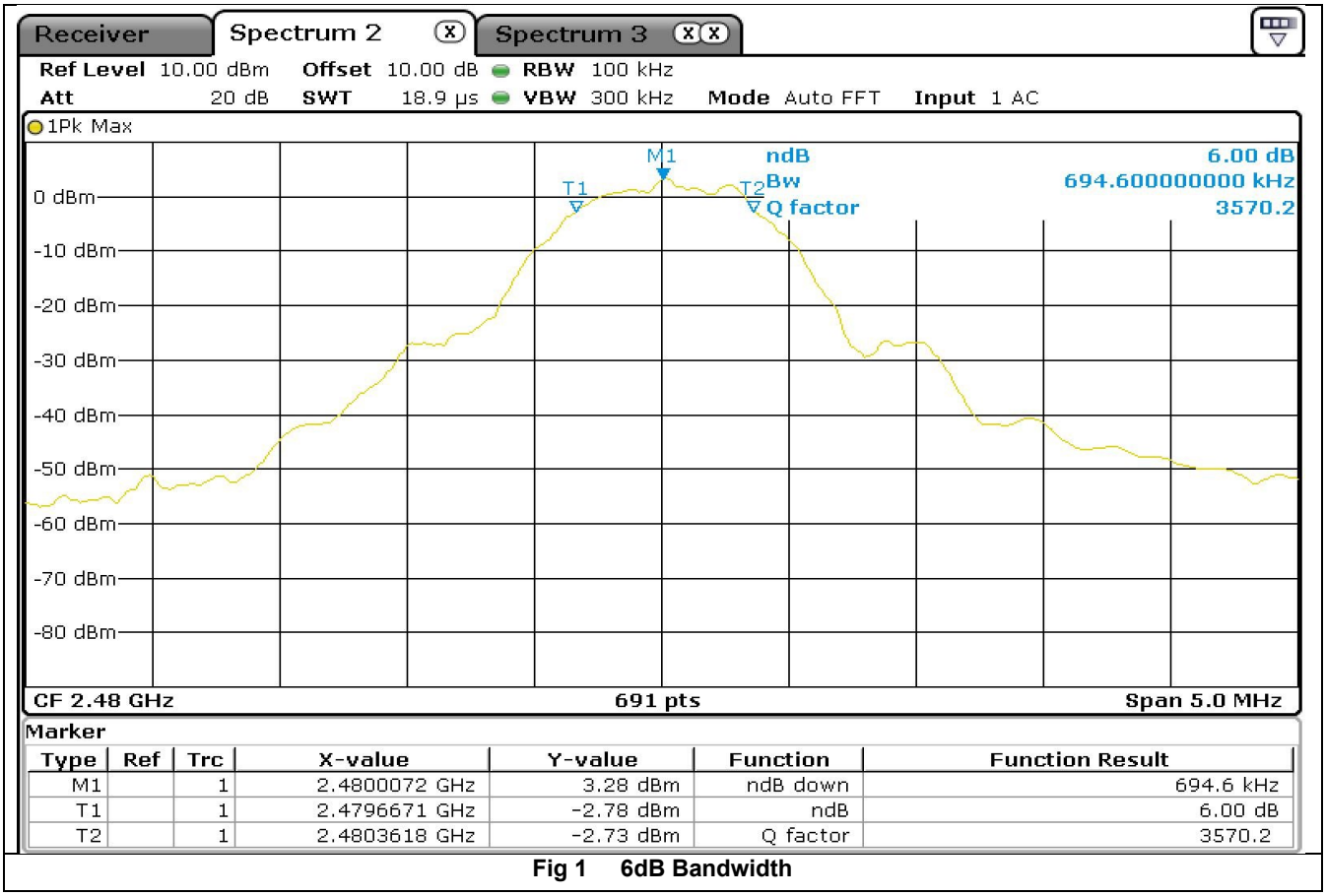


Fig 1 6dB Bandwidth

Frequency	6dB Bandwidth	Limit Min	Margin
GHz	KHz	KHz	KHz
2.402	709.1	500	209.1
2.44	665.7	500	165.7
2.48	694.6	500	194.6

Result :- Pass

4.1.2 99% bandwidth

4.1.2.1 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).

4.1.2.2 Results

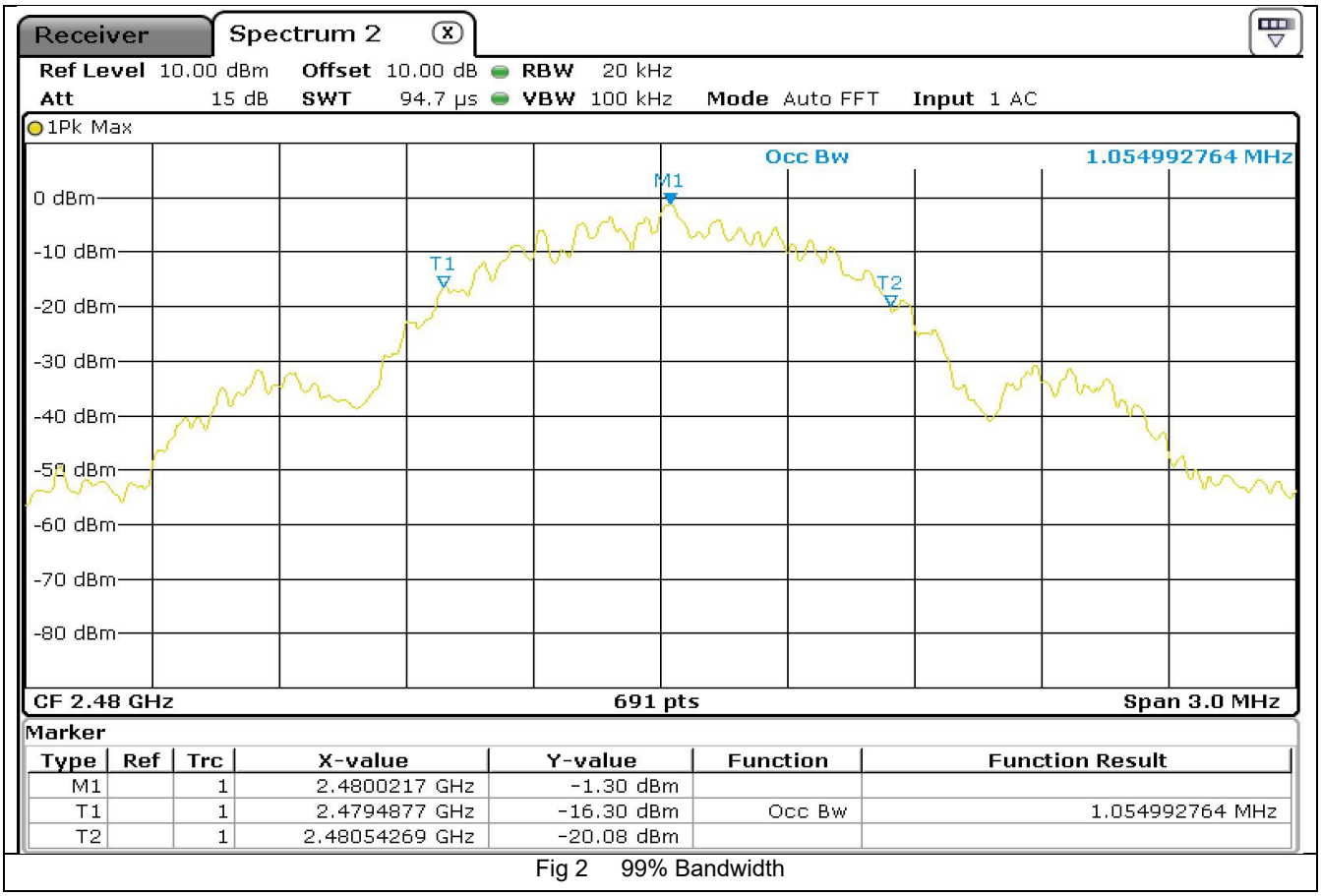


Fig 2 99% Bandwidth

Frequency	99% Bandwidth
GHz	MHz
2.402	1.055
2.426	1.059
2.48	1.055

Result :- Pass

4.2 Duty Cycle

4.2.1 Test Method
As per Ansi 63.10 Section 7.5 KDB 558074 zero span measurement method

Ansi63.10 Section **7.5 Procedure for determining the average value of pulsed emissions**
Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 s (100 ms). In cases where the pulse train exceeds 0.1 s, the measured field strength shall be determined during a 0.1 s interval.64 The following procedure is an example of how the average value may be determined. The average field strength may be found by measuring the peak pulse amplitude (in log equivalent units) and determining the duty cycle correction factor (in dB) associated with the pulse modulation as shown in Equation (10):
δ(dB) = 20log(Δ) (10)
where
δ is the duty cycle correction factor (dB)
Δ is the duty cycle (dimensionless)

4.2.2 Results

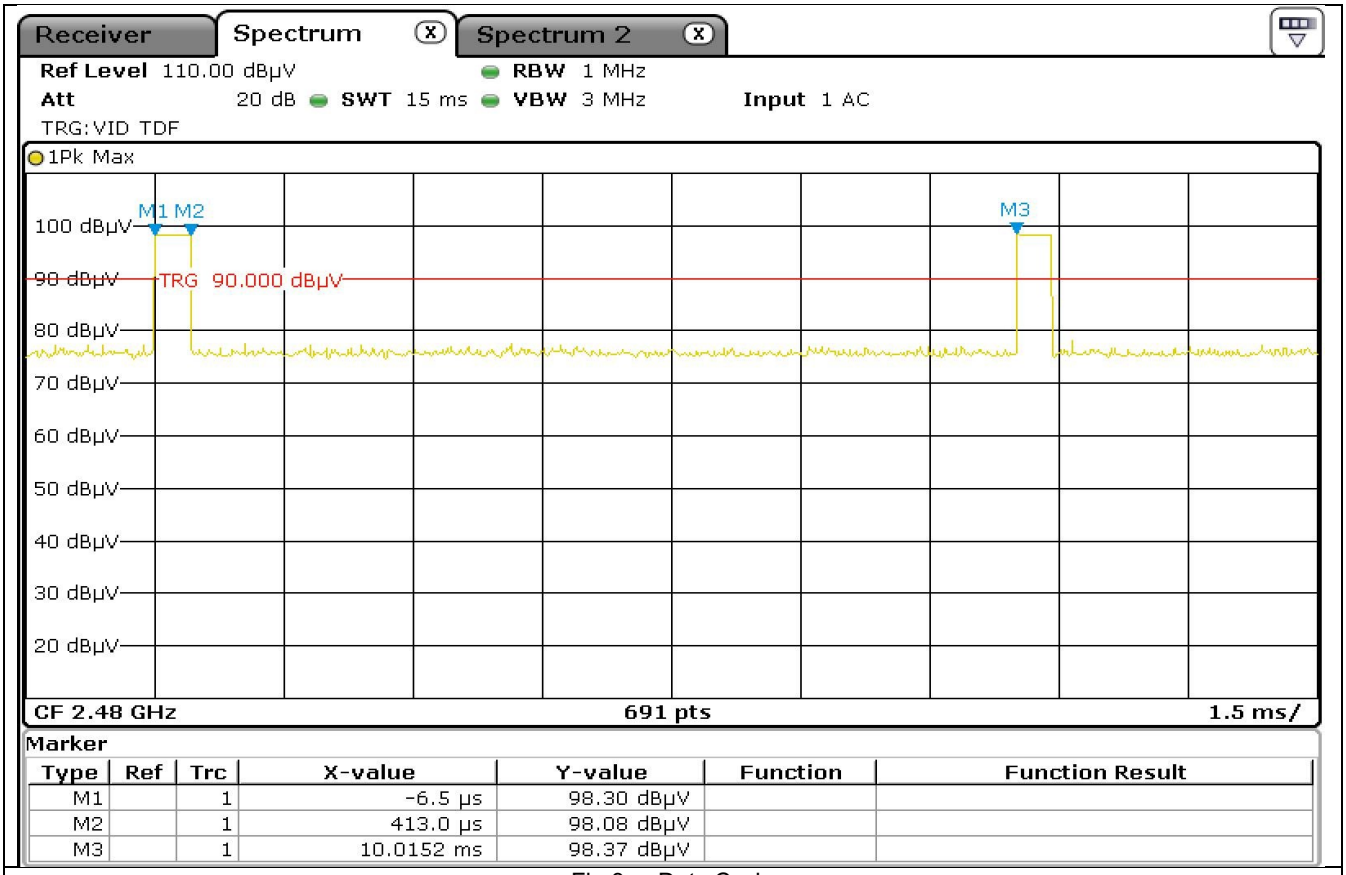


Fig 3 Duty Cycle

Duty Cycle
Note the duty cycle results above shows how the sample operated during testing.
Duty cycle =Ton/Tperiod =0.413/10.015 = 4.12%
=> Duty cycle correction factor =20*log (1/d) = 27.69 dB

4.3 Power Spectral Density

4.3.1 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.

4.3.2 Results

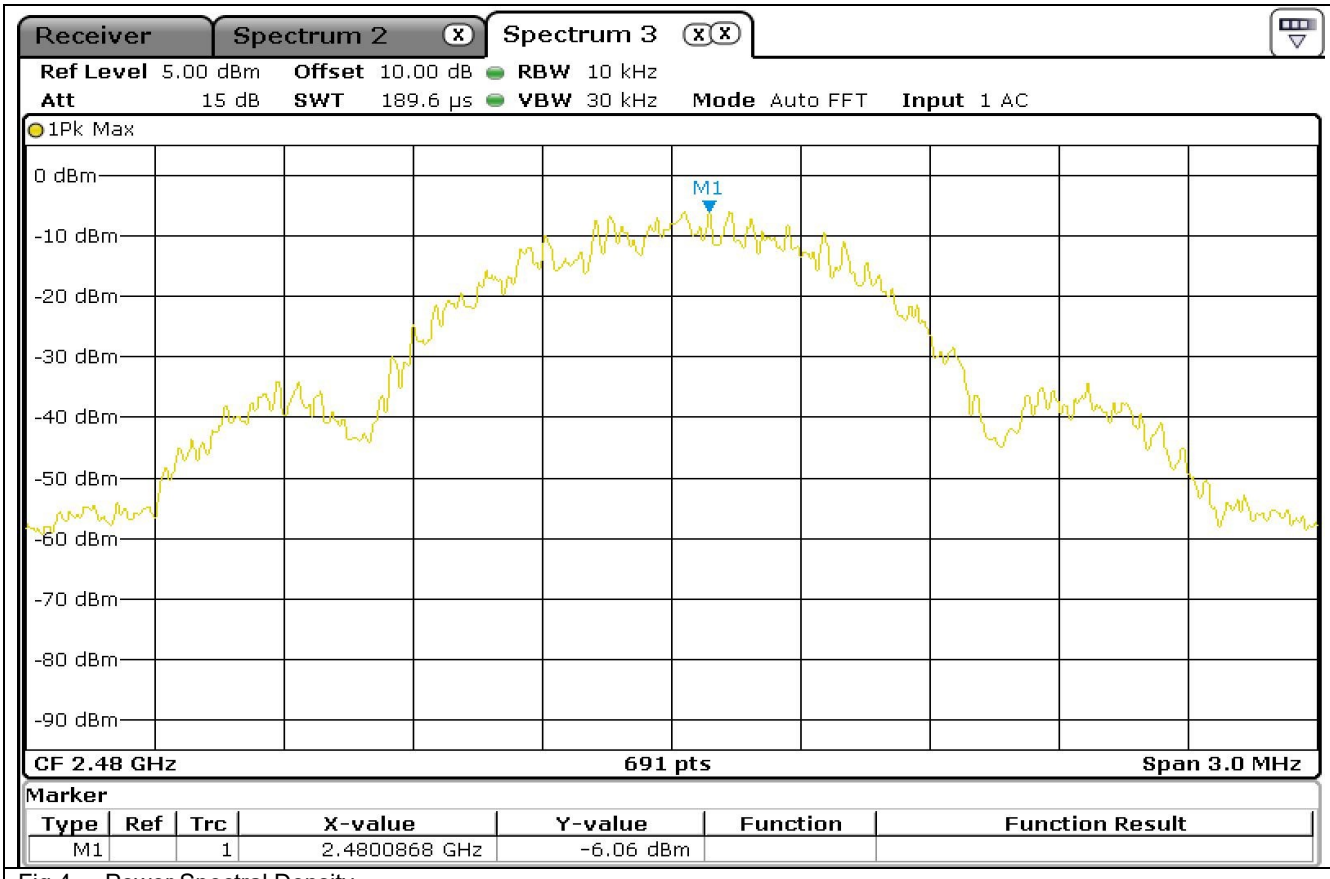


Fig 4 Power Spectral Density

Frequency	Conducted Peak	Limit	Margin
GHz	dBm	dBm	dB
2.402	-7.68	8	15.68
2.426	-5.33	8	13.33
2.48	-6.06	8	14.06

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

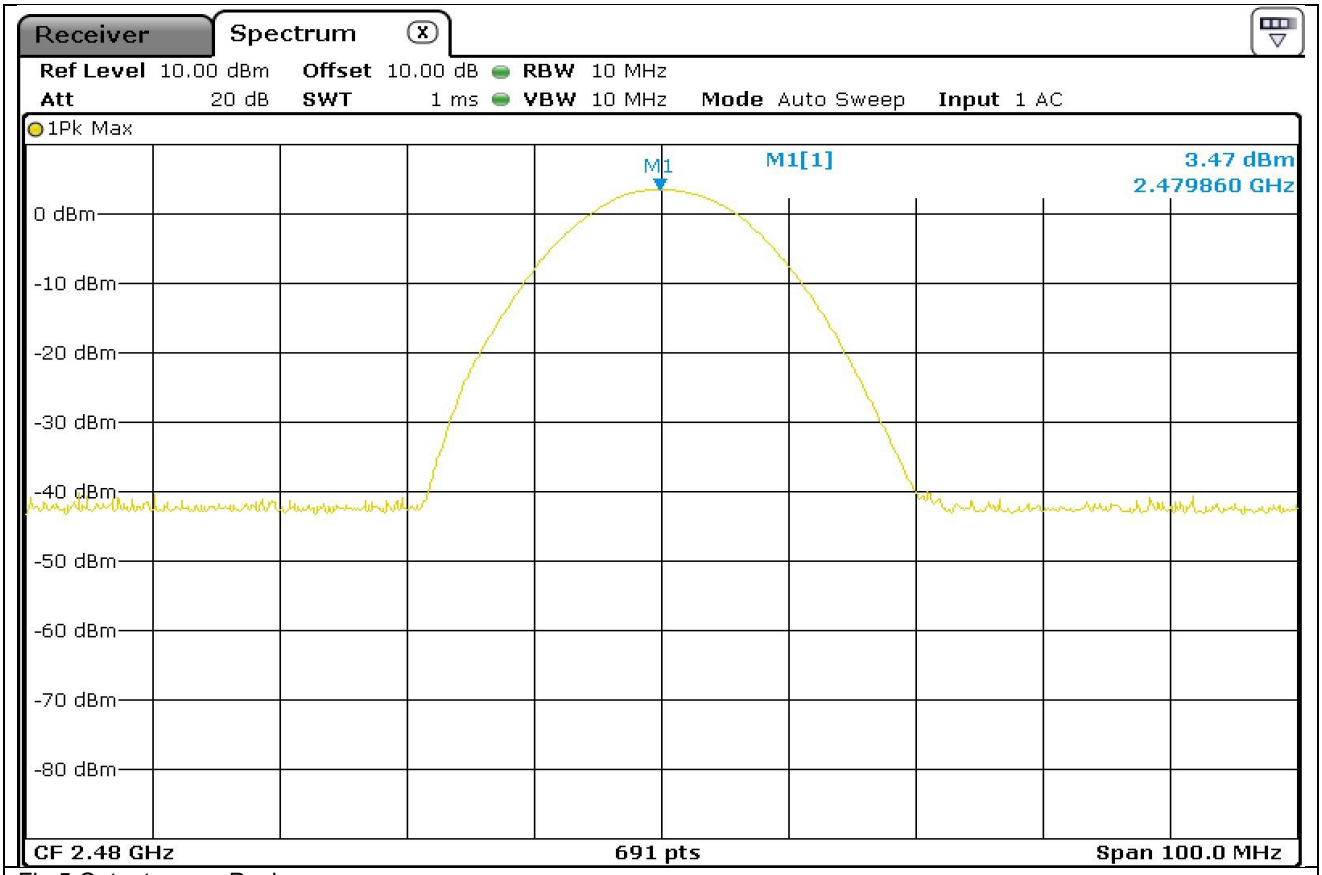


Fig 5 Output power Peak

Frequency	Conducted Peak Measurement	Limit	Margin
GHz	dBm	dBm	dB
2.402	2.21	30	27.79
2.426	2.71	30	27.29
2.48	3.47	30	26.53

Test Result :- Pass

4.5 Spurious Emissions Measurements

4.5.1 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).

4.5.2 Results

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.402	2.13	-	-
4.824	-55.97	20	38.1
7.206	-57.81	20	39.94
2.21	-54.88	20	37.01
2.594	-51.77	20	33.9

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.426	2.53	-	-
4.852	-68.67	20	51.2
2.234	-54.89	20	37.42
2.618	-52.21	20	34.74

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.48	3.12	-	-
4.96	-64.61	20	47.73

Frequency	100KHz RBW	dBc Limit Min	Margin
GHz	dBm	dB	dB
2.48	3.37	-	-
4.96	-64.61	20	47.98

Ref Appendix A for Scans

Test Result: - Pass

5 Radiated Measurements

5.1 Radiated Spurious Emissions in Restricted bands

5.1.1 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

Ref Section 5.5

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
4.804	52.8	32.4	37.1	5.2	Vertical	0.00	53.3	74	20.7
12.010	42.7	40.3	36.5	7.8	Vertical	0.00	54.3	74	19.7
4.804	52.2	32.4	37.1	5.2	Horizontal	0.00	52.7	74	21.3
12.010	43.1	40.3	36.5	7.8	Horizontal	0.00	54.7	74	19.3

Frequency	Measured Peak 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
12.010	42.7	40.3	36.5	7.8	Vertical	-27.69	26.62	54	27.4
12.010	43.1	40.3	36.5	7.8	Horizontal	-27.69	27.0	54	27.0

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
4.852	56.0	32.4	37.3	5.2	Vertical	0.00	56.3	74	17.7
7.278	47.1	37.7	38	6.7	Vertical	0.00	53.5	74	20.5
12.130	43.0	40.3	37.1	7.4	Horizontal	0.00	53.6	74	20.4
4.852	59.2	32.4	37.3	5.2	Horizontal	0.00	59.5	74	14.5
7.278	49.0	37.7	38	6.7	Vertical	0.00	55.4	74	18.6
12.130	43.7	40.3	37.1	7.4	Horizontal	0.00	54.3	74	19.7

Frequency	Measured Peak 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
4.852	56.0	32.4	37.3	5.2	Vertical	-27.69	28.6	54	25.4
4.852	59.2	32.4	37.3	5.2	Horizontal	-27.69	31.8	54	22.2
7.278	49.0	37.7	38	6.7	Vertical	-27.69	27.7	54	26.3
12.130	43.7	40.3	37.1	7.4	Horizontal	-27.69	26.6	54	27.4

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	50.6	33.5	37.4	5.4	Vertical	0.00	52.1	74	21.9
7.440	47.4	37.7	37.5	6.3	Vertical	0.00	53.9	74	20.1
12.400	42.8	40.3	36.4	8.0	Vertical	0.00	54.7	74	19.3
4.960	52.6	33.5	37.4	5.4	Horizontal	0.00	54.1	74	19.9
7.440	50.2	37.7	37.5	6.3	Horizontal	0.00	56.7	74	17.3
12.400	42.7	40.3	36.4	8.0	Horizontal	0.00	54.6	74	19.4

Frequency	Measured Peak 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
12.400	42.8	40.3	36.4	8.0	Vertical	-27.69	27.0	54	27.0
4.960	52.6	33.5	37.4	5.4	Horizontal	-27.69	26.4	54	27.6
7.440	50.2	37.7	37.5	6.3	Horizontal	-27.69	29.1	54	25.0
12.400	42.7	40.3	36.4	8.0	Horizontal	-27.69	26.9	54	27.1

Average measurements not performed where the Final Peak level is below the Average limit of 54dBuV/m limit.

Test Result: - Pass

5.2 Radiated Band Edge / Restricted band Measurements

Band Edge/ 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
2.400	72.1	27.4	38.5	3.5	Vertical	0.00	64.5	74	9.5
2.390	73.2	27.4	38.5	3.5	Vertical	0.00	65.6	74	8.4
2.300	75.0	27.4	39.2	3.4	Vertical	0.00	66.6	74	7.4
2.200	73.0	27.4	39.5	3.4	Vertical	0.00	64.3	74	9.7
2.400	72.6	27.4	38.5	3.5	Horizontal	0.00	65.0	74	9.0
2.390	72.4	27.4	38.5	3.5	Horizontal	0.00	64.8	74	9.2
2.300	74.8	27.4	39.2	3.4	Horizontal	0.00	66.4	74	7.6
2.200	71.1	27.4	39.5	3.4	Horizontal	0.00	62.4	74	11.6

Frequency	Measured Peak 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
2.390	73.2	27.4	38.5	3.5	Vertical	-27.69	37.87	54	16.1
2.300	75.0	27.4	39.2	3.4	Vertical	-27.69	38.9	54	15.1
2.200	73.0	27.4	39.5	3.4	Vertical	-27.69	36.6	54	17.4
2.390	72.4	27.4	38.5	3.5	Horizontal	-27.69	37.1	54	16.9
2.300	74.8	27.4	39.2	3.4	Horizontal	-27.69	38.7	54	15.3
2.200	71.1	27.4	39.5	3.4	Horizontal	-27.69	34.7	54	19.3

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
2.4835	71.2	28.7	38.3	3.4	Vertical	0.00	65.0	74	9.0
2.500	71.4	28.7	38.3	3.4	Vertical	0.00	65.2	74	8.8
2.4835	72.0	28.7	38.3	3.4	Horizontal	0.00	65.8	74	8.2
2.500	72.2	28.7	38.3	3.4	Horizontal	0.00	66.0	74	8.0

Frequency	Measured Peak 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	71.2	28.7	38.3	3.4	Vertical	-27.69	37.3	54	16.7
2.500	71.4	28.7	38.3	3.4	Vertical	-27.69	37.5	54	16.5
2.4835	72.0	28.7	38.3	3.4	Horizontal	-27.69	38.1	54	15.9
2.500	72.2	28.7	38.3	3.4	Horizontal	-27.69	38.3	54	15.7

Duty Cycle correction for Average measurement of pulsed signal -27.69dB
as per ANSI C63.10 Section 7.5

Test Result: - Pass

5.3 Radiated Power at fundamental

Frequency	Measured Average Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Final Peak Level	Transmitted power	Limit	Margin
GHz	dBuV/m	dB	dB	dB	V/H	dBuV/m	dBm	dBm	dB
2.402	107.1	27.4	38.5	3.5	Vertical	99.45	4.3	36.0	31.8
2.402	109.4	27.4	38.5	3.5	Horizontal	101.78	6.6	36.0	29.4
2.426	107.2	27.4	38.5	3.5	Vertical	99.60	4.4	36.0	31.6
2.426	108.4	27.4	38.5	3.5	Horizontal	100.81	5.6	36.0	30.4
2.480	106.6	28.7	38.3	3.4	Vertical	100.42	5.2	36.0	30.8
2.480	107.1	28.7	38.3	3.4	Horizontal	100.94	5.7	36.0	30.3

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

Test Result Pass

6 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.

7 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	10-Dec-24	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	06-Oct-24	36
Anechoic Chamber	CEI	SAR 10M	845	845	16-May-22	36
Antenna Log Periodic	Chase	UPA6108	1072	609	09-Sep-24	36
Fully Anechoic Chamber	CEI	FAR 3M	906	906	23-Jul-22	36
Microwave Preamplifier	Hewlett Packard	83017A	3123A00175	805	30-Sep-22	12
Antenna Horn Standard Gain 18-26.5GHz	A-Info	LB-42-25-C-KF	J2021091103028	877	05-Oct-22	12
Antenna Horn	EMCO	3115	9905-5809	655	21-Jan-24	24

Appendix A Conducted Measurements on the Antenna Port

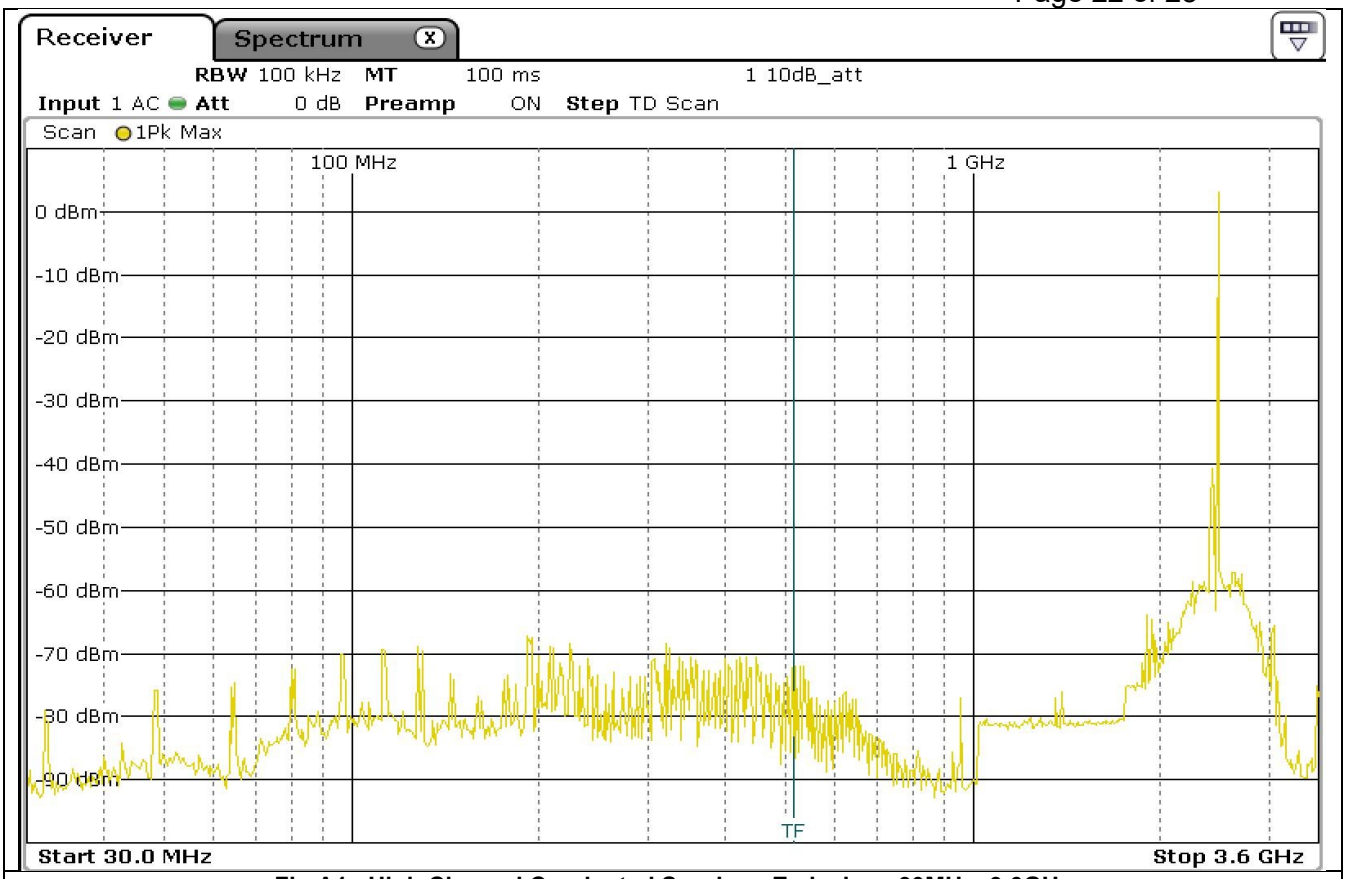


Fig A1 High Channel Conducted Spurious Emissions 30MHz -3.6GHz

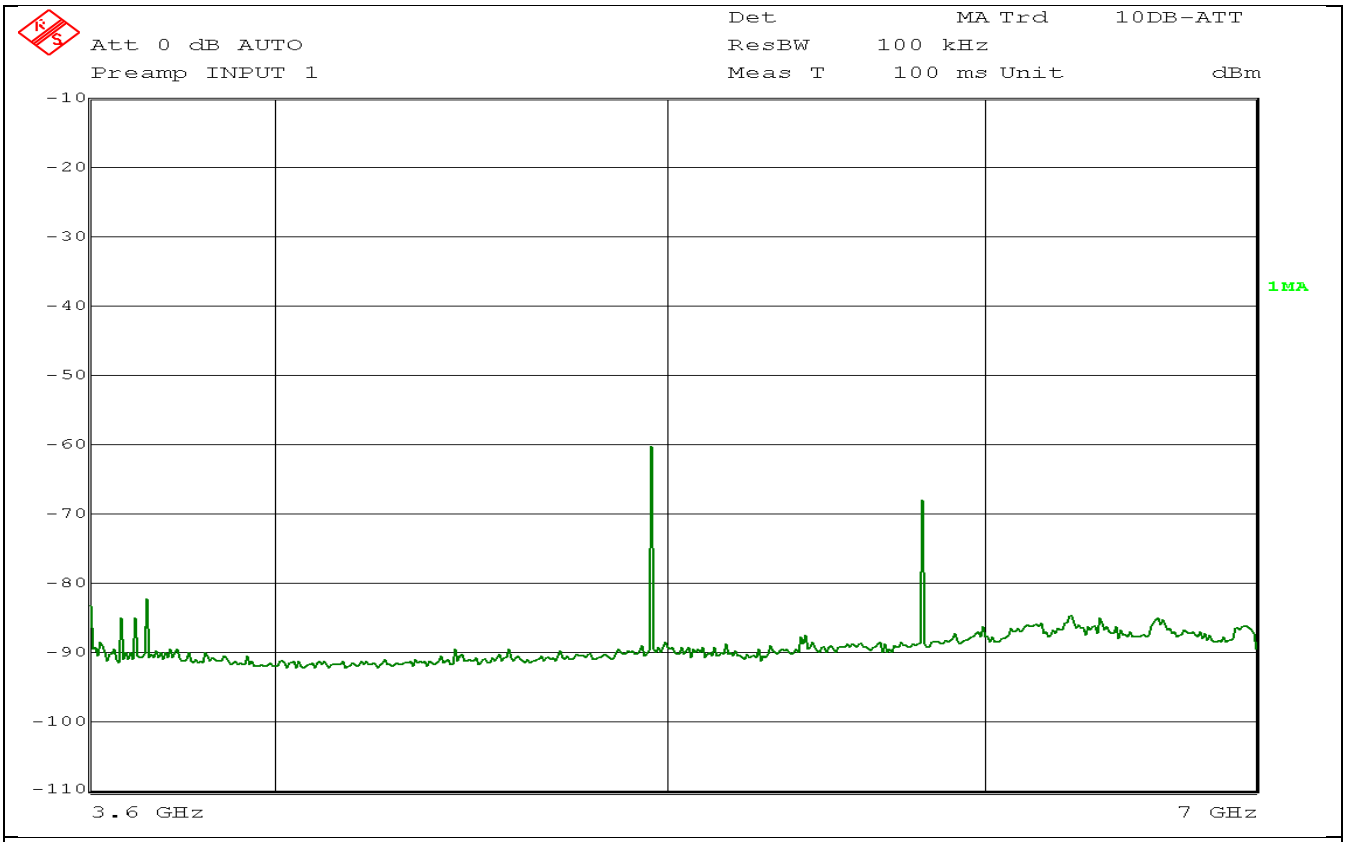


Fig A2 High Channel Conducted Spurious Emissions 3.6GHz-7GHz

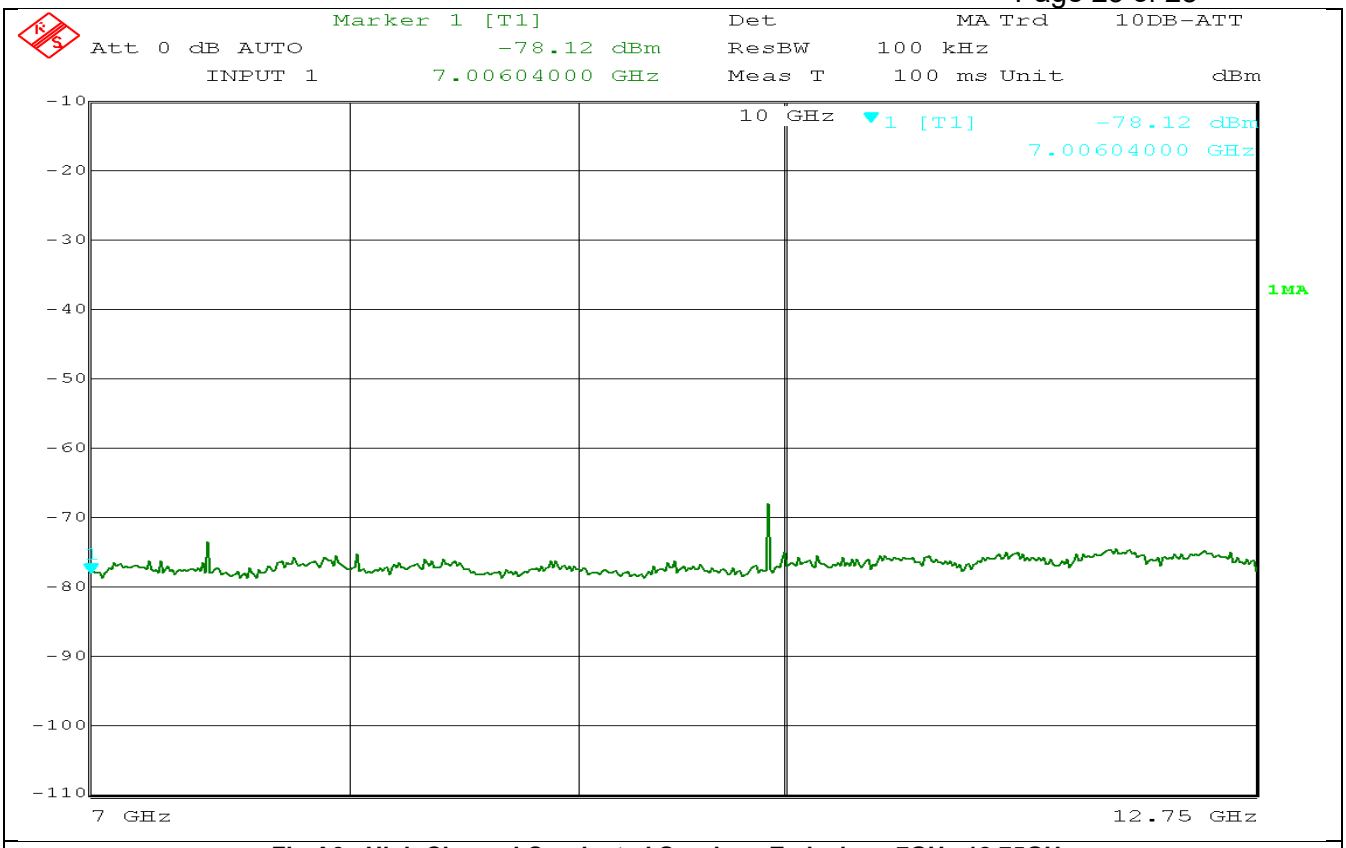


Fig A3 High Channel Conducted Spurious Emissions 7GHz-12.75GHz

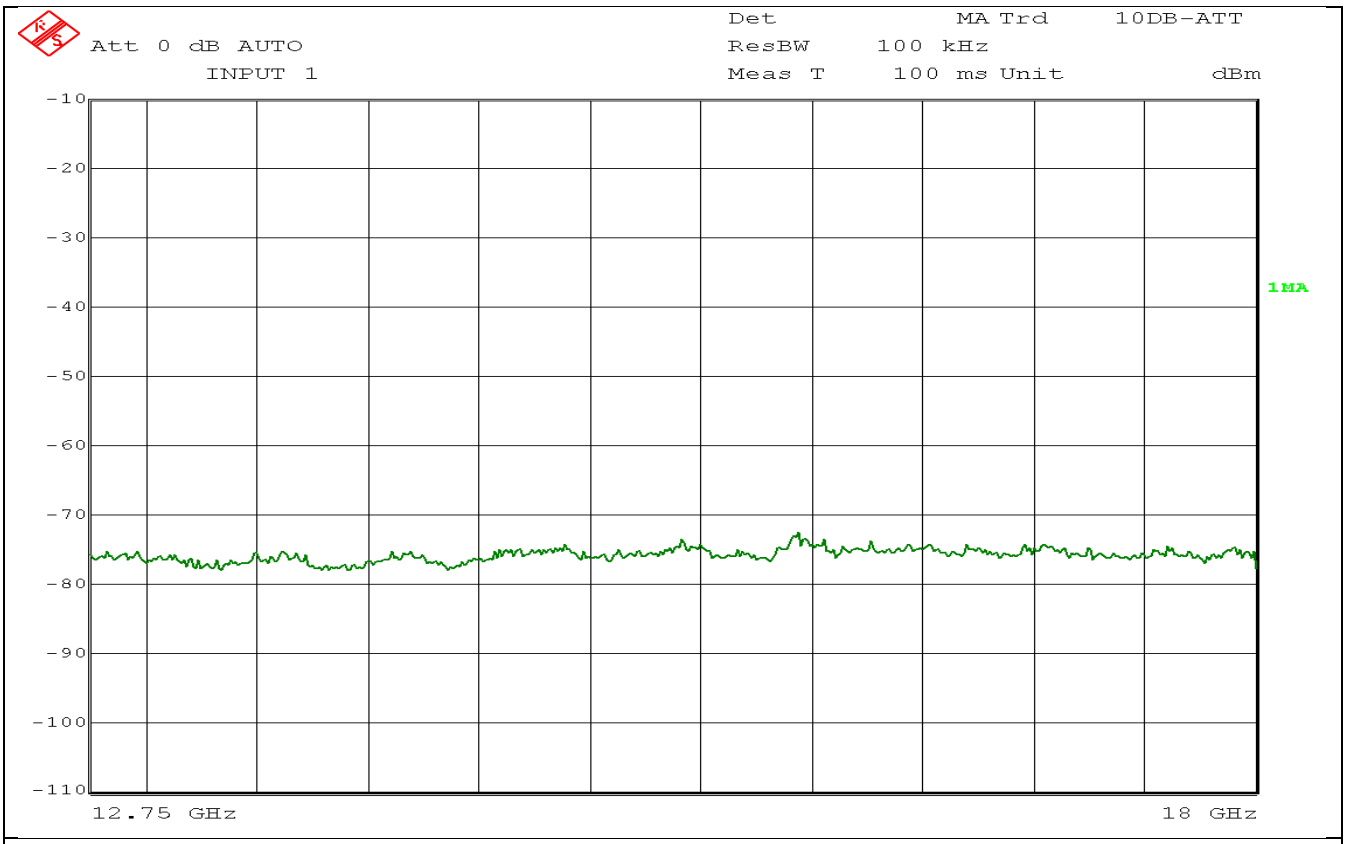


Fig A4 High Channel Conducted Spurious Emissions 12.75GHz -18GHz

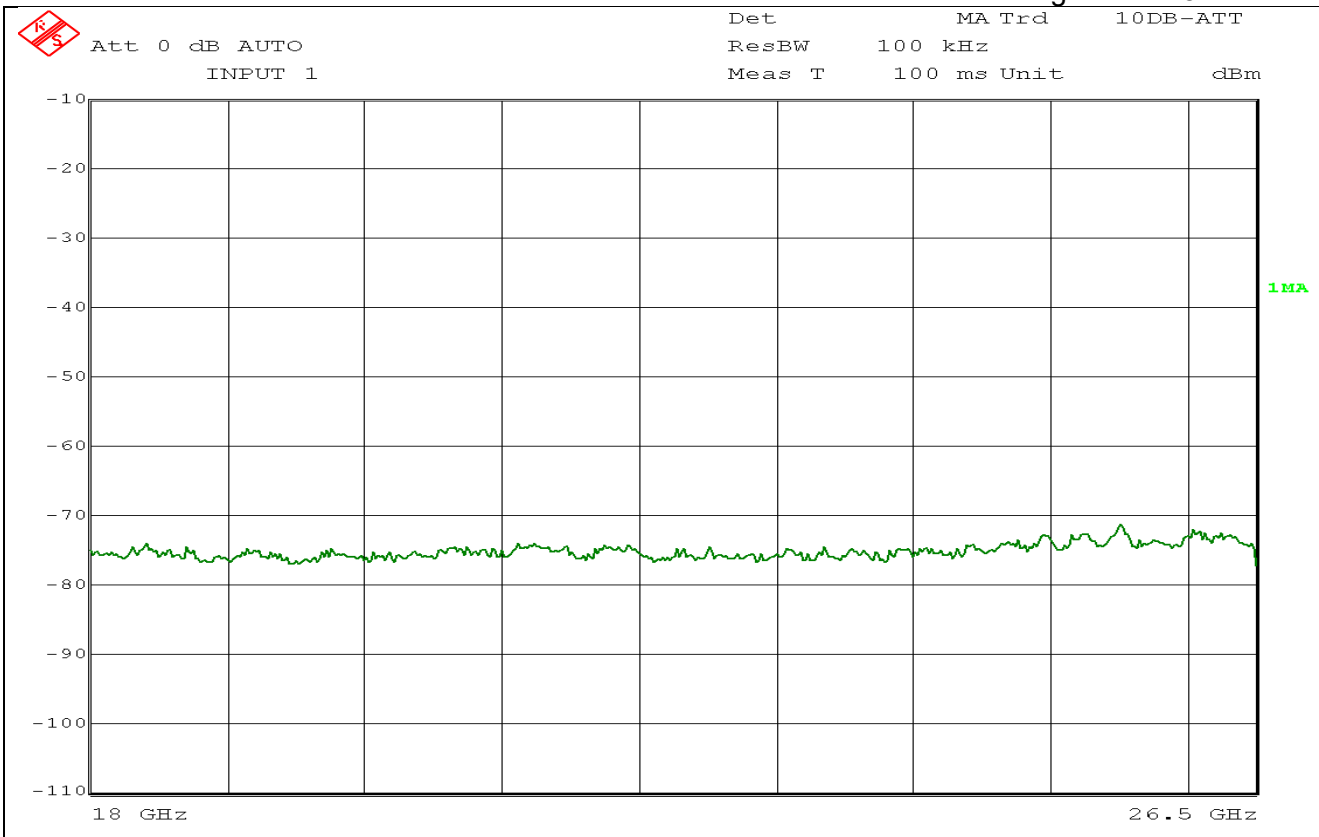


Fig A5 High Channel Conducted Spurious Emissions 18GHz -26.5GHz

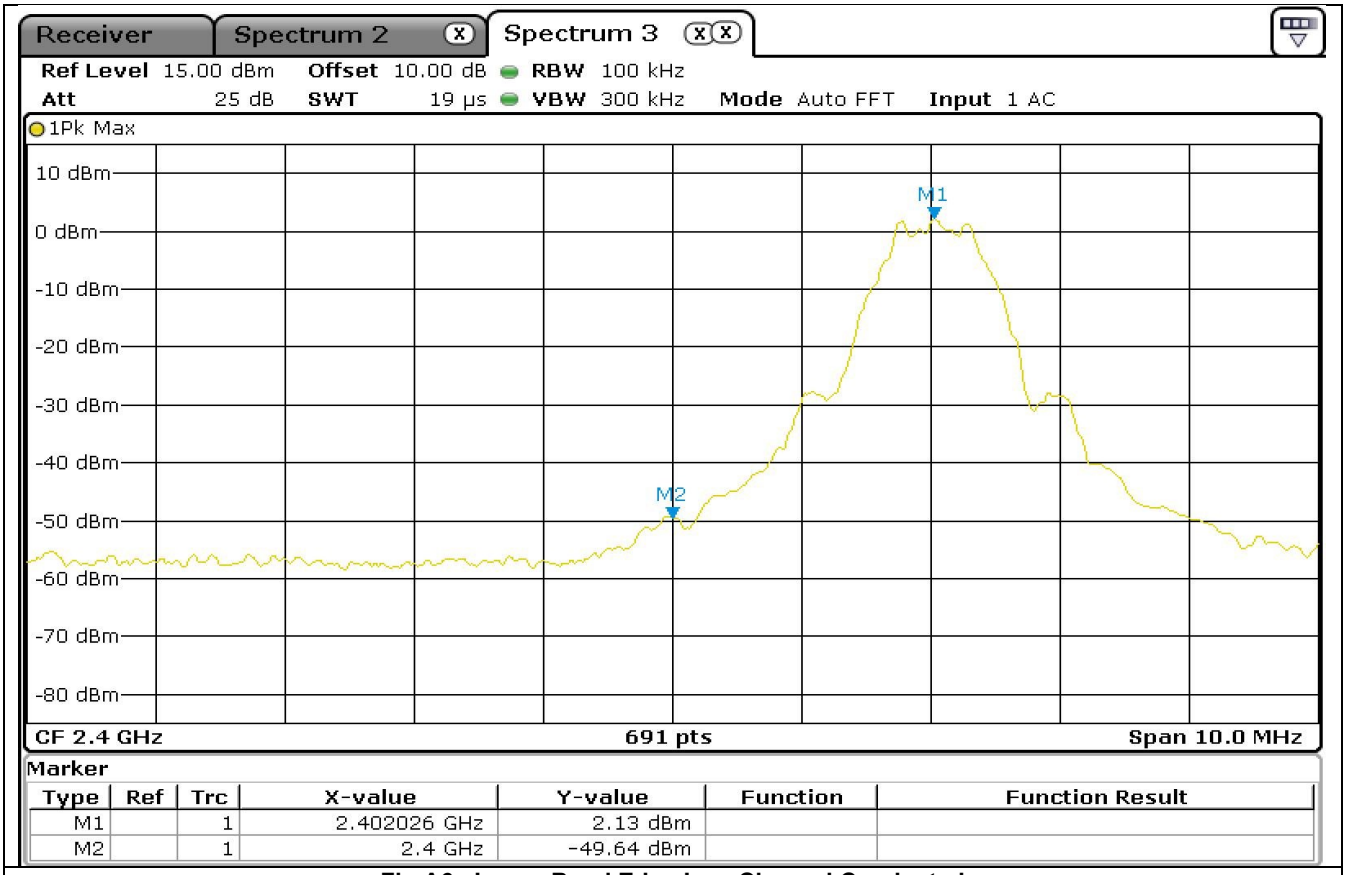


Fig A6 Lower Band Edge Low Channel Conducted

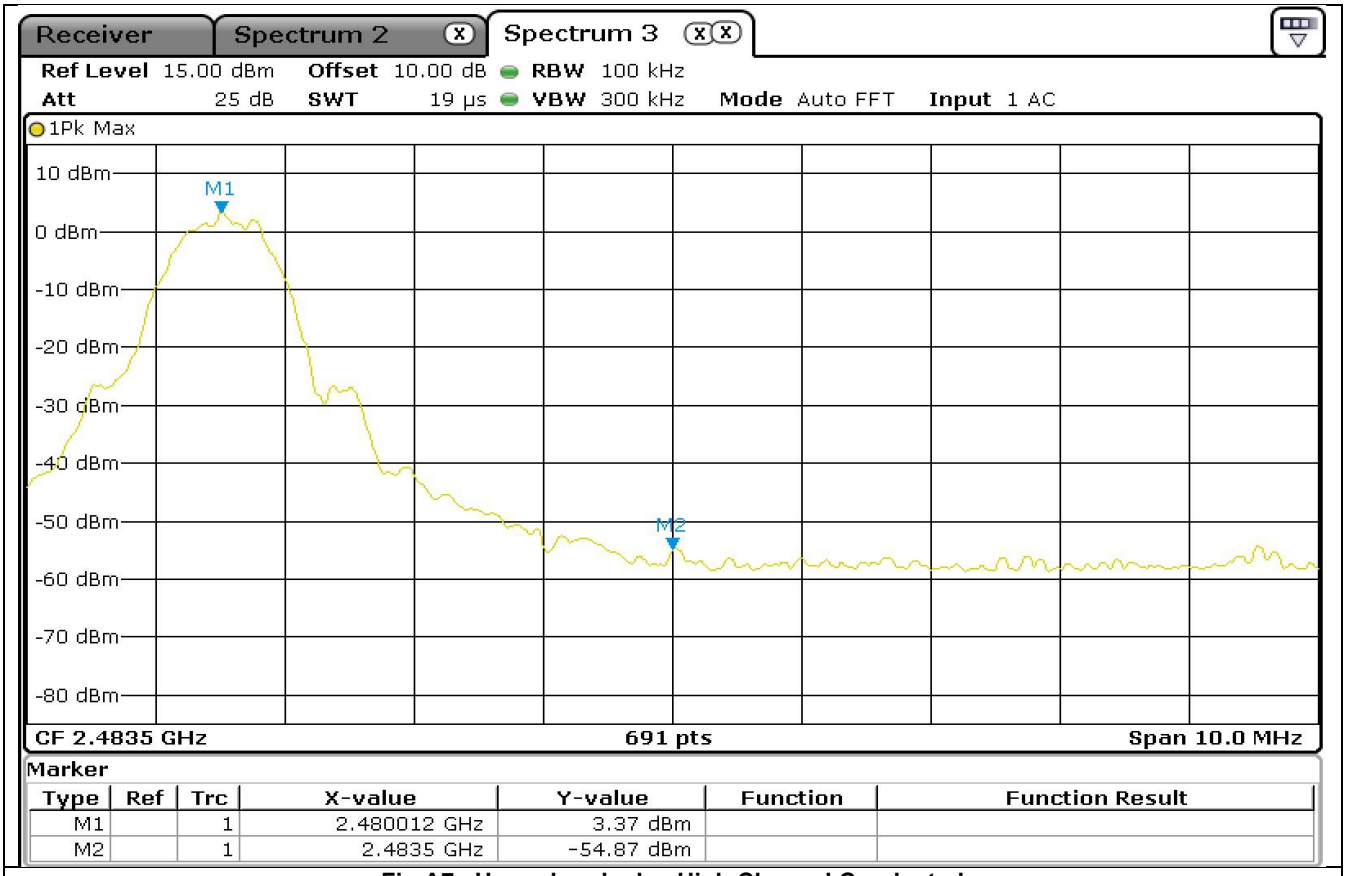


Fig A7 Upper band edge High Channel Conducted

Appendix B Radiated tests for Band Edges /Restricted band

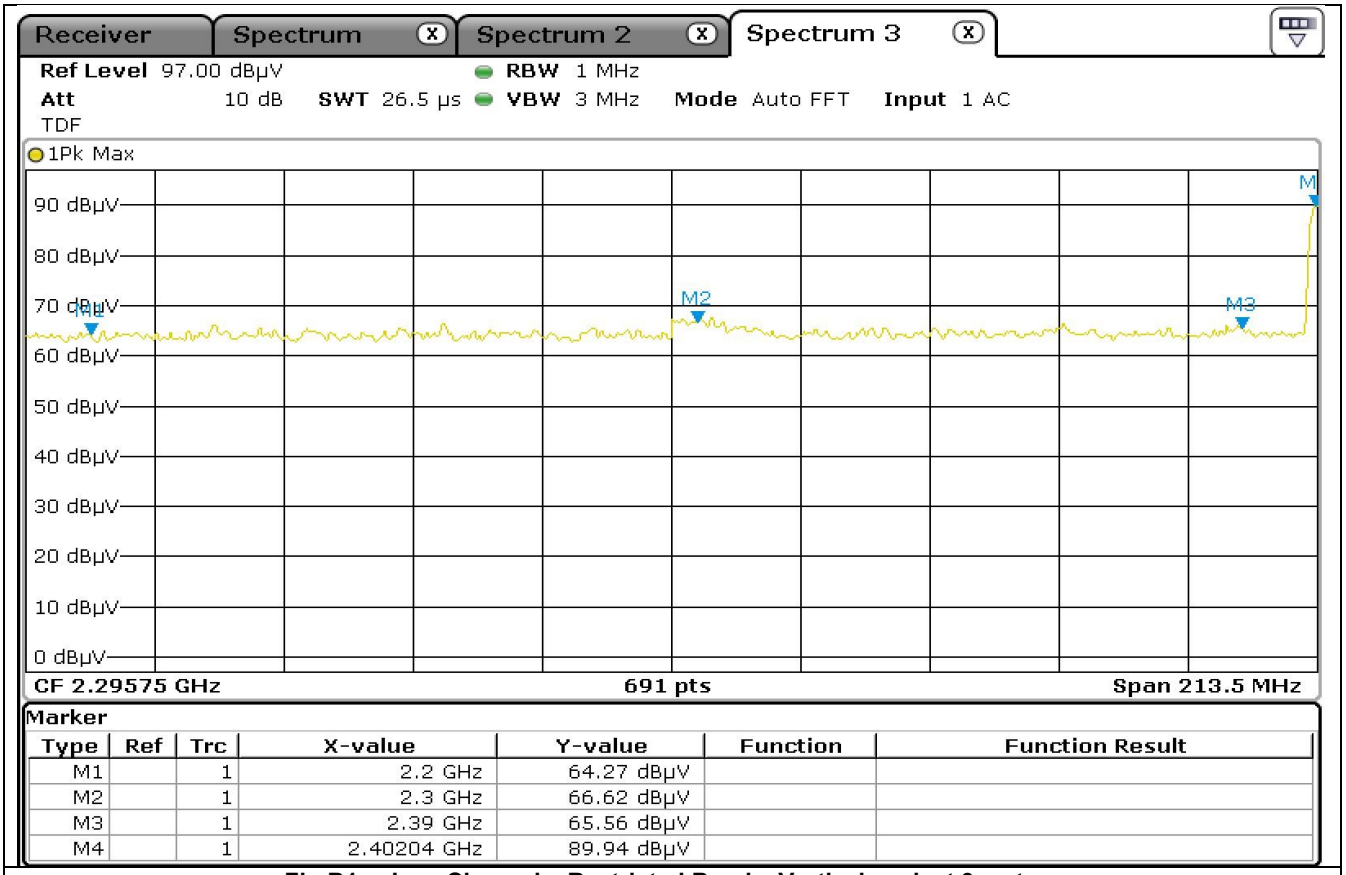


Fig B1 Low Channel Restricted Band Vertical peak at 3 metres

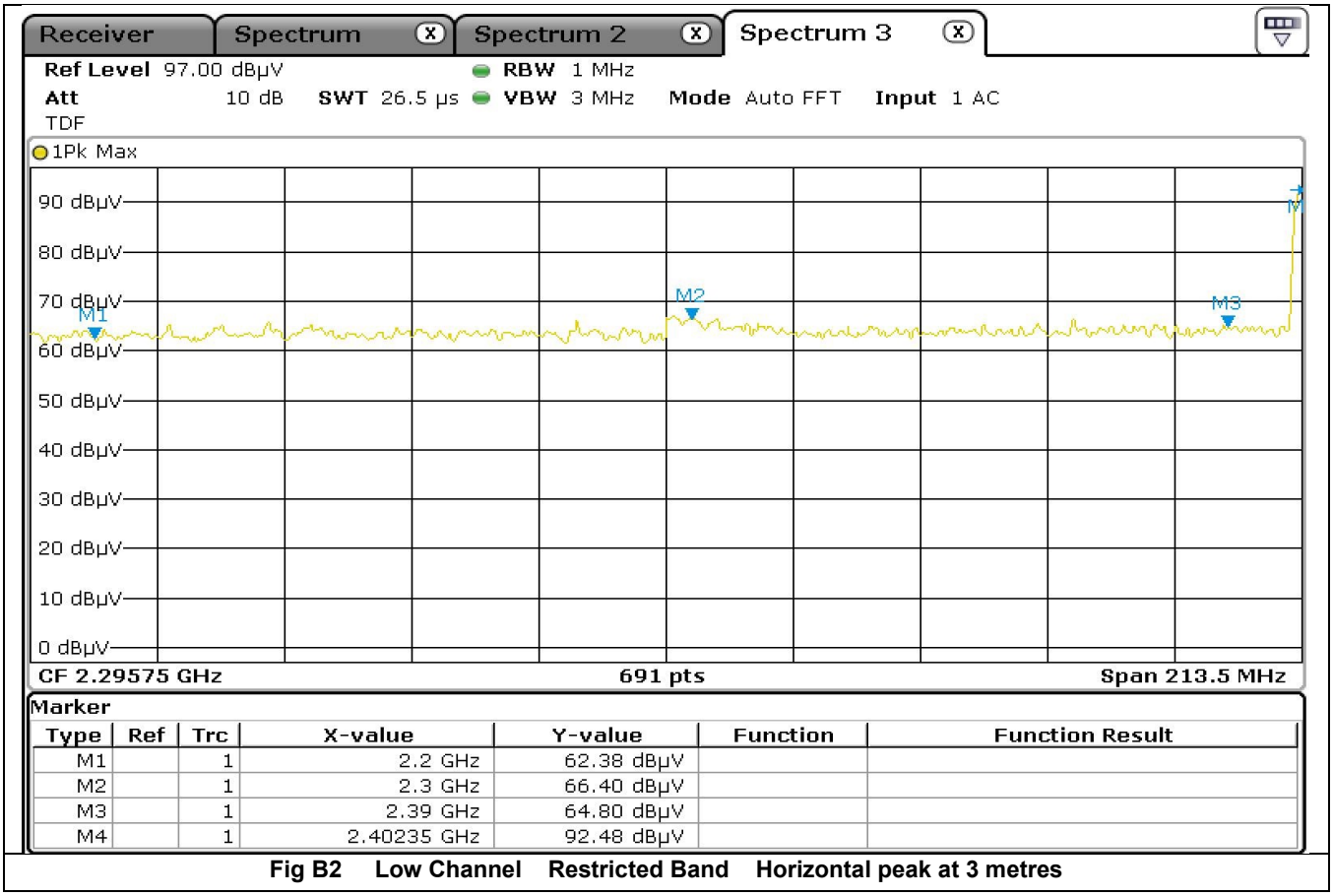
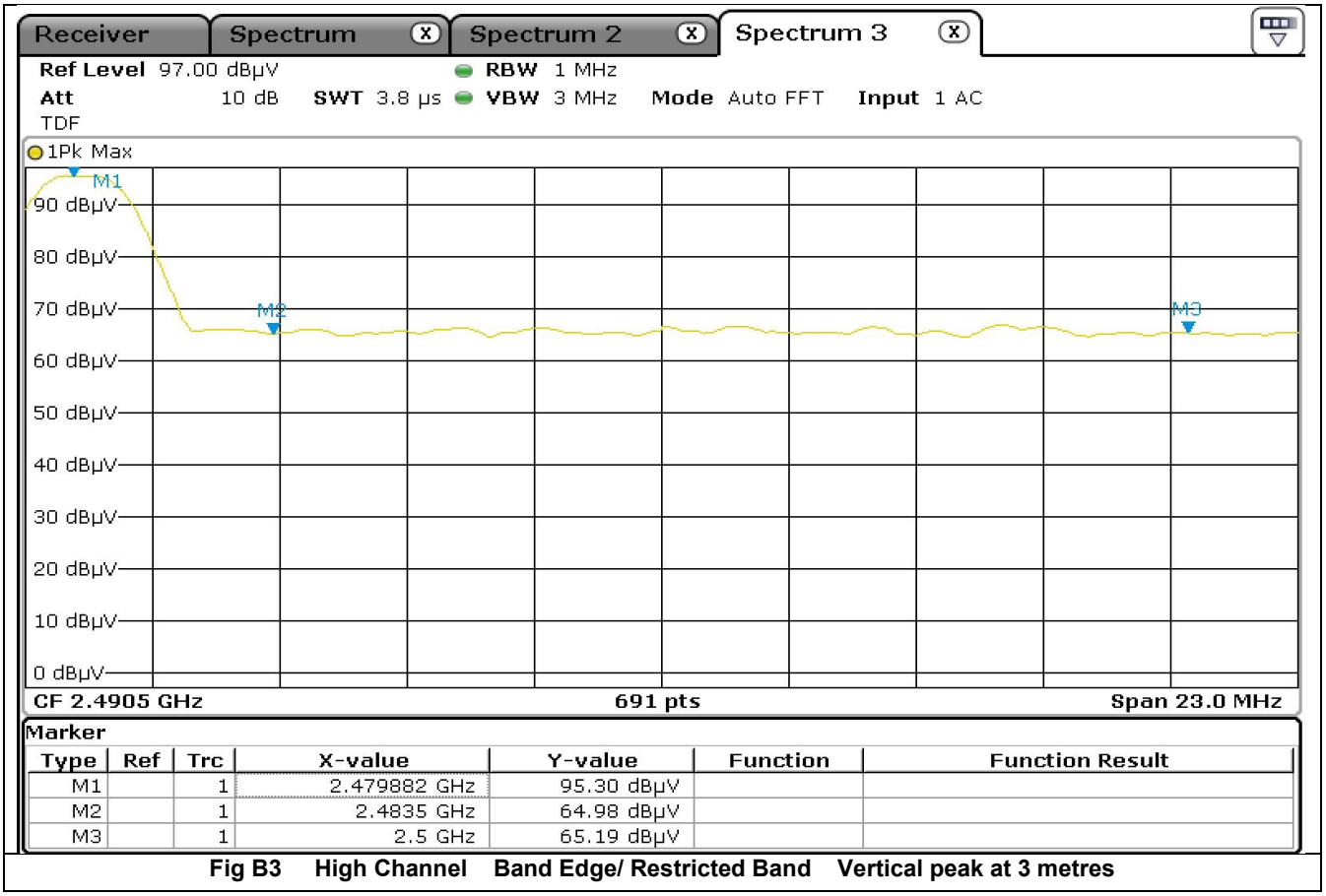
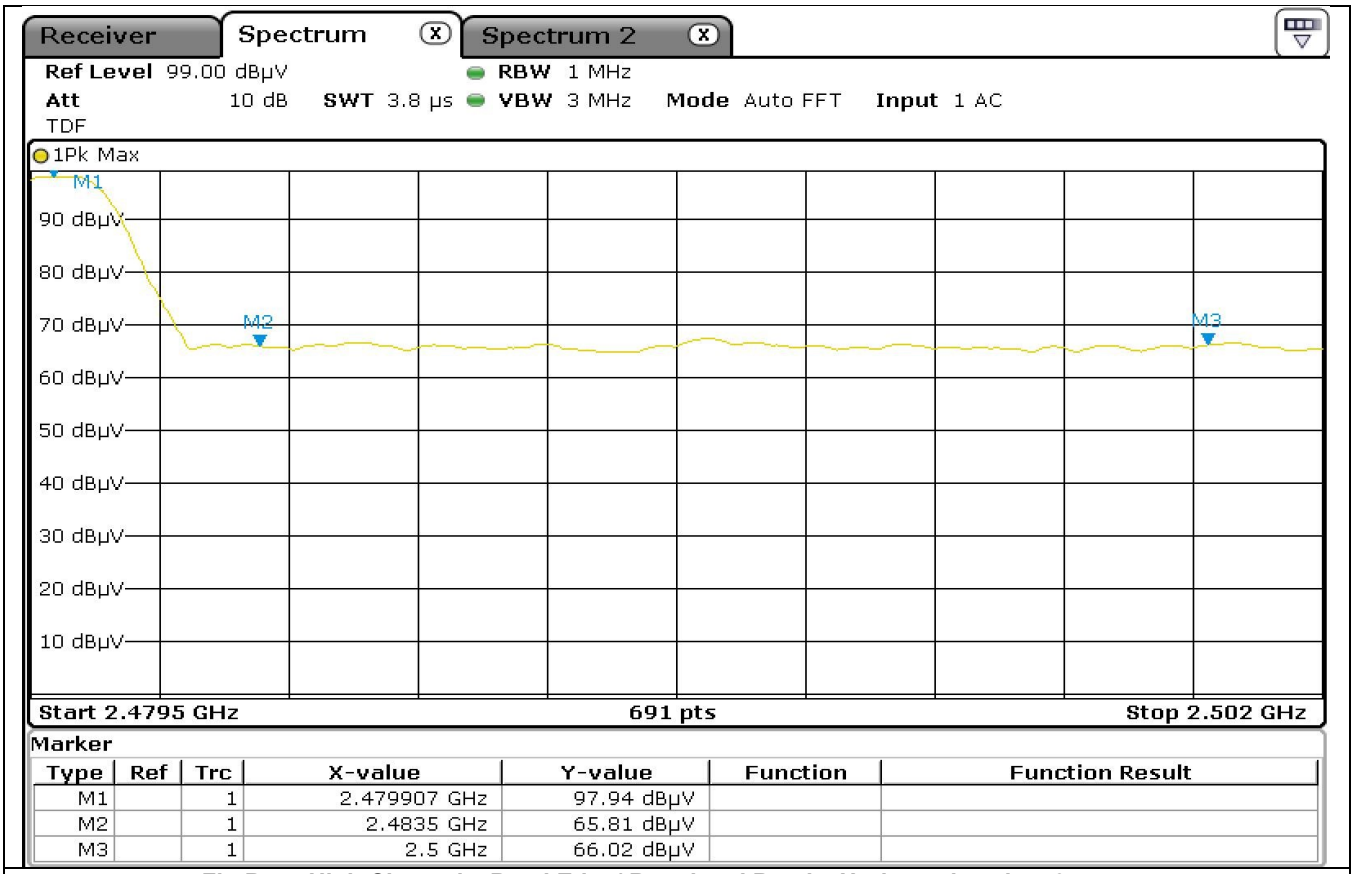


Fig B2 Low Channel Restricted Band Horizontal peak at 3 metres



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479882 GHz	95.30 dBµV		
M2		1	2.4835 GHz	64.98 dBµV		
M3		1	2.5 GHz	65.19 dBµV		

Fig B3 High Channel Band Edge/ Restricted Band Vertical peak at 3 metres



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479907 GHz	97.94 dBµV		
M2		1	2.4835 GHz	65.81 dBµV		
M3		1	2.5 GHz	66.02 dBµV		

Fig B4 High Channel Band Edge/ Restricted Band Horizontal peak at 3 metres