

**FCC Part 15C,  
Industry Canada  
Displaydata  
Certification Report**

for

**Electronic Shelf Labels**

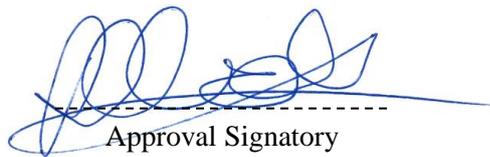
**Model: DD60X**

**FCC ID:VC712-0225**

**IC ID:8910A-1200225**



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Project Engineer: R. Pennell



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Approval Signatory

Approved signatories: J. A. Jones  D. Tiroke  A. Coombes

*The above named are authorised Eurofins Hursley signatories.*

**UKAS Accredited  
EU Notified Body  
FCC & VCCI Registered  
KC Lab ID: EU0184**

## Contents

<b>1.0</b>	<b>DECLARATION</b> .....	<b>3</b>
1.1	FCC PART 15C STATEMENT AND INDUSTRY CANADA (IC) STATEMENT .....	3
1.2	RELATED SUBMITTAL(S) GRANTS .....	3
1.3	EUT MANUFACTURER .....	3
<b>2.0</b>	<b>EUT DESCRIPTION</b> .....	<b>4</b>
2.1	PRODUCT INFORMATION .....	4
2.2	PRODUCT OPERATION .....	4
2.3	SUPPORT EQUIPMENT .....	4
2.4	EXERCISER PROGRAM .....	4
<b>3.0</b>	<b>MEASUREMENT PROCEDURE AND INSTRUMENTATION</b> .....	<b>5</b>
3.1	EMI SITE ADDRESS & TEST DATE .....	5
3.2	GENERAL OPERATING CONDITIONS .....	5
3.3	UNCERTAINTY .....	5
3.4	ENVIRONMENTAL AMBIENT .....	6
3.5	RADIATED EMISSIONS .....	7
<b>4.0</b>	<b>TEST DATA</b> .....	<b>7</b>
4.1	RADIATED EMISSIONS 30MHZ TO 1GHZ.....	7
4.2	RADIATED EMISSIONS 1 TO 10 GHZ .....	12
4.3	OCCUPIED BANDWIDTH.....	16
4.4	OCCUPIED BANDWIDTH (IC) .....	16
4.5	OCCUPIED BANDWIDTH (FCC).....	16
4.6	OCCUPIED BANDWIDTH (AS/NZ).....	16
<b>5.0</b>	<b>TEST PLOTS</b> .....	<b>17</b>
5.1	99% BANDWIDTH PLOTS (IC) .....	17
5.2	20DB BANDWIDTH PLOTS (FCC) .....	18
5.3	99% BANDWIDTH PLOTS (AS/NZ 4268) .....	20
<b>6.0</b>	<b>PHOTO LOG</b> .....	<b>22</b>

## 1.0 DECLARATION

### 1.1 FCC Part 15C Statement and Industry Canada (IC) Statement

The Equipment Under Test (EUT), as described and reported within this document, complies with ISED RSS-Gen Issue 5 March 2019 and IC RSS-210 Issue 10 December 2019 and the parts 15.109, 15.209 and 15.249 of the CFR 47:2015 FCC rules. The EUT operates at frequencies of 902.5 to 927.5 MHz and complies with part 15C emission requirements.

For emissions outside the 902 - 928MHz band the EUT, as described and reported within this document, complies with the parts 15.207 and 15.209 of the CFR 47 FCC rules in accordance with ANSI C63.10:2013 and ANSI C63.4:2014.

### 1.2 Related Submittal(s) Grants

This is an application for certification of a DD60X (transmitting at 902.5 to 927.5 MHz ), described in this report.

The sections of FCC Part 15 that apply to the EUT are:

- 15.209 General requirements
- 15.249 Operation within the band 902 to 928 MHz
- 15.109 applied to the EUT in receive mode.

Note: The EUT in receiver mode complies with part 15B of the FCC rules for unintentional radiators.

### 1.3 EUT Manufacturer

Trade name:	Displaydata Limited
Company name:	Displaydata Limited
Company address:	Greenwood House London Road Bracknell Berkshire RG12 2AA United Kingdom
Manufacturing address:	As above.
Company representative:	Mr Oli Bailey E-mail - oli.bailey@Displaydata.com

## 2.0 EUT DESCRIPTION

### 2.1 Product Information

EUT:	Electronic Shelf Label
Model:	DD60X
Serial number:	LP10000120C
Sample build:	Production
FCC ID:	VC7120-0225
IC ID:	8910A-1200225
Power supply:	Battery (2.2v to 3.2v d.c.)
Firmware version:	Emissions: 1.3.1.0 Immunity: 1.3.1.0
Lowest Clock frequency:	32.768kHz
Highest Clock frequency:	24.000MHz

### 2.2 Product Operation

The EUT is part of a system for electronic shelf labels to be used within retail outlets such as shops and super markets. The EUT is an electronic shelf edge label that displays product and price information. The EUT is always installed in a horizontal (landscape) position. The EUT contains a radio for receiving and transmitting data to a base unit known as a Dynamic Communicator. The EUT transmits infrequently, typically once a day for a few milliseconds

### 2.3 Support Equipment

SUPPORTING EQUIPMENT	PART/MODEL NUMBER	SERIAL NUMBER
Dynamic Communicator Hub	N/A	ZC00003943

### 2.4 Exerciser Program

The EUT was set to transmit continuously at the bottom, middle and top of the 902 to 928MHz radio operating range, this being 902.5, 913.5 and 927.5MHz respectively. The laptop, via the Dynamic Communicator, was used to set the operating frequency of the EUT. Once transmitting the EUT was tested standalone in the semi-anechoic chamber.

All measurements were performed with the EUT operating at 100kbps data rate.

All the tests were performed with the EUT powered with new batteries.

### 3.0 MEASUREMENT PROCEDURE AND INSTRUMENTATION

#### 3.1 EMI Site Address & Test Date

EMI Company Offices Eurofins Hursley  
Trafalgar House, Trafalgar Close, Chandlers Ford, Hampshire

EMI Measurement Site Eurofins Hursley  
UK Designation number: UK0006  
Canada Registration Number: 7104A-1

Test Dates 29<sup>th</sup> January to 3<sup>rd</sup> February 2020

Eurofins Hursley References: 1869

#### 3.2 General Operating Conditions

Testing was performed according to the procedures in accordance with ANSI C63.4:2014 and 63.10 2013. Final radiated testing was performed at a EUT to antenna distance of three metres. Instrumentation, including receiver and spectrum analyser bandwidth, comply with the requirements of ANSI C63.2:1996.

#### 3.3 Uncertainty

The following measurement uncertainties have been calculated in accordance with ANSI C63.23, CISPR 16-4-2 and in line with other available guidance to provide a confidence level of 95% (coverage factor,  $k = 2$ ) in the reported measurements:

For radiated emissions below 1 GHz:

3 m measurement distance	30 MHz – 200 MHz	200 MHz – 1 GHz
Vertical polarisation	$\pm 3.7$ dB	$\pm 5.1$ dB
Horizontal polarisation	$\pm 3.9$ dB	$\pm 3.8$ dB

For radiated emissions below 1 GHz:

10 m measurement distance	30 MHz – 200 MHz	200 MHz – 1 GHz
Vertical polarisation	$\pm 4.4$ dB	$\pm 4.8$ dB
Horizontal polarisation	$\pm 4.5$ dB	$\pm 4.6$ dB

For radiated emissions above 1 GHz:

3 m measurement distance	1 GHz – 6 GHz	6 GHz - 18 GHz	18 GHz – 40 GHz
Both polarisations	$\pm 4.5$ dB	$\pm 4.4$ dB	$\pm 4.3$ dB

Band Edge tests	
Conducted (absolute measurements)	$\pm 2.3$ dB
Close coupled radiated (relative measurements)	$\pm 0.3$ dB

Occupied bandwidth tests	
RBW setting $\leq 100$ kHz	$\pm 0.62$ %
RBW setting $> 100$ kHz	$\pm 1.66$ %

### 3.4 Environmental Ambient

Test Type	Temperature	Humidity	Atmospheric Pressure
Radiated	19 to 24 degrees Celsius	41 to 58 % relative	1003 to 1014 millibars

### 3.5 Radiated Emissions

#### Initial Scan

A radiated profile scan was taken at a three metre distance on eight azimuths of the system under test in both vertical and horizontal polarities of the antenna in a semi-anechoic chamber. Instrumentation used in the chamber as below:

#ID	CP	Manufacturer	Type	Serial No	Description	Calibration due date
053	1	HP	8449B	3008A01394	Pre-amplifier (1.0-26.5GHz)	17/10/2020
456	1	Rohde & Schwarz	ESCI7	1144573407	EMI Test Receiver	21/08/2020
466	3	Schwarzbeck	BBHA 9120 571	571	1-10GHz Horn	28/02/2022
651	1	Rohde & Schwarz	ESIB 40 no.2	100262	40GHz receiver	27/11/2020
750	1	Global	CISPR16 chamber	1	11 x 7 x 6.2m	28/10/2020
762	3	Schwarzbeck	VULB9162	129	30-7000MHz	07/04/2020
762a	3	Schwarzbeck	DGA 9552N	0	6dB attenuator for #762	07/04/2020

**CP = Interval period [year] prescribed for external calibrations**

**Note:** 'Calibration due date' means that the instrument is certified with a UKAS or traceable calibration certificate.  
'Internal' means internally calibrated using Eurofins Hursley procedures

The data obtained from the profile scan was used as a guide for the final measurements.

#### Final Measurements

Final measurements of the system under test were also taken in the semi-anechoic chamber. The data obtained from the chamber profile-scan was used as a guide. Above 30 MHz, each emission identified from the EUT was maximised by revolving the system on the turntable and moving the antennae in height and azimuth. The worst-case data is presented in this report. Test instrumentation used for final measurements is unchanged from the initial scan.

## 4.0 TEST DATA

### 4.1 Radiated Emissions 30MHz to 1GHz

A search was made of the frequency spectrum from 30 MHz to 10 GHz and the measurements reported are the highest emissions relative to the:

'FCC CFR 47 Section 15.209 and 15.249 Limits' at a measuring distance of three metres.

'ISED RSS-210 issue 10 Annex B section B10'

Testing was performed with the EUT at the top, bottom and middle transmitter operating frequencies. Below 1 GHz a quasi-peak detector was used (bandwidth 120 kHz), above 1 GHz a peak and average detector was used (bandwidth 1 MHz). The worst-case results from all tests are presented here.

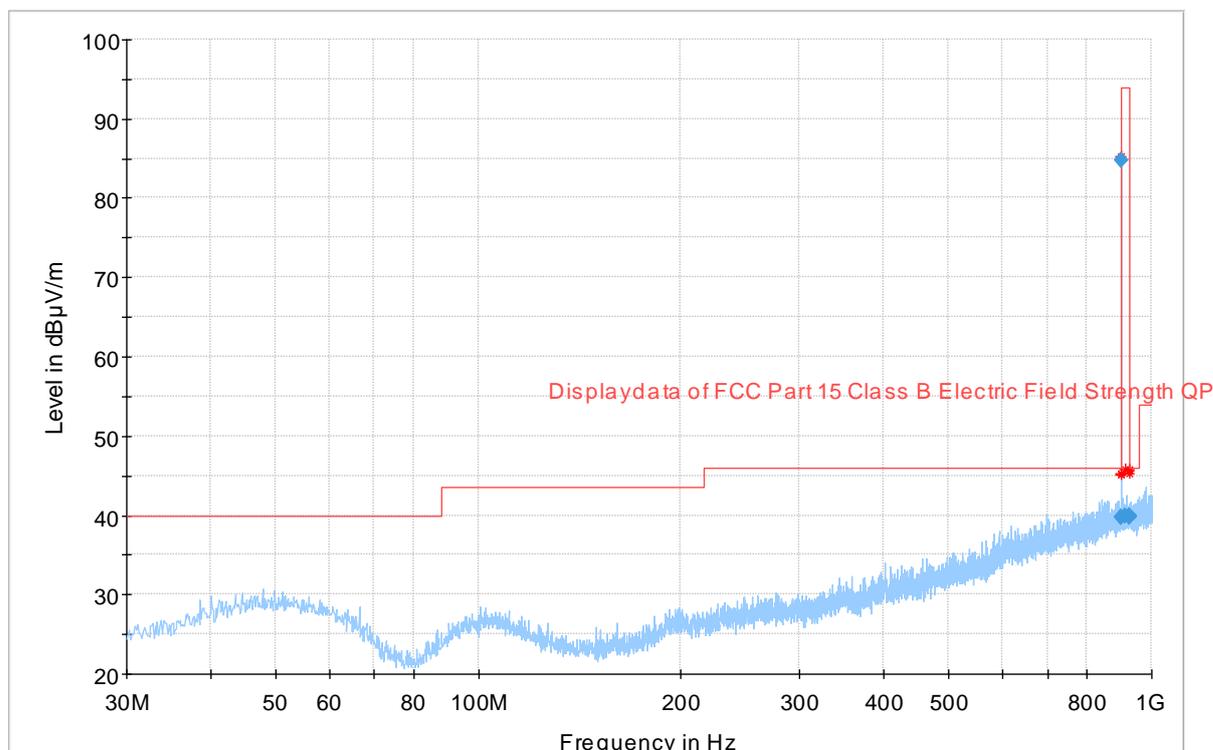
### 4.1.1 Data, DD60X; (Transmitting) Bottom Channel

Frequency	Quasi Peak	Specified Limit	Margin	Height	Pol	Azimuth	Corr	
MHz	dBµV/m	dBµV/m	dB	cm	H/V	Deg	dB/m	Status
901.95000	39.66	46.00	5.97	386.0	V	345.0	31.3	Pass
902.000000	39.68	94.00	54.32	231.0	V	114.0	31.3	Pass
902.500000*	84.74	94.00	10.12	119.0	V	155.0	31.3	Pass
913.500000	39.91	94.00	54.08	128.0	V	358.0	31.5	Pass
927.500000	39.80	94.00	54.21	220.0	V	213.0	31.4	Pass
928.000000	39.84	94.00	54.16	119.0	H	166.0	31.4	Pass
928.050000	39.88	46.00	6.12	239.0	H	272.0	31.4	Pass

\*Transmitter frequency

The table for transmitted frequencies shows test results measured with 100kbps data rates, in landscape orientation.

### 4.1.2 Profile; DD60X; (Transmitting) Bottom Channel



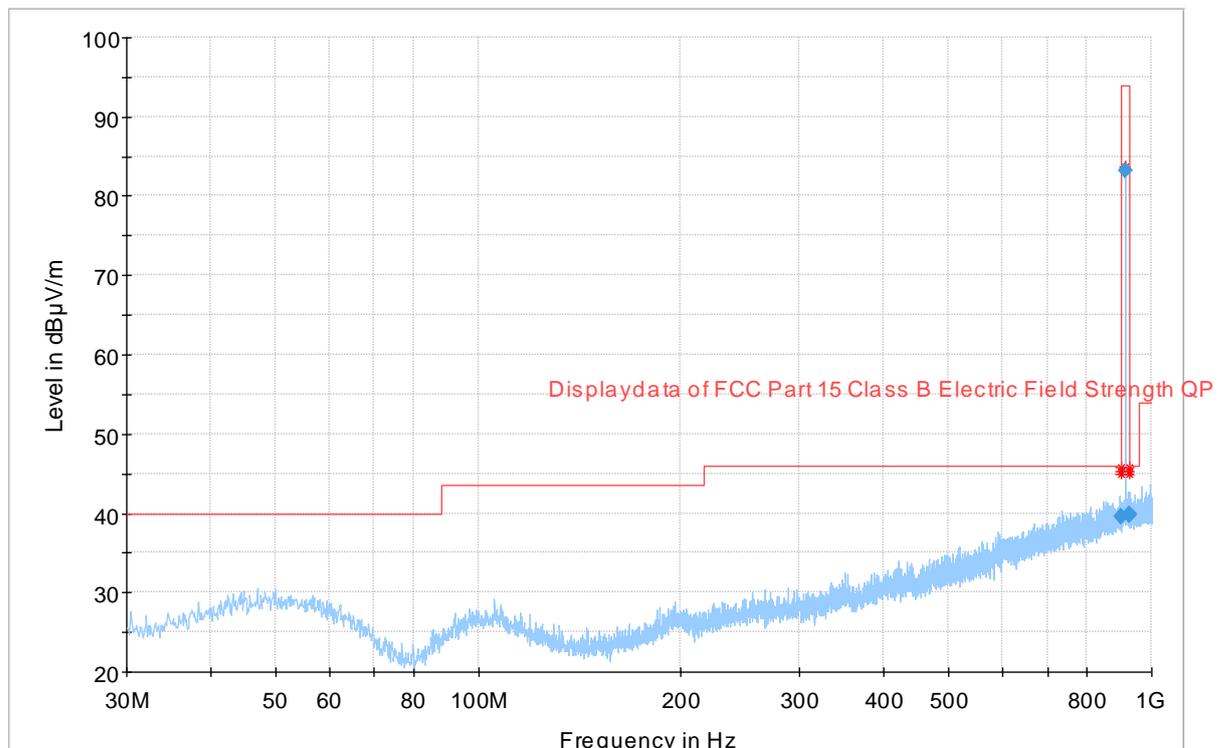
### 4.1.3 Data; DD60X; (Transmitting) Middle Channel

Frequency	Quasi Peak	Specified Limit	Margin	Height	Pol	Azimuth	Corr	
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	Status
901.950000	45.32	46.00	1.58	128.0	H	3.0	31.3	Pass
902.000000	44.91	94.00	49.09	212.0	H	0.0	31.3	Pass
902.500000	45.88	94.00	48.79	266.0	H	144.0	31.3	Pass
913.500000*	83.71	94.00	14.94	119.0	V	160.0	31.5	Pass
927.500000	45.80	94.00	48.13	382.0	H	296.0	31.4	Pass
928.000000	45.00	94.00	49.00	118.0	H	243.0	31.4	Pass
928.050000	45.35	46.00	1.20	326.0	H	193.0	31.4	Pass

\*Transmitter frequency

The table for transmitted frequencies shows test results measured with 100kbps data rates, in landscape orientation.

### 4.1.4 Profile; DD60X; (Transmitting) Middle Channel



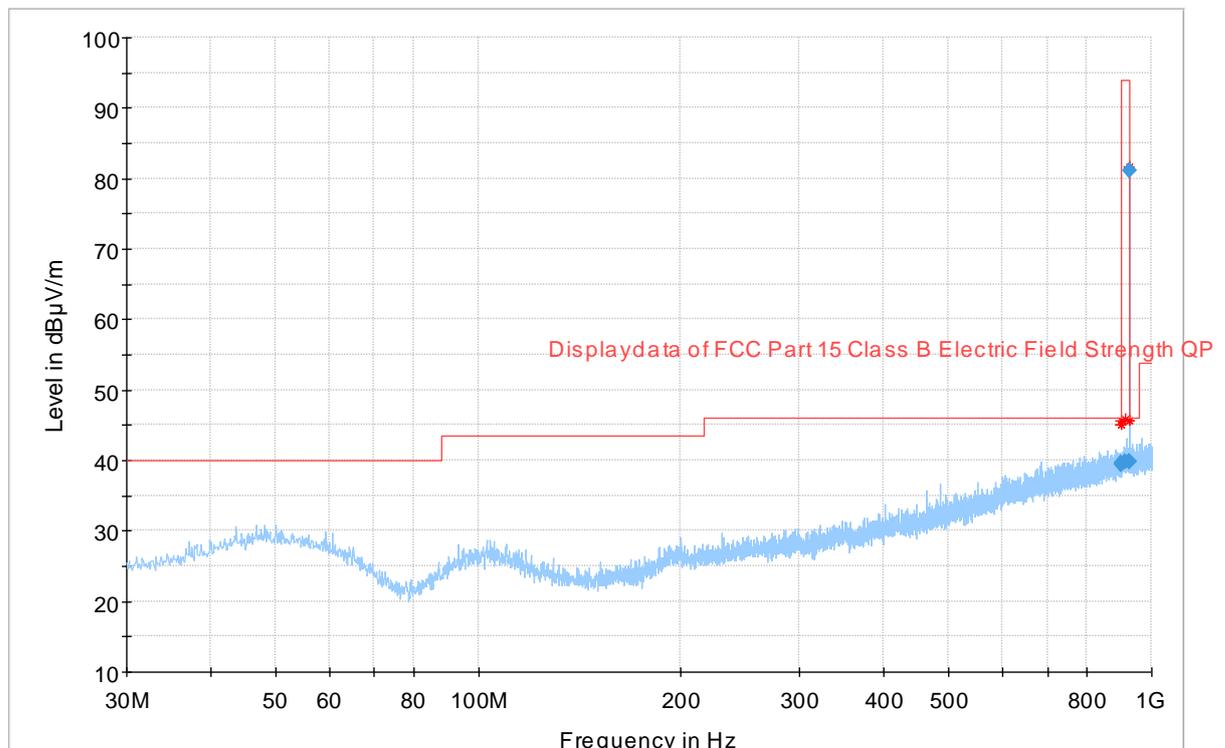
### 4.1.5 Data; DD60X; (Transmitting) Top Channel

Frequency	Quasi Peak	Specified Limit	Margin	Height	Pol	Azimuth	Corr	
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	Status
901.950000	39.50	46.00	6.49	305.0	V	121.0	31.3	Pass
902.000000	39.49	94.00	54.51	400.0	V	336.0	31.3	Pass
902.500000	39.55	94.00	54.42	387.0	H	152.0	31.3	Pass
913.500000	39.75	94.00	54.21	224.0	H	100.0	31.5	Pass
927.500000*	81.19	94.00	11.47	119.0	V	179.0	31.4	Pass
928.000000	39.76	94.00	54.24	400.0	V	30.0	31.4	Pass
928.050000	39.73	46.00	6.26	172.0	H	305.0	31.4	Pass

\*Transmitter frequency

The table for transmitted frequencies shows test results measured with 100kbps data rates, in landscape orientation.

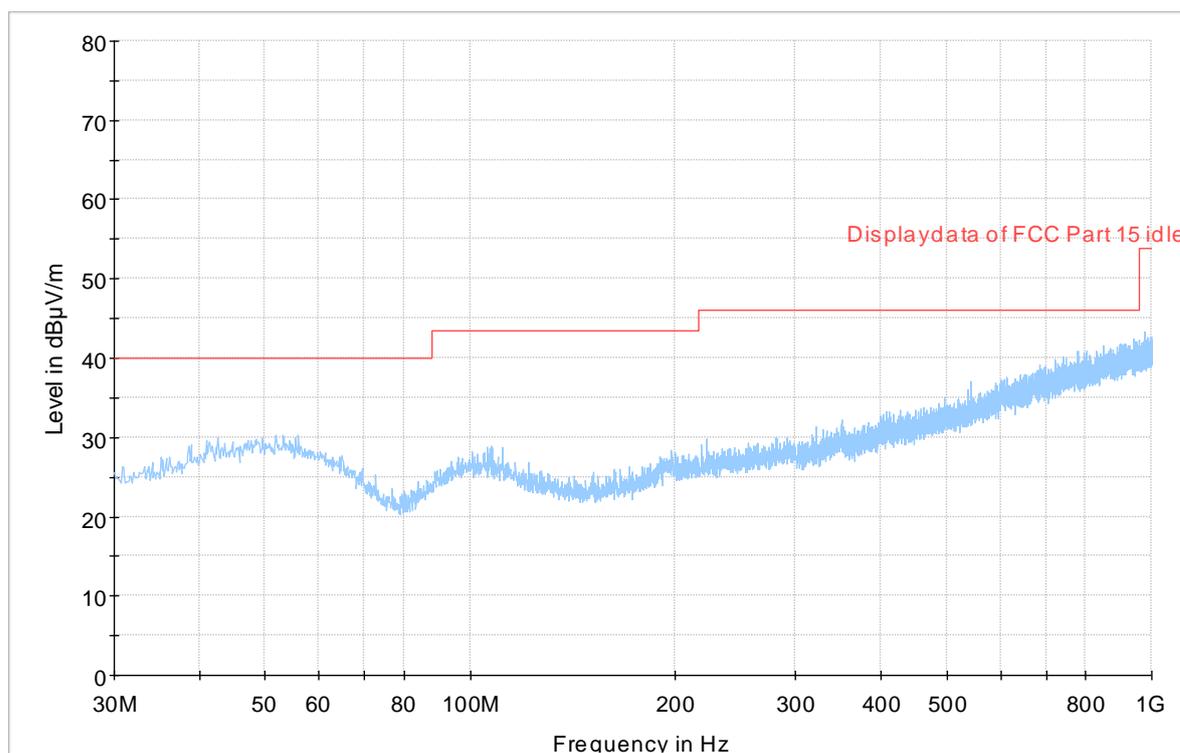
### 4.1.6 Profile; DD60X; (Transmitting) Top Channel



#### 4.1.7 Data; DD60X; Idle Mode

Frequency	Quasi Peak	Specified Limit	Margin	Height	Pol	Azimuth	Corr	Status
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	
No Significant Peaks Were Found								Pass

#### 4.1.8 Profile; DD60X; Idle Mode

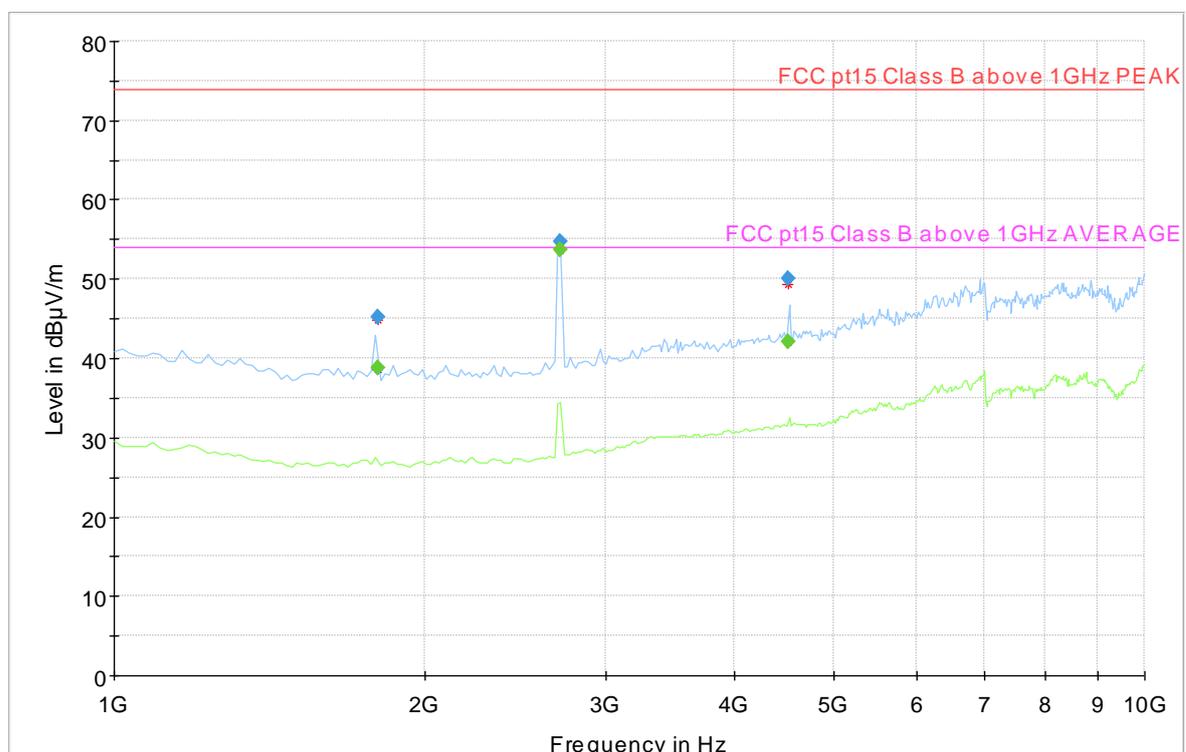


## 4.2 Radiated Emissions 1 to 10 GHz

### 4.2.1 Data; DD60X; (Transmitting) Bottom Channel

Frequency	Peak	Average	Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	Status
1804.9992	45.27	---	74.00	28.73	118.0	V	320.0	-8.0	Pass
1805.1789	---	38.80	54.00	15.20	158.0	V	318.0	-8.0	Pass
2707.5813	---	53.67	54.00	0.33	190.0	H	347.0	-6.1	Pass
2707.8531	54.68	---	74.00	19.33	197.0	H	343.0	-6.1	Pass
4512.2816	---	42.12	54.00	11.88	298.0	H	310.0	-1.1	Pass
4512.7342	50.07	---	74.00	23.93	208.0	H	309.0	-1.1	Pass

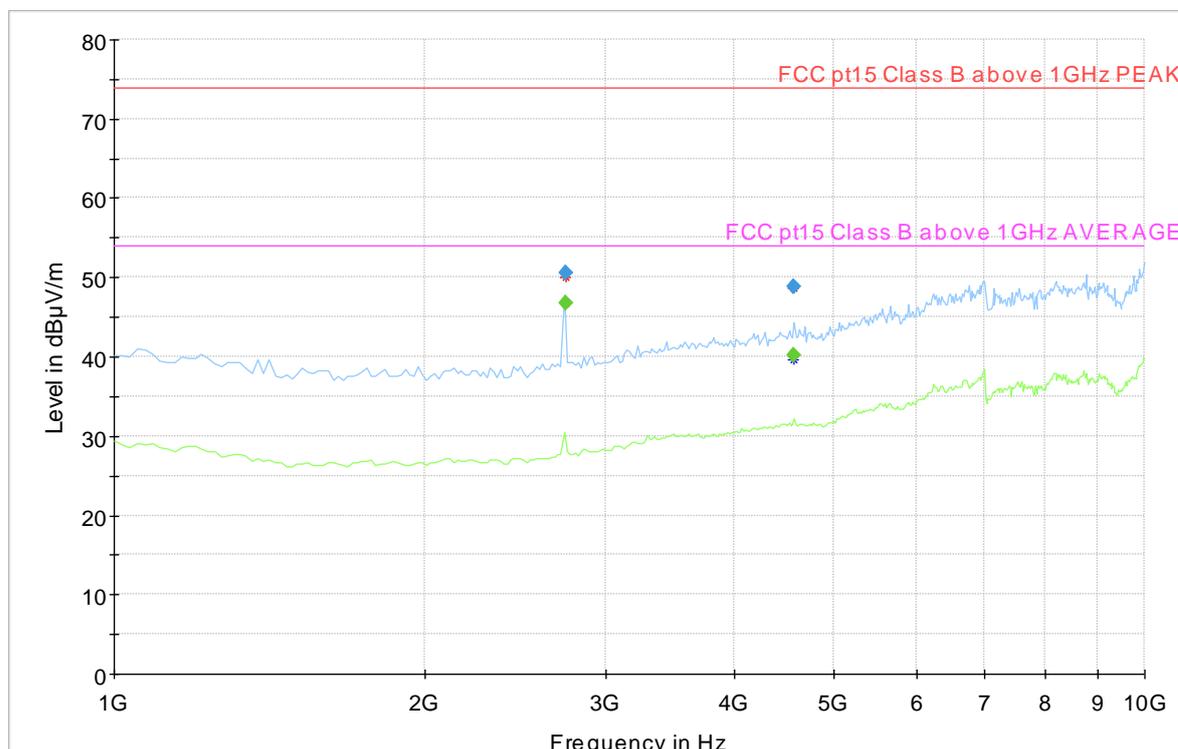
### 4.2.2 Profile; DD60X; (Transmitting) Bottom Channel



### 4.2.3 Data; DD60X; (Transmitting) Middle Channel

Frequency	Peak	Average	Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	Status
2740.6316	---	46.67	54.00	7.33	109.0	H	167.0	-6.0	Pass
2740.6316	50.63	---	74.00	23.37	127.0	H	163.0	-6.0	Pass
4567.2490	---	40.15	54.00	13.85	276.0	H	133.0	-1.0	Pass
4567.7070	48.76	---	74.00	25.24	170.0	H	131.0	-1.0	Pass

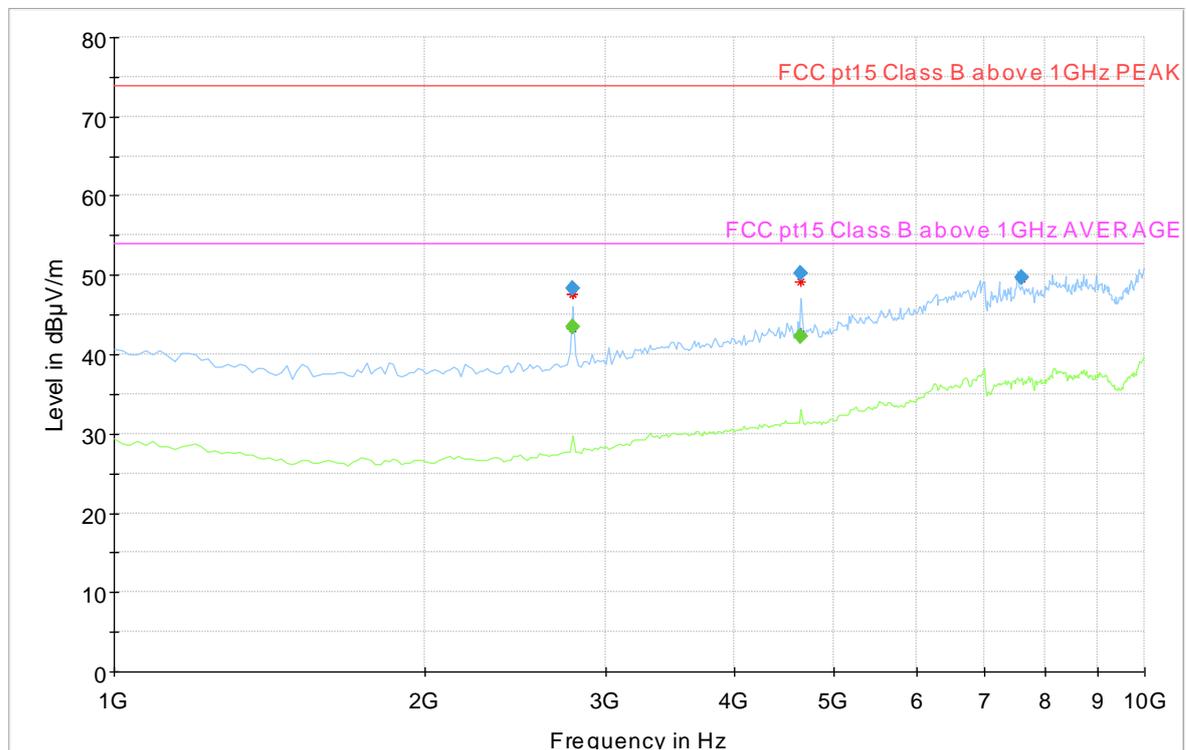
### 4.2.4 Profile; DD60X; (Transmitting) Middle Channel



### 4.2.5 Data; DD60X; (Transmitting) Top Channel

Frequency	Peak	Average	Limit	Margin	Height	Pol	Azimuth	Corr.	
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	Status
2782.3613	48.27	---	74.00	25.73	140.0	H	350.0	-5.9	Pass
2782.6404	---	43.43	54.00	10.57	100.0	H	350.0	-5.9	Pass
4637.4708	---	42.31	54.00	11.69	110.0	H	315.0	-0.9	Pass
4637.4708	50.13	---	74.00	23.87	187.0	H	312.0	-0.9	Pass
7606.3856	49.71	---	74.00	24.29	379.0	V	325.0	3.2	Pass

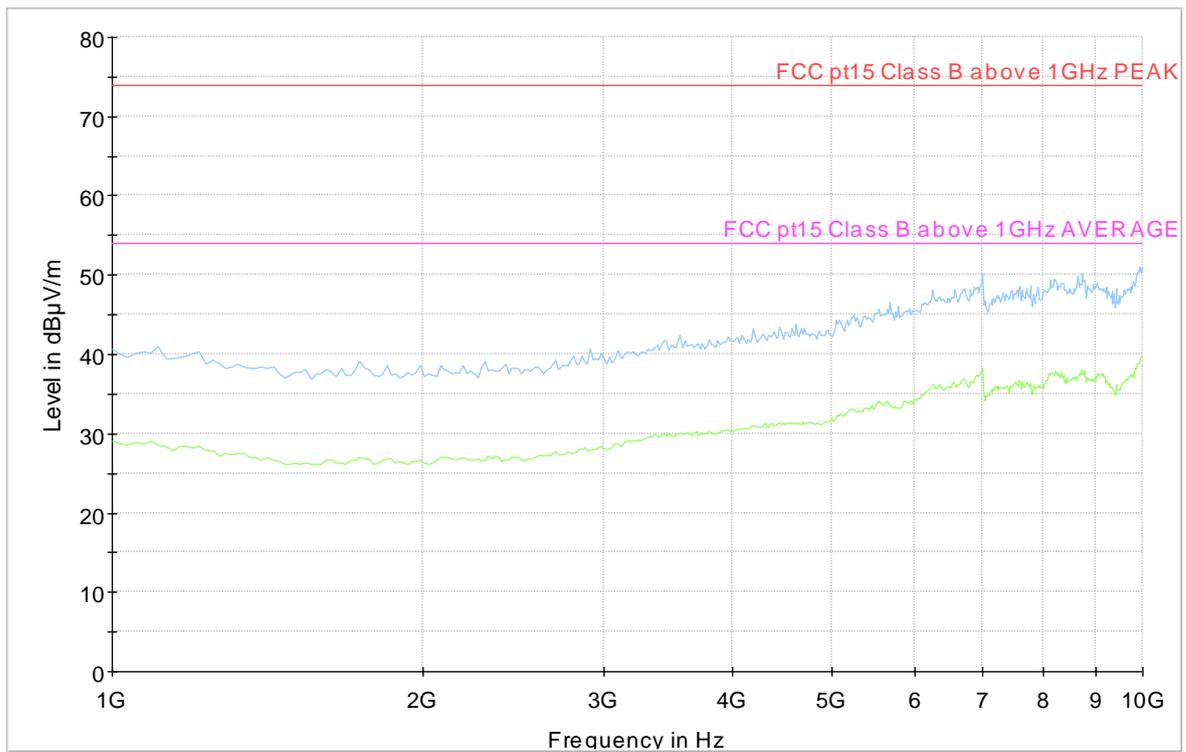
### 4.2.6 Profile; DD60X; (Transmitting) Top Channel



### 4.2.7 Data; DD60X; Idle Mode

Frequency	Peak	Average	Limit	Margin	Height	Pol	Azimuth	Corr.	Status
MHz	dB $\mu$ V/m	dB $\mu$ V/m	dB $\mu$ V/m	dB	cm	H/V	Deg	dB/m	Pass
No Significant Peaks Were Found									Pass

### 4.2.8 Profile; DD60X; Idle Mode



### 4.3 Occupied Bandwidth

Test instrumentation used was as follows:

#ID	CP	Manufacturer	Type	Serial No	Description	Calibration due date
456	1	Rohde & Schwarz	ESCI7	1144573407	EMI Test Receiver	21/08/2020

### 4.4 Occupied Bandwidth (IC)

RSS-GEN Section 6.6

The output from the measuring antenna was fed into the input of the ESCI7 spectrum analyser/receiver. The bandwidth of the transmitter was measured with an ESCI7 analyser set to 99% Occupied Bandwidth with a sampling detector on max hold. The resolution bandwidth, span and video bandwidth are indicated on the occupied bandwidth plot (modulated) included with this report.

In TX mode with a 100kbps data rate the bandwidth of the modulated transmitter signal was measured.

### 4.5 Occupied Bandwidth (FCC)

FCC 15.215 (c) / Ansi C63.10 Section 6.9

The output from the measuring antenna was fed into the input of the ESCI7 spectrum analyser/receiver. The bandwidth of the transmitter was measured 20dB down either side of the peak. The ESCI7 analyser was set to sampling detector on max hold. The resolution bandwidth, span and video bandwidth are indicated on the occupied bandwidth plot (modulated) included with this report.

In TX mode with a 100kbps data rate the bandwidth of the modulated transmitter signal was measured.

### 4.6 Occupied Bandwidth (As/Nz)

AS/NZ 4268 Section 8.3.2

The output from the measuring antenna was fed into the input of the ESCI7 spectrum analyser/receiver. The bandwidth of the transmitter was measured with an ESCI7 analyser set to 99% Occupied Bandwidth with a sampling detector on max hold. The resolution bandwidth, span and video bandwidth are indicated on the occupied bandwidth plot (modulated) included with this report.

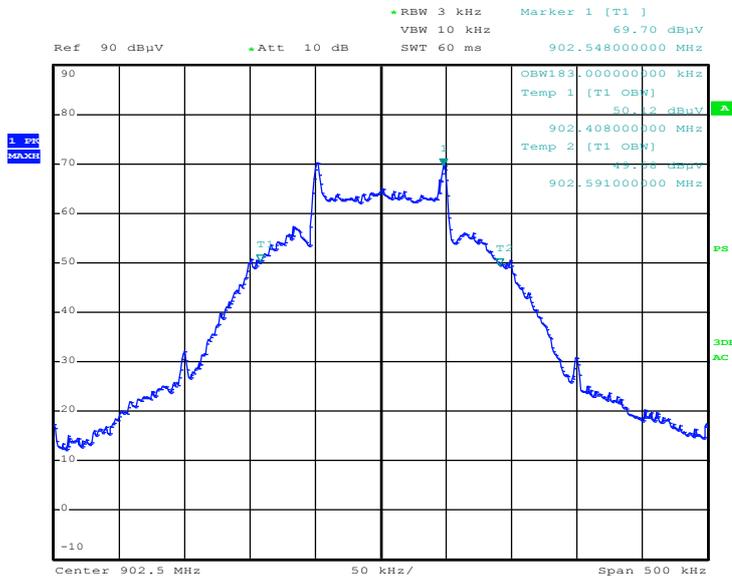
In TX mode with a 100kbps data rate the bandwidth of the modulated transmitter signal was measured.

TEST ENGINEER: Richard Pennell

## 5.0 TEST PLOTS

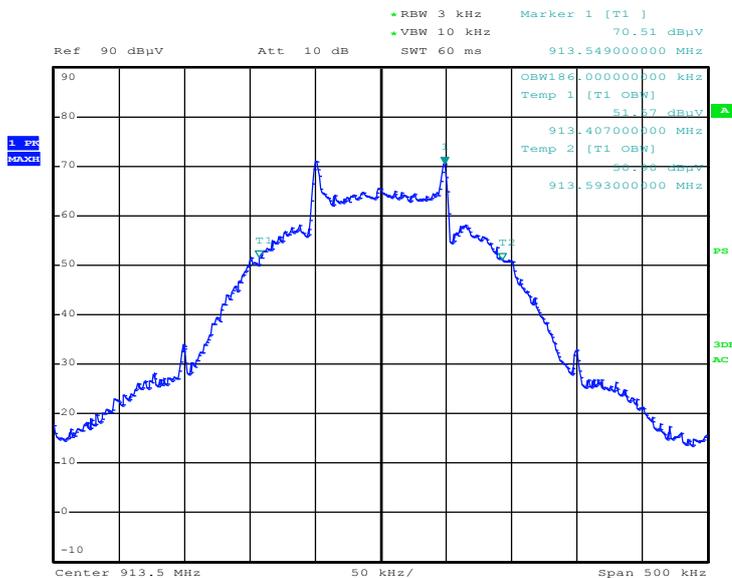
### 5.1 99% Bandwidth Plots (IC)

(902.5MHz - Bottom) 99% bandwidth measured as 183kHz



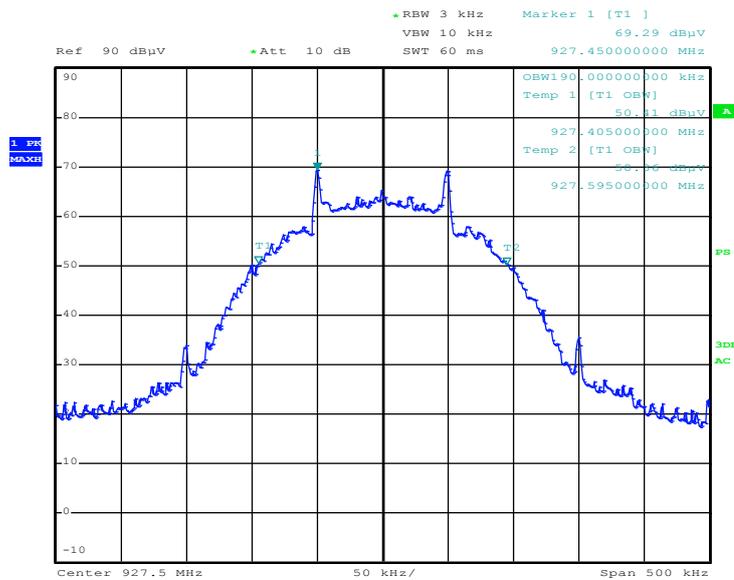
Date: 3.FEB.2020 10:14:53

(913.5MHz - Middle) 99% bandwidth measured as 186kHz



Date: 30.JAN.2020 17:14:46

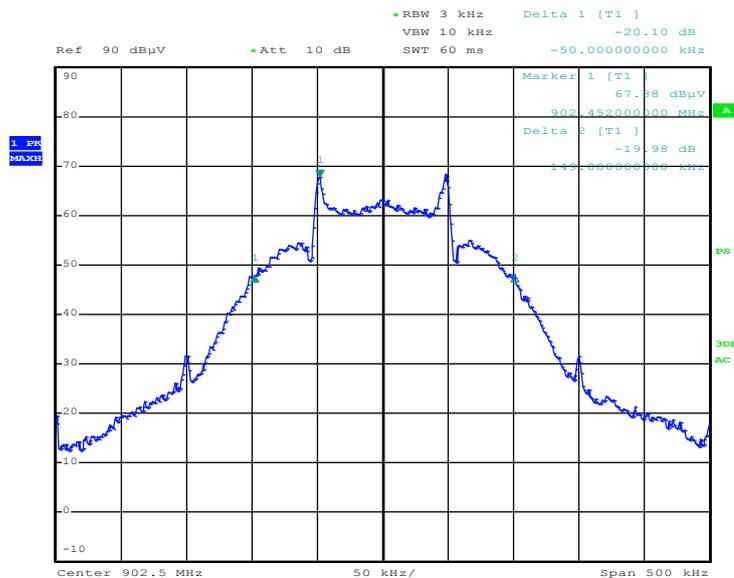
(927.5MHz -Top) 99% bandwidth measured as 190kHz



Date: 3.FEB.2020 10:29:31

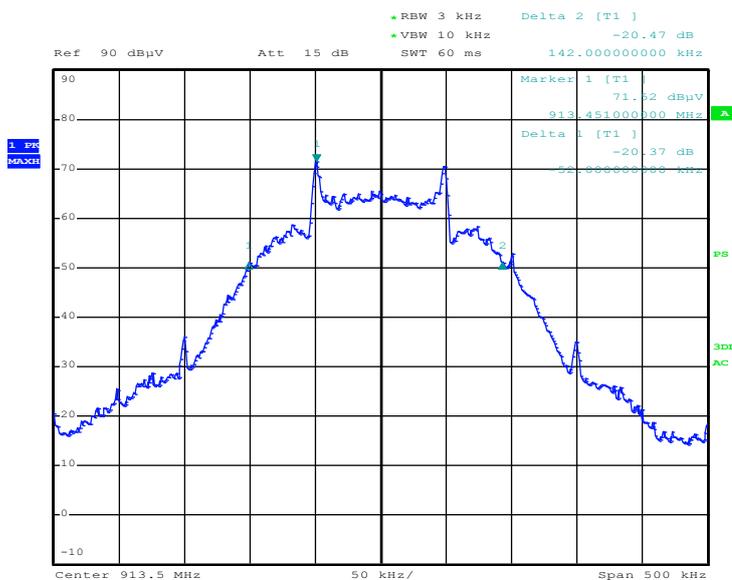
## 5.2 20dB Bandwidth Plots (FCC)

(902.5MHz - Bottom) 20dB bandwidth measured as 199kHz



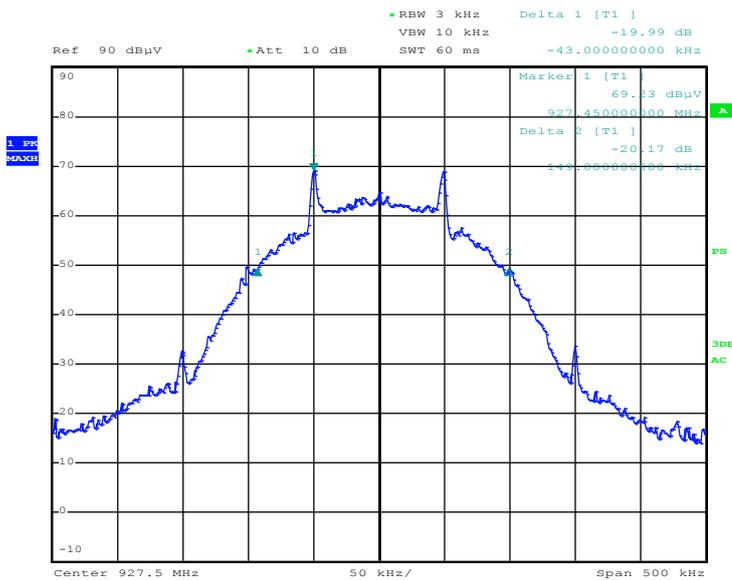
Date: 3.FEB.2020 10:10:08

(913.5MHz - Middle) 20dB bandwidth measured as 194kHz



Date: 30.JAN.2020 17:13:33

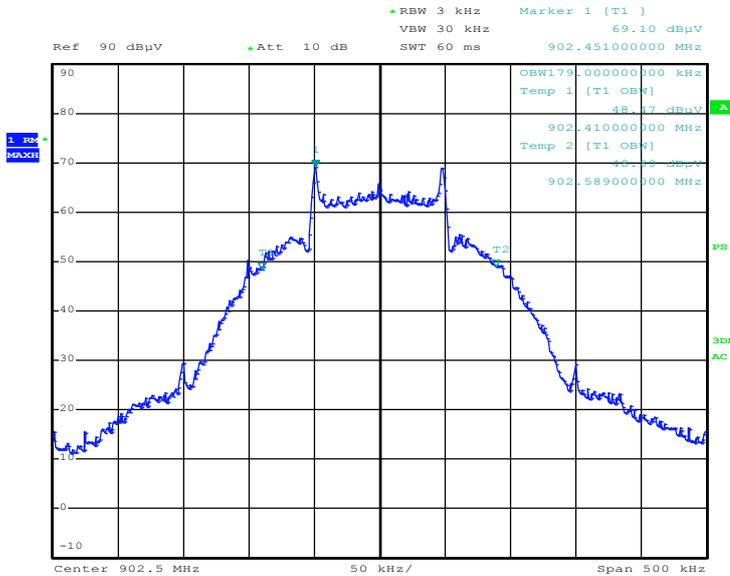
(927.5MHz -Top) 20dB bandwidth measured as 192kHz



Date: 3.FEB.2020 10:36:02

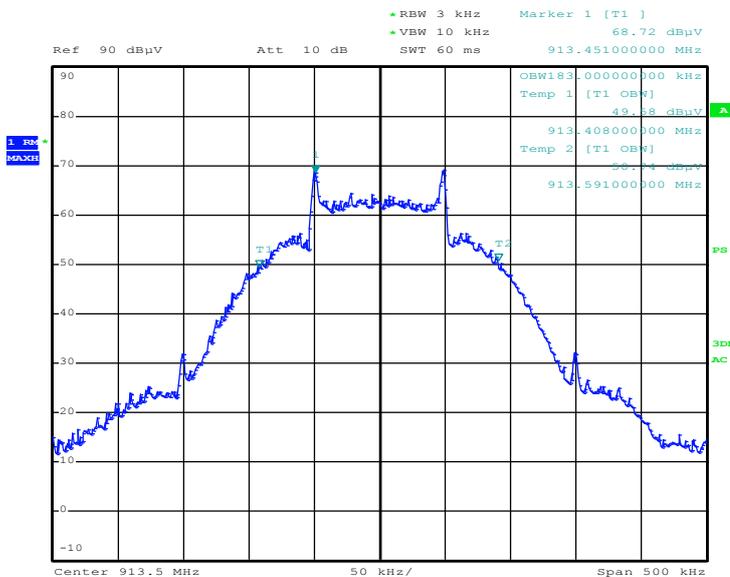
### 5.3 99% Bandwidth Plots (AS/NZ 4268)

(902.5MHz - Bottom) 99% bandwidth measured as 179kHz



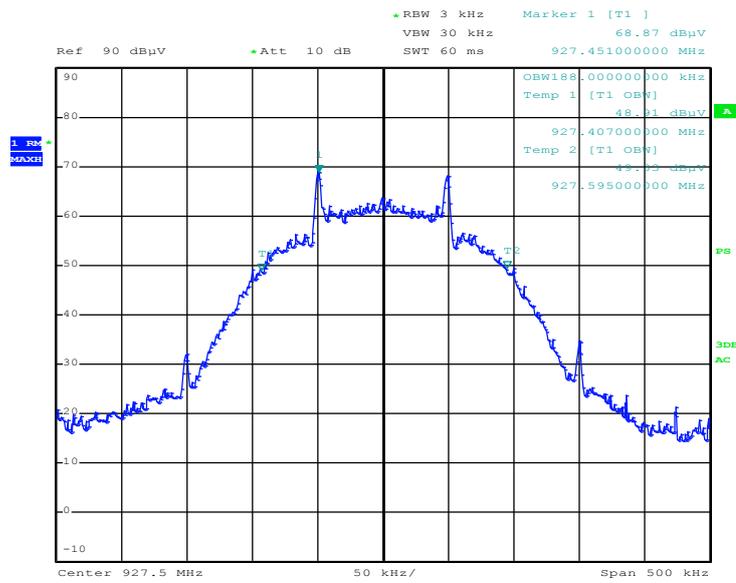
Date: 3.FEB.2020 10:19:51

(913.5MHz - Middle) 99% bandwidth measured as 183kHz



Date: 30.JAN.2020 17:21:13

(927.5MHz -Top) 99% bandwidth measured as 188kHz



Date: 3.FEB.2020 10:26:42

## 6.0 PHOTO LOG

### Emissions:

Radiated emissions, Pre-scan, 30 MHz to 1000 MHz;



Photo Log (continued)

Radiated emissions, Pre-scan, > 1000 MHz;

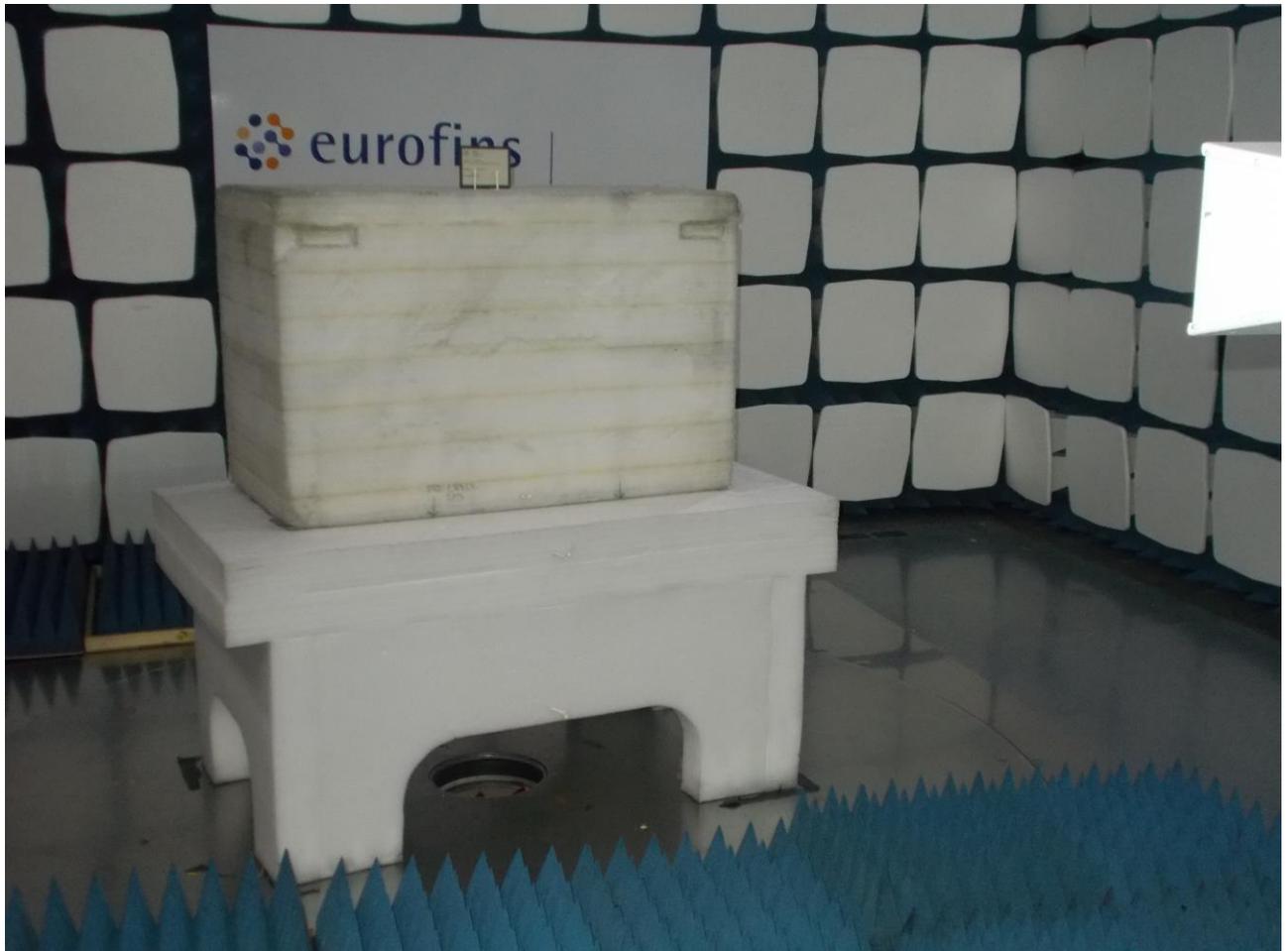


Photo Log (continued)

Occupied Bandwidth ;

